TESTING
No. L2264

OET 65

TEST REPORT

Product Name	HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth; HUAWEI Ascend G 300; Ascend G 300
Model	HUAWEI U8815, U8815
FCC ID	QISU8815
Client	Huawei Technologies Co., Ltd.

TA Technology (Shanghai) Co., Ltd.

GENERAL SUMMARY

Product Name	HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth; HUAWEI Ascend G 300; Ascend G 300	**Model**	HUAWEI U8815, U8815
FCC ID	QISU8815		
Report No.	RZA1201-0031SAR01		
Client	Huawei Technologies Co., Ltd.		
Manufacturer	Huawei Technologies Co., Ltd.		
Reference Standard(s)	**IEEE Std C95.1, 1999:** IEEE Standard for Safety Levels with Respect to Human Exposure to Radiofrequency Electromagnetic Fields, 3 kHz to 300 GHz. **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. **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. **RSS-102 Issue 4 March 2010:** Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands) **KDB648474 D01 SAR Handsets Multi Xmiter and Ant, v01r05:** SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas. **KDB 941225 D06 Hot Spot SAR v01** SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities		
Conclusion	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. General Judgment: **Pass** (Stamp) **Date of issue: February 6th, 2012**		
Comment	The test result only responds to the measured sample.		

Approved by _____ Director **Revised by** _____ SAR Manager **Performed by** _____ SAR Engineer

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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.

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1.3. Applicant Information

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1.4. Manufacturer Information

Company:	Huawei Technologies Co., Ltd.
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Country:	P.R.China
Telephone:	0755-28780808
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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:	HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth; HUAWEI Ascend G 300; Ascend G 300		
IMEI:	861229010006206		
Hardware Version:	HD1U8815M		
Software Version:	U8815V100R001C00B867		
Antenna Type:	Internal Antenna		
Device Operating Configurations :			
Supporting Mode(s):	GSM 850/GSM 1900; (tested) WiFi (802.11b/g/n HT20); (tested) GSM 900/GSM 1800; (untested) WCDMA Band I/WCDMA Band VIII; (untested) Bluetooth; (untested)		
Test Modulation:	(GSM)GMSK; (WCDMA)QPSK		
Device Class:	B		
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
Power Class:	GSM 850: 4, tested with power level 5		
	GSM 1900: 1, tested with power level 0		
Test Channel: (Low - Middle - High)	128 - 190 - 251 (GSM 850) (tested) 512 - 661 - 810 (GSM 1900) (tested) 1 - 6 - 11 (802.11b) (tested)		

Auxiliary Equipment Details

AE1:Battery

Model:	HB5N1H
Manufacturer:	Huawei Technologies Co., Ltd.
S/N:	WLCB9166I3600877

AE2:Battery

Model:	HB5N1
Manufacturer:	Huawei Technologies Co., Ltd.
S/N:	GAGBB07XC4567157

AE3:Battery

Model:	HB5N1
Manufacturer:	Huawei Technologies Co., Ltd.
S/N:	BAABC12C98021591

AE4:Battery

Model:	HB5N1H
Manufacturer:	Huawei Technologies Co., Ltd.
S/N:	UPDBC14X97502626

Equipment Under Test (EUT) is a model of HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth; HUAWEI Ascend G 300; Ascend G 300. The EUT has a GSM/WCDMA antenna that is used for Tx/Rx, the second is diversity antenna that only can be used for Rx, the third is BT/WIFI antenna that can be used for Tx/Rx, the forth is GPS antenna that only can be used for Rx. It has Personal Wireless Routers (hot spots) function and Proximity Sensor function. The detail about EUT and Lithium Battery is in chapter 1.5 in this report. SAR are tested for GSM 850, GSM 1900 and WiFi.

The sample under test was selected by the Client.

Components list please refer to documents of the manufacturer.

1.6. The Maximum SAR_{1g} Values

Head SAR Configuration

Mode	Channel	Position	SAR_{1g} (W/kg)
GSM 850	Middle/190	Right, Cheek	**0.108**
GSM 1900	Middle/661	Right, Cheek	**0.233**
WiFi(802.11b)	Middle/6	Right, Cheek	**0.086**

Body Worn Configuration

Mode	Channel	Position	Separation distance	SAR_{1g} (W/kg)
2Txslots GPRS 850	Middle/190	Back Side	10mm	**0.602**
2Txslots EGPRS 1900	Middle/661	Back Side	10mm	**0.988**
WiFi(802.11b)	Middle/6	Back Side	10mm	**0.122**

Hotspot SAR Configuration

Mode	Channel	Position	Separation distance	SAR_{1g} (W/kg)
2Txslots GPRS 850	Middle/190	Back Side	10mm	**0.602**
2Txslots EGPRS 1900	Middle/661	Back Side	10mm	**0.988**
WiFi(802.11b)	Middle/6	Back Side	10mm	**0.122**

Simultaneous SAR

SAR_{1g}(W/kg) / Test Position	GSM1900	WIFI (802.11b)	MAX. ΣSAR_{1g}
Body, Back Side	0.988	0.122	1.110

Extrapolated SAR Values of the highest measured SAR

Mode	Test Position	Channel	Measurement Result		Tune-up procedures MAX Power(dBm)	1g Average Limit 1.6 W/kg
			Conducted Power(dBm)	1g Average (W/kg)		Extrapolated Result (W/kg)
GSM850	Right, Cheek	Middle/190	32.51	0.108	33.20	0.127
GSM850	Back Side	Middle/190	32.51	0.371	33.20	0.435
2Txslots GPRS850	Back Side	Middle/190	31.51	0.602	32.00	0.674
2Txslots EGPRS850	Back Side	Middle/190	31.50	0.572	32.00	0.642
GSM1900	Right, Cheek	Middle/661	29.08	0.233	29.70	0.269
GSM1900	Back Side	Middle/661	29.08	0.666	29.70	0.768
2Txslots GPRS1900	Back Side	Middle/661	28.00	0.978	28.50	1.097
2Txslots EGPRS1900	Back Side	Middle/661	27.96	0.988	28.50	1.119

1.7. Maximum Conducted Power of each tested Mode

GSM Maximum Power

Mode		Max Burst Conducted Power (dBm)	Max Average Power (dBm)
GSM 850	GSM	**32.51**	**23.48**
	GPRS, 2Txslots	**31.51**	**25.49**
	EGPRS, 2Txslots	**31.50**	**25.48**
GSM 1900	GSM	**29.09**	**20.06**
	GPRS, 2Txslots	**28.00**	**21.98**
	EGPRS, 2Txslots	**27.96**	**21.94**

WiFi Maximum Power

Mode	Maximum Conducted Power (dBm)
WiFi(802.11b)	**14.97**

Note: The detail Power refer to Table 9 (Power Measurement Results).

1.8. Test Date

The test is performed from January 9, 2012 to January 16, 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.

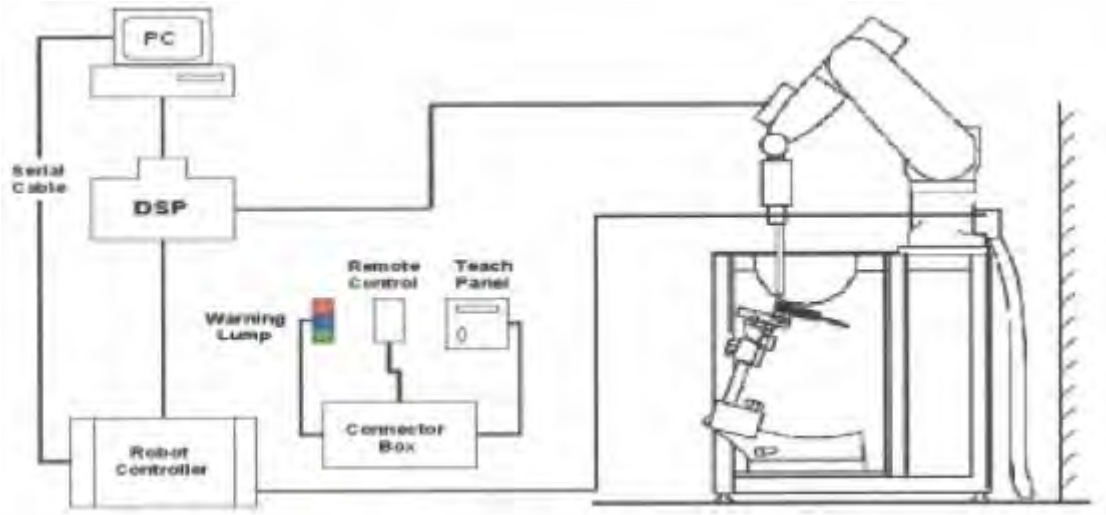


Figure 1 SAR Lab Test Measurement Set-up

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 µW/g to > 100 mW/g Linearity: ± 0.2dB (noise: typically < 1 µW/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 ± 10%. The spherical isotropy was evaluated and found to be better than ± 0.25dB. 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 bellow 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.

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

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

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

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 die rent 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)
Aailable	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

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 7x7x7 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 7x7x7 measurement points with 5mm resolution amounting to 343 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 7x7x7 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.

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

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

= equivalent tissue density in g/cm^3

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.

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

with P_{pwe} = equivalent power density of a plane wave in mW/cm^2

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. = 20°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 ε=41.5 σ=0.9

MIXTURE%	FREQUENCY(Brain) 1900MHz
Water	55.242
Glycol monobutyl	44.452
Salt	0.306
Dielectric Parameters Target Value	f=1900MHz ε=40.0 σ=1.40

MIXTURE%	FREQUENCY(Brain) 2450MHz
Water	62.7
Glycol	36.8
Salt	0.5
Dielectric Parameters Target Value	f=2450MHz ε=39.20 σ=1.80

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 ε=55.2 σ=0.97

MIXTURE%	FREQUENCY (Body) 1900MHz
Water	69.91
Glycol monobutyl	29.96
Salt	0.13
Dielectric Parameters Target Value	f=1900MHz ε=53.3 σ=1.52

MIXTURE%	FREQUENCY(Body) 2450MHz
Water	73.2
Glycol	26.7
Salt	0.1
Dielectric Parameters Target Value	f=2450MHz ε=52.70 σ=1.95

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)	
837MHz (Middle)	Target value ± 5% window	41.50 39.43 — 43.58	0.90 0.86 — 0.95	22.0
	Measurement value 2012-1-11	42.60	0.897	21.7
1880MHz (Middle)	Target value ±5% window	40.00 38.00 — 42.00	1.40 1.33 — 1.47	22.0
	Measurement value 2012-1-9	40.60	1.38	21.8
2437MHz (Middle)	Target value ±5% window	39.22 37.26 — 41.18	1.79 1.70 — 1.88	22.0
	Measurement value 2012-1-16	39.3	1.79	21.8

Table 5: Dielectric Performance of Body Tissue Simulating Liquid

Frequency	Description	Dielectric Parameters		Temp ℃
		ε_r	σ(s/m)	
837MHz (Middle)	Target value ±5% window	55.19 52.43 — 57.95	0.97 0.92 — 1.02	22.0
	Measurement value 2012-1-10	54.3	0.977	21.7
1910MHz (High)	Target value ±5% window	53.30 50.64 — 55.97	1.52 1.44 — 1.60	22.0
	Measurement value 2012-1-10	52.9	1.49	21.8
1880MHz (Middle)	Target value ±5% window	53.30 50.64 — 55.97	1.52 1.44 — 1.60	22.0
	Measurement value 2012-1-10	53.1	1.47	21.8
1850.2MHz (Low)	Target value ±5% window	53.30 50.64 — 55.97	1.52 1.44 — 1.60	22.0
	Measurement value 2012-1-10	53.2	1.46	21.8
2437MHz (Middle)	Target value ±5% window	52.72 50.08 — 55.36	1.94 1.85 — 2.04	22.0
	Measurement value 2012-1-16	52	1.95	21.9

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 (±10 %).

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

.

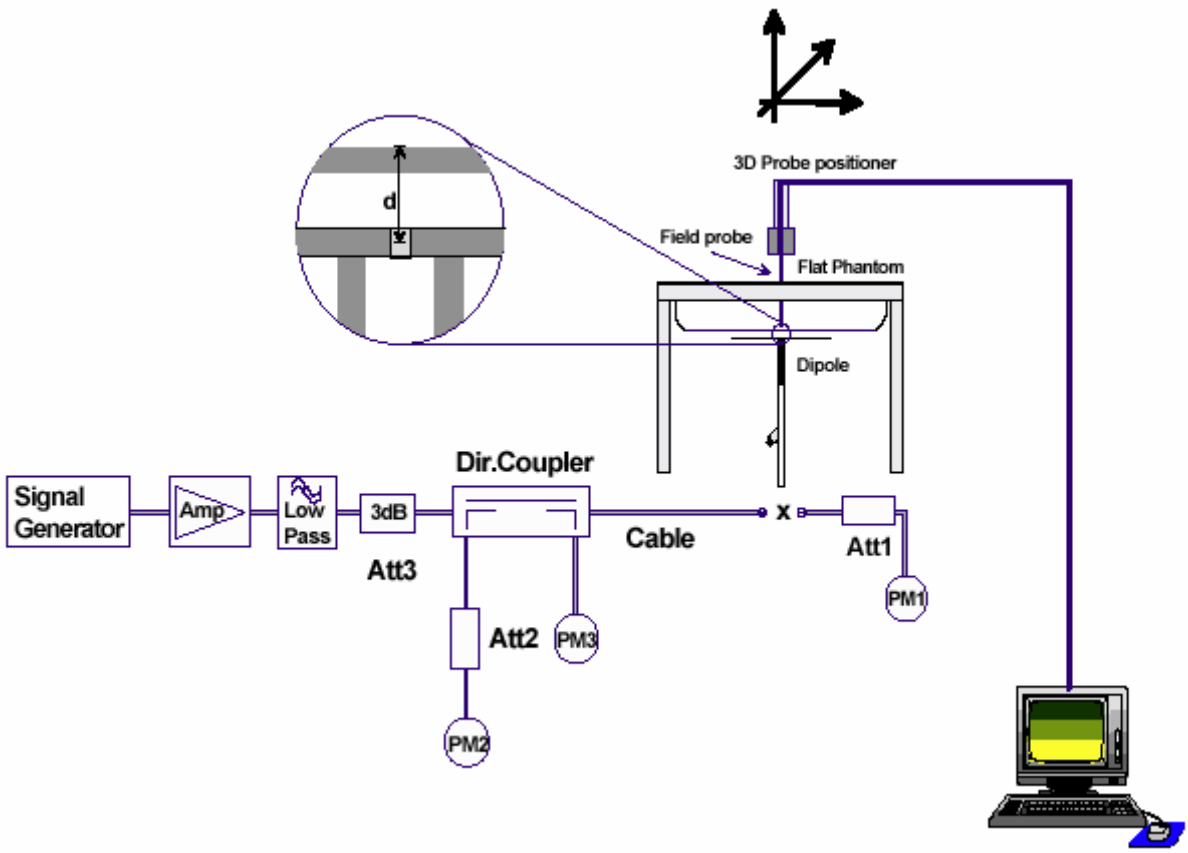


Figure 6 System Check Set-up

5.2. System Check Results

Table 6: System Check in Head Tissue Simulating Liquid

Frequency	Test Date	Dielectric Parameters		Temp	250mW Measured SAR_{1g}	1W Normalized SAR_{1g}	1W Target SAR_{1g} (±10% Deviation)
		ε_r	σ(s/m)	(℃)	(W/kg)		
835MHz	2012-1-11	42.65	0.895	21.7	2.40	9.60	9.34 (8.41 ~ 10.27)
1900 MHz	2012-1-9	40.44	1.40	21.8	10.33	41.32	40.30 (36.27 ~ 44.33)
2450MHz	2012-1-16	39.27	1.81	21.8	14.06	56.24	53.80 (48.42 ~ 59.18)

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

Table 7: System Check for in Body Tissue Simulating Liquid

Frequency	Test Date	Dielectric Parameters		Temp	250mW Measured SAR_{1g}	1W Normalized SAR_{1g}	1W Target SAR_{1g} (±10% Deviation)
		ε_r	σ(s/m)	(℃)	(W/kg)		
835MHz	2012-1-10	54.28	0.974	21.7	2.54	10.16	9.46 (8.51 ~ 10.41)
1900 MHz	2012-1-10	53.02	1.48	21.8	10.20	40.80	41.70 (37.53 ~ 45.87)
2450MHz	2012-1-16	51.97	1.96	21.9	14.01	56.04	51.70 (46.53 ~ 56.87)

Note：1. The graph results see ANNEX B.
2. Target Value 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. 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	1.5

EGPRS (8PSK):

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

EGPRS (GMSK):

Number of timeslots in uplink assignment	**reduction of maximum output power, (dB)**
1	0
2	1.5

GSM 1900

GPRS (GMSK):

Number of timeslots in uplink assignment	**reduction of maximum output power, (dB)**
1	0
2	1.5

EGPRS (8PSK):

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

EGPRS (GMSK):

Number of timeslots in uplink assignment	**reduction of maximum output power, (dB)**
1	0
2	1.5

6.3.2. 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 channels1,6,11;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 8.

Table 8: “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 11to 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”

7. Test Results

7.1. Conducted Power Results

Table 9: 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		32.44	32.51	32.42	-9.03dB	23.41	23.48	23.39
GPRS (GMSK)	1Txslot	32.39	32.52	32.41	-9.03dB	23.36	23.49	23.38
	2Txslots	31.42	31.51	31.43	-6.02dB	**25.40**	**25.49**	**25.41**
EGPRS (GMSK)	1Txslot	32.39	32.50	32.39	-9.03dB	23.36	23.47	23.36
	2Txslots	31.32	31.50	31.40	-6.02dB	**25.30**	**25.48**	**25.38**
EGPRS (8PSK)	1Txslot	26.77	26.83	26.81	-9.03dB	17.74	17.8	17.78
	2Txslots	25.73	25.80	25.78	-6.02dB	**19.71**	**19.78**	**19.76**
GSM 1900		**Burst Conducted Power(dBm)**				**Average power(dBm)**		
		Channel 512	Channel 661	Channel 810		Channel 512	Channel 661	Channel 810
GSM		29.09	29.08	29.04	-9.03dB	20.06	20.05	20.01
GPRS (GMSK)	1Txslot	29.12	29.1	29.07	-9.03dB	20.09	20.07	20.04
	2Txslots	27.95	28.00	27.96	-6.02dB	**21.93**	**21.98**	**21.94**
EGPRS (GMSK)	1Txslot	29.09	29.03	29.03	-9.03dB	20.06	20.00	20.00
	2Txslots	27.92	27.96	27.93	-6.02dB	**21.90**	**21.94**	**21.91**
EGPRS (8PSK)	1Txslot	26.04	26.07	25.98	-9.03dB	17.01	17.04	16.95
	2Txslots	24.95	24.98	24.96	-6.02dB	**18.93**	**18.96**	**18.94**

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.

7.2. SAR Test Results

7.2.1. GSM 850 (GPRS/EGPRS)

Table 10: 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 (Battery SN: WLCB9166I3600877)					
Left hand, Touch Cheek	Middle/190	0.073	0.097	-0.093	Figure 13
Left hand, Tilt 15 Degree	Middle/190	0.057	0.077	-0.066	Figure 14
Right hand, Touch Cheek	Middle/190	0.081	0.108	-0.020	Figure 15
Right hand, Tilt 15 Degree	Middle/190	0.058	0.075	-0.131	Figure 16
Worst Case Position of Head with Battery (SN: GAGBB07XC4567157)					
Right hand, Touch Cheek	Middle/190	0.073	0.096	-0.073	Figure 17
Worst Case Position of Head with Battery (SN: BAABC12C98021591)					
Right hand, Touch Cheek	Middle/190	0.072	0.096	0.026	Figure 18
Worst Case Position of Head with Battery (SN: UPDBC14X97502626)					
Right hand, Touch Cheek	Middle/190	0.078	0.104	0.076	Figure 19
Test position of Body (Battery SN: WLCB9166I3600877, Distance 10mm)					
Back Side (GSM/1Txslot)	Middle/190	0.278	0.371	0.030	Figure 20
Back Side (2Txslots)	Middle/190	0.441	0.589	-0.040	Figure 21
Front Side(2Txslots)	Middle/190	0.187	0.244	-0.067	Figure 22
Left Edge(2Txslots)	Middle/190	0.153	0.220	-0.132	Figure 23
Right Edge(2Txslots)	Middle/190	0.163	0.236	-0.057	Figure 24
Top Edge(2Txslots)	N/A	N/A	N/A	N/A	N/A
Bottom Edge(2Txslots)	Middle/190	0.018	0.029	0.057	Figure 25
Worst Case Position of Body with Earphone (Battery SN: WLCB9166I3600877, Distance 10mm)					
Back Side (GSM)	Middle/190	0.235	0.314	-0.025	Figure 26
Worst Case Position of Body with EGPRS (Battery SN: WLCB9166I3600877, GMSK, Distance 10mm)					
Back Side (2Txslots)	Middle/190	0.429	0.572	-0.124	Figure 27

Worst Case Position of Body with Battery (SN: GAGBB07XC4567157, Distance 10mm)					
Back Side (2Txslots)	Middle/190	0.449	0.602	0.046	Figure 28
Worst Case Position of Body with Battery (SN: BAABC12C98021591, Distance 10mm)					
Back Side (2Txslots)	Middle/190	0.432	0.575	-0.053	Figure 29
Worst Case Position of Body with Battery (SN: UPDBC14X97502626, Distance 10mm)					
Back Side (2Txslots)	Middle/190	0.447	0.596	-0.088	Figure 30

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 high, middle and low 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 I). 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.

7.2.2. GSM 1900 (GPRS/EGPRS)

Table 11: 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 (Battery SN: WLCB9166I3600877)					
Left hand, Touch Cheek	Middle/661	0.125	0.184	-0.084	Figure 31
Left hand, Tilt 15 Degree	Middle/661	0.037	0.062	0.049	Figure 32
Right hand, Touch Cheek	Middle/661	0.139	0.212	0.020	Figure 33
Right hand, Tilt 15 Degree	Middle/661	0.027	0.046	0.074	Figure 34
Worst Case Position of Head with Battery (SN: GAGBB07XC4567157)					
Right hand, Touch Cheek	Middle/661	0.151	0.233	0.002	Figure 35
Worst Case Position of Head with Battery (SN: BAABC12C98021591)					
Right hand, Touch Cheek	Middle/661	0.150	0.233	0.029	Figure 36
Worst Case Position of Head with Battery (SN: UPDBC14X97502626)					
Right hand, Touch Cheek	Middle/661	0.149	0.232	-0.156	Figure 37
Test position of Body (Battery SN: WLCB9166I3600877, Distance 10mm)					
Back Side (GSM/1Txslot)	Middle/661	0.353	0.614	0.146	Figure 38
Back Side (2Txslots)	High/810	0.523	0.929	-0.017	Figure 39
	Middle/661	0.552	0.978	-0.154	Figure 40
	Low/512	0.523	0.887	-0.173	Figure 41
Front Side(2Txslots)	Middle/661	0.251	0.391	-0.018	Figure 42
Left Edge(2Txslots)	Middle/661	0.089	0.154	0.094	Figure 43
Right Edge(2Txslots)	Middle/661	0.064	0.105	-0.166	Figure 44
Top Edge(2Txslots)	N/A	N/A	N/A	N/A	N/A
Bottom Edge(2Txslots)	Middle/661	0.316	0.561	0.050	Figure 45
Worst Case Position of Body with Earphone (Battery SN: WLCB9166I3600877, Distance 10mm)					
Back Side (GSM)	Middle/661	0.381	0.666	0.061	Figure 46
Worst Case Position of Body with EGPRS (Battery SN: WLCB9166I3600877, GMSK, Distance 10mm)					

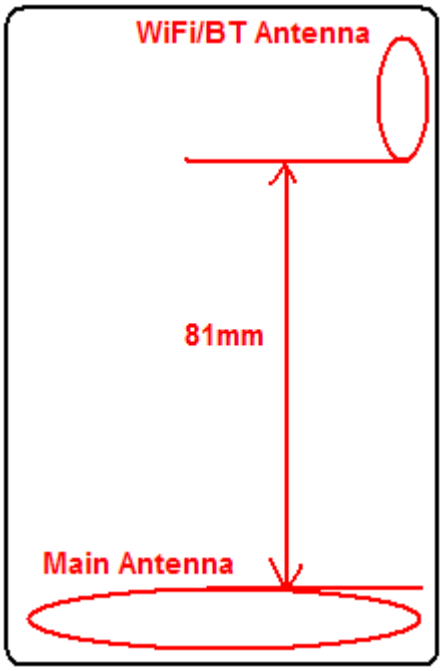
Back Side (2Txslots)	Middle/661	0.567	0.988	-0.087	Figure 47
Worst Case Position of Body with Battery (SN: GAGBB07XC4567157, Distance 10mm)					
Back Side (2Txslots)	Middle/661	0.510	0.890	-0.132	Figure 48
Worst Case Position of Body with Battery (SN: BAABC12C98021591, Distance 10mm)					
Back Side (2Txslots)	Middle/661	0.506	0.889	0.044	Figure 49
Worst Case Position of Body with Battery (SN: UPDBC14X97502626, Distance 10mm)					
Back Side (2Txslots)	Middle/661	0.527	0.936	-0.064	Figure 50

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 high, middle and low 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 I). 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.

7.2.3. Bluetooth/WiFi Function

The distance between BT/WIFI antenna and main antenna is ＞5cm. The location of the antennas inside mobile phone is shown in Annex I:



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)	6.15	7.49	6.45

The output power of WIFI antenna is as following:

Mode	Channel	Data rate (Mbps)	AV Power (dBm)
11b	1	1	14.97
		2	14.95
		5.5	14.92
		11	14.89
	6	1	14.77
		2	14.73
		5.5	14.72
		11	14.75

	11	1	14.15
		2	14.14
		5.5	14.11
		11	14.09
11g	1	6	11.99
		9	11.97
		12	11.95
		18	11.98
		24	11.94
		36	11.93
		48	11.95
		54	11.92
	6	6	11.86
		9	11.85
		12	11.86
		18	11.82
		24	11.81
		36	11.8
		48	11.83
		54	11.82
	11	6	11.27
		9	11.25
		12	11.24
		18	11.21
		24	11.26
		36	11.2
		48	11.19
		54	11.2
11n HT20	1	6.5	9.95
		13	9.93
		19.5	9.9
		26	9.89
		39	9.93
		52	9.92

		58.5	9.94
		65	9.91
	6	6.5	9.81
		13	9.8
		19.5	9.79
		26	9.77
		39	9.75
		52	9.76
		58.5	9.72
		65	9.71
	11	6.5	9.16
		13	9.15
		19.5	9.16
		26	9.18
		39	9.15
		52	9.14
		58.5	9.12
		65	9.11

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 antenna we can draw the conclusion that:

WIFI antenna is ＞5cm from GSM antenna, stand-alone SAR are required for WIFI, because the output power of WIFI transmitter is ＞$2P_{Ref}$=13.8dBm.

Table 12: 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 (Battery SN: WLCB9166I3600877)					
Left hand, Touch cheek	Middle/6	0.030	0.054	0.094	Figure 51
Left hand, Tilt 15 Degree	Middle/6	0.038	0.074	0.143	Figure 52
Right hand, Touch cheek	Middle/6	0.043	0.086	0.192	Figure 53
Right hand, Tilt 15 Degree	Middle/6	0.032	0.059	0.110	Figure 54
Worst Case Position of Head with Battery (SN: GAGBB07XC4567157)					
Right hand, Touch cheek	Middle/6	0.040	0.079	0.069	Figure 55
Worst Case Position of Head with Battery (SN: BAABC12C98021591)					
Right hand, Touch cheek	Middle/6	0.040	0.080	0.192	Figure 56
Worst Case Position of Head with Battery (SN: UPDBC14X97502626)					
Right hand, Touch cheek	Middle/6	0.041	0.081	0.077	Figure 57
Test position of Body (Battery SN: WLCB9166I3600877, Distance 10mm)					
Back Side	Middle/6	0.025	0.059	0.012	Figure 58
Front Side	Middle/6	0.018	0.032	0.094	Figure 59
Left Edge	Middle/6	0.020	0.043	0.049	Figure 60
Right Edge	N/A	N/A	N/A	N/A	N/A
Top Edge	Middle/6	0.019	0.035	0.011	Figure 61
Bottom Edge	N/A	N/A	N/A	N/A	N/A
Worst Case Position of Body with Earphone (Battery SN: WLCB9166I3600877, Distance 10mm)					
Back Side	Middle/6	0.045	0.104	0.091	Figure 62
Worst Case Position of Body with Battery (SN: GAGBB07XC4567157, Distance 10mm)					
Back Side	Middle/6	0.052	0.121	-0.002	Figure 63
Worst Case Position of Body with Battery (SN: BAABC12C98021591, Distance 10mm)					

Back Side	Middle/6	0.052	0.120	0.112	Figure 64
Worst Case Position of Body with Battery (SN: UPDBC14X97502626, Distance 10mm)					
Back Side	Middle/6	0.053	0.122	-0.002	Figure 65

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 high, middle and low 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 Left edge; antenna-to-Bottom/Right edge distance is more than 2.5 cm (see ANNEX I). 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 antenna, stand-alone SAR are not required for BT, because the output power of BT transmitter is ＜ $2P_{Ref}$ =13.8dBm

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

Simultaneous SAR

About BT antenna is ＞5cm from GSM antenna, stand-alone SAR are not required for BT, so Simultaneous SAR are not required for BT and GSM Antenna.

About BT and WIFI Antenna,

SAR_{1g}(W/kg) / Test Position	WIFI (802.11b)	BT	MAX. ΣSAR_{1g}
Left hand, Touch cheek	**0.054**	0	0.054
Left hand, Tilt 15 Degree	**0.074**	0	0.074
Right hand, Touch cheek	**0.086**	0	0.086
Right hand, Tilt 15 Degree	**0.059**	0	0.059
Body, Back Side	**0.122**	0	0.122
Body, Front Side	**0.032**	0	0.032
Body, Left Edge	**0.043**	0	0.043
Body, Right Edge	N/A	0	0
Body, Top Edge	**0.035**	0	0.035
Body, Bottom Edge	N/A	0	0

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 requird. Its SAR is considered 0 in the 1-g SAR summing process to determine simultaneous transmission SAR evaluation requirments.

BT antenna is ＜2.5cm from WIFI Antenna. (WIFI Antenna SAR_{MAX})0.122 +(BT Antenna SAR_{MAX})0 =0. 122 ＜1.6, So the Simultaneous SAR are not required for BT and WIFI antenna.

About WIFI and GSM Antenna,

SAR_{1g}(W/kg) / Test Position	GSM850	GSM1900	WIFI (802.11b)	MAX. ΣSAR_{1g}
Left hand, Touch cheek	0.097	**0.184**	0.054	0.238
Left hand, Tilt 15 Degree	**0.077**	0.062	0.074	0.151
Right hand, Touch cheek	0.108	**0.233**	0.086	0.319
Right hand, Tilt 15 Degree	**0.075**	0.046	0.059	0.134
Body, Back Side	0.602	**0.988**	0.122	1.110
Body, Front Side	0.244	**0.391**	0.032	0.423
Body, Left Edge	**0.220**	0.154	0.043	0.263
Body, Right Edge	**0.236**	0.105	N/A	0.236
Body, Top Edge	N/A	N/A	0.035	0.035
Body, Bottom Edge	0.029	**0.561**	N/A	0.561

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 Antenna. (GSM Antenna SAR_{MAX})0.988 +(WIFI Antenna SAR_{MAX})0.122 =1.110 ＜1.6, So the Simultaneous SAR are not required for WIFI and GSM Antenna.

8. Measurement Uncertainty

No.	source	Type	Uncertainty Value (%)	Probability Distribution	k	c_i	Standard ncertainty $u_i^{'}$ (%)	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	5.9	N	1	1	5.9	∞
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	4.92	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	∞

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		$u_c^{'} = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$					12.12	
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$		N	k=2		24.24	

9. Main Test Instruments

Table 13: List of Main Instruments

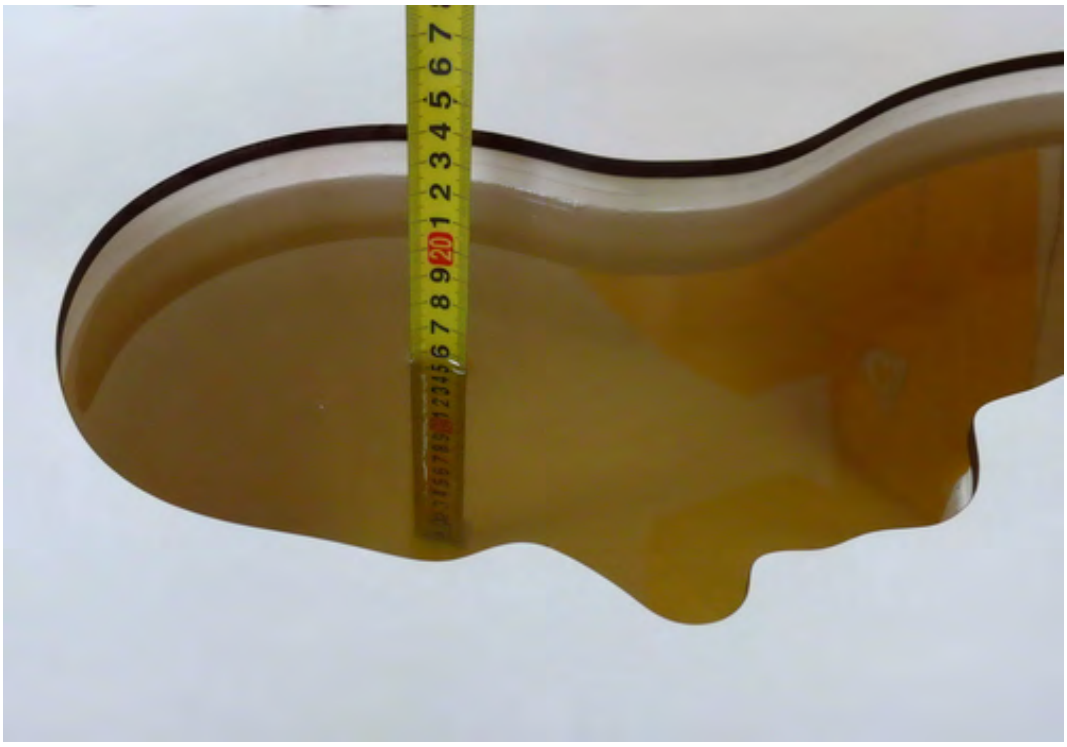
No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	Agilent 8753E	US37390326	September 12, 2011	One year
02	Dielectric Probe Kit	Agilent 85070E	US44020115	No Calibration Requested	
03	Power meter	Agilent E4417A	GB41291714	March 12, 2011	One year
04	Power sensor	Agilent N8481H	MY50350004	September 25, 2011	One year
05	Signal Generator	HP 8341B	2730A00804	September 12, 2011	One year
06	Amplifier	IXA-020	0401	No Calibration Requested	
07	BTS	E5515C	MY48360988	December 2, 2011	One year
08	E-field Probe	EX3DV4	3816	October 3, 2011	One year
09	DAE	DAE4	871	November 22, 2011	One year
10	Validation Kit 835MHz	D835V2	4d020	August 26, 2011	One year
11	Validation Kit 1900MHz	D1900V2	5d060	August 31, 2011	One year
12	Validation Kit 2450MHz	D2450V2	786	August 29, 2011	One year
13	Temperature Probe	JM222	AA1009129	March 16, 2011	One year
14	Hygrothermograph	HTC-1	TASH121602	June 21, 2011	One year

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

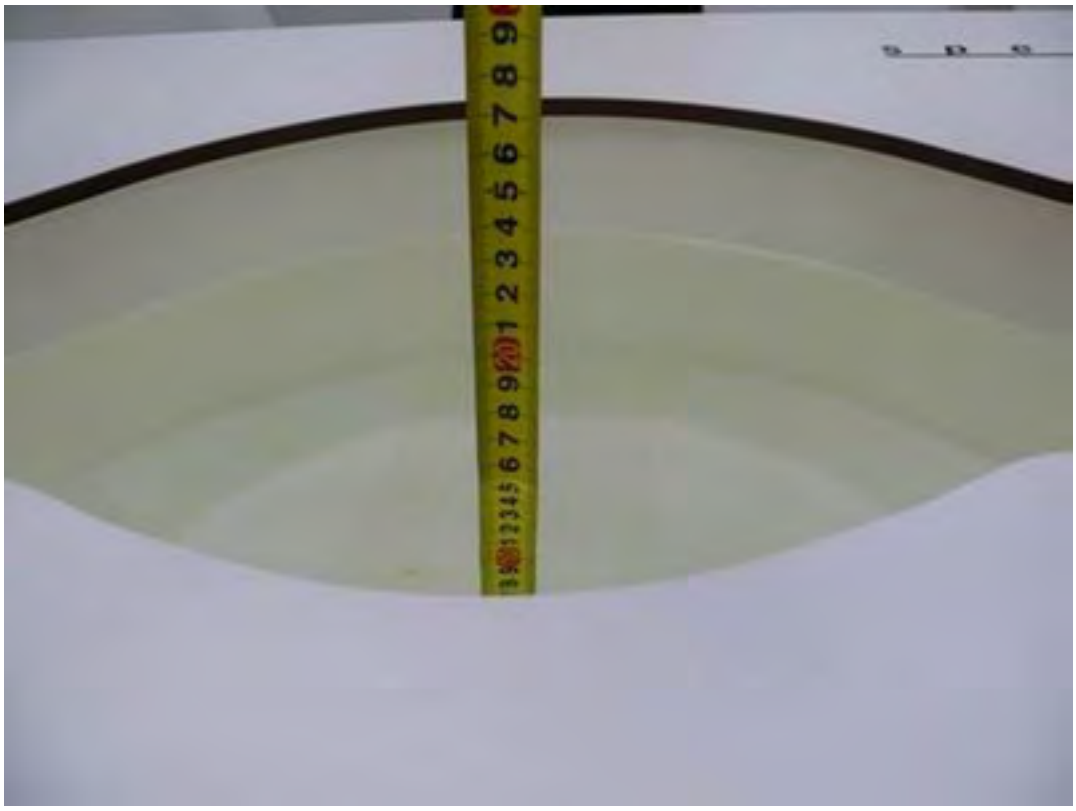
ANNEX A: Test Layout

Picture 1: Specific Absorption Rate Test Layout

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

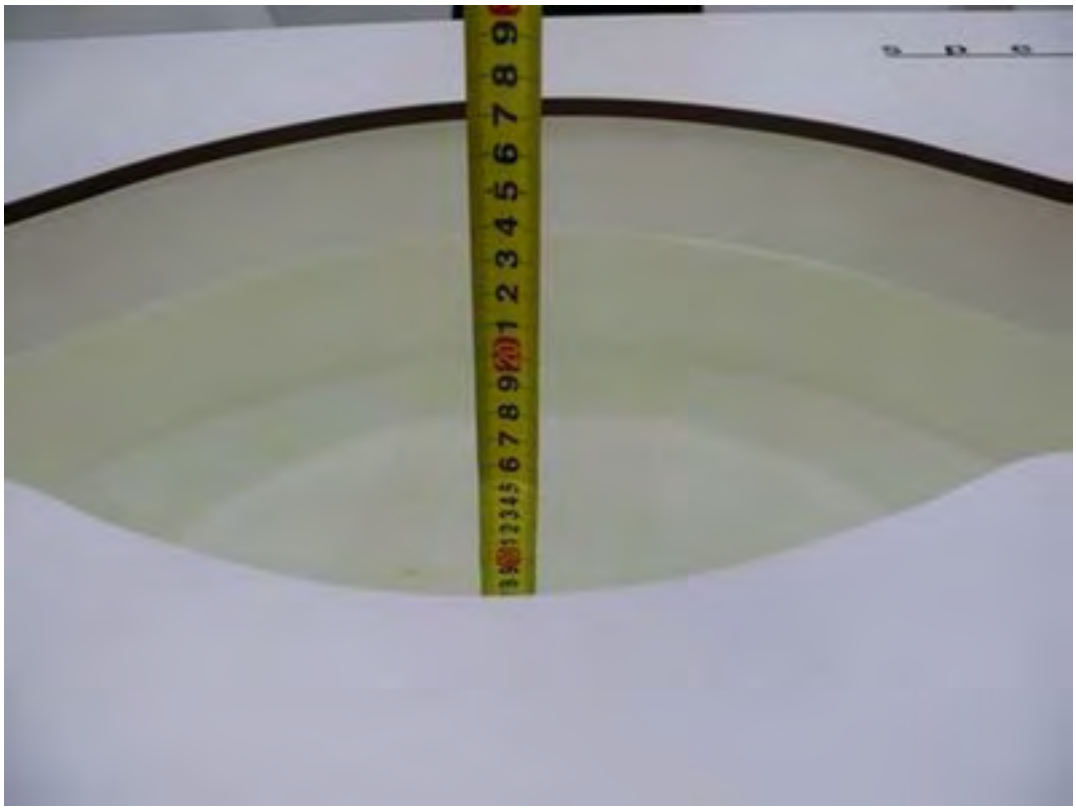


Picture 3: Liquid depth in the head Phantom (835MHz, 15.3cm depth)



Picture 4: Liquid depth in the flat Phantom (1900 MHz**,** 15.2cm depth)

Picture 5: liquid depth in the head Phantom (1900 MHz, 15.3cm depth)



Picture 6: Liquid depth in the flat Phantom (2450 MHz, 15.3cm depth)

Picture 7: 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: 1/11/2012 10:30:13 AM

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

Medium parameters used: f = 835 MHz; σ = 0.895 mho/m; ε_r = 42.65; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.7℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(9.22, 9.22, 9.22) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

Phantom: SAM1; Type: SAM; Serial: TP-1524

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

d=15mm, Pin=250mW/Area Scan (101x121x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.56 mW/g

