



# SAR TEST REPORT

No. 2011SAR00132

For

**TCT Mobile Limited**

**GSM dual band mobile phone**

**B11S Lite US**

**one touch 390A**

With

**Hardware Version: PIO**

**Software Version: H30**

**FCCID: RAD213**

**Issued Date: 2011-11-22**



**No. DGA-PL-114/01-02**

**Note:**

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of TMC Beijing.

**Test Laboratory:**

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## 1 Test Laboratory

### 1.1 Testing Location

Company Name: TMC Beijing, Telecommunication Metrology Center of MIIT  
Address: No 52, Huayuan beilu, Haidian District, Beijing,P.R.China  
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### 1.2 Testing Environment

Temperature: 18°C~25 °C,  
Relative humidity: 30%~ 70%  
Ground system resistance: < 0.5 Ω

Ambient noise is checked and found very low and in compliance with requirement of standards.  
Reflection of surrounding objects is minimized and in compliance with requirement of standards.

### 1.3 Project Data

Project Leader: Qi Dianyuan  
Test Engineer: Lin Xiaojun  
Testing Start Date: November 10, 2011  
Testing End Date: November 11, 2011

### 1.4 Signature



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Lin Xiaojun  
(Prepared this test report)



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Qi Dianyuan  
(Reviewed this test report)



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Xiao Li  
Deputy Director of the laboratory  
(Approved this test report)

## 2 Client Information

### 2.1 Applicant Information

Company Name: TCT Mobile Limited  
Address /Post: 5F, E building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,  
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### 2.2 Manufacturer Information

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Postal Code: 201203  
Country: P. R. China  
Telephone: 0086-21-61460890  
Fax: 0086-21-61460602

### 3 Equipment Under Test (EUT) and Ancillary Equipment (AE)

#### 3.1 About EUT

EUT Description:	GSM dual band mobile phone
Model Name:	B11S Lite US
Marketing Name:	one touch 390A
Frequency Band:	GSM 850 / PCS 1900
GPRS Multislot Class:	10
GPRS capability Class:	B

#### 3.2 Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	012897000010459 / 012897000010251	PIO	H30

\*EUT ID: is used to identify the test sample in the lab internally.

#### 3.3 Internal Identification of AE used during the test

AE ID*	Description	Model	SN	Manufacturer
AE1	Battery	CAB2450000C1	/	BYD
AE2	Headset	CCB3160A11C4	/	Meihao
AE3	Headset	CCB3160A15C4	/	Meihao
AE4	Headset	CCB3160A11C1	/	Juwei
AE5	Headset	CCB3160A15C1	/	Juwei

\*AE ID: is used to identify the test sample in the lab internally.

## 4 CHARACTERISTICS OF THE TEST

### 4.1 Applicable Limit Regulations

**EN 50360–2001:** Product standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones.

It specifies the maximum exposure limit of **2.0 W/kg** as averaged over any 10 gram of tissue for portable devices being used within 20 cm of the user in the uncontrolled environment.

**ANSI 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.

## 4.2 Applicable Measurement Standards

**EN 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).

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

**OET Bulletin 65 (Edition 97-01) and Supplement C(Edition 01-01):** Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits.

**IEC 62209-1:** 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)

## 5 OPERATIONAL CONDITIONS DURING TEST

### 5.1 Schematic Test Configuration

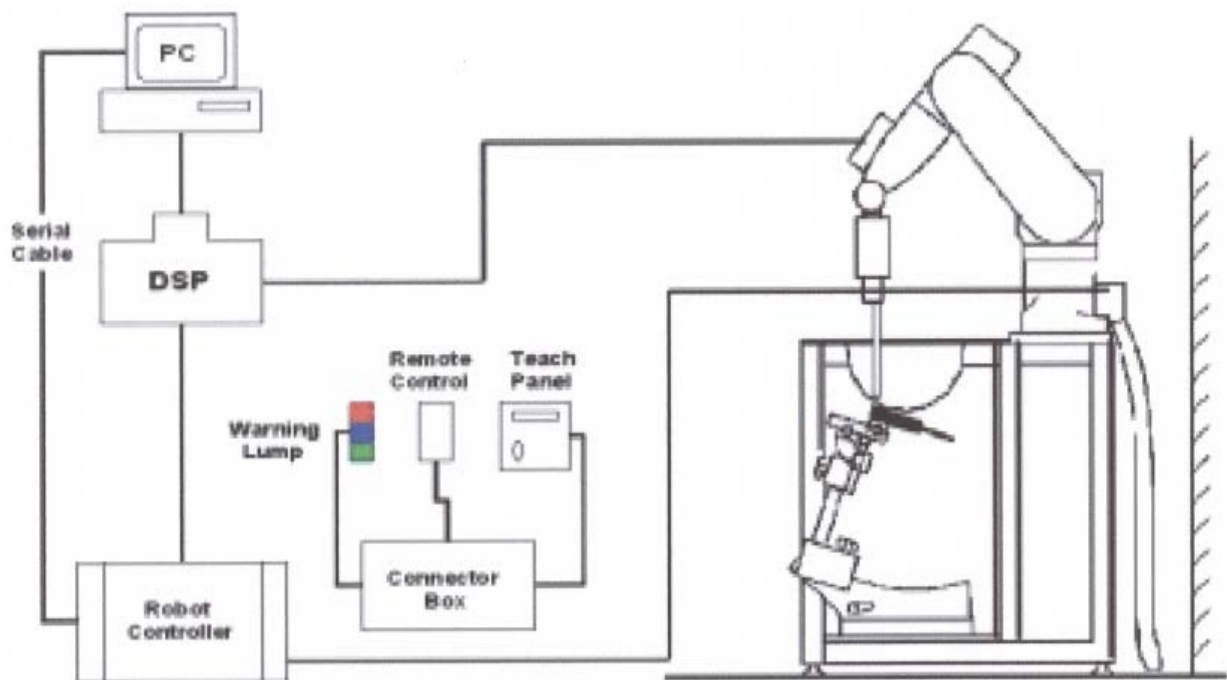
During SAR test, EUT is in Traffic Mode (Channel Allocated) at Normal Voltage Condition. A communication link is set up with a System Simulator (SS) by air link, and a call is established. The Absolute Radio Frequency Channel Number (ARFCN) is allocated to 128, 190 and 251 respectively in the case of GSM 850 MHz, or to 512, 661 and 810 respectively in the case of PCS 1900 MHz. The EUT is commanded to operate at maximum transmitting power.

The EUT shall use its internal transmitter. The antenna(s), battery and accessories shall be those specified by the manufacturer. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output. If a wireless link is used, the antenna connected to the output of the base station simulator shall be placed at least 50 cm away from the handset. The signal transmitted by the simulator to the antenna feeding point shall be lower than the output power level of the handset by at least 30 dB.

### 5.2 SAR Measurement Set-up

These measurements were performed with the automated near-field scanning system DASY4 Professional from Schmid & Partner Engineering AG (SPEAG). The system is based on a high precision robot (working range greater than 0.9m), which positions the probes with a positional repeatability of better than  $\pm 0.02\text{mm}$ . Special E- and H-field probes have been developed for measurements close to material discontinuity, the sensors of which are directly loaded with a Schottky diode and connected via highly resistive lines (length =300mm) to the data acquisition unit.

A cell controller system contains the power supply, robot controller, teaches pendant (Joystick), and remote control, is used to drive the robot motors. The PC consists of the Micron Pentium III 800 MHz computer with Windows 2000 system and SAR Measurement Software DASY4 Professional, A/D interface card, monitor, mouse, and keyboard. The Stäubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card.



**Picture 1: SAR Lab Test Measurement Set-up**

The DAE consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.

### 5.3 Dasy4 E-field Probe System

The SAR measurements were conducted with the dosimetric probe ES3DV3 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe has been calibrated according to the standard procedure with an accuracy of better than  $\pm 10\%$ . The spherical isotropy was evaluated and found to be better than  $\pm 0.25\text{dB}$ .

### ES3DV3 Probe Specification

Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Basic Broad Band Calibration in air Conversion Factors (CF) for HSL 900 and HSL 1810 Additional CF for other liquids and frequencies upon request



**Picture 2: ES3DV3 E-field**

Frequency 10 MHz to 4 GHz; Linearity:  $\pm 0.2$  dB (30 MHz to 4 GHz)

Directivity  $\pm 0.2$  dB in HSL (rotation around probe axis)  
 $\pm 0.3$  dB in tissue material (rotation normal to probe axis)

Dynamic Range 5  $\mu$ W/g to > 100 mW/g; Linearity:  $\pm 0.2$  dB

Dimensions Overall length: 330 mm (Tip: 20 mm)  
Tip diameter: 3.9 mm (Body: 12 mm)  
Distance from probe tip to dipole centers: 2.0 mm

Application General dosimetry up to 4 GHz  
Dosimetry in strong gradient fields  
Compliance tests of mobile phones



**Picture3:ES3DV3 E-field probe**

### 5.4 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  $\pm 0.25$ 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.



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

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

Or

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

Where:

$\sigma$  = Simulated tissue conductivity,  
 $\rho$  = Tissue density ( $\text{kg/m}^3$ ).



**Picture 4: Device Holder**

## 5.5 Other Test Equipment

### 5.5.1 Device Holder for Transmitters

In combination with the Generic Twin Phantom V3.0, the Mounting Device (POM) enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation points is the ear opening. The devices can be easily, accurately, and repeatably positioned according to the FCC and CENELEC specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).

### 5.5.2 Phantom

The Generic Twin Phantom is constructed of a fiberglass shell integrated in a wooden table. 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



**Picture 5: Generic Twin Phantom**

## 5.6 Equivalent Tissues

The liquid used for the frequency range of 800-3000 MHz consisted of water, sugar, salt, preventol, glycol monobutyl and Cellulose. The liquid has been previously proven to be suited for worst-case. The Table 1 and 2 shows the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the IEEE 1528.

**Table 1. Composition of the Head Tissue Equivalent Matter**

MIXTURE %	FREQUENCY 850MHz
Water	41.45
Sugar	56.0
Salt	1.45
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=850MHz $\epsilon=41.5$ $\sigma=0.90$
MIXTURE %	FREQUENCY 1900MHz
Water	55.242
Glycol monobutyl	44.452
Salt	0.306
Dielectric Parameters Target Value	f=1900MHz $\epsilon=40.0$ $\sigma=1.40$

**Table 2. Composition of the Body Tissue Equivalent Matter**

MIXTURE %	FREQUENCY 850MHz
Water	52.5
Sugar	45.0
Salt	1.4
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=850MHz $\epsilon=55.2$ $\sigma=0.97$
MIXTURE %	FREQUENCY 1900MHz
Water	69.91
Glycol monobutyl	29.96
Salt	0.13
Dielectric Parameters Target Value	f=1900MHz $\epsilon=53.3$ $\sigma=1.52$

## 5.7 System Specifications

### Specifications

**Positioner:** Stäubli Unimation Corp. Robot Model: RX90L

**Repeatability:**  $\pm 0.02$  mm

**No. of Axis:** 6

### Data Acquisition Electronic (DAE) System

#### Cell Controller

**Processor:** Pentium III

**Clock Speed:** 800 MHz

**Operating System:** Windows 2000

**Data Converter**

**Features:**Signal Amplifier, multiplexer, A/D converter, and control logic

**Software:** DASY4 software

**Connecting Lines:** Optical downlink for data and status info.  
Optical uplink for commands and clock

## 6 CONDUCTED OUTPUT POWER MEASUREMENT

### 6.1 Summary

During the process of testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication tester (CMU-200) to ensure the maximum power transmission and proper modulation. This result contains conducted output power for the EUT. In all cases, the measured output power should be greater and within 5% than EMI measurement.

### 6.2 Conducted Power

#### 6.2.1 Measurement Methods

The EUT was set up for the maximum output power. The channel power was measured with CMU200. These measurements were done at low, middle and high channels.

#### 6.2.2 Measurement result

**Table 3: The conducted power for GSM 850/1900**

GSM 850MHZ	Conducted Power (dBm)		
	Channel 251(848.8MHz)	Channel 190(836.6MHz)	Channel 128(824.2MHz)
	32.98	33.03	33.12
GSM 1900MHZ	Conducted Power (dBm)		
	Channel 810(1909.8MHz)	Channel 661(1880MHz)	Channel 512(1850.2MHz)
	30.90	30.92	30.87

**Table 4: The conducted power for GPRS 850/1900 and EGPRS 850/1900**

GSM 850 GPRS	Measured Power (dBm)			calculation	Averaged Power (dBm)		
	251	190	128		251	190	128
1 Txslot	32.98	33.01	33.10	-9.03dB	23.95	23.98	24.07
<b>2 Txslots</b>	31.98	32.03	32.13	-6.02dB	<b>25.96</b>	<b>26.01</b>	<b>26.11</b>
PCS1900 GPRS	Measured Power (dBm)			calculation	Averaged Power (dBm)		
	810	661	512		810	661	512
1 Txslot	30.88	30.91	30.86	-9.03dB	21.85	21.88	21.83
<b>2 Txslots</b>	29.67	29.69	29.65	-6.02dB	<b>23.65</b>	<b>23.67</b>	<b>23.63</b>

NOTES:

1) Division Factors

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

1TX-slot = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB

2TX-slots = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB

**According to the conducted power as above, the body measurements are performed with 2 Txslots for GSM850 and PCS1900.**

### 6.2.3 Power Drift

To control the output power stability during the SAR test, DASY4 system calculates the power drift by measuring the E-field at the same location at the beginning and at the end of the measurement for each test position. These drift values can be found in Table 9 to Table 16 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 5%.

## 7 TEST RESULTS

### 7.1 Dielectric Performance

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

Measurement is made at temperature 23.0 °C and relative humidity 40%.			
Liquid temperature during the test: 22.5°C			
Measurement Date : 850 MHz <u>November 10, 2011</u> 1900 MHz <u>November 11, 2011</u>			
/	<b>Frequency</b>	<b>Permittivity <math>\epsilon</math></b>	<b>Conductivity <math>\sigma</math> (S/m)</b>
<b>Target value</b>	835 MHz	41.5	0.90
	1900 MHz	40.0	1.40
<b>Measurement value (Average of 10 tests)</b>	835 MHz	40.5	0.88
	1900 MHz	39.0	1.39

**Table 6: Dielectric Performance of Body Tissue Simulating Liquid**

Measurement is made at temperature 23.0 °C and relative humidity 40%.			
Liquid temperature during the test: 22.5°C			
Measurement Date : 850 MHz <u>November 10, 2011</u> 1900 MHz <u>November 11, 2011</u>			
/	<b>Frequency</b>	<b>Permittivity <math>\epsilon</math></b>	<b>Conductivity <math>\sigma</math> (S/m)</b>
<b>Target value</b>	835 MHz	55.2	0.97
	1900 MHz	53.3	1.52
<b>Measurement value (Average of 10 tests)</b>	835 MHz	53.9	0.95
	1900 MHz	51.3	1.50

### 7.2 System Validation

**Table 7: System Validation of Head**

Measurement is made at temperature 23.0 °C and relative humidity 40%.				
Liquid temperature during the test: 22.5°C				
Measurement Date : 850 MHz <u>November 10, 2011</u> 1900 MHz <u>November 11, 2011</u>				
<b>Liquid parameters</b>	Dipole calibration Target value	<b>Frequency</b>	<b>Permittivity <math>\epsilon</math></b>	<b>Conductivity <math>\sigma</math> (S/m)</b>
		835 MHz	41.6	0.92
	Actual Measurement value	1900 MHz	39.6	1.40
		835 MHz	40.5	0.88
		1900 MHz	39.0	1.39

Verification results	Frequency	Target value (W/kg)		Measured value (W/kg)		Deviation	
		10 g Average	1 g Average	10 g Average	1 g Average	10 g Average	1 g Average
		835 MHz	6.12	9.41	6.04	9.24	-1.31%
1900 MHz	20.1	39.4	19.64	38.88	-2.29%	-1.32%	

Note: The forward power is 250mW. Target values are the data of the dipole validation results, please check Annex F for the Dipole Calibration Certificate.

**Table 8: System Validation of Body**

Measurement is made at temperature 23.0 °C and relative humidity 40%.							
Liquid temperature during the test: 22.5°C							
Measurement Date : 850 MHz <u>November 10, 2011</u> 1900 MHz <u>November 11, 2011</u>							
Liquid parameters	Dipole calibration Target value	Frequency		Permittivity $\epsilon$	Conductivity $\sigma$ (S/m)		
		835 MHz	1900 MHz	54.5	0.97		
	Actual Measurement value	835 MHz	1900 MHz	53.9	0.95		
		835 MHz	1900 MHz	51.3	1.50		
	Verification results	Frequency	Target value (W/kg)		Measured value (W/kg)		Deviation
10 g Average			1 g Average	10 g Average	1 g Average	10 g Average	1 g Average
835 MHz			6.24	9.57	6.12	9.40	-1.92%
1900 MHz	20.9	41.4	20.52	40.8	-1.82%	-1.45%	

Note: The forward power is 250mW. Target values are the data of the dipole validation results, please check Annex F for the Dipole Calibration Certificate.

### 7.3 Summary of Measurement Results

**Table 9: SAR Values (850MHz-Head) – Slide up**

Limit of SAR (W/kg)	10 g Average	1 g Average	Power Drift (dB)
	2.0	1.6	
Test Case	Measurement Result (W/kg)		
	10 g Average	1 g Average	
Left hand, Touch cheek, High frequency (See Fig.1)	0.490	0.673	0.130
Left hand, Touch cheek, Mid frequency (See Fig.2)	0.437	0.598	-0.159
Left hand, Touch cheek, Low frequency (See Fig.3)	0.414	0.564	-0.040
Left hand, Tilt 15 Degree, High frequency (See Fig.4)	0.189	0.258	-0.043
Left hand, Tilt 15 Degree, Mid frequency (See Fig.5)	0.182	0.247	-0.021
Left hand, Tilt 15 Degree, Low frequency (See Fig.6)	0.174	0.235	-0.133
Right hand, Touch cheek, High frequency (See Fig.7)	0.399	0.554	0.165

Right hand, Touch cheek, Mid frequency (See Fig.8)	0.349	0.482	0.030
Right hand, Touch cheek, Low frequency (See Fig.9)	0.306	0.420	-0.039
Right hand, Tilt 15 Degree, High frequency (See Fig.10)	0.250	0.346	-0.039
Right hand, Tilt 15 Degree, Mid frequency (See Fig.11)	0.241	0.331	-0.076
Right hand, Tilt 15 Degree, Low frequency (See Fig.12)	0.232	0.317	-0.151

**Table 10: SAR Values (850MHz-Head) – Slide down**

Limit of SAR (W/kg)	10 g Average	1 g Average	Power Drift (dB)
	2.0	1.6	
Test Case	Measurement Result (W/kg)		
	10 g Average	1 g Average	
Left hand, Touch cheek, High frequency (See Fig.13)	0.277	0.370	0.105

**Table 11: SAR Values (1900MHz-Head) – Slide down**

Limit of SAR (W/kg)	10 g Average	1 g Average	Power Drift (dB)
	2.0	1.6	
Test Case	Measurement Result (W/kg)		
	10 g Average	1 g Average	
Left hand, Touch cheek, High frequency (See Fig.14)	0.491	0.794	0.053
Left hand, Touch cheek, Mid frequency (See Fig.15)	0.463	0.751	0.126
Left hand, Touch cheek, Low frequency (See Fig.16)	0.360	0.579	0.030
Left hand, Tilt 15 Degree, High frequency (See Fig.17)	0.189	0.307	0.016
Left hand, Tilt 15 Degree, Mid frequency (See Fig.18)	0.163	0.260	0.016
Left hand, Tilt 15 Degree, Low frequency (See Fig.19)	0.124	0.195	-0.012
Right hand, Touch cheek, High frequency (See Fig.20)	0.533	0.892	-0.011
Right hand, Touch cheek, Mid frequency (See Fig.21)	0.497	0.833	-0.114
Right hand, Touch cheek, Low frequency (See Fig.22)	0.406	0.678	-0.109
Right hand, Tilt 15 Degree, High frequency (See Fig.23)	0.181	0.284	0.023
Right hand, Tilt 15 Degree, Mid frequency (See Fig.24)	0.163	0.252	-0.017
Right hand, Tilt 15 Degree, Low frequency (See Fig.25)	0.132	0.201	-0.011

**Table 12: SAR Values (1900MHz-Head) – Slide up**

Limit of SAR (W/kg)	10 g Average	1 g Average	Power Drift (dB)
	2.0	1.6	
Test Case	Measurement Result (W/kg)		
	10 g Average	1 g Average	
Right hand, Touch cheek, High frequency (See Fig.26)	0.192	0.314	-0.105

**Table 13: SAR Values (850MHz-Body) – Slide up**

Limit of SAR (W/kg)	10 g Average	1g Average	Power Drift (dB)
	2.0	1.6	
Test Case	Measurement Result (W/kg)		Power Drift (dB)
	10 g Average	1 g Average	
Body, Towards Ground, High frequency with GPRS (See Fig.27)	0.794	1.11	-0.006
Body, Towards Ground, Mid frequency with GPRS (See Fig.28)	0.782	1.09	0.027
Body, Towards Ground, Low frequency with GPRS (See Fig.29)	0.766	1.06	0.009
Body, Towards Phantom, High frequency with GPRS (See Fig.30)	0.797	1.1	0.001
Body, Towards Phantom, Mid frequency with GPRS (See Fig.31)	0.689	0.941	0.043
Body, Towards Phantom, Low frequency with GPRS (See Fig.32)	0.743	1.01	0.012
Body, Towards Ground, High frequency with Headset_CCB3160A11C1 (See Fig.33)	0.513	0.717	-0.052
Body, Towards Ground, High frequency with Headset_CCB3160A11C4 (See Fig.34)	0.458	0.641	-0.046
Body, Towards Ground, High frequency with Headset_CCB3160A15C1 (See Fig.35)	0.507	0.712	-0.058
Body, Towards Ground, High frequency with Headset_CCB3160A15C4 (See Fig.36)	0.451	0.631	-0.112

**Table 14: SAR Values (850MHz-Body) – Slide down**

Limit of SAR (W/kg)	10 g Average	1g Average	Power Drift (dB)
	2.0	1.6	
Test Case	Measurement Result (W/kg)		Power Drift (dB)
	10 g Average	1 g Average	
Body, Towards Ground, High frequency with GPRS (See Fig.37)	0.500	0.709	0.011

**Table 15: SAR Values (1900MHz-Body) – Slide up**

Limit of SAR (W/kg)	10 g Average	1g Average	Power Drift (dB)
	2.0	1.6	
Test Case	Measurement Result (W/kg)		Power Drift (dB)
	10 g Average	1 g Average	
Body, Towards Ground, High frequency with GPRS (See Fig.38)	0.412	0.698	-0.077
Body, Towards Ground, Mid frequency with GPRS (See Fig.39)	0.358	0.607	-0.156
Body, Towards Ground, Low frequency with GPRS (See Fig.40)	0.298	0.503	-0.016
Body, Towards Phantom, High frequency with GPRS (See Fig.41)	0.286	0.465	0.128
Body, Towards Phantom, Mid frequency with GPRS (See Fig.42)	0.252	0.411	-0.167
Body, Towards Phantom, Low frequency with GPRS (See Fig.43)	0.203	0.331	-0.198
Body, Towards Ground, High frequency with Headset_CCB3160A11C1 (See Fig.44)	0.275	0.460	0.136
Body, Towards Ground, High frequency with Headset_CCB3160A11C4 (See Fig.45)	0.257	0.429	0.046
Body, Towards Ground, High frequency with Headset_CCB3160A15C1 (See Fig.46)	0.257	0.437	0.069
Body, Towards Ground, High frequency with Headset_CCB3160A15C4 (See Fig.47)	0.257	0.430	0.027

**Table 16: SAR Values (1900MHz-Body) – Slide down**

Limit of SAR (W/kg)	10 g Average	1g Average	Power Drift (dB)
	2.0	1.6	
Test Case	Measurement Result (W/kg)		Power Drift (dB)
	10 g Average	1 g Average	
Body, Towards Ground, High frequency with GPRS (See Fig.48)	0.262	0.421	0.074

## 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 4.2 of this report. Maximum localized SAR is below exposure limits specified in the relevant standards cited in Clause 4.1 of this test report.

The maximum SAR values are obtained at the case of **GSM 850 Body, Towards Ground, High frequency with GPRS (Table 13)**, and the value are: **0.794(10g), 1.11(1g)**.



## 8 Measurement Uncertainty

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
<b>Measurement system</b>										
1	Probe calibration	B	5.5	N	1	1	1	5.5	5.5	$\infty$
2	Isotropy	B	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	$\infty$
3	Boundary effect	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	$\infty$
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	$\infty$
5	Detection limit	B	1.0	N	1	1	1	0.6	0.6	$\infty$
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	$\infty$
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	$\infty$
8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	$\infty$
9	RF ambient conditions-noise	B	0	R	$\sqrt{3}$	1	1	0	0	$\infty$
10	RF ambient conditions-reflection	B	0	R	$\sqrt{3}$	1	1	0	0	$\infty$
11	Probe positioned mech. restrictions	B	0.4	R	$\sqrt{3}$	1	1	0.2	0.2	$\infty$
12	Probe positioning with respect to phantom shell	B	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	$\infty$
13	Post-processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	$\infty$
<b>Test sample related</b>										
14	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
15	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
16	Drift of output power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	$\infty$
<b>Phantom and set-up</b>										
17	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	$\infty$
18	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	$\infty$
19	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43
20	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	$\infty$
21	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521
Combined standard uncertainty		$u_c = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$						9.25	9.12	257

Expanded uncertainty (confidence interval of 95 %)	$u_e = 2u_c$					18.5	18.2	
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## 9 MAIN TEST INSTRUMENTS

**Table 17: List of Main Instruments**

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	E5071C	MY46110673	February 15, 2011	One year
02	Power meter	NRVD	102083	September 11, 2011	One year
03	Power sensor	NRV-Z5	100595		
04	Signal Generator	E4438C	MY49070393	November 13, 2010	One Year
05	Amplifier	VTL5400	0505	No Calibration Requested	
06	BTS	8960	MY48365192	November 18, 2010	One year
07	E-field Probe	SPEAG ES3DV3	3149	September 24, 2011	One year
08	DAE	SPEAG DAE4	771	November 21, 2010	One year
09	Dipole Validation Kit	SPEAG D835V2	443	February 26, 2010	Two years
10	Dipole Validation Kit	SPEAG D1900V2	541	February 26, 2010	Two years

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

## ANNEX A MEASUREMENT PROCESS

The evaluation was performed with the following procedure:

Step 1: Measurement of the SAR value at a fixed location above the reference point was measured and was used as a reference value for assessing the power drop.

Step 2: The SAR distribution at the exposed side of the phantom was measured at a distance of 3.9 mm from the inner surface of the shell. The area covered the entire dimension of the flat phantom and the horizontal grid spacing was 10 mm x 10 mm. Based on this data, the area of the maximum absorption was determined by spline interpolation.

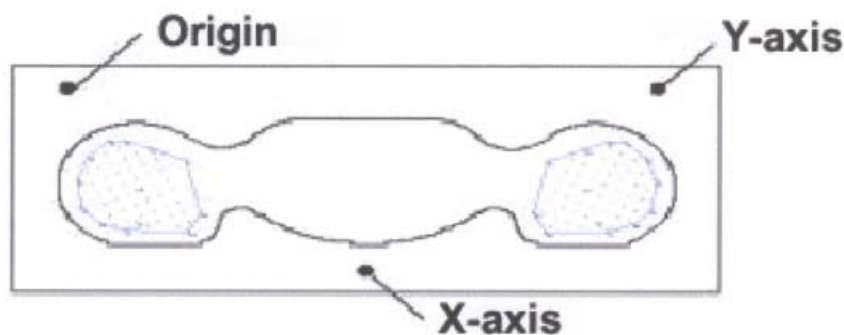
Step 3: Around this point, a volume of 30 mm x 30 mm x 30 mm was assessed by measuring 7 x 7x 7 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

a. The data at the surface were extrapolated, since the center of the dipoles is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2 mm. The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip.

b. The maximum interpolated value was searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1g or 10g) were computed using the 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot"-condition (in x ~ y and z-directions). The volume was integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the average.

c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

Step 4: Re-measurement the SAR value at the same location as in Step 1. If the value changed by more than 5%, the evaluation is repeated.

