TESTING
No. L2264

# OET 65

# TEST REPORT

| | |
|---|---|
| **Product Name** | GSM/GPRS quad bands mobile phone |
| **Model Name** | Tytip 2SIM |
| **Marketing Name** | ONE TOUCH 595D |
| **FCC ID** | RAD236 |
| **Client** | TCT Mobile Limited |

## TA Technology (Shanghai) Co., Ltd.

# GENERAL SUMMARY

| | | | |
|---|---|---|---|
| **Product Name** | GSM/GPRS quad bands mobile phone | **Model** | Tytip 2SIM |
| **Report No.** | RXA1204-0070SAR01R1 | **FCC ID** | RAD236 |
| **Client** | TCT Mobile Limited | | |
| **Manufacturer** | TCT Mobile Limited | | |
| **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.<br><br>**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.<br><br>**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.<br><br>**KDB 648474 D01 SAR Handsets Multi Xmiter and Ant, v01r05:** SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas. | | |
| **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.<br><br>General Judgment: **Pass**<br><br>(Stamp)<br>**Date of issue: April 23rd, 2012** | | |
| **Comment** | The test result only responds to the measured sample. | | |

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

# TABLE OF CONTENT

# 1. General Information

## 1.1. Notes of the Test Report

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

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

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

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

## 1.2. Testing Laboratory

| | |
|---|---|
| Company: | TA Technology (Shanghai) Co., Ltd. |
| Address: | No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China |
| City: | Shanghai |
| Post code: | 201201 |
| Country: | P. R. China |
| Contact: | Yang Weizhong |
| Telephone: | +86-021-50791141/2/3 |
| Fax: | +86-021-50791141/2/3-8000 |
| Website: | http://www.ta-shanghai.com |
| E-mail: | yangweizhong@ta-shanghai.com |

## 1.3. Applicant Information

| | |
|---|---|
| Company: | TCT Mobile Limited |
| Address: | 5F, E building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area Shanghai, P.R. China. 201203 |
| City: | Shanghai |
| Postal Code: | 201203 |
| Country: | P.R. China |
| Contact: | Gong Zhizhou |
| Telephone: | 0086-21-61460890 |
| Fax: | 0086-21-61460602 |

## 1.4. Manufacturer Information

| | |
|---|---|
| Company: | TCT Mobile Limited |
| Address: | 5F, E building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area Shanghai, P.R. China. 201203 |
| City: | Shanghai |
| Postal Code: | 201203 |
| Country: | P.R. China |
| Telephone: | 0086-21-61460890 |
| Fax: | 0086-21-61460602 |

## 1.5. Information of EUT

**General Information**

| | | | |
|---|---|---|---|
| Device Type: | Portable Device | | |
| Exposure Category: | Uncontrolled Environment / General Population | | |
| State of Sample: | Prototype Unit | | |
| Product Name: | GSM/GPRS quad bands mobile phone | | |
| IMEI: | 861558010003908 | | |
| Hardware Version: | PIO | | |
| Software Version: | VN13 | | |
| Antenna Type: | Internal Antenna | | |
| Device Operating Configurations : | | | |
| Supporting Mode(s): | GSM 850/GSM 1900; (tested)<br>GSM 900/GSM 1800; (untested)<br>Bluetooth; (untested) | | |
| Test Modulation: | (GSM)GMSK; | | |
| Device Class: | B | | |
| GPRS Multislot Class(12): | Max Number of Timeslots in Uplink | | 4 |
| | 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:<br>(Low - Middle - High) | 128 - 190 - 251<br>512 - 661 - 810 | (GSM 850)<br>(GSM 1900) | (tested)<br>(tested) |

**Auxiliary Equipment Details**

| Name | Model | Manufacturer | S/N |
|---|---|---|---|
| Battery 1 | CAB3120000C3 | BAK | BAK2011110800329 |
| Battery 2 | CAB3120000C1 | BYD | B2979605CCA |
| Stereo Headset 1 | CCB3160A11C2 | Shunda | / |
| Stereo Headset 2 | CCB3160A11C4 | Meihao | / |
| Stereo Headset 3 | CCB3160A15C2 | Shunda | / |
| Stereo Headset 4 | CCB3160A15C4 | Meihao | / |
| Note: 1. Stereo Headset 1 and Stereo Headset 2 non-REACH, need test.<br>2. Stereo Headset 3 and Stereo Headset 4 REACH,no need test. | | | |

Equipment Under Test (EUT) is a GSM/GPRS quad bands mobile phone. The EUT has a GSM antenna that is used for Tx/Rx, and the other is BT antenna that can be used for Tx/Rx. The detail about EUT and Lithium Battery is in chapter 1.5 in this report. SAR are tested for GSM 850 and GSM 1900.

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 | High/251 | Right, Cheek | **0.365** |
| GSM 1900 | Low/512 | Left, Cheek | **0.561** |

**Body Worn Configuration**

| Mode | Channel | Position | Separation distance | $SAR_{1g}$ (W/kg) |
|---|---|---|---|---|
| 3Txslots GPRS 850 | High/251 | Towards Ground | 15mm | **0.750** |
| 4Txslots GPRS 1900 | Low/512 | Towards Ground | 15mm | **0.617** |

**Simultaneous SAR**

| $SAR_{1g}$(W/kg) Test Position | GSM 850 | BT | MAX. $\Sigma SAR_{1g}$ |
|---|---|---|---|
| Body, Towards Ground(Slide Open) | 0.750 | 0 | 0.750 |

Note: 1. 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.

## 1.7. Test Date

The test performed from April 20, 2012 to April 22, 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.

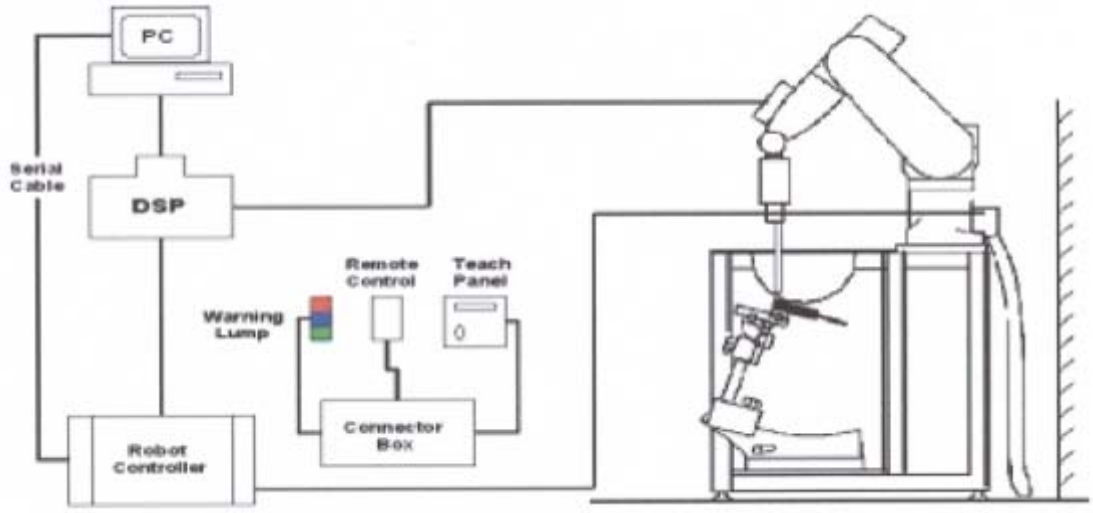



**Figure 1 SAR Lab Test Measurement Set-up**

## 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<br>Built-in shielding against static charges<br>PEEK enclosure material (resistant to organic solvents, e.g., DGBE) |
| Calibration | ISO/IEC 17025 calibration service available |
| Frequency | 10 MHz to > 6 GHz<br>Linearity: ± 0.2 dB<br>(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:<br>± 0.2dB (noise: typically < 1 μW/g) |
| Dimensions | Overall length: 330 mm (Tip: 20 mm)<br>Tip diameter: 2.5 mm (Body: 12 mm)<br>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).<br>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.

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

Where: $\Delta t$ = Exposure time (30 seconds),
C = Heat capacity of tissue (brain or muscle),
$\Delta T$ = Temperature increase due to RF exposure.
Or

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

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 5x5x7 points within a cube whose base is centered around the maxima found in the preceding area scan.

- Spatial Peak Detection
  The procedure for spatial peak SAR evaluation has been implemented and can determine values of masses of 1g and 10g, as well as for user-specific masses.The DASY5 system allows evaluations that combine measured data and robot positions, such as:
  • maximum search
  • extrapolation
  • boundary correction
  • peak search for averaged SAR
  During a maximum search, global and local maxima searches are automatically performed in 2-D after each Area Scan measurement with at least 6 measurement points. It is based on the evaluation of the local SAR gradient calculated by the Quadratic Shepard's method. The algorithm will find the global maximum and all local maxima within -2 dB of the global maxima for all SAR distributions.
  Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. Several measurements at different distances are necessary for the extrapolation. Extrapolation routines require at least 10 measurement points in 3-D space. They are used in the Zoom Scan to obtain SAR values between the lowest measurement points and the inner phantom surface. The routine uses the modified Quadratic Shepard's method for extrapolation. For a grid using 5x5x7 measurement points with 8mm resolution amounting to175 measurement points, the uncertainty of the extrapolation routines is less than 1% for 1g and 10g cubes.
- A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube 5x5x7 scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 5mm steps.

## 2.5. Data Storage and Evaluation

### 2.5.1. Data Storage

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

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

### 2.5.2. Data Evaluation by SEMCAD

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

| | | |
|---|---|---|
| Probe parameters: | - Sensitivity | Normi, $a_{i0}$, $a_{i1}$, $a_{i2}$ |
| | - Conversion factor | $ConvF_i$ |
| | - Diode compression point | $Dcp_i$ |
| Device parameters: | - Frequency | f |
| | - Crest factor | cf |
| Media parameters: | - Conductivity | |
| | - Density | |

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

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics.

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

$\sigma$ = conductivity in [mho/m] or [Siemens/m]

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

# 4. Tissue-equivalent Liquid

## 4.1. Tissue-equivalent Liquid Ingredients

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

**Table 2: Composition of the Head Tissue Equivalent Matter**

| MIXTURE% | FREQUENCY(Brain) 835MHz |
|---|---|
| Water | 41.45 |
| Sugar | 56 |
| Salt | 1.45 |
| Preventol | 0.1 |
| Cellulose | 1.0 |
| Dielectric Parameters Target Value | f=835MHz 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 |

**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 |

## 4.2. Tissue-equivalent Liquid Properties

**Table 4: Dielectric Performance of Head Tissue Simulating Liquid**

| Frequency | Description | Dielectric Parameters | | Temp ℃ |
|---|---|---|---|---|
| | | $\varepsilon_r$ | σ(s/m) | |
| **835MHz (head)** | Target value ± 5% window | 41.50 39.43 — 43.58 | 0.90 0.86 — 0.95 | 22.0 |
| | Measurement value 2012-4-20 | 41.4 | 0.899 | 21.5 |
| **1900MHz (head)** | Target value ±5% window | 40.00 38.00 — 42.00 | 1.40 1.33 — 1.47 | 22.0 |
| | Measurement value 2012-4-21 | 40.8 | 1.41 | 21.5 |

**Table 5: Dielectric Performance of Body Tissue Simulating Liquid**

| Frequency | Description | Dielectric Parameters | | Temp ℃ |
|---|---|---|---|---|
| | | $\varepsilon_r$ | σ(s/m) | |
| **835MHz (body)** | Target value ±5% window | 55.20 52.44 — 57.96 | 0.97 0.92 — 1.02 | 22.0 |
| | Measurement value 2012-4-21 | 54.3 | 0.986 | 21.5 |
| **1900MHz (body)** | Target value ±5% window | 53.30 50.64 — 55.97 | 1.52 1.44 — 1.60 | 22.0 |
| | Measurement value 2012-4-21 | 52.1 | 1.55 | 21.5 |

# 5. System Check

## 5.1. Description of System Check

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

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

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

.

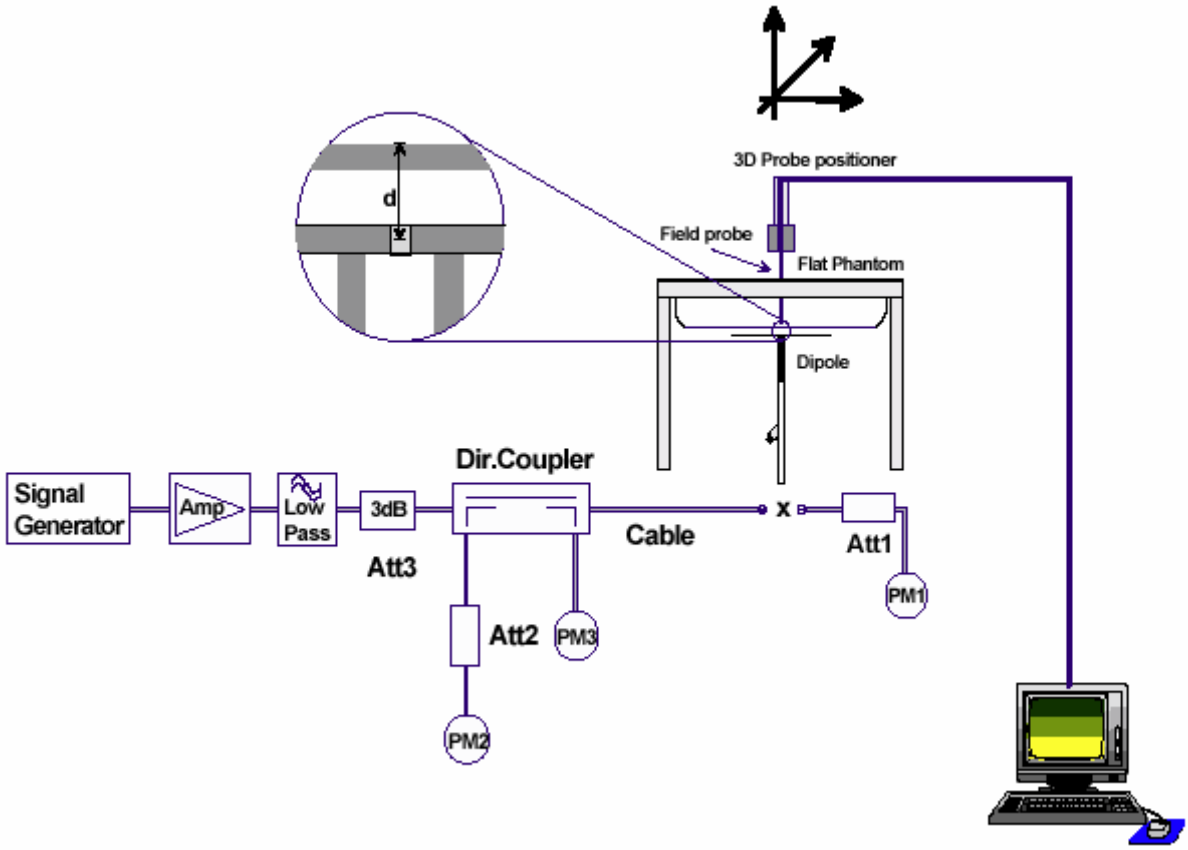



**Figure 6 System Check Set-up**

## 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) |
|---|---|---|---|---|---|---|---|
| | | $\varepsilon_r$ | σ(s/m) | (℃) | (W/kg) | | |
| **835MHz** | 2012-4-20 | 41.4 | 0.899 | 21.5 | 2.46 | 9.84 | 9.34 (8.41~10.27) |
| **1900MHz** | 2012-4-21 | 40.8 | 1.41 | 21.5 | 9.64 | 38.56 | 40.30 (36.27~ 44.33) |

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

**Table 7: System Check 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) |
|---|---|---|---|---|---|---|---|
| | | $\varepsilon_r$ | σ(s/m) | (℃) | (W/kg) | | |
| **835MHz** | 2012-4-21 | 54.3 | 0.986 | 21.5 | 2.51 | 10.04 | 9.46 (8.51~10.41) |
| **1900MHz** | 2012-4-21 | 52.1 | 1.55 | 21.5 | 10.80 | 43.20 | 41.70 (37.53~45.87) |

Note：1. The graph results see ANNEX B.
2. Target Values 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. The distance between the device and the phantom was kept 15mm.

## 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 12 for this EUT, it has at most 4 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslots is 5.

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:

**Table 8: The allowed power reduction in the multi-slot configuration**

| Number of timeslots in uplink assignment | Permissible nominal reduction of maximum output power,(dB) |
|---|---|
| 1 | 0 |
| 2 | 0 to 3,0 |
| 3 | 1,8 to 4,8 |
| 4 | 3,0 to 6,0 |

# 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 | | 33.65 | 33.58 | 33.49 | -9.03dB | 24.62 | 24.55 | 24.46 |
| GPRS (GMSK) | 1Txslot | 33.53 | 33.47 | 33.35 | -9.03dB | 24.5 | 24.44 | 24.32 |
| | 2Txslots | 30.92 | 30.83 | 30.66 | -6.02dB | 24.9 | 24.81 | 24.64 |
| | 3Txslots | 29.56 | 29.41 | 29.29 | -4.26dB | **25.3** | **25.15** | **25.03** |
| | 4Txslots | 27.82 | 27.62 | 27.52 | -3.01dB | 24.81 | 24.61 | 24.51 |
| **GSM 1900** | | **Burst Conducted Power(dBm)** | | | | **Average power(dBm)** | | |
| | | Channel 512 | Channel 661 | Channel 810 | | Channel 512 | Channel 661 | Channel 810 |
| GSM | | 29.86 | 29.31 | 29.31 | -9.03dB | 20.83 | 20.28 | 20.28 |
| GPRS (GMSK) | 1Txslot | 29.26 | 29.19 | 29.2 | -9.03dB | 20.23 | 20.16 | 20.17 |
| | 2Txslots | 28.7 | 28.71 | 28.72 | -6.02dB | 22.68 | 22.69 | 22.7 |
| | 3Txslots | 27.63 | 27.65 | 27.67 | -4.26dB | 23.37 | 23.39 | 23.41 |
| | 4Txslots | 26.65 | 26.69 | 26.68 | -3.01dB | **23.64** | **23.68** | **23.67** |

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

3Txslots = 3 transmit time slots out of 8 time slots

=> conducted power divided by (8/3) => -4.26 dB

4Txslots = 4 transmit time slots out of 8 time slots

=> conducted power divided by (8/4) => -3.01 dB

2) Average power numbers

The maximum power numbers are marks in bold.

## 7.2. SAR Test Results

### 7.2.1. GSM 850 (GPRS)

**Table 10: SAR Values [GSM 850 (GPRS)]**

| 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 with Battery 1 (Slide Open)** | | | | | |
| Left hand, Touch Cheek | High/251 | 0.252 | 0.335 | -0.060 | Figure 11 |
| | Middle/190 | 0.223 | 0.295 | -0.049 | Figure 12 |
| | Low/128 | 0.220 | 0.291 | -0.182 | Figure 13 |
| Left hand, Tilt 15 Degree | High/251 | 0.130 | 0.169 | -0.046 | Figure 14 |
| | Middle/190 | 0.117 | 0.152 | 0.030 | Figure 15 |
| | Low/128 | 0.115 | 0.148 | 0.018 | Figure 16 |
| Right hand, Touch Cheek | High/251 | 0.276 | 0.365 | 0.010 | Figure 17 |
| | Middle/190 | 0.238 | 0.314 | 0.144 | Figure 18 |
| | Low/128 | 0.222 | 0.292 | -0.026 | Figure 19 |
| Right hand, Tilt 15 Degree | High/251 | 0.133 | 0.173 | -0.039 | Figure 20 |
| | Middle/190 | 0.119 | 0.154 | -0.101 | Figure 21 |
| | Low/128 | 0.114 | 0.148 | -0.038 | Figure 22 |
| **Test Position of Head with Battery 1 (Slide Close)** | | | | | |
| Left hand, Touch Cheek | Low/128 | 0.203 | 0.274 | -0.024 | Figure 23 |
| Right hand, Touch Cheek | High/251 | 0.262 | 0.355 | -0.021 | Figure 24 |
| **Test position of Body with Battery 1 (Slide Open, Distance 15mm)** | | | | | |
| Towards Ground (3Txslots) | High/251 | 0.544 | 0.750 | 0.032 | Figure 25 |
| | Middle/190 | 0.520 | 0.715 | -0.042 | Figure 26 |
| | Low/128 | 0.449 | 0.618 | -0.060 | Figure 27 |
| Towards Phantom (3Txslots) | High/251 | 0.380 | 0.508 | -0.051 | Figure 28 |
| | Middle/190 | 0.349 | 0.467 | 0.041 | Figure 29 |
| | Low/128 | 0.311 | 0.414 | 0.027 | Figure 30 |
| **Test position of Body with Battery 1 (Slide Close, Distance 15mm)** | | | | | |
| Towards Ground (3Txslots) | High/251 | 0.307 | 0.445 | 0.016 | Figure 31 |
| | Low/128 | 0.284 | 0.410 | -0.066 | Figure 32 |

| | | | | | |
|---|---|---|---|---|---|
| **Worst Case Position of Body with Stereo Headset 1 and Battery 1 (Slide Open, Distance 15mm)** | | | | | |
| Towards Ground | High/251 | 0.371 | 0.508 | -0.047 | Figure 33 |
| **Worst Case Position of Body with Stereo Headset 2 and Battery 1 (Slide Open, Distance 15mm)** | | | | | |
| Towards Ground | High/251 | 0.296 | 0.404 | -0.120 | Figure 34 |
| **Worst Case Position of Body with Battery 2 (Slide Open, Distance 15mm)** | | | | | |
| Towards Ground (3Txslots) | High/251 | 0.510 | 0.707 | -0.027 | Figure 35 |

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

2. The Head SAR test shall be performed at the high, middle and low frequency channels of each operating mode.
3. The Body SAR test firstly shall be performed at the high, middle and low frequency channels of the maximum source-based time-averaged output power.

### 7.2.2. GSM 1900 (GPRS)

**Table 11: SAR Values [GSM 1900(GPRS)]**

| 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 with Battery 1(Slide Open)** | | | | | |
| Left hand, Touch Cheek | Low/512 | 0.181 | 0.287 | -0.025 | Figure 36 |
| Right hand, Touch Cheek | Low/512 | 0.185 | 0.304 | 0.024 | Figure 37 |
| **Test Position of Head with Battery 1(Slide Close)** | | | | | |
| Left hand, Touch Cheek | High/810 | 0.259 | 0.474 | 0.053 | Figure 38 |
| | Middle/661 | 0.278 | 0.509 | 0.028 | Figure 39 |
| | Low/512 | 0.310 | 0.561 | -0.086 | Figure 40 |
| Left hand, Tilt 15 Degree | High/810 | 0.136 | 0.221 | 0.044 | Figure 41 |
| | Middle/661 | 0.139 | 0.224 | 0.029 | Figure 42 |
| | Low/512 | 0.147 | 0.234 | 0.011 | Figure 43 |
| Right hand, Touch Cheek | High/810 | 0.250 | 0.448 | 0.024 | Figure 44 |
| | Middle/661 | 0.272 | 0.479 | -0.004 | Figure 45 |
| | Low/512 | 0.310 | 0.547 | -0.115 | Figure 46 |
| Right hand, Tilt 15 Degree | High/810 | 0.166 | 0.282 | 0.036 | Figure 47 |
| | Middle/661 | 0.166 | 0.279 | 0.014 | Figure 48 |
| | Low/512 | 0.167 | 0.278 | 0.001 | Figure 49 |
| **Worst Case Position of Head with Battery 2(Slide Close)** | | | | | |
| Left hand, Touch Cheek | Low/512 | 0.301 | 0.546 | -0.147 | Figure 50 |
| **Test position of Body with Battery 1 (Slide Open, Distance 15mm)** | | | | | |
| Towards Ground (4Txslots) | High/810 | 0.321 | 0.522 | 0.055 | Figure 51 |
| | Middle/661 | 0.335 | 0.538 | 0.074 | Figure 52 |
| | Low/512 | 0.385 | 0.617 | 0.018 | Figure 53 |
| Towards Phantom (4Txslots) | High/810 | 0.181 | 0.279 | 0.024 | Figure 54 |
| | Middle/661 | 0.204 | 0.313 | -0.080 | Figure 55 |
| | Low/512 | 0.222 | 0.340 | -0.056 | Figure 56 |
| **Test position of Body with Battery 1 (Slide Close, Distance 15mm)** | | | | | |
| Towards Ground (4Txslots) | Low/512 | 0.247 | 0.422 | 0.024 | Figure 57 |

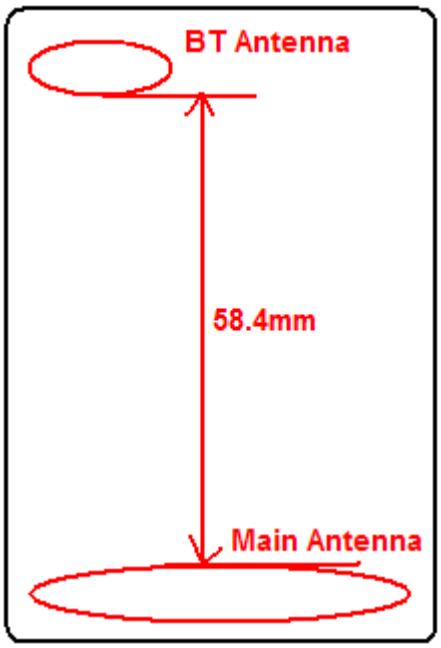
| | | | | | |
|---|---|---|---|---|---|
| **Worst Case Position of Body with Stereo Headset 1 and Battery 1 (Slide Open, Distance 15mm)** | | | | | |
| Towards Ground | Low/512 | 0.171 | 0.281 | -0.034 | Figure 58 |
| **Worst Case Position of Body with Stereo Headset 2 and Battery 1 (Slide Open, Distance 15mm)** | | | | | |
| Towards Ground | Low/512 | 0.127 | 0.208 | 0.107 | Figure 59 |

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

2. The Head SAR test shall be performed at the high, middle and low frequency channels of each operating mode.
3. The Body SAR test firstly shall be performed at the high, middle and low frequency channels of the maximum source-based time-averaged output power.

### 7.2.3. Bluetooth Function

The distance between BT antenna and GSM antenna is ＞5cm. The location of the antennas inside EUT is shown in Annex H:




The output power of BT antenna is as following:

| Channel | Ch 0<br>2402 MHz | Ch 39<br>2441 MHz | Ch 78<br>2480 MHz |
|---|---|---|---|
| GFSK(dBm) | 8.64 | 5.83 | 7.62 |
| EDR2M-4_DQPSK(dBm) | 8.32 | 5.49 | 7.36 |
| EDR3M-8DPSK(dBm) | 8.62 | 5.80 | 7.63 |

**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 antenna and GSM antenna we can draw the conclusion that:

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.

**Simultaneous SAR**

About BT and GSM Antenna,

| $SAR_{1g}$(W/kg) / Test Position | GSM 850 | GSM 1900 | BT | MAX. $\Sigma SAR_{1g}$ |
|---|---|---|---|---|
| Left hand, Touch cheek(Slide Open) | **0.335** | 0.287 | 0 | 0.335 |
| Left hand, Touch cheek(Slide Close) | 0.274 | **0.561** | 0 | 0.561 |
| Left hand, Tilt 15 Degree(Slide Open) | **0.169** | N/A | 0 | 0.169 |
| Left hand, Tilt 15 Degree(Slide Close) | N/A | **0.234** | 0 | 0.234 |
| Right hand, Touch cheek(Slide Open) | **0.365** | 0.304 | 0 | 0.365 |
| Right hand, Touch cheek(Slide Close) | 0.355 | **0.547** | 0 | 0.547 |
| Right hand, Tilt 15 Degree(Slide Open) | **0.173** | N/A | 0 | 0.173 |
| Right hand, Tilt 15 Degree(Slide Close) | N/A | **0.282** | 0 | 0.282 |
| Body, Towards Ground(Slide Open) | **0.750** | 0.617 | 0 | 0.750 |
| Body, Towards Ground(Slide Close) | **0.445** | 0.422 | 0 | 0.445 |
| Body, Towards Phantom(Slide Open) | **0.508** | 0.340 | 0 | 0.508 |
| Body, Towards Phantom(Slide Close) | N/A | N/A | 0 | 0 |

Note: 1.The value with blue color is the maximum $\Sigma SAR_{1g}$ Value.

2. MAX. $\Sigma SAR_{1g}$ =Unlicensed $SAR_{MAX}$ +Licensed $SAR_{MAX}$

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

BT antenna is ＞5cm from GSM Antenna. (GSM Antenna $SAR_{MAX}$)0.750 +(BT Antenna $SAR_{MAX}$)0 =0.750 ＜1.6, So the Simultaneous SAR are not required for BT 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 | 6.0 | N | 1 | 1 | 6.0 | ∞ |
| 3 | -axial isotropy of the probe | B | 4.7 | R | $\sqrt{3}$ | $\sqrt{0.5}$ | 1.9 | ∞ |
| 4 | - Hemispherical isotropy of the probe | B | 9.4 | R | $\sqrt{3}$ | $\sqrt{0.5}$ | 3.9 | ∞ |
| 6 | -boundary effect | B | 1.9 | R | $\sqrt{3}$ | 1 | 1.1 | ∞ |
| 7 | -probe linearity | B | 4.7 | R | $\sqrt{3}$ | 1 | 2.7 | ∞ |
| 8 | - System detection limits | B | 1.0 | R | $\sqrt{3}$ | 1 | 0.6 | ∞ |
| 9 | -readout Electronics | B | 1.0 | N | 1 | 1 | 1.0 | ∞ |
| 10 | -response time | B | 0 | R | $\sqrt{3}$ | 1 | 0 | ∞ |
| 11 | -integration time | B | 4.32 | R | $\sqrt{3}$ | 1 | 2.5 | ∞ |
| 12 | -noise | B | 0 | R | $\sqrt{3}$ | 1 | 0 | ∞ |
| 13 | -RF Ambient Conditions | B | 3 | R | $\sqrt{3}$ | 1 | 1.73 | ∞ |
| 14 | -Probe Positioner Mechanical Tolerance | B | 0.4 | R | $\sqrt{3}$ | 1 | 0.2 | ∞ |
| 15 | -Probe Positioning with respect to Phantom Shell | B | 2.9 | R | $\sqrt{3}$ | 1 | 1.7 | ∞ |
| 16 | -Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation | B | 3.9 | R | $\sqrt{3}$ | 1 | 2.3 | ∞ |
| Test sample Related | | | | | | | | |
| 17 | -Test Sample Positioning | A | 2.9 | N | 1 | 1 | 2.9 | 71 |
| 18 | -Device Holder Uncertainty | A | 4.1 | N | 1 | 1 | 4.1 | 5 |
| 19 | -Output Power Variation - SAR drift measurement | B | 5.0 | R | $\sqrt{3}$ | 1 | 2.9 | ∞ |
| Physical parameter | | | | | | | | |
| 20 | -phantom | B | 4.0 | R | $\sqrt{3}$ | 1 | 2.3 | ∞ |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 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 | | $u_c^{'} = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$ | | | | | 12.16 | |
| Expanded uncertainty (confidence interval of 95 %) | | $u_e = 2u_c$ | | N | | k=2 | 23.00 | |

# 9. Main Test Instruments

**Table 12: List of Main Instruments**

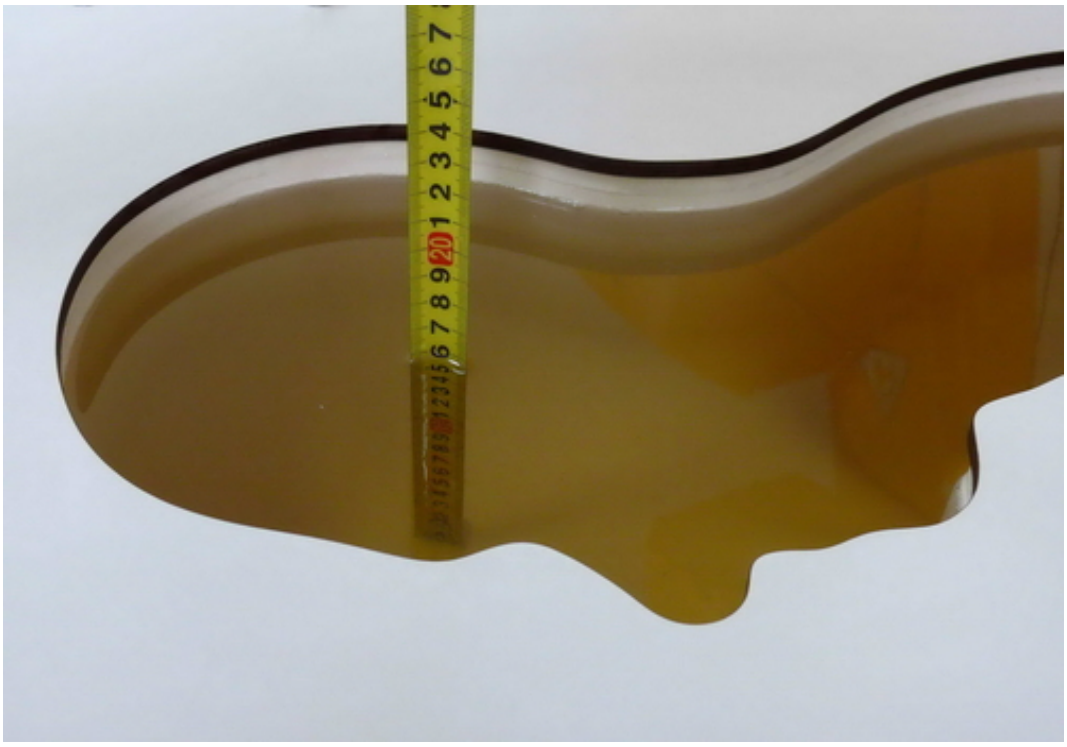
| No. | Name | Type | Serial Number | Calibration Date | Valid Period |
|---|---|---|---|---|---|
| 01 | Network analyzer | Agilent 8753E | US37390326 | September 12, 2011 | One year |
| 02 | Dielectric Probe Kit | Agilent 85070E | US44020115 | No Calibration Requested | |
| 03 | Power meter | Agilent E4417A | GB41291714 | March 11, 2012 | One year |
| 04 | Power sensor | Agilent N8481H | MY50350004 | September 25, 2011 | One year |
| 05 | Power sensor | E9327A | US40441622 | September 24, 2011 | One year |
| 06 | Signal Generator | HP 8341B | 2730A00804 | September 12, 2011 | One year |
| 07 | Dual directional coupler | 778D-012 | 5051P | August 21, 2011 | One year |
| 09 | Amplifier | IXA-020 | 0401 | No Calibration Requested | |
| 10 | BTS | E5515C | MY48360988 | December 2, 2011 | One year |
| 11 | E-field Probe | EX3DV4 | 3753 | January 4, 2012 | One year |
| 12 | DAE | DAE4 | 871 | November 22, 2011 | One year |
| 13 | Validation Kit 835MHz | D835V2 | 4d020 | August 26, 2011 | One year |
| 14 | Validation Kit 1900MHz | D1900V2 | 5d060 | August 31, 2011 | One year |
| 15 | Temperature Probe | JM222 | AA1009129 | March 15, 2012 | One year |
| 16 | Hygrothermograph | WS-1 | 64591 | September 28, 2011 | One year |

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

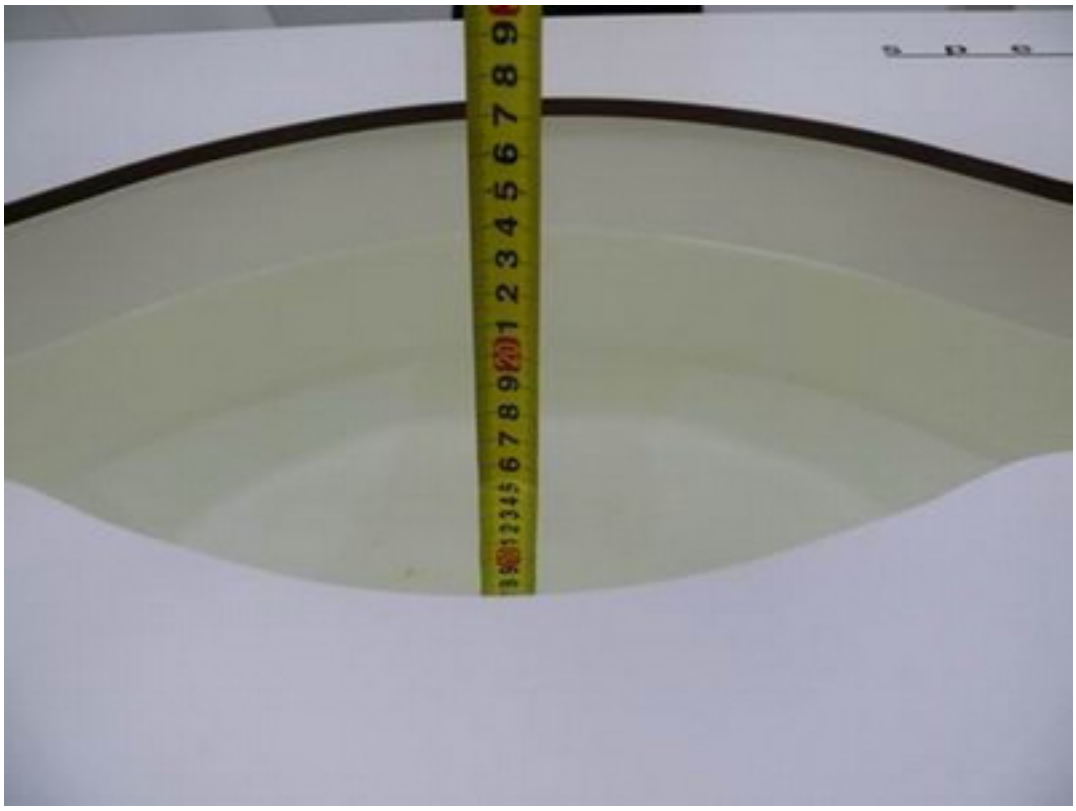
# ANNEX A: Test Layout


Picture 1: Specific Absorption Rate Test Layout

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



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



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

Picture 5: liquid depth in the head Phantom (1900 MHz, 15.3cm 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: 4/20/2012 10:27:57 PM