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

Reference Value = 51.1 V/m; Power Drift = -0.037 dB

Peak SAR (extrapolated) = 3.54 W/kg

SAR(1 g) = 2.40 mW/g; SAR(10 g) = 1.58 mW/g

Maximum value of SAR (measured) = 2.63 mW/g

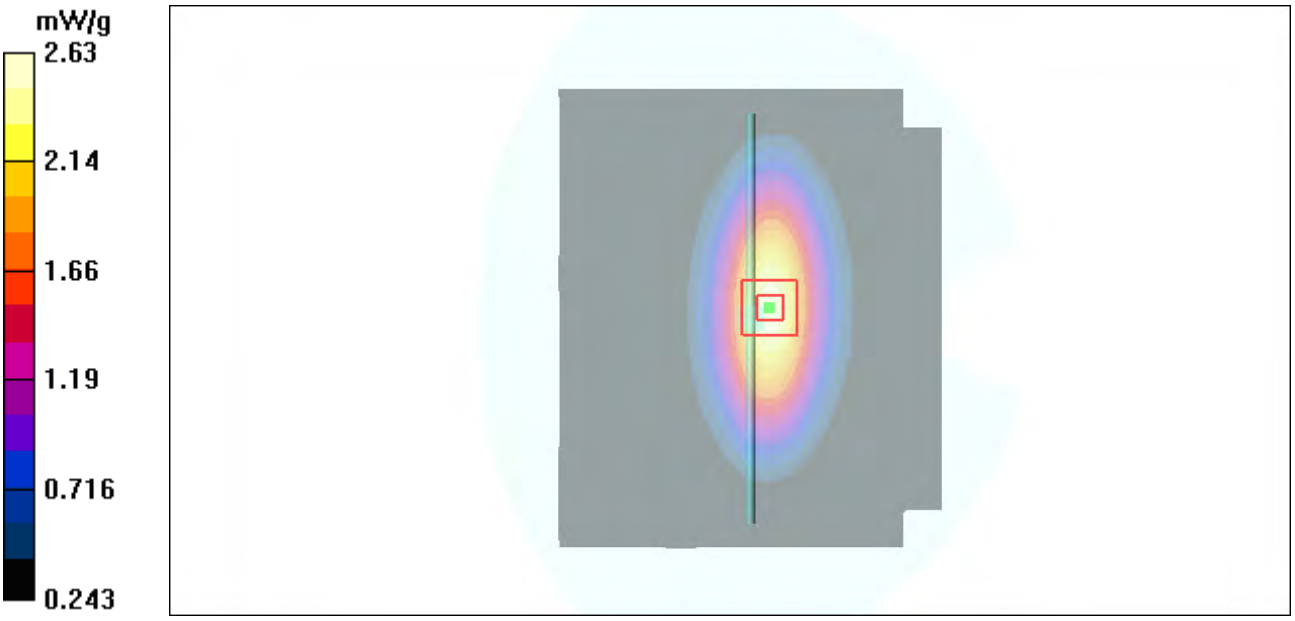


Figure 7 System Performance Check 835MHz 250mW

System Performance Check at 835 MHz Body TSL

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

Date/Time: 1/10/2012 8:10:20 AM

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

Medium parameters used: f = 835 MHz; σ = 0.974 mho/m; ε_r = 54.28; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.7℃

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(9.38, 9.38, 9.38) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

Phantom: SAM1; Type: SAM; Serial: TP-1524

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

d=15mm, Pin=250mW/Area Scan (61x121x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.72 mW/g

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

Reference Value = 50.9 V/m; Power Drift = 0.023 dB

Peak SAR (extrapolated) = 3.63 W/kg

SAR(1 g) = 2.54 mW/g; SAR(10 g) = 1.64 mW/g

Maximum value of SAR (measured) = 2.72 mW/g

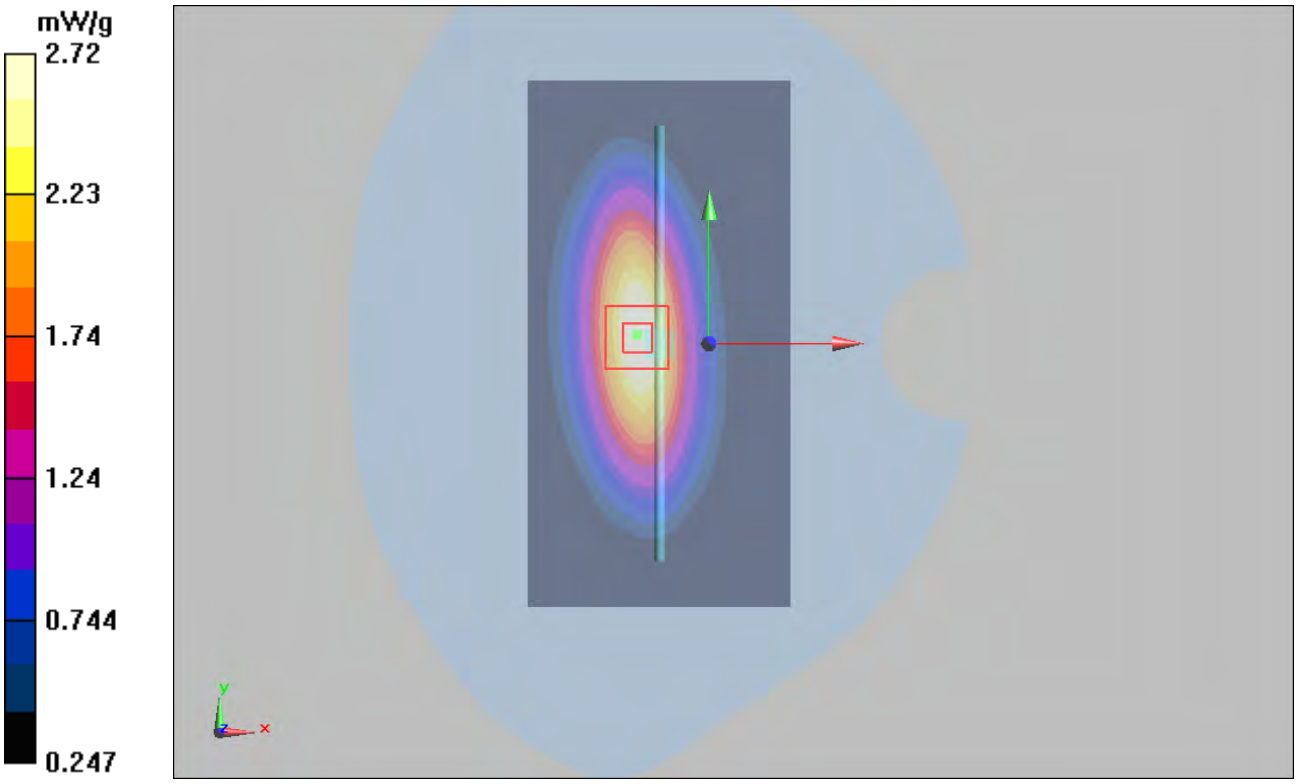


Figure 8 System Performance Check 835MHz 250mW

System Performance Check at 1900 MHz Head TSL

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

Date/Time: 1/9/2012 8:40:34 AM

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

Medium parameters used: f = 1900 MHz; σ = 1.40 mho/m; ε_r = 40.44; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.8℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.90, 7.90, 7.90) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 12.7 mW/g

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

Reference Value = 81.0 V/m; Power Drift = -0.068 dB

Peak SAR (extrapolated) = 18.9 W/kg

SAR(1 g) = 10.33 mW/g; SAR(10 g) = 5.30 mW/g

Maximum value of SAR (measured) = 11.53 mW/g

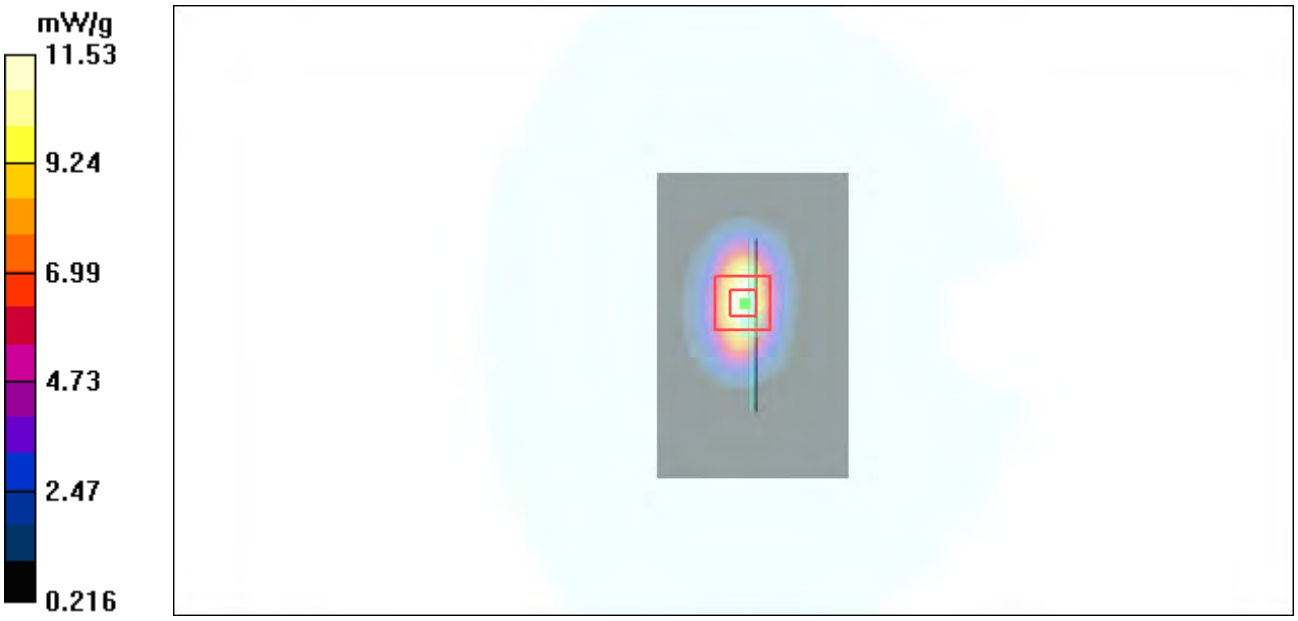


Figure 9 System Performance Check 1900MHz 250mW

System Performance Check at 1900 MHz Body TSL

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

Date/Time: 1/10/2012 6:43:19 AM

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

Medium parameters used: f = 1900 MHz; σ = 1.48 mho/m; ε_r = 53.02; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.8℃

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.51, 7.51, 7.51) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 11.9 mW/g

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

Reference Value = 80.8 V/m; Power Drift = -0.063 dB

Peak SAR (extrapolated) = 17.6 W/kg

SAR(1 g) = 10.20 mW/g; SAR(10 g) = 5.36 mW/g

Maximum value of SAR (measured) = 11.05 mW/g

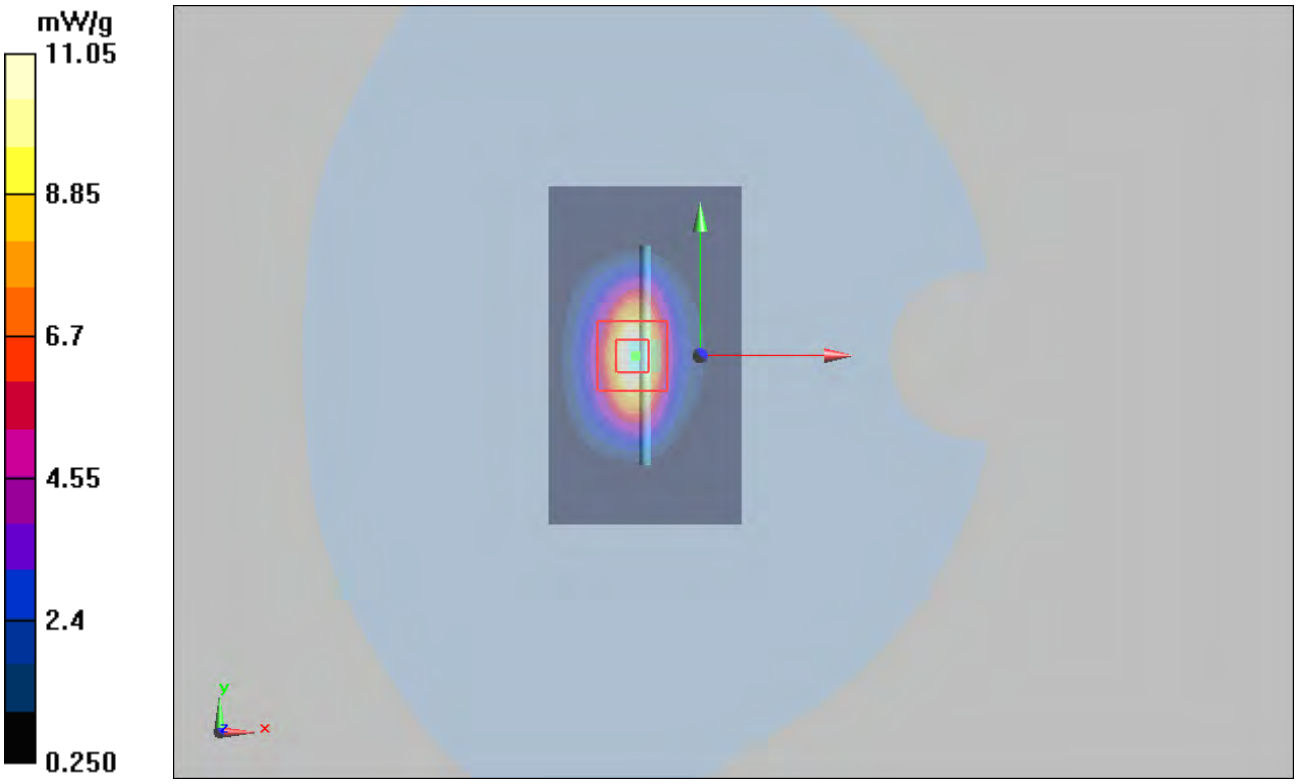


Figure 10 System Performance Check 1900MHz 250mW

System Performance Check at 2450 MHz Head TSL

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

Date/Time: 1/16/2012 8:04:36 AM

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

Medium parameters used: f = 2450 MHz; σ = 1.81 mho/m; ε_r = 39.27; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.8℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.17, 7.17, 7.17) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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 (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 21.4 mW/g

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

Reference Value = 67.0 V/m; Power Drift = 0.010 dB

Peak SAR (extrapolated) = 28.0 W/kg

SAR(1 g) = 14.06 mW/g; SAR(10 g) = 6.52 mW/g

Maximum value of SAR (measured) = 15.68 mW/g

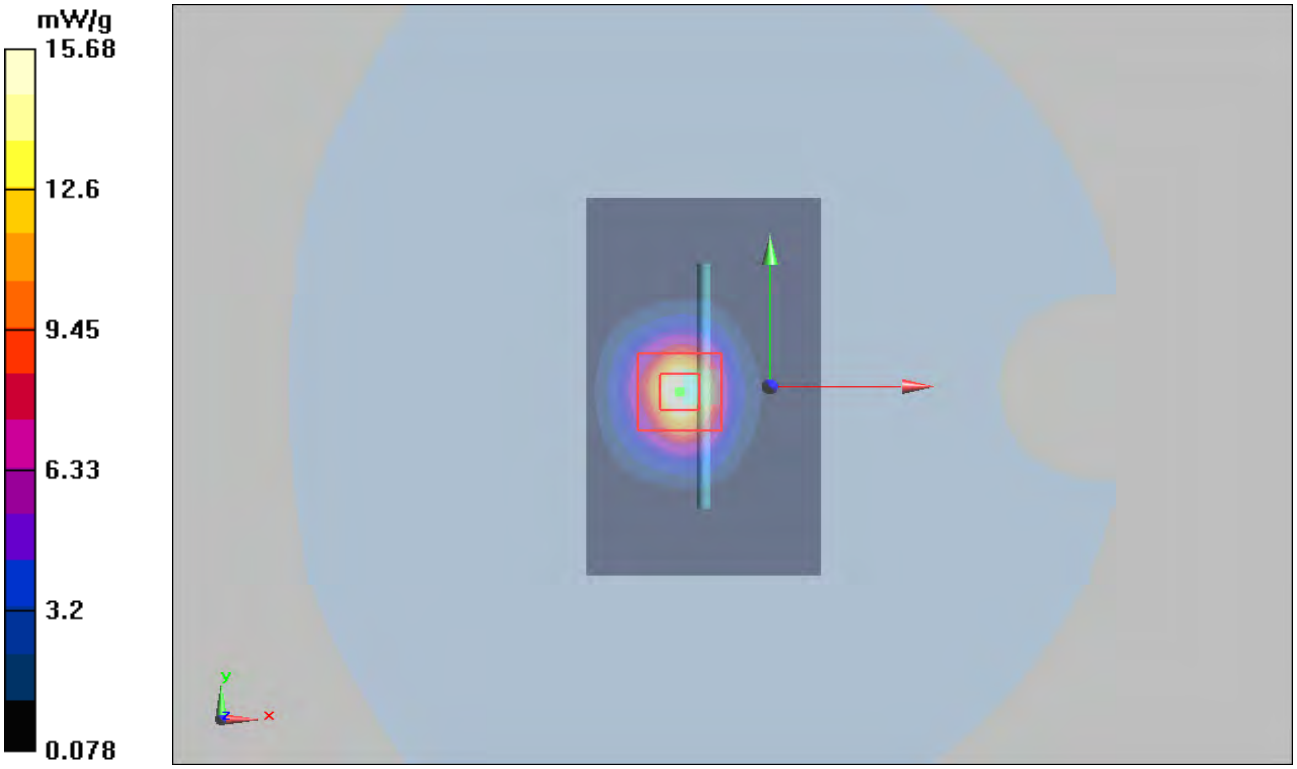


Figure 11 System Performance Check 2450MHz 250mW

System Performance Check at 2450 MHz Body TSL

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

Date/Time: 1/16/2012 1:15:36 PM

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

Medium parameters used: f = 2450 MHz; σ = 1.96 mho/m; ε_r = 51.97; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.9℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.19, 7.19, 7.19) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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 (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 21.5 mW/g

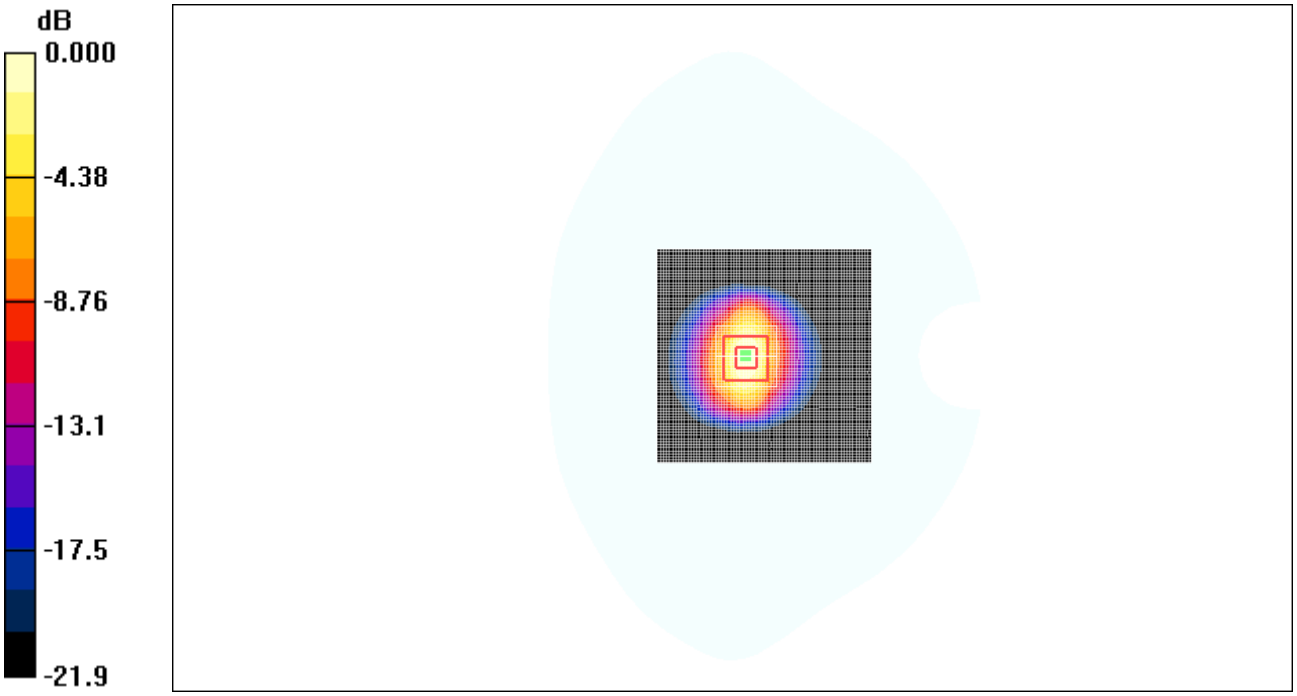
d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 71.0 V/m; Power Drift = 0.011 dB

Peak SAR (extrapolated) = 28.2 W/kg

SAR(1 g) = 14.01 mW/g; SAR(10 g) = 6.48 mW/g

Maximum value of SAR (measured) = 19.82 mW/g



0 dB = 19.82mW/g

Figure 12 System Performance Check 2450MHz 250mW

ANNEX C: Graph Results

GSM 850 Left Cheek Middle (SN: WLCB9166I3600877)

Date/Time: 1/11/2012 12:29:50 PM
Communication System: GSM; Frequency: 836.6 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 837 MHz; σ = 0.897 mho/m; ε_r = 42.6; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Probe: EX3DV4 - SN3816; ConvF(9.22, 9.22, 9.22) Calibrated: 10/3/2011;
Electronics: DAE4 Sn871; Calibrated: 11/22/2011
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) = 0.100 mW/g

Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.84 V/m; Power Drift = -0.093 dB
Peak SAR (extrapolated) = 0.120 W/kg
SAR(1 g) = 0.097 mW/g; SAR(10 g) = 0.073 mW/g
Maximum value of SAR (measured) = 0.102 mW/g

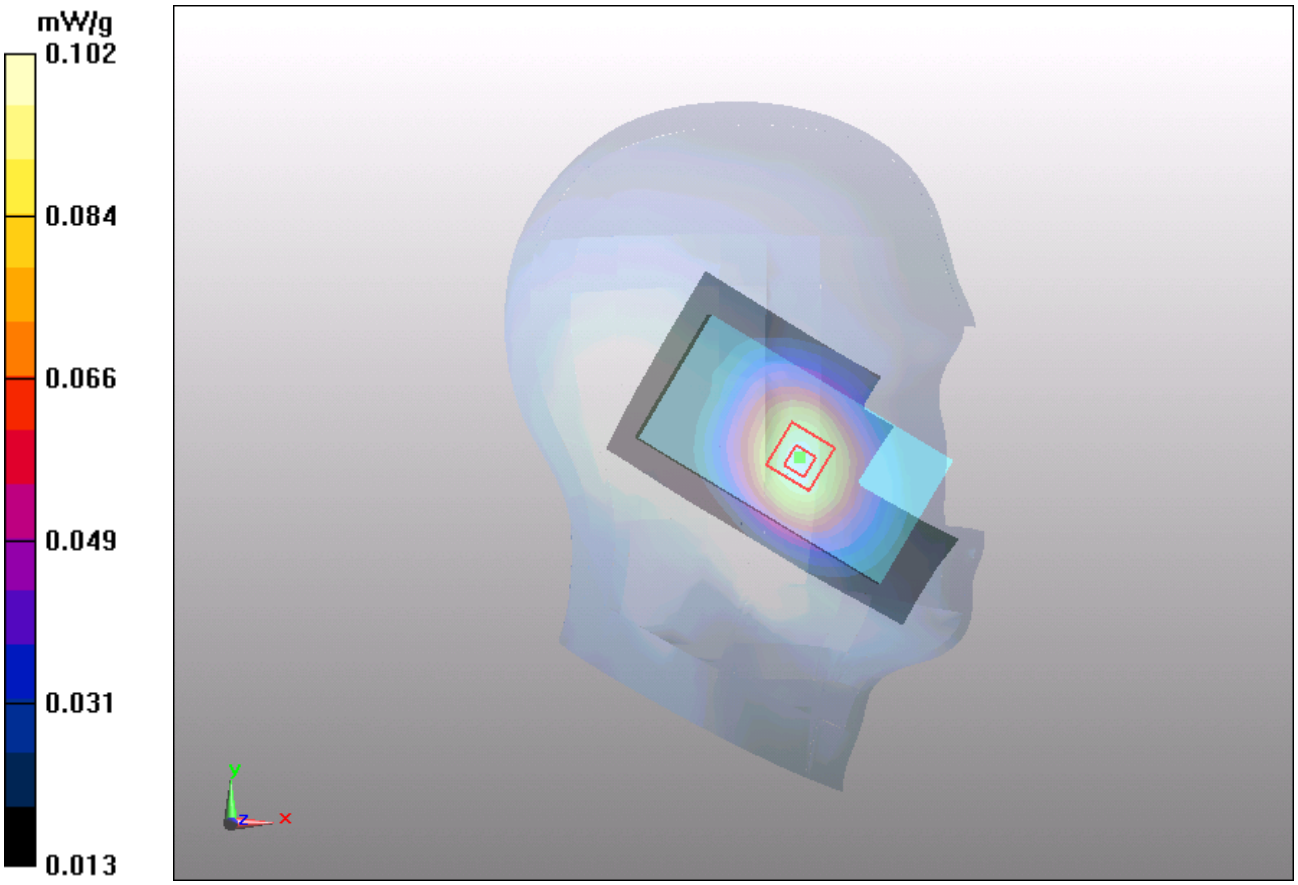


Figure 13 Left Hand Touch Cheek GSM 850 Channel 190

GSM 850 Left Tilt Middle (SN: WLCB9166I3600877)

Date/Time: 1/11/2012 6:50:36 PM

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

Medium parameters used: f = 837 MHz; σ = 0.897 mho/m; ε_r = 42.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Left Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(9.22, 9.22, 9.22) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.079 mW/g

Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.2 V/m; Power Drift = -0.066 dB

Peak SAR (extrapolated) = 0.100 W/kg

SAR(1 g) = 0.077 mW/g; SAR(10 g) = 0.057 mW/g

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

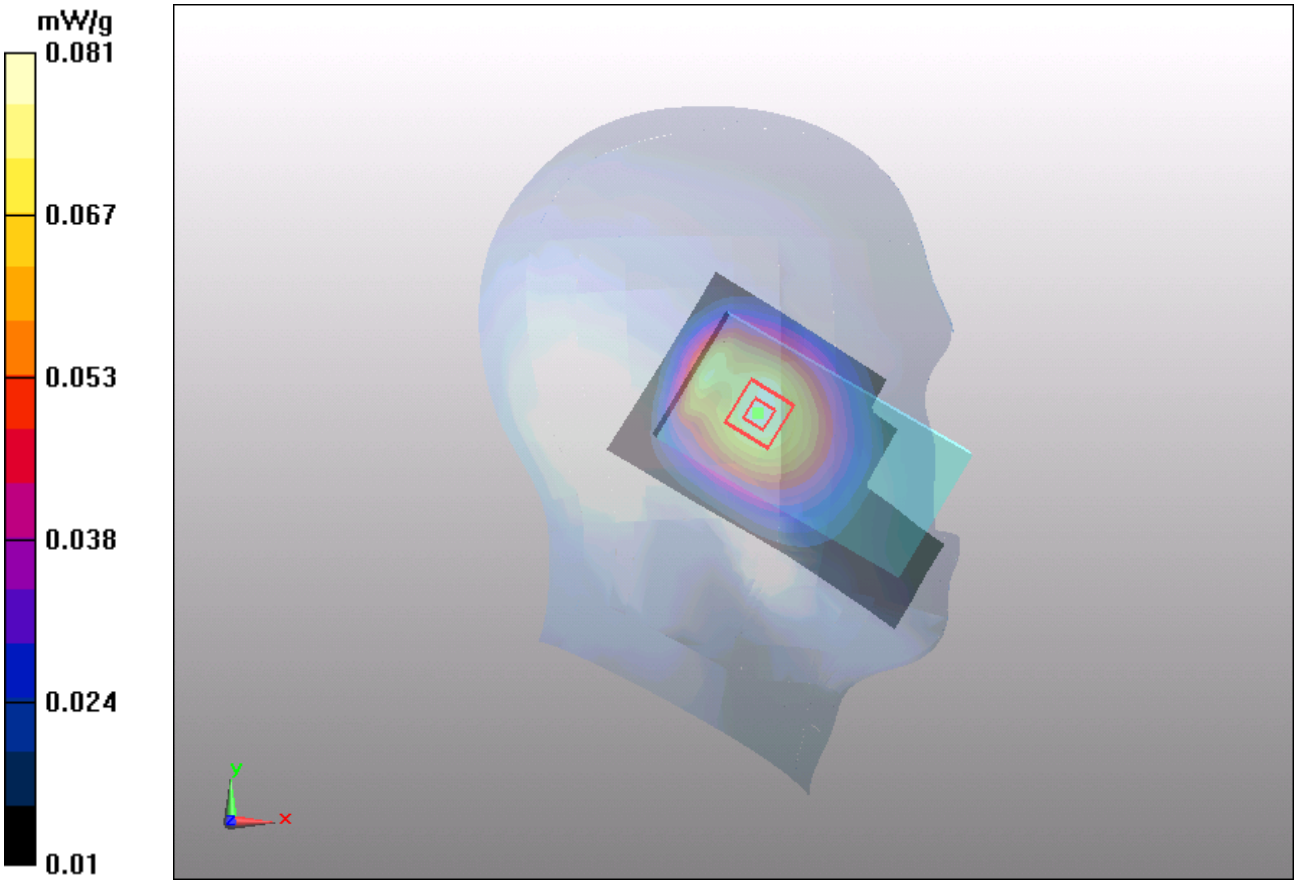


Figure 14 Left Hand Tilt 15° GSM 850 Channel 190

GSM 850 Right Cheek Middle (SN: WLCB9166I3600877)

Date/Time: 1/11/2012 6:08:38 PM

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

Medium parameters used: f = 837 MHz; σ = 0.897 mho/m; ε_r = 42.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Right Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(9.22, 9.22, 9.22) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.113 mW/g

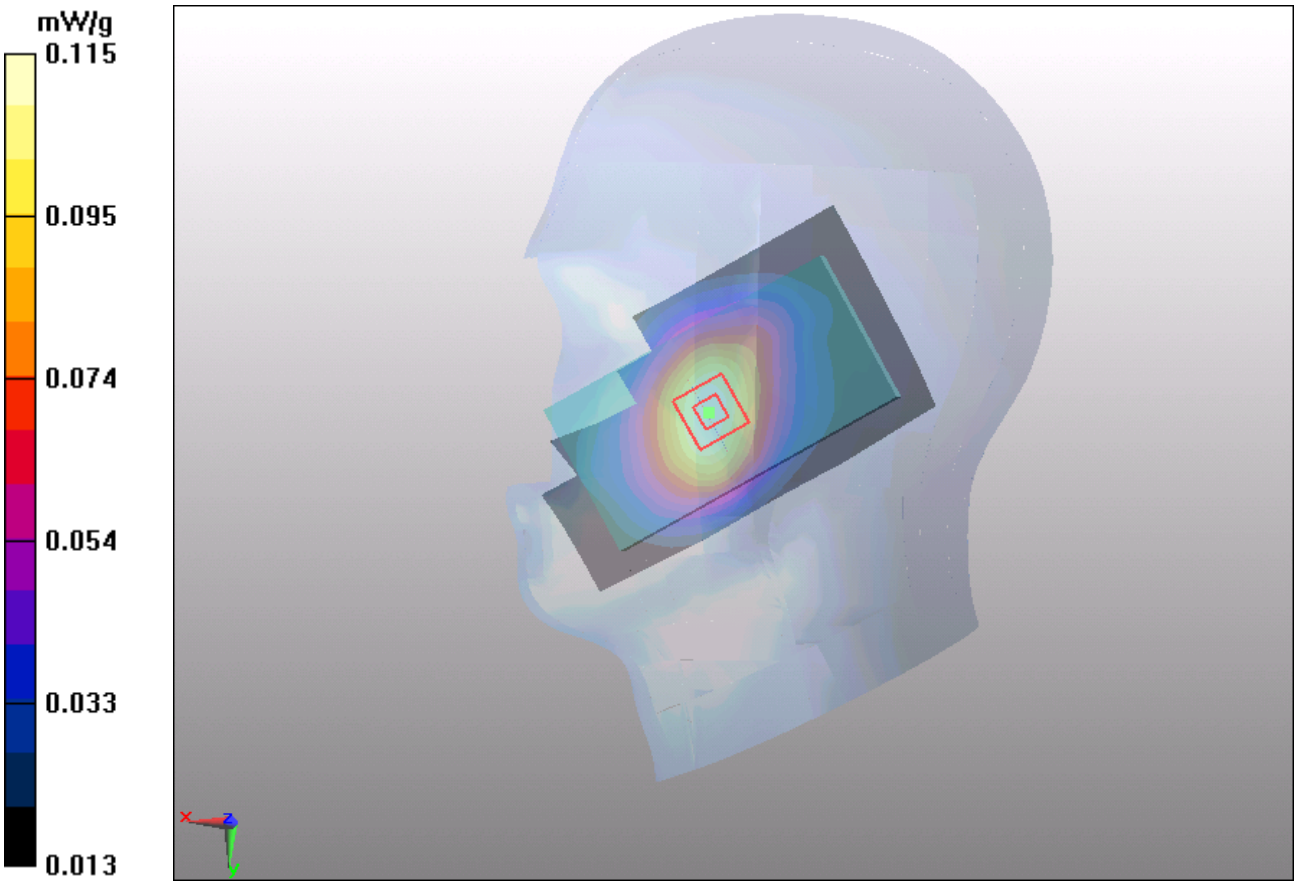
Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.7 V/m; Power Drift = -0.020 dB

Peak SAR (extrapolated) = 0.135 W/kg

SAR(1 g) = 0.108 mW/g; SAR(10 g) = 0.081 mW/g

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



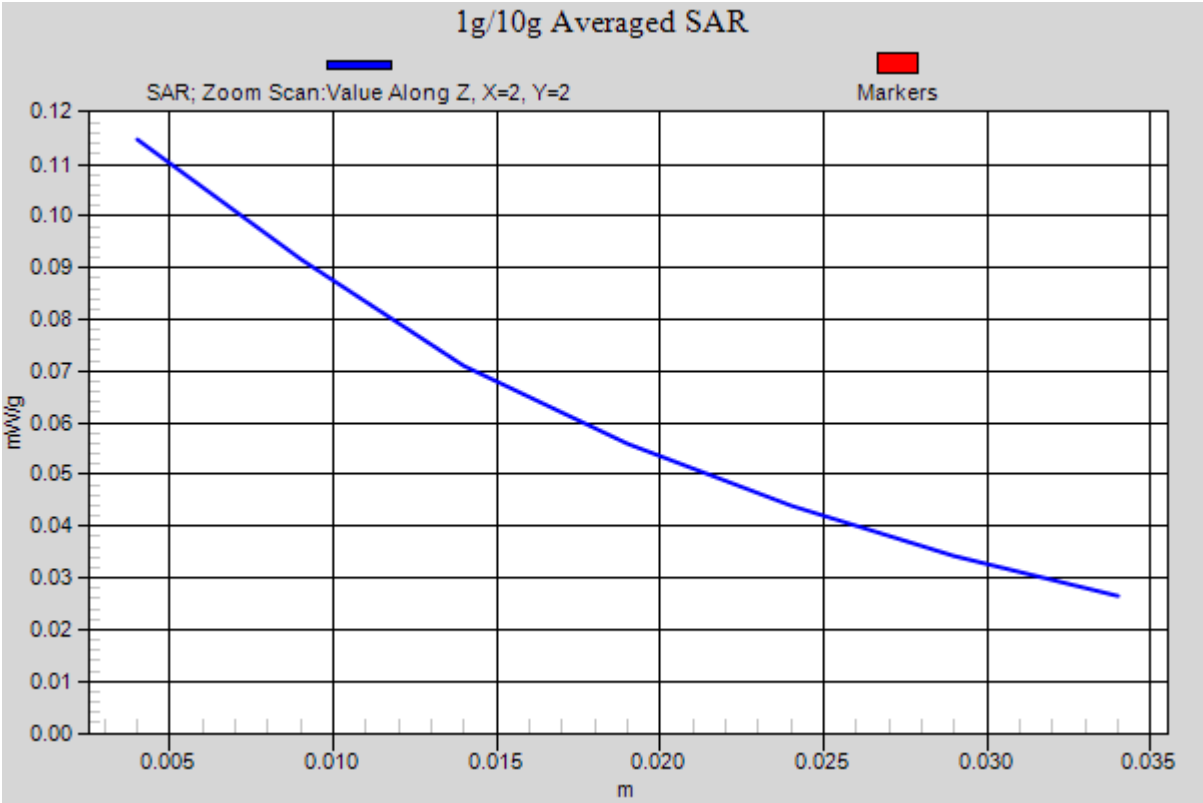


Figure 15 Right Hand Touch Cheek GSM 850 Channel 190

GSM 850 Right Tilt Middle (SN: WLCB9166I3600877)

Date/Time: 1/11/2012 6:27:16 PM

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

Medium parameters used: f = 837 MHz; σ = 0.897 mho/m; ε_r = 42.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Right Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(9.22, 9.22, 9.22) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.080 mW/g

Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.62 V/m; Power Drift = -0.131 dB

Peak SAR (extrapolated) = 0.095 W/kg

SAR(1 g) = 0.075 mW/g; SAR(10 g) = 0.058 mW/g

Maximum value of SAR (measured) = 0.080 mW/g

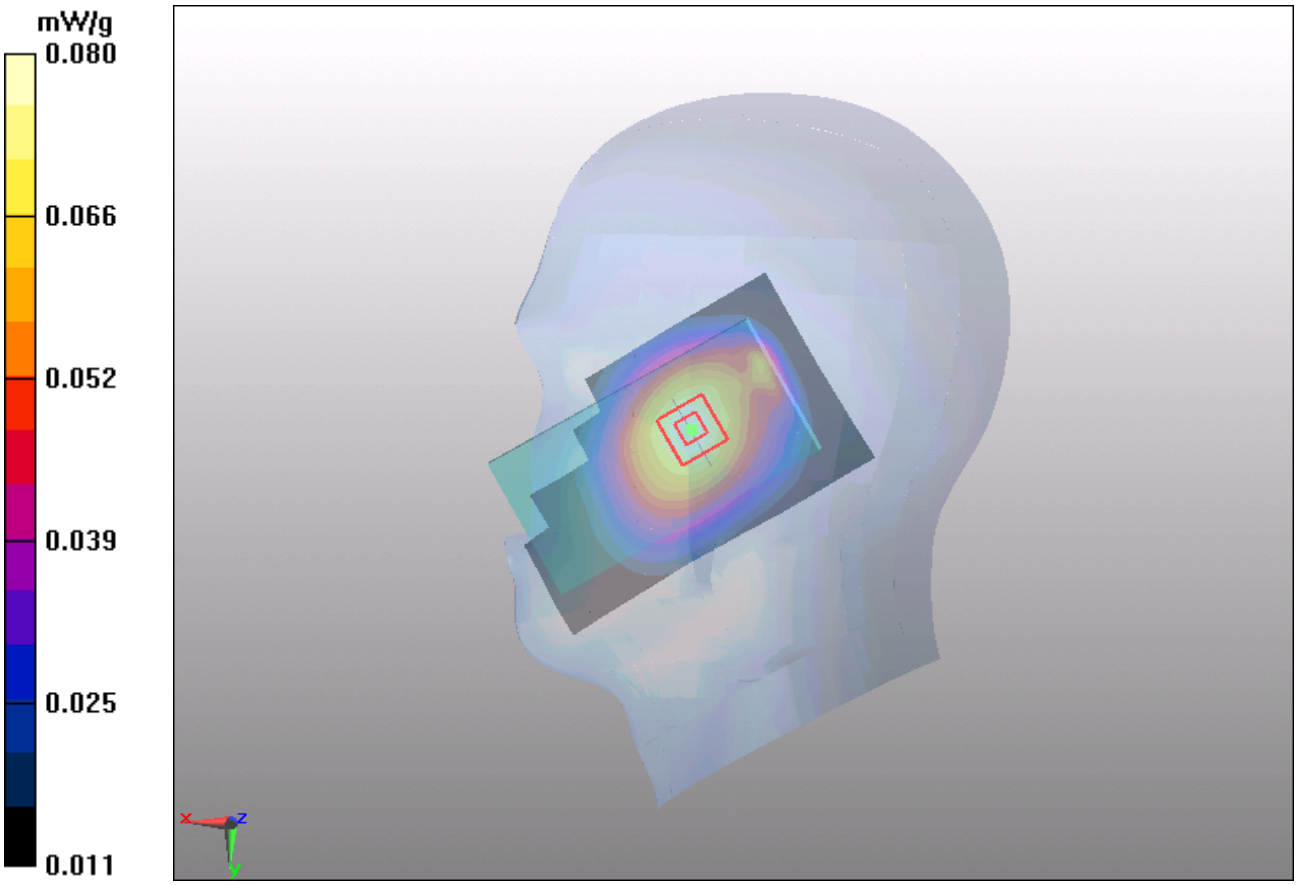


Figure 16 Right Hand Tilt 15° GSM 850 Channel 190

GSM 850 Right Cheek Middle (SN: GAGBB07XC4567157)

Date/Time: 1/11/2012 11:48:26 AM

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

Medium parameters used: f = 837 MHz; σ = 0.897 mho/m; ε_r = 42.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Right Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(9.22, 9.22, 9.22) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.100 mW/g

Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.98 V/m; Power Drift = -0.073 dB

