

SAR TEST REPORT

HCT CO., LTD

EUT Type:	Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN	
FCC ID:	ZNFVS840	
Model:	VS840	
Date of Issue:	Feb. 10, 2012	
Test report No.:	HCTA1202FS01	
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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	

Table of Contents

1. INTRODUCTION	3
2. DESCRIPTION OF DEVICE	4
3. DESCRIPTION OF TEST EQUIPMENT	7
4. SAR MEASUREMENT PROCEDURE	14
5. DESCRIPTION OF TEST POSITION	15
5.1 HEAD POSITION	15
5.2 Body Holster/Belt Clip Configurations	16
6. MEASUREMENT UNCERTAINTY	17
7. ANSI/ IEEE C95.1 - 1992 RF EXPOSURE LIMITS	18
8. SYSTEM VERIFICATION	19
8.1 Tissue Verification	19
8.2 System Validation	20
8.3 System Validation Procedure	20
9. RF CONDUCTED POWER MEASUREMENT	21
9.1 CDMA & EVDO	21
9.2 WiFi	23
9.3 LTE	24
10. Mobile Hotspot Side for SAR Testing	28
11. SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas	30
12. SAR TEST DATA SUMMARY	37
12.1 Measurement Results (CDMA835/EVDO835 Head SAR)	37
12.2 Measurement Results (PCS1900/EVDO1900 Head SAR)	38
12.3 Measurement Results (LTE Band13 10MHz Head SAR)	39
12.4 Measurement Results (LTE Band13 16QAM Head SAR)	40
12.5 Measurement Results (802.11b/g/n Head SAR)	41
12.6 Measurement Results (CDMA835/EVDO835 Body SAR)	42
12.7 Measurement Results (PCS1900/ EVDO1900 Hotspot Body SAR)	43
12.8 Measurement Results (LTE Band13 10MHz QPSK Body SAR)	44
12.9 Measurement Results (LTE Band13 10MHz 16QAM Body SAR)	45
12.10 Measurement Results (802.11b/g/n Hotspot Body SAR)	46
13. CONCLUSION	47
14. REFERENCES	48
Attachment 1. – SAR Test Plots	49
Attachment 2. – Dipole Validation Plots	152
Attachment 3. – Probe Calibration Data	170
Attachment 4. – Dipole Calibration Data	184

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 (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ). 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 CDMA and LTE Phone with Bluetooth and WLAN			
FCC ID:	ZNFVS840			
Model:	VS840			
Trade Name	LG	Serial Number(s)	#1	
Mode(s)of Operation	CDMA835/PCS1900/802.11bgn/LTE Band13			
Application Type	Permissive Change Class I			
Tx Frequency	824.70 - 848.31 MHz (CDMA835) / 1 851.25 – 1 908.75 MHz (PCS CDMA) 2 412- 2 462 MHz (WLAN)/ 777-787 MHz (LTE Band13)			
Rx Frequency	869.70 - 893.31 MHz (CDMA835) / 1 931.25 – 1 988.75 MHz (PCS CDMA) 2 412- 2 462 MHz (WLAN)/ 746 – 756 MHz (LTE Band13)			
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
	CDMA835	0.678	0.767	0.614
	PCS1900	0.894	0.593	0.849
	LTE 13	0.347	0.519	0.519
	802.11b	0.111	0.159	0.159
Date(s) of Tests	Feb. 2, 2012 ~ Feb. 10, 2012			
Antenna Type	Integral Antenna			
EVDO	Rev.0, A			
Key Features;	Mobile Hotspot support, SVDO & SVLTE support, Power reduction implement			
Accessory	1. Headset 2. Battery Cover: Normal Battery Cover, Wireless Charging Battery Cover			

2.2 KDB 941225 LTE information

#	Description	Parameter																							
1	Identify the operating frequency range of each LTE Transmission band used by the device	Band 13: 777 - 787 MHz																							
2	Identify the channel bandwidths used in each frequency band; 1.4, 3, 5, 10, 15, 20 MHz etc	Band 13: 10 MHz																							
3	Identify the high, middle and low channel numbers and frequencies in each LTE frequency band	LTE Band13, Ch No.: 23230, Frequency: 782 MHz																							
4	Specify the UE category and uplink modulations used	The UE Category is 3/ QPSK, 16QAM																							
5	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.	This model(VS840) has the same HW and one Tx antenna for CDMA USPCS EVDO/LTE. For details, please refer to the antenna information.																							
6	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.	Exposure conditions 1) Body SAR is required because LTE hotspot is supported. 2) Hotspot SAR: Front/Rear/Right/Left/Bottom/Top is required.																							
7	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.	As per 3GPP TS 36.101 v10.3.0 (2011-09), Release 10.4 <table><tr><th rowspan="2">Modulation</th><th colspan="3">Channel bandwidth / Transmission bandwidth configuration (RB)</th><th rowspan="2">MPR (dB)</th></tr><tr><th>1.4 MHz</th><th>3.0 MHz</th><th>5.0 MHz</th></tr><tr><td>QPSK</td><td>> 5</td><td>> 4</td><td>> 8</td><td>≤ 1</td></tr><tr><td>16 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 1</td></tr><tr><td>64 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>≤ 1</td></tr></table> MPR is permanently built-in by design. A-MPR is supported by design, but is disabled for SAR testing.	Modulation	Channel bandwidth / Transmission bandwidth configuration (RB)			MPR (dB)	1.4 MHz	3.0 MHz	5.0 MHz	QPSK	> 5	> 4	> 8	≤ 1	16 QAM	≤ 5	≤ 4	≤ 8	≤ 1	64 QAM	> 5	> 4	> 8	≤ 1
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QPSK	> 5	> 4	> 8	≤ 1																					
16 QAM	≤ 5	≤ 4	≤ 8	≤ 1																					
64 QAM	> 5	> 4	> 8	≤ 1																					
8	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	Refer to section 9 RF output power table.																							

9	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	* Supported band & Exposure conditions 1) Bluetooth 2.4GHZ - Exposure conditions: BT SAR is not required due to the lower power & antenna separation distance. 2) WiFi 2.4GHz * WiFi hotspot is supported. - Exposure conditions: Head/Body SAR required																
10	Include the maximum average conducted output power measured for the other wireless mode and freq. bands	See section 9 RF output power measurements in SAR report.																
11	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.)	Please refer to the table in section 11																
12	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	1. Power Reduction operation table for SV-DO Mode <table border="1"> <thead> <tr> <th>Mode</th><th>CDMA Current Voice Power for BC0, BC1</th><th>CDMA EVDO Max. Power for BC0 & BC1</th></tr> </thead> <tbody> <tr> <td rowspan="2">SV-DO</td><td>$P < 15.5 \text{ dBm}$</td><td>23.7 dBm (Limited)</td></tr> <tr> <td>$P \geq 15.5 \text{ dBm}$</td><td>18.7 dBm (Limited)</td></tr> </tbody> </table> 2. Power Reduction operation table for SV-LTE Mode <table border="1"> <thead> <tr> <th>Mode</th><th>CDMA Current Voice Power for BC0, BC1</th><th>LTE Max. Power for B13</th></tr> </thead> <tbody> <tr> <td rowspan="2">SV-LTE</td><td>$P < 18.5 \text{ dBm}$</td><td>22.5 dBm (Limited)</td></tr> <tr> <td>$P \geq 18.5 \text{ dBm}$</td><td>18.5 dBm (Limited)</td></tr> </tbody> </table>	Mode	CDMA Current Voice Power for BC0, BC1	CDMA EVDO Max. Power for BC0 & BC1	SV-DO	$P < 15.5 \text{ dBm}$	23.7 dBm (Limited)	$P \geq 15.5 \text{ dBm}$	18.7 dBm (Limited)	Mode	CDMA Current Voice Power for BC0, BC1	LTE Max. Power for B13	SV-LTE	$P < 18.5 \text{ dBm}$	22.5 dBm (Limited)	$P \geq 18.5 \text{ dBm}$	18.5 dBm (Limited)
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	$P \geq 18.5 \text{ dBm}$	18.5 dBm (Limited)																
13	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	* Power reduction is implemented on EVDO in SVDO mode * Power reduction is implemented on LTE in SVLTE mode																
14	When appropriate, include a SAR test plan proposal with respect to the above	Not Applicable																
15	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	Not Applicable																

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.

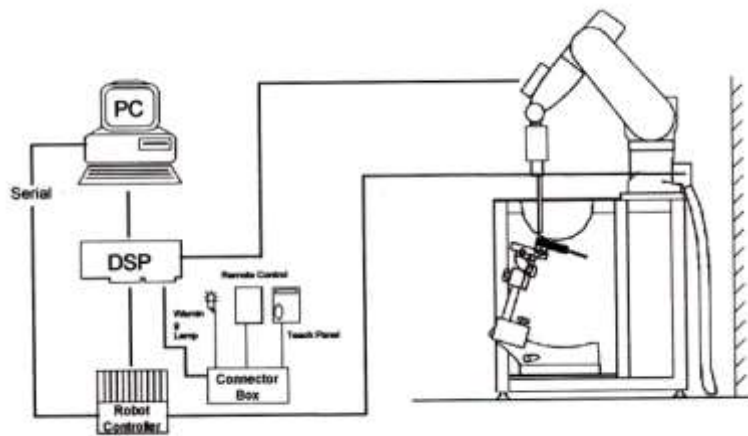


Figure 3.1 HCT SAR Lab. Test Measurement Set-up

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

3.1 ES3DV3 Probe Specification

Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Basic Broad Band Calibration in air Conversion Factors (CF) for HSL 900 and HSL 1810 Additional CF for other liquids and frequencies upon request
Frequency	10 MHz to 4 GHz; Linearity: ± 0.2 dB (30 MHz to 4 GHz)
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.3 dB in tissue material (rotation normal to probe axis)
Dynamic Range	5 μ W/g to > 100 mW/g; Linearity: ± 0.2 dB
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.0 mm
Application	General dosimetry up to 4 GHz Dosimetry in strong gradient fields Compliance tests of mobile phones



Figure 3.1 Photograph of the probe and the Phantom

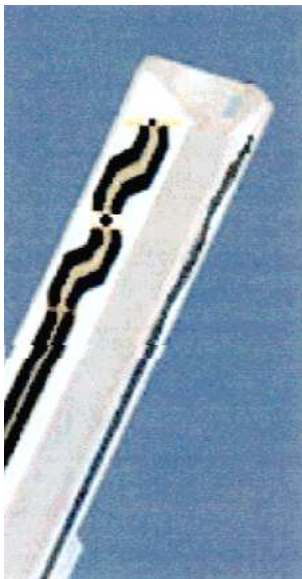


Figure 3.2 ET3DV6 E-field Probe

The SAR measurements were conducted with the dosimetric probe ET3DV6, designed in the classical triangular configuration [5] 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 mortifier 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 $\pm 10\%$. 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 below 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/cm³ for brain tissue)

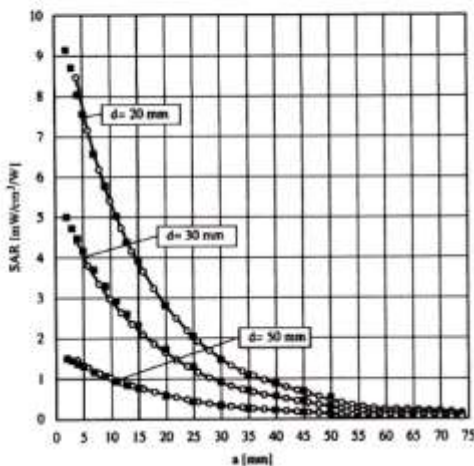


Figure 3.4 E-Field and Temperature measurements at 900 MHz

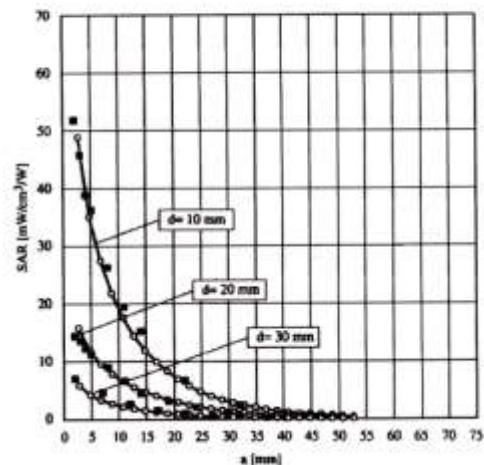


Figure 3.5 E-Field and temperature measurements at 1.8 GHz

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/cm³

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

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

with P_{free} = equivalent power density of a plane wave in W/cm²
 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 $\pm$ 0.2 mm (6 $\pm$ 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 repeatably 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 bactericide 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	DAE3	466	Mar. 1, 2011	Annual	Mar. 1, 2012
SPEAG	E-Field Probe ET3DV6	1630	Nov. 18, 2011	Annual	Nov. 18, 2012
SPEAG	Validation Dipole D835V2	441	May 16, 2011	Annual	May 16, 2012
SPEAG	Validation Dipole D1900V2	5d032	July 22, 2011	Annual	July 22, 2012
SPEAG	Validation Dipole D2450V2	743	Aug. 29, 2011	Annual	Aug. 29, 2012
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	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 26, 2011	Annual	July 26, 2012
Agilent	Base Station E5515C	GB44400269	Feb. 10, 2011	Annual	Feb. 10, 2012
HP	Signal Generator E4438C	MY42082646	Nov. 11, 2011	Annual	Nov. 11, 2012
HP	Network Analyzer 8753ES	JP39240221	Mar. 30, 2011	Annual	Mar. 30, 2012
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.

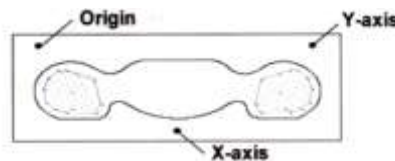


Figure 4.1 SAR Measurement Point in Area Scan

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 15° or until the device antenna touch the phantom. Please refer to IEEE 1528-2003 illustration below.

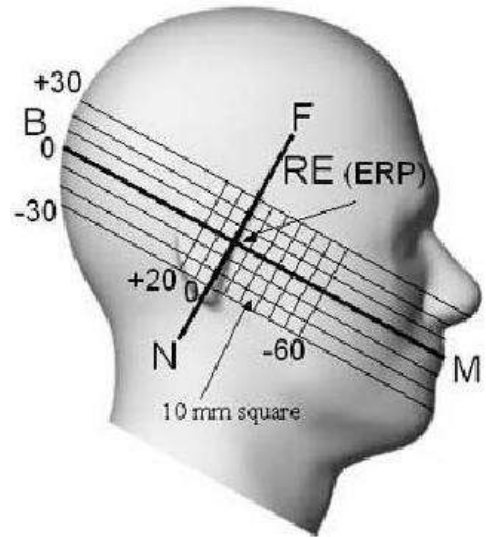


Figure 5.1 Side view of the phantom

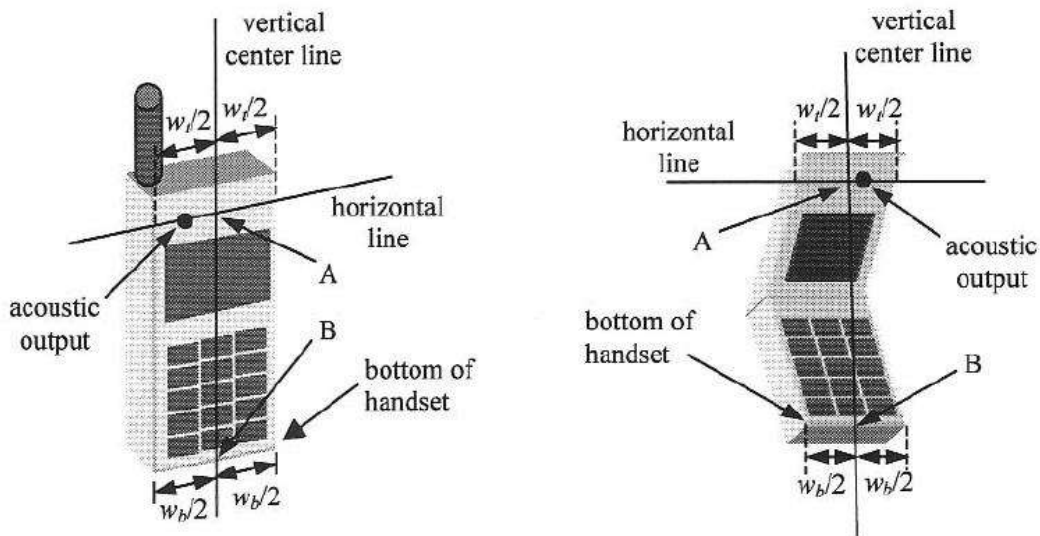


Figure 5.2 Handset vertical and horizontal reference lines

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 Permittivity(target)	5.00	R	1.73	0.6	1.73	∞
Liquid Permittivity(meas.)	5.02	N	1	0.6	3.01	9
Combine 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

Freq. [MHz]	Date	Liquid	Liquid Temp.[°C]	Parameters	Target Value	Measured Value	Deviation [%]	Limit [%]
835	Feb. 2, 2012	Head	21.2	ϵ_r	41.5	43	+ 3.61	± 5
				σ	0.90	0.903	+ 0.33	± 5
835	Feb. 3, 2012	Body	21.2	ϵ_r	55.2	54.4	- 1.45	± 5
				σ	0.97	0.991	+ 2.16	± 5
1 900	Feb. 6, 2012	Head	21.2	ϵ_r	40.0	39.1	- 2.25	± 5
				σ	1.40	1.44	+ 2.86	± 5
1 900	Feb. 7, 2012	Body	21.3	ϵ_r	53.3	55	+ 3.19	± 5
				σ	1.52	1.47	- 3.29	± 5
2 450	Feb. 10, 2012	Head	21.3	ϵ_r	39.2	38.7	- 1.28	± 5
				σ	1.80	1.85	+ 2.78	± 5
2 450	Feb. 10, 2012	Body	21.3	ϵ_r	52.7	52	- 1.33	± 5
				σ	1.95	1.89	- 3.08	± 5
750	Feb. 8, 2012	Head	21.3	ϵ_r	41.9	42.2	+ 0.72	± 5
				σ	0.89	0.867	- 2.58	± 5
750	Feb. 9, 2012	Body	21.2	ϵ_r	55.5	54.7	- 1.44	± 5
				σ	0.96	0.974	+ 1.46	± 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 $\pm 10\%$ of the specifications at 835 MHz / 750 MHz/ 1 900 MHz/ 2 450 MHz by using the system validation kit. (Graphic Plots Attached)

* Input Power: 100 m W

Freq. [MHz]		Probe (SN)	Dipole (SN)	Date	Liquid	Liquid Temp. [°C]	SAR Average	Target Value (SPEAG) (mW/g)	*Measured Value (mW/g)	Deviation [%]	Limit [%]
CDMA	835	1630	441	Feb. 2, 2012	Head	21.2	1 g	9.34	0.968	+ 3.64	± 10
	835		441	Feb. 3, 2012	Body	21.2	1 g	9.45	0.947	+ 0.21	± 10
PCS	1 900		5d032	Feb. 6, 2012	Head	21.2	1 g	39.9	4.04	+ 1.25	± 10
	1 900		5d032	Feb. 7, 2012	Body	21.3	1 g	41.5	4.17	+ 0.48	± 10
WIFI	2 450		743	Feb. 10, 2012	Head	21.3	1 g	53.8	5.44	+ 1.12	± 10
	2 450		743	Feb. 10, 2012	Body	21.3	1 g	51.7	4.97	- 3.87	± 10
LTE	750		1014	Feb. 8, 2012	Head	21.3	1 g	8.29	0.864	+ 4.22	± 10
	750		1014	Feb. 9, 2012	Body	21.2	1 g	8.8	0.918	+ 4.32	± 10

8.3 System Validation Procedure

SAR measurement was Prior to assessment, the system is verified to the $\pm 10\%$ 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

9.1 CDMA & EVDO

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 evaluating 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 than 5% occurred, the tests were repeated.

9.2 SAR Measurement Conditions for CDMA2000 1x

These procedures were followed according to FCC "SAR Measurement Procedures for 3G Devices", May 2006.

9.1.1 Output Power Verification

See 3GPP2 C.S0011/TIA-98-E as recommended by "SAR Measurement Procedures for 3G Devices", May 2006. MMaximum output power is verified on the High, Middle and Low channels according to procedures defined in section 4.4.5.2 of 3GPP2 C.S0011/TIA-98-E. SO55 tests were measured with power control bits in "All Up" condition.

1. If the mobile station supports Reverse TCH RC 1 and Forward TCH RC 1, set up a call using Fundamental Channel Test Mode 1 (RC=1/1) with 9 600 bps data rate only.
2. Under RC1, C.S0011 Table 4.4.5.2-1 (Table 9.1) parameters were applied.
3. If the MS supports the RC 3 Reverse FCH, RC3 Reverse SCH0 and demodulation of RC 3, 4, or 5, set up a call using Supplemental Channel Test Mode 3 (RC 3/3) with 9 600 bps Fundamental Channel and 9 600 bps SCH0 data rate Channel and 9 600 bps SCH0 data rate.
4. Under RC3, C.S0011 Table 4.4.5.2-2 (Table 9.2) was applied.
5. FCHs were configured at full rate for mMaximum SAR with "All Up" power control bits.

Parameters for Max. Power for RC1

Parameter	Units	Value
I_{or}	dBm/1.23 MHz	-104
$\frac{Pilot E_c}{I_{or}}$	dB	-7
$\frac{Traffic E_c}{I_{or}}$	dB	-7.4

Table. 9.1

Parameters for Max. Power for RC3

Parameter	Units	Value
I_{or}	dBm/1.23 MHz	-86
$\frac{Pilot E_c}{I_{or}}$	dB	-7
$\frac{Traffic E_c}{I_{or}}$	dB	-7.4

Table. 9.2

9.1.2 Head SAR Measurement

SAR for head exposure configurations is measured in RC3 with the DUT configured to transmit at full rate using Loopback Service Option SO55. SAR for RC1 is not required when the mMaximum average output of each channel is less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the mMaximum output channel in RC1 using the exposure configuration that results in the highest SAR for that channel in RC3.

9.1.3 Body SAR Measurement

SAR for body exposure configurations is measured in RC3 with the DUT configured to transmit at full rate on FCH with all other code channels disabled using TDSO / SO32. SAR for multiple code channels (FCH + SCHn) is not required when the mMaximum average output of each RF channel is less than ¼ dB higher than that measured with FCH only. Otherwise, SAR is measured on the mMaximum output channel (FCH + SCHn) with FCH at full rate and SCH0 enabled at 9 600 bps using the exposure configuration that results in the highest SAR for that channel with FCH only. When multiple code channels are enabled, the DUT output may shift by more than 0.5 dB and lead to higher SAR drifts and SCH dropouts.

Body SAR in RC1 is not required when the mMaximum average output of each channel is less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the mMaximum output channel in RC1; with Loopback Service Option SO55, at full rate, using the body exposure configuration that results in the highest SAR for that channel in RC3.

9.1.4 Handsets with EV-DO

For handsets with Ev-Do capabilities, when the mMaximum average output of each channel in Rev. 0 is less than ¼ dB higher than that measured in RC3 (1x RTT), body SAR for Ev-Do is not required. Otherwise, SAR for Rev. 0 is measured on the mMaximum output channel at 153.6 kbps using the body exposure configuration that results in the highest SAR for that channel in RC3. SAR for Rev. A is not required when the mMaximum average output of each channel is less than that measured in Rev. 0 or less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the mMaximum output channel for Rev. A using a Reverse Data Channel payload size of 4 096 bits and a Termination Target of 16 slots defined for Subtype 2 Physical Layer configurations. A Forward Traffic Channel data rate corresponding to the 2-slot version of 307.2 kbps with the ACK Channel transmitting in all slots should be configured in the downlink for both Rev. 0 and Rev. A.

Maximum Average Output Power Measurement for FCC ID: ZNFVS840

Band	Ch.	SO2	SO2	SO55	SO55	TDSO	1xEvDO	1xEvDO	1xEvDO	1xEvDO
		RC1/1	RC3/3	RC1/1	RC3/3	SO32	Rev.0	Rev.0	Rev.A	Rev.A
CDMA	1013	24.20	24.14	24.26	24.29	24.09	24.24	24.23	24.19	24.24
	384	24.19	23.98	24.17	23.96	23.96	24.28	24.23	24.24	24.28
	777	24.38	24.22	24.45	24.20	24.22	24.15	24.13	24.18	24.24
PCS	25	24.25	24.24	24.37	24.18	24.25	24.11	24.15	24.20	24.18
	600	24.25	24.16	24.19	24.02	24.20	24.25	24.20	24.23	24.20
	1175	24.29	24.23	24.31	24.09	24.33	24.24	24.25	24.30	24.29

CDMA Average Conducted output powers (dBm)

9.2 WiFi

9.2.1 SAR Testing for 802.11a/b/g/n modes

General Device Setup

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

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

Frequency Channel Configurations

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

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

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

802.11 Test Channels per FCC Requirements

Band	Channel	Conducted Power (dBm)	
		(dBm)	(mW)
IEEE 802.11b	1	15.0	31.6
	6	15.0	31.6
	11	15.0	31.6
IEEE 802.11b	1	11.9	15.6
	6	12.1	16.0
	11	12.0	15.7
IEEE 802.11b	1	12.6	18.2
	6	12.6	18.3
	11	12.5	17.9

Note;
SAR testing was performed according to the FCC KDB 248227.

9.3 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.

9.3.1 LTE13 10MHz

Bandwidth	UL Channel	UL Freq.(MHz)	Modulation	RB Size	RB Offset	Max.Average Power (dBm)	Target MPR (dB)	Measured Power reduction (dB)
10 MHz	23230	782	QPSK	1	0	23.06	0	0
			QPSK	1	49	22.99	0	0.07
			QPSK	25	13	21.93	1	1.13
			QPSK	50	0	21.89	1	1.17
			16QAM	1	0	21.82	1	1.24
			16QAM	1	49	21.89	1	1.17
			16QAM	25	13	21.02	2	2.04
			16QAM	50	0	21	2	2.06

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	Voice Average Power 1x(dBm)	Maximum EVDO Average Power (dBm)
SVDO	P<15.5	23.7 (Limited)
	P ≥ 15.5	18.7 (Limited)
Mode	Voice Average Power 1x (dBm)	Maximum LTE Average Power (dBm)
SVLTE	P<18.5	22.5 (Limited)
	P ≥ 18.5	18.5 (Limited)

Power reduction Settings

9.4.1 SVDO

SV-DO: CDMA 1xRTT(BC0) to 1xEVDO(BC0 & BC1)

CDAM BC0 850 1xRTT		BC0 850 1xEVDO			BC1 1900 1xEVDO		
		Output Power[dBm]			Output Power[dBm]		
ch #	Output Power [dBm]	low 1013	Middle 384	high 777	low 25	Middle 600	high 1175
low-1013	11	24.20	24.10	24.20	24.10	23.90	24.00
	15	24.20	24.10	24.10	24.10	24.00	24.00
	16	19.50	19.40	19.50	19.50	19.60	19.50
	24	19.50	19.40	19.50	19.50	19.60	19.50
Middle_384	11	24.10	24.20	24.10	24.30	24.10	24.10
	15	24.10	24.20	24.10	24.20	24.10	24.10
	16	19.50	19.50	19.40	19.50	19.40	19.40
	24	19.50	19.60	19.40	19.50	19.50	19.40
High_777	11	24.30	24.40	24.40	24.30	24.10	24.20
	15	24.30	24.30	24.40	24.30	24.20	24.20
	16	19.50	19.50	19.60	19.60	19.40	19.40
	24	19.50	19.50	19.60	19.50	19.40	19.50

SV-DO: CDMA 1xRTT(BC1) to 1xEVDO(BC0 & BC1)

CDAM BC1 1900 1xRTT		BC0 850 1xEVDO			BC1 1900 1xEVDO		
		Output Power[dBm]			Output Power[dBm]		
ch #	Output Power [dBm]	low 1013	Middle 384	high 777	low 25	Middle 600	high 1175
low-25	11	24.10	24.30	24.30	24.30	24.00	24.00
	15	24.10	24.20	24.30	24.30	24.00	24.10
	16	19.50	19.50	19.60	19.60	19.60	19.50
	24	19.50	19.50	19.50	19.60	19.50	19.50
Middle_600	11	24.20	24.20	24.30	24.40	24.00	24.00
	15	24.10	24.20	24.20	24.30	24.10	24.00
	16	19.50	19.60	19.50	19.60	19.50	19.40
	24	19.50	19.60	19.50	19.50	19.50	19.40
High_1175	11	24.20	24.20	24.20	24.20	24.20	24.00
	15	24.10	24.20	24.30	24.20	24.20	24.20
	16	19.50	19.40	19.60	19.50	19.40	19.40
	24	19.50	19.40	19.50	19.40	19.40	19.50

9.4.2 SVLTE

SV-LTE: CDMA 1xRTT(BC0) to SV-LTE Band13 (QPSK, 16QAM)

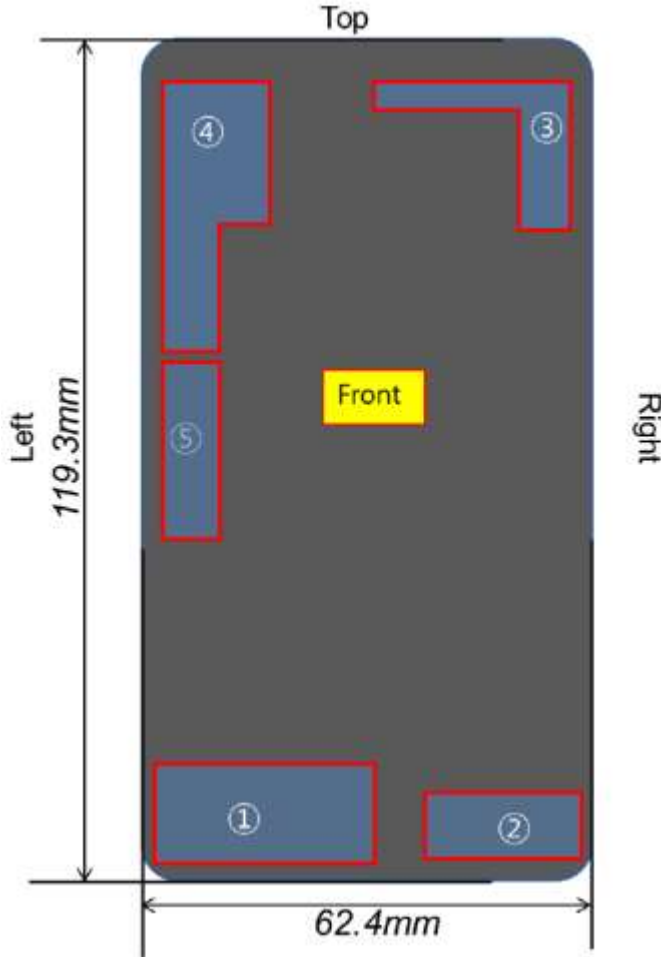
CDMA BC0 850 1xRTT		QPSK				16QAM			
		Output Power[dBm]				Output Power[dBm]			
ch #	Output	1RB,0	1RB,	25RB,	50RB	1RB,0	1RB,	25RB,	50RB
low-1013	11	23.08	22.97	22.04	21.81	21.81	21.66	21.02	20.95
	18	23.08	22.97	22.04	21.81	21.81	21.66	21.02	20.95
	19	19.09	18.98	19.09	18.97	18.92	18.82	19.09	19.07
	24	19.09	18.98	19.09	18.97	18.92	18.82	19.09	19.07
Middle_384	11	23.09	22.97	22.06	21.8	21.9	21.65	21.02	20.94
	18	23.09	22.97	22.06	21.8	21.9	21.65	21.02	20.94
	19	19.07	18.97	19.05	18.93	18.94	18.88	19.09	19.04
	24	19.07	18.97	19.05	18.93	18.94	18.88	19.09	19.04
High_777	11	23.07	22.98	22.06	21.87	21.93	21.61	21.01	20.98
	15	23.07	22.98	22.06	21.87	21.93	21.61	21.01	20.98
	16	19.09	18.98	19.3	18.95	18.89	18.9	19.12	19.08
	24	19.09	18.98	19.3	18.95	18.89	18.9	19.12	19.08

SV-LTE: CDMA 1xRTT(BC1) to SV-LTE Band13 (QPSK, 16QAM)

CDMA BC1 1900 1xRTT		QPSK				16QAM			
		Output Power[dBm]				Output Power[dBm]			
ch #	Output	1RB,0	1RB,	25RB,	50RB	1RB,0	1RB,	25RB,	50RB
low-25	11	23.06	22.98	22.06	21.87	21.9	21.63	21.02	20.93
	18	23.06	22.98	22.06	21.87	21.9	21.63	21.02	20.93
	19	19.08	19	19.05	18.96	18.91	18.91	19.1	19.04
	24	19.08	19	19.05	18.96	18.91	18.91	19.1	19.04
Middle_600	11	23.08	22.96	22.08	21.86	21.82	21.65	21.02	20.91
	18	23.08	22.96	22.08	21.86	21.82	21.65	21.02	20.91
	19	19.07	18.98	19.04	18.93	18.93	18.9	19.1	19.01
	24	19.07	18.98	19.04	18.93	18.93	18.9	19.1	19.01
High_1175	11	23.03	23.01	19.10	21.81	21.83	21.60	21.07	20.91
	15	23.03	23.01	19.10	21.81	21.83	21.60	21.07	20.91
	16	19.06	19.00	21.98	18.95	18.91	18.88	19.13	19.01
	24	19.06	19.00	21.98	18.95	18.91	18.88	19.13	19.01

10. Antenna Information & SAR Testing Confogurations

10.1 Antenna and Device Information



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

② LTE Band 13 Rx/Tx

MODE	BAND	TX(MHz)	RX(MHz)
LTE	B13	777 ~ 787	746 ~ 756

MODE	BAND	TX(MHz)	RX(MHz)
GPS	x	1575.42	
LTE	B13	2 nd Rx	

MODE	TX(MHz)	RX(MHz)
EVDO BC0	824 ~ 849	869~894
EVDO BC1	1850 ~ 1910	1930 ~ 1990

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		14.3	73.8	51.3	29.6
ANT ②	14.3		68.7	75.4	44.3
ANT ③	73.8	68.7		21.0	46.3
ANT ④	51.3	75.4	21.0		0.7
ANT ⑤	29.6	44.3	46.3	0.7	

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.

10.2 SAR Test configurations

Head Operation						
Mode	Tx(Mhz)	ANT ①	ANT ②	ANT ③	ANT ④	ANT⑤
CDMA Voice(1xRTT)	835	Yes	No	No	No	No
CDMA Voice(1xRTT)	1900	Yes	No	No	No	No
EVDO(VOIP)	835	No	No	No	Yes	No
EVDO(VOIP)	1900	No	No	Yes	No	No
LTE Data	1900	No	No	Yes	No	No
SVDO(Voice & Data)	835	Yes	No	No	Yes	No
SVDO(Voice & Data)	1900	Yes	No	Yes	No	No
SVLTE(Voice & Data)	835/1900	Yes	No	Yes	No	No
SVLTE(Voice & Data)	1900/1900	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	Tx(Mhz)	ANT ①	ANT ②	ANT ③	ANT ④	ANT⑤
CDMA Voice(1xRTT)	835	Yes	No	No	No	No
CDMA Voice(1xRTT)	1900	Yes	No	No	No	No
EVDO (VOIP)	835	No	No	No	Yes	No
EVDO (VOIP)	1900	No	No	Yes	No	No
LTE Data	1900	No	No	Yes	No	No
SVDO(Voice & Data)	835	Yes	No	No	Yes	No
SVDO(Voice & Data)	1900	Yes	No	Yes	No	No
SVLTE(Voice & Data)	835/1900	Yes	No	Yes	No	No
SVLTE(Voice & Data)	1900/1900	Yes	No	Yes	No	No
Wi-Fi(VOIP)	2400	No	No	No	No	Yes
BT	2400	No	No	No	No	Yes

Wireless Router/ Hot Spot Operation						
Separation Distance = 1Cm						
Mode	Tx(Mhz)	ANT ①	ANT ②	ANT ③	ANT ④	ANT⑤
EVDO Data+Wi-Fi	835/2400	No	No	No	Yes	Yes
EVDO Data+Wi-Fi	1900/2400	No	No	No	Yes	Yes
LTE Data+Wi-Fi	780/2400	No	Yes	No	No	Yes
SVDO(Voice & Data)+Wi-Fi	835/835/2400	Yes	No	No	Yes	Yes
SVDO(Voice & Data)+Wi-Fi	835/1900/2400	Yes	No	No	Yes	Yes
SVDO(Voice & Data)+Wi-Fi	1900/835/2400	Yes	No	No	Yes	Yes
SVDO(Voice & Data)+Wi-Fi	1900/1900/2400	Yes	No	No	Yes	Yes
SVLTE(Voice & Data)+Wi-F	835/780/2400	Yes	Yes	No	No	Yes
SVLTE(Voice & Data)+Wi-F	1900/730/2400	Yes	Yes	No	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	<u>Routine evaluation required</u>	<u>SAR not required:</u> <u>Unlicensed only</u> - when stand-alone 1-g SAR is not required and antenna is ≥ 5 cm from other antennas <u>Licensed & Unlicensed</u> - 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 <u>SAR required:</u> <u>Licensed & Unlicensed</u> 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 <u>Note: simultaneous transmission exposure conditions for head and body can be different for different style phones; therefore, different test requirements may apply</u>
Unlicensed Transmitters	<u>When there is no simultaneous transmission –</u> - output ≤ 60 f: SAR not required - output > 60 f: stand-alone SAR required <u>When there is simultaneous transmission –</u> <u>Stand-alone SAR not required when</u> - output $\leq 2 \cdot P_{Ref}$ and antenna is ≥ 5.0 cm from other antennas - output $\leq P_{Ref}$ and antenna is ≥ 2.5 cm from other antennas - output $\leq P_{Ref}$ and antenna is < 2.5 cm from other antennas, each with either output power $\leq P_{Ref}$ or 1-g SAR < 1.2 W/kg <u>Otherwise stand-alone SAR is required</u> <u>When stand-alone SAR is required</u> - 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	<u>Flat phantom SAR required</u> - 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: ZNFVS840/ BT Max. RF output power: 8.7 mW

WLAN Max. RF output power: 31.6 mW (802.11b)

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
4	CDMA BC0 EVDO	O	O	x	x	x	Stand-alone CDMA EVDO BC0
5	CDMA BC1 EVDO	O	O	x	x	x	Stand-alone CDMA EVDO BC1
6	LTE B13	O	O	x	x	x	Stand-alone LTE B13 data
8	Wi-Fi	O	O	x	x	x	Stand-alone Wi-Fi
9	BT	x	x	x	x	x	N/A
10	CDMA BC0 Voice + Wi-Fi data	O	O	x	x	x	
11	CDMA BC1 Voice + Wi-Fi data	O	O	x	x	x	
13	CDMA BC0 EVDO+ Wi-Fi data	x	O	O	x	x	Wi-Fi Hotspot
14	CDMA BC1 EVDO+ Wi-Fi data	x	O	O	x	x	Wi-Fi Hotspot
15	LTE B13 + Wi-Fi data	x	O	O	x	x	Wi-Fi Hotspot
17	CDMA BC0 Voice + CDMA BC0 EVDO	O	O	x	O	x	SVDO
18	CDMA BC0 Voice + CDMA BC1 EVDO	O	O	x	O	x	SVDO
19	CDMA BC0 Voice + LTE B13	O	O	x	x	O	SVLTE
21	CDMA BC1 Voice + CDMA BC0 EVDO	O	O	x	O	x	SVDO
22	CDMA BC1 Voice + CDMA BC1 EVDO	O	O	x	O	x	SVDO
23	CDMA BC1 Voice + LTE B13	O	O	x	x	O	SVLTE
29	CDMA BC0 Voice + CDMA BC0 EVDO + WLAN	O	O	O	O	x	Wi-Fi Hotspot + SVDO
30	CDMA BC0 Voice + CDMA BC1 EVDO + WLAN	O	O	O	O	x	Wi-Fi Hotspot + SVDO
31	CDMA BC0 Voice + LTE B13 + WLAN	O	O	O	x	O	Wi-Fi Hotspot + SVLTE
33	CDMA BC1 Voice + CDMA BC0 EVDO+ WLAN	O	O	O	O	x	Wi-Fi Hotspot + SVDO
34	CDMA BC1 Voice + CDMA BC1 EVDO+ WLAN	O	O	O	O	x	Wi-Fi Hotspot + SVDO
35	CDMA BC1 Voice + LTE B13+ WLAN	O	O	O	x	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-DO Head Exposure Condition

Position	Voice		Data			Σ 1g SAR
	CDMA850 1xRTT	CDMA1900 1xRTT	CDMA850 1xEVDO	CDMA1900 1xEVDO	WiFi	
Left Touch	0.484	-	0.477	-	0.104	1.065
Left Tilt	0.222	-	0.248	-	0.026	0.496
Right Touch	0.417	-	0.678	-	0.111	1.206
Right Tilt	0.263	-	0.34	-	0.041	0.644
Left Touch	0.484	-	-	0.569	0.104	1.157
Left Tilt	0.222	-	-	0.524	0.026	0.772
Right Touch	0.417	-	-	0.761	0.111	1.289
Right Tilt	0.263	-	-	0.538	0.041	0.842
Left Touch	-	0.894	0.477	-	0.104	1.475
Left Tilt	-	0.293	0.248	-	0.026	0.567
Right Touch	-	0.605	0.678	-	0.111	1.394
Right Tilt	-	0.279	0.34	-	0.041	0.66
Left Touch	-	0.894	-	0.569	0.104	1.567
Left Tilt	-	0.293	-	0.524	0.026	0.843
Right Touch	-	0.605	-	0.761	0.111	1.477
Right Tilt	-	0.279	-	0.538	0.041	0.858

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

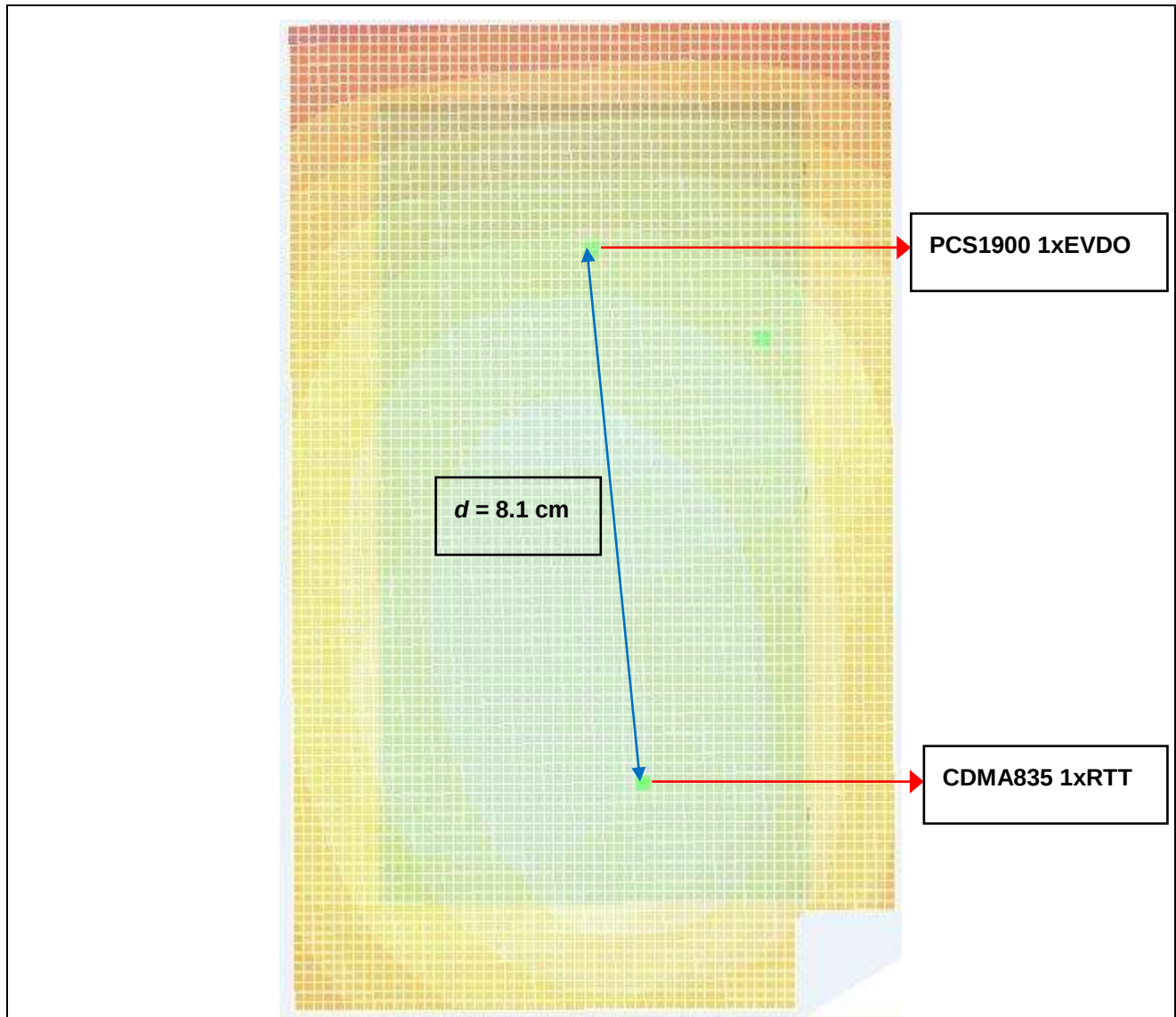
Position	Voice		Data			Σ 1g SAR
	CDMA850 1xRTT	CDMA1900 1xRTT	CDMA850 1xEVDO	CDMA1900 1xEVDO	WiFi	
Rear	0.767	-	0.614	-	0.159	1.54
	0.767	-	-	0.849	0.159	1.775
Front	0.389	-	0.232	-	0.033	0.654
	0.389	-	-	0.386	0.033	0.808
Rear	-	0.593	0.614	-	0.159	1.366
	-	0.593	-	0.796	0.159	1.548
Front	-	0.572	0.232	-	0.033	0.837
	-	0.572	-	0.386	0.033	0.991

SAR to Peak Location Separation Ratio (SPLSR)

Test Position	worst-case combination			Σ 1g SAR	3D distance (cm)	SPLSR
	CDMA850 1xRTT	PCS1900 EVDO	WiFi			
Rear	0.767	0.849	0.159	1.775		
	0.767	0.849		1.616	8.1	0.20
	0.767		0.159	0.926	n/a	n/a
		0.849	0.159	1.008	n/a	n/a

SAR to Peak Location Separation Ratio (SPLSR)

“CDMA835 1xRTT” to “PCS1900 1xEVDO”



CDMA835 1xRTT

PCS1900 1xEVDO

Value of SAR	X	Y	Z
mW/g	m	m	m
0.816	-0.00948	-0.0855	-0.204
0.91	-0.0169	-0.00449	-0.204

Separation Distance $d = \sqrt{(X1 - X2)^2 + (Y1 - Y2)^2 + (Z1 - Z2)^2}$
= 8.1 cm

11.3.3 SV-LTE Head Exposure Condition

Band 13

Position	Voice		Data		Σ 1g SAR
	CDMA850 1xRTT	CDMA1900 1xRTT	LTE Band 13	WiFi	
Left Touch	0.484	-	0.268	0.104	0.856
Left Tilt	0.222	-	0.162	0.026	0.41
Right Touch	0.417	-	0.347	0.111	0.875
Right Tilt	0.263	-	0.211	0.041	0.515
Left Touch	-	0.894	0.268	0.104	1.266
Left Tilt	-	0.293	0.162	0.026	0.481
Right Touch	-	0.605	0.347	0.111	1.063
Right Tilt	-	0.279	0.211	0.041	0.531

Note;

Simultaneous transmission SAR is not required because the sum of the 1g-SAR is < 1.6 W/kg.

