TESTING
No. L2264

OET 65

TEST REPORT

Product Name	HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth
Model	HUAWEI U8100-5/U8100-5/IVY
FCC ID	QISU8100-5
Client	HUAWEI Technologies Co., Ltd.

TA Technology (Shanghai) Co., Ltd.

GENERAL SUMMARY

Product Name	HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth	Model	HUAWEI U8100-5/U8100-5/IVY
FCC ID	QISU8100-5	Report No.	RZA2010-0426
Client	HUAWEI Technologies Co., Ltd.		
Manufacturer	HUAWEI Technologies Co., Ltd.		
Reference Standard(s)	**IEEE Std C95.1, 1999:** IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz. **IEEE Std 1528™-2003:** IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques. **SUPPLEMENT C Edition 01-01 to OET BULLETIN 65 Edition 97-01 June 2001+DA 02-1438 June 19, 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.		
Conclusion	This portable wireless equipment has been measured in all cases requested by the relevant standards. Test results in Chapter 7 of this test report are below limits specified in the relevant standards. General Judgment: **Pass** (Stamp) **Date of issue: March 29th, 2010**		
Comment	The test result only responds to the measured sample.		

Approved by _Yang Weizhong_   **Revised by** _Ling Minbao_   **Performed by** _Wang Lu_

Yang Weizhong   Ling Minbao   Wang Lu

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1.   General Information

1.1. Notes of the test report

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

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1.4. Manufacturer Information

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City: Shenzhen

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1.5. Information of EUT

General information

Device type :	portable device
Exposure category:	uncontrolled environment / general population
Product Name:	HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth
IMEI or SN:	L12AB11020600025
Device operating configurations :	
Operating mode(s):	GSM850; (tested) GSM1900; (tested) WCDMA Band II; (tested) WCDMA Band V; (tested)
Test Modulation:	(GSM) GMSK, (WCDMA)QPSK
GPRS multislot class :	10
EGPRS multislot class :	10
HSDPA UE category	8
Operating frequency range(s):	Band	Tx (MHz)	Rx (MHz)
	GSM 850	824.2 ~ 848.8	869.2 ~ 893.8
	GSM 1900	1850.2 ~ 1909.8	1930.2 ~ 1989.8
	WCDMA Band II	1852.4 ~ 1907.6	1932.4 ~ 1987.6
	WCDMA Band V	826.4 ~ 846.6	871.4 ~ 891.6
Power class	GSM 850: 4, tested with power level 5
	GSM 1900: 1, tested with power level 0
	WCDMA Band II: 3, tested with maximum output power
	WCDMA Band V: 3, tested with maximum output power
Test channel (Low - Middle - High)	128 -192 - 251 (GSM850) (tested) 512 - 661 - 810 (GSM1900) (tested) 9262 - 9400 - 9538 (WCDMA Band II) (tested) 4132 - 4183 - 4233 (WCDMA Band V) (tested)
Hardware version:	HD1U811M Ver.B
Software version:	U8105V100R001C00B210
Antenna type:	Internal antenna

Auxiliary equipment details

AE1:Battery

Model:	HB5A2H
Manufacture:	HUAWEI Technologies Co., Ltd.
IMEI or SN:	YAC9210H10302487

AE2:Travel Adaptor

Model:	HS-050040U6
Manufacture:	HUAWEI Technologies Co., Ltd.
IMEI or SN:	/

Equipment Under Test (EUT) is a model of HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth with internal antenna. The detail about Mobile phone, Lithium Battery and AC/DC Adapter is in in chapter 1.5 in this report. SAR is tested for GSM850, GSM 1900, WCDMA Band II and WCDMA Band V. The EUT has GPRS (class 10), EGPRS (class 10) and WCDMA/HSDPA functions.

The sample under test was selected by the Client.

Components list please refer to documents of the manufacturer.

1.6. Test Date

The test is performed from March 25, 2010 to March 28, 2010.

2. Operational Conditions during Test

2.1. 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 Radio Frequency Channel Number (ARFCN) is allocated to 128, 192 and 251 in the case of GSM 850, to 512, 661 and 810 in the case of GSM 1900, to 9262, 9400 and 9538 in the case of WCDMA Band II, to 4132, 4183 and 4233 in the case of WCDMA Band V. The EUT is commanded to operate at maximum transmitting power.

Connection to the EUT is established via air interface with E5515C, and the EUT is set to maximum output power by E5515C. The 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.

2.2. 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" in SAR of GSM850, set to "0" in SAR of GSM1900. The test in the band of GSM850 and GSM1900 are performed in the mode of speech transfer function and GPRS/EGPRS function. Since the GPRS class is 10 for this EUT, it has at most 2 timeslots in uplink. The EGPRS class is 10 for this EUT; it has at most 2 timeslots in uplink.

2.3. WCDMA Test Configuration

2.3.1. Output power Verification

Maximum output power is verified on the High, Middle and Low channel according to the procedures described in section 5.2 of 3GPP TS 34. 121, using the appropriate RMC or AMR with TPC(transmit power control) set to all "1's" for WCDMA/HSDPA or applying the required inner loop power control procedures to the maximum output power while HSUPA is active. Results for all applicable physical channel configuration (DPCCH, $DPDCH_n$ and spreading codes, HSDPA, HSPA) should be tabulated in the SAR report. All configuration that are not supported by the DUT or can not be measured due to technical or equipment limitations should be clearly identified.

2.3.2. Head SAR Measurements

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

2.3.3. Body SAR Measurements

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

2.4. HSDPA Test Configuration

SAR for body exposure configurations is measured according to the "Body SAR Measurements" procedures of that section. In addition, body SAR is also measured for HSDPA when the maximum average output of each RF channel with HSDPA active is at least 1/4 dB higher than that measured without HSDPA using 12.2kbps RMC or the maximum SAR 12.2kbps RMC is above 75% of the SAR limit. Body SAR for HSDPA is measured using an FRC with H-Set 1 in Sub-test 1 and a 12.2kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration in 12.2 kbps RMC without HSDPA.

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

Table 1: Subtests for UMTS Release 5 HSDPA

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

Note1: $\triangle_{ACK}$, $\triangle_{NACK}$ and $\triangle_{CQI}$= 8 $\Leftrightarrow$ A_{hs} = β_{hs}/β_c=30/15 $\Leftrightarrow$ β_{hs}=30/15*β_c

Note2: For the HS-DPCCH power mask requirement test in clause 5.2C,5.7A,and the Error Vector Magnitude(EVM) with HS-DPCCH test in clause 5.13.1.A,and HSDPA EVM with phase discontinuity in clause 5.13.1AA, $\triangle_{ACK}$ and $\triangle_{NACK}$= 8 ($A_{hs=}$30/15) with β_{hs}=30/15*β_c,and $\triangle_{CQI}$= 7 ($A_{hs=}$24/15) with β_{hs}=24/15*β_c.

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

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

Table 2: Settings of required H-Set 1 QPSK in HSDPA mode

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

Table 3: HSDPA UE category

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

3. SAR Measurements System Configuration

3.1. SAR Measurement Set-up

The DASY4 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 DASY4 measurement server.
- The DASY4 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
- DASY4 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.
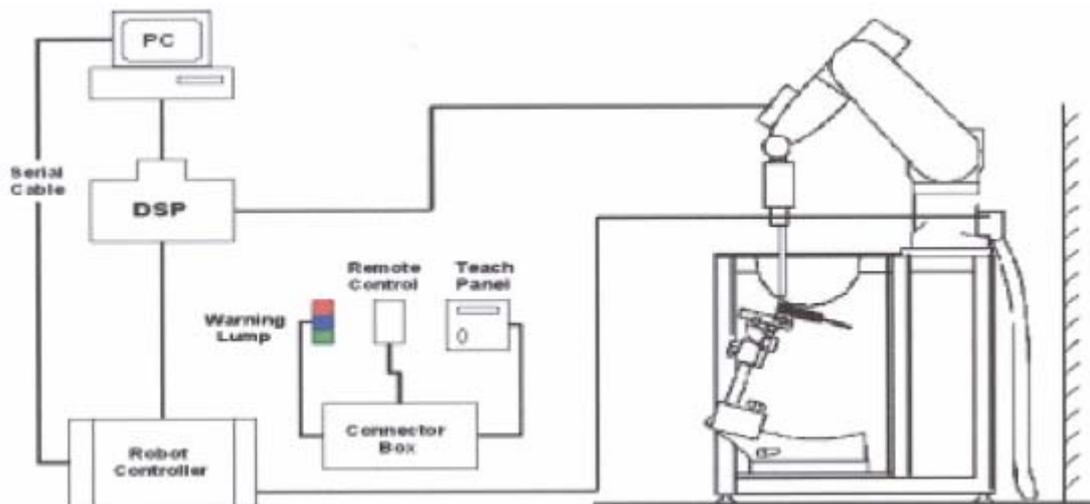- System validation dipoles allowing to validate the proper functioning of the system.

Figure 1 SAR Lab Test Measurement Set-up

3.2. DASY4 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.

3.2.1. EX3DV4 Probe Specification

Construction
    Symmetrical design with triangular core
    Built-in shielding against static charges
    PEEK enclosure material (resistant to organic solvents, e.g., DGBE)

Calibration
    Basic Broad Band Calibration in air
    Conversion Factors (CF) for HSL 900 and HSL 1750
    Additional CF for other liquids and frequencies upon request

Figure 2.EX3DV4 E-field Probe

Frequency
    10 MHz to > 6 GHz
    Linearity: ± 0.2 dB
    (30 MHz to 6 GHz)

Directivity
    ± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)

Dynamic Range
    10 µW/g to > 100 mW/g Linearity:
    ± 0.2dB (noise: typically < 1 µW/g)

Dimensions
    Overall length: 330 mm (Tip: 20 mm)
    Tip diameter: 2.5 mm (Body: 12 mm)
    Typical distance from probe tip to dipole centers: 1 mm

Application
    High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields).
    Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.

Figure 3. EX3DV4 E-field probe

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

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

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

3.3. Other Test Equipment

3.3.1. 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

3.3.2. 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 l000 x 500 mm (H x L x W)
Aailable   Special

Figure 5 Generic Twin Phantom

3.4. Scanning procedure

The DASY4 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 DASY4 system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ± 0.1mm). To prevent wrong results tests are only executed when the liquid is free of air bubbles. The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe. (It does not depend on the surface reflectivity or the probe angle to the surface within ± 30°.)

● Area Scan
  The Area Scan is used as a fast scan in two dimensions to find the area of high field values
  before running a detailed measurement around the hot spot.Before starting the area scan a grid

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

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

- Zoom Scan

  Zoom Scans are used to estimate the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The default Zoom Scan is done by 7x7x7 points within a cube whose base is centered around the maxima found in the preceding area scan.

- Spatial Peak Detection

  The procedure for spatial peak SAR evaluation has been implemented and can determine values of masses of 1g and 10g, as well as for user-specific masses.The DASY4 system allows evaluations that combine measured data and robot positions, such as:

  • maximum search

  • extrapolation

  • boundary correction

  • peak search for averaged SAR

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

  Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. Several measurements at different distances are necessary for the extrapolation. Extrapolation routines require at least 10 measurement points in 3-D space. They are used in the Zoom Scan to obtain SAR values between the lowest measurement points and the inner phantom surface. The routine uses the modified Quadratic Shepard′s method for extrapolation. For a grid using 7x7x7 measurement points with 5mm resolution amounting to 343 measurement points, the uncertainty of the extrapolation routines is less than 1% for 1g and 10g cubes.

- A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube 7x7x7 scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 5mm steps.

3.5. Data Storage and Evaluation

3.5.1. Data Storage

The DASY4 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.

3.5.2. 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, ai_0, 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 DASY4 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:

$$V_i = U_i + U_i^2 \cdot cf / dcp_i$$

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

        U_i = input signal of channel i   (i = x, y, z)

        cf = crest factor of exciting field   (DASY parameter)

        dcp_i = diode compression point   (DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

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

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

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

        $Norm_i$ = sensor sensitivity of channel i   (i = x, y, z)

                $[mV/(V/m)^2]$ for E-field Probes

        $ConvF$ = sensitivity enhancement in solution

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

        f = carrier frequency [GHz]

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

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

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

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

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

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

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

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

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

  . = equivalent tissue density in g/cm^3

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

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

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

3.6. 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 10 and table 11.

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 DASY 4 system.

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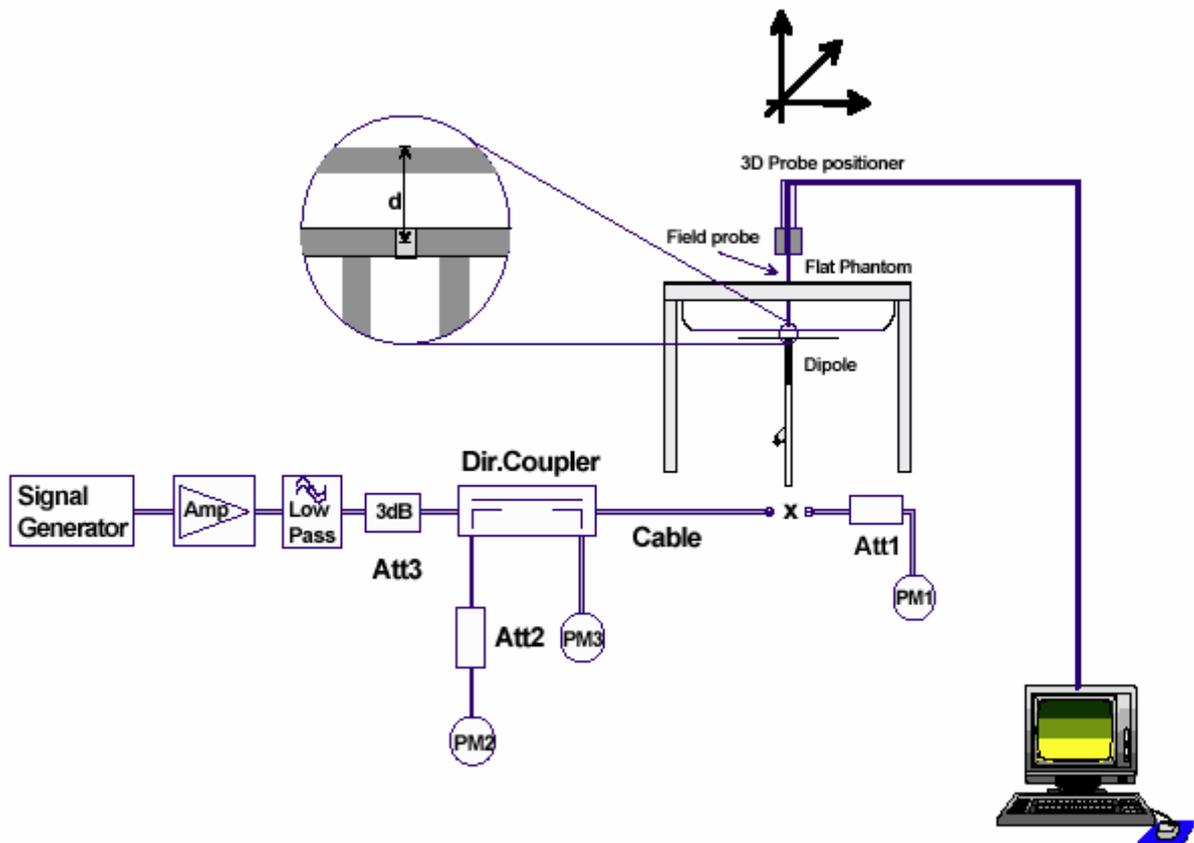
Figure 6 System Check Set-up

3.7. Equivalent Tissues

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 4 and Table 5 show the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the OET 65.

Table 4: 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 5: 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. Laboratory Environment

Table 6: The Ambient Conditions during Test

Temperature	Min. = 20°C, Max. = 25 °C
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5 Ω
Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

5. Characteristics of the Test

5.1. Applicable Limit Regulations

IEEE Std C95.1, 1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

5.2. Applicable Measurement Standards

IEEE Std 1528™-2003: IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.

SUPPLEMENT C Edition 01-01 to OET BULLETIN 65 Edition 97-01 June 2001+DA 02-1438 June 19, 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

6. Conducted Output Power Measurement

6.1. Summary

The DUT is tested using an E5515C communications tester as controller unit to set test channels and maximum output power to the DUT, as well as for measuring the conducted power.
Conducted output power was measured using an integrated RF connector and attached RF cable. This result contains conducted output power for the EUT.

6.2. Conducted Power Results

Table 7: Conducted Power Measurement Results

GSM 850	Conducted Power		
	Channel 128	Channel 192	Channel 251
	(824.2MHz)	(837MHz)	(848.8MHz)
Before Test (dBm)	32.69	32.61	32.69
After Test (dBm)	32.72	32.64	32.66
GSM 850+ GPRS	**Conducted Power**		
	Channel 128	Channel 192	Channel 251
	(824.2MHz)	(837MHz)	(848.8MHz)
Before Test (dBm)	31.51	31.39	31.51
After Test (dBm)	31.48	31.37	31.51
GSM 850+ EGPRS	**Conducted Power**		
	Channel 128	Channel 192	Channel 251
	(824.2MHz)	(837MHz)	(848.8MHz)
Before Test (dBm)	27.68	27.50	27.67
After Test (dBm)	27.69	27.53	27.66
GSM 1900	**Conducted Power**		
	Channel 512	Channel 661	Channel 810
	(1850.2MHz)	(1880MHz)	(1909.8MHz)
Before Test (dBm)	30.32	30.38	30.41
After Test (dBm)	30.35	30.39	30.45
GSM 1900+ GPRS	**Conducted Power**		
	Channel 512	Channel 661	Channel 810
	(1850.2MHz)	(1880MHz)	(1909.8MHz)
Before Test (dBm)	30.32	30.35	30.39
After Test (dBm)	30.34	30.36	30.39
GSM 1900+ EGPRS	**Conducted Power**		
	Channel 512	Channel 661	Channel 810
	(1850.2MHz)	(1880MHz)	(1909.8MHz)
Before Test (dBm)	26.94	27.02	27.04
After Test (dBm)	26.96	27.00	27.01

WCDMA Band II(dBm)		Conducted Power		
		Channel 9262	Channel 9400	Channel 9538
12.2kbps RMC	Before	22.89	22.80	22.76
	After	22.92	22.80	22.74
64kbps RMC	Before	22.91	22.77	22.74
	After	22.94	22.74	22.79
144kbps RMC	Before	22.84	22.74	22.80
	After	22.86	22.76	22.84
384kbps RMC	Before	22.91	22.71	22.76
	After	22.90	22.74	22.74
WCDMA Band II+HSDPA(dBm)		**Conducted Power**		
		Channel 9262	Channel 9400	Channel 9538
Sub - Test 1	Before	22.75	22.60	22.57
	After	22.79	22.58	22.54
Sub - Test 2	Before	22.15	22.01	21.89
	After	22.19	22.03	21.92
Sub - Test 3	Before	20.63	20.47	20.34
	After	20.66	20.49	20.38
Sub - Test 4	Before	20.09	20.01	19.88
	After	20.05	19.97	19.86
WCDMA Band V(dBm)		**Conducted Power**		
		Channel 4132	Channel 4183	Channel 4233
12.2kbps RMC	Before	23.34	23.25	23.10
	After	23.38	23.28	23.09
64kbps RMC	Before	23.21	23.35	23.10
	After	23.23	23.39	23.14
144kbps RMC	Before	23.32	23.14	23.15
	After	23.29	23.14	23.16
384kbps RMC	Before	23.37	23.10	23.23
	After	23.39	23.12	23.22
WCDMA Band V+HSDPA(dBm)		**Conducted Power**		
		Channel 4132	Channel 4183	Channel 4233
Sub - Test 1	Before	22.83	22.77	22.59
	After	22.84	22.74	22.63
Sub - Test 2	Before	22.11	22.04	21.94
	After	22.08	22.06	21.98
Sub - Test 3	Before	20.63	20.50	20.41
	After	20.67	20.49	20.37
Sub - Test 4	Before	20.09	20.01	19.88
	After	20.05	19.98	19.86

7. Test Results

7.1. Dielectric Performance

Table 8: Dielectric Performance of Head Tissue Simulating Liquid

Frequency	Description	Dielectric Parameters		Temp
		ε_r	σ(s/m)	℃
835MHz **(head)**	Target value ± 5% window	41.50 39.43 — 43.58	0.90 0.86 — 0.95	/
	Measurement value 2010-3-27	41.12	0.90	21.8
1900MHz **(head)**	Target value ±5% window	40.00 38.00 — 42.00	1.40 1.33 — 1.47	/
	Measurement value 2010-3-26	40.17	1.42	21.9

Table 9: Dielectric Performance of Body Tissue Simulating Liquid

Frequency	Description	Dielectric Parameters		Temp
		ε_r	σ(s/m)	℃
835MHz **(body)**	Target value ±5% window	55.20 52.44 — 57.96	0.97 0.92 — 1.02	/
	Measurement value 2010-3-25	54.00	0.99	21.8
1900MHz **(body)**	Target value ±5% window	53.30 50.64 — 55.97	1.52 1.44 — 1.60	/
	Measurement value 2010-3-27	52.41	1.54	21.9

7.2. System Check Results

Table 10: System Check for Head tissue simulation liquid

Frequency	Description	SAR(W/kg)		Dielectric Parameters		Temp
		10g	1g	ε_r	σ(s/m)	℃
835MHz	Recommended result ±10% window	1.58 1.42 - 1.74	2.42 2.18 - 2.66	40.5	0.89	/
	Measurement value 2010-3-27	1.62	2.48	41.12	0.90	21.9
1900MHz	Recommended result ±10% window	5.38 4.84 — 5.92	10.30 9.27 — 11.33	41.00	1.42	/
	Measurement value 2010-3-26	5.46	10.6	40.17	1.42	22.1

Note: 1. the graph results see ANNEX B.

2. Recommended Values used derive from the calibration certificate and 250 mW is used as feeding power to the calibrated dipole.

Table 11: System Check for Body tissue simulation liquid

Frequency	Description	SAR(W/kg)		Dielectric Parameters		Temp
		10g	1g	ε_r	σ(s/m)	℃
835MHz	Recommended result ±10% window	1.68 1.51 - 1.85	2.56 2.30 - 2.82	53	0.99	/
	Measurement value 2010-3-25	1.68	2.56	54.00	0.99	21.9
1900 MHz	Recommended result ±10% window	5.52 4.97—6.07	10.50 9.45 — 11.55	54	1.55	/
	Measurement value 2010-3-27	5.17	9.73	52.41	1.54	21.7

Note：1. The graph results see ANNEX B.

2. Target Values used derive from the calibration certificate and 250 mW is used as feeding power to the Calibrated dipole.

7.3. Test Results

7.3.1. Summary of Measurement Results (GSM850/GPRS/EGPRS)

Table 12: SAR Values (GSM850/GPRS/EGPRS)

Limit of SAR (W/kg)		10 g Average	1 g Average	Power Drift (dB)	Graph Results
		2.0	1.6	$\pm$ 0.21	
Different Test Position	Channel	Measurement Result(W/kg)		Power Drift(dB)	
		10 g Average	1 g Average		
Test position of Head					
Left hand, Touch cheek	Middle	0.454	0.609	-0.029	Figure 11
Left hand, Tilt 15 Degree	Middle	0.236	0.312	-0.157	Figure 12
Right hand, Touch cheek	High	0.554	0.775	-0.120	Figure 13
	Middle	0.524	0.723	0.137	Figure 14
	Low	0.508	0.708	-0.100	Figure 15
Right hand, Tilt 15 Degree	Middle	0.264	0.351	0.001	Figure 16
Test position of Body (Distance 15mm)					
Towards Ground	High	0.522	0.743	-0.039	Figure 17
	Middle	0.459	0.652	0.108	Figure 18
	Low	0.462	0.657	-0.002	Figure 19
Towards Phantom	Middle	0.288	0.391	0.039	Figure 20
Worst case position of Body with Earphone					
Towards Ground	High	0.331	0.490	-0.008	Figure 21
Worst case position of Body with GPRS(2UP, Distance 15mm)					
Towards Ground	High	0.651	0.916	-0.033	Figure 22
	Middle	0.577	0.816	-0.027	Figure 23
	Low	0.557	0.789	0.083	Figure 24
Towards Phantom	Middle	0.383	0.519	-0.168	Figure 25
Worst case position of Body with EGPRS(2UP, Distance 15mm)					
Towards Ground	High	0.689	0.974	-0.148	Figure 26

Note: 1.The value with blue color is the maximum SAR Value of test case of head and body in each test band.

2. Upper and lower frequencies were measured at the worst position.

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

7.3.2. Summary of Measurement Results (GSM1900/GPRS/EGPRS)

Table 13: SAR Values (GSM1900/GPRS/EGPRS)

Limit of SAR (W/kg)		10 g Average	1 g Average	Power Drift (dB)	Graph Results
		2.0	1.6	± 0.21	
Different Test Position	Channel	Measurement Result(W/kg)		Power Drift(dB)	
		10 g Average	1 g Average		
Test position of Head					
Left hand, Touch cheek	Middle	0.325(max.cube)	0.587(max.cube)	0.007	Figure 27
Left hand, Tilt 15 Degree	Middle	0.157	0.256	0.148	Figure 28
Right hand, Touch cheek	High	0.518	0.937	-0.141	Figure 29
	Middle	0.525	0.950	-0.138	Figure 30
	Low	0.466	0.842	-0.143	Figure 31
Right hand, Tilt 15 Degree	Middle	0.127	0.209	-0.047	Figure 32
Test position of Body (Distance 15mm)					
Towards Ground	High	0.211	0.370	-0.064	Figure 33
	Middle	0.210	0.369	0.079	Figure 34
	Low	0.190	0.335	0.005	Figure 35
Towards Phantom	Middle	0.133	0.213	-0.147	Figure 36
Worst case position of Body with Earphone					
Towards Ground	High	0.225	0.406	-0.040	Figure 37
Worst case position of Body with GPRS(2UP, Distance 15mm)					
Towards Ground	High	0.403	0.707	-0.137	Figure 38
	Middle	0.398	0.695	-0.155	Figure 39
	Low	0.362	0.639	-0.016	Figure 40
Towards Phantom	Middle	0.208	0.330	-0.057	Figure 41
Worst case position of Body with EGPRS(2UP, Distance 15mm)					
Towards Ground	High	0.398	0.698	-0.040	Figure 42

Note: 1.The value with blue color is the maximum SAR Value of test case of head and body in each test band.

2. Upper and lower frequencies were measured at the worst position.

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

4. The (max.cube) labeling indicates that during the grid scanning an additional peak was found which was within 2.0dB of the highest peak. The value of the highest cube is given in the table above; the value from the second assessed cube is given in the SAR distribution plots (See ANNEX C).

7.3.3. Summary of Measurement Results (WCDMA Band II/WCDMA/HSDPA)

Table 14: SAR Values (WCDMA Band II/WCDMA/HSDPA)

Limit of SAR (W/kg)		10 g Average	1 g Average	Power Drift (dB)	Graph Results
		2.0	1.6	$\pm$ 0.21	
Different Test Position	Channel	Measurement Result(W/kg)		Power Drift(dB)	
		10 g Average	1 g Average		
Test position of Head					
Left hand, Touch cheek	Middle	0.417(max.cube)	0.688(max.cube)	0.065	Figure 43
Left hand, Tilt 15 Degree	Middle	0.178	0.290	0.009	Figure 44
Right hand, Touch cheek	High	0.588	1.050	-0.099	Figure 45
	Middle	0.584	1.040	-0.077	Figure 46
	Low	0.605	1.090	-0.178	Figure 47
Right hand, Tilt 15 Degree	Middle	0.158	0.258	0.009	Figure 48
Test position of Body (Distance 15mm)					
Towards Ground	High	0.246	0.423	-0.009	Figure 49
	Middle	0.238	0.410	0.028	Figure 50
	Low	0.233	0.401	0.067	Figure 51
Towards Phantom	Middle	0.160	0.255	0.134	Figure 52
Worst case position of Body with Earphone (Distance 15mm)					
Towards Ground	High	0.247	0.437	0.063	Figure 53
Worst case position of Body with HSDPA (Distance 15mm)					
Towards Ground	High	0.179	0.311	0.081	Figure 54

Note: 1.The value with blue color is the maximum SAR Value of test case of head and body in each test band.

2. Upper and lower frequencies were measured at the worst position.

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

4. The (max.cube) labeling indicates that during the grid scanning an additional peak was found which was within 2.0dB of the highest peak. The value of the highest cube is given in the table above; the value from the second assessed cube is given in the SAR distribution plots (See ANNEX C).

7.3.4. Summary of Measurement Results (WCDMA Band V/WCDMA/HSDPA)

Table 15: SAR Values (WCDMA Band V/WCDMA/HSDPA)

Limit of SAR (W/kg)		10 g Average	1 g Average	Power Drift (dB)	Graph Results
		2.0	1.6	± 0.21	
Different Test Position	Channel	Measurement Result(W/kg)		Power Drift(dB)	
		10 g Average	1 g Average		
Test position of Head					
Left hand, Touch cheek	Middle	0.359	0.481	-0.079	Figure 55
Left hand, Tilt 15 Degree	Middle	0.191	0.251	0.021	Figure 56
Right hand, Touch cheek	High	0.472	0.665	-0.090	Figure 57
	Middle	0.406	0.555	-0.084	Figure 58
	Low	0.396	0.549	0.088	Figure 59
Right hand, Tilt 15 Degree	Middle	0.208	0.276	-0.068	Figure 60
Test position of Body (Distance 15mm)					
Towards Ground	High	0.390	0.548	0.042	Figure 61
	Middle	0.370	0.521	0.013	Figure 62
	Low	0.353	0.498	0.108	Figure 63
Towards Phantom	Middle	0.241	0.328	0.097	Figure 64
Worst case position of Body with Earphone (Distance 15mm)					
Towards Ground	High	0.230	0.337	-0.033	Figure 65
Worst case position of Body with HSDPA (Distance 15mm)					
Towards Ground	High	0.390	0.547	-0.020	Figure 66

Note: 1.The value with blue color is the maximum SAR Value of test case of head and body in each test band.

2. Upper and lower frequencies were measured at the worst position.

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

7.3.5. Summary of Measurement Results (WIFI/BT function)

The distance between BT antenna and GSM antenna is >5cm. The location of the antennas inside mobile phone is shown below:
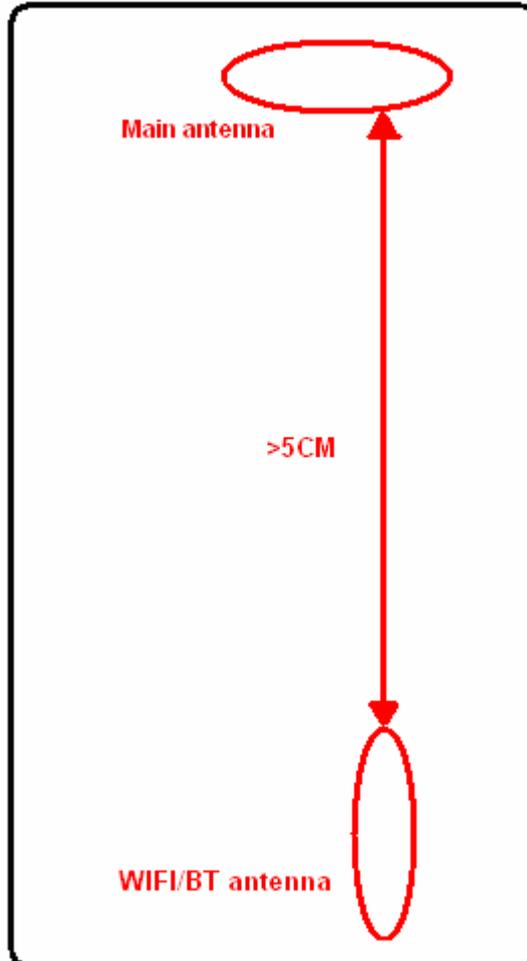
The output power of BT antenna is as following:

Channel	Ch 0 2402 MHz	Ch 39 2441 Mhz	Ch 78 2480 MHz
Peak Conducted Output Power(dBm)	3.09	2.75	1.64

The output power of WIFI antenna is as following:

802.11b	Ch 1 2412MHz	Ch 6 2437 Mhz	Ch 11 2462 MHz
Before Test (dBm)	12.23	12.52	12.27
After Test (dBm)	12.22	12.48	12.31
802.11g	Ch 1 2412MHz	Ch 6 2437 Mhz	Ch 11 2462 MHz
Before Test (dBm)	12.36	12.86	12.35
After Test (dBm)	12.40	12.91	12.38

According to the output power measurement result and the distance between the two antennas, we can draw the conclusion that: stand-alone SAR and simultaneous transmission SAR are not required for BT/WIFI transmitter, because the output power of BT/WIFI transmitter is $\leqslant 2P_{Ref}$ and its antenna is $>$5cm from main antenna.

7.4. Conclusion

Localized Specific Absorption Rate (SAR) of this portable wireless device has been measured in all cases requested by the relevant standards cited in Clause 5.2 of this report. Maximum localized SAR_{1g} are **1.090** (head) and **0.974** W/kg (body) that are below exposure limits specified in the relevant standards cited in Clause 5.1 of this test report.

8. Measurement Uncertainty

No.	source	Type	Uncertainty Value (%)	Probability Distribution	k	c_i	Standard uncertainty $u_i^{'}$ (%)	Degree of freedom V_{eff} or v_i
1	System repetivity	A	0.5	N	1	1	0.5	9
Measurement system								
2	probe calibration	B	5.9	N	1	1	5.9	∞
3	axial isotropy of the probe	B	4.7	R	$\sqrt{3}$	$\sqrt{0.5}$	1.9	∞
4	Hemispherical isotropy of the probe	B	9.4	R	$\sqrt{3}$	$\sqrt{0.5}$	3.9	∞
6	boundary effect	B	1.9	R	$\sqrt{3}$	1	1.1	∞
7	probe linearity	B	4.7	R	$\sqrt{3}$	1	2.7	∞
8	System detection limits	B	1.0	R	$\sqrt{3}$	1	0.6	∞
9	readout Electronics	B	1.0	N	1	1	1.0	∞
10	response time	B	0	R	$\sqrt{3}$	1	0	∞
11	integration time	B	4.32	R	$\sqrt{3}$	1	2.5	∞
12	noise	B	0	R	$\sqrt{3}$	1	0	∞
13	RF Ambient Conditions	B	3	R	$\sqrt{3}$	1	1.73	∞
14	Probe Positioner Mechanical Tolerance	B	0.4	R	$\sqrt{3}$	1	0.2	∞
15	Probe Positioning with respect to Phantom Shell	B	2.9	R	$\sqrt{3}$	1	1.7	∞
16	Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	B	3.9	R	$\sqrt{3}$	1	2.3	∞
Test sample Related								
17	-Test Sample Positioning	A	2.9	N	1	1	2.9	5
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	5.0	N	1	0.64	3.2	∞
23	-liquid permittivity (deviation from target)	B	5.0	R	$\sqrt{3}$	0.6	1.7	∞
24	-liquid permittivity (measurement uncertainty)	B	5.0	N	1	0.6	3.0	∞
Combined standard uncertainty	$u_c^{'} = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$						12.0	
Expanded uncertainty (confidence interval of 95 %)	$u_e = 2u_c$		N		k=2		24.0	

9. Main Test Instruments

Table 16: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	Agilent 8753E	US37390326	September 13, 2009	One year
02	Dielectric Probe Kit	Agilent 85070E	US44020115	No Calibration Requested	
03	Power meter	Agilent E4417A	GB41291714	March 13, 2010	One year
04	Signal Generator	HP 8341B	2730A00804	September 13, 2009	One year
05	Amplifier	IXA-020	0401	No Calibration Requested	
06	BTS	E5515C	MY48360988	December 4, 2009	One year
07	E-field Probe	EX3DV4	3677	September 23, 2009	One year
08	DAE	DAE4	871	November 11, 2009	One year
09	Validation Kit 835MHz	D835V2	4d082	July 13, 2009	One year
10	Validation Kit 1900MHz	D1900V2	5d018	June 26, 2009	One year

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

ANNEX A: Test Layout

Picture 1: Specific Absorption Rate Test Layout

Picture 2: Liquid depth in the flat Phantom (835MHz)
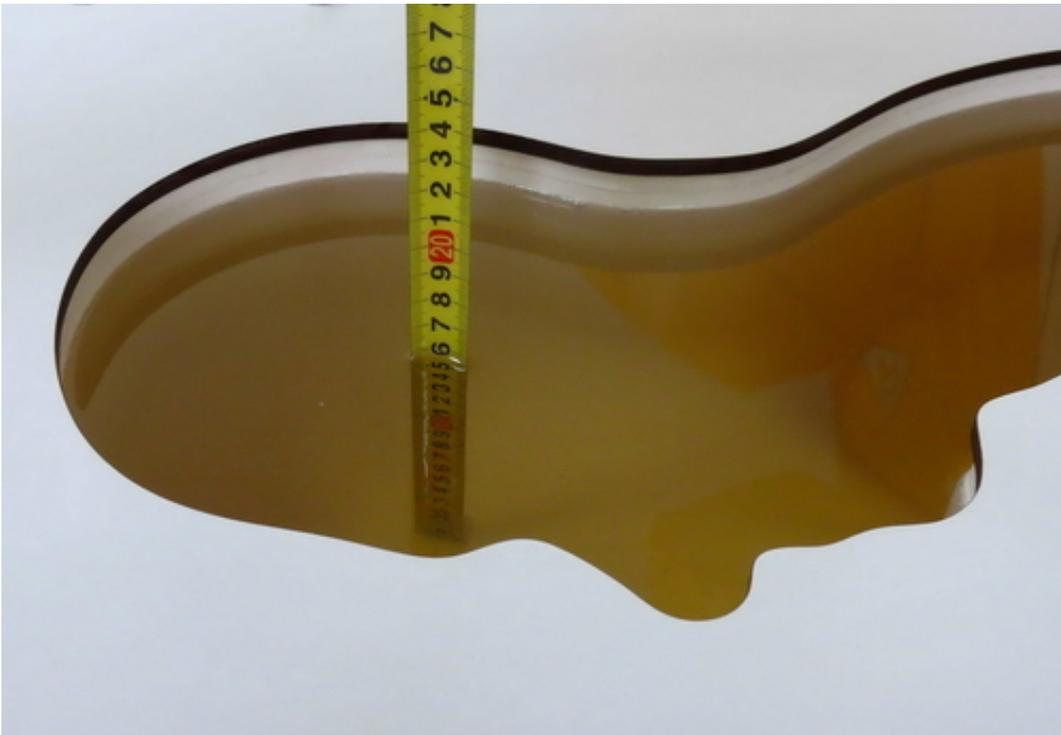
Picture 3: Liquid depth in the head Phantom (835MHz)
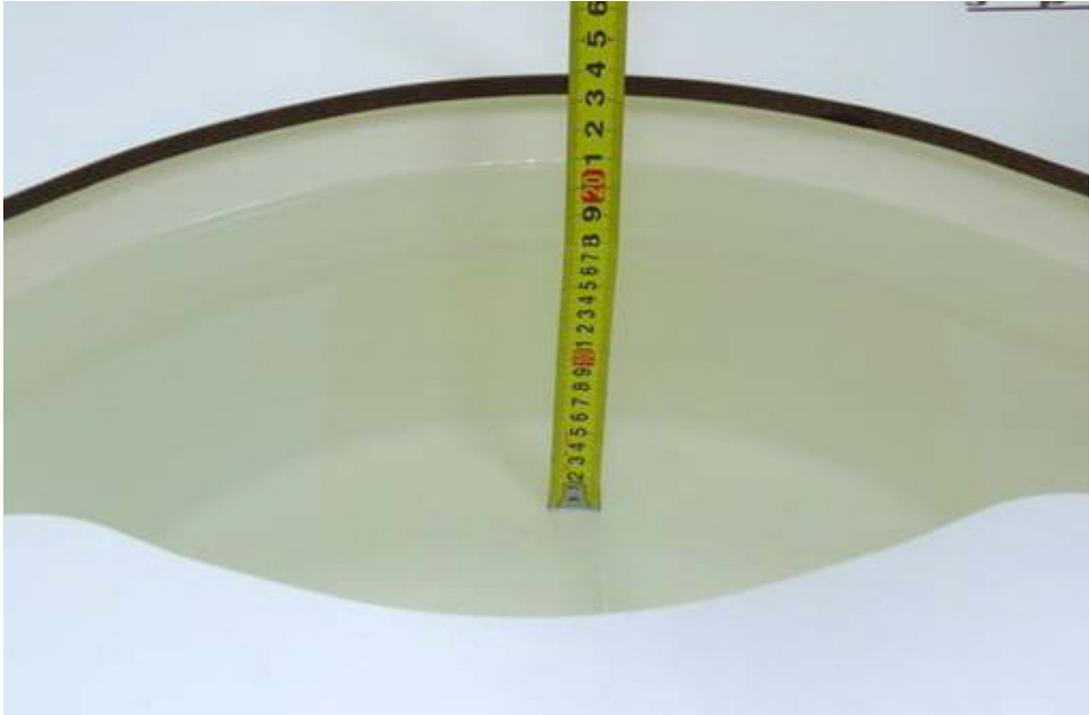
Picture 4: Liquid depth in the flat Phantom (1900 MHz)

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

ANNEX B: System Check Results

System Performance Check at 835 MHz Head TSL
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d082

Date/Time: 3/27/2010 12:56:02 PM

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

Medium parameters used: f = 835 MHz; σ = 0.90 mho/m; ε_r = 41.12; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.2, 9.2, 9.2); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Maximum value of SAR (interpolated) = 2.71 mW/g

