



OET 65

TEST REPORT

Product Name	Ascend P1; HSPA+/HSUPA/HSDPA/UMTS/GSM/GPRS/E DGE Mobile Phone with Bluetooth
Model	HUAWEI U9200, U9200, U9200-1, U9200-51
FCC ID	QISU9200
Client	Huawei Technologies Co., Ltd.

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GENERAL SUMMARY

Product Name	Ascend P1; HSPA+/HSUPA/HSDPA/UMTS/GSM/GPRS/EDGE Mobile Phone with Bluetooth	Model	HUAWEI U9200, U9200, U9200-1, U9200-51
Report No.	RHA1207-0047SAR01R1	FCC ID	QISU9200
Client	Huawei Technologies Co., Ltd.		
Manufacturer	Huawei Technologies Co., Ltd.		
Reference Standard(s)	<p>IEEE Std C95.1, 1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radiofrequency Electromagnetic Fields, 3 kHz to 300 GHz.</p> <p>IEEE Std 1528™-2003: IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.</p> <p>SUPPLEMENT C Edition 01-01 to OET BULLETIN 65 Edition 97-01 June 2001 including DA 02-1438, published June 2002: Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields Additional Information for Evaluation Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions.</p> <p>RSS-102 Issue 4 March 2010: Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)</p> <p>KDB 648474 D01 SAR Handsets Multi Xmitter and Ant, v01r05: SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas.</p> <p>KDB 941225 D06 Hot Spot SAR v01 SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities</p> <p>KDB941225 D01 SAR test for 3G devices v02: SAR Measurement Procedures CDMA 20001x RTT, 1x Ev-Do, WCDMA, HSDPA/HSPA</p>		
Conclusion	<p>This portable wireless equipment has been measured in all cases requested by the relevant standards. Test results in Chapter 7 of this test report are below limits specified in the relevant standards.</p> <p>General Judgment: Pass</p> <p style="text-align: right;">(Stamp) Date of issue: July 12th, 2012</p>		
Comment	The test result only responds to the measured sample.		

Approved by 杨伟中
Director

Revised by 凌敏宝
SAR Manager

Performed by 沈辰
SAR Engineer

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Modified History

REV	DESCRIPTION	ISSUED DATE	REMARK
Rev. 1.0	Initial Test Report Release	2012-7-6	Lingminbao
Rev 1.1	1. Added earphones test data.	2012-7-12	Lingminbao

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1. General Information

1.1. Notes of the Test Report

TA Technology (Shanghai) Co., Ltd. guarantees the reliability of the data presented in this test report, which is the results of measurements and tests performed for the items under test on the date and under the conditions stated in this test report and is based on the knowledge and technical facilities available at TA Technology (Shanghai) Co., Ltd. at the time of execution of the test.

TA Technology (Shanghai) Co., Ltd. is liable to the client for the maintenance by its personnel of the confidentiality of all information related to the items under test and the results of the test. This report only refers to the item that has undergone the test.

This report standalone dose not constitute or imply by its own an approval of the product by the certification Bodies or competent Authorities. This report cannot be used partially or in full for publicity and/or promotional purposes without previous written approval of **TA Technology (Shanghai) Co., Ltd.** and the Accreditation Bodies, if it applies.

If the electrical report is inconsistent with the printed one, it should be subject to the latter.

1.2. Testing Laboratory

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1.3. Applicant Information

Company: Huawei Technologies Co., Ltd.
Address: Bantian, Longgang District
City: Shenzhen
Postal Code: 518129
Country: P.R. China

1.4. Manufacturer Information

Company: Huawei Technologies Co., Ltd.
Address: Bantian, Longgang District
City: Shenzhen
Postal Code: 518129
Country: P.R.China

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1.5. Information of EUT

General Information

Device Type:	Portable Device		
Exposure Category:	Uncontrolled Environment / General Population		
State of Sample:	Prototype Unit		
Product Name:	Ascend P1; HSPA+/HSUPA/HSDPA/UMTS/GSM/GPRS/EDGE Mobile Phone with Bluetooth		
IMEI:	863102010152478		
Hardware Version:	Ver.B		
Software Version:	U9200-1V100R001C02B006		
Antenna Type:	Internal Antenna		
Device Operating Configurations :			
Supporting Mode(s):	GSM 850/GSM 1900; (tested) WCDMA Band II/WCDMA Band IV/WCDMA Band V; (tested) WiFi (802.11b/g/n HT20); (tested) GSM 900/GSM 1800/WCDMA Band I/WCDMA Band VIII; (untested) Bluetooth; (untested)		
Test Modulation:	(GSM)GMSK; (WCDMA)QPSK		
Device Class:	B		
HSDPA UE Category:	14		
HSUPA UE Category:	6		
GPRS Multislot Class(10):	Max Number of Timeslots in Uplink	2	
	Max Number of Timeslots in Downlink	4	
	Max Total Timeslot	5	
EGPRS Multislot Class(10):	Max Number of Timeslots in Uplink	2	
	Max Number of Timeslots in Downlink	4	
	Max Total Timeslot	5	
Operating Frequency Range(s):	Mode	Tx (MHz)	Rx (MHz)
	GSM 850	824.2 ~ 848.8	869.2 ~ 893.8
	GSM 1900	1850.2 ~ 1909.8	1930.2 ~ 1989.8
	WCDMA Band II	1852.4 ~ 1907.6	1932.4 ~ 1987.6
	WCDMA Band IV	1712.4 ~ 1752.6	2112.4 ~ 2152.6
	WCDMA Band V	826.4 ~ 846.6	871.4 ~ 891.6
Power Class:	GSM 850: 4		
	GSM 1900: 1		

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	WCDMA Band II: 3		
	WCDMA Band IV: 3		
	WCDMA Band V: 3		
Power Level	GSM 850: tested with power level 5		
	GSM 1900: tested with power level 0		
	WCDMA Band II: tested with power control all up bits		
	WCDMA Band IV: tested with power control all up bits		
	WCDMA Band V: tested with power control all up bits		
Test Channel: (Low - Middle - High)	128 - 190 - 251	(GSM 850)	(tested)
	512 - 661 - 810	(GSM 1900)	(tested)
	9262 - 9400 - 9538	(WCDMA Band II)	(tested)
	1312 - 1413 - 1513	(WCDMA Band IV)	(tested)
	4132 - 4183 - 4233	(WCDMA Band V)	(tested)
	1 - 6 - 11	(802.11b)	(tested)

Auxiliary Equipment Details

AE:Battery

Model: HB4Q1HV
 Manufacturer: Huawei Technologies Co., Ltd.
 S/N: LAIC413X09700235

Equipment Under Test (EUT) is a Ascend P1; HSPA+/HSUPA/HSDPA/UMTS/GSM/GPRS/EDGE Mobile Phone with Bluetooth. The EUT has a GSM/WCDMA antenna that is used for Tx/Rx, the other is BT/WIFI antenna that can be used for Tx/Rx. It has Personal Wireless Routers (hot spots) function. The detail about EUT and Lithium Battery is in chapter 1.5 in this report. SAR are tested for GSM 850, GSM 1900, WCDMA Band II, WCDMA Band IV, WCDMA Band V and WiFi.

The sample under test was selected by the Client.

Components list please refer to documents of the manufacturer.

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1.6. The Maximum SAR_{1g} Values

Head SAR Configuration

Mode	Channel	Position	SAR _{1g} (W/kg)
GSM 850	Middle/190	Right, Cheek	0.231
GSM 1900	Middle/661	Right, Cheek	0.245
WCDMA Band II	Middle/9400	Right, Cheek	0.484
WCDMA Band IV	Middle/1413	Right, Cheek	0.745
WCDMA Band V	Middle/4183	Right, Cheek	0.243
WiFi(802.11b)	Middle/6	Left, Cheek	0.207

Body Worn Configuration

Mode	Channel	Position	Separation distance	SAR _{1g} (W/kg)
2Txslots GPRS 850	Middle/190	Back Side	10mm	0.614
2Txslots GPRS 1900	Middle/661	Back Side	10mm	0.650
WCDMA Band II	Low/9262	Front Side	10mm	1.020
WCDMA Band IV	Middle/1413	Front Side	10mm	0.888
WCDMA Band V	Middle/4183	Back Side	10mm	0.537
WiFi(802.11b)	Middle/6	Back Side	10mm	0.093

Hotspot SAR Configuration

Mode	Channel	Position	Separation distance	SAR _{1g} (W/kg)
2Txslots GPRS 850	Middle/190	Back Side	10mm	0.614
2Txslots GPRS 1900	Middle/661	Bottom Edge	10mm	0.890
WCDMA Band II	Low/9262	Bottom Edge	10mm	1.290
WCDMA Band IV	High/1513	Bottom Edge	10mm	0.957
WCDMA Band V	Middle/4183	Back Side	10mm	0.537
WiFi(802.11b)	Middle/6	Back Side	10mm	0.093

Simultaneous SAR

SAR _{1g} (W/kg)	WCDMA Band II	WIFI (802.11b)	MAX. ΣSAR _{1g}
Test Position			
Body, Bottom Edge	1.290	N/A	1.290

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Extrapolated SAR Values of the highest measured SAR

Mode	Test Position	Channel	Measurement Result		Tune-up procedures MAX Average Power(dBm)	1g Average Limit 1.6 W/kg
			Average Conducted Power(dBm)	1g Average (W/kg)		Extrapolated Result (W/kg)
GSM850	Right, Cheek	Middle/190	23.77	0.231	25.47	0.342
GSM850	Back Side	Middle/190	23.77	0.487	25.47	0.720
2Txslots GPRS850	Back Side	Middle/190	24.78	0.614	26.48	0.908
2Txslots EGPRS850	Back Side	Middle/190	24.78	0.612	26.48	0.905
GSM1900	Right, Cheek	Middle/661	20.87	0.245	21.97	0.316
GSM1900	Bottom Edge	Middle/661	20.87	0.701	21.97	0.903
2Txslots GPRS1900	Bottom Edge	Middle/661	21.78	0.890	22.98	1.173
2Txslots EGPRS1900	Bottom Edge	Middle/661	21.78	0.889	22.98	1.172
WCDMA Band II	Right, Cheek	Middle/9400	22.80	0.484	23.8	0.609
WCDMA Band II	Bottom Edge	Low/9262	22.90	1.290	23.8	1.587
WCDMA Band II HSDPA	Bottom Edge	Low/9262	22.50	1.240	23.5	1.561
WCDMA Band II HSUPA	Bottom Edge	Low/9262	22.35	1.150	23.5	1.499
WCDMA Band IV	Right, Cheek	Middle/1413	22.90	0.745	24.5	1.077
WCDMA Band IV	Bottom Edge	High/1513	22.90	0.957	24.5	1.383
WCDMA Band V	Right, Cheek	Middle/4183	23.70	0.243	24.7	0.306
WCDMA Band V	Back Side	Middle/4183	23.70	0.537	24.7	0.676

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1.7. Maximum Conducted Power of each tested Mode

Mode		Max Burst Conducted Power (dBm)	Max Average Power (dBm)
GSM 850	GSM	33.1	24.07
	GPRS, 2Txslots	30.8	24.78
	EGPRS, 2Txslots	30.8	24.78
GSM 1900	GSM	29.9	20.87
	GPRS, 2Txslots	27.8	21.78
	EGPRS, 2Txslots	27.8	21.78

Mode	Maximum Conducted Power (dBm)
WCDMA Band II	22.90
WCDMA Band IV	23.12
WCDMA Band V	23.90
WiFi(802.11b)	14.92

Note: The detail Power refer to Table 14 (Power Measurement Results).

1.8. Test Date

The test performed from June 28, 2012 to July 12, 2012.

2. SAR Measurements System Configuration

2.1. SAR Measurement Set-up

The DASY5 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Stäubli RX family) with controller and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A dosimetric probe, i.e. an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- A data acquisition electronic (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- A unit to operate the optical surface detector which is connected to the EOC.
- The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY5 measurement server.
- The DASY5 measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows 2003
- DASY5 software and SEMCAD data evaluation software.
- Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.
- The generic twin phantom enabling the testing of left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- System validation dipoles allowing to validate the proper functioning of the system.

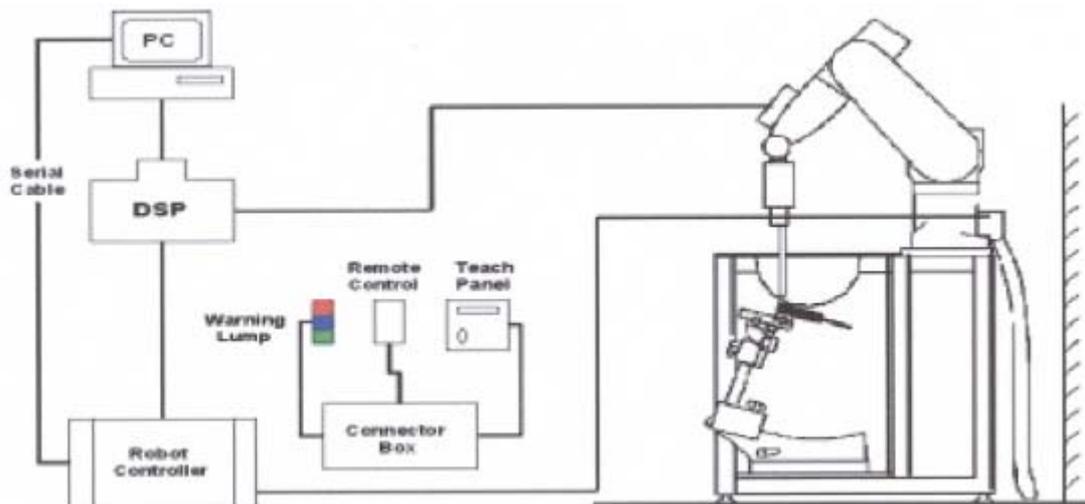


Figure 1 SAR Lab Test Measurement Set-up

2.2. DASY5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe EX3DV4 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.

2.2.1. EX3DV4 Probe Specification

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 μ W/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μ W/g)
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.



Figure 2. EX3DV4 E-field Probe



Figure 3. EX3DV4 E-field probe

2.2.2. E-field Probe Calibration

Each probe is calibrated according to a dosimetric assessment procedure with accuracy better than $\pm 10\%$. The spherical isotropy was evaluated and found to be better than $\pm 0.25\text{dB}$. The sensitivity parameters (NormX, NormY, NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are 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 wave guide 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.

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

Where: Δt = Exposure time (30 seconds),
C = Heat capacity of tissue (brain or muscle),
 ΔT = Temperature increase due to RF exposure.
Or

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

Where:
 σ = Simulated tissue conductivity,
 ρ = Tissue density (kg/m³).

2.3. Other Test Equipment

2.3.1. Device Holder for Transmitters

The DASY device holder is designed to cope with the different positions given in the standard.

It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.

The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the inference of the clamp on the test results could thus be lowered.



Figure 4 Device Holder

2.3.2. Phantom

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

Shell Thickness	2±0.1 mm
Filling Volume	Approx. 20 liters
Dimensions	810 x 1000 x 500 mm (H x L x W)
Available	Special



Figure 5 Generic Twin Phantom

2.4. Scanning Procedure

The DASY5 installation includes predefined files with recommended procedures for measurements and validation. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or body-worn) are tested with the same configuration of test steps differing only in the grid definition for the different test positions.

- The “reference” and “drift” measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the DUT’s output power and should vary max. ± 5 %.
- The “surface check” measurement tests the optical surface detection system of the DASY5 system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ± 0.1mm). To prevent wrong results tests are only executed when the liquid is free of air bubbles. The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe. (It does not depend on the surface reflectivity or the probe angle to the surface within ± 30°.)
- Area Scan
The Area Scan is used as a fast scan in two dimensions to find the area of high field values before running a detailed measurement around the hot spot. Before starting the area scan a grid

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spacing of 15 mm x 15 mm is set. During the scan the distance of the probe to the phantom remains unchanged.

After finishing area scan, the field maxima within a range of 2 dB will be ascertained.

- Zoom Scan

Zoom Scans are used to estimate the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The default Zoom Scan is done by 5x5x7 points within a cube whose base is centered around the maxima found in the preceding area scan.

- Spatial Peak Detection

The procedure for spatial peak SAR evaluation has been implemented and can determine values of masses of 1g and 10g, as well as for user-specific masses. The DASY5 system allows evaluations that combine measured data and robot positions, such as:

- maximum search
- extrapolation
- boundary correction
- peak search for averaged SAR

During a maximum search, global and local maxima searches are automatically performed in 2-D after each Area Scan measurement with at least 6 measurement points. It is based on the evaluation of the local SAR gradient calculated by the Quadratic Shepard's method. The algorithm will find the global maximum and all local maxima within -2 dB of the global maxima for all SAR distributions.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. Several measurements at different distances are necessary for the extrapolation. Extrapolation routines require at least 10 measurement points in 3-D space. They are used in the Zoom Scan to obtain SAR values between the lowest measurement points and the inner phantom surface. The routine uses the modified Quadratic Shepard's method for extrapolation. For a grid using 5x5x7 measurement points with 8mm resolution amounting to 175 measurement points, the uncertainty of the extrapolation routines is less than 1% for 1g and 10g cubes.

- A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube 5x5x7 scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 5mm steps.

2.5. Data Storage and Evaluation

2.5.1. Data Storage

The DASY5 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension “.DA4”. The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [mW/g], [mW/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

2.5.2. Data Evaluation by SEMCAD

The SEMCAD software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters:	- Sensitivity	Normi, a _{i0} , a _{i1} , a _{i2}
	- Conversion factor	ConvF _i
	- Diode compression point	Dcp _i
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	
	- Density	

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY5 components. In the direct measuring mode of the multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

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.

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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 as:

$$V_i = U_i + U_i^2 \cdot c f / d c p_i$$

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: $E_i = (V_i / Norm_i \cdot ConvF)^{1/2}$

H-field probes: $H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1} f + a_{i2} f^2) / f$

With V_i = compensated signal of channel i (i = x, y, z)

$Norm_i$ = sensor sensitivity of channel i (i = x, y, z)
[mV/(V/m)²] for E-field Probes

$ConvF$ = sensitivity enhancement in solution

a_{ij} = sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

E_i = electric field strength of channel i in V/m

H_i = magnetic field strength of channel i in A/m

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

$$E_{tot} = (E_x^2 + E_y^2 + E_z^2)^{1/2}$$

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

$$SAR = (E_{tot})^2 \cdot \sigma / (\rho \cdot 1000)$$

with **SAR** = local specific absorption rate in mW/g

E_{tot} = total field strength in V/m

σ = conductivity in [mho/m] or [Siemens/m]

ρ = equivalent tissue density in g/cm³

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid. The power flow density is calculated assuming the excitation field to be a free space field.

$$P_{pwe} = E_{tot}^2 / 3770 \quad \text{or} \quad P_{pwe} = H_{tot}^2 \cdot 37.7$$

with **P_{pwe}** = equivalent power density of a plane wave in mW/cm²

E_{tot} = total electric field strength in V/m

H_{tot} = total magnetic field strength in A/m

3. Laboratory Environment

Table 1: The Requirements of the Ambient Conditions

Temperature	Min. = 18°C, Max. = 25 °C
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5 Ω
Ambient noise is checked and found very low and in compliance with requirement of standards.	
Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

4. Tissue-equivalent Liquid

4.1. Tissue-equivalent Liquid Ingredients

The liquid is consisted of water, salt, Glycol, Sugar, Preventol and Cellulose. The liquid has previously been proven to be suited for worst-case. The table 2 and table 3 show the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the OET 65.

Table 2: Composition of the Head Tissue Equivalent Matter

MIXTURE%	FREQUENCY(Brain) 835MHz
Water	41.45
Sugar	56
Salt	1.45
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=835MHz $\epsilon=41.5$ $\sigma=0.9$

MIXTURE%	FREQUENCY(Brain) 1750MHz
Water	55.24
Glycol	44.45
Salt	0.31
Dielectric Parameters Target Value	f=1750MHz $\epsilon=40.1$ $\sigma=1.37$

MIXTURE%	FREQUENCY(Brain) 1900MHz
Water	55.242
Glycol monobutyl	44.452
Salt	0.306
Dielectric Parameters Target Value	f=1900MHz $\epsilon=40.0$ $\sigma=1.40$

MIXTURE%	FREQUENCY(Brain) 2450MHz
Water	62.7
Glycol	36.8
Salt	0.5
Dielectric Parameters Target Value	f=2450MHz $\epsilon=39.20$ $\sigma=1.80$

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Table 3: Composition of the Body Tissue Equivalent Matter

MIXTURE%	FREQUENCY(Body) 835MHz
Water	52.5
Sugar	45
Salt	1.4
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=835MHz $\epsilon=55.2$ $\sigma=0.97$

MIXTURE%	FREQUENCY(Body) 1750MHz
Water	69.91
Glycol	29.97
Salt	0.12
Dielectric Parameters Target Value	f=1750MHz $\epsilon=53.4$ $\sigma=1.49$

MIXTURE%	FREQUENCY (Body) 1900MHz
Water	69.91
Glycol monobutyl	29.96
Salt	0.13
Dielectric Parameters Target Value	f=1900MHz $\epsilon=53.3$ $\sigma=1.52$

MIXTURE%	FREQUENCY(Body) 2450MHz
Water	73.2
Glycol	26.7
Salt	0.1
Dielectric Parameters Target Value	f=2450MHz $\epsilon=52.70$ $\sigma=1.95$

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4.2. Tissue-equivalent Liquid Properties

Table 4: Dielectric Performance of Head Tissue Simulating Liquid

Frequency	Description	Dielectric Parameters		Temp ℃
		ϵ_r	σ (s/m)	
835MHz (head)	Target value ± 5% window	41.50 39.43 — 43.58	0.90 0.86 — 0.95	22.0
	Measurement value 2012-6-30	42.1	0.894	21.5
1750MHz (head)	Target value ±5% window	40.1 38.10 — 42.11	1.37 1.30 — 1.44	22.0
	Measurement value 2012-7-1	39.2	1.40	21.5
1900MHz (head)	Target value ±5% window	40.00 38.00 — 42.00	1.40 1.33 — 1.47	22.0
	Measurement value 2012-7-1	40.4	1.40	21.5
2450MHz (head)	Target value ±5% window	39.20 37.24 — 41.16	1.80 1.71 — 1.89	22.0
	Measurement value 2012-7-2	38.3	1.88	21.5

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Table 5: Dielectric Performance of Body Tissue Simulating Liquid

Frequency	Description	Dielectric Parameters		Temp ℃
		ϵ_r	σ (s/m)	
835MHz (body)	Target value ±5% window	55.20 52.44 — 57.96	0.97 0.92 — 1.02	22.0
	Measurement value 2012-6-29	54.5	0.968	21.5
1750MHz (body)	Target value ±5% window	53.40 50.73 — 56.07	1.49 1.42 — 1.56	22.0
	Measurement value 2012-6-28	52.7	1.48	21.5
	Measurement value 2012-7-12	53.43	1.50	21.5
1900MHz (body)	Target value ±5% window	53.30 50.64 — 55.97	1.52 1.44 — 1.60	22.0
	Measurement value 2012-6-30	53.1	1.52	21.5
	Measurement value 2012-7-12	53.0	1.48	21.5
2450MHz (body)	Target value ±5% window	52.70 50.07 — 55.34	1.95 1.85 — 2.05	22.0
	Measurement value 2012-6-30	51.7	1.90	21.5

5. System Check

5.1. Description of System Check

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulates were measured every day using the dielectric probe kit and the network analyzer. A system check measurement was made following the determination of the dielectric parameters of the simulates, using the dipole validation kit. A power level of 250 mW was supplied to the dipole antenna, which was placed under the flat section of the twin SAM phantom. The system check results (dielectric parameters and SAR values) are given in the table 6 and table 7.

System check results have to be equal or near the values determined during dipole calibration with the relevant liquids and test system ($\pm 10\%$).

System check is performed regularly on all frequency bands where tests are performed with the DASY5 system.

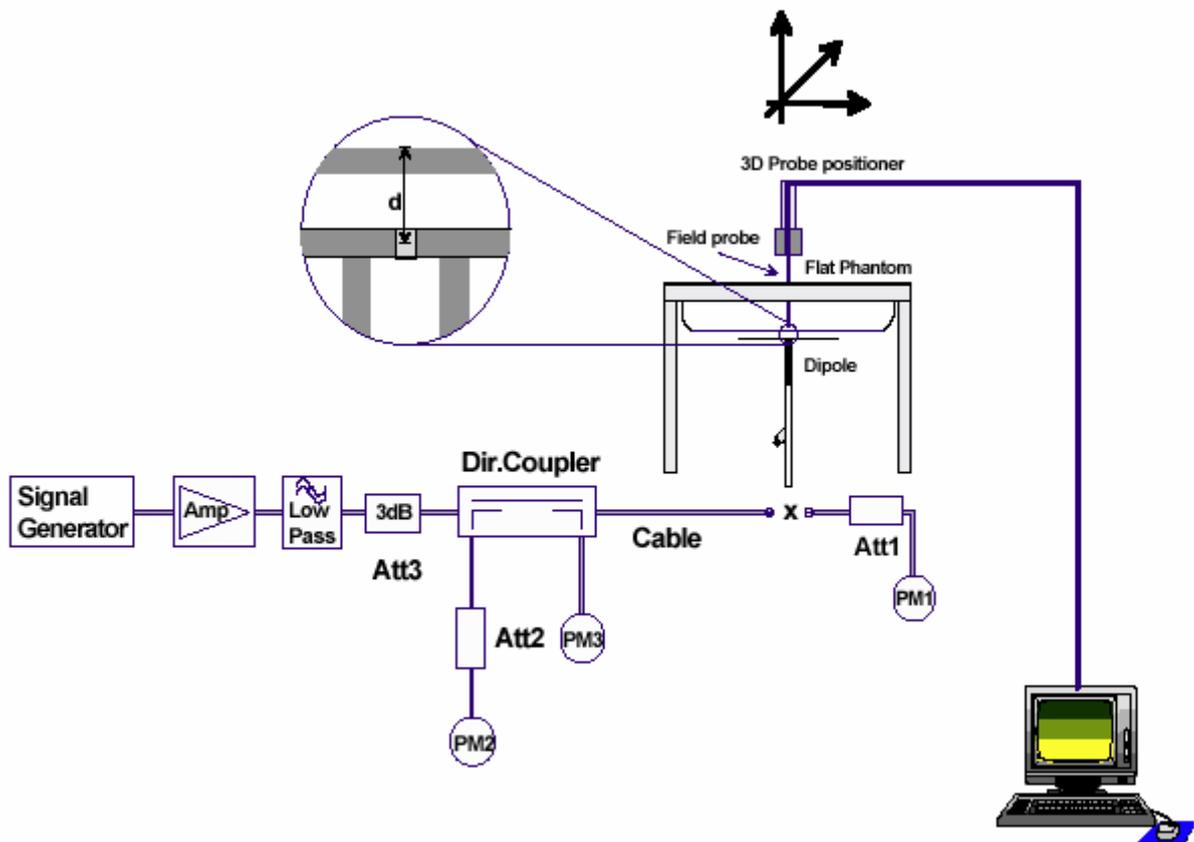


Figure 6 System Check Set-up

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Justification for Extended SAR Dipole Calibrations

Usage of SAR dipoles calibrated less than 2 years ago but more than 1 year ago were confirmed in maintaining return loss (< - 20 dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB Publication 450824:

Dipole D1750V2 SN: 1033				
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	$\Delta\Omega$
5/17/2010	-38.1	/	49.4	/
5/16/2011	-36.5	4.2%	51.1	1.7 Ω
5/15/2012	-36.7	3.7%	50.9	1.5 Ω
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	$\Delta\Omega$
5/17/2010	-25.7	/	45.1	/
5/16/2011	-26.4	2.7 %	46.7	1.6 Ω
5/15/2012	-24.9	3.1%	46.9	1.8 Ω

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5.2. System Check Results

Table 6: System Check in Head Tissue Simulating Liquid

Frequency	Test Date	Dielectric Parameters		Temp (°C)	250mW Measured SAR _{1g}	1W Normalized SAR _{1g}	1W Target SAR _{1g} (±10% Deviation)
		ε _r	σ(s/m)				
835MHz	2012-6-30	42.1	0.894	21.5	2.44	9.76	9.34 (8.41~10.27)
1750MHz	2012-7-1	39.2	1.40	21.5	8.61	34.44	36.10 (32.49~39.71)
1900MHz	2012-7-1	40.4	1.40	21.5	9.48	37.92	40.30 (36.27~44.33)
2450MHz	2012-7-2	38.3	1.88	21.5	13.70	54.80	53.80 (48.42~59.18)

Note: 1. The graph results see ANNEX B.
2. Target Values used derive from the calibration certificate

Table 7: System Check in Body Tissue Simulating Liquid

Frequency	Test Date	Dielectric Parameters		Temp (°C)	250mW Measured SAR _{1g}	1W Normalized SAR _{1g}	1W Target SAR _{1g} (±10% Deviation)
		ε _r	σ(s/m)				
835MHz	2012-6-29	54.5	0.968	21.5	2.41	9.64	9.46 (8.51~10.41)
1750MHz	2012-6-28	52.7	1.48	21.5	8.73	34.92	38.50 (34.65~42.35)
	2012-7-12	53.43	1.50	21.5	9.24	36.96	
1900MHz	2012-6-30	53.1	1.52	21.5	9.93	39.72	41.70 (37.53~45.87)
	2012-7-12	53.0	1.48	21.5	10.1	40.40	
2450MHz	2012-6-30	51.7	1.90	21.5	12.90	51.60	51.70 (46.53~56.87)

Note: 1. The graph results see ANNEX B.
2. Target Values used derive from the calibration certificate

6. Operational Conditions during Test

6.1. General Description of Test Procedures

A communication link is set up with a System Simulator (SS) by air link, and a call is established. The Absolute Radiofrequency Channel Number (ARFCN) is allocated to 128, 190 and 251 in the case of GSM 850, to 512, 661 and 810 in the case of GSM 1900, to 9262, 9400 and 9538 in the case of WCDMA Band II, to 1312, 1413 and 1513 in the case of WCDMA Band IV, to 4132, 4183 and 4233 in the case of WCDMA Band V. The EUT is commanded to operate at maximum transmitting power.

Connection to the EUT is established via air interface with E5515C, and the EUT is set to maximum output power by E5515C. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output. The antenna connected to the output of the base station simulator shall be placed at least 50 cm away from the EUT. The signal transmitted by the simulator to the antenna feeding point shall be lower than the output power level of the EUT by at least 30 dB.

6.2. Test Positions

6.2.1. Against Phantom Head

Measurements were made in “cheek” and “tilt” positions on both the left hand and right hand sides of the phantom.

The positions used in the measurements were according to IEEE 1528 - 2003 "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate(SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques".

6.2.2. Body Worn Configuration

Body-worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations. Devices with a headset output should be tested with a headset connected to the device.

Based upon KDB941225 D06 V01, when the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested. The distance between the device and the phantom was kept 10mm of wireless routers.

6.3. Test Configuration

6.3.1. GSM Test Configuration

SAR tests for GSM 850 and GSM 1900, a communication link is set up with a System Simulator (SS) by air link. Using E5515C the power lever is set to “5” for GSM 850, set to “0” for GSM 1900. Since the GPRS class is 10 for this EUT, it has at most 2 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslots is 5; the EGPRS class is 10 for this EUT, it has at most 2 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslots is 5.

When SAR tests for EGPRS mode is necessary, GMSK modulation should be used to minimize SAR measurement error due to higher peak-to-average power (PAR) ratios inherent in 8-PSK.

According to specification 3GPP TS 51.010, the maximum power of the GSM can do the power reduction for the multi-slot. The allowed power reduction in the multi-slot configuration is as following:

Output power of reductions:

GSM 850

GPRS (GMSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	2

EGPRS (8PSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	2.5

EGPRS (GMSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	2

GSM 1900

GPRS (GMSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	2

EGPRS (8PSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	2.5

EGPRS (GMSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	2

6.3.2. WCDMA Test Configuration

6.3.2.1. Output power Verification

Maximum output power is verified on the High, Middle and Low channel according to the procedures described in section 5.2 of 3GPP TS 34. 121, using the appropriate RMC or AMR with TPC(transmit power control) set to all up bits for WCDMA/HSDPA or applying the required inner loop power control procedures to the maximum output power while HSUPA is active. Results for all applicable physical channel configuration (DPCCH, DPDCH_n and spreading codes, HSDPA, HSPA) should be tabulated in the SAR report. All configuration that are not supported by the DUT or can not be measured due to technical or equipment limitations should be clearly identified

6.3.2.2. Head SAR Measurements

SAR for head exposure configurations in voice mode is measured using a 12.2kbps RMC with TPC bits configured to all up bits. SAR in AMR configurations is not required when the maximum average output of each RF channel for 12.2kbps AMR is less than 1/4 dB higher than that measured in 12.2 kbps RMC. Otherwise, SAR is measured on the maximum output channel in 12.2kbps AMR with a 3.4 kbps SRB(Signaling radio bearer) using the exposure configuration that results in the highest SAR in 12.2kbps RMC for that RF channel.