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

Band 13

Position	Voice		Data		Σ 1g SAR
	CDMA850 1xRTT	CDMA1900 1xRTT	LTE Band 13	WiFi	
Rear	0.767	-	0.519	0.159	1.445
Front	0.389	-	0.284	0.033	0.706
Rear	-	0.593	0.519	0.159	1.271
Front	-	0.572	0.284	0.033	0.889

12. SAR TEST DATA SUMMARY

12.1 Measurement Results (CDMA835/EVDO835 Head SAR)

Frequency		Modulation	Conducted Power (dBm)	Power Drift (dB)	Battery	Phantom Position	SAR(mW/g)
MHz	Channel						
836.52	384 (Mid)	CDMA835	23.96	-0.078	Standard	Left Ear	0.484
836.52	384 (Mid)	CDMA835	23.96	-0.084	Standard	Left Tilt 15°	0.222
836.52	384 (Mid)	CDMA835	23.96	-0.191	Standard	Right Ear	0.417
836.52	384 (Mid)	CDMA835	23.96	0.031	Standard	Right Tilt 15°	0.263
836.52	384 (Mid)	EVDO	24.23	-0.029	Standard	Left Ear	0.477
836.52	384 (Mid)	EVDO	24.23	-0.019	Standard	Left Tilt 15°	0.248
836.52	384 (Mid)	EVDO	24.23	-0.167	Standard	Right Ear	0.678
836.52	384 (Mid)	EVDO	24.23	-0.012	Standard	Right Tilt 15°	0.340
836.52	384 (Mid)	CDMA835	23.96	-0.012	Standard	Left Ear	*0.449
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:

- 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].
- All modes of operation were investigated and the worst-case are reported.
- Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.
- Tissue parameters and temperatures are listed on the SAR plot.
- Battery Type ☒ Standard ☐ Extended ☐ Slim
Batteries are fully charged for all readings.
- Test Signal Call Mode ☐ Manual Test cord ☒ Base Station Simulator
- 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).
- EVDO SAR was tested under EVDO Rev.0 RTAP.
- *SAR testing was performed at worst case SAR with Wireless charging battery cover.

12.2 Measurement Results (PCS1900/EVDO1900 Head SAR)

Frequency		Modulation	Conducted Power (dBm)	Power Drift (dB)	Battery	Phantom Position	SAR(mW/g)
MHz	Channel						
1851.25	25 (Low)	PCS1900	24.18	-0.043	Standard	Left Ear	0.700
1880.00	600 (Mid)	PCS1900	24.02	0.188	Standard	Left Ear	0.850
1908.75	1175 (High)	PCS1900	24.09	0.013	Standard	Left Ear	0.894
1880.00	600 (Mid)	PCS1900	24.02	0.016	Standard	Left Tilt 15°	0.293
1880.00	600 (Mid)	PCS1900	24.02	0.189	Standard	Right Ear	0.605
1880.00	600 (Mid)	PCS1900	24.02	0.065	Standard	Right Tilt 15°	0.279
1880.00	600 (Mid)	EVDO	24.20	-0.074	Standard	Left Ear	0.569
1880.00	600 (Mid)	EVDO	24.20	0.095	Standard	Left Tilt 15°	0.524
1880.00	600 (Mid)	EVDO	24.20	0.030	Standard	Right Ear	0.761
1880.00	600 (Mid)	EVDO	24.20	-0.081	Standard	Right Tilt 15°	0.538
1908.75	1175 (High)	PCS1900	24.09	-0.124	Standard	Left Ear	*0.817
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:

- 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].
- All modes of operation were investigated and the worst-case are reported.
- Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.
- Tissue parameters and temperatures are listed on the SAR plot.
- Battery Type ☒ Standard ☐ Extended ☐ Slim
Batteries are fully charged for all readings.
- Test Signal Call Mode ☐ Manual Test cord ☒ Base Station Simulator
- 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).
- EVDO SAR was tested under EVDO Rev.0 RTAP.
- *SAR testing was performed at worst case SAR with Wireless charging battery cover.

12.3 Measurement Results (LTE Band13 10MHz Head SAR)

Frequency		Modulation	Conducted Power (dBm)	Power Drift (dB)	RB Size	RB Offset	Phantom Position	SAR(mW/g)	MPR
MHz	Channel								
782	23230	QPSK	21.93	-0.067	25	12	Left Ear	0.199	1
782	23230	QPSK	23.06	-0.010	1	0	Left Ear	0.268	0
782	23230	QPSK	22.99	-0.012	1	49	Left Ear	0.238	0
782	23230	QPSK	21.93	0.078	25	12	Left Tilt 15°	0.118	1
782	23230	QPSK	23.06	-0.003	1	0	Left Tilt 15°	0.162	0
782	23230	QPSK	22.99	0.001	1	49	Left Tilt 15°	0.131	0
782	23230	QPSK	21.93	-0.131	25	12	Right Ear	0.269	1
782	23230	QPSK	23.06	-0.052	1	0	Right Ear	0.343	0
782	23230	QPSK	22.99	-0.01	1	49	Right Ear	0.327	0
782	23230	QPSK	21.93	-0.023	25	12	Right Tilt 15°	0.155	1
782	23230	QPSK	23.06	-0.097	1	0	Right Tilt 15°	0.211	0
782	23230	QPSK	22.99	-0.094	1	49	Right Tilt 15°	0.167	0
782	23230	QPSK	23.06	-0.045	1	0	Right Ear	*0.347	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:

- 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].
- All modes of operation were investigated and the worst-case are reported.
- Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.
- Tissue parameters and temperatures are listed on the SAR plot.
- Battery Type ☒ Standard ☐ Extended ☐ Slim
Batteries are fully charged for all readings.
- Test Signal Call Mode ☐ Manual Test cord ☒ Base Station Simulator
- 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.
- *SAR testing was performed at worst case SAR with Wireless charging battery cover.

12.4 Measurement Results (LTE Band13 16QAM Head SAR)

Frequency		Modulation	Conductor Power (dBm)	Power Drift (dB)	RB Size	RB Offset	Phantom Position	SAR(mW/g)	MPR
MHz	Channel								
782	23230	16QAM	21.02	-0.08	25	12	Left Ear	0.149	2
782	23230	16QAM	21.82	-0.053	1	0	Left Ear	0.195	1
782	23230	16QAM	21.89	-0.016	1	49	Left Ear	0.172	1
782	23230	16QAM	21.02	-0.003	25	12	Left Tilt 15°	0.087	2
782	23230	16QAM	21.82	-0.017	1	0	Left Tilt 15°	0.123	1
782	23230	16QAM	21.89	-0.152	1	49	Left Tilt 15°	0.094	1
782	23230	16QAM	21.02	-0.176	25	12	Right Ear	0.190	2
782	23230	16QAM	21.82	0.023	1	0	Right Ear	0.285	1
782	23230	16QAM	21.89	-0.176	1	49	Right Ear	0.266	1
782	23230	16QAM	21.02	-0.063	25	12	Right Tilt 15°	0.111	2
782	23230	16QAM	21.82	-0.050	1	0	Right Tilt 15°	0.155	1
782	23230	16QAM	21.89	-0.097	1	49	Right Tilt 15°	0.120	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:

- 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].
- All modes of operation were investigated and the worst-case are reported.
- Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.
- Tissue parameters and temperatures are listed on the SAR plot.
- Battery Type ☒ Standard ☐ Extended ☐ Slim
Batteries are fully charged for all readings.
- Test Signal Call Mode ☐ Manual Test cord ☒ Base Station Simulator
- 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.

12.5 Measurement Results (802.11b/g/n Head SAR)

Frequency		Modulation	Conducted Power (dBm)	Power Drift (dB)	Battery	Phantom Position	SAR(mW/g)
MHz	Channel						
2 437	6 (Mid)	802.11b	15.0	-0.007	Standard	Left Ear	0.104
2 437	6 (Mid)	802.11b	15.0	-0.024	Standard	Left Tilt 15°	0.026
2 437	6 (Mid)	802.11b	15.0	0.067	Standard	Right Ear	0.111
2 437	6 (Mid)	802.11b	15.0	-0.06	Standard	Right Tilt 15	0.041
2 437	6 (Mid)	802.11b	15.0	-0.058	Standard	Right Ear	*0.065
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:

- 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].
- All modes of operation were investigated and the worst-case are reported.
- Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.
- Tissue parameters and temperatures are listed on the SAR plot.
- Battery Type ☒ Standard ☐ Extended ☐ Slim
Batteries are fully charged for all readings.
- Test Signal Call Mode ☒ Manual Test cord ☐ Base Station Simulator
- IEEE 802.11g(including 802.11n) SAR testing is required when the conducted powers are equal to or greater than 0.25 dB Than the conducted powers in IEEE 802.11b.
- For 2.4GHz WLAN, Highest average power channel for the lowest data rate was selected for SAR evaluation based on KDB 248227. Other channels are not necessary because 1g-average SAR < 0.8 W/Kg and peak SAR < 1.6W/Kg per KDB 248227.
- *SAR testing was performed at worst case SAR with Wireless charging battery cover.

12.6 Measurement Results (CDMA835/EVDO835 Body SAR)

Frequency		Modulation	Conducted Power (dBm)	Power Drift (dB)	Configuration	Separation Distance	SAR(mW/g)
MHz	Channel						
835	384 (Mid)	CDMA835	23.96	0.021	Rear	1.0 cm	0.767
835	384 (Mid)	CDMA835	23.96	0.041	Front	1.0 cm	0.389
835	384 (Mid)	EVDO	24.23	-0.16	Rear	1.0 cm	0.614
835	384 (Mid)	EVDO	24.23	-0.147	Front	1.0 cm	0.232
835	384 (Mid)	EVDO	24.23	-0.045	Left	1.0 cm	0.403
835	384 (Mid)	EVDO	24.23	-0.019	Top	1.0 cm	0.065
835	384 (Mid)	EVDO	24.23	-0.07	Rear	1.0 cm	*0.436
835	384 (Mid)	CDMA835	23.96	0.093	Rear	1.0 cm	*0.631
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:

- 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].
- All modes of operation were investigated and the worst-case are reported.
- Measured Depth of Simulating Tissue is 15.0 cm $\pm$ 0.2 cm.
- Tissue parameters and temperatures are listed on the SAR plot.
- Battery Type ☒ Standard ☐ Extended ☐ Slim
Batteries are fully charged for all readings.
- Test Signal Call Mode ☐ Manual Test cord ☒ Base Station Simulator
- EVDO SAR was tested under EVDO Rev.0 RTAP.
- Test Configuration ☐ With Holster ☒ Without Holster
- 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).
- *SAR testing was performed at worst case SAR with Wireless charging battery cover.

12.7 Measurement Results(PCS1900/ EVDO1900 Hotspot Body SAR)

Frequency		Modulation	Conducted Power (dBm)	Power Drift (dB)	Configuration	Separation Distance	SAR(mW/g)
MHz	Channel						
1880.00	600 (Mid)	PCS1900	24.20	-0.044	Rear	1.0 cm	0.593
1880.00	600 (Mid)	PCS1900	24.20	0.035	Front	1.0 cm	0.572
1880.00	600 (Mid)	EVDO	24.20	-0.088	Rear	1.0 cm	0.849
1880.00	600 (Mid)	EVDO	24.20	0.096	Front	1.0 cm	0.386
1880.00	600 (Mid)	EVDO	24.20	-0.018	Left	1.0 cm	0.350
1880.00	600 (Mid)	EVDO	24.20	-0.05	Top	1.0 cm	0.186
1880.00	600 (Mid)	EVDO	24.20	-0.153	Rear	1.0 cm	*0.624
1880.00	600 (Mid)	PCS1900	24.20	-0.030	Rear	1.0 cm	*0.553
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:

- 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].
- All modes of operation were investigated and the worst-case are reported.
- Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.
- Tissue parameters and temperatures are listed on the SAR plot.
- Battery Type ☒ Standard ☐ Extended ☐ Slim
Batteries are fully charged for all readings.
- Test Signal Call Mode ☐ Manual Test cord ☒ Base Station Simulator
- EVDO SAR was tested under EVDO Rev.0 RTAP.
- Test Configuration ☐ With Holster ☒ Without Holster
- 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).
- *SAR testing was performed at worst case SAR with Wireless charging battery cover.

12.8 Measurement Results (LTE Band13 10MHz QPSK Body SAR)

Frequency		Modulation	Conducted Power (dBm)	Power Drift (dB)	Configuration	RB Size	RB Offset	Separation Distance	SAR(mW /g)	MPR
MHz	Channel									
782	23230	QPSK	21.93	-0.009	Rear	25	12	1.0 cm	0.396	1
782	23230	QPSK	23.06	-0.083	Rear	1	0	1.0 cm	0.519	0
782	23230	QPSK	22.99	-0.056	Rear	1	49	1.0 cm	0.510	0
782	23230	QPSK	21.93	-0.006	Front	25	12	1.0 cm	0.222	1
782	23230	QPSK	23.06	-0.036	Front	1	0	1.0 cm	0.284	0
782	23230	QPSK	22.99	-0.059	Front	1	49	1.0 cm	0.250	0
782	23230	QPSK	21.93	0.031	Right	25	12	1.0 cm	0.236	1
782	23230	QPSK	23.06	-0.104	Right	1	0	1.0 cm	0.312	0
782	23230	QPSK	22.99	-0.056	Right	1	49	1.0 cm	0.275	0
782	23230	QPSK	21.93	0.059	Bottom	25	12	1.0 cm	0.150	1
782	23230	QPSK	23.06	-0.043	Bottom	1	0	1.0 cm	0.172	0
782	23230	QPSK	22.99	-0.091	Bottom	1	49	1.0 cm	0.174	0
782	23230	QPSK	23.06	-0.072	Rear	1	0	1.0 cm	*0.371	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:

- 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].
- All modes of operation were investigated and the worst-case are reported.
- Measured Depth of Simulating Tissue is 15.0 cm $\pm$ 0.2 cm.
- Tissue parameters and temperatures are listed on the SAR plot.
- Battery Type ☒ Standard ☐ Extended ☐ Slim
Batteries are fully charged for all readings.
- Test Signal Call Mode ☐ Manual Test cord ☒ Base Station Simulator
- 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).
- 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 $\leq$ 0.8 W/kg.
- *SAR testing was performed at worst case SAR with Wireless charging battery cover.

12.9 Measurement Results (LTE Band13 10MHz 16QAM Body SAR)

Frequency		Modulation	Conducted Power (dBm)	Power Drift (dB)	Configuration	RB Size	RB Offset	Separation Distance	SAR(mW/g)	MPR
MHz	Channel									
782	23230	16QAM	21.02	-0.107	Rear	25	12	1.0 cm	0.303	2
782	23230	16QAM	21.82	0.066	Rear	1	0	1.0 cm	0.400	1
782	23230	16QAM	21.89	0.009	Rear	1	49	1.0 cm	0.391	1
782	23230	16QAM	21.02	-0.034	Front	25	12	1.0 cm	0.161	2
782	23230	16QAM	21.82	-0.053	Front	1	0	1.0 cm	0.207	1
782	23230	16QAM	21.89	-0.024	Front	1	49	1.0 cm	0.180	1
782	23230	16QAM	21.02	-0.019	Right	25	12	1.0 cm	0.161	2
782	23230	16QAM	21.82	-0.031	Right	1	0	1.0 cm	0.254	1
782	23230	16QAM	21.89	-0.044	Right	1	49	1.0 cm	0.223	1
782	23230	16QAM	21.02	0.001	Bottom	25	12	1.0 cm	0.129	2
782	23230	16QAM	21.82	0.073	Bottom	1	0	1.0 cm	0.131	1
782	23230	16QAM	21.89	0.080	Bottom	1	49	1.0 cm	0.126	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:

- 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].
- All modes of operation were investigated and the worst-case are reported.
- Measured Depth of Simulating Tissue is 15.0 cm $\pm$ 0.2 cm.
- Tissue parameters and temperatures are listed on the SAR plot.
- Battery Type ☒ Standard ☐ Extended ☐ Slim
Batteries are fully charged for all readings.
- Test Signal Call Mode ☐ Manual Test cord ☒ Base Station Simulator
- 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).
- 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 $\leq$ 0.8 W/kg.

12.10 Measurement Results (802.11b/g/n Hotspot Body SAR)

Frequency		Modulation	Conducted Power (dBm)	Power Drift (dB)	Configuration	Separation Distance	Data Rate	SAR(mW/g)
MHz	Channel							
2 437	6 (Mid)	802.11b	15.0	-0.08	Rear	1.0 cm	1 Mbps	0.159
2 437	6 (Mid)	802.11b	15.0	-0.051	Front	1.0 cm	1 Mbps	0.033
2 437	6 (Mid)	802.11b	15.0	-0.069	Left	1.0 cm	1 Mbps	0.089
2 437	6 (Mid)	802.11b	15.0	-0.058	Rear	1.0 cm	1 Mbps	*0.108
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:

- 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].
- All modes of operation were investigated and the worst-case are reported.
- Measured Depth of Simulating Tissue is 15.0 cm $\pm$ 0.2 cm.
- Tissue parameters and temperatures are listed on the SAR plot.
- Battery Type ☒ Standard ☐ Extended ☐ Slim
Batteries are fully charged for all readings.
- Test Signal Call Mode ☒ Manual Test code ☐ Base Station Simulator
- IEEE 802.11g(including 802.11n) SAR testing is required when the conducted powers are equal to or greater than 0.25 dB Than the conducted powers in IEEE 802.11b.
- For 2.4GHz WLAN, Highest average power channel for the lowest data rate was selected for SAR evaluation based on KDB 248227. Other channels are not necessary because 1g-average SAR < 0.8 W/Kg and peak SAR < 1.6W/Kg per KDB 248227.
- *SAR testing was performed at worst case SAR with Wireless charging battery cover.

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 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 2, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.52$ MHz; $\sigma = 0.904$ mho/m; $\epsilon_r = 43$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Left touch 384/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.490 mW/g

Left touch 384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

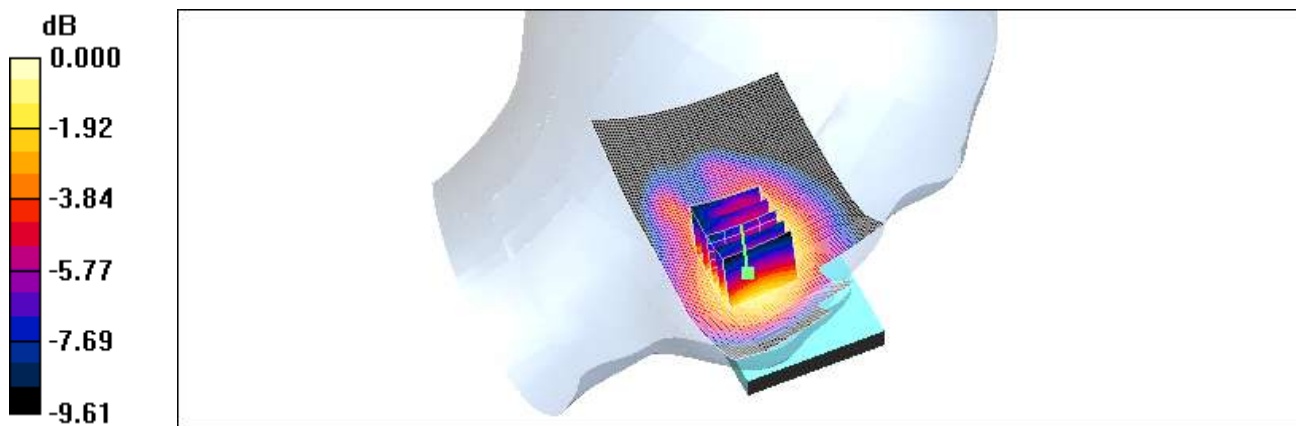
Reference Value = 11.9 V/m; Power Drift = -0.078 dB

Peak SAR (extrapolated) = 0.688 W/kg

SAR(1 g) = 0.484 mW/g; SAR(10 g) = 0.353 mW/g

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

Maximum value of SAR (measured) = 0.517 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 2, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.52 \text{ MHz}$; $\sigma = 0.904 \text{ mho/m}$; $\epsilon_r = 43$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Left tilt 384/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.247 mW/g

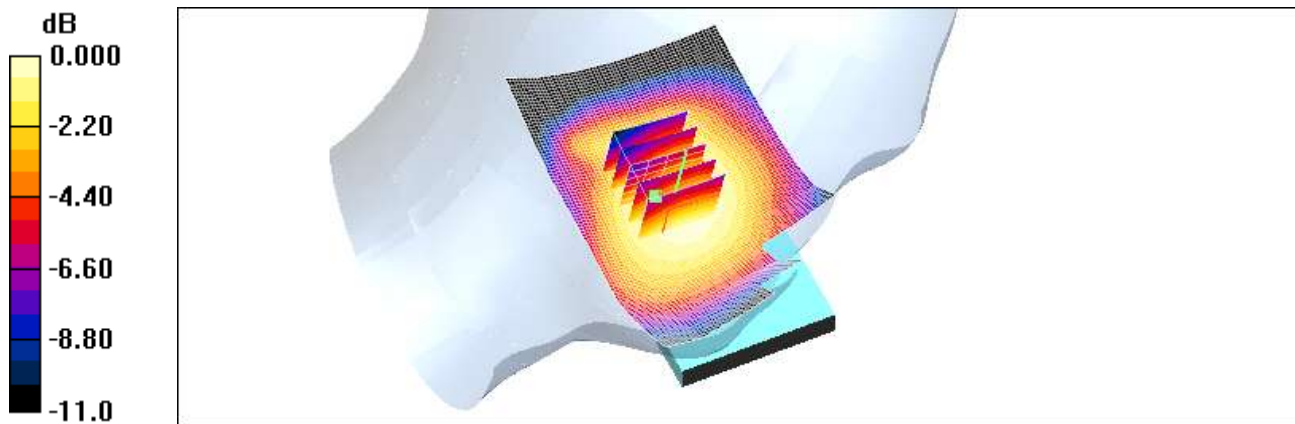
Left tilt 384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 8.74 V/m; Power Drift = -0.084 dB

Peak SAR (extrapolated) = 0.265 W/kg

SAR(1 g) = 0.222 mW/g; SAR(10 g) = 0.170 mW/g

Maximum value of SAR (measured) = 0.232 mW/g



0 dB = 0.232mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 2, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.52 \text{ MHz}$; $\sigma = 0.904 \text{ mho/m}$; $\epsilon_r = 43$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Right touch 384/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

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

Right touch 384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

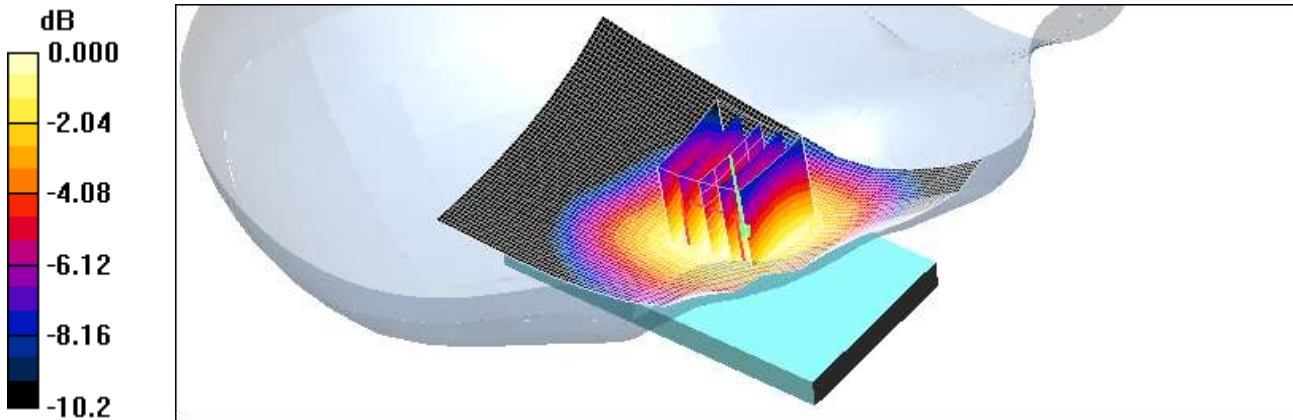
Reference Value = 5.07 V/m; Power Drift = -0.191 dB

Peak SAR (extrapolated) = 0.504 W/kg

SAR(1 g) = 0.417 mW/g; SAR(10 g) = 0.309 mW/g

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

Maximum value of SAR (measured) = 0.436 mW/g



0 dB = 0.436mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 2, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.52 \text{ MHz}$; $\sigma = 0.904 \text{ mho/m}$; $\epsilon_r = 43$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Right tilt 384/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.265 mW/g

Right tilt 384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

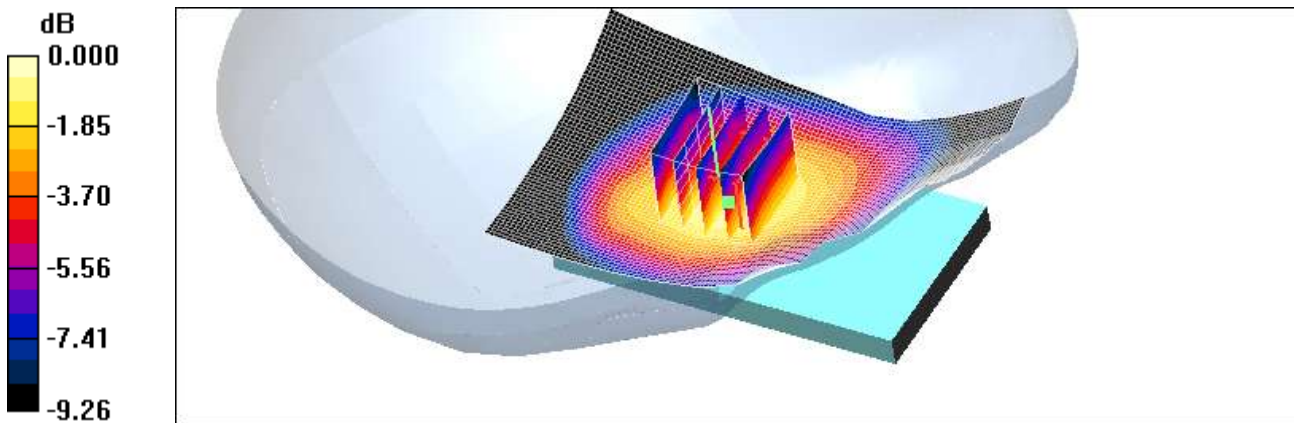
Reference Value = 9.87 V/m; Power Drift = 0.031 dB

Peak SAR (extrapolated) = 0.415 W/kg

SAR(1 g) = 0.263 mW/g; SAR(10 g) = 0.195 mW/g

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

Maximum value of SAR (measured) = 0.310 mW/g



0 dB = 0.310mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 2, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.52 \text{ MHz}$; $\sigma = 0.904 \text{ mho/m}$; $\epsilon_r = 43$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Left touch 384 EVDO/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.516 mW/g

Left touch 384 EVDO/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

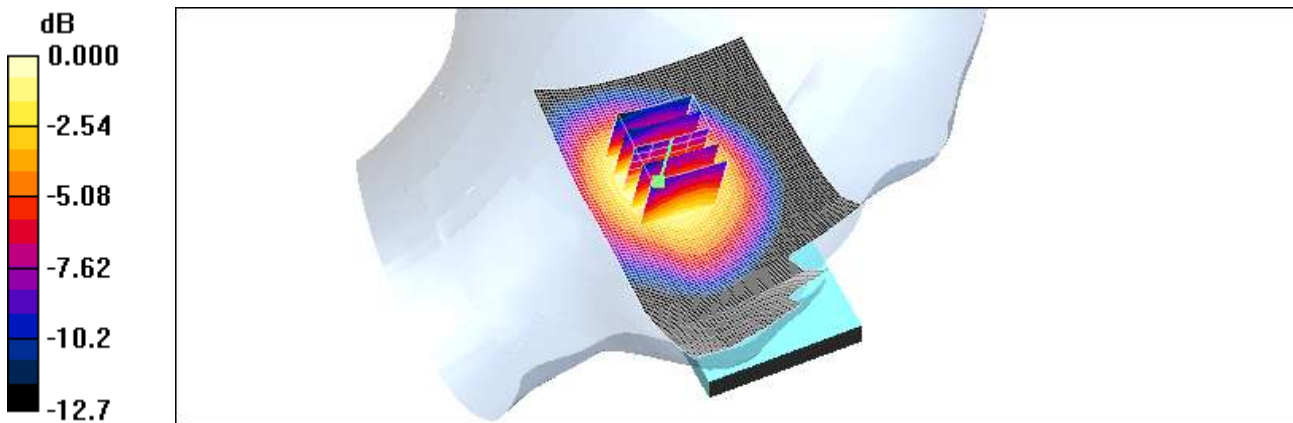
Reference Value = 12.1 V/m; Power Drift = -0.029 dB

Peak SAR (extrapolated) = 0.662 W/kg

SAR(1 g) = 0.477 mW/g; SAR(10 g) = 0.319 mW/g

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

Maximum value of SAR (measured) = 0.516 mW/g



0 dB = 0.516mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 2, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.52 \text{ MHz}$; $\sigma = 0.904 \text{ mho/m}$; $\epsilon_r = 43$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Left tilt 384 EVDO/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.263 mW/g

Left tilt 384 EVDO/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

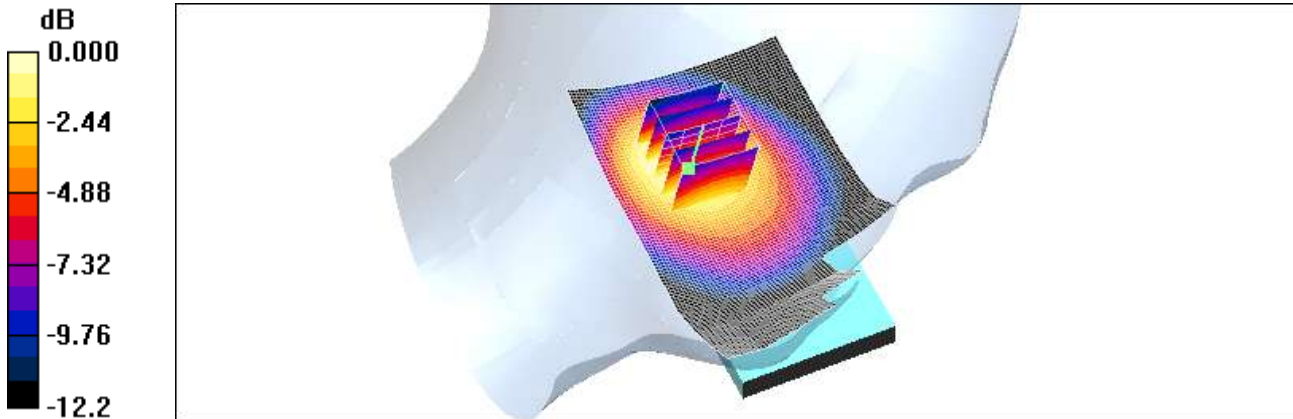
Reference Value = 10.2 V/m; Power Drift = -0.019 dB

Peak SAR (extrapolated) = 0.340 W/kg

SAR(1 g) = 0.248 mW/g; SAR(10 g) = 0.167 mW/g

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

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



0 dB = 0.269mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 2, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.52 \text{ MHz}$; $\sigma = 0.904 \text{ mho/m}$; $\epsilon_r = 43$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Right touch 384 EVDO/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.795 mW/g

Right touch 384 EVDO/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

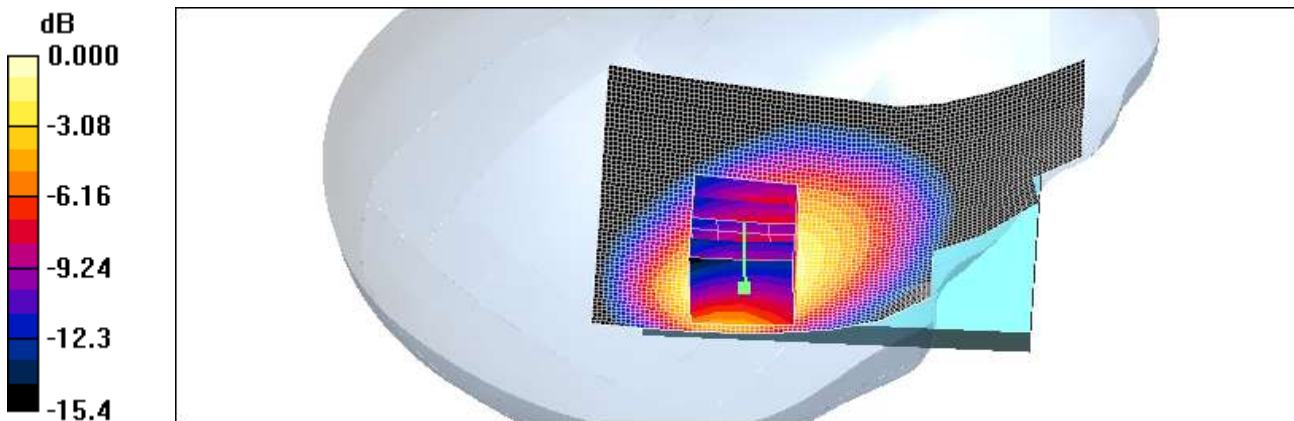
Reference Value = 8.11 V/m; Power Drift = -0.167 dB

Peak SAR (extrapolated) = 1.06 W/kg

SAR(1 g) = 0.678 mW/g; SAR(10 g) = 0.415 mW/g

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

Maximum value of SAR (measured) = 0.741 mW/g



0 dB = 0.741mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 2, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.52 \text{ MHz}$; $\sigma = 0.904 \text{ mho/m}$; $\epsilon_r = 43$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Right tilt 384 EVDO/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

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

Right tilt 384 EVDO/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

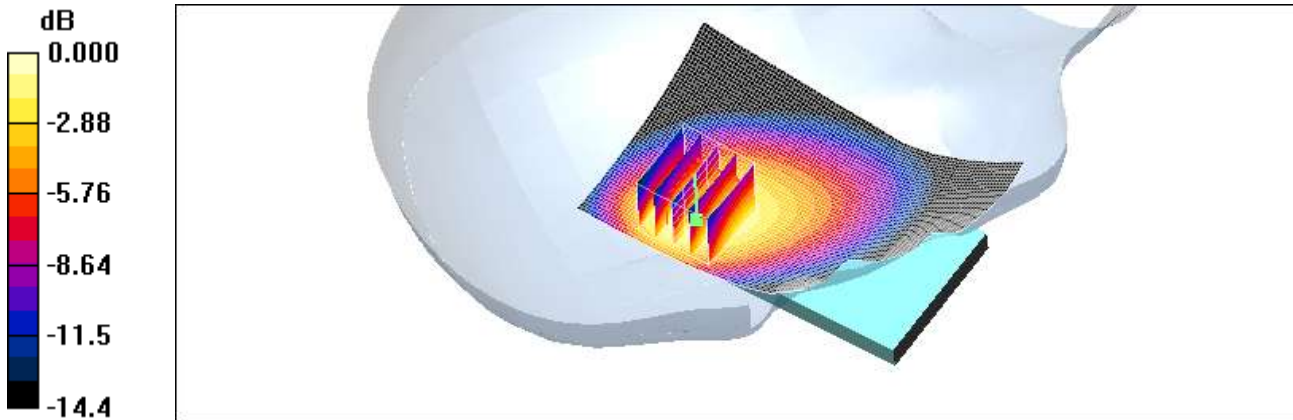
Reference Value = 8.41 V/m; Power Drift = -0.012 dB

Peak SAR (extrapolated) = 0.493 W/kg

SAR(1 g) = 0.340 mW/g; SAR(10 g) = 0.219 mW/g

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

Maximum value of SAR (measured) = 0.371 mW/g



0 dB = 0.371mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 2, 2012
Option: Wireless Charging Cover

DUT: VS840; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.52 \text{ MHz}$; $\sigma = 0.904 \text{ mho/m}$; $\epsilon_r = 43$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Left touch 384/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.493 mW/g

Left touch 384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

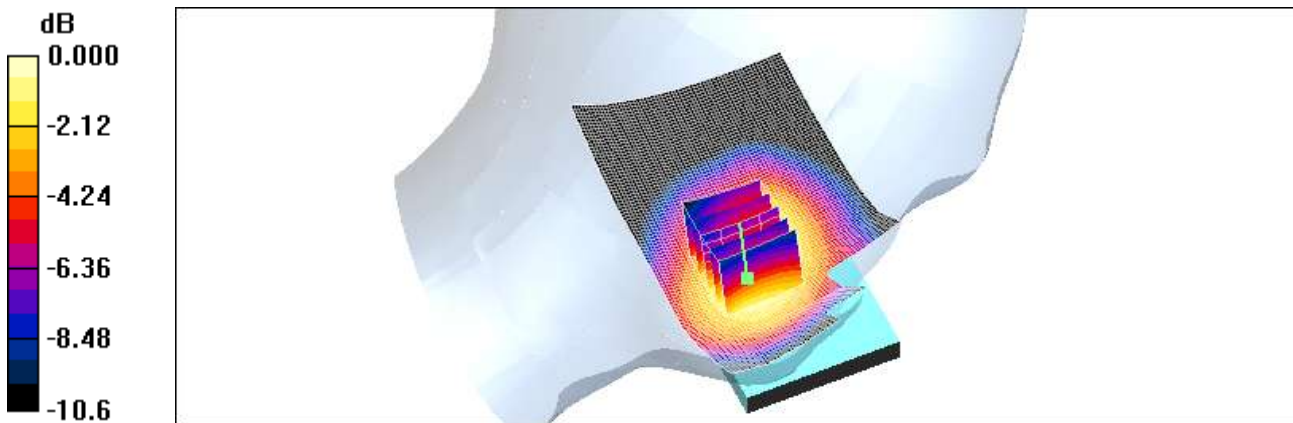
Reference Value = 12.5 V/m; Power Drift = -0.012 dB

Peak SAR (extrapolated) = 0.585 W/kg

SAR(1 g) = 0.449 mW/g; SAR(10 g) = 0.328 mW/g

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

Maximum value of SAR (measured) = 0.480 mW/g



0 dB = 0.480mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 3, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: PCS 1900MHz FCC; Frequency: 1851.25 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1851.25$ MHz; $\sigma = 1.39$ mho/m; $\epsilon_r = 39.3$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(5.17, 5.17, 5.17); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Left touch 25/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.749 mW/g

Left touch 25/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

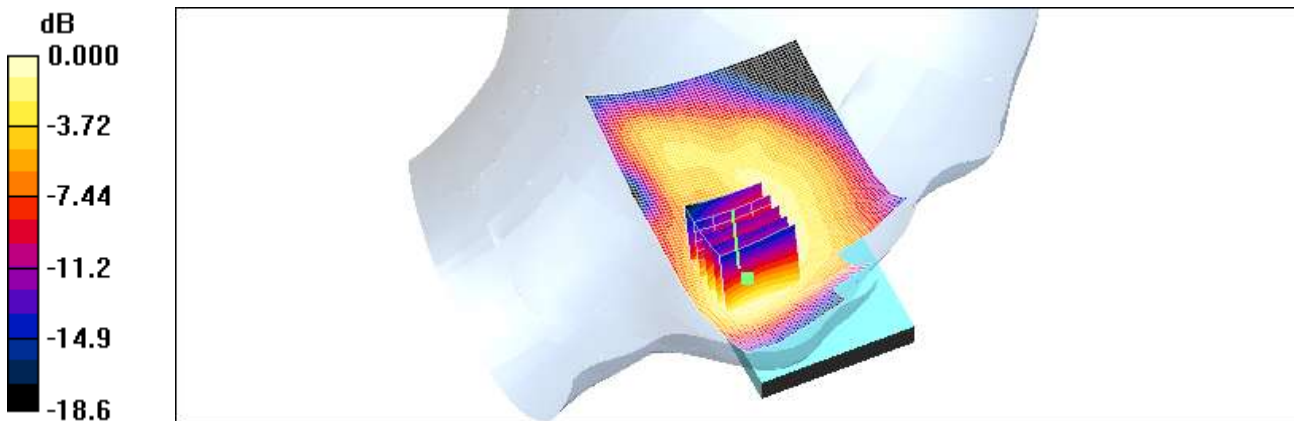
Reference Value = 8.43 V/m; Power Drift = 0.188 dB

Peak SAR (extrapolated) = 1.11 W/kg

SAR(1 g) = 0.700 mW/g; SAR(10 g) = 0.420 mW/g

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

Maximum value of SAR (measured) = 0.761 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 3, 2012

DUT: VS840; Type: bar; Serial: #1

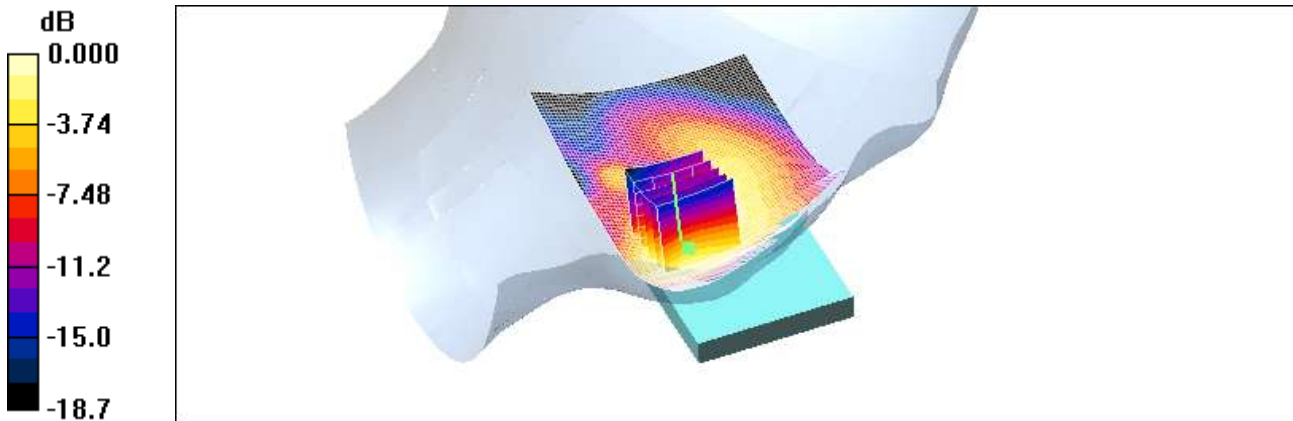
Communication System: PCS 1900MHz FCC; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.43 \text{ mho/m}$; $\epsilon_r = 39.2$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(5.17, 5.17, 5.17); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Left touch 600/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.886 mW/g

Left touch 600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 12.9 V/m; Power Drift = -0.043 dB
Peak SAR (extrapolated) = 1.36 W/kg
SAR(1 g) = 0.850 mW/g; SAR(10 g) = 0.505 mW/g
Maximum value of SAR (measured) = 0.907 mW/g



0 dB = 0.907mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 3, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: PCS 1900MHz FCC; Frequency: 1908.75 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1908.75$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 39.1$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(5.17, 5.17, 5.17); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Left touch 1175/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.910 mW/g