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

Reference Value = 55.5 V/m; Power Drift = -0.092 dB

Peak SAR (extrapolated) = 3.75 W/kg

SAR(1 g) = 2.48 mW/g; SAR(10 g) = 1.62 mW/g

Maximum value of SAR (measured) = 2.67 mW/g
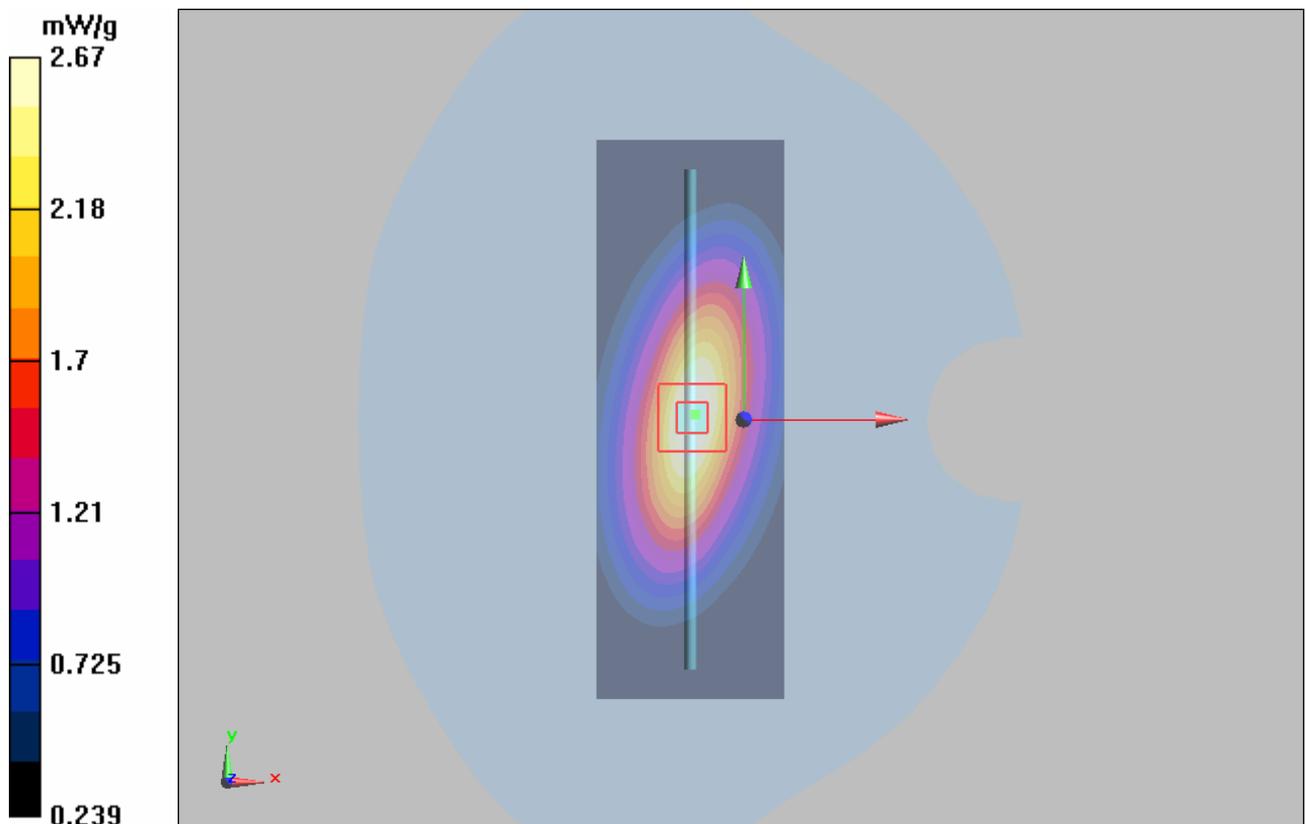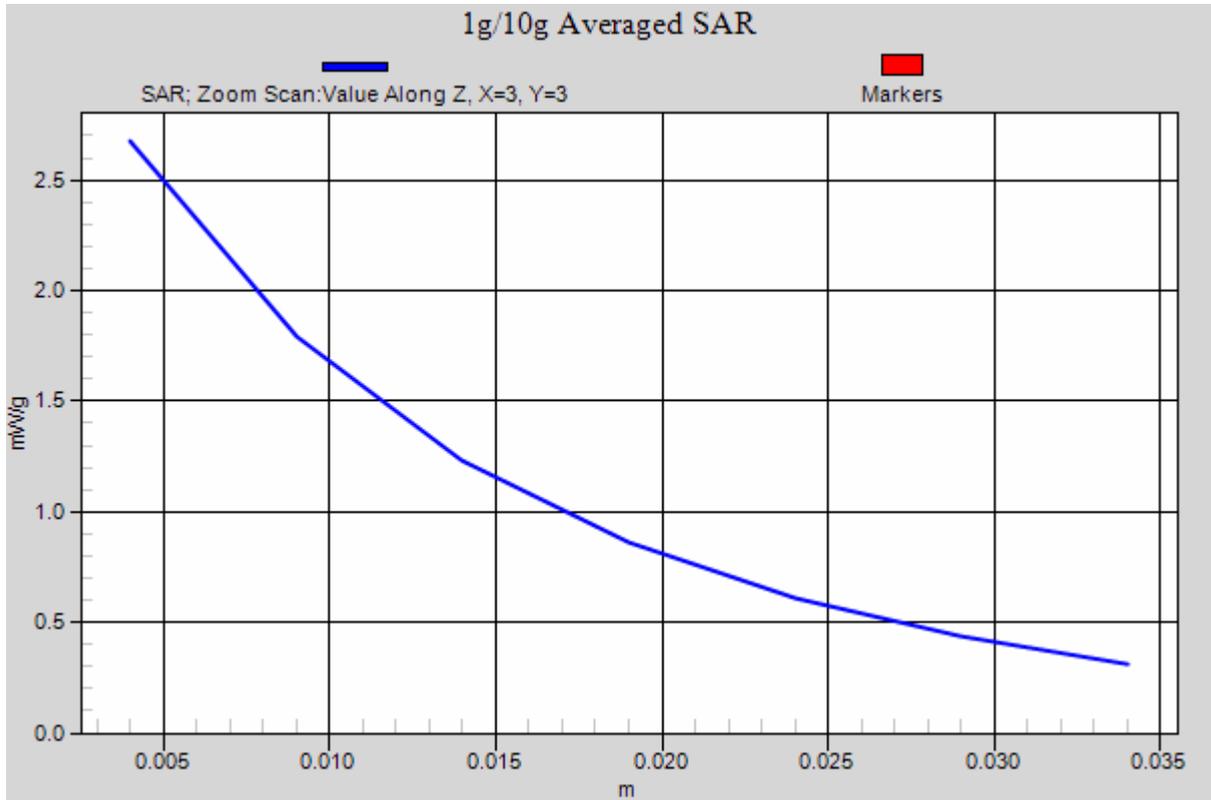
Figure 7 System Performance Check 835MHz 250mW

System Performance Check at 835 MHz Body TSL

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d082

Date/Time: 3/25/2010 1:08:20 PM

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

Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 54; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Maximum value of SAR (interpolated) = 2.77 mW/g

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

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

Peak SAR (extrapolated) = 3.68 W/kg

SAR(1 g) = 2.56 mW/g; SAR(10 g) = 1.68 mW/g

Maximum value of SAR (measured) = 2.77 mW/g
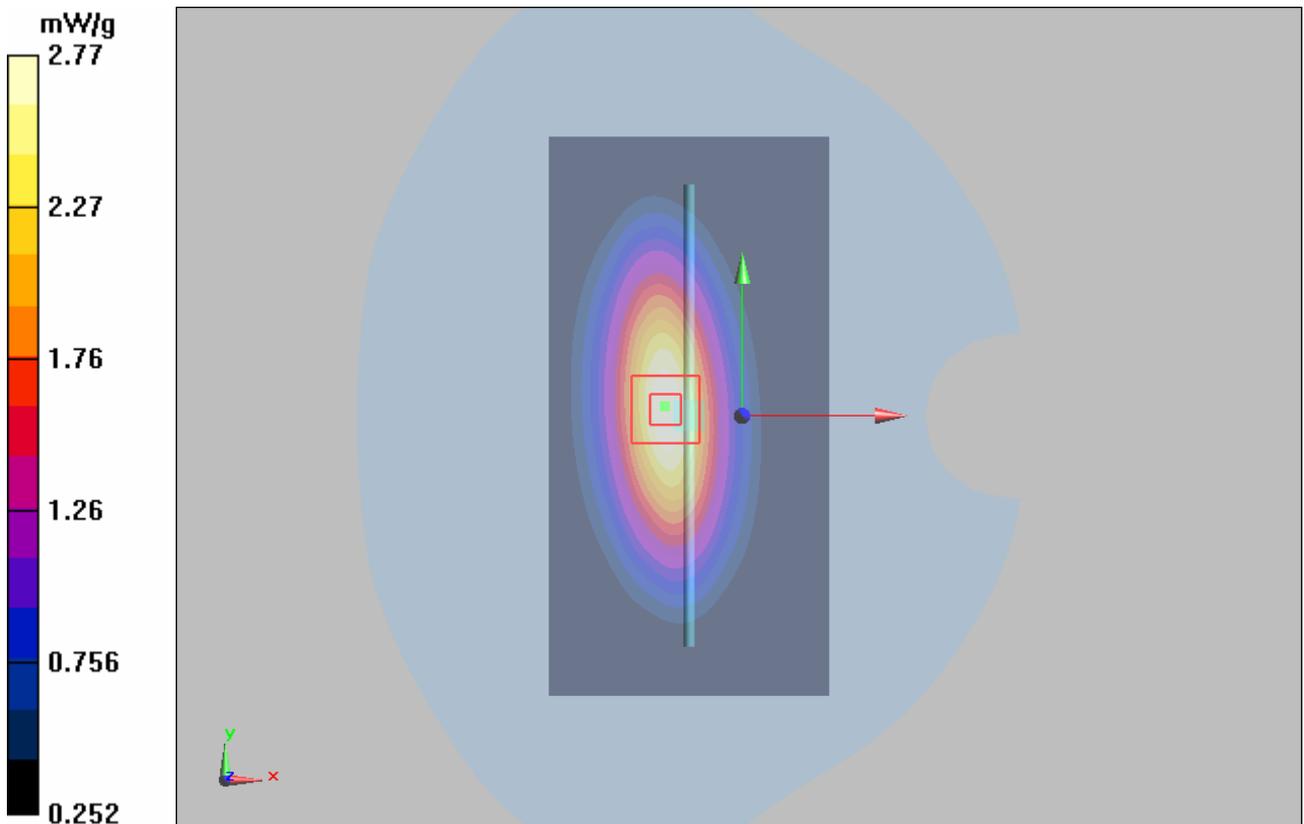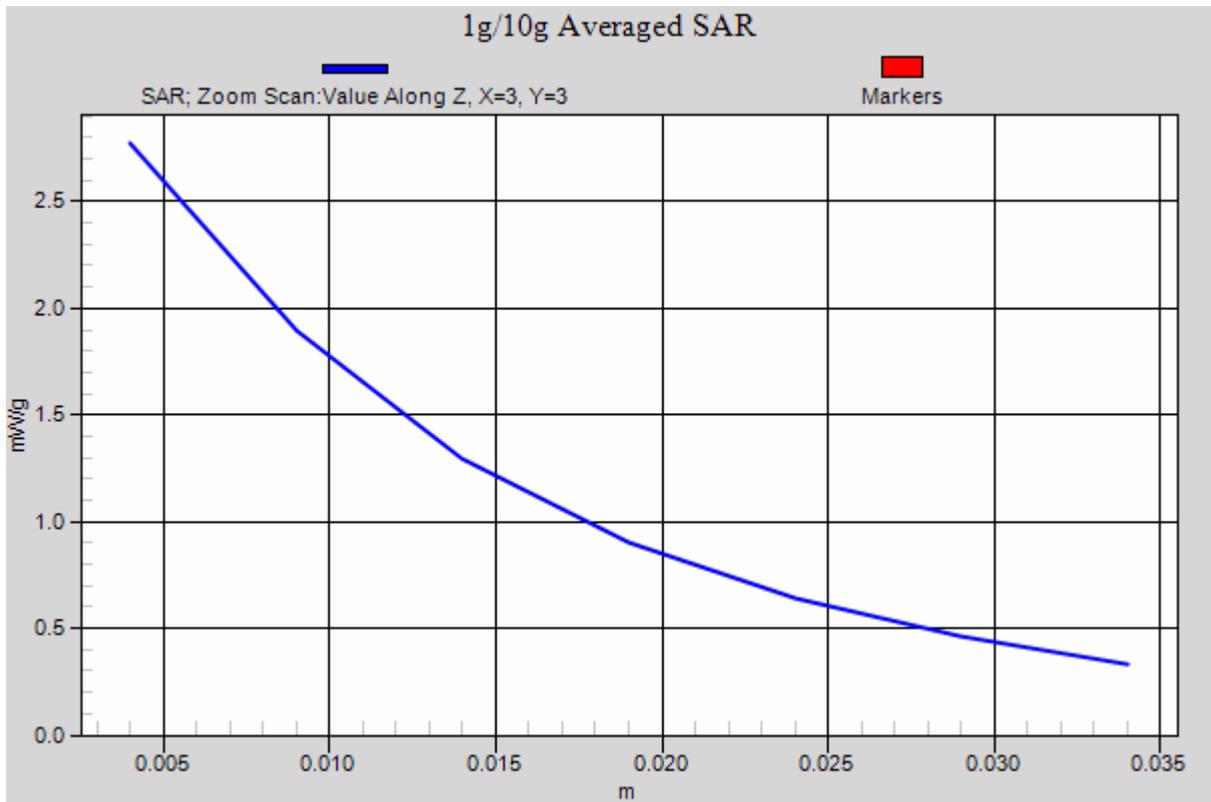
Figure 8 System Performance Check 835MHz 250mW

System Performance Check at 1900 MHz Head TSL

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d018

Date/Time: 3/26/2010 8:05:04 AM

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

Medium parameters used: f = 1900 MHz; σ = 1.42 mho/m; ε_r = 40.17; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.53, 7.53, 7.53); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Maximum value of SAR (interpolated) = 12.9 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 = 0.040 dB

Peak SAR (extrapolated) = 20.1 W/kg

SAR(1 g) = 10.6 mW/g; SAR(10 g) = 5.46 mW/g

Maximum value of SAR (measured) = 11.9 mW/g
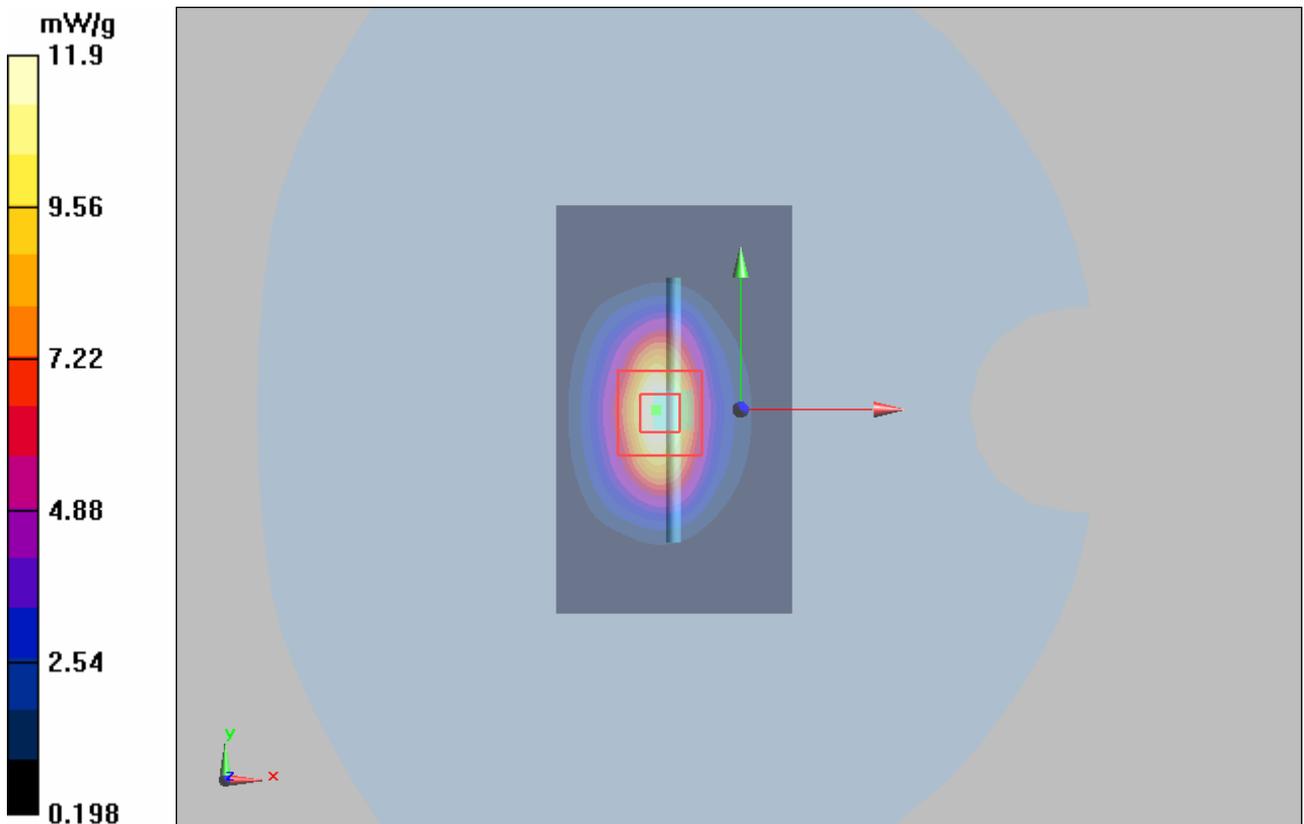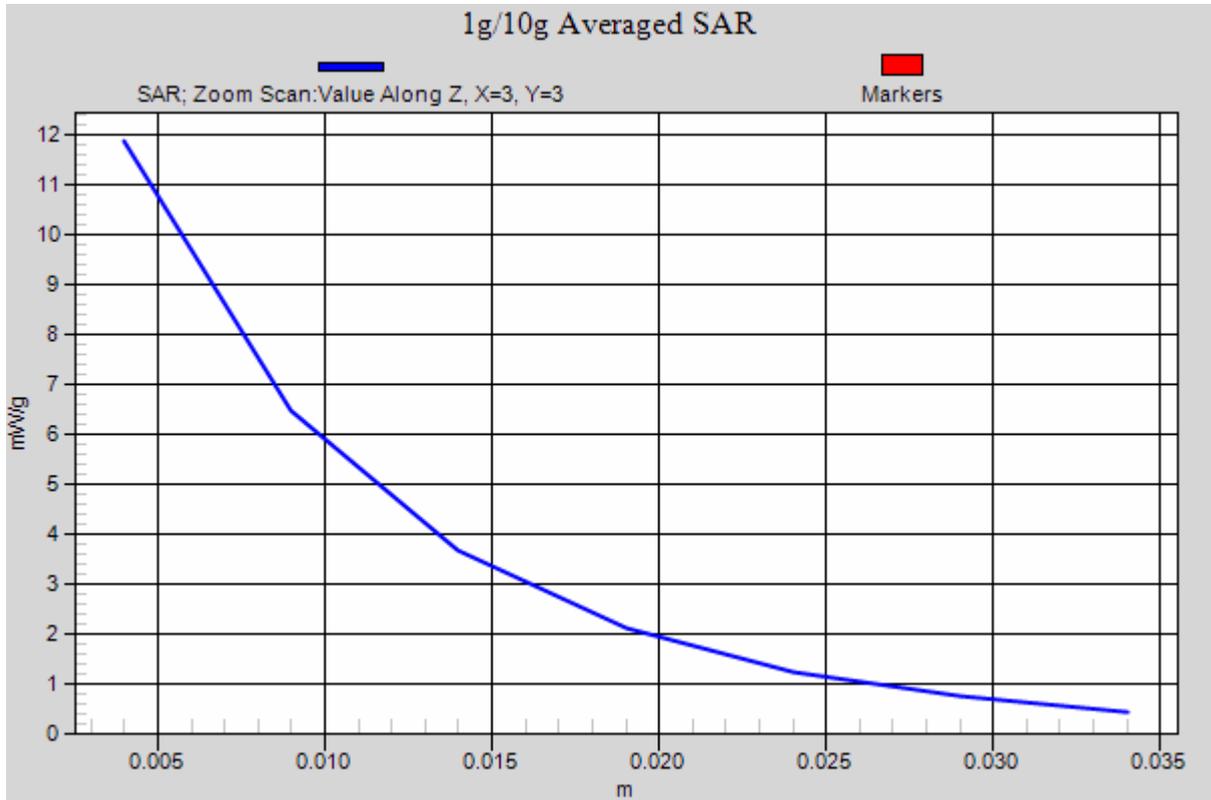
Figure 9 System Performance Check 1900MHz 250mW

System Performance Check at 1900 MHz Body TSL

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d018

Date/Time: 3/27/2010 6:02:19 PM

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

Medium parameters used: f = 1900 MHz; σ = 1.54 mho/m; ε_r = 52.41; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

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

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

Reference Value = 75.9 V/m; Power Drift = 0.051 dB

Peak SAR (extrapolated) = 16.8 W/kg

SAR(1 g) = 9.73 mW/g; SAR(10 g) = 5.17 mW/g

Maximum value of SAR (measured) = 11 mW/g
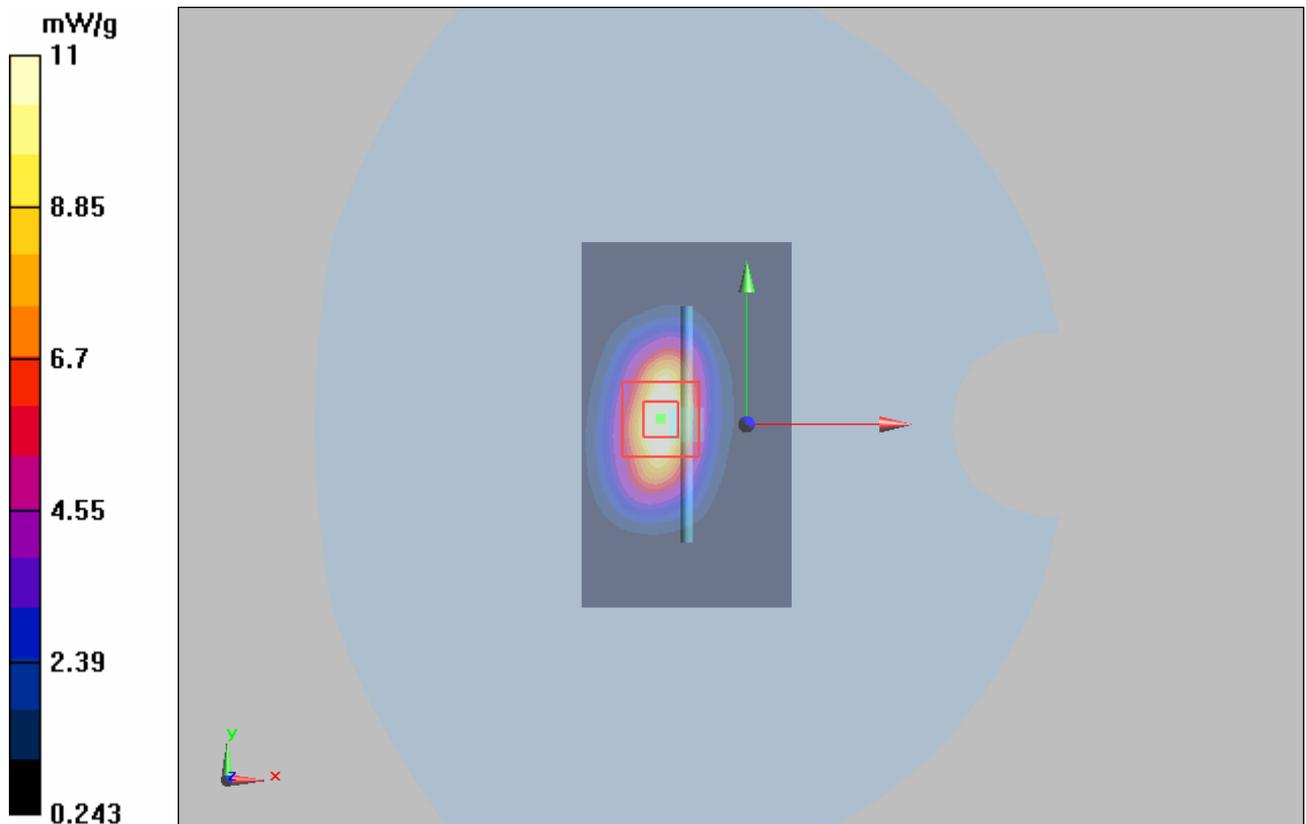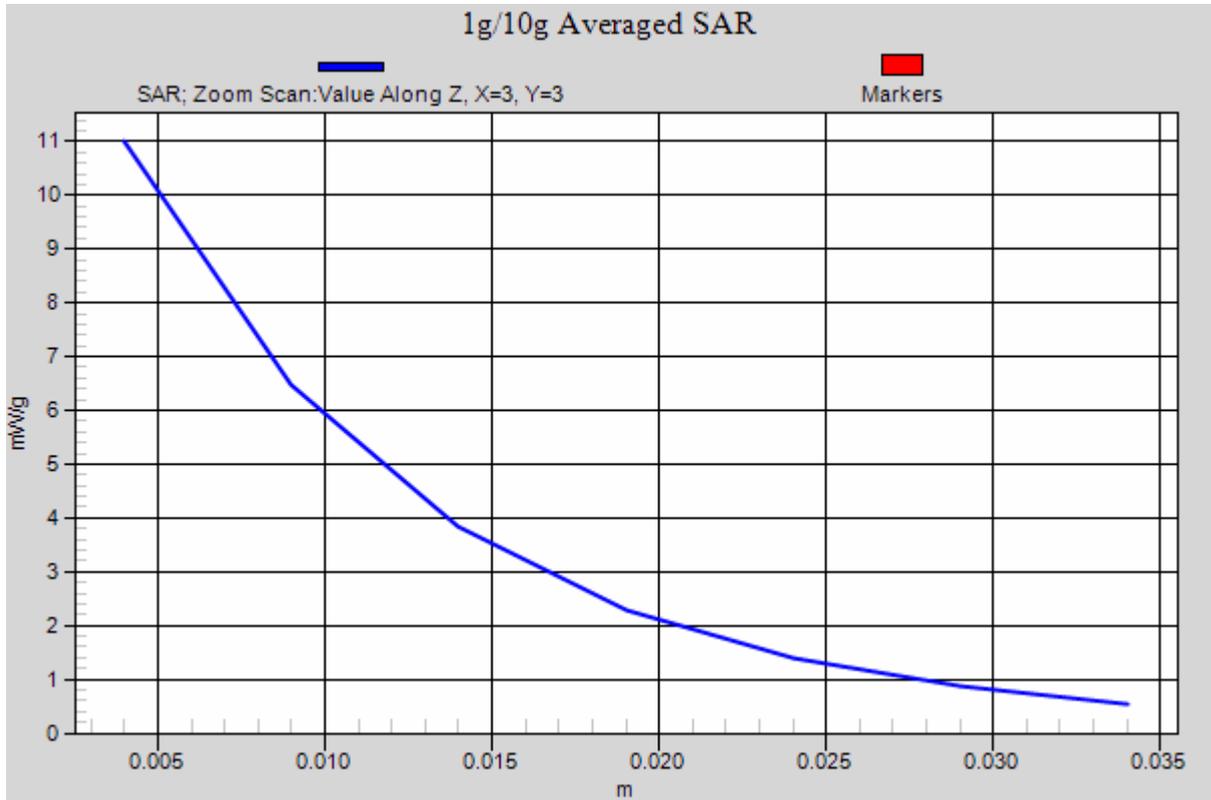
Figure 10 System Performance Check 1900MHz 250mW

ANNEX C: Graph Results

GSM 850 Left Cheek Middle

Date/Time: 3/27/2010 2:22:42 PM

Communication System: GSM 850; Frequency: 837 MHz;Duty Cycle: 1:8.3

Medium parameters used: f = 837 MHz; σ = 0.899 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.2, 9.2, 9.2); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 7.89 V/m; Power Drift = -0.029 dB

Peak SAR (extrapolated) = 0.748 W/kg

SAR(1 g) = 0.609 mW/g; SAR(10 g) = 0.454 mW/g

Maximum value of SAR (measured) = 0.642 mW/g
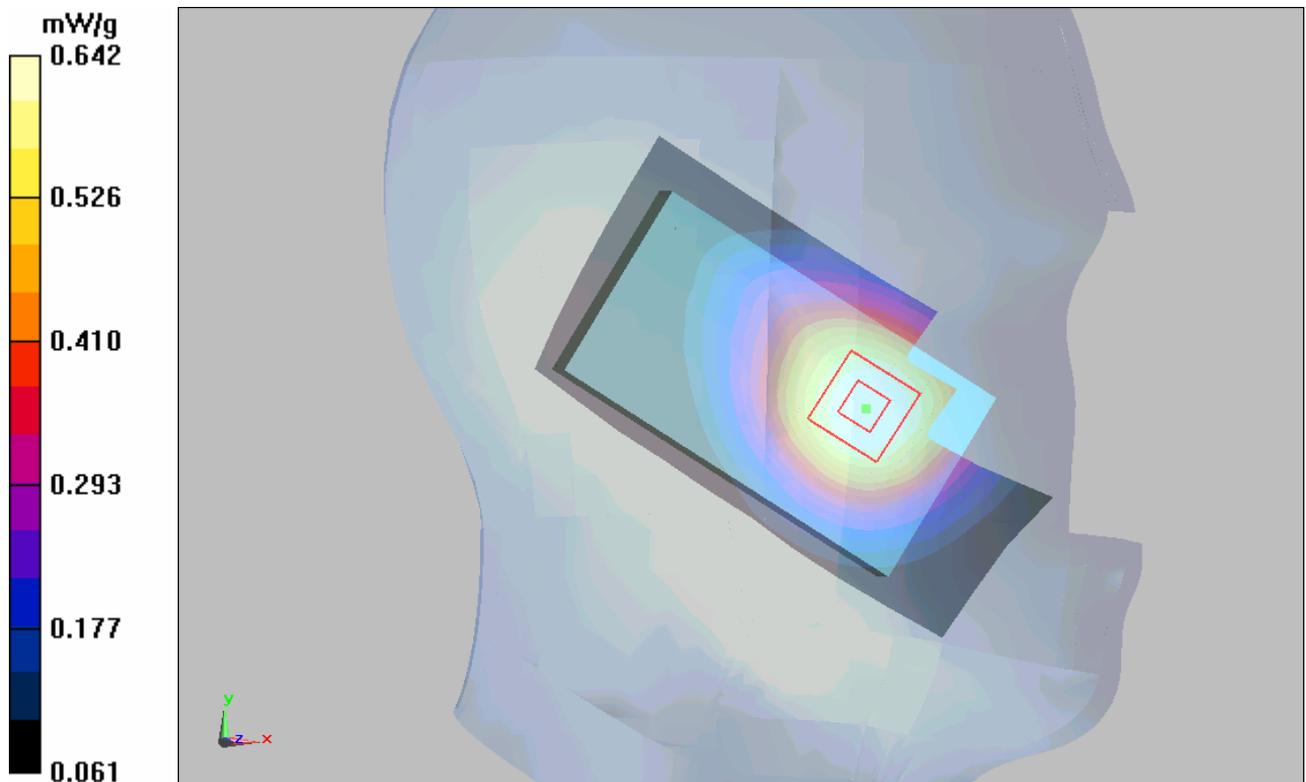
Figure 11 Left Hand Touch Cheek GSM 850 Channel 192

GSM 850 Left Tilt Middle

Date/Time: 3/27/2010 3:01:57 PM

Communication System: GSM 850; Frequency: 837 MHz;Duty Cycle: 1:8.3

Medium parameters used: f = 837 MHz; σ = 0.899 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.2, 9.2, 9.2); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Tilt Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.327 mW/g

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

Reference Value = 13.1 V/m; Power Drift = -0.157 dB

Peak SAR (extrapolated) = 0.386 W/kg

SAR(1 g) = 0.312 mW/g; SAR(10 g) = 0.236 mW/g

Maximum value of SAR (measured) = 0.333 mW/g
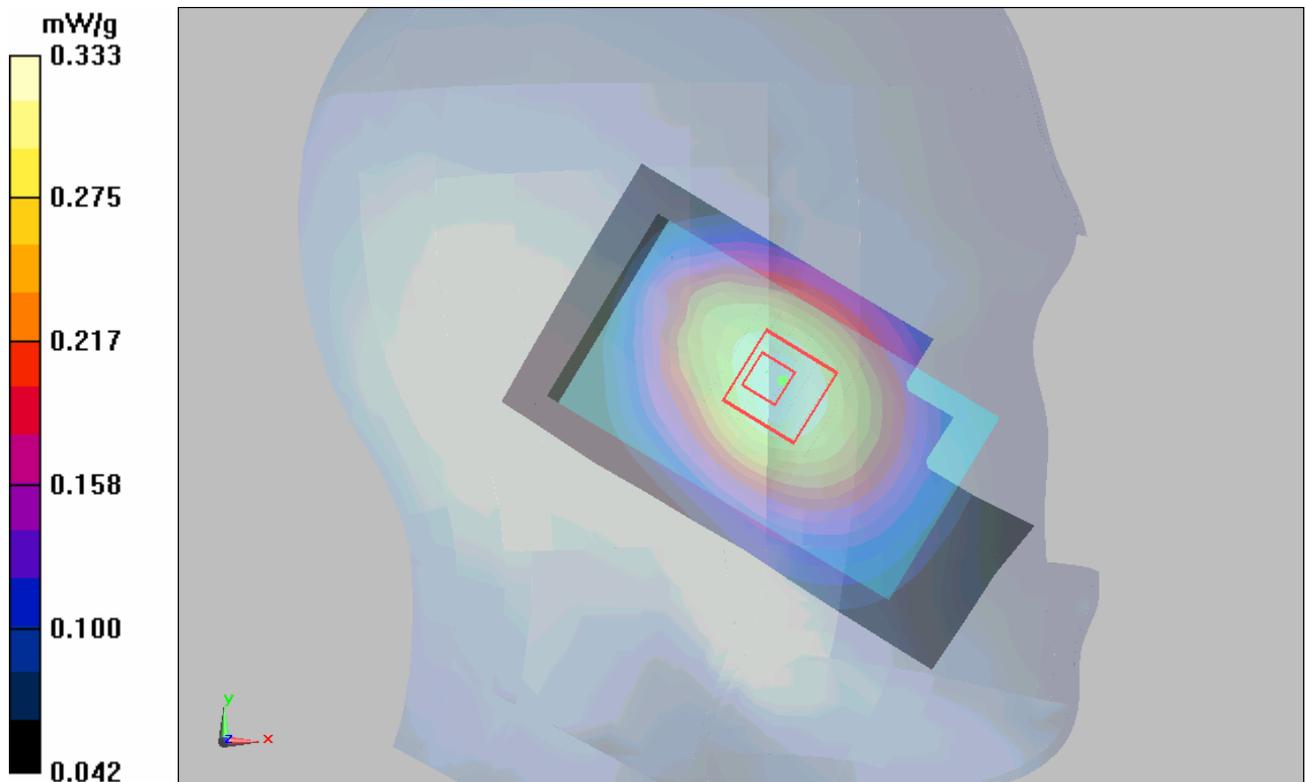
Figure 12 Left Hand Tilt 15° GSM 850 Channel 192

GSM 850 Right Cheek High

Date/Time: 3/27/2010 5:08:02 PM

Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:8.3

Medium parameters used: f = 849 MHz; σ = 0.911 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.2, 9.2, 9.2); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.832 mW/g

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

Reference Value = 10.9 V/m; Power Drift = -0.120 dB

Peak SAR (extrapolated) = 1.02 W/kg

SAR(1 g) = 0.775 mW/g; SAR(10 g) = 0.554 mW/g

Maximum value of SAR (measured) = 0.829 mW/g
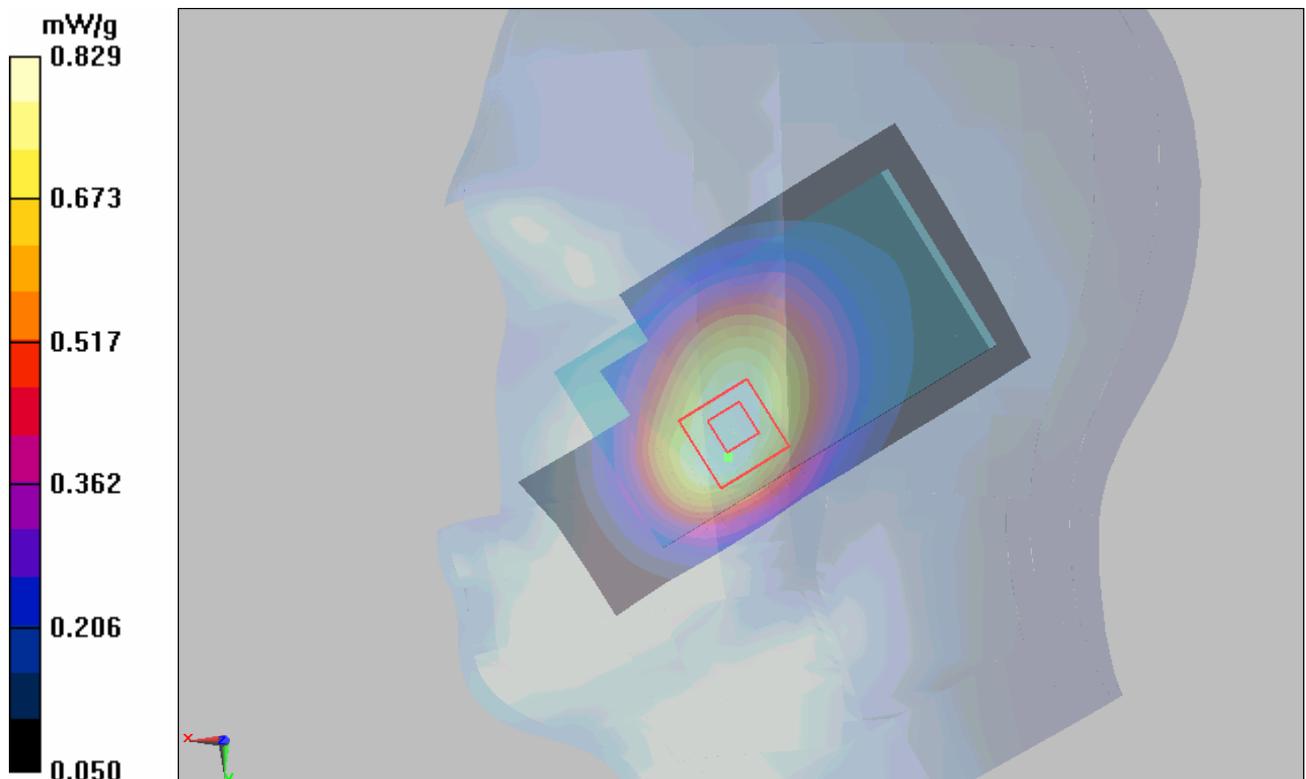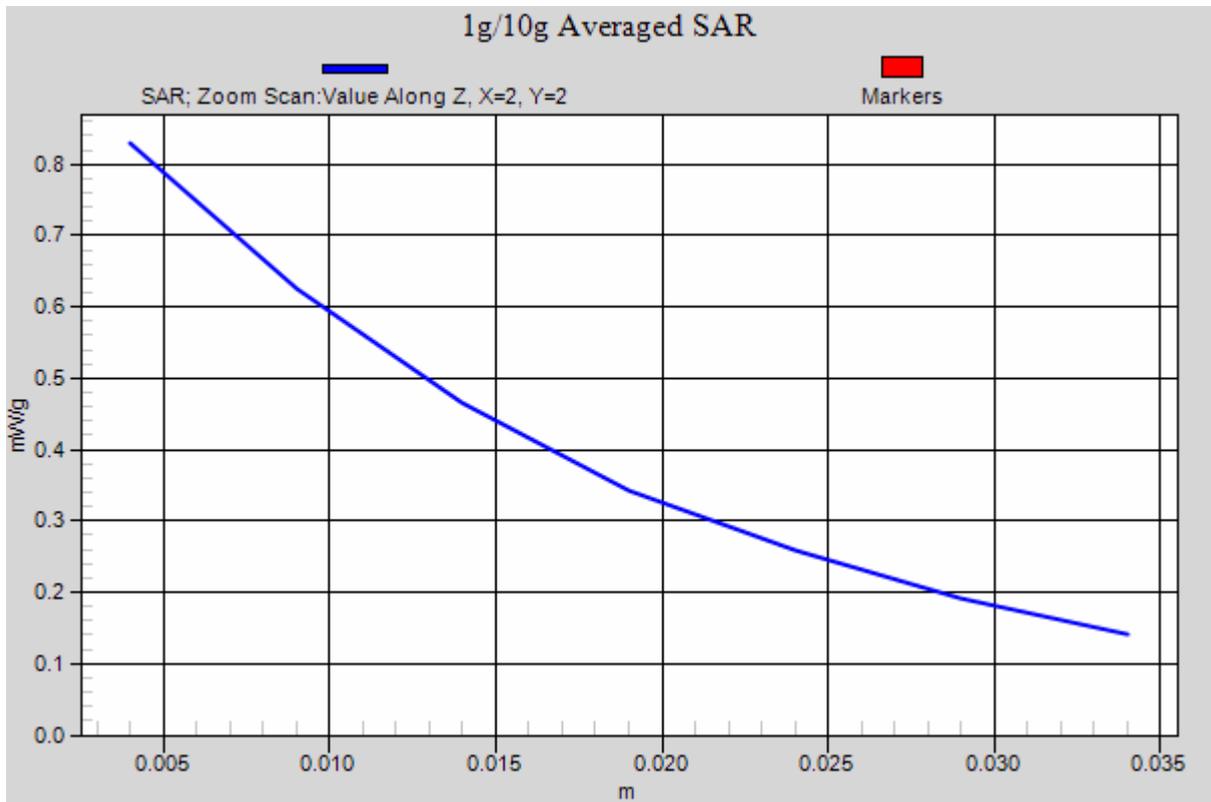
Figure 13 Right Hand Touch Cheek GSM 850 Channel 251

