



Report No.: RZA2010-0158



# OET 65

# TEST REPORT

<b>Product Name</b>	WCDMA/GPRS/GSM Mobile Handset
<b>Model</b>	F160
<b>FCC ID</b>	Q78-ZTEF160
<b>Client</b>	ZTE CORPORATION

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



## GENERAL SUMMARY

<b>Product Name</b>	WCDMA/GPRS/GSM Mobile Handset	<b>Model</b>	F160
<b>FCC ID</b>	Q78-ZTEF160	<b>Report No.</b>	RZA2010-0158
<b>Client</b>	ZTE CORPORATION		
<b>Manufacturer</b>	ZTE CORPORATION		
<b>Reference Standard(s)</b>	<p><b>ANSI/IEEE Std C95.1-1999:</b> IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.</p> <p><b>IEEE 1528-2003:</b> Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head Due to Wireless Communications Devices: Experimental Techniques.</p> <p><b>OET Bulletin 65 supplement C, published June 2001 including DA 02-1438, published June 2002:</b> Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits. Transition Period for the Phantom Requirements of Supplement C to OET Bulletin 65.</p> <p><b>IEC 62209-1:2006</b> Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures –Part 1: Procedure to determine the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear. (frequency range of 300 MHz to 3 GHz).</p> <p><b>IEC 62209-2:2008(106/162/CDV):</b> Human exposure to radio frequency fields from handheld and body-mounted wireless communication devices – Human models, instrumentation, and procedures –Part 2: Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body. ( frequency rang of 30MHz to 6GHz )</p>		
<b>Conclusion</b>	<p>This portable wireless equipment has been measured in all cases requested by the relevant standards. Test results in Chapter 7 of this test report are below limits specified in the relevant standards.</p> <p>General Judgment: <b>Pass</b></p> <p style="text-align: right;">(Stamp)</p> <p style="text-align: right;"><b>Date of issue: February 20<sup>th</sup>, 2010</b></p>		
<b>Comment</b>	The test result only responds to the measured sample.		

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## TABLE OF CONTENT

1. General Information .....	5
1.1. Notes of the test report .....	5
1.2. Testing laboratory .....	5
1.3. Applicant Information .....	6
1.4. Manufacturer Information .....	6
1.5. Information of EUT .....	7
1.6. Test Date .....	8
2. Operational Conditions during Test .....	9
2.1. General description of test procedures .....	9
2.2. GSM Test Configuration .....	9
2.3. WCDMA Test Configuration .....	9
2.3.1. Output power Verification .....	9
2.3.2. Head SAR Measurements .....	9
2.3.3. Body SAR Measurements .....	10
2.4. HSDPA Test Configuration .....	11
3. SAR Measurements System Configuration .....	13
3.1. SAR Measurement Set-up .....	13
3.2. DASY5 E-field Probe System .....	14
3.2.1. EX3DV4 Probe Specification .....	14
3.2.2. E-field Probe Calibration .....	15
3.3. Other Test Equipment .....	15
3.3.1. Device Holder for Transmitters .....	15
3.3.2. Phantom .....	16
3.4. Scanning procedure .....	16
3.5. Data Storage and Evaluation .....	18
3.5.1. Data Storage .....	18
3.5.2. Data Evaluation by SEMCAD .....	18
3.6. System check .....	21
3.7. Equivalent Tissues .....	22
4. Laboratory Environment .....	23
5. Characteristics of the Test .....	23
5.1. Applicable Limit Regulations .....	23
5.2. Applicable Measurement Standards .....	23
6. Conducted Output Power Measurement .....	24
6.1. Summary .....	24
6.2. Conducted Power Results .....	24
7. Test Results .....	28
7.1. Dielectric Performance .....	28
7.2. System Check Results .....	29
7.3. Test Results .....	30
7.3.1. Summary of Measurement Results (GSM850/GPRS/EGPRS) .....	30

**TA Technology (Shanghai) Co., Ltd.**  
**Test Report**

Report No.: RZA2010-0158

Page 4 of 135

---

7.3.2.	Summary of Measurement Results (GSM1900/GPRS/EGPRS).....	31
7.3.3.	Summary of Measurement Results (WCDMA Band II/WCDMA/HSDPA).....	32
7.3.4.	Summary of Measurement Results (WCDMA Band V/WCDMA/HSDPA) .....	33
7.3.5.	Summary of Measurement Results (Bluetooth function).....	34
7.4.	Conclusion .....	35
8.	Measurement Uncertainty .....	36
9.	Main Test Instruments .....	37
ANNEX A:	Test Layout .....	38
ANNEX B:	System Check Results .....	41
ANNEX C:	Graph Results .....	45
ANNEX D:	Probe Calibration Certificate .....	99
ANNEX E:	D835V2 Dipole Calibration Certificate .....	108
ANNEX F:	D1900V2 Dipole Calibration Certificate .....	117
ANNEX G:	DAE4 Calibration Certificate.....	126
ANNEX H:	The EUT Appearances and Test Configuration.....	131

## 1. General Information

### 1.1. Notes of the test report

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

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

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# TA Technology (Shanghai) Co., Ltd.

## Test Report

Report No.: RZA2010-0158

Page 6 of 135

---

### 1.3. Applicant Information

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**TA Technology (Shanghai) Co., Ltd.**  
**Test Report**

Report No.: RZA2010-0158

Page 7 of 135

**1.5. Information of EUT**

**General information**

Device type :	portable device		
Exposure category:	uncontrolled environment / general population		
Product Name:	WCDMA/GPRS/GSM Mobile Handset		
IMEI or SN:	359078030001583		
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		
Maximum no. of timeslots in uplink:	2		
HSDPA UE category	12		
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 -190 -251	(GSM850)	(tested)
	512 - 661-810	(GSM1900)	(tested)
	9262 - 9400-9538	(WCDMA Band II)	(tested)
	4132 - 4183-4233	(WCDMA Band V)	(tested)
Hardware version:	wt7B		
Software version:	F160 T01		
Antenna type:	Internal antenna		

**Auxiliary equipment details**

**AE1: Battery**

Model: Li3709T42P3h553447

Manufacture: ZTE CORPORATION

IMEI or SN: 60110909030002832

**AE2: Travel Adaptor**

Model: STC-A22O5OI700USBA-Z

Manufacture: ZTE CORPORATION

IMEI or SN: /

Equipment Under Test (EUT) is a model of WCDMA/GPRS/GSM Mobile Handset with internal antenna. The detail about Mobile phone, Lithium Battery and AC/DC Adapter is in chapter 1.5. in this report. SAR is tested for GSM 850, GSM 1900, WCDMA Band II and WCDMA Band V.

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 February 5, 2010 to February 11, 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, 190 and 251 in the case of GSM 850, to 512, 661 and 810 in the case of GSM 1900, to 9262, 9400 and 9538 in the case of WCDMA Band II, to 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 level is set to "5" in head SAR and body SAR of GSM850, set to "0" in head SAR and body SAR of GSM1900. The tests 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 or 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<sub>n</sub> 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<sub>n</sub>, when supported by the DUT, are not required when the maximum average output of each RF channel, for each spreading code and DPDCH<sub>n</sub> 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<sub>n</sub> using the exposure configuration that results in the highest SAR with 12.2 kbps RMC. When more than 2 DPDCH<sub>n</sub> are supported by the DUT, it may be necessary to configure additional DPDCH<sub>n</sub> 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 ( $\beta_c$ ,  $\beta_d$ ), and HS-DPCCH power offset parameters ( $\Delta_{ACK}$ ,  $\Delta_{NACK}$ ,  $\Delta_{CQI}$ ) 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	$\beta_c$	$\beta_d$	$\beta_d$ (SF)	$\beta_c / \beta_d$	$\beta_{hs}$ (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:  $\Delta_{ACK}$ ,  $\Delta_{NACK}$  and  $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$

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

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

Note 4: For subtest 2 the  $\beta_c/\beta_d$  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  $\beta_c = 11/15$  and  $\beta_d = 15/15$ .

**TA Technology (Shanghai) Co., Ltd.**  
**Test Report**

Report No.: RZA2010-0158

Page 12 of 135

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

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

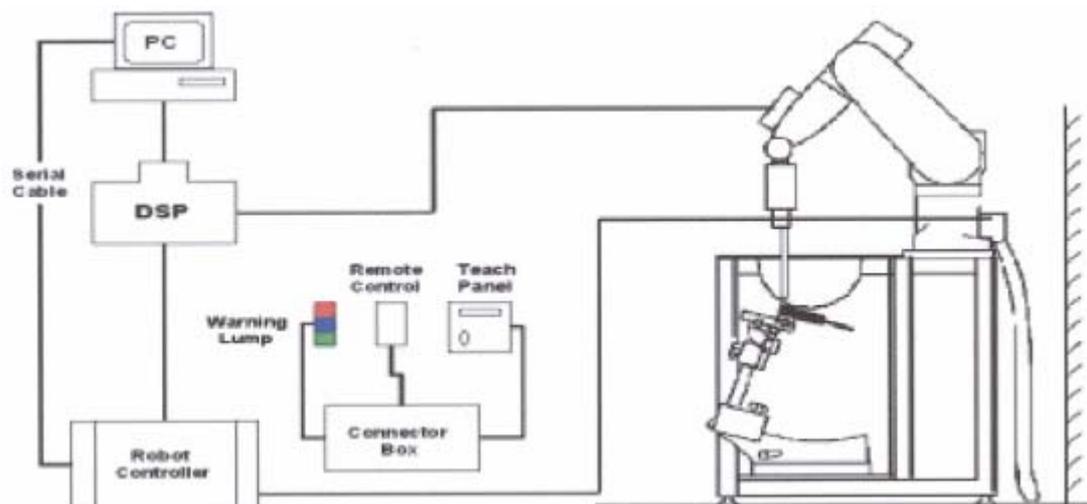


Figure 1 SAR Lab Test Measurement Set-up

### 3.2. DASY5 E-field Probe System

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

#### 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 835 ,HSL 900, HSL 1750 and HSL 1950 Additional CF for other liquids and frequencies upon request
Frequency	10 MHz to > 6 GHz Linearity: $\pm 0.2$ dB (30 MHz to 6 GHz)
Directivity	$\pm 0.3$ dB in HSL (rotation around probe axis) $\pm 0.5$ dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 $\mu$ W/g to > 100 mW/g Linearity: $\pm 0.2$ dB (noise: typically < 1 $\mu$ W/g)
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.



Figure 2. EX3DV4 E-field Probe



Figure 3. EX3DV4 E-field probe

### 3.2.2. E-field Probe Calibration

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

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies below 1 GHz, and in a wave guide above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees.

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium correlates to temperature rise in a dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

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

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

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

Where:  
 $\sigma$  = Simulated tissue conductivity,  
 $\rho$  = Tissue density (kg/m<sup>3</sup>).

### 3.3. Other Test Equipment

#### 3.3.1. Device Holder for Transmitters

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

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

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



**Figure 4 Device Holder**

### 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 1000 x 500 mm (H x L x W)
Available	Special



**Figure 5 Generic Twin Phantom**

### 3.4. Scanning procedure

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

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

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

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

- Zoom Scan

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

- Spatial Peak Detection

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

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

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

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

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

### **3.5. Data Storage and Evaluation**

#### **3.5.1. Data Storage**

The DASY5 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension ".DA5". 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/cm<sup>2</sup>], [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, a <sub>i0</sub> , a <sub>i1</sub> , a <sub>i2</sub>
	- Conversion factor	ConvF <sub>i</sub>
	- Diode compression point	Dcp <sub>i</sub>
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	
	- Density	

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

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

**TA Technology (Shanghai) Co., Ltd.**  
**Test Report**

Report No.: RZA2010-0158

Page 19 of 135

If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

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

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

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

$cf$  = crest factor of exciting field (DASY parameter)

$dcp_i$  = diode compression point (DASY parameter)

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

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

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

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

$Norm_i$  = sensor sensitivity of channel i (i = x, y, z)  
[mV/(V/m)<sup>2</sup>] 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.

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

**TA Technology (Shanghai) Co., Ltd.**  
**Test Report**

Report No.: RZA2010-0158

Page 20 of 135

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

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

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

**$\rho$**  = equivalent tissue density in g/cm<sup>3</sup>

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<sup>2</sup>

**$E_{tot}$**  = 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 ( $\pm 10\%$ ).

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

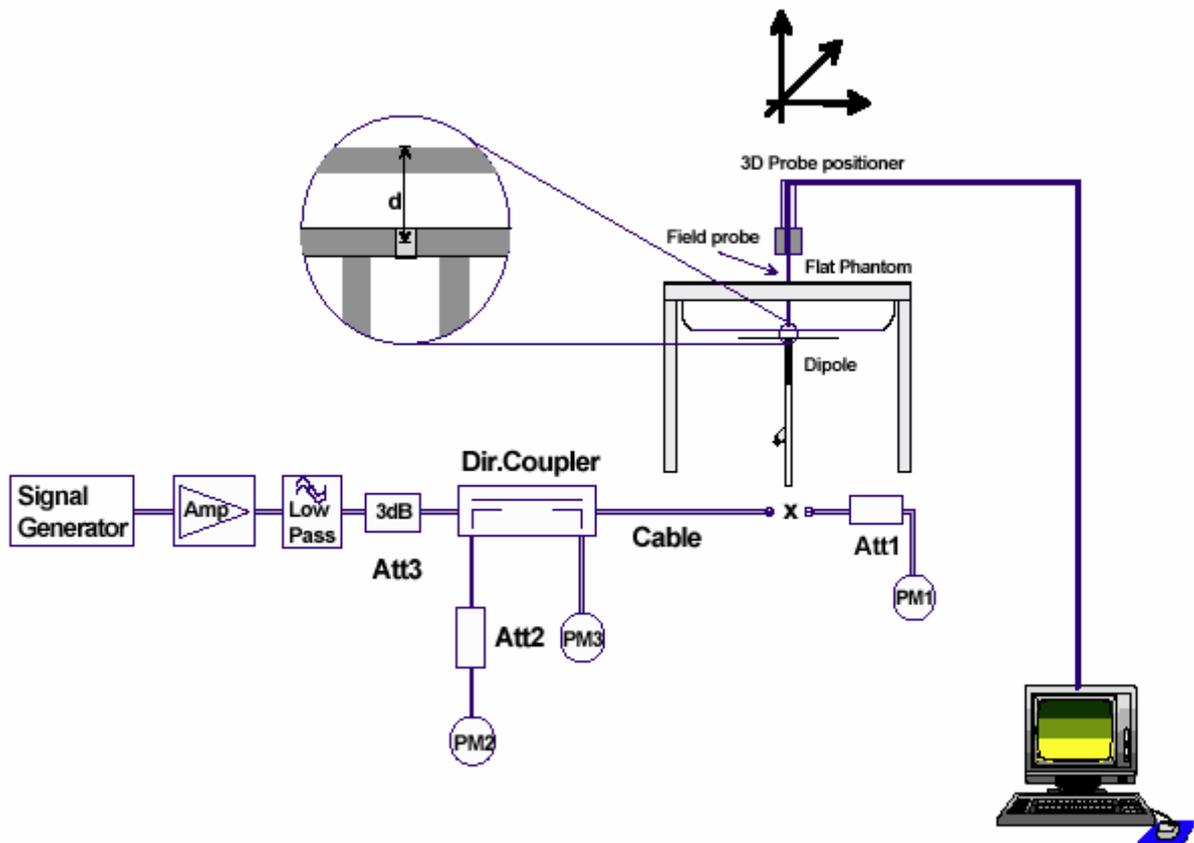


Figure 6 System Check Set-up

### 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 $\epsilon=41.5$ $\sigma=0.9$

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

**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 $\epsilon=55.2$ $\sigma=0.97$

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

## 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 $\Omega$
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

**ANSI/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.

It specifies the maximum exposure limit of 1.6 W/kg as averaged over any 1 gram of tissue for portable devices being used within 20 cm of the user in the uncontrolled environment.

### 5.2. Applicable Measurement Standards

**IEEE 1528–2003:** Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head Due to Wireless Communications Devices: Experimental Techniques.

**OET Bulletin 65 supplement C, published June 2001 including DA 02-1438, published June 2002:** Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits. Transition Period for the Phantom Requirements of Supplement C to OET Bulletin 65.

**IEC 62209-1: 2006** Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures –Part 1: Procedure to determine the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear. (frequency range of 300 MHz to 3 GHz).

**IEC 62209-2:2008(106/162/CDV)::** Human exposure to radio frequency fields from handheld and body-mounted wireless communication devices – Human models, instrumentation, and procedures –Part 2: Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body. ( frequency rang of 30MHz to 6GHz )

## 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**

<b>GSM 850</b>	<b>Conducted Power</b>		
	Channel 128	Channel 190	Channel 251
	(824.2MHz)	(836.6MHz)	(848.8MHz)
Before Test (dBm)	33.10	33.21	33.16
After Test (dBm)	33.11	33.20	33.15
<b>GSM 1900</b>	<b>Conducted Power</b>		
	Channel 512	Channel 661	Channel 810
	(1850.2MHz)	(1880MHz)	(1909.8MHz)
Before Test (dBm)	30.04	29.93	30.01
After Test (dBm)	30.03	29.92	30.00
<b>WCDMA Band II (12.2kbps RMC)</b>	<b>Conducted Power</b>		
	Channel 9262	Channel 9400	Channel 9538
	(1852.4MHz)	(1880MHz)	(1907.6MHz)
Before Test (dBm)	22.83	22.50	22.74
After Test (dBm)	22.82	22.49	22.73
<b>WCDMA Band II (64kbps RMC)</b>	<b>Conducted Power</b>		
	Channel 9262	Channel 9400	Channel 9538
	(1852.4MHz)	(1880MHz)	(1907.6MHz)
Before Test (dBm)	22.82	22.48	22.72
After Test (dBm)	22.81	22.47	22.71
<b>WCDMA Band II (144kbps RMC)</b>	<b>Conducted Power</b>		
	Channel 9262	Channel 9400	Channel 9538
	(1852.4MHz)	(1880MHz)	(1907.6MHz)
Before Test (dBm)	22.80	22.47	22.70
After Test (dBm)	22.79	22.46	22.70

**TA Technology (Shanghai) Co., Ltd.**  
**Test Report**

Report No.: RZA2010-0158

Page 25 of 135

<b>WCDMA Band II (384kbps RMC)</b>	<b>Conducted Power</b>		
	Channel 9262 (1852.4MHz)	Channel 9400 (1880MHz)	Channel 9538 (1907.6MHz)
Before Test (dBm)	22.81	22.45	22.68
After Test (dBm)	22.77	22.44	22.67
<b>HSDPA Band II (<math>\beta_c/\beta_d=2/15</math>)</b>	<b>Conducted Power</b>		
	Channel 9262 (1852.4MHz)	Channel 9400 (1880MHz)	Channel 9538 (1907.6MHz)
Before Test (dBm)	22.58	22.48	22.47
After Test (dBm)	22.57	22.47	22.46
<b>HSDPA Band II (<math>\beta_c/\beta_d=12/15</math>)</b>	<b>Conducted Power</b>		
	Channel 9262 (1852.4MHz)	Channel 9400 (1880MHz)	Channel 9538 (1907.6MHz)
Before Test (dBm)	22.59	22.49	22.49
After Test (dBm)	22.58	22.48	22.44
<b>HSDPA Band II (<math>\beta_c/\beta_d=15/8</math>)</b>	<b>Conducted Power</b>		
	Channel 9262 (1852.4MHz)	Channel 9400 (1880MHz)	Channel 9538 (1907.6MHz)
Before Test (dBm)	22.57	22.49	22.47
After Test (dBm)	22.56	22.48	22.46
<b>HSDPA Band II (<math>\beta_c/\beta_d=15/4</math>)</b>	<b>Conducted Power</b>		
	Channel 9262 (1852.4MHz)	Channel 9400 (1880MHz)	Channel 9538 (1907.6MHz)
Before Test (dBm)	22.51	22.48	22.49
After Test (dBm)	22.50	22.49	22.48
<b>WCDMA Band V (12.2kbps RMC)</b>	<b>Conducted Power</b>		
	Channel 4132 (826.4MHz)	Channel 4183 (836.6MHz)	Channel 4233 (846.6MHz)
Before Test (dBm)	22.49	22.39	22.54
After Test (dBm)	22.47	22.37	22.52
<b>WCDMA Band V (64kbps AMR)</b>	<b>Conducted Power</b>		
	Channel 4132 (826.4MHz)	Channel 4183 (836.6MHz)	Channel 4233 (846.6MHz)
Before Test (dBm)	22.43	22.33	22.53
After Test (dBm)	22.42	22.32	22.52
<b>WCDMA Band V (144kbps RMC)</b>	<b>Conducted Power</b>		
	Channel 4132	Channel 4183	Channel 4233

# TA Technology (Shanghai) Co., Ltd.

## Test Report

Report No.: RZA2010-0158

Page 26 of 135

	(826.4MHz)	(836.6MHz)	(846.6MHz)
Before Test (dBm)	22.42	22.32	22.52
After Test (dBm)	22.41	22.31	22.51
<b>WCDMA Band V (384kbps RMC)</b>	<b>Conducted Power</b>		
	Channel 4132	Channel 4183	Channel 4233
	(826.4MHz)	(836.6MHz)	(846.6MHz)
Before Test (dBm)	22.41	22.31	22.50
After Test (dBm)	22.40	22.30	22.50
<b>HSDPA Band V (<math>\beta_c/\beta_d=2/15</math>)</b>	<b>Conducted Power</b>		
	Channel 4132	Channel 4183	Channel 4233
	(826.4MHz)	(836.6MHz)	(846.6MHz)
Before Test (dBm)	22.93	22.48	22.72
After Test (dBm)	22.92	22.47	22.71
<b>HSDPA Band V (<math>\beta_c/\beta_d=12/15</math>)</b>	<b>Conducted Power</b>		
	Channel 4132	Channel 4183	Channel 4233
	(826.4MHz)	(836.6MHz)	(846.6MHz)
Before Test (dBm)	22.91	22.49	22.81
After Test (dBm)	22.90	22.48	22.80
<b>HSDPA Band V (<math>\beta_c/\beta_d=15/8</math>)</b>	<b>Conducted Power</b>		
	Channel 4132	Channel 4183	Channel 4233
	(826.4MHz)	(836.6MHz)	(846.6MHz)
Before Test (dBm)	22.89	22.45	22.80
After Test (dBm)	22.88	22.44	22.81
<b>HSDPA Band V (<math>\beta_c/\beta_d=15/4</math>)</b>	<b>Conducted Power</b>		
	Channel 4132	Channel 4183	Channel 4233
	(826.4MHz)	(836.6MHz)	(846.6MHz)
Before Test (dBm)	22.84	22.46	22.82
After Test (dBm)	22.83	22.45	22.81

### Average power

<b>GSM850 + GPRS</b>		<b>Conducted Power(dBm)</b>						
		Channel 128	Channel 190	Channel 251		Channel 128	Channel 190	Channel 251
1TXslot	Before	33.08	33.18	33.13	-9.03dB	24.05	24.15	24.10
	After	33.07	33.17	33.12	-9.03dB	24.04	24.14	24.09
2TXslots	Before	32.07	32.16	32.12	-6.02dB	<b>26.05</b>	<b>26.14</b>	<b>26.10</b>
	After	32.06	32.15	32.11	-6.02dB	26.04	26.13	26.09

# TA Technology (Shanghai) Co., Ltd.

## Test Report

Report No.: RZA2010-0158

Page 27 of 135

GSM850 + EGPRS		Conducted Power(dBm)						
		Channel 128	Channel 190	Channel 251		Channel 128	Channel 190	Channel 251
1TXslot	Before	33.07	33.17	33.12	-9.03dB	24.04	24.14	24.09
	After	33.06	33.16	33.11	-9.03dB	24.03	24.13	24.08
2TXslots	Before	32.06	32.15	32.11	-6.02dB	<b>26.04</b>	<b>26.13</b>	<b>26.09</b>
	After	32.05	32.14	32.1	-6.02dB	26.03	26.12	26.08
GSM1900 + GPRS		Conducted Power(dBm)						
		Channel 512	Channel 661	Channel 810		Channel 512	Channel 661	Channel 810
1TXslot	Before	30.00	29.90	29.98	-9.03dB	20.97	20.87	20.95
	After	30.01	29.91	29.97	-9.03dB	20.98	20.88	20.94
2TXslots	Before	28.97	28.87	28.94	-6.02dB	<b>22.95</b>	<b>22.85</b>	<b>22.92</b>
	After	28.96	28.86	28.93	-6.02dB	22.94	22.84	22.91
GSM1900 + EGPRS		Conducted Power(dBm)						
		Channel 512	Channel 661	Channel 810		Channel 512	Channel 661	Channel 810
1TXslot	Before	29.99	29.89	29.97	-9.03dB	20.96	20.86	20.94
	After	30.00	29.90	29.96	-9.03dB	20.97	20.87	20.93
2TXslots	Before	28.96	28.86	28.93	-6.02dB	<b>22.94</b>	<b>22.84</b>	<b>22.91</b>
	After	28.95	28.85	28.92	-6.02dB	22.93	22.83	22.9

Note:

1) Division Factors

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

1 TX- slot = 1 transmit tome slot out of 8 time slots

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

2 TX- slot = 2 transmit tome slots out of 8 time slots

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

## 7. Test Results

### 7.1. Dielectric Performance

**Table 8: Dielectric Performance of Head Tissue Simulating Liquid**

Frequency	Description	Dielectric Parameters		Temp °C
		$\epsilon_r$	$\sigma$ (s/m)	
<b>835MHz (head)</b>	Target value ± 5% window	41.50 39.43 — 43.58	0.90 0.86 — 0.95	/
	Measurement value 2010-2-5	42.58	0.92	21.8
<b>1900MHz (head)</b>	Target value ±5% window	40.00 38.00 — 42.00	1.40 1.33 — 1.47	/
	Measurement value 2010-2-6	39.98	1.42	21.9

**Table 9: Dielectric Performance of Body Tissue Simulating Liquid**

Frequency	Description	Dielectric Parameters		Temp °C
		$\epsilon_r$	$\sigma$ (s/m)	
<b>835MHz (body)</b>	Target value ±5% window	55.20 52.44 — 57.96	0.97 0.92 — 1.02	/
	Measurement value 2010-2-10	54.87	0.98	21.8
<b>1900MHz (body)</b>	Target value ±5% window	53.30 50.64 — 55.97	1.52 1.44 — 1.60	/
	Measurement value 2010-2-11	52.75	1.52	21.9

**TA Technology (Shanghai) Co., Ltd.**  
**Test Report**

**7.2. System Check Results**

**Table 10: System Check for Head tissue simulation liquid**

Frequency	Description	SAR(W/kg)		Dielectric Parameters		Temp
		10g	1g	$\epsilon_r$	$\sigma$ (s/m)	°C
835MHz	Recommended value ±10% window	1.58 1.42 — 1.74	2.42 2.18 — 2.66	40.50	0.89	/
	Measurement value 2010-2-5	1.62	2.48	42.58	0.92	21.9
1900MHz	Recommended value ±10% window	5.38 4.84 — 5.92	10.3 9.27 — 11.33	41	1.42	/
	Measurement value 2010-2-6	5.46	10.6	39.98	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	$\epsilon_r$	$\sigma$ (s/m)	°C
835MHz	Recommended value ±10% window	1.68 1.51 — 1.85	2.56 2.3 — 2.82	53	0.99	/
	Measurement value 2010-2-10	1.68	2.56	54.87	0.98	21.9
1900 MHz	Recommended value ±10% window	5.52 4.97 — 6.07	10.5 9.45 — 11.55	54	1.55	/
	Measurement value 2010-2-11	5.17	9.73	52.75	1.52	21.7

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.

# TA Technology (Shanghai) Co., Ltd.

## Test Report

Report No.: RZA2010-0158

Page 30 of 135

### 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		
Test Case Of Head		Measurement Result(W/kg)		Power Drift(dB)	
Different Test Position	Channel	10 g Average	1 g Average		
<b>Test position of Head</b>					
Left hand, Touch cheek	High	0.653	0.913	0.026	Figure 11
	Middle	0.672	0.962	-0.138	Figure 12
	Low	0.552	0.768	-0.030	Figure 13
Left hand, Tilt 15 Degree	Middle	0.407	0.556	-0.059	Figure 14
Right hand, Touch cheek	High	0.667	0.929	0.079	Figure 15
	Middle	0.736	1.020	-0.092	Figure 16
	Low	0.563	0.780	0.100	Figure 17
Right hand, Tilt 15 Degree	Middle	0.411	0.560	-0.123	Figure 18
<b>Test position of Body (Distance 15mm)</b>					
Towards Ground	High	0.596	0.827	0.034	Figure 19
	Middle	0.743	1.030	0.004	Figure 20
	Low	0.792	1.100	-0.044	Figure 21
Towards Phantom	High	0.519	0.723	0.161	Figure 22
	Middle	0.622	0.854	-0.011	Figure 23
	Low	0.538	0.745	-0.123	Figure 24
<b>Worst case position of Body with Earphone (Distance 15mm)</b>					
Towards Ground	Low	0.652	0.901	0.171	Figure 25
<b>Worst case position of Body with GPRS(2UP) (Distance 15mm)</b>					
Towards Ground	Low	0.997	1.370	-0.099	Figure 26
<b>Worst case position of Body with EGPRS(2UP) (Distance 15mm)</b>					
Towards Ground	Low	0.992	1.370	-0.008	Figure 27

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.

**TA Technology (Shanghai) Co., Ltd.**  
**Test Report**

Report No.: RZA2010-0158

Page 31 of 135

**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	
Test Case Of Head		Measurement Result(W/kg)		Power Drift(dB)	
Different Test Position	Channel	10 g Average	1 g Average		
<b>Test position of Head</b>					
Left hand, Touch cheek	High	0.391	0.688	0.003	Figure 28
	Middle	0.357	0.618	0.040	Figure 29
	Low	0.324	0.570	0.097	Figure 30
Left hand, Tilt 15 Degree	Middle	0.080	0.132	-0.117	Figure 31
Right hand, Touch cheek	Middle	0.314	0.506	0.074	Figure 32
Right hand, Tilt 15 Degree	Middle	0.091	0.148	0.078	Figure 33
<b>Test position of Body (Distance 15mm)</b>					
Towards Ground	High	0.207	0.341	0.022	Figure 34
	Middle	0.173(max.cube)	0.289(max.cube)	0.045	Figure 35
	Low	0.174(max.cube)	0.294(max.cube)	0.025	Figure 36
Towards Phantom	Middle	0.159	0.268	-0.134	Figure 37
<b>Worst case position of Body with Earphone (Distance 15mm)</b>					
Towards Ground	High	0.196	0.329	-0.139	Figure 38
<b>Worst case position of Body with GPRS(2UP) (Distance 15mm)</b>					
Towards Ground	High	0.335	0.533	-0.103	Figure 39
<b>Worst case position of Body with EGPRS(2UP) (Distance 15mm)</b>					
Towards Ground	High	0.327	0.534	-0.007	Figure 40

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).

# TA Technology (Shanghai) Co., Ltd.

## Test Report

Report No.: RZA2010-0158

Page 32 of 135

### 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	± 0.21	
Test Case Of Head		Measurement Result(W/kg)		Power Drift(dB)	
Different Test Position	Channel	10 g Average	1 g Average		
<b>Test position of Head</b>					
Left hand, Touch cheek	High	0.404	0.711	0.091	Figure 41
	Middle	0.304	0.527	0.012	Figure 42
	Low	0.547	0.953	0.123	Figure 43
Left hand, Tilt 15 Degree	Middle	0.066	0.110	-0.062	Figure 44
Right hand, Touch cheek	Middle	0.263	0.427	-0.124	Figure 45
Right hand, Tilt 15 Degree	Middle	0.075	0.121	0.077	Figure 46
<b>Test position of Body (Distance 15mm)</b>					
Towards Ground	Middle	0.128	0.200	-0.191	Figure 47
Towards Phantom	High	0.158	0.262	0.104	Figure 48
	Middle	0.134	0.224	-0.177	Figure 49
	Low	0.224	0.374	0.105	Figure 50
<b>Worst case position of Body with Earphone (Distance 15mm)</b>					
Towards Phantom	Low	0.225(max.cube)	0.369(max.cube)	-0.138	Figure 51
<b>Worst case position of Body with HSDPA (Distance 15mm)</b>					
Towards Phantom	Low	0.183(max.cube)	0.306(max.cube)	0.157	Figure 52

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).

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## Test Report

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

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

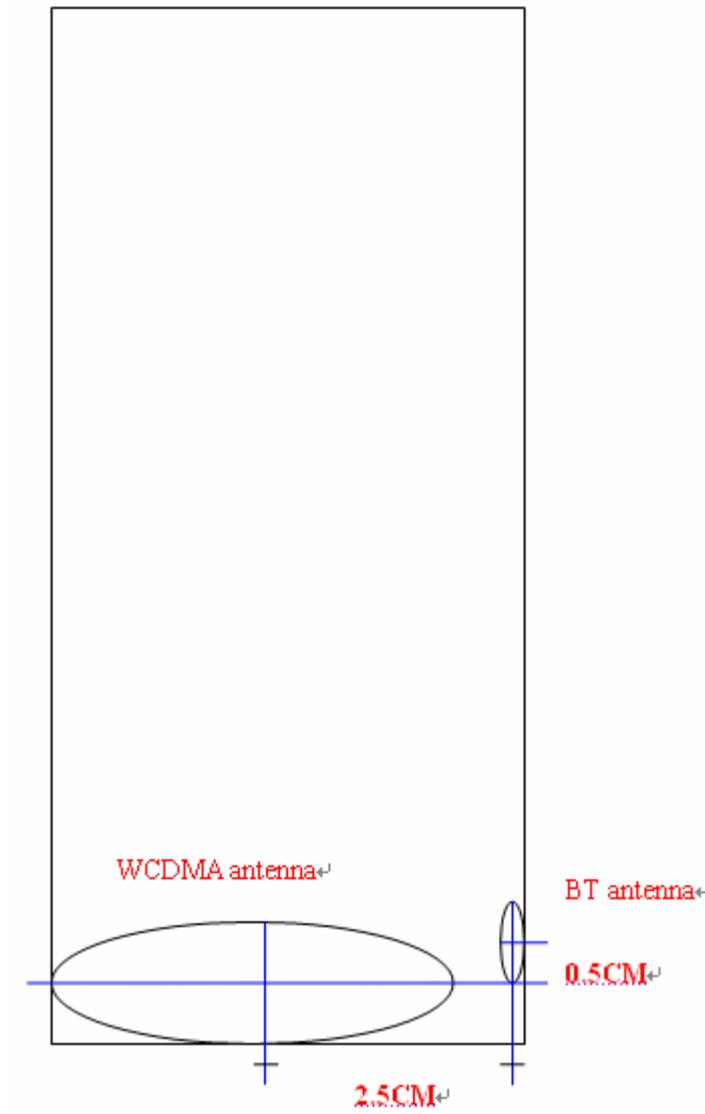
Limit of SAR (W/kg)		10 g Average	1 g Average	Power Drift (dB)	Graph Results
		2.0	1.6	± 0.21	
Test Case Of Head		Measurement Result(W/kg)		Power Drift(dB)	
Different Test Position	Channel	10 g Average	1 g Average	Power Drift(dB)	
<b>Test position of Head</b>					
Left hand, Touch cheek	Middle	0.270	0.386	0.014	Figure 53
Left hand, Tilt 15 Degree	Middle	0.180	0.246	-0.061	Figure 54
Right hand, Touch cheek	High	0.410	0.575	0.026	Figure 55
	Middle	0.317	0.442	0.152	Figure 56
	Low	0.358	0.497	0.101	Figure 57
Right hand, Tilt 15 Degree	Middle	0.196	0.266	0.078	Figure 58
<b>Test position of Body (Distance 15mm)</b>					
Towards Ground	High	0.488	0.677	0.034	Figure 59
	Middle	0.552	0.761	-0.006	Figure 60
	Low	0.522	0.723	-0.061	Figure 61
Towards Phantom	Middle	0.262	0.360	0.161	Figure 62
<b>Worst case position of Body with Earphone (Distance 15mm)</b>					
Towards Ground	Middle	0.320	0.442	-0.024	Figure 63
<b>Worst case position of Body with HSDPA (Distance 15mm)</b>					
Towards Ground	Middle	0.498	0.687	0.080	Figure 64

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 (Bluetooth function)**

The distance between BT antenna and WCDMA antenna is 2.5cm. 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)	4.87	6.35	6.00

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 transmitter, because the output power of BT transmitter is  $\leq P_{Ref}$  and its antenna is  $\leq 2.5\text{cm}$  from other 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<sub>1g</sub> are 1.020 W/kg (head) and 1.37 W/kg (body) that are below exposure limits specified in the relevant standards cited in Clause 5.1 of this test report.

