



# SAR TEST REPORT

No. 2009SAR00161

**For**

**LTT Card Services, INC  
GSM Mobile Phone**

**X3**

**With**

**Hardware Version: V1.1**

**Software Version: F1\_DHDZ-ENX\_900-LATI--**

**MCP\_NWLS2-HW\_V1.0-SW\_VOO1**

**FCCID: XUMPREX3**

**Issued Date: 2009-10-28**



**No. DAT-P-114/01-01**

**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 MII  
Address: No 52, Huayuan beilu, Haidian District, Beijing, P.R.China  
Postal Code: 100083  
Telephone: +86-10-62303288  
Fax: +86-10-62304793

### 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: Sun Qian  
Test Engineer: Lin Xiaojun  
Testing Start Date: October 23, 2009  
Testing End Date: October 24, 2009

### 1.4 Signature



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Lin Xiaojun

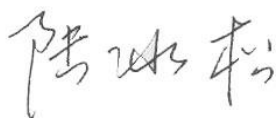
(Prepared this test report)



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Sun Qian

(Reviewed this test report)



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Lu Bingsong

Deputy Director of the laboratory

(Approved this test report)

## **2 Client Information**

### **2.1 Applicant Information**

Company Name: LTT Card Services, INC  
Address /Post: PO Box 194625 San Juan, Puerto Rico 00919-4625 United States  
City:  
Postal Code: /  
Country: USA  
Telephone: 00787-273-2100  
Fax: /

### **2.2 Manufacturer Information**

Company Name: General Electric Communication Limited  
Address /Post: Unit 1017, Tian An Cyber Times Tower A, Futian District, Shenzhen, China  
City: Shenzhen, Guangdong  
Postal Code: /  
Country: P. R. China  
Telephone: /  
Fax: /

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

#### 3.1 About EUT

EUT Description: GSM mobile phone  
Model Name: X3  
Trade Name: Premier  
GSM Frequency Band: GSM 850/GSM 1900



Picture 1: Constituents of the sample

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

N/A

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

AE ID*	Description	Model	SN	Manufacturer
AE1	Travel Adapter	TN0500550D-08	\	DTN
AE2	Battery	\	\	BK
AE3	Headset	\	\	\

\*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 50361–2001:** Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones.

**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)

**IEC 62209-2 (Draft):** Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures – Part 2: Procedure to determine the Specific Absorption Rate (SAR) in the head and body for 30MHz to 6GHz Handheld and Body-Mounted Devices used in close proximity to the Body.

They specify the measurement method for demonstration of compliance with the SAR limits for such equipments.

## **5 OPERATIONAL CONDITIONS DURING TEST**

### **5.1 Schematic Test Configuration**

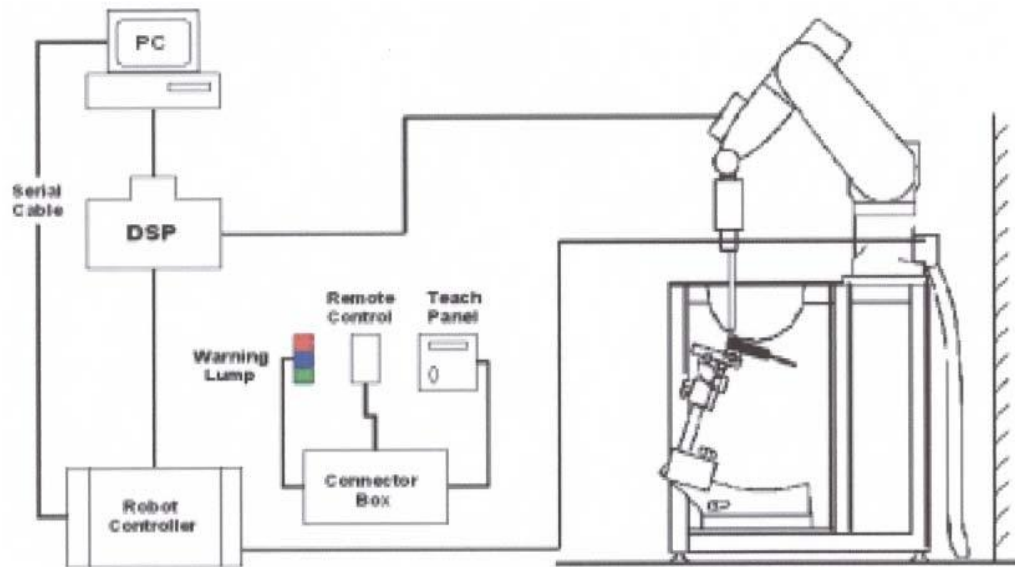
During SAR test, EUT is in Traffic Mode (Channel Allocated) at Normal Voltage Condition. A communication link is set up with a System Simulator (SS) by air link, and a call is established. The Absolute Radio Frequency Channel Number (ARFCN) is allocated to 128, 190 and 251 respectively in the case of 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 2: 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
Frequency	10 MHz to 4 GHz; Linearity: $\pm 0.2 \text{ dB}$ (30 MHz to 4 GHz)
Directivity	$\pm 0.2 \text{ dB}$ in HSL (rotation around probe axis)
	$\pm 0.3 \text{ dB}$ in tissue material (rotation normal to probe axis)



**Picture 3: ES3DV3 E-field Probe**



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



**Picture4: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  $\pm$  0.25dB. The sensitivity parameters (NormX, NormY, NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested.