GSM 850 Right Cheek Middle

Date/Time: 3/27/2010 2:43:59 PM

Communication System: GSM 850; Frequency: 837 MHz;Duty Cycle: 1:8.3

Medium parameters used: f = 837 MHz; σ = 0.899 mho/m; $ε_r$ = 41.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.2, 9.2, 9.2); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.759 mW/g

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

Reference Value = 9.85 V/m; Power Drift = 0.137 dB

Peak SAR (extrapolated) = 0.942 W/kg

SAR(1 g) = 0.723 mW/g; SAR(10 g) = 0.524 mW/g

Maximum value of SAR (measured) = 0.773 mW/g
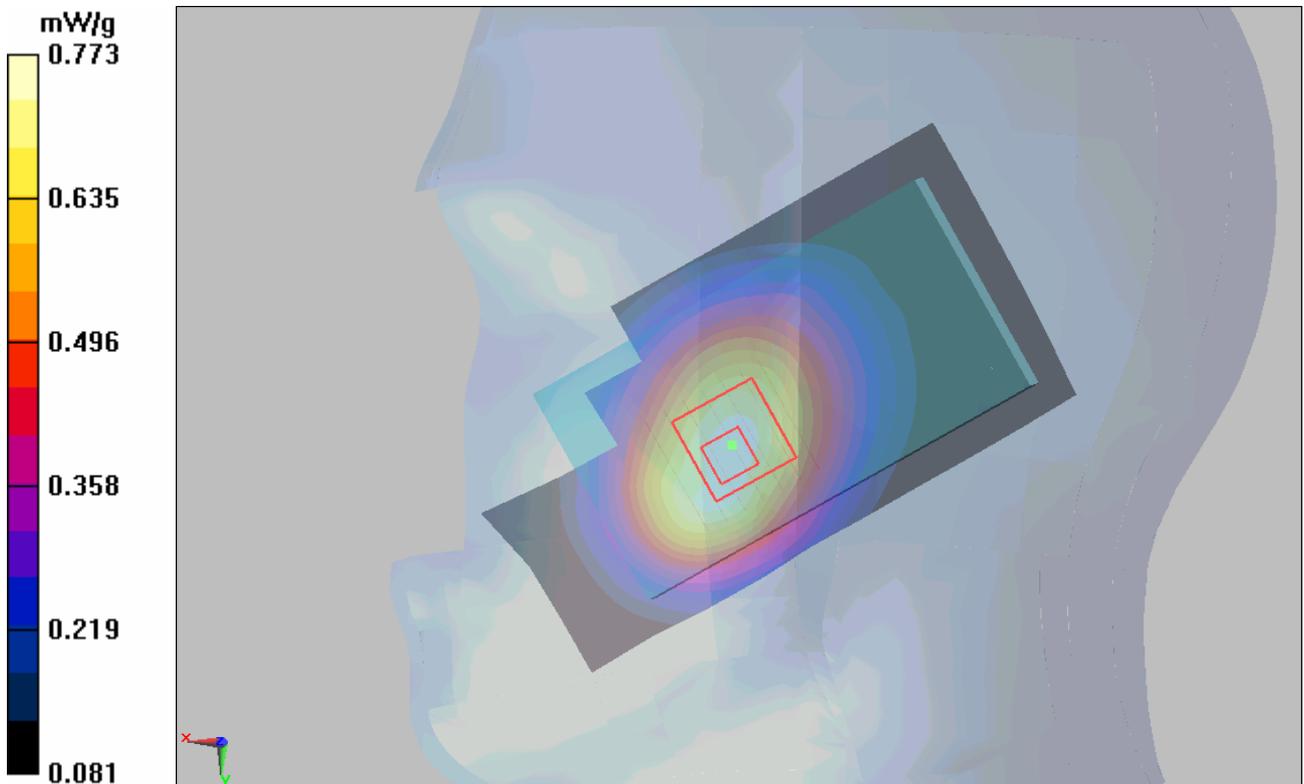
Figure 14 Right Hand Touch Cheek GSM 850 Channel 192

GSM 850 Right Cheek Low

Date/Time: 3/27/2010 5:30:03 PM

Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3

Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.886 mho/m; $ε_r$ = 41.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.2, 9.2, 9.2); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.762 mW/g

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

Reference Value = 10.6 V/m; Power Drift = -0.100 dB

Peak SAR (extrapolated) = 0.949 W/kg

SAR(1 g) = 0.708 mW/g; SAR(10 g) = 0.508 mW/g

Maximum value of SAR (measured) = 0.756 mW/g
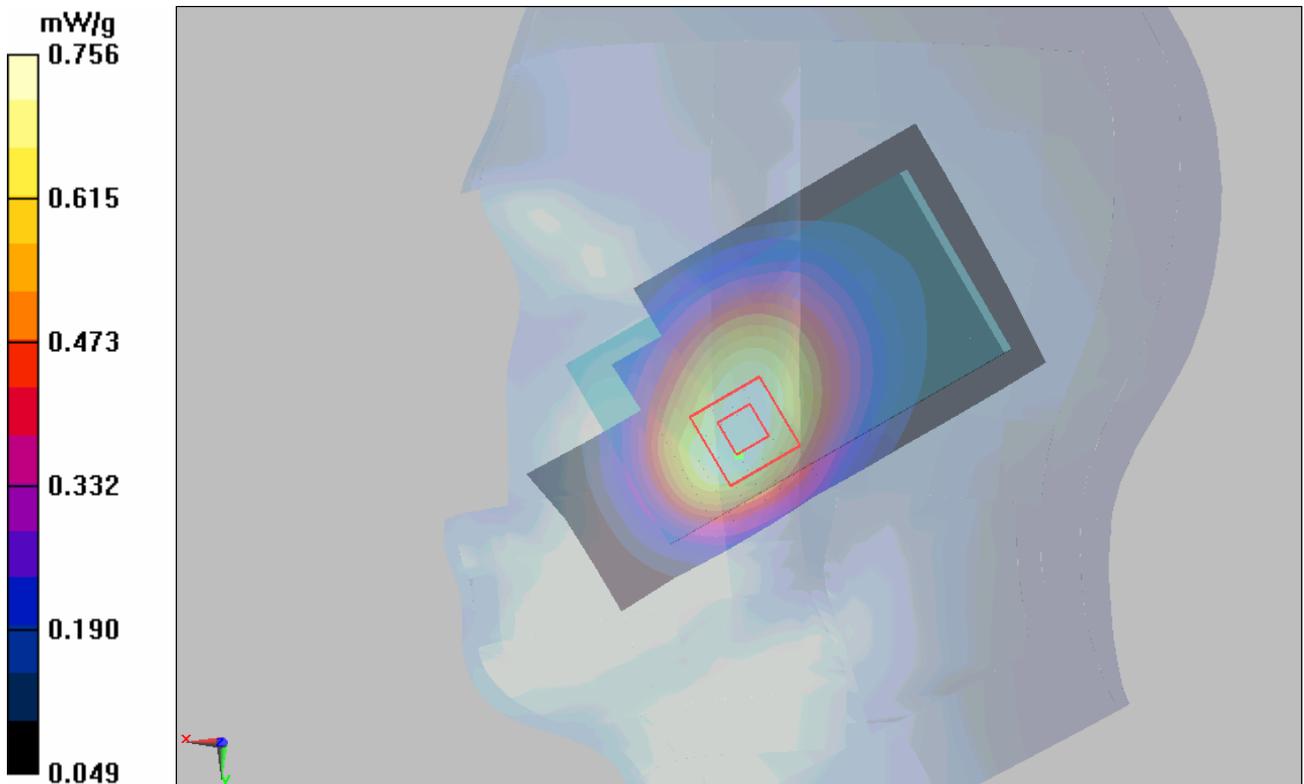
Figure 15 Right Hand Touch Cheek GSM 850 Channel 128

GSM 850 Right Tilt Middle

Date/Time: 3/27/2010 5:55:44 PM

Communication System: GSM 850; Frequency: 837 MHz;Duty Cycle: 1:8.3

Medium parameters used: f = 837 MHz; σ = 0.899 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.2, 9.2, 9.2); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Tilt Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 14.5 V/m; Power Drift = 0.001 dB

Peak SAR (extrapolated) = 0.429 W/kg

SAR(1 g) = 0.351 mW/g; SAR(10 g) = 0.264 mW/g

Maximum value of SAR (measured) = 0.371 mW/g
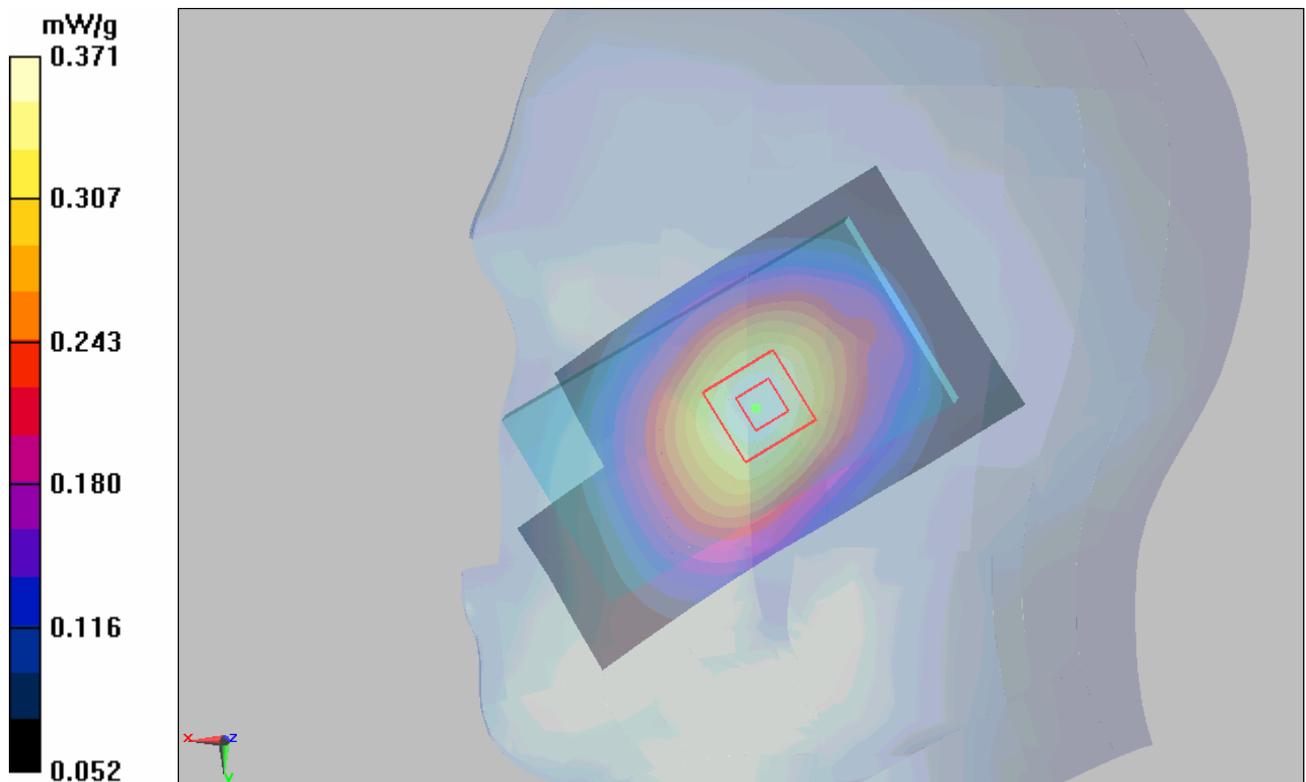
Figure 16 Right Hand Tilt 15° GSM 850 Channel 192

GSM 850 Towards Ground High

Date/Time: 3/25/2010 3:00:07 PM

Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:8.3

Medium parameters used: f = 849 MHz; σ = 1.01 mho/m; $ε_r$ = 53.8; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.792 mW/g

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

Reference Value = 11.6 V/m; Power Drift = -0.039 dB

Peak SAR (extrapolated) = 0.983 W/kg

SAR(1 g) = 0.743 mW/g; SAR(10 g) = 0.522 mW/g

Maximum value of SAR (measured) = 0.791 mW/g
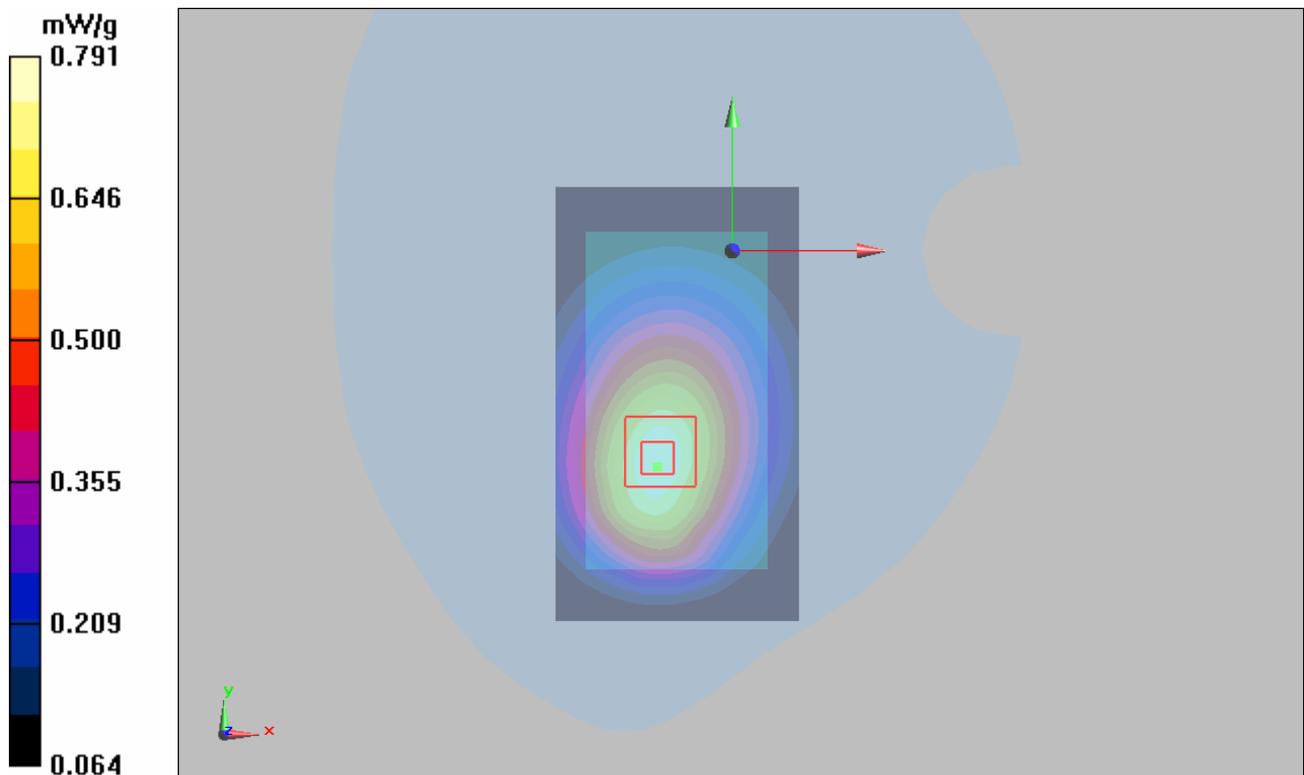
Figure 17 Body, Towards Ground, GSM 850 Channel 251

GSM 850 Towards Ground Middle

Date/Time: 3/25/2010 2:37:27 PM

Communication System: GSM 850; Frequency: 837 MHz;Duty Cycle: 1:8.3

Medium parameters used: f = 837 MHz; σ = 0.995 mho/m; $ε_r$ = 54; ρ = 1000 kg/m³

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 10.6 V/m; Power Drift = 0.108 dB

Peak SAR (extrapolated) = 0.861 W/kg

SAR(1 g) = 0.652 mW/g; SAR(10 g) = 0.459 mW/g

Maximum value of SAR (measured) = 0.697 mW/g
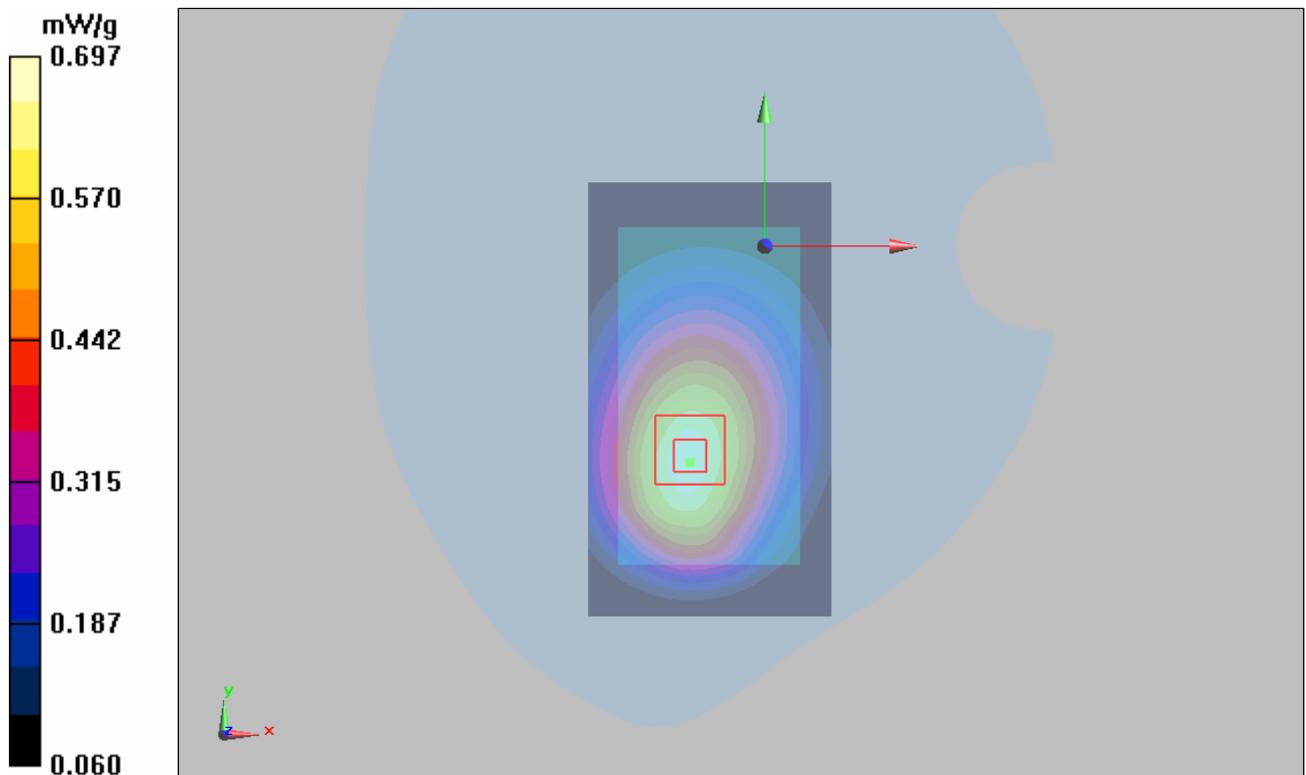
Figure 18 Body, Towards Ground, GSM 850 Channel 192

GSM 850 Towards Ground Low

Date/Time: 3/25/2010 4:12:25 PM

Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3

Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.983 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.706 mW/g

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

Reference Value = 10.4 V/m; Power Drift = -0.002 dB

Peak SAR (extrapolated) = 0.877 W/kg

SAR(1 g) = 0.657 mW/g; SAR(10 g) = 0.462 mW/g

Maximum value of SAR (measured) = 0.704 mW/g
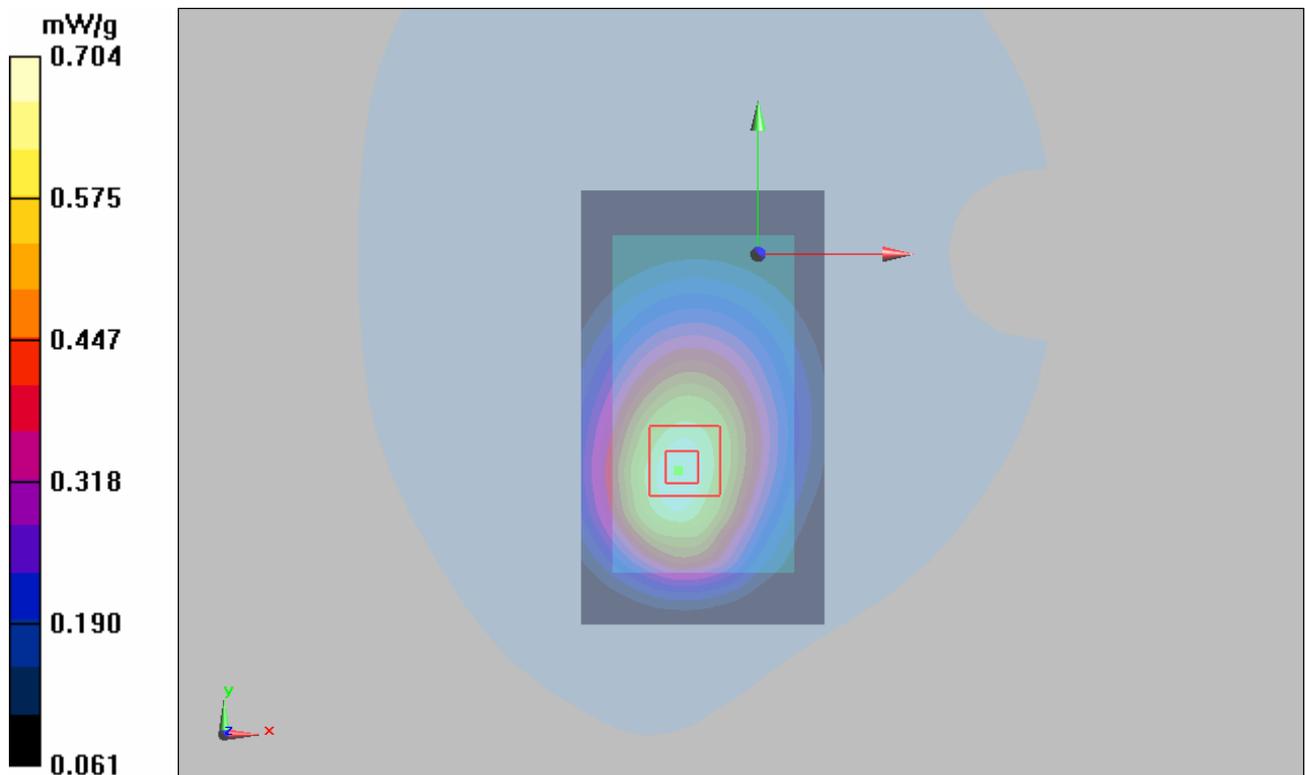
Figure 19 Body, Towards Ground, GSM 850 Channel 128

GSM 850 Towards Phantom Middle

Date/Time: 3/25/2010 4:36:43 PM

Communication System: GSM 850; Frequency: 837 MHz;Duty Cycle: 1:8.3

Medium parameters used: f = 837 MHz; σ = 0.995 mho/m; $ε_r$ = 54; ρ = 1000 kg/m³

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Phantom Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.414 mW/g

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

Reference Value = 9.02 V/m; Power Drift = 0.039 dB

Peak SAR (extrapolated) = 0.494 W/kg

SAR(1 g) = 0.391 mW/g; SAR(10 g) = 0.288 mW/g

Maximum value of SAR (measured) = 0.414 mW/g
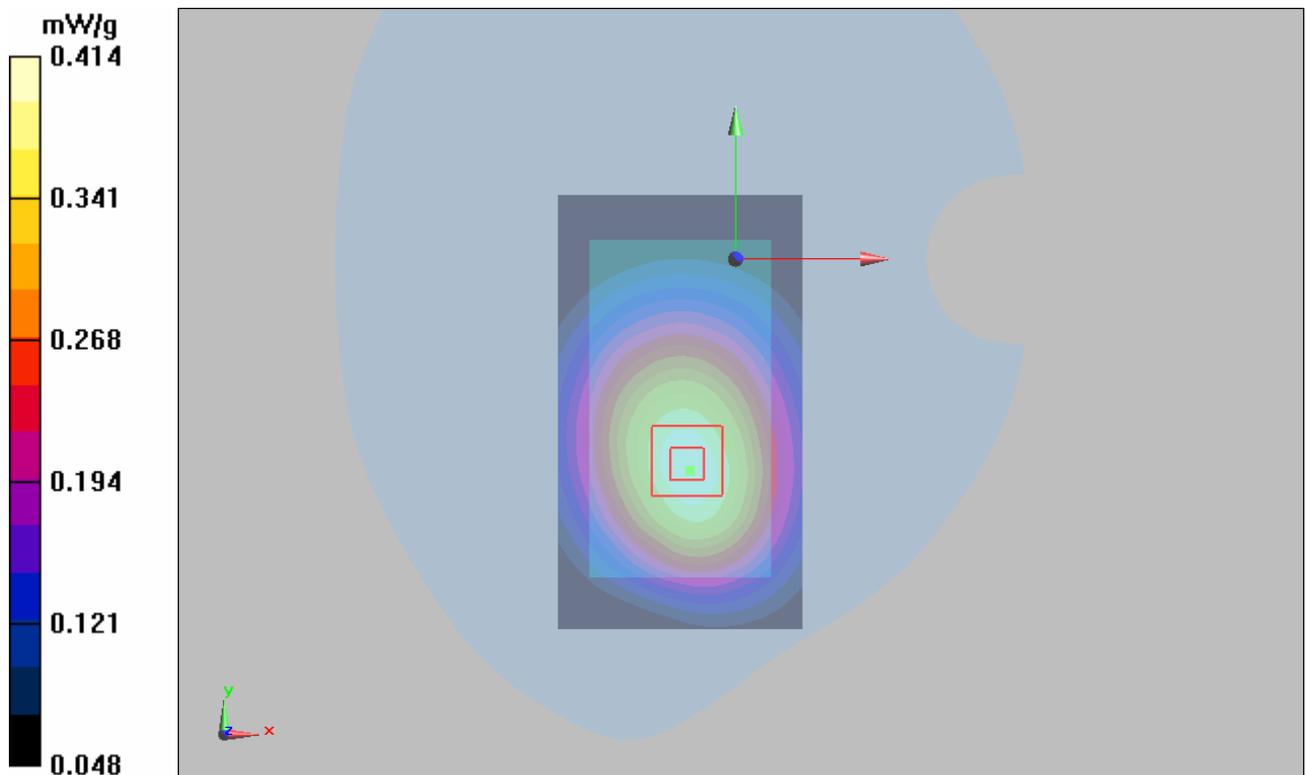
Figure 20 Body, Towards Phantom, GSM 850 Channel 192

GSM 850 with Earphone Towards Ground High

Date/Time: 3/25/2010 5:00:44 PM

Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:8.3

Medium parameters used: f = 849 MHz; σ = 1.01 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.529 mW/g

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

Reference Value = 7.5 V/m; Power Drift = -0.008 dB

Peak SAR (extrapolated) = 0.695 W/kg

SAR(1 g) = 0.490 mW/g; SAR(10 g) = 0.331 mW/g

Maximum value of SAR (measured) = 0.529 mW/g
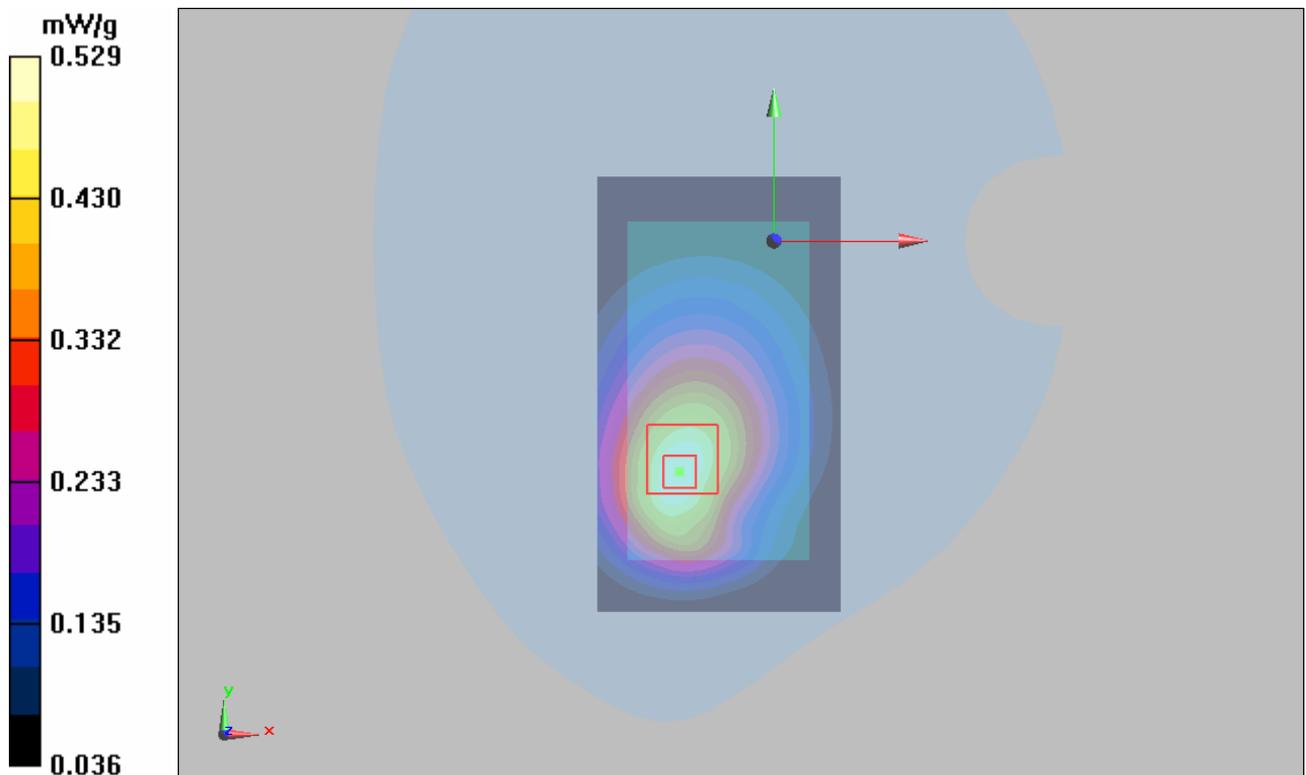
Figure 21 Body, Towards Ground, GSM 850 Channel 251

GSM 850+GPRS(2UP) Towards Ground High

Date/Time: 3/25/2010 6:00:39 PM

Communication System: GSM850 + GPRS(2Up); Frequency: 848.8 MHz;Duty Cycle: 1:4.15

Medium parameters used: f = 849 MHz; σ = 1.01 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.991 mW/g

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

Reference Value = 12.3 V/m; Power Drift = -0.033 dB

Peak SAR (extrapolated) = 1.21 W/kg

SAR(1 g) = 0.916 mW/g; SAR(10 g) = 0.651 mW/g

Maximum value of SAR (measured) = 0.982 mW/g
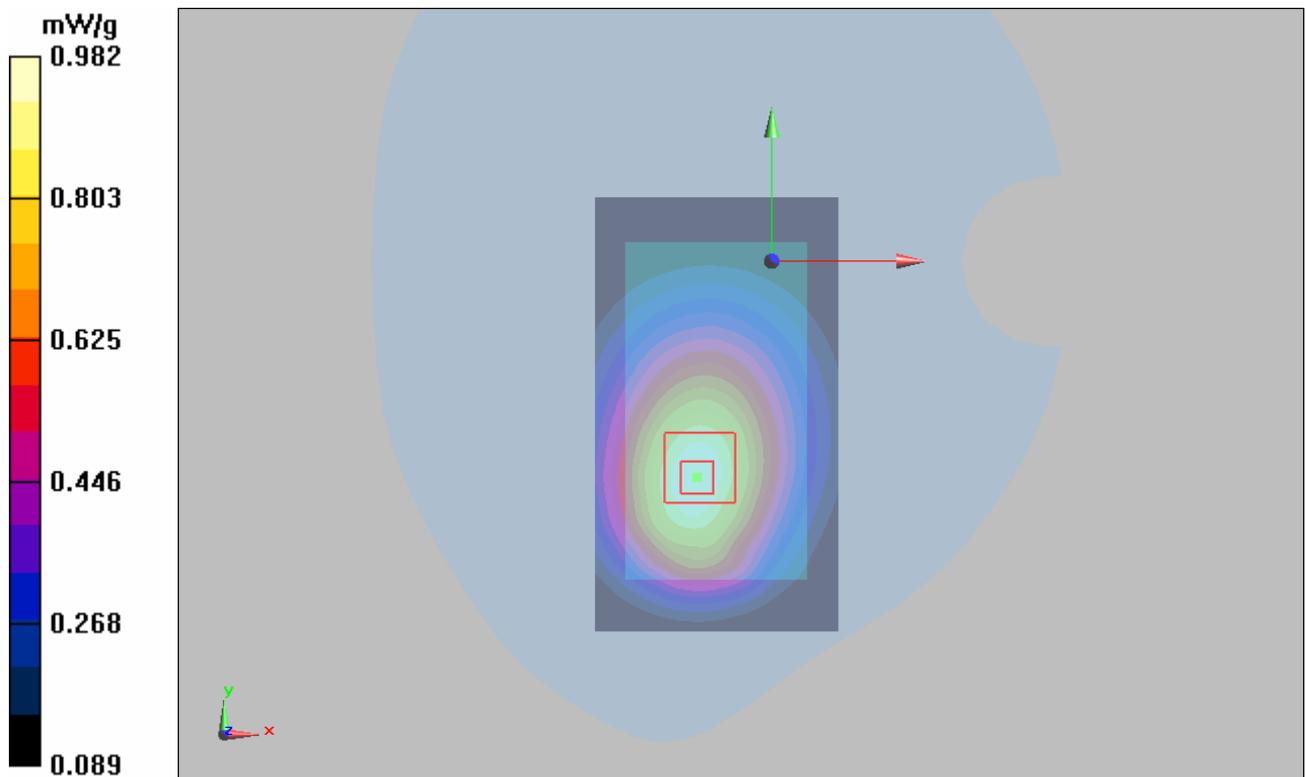
Figure 22 Body, Towards Ground, GSM 850 GPRS (2UP) Channel 251

GSM 850+GPRS(2UP) Towards Ground Middle

Date/Time: 3/25/2010 5:20:09 PM

Communication System: GSM850 + GPRS(2Up); Frequency: 837 MHz;Duty Cycle: 1:4.15

Medium parameters used: f = 837 MHz; σ = 0.995 mho/m; ε_r = 54; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.876 mW/g

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

Reference Value = 11.3 V/m; Power Drift = -0.027 dB

Peak SAR (extrapolated) = 1.09 W/kg

SAR(1 g) = 0.816 mW/g; SAR(10 g) = 0.577 mW/g

Maximum value of SAR (measured) = 0.874 mW/g
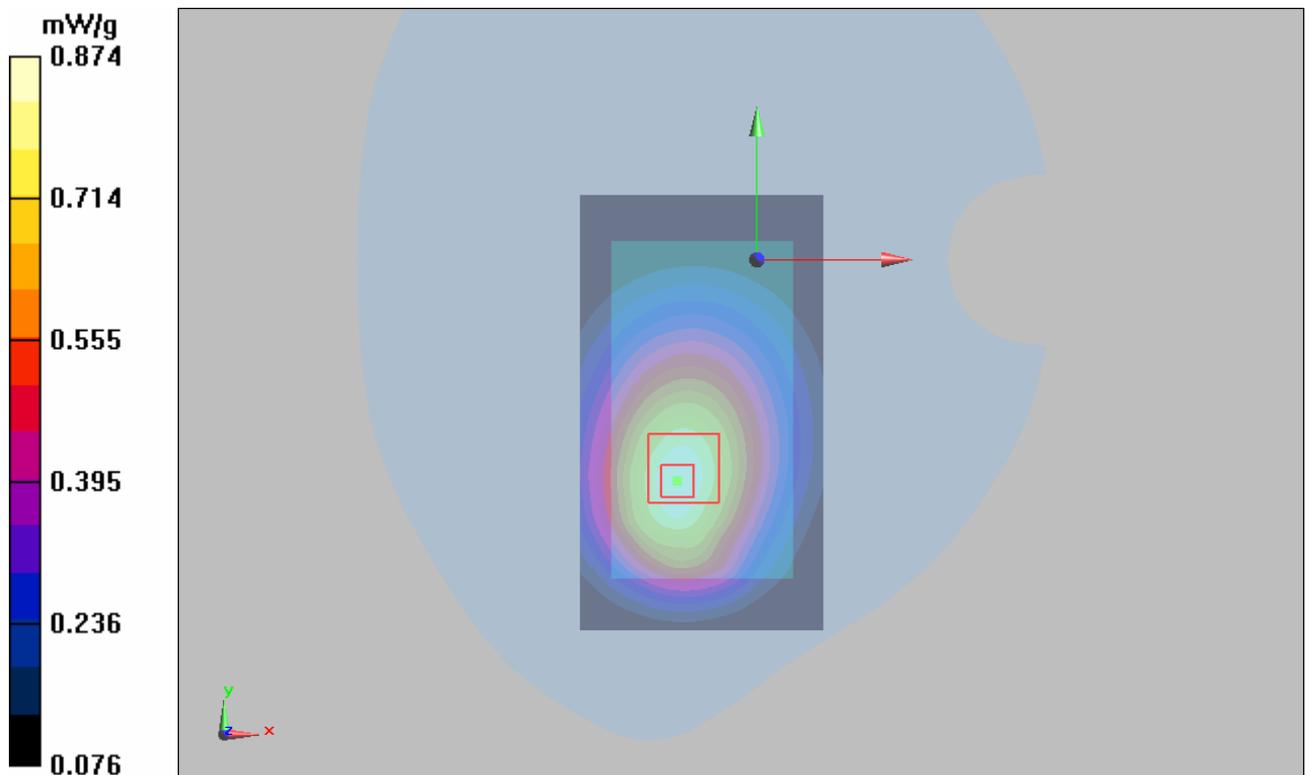
Figure 23 Body, Towards Ground, GSM 850 GPRS (2UP) Channel 192

GSM 850+GPRS(2UP) Towards Ground Low

Date/Time: 3/25/2010 6:19:13 PM

Communication System: GSM850 + GPRS(2Up); Frequency: 824.2 MHz;Duty Cycle: 1:4.15

Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.983 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.839 mW/g

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

Reference Value = 10.9 V/m; Power Drift = 0.083 dB

Peak SAR (extrapolated) = 1.06 W/kg

SAR(1 g) = 0.789 mW/g; SAR(10 g) = 0.557 mW/g

Maximum value of SAR (measured) = 0.845 mW/g
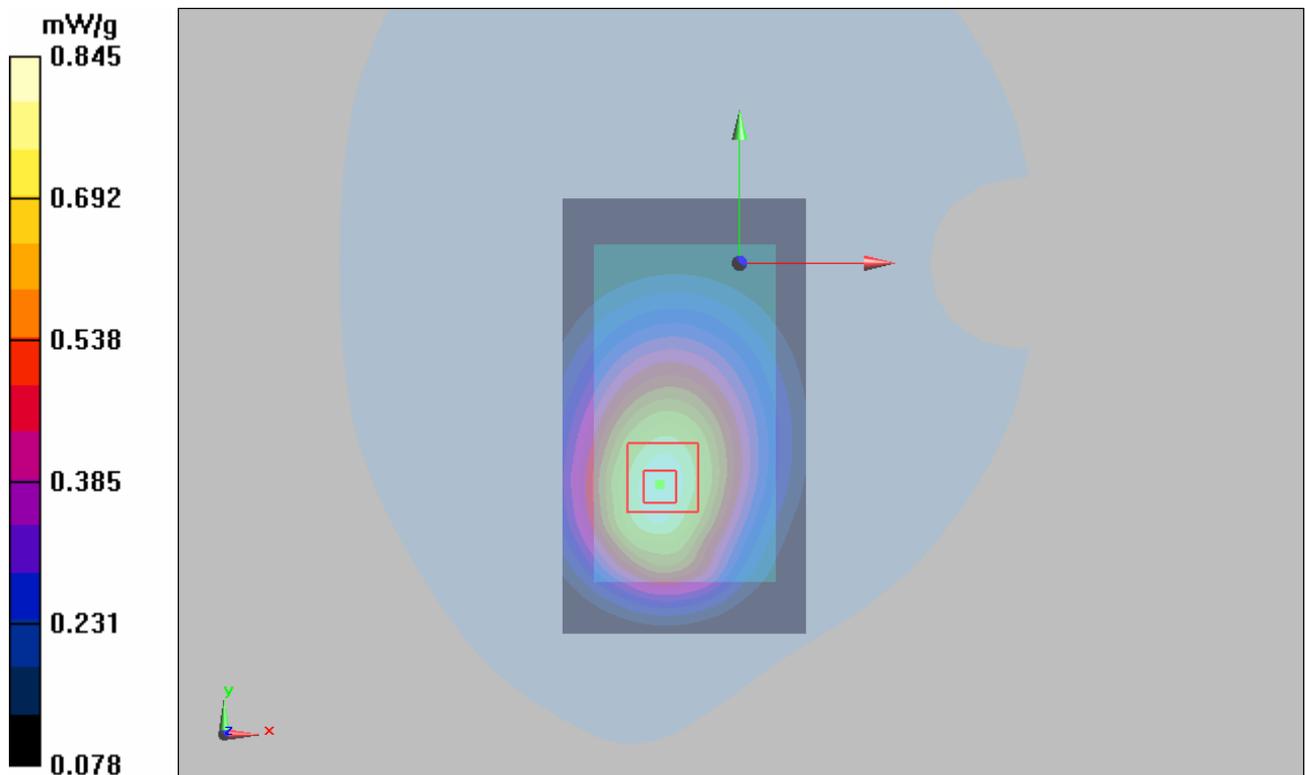
Figure 24 Body, Towards Ground, GSM 850 GPRS (2UP) Channel 128