**TA Technology (Shanghai) Co., Ltd.**  
**Test Report**

Report No.: RZA2010-0158

Page 36 of 135

**8. Measurement Uncertainty**

No.	source	Type	Uncertainty Value (%)	Probability Distribution	k	c <sub>i</sub>	Standard uncertainty u <sub>i</sub> (%)	Degree of freedom V <sub>eff</sub> or v <sub>i</sub>
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								

**TA Technology (Shanghai) Co., Ltd.**  
**Test Report**

Report No.: RZA2010-0158

Page 37 of 135

20	-phantom	B	4.0	R	$\sqrt{3}$	1	2.3	$\infty$	
21	-liquid conductivity (deviation from target)	B	5.0	R	$\sqrt{3}$	$\frac{0.6}{4}$	1.8	$\infty$	
22	-liquid conductivity (measurement uncertainty)	B	5.0	N	1	$\frac{0.6}{4}$	3.2	$\infty$	
23	-liquid permittivity (deviation from target)	B	5.0	R	$\sqrt{3}$	0.6	1.7	$\infty$	
24	-liquid permittivity (measurement uncertainty)	B	5.0	N	1	0.6	3.0	$\infty$	
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 14, 2009	One year
04	Power sensor	Agilent 8481H	MY41091316	March 14, 2009	One year
05	Signal Generator	HP 8341B	2730A00804	September 13, 2009	One year
06	Amplifier	IXA-020	0401	No Calibration Requested	
07	BTS	E5515C	MY48360988	December 4, 2009	One year
08	E-field Probe	EX3DV4	3677	September 23, 2009	One year
09	DAE	DAE4	871	November 11, 2009	One year
10	Validation Kit 835MHz	D835V2	4d082	July 13, 2009	One year
11	Validation Kit 1900MHz	D1900V2	5d018	June 26, 2009	One year

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

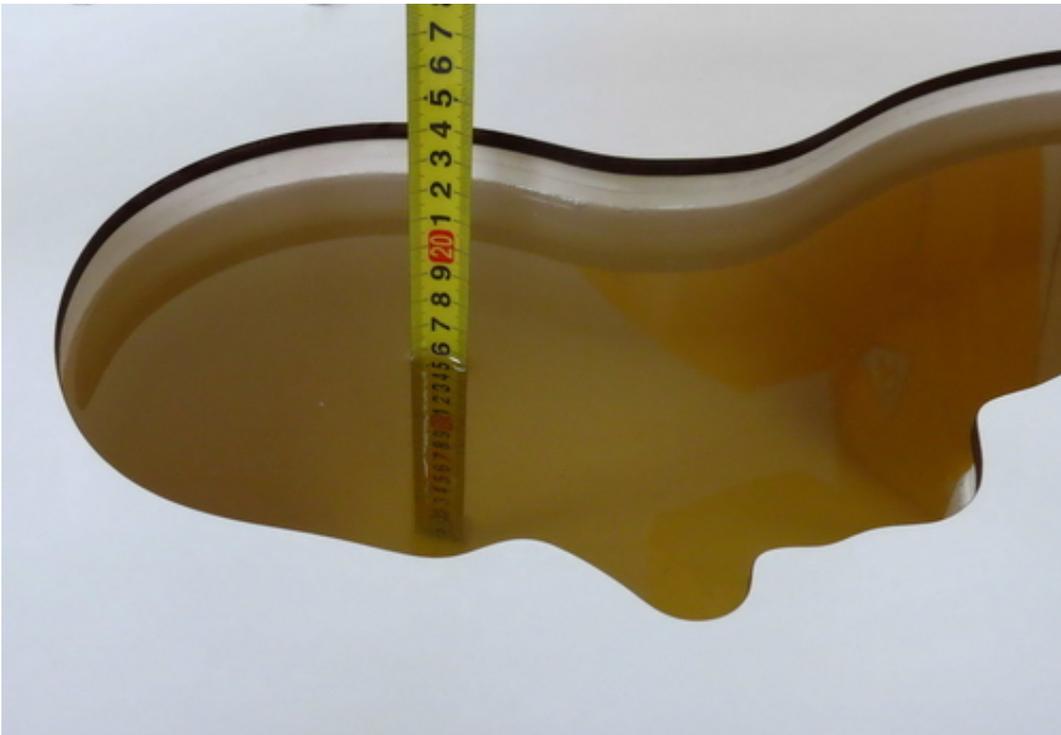
## ANNEX A: Test Layout



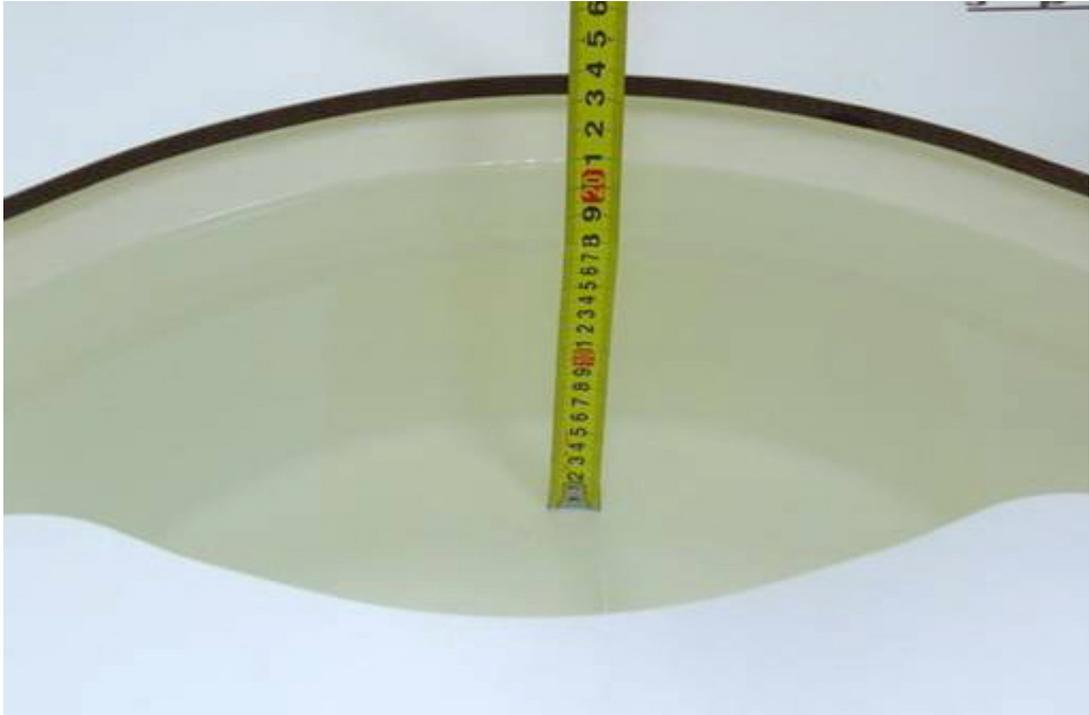
Picture 1: Specific Absorption Rate Test Layout



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: 2/5/2010 6:30:02 PM

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

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.92 \text{ mho/m}$ ;  $\epsilon_r = 42.58$ ;  $\rho = 1000 \text{ kg/m}^3$

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**835 MHz Dipole/Area Scan (41x121x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (interpolated) =  $2.71 \text{ mW/g}$

**835 MHz Dipole/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $55.5 \text{ V/m}$ ; Power Drift =  $-0.092 \text{ dB}$

Peak SAR (extrapolated) =  $3.75 \text{ W/kg}$

**SAR(1 g) =  $2.48 \text{ mW/g}$ ; SAR(10 g) =  $1.62 \text{ mW/g}$**

Maximum value of SAR (measured) =  $2.67 \text{ mW/g}$

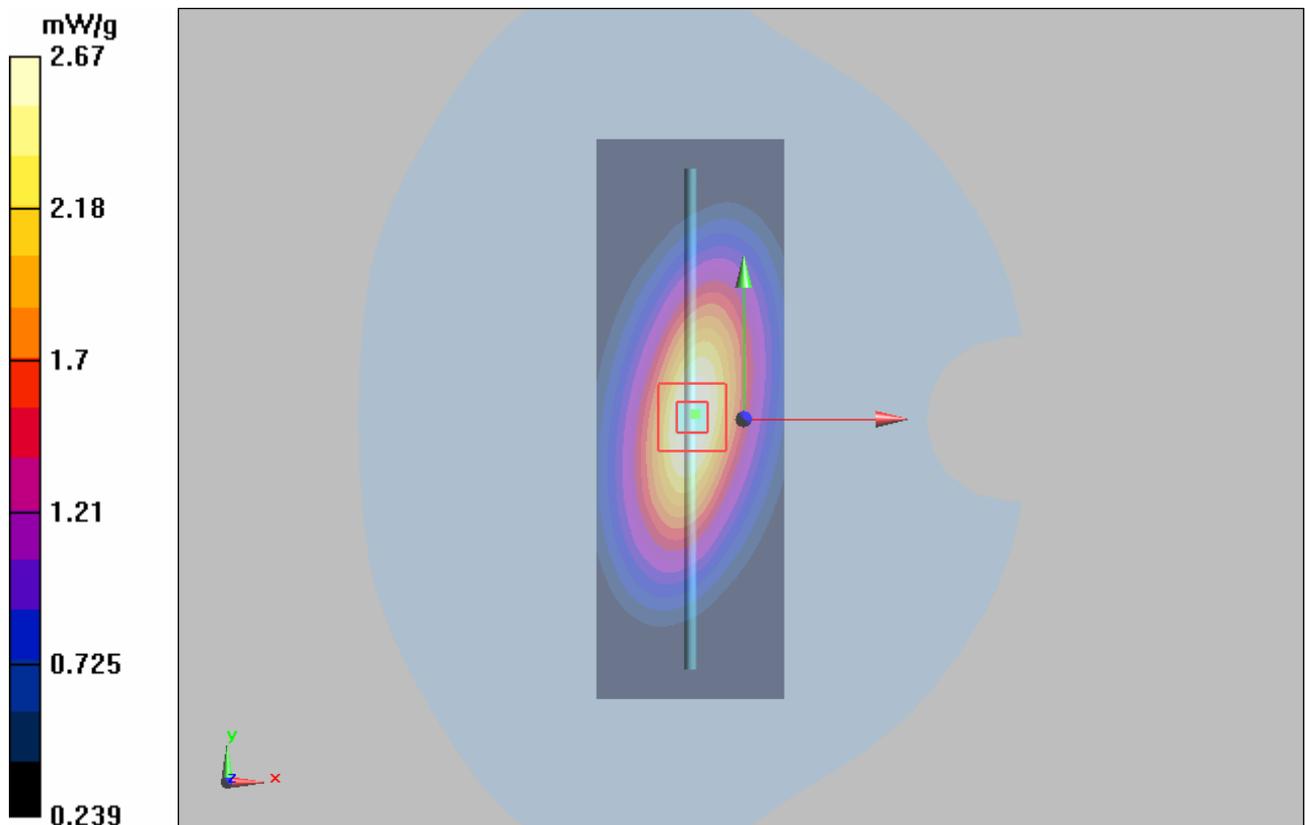


Figure 7 System Performance Check 835MHz 250mW

### System Performance Check at 835 MHz Body TSL

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

Date/Time: 2/10/2010 2:00:20 PM

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

Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.98$  mho/m;  $\epsilon_r = 54.87$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**835 MHz Dipole/Area Scan (61x121x1):** Measurement grid: dx=15mm, dy=15mm

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

**835 MHz Dipole/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

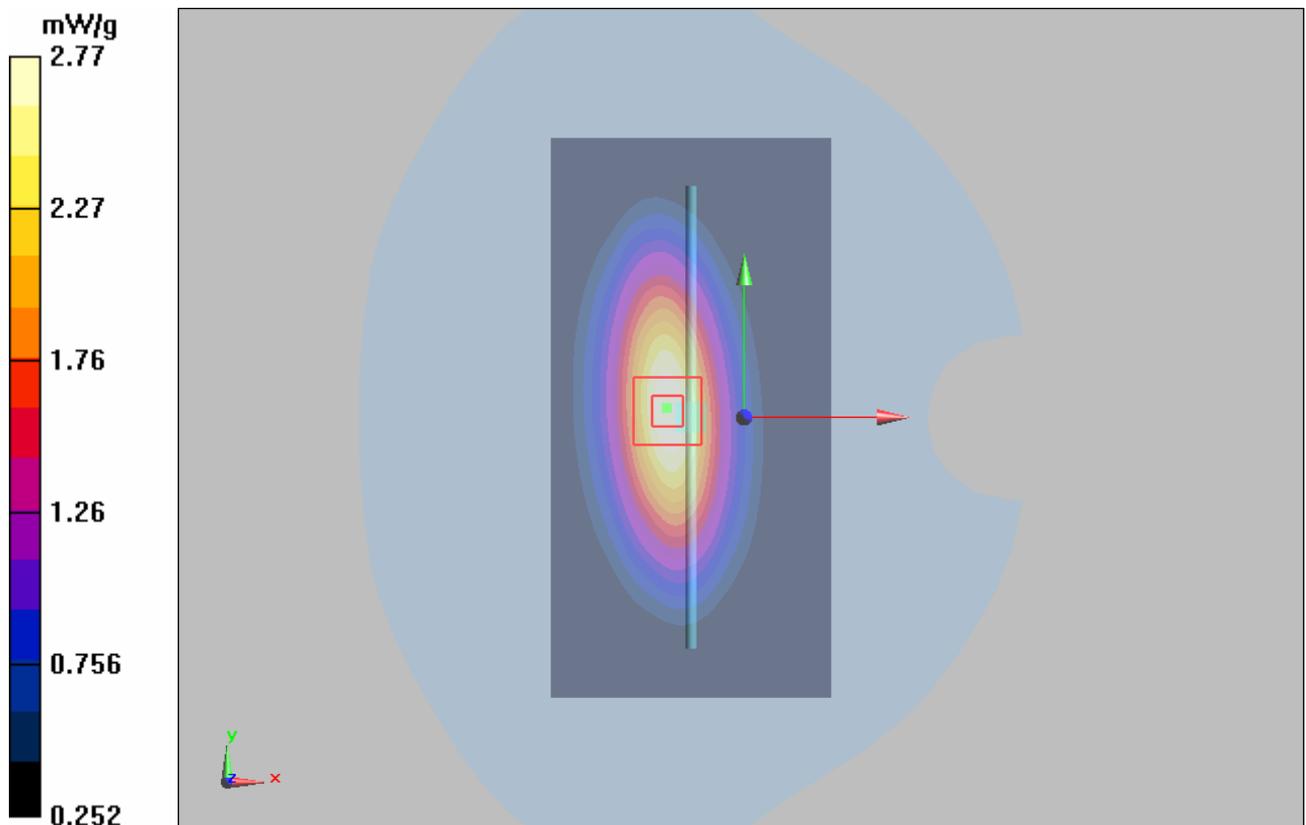


Figure 8 System Performance Check 835MHz 250mW

### System Performance Check at 1900 MHz Head TSL

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

Date/Time: 2/6/2010 2:00:04 AM

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

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.42$  mho/m;  $\epsilon_r = 39.98$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**1900 MHz Dipole/Area Scan (41x71x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 12.9 mW/g

**1900 MHz Dipole/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

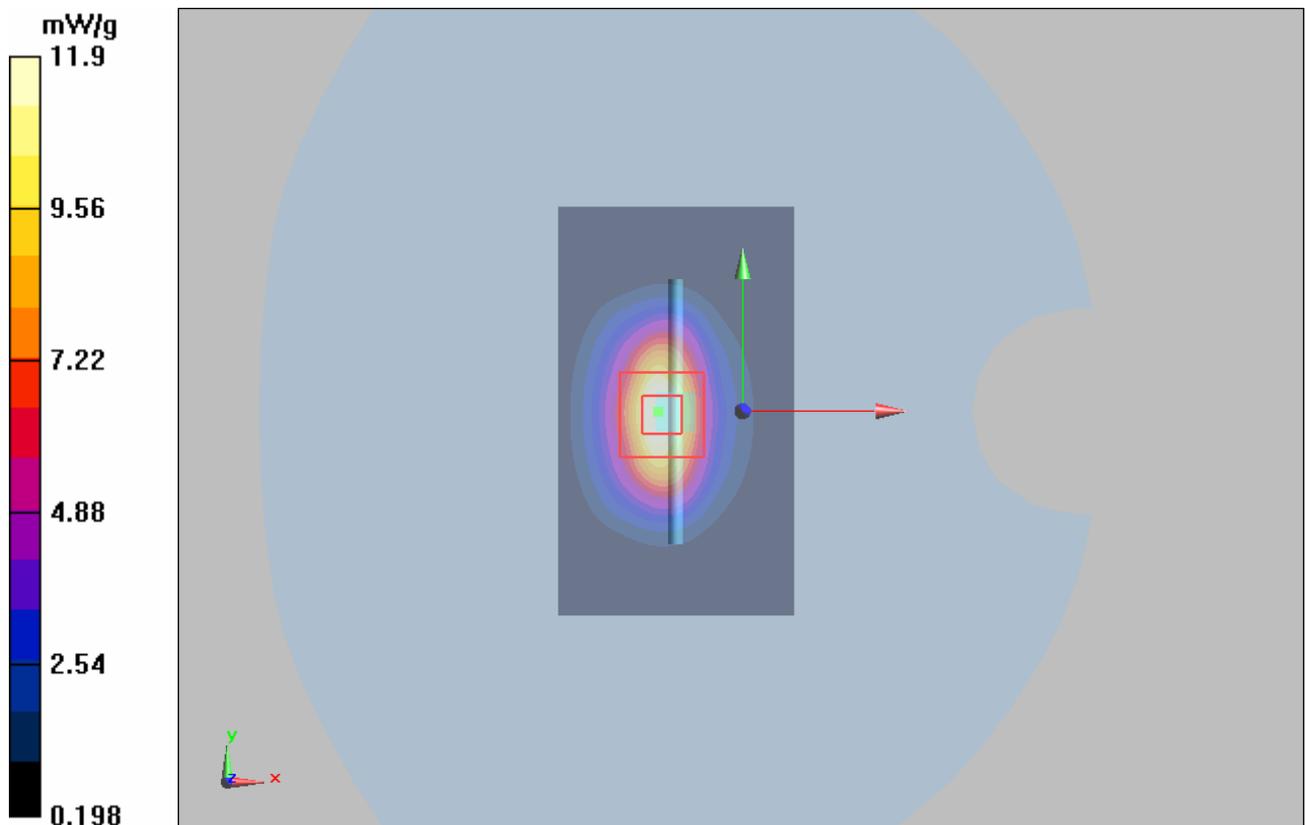


Figure 9 System Performance Check 1900MHz 250mW

### System Performance Check at 1900 MHz Body TSL

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

Date/Time: 2/11/2010 9:00:19 AM

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

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.52$  mho/m;  $\epsilon_r = 52.75$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**1900 MHz Dipole/Area Scan (41x71x1):** Measurement grid: dx=15mm, dy=15mm

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

**1900 MHz Dipole/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

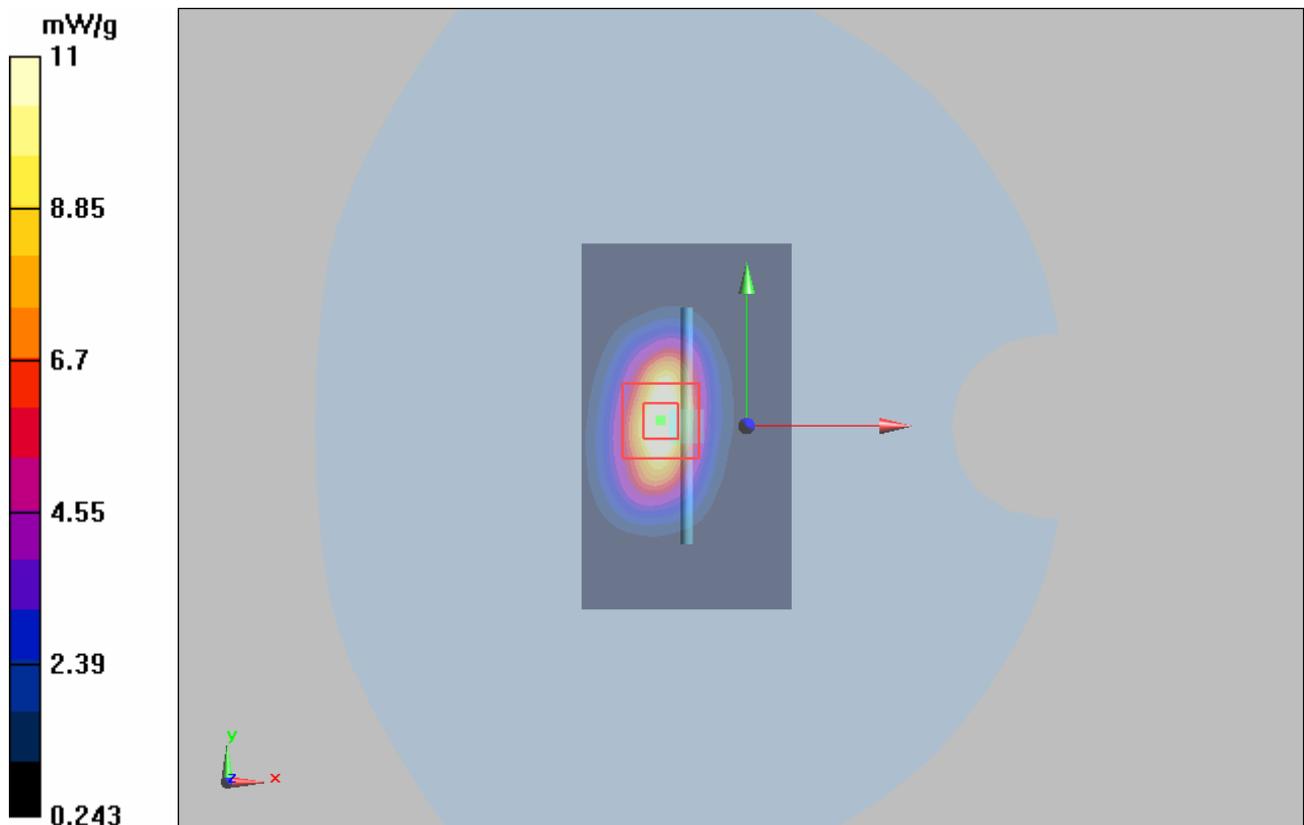


Figure 10 System Performance Check 1900MHz 250mW

## ANNEX C: Graph Results

### GSM 850 Left Cheek High

Date/Time: 2/5/2010 8:58:38 PM

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

Medium parameters used:  $f = 849$  MHz;  $\sigma = 0.935$  mho/m;  $\epsilon_r = 42.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.976 mW/g

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

Reference Value = 9.48 V/m; Power Drift = 0.026 dB

Peak SAR (extrapolated) = 1.2 W/kg

**SAR(1 g) = 0.913 mW/g; SAR(10 g) = 0.653 mW/g**

Maximum value of SAR (measured) = 0.978 mW/g

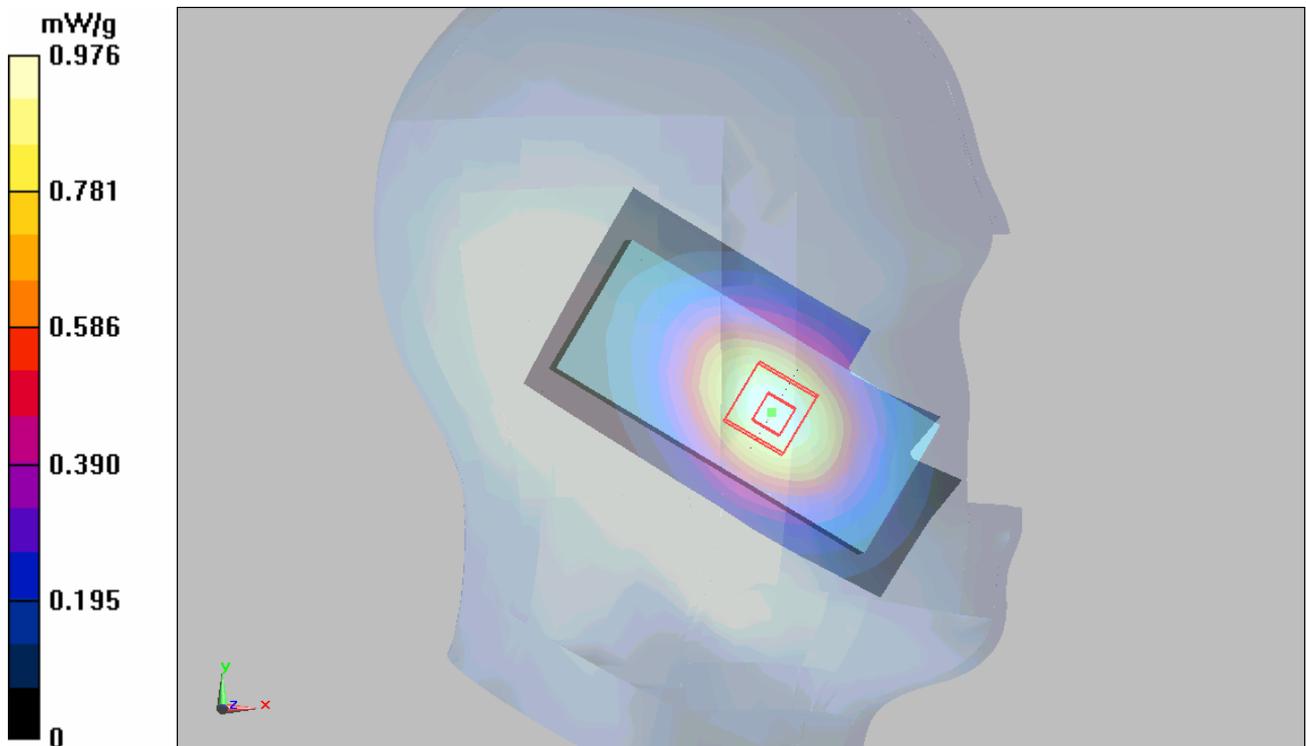


Figure 11 Left Hand Touch Cheek GSM 850 Channel 251

**GSM 850 Left Cheek Middle**

Date/Time: 2/5/2010 8:35:28 PM

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.925$  mho/m;  $\epsilon_r = 42.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

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

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

Reference Value = 8.73 V/m; Power Drift = -0.138 dB

Peak SAR (extrapolated) = 1.29 W/kg

**SAR(1 g) = 0.962 mW/g; SAR(10 g) = 0.672 mW/g**

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

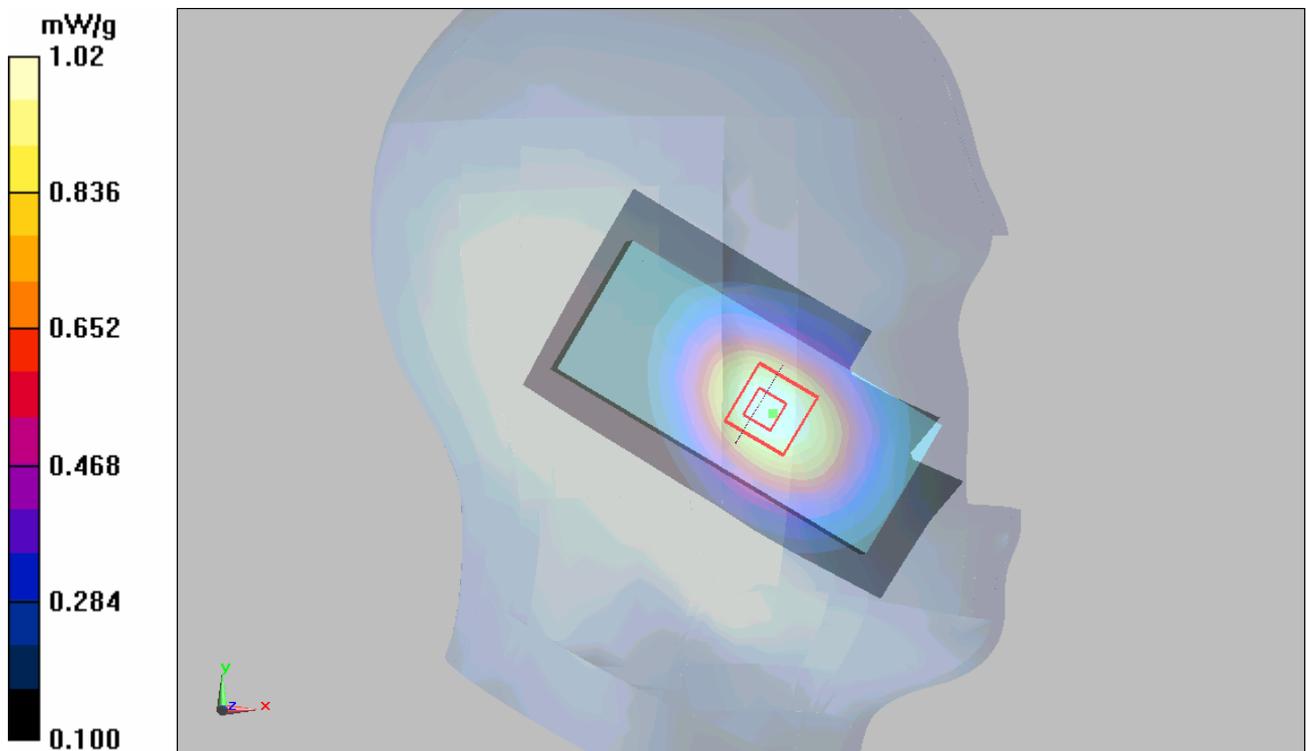


Figure 12 Left Hand Touch Cheek GSM 850 Channel 190

**GSM 850 Left Cheek Low**

Date/Time: 2/5/2010 9:20:21 PM

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

Medium parameters used (interpolated):  $f = 824.2$  MHz;  $\sigma = 0.915$  mho/m;  $\epsilon_r = 42.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.810 mW/g

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

Reference Value = 9.17 V/m; Power Drift = -0.030 dB

Peak SAR (extrapolated) = 1 W/kg

**SAR(1 g) = 0.768 mW/g; SAR(10 g) = 0.552 mW/g**

Maximum value of SAR (measured) = 0.821 mW/g

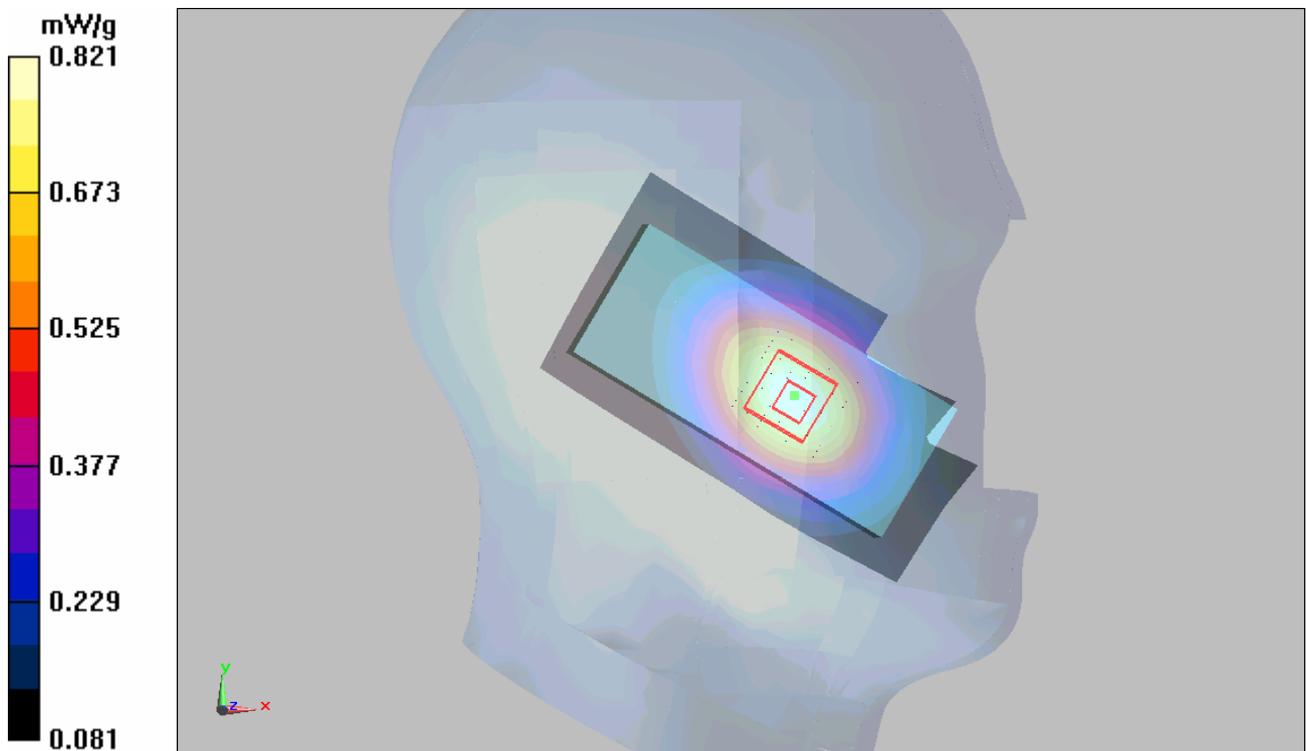


Figure 13 Left Hand Touch Cheek GSM 850 Channel 128

### GSM 850 Left Tilt Middle

Date/Time: 2/5/2010 9:42:13 PM

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.925$  mho/m;  $\epsilon_r = 42.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.588 mW/g

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

Reference Value = 16.2 V/m; Power Drift = -0.059 dB

Peak SAR (extrapolated) = 0.719 W/kg

**SAR(1 g) = 0.556 mW/g; SAR(10 g) = 0.407 mW/g**

Maximum value of SAR (measured) = 0.585 mW/g

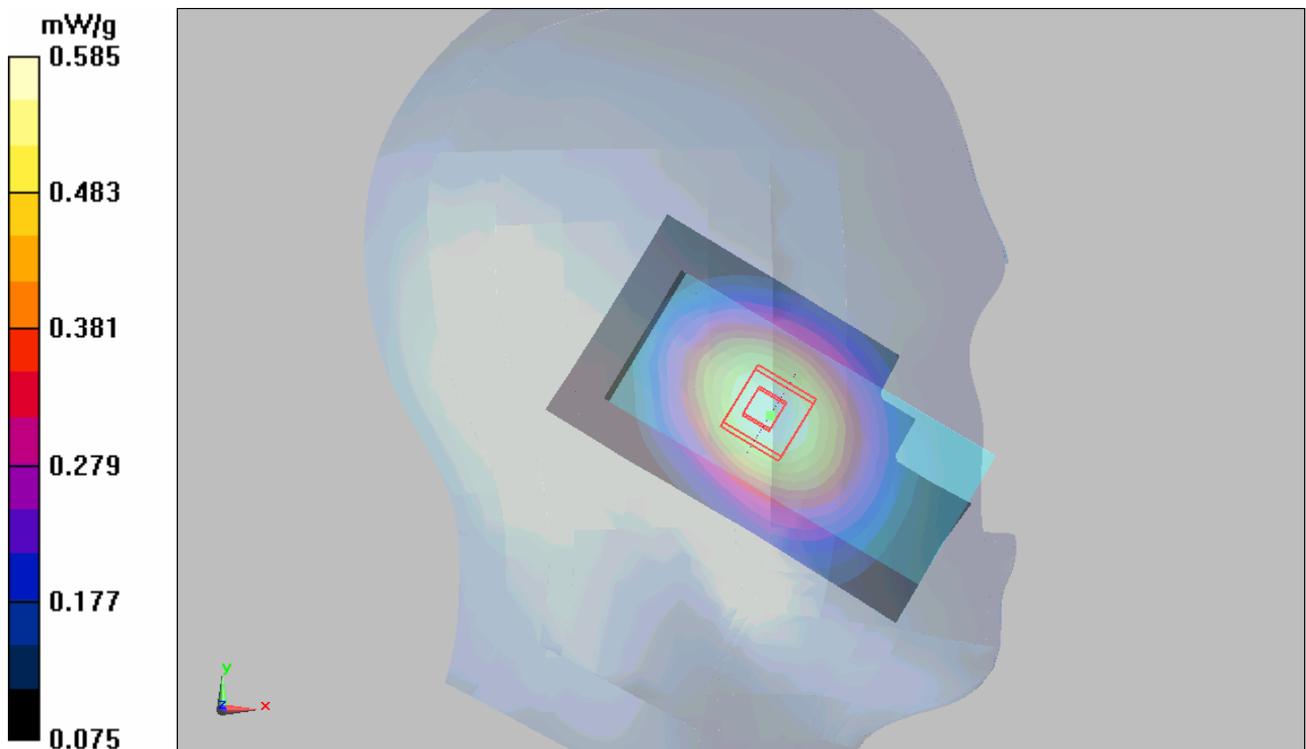


Figure 14 Left Hand Tilt 15° GSM 850 Channel 190

### GSM 850 Right Cheek High

Date/Time: 2/5/2010 10:58:40 PM

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

Medium parameters used:  $f = 849$  MHz;  $\sigma = 0.935$  mho/m;  $\epsilon_r = 42.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.998 mW/g