6.3.2.3. Body SAR Measurements

SAR for body exposure configurations in voice and data modes is measured using 12.2kbps RMC with TPC bits configured to all up bits. SAR for other spreading codes and multiple DPDCH_n, when supported by the DUT, are not required when the maximum average output of each RF channel, for each spreading code and DPDCH_n configuration, are less than 1/4 dB higher than those measured in 12.2kbps RMC. Otherwise, SAR is measured on the maximum output channel with an applicable RMC configuration for the corresponding spreading code or DPDCH_n using the exposure configuration that results in the highest SAR with 12.2 kbps RMC. When more than 2 DPDCH_n are supported by the DUT, it may be necessary to configure additional DPDCH_n for a DUT using FTM (Factory Test Mode) or other chipset based test approaches with parameters similar to those used in 384 kbps and 768 kbps RMC.

6.3.3. HSDPA Test Configuration

SAR for body exposure configurations is measured according to the ‘Body SAR Measurements’ procedures of that section. In addition, body SAR is also measured for HSDPA when the maximum average output of each RF channel with HSDPA active is at least ¼ dB higher than that measured without HSDPA using 12.2 kbps RMC or the maximum SAR for 12.2 kbps RMC is above 75% of the SAR limit.³⁰ Body SAR for HSDPA is measured using an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration in 12.2 kbps RMC without HSDPA.

HSDPA should be configured according to the UE category of a test device. The number of HSDSCH/ HS-PDSCHs, HARQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the H-set. To maintain a consistent test configuration and stable transmission conditions, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4 ms with a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors (β_c , β_d), and HS-DPCCH power offset parameters (Δ_{ACK} , Δ_{NACK} , Δ_{CQI}) should be set according to values indicated in the Table below.³² The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the H-set.

Table 8: Subtests for UMTS Release 5 HSDPA

Sub-set	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (note 1, note 2)	CM(dB) (note 3)	MPR(dB)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (note 4)	15/15 (note 4)	64	12/15 (note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$

Note2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1.A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and $\Delta_{NACK} = 8$ ($A_{hs} = 30/15$) with $\beta_{hs} = 30/15 * \beta_c$, and $\Delta_{CQI} =$

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7 ($A_{HS}=24/15$) with $\beta_{HS}=24/15*\beta_c$.

Note3: CM=1 for $\beta_c/\beta_d =12/15$, $\beta_{HS}/\beta_c=24/15$. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4:For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period(TF1,TF0) is achieved by setting the signaled gain factors for the reference TFC (TFC1,TF1) to $\beta_c=11/15$ and $\beta_d=15/15$.

Table 9: Settings of required H-Set 1 QPSK in HSDPA mode

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	534
Inter-TTI Distance	TTI's	3
Number of HARQ Processes	Processes	2
Information Bit Payload (N_{INF})	Bits	3202
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	4800
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	9600
Coding Rate	/	0.67
Number of Physical Channel Codes	Codes	5
Modulation	/	QPSK

Table 10: HSDPA UE category

HS-DSCH Category	Maximum HS-DSCH Codes Received	Minimum Inter-TTI Interval	Maximum Transport Bits/HS-DSCH	Total Channel
1	5	3	7298	19200
2	5	3	7298	28800
3	5	2	7298	28800
4	5	2	7298	38400
5	5	1	7298	57600
6	5	1	7298	67200
7	10	1	14411	115200
8	10	1	14411	134400
9	15	1	25251	172800
10	15	1	27952	172800
11	5	2	3630	14400
12	5	1	3630	28800
13	15	1	34800	259200
14	15	1	42196	259200
15	15	1	23370	345600
16	15	1	27952	345600

6.3.4. HSUPA Test Configuration

Body SAR is also measured for HSPA when the maximum average output of each RF channel with HSPA active is at least ¼ dB higher than that measured without HSPA using 12.2 kbps RMC or the maximum SAR for 12.2 kbps RMC is above 75% of the SAR limit. Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set 1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 with power control algorithm 2, according to the highest body SAR configuration in 12.2 kbps RMC without HSPA.⁴⁰

Due to inner loop power control requirements in HSPA, a commercial communication test set should be used for the output power and SAR tests.⁴¹ The 12.2 kbps RMC, FRC H-set 1 and E-DCH configurations for HSPA should be configured according to the β values indicated below as well as other applicable procedures described in the 'WCDMA Handset' and 'Release 5 HSDPA Data Devices' sections of 3 G device.

Table 11: Sub-Test 5 Setup for Release 6 HSUPA

Sub-set	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{hs}^{(1)}$	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM ⁽²⁾ (dB)	MPR (dB)	AG ⁽⁴⁾ Index	E-TFCI
1	11/15 ⁽³⁾	15/15 ⁽³⁾	64	11/15 ⁽³⁾	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1} :47/15 β_{ed2} :47/15	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 ⁽⁴⁾	15/15 ⁽⁴⁾	64	15/15 ⁽⁴⁾	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$.

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$.

Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$.

Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Figure 5.1g.

Note 6: β_{ed} can not be set directly; it is set by Absolute Grant Value.

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Table 12: HSUPA UE category

UE E-DCH Category	Maximum E-DCH Codes Transmitted	Number of HARQ Processes	E-DCH TTI (ms)	Minimum Spreading Factor	Maximum E-DCH Transport Block Bits	Max Rate (Mbps)
1	1	4	10	4	7110	0.7296
2	2	8	2	4	2798	1.4592
	2	4	10	4	14484	
3	2	4	10	4	14484	1.4592
4	2	8	2	2	5772	2.9185
	2	4	10	2	20000	2.00
5	2	4	10	2	20000	2.00
6 (No DPDCH)	4	8	2	2 SF2 & 2 SF4	11484	5.76
	4	4	10		20000	2.00
7 (No DPDCH)	4	8	2	2 SF2 & 2 SF4	22996	?
	4	4	10		20000	?

NOTE: When 4 codes are transmitted in parallel, two codes shall be transmitted with SF2 and two with SF4.
 UE Categories 1 to 6 supports QPSK only. UE Category 7 supports QPSK and 16QAM.
 (TS25.306-7.3.0)

6.3.5. WIFI Test Configuration

For WLAN SAR testing, WLAN engineering testing software installed on the DUT can provide continuous transmitting RF signal. This RF signal utilized in SAR measurement has almost 100% duty cycle and its crest factor is 1.

For the 802.11b/g SAR tests, a communication link is set up with the test mode software for WIFI mode test. The Absolute Radio Frequency Channel Number (ARFCN) is allocated to 1, 6 and 11 respectively in the case of 2450 MHz. During the test, at the each test frequency channel, the EUT is operated at the RF continuous emission mode. Each channel should be tested at the lowest data rate. Testing at higher data rates is not required when the maximum average output power is less than 0.25dB higher than those measured at the lowest data rate.

802.11b/g operating modes are tested independently according to the service requirements in each frequency band. 802.11b/g modes are tested on channels 1, 6, 11; however, if output power reduction is necessary for channels 1 and /or 11 to meet restricted band requirements the highest output channels closest to each of these channels must be tested instead.

SAR is not required for 802.11g channels when the maximum average output power is less than 0.25dB higher than that measured on the corresponding 802.11b channels. When the maximum average output channel in each frequency band is not included in the “default test channels”, the maximum channel should be tested instead of an adjacent “default test channels”, these are referred to as the “required test channels” and are illustrated in table 13.

Table 13: “Default Test Channels”

Mode	GHz	Channel	Turbo Channel	“Default Test Channels”			
				15.247		UNII	
				802.11b	802.11g		
802.11b/g	2.412	1 [#]		√	*		
	2.437	6	6	√	*		
	2.462	11 [#]		√	*		

Note: [#]= when output power is reduced for channel 1 and /or 11 to meet restricted band requirements the highest out put channels closet to each of these channels should be tested.
 √= “default test channels”
 *= possible 802.11g channels with maximum average output 0.25dB>=the “default test channels”

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7. Test Results

7.1. Conducted Power Results

Table 14: Conducted Power Measurement Results

GSM 850		Burst Conducted Power(dBm)				Average power(dBm)		
		Channel 128	Channel 190	Channel 251		Channel 128	Channel 190	Channel 251
GSM		32.9	32.8	33.1	-9.03dB	23.87	23.77	24.07
GPRS (GMSK)	1Txslot	32.6	32.8	32.8	-9.03dB	23.57	23.77	23.77
	2Txslots	30.6	30.8	30.8	-6.02dB	24.58	24.78	24.78
EGPRS (GMSK)	1Txslot	32.6	32.8	32.8	-9.03dB	23.57	23.77	23.77
	2Txslots	30.6	30.8	30.8	-6.02dB	24.58	24.78	24.78
EGPRS (8PSK)	1Txslot	26.72	26.74	26.78	-9.03dB	17.69	17.71	17.75
	2Txslots	24.62	24.65	24.75	-6.02dB	18.6	18.63	18.73
GSM 1900		Burst Conducted Power(dBm)				Average power(dBm)		
		Channel 512	Channel 661	Channel 810		Channel 512	Channel 661	Channel 810
GSM		29.9	29.9	29.8	-9.03dB	20.87	20.87	20.77
GPRS (GMSK)	1Txslot	29.8	29.9	29.8	-9.03dB	20.77	20.87	20.77
	2Txslots	27.7	27.8	27.8	-6.02dB	21.68	21.78	21.78
EGPRS (GMSK)	1Txslot	29.8	29.9	29.8	-9.03dB	20.77	20.87	20.77
	2Txslots	27.7	27.8	27.8	-6.02dB	21.68	21.78	21.78
EGPRS (8PSK)	1Txslot	25.53	25.65	25.64	-9.03dB	16.5	16.62	16.61
	2Txslots	23.44	23.5	23.5	-6.02dB	17.42	17.48	17.48

Note:

1) Division Factors

To average the power, the division factor is as follows:

1Txslot = 1 transmit time slot out of 8 time slots

=> conducted power divided by (8/1) => -9.03 dB

2Txslots = 2 transmit time slots out of 8 time slots

=> conducted power divided by (8/2) => -6.02 dB

2) Average power numbers

The maximum power numbers are marks in bold.

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WCDMA Band II		Conducted Power (dBm)		
		Channel 9262	Channel 9400	Channel 9538
RMC	12.2kbps RMC	22.9	22.8	22.9
	64kbps RMC	22.48	22.43	22.62
	144kbps RMC	22.37	22.55	22.54
	384kbps RMC	22.51	22.38	22.61
HSDPA	Sub - Test 1	22.5	22.5	22.53
	Sub - Test 2	22.3	22.24	22.26
	Sub - Test 3	21.64	21.6	21.74
	Sub - Test 4	21.38	21.34	21.47
HSUPA	Sub - Test 1	22.35	22.33	22.32
	Sub - Test 2	19.84	19.79	19.91
	Sub - Test 3	20.95	20.94	21.06
	Sub - Test 4	20.4	20.39	20.51
	Sub - Test 5	22.32	22.36	22.45
WCDMA Band IV		Conducted Power (dBm)		
		Channel 1312	Channel 1413	Channel 1513
RMC	12.2kbps RMC	22.8	22.9	22.9
	64kbps RMC	22.98	22.93	23.12
	144kbps RMC	22.87	23.05	23.04
	384kbps RMC	23.01	22.88	23.11
HSDPA	Sub - Test 1	22.72	22.64	22.81
	Sub - Test 2	21.48	21.44	21.6
	Sub - Test 3	21.14	21.1	21.24
	Sub - Test 4	20.88	20.84	20.97
HSUPA	Sub - Test 1	21.66	21.63	21.75
	Sub - Test 2	19.34	19.29	19.41
	Sub - Test 3	20.45	20.44	20.56
	Sub - Test 4	19.9	19.89	20.01
	Sub - Test 5	21.82	21.86	21.95
WCDMA Band V		Conducted Power (dBm)		
		Channel 4132	Channel 4183	Channel 4233

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RMC	12.2kbps RMC	23.6	23.7	23.8
	64kbps RMC	23.6	23.8	23.9
	144kbps RMC	23.6	23.8	23.9
	384kbps RMC	23.6	23.8	23.9
HSDPA	Sub - Test 1	23.13	23.02	23.04
	Sub - Test 2	21.87	21.72	21.7
	Sub - Test 3	21.53	21.41	21.38
	Sub - Test 4	21.25	21.14	21.12
HSUPA	Sub - Test 1	21.89	21.85	21.86
	Sub - Test 2	19.58	19.54	19.51
	Sub - Test 3	20.98	20.81	20.58
	Sub - Test 4	20.23	20.04	20.07
	Sub - Test 5	22.12	22.02	22.03

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7.2. SAR Test Results

7.2.1. GSM 850 (GPRS/EGPRS)

Table 15: SAR Values [GSM 850 (GPRS/EGPRS)]

Limit of SAR		10 g Average	1 g Average	Power Drift	Graph Results
		2.0 W/kg	1.6 W/kg	± 0.21 dB	
Different Test Position	Channel	Measurement Result(W/kg)		Power Drift (dB)	
		10 g Average	1 g Average		
Test Position of Head					
Left hand, Touch Cheek	Middle/190	0.159	0.209	-0.082	Figure 17
Left hand, Tilt 15 Degree	Middle/190	0.098	0.148	-0.076	Figure 18
Right hand, Touch Cheek	Middle/190	0.179	0.231	-0.011	Figure 19
Right hand, Tilt 15 Degree	Middle/190	0.127	0.168	-0.030	Figure 20
Test position of Body (Distance 10mm)					
Back Side (GSM/1Txslot)	Middle/190	0.364	0.487	-0.024	Figure 21
Back Side (2Txslots)	Middle/190	0.460	0.614	-0.128	Figure 22
Front Side(2Txslots)	Middle/190	0.313	0.405	0.005	Figure 23
Left Edge(2Txslots)	Middle/190	0.183	0.265	0.010	Figure 24
Right Edge(2Txslots)	Middle/190	0.215	0.308	0.016	Figure 25
Top Edge(2Txslots)	N/A	N/A	N/A	N/A	N/A
Bottom Edge(2Txslots)	Middle/190	0.033	0.059	0.009	Figure 26
Worst Case Position of Body with Earphone (Distance 10mm)					
Back Side (GSM)	Middle/190	0.326	0.439	-0.067	Figure 27
Worst Case Position of Body with EGPRS (GMSK, Distance 10mm)					
Back Side (2Txslots)	Middle/190	0.459	0.612	-0.120	Figure 28

Note: 1. The value with blue color is the maximum SAR Value of each test band.

2. The SAR test shall be performed at the middle frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 0.8W/kg), testing at the high and low channels is optional.
3. WWAN antenna is located at bottom edge; antenna-to-top edge distance is more than 2.5 cm (see ANNEX J). Based upon KDB941225 D06, when the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.
4. When SAR tests for EGPRS mode is necessary, GMSK modulation should be used to minimize SAR measurement error due to higher peak-to-average power (PAR) ratios inherent in 8-PSK.

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7.2.2. GSM 1900 (GPRS/EGPRS)

Table 16: SAR Values [GSM 1900(GPRS/EGPRS)]

Limit of SAR		10 g Average	1 g Average	Power Drift	Graph Results
		2.0 W/kg	1.6 W/kg	± 0.21 dB	
Different Test Position	Channel	Measurement Result(W/kg)		Power Drift (dB)	
		10 g Average	1 g Average		
Test Position of Head					
Left hand, Touch Cheek	Middle/661	0.123	0.203	-0.017	Figure 29
Left hand, Tilt 15 Degree	Middle/661	0.080	0.133	0.080	Figure 30
Right hand, Touch Cheek	Middle/661	0.147	0.245	-0.032	Figure 31
Right hand, Tilt 15 Degree	Middle/661	0.077	0.134	-0.072	Figure 32
Test position of Body (Distance 10mm)					
Back Side (GSM/1Txslot)	Middle/661	0.282	0.489	0.011	Figure 33
Back Side (2Txslots)	Middle/661	0.374	0.650	-0.117	Figure 34
Front Side(2Txslots)	Middle/661	0.363	0.638	0.068	Figure 35
Left Edge(2Txslots)	Middle/661	0.046	0.075	-0.045	Figure 36
Right Edge(2Txslots)	Middle/661	0.048	0.082	0.052	Figure 37
Top Edge(2Txslots)	N/A	N/A	N/A	N/A	N/A
Bottom Edge(2Txslots)	High/810	0.425	0.797	-0.169	Figure 38
	Middle/661	0.472	0.890	-0.017	Figure 39
	Low/512	0.446	0.836	-0.081	Figure 40
Worst Case Position of Body with Earphone (Distance 10mm)					
Back Side (GSM)	Middle/661	0.351	0.612	-0.068	Figure 41
Worst Case Position of Body with EGPRS (GMSK, Distance 10mm)					
Bottom Edge(2Txslots)	Middle/661	0.472	0.889	-0.148	Figure 42

Note: 1. The value with blue color is the maximum SAR Value of each test band.
 2. The SAR test shall be performed at the middle frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 0.8W/kg), testing at the high and low channels is optional.
 3. WWAN antenna is located at bottom edge; antenna-to-top edge distance is more than 2.5 cm (see ANNEX J). Based upon KDB941225 D06, when the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.
 4. When SAR tests for EGPRS mode is necessary, GMSK modulation should be used to minimize SAR measurement error due to higher peak-to-average power (PAR) ratios inherent in 8-PSK.

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7.2.3. WCDMA Band II (WCDMA/HSDPA/HSUPA)

Table 17: SAR Values [WCDMA Band II (WCDMA/HSDPA/HSUPA)]

Limit of SAR		10 g Average	1 g Average	Power Drift	Graph Results
		2.0 W/kg	1.6 W/kg	± 0.21 dB	
Different Test Position	Channel	Measurement Result(W/kg)		Power Drift (dB)	
		10 g Average	1 g Average		
Test Position of Head					
Left Hand, Touch Cheek	Middle/9400	0.277	0.456	0.103	Figure 43
Left Hand, Tilt 15 Degree	Middle/9400	0.159	0.265	0.005	Figure 44
Right Hand, Touch Cheek	Middle/9400	0.296	0.484	0.124	Figure 45
Right Hand, Tilt 15 Degree	Middle/9400	0.151	0.260	0.105	Figure 46
Test position of Body (Distance 10mm)					
Back Side	High/9538	0.555	0.981	-0.053	Figure 47
	Middle/9400	0.560	0.970	-0.098	Figure 48
	Low/9262	0.521	0.919	0.061	Figure 49
Front Side	High/9538	0.516	0.920	-0.030	Figure 50
	Middle/9400	0.550	0.970	-0.082	Figure 51
	Low/9262	0.582	1.020	-0.019	Figure 52
Left Edge	Middle/9400	0.066	0.110	0.040	Figure 53
Right Edge	Middle/9400	0.100	0.169	0.036	Figure 54
Top Edge	N/A	N/A	N/A	N/A	N/A
Bottom Edge	High/9538	0.637	1.200	-0.170	Figure 55
	Middle/9400	0.661	1.240	-0.136	Figure 56
	Low/9262	0.682	1.290	-0.034	Figure 57
Worst Case Position of Body with Earphone (Distance 10mm)					
Front Side	Low/9262	0.524	1.010	-0.164	Figure 58
Worst Case Position of RMC with HSDPA (Distance 10mm)					
Bottom Edge	Low/9262	0.693	1.240	-0.063	Figure 59
Worst Case Position of RMC with HSUPA (Distance 10mm)					
Bottom Edge	Low/9262	0.647	1.150	-0.025	Figure 60

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Note: 1. The value with blue color is the maximum SAR Value of each test band.

2. The SAR test shall be performed at the middle frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit ($< 0.8\text{W/kg}$), testing at the high and low channels is optional.
3. WWAN antenna is located at bottom edge; antenna-to-top edge distance is more than 2.5 cm (see ANNEX J). Based upon KDB941225 D06, when the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.
4. WCDMA mode were tested under RMC 12.2kbps with HSPA (HSDPA/HSUPA) inactive per KDB Publication 941225 D01. HSPA (HSDPA/HSUPA) SAR for body was not required since the average output power of the HSPA (HSDPA/HSUPA) subtests was not more than 0.25 dB higher than the RMC level and the maximum SAR for 12.2kbps RMC was less than 75% SAR limit.

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7.2.4. WCDMA Band IV (WCDMA/HSDPA/HSUPA)

Table 18: SAR Values [WCDMA Band IV (WCDMA/HSDPA/HSUPA)]

Limit of SAR		10 g Average	1 g Average	Power Drift	Graph Results
		2.0 W/kg	1.6 W/kg	± 0.21 dB	
Different Test Position	Channel	Measurement Result(W/kg)		Power Drift (dB)	
		10 g Average	1 g Average		
Test Position of Head					
Left Hand, Touch Cheek	Middle/1413	0.324	0.525	-0.098	Figure 61
Left Hand, Tilt 15 Degree	Middle/1413	0.182	0.291	0.013	Figure 62
Right Hand, Touch Cheek	Middle/1413	0.464	0.745	-0.034	Figure 63
Right Hand, Tilt 15 Degree	Middle/1413	0.170	0.284	0.052	Figure 64
Test position of Body (Distance 10mm)					
Back Side	Middle/1413	0.444	0.785	-0.060	Figure 65
Front Side	High/1513	0.468	0.794	0.039	Figure 66
	Middle/1413	0.476	0.815	-0.019	Figure 67
	Low/1312	0.378	0.640	0.043	Figure 68
Left Edge	Middle/1413	0.089	0.140	-0.021	Figure 69
Right Edge	Middle/1413	0.092	0.149	0.100	Figure 70
Top Edge	N/A	N/A	N/A	N/A	N/A
Bottom Edge	High/1513	0.516	0.957	0.027	Figure 71
	Middle/1413	0.500	0.928	0.130	Figure 72
	Low/1312	0.418	0.776	0.083	Figure 73
Worst Case Position of Body with Earphone (Distance 10mm)					
Front Side	Middle/1413	0.513	0.888	-0.020	Figure 74

Note: 1. The value with blue color is the maximum SAR Value of each test band.
2. The SAR test shall be performed at the middle frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 0.8W/kg), testing at the high and low channels is optional.
3. WWAN antenna is located at bottom edge; antenna-to-top edge distance is more than 2.5 cm (see ANNEX J). Based upon KDB941225 D06, when the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.
4. WCDMA mode were tested under RMC 12.2kbps with HSPA (HSDPA/HSUPA) inactive per KDB Publication 941225 D01. HSPA (HSDPA/HSUPA) SAR for body was not required since the average output power of the HSPA (HSDPA/HSUPA) subtests was not more than 0.25 dB higher than the RMC level and the maximum SAR for 12.2kbps RMC was less than 75% SAR limit.

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7.2.5. WCDMA Band V (WCDMA/HSDPA/HSUPA)

Table 19: SAR Values [WCDMA Band V (WCDMA/HSDPA/HSUPA)]

Limit of SAR		10 g Average	1 g Average	Power Drift	Graph Results
		2.0 W/kg	1.6 W/kg	± 0.21 dB	
Different Test Position	Channel	Measurement Result(W/kg)		Power Drift (dB)	
		10 g Average	1 g Average		
Test Position of Head					
Left Hand, Touch Cheek	Middle/4183	0.164	0.214	-0.048	Figure 75
Left Hand, Tilt 15 Degree	Middle/4183	0.133	0.173	-0.063	Figure 76
Right Hand, Touch Cheek	Middle/4183	0.189	0.243	-0.031	Figure 77
Right Hand, Tilt 15 Degree	Middle/4183	0.130	0.170	-0.003	Figure 78
Test position of Body (Distance 10mm)					
Back Side	Middle/4183	0.404	0.537	-0.118	Figure 79
Front Side	Middle/4183	0.276	0.359	-0.016	Figure 80
Left Edge	Middle/4183	0.157	0.225	-0.152	Figure 81
Right Edge	Middle/4183	0.182	0.260	0.008	Figure 82
Top Edge	N/A	N/A	N/A	N/A	N/A
Bottom Edge	Middle/4183	0.031	0.053	-0.086	Figure 83
Worst Case Position of Body with Earphone (Distance 10mm)					
Back Side	Middle/4183	0.276	0.389	-0.122	Figure 84

Note: 1. The value with blue color is the maximum SAR Value of each test band.

2. The SAR test shall be performed at the middle frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 0.8W/kg), testing at the high and low channels is optional.

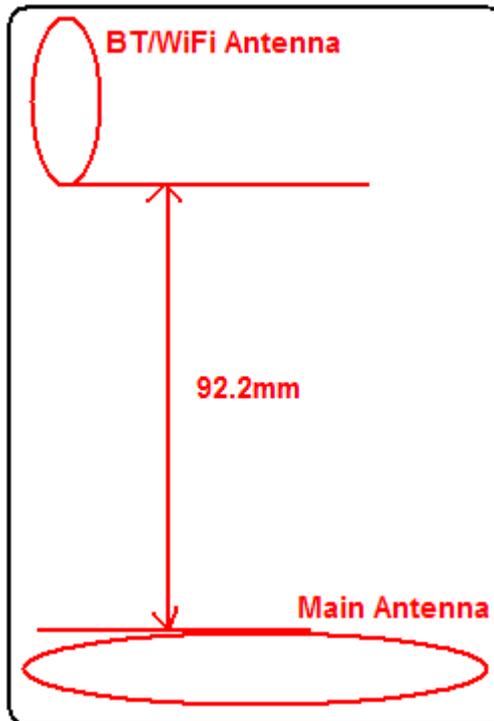
3. WWAN antenna is located at bottom edge; antenna-to-top edge distance is more than 2.5 cm (see ANNEX J). Based upon KDB941225 D06, when the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.

4. WCDMA mode were tested under RMC 12.2kbps with HSPA (HSDPA/HSUPA) inactive per KDB Publication 941225 D01. HSPA (HSDPA/HSUPA) SAR for body was not required since the average output power of the HSPA (HSDPA/HSUPA) subtests was not more than 0.25 dB higher than the RMC level and the maximum SAR for 12.2kbps RMC was less than 75% SAR limit.

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7.2.6. Bluetooth/WiFi Function

The distance between BT/WiFi antenna and GSM/WCDMA antenna is >5cm. The location of the antennas inside mobile phone is shown in Annex J:



The output power of BT antenna is as following:

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz
Average Conducted Output Power(dBm)	6.17	8.30	8.33

The output power of WIFI antenna is as following:

Mode	Channel	Data rate (Mbps)	AV Power (dBm)
11b	1	1	14.42
		2	14.33
		5.5	14.28
		11	13.90
	6	1	14.92
		2	14.85
		5.5	14.78
		11	14.62

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	11	1	14.76
		2	14.75
		5.5	14.78
		11	14.53
11g	1	6	14.43
		9	14.32
		12	14.19
		18	14.02
		24	13.82
		36	13.52
		48	13.21
		54	13.11
	6	6	14.63
		9	14.46
		12	14.91
		18	14.55
		24	14.54
		36	14.24
		48	13.94
		54	13.79
	11	6	14.59
		9	14.49
		12	13.98
		18	14.57
		24	14.57
		36	14.29
		48	13.92
		54	13.83
11n HT20	1	6.5	12.29
		13	12.08
		19.5	11.85
		26	11.68
		39	11.34
		52	11.06

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		58.5	11.01
		65	10.92
	6	6.5	13.09
		13	12.82
		19.5	12.67
		26	12.41
		39	12.18
		52	11.92
		58.5	11.76
		65	11.67
	11	6.5	13.06
		13	12.75
		19.5	12.63
		26	12.46
		39	12.15
		52	11.89
		58.5	11.79
		65	11.60

Note: 1. KDB 248227-SAR is not required for 802.11g/n channels when the maximum average output power is less than ¼ dB higher than measured on the corresponding 802.11b channels.

Output Power Thresholds for Unlicensed Transmitters

	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.				

Stand-alone SAR

According to the output power measurement result and the distance between BT/WIFI antenna and GSM/WCDMA antenna we can draw the conclusion that:

Stand-alone SAR are required for WIFI, because WIFI antenna is >5cm from other antennas and the output power of WIFI transmitter is >2P_{Ref}=13.8dBm

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Table 20: SAR Values (802.11b)

Limit of SAR (W/kg)		10 g Average	1g Average	Power Drift (dB)	Graph Results
		2.0	1.6	± 0.21	
Different Test Position	Channel	Measurement Result(W/kg)		Power Drift (dB)	
		10 g Average	1g Average		
Test Position of Head					
Left hand, Touch cheek	Middle/6	0.100	0.207	-0.070	Figure 85
Left hand, Tilt 15 Degree	Middle/6	0.091	0.192	0.045	Figure 86
Right hand, Touch cheek	Middle/6	0.089	0.170	0.044	Figure 87
Right hand, Tilt 15 Degree	Middle/6	0.091	0.172	-0.181	Figure 88
Test position of Body (Distance 10mm)					
Back Side	Middle/6	0.043	0.093	0.095	Figure 89
Front Side	Middle/6	0.032	0.055	-0.012	Figure 90
Left Edge	N/A	N/A	N/A	N/A	N/A
Right Edge	Middle/6	0.030	0.063	0.090	Figure 91
Top Edge	Middle/6	0.036	0.069	-0.007	Figure 92
Bottom Edge	N/A	N/A	N/A	N/A	N/A

Note: 1. The value with blue color is the maximum SAR Value of each test band.
 2. The SAR test shall be performed at the middle frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 0.8W/kg), testing at the high and low channels is optional.
 3. WLAN antenna is located at Right edge; antenna-to- Left/Bottom edge distance is more than 2.5 cm (see ANNEX J). Based upon KDB941225 D06, when the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.
 4. KDB 248227-SAR is not required for 802.11g/n channels when the maximum average output power is less than ¼ dB higher than measured on the corresponding 802.11b channels.

BT antenna is >5cm from GSM/WCDMA antenna, stand-alone SAR are not required for BT, because the output power of BT transmitter is $\leq 2P_{Ref} = 13.8\text{dBm}$.

BT antenna is <2.5cm from WIFI antenna, stand-alone SAR are not required for BT, because $SAR_{MAX.WIFI} \leq 1.2\text{W/Kg}$.

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Simultaneous SAR

About WIFI and GSM/WCDMA Antenna,

SAR _{1g} (W/kg) Test Position	GSM850	GSM1900	WCDMA Band II	WCDMA Band IV	WCDMA Band V	WIFI (802.11b)	MAX. ΣSAR _{1g}
Left hand, Touch cheek	0.209	0.203	0.456	0.525	0.214	0.207	0.732
Left hand, Tilt 15 Degree	0.148	0.133	0.265	0.291	0.173	0.192	0.483
Right hand, Touch cheek	0.231	0.245	0.484	0.745	0.243	0.170	0.915
Right hand, Tilt 15 Degree	0.168	0.134	0.260	0.284	0.170	0.172	0.456
Body, Back Side	0.614	0.650	0.981	0.785	0.537	0.093	1.074
Body, Front Side	0.405	0.638	1.020	0.888	0.359	0.055	1.075
Body, Left Edge	0.265	0.075	0.110	0.140	0.225	N/A	0.265
Body, Right Edge	0.308	0.082	0.169	0.149	0.260	0.063	0.371
Body, Top Edge	N/A	N/A	N/A	N/A	N/A	0.069	0.069
Body, Bottom Edge	0.059	0.890	1.290	0.957	0.053	N/A	1.290

Note: 1. The value with blue color is the maximum ΣSAR_{1g} Value.

2. MAX. ΣSAR_{1g} = Unlicensed SAR_{MAX} + Licensed SAR_{MAX}

WIFI antenna is >5cm from GSM/WCDMA Antenna. (GSM/WCDMA Antenna SAR_{MAX})1.290 +(WIFI Antenna SAR_{MAX}) N/A =1.290 <1.6, So the Simultaneous SAR are not required for WIFI and GSM/WCDMA antenna.

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About BT and GSM/WCDMA Antenna,

SAR _{1g} (W/kg) Test Position	GSM850	GSM1900	WCDMA Band II	WCDMA Band IV	WCDMA Band V	BT	MAX. ΣSAR _{1g}
Left hand, Touch cheek	0.209	0.203	0.456	0.525	0.214	0	0.525
Left hand, Tilt 15 Degree	0.148	0.133	0.265	0.291	0.173	0	0.291
Right hand, Touch cheek	0.231	0.245	0.484	0.745	0.243	0	0.745
Right hand, Tilt 15 Degree	0.168	0.134	0.260	0.284	0.170	0	0.284
Body, Back Side	0.614	0.650	0.981	0.785	0.537	0	0.981
Body, Front Side	0.405	0.638	1.020	0.888	0.359	0	1.020
Body, Left Edge	0.265	0.075	0.110	0.140	0.225	0	0.265
Body, Right Edge	0.308	0.082	0.169	0.149	0.260	0	0.308
Body, Top Edge	N/A	N/A	N/A	N/A	N/A	0	0
Body, Bottom Edge	0.059	0.890	1.290	0.957	0.053	0	1.290

Note: 1. The value with blue color is the maximum ΣSAR_{1g} Value.

2. MAX. ΣSAR_{1g} = Unlicensed SAR_{MAX} + Licensed SAR_{MAX}

3. Stand alone SAR for BT is not required. Its SAR is considered 0 in the 1-g SAR summing process to determine simultaneous transmission SAR evaluation requirements.

BT antenna is >5cm from GSM/WCDMA Antenna. (GSM/WCDMA Antenna SAR_{MAX})1.290 +(BT Antenna SAR_{MAX})0 =1.290 < 1.6, So the Simultaneous SAR are not required for BT and GSM/WCDMA antenna.

About BT and WIFI Antenna, BT antenna is < 2.5cm from WIFI Antenna. (WIFI Antenna SAR_{MAX})0.207 +(BT Antenna SAR_{MAX})0 =0.207 < 1.6, So the Simultaneous SAR are not required for BT and WIFI antenna.