GSM 850+GPRS(2UP) Towards Phantom Middle

Date/Time: 3/25/2010 5:41:51 PM

Communication System: GSM850 + GPRS(2Up); Frequency: 837 MHz;Duty Cycle: 1:4.15

Medium parameters used: f = 837 MHz; σ = 0.995 mho/m; ε_r = 54; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Phantom Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 10.8 V/m; Power Drift = -0.168 dB

Peak SAR (extrapolated) = 0.648 W/kg

SAR(1 g) = 0.519 mW/g; SAR(10 g) = 0.383 mW/g

Maximum value of SAR (measured) = 0.547 mW/g
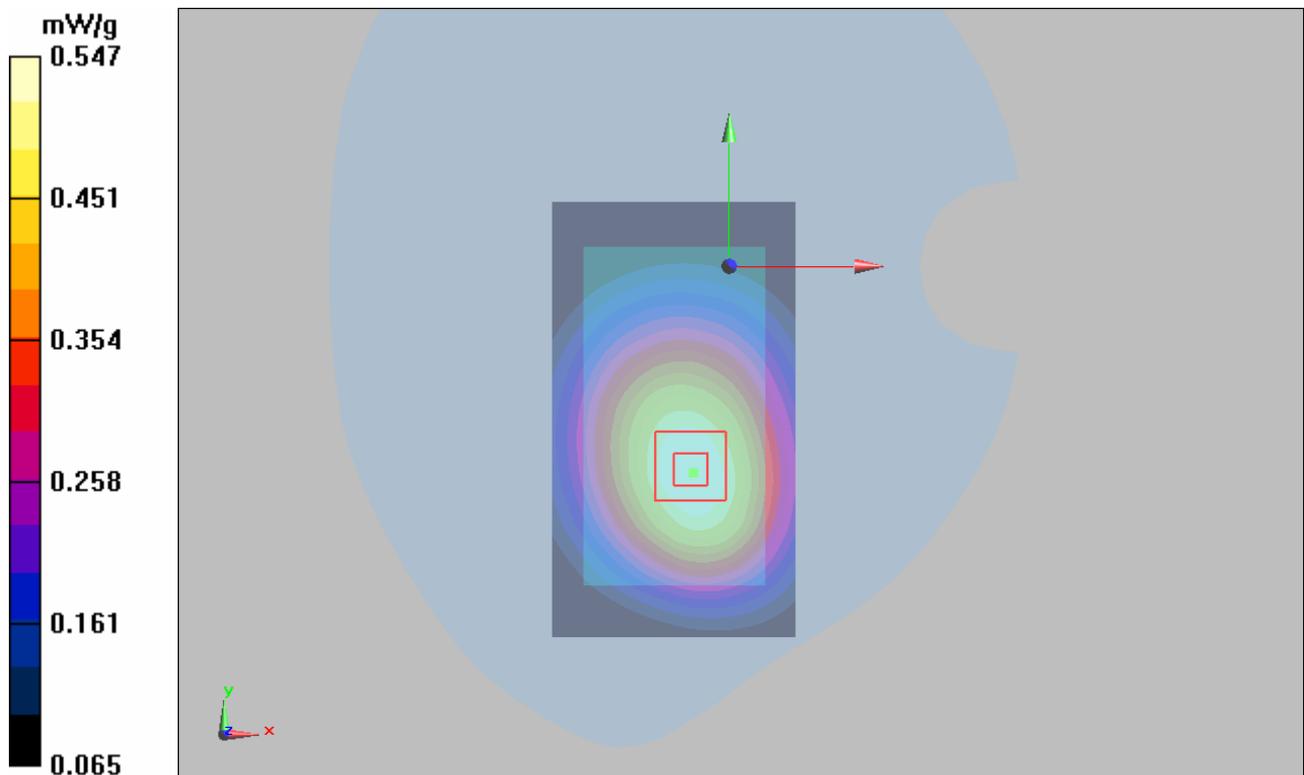
Figure 25 Body, Towards Phantom, GSM 850 GPRS (2UP) Channel 192

GSM 850+EGPRS (2UP) Towards Ground High

Date/Time: 3/25/2010 6:42:44 PM

Communication System: GSM850 +EGPRS(2Up); Frequency: 848.8 MHz;Duty Cycle: 1:4.15

Medium parameters used: f = 849 MHz; σ = 1.01 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 14 V/m; Power Drift = -0.148 dB

Peak SAR (extrapolated) = 1.28 W/kg

SAR(1 g) = 0.974 mW/g; SAR(10 g) = 0.689 mW/g

Maximum value of SAR (measured) = 1.04 mW/g
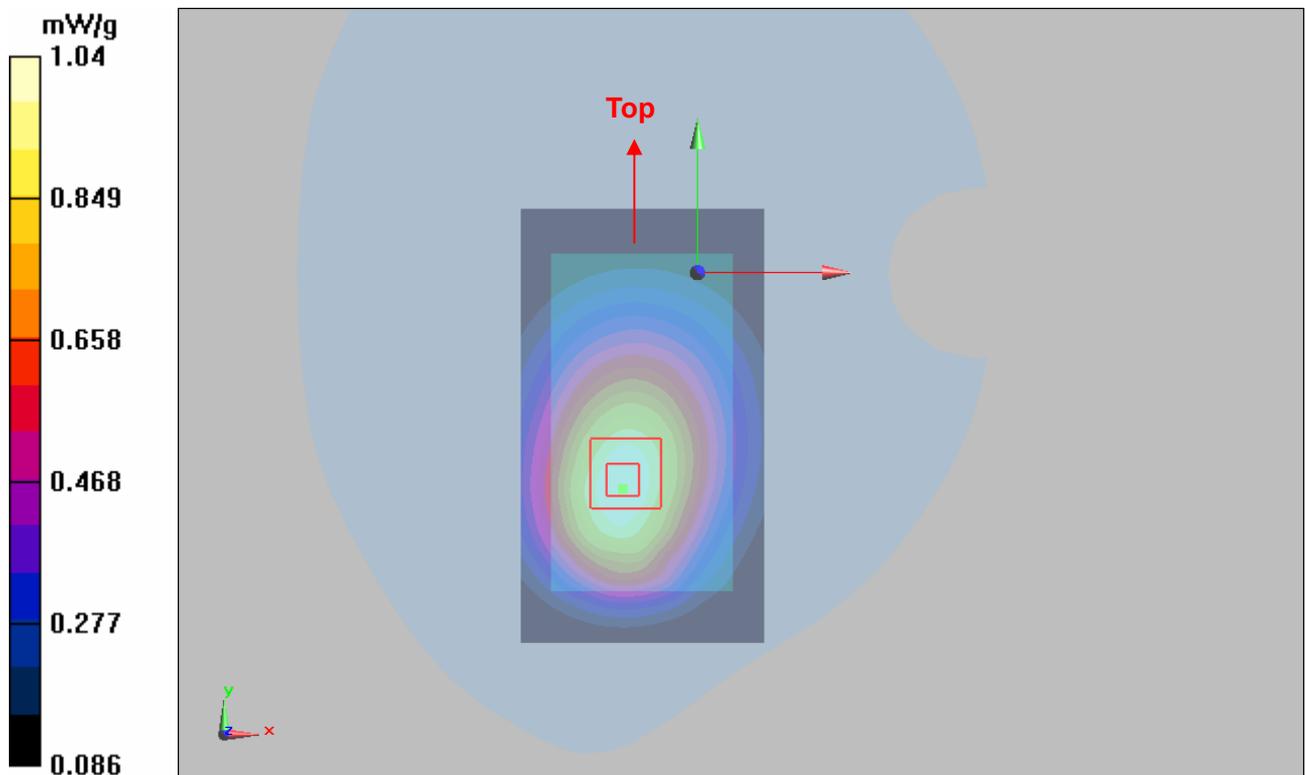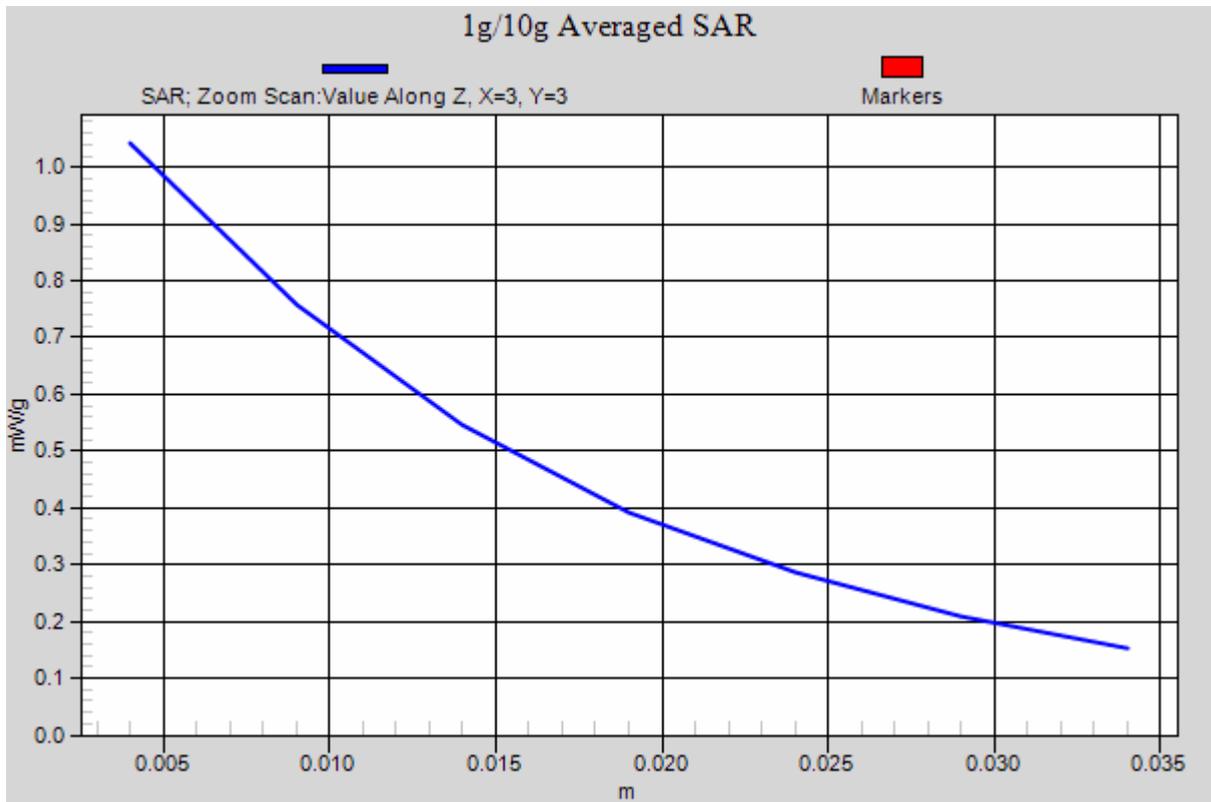
Figure 26 Body, Towards Ground, GSM 850 EGPRS (2UP) Channel 251

GSM 1900 Left Cheek Middle

Date/Time: 3/26/2010 11:05:28 AM

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3

Medium parameters used: f = 1880 MHz; σ = 1.39 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.53, 7.53, 7.53); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.576 mW/g

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

Reference Value = 9.54 V/m; Power Drift = 0.007 dB

Peak SAR (extrapolated) = 0.955 W/kg

SAR(1 g) = 0.587 mW/g; SAR(10 g) = 0.325 mW/g

Maximum value of SAR (measured) = 0.655 mW/g

Cheek Middle/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.54 V/m; Power Drift = 0.007 dB

Peak SAR (extrapolated) = 0.773 W/kg

SAR(1 g) = 0.557 mW/g; SAR(10 g) = 0.337 mW/g

Maximum value of SAR (measured) = 0.611 mW/g
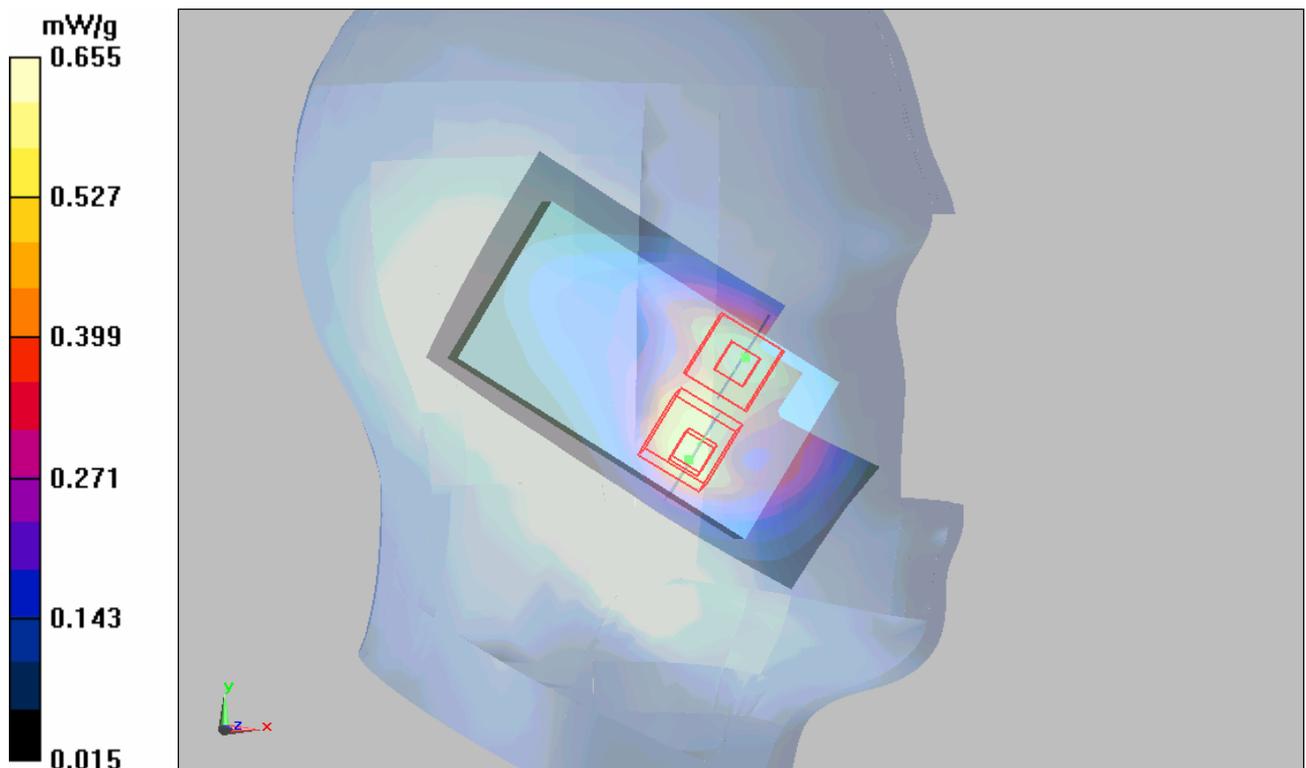
Figure 27 Left Hand Touch Cheek GSM 1900 Channel 661

GSM 1900 Left Tilt Middle

Date/Time: 3/26/2010 1:25:50 PM

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3

Medium parameters used: f = 1880 MHz; σ = 1.39 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.53, 7.53, 7.53); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Tilt Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.284 mW/g

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

Reference Value = 15.1 V/m; Power Drift = -0.148 dB

Peak SAR (extrapolated) = 0.359 W/kg

SAR(1 g) = 0.256 mW/g; SAR(10 g) = 0.157 mW/g

Maximum value of SAR (measured) = 0.284 mW/g
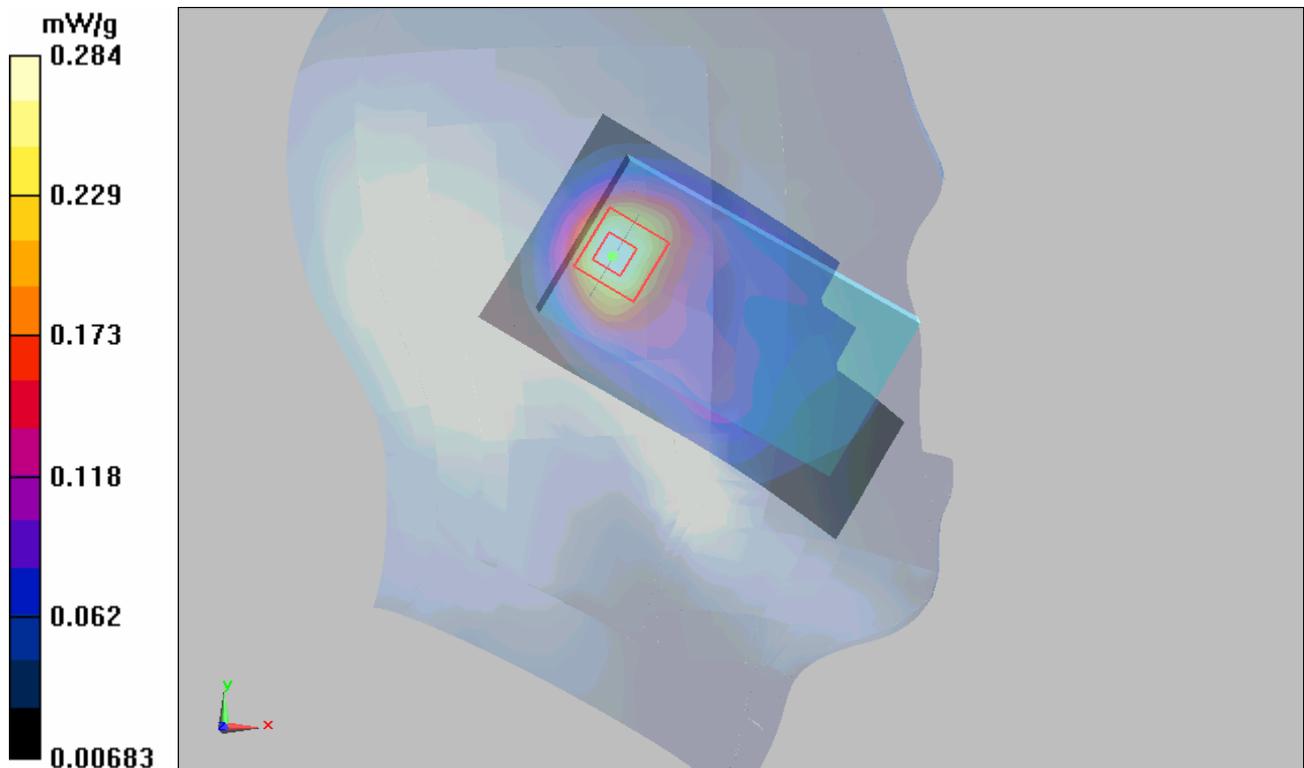
Figure 28 Left Hand Tilt 15° GSM 1900 Channel 661

GSM 1900 Right Cheek High

Date/Time: 3/26/2010 9:53:02 AM

Communication System: PCS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3

Medium parameters used: f = 1910 MHz; σ = 1.44 mho/m; ε_r = 40.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.53, 7.53, 7.53); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.985 mW/g

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

Reference Value = 9.41 V/m; Power Drift = -0.141 dB

Peak SAR (extrapolated) = 1.4 W/kg

SAR(1 g) = 0.937 mW/g; SAR(10 g) = 0.518 mW/g

Maximum value of SAR (measured) = 1.07 mW/g
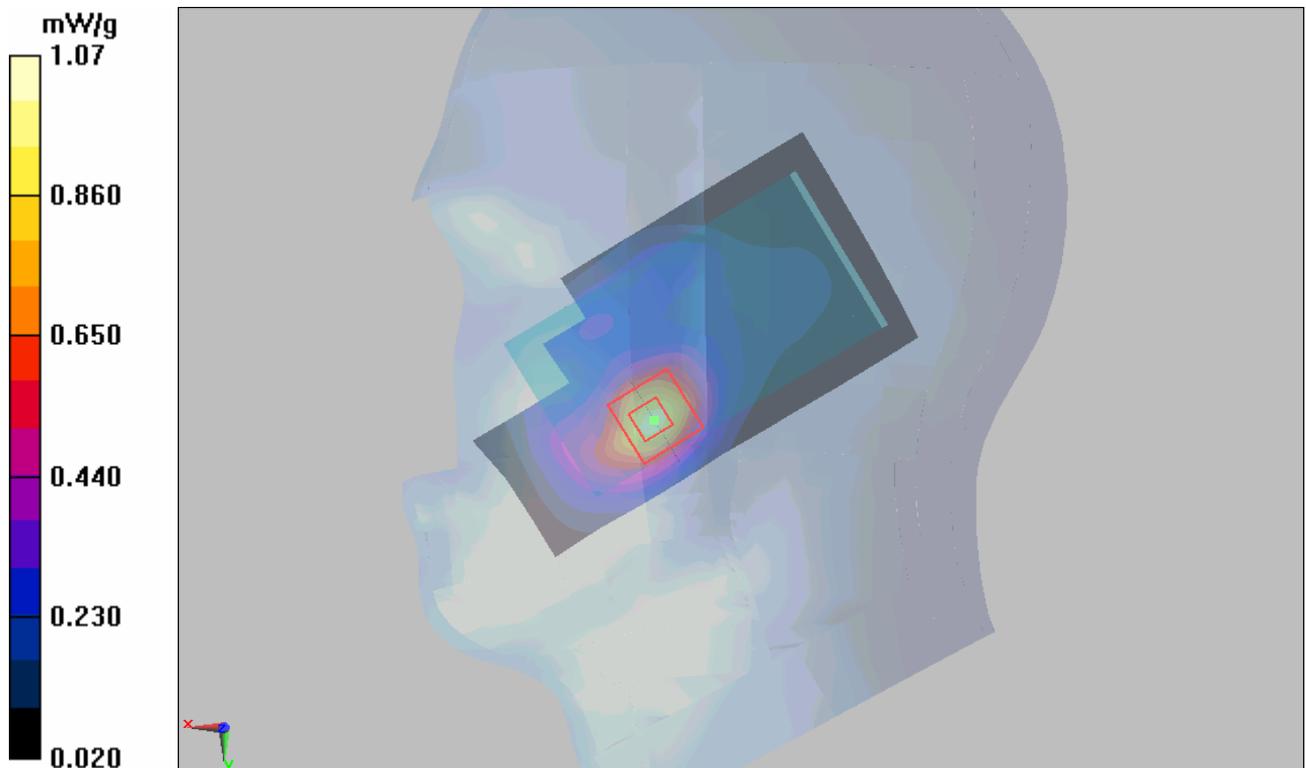
Figure 29 Right Hand Touch Cheek GSM 1900 Channel 810

GSM 1900 Right Cheek Middle

Date/Time: 3/26/2010 9:29:45 AM

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3

Medium parameters used: f = 1880 MHz; σ = 1.39 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.53, 7.53, 7.53); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 9.11 V/m; Power Drift = -0.138 dB

Peak SAR (extrapolated) = 1.41 W/kg

SAR(1 g) = 0.950 mW/g; SAR(10 g) = 0.525 mW/g

Maximum value of SAR (measured) = 1.1 mW/g
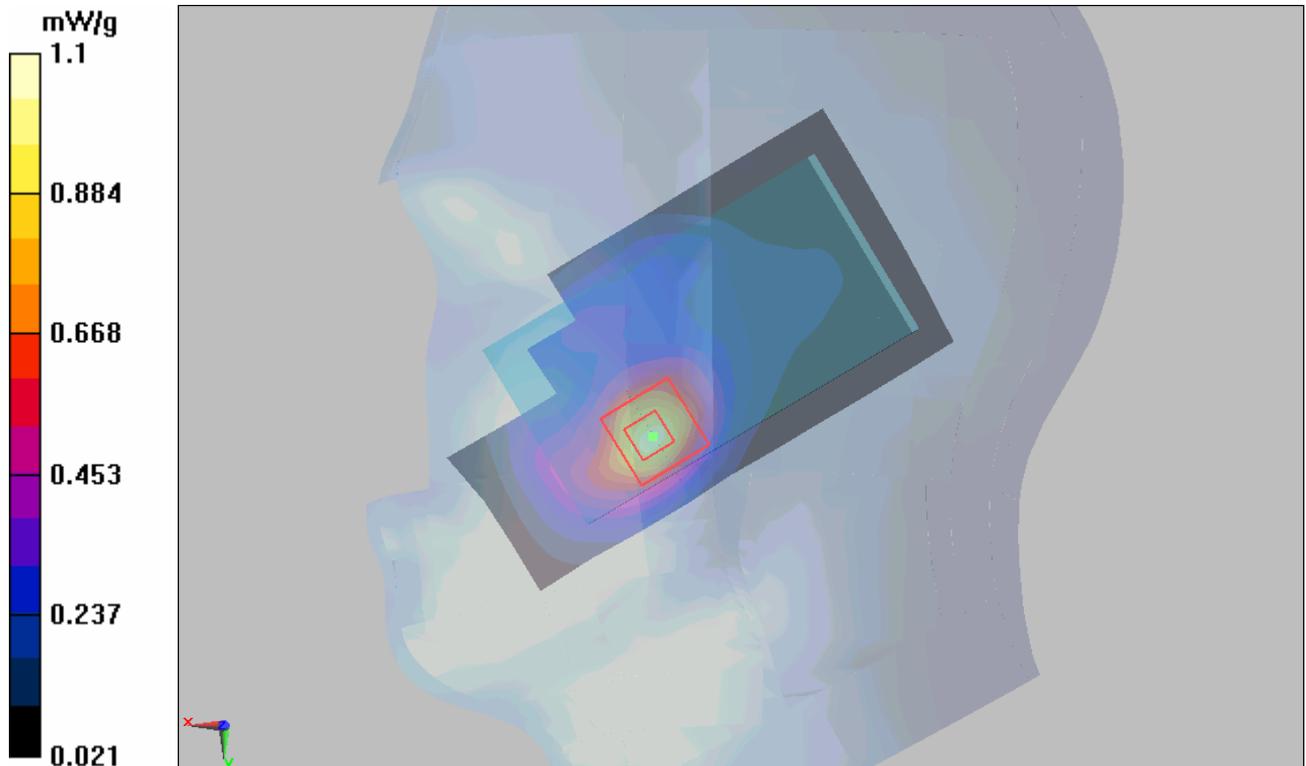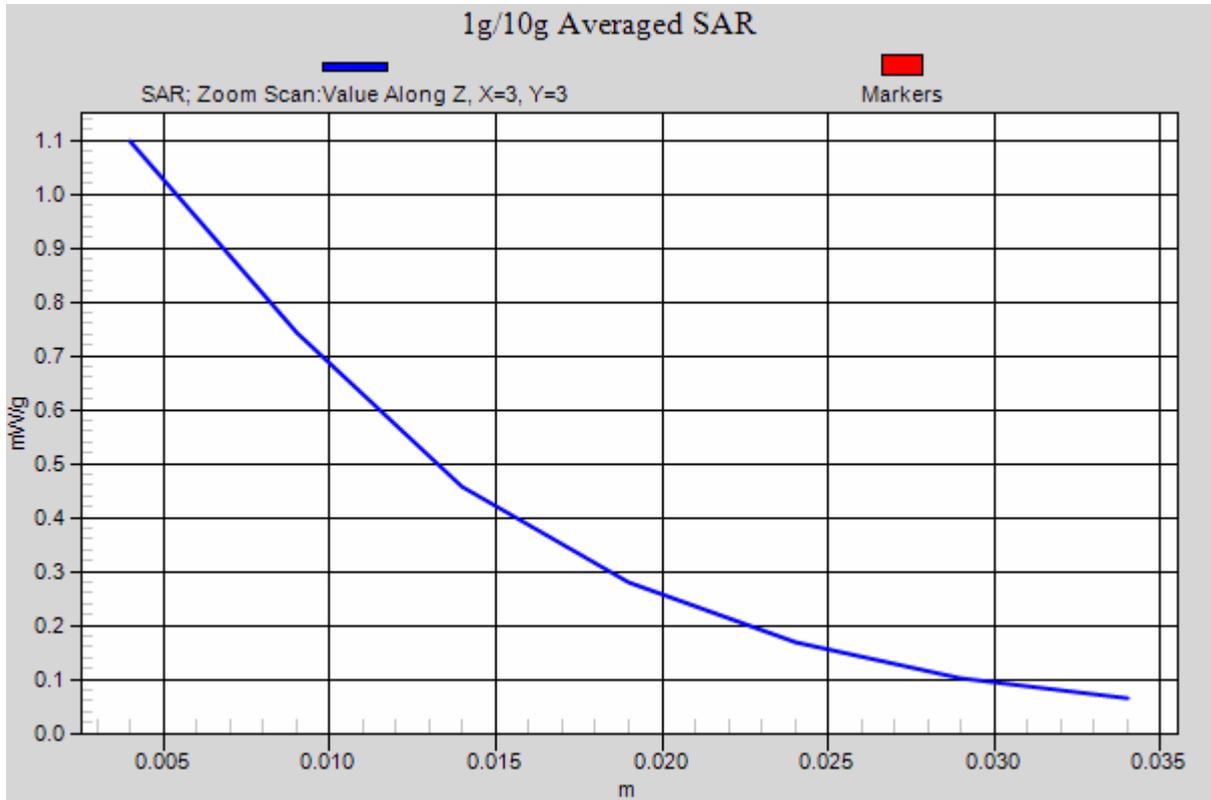
Figure 30 Right Hand Touch Cheek GSM 1900 Channel 661

GSM 1900 Right Cheek Low

Date/Time: 3/26/2010 10:15:57 AM

Communication System: PCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3

Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.36 mho/m; $ε_r$ = 40.5; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.53, 7.53, 7.53); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.894 mW/g

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

Reference Value = 8.1 V/m; Power Drift = -0.143 dB

Peak SAR (extrapolated) = 1.26 W/kg

SAR(1 g) = 0.842 mW/g; SAR(10 g) = 0.466 mW/g

Maximum value of SAR (measured) = 0.957 mW/g
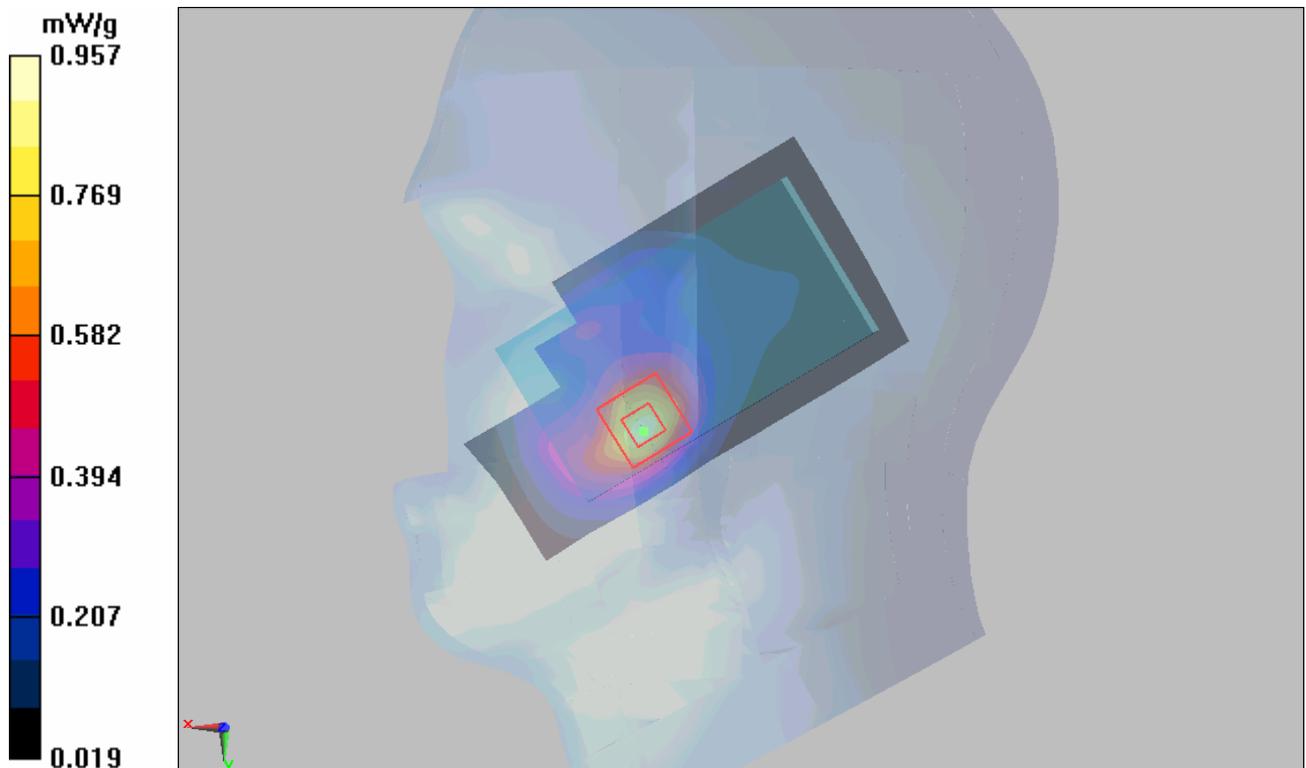
Figure 31 Right Hand Touch Cheek GSM 1900 Channel 512

GSM 1900 Right Tilt Middle

Date/Time: 3/26/2010 10:38:42 AM

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3

Medium parameters used: f = 1880 MHz; σ = 1.39 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.53, 7.53, 7.53); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Tilt Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 13.1 V/m; Power Drift = -0.047 dB

Peak SAR (extrapolated) = 0.294 W/kg

SAR(1 g) = 0.209 mW/g; SAR(10 g) = 0.127 mW/g

Maximum value of SAR (measured) = 0.229 mW/g
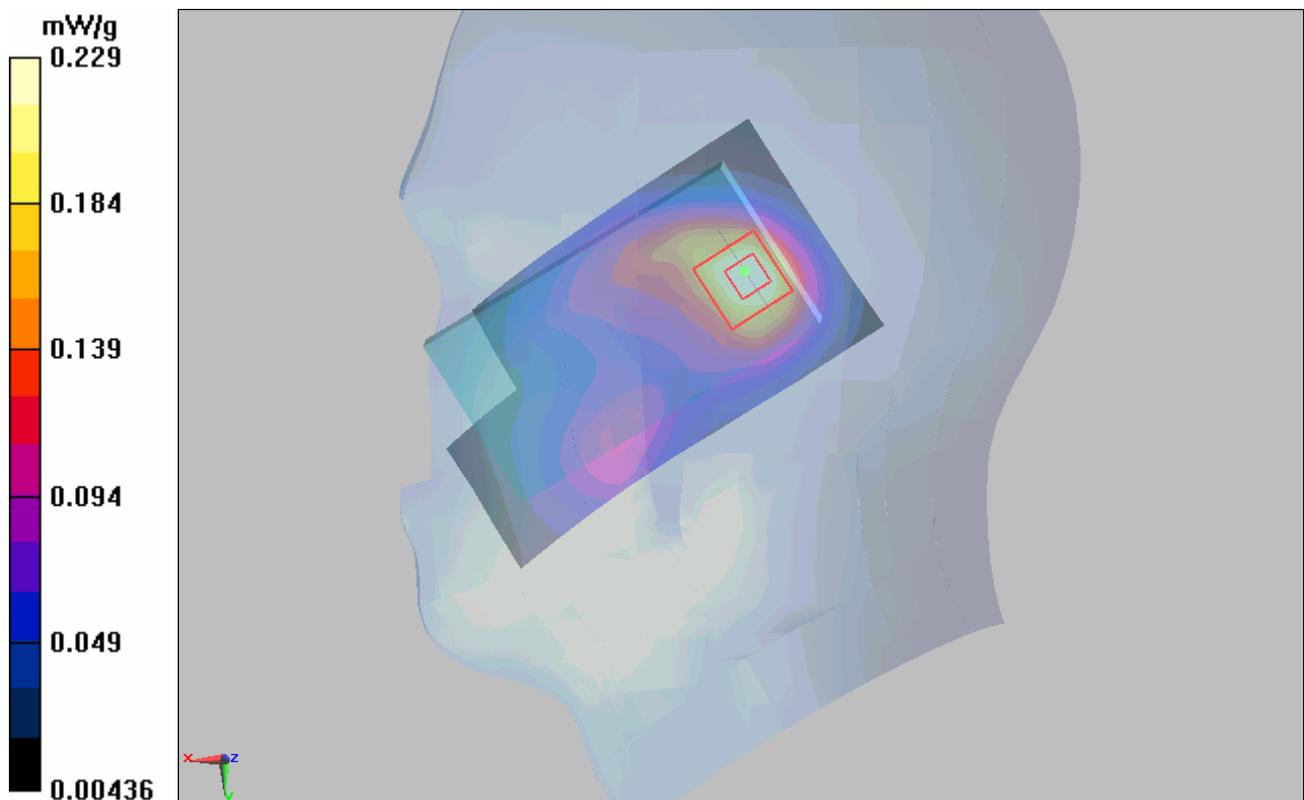
Figure 32 Right Hand Tilt 15° GSM 1900 Channel 661

GSM 1900 Towards Ground High

Date/Time: 3/27/2010 8:18:33 PM

Communication System: PCS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3

Medium parameters used: f = 1910 MHz; σ = 1.56 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.404 mW/g

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

Reference Value = 8.23 V/m; Power Drift = -0.064 dB

Peak SAR (extrapolated) = 0.695 W/kg

SAR(1 g) = 0.370 mW/g; SAR(10 g) = 0.211 mW/g

Maximum value of SAR (measured) = 0.398 mW/g
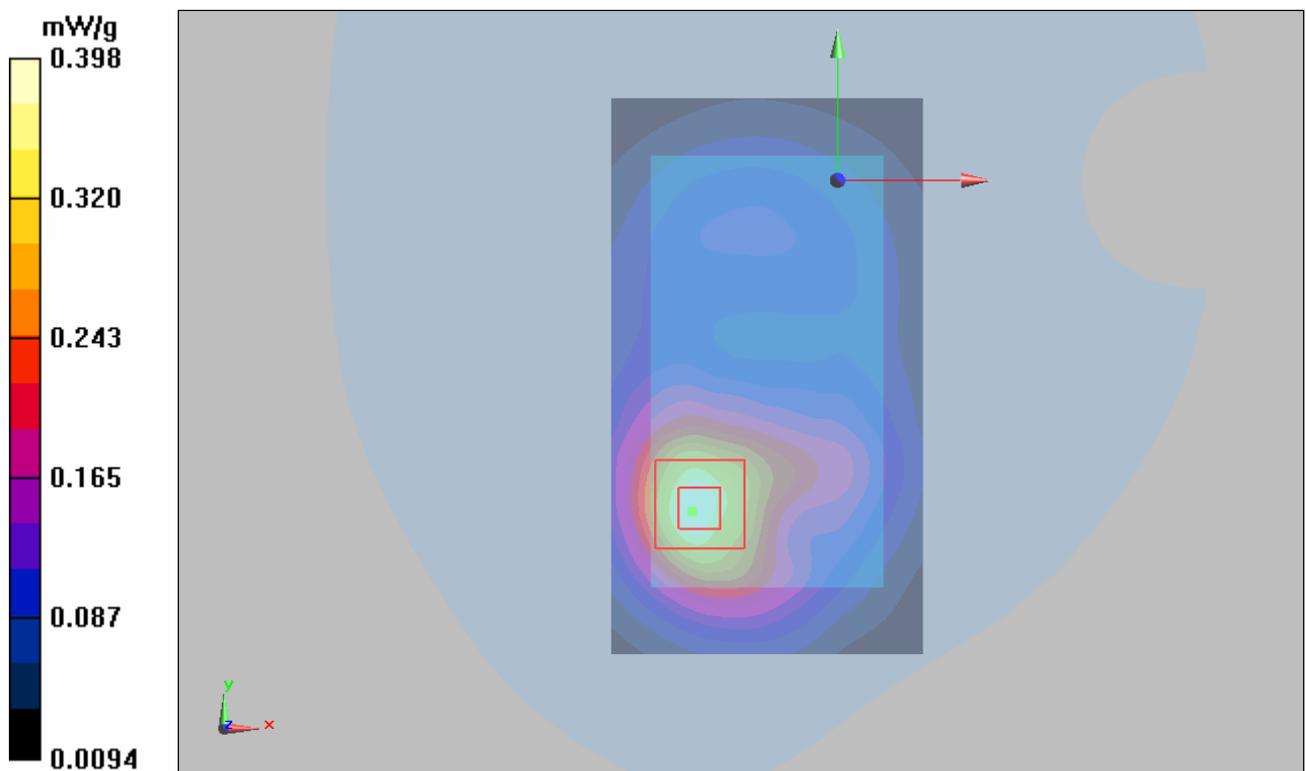
Figure 33 Body, Towards Ground, GSM 1900 Channel 810

GSM 1900 Towards Ground Middle

Date/Time: 3/27/2010 7:52:04 PM

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3

Medium parameters used: f = 1880 MHz; σ = 1.5 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.398 mW/g