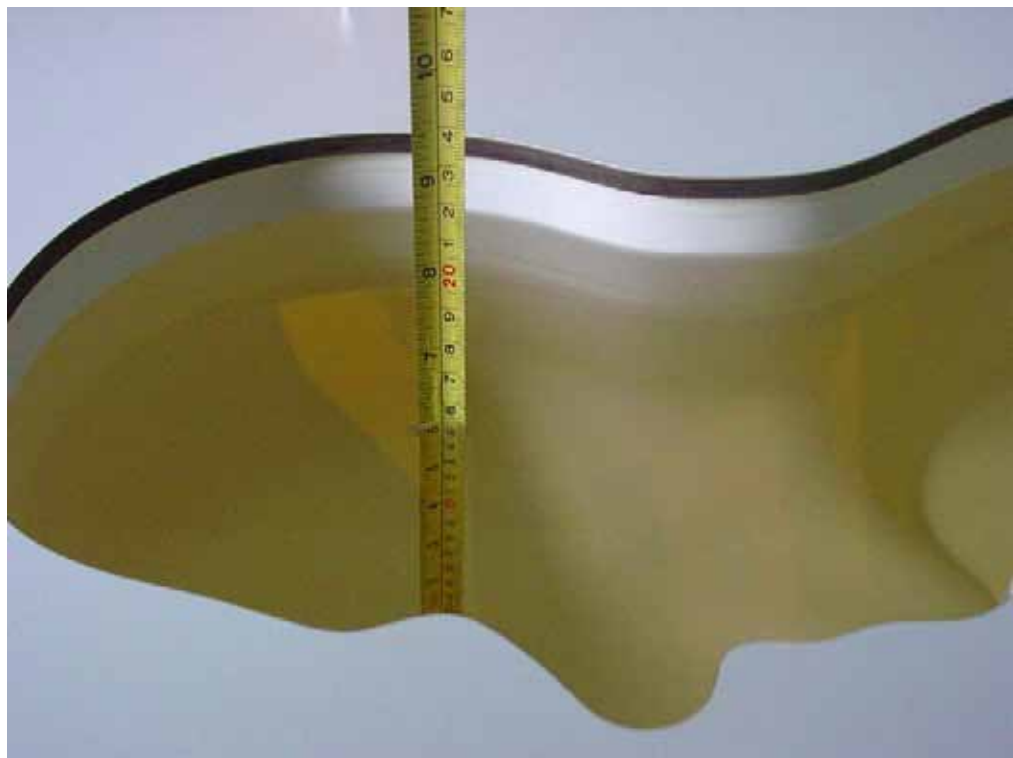


Picture A: SAR Measurement Points in Area Scan

**ANNEX B TEST LAYOUT**



**Picture B1: Specific Absorption Rate Test Layout**



**Picture B2: Liquid depth in the Flat Phantom (850 MHz)**



**Picture B3 Liquid depth in the Flat Phantom (1900MHz)**



**Picture B4: Left Hand Touch Cheek Position – Slide down**



**Picture B5: Left Hand Tilt 15° Position – Slide down**



**Picture B6: Right Hand Touch Cheek Position – Slide down**



**Picture B7: Right Hand Tilt 15° Position – Slide down**



**Picture B8: Left Hand Touch Cheek Position – Slide up**



**Picture B9: Left Hand Tilt 15° Position – Slide up**

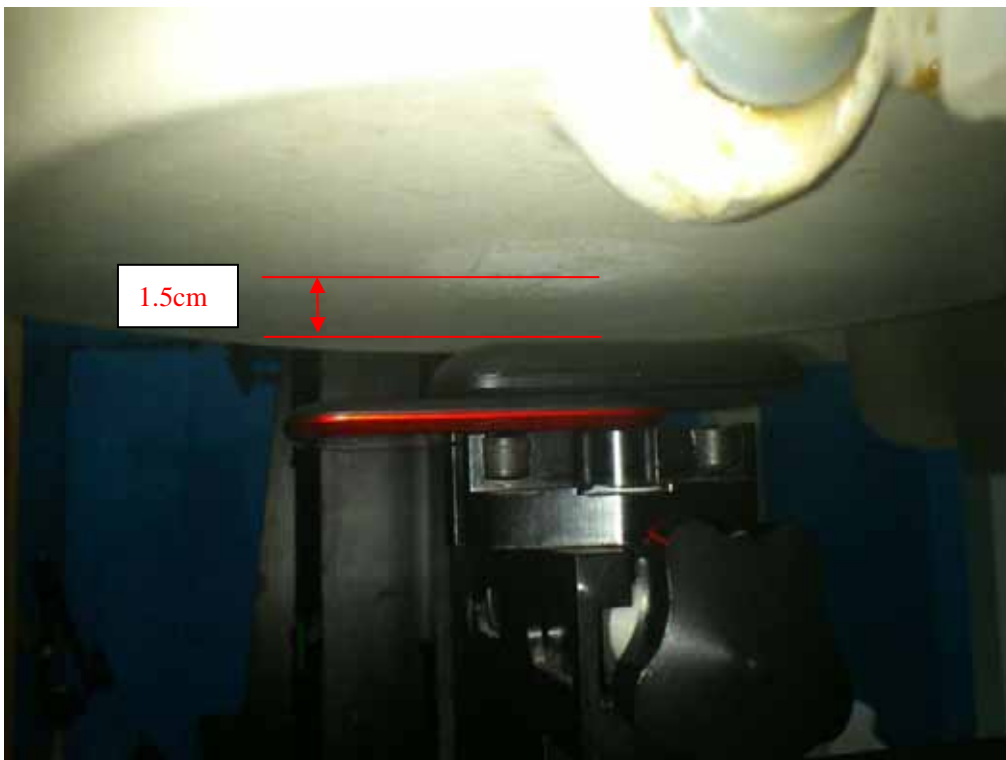


**Picture B10: Right Hand Touch Cheek Position – Slide up**

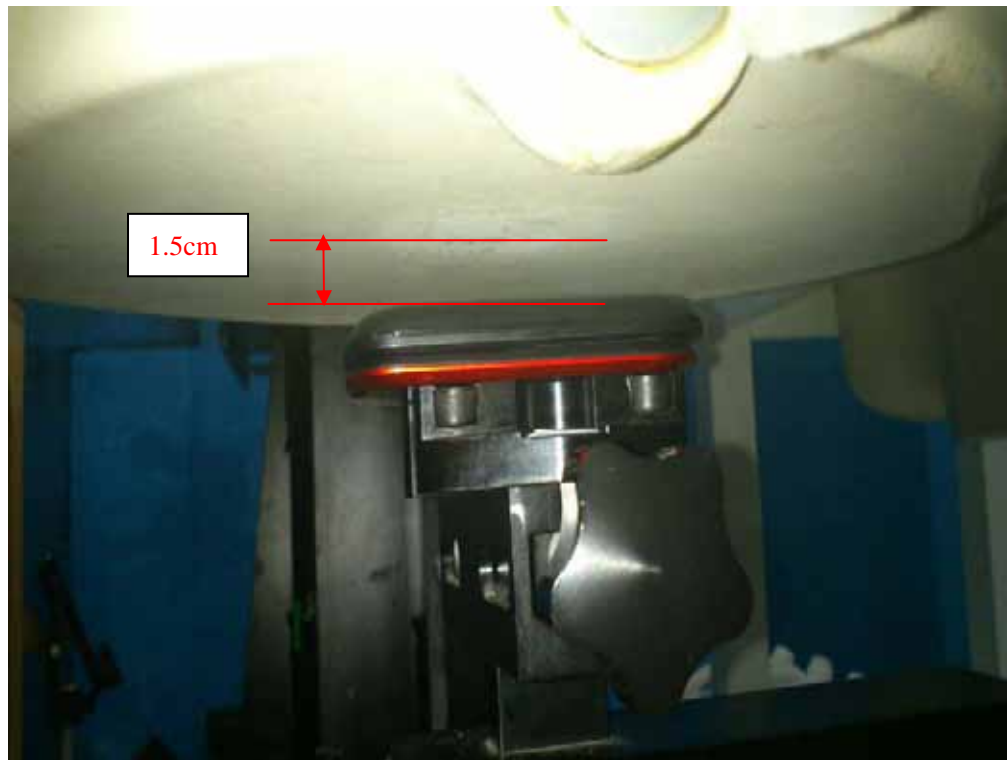




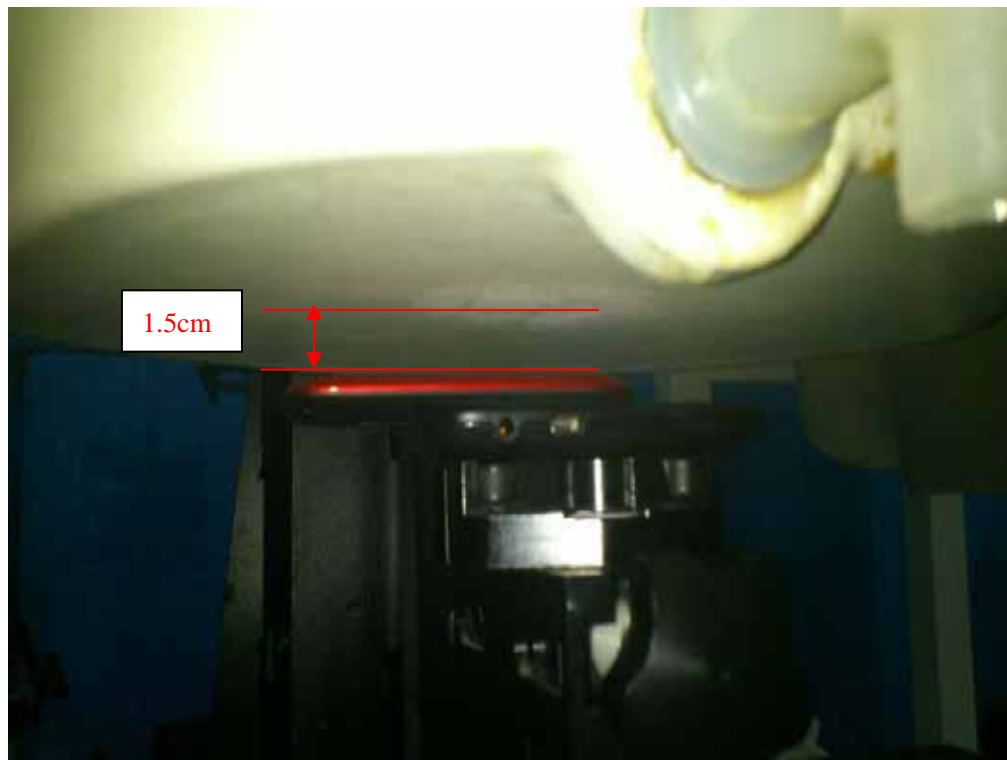
Picture B11: Right Hand Tilt 15° Position – Slide up



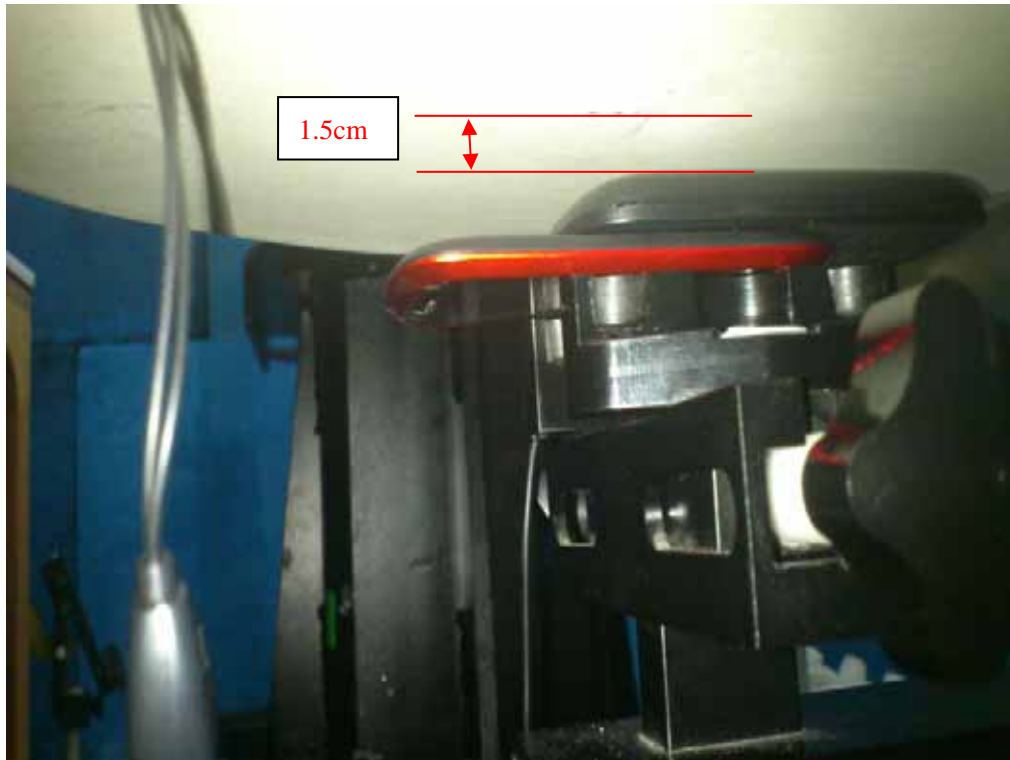
Picture B12: Body-worn Position (towards ground, the distance from handset to the bottom of the Phantom is 1.5cm) – Slide up



Picture B13: Body-worn Position (towards ground, the distance from handset to the bottom of the Phantom is 1.5cm) – Slide down



Picture B14: Body-worn Position (towards phantom, the distance from handset to the bottom of the Phantom is 1.5cm) – Slide up



**Picture B15: Body-worn Position with Headset (towards ground, the distance from handset to the bottom of the Phantom is 1.5cm) – Slide up**

## ANNEX C GRAPH RESULTS

### 850 Left Cheek High – Slide up

Date/Time: 2011-11-10 8:32:15

Electronics: DAE4 Sn771

Medium: Head 850 MHz

Medium parameters used (interpolated):  $f = 848.8$  MHz;  $\sigma = 0.90$  mho/m;  $\epsilon_r = 40.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

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

Probe: ES3DV3 - SN3149 ConvF(6.56, 6.56, 6.56)

**Cheek High/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

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

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

Reference Value = 5.83 V/m; Power Drift = 0.130 dB

Peak SAR (extrapolated) = 0.857 W/kg

**SAR(1 g) = 0.673 mW/g; SAR(10 g) = 0.490 mW/g**

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

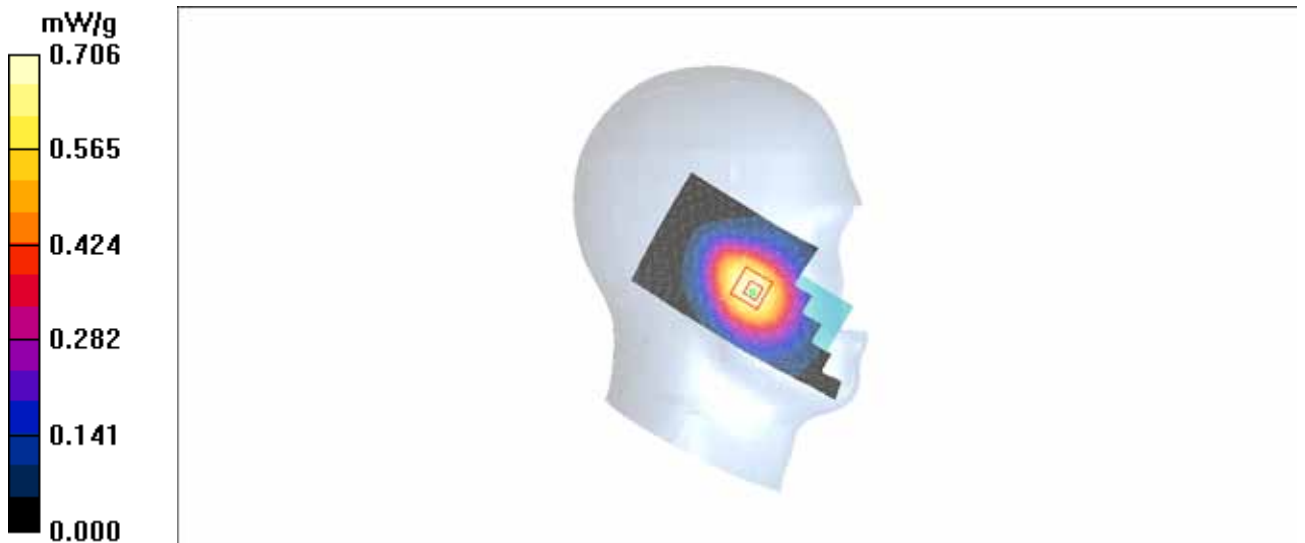
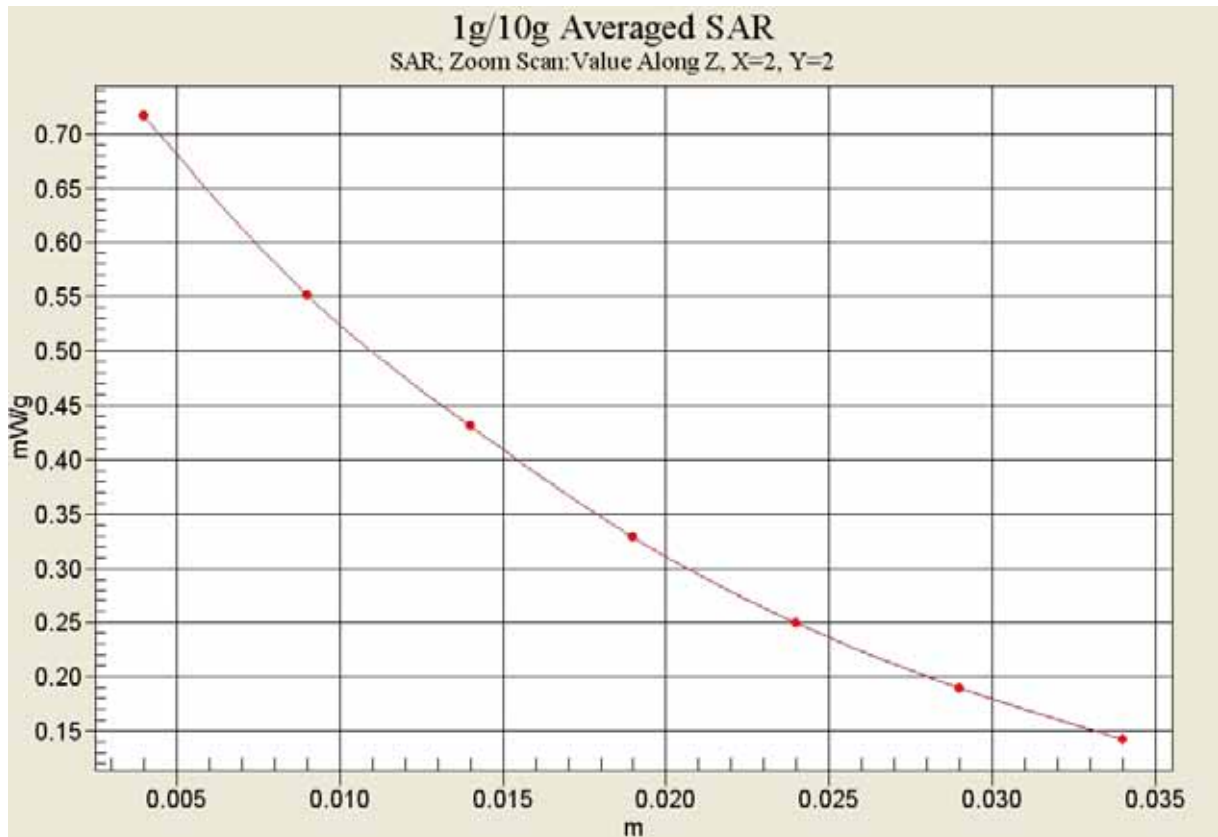


Fig. 1 850MHz CH251



**Fig. 1-1 Z-Scan at power reference point (850 MHz CH251)**

**850 Left Cheek Middle – Slide up**

Date/Time: 2011-11-10 8:46:33

Electronics: DAE4 Sn771

Medium: Head 850 MHz

Medium parameters used (interpolated):  $f = 836.6$  MHz;  $\sigma = 0.888$  mho/m;  $\epsilon_r = 40.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

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

Probe: ES3DV3 - SN3149 ConvF(6.56, 6.56, 6.56)

**Cheek Middle/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

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

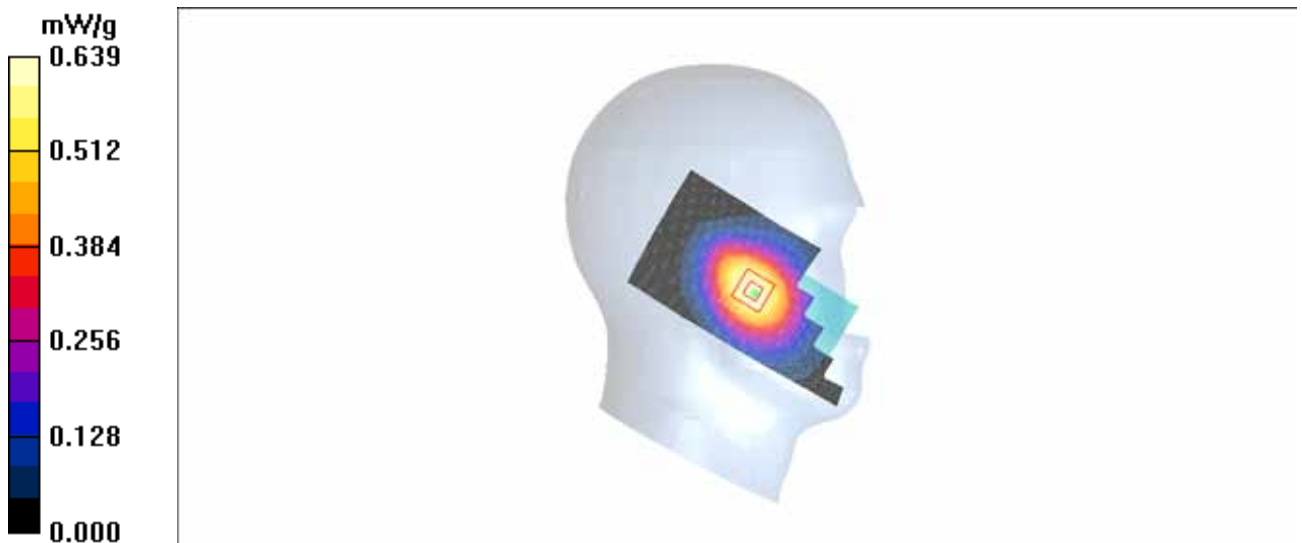
**Cheek Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.73 V/m; Power Drift = -0.159 dB

Peak SAR (extrapolated) = 0.759 W/kg

**SAR(1 g) = 0.598 mW/g; SAR(10 g) = 0.437 mW/g**

Maximum value of SAR (measured) = 0.633 mW/g



**Fig. 2 850 MHz CH190**

**850 Left Cheek Low – Slide up**

Date/Time: 2011-11-10 9:00:52

Electronics: DAE4 Sn771

Medium: Head 850 MHz

Medium parameters used:  $f = 825 \text{ MHz}$ ;  $\sigma = 0.876 \text{ mho/m}$ ;  $\epsilon_r = 40.5$ ;  $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature:  $23.0^\circ\text{C}$       Liquid Temperature:  $22.5^\circ\text{C}$

Communication System: GSM 850 Frequency:  $824.2 \text{ MHz}$  Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(6.56, 6.56, 6.56)

**Cheek Low/Area Scan (61x111x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) =  $0.607 \text{ mW/g}$

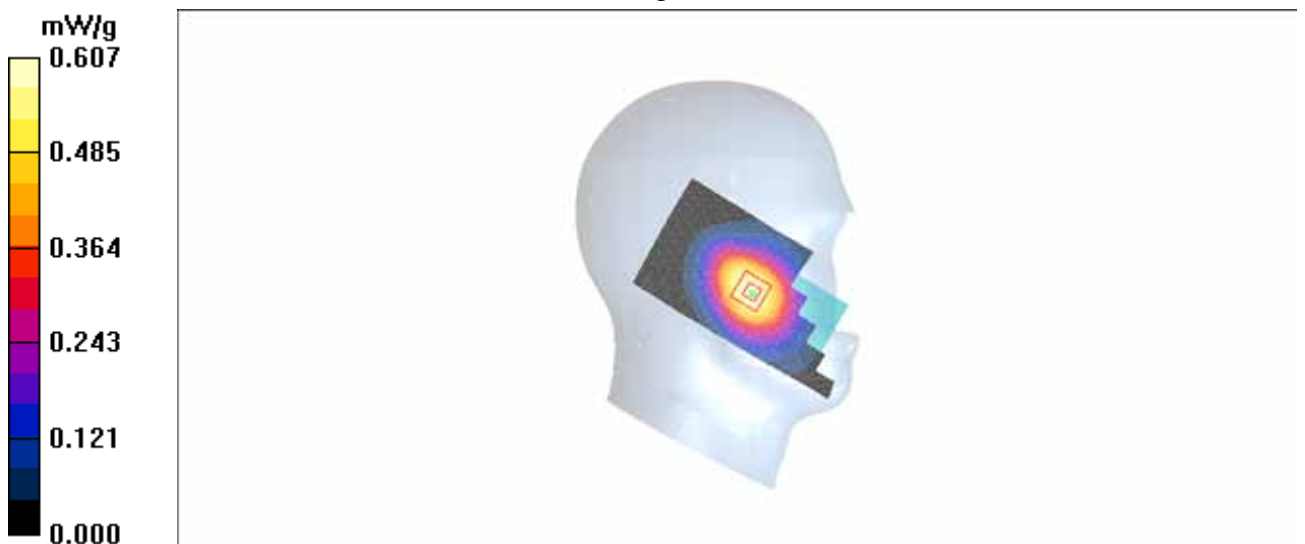
**Cheek Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $5.40 \text{ V/m}$ ; Power Drift =  $-0.040 \text{ dB}$

Peak SAR (extrapolated) =  $0.711 \text{ W/kg}$

**SAR(1 g) =  $0.564 \text{ mW/g}$ ; SAR(10 g) =  $0.414 \text{ mW/g}$**

Maximum value of SAR (measured) =  $0.597 \text{ mW/g}$



**Fig. 3 850 MHz CH128**

**850 Left Tilt High – Slide up**

Date/Time: 2011-11-10 9:15:18

Electronics: DAE4 Sn771

Medium: Head 850 MHz

Medium parameters used (interpolated):  $f = 848.8$  MHz;  $\sigma = 0.90$  mho/m;  $\epsilon_r = 40.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

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

Probe: ES3DV3 - SN3149 ConvF(6.56, 6.56, 6.56)

**Tilt High/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.278 mW/g

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

Reference Value = 7.19 V/m; Power Drift = -0.043 dB

Peak SAR (extrapolated) = 0.334 W/kg

**SAR(1 g) = 0.258 mW/g; SAR(10 g) = 0.189 mW/g**

Maximum value of SAR (measured) = 0.272 mW/g

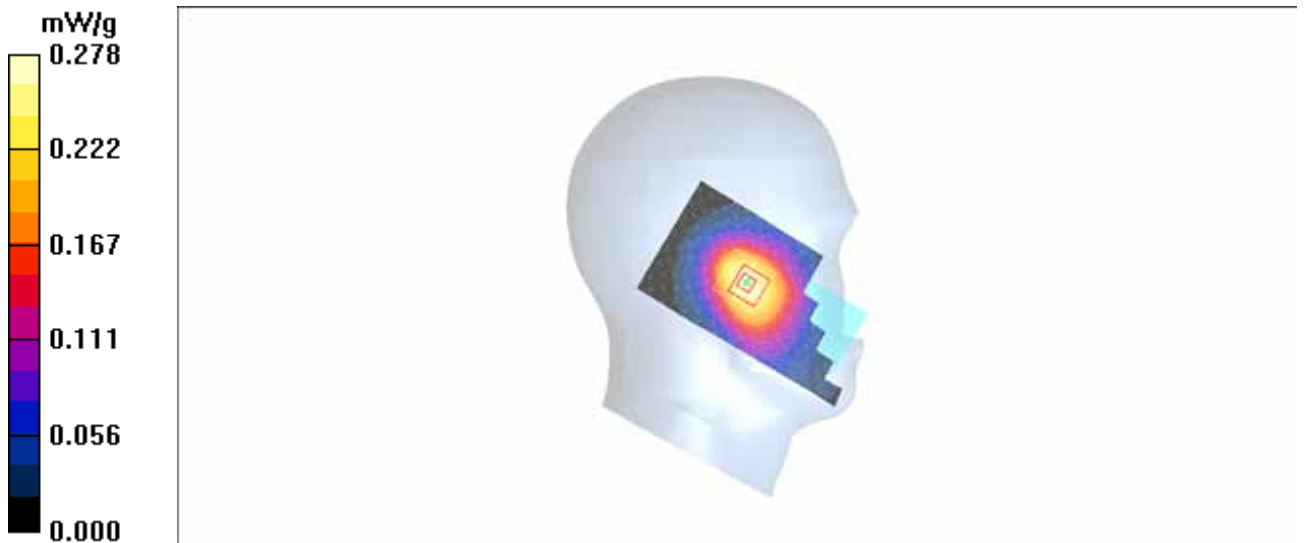


Fig.4 850 MHz CH251



**850 Left Tilt Middle – Slide up**

Date/Time: 2011-11-10 9:29:36

Electronics: DAE4 Sn771

Medium: Head 850 MHz

Medium parameters used (interpolated):  $f = 836.6$  MHz;  $\sigma = 0.888$  mho/m;  $\epsilon_r = 40.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

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

Probe: ES3DV3 - SN3149 ConvF(6.56, 6.56, 6.56)

**Tilt Middle/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.269 mW/g

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

Reference Value = 7.19 V/m; Power Drift = -0.021 dB

Peak SAR (extrapolated) = 0.317 W/kg

**SAR(1 g) = 0.247 mW/g; SAR(10 g) = 0.182 mW/g**

Maximum value of SAR (measured) = 0.260 mW/g

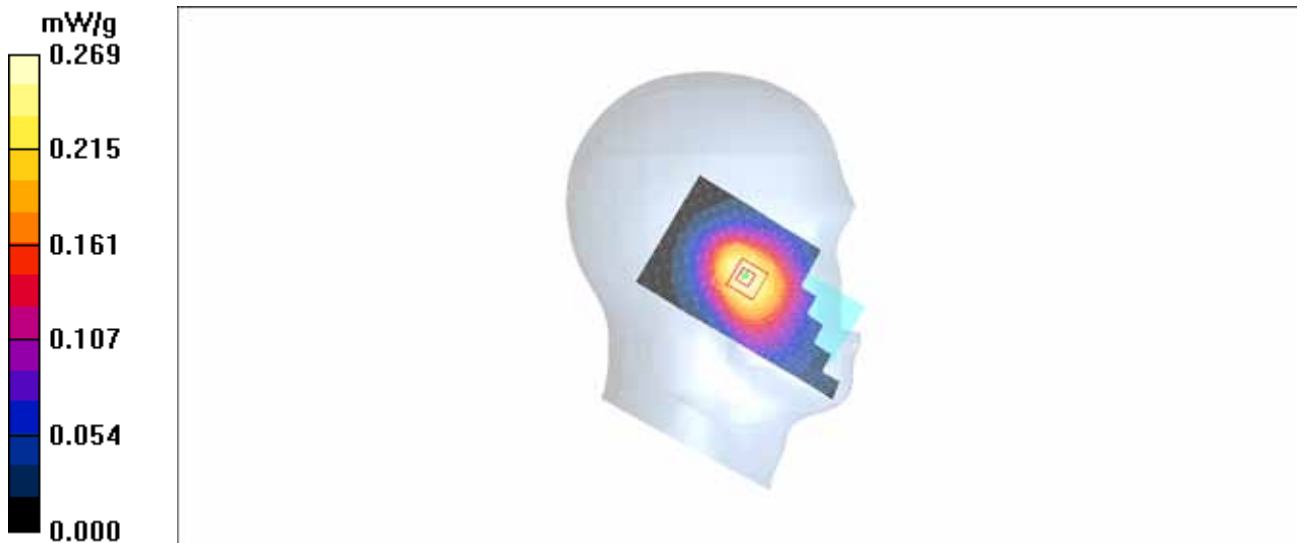


Fig.5 850 MHz CH190

**850 Left Tilt Low – Slide up**

Date/Time: 2011-11-10 9:43:57

Electronics: DAE4 Sn771

Medium: Head 850 MHz

Medium parameters used:  $f = 825 \text{ MHz}$ ;  $\sigma = 0.876 \text{ mho/m}$ ;  $\epsilon_r = 40.5$ ;  $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature:  $23.0^\circ\text{C}$       Liquid Temperature:  $22.5^\circ\text{C}$

Communication System: GSM 850 Frequency:  $824.2 \text{ MHz}$  Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(6.56, 6.56, 6.56)