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

Medium parameters used: f = 835 MHz; $\sigma$ = 0.899 mho/m; $\varepsilon_r$ = 41.4; $\rho$ = 1000 kg/m$^3$

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

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

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

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

Maximum value of SAR (interpolated) = 2.66 mW/g

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

Reference Value = 54.7 V/m; Power Drift = -0.096 dB

Peak SAR (extrapolated) = 3.67 W/kg

**SAR(1 g) = 2.46 mW/g; SAR(10 g) = 1.62 mW/g**

Maximum value of SAR (measured) = 2.66 mW/g

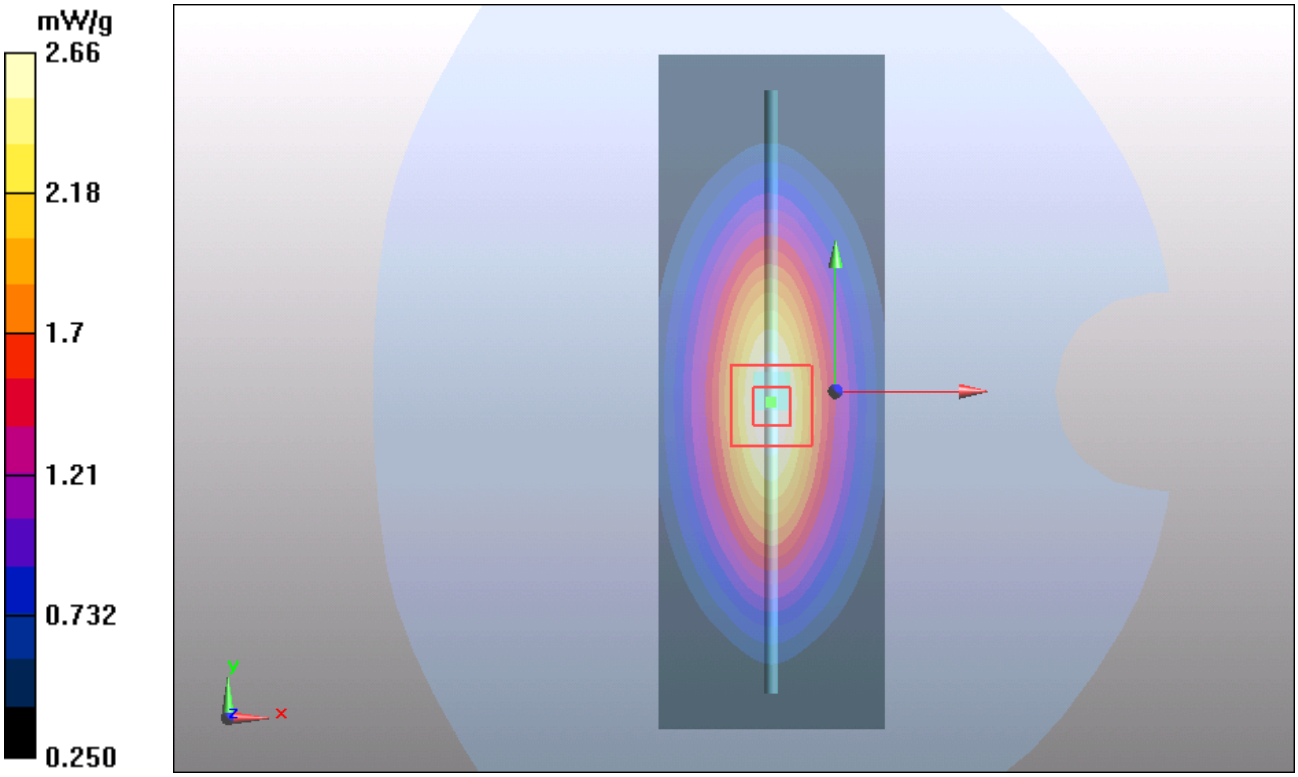



Figure 7 System Performance Check 835MHz 250mW

## System Performance Check at 835 MHz Body TSL

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

Date/Time: 4/21/2012 3:52:39 PM

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

Medium parameters used: f = 835 MHz; $\sigma$ = 0.986 mho/m; $\varepsilon_r$ = 54.3; $\rho$ = 1000 kg/m$^3$

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

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

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

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

Maximum value of SAR (interpolated) = 2.74 mW/g

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

Reference Value = 52.5 V/m; Power Drift = -0.094 dB

Peak SAR (extrapolated) = 3.71 W/kg

**SAR(1 g) = 2.51 mW/g; SAR(10 g) = 1.66 mW/g**

Maximum value of SAR (measured) = 2.7 mW/g

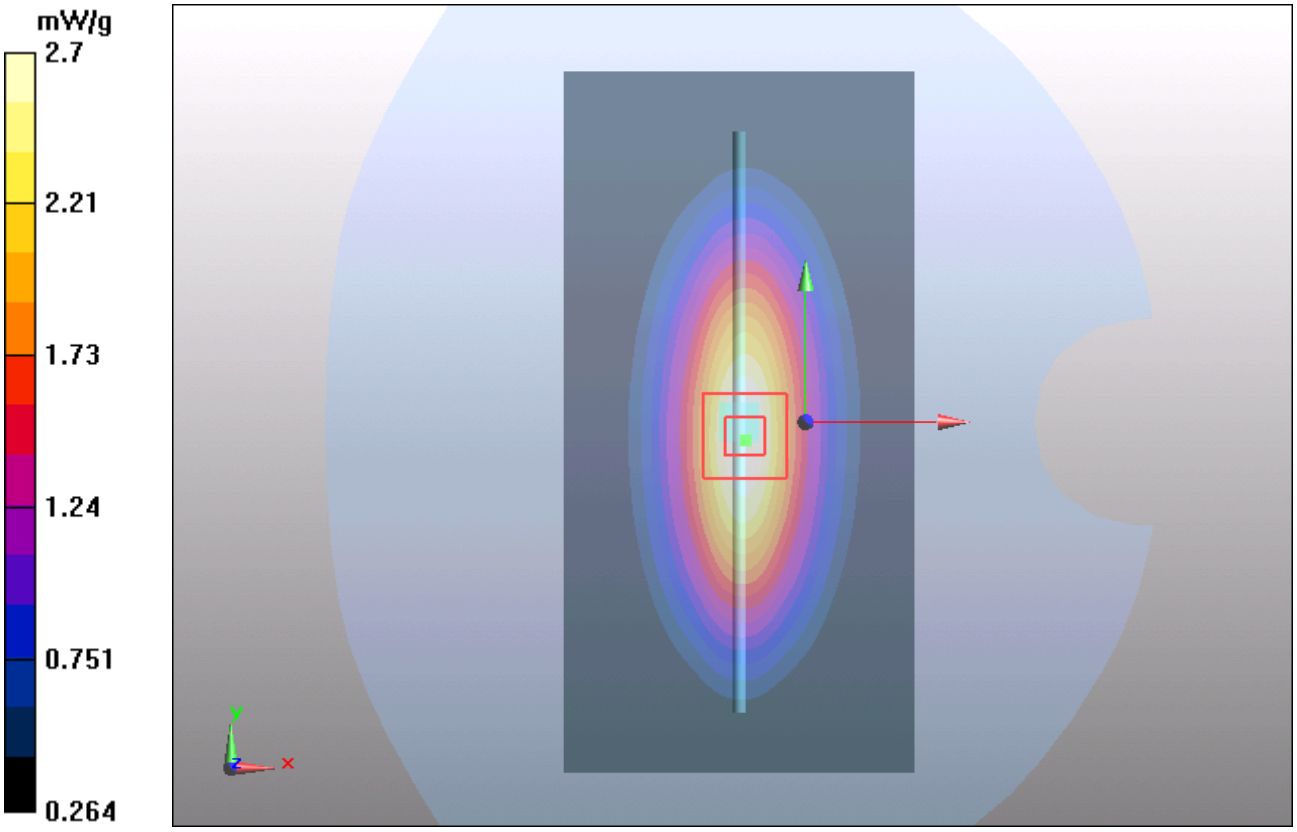



Figure 8 System Performance Check 835MHz 250mW

## System Performance Check at 1900 MHz Head TSL

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

Date/Time: 4/21/2012 5:54:57 AM

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

Medium parameters used: f = 1900 MHz; $\sigma$ = 1.41 mho/m; $\varepsilon_r$ = 40.8; $\rho$ = 1000 kg/m$^3$

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

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

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) = 11.6 mW/g

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

Reference Value = 85.5 V/m; Power Drift = 0.091 dB

Peak SAR (extrapolated) = 17.8 W/kg

**SAR(1 g) = 9.64 mW/g; SAR(10 g) = 5.04 mW/g**

Maximum value of SAR (measured) = 10.8 mW/g

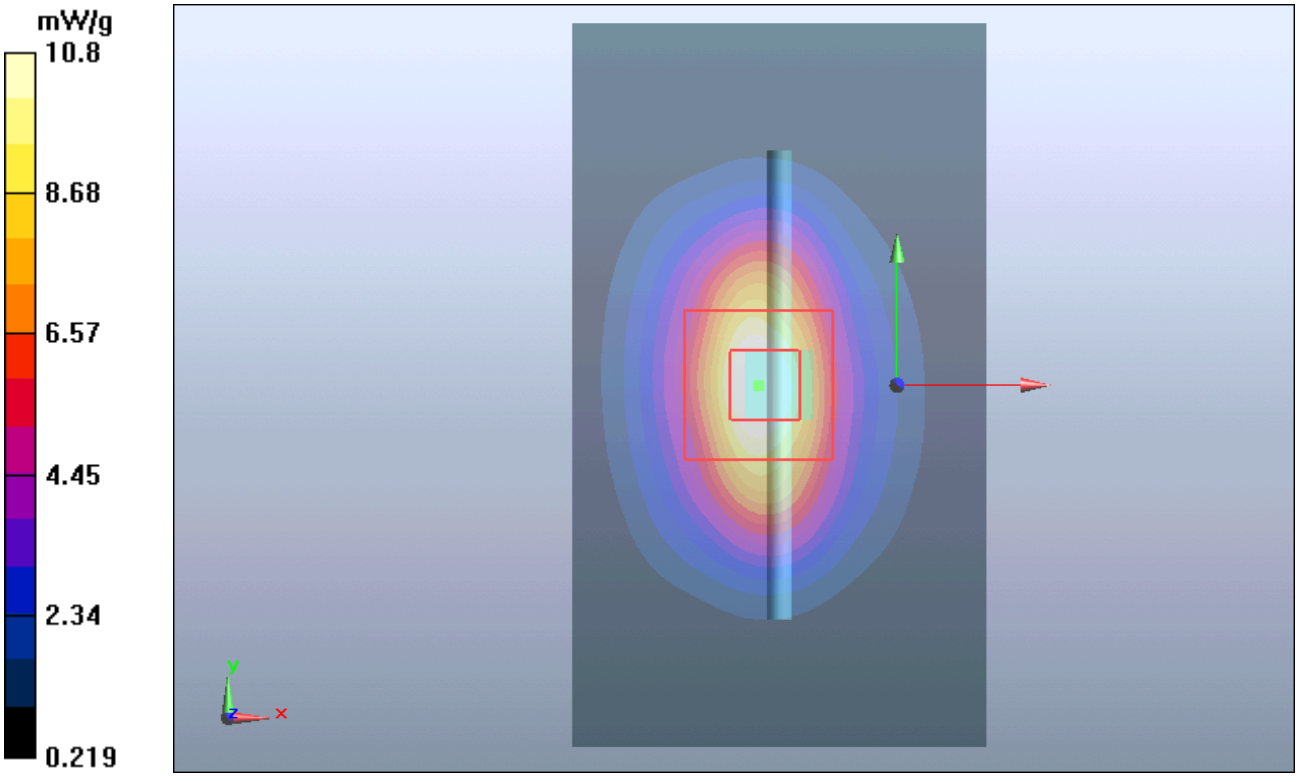



Figure 9 System Performance Check 1900MHz 250mW

## System Performance Check at 1900 MHz Body TSL

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

Date/Time: 4/21/2012 8:38:51 PM

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

Medium parameters used: f = 1900 MHz; $\sigma$ = 1.55 mho/m; $\varepsilon_r$ = 52.1; $\rho$ = 1000 kg/m$^3$

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

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

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) = 12.8 mW/g

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

Reference Value = 87.8 V/m; Power Drift = 0.008 dB

Peak SAR (extrapolated) = 19.4 W/kg

**SAR(1 g) = 10.8 mW/g; SAR(10 g) = 5.65 mW/g**

Maximum value of SAR (measured) = 12.1 mW/g

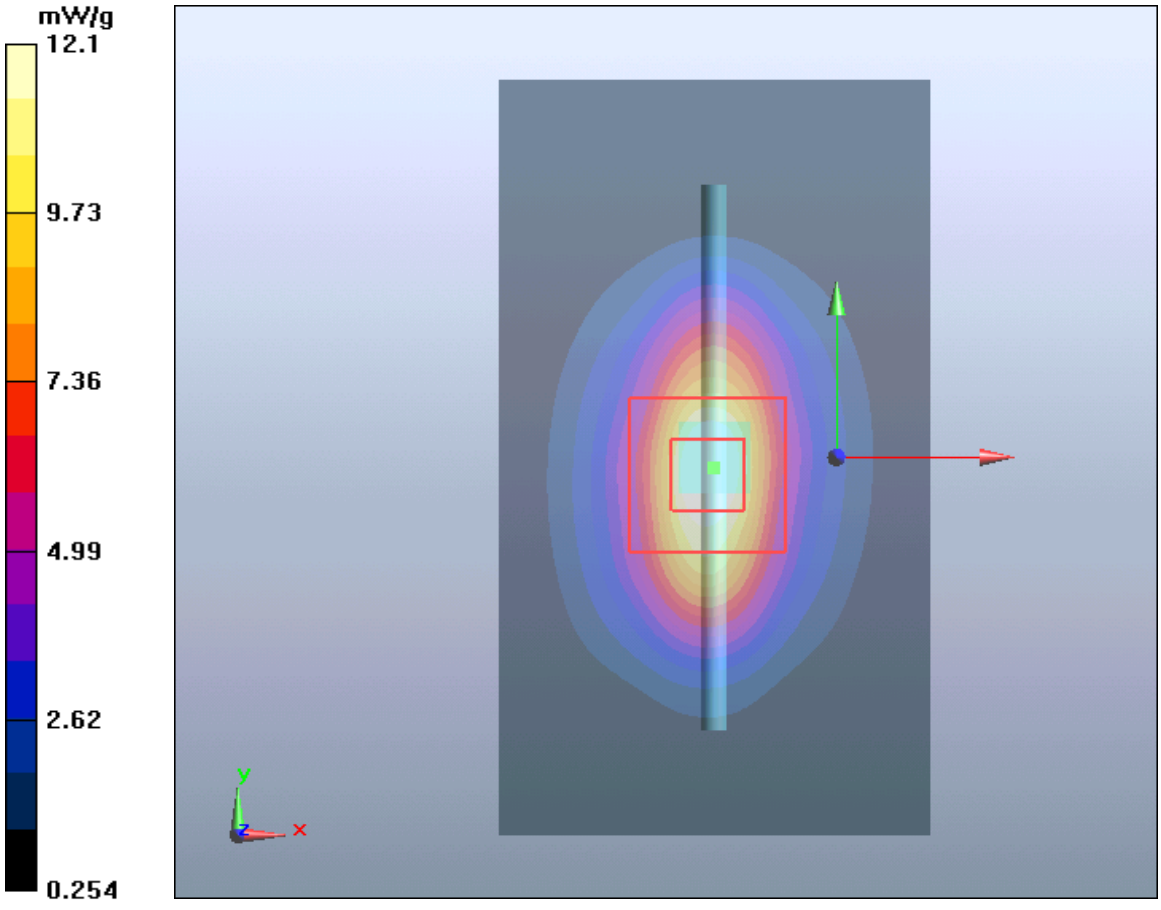



Figure 10 System Performance Check 1900MHz 250mW

# ANNEX C: Graph Results

## GSM 850 Left Cheek High (Slide Open, Battery 1)

Date/Time: 4/21/2012 12:17:54 AM
Communication System: GSM; Frequency: 848.8 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 849 MHz; $\sigma$ = 0.913 mho/m; $\varepsilon_r$ = 41.2; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(9.02, 9.02, 9.02); Calibrated: 1/4/2012
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 High/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.359 mW/g

**Cheek High/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.24 V/m; Power Drift = -0.060 dB
Peak SAR (extrapolated) = 0.413 W/kg
**SAR(1 g) = 0.335 mW/g; SAR(10 g) = 0.252 mW/g**
Maximum value of SAR (measured) = 0.351 mW/g

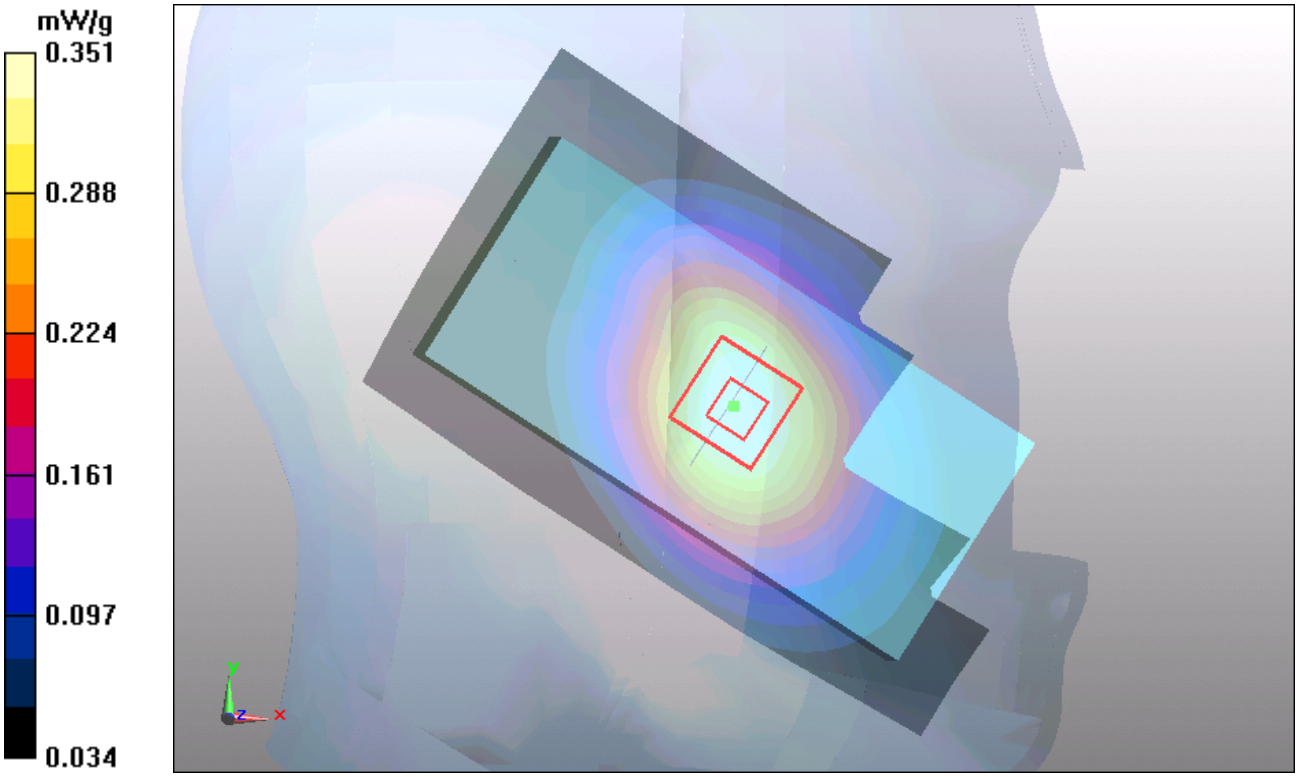



Figure 11 Left Hand Touch Cheek GSM 850 Channel 251

**GSM 850 Left Cheek Middle (Slide Open, Battery 1)**

Date/Time: 4/21/2012 12:02:20 AM
Communication System: GSM; Frequency: 836.6 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 837 MHz; $\sigma$ = 0.9 mho/m; $\varepsilon_r$ = 41.3; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(9.02, 9.02, 9.02); Calibrated: 1/4/2012
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) = 0.313 mW/g

**Cheek Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.9 V/m; Power Drift = -0.049 dB
Peak SAR (extrapolated) = 0.361 W/kg
**SAR(1 g) = 0.295 mW/g; SAR(10 g) = 0.223 mW/g**
Maximum value of SAR (measured) = 0.309 mW/g

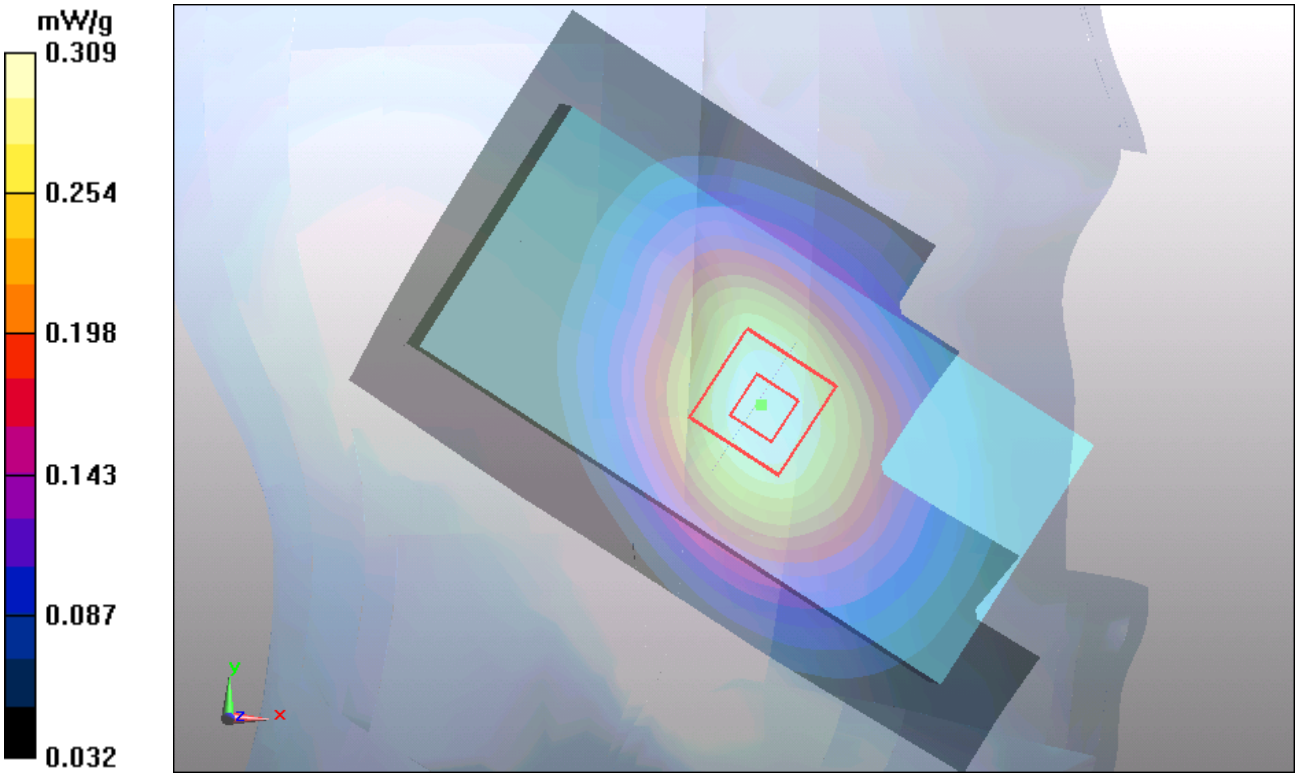



Figure 12 Left Hand Touch Cheek GSM 850 Channel 190

**GSM 850 Left Cheek Low (Slide Open, Battery 1)**

Date/Time: 4/20/2012 11:27:10 PM
Communication System: GSM; Frequency: 824.2 MHz;Duty Cycle: 1:8.30042
Medium parameters used (interpolated): f = 824.2 MHz; $\sigma$ = 0.887 mho/m; $\varepsilon_r$ = 41.5; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(9.02, 9.02, 9.02); Calibrated: 1/4/2012
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 Low/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.309 mW/g

**Cheek Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.8 V/m; Power Drift = -0.182 dB
Peak SAR (extrapolated) = 0.356 W/kg
**SAR(1 g) = 0.291 mW/g; SAR(10 g) = 0.220 mW/g**
Maximum value of SAR (measured) = 0.305 mW/g

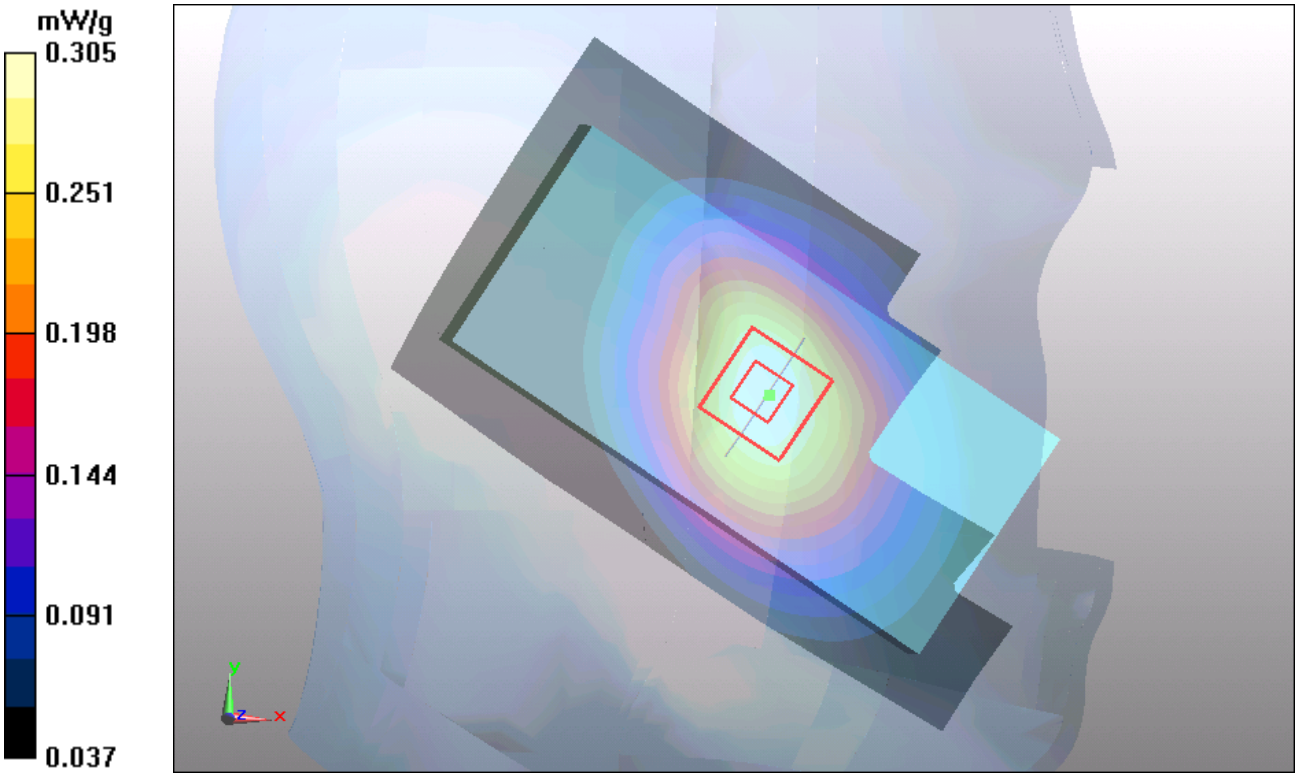



Figure 13 Left Hand Touch Cheek GSM 850 Channel 128

**GSM 850 Left Tilt High (Slide Open, Battery 1)**

Date/Time: 4/21/2012 2:18:25 AM
Communication System: GSM; Frequency: 848.8 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 849 MHz; $\sigma$ = 0.913 mho/m; $\varepsilon_r$ = 41.2; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(9.02, 9.02, 9.02); Calibrated: 1/4/2012
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 High/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.180 mW/g

**Tilt High/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.94 V/m; Power Drift = -0.046 dB
Peak SAR (extrapolated) = 0.208 W/kg
**SAR(1 g) = 0.169 mW/g; SAR(10 g) = 0.130 mW/g**
Maximum value of SAR (measured) = 0.176 mW/g

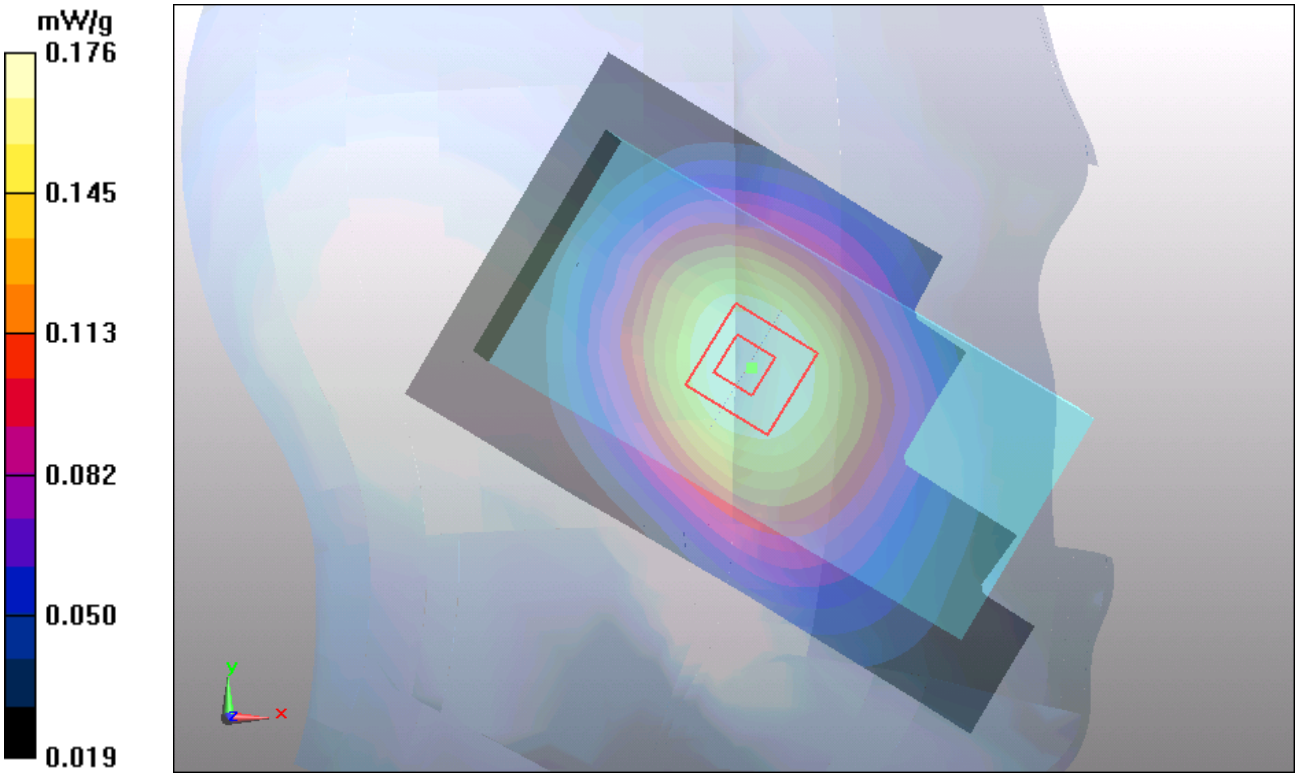



Figure 14 Left Hand Tilt 15° GSM 850 Channel 251

**GSM 850 Left Tilt Middle (Slide Open, Battery 1)**

Date/Time: 4/21/2012 2:03:41 AM
Communication System: GSM; Frequency: 836.6 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 837 MHz; $\sigma$ = 0.9 mho/m; $\varepsilon_r$ = 41.3; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(9.02, 9.02, 9.02); Calibrated: 1/4/2012
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) = 0.160 mW/g

**Tilt Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.72 V/m; Power Drift = 0.030 dB
Peak SAR (extrapolated) = 0.193 W/kg
**SAR(1 g) = 0.152 mW/g; SAR(10 g) = 0.117 mW/g**
Maximum value of SAR (measured) = 0.157 mW/g

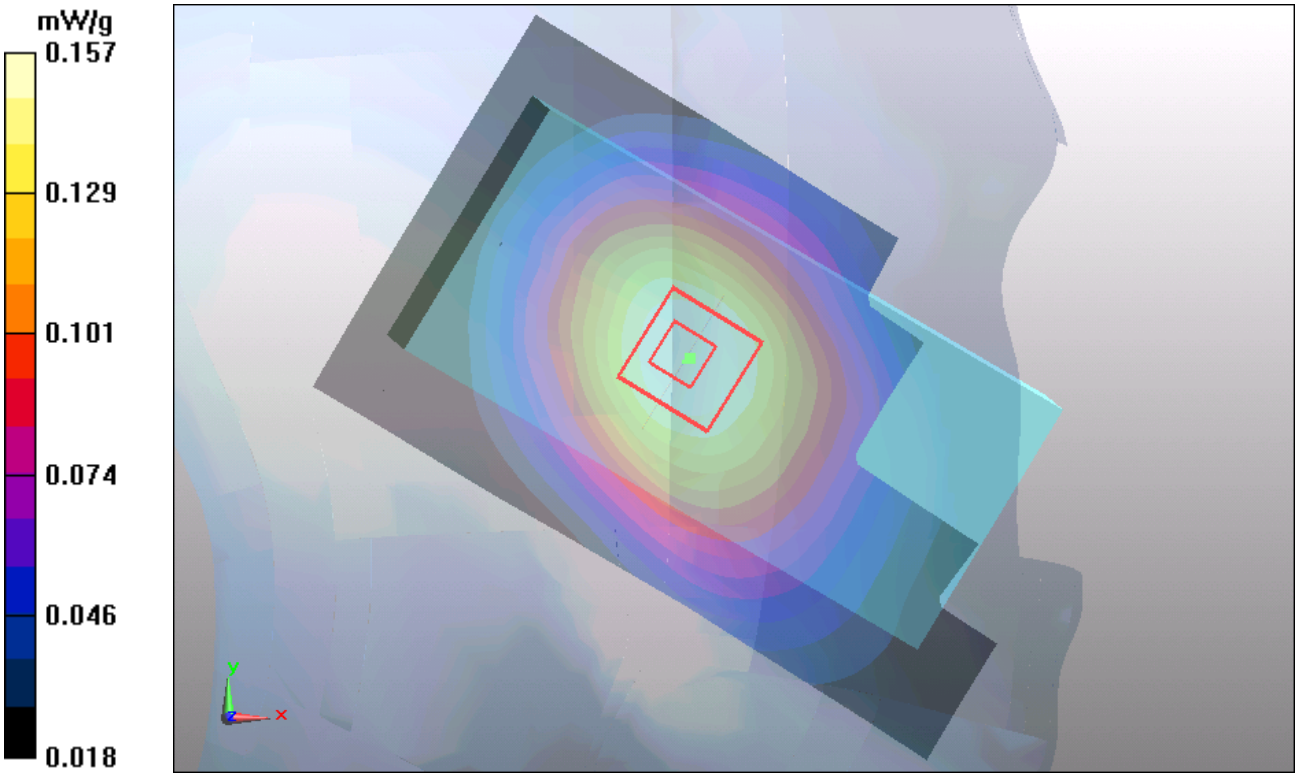



Figure 15 Left Hand Tilt 15° GSM 850 Channel 190

**GSM 850 Left Tilt Low (Slide Open, Battery 1)**

Date/Time: 4/21/2012 1:48:40 AM
Communication System: GSM; Frequency: 824.2 MHz;Duty Cycle: 1:8.30042
Medium parameters used (interpolated): f = 824.2 MHz; $\sigma$ = 0.887 mho/m; $\varepsilon_r$ = 41.5; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(9.02, 9.02, 9.02); Calibrated: 1/4/2012
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 Low/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.158 mW/g

**Tilt Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.8 V/m; Power Drift = 0.018 dB
Peak SAR (extrapolated) = 0.181 W/kg
**SAR(1 g) = 0.148 mW/g; SAR(10 g) = 0.115 mW/g**
Maximum value of SAR (measured) = 0.153 mW/g