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

Reference Value = 8.93 V/m; Power Drift = 0.079 dB

Peak SAR (extrapolated) = 1.2 W/kg

**SAR(1 g) = 0.929 mW/g; SAR(10 g) = 0.667 mW/g**

Maximum value of SAR (measured) = 0.987 mW/g

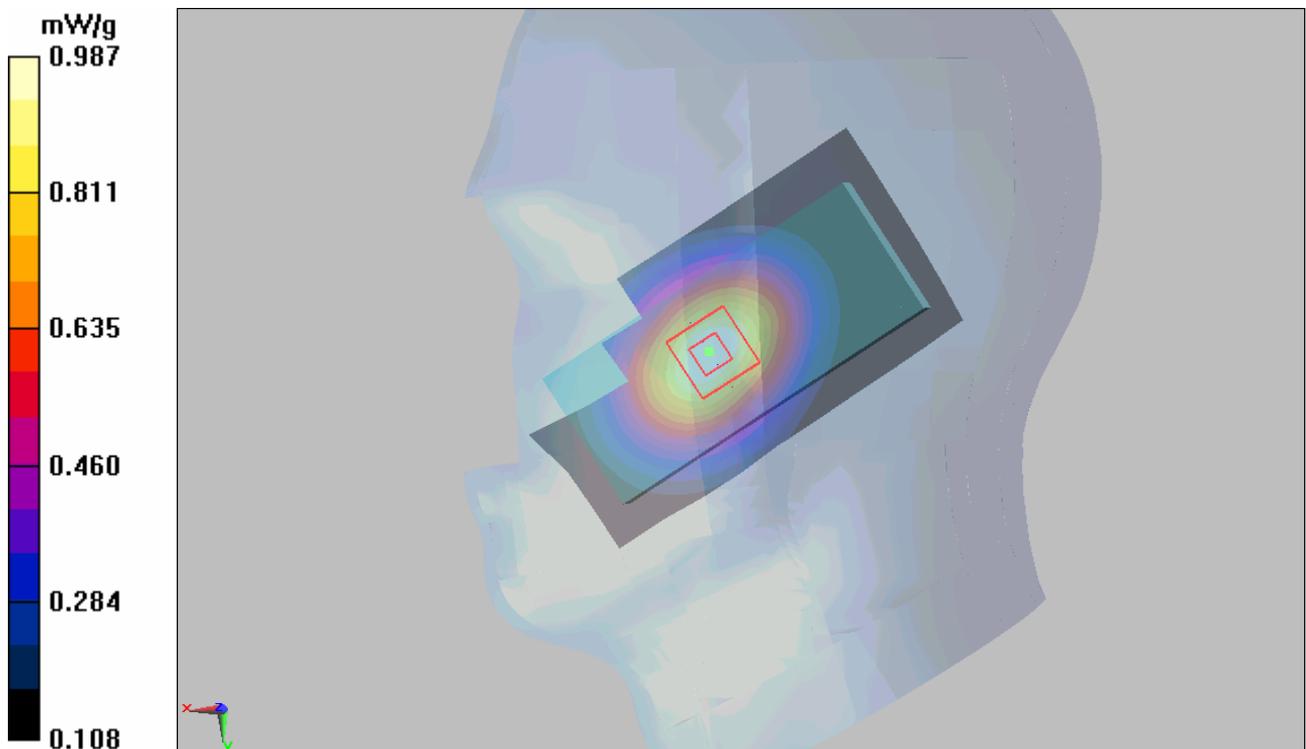


Figure 15 Right Hand Touch Cheek GSM 850 Channel 251

**GSM 850 Right Cheek Middle**

Date/Time: 2/5/2010 10:35:35 PM

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.925$  mho/m;  $\epsilon_r = 42.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 1.12 mW/g

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

Reference Value = 9.68 V/m; Power Drift = -0.092 dB

Peak SAR (extrapolated) = 1.32 W/kg

**SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.736 mW/g**

Maximum value of SAR (measured) = 1.1 mW/g

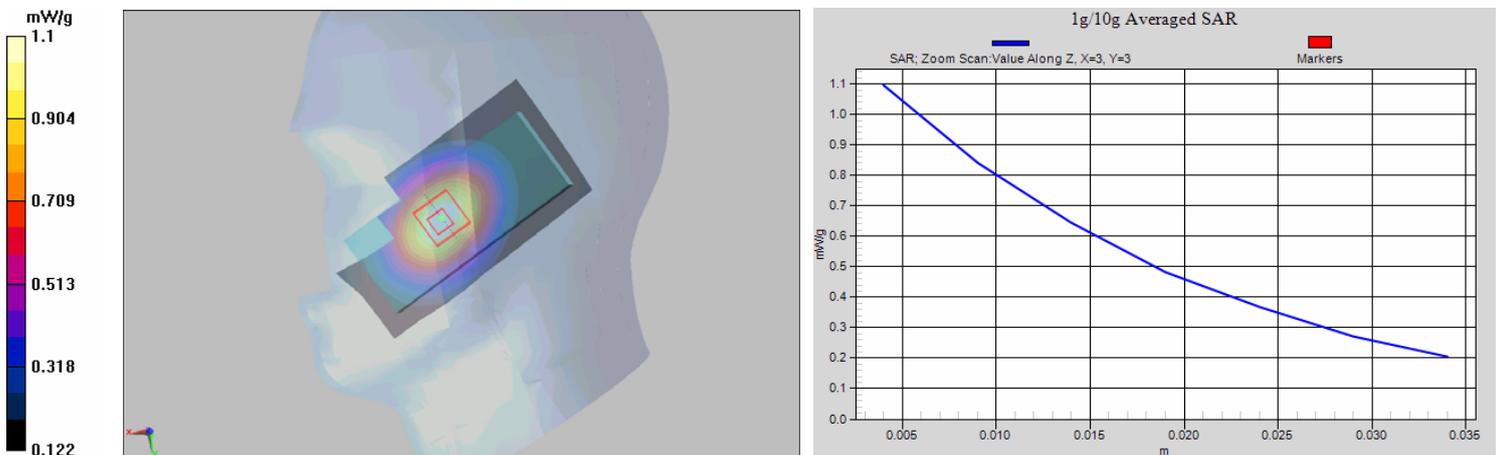


Figure 16 Right Hand Touch Cheek GSM 850 Channel 190

### GSM 850 Right Cheek Low

Date/Time: 2/5/2010 11:20:52 PM

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

Medium parameters used (interpolated):  $f = 824.2$  MHz;  $\sigma = 0.915$  mho/m;  $\epsilon_r = 42.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.835 mW/g

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

Reference Value = 8.52 V/m; Power Drift = 0.100 dB

Peak SAR (extrapolated) = 1.02 W/kg

**SAR(1 g) = 0.780 mW/g; SAR(10 g) = 0.563 mW/g**

Maximum value of SAR (measured) = 0.835 mW/g

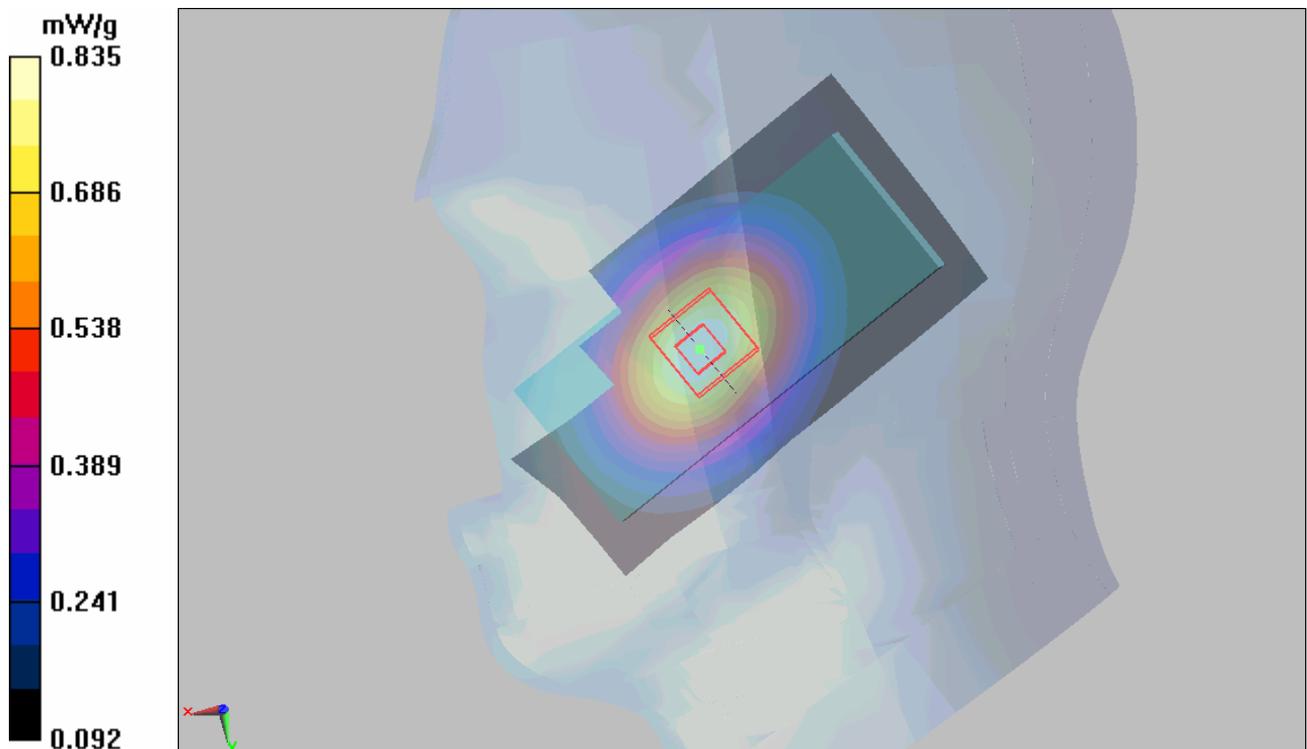


Figure 17 Right Hand Touch Cheek GSM 850 Channel 128

**GSM 850 Right Tilt Middle**

Date/Time: 2/5/2010 10:13:19 PM

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.925$  mho/m;  $\epsilon_r = 42.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.600 mW/g

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

Reference Value = 15.7 V/m; Power Drift = -0.123 dB

Peak SAR (extrapolated) = 0.724 W/kg

**SAR(1 g) = 0.560 mW/g; SAR(10 g) = 0.411 mW/g**

Maximum value of SAR (measured) = 0.592 mW/g

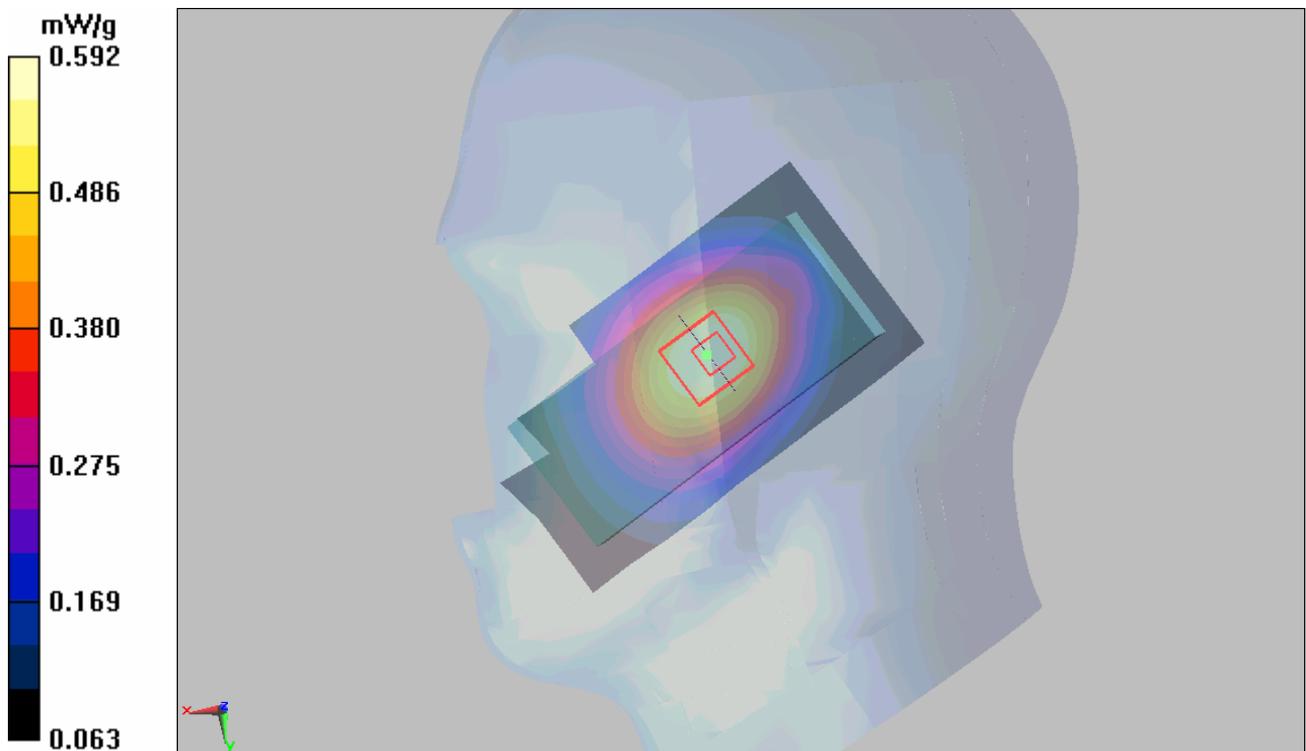


Figure 18 Right Hand Tilt 15° GSM 850 Channel 190

### GSM 850 Towards Ground High

Date/Time: 2/10/2010 7:38:30 PM

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

Medium parameters used:  $f = 849$  MHz;  $\sigma = 1$  mho/m;  $\epsilon_r = 54.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**Towards Ground High/Area Scan (51x101x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 0.868 mW/g

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

Reference Value = 12.8 V/m; Power Drift = 0.034 dB

Peak SAR (extrapolated) = 1.1 W/kg

**SAR(1 g) = 0.827 mW/g; SAR(10 g) = 0.596 mW/g**

Maximum value of SAR (measured) = 0.879 mW/g

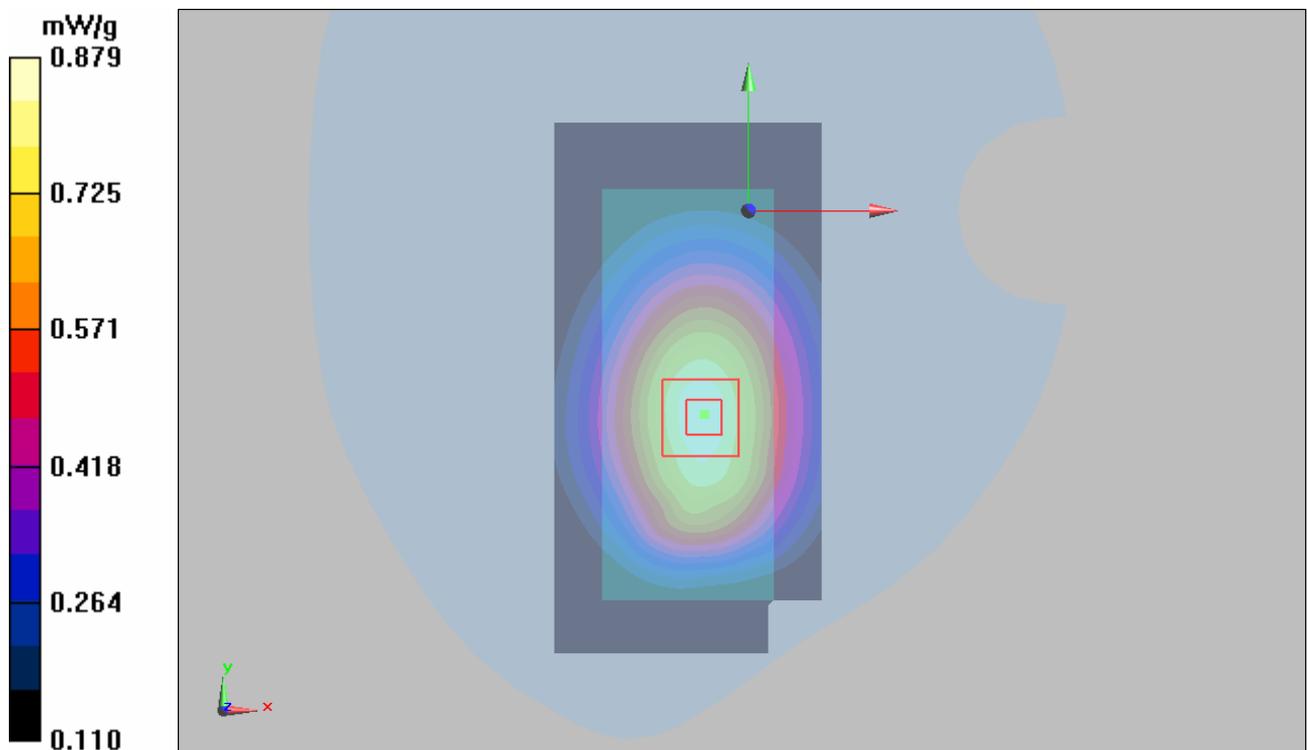


Figure 19 Body, Towards Ground, GSM 850 Channel 251

### GSM 850 Towards Ground Middle

Date/Time: 2/10/2010 7:15:50 PM

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.987$  mho/m;  $\epsilon_r = 55$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**Towards Ground Middle/Area Scan (51x101x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 1.08 mW/g

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

Reference Value = 14.1 V/m; Power Drift = 0.004 dB

Peak SAR (extrapolated) = 1.39 W/kg

**SAR(1 g) = 1.03 mW/g; SAR(10 g) = 0.743 mW/g**

Maximum value of SAR (measured) = 1.26 mW/g

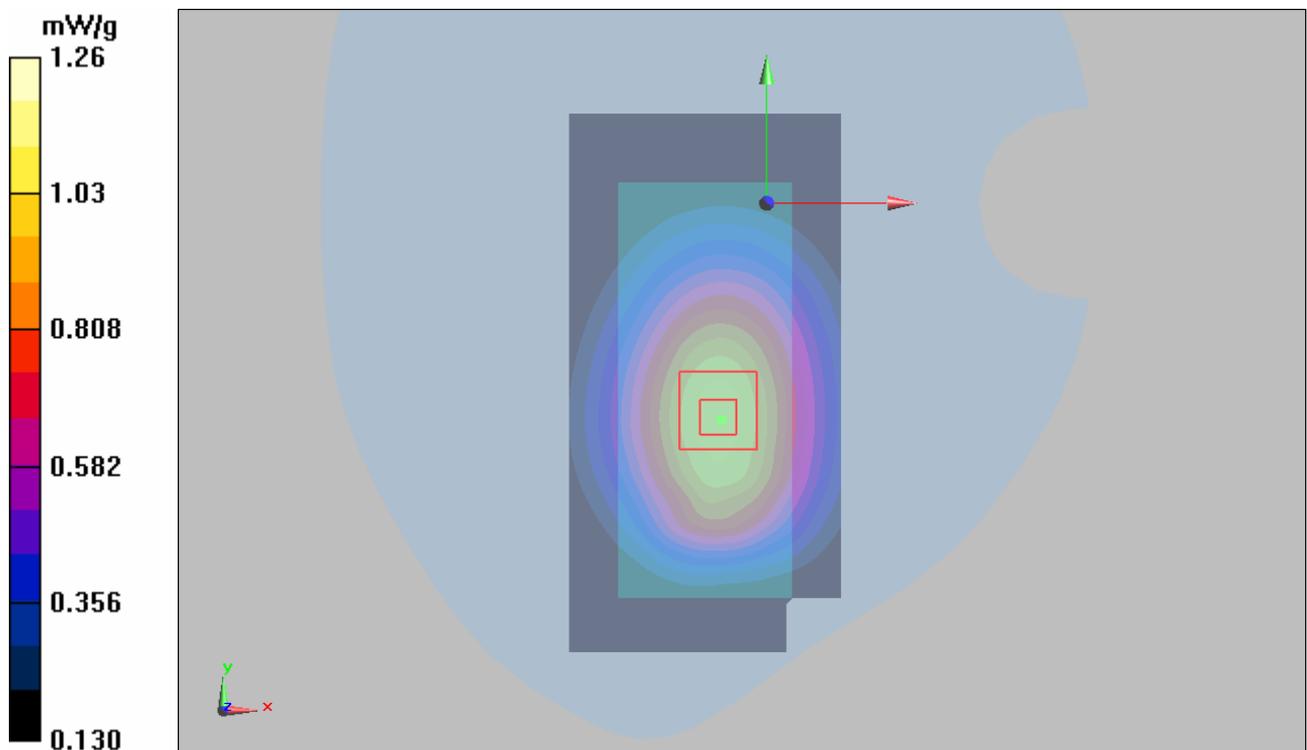


Figure 20 Body, Towards Ground, GSM 850 Channel 190

### GSM 850 Towards Ground Low

Date/Time: 2/10/2010 8:05:08 PM

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

Medium parameters used (interpolated):  $f = 824.2$  MHz;  $\sigma = 0.976$  mho/m;  $\epsilon_r = 55.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**Towards Ground Low/Area Scan (51x101x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 1.16 mW/g

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

Reference Value = 14.4 V/m; Power Drift = -0.044 dB

Peak SAR (extrapolated) = 1.48 W/kg

**SAR(1 g) = 1.1 mW/g; SAR(10 g) = 0.792 mW/g**

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

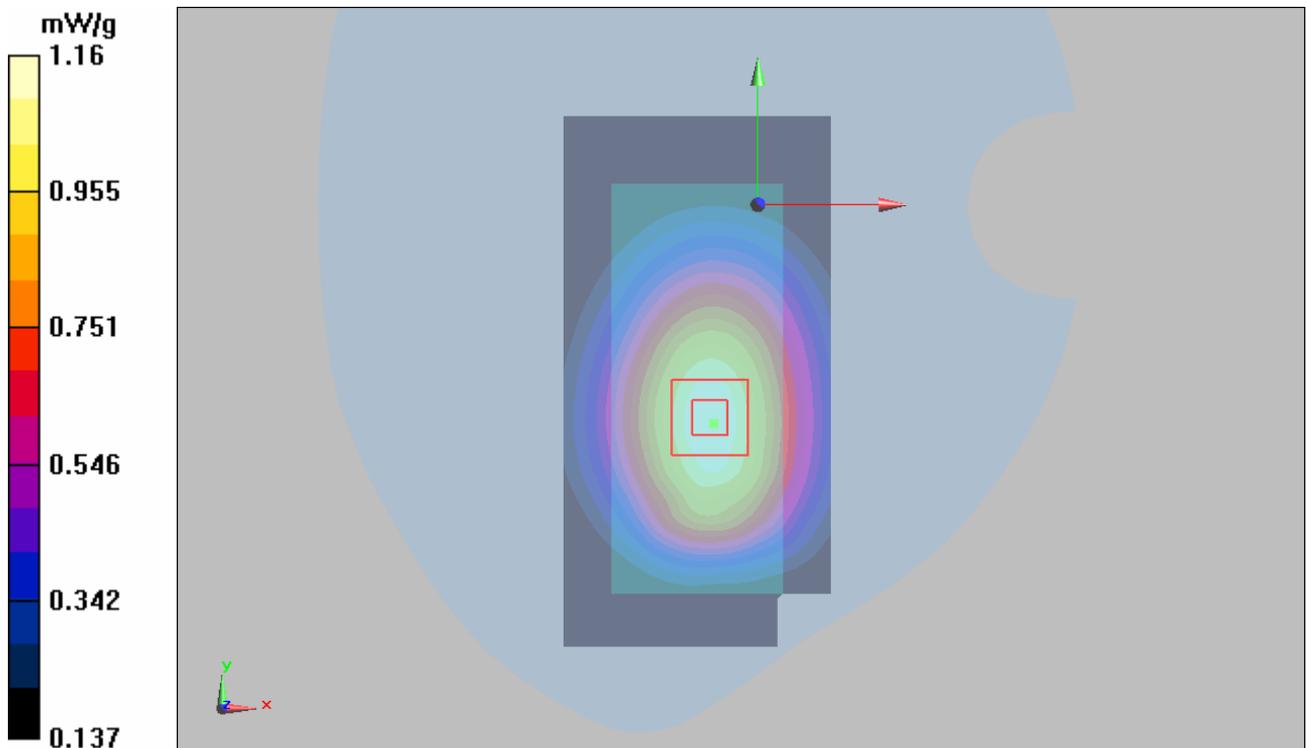


Figure 21 Body, Towards Ground, GSM 850 Channel 128

### GSM 850 Towards Phantom High

Date/Time: 2/10/2010 9:02:43 PM

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

Medium parameters used:  $f = 849$  MHz;  $\sigma = 0.992$  mho/m;  $\epsilon_r = 54.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**Towards Phantom High/Area Scan (51x91x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 0.781 mW/g

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

Reference Value = 9.32 V/m; Power Drift = 0.161 dB

Peak SAR (extrapolated) = 0.924 W/kg

**SAR(1 g) = 0.723 mW/g; SAR(10 g) = 0.519 mW/g**

Maximum value of SAR (measured) = 0.771 mW/g

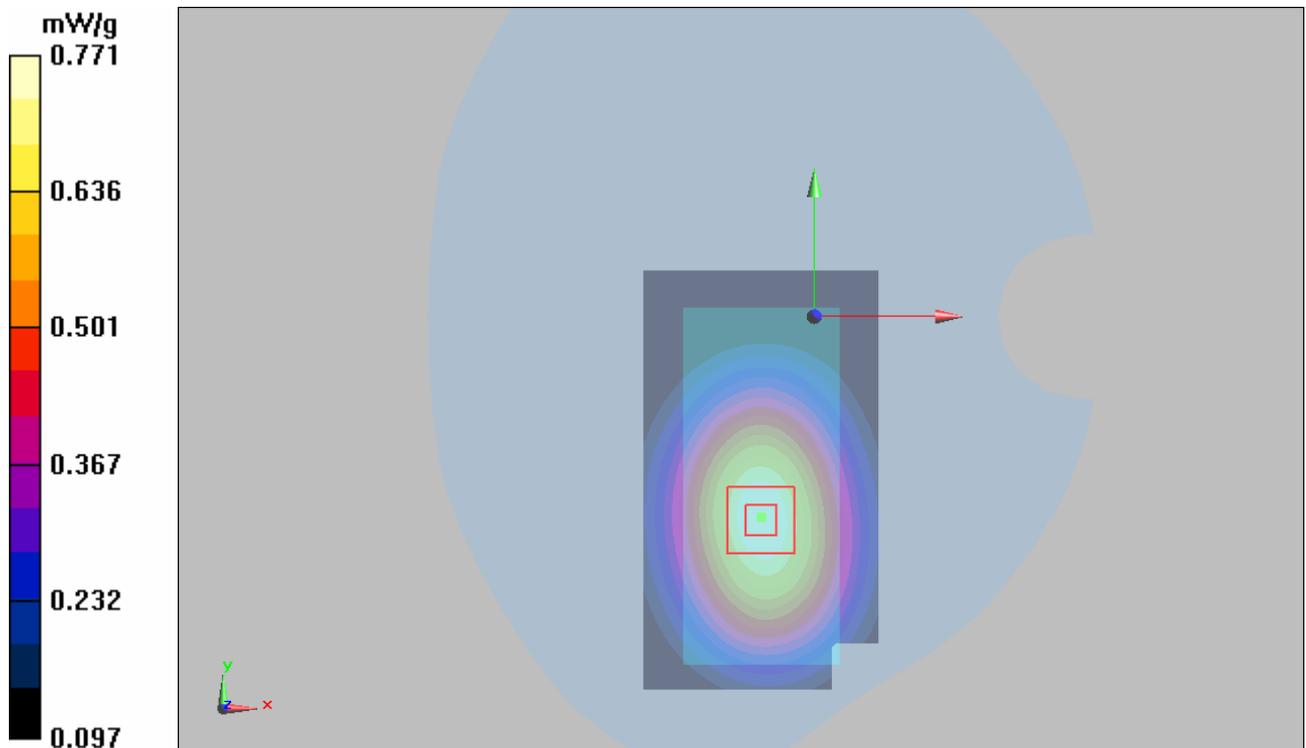


Figure 22 Body, Towards Phantom, GSM 850 Channel 251

### GSM 850 Towards Phantom Middle

Date/Time: 2/10/2010 8:28:29 PM

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.979$  mho/m;  $\epsilon_r = 54.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

Phantom section: Flat Section

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.925 mW/g

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

Reference Value = 12.2 V/m; Power Drift = -0.011 dB

Peak SAR (extrapolated) = 1.09 W/kg

**SAR(1 g) = 0.854 mW/g; SAR(10 g) = 0.622 mW/g**

Maximum value of SAR (measured) = 0.904 mW/g

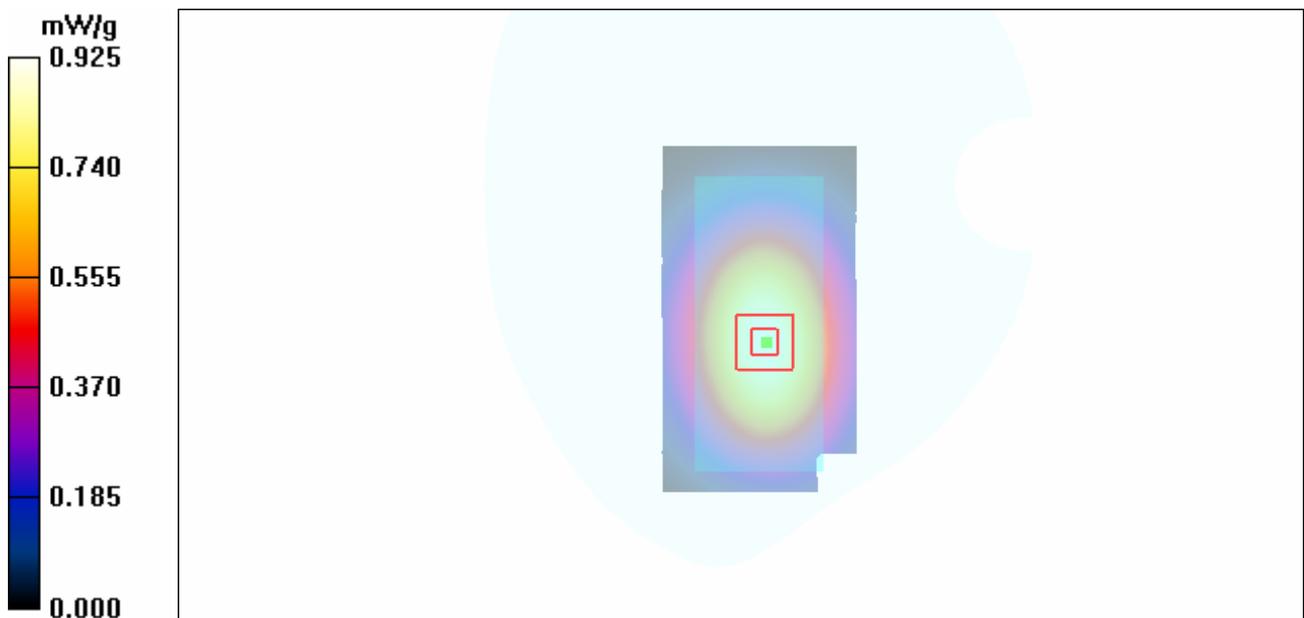


Figure 23 Body, Towards Phantom, GSM 850 Channel 190

**GSM 850 Towards Phantom Low**

Date/Time: 2/10/2010 9:24:22 PM

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

Medium parameters used (interpolated):  $f = 824.2$  MHz;  $\sigma = 0.969$  mho/m;  $\epsilon_r = 55$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.796 mW/g

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

Reference Value = 9.18 V/m; Power Drift = -0.123 dB

Peak SAR (extrapolated) = 0.940 W/kg

**SAR(1 g) = 0.745 mW/g; SAR(10 g) = 0.538 mW/g**

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

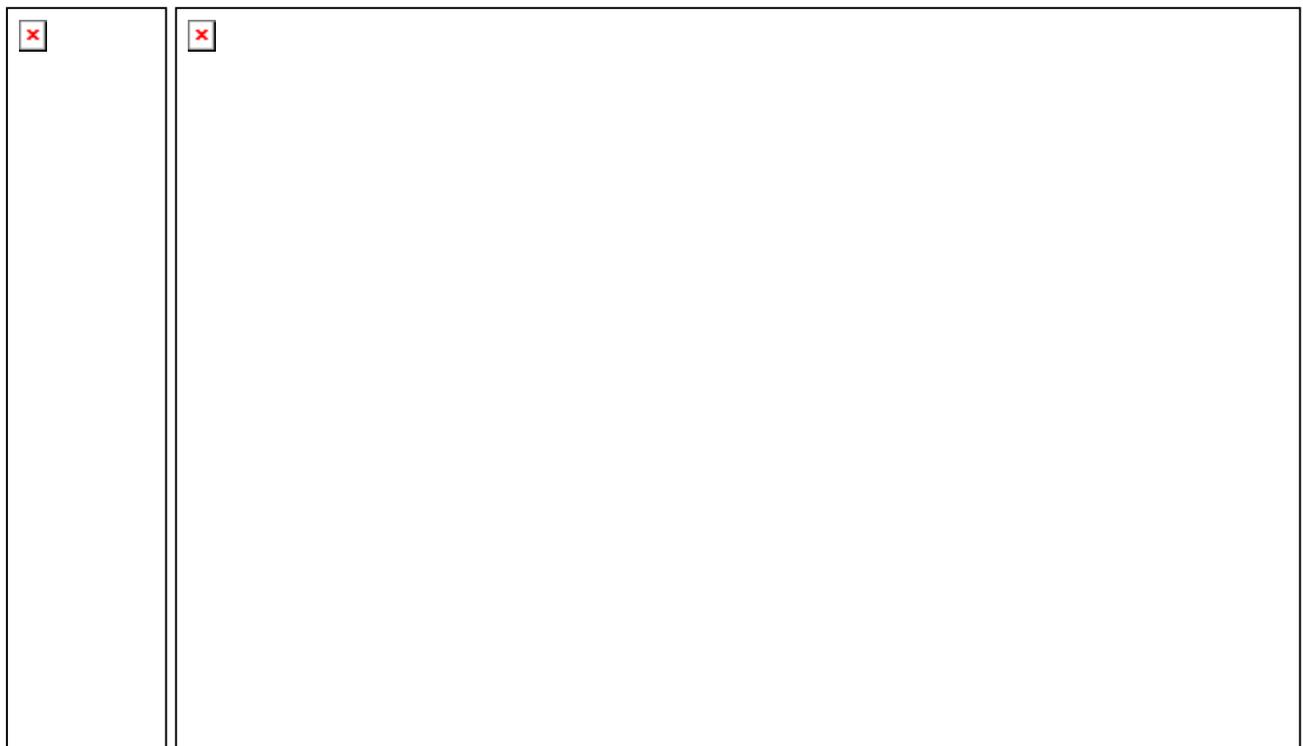


Figure 24 Body, Towards Phantom, GSM 850 Channel 128

### GSM 850 Towards Ground with Earphone Low

Date/Time: 2/10/2010 8:50:15 PM

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

Medium parameters used (interpolated):  $f = 824.2$  MHz;  $\sigma = 0.969$  mho/m;  $\epsilon_r = 55$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