**Tilt Low/Area Scan (61x111x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) =  $0.256 \text{ mW/g}$

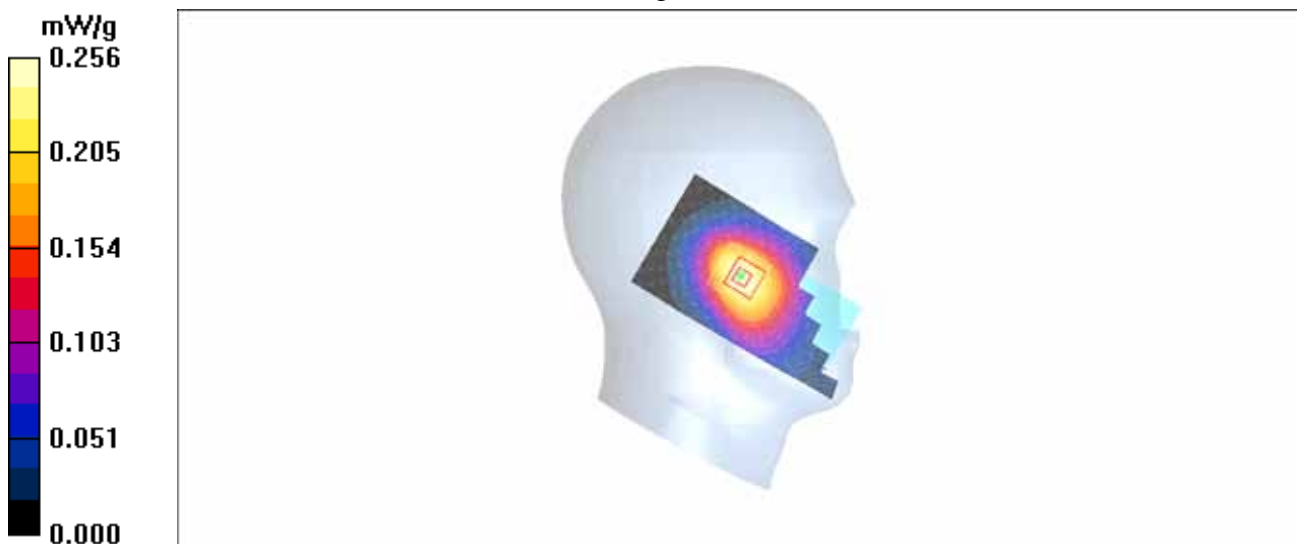
**Tilt Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $7.18 \text{ V/m}$ ; Power Drift =  $-0.133 \text{ dB}$

Peak SAR (extrapolated) =  $0.299 \text{ W/kg}$

**SAR(1 g) =  $0.235 \text{ mW/g}$ ; SAR(10 g) =  $0.174 \text{ mW/g}$**

Maximum value of SAR (measured) =  $0.247 \text{ mW/g}$



**Fig. 6 850 MHz CH128**

**850 Right Cheek High – Slide up**

Date/Time: 2011-11-10 9:58:40

Electronics: DAE4 Sn771

Medium: Head 850 MHz

Medium parameters used (interpolated):  $f = 848.8$  MHz;  $\sigma = 0.90$  mho/m;  $\epsilon_r = 40.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

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

Probe: ES3DV3 - SN3149 ConvF(6.56, 6.56, 6.56)

**Cheek High/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.560 mW/g

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

Reference Value = 5.52 V/m; Power Drift = 0.165 dB

Peak SAR (extrapolated) = 0.711 W/kg

**SAR(1 g) = 0.554 mW/g; SAR(10 g) = 0.399 mW/g**

Maximum value of SAR (measured) = 0.587 mW/g



**Fig. 7 850 MHz CH251**

### 850 Right Cheek Middle – Slide up

Date/Time: 2011-11-10 10:13:01

Electronics: DAE4 Sn771

Medium: Head 850 MHz

Medium parameters used (interpolated):  $f = 836.6$  MHz;  $\sigma = 0.888$  mho/m;  $\epsilon_r = 40.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

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

Probe: ES3DV3 - SN3149 ConvF(6.56, 6.56, 6.56)

**Cheek Middle/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.508 mW/g

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

Reference Value = 5.48 V/m; Power Drift = 0.030 dB

Peak SAR (extrapolated) = 0.623 W/kg

**SAR(1 g) = 0.482 mW/g; SAR(10 g) = 0.349 mW/g**

Maximum value of SAR (measured) = 0.509 mW/g

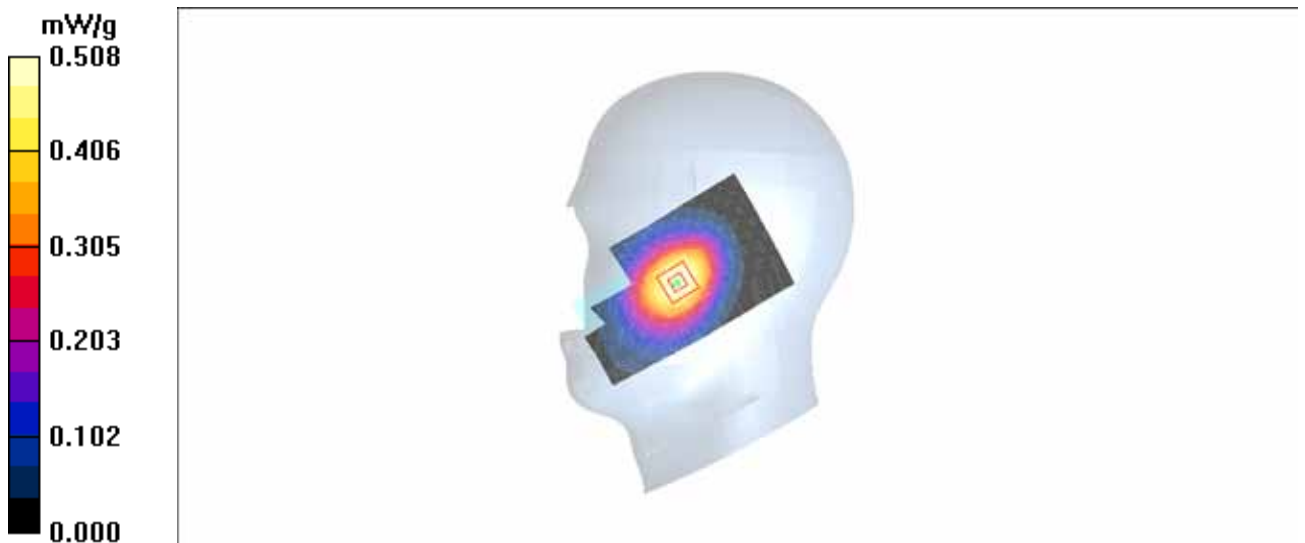


Fig. 8 850 MHz CH190

**850 Right Cheek Low – Slide up**

Date/Time: 2011-11-10 10:27:20

Electronics: DAE4 Sn771

Medium: Head 850 MHz

Medium parameters used:  $f = 825$  MHz;  $\sigma = 0.876$  mho/m;  $\epsilon_r = 40.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

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

Probe: ES3DV3 - SN3149 ConvF(6.56, 6.56, 6.56)

**Cheek Low/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.448 mW/g

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

Reference Value = 5.34 V/m; Power Drift = -0.039 dB

Peak SAR (extrapolated) = 0.536 W/kg

**SAR(1 g) = 0.420 mW/g; SAR(10 g) = 0.306 mW/g**

Maximum value of SAR (measured) = 0.443 mW/g

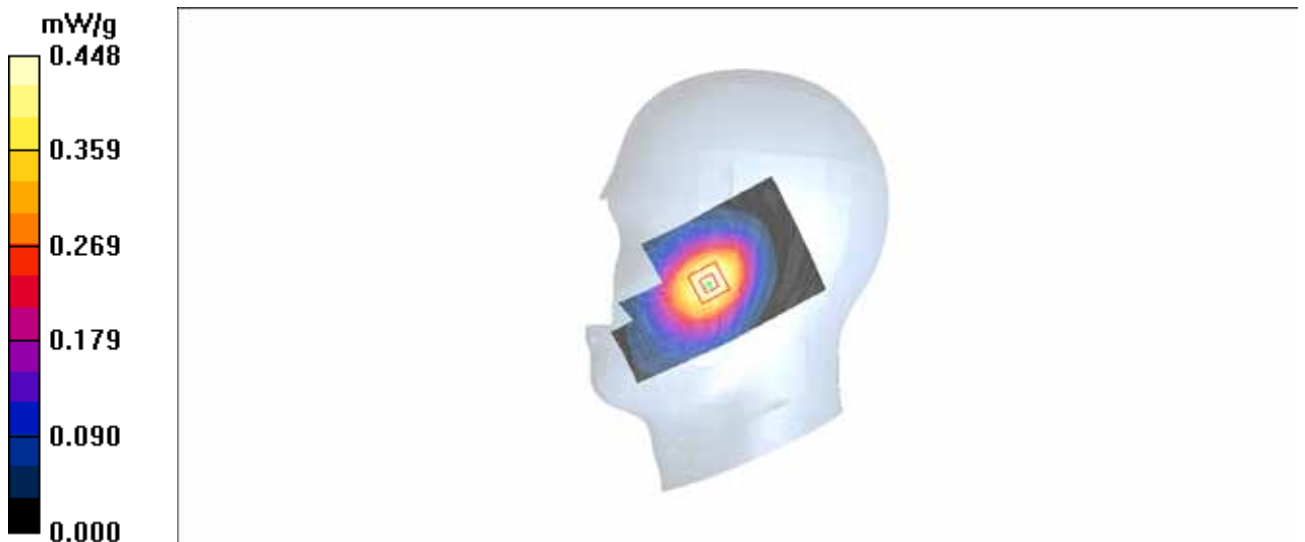


Fig. 9 850 MHz CH128

**850 Right Tilt High – Slide up**

Date/Time: 2011-11-10 10:41:57

Electronics: DAE4 Sn771

Medium: Head 850 MHz

Medium parameters used (interpolated):  $f = 848.8$  MHz;  $\sigma = 0.90$  mho/m;  $\epsilon_r = 40.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

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

Probe: ES3DV3 - SN3149 ConvF(6.56, 6.56, 6.56)

**Tilt High/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

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

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

Reference Value = 10.4 V/m; Power Drift = -0.039 dB

Peak SAR (extrapolated) = 0.451 W/kg

**SAR(1 g) = 0.346 mW/g; SAR(10 g) = 0.250 mW/g**

Maximum value of SAR (measured) = 0.365 mW/g

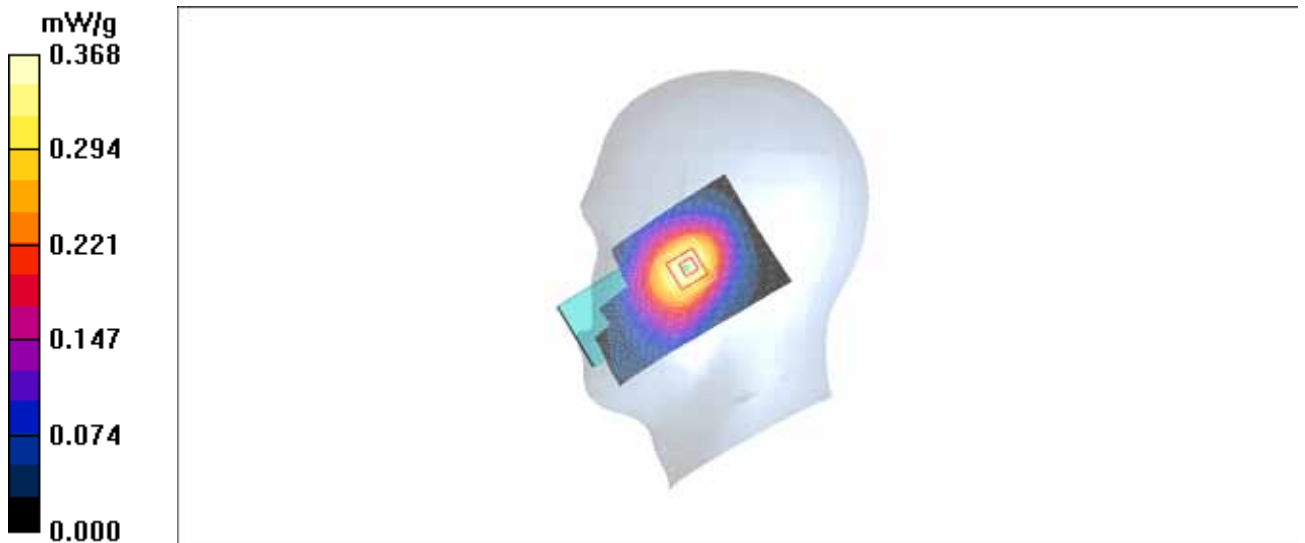


Fig.10 850 MHz CH251

**850 Right Tilt Middle – Slide up**

Date/Time: 2011-11-10 10:56:18

Electronics: DAE4 Sn771

Medium: Head 850 MHz

Medium parameters used (interpolated):  $f = 836.6$  MHz;  $\sigma = 0.888$  mho/m;  $\epsilon_r = 40.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

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

Probe: ES3DV3 - SN3149 ConvF(6.56, 6.56, 6.56)

**Tilt Middle/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.352 mW/g

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

Reference Value = 10.4 V/m; Power Drift = -0.076 dB

Peak SAR (extrapolated) = 0.428 W/kg

**SAR(1 g) = 0.331 mW/g; SAR(10 g) = 0.241 mW/g**

Maximum value of SAR (measured) = 0.349 mW/g

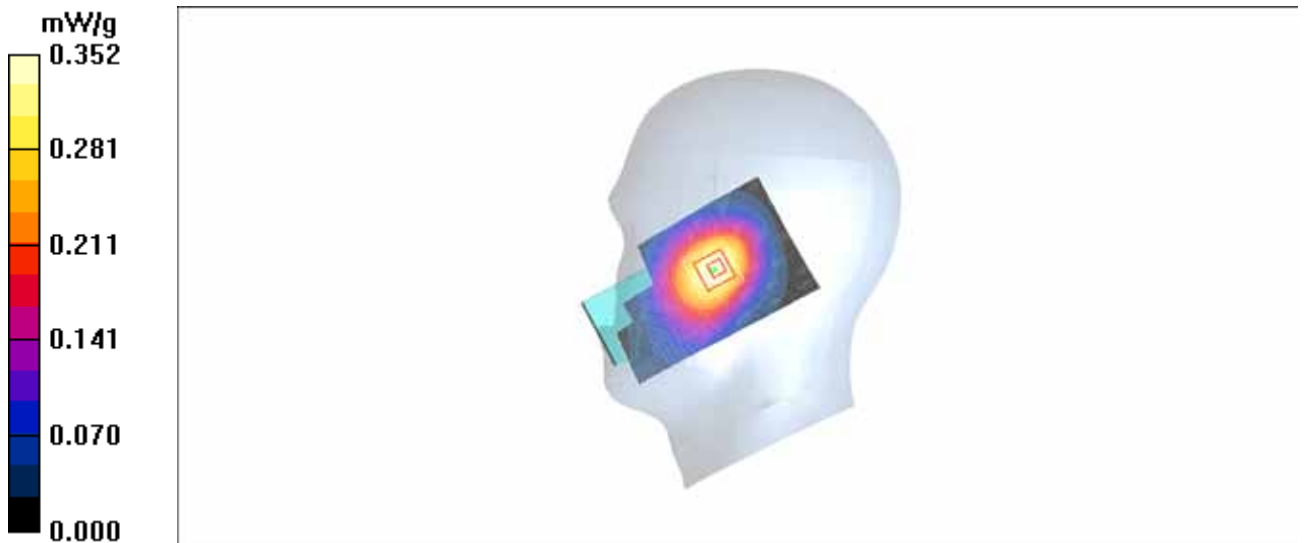


Fig.11 850 MHz CH190

**850 Right Tilt Low – Slide up**

Date/Time: 2011-11-10 11:10:37

Electronics: DAE4 Sn771

Medium: Head 850 MHz

Medium parameters used:  $f = 825 \text{ MHz}$ ;  $\sigma = 0.876 \text{ mho/m}$ ;  $\epsilon_r = 40.5$ ;  $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature:  $23.0^\circ\text{C}$       Liquid Temperature:  $22.5^\circ\text{C}$

Communication System: GSM 850 Frequency:  $824.2 \text{ MHz}$  Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(6.56, 6.56, 6.56)

**Tilt Low/Area Scan (61x111x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) =  $0.338 \text{ mW/g}$

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

Reference Value =  $10.5 \text{ V/m}$ ; Power Drift =  $-0.151 \text{ dB}$

Peak SAR (extrapolated) =  $0.407 \text{ W/kg}$

**SAR(1 g) =  $0.317 \text{ mW/g}$ ; SAR(10 g) =  $0.232 \text{ mW/g}$**

Maximum value of SAR (measured) =  $0.335 \text{ mW/g}$

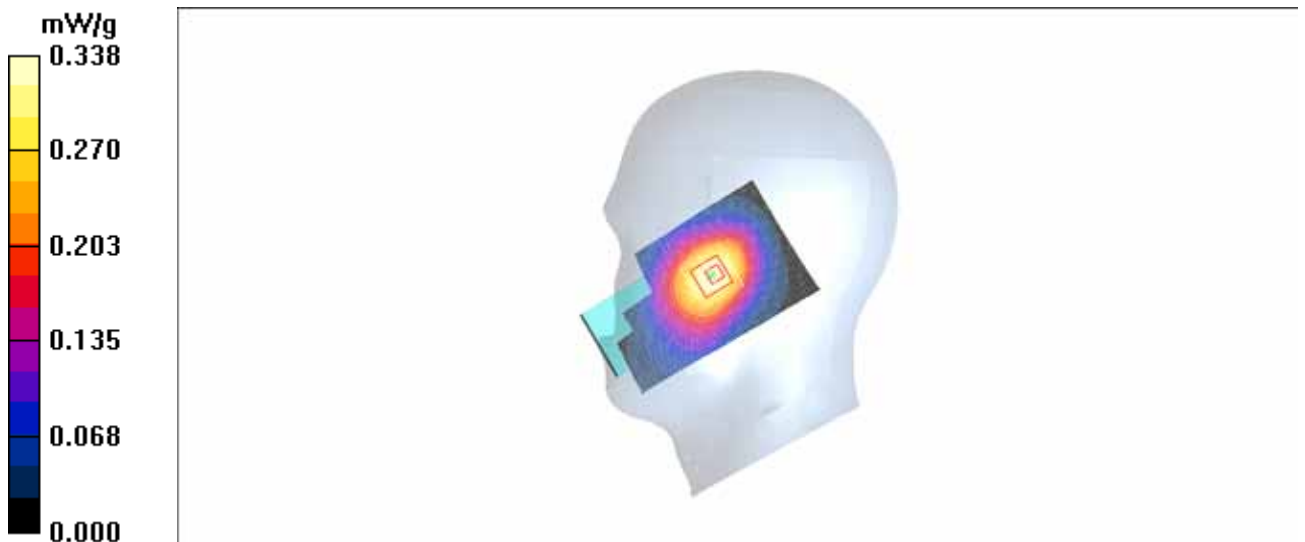


Fig. 12 850 MHz CH128



### 850 Left Cheek High – Slide down

Date/Time: 2011-11-10 11:27:16

Electronics: DAE4 Sn771

Medium: Head 850 MHz

Medium parameters used (interpolated):  $f = 848.8$  MHz;  $\sigma = 0.90$  mho/m;  $\epsilon_r = 40.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

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

Probe: ES3DV3 - SN3149 ConvF(6.56, 6.56, 6.56)

**Cheek High/Area Scan (61x91x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.388 mW/g

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

Reference Value = 7.89 V/m; Power Drift = 0.105 dB

Peak SAR (extrapolated) = 0.457 W/kg

**SAR(1 g) = 0.370 mW/g; SAR(10 g) = 0.277 mW/g**

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

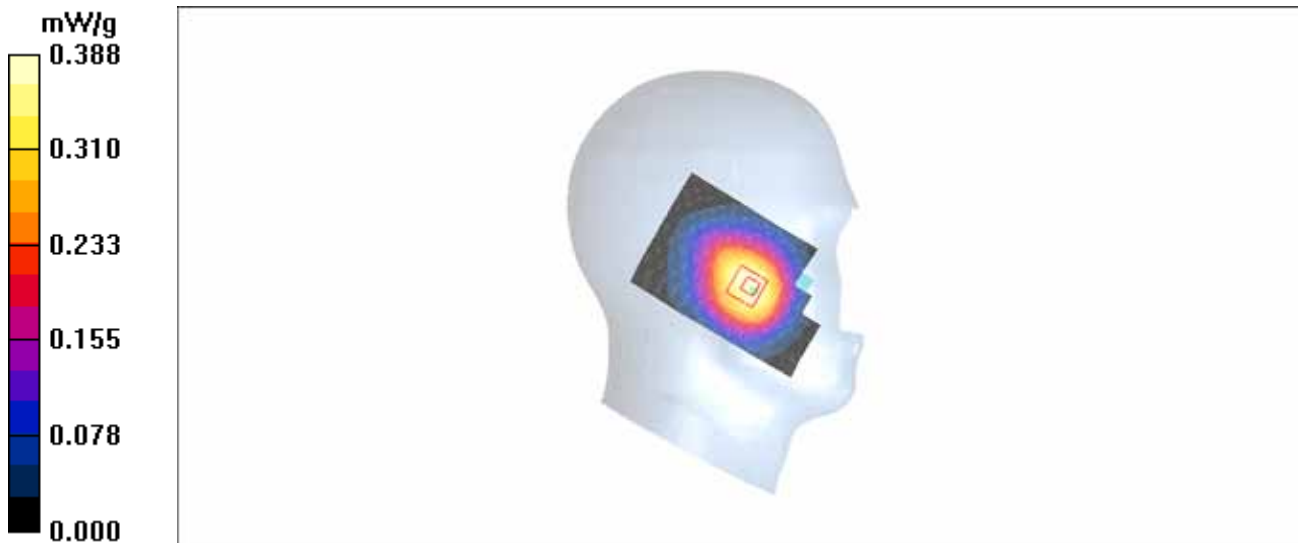


Fig. 13 850MHz CH251

**1900 Left Cheek High – Slide down**

Date/Time: 2011-11-11 8:12:05

Electronics: DAE4 Sn771

Medium: Head 1900 MHz

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.41$  mho/m;  $\epsilon_r = 38.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 1900MHz Frequency: 1909.8 MHz Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

**Cheek High/Area Scan (61x91x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.858 mW/g

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

Reference Value = 12.1 V/m; Power Drift = 0.053 dB

Peak SAR (extrapolated) = 1.16 W/kg

**SAR(1 g) = 0.794 mW/g; SAR(10 g) = 0.491 mW/g**

Maximum value of SAR (measured) = 0.877 mW/g

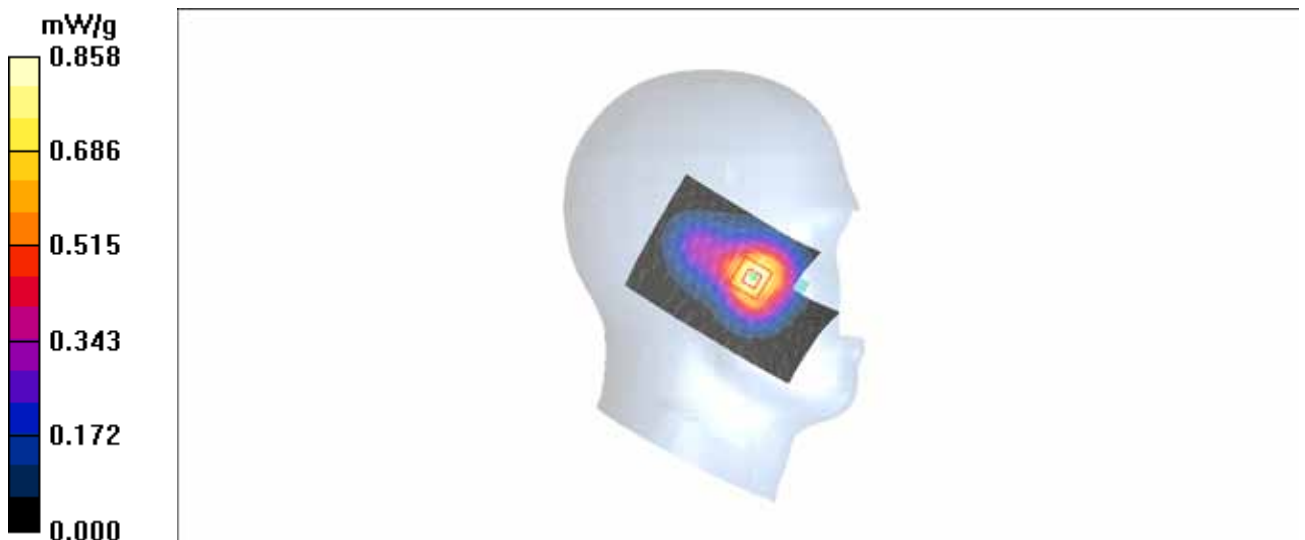


Fig. 14 1900 MHz CH810

**1900 Left Cheek Middle – Slide down**

Date/Time: 2011-11-11 8:26:23

Electronics: DAE4 Sn771

Medium: Head 1900 MHz

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.39$  mho/m;  $\epsilon_r = 39.0$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 1900MHz Frequency: 1880 MHz Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

**Cheek Middle/Area Scan (61x91x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.801 mW/g

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

Reference Value = 10.4 V/m; Power Drift = 0.126 dB

Peak SAR (extrapolated) = 1.11 W/kg

**SAR(1 g) = 0.751 mW/g; SAR(10 g) = 0.463 mW/g**

Maximum value of SAR (measured) = 0.833 mW/g

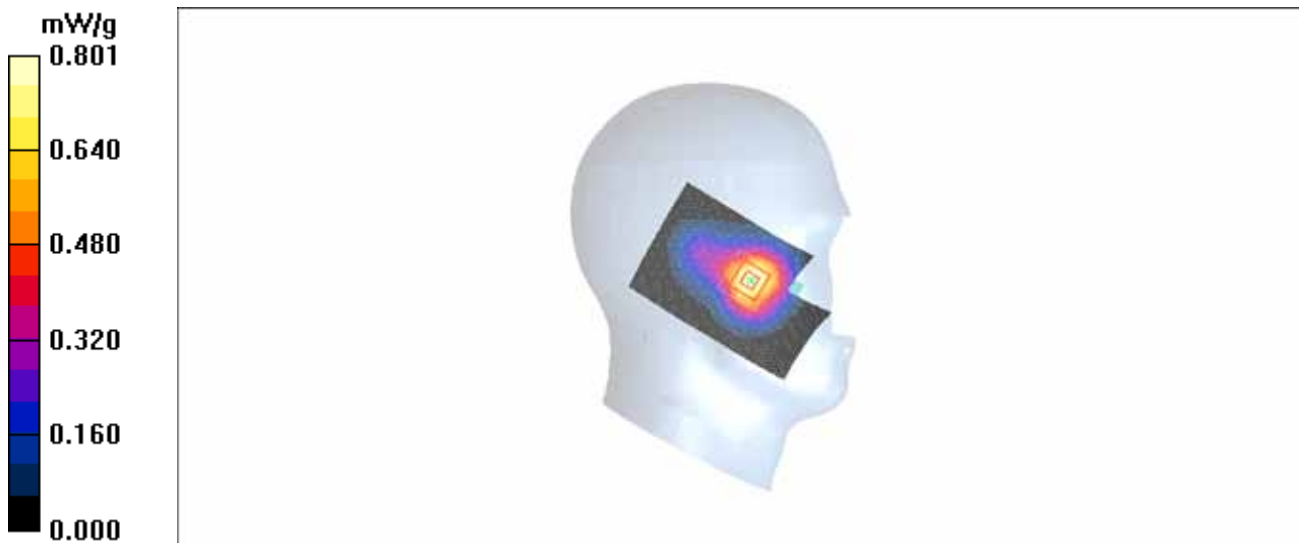


Fig. 15 1900 MHz CH661

**1900 Left Cheek Low – Slide down**

Date/Time: 2011-11-11 8:40:46

Electronics: DAE4 Sn771

Medium: Head 1900 MHz

Medium parameters used (interpolated):  $f = 1850.2$  MHz;  $\sigma = 1.36$  mho/m;  $\epsilon_r = 39.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 1900MHz Frequency: 1850.2 MHz Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

**Cheek Low/Area Scan (61x91x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.623 mW/g

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

Reference Value = 8.62 V/m; Power Drift = 0.030 dB

Peak SAR (extrapolated) = 0.841 W/kg

**SAR(1 g) = 0.579 mW/g; SAR(10 g) = 0.360 mW/g**

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

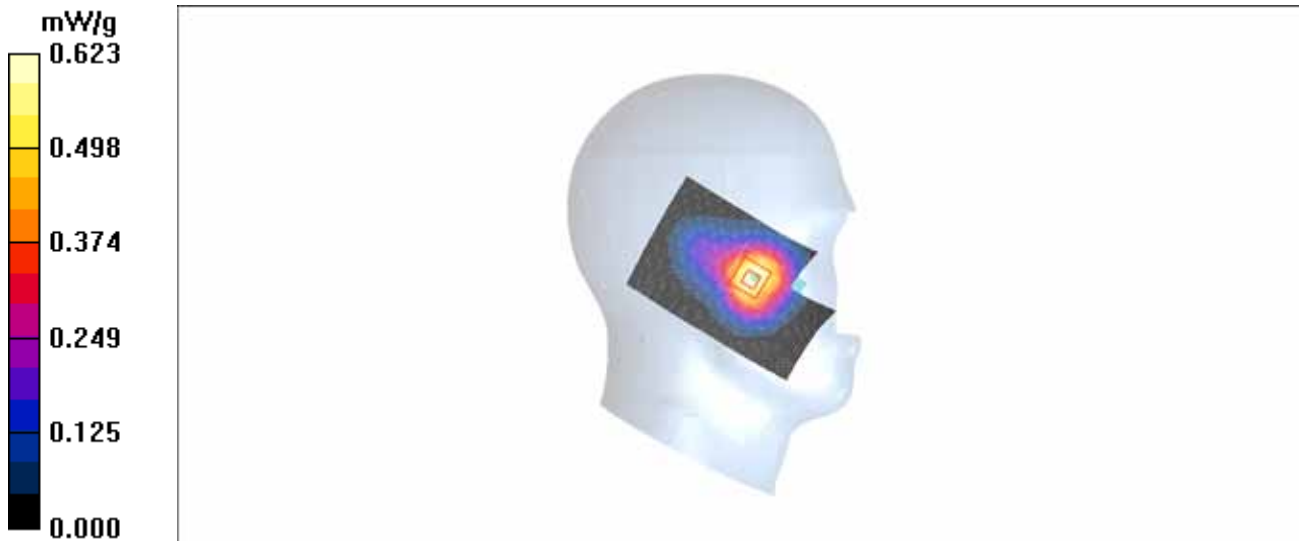


Fig. 16 1900 MHz CH512

**1900 Left Tilt High – Slide down**

Date/Time: 2011-11-11 8:55:17

Electronics: DAE4 Sn771

Medium: Head 1900 MHz

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.41$  mho/m;  $\epsilon_r = 38.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 1900MHz Frequency: 1909.8 MHz Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