Left touch 1175/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

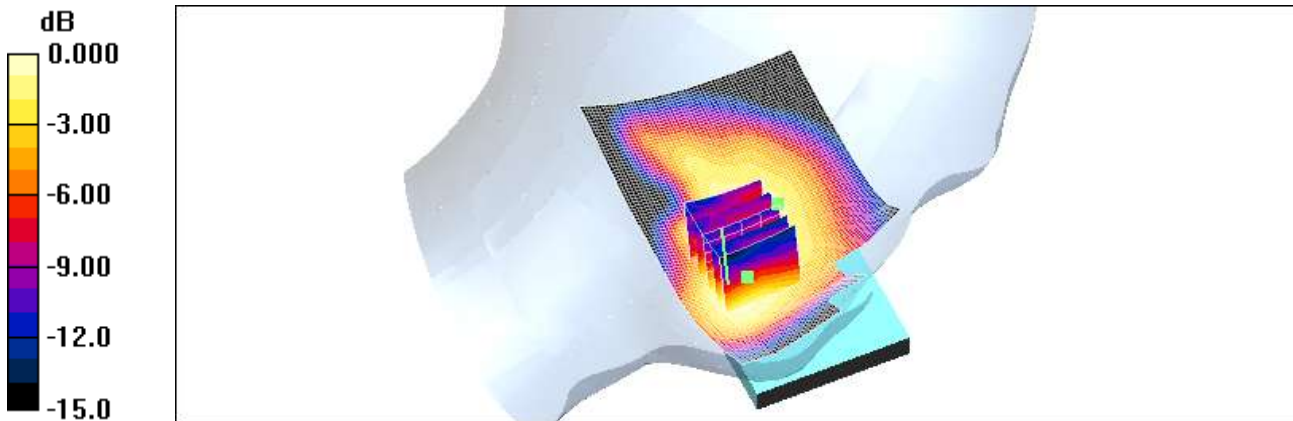
Reference Value = 10.00 V/m; Power Drift = 0.013 dB

Peak SAR (extrapolated) = 2.10 W/kg

SAR(1 g) = 0.894 mW/g; SAR(10 g) = 0.535 mW/g

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

Maximum value of SAR (measured) = 0.919 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 3, 2012

DUT: VS840; Type: bar; Serial: #1

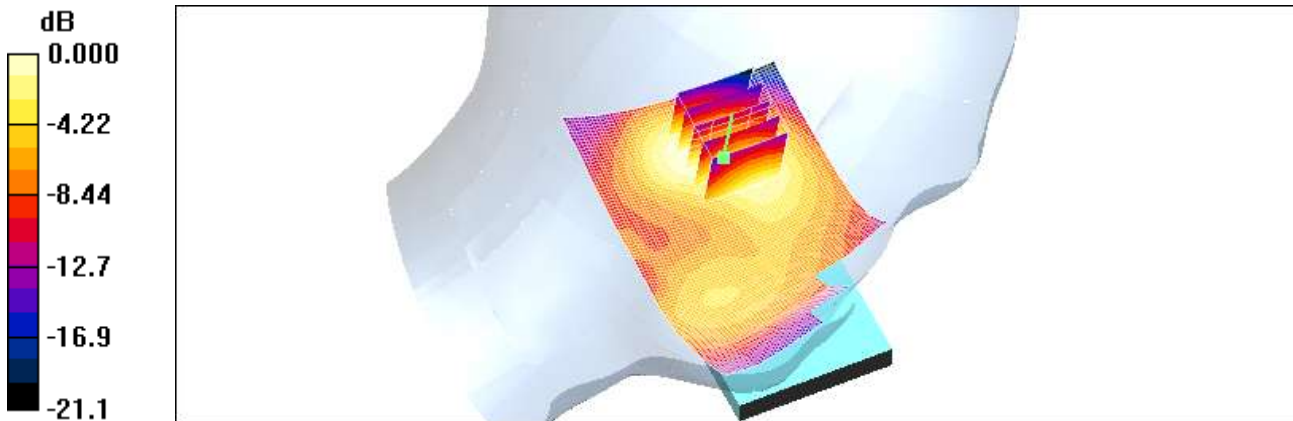
Communication System: PCS 1900MHz FCC; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.43 \text{ mho/m}$; $\epsilon_r = 39.2$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(5.17, 5.17, 5.17); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Left tilt 600/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.332 mW/g

Left tilt 600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 13.9 V/m; Power Drift = 0.016 dB
Peak SAR (extrapolated) = 0.448 W/kg
SAR(1 g) = 0.293 mW/g; SAR(10 g) = 0.179 mW/g
Maximum value of SAR (measured) = 0.311 mW/g



0 dB = 0.311mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 3, 2012

DUT: VS840; Type: bar; Serial: #1

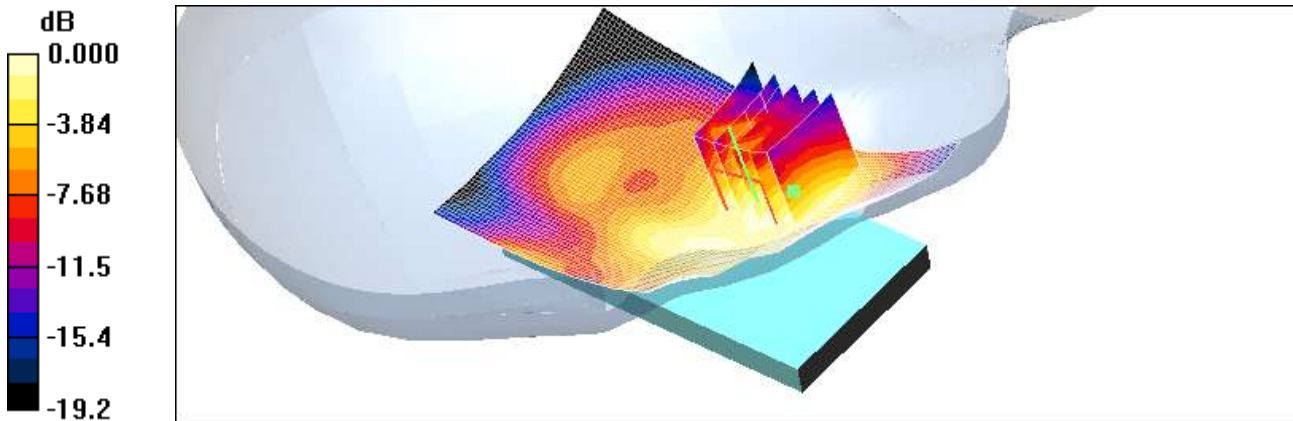
Communication System: PCS 1900MHz FCC; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.43$ mho/m; $\epsilon_r = 39.2$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(5.17, 5.17, 5.17); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Right touch 600/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.589 mW/g

Right touch 600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.83 V/m; Power Drift = 0.189 dB
Peak SAR (extrapolated) = 1.22 W/kg
SAR(1 g) = 0.605 mW/g; SAR(10 g) = 0.388 mW/g
Maximum value of SAR (measured) = 0.622 mW/g



0 dB = 0.622mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 3, 2012

DUT: VS840; Type: bar; Serial: #1

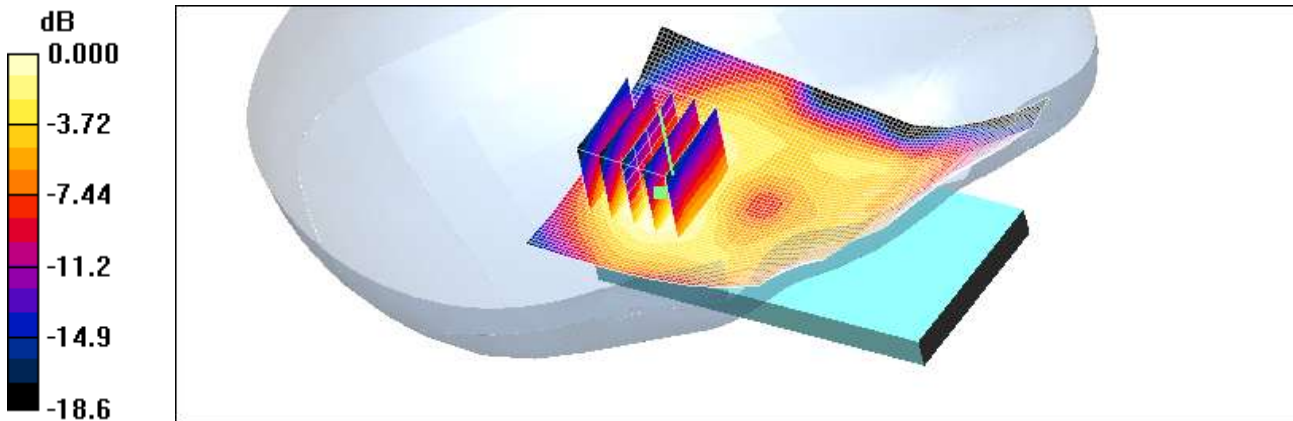
Communication System: PCS 1900MHz FCC; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.43$ mho/m; $\epsilon_r = 39.2$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(5.17, 5.17, 5.17); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Right tilt 600/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.363 mW/g

Right tilt 600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.5 V/m; Power Drift = 0.065 dB
Peak SAR (extrapolated) = 0.460 W/kg
SAR(1 g) = 0.279 mW/g; SAR(10 g) = 0.156 mW/g
Maximum value of SAR (measured) = 0.300 mW/g



0 dB = 0.300mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 3, 2012

DUT: VS840; Type: bar; Serial: #1

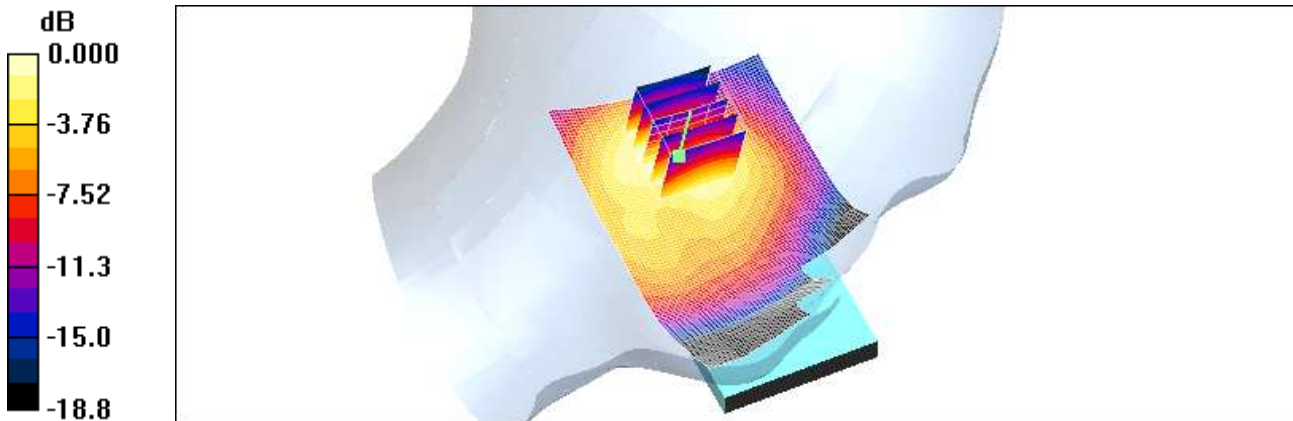
Communication System: PCS 1900MHz FCC; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.43 \text{ mho/m}$; $\epsilon_r = 39.2$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(5.17, 5.17, 5.17); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Left touch 600 EVDO/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.643 mW/g

Left touch 600 EVDO/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 20.9 V/m; Power Drift = -0.074 dB
Peak SAR (extrapolated) = 0.930 W/kg
SAR(1 g) = 0.569 mW/g; SAR(10 g) = 0.332 mW/g
Maximum value of SAR (measured) = 0.621 mW/g



0 dB = 0.621mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 3, 2012

DUT: VS840; Type: bar; Serial: #1

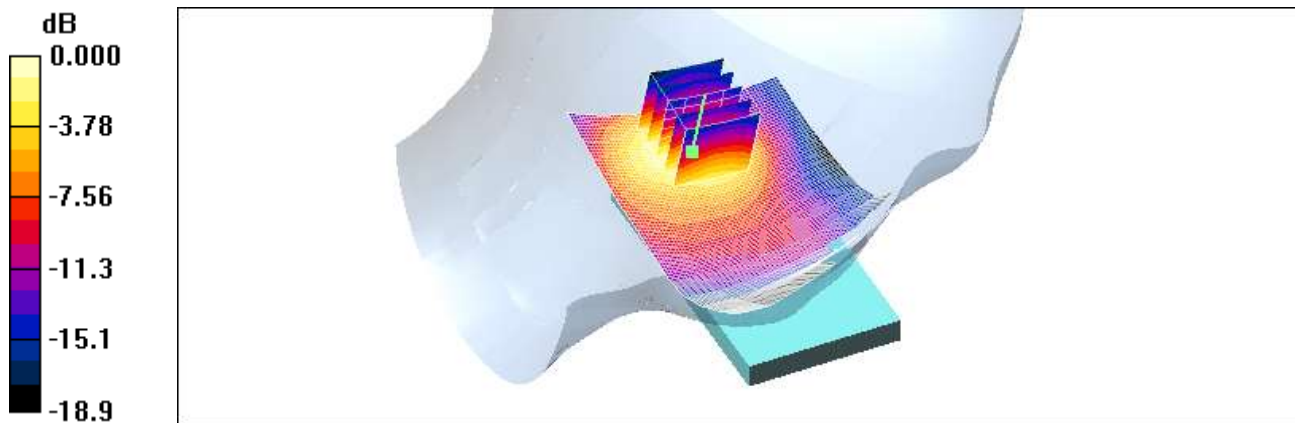
Communication System: PCS 1900MHz FCC; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.43 \text{ mho/m}$; $\epsilon_r = 39.2$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(5.17, 5.17, 5.17); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Left tilt 600 EVDO/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.585 mW/g

Left tilt 600 EVDO/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 20.4 V/m; Power Drift = 0.095 dB
Peak SAR (extrapolated) = 0.868 W/kg
SAR(1 g) = 0.524 mW/g; SAR(10 g) = 0.294 mW/g
Maximum value of SAR (measured) = 0.588 mW/g



0 dB = 0.588mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 3, 2012

DUT: VS840; Type: bar; Serial: #1

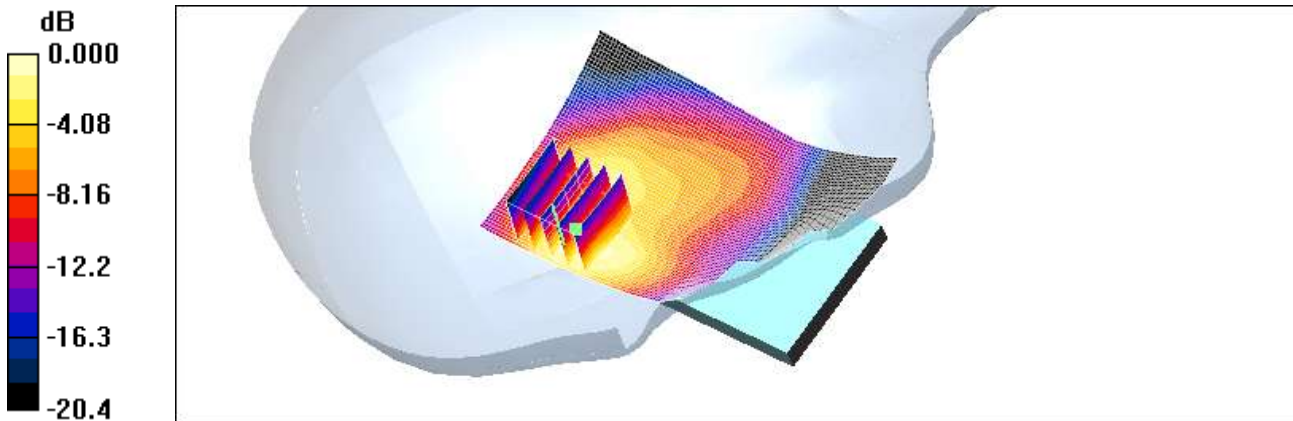
Communication System: PCS 1900MHz FCC; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.43 \text{ mho/m}$; $\epsilon_r = 39.2$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(5.17, 5.17, 5.17); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Right touch 600 EVDO/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.915 mW/g

Right touch 600 EVDO/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 17.0 V/m; Power Drift = 0.030 dB
Peak SAR (extrapolated) = 1.52 W/kg
SAR(1 g) = 0.761 mW/g; SAR(10 g) = 0.398 mW/g
Maximum value of SAR (measured) = 0.795 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 3, 2012

DUT: VS840; Type: bar; Serial: #1

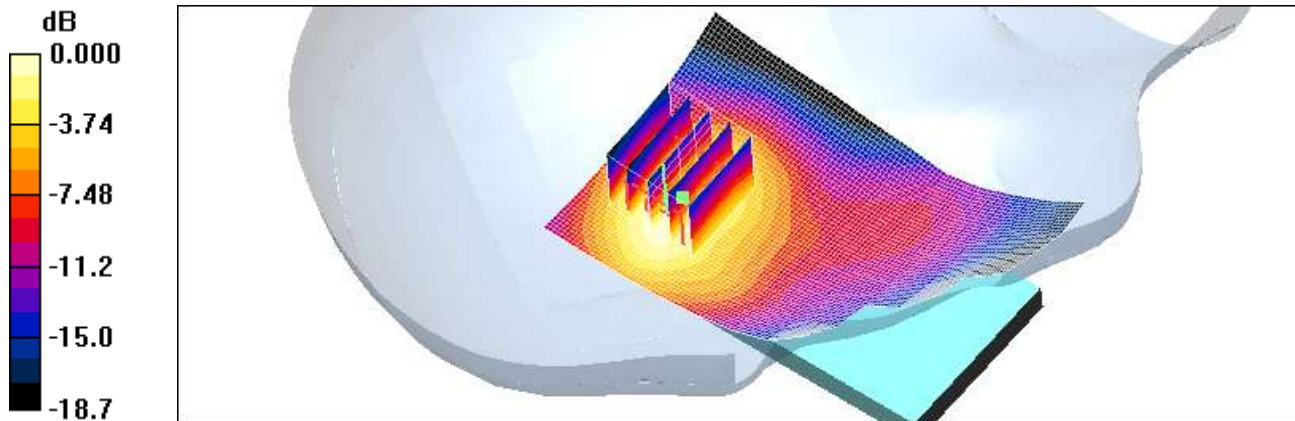
Communication System: PCS 1900MHz FCC; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.43 \text{ mho/m}$; $\epsilon_r = 39.2$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(5.17, 5.17, 5.17); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Right tilt 600 EVDO/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.587 mW/g

Right tilt 600 EVDO/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 18.3 V/m; Power Drift = -0.081 dB
Peak SAR (extrapolated) = 1.02 W/kg
SAR(1 g) = 0.538 mW/g; SAR(10 g) = 0.301 mW/g
Maximum value of SAR (measured) = 0.586 mW/g



0 dB = 0.586mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 3, 2012
Option: Wireless Charging Cover

DUT: VS840; Type: bar; Serial: #1

Communication System: PCS 1900MHz FCC; Frequency: 1908.75 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1908.75 \text{ MHz}$; $\sigma = 1.45 \text{ mho/m}$; $\epsilon_r = 39.1$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 – SN1630; ConvF(5.17, 5.17, 5.17); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Left touch 1175/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.857 mW/g

Left touch 1175/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 10.3 V/m; Power Drift = -0.124 dB

Peak SAR (extrapolated) = 1.31 W/kg

SAR(1 g) = 0.817 mW/g; SAR(10 g) = 0.483 mW/g

Maximum value of SAR (measured) = 0.855 mW/g

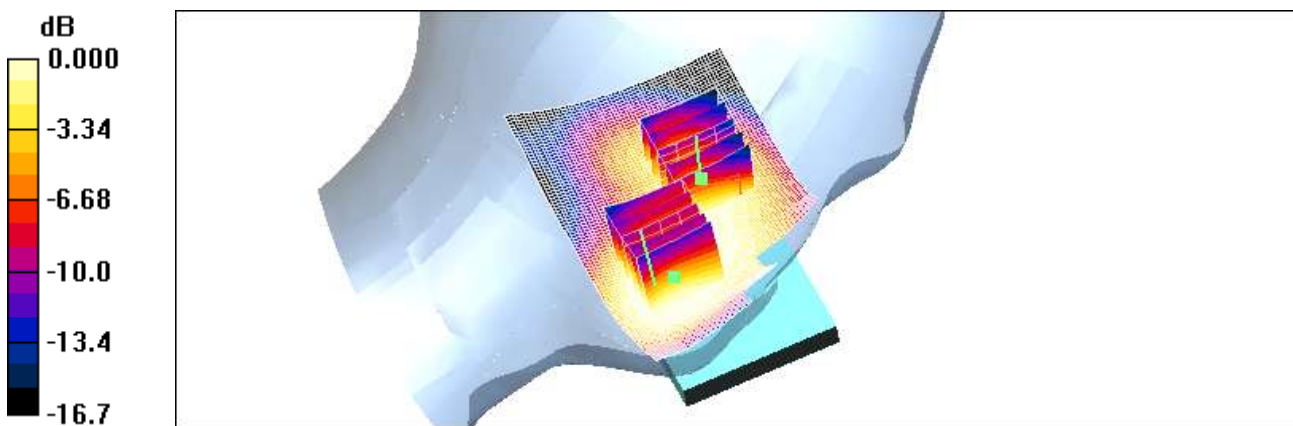
Left touch 1175/Zoom Scan (5x5x7)/Cube 1: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 10.3 V/m; Power Drift = -0.124 dB

Peak SAR (extrapolated) = 0.714 W/kg

SAR(1 g) = 0.492 mW/g; SAR(10 g) = 0.311 mW/g

Maximum value of SAR (measured) = 0.521 mW/g



0 dB = 0.521mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 8, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 782.5$ MHz; $\sigma = 0.894$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Left touch 23230 25RB 12 offset QPSK/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.209 mW/g

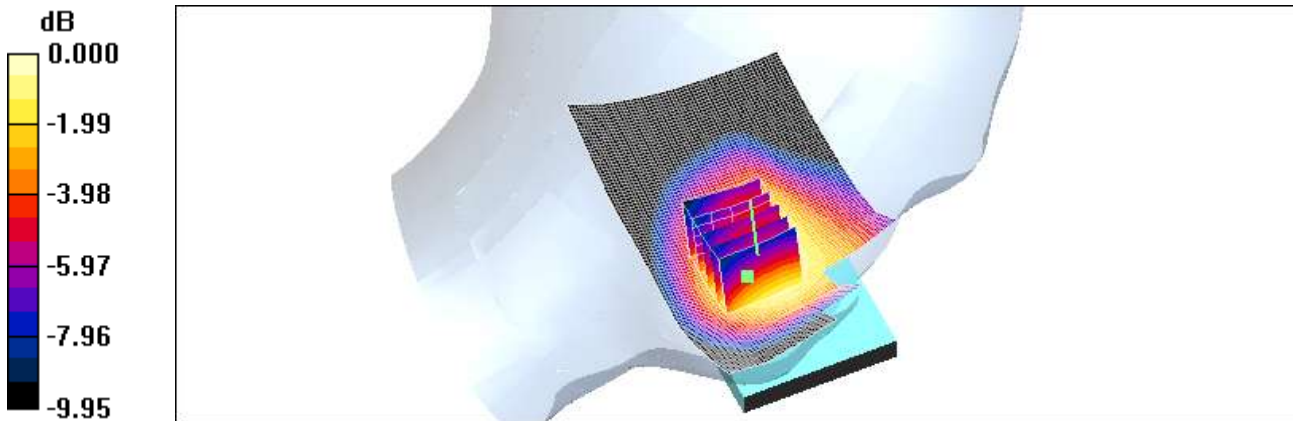
Left touch 23230 25RB 12 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.54 V/m; Power Drift = -0.067 dB

Peak SAR (extrapolated) = 0.244 W/kg

SAR(1 g) = 0.199 mW/g; SAR(10 g) = 0.149 mW/g

Maximum value of SAR (measured) = 0.210 mW/g



0 dB = 0.210mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 8, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 782.5$ MHz; $\sigma = 0.894$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

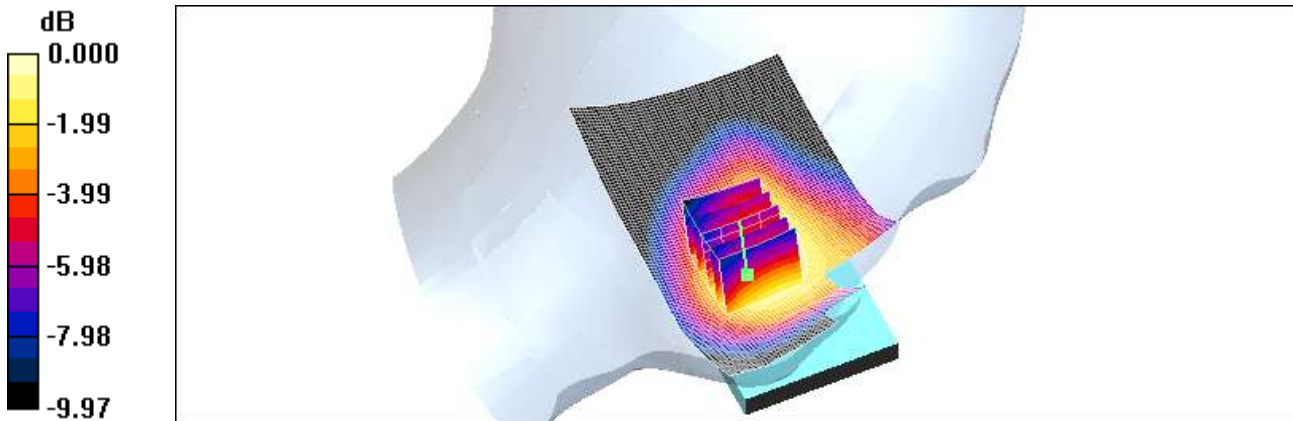
DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Left touch 23230 1RB 0 offset QPSK/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.288 mW/g

Left touch 23230 1RB 0 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.46 V/m; Power Drift = -0.010 dB
Peak SAR (extrapolated) = 0.330 W/kg
SAR(1 g) = 0.268 mW/g; SAR(10 g) = 0.202 mW/g

Maximum value of SAR (measured) = 0.280 mW/g



0 dB = 0.280mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 8, 2012

DUT: VS840; Type: bar; Serial: #1

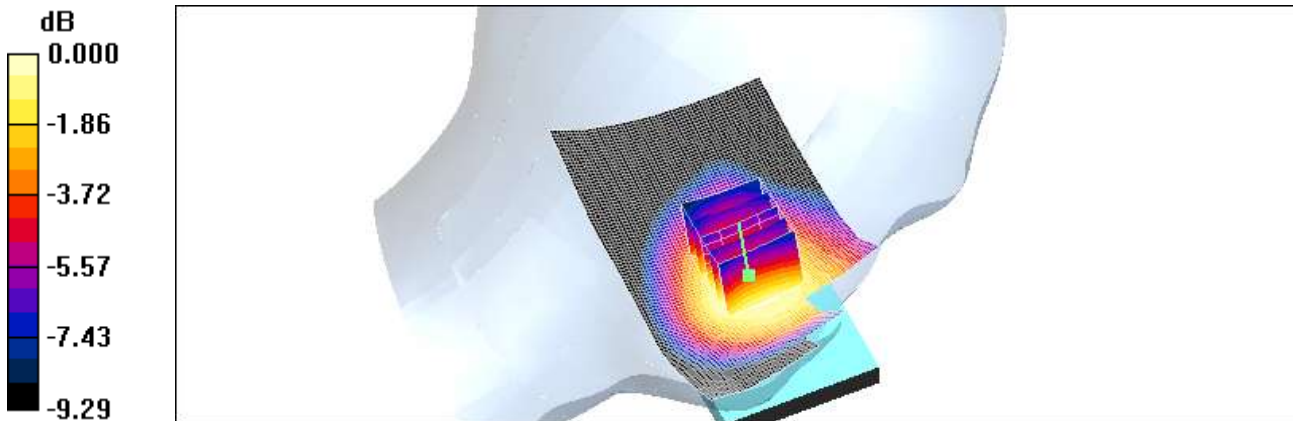
Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 782.5$ MHz; $\sigma = 0.894$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Left touch 23230 1RB 49 offset QPSK/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.244 mW/g

Left touch 23230 1RB 49 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.20 V/m; Power Drift = -0.012 dB
Peak SAR (extrapolated) = 0.290 W/kg
SAR(1 g) = 0.238 mW/g; SAR(10 g) = 0.178 mW/g
Maximum value of SAR (measured) = 0.249 mW/g



0 dB = 0.249mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 8, 2012

DUT: VS840; Type: bar; Serial: #1

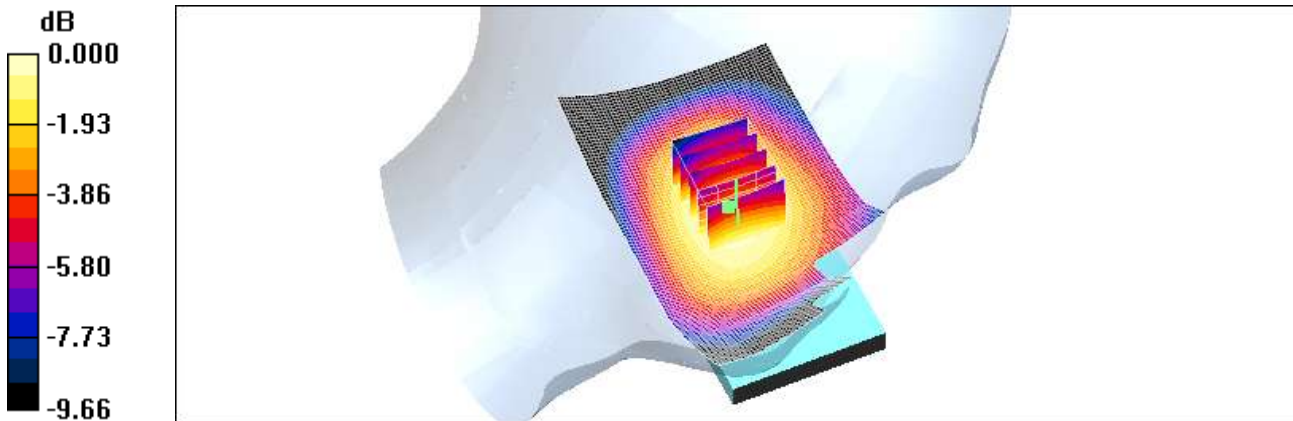
Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 782.5$ MHz; $\sigma = 0.894$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Left tilt 23230 25RB 12 offset QPSK/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.125 mW/g

Left tilt 23230 25RB 12 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.50 V/m; Power Drift = 0.078 dB
Peak SAR (extrapolated) = 0.138 W/kg
SAR(1 g) = 0.118 mW/g; SAR(10 g) = 0.093 mW/g
Maximum value of SAR (measured) = 0.124 mW/g



0 dB = 0.124mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 8, 2012

DUT: VS840; Type: bar; Serial: #1

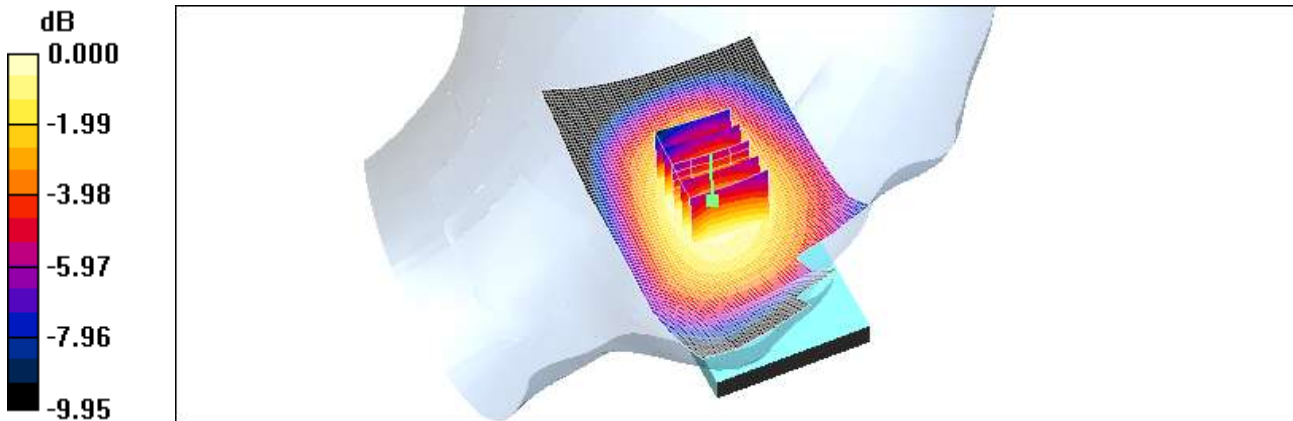
Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 782.5 \text{ MHz}$; $\sigma = 0.894 \text{ mho/m}$; $\epsilon_r = 41.7$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Left tilt 23230 1RB 0 offset QPSK/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.174 mW/g

Left tilt 23230 1RB 0 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 8.79 V/m; Power Drift = -0.003 dB
Peak SAR (extrapolated) = 0.193 W/kg
SAR(1 g) = 0.162 mW/g; SAR(10 g) = 0.126 mW/g
Maximum value of SAR (measured) = 0.168 mW/g



0 dB = 0.168mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 8, 2012

DUT: VS840; Type: bar; Serial: #1

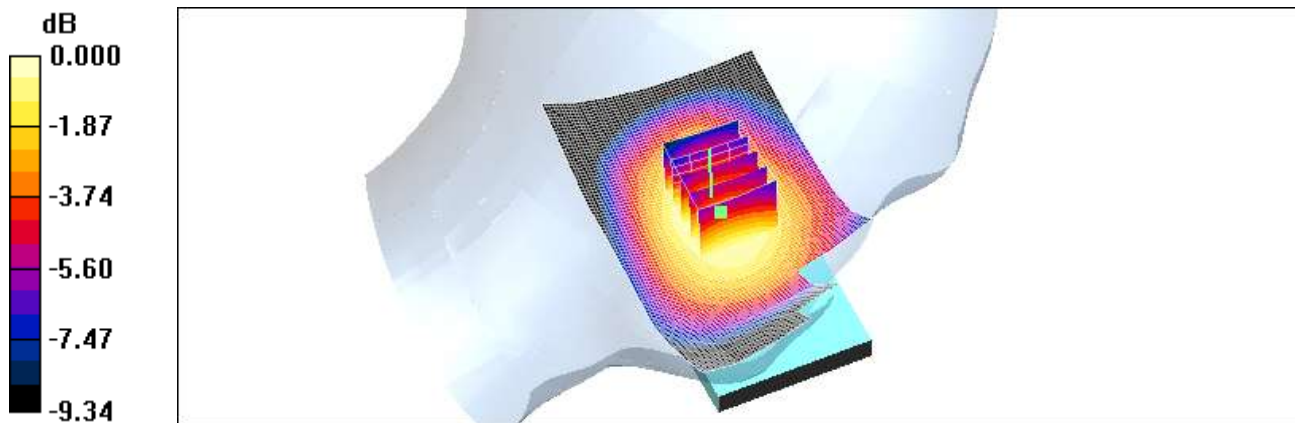
Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 782.5 \text{ MHz}$; $\sigma = 0.894 \text{ mho/m}$; $\epsilon_r = 41.7$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Left tilt 23230 1RB 49 offset QPSK/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.135 mW/g

Left tilt 23230 1RB 49 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 8.04 V/m; Power Drift = 0.001 dB
Peak SAR (extrapolated) = 0.156 W/kg
SAR(1 g) = 0.131 mW/g; SAR(10 g) = 0.102 mW/g
Maximum value of SAR (measured) = 0.136 mW/g



0 dB = 0.136mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 8, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 782.5$ MHz; $\sigma = 0.894$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Right touch 23230 25RB 12 offset QPSK/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.287 mW/g

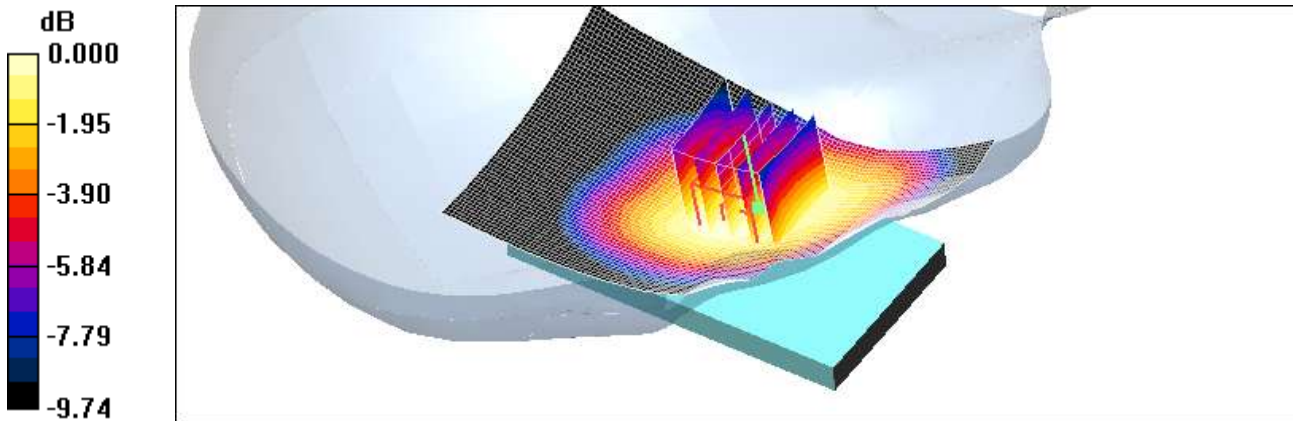
Right touch 23230 25RB 12 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.96 V/m; Power Drift = -0.131 dB

Peak SAR (extrapolated) = 0.329 W/kg

SAR(1 g) = 0.269 mW/g; SAR(10 g) = 0.201 mW/g

Maximum value of SAR (measured) = 0.279 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 8, 2012

DUT: VS840; Type: bar; Serial: #1

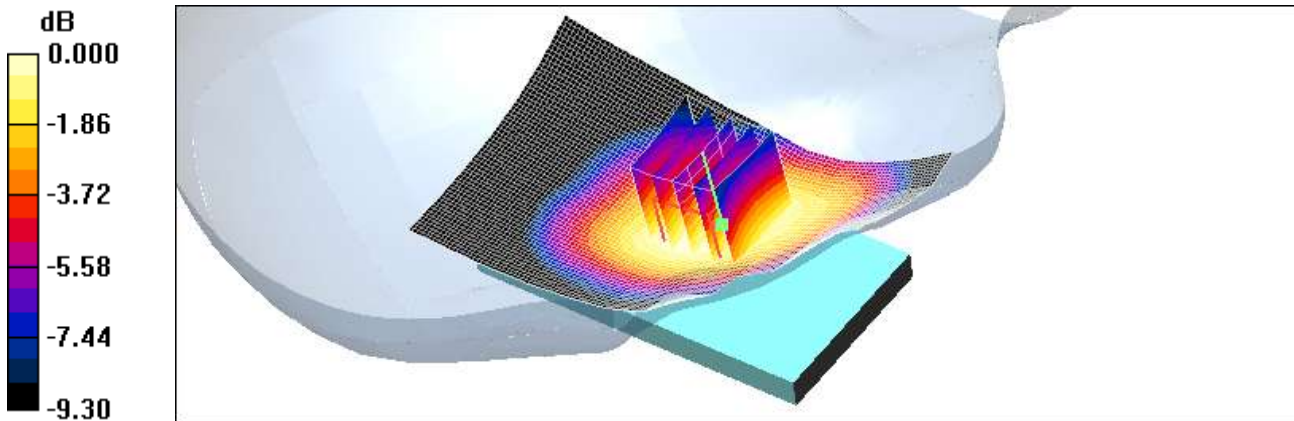
Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 782.5$ MHz; $\sigma = 0.894$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Right touch 23230 1RB 0 offset QPSK/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.371 mW/g

Right touch 23230 1RB 0 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.80 V/m; Power Drift = -0.052 dB
Peak SAR (extrapolated) = 0.417 W/kg
SAR(1 g) = 0.343 mW/g; SAR(10 g) = 0.258 mW/g
Maximum value of SAR (measured) = 0.360 mW/g



0 dB = 0.360mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 8, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 782.5 \text{ MHz}$; $\sigma = 0.894 \text{ mho/m}$; $\epsilon_r = 41.7$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Right touch 23230 1RB 49 offset QPSK/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.353 mW/g

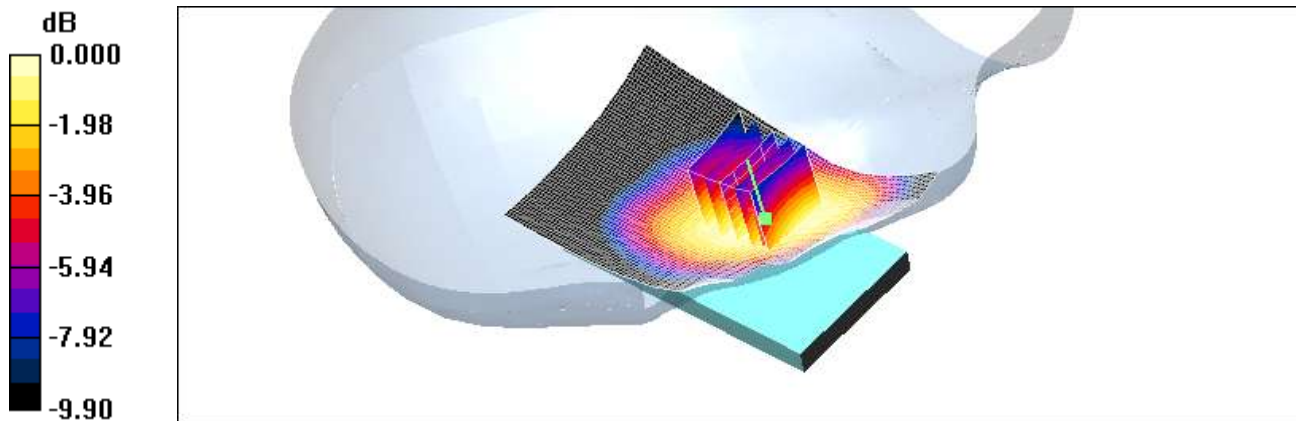
Right touch 23230 1RB 49 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 5.38 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.423 W/kg

SAR(1 g) = 0.327 mW/g; SAR(10 g) = 0.242 mW/g

Maximum value of SAR (measured) = 0.345 mW/g



0 dB = 0.345mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 8, 2012

DUT: VS840; Type: bar; Serial: #1

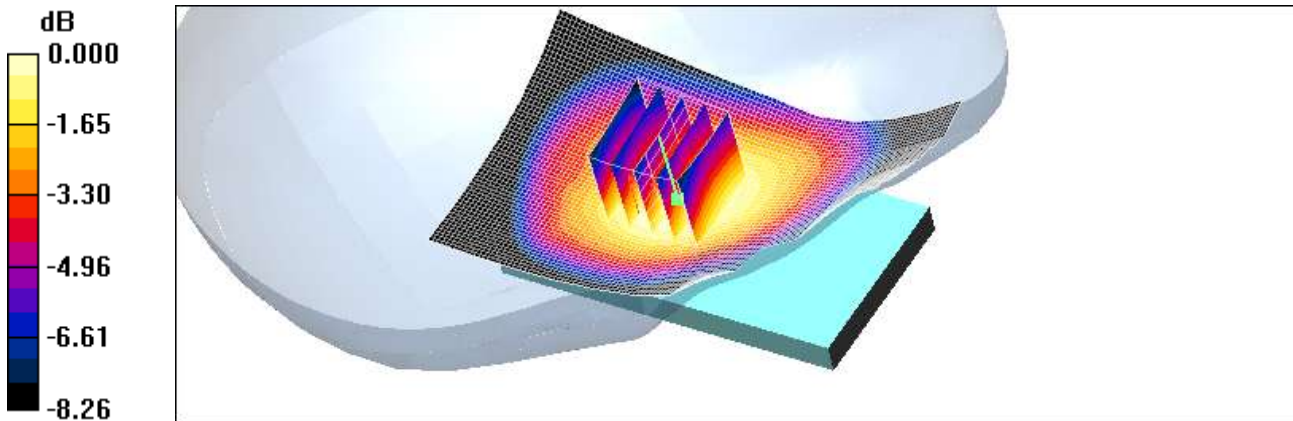
Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 782.5$ MHz; $\sigma = 0.894$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Right tilt 23230 25RB 12 offset QPSK/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.168 mW/g

Right tilt 23230 25RB 12 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.00 V/m; Power Drift = -0.023 dB
Peak SAR (extrapolated) = 0.181 W/kg
SAR(1 g) = 0.155 mW/g; SAR(10 g) = 0.119 mW/g
Maximum value of SAR (measured) = 0.162 mW/g



0 dB = 0.162mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 8, 2012

DUT: VS840; Type: bar; Serial: #1

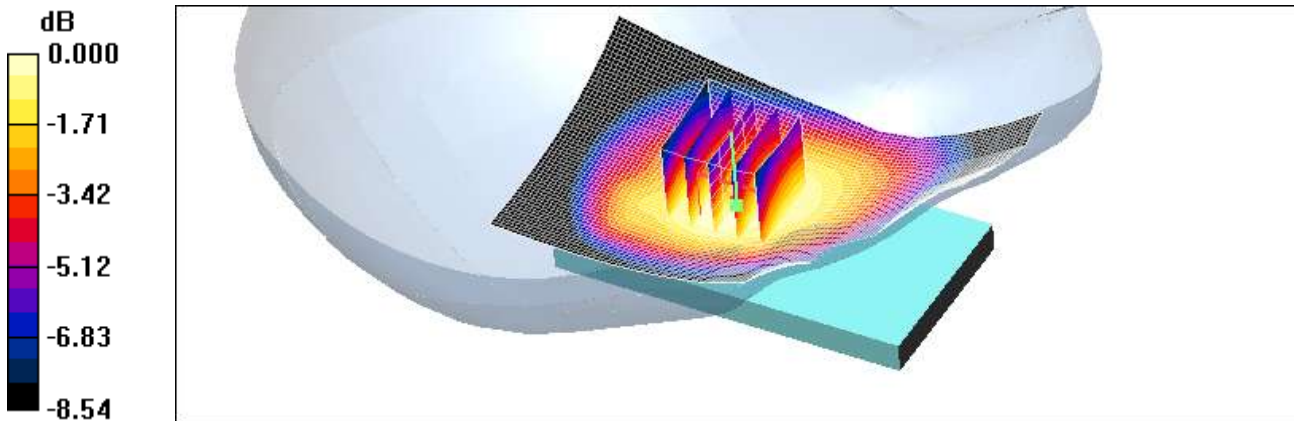
Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 782.5$ MHz; $\sigma = 0.894$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Right tilt 23230 1RB 0 offset QPSK/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.224 mW/g