Phantom section: Flat Section

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.957 mW/g

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

Reference Value = 12.2 V/m; Power Drift = 0.171 dB

Peak SAR (extrapolated) = 1.18 W/kg

**SAR(1 g) = 0.901 mW/g; SAR(10 g) = 0.652 mW/g**

Maximum value of SAR (measured) = 0.953 mW/g

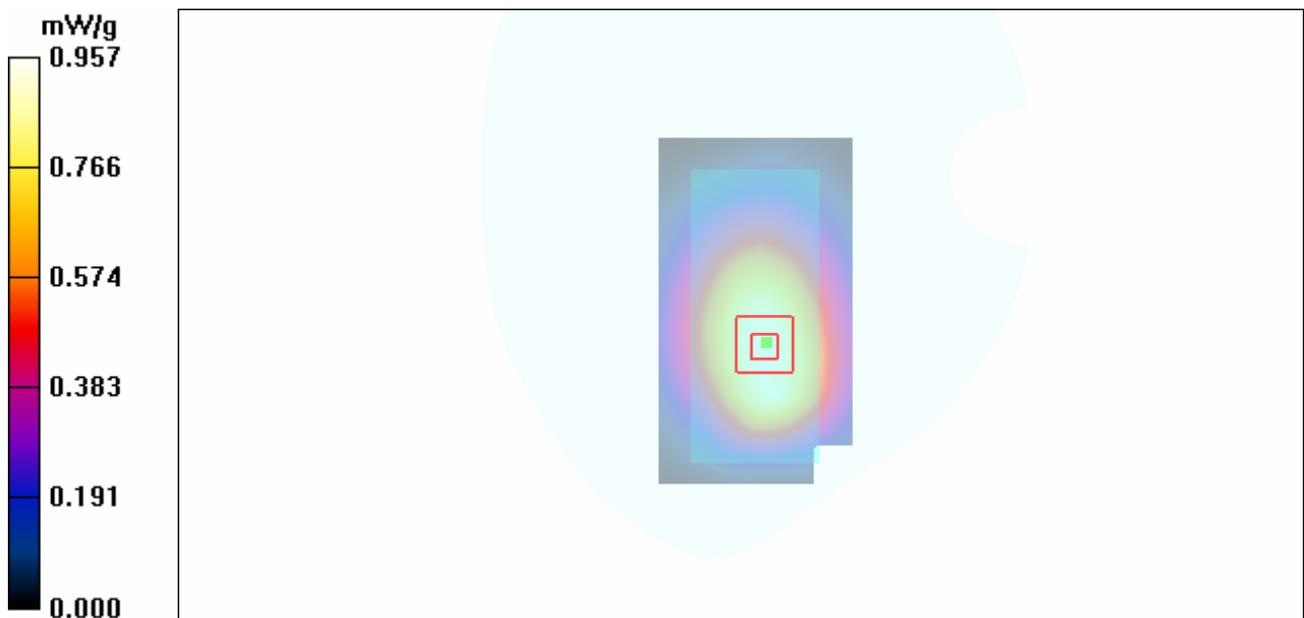


Figure 25 Body with Earphone, Towards Ground, GSM 850 Channel 128

**GSM 850+GPRS(2Up) Towards Ground Low**

Date/Time: 2/10/2010 9:25:42 PM

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

Medium parameters used (interpolated):  $f = 824.2$  MHz;  $\sigma = 0.969$  mho/m;  $\epsilon_r = 55$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

Phantom section: Flat Section

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**Towards Ground Low 2/Area Scan (51x91x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.45 mW/g

**Towards Ground Low 2/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm,

dz=5mm

Reference Value = 14.1 V/m; Power Drift = -0.099 dB

Peak SAR (extrapolated) = 2.70 W/kg

**SAR(1 g) = 1.37 mW/g; SAR(10 g) = 0.997 mW/g**

Maximum value of SAR (measured) = 1.45 mW/g

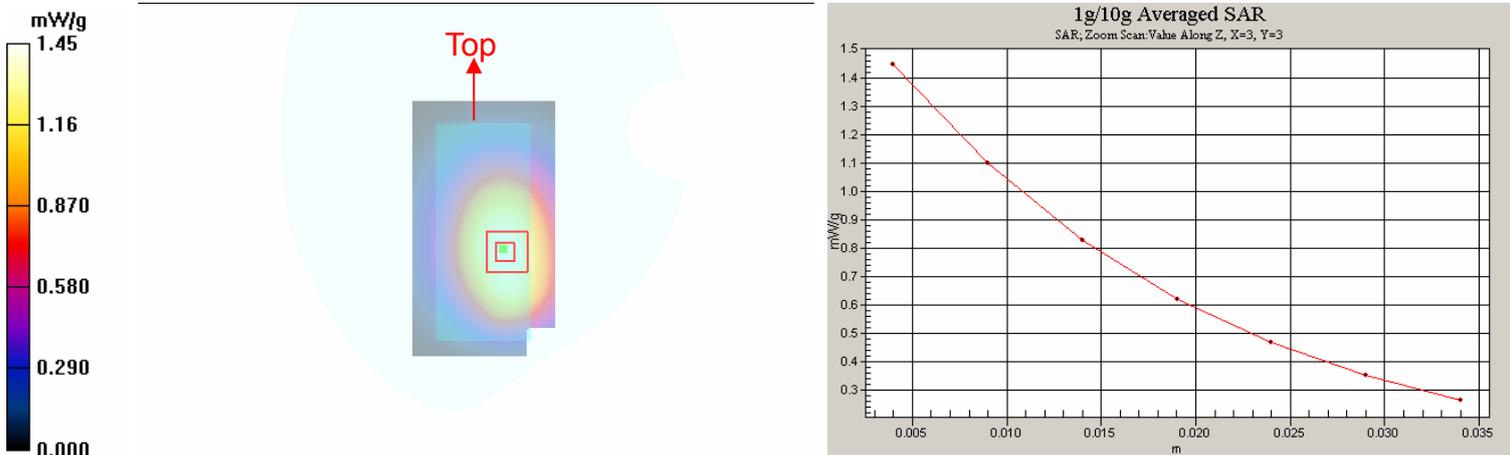


Figure 26 Body, Towards Ground, GSM 850 GPRS(2Up) Channel 128

### GSM 850+EGPRS(2Up) Towards Ground Low

Date/Time: 2/10/2010 9:48:44 PM

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

Medium parameters used (interpolated):  $f = 824.2$  MHz;  $\sigma = 0.969$  mho/m;  $\epsilon_r = 55$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

Phantom section: Flat Section

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 1.44 mW/g

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

Reference Value = 14.0 V/m; Power Drift = -0.008 dB

Peak SAR (extrapolated) = 1.79 W/kg

**SAR(1 g) = 1.37 mW/g; SAR(10 g) = 0.992 mW/g**

Maximum value of SAR (measured) = 1.45 mW/g

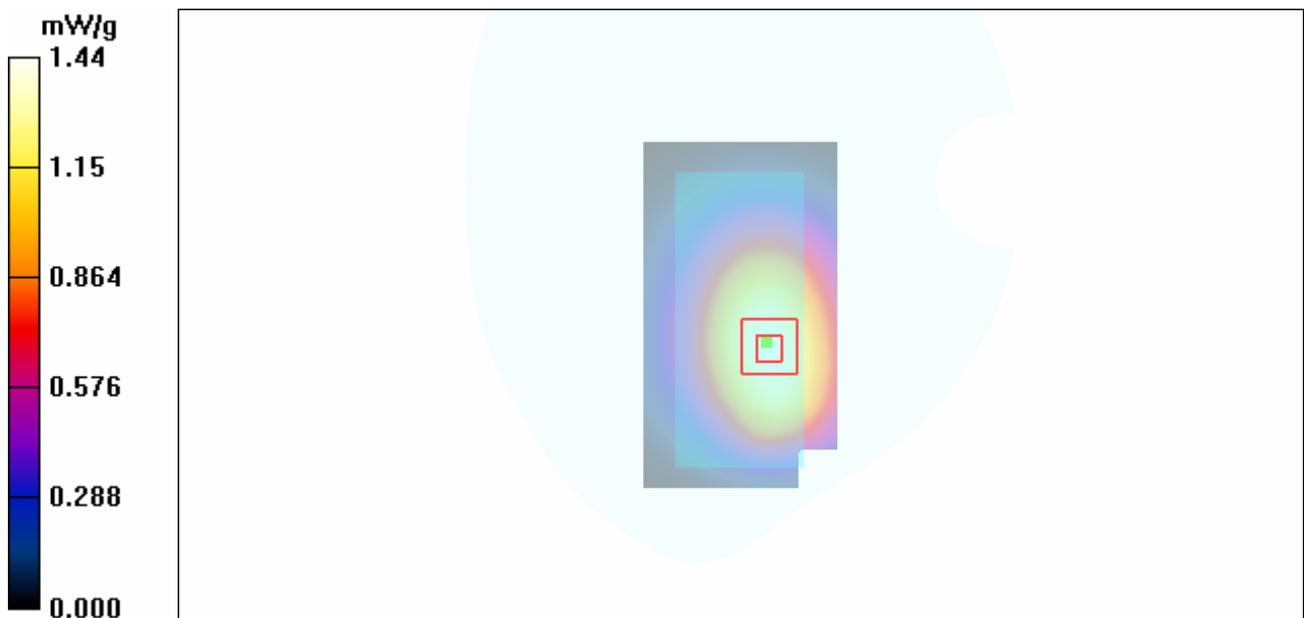


Figure 27 Body, Towards Ground, GSM 850 EGPRS(2Up) Channel 128

### GSM 1900 Left Cheek High

Date/Time: 2/6/2010 9:05:21 AM

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

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.43$  mho/m;  $\epsilon_r = 40$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.731 mW/g

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

Reference Value = 4.88 V/m; Power Drift = 0.003 dB

Peak SAR (extrapolated) = 1.08 W/kg

**SAR(1 g) = 0.688 mW/g; SAR(10 g) = 0.391 mW/g**

Maximum value of SAR (measured) = 0.771 mW/g

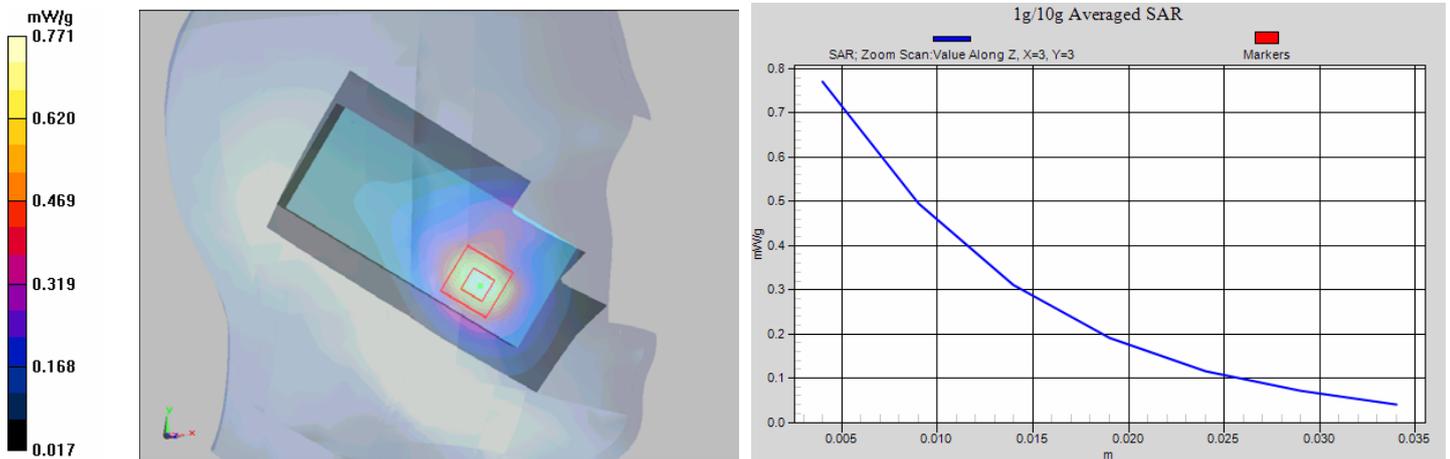


Figure 28 Left Hand Touch Cheek GSM 1900 Channel 810

**GSM 1900 Left Cheek Middle**

Date/Time: 2/6/2010 7:31:21 AM

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.39$  mho/m;  $\epsilon_r = 40$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.652 mW/g

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

Reference Value = 4.55 V/m; Power Drift = 0.040 dB

Peak SAR (extrapolated) = 0.965 W/kg

**SAR(1 g) = 0.618 mW/g; SAR(10 g) = 0.357 mW/g**

Maximum value of SAR (measured) = 0.687 mW/g

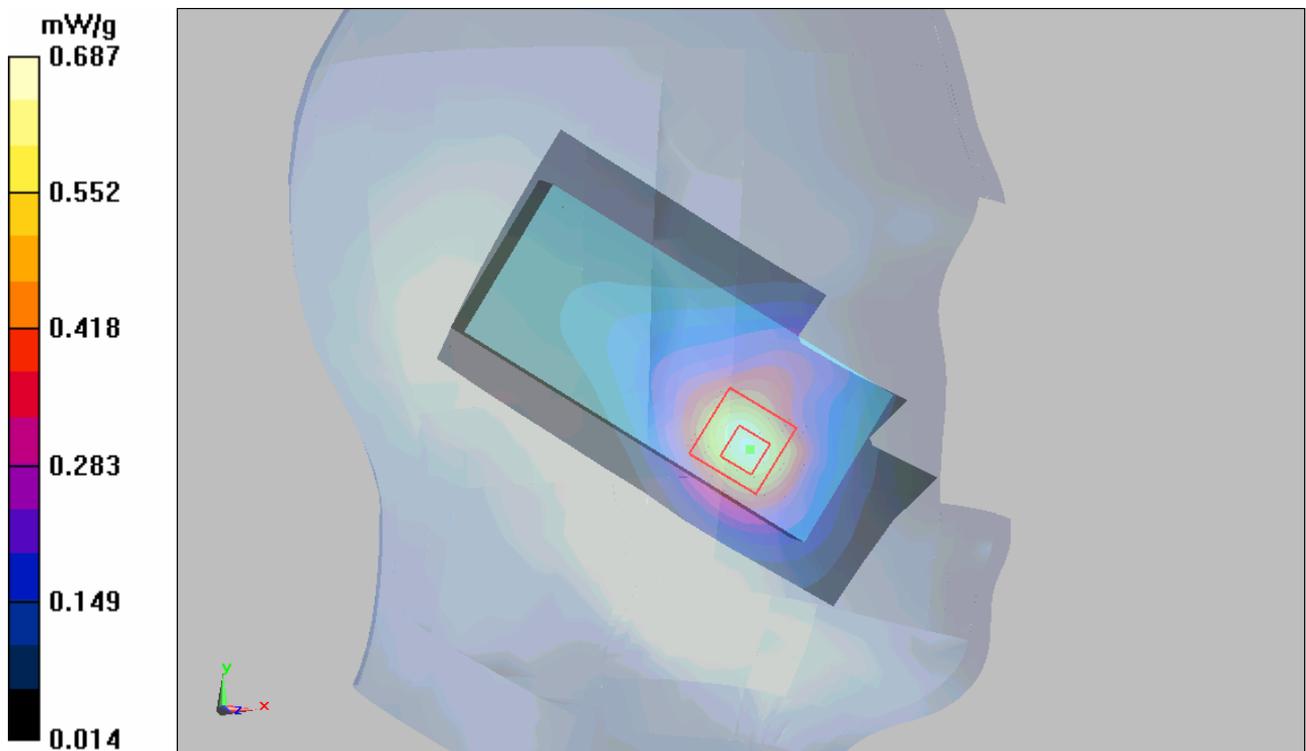


Figure 29 Left Hand Touch Cheek GSM 1900 Channel 661

**GSM 1900 Left Cheek Low**

Date/Time: 2/6/2010 9:26:56 AM

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

Medium parameters used (interpolated):  $f = 1850.2$  MHz;  $\sigma = 1.36$  mho/m;  $\epsilon_r = 40.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.600 mW/g

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

Reference Value = 3.54 V/m; Power Drift = 0.097 dB

Peak SAR (extrapolated) = 0.892 W/kg

**SAR(1 g) = 0.570 mW/g; SAR(10 g) = 0.324 mW/g**

Maximum value of SAR (measured) = 0.635 mW/g

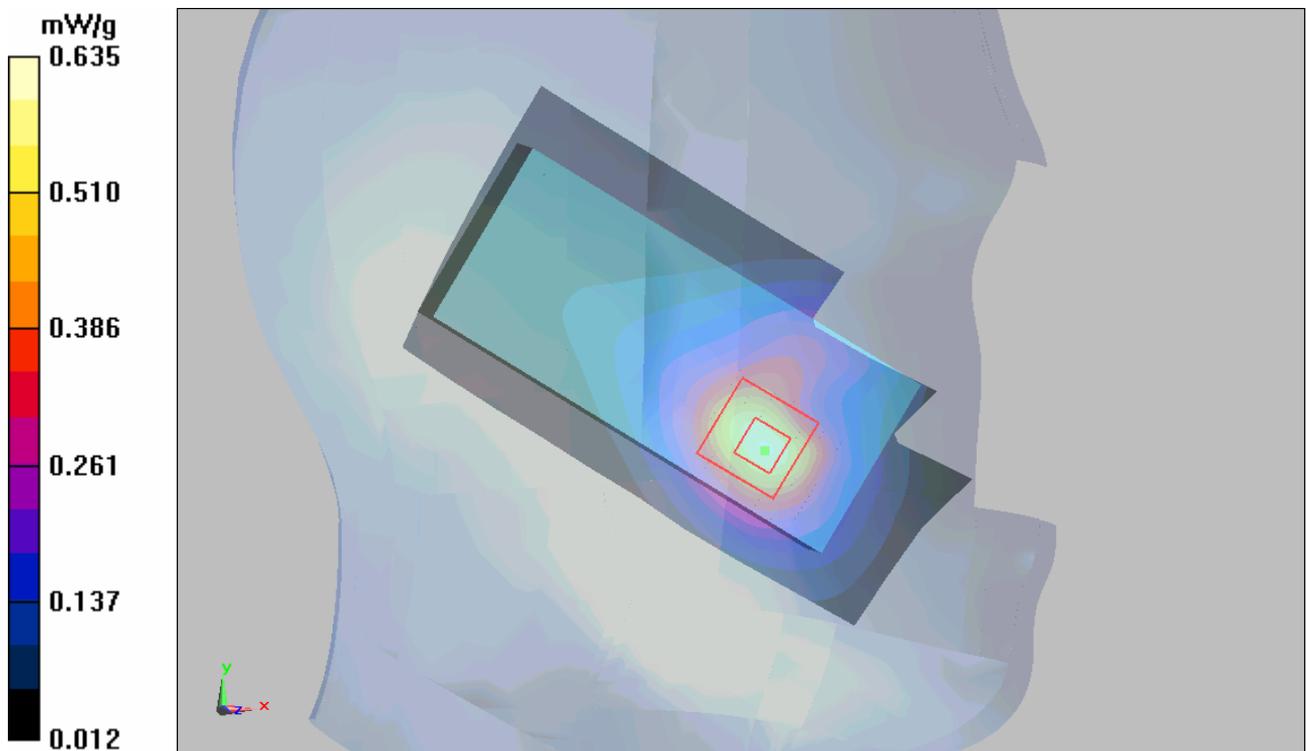


Figure 30 Left Hand Touch Cheek GSM 1900 Channel 512

### GSM 1900 Left Tilt Middle

Date/Time: 2/6/2010 7:53:04 AM

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.39$  mho/m;  $\epsilon_r = 40$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.156 mW/g

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

Reference Value = 7.93 V/m; Power Drift = -0.117 dB

Peak SAR (extrapolated) = 0.202 W/kg

**SAR(1 g) = 0.132 mW/g; SAR(10 g) = 0.080 mW/g**

Maximum value of SAR (measured) = 0.144 mW/g

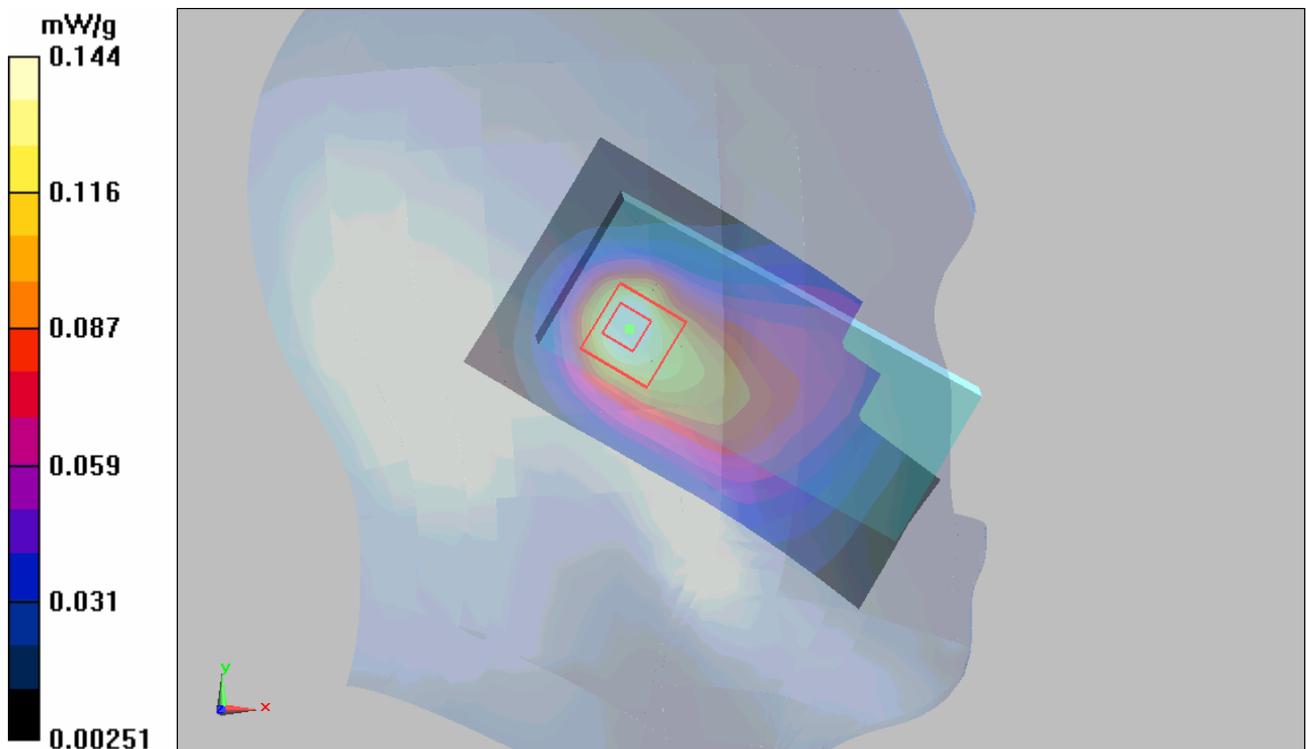


Figure 31 Left Hand Tilt 15° GSM 1900 Channel 661

**GSM 1900 Right Cheek Middle**

Date/Time: 2/6/2010 8:19:09 AM

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.39$  mho/m;  $\epsilon_r = 40$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

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

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

Reference Value = 3.73 V/m; Power Drift = 0.074 dB

Peak SAR (extrapolated) = 0.770 W/kg

**SAR(1 g) = 0.506 mW/g; SAR(10 g) = 0.314 mW/g**

Maximum value of SAR (measured) = 0.552 mW/g

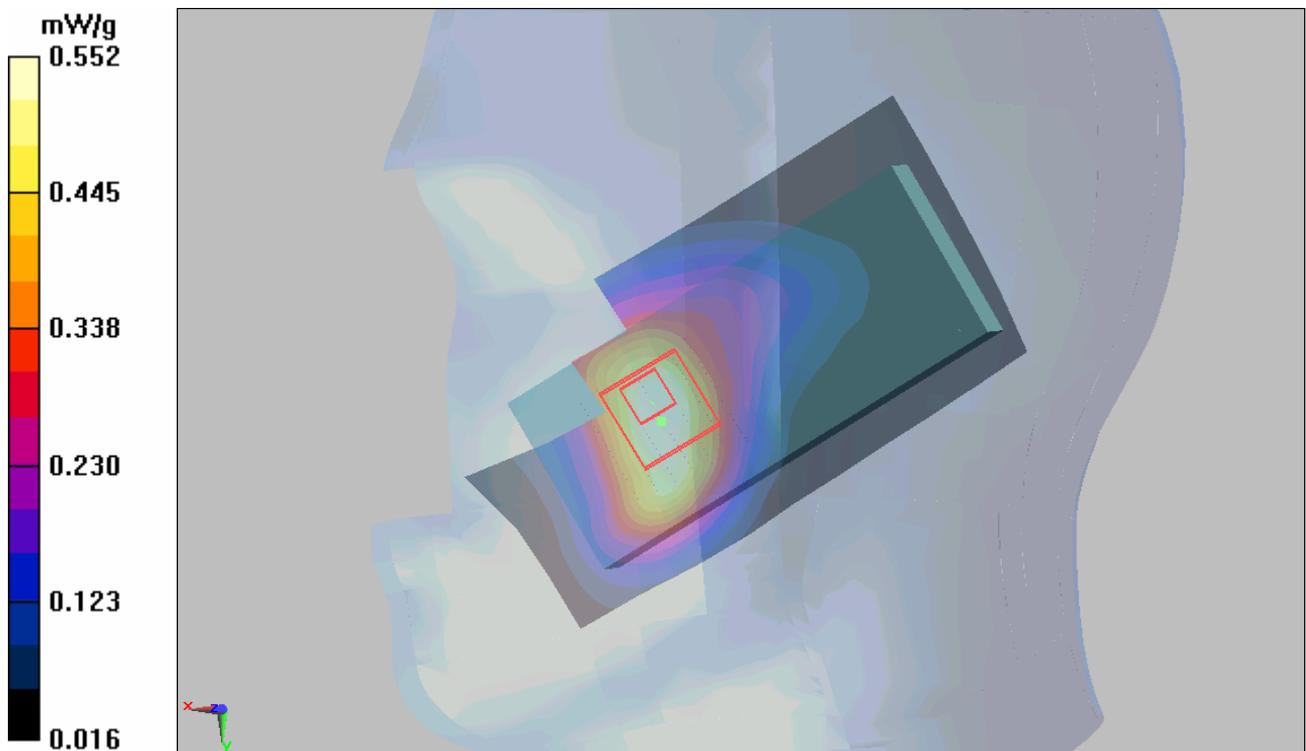


Figure 32 Right Hand Touch Cheek GSM 1900 Channel 661

### GSM 1900 Right Tilt Middle

Date/Time: 2/6/2010 8:40:56 AM

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.39$  mho/m;  $\epsilon_r = 40$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.177 mW/g

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

Reference Value = 7.78 V/m; Power Drift = 0.078 dB

Peak SAR (extrapolated) = 0.225 W/kg

**SAR(1 g) = 0.148 mW/g; SAR(10 g) = 0.091 mW/g**

Maximum value of SAR (measured) = 0.159 mW/g

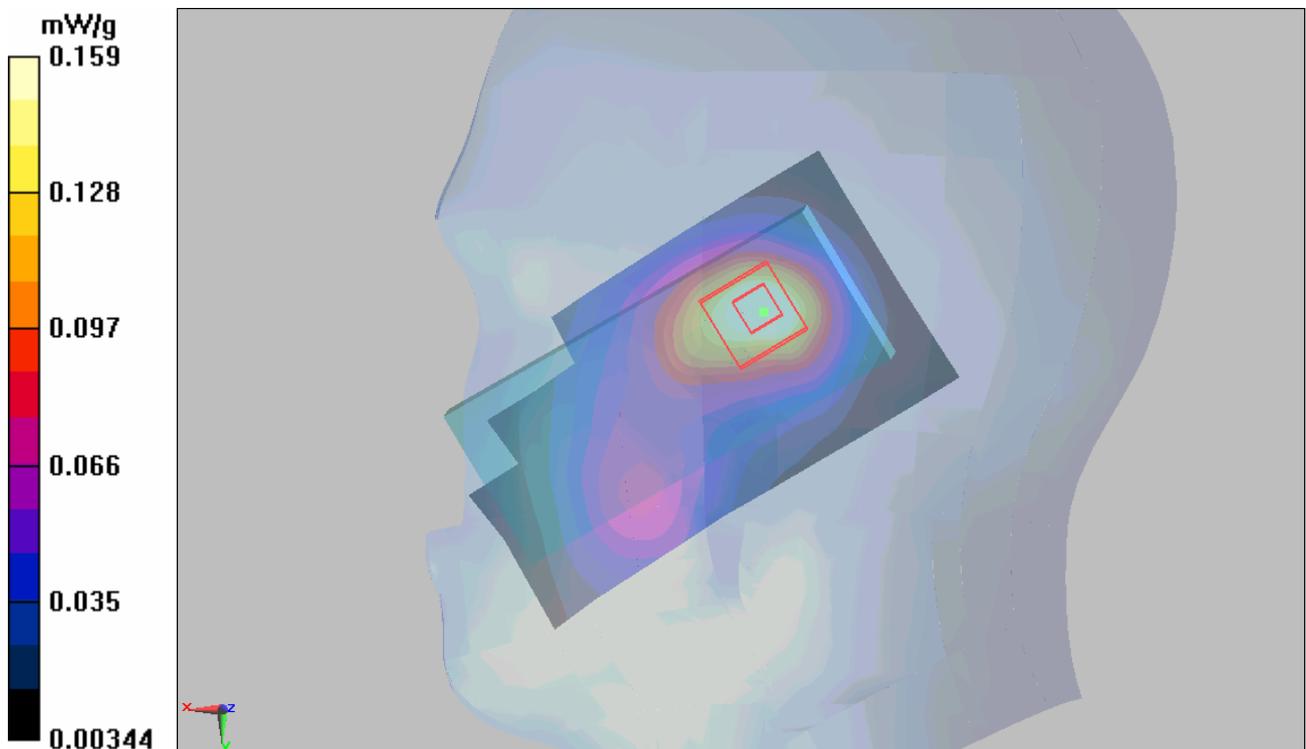


Figure 33 Right Hand Tilt 15° GSM 1900 Channel 661

### GSM 1900 Towards Ground High

Date/Time: 2/11/2010 3:35:30 PM

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

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.53$  mho/m;  $\epsilon_r = 52.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.376 mW/g

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

dz=5mm

Reference Value = 8.22 V/m; Power Drift = 0.022 dB

Peak SAR (extrapolated) = 0.569 W/kg

**SAR(1 g) = 0.341 mW/g; SAR(10 g) = 0.207 mW/g**

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

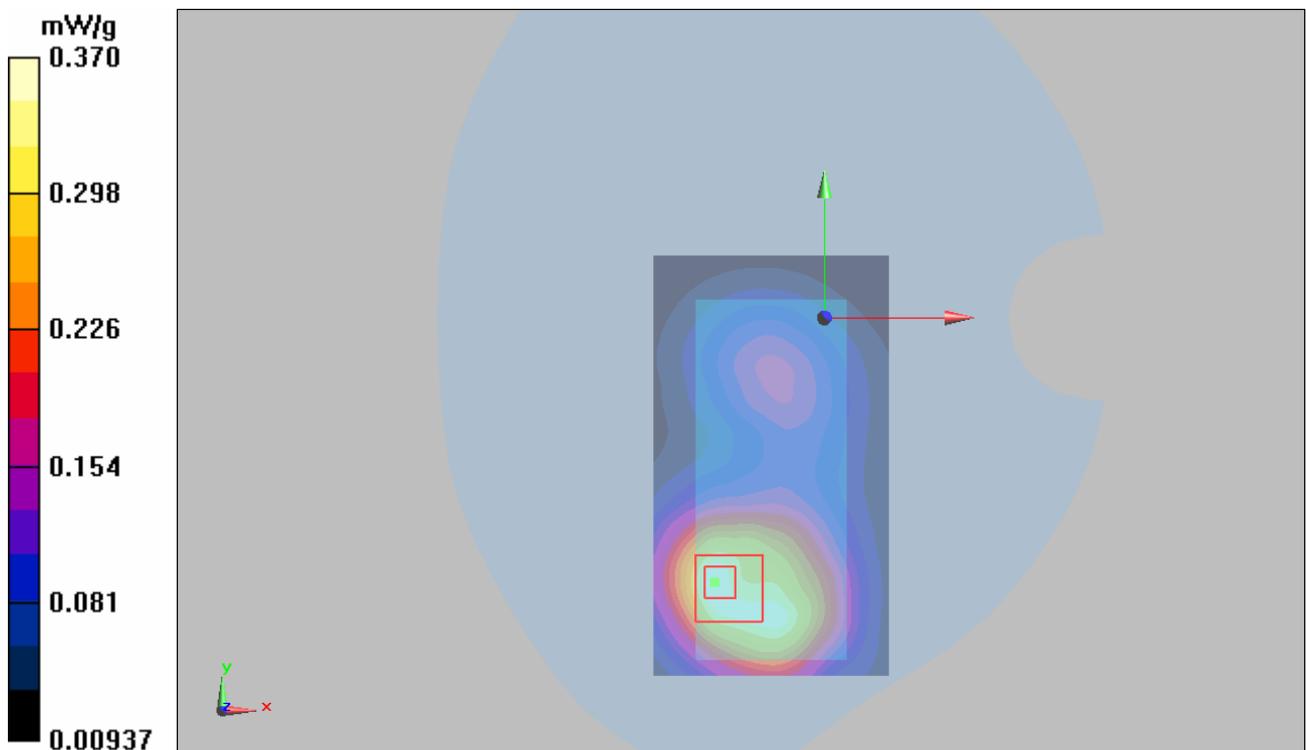


Figure 34 Body, Towards Ground, GSM 1900 Channel 810

### GSM 1900 Towards Ground Middle

Date/Time: 2/11/2010 2:56:08 PM

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.49$  mho/m;  $\epsilon_r = 52.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**Towards Ground Middle/Area Scan (51x101x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.318 mW/g

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

Reference Value = 7.74 V/m; Power Drift = 0.045 dB

Peak SAR (extrapolated) = 0.471 W/kg

**SAR(1 g) = 0.289 mW/g; SAR(10 g) = 0.173 mW/g**

Maximum value of SAR (measured) = 0.315 mW/g

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

Reference Value = 7.74 V/m; Power Drift = 0.045 dB

Peak SAR (extrapolated) = 0.473 W/kg

**SAR(1 g) = 0.263 mW/g; SAR(10 g) = 0.164 mW/g**

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

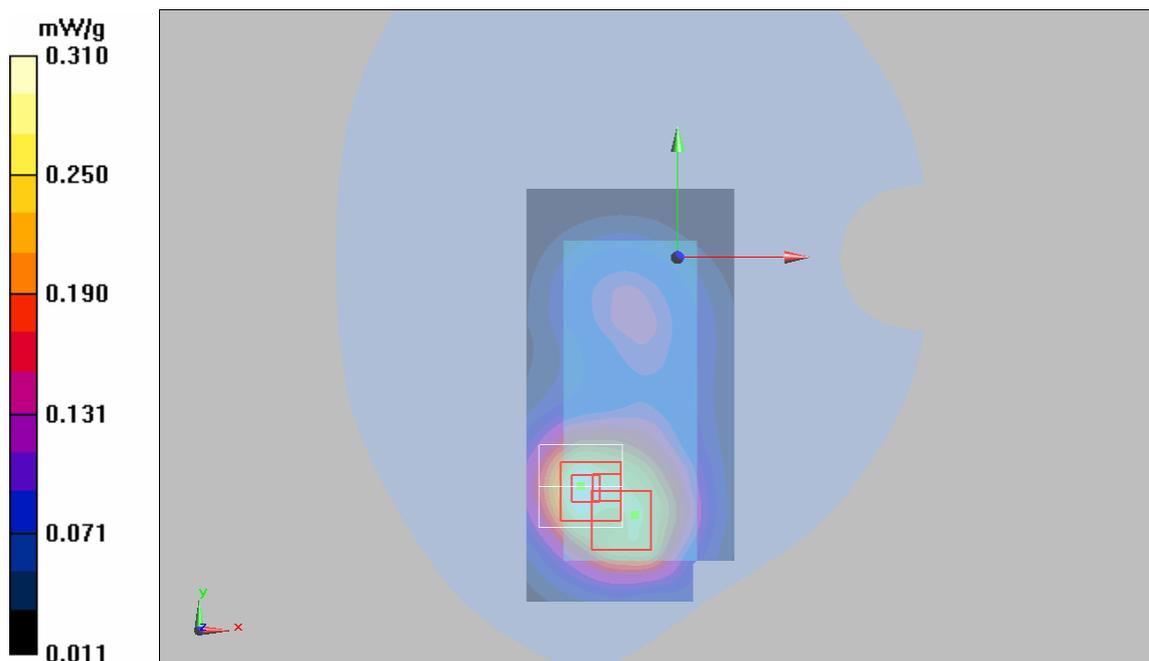


Figure 35 Body, Towards Ground, GSM 1900 Channel 661

### GSM 1900 Towards Ground Low

Date/Time: 2/11/2010 4:07:39 PM

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

Medium parameters used (interpolated):  $f = 1850.2$  MHz;  $\sigma = 1.46$  mho/m;  $\epsilon_r = 52.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