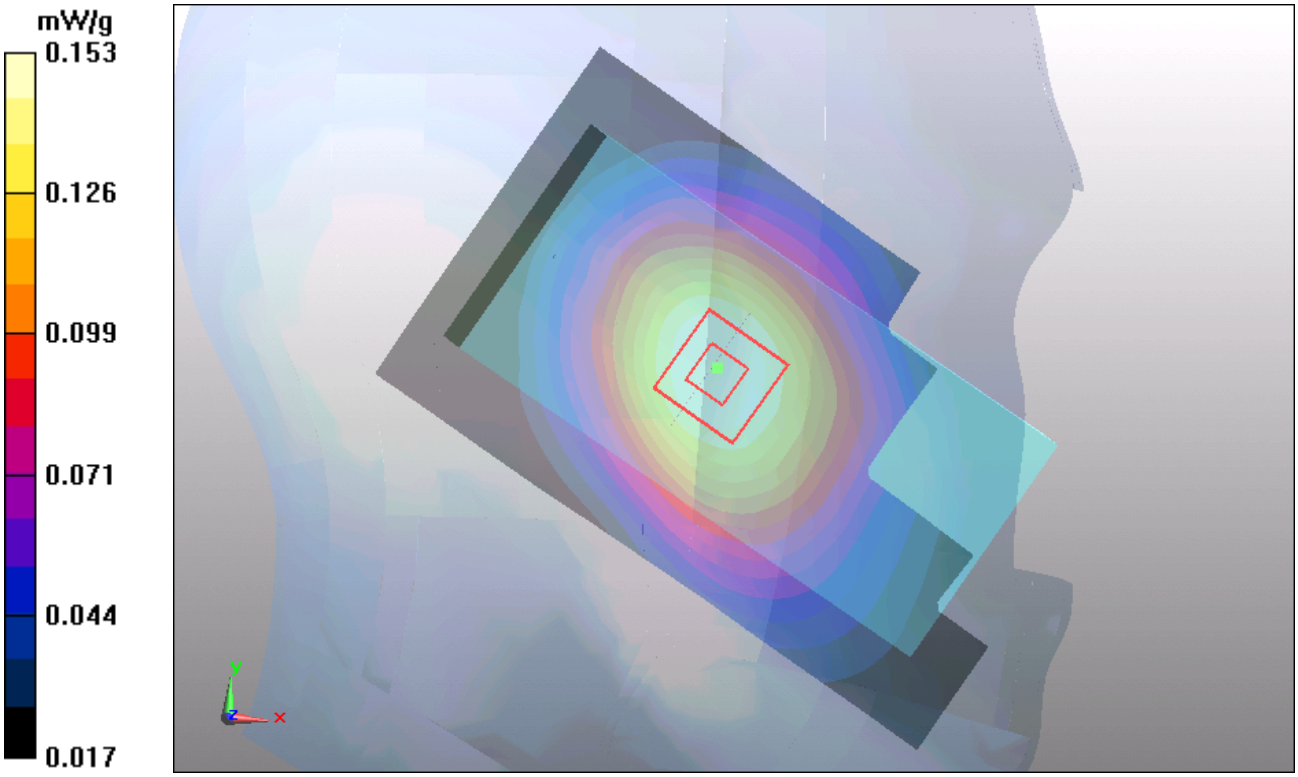


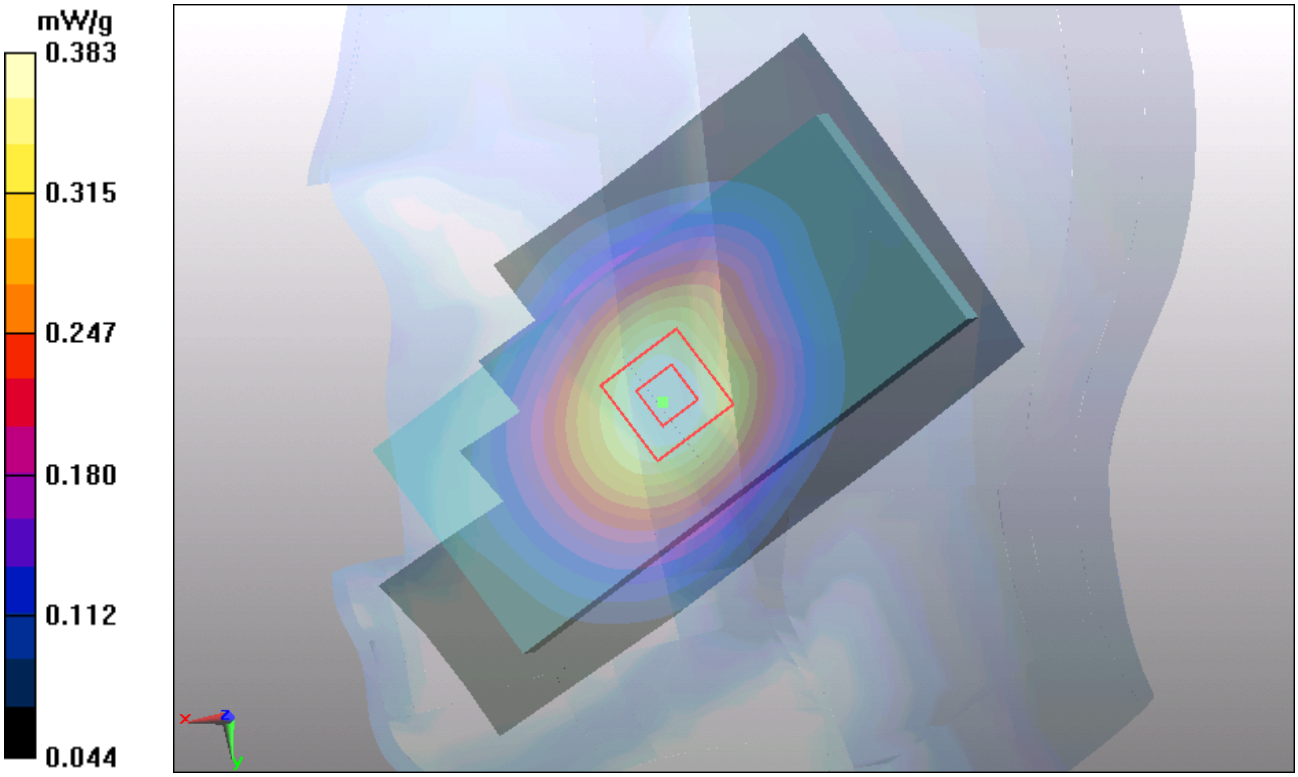

Figure 16 Left Hand Tilt 15° GSM 850 Channel 128

**GSM 850 Right Cheek High (Slide Open, Battery 1)**

Date/Time: 4/21/2012 3:09:29 AM
Communication System: GSM; Frequency: 848.8 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 849 MHz; $\sigma$ = 0.913 mho/m; $\varepsilon_r$ = 41.2; $\rho$ = 1000 kg/$m^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(9.02, 9.02, 9.02); Calibrated: 1/4/2012
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 High/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.390 mW/g

**Cheek High/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.33 V/m; Power Drift = 0.010 dB
Peak SAR (extrapolated) = 0.448 W/kg
**SAR(1 g) = 0.365 mW/g; SAR(10 g) = 0.276 mW/g**
Maximum value of SAR (measured) = 0.383 mW/g



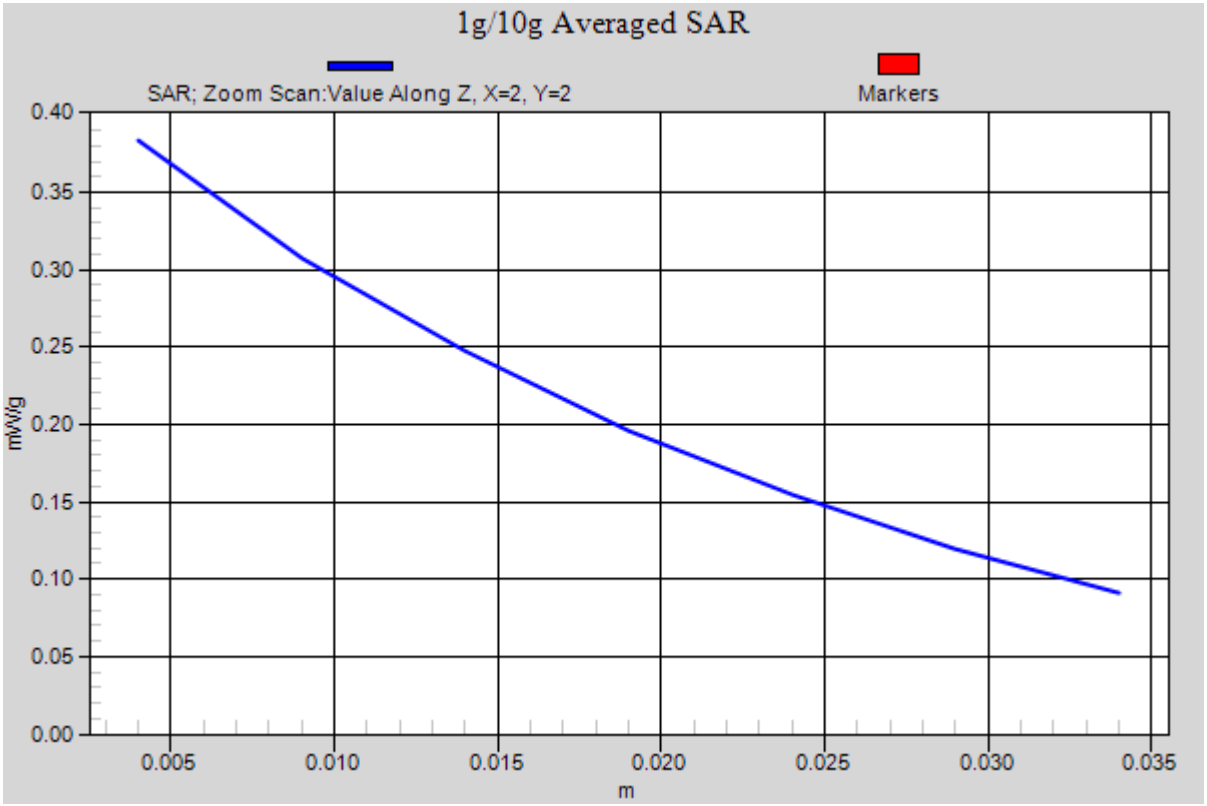



Figure 17 Right Hand Touch Cheek GSM 850 Channel 251

**GSM 850 Right Cheek Middle (Slide Open, Battery 1)**

Date/Time: 4/21/2012 2:54:33 AM
Communication System: GSM; Frequency: 836.6 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 837 MHz; $\sigma$ = 0.9 mho/m; $\varepsilon_r$ = 41.3; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(9.02, 9.02, 9.02); Calibrated: 1/4/2012
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) = 0.334 mW/g

**Cheek Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.04 V/m; Power Drift = 0.144 dB
Peak SAR (extrapolated) = 0.382 W/kg
**SAR(1 g) = 0.314 mW/g; SAR(10 g) = 0.238 mW/g**
Maximum value of SAR (measured) = 0.330 mW/g

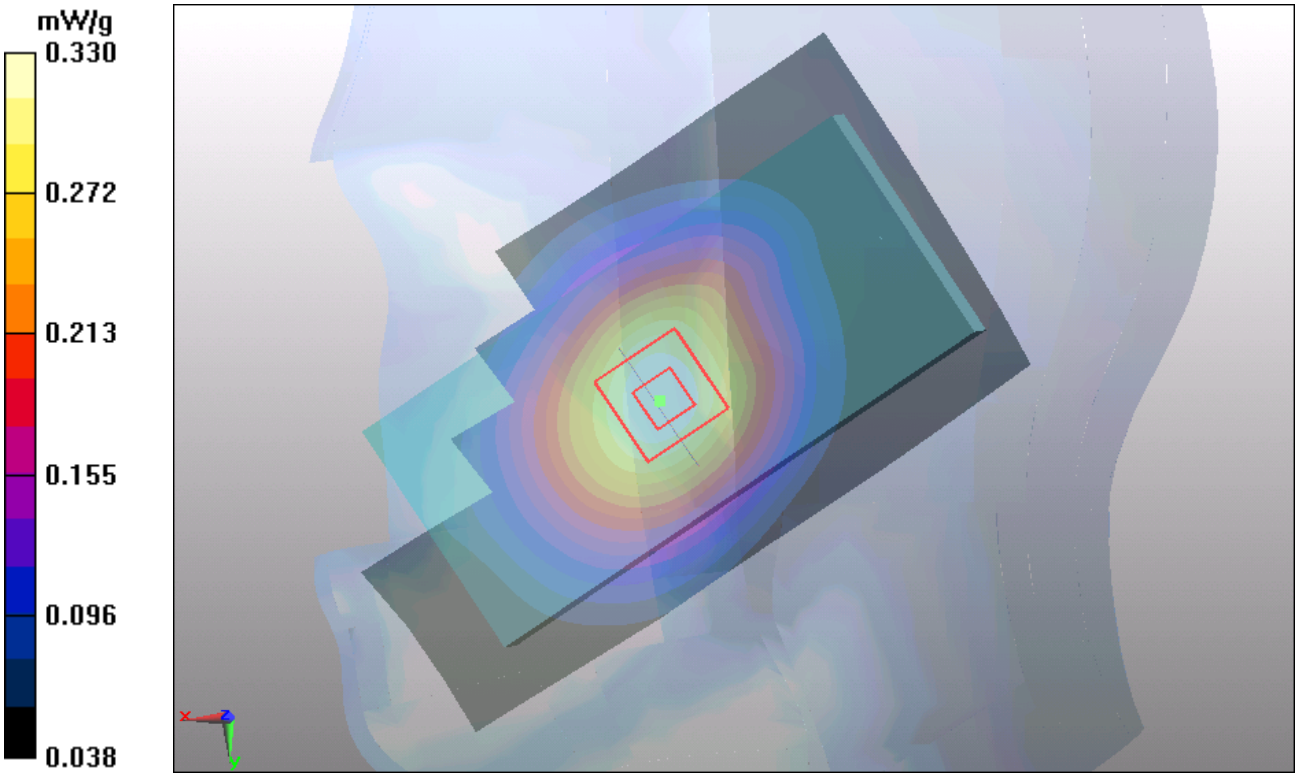



Figure 18 Right Hand Touch Cheek GSM 850 Channel 190

**GSM 850 Right Cheek Low (Slide Open, Battery 1)**

Date/Time: 4/21/2012 2:39:27 AM
Communication System: GSM; Frequency: 824.2 MHz;Duty Cycle: 1:8.30042
Medium parameters used (interpolated): f = 824.2 MHz; $\sigma$ = 0.887 mho/m; $\varepsilon_r$ = 41.5; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(9.02, 9.02, 9.02); Calibrated: 1/4/2012
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 Low/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.310 mW/g

**Cheek Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.8 V/m; Power Drift = -0.026 dB
Peak SAR (extrapolated) = 0.353 W/kg
**SAR(1 g) = 0.292 mW/g; SAR(10 g) = 0.222 mW/g**
Maximum value of SAR (measured) = 0.306 mW/g

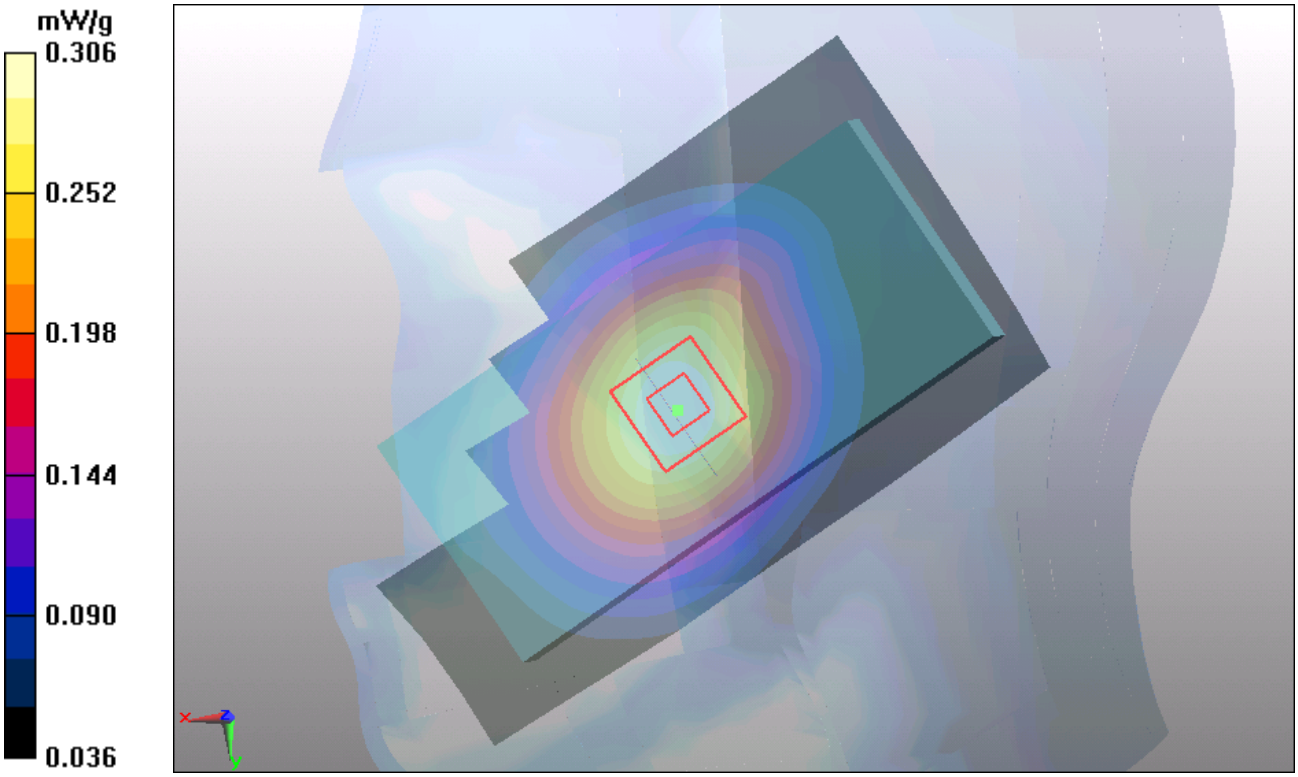



Figure 19 Right Hand Touch Cheek GSM 850 Channel 128

**GSM 850 Right Tilt High (Slide Open, Battery 1)**

Date/Time: 4/21/2012 3:57:12 AM
Communication System: GSM; Frequency: 848.8 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 849 MHz; $\sigma$ = 0.913 mho/m; $\varepsilon_r$ = 41.2; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(9.02, 9.02, 9.02); Calibrated: 1/4/2012
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 High/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.182 mW/g

**Tilt High/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.12 V/m; Power Drift = -0.039 dB
Peak SAR (extrapolated) = 0.213 W/kg
**SAR(1 g) = 0.173 mW/g; SAR(10 g) = 0.133 mW/g**
Maximum value of SAR (measured) = 0.180 mW/g

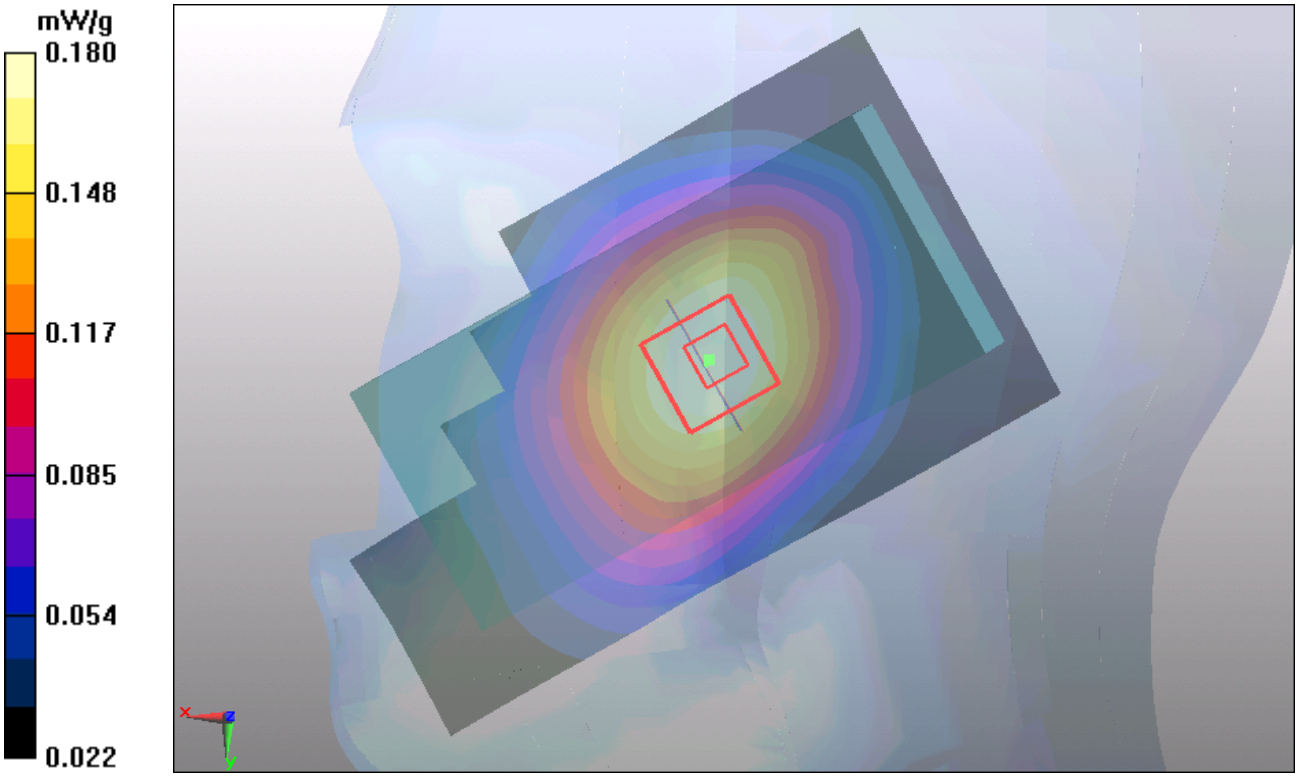



Figure 20 Right Hand Tilt 15° GSM 850 Channel 251

**GSM 850 Right Tilt Middle (Slide Open, Battery 1)**

Date/Time: 4/21/2012 3:42:07 AM
Communication System: GSM; Frequency: 836.6 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 837 MHz; $\sigma$ = 0.9 mho/m; $\varepsilon_r$ = 41.3; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(9.02, 9.02, 9.02); Calibrated: 1/4/2012
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) = 0.164 mW/g

**Tilt Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.84 V/m; Power Drift = -0.101 dB
Peak SAR (extrapolated) = 0.190 W/kg
**SAR(1 g) = 0.154 mW/g; SAR(10 g) = 0.119 mW/g**
Maximum value of SAR (measured) = 0.161 mW/g

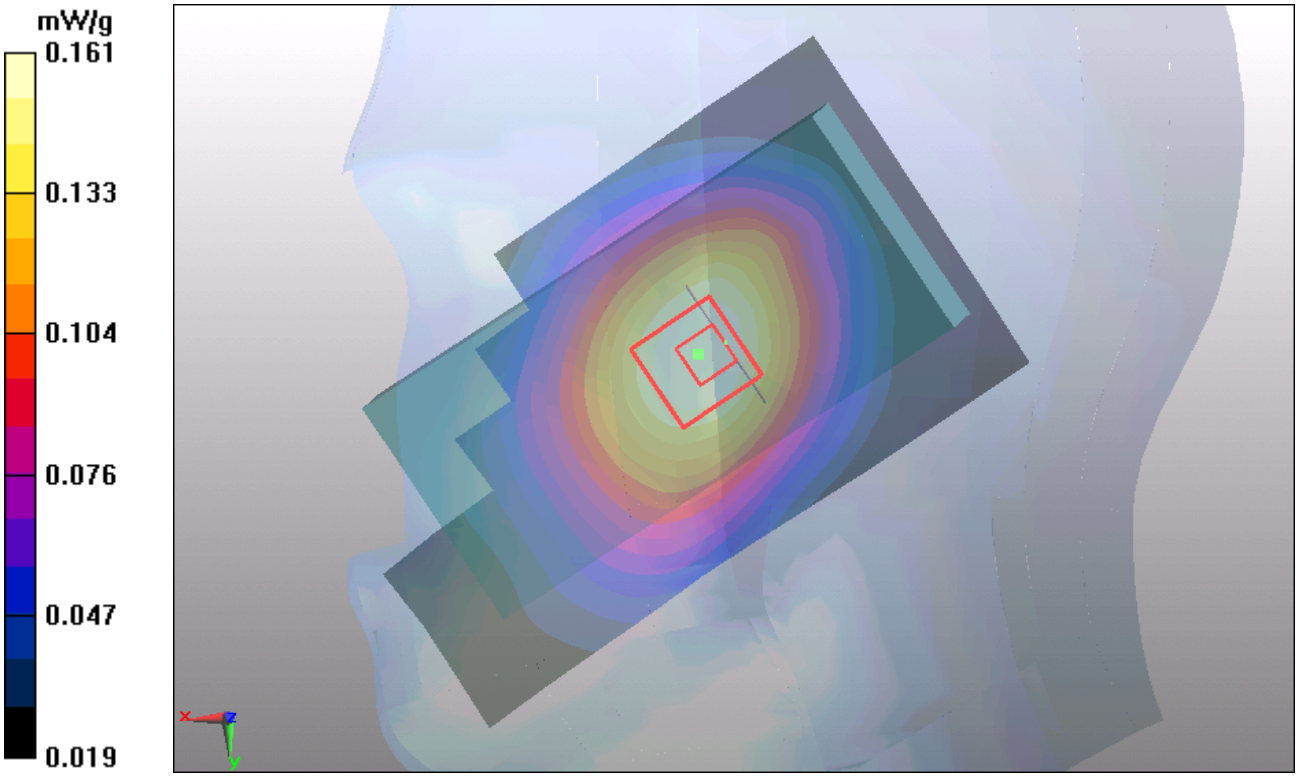



Figure 21 Right Hand Tilt 15° GSM 850 Channel 190

**GSM 850 Right Tilt Low (Slide Open, Battery 1)**

Date/Time: 4/21/2012 3:27:06 AM
Communication System: GSM; Frequency: 824.2 MHz;Duty Cycle: 1:8.30042
Medium parameters used (interpolated): f = 824.2 MHz; $\sigma$ = 0.887 mho/m; $\varepsilon_r$ = 41.5; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(9.02, 9.02, 9.02); Calibrated: 1/4/2012
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 Low/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.156 mW/g

**Tilt Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.75 V/m; Power Drift = -0.038 dB
Peak SAR (extrapolated) = 0.181 W/kg
**SAR(1 g) = 0.148 mW/g; SAR(10 g) = 0.114 mW/g**
Maximum value of SAR (measured) = 0.154 mW/g

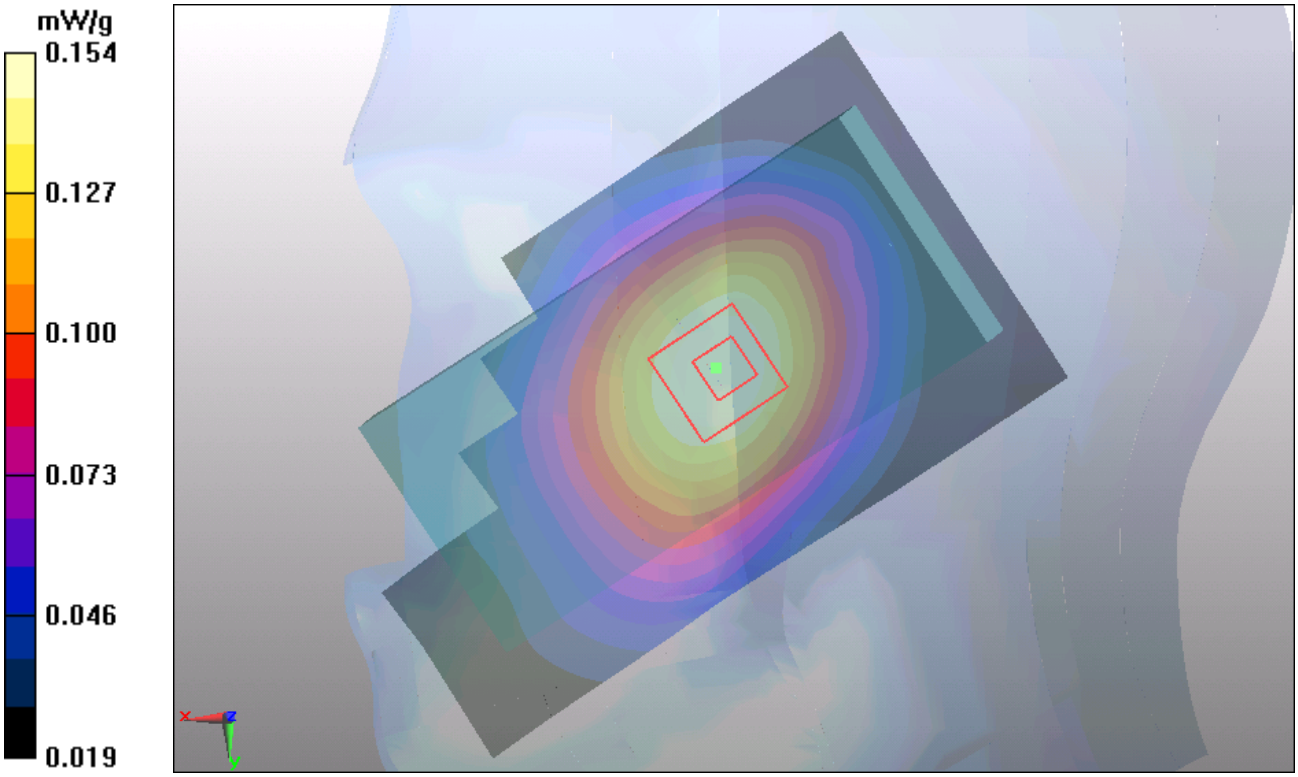



Figure 22 Right Hand Tilt 15° GSM 850 Channel 128

### GSM 850 Left Cheek Low (Slide Close, Battery 1)

Date/Time: 4/20/2012 11:45:03 PM
Communication System: GSM; Frequency: 824.2 MHz;Duty Cycle: 1:8.30042
Medium parameters used (interpolated): f = 824.2 MHz; $\sigma$ = 0.887 mho/m; $\varepsilon_r$ = 41.5; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(9.02, 9.02, 9.02); Calibrated: 1/4/2012
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 Low/Area Scan (61x81x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.298 mW/g

**Cheek Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.65 V/m; Power Drift = -0.024 dB
Peak SAR (extrapolated) = 0.356 W/kg
**SAR(1 g) = 0.274 mW/g; SAR(10 g) = 0.203 mW/g**
Maximum value of SAR (measured) = 0.283 mW/g

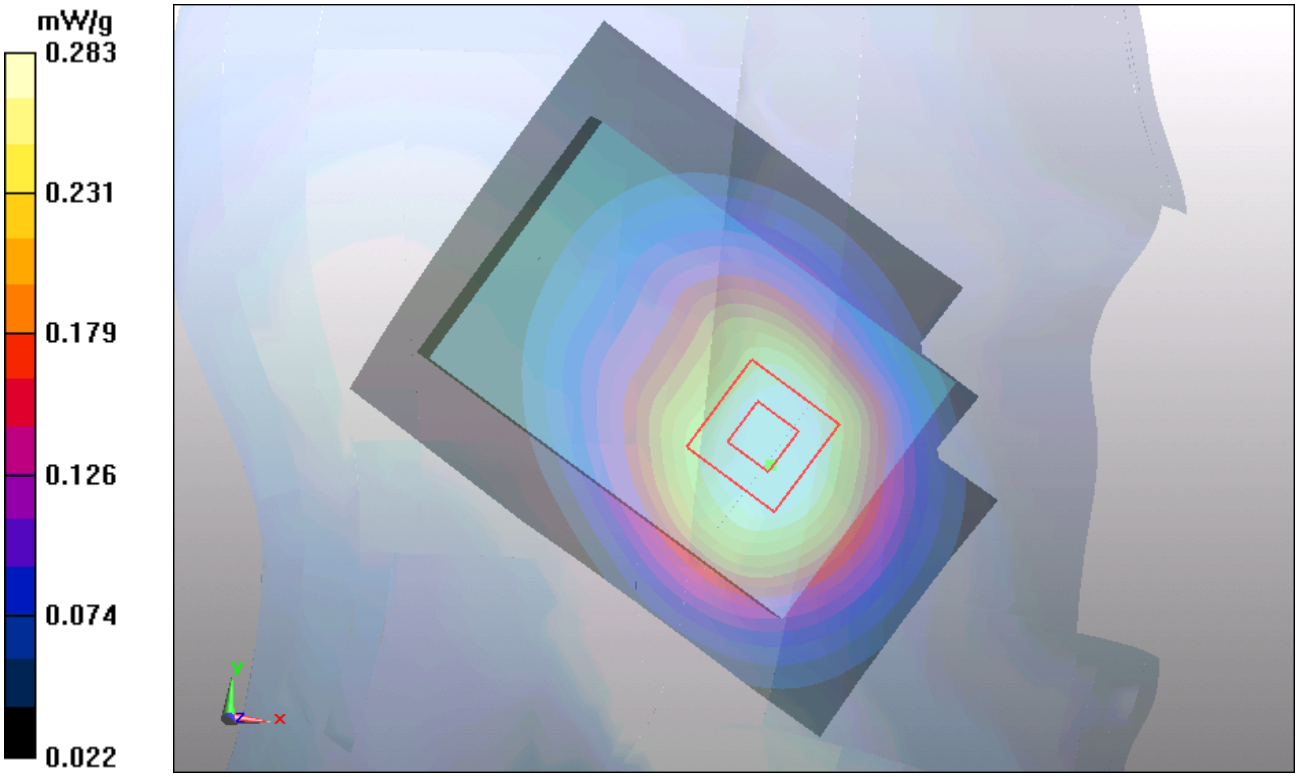



Figure 23 Left Hand Touch Cheek GSM 850 Channel 128

**GSM 850 Right Cheek High (Slide Close, Battery 1)**

Date/Time: 4/21/2012 4:19:01 AM
Communication System: GSM; Frequency: 848.8 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 849 MHz; $\sigma$ = 0.913 mho/m; $\varepsilon_r$ = 41.2; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(9.02, 9.02, 9.02); Calibrated: 1/4/2012
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 High/Area Scan (61x71x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.373 mW/g

**Cheek High/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.01 V/m; Power Drift = -0.021 dB
Peak SAR (extrapolated) = 0.448 W/kg
**SAR(1 g) = 0.355 mW/g; SAR(10 g) = 0.262 mW/g**
Maximum value of SAR (measured) = 0.372 mW/g

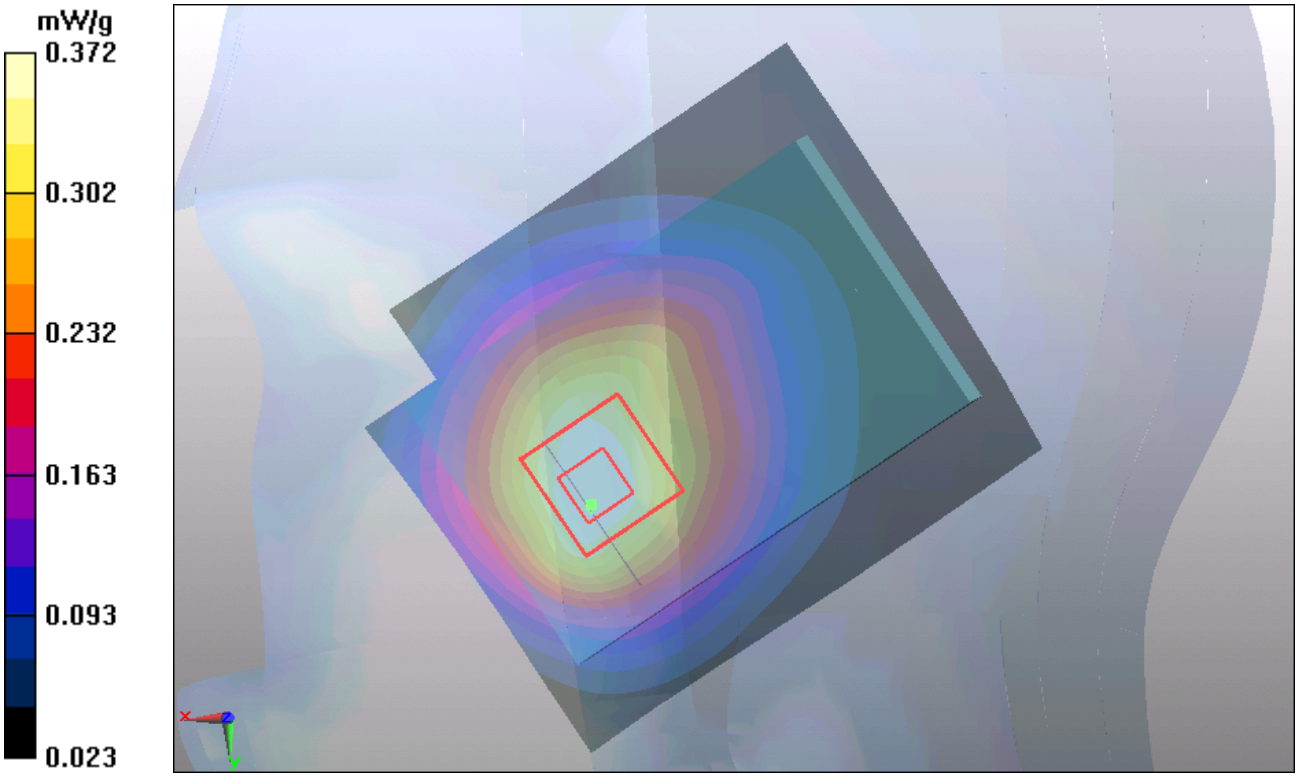


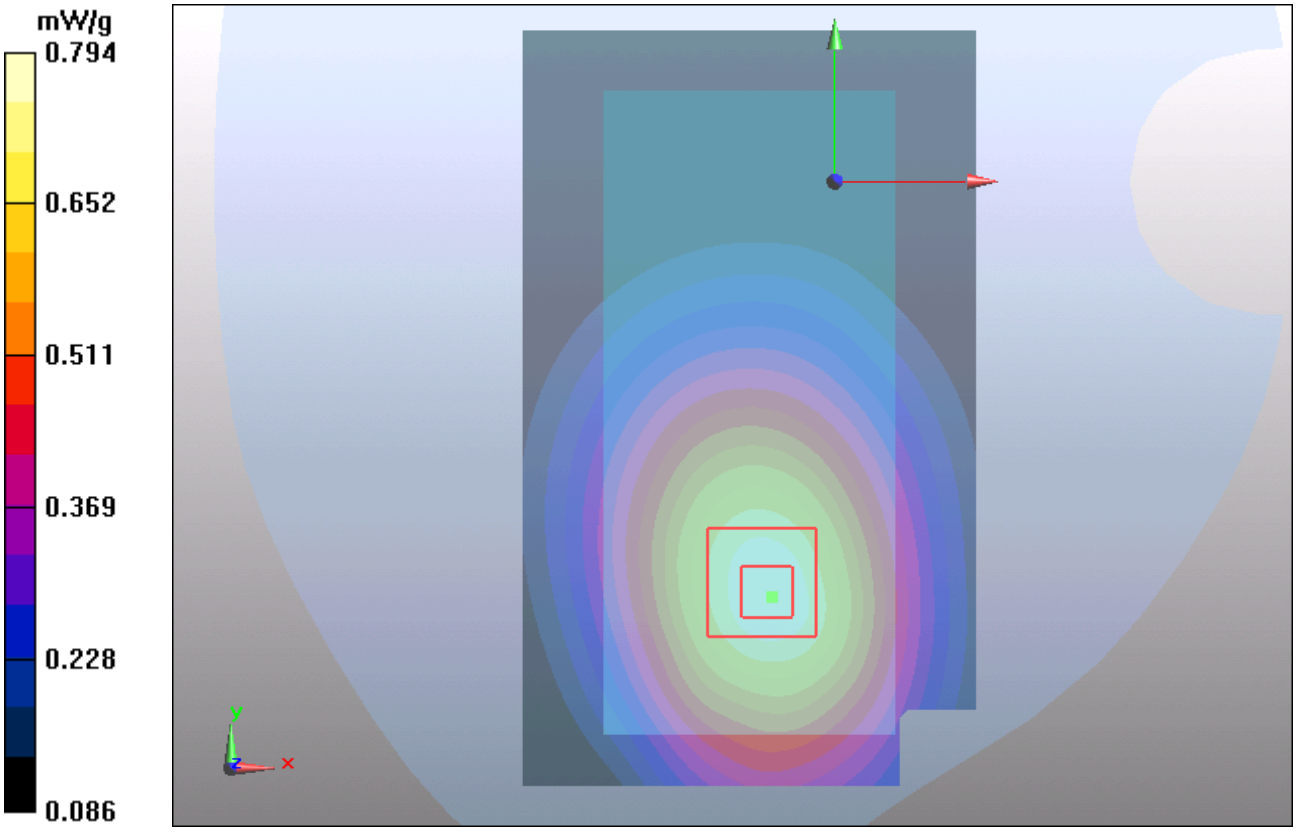

Figure 24 Right Hand Touch Cheek GSM 850 Channel 251

**GSM 850 GPRS (3Txslots) Towards Ground High (Slide Open, Battery 1)**

Date/Time: 4/21/2012 5:23:45 PM
Communication System: GPRS 3TX; Frequency: 848.8 MHz;Duty Cycle: 1:2.76694
Medium parameters used: f = 849 MHz; $\sigma$ = 1.01 mho/m; $\varepsilon_r$ = 54.1; $\rho$ = 1000 kg/$m^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(9.18, 9.18, 9.18); Calibrated: 1/4/2012
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