Right tilt 23230 1RB 0 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.64 V/m; Power Drift = -0.097 dB
Peak SAR (extrapolated) = 0.247 W/kg
SAR(1 g) = 0.211 mW/g; SAR(10 g) = 0.163 mW/g
Maximum value of SAR (measured) = 0.219 mW/g



0 dB = 0.219mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 8, 2012

DUT: VS840; Type: bar; Serial: #1

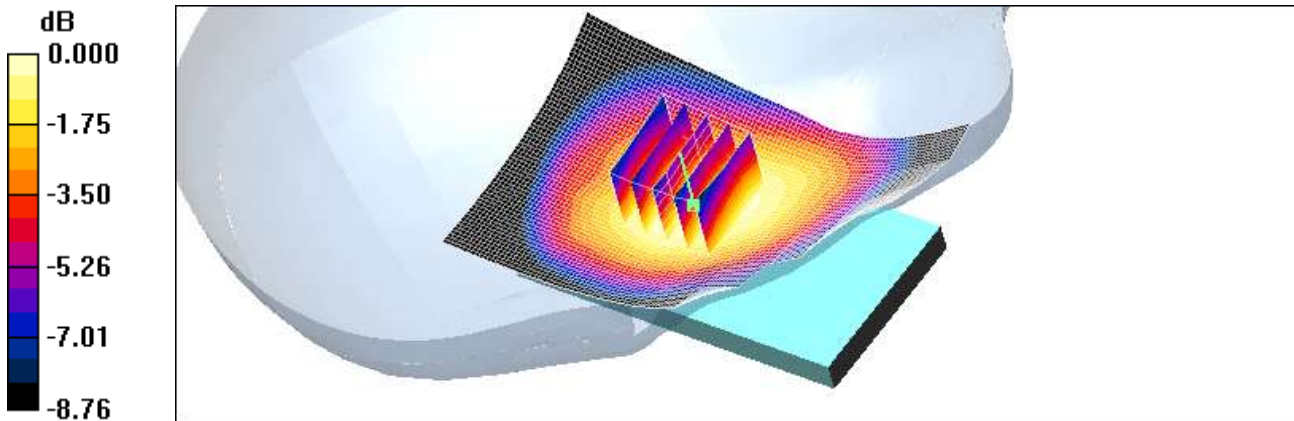
Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 782.5$ MHz; $\sigma = 0.894$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Right tilt 23230 1RB 49 offset QPSK/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.177 mW/g

Right tilt 23230 1RB 49 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.02 V/m; Power Drift = -0.094 dB
Peak SAR (extrapolated) = 0.197 W/kg
SAR(1 g) = 0.167 mW/g; SAR(10 g) = 0.129 mW/g
Maximum value of SAR (measured) = 0.175 mW/g



0 dB = 0.175mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 8, 2012
Option: Wireless Charging Cover

DUT: VS840; Type: bar; Serial: #1

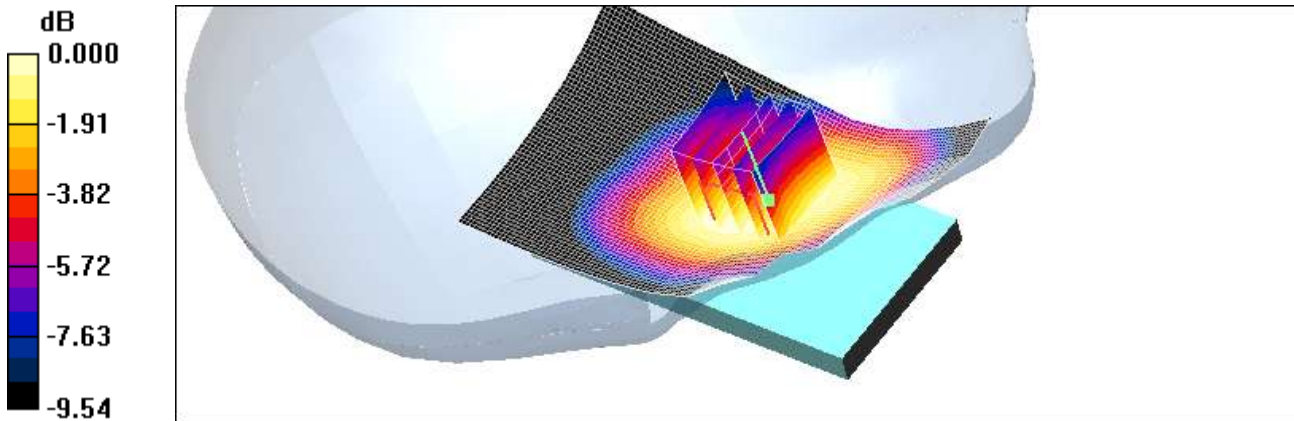
Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 782.5$ MHz; $\sigma = 0.894$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Right touch 23230 1RB 0 offset QPSK/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.375 mW/g

Right touch 23230 1RB 0 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.72 V/m; Power Drift = -0.045 dB
Peak SAR (extrapolated) = 0.436 W/kg
SAR(1 g) = 0.347 mW/g; SAR(10 g) = 0.263 mW/g
Maximum value of SAR (measured) = 0.362 mW/g



0 dB = 0.362mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 8, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 782.5$ MHz; $\sigma = 0.894$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Left touch 23230 25RB 12 offset 16QAM/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.152 mW/g

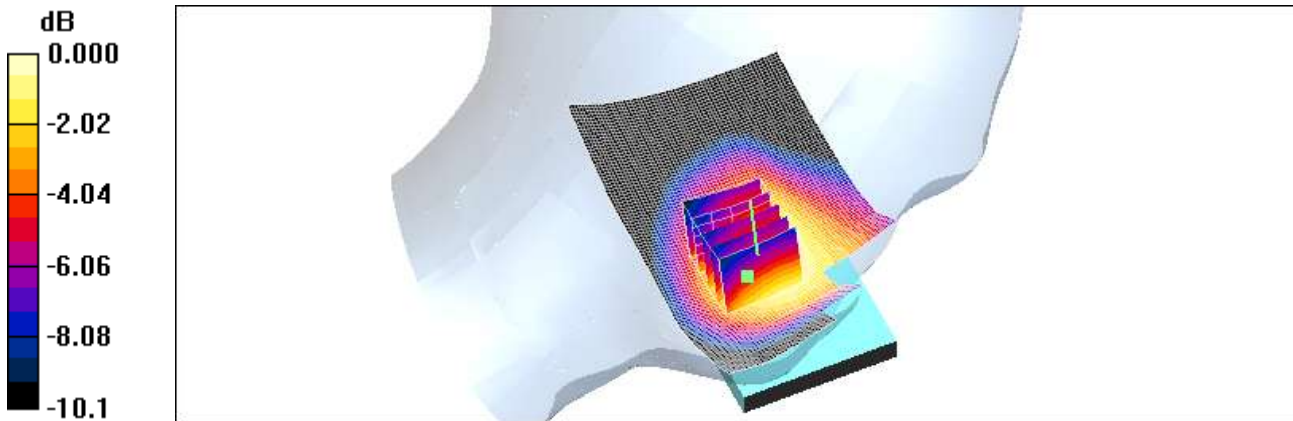
Left touch 23230 25RB 12 offset 16QAM/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.85 V/m; Power Drift = -0.080 dB

Peak SAR (extrapolated) = 0.184 W/kg

SAR(1 g) = 0.149 mW/g; SAR(10 g) = 0.111 mW/g

Maximum value of SAR (measured) = 0.157 mW/g



0 dB = 0.157mW/g

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
 Liquid Temperature: 21.3 °C
 Ambient Temperature: 21.5 °C
 Test Date: Feb. 8, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 782.5 \text{ MHz}$; $\sigma = 0.894 \text{ mho/m}$; $\epsilon_r = 41.7$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Left touch 23230 1RB 0 offset 16QAM/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
 Maximum value of SAR (interpolated) = 0.200 mW/g

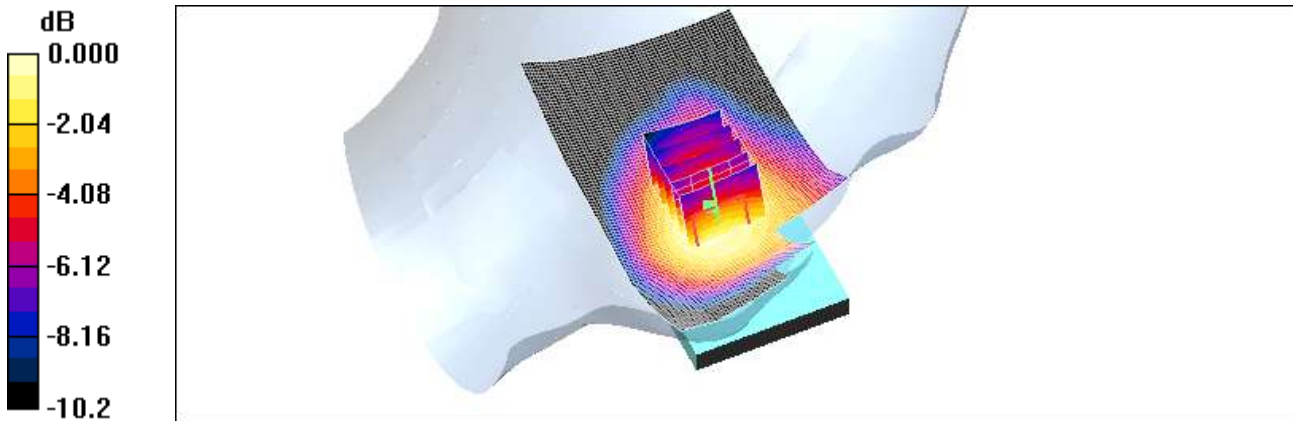
Left touch 23230 1RB 0 offset 16QAM/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 4.96 V/m; Power Drift = -0.053 dB

Peak SAR (extrapolated) = 0.241 W/kg

SAR(1 g) = 0.195 mW/g; SAR(10 g) = 0.145 mW/g

Maximum value of SAR (measured) = 0.210 mW/g



0 dB = 0.210mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 8, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 782.5$ MHz; $\sigma = 0.894$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Left touch 23230 1RB 49 offset 16QAM/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.180 mW/g

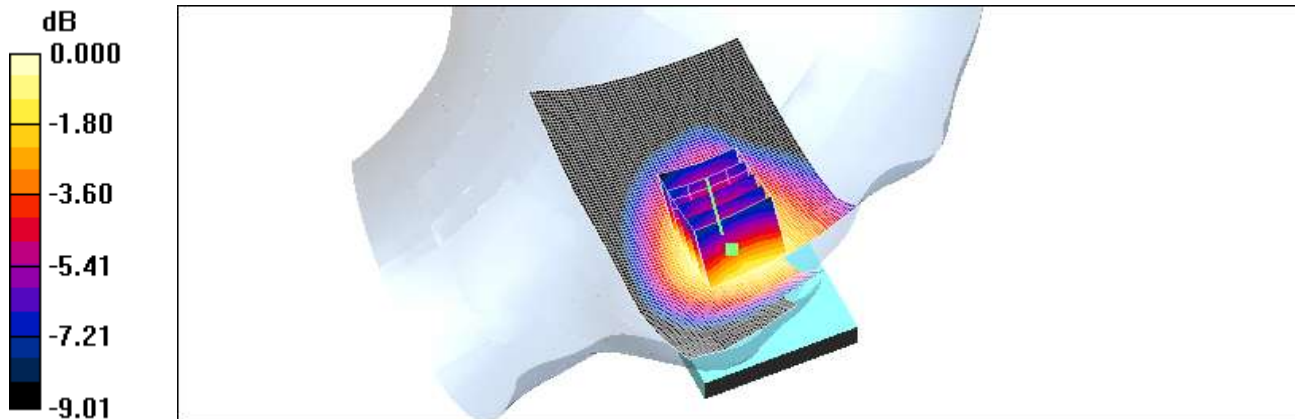
Left touch 23230 1RB 49 offset 16QAM/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.02 V/m; Power Drift = -0.016 dB

Peak SAR (extrapolated) = 0.212 W/kg

SAR(1 g) = 0.172 mW/g; SAR(10 g) = 0.127 mW/g

Maximum value of SAR (measured) = 0.181 mW/g



0 dB = 0.181mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 8, 2012

DUT: VS840; Type: bar; Serial: #1

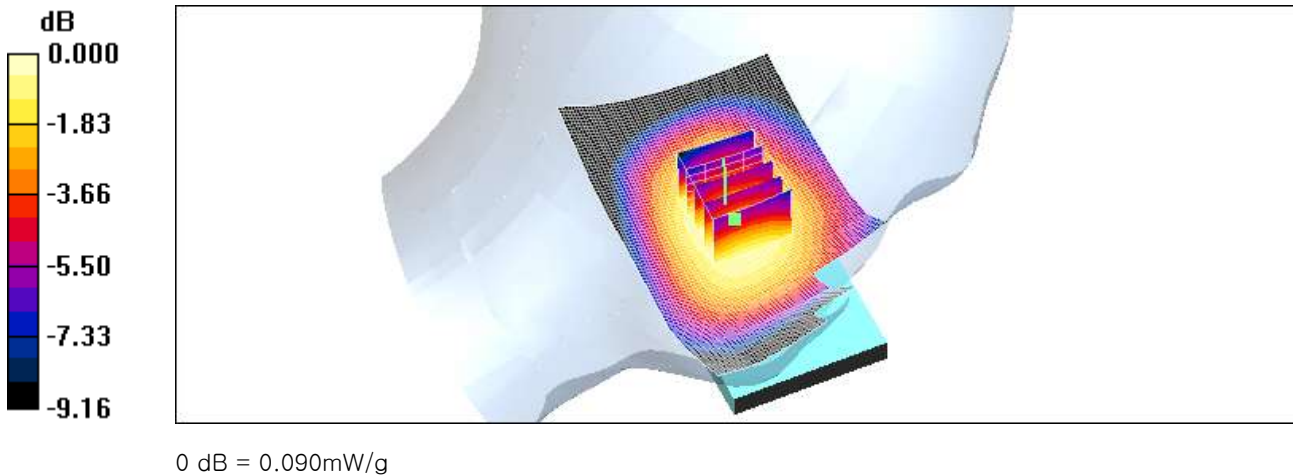
Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 782.5$ MHz; $\sigma = 0.894$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Left tilt 23230 25RB 12 offset 16QAM/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.092 mW/g

Left tilt 23230 25RB 12 offset 16QAM/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.47 V/m; Power Drift = -0.003 dB
Peak SAR (extrapolated) = 0.103 W/kg
SAR(1 g) = 0.087 mW/g; SAR(10 g) = 0.068 mW/g
Maximum value of SAR (measured) = 0.090 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 8, 2012

DUT: VS840; Type: bar; Serial: #1

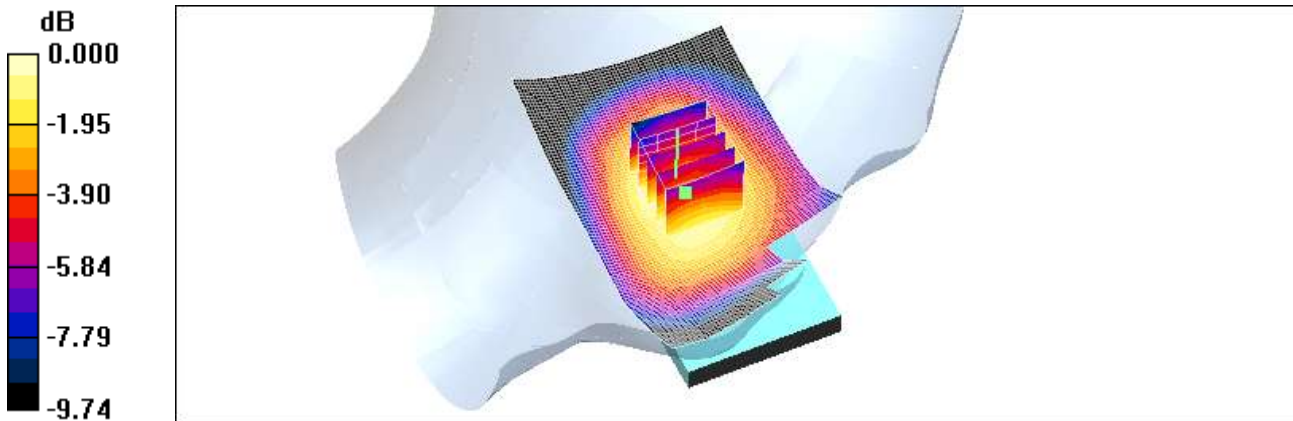
Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 782.5 \text{ MHz}$; $\sigma = 0.894 \text{ mho/m}$; $\epsilon_r = 41.7$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Left tilt 23230 1RB 0 offset 16QAM/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.131 mW/g

Left tilt 23230 1RB 0 offset 16QAM/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.70 V/m; Power Drift = -0.017 dB
Peak SAR (extrapolated) = 0.161 W/kg
SAR(1 g) = 0.123 mW/g; SAR(10 g) = 0.094 mW/g
Maximum value of SAR (measured) = 0.130 mW/g



0 dB = 0.130mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 8, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 782.5 \text{ MHz}$; $\sigma = 0.894 \text{ mho/m}$; $\epsilon_r = 41.7$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

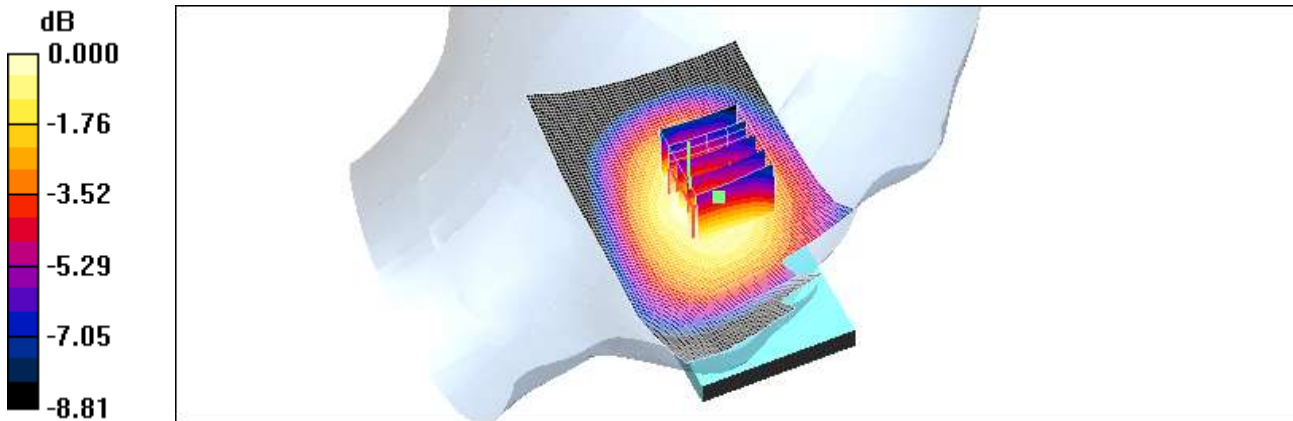
DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Left tilt 23230 1RB 49 offset 16QAM/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.099 mW/g

Left tilt 23230 1RB 49 offset 16QAM/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 6.74 V/m; Power Drift = -0.152 dB
Peak SAR (extrapolated) = 0.111 W/kg
SAR(1 g) = 0.094 mW/g; SAR(10 g) = 0.073 mW/g

Maximum value of SAR (measured) = 0.099 mW/g



0 dB = 0.099mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 8, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 782.5$ MHz; $\sigma = 0.894$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Right touch 23230 25RB 12 offset 16QAM/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.204 mW/g

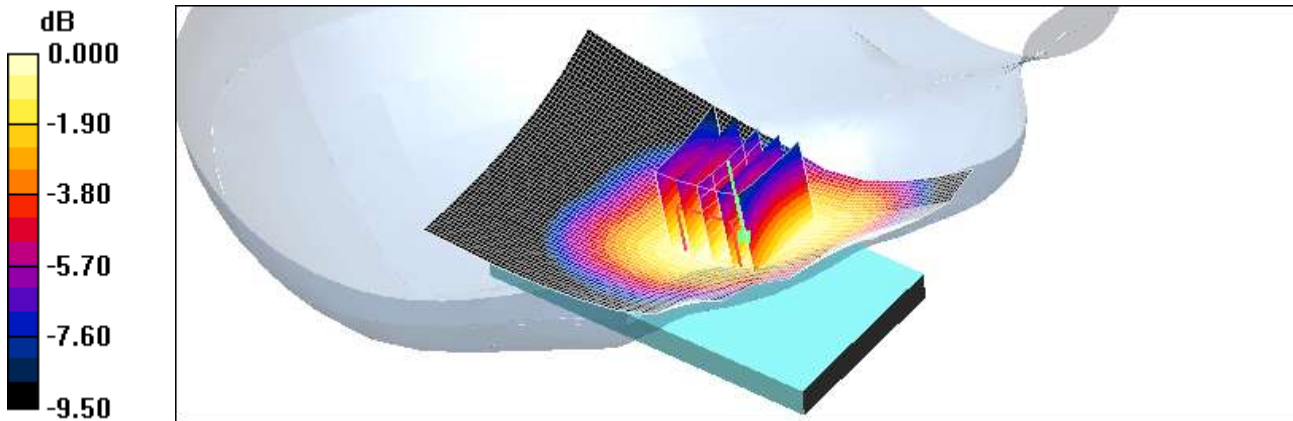
Right touch 23230 25RB 12 offset 16QAM/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.06 V/m; Power Drift = -0.176 dB

Peak SAR (extrapolated) = 0.238 W/kg

SAR(1 g) = 0.190 mW/g; SAR(10 g) = 0.141 mW/g

Maximum value of SAR (measured) = 0.198 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 8, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 782.5$ MHz; $\sigma = 0.894$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Right touch 23230 1RB 0 offset 16QAM/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.303 mW/g

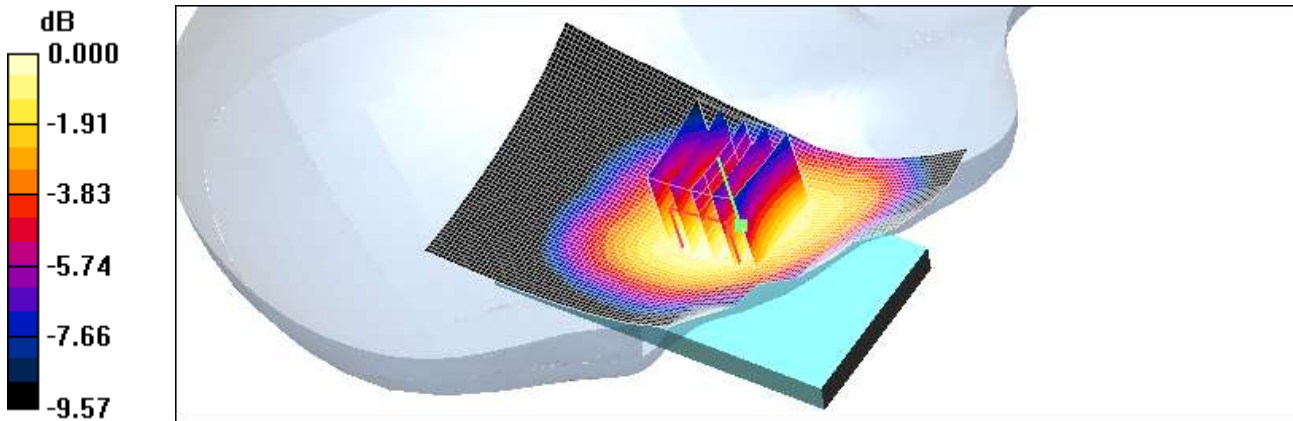
Right touch 23230 1RB 0 offset 16QAM/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.27 V/m; Power Drift = 0.023 dB

Peak SAR (extrapolated) = 0.349 W/kg

SAR(1 g) = 0.285 mW/g; SAR(10 g) = 0.214 mW/g

Maximum value of SAR (measured) = 0.298 mW/g



0 dB = 0.298mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 8, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 782.5$ MHz; $\sigma = 0.894$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Right touch 23230 1RB 49 offset 16QAM/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.287 mW/g

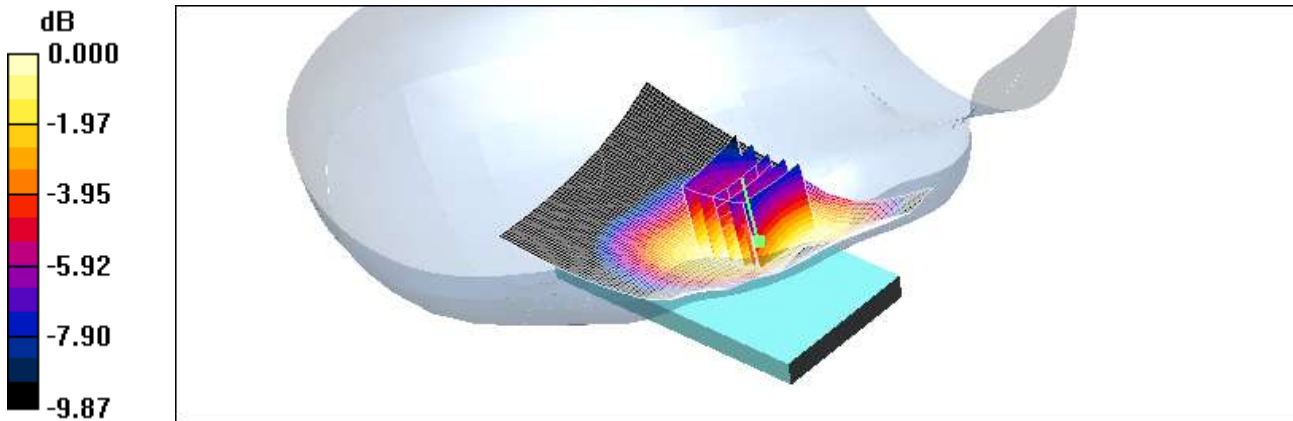
Right touch 23230 1RB 49 offset 16QAM/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.88 V/m; Power Drift = -0.176 dB

Peak SAR (extrapolated) = 0.343 W/kg

SAR(1 g) = 0.266 mW/g; SAR(10 g) = 0.197 mW/g

Maximum value of SAR (measured) = 0.281 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 8, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 782.5$ MHz; $\sigma = 0.894$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Right tilt 23230 25RB 12 offset 16QAM/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.118 mW/g

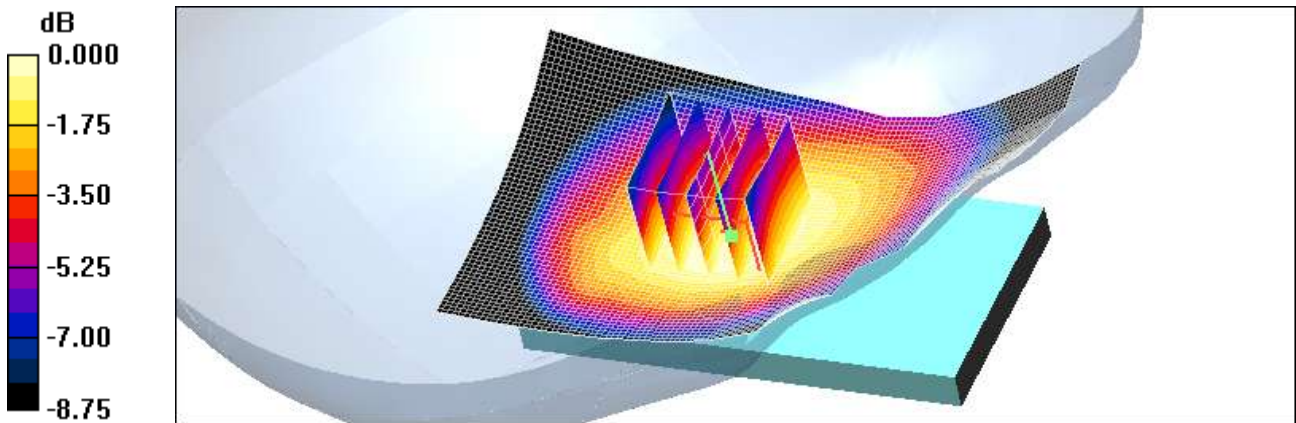
Right tilt 23230 25RB 12 offset 16QAM/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.23 V/m; Power Drift = -0.063 dB

Peak SAR (extrapolated) = 0.132 W/kg

SAR(1 g) = 0.111 mW/g; SAR(10 g) = 0.085 mW/g

Maximum value of SAR (measured) = 0.115 mW/g



0 dB = 0.115mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 8, 2012

DUT: VS840; Type: bar; Serial: #1

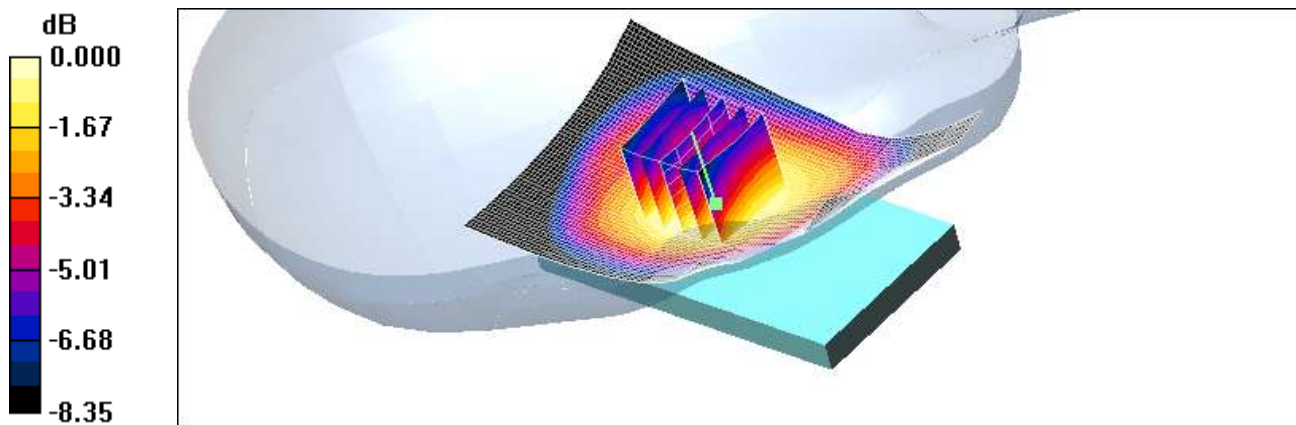
Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 782.5$ MHz; $\sigma = 0.894$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Right tilt 23230 1RB 0 offset 16QAM/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.168 mW/g

Right tilt 23230 1RB 0 offset 16QAM/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.52 V/m; Power Drift = -0.050 dB
Peak SAR (extrapolated) = 0.184 W/kg
SAR(1 g) = 0.155 mW/g; SAR(10 g) = 0.119 mW/g
Maximum value of SAR (measured) = 0.167 mW/g



0 dB = 0.167mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 8, 2012

DUT: VS840; Type: bar; Serial: #1

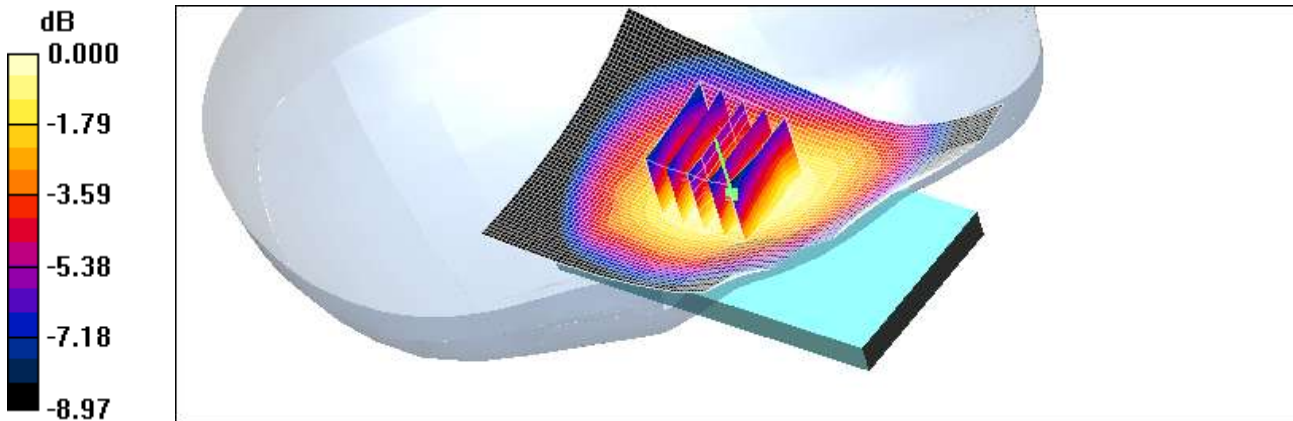
Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 782.5$ MHz; $\sigma = 0.894$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Right tilt 23230 1RB 49 offset 16QAM/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.128 mW/g

Right tilt 23230 1RB 49 offset 16QAM/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.80 V/m; Power Drift = -0.097 dB
Peak SAR (extrapolated) = 0.146 W/kg
SAR(1 g) = 0.120 mW/g; SAR(10 g) = 0.091 mW/g
Maximum value of SAR (measured) = 0.127 mW/g



0 dB = 0.127mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 10, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.84$ mho/m; $\epsilon_r = 38.7$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.57, 4.57, 4.57); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: SAM 1800/1900 MHz; Type: SAM

Left touch 6/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

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

Left touch 6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

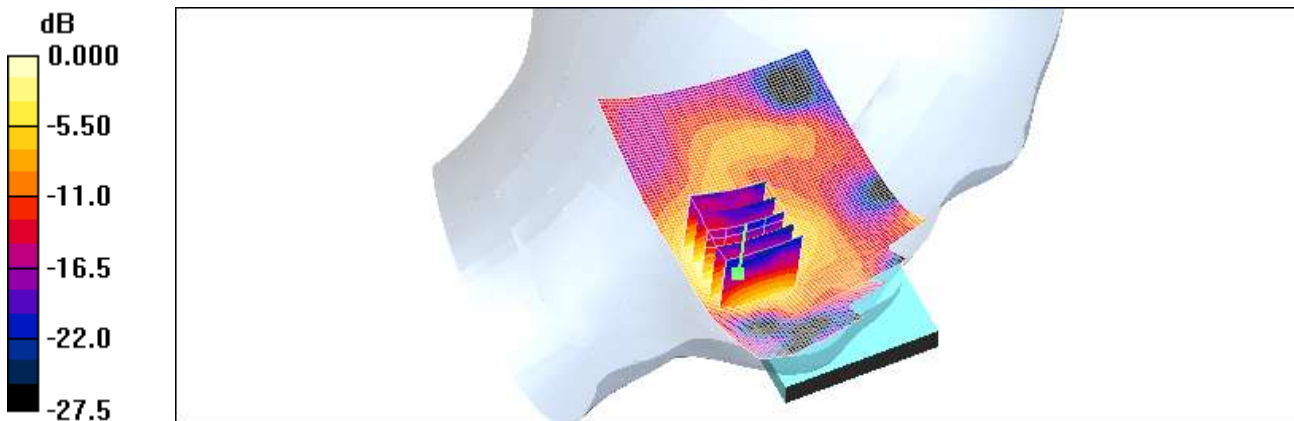
Reference Value = 2.96 V/m; Power Drift = -0.007 dB

Peak SAR (extrapolated) = 0.270 W/kg

SAR(1 g) = 0.104 mW/g; SAR(10 g) = 0.049 mW/g

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

Maximum value of SAR (measured) = 0.111 mW/g



0 dB = 0.111mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 10, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2437 \text{ MHz}$; $\sigma = 1.84 \text{ mho/m}$; $\epsilon_r = 38.7$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.57, 4.57, 4.57); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: SAM 1800/1900 MHz; Type: SAM

Left tilt 6/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.032 mW/g

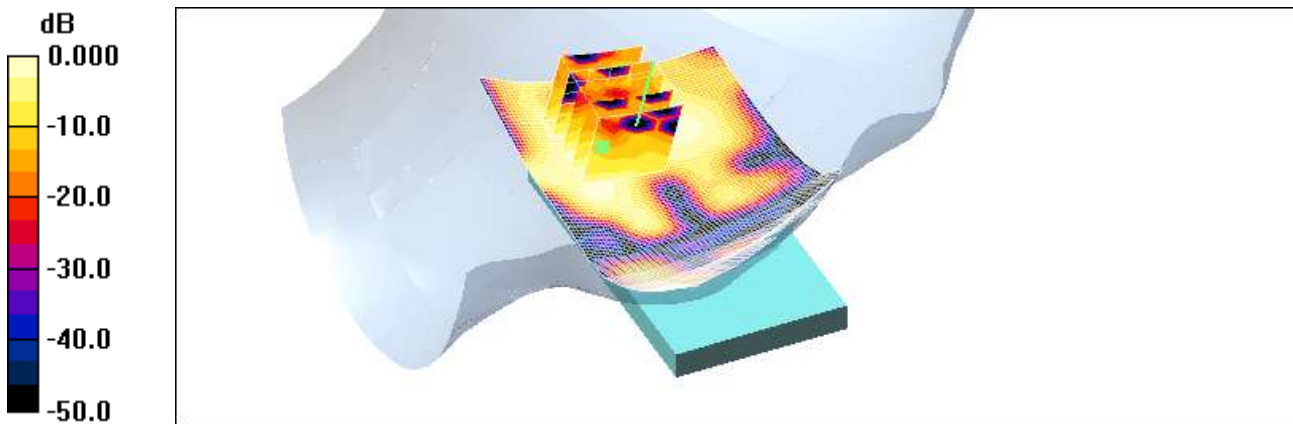
Left tilt 6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 4.03 V/m; Power Drift = -0.024 dB

Peak SAR (extrapolated) = 0.048 W/kg

SAR(1 g) = 0.026 mW/g; SAR(10 g) = 0.012 mW/g

Maximum value of SAR (measured) = 0.031 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 10, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.84$ mho/m; $\epsilon_r = 38.7$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.57, 4.57, 4.57); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right touch 6/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.131 mW/g

Right touch 6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

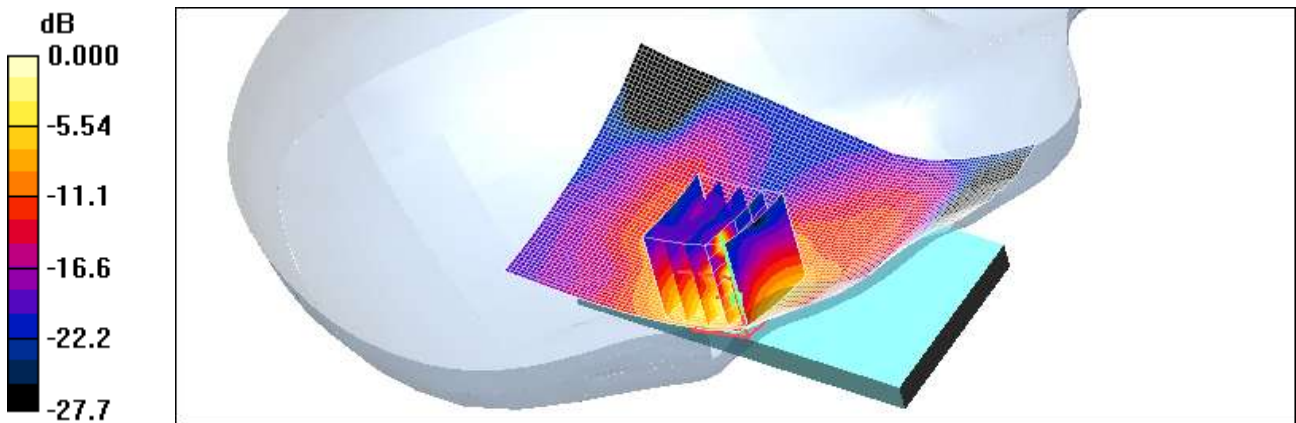
Reference Value = 2.26 V/m; Power Drift = 0.067 dB

Peak SAR (extrapolated) = 0.251 W/kg

SAR(1 g) = 0.111 mW/g; SAR(10 g) = 0.061 mW/g

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

Maximum value of SAR (measured) = 0.241 mW/g



0 dB = 0.241mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 10, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.84$ mho/m; $\epsilon_r = 38.7$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.57, 4.57, 4.57); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right tilt 6/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.228 mW/g

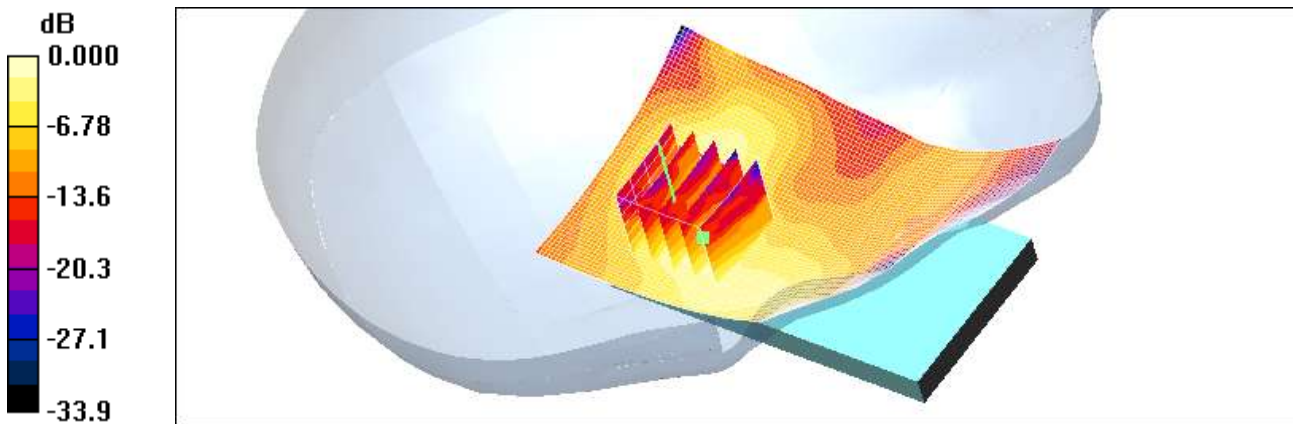
Right tilt 6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.05 V/m; Power Drift = -0.060 dB

Peak SAR (extrapolated) = 0.076 W/kg

SAR(1 g) = 0.041 mW/g; SAR(10 g) = 0.018 mW/g

Maximum value of SAR (measured) = 0.045 mW/g



0 dB = 0.045mW/g

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
 Liquid Temperature: 21.3 °C
 Ambient Temperature: 21.5 °C
 Test Date: Feb. 10, 2012
 Option: Wireless Charging Cover

DUT: VS840; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2437 MHz; Duty Cycle: 1:1
 Medium parameters used (interpolated): $f = 2437 \text{ MHz}$; $\sigma = 1.84 \text{ mho/m}$; $\epsilon_r = 38.7$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.57, 4.57, 4.57); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right touch 6/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.056 mW/g

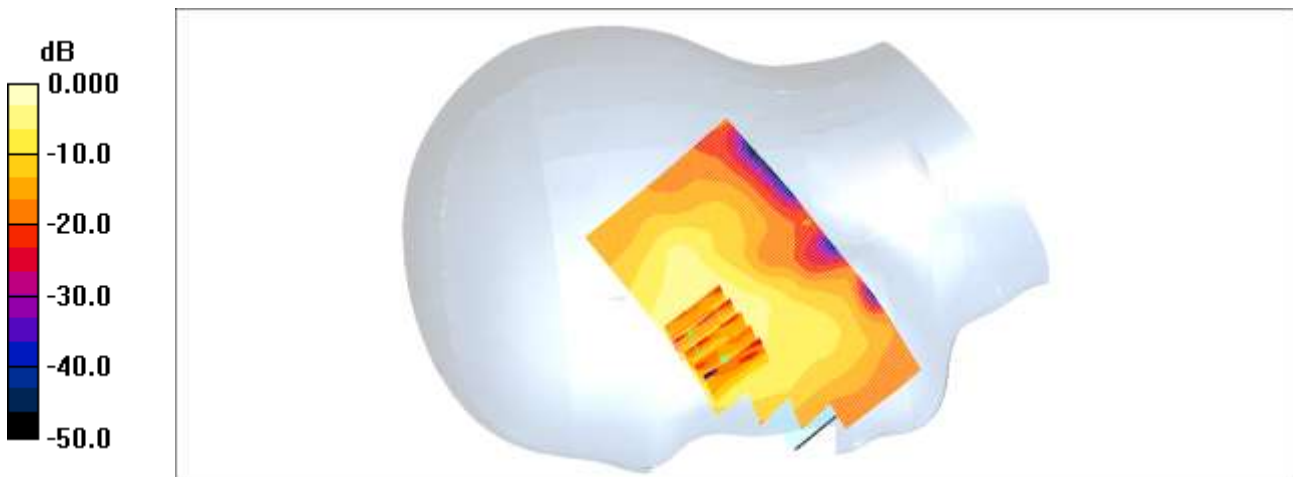
Right touch 6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 1.84 V/m; Power Drift = -0.136 dB