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8. Measurement Uncertainty

No.	source	Type	Uncertainty Value (%)	Probability Distribution	k	c _i	Standard uncertainty u _i (%)	Degree of freedom V _{eff} or V _i
1	System repetivity	A	0.5	N	1	1	0.5	9
Measurement system								
2	-probe calibration	B	6.0	N	1	1	6.0	∞
3	-axial isotropy of the probe	B	4.7	R	$\sqrt{3}$	$\sqrt{0.5}$	1.9	∞
4	- Hemispherical isotropy of the probe	B	9.4	R	$\sqrt{3}$	$\sqrt{0.5}$	3.9	∞
6	-boundary effect	B	1.9	R	$\sqrt{3}$	1	1.1	∞
7	-probe linearity	B	4.7	R	$\sqrt{3}$	1	2.7	∞
8	- System detection limits	B	1.0	R	$\sqrt{3}$	1	0.6	∞
9	-readout Electronics	B	1.0	N	1	1	1.0	∞
10	-response time	B	0	R	$\sqrt{3}$	1	0	∞
11	-integration time	B	4.32	R	$\sqrt{3}$	1	2.5	∞
12	-noise	B	0	R	$\sqrt{3}$	1	0	∞
13	-RF Ambient Conditions	B	3	R	$\sqrt{3}$	1	1.73	∞
14	-Probe Positioner Mechanical Tolerance	B	0.4	R	$\sqrt{3}$	1	0.2	∞
15	-Probe Positioning with respect to Phantom Shell	B	2.9	R	$\sqrt{3}$	1	1.7	∞
16	-Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	B	3.9	R	$\sqrt{3}$	1	2.3	∞
Test sample Related								
17	-Test Sample Positioning	A	2.9	N	1	1	2.9	71
18	-Device Holder Uncertainty	A	4.1	N	1	1	4.1	5
19	-Output Power Variation - SAR drift measurement	B	5.0	R	$\sqrt{3}$	1	2.9	∞
Physical parameter								
20	-phantom	B	4.0	R	$\sqrt{3}$	1	2.3	∞

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21	-liquid conductivity (deviation from target)	B	5.0	R	$\sqrt{3}$	0.64	1.8	∞
22	-liquid conductivity (measurement uncertainty)	B	2.5	N	1	0.64	1.6	9
23	-liquid permittivity (deviation from target)	B	5.0	R	$\sqrt{3}$	0.6	1.7	∞
24	-liquid permittivity (measurement uncertainty)	B	2.5	N	1	0.6	1.5	9
Combined standard uncertainty		$u_c = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$					11.50	
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$		N	k=2	23.00		

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9. Main Test Instruments

Table 21: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	Agilent 8753E	US37390326	September 12, 2011	One year
02	Dielectric Probe Kit	Agilent 85070E	US44020115	No Calibration Requested	
03	Power meter	Agilent E4417A	GB41291714	March 11, 2012	One year
04	Power sensor	Agilent N8481H	MY50350004	September 25, 2011	One year
05	Power sensor	E9327A	US40441622	September 24, 2011	One year
06	Signal Generator	HP 8341B	2730A00804	September 12, 2011	One year
07	Dual directional coupler	778D-012	50519	March 26, 2012	One year
08	Dual directional coupler	777D	50146	March 26, 2012	One year
09	Amplifier	IXA-020	0401	No Calibration Requested	
10	BTS	E5515C	MY48360988	December 2, 2011	One year
11	E-field Probe	EX3DV4	3753	January 4, 2012	One year
12	DAE	DAE4	1317	January 23, 2012	One year
13	Validation Kit 835MHz	D835V2	4d020	August 26, 2011	Three years
14	Validation Kit 1750MHz	D1750V2	1033	May 17, 2010	Three years
15	Validation Kit 1900MHz	D1900V2	5d060	August 31, 2011	Three years
16	Validation Kit 2450MHz	D2450V2	786	August 29, 2011	Three years
17	Temperature Probe	JM222	AA1009129	March 15, 2012	One year
18	Hygrothermograph	WS-1	64591	September 28, 2011	One year

*****END OF REPORT *****

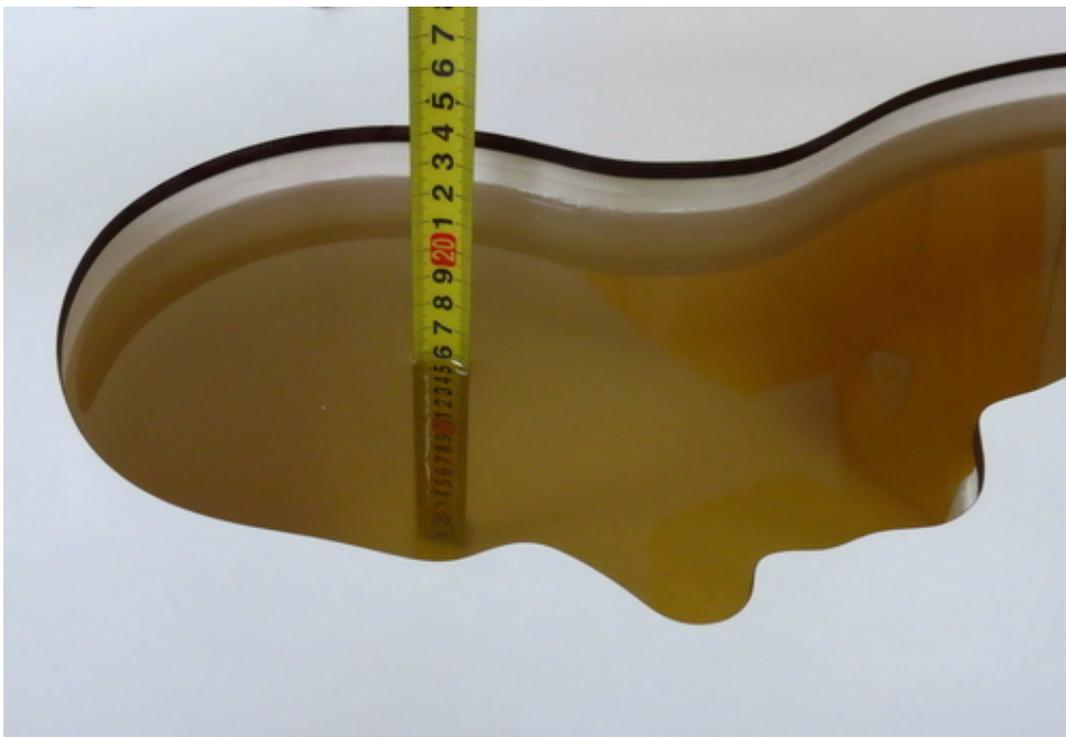
ANNEX A: Test Layout



Picture 1: Specific Absorption Rate Test Layout



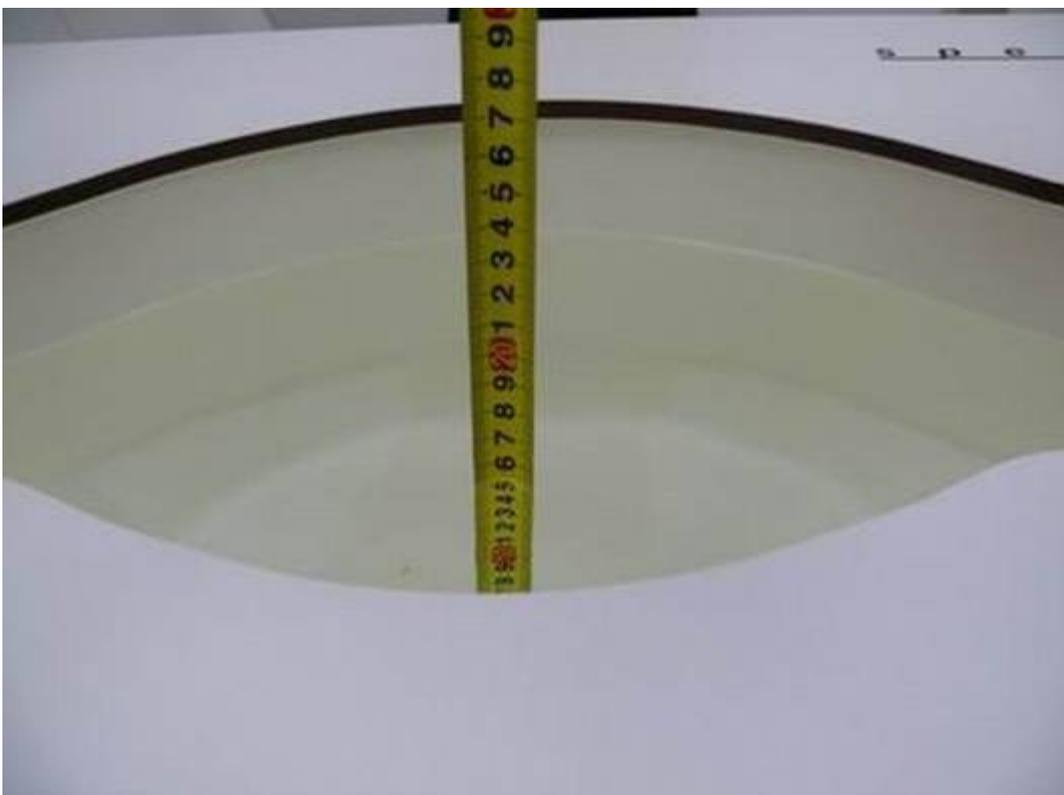
Picture 2: Liquid depth in the flat Phantom (835MHz, 15.4cm depth)



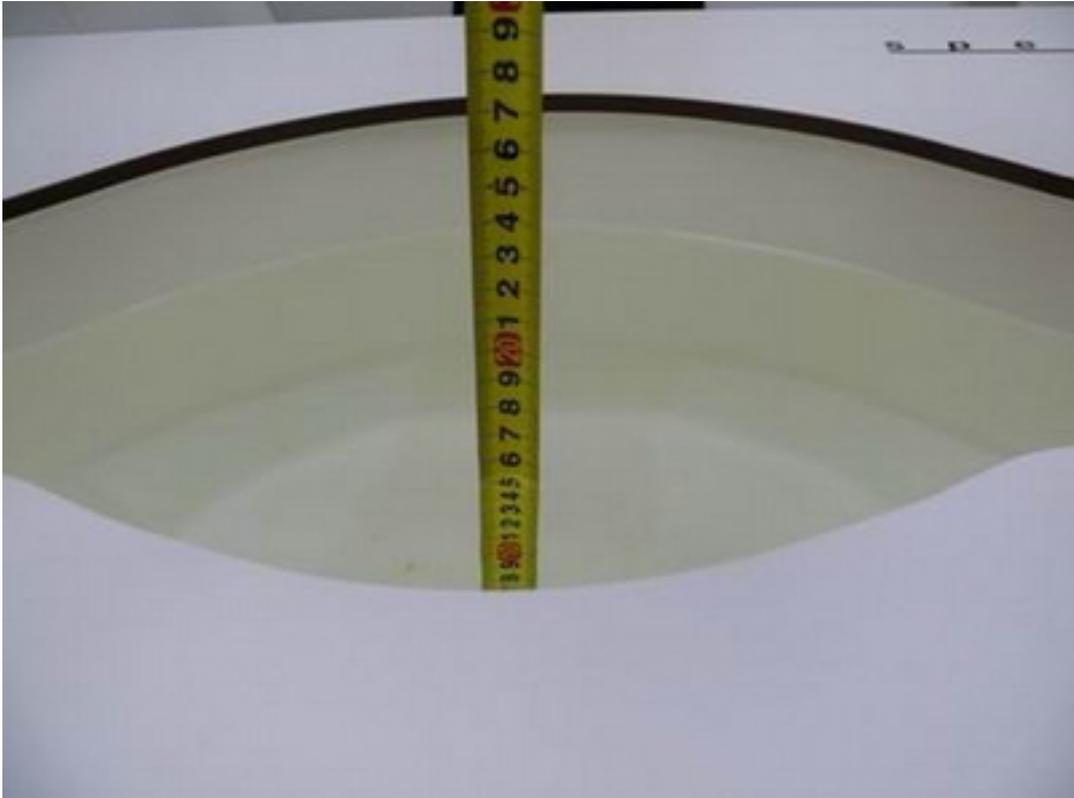
Picture 3: Liquid depth in the head Phantom (835MHz, 15.3cm depth)



Picture 4: liquid depth in the head Phantom (1750 MHz, 15.2cm depth)



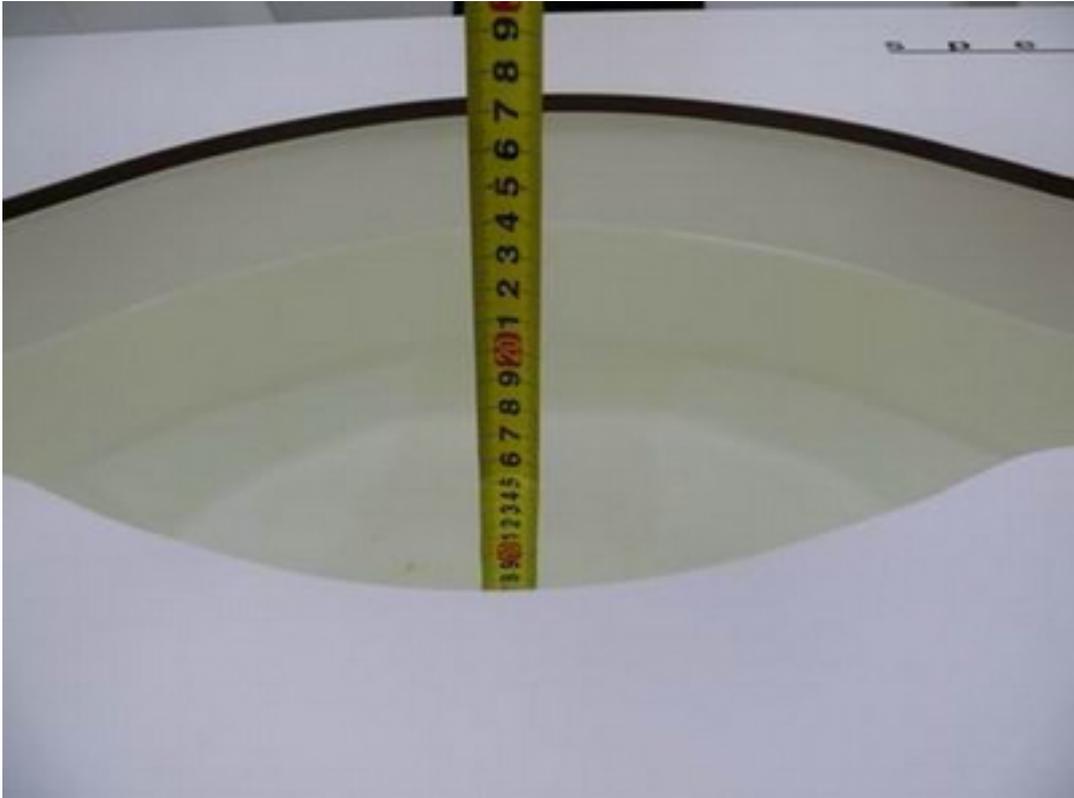
Picture 5: Liquid depth in the Flat Phantom (1750 MHz, 15.3cm depth)



Picture 6: Liquid depth in the flat Phantom (1900 MHz, 15.2cm depth)



Picture 7: liquid depth in the head Phantom (1900 MHz, 15.3cm depth)



Picture 8: Liquid depth in the flat Phantom (2450 MHz, 15.3cm depth)



Picture 9: Liquid depth in the head Phantom (2450 MHz, 15.4cm depth)

ANNEX B: System Check Results

System Performance Check at 835 MHz Head TSL

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d020

Date/Time: 6/30/2012 6:51:38 AM

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 835$ MHz; $\sigma = 0.894$ mho/m; $\epsilon_r = 42.1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5°C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(9.02, 9.02, 9.02); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

d=15mm, Pin=250mW/Area Scan (41x121x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.64 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.4 V/m; Power Drift = -0.076 dB

Peak SAR (extrapolated) = 3.67 W/kg

SAR(1 g) = 2.44 mW/g; SAR(10 g) = 1.6 mW/g

Maximum value of SAR (measured) = 2.64 mW/g

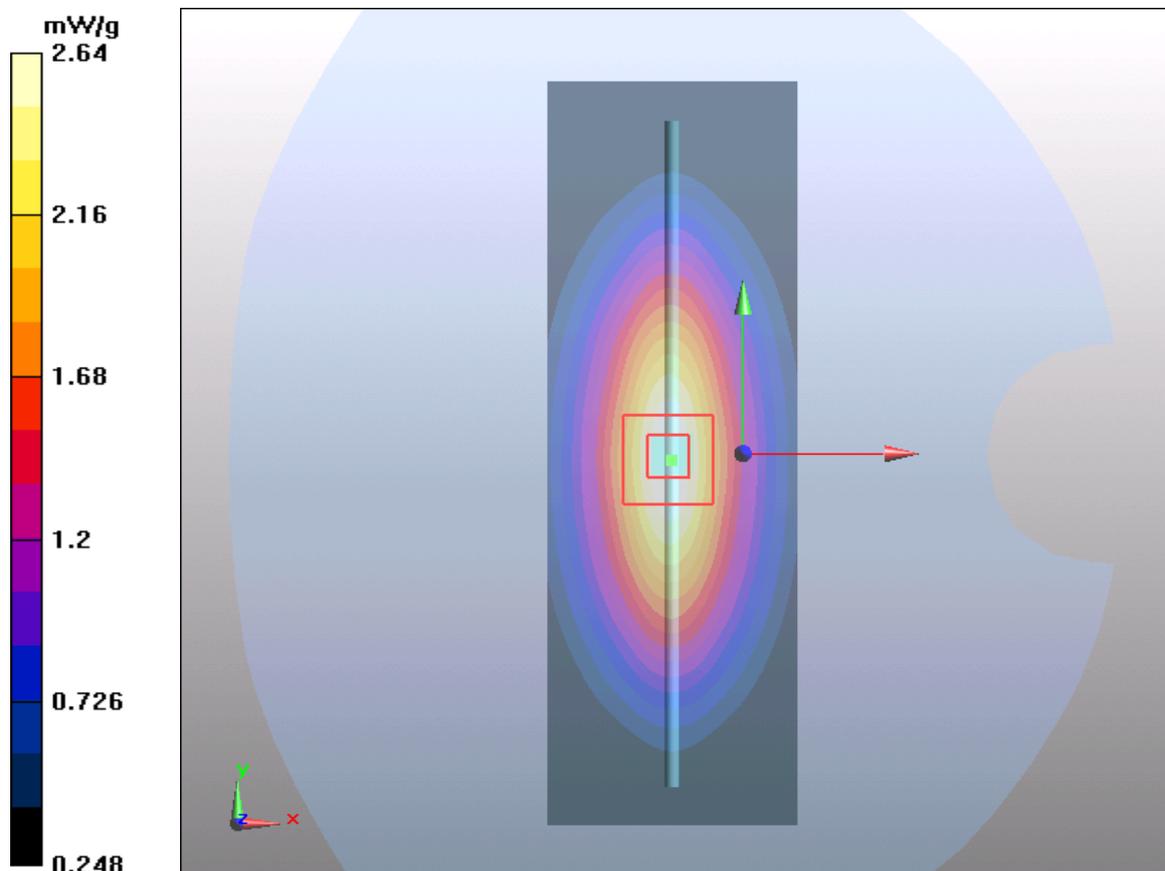


Figure 7 System Performance Check 835MHz 250mW

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System Performance Check at 835 MHz Body TSL

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d020

Date/Time: 6/29/2012 10:10:37 AM

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 835$ MHz; $\sigma = 0.968$ mho/m; $\epsilon_r = 54.5$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(9.18, 9.18, 9.18); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

d=15mm, Pin=250mW/Area Scan (41x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.58 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 51.9 V/m; Power Drift = -0.058 dB

Peak SAR (extrapolated) = 3.5 W/kg

SAR(1 g) = 2.41 mW/g; SAR(10 g) = 1.6 mW/g

Maximum value of SAR (measured) = 2.6 mW/g

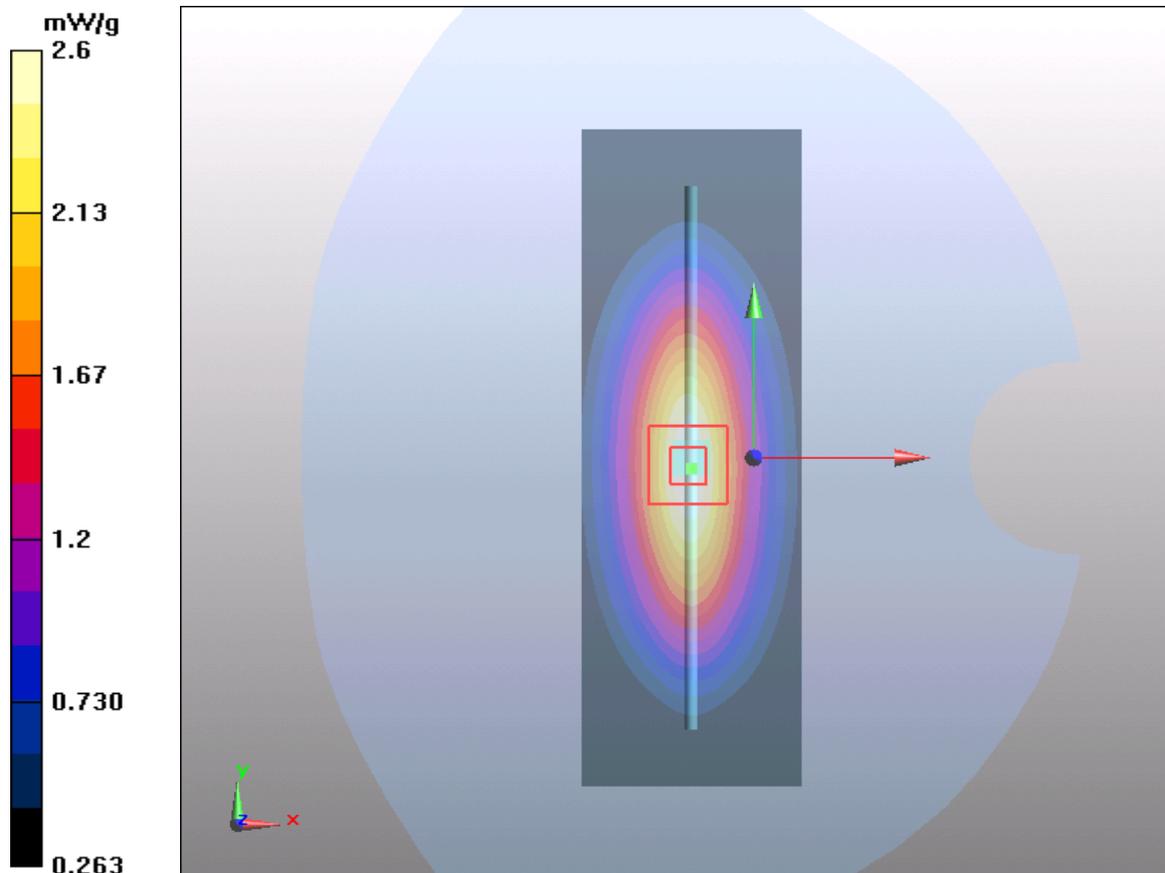


Figure 8 System Performance Check 835MHz 250mW

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System Performance Check at 1750 MHz Head TSL

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1033

Date/Time: 7/1/2012 4:50:33 PM

Communication System: CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 39.2$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(8.37, 8.37, 8.37); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

d=10mm, Pin=250mW/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 9.89 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 81.1 V/m; Power Drift = 0.007 dB

Peak SAR (extrapolated) = 15.5 W/kg

SAR(1 g) = 8.61 mW/g; SAR(10 g) = 4.57 mW/g

Maximum value of SAR (measured) = 9.63 mW/g

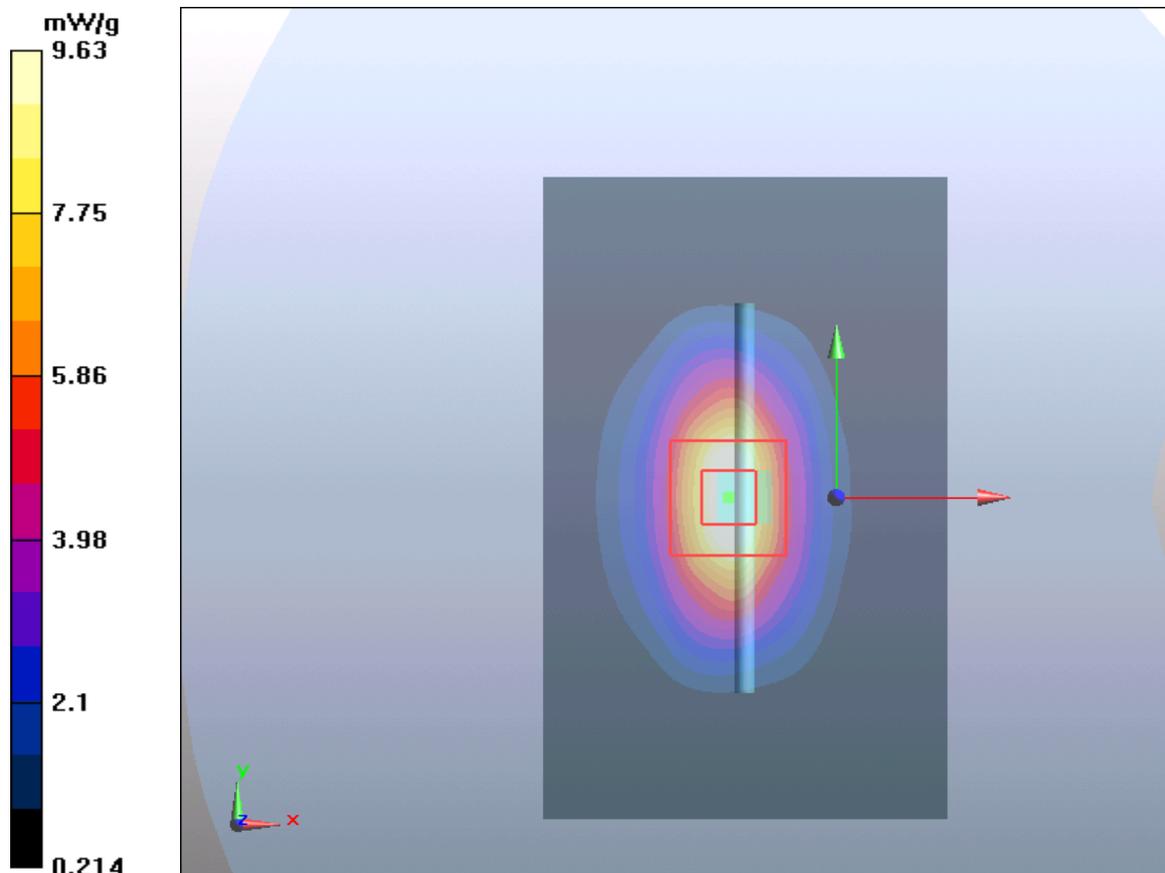


Figure 9 System Performance Check 1750MHz 250mW

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System Performance Check at 1750 MHz Body TSL

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1033

Date/Time: 6/28/2012 8:32:45 AM

Communication System: CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 52.7$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(8, 8, 8); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

d=10mm, Pin=250mW/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 10 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 74.8 V/m; Power Drift = 0.050 dB

Peak SAR (extrapolated) = 15.3 W/kg

SAR(1 g) = 8.73 mW/g; SAR(10 g) = 4.69 mW/g

Maximum value of SAR (measured) = 9.86 mW/g

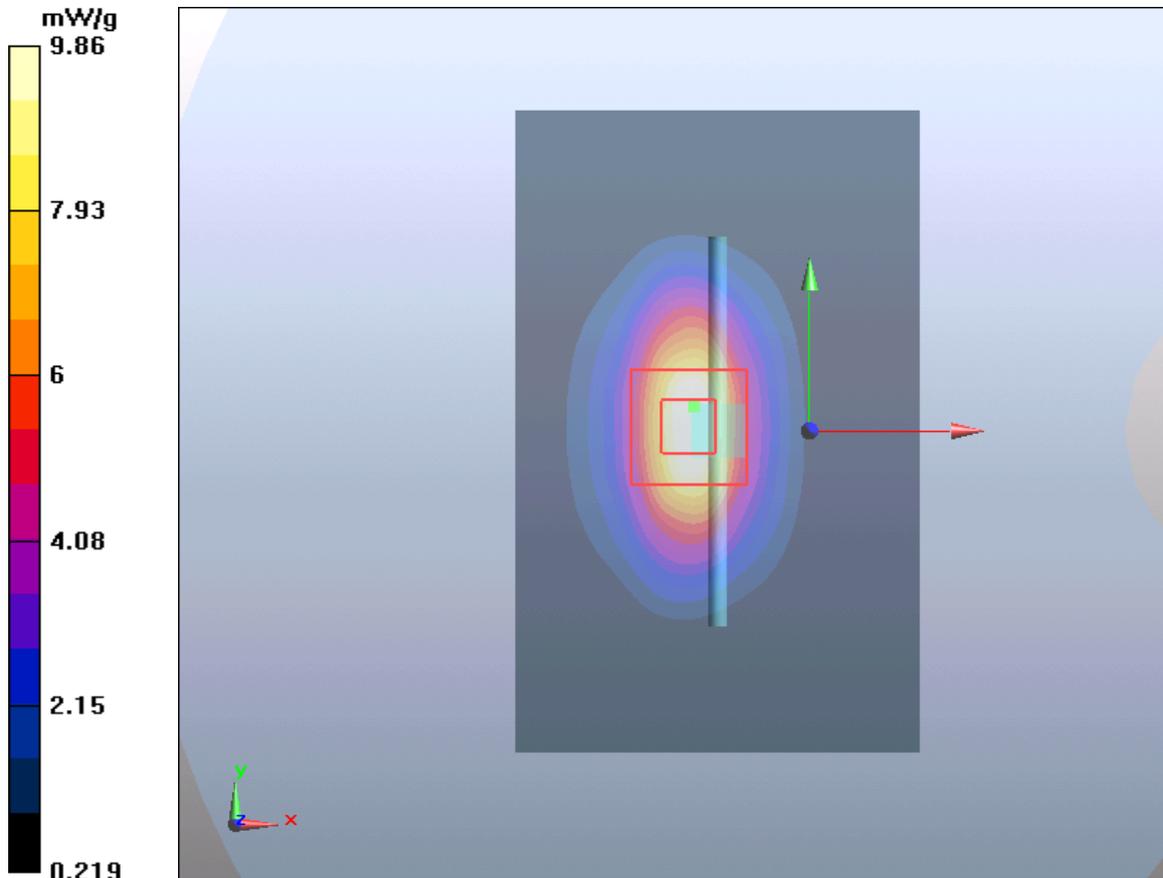


Figure 10 System Performance Check 1750MHz 250mW

System Performance Check at 1750 MHz Body TSL

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1033

Date/Time: 7/12/2012 5:50:55 PM

Communication System: CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.50$ mho/m; $\epsilon_r = 53.43$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(8, 8, 8); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

d=10mm, Pin=250mW/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 10.6 mW/g

d=10mm, Pin=250mW/Area Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 77.7 V/m; Power Drift = 0.097 dB

Peak SAR (extrapolated) = 16.8 W/kg

SAR(1 g) = 9.24 mW/g; SAR(10 g) = 4.9 mW/g

Maximum value of SAR (measured) = 10.3 mW/g

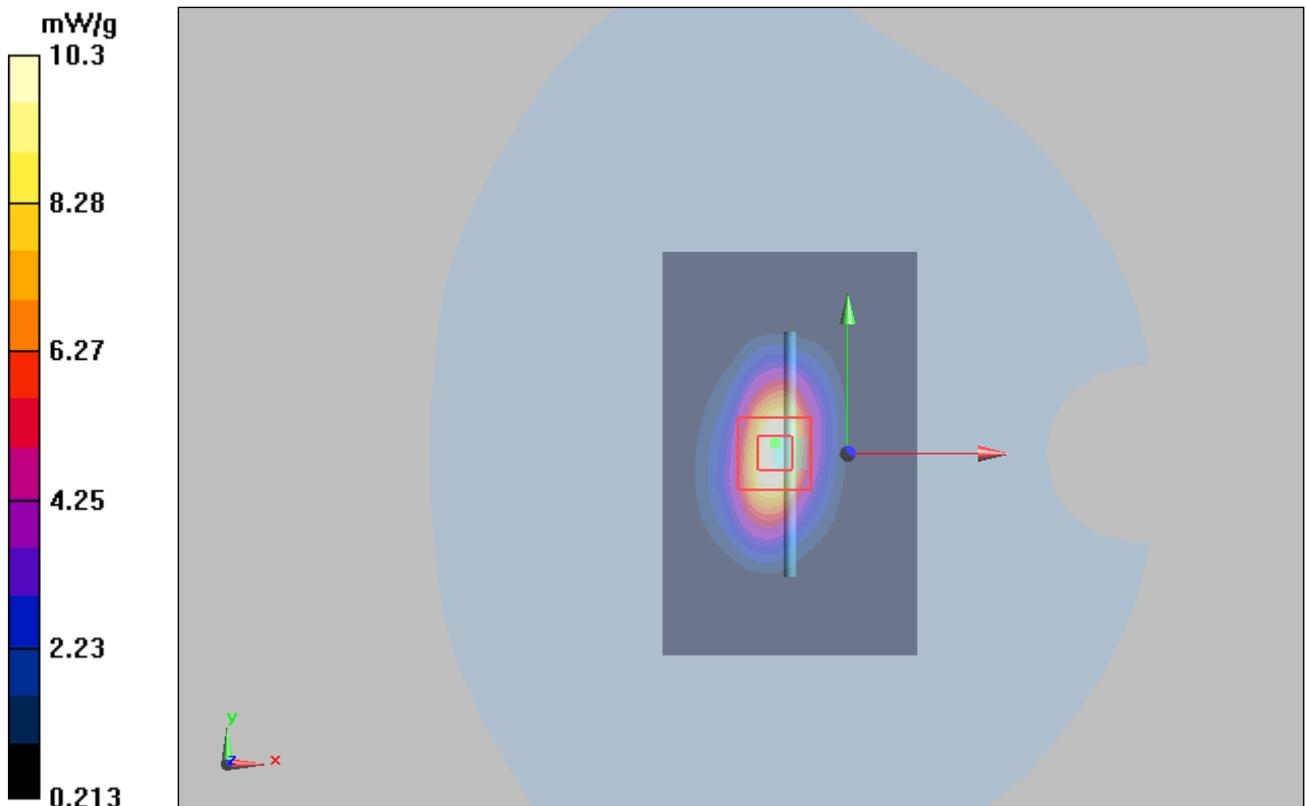


Figure 11 System Performance Check 1750MHz 250mW

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System Performance Check at 1900 MHz Head TSL