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

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

Reference Value = 7.61 V/m; Power Drift = 0.025 dB

Peak SAR (extrapolated) = 0.486 W/kg

**SAR(1 g) = 0.294 mW/g; SAR(10 g) = 0.174 mW/g**

Maximum value of SAR (measured) = 0.322 mW/g

**Towards Ground Low/Zoom Scan (7x7x7)/Cube 1:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.61 V/m; Power Drift = 0.025 dB

Peak SAR (extrapolated) = 0.477 W/kg

**SAR(1 g) = 0.258 mW/g; SAR(10 g) = 0.157 mW/g**

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

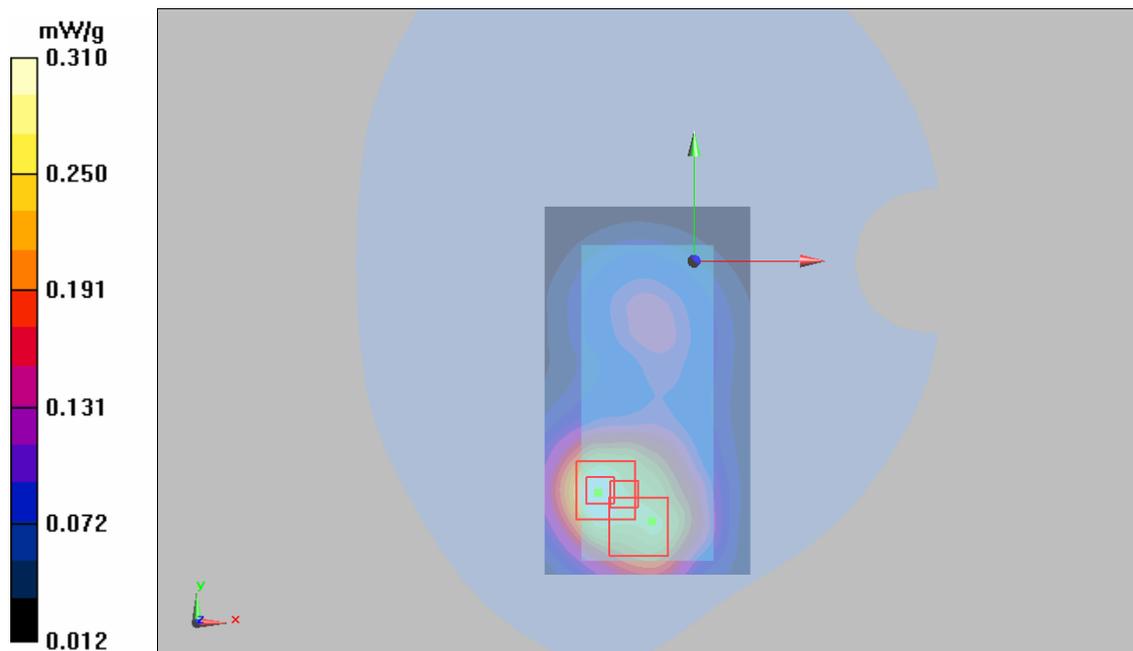


Figure 36 Body, Towards Ground, GSM 1900 Channel 512

### GSM 1900 Towards Phantom Middle

Date/Time: 2/11/2010 2:32:17 PM

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.49$  mho/m;  $\epsilon_r = 52.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**Towards Phantom Middle/Area Scan (51x101x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 0.305 mW/g

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

Reference Value = 5.39 V/m; Power Drift = -0.134 dB

Peak SAR (extrapolated) = 0.435 W/kg

**SAR(1 g) = 0.268 mW/g; SAR(10 g) = 0.159 mW/g**

Maximum value of SAR (measured) = 0.293 mW/g

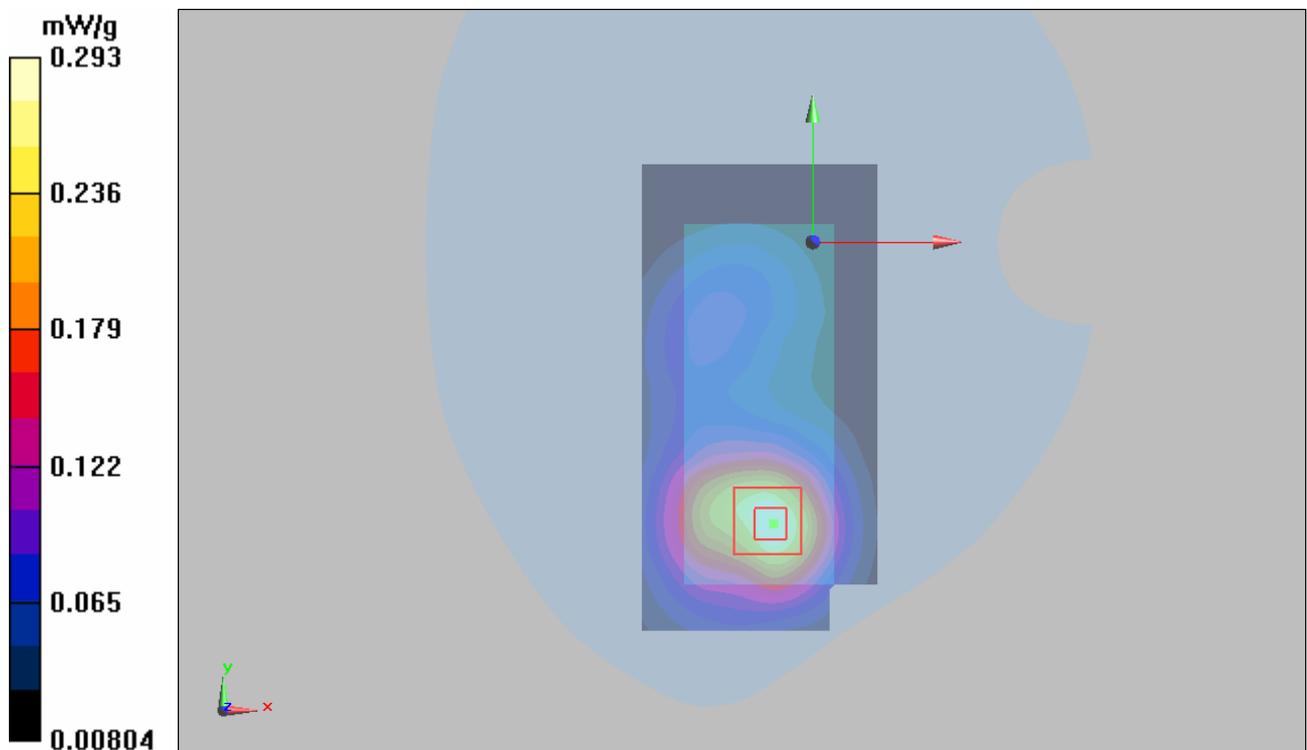


Figure 37 Body, Towards Phantom, GSM 1900 Channel 661

### GSM 1900 Towards Ground with Earphone High

Date/Time: 2/11/2010 4:48:53 PM

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

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.53$  mho/m;  $\epsilon_r = 52.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.368 mW/g

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

dz=5mm

Reference Value = 5.32 V/m; Power Drift = -0.139 dB

Peak SAR (extrapolated) = 0.551 W/kg

**SAR(1 g) = 0.329 mW/g; SAR(10 g) = 0.196 mW/g**

Maximum value of SAR (measured) = 0.360 mW/g

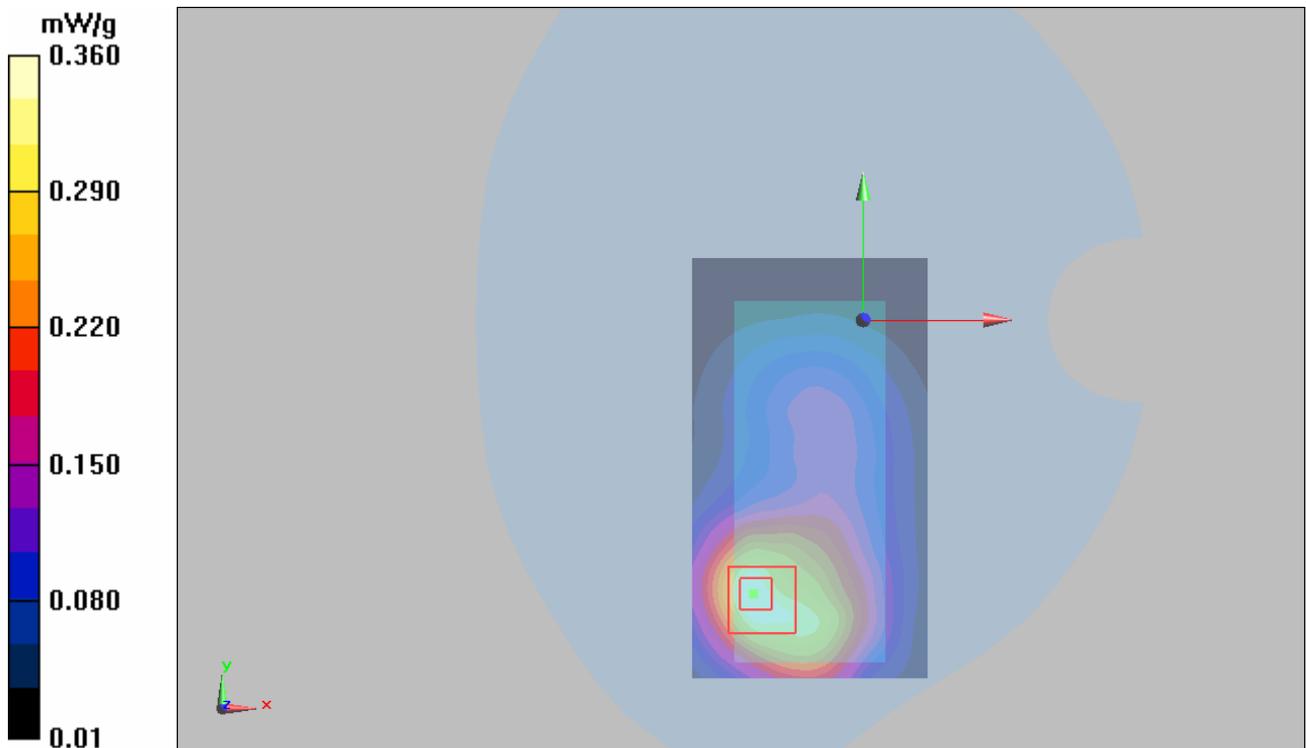


Figure 38 Body with Earphone, Towards Ground, GSM 1900 Channel 810

### GSM 1900+GPRS(2Up) Towards Ground High

Date/Time: 2/11/2010 5:09:50 PM

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

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.53$  mho/m;  $\epsilon_r = 52.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.552 mW/g

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

dz=5mm

Reference Value = 10.2 V/m; Power Drift = -0.103 dB

Peak SAR (extrapolated) = 0.883 W/kg

**SAR(1 g) = 0.533 mW/g; SAR(10 g) = 0.335 mW/g**

Maximum value of SAR (measured) = 0.583 mW/g

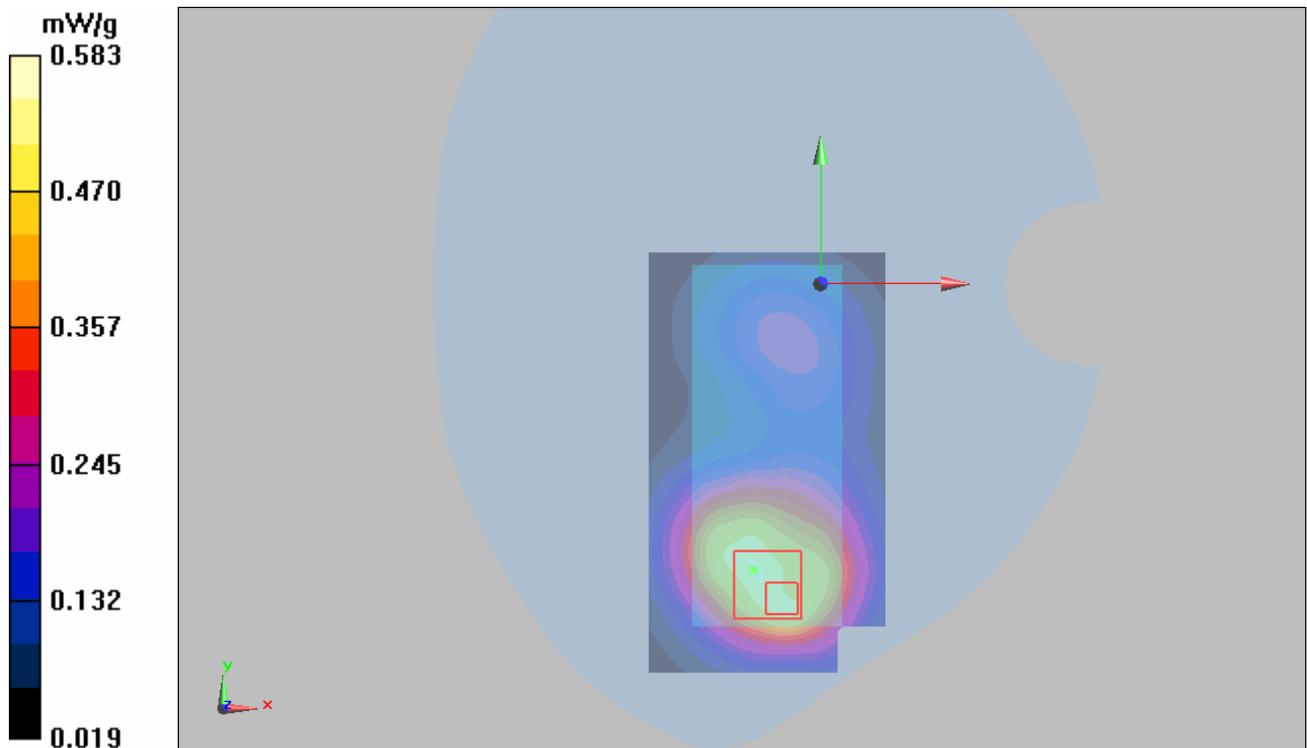


Figure 39 Body, Towards Ground, GSM 1900 GPRS(2up) Channel 810

### GSM 1900+EGPRS(2Up) Towards Ground High

Date/Time: 2/11/2010 5:35:47 PM

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

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.53$  mho/m;  $\epsilon_r = 52.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.607 mW/g

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

dz=5mm

Reference Value = 11.3 V/m; Power Drift = -0.007 dB

Peak SAR (extrapolated) = 0.868 W/kg

**SAR(1 g) = 0.534 mW/g; SAR(10 g) = 0.327 mW/g**

Maximum value of SAR (measured) = 0.580 mW/g

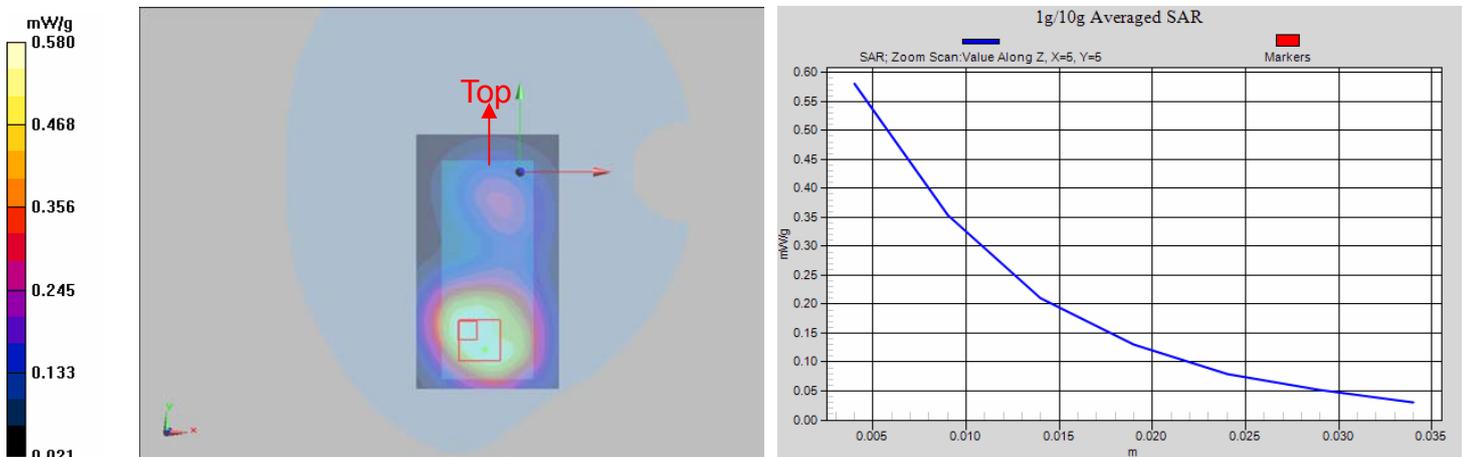


Figure 40 Body, Towards Ground, GSM 1900 EGPRS(2up) Channel 810

### WCDMA Band II Left Cheek High

Date/Time: 2/6/2010 6:06:10 AM

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

Medium parameters used:  $f = 1908$  MHz;  $\sigma = 1.42$  mho/m;  $\epsilon_r = 40$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.740 mW/g

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

Reference Value = 6.4 V/m; Power Drift = 0.091 dB

Peak SAR (extrapolated) = 1.11 W/kg

**SAR(1 g) = 0.711 mW/g; SAR(10 g) = 0.404 mW/g**

Maximum value of SAR (measured) = 0.791 mW/g

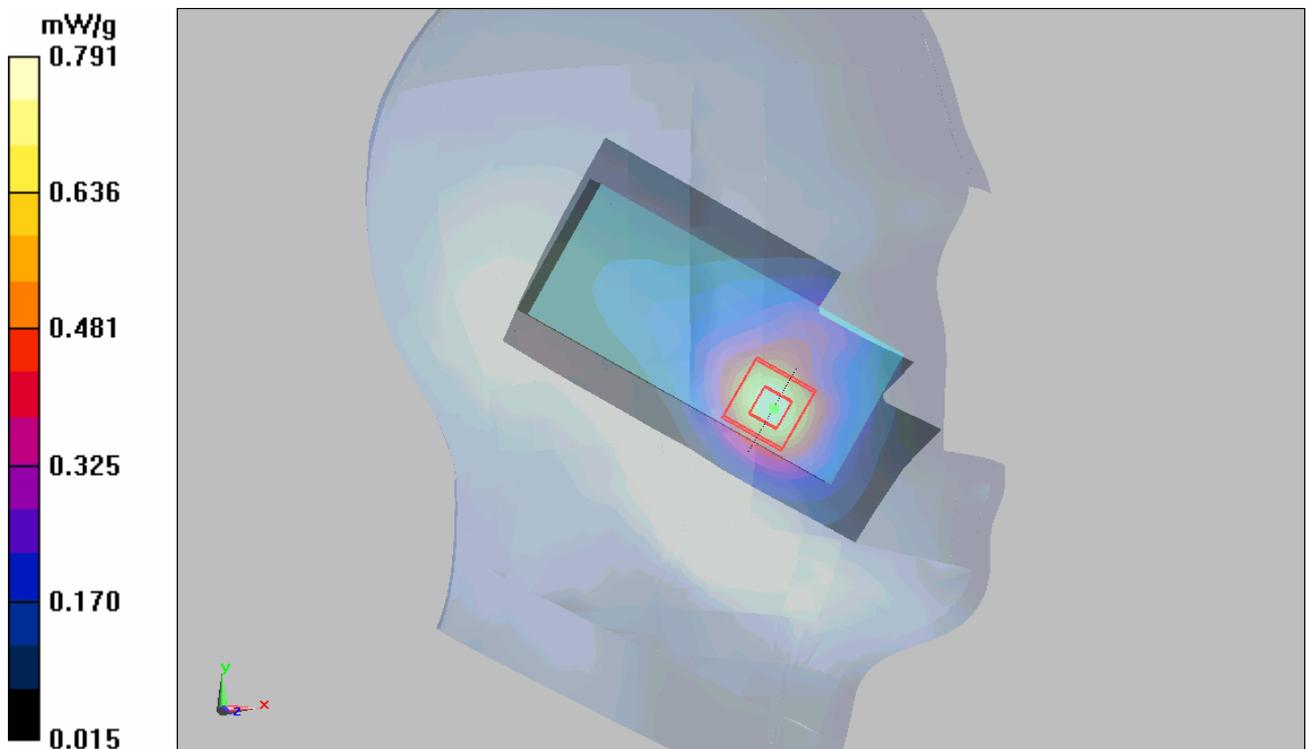


Figure 41 Left Hand Touch Cheek WCDMA Band II Channel 9538

### WCDMA Band II Left Cheek Middle

Date/Time: 2/6/2010 4:19:29 AM

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.39$  mho/m;  $\epsilon_r = 40$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.568 mW/g

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

Reference Value = 4.55 V/m; Power Drift = 0.012 dB

Peak SAR (extrapolated) = 0.829 W/kg

**SAR(1 g) = 0.527 mW/g; SAR(10 g) = 0.304 mW/g**

Maximum value of SAR (measured) = 0.586 mW/g

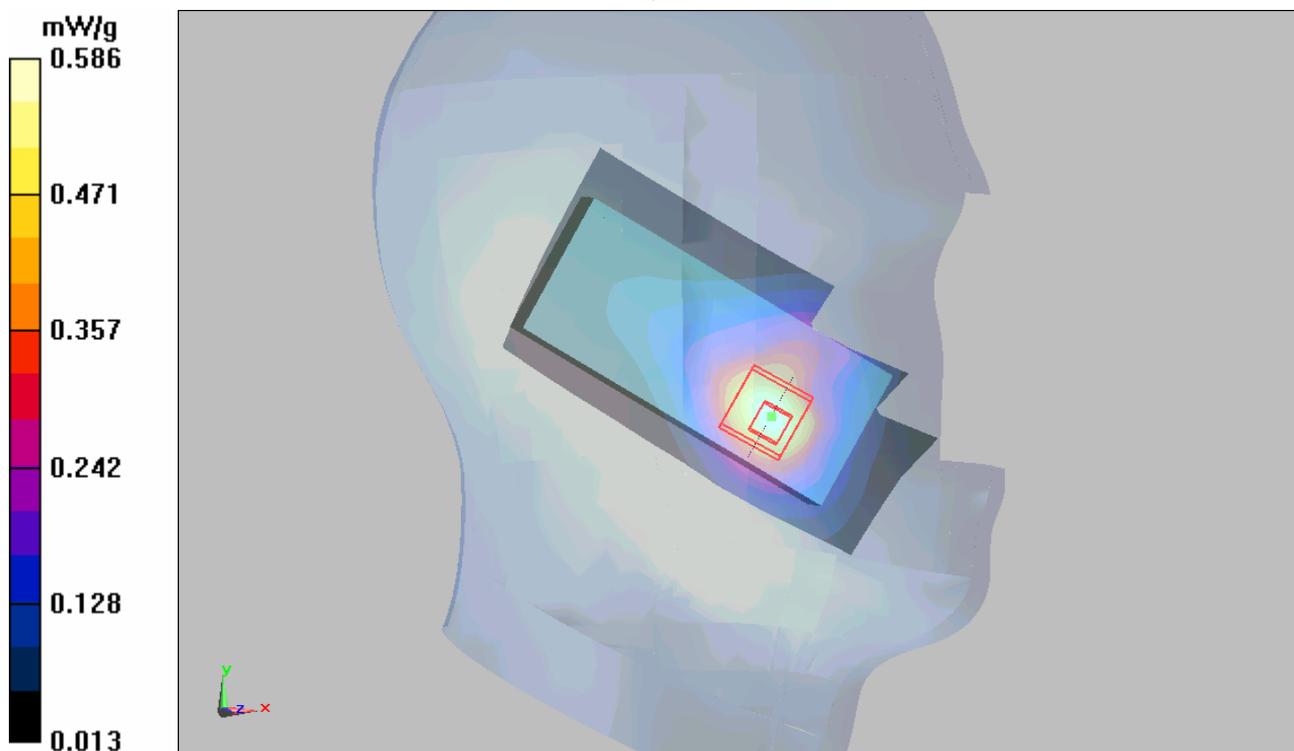


Figure 42 Left Hand Touch Cheek WCDMA Band II Channel 9400

**WCDMA Band II Left Cheek Low**

Date/Time: 2/6/2010 6:34:39 AM

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

Medium parameters used (interpolated):  $f = 1852.4$  MHz;  $\sigma = 1.37$  mho/m;  $\epsilon_r = 40.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.998 mW/g

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

Reference Value = 5.55 V/m; Power Drift = 0.123 dB

Peak SAR (extrapolated) = 1.46 W/kg

**SAR(1 g) = 0.953 mW/g; SAR(10 g) = 0.547 mW/g**

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

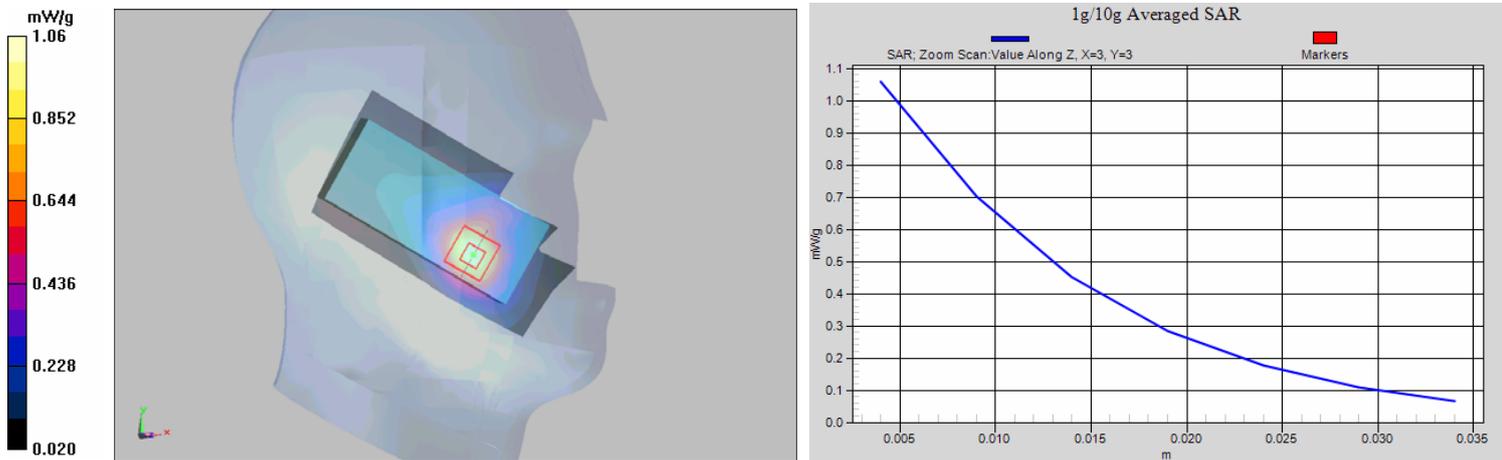


Figure 43 Left Hand Touch Cheek WCDMA Band II Channel 9262

### WCDMA Band II Left Tilt Middle

Date/Time: 2/6/2010 4:41:23 AM

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.39$  mho/m;  $\epsilon_r = 40$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.132 mW/g

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

Reference Value = 7.74 V/m; Power Drift = -0.062 dB

Peak SAR (extrapolated) = 0.171 W/kg

**SAR(1 g) = 0.110 mW/g; SAR(10 g) = 0.066 mW/g**

Maximum value of SAR (measured) = 0.121 mW/g

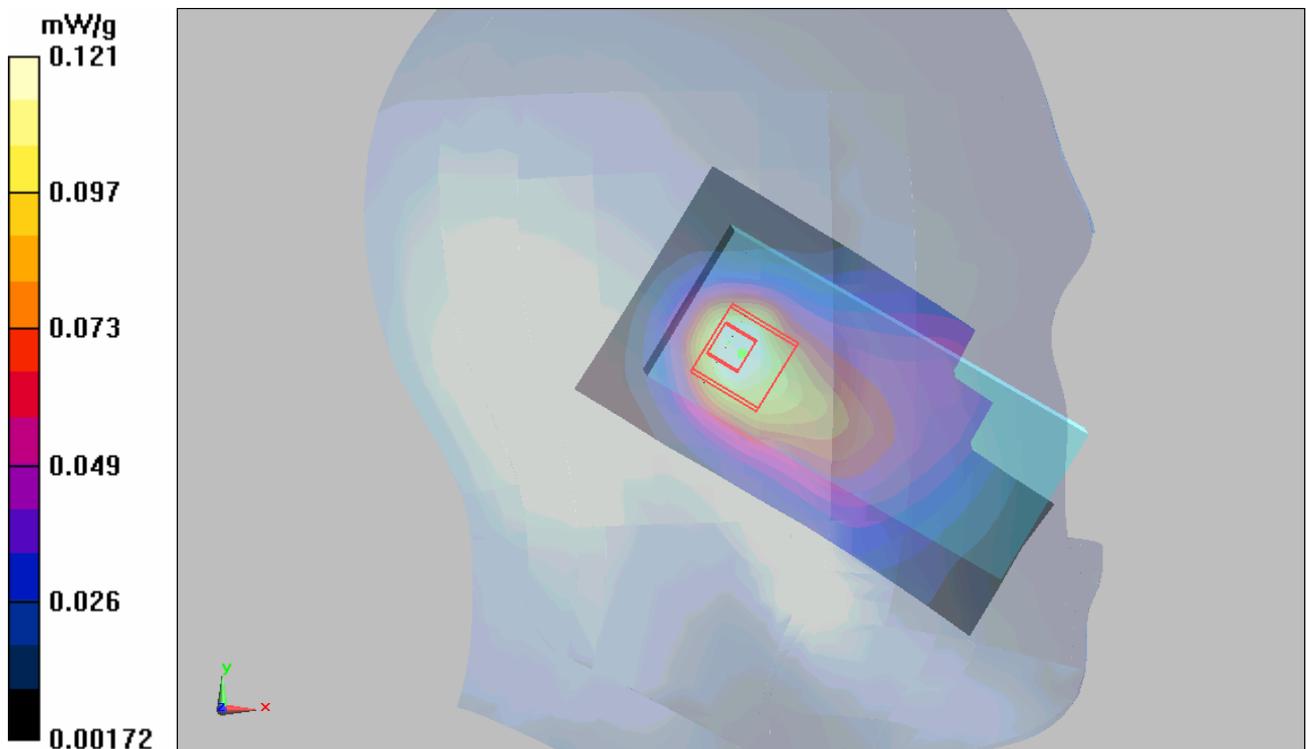


Figure 44 Left Hand Tilt 15° WCDMA Band II Channel 9400

### WCDMA Band II Right Cheek Middle

Date/Time: 2/6/2010 5:42:53 AM

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.39$  mho/m;  $\epsilon_r = 40$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.489 mW/g

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

Reference Value = 4.16 V/m; Power Drift = -0.124 dB

Peak SAR (extrapolated) = 0.632 W/kg

**SAR(1 g) = 0.427 mW/g; SAR(10 g) = 0.263 mW/g**

Maximum value of SAR (measured) = 0.465 mW/g

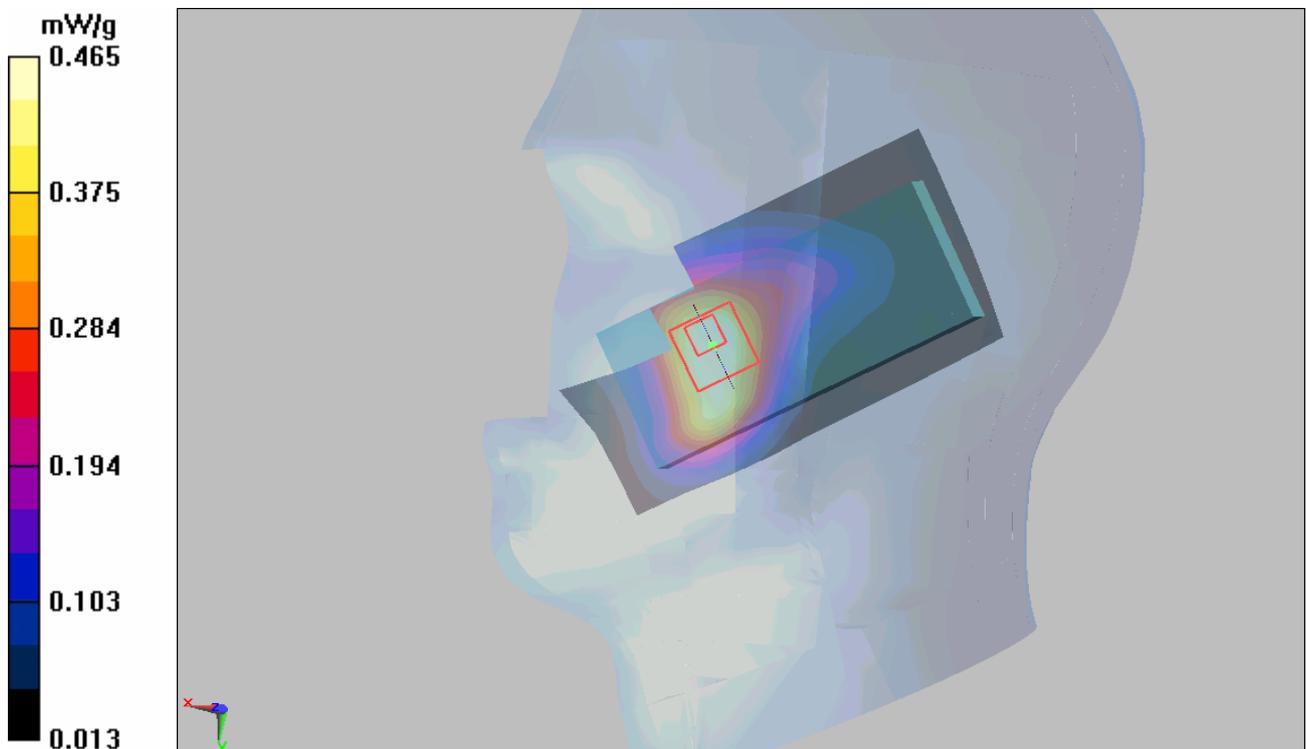


Figure 45 Right Hand Touch Cheek WCDMA Band II Channel 9400

**WCDMA Band II Right Tilt Middle**

Date/Time: 2/6/2010 5:05:53 AM

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.39$  mho/m;  $\epsilon_r = 40$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.143 mW/g