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

Reference Value = 8.04 V/m; Power Drift = 0.079 dB

Peak SAR (extrapolated) = 0.692 W/kg

SAR(1 g) = 0.369 mW/g; SAR(10 g) = 0.210 mW/g

Maximum value of SAR (measured) = 0.396 mW/g
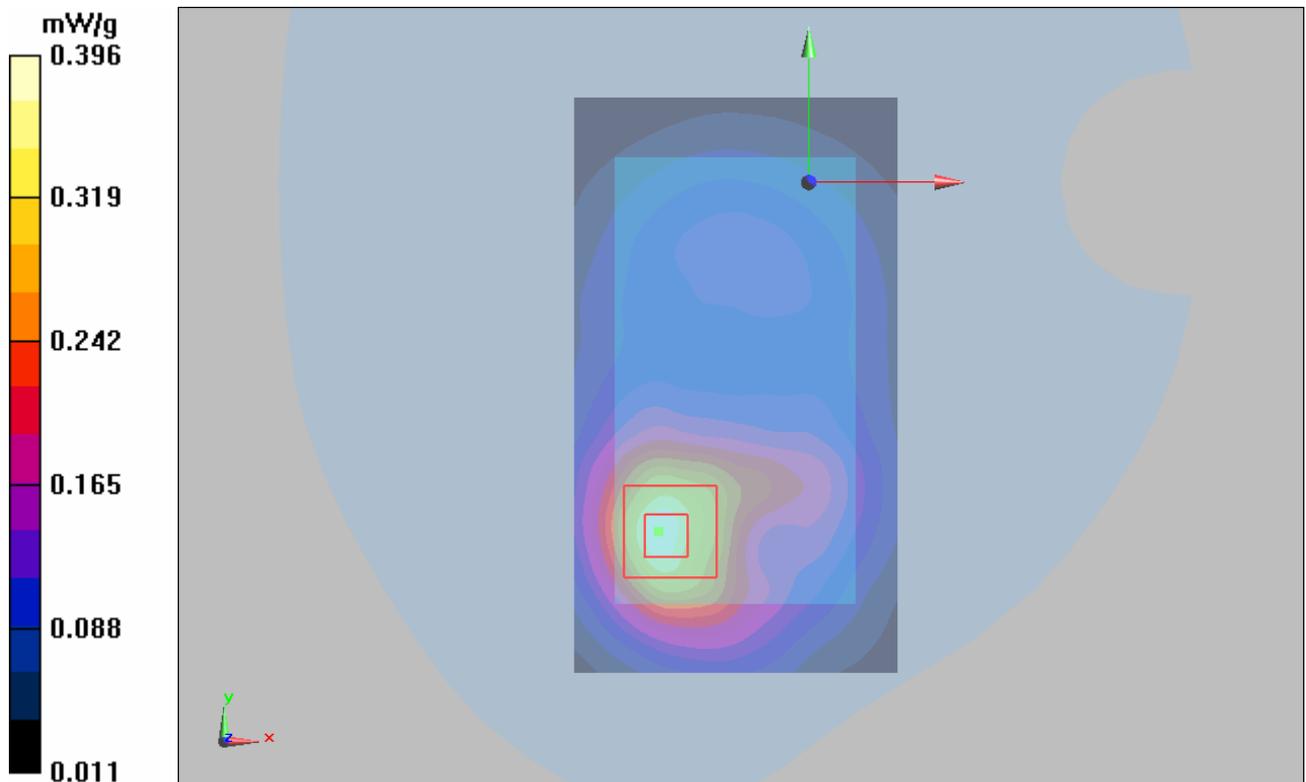
Figure 34 Body, Towards Ground, GSM 1900 Channel 661

GSM 1900 Towards Ground Low

Date/Time: 3/27/2010 8:41:11 PM

Communication System: PCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3

Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.46 mho/m; ε_r = 52.8; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 7.89 V/m; Power Drift = 0.005 dB

Peak SAR (extrapolated) = 0.611 W/kg

SAR(1 g) = 0.335 mW/g; SAR(10 g) = 0.190 mW/g

Maximum value of SAR (measured) = 0.366 mW/g
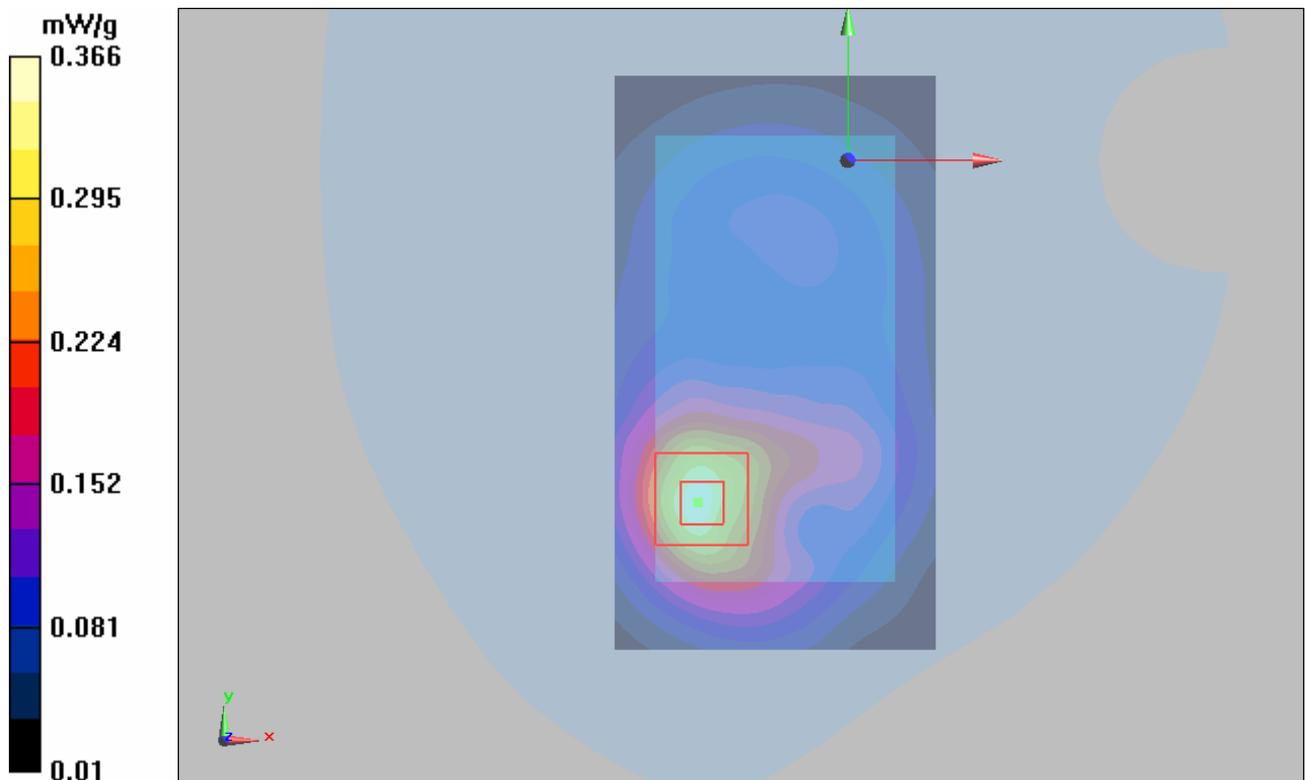
Figure 35 Body, Towards Ground, GSM 1900 Channel 512

GSM 1900 Towards Phantom Middle

Date/Time: 3/27/2010 7:27:57 PM

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3

Medium parameters used: f = 1880 MHz; σ = 1.5 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Phantom Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 8.36 V/m; Power Drift = -0.147 dB

Peak SAR (extrapolated) = 0.356 W/kg

SAR(1 g) = 0.213 mW/g; SAR(10 g) = 0.133 mW/g

Maximum value of SAR (measured) = 0.227 mW/g
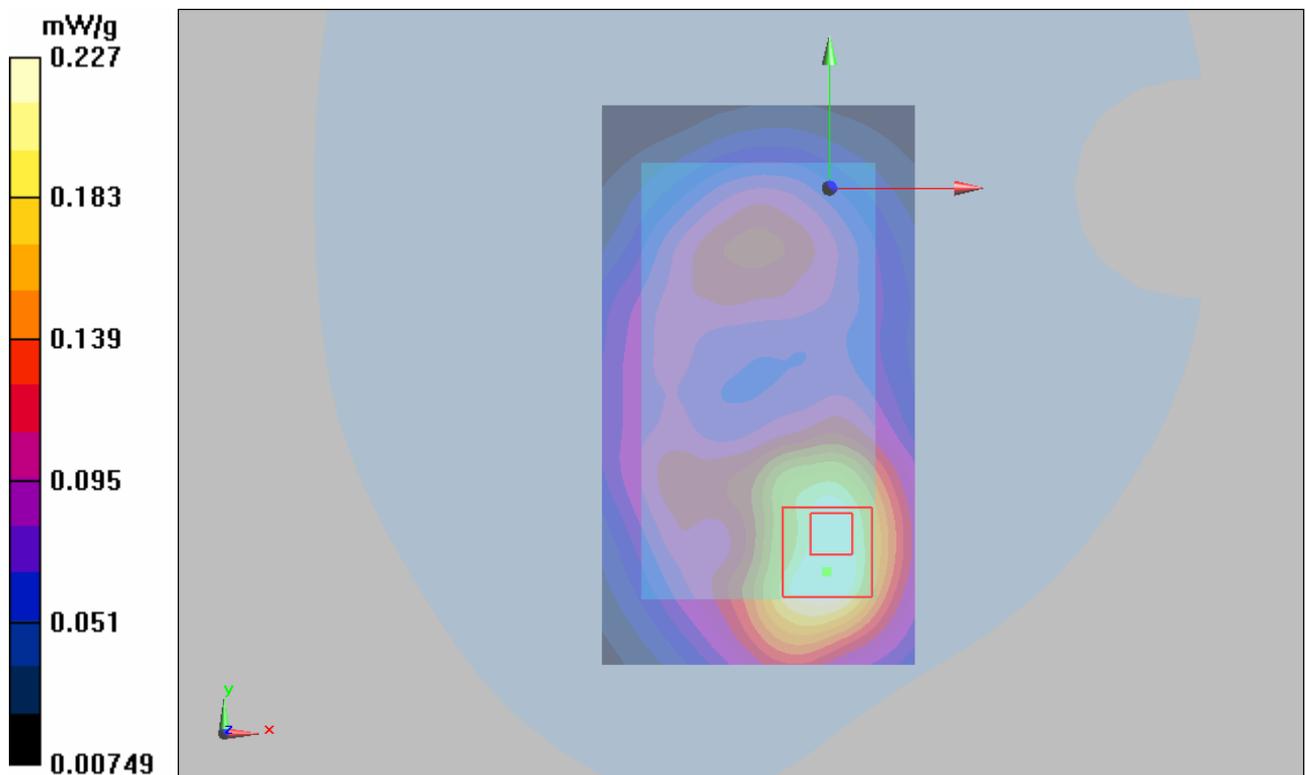
Figure 36 Body, Towards Phantom, GSM 1900 Channel 661

GSM 1900 with Earphone Towards Ground High

Date/Time: 3/27/2010 9:07:12 PM

Communication System: PCS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3

Medium parameters used: f = 1910 MHz; σ = 1.56 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 8.49 V/m; Power Drift = -0.040 dB

Peak SAR (extrapolated) = 0.766 W/kg

SAR(1 g) = 0.406 mW/g; SAR(10 g) = 0.225 mW/g

Maximum value of SAR (measured) = 0.443 mW/g
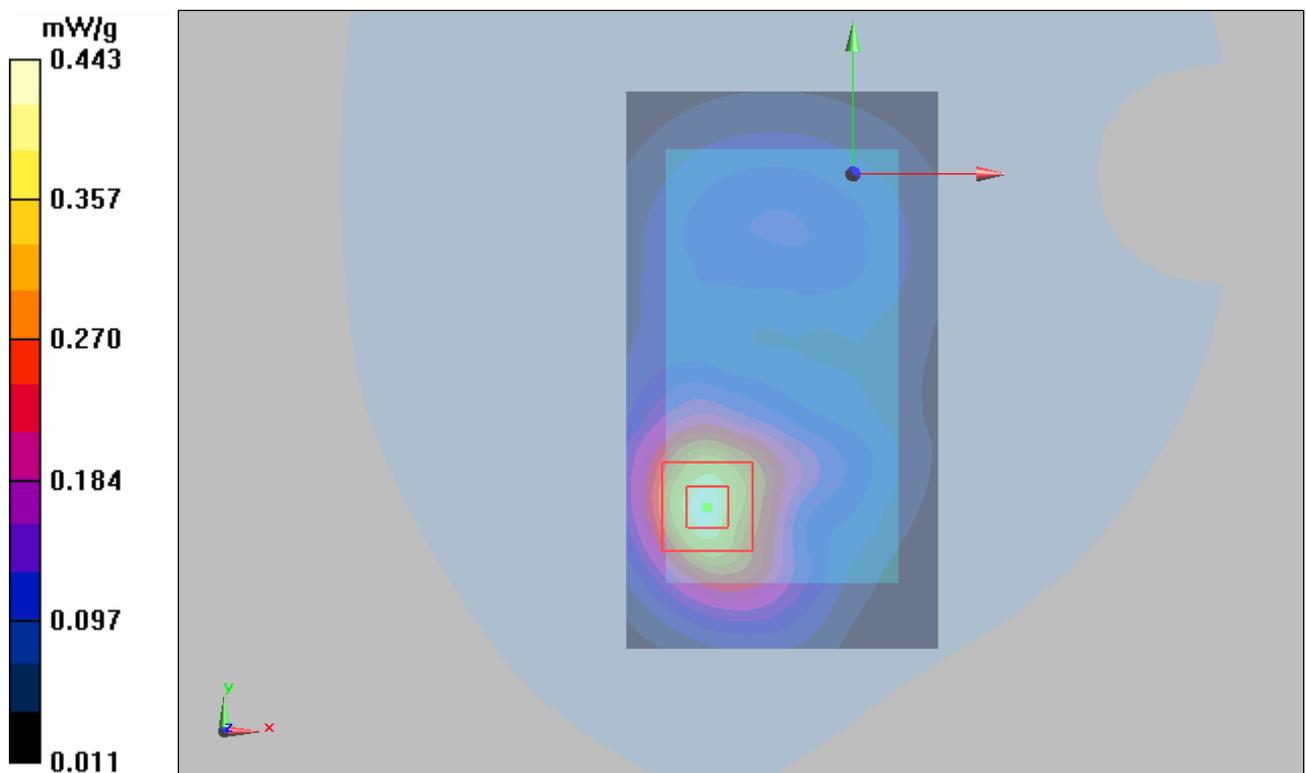
Figure 37 Body, Towards Ground, GSM 1900 Channel 810

GSM 1900+GPRS(2UP) Towards Ground High

Date/Time: 3/27/2010 9:33:10 PM

Communication System: PCS 1900+GPRS(2Up); Frequency: 1909.8 MHz;Duty Cycle: 1:4.15

Medium parameters used: f = 1910 MHz; σ = 1.56 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.787 mW/g

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

Reference Value = 11.4 V/m; Power Drift = -0.137 dB

Peak SAR (extrapolated) = 1.33 W/kg

SAR(1 g) = 0.707 mW/g; SAR(10 g) = 0.403 mW/g

Maximum value of SAR (measured) = 0.762 mW/g
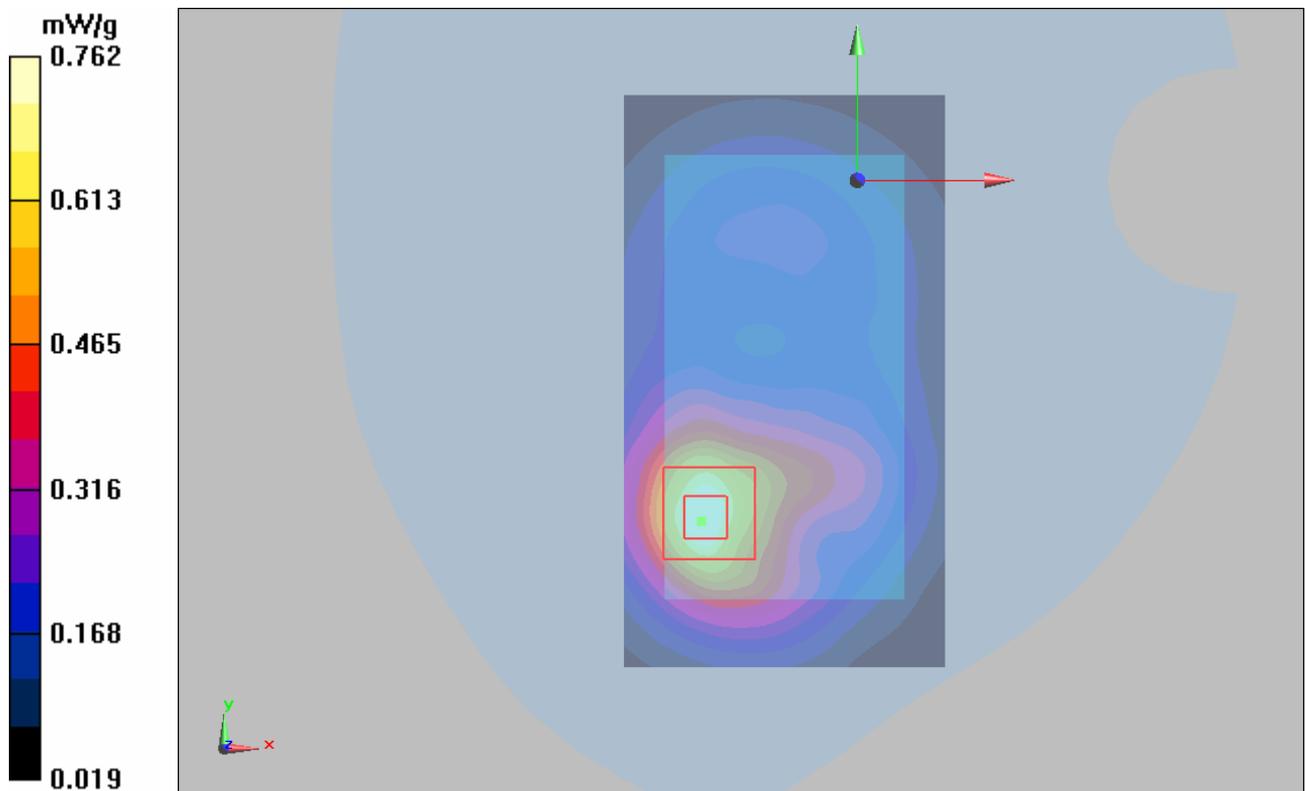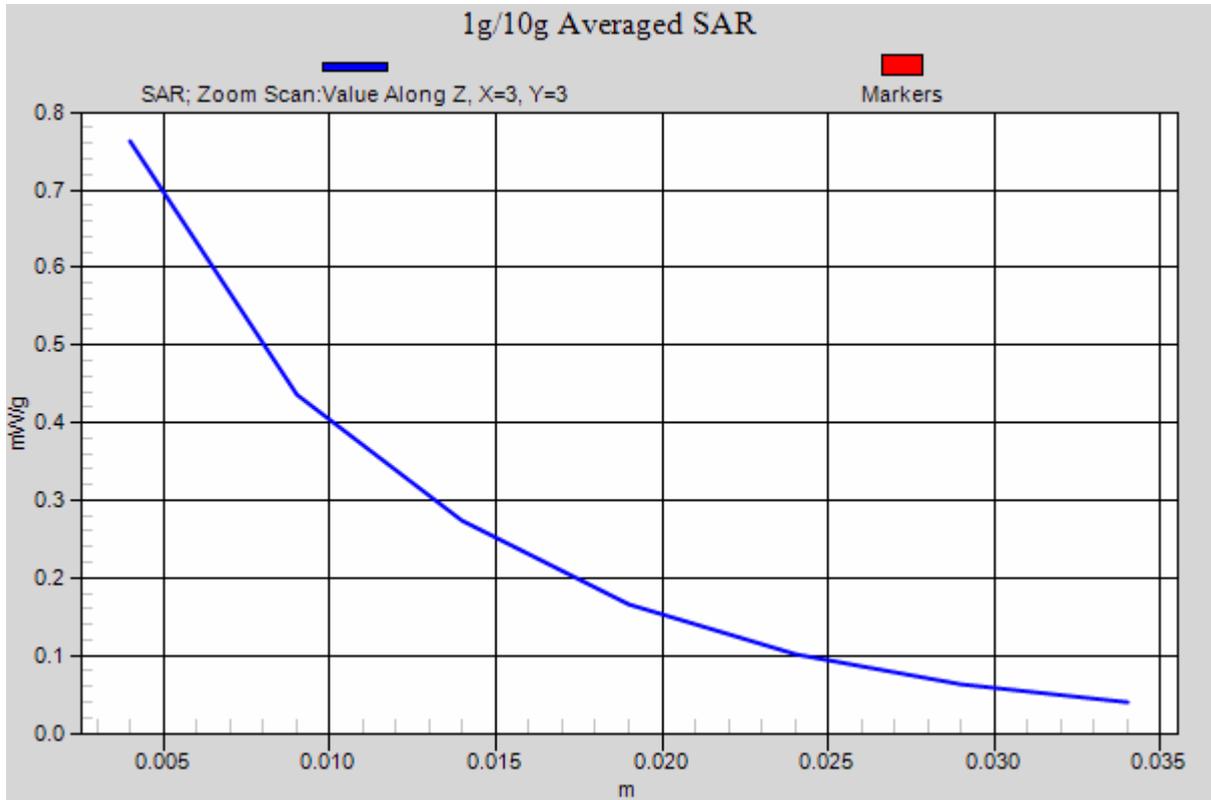
Figure 38 Body, Towards Ground, GSM 1900 GPRS (2UP) Channel 810

GSM 1900+GPRS(2UP) Towards Ground Middle

Date/Time: 3/27/2010 10:16:13 PM

Communication System: PCS 1900+GPRS(2Up); Frequency: 1880 MHz;Duty Cycle: 1:4.15

Medium parameters used: f = 1880 MHz; σ = 1.5 mho/m; $ε_r$ = 52.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.772 mW/g

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

Reference Value = 10 V/m; Power Drift = -0.155 dB

Peak SAR (extrapolated) = 1.27 W/kg

SAR(1 g) = 0.695 mW/g; SAR(10 g) = 0.398 mW/g

Maximum value of SAR (measured) = 0.747 mW/g
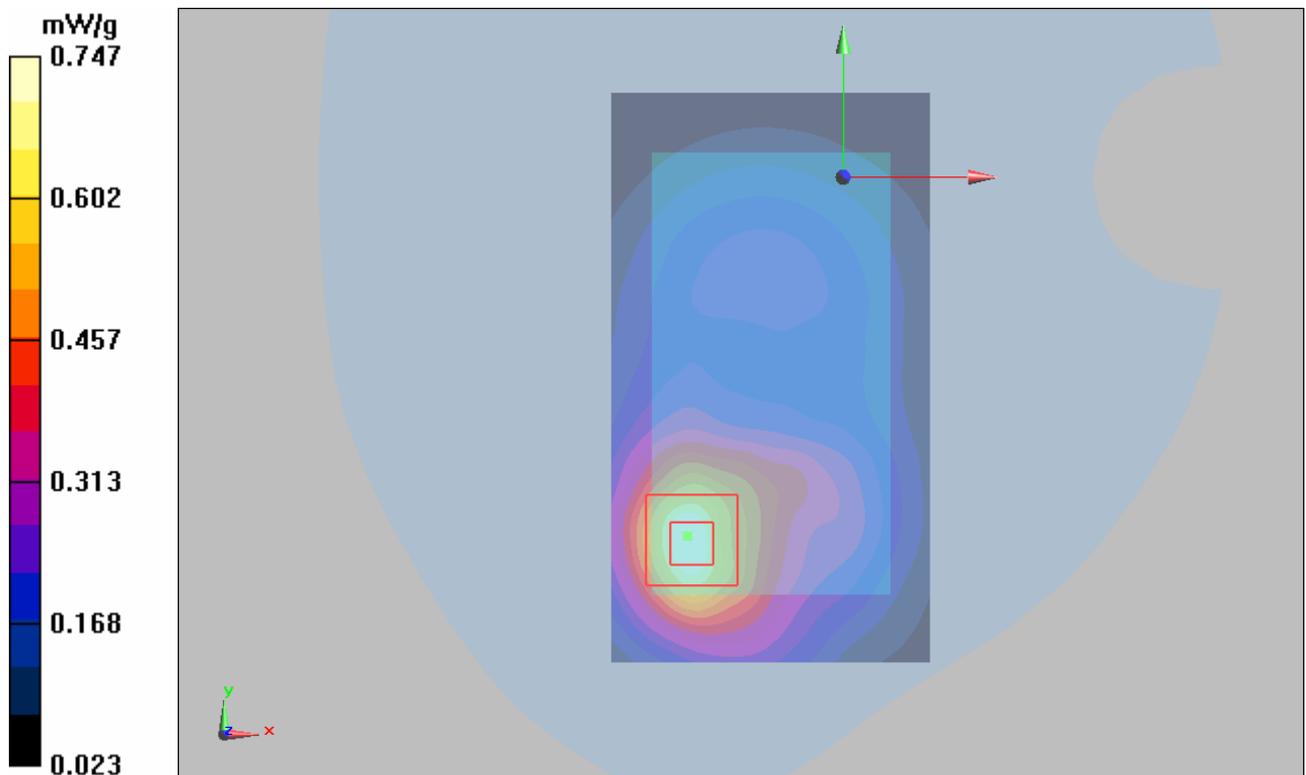
Figure 39 Body, Towards Ground, GSM 1900 GPRS (2UP) Channel 661

GSM 1900+GPRS(2UP) Towards Ground Low

Date/Time: 3/27/2010 9:56:43 PM

Communication System: PCS 1900+GPRS(2Up); Frequency: 1850.2 MHz;Duty Cycle: 1:4.15

Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.46 mho/m; ε_r = 52.8; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.697 mW/g

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

Reference Value = 10.6 V/m; Power Drift = -0.016 dB

Peak SAR (extrapolated) = 1.18 W/kg

SAR(1 g) = 0.639 mW/g; SAR(10 g) = 0.362 mW/g

Maximum value of SAR (measured) = 0.697 mW/g
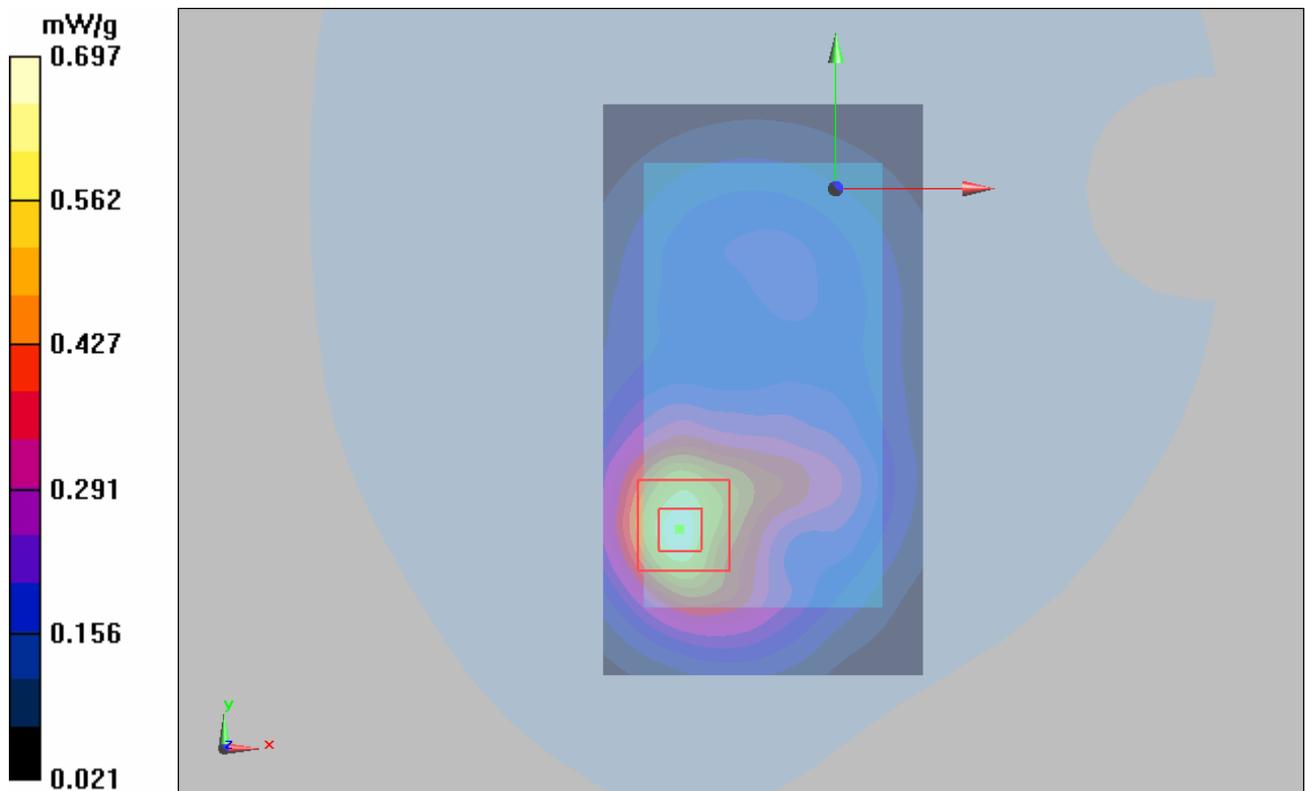
Figure 40 Body, Towards Ground, GSM 1900 GPRS (2UP) Channel 512

GSM 1900+GPRS(2UP) Towards Phantom Middle

Date/Time: 3/27/2010 11:20:01 PM

Communication System: PCS 1900+GPRS(2Up); Frequency: 1880 MHz;Duty Cycle: 1:4.15

Medium parameters used: f = 1880 MHz; σ = 1.5 mho/m; $ε_r$ = 52.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Phantom Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.367 mW/g

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

Reference Value = 10.1 V/m; Power Drift = -0.057 dB

Peak SAR (extrapolated) = 0.557 W/kg

SAR(1 g) = 0.330 mW/g; SAR(10 g) = 0.208 mW/g

Maximum value of SAR (measured) = 0.352 mW/g
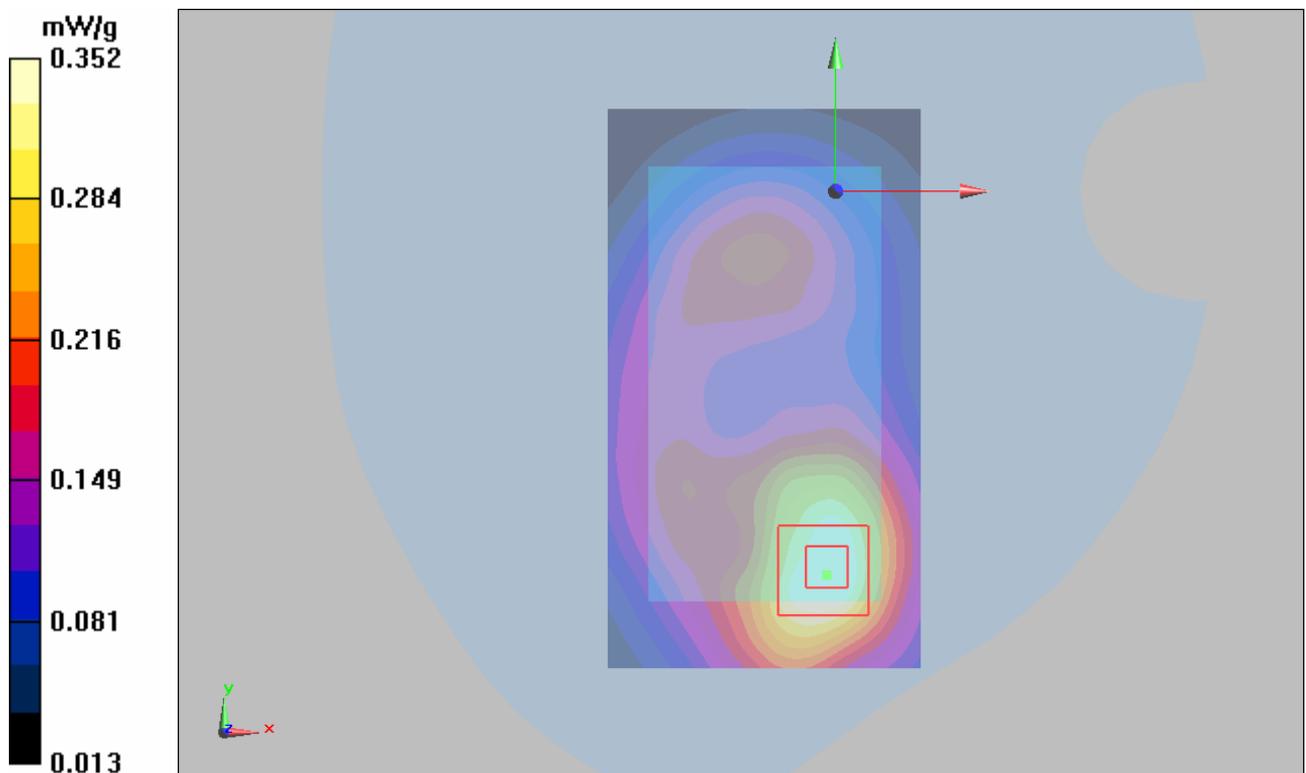
Figure 41 Body, Towards Phantom, GSM 1900 GPRS (2UP) Channel 661

GSM 1900+EGPRS(2UP) Towards Ground High

Date/Time: 3/27/2010 10:35:20 PM

Communication System: PCS 1900+EGPRS(2Up); Frequency: 1909.8 MHz;Duty Cycle: 1:4.15

Medium parameters used: f = 1910 MHz; σ = 1.56 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.769 mW/g

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

Reference Value = 11.4 V/m; Power Drift = -0.040 dB

Peak SAR (extrapolated) = 1.3 W/kg

SAR(1 g) = 0.698 mW/g; SAR(10 g) = 0.398 mW/g

Maximum value of SAR (measured) = 0.755 mW/g
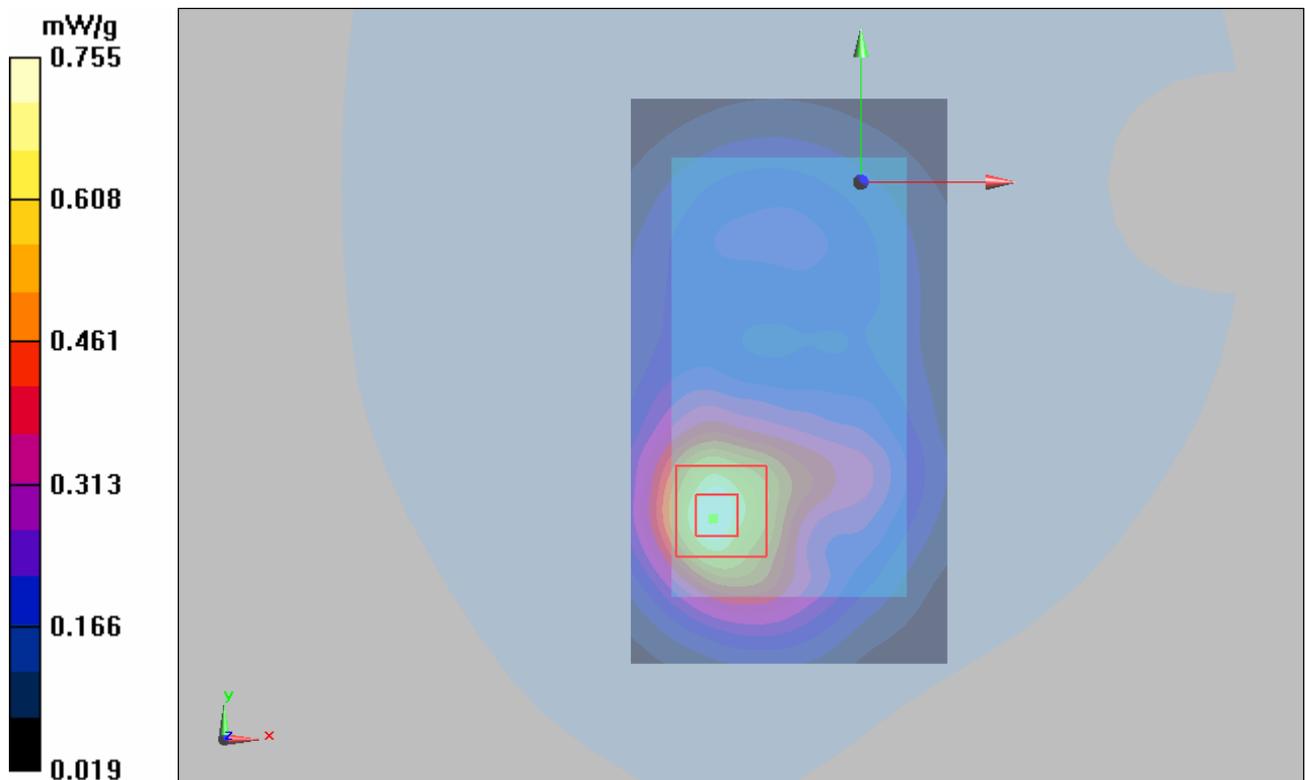
Figure 42 Body, Towards Ground, GSM 1900 EGPRS(2UP) Channel 810

WCDMA Band II Left Cheek Middle

Date/Time: 3/26/2010 2:24:05 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.39 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.53, 7.53, 7.53); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.722 mW/g

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

Reference Value = 9.71 V/m; Power Drift = 0.065 dB

Peak SAR (extrapolated) = 0.938 W/kg

SAR(1 g) = 0.688 mW/g; SAR(10 g) = 0.417 mW/g

Maximum value of SAR (measured) = 0.752 mW/g

Cheek Middle/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.71 V/m; Power Drift = 0.065 dB

Peak SAR (extrapolated) = 1.03 W/kg

SAR(1 g) = 0.653 mW/g; SAR(10 g) = 0.357 mW/g

Maximum value of SAR (measured) = 0.743 mW/g
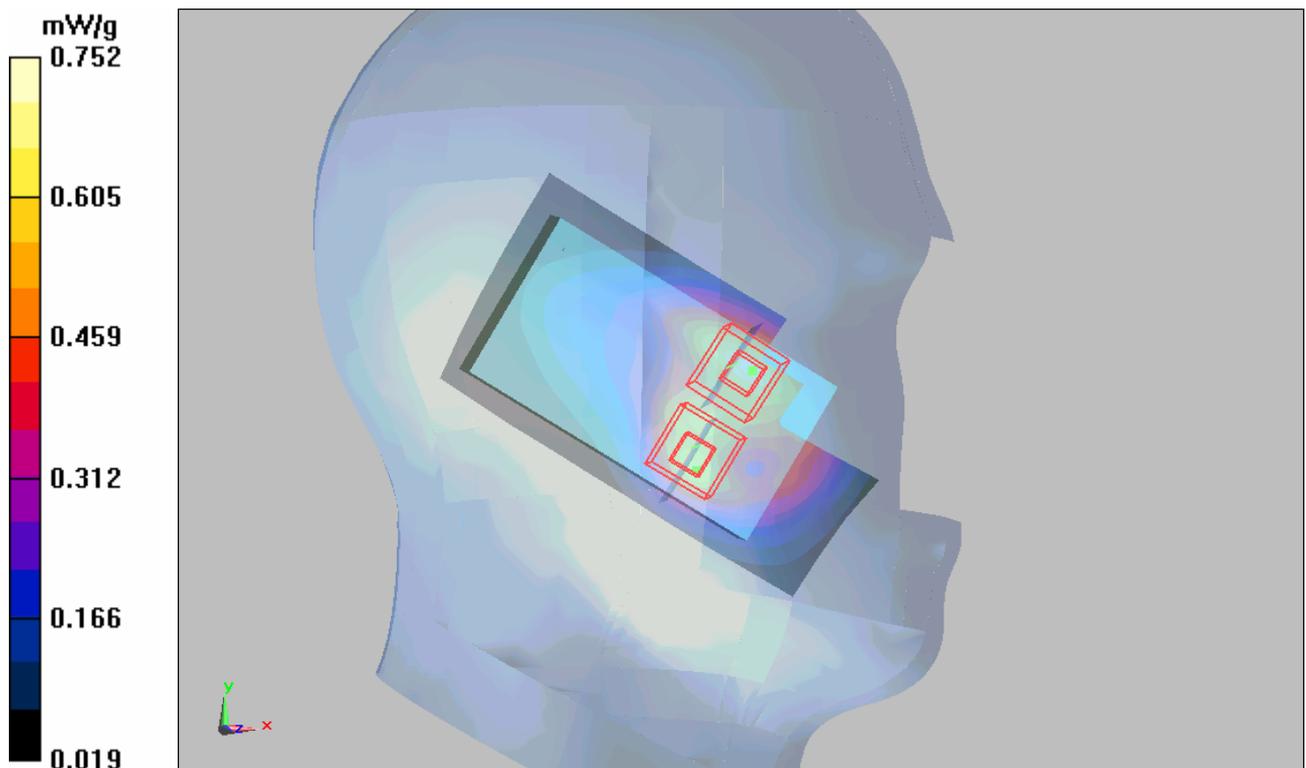
Figure 43 Left Hand Touch Cheek WCDMA Band II Channel 9400

WCDMA Band II Left Tilt Middle

Date/Time: 3/26/2010 1:50:17 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.39 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.53, 7.53, 7.53); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Tilt Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 15.3 V/m; Power Drift = 0.009 dB