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d060

Date/Time: 7/1/2012 1:13:55 PM

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 40.4$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(8.05, 8.05, 8.05); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 11.3 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 85.5 V/m; Power Drift = 0.028 dB

Peak SAR (extrapolated) = 17.8 W/kg

SAR(1 g) = 9.48 mW/g; SAR(10 g) = 4.9 mW/g

Maximum value of SAR (measured) = 10.7 mW/g

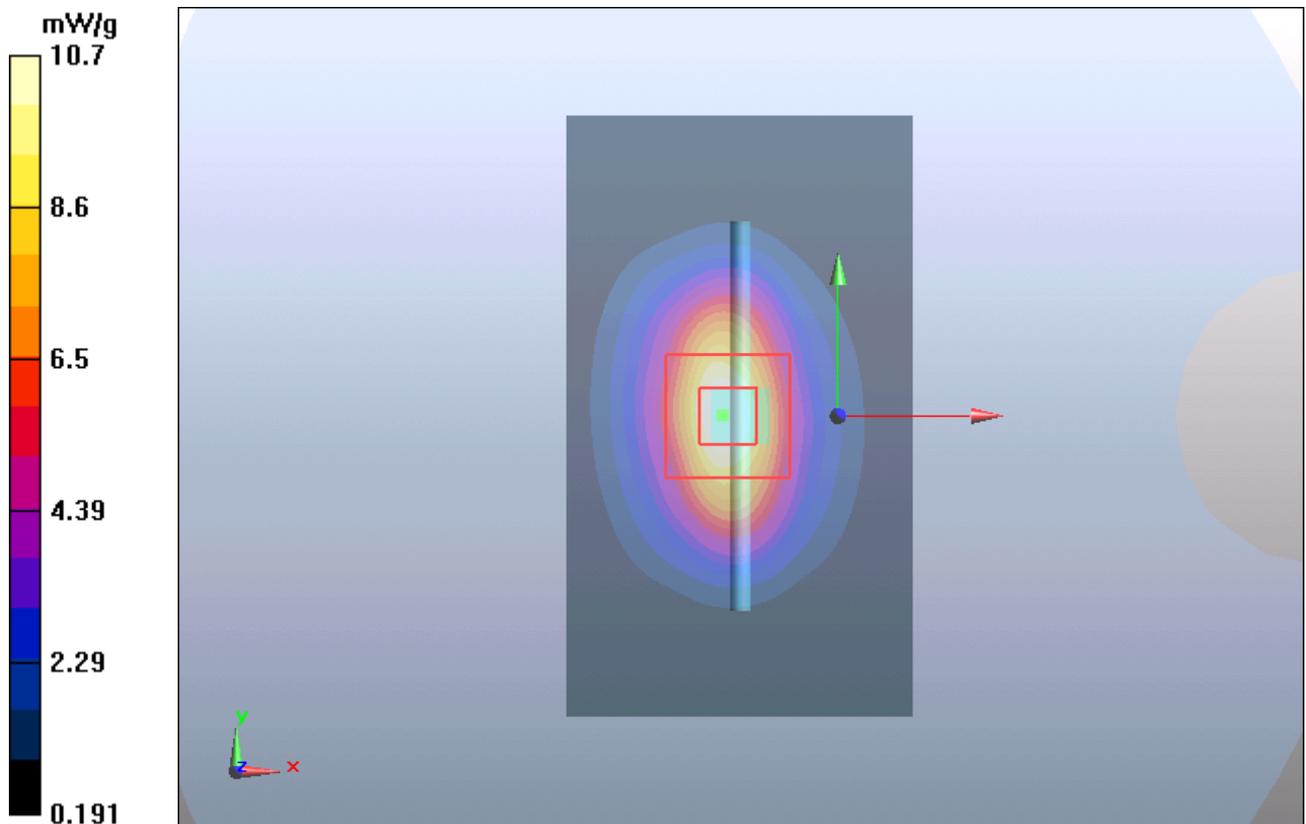


Figure 12 System Performance Check 1900MHz 250mW

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System Performance Check at 1900 MHz Body TSL

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d060

Date/Time: 6/30/2012 4:08:25 AM

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.52$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(7.57, 7.57, 7.57); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 12.2 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 82.3 V/m; Power Drift = 0.068 dB

Peak SAR (extrapolated) = 17.8 W/kg

SAR(1 g) = 9.93 mW/g; SAR(10 g) = 5.25 mW/g

Maximum value of SAR (measured) = 11.3 mW/g

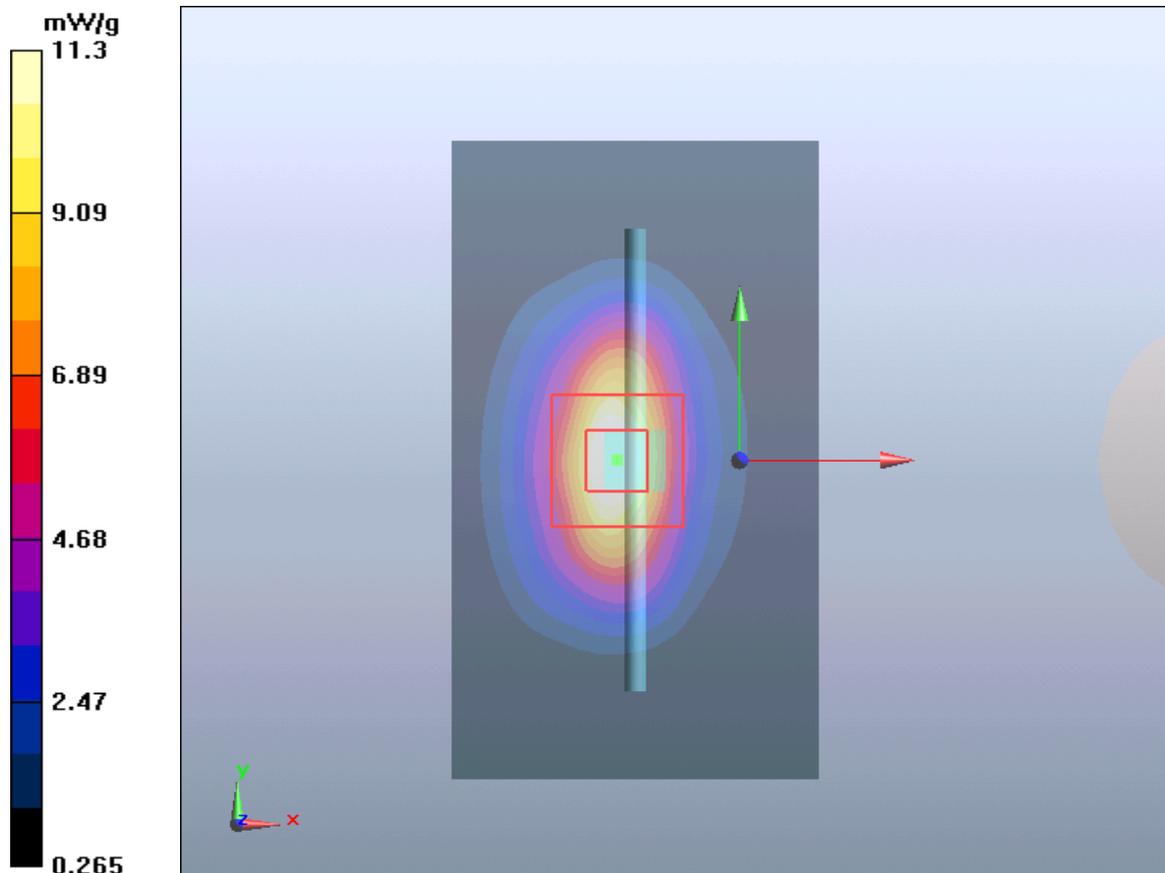


Figure 13 System Performance Check 1900MHz 250mW

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System Performance Check at 1900 MHz Body TSL

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d060

Date/Time: 7/12/2012 4:25:51 PM

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 53$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(7.57, 7.57, 7.57); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 12.5 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 83.4 V/m; Power Drift = 0.173 dB

Peak SAR (extrapolated) = 18.6 W/kg

SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.28 mW/g

Maximum value of SAR (measured) = 11.4 mW/g

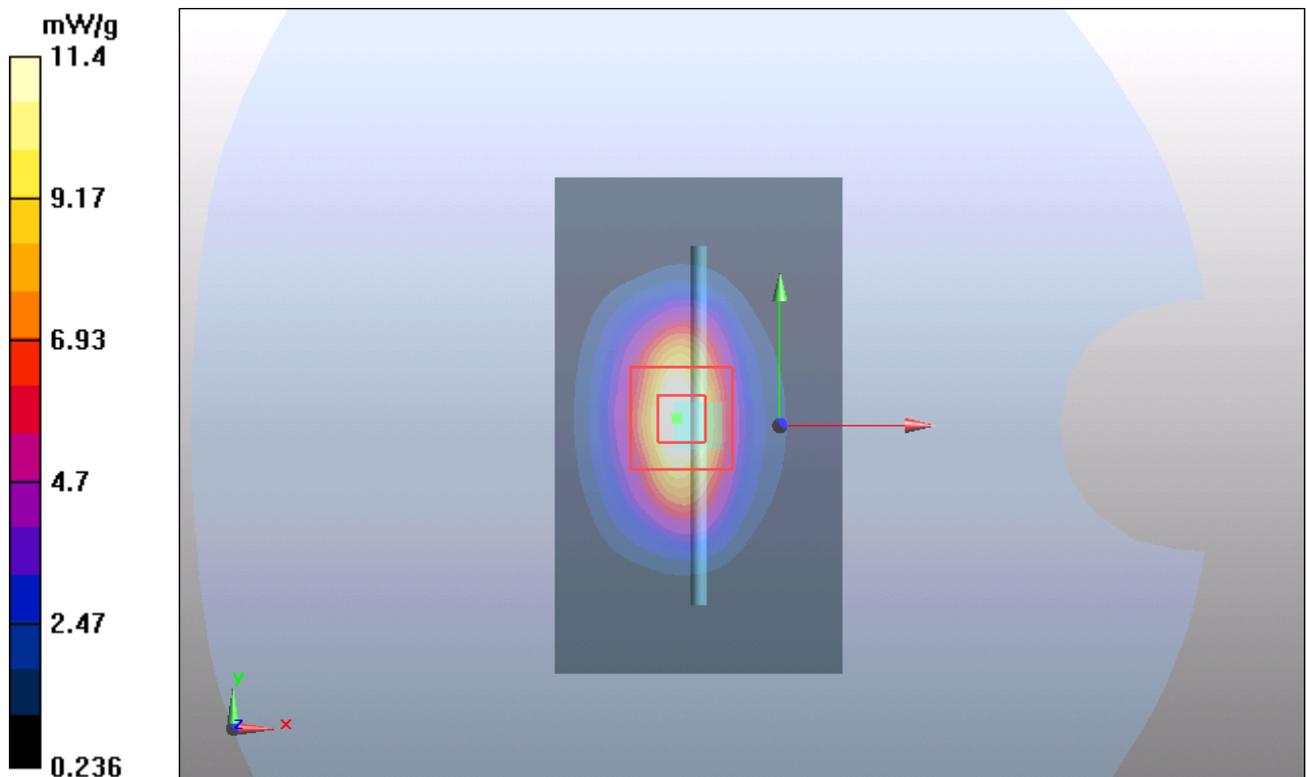


Figure 14 System Performance Check 1900MHz 250mW

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System Performance Check at 2450 MHz Head TSL

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 786

Date/Time: 7/2/2012 9:00:12 AM

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.88$ mho/m; $\epsilon_r = 38.3$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(6.89, 6.89, 6.89); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 18.2 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 88.8 V/m; Power Drift = 0.075 dB

Peak SAR (extrapolated) = 30 W/kg

SAR(1 g) = 13.7 mW/g; SAR(10 g) = 6.22 mW/g

Maximum value of SAR (measured) = 15.9 mW/g

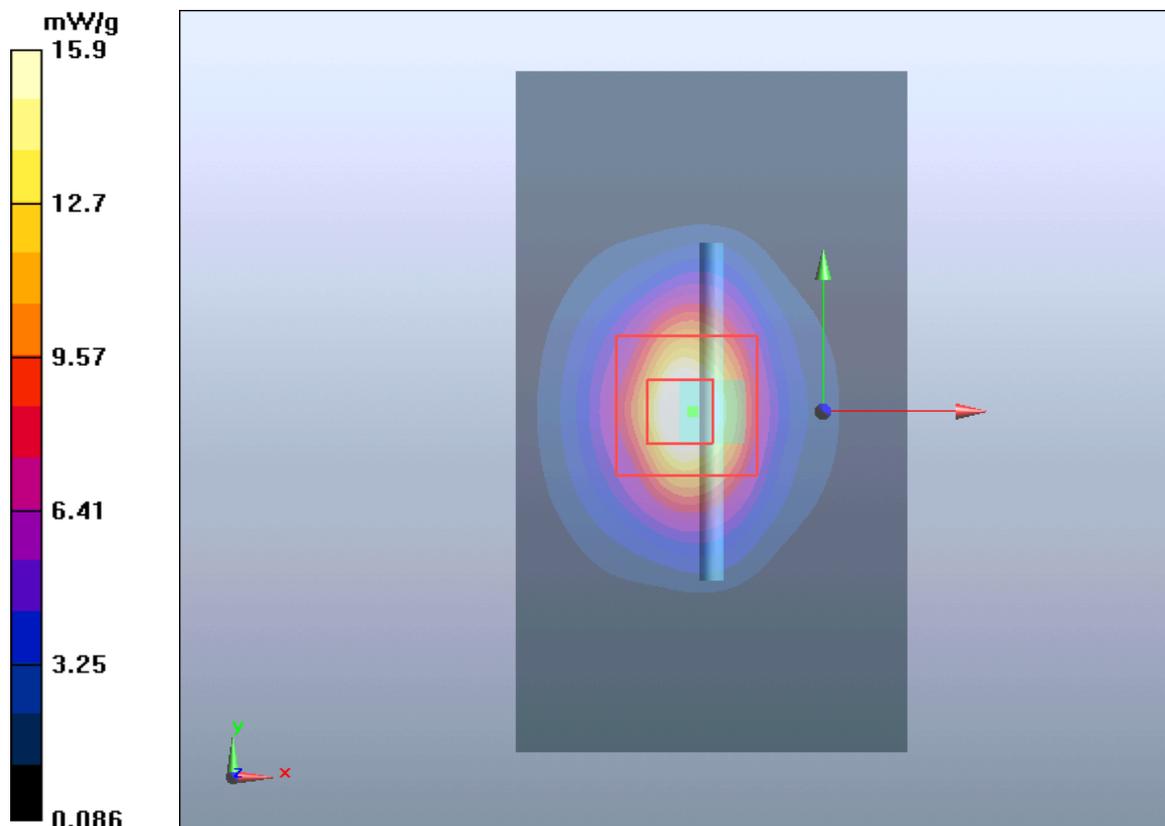


Figure 15 System Performance Check 2450MHz 250mW

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System Performance Check at 2450 MHz Body TSL

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 786

Date/Time: 6/30/2012 5:33:59 AM

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.9$ mho/m; $\epsilon_r = 51.7$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(7.03, 7.03, 7.03); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 16 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 81.2 V/m; Power Drift = 0.076 dB

Peak SAR (extrapolated) = 25.4 W/kg

SAR(1 g) = 12.9 mW/g; SAR(10 g) = 6.13 mW/g

Maximum value of SAR (measured) = 14.9 mW/g

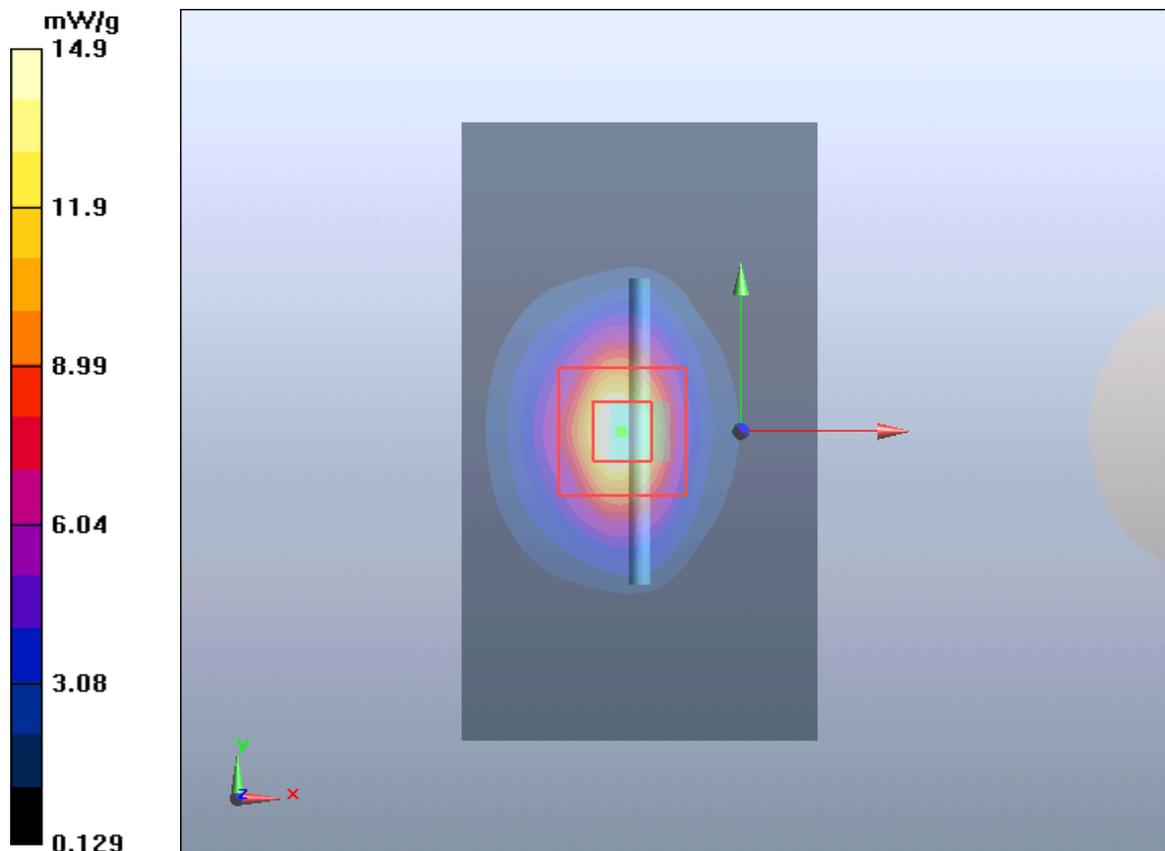


Figure 16 System Performance Check 2450MHz 250mW

ANNEX C: Graph Results

GSM 850 Left Cheek Middle

Date/Time: 6/30/2012 5:08:10 PM

Communication System: GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.30042

Medium parameters used: $f = 837$ MHz; $\sigma = 0.896$ mho/m; $\epsilon_r = 42$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(9.02, 9.02, 9.02); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Cheek Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.220 mW/g

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

Reference Value = 9.19 V/m; Power Drift = -0.082 dB

Peak SAR (extrapolated) = 0.264 W/kg

SAR(1 g) = 0.209 mW/g; SAR(10 g) = 0.159 mW/g

Maximum value of SAR (measured) = 0.218 mW/g

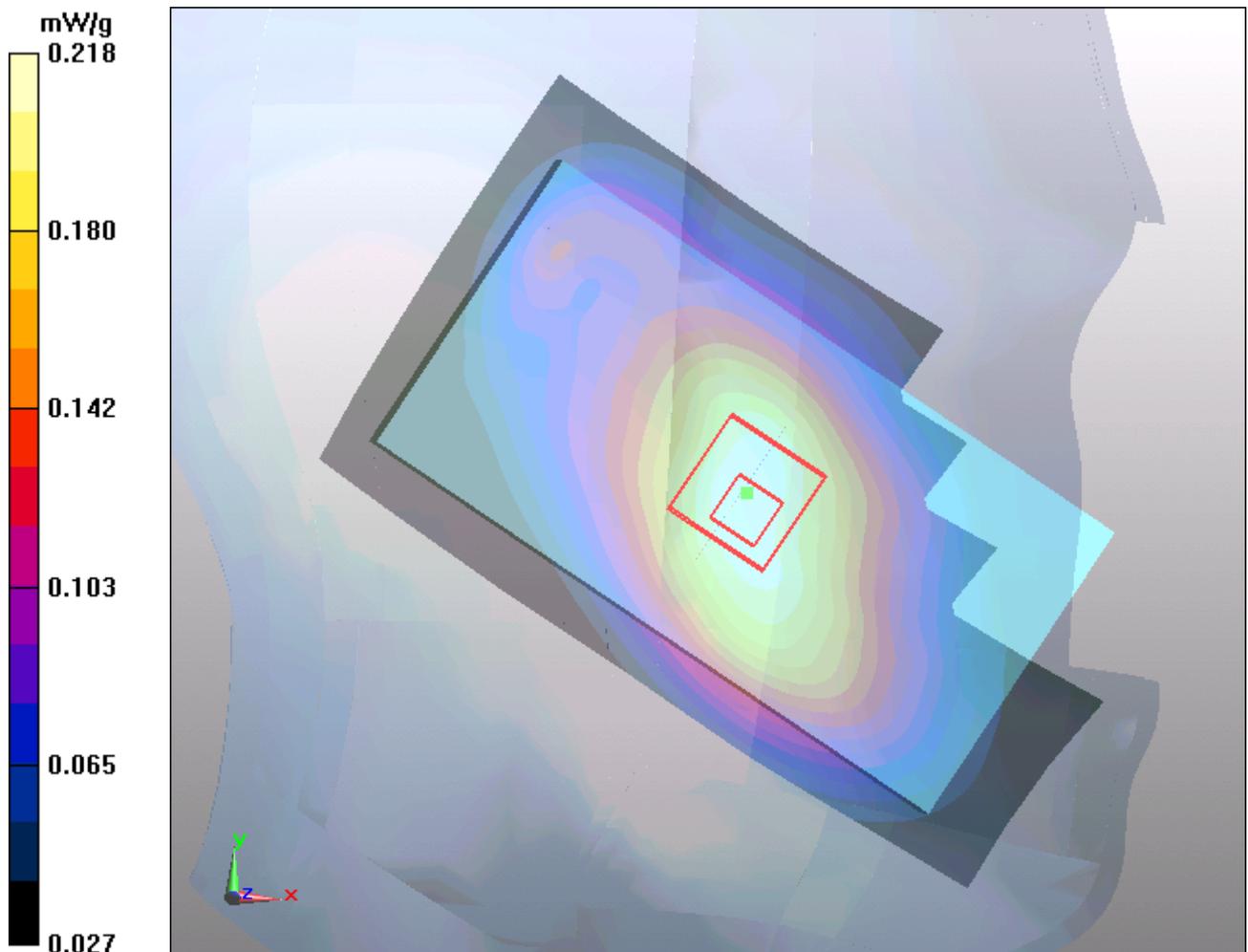


Figure 17 Left Hand Touch Cheek GSM 850 Channel 190

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GSM 850 Left Tilt Middle

Date/Time: 6/30/2012 5:25:39 PM

Communication System: GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.30042

Medium parameters used: $f = 837$ MHz; $\sigma = 0.896$ mho/m; $\epsilon_r = 42$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(9.02, 9.02, 9.02); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Tilt Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.184 mW/g

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

Reference Value = 12.4 V/m; Power Drift = -0.076 dB

Peak SAR (extrapolated) = 0.301 W/kg

SAR(1 g) = 0.148 mW/g; SAR(10 g) = 0.098 mW/g

Maximum value of SAR (measured) = 0.160 mW/g

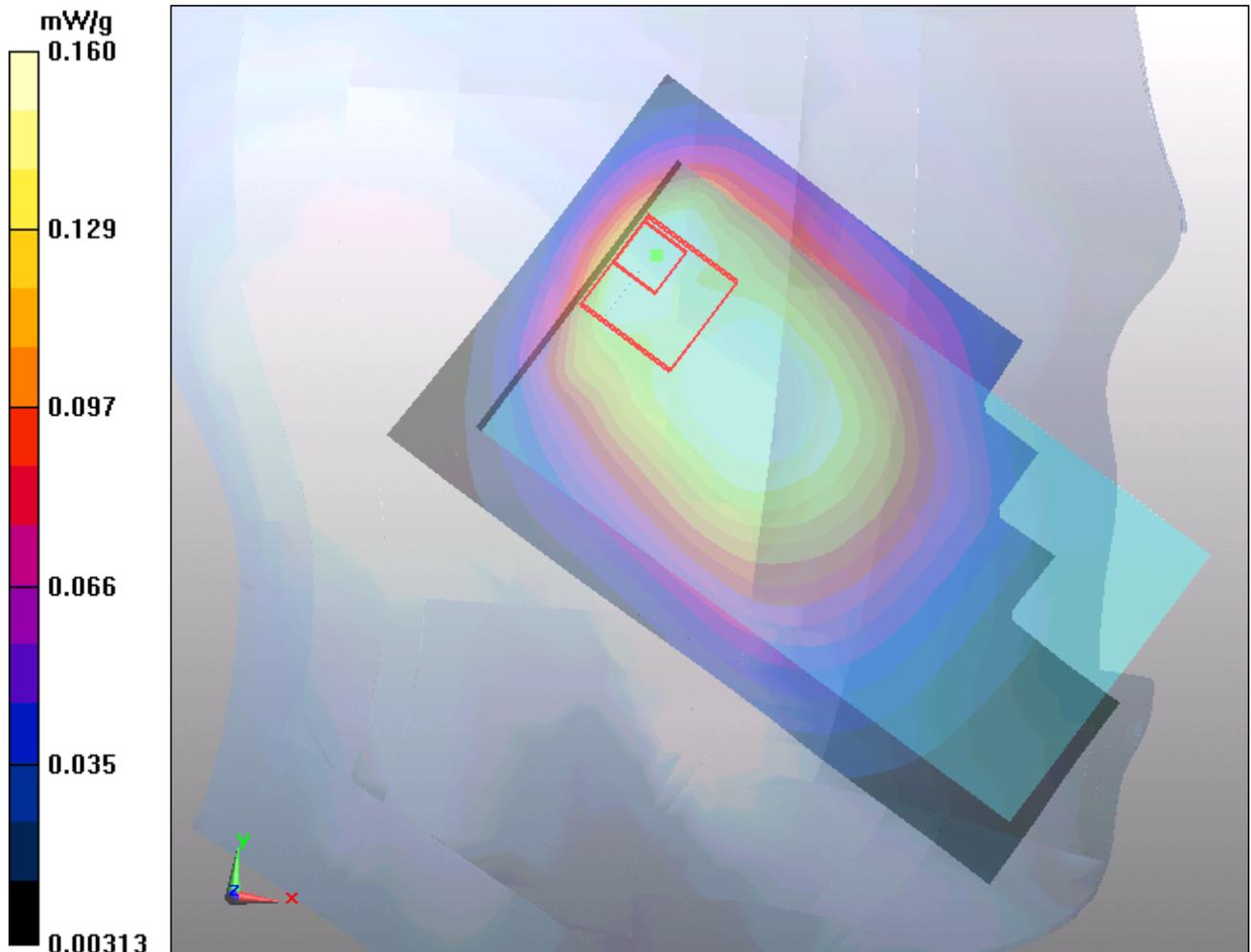


Figure 18 Left Hand Tilt 15° GSM 850 Channel 190

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GSM 850 Right Cheek Middle

Date/Time: 6/30/2012 5:44:13 PM

Communication System: GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.30042

Medium parameters used: $f = 837$ MHz; $\sigma = 0.896$ mho/m; $\epsilon_r = 42$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Right Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(9.02, 9.02, 9.02); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Cheek Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.246 mW/g

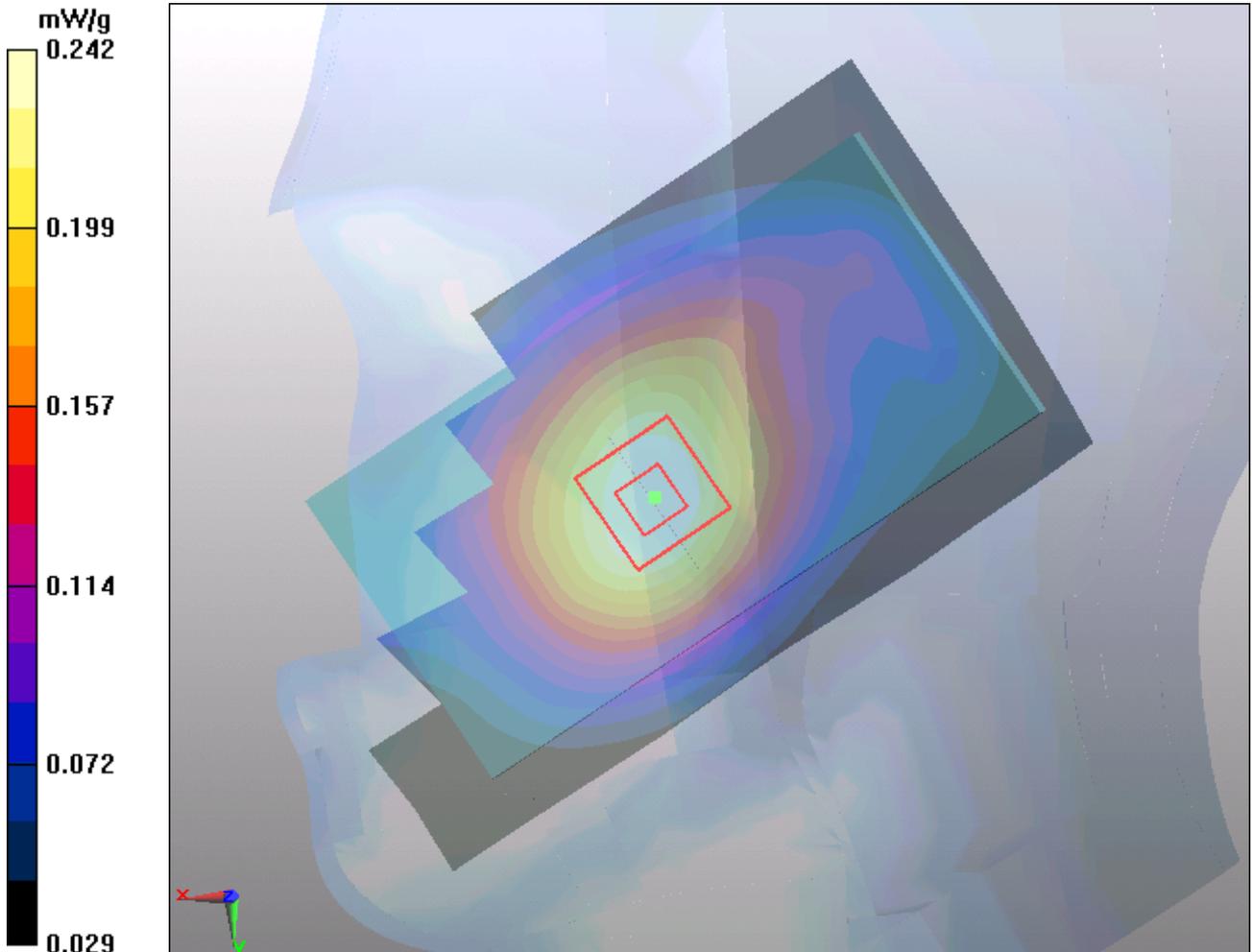
Cheek Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 10.1 V/m; Power Drift = -0.011 dB