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies 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 5: 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



## 5.6 Equivalent Tissues

**Picture 6: Generic Twin Phantom**

The liquid used for the frequency range of 800-2000 MHz consisted of water, sugar, salt 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

### 5.7.1 Robotic 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 LABORATORY ENVIRONMENT

**Table 3: The Ambient Conditions during EMF Test**

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5 $\Omega$
Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

## 7 CONDUCTED OUTPUT POWER MEASUREMENT

### 7.1 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 and ERP for the EUT. In all cases, the measured peak output power should be greater and within 5% than EMI measurement.

### 7.2 Conducted Power

#### 7.2.1 Measurement Methods

The EUT was set up for the maximum output power. The channel power was measured with Agilent Spectrum Analyzer E4440A. These measurements were done at low, middle and high channels.

#### 7.2.2 Measurement result

**Table 4: Conducted Power Measurement Results**

850MHZ	Conducted Power (dBm)		
	Channel 251(848.8MHz)	Channel 190(836.6MHz)	Channel 128(824.2MHz)
	31.46	31.55	32.01
1900MHZ	Conducted Power (dBm)		
	Channel 810(1909.8MHz)	Channel 661(1880MHz)	Channel 512(1850.2MHz)
	29.12	29.13	29.15

#### 7.2.3 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 8 to Table 11 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 5%.

## 8 TEST RESULTS

### 8.1 Dielectric Performance

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

Measurement is made at temperature 23.3 °C and relative humidity 49%.			
Liquid temperature during the test: 22.5°C			
Measurement Date : 850 MHz <u>Oct 23,2009</u> 1900 MHz <u>Oct 24,2009</u>			
/	Frequency	Permittivity $\epsilon$	Conductivity $\sigma$ (S/m)
Target value	850 MHz	41.5	0.90
	1900 MHz	40.0	1.40
Measurement value (Average of 10 tests)	850 MHz	40.3	0.92
	1900 MHz	39.2	1.42

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

Measurement is made at temperature 23.3 °C and relative humidity 49%.			
Liquid temperature during the test: 22.5°C			
Measurement Date : 850 MHz <u>Oct 23,2009</u> 1900 MHz <u>Oct 24,2009</u>			
/	Frequency	Permittivity $\epsilon$	Conductivity $\sigma$ (S/m)
Target value	850 MHz	55.2	0.97
	1900 MHz	53.3	1.52
Measurement value (Average of 10 tests)	850 MHz	53.7	1.01
	1900 MHz	52.3	1.56

**Table 7: System Validation**

Measurement is made at temperature 23.3 °C and relative humidity 49%.							
Liquid temperature during the test: 22.5°C							
Measurement Date : 850 MHz <u>Oct 23,2009</u> 1900 MHz <u>Oct 24,2009</u>							
Liquid parameters	Dipole calibration Target value	Frequency		Permittivity $\epsilon$		Conductivity $\sigma$ (S/m)	
		835 MHz		39.9		0.88	
		1900 MHz		38.9		1.38	
	Actual Measurement value	835 MHz		40.4		0.90	
		1900 MHz		39.2		1.42	
	Verification results	Frequency		Target value (W/kg)		Measured value (W/kg)	
						Deviation	
		10 g	1 g	10 g	1 g	10 g	1 g
		Average	Average	Average	Average	Average	Average
	835 MHz	1.60	2.48	1.62	2.50	1.25%	0.81%
	1900 MHz	5.09	9.73	5.27	9.91	3.54%	1.85%

Note: Target values are the data of the dipole validation results, please check Annex F for the Dipole Calibration Certificate.