Peak SAR (extrapolated) = 0.409 W/kg

SAR(1 g) = 0.290 mW/g; SAR(10 g) = 0.178 mW/g

Maximum value of SAR (measured) = 0.321 mW/g
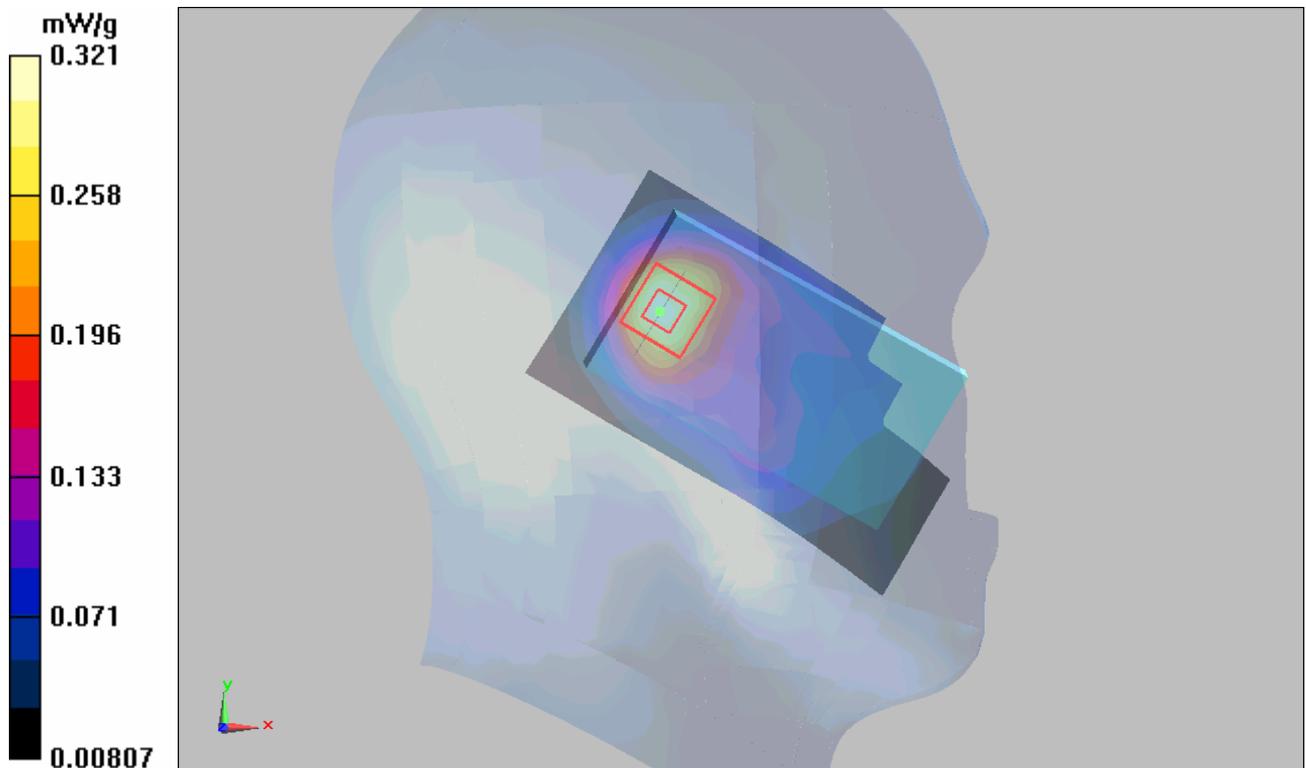
Figure 44 Left Hand Tilt 15° WCDMA Band II Channel 9400

WCDMA Band II Right Cheek High

Date/Time: 3/26/2010 10:08:47 PM

Communication System: WCDMA Band II; Frequency: 1907.6 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1908 MHz; σ = 1.43 mho/m; ε_r = 40.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.53, 7.53, 7.53); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 10.2 V/m; Power Drift = -0.099 dB

Peak SAR (extrapolated) = 1.55 W/kg

SAR(1 g) = 1.05 mW/g; SAR(10 g) = 0.588 mW/g

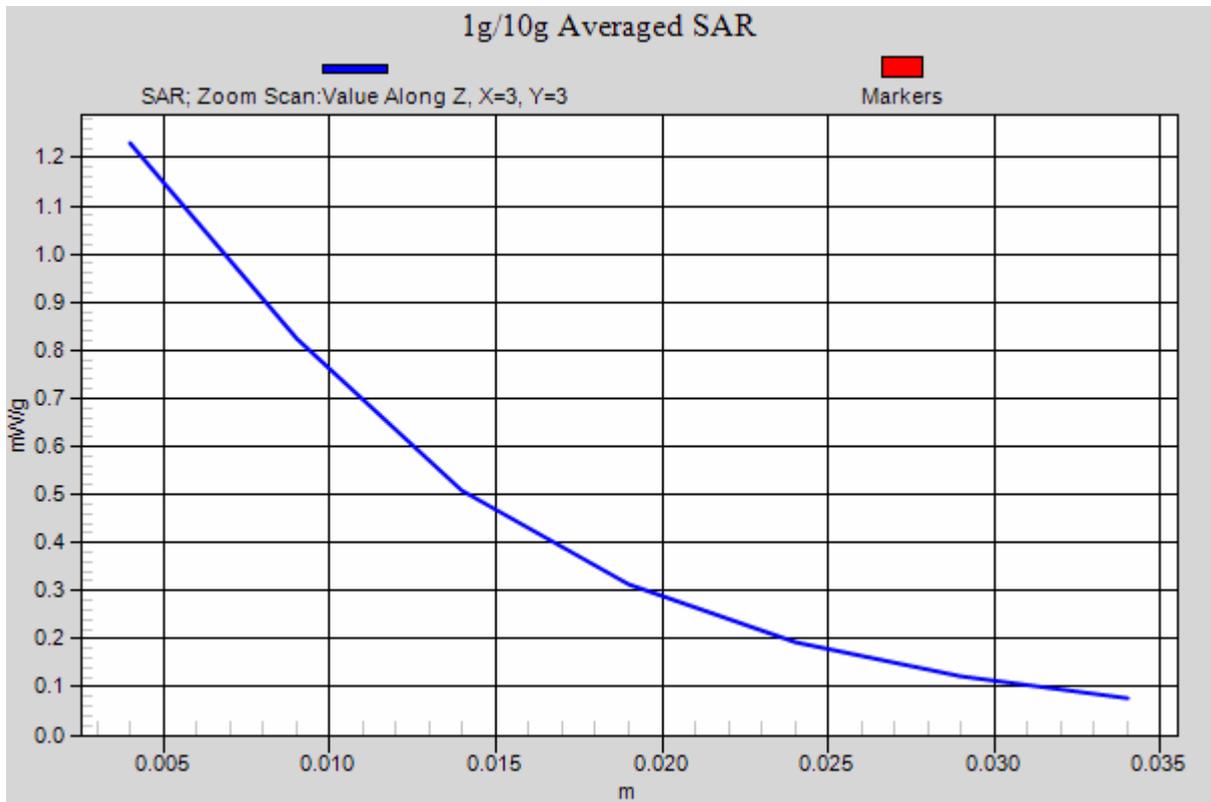Maximum value of SAR (measured) = 1.19 mW/g
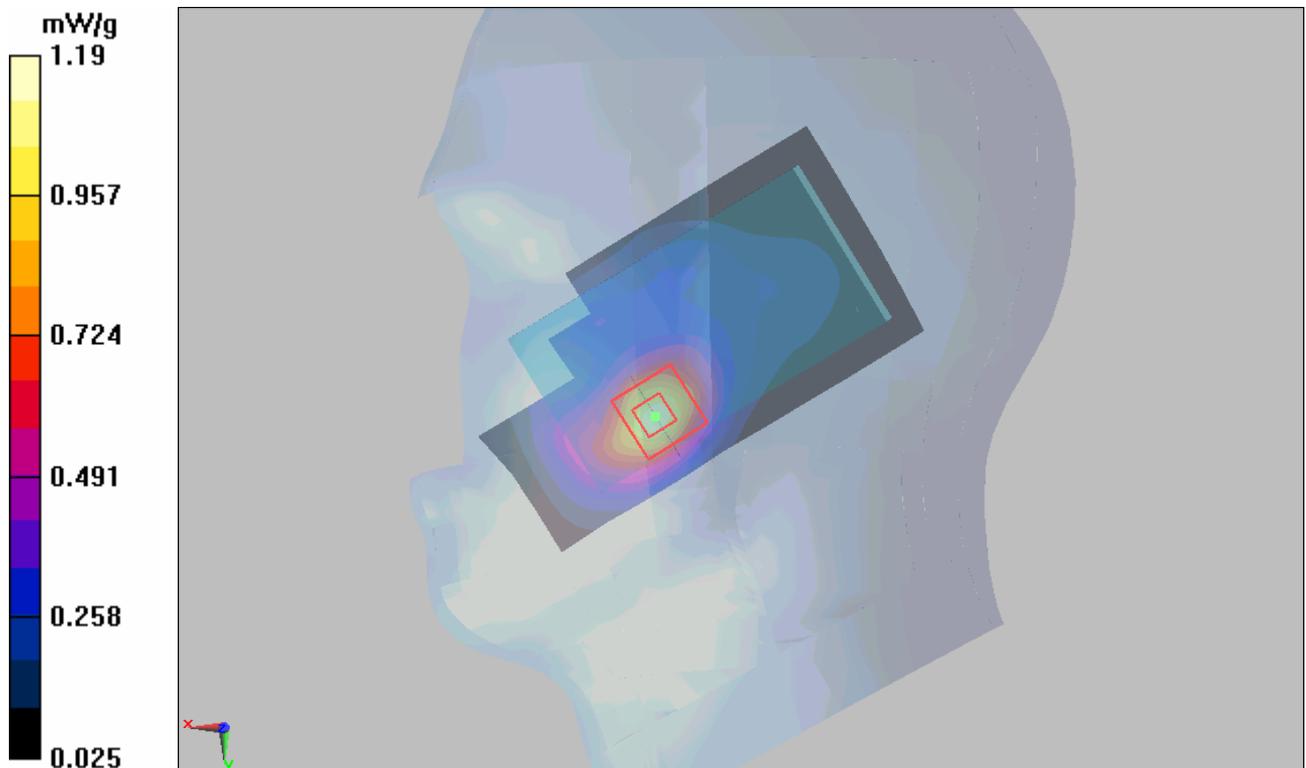
Figure 45 Right Hand Touch Cheek WCDMA Band II Channel 9538

WCDMA Band II Right Cheek Middle

Date/Time: 3/26/2010 9:46:25 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.39 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.53, 7.53, 7.53); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.09 mW/g

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

Reference Value = 9.75 V/m; Power Drift = -0.077 dB

Peak SAR (extrapolated) = 1.55 W/kg

SAR(1 g) = 1.04 mW/g; SAR(10 g) = 0.584 mW/g

Maximum value of SAR (measured) = 1.19 mW/g
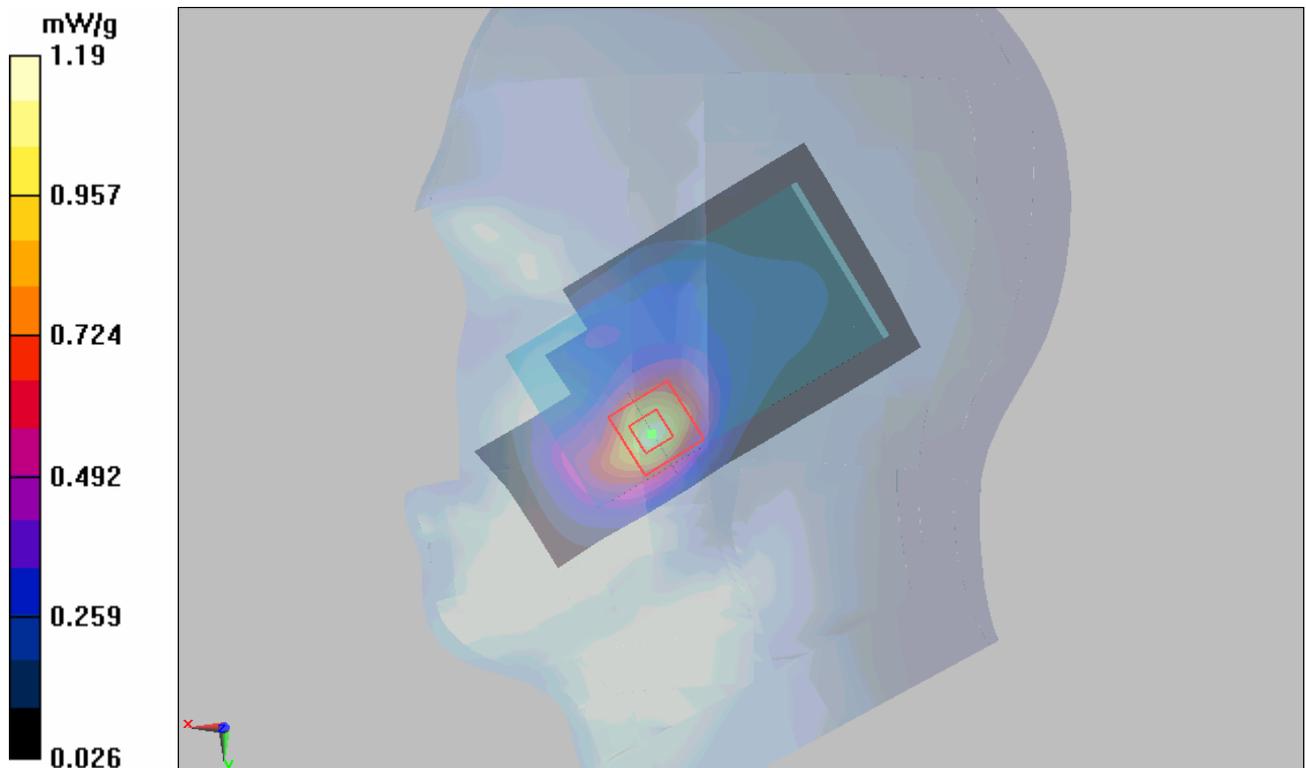
Figure 46 Right Hand Touch Cheek WCDMA Band II Channel 9400

WCDMA Band II Right Cheek Low

Date/Time: 3/26/2010 10:33:03 PM

Communication System: WCDMA Band II; Frequency: 1852.4 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.36 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.53, 7.53, 7.53); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.16 mW/g

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

Reference Value = 9.22 V/m; Power Drift = -0.178 dB

Peak SAR (extrapolated) = 1.64 W/kg

SAR(1 g) = 1.09 mW/g; SAR(10 g) = 0.605 mW/g

Maximum value of SAR (measured) = 1.23 mW/g
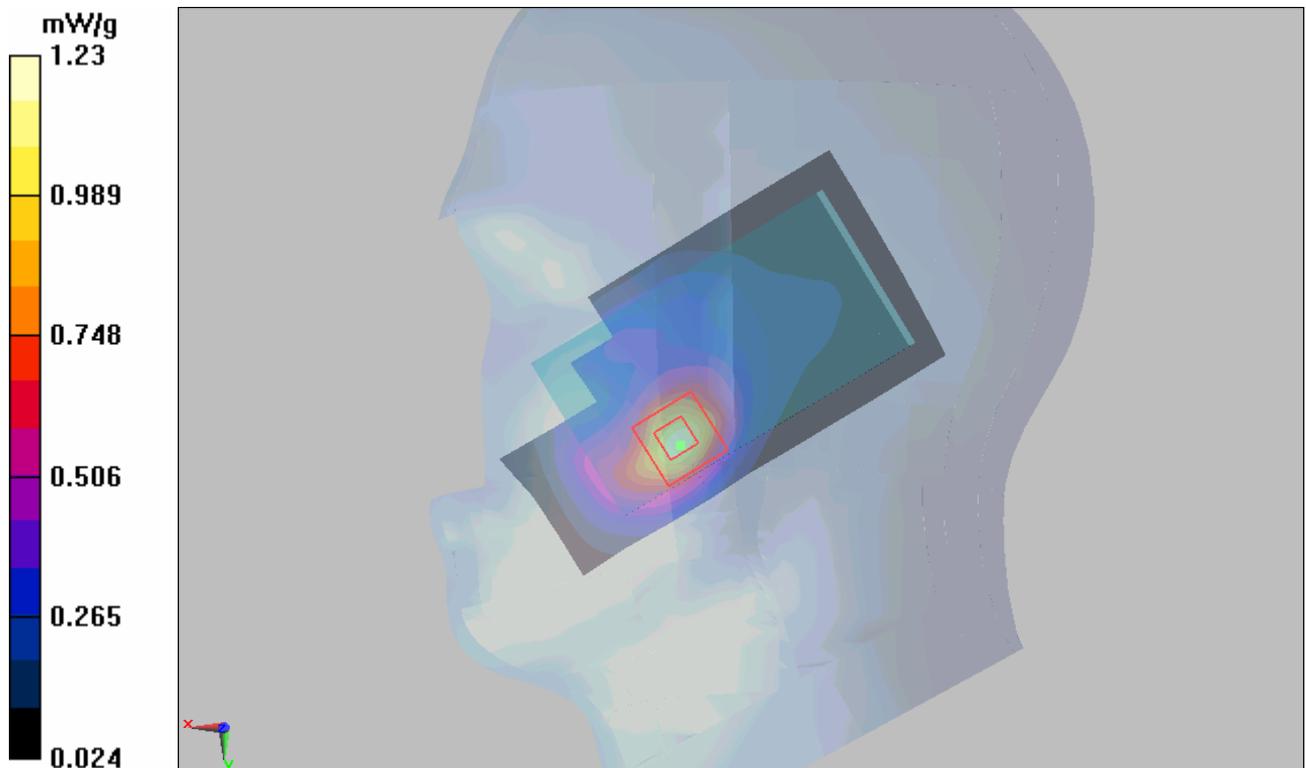
Figure 47 Right Hand Touch Cheek WCDMA Band II Channel 9262

WCDMA Band II Right Tilt Middle

Date/Time: 3/26/2010 10:55:45 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.39 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.53, 7.53, 7.53); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Tilt Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.288 mW/g

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

Reference Value = 14.7 V/m; Power Drift = 0.009 dB

Peak SAR (extrapolated) = 0.361 W/kg

SAR(1 g) = 0.258 mW/g; SAR(10 g) = 0.158 mW/g

Maximum value of SAR (measured) = 0.285 mW/g
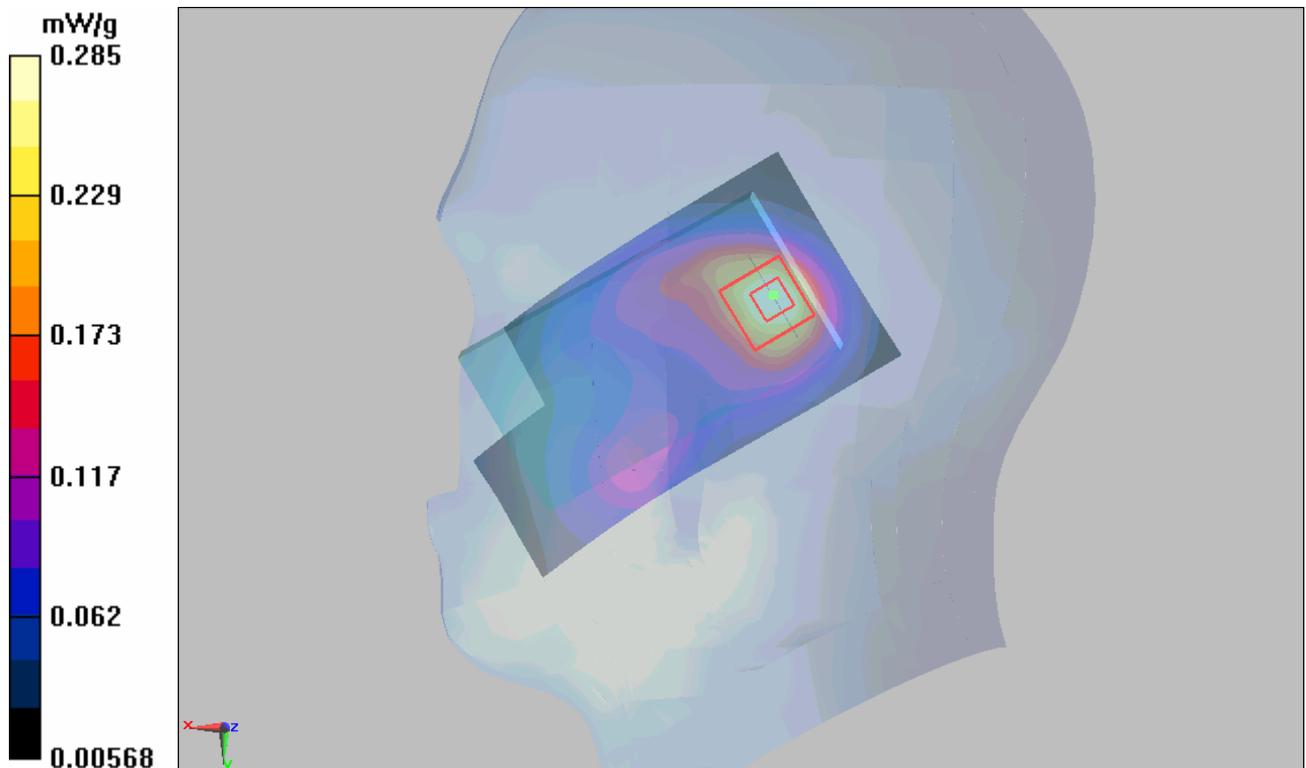
Figure 48 Right Hand Tilt 15° WCDMA Band II Channel 9400

WCDMA Band II Towards Ground High

Date/Time: 3/28/2010 11:02:07 AM

Communication System: WCDMA Band II; Frequency: 1907.6 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1908 MHz; σ = 1.56 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 8.84 V/m; Power Drift = -0.009 dB

Peak SAR (extrapolated) = 0.775 W/kg

SAR(1 g) = 0.423 mW/g; SAR(10 g) = 0.246 mW/g
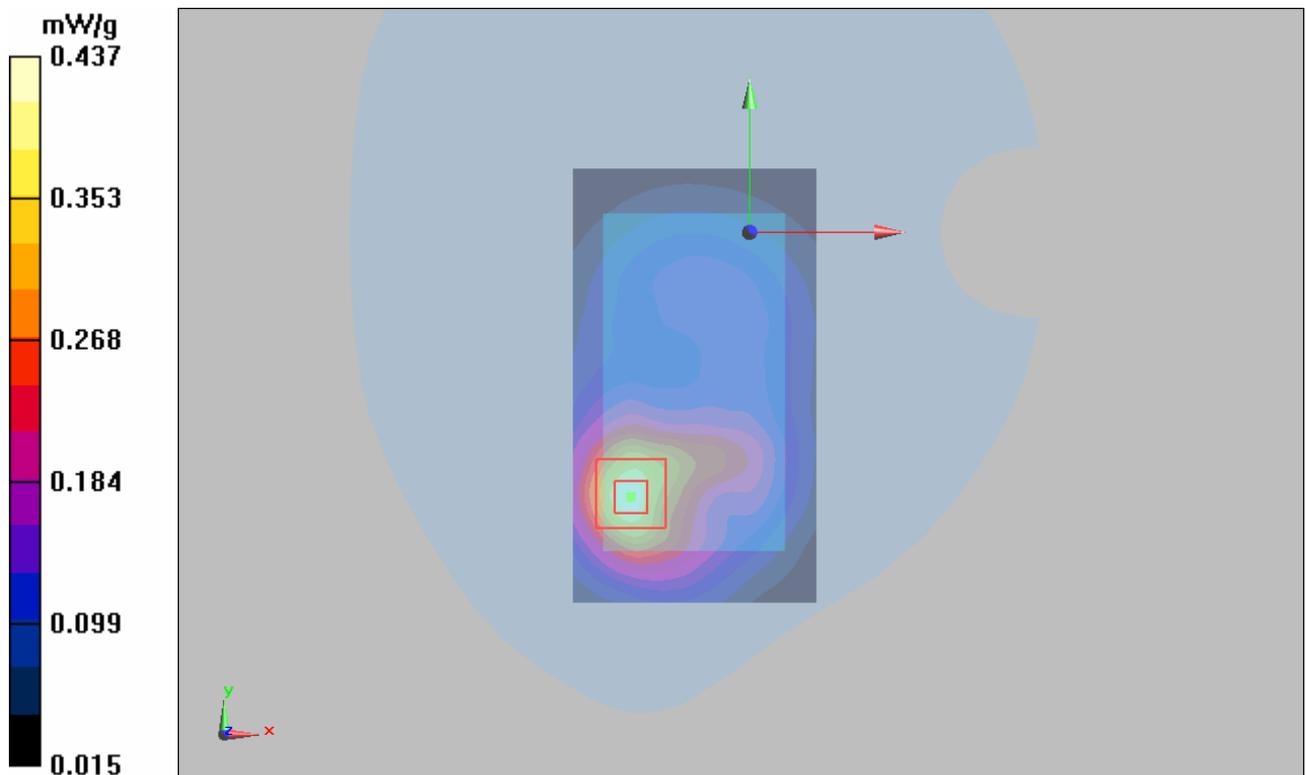
Maximum value of SAR (measured) = 0.457 mW/g
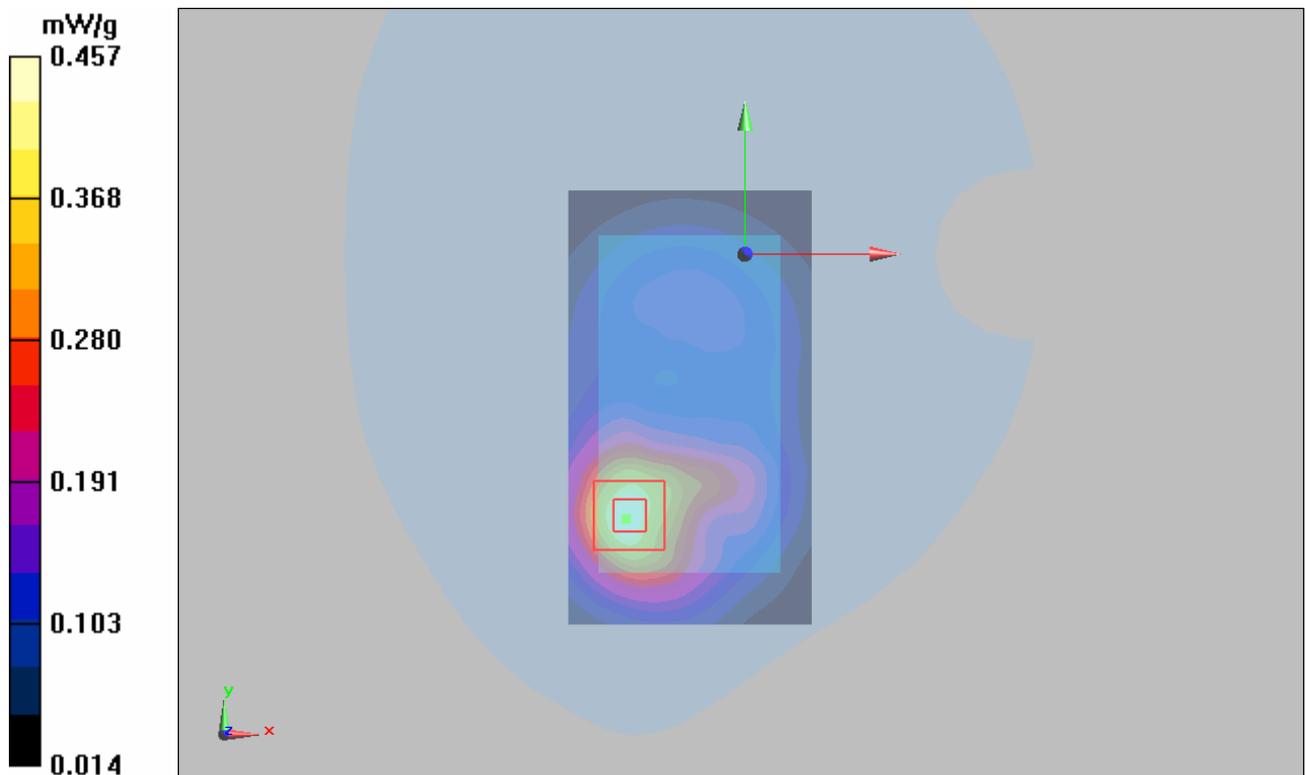
Figure 49 Body, Towards Ground, WCDMA Band II Channel 9538

WCDMA Band II Towards Ground Middle

Date/Time: 3/28/2010 10:38:59 AM

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

Medium parameters used: f = 1880 MHz; σ = 1.5 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.449 mW/g

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

Reference Value = 8.7 V/m; Power Drift = 0.028 dB

Peak SAR (extrapolated) = 0.744 W/kg

SAR(1 g) = 0.410 mW/g; SAR(10 g) = 0.238 mW/g

Maximum value of SAR (measured) = 0.443 mW/g
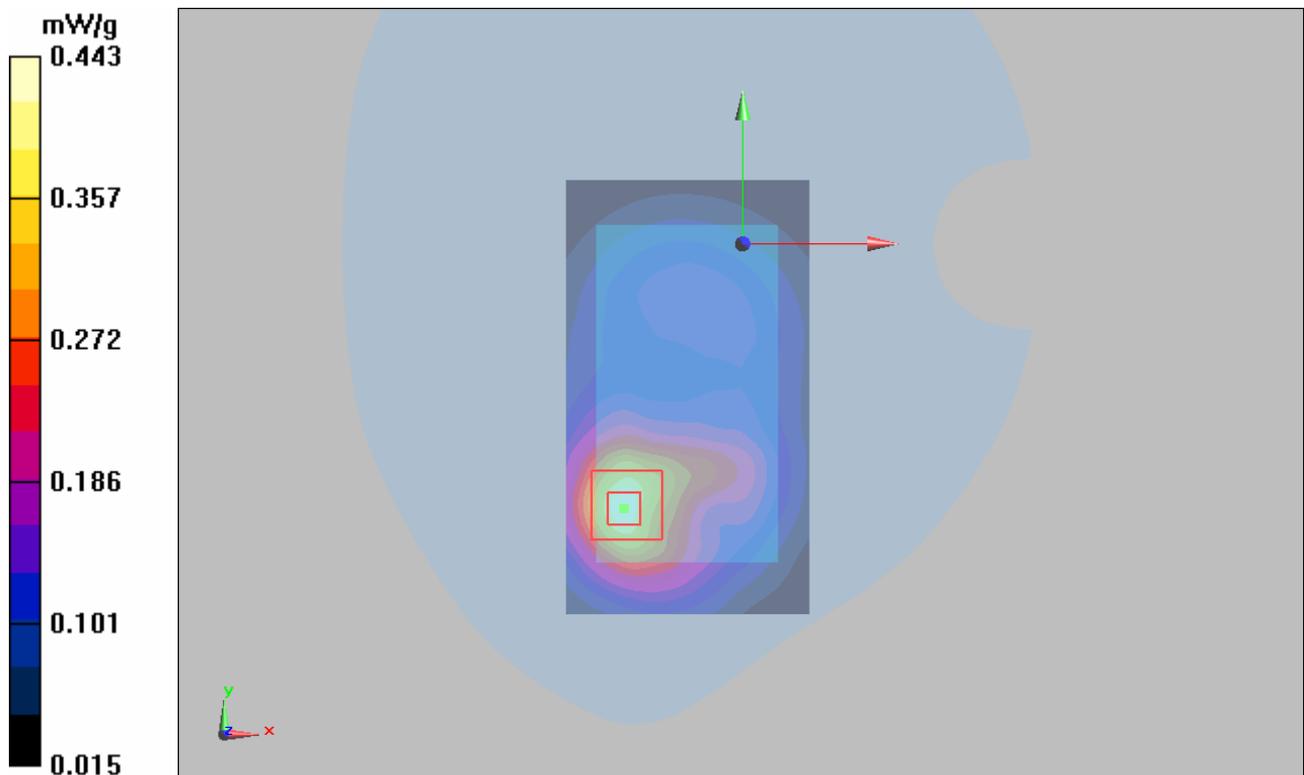
Figure 50 Body, Towards Ground, WCDMA Band II Channel 9400

WCDMA Band II Towards Ground Low

Date/Time: 3/28/2010 11:25:03 AM

Communication System: WCDMA Band II; Frequency: 1852.4 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.46 mho/m; $ε_r$ = 52.8; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 8.53 V/m; Power Drift = 0.067 dB

Peak SAR (extrapolated) = 0.716 W/kg

SAR(1 g) = 0.401 mW/g; SAR(10 g) = 0.233 mW/g

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

Figure 51 Body, Towards Ground, WCDMA Band II Channel 9262

WCDMA Band II Towards Phantom Middle

Date/Time: 3/28/2010 10:15:26 AM

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

Medium parameters used: f = 1880 MHz; σ = 1.5 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Phantom Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.275 mW/g

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

Reference Value = 9.17 V/m; Power Drift = 0.134 dB

Peak SAR (extrapolated) = 0.426 W/kg

SAR(1 g) = 0.255 mW/g; SAR(10 g) = 0.160 mW/g

Maximum value of SAR (measured) = 0.271 mW/g
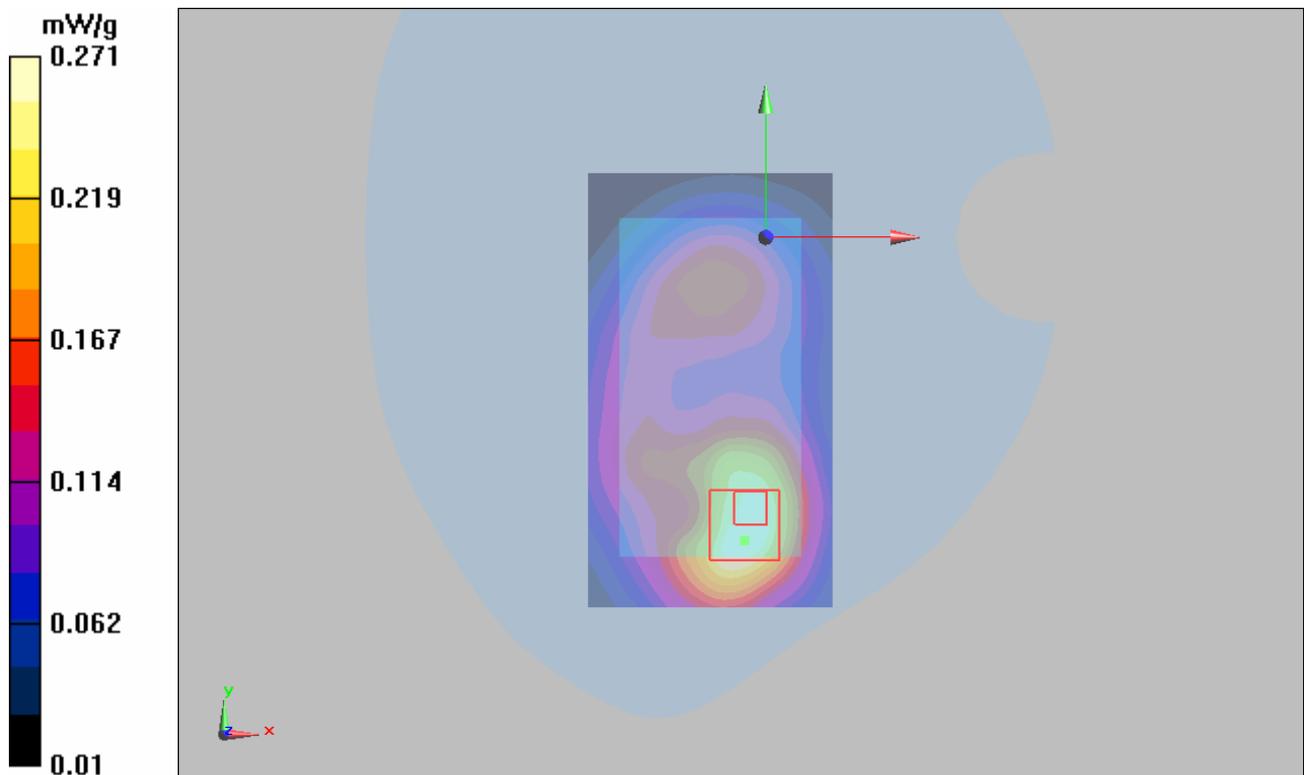
Figure 52 Body, Towards Phantom, WCDMA Band II Channel 9400

WCDMA Band II with Earphone Towards Ground High

Date/Time: 3/28/2010 11:48:08 AM

Communication System: WCDMA Band II; Frequency: 1907.6 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1908 MHz; σ = 1.56 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 8.41 V/m; Power Drift = 0.063 dB

Peak SAR (extrapolated) = 0.808 W/kg

SAR(1 g) = 0.437 mW/g; SAR(10 g) = 0.247 mW/g

Maximum value of SAR (measured) = 0.473 mW/g
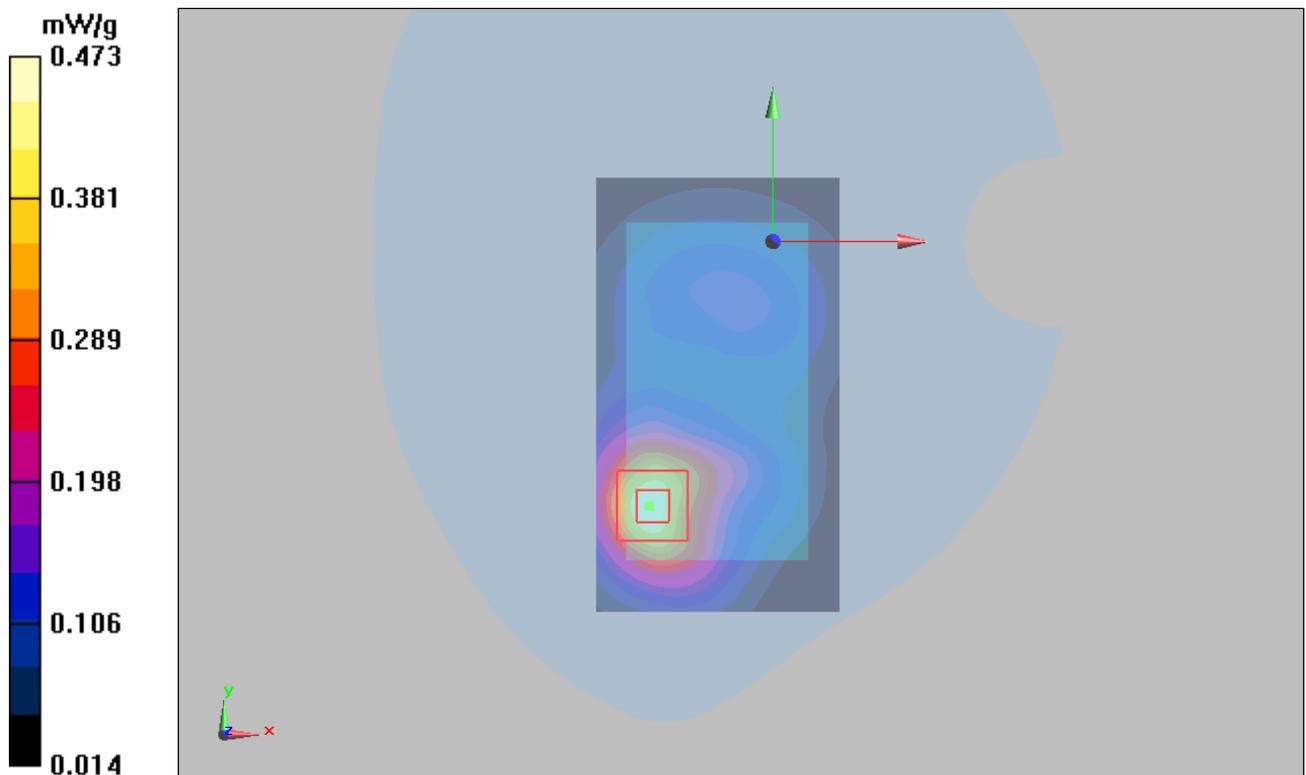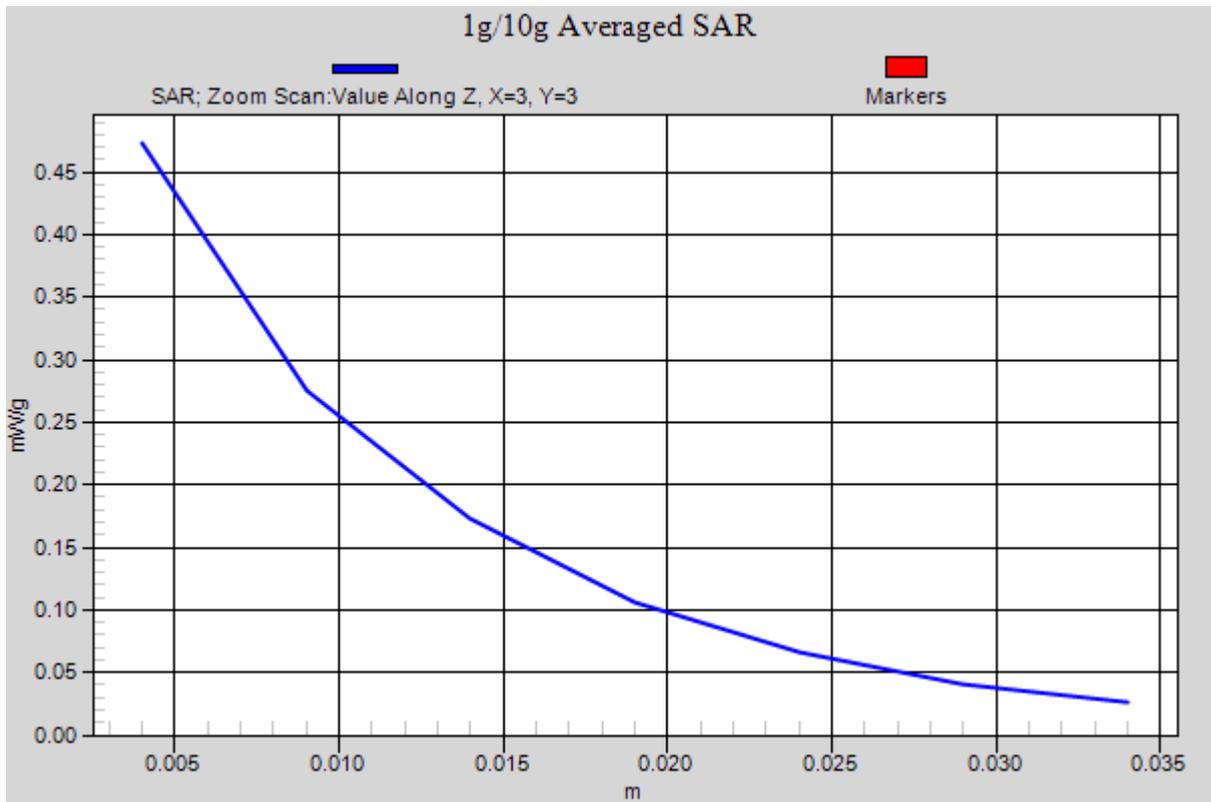
Figure 53 Body, Towards Ground, WCDMA Band II Channel 9538