Peak SAR (extrapolated) = 0.276 W/kg

SAR(1 g) = 0.231 mW/g; SAR(10 g) = 0.179 mW/g

Maximum value of SAR (measured) = 0.242 mW/g



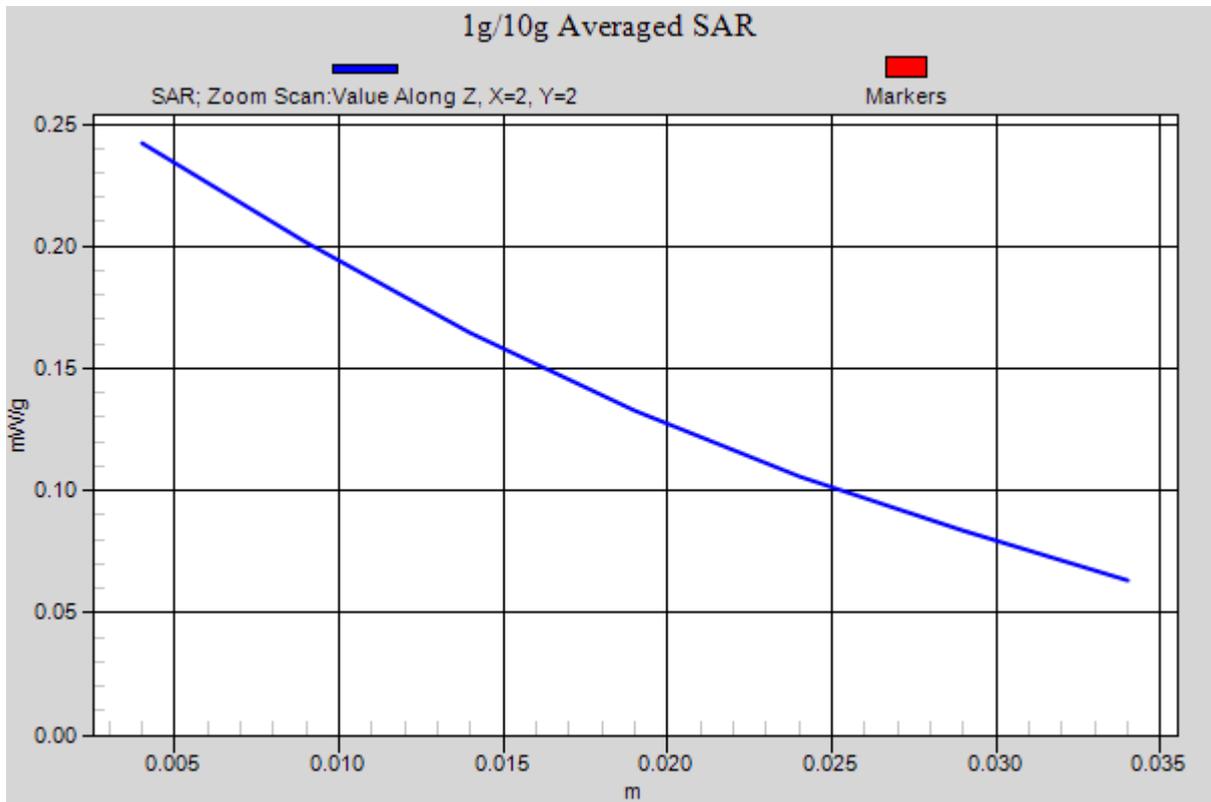


Figure 19 Right Hand Touch Cheek GSM 850 Channel 190

TA Technology (Shanghai) Co., Ltd.
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GSM 850 Right Tilt Middle

Date/Time: 6/30/2012 6:01:29 PM

Communication System: GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.30042

Medium parameters used: $f = 837 \text{ MHz}$; $\sigma = 0.896 \text{ mho/m}$; $\epsilon_r = 42$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature: $22.3 \text{ }^\circ\text{C}$ Liquid Temperature: $21.5 \text{ }^\circ\text{C}$

Phantom section: Right Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(9.02, 9.02, 9.02); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

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

Maximum value of SAR (interpolated) = 0.180 mW/g

Tilt Middle/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 = -0.03 dB

Peak SAR (extrapolated) = 0.212 W/kg

SAR(1 g) = 0.168 mW/g ; SAR(10 g) = 0.127 mW/g

Maximum value of SAR (measured) = 0.174 mW/g

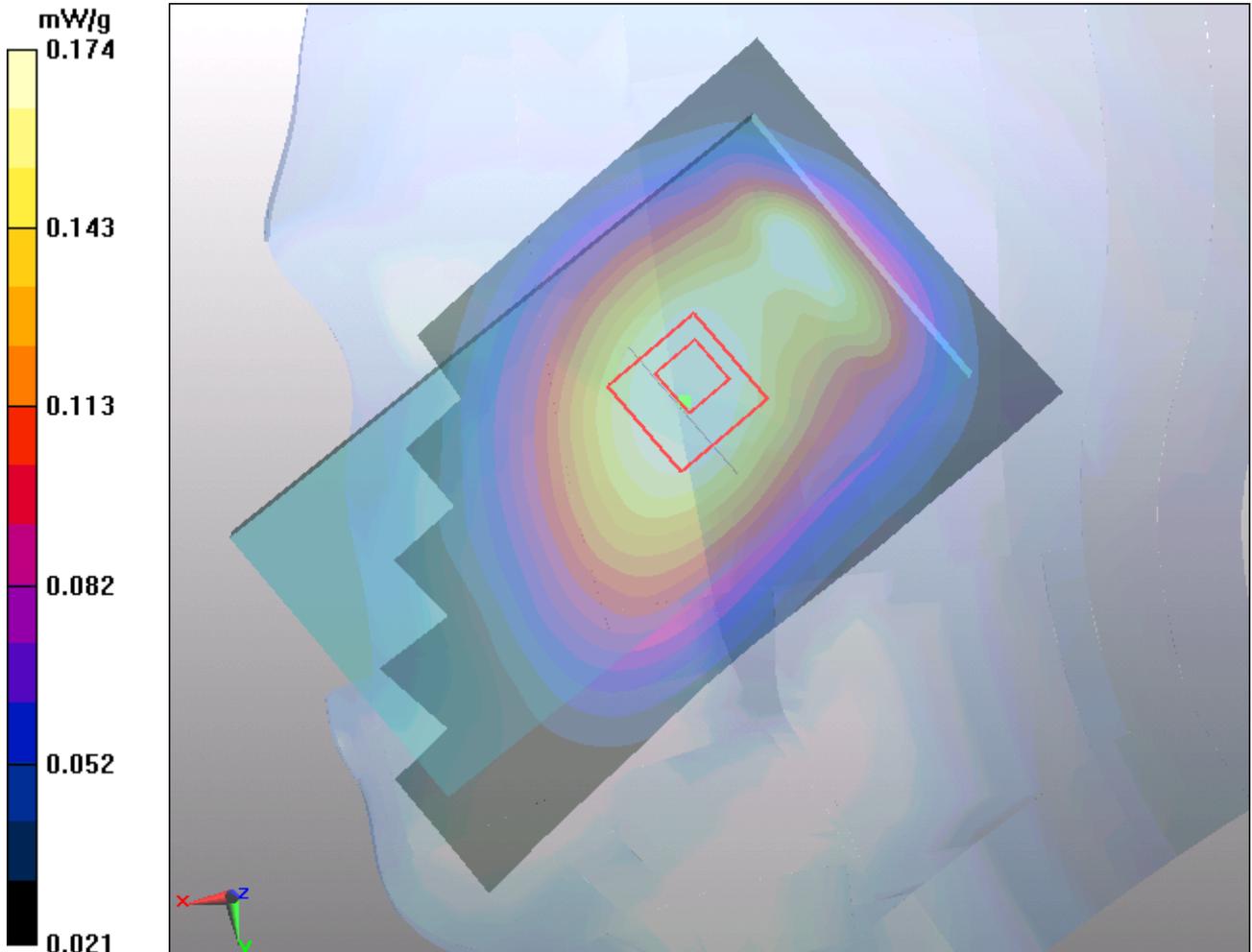


Figure 20 Right Hand Tilt 15° GSM 850 Channel 190

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GSM 850 GPRS (1Txslot) Back Side Middle

Date/Time: 6/29/2012 2:41:05 PM

Communication System: GPRS 1TX; Frequency: 836.6 MHz; Duty Cycle: 1:8.30042

Medium parameters used: $f = 837$ MHz; $\sigma = 0.971$ mho/m; $\epsilon_r = 54.5$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(9.18, 9.18, 9.18); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Back Side Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.507 mW/g

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

Reference Value = 21.2 V/m; Power Drift = -0.024 dB

Peak SAR (extrapolated) = 0.629 W/kg

SAR(1 g) = 0.487 mW/g; SAR(10 g) = 0.364 mW/g

Maximum value of SAR (measured) = 0.513 mW/g

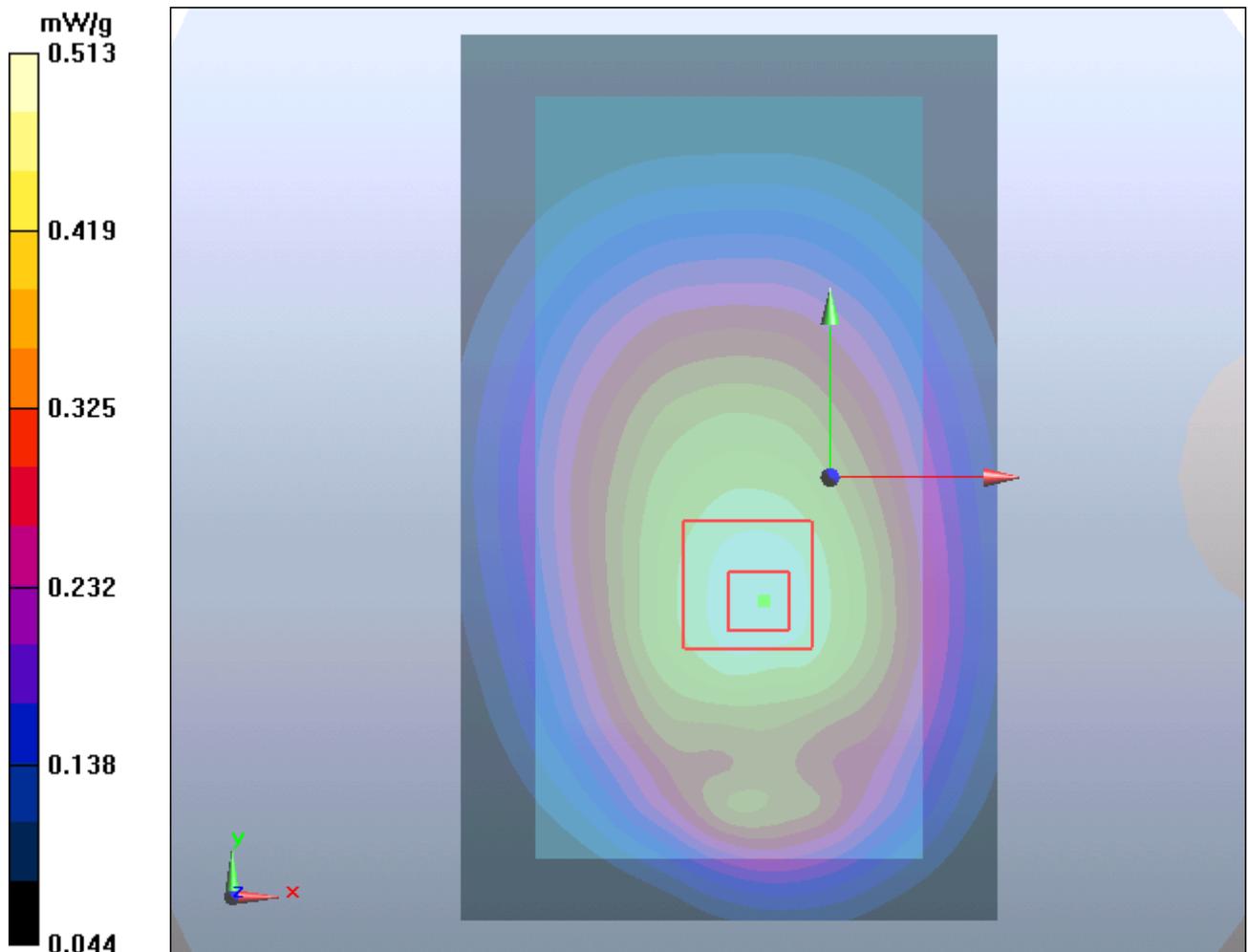


Figure 21 Body, Back Side, GSM 850 GPRS (1Txslot) Channel 190

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GSM 850 GPRS (2Txslots) Back Side Middle

Date/Time: 6/29/2012 3:21:08 PM

Communication System: GPRS 2TX ; Frequency: 836.6 MHz; Duty Cycle: 1:4.14954

Medium parameters used: $f = 837$ MHz; $\sigma = 0.971$ mho/m; $\epsilon_r = 54.5$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(9.18, 9.18, 9.18); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Back Side Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.653 mW/g

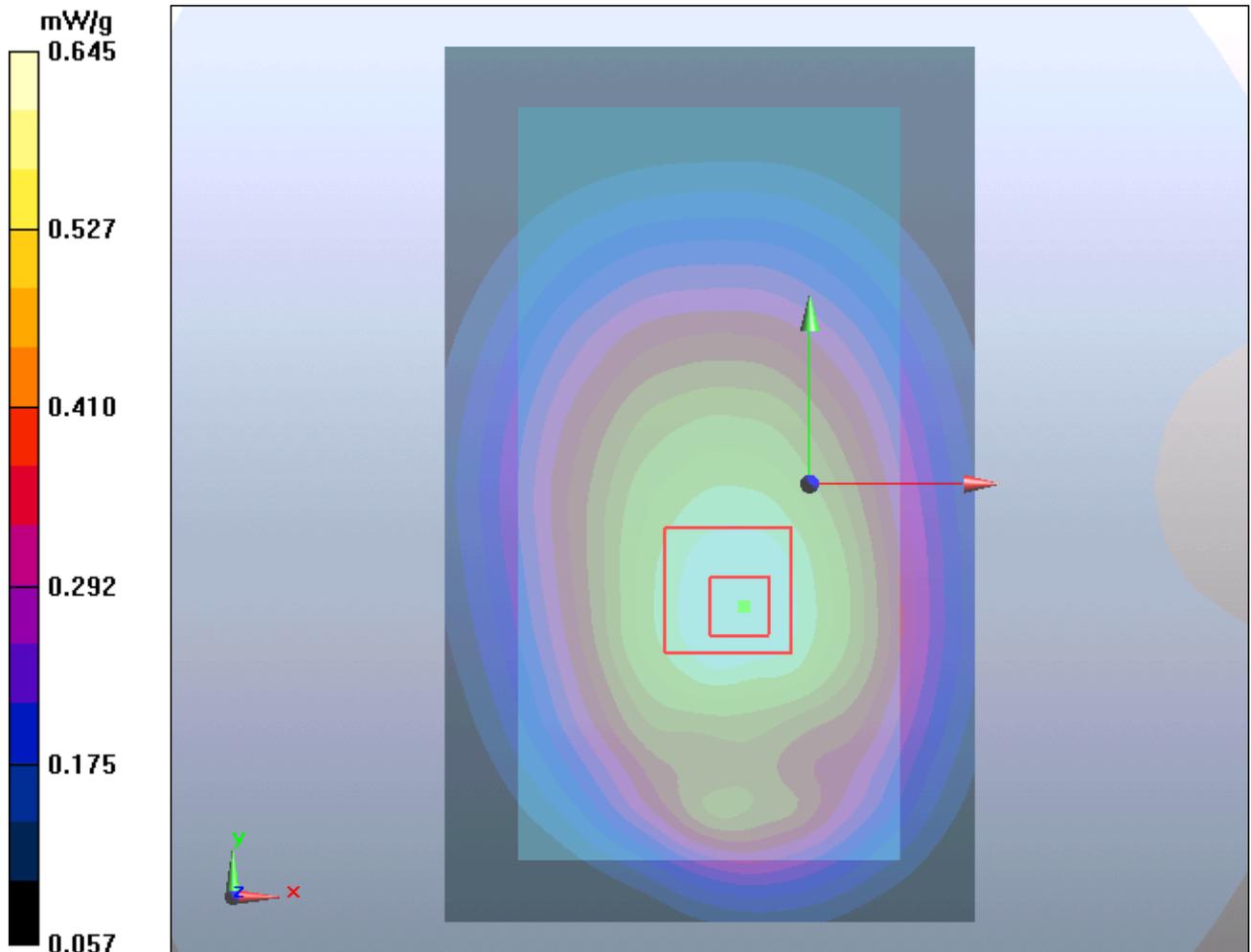
Back Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 24.1 V/m; Power Drift = -0.128 dB

Peak SAR (extrapolated) = 0.783 W/kg

SAR(1 g) = 0.614 mW/g; SAR(10 g) = 0.460 mW/g

Maximum value of SAR (measured) = 0.645 mW/g



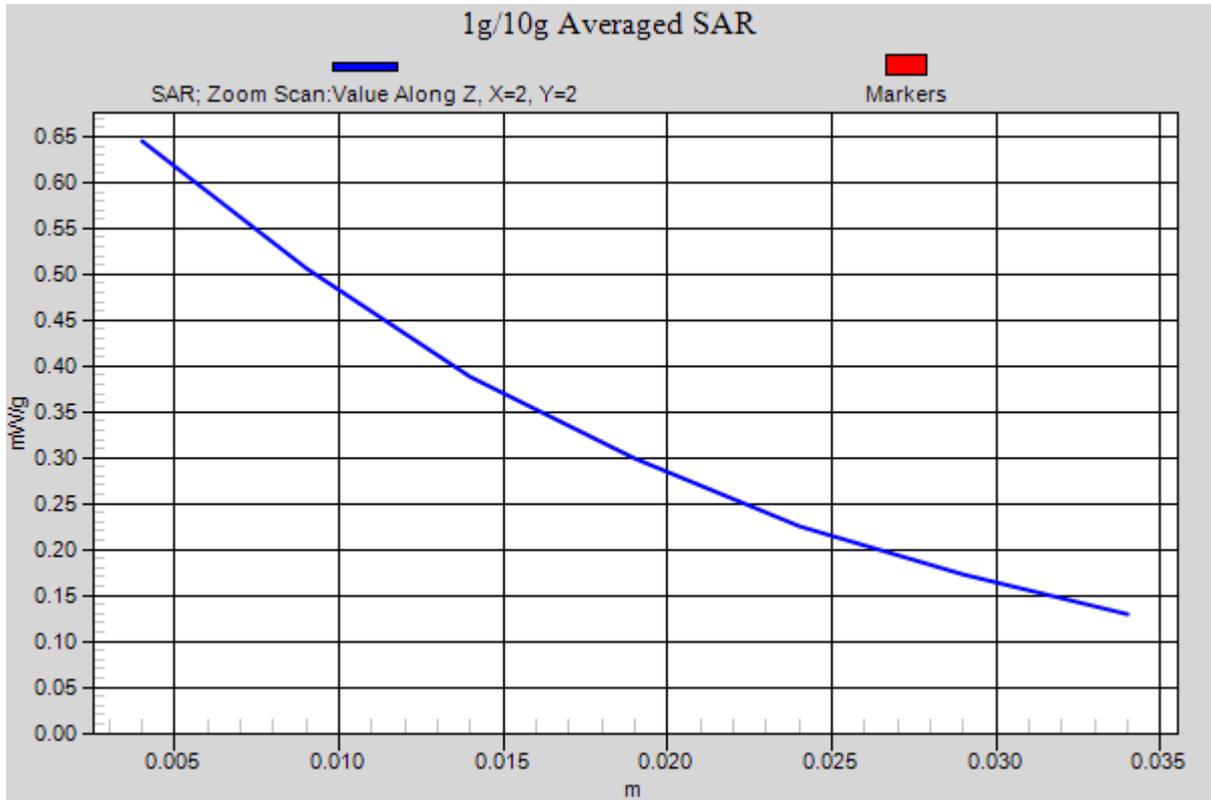


Figure 22 Body, Back Side, GSM 850 GPRS (2Txslots) Channel 190

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GSM 850 GPRS (2Txslots) Front Side Middle

Date/Time: 6/29/2012 7:13:33 PM

Communication System: GPRS 2TX ; Frequency: 836.6 MHz; Duty Cycle: 1:4.14954

Medium parameters used: $f = 837$ MHz; $\sigma = 0.971$ mho/m; $\epsilon_r = 54.5$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(9.18, 9.18, 9.18); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Front Side Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.424 mW/g

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

Reference Value = 20.3 V/m; Power Drift = 0.005 dB

Peak SAR (extrapolated) = 0.501 W/kg

SAR(1 g) = 0.405 mW/g; SAR(10 g) = 0.313 mW/g

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

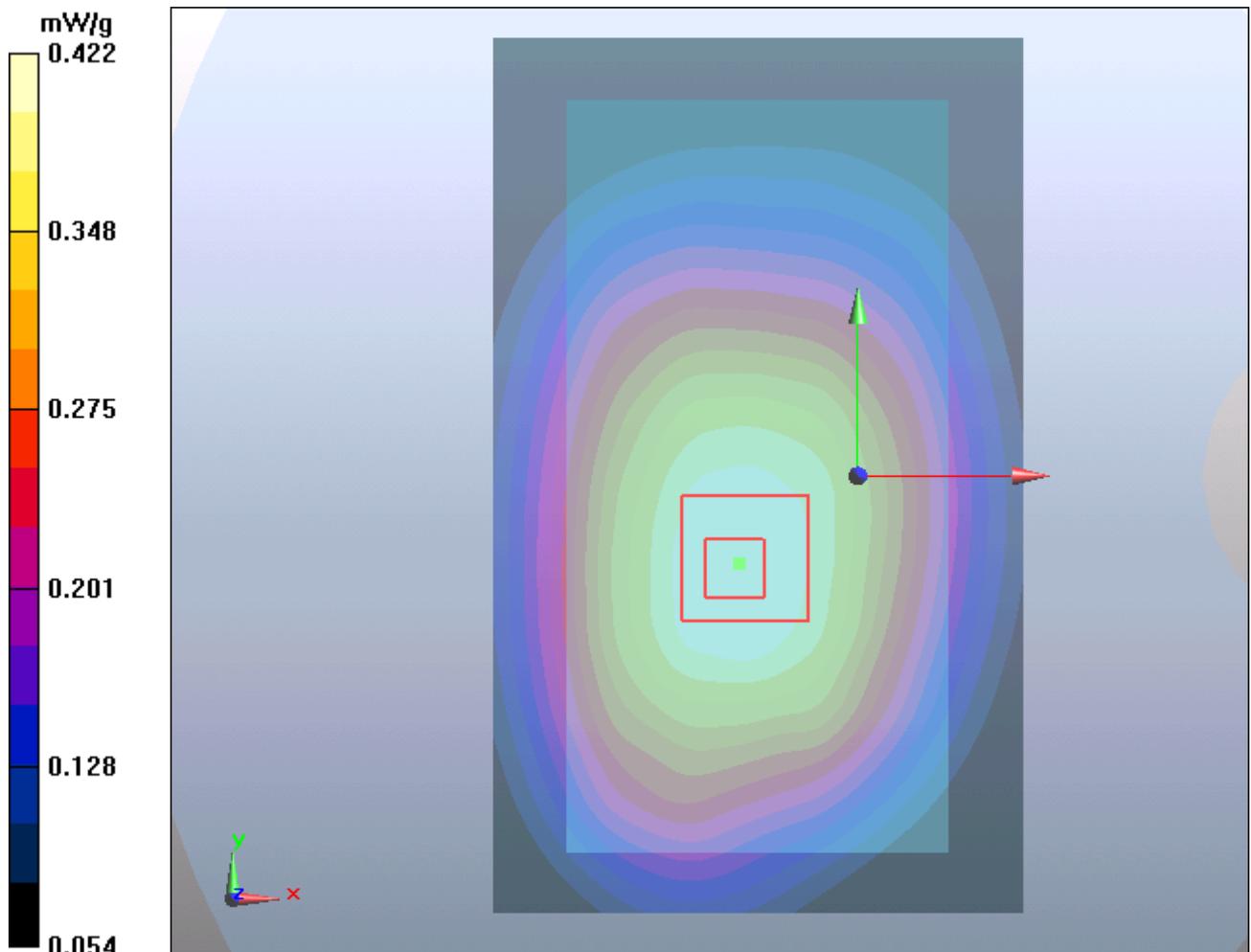


Figure 23 Body, Front Side, GSM 850 GPRS (2Txslots) Channel 190

GSM 850 GPRS (2Txslots) Left Edge Middle

Date/Time: 6/29/2012 7:34:50 PM

Communication System: GPRS 2TX ; Frequency: 836.6 MHz; Duty Cycle: 1:4.14954

Medium parameters used: $f = 837$ MHz; $\sigma = 0.971$ mho/m; $\epsilon_r = 54.5$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(9.18, 9.18, 9.18); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Left Edge Middle/Area Scan (31x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.283 mW/g

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

Reference Value = 16.8 V/m; Power Drift = 0.010 dB

Peak SAR (extrapolated) = 0.369 W/kg

SAR(1 g) = 0.265 mW/g; SAR(10 g) = 0.183 mW/g

Maximum value of SAR (measured) = 0.283 mW/g

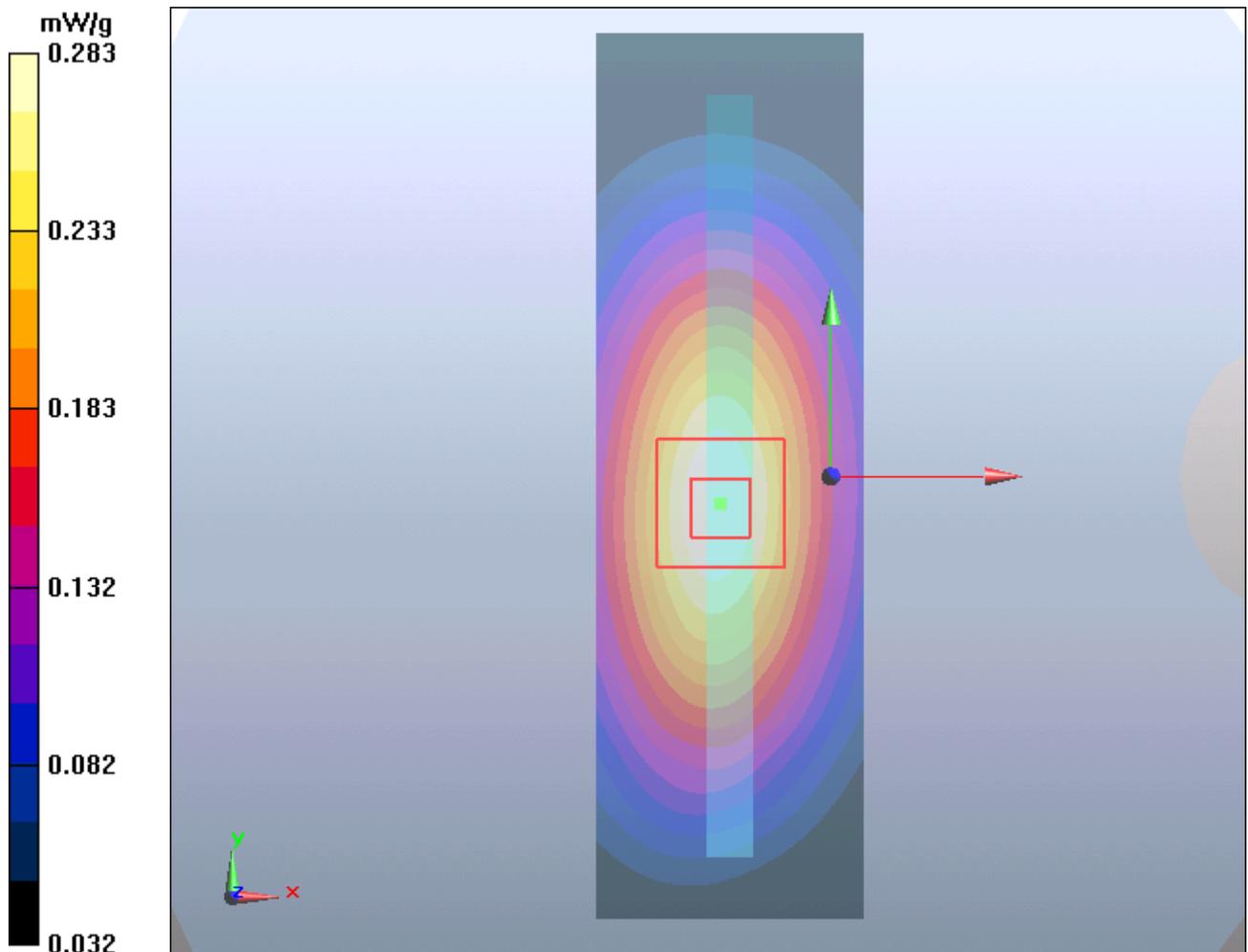


Figure 24 Body, Left Edge, GSM 850 GPRS (2Txslots) Channel 190

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GSM 850 GPRS (2Txslots) Right Edge Middle

Date/Time: 6/29/2012 7:49:42 PM

Communication System: GPRS 2TX ; Frequency: 836.6 MHz; Duty Cycle: 1:4.14954

Medium parameters used: $f = 837$ MHz; $\sigma = 0.971$ mho/m; $\epsilon_r = 54.5$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(9.18, 9.18, 9.18); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Right Edge Middle/Area Scan (31x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.328 mW/g

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

Reference Value = 18.2 V/m; Power Drift = 0.016 dB

Peak SAR (extrapolated) = 0.431 W/kg

SAR(1 g) = 0.308 mW/g; SAR(10 g) = 0.215 mW/g

Maximum value of SAR (measured) = 0.329 mW/g

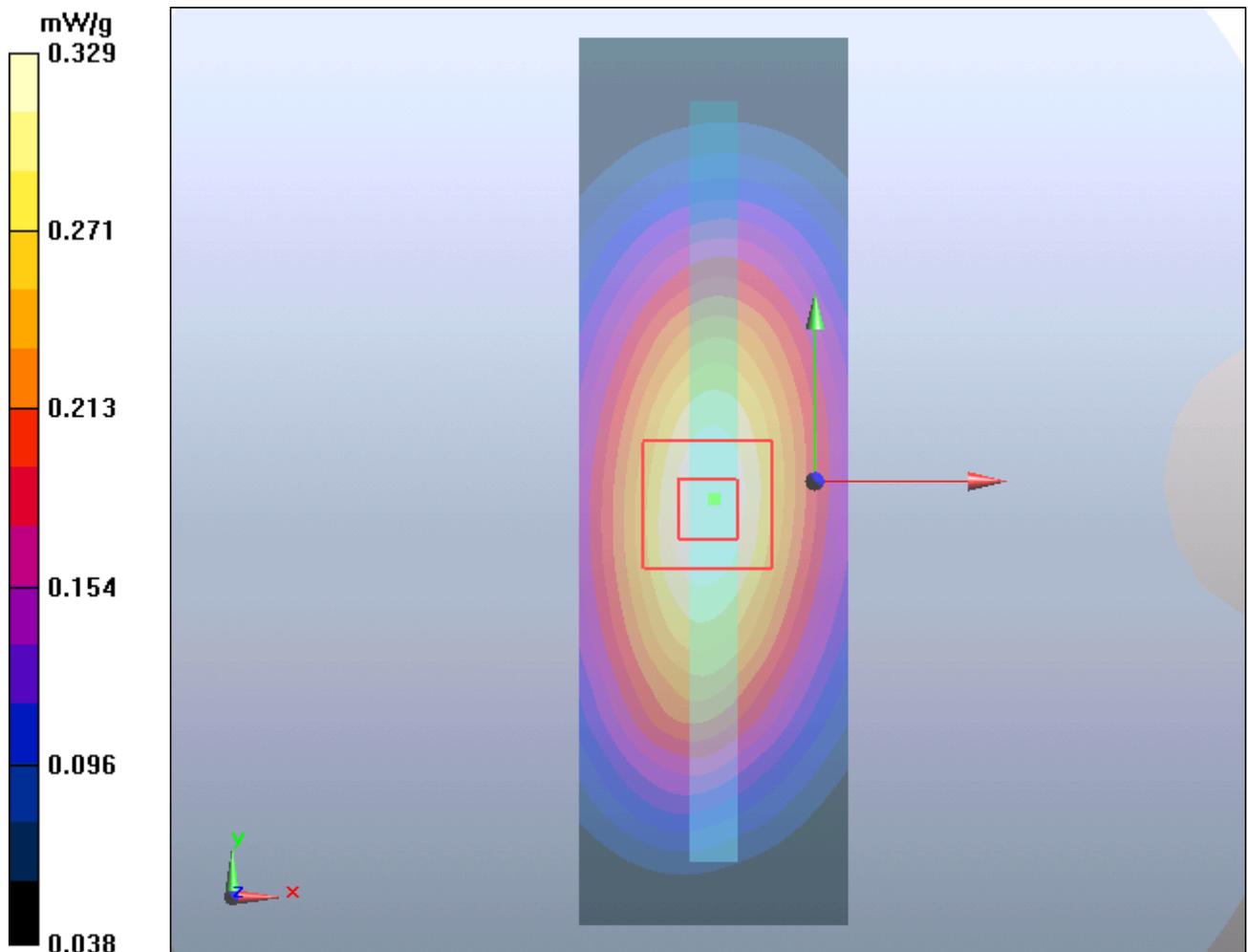


Figure 25 Body, Right Edge, GSM 850 GPRS (2Txslots) Channel 190

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GSM 850 GPRS (2Txslots) Bottom Edge Middle

Date/Time: 6/29/2012 8:06:20 PM

Communication System: GPRS 2TX ; Frequency: 836.6 MHz; Duty Cycle: 1:4.14954

Medium parameters used: $f = 837$ MHz; $\sigma = 0.971$ mho/m; $\epsilon_r = 54.5$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(9.18, 9.18, 9.18); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Bottom Edge Middle/Area Scan (31x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.066 mW/g