### 8.3 Summary of Measurement Results (850MHz)

**Table 8: SAR Values (850MHz-Head)**

Limit of SAR (W/kg)	10 g	1 g	Power Drift (dB)
	Average	Average	
	2.0	1.6	
Test Case	Measurement Result (W/kg)		
	10 g Average	1 g Average	
Left hand, Touch cheek, Top frequency(See Fig.1)	0.634	0.917	-0.151
Left hand, Touch cheek, Mid frequency(See Fig.3)	0.543	0.784	-0.195
Left hand, Touch cheek, Bottom frequency(See Fig.4)	0.595	0.857	-0.133
Left hand, Tilt 15 Degree, Top frequency(See Fig.5)	0.345	0.469	-0.137
Left hand, Tilt 15 Degree, Mid frequency(See Fig.6)	0.298	0.401	-0.063
Left hand, Tilt 15 Degree, Bottom frequency(See Fig.7)	0.330	0.443	-0.088
Right hand, Touch cheek, Top frequency(See Fig.8)	0.482	0.803	-0.070
Right hand, Touch cheek, Mid frequency(See Fig.9)	0.429	0.623	0.105
Right hand, Touch cheek, Bottom frequency(See Fig.10)	0.445	0.751	0.069
Right hand, Tilt 15 Degree, Top frequency(See Fig.11)	0.388	0.535	0.040
Right hand, Tilt 15 Degree, Mid frequency(See Fig.12)	0.349	0.475	-0.074
Right hand, Tilt 15 Degree, Bottom frequency(See Fig.13)	0.365	0.498	-0.119

**Table 9: SAR Values (850MHz-Body)**

Limit of SAR (W/kg)	10 g Average	1g Average	Power Drift (dB)
	2.0	1.6	
Test Case	Measurement Result (W/kg)		
	10 g Average	1 g Average	
Body, Towards Ground, Top frequency with GPRS(See Fig.14)	0.756	1.07	-0.092
Body, Towards Ground, Mid frequency with GPRS (See Fig.15)	0.780	1.1	-0.146
Body, Towards Ground, Bottom frequency with GPRS(See Fig.16)	0.803	1.13	-0.126
Body, Towards Ground, Bottom frequency with Headset(See Fig.18)	0.421	0.589	-0.094

#### 8.4 Summary of Measurement Results (1900MHz)

**Table 10: SAR Values (1900MHz-Head)**

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, Top frequency(See Fig.19)	0.380	0.688	0.056
Left hand, Touch cheek, Mid frequency(See Fig.20)	0.465	0.835	-0.093
Left hand, Touch cheek, Bottom frequency(See Fig.21)	0.648	1.17	-0.070
Left hand, Tilt 15 Degree, Top frequency(See Fig.23)	0.120	0.199	0.142
Left hand, Tilt 15 Degree, Mid frequency(See Fig.24)	0.154	0.251	0.037
Left hand, Tilt 15 Degree, Bottom frequency(See Fig.25)	0.153	0.256	-0.090
Right hand, Touch cheek, Top frequency(See Fig.26)	0.316	0.525	0.044
Right hand, Touch cheek, Mid frequency(See Fig.27)	0.409	0.671	0.131
Right hand, Touch cheek, Bottom frequency(See Fig.28)	0.501	0.817	-0.068
Right hand, Tilt 15 Degree, Top frequency(See Fig.29)	0.151	0.256	0.162
Right hand, Tilt 15 Degree, Mid frequency(See Fig.30)	0.173	0.289	-0.076
Right hand, Tilt 15 Degree, Bottom frequency(See Fig.31)	0.191	0.318	0.108

**Table 11: SAR Values (1900MHz-Body)**

Limit of SAR (W/kg)	10 g Average	1g Average	Power Drift (dB)
	2.0	1.6	
Test Case	Measurement Result (W/kg)		
	10 g Average	1 g Average	
Body, Towards Ground, Top frequency with GPRS(See Fig.32)	0.275	0.446	-0.195
Body, Towards Ground, Mid frequency with GPRS(See Fig.34)	0.219	0.352	-0.116
Body, Towards Ground, Bottom frequency with GPRS (See Fig.35)	0.105	0.170	-0.108
Body, Towards Ground, Top frequency with Headset (See Fig.36)	0.127	0.205	0.098