**Tilt High/Area Scan (61x91x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.340 mW/g

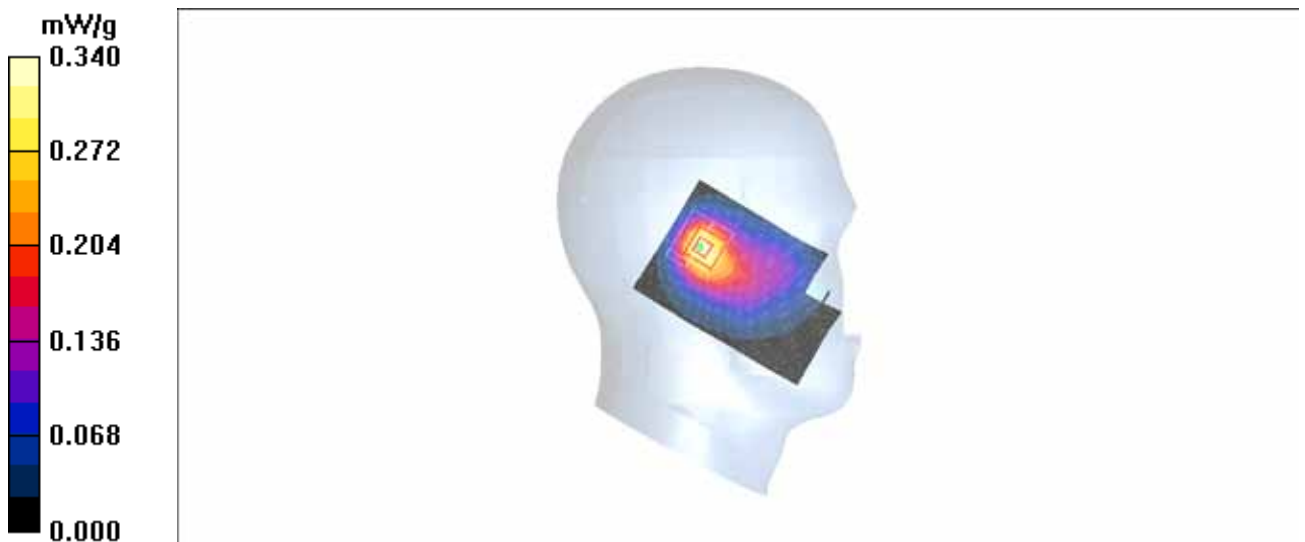
**Tilt High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 15.0 V/m; Power Drift = 0.016 dB

Peak SAR (extrapolated) = 0.459 W/kg

**SAR(1 g) = 0.307 mW/g; SAR(10 g) = 0.189 mW/g**

Maximum value of SAR (measured) = 0.333 mW/g



**Fig.17 1900 MHz CH810**

**1900 Left Tilt Middle – Slide down**

Date/Time: 2011-11-11 9:09:36

Electronics: DAE4 Sn771

Medium: Head 1900 MHz

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.39$  mho/m;  $\epsilon_r = 39.0$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 1900MHz Frequency: 1880 MHz Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

**Tilt Middle/Area Scan (61x91x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.289 mW/g

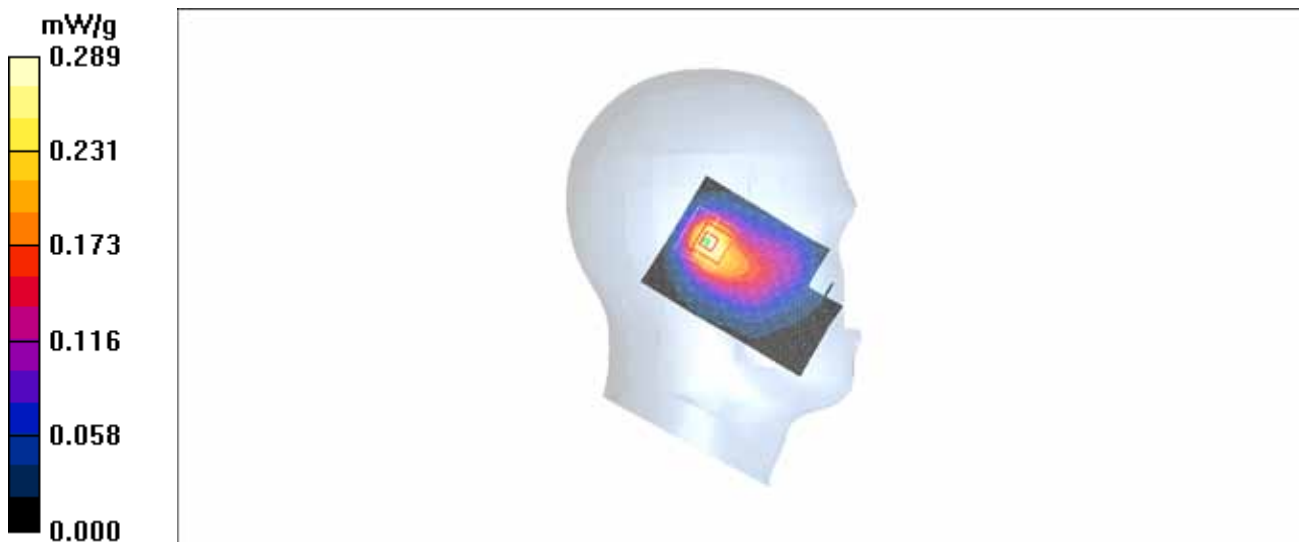
**Tilt Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 13.9 V/m; Power Drift = 0.016 dB

Peak SAR (extrapolated) = 0.387 W/kg

**SAR(1 g) = 0.260 mW/g; SAR(10 g) = 0.163 mW/g**

Maximum value of SAR (measured) = 0.279 mW/g



**Fig. 18 1900 MHz CH661**

**1900 Left Tilt Low – Slide down**

Date/Time: 2011-11-11 9:23:55

Electronics: DAE4 Sn771

Medium: Head 1900 MHz

Medium parameters used (interpolated):  $f = 1850.2$  MHz;  $\sigma = 1.36$  mho/m;  $\epsilon_r = 39.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 1900MHz Frequency: 1850.2 MHz Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

**Tilt Low/Area Scan (61x91x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.216 mW/g

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

Reference Value = 12.1 V/m; Power Drift = -0.012 dB

Peak SAR (extrapolated) = 0.283 W/kg

**SAR(1 g) = 0.195 mW/g; SAR(10 g) = 0.124 mW/g**

Maximum value of SAR (measured) = 0.211 mW/g

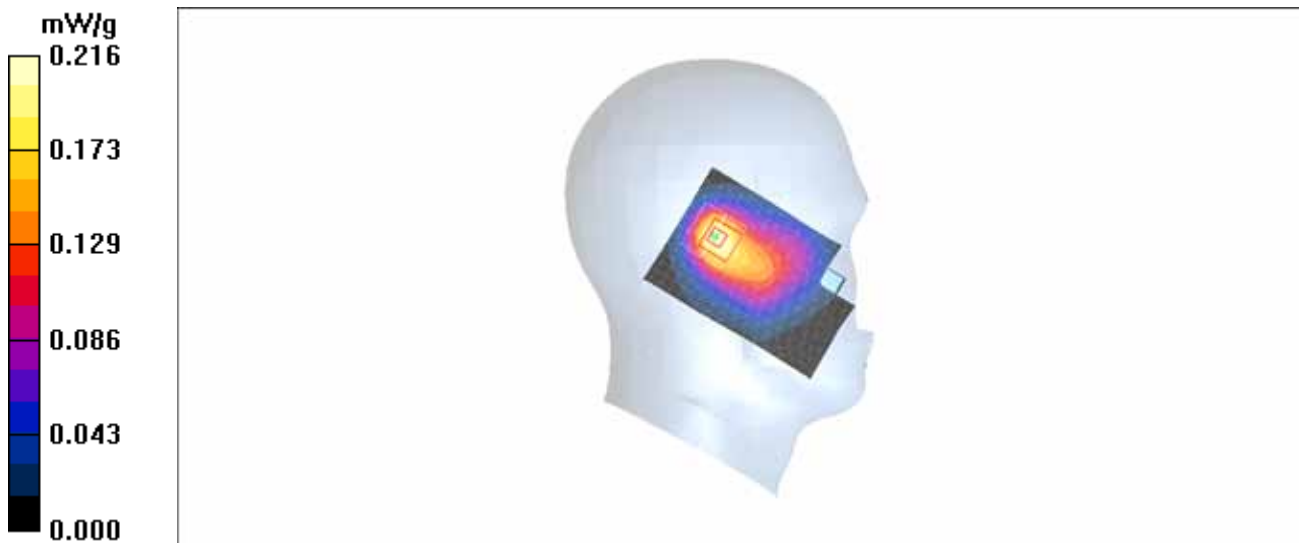


Fig. 19 1900 MHz CH512

**1900 Right Cheek High – Slide down**

Date/Time: 2011-11-11 9:38:35

Electronics: DAE4 Sn771

Medium: Head 1900 MHz

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.41$  mho/m;  $\epsilon_r = 38.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 1900MHz Frequency: 1909.8 MHz Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

**Cheek High/Area Scan (61x91x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.966 mW/g

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

Reference Value = 9.60 V/m; Power Drift = -0.011 dB

Peak SAR (extrapolated) = 1.35 W/kg

**SAR(1 g) = 0.892 mW/g; SAR(10 g) = 0.533 mW/g**

Maximum value of SAR (measured) = 0.960 mW/g

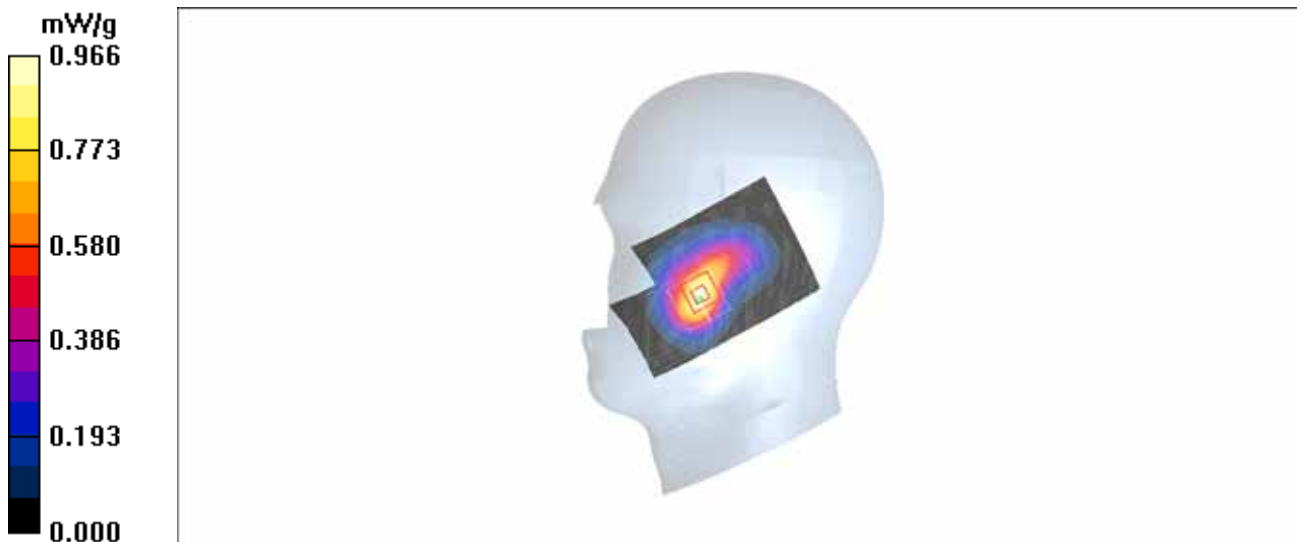
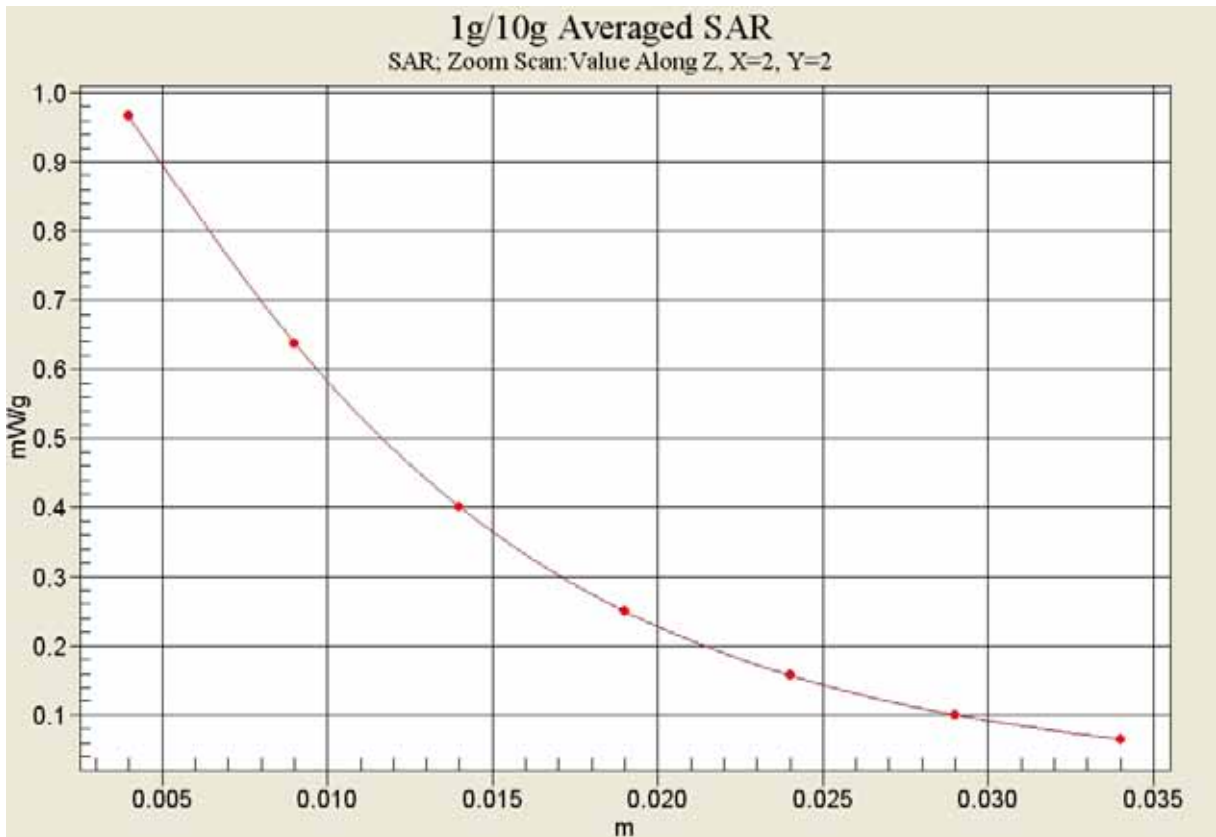


Fig. 20 1900 MHz CH810





**Fig. 20-1 Z-Scan at power reference point (1900 MHz CH810)**

**1900 Right Cheek Middle – Slide down**

Date/Time: 2011-11-11 9:52:51

Electronics: DAE4 Sn771

Medium: Head 1900 MHz

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.39$  mho/m;  $\epsilon_r = 39.0$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 1900MHz Frequency: 1880 MHz Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

**Cheek Middle/Area Scan (61x91x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.915 mW/g

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

Reference Value = 8.27 V/m; Power Drift = -0.114 dB

Peak SAR (extrapolated) = 1.25 W/kg

**SAR(1 g) = 0.833 mW/g; SAR(10 g) = 0.497 mW/g**

Maximum value of SAR (measured) = 0.892 mW/g

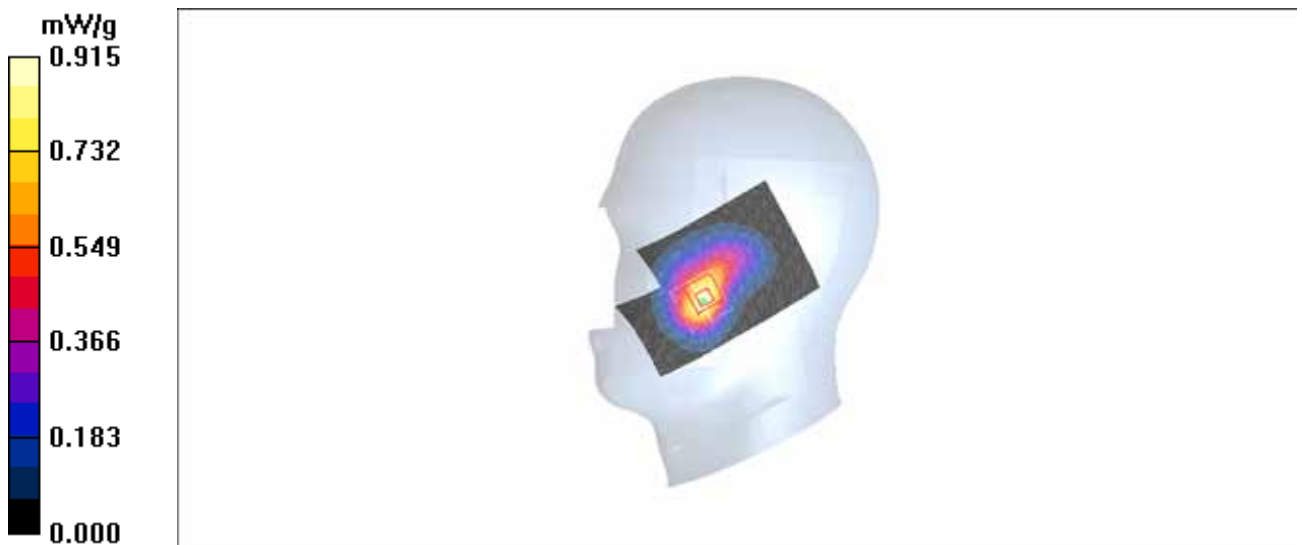


Fig. 21 1900 MHz CH661

**1900 Right Cheek Low – Slide down**

Date/Time: 2011-11-11 10:07:10

Electronics: DAE4 Sn771

Medium: Head 1900 MHz

Medium parameters used (interpolated):  $f = 1850.2$  MHz;  $\sigma = 1.36$  mho/m;  $\epsilon_r = 39.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 1900MHz Frequency: 1850.2 MHz Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

**Cheek Low/Area Scan (61x91x1):** Measurement grid: dx=10mm, dy=10mm

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

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

Reference Value = 7.06 V/m; Power Drift = -0.109 dB

Peak SAR (extrapolated) = 1.01 W/kg

**SAR(1 g) = 0.678 mW/g; SAR(10 g) = 0.406 mW/g**

Maximum value of SAR (measured) = 0.721 mW/g

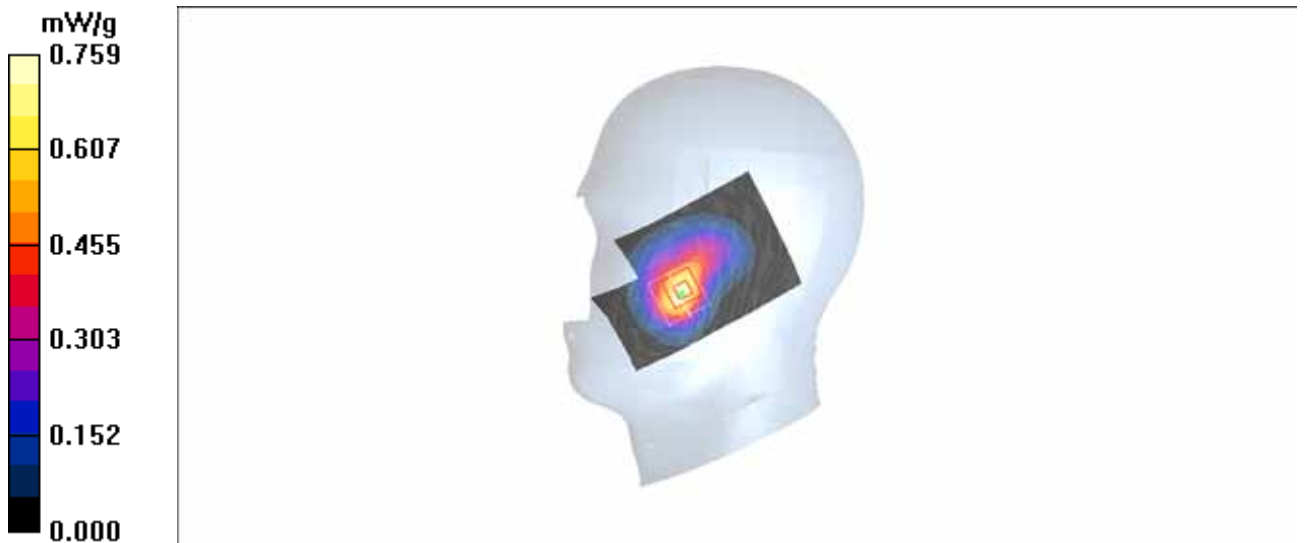


Fig. 22 1900 MHz CH512

**1900 Right Tilt High – Slide down**

Date/Time: 2011-11-11 10:21:54

Electronics: DAE4 Sn771

Medium: Head 1900 MHz

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.41$  mho/m;  $\epsilon_r = 38.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 1900MHz Frequency: 1909.8 MHz Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

**Tilt High/Area Scan (61x91x1):** Measurement grid: dx=10mm, dy=10mm

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

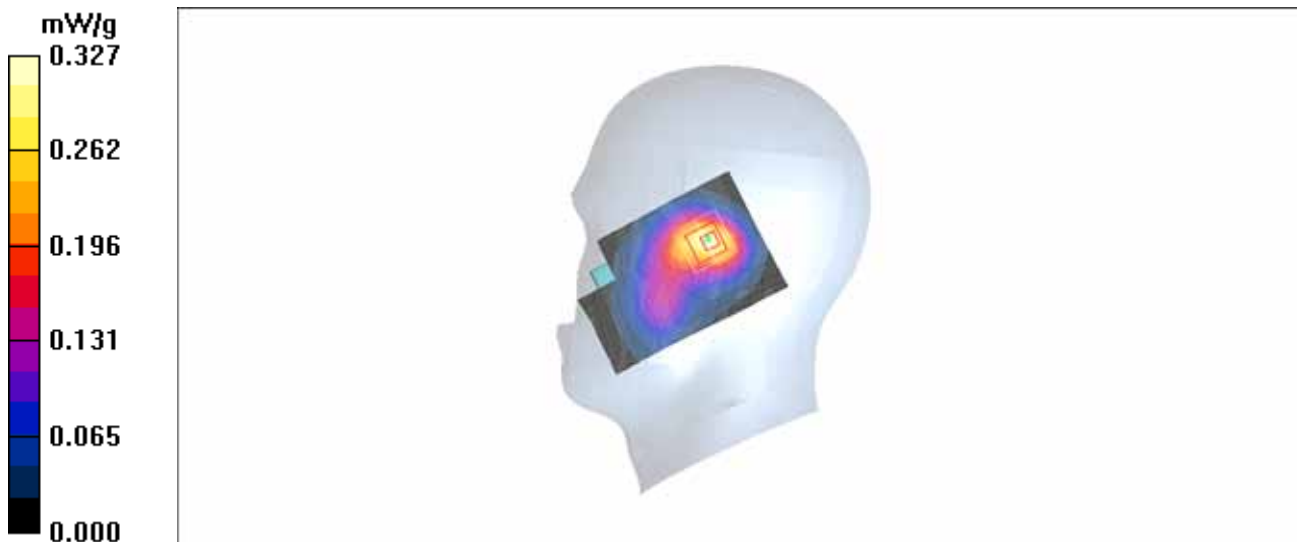
**Tilt High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 13.0 V/m; Power Drift = 0.023 dB

Peak SAR (extrapolated) = 0.417 W/kg

**SAR(1 g) = 0.284 mW/g; SAR(10 g) = 0.181 mW/g**

Maximum value of SAR (measured) = 0.305 mW/g



**Fig. 23 1900 MHz CH810**

**1900 Right Tilt Middle – Slide down**

Date/Time: 2011-11-11 10:36:19

Electronics: DAE4 Sn771

Medium: Head 1900 MHz

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.39$  mho/m;  $\epsilon_r = 39.0$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 1900MHz Frequency: 1880 MHz Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

**Tilt Middle/Area Scan (61x91x1):** Measurement grid: dx=10mm, dy=10mm

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

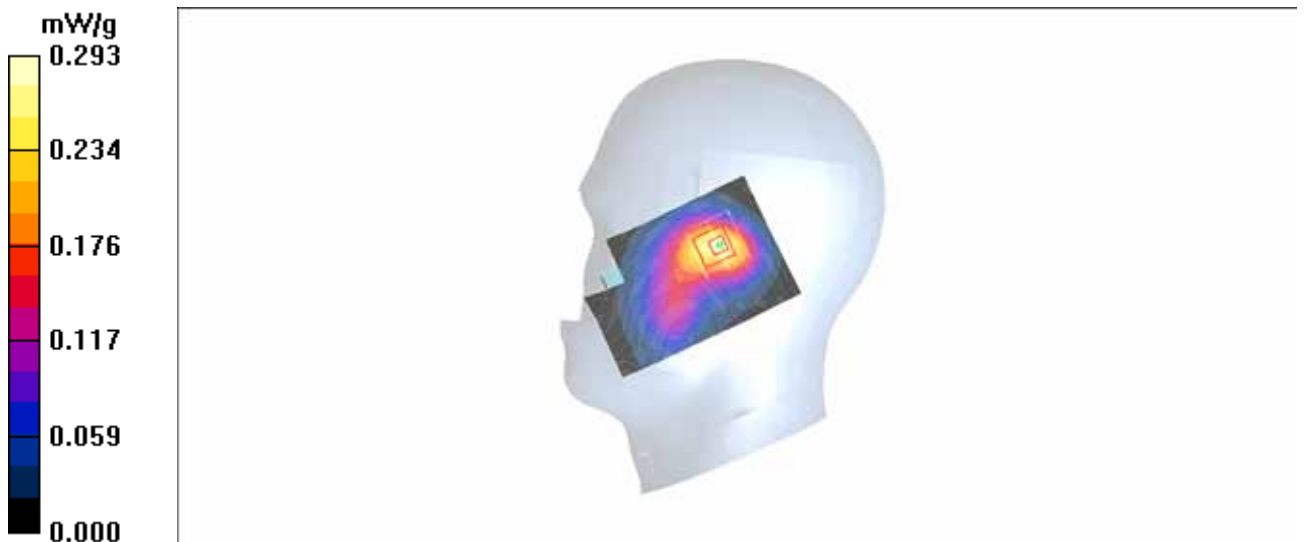
**Tilt Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.1 V/m; Power Drift = -0.017 dB

Peak SAR (extrapolated) = 0.363 W/kg

**SAR(1 g) = 0.252 mW/g; SAR(10 g) = 0.163 mW/g**

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



**Fig.24 1900 MHz CH661**

**1900 Right Tilt Low – Slide down**

Date/Time: 2011-11-11 10:50:35

Electronics: DAE4 Sn771

Medium: Head 1900 MHz

Medium parameters used (interpolated):  $f = 1850.2$  MHz;  $\sigma = 1.36$  mho/m;  $\epsilon_r = 39.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 1900MHz Frequency: 1850.2 MHz Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

**Tilt Low/Area Scan (61x91x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.234 mW/g

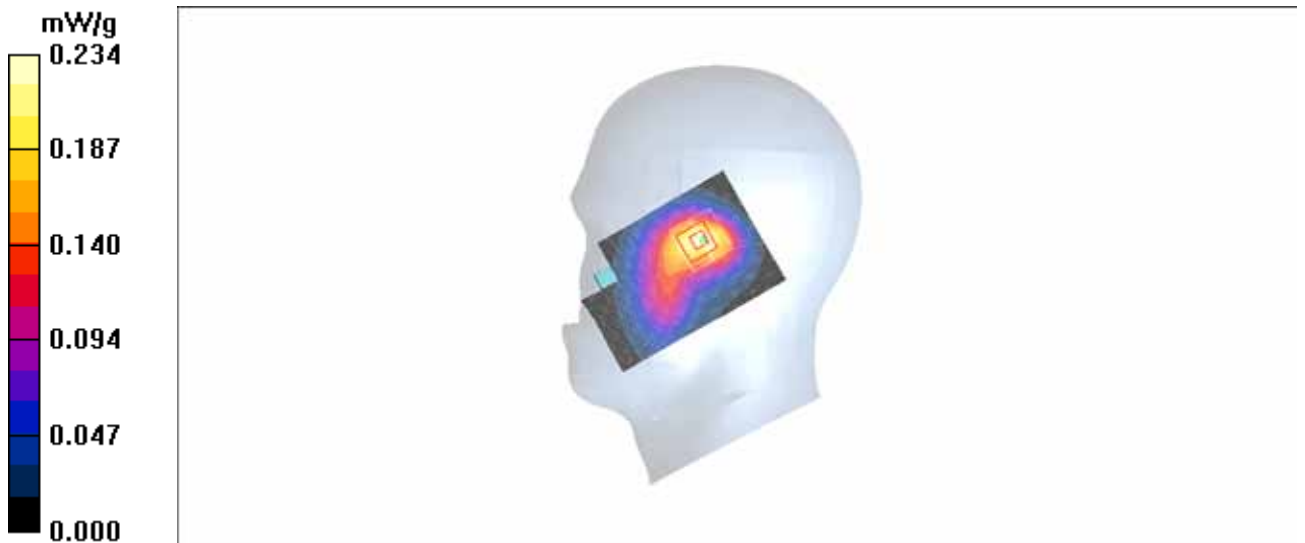
**Tilt Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.7 V/m; Power Drift = -0.011 dB

Peak SAR (extrapolated) = 0.290 W/kg

**SAR(1 g) = 0.201 mW/g; SAR(10 g) = 0.132 mW/g**

Maximum value of SAR (measured) = 0.215 mW/g



**Fig.25 1900 MHz CH512**

**1900 Right Cheek High – Slide up**

Date/Time: 2011-11-11 11:07:24

Electronics: DAE4 Sn771

Medium: Head 1900 MHz

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.41$  mho/m;  $\epsilon_r = 38.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 1900MHz Frequency: 1909.8 MHz Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

**Cheek High/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.339 mW/g

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

Reference Value = 2.99 V/m; Power Drift = -0.105 dB

Peak SAR (extrapolated) = 0.485 W/kg

**SAR(1 g) = 0.314 mW/g; SAR(10 g) = 0.192 mW/g**

Maximum value of SAR (measured) = 0.345 mW/g

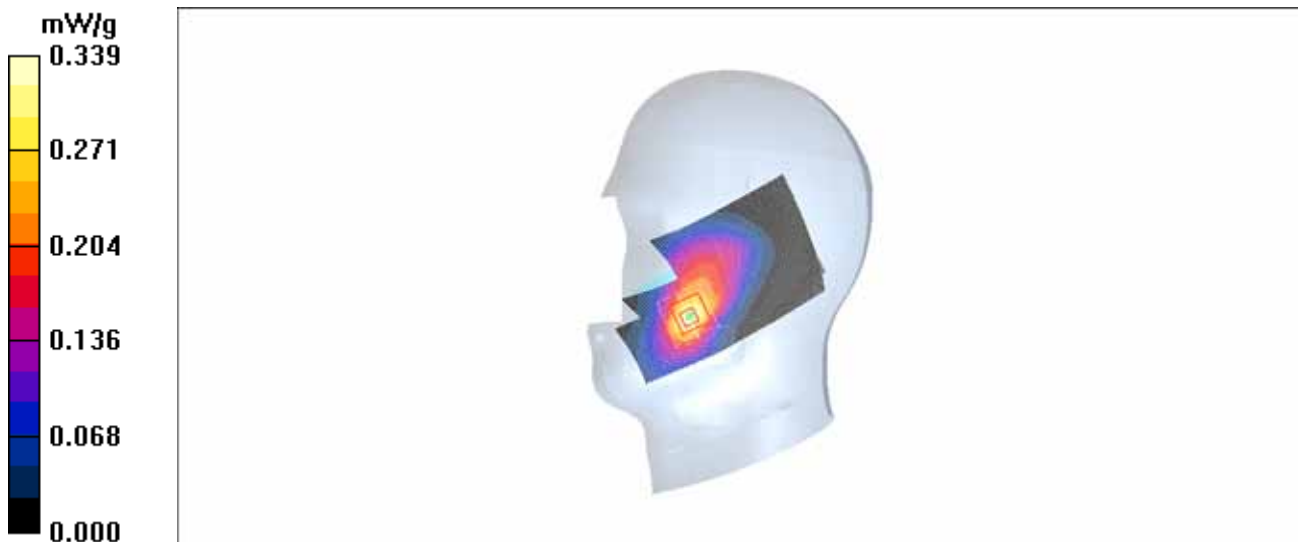


Fig. 26 1900 MHz CH810

**850 Body Towards Ground High with GPRS – Slide up**

Date/Time: 2011-11-10 13:46:04

Electronics: DAE4 Sn771

Medium: Body 850 MHz

Medium parameters used (interpolated):  $f = 848.8$  MHz;  $\sigma = 0.97$  mho/m;  $\epsilon_r = 53.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 850 GPRS Frequency: 848.8 MHz Duty Cycle: 1:4