Peak SAR (extrapolated) = 0.119 W/kg

SAR(1 g) = 0.096 mW/g; SAR(10 g) = 0.073 mW/g

Maximum value of SAR (measured) = 0.102 mW/g

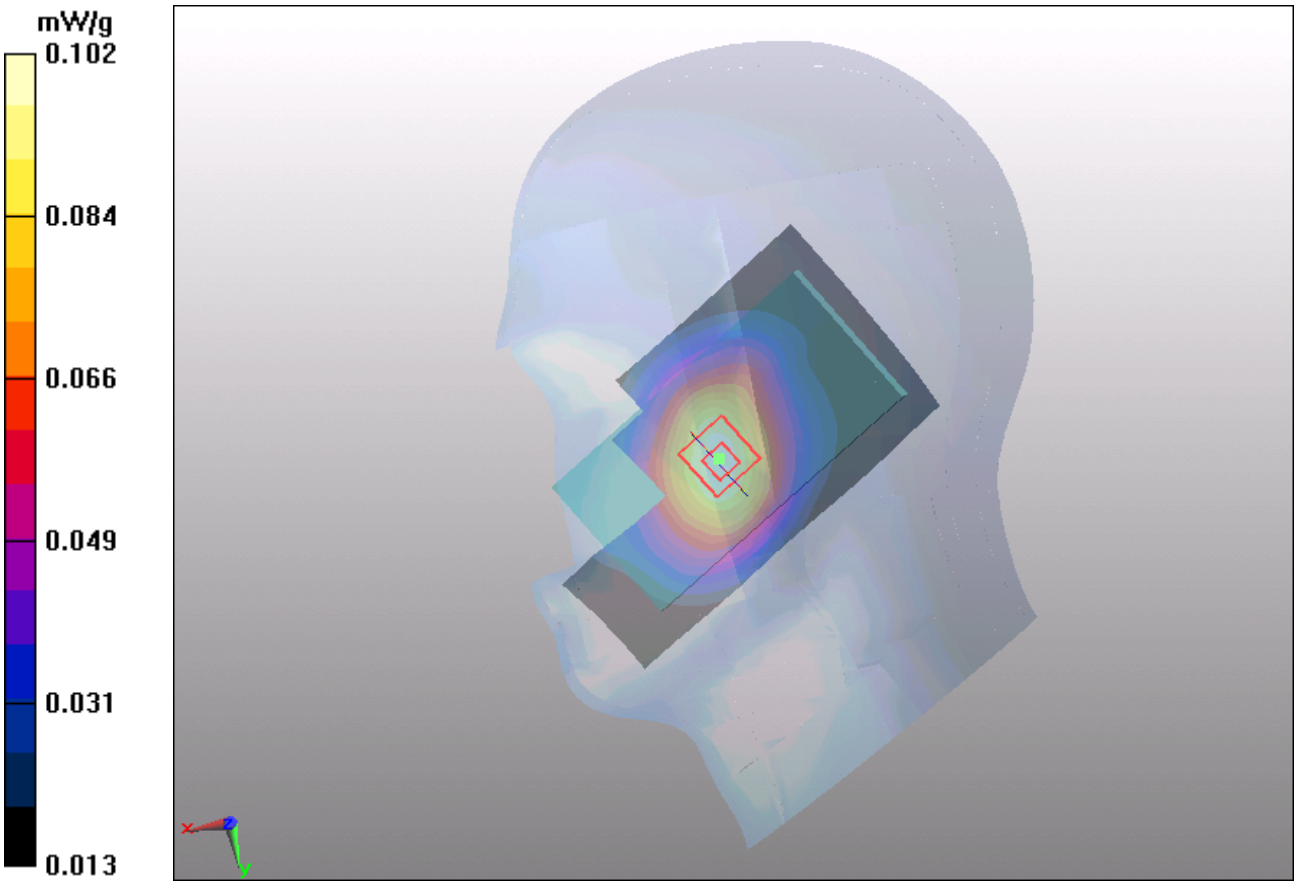


Figure 17 Right Hand Touch Cheek GSM 850 Channel 190

GSM 850 Right Cheek Middle (SN: BAABC12C98021591)

Date/Time: 1/11/2012 12:09:13 PM
Communication System: GSM; Frequency: 836.6 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 837 MHz; σ = 0.897 mho/m; ε_r = 42.6; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Probe: EX3DV4 - SN3816; ConvF(9.22, 9.22, 9.22) Calibrated: 10/3/2011;
Electronics: DAE4 Sn871; Calibrated: 11/22/2011
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) = 0.100 mW/g

Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.83 V/m; Power Drift = 0.026 dB
Peak SAR (extrapolated) = 0.119 W/kg
SAR(1 g) = 0.096 mW/g; SAR(10 g) = 0.072 mW/g
Maximum value of SAR (measured) = 0.101 mW/g

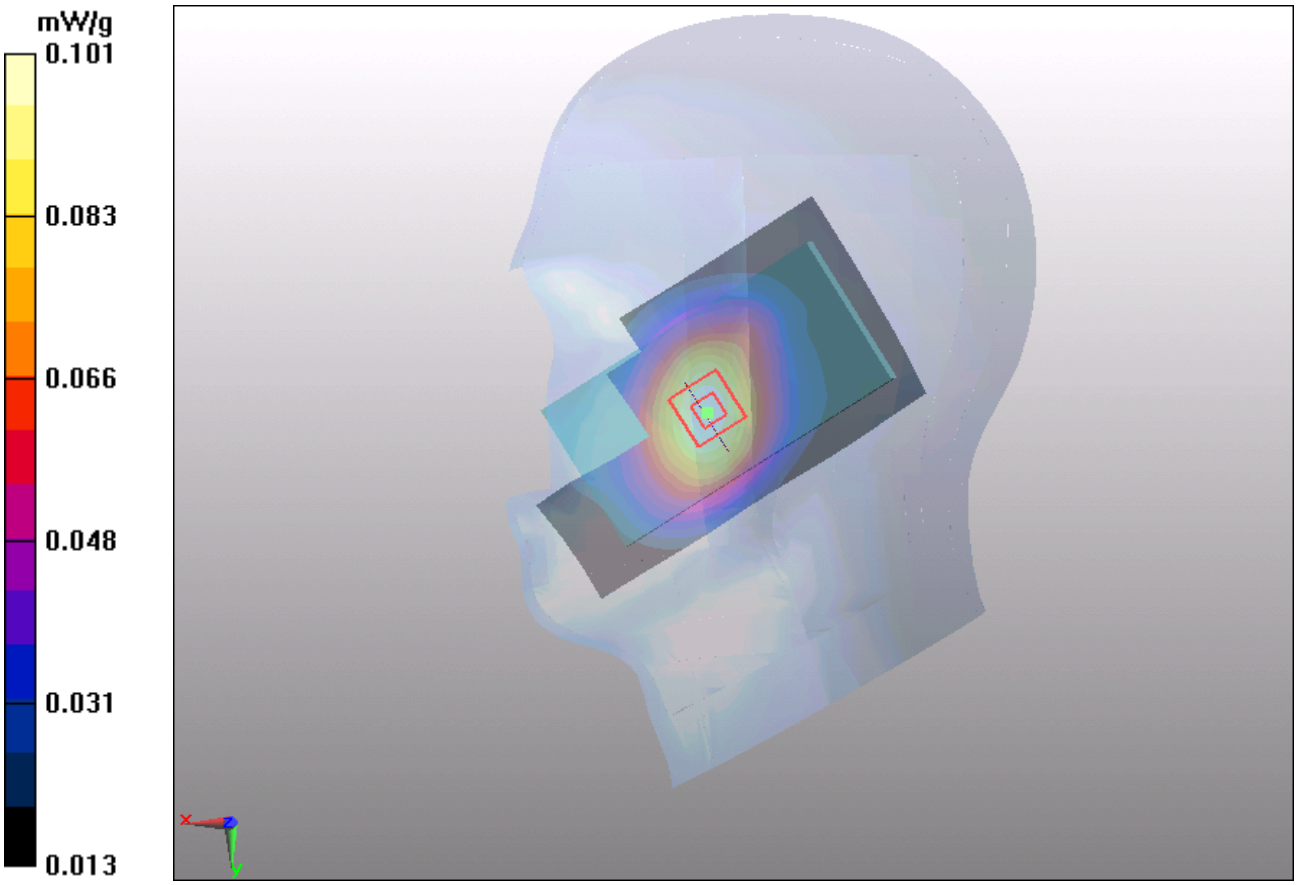


Figure 18 Right Hand Touch Cheek GSM 850 Channel 190

GSM 850 Right Cheek Middle (SN: UPDBC14X97502626)

Date/Time: 1/11/2012 12:54:39 PM

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

Medium parameters used: f = 837 MHz; σ = 0.897 mho/m; ε_r = 42.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Right Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(9.22, 9.22, 9.22) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.108 mW/g

Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.2 V/m; Power Drift = 0.076 dB

Peak SAR (extrapolated) = 0.126 W/kg

SAR(1 g) = 0.104 mW/g; SAR(10 g) = 0.078 mW/g

Maximum value of SAR (measured) = 0.109 mW/g

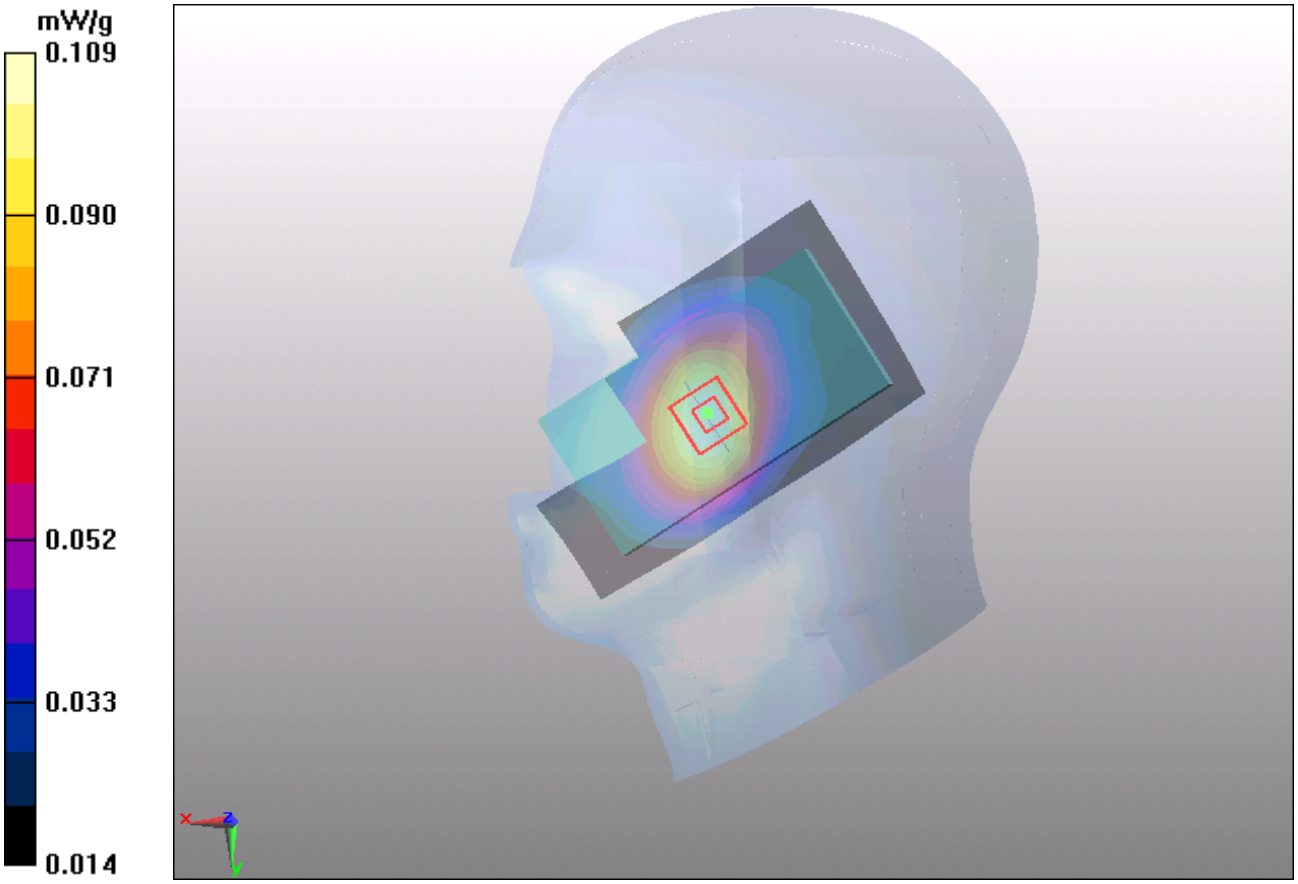


Figure 19 Right Hand Touch Cheek GSM 850 Channel 190

GSM 850 GPRS (1Txslot) Back Side Middle (SN: WLCB9166I3600877)

Date/Time: 1/10/2012 9:27:50 PM

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

Medium parameters used: f = 837 MHz; σ = 0.977 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(9.38, 9.38, 9.38) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.387 mW/g

Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 19.7 V/m; Power Drift = 0.030 dB

Peak SAR (extrapolated) = 0.470 W/kg

SAR(1 g) = 0.371 mW/g; SAR(10 g) = 0.278 mW/g

Maximum value of SAR (measured) = 0.390 mW/g

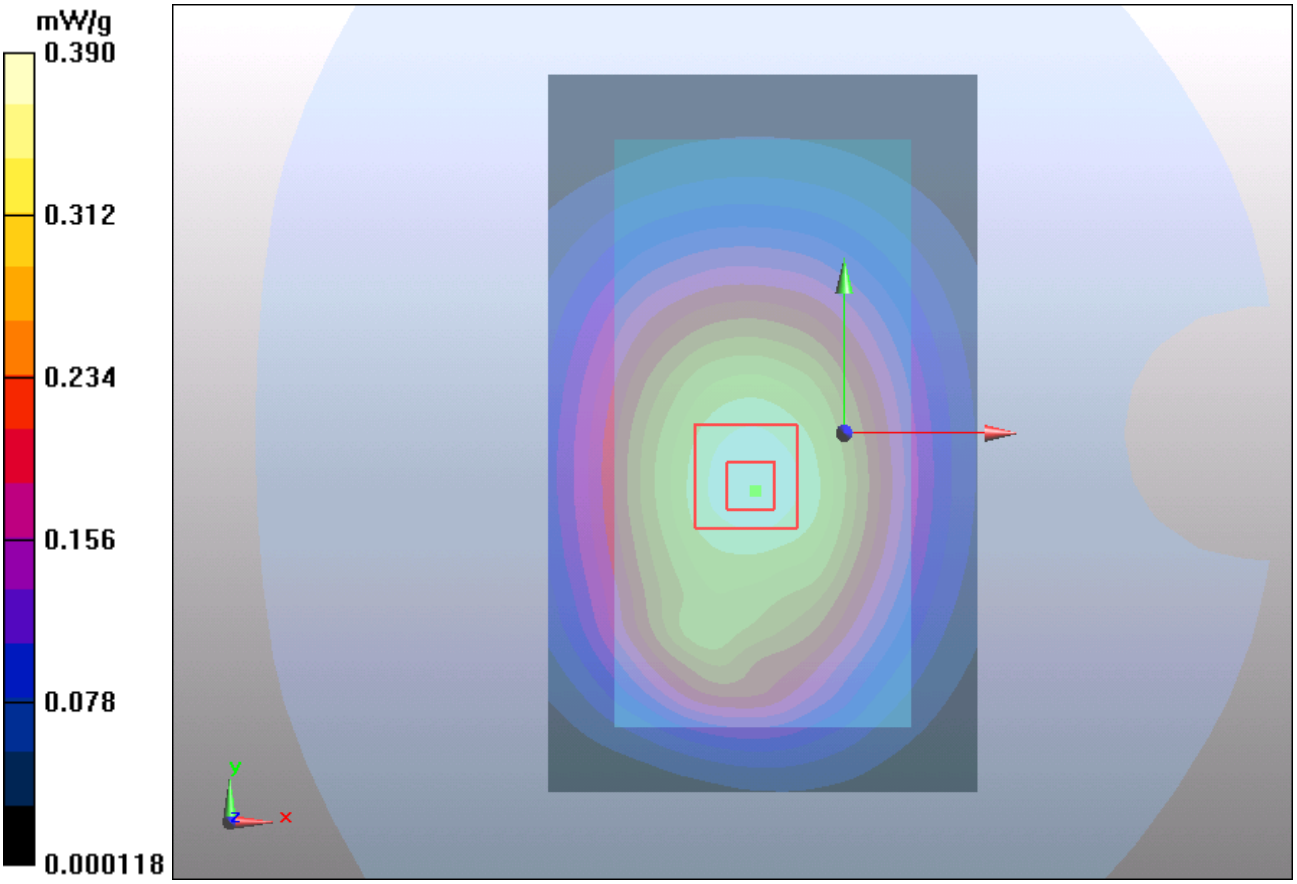


Figure 20 Body, Back Side, GSM 850 GPRS (1Txslot) Channel 190

GSM 850 GPRS (2Txslots) Back Side Middle (SN: WLCB9166I3600877)

Date/Time: 1/10/2012 9:10:06 PM

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

Medium parameters used: f = 837 MHz; σ = 0.977 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(9.38, 9.38, 9.38) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.621 mW/g

Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 25 V/m; Power Drift = -0.040 dB

Peak SAR (extrapolated) = 0.741 W/kg

SAR(1 g) = 0.589 mW/g; SAR(10 g) = 0.441 mW/g

Maximum value of SAR (measured) = 0.621 mW/g

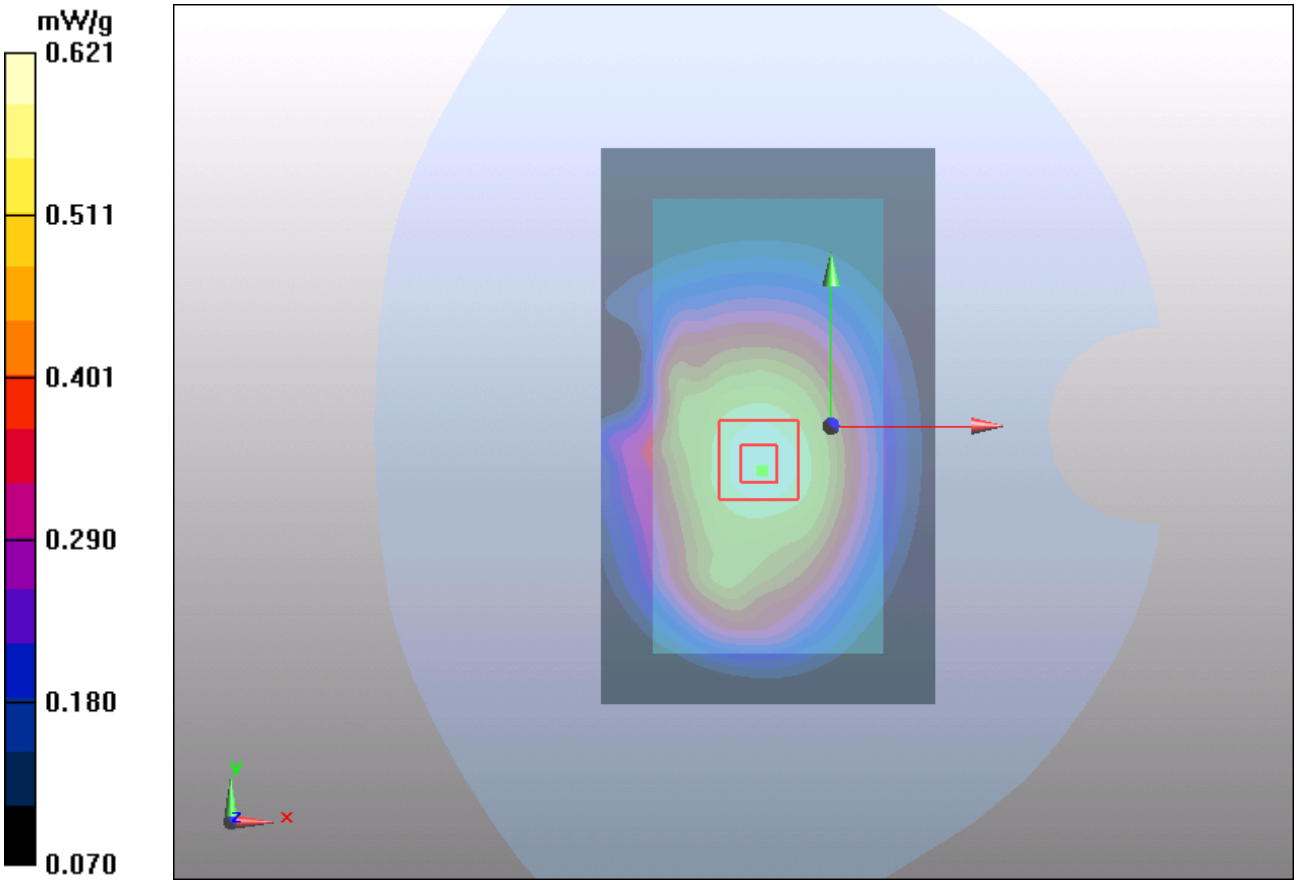


Figure 21 Body, Back Side, GSM 850 GPRS (2Txslots) Channel 190

GSM 850 GPRS (2Txslots) Front Side Middle (SN: WLCB9166I3600877)

Date/Time: 1/10/2012 11:23:40 PM

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

Medium parameters used: f = 837 MHz; σ = 0.977 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(9.38, 9.38, 9.38) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.257 mW/g

Front Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 16.4 V/m; Power Drift = -0.067 dB

Peak SAR (extrapolated) = 0.301 W/kg

SAR(1 g) = 0.244 mW/g; SAR(10 g) = 0.187 mW/g

Maximum value of SAR (measured) = 0.258 mW/g

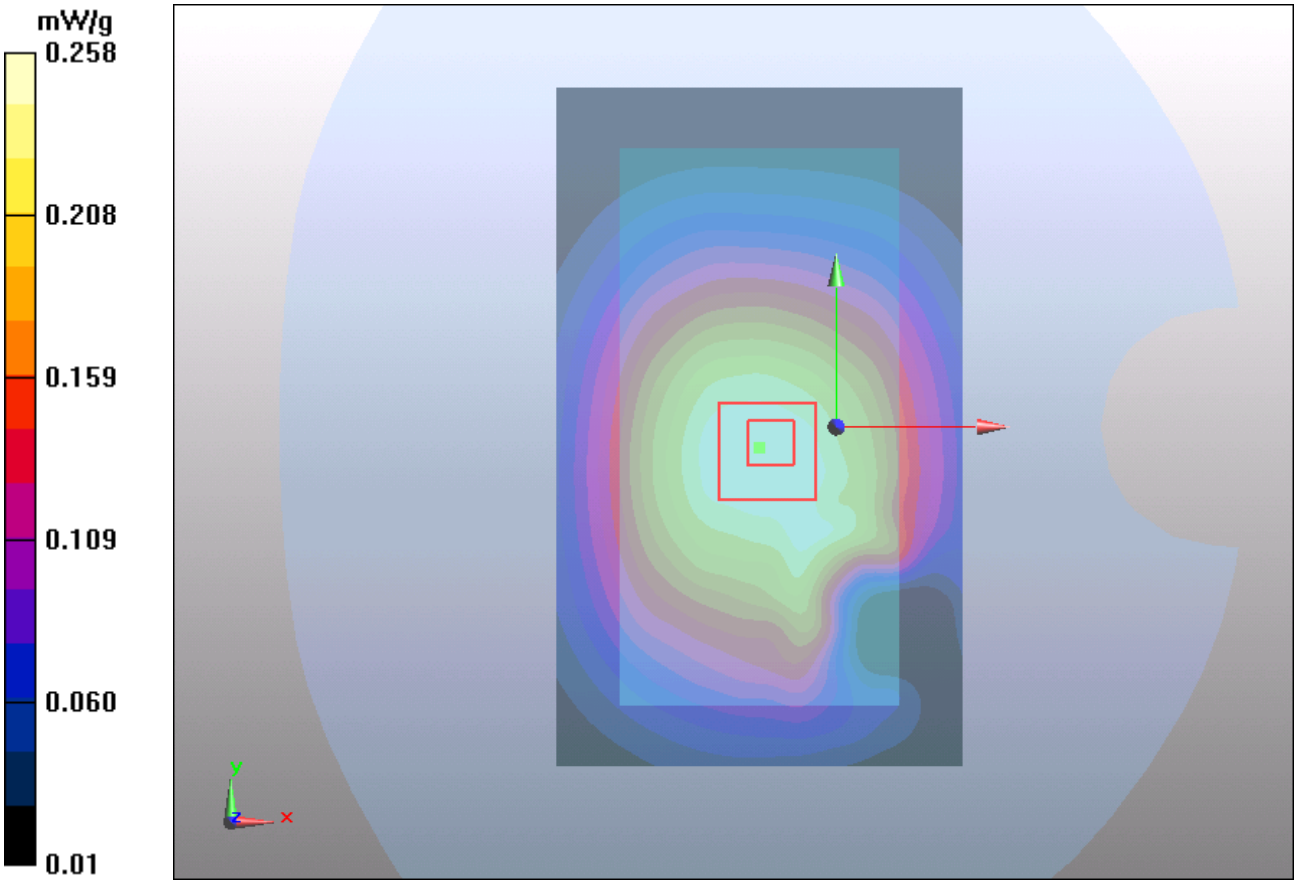


Figure 22 Body, Front Side, GSM 850 GPRS (2Txslots) Channel 190

GSM 850 GPRS (2Txslots) Left Edge Middle (SN: WLCB9166I3600877)

Date/Time: 1/10/2012 10:16:45 PM

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

Medium parameters used: f = 837 MHz; σ = 0.977 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(9.38, 9.38, 9.38) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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 (41x101x1): Measurement grid: dx=15mm, dy=15mm

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

Left Edge Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 15.9 V/m; Power Drift = -0.132 dB

Peak SAR (extrapolated) = 0.344 W/kg

SAR(1 g) = 0.220 mW/g; SAR(10 g) = 0.153 mW/g

Maximum value of SAR (measured) = 0.237 mW/g

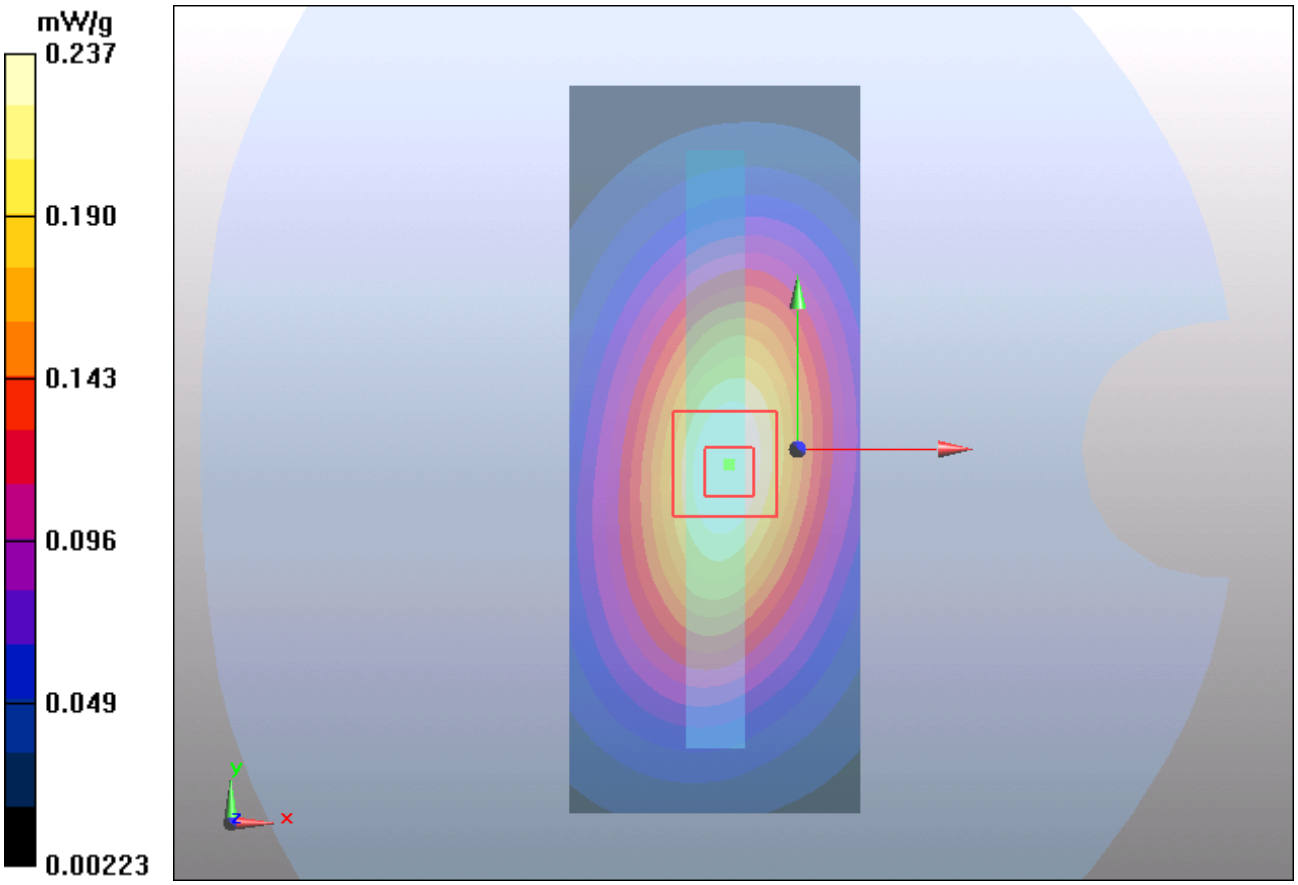


Figure 23 Body, Left Edge, GSM 850 GPRS (2Txslots) Channel 190

GSM 850 GPRS (2Txslots) Right Edge Middle (SN: WLCB9166I3600877)

Date/Time: 1/10/2012 10:34:07 PM

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

Medium parameters used: f = 837 MHz; σ = 0.977 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(9.38, 9.38, 9.38) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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 (41x101x1): Measurement grid: dx=15mm, dy=15mm

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

Right Edge Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 16.4 V/m; Power Drift = -0.057 dB

Peak SAR (extrapolated) = 0.328 W/kg

SAR(1 g) = 0.236 mW/g; SAR(10 g) = 0.163 mW/g

Maximum value of SAR (measured) = 0.252 mW/g

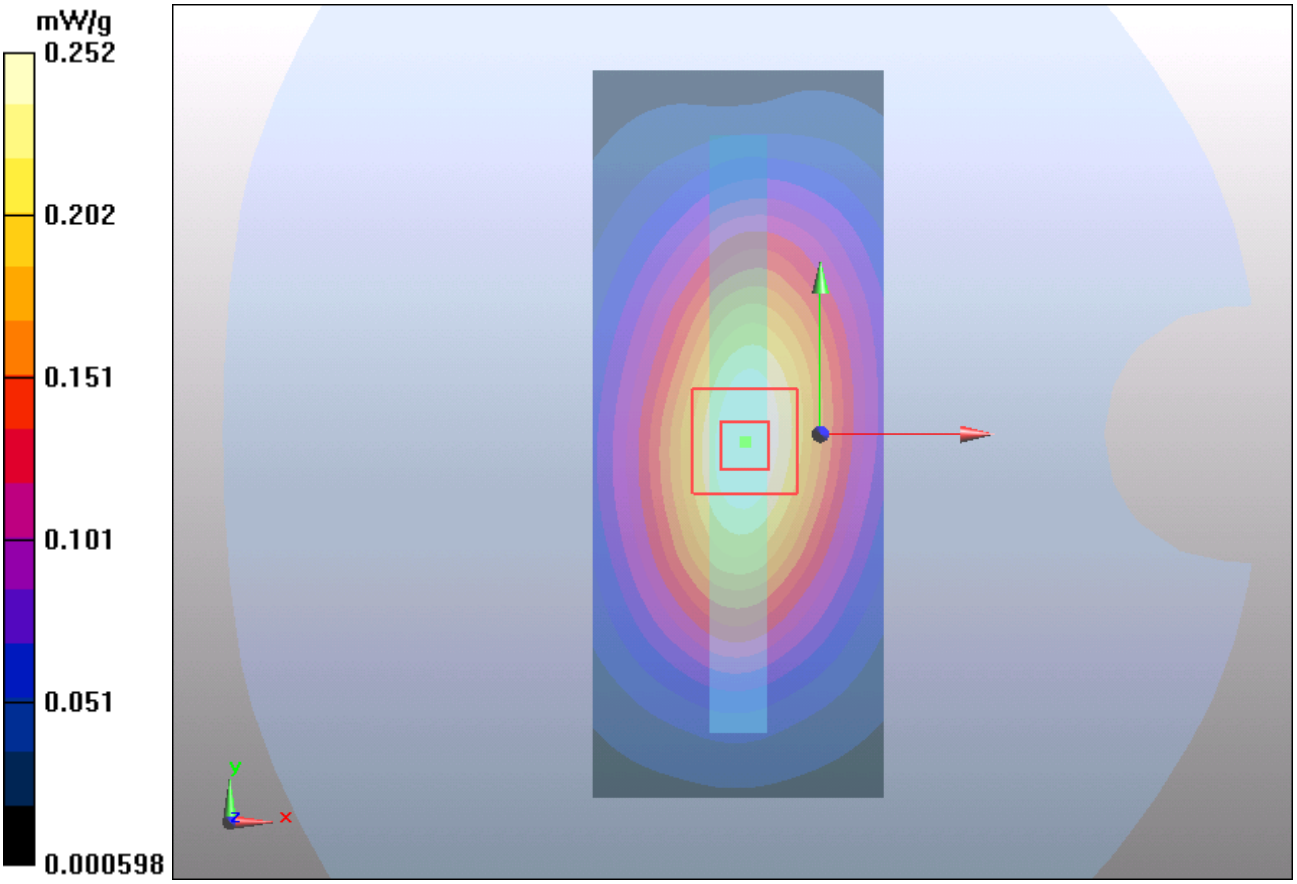


Figure 24 Body, Right Edge, GSM 850 GPRS (2Txslots) Channel 190

GSM 850 GPRS (2Txslots) Bottom Edge Middle (SN: WLCB9166I3600877)

Date/Time: 1/10/2012 11:05:16 PM

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

Medium parameters used: f = 837 MHz; σ = 0.977 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(9.38, 9.38, 9.38) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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 (41x61x1): Measurement grid: dx=15mm, dy=15mm

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

Bottom Edge Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.62 V/m; Power Drift = 0.057 dB

Peak SAR (extrapolated) = 0.046 W/kg

SAR(1 g) = 0.029 mW/g; SAR(10 g) = 0.018 mW/g

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

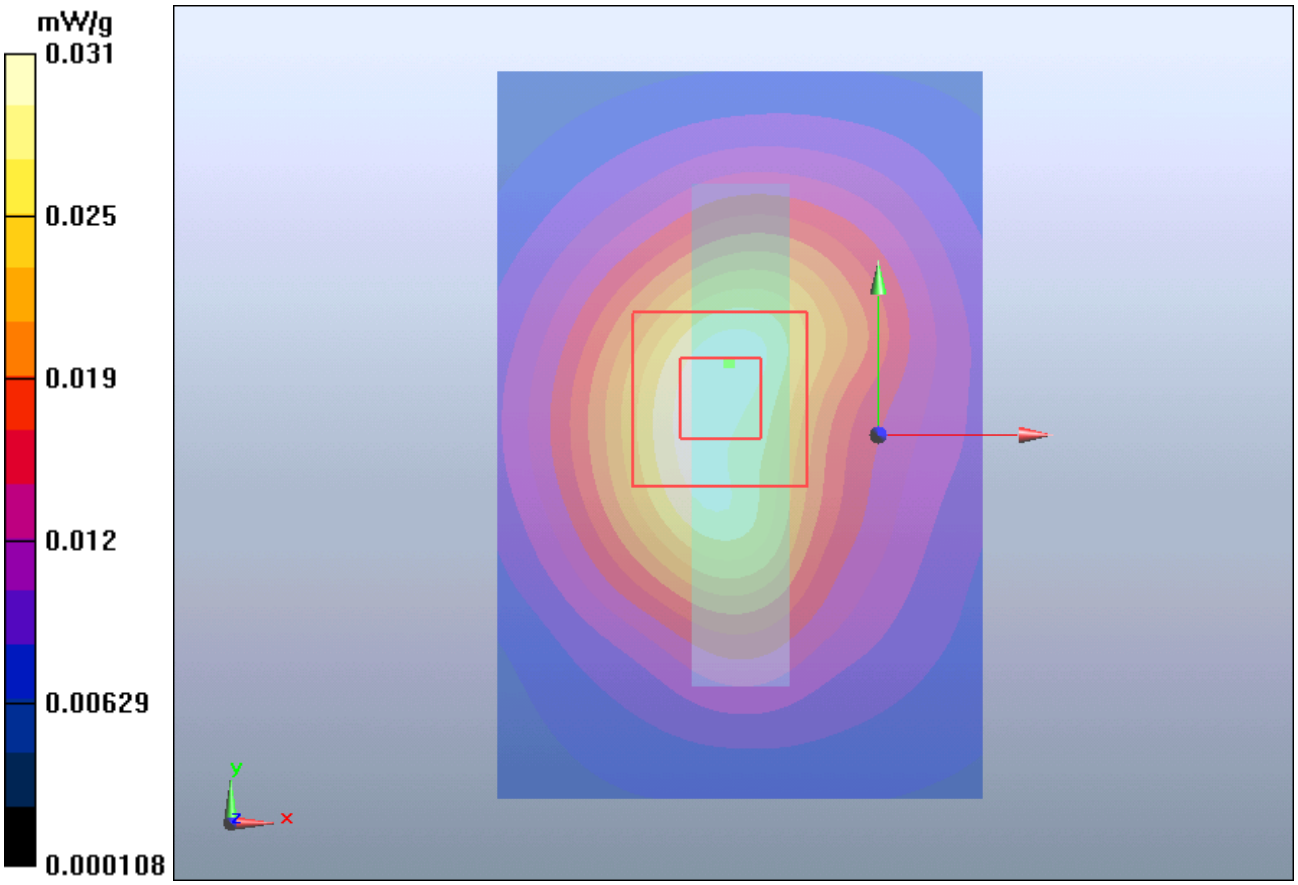


Figure 25 Body, Bottom Edge, GSM 850 GPRS (2Txslots) Channel 190

GSM 850 with Earphone Back Side Middle (SN: WLCB9166I3600877)

Date/Time: 1/10/2012 9:28:04 AM

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

Medium parameters used: f = 837 MHz; σ = 0.977 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(9.38, 9.38, 9.38) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.333 mW/g

Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.6 V/m; Power Drift = -0.025 dB

Peak SAR (extrapolated) = 0.392 W/kg

SAR(1 g) = 0.314 mW/g; SAR(10 g) = 0.235 mW/g

Maximum value of SAR (measured) = 0.330 mW/g

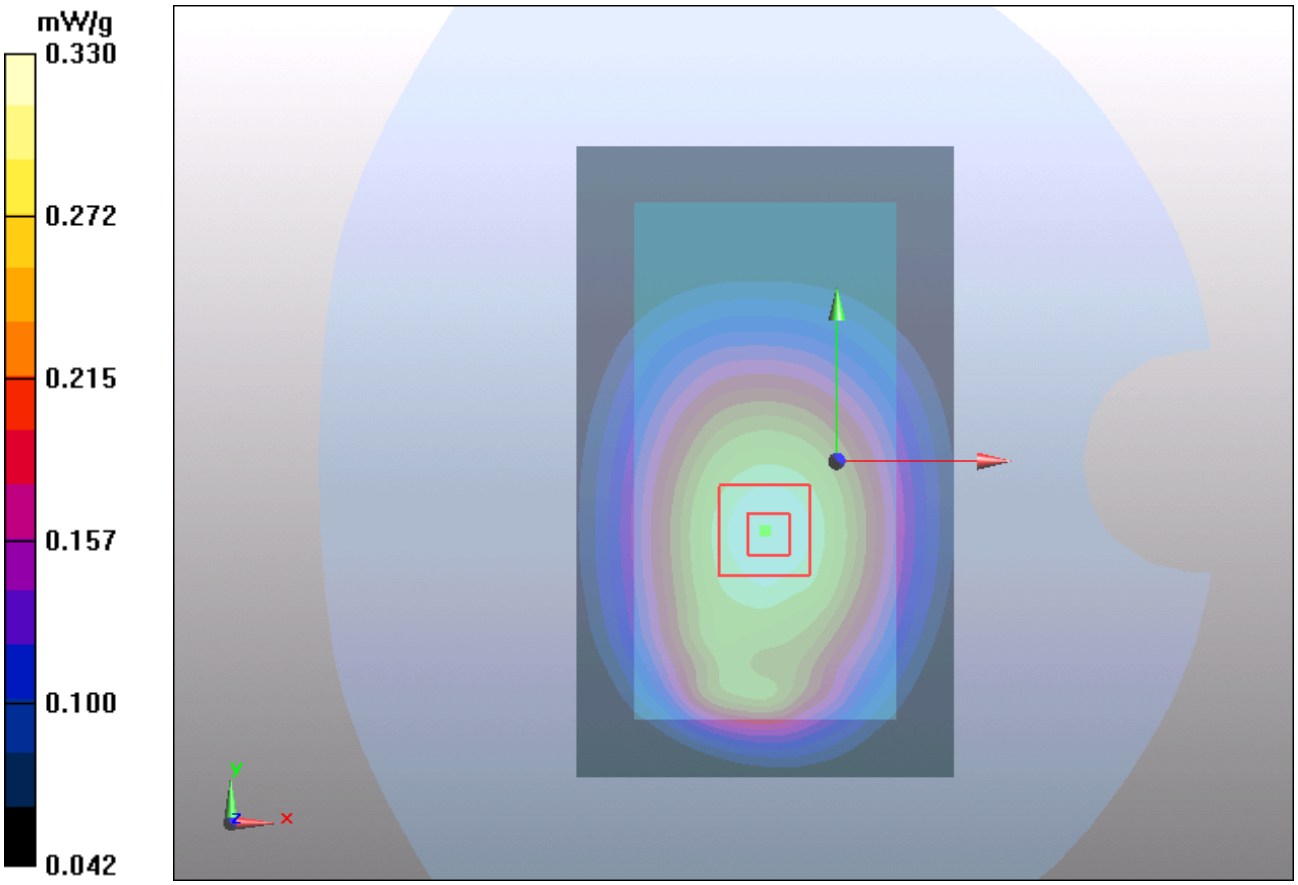


Figure 26 Body with Earphone, Back Side, GSM 850 Channel 190

GSM 850 EGPRS (2Txslots) Back Side Middle (SN: WLCB9166I3600877)

Date/Time: 1/10/2012 9:47:20 AM

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

Medium parameters used: f = 837 MHz; σ = 0.977 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(9.38, 9.38, 9.38) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.620 mW/g

Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 24.7 V/m; Power Drift = -0.124 dB