## 8.5 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.

## 9 Measurement Uncertainty

SN	a	Type	c	d	$e = f(d,k)$	f	$h = c \times f / e$	k
	Uncertainty Component		Tol. ( $\pm$ %)	Prob. Dist.	Div.	$c_i$ (1 g)	$1 g$ $u_i$ ( $\pm$ %)	$v_i$
1	System repetivity	A	0.5	N	1	1	0.5	9
Measurement System								
2	Probe Calibration	B	5	N	2	1	2.5	$\infty$
3	Axial Isotropy	B	4.7	R	$\sqrt{3}$	$(1-cp)^{1/2}$	4.3	$\infty$
4	Hemispherical Isotropy	B	9.4	R	$\sqrt{3}$	$\sqrt{c_p}$		$\infty$
5	Boundary Effect	B	0.4	R	$\sqrt{3}$	1	0.23	$\infty$
6	Linearity	B	4.7	R	$\sqrt{3}$	1	2.7	$\infty$
7	System Detection Limits	B	1.0	R	$\sqrt{3}$	1	0.6	$\infty$
8	Readout Electronics	B	1.0	N	1	1	1.0	$\infty$
9	RF Ambient Conditions	B	3.0	R	$\sqrt{3}$	1	1.73	$\infty$
10	Probe Positioner Mechanical Tolerance	B	0.4	R	$\sqrt{3}$	1	0.2	$\infty$
11	Probe Positioning with respect to Phantom Shell	B	2.9	R	$\sqrt{3}$	1	1.7	$\infty$
12	Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	B	3.9	R	$\sqrt{3}$	1	2.3	$\infty$
Test sample Related								
13	Test Sample Positioning	A	4.9	N	1	1	4.9	N-1
14	Device Holder Uncertainty	A	6.1	N	1	1	6.1	N-1
15	Output Power Variation - SAR drift measurement	B	5.0	R	$\sqrt{3}$	1	2.9	$\infty$
Phantom and Tissue Parameters								
16	Phantom Uncertainty (shape and thickness tolerances)	B	1.0	R	$\sqrt{3}$	1	0.6	$\infty$
17	Liquid Conductivity - deviation from target values	B	5.0	R	$\sqrt{3}$	0.64	1.7	$\infty$
18	Liquid Conductivity - measurement B	B	5.0	N	1	0.64	1.7	M



	uncertainty							
19	Liquid Permittivity - deviation from target values	B	5.0	R	$\sqrt{3}$	0.6	1.7	$\infty$
20	Liquid Permittivity - measurement uncertainty	B	5.0	N	1	0.6	1.7	M
	Combined Standard Uncertainty			RSS			11.25	
	Expanded Uncertainty (95% CONFIDENCE INTERVAL)			K=2			22.5	

## 10 MAIN TEST INSTRUMENTS

**Table 12: List of Main Instruments**

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	HP 8753E	US38433212	August 30, 2009	One year
02	Power meter	NRVD	116153	June 20, 2009	One year
03	Power sensor	NRV-Z5	100333		
04	Power sensor	NRV-Z6	100011	September 2, 2009	One year
05	Signal Generator	E4433B	US37230472	September 4, 2009	One Year
06	Amplifier	VTL5400	0505	No Calibration Requested	
07	BTS	CMU 200	105948	August 15, 2009	One year
08	E-field Probe	SPEAG ES3DV3	3149	October 1, 2009	One year
09	DAE	SPEAG DAE4	771	November 20, 2008	One year
10	Dipole Validation Kit	SPEAG D835V2	443	February 18, 2009	Two years
11	Dipole Validation Kit	SPEAG D1900V2	541	February 19, 2009	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.

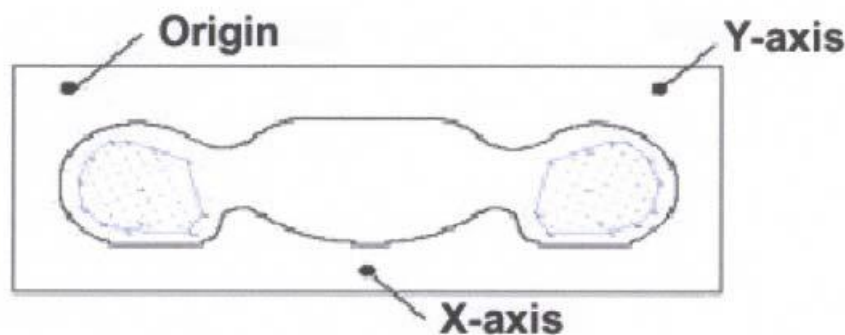
Step 3: Around this point, a volume of 30 mm x 30 mm x 30 mm was assessed by measuring 7 x 7x 7 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

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.