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

Reference Value = 7.71 V/m; Power Drift = 0.009 dB

Peak SAR (extrapolated) = 0.106 W/kg

SAR(1 g) = 0.059 mW/g; SAR(10 g) = 0.033 mW/g

Maximum value of SAR (measured) = 0.066 mW/g

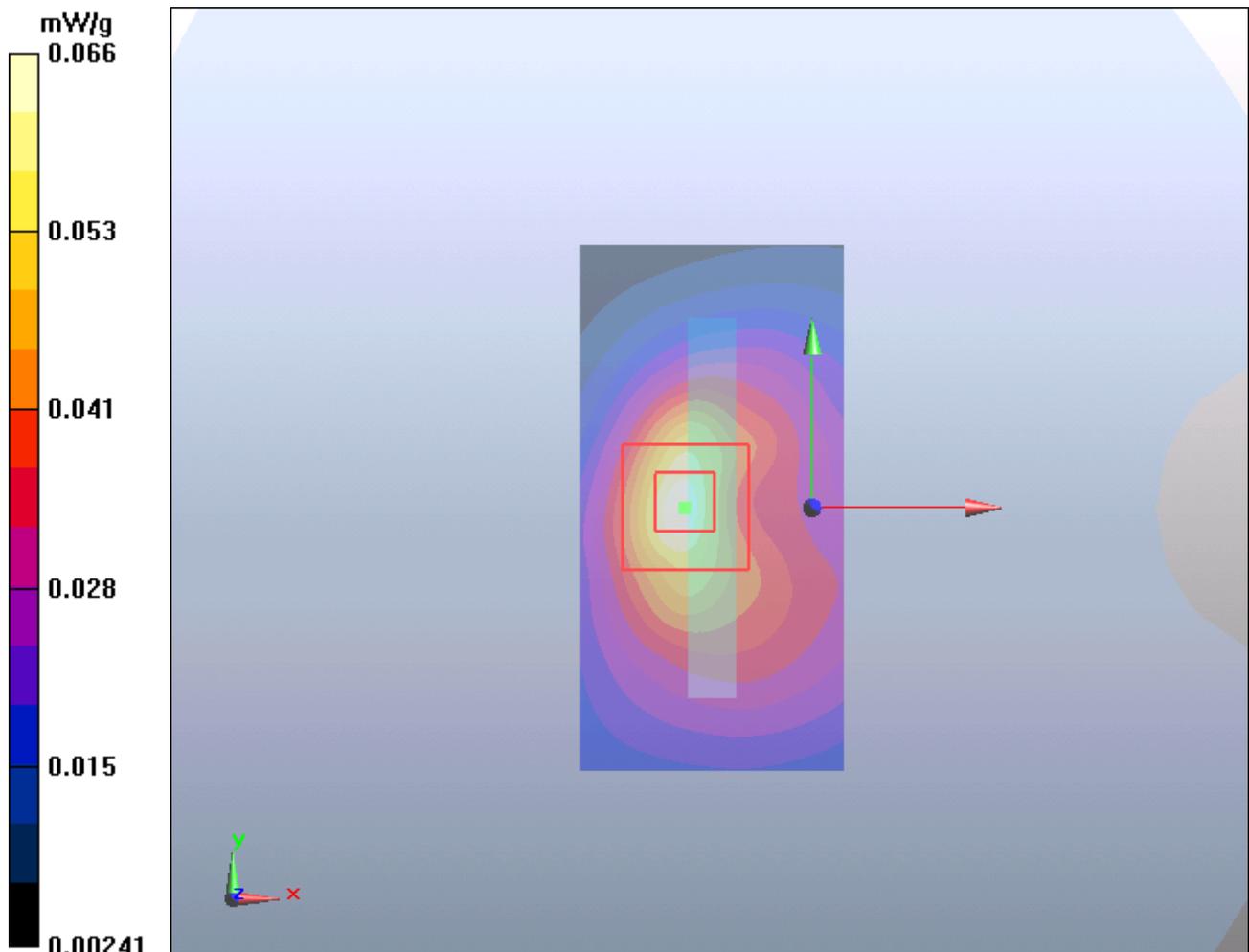


Figure 26 Body, Bottom Edge, GSM 850 GPRS (2Txslots) Channel 190

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GSM 850 with Earphone Back Side Middle

Date/Time: 6/29/2012 4:00:21 PM

Communication System: GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.30042

Medium parameters used: $f = 837$ MHz; $\sigma = 0.971$ mho/m; $\epsilon_r = 54.5$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5°C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(9.18, 9.18, 9.18); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Back Side Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 20.2 V/m; Power Drift = -0.067 dB

Peak SAR (extrapolated) = 0.565 W/kg

SAR(1 g) = 0.439 mW/g; SAR(10 g) = 0.326 mW/g

Maximum value of SAR (measured) = 0.462 mW/g

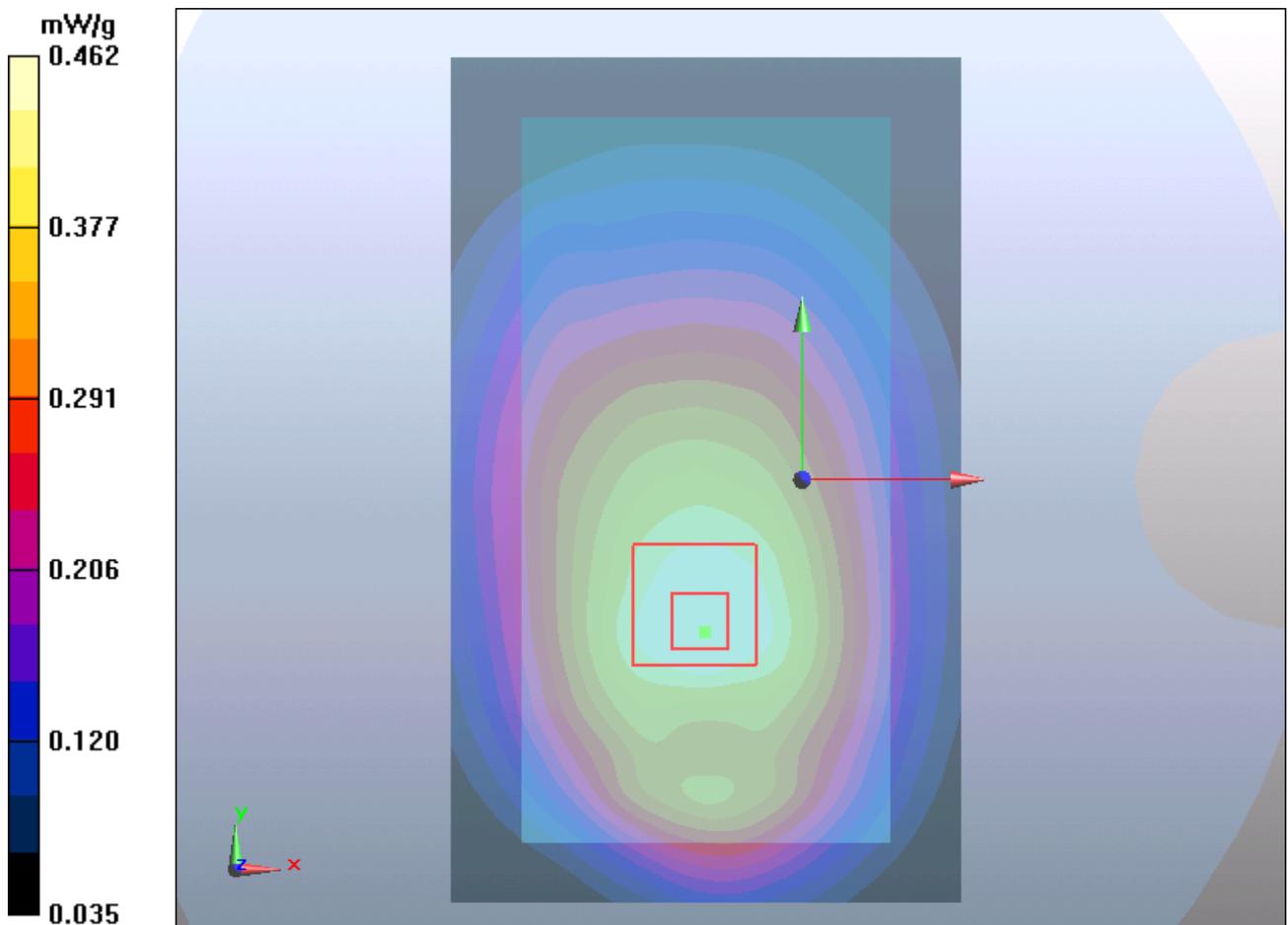


Figure 27 Body with Earphone, Back Side, GSM 850 Channel 190

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GSM 850 EGPRS (2Txslots) Back Side Middle

Date/Time: 6/29/2012 8:31:15 PM

Communication System: EGPRS 2TX; Frequency: 836.6 MHz; Duty Cycle: 1:4.14954

Medium parameters used: $f = 837$ MHz; $\sigma = 0.971$ mho/m; $\epsilon_r = 54.5$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(9.18, 9.18, 9.18); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Back Side Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.647 mW/g

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

Reference Value = 24.3 V/m; Power Drift = -0.120 dB

Peak SAR (extrapolated) = 0.779 W/kg

SAR(1 g) = 0.612 mW/g; SAR(10 g) = 0.459 mW/g

Maximum value of SAR (measured) = 0.641 mW/g

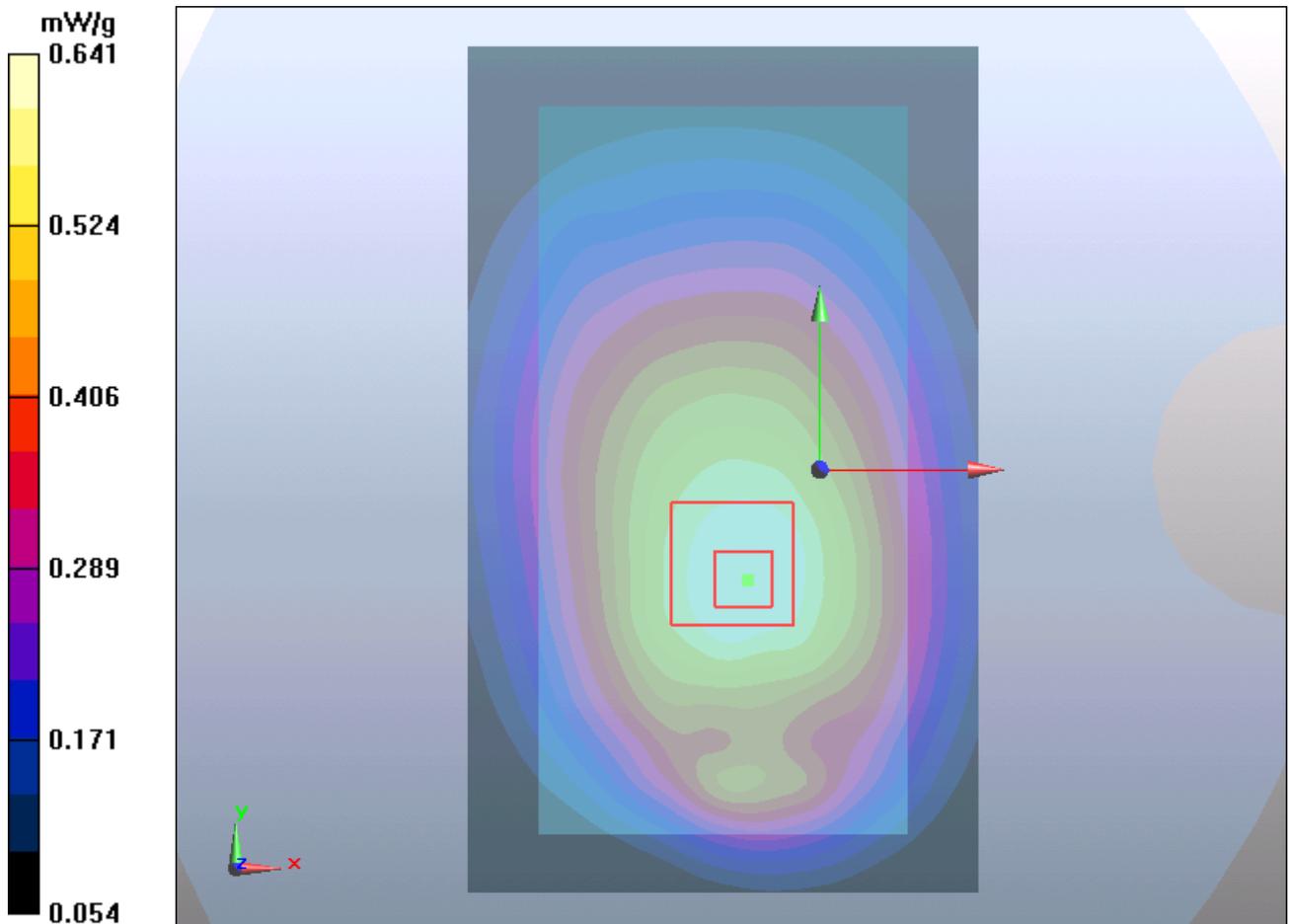


Figure 28 Body, Back Side, GSM 850 EGPRS (2Txslots) Channel 190

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GSM 1900 Left Cheek Middle

Date/Time: 7/1/2012 2:30:41 PM

Communication System: GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.30042

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(8.05, 8.05, 8.05); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Cheek Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.225 mW/g

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

Reference Value = 6.36 V/m; Power Drift = -0.017 dB

Peak SAR (extrapolated) = 0.311 W/kg

SAR(1 g) = 0.203 mW/g; SAR(10 g) = 0.123 mW/g

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

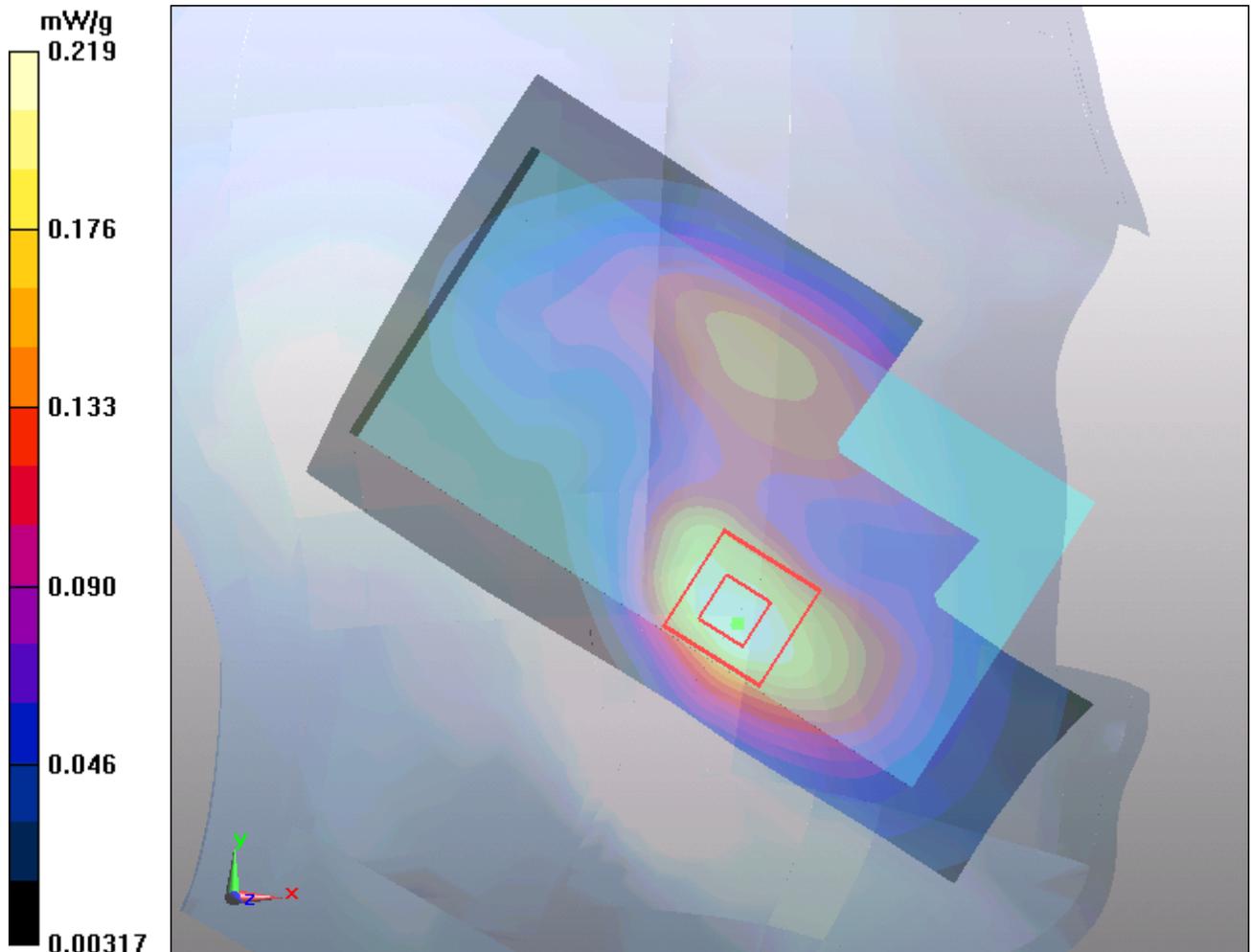


Figure 29 Left Hand Touch Cheek GSM 1900 Channel 661

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GSM 1900 Left Tilt Middle

Date/Time: 7/1/2012 2:59:00 PM

Communication System: GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.30042

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(8.05, 8.05, 8.05); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Tilt Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.164 mW/g

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

Reference Value = 9.69 V/m; Power Drift = 0.080 dB

Peak SAR (extrapolated) = 0.199 W/kg

SAR(1 g) = 0.133 mW/g; SAR(10 g) = 0.080 mW/g

Maximum value of SAR (measured) = 0.146 mW/g

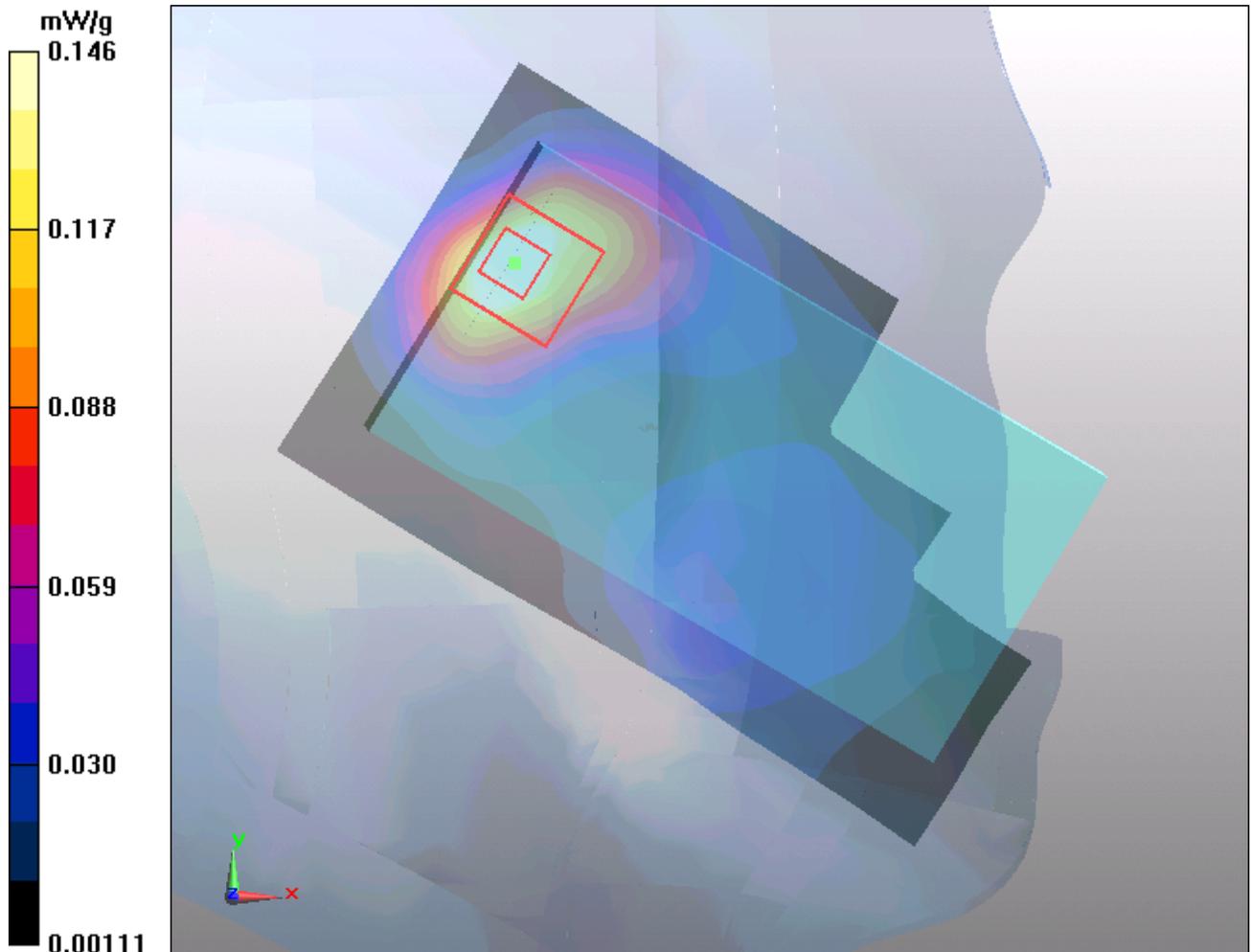


Figure 30 Left Hand Tilt 15° GSM 1900 Channel 661

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GSM 1900 Right Cheek Middle

Date/Time: 7/1/2012 3:26:32 PM

Communication System: GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.30042

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Right Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(8.05, 8.05, 8.05); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Cheek Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.270 mW/g

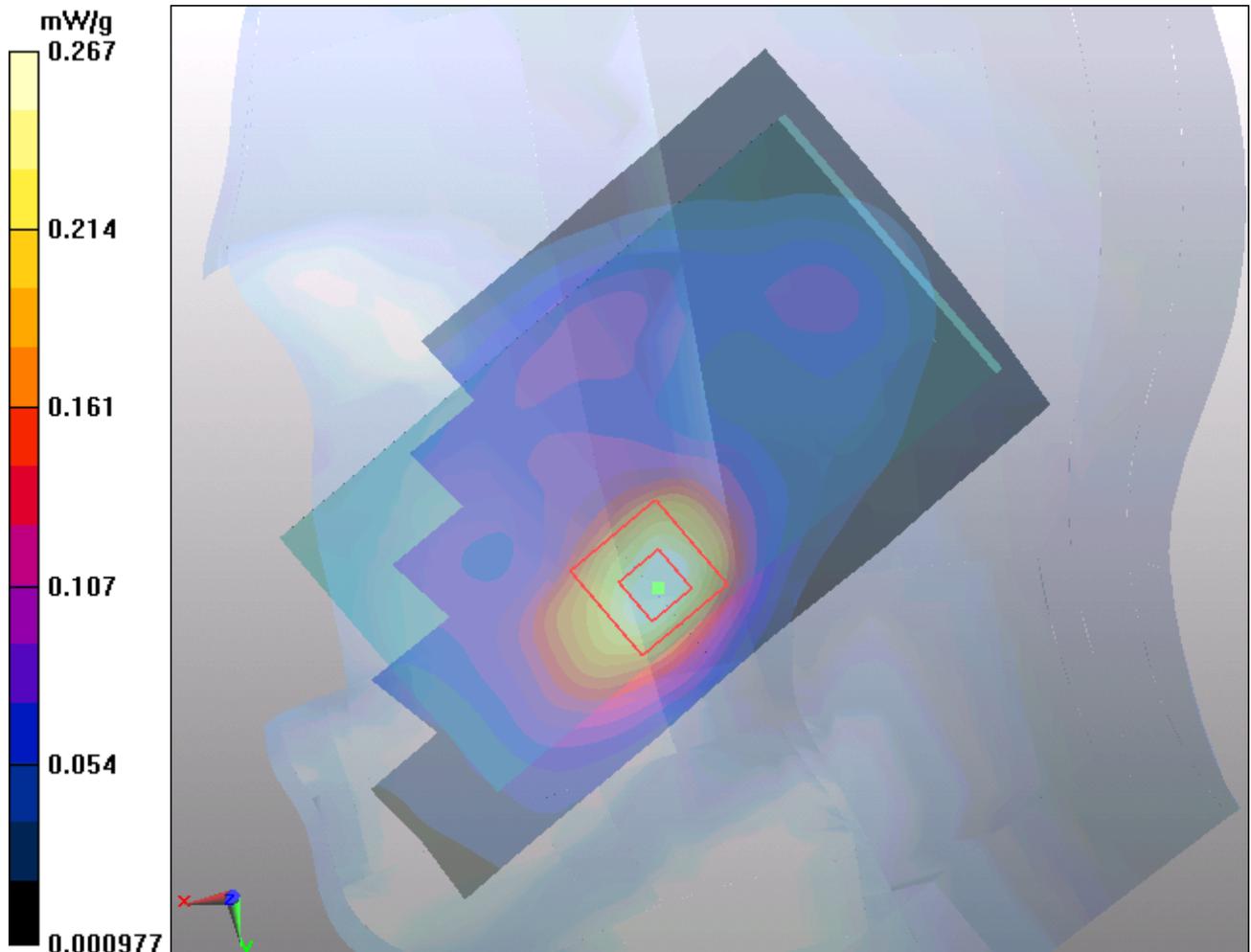
Cheek Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.91 V/m; Power Drift = -0.032 dB

Peak SAR (extrapolated) = 0.377 W/kg

SAR(1 g) = 0.245 mW/g; SAR(10 g) = 0.147 mW/g

Maximum value of SAR (measured) = 0.267 mW/g



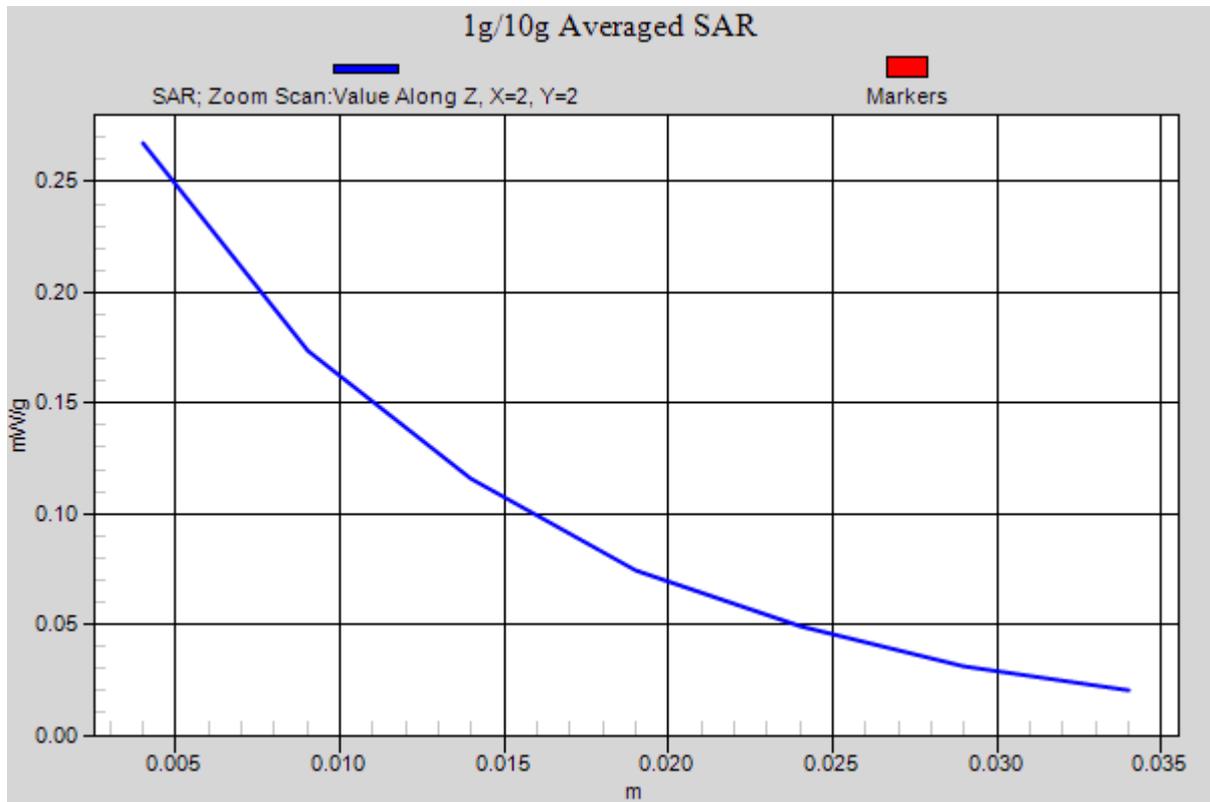


Figure 31 Right Hand Touch Cheek GSM 1900 Channel 661

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GSM 1900 Right Tilt Middle

Date/Time: 7/1/2012 3:43:03 PM

Communication System: GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.30042

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Right Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(8.05, 8.05, 8.05); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Tilt Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.152 mW/g

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

Reference Value = 10.1 V/m; Power Drift = -0.072 dB

Peak SAR (extrapolated) = 0.218 W/kg

SAR(1 g) = 0.134 mW/g; SAR(10 g) = 0.077 mW/g

Maximum value of SAR (measured) = 0.146 mW/g

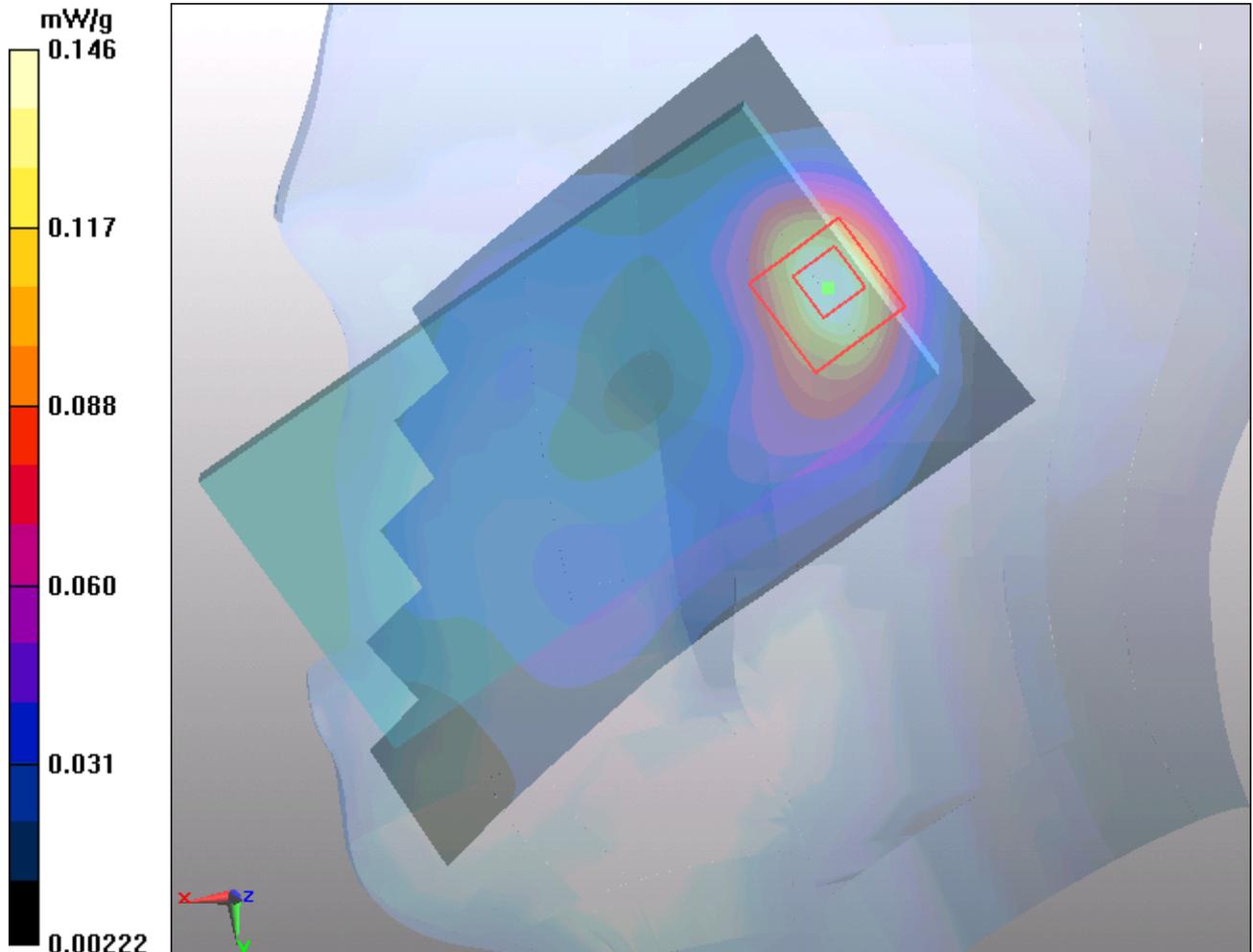


Figure 32 Right Hand Tilt 15° GSM 1900 Channel 661

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GSM 1900 GPRS (1Txslot) Back Side Middle

Date/Time: 6/30/2012 10:22:18 AM

Communication System: GPRS 1TX; Frequency: 1880 MHz; Duty Cycle: 1:8.30042

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.5$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(7.57, 7.57, 7.57); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Back Side Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.531 mW/g