Peak SAR (extrapolated) = 0.153 W/kg

SAR(1 g) = 0.065 mW/g; SAR(10 g) = 0.030 mW/g

Maximum value of SAR (measured) = 0.073 mW/g



0 dB = 0.073mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 3, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.52 \text{ MHz}$; $\sigma = 0.992 \text{ mho/m}$; $\epsilon_r = 54.4$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body rear 384 1xRTT/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.849 mW/g

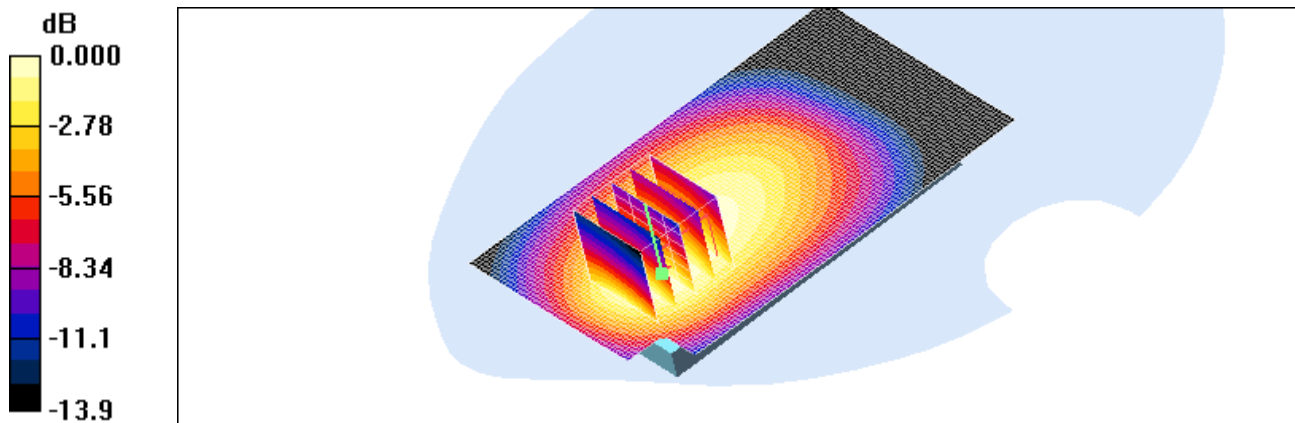
Body rear 384 1xRTT/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.02 V/m; Power Drift = 0.021 dB

Peak SAR (extrapolated) = 1.21 W/kg

SAR(1 g) = 0.767 mW/g; SAR(10 g) = 0.537 mW/g

Maximum value of SAR (measured) = 0.816 mW/g



0 dB = 0.816mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 3, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.52 \text{ MHz}$; $\sigma = 0.992 \text{ mho/m}$; $\epsilon_r = 54.4$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body front 384 1xRTT/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.409 mW/g

Body front 384 1xRTT/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

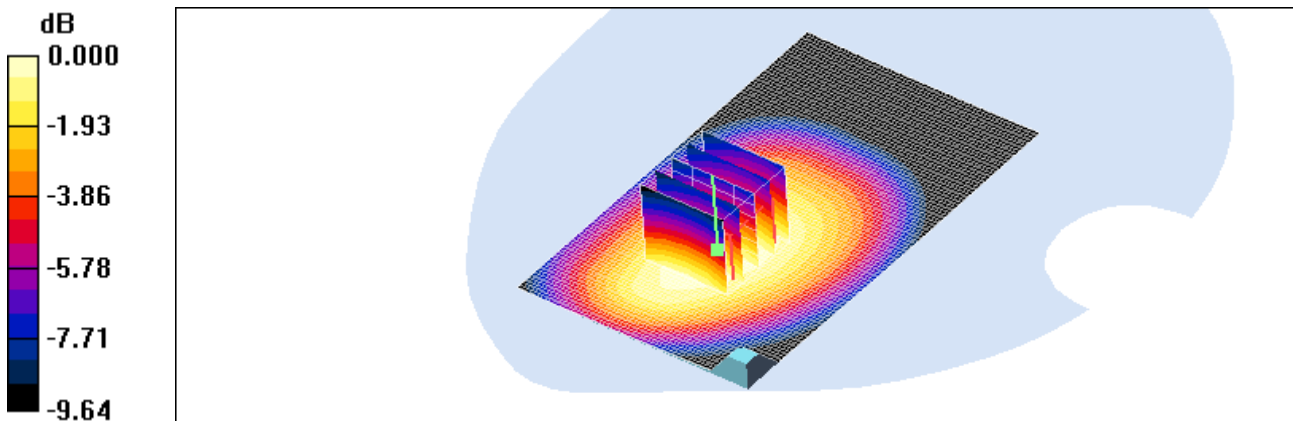
Reference Value = 6.96 V/m; Power Drift = 0.041 dB

Peak SAR (extrapolated) = 0.486 W/kg

SAR(1 g) = 0.389 mW/g; SAR(10 g) = 0.288 mW/g

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

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



0 dB = 0.410mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 3, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.52 \text{ MHz}$; $\sigma = 0.992 \text{ mho/m}$; $\epsilon_r = 54.4$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body rear 384 EVDO/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.672 mW/g

Body rear 384 EVDO/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

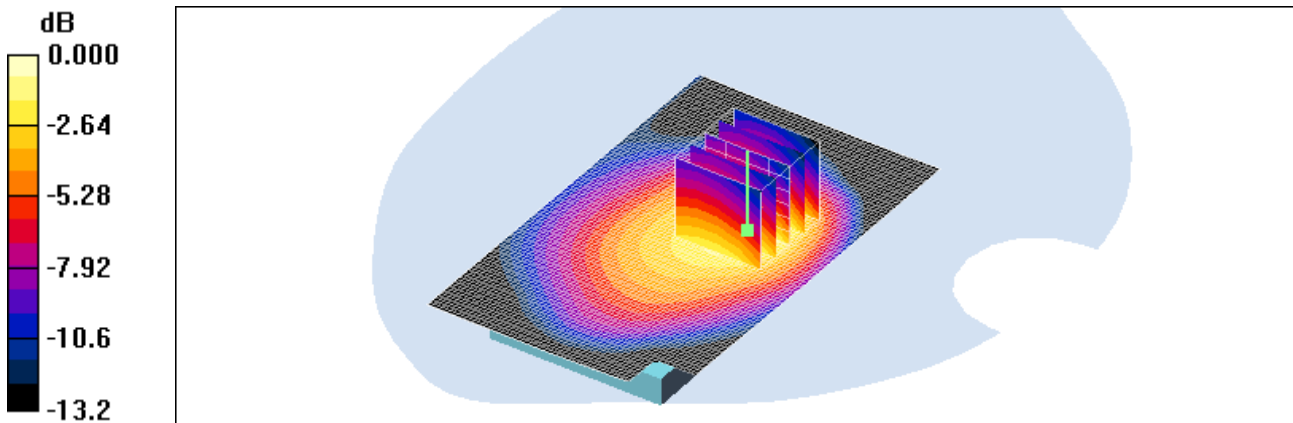
Reference Value = 17.6 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 0.977 W/kg

SAR(1 g) = 0.614 mW/g; SAR(10 g) = 0.382 mW/g

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

Maximum value of SAR (measured) = 0.649 mW/g



0 dB = 0.649mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 3, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.52 \text{ MHz}$; $\sigma = 0.992 \text{ mho/m}$; $\epsilon_r = 54.4$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body front 384 EVDO/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

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

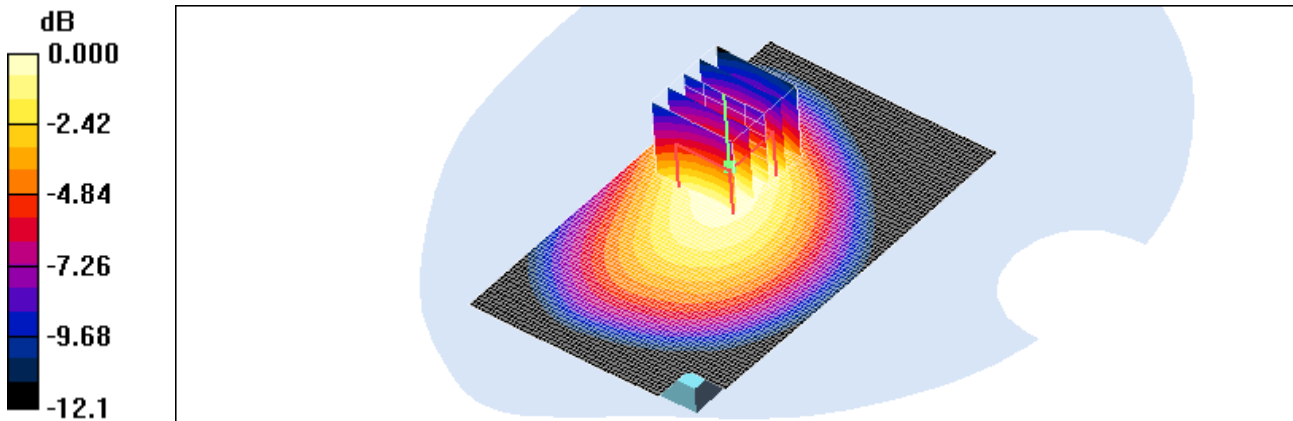
Body front 384 EVDO/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 7.62 V/m; Power Drift = -0.147 dB

Peak SAR (extrapolated) = 0.313 W/kg

SAR(1 g) = 0.232 mW/g; SAR(10 g) = 0.162 mW/g

Maximum value of SAR (measured) = 0.248 mW/g



0 dB = 0.248mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 3, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.52$ MHz; $\sigma = 0.992$ mho/m; $\epsilon_r = 54.4$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body left 384 EVDO Left/Area Scan (41x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.437 mW/g

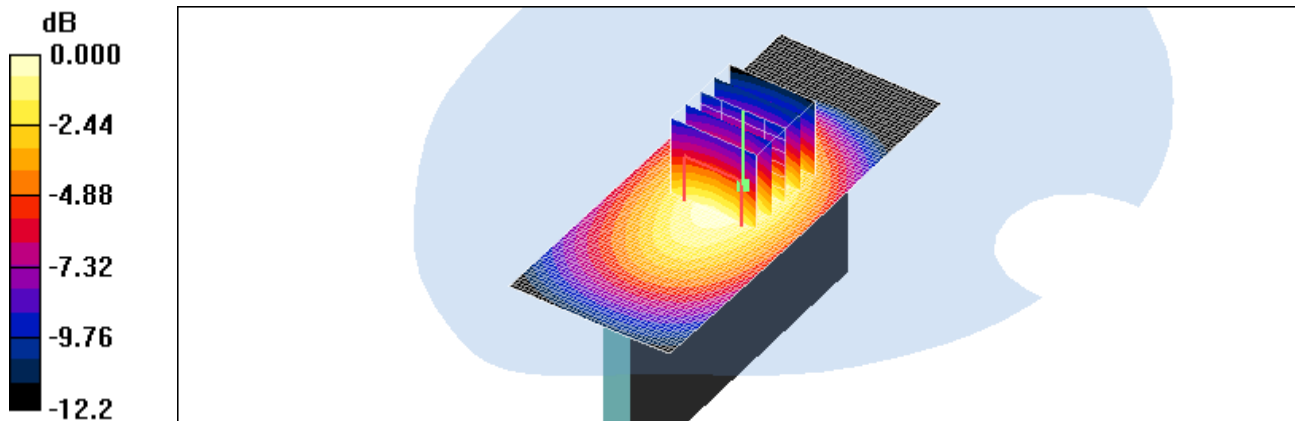
Body left 384 EVDO Left /Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.5 V/m; Power Drift = -0.045 dB

Peak SAR (extrapolated) = 0.574 W/kg

SAR(1 g) = 0.403 mW/g; SAR(10 g) = 0.271 mW/g

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



0 dB = 0.434mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 3, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.52$ MHz; $\sigma = 0.992$ mho/m; $\epsilon_r = 54.4$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body Top 384 EVDO/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.072 mW/g

Body Top 384 EVDO/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

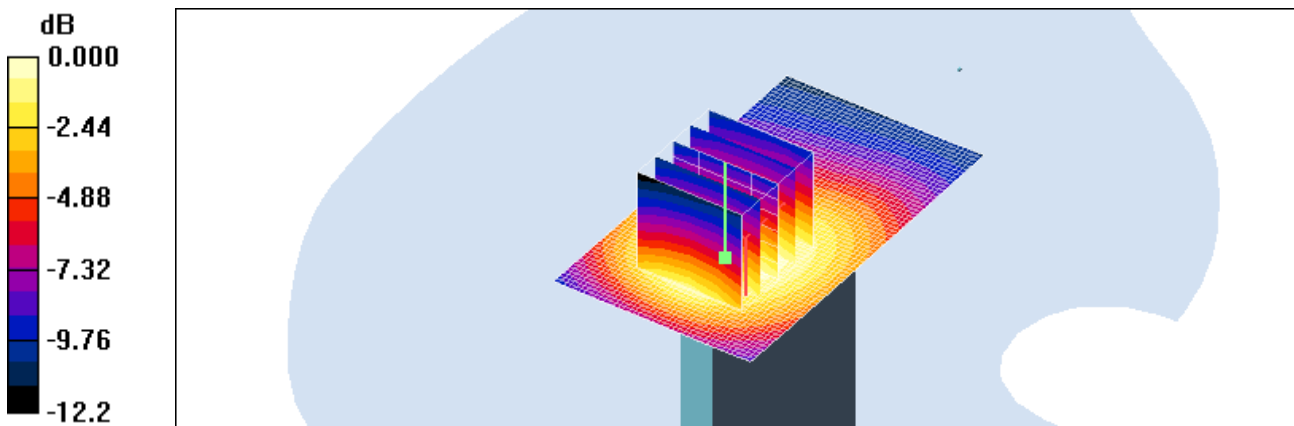
Reference Value = 7.53 V/m; Power Drift = -0.019 dB

Peak SAR (extrapolated) = 0.093 W/kg

SAR(1 g) = 0.065 mW/g; SAR(10 g) = 0.044 mW/g

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

Maximum value of SAR (measured) = 0.069 mW/g



0 dB = 0.069mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 3, 2012
Option: Wireless Charging Cover

DUT: VS840; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.52 \text{ MHz}$; $\sigma = 0.992 \text{ mho/m}$; $\epsilon_r = 54.4$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body rear 384 EVDO/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.458 mW/g

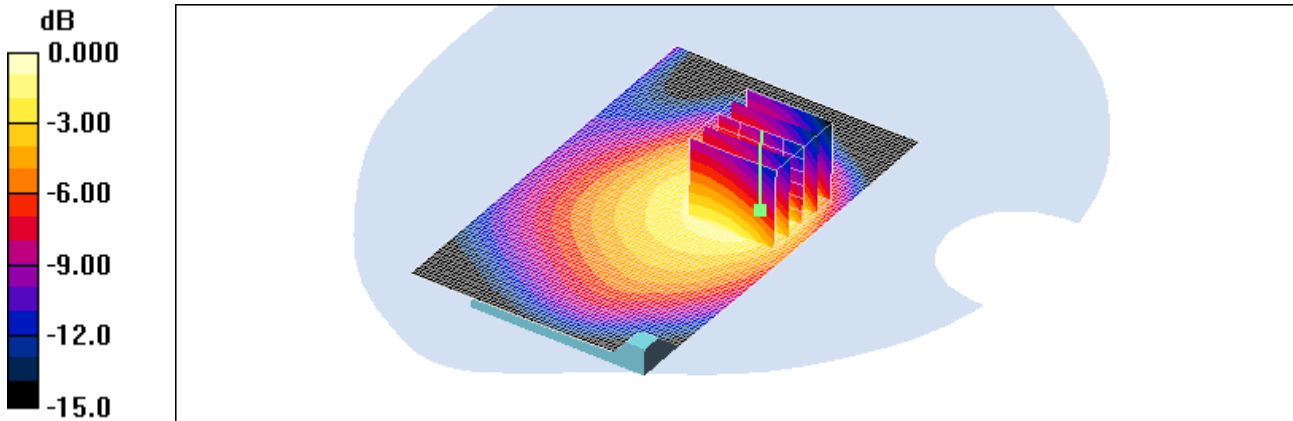
Body rear 384 EVDO/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 16.3 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 0.657 W/kg

SAR(1 g) = 0.436 mW/g; SAR(10 g) = 0.284 mW/g

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



0 dB = 0.468mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 3, 2012
Option: Wireless Charging Cover

DUT: VS840; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.52$ MHz; $\sigma = 0.992$ mho/m; $\epsilon_r = 54.4$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8
Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body rear 384 1xRTT/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.689 mW/g

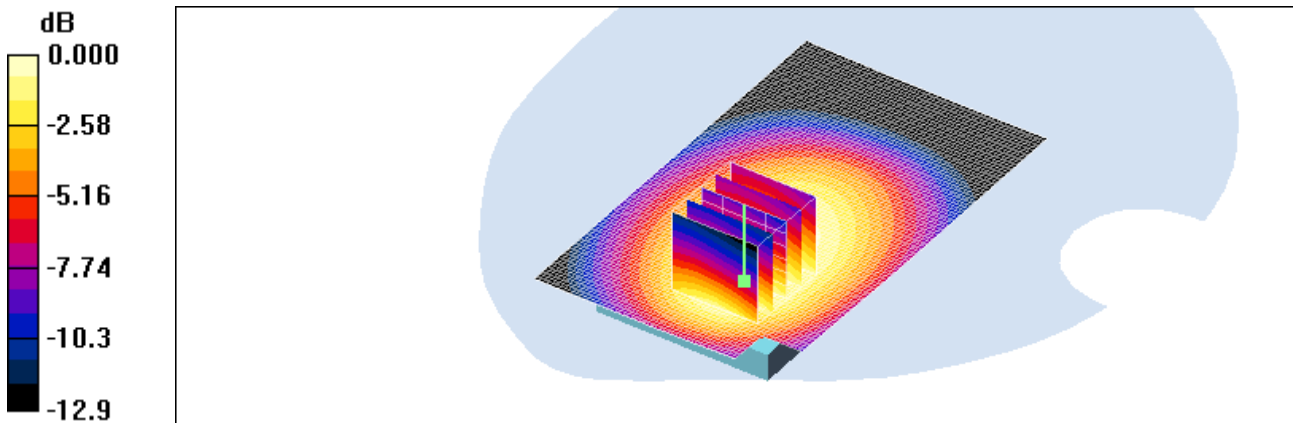
Body rear 384 1xRTT/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.83 V/m; Power Drift = 0.093 dB

Peak SAR (extrapolated) = 0.888 W/kg

SAR(1 g) = 0.631 mW/g; SAR(10 g) = 0.452 mW/g

Maximum value of SAR (measured) = 0.668 mW/g



0 dB = 0.668mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 7, 2012

DUT: VS840; Type: bar; Serial: #1

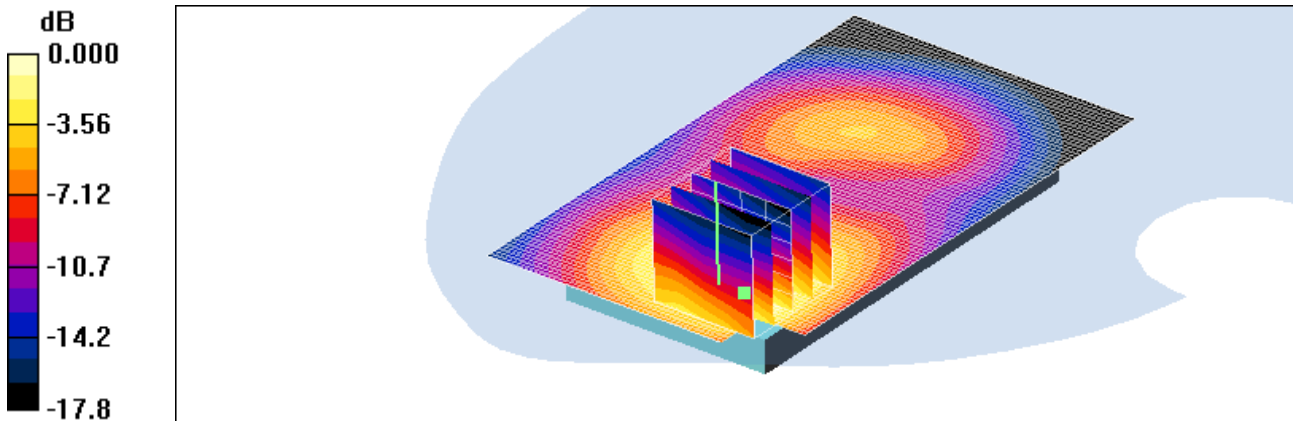
Communication System: PCS 1900MHz FCC; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.45 \text{ mho/m}$; $\epsilon_r = 55.1$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.75, 4.75, 4.75); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Body rear 600 1xRTT/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.615 mW/g

Body rear 600 1xRTT/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 10.1 V/m; Power Drift = -0.044 dB
Peak SAR (extrapolated) = 1.06 W/kg
SAR(1 g) = 0.593 mW/g; SAR(10 g) = 0.338 mW/g
Maximum value of SAR (measured) = 0.665 mW/g



0 dB = 0.665mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 7, 2012

DUT: VS840; Type: bar; Serial: #1

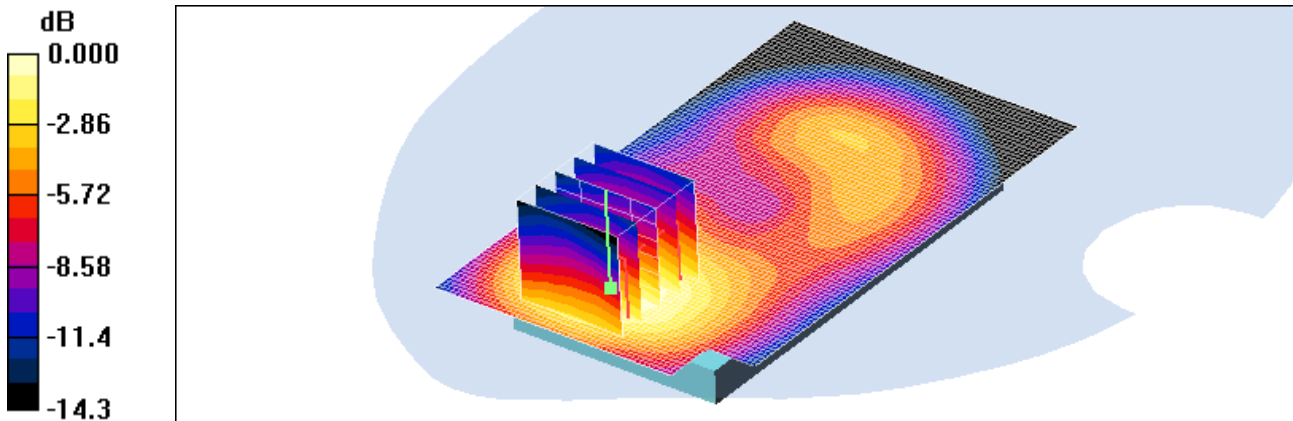
Communication System: PCS 1900MHz FCC; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.45 \text{ mho/m}$; $\epsilon_r = 55.1$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.75, 4.75, 4.75); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Body front 600 1xRTT/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.603 mW/g

Body front 600 1xRTT/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 13.6 V/m; Power Drift = 0.035 dB
Peak SAR (extrapolated) = 0.848 W/kg
SAR(1 g) = 0.572 mW/g; SAR(10 g) = 0.368 mW/g
Maximum value of SAR (measured) = 0.618 mW/g



0 dB = 0.618mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 7, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: PCS 1900MHz FCC; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 55.1$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

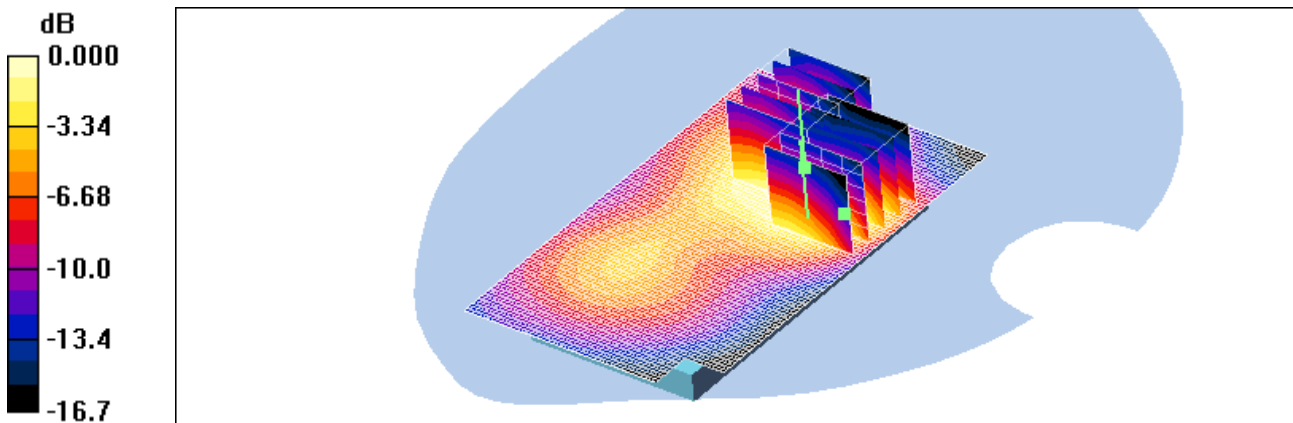
- Probe: ET3DV6 - SN1630; ConvF(4.75, 4.75, 4.75); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Body rear 600 EVDO/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.999 mW/g

Body rear 600 EVDO/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 28.7 V/m; Power Drift = -0.066 dB
Peak SAR (extrapolated) = 1.43 W/kg
SAR(1 g) = 0.796 mW/g; SAR(10 g) = 0.467 mW/g

Maximum value of SAR (measured) = 0.854 mW/g

Body rear 600 EVDO/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 28.7 V/m; Power Drift = -0.066 dB
Peak SAR (extrapolated) = 1.36 W/kg
SAR(1 g) = 0.849 mW/g; SAR(10 g) = 0.525 mW/g
Maximum value of SAR (measured) = 0.910 mW/g



0 dB = 0.910mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 7, 2012

DUT: VS840; Type: bar; Serial: #1

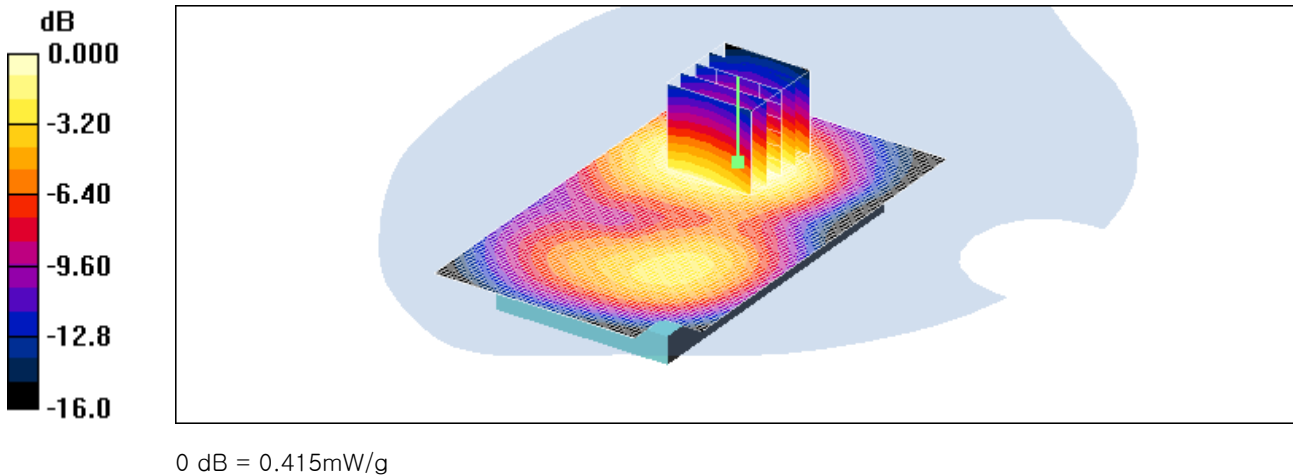
Communication System: PCS 1900MHz FCC; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 55.1$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.75, 4.75, 4.75); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Body front 600 EVDO/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.430 mW/g

Body front 600 EVDO/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.1 V/m; Power Drift = 0.096 dB
Peak SAR (extrapolated) = 0.584 W/kg
SAR(1 g) = 0.386 mW/g; SAR(10 g) = 0.242 mW/g
Maximum value of SAR (measured) = 0.415 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 7, 2012

DUT: VS840; Type: bar; Serial: #1

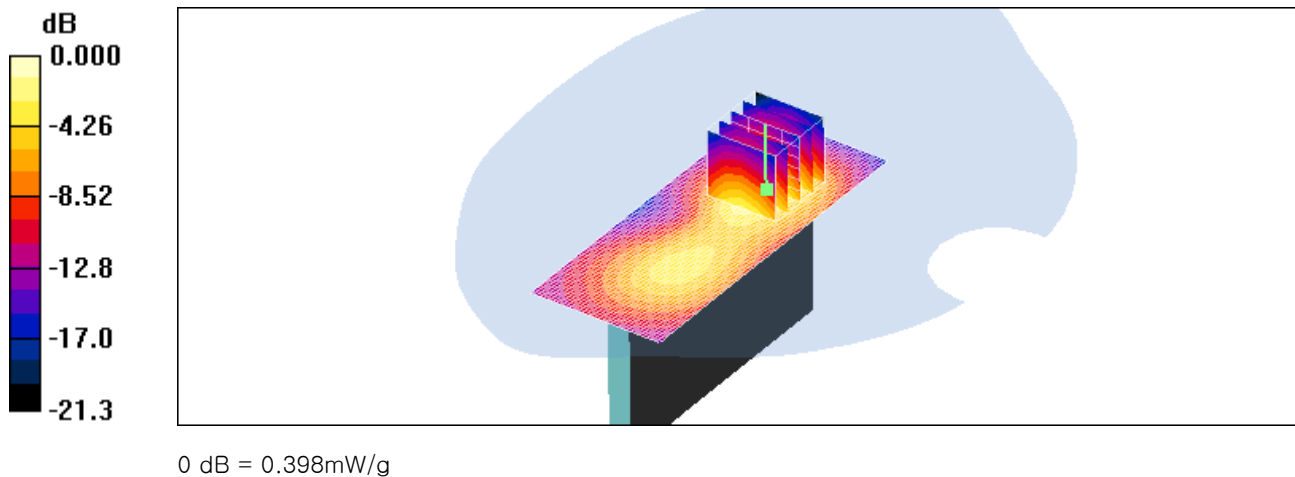
Communication System: PCS 1900MHz FCC; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 55.1$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.75, 4.75, 4.75); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Body left 600 EVDO/Area Scan (41x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.416 mW/g

Body left 600 EVDO/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.3 V/m; Power Drift = -0.018 dB
Peak SAR (extrapolated) = 0.632 W/kg
SAR(1 g) = 0.350 mW/g; SAR(10 g) = 0.180 mW/g
Maximum value of SAR (measured) = 0.398 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 7, 2012

DUT: VS840; Type: bar; Serial: #1

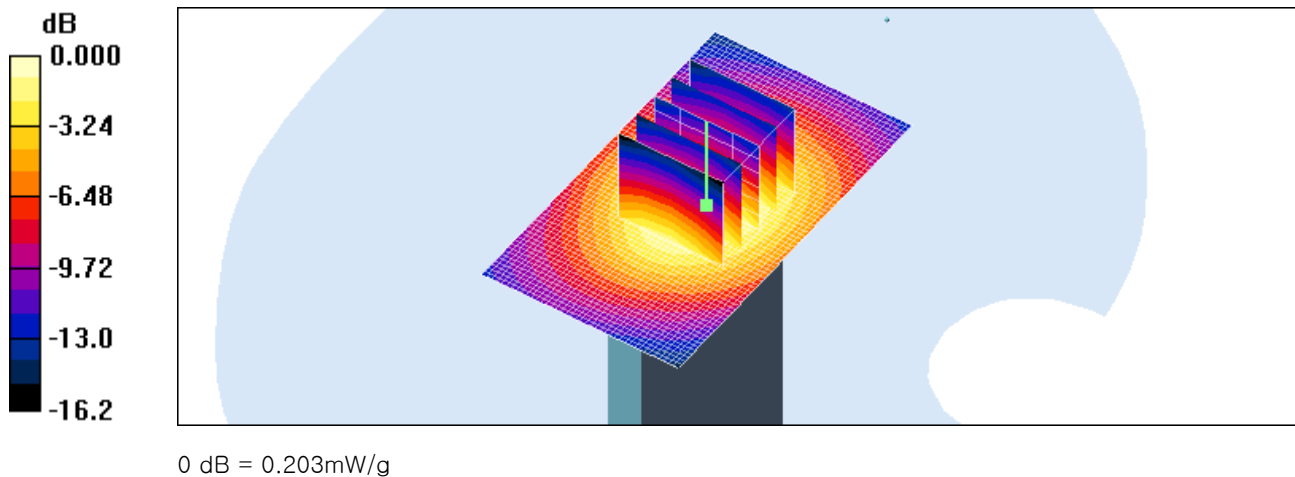
Communication System: PCS 1900MHz FCC; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 55.1$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.75, 4.75, 4.75); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Body Top 600 EVDO/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.208 mW/g

Body Top 600 EVDO/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.7 V/m; Power Drift = -0.0F50 dB
Peak SAR (extrapolated) = 0.286 W/kg
SAR(1 g) = 0.186 mW/g; SAR(10 g) = 0.113 mW/g
Maximum value of SAR (measured) = 0.203 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 7, 2012
Option: Wireless charging Cover

DUT: VS840; Type: bar; Serial: #1

Communication System: PCS 1900MHz FCC; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.45 \text{ mho/m}$; $\epsilon_r = 55.1$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.75, 4.75, 4.75); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Body rear 600 EVDO/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.692 mW/g

Body rear 600 EVDO/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 22.0 V/m; Power Drift = -0.153 dB

Peak SAR (extrapolated) = 0.901 W/kg

SAR(1 g) = 0.624 mW/g; SAR(10 g) = 0.399 mW/g

Maximum value of SAR (measured) = 0.673 mW/g

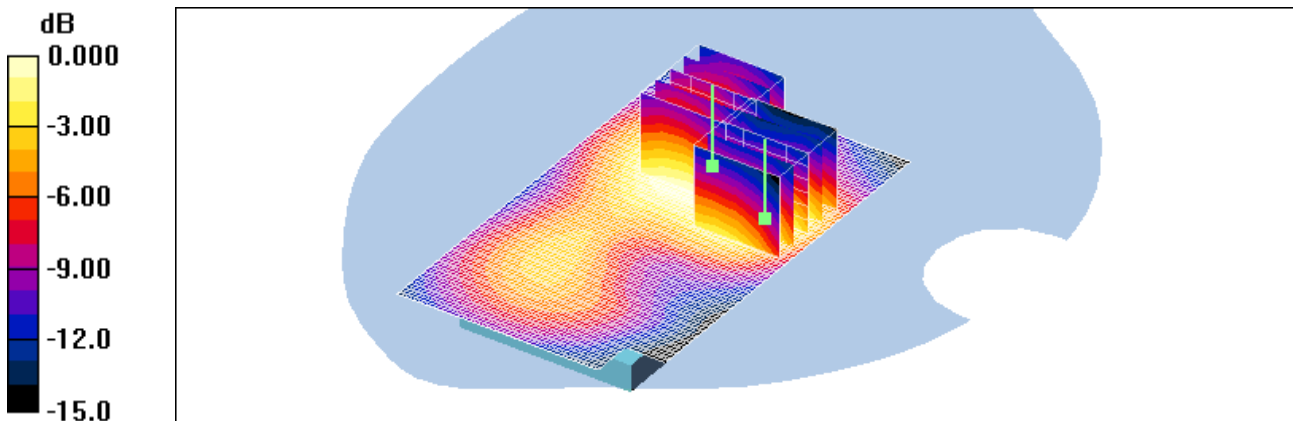
Body rear 600 EVDO/Zoom Scan (5x5x7)/Cube 1: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 22.0 V/m; Power Drift = -0.153 dB

Peak SAR (extrapolated) = 0.822 W/kg

SAR(1 g) = 0.468 mW/g; SAR(10 g) = 0.286 mW/g

Maximum value of SAR (measured) = 0.511 mW/g



0 dB = 0.511mW/g

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
 Liquid Temperature: 21.3 °C
 Ambient Temperature: 21.5 °C
 Test Date: Feb. 7, 2012
 Option: Wireless Charging Cover

DUT: VS840; Type: bar; Serial: #1

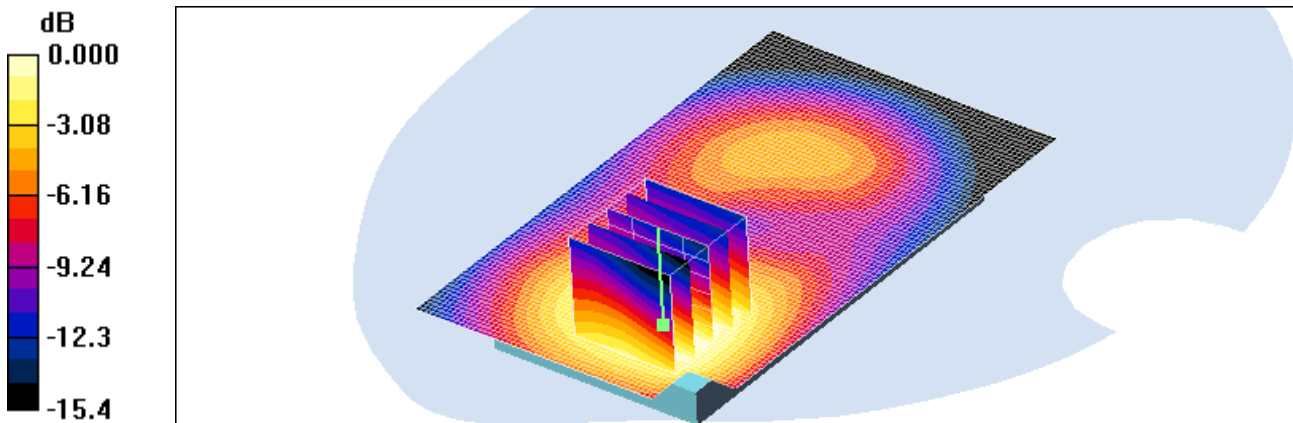
Communication System: PCS 1900MHz FCC; Frequency: 1880 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.45 \text{ mho/m}$; $\epsilon_r = 55.1$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.75, 4.75, 4.75); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Body rear 600 1xRTT/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
 Maximum value of SAR (interpolated) = 0.596 mW/g

Body rear 600 1xRTT/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
 Reference Value = 11.5 V/m; Power Drift = -0.030 dB
 Peak SAR (extrapolated) = 0.923 W/kg
SAR(1 g) = 0.553 mW/g; SAR(10 g) = 0.338 mW/g
 Maximum value of SAR (measured) = 0.597 mW/g



0 dB = 0.597mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 9, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body rear 23230 25RB 12 offset QPSK/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.440 mW/g

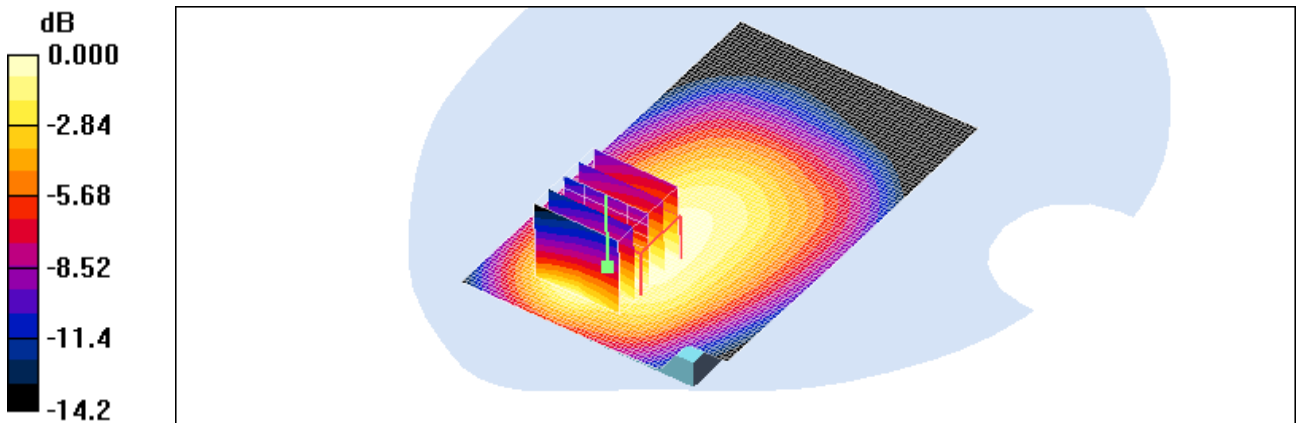
Body rear 23230 25RB 12 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.14 V/m; Power Drift = -0.009 dB

Peak SAR (extrapolated) = 0.690 W/kg

SAR(1 g) = 0.396 mW/g; SAR(10 g) = 0.270 mW/g

Maximum value of SAR (measured) = 0.422 mW/g



0 dB = 0.422mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 9, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body rear 23230 1RB 0 offset QPSK/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.578 mW/g

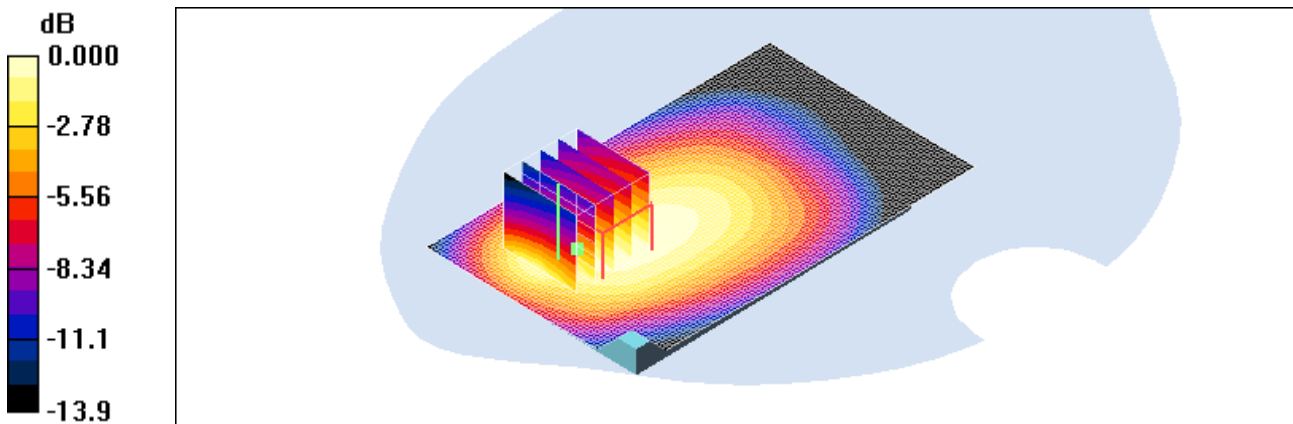
Body rear 23230 1RB 0 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.39 V/m; Power Drift = -0.083 dB

Peak SAR (extrapolated) = 0.894 W/kg

SAR(1 g) = 0.519 mW/g; SAR(10 g) = 0.365 mW/g

Maximum value of SAR (measured) = 0.564 mW/g



0 dB = 0.564mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 9, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body rear 23230 1RB 49 offset QPSK/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.556 mW/g

Body rear 23230 1RB 49 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

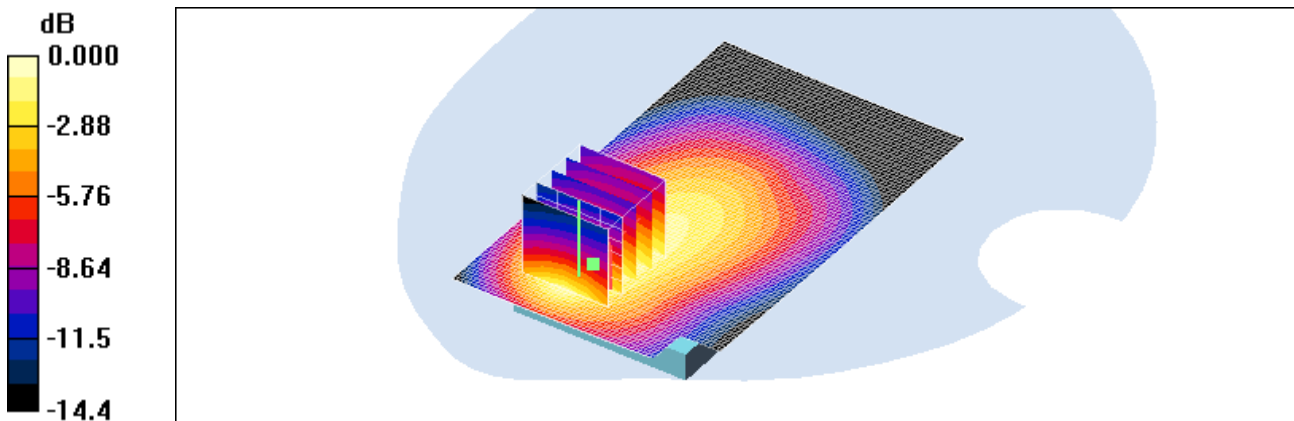
Reference Value = 7.34 V/m; Power Drift = -0.056 dB