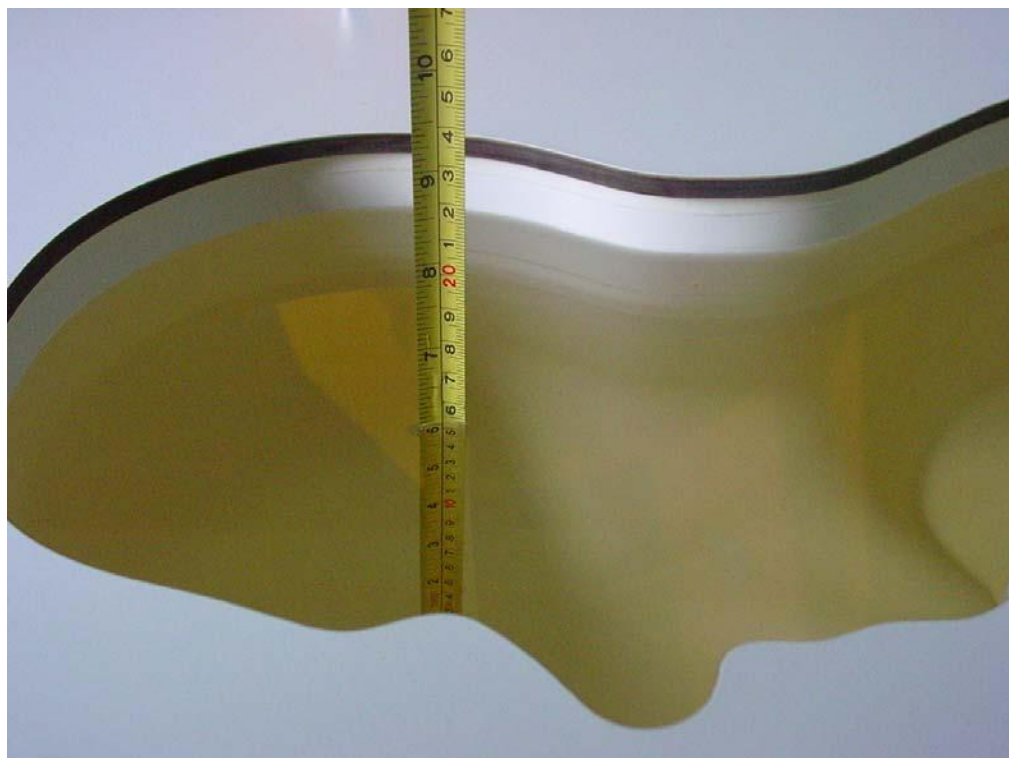


**Picture A: SAR Measurement Points in Area Scan**

## ANNEX B TEST LAYOUT



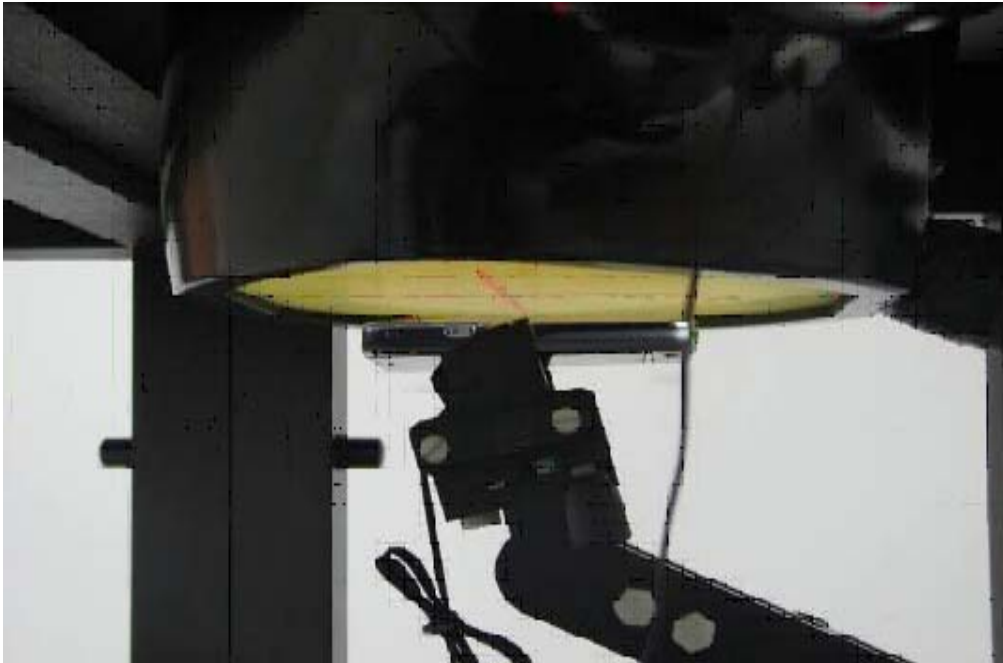
**Picture B1: Specific Absorption Rate Test Layout**



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



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



**Picture B4: the back side of the EUT**



**Picture B5: Cheek device with head phantom**



**Picture B6: Tilt device with head phantom**



**Picture B7: back side of the EUT in body position**



## ANNEX C GRAPH RESULTS

### 850 Left Cheek High

Date/Time: 2009-2-26 8:43:16

Electronics: DAE4 Sn771

Medium: Head 850

Medium parameters used (interpolated):  $f = 848.8$  MHz;  $\sigma = 0.92$  mho/m;  $\epsilon_r = 40.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°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 (61x121x1): Measurement grid:  $dx=10$ mm,  $dy=10$ mm