Probe: ES3DV3 - SN3149 ConvF(6.22, 6.22, 6.22)

**Toward Ground High/Area Scan (61x121x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.19 mW/g

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

Reference Value = 30.5 V/m; Power Drift = -0.006 dB

Peak SAR (extrapolated) = 1.47 W/kg

**SAR(1 g) = 1.11 mW/g; SAR(10 g) = 0.794 mW/g**

Maximum value of SAR (measured) = 1.19 mW/g

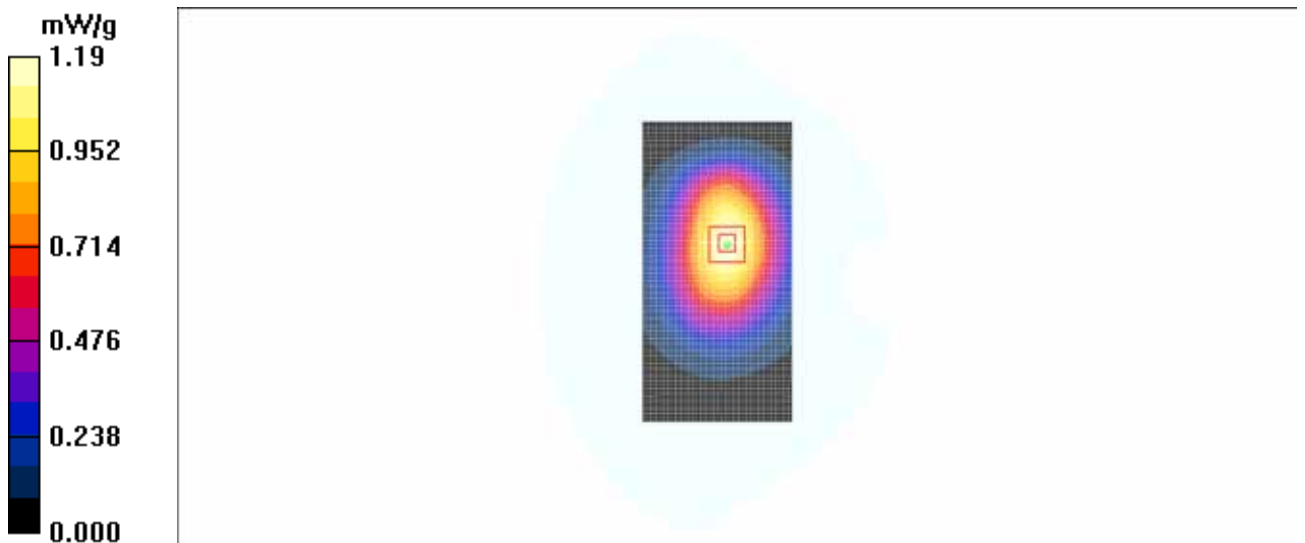
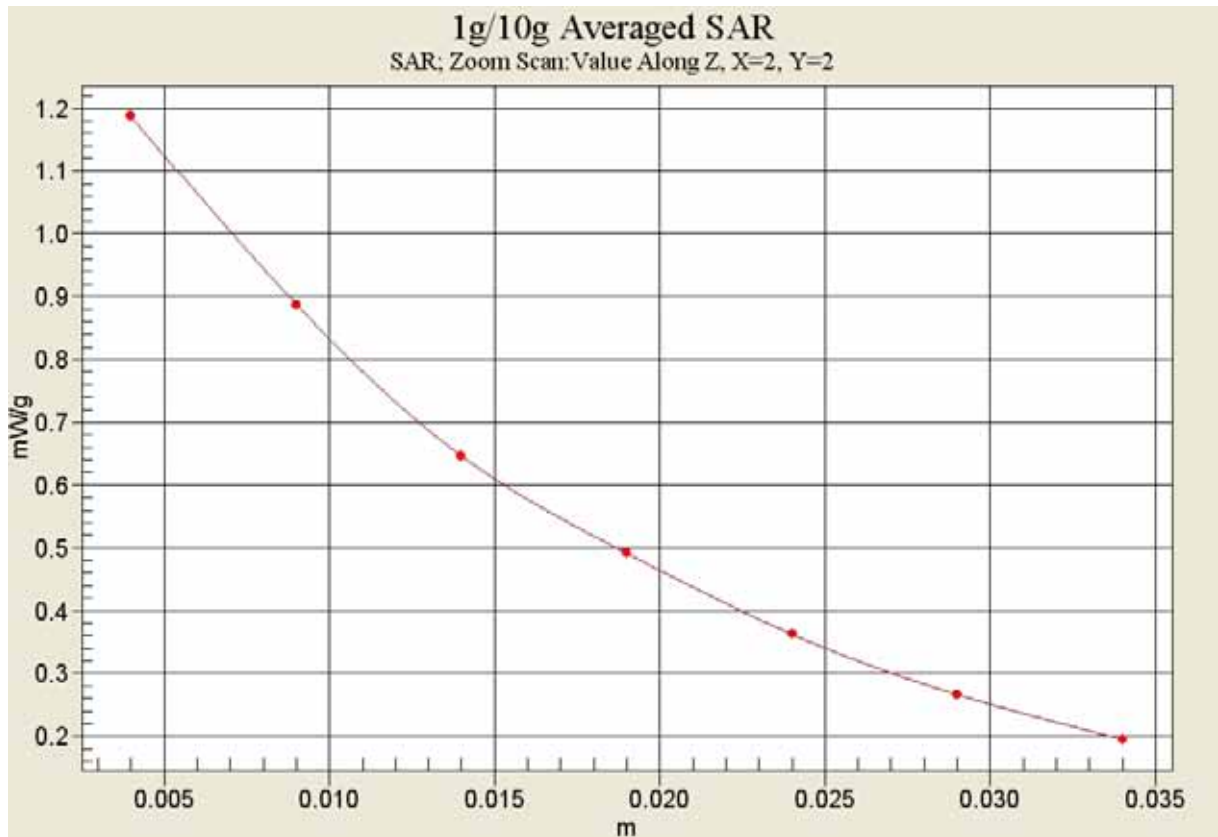


Fig. 27 850 MHz CH251





**Fig. 27-1 Z-Scan at power reference point (850 MHz CH251)**

**850 Body Towards Ground Middle with GPRS – Slide up**

Date/Time: 2011-11-10 14:01:32

Electronics: DAE4 Sn771

Medium: Body 850 MHz

Medium parameters used (interpolated):  $f = 836.6$  MHz;  $\sigma = 0.96$  mho/m;  $\epsilon_r = 53.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 850 GPRS Frequency: 836.6 MHz Duty Cycle: 1:4

Probe: ES3DV3 - SN3149 ConvF(6.22, 6.22, 6.22)

**Toward Ground Middle/Area Scan (61x121x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.15 mW/g

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

dy=5mm, dz=5mm

Reference Value = 31.5 V/m; Power Drift = 0.027 dB

Peak SAR (extrapolated) = 1.43 W/kg

**SAR(1 g) = 1.09 mW/g; SAR(10 g) = 0.782 mW/g**

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

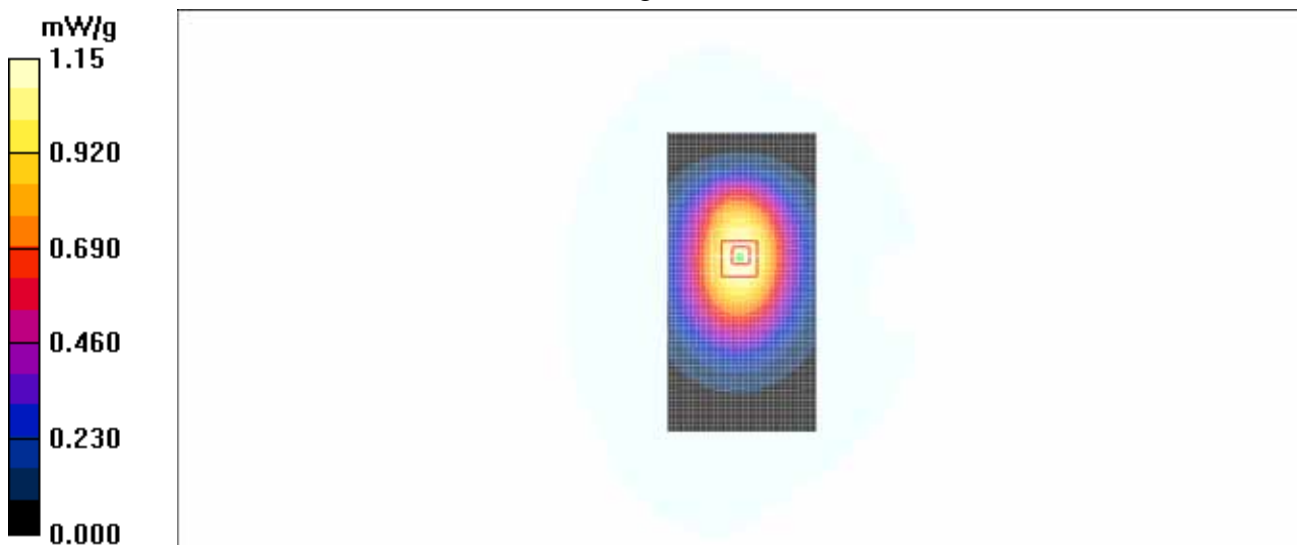


Fig. 28 850 MHz CH190

**850 Body Towards Ground Low with GPRS – Slide up**

Date/Time: 2011-11-10 14:16:58

Electronics: DAE4 Sn771

Medium: Body 850 MHz

Medium parameters used:  $f = 825$  MHz;  $\sigma = 0.943$  mho/m;  $\epsilon_r = 54.0$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 850 GPRS Frequency: 824.2 MHz Duty Cycle: 1:4

Probe: ES3DV3 - SN3149 ConvF(6.22, 6.22, 6.22)

**Toward Ground Low/Area Scan (61x121x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.13 mW/g

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

Reference Value = 29.1 V/m; Power Drift = 0.009 dB

Peak SAR (extrapolated) = 1.37 W/kg

**SAR(1 g) = 1.06 mW/g; SAR(10 g) = 0.766 mW/g**

Maximum value of SAR (measured) = 1.13 mW/g

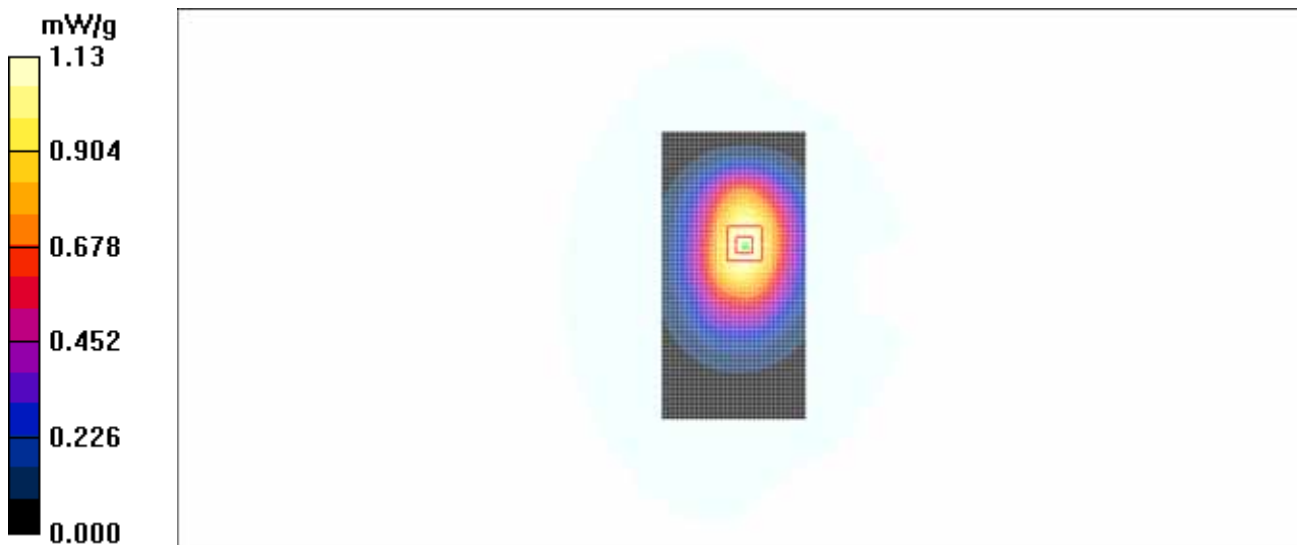


Fig. 29 850 MHz CH128

**850 Body Towards Phantom High with GPRS – Slide up**

Date/Time: 2011-11-10 14:32:29

Electronics: DAE4 Sn771

Medium: Body 850 MHz

Medium parameters used (interpolated):  $f = 848.8$  MHz;  $\sigma = 0.97$  mho/m;  $\epsilon_r = 53.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 850 GPRS Frequency: 848.8 MHz Duty Cycle: 1:4

Probe: ES3DV3 - SN3149 ConvF(6.22, 6.22, 6.22)

**Toward Phantom High/Area Scan (61x121x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.15 mW/g

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

Reference Value = 33.0 V/m; Power Drift = 0.001 dB

Peak SAR (extrapolated) = 1.43 W/kg

**SAR(1 g) = 1.1 mW/g; SAR(10 g) = 0.797 mW/g**

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

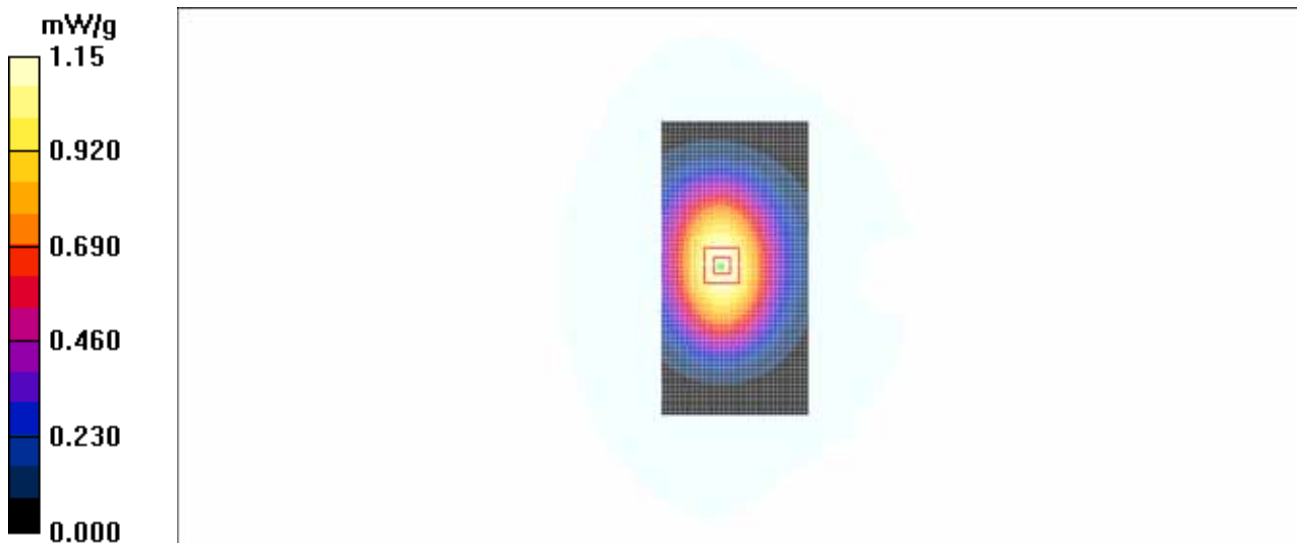


Fig. 30 850 MHz CH251

**850 Body Towards Phantom Middle with GPRS – Slide up**

Date/Time: 2011-11-10 14:47:46

Electronics: DAE4 Sn771

Medium: Body 850 MHz

Medium parameters used (interpolated):  $f = 836.6$  MHz;  $\sigma = 0.96$  mho/m;  $\epsilon_r = 53.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 850 GPRS Frequency: 836.6 MHz Duty Cycle: 1:4

Probe: ES3DV3 - SN3149 ConvF(6.22, 6.22, 6.22)

**Toward Phantom Middle/Area Scan (61x121x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.00 mW/g

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

dy=5mm, dz=5mm

Reference Value = 31.2 V/m; Power Drift = 0.043 dB

Peak SAR (extrapolated) = 1.21 W/kg

**SAR(1 g) = 0.941 mW/g; SAR(10 g) = 0.689 mW/g**

Maximum value of SAR (measured) = 0.992 mW/g

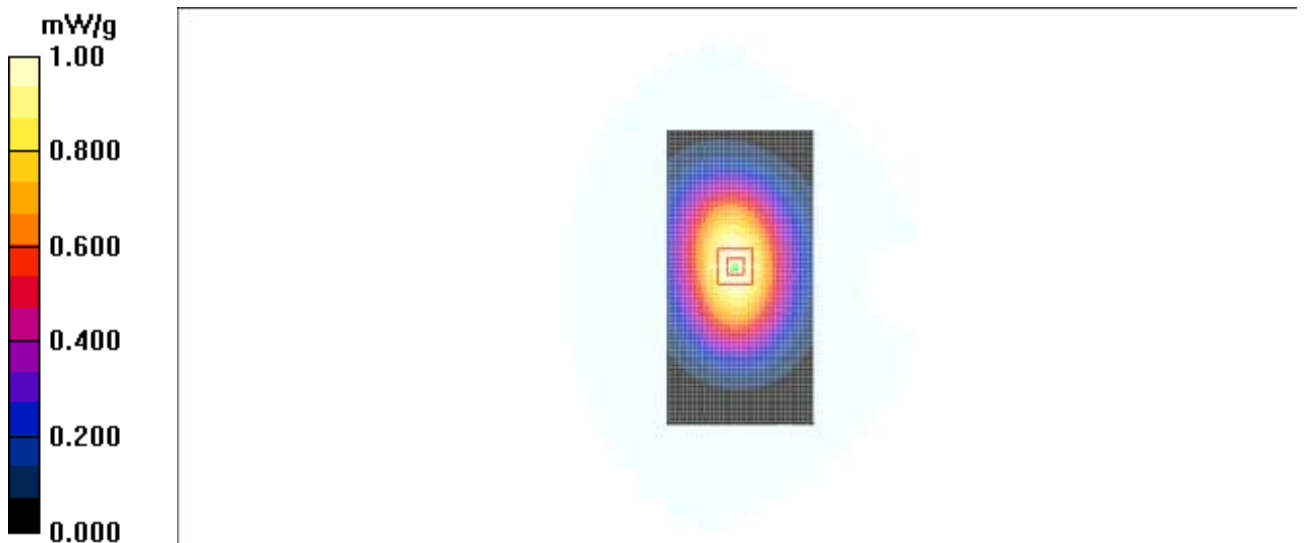


Fig. 31 850 MHz CH190

**850 Body Towards Phantom Low with GPRS – Slide up**

Date/Time: 2011-11-10 15:03:14

Electronics: DAE4 Sn771

Medium: Body 850 MHz

Medium parameters used:  $f = 825$  MHz;  $\sigma = 0.943$  mho/m;  $\epsilon_r = 54.0$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 850 GPRS Frequency: 824.2 MHz Duty Cycle: 1:4

Probe: ES3DV3 - SN3149 ConvF(6.22, 6.22, 6.22)

**Toward Phantom Low/Area Scan (61x121x1):** Measurement grid: dx=10mm, dy=10mm

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

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

Reference Value = 31.9 V/m; Power Drift = 0.012 dB

Peak SAR (extrapolated) = 1.30 W/kg

**SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.743 mW/g**

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

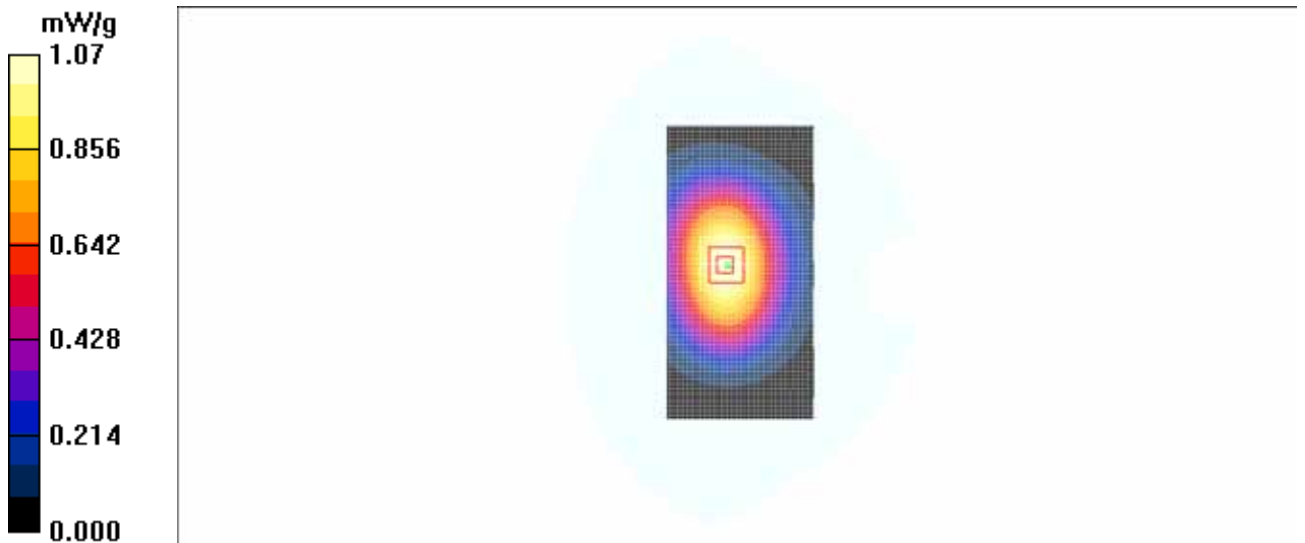


Fig. 32 850 MHz CH128

**850 Body Towards Ground High with Headset\_CCB3160A11C1 – Slide up**

Date/Time: 2011-11-10 15:20:09

Electronics: DAE4 Sn771

Medium: Body 850 MHz

Medium parameters used (interpolated):  $f = 848.8$  MHz;  $\sigma = 0.97$  mho/m;  $\epsilon_r = 53.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

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

Probe: ES3DV3 - SN3149 ConvF(6.22, 6.22, 6.22)

**Toward Ground High/Area Scan (61x121x1):** Measurement grid: dx=10mm, dy=10mm

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

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

Reference Value = 25.5 V/m; Power Drift = -0.052 dB

Peak SAR (extrapolated) = 0.957 W/kg

**SAR(1 g) = 0.717 mW/g; SAR(10 g) = 0.513 mW/g**

Maximum value of SAR (measured) = 0.760 mW/g

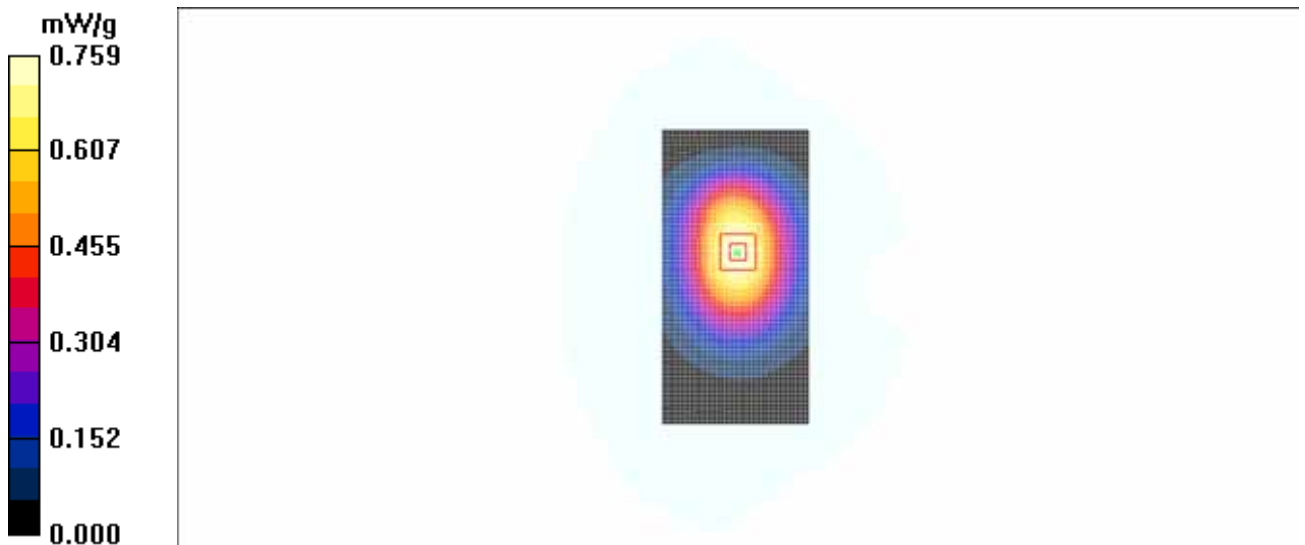


Fig. 33 850 MHz CH251

**850 Body Towards Ground High with Headset\_CCB3160A11C4 – Slide up**

Date/Time: 2011-11-10 15:37:17

Electronics: DAE4 Sn771

Medium: Body 850 MHz

Medium parameters used (interpolated):  $f = 848.8$  MHz;  $\sigma = 0.97$  mho/m;  $\epsilon_r = 53.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

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

Probe: ES3DV3 - SN3149 ConvF(6.22, 6.22, 6.22)

**Toward Ground High/Area Scan (61x121x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.680 mW/g

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

Reference Value = 25.0 V/m; Power Drift = -0.046 dB

Peak SAR (extrapolated) = 0.848 W/kg

**SAR(1 g) = 0.641 mW/g; SAR(10 g) = 0.458 mW/g**

Maximum value of SAR (measured) = 0.681 mW/g

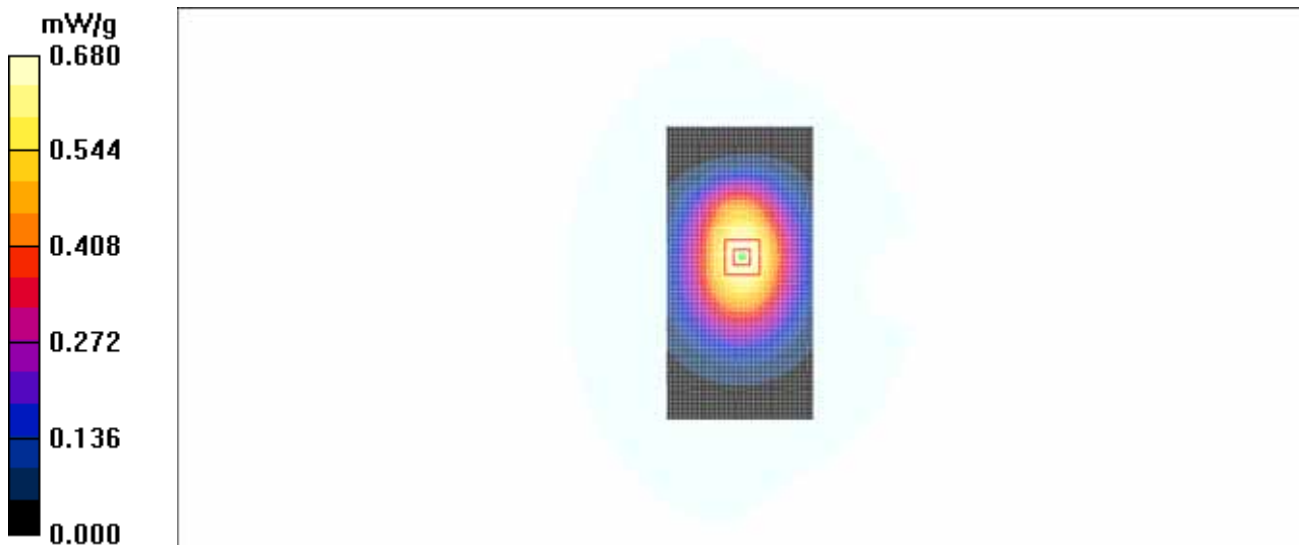


Fig. 34 850 MHz CH251



**850 Body Towards Ground High with Headset\_CCB3160A15C1 – Slide up**

Date/Time: 2011-11-10 15:54:38

Electronics: DAE4 Sn771

Medium: Body 850 MHz

Medium parameters used (interpolated):  $f = 848.8$  MHz;  $\sigma = 0.97$  mho/m;  $\epsilon_r = 53.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

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

Probe: ES3DV3 - SN3149 ConvF(6.22, 6.22, 6.22)

**Toward Ground High/Area Scan (61x121x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.753 mW/g

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

Reference Value = 25.7 V/m; Power Drift = -0.058 dB

Peak SAR (extrapolated) = 0.948 W/kg

**SAR(1 g) = 0.712 mW/g; SAR(10 g) = 0.507 mW/g**

Maximum value of SAR (measured) = 0.757 mW/g

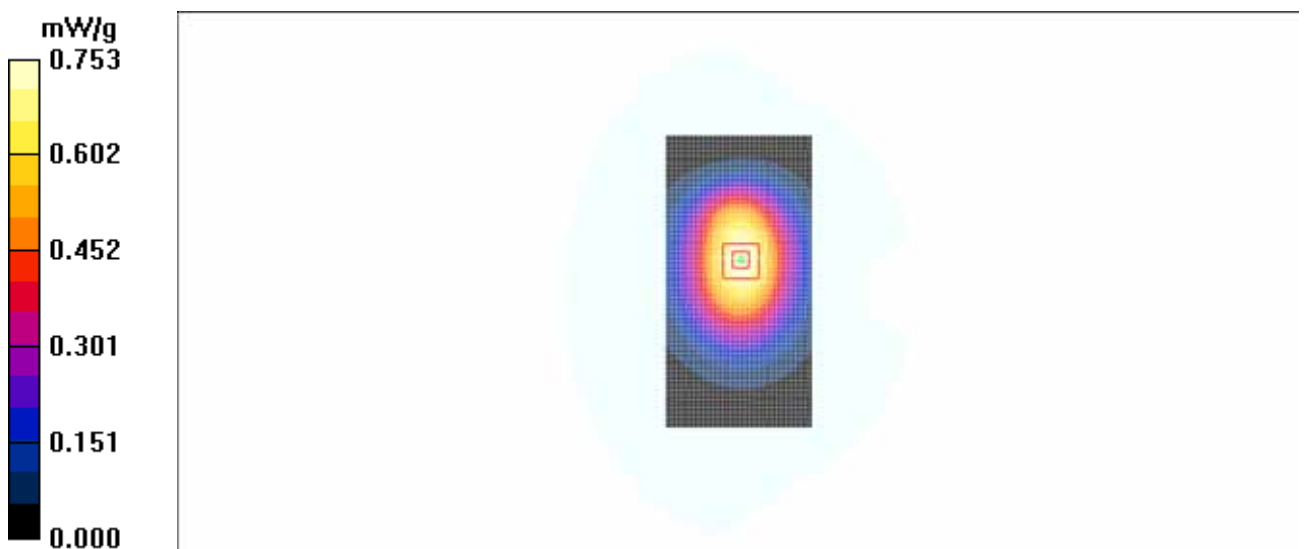


Fig. 35 850 MHz CH251

**850 Body Towards Ground High with Headset\_CCB3160A15C4 – Slide up**

Date/Time: 2011-11-10 16:11:52

Electronics: DAE4 Sn771

Medium: Body 850 MHz

Medium parameters used (interpolated):  $f = 848.8$  MHz;  $\sigma = 0.97$  mho/m;  $\epsilon_r = 53.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