**Towards Ground High/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.790 mW/g

**Towards Ground High/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.44 V/m; Power Drift = 0.032 dB
Peak SAR (extrapolated) = 1 W/kg
**SAR(1 g) = 0.750 mW/g; SAR(10 g) = 0.544 mW/g**
Maximum value of SAR (measured) = 0.794 mW/g



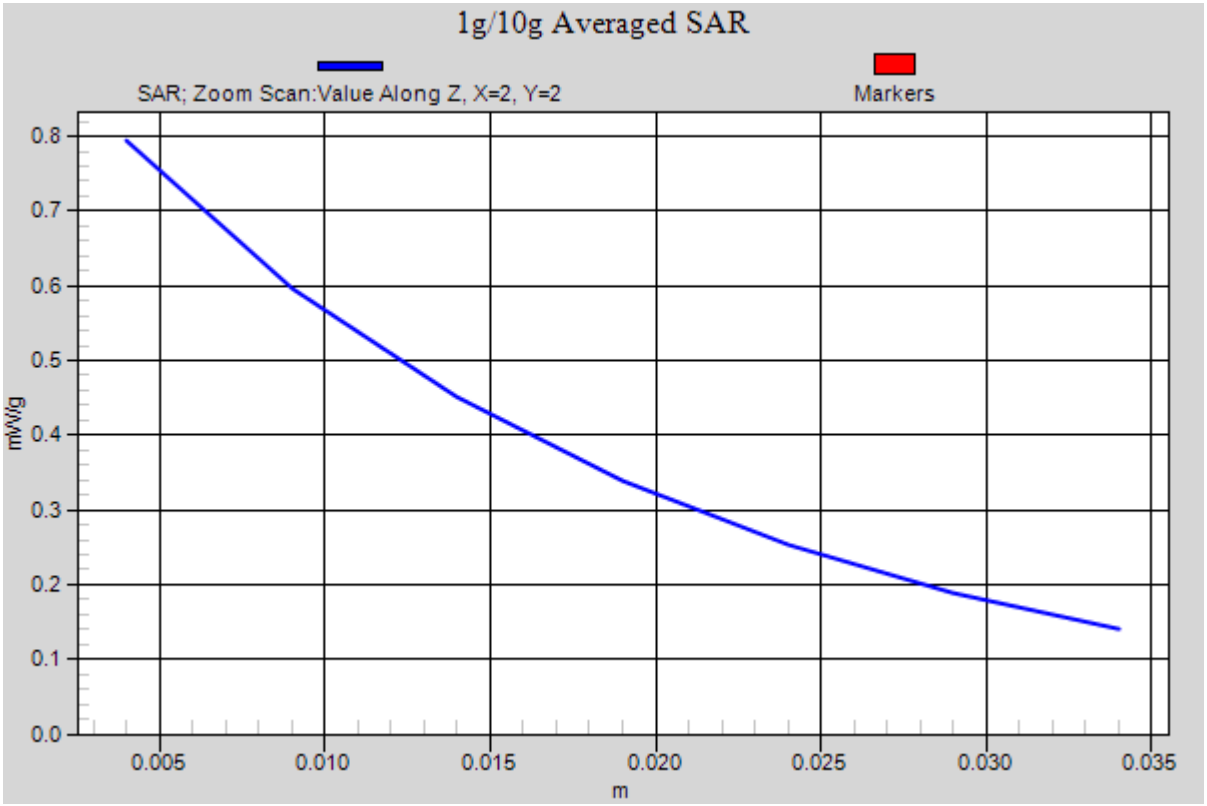



Figure 25 Body, Towards Ground, GSM 850 GPRS (3Txslots) Channel 251

**GSM 850 GPRS (3Txslots) Towards Ground Middle (Slide Open, Battery 1)**

Date/Time: 4/21/2012 5:07:05 PM
Communication System: GPRS 3TX; Frequency: 836.6 MHz;Duty Cycle: 1:2.76694
Medium parameters used: f = 837 MHz; $\sigma$ = 0.988 mho/m; $\varepsilon_r$ = 54.2; $\rho$ = 1000 kg/$m^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(9.18, 9.18, 9.18); Calibrated: 1/4/2012
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

**Towards Ground Middle/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.757 mW/g

**Towards Ground Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.17 V/m; Power Drift = -0.042 dB
Peak SAR (extrapolated) = 0.943 W/kg
**SAR(1 g) = 0.715 mW/g; SAR(10 g) = 0.520 mW/g**
Maximum value of SAR (measured) = 0.753 mW/g

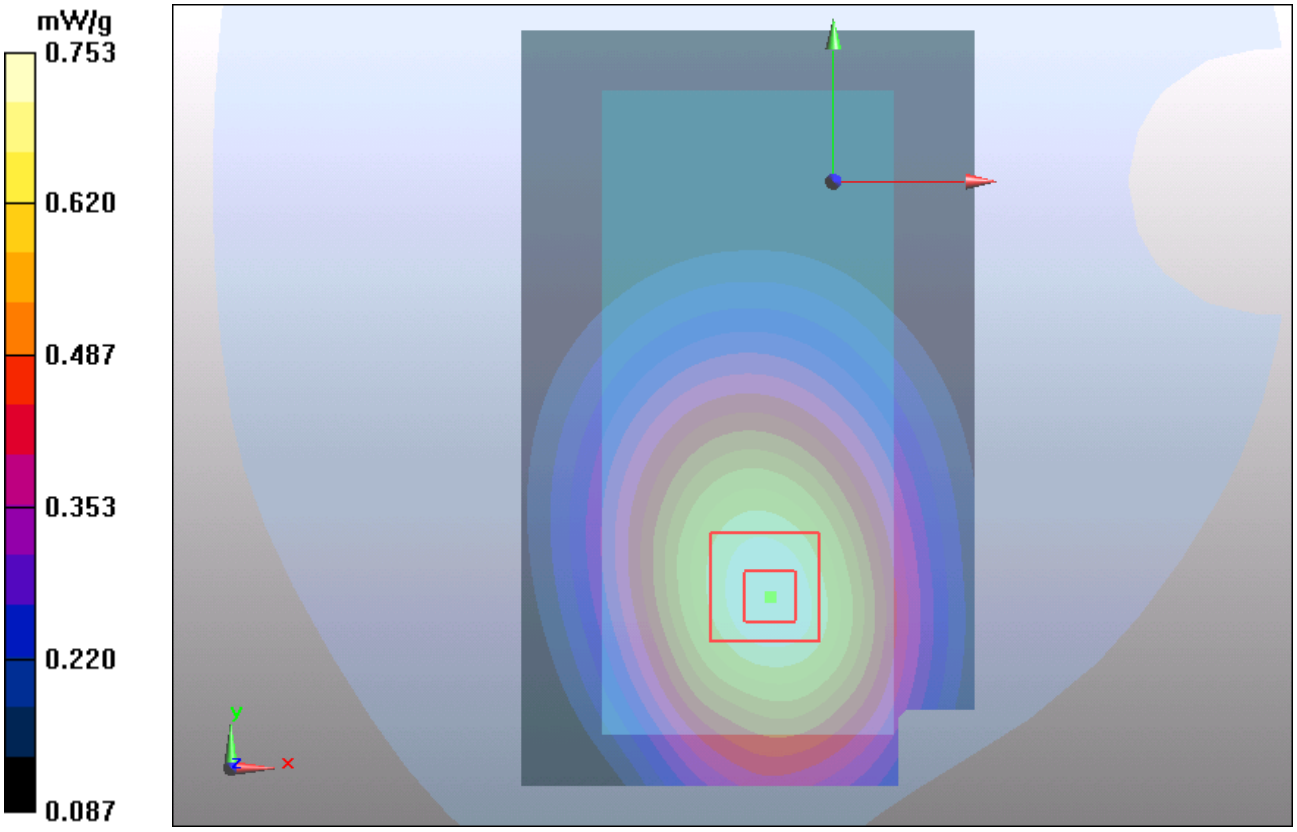



Figure 26 Body, Towards Ground, GSM 850 GPRS (3Txslots) Channel 190

**GSM 850 GPRS (3Txslots) Towards Ground Low (Slide Open, Battery 1)**

Date/Time: 4/21/2012 4:30:11 PM
Communication System: GPRS 3TX; Frequency: 824.2 MHz;Duty Cycle: 1:2.76694
Medium parameters used (interpolated): f = 824.2 MHz; $\sigma$ = 0.972 mho/m; $\varepsilon_r$ = 54.4; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(9.18, 9.18, 9.18); Calibrated: 1/4/2012
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

**Towards Ground Low/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.650 mW/g

**Towards Ground Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.44 V/m; Power Drift = -0.060 dB
Peak SAR (extrapolated) = 0.815 W/kg
**SAR(1 g) = 0.618 mW/g; SAR(10 g) = 0.449 mW/g**
Maximum value of SAR (measured) = 0.654 mW/g

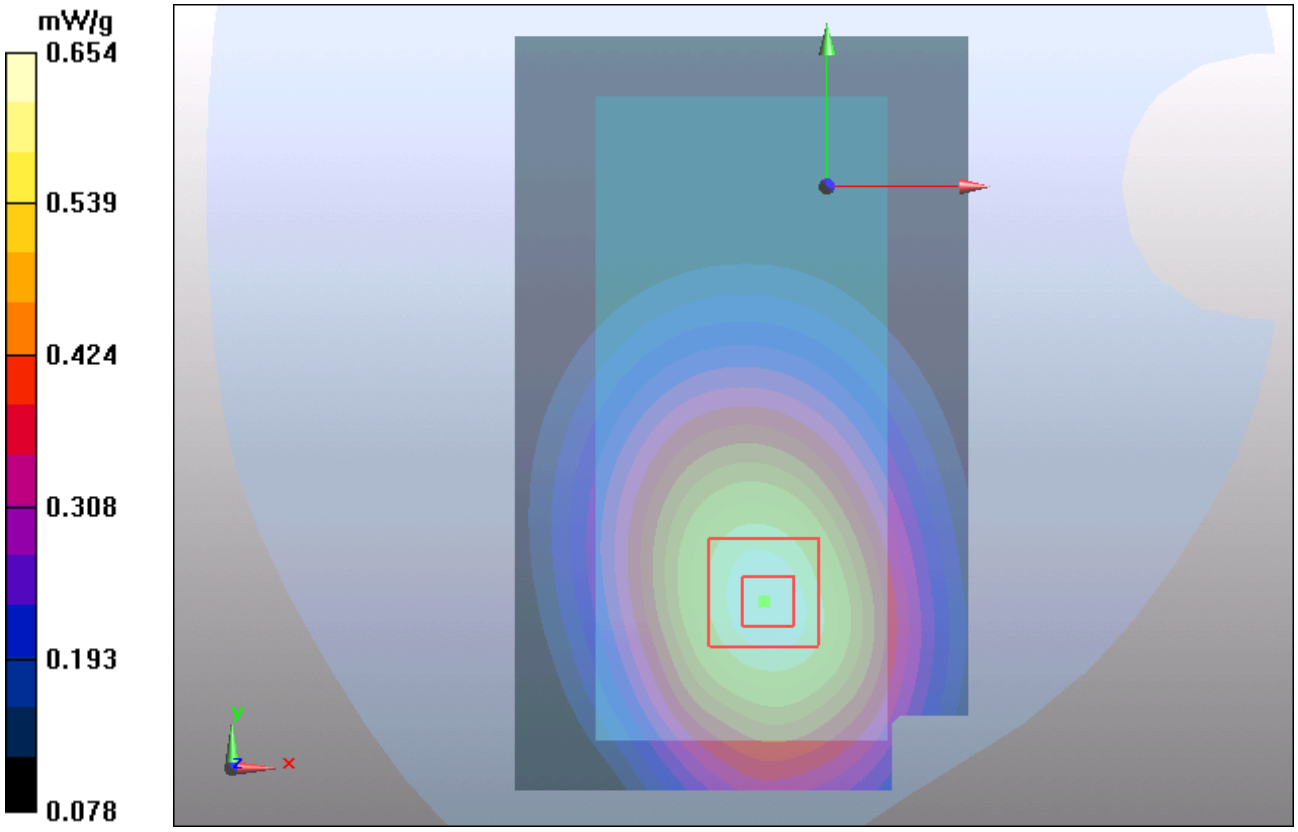



Figure 27 Body, Towards Ground, GSM 850 GPRS (3Txslots) Channel 128

**GSM 850 GPRS (3Txslots) Towards Phantom High (Slide Open, Battery 1)**

Date/Time: 4/21/2012 5:45:54 PM

Communication System: GPRS 3TX; Frequency: 848.8 MHz;Duty Cycle: 1:2.76694

Medium parameters used: f = 849 MHz; $\sigma$ = 1.01 mho/m; $\varepsilon_r$ = 54.1; $\rho$ = 1000 kg/$m^3$

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

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

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

**Towards Phantom High/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 8.01 V/m; Power Drift = -0.051 dB

Peak SAR (extrapolated) = 0.648 W/kg

**SAR(1 g) = 0.508 mW/g; SAR(10 g) = 0.380 mW/g**

Maximum value of SAR (measured) = 0.532 mW/g

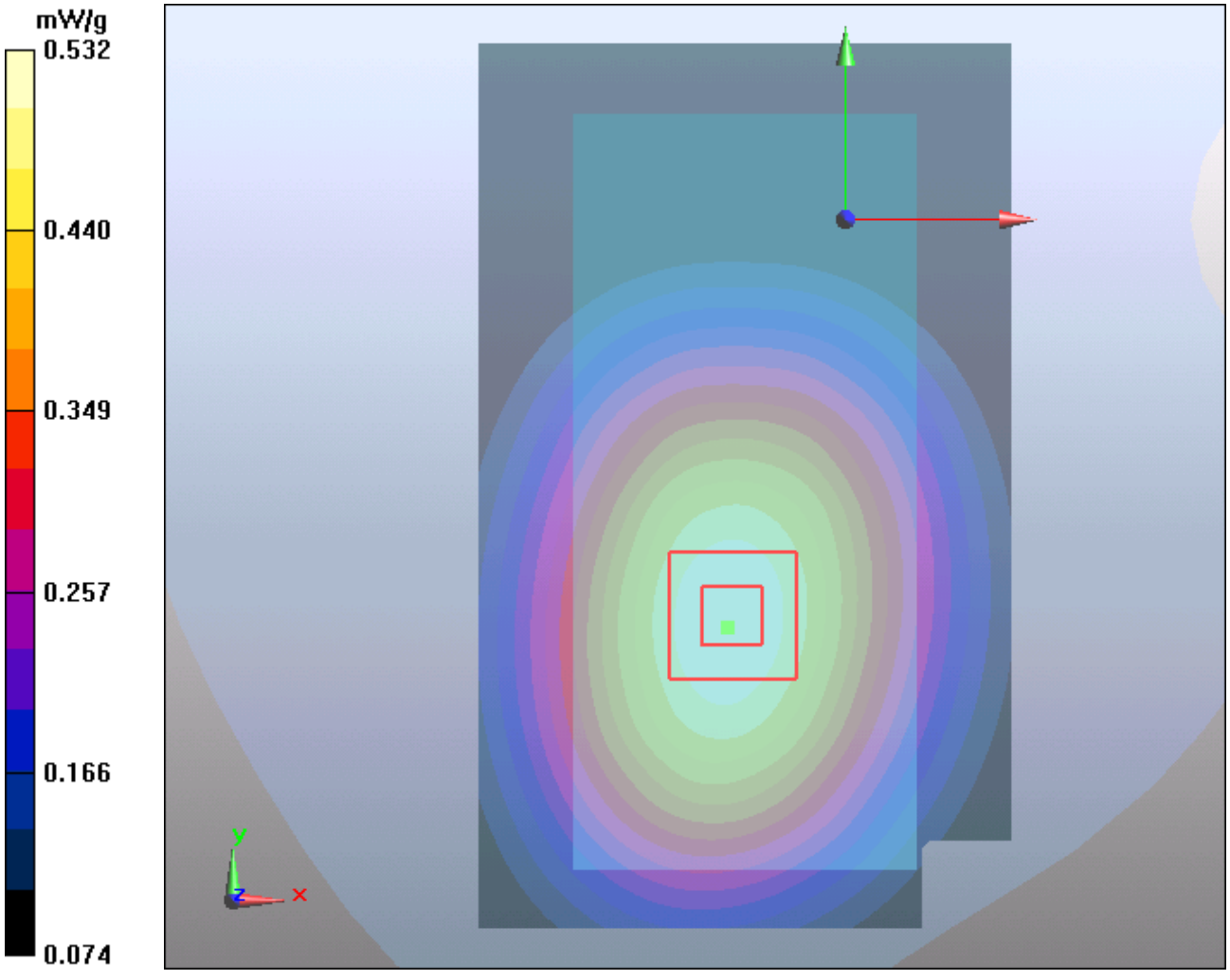



Figure 28 Body, Towards Phantom, GSM 850 GPRS (3Txslots) Channel 251

**GSM 850 GPRS (3Txslots) Towards Phantom Middle (Slide Open, Battery 1)**

Date/Time: 4/21/2012 6:01:54 PM

Communication System: GPRS 3TX; Frequency: 836.6 MHz;Duty Cycle: 1:2.76694

Medium parameters used: f = 837 MHz; $\sigma$ = 0.988 mho/m; $\varepsilon_r$ = 54.2; $\rho$ = 1000 kg/m$^3$

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

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

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

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

Maximum value of SAR (interpolated) = 0.487 mW/g

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

Reference Value = 7.62 V/m; Power Drift = 0.041 dB

Peak SAR (extrapolated) = 0.604 W/kg

**SAR(1 g) = 0.467 mW/g; SAR(10 g) = 0.349 mW/g**

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

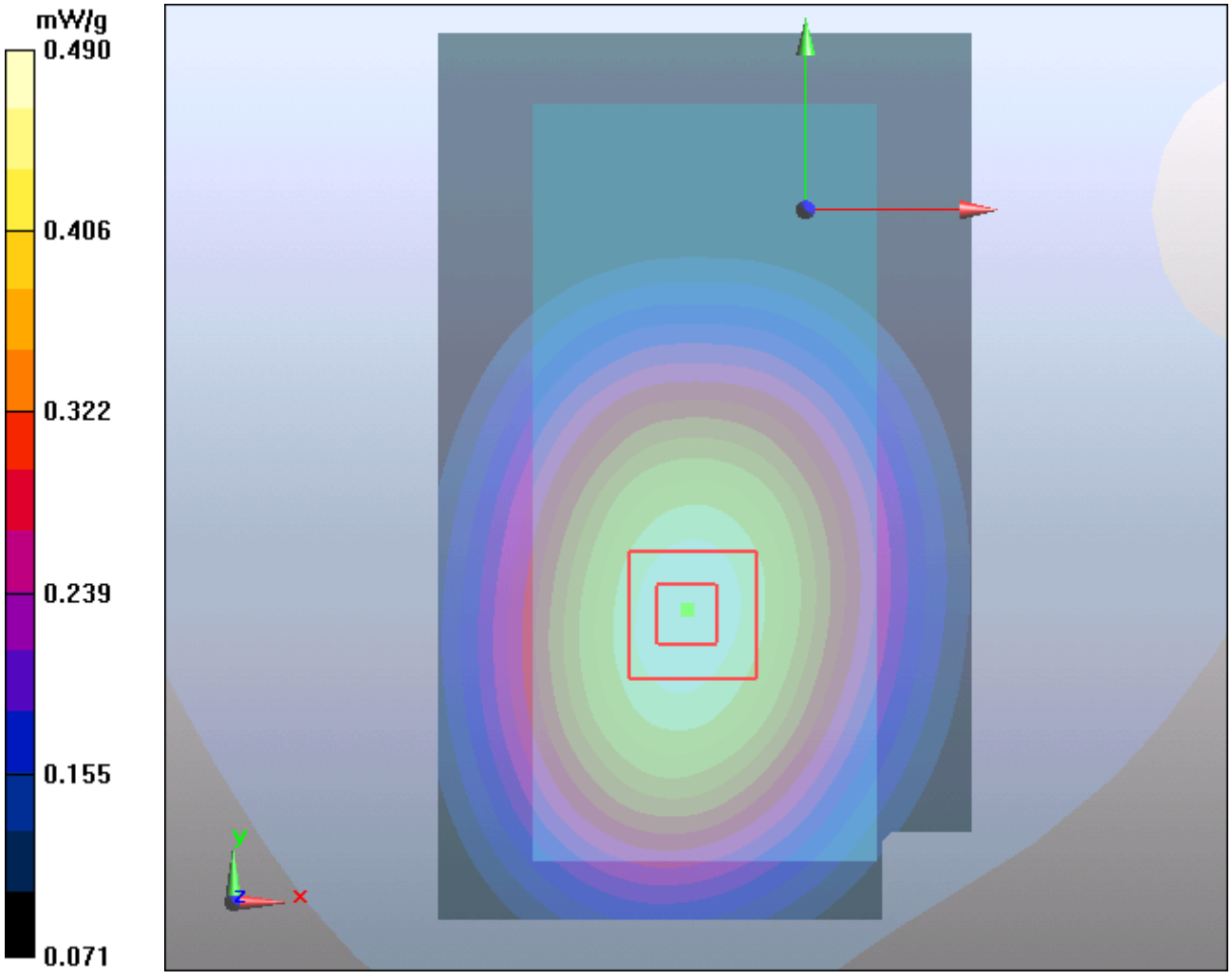



Figure 29 Body, Towards Phantom, GSM 850 GPRS (3Txslots) Channel 190

**GSM 850 GPRS (3Txslots) Towards Phantom Low (Slide Open, Battery 1)**

Date/Time: 4/21/2012 6:23:02 PMM
Communication System: GPRS 3TX; Frequency: 824.2 MHz;Duty Cycle: 1:2.76694
Medium parameters used (interpolated): f = 824.2 MHz; $\sigma$ = 0.972 mho/m; $\varepsilon_r$ = 54.4; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(9.18, 9.18, 9.18); Calibrated: 1/4/2012
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

**Towards Phantom Low/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.433 mW/g

**Towards Phantom Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.12 V/m; Power Drift = 0.027 dB
Peak SAR (extrapolated) = 0.533 W/kg
**SAR(1 g) = 0.414 mW/g; SAR(10 g) = 0.311 mW/g**
Maximum value of SAR (measured) = 0.436 mW/g

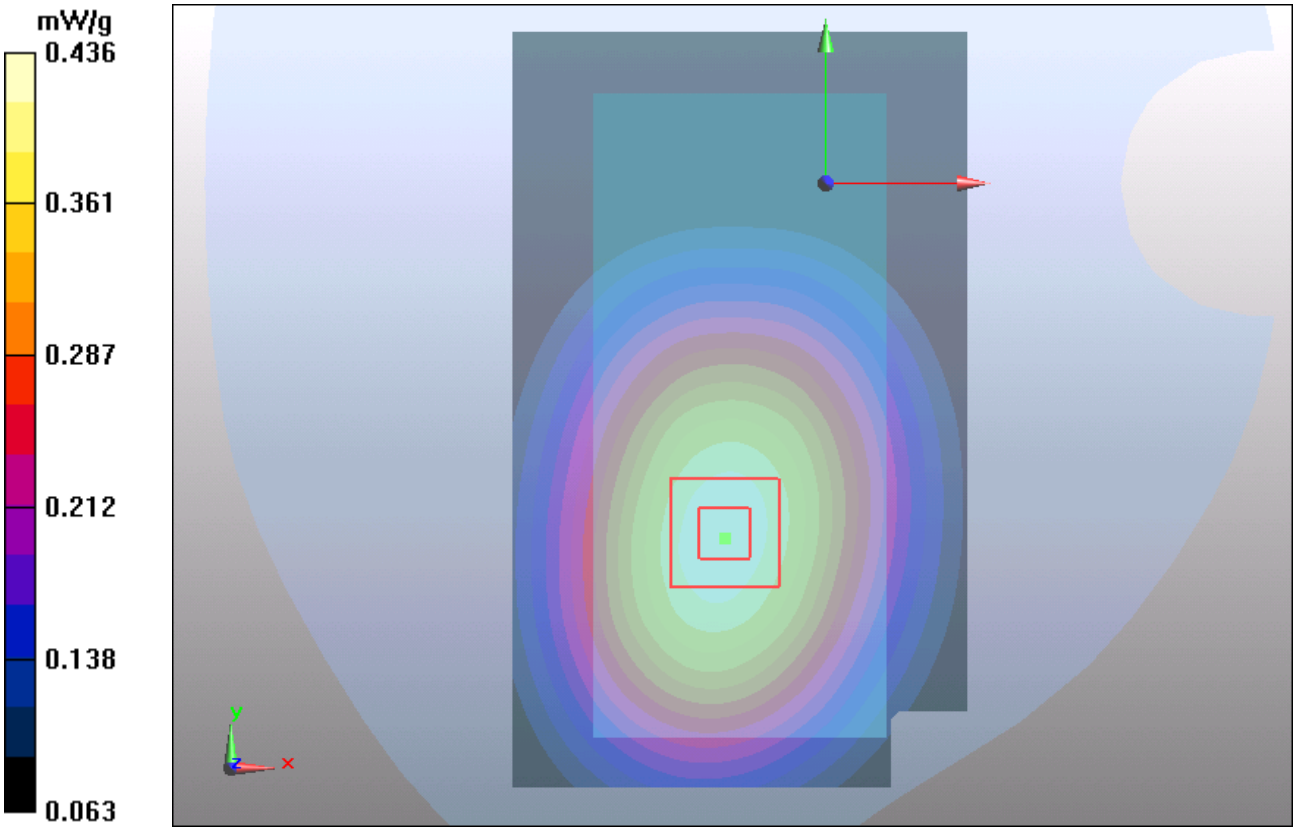



Figure 30 Body, Towards Phantom, GSM 850 GPRS (3Txslots) Channel 128

**GSM 850 GPRS (3Txslots) Towards Ground High (Slide Close, Battery 1)**

Date/Time: 4/21/2012 7:43:07 PM

Communication System: GPRS 3TX; Frequency: 848.8 MHz;Duty Cycle: 1:2.76694

Medium parameters used: f = 849 MHz; $\sigma$ = 1.01 mho/m; $\varepsilon_r$ = 54.1; $\rho$ = 1000 kg/$m^3$

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

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

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

**Towards Ground High/Area Scan (61x81x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.483 mW/g

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

Reference Value = 8.32 V/m; Power Drift = 0.016 dB

Peak SAR (extrapolated) = 0.621 W/kg

**SAR(1 g) = 0.445 mW/g; SAR(10 g) = 0.307 mW/g**

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

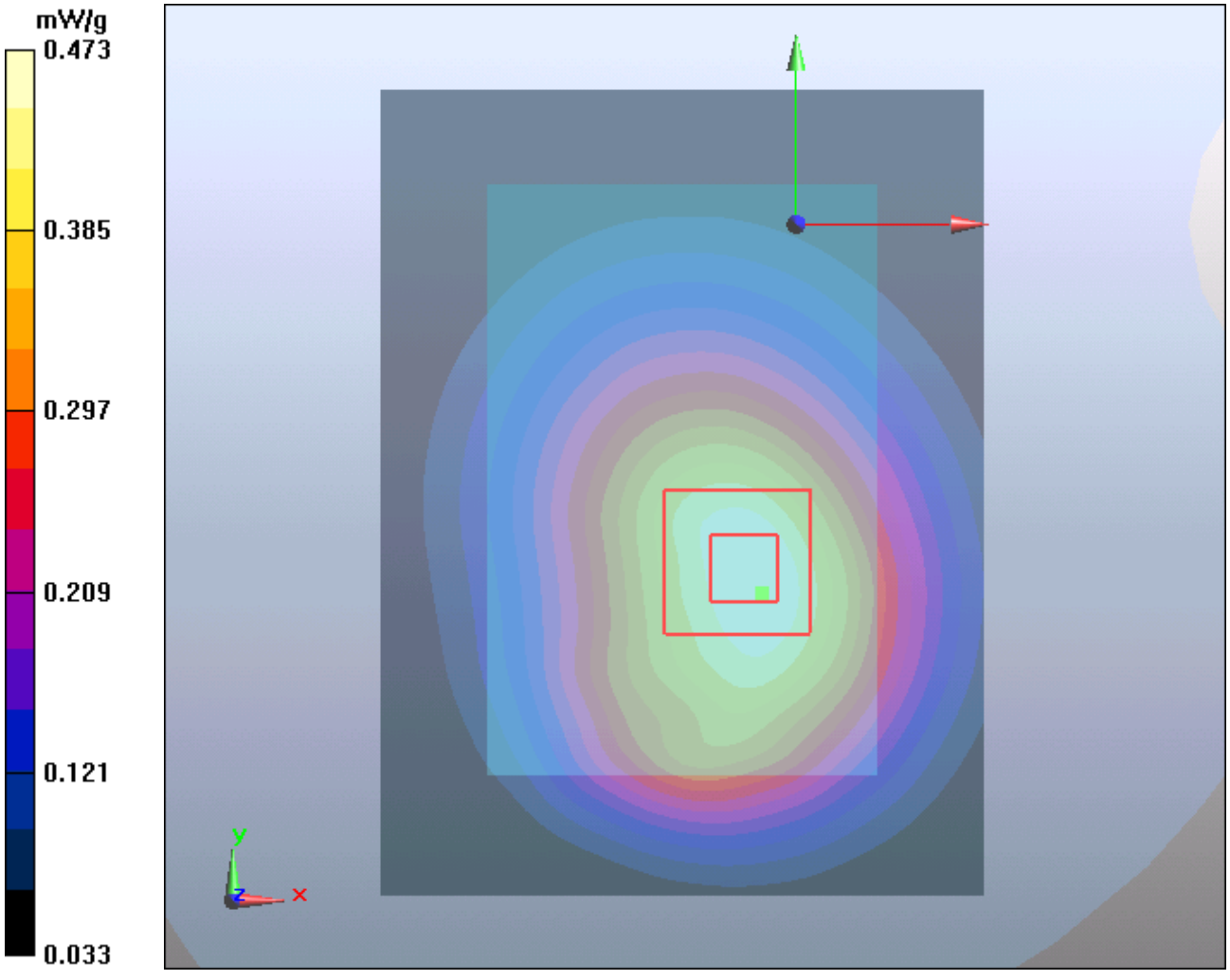



Figure 31 Body, Towards Ground, GSM 850 GPRS (3Txslots) Channel 251

**GSM 850 GPRS (3Txslots) Towards Ground Low (Slide Close, Battery 1)**

Date/Time: 4/21/2012 4:49:50 PM

Communication System: GPRS 3TX; Frequency: 824.2 MHz;Duty Cycle: 1:2.76694

Medium parameters used (interpolated): f = 824.2 MHz; $\sigma$ = 0.972 mho/m; $\varepsilon_r$ = 54.4; $\rho$ = 1000 kg/m$^3$

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

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

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

**Towards Ground Low/Area Scan (61x81x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.441 mW/g

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

Reference Value = 7.35 V/m; Power Drift = -0.066 dB

Peak SAR (extrapolated) = 0.583 W/kg

**SAR(1 g) = 0.410 mW/g; SAR(10 g) = 0.284 mW/g**

Maximum value of SAR (measured) = 0.438 mW/g

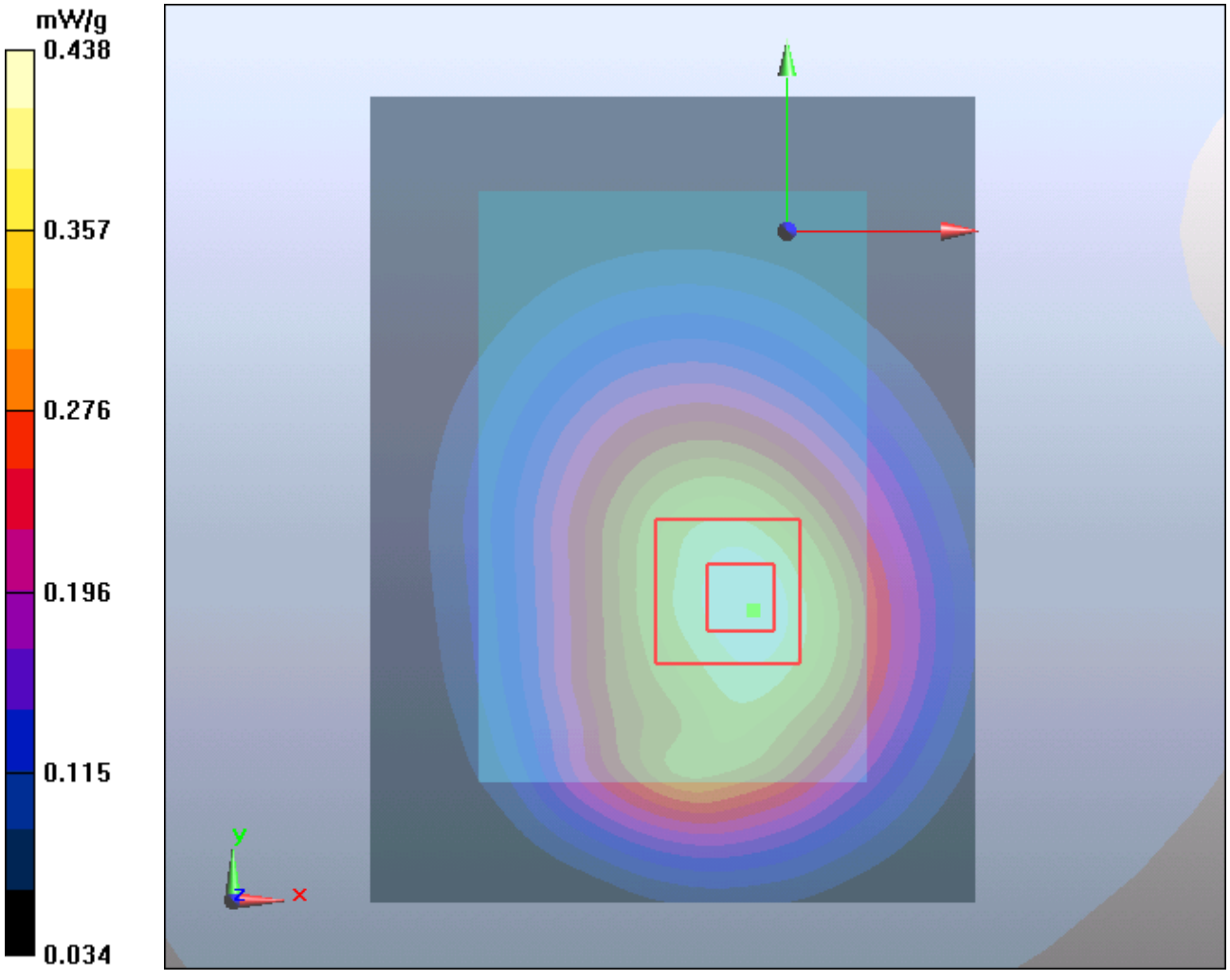



Figure 32 Body, Towards Ground, GSM 850 GPRS (3Txslots) Channel 128

**GSM 850 with Stereo Headset 1 Towards Ground High (Slide Open, Battery 1)**

Date/Time: 4/21/2012 6:58:52 PM

Communication System: GSM; Frequency: 848.8 MHz;Duty Cycle: 1:8.30042

Medium parameters used: f = 849 MHz; $\sigma$ = 1.01 mho/m; $\varepsilon_r$ = 54.1; $\rho$ = 1000 kg/m$^3$