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

Reference Value = 7.15 V/m; Power Drift = 0.077 dB

Peak SAR (extrapolated) = 0.184 W/kg

**SAR(1 g) = 0.121 mW/g; SAR(10 g) = 0.075 mW/g**

Maximum value of SAR (measured) = 0.133 mW/g

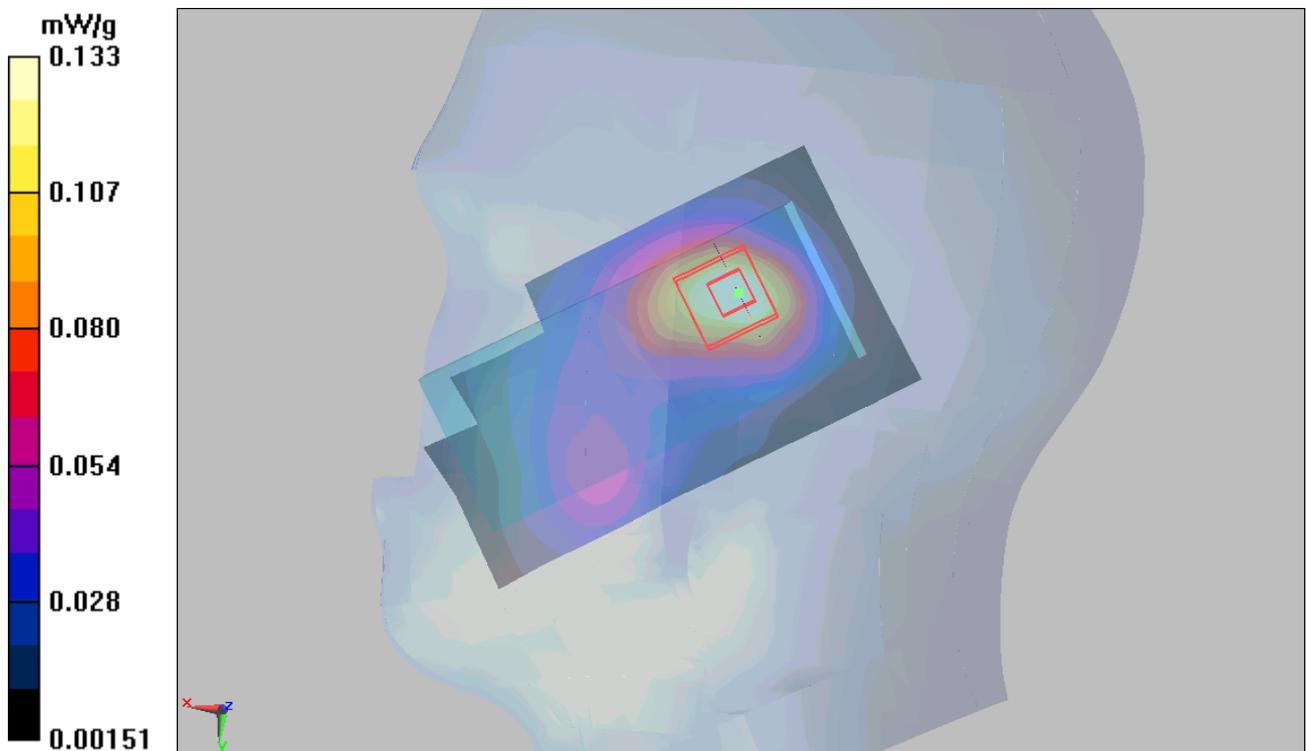


Figure 46 Right Hand Tilt 15° WCDMA Band II Channel 9400

### WCDMA Band II Towards Ground Middle

Date/Time: 2/11/2010 11:39:05 AM

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.39$  mho/m;  $\epsilon_r = 40$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**Towards Ground Middle/Area Scan (51x101x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 0.226 mW/g

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

Reference Value = 7.57 V/m; Power Drift = -0.191 dB

Peak SAR (extrapolated) = 0.319 W/kg

**SAR(1 g) = 0.200 mW/g; SAR(10 g) = 0.128 mW/g**

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

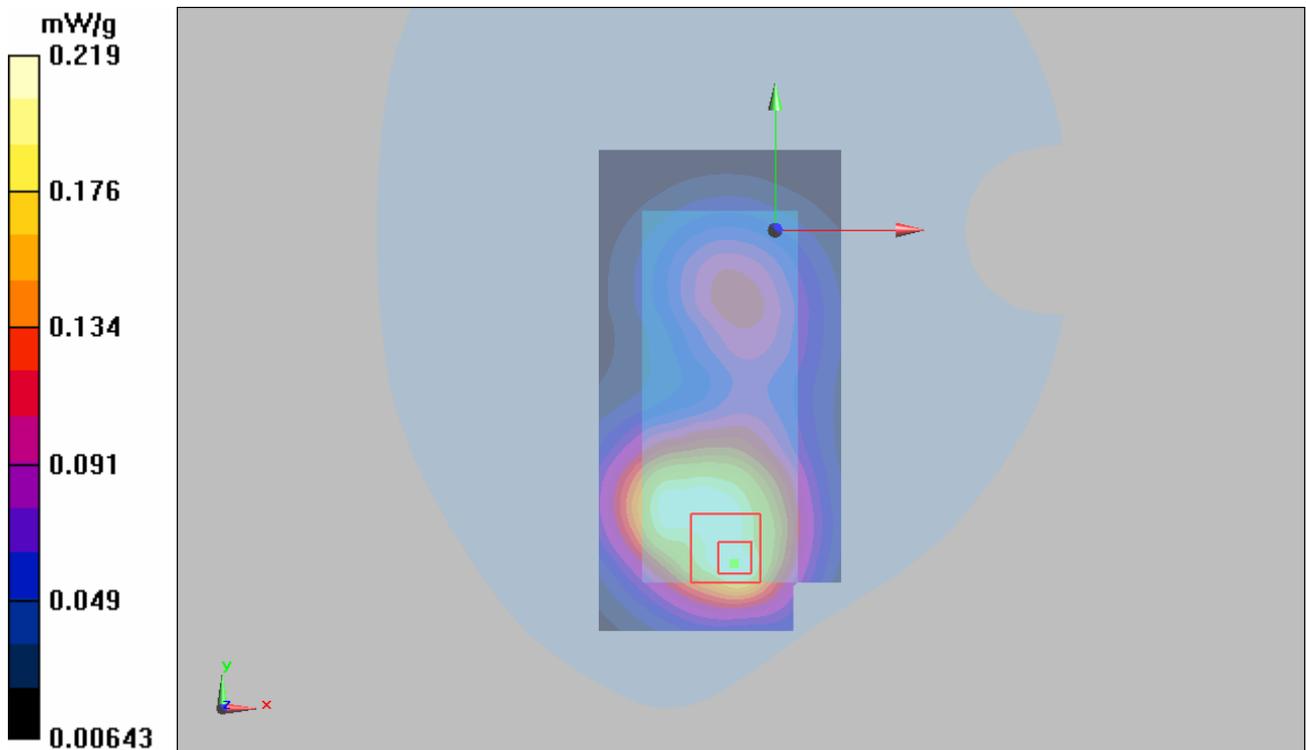


Figure 47 Body, Towards Ground, WCDMA Band II Channel 9400

### WCDMA Band II Towards Phantom High

Date/Time: 2/11/2010 12:29:05 PM

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

Medium parameters used:  $f = 1908$  MHz;  $\sigma = 1.53$  mho/m;  $\epsilon_r = 52.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

Phantom section: Flat Section

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.306 mW/g

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

dz=5mm

Reference Value = 6.00 V/m; Power Drift = 0.104 dB

Peak SAR (extrapolated) = 0.427 W/kg

**SAR(1 g) = 0.262 mW/g; SAR(10 g) = 0.158 mW/g**

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

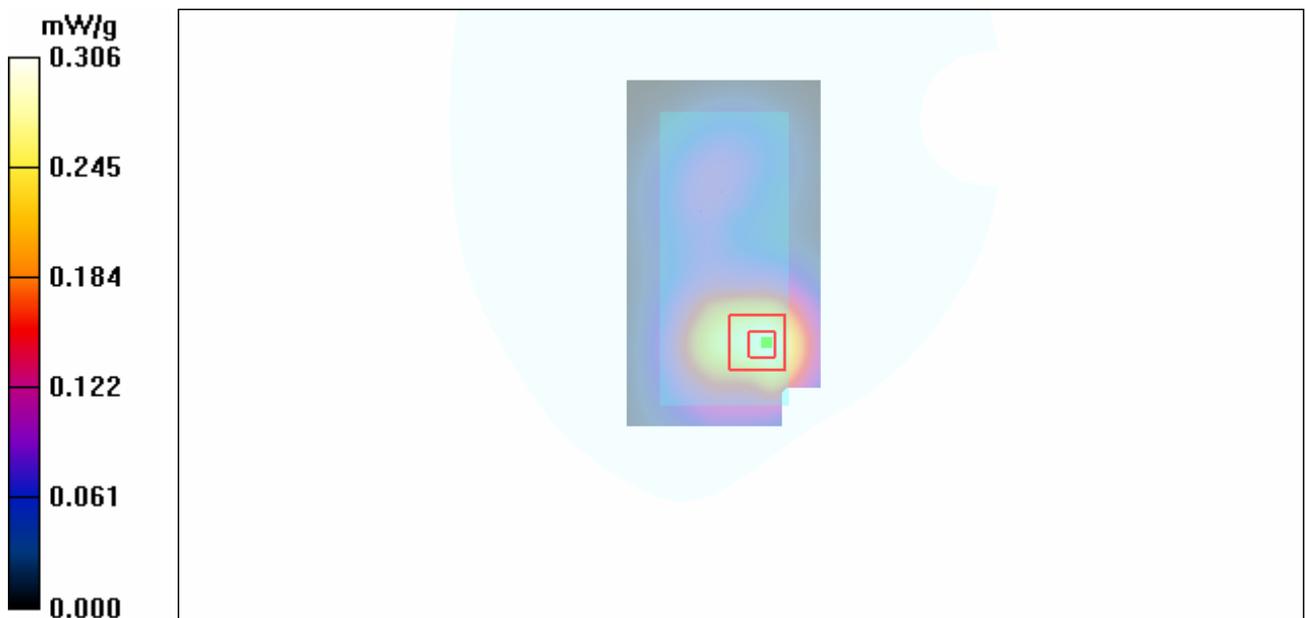


Figure 48 Body, Towards Phantom, WCDMA Band II Channel 9538

### WCDMA Band II Towards Phantom Middle

Date/Time: 2/11/2010 11:13:05 AM

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.39$  mho/m;  $\epsilon_r = 40$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**Towards Phantom Middle/Area Scan (51x101x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 0.258 mW/g

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

Reference Value = 5.86 V/m; Power Drift = -0.177 dB

Peak SAR (extrapolated) = 0.348 W/kg

**SAR(1 g) = 0.224 mW/g; SAR(10 g) = 0.134 mW/g**

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

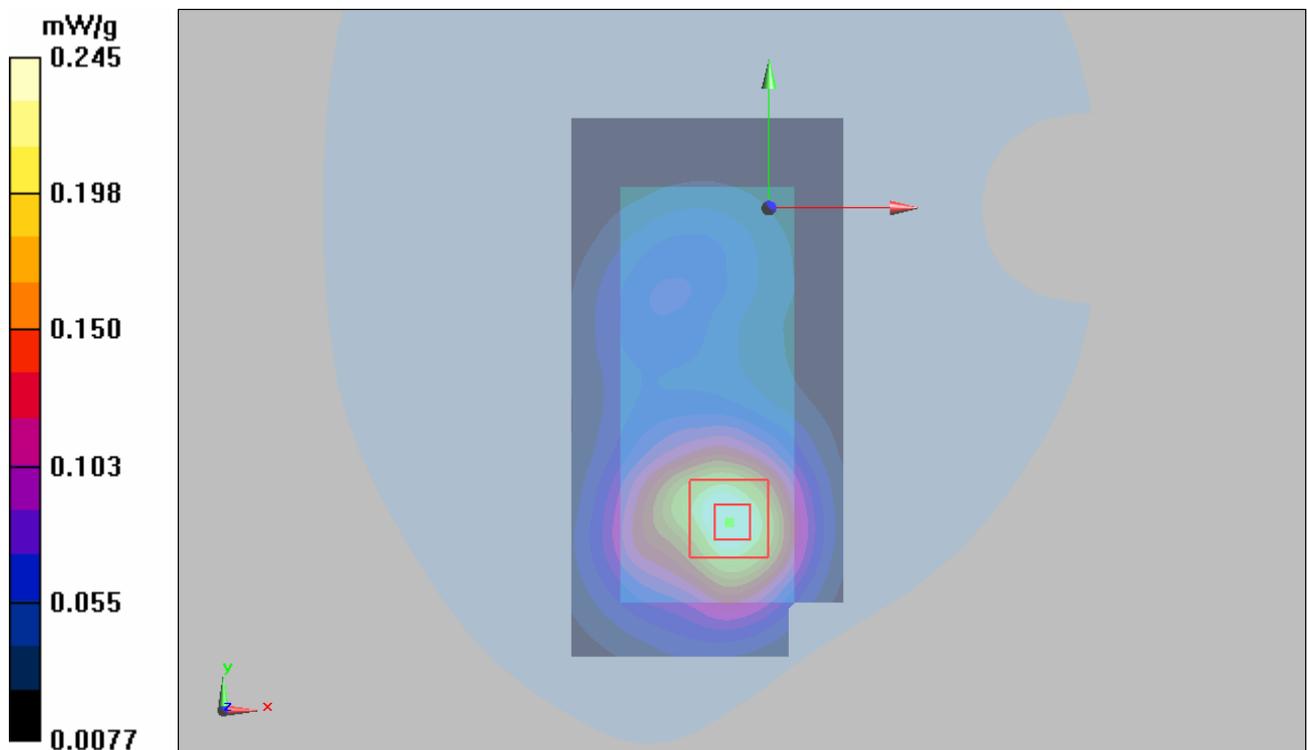


Figure 49 Body, Towards Phantom, WCDMA Band II Channel 9400

### WCDMA Band II Towards Phantom Low

Date/Time: 2/11/2010 12:03:47 PM

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

Medium parameters used (interpolated):  $f = 1852.4$  MHz;  $\sigma = 1.37$  mho/m;  $\epsilon_r = 40.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**Towards Phantom Low/Area Scan (51x101x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.412 mW/g

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

Reference Value = 7.65 V/m; Power Drift = 0.105 dB

Peak SAR (extrapolated) = 0.578 W/kg

**SAR(1 g) = 0.374 mW/g; SAR(10 g) = 0.224 mW/g**

Maximum value of SAR (measured) = 0.412 mW/g

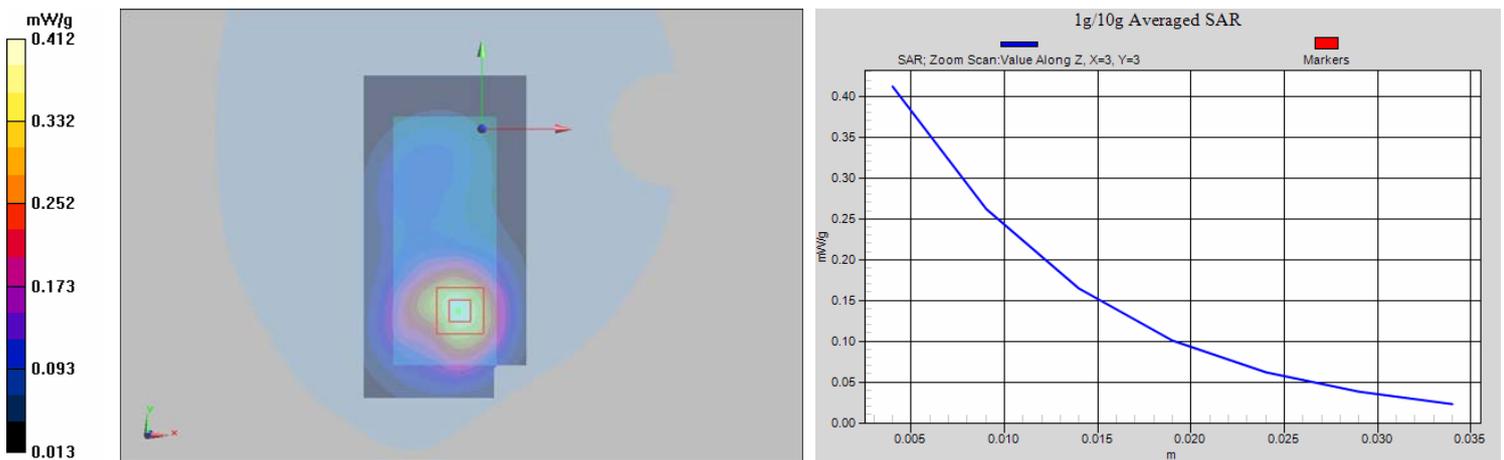


Figure 50 Body, Towards Phantom, WCDMA Band II Channel 9262

### WCDMA Band II Towards Phantom with Earphone Low

Date/Time: 2/11/2010 12:55:58 PM

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

Medium parameters used (interpolated):  $f = 1852.4$  MHz;  $\sigma = 1.46$  mho/m;  $\epsilon_r = 52.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

Phantom section: Flat Section

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

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

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

Reference Value = 6.11 V/m; Power Drift = -0.138 dB

Peak SAR (extrapolated) = 0.607 W/kg

**SAR(1 g) = 0.369 mW/g; SAR(10 g) = 0.225 mW/g**

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

**Towards Phantom Low/Zoom Scan (7x7x7)/Cube 1:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.11 V/m; Power Drift = -0.138 dB

Peak SAR (extrapolated) = 0.554 W/kg

**SAR(1 g) = 0.347 mW/g; SAR(10 g) = 0.219 mW/g**

Maximum value of SAR (measured) = 0.381 mW/g

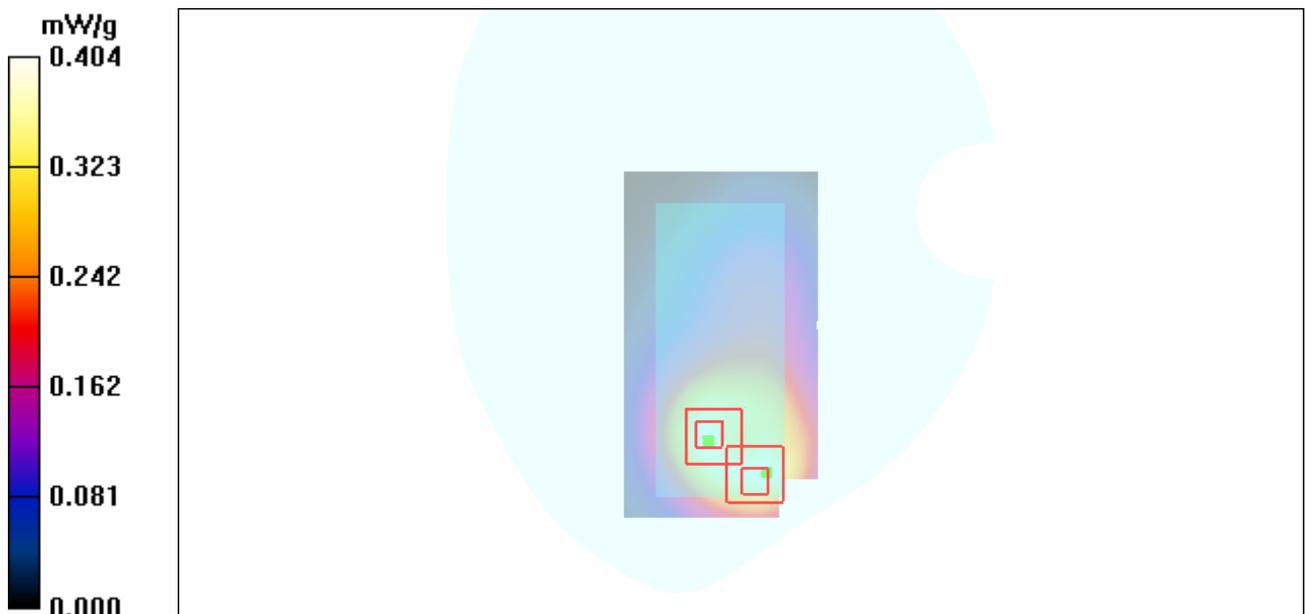


Figure 51 Body with Earphone, Towards Phantom, WCDMA Band II Channel 9262

### WCDMA Band II+HSDPA Towards Phantom Low

Date/Time: 2/11/2010 11:33:22 PM

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

Medium parameters used (interpolated):  $f = 1852.4$  MHz;  $\sigma = 1.46$  mho/m;  $\epsilon_r = 52.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

Phantom section: Flat Section

DASY5 Configuration:

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

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

Phantom: SAM2; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.387 mW/g

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

Reference Value = 9.50 V/m; Power Drift = 0.157 dB

Peak SAR (extrapolated) = 0.517 W/kg

**SAR(1 g) = 0.306 mW/g; SAR(10 g) = 0.183 mW/g**

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

**Towards Phantom Low/Zoom Scan (7x7x7)/Cube 1:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.50 V/m; Power Drift = 0.157 dB

Peak SAR (extrapolated) = 0.743 W/kg

**SAR(1 g) = 0.269 mW/g; SAR(10 g) = 0.165 mW/g**

Maximum value of SAR (measured) = 0.301 mW/g

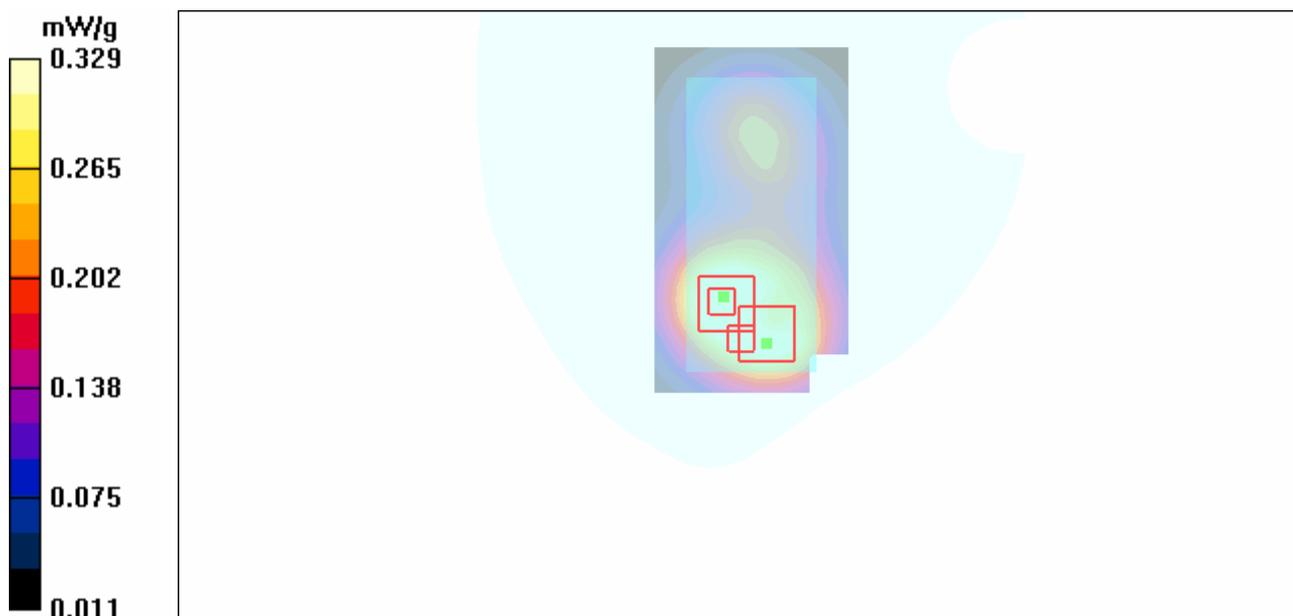


Figure 52 Body, Towards Phantom, WCDMA Band II HSDPA Channel 9262

### WCDMA Band V Left Cheek Middle

Date/Time: 2/5/2010 11:42:48 PM

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

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.925$  mho/m;  $\epsilon_r = 42.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

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

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

Reference Value = 5.35 V/m; Power Drift = 0.014 dB

Peak SAR (extrapolated) = 0.523 W/kg

**SAR(1 g) = 0.386 mW/g; SAR(10 g) = 0.270 mW/g**

Maximum value of SAR (measured) = 0.413 mW/g

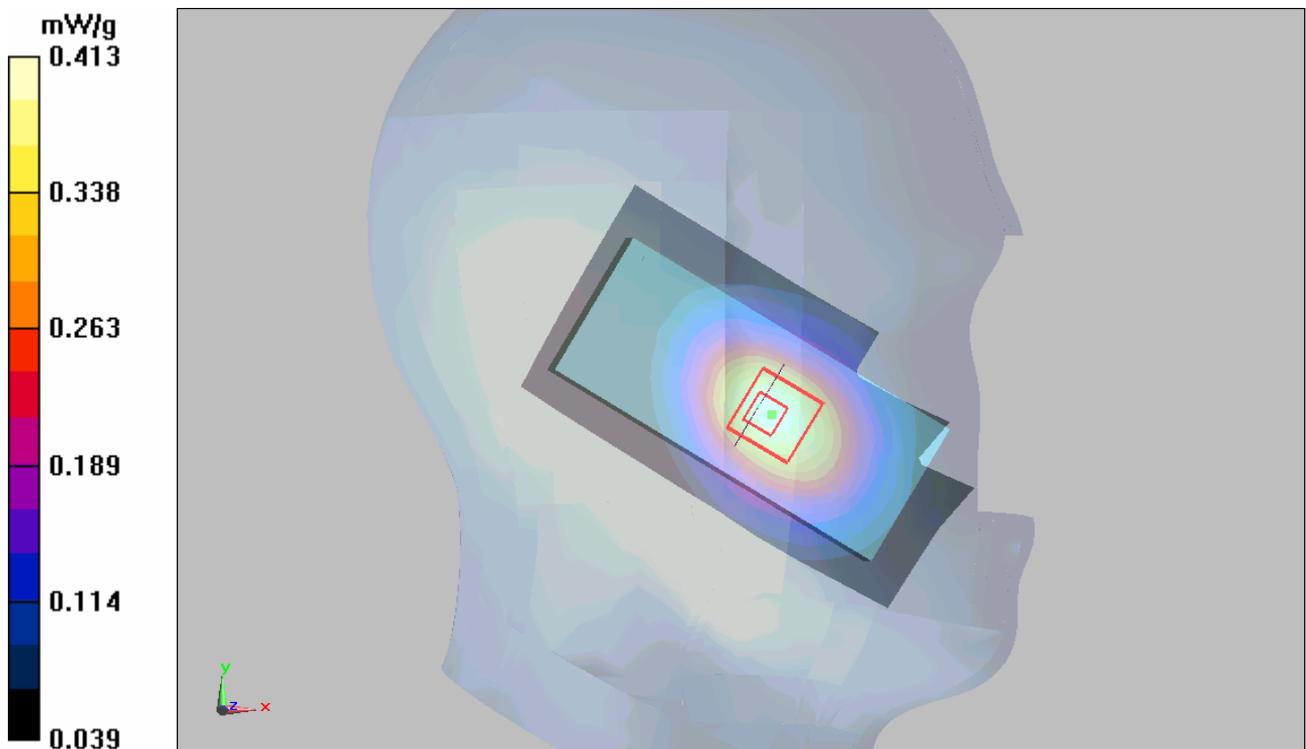


Figure 53 Left Hand Touch Cheek WCDMA Band V Channel 4183

### WCDMA Band V Left Tilt Middle

Date/Time: 2/6/2010 12:05:02 AM

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

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.925$  mho/m;  $\epsilon_r = 42.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**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 = 9.9 V/m; Power Drift = -0.061 dB

Peak SAR (extrapolated) = 0.318 W/kg

**SAR(1 g) = 0.246 mW/g; SAR(10 g) = 0.180 mW/g**

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

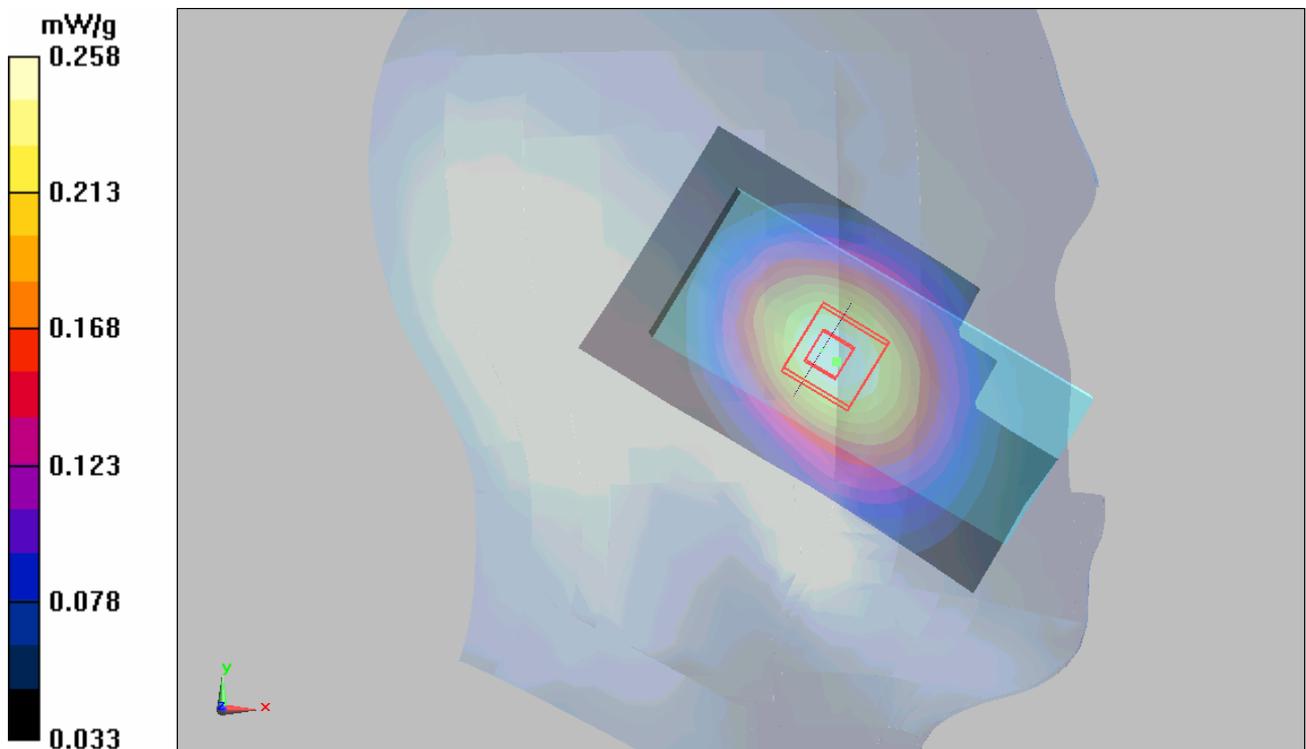


Figure 54 Left Hand Tilt 15° WCDMA Band V Channel 4183

### WCDMA Band V Right Cheek High

Date/Time: 2/6/2010 1:13:46 AM

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

Medium parameters used:  $f = 847$  MHz;  $\sigma = 0.934$  mho/m;  $\epsilon_r = 42.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.606 mW/g

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

Reference Value = 6.74 V/m; Power Drift = 0.026 dB

Peak SAR (extrapolated) = 0.754 W/kg

**SAR(1 g) = 0.575 mW/g; SAR(10 g) = 0.410 mW/g**

Maximum value of SAR (measured) = 0.616 mW/g

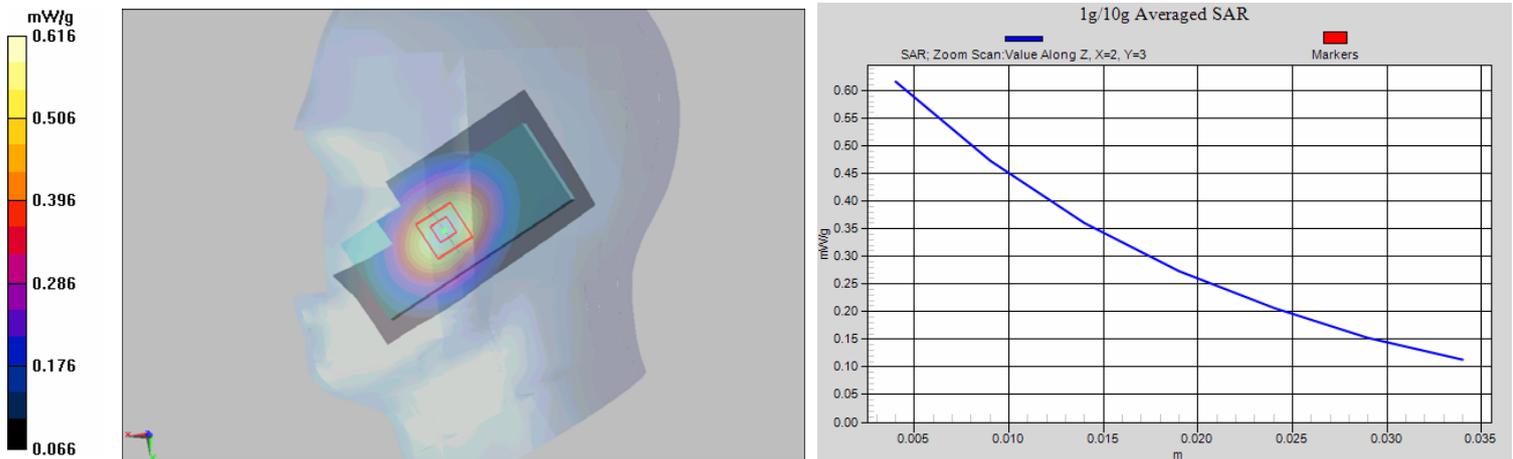


Figure 55 Right Hand Touch Cheek WCDMA Band V Channel 4233

### WCDMA Band V Right Cheek Middle

Date/Time: 2/6/2010 12:28:09 AM

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

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.925$  mho/m;  $\epsilon_r = 42.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

Maximum value of SAR (interpolated) = 0.474 mW/g

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

Reference Value = 5.97 V/m; Power Drift = 0.152 dB

Peak SAR (extrapolated) = 0.581 W/kg

**SAR(1 g) = 0.442 mW/g; SAR(10 g) = 0.317 mW/g**

Maximum value of SAR (measured) = 0.470 mW/g

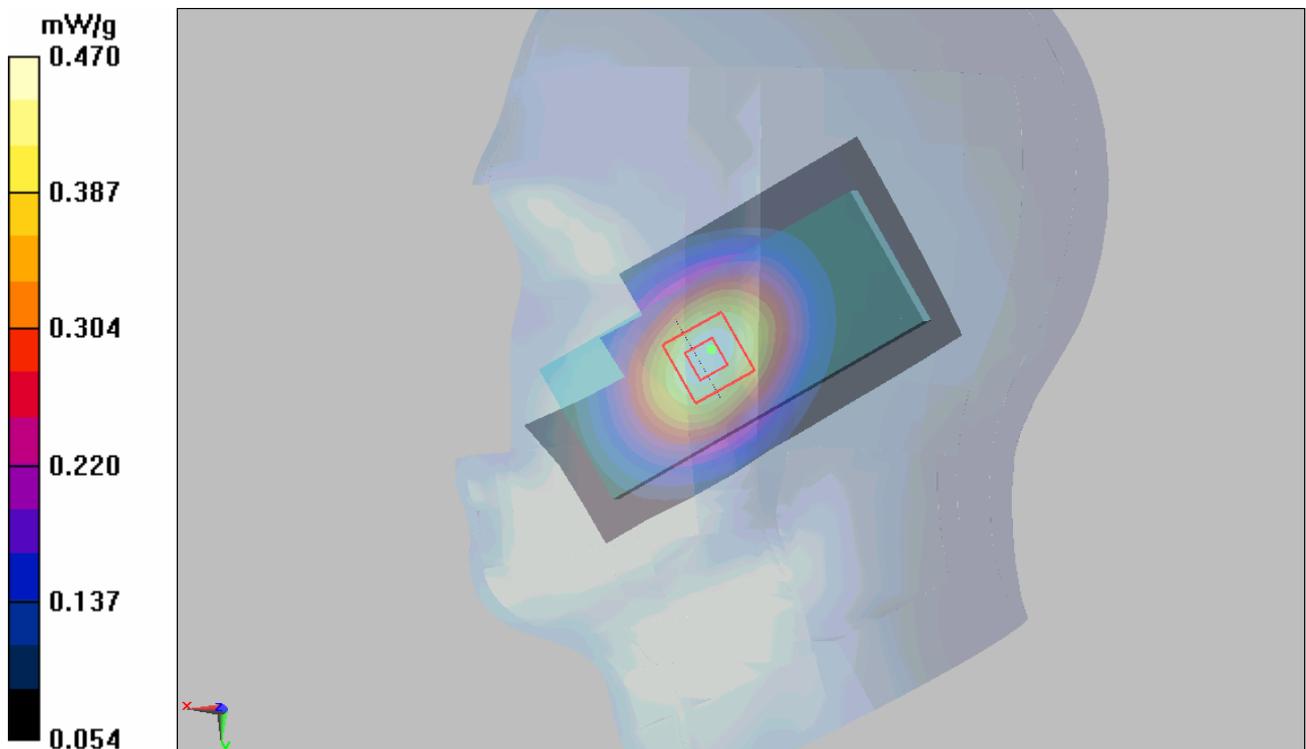


Figure 56 Right Hand Touch Cheek WCDMA Band V Channel 4183

### WCDMA Band V Right Cheek Low

Date/Time: 2/6/2010 1:35:07 AM

Communication System: WCDMA Band V; Frequency: 826.4 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 826.4$  MHz;  $\sigma = 0.916$  mho/m;  $\epsilon_r = 42.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