Peak SAR (extrapolated) = 0.890 W/kg

SAR(1 g) = 0.510 mW/g; SAR(10 g) = 0.317 mW/g

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

Maximum value of SAR (measured) = 0.559 mW/g



0 dB = 0.559mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 9, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body front 23230 25RB 12 offset QPSK/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.234 mW/g

Body front 23230 25RB 12 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

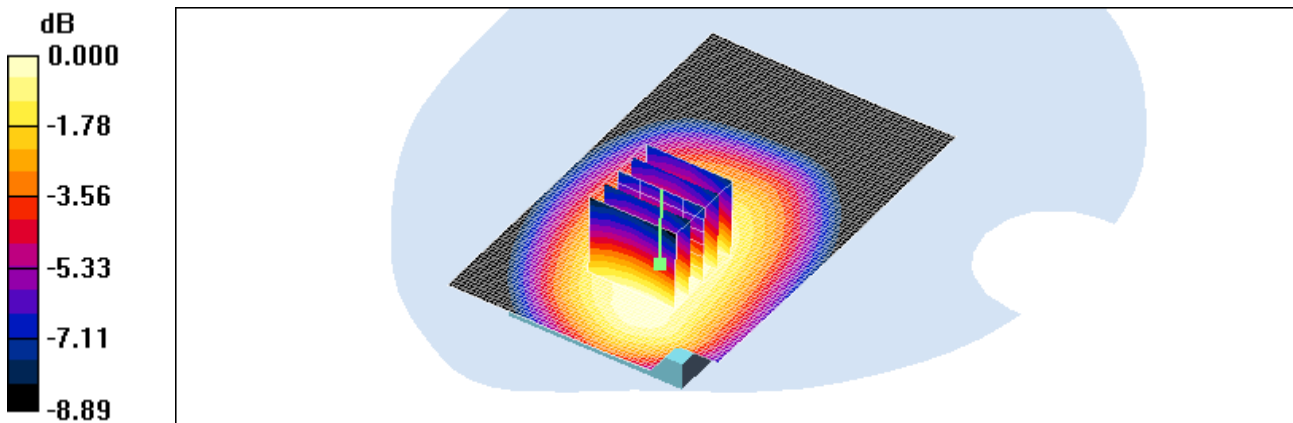
Reference Value = 5.43 V/m; Power Drift = -0.006 dB

Peak SAR (extrapolated) = 0.271 W/kg

SAR(1 g) = 0.222 mW/g; SAR(10 g) = 0.168 mW/g

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

Maximum value of SAR (measured) = 0.232 mW/g



0 dB = 0.232mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 9, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body front 23230 1RB 0 offset QPSK/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.291 mW/g

Body front 23230 1RB 0 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

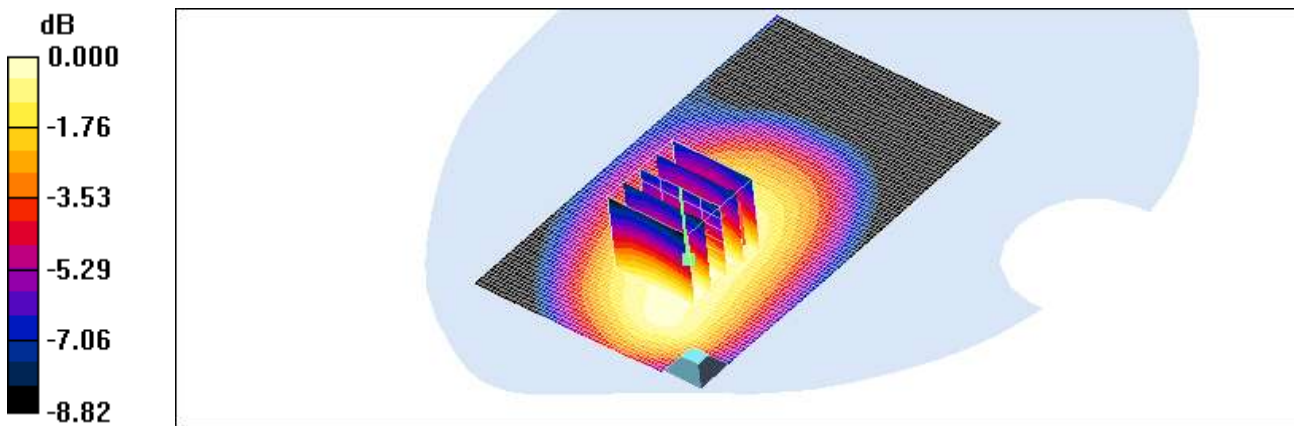
Reference Value = 16.9 V/m; Power Drift = -0.036 dB

Peak SAR (extrapolated) = 0.349 W/kg

SAR(1 g) = 0.284 mW/g; SAR(10 g) = 0.214 mW/g

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

Maximum value of SAR (measured) = 0.302 mW/g



0 dB = 0.302mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 9, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body front 23230 1RB 49 offset QPSK/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

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

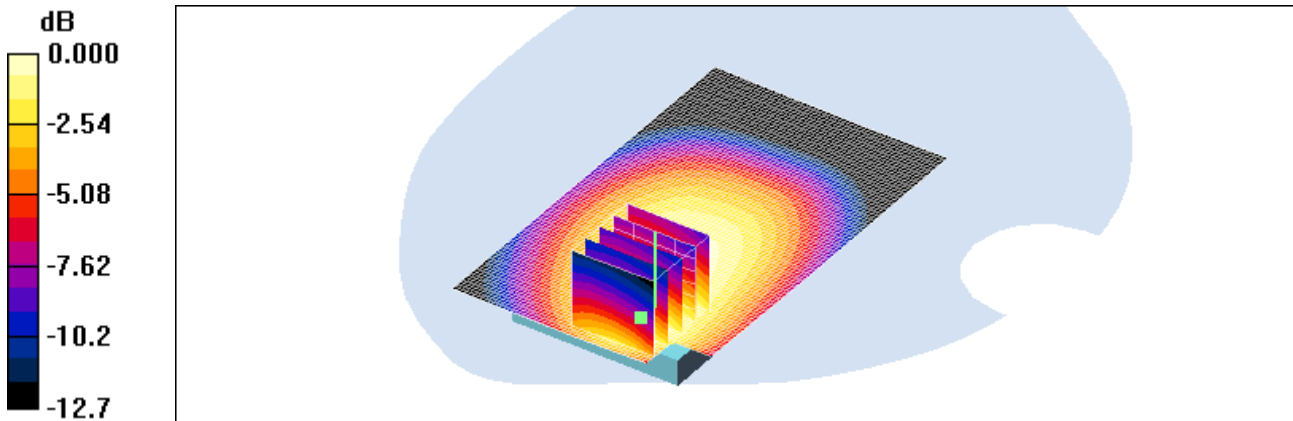
Body front 23230 1RB 49 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.84 V/m; Power Drift = -0.059 dB

Peak SAR (extrapolated) = 0.344 W/kg

SAR(1 g) = 0.250 mW/g; SAR(10 g) = 0.174 mW/g

Maximum value of SAR (measured) = 0.264 mW/g



0 dB = 0.264mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 9, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body right 23230 25RB 12 offset QPSK/Area Scan (41x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.255 mW/g

Body right 23230 25RB 12 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

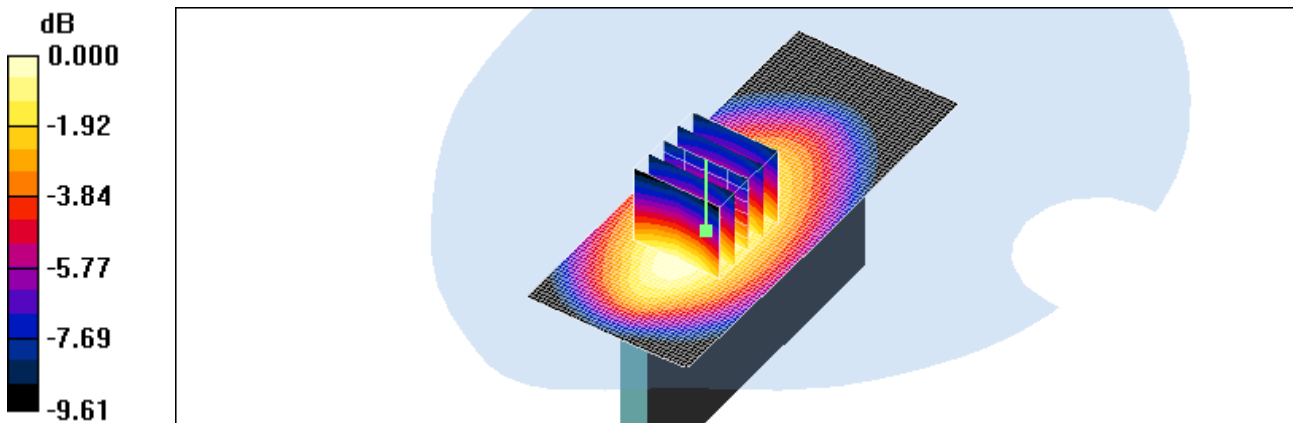
Reference Value = 8.00 V/m; Power Drift = 0.031 dB

Peak SAR (extrapolated) = 0.313 W/kg

SAR(1 g) = 0.236 mW/g; SAR(10 g) = 0.166 mW/g

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

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



0 dB = 0.253mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 9, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body right 23230 1RB 0 offset QPSK/Area Scan (41x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.340 mW/g

Body right 23230 1RB 0 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

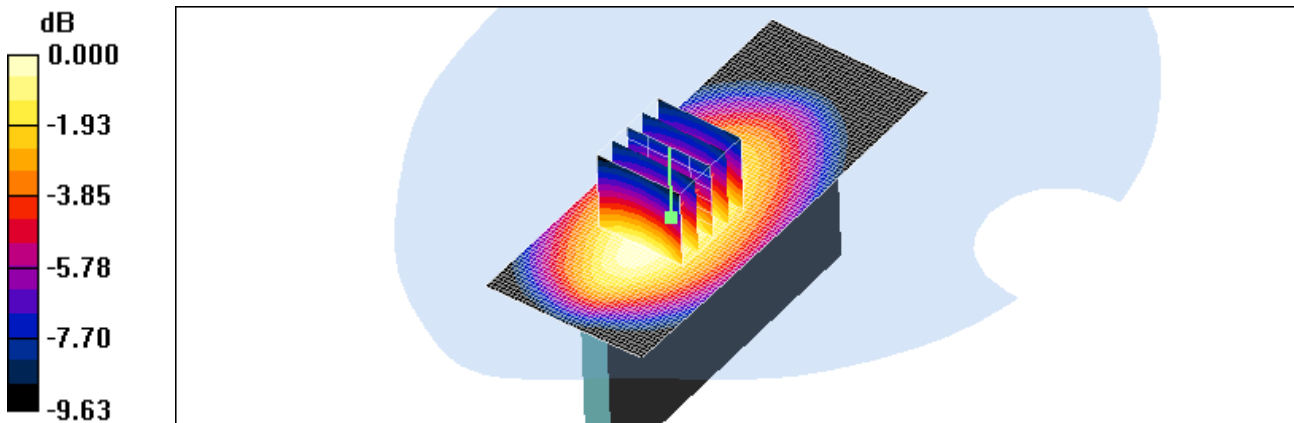
Reference Value = 9.49 V/m; Power Drift = -0.104 dB

Peak SAR (extrapolated) = 0.414 W/kg

SAR(1 g) = 0.312 mW/g; SAR(10 g) = 0.219 mW/g

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

Maximum value of SAR (measured) = 0.335 mW/g



0 dB = 0.335mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 9, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body right 23230 1RB 49 offset QPSK/Area Scan (41x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.294 mW/g

Body right 23230 1RB 49 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

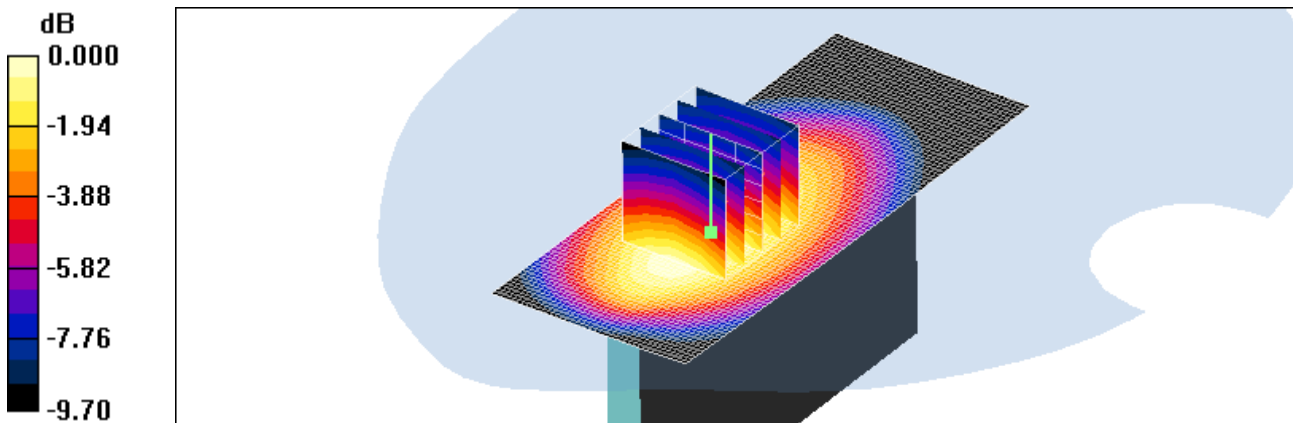
Reference Value = 8.28 V/m; Power Drift = -0.056 dB

Peak SAR (extrapolated) = 0.367 W/kg

SAR(1 g) = 0.275 mW/g; SAR(10 g) = 0.193 mW/g

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

Maximum value of SAR (measured) = 0.294 mW/g



0 dB = 0.294mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 9, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body bottom 23230 25RB 12 offset QPSK/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.182 mW/g

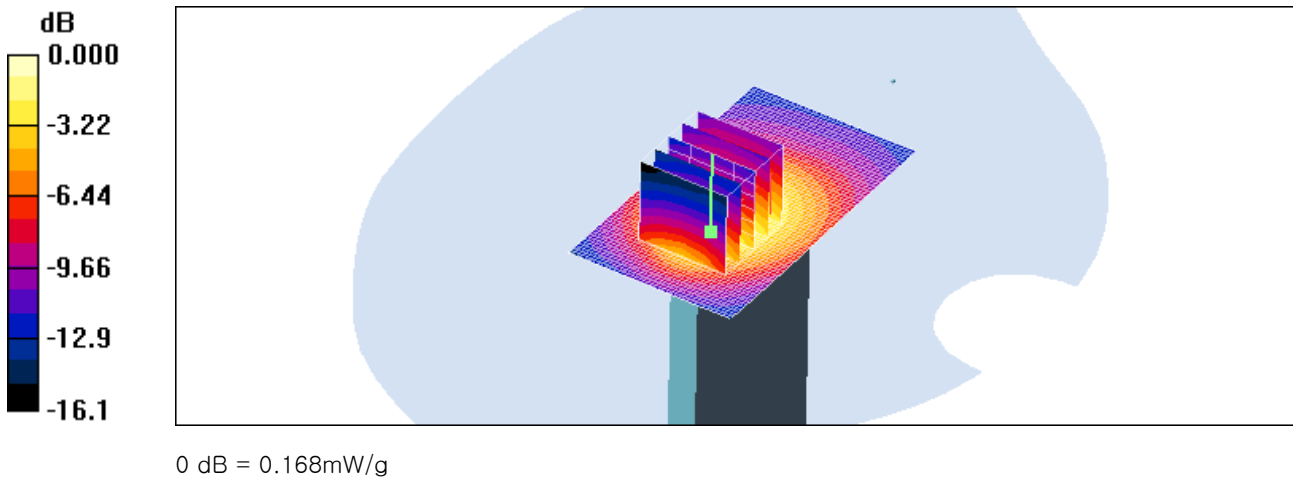
Body bottom 23230 25RB 12 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.6 V/m; Power Drift = 0.059 dB

Peak SAR (extrapolated) = 0.304 W/kg

SAR(1 g) = 0.150 mW/g; SAR(10 g) = 0.087 mW/g

Maximum value of SAR (measured) = 0.168 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 9, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body bottom 23230 1RB 0 offset QPSK/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.213 mW/g

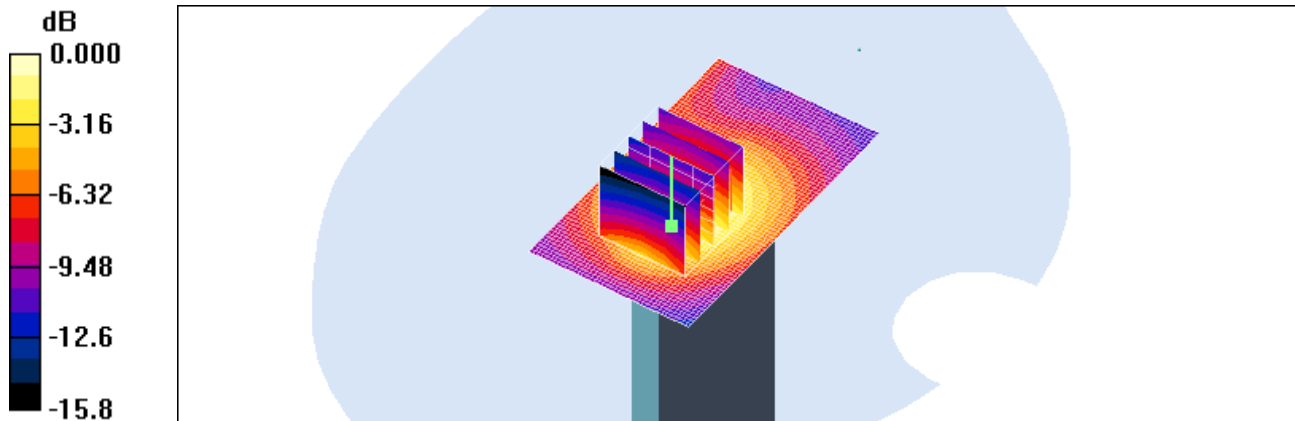
Body bottom 23230 1RB 0 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.8 V/m; Power Drift = -0.043 dB

Peak SAR (extrapolated) = 0.347 W/kg

SAR(1 g) = 0.172 mW/g; SAR(10 g) = 0.101 mW/g

Maximum value of SAR (measured) = 0.191 mW/g



0 dB = 0.191mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 9, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body bottom 23230 1RB 49 offset QPSK/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.218 mW/g

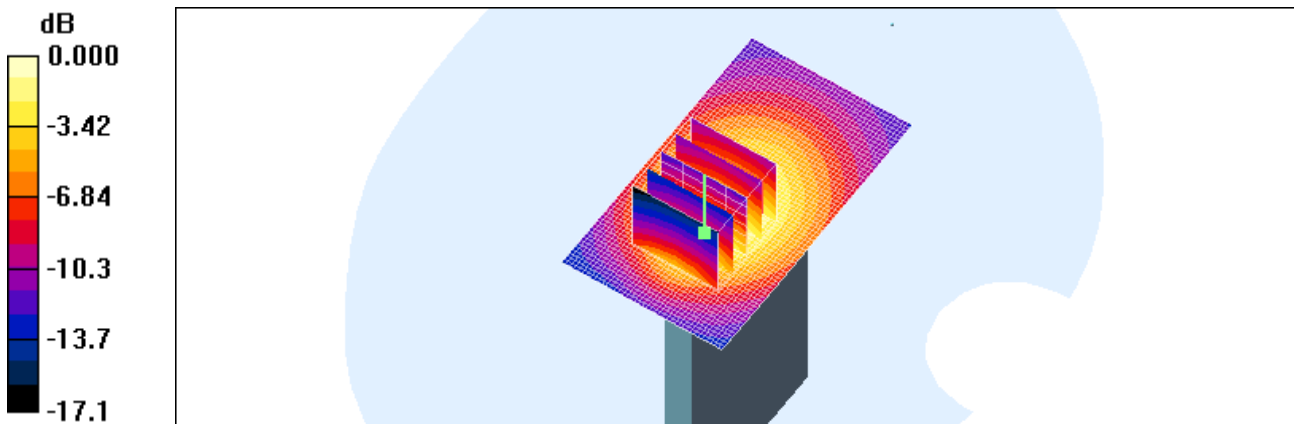
Body bottom 23230 1RB 49 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.9 V/m; Power Drift = -0.091 dB

Peak SAR (extrapolated) = 0.358 W/kg

SAR(1 g) = 0.174 mW/g; SAR(10 g) = 0.103 mW/g

Maximum value of SAR (measured) = 0.192 mW/g



0 dB = 0.192mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 9, 2012
Option: Wireless Charging Cover

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body rear 23230 1RB 0 offset QPSK/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

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

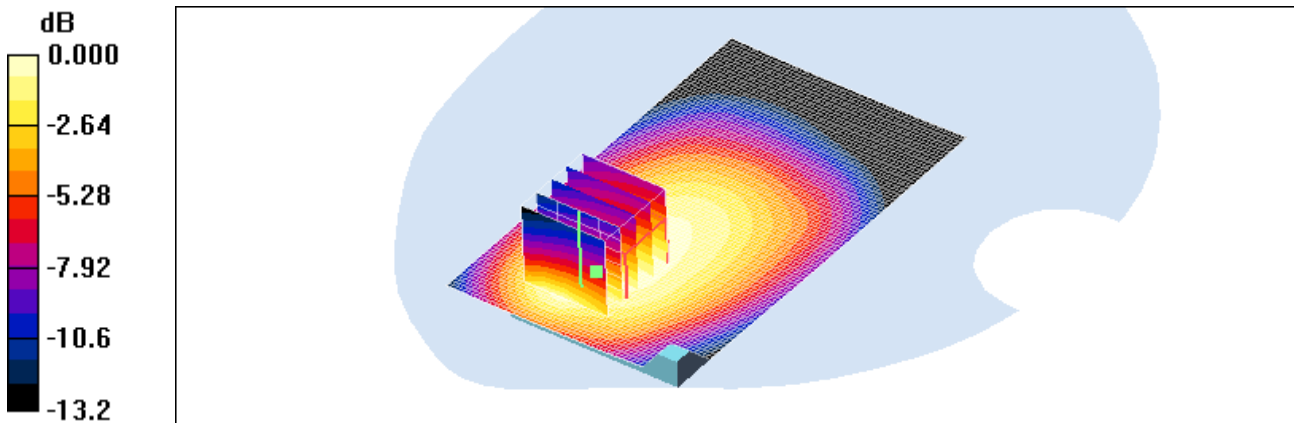
Body rear 23230 1RB 0 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.85 V/m; Power Drift = -0.072 dB

Peak SAR (extrapolated) = 0.608 W/kg

SAR(1 g) = 0.371 mW/g; SAR(10 g) = 0.254 mW/g

Maximum value of SAR (measured) = 0.395 mW/g



0 dB = 0.395mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 9, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body rear 23230 25RB 12 offset 16QAM/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.333 mW/g

Body rear 23230 25RB 12 offset 16QAM/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

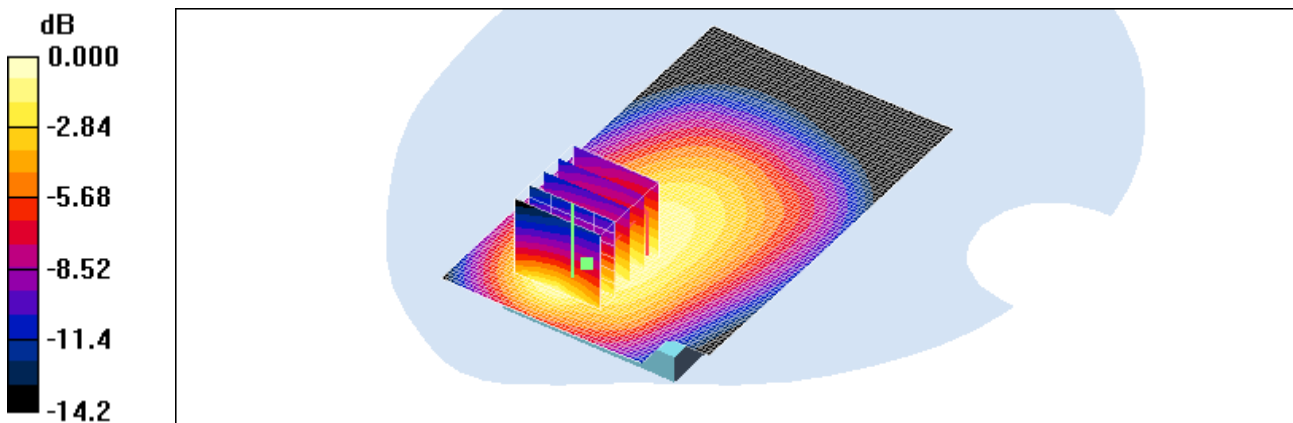
Reference Value = 5.88 V/m; Power Drift = -0.107 dB

Peak SAR (extrapolated) = 0.541 W/kg

SAR(1 g) = 0.303 mW/g; SAR(10 g) = 0.191 mW/g

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

Maximum value of SAR (measured) = 0.334 mW/g



0 dB = 0.334mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 9, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body rear 23230 1RB 0 offset 16QAM/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.438 mW/g

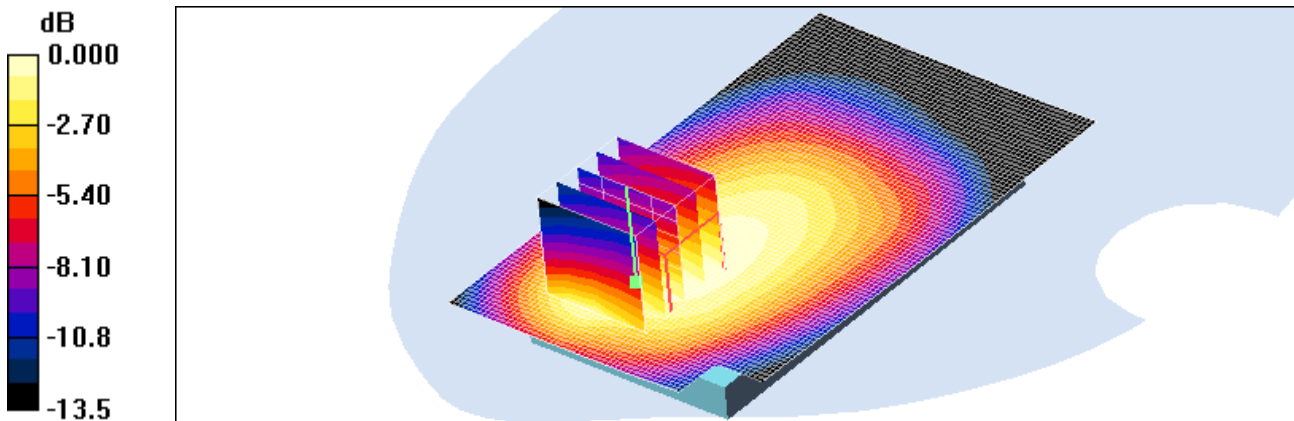
Body rear 23230 1RB 0 offset 16QAM/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 7.26 V/m; Power Drift = 0.066 dB

Peak SAR (extrapolated) = 0.679 W/kg

SAR(1 g) = 0.400 mW/g; SAR(10 g) = 0.282 mW/g

Maximum value of SAR (measured) = 0.424 mW/g



0 dB = 0.424mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 9, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body rear 23230 1RB 49 offset 16QAM/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.431 mW/g

Body rear 23230 1RB 49 offset 16QAM/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

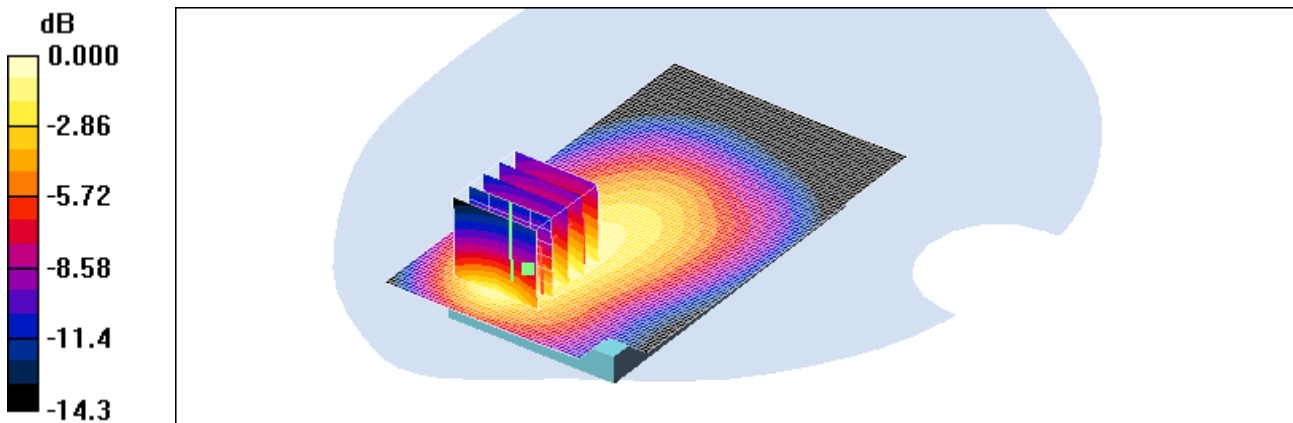
Reference Value = 6.42 V/m; Power Drift = 0.009 dB

Peak SAR (extrapolated) = 0.686 W/kg

SAR(1 g) = 0.391 mW/g; SAR(10 g) = 0.244 mW/g

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

Maximum value of SAR (measured) = 0.425 mW/g



0 dB = 0.425mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 9, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body front 23230 25RB 12 offset 16QAM/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.169 mW/g

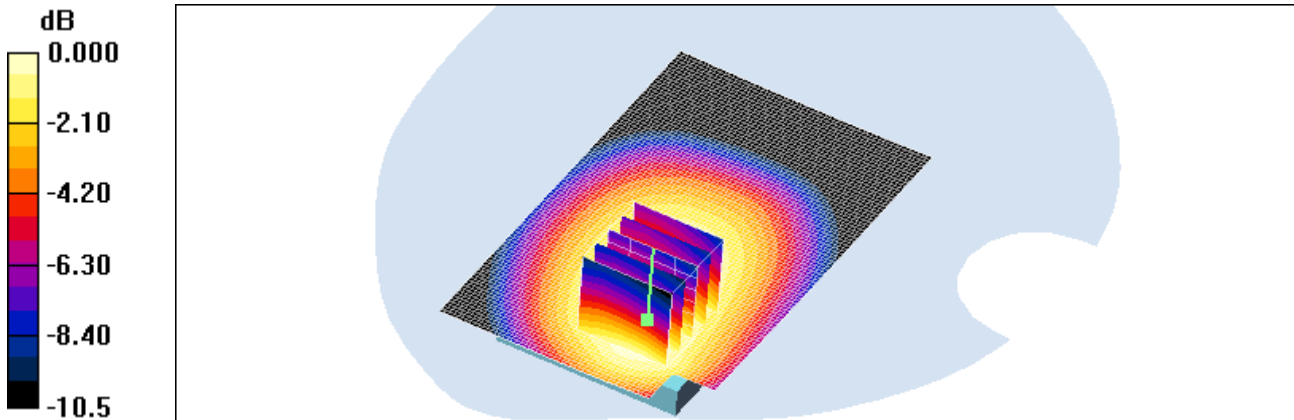
Body front 23230 25RB 12 offset 16QAM/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.69 V/m; Power Drift = -0.034 dB

Peak SAR (extrapolated) = 0.208 W/kg

SAR(1 g) = 0.161 mW/g; SAR(10 g) = 0.120 mW/g

Maximum value of SAR (measured) = 0.169 mW/g



0 dB = 0.169mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 9, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body front 23230 1RB 0 offset 16QAM/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

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

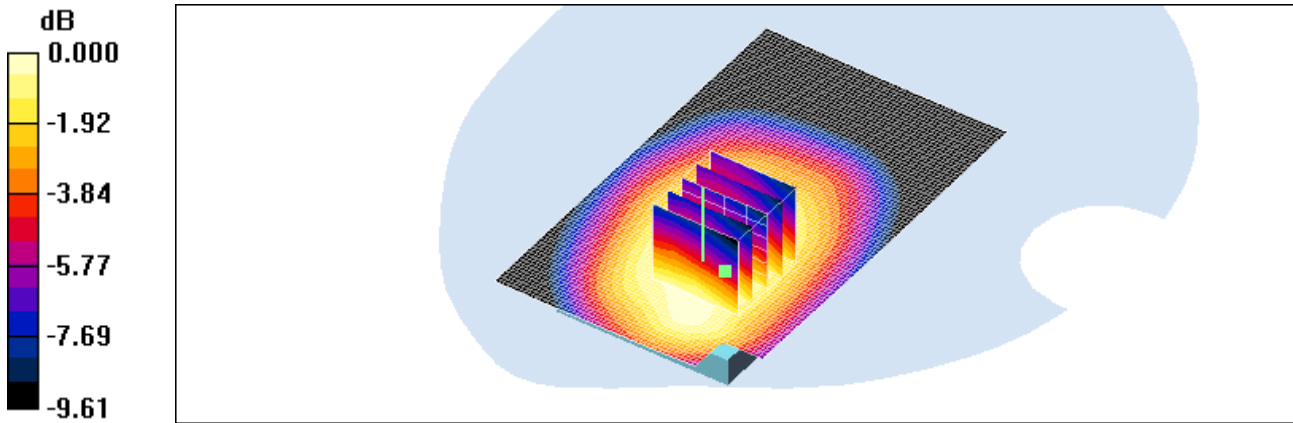
Body front 23230 1RB 0 offset 16QAM/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.65 V/m; Power Drift = -0.053 dB

Peak SAR (extrapolated) = 0.264 W/kg

SAR(1 g) = 0.207 mW/g; SAR(10 g) = 0.156 mW/g

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



0 dB = 0.219mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 9, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body front 23230 1RB 49 offset 16QAM/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.200 mW/g

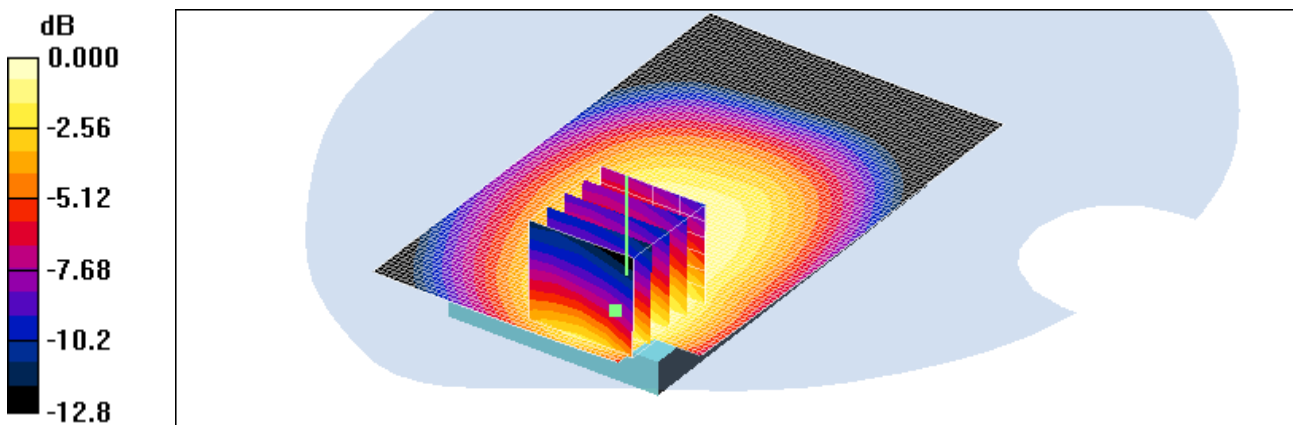
Body front 23230 1RB 49 offset 16QAM/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 4.99 V/m; Power Drift = -0.024 dB

Peak SAR (extrapolated) = 0.245 W/kg

SAR(1 g) = 0.180 mW/g; SAR(10 g) = 0.126 mW/g

Maximum value of SAR (measured) = 0.194 mW/g



0 dB = 0.194mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 9, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body right 23230 25RB 12 offset 16QAM/Area Scan (41x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.173 mW/g

Body right 23230 25RB 12 offset 16QAM/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

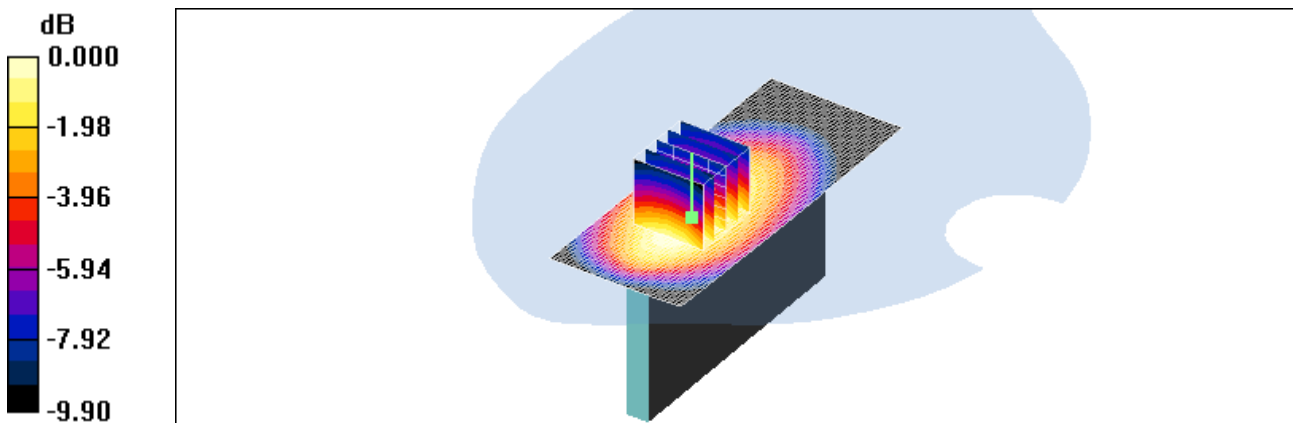
Reference Value = 6.53 V/m; Power Drift = -0.019 dB

Peak SAR (extrapolated) = 0.214 W/kg

SAR(1 g) = 0.161 mW/g; SAR(10 g) = 0.113 mW/g

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

Maximum value of SAR (measured) = 0.172 mW/g



0 dB = 0.172mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 9, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body right 23230 1RB 0 offset 16QAM/Area Scan (41x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.272 mW/g

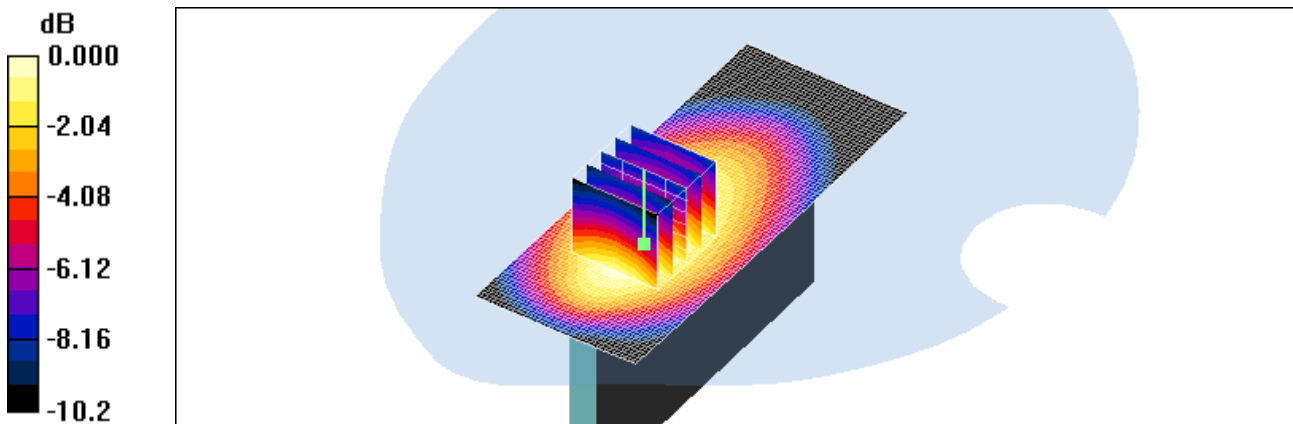
Body right 23230 1RB 0 offset 16QAM/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 8.51 V/m; Power Drift = -0.031 dB

Peak SAR (extrapolated) = 0.335 W/kg

SAR(1 g) = 0.254 mW/g; SAR(10 g) = 0.179 mW/g

Maximum value of SAR (measured) = 0.270 mW/g



0 dB = 0.270mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 9, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body right 23230 1RB 49 offset 16QAM/Area Scan (41x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.242 mW/g

Body right 23230 1RB 49 offset 16QAM/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

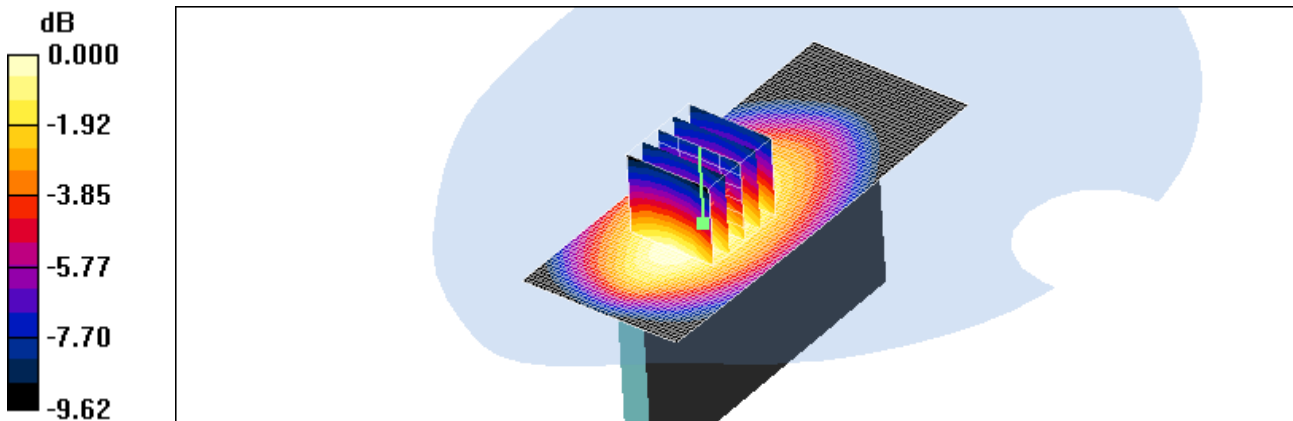
Reference Value = 7.43 V/m; Power Drift = -0.044 dB

Peak SAR (extrapolated) = 0.294 W/kg

SAR(1 g) = 0.223 mW/g; SAR(10 g) = 0.157 mW/g

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

Maximum value of SAR (measured) = 0.238 mW/g



0 dB = 0.238mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 9, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body bottom 23230 25RB 12 offset 16QAM/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.159 mW/g

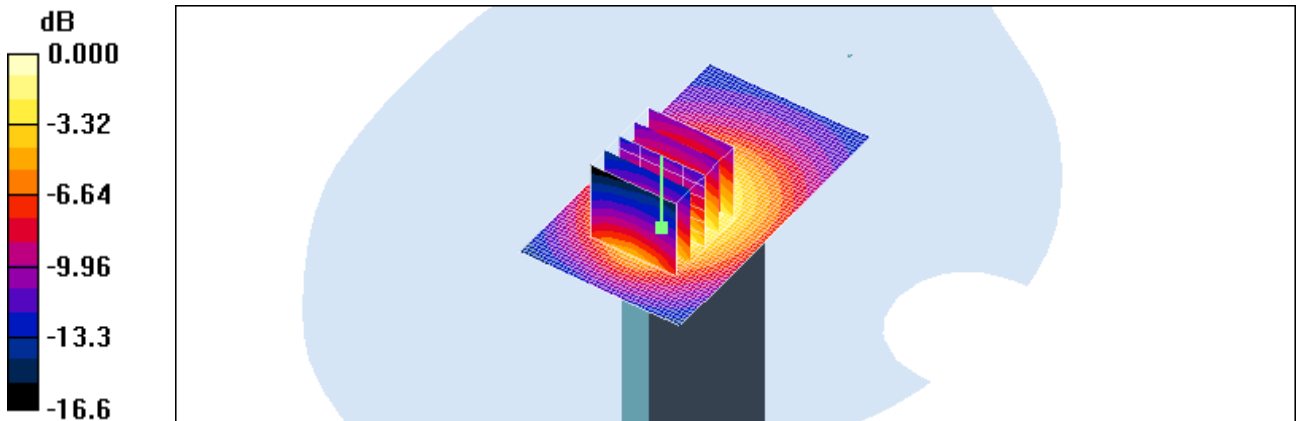
Body bottom 23230 25RB 12 offset 16QAM/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 10.8 V/m; Power Drift = 0.001 dB

Peak SAR (extrapolated) = 0.257 W/kg

SAR(1 g) = 0.129 mW/g; SAR(10 g) = 0.076 mW/g

Maximum value of SAR (measured) = 0.146 mW/g



0 dB = 0.146mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 9, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body bottom 23230 1RB 0 offset 16QAM/Area Scan (41x71x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.156 mW/g

Body bottom 23230 1RB 0 offset 16QAM/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