Maximum value of SAR (interpolated) = 0.970 mW/g

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

Reference Value = 7.48 V/m; Power Drift = -0.151 dB

Peak SAR (extrapolated) = 1.28 W/kg

SAR(1 g) = 0.917 mW/g; SAR(10 g) = 0.634 mW/g

Maximum value of SAR (measured) = 0.981 mW/g

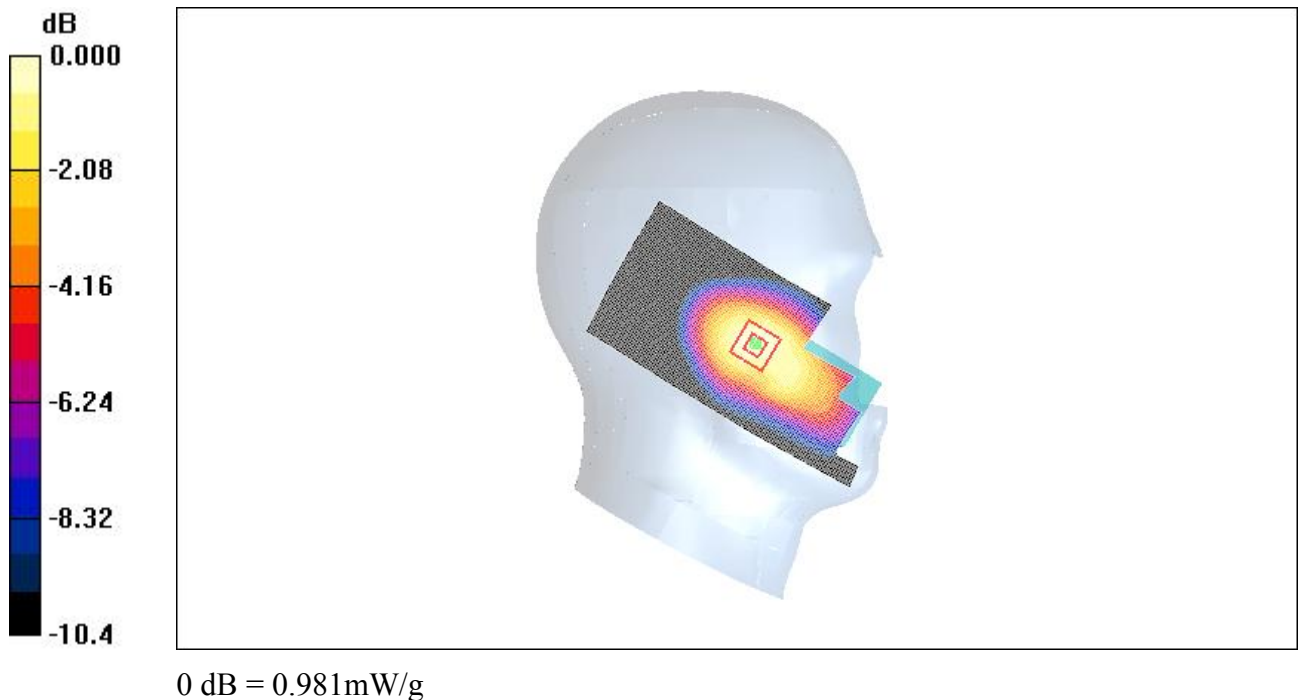
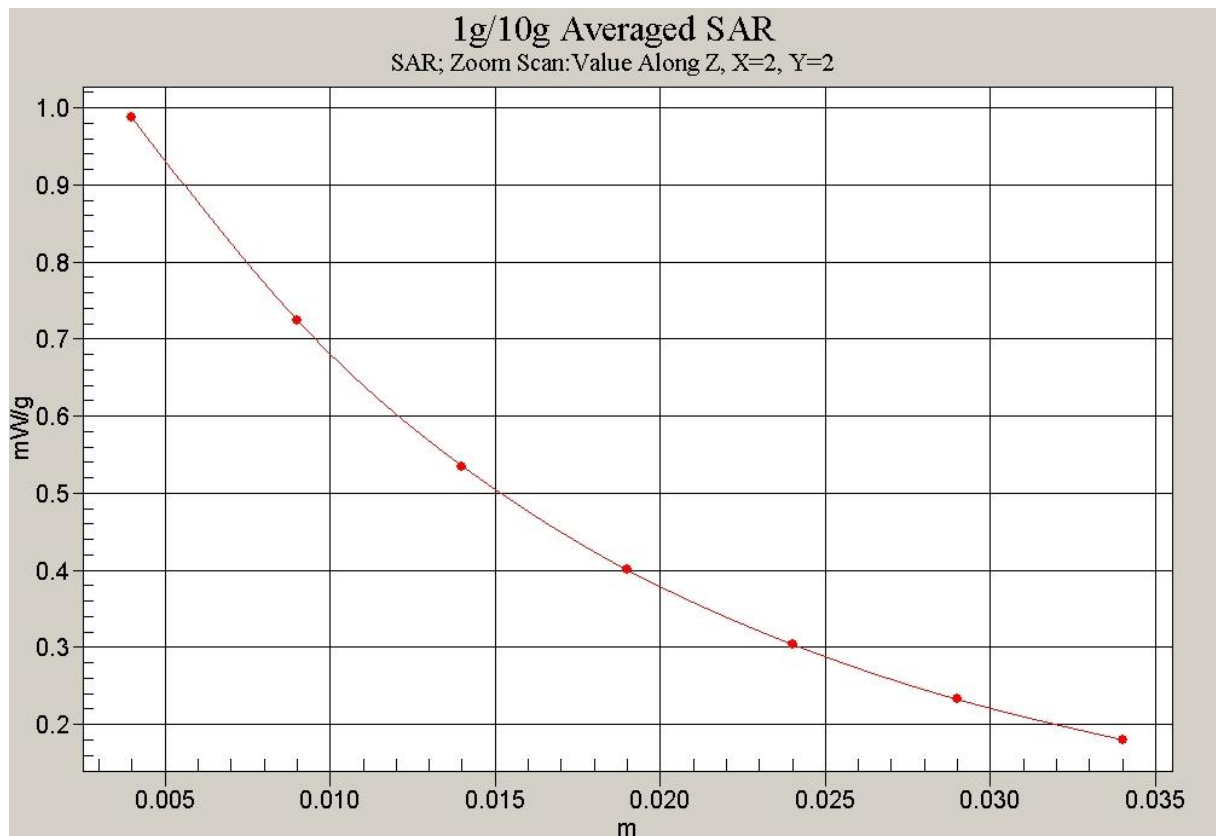