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

Reference Value = 7.05 V/m; Power Drift = 0.011 dB

Peak SAR (extrapolated) = 0.782 W/kg

SAR(1 g) = 0.489 mW/g; SAR(10 g) = 0.282 mW/g

Maximum value of SAR (measured) = 0.538 mW/g

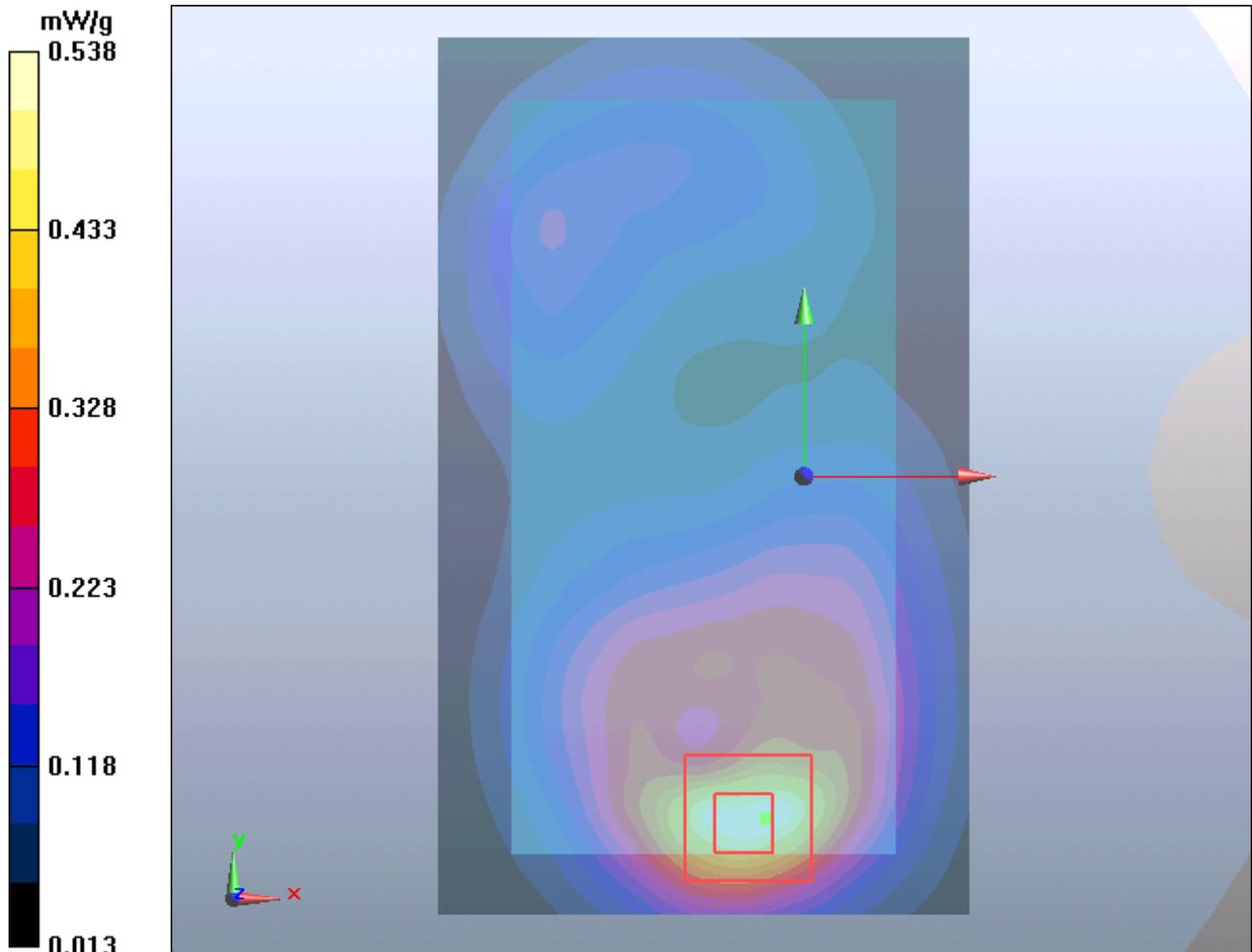


Figure 33 Body, Back Side, GSM 1900 GPRS (1Txslot) Channel 661

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GSM 1900 GPRS (2Txslots) Back Side Middle

Date/Time: 6/30/2012 1:17:12 PM

Communication System: GPRS 2TX ; Frequency: 1880 MHz; Duty Cycle: 1:4.14954

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.5$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(7.57, 7.57, 7.57); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Back Side Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 7.07 V/m; Power Drift = -0.117 dB

Peak SAR (extrapolated) = 1.04 W/kg

SAR(1 g) = 0.650 mW/g; SAR(10 g) = 0.374 mW/g

Maximum value of SAR (measured) = 0.707 mW/g

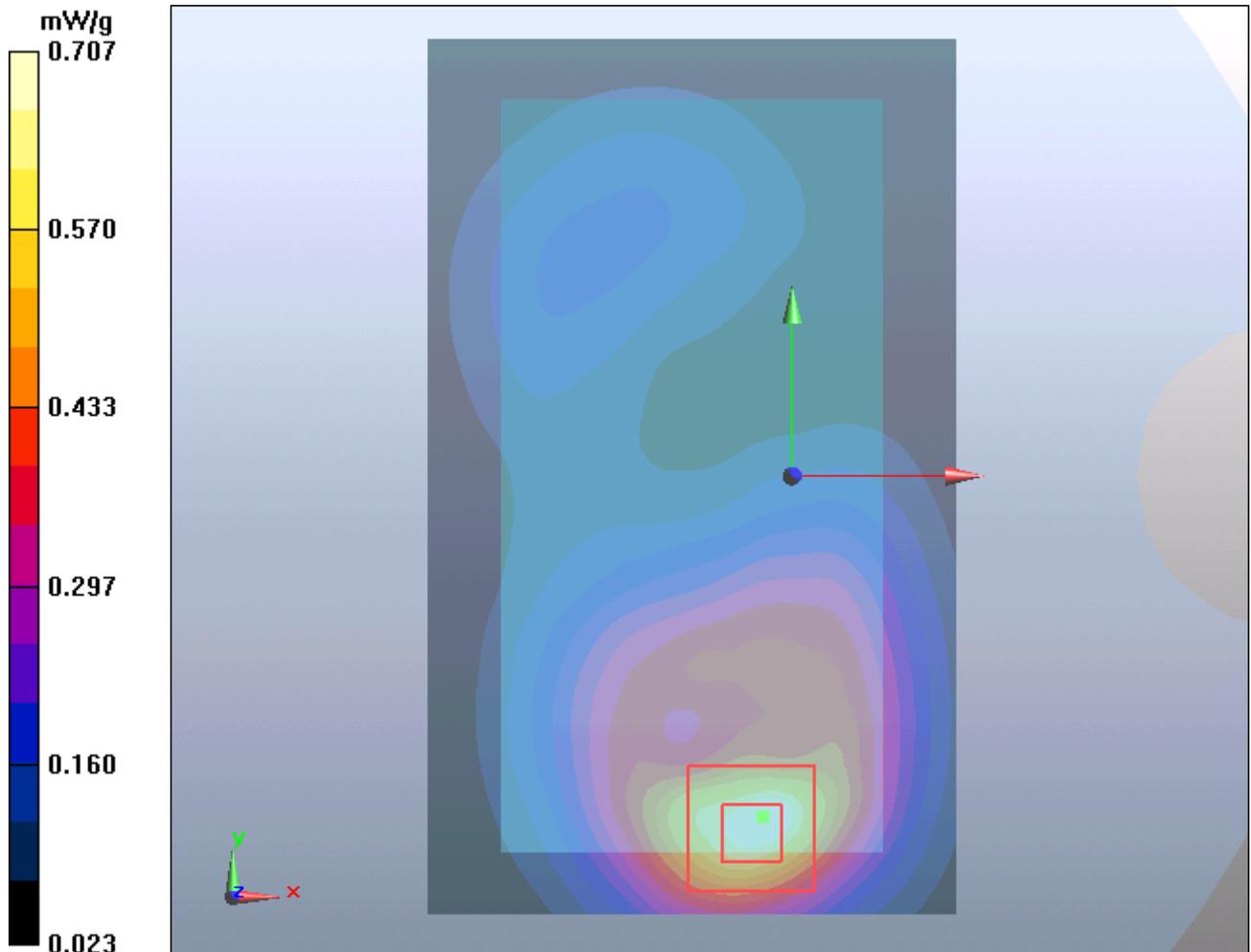


Figure 34 Body, Back Side, GSM 1900 GPRS (2Txslots) Channel 661

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GSM 1900 GPRS (2Txslots) Front Side Middle

Date/Time: 6/30/2012 11:42:57 AM

Communication System: GPRS 2TX ; Frequency: 1880 MHz; Duty Cycle: 1:4.14954

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.5$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(7.57, 7.57, 7.57); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Front Side Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.686 mW/g

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

Reference Value = 7.81 V/m; Power Drift = 0.068 dB

Peak SAR (extrapolated) = 1.03 W/kg

SAR(1 g) = 0.638 mW/g; SAR(10 g) = 0.363 mW/g

Maximum value of SAR (measured) = 0.658 mW/g

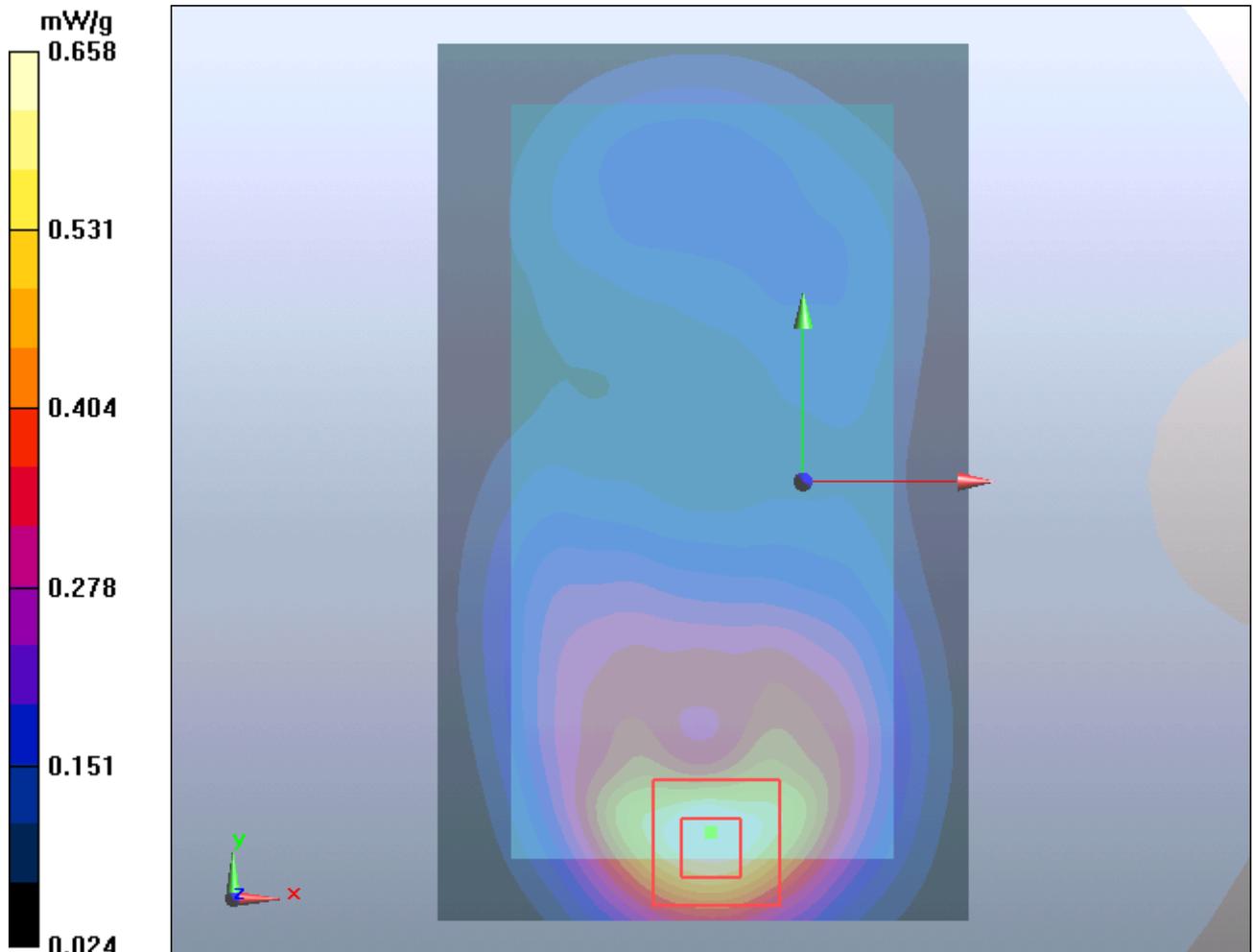


Figure 35 Body, Front Side, GSM 1900 GPRS (2Txslots) Channel 661

TA Technology (Shanghai) Co., Ltd.
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GSM 1900 GPRS (2Txslots) Left Edge Middle

Date/Time: 6/30/2012 12:03:20 PM

Communication System: GPRS 2TX ; Frequency: 1880 MHz; Duty Cycle: 1:4.14954

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.5$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(7.57, 7.57, 7.57); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Left Edge Middle/Area Scan (31x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.081 mW/g

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

Reference Value = 7.11 V/m; Power Drift = -0.045 dB

Peak SAR (extrapolated) = 0.119 W/kg

SAR(1 g) = 0.075 mW/g; SAR(10 g) = 0.046 mW/g

Maximum value of SAR (measured) = 0.082 mW/g

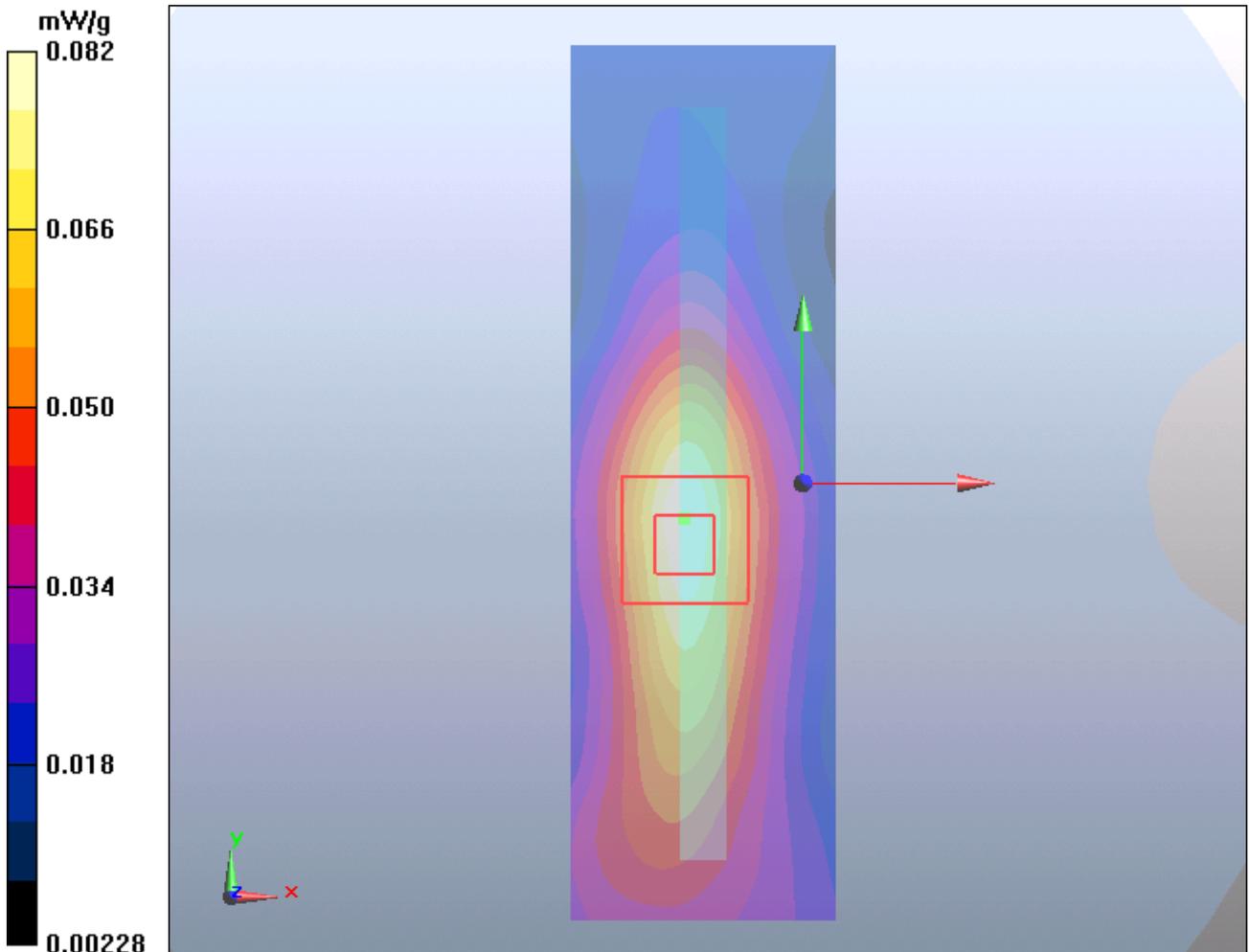


Figure 36 Body, Left Edge, GSM 1900 GPRS (2Txslots) Channel 661

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GSM 1900 GPRS (2Txslots) Right Edge Middle

Date/Time: 6/30/2012 8:35:21 PM

Communication System: GPRS 2TX ; Frequency: 1880 MHz; Duty Cycle: 1:4.14954

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.5$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(7.57, 7.57, 7.57); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Right Edge Middle/Area Scan (31x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.089 mW/g

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

Reference Value = 7.02 V/m; Power Drift = 0.052 dB

Peak SAR (extrapolated) = 0.133 W/kg

SAR(1 g) = 0.082 mW/g; SAR(10 g) = 0.048 mW/g

Maximum value of SAR (measured) = 0.090 mW/g

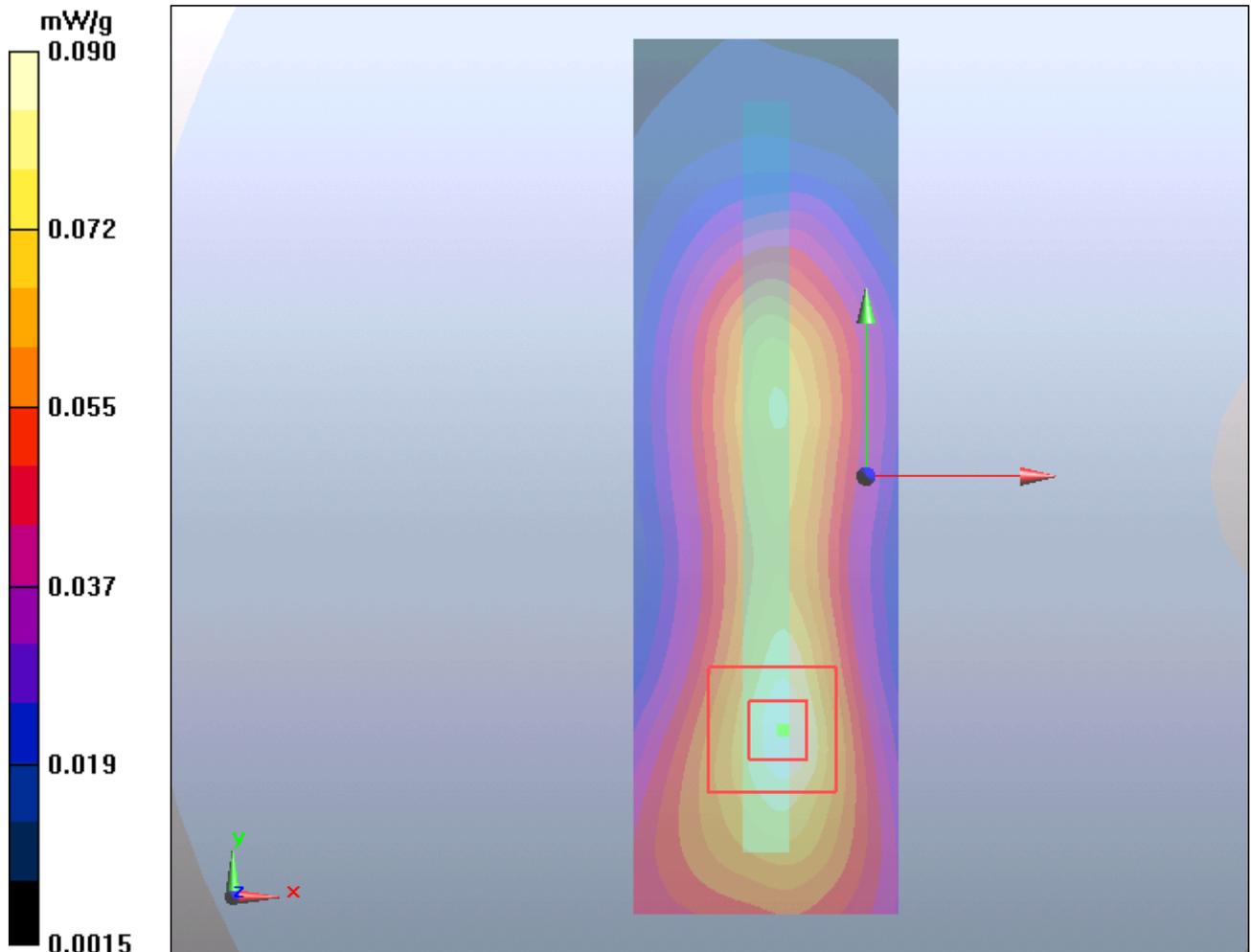


Figure 37 Body, Right Edge, GSM 1900 GPRS (2Txslots) Channel 661

GSM 1900 GPRS (2Txslots) Bottom Edge High

Date/Time: 6/30/2012 9:18:45 PM

Communication System: GPRS 2TX ; Frequency: 1909.8 MHz; Duty Cycle: 1:4.14954

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5°C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(7.57, 7.57, 7.57); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Bottom Edge High/Area Scan (31x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.917 mW/g

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

Reference Value = 22.8 V/m; Power Drift = -0.169 dB

Peak SAR (extrapolated) = 1.35 W/kg

SAR(1 g) = 0.797 mW/g; SAR(10 g) = 0.425 mW/g

Maximum value of SAR (measured) = 0.897 mW/g

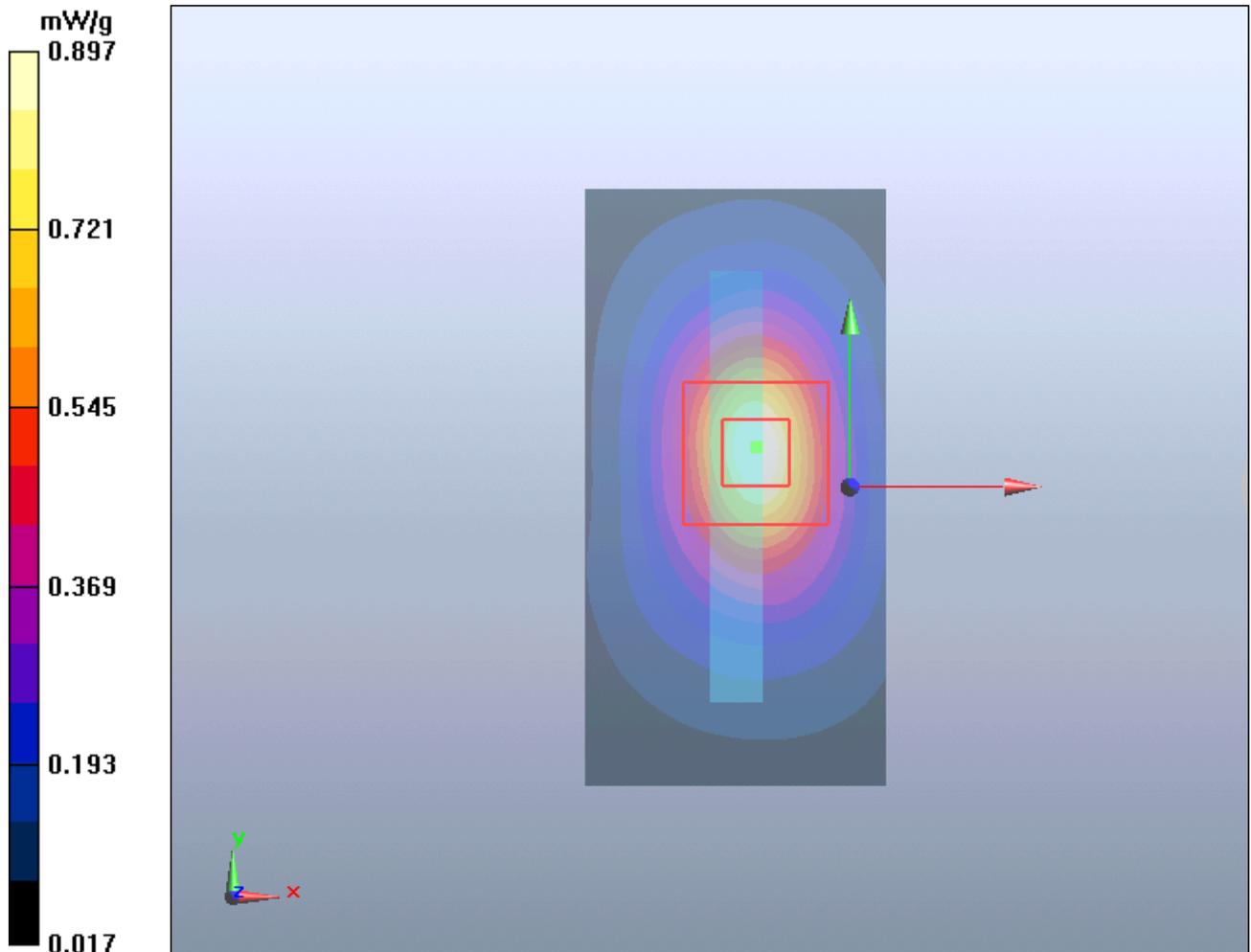


Figure 38 Body, Bottom Edge, GSM 1900 GPRS (2Txslots) Channel 810

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GSM 1900 GPRS (2Txslots) Bottom Edge Middle

Date/Time: 6/30/2012 9:51:35 PM

Communication System: GPRS 2TX ; Frequency: 1880 MHz; Duty Cycle: 1:4.14954

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.5$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5°C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(7.57, 7.57, 7.57); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Bottom Edge Middle/Area Scan (31x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.02 mW/g

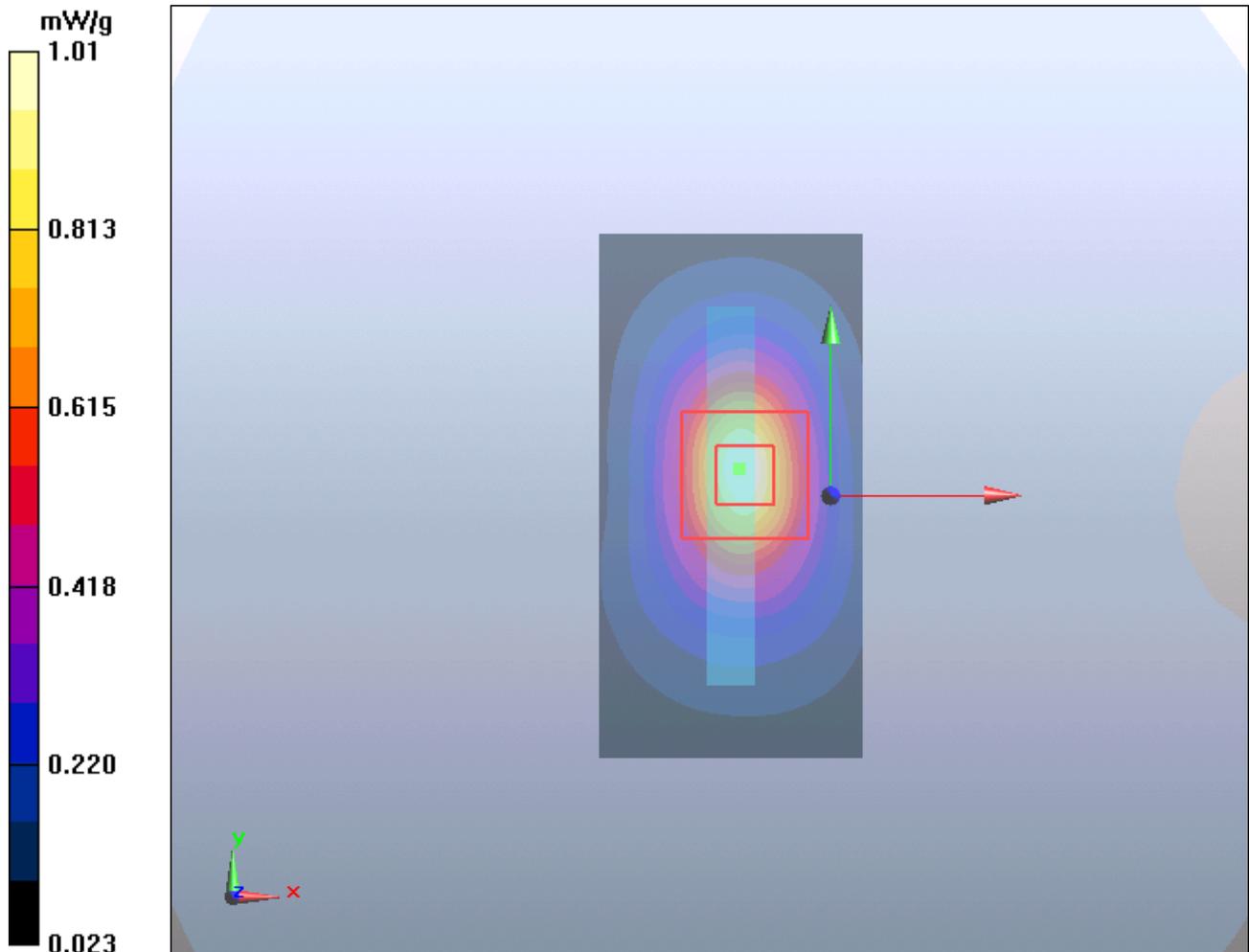
Bottom Edge Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 24.8 V/m; Power Drift = -0.017 dB

Peak SAR (extrapolated) = 1.51 W/kg

SAR(1 g) = 0.890 mW/g; SAR(10 g) = 0.472 mW/g

Maximum value of SAR (measured) = 1.01 mW/g



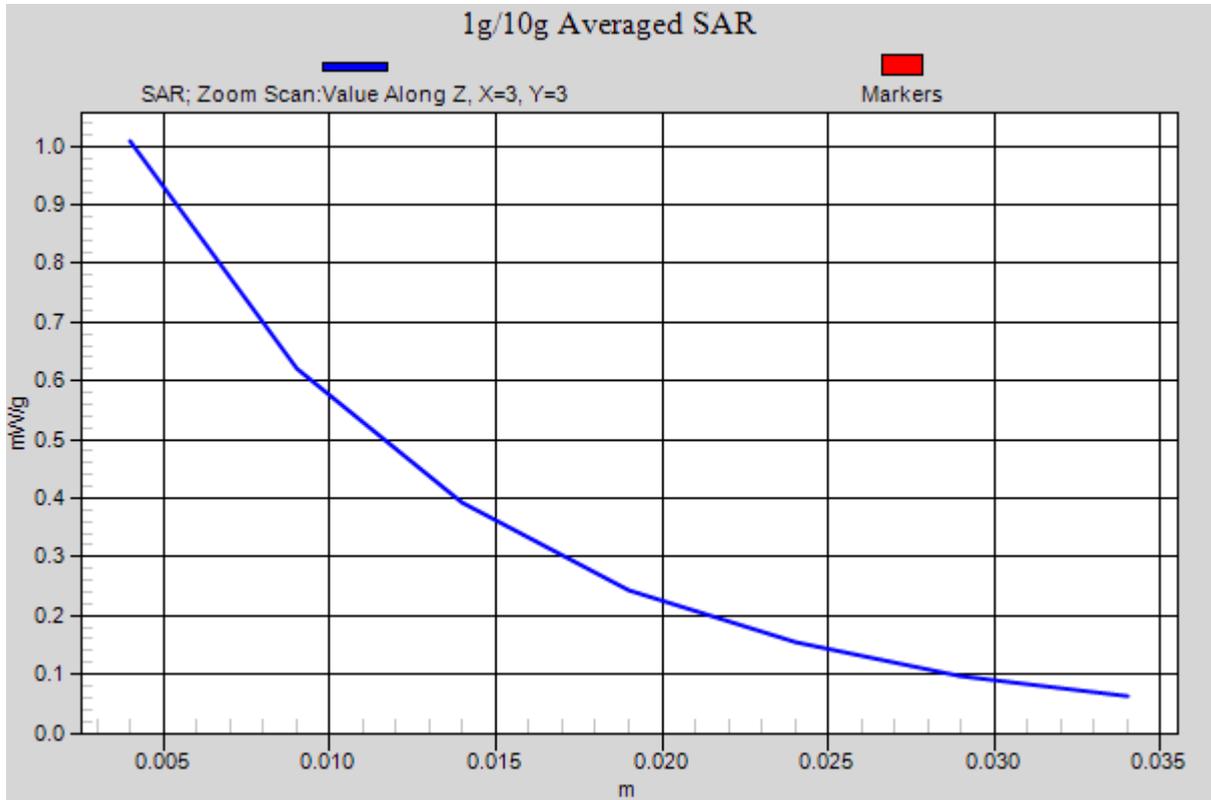


Figure 39 Body, Bottom Edge, GSM 1900 GPRS (2Txslots) Channel 661

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GSM 1900 GPRS (2Txslots) Bottom Edge Low