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

Probe: ES3DV3 - SN3149 ConvF(6.22, 6.22, 6.22)

**Toward Ground High/Area Scan (61x121x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.671 mW/g

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

Reference Value = 24.9 V/m; Power Drift = -0.112 dB

Peak SAR (extrapolated) = 0.830 W/kg

**SAR(1 g) = 0.631 mW/g; SAR(10 g) = 0.451 mW/g**

Maximum value of SAR (measured) = 0.668 mW/g

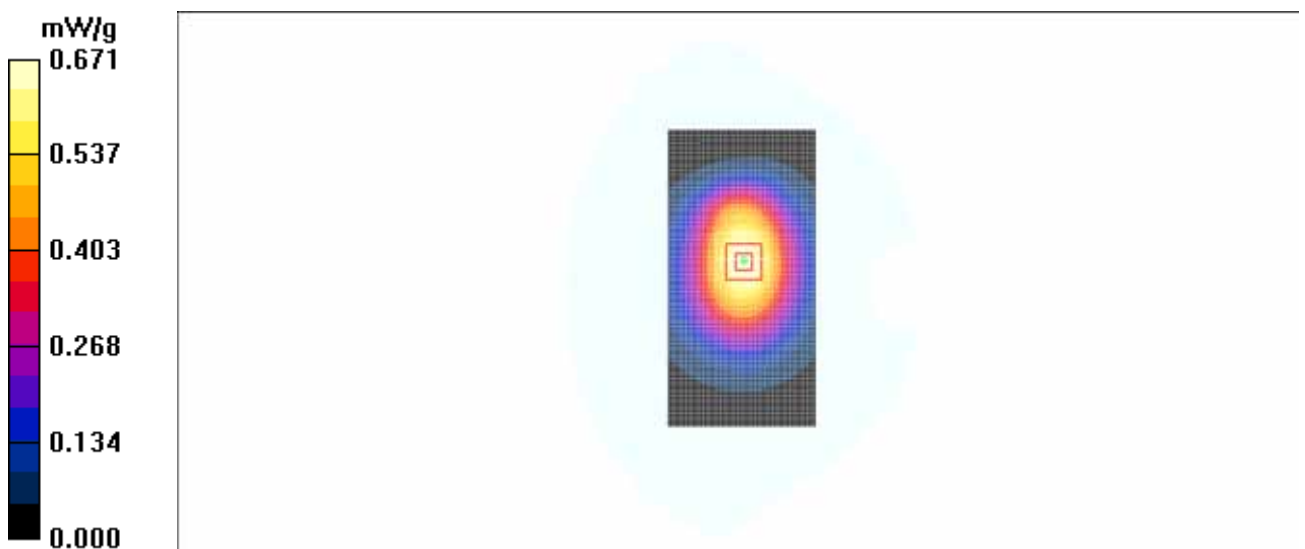


Fig. 36 850 MHz CH251

**850 Body Towards Ground High with GPRS – Slide down**

Date/Time: 2011-11-10 16:28:44

Electronics: DAE4 Sn771

Medium: Body 850 MHz

Medium parameters used (interpolated):  $f = 848.8$  MHz;  $\sigma = 0.97$  mho/m;  $\epsilon_r = 53.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 850 GPRS Frequency: 848.8 MHz Duty Cycle: 1:4

Probe: ES3DV3 - SN3149 ConvF(6.22, 6.22, 6.22)

**Toward Ground High/Area Scan (61x91x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.754 mW/g

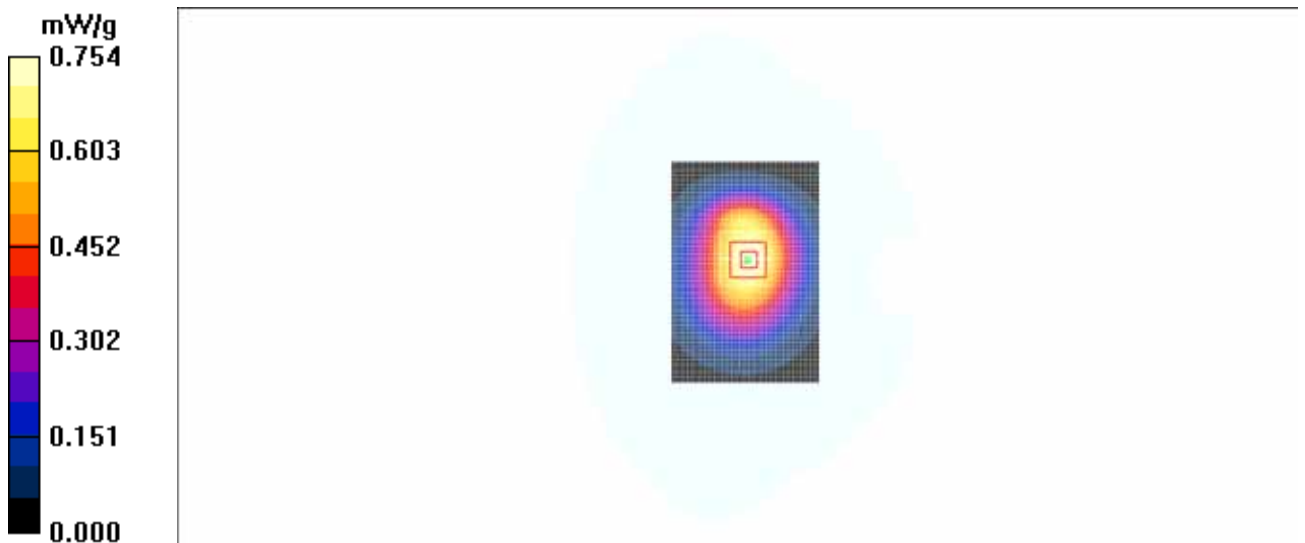
**Toward Ground High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 26.8 V/m; Power Drift = 0.011 dB

Peak SAR (extrapolated) = 0.953 W/kg

**SAR(1 g) = 0.709 mW/g; SAR(10 g) = 0.500 mW/g**

Maximum value of SAR (measured) = 0.753 mW/g



**Fig. 37 850 MHz CH251**

**1900 Body Towards Ground High with GPRS – Slide up**

Date/Time: 2011-11-11 14:00:12

Electronics: DAE4 Sn771

Medium: Body 1900 MHz

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.51$  mho/m;  $\epsilon_r = 51.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 1900MHz GPRS Frequency: 1909.8 MHz Duty Cycle: 1:4

Probe: ES3DV3 - SN3149 ConvF(4.68, 4.68, 4.68)

**Toward Ground High/Area Scan (61x121x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.777 mW/g

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

Reference Value = 8.22 V/m; Power Drift = -0.077 dB

Peak SAR (extrapolated) = 1.16 W/kg

**SAR(1 g) = 0.698 mW/g; SAR(10 g) = 0.412 mW/g**

Maximum value of SAR (measured) = 0.760 mW/g

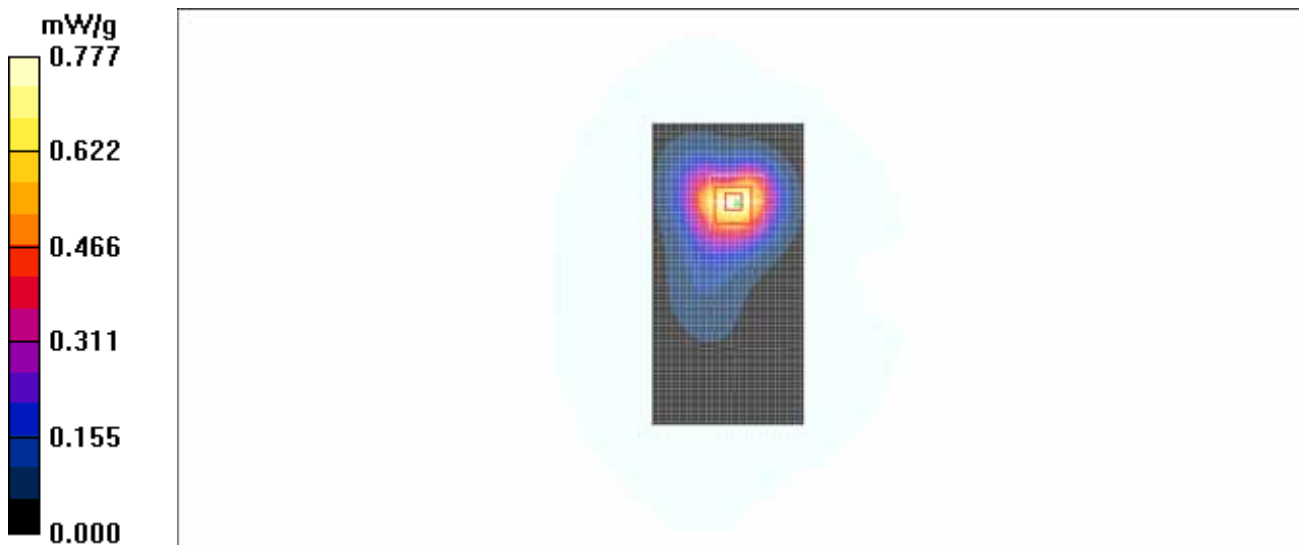
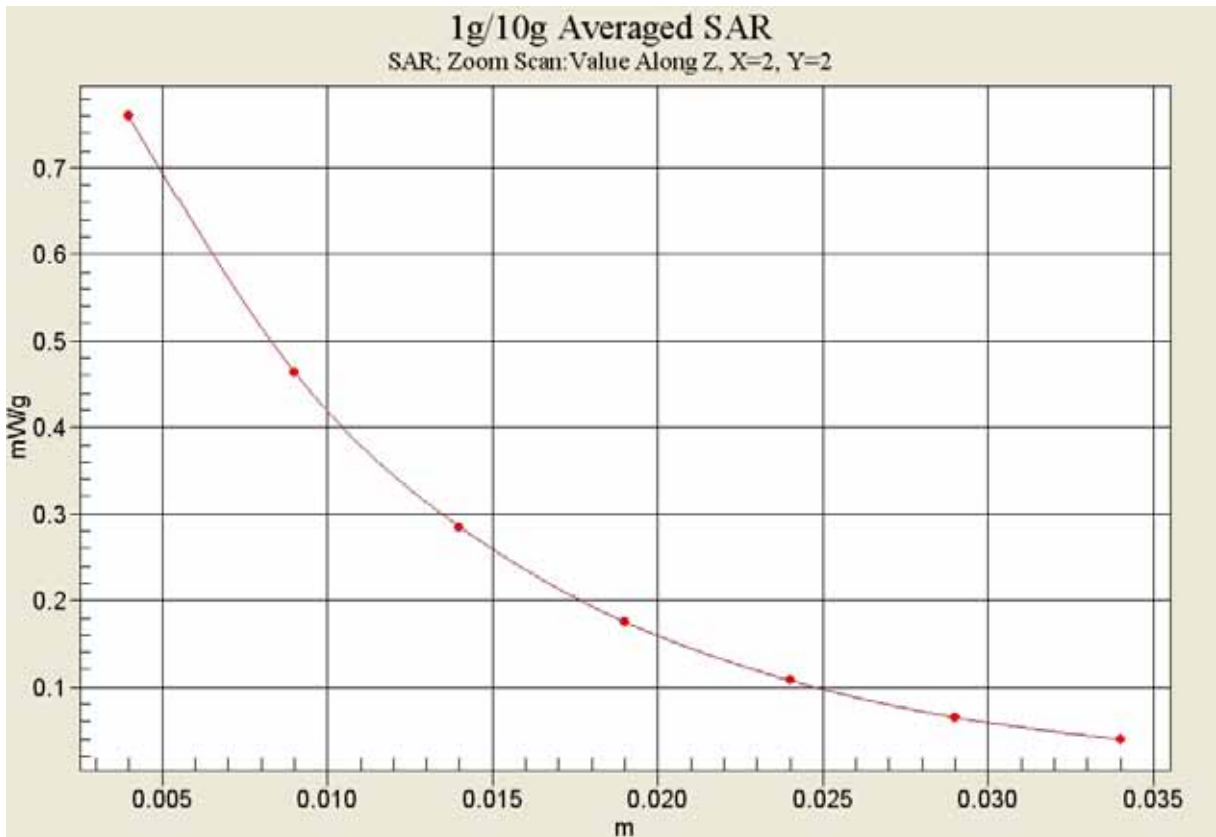


Fig. 38 1900 MHz CH810



**Fig. 38-1 Z-Scan at power reference point (1900 MHz CH810)**

**1900 Body Towards Ground Middle with GPRS – Slide up**

Date/Time: 2011-11-11 14:15:38

Electronics: DAE4 Sn771

Medium: Body 1900 MHz

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.48$  mho/m;  $\epsilon_r = 51.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 1900MHz GPRS Frequency: 1880 MHz Duty Cycle: 1:4

Probe: ES3DV3 - SN3149 ConvF(4.68, 4.68, 4.68)

**Toward Ground Middle/Area Scan (61x121x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.670 mW/g

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

Reference Value = 8.03 V/m; Power Drift = -0.156 dB

Peak SAR (extrapolated) = 1.01 W/kg

**SAR(1 g) = 0.607 mW/g; SAR(10 g) = 0.358 mW/g**

Maximum value of SAR (measured) = 0.660 mW/g

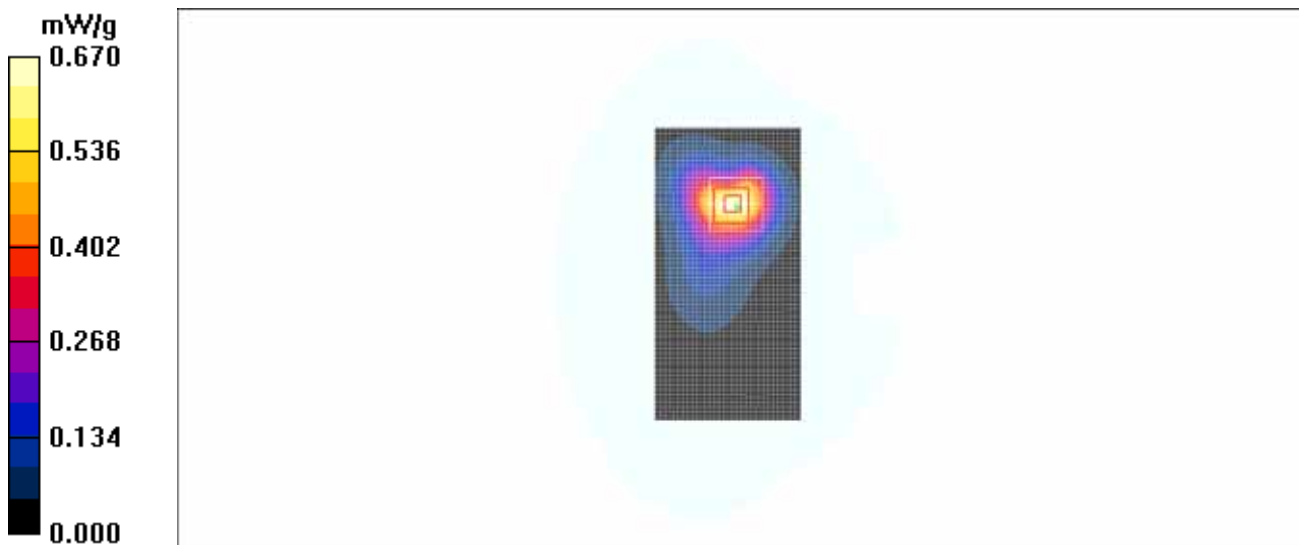


Fig. 39 1900 MHz CH661

**1900 Body Towards Ground Low with GPRS – Slide up**

Date/Time: 2011-11-11 14:30:59

Electronics: DAE4 Sn771

Medium: Body 1900 MHz

Medium parameters used (interpolated):  $f = 1850.2$  MHz;  $\sigma = 1.46$  mho/m;  $\epsilon_r = 51.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 1900MHz GPRS Frequency: 1850.2 MHz Duty Cycle: 1:4

Probe: ES3DV3 - SN3149 ConvF(4.68, 4.68, 4.68)

**Toward Ground Low/Area Scan (61x121x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.562 mW/g

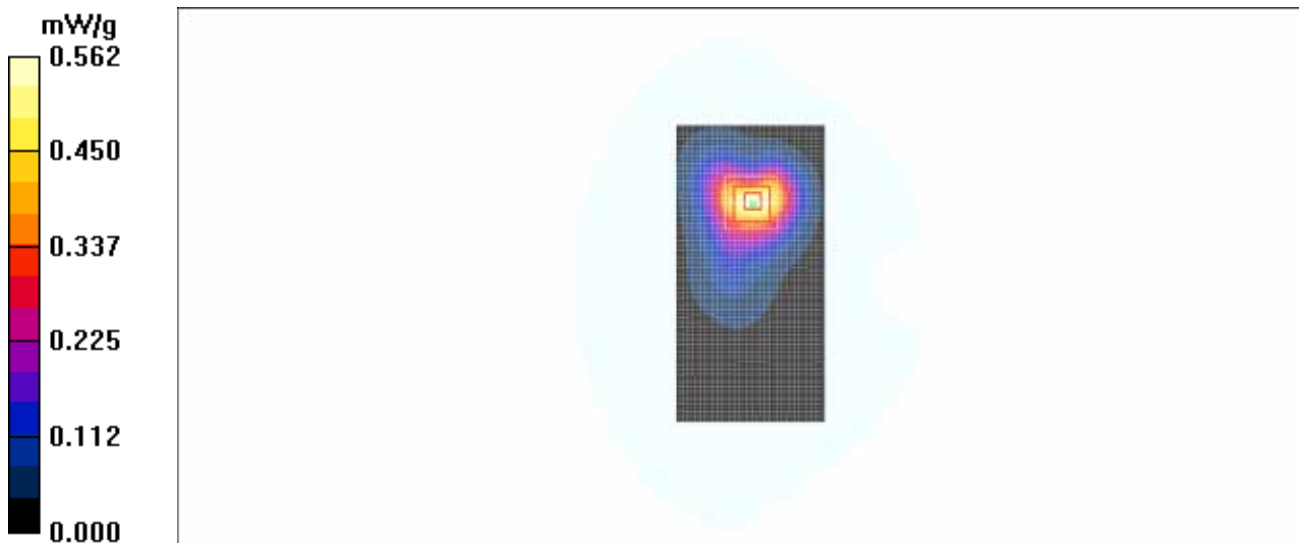
**Toward Ground Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.53 V/m; Power Drift = -0.016 dB

Peak SAR (extrapolated) = 0.831 W/kg

**SAR(1 g) = 0.503 mW/g; SAR(10 g) = 0.298 mW/g**

Maximum value of SAR (measured) = 0.547 mW/g



**Fig. 40 1900 MHz CH512**

**1900 Body Towards Phantom High with GPRS – Slide up**

Date/Time: 2011-11-11 14:46:41

Electronics: DAE4 Sn771

Medium: Body 1900 MHz

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.51$  mho/m;  $\epsilon_r = 51.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 1900MHz GPRS Frequency: 1909.8 MHz Duty Cycle: 1:4

Probe: ES3DV3 - SN3149 ConvF(4.68, 4.68, 4.68)

**Toward Phantom High/Area Scan (61x121x1):** Measurement grid: dx=10mm, dy=10mm

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

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

Reference Value = 10.7 V/m; Power Drift = 0.128 dB

Peak SAR (extrapolated) = 0.757 W/kg

**SAR(1 g) = 0.465 mW/g; SAR(10 g) = 0.286 mW/g**

Maximum value of SAR (measured) = 0.498 mW/g



Fig. 41 1900 MHz CH810



**1900 Body Towards Phantom Middle with GPRS – Slide up**

Date/Time: 2011-11-11 15:02:08

Electronics: DAE4 Sn771

Medium: Body 1900 MHz

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.48$  mho/m;  $\epsilon_r = 51.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 1900MHz GPRS Frequency: 1880 MHz Duty Cycle: 1:4

Probe: ES3DV3 - SN3149 ConvF(4.68, 4.68, 4.68)

**Toward Phantom Middle/Area Scan (61x121x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.455 mW/g

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

Reference Value = 9.51 V/m; Power Drift = -0.167 dB

Peak SAR (extrapolated) = 0.666 W/kg

**SAR(1 g) = 0.411 mW/g; SAR(10 g) = 0.252 mW/g**

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

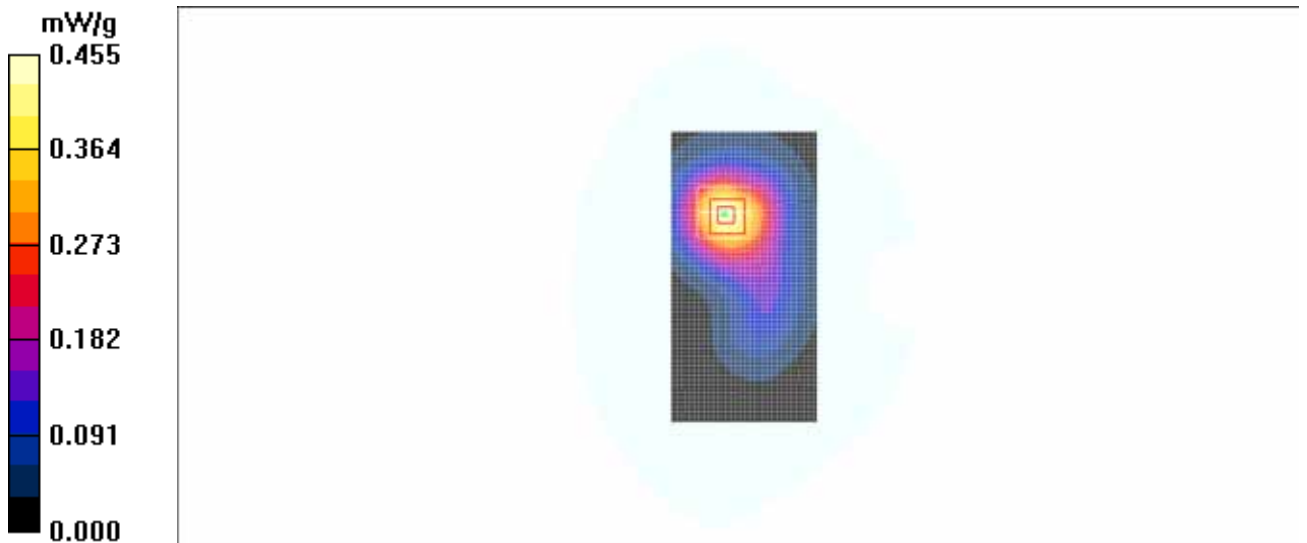


Fig. 42 1900 MHz CH661

**1900 Body Towards Phantom Low with GPRS – Slide up**

Date/Time: 2011-11-11 15:17:32

Electronics: DAE4 Sn771

Medium: Body 1900 MHz

Medium parameters used (interpolated):  $f = 1850.2$  MHz;  $\sigma = 1.46$  mho/m;  $\epsilon_r = 51.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 1900MHz GPRS Frequency: 1850.2 MHz Duty Cycle: 1:4

Probe: ES3DV3 - SN3149 ConvF(4.68, 4.68, 4.68)

**Toward Phantom Low/Area Scan (61x121x1):** Measurement grid: dx=10mm, dy=10mm

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

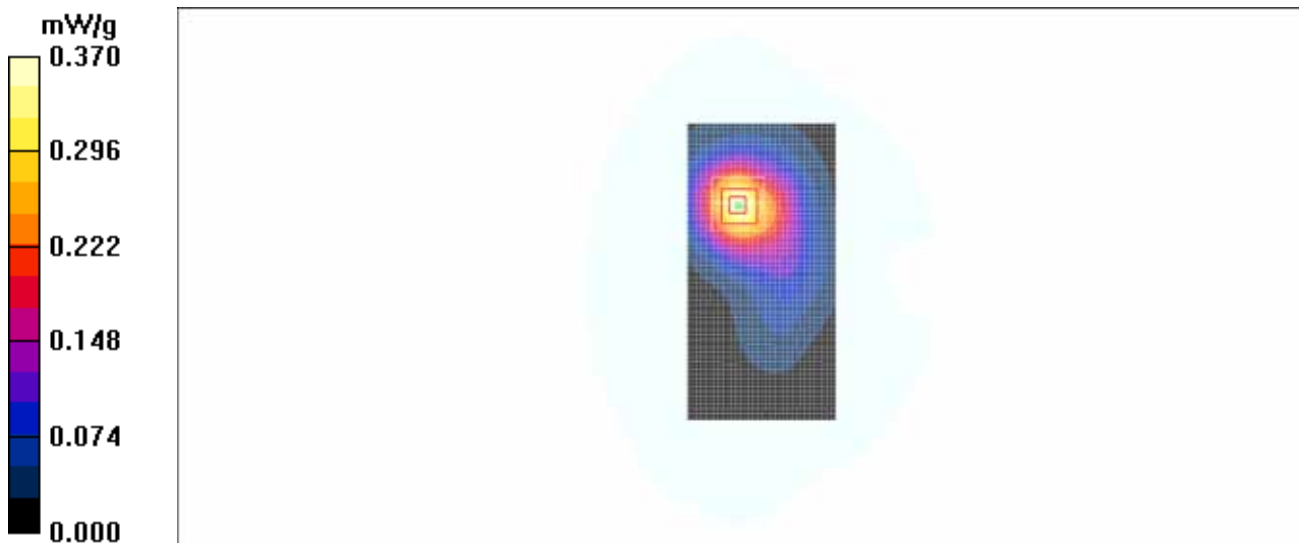
**Toward Phantom Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.67 V/m; Power Drift = -0.198 dB

Peak SAR (extrapolated) = 0.530 W/kg

**SAR(1 g) = 0.331 mW/g; SAR(10 g) = 0.203 mW/g**

Maximum value of SAR (measured) = 0.359 mW/g



**Fig. 43 1900 MHz CH512**

**1900 Body Towards Ground High with Headset\_CCB3160A11C1 – Slide up**

Date/Time: 2011-11-11 15:34:30

Electronics: DAE4 Sn771

Medium: Body 1900 MHz

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.51$  mho/m;  $\epsilon_r = 51.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 1900MHz Frequency: 1909.8 MHz Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(4.68, 4.68, 4.68)

**Toward Ground High/Area Scan (61x121x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.495 mW/g

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

Reference Value = 8.46 V/m; Power Drift = 0.136 dB

Peak SAR (extrapolated) = 0.760 W/kg

**SAR(1 g) = 0.460 mW/g; SAR(10 g) = 0.275 mW/g**

Maximum value of SAR (measured) = 0.493 mW/g

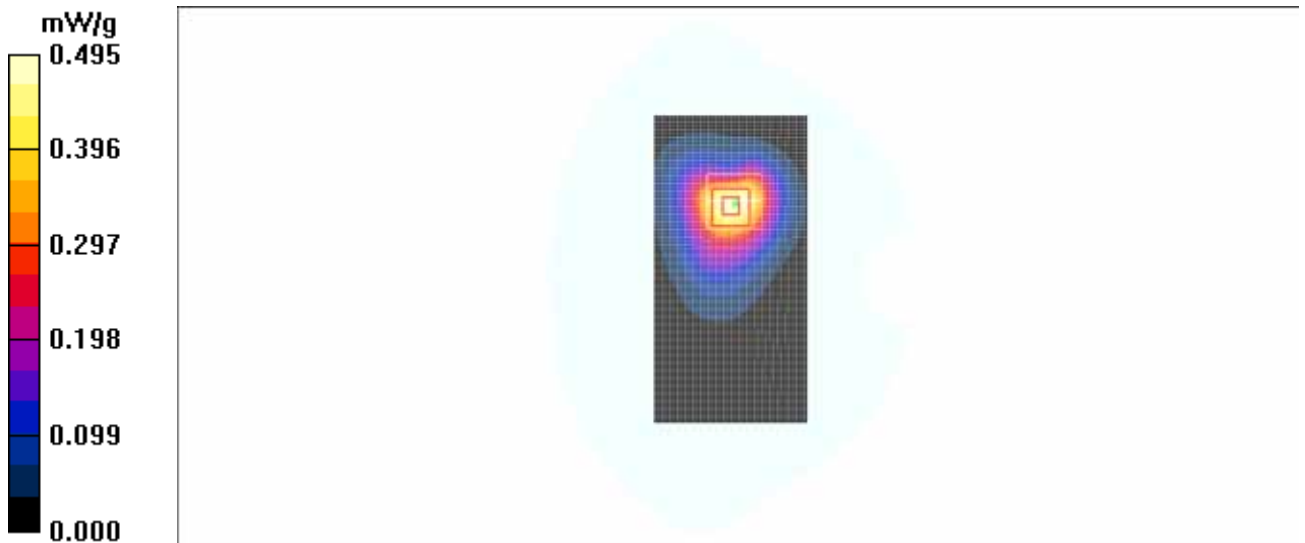


Fig. 44 1900 MHz CH810

**1900 Body Towards Ground High with Headset\_CCB3160A11C4 – Slide up**

Date/Time: 2011-11-11 15:51:36

Electronics: DAE4 Sn771

Medium: Body 1900 MHz

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.51$  mho/m;  $\epsilon_r = 51.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 1900MHz Frequency: 1909.8 MHz Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(4.68, 4.68, 4.68)