Fig. 1 850MHz CH251



**Fig. 2 Z-Scan at power reference point (850 MHz CH251)**



### 850 Left Cheek Middle

Date/Time: 2009-10-23 8:58:21

Electronics: DAE4 Sn771

Medium: Head 850

Medium parameters used (interpolated):  $f = 836.6$  MHz;  $\sigma = 0.908$  mho/m;  $\epsilon_r = 40.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°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 (61x121x1): Measurement grid:  $dx=10$ mm,  $dy=10$ mm

Maximum value of SAR (interpolated) = 0.828 mW/g

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

Reference Value = 6.62 V/m; Power Drift = -0.195 dB

Peak SAR (extrapolated) = 1.10 W/kg

SAR(1 g) = 0.784 mW/g; SAR(10 g) = 0.543 mW/g

Maximum value of SAR (measured) = 0.842 mW/g

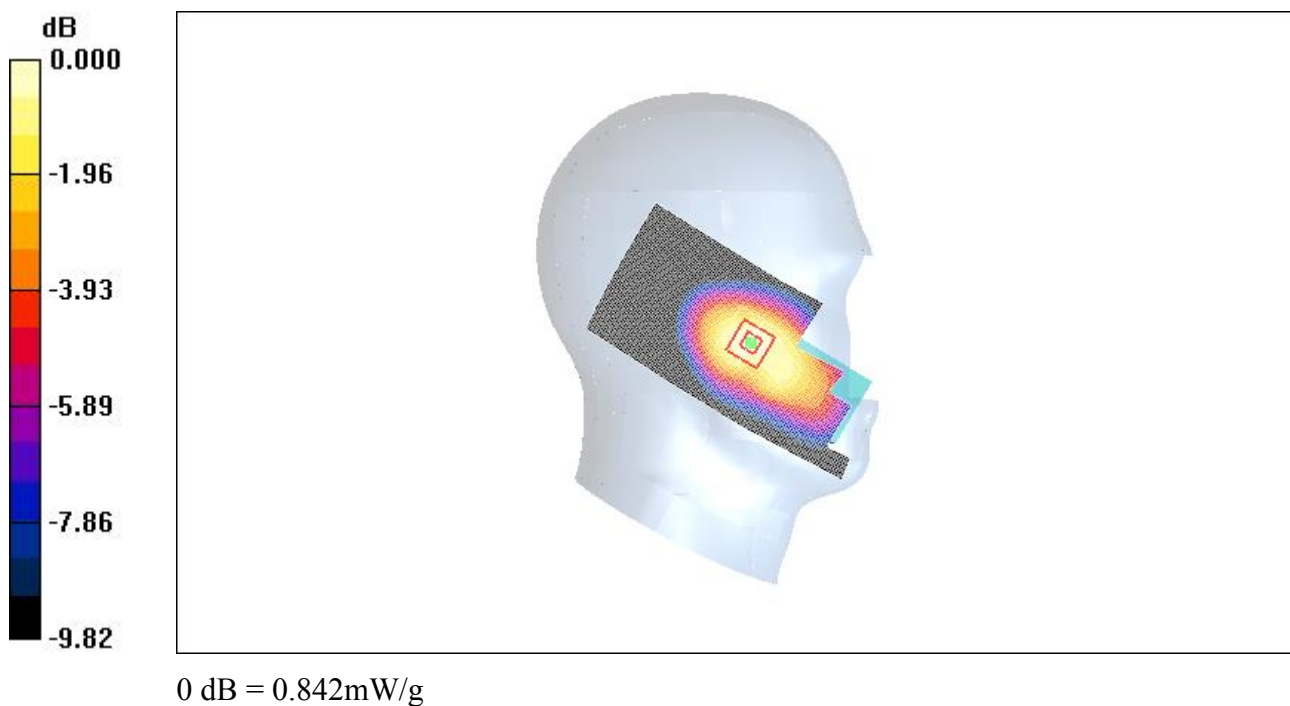