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

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

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

**Towards Ground High/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.539 mW/g

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

Reference Value = 6.83 V/m; Power Drift = -0.047 dB

Peak SAR (extrapolated) = 0.659 W/kg

**SAR(1 g) = 0.508 mW/g; SAR(10 g) = 0.371 mW/g**

Maximum value of SAR (measured) = 0.536 mW/g

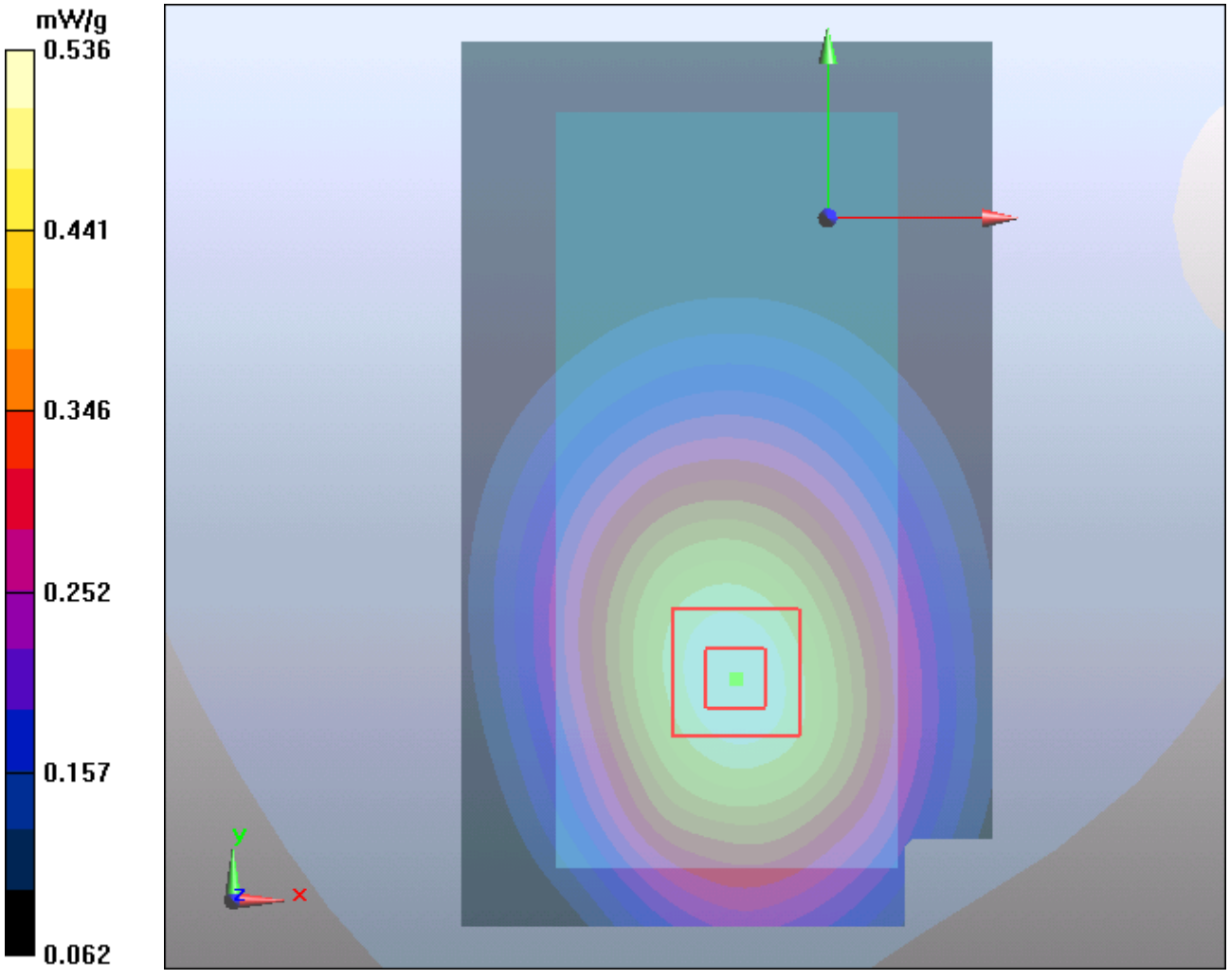



Figure 33 Body with Stereo Headset 1, Towards Ground, GSM 850 Channel 251

**GSM 850 with Stereo Headset 2 Towards Ground High (Slide Open, Battery 1)**

Date/Time: 4/21/2012 7:17:04 PM

Communication System: GSM; Frequency: 848.8 MHz;Duty Cycle: 1:8.30042

Medium parameters used: f = 849 MHz; $\sigma$ = 1.01 mho/m; $\varepsilon_r$ = 54.1; $\rho$ = 1000 kg/m$^3$

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

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

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

**Towards Ground High/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.429 mW/g

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

Reference Value = 5.57 V/m; Power Drift = -0.120 dB

Peak SAR (extrapolated) = 0.522 W/kg

**SAR(1 g) = 0.404 mW/g; SAR(10 g) = 0.296 mW/g**

Maximum value of SAR (measured) = 0.427 mW/g

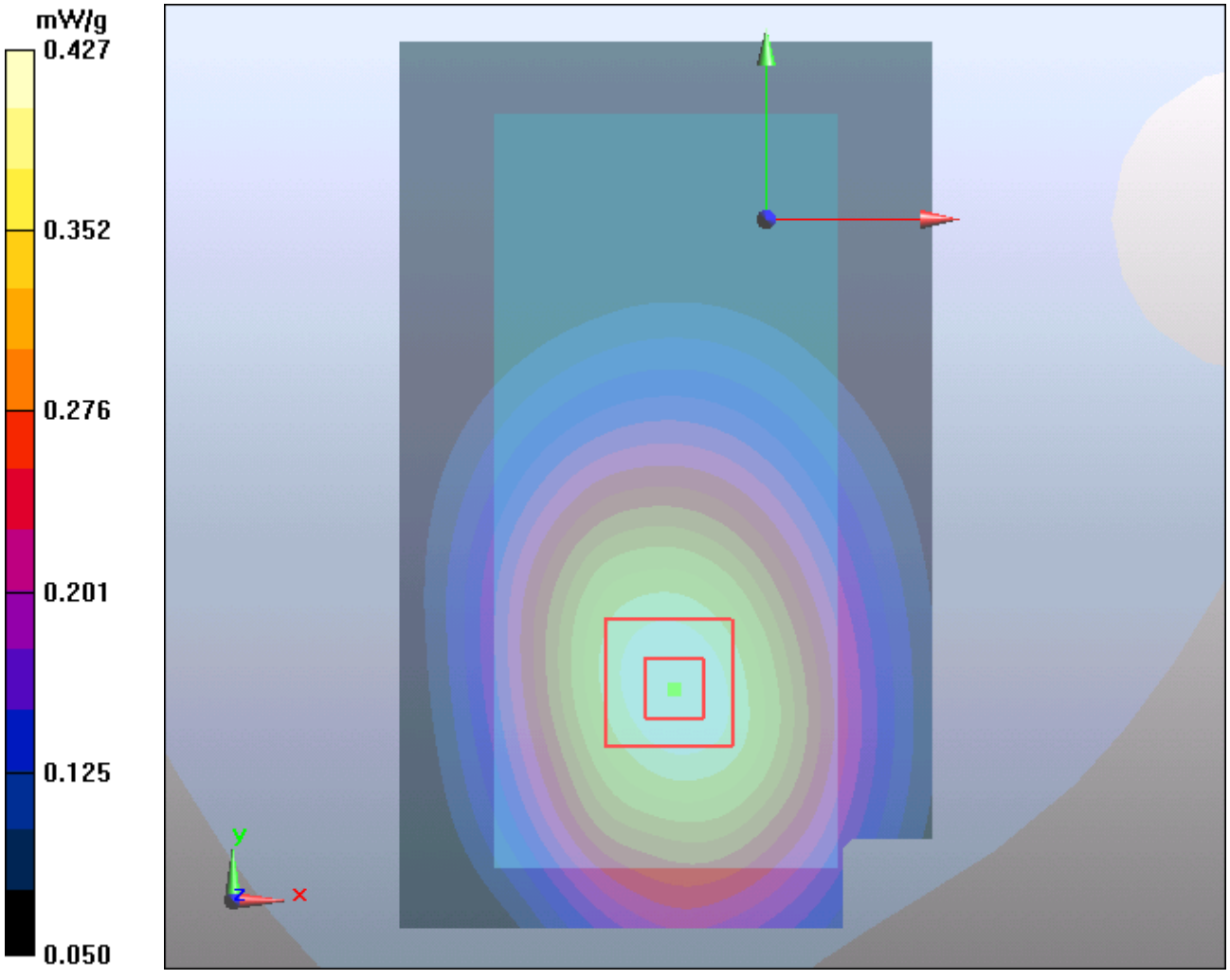



Figure 34 Body with Stereo Headset 2, Towards Ground, GSM 850 Channel 251

**GSM 850 GPRS (3Txslots) Towards Ground High (Slide Open, Battery 2)**

Date/Time: 4/22/2012 12:53:45 AM

Communication System: GPRS 3TX; Frequency: 848.8 MHz;Duty Cycle: 1:2.76694

Medium parameters used: f = 849 MHz; $\sigma$ = 1.01 mho/m; $\varepsilon_r$ = 54.1; $\rho$ = 1000 kg/m$^3$

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

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

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

**Towards Ground High/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 7.55 V/m; Power Drift = -0.027 dB

Peak SAR (extrapolated) = 0.946 W/kg

**SAR(1 g) = 0.707 mW/g; SAR(10 g) = 0.510 mW/g**

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

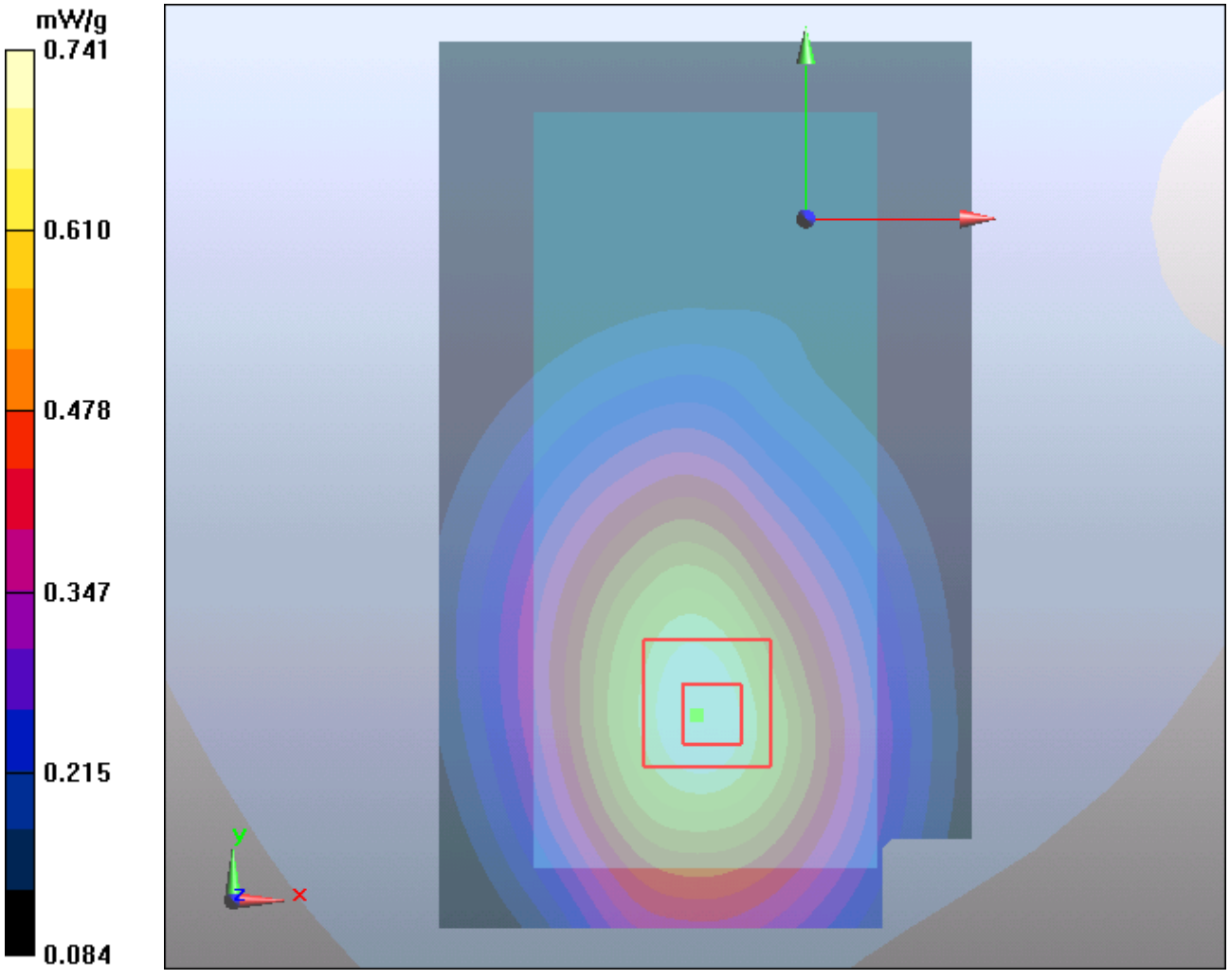



Figure 35 Body, Towards Ground, GSM 850 GPRS (3Txslots) Channel 251

**GSM 1900 Left Cheek Low (Slide Open, Battery 1)**

Date/Time: 4/21/2012 3:15:48 PM
Communication System: GSM; Frequency: 1850.2 MHz;Duty Cycle: 1:8.30042
Medium parameters used (interpolated): f = 1850.2 MHz; $\sigma$ = 1.37 mho/m; $\varepsilon_r$ = 41; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(8.05, 8.05, 8.05); Calibrated: 1/4/2012
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 Low/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.315 mW/g

**Cheek Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.88 V/m; Power Drift = -0.025 dB
Peak SAR (extrapolated) = 0.441 W/kg
**SAR(1 g) = 0.287 mW/g; SAR(10 g) = 0.181 mW/g**
Maximum value of SAR (measured) = 0.311 mW/g

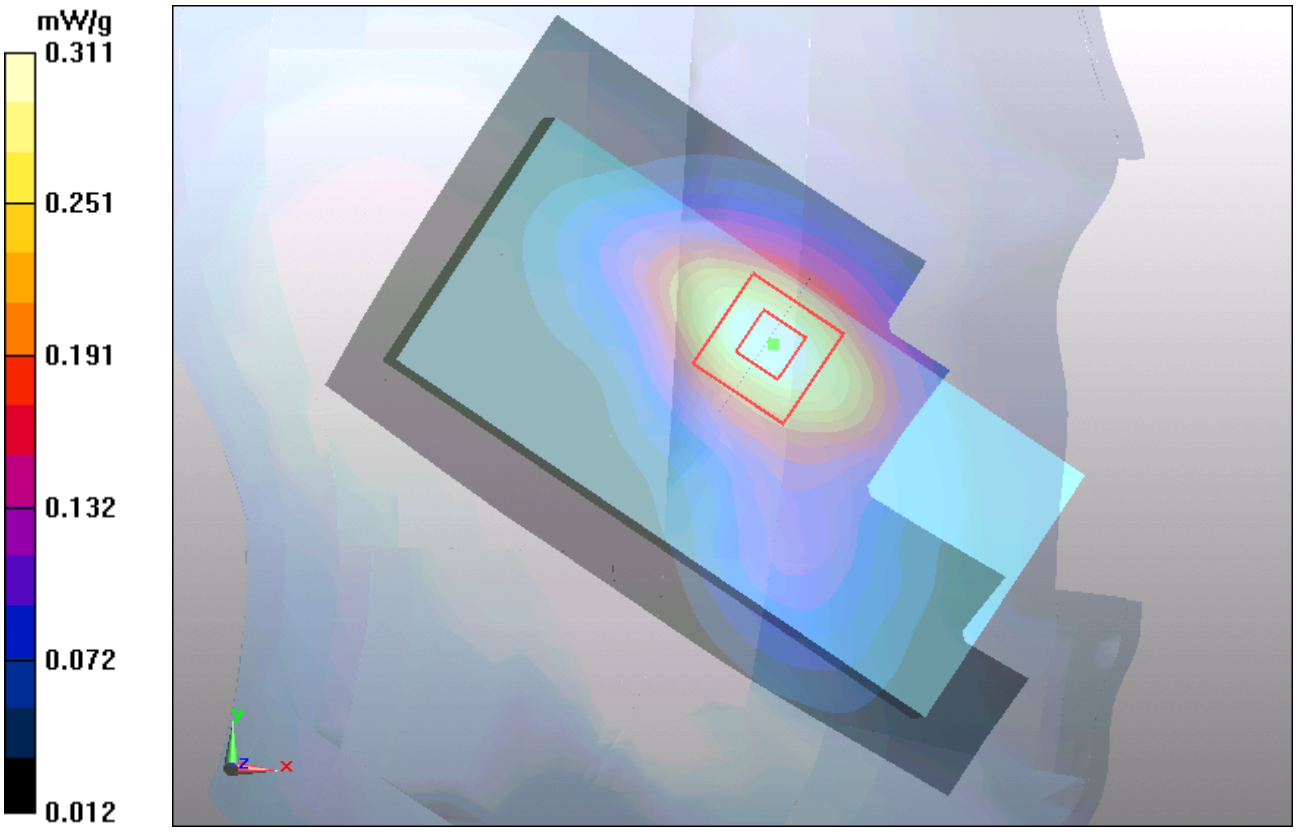



Figure 36 Left Hand Touch Cheek GSM 1900 Channel 512

**GSM 1900 Right Cheek Low (Slide Open, Battery 1)**

Date/Time: 4/21/2012 5:01:36 AM
Communication System: GSM; Frequency: 1850.2 MHz;Duty Cycle: 1:8.30042
Medium parameters used (interpolated): f = 1850.2 MHz; $\sigma$ = 1.37 mho/m; $\varepsilon_r$ = 41; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(8.05, 8.05, 8.05); Calibrated: 1/4/2012
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 Low/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.333 mW/g

**Cheek Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.73 V/m; Power Drift = 0.024 dB
Peak SAR (extrapolated) = 0.459 W/kg
**SAR(1 g) = 0.304 mW/g; SAR(10 g) = 0.185 mW/g**
Maximum value of SAR (measured) = 0.338 mW/g

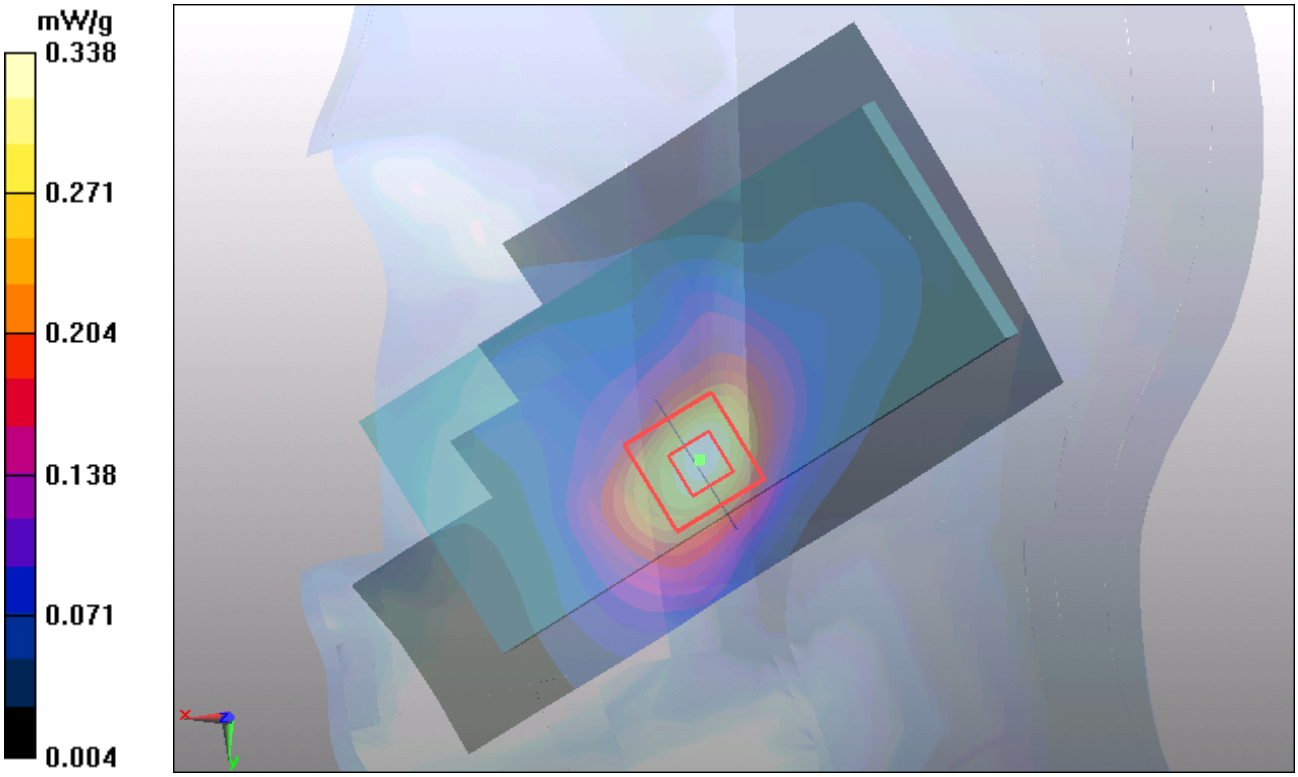



Figure 37 Right Hand Touch Cheek GSM 1900 Channel 512

**GSM 1900 Left Cheek High (Slide Close, Battery 1)**

Date/Time: 4/21/2012 2:05:03 PM
Communication System: GSM; Frequency: 1909.8 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1910 MHz; $\sigma$ = 1.42 mho/m; $\varepsilon_r$ = 40.8; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(8.05, 8.05, 8.05); Calibrated: 1/4/2012
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 High/Area Scan (61x81x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.514 mW/g

**Cheek High/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.19 V/m; Power Drift = 0.053 dB
Peak SAR (extrapolated) = 0.788 W/kg
**SAR(1 g) = 0.474 mW/g; SAR(10 g) = 0.259 mW/g**
Maximum value of SAR (measured) = 0.529 mW/g

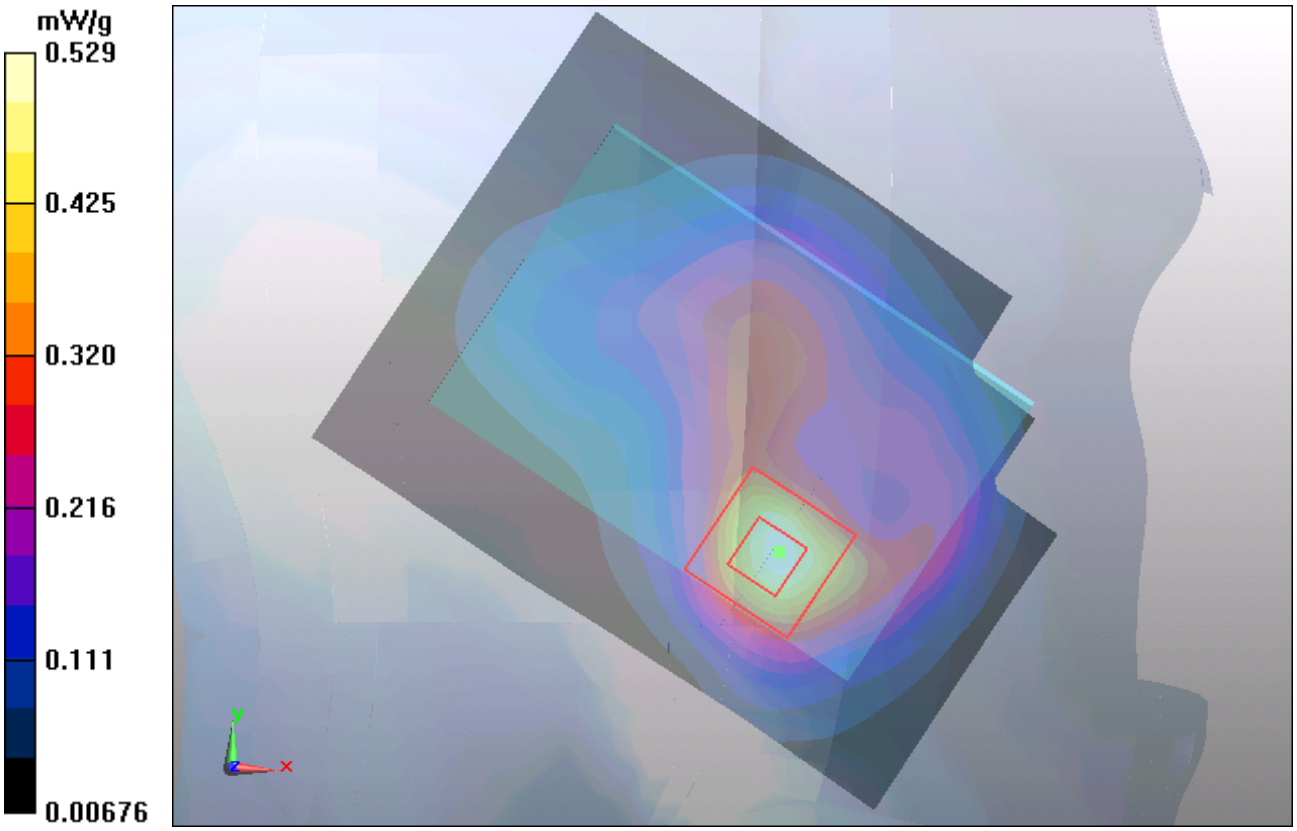



Figure 38 Left Hand Touch Cheek GSM 1900 Channel 810

**GSM 1900 Left Cheek Middle (Slide Close, Battery 1)**

Date/Time: 4/21/2012 1:50:34 PM
Communication System: GSM; Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; $\sigma$ = 1.4 mho/m; $\varepsilon_r$ = 40.9; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(8.05, 8.05, 8.05); Calibrated: 1/4/2012
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 (61x81x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.560 mW/g

**Cheek Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.39 V/m; Power Drift = 0.028 dB
Peak SAR (extrapolated) = 0.847 W/kg
**SAR(1 g) = 0.509 mW/g; SAR(10 g) = 0.278 mW/g**
Maximum value of SAR (measured) = 0.572 mW/g

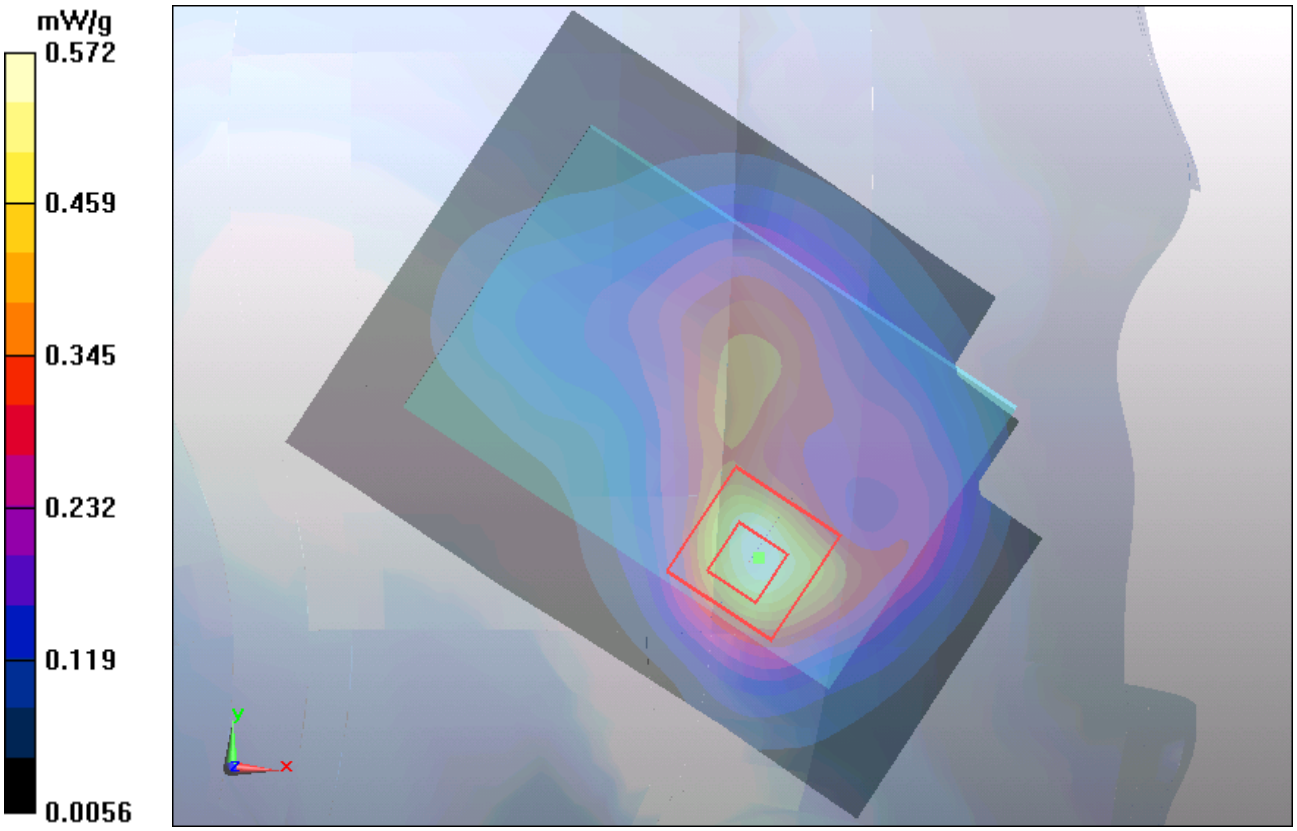


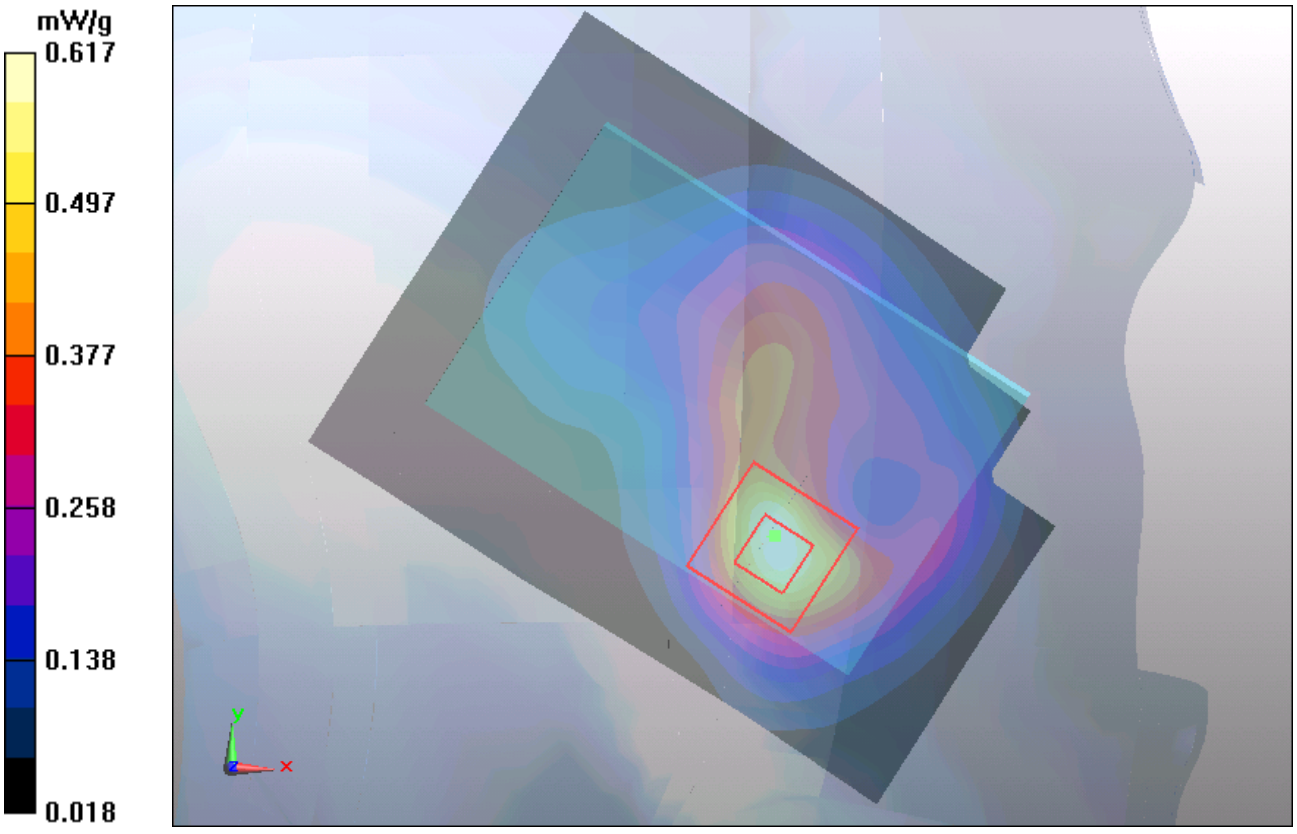

Figure 39 Left Hand Touch Cheek GSM 1900 Channel 661

**GSM 1900 Left Cheek Low (Slide Close, Battery 1)**

Date/Time: 4/21/2012 7:22:42 AM
Communication System: GSM; Frequency: 1850.2 MHz;Duty Cycle: 1:8.30042
Medium parameters used (interpolated): f = 1850.2 MHz; $\sigma$ = 1.37 mho/m; $\varepsilon_r$ = 41; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(8.05, 8.05, 8.05); Calibrated: 1/4/2012
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 Low/Area Scan (61x81x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.607 mW/g

**Cheek Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.19 V/m; Power Drift = -0.086 dB
Peak SAR (extrapolated) = 0.925 W/kg
**SAR(1 g) = 0.561 mW/g; SAR(10 g) = 0.310 mW/g**
Maximum value of SAR (measured) = 0.617 mW/g



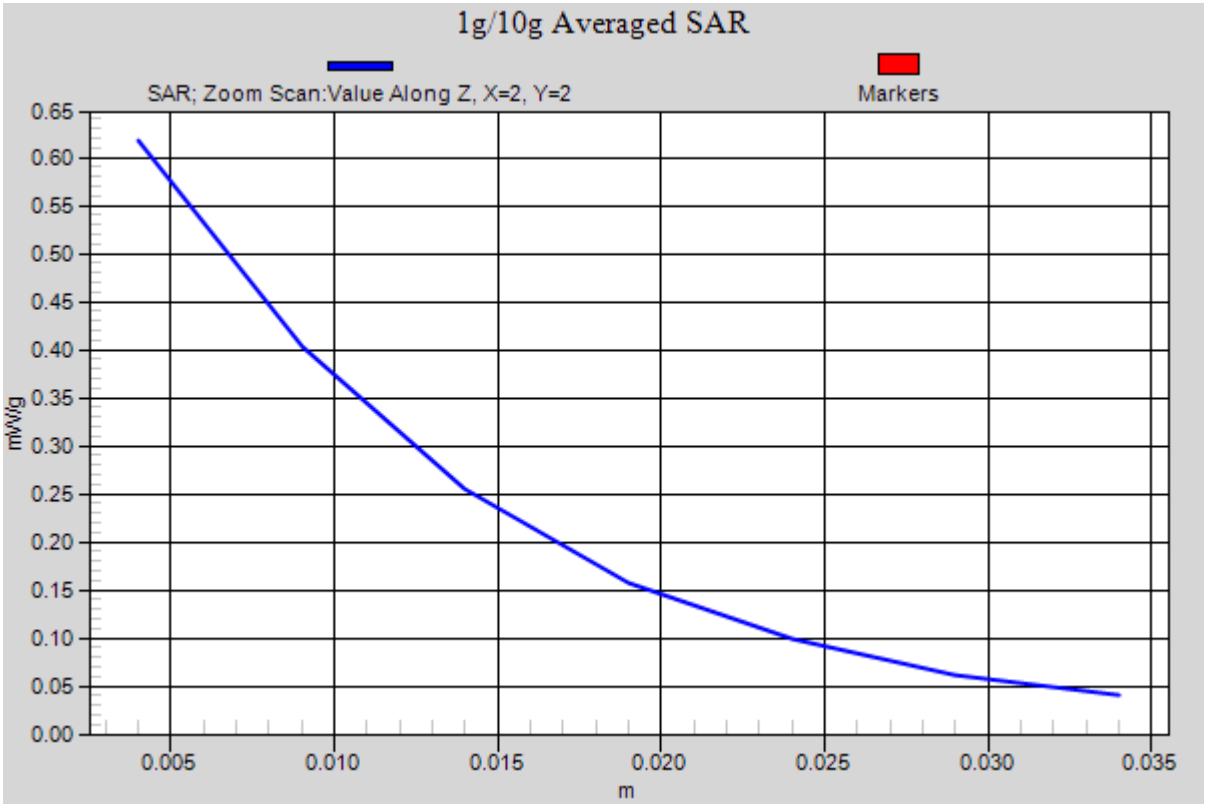



Figure 40 Left Hand Touch Cheek GSM 1900 Channel 512

**GSM 1900 Left Tilt High (Slide Close, Battery 1)**

Date/Time: 4/21/2012 2:22:44 PM
Communication System: GSM; Frequency: 1909.8 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1910 MHz; $\sigma$ = 1.42 mho/m; $\varepsilon_r$ = 40.8; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(8.05, 8.05, 8.05); Calibrated: 1/4/2012
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 High/Area Scan (61x81x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.246 mW/g