Peak SAR (extrapolated) = 0.683 W/kg

SAR(1 g) = 0.572 mW/g; SAR(10 g) = 0.429 mW/g

Maximum value of SAR (measured) = 0.613 mW/g

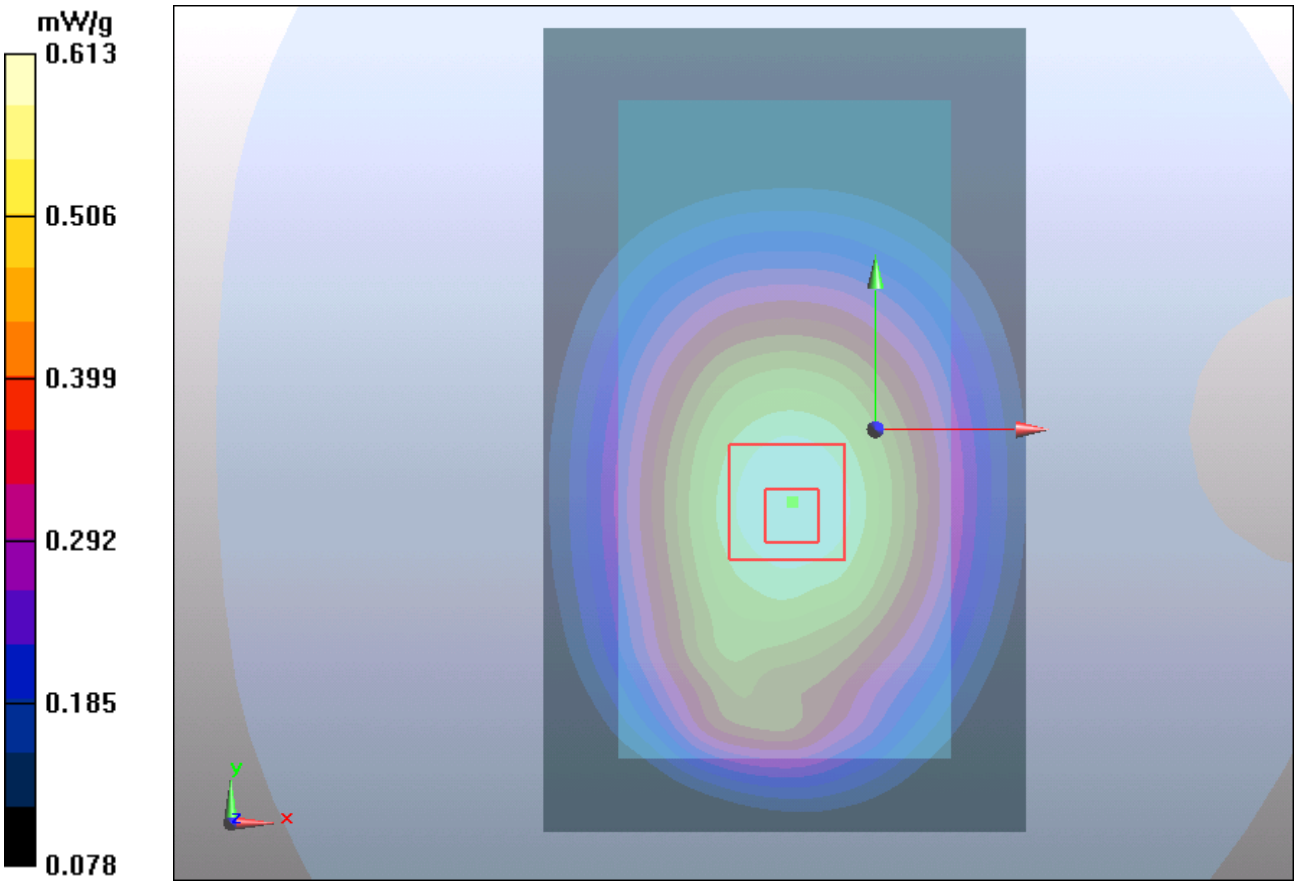


Figure 27 Body, Back Side, GSM 850 EGPRS (2Txslots) Channel 190

GSM 850 GPRS (2Txslots) Back Side Middle (SN: GAGBB07XC4567157)

Date/Time: 1/10/2012 10:13:12 AM

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

Medium parameters used: f = 837 MHz; σ = 0.977 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(9.38, 9.38, 9.38) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.621 mW/g

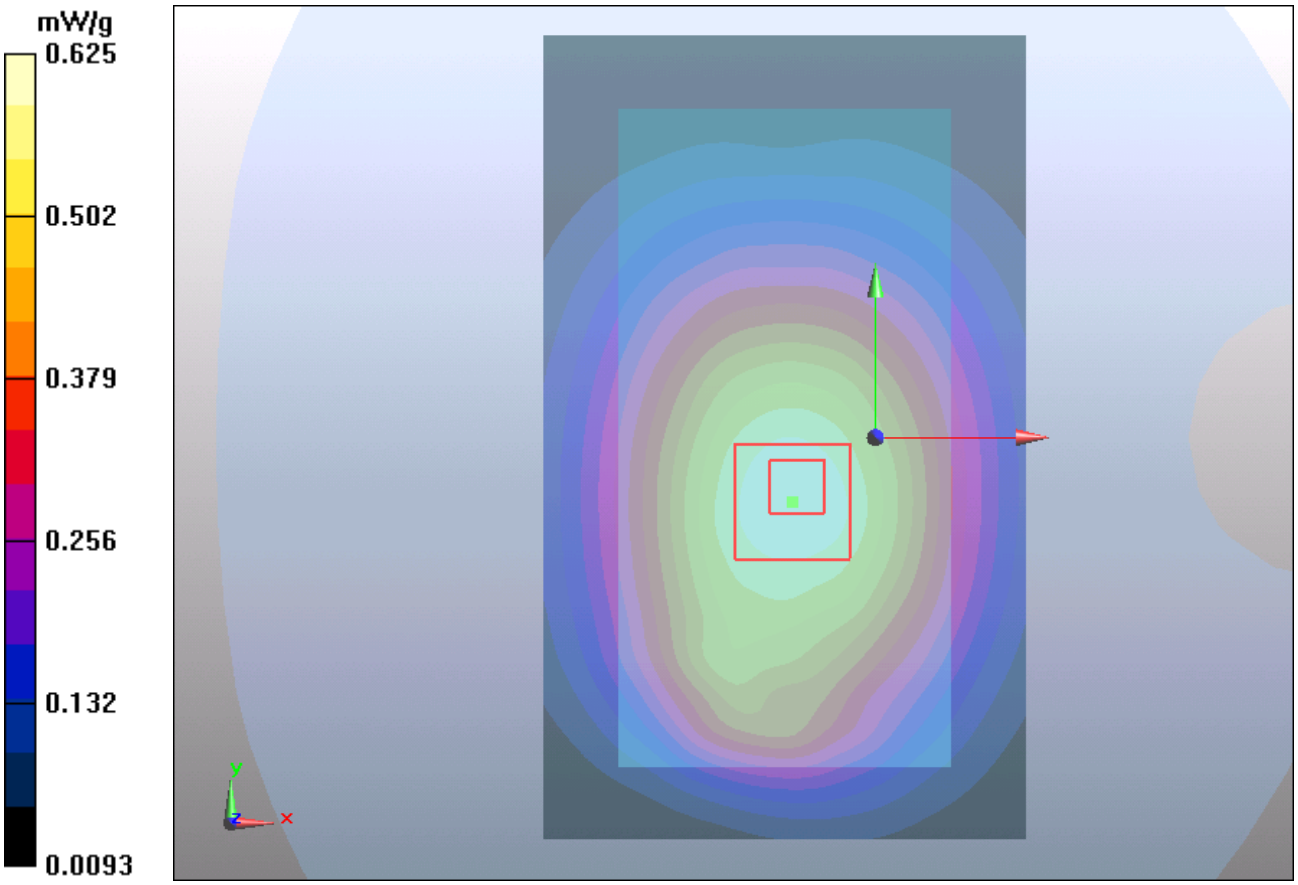
Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 24.8 V/m; Power Drift = 0.046 dB

Peak SAR (extrapolated) = 1.34 W/kg

SAR(1 g) = 0.602 mW/g; SAR(10 g) = 0.449 mW/g

Maximum value of SAR (measured) = 0.625 mW/g



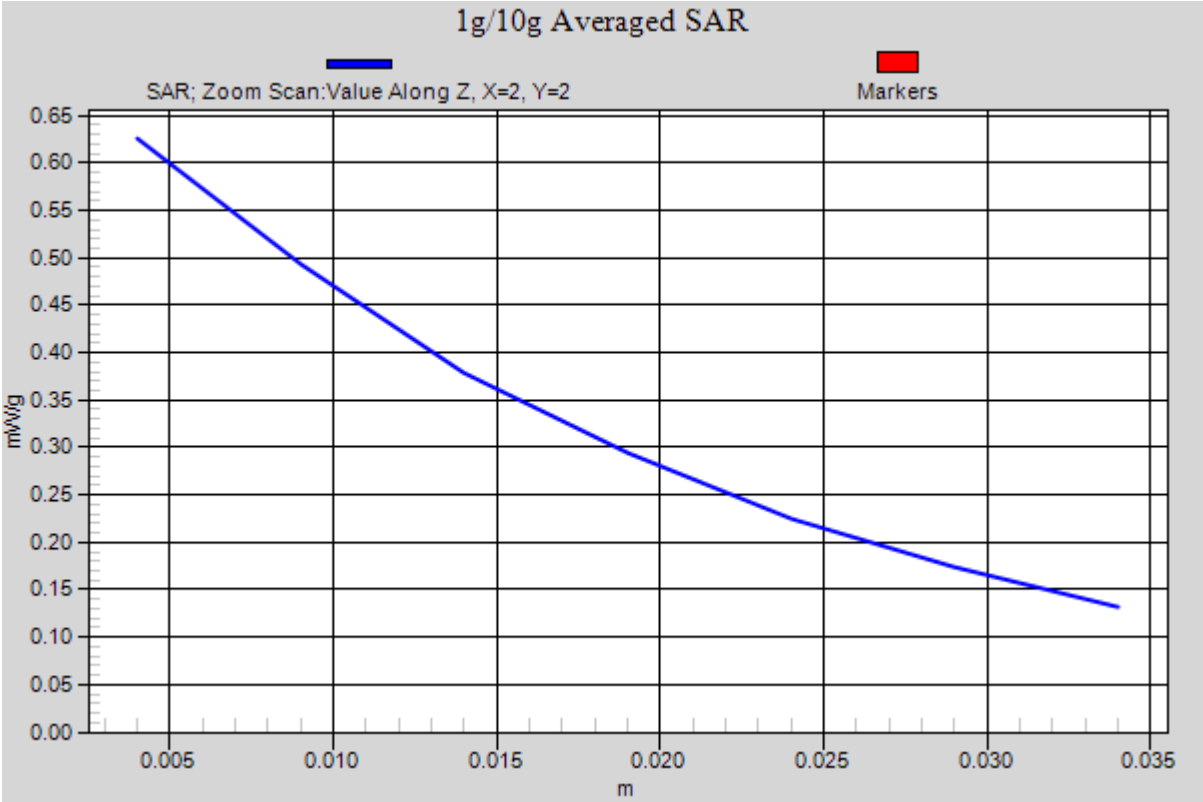


Figure 28 Body, Back Side, GSM 850 GPRS (2Txslots) Channel 190

GSM 850 GPRS (2Txslots) Back Side Middle (SN: BAABC12C98021591)

Date/Time: 1/10/2012 10:36:16 AM

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

Medium parameters used: f = 837 MHz; σ = 0.977 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(9.38, 9.38, 9.38) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.613 mW/g

Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 24.4 V/m; Power Drift = -0.053 dB

Peak SAR (extrapolated) = 0.732 W/kg

SAR(1 g) = 0.575 mW/g; SAR(10 g) = 0.432 mW/g

Maximum value of SAR (measured) = 0.596 mW/g

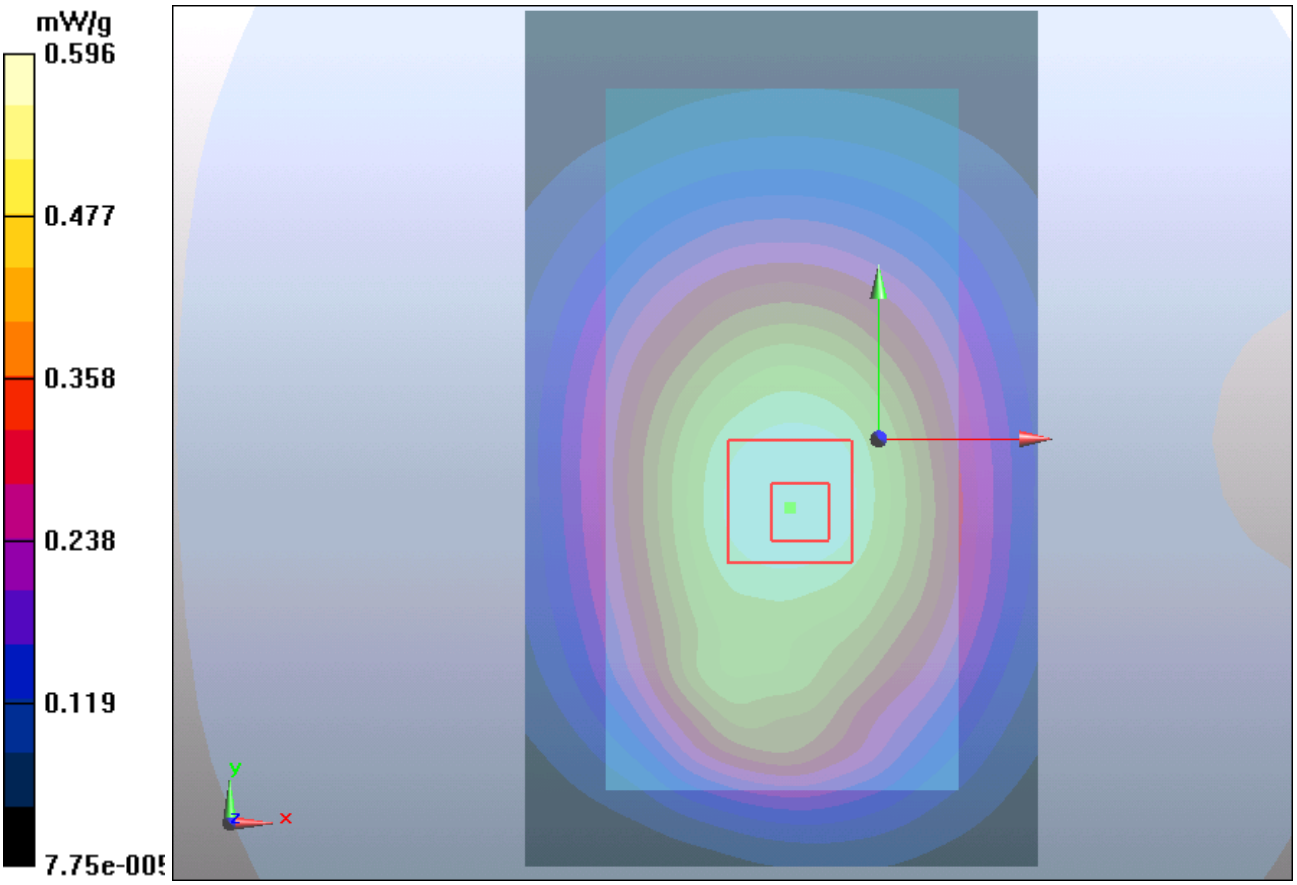


Figure 29 Body, Back Side, GSM 850 GPRS (2Txslots) Channel 190

GSM 850 GPRS (2Txslots) Back Side Middle (SN: UPDBC14X97502626)

Date/Time: 1/10/2012 7:43:28 PM

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

Medium parameters used: f = 837 MHz; σ = 0.977 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(9.38, 9.38, 9.38) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.630 mW/g

Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 25.5 V/m; Power Drift = -0.088 dB

Peak SAR (extrapolated) = 0.754 W/kg

SAR(1 g) = 0.596 mW/g; SAR(10 g) = 0.447 mW/g

Maximum value of SAR (measured) = 0.631 mW/g

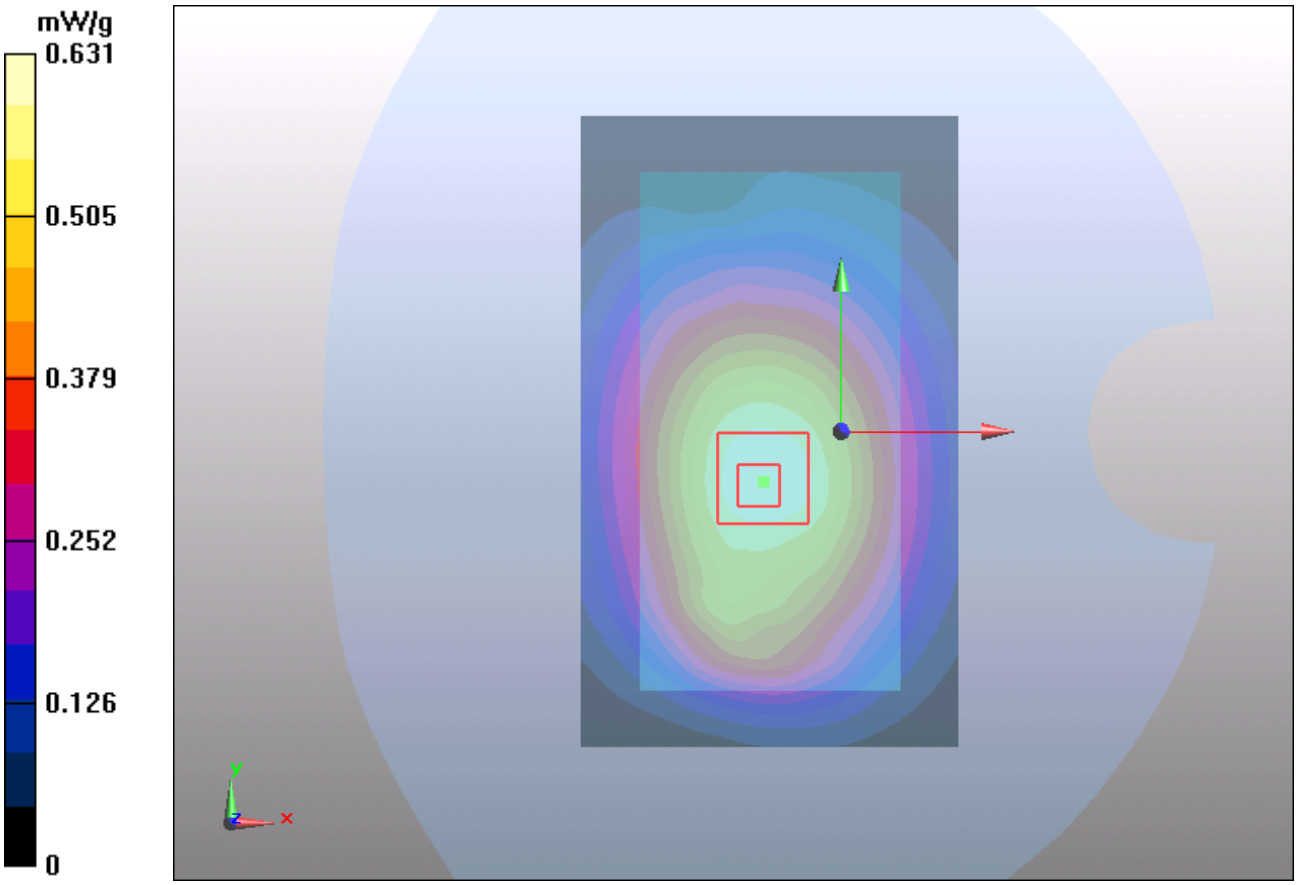


Figure 30 Body, Back Side, GSM 850 GPRS (2Txslots) Channel 190

GSM 1900 Left Cheek Middle (SN: WLCB9166I3600877)

Date/Time: 1/9/2012 1:44:19 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.38 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Left Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.90, 7.90, 7.90) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.202 mW/g

Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.01 V/m; Power Drift = -0.084 dB

Peak SAR (extrapolated) = 0.261 W/kg

SAR(1 g) = 0.184 mW/g; SAR(10 g) = 0.125 mW/g

Maximum value of SAR (measured) = 0.196 mW/g

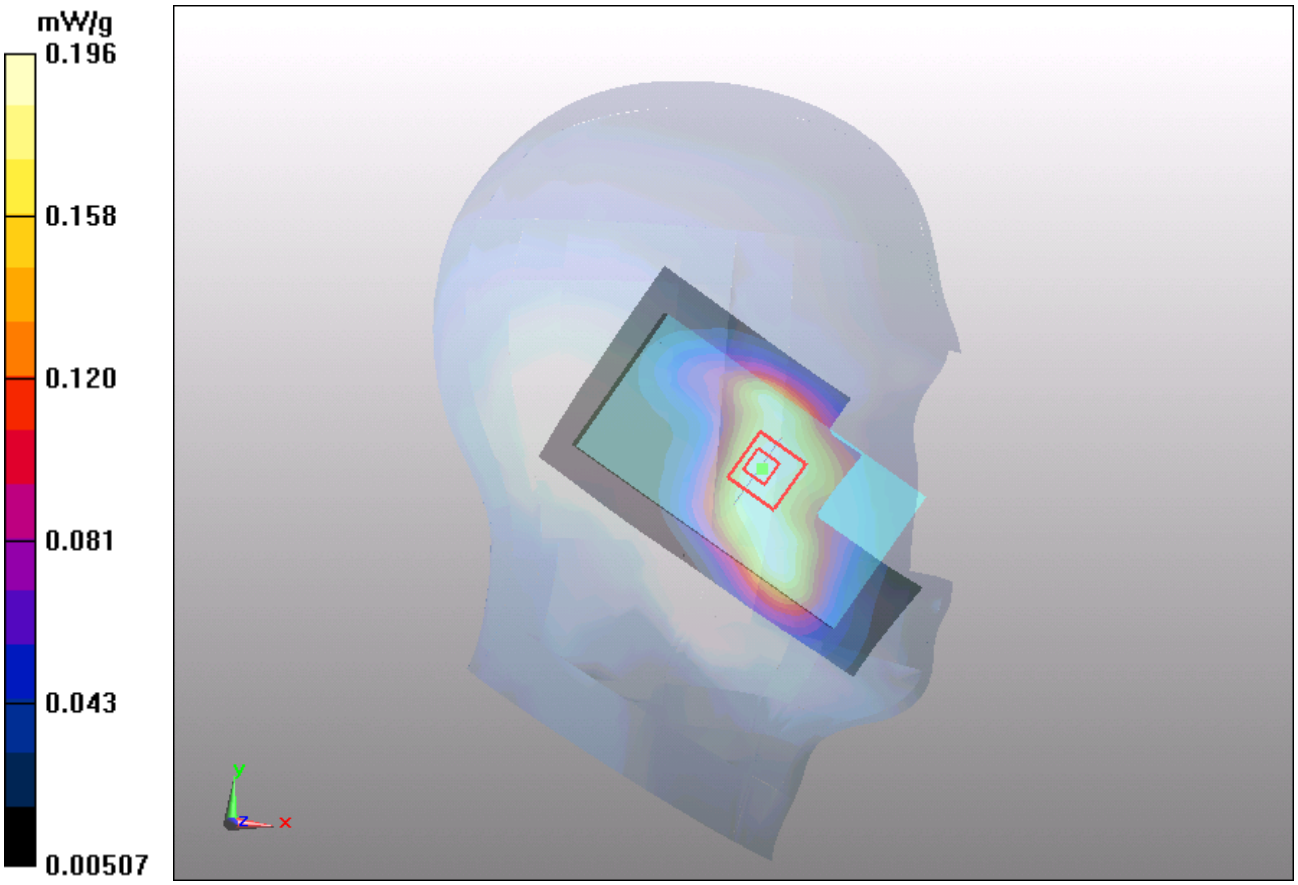


Figure 31 Left Hand Touch Cheek GSM 1900 Channel 661

GSM 1900 Left Tilt Middle (SN: WLCB9166I3600877)

Date/Time: 1/9/2012 7:43:31 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.38 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Left Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.90, 7.90, 7.90) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.073 mW/g

Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.07 V/m; Power Drift = 0.049 dB

Peak SAR (extrapolated) = 0.100 W/kg

SAR(1 g) = 0.062 mW/g; SAR(10 g) = 0.037 mW/g

Maximum value of SAR (measured) = 0.068 mW/g

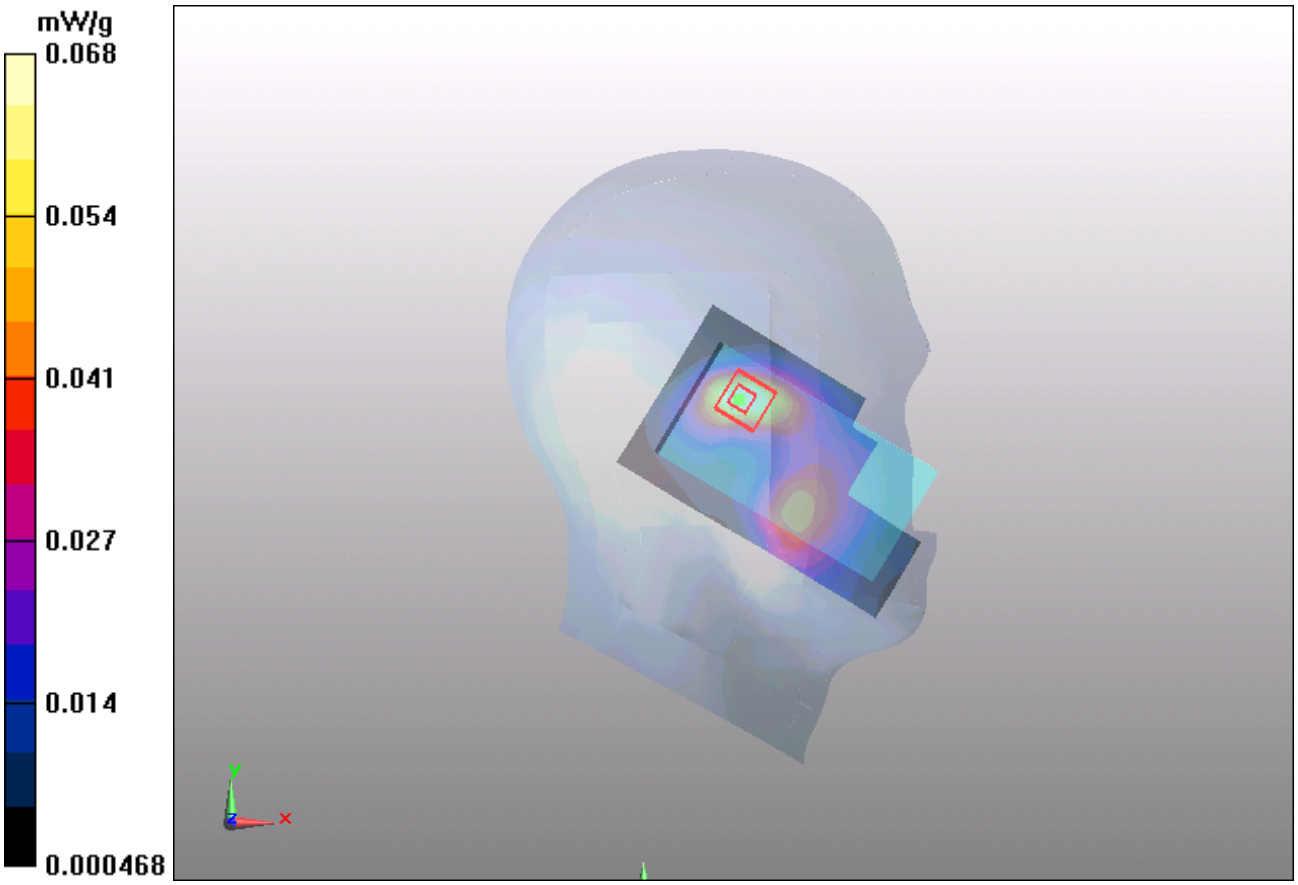


Figure 32 Left Hand Tilt 15° GSM 1900 Channel 661

GSM 1900 Right Cheek Middle (SN: WLCB9166I3600877)

Date/Time: 1/9/2012 2:05:01 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.38 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Right Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.90, 7.90, 7.90) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.246 mW/g

Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.62 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.320 W/kg

SAR(1 g) = 0.212 mW/g; SAR(10 g) = 0.139 mW/g

Maximum value of SAR (measured) = 0.221 mW/g

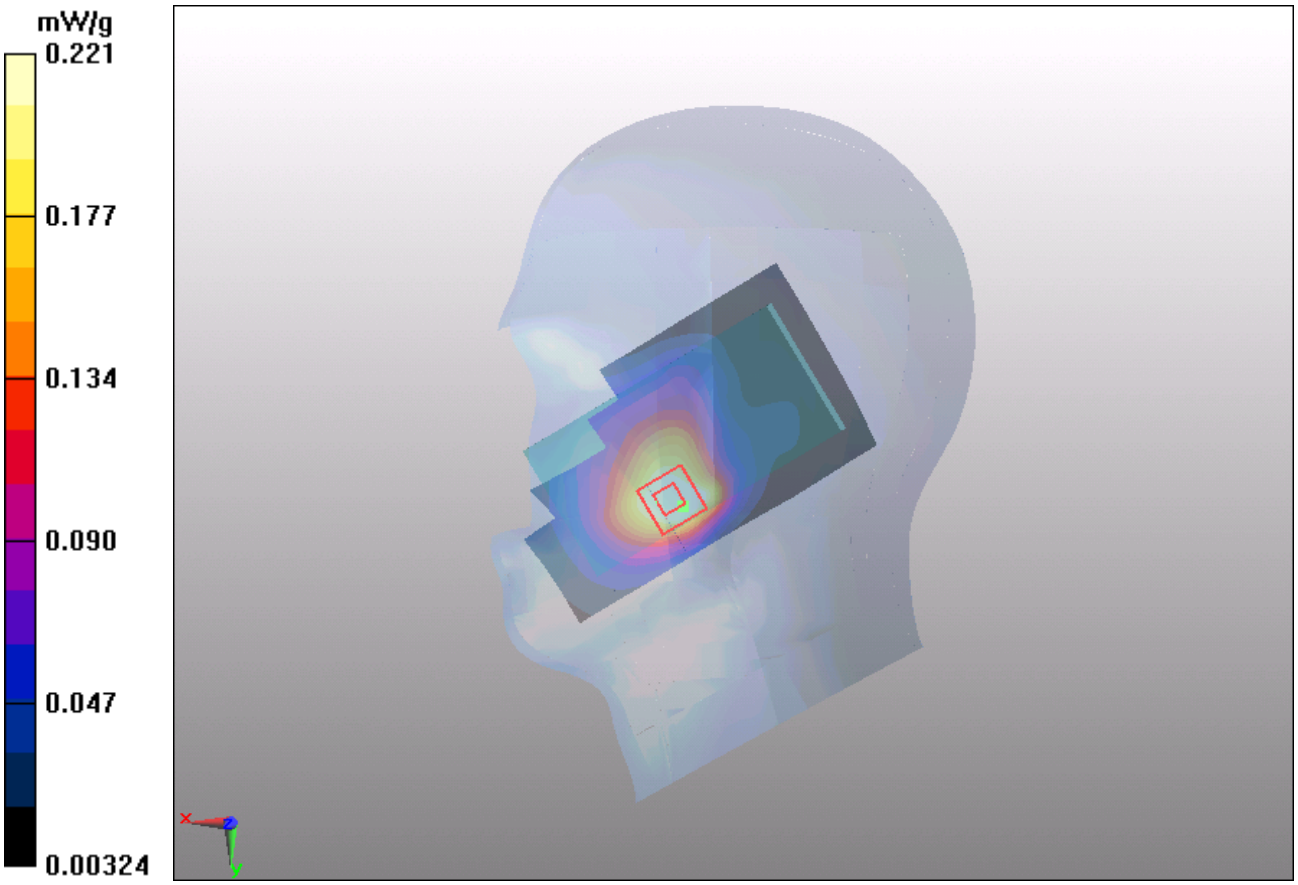


Figure 33 Right Hand Touch Cheek GSM 1900 Channel 661

GSM 1900 Right Tilt Middle (SN: WLCB9166I3600877)

Date/Time: 1/9/2012 8:05:20 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.38 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Right Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.90, 7.90, 7.90) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.054 mW/g

Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.42 V/m; Power Drift = 0.074 dB

Peak SAR (extrapolated) = 0.073 W/kg

SAR(1 g) = 0.046 mW/g; SAR(10 g) = 0.027 mW/g

Maximum value of SAR (measured) = 0.049 mW/g

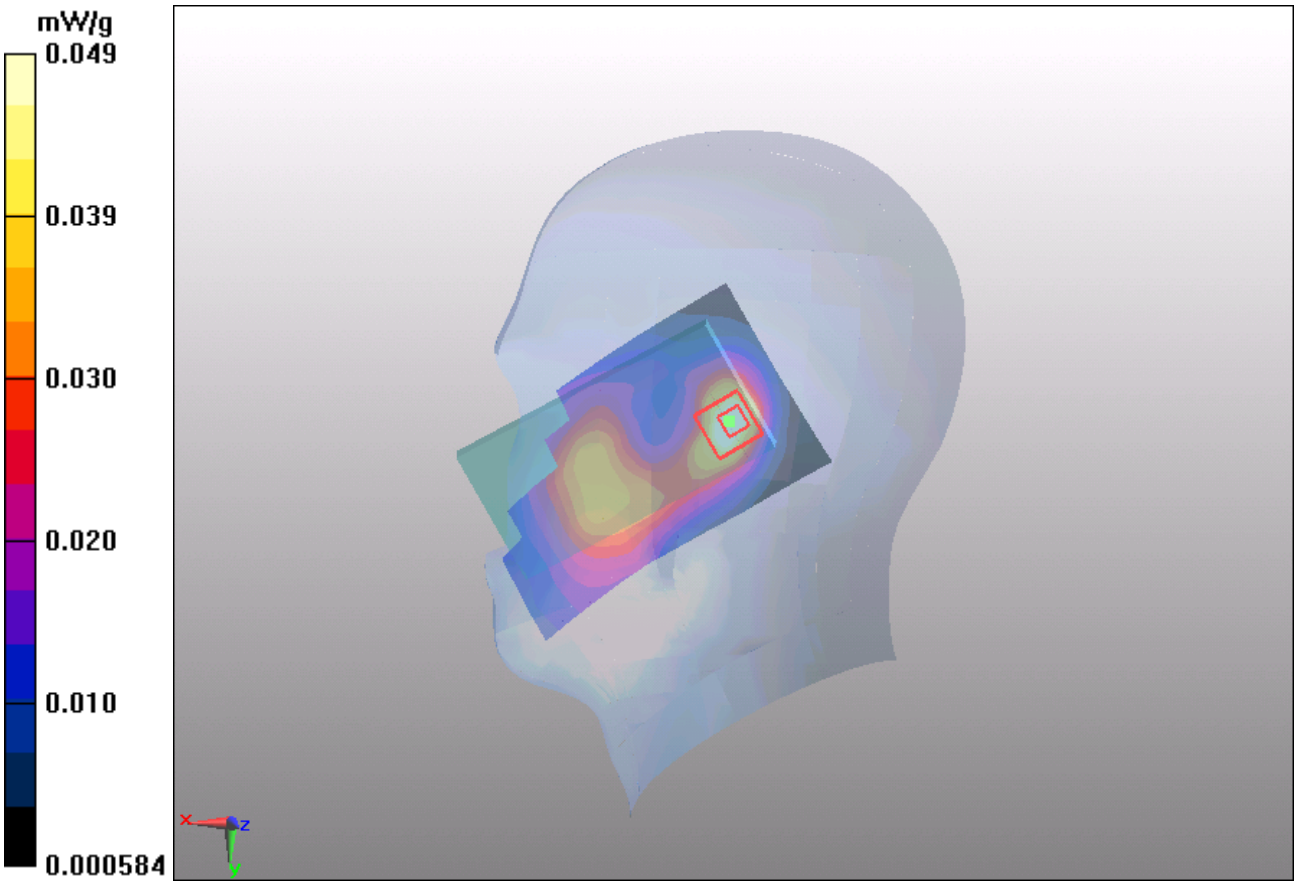


Figure 34 Right Hand Tilt 15° GSM 1900 Channel 661

GSM 1900 Right Cheek Middle (SN: GAGBB07XC4567157)

Date/Time: 1/9/2012 11:21:05 AM

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

Medium parameters used: f = 1880 MHz; σ = 1.38 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Right Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.90, 7.90, 7.90) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.266 mW/g

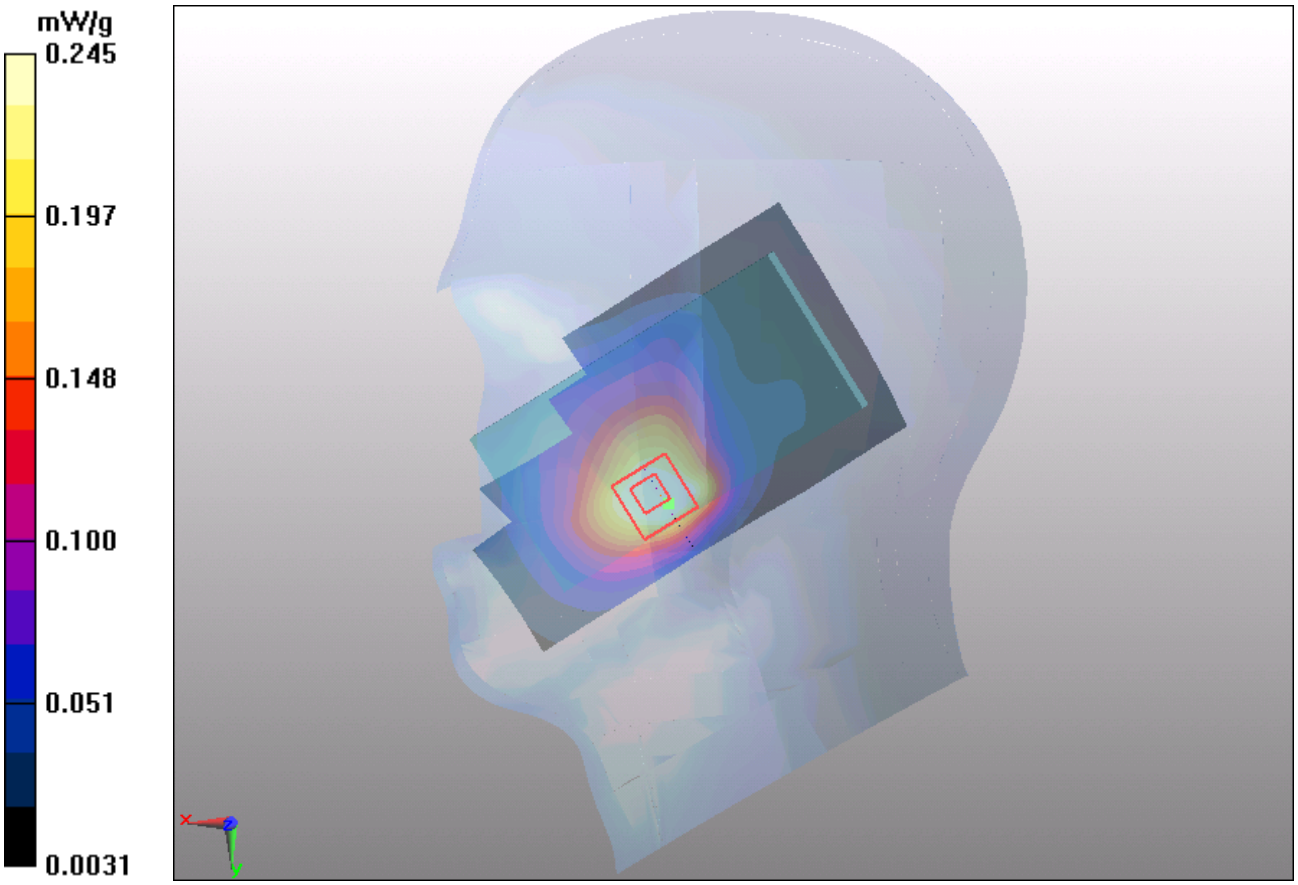
Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3 V/m; Power Drift = 0.002 dB

Peak SAR (extrapolated) = 0.355 W/kg

SAR(1 g) = 0.233 mW/g; SAR(10 g) = 0.151 mW/g

Maximum value of SAR (measured) = 0.245 mW/g



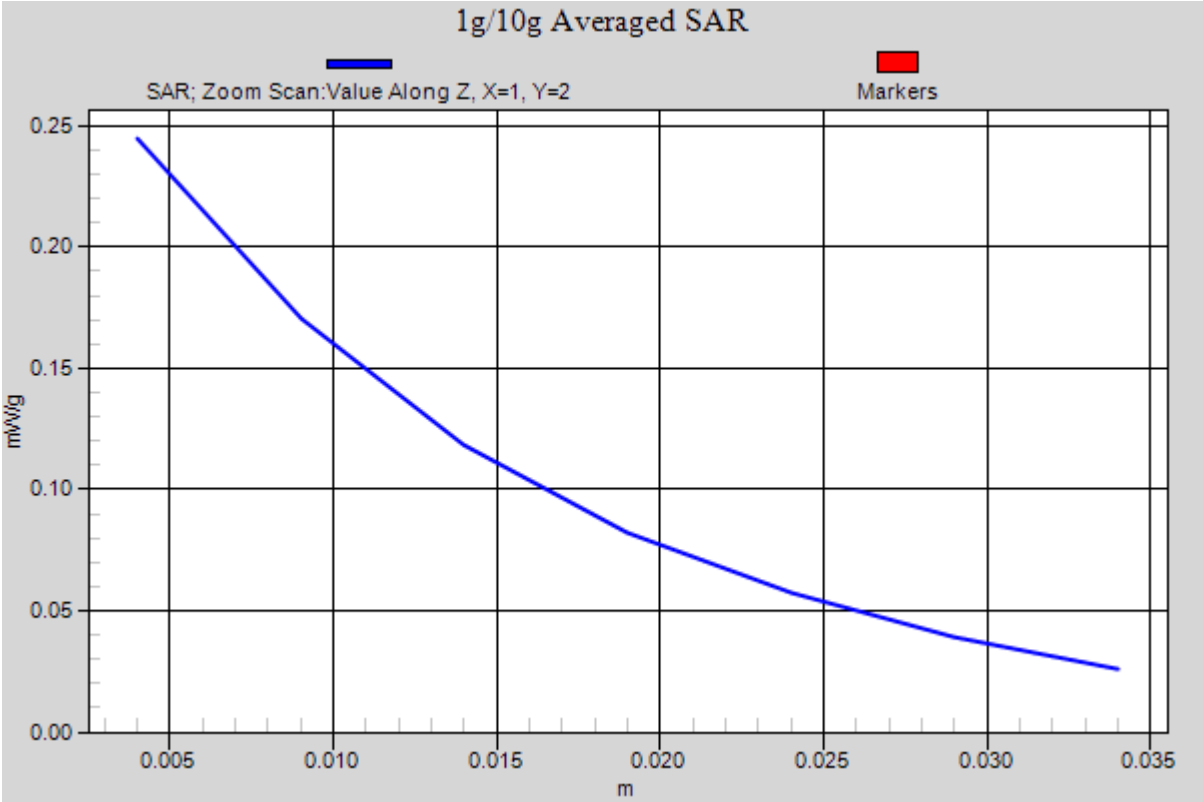


Figure 35 Right Hand Touch Cheek GSM 1900 Channel 661

GSM 1900 Right Cheek Middle (SN: BAABC12C98021591)

Date/Time: 1/9/2012 10:59:36 AM

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

Medium parameters used: f = 1880 MHz; σ = 1.38 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Right Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.90, 7.90, 7.90) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.267 mW/g

Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.94 V/m; Power Drift = 0.029 dB