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

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

Reference Value = 6.4 V/m; Power Drift = 0.101 dB

Peak SAR (extrapolated) = 0.644 W/kg

**SAR(1 g) = 0.497 mW/g; SAR(10 g) = 0.358 mW/g**

Maximum value of SAR (measured) = 0.527 mW/g

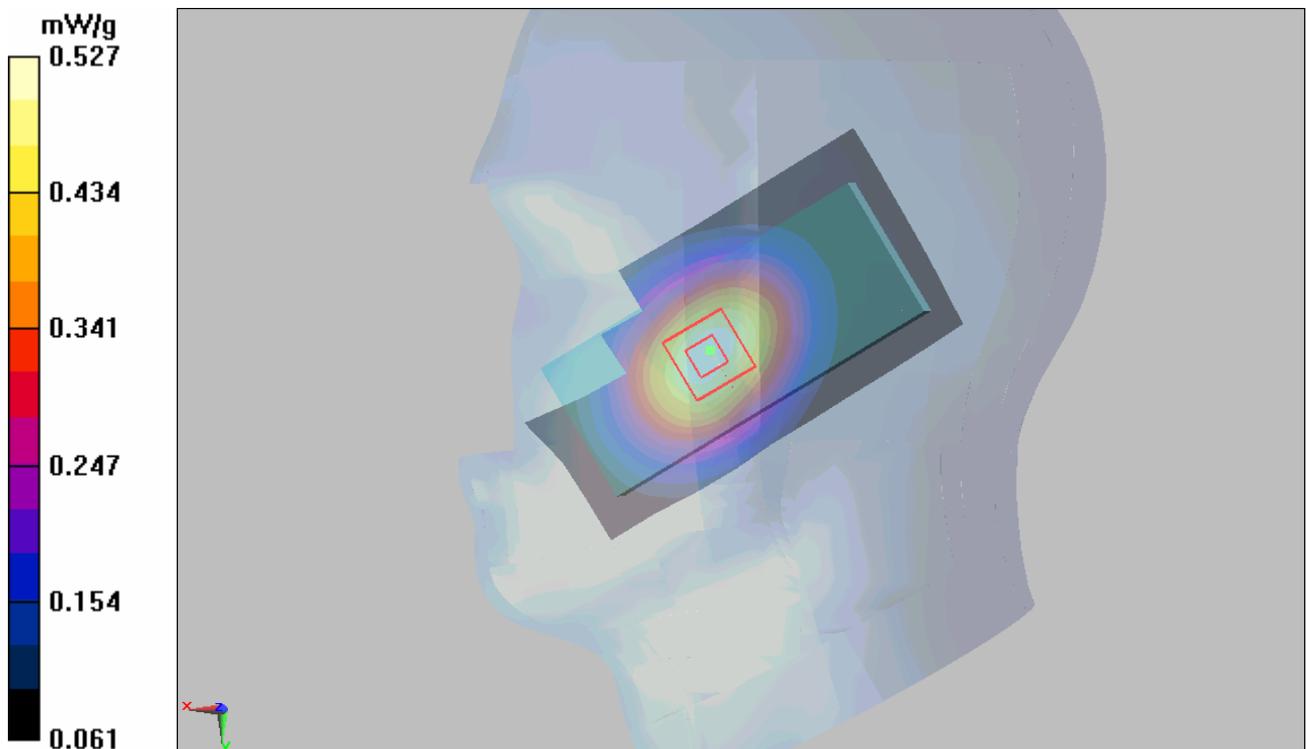


Figure 57 Right Hand Touch Cheek WCDMA Band V Channel 4132

### WCDMA Band V Right Tilt Middle

Date/Time: 2/6/2010 12:50:34 AM

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

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.925$  mho/m;  $\epsilon_r = 42.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

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

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

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

Reference Value = 10.3 V/m; Power Drift = 0.078 dB

Peak SAR (extrapolated) = 0.347 W/kg

**SAR(1 g) = 0.266 mW/g; SAR(10 g) = 0.196 mW/g**

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

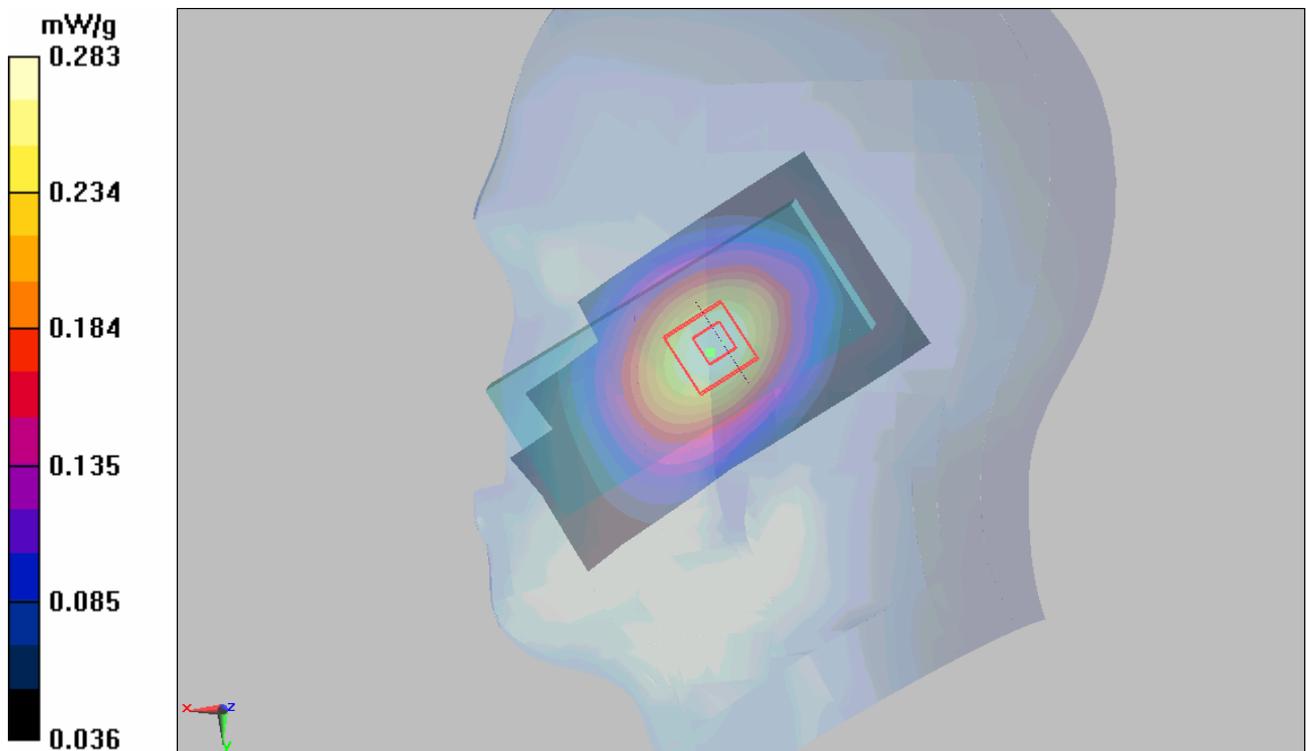


Figure 58 Right Hand Tilt 15° WCDMA Band V Channel 4183

### WCDMA Band V Towards Ground High

Date/Time: 2/10/2010 5:05:55 PM

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

Medium parameters used:  $f = 847$  MHz;  $\sigma = 0.999$  mho/m;  $\epsilon_r = 54.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**Towards Ground High/Area Scan (51x101x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 0.718 mW/g

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

Reference Value = 10.8 V/m; Power Drift = 0.034 dB

Peak SAR (extrapolated) = 0.909 W/kg

**SAR(1 g) = 0.677 mW/g; SAR(10 g) = 0.488 mW/g**

Maximum value of SAR (measured) = 0.718 mW/g

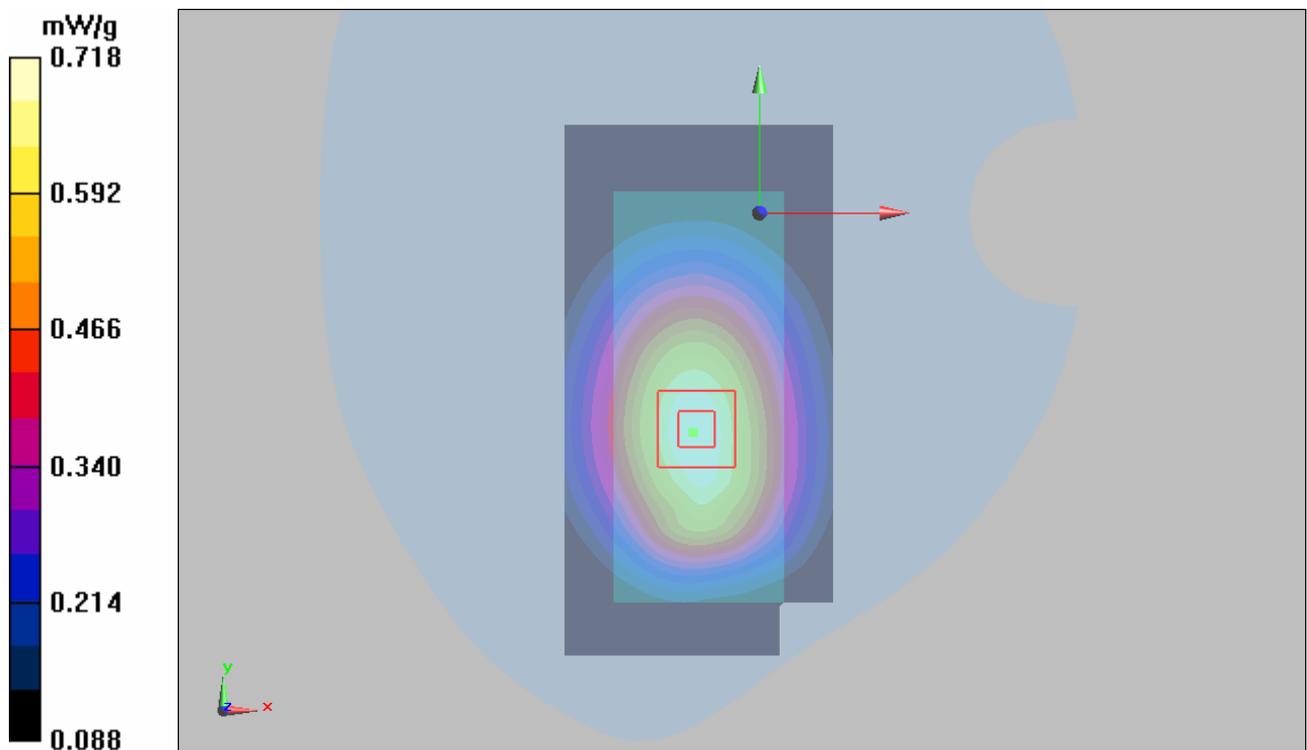


Figure 59 Body, Towards Ground, WCDMA Band V Channel 4233

### WCDMA Band V Towards Ground Middle

Date/Time: 2/10/2010 4:43:23 PM

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

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.987$  mho/m;  $\epsilon_r = 55$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**Towards Ground Middle/Area Scan (51x101x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 0.808 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 = -0.006 dB

Peak SAR (extrapolated) = 0.997 W/kg

**SAR(1 g) = 0.761 mW/g; SAR(10 g) = 0.552 mW/g**

Maximum value of SAR (measured) = 0.803 mW/g

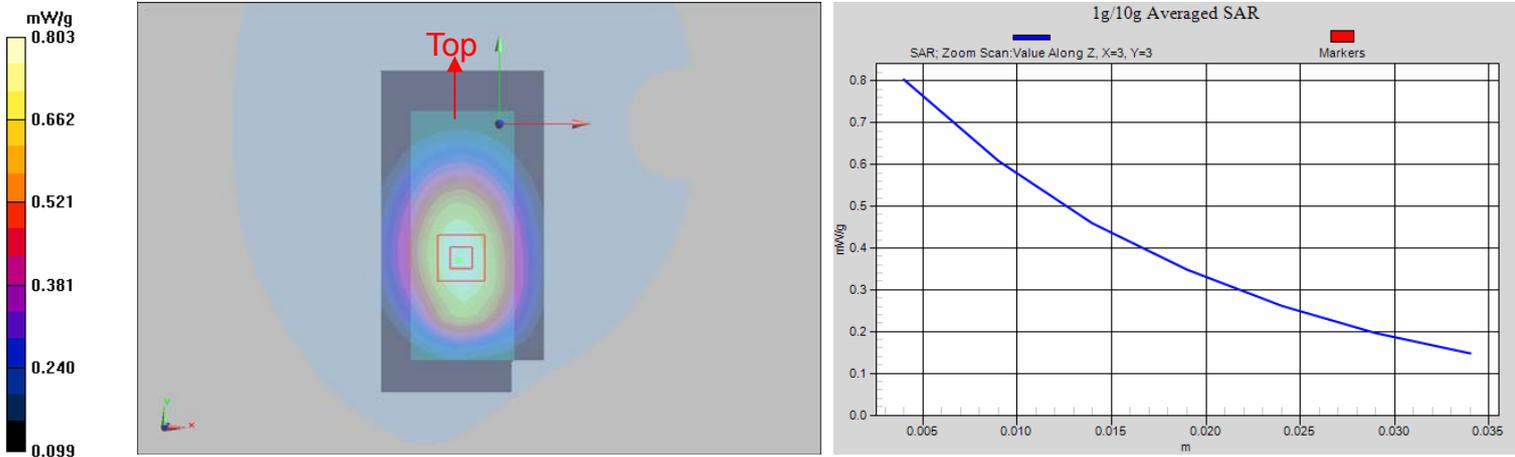


Figure 60 Body, Towards Ground, WCDMA Band V Channel 4183

### WCDMA Band V Towards Ground Low

Date/Time: 2/10/2010 5:54:21 PM

Communication System: WCDMA Band V; Frequency: 826.4 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 826.4$  MHz;  $\sigma = 0.978$  mho/m;  $\epsilon_r = 55.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**Towards Ground Low/Area Scan (51x101x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 0.788 mW/g

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

Reference Value = 11.1 V/m; Power Drift = -0.061 dB

Peak SAR (extrapolated) = 0.968 W/kg

**SAR(1 g) = 0.723 mW/g; SAR(10 g) = 0.522 mW/g**

Maximum value of SAR (measured) = 0.767 mW/g

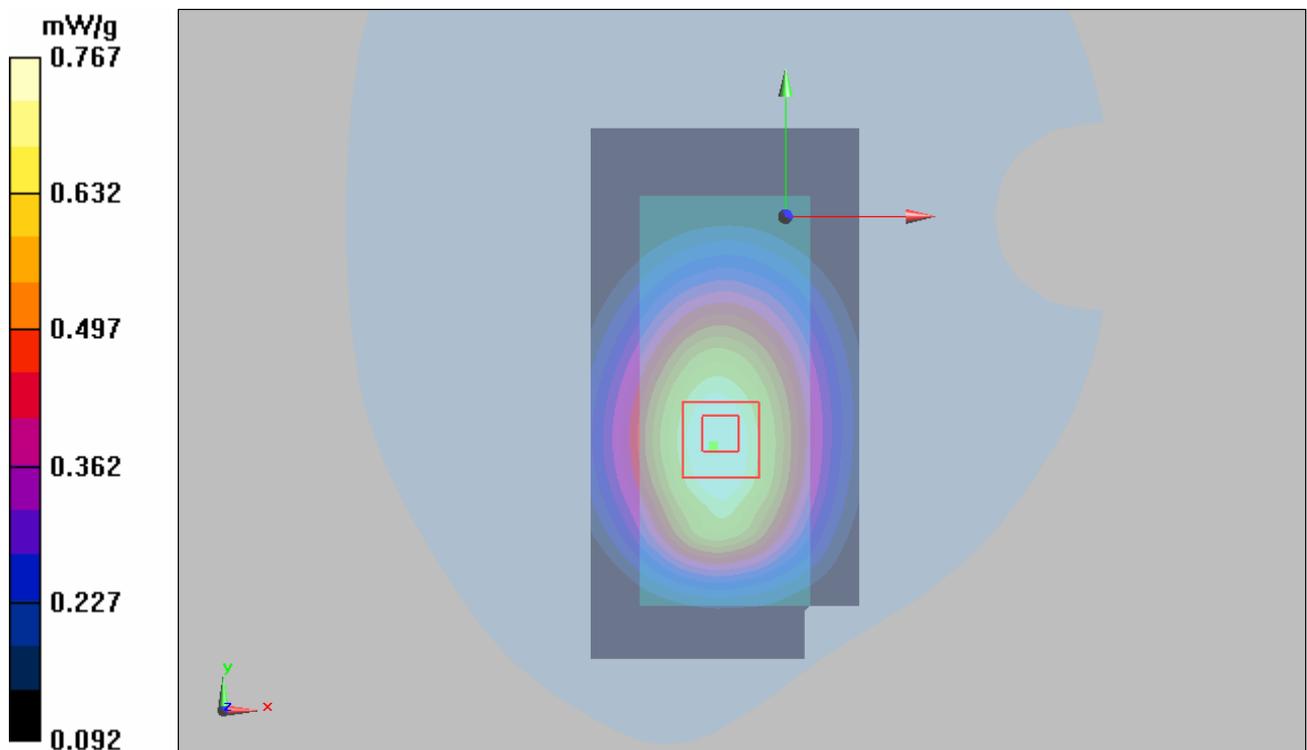


Figure 61 Body, Towards Ground, WCDMA Band V Channel 4132

### WCDMA Band V Towards Phantom Middle

Date/Time: 2/10/2010 4:19:12 PM

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

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.987$  mho/m;  $\epsilon_r = 55$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**Towards Phantom Middle/Area Scan (51x101x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 0.381 mW/g

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

Reference Value = 7.27 V/m; Power Drift = 0.161 dB

Peak SAR (extrapolated) = 0.474 W/kg

**SAR(1 g) = 0.360 mW/g; SAR(10 g) = 0.262 mW/g**

Maximum value of SAR (measured) = 0.381 mW/g

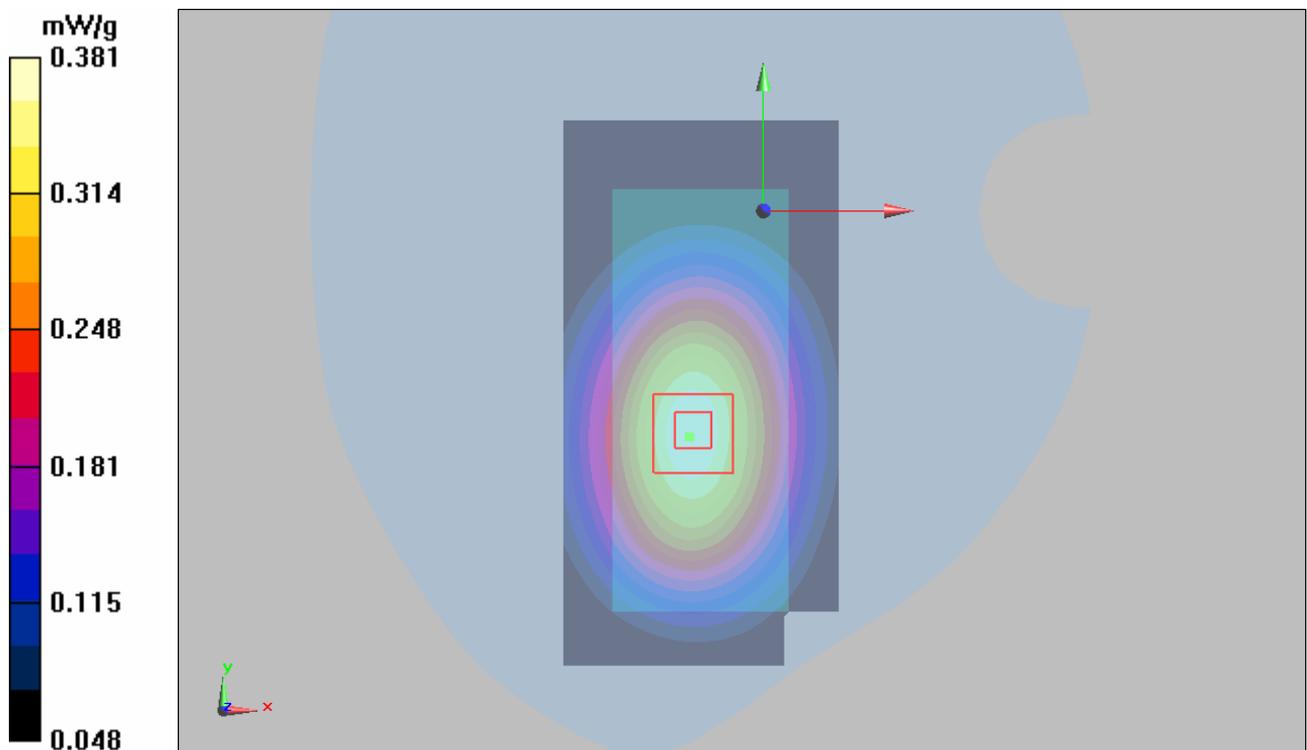


Figure 62 Body, Towards Phantom, WCDMA Band V Channel 4183

### WCDMA Band V Towards Ground with Earphone Middle

Date/Time: 2/10/2010 6:17:58 PM

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

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.987$  mho/m;  $\epsilon_r = 55$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**Towards Ground Middle/Area Scan (51x101x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 0.466 mW/g

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

Reference Value = 10.7 V/m; Power Drift = -0.024 dB

Peak SAR (extrapolated) = 0.586 W/kg

**SAR(1 g) = 0.442 mW/g; SAR(10 g) = 0.320 mW/g**

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

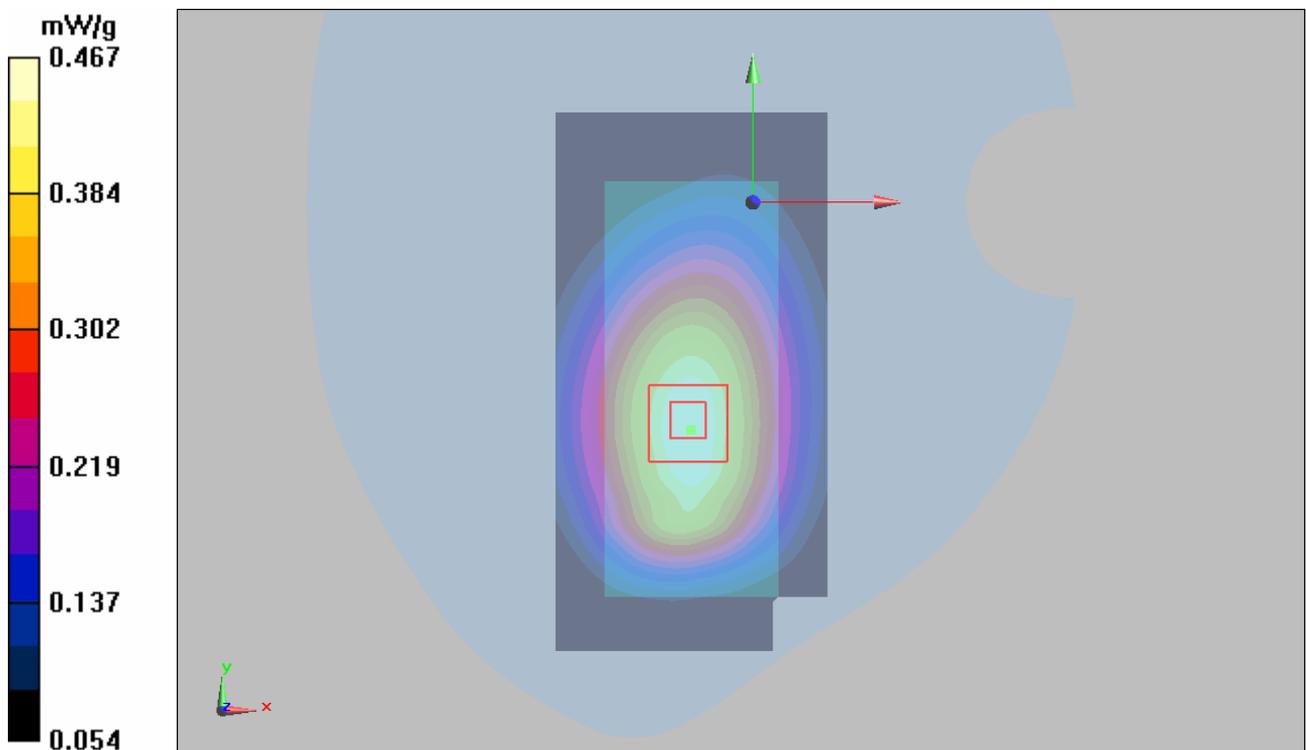


Figure 63 Body with Earphone, Towards Ground, WCDMA Band V Channel 4183

### WCDMA Band V+HSDPA Towards Ground Middle

Date/Time: 2/10/2010 6:51:23 PM

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

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.987$  mho/m;  $\epsilon_r = 55$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

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

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

Phantom: SAM1; Type: SAM;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**Towards Ground Middle/Area Scan (51x101x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 0.713 mW/g

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

Reference Value = 10.8 V/m; Power Drift = 0.080 dB

Peak SAR (extrapolated) = 0.917 W/kg

**SAR(1 g) = 0.687 mW/g; SAR(10 g) = 0.498 mW/g**

Maximum value of SAR (measured) = 0.732 mW/g

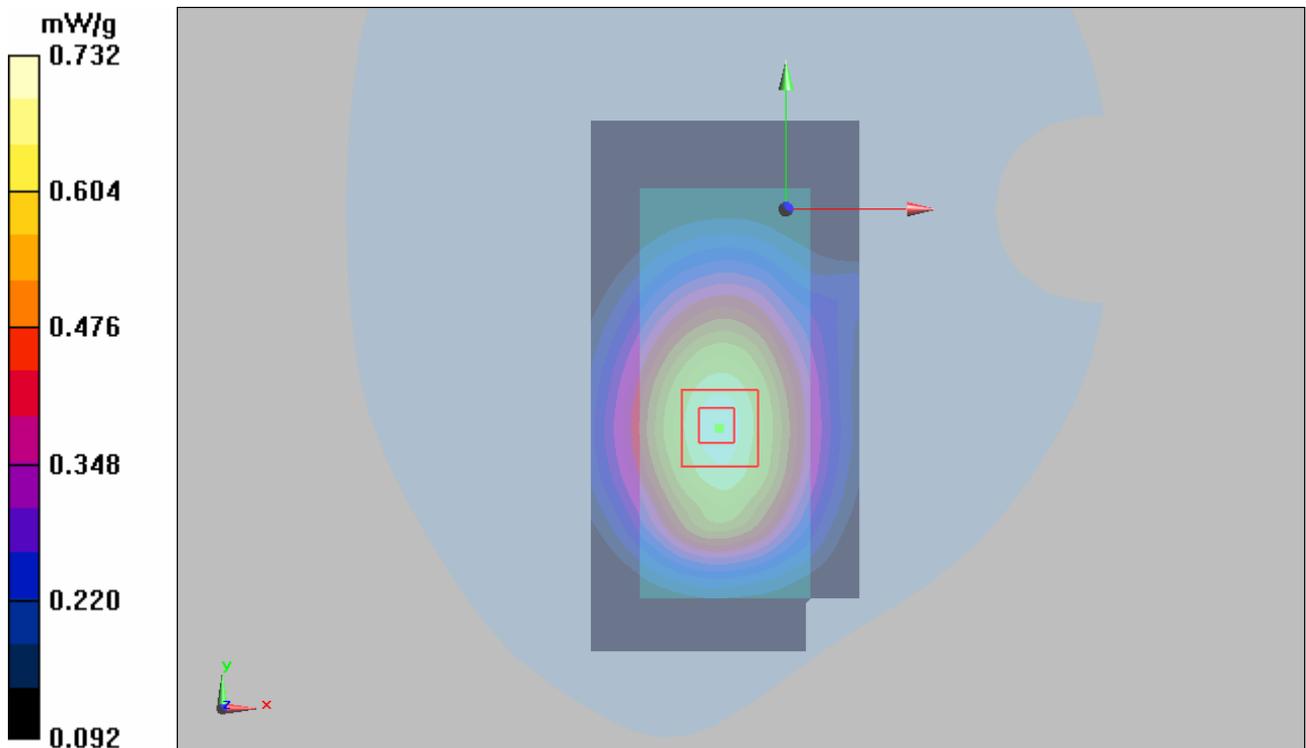


Figure 64 Body, Towards Ground, WCDMA Band V HSDPA Channel 4183

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

Report No.: RZA2010-0158

Page 99 of 135

## ANNEX D: Probe Calibration Certificate

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



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

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

Accreditation No.: **SCS 108**

Client **TA (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

Calibrated by: **Claudio Leubler** (Name), **Laboratory Technician** (Function), *[Signature]* (Signature)

Approved by: **Katja Pokovic** (Name), **Technical Manager** (Function), *[Signature]* (Signature)

Issued: September 23, 2009

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

# TA Technology (Shanghai) Co., Ltd.

## Test Report

Report No.: RZA2010-0158

Page 100of 135

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



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

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

Accreditation No.: **SCS 108**

### Glossary:

TSL	tissue simulating liquid
NORM <sub>x,y,z</sub>	sensitivity in free space
ConvF	sensitivity in TSL / NORM <sub>x,y,z</sub>
DCP	diode compression point
Polarization $\varphi$	$\varphi$ rotation around probe axis
Polarization $\vartheta$	$\vartheta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis

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

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

### Methods Applied and Interpretation of Parameters:

- NORM<sub>x,y,z</sub>**: Assessed for E-field polarization  $\vartheta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide). NORM<sub>x,y,z</sub> are only intermediate values, i.e., the uncertainties of NORM<sub>x,y,z</sub> does not effect the  $E^2$ -field uncertainty inside TSL (see below ConvF).
- NORM(f)<sub>x,y,z</sub>** = NORM<sub>x,y,z</sub> \* frequency\_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP<sub>x,y,z</sub>**: 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  $f \leq 800$  MHz) and inside waveguide using analytical field distributions based on power measurements for  $f > 800$  MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM<sub>x,y,z</sub> \* 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  $\pm 50$  MHz to  $\pm 100$  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.

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 DASYS Systems

(Note: non-compatible with DASYS2 system!)