**Tilt High/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.5 V/m; Power Drift = 0.044 dB
Peak SAR (extrapolated) = 0.337 W/kg
**SAR(1 g) = 0.221 mW/g; SAR(10 g) = 0.136 mW/g**
Maximum value of SAR (measured) = 0.231 mW/g

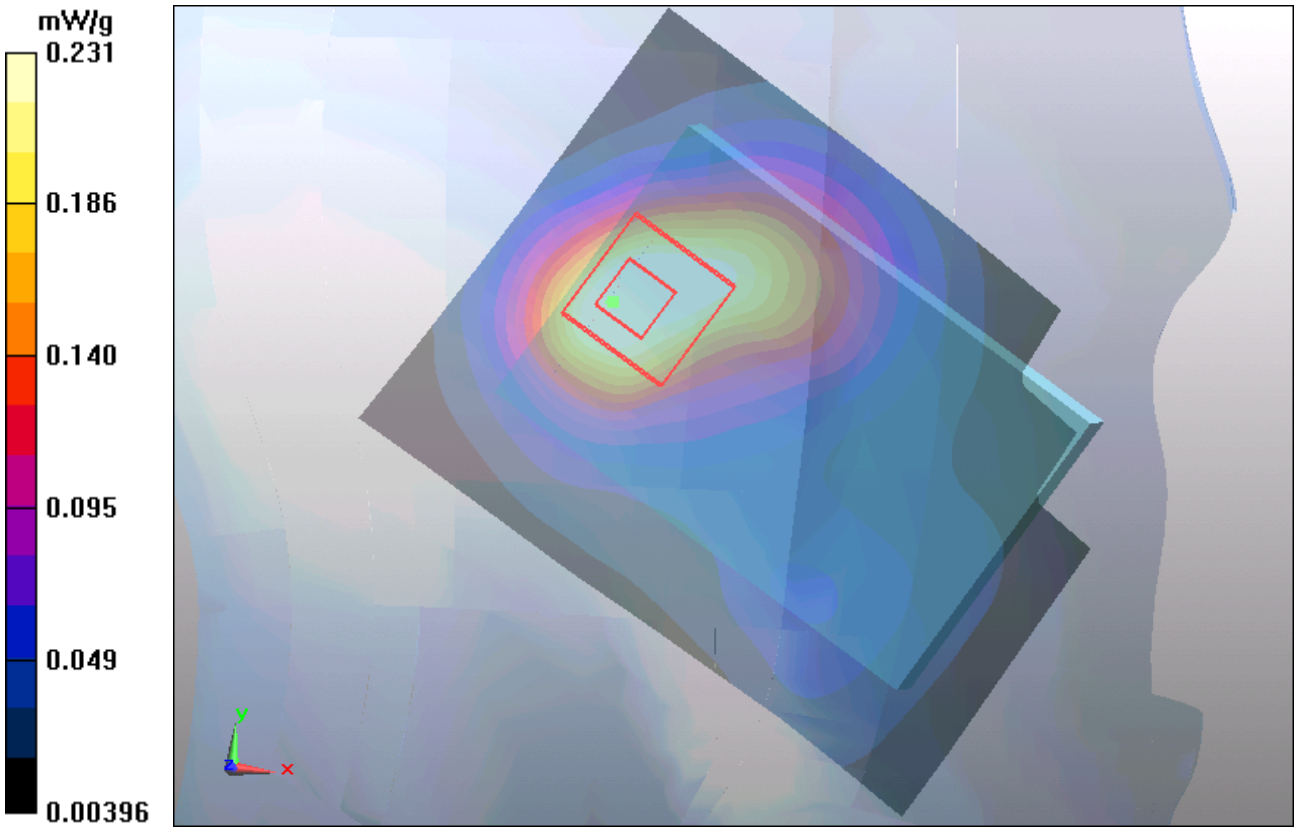



Figure 41 Left Hand Tilt 15° GSM 1900 Channel 810

**GSM 1900 Left Tilt Middle (Slide Close, Battery 1)**

Date/Time: 4/21/2012 2:55:53 PM
Communication System: GSM; Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; $\sigma$ = 1.4 mho/m; $\varepsilon_r$ = 40.9; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(8.05, 8.05, 8.05); Calibrated: 1/4/2012
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 (61x81x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.254 mW/g

**Tilt Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.8 V/m; Power Drift = 0.029 dB
Peak SAR (extrapolated) = 0.339 W/kg
**SAR(1 g) = 0.224 mW/g; SAR(10 g) = 0.139 mW/g**
Maximum value of SAR (measured) = 0.235 mW/g

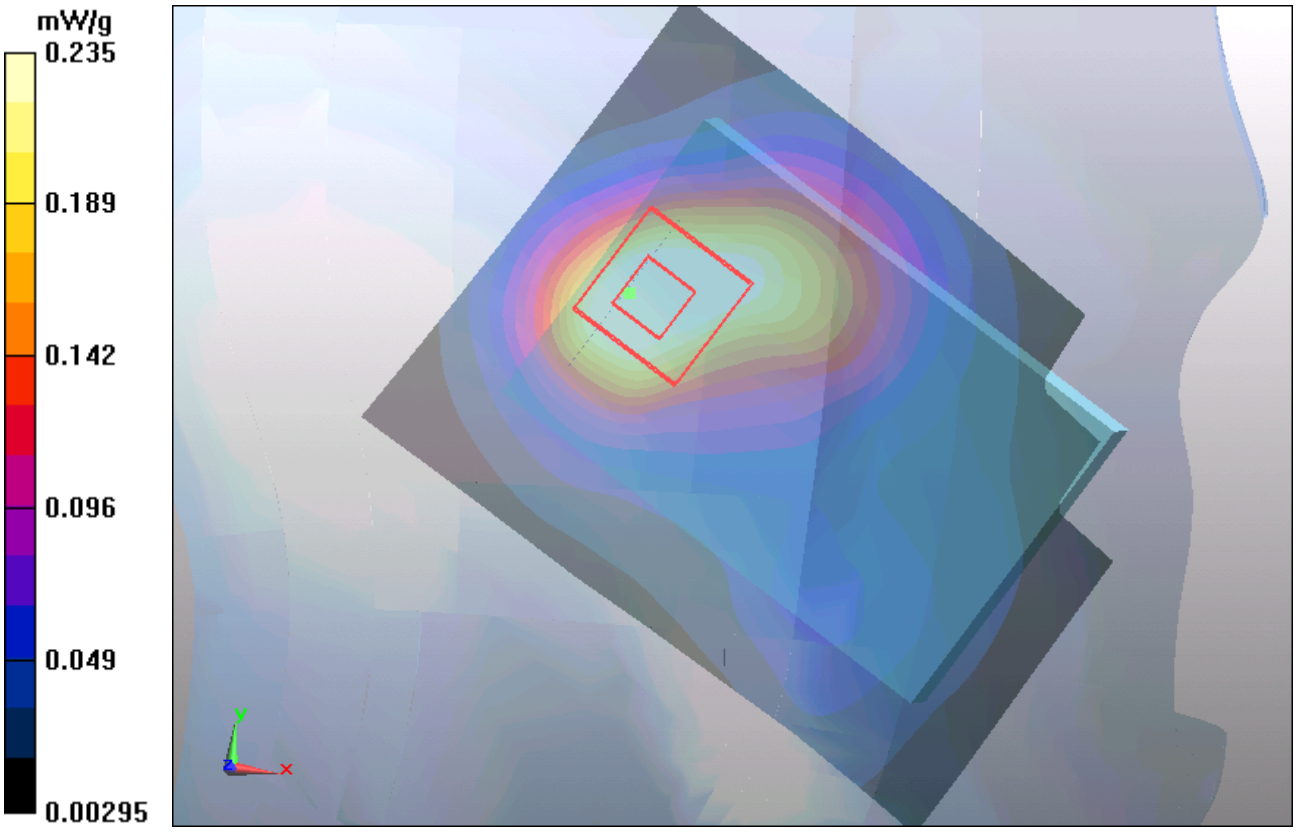



Figure 42 Left Hand Tilt 15° GSM 1900 Channel 661

**GSM 1900 Left Tilt Low (Slide Close, Battery 1)**

Date/Time: 4/21/2012 2:37:15 PM
Communication System: GSM; Frequency: 1850.2 MHz;Duty Cycle: 1:8.30042
Medium parameters used (interpolated): f = 1850.2 MHz; $\sigma$ = 1.37 mho/m; $\varepsilon_r$ = 41; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(8.05, 8.05, 8.05); Calibrated: 1/4/2012
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 Low/Area Scan (61x81x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.253 mW/g

**Tilt Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.2 V/m; Power Drift = 0.011 dB
Peak SAR (extrapolated) = 0.353 W/kg
**SAR(1 g) = 0.234 mW/g; SAR(10 g) = 0.147 mW/g**
Maximum value of SAR (measured) = 0.246 mW/g

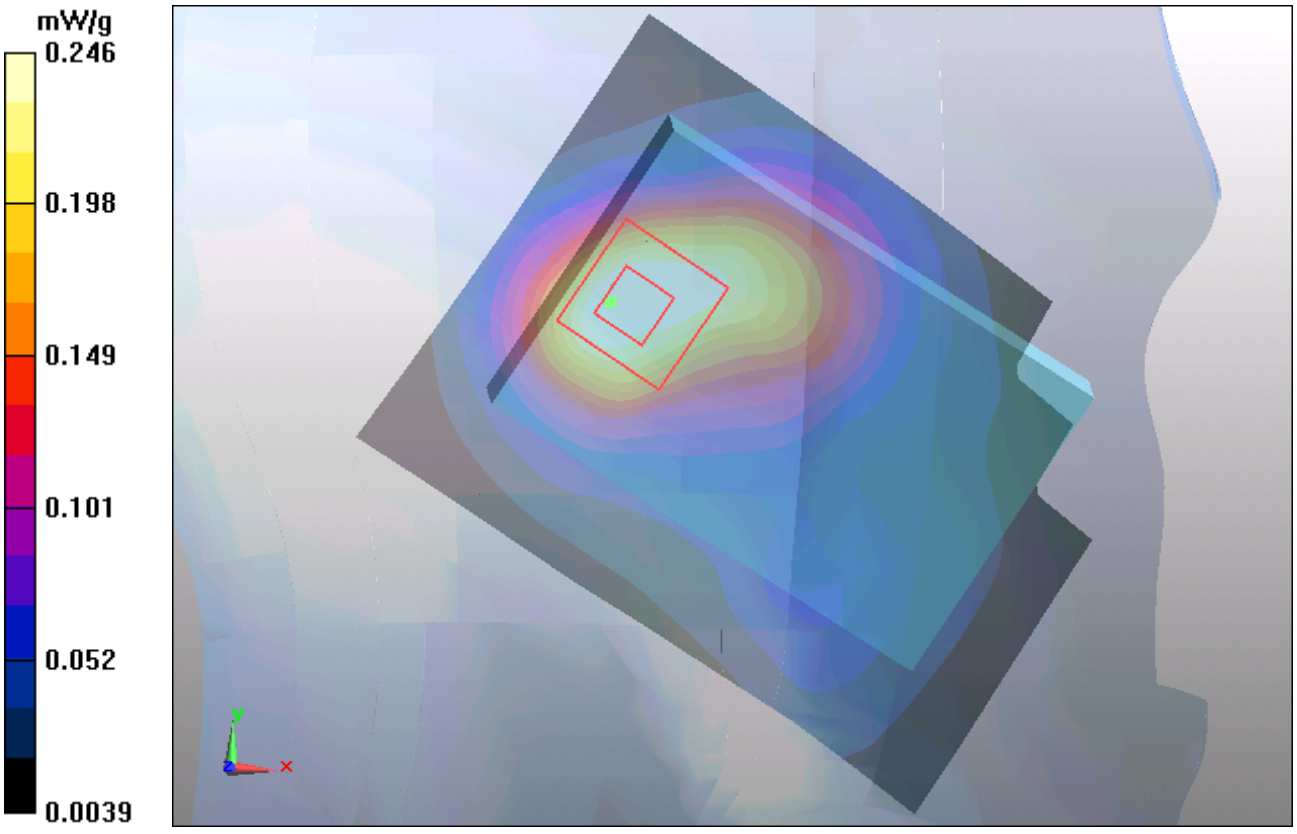



Figure 43 Left Hand Tilt 15° GSM 1900 Channel 512

**GSM 1900 Right Cheek High (Slide Close, Battery 1)**

Date/Time: 4/21/2012 5:35:14 AM
Communication System: GSM; Frequency: 1909.8 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1910 MHz; $\sigma$ = 1.42 mho/m; $\varepsilon_r$ = 40.8; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(8.05, 8.05, 8.05); Calibrated: 1/4/2012
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 High/Area Scan (61x71x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.473 mW/g

**Cheek High/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.79 V/m; Power Drift = 0.024 dB
Peak SAR (extrapolated) = 0.735 W/kg
**SAR(1 g) = 0.448 mW/g; SAR(10 g) = 0.250 mW/g**
Maximum value of SAR (measured) = 0.458 mW/g

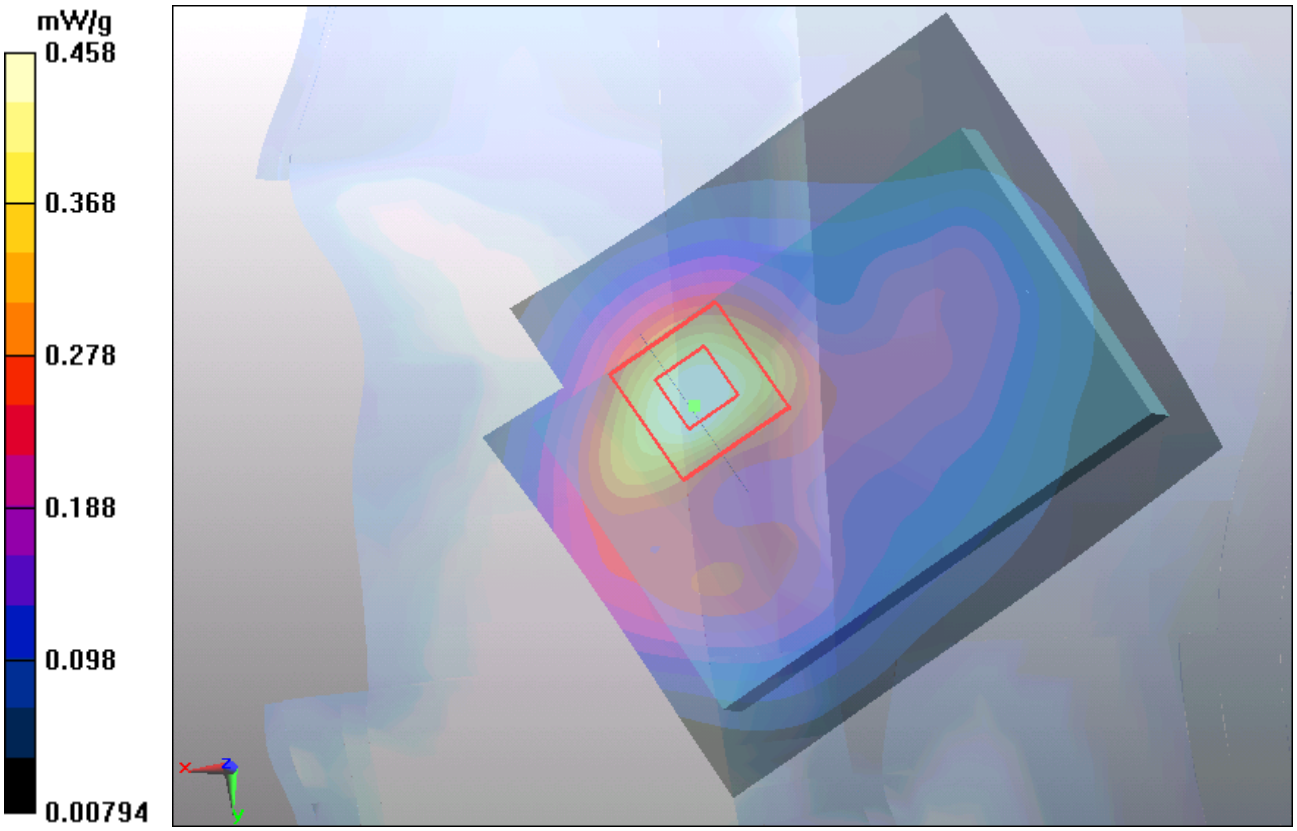



Figure 44 Right Hand Touch Cheek GSM 1900 Channel 810

**GSM 1900 Right Cheek Middle (Slide Close, Battery 1)**

Date/Time: 4/21/2012 5:21:34 AM
Communication System: GSM; Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; $\sigma$ = 1.4 mho/m; $\varepsilon_r$ = 40.9; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(8.05, 8.05, 8.05); Calibrated: 1/4/2012
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 (61x71x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.516 mW/g

**Cheek Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.94 V/m; Power Drift = -0.004 dB
Peak SAR (extrapolated) = 0.762 W/kg
**SAR(1 g) = 0.479 mW/g; SAR(10 g) = 0.272 mW/g**
Maximum value of SAR (measured) = 0.501 mW/g

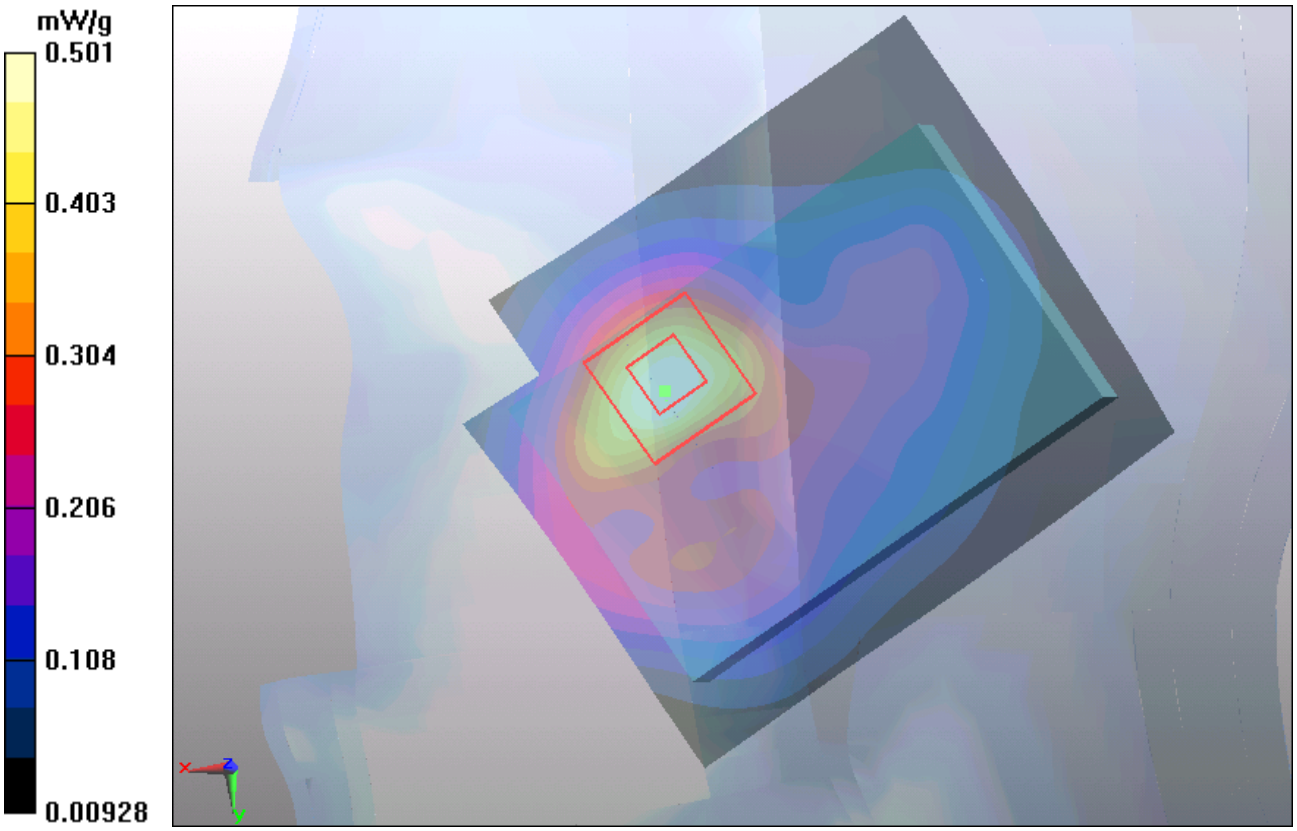



Figure 45 Right Hand Touch Cheek GSM 1900 Channel 661

**GSM 1900 Right Cheek Low (Slide Close, Battery 1)**

Date/Time: 4/21/2012 4:42:20 AM
Communication System: GSM; Frequency: 1850.2 MHz;Duty Cycle: 1:8.30042
Medium parameters used (interpolated): f = 1850.2 MHz; $\sigma$ = 1.37 mho/m; $\varepsilon_r$ = 41; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(8.05, 8.05, 8.05); Calibrated: 1/4/2012
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 Low/Area Scan (61x71x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.595 mW/g

**Cheek Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.81 V/m; Power Drift = -0.115 dB
Peak SAR (extrapolated) = 0.861 W/kg
**SAR(1 g) = 0.547 mW/g; SAR(10 g) = 0.310 mW/g**
Maximum value of SAR (measured) = 0.576 mW/g

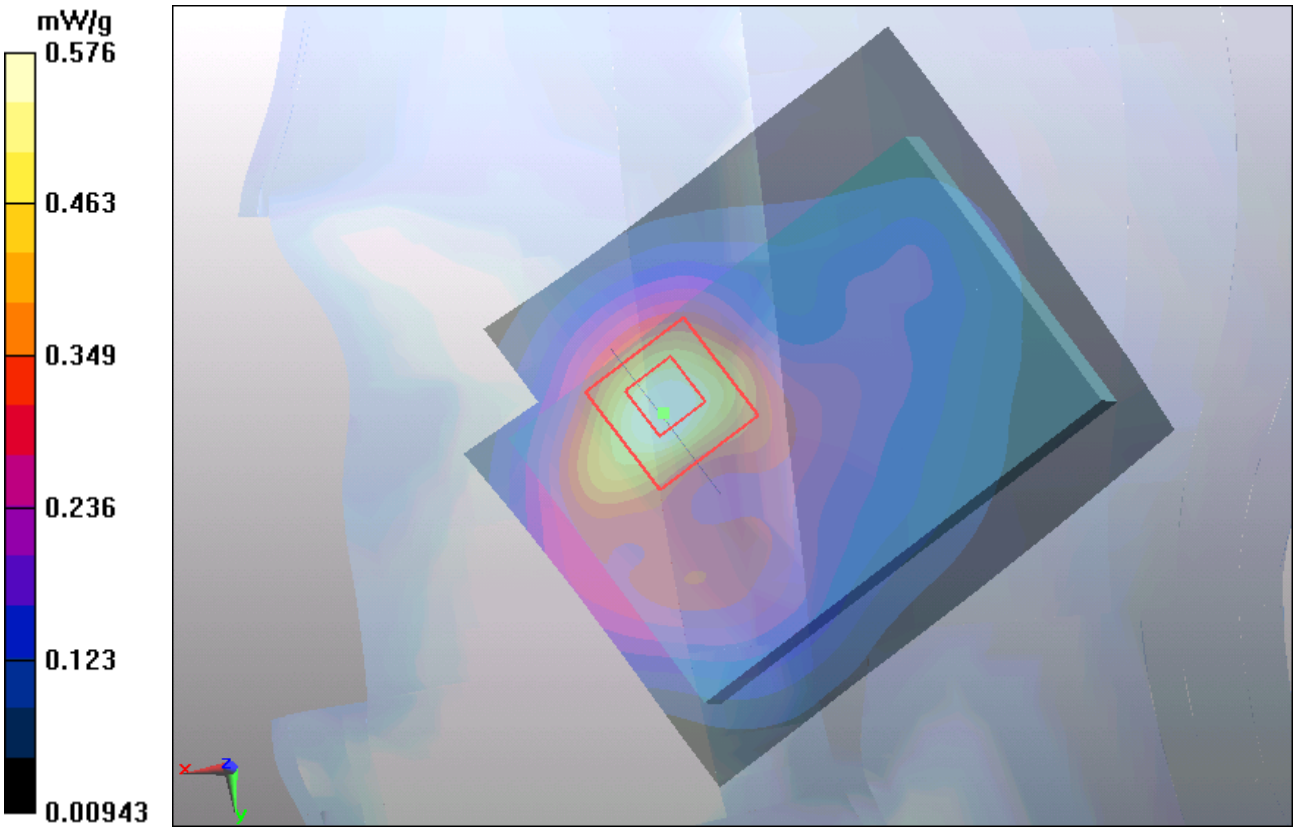



Figure 46 Right Hand Touch Cheek GSM 1900 Channel 512

**GSM 1900 Right Tilt High (Slide Close, Battery 1)**

Date/Time: 4/21/2012 6:49:12 AM
Communication System: GSM; Frequency: 1909.8 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1910 MHz; $\sigma$ = 1.42 mho/m; $\varepsilon_r$ = 40.8; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(8.05, 8.05, 8.05); Calibrated: 1/4/2012
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 High/Area Scan (61x71x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.324 mW/g

**Tilt High/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.4 V/m; Power Drift = 0.036 dB
Peak SAR (extrapolated) = 0.447 W/kg
**SAR(1 g) = 0.282 mW/g; SAR(10 g) = 0.166 mW/g**
Maximum value of SAR (measured) = 0.312 mW/g

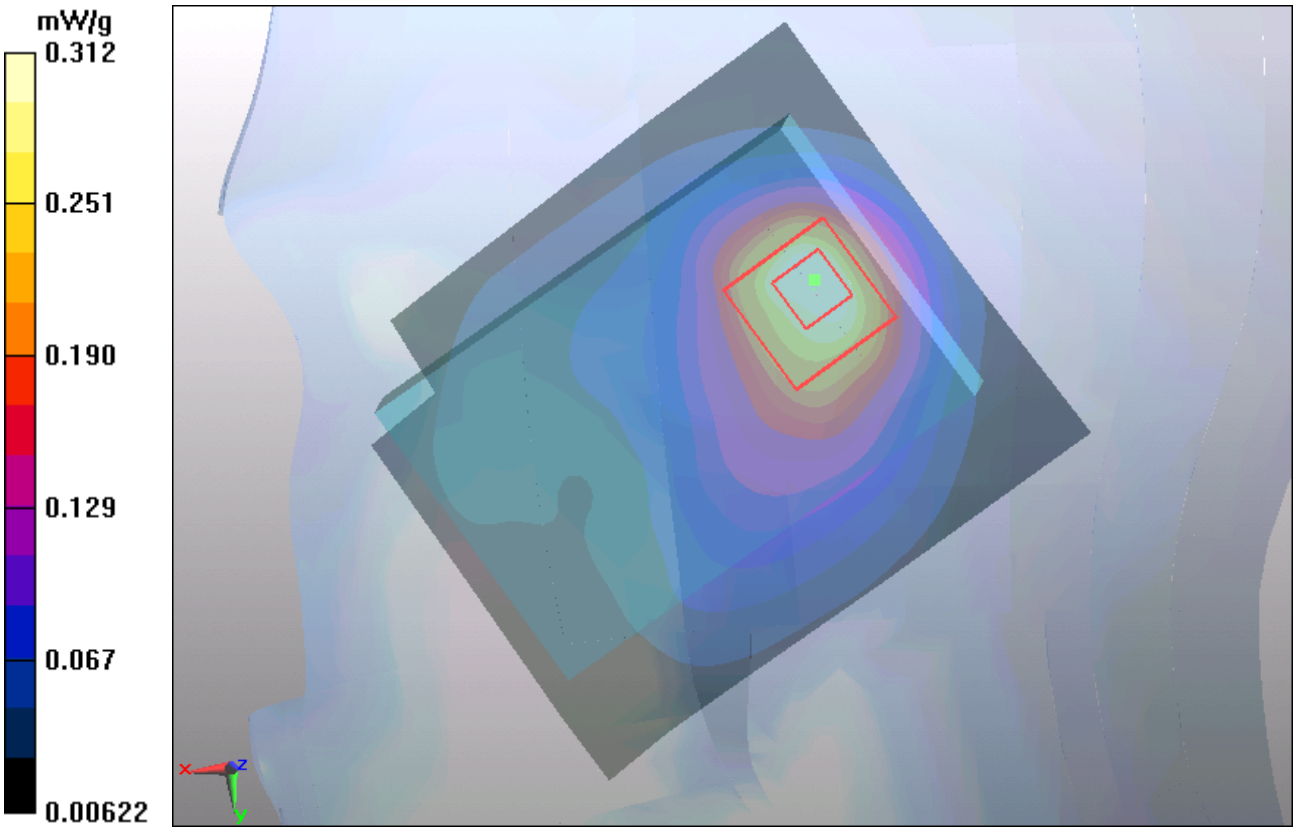



Figure 47 Right Hand Tilt 15° GSM 1900 Channel 810

**GSM 1900 Right Tilt Middle (Slide Close, Battery 1)**

Date/Time: 4/21/2012 6:35:03 AM
Communication System: GSM; Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; $\sigma$ = 1.4 mho/m; $\varepsilon_r$ = 40.9; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(8.05, 8.05, 8.05); Calibrated: 1/4/2012
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 (61x71x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.320 mW/g

**Tilt Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.5 V/m; Power Drift = 0.014 dB
Peak SAR (extrapolated) = 0.439 W/kg
**SAR(1 g) = 0.279 mW/g; SAR(10 g) = 0.166 mW/g**
Maximum value of SAR (measured) = 0.307 mW/g

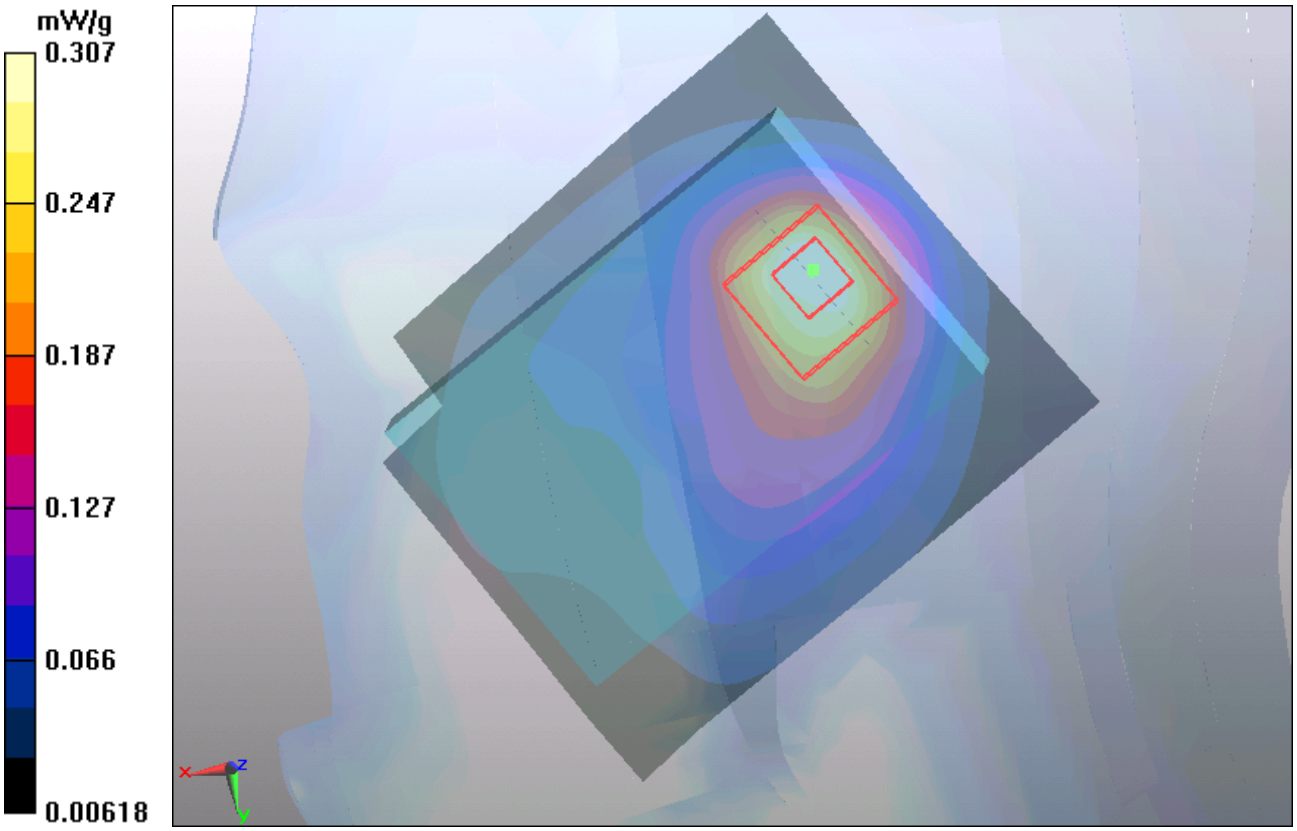



Figure 48 Right Hand Tilt 15° GSM 1900 Channel 661

**GSM 1900 Right Tilt Low (Slide Close, Battery 1)**

Date/Time: 4/21/2012 6:20:38 AM
Communication System: GSM; Frequency: 1850.2 MHz;Duty Cycle: 1:8.30042
Medium parameters used (interpolated): f = 1850.2 MHz; $\sigma$ = 1.37 mho/m; $\varepsilon_r$ = 41; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(8.05, 8.05, 8.05); Calibrated: 1/4/2012
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 Low/Area Scan (61x71x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.318 mW/g

**Tilt Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.6 V/m; Power Drift = 0.001 dB
Peak SAR (extrapolated) = 0.433 W/kg
**SAR(1 g) = 0.278 mW/g; SAR(10 g) = 0.167 mW/g**
Maximum value of SAR (measured) = 0.306 mW/g

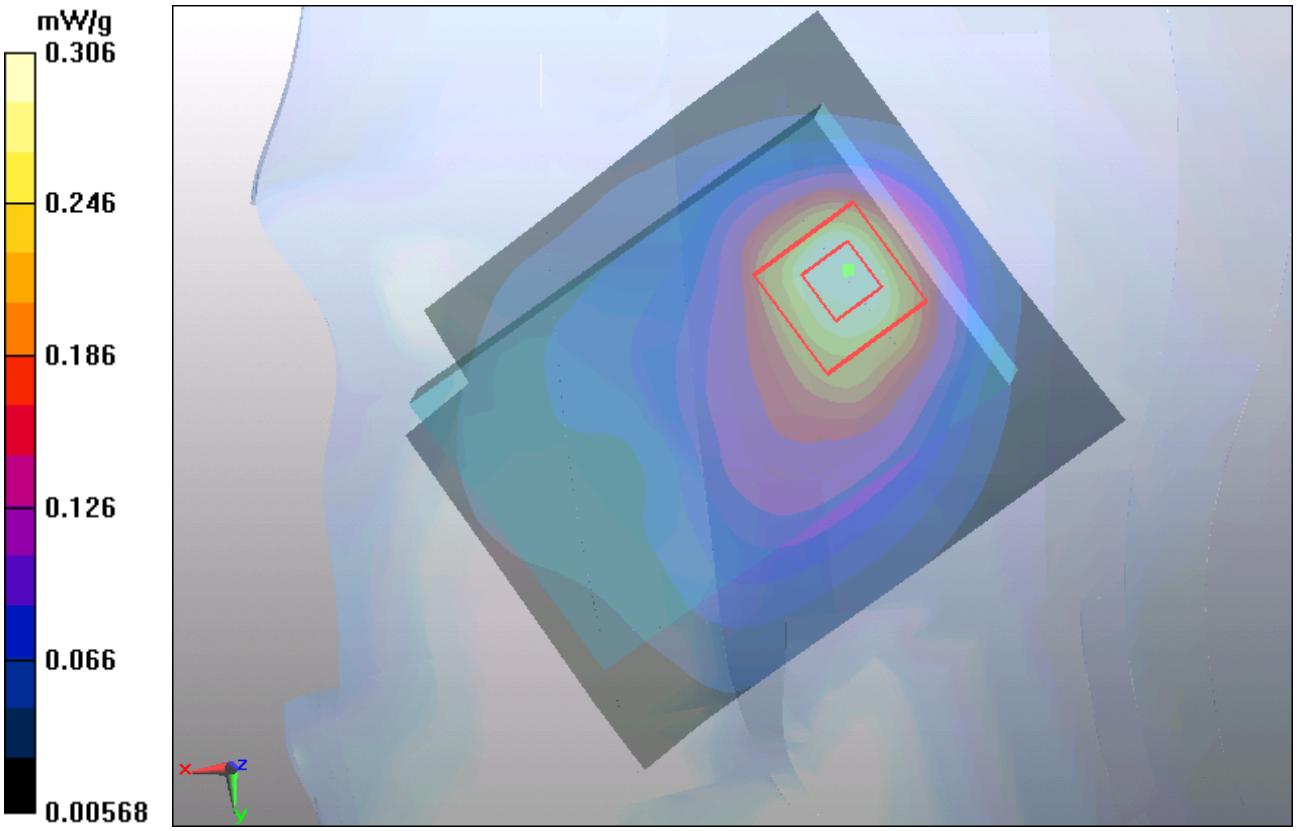



Figure 49 Right Hand Tilt 15° GSM 1900 Channel 512

**GSM 1900 Left Cheek Low (Slide Close, Battery 2)**

Date/Time: 4/21/2012 8:04:22 PM
Communication System: GSM; Frequency: 1850.2 MHz;Duty Cycle: 1:8.30042
Medium parameters used (interpolated): f = 1850.2 MHz; $\sigma$ = 1.37 mho/m; $\varepsilon_r$ = 41; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Probe: EX3DV4 - SN3753; ConvF(8.05, 8.05, 8.05); Calibrated: 1/4/2012
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 Low/Area Scan (61x81x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.590 mW/g
**Cheek Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.32 V/m; Power Drift = -0.147 dB
Peak SAR (extrapolated) = 0.903 W/kg
**SAR(1 g) = 0.546 mW/g; SAR(10 g) = 0.301 mW/g**
Maximum value of SAR (measured) = 0.611 mW/g