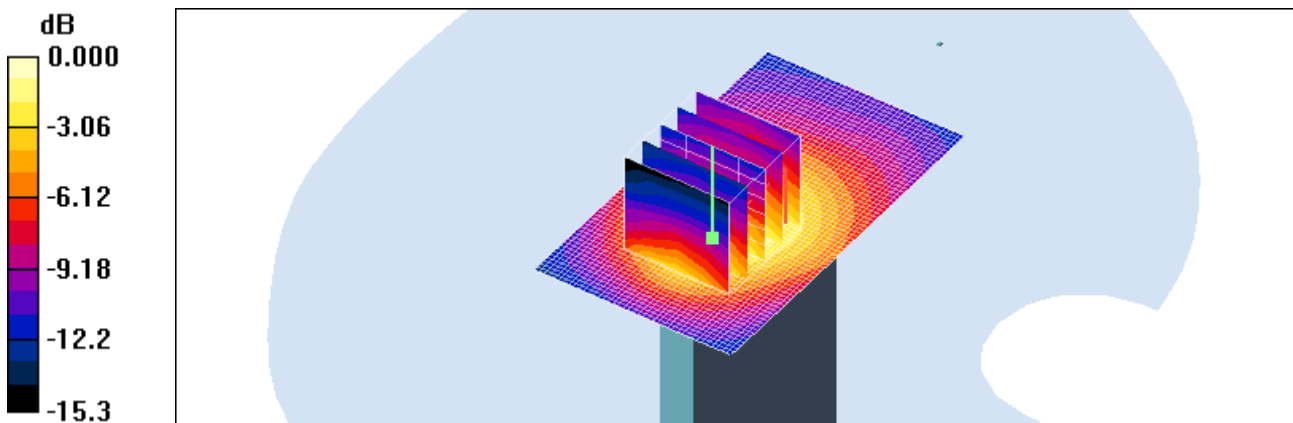
Reference Value = 10.8 V/m; Power Drift = 0.073 dB

Peak SAR (extrapolated) = 0.254 W/kg

SAR(1 g) = 0.131 mW/g; SAR(10 g) = 0.077 mW/g

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

Maximum value of SAR (measured) = 0.148 mW/g



0 dB = 0.148mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 9, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 – SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body bottom 23230 1RB 49 offset 16QAM/Area Scan (41x71x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.158 mW/g

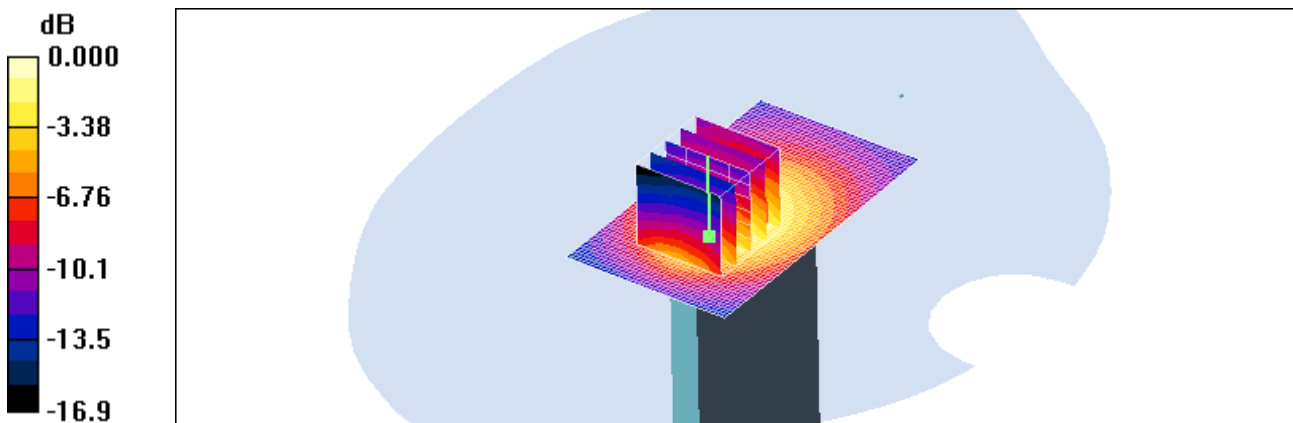
Body bottom 23230 1RB 49 offset 16QAM/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 10.7 V/m; Power Drift = 0.080 dB

Peak SAR (extrapolated) = 0.252 W/kg

SAR(1 g) = 0.126 mW/g; SAR(10 g) = 0.074 mW/g

Maximum value of SAR (measured) = 0.144 mW/g



0 dB = 0.144mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 10, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.87$ mho/m; $\epsilon_r = 52.1$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.3, 4.3, 4.3); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body rear 6/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.193 mW/g

Body rear 6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

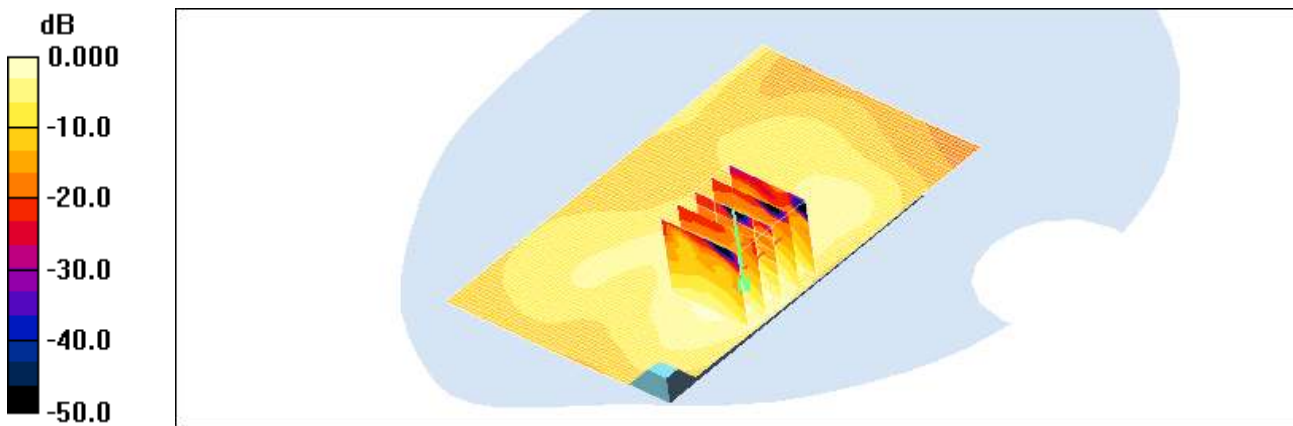
Reference Value = 6.73 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 0.405 W/kg

SAR(1 g) = 0.159 mW/g; SAR(10 g) = 0.073 mW/g

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

Maximum value of SAR (measured) = 0.169 mW/g



0 dB = 0.169mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 10, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.87$ mho/m; $\epsilon_r = 52.1$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.3, 4.3, 4.3); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body front 6/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.037 mW/g

Body front 6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

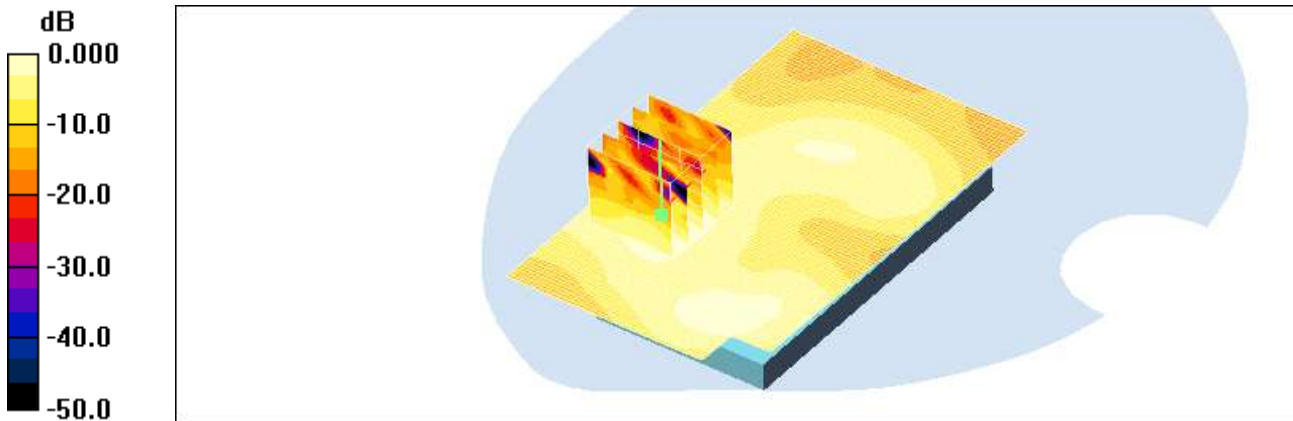
Reference Value = 2.84 V/m; Power Drift = -0.051 dB

Peak SAR (extrapolated) = 0.060 W/kg

SAR(1 g) = 0.033 mW/g; SAR(10 g) = 0.015 mW/g

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

Maximum value of SAR (measured) = 0.039 mW/g



0 dB = 0.039mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 10, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.87$ mho/m; $\epsilon_r = 52.1$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.3, 4.3, 4.3); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body left 6/Area Scan (41x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.103 mW/g

Body left 6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

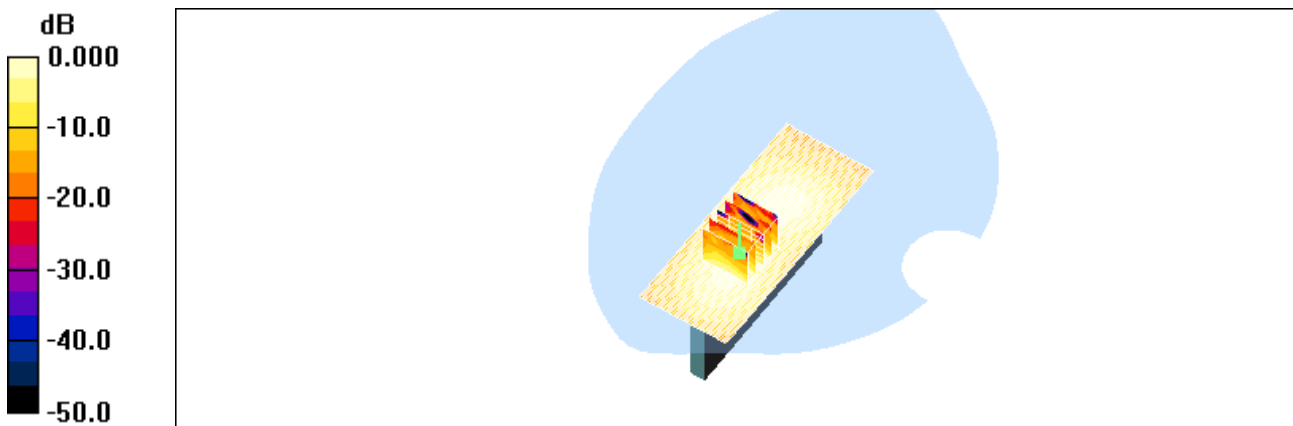
Reference Value = 4.71 V/m; Power Drift = -0.069 dB

Peak SAR (extrapolated) = 0.178 W/kg

SAR(1 g) = 0.089 mW/g; SAR(10 g) = 0.038 mW/g

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

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



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 10, 2012
Option: Wireless Cover

DUT: VS840; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.87$ mho/m; $\epsilon_r = 52.1$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.3, 4.3, 4.3); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Body rear 6/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.126 mW/g

Body rear 6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

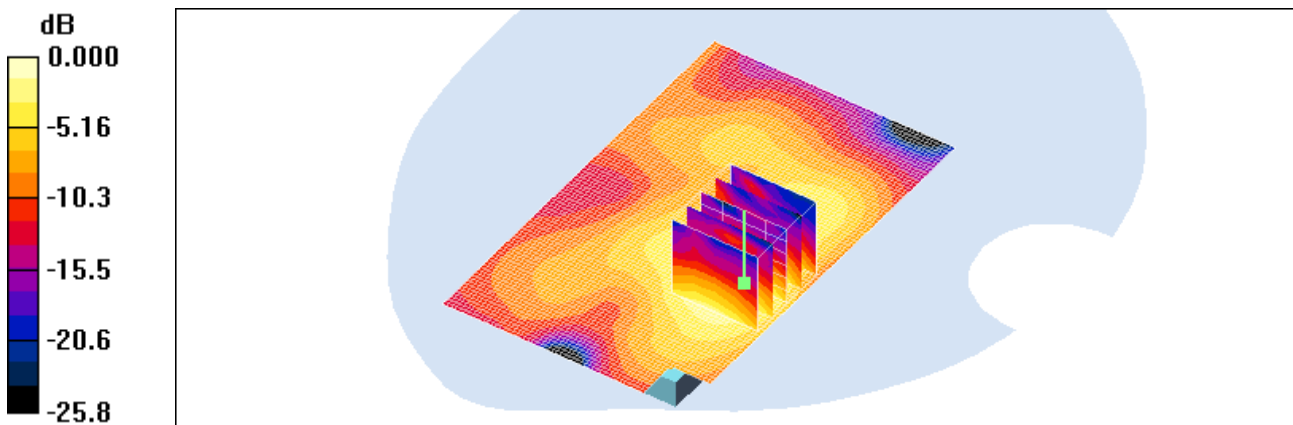
Reference Value = 5.55 V/m; Power Drift = -0.058 dB

Peak SAR (extrapolated) = 0.351 W/kg

SAR(1 g) = 0.108 mW/g; SAR(10 g) = 0.051 mW/g

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

Maximum value of SAR (measured) = 0.115 mW/g



0 dB = 0.115mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 2, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.52 \text{ MHz}$; $\sigma = 0.904 \text{ mho/m}$; $\epsilon_r = 43$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Right touch 384 EVDO/Area Scan (61x101x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.795 mW/g

Right touch 384 EVDO/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

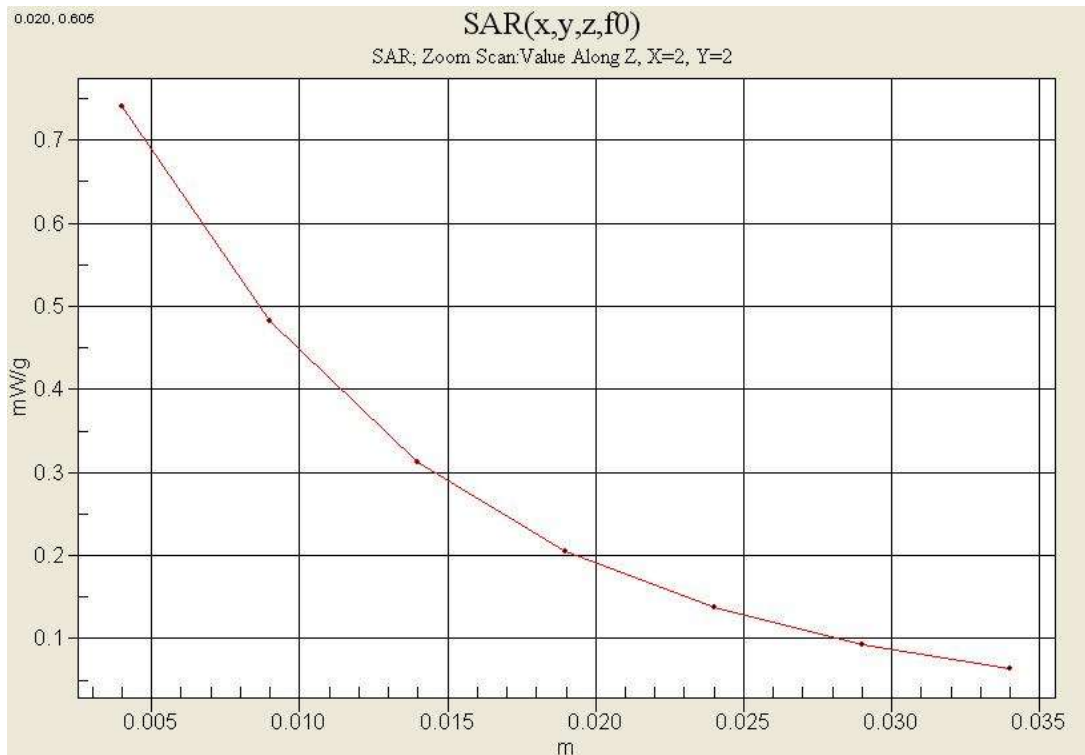
Reference Value = 8.11 V/m; Power Drift = -0.167 dB

Peak SAR (extrapolated) = 1.06 W/kg

SAR(1 g) = 0.678 mW/g; SAR(10 g) = 0.415 mW/g

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

Maximum value of SAR (measured) = 0.741 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 3, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.52 \text{ MHz}$; $\sigma = 0.992 \text{ mho/m}$; $\epsilon_r = 54.4$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body rear 384 1xRTT/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.849 mW/g

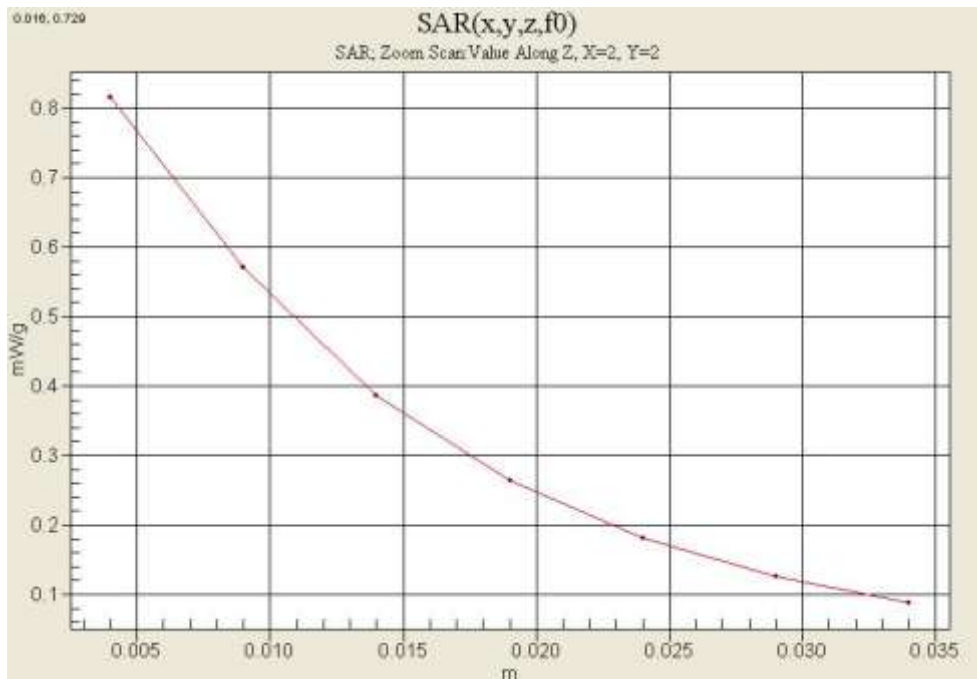
Body rear 384 1xRTT/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.02 V/m; Power Drift = 0.021 dB

Peak SAR (extrapolated) = 1.21 W/kg

SAR(1 g) = 0.767 mW/g; SAR(10 g) = 0.537 mW/g

Maximum value of SAR (measured) = 0.816 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 6, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: PCS 1900MHz FCC; Frequency: 1908.75 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1908.75$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 39.1$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(5.17, 5.17, 5.17); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Left touch 1175/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.910 mW/g

Left touch 1175/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 10.00 V/m; Power Drift = 0.013 dB

Peak SAR (extrapolated) = 2.10 W/kg

SAR(1 g) = 0.894 mW/g; SAR(10 g) = 0.535 mW/g

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

Maximum value of SAR (measured) = 0.919 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 7, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: PCS 1900MHz FCC; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 55.1$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.75, 4.75, 4.75); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Body rear 600 EVDO/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.999 mW/g

Body rear 600 EVDO/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 28.7 V/m; Power Drift = -0.066 dB
Peak SAR (extrapolated) = 1.43 W/kg
SAR(1 g) = 0.796 mW/g; SAR(10 g) = 0.467 mW/g

Maximum value of SAR (measured) = 0.854 mW/g

Body rear 600 EVDO/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 28.7 V/m; Power Drift = -0.066 dB
Peak SAR (extrapolated) = 1.36 W/kg
SAR(1 g) = 0.849 mW/g; SAR(10 g) = 0.525 mW/g
Maximum value of SAR (measured) = 0.910 mW/g



Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
 Liquid Temperature: 21.3 °C
 Ambient Temperature: 21.5 °C
 Test Date: Feb. 8, 2012
 Option: Wireless Charging Cover

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 782.5$ MHz; $\sigma = 0.894$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³
 Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 1800/1900 Phantom; Type: SAM

Right touch 23230 1RB 0 offset QPSK/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
 Maximum value of SAR (interpolated) = 0.375 mW/g

Right touch 23230 1RB 0 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
 Reference Value = 5.72 V/m; Power Drift = -0.045 dB
 Peak SAR (extrapolated) = 0.436 W/kg
SAR(1 g) = 0.347 mW/g; SAR(10 g) = 0.263 mW/g
 Maximum value of SAR (measured) = 0.362 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Feb. 9, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body rear 23230 1RB 0 offset QPSK/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.578 mW/g

Body rear 23230 1RB 0 offset QPSK/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.39 V/m; Power Drift = -0.083 dB

Peak SAR (extrapolated) = 0.894 W/kg

SAR(1 g) = 0.519 mW/g; SAR(10 g) = 0.365 mW/g

Maximum value of SAR (measured) = 0.564 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.5 °C
Test Date: Feb. 10, 2012

DUT: VS840; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.87$ mho/m; $\epsilon_r = 52.1$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.3, 4.3, 4.3); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: 835/900 Phantom ; Type: SAM

Body rear 6/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.193 mW/g

Body rear 6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.73 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 0.405 W/kg

SAR(1 g) = 0.159 mW/g; SAR(10 g) = 0.073 mW/g

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

Maximum value of SAR (measured) = 0.169 mW/g



Attachment 2. – Dipole Validation Plots

■ Validation Data (835 MHz Head)

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20 dBm)

Liquid Temp: 21.2 °C

Test Date: Feb. 2, 2012

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

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.903 \text{ mho/m}$; $\epsilon_r = 43$; $\rho = 1000 \text{ kg/m}^3$

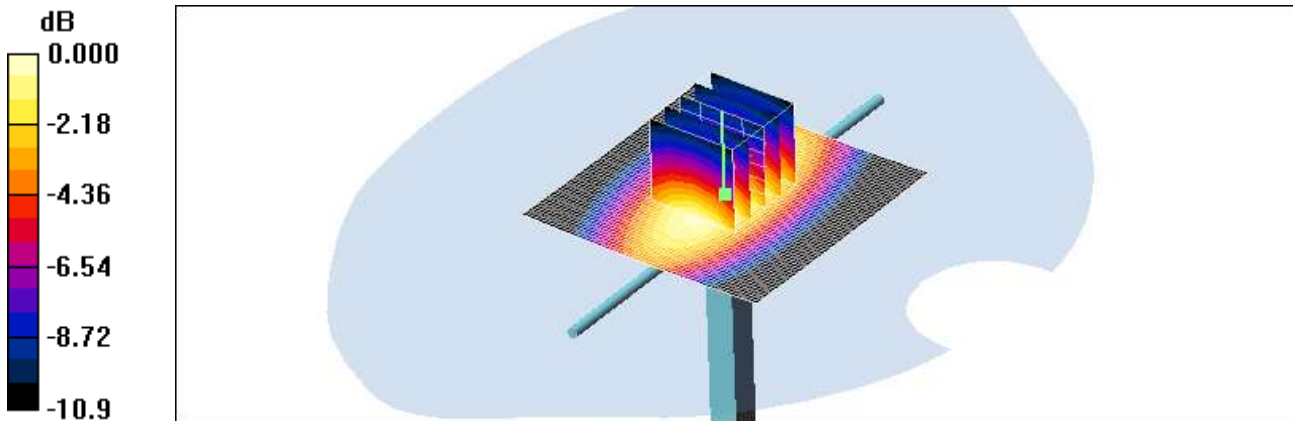
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 – SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: SAM 1800/1900 MHz; Type: SAM

Validation 835MHz/Area Scan (61x61x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 1.06 mW/g

Validation 835MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 35.8 V/m; Power Drift = -0.018 dB
Peak SAR (extrapolated) = 1.42 W/kg
SAR(1 g) = 0.968 mW/g; SAR(10 g) = 0.625 mW/g
Maximum value of SAR (measured) = 1.05 mW/g



0 dB = 1.05mW/g

■ Validation Data (835 MHz Body)

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20 dBm)

Liquid Temp: 21.2 °C

Test Date: Feb. 3, 2012

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

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.991 \text{ mho/m}$; $\epsilon_r = 54.4$; $\rho = 1000 \text{ kg/m}^3$

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

DASY4 Configuration:

- Probe: ET3DV6 – SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: SAM 1800/1900 MHz; Type: SAM

Validation 835MHz/Area Scan (61x61x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 1.03 mW/g

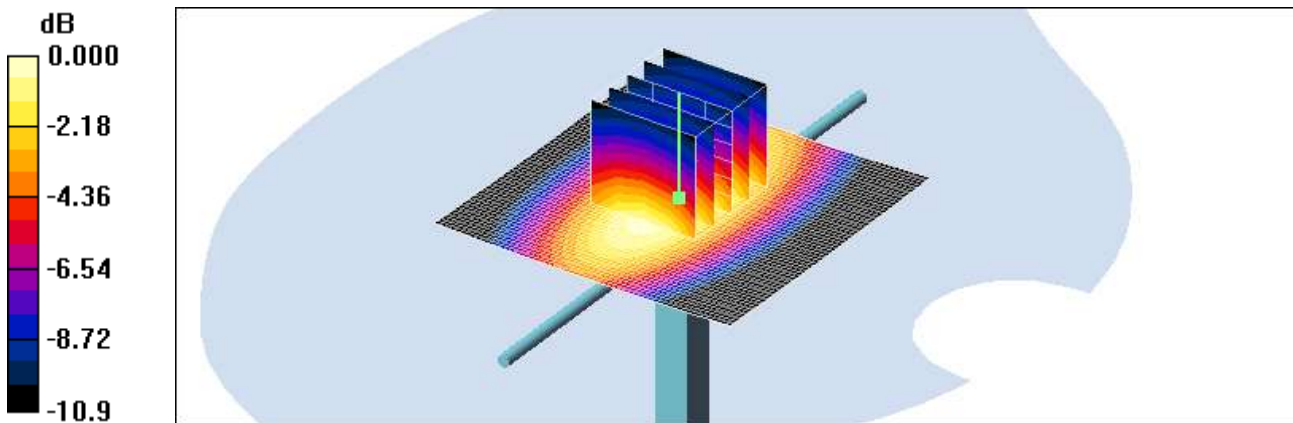
Validation 835MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 33.7 V/m; Power Drift = -0.067 dB

Peak SAR (extrapolated) = 1.36 W/kg

SAR(1 g) = 0.947 mW/g; SAR(10 g) = 0.613 mW/g

Maximum value of SAR (measured) = 1.03 mW/g



0 dB = 1.03mW/g

■ Validation Data (1900 MHz Head)

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20 dBm)

Liquid Temp: 21.2 °C

Test Date: Feb. 6, 2012

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

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.44$ mho/m; $\epsilon_r = 39.1$; $\rho = 1000$ kg/m³

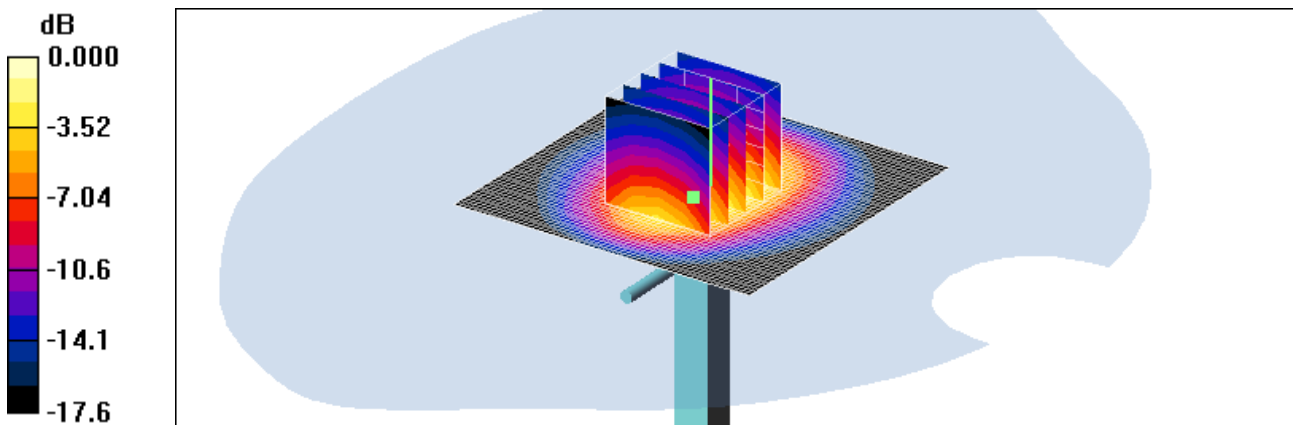
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 – SN1630; ConvF(5.17, 5.17, 5.17); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: SAM 835/900 MHz; Type: SAM

Dipole 1900MHz Validation/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 4.50 mW/g

Dipole 1900MHz Validation/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 58.2 V/m; Power Drift = -0.017 dB
Peak SAR (extrapolated) = 6.87 W/kg
SAR(1 g) = 4.04 mW/g; SAR(10 g) = 2.26 mW/g
Maximum value of SAR (measured) = 4.45 mW/g



0 dB = 4.45mW/g

■ Validation Data (1900 MHz Body)

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20 dBm)

Liquid Temp: 21.3 °C

Test Date: Feb. 7, 2012

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

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.47 \text{ mho/m}$; $\epsilon_r = 55$; $\rho = 1000 \text{ kg/m}^3$

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

DASY4 Configuration:

- Probe: ET3DV6 – SN1630; ConvF(4.75, 4.75, 4.75); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: SAM 1800/1900 MHz; Type: SAM

Dipole 1900MHz Validation/Area Scan (61x61x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 4.91 mW/g

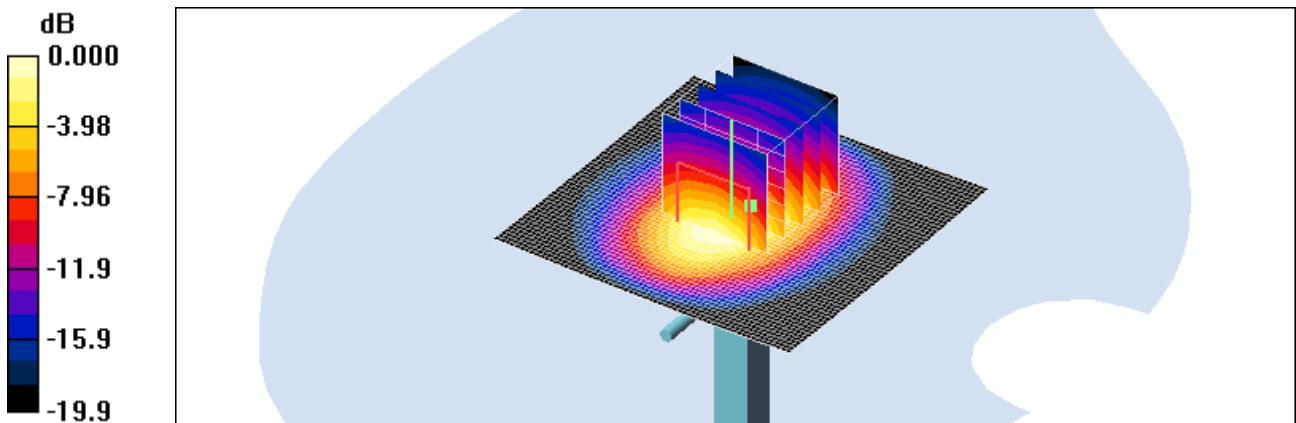
Dipole 1900MHz Validation/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 61.5 V/m; Power Drift = -0.191 dB

Peak SAR (extrapolated) = 7.09 W/kg

SAR(1 g) = 4.17 mW/g; SAR(10 g) = 2.18 mW/g

Maximum value of SAR (measured) = 4.71 mW/g



0 dB = 4.71mW/g

■ Validation Data (LTE 750 MHz Head)

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20 dBm)

Liquid Temp: 21.3 °C

Test Date: Feb. 8, 2012

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 – SN: 1014

Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.867 \text{ mho/m}$; $\epsilon_r = 42.2$; $\rho = 1000 \text{ kg/m}^3$

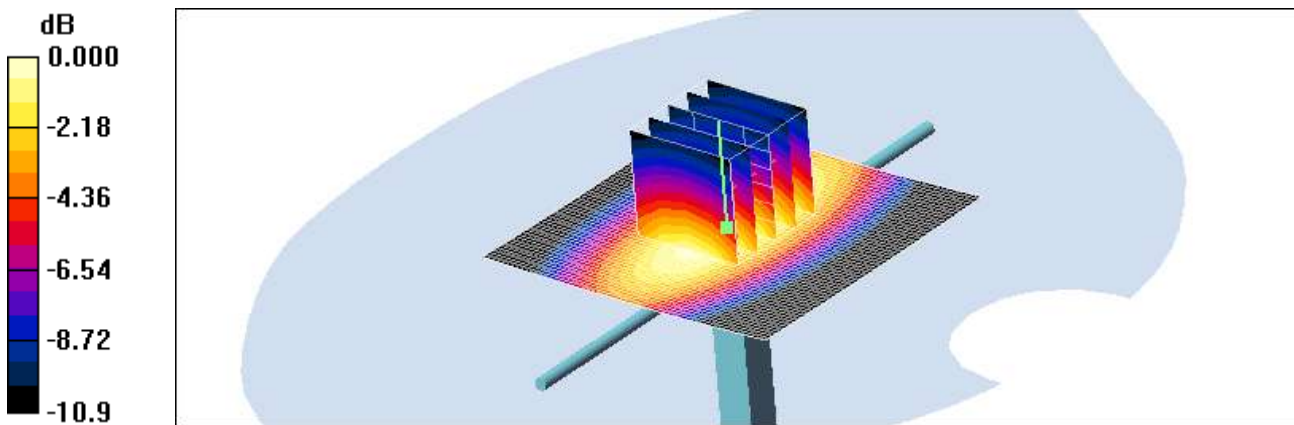
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 – SN1630; ConvF(6.61, 6.61, 6.61); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: SAM 1800/1900 MHz; Type: SAM

Validation 750MHz/Area Scan (61x61x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.947 mW/g

Validation 750MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 34.0 V/m; Power Drift = 0.005 dB
Peak SAR (extrapolated) = 1.27 W/kg
SAR(1 g) = 0.864 mW/g; SAR(10 g) = 0.557 mW/g
Maximum value of SAR (measured) = 0.940 mW/g



0 dB = 0.940mW/g

■ Validation Data (LTE 750 MHz Body)

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20 dBm)

Liquid Temp: 21.2 °C

Test Date: Feb. 9, 2012

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 – SN:1014

Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.974 \text{ mho/m}$; $\epsilon_r = 54.7$; $\rho = 1000 \text{ kg/m}^3$

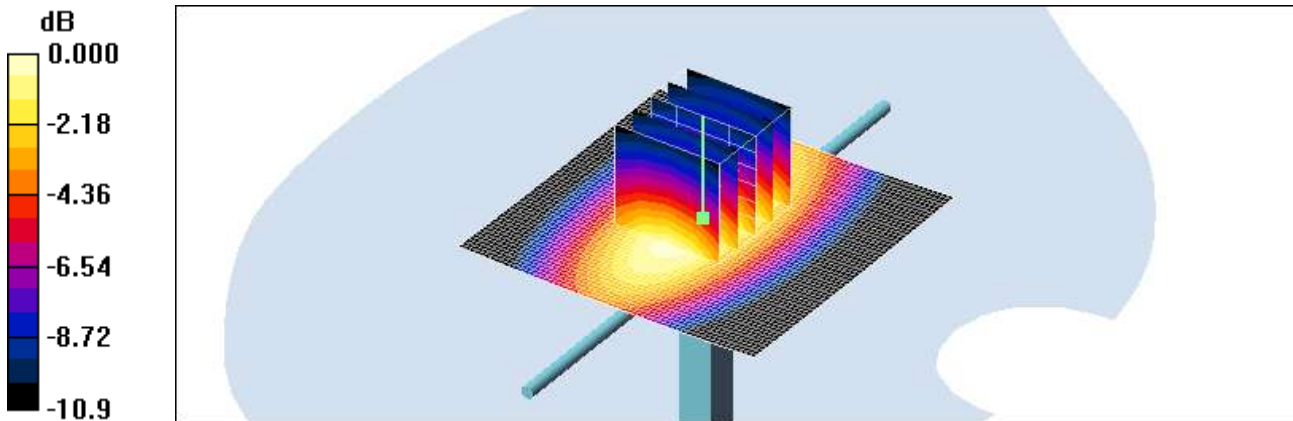
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 – SN1630; ConvF(6.36, 6.36, 6.36); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: SAM 1800/1900 MHz; Type: SAM

Validation 750 MHz /Area Scan (61x61x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 1.00 mW/g

Validation 750 MHz /Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 33.5 V/m; Power Drift = -0.067 dB
Peak SAR (extrapolated) = 1.32 W/kg
SAR(1 g) = 0.918 mW/g; SAR(10 g) = 0.594 mW/g
Maximum value of SAR (measured) = 1.000 mW/g



0 dB = 1.00mW/g

■ Validation Data (2450 MHz Head)

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20 dBm)

Liquid Temp: 21.3 °C

Test Date: Feb. 10, 2012

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

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.85$ mho/m; $\epsilon_r = 38.7$; $\rho = 1000$ kg/m³

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

DASY4 Configuration:

- Probe: ET3DV6 – SN1630; ConvF(4.57, 4.57, 4.57); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: SAM 1800/1900 MHz; Type: SAM

Validation 2450MHz/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 6.55 mW/g

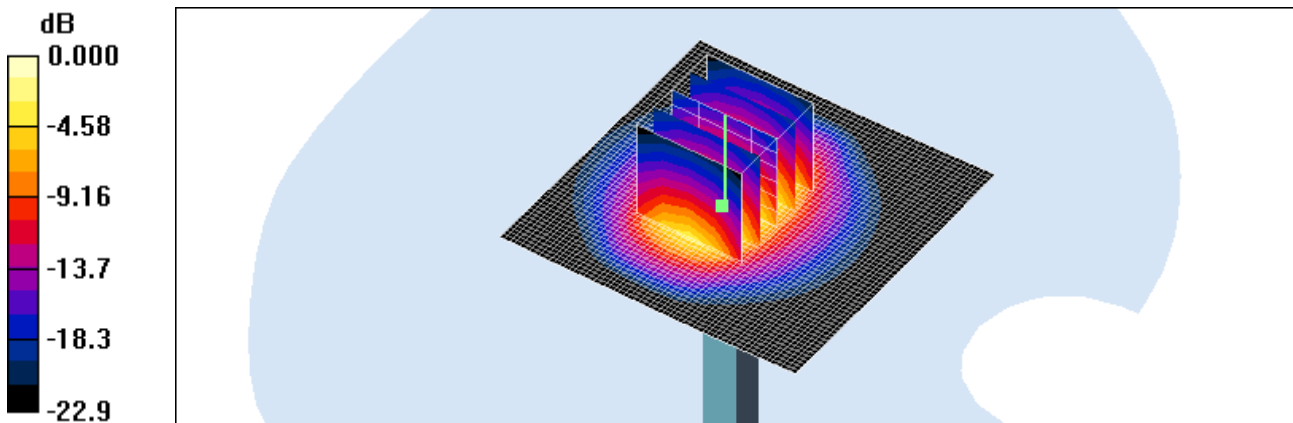
Validation 2450MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 59.9 V/m; Power Drift = -0.035 dB

Peak SAR (extrapolated) = 12.7 W/kg

SAR(1 g) = 5.44 mW/g; SAR(10 g) = 2.47 mW/g

Maximum value of SAR (measured) = 5.99 mW/g



0 dB = 5.99mW/g

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20 dBm)

Liquid Temp: 21.3 °C

Test Date: Feb. 10, 2012

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

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.85$ mho/m; $\epsilon_r = 38.7$; $\rho = 1000$ kg/m³

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

DASY4 Configuration:

- Probe: ET3DV6 – SN1630; ConvF(4.57, 4.57, 4.57); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: SAM 1800/1900 MHz; Type: SAM

Validation 2450MHz/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 6.55 mW/g

Validation 2450MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 59.9 V/m; Power Drift = -0.035 dB

Peak SAR (extrapolated) = 12.7 W/kg

SAR(1 g) = 5.44 mW/g; SAR(10 g) = 2.47 mW/g

Maximum value of SAR (measured) = 5.99 mW/g



■ Validation Data (2450 MHz Body)

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20 dBm)

Liquid Temp: 21.3 °C

Test Date: Feb. 10, 2012

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

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.89$ mho/m; $\epsilon_r = 52$; $\rho = 1000$ kg/m³

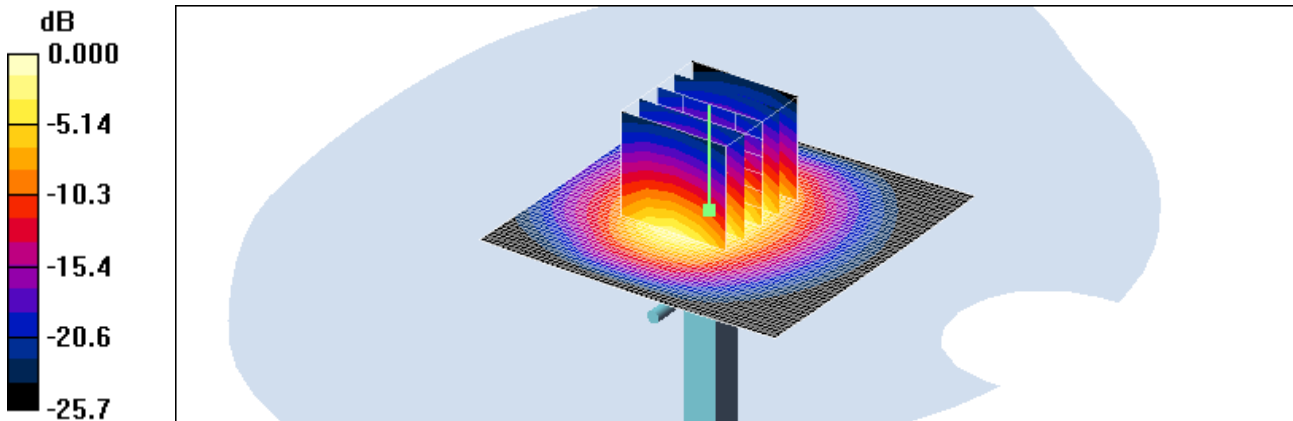
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 – SN1630; ConvF(4.3, 4.3, 4.3); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2011-03-01
- Phantom: SAM 1800/1900 MHz; Type: SAM

Validation 2450MHz/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 5.98 mW/g

Validation 2450MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 54.6 V/m; Power Drift = 0.004 dB
Peak SAR (extrapolated) = 11.9 W/kg
SAR(1 g) = 4.97 mW/g; SAR(10 g) = 2.22 mW/g
Maximum value of SAR (measured) = 5.48 mW/g



0 dB = 5.48mW/g

■ Dielectric Parameter (835 MHz Head)

Title VS840
 SubTitle CDMA835(Head)
 Test Date Feb. 2, 2012

Frequency	e'	e''
800000000.0000	43.5097	19.5651
805000000.0000	43.4458	19.5588
810000000.0000	43.3973	19.5267
815000000.0000	43.3076	19.5175
820000000.0000	43.2526	19.4935
825000000.0000	43.1837	19.4737
830000000.0000	43.1390	19.4421
835000000.0000	43.0074	19.4361
840000000.0000	42.9994	19.4156
845000000.0000	42.9058	19.4047
850000000.0000	42.8479	19.4044
855000000.0000	42.7553	19.3887
860000000.0000	42.7047	19.3713
865000000.0000	42.6513	19.3242
870000000.0000	42.5443	19.3346
875000000.0000	42.5376	19.3355
880000000.0000	42.4803	19.3010
885000000.0000	42.4294	19.2851
890000000.0000	42.4096	19.2700
895000000.0000	42.3547	19.2359
900000000.0000	42.2791	19.2134

■ Dielectric Parameter (835 MHz Body)

Title VS840
 SubTitle CDMA 850(Body)
 Test Date Feb. 3, 2012

Frequency	e'	e''
800000000.0000	54.8983	21.3373
805000000.0000	54.8629	21.2988
810000000.0000	54.7972	21.3619
815000000.0000	54.7213	21.3608
820000000.0000	54.6332	21.3531
825000000.0000	54.5466	21.3452
830000000.0000	54.4723	21.3666
835000000.0000	54.3876	21.3255
840000000.0000	54.3113	21.3039
845000000.0000	54.2484	21.2559
850000000.0000	54.2237	21.2051
855000000.0000	54.1674	21.1557
860000000.0000	54.1287	21.1218
865000000.0000	54.1297	21.0624
870000000.0000	54.0960	21.0379
875000000.0000	54.0992	21.0100
880000000.0000	54.0716	20.9834
885000000.0000	54.0666	20.9587
890000000.0000	54.0530	20.9373
895000000.0000	54.0273	20.9103
900000000.0000	53.9825	20.8595

■ Dielectric Parameter (1900 MHz Head)

Title VS840
 SubTitle PCS1900(Head)
 Test Date Feb. 6, 2012

Frequency	e'	e''
1850000000.0000	39.3474	13.5140
1855000000.0000	39.3356	13.5286
1860000000.0000	39.3133	13.5647
1865000000.0000	39.2976	13.5817
1870000000.0000	39.2805	13.6056
1875000000.0000	39.2610	13.6011
1880000000.0000	39.2293	13.6341
1885000000.0000	39.2170	13.6401
1890000000.0000	39.1882	13.6386
1895000000.0000	39.1536	13.6557
1900000000.0000	39.1221	13.6443
1905000000.0000	39.1010	13.6442
1910000000.0000	39.0817	13.6371
1915000000.0000	39.0430	13.6365
1920000000.0000	39.0072	13.6400
1925000000.0000	38.9929	13.6536
1930000000.0000	38.9672	13.6628
1935000000.0000	38.9583	13.6611
1940000000.0000	38.9289	13.6728
1945000000.0000	38.9108	13.6742
1950000000.0000	38.8904	13.7036

■ Dielectric Parameter (1900 MHz Body)

Title VS840
 SubTitle PCS1900(Body)
 Test Date Feb. 7, 2012

Frequency	e'	e''
1850000000.0000	55.1427	13.7745
1855000000.0000	55.1203	13.7900
1860000000.0000	55.1078	13.7731
1865000000.0000	55.0765	13.8037
1870000000.0000	55.0714	13.8015
1875000000.0000	55.0599	13.8273
1880000000.0000	55.0537	13.8451
1885000000.0000	55.0386	13.8515
1890000000.0000	55.0322	13.8789
1895000000.0000	55.0327	13.8913
1900000000.0000	55.0210	13.9064
1905000000.0000	55.0418	13.9301
1910000000.0000	55.0375	13.9514
1915000000.0000	55.0282	13.9505
1920000000.0000	55.0135	13.9591
1925000000.0000	55.0217	13.9652
1930000000.0000	55.0123	13.9656
1935000000.0000	55.0079	13.9579
1940000000.0000	54.9890	13.9572
1945000000.0000	54.9604	13.9555
1950000000.0000	54.9514	13.9387

■ Dielectric Parameter (750 MHz Head)

Title VS840
SubTitle LTE PCS1900(Head)
Test Date Feb. 8, 2012

Frequency	e'	e''
750000000.0000	42.1833	20.7773
752500000.0000	42.1136	20.7591
755000000.0000	42.0768	20.7327
757500000.0000	42.0673	20.7225
760000000.0000	42.0147	20.6777
762500000.0000	41.9843	20.6731
765000000.0000	41.9660	20.6484
767500000.0000	41.8935	20.6548
770000000.0000	41.8357	20.6067
772500000.0000	41.8318	20.6126
775000000.0000	41.8133	20.6053
777500000.0000	41.7594	20.5906
780000000.0000	41.7464	20.5597
782500000.0000	41.7155	20.5448
785000000.0000	41.6798	20.5536
787500000.0000	41.6336	20.5208
790000000.0000	41.6035	20.5060
792500000.0000	41.5687	20.5147
795000000.0000	41.5391	20.5001
797500000.0000	41.5590	20.5053
800000000.0000	41.5039	20.4756

■ Dielectric Parameter (750 MHz Body)

Title VS840
 SubTitle LTE PCS1900(Body)
 Test Date Feb. 9, 2012

Frequency	e'	e''
700000000.0000	55.5016	23.7425
705000000.0000	55.4479	23.6882
710000000.0000	55.3254	23.6122
715000000.0000	55.2941	23.6591
720000000.0000	55.2206	23.5504
725000000.0000	55.1180	23.5021
730000000.0000	55.0394	23.4655
735000000.0000	54.9698	23.4143
740000000.0000	54.8500	23.3925
745000000.0000	54.8308	23.3382
750000000.0000	54.7144	23.3347
755000000.0000	54.6811	23.2861
760000000.0000	54.5394	23.2502
765000000.0000	54.5797	23.1481
770000000.0000	54.4466	23.1113
775000000.0000	54.3787	23.0531
780000000.0000	54.3146	23.0882
785000000.0000	54.2886	22.9584
790000000.0000	54.2027	22.9897
795000000.0000	54.1242	22.9377
800000000.0000	54.0665	22.8102

■ Dielectric Parameter (2450 MHz Head)

Title VS840
 SubTitle 2450MHz (Head)
 Test Date Feb. 10, 2012

Frequency	e'	e''
2400000000.0000	38.8430	13.4612
2405000000.0000	38.8282	13.4795
2410000000.0000	38.8158	13.4903
2415000000.0000	38.7880	13.5057
2420000000.0000	38.7735	13.5100
2425000000.0000	38.7531	13.5137
2430000000.0000	38.7302	13.5308
2435000000.0000	38.7200	13.5428
2440000000.0000	38.7048	13.5619
2445000000.0000	38.6910	13.5659
2450000000.0000	38.6609	13.5865
2455000000.0000	38.6415	13.5899
2460000000.0000	38.6093	13.6041
2465000000.0000	38.6017	13.6143
2470000000.0000	38.5840	13.6386
2475000000.0000	38.5777	13.6368
2480000000.0000	38.5494	13.6481
2485000000.0000	38.5300	13.6630
2490000000.0000	38.5085	13.6687
2495000000.0000	38.4922	13.6866
2500000000.0000	38.4705	13.6981

■ Dielectric Parameter (2450 MHz Body)

Title VS840
 SubTitle 2450MHz (Body)
 Test Date Feb. 10, 2012

Frequency	e'	e''
2400000000.0000	52.2035	13.6584
2405000000.0000	52.1847	13.6770
2410000000.0000	52.1711	13.6816
2415000000.0000	52.1520	13.6934
2420000000.0000	52.1237	13.7095
2425000000.0000	52.1037	13.7377
2430000000.0000	52.0905	13.7650
2435000000.0000	52.1003	13.7894
2440000000.0000	52.0885	13.7965
2445000000.0000	52.0715	13.8140
2450000000.0000	52.0435	13.8460
2455000000.0000	52.0445	13.8709
2460000000.0000	52.0348	13.8872
2465000000.0000	52.0486	13.8806
2470000000.0000	52.0227	13.8955
2475000000.0000	52.0155	13.9012
2480000000.0000	51.9957	13.9086
2485000000.0000	51.9834	13.9214
2490000000.0000	51.9787	13.9167
2495000000.0000	51.9733	13.9055
2500000000.0000	51.9497	13.9033

Attachment 3. – Probe Calibration Data

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Accreditation No.: SCS 108

Client **HCT (Dymstec)**

Certificate No: ET3-1630_Nov11

CALIBRATION CERTIFICATE

Object **ET3DV6 - SN:1630**

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: **November 18, 2011**

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 $(22 \pm 3)^{\circ}\text{C}$ 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	MY41486087	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-10 (No. ES3-3013_Dec10)	Dec-11
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 Analyser HP 8753E	US37390585	18-Oct-01 (in house check Oct-11)	in house check: Oct-12

	Name	Function	Signature
Calibrated by:	Jeton Kasirati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	
Issued: November 18, 2011			

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

Calibration Laboratory of
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Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,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., $\theta = 0$ is normal to probe axis

Calibration is Performed According to the Following Standards:

- 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
- 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:

- NORM_{x,y,z}: Assessed for E-field polarization $\theta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z} = NORM_{x,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.
- DCP_{x,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
- A_{x,y,z}, B_{x,y,z}, C_{x,y,z}, VR_{x,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 $f \leq 800$ 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 NORM_{x,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.