Peak SAR (extrapolated) = 0.355 W/kg

SAR(1 g) = 0.233 mW/g; SAR(10 g) = 0.150 mW/g

Maximum value of SAR (measured) = 0.244 mW/g

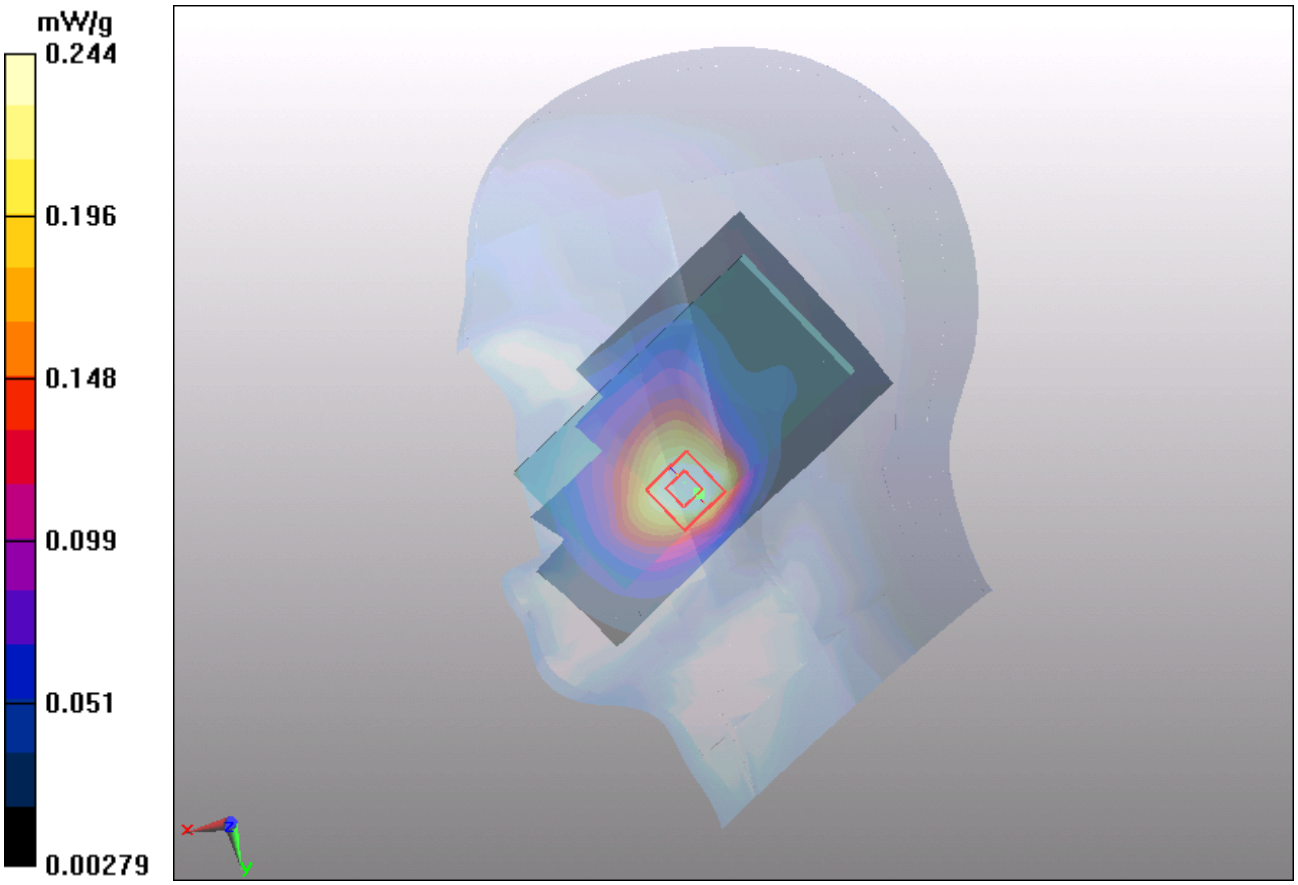


Figure 36 Right Hand Touch Cheek GSM 1900 Channel 661

GSM 1900 Right Cheek Middle (SN: UPDBC14X97502626)

Date/Time: 1/9/2012 10:01:49 AM

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

Medium parameters used: f = 1880 MHz; σ = 1.38 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Right Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.90, 7.90, 7.90) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.253 mW/g

Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.98 V/m; Power Drift = -0.156 dB

Peak SAR (extrapolated) = 0.342 W/kg

SAR(1 g) = 0.232 mW/g; SAR(10 g) = 0.149 mW/g

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

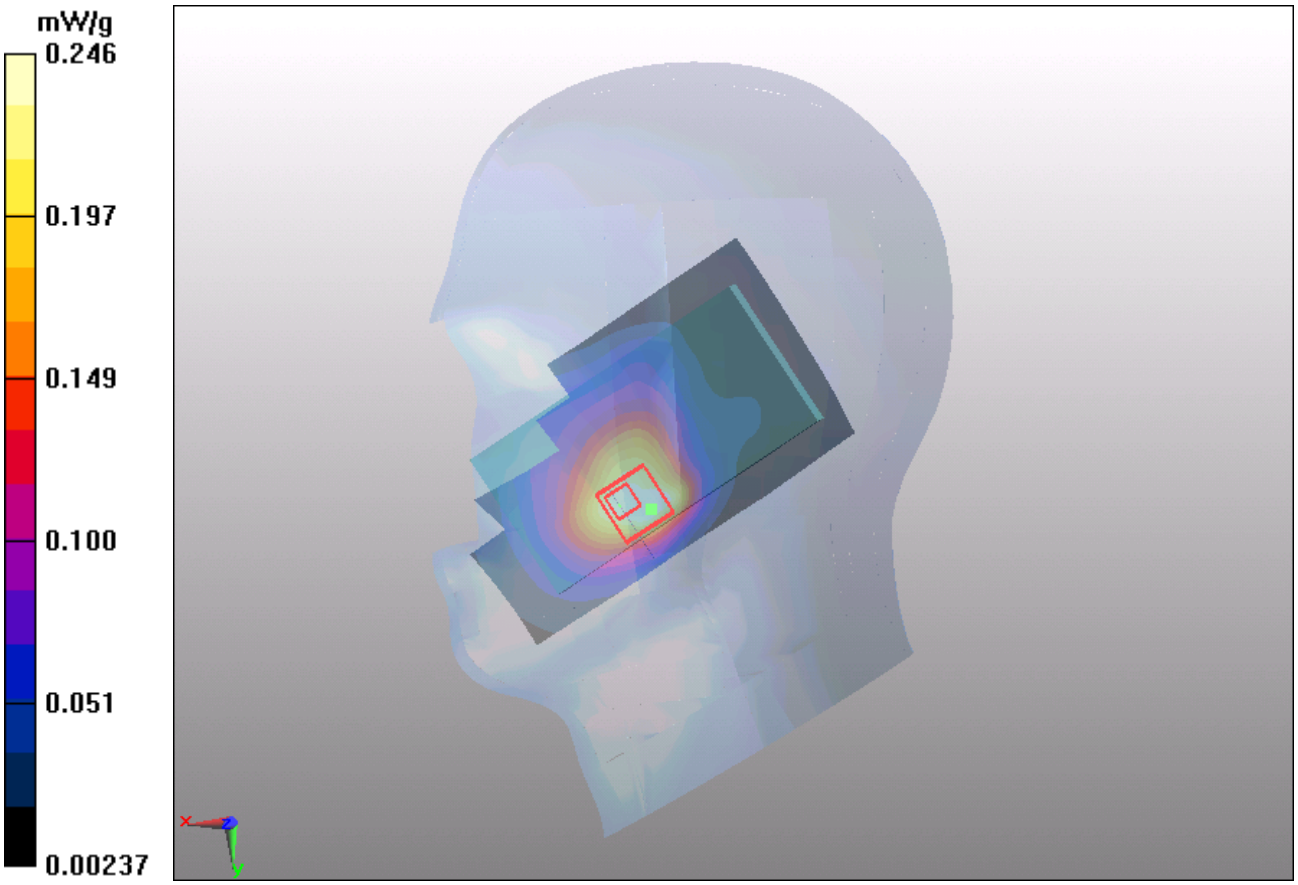


Figure 37 Right Hand Touch Cheek GSM 1900 Channel 661

GSM 1900 GPRS (1Txslot) Back Side Middle (SN: WLCB9166I3600877)

Date/Time: 1/10/2012 3:11:37 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.51, 7.51, 7.51) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.705 mW/g

Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.62 V/m; Power Drift = 0.146 dB

Peak SAR (extrapolated) = 1.01 W/kg

SAR(1 g) = 0.614 mW/g; SAR(10 g) = 0.353 mW/g

Maximum value of SAR (measured) = 0.695 mW/g

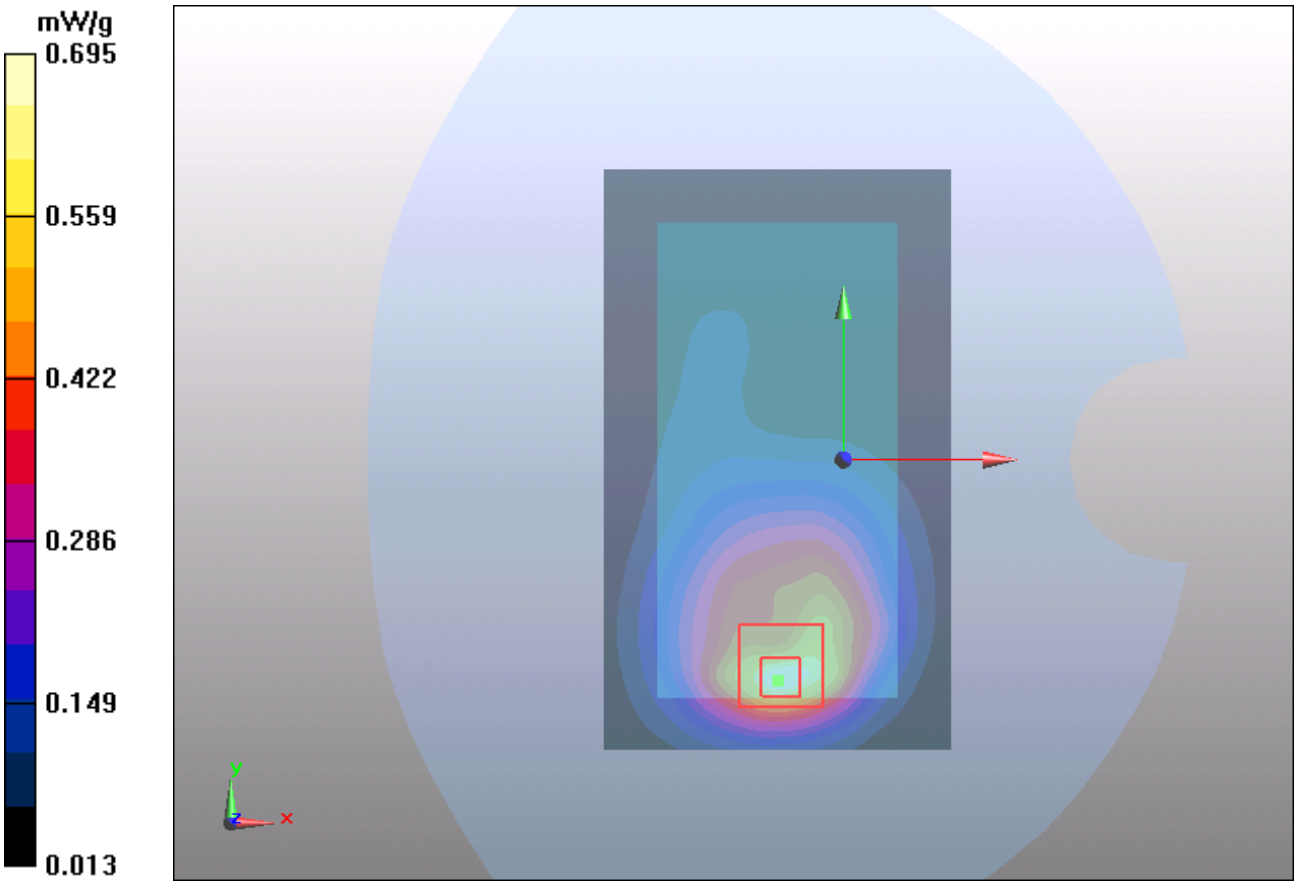


Figure 38 Body, Back Side, GSM 1900 GPRS (1Txslot) Channel 661

GSM 1900 GPRS (2Txslots) Back Side High (SN: WLCB9166I3600877)

Date/Time: 1/10/2012 2:39:05 PM

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

Medium parameters used: f = 1910 MHz; σ = 1.49 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.51, 7.51, 7.51) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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

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

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

Maximum value of SAR (interpolated) = 1.06 mW/g

Back Side High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.5 V/m; Power Drift = -0.017 dB

Peak SAR (extrapolated) = 1.57 W/kg

SAR(1 g) = 0.929 mW/g; SAR(10 g) = 0.523 mW/g

Maximum value of SAR (measured) = 1.05 mW/g

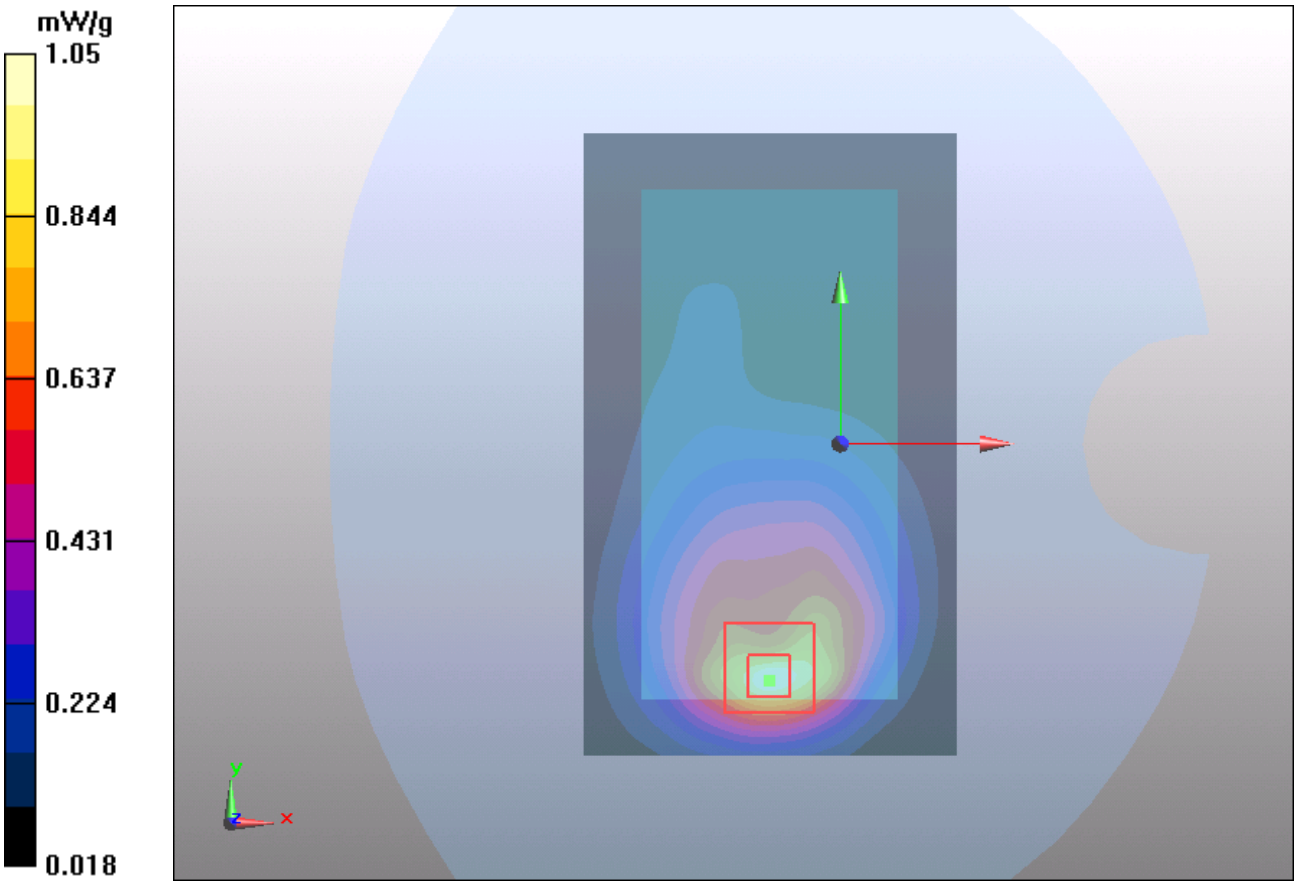


Figure 39 Body, Back Side, GSM 1900 GPRS (2Txslots) Channel 810

GSM 1900 GPRS (2Txslots) Back Side Middle (SN: WLCB9166I3600877)

Date/Time: 1/10/2012 2:20:34 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.51, 7.51, 7.51) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 1.12 mW/g

Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11 V/m; Power Drift = -0.154 dB

Peak SAR (extrapolated) = 2.09 W/kg

SAR(1 g) = 0.978 mW/g; SAR(10 g) = 0.552 mW/g

Maximum value of SAR (measured) = 1.07 mW/g

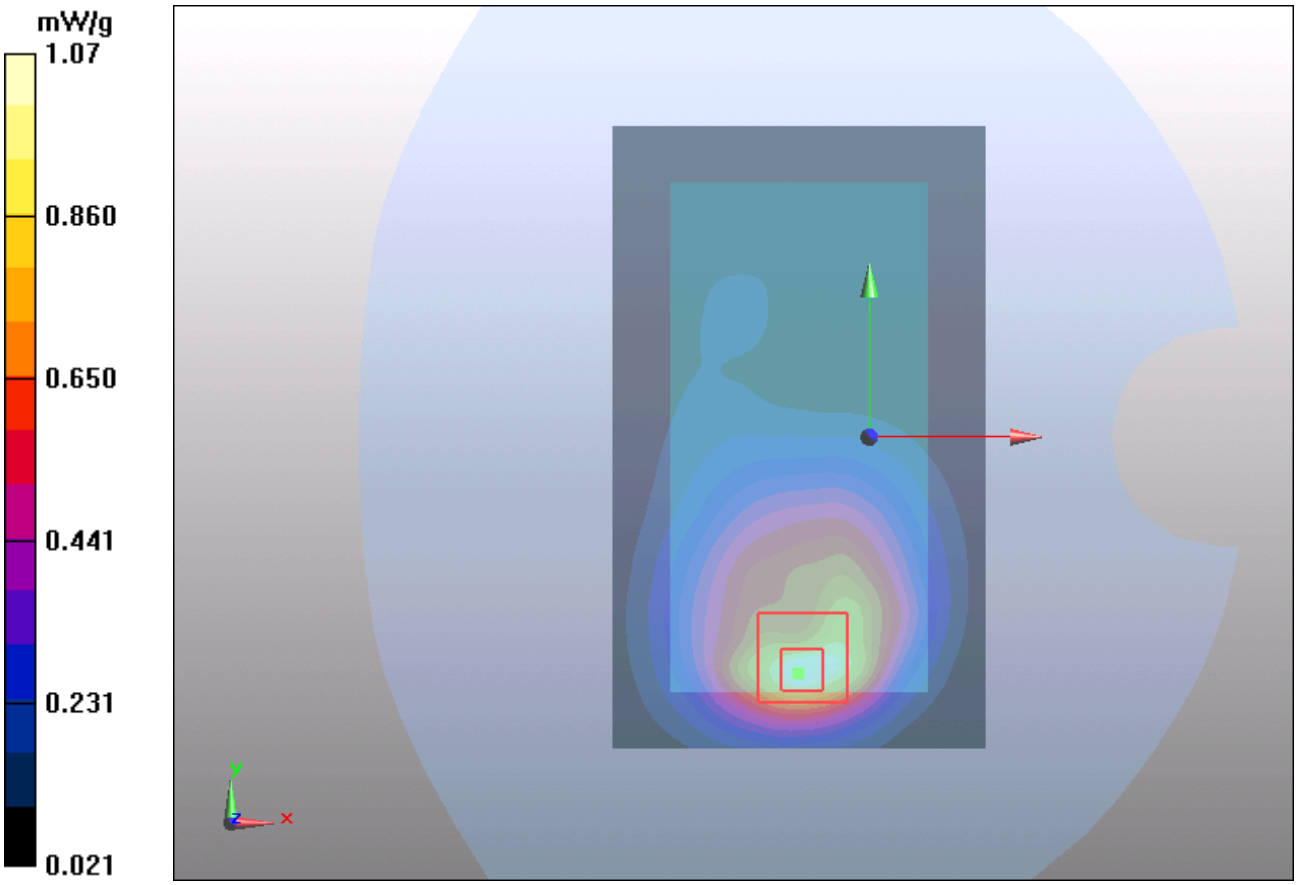


Figure 40 Body, Back Side, GSM 1900 GPRS (2Txslots) Channel 661

GSM 1900 GPRS (2Txslots) Back Side Low (SN: WLCB9166I3600877)

Date/Time: 1/10/2012 11:06:47 AM

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

Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.46 mho/m; ε_r = 53.2; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.51, 7.51, 7.51) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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

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

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

Maximum value of SAR (interpolated) = 1.05 mW/g

Back Side Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.36 V/m; Power Drift = -0.173 dB

Peak SAR (extrapolated) = 1.43 W/kg

SAR(1 g) = 0.887 mW/g; SAR(10 g) = 0.523 mW/g

Maximum value of SAR (measured) = 0.996 mW/g

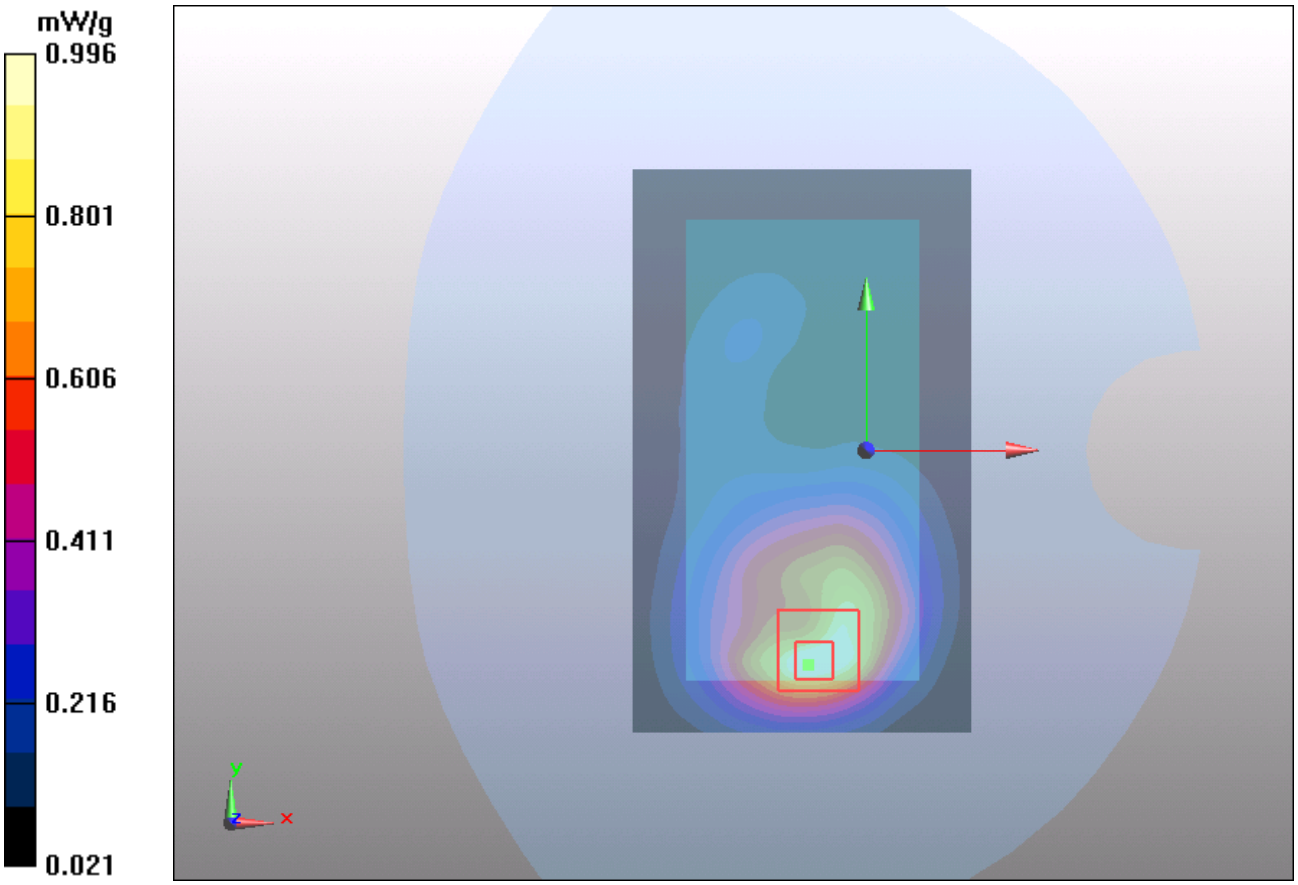


Figure 41 Body, Back Side, GSM 1900 GPRS (2Txslots) Channel 512

GSM 1900 GPRS (2Txslots) Front Side Middle (SN: WLCB9166I3600877)

Date/Time: 1/10/2012 3:37:51 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.51, 7.51, 7.51) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.438 mW/g

Front Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.34 V/m; Power Drift = -0.018 dB

Peak SAR (extrapolated) = 0.601 W/kg

SAR(1 g) = 0.391 mW/g; SAR(10 g) = 0.251 mW/g

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

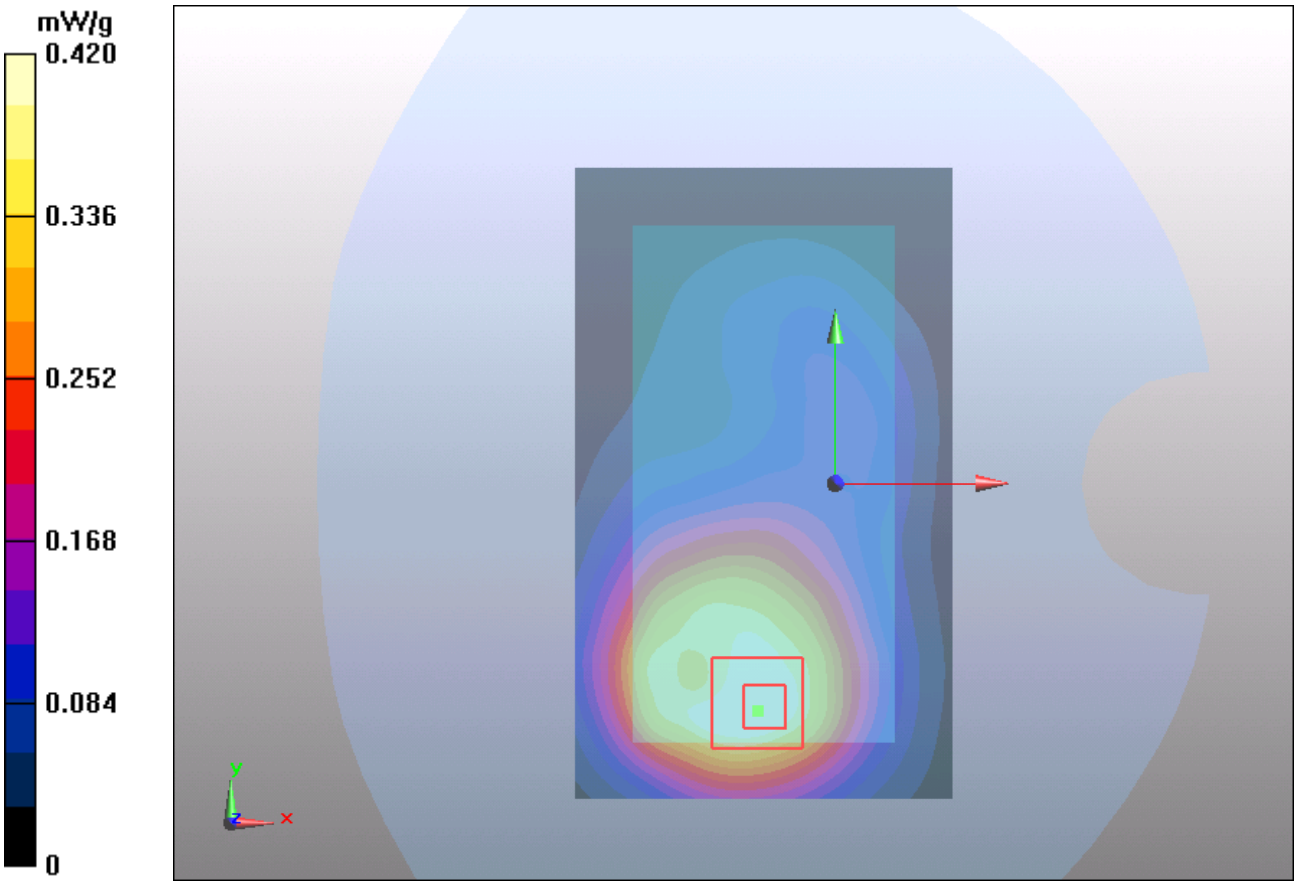


Figure 42 Body, Front Side, GSM 1900 GPRS (2Txslots) Channel 661

GSM 1900 GPRS (2Txslots)) Left Edge Middle (SN: WLCB9166I3600877)

Date/Time: 1/10/2012 4:30:26 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.51, 7.51, 7.51) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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 (41x101x1): Measurement grid: dx=15mm, dy=15mm

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

Left Edge Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.66 V/m; Power Drift = 0.094 dB

Peak SAR (extrapolated) = 0.251 W/kg

SAR(1 g) = 0.154 mW/g; SAR(10 g) = 0.089 mW/g

Maximum value of SAR (measured) = 0.167 mW/g

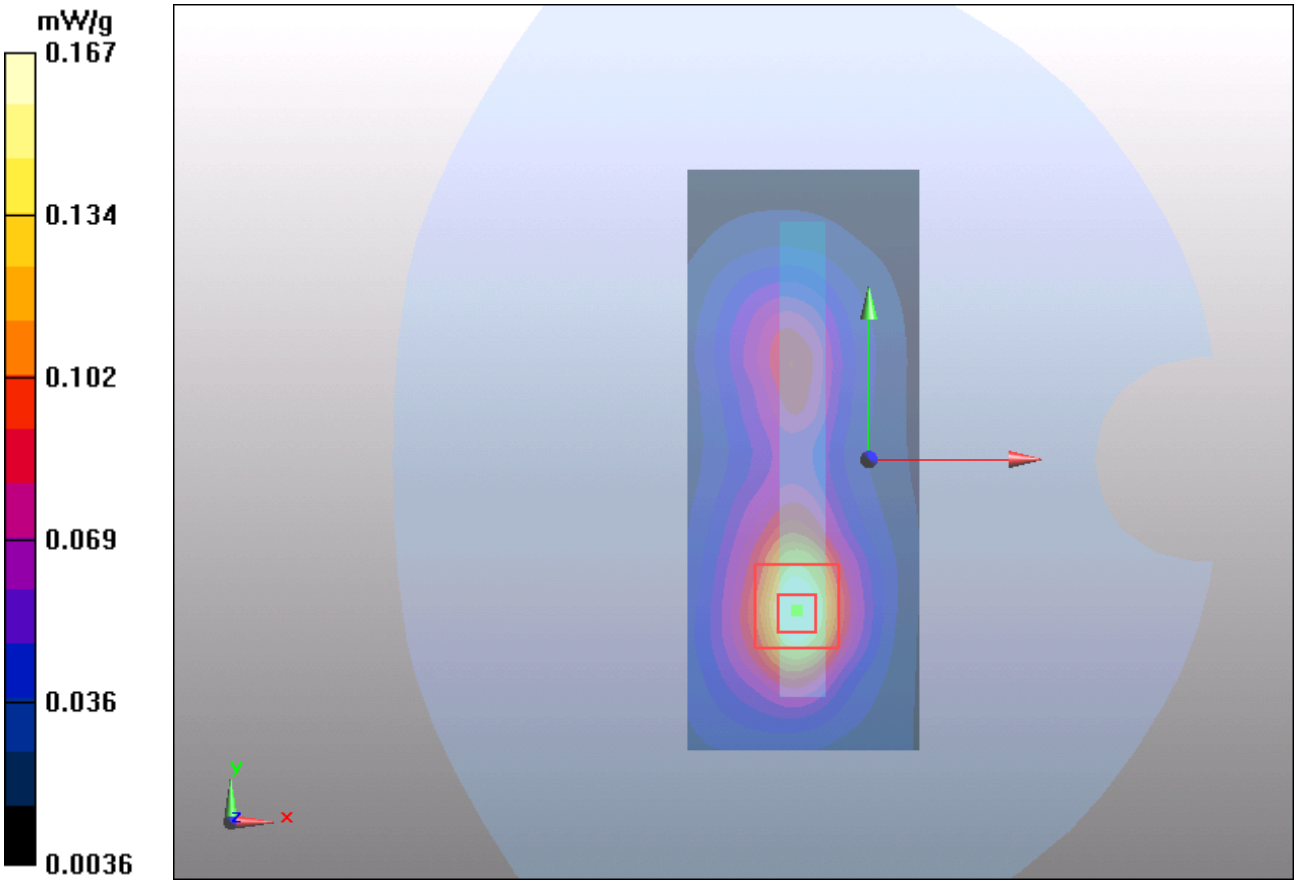


Figure 43 Body, Left Edge, GSM 1900 GPRS (2Txslots) Channel 661

GSM 1900 GPRS (2Txslots) Right Edge Middle (SN: WLCB9166I3600877)

Date/Time: 1/10/2012 4:13:06 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.51, 7.51, 7.51) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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 (41x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.112 mW/g

Right Edge Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.22 V/m; Power Drift = -0.166 dB

Peak SAR (extrapolated) = 0.173 W/kg

SAR(1 g) = 0.105 mW/g; SAR(10 g) = 0.064 mW/g

Maximum value of SAR (measured) = 0.113 mW/g

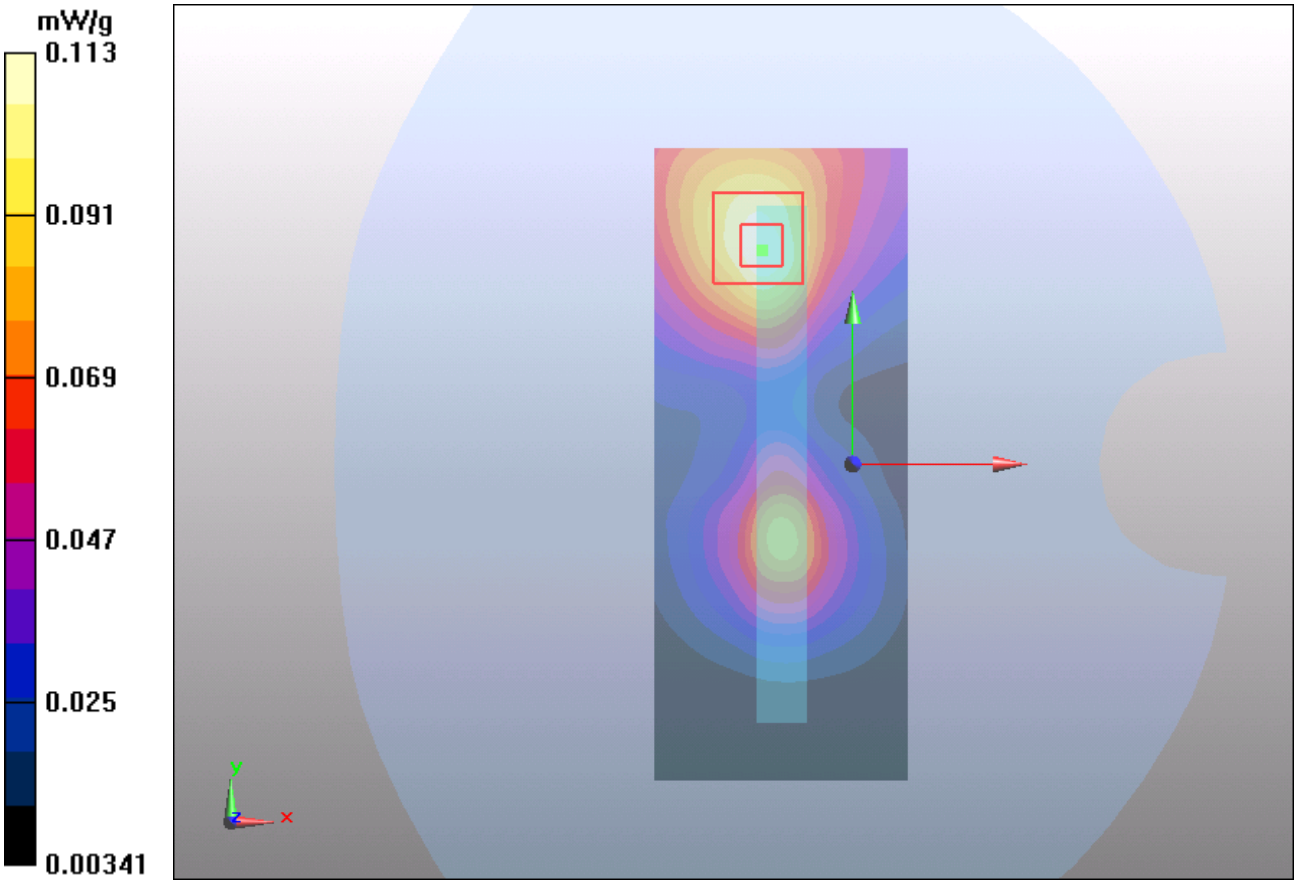


Figure 44 Body, Right Edge, GSM 1900 GPRS (2Txslots) Channel 661

GSM 1900 GPRS (2Txslots) Bottom Edge Middle (SN: WLCB9166I3600877)

Date/Time: 1/10/2012 4:53:59 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.51, 7.51, 7.51) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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 (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.626 mW/g

Bottom Edge Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 20.4 V/m; Power Drift = 0.050 dB

Peak SAR (extrapolated) = 0.944 W/kg

SAR(1 g) = 0.561 mW/g; SAR(10 g) = 0.316 mW/g

Maximum value of SAR (measured) = 0.610 mW/g

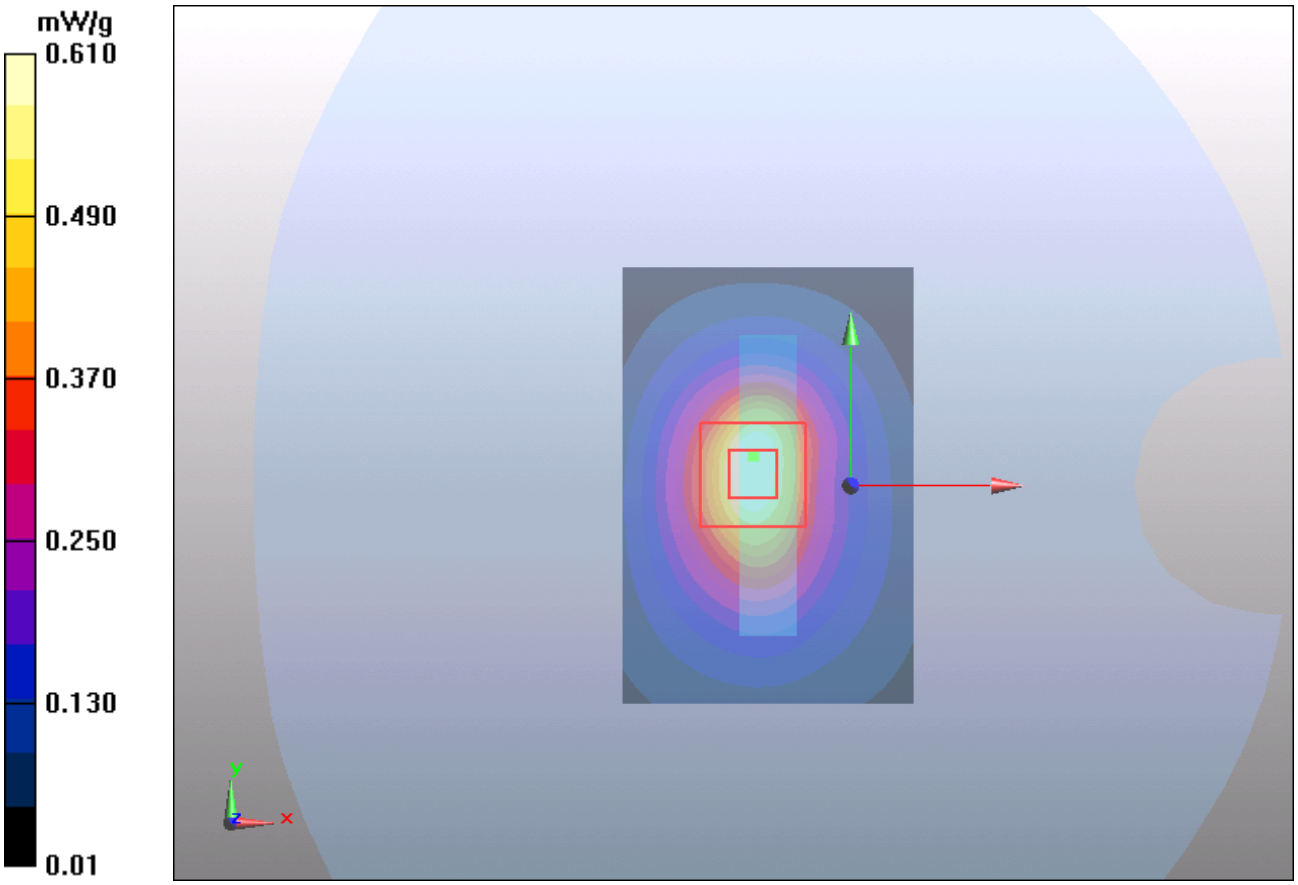


Figure 45 Body, Bottom Edge, GSM 1900 GPRS (2Txslots) Channel 661

GSM 1900 with Earphone Back Side Middle (SN: WLCB9166I3600877)

Date/Time: 1/10/2012 5:16:09 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.51, 7.51, 7.51) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.777 mW/g

Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.39 V/m; Power Drift = 0.061 dB