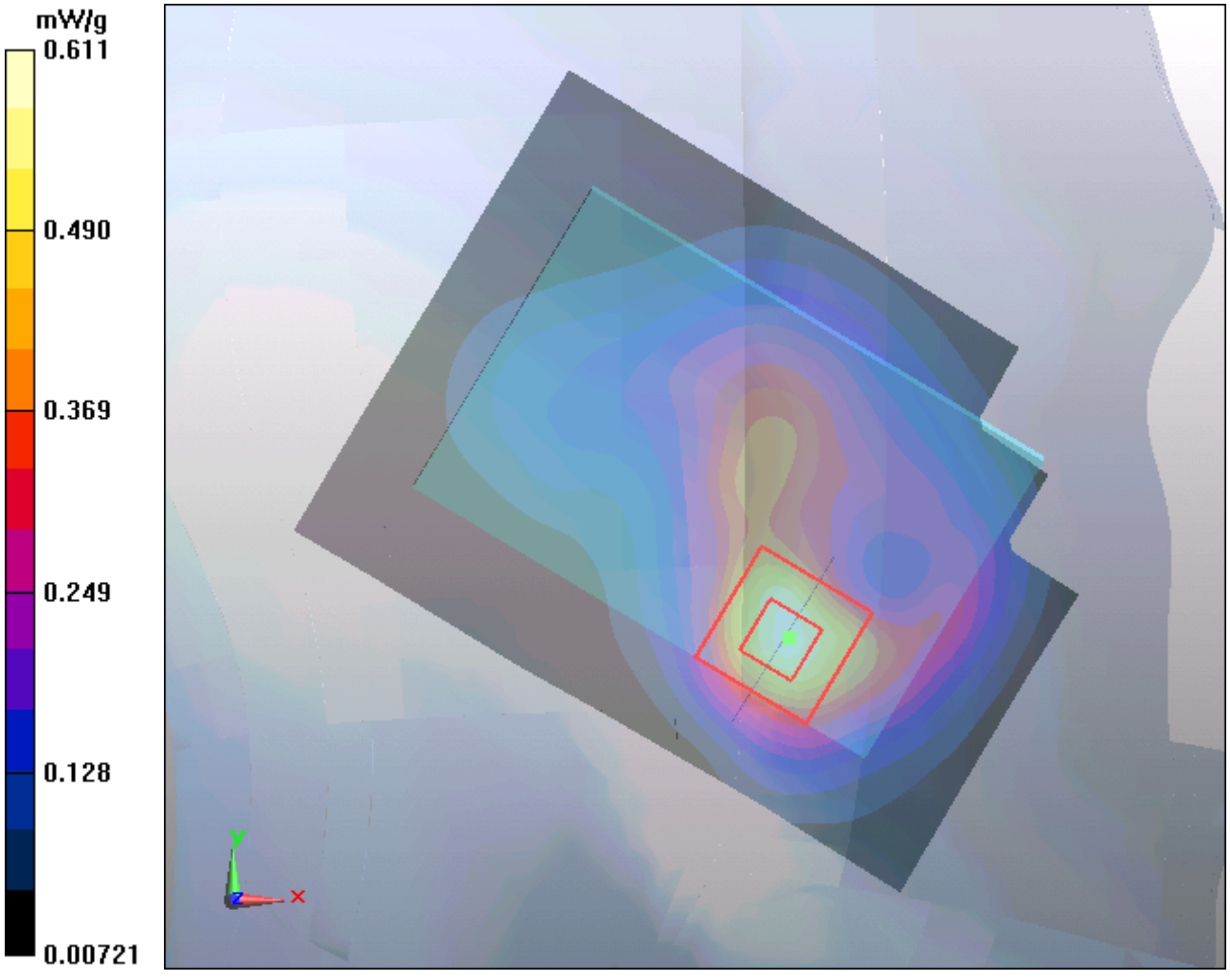



Figure 50 Left Hand Touch Cheek GSM 1900 Channel 512

**GSM 1900 GPRS (4Txslots) Towards Ground High (Slide Open, Battery 1)**

Date/Time: 4/21/2012 10:21:45 PM

Communication System: GPRS 4TX; Frequency: 1909.8 MHz;Duty Cycle: 1:2.07491

Medium parameters used: f = 1910 MHz; $\sigma$ = 1.56 mho/m; $\varepsilon_r$ = 52.1; $\rho$ = 1000 kg/m$^3$

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

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

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

**Towards Ground High/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 7 V/m; Power Drift = 0.055 dB

Peak SAR (extrapolated) = 0.823 W/kg

**SAR(1 g) = 0.522 mW/g; SAR(10 g) = 0.321 mW/g**

Maximum value of SAR (measured) = 0.553 mW/g

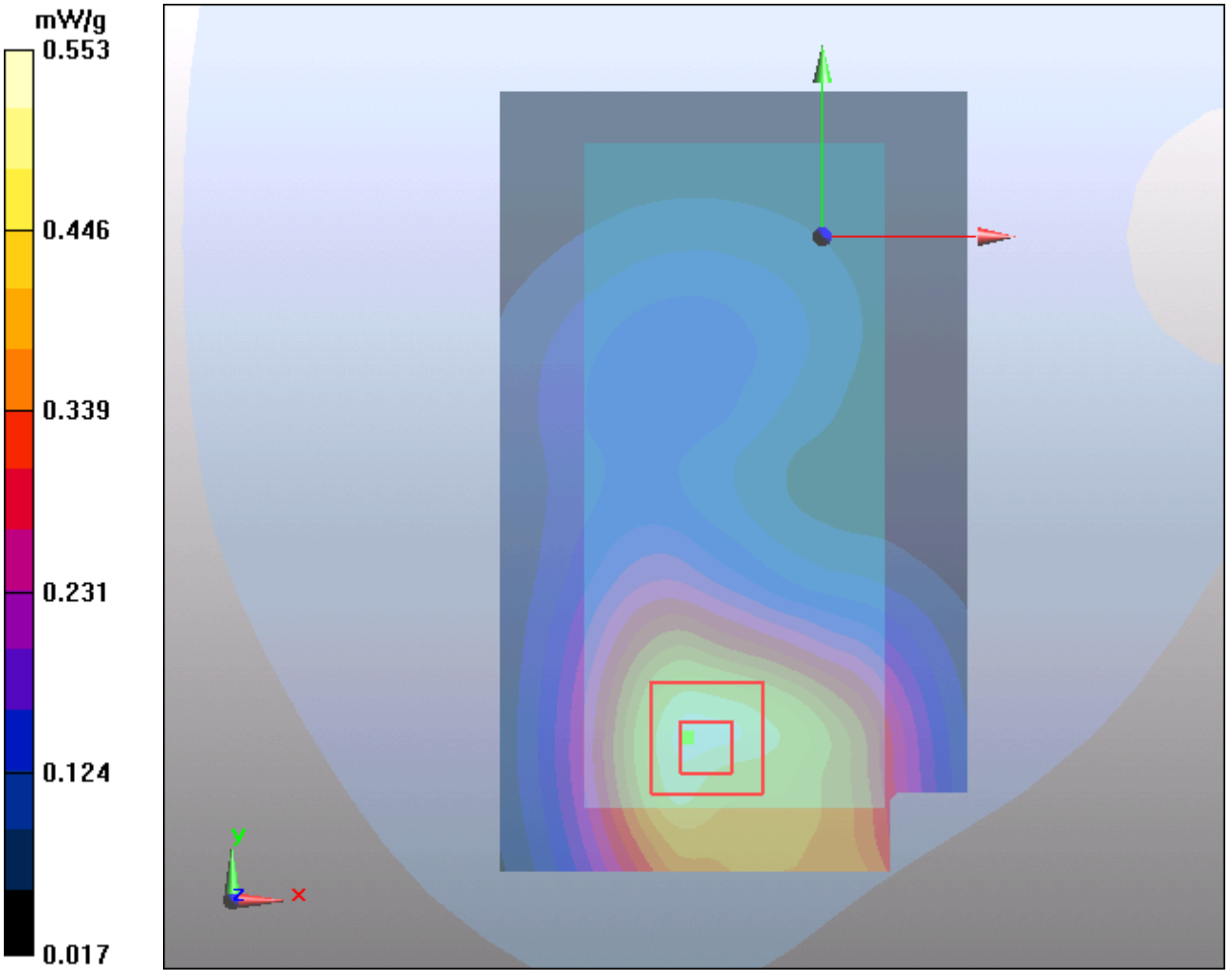



Figure 51 Body, Towards Ground, GSM 1900 GPRS (4Txslots) Channel 810

**GSM 1900 GPRS (4Txslots) Towards Ground Middle (Slide Open, Battery 1)**

Date/Time: 4/21/2012 10:06:07 PM

Communication System: GPRS 4TX; Frequency: 1880 MHz;Duty Cycle: 1:2.07491

Medium parameters used: f = 1880 MHz; $\sigma$ = 1.54 mho/m; $\varepsilon_r$ = 52.2; $\rho$ = 1000 kg/m$^3$

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

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

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

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

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

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

Reference Value = 7.25 V/m; Power Drift = 0.074 dB

Peak SAR (extrapolated) = 0.836 W/kg

**SAR(1 g) = 0.538 mW/g; SAR(10 g) = 0.335 mW/g**

Maximum value of SAR (measured) = 0.570 mW/g

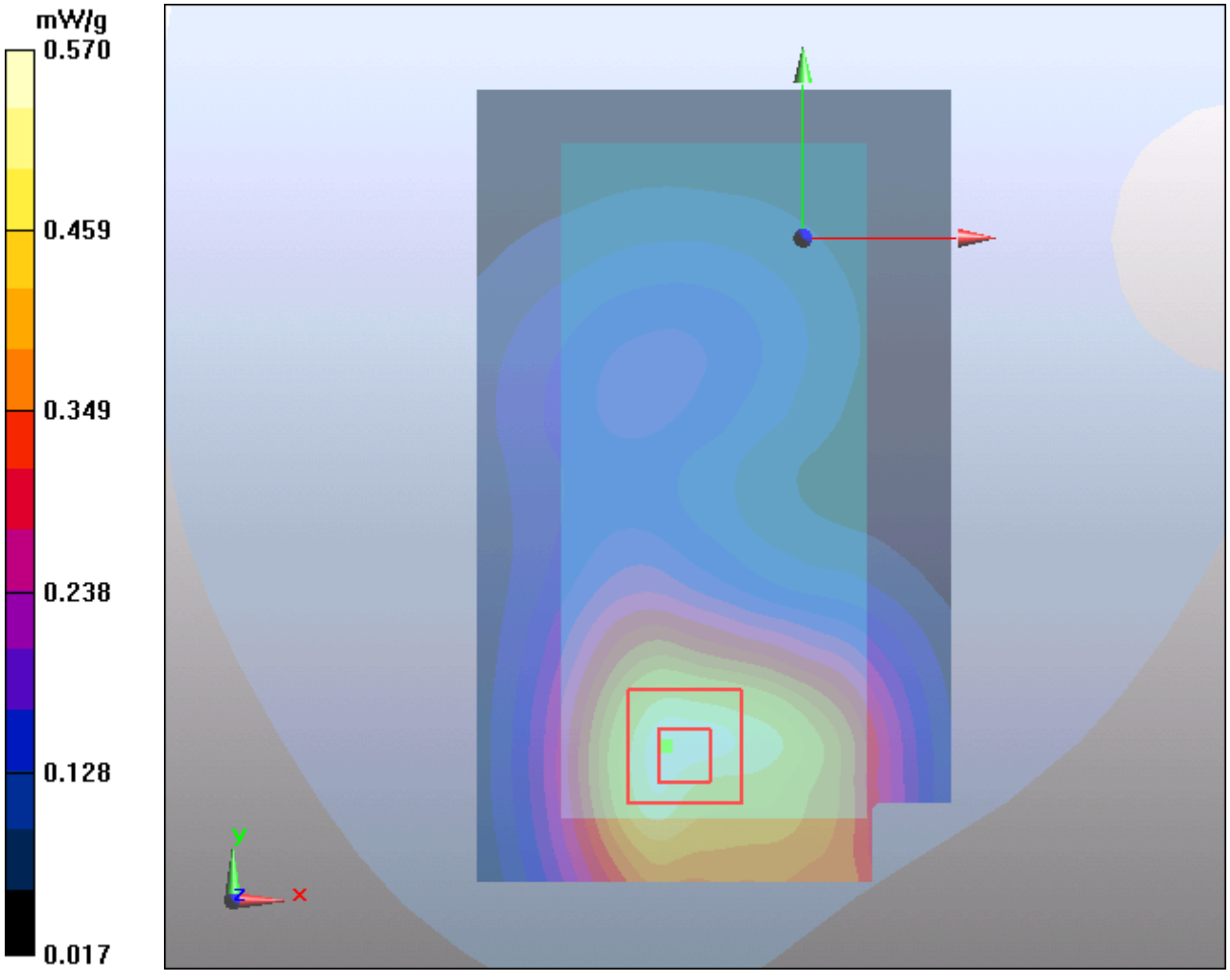



Figure 52 Body, Towards Ground, GSM 1900 GPRS (4Txslots) Channel 661

**GSM 1900 GPRS (4Txslots) Towards Ground Low (Slide Open, Battery 1)**

Date/Time: 4/21/2012 9:14:44 PM

Communication System: GPRS 4TX; Frequency: 1850.2 MHz;Duty Cycle: 1:2.07491

Medium parameters used (interpolated): f = 1850.2 MHz; $\sigma$ = 1.51 mho/m; $\varepsilon_r$ = 52.3; $\rho$ = 1000 kg/m$^3$

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

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

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

**Towards Ground Low/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.651 mW/g

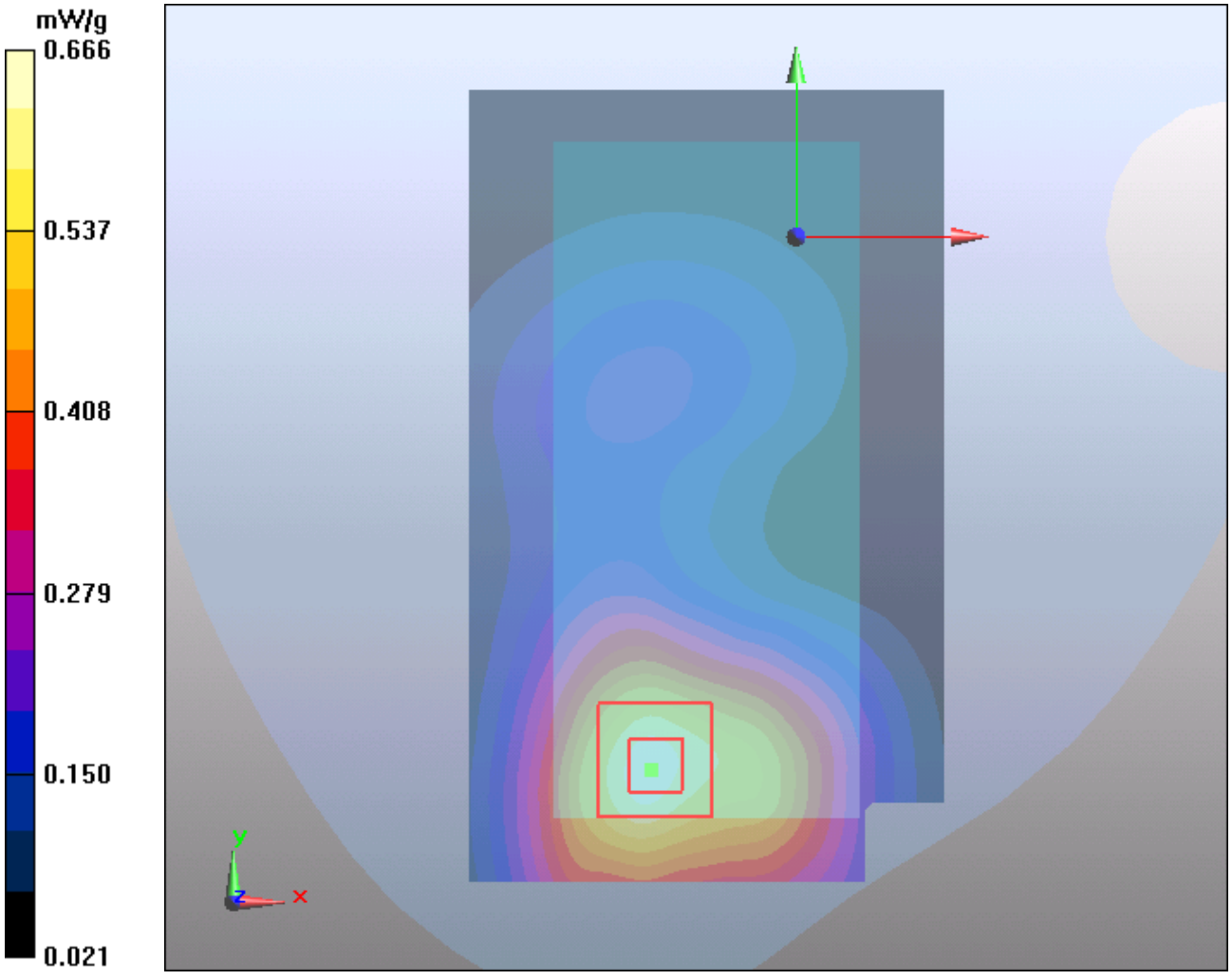
**Towards Ground Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.44 V/m; Power Drift = 0.018 dB

Peak SAR (extrapolated) = 0.955 W/kg

**SAR(1 g) = 0.617 mW/g; SAR(10 g) = 0.385 mW/g**

Maximum value of SAR (measured) = 0.666 mW/g



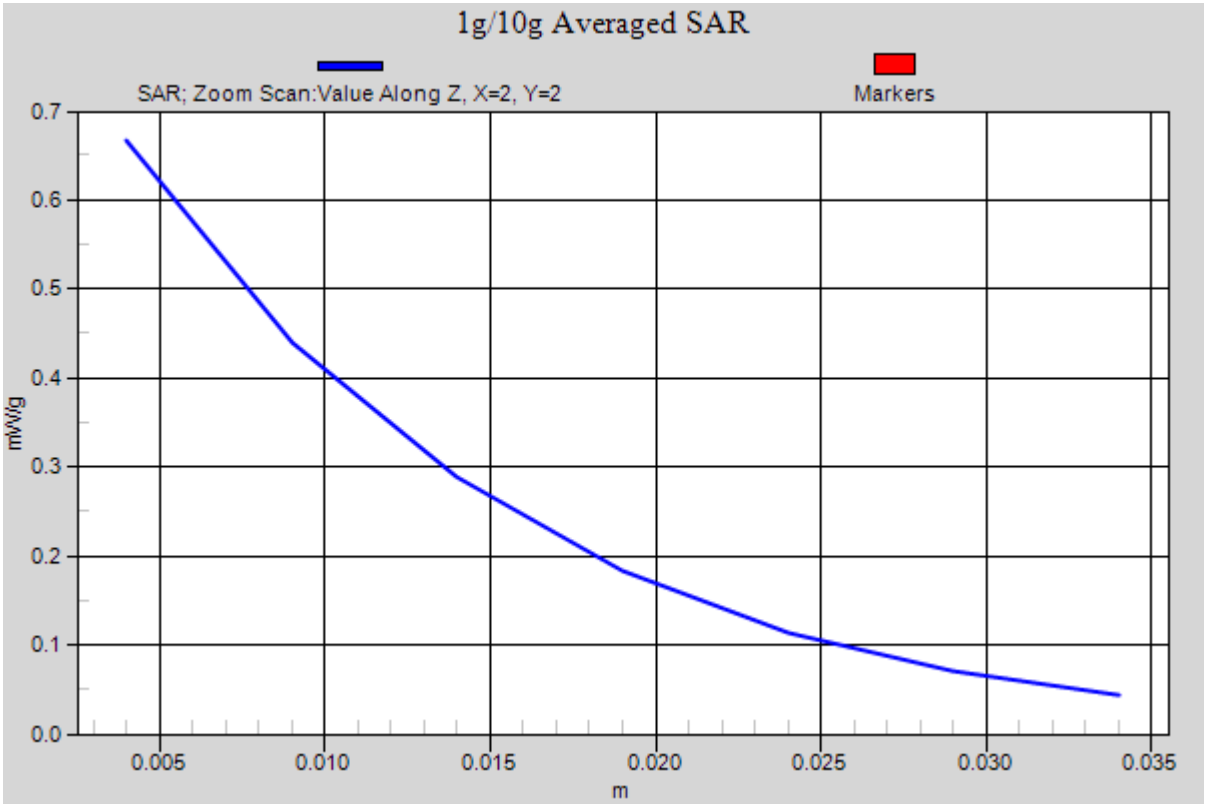



Figure 53 Body, Towards Ground, GSM 1900 GPRS (4Txslots) Channel 512

**GSM 1900 GPRS (4Txslots) Towards Phantom High (Slide Open, Battery 1)**

Date/Time: 4/21/2012 10:40:54 PM

Communication System: GPRS 4TX; Frequency: 1909.8 MHz;Duty Cycle: 1:2.07491

Medium parameters used: f = 1910 MHz; $\sigma$ = 1.56 mho/m; $\varepsilon_r$ = 52.1; $\rho$ = 1000 kg/m$^3$

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

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

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

**Towards Phantom High/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.311 mW/g

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

Reference Value = 8.04 V/m; Power Drift = 0.024 dB

Peak SAR (extrapolated) = 0.415 W/kg

**SAR(1 g) = 0.279 mW/g; SAR(10 g) = 0.181 mW/g**

Maximum value of SAR (measured) = 0.296 mW/g

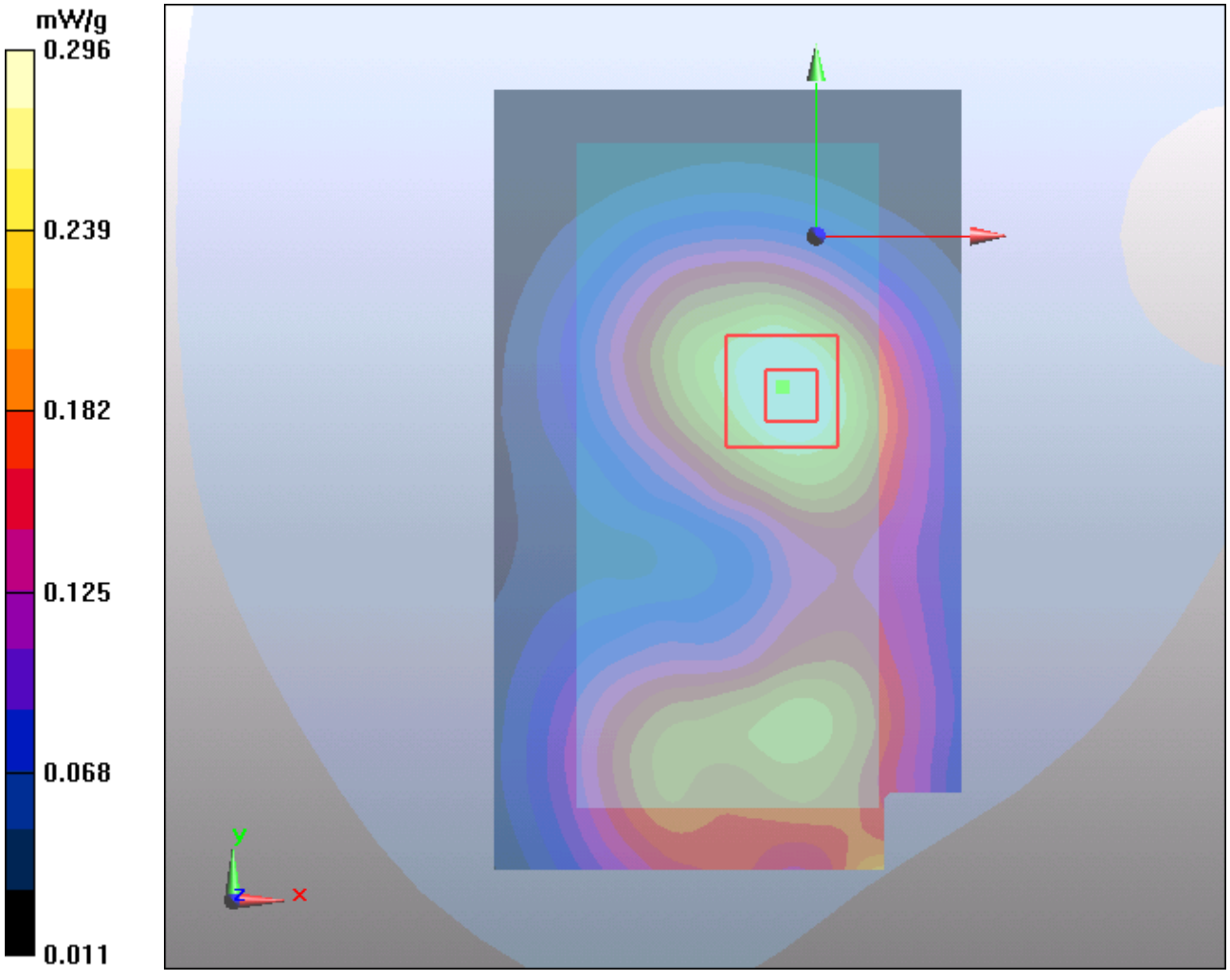



Figure 54 Body, Towards Phantom, GSM 1900 GPRS (4Txslots) Channel 810

**GSM 1900 GPRS (4Txslots) Towards Phantom Middle (Slide Open, Battery 1)**

Date/Time: 4/21/2012 10:56:31 PM

Communication System: GPRS 4TX; Frequency: 1880 MHz;Duty Cycle: 1:2.07491

Medium parameters used: f = 1880 MHz; $\sigma$ = 1.54 mho/m; $\varepsilon_r$ = 52.2; $\rho$ = 1000 kg/m$^3$

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

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

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

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

Maximum value of SAR (interpolated) = 0.346 mW/g

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

Reference Value = 8.7 V/m; Power Drift = -0.080 dB

Peak SAR (extrapolated) = 0.460 W/kg

**SAR(1 g) = 0.313 mW/g; SAR(10 g) = 0.204 mW/g**

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

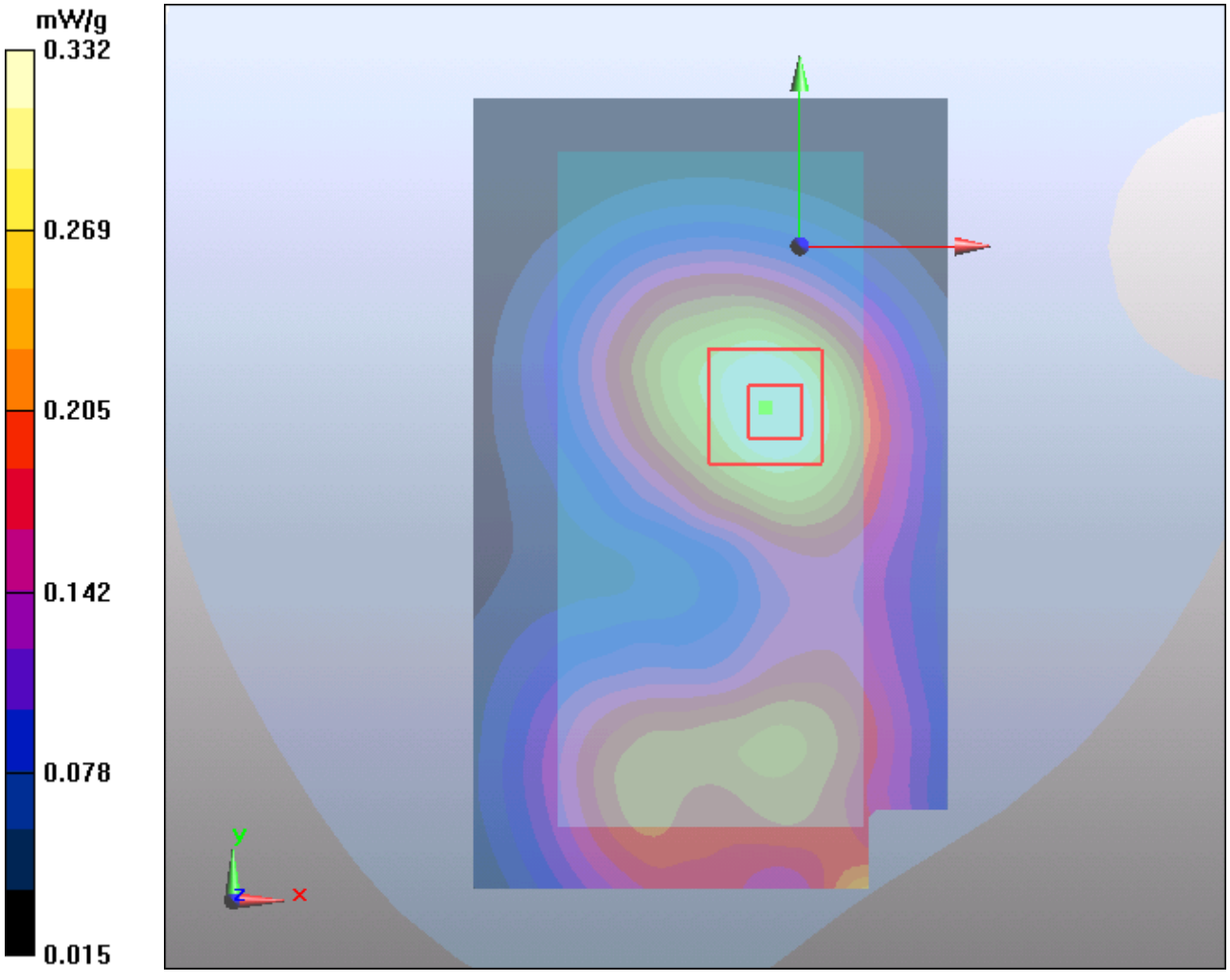



Figure 55 Body, Towards Phantom, GSM 1900 GPRS (4Txslots) Channel 661

**GSM 1900 GPRS (4Txslots) Towards Phantom Low (Slide Open, Battery 1)**

Date/Time: 4/21/2012 11:12:17 PM

Communication System: GPRS 4TX; Frequency: 1850.2 MHz;Duty Cycle: 1:2.07491

Medium parameters used (interpolated): f = 1850.2 MHz; $\sigma$ = 1.51 mho/m; $\varepsilon_r$ = 52.3; $\rho$ = 1000 kg/m$^3$

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

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

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

**Towards Phantom Low/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.370 mW/g

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

Reference Value = 8.97 V/m; Power Drift = -0.056 dB

Peak SAR (extrapolated) = 0.504 W/kg

**SAR(1 g) = 0.340 mW/g; SAR(10 g) = 0.222 mW/g**

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

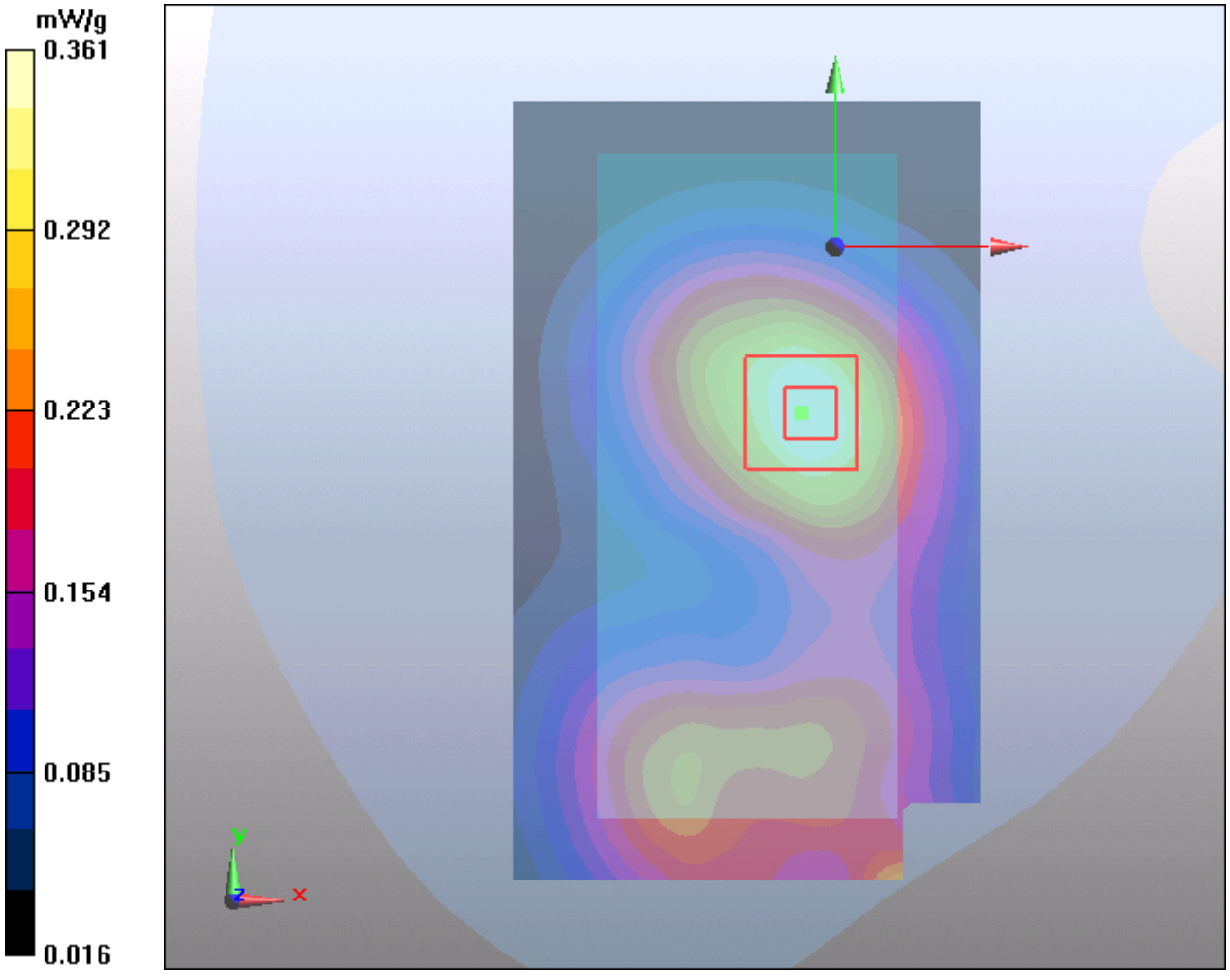



Figure 56 Body, Towards Phantom, GSM 1900 GPRS (4Txslots) Channel 512

**GSM 1900 GPRS (4Txslots) Towards Ground Low (Slide Close, Battery 1)**

Date/Time: 4/21/2012 9:33:26 PM

Communication System: GPRS 4TX; Frequency: 1850.2 MHz;Duty Cycle: 1:2.07491

Medium parameters used (interpolated): f = 1850.2 MHz; $\sigma$ = 1.51 mho/m; $\varepsilon_r$ = 52.3; $\rho$ = 1000 kg/m$^3$

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

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

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

**Towards Ground Low/Area Scan (61x81x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.467 mW/g

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

Reference Value = 8.91 V/m; Power Drift = 0.024 dB

Peak SAR (extrapolated) = 0.675 W/kg

**SAR(1 g) = 0.422 mW/g; SAR(10 g) = 0.247 mW/g**

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

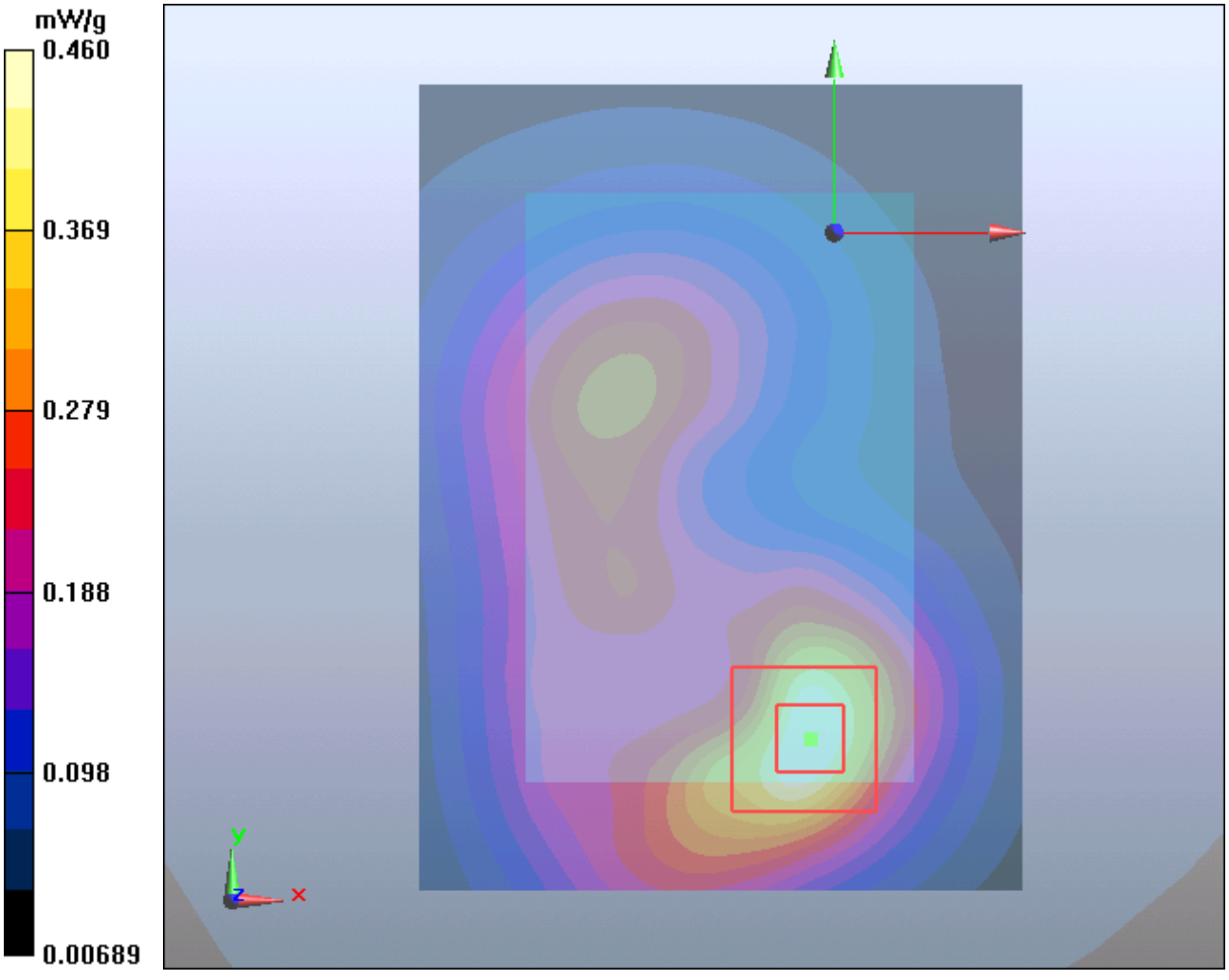



Figure 57 Body, Towards Ground, GSM 1900 GPRS (4Txslots) Channel 512

**GSM 1900 with Stereo Headset 1 Towards Ground Low (Slide Open, Battery 1)**

Date/Time: 4/21/2012 11:59:05 PM

Communication System: GSM; Frequency: 1850.2 MHz;Duty Cycle: 1:8.30042

Medium parameters used (interpolated): f = 1850.2 MHz; $\sigma$ = 1.51 mho/m; $\varepsilon_r$ = 52.3; $\rho$ = 1000 kg/m$^3$