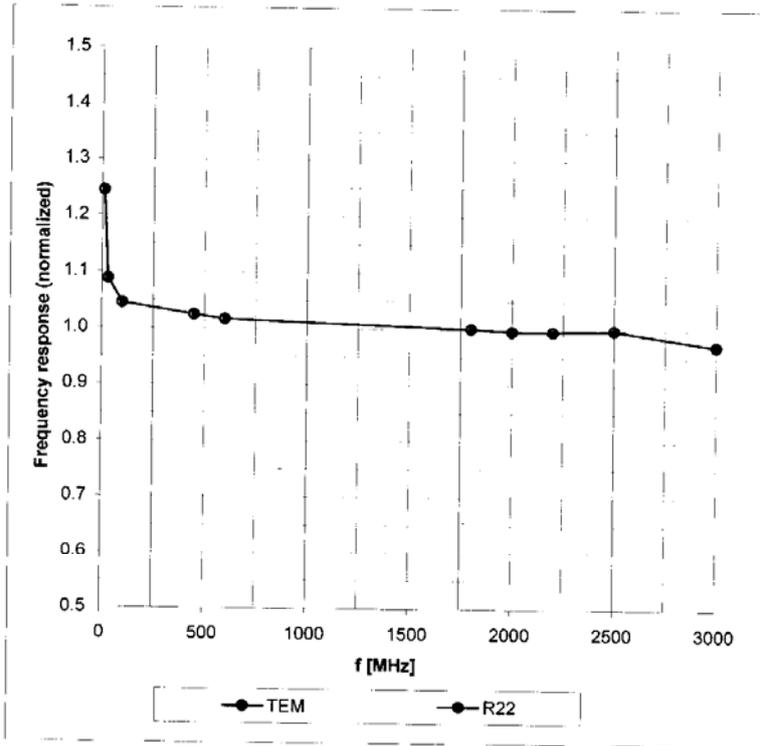


EX3DV4 SN:3677

September 23, 2009

### Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide: R22)

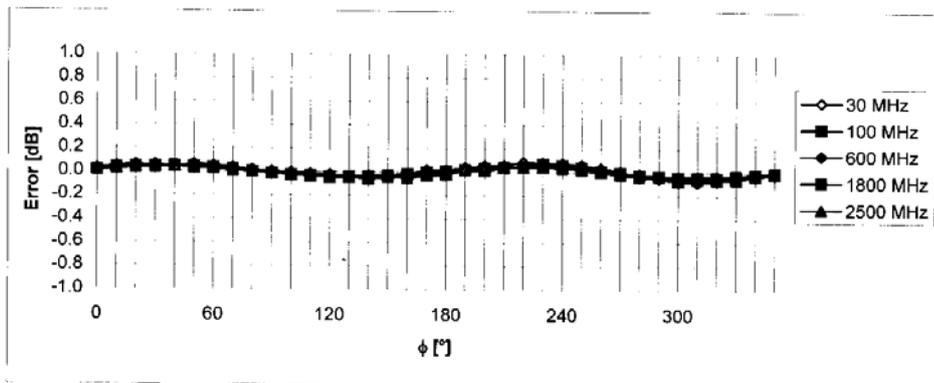
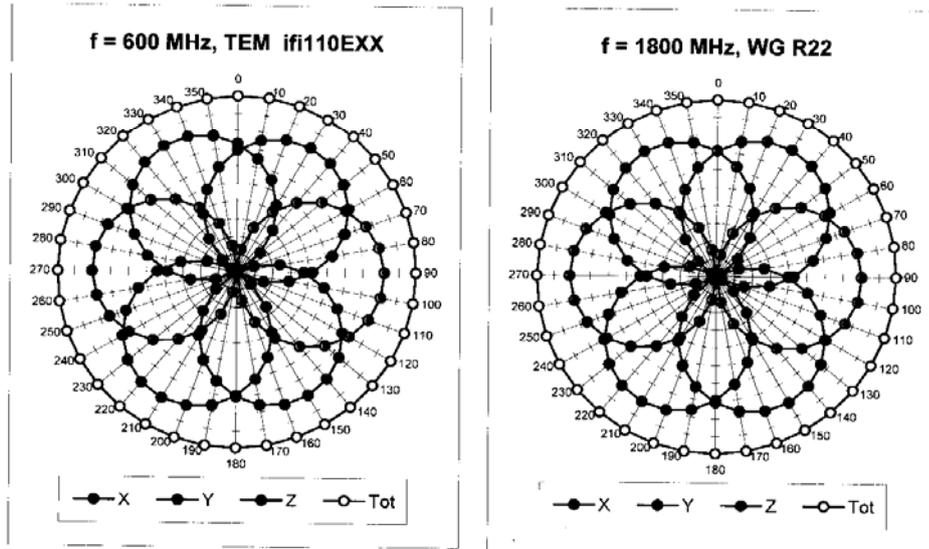


Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  (k=2)

EX3DV4 SN:3677

September 23, 2009

Receiving Pattern ( $\phi$ ),  $\theta = 0^\circ$

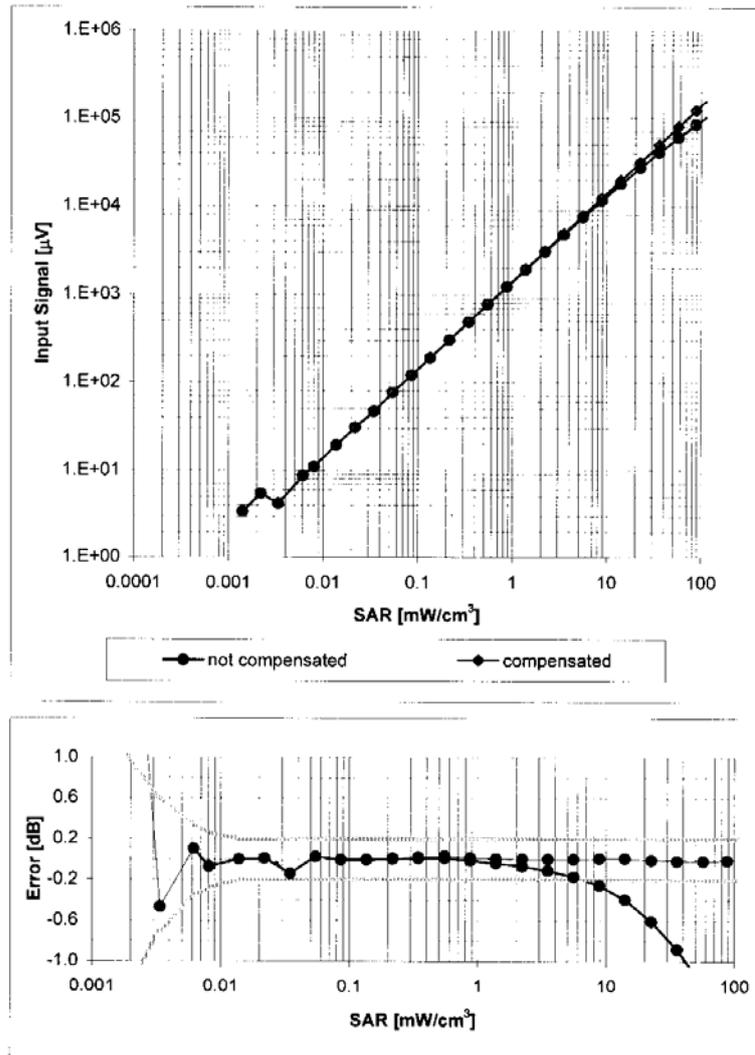


Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  (k=2)

EX3DV4 SN:3677

September 23, 2009

**Dynamic Range  $f(SAR_{head})$**   
(Waveguide R22,  $f = 1800$  MHz)

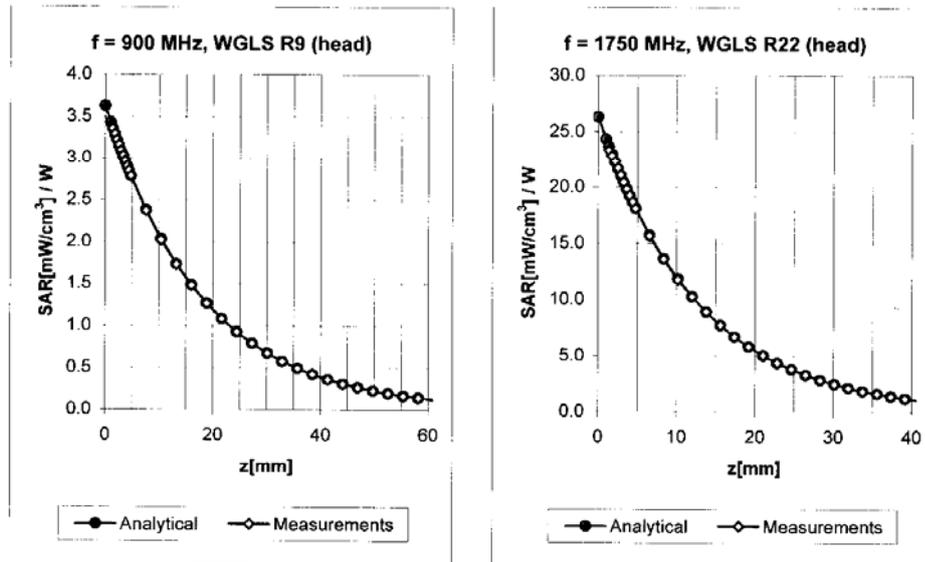


Uncertainty of Linearity Assessment:  $\pm 0.6\%$  ( $k=2$ )

EX3DV4 SN:3677

September 23, 2009

### Conversion Factor Assessment



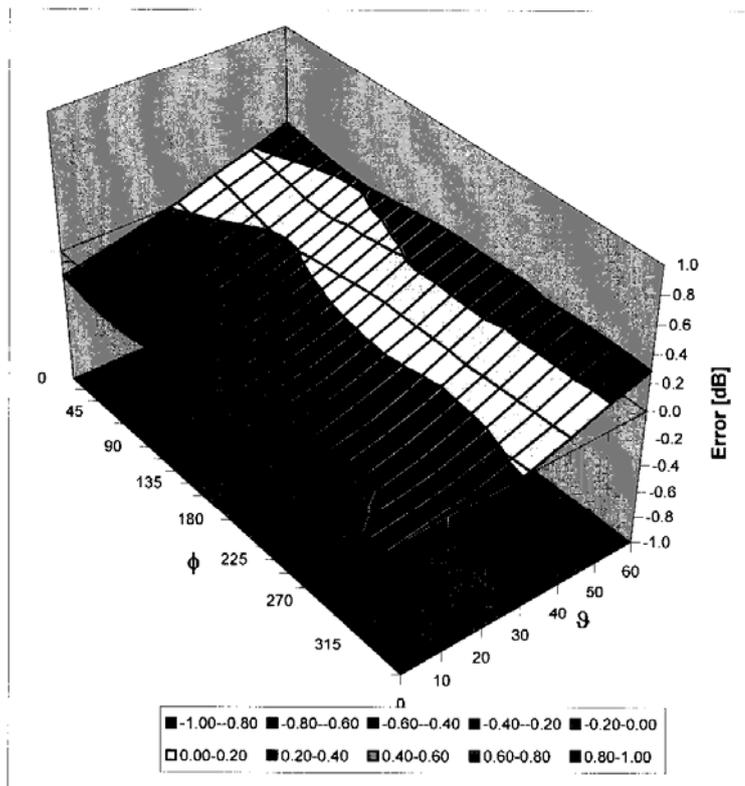
f [MHz]	Validity [MHz] <sup>c</sup>	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.68	0.64	9.20 ± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.71	0.62	8.91 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.68	0.62	8.04 ± 11.0% (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)

<sup>c</sup> 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 ( $\phi$ ,  $\vartheta$ ),  $f = 900$  MHz



Uncertainty of Spherical Isotropy Assessment:  $\pm 2.6\%$  ( $k=2$ )

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

Report No.: RZA2010-0158

Page 108 of 135

## 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																																														
<p>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.</p> <p>All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity &lt; 70%.</p> <p>Calibration Equipment used (M&amp;TE critical for calibration)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Primary Standards</th> <th style="width: 15%;">ID #</th> <th style="width: 35%;">Cal Date (Certificate No.)</th> <th style="width: 20%;">Scheduled Calibration</th> </tr> </thead> <tbody> <tr> <td>Power meter EPM-442A</td> <td>GB37480704</td> <td>08-Oct-08 (No. 217-00898)</td> <td>Oct-09</td> </tr> <tr> <td>Power sensor HP 8481A</td> <td>US37292783</td> <td>08-Oct-08 (No. 217-00898)</td> <td>Oct-09</td> </tr> <tr> <td>Reference 20 dB Attenuator</td> <td>SN: 5086 (20g)</td> <td>31-Mar-09 (No. 217-01025)</td> <td>Mar-10</td> </tr> <tr> <td>Type-N mismatch combination</td> <td>SN: 5047.2 / 06327</td> <td>31-Mar-09 (No. 217-01029)</td> <td>Mar-10</td> </tr> <tr> <td>Reference Probe ES3DV2</td> <td>SN: 3025</td> <td>30-Apr-09 (No. ES3-3025_Apr09)</td> <td>Apr-10</td> </tr> <tr> <td>DAE4</td> <td>SN: 601</td> <td>07-Mar-09 (No. DAE4-601_Mar09)</td> <td>Mar-10</td> </tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Secondary Standards</th> <th style="width: 15%;">ID #</th> <th style="width: 35%;">Check Date (in house)</th> <th style="width: 20%;">Scheduled Check</th> </tr> </thead> <tbody> <tr> <td>Power sensor HP 8481A</td> <td>MY41092317</td> <td>18-Oct-02 (in house check Oct-07)</td> <td>In house check: Oct-09</td> </tr> <tr> <td>RF generator R&amp;S SMT-06</td> <td>100005</td> <td>4-Aug-99 (in house check Oct-07)</td> <td>In house check: Oct-09</td> </tr> <tr> <td>Network Analyzer HP 8753E</td> <td>US37390585 S4206</td> <td>18-Oct-01 (in house check Oct-08)</td> <td>In house check: Oct-09</td> </tr> </tbody> </table>				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
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																																												
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Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-08)	In house check: Oct-09																																												
Calibrated by:	Name Jeton Kastrati	Function Laboratory Technician	Signature 																																												
Approved by:	Name Katja Pokovic	Function Technical Manager	Signature 																																												
			Issued: July 13, 2009																																												
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# TA Technology (Shanghai) Co., Ltd.

## Test Report

Report No.: RZA2010-0158

Page 109 of 135

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



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

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

Accreditation No.: **SCS 108**

### Glossary:

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

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

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

### Additional Documentation:

- DASY4/5 System Handbook

### Methods Applied and Interpretation of Parameters:

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

# TA Technology (Shanghai) Co., Ltd.

## Test Report

Report No.: RZA2010-0158

Page 110 of 135

### Measurement Conditions

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

<b>DASY Version</b>	DASY5	V5.0
<b>Extrapolation</b>	Advanced Extrapolation	
<b>Phantom</b>	Modular Flat Phantom V4.9	
<b>Distance Dipole Center - TSL</b>	15 mm	with Spacer
<b>Zoom Scan Resolution</b>	dx, dy, dz = 5 mm	
<b>Frequency</b>	835 MHz $\pm$ 1 MHz	

### Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
<b>Nominal Head TSL parameters</b>	22.0 °C	41.5	0.90 mho/m
<b>Measured Head TSL parameters</b>	(22.0 $\pm$ 0.2) °C	40.4 $\pm$ 6 %	0.89 mho/m $\pm$ 6 %
<b>Head TSL temperature during test</b>	(22.2 $\pm$ 0.2) °C	---	---

### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (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 <sup>1</sup>	normalized to 1W	<b>9.71 mW / g <math>\pm</math> 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (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 <sup>1</sup>	normalized to 1W	<b>6.34 mW / g <math>\pm</math> 16.5 % (k=2)</b>

<sup>1</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

# TA Technology (Shanghai) Co., Ltd.

## Test Report

### 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 cm <sup>3</sup> (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 <sup>2</sup>	normalized to 1W	<b>10.0 mW / g ± 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (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 <sup>2</sup>	normalized to 1W	<b>6.61 mW / g ± 16.5 % (k=2)</b>

<sup>2</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

## Appendix

### Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.3 $\Omega$ - 2.5 j $\Omega$
Return Loss	- 29.5 dB

### Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.3 $\Omega$ - 4.3 j $\Omega$
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;  $\sigma = 0.89$  mho/m;  $\epsilon_r = 40.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

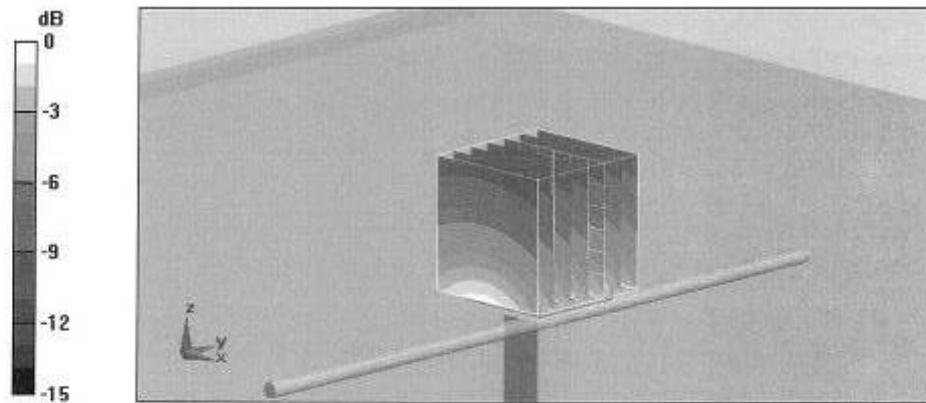
**Pin=250mW; dip=15mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

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



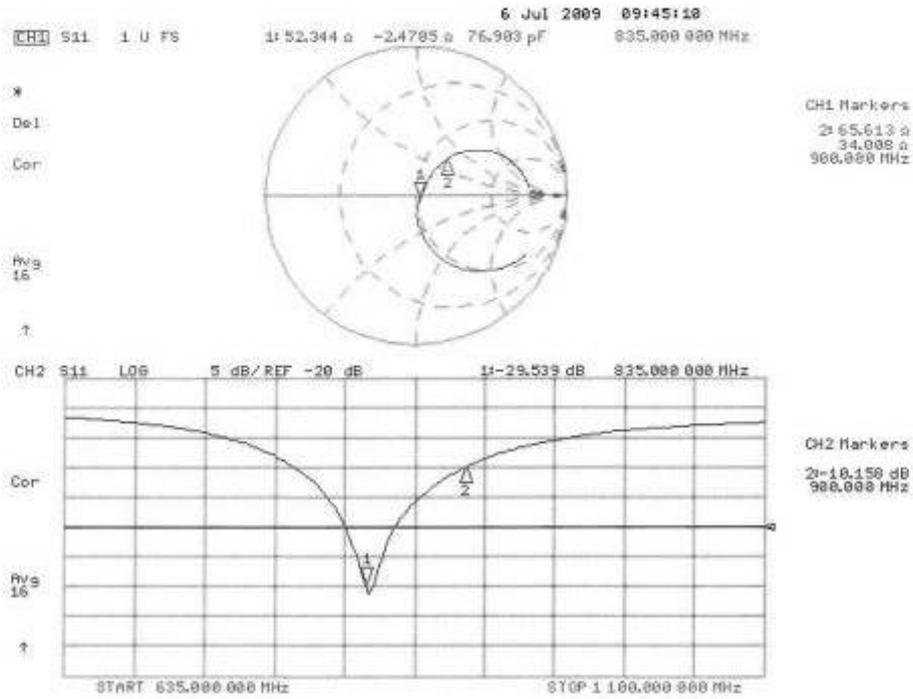
0 dB = 2.8mW/g

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

Report No.: RZA2010-0158

Page 114 of 135

## 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;  $\sigma = 0.99$  mho/m;  $\epsilon_r = 53$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

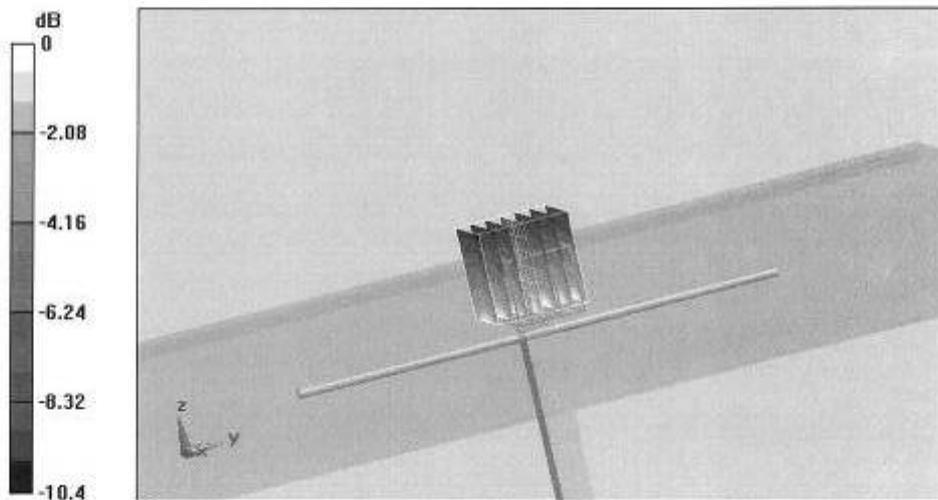
**Pin = 250mW, d = 15mm/Zoom Scan (7x7x7)/Cube 0; Measurement grid: dx=5mm, dy=5mm, dz=5mm**

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



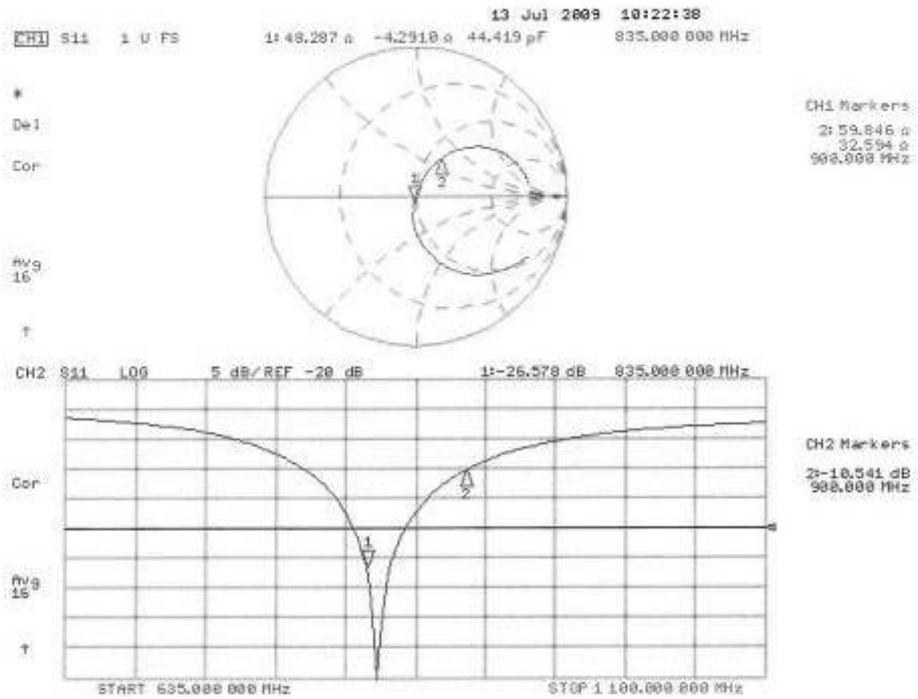
0 dB = 2.97mW/g

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

Report No.: RZA2010-0158

Page 116 of 135

## Impedance Measurement Plot for Body TSL



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

Report No.: RZA2010-0158

Page 117 of 135

## ANNEX F: D1900V2 Dipole Calibration Certificate

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



**S** Schweizerischer Kalibrierdienst  
**S** 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 **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 64206	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

Calibrated by:	Name <b>Jeton Kastrati</b>	Function <b>Laboratory Technician</b>	Signature 
Approved by:	Name <b>Katja Pakovic</b>	Technical Manager	

Issued: June 29, 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  
S Servizio svizzero di taratura  
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The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

**Glossary:**

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

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

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001
- Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

**Additional Documentation:**

- DASY4/5 System Handbook

**Methods Applied and Interpretation of Parameters:**

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

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

Report No.: RZA2010-0158

Page 119of 135

## Measurement Conditions

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

<b>DASY Version</b>	DASY5	V5.0
<b>Extrapolation</b>	Advanced Extrapolation	
<b>Phantom</b>	Modular Flat Phantom V5.0	
<b>Distance Dipole Center - TSL</b>	10 mm	with Spacer
<b>Zoom Scan Resolution</b>	dx, dy, dz = 5 mm	
<b>Frequency</b>	1900 MHz $\pm$ 1 MHz	

## Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
<b>Nominal Head TSL parameters</b>	22.0 °C	40.0	1.40 mho/m
<b>Measured Head TSL parameters</b>	(22.0 $\pm$ 0.2) °C	41.0 $\pm$ 6 %	1.42 mho/m $\pm$ 6 %
<b>Head TSL temperature during test</b>	(22.0 $\pm$ 0.2) °C	----	----

## SAR result with Head TSL

<b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Head TSL</b>	condition	
SAR measured	250 mW input power	10.3 mW / g
SAR normalized	normalized to 1W	41.2 mW / g
SAR for nominal Head TSL parameters <sup>1</sup>	normalized to 1W	<b>41.1 mW / g <math>\pm</math> 17.0 % (k=2)</b>

<b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Head TSL</b>	Condition	
SAR measured	250 mW input power	5.38 mW / g
SAR normalized	normalized to 1W	21.5 mW / g
SAR for nominal Head TSL parameters <sup>1</sup>	normalized to 1W	<b>21.5 mW / g <math>\pm</math> 16.5 % (k=2)</b>

<sup>1</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

**TA Technology (Shanghai) Co., Ltd.**  
**Test Report**

**Body TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.9 ± 6 %	1.55 mho/m ± 6 %
Body TSL temperature during test	(21.2 ± 0.2) °C	-----	-----

**SAR result with Body TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.5 mW / g
SAR normalized	normalized to 1W	42.0 mW / g
SAR for nominal Body TSL parameters <sup>2</sup>	normalized to 1W	<b>41.7 mW / g ± 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.52 mW / g
SAR normalized	normalized to 1W	22.1 mW / g
SAR for nominal Body TSL parameters <sup>2</sup>	normalized to 1W	<b>22.0 mW / g ± 16.5 % (k=2)</b>

<sup>2</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

**TA Technology (Shanghai) Co., Ltd.**  
**Test Report**

**Appendix**

**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	51.8 $\Omega$ + 2.7 j $\Omega$
Return Loss	- 29.9 dB

**Antenna Parameters with Body TSL**

Impedance, transformed to feed point	46.6 $\Omega$ + 4.3 j $\Omega$
Return Loss	- 24.9 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.195 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	June 04, 2002

**DASY5 Validation Report for Head TSL**

Date/Time: 26.06.2009 13:05:15

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: HSL U11 BB

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.42$  mho/m;  $\epsilon_r = 41$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

**DASY5 Configuration:**

- Probe: ES3DV2 - SN3025; ConvF(4.88, 4.88, 4.88); Calibrated: 30.04.2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.03.2009
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**Pin = 250 mW; dip = 10 mm/Zoom Scan (dist=3.0 mm, probe 0deg) (7x7x7)/Cube 0:**

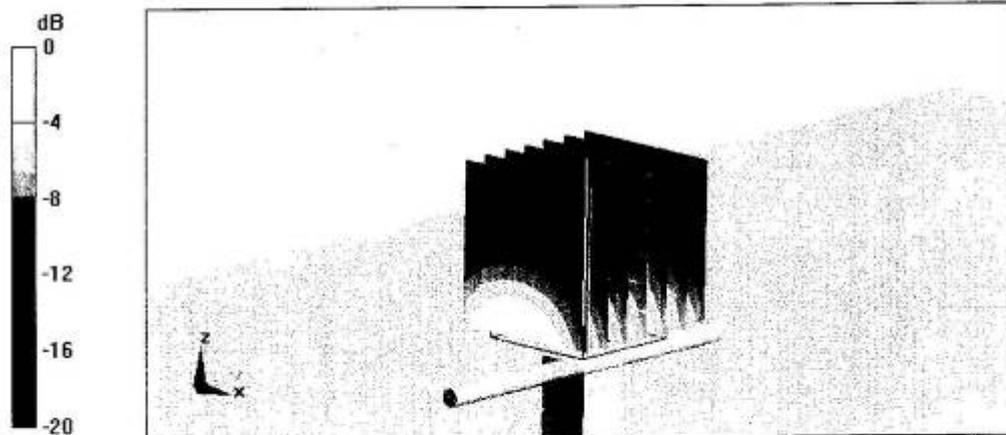
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 97.6 V/m; Power Drift = 0.030 dB

Peak SAR (extrapolated) = 18.7 W/kg

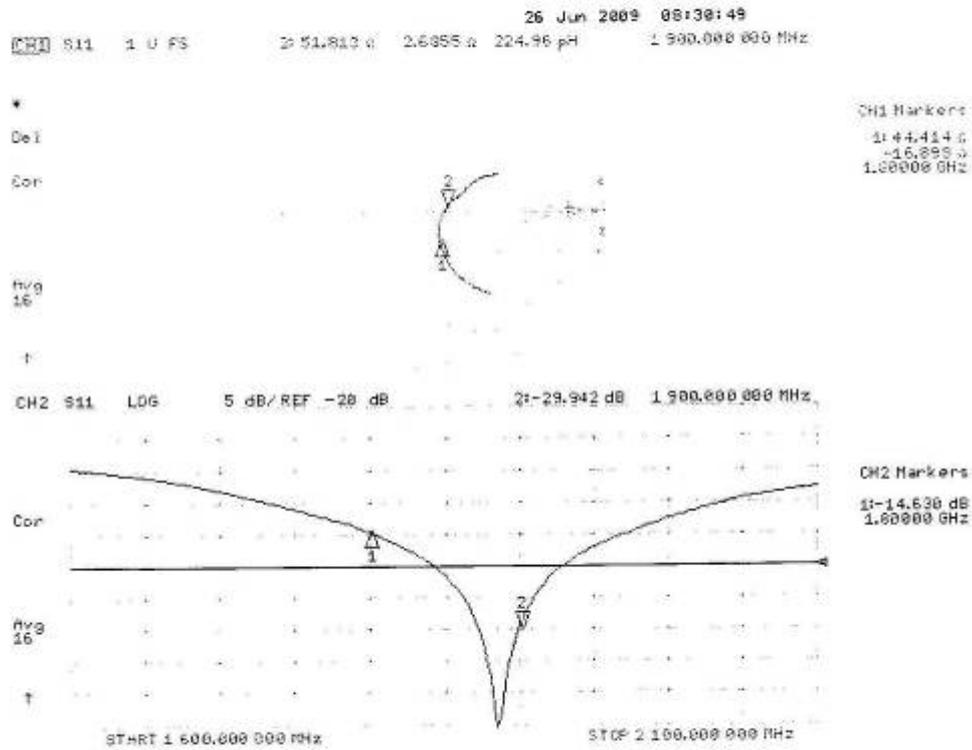
**SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.38 mW/g**

Maximum value of SAR (measured) = 12.6 mW/g



0 dB = 12.6mW/g

**Impedance Measurement Plot for Head TSL**



**DASY5 Validation Report for Body TSL**

Date/Time: 26.06.2009 14:30:50

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: MSL U10 BB

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.55$  mho/m;  $\epsilon_r = 54$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

**DASY5 Configuration:**

- Probe: ES3DV2 - SN3025; ConvF(4.46, 4.46, 4.46); Calibrated: 30.04.2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.03.2009
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**Pin = 250 mW; dip = 10 mm/Zoom Scan (dist=3.0mm, probe 0deg) (7x7x7)/Cube 0:**

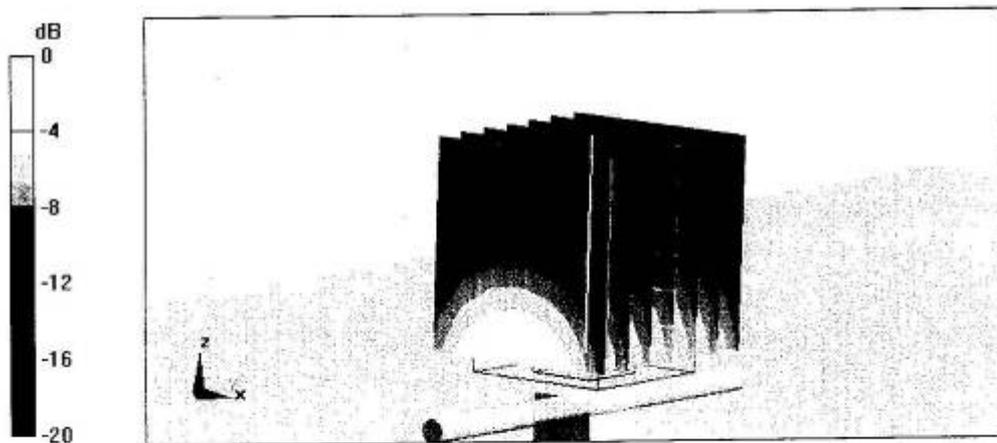
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 95.8 V/m; Power Drift = 0.043 dB

Peak SAR (extrapolated) = 18.9 W/kg

**SAR(1 g) = 10.5 mW/g; SAR(10 g) = 5.52 mW/g**

Maximum value of SAR (measured) = 13.3 mW/g



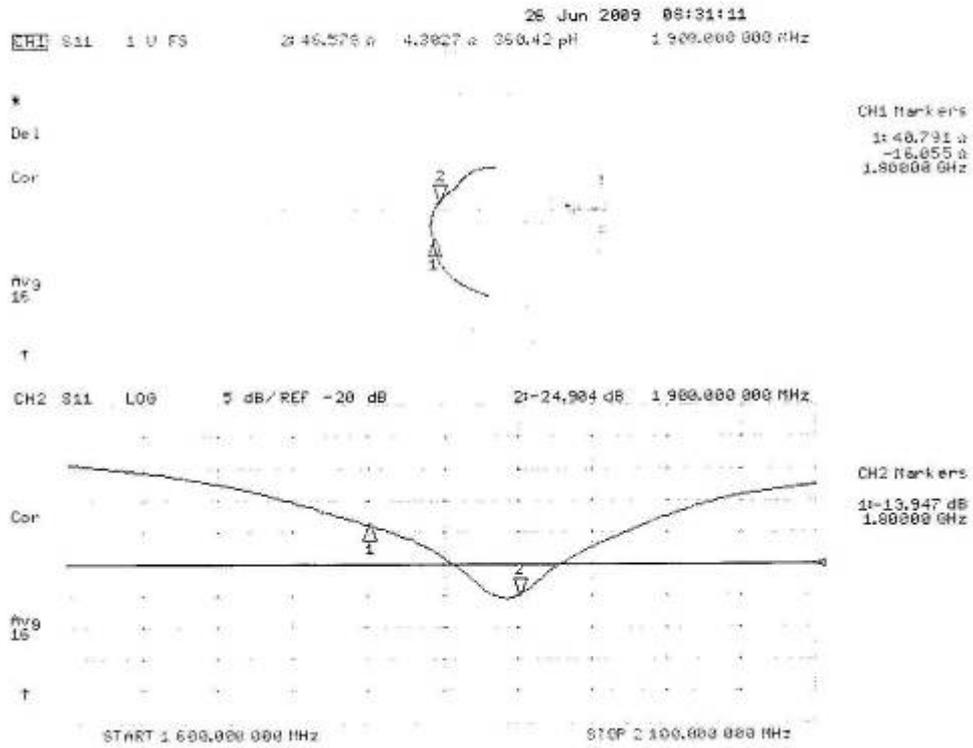
0 dB = 13.3mW/g

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

Report No.: RZA2010-0158

Page 125 of 135

## Impedance Measurement Plot for Body TSL



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

Report No.: RZA2010-0158

Page 126of 135

## ANNEX G: DAE4 Calibration Certificate

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



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

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

Accreditation No.: **SCS 108**

Client **TA – SH (Auden)**

Certificate No: **DAE4-871\_Nov09**

### CALIBRATION CERTIFICATE

Object **DAE4 - SD 000 D04 BJ - SN: 871**

Calibration procedure(s) **QA CAL-06.v12  
Calibration procedure for the data acquisition electronics (DAE)**

Calibration date: **November 11, 2009**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	1-Oct-09 (No: 9055)	Oct-10
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Calibrator Box V1.1	SE UMS 006 AB 1004	05-Jun-09 (in house check)	In house check: Jun-10

	Name	Function	Signature
Calibrated by:	Andrea Guntli	Technician	
Approved by:	Fin Bomholt	R&D Director	

Issued: November 11, 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  
**S** Servizio svizzero di taratura  
**S** Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)

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

Accreditation No.: **SCS 108**

### Glossary

**DAE** data acquisition electronics  
**Connector angle** information used in DASYS system to align probe sensor X to the robot coordinate system.

### Methods Applied and Interpretation of Parameters

- **DC Voltage Measurement:** Calibration Factor assessed for use in DASYS system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- **Connector angle:** The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
  - **DC Voltage Measurement Linearity:** Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
  - **Common mode sensitivity:** Influence of a positive or negative common mode voltage on the differential measurement.
  - **Channel separation:** Influence of a voltage on the neighbor channels not subject to an input voltage.
  - **AD Converter Values with inputs shorted:** Values on the internal AD converter corresponding to zero input voltage
  - **Input Offset Measurement:** Output voltage and statistical results over a large number of zero voltage measurements.
  - **Input Offset Current:** Typical value for information; Maximum channel input offset current, not considering the input resistance.
  - **Input resistance:** DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - **Low Battery Alarm Voltage:** Typical value for information. Below this voltage, a battery alarm signal is generated.
  - **Power consumption:** Typical value for information. Supply currents in various operating modes.

**TA Technology (Shanghai) Co., Ltd.**  
**Test Report**

Report No.: RZA2010-0158

Page 128of 135

**DC Voltage Measurement**

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1 $\mu$ V , full range = -100...+300 mV

Low Range: 1LSB = 61nV , full range = -1.....+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	404.813 $\pm$ 0.1% (k=2)	404.794 $\pm$ 0.1% (k=2)	405.237 $\pm$ 0.1% (k=2)
Low Range	3.98191 $\pm$ 0.7% (k=2)	3.98417 $\pm$ 0.7% (k=2)	3.98912 $\pm$ 0.7% (k=2)

**Connector Angle**

Connector Angle to be used in DASY system	90.0 $\circ$ $\pm$ 1 $\circ$
---	------------------------------

# TA Technology (Shanghai) Co., Ltd.

## Test Report

Report No.: RZA2010-0158

Page 129of 135

### Appendix

#### 1. DC Voltage Linearity

High Range	Reading ( $\mu\text{V}$ )	Difference ( $\mu\text{V}$ )	Error (%)
Channel X + Input	199994.0	1.84	0.00
Channel X + Input	19999.85	0.05	0.00
Channel X - Input	-19997.97	1.83	-0.01
Channel Y + Input	200010.3	-3.71	-0.00
Channel Y + Input	19999.12	-0.48	-0.00
Channel Y - Input	-20000.18	-0.78	0.00
Channel Z + Input	200010.2	-2.80	-0.00
Channel Z + Input	19998.54	-0.86	-0.00
Channel Z - Input	-19999.82	0.00	0.00

Low Range	Reading ( $\mu\text{V}$ )	Difference ( $\mu\text{V}$ )	Error (%)
Channel X + Input	2000.3	0.22	0.01
Channel X + Input	200.20	0.30	0.15
Channel X - Input	-199.89	0.21	-0.10
Channel Y + Input	1999.8	-0.13	-0.01
Channel Y + Input	200.06	-0.04	-0.02
Channel Y - Input	-200.43	-0.73	0.36
Channel Z + Input	1999.5	-0.57	-0.03
Channel Z + Input	199.58	-0.72	-0.36
Channel Z - Input	-201.11	-1.01	0.51

#### 2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading ( $\mu\text{V}$ )	Low Range Average Reading ( $\mu\text{V}$ )
Channel X	200	13.79	12.75
	-200	-12.26	-13.72
Channel Y	200	-11.82	-11.47
	-200	10.67	10.68
Channel Z	200	-1.08	-1.35
	-200	0.32	0.12

#### 3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X ( $\mu\text{V}$ )	Channel Y ( $\mu\text{V}$ )	Channel Z ( $\mu\text{V}$ )
Channel X	200	-	3.36	1.06
Channel Y	200	1.52	-	3.59
Channel Z	200	2.55	1.41	-

# TA Technology (Shanghai) Co., Ltd.

## Test Report

Report No.: RZA2010-0158

Page 130 of 135

#### 4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	15928	16288
Channel Y	16188	15745
Channel Z	15790	16219

#### 5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Input 10M $\Omega$

	Average ( $\mu$ V)	min. Offset ( $\mu$ V)	max. Offset ( $\mu$ V)	Std. Deviation ( $\mu$ V)
Channel X	0.06	-3.43	1.18	0.52
Channel Y	-0.71	-2.66	0.96	0.57
Channel Z	-0.95	-1.94	0.04	0.41

#### 6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

#### 7. Input Resistance

	Zeroing (MOhm)	Measuring (MOhm)
Channel X	0.1999	204.4
Channel Y	0.1999	203.6
Channel Z	0.1999	203.8

#### 8. Low Battery Alarm Voltage (verified during pre test)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

#### 9. Power Consumption (verified during pre test)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.0	+6	+14
Supply (- Vcc)	-0.01	-8	-9