Peak SAR (extrapolated) = 1.11 W/kg

SAR(1 g) = 0.666 mW/g; SAR(10 g) = 0.381 mW/g

Maximum value of SAR (measured) = 0.742 mW/g

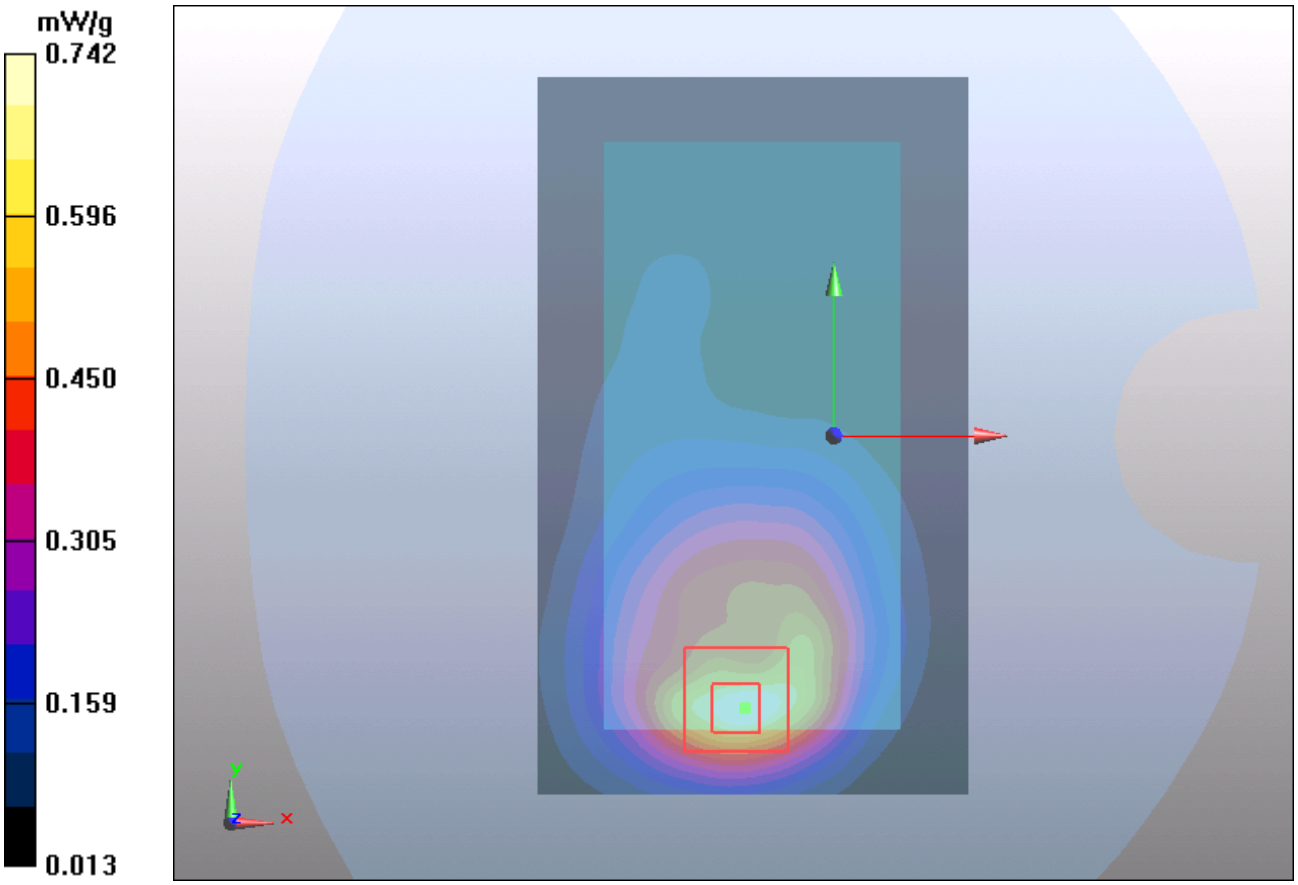


Figure 46 Body with Earphone, Back Side, GSM 1900 Channel 661

GSM 1900 EGPRS (2Txslots) Back Side Middle (SN: WLCB9166I3600877)

Date/Time: 1/10/2012 5:35:49 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.51, 7.51, 7.51) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 1.15 mW/g

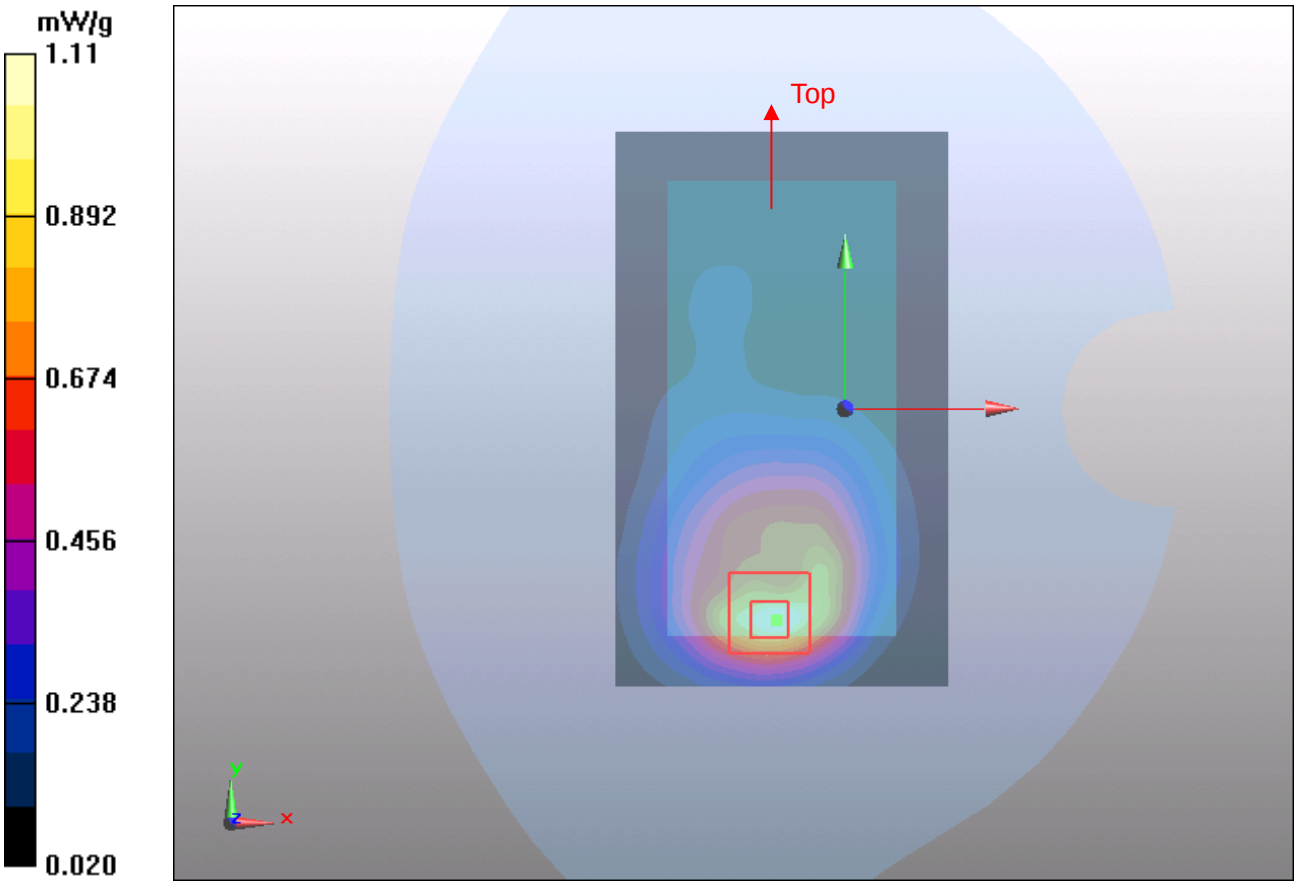
Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.2 V/m; Power Drift = -0.087 dB

Peak SAR (extrapolated) = 1.64 W/kg

SAR(1 g) = 0.988 mW/g; SAR(10 g) = 0.567 mW/g

Maximum value of SAR (measured) = 1.11 mW/g



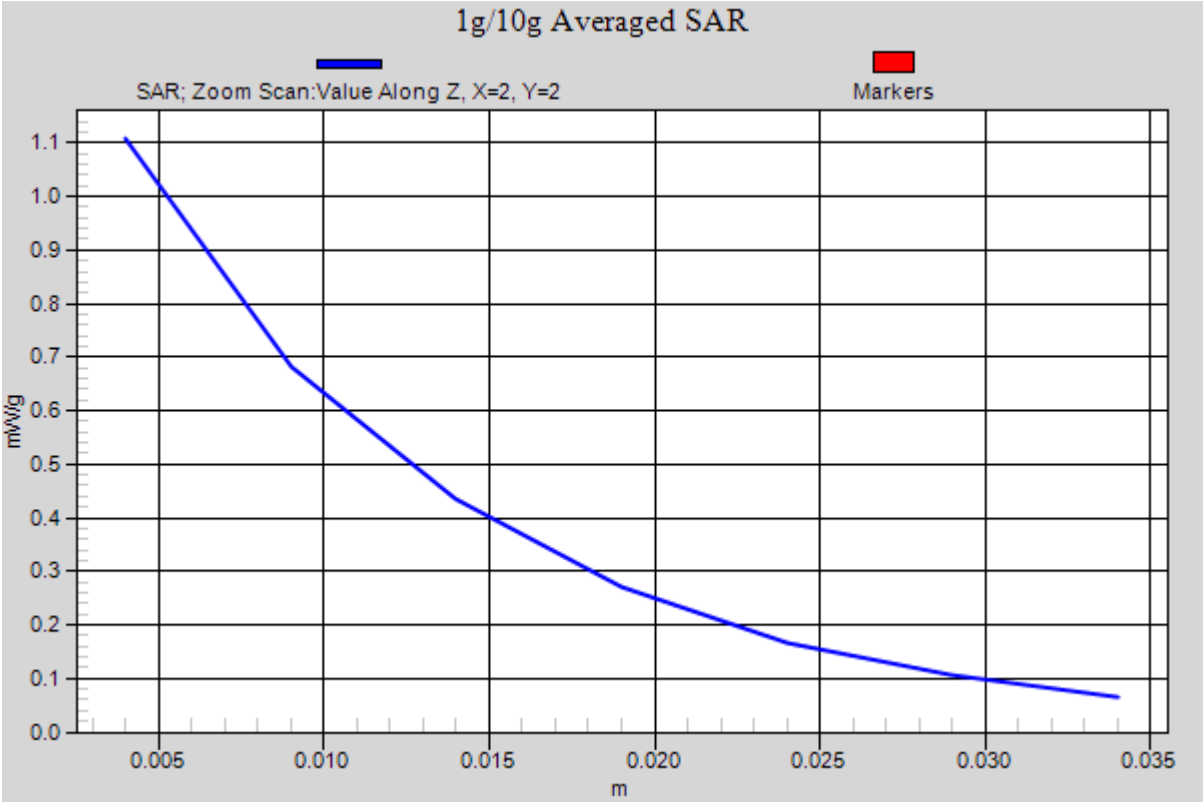


Figure 47 Body, Back Side, GSM 1900 EGPRS (2Txslots) Channel 661

GSM 1900 EGPRS (2Txslots) Back Side Middle (SN: GAGBB07XC4567157)

Date/Time: 1/10/2012 6:08:47 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.51, 7.51, 7.51) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.993 mW/g

Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.09 V/m; Power Drift = -0.132 dB

Peak SAR (extrapolated) = 1.46 W/kg

SAR(1 g) = 0.890 mW/g; SAR(10 g) = 0.510 mW/g

Maximum value of SAR (measured) = 1 mW/g

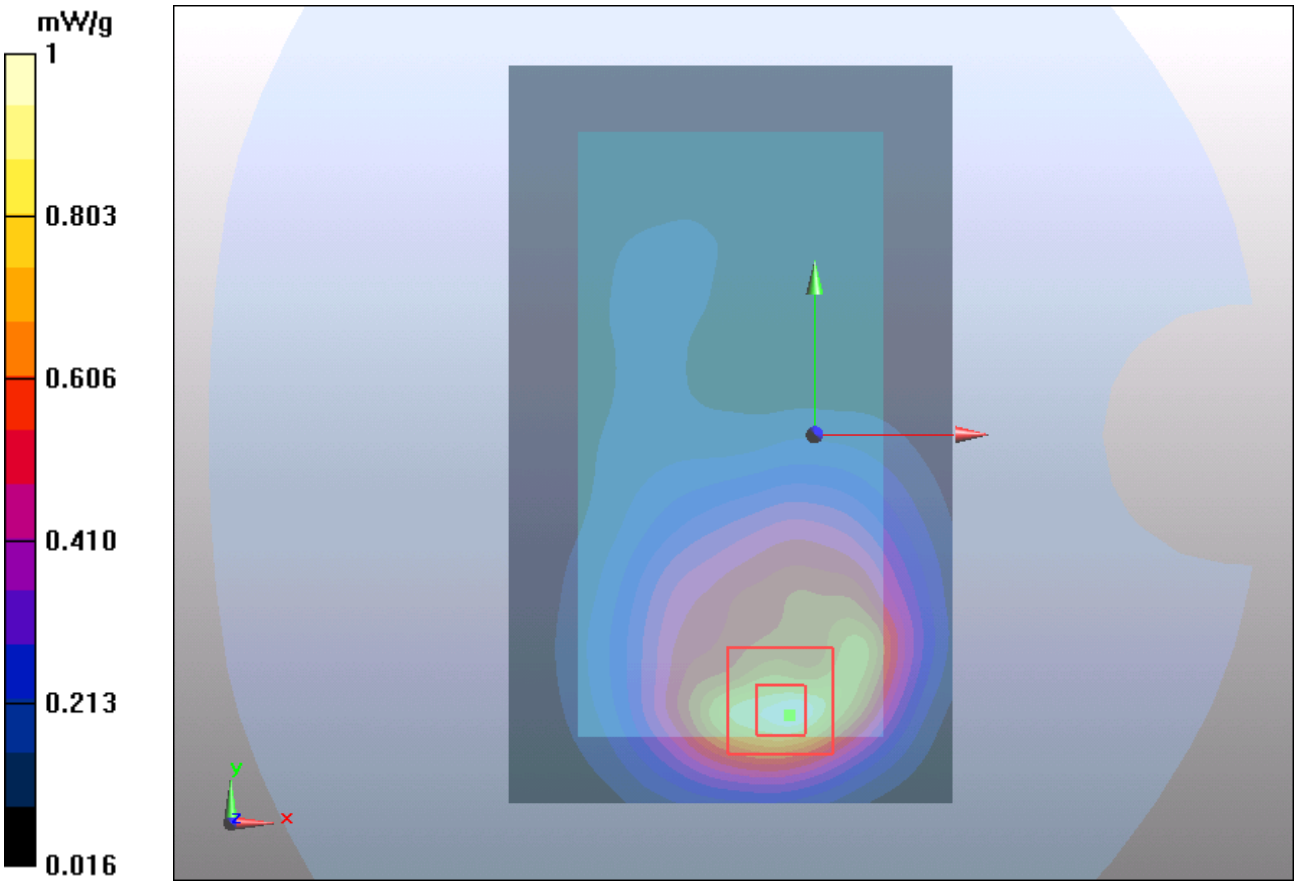


Figure 48 Body, Back Side, GSM 1900 EGPRS (2Txslots) Channel 661

GSM 1900 EGPRS (2Txslots) Back Side Middle (SN: BAABC12C98021591)

Date/Time: 1/10/2012 6:27:25 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.51, 7.51, 7.51) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 1.04 mW/g

Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.05 V/m; Power Drift = 0.044 dB

Peak SAR (extrapolated) = 1.49 W/kg

SAR(1 g) = 0.889 mW/g; SAR(10 g) = 0.506 mW/g

Maximum value of SAR (measured) = 0.942 mW/g

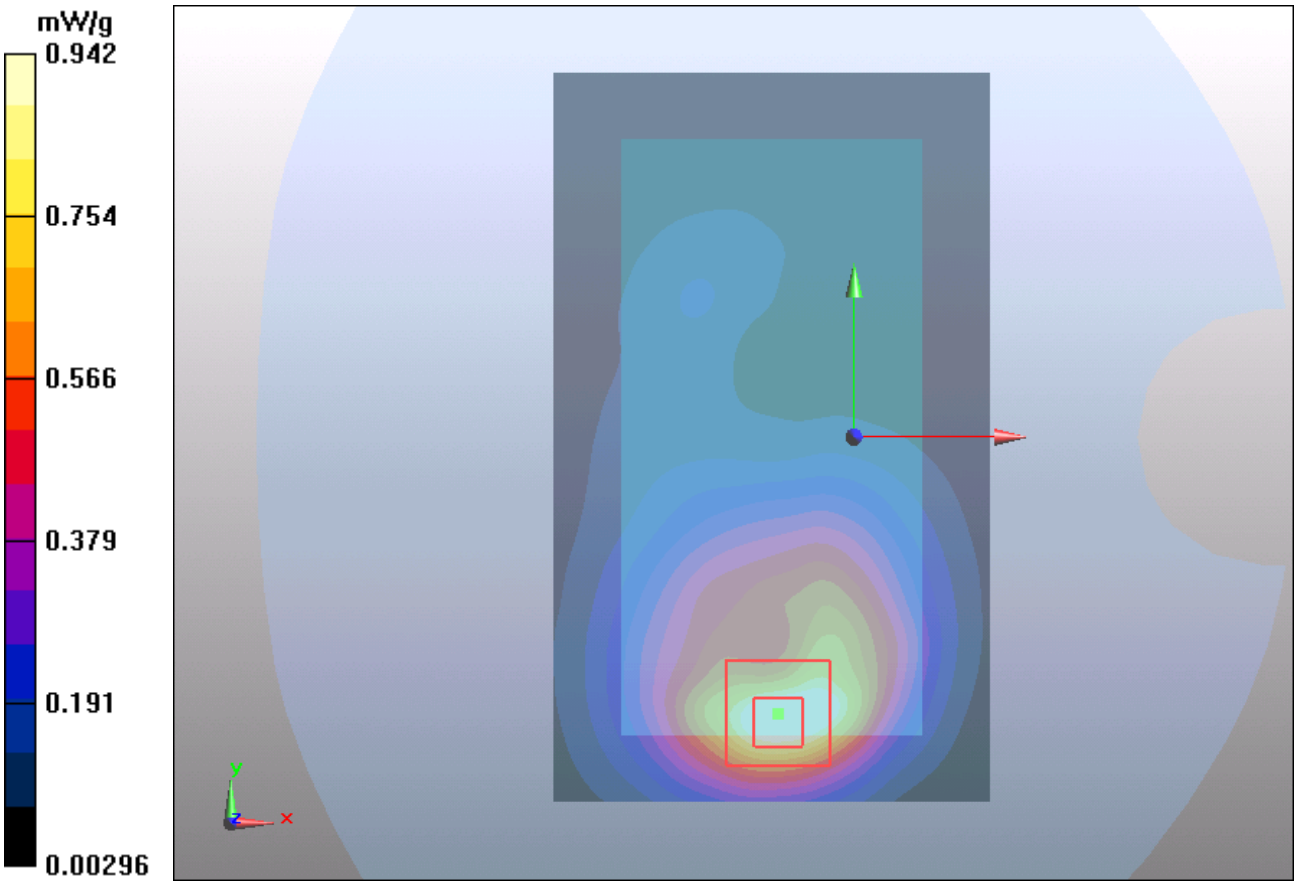


Figure 49 Body, Back Side, GSM 1900 EGPRS (2Txslots) Channel 661

GSM 1900 EGPRS (2Txslots) Back Side Middle (SN: UPDBC14X97502626)

Date/Time: 1/10/2012 6:50:56 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.51, 7.51, 7.51) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.986 mW/g

Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.1 V/m; Power Drift = -0.064 dB

Peak SAR (extrapolated) = 1.57 W/kg

SAR(1 g) = 0.936 mW/g; SAR(10 g) = 0.527 mW/g

Maximum value of SAR (measured) = 1.07 mW/g

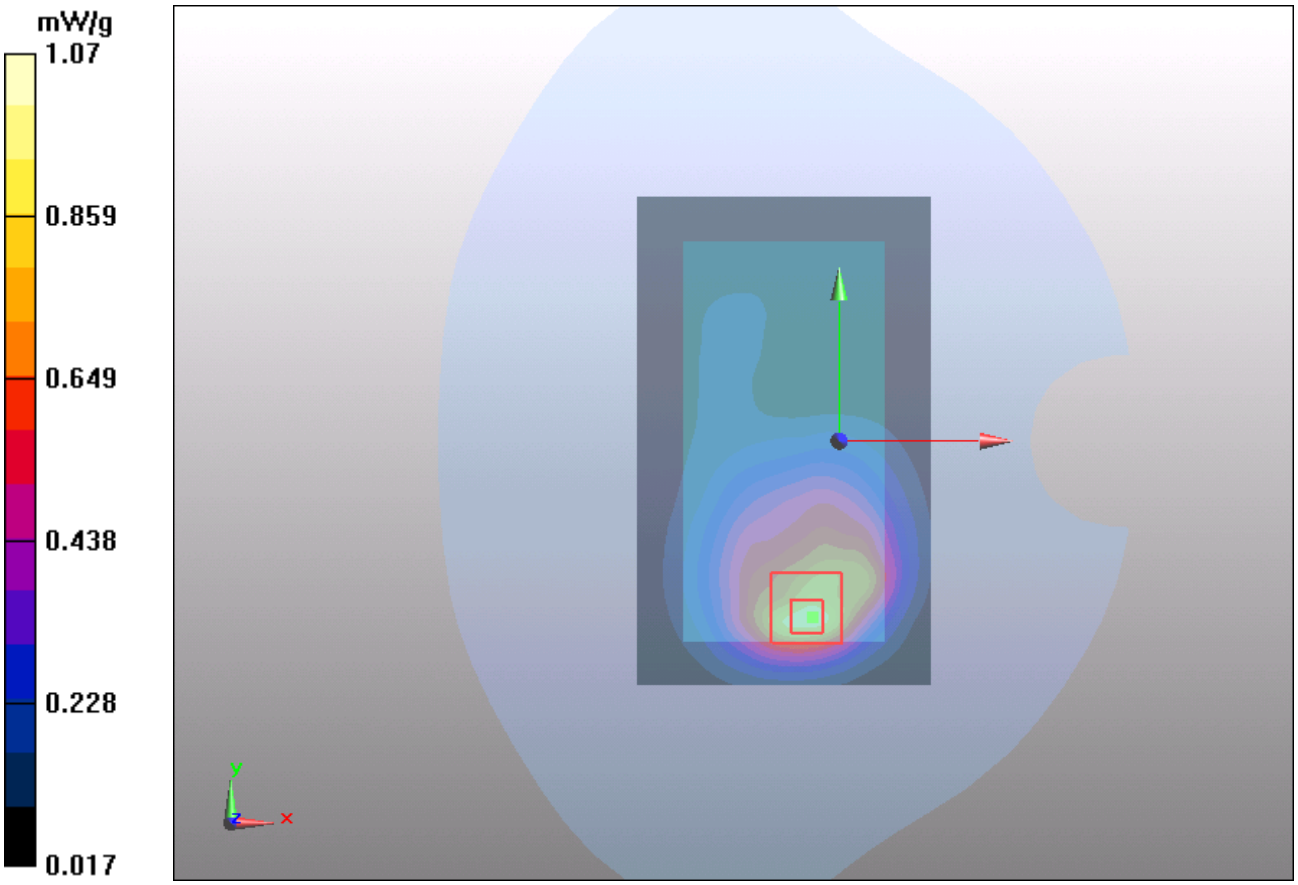


Figure 50 Body, Back Side, GSM 1900 EGPRS (2Txslots) Channel 661

802.11b Left Cheek Middle (SN: WLCB9166I3600877)

Date/Time: 1/16/2012 10:12:54 AM

Communication System: 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 2437 MHz; σ = 1.79 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Left Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.17, 7.17, 7.17) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.054 mW/g

Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.53 V/m; Power Drift = 0.094 dB

Peak SAR (extrapolated) = 0.095 W/kg

SAR(1 g) = 0.054 mW/g; SAR(10 g) = 0.030 mW/g

Maximum value of SAR (measured) = 0.059 mW/g

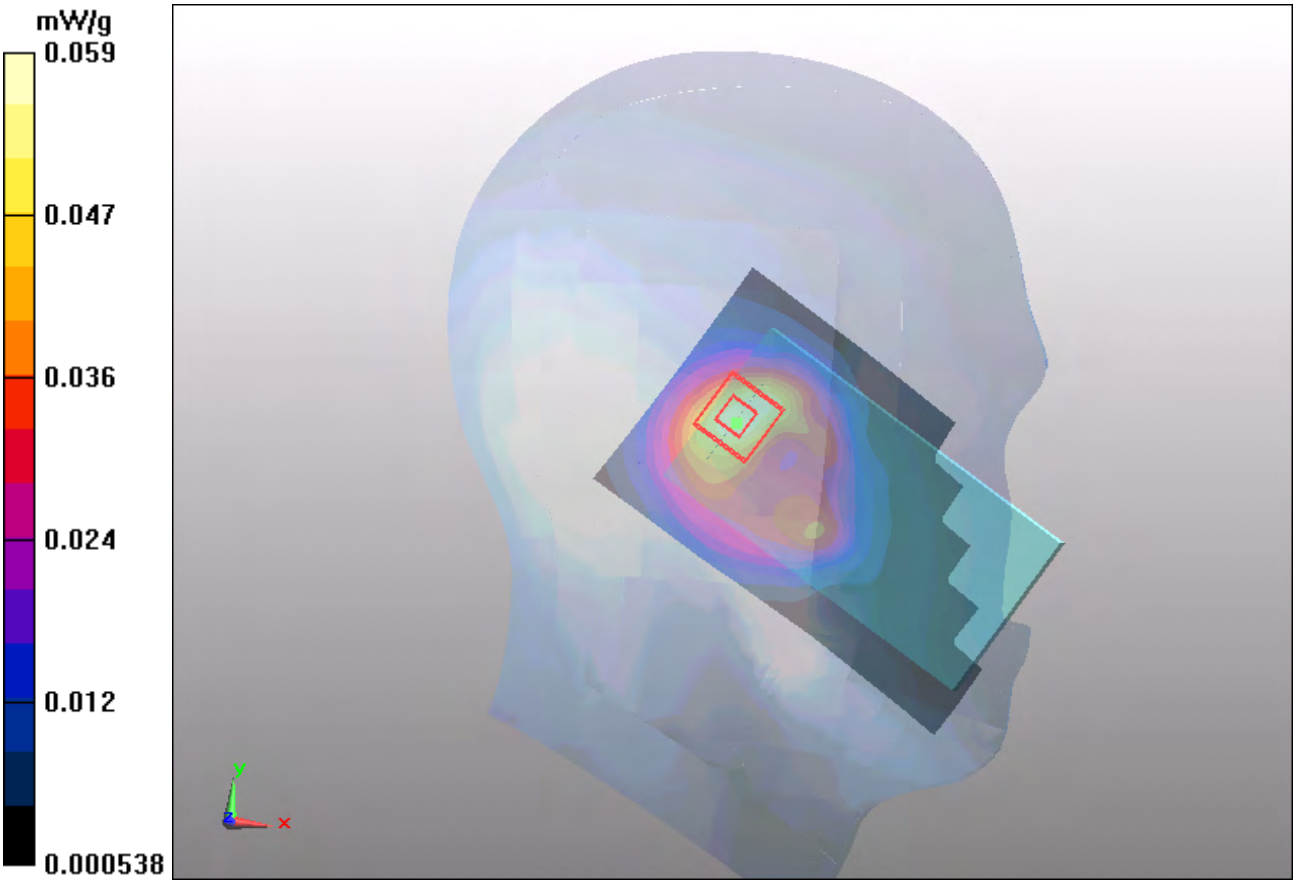


Figure 51 Left Hand Touch Cheek 802.11b Channel 6

802.11b Left Tilt Middle (SN: WLCB9166I3600877)

Date/Time: 1/16/2012 10:30:34 AM

Communication System: 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 2437 MHz; σ = 1.79 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Left Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.17, 7.17, 7.17) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.078 mW/g

Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.49 V/m; Power Drift = 0.143 dB

Peak SAR (extrapolated) = 0.141 W/kg

SAR(1 g) = 0.074 mW/g; SAR(10 g) = 0.038 mW/g

Maximum value of SAR (measured) = 0.085 mW/g

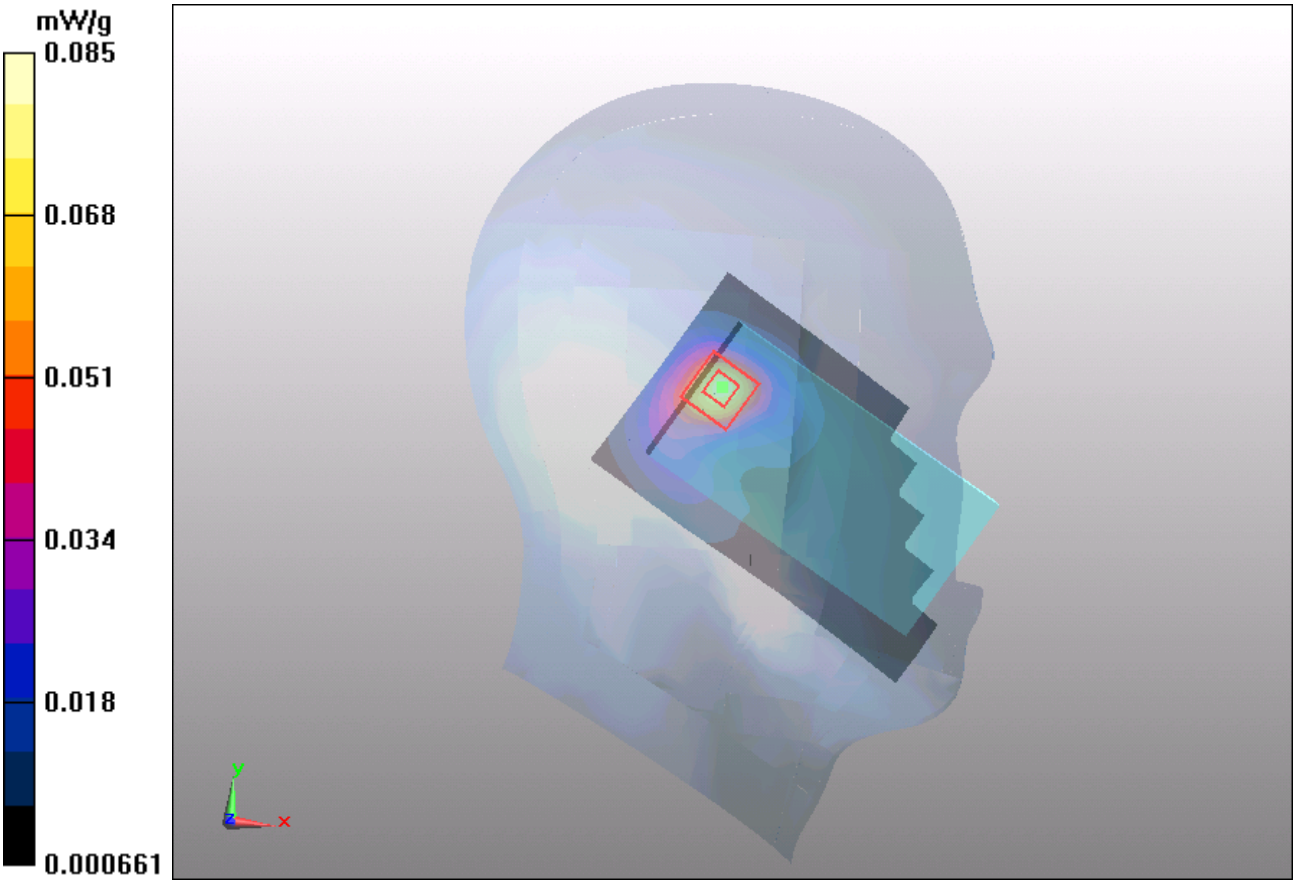


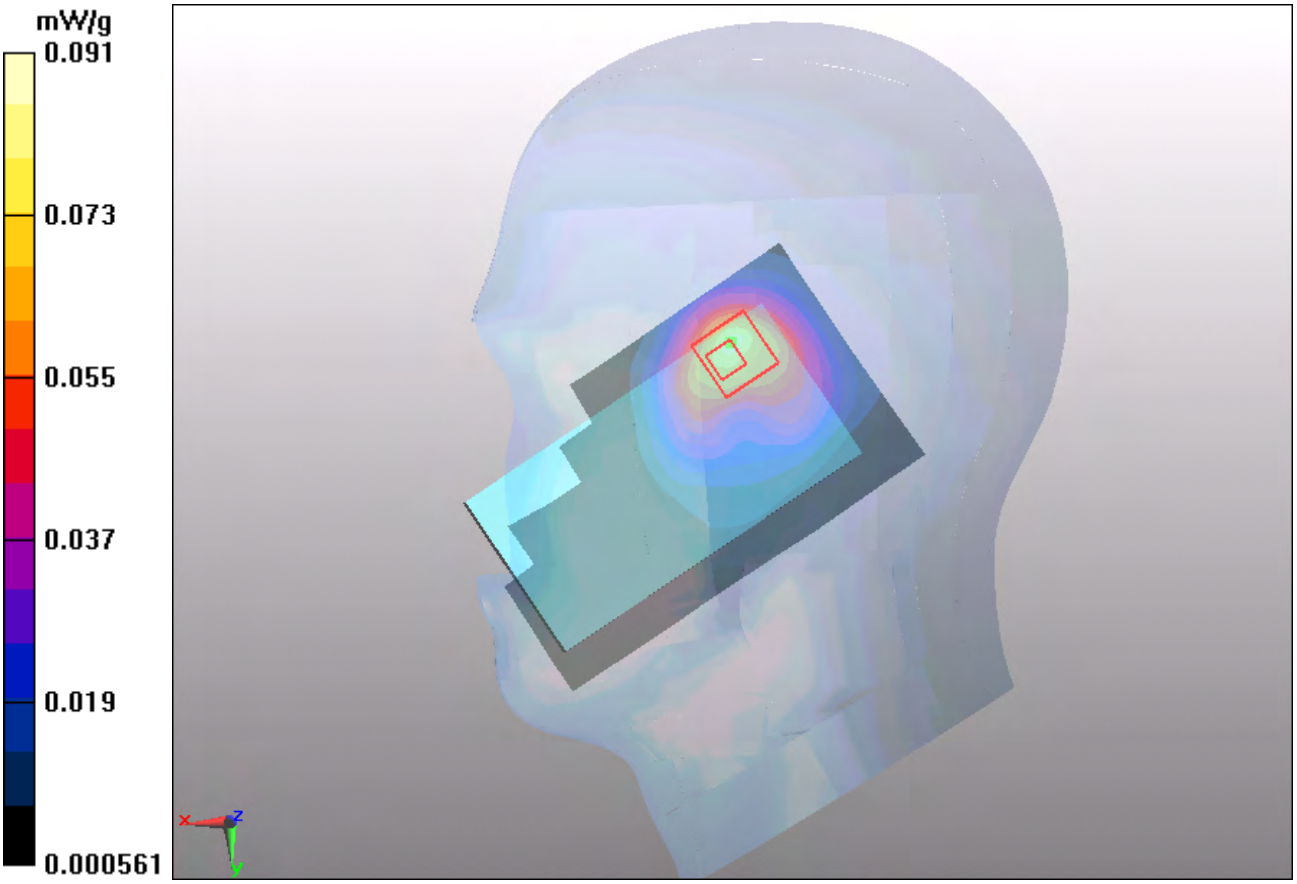
Figure 52 Left Hand Tilt 15° 802.11b Channel 6

802.11b Right Cheek Middle (SN: WLCB9166I3600877)

Date/Time: 1/16/2012 9:30:57 AM
Communication System: 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.79 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Probe: EX3DV4 - SN3816; ConvF(7.17, 7.17, 7.17) Calibrated: 10/3/2011;
Electronics: DAE4 Sn871; Calibrated: 11/22/2011
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) = 0.082 mW/g

Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.24 V/m; Power Drift = 0.192 dB
Peak SAR (extrapolated) = 0.189 W/kg
SAR(1 g) = 0.086 mW/g; SAR(10 g) = 0.043 mW/g
Maximum value of SAR (measured) = 0.091 mW/g



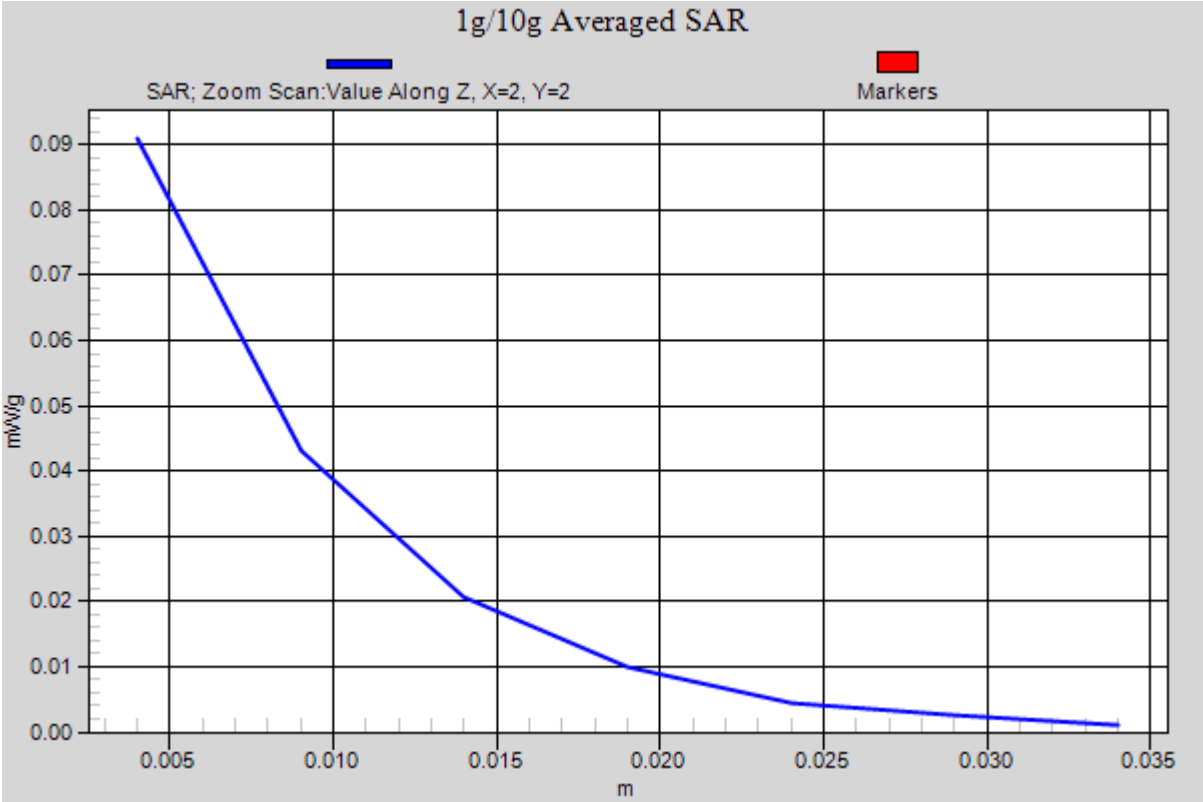


Figure 53 Right Hand Touch Cheek 802.11b Channel 6

802.11b Right Tilt Middle (SN: WLCB9166I3600877)

Date/Time: 1/16/2012 9:49:22 AM

Communication System: 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 2437 MHz; σ = 1.79 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Right Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.17, 7.17, 7.17) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.061 mW/g

Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.04 V/m; Power Drift = 0.110 dB

Peak SAR (extrapolated) = 0.105 W/kg

SAR(1 g) = 0.059 mW/g; SAR(10 g) = 0.032 mW/g

Maximum value of SAR (measured) = 0.064 mW/g

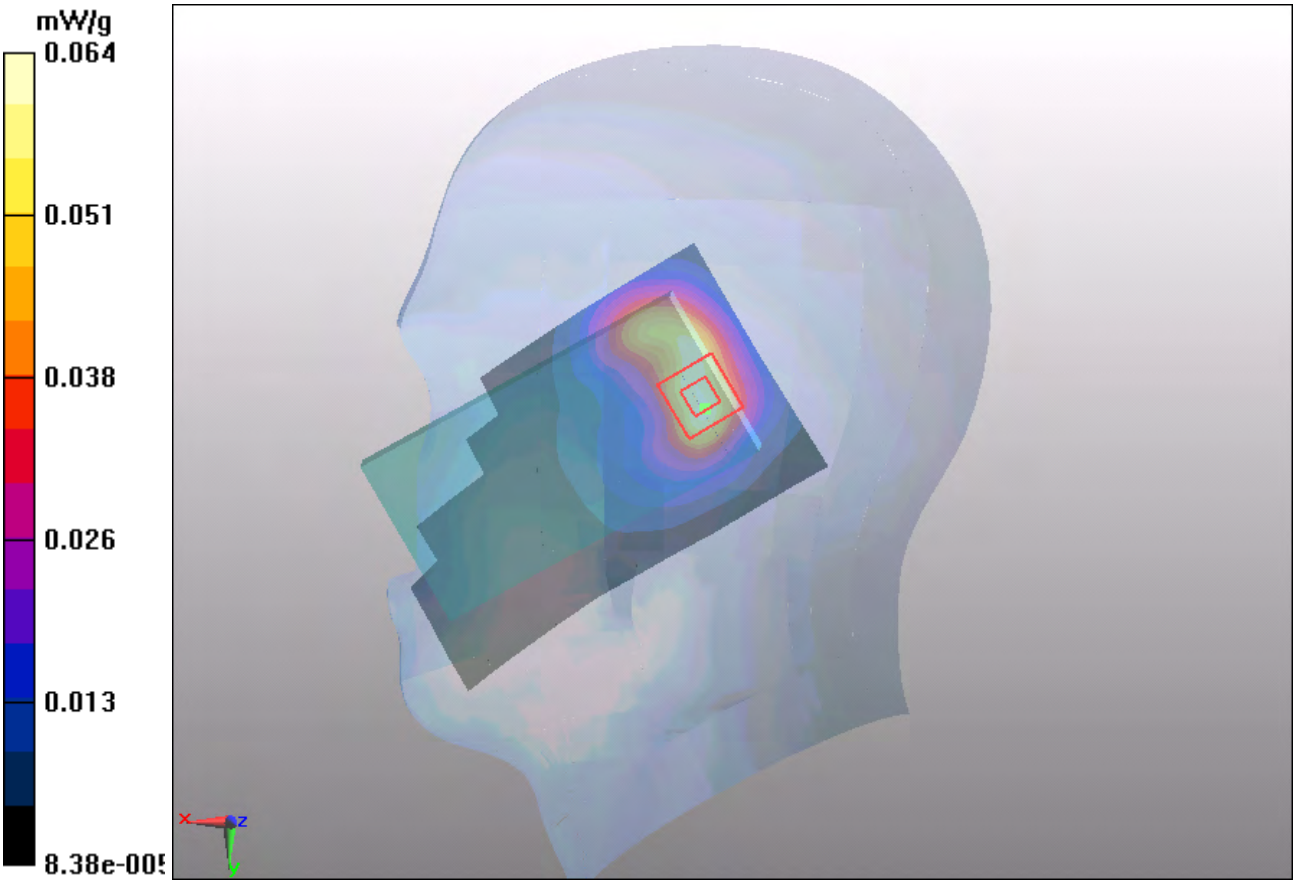


Figure 54 Right Hand Tilt 15° 802.11b Channel 6

802.11b Right Cheek Middle (SN: GAGBB07XC4567157)