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

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

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

**Towards Ground Low/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.304 mW/g

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

Reference Value = 4.13 V/m; Power Drift = -0.034 dB

Peak SAR (extrapolated) = 0.443 W/kg

**SAR(1 g) = 0.281 mW/g; SAR(10 g) = 0.171 mW/g**

Maximum value of SAR (measured) = 0.304 mW/g

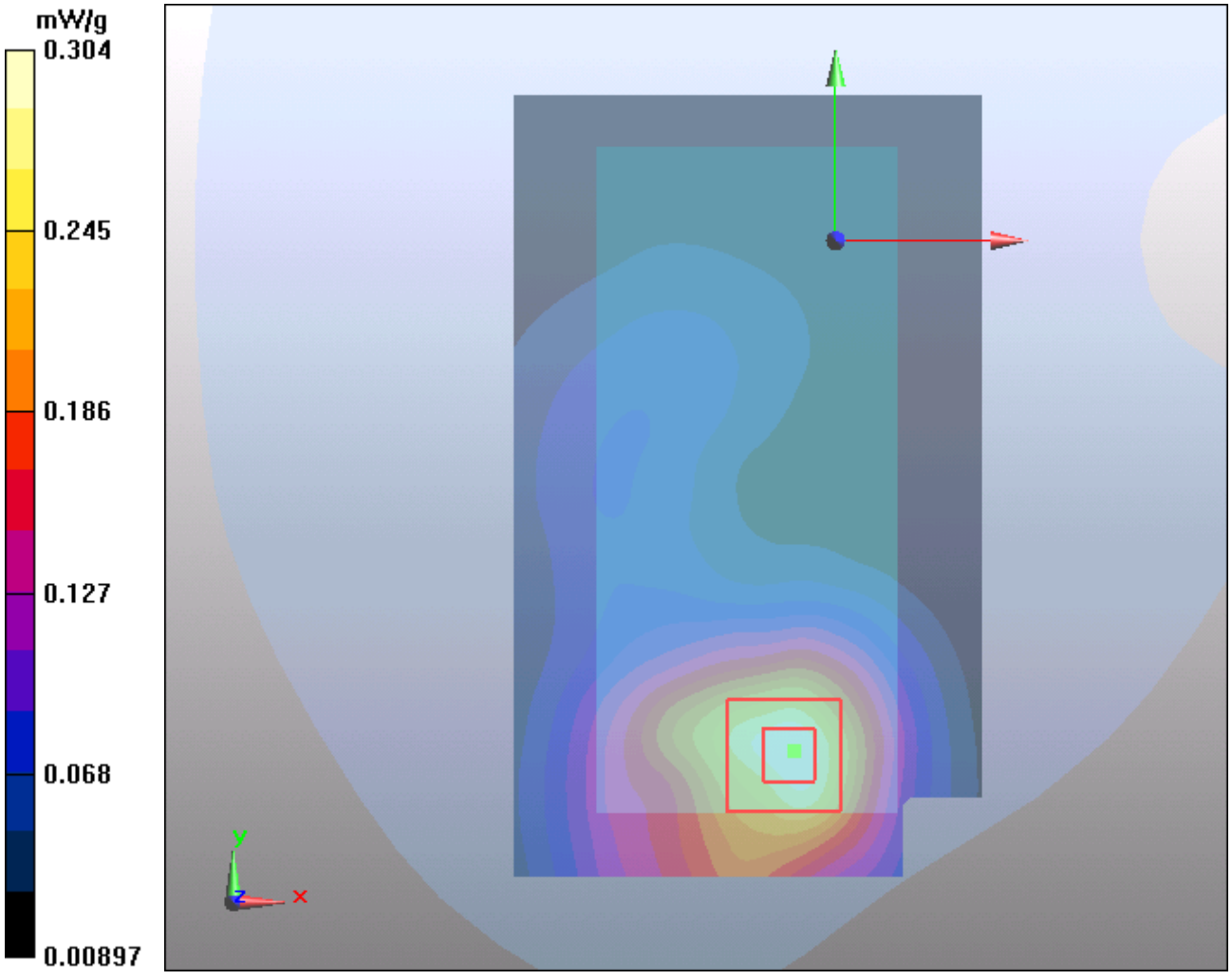



Figure 58 Body with Stereo Headset 1, Towards Ground, GSM 1900 Channel 512

**GSM 1900 with Stereo Headset 2 Towards Ground Low (Slide Open, Battery 1)**

Date/Time: 4/21/2012 11:41:29 PM

Communication System: GSM; Frequency: 1850.2 MHz;Duty Cycle: 1:8.30042

Medium parameters used (interpolated): f = 1850.2 MHz; $\sigma$ = 1.51 mho/m; $\varepsilon_r$ = 52.3; $\rho$ = 1000 kg/m$^3$

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

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

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

**Towards Ground Low/Area Scan (61x101x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.224 mW/g

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

Reference Value = 4.75 V/m; Power Drift = 0.107 dB

Peak SAR (extrapolated) = 0.335 W/kg

**SAR(1 g) = 0.208 mW/g; SAR(10 g) = 0.127 mW/g**

Maximum value of SAR (measured) = 0.224 mW/g

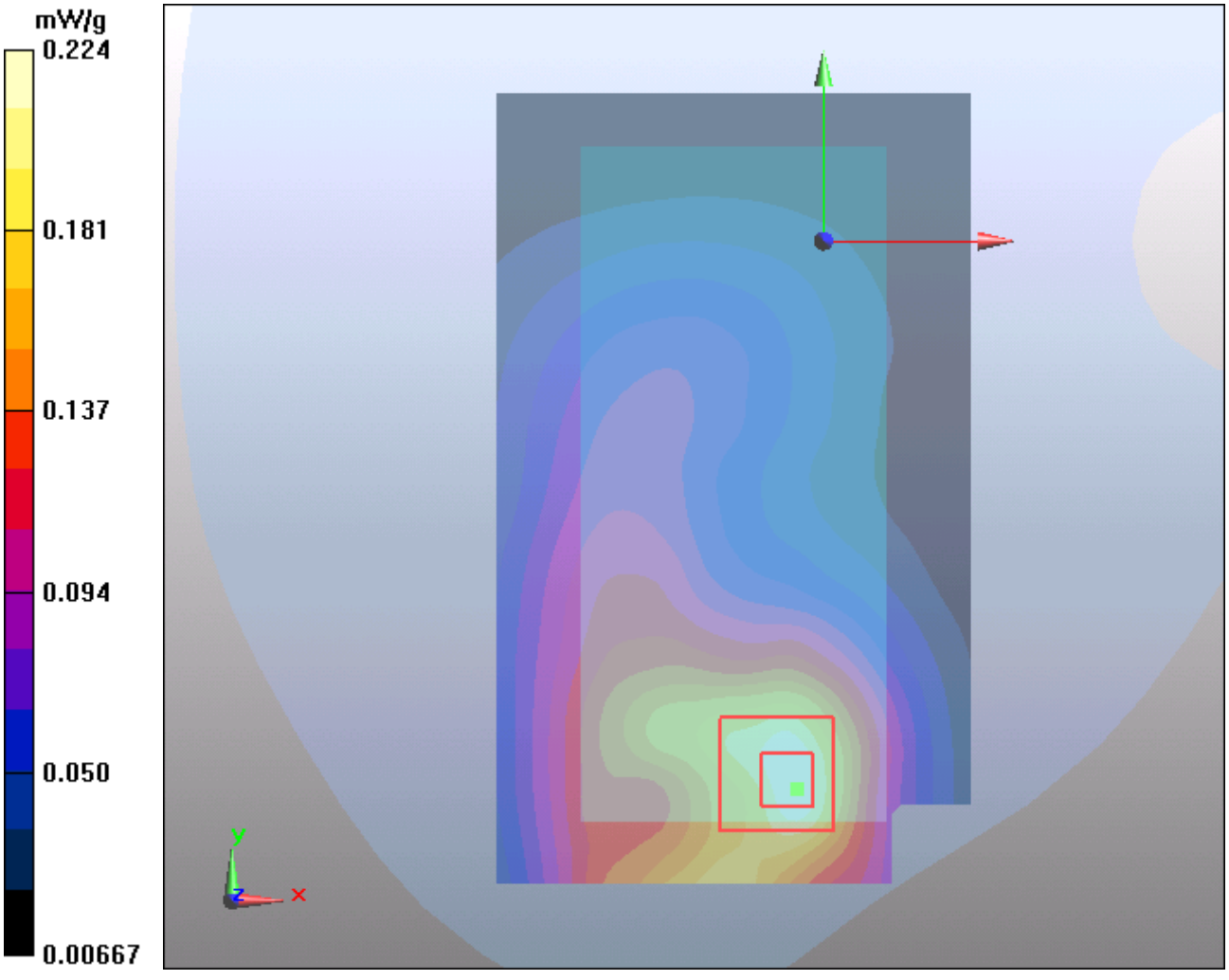



Figure 59 Body with Stereo Headset 2, Towards Ground, GSM 1900 Channel 512

# ANNEX D: Probe Calibration Certificate

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

S C S **Schweizerischer Kalibrierdienst**
**Service suisse d'étalonnage**
**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** Auden

**Certificate No: EX3-3753_Jan12**

## CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3753

Calibration procedure(s): QA CAL-01.v8, QA CAL-14.v3, QA CAL-23.v4, QA CAL-25.v4
Calibration procedure for dosimetric E-field probes

Calibration date: January 4, 2012

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

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

Calibration Equipment used (M&TE critical for calibration)

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

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

Issued: January 4, 2012

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
S Swiss Calibration Service

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

## Glossary:

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

## Calibration is Performed According to the Following Standards:

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

## Methods Applied and Interpretation of Parameters:

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

# Probe EX3DV4

## SN:3753

Manufactured: March 16, 2010
Calibrated: January 4, 2012

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

EX3DV4– SN:3753 January 4, 2012

# DASY/EASY - Parameters of Probe: EX3DV4 - SN:3753

## Basic Calibration Parameters

| | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |
|---|---|---|---|---|
| Norm ($\mu V/(V/m)^2$)[A] | 0.33 | 0.49 | 0.53 | ± 10.1 % |
| DCP (mV)[B] | 103.0 | 96.0 | 100.6 | |

## 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 | 119.0 | ±2.7 % |
| | | | Y | 0.00 | 0.00 | 1.00 | 115.7 | |
| | | | Z | 0.00 | 0.00 | 1.00 | 116.2 | |

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:3753

## 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) |
|---|---|---|---|---|---|---|---|---|
| 750 | 41.9 | 0.89 | 9.43 | 9.43 | 9.43 | 0.39 | 0.87 | ± 12.0 % |
| 835 | 41.5 | 0.90 | 9.02 | 9.02 | 9.02 | 0.39 | 0.79 | ± 12.0 % |
| 1750 | 40.1 | 1.37 | 8.37 | 8.37 | 8.37 | 0.10 | 1.14 | ± 12.0 % |
| 1900 | 40.0 | 1.40 | 8.05 | 8.05 | 8.05 | 0.54 | 0.70 | ± 12.0 % |
| 2000 | 40.0 | 1.40 | 7.94 | 7.94 | 7.94 | 0.10 | 0.89 | ± 12.0 % |
| 2450 | 39.2 | 1.80 | 6.89 | 6.89 | 6.89 | 0.34 | 0.90 | ± 12.0 % |
| 5200 | 36.0 | 4.66 | 4.83 | 4.83 | 4.83 | 0.36 | 1.80 | ± 13.1 % |
| 5300 | 35.9 | 4.76 | 4.58 | 4.58 | 4.58 | 0.40 | 1.80 | ± 13.1 % |
| 5500 | 35.6 | 4.96 | 4.63 | 4.63 | 4.63 | 0.40 | 1.80 | ± 13.1 % |
| 5600 | 35.5 | 5.07 | 4.23 | 4.23 | 4.23 | 0.50 | 1.80 | ± 13.1 % |
| 5800 | 35.3 | 5.27 | 4.26 | 4.26 | 4.26 | 0.50 | 1.80 | ± 13.1 % |

[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:3753 January 4, 2012

# DASY/EASY - Parameters of Probe: EX3DV4 - SN:3753

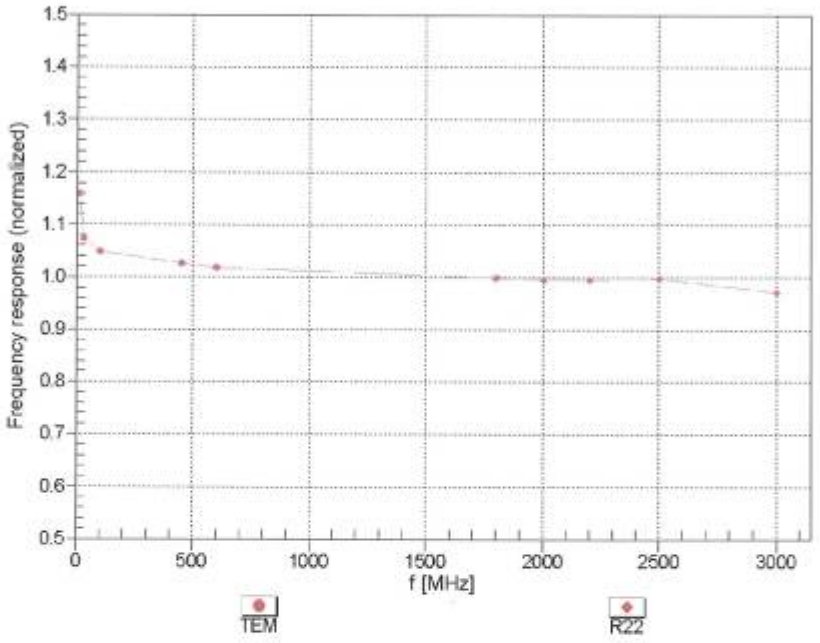
## Calibration Parameter Determined in Body Tissue Simulating Media

| f (MHz) [C] | Relative Permittivity [F] | Conductivity (S/m) [F] | ConvF X | ConvF Y | ConvF Z | Alpha | Depth (mm) | Unct. (k=2) |
|---|---|---|---|---|---|---|---|---|
| 750 | 55.5 | 0.96 | 9.29 | 9.29 | 9.29 | 0.30 | 1.11 | ± 12.0 % |
| 835 | 55.2 | 0.97 | 9.18 | 9.18 | 9.18 | 0.47 | 0.85 | ± 12.0 % |
| 1750 | 53.4 | 1.49 | 8.00 | 8.00 | 8.00 | 0.62 | 0.69 | ± 12.0 % |
| 1900 | 53.3 | 1.52 | 7.57 | 7.57 | 7.57 | 0.31 | 0.93 | ± 12.0 % |
| 2000 | 53.3 | 1.52 | 7.52 | 7.52 | 7.52 | 0.48 | 0.76 | ± 12.0 % |
| 2300 | 52.9 | 1.81 | 7.20 | 7.20 | 7.20 | 0.49 | 0.75 | ± 12.0 % |
| 2450 | 52.7 | 1.95 | 7.03 | 7.03 | 7.03 | 0.80 | 0.50 | ± 12.0 % |
| 2600 | 52.5 | 2.16 | 6.75 | 6.75 | 6.75 | 0.80 | 0.50 | ± 12.0 % |
| 3500 | 51.3 | 3.31 | 6.04 | 6.04 | 6.04 | 0.29 | 1.45 | ± 13.1 % |
| 5200 | 49.0 | 5.30 | 4.30 | 4.30 | 4.30 | 0.50 | 1.90 | ± 13.1 % |
| 5300 | 48.9 | 5.42 | 3.96 | 3.96 | 3.96 | 0.60 | 1.90 | ± 13.1 % |
| 5500 | 48.6 | 5.65 | 3.67 | 3.67 | 3.67 | 0.60 | 1.90 | ± 13.1 % |
| 5600 | 48.5 | 5.77 | 3.36 | 3.36 | 3.36 | 0.70 | 1.90 | ± 13.1 % |
| 5800 | 48.2 | 6.00 | 3.86 | 3.86 | 3.86 | 0.60 | 1.90 | ± 13.1 % |

[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:3753 January 4, 2012

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

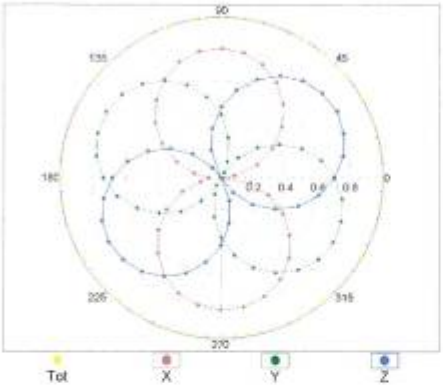



Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

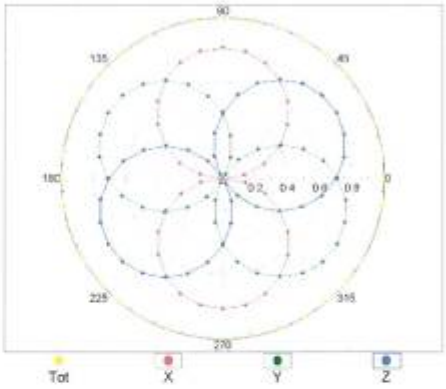
EX3DV4– SN:3753 January 4, 2012

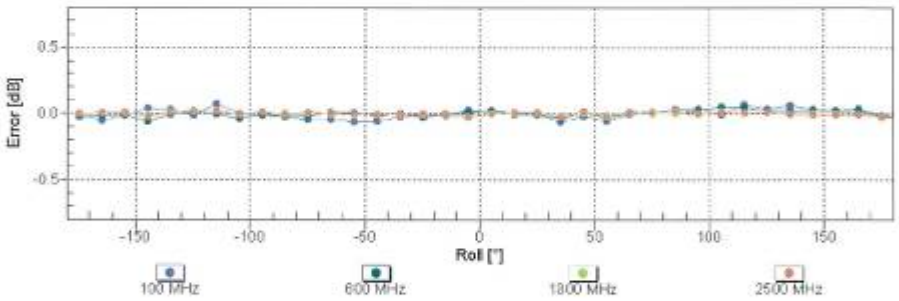
## Receiving Pattern ($\phi$), $\vartheta$ = 0°

f=600 MHz,TEM



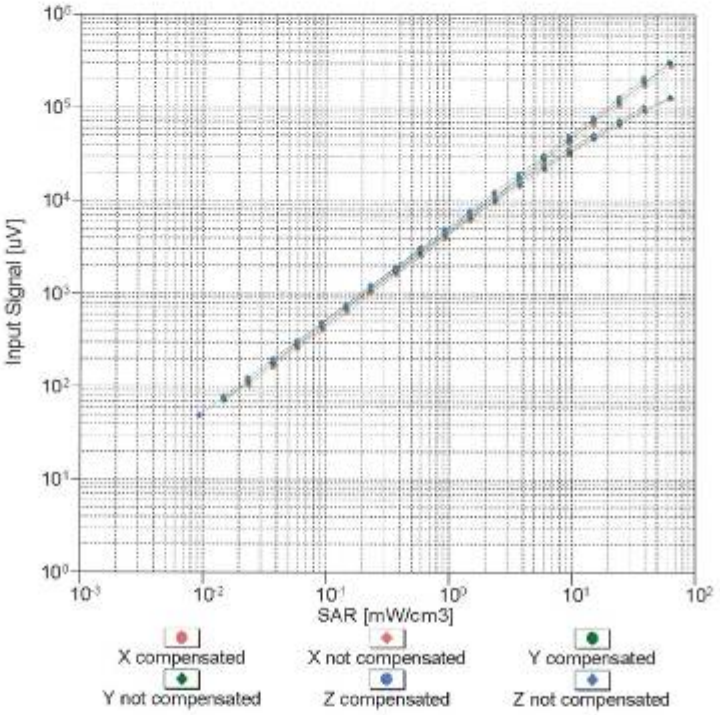

f=1800 MHz,R22

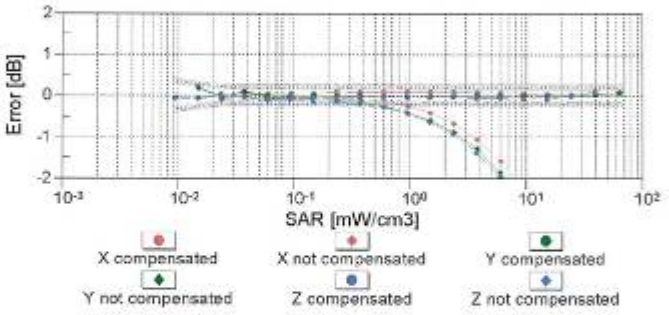



**Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)**

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



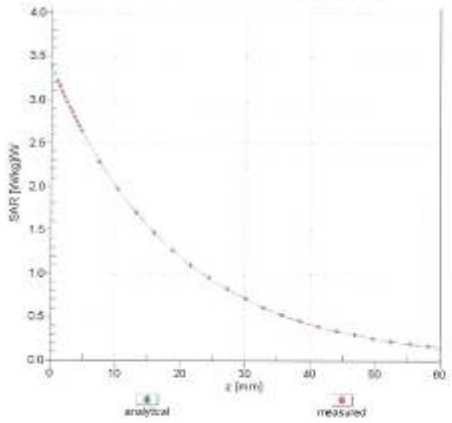




**Uncertainty of Linearity Assessment: ± 0.6% (k=2)**

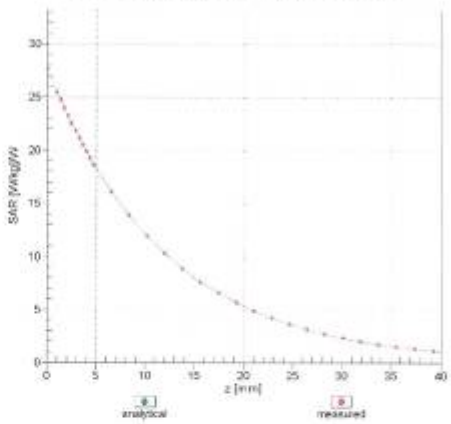
EX3DV4– SN:3753 January 4, 2012

## Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

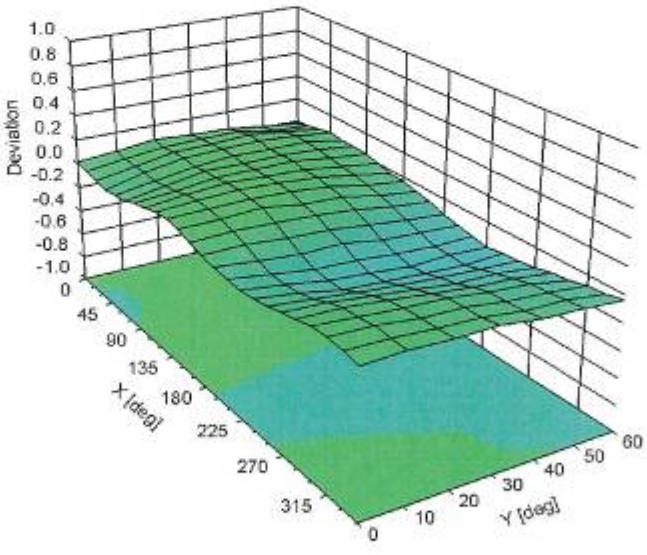


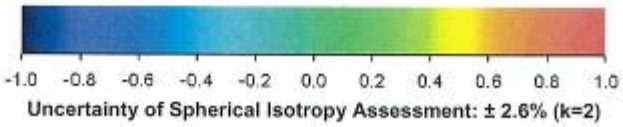

f = 1900 MHz,WGLS R22 (H_convF)




## Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz




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

# DASY/EASY - Parameters of Probe: EX3DV4 - SN:3753

**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**

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

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

**Accreditation No.: SCS 108**

**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: | Jeton Kastrati | Laboratory Technician | |
| Approved by: | Katja Pokovic | Technical Manager | |

Issued: August 26, 2011

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

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

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

**Accreditation No.: SCS 108**

**Glossary:**

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

**Calibration is Performed According to the Following Standards:**

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

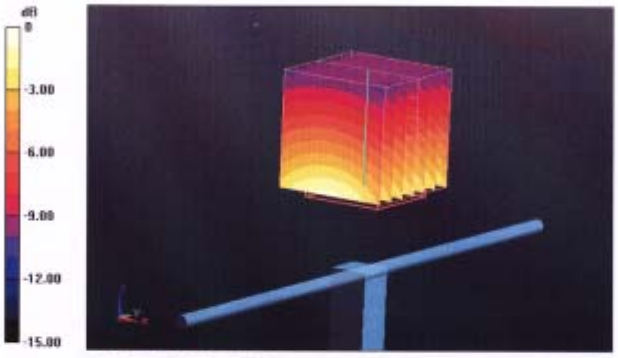
**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d020**

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

DASY52 Configuration:

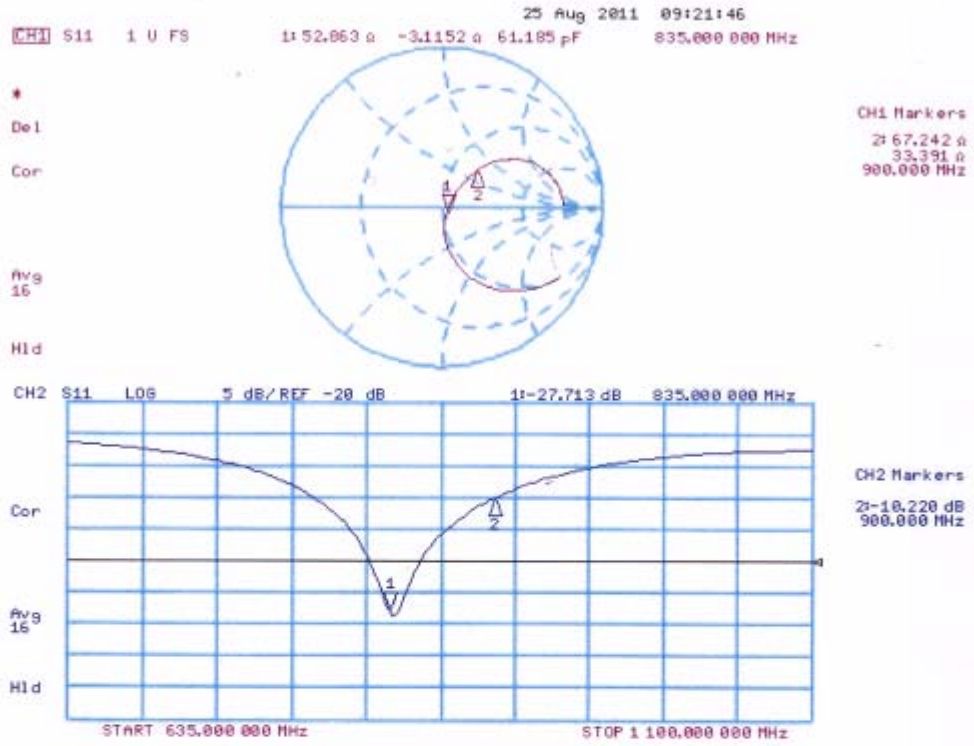
- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

**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

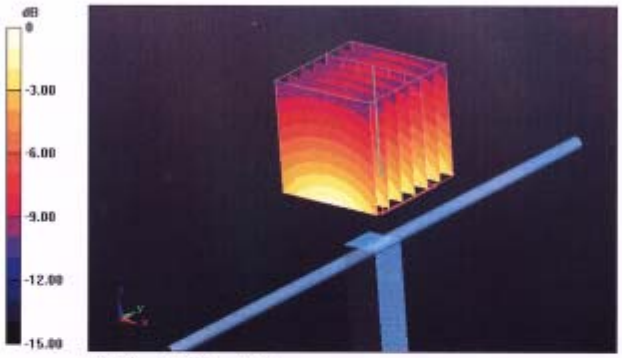
**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d020**

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

DASY52 Configuration:

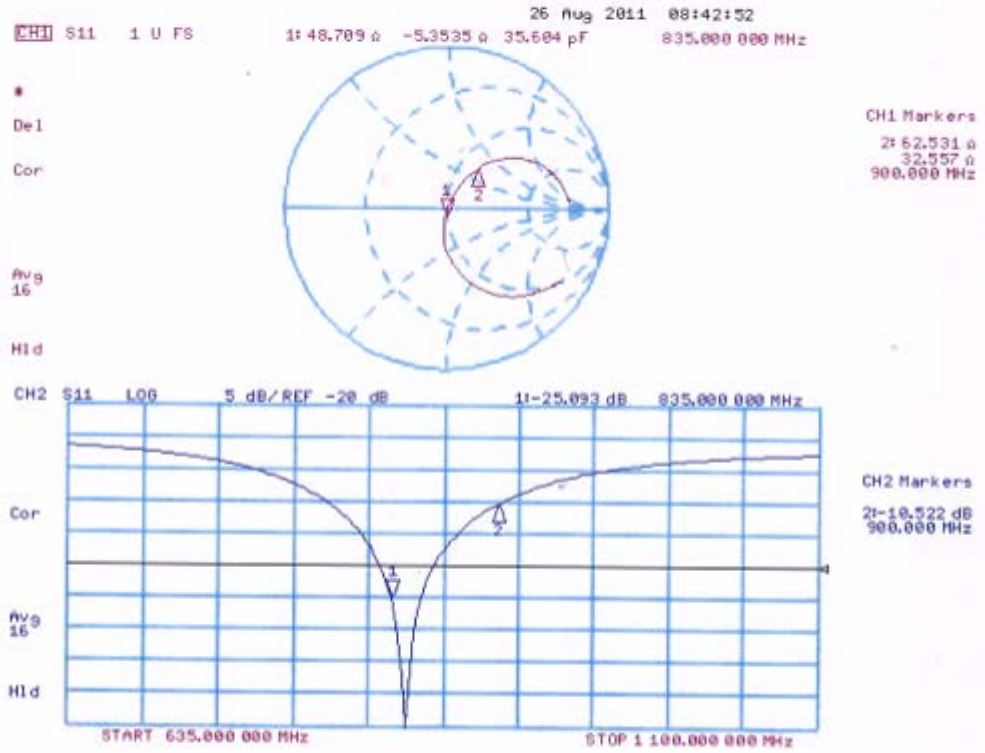
- Probe: ES3DV3 - SN3205; ConvF(6.02, 6.02, 6.02); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

**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**

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

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

**Accreditation No.: SCS 108**

Client **TA-Shanghai (Auden)** Certificate No: **D1900V2-5d060_Aug11**

## CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | D1900V2 - SN: 5d060 |
| Calibration procedure(s) | QA CAL-05.v8<br>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

**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 |
| 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

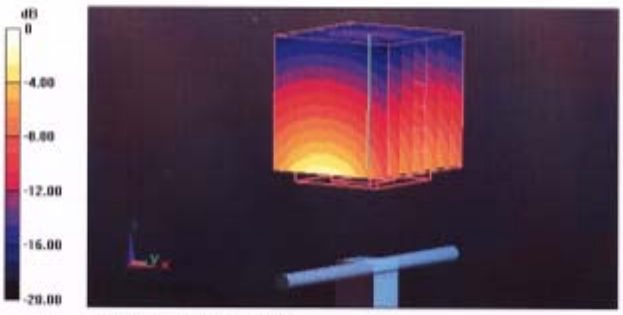
**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d060**

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

DASY52 Configuration:

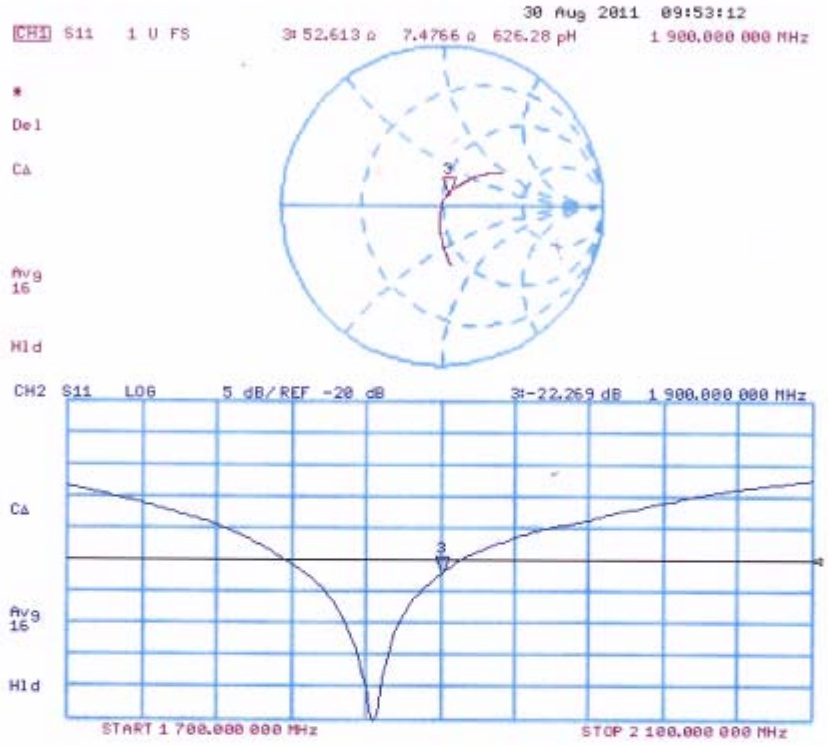
- Probe: ES3DV3 - SN3205; ConvF(5.01, 5.01, 5.01); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

**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; $\sigma$ = 1.57 mho/m; $\varepsilon_r$ = 53.9; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

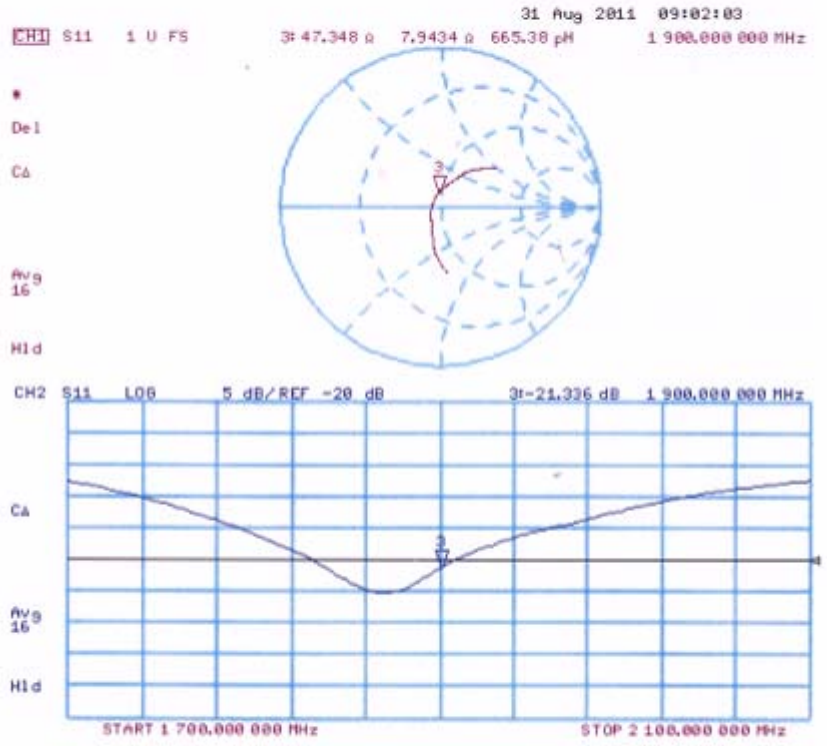
DASY52 Configuration:

- 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: DAE4 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
S Swiss Calibration Service

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

**Accreditation No.: SCS 108**

**Client** 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

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

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

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

**Accreditation No.: SCS 108**

**Glossary**

| | |
|---|---|
| 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 |