ET3DV6 – SN:1630

November 18, 2011

Probe ET3DV6

SN:1630

Manufactured: October 12, 2001
Calibrated: November 18, 2011

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

ET3DV6--SN:1630

November 18, 2011

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1630

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V/m})^2$) ^A	1.71	1.62	1.60	± 10.1 %
DCP (mV) ^B	100.3	99.5	101.7	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc ^C (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	98.2	±2.7 %
			Y	0.00	0.00	1.00	101.9	
			Z	0.00	0.00	1.00	98.0	

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 E²-field uncertainty inside TSL (see Pages 5 and 6).

^B Numerical linearization parameter; uncertainty not required.

^C Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

ET3DV6—SN:1630

November 18, 2011

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1630

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^c	Relative Permittivity ^a	Conductivity (S/m) ^a	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (kW2)
300	45.3	0.87	8.13	8.13	8.13	0.31	1.60	± 13.4 %
450	43.5	0.87	7.40	7.40	7.40	0.22	2.27	± 13.4 %
750	41.9	0.89	6.61	6.61	6.61	0.82	1.68	± 12.0 %
835	41.5	0.90	6.27	6.27	6.27	0.72	1.84	± 12.0 %
900	41.5	0.97	6.16	6.16	6.16	0.68	1.92	± 12.0 %
1450	40.5	1.20	5.57	5.57	5.57	0.54	2.48	± 12.0 %
1750	40.1	1.37	5.43	5.43	5.43	0.60	2.26	± 12.0 %
1900	40.0	1.40	5.17	5.17	5.17	0.63	2.15	± 12.0 %
1950	40.0	1.40	5.05	5.05	5.05	0.63	2.13	± 12.0 %
2450	39.2	1.80	4.57	4.57	4.57	0.81	1.74	± 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.

^a 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:1630

November 18, 2011

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1630

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) ^c	Relative Permittivity ^e	Conductivity (S/m) ^e	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
300	58.2	0.92	7.96	7.96	7.96	0.29	2.29	± 13.4 %
450	56.7	0.94	7.74	7.74	7.74	0.16	2.25	± 13.4 %
750	55.5	0.96	6.36	6.36	6.36	0.75	1.84	± 12.0 %
835	55.2	0.97	6.27	6.27	6.27	0.72	1.88	± 12.0 %
1450	54.0	1.30	5.46	5.46	5.46	0.70	1.97	± 12.0 %
1750	53.4	1.49	4.95	4.95	4.95	0.58	2.72	± 12.0 %
1900	53.3	1.52	4.75	4.75	4.75	0.60	2.56	± 12.0 %
2450	52.7	1.95	4.30	4.30	4.30	1.00	1.29	± 12.0 %

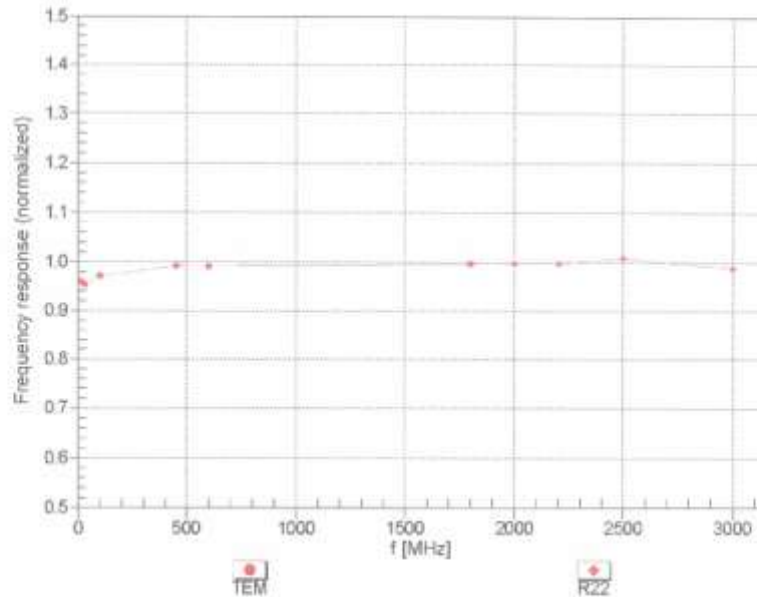
^c Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^e At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to $\pm 10\%$ 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 $\pm 5\%$. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

ET30V6-SN.1630

November 18, 2011

Frequency Response of E-Field (TEM-Cell:ifi110 EXX, Waveguide: R22)

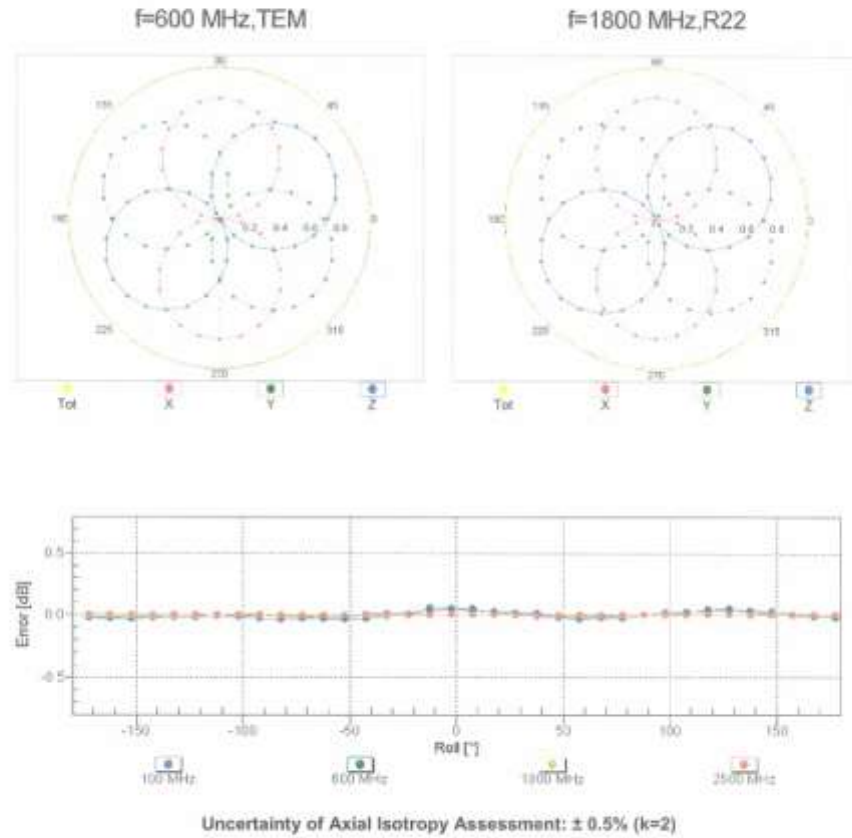


Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

ET3DV6- SN:1630

November 18, 2011

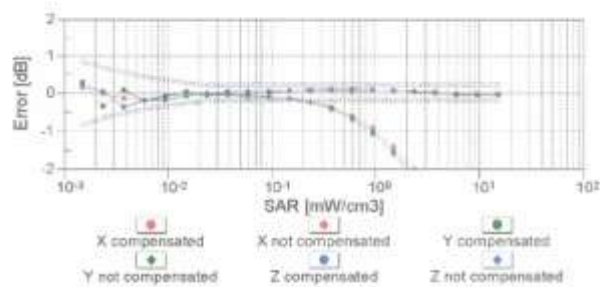
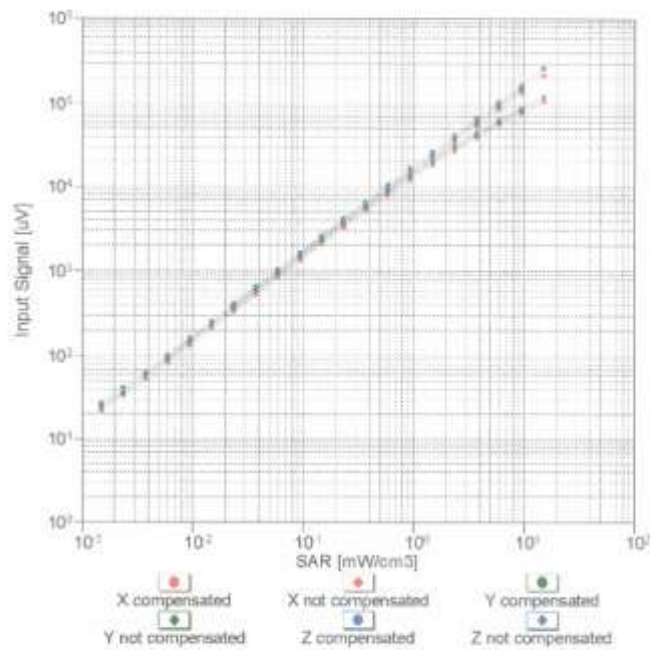
Receiving Pattern (ϕ), $\theta = 0^\circ$



ET3DV6- SN.1630

November 18, 2011

Dynamic Range $f(\text{SAR}_{\text{head}})$ (TEM cell, $f = 900 \text{ MHz}$)



Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

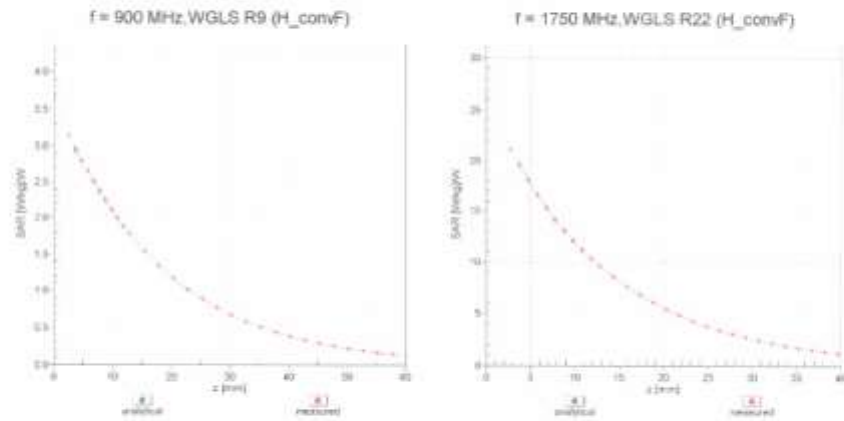
Certificate No: ET3-1630_Nov11

Page 9 of 11

ET3DV8- SN.1630

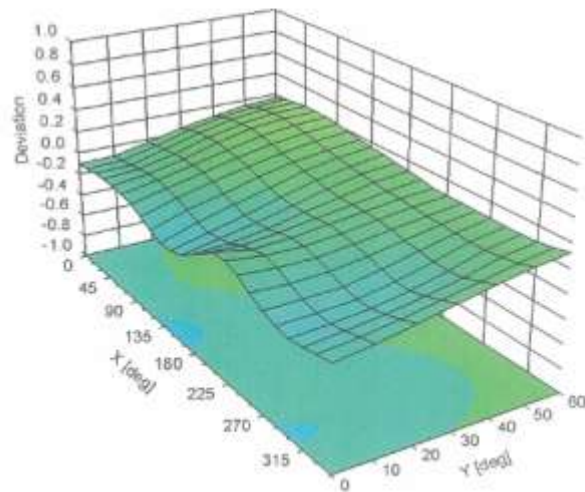
November 18, 2011

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ , θ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: $\pm 2.6\%$ (k=2)

ET3DV6- SN:1630

November 18, 2011

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1630**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

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Phone +41 44 245 9700, Fax +41 44 245 9779
info@speag.com, <http://www.speag.com>**Additional Conversion Factors**
for Dosimetric E-Field Probe

Type:

ET3DV6

Serial Number:

1630

Place of Assessment:

Zurich

Date of Assessment:

November 21, 2011

Probe Calibration Date:

November 18, 2011

Schmid & Partner Engineering AG hereby certifies that conversion factor(s) of this probe have been evaluated on the date indicated above. The assessment was performed using the FDTD numerical code SEMCAD of Schmid & Partner Engineering AG. Since the evaluation is coupled with measured conversion factors, it has to be recalculated yearly, i.e., following the recalibration schedule of the probe. The uncertainty of the numerical assessment is based on the extrapolation from measured value at 450, 900 MHz or at 1750 MHz.

Assessed by:



ET3DV6-SN:1630

Page 1 of 2

November 21, 2011

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s p e a g

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Dosimetric E-Field Probe ET3DV6 - SN:1630

Conversion factor ($\pm$ standard deviation)

150 $\pm$ 50 MHz *ConvF* 8.03 $\pm$ 10 %

$\epsilon_r = 52.3 \pm 5\%$
 $\sigma = 0.76 \pm 5\% \text{ mho/m}$
(head tissue)

150 $\pm$ 50 MHz *ConvF* 8.29 $\pm$ 10 %

$\epsilon_r = 61.9 \pm 5\%$
 $\sigma = 0.80 \pm 5\% \text{ mho/m}$
(body tissue)

Important Note:

For numerically assessed probe conversion factors, parameters Alpha and Delta in the DASY software must have the following entries: Alpha = 0 and Delta = 1.

Please see also DASY Manual.

Attachment 4. – Dipole Calibration Data

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Accreditation No.: SCS 108

Client: **HCT (Dymstec)**

Certificate No: D835V2-441_May11

CALIBRATION CERTIFICATE

Object: D835V2 - SN: 441

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

Calibration date: May 16, 2011

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	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Issued: May 16, 2011

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Certificate No: D835V2-441_May11

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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:

- 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
- 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
- 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:

- 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	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	40.4 $\pm$ 6 %	0.88 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.31 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	9.34 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.51 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	6.09 mW / g $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	53.9 $\pm$ 6 %	1.00 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.43 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	9.45 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.60 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	6.27 mW / g $\pm$ 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.2 Ω - 9.8 $j\Omega$
Return Loss	- 20.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.3 Ω - 10.3 $j\Omega$
Return Loss	- 18.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.374 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.

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 09, 2001

DASY5 Validation Report for Head TSL

Date: 16.05.2011

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL900

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.88 \text{ mho/m}$; $\epsilon_r = 40.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

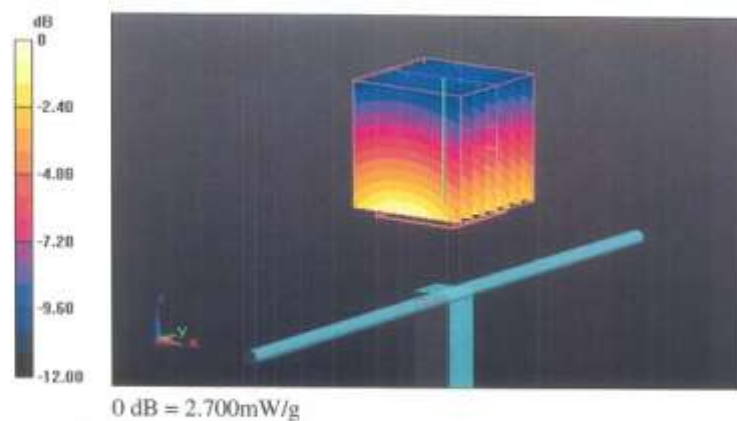
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 57.041 V/m; Power Drift = 0.03 dB

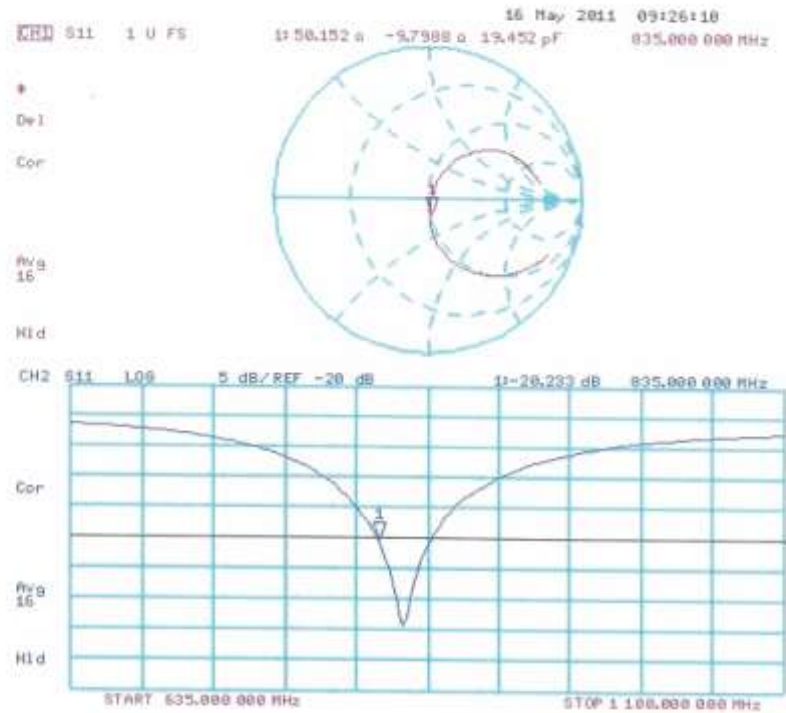
Peak SAR (extrapolated) = 3.442 W/kg

SAR(1 g) = 2.31 mW/g; SAR(10 g) = 1.51 mW/g

Maximum value of SAR (measured) = 2.703 mW/g



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 16.05.2011

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: MSL900

Medium parameters used: $f = 835$ MHz; $\sigma = 1$ mho/m; $\epsilon_r = 53.9$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.02, 6.02, 6.02); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

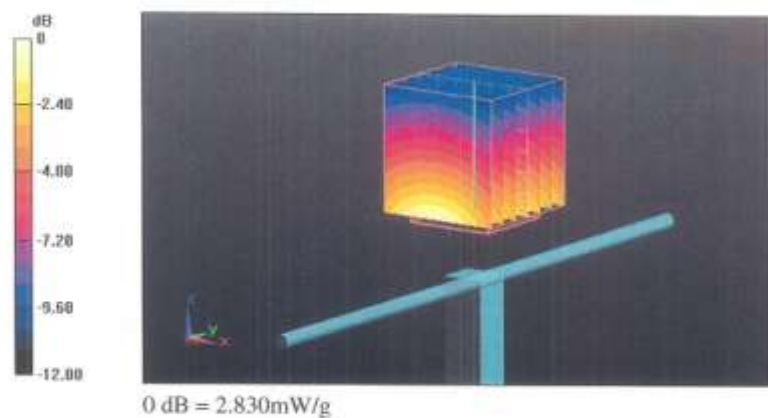
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.302 V/m; Power Drift = 0.02 dB

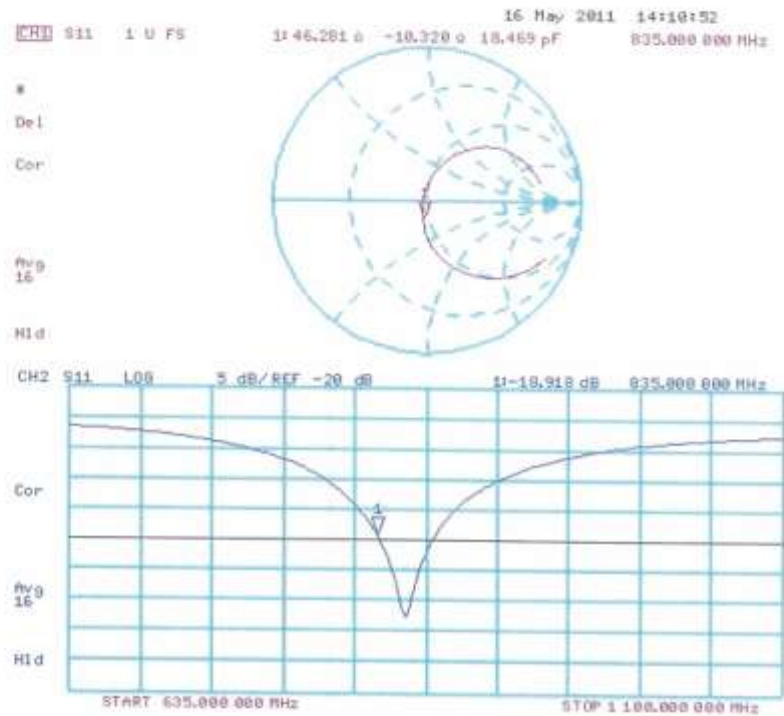
Peak SAR (extrapolated) = 3.553 W/kg

SAR(1 g) = 2.43 mW/g; SAR(10 g) = 1.6 mW/g

Maximum value of SAR (measured) = 2.833 mW/g



Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client: **HCT (Dymstec)**

Certificate No: **D1900V2-5d032_Jul11**

CALIBRATION CERTIFICATE

Object: **D1900V2 - SN: 5d032**

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

Calibration date: **July 22, 2011**

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	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-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-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Issued: August 2, 2011

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Certificate No: D1900V2-5d032_Jul11

Page 1 of 8

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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:

- 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
- 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
- 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:

- 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	V52.6.2
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 $\pm$ 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 $\pm$ 0.2) °C	39.1 $\pm$ 6 %	1.42 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	-----	-----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.1 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	39.9 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.29 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	21.0 mW / g $\pm$ 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 $\pm$ 0.2) °C	52.3 $\pm$ 6 %	1.53 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	-----	-----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.3 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	40.9 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.39 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	21.5 mW / g $\pm$ 16.5 % (k=2)

Appendix**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	52.6 Ω + 6.5 j Ω
Return Loss	- 23.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.6 Ω + 6.0 j Ω
Return Loss	- 22.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.190 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.

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 17, 2003

DASY5 Validation Report for Head TSL

Date: 20.07.2011

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.42$ mho/m; $\epsilon_r = 39.1$; $\rho = 1000$ kg/m³

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: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

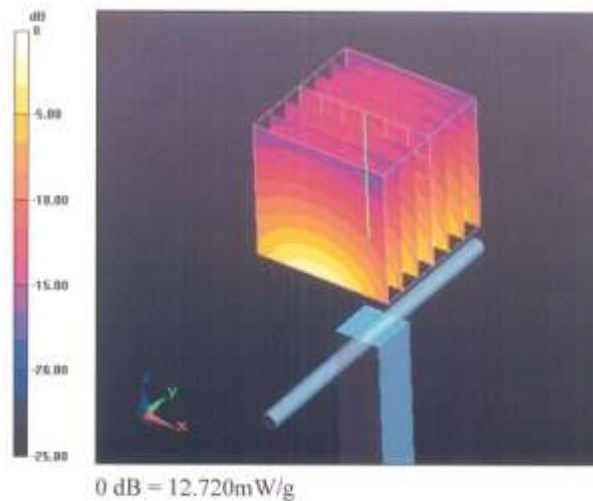
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 98.253 V/m; Power Drift = 0.03 dB

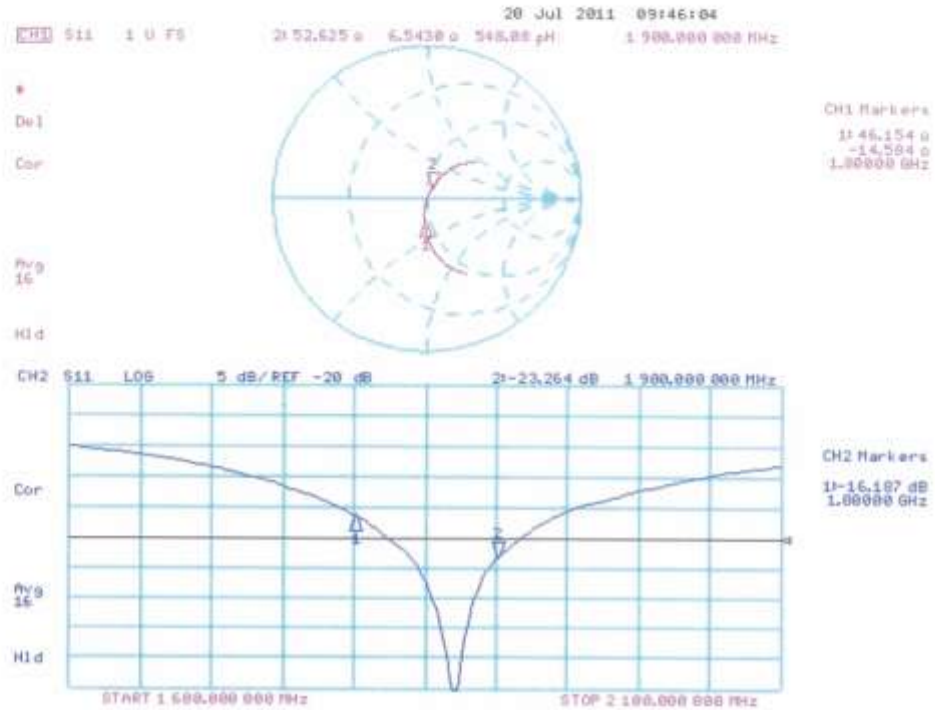
Peak SAR (extrapolated) = 18.469 W/kg

SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.29 mW/g

Maximum value of SAR (measured) = 12.721 mW/g



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 22.07.2011

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 52.3$; $\rho = 1000$ kg/m³

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: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

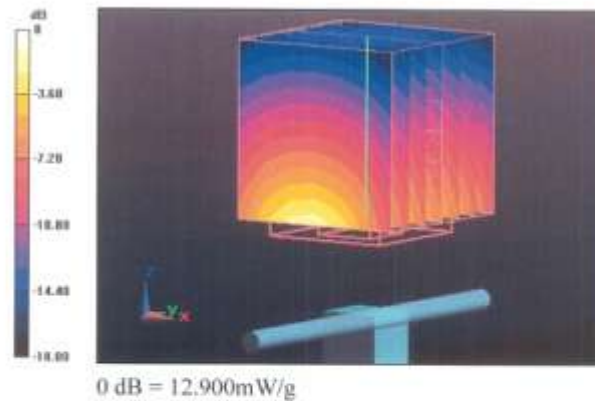
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 95.827 V/m; Power Drift = 0.0078 dB

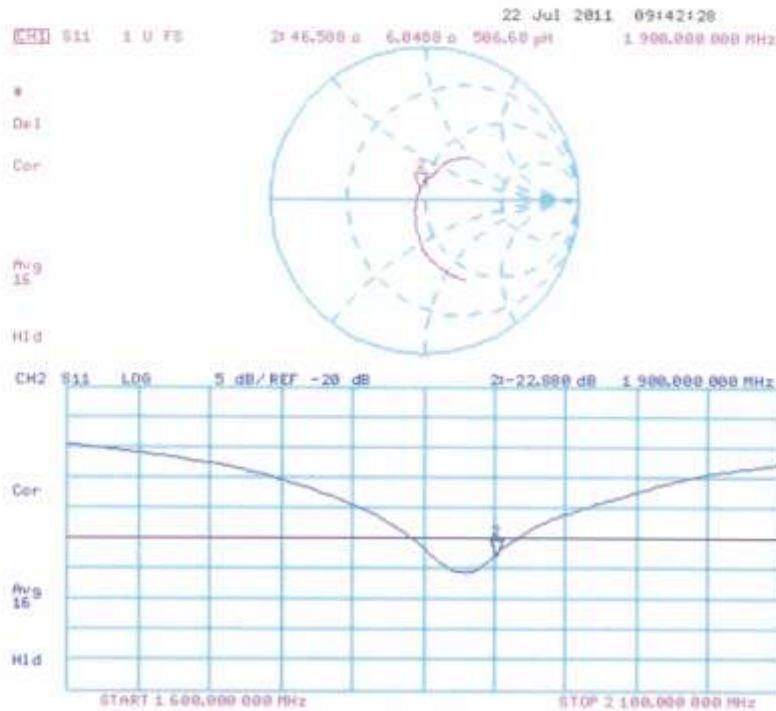
Peak SAR (extrapolated) = 18.111 W/kg

SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.39 mW/g

Maximum value of SAR (measured) = 12.898 mW/g



Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client: HCT (Dymstec)

Certificate No: D2450V2-743_Aug11

CALIBRATION CERTIFICATE

Object: D2450V2 - SN: 743

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

Calibration date: August 29, 2011

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 $(22 \pm 3)^{\circ}\text{C}$ 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	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 08327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3206	29-Apr-11 (No. ES3-3205_Apr11)	Apr-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-09)	in house check: Oct-11
RF generator R&S SMT-08	100005	04-Aug-99 (in house check Oct-09)	in house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	in house check: Oct-11

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

Issued: August 29, 2011

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Certificate No: D2450V2-743_Aug11

Page 1 of 8

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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:

- 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
- 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
- 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:

- 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	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	38.4 $\pm$ 6 %	1.85 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.7 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	53.8 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.40 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	25.4 mW / g $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	51.8 $\pm$ 6 %	2.02 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.2 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	51.7 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.11 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	24.2 mW / g $\pm$ 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	55.0 Ω + 4.8 j Ω
Return Loss	- 23.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.3 Ω + 5.8 j Ω
Return Loss	- 24.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1,160 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.

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	December 01, 2003

DASY5 Validation Report for Head TSL

Date: 29.08.2011

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.85$ mho/m; $\epsilon_r = 38.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.45, 4.45, 4.45); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

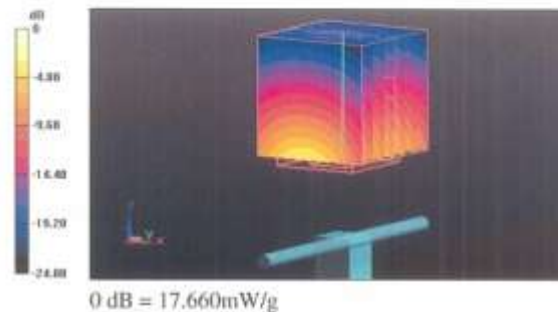
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 101.2 V/m; Power Drift = 0.03 dB

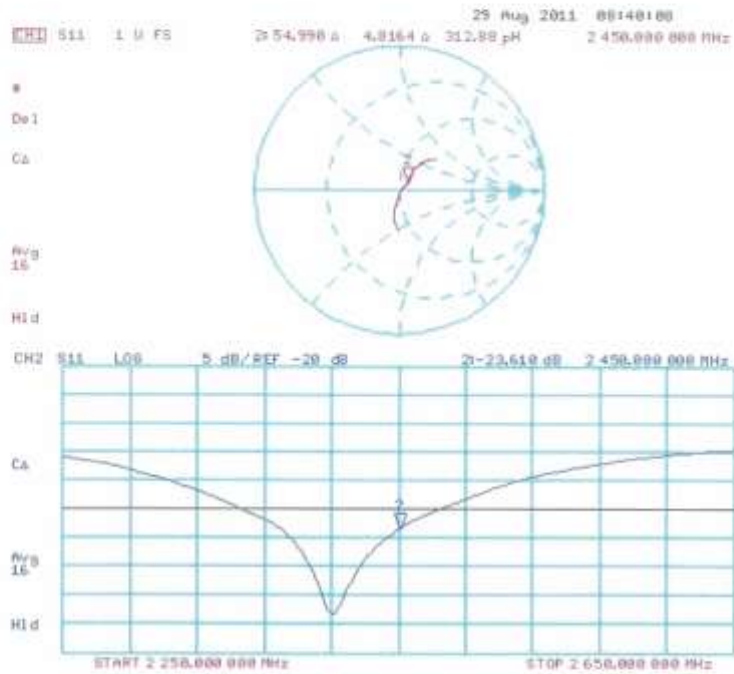
Peak SAR (extrapolated) = 28.291 W/kg

SAR(1 g) = 13.7 mW/g; SAR(10 g) = 6.4 mW/g

Maximum value of SAR (measured) = 17.657 mW/g



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 29.08.2011

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 2.02$ mho/m; $\epsilon_r = 51.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.26, 4.26, 4.26); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

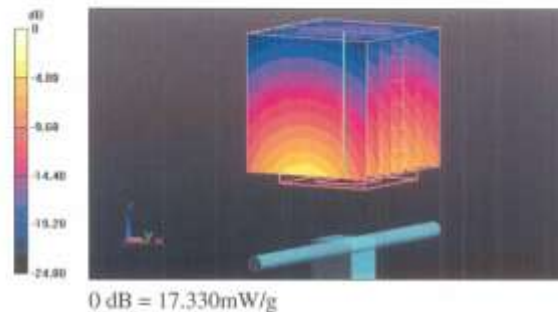
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 95.903 V/m; Power Drift = -0.0051 dB

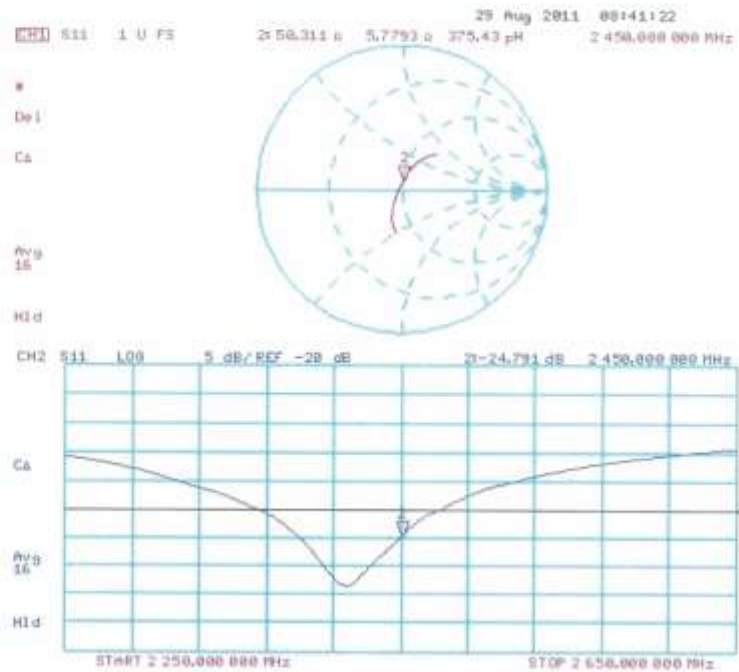
Peak SAR (extrapolated) = 27.107 W/kg

SAR(1 g) = 13.2 mW/g; SAR(10 g) = 6.11 mW/g

Maximum value of SAR (measured) = 17.329 mW/g



Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client **HCT (Dymistec)**

Certificate No: **D750V3-1014_Jul11**

CALIBRATION CERTIFICATE

Object **D750V3 - SN:1014**

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

Calibration date: **July 25, 2011**

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 (MATE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8461A	U537292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: 55085 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-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 8461A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 54206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

Calibrated by:	Name Claudio Leubler	Function Laboratory Technician	Signature
Approved by:	Name Kajsa Pokovic	Technical Manager	

Issued: July 25, 2011

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

Certificate No: D750V3-1014_Jul11

Page 1 of 8

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
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

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:

- 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
- 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
- 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:

- 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	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	41.7 $\pm$ 6 %	0.91 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.15 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	8.44 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.40 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	5.52 mW / g $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	55.2 $\pm$ 6 %	0.96 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.22 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	8.87 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.47 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	5.88 mW / g $\pm$ 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$53.3 \Omega + 0.4 j\Omega$
Return Loss	-30.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$49.0 \Omega - 2.7 j\Omega$
Return Loss	-30.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.040 ns
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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.

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 22, 2010

DASY5 Validation Report for Head TSL

Date: 25.07.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1014

Communication System: CW; Frequency: 750 MHz

Medium parameters used: $f = 750$ MHz; $\sigma = 0.91$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.33, 6.33, 6.33); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Head Tissue/Pin=250mW; dip=15mm; dist=3.0mm/Zoom Scan

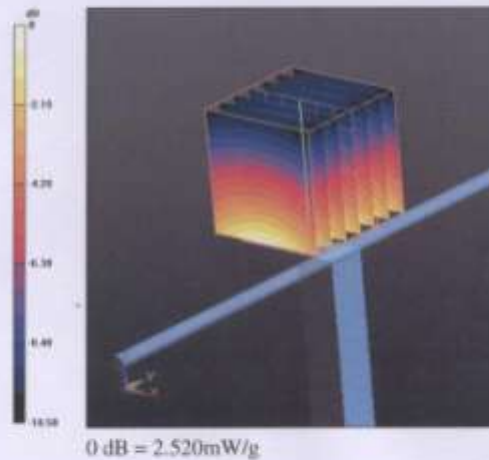
(7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 51.352 V/m; Power Drift = 0.06 dB

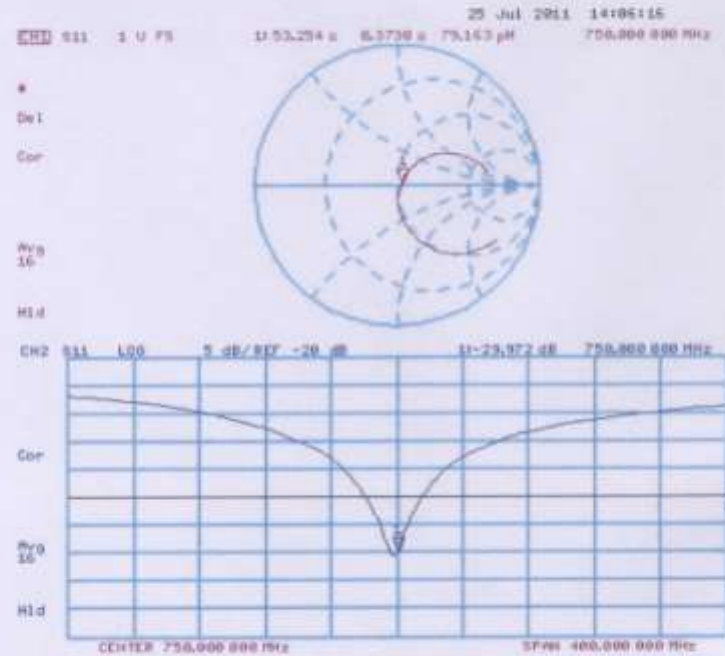
Peak SAR (extrapolated) = 3.258 W/kg

SAR(1 g) = 2.15 mW/g; SAR(10 g) = 1.4 mW/g

Maximum value of SAR (measured) = 2.524 mW/g



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 25.07.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1014

Communication System: CW; Frequency: 750 MHz

Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.96 \text{ mho/m}$; $\epsilon_r = 55.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.12, 6.12, 6.12); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Body Tissue/Pin=250mW; dip=15mm; dist=3.0mm/Zoom Scan

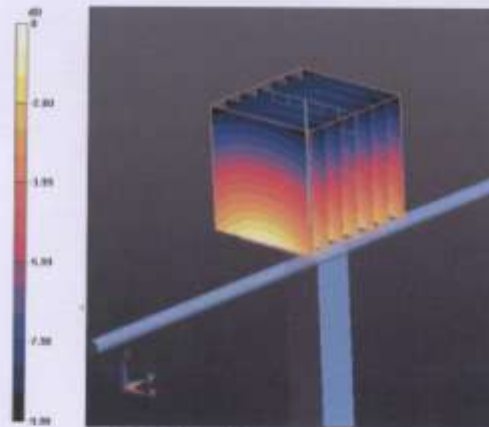
(7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 52.652 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 3.311 W/kg

SAR(1 g) = 2.22 mW/g; SAR(10 g) = 1.47 mW/g

Maximum value of SAR (measured) = 2.584 mW/g



0 dB = 2.580mW/g

Impedance Measurement Plot for Body TSL