Date/Time: 1/16/2012 11:36:22 AM

Communication System: 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 2437 MHz; σ = 1.79 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Right Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.17, 7.17, 7.17) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.084 mW/g

Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.37 V/m; Power Drift = 0.069 dB

Peak SAR (extrapolated) = 0.170 W/kg

SAR(1 g) = 0.079 mW/g; SAR(10 g) = 0.040 mW/g

Maximum value of SAR (measured) = 0.088 mW/g

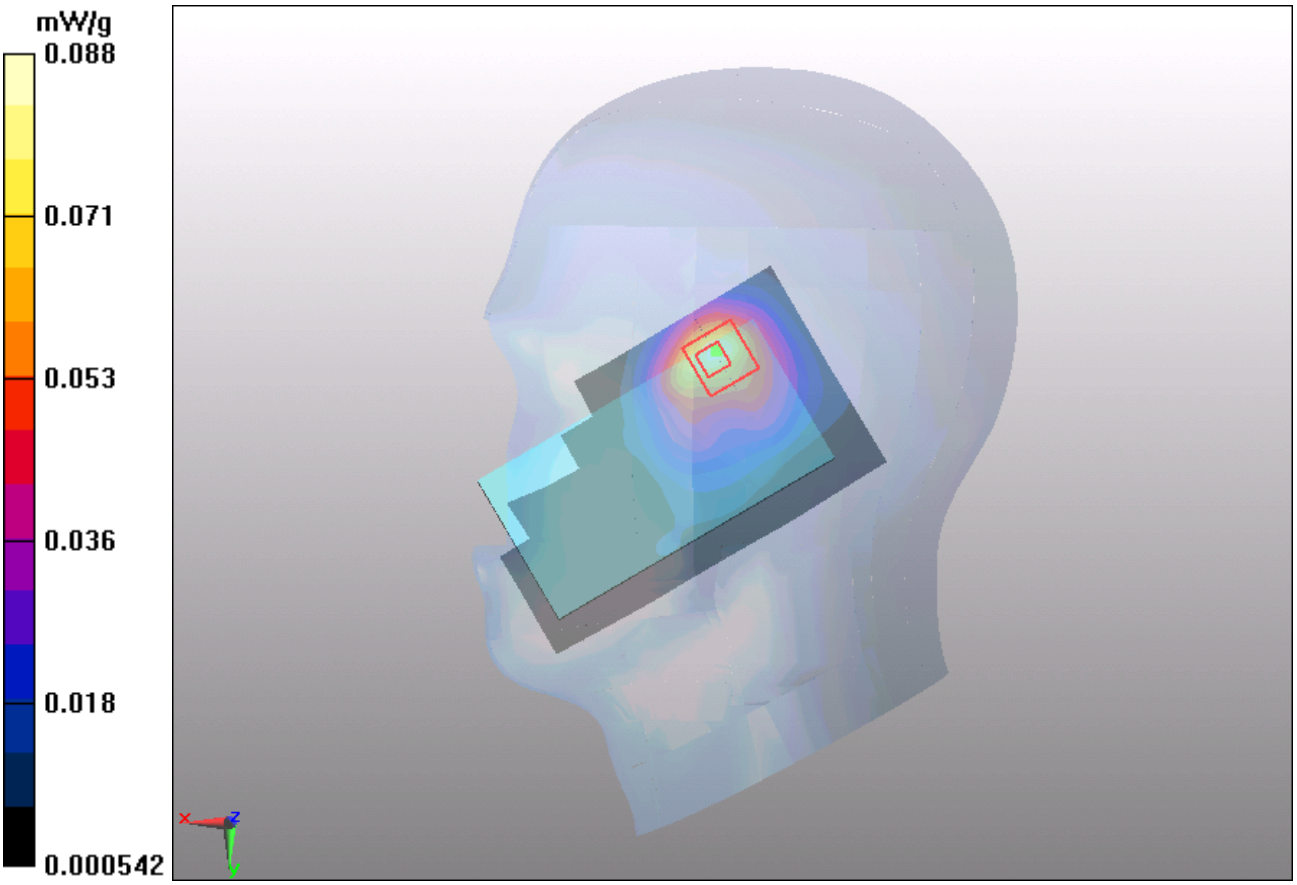


Figure 55 Right Hand Touch Cheek 802.11b Channel 6

802.11b Right Cheek Middle (SN: BAABC12C98021591)

Date/Time: 1/16/2012 11:14:33 AM

Communication System: 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 2437 MHz; σ = 1.79 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Right Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.17, 7.17, 7.17) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.084 mW/g

Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.36 V/m; Power Drift = 0.192 dB

Peak SAR (extrapolated) = 0.176 W/kg

SAR(1 g) = 0.080 mW/g; SAR(10 g) = 0.040 mW/g

Maximum value of SAR (measured) = 0.091 mW/g

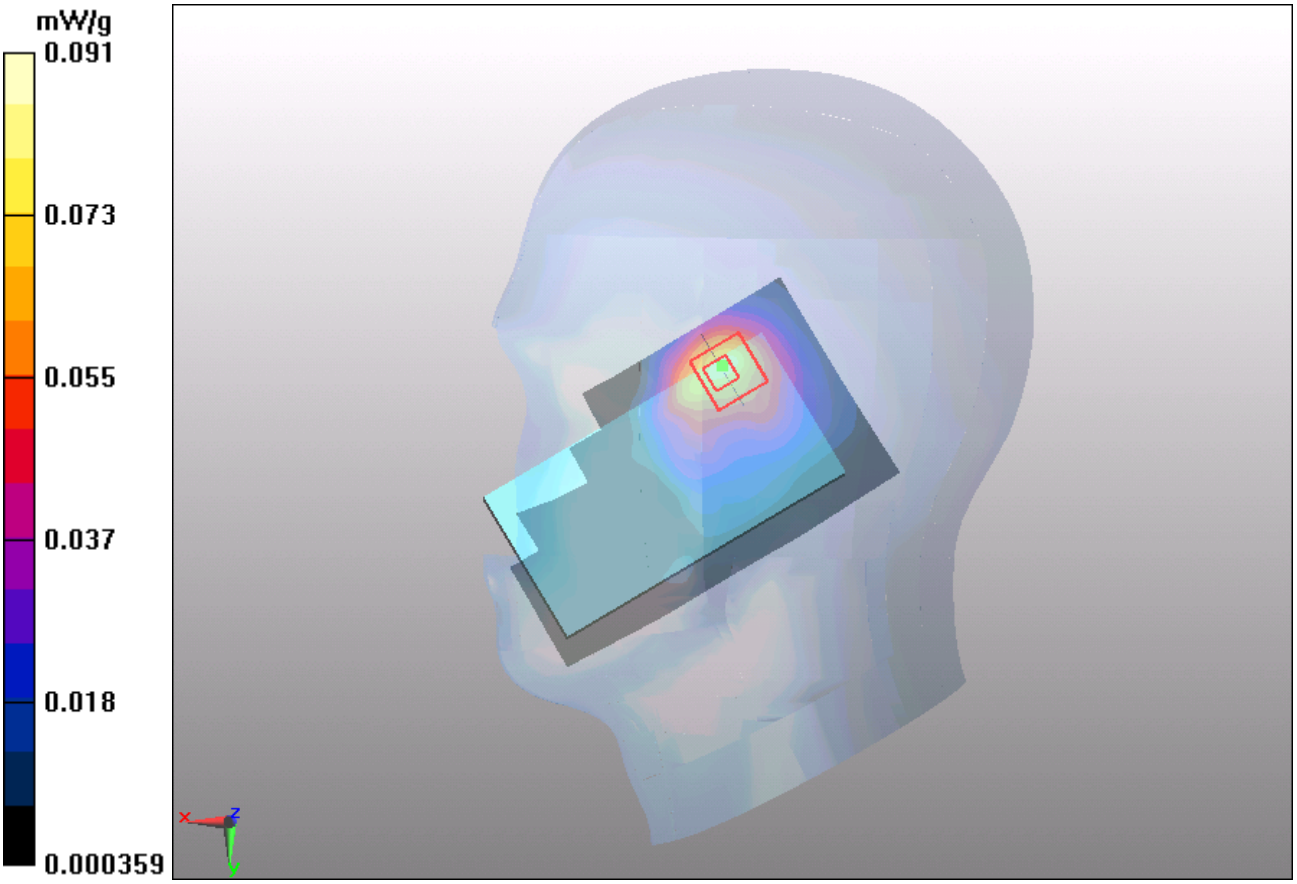


Figure 56 Right Hand Touch Cheek 802.11b Channel 6

802.11b Right Cheek Middle (SN: UPDBC14X97502626)

Date/Time: 1/16/2012 10:55:02 AM

Communication System: 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 2437 MHz; σ = 1.79 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Right Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.17, 7.17, 7.17) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.085 mW/g

Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.17 V/m; Power Drift = 0.077 dB

Peak SAR (extrapolated) = 0.179 W/kg

SAR(1 g) = 0.081 mW/g; SAR(10 g) = 0.041 mW/g

Maximum value of SAR (measured) = 0.091 mW/g

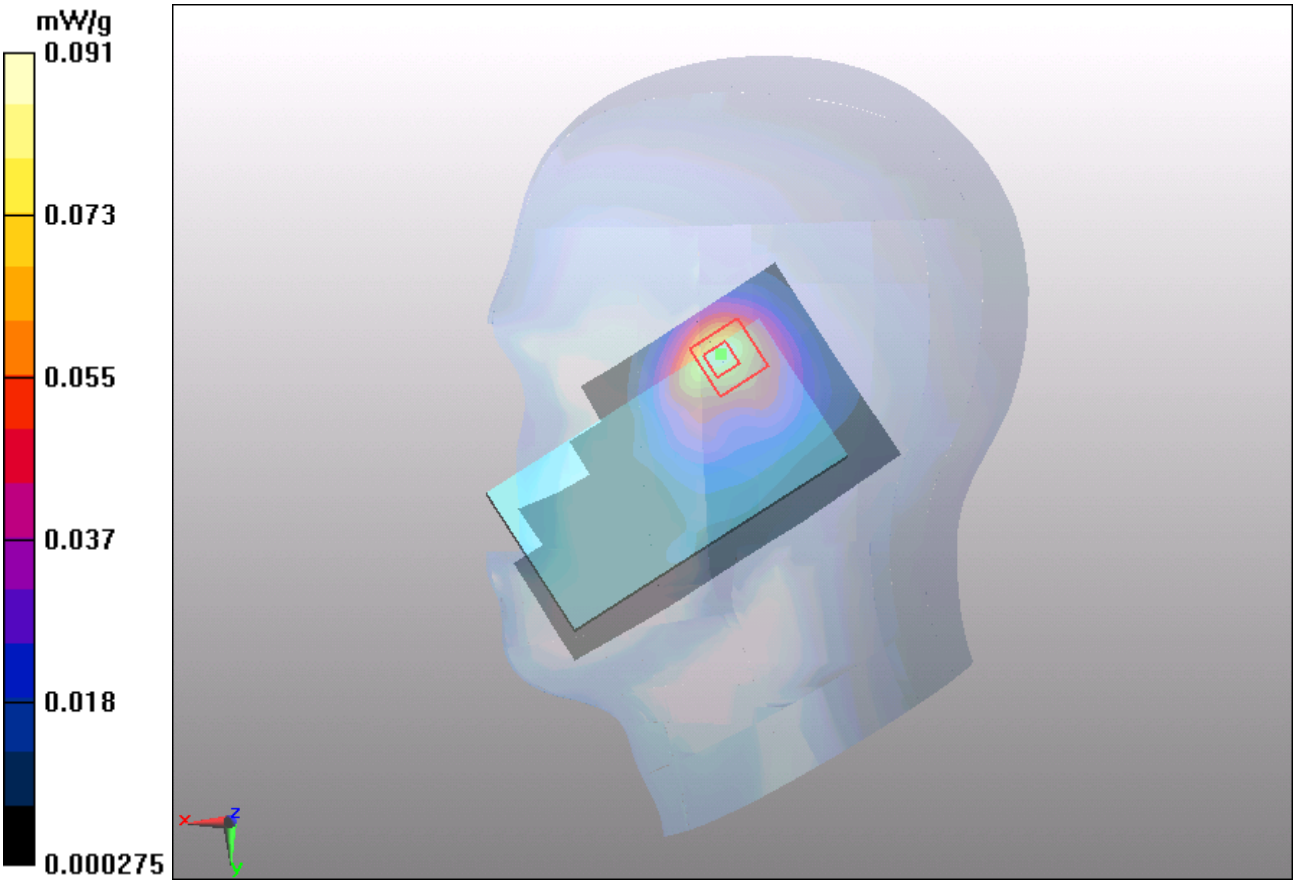


Figure 57 Right Hand Touch Cheek 802.11b Channel 6

802.11b Back Side Middle (SN: WLCB9166I3600877)

Date/Time: 1/16/2012 2:52:57 PM

Communication System: 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 2437 MHz; σ = 1.95 mho/m; ε_r = 52; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.19, 7.19, 7.19) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.063 mW/g

Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.65 V/m; Power Drift = 0.012 dB

Peak SAR (extrapolated) = 0.133 W/kg

SAR(1 g) = 0.059 mW/g; SAR(10 g) = 0.025 mW/g

Maximum value of SAR (measured) = 0.070 mW/g

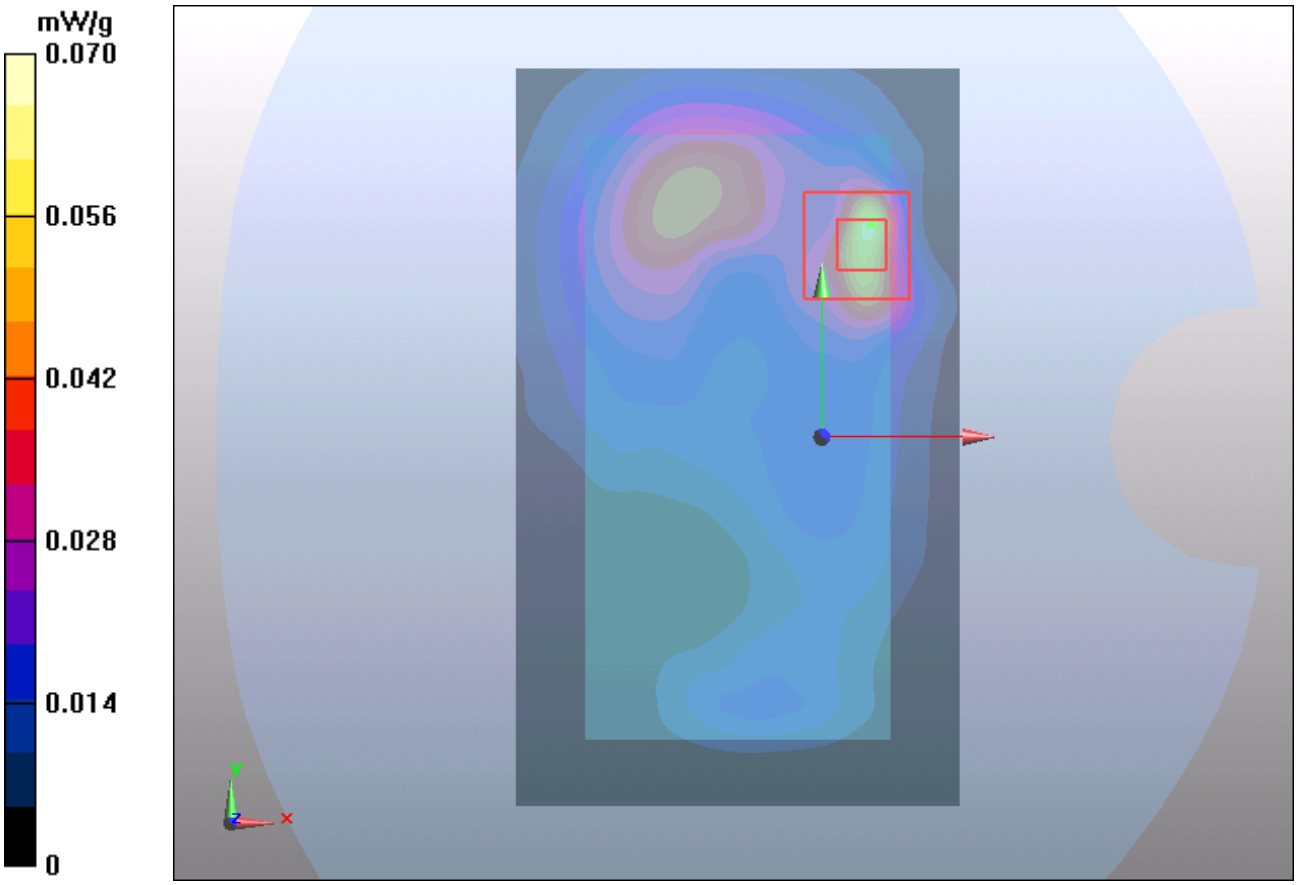


Figure 58 Body, Back Side, 802.11b Channel 6

802.11b Front Side Middle (SN: WLCB9166I3600877)

Date/Time: 1/16/2012 2:33:05 PM

Communication System: 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 2437 MHz; σ = 1.95 mho/m; ε_r = 52; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.19, 7.19, 7.19) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.035 mW/g

Front Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 1.29 V/m; Power Drift = 0.094 dB

Peak SAR (extrapolated) = 0.056 W/kg

SAR(1 g) = 0.032 mW/g; SAR(10 g) = 0.018 mW/g

Maximum value of SAR (measured) = 0.034 mW/g

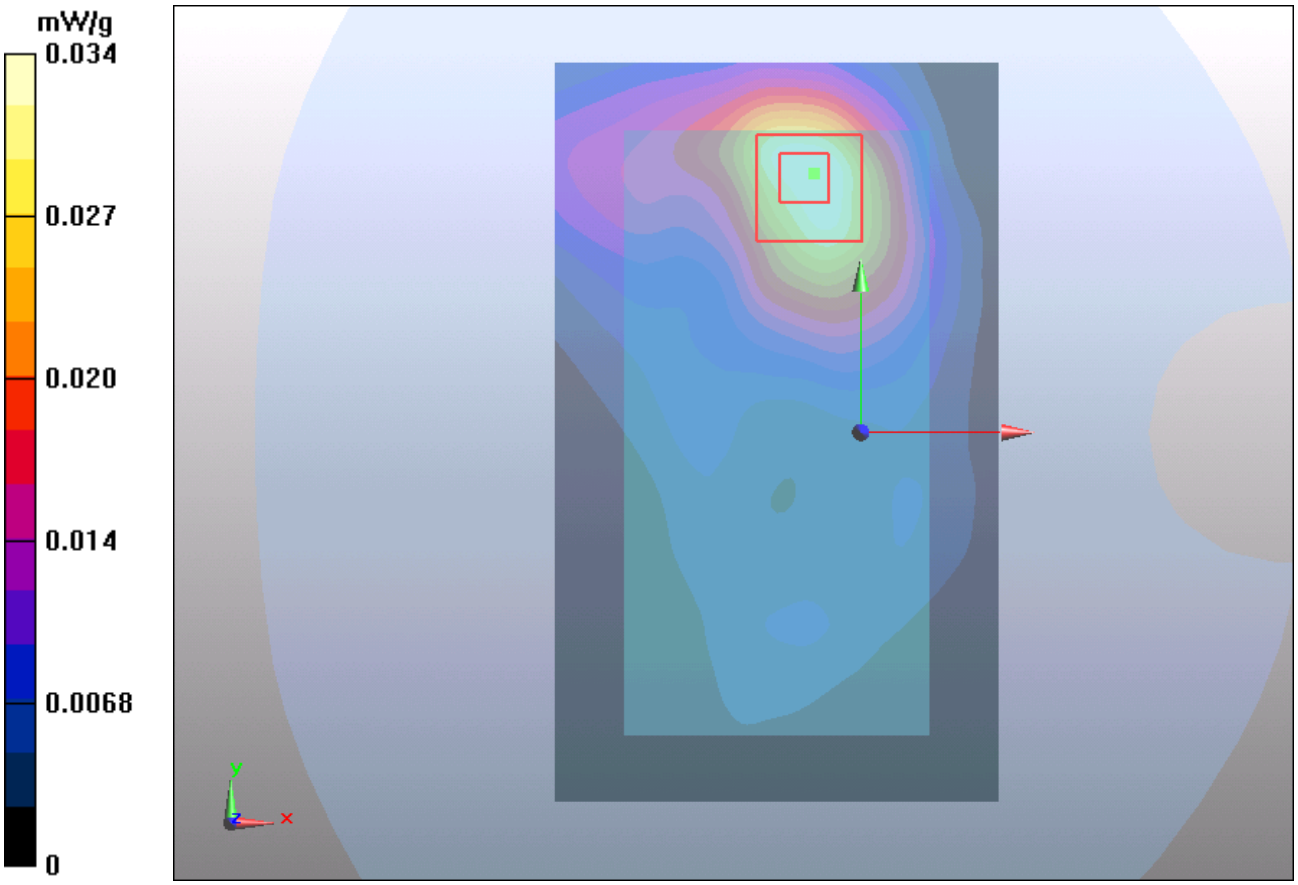


Figure 59 Body, Front Side, 802.11b Channel 6

802.11b Left Edge Middle (SN: WLCB9166I3600877)

Date/Time: 1/16/2012 4:59:21 PM

Communication System: 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 2437 MHz; σ = 1.95 mho/m; ε_r = 52; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.19, 7.19, 7.19) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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 (41x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.041 mW/g

Left Edge Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.64 V/m; Power Drift = 0.049 dB

Peak SAR (extrapolated) = 0.090 W/kg

SAR(1 g) = 0.043 mW/g; SAR(10 g) = 0.020 mW/g

Maximum value of SAR (measured) = 0.049 mW/g

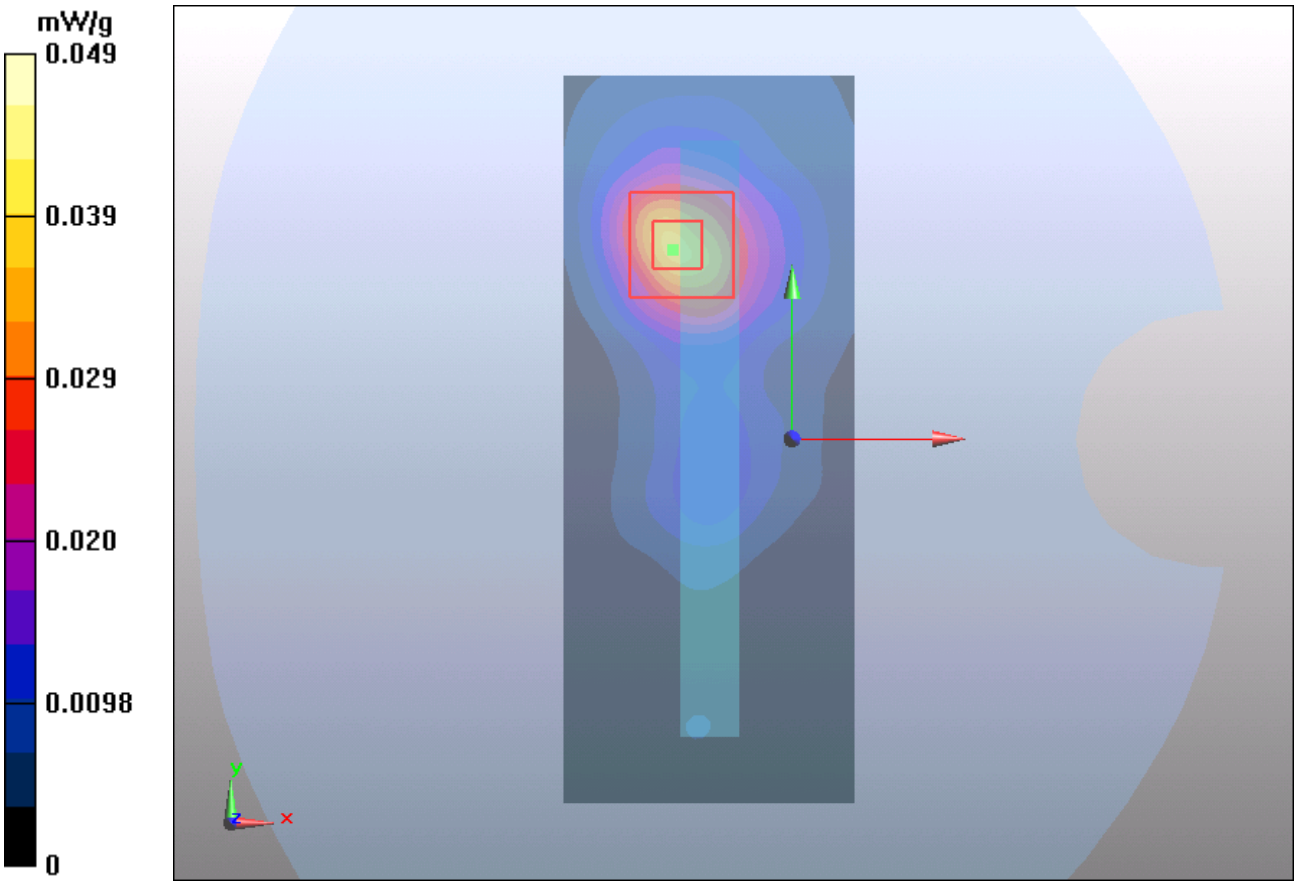


Figure 60 Body, Left Edge, 802.11b Channel 6

802.11b Top Edge Middle (SN: WLCB9166I3600877)

Date/Time: 1/16/2012 5:21:29 PM

Communication System: 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 2437 MHz; σ = 1.95 mho/m; ε_r = 52; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.19, 7.19, 7.19) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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

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

Top Edge Middle/Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.040 mW/g

Top Edge Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.61 V/m; Power Drift = 0.011 dB

Peak SAR (extrapolated) = 0.066 W/kg

SAR(1 g) = 0.035 mW/g; SAR(10 g) = 0.019 mW/g

Maximum value of SAR (measured) = 0.039 mW/g

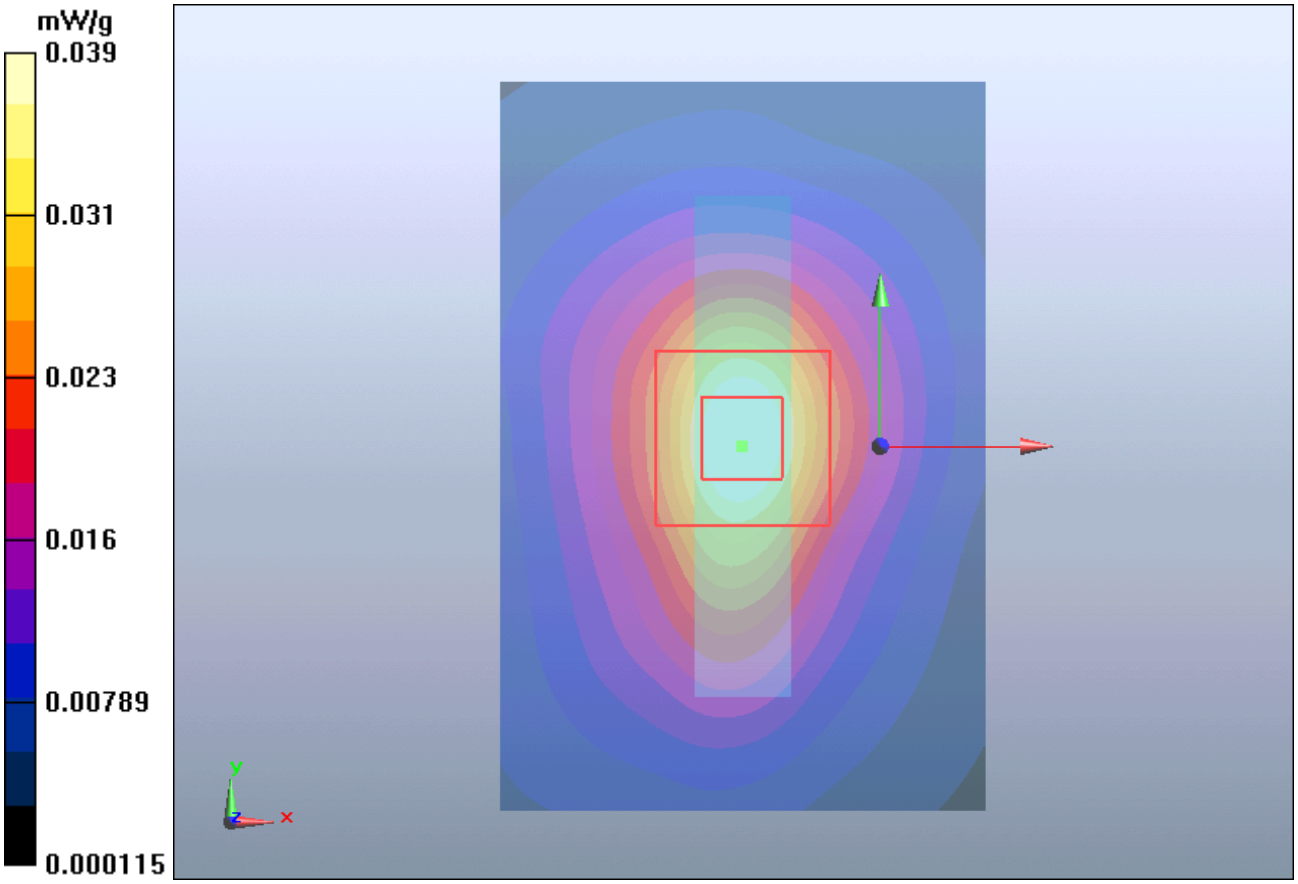


Figure 61 Body, Top Edge, 802.11b Channel 6

802.11b with Earphone Back Side Middle (SN: WLCB9166I3600877)

Date/Time: 1/16/2012 5:48:46 PM

Communication System: 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 2437 MHz; σ = 1.95 mho/m; ε_r = 52; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.19, 7.19, 7.19) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.096 mW/g

Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.06 V/m; Power Drift = 0.091 dB

Peak SAR (extrapolated) = 0.224 W/kg

SAR(1 g) = 0.104 mW/g; SAR(10 g) = 0.045 mW/g

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

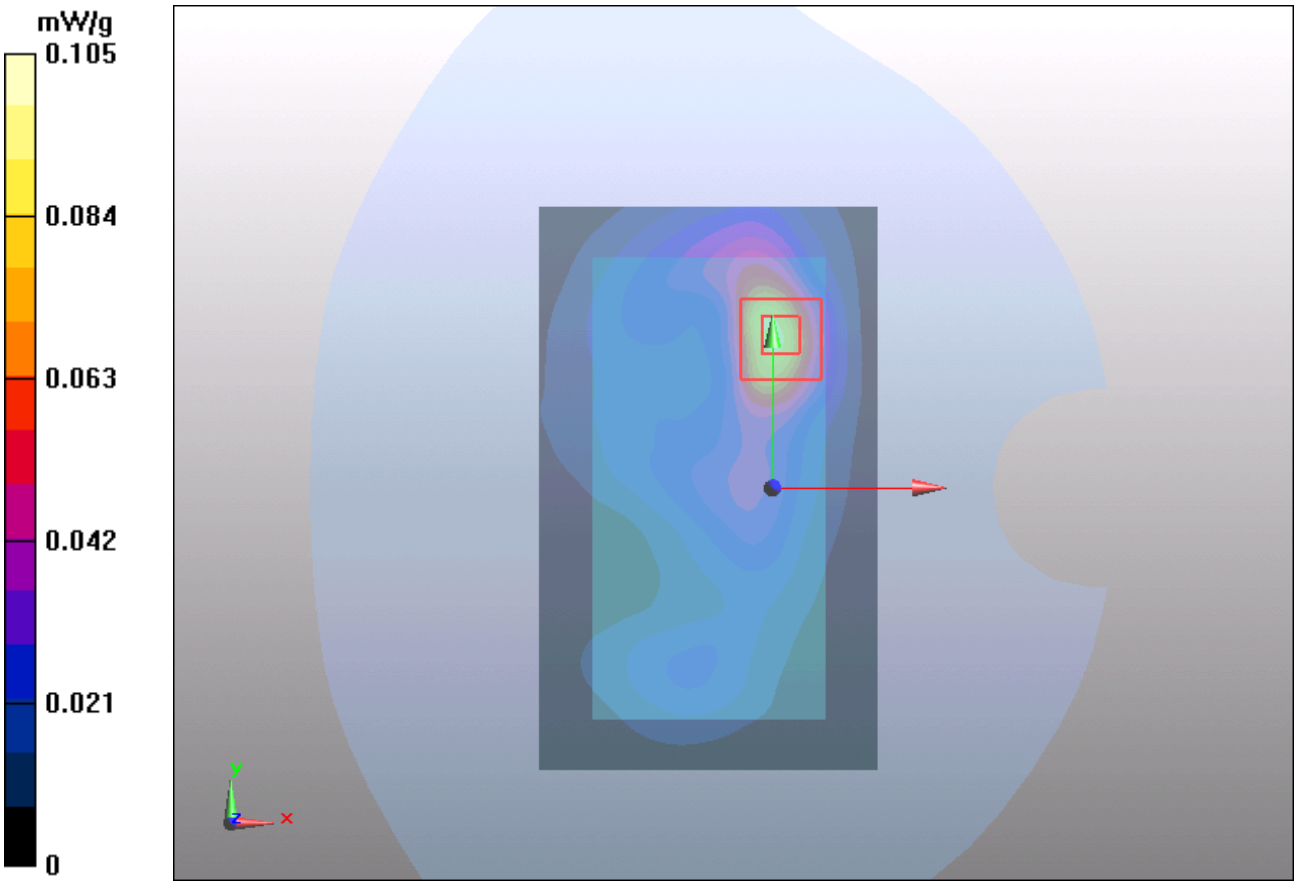


Figure 62 Body with earphone, Back Side, 802.11b Channel 6

802.11b Back Side Middle (SN: GAGBB07XC4567157)

Date/Time: 1/16/2012 6:54:45 PM

Communication System: 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 2437 MHz; σ = 1.95 mho/m; ε_r = 52; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.19, 7.19, 7.19) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.113 mW/g

Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.21 V/m; Power Drift = -0.002 dB

Peak SAR (extrapolated) = 0.266 W/kg

SAR(1 g) = 0.121 mW/g; SAR(10 g) = 0.052 mW/g

Maximum value of SAR (measured) = 0.123 mW/g

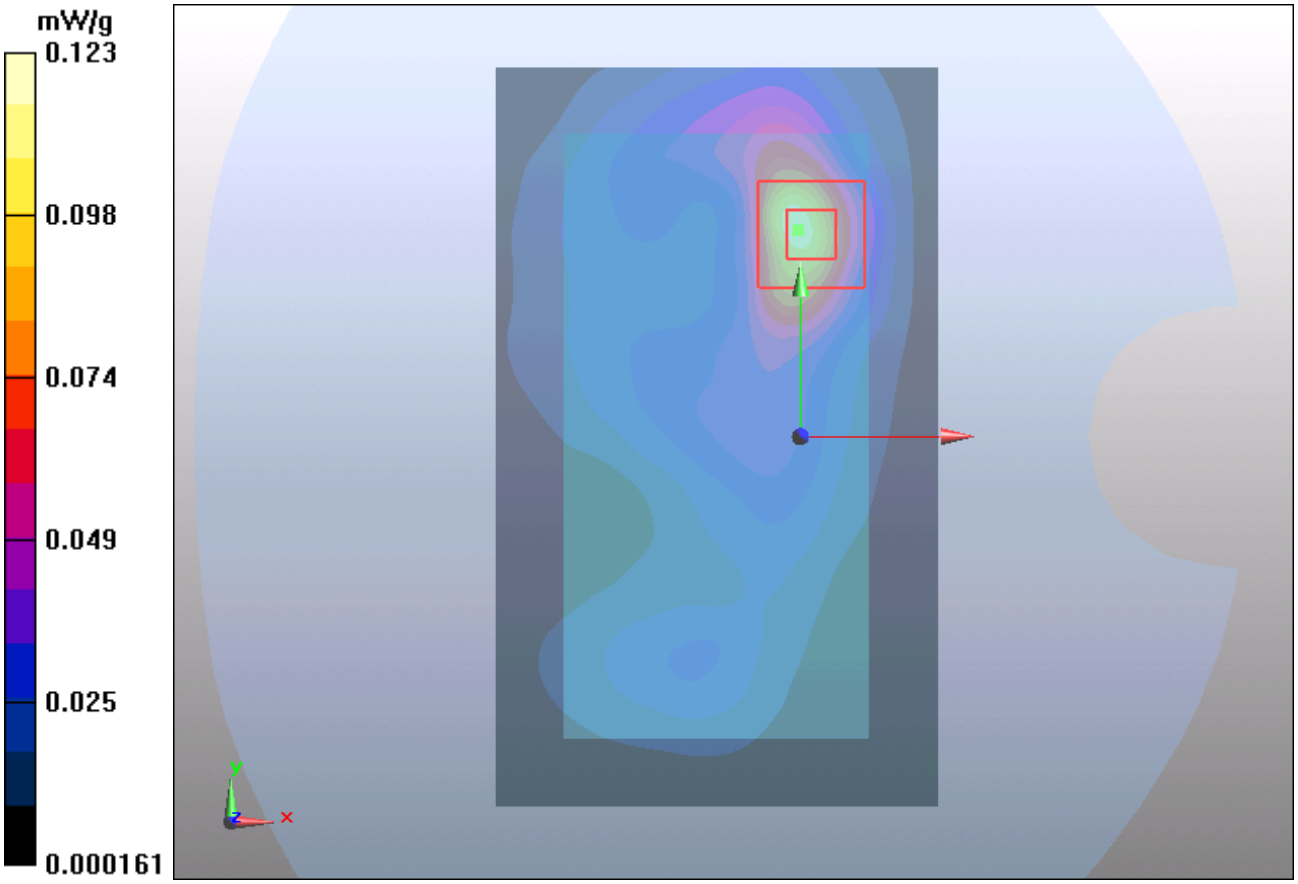


Figure 63 Body, Back Side, 802.11b Channel 6

802.11b Back Side Middle (SN: BAABC12C98021591)

Date/Time: 1/16/2012 6:23:33 PM

Communication System: 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 2437 MHz; σ = 1.95 mho/m; ε_r = 52; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.19, 7.19, 7.19) Calibrated: 10/3/2011;

Electronics: DAE4 Sn871; Calibrated: 11/22/2011

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) = 0.111 mW/g

Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.19 V/m; Power Drift = 0.112 dB