**Toward Ground High/Area Scan (61x121x1):** Measurement grid: dx=10mm, dy=10mm

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

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

Reference Value = 7.69 V/m; Power Drift = 0.046 dB

Peak SAR (extrapolated) = 0.708 W/kg

**SAR(1 g) = 0.429 mW/g; SAR(10 g) = 0.257 mW/g**

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

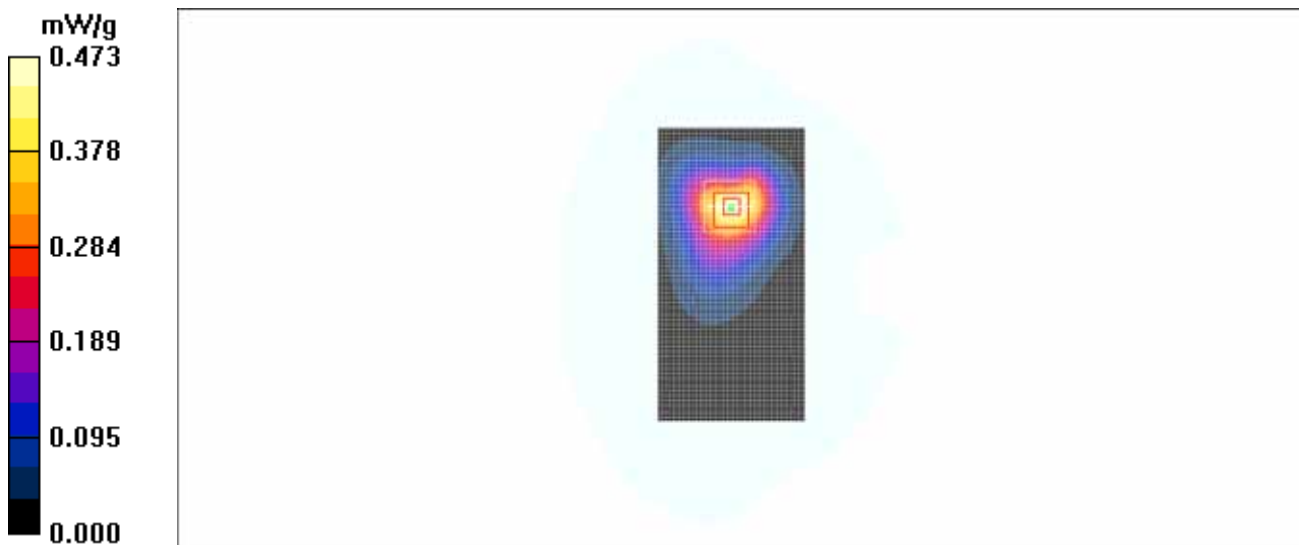


Fig. 45 1900 MHz CH810

**1900 Body Towards Ground High with Headset\_CCB3160A15C1 – Slide up**

Date/Time: 2011-11-11 16:08:44

Electronics: DAE4 Sn771

Medium: Body 1900 MHz

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.51$  mho/m;  $\epsilon_r = 51.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 1900MHz Frequency: 1909.8 MHz Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(4.68, 4.68, 4.68)

**Toward Ground High/Area Scan (61x121x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.491 mW/g

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

Reference Value = 9.03 V/m; Power Drift = 0.069 dB

Peak SAR (extrapolated) = 0.736 W/kg

**SAR(1 g) = 0.437 mW/g; SAR(10 g) = 0.257 mW/g**

Maximum value of SAR (measured) = 0.463 mW/g

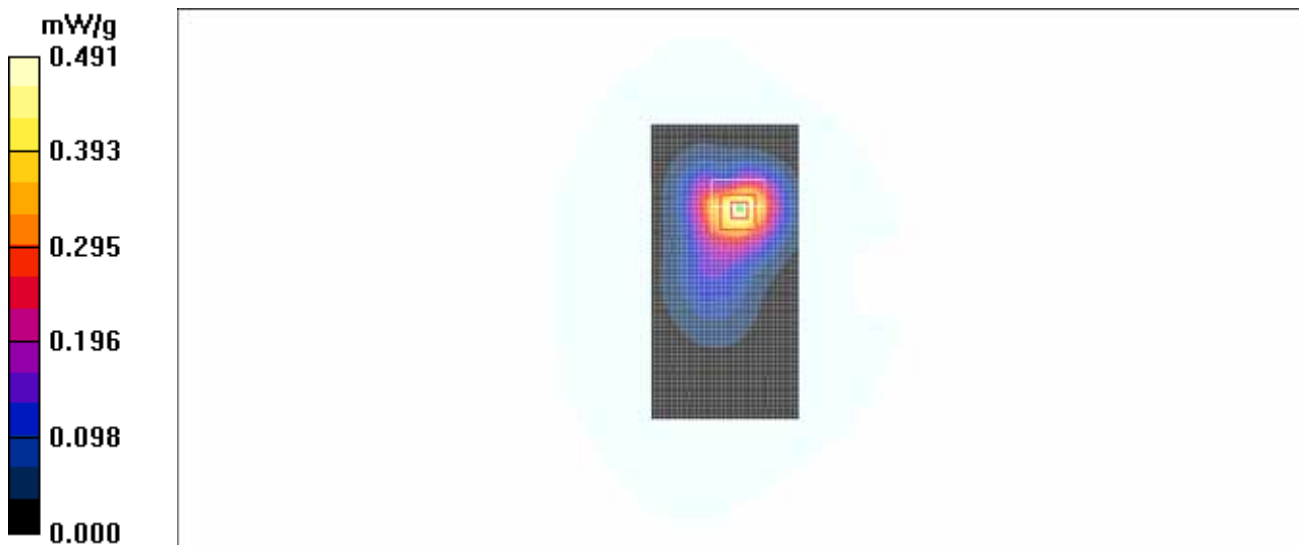


Fig. 46 1900 MHz CH810

**1900 Body Towards Ground High with Headset\_CCB3160A15C4 – Slide up**

Date/Time: 2011-11-11 16:25:39

Electronics: DAE4 Sn771

Medium: Body 1900 MHz

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.51$  mho/m;  $\epsilon_r = 51.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 1900MHz Frequency: 1909.8 MHz Duty Cycle: 1:8.3

Probe: ES3DV3 - SN3149 ConvF(4.68, 4.68, 4.68)

**Toward Ground High/Area Scan (61x121x1):** Measurement grid: dx=10mm, dy=10mm

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

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

Reference Value = 7.65 V/m; Power Drift = 0.027 dB

Peak SAR (extrapolated) = 0.710 W/kg

**SAR(1 g) = 0.430 mW/g; SAR(10 g) = 0.257 mW/g**

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

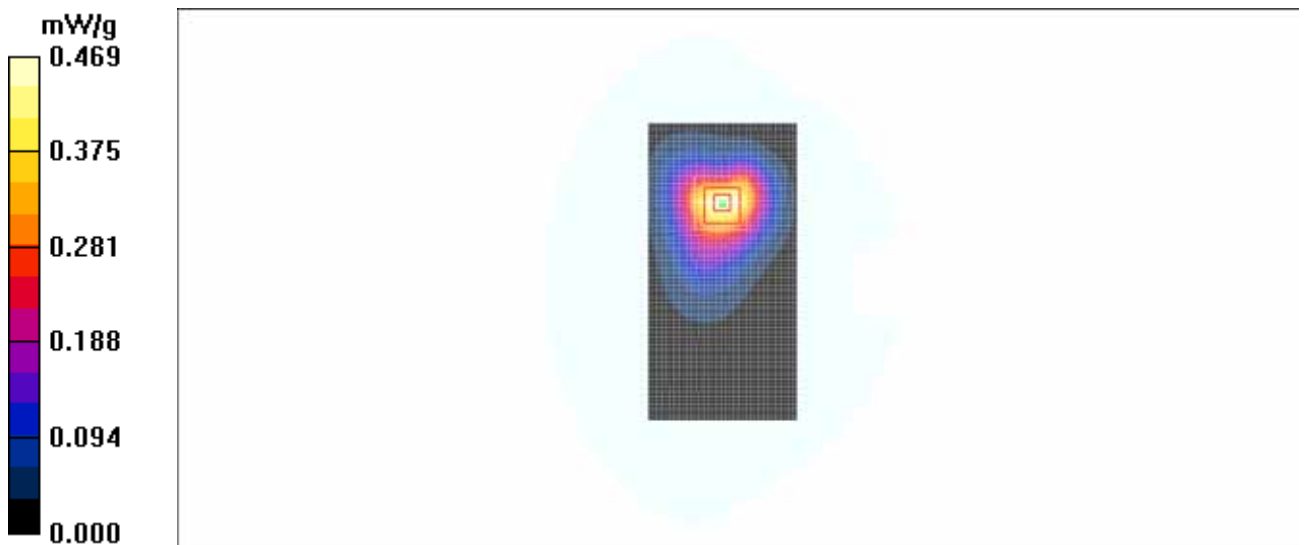


Fig. 47 1900 MHz CH810

**1900 Body Towards Ground High with GPRS – Slide down**

Date/Time: 2011-11-11 16:42:51

Electronics: DAE4 Sn771

Medium: Body 1900 MHz

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.51$  mho/m;  $\epsilon_r = 51.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.0°C      Liquid Temperature: 22.5°C

Communication System: GSM 1900MHz GPRS Frequency: 1909.8 MHz Duty Cycle: 1:4

Probe: ES3DV3 - SN3149 ConvF(4.68, 4.68, 4.68)

**Toward Ground High/Area Scan (61x91x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.455 mW/g

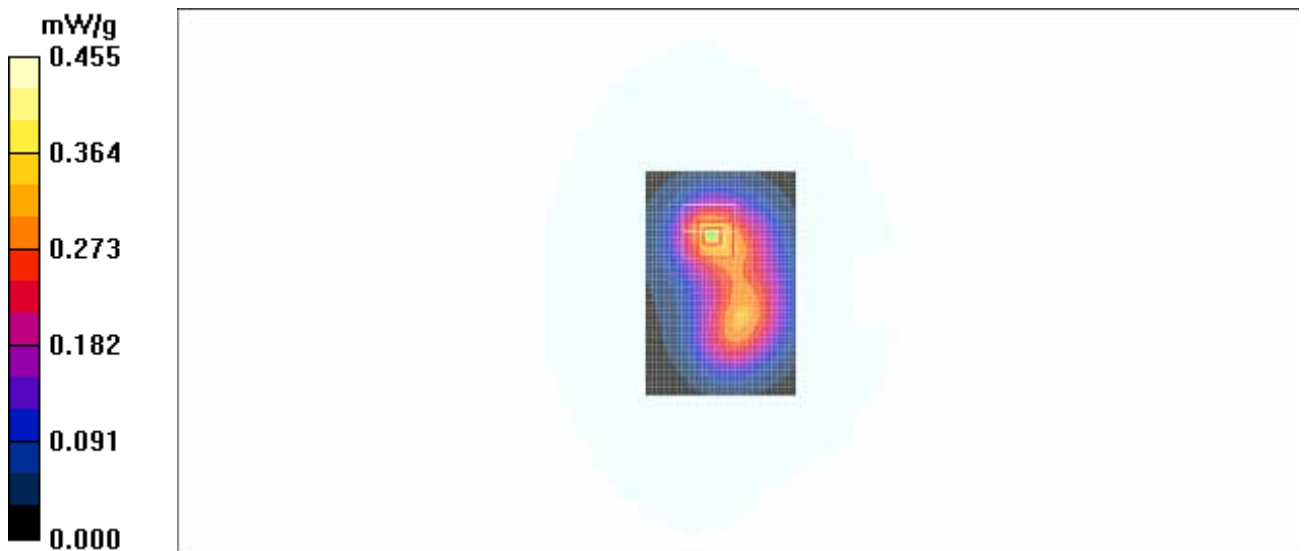
**Toward Ground High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.8 V/m; Power Drift = 0.074 dB

Peak SAR (extrapolated) = 0.626 W/kg

**SAR(1 g) = 0.421 mW/g; SAR(10 g) = 0.262 mW/g**

Maximum value of SAR (measured) = 0.445 mW/g



**Fig. 48 1900 MHz CH810**

## ANNEX D SYSTEM VALIDATION RESULTS

### 835MHz

Date/Time: 2011-11-10 7:29:01

Electronics: DAE4 Sn771

Medium: Head 850 MHz

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.88 \text{ mho/m}$ ;  $\epsilon_r = 40.5$ ;  $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature:  $23.0^\circ\text{C}$       Liquid Temperature:  $22.5^\circ\text{C}$

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

Probe: ES3DV3 - SN3149 ConvF(6.56, 6.56, 6.56)

**System Validation /Area Scan (101x101x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
Maximum value of SAR (interpolated) = 2.53 mW/g

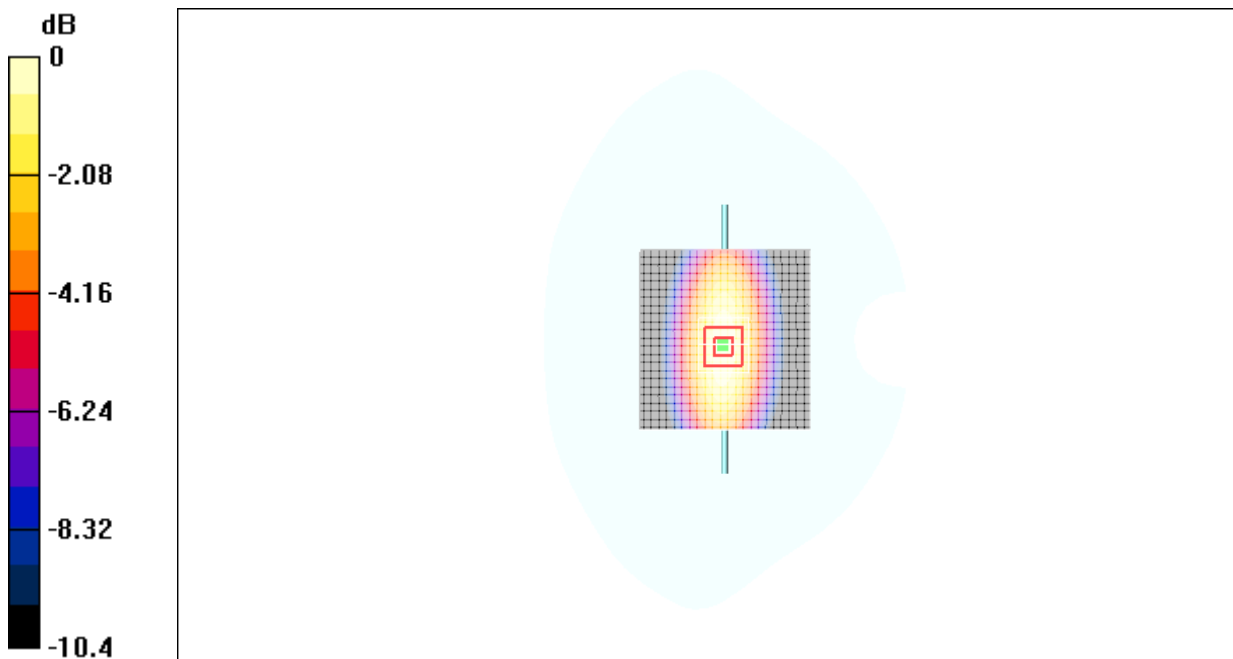
**System Validation /Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 55.1 V/m; Power Drift = 0.093 dB

Peak SAR (extrapolated) = 3.32 W/kg

**SAR(1 g) = 2.31 mW/g; SAR(10 g) = 1.51 mW/g**

Maximum value of SAR (measured) = 2.44 mW/g



0 dB = 2.44mW/g

**Fig.49 validation 835MHz 250mW**



## 835MHz

Date/Time: 2011-11-10 13:15:36

Electronics: DAE4 Sn771

Medium: Body 850 MHz

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.95 \text{ mho/m}$ ;  $\epsilon_r = 53.9$ ;  $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature:  $23.0^\circ\text{C}$       Liquid Temperature:  $22.5^\circ\text{C}$

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

Probe: ES3DV3 - SN3149 ConvF(6.22, 6.22, 6.22)

**System Validation /Area Scan (101x101x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
Maximum value of SAR (interpolated) =  $2.57 \text{ mW/g}$

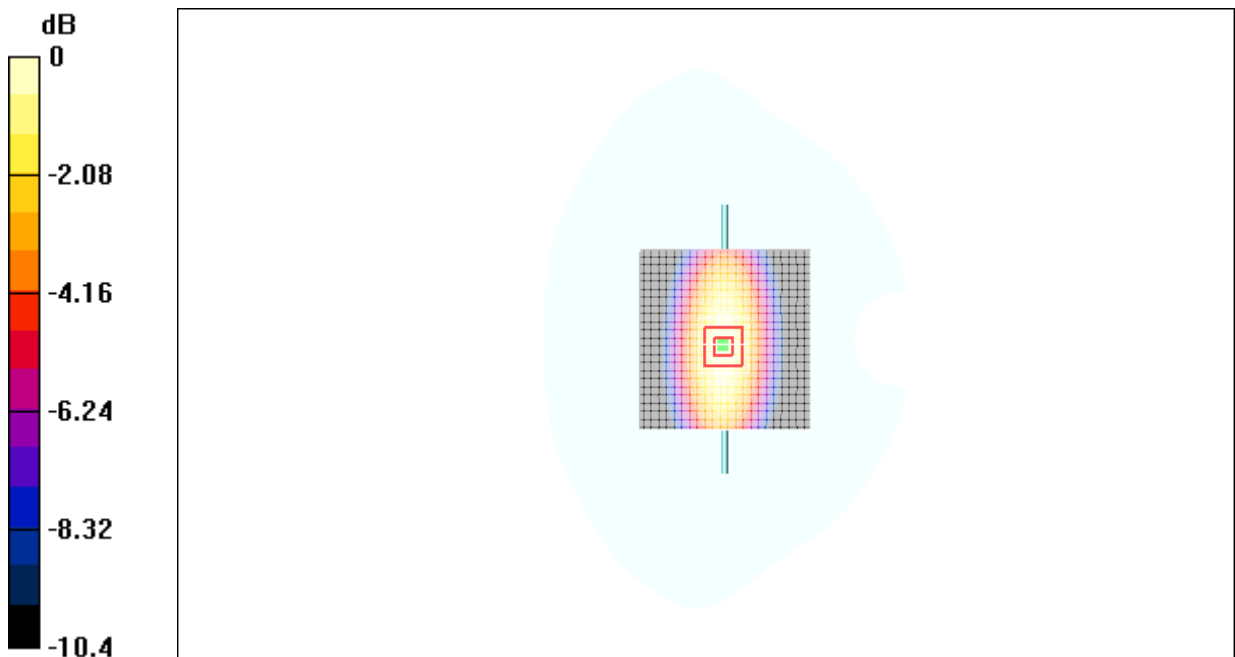
**System Validation /Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  
 $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $51.8 \text{ V/m}$ ; Power Drift =  $-0.081 \text{ dB}$

Peak SAR (extrapolated) =  $3.34 \text{ W/kg}$

**SAR(1 g) =  $2.35 \text{ mW/g}$ ; SAR(10 g) =  $1.53 \text{ mW/g}$**

Maximum value of SAR (measured) =  $2.43 \text{ mW/g}$



0 dB =  $2.43\text{mW/g}$

**Fig.50 validation 835MHz 250mW**

## 1900MHz

Date/Time: 2011-11-11 7:28:37

Electronics: DAE4 Sn771

Medium: Head 1900 MHz

Medium parameters used:  $f = 1900 \text{ MHz}$ ;  $\sigma = 1.39 \text{ mho/m}$ ;  $\epsilon_r = 39.0$ ;  $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature:  $23.0^\circ\text{C}$       Liquid Temperature:  $22.5^\circ\text{C}$

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

Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

**System Validation/Area Scan (101x101x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
Maximum value of SAR (interpolated) =  $11.4 \text{ mW/g}$

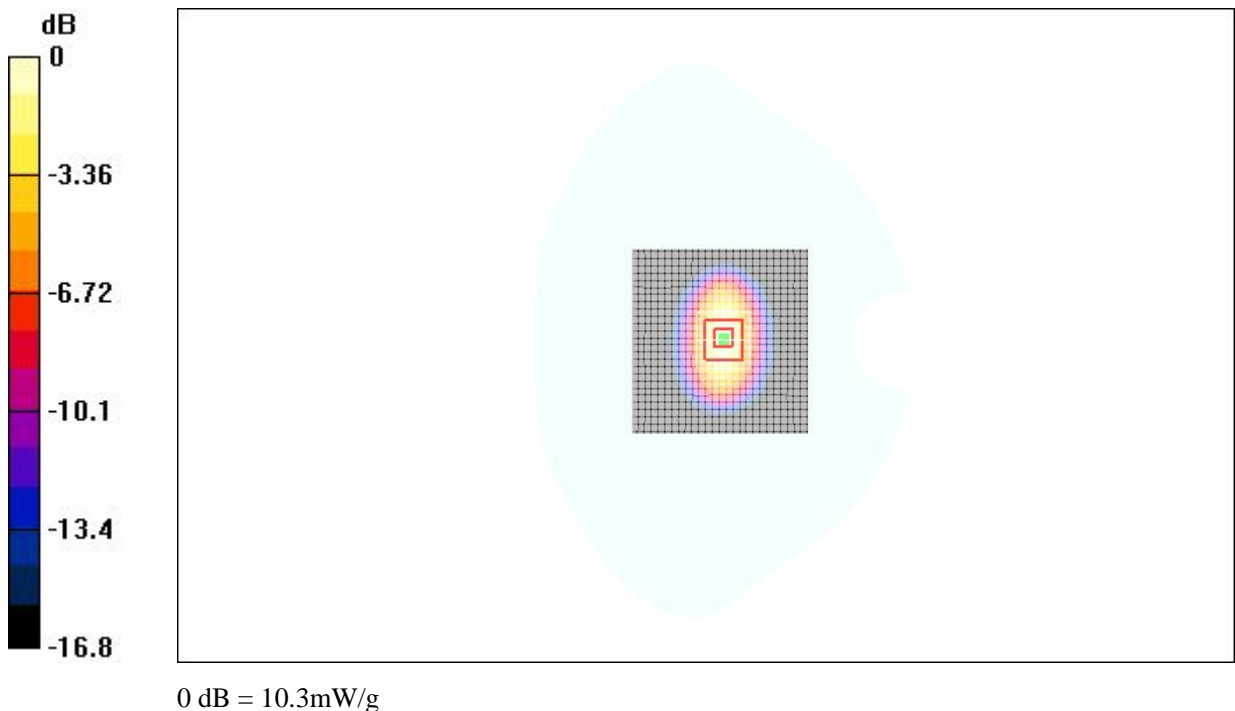
**System Validation/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $88.2 \text{ V/m}$ ; Power Drift =  $-0.059 \text{ dB}$

Peak SAR (extrapolated) =  $14.5 \text{ W/kg}$

**SAR(1 g) =  $9.72 \text{ mW/g}$ ; SAR(10 g) =  $4.91 \text{ mW/g}$**

Maximum value of SAR (measured) =  $10.3 \text{ mW/g}$



**Fig.51 validation 1900MHz 250mW**

## 1900MHz

Date/Time: 2011-11-11 13:20:09

Electronics: DAE4 Sn771

Medium: Body 1900 MHz

Medium parameters used:  $f = 1900 \text{ MHz}$ ;  $\sigma = 1.50 \text{ mho/m}$ ;  $\epsilon_r = 51.3$ ;  $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature:  $23.0^\circ\text{C}$       Liquid Temperature:  $22.5^\circ\text{C}$

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

Probe: ES3DV3 - SN3149 ConvF(4.68, 4.68, 4.68)

**System Validation/Area Scan (101x101x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
Maximum value of SAR (interpolated) =  $11.5 \text{ mW/g}$

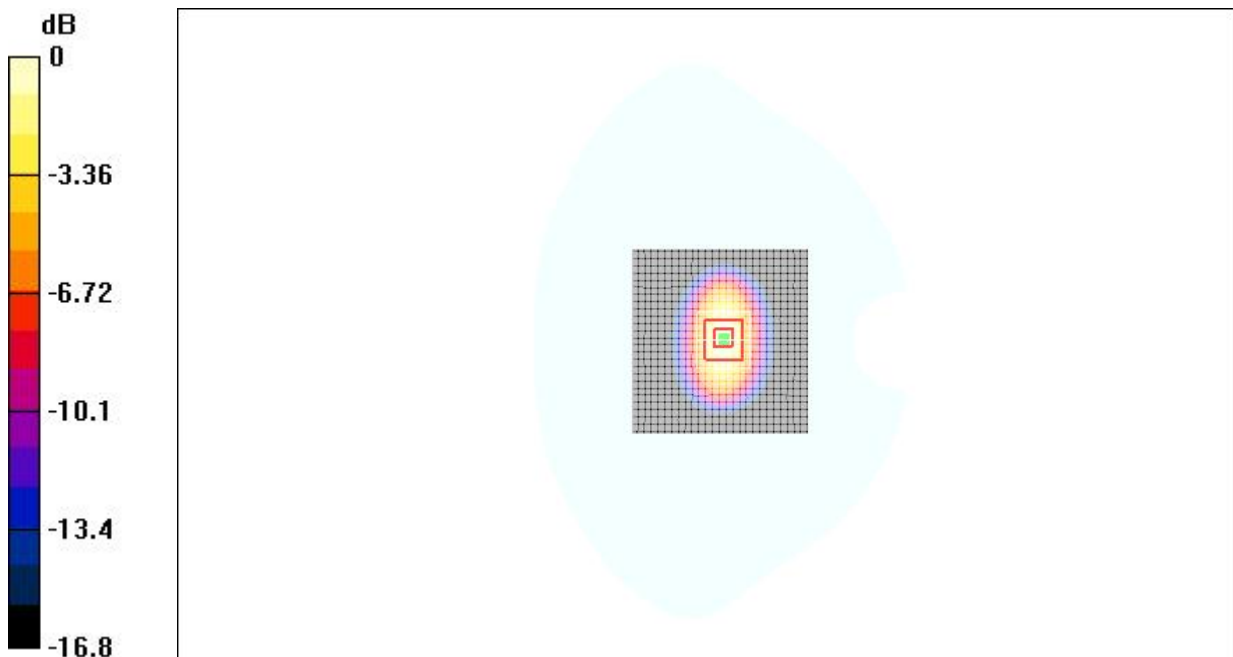
**System Validation/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  
 $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $92.0 \text{ V/m}$ ; Power Drift =  $-0.057 \text{ dB}$

Peak SAR (extrapolated) =  $14.9 \text{ W/kg}$

**SAR(1 g) =  $10.2 \text{ mW/g}$ ; SAR(10 g) =  $5.13 \text{ mW/g}$**

Maximum value of SAR (measured) =  $10.7 \text{ mW/g}$



0 dB =  $10.7 \text{ mW/g}$

**Fig.52 validation 1900MHz 250mW**

## ANNEX E 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 **TMC China**

Certificate No: **ES3DV3-3149\_Sep11**

### CALIBRATION CERTIFICATE

Object	<b>ES3DV3-SN: 3149</b>
Calibration procedure(s)	<b>QA CAL-01.v6 Calibration procedure for dosimetric E-field probes</b>
Calibration date:	<b>September 24, 2011</b>
Condition of the calibrated item	<b>In Tolerance</b>

This calibration certify 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 at an environment temperature (22±3)°C and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID#	Cal Data (Calibrated by, Certification NO.)	Scheduled Calibration
Power meter E4419B	GB41293874	5-May-11 (METAS, NO. 251-00388)	May-12
Power sensor E4412A	MY41495277	5-May-11 (METAS, NO. 251-00388)	May-12
Reference 3 dB Attenuator	SN:S5054 (3c)	11-Aug-11 (METAS, NO. 251-00403)	Aug-12
Reference 20 dB Attenuator	SN:S5086 (20b)	3-May-11 (METAS, NO. 251-00389)	May-12
Reference 30 dB Attenuator	SN:S5129 (30b)	11-Aug-11 (METAS, NO. 251-00404)	Aug-12
DAE4	SN:617	10-Jun-11 (SPEAG, NO.DAE4-907_Jun11)	Jun-12
Reference Probe ES3DV2	SN: 3013	12-Jan-11 (SPEAG, NO. ES3-3013_Jan11)	Jan-12

Secondary Standards	ID#	Check Data (in house)	Scheduled Calibration
RF generator HP8648C	US3642U01700	4-Aug-99(SPEAG, in house check Oct-10)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01(SPEAG, in house check Nov-10)	In house check: Nov-11

Name	Function	Signature
Calibrated by: Katja Pokovic	Technical Manager	

Approved by: Niels Kuster	Quality Manager	
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Issued: **September 24, 2011**

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

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



**S** Schweizerischer Kalibrierdienst  
**S** Service suisse d'étalonnage  
**C** 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
ConF	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:**

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

**Methods Applied and Interpretation of Parameters:**

- **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.

ES3DV3 SN: 3149

September 24, 2011

# Probe ES3DV3

**SN: 3149**

Manufactured: June 12, 2007

Calibrated: September 24, 2011

Calibrated for DASY/EASY System

(Note: non-compatible with DASY2 system!)

ES3DV3 SN: 3149

September 24, 2011

**DASY/EASY – Parameters of Probe: ES3DV3 - SN:3149**

**Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ( $\mu V/(V/m)^2$ ) <sup>A</sup>	1.14	1.23	1.29	$\pm 10.1\%$
DCP (mV) <sup>B</sup>	94	95	91	

**Modulation Calibration Parameters**

UID	Communication System Name	PAR		A dB	B dBuV	C	VR mV	Unc <sup>E</sup> (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	300.0	$\pm 1.5\%$
			Y	0.00	0.00	1.00	300.0	
			Z	0.00	0.00	1.00	300.0	

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

<sup>A</sup> The uncertainties of NormX, Y, Z do not affect the E<sup>2</sup>-field uncertainty inside TSL (see Page 5 and 6).

<sup>B</sup> Numerical linearization parameter: uncertainty not required.

<sup>E</sup> Uncertainty is determined using the maximum deviation from linear response applying recatangular distribution and is expressed for the square of the field value.

ES3DV3 SN: 3149

September 24, 2011

## DASY/EASY – Parameters of Probe: ES3DV3 - SN:3149

### Calibration Parameter Determined in Head Tissue Simulating Media

f[MHz] <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
850	41.5	0.90	6.56	6.56	6.56	0.91	1.13	±12.0%
900	41.5	0.97	6.34	6.34	6.34	0.83	1.26	±12.0%
1800	40.0	1.40	5.18	5.18	5.18	0.69	1.47	±12.0%
1900	40.0	1.40	5.03	5.03	5.03	0.72	1.38	±12.0%
2100	39.8	1.49	4.58	4.58	4.58	0.66	1.34	±12.0%
2450	39.2	1.80	4.35	4.35	4.35	0.67	1.36	±12.0%

<sup>C</sup> Frequency validity of ±100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ±50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

<sup>F</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.