WCDMA Band II+HSDPA Towards Ground High

Date/Time: 3/28/2010 12:38:30 PM

Communication System: WCDMA Band II+HSDPA; Frequency: 1907.6 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1908 MHz; σ = 1.56 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM000 T01; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.342 mW/g

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

Reference Value = 7.39 V/m; Power Drift = 0.081 dB

Peak SAR (extrapolated) = 0.571 W/kg

SAR(1 g) = 0.311 mW/g; SAR(10 g) = 0.179 mW/g

Maximum value of SAR (measured) = 0.336 mW/g
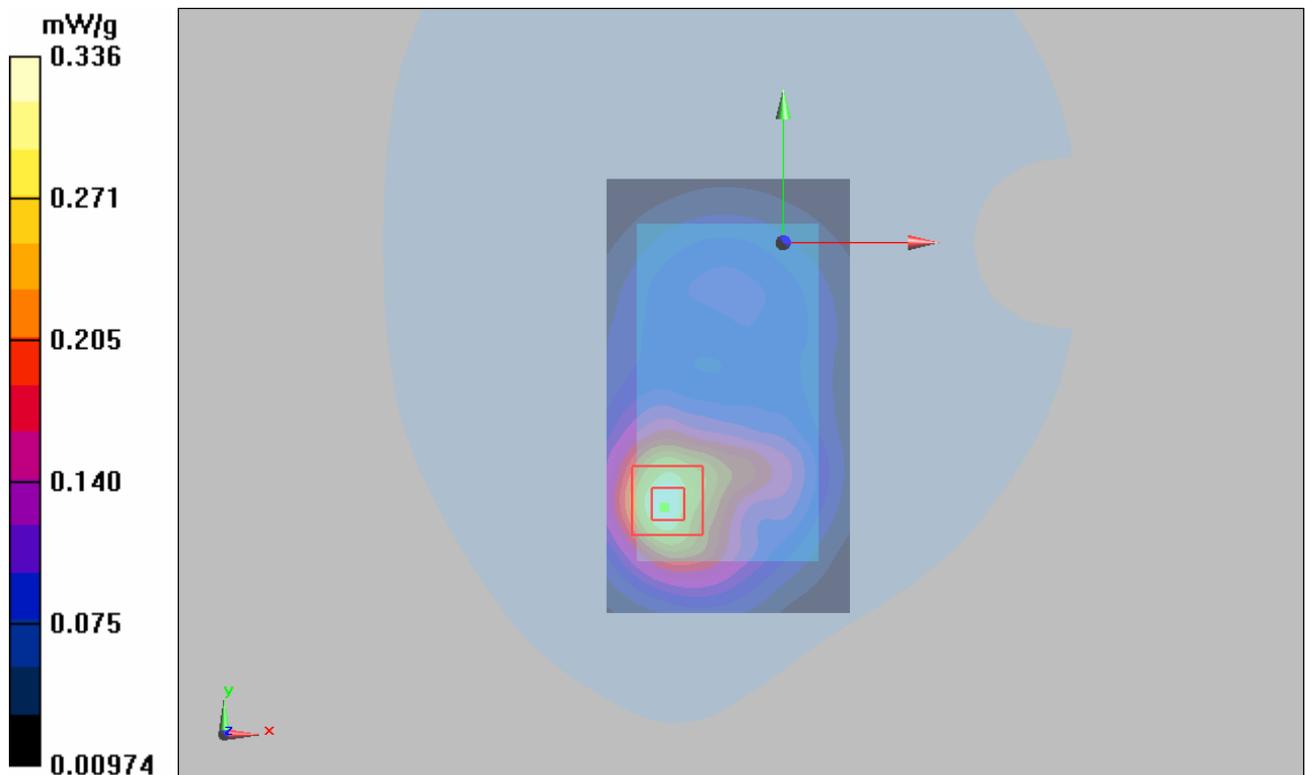
Figure 54 Body, Towards Ground, WCDMA Band II HSDPA Channel 9538

WCDMA Band V Left Cheek Middle

Date/Time: 3/27/2010 3:47:58 PM

Communication System: WCDMA Band V; Frequency: 836.6 MHz;Duty Cycle: 1:1

Medium parameters used: f = 837 MHz; σ = 0.899 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.2, 9.2, 9.2); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.510 mW/g

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

Reference Value = 7.64 V/m; Power Drift = -0.079 dB

Peak SAR (extrapolated) = 0.582 W/kg

SAR(1 g) = 0.481 mW/g; SAR(10 g) = 0.359 mW/g

Maximum value of SAR (measured) = 0.502 mW/g
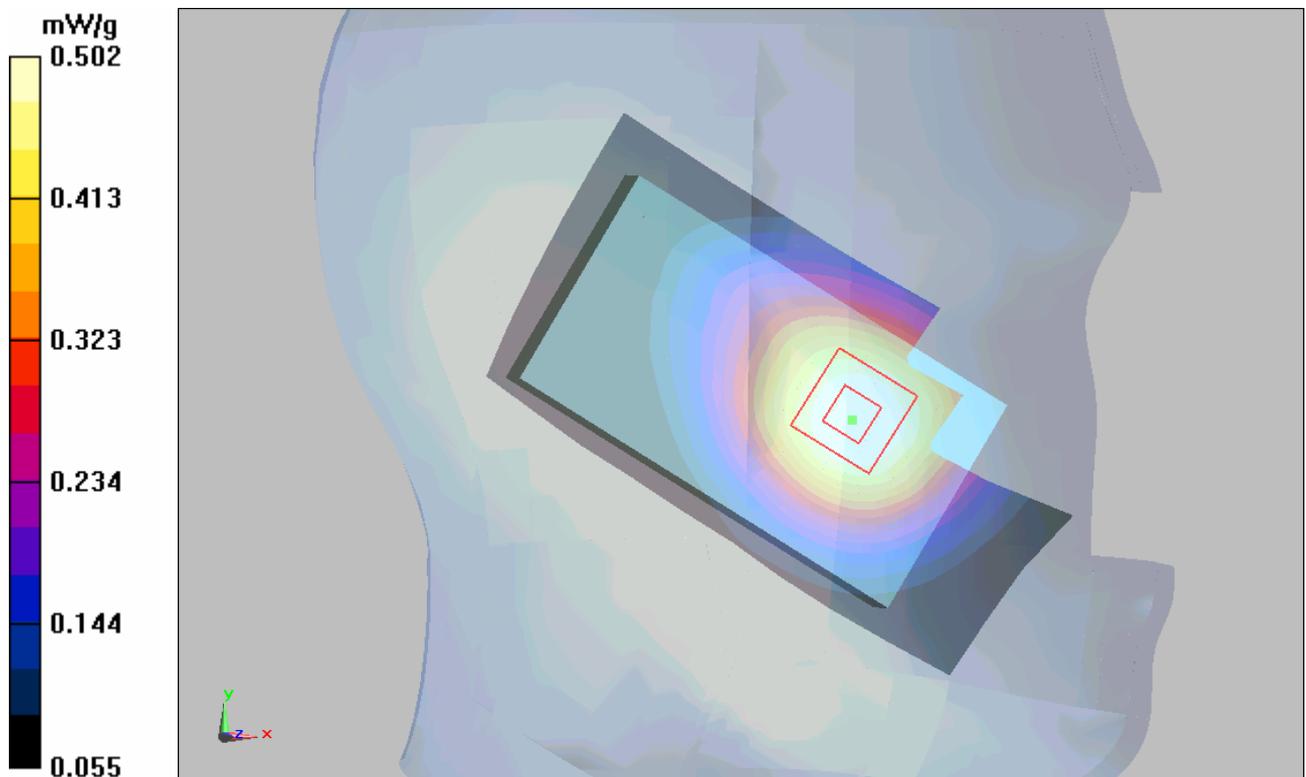
Figure 55 Left Hand Touch Cheek WCDMA Band V Channel 4183

WCDMA Band V Left Tilt Middle

Date/Time: 3/27/2010 3:25:14 PM

Communication System: WCDMA Band V; Frequency: 836.6 MHz;Duty Cycle: 1:1

Medium parameters used: f = 837 MHz; σ = 0.899 mho/m; $ε_r$ = 41.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.2, 9.2, 9.2); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Tilt Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.259 mW/g

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

Reference Value = 11.5 V/m; Power Drift = 0.021 dB

Peak SAR (extrapolated) = 0.312 W/kg

SAR(1 g) = 0.251 mW/g; SAR(10 g) = 0.191 mW/g

Maximum value of SAR (measured) = 0.268 mW/g
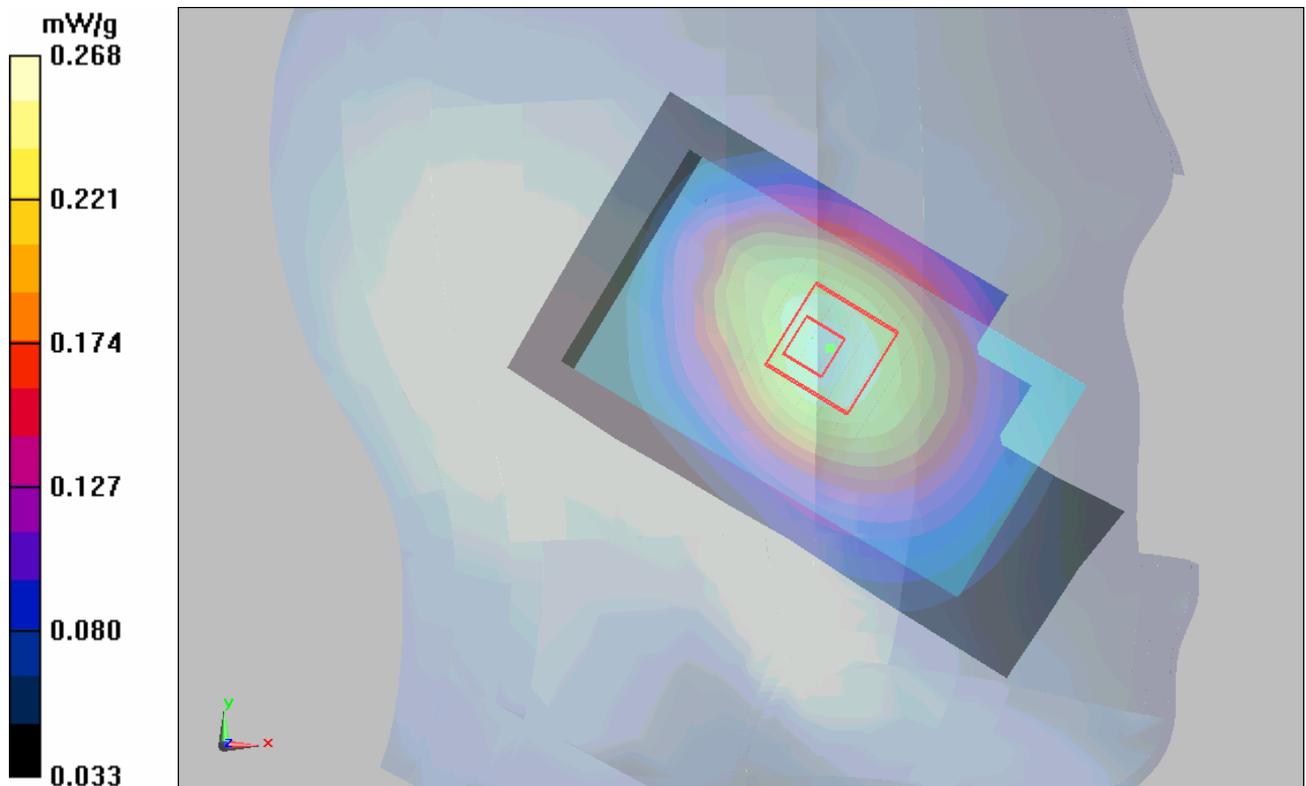
Figure 56 Left Hand Tilt 15° WCDMA Band V Channel 4183

WCDMA Band V Right Cheek High

Date/Time: 3/27/2010 4:36:32 PM

Communication System: WCDMA Band V; Frequency: 846.6 MHz;Duty Cycle: 1:1

Medium parameters used: f = 847 MHz; σ = 0.91 mho/m; ε_r = 41; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃　　　　Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.2, 9.2, 9.2); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.716 mW/g

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

Reference Value = 10 V/m; Power Drift = -0.090 dB

Peak SAR (extrapolated) = 0.898 W/kg

SAR(1 g) = 0.665 mW/g; SAR(10 g) = 0.472 mW/g

Maximum value of SAR (measured) = 0.712 mW/g
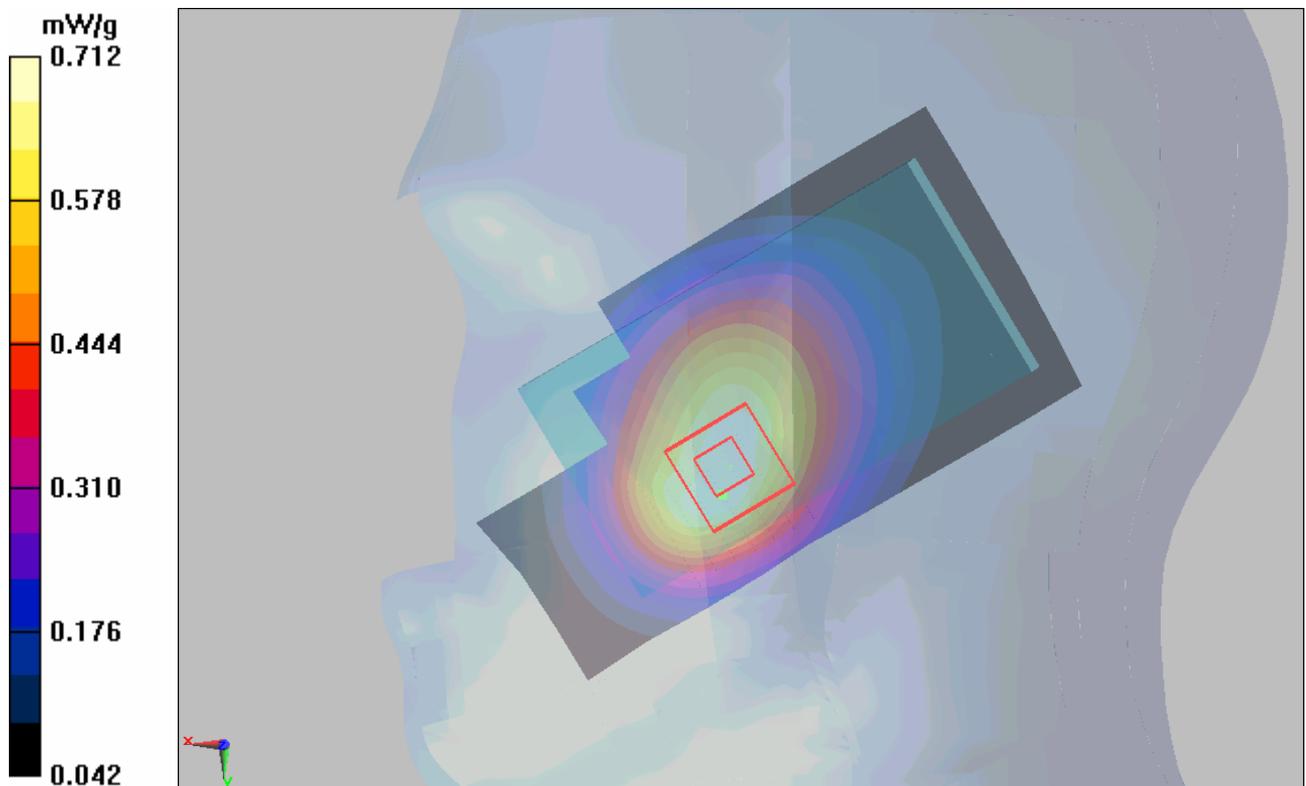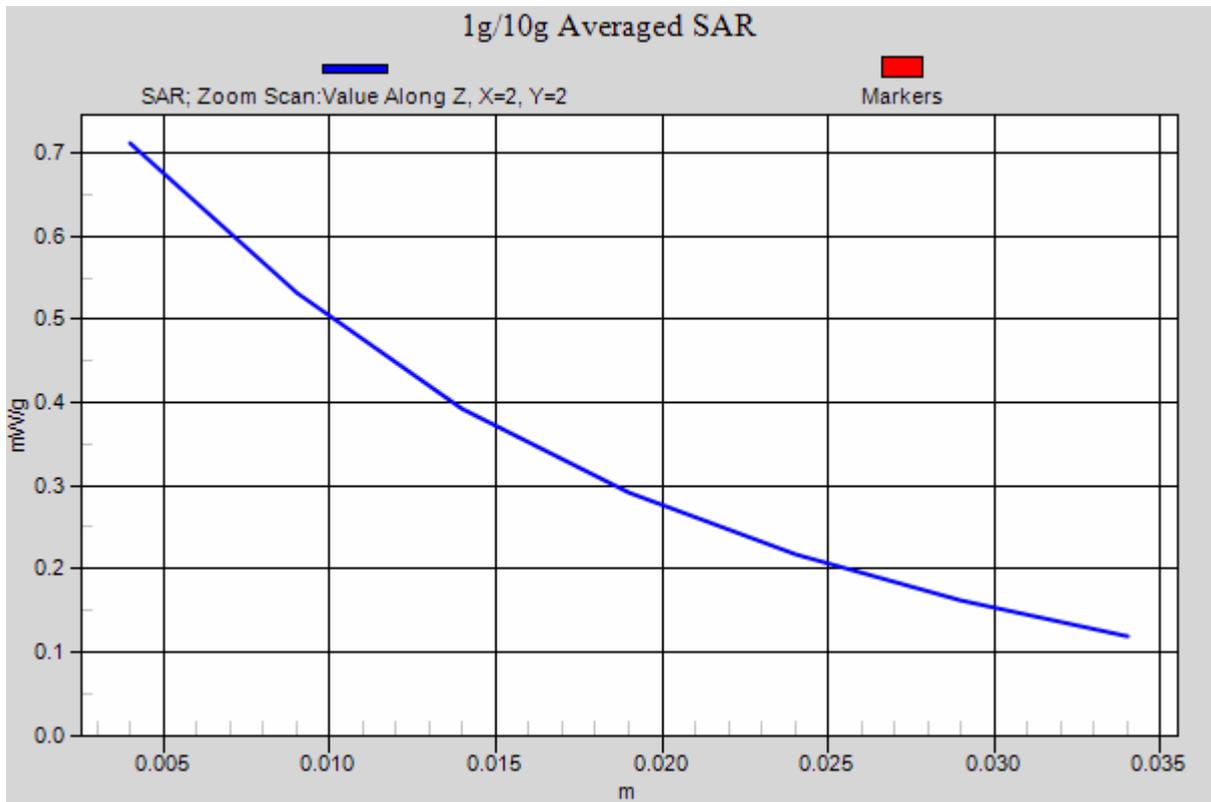
Figure 57 Right Hand Touch Cheek WCDMA Band V Channel 4233

WCDMA Band V Right Cheek Middle

Date/Time: 3/27/2010 4:18:17 PM

Communication System: WCDMA Band V; Frequency: 836.6 MHz;Duty Cycle: 1:1

Medium parameters used: f = 837 MHz; σ = 0.899 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.2, 9.2, 9.2); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.591 mW/g

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

Reference Value = 9.41 V/m; Power Drift = -0.084 dB

Peak SAR (extrapolated) = 0.736 W/kg

SAR(1 g) = 0.555 mW/g; SAR(10 g) = 0.406 mW/g

Maximum value of SAR (measured) = 0.593 mW/g
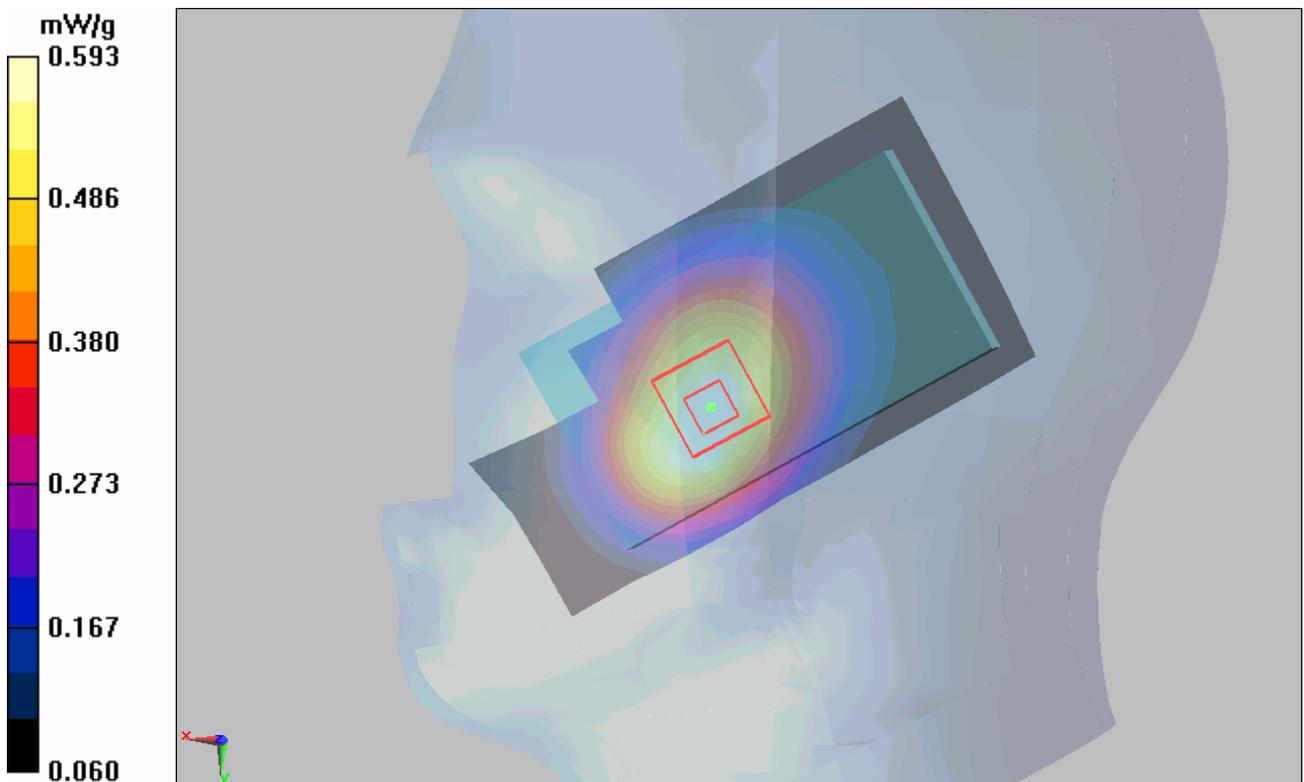
Figure 58 Right Hand Touch Cheek WCDMA Band V Channel 4183

WCDMA Band V Right Cheek Low

Date/Time: 3/27/2010 6:26:25 PM

Communication System: WCDMA Band V; Frequency: 826.4 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.888 mho/m; ε_r = 41.2; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.2, 9.2, 9.2); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.593 mW/g

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

Reference Value = 9.23 V/m; Power Drift = 0.088 dB

Peak SAR (extrapolated) = 0.738 W/kg

SAR(1 g) = 0.549 mW/g; SAR(10 g) = 0.396 mW/g

Maximum value of SAR (measured) = 0.586 mW/g
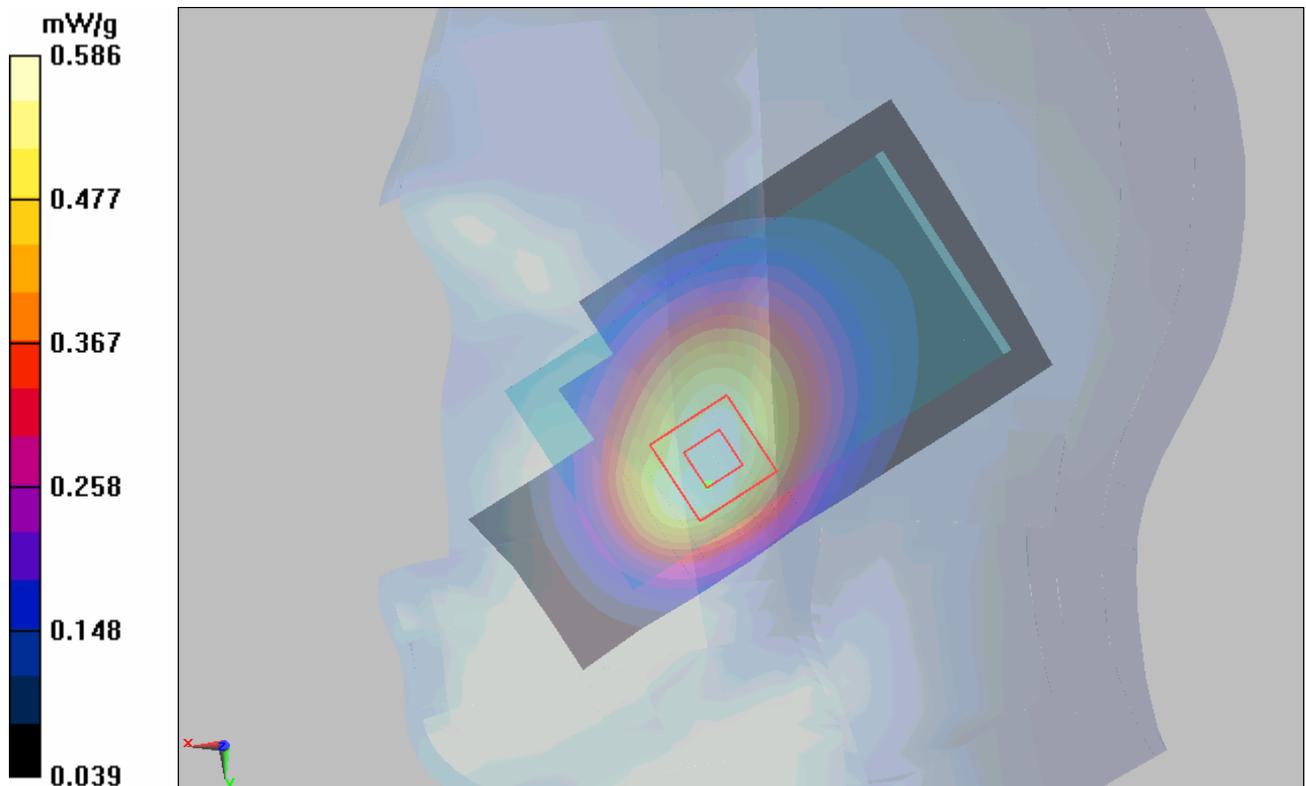
Figure 59 Right Hand Touch Cheek WCDMA Band V Channel 4132

WCDMA Band V Right Tilt Middle

Date/Time: 3/27/2010 6:51:14 PM

Communication System: WCDMA Band V; Frequency: 836.6 MHz;Duty Cycle: 1:1

Medium parameters used: f = 837 MHz; σ = 0.899 mho/m; $ε_r$ = 41.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.2, 9.2, 9.2); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Tilt Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.289 mW/g

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

Reference Value = 12.6 V/m; Power Drift = -0.068 dB

Peak SAR (extrapolated) = 0.336 W/kg

SAR(1 g) = 0.276 mW/g; SAR(10 g) = 0.208 mW/g

Maximum value of SAR (measured) = 0.291 mW/g
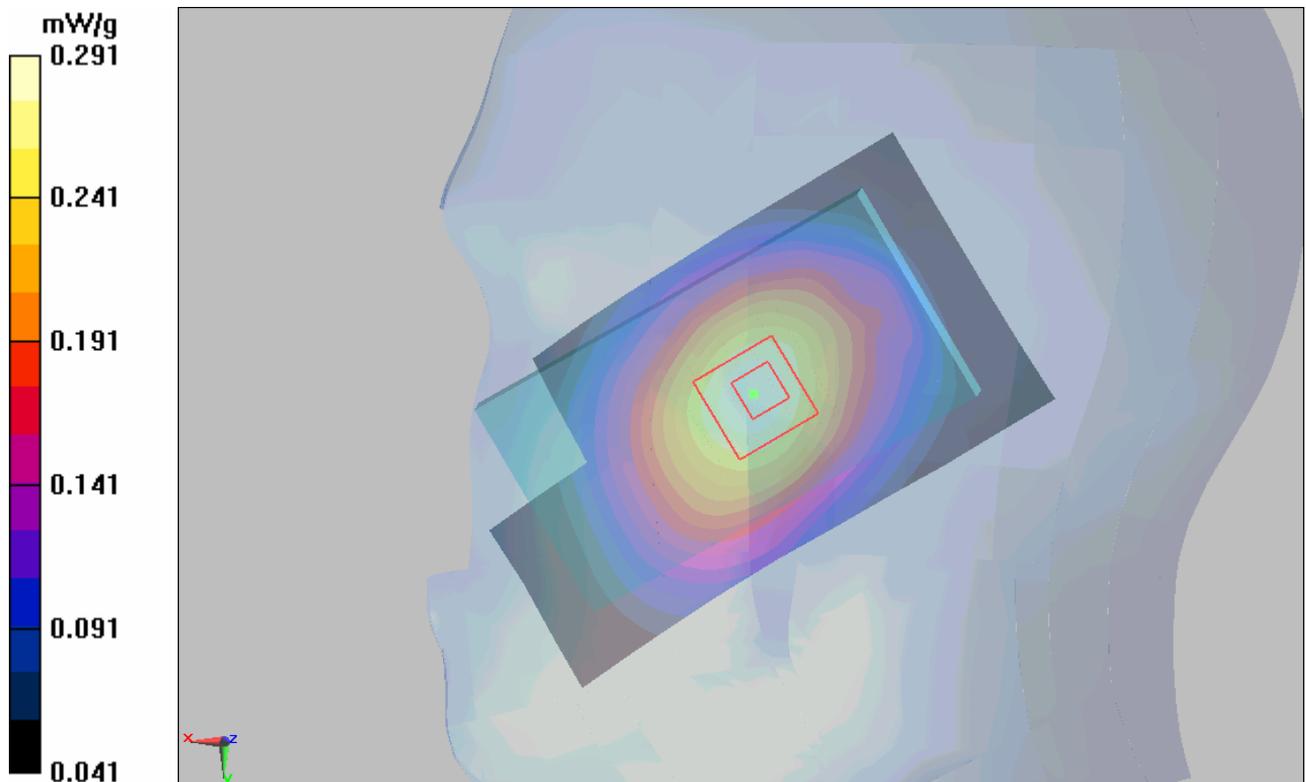
Figure 60 Right Hand Tilt 15° WCDMA Band V Channel 4183

WCDMA Band V Towards Ground High

Date/Time: 3/25/2010 8:02:10 PM

Communication System: WCDMA Band V; Frequency: 846.6 MHz;Duty Cycle: 1:1

Medium parameters used: f = 847 MHz; σ = 1 mho/m; $ε_r$ = 53.9; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.583 mW/g

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

Reference Value = 9.67 V/m; Power Drift = 0.042 dB

Peak SAR (extrapolated) = 0.717 W/kg

SAR(1 g) = 0.548 mW/g; SAR(10 g) = 0.390 mW/g

Maximum value of SAR (measured) = 0.585 mW/g
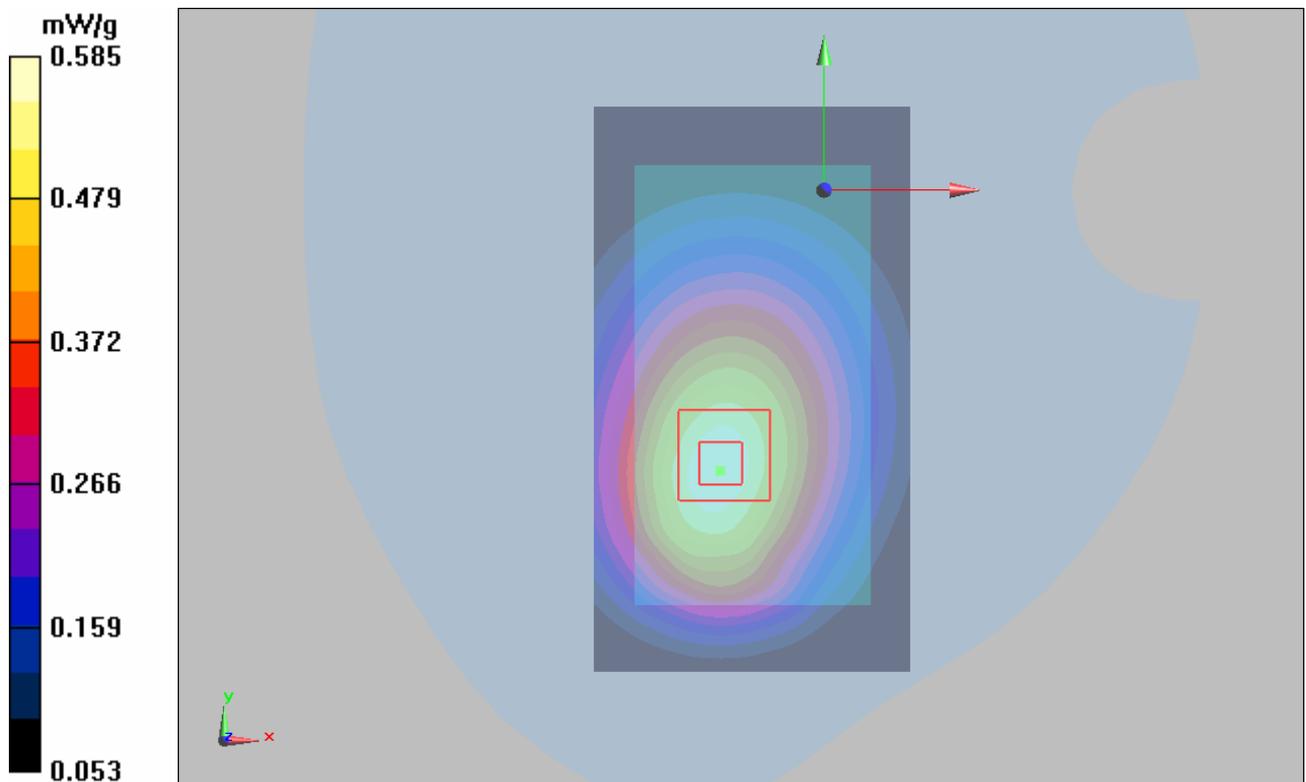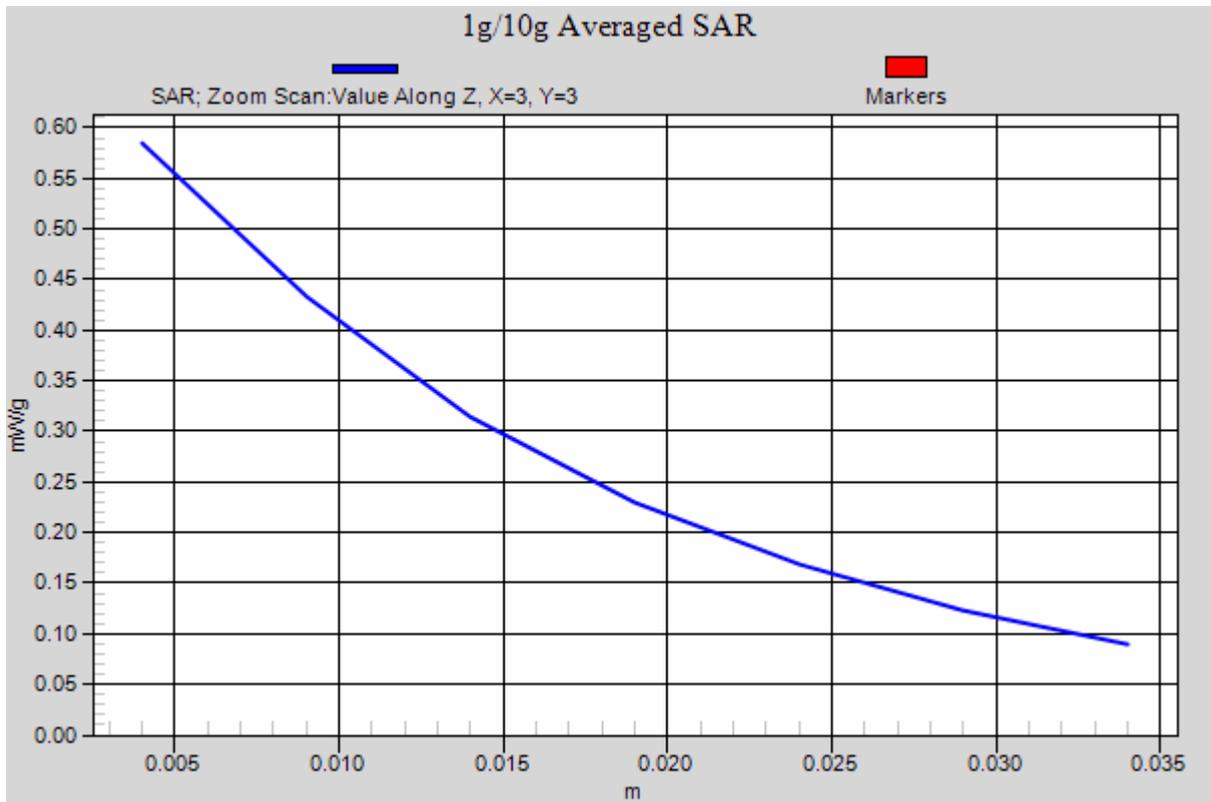
Figure 61 Body, Towards Ground, WCDMA Band V Channel 4233

WCDMA Band V Towards Ground Middle

Date/Time: 3/25/2010 7:36:05 PM

Communication System: WCDMA Band V; Frequency: 836.6 MHz;Duty Cycle: 1:1

Medium parameters used: f = 837 MHz; σ = 0.995 mho/m; ε_r = 54; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.562 mW/g