Date/Time: 6/30/2012 8:59:34 PM

Communication System: GPRS 2TX ; Frequency: 1850.2 MHz; Duty Cycle: 1:4.14954

Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.47$ mho/m; $\epsilon_r = 53.2$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5°C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(7.57, 7.57, 7.57); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Bottom Edge Low/Area Scan (31x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.965 mW/g

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

Reference Value = 24.6 V/m; Power Drift = -0.081 dB

Peak SAR (extrapolated) = 1.4 W/kg

SAR(1 g) = 0.836 mW/g; SAR(10 g) = 0.446 mW/g

Maximum value of SAR (measured) = 0.937 mW/g

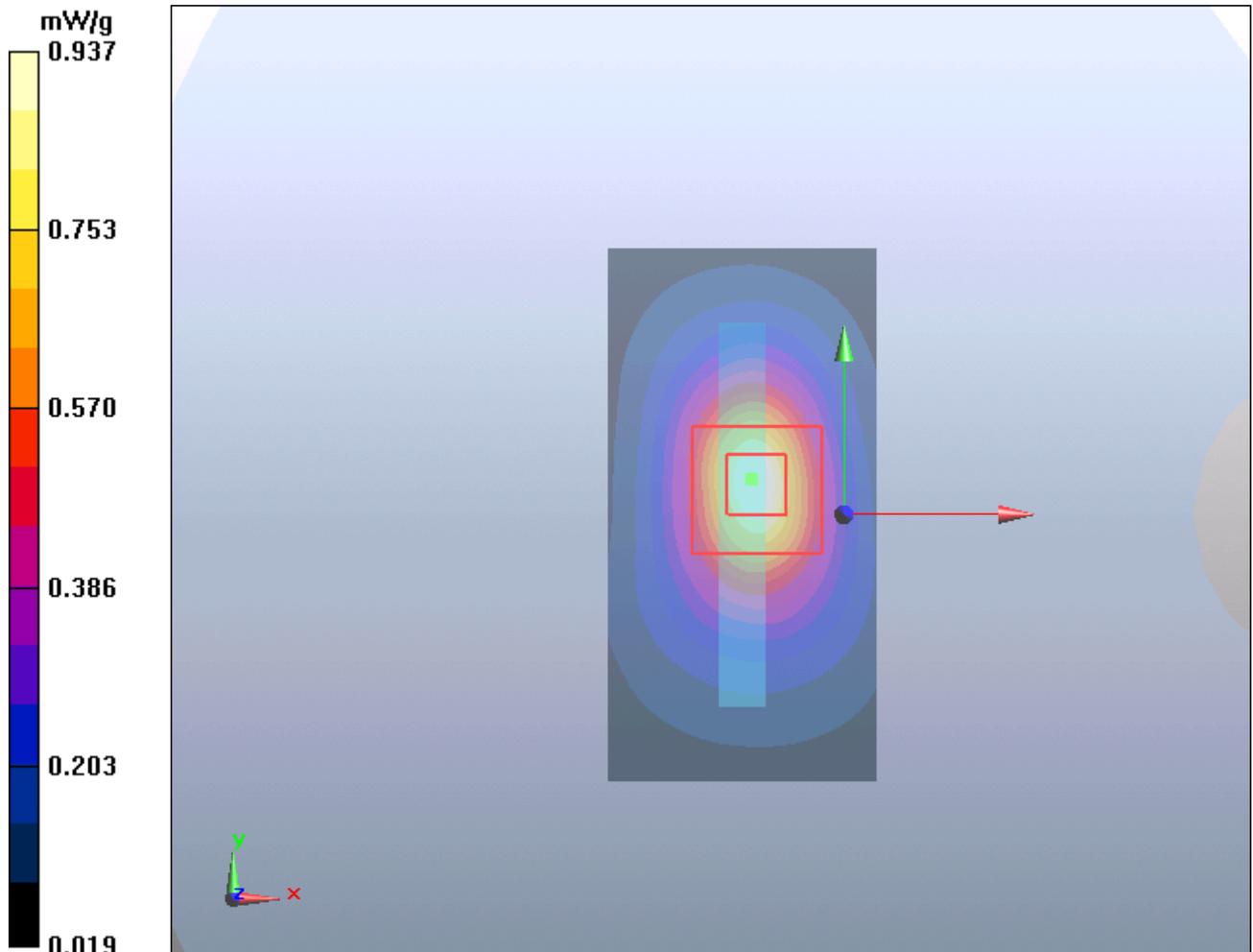


Figure 40 Body, Bottom Edge, GSM 1900 GPRS (2Txslots) Channel 512

GSM 1900 with Earphone Back Side Middle

Date/Time: 7/12/2012 4:53:30 PM

Communication System: GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.30042

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.52$ mho/m; $\epsilon_r = 52.7$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(7.57, 7.57, 7.57); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Back Side Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.678 mW/g

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

Reference Value = 7.17 V/m; Power Drift = -0.068 dB

Peak SAR (extrapolated) = 0.984 W/kg

SAR(1 g) = 0.612 mW/g; SAR(10 g) = 0.351 mW/g

Maximum value of SAR (measured) = 0.639 mW/g

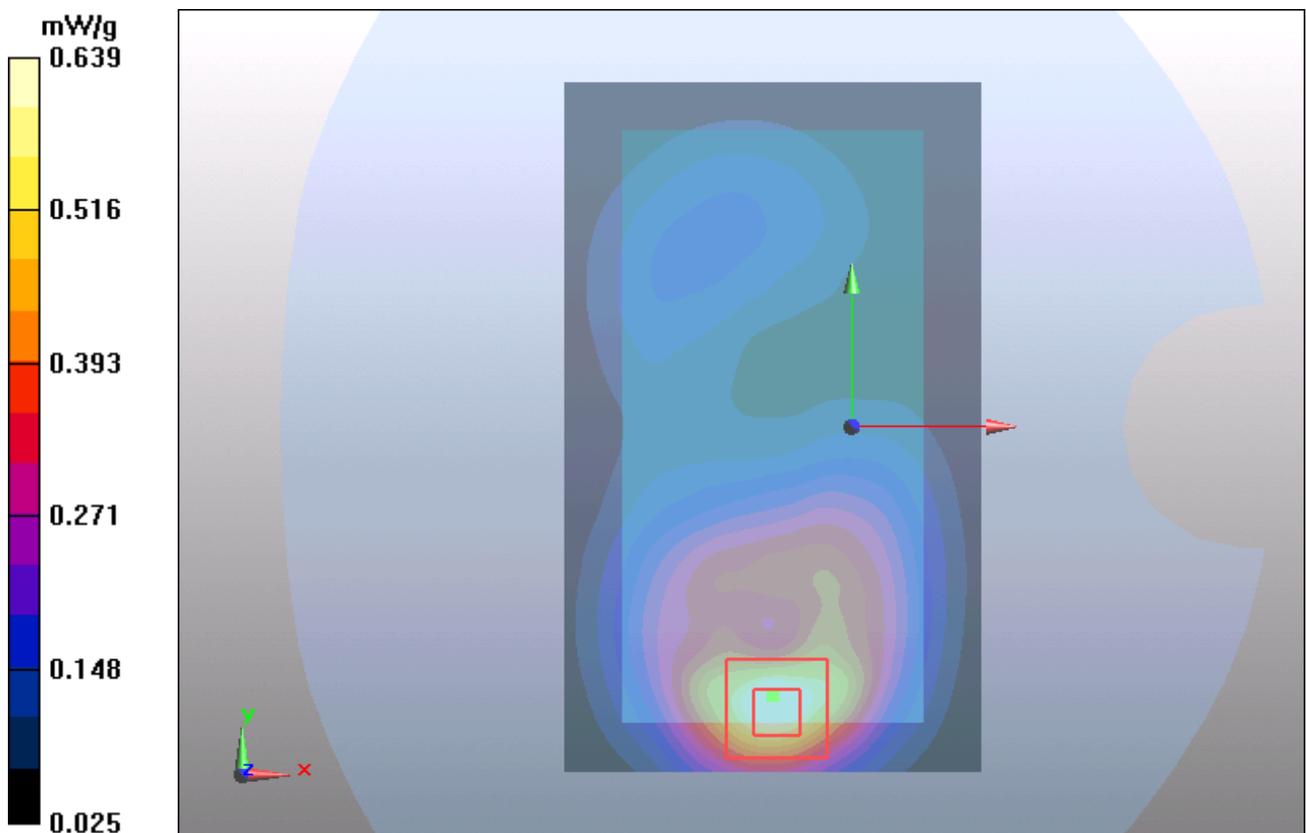


Figure 41 Body with Earphone, Back Side, GSM 1900 Channel 661

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GSM 1900 EGPRS (2Txslots) Bottom Edge Middle

Date/Time: 6/30/2012 9:55:20 PM

Communication System: EGPRS 2TX; Frequency: 1880 MHz; Duty Cycle: 1:4.14954

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.5$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(7.57, 7.57, 7.57); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Bottom Edge Middle/Area Scan (31x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.02 mW/g

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

Reference Value = 24.9 V/m; Power Drift = -0.148 dB

Peak SAR (extrapolated) = 1.5 W/kg

SAR(1 g) = 0.889 mW/g; SAR(10 g) = 0.472 mW/g

Maximum value of SAR (measured) = 0.980 mW/g

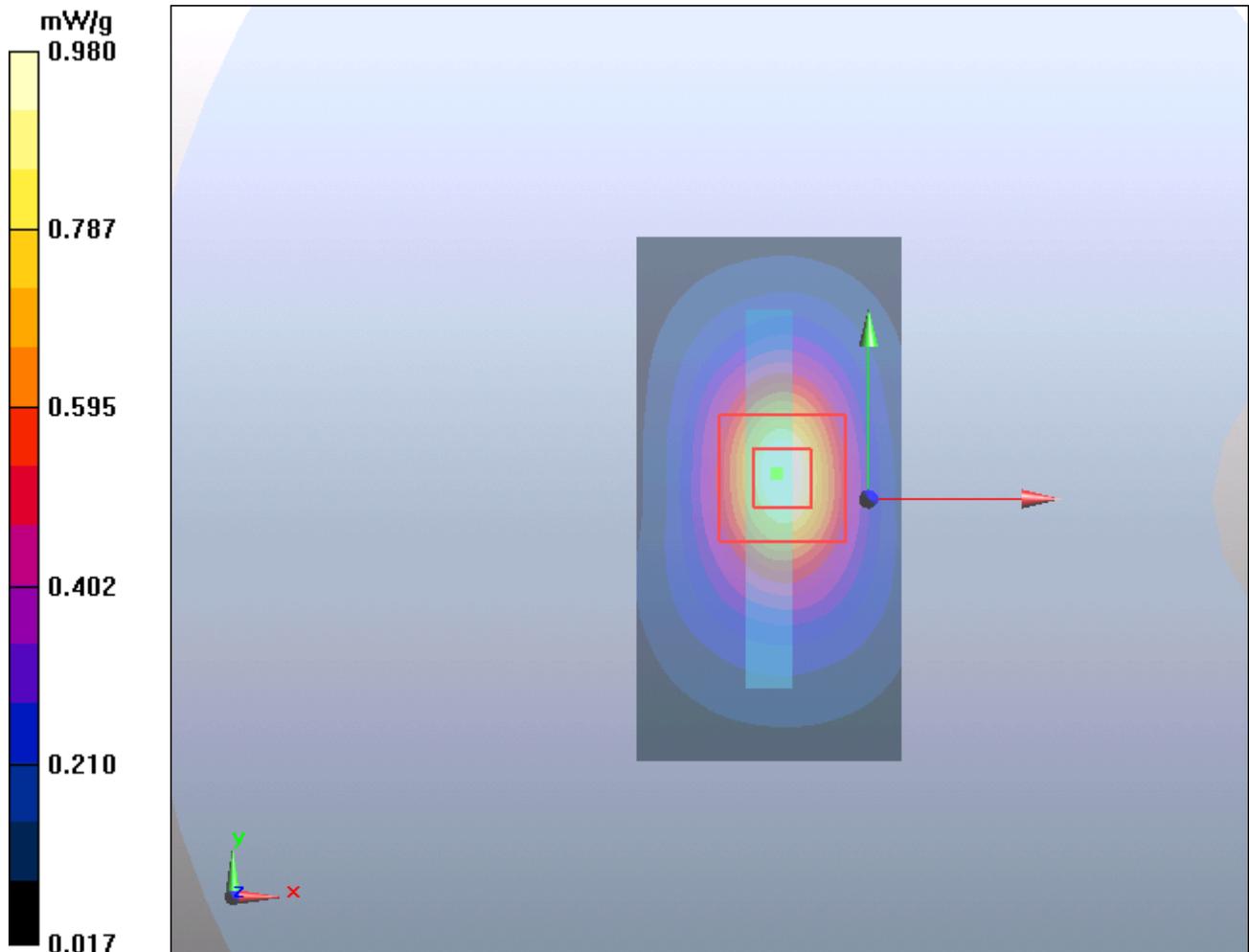


Figure 42 Body, Bottom Side, GSM 1900 EGPRS (2Txslots) Channel 661

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WCDMA Band II Left Cheek Middle

Date/Time: 7/1/2012 4:41:06 PM

Communication System: WCDMA ; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5°C

Phantom section: Left Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(8.05, 8.05, 8.05); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Cheek Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.525 mW/g

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

Reference Value = 9.12 V/m; Power Drift = 0.103 dB

Peak SAR (extrapolated) = 0.701 W/kg

SAR(1 g) = 0.456 mW/g; SAR(10 g) = 0.277 mW/g

Maximum value of SAR (measured) = 0.505 mW/g

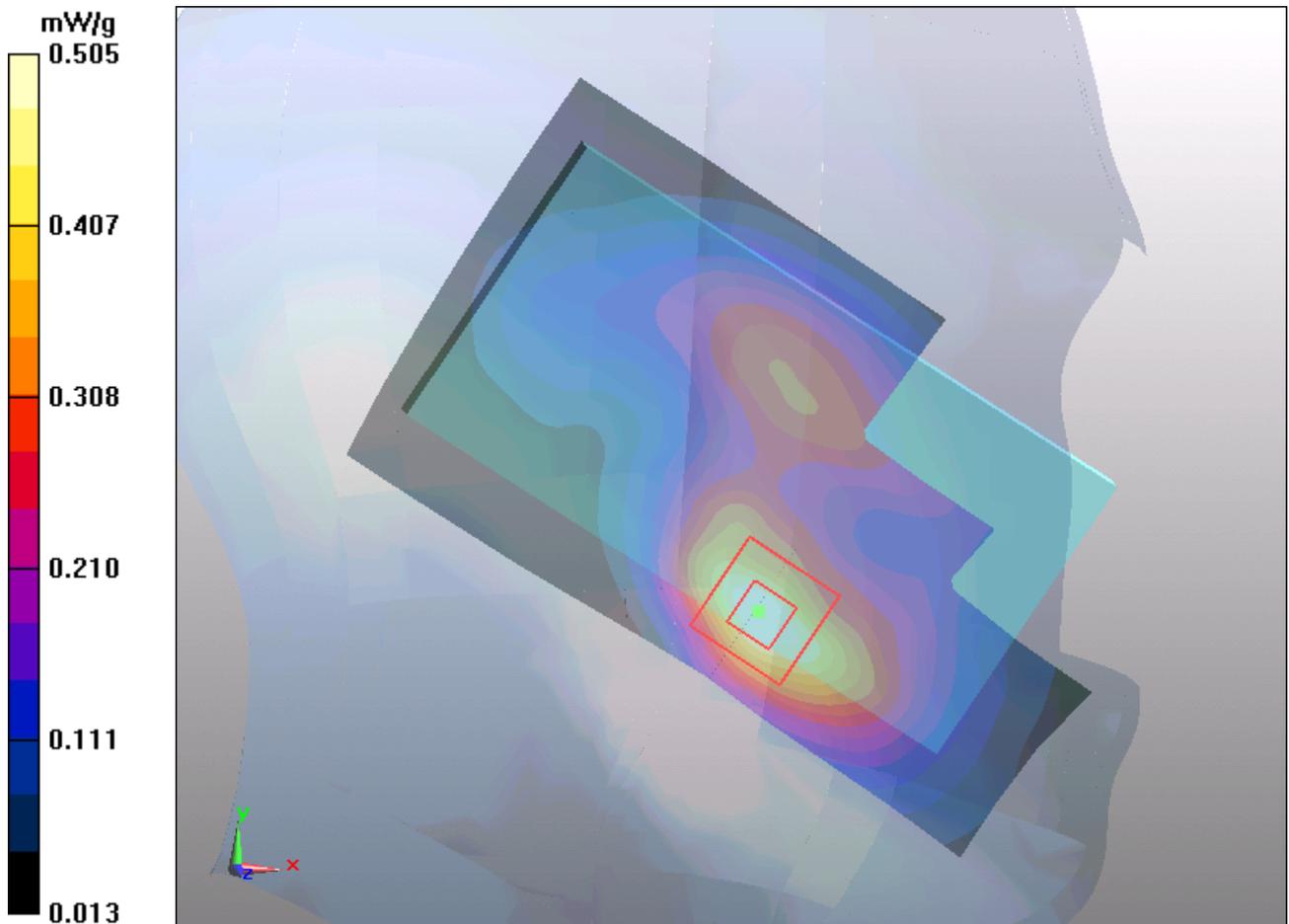


Figure 43 Left Hand Touch Cheek WCDMA Band II Channel 9400

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WCDMA Band II Left Tilt Middle

Date/Time: 7/1/2012 5:01:34 PM

Communication System: WCDMA ; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5°C

Phantom section: Left Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(8.05, 8.05, 8.05); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Tilt Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.319 mW/g

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

Reference Value = 14.1 V/m; Power Drift = 0.005 dB

Peak SAR (extrapolated) = 0.412 W/kg

SAR(1 g) = 0.265 mW/g; SAR(10 g) = 0.159 mW/g

Maximum value of SAR (measured) = 0.290 mW/g

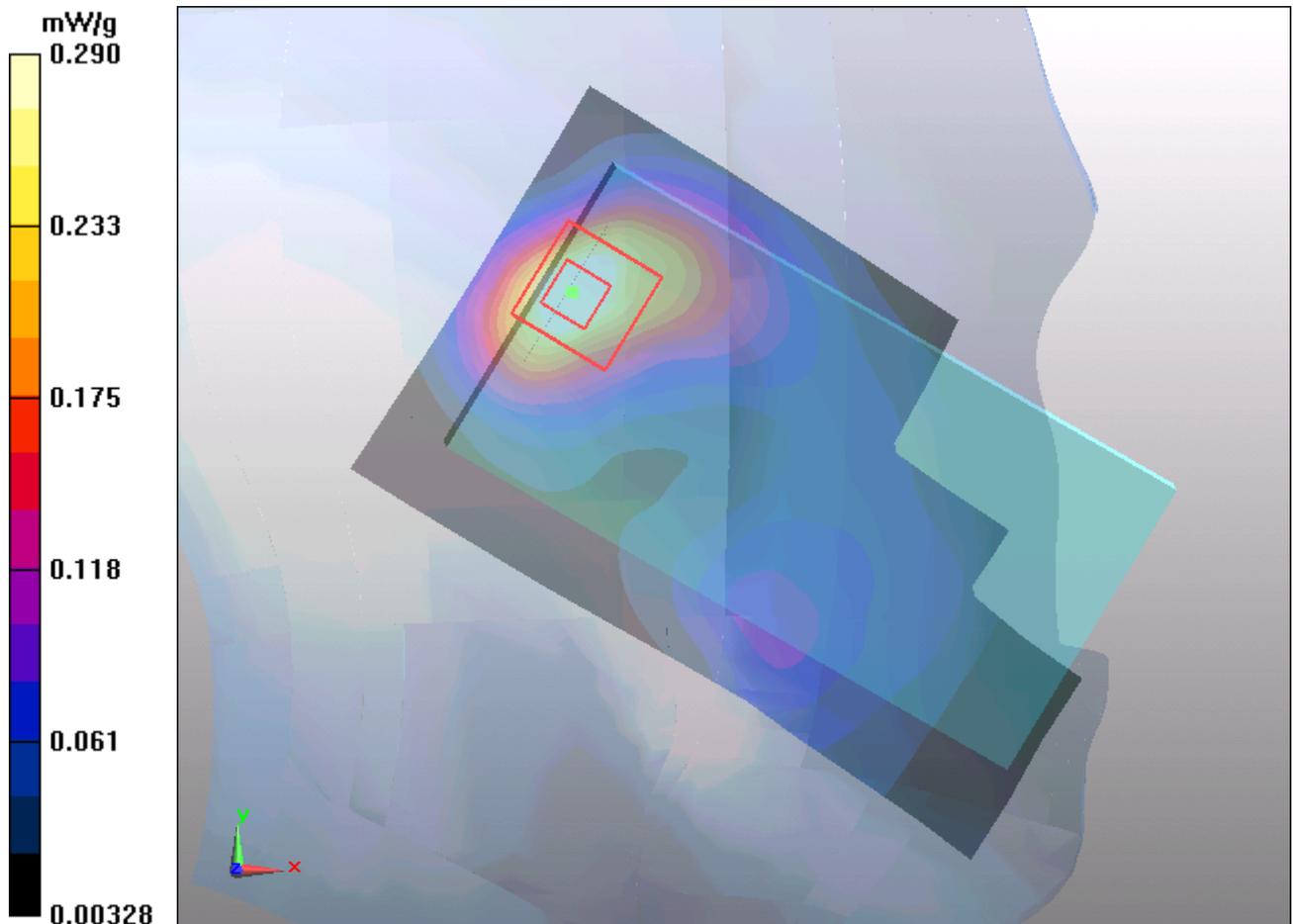


Figure 44 Left Hand Tilt 15° WCDMA Band II Channel 9400

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WCDMA Band II Right Cheek Middle

Date/Time: 7/1/2012 4:06:09 PM

Communication System: WCDMA ; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Right Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(8.05, 8.05, 8.05); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Cheek Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.530 mW/g

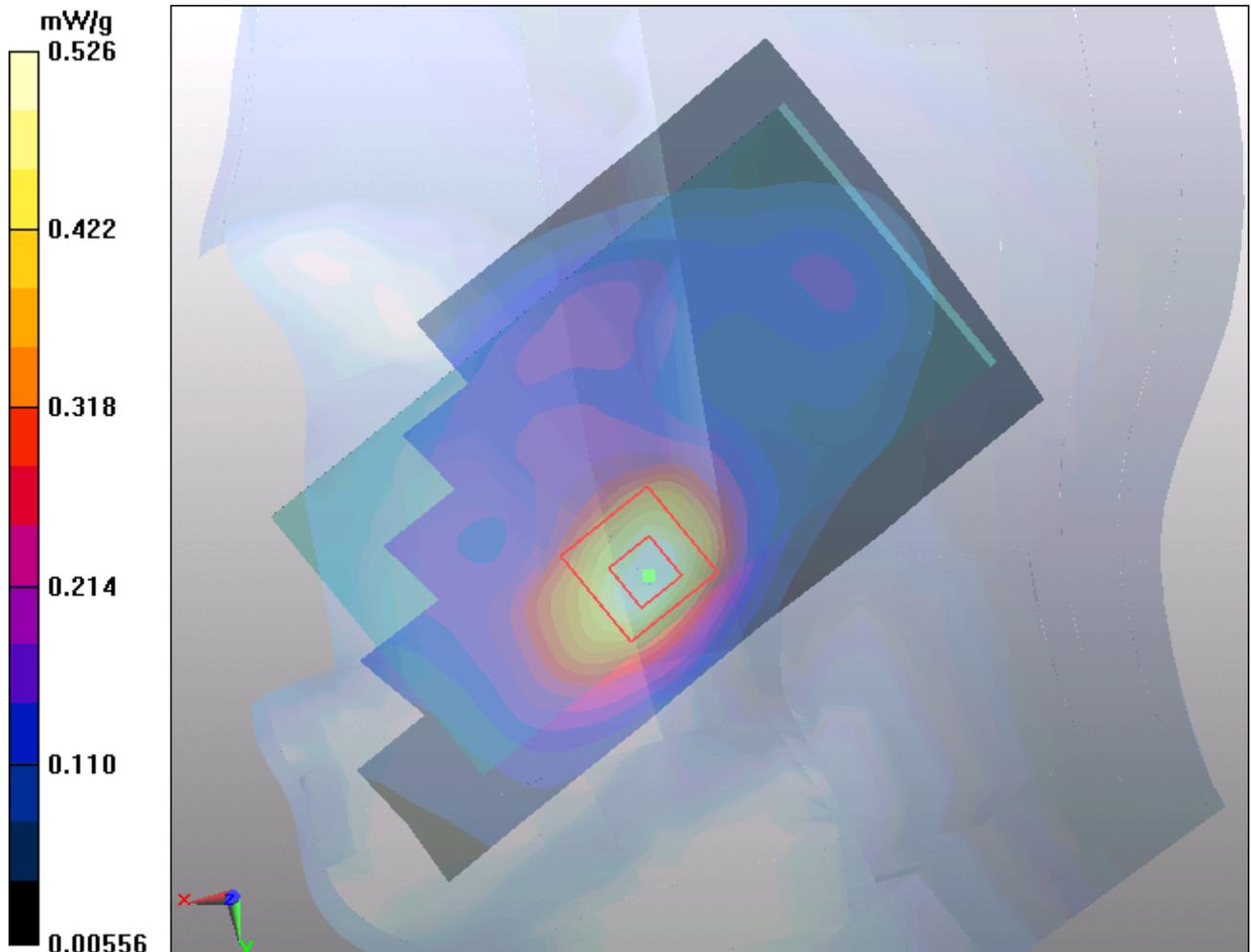
Cheek Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.78 V/m; Power Drift = 0.124 dB

Peak SAR (extrapolated) = 0.736 W/kg

SAR(1 g) = 0.484 mW/g; SAR(10 g) = 0.296 mW/g

Maximum value of SAR (measured) = 0.526 mW/g



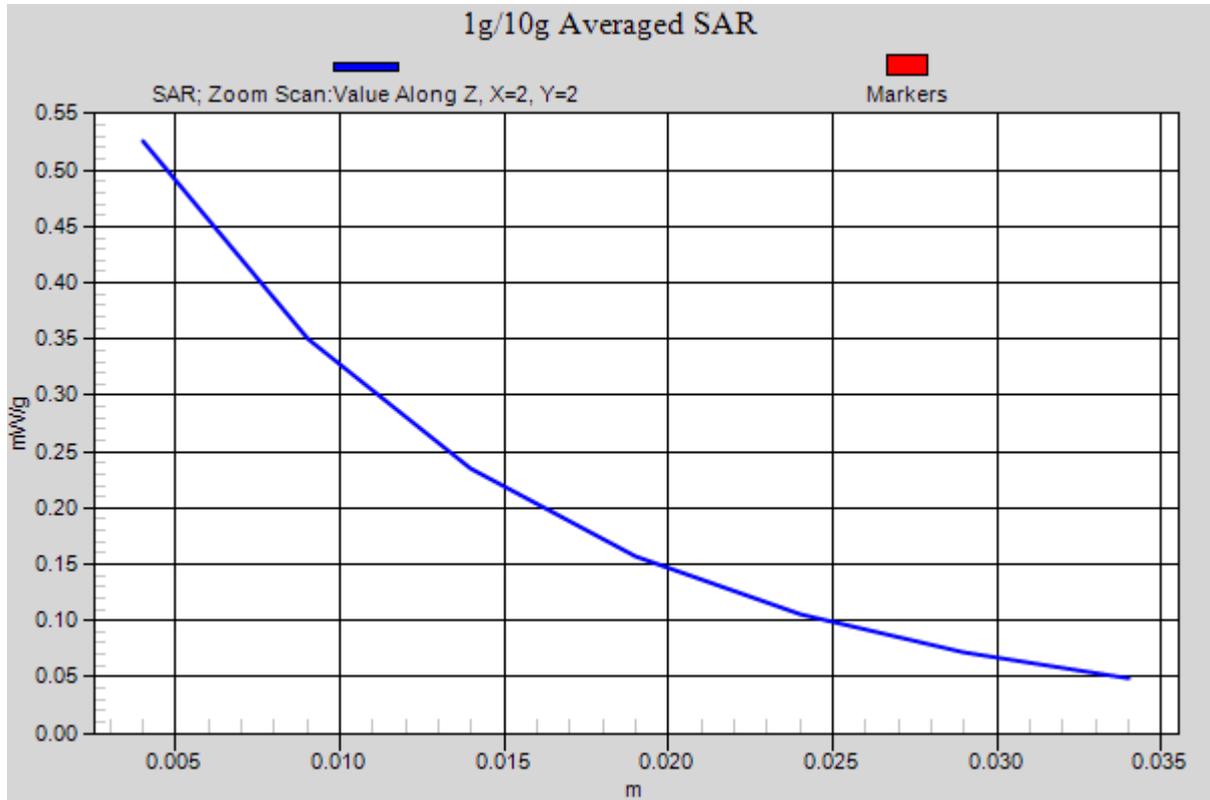


Figure 45 Right Hand Touch Cheek WCDMA Band II Channel 9400

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WCDMA Band II Right Tilt Middle

Date/Time: 7/1/2012 4:23:19 PM

Communication System: WCDMA ; Frequency: 1880 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³

Ambient Temperature:22.3 °C Liquid Temperature: 21.5°C

Phantom section: Right Section

DASY5 Configuration:

Probe: EX3DV4 - SN3753; ConvF(8.05, 8.05, 8.05); Calibrated: 1/4/2012

Electronics: DAE4 Sn1317; Calibrated: 1/23/2012

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Tilt Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 14.2 V/m; Power Drift = 0.105 dB

Peak SAR (extrapolated) = 0.416 W/kg

SAR(1 g) = 0.260 mW/g; SAR(10 g) = 0.151 mW/g

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

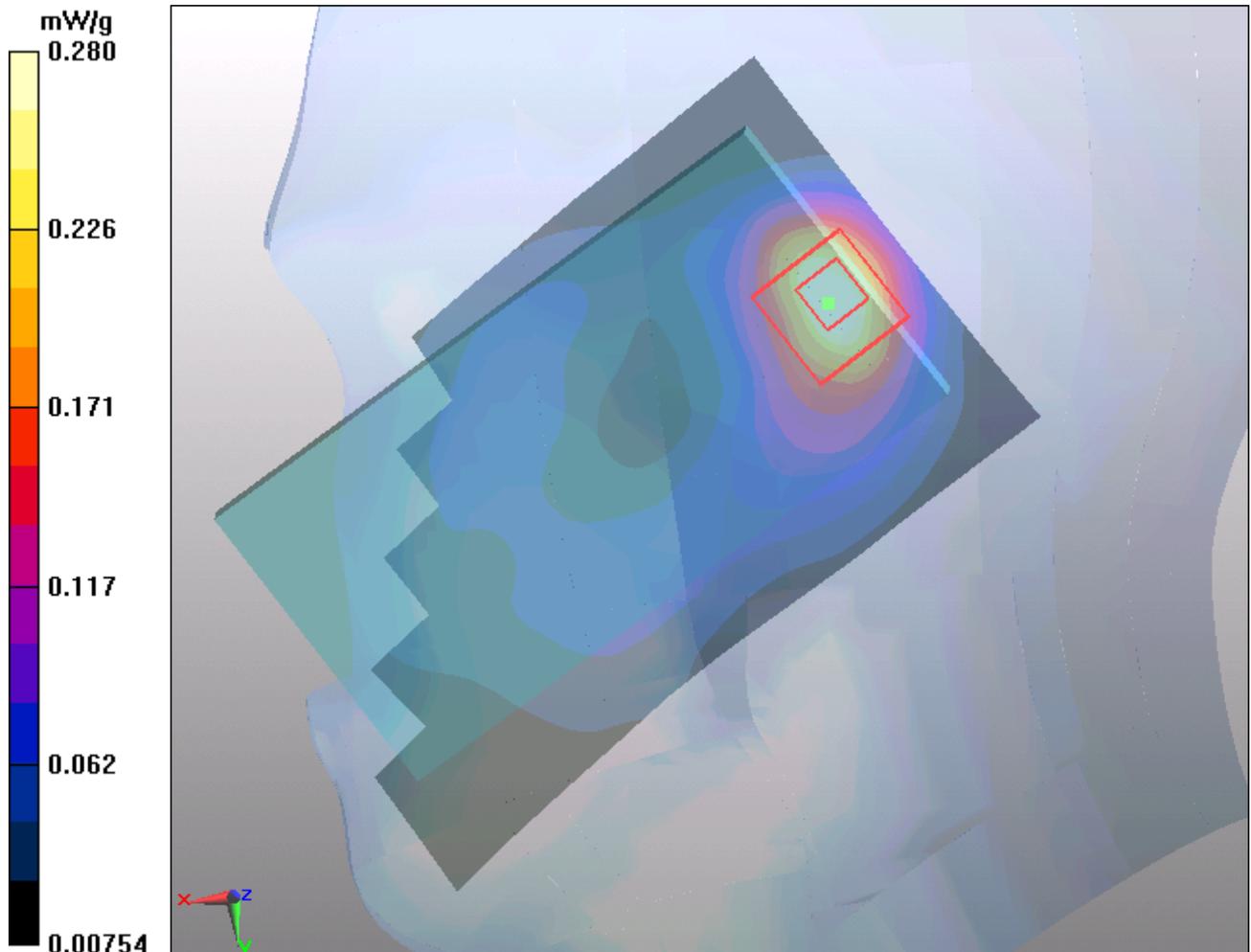


Figure 46 Right Hand Tilt 15° WCDMA Band II Channel 9400