Peak SAR (extrapolated) = 0.259 W/kg

SAR(1 g) = 0.120 mW/g; SAR(10 g) = 0.052 mW/g

Maximum value of SAR (measured) = 0.122 mW/g

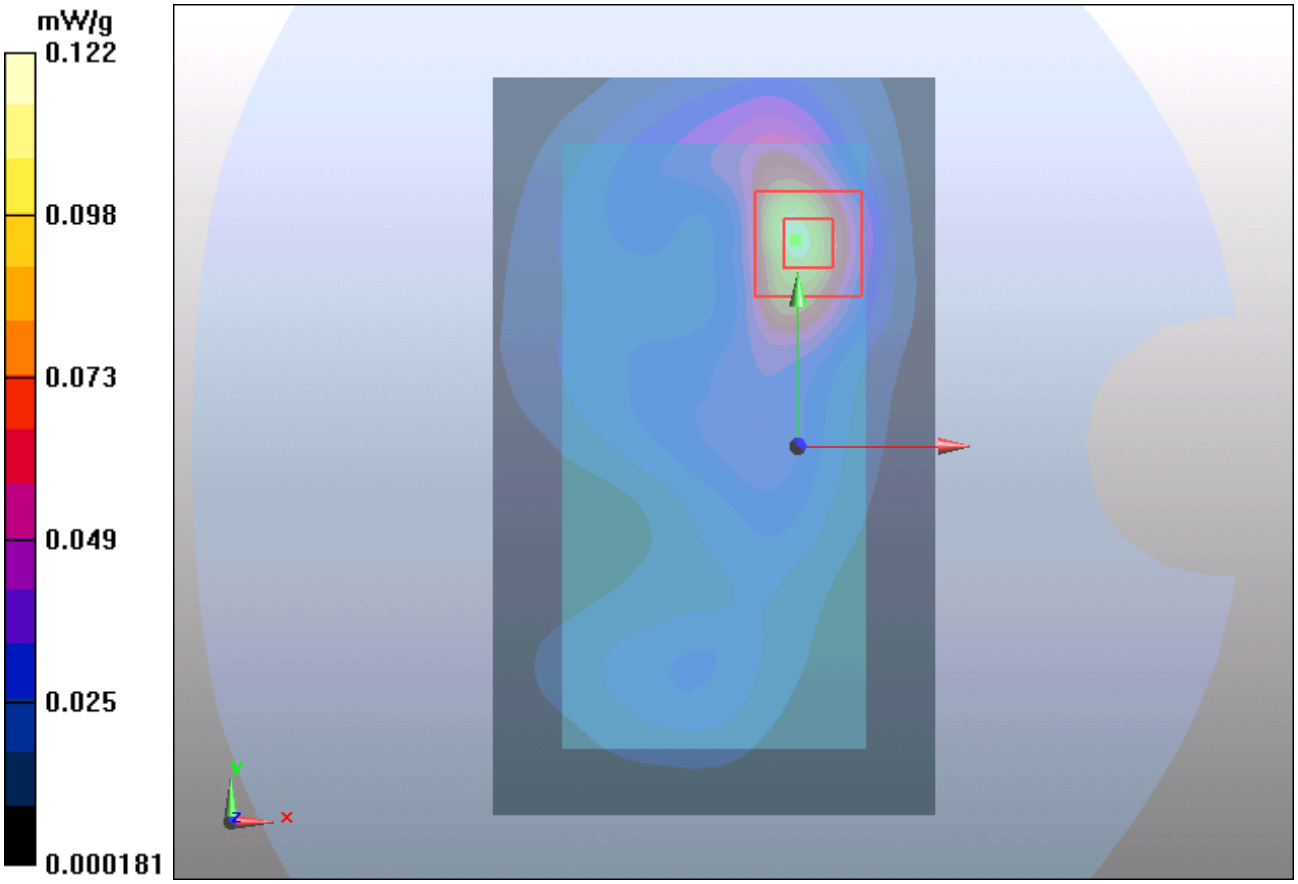


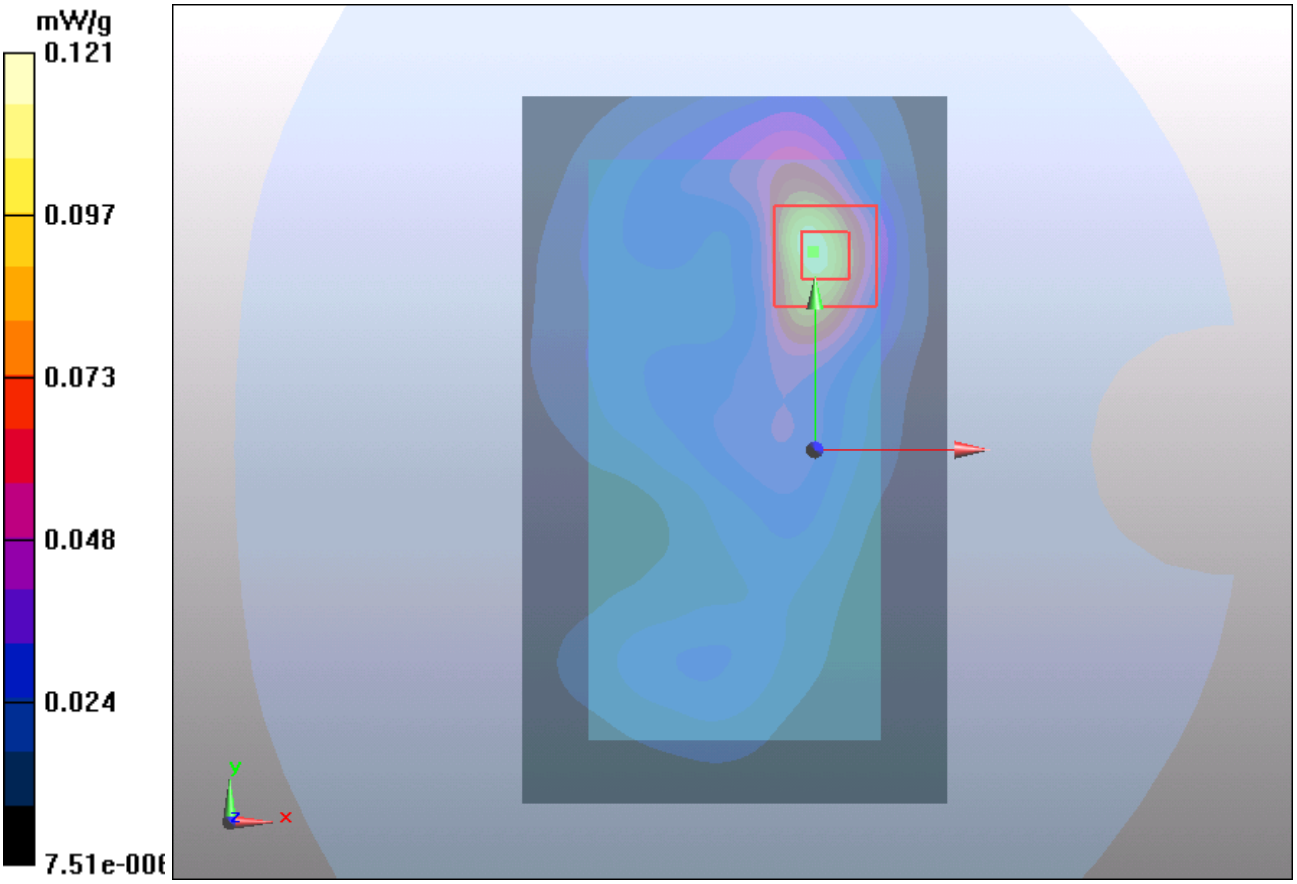
Figure 64 Body, Back Side, 802.11b Channel 6

802.11b Back Side Middle (SN: UPDBC14X97502626)

Date/Time: 1/16/2012 7:13:27 PM
Communication System: 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.95 mho/m; ε_r = 52; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Probe: EX3DV4 - SN3816; ConvF(7.19, 7.19, 7.19) Calibrated: 10/3/2011;
Electronics: DAE4 Sn871; Calibrated: 11/22/2011
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) = 0.112 mW/g

Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.21 V/m; Power Drift = -0.002 dB
Peak SAR (extrapolated) = 0.267 W/kg
SAR(1 g) = 0.122 mW/g; SAR(10 g) = 0.053 mW/g
Maximum value of SAR (measured) = 0.121 mW/g



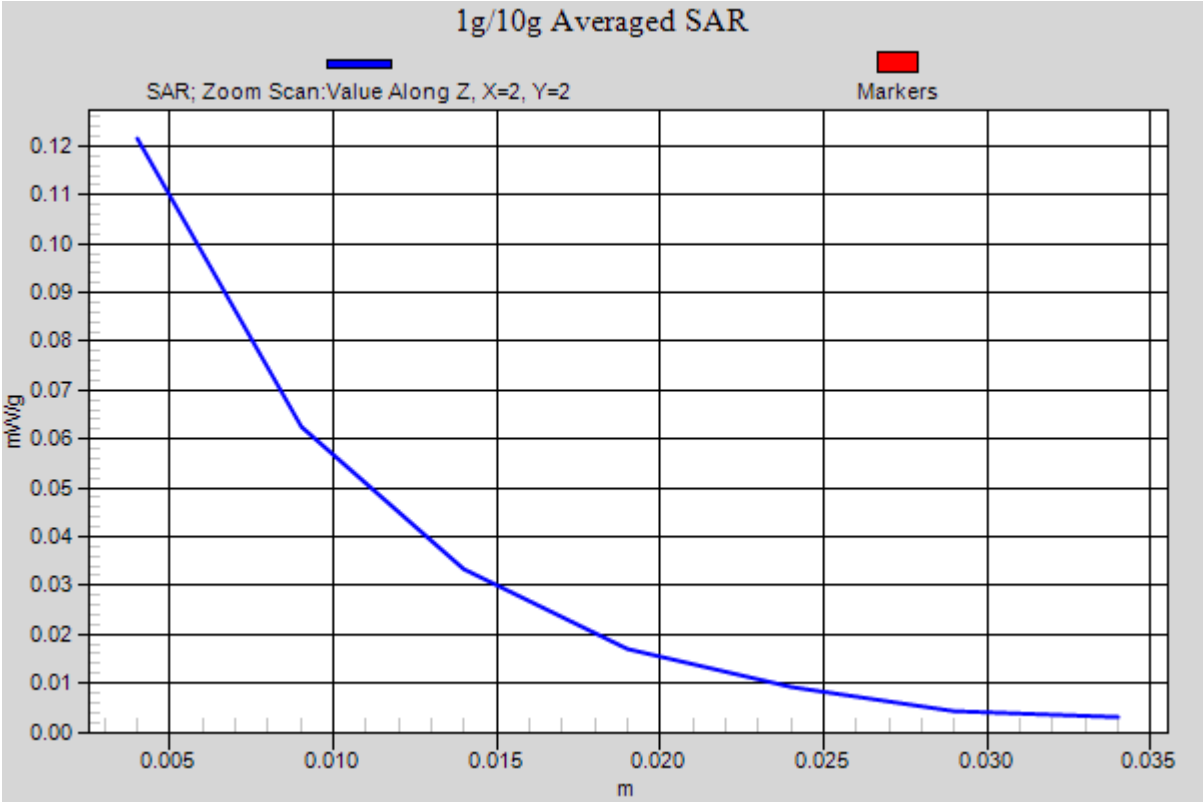


Figure 65 Body, Back Side, 802.11b Channel 6

ANNEX D: Probe Calibration Certificate

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

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

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

Accreditation No.: SCS 108

Client: TMC Shanghai (Auden)

Certificate No: EX3-3816_Oct11

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3816

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

Calibration date: October 3, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-10 (No. ES3-3013_Dec10)	Dec-11
DAE4	SN: 654	3-May-11 (No. DAE4-654_May11)	May-12
Secondary Standards	**ID**	**Check Date (in house)**	**Scheduled Check**
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

	Name	Function	Signature
Calibrated by:	Jelon Kastalli	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: October 3, 2011

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

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

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

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

Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003

b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

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

Probe EX3DV4

SN:3816

Manufactured: September 2, 2011
Calibrated: October 3, 2011

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3816

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.48	0.56	0.61	± 10.1 %
DCP (mV)[B]	99.8	102.2	102.1	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	111.3	±2.7 %
			Y	0.00	0.00	1.00	127.3	
			Z	0.00	0.00	1.00	127.7	

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

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3816

Calibration Parameter Determined In Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	43.5	0.87	9.97	9.97	9.97	0.11	1.00	± 13.4 %
750	41.9	0.89	9.47	9.47	9.47	0.62	0.78	± 12.0 %
835	41.5	0.90	9.22	9.22	9.22	0.76	0.66	± 12.0 %
1450	40.5	1.20	8.58	8.58	8.58	0.65	0.77	± 12.0 %
1750	40.1	1.37	8.23	8.23	8.23	0.80	0.58	± 12.0 %
1900	40.0	1.40	7.90	7.90	7.90	0.80	0.57	± 12.0 %
2450	39.2	1.80	7.17	7.17	7.17	0.86	0.64	± 12.0 %
2600	39.0	1.96	7.06	7.06	7.06	0.64	0.67	± 12.0 %

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3816

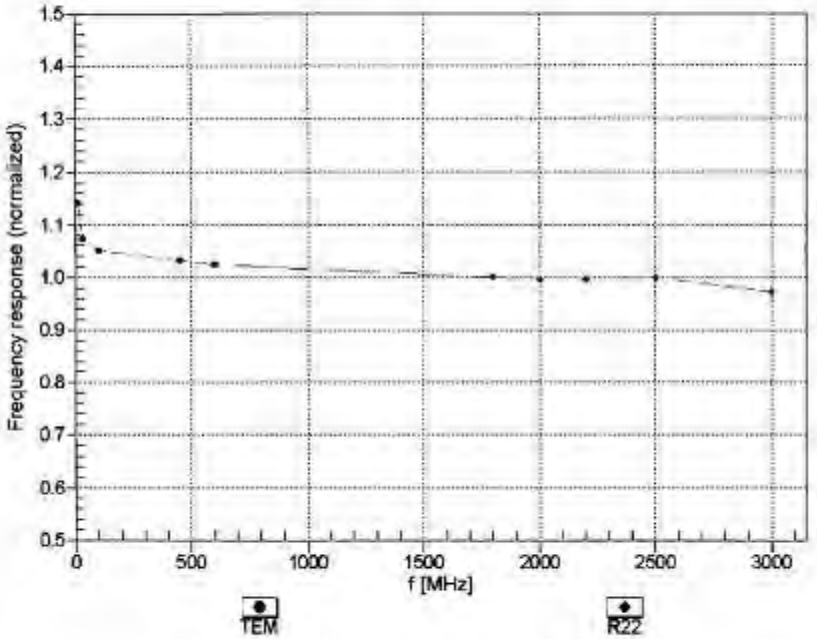
Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	56.7	0.94	10.83	10.83	10.83	0.02	1.00	± 13.4 %
750	55.5	0.96	9.50	9.50	9.50	0.80	0.70	± 12.0 %
835	55.2	0.97	9.38	9.38	9.38	0.68	0.69	± 12.0 %
1750	53.4	1.49	7.80	7.80	7.80	0.80	0.65	± 12.0 %
1900	53.3	1.52	7.51	7.51	7.51	0.80	0.65	± 12.0 %
2450	52.7	1.95	7.19	7.19	7.19	0.80	0.80	± 12.0 %
2600	52.5	2.16	7.14	7.14	7.14	0.80	0.59	± 12.0 %

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

EX3DV4– SN:3816 October 3, 2011

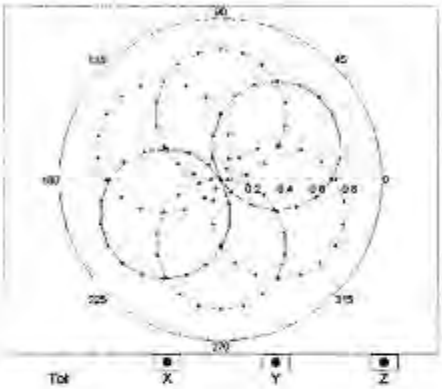
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



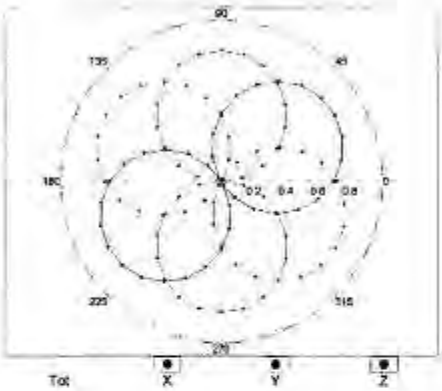
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

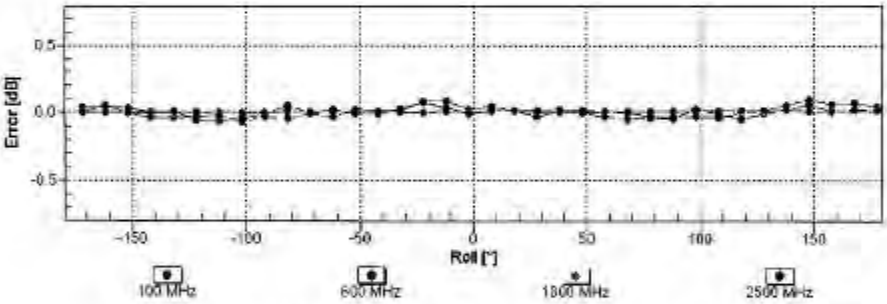
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



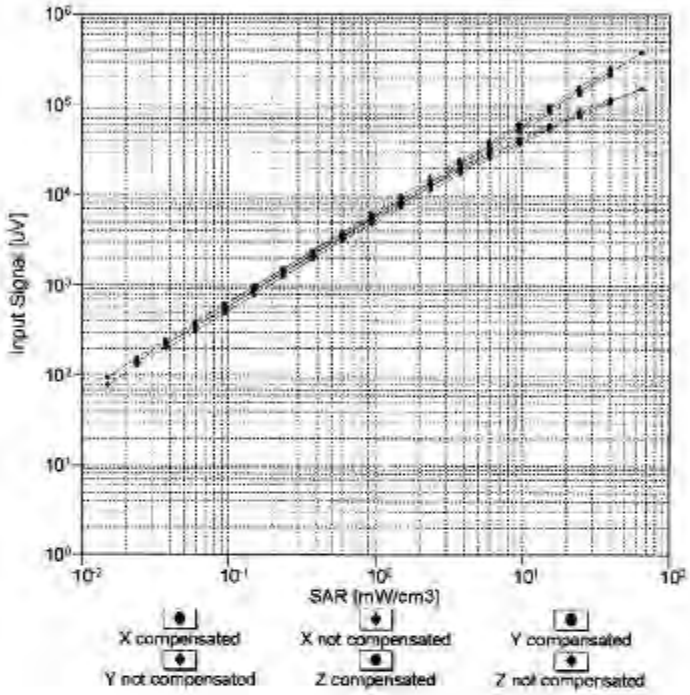
f=1800 MHz,R22

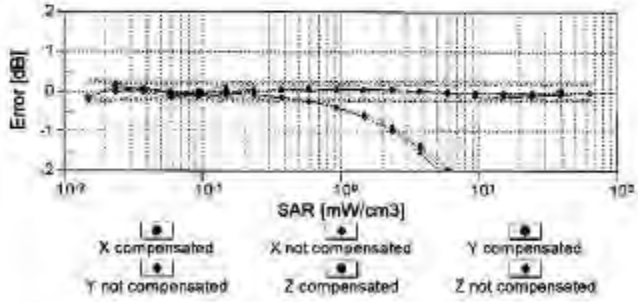




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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



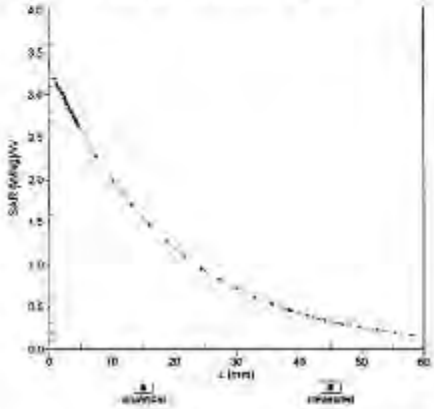


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

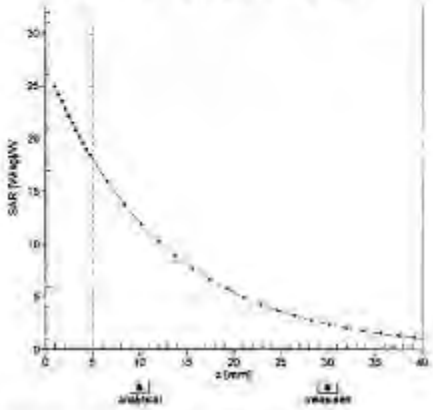
EX3DV4– SN:3816 October 3, 2011

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

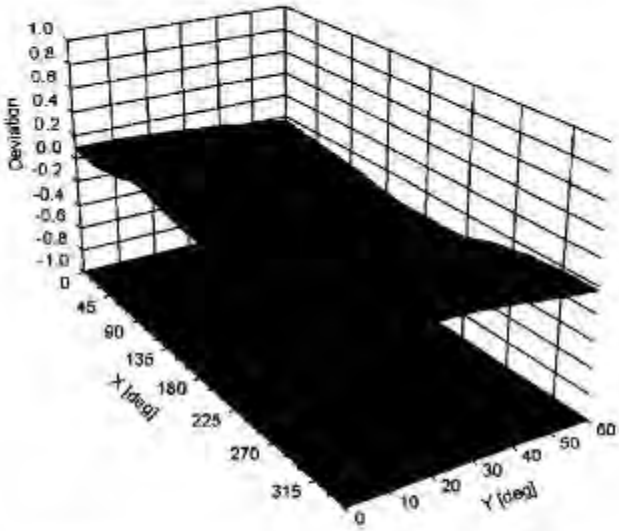


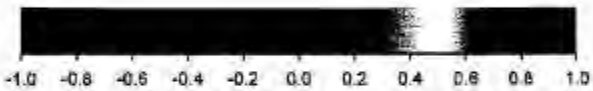
f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3816

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	2 mm

ANNEX E: D835V2 Dipole Calibration Certificate

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

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

Accreditation No.: SCS 108

Client **TA-Shanghai (Auden)**

Certificate No: D835V2-4d020_Aug11

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d020
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	August 26, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Issued: August 26, 2011

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

Calibration Laboratory of
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Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.1 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.32 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.34 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.52 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**6.11 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.4 ± 6 %	0.99 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.42 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**9.46 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.59 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**6.26 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.9 Ω - 3.1 jΩ
Return Loss	- 27.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.7 Ω - 5.4 jΩ
Return Loss	- 25.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.391 ns

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	April 22, 2004

DASY5 Validation Report for Head TSL

Date: 25.08.2011

Test Laboratory: SPEAG, Zurich, Switzerland

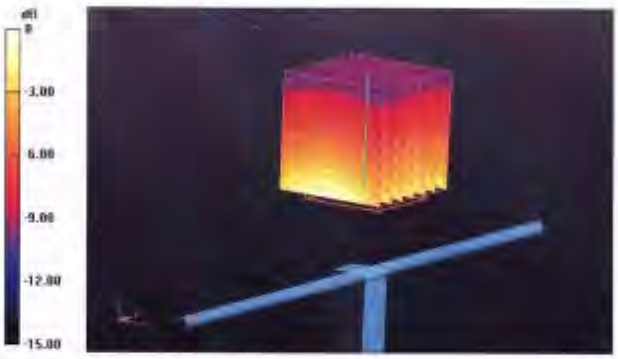
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d020

Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.89 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

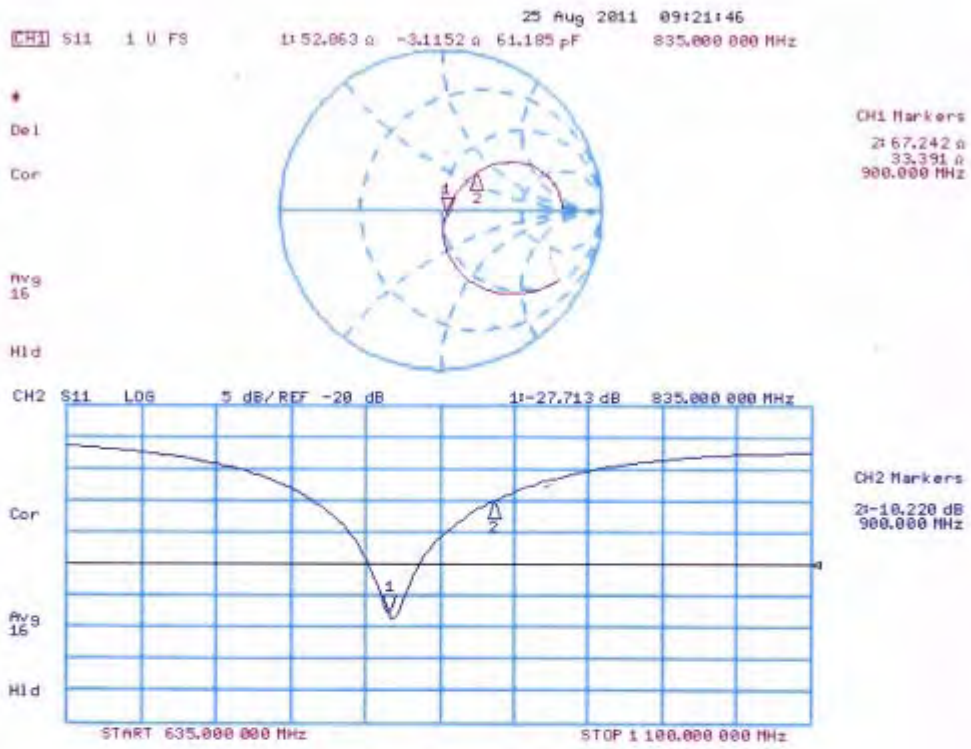
- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.930 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 3.421 W/kg
SAR(1 g) = 2.32 mW/g; SAR(10 g) = 1.52 mW/g
Maximum value of SAR (measured) = 2.708 mW/g



0 dB = 2.710mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 26.08.2011

Test Laboratory: SPEAG, Zurich, Switzerland

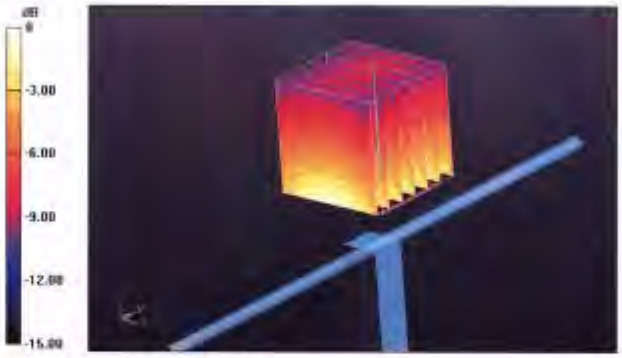
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d020

Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 53.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

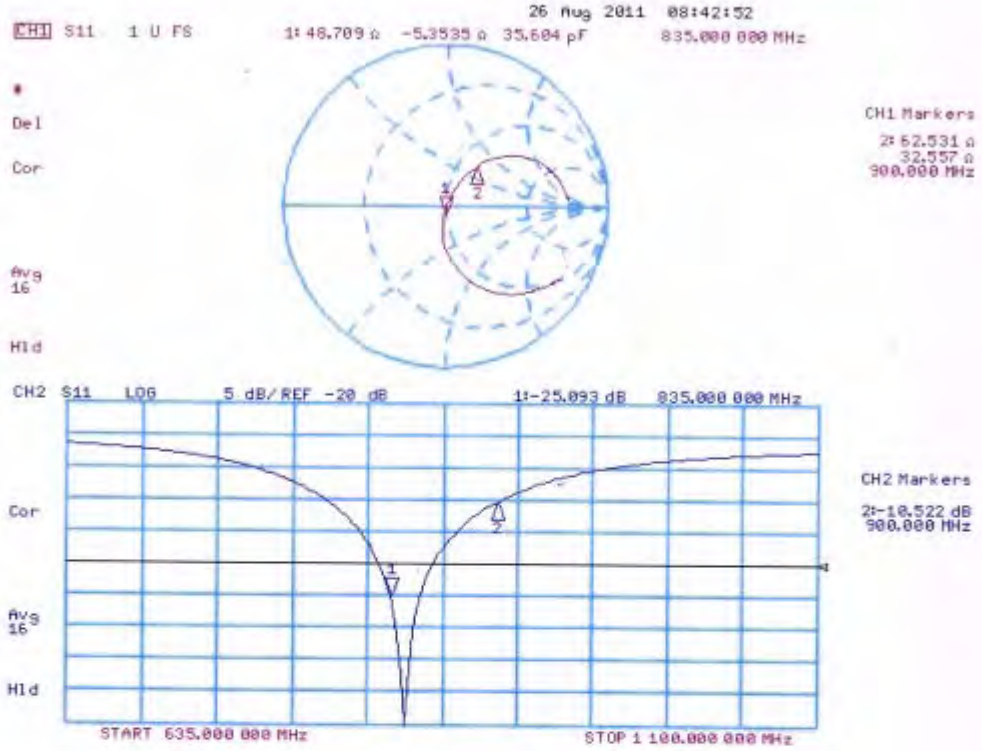
- Probe: ES3DV3 - SN3205; ConvF(6.02, 6.02, 6.02); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.406 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.509 W/kg
SAR(1 g) = 2.42 mW/g; SAR(10 g) = 1.59 mW/g
Maximum value of SAR (measured) = 2.827 mW/g



0 dB = 2.830mW/g

Impedance Measurement Plot for Body TSL



ANNEX F: D1900V2 Dipole Calibration Certificate

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

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Accreditation No.: SCS 108

Client TA-Shanghai (Auden)

Certificate No: D1900V2-5d060_Aug11

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d060
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	August 31, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Issued: August 31, 2011

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Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.5 ± 6 %	1.42 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.2 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**40.3 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.30 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**21.1 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.9 ± 6 %	1.57 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.6 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**41.7 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.55 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**22.0 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.6 Ω + 7.5 jΩ
Return Loss	- 22.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.3 Ω + 7.9 jΩ
Return Loss	- 21.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.194 ns

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 10, 2004

DASY5 Validation Report for Head TSL

Date: 30.08.2011

Test Laboratory: SPEAG, Zurich, Switzerland

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

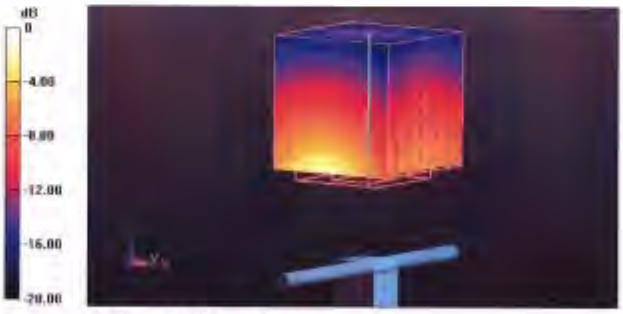
Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.42 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.01, 5.01, 5.01); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

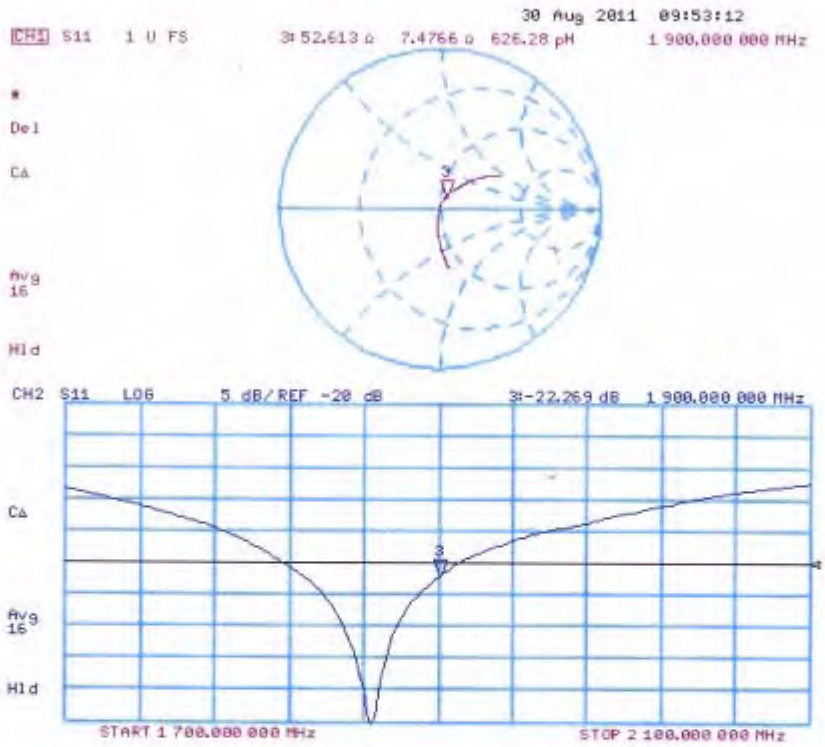
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 97.636 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 18.535 W/kg
SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.3 mW/g
Maximum value of SAR (measured) = 12.600 mW/g



0 dB = 12.600mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 31.08.2011

Test Laboratory: SPEAG, Zurich, Switzerland

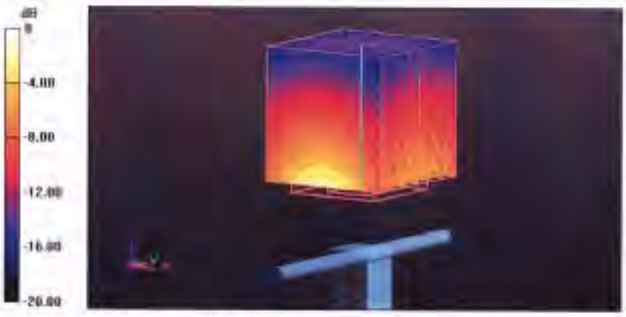
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d060

Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.57 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

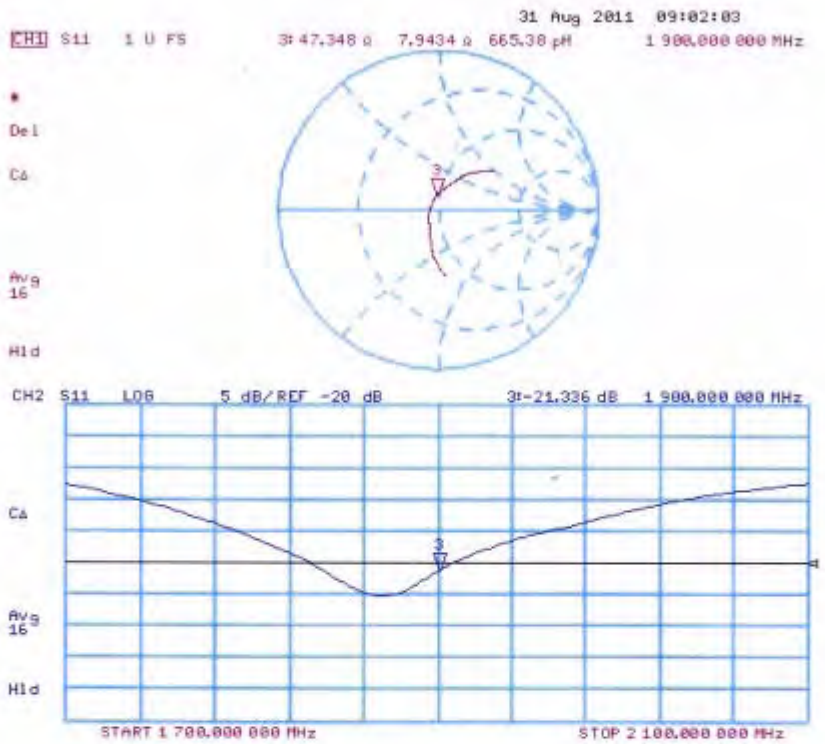
- Probe: ES3DV3 - SN3205; ConvF(4.62, 4.62, 4.62); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.435 V/m; Power Drift = -0.0099 dB
Peak SAR (extrapolated) = 18.663 W/kg
SAR(1 g) = 10.6 mW/g; SAR(10 g) = 5.55 mW/g
Maximum value of SAR (measured) = 13.397 mW/g



0 dB = 13.400mW/g

Impedance Measurement Plot for Body TSL



ANNEX G: D2450V2 Dipole Calibration Certificate

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Accreditation No.: SCS 108

Client **TA-Shanghai (Auden)**

Certificate No: D2450V2-786_Aug11

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 786
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	August 29, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Issued: August 29, 2011

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Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.4 ± 6 %	1.85 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.7 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**53.8 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.41 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**25.4 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.8 ± 6 %	2.02 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.2 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**51.7 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.10 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**24.2 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	55.0 Ω + 2.4 jΩ
Return Loss	- 25.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.4 Ω + 3.5 jΩ
Return Loss	- 29.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.154 ns

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	May 06, 2005

DASY5 Validation Report for Head TSL

Date: 29.08.2011

Test Laboratory: SPEAG, Zurich, Switzerland

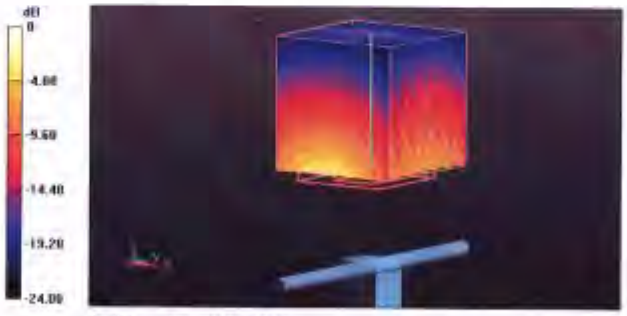
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 786

Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.85 mho/m; ε_r = 38.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

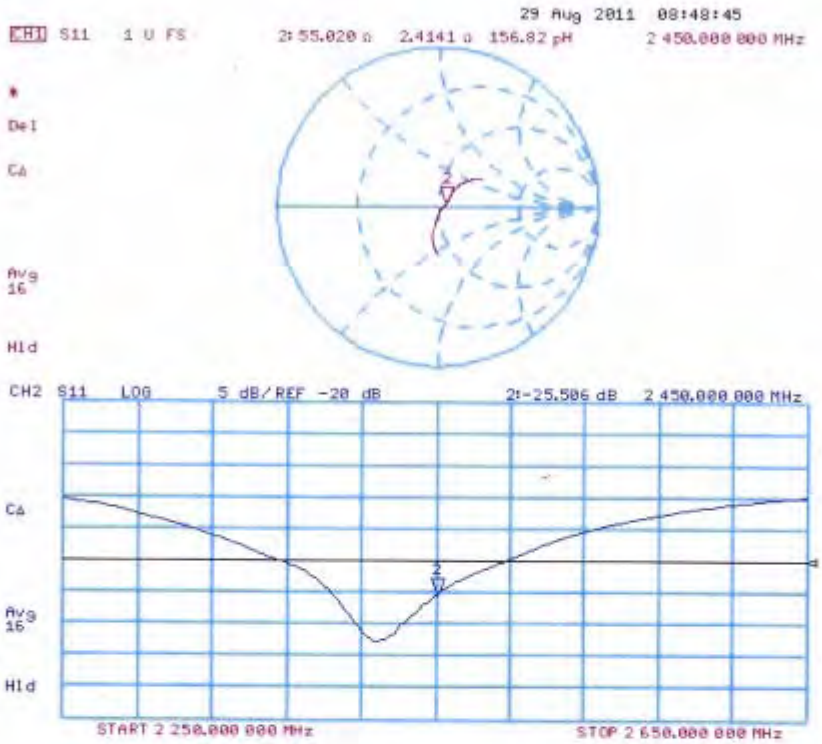
- Probe: ES3DV3 - SN3205; ConvF(4.45, 4.45, 4.45); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 101.5 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 28.303 W/kg
SAR(1 g) = 13.7 mW/g; SAR(10 g) = 6.41 mW/g
Maximum value of SAR (measured) = 17.561 mW/g



0 dB = 17.560mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 29.08.2011

Test Laboratory: SPEAG, Zurich, Switzerland

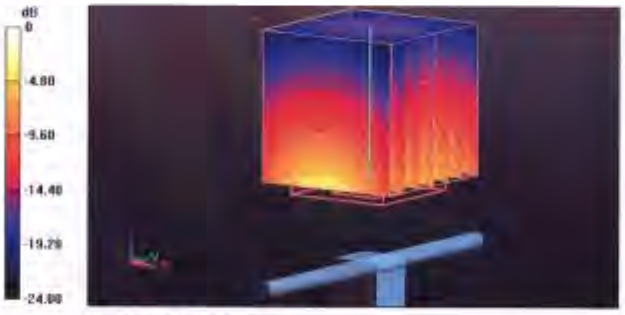
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 786

Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.02 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

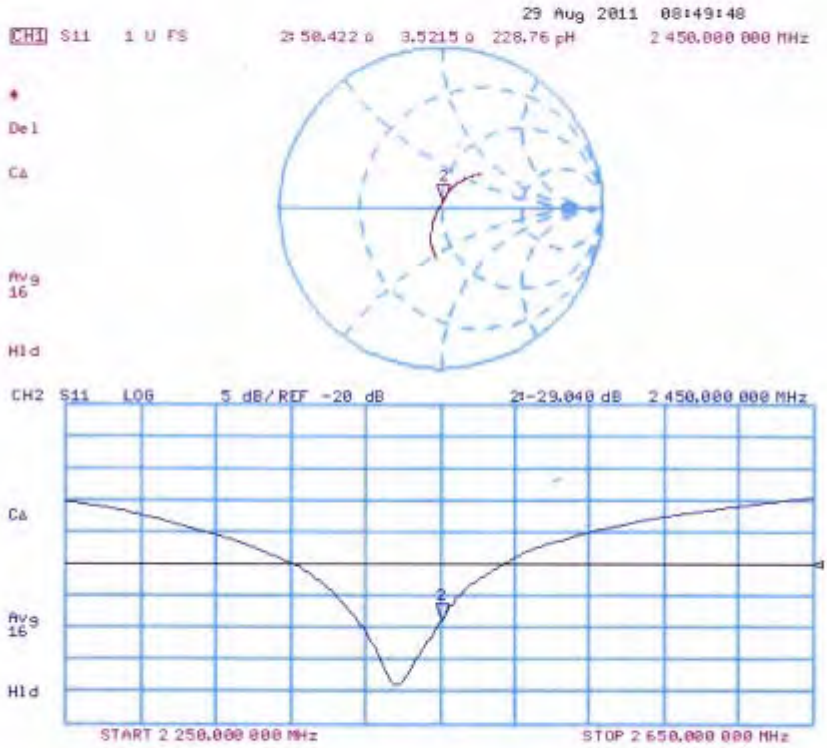
- Probe: ES3DV3 - SN3205; ConvF(4.26, 4.26, 4.26); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.118 V/m; Power Drift = 0.0072 dB
Peak SAR (extrapolated) = 27.129 W/kg
SAR(1 g) = 13.2 mW/g; SAR(10 g) = 6.1 mW/g
Maximum value of SAR (measured) = 17.387 mW/g



0 dB = 17.390mW/g

Impedance Measurement Plot for Body TSL



ANNEX H: DAE4 Calibration Certificate

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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 108

Client TA – SH (Auden)

Certificate No: DAE4-871_Nov11

CALIBRATION CERTIFICATE

Object	DAE4 - SD 000 D04 BJ - SN: 871
Calibration procedure(s)	QA CAL-06.v23 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	November 22, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	28-Sep-11 (No:11450)	Sep-12
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Calibrator Box V1.1	SE UMS 006 AB 1004	08-Jun-11 (in house check)	In house check: Jun-12

	Name	Function	Signature
Calibrated by:	Andrea Guntli	Technician	
Approved by:	Fin Bomholt	R&D Director	i.V.

Issued: November 22, 2011

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Accreditation No.: SCS 108

Glossary

DAE	data acquisition electronics
Connector angle	information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
  - *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
  - *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
  - *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.
  - *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage
  - *Input Offset Measurement*: Output voltage and statistical results over a large number of zero voltage measurements.
  - *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.
  - *Input resistance:* Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
  - *Power consumption:* Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1μV , full range = -100...+300 mV

Low Range: 1LSB = 61nV , full range = -1.....+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	404.749 ± 0.1% (k=2)	404.733 ± 0.1% (k=2)	405.174 ± 0.1% (k=2)
Low Range	3.98175 ± 0.7% (k=2)	3.93601 ± 0.7% (k=2)	3.96830 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	90.0 ° ± 1 °

Appendix

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	199991.9	-0.91	-0.00
Channel X	+ Input	20000.28	0.48	0.00
Channel X	- Input	-19998.51	0.59	-0.00
Channel Y	+ Input	200003.0	1.24	0.00
Channel Y	+ Input	19999.67	0.17	0.00
Channel Y	- Input	-20000.04	-0.34	0.00
Channel Z	+ Input	200010.1	-0.11	-0.00
Channel Z	+ Input	19999.33	-0.07	-0.00
Channel Z	- Input	-20001.45	-0.85	0.00

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2000.0	0.05	0.00
Channel X	+ Input	199.81	-0.09	-0.04
Channel X	- Input	-199.63	0.37	-0.19
Channel Y	+ Input	1999.9	-0.22	-0.01
Channel Y	+ Input	198.81	-1.19	-0.59
Channel Y	- Input	-201.62	-1.72	0.86
Channel Z	+ Input	2000.4	0.48	0.02
Channel Z	+ Input	199.30	-0.70	-0.35
Channel Z	- Input	-200.86	-1.06	0.53

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	14.43	13.13
	- 200	-12.22	-13.72
Channel Y	200	-10.07	-9.78
	- 200	9.61	8.66
Channel Z	200	-0.56	-0.83
	- 200	-0.01	0.11

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	3.08	0.09
Channel Y	200	3.19	-	4.59
Channel Z	200	0.90	-0.06	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	15920	15519
Channel Y	16179	17567
Channel Z	15791	15270

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	0.03	-1.16	2.66	0.46
Channel Y	-0.63	-3.22	0.29	0.46
Channel Z	-0.87	-2.03	0.28	0.46

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	-0.01	-8	-9