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

Reference Value = 9.37 V/m; Power Drift = 0.013 dB

Peak SAR (extrapolated) = 0.682 W/kg

SAR(1 g) = 0.521 mW/g; SAR(10 g) = 0.370 mW/g
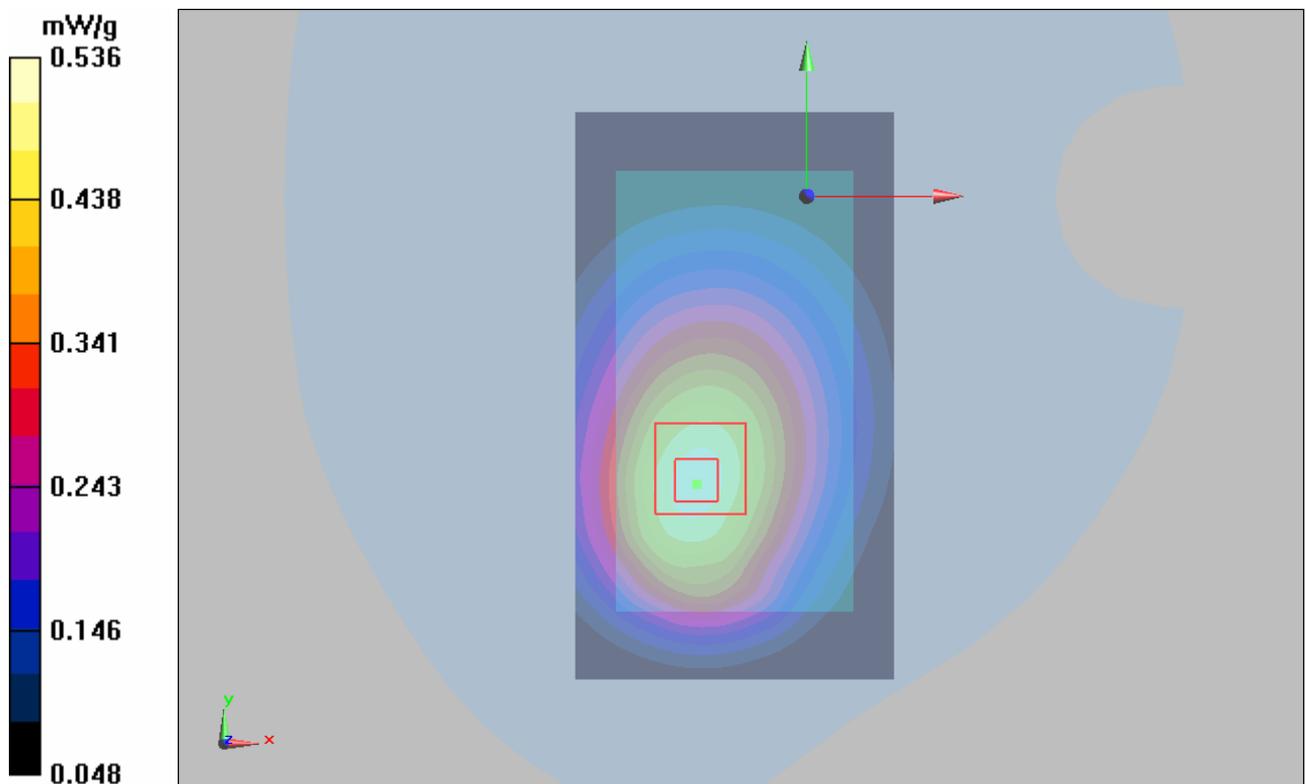
Maximum value of SAR (measured) = 0.556 mW/g
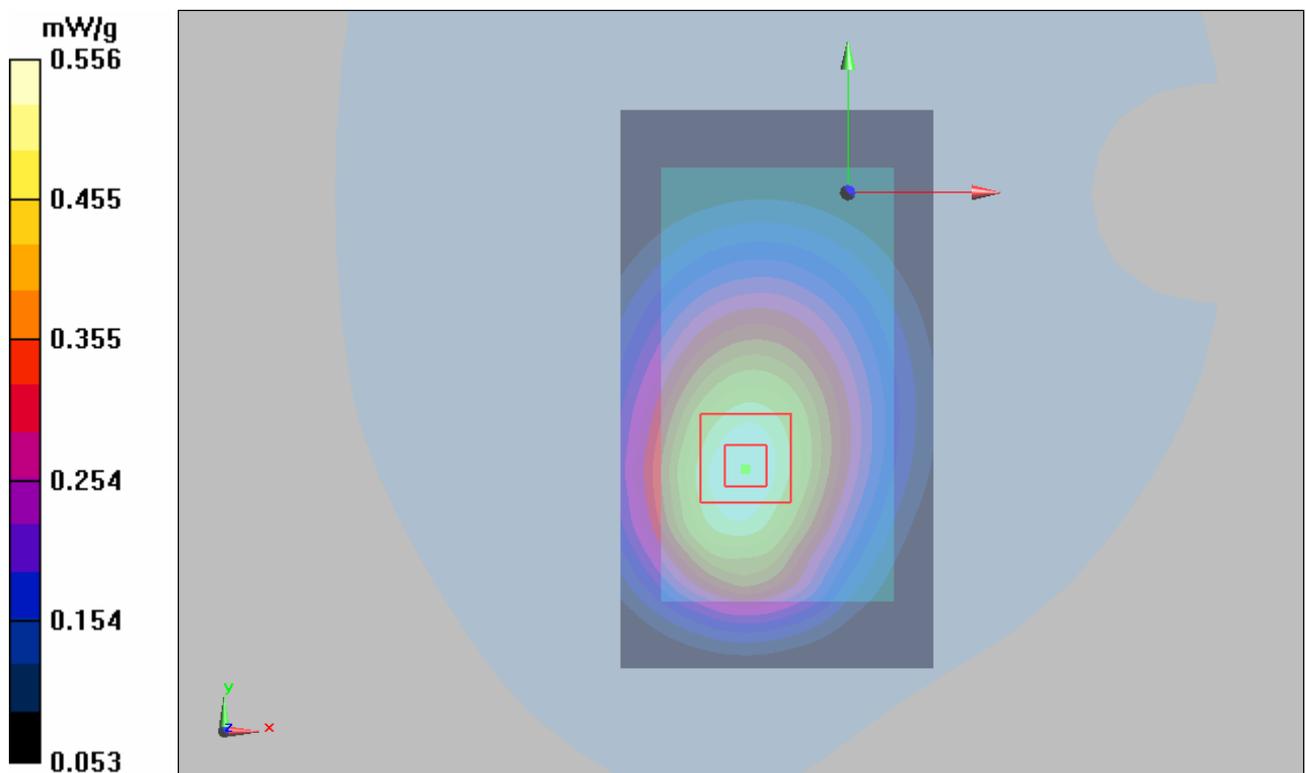
Figure 62 Body, Towards Ground, WCDMA Band V Channel 4183

WCDMA Band V Towards Ground Low

Date/Time: 3/25/2010 8:24:53 PM

Communication System: WCDMA Band V; Frequency: 826.4 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.984 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 8.93 V/m; Power Drift = 0.108 dB

Peak SAR (extrapolated) = 0.661 W/kg

SAR(1 g) = 0.498 mW/g; SAR(10 g) = 0.353 mW/g

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

Figure 63 Body, Towards Ground, WCDMA Band V Channel 4132

WCDMA Band V Towards Phantom Middle

Date/Time: 3/25/2010 7:05:59 PM

Communication System: WCDMA Band V; Frequency: 836.6 MHz;Duty Cycle: 1:1

Medium parameters used: f = 837 MHz; σ = 0.995 mho/m; ε_r = 54; ρ = 1000 kg/m³

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Phantom Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.343 mW/g

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

Reference Value = 8.14 V/m; Power Drift = 0.097 dB

Peak SAR (extrapolated) = 0.412 W/kg

SAR(1 g) = 0.328 mW/g; SAR(10 g) = 0.241 mW/g

Maximum value of SAR (measured) = 0.346 mW/g
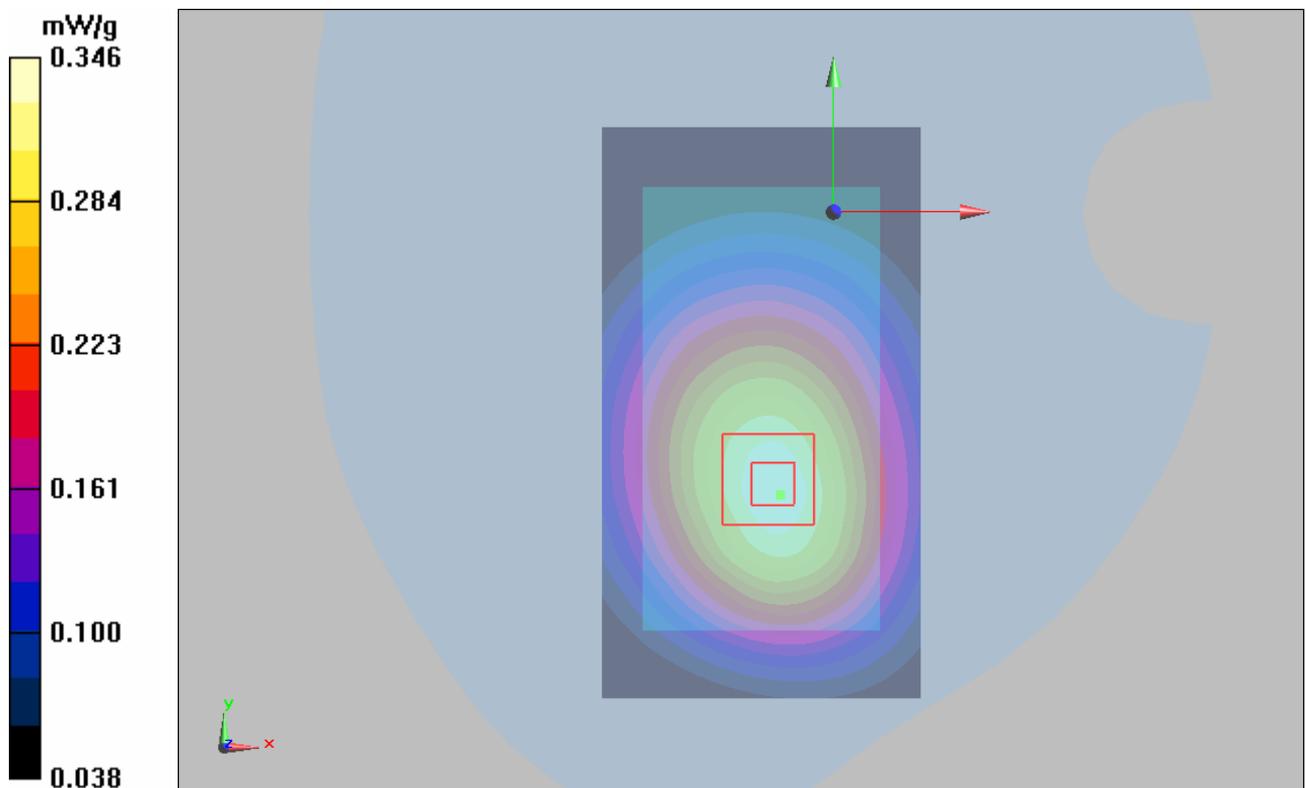
Figure 64 Body, Towards Phantom, WCDMA Band V Channel 4183

WCDMA Band V with Earphone Towards Ground High

Date/Time: 3/25/2010 8:49:49 PM

Communication System: WCDMA Band V; Frequency: 846.6 MHz;Duty Cycle: 1:1

Medium parameters used: f = 847 MHz; σ = 1 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 6.38 V/m; Power Drift = -0.033 dB

Peak SAR (extrapolated) = 0.469 W/kg

SAR(1 g) = 0.337 mW/g; SAR(10 g) = 0.230 mW/g

Maximum value of SAR (measured) = 0.362 mW/g
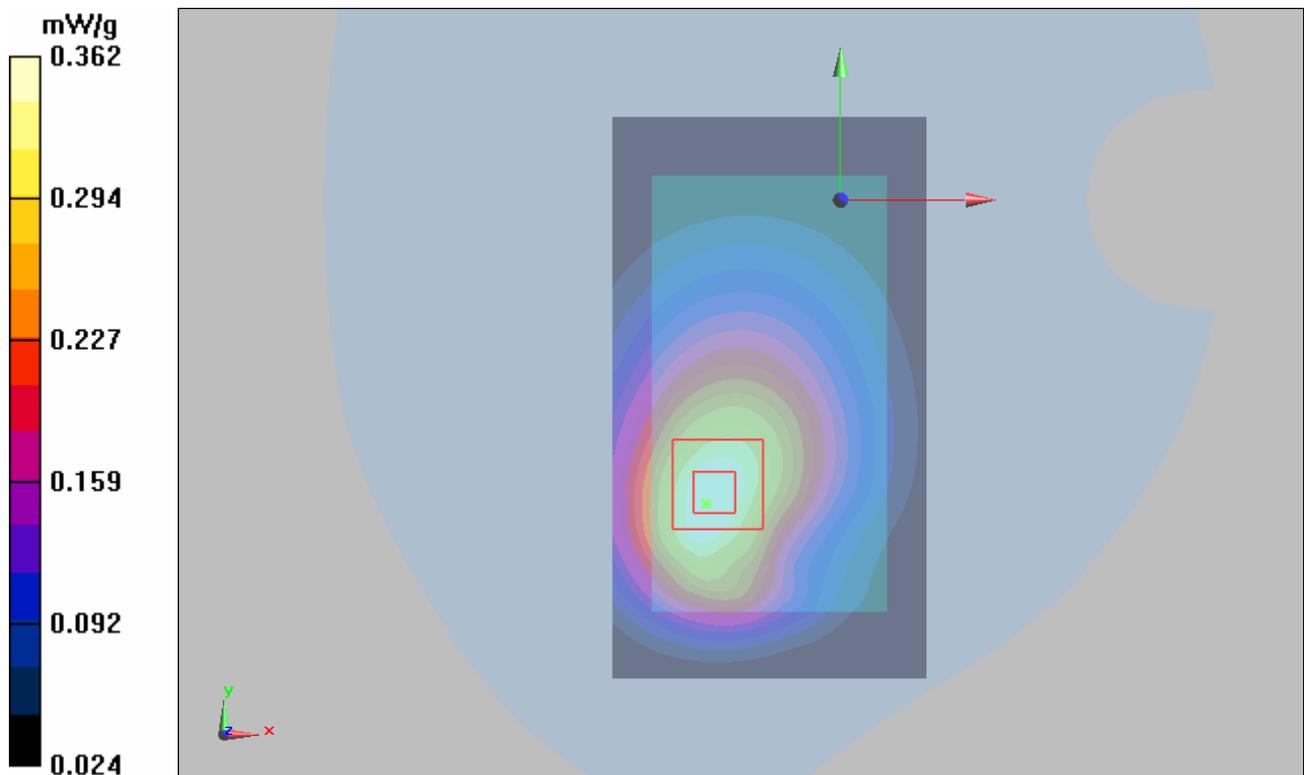
Figure 65 Body, Towards Ground, WCDMA Band V Channel 4233

WCDMA Band V+HSDPA Towards Ground High

Date/Time: 3/25/2010 9:13:44 PM

Communication System: WCDMA Band V+HSDPA; Frequency: 846.6 MHz;Duty Cycle: 1:1

Medium parameters used: f = 847 MHz; σ = 1 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY4 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.583 mW/g

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

Reference Value = 9.99 V/m; Power Drift = -0.020 dB

Peak SAR (extrapolated) = 0.714 W/kg

SAR(1 g) = 0.547 mW/g; SAR(10 g) = 0.390 mW/g

Maximum value of SAR (measured) = 0.582 mW/g
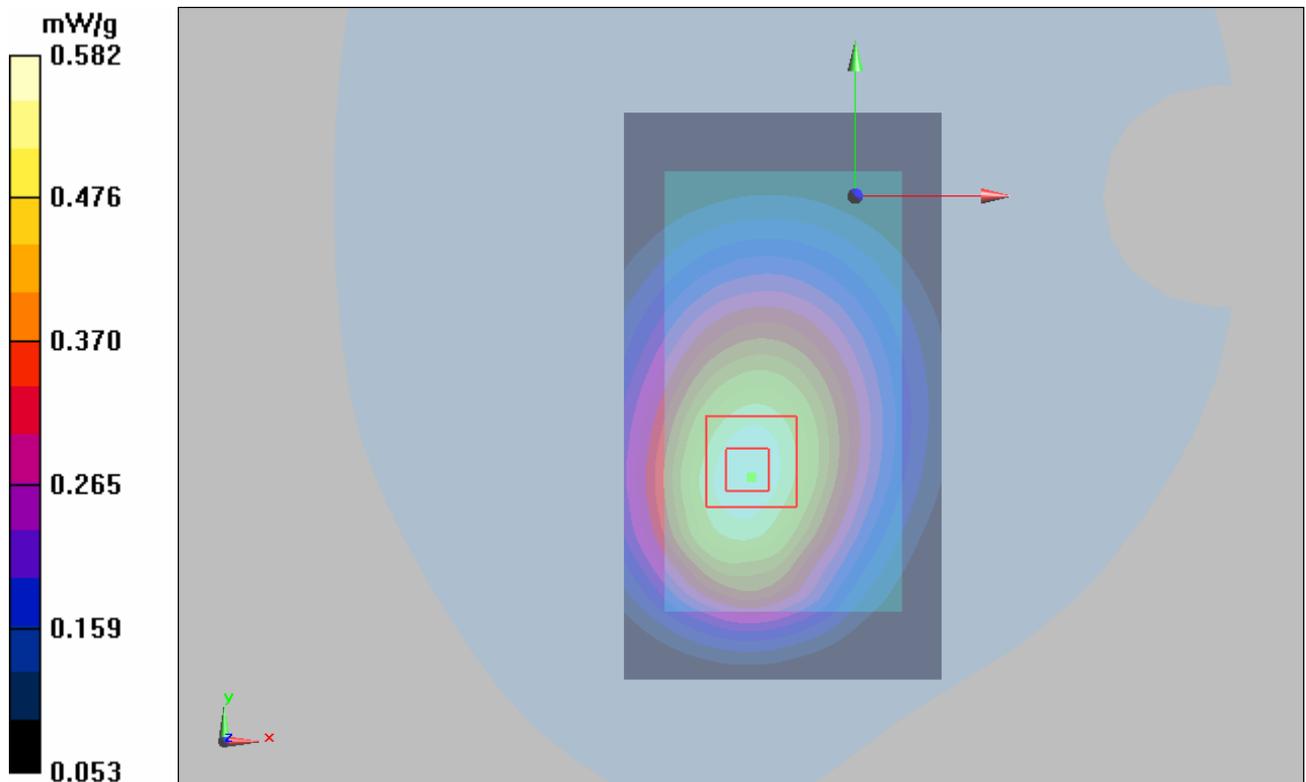
Figure 66 Body, Towards Ground, WCDMA Band V HSDPA Channel 4233

ANNEX D: Probe Calibration Certificate

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

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

ilac-MRA

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 (Auden)**   Certificate No: **EX3-3677_Sep09**

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3677
Calibration procedure(s)	QA CAL-01.v6, QA CAL-12.v5, QA CAL-23.v3 and QA CAL-25.v2 Calibration procedure for dosimetric E-field probes
Calibration date:	September 23, 2009
Condition of the calibrated item	In Tolerance

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	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41495277	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41498087	1-Apr-09 (No. 217-01030)	Apr-10
Reference 3 dB Attenuator	SN: S5054 (3c)	31-Mar-09 (No. 217-01026)	Mar-10
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-09 (No. 217-01028)	Mar-10
Reference 30 dB Attenuator	SN: S5129 (30b)	31-Mar-09 (No. 217-01027)	Mar-10
Reference Probe ES3DV2	SN: 3013	2-Jan-09 (No. ES3-3013_Jan09)	Jan-10
DAE4	SN: 660	9-Sep-08 (No. DAE4-660_Sep08)	Sep-09

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: September 23, 2009

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

Certificate No: EX3-3677_Sep09   Page 1 of 9

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

S   Schweizerischer Kalibrierdienst
C   Service suisse d'étalonnage
    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
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
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 effect 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 (no uncertainty required). DCP does not depend on frequency nor media.

- *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.

Certificate No: EX3-3677_Sep09 | Page 2 of 9

EX3DV4 SN:3677   September 23, 2009

Probe EX3DV4

SN:3677

Manufactured: September 9, 2008
Last calibrated: November 7, 2008
Recalibrated: September 23, 2009

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

EX3DV4 SN:3677   September 23, 2009

DASY - Parameters of Probe: EX3DV4 SN:3677

Sensitivity in Free Space[A]   **Diode Compression**[B]

NormX	$0.42 \pm 10.1\%$	$\mu V/(V/m)^2$	DCP X	91 mV
NormY	$0.47 \pm 10.1\%$	$\mu V/(V/m)^2$	DCP Y	92 mV
NormZ	$0.40 \pm 10.1\%$	$\mu V/(V/m)^2$	DCP Z	93 mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL   **900 MHz**   **Typical SAR gradient: 5 % per mm**

		2.0 mm	3.0 mm
Sensor Center to Phantom Surface Distance			
SAR_{be} [%]	Without Correction Algorithm	8.2	4.4
SAR_{be} [%]	With Correction Algorithm	0.8	0.5

TSL   **1750 MHz**   **Typical SAR gradient: 10 % per mm**

		2.0 mm	3.0 mm
Sensor Center to Phantom Surface Distance			
SAR_{be} [%]	Without Correction Algorithm	7.5	3.9
SAR_{be} [%]	With Correction Algorithm	0.8	0.4

Sensor Offset

Probe Tip to Sensor Center   **1.0** mm

> 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 Page 8).

[B] Numerical linearization parameter: uncertainty not required.

EX3DV4 SN:3677   September 23, 2009

Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide: R22)
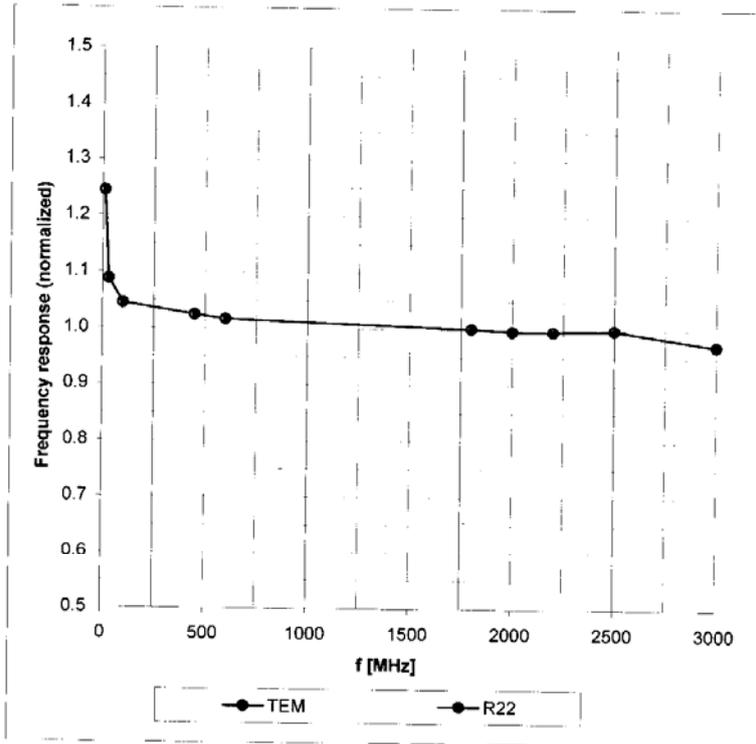
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

EX3DV4 SN:3677   September 23, 2009

Receiving Pattern (ϕ), $\vartheta = 0°$

f = 600 MHz, TEM ifi110EXX   f = 1800 MHz, WG R22
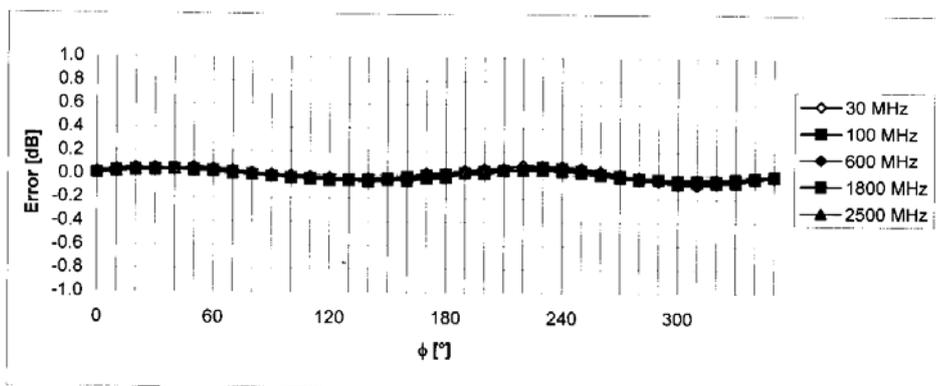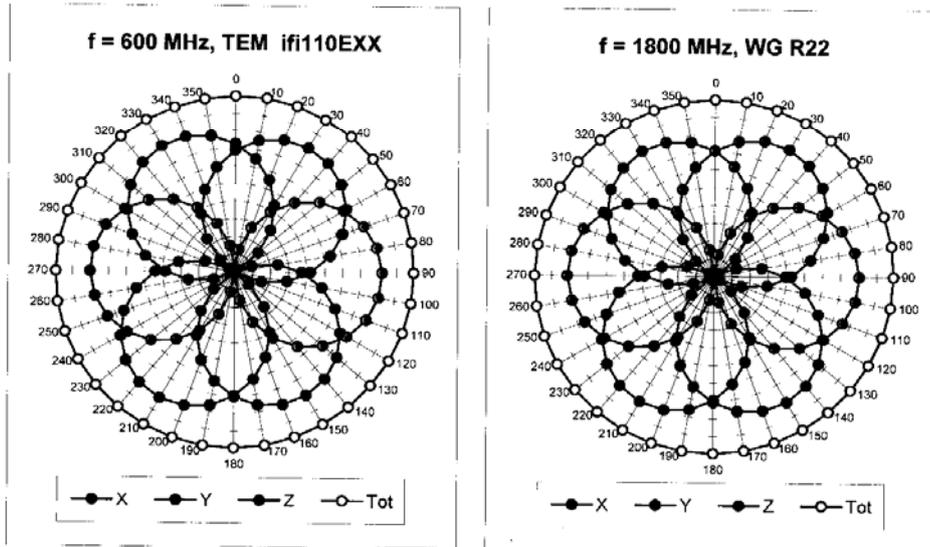
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

EX3DV4 SN:3677

September 23, 2009

Dynamic Range f(SAR$_{head}$)
(Waveguide R22, f = 1800 MHz)

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

EX3DV4 SN:3677   September 23, 2009

Conversion Factor Assessment

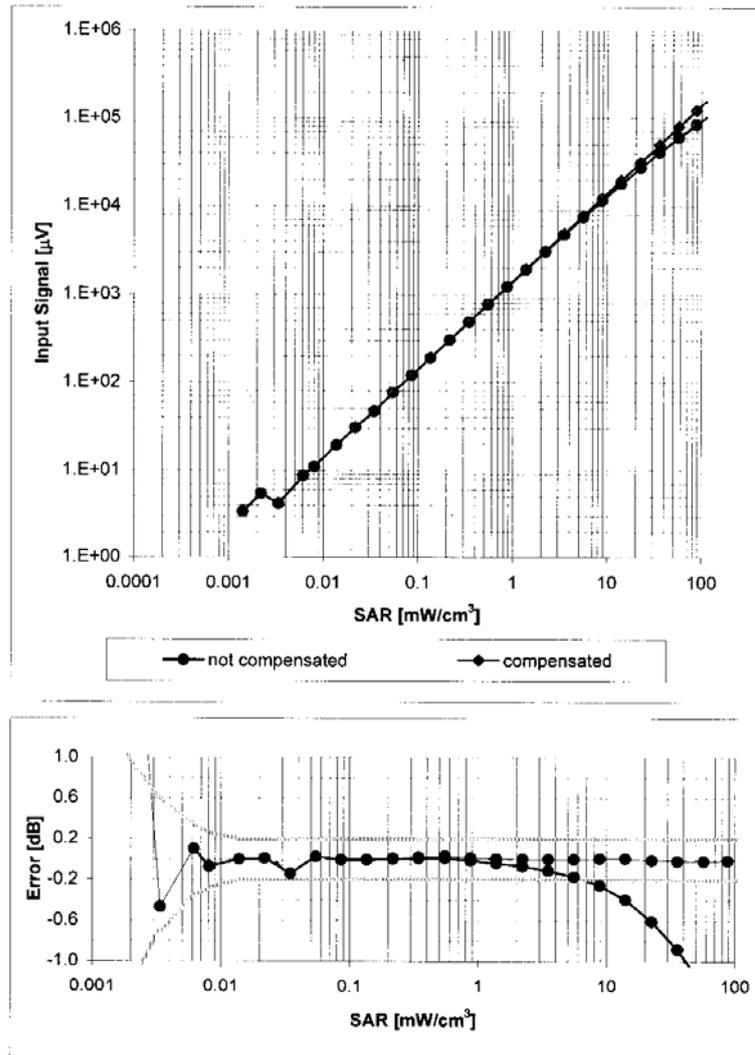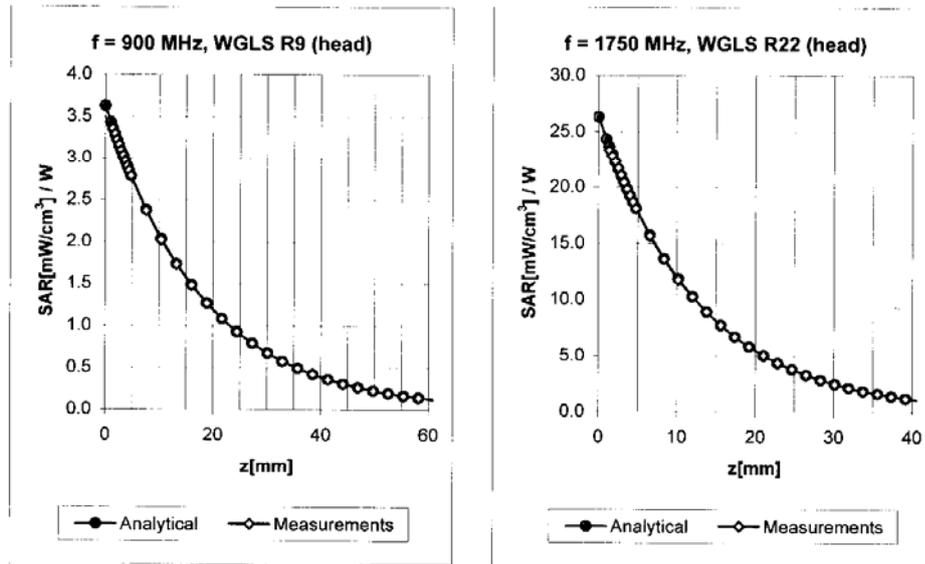| f [MHz]	Validity [MHz][c]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF	Uncertainty
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.68	0.64	9.20	± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.71	0.62	8.91	± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.68	0.62	8.04	± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.70	0.60	7.53	± 11.0% (k=2)
450	± 50 / ± 100	Body	56.7 ± 5%	0.94 ± 5%	0.32	0.49	10.43	± 13.3% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.54	0.73	9.11	± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.63	0.71	8.89	± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.55	0.74	7.70	± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.30	1.01	7.62	± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.56	0.68	7.28	± 11.0% (k=2)

[c] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

EX3DV4 SN:3677   September 23, 2009
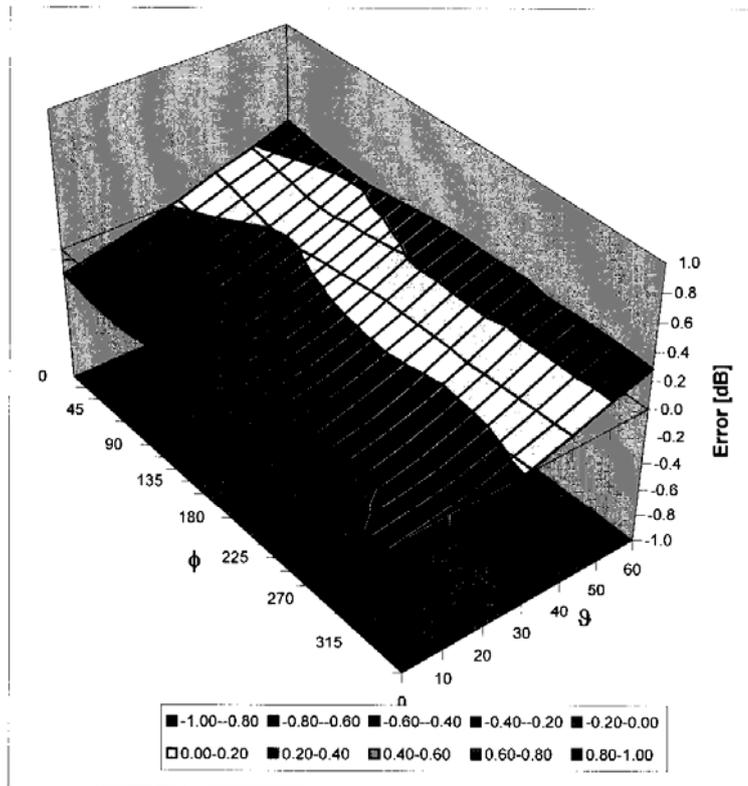
Deviation from Isotropy in HSL
Error (φ, ϑ), f = 900 MHz

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

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   **ATL (Auden)**   Certificate No: **D835V2-4d082_Jul09**

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d082
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	July 13, 2009
Condition of the calibrated item	In Tolerance

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	08-Oct-08 (No. 217-00898)	Oct-09
Power sensor HP 8481A	US37292783	08-Oct-08 (No. 217-00898)	Oct-09
Reference 20 dB Attenuator	SN: 5086 (20g)	31-Mar-09 (No. 217-01025)	Mar-10
Type-N mismatch combination	SN: 5047.2 / 06327	31-Mar-09 (No. 217-01029)	Mar-10
Reference Probe ES3DV2	SN: 3025	30-Apr-09 (No. ES3-3025_Apr09)	Apr-10
DAE4	SN: 601	07-Mar-09 (No. DAE4-601_Mar09)	Mar-10

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-07)	In house check: Oct-09
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

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

Issued: July 13, 2009

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
      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.

Certificate No: D835V2-4d082_Jul09   Page 2 of 9

Measurement Conditions

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

DASY Version	DASY5	V5.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
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	40.4 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature during test	(22.2 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.42 mW / g
SAR normalized	normalized to 1W	9.68 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	9.71 mW /g ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.58 mW / g
SAR normalized	normalized to 1W	6.32 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	6.34 mW /g ± 16.5 % (k=2)

---

[1] Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Certificate No: D835V2-4d082_Jul09   Page 3 of 9

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	53.0 ± 6 %	0.99 mho/m ± 6 %
Body TSL temperature during test	(22.5 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.56 mW / g
SAR normalized	normalized to 1W	10.2 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**10.0 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.68 mW / g
SAR normalized	normalized to 1W	6.72 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**6.61 mW / g ± 16.5 % (k=2)**

---

[2] Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.3 Ω - 2.5 jΩ
Return Loss	- 29.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.3 Ω - 4.3 jΩ
Return Loss	- 26.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.390 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	October 17, 2008

DASY5 Validation Report for Head TSL

Date/Time: 13.07.2009 11:31:45

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d082

Communication System: CW-835; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL 900 MHz
Medium parameters used: f = 835 MHz; σ = 0.89 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(5.86, 5.86, 5.86); Calibrated: 30.04.2009

- Sensor-Surface: 3mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn601; Calibrated: 07.03.2009

- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001

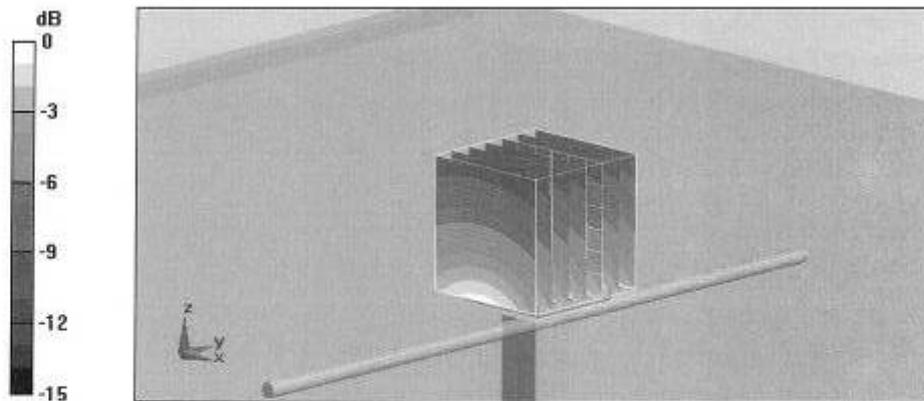- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Pin=250mW; dip=15mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.4 V/m; Power Drift = 0.00639 dB
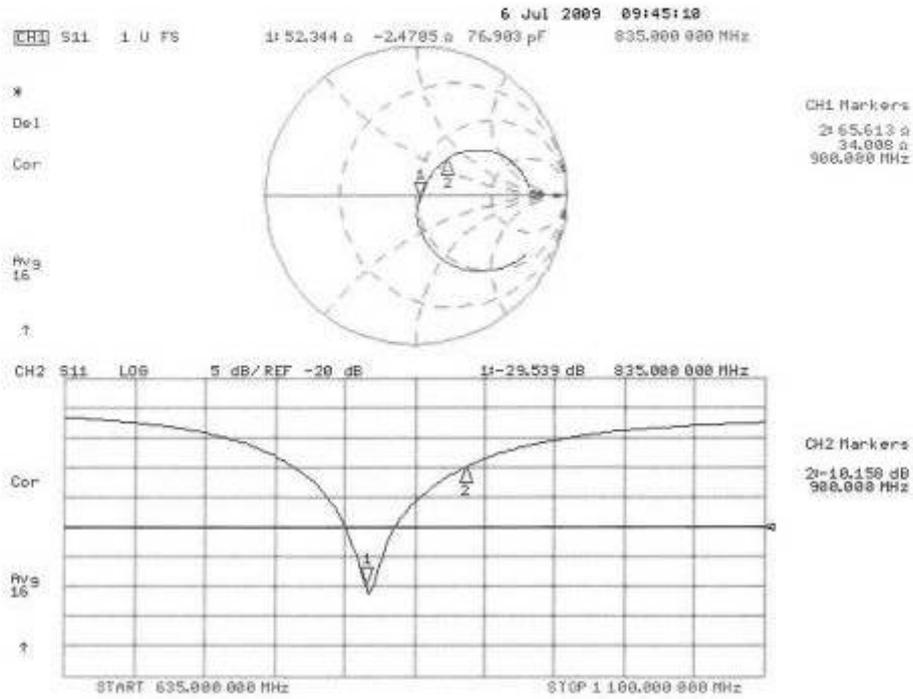Peak SAR (extrapolated) = 3.62 W/kg
SAR(1 g) = 2.42 mW/g; SAR(10 g) = 1.58 mW/g
Maximum value of SAR (measured) = 2.8 mW/g

0 dB = 2.8mW/g

Impedance Measurement Plot for Head TSL

DASY5 Validation Report for Body TSL

Date/Time: 13.07.2009 11:50:13

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d082

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: MSL900
Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(5.79, 5.79, 5.79); Calibrated: 30.04.2009

- Sensor-Surface: 3mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn601; Calibrated: 07.03.2009

- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001

- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45
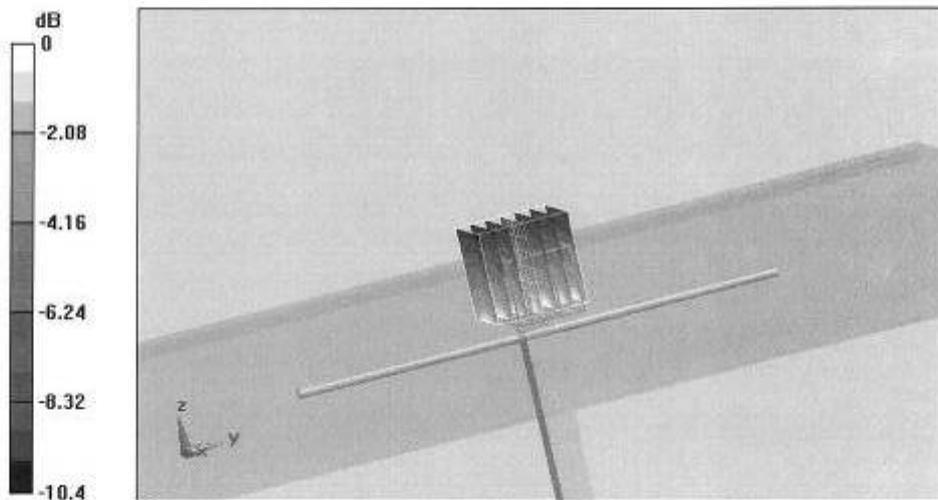
Pin = 250mW, d = 15mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.4 V/m; Power Drift = 0.013 dB
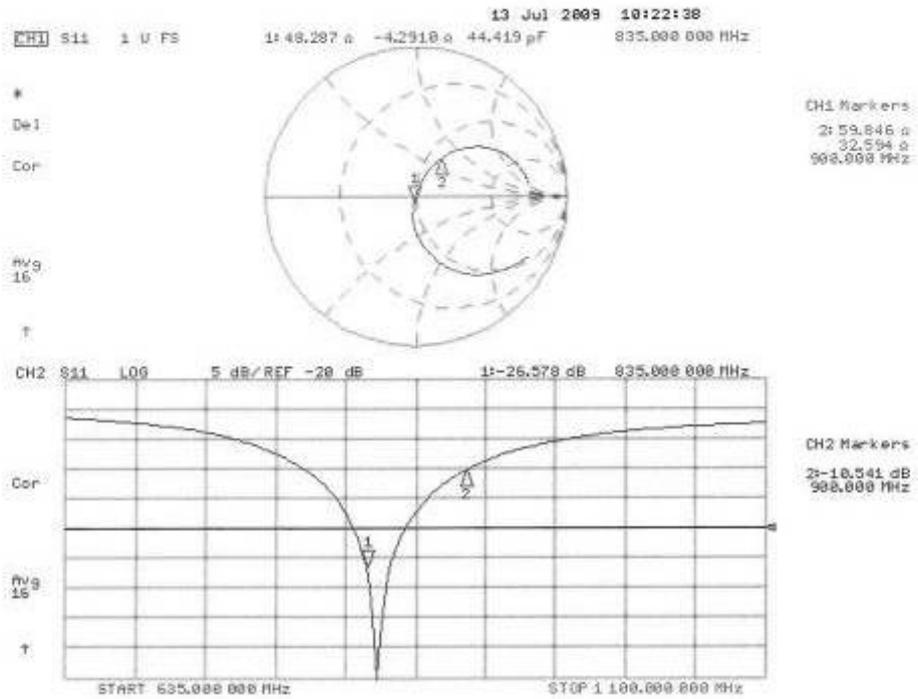Peak SAR (extrapolated) = 3.76 W/kg
SAR(1 g) = 2.56 mW/g; SAR(10 g) = 1.68 mW/g
Maximum value of SAR (measured) = 2.97 mW/g

0 dB = 2.97mW/g

Certificate No: D835V2-4d082_Jul09   Page 8 of 9

Impedance Measurement Plot for Body TSL

ANNEX F: D1900V2 Dipole Calibration Certificate

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

ilac-MRA

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

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

Accreditation No.: **SCS 108**

Client   **Auden**   Certificate No: **D1900V2-5d018-Jun09**

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d018
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	June 26, 2009
Condition of the calibrated item	In Tolerance

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 (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	08-Oct-08 (No. 217-00898)	Oct-09
Power sensor HP 8481A	US37292783	08-Oct-08 (No. 217-00898)	Oct-09
Reference 20 dB Attenuator	SN: 5086 (20g)	31-Mar-09 (No. 217-01025)	Mar-10
Type-N mismatch combination	SN: 5047.2 / 06327	31-Mar-09 (No. 217-01029)	Mar-10
Reference Probe ES3DV2	SN: 3025	30-Apr-09 (No. ES3-3025_Apr09)	Apr-10
DAE4	SN: 601	07-Mar-09 (No. DAE4-601_Mar09)	Mar-10

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-07)	In house check: Oct-09
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

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

Issued: June 29, 2009

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