ES3DV3 SN: 3149

September 24, 2011

## DASY/EASY – Parameters of Probe: ES3DV3 - SN:3149

### Calibration Parameter Determined in Body Tissue Simulating Media

f[MHz] <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
850	55.2	0.97	6.22	6.22	6.22	0.76	1.26	±12.0%
900	55.0	1.05	6.02	6.02	6.02	0.99	1.06	±12.0%
1800	53.3	1.52	4.97	4.97	4.97	0.75	1.34	±12.0%
1900	53.3	1.52	4.68	4.68	4.68	0.62	1.33	±12.0%
2100	53.5	1.57	4.35	4.35	4.35	0.68	1.34	±12.0%
2450	52.7	1.95	4.13	4.13	4.13	0.71	1.35	±12.0%

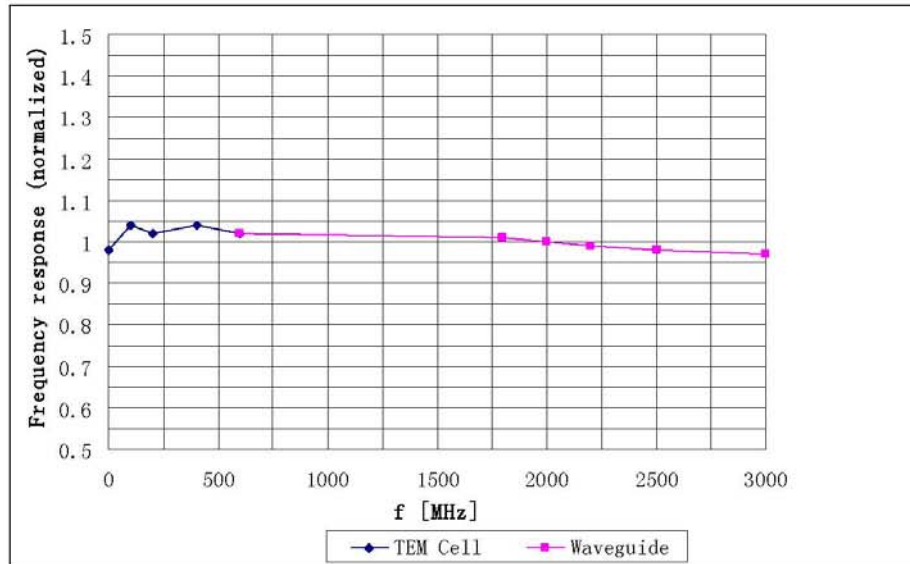
<sup>C</sup> Frequency validity of ±100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ±50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

<sup>F</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

ES3DV3 SN: 3149

September 24, 2011

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

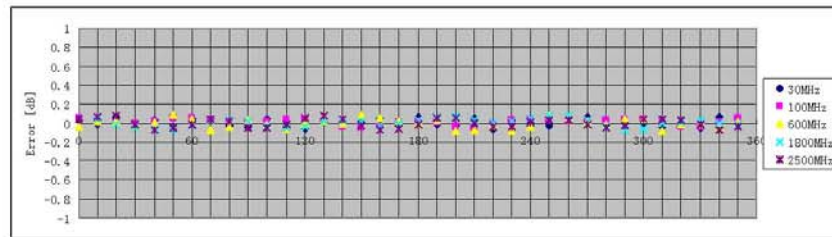
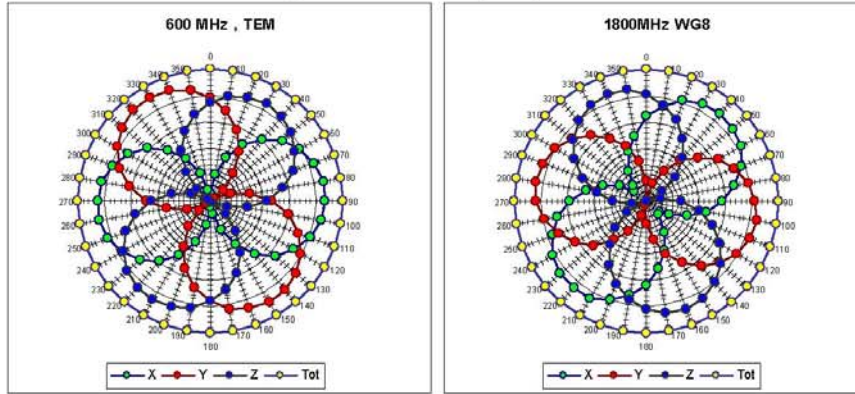


Uncertainty of Frequency Response of E-field:  $\pm 5.0\%$  (k=2)

ES3DV3 SN: 3149

September 24, 2011

### Receiving Pattern ( $\phi$ ), $\theta = 0^\circ$

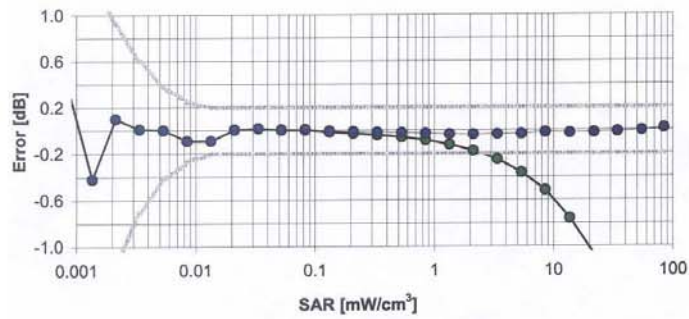
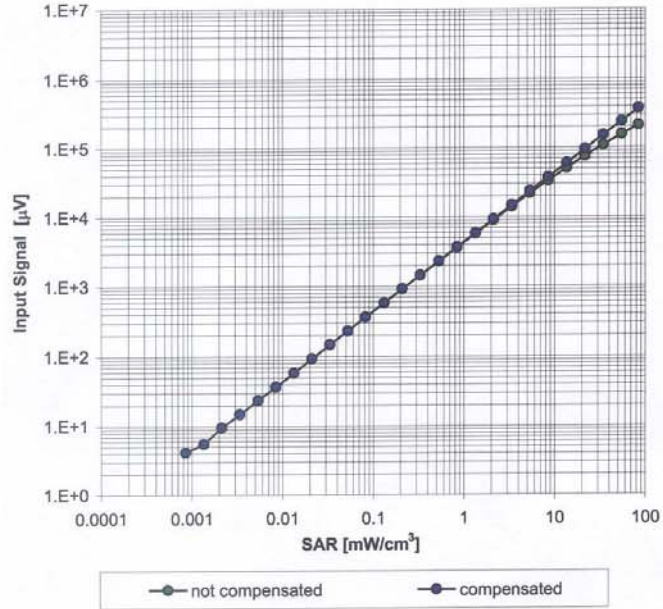


Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  (k=2)

ES3DV3 SN: 3149

September 24, 2011

### Dynamic Range $f(\text{SAR}_{\text{head}})$ (Waveguide: WG8, $f = 1800 \text{ MHz}$ )

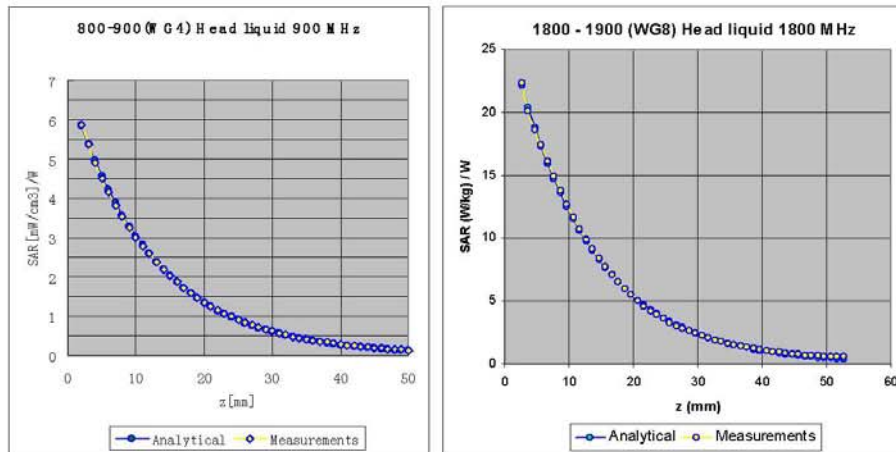


Uncertainty of Linearity Assessment:  $\pm 0.5\%$  ( $k=2$ )

ES3DV3 SN: 3149

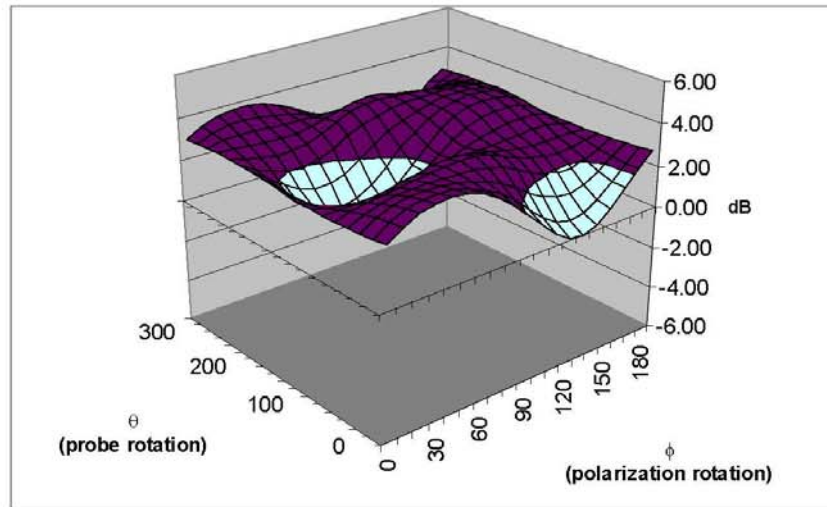
September 24, 2011

## Conversion Factor Assessment



## Deviation from Isotropy

Error ( $\phi, \theta$ ),  $f = 900$  MHz



Uncertainty of Spherical Isotropy Assessment:  $\pm 2.5\%$  ( $k=2$ )

ES3DV3 SN: 3149

September 24, 2011


**DASY/EASY – Parameters of Probe: ES3DV3 - SN:3149****Other Probe Parameters**


Sensor Arrangement	Triangular
Connector Angle ( ° )	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	2 mm


## ANNEX F DIPOLE CALIBRATION CERTIFICATE

### 835 MHz Dipole Calibration Certificate

工业和信息化部通信计量中心  
Telecommunication Metrology Center of MIIT







校准  
CNAS L0442

Client **TMC** Certificate No: **D835V2-443\_Feb10**

### CALIBRATION CERTIFICATE

Object: **D835V2 - SN: 443**

Calibration Procedure(s): **TMC-XZ-01-027  
Calibration procedure for dipole validation kits**

Calibration date: **February 26, 2010**

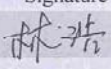
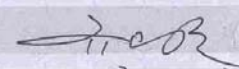
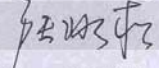
Condition of the calibrated item: **In Tolerance**

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 NRVD	101253	04-Sep-09 (TMC, No.JZ09-248)	Jun-10
Power sensor NRV-Z5	100333	04-Sep-09 (TMC, No. JZ09-248)	Jun-10
Reference Probe ES3DV3	SN 3149	25-Sep-09(SPEAG, No.ES3-3149_Sep09)	Sep-10
DAE4	SN 771	19-Nov-09(SPEAG, No.DAE4-771_Nov09)	Nov-10
RF generator E4438C	MY45092879	18-Jun-09(TMC, No.JZ09-302)	Jun-10
Network Analyzer 8753E	US38433212	29-Aug-09(TMC, No.JZ09-056)	Aug-10

	Name	Function	Signature
Calibrated by:	Lin Hao	SAR Test Engineer	
Reviewed by:	Qi Dianyuan	SAR Project Leader	
Approved by:	Lu Bingsong	Deputy Director of the laboratory	

Issued: February 26, 2010

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

Certificate No: D835V2-443\_Feb10

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**Glossary:**

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM <sub>x,y,z</sub>
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 300MHz to 3GHz)", 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:**

- DASY System Handbook

**Methods Applied and Interpretation of Parameters:**

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



### Measurement Conditions

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

DASY Version	DASY5	V5.0
Extrapolation	Advanced Extrapolation	
Phantom	2mm Oval Phantom ELI4	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz $\pm$ 1 MHz	

### Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	41.6 $\pm$ 6 %	0.92mho/m $\pm$ 6 %
Head TSL temperature during test	(21.7 $\pm$ 0.2) °C	----	----

### SAR result with Head TSL

SAR averaged over 1 $cm^3$ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.38 mW / g
SAR normalized	normalized to 1W	9.52 mW / g
SAR for nominal Head TSL parameters <sup>1</sup>	normalized to 1W	<b>9.41 mW / g <math>\pm</math> 17.0 % (k=2)</b>

SAR averaged over 10 $cm^3$ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.54 mW / g
SAR normalized	normalized to 1W	6.16 mW / g
SAR for nominal Head TSL parameters <sup>1</sup>	normalized to 1W	<b>6.12 mW / g <math>\pm</math> 16.5 % (k=2)</b>

<sup>1</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

### 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	54.5 ± 6%	0.97mho/m ± 6 %
Body TSL temperature during test	(21.9 ± 0.2) °C	----	----

### SAR result with Body TSL

SAR averaged over 1 $cm^3$ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.41 mW / g
SAR normalized	normalized to 1W	9.64 mW / g
SAR for nominal Body TSL parameters <sup>2</sup>	normalized to 1W	<b>9.57 mW / g ± 17.0 % (k=2)</b>

SAR averaged over 10 $cm^3$ (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	1.57 mW / g
SAR normalized	normalized to 1W	6.28 mW / g
SAR for nominal Body TSL parameters <sup>2</sup>	normalized to 1W	<b>6.24 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	53.7Ω - 3.7 jΩ
Return Loss	- 25.9dB

### Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.4Ω - 5.1 jΩ
Return Loss	-25.6dB

### General Antenna Parameters and Design

Electrical Delay (one direction)	1.387 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	September 3, 2001

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**DASY5 Validation Report for Head TSL**

Date/Time: 2010-2-26 14:31:40

Test Laboratory: TMC, Beijing, China

DUT: Dipole 835 MHz; Type: D835V2; Serial: SN: 443

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

Medium: Head 835MHz

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.92 \text{ mho/m}$ ;  $\epsilon_r = 41.6$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3149; ConvF(6.56, 6.56, 6.56); Calibrated: 25.09.09
- Electronics: DAE4 Sn771; Calibration: 19.11.09
- Phantom: 2mm Oval Phantom ELI4; Type: QDOVA001BB
- Measurement SW: DASY5, V5.0 Build 119.9; Postprocessing SW: SEMCAD, V13.2 Build 87

Pin=250mW; d=15mm/Zoom Scan (7x7x7)/Cube 0:

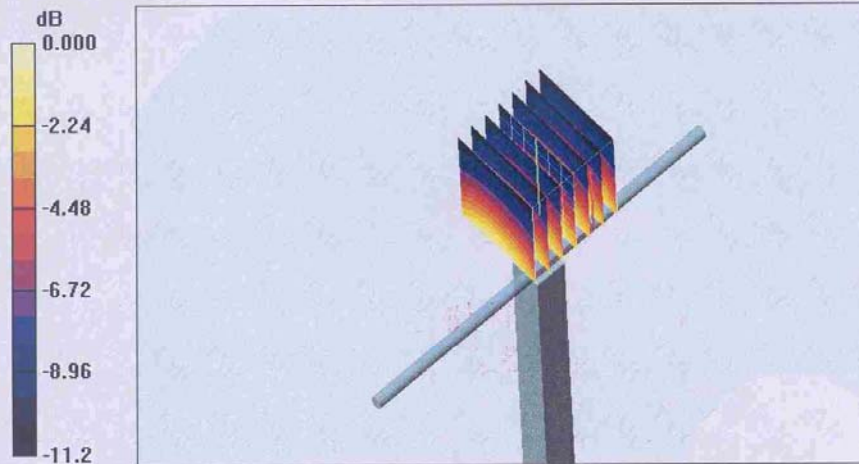
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.8 V/m; Power Drift = -0.037 dB

Peak SAR (extrapolated) = 3.11 W/kg

SAR(1 g) = 2.38 mW/g; SAR(10 g) = 1.54 mW/g

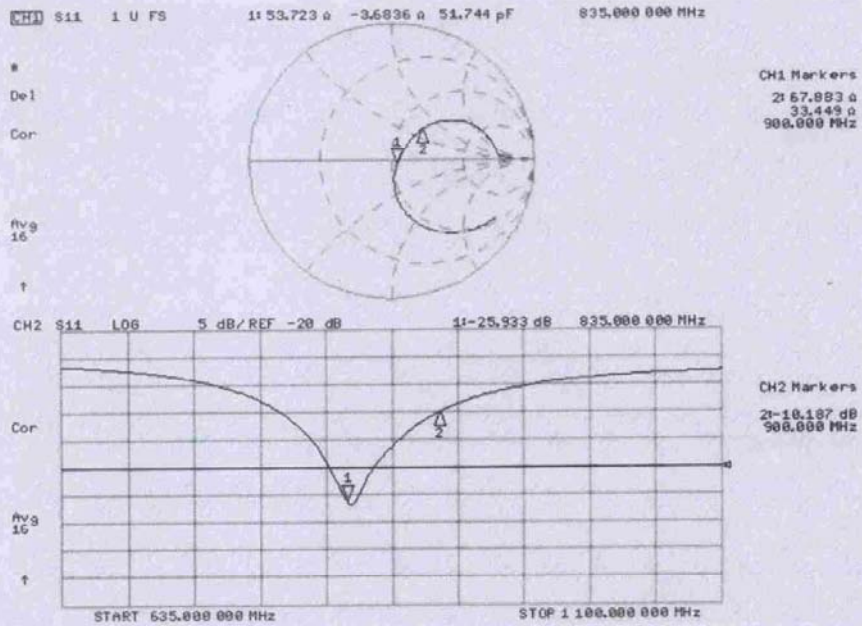
Maximum value of SAR (measured) = 2.71 mW/g



0 dB = 2.71mW/g

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Impedance Measurement Plot for Head TSL



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**DASY5 Validation Report for Body TSL**

Date/Time: 2010-2-26 9:52:36

Test Laboratory: TMC, Beijing, China

DUT: Dipole 835 MHz; Type: D835V2; Serial: SN: 443

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

Medium: Body 835MHz

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.97 \text{ mho/m}$ ;  $\epsilon_r = 54.5$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3149; ConvF(6.22, 6.22, 6.22); Calibrated: 25.09.09
- Electronics: DAE4 Sn771; Calibration: 19.11.09
- Phantom: 2mm Oval Phantom ELI4; Type: QDOVA001BB
- Measurement SW: DASY5, V5.0 Build 119.9; Postprocessing SW: SEMCAD, V13.2 Build 87

**Pin=250mW; d=15mm/Zoom Scan (7x7x7)/Cube 0:**

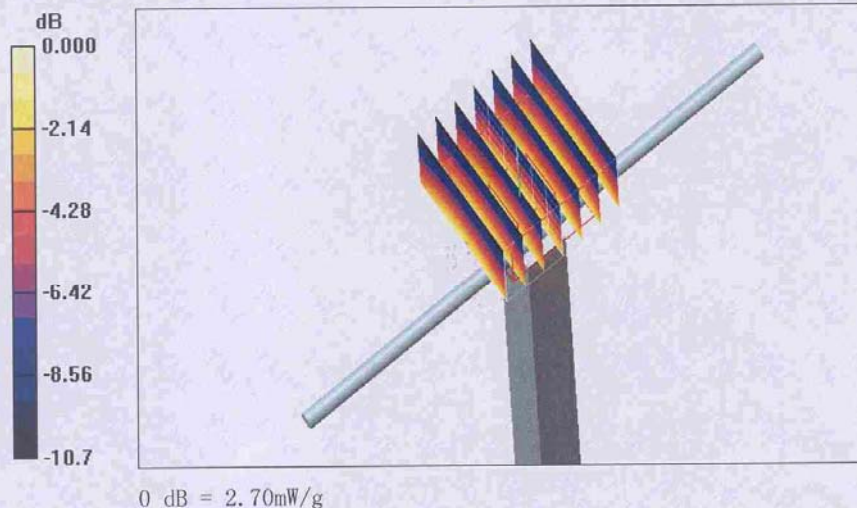
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.0 V/m; Power Drift = -0.025 dB

Peak SAR (extrapolated) = 3.78 W/kg

SAR(1 g) = 2.41 mW/g; SAR(10 g) = 1.57 mW/g

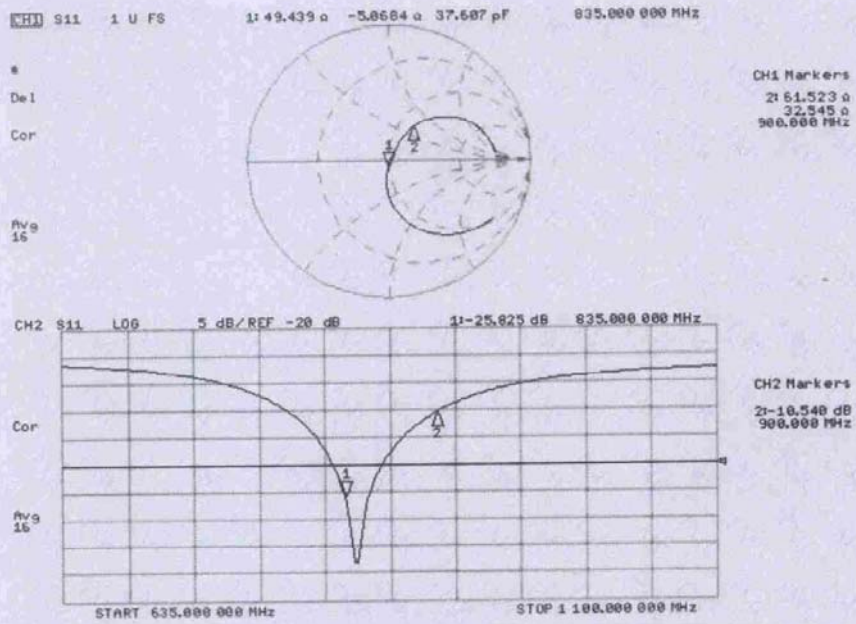
Maximum value of SAR (measured) = 2.70 mW/g



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Impedance Measurement Plot for Body TSL



1900 MHz Dipole Calibration Certificate

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校准  
CNAS L0442

Client: **TMC** Certificate No: **D1900V2-541\_Feb10**

**CALIBRATION CERTIFICATE**

Object: D1900V2 - SN: 541

Calibration Procedure(s): TMC-XZ-01-027  
Calibration procedure for dipole validation kits

Calibration date: February 26, 2010

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 NRVD	101253	04-Sep-09 (TMC, No. JZ09-248)	Sep-10
Power sensor NRV-Z5	100333	04-Sep-09 (TMC, No. JZ09-248)	Sep-10
Reference Probe ES3DV3	SN 3149	25-Sep-09(SPEAG, No.ES3-3149_Sep09)	Sep-10
DAE4	SN 771	19-Nov-09(SPEAG, No.DAE4-771_Nov09)	Nov-10
RF generator E4438C	MY45092879	18-Jun-09(TMC, No.JZ09-302)	Jun-10
Network Analyzer 8753E	US38433212	29-Aug-09(TMC, No.JZ09-056)	Aug-10

	Name	Function	Signature
Calibrated by:	Lin Hao	SAR Test Engineer	
Reviewed by:	Qi Dianyuan	SAR Project Leader	
Approved by:	Lu Bingsong	Deputy Director of the laboratory	

Issued: February 26, 2010

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Certificate No: D1900V2-541\_Feb10

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**Glossary:**

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

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

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

**Additional Documentation:**

- d) DASY System Handbook

**Methods Applied and Interpretation of Parameters:**

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

### Measurement Conditions

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

DASY Version	DASY5	V5.0
Extrapolation	Advanced Extrapolation	
Phantom	2mm Oval Phantom EL14	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz $\pm$ 1 MHz	

### Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	39.6 $\pm$ 6 %	1.40mho/m $\pm$ 6 %
Head TSL temperature during test	(21.9 $\pm$ 0.2) °C	----	----

### SAR result with Head TSL

SAR averaged over 1 $cm^3$ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.91 mW / g
SAR normalized	normalized to 1W	39.6 mW / g
SAR for nominal Head TSL parameters <sup>1</sup>	normalized to 1W	39.4 mW /g $\pm$ 17.0 % (k=2)

SAR averaged over 10 $cm^3$ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.05 mW / g
SAR normalized	normalized to 1W	20.2 mW / g
SAR for nominal Head TSL parameters <sup>1</sup>	normalized to 1W	20.1 mW /g $\pm$ 16.5 % (k=2)

<sup>1</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

### 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	52.5 ± 6%	1.51 mho/m ± 6 %
Body TSL temperature during test	(21.8 ± 0.2) °C	----	----

### SAR result with Body TSL

SAR averaged over 1 $cm^3$ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.4 mW / g
SAR normalized	normalized to 1W	41.6 mW / g
SAR for nominal Body TSL parameters <sup>2</sup>	normalized to 1W	<b>41.4 mW /g ± 17.0 % (k=2)</b>

SAR averaged over 10 $cm^3$ (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	5.24 mW / g
SAR normalized	normalized to 1W	21.0 mW / g
SAR for nominal Body TSL parameters <sup>2</sup>	normalized to 1W	<b>20.9 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	$54.8\Omega + 4.0 j\Omega$
Return Loss	- 23.7dB

### Antenna Parameters with Body TSL

Impedance, transformed to feed point	$47.9\Omega + 7.1 j\Omega$
Return Loss	- 22.6dB

### General Antenna Parameters and Design

Electrical Delay (one direction)	1.201 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 4, 2001

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**DASY5 Validation Report for Head TSL**

Date/Time: 2010-2-26 15:20:47

Test Laboratory: TMC, Beijing, China

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: SN: 541

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

Medium: Head 1900MHz

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.40$  mho/m;  $\epsilon_r = 39.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3149; ConvF(5.03, 5.03, 5.03); Calibrated: 25.09.09
- Electronics: DAE4 Sn771; Calibration: 19.11.09
- Phantom: 2mm Oval Phantom ELI4; Type: QDOVA001BB
- Measurement SW: DASY5, V5.0 Build 119.9; Postprocessing SW: SEMCAD, V13.2 Build 87

Pin=250mW; d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 85.1 V/m; Power Drift = -0.057 dB

Peak SAR (extrapolated) = 18.8 W/kg

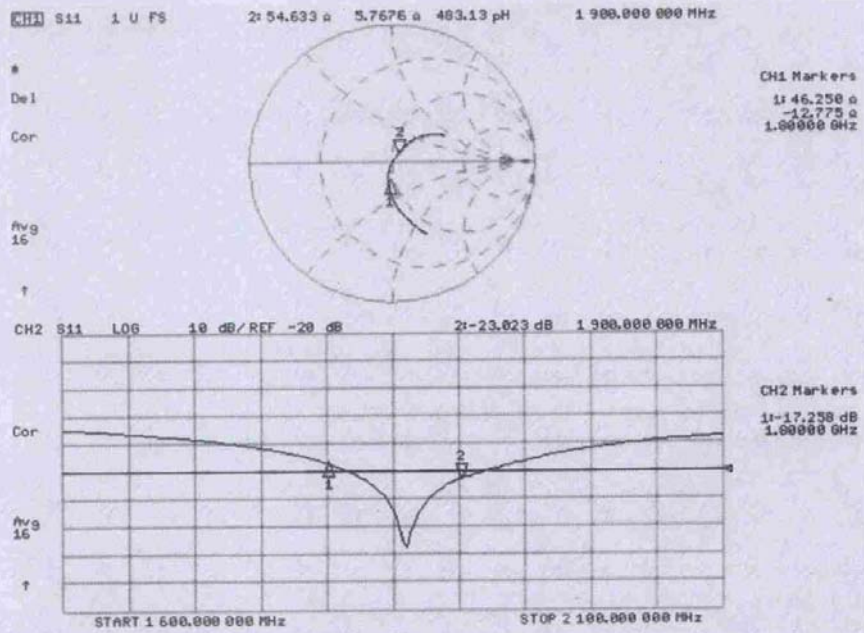
SAR(1 g) = 9.91 mW/g; SAR(10 g) = 5.05 mW/g

Maximum value of SAR (measured) = 11.5 mW/g



0 dB = 11.5mW/g

Impedance Measurement Plot for Head TSL



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**DASY5 Validation Report for Body TSL**

Date/Time: 2010-2-26 10:41:08

Test Laboratory: TMC, Beijing, China

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: SN: 541

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

Medium: Body 1900MHz

Medium parameters used:  $f = 1900 \text{ MHz}$ ;  $\sigma = 1.51 \text{ mho/m}$ ;  $\epsilon_r = 52.5$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3149; ConvF(4.68, 4.68, 4.68); Calibrated: 25.09.09
- Electronics: DAE4 Sn771; Calibration: 19.11.09
- Phantom: 2mm Oval Phantom ELI4; Type: QDOVA001BB
- Measurement SW: DASY5, V5.0 Build 119.9; Postprocessing SW: SEMCAD, V13.2 Build 87

Pin=250mW; d=10mm/Zoom Scan (7x7x7)/Cube 0:

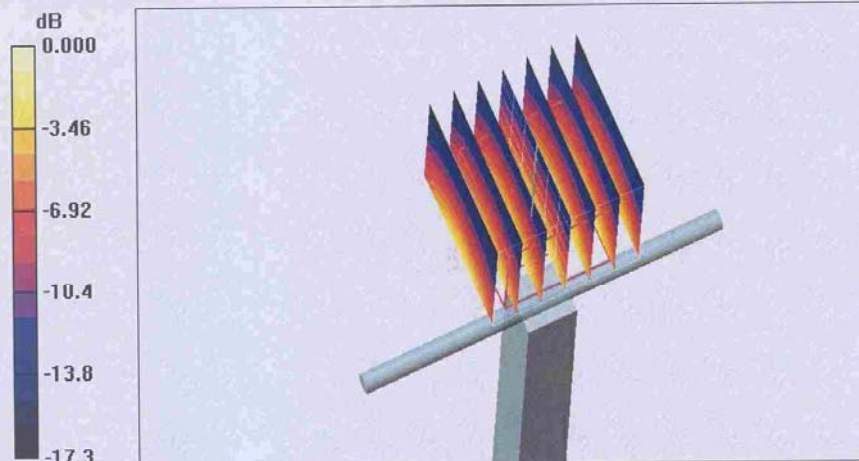
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 80.2 V/m; Power Drift = -0.009 dB

Peak SAR (extrapolated) = 19.1 W/kg

SAR(1 g) = 10.4 mW/g; SAR(10 g) = 5.24 mW/g

Maximum value of SAR (measured) = 12.0 mW/g



0 dB = 12.0mW/g

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### Impedance Measurement Plot for Body TSL

CH1 S11 1 U FS 21 47.564  $\alpha$  7.0098  $\alpha$  507.18 pH 1 900.000 000 MHz

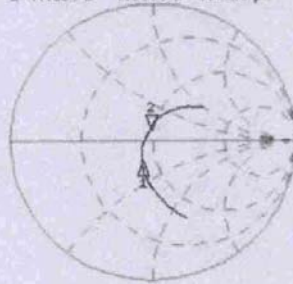
#

De1

Cor

avg

16



CH1 Markers

11-41.211  $\alpha$

-13.982  $\alpha$

1.90000 GHz

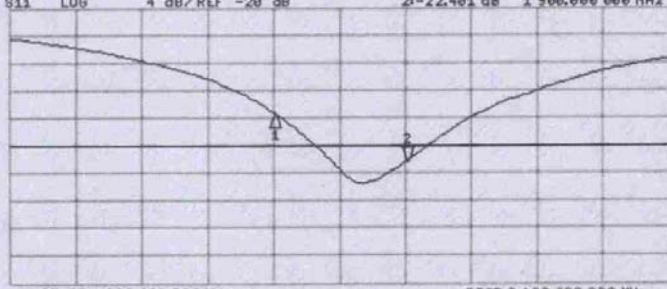
CH2 S11 LOG 4 dB/REF -20 dB 21-22.401 dB 1 900.000 000 MHz

#

Cor

avg

16



CH2 Markers

11-15.338 dB

1.90000 GHz

START 1 900.000 000 MHz

STOP 2 1 000.000 000 MHz