Fig. 3 850 MHz CH190

### 850 Left Cheek Low

Date/Time: 2009-10-23 9:13:35

Electronics: DAE4 Sn771

Medium: Head 850

Medium parameters used:  $f = 825$  MHz;  $\sigma = 0.896$  mho/m;  $\epsilon_r = 40.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°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 (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.902 mW/g

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

Reference Value = 6.97 V/m; Power Drift = -0.133 dB

Peak SAR (extrapolated) = 1.22 W/kg

SAR(1 g) = 0.857 mW/g; SAR(10 g) = 0.595 mW/g

Maximum value of SAR (measured) = 0.921 mW/g

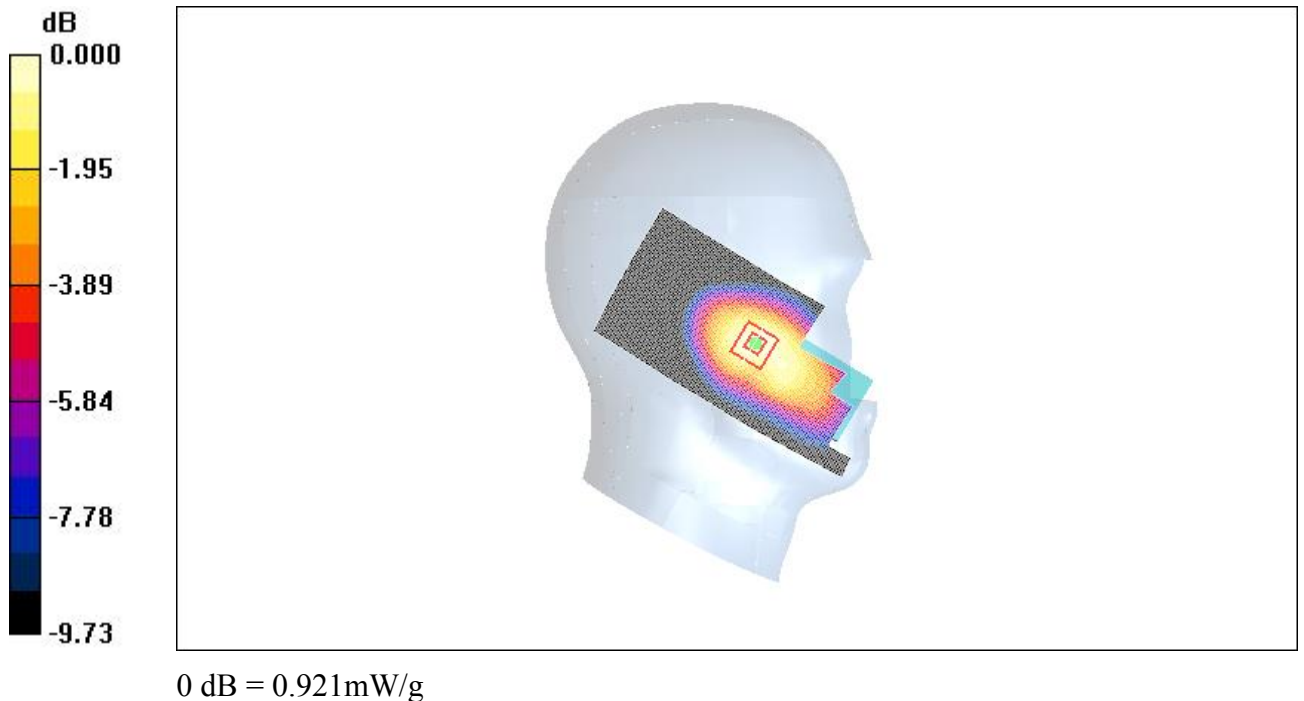


Fig. 4 850 MHz CH128

### 850 Left Tilt High

Date/Time: 2009-10-23 9:28:44

Electronics: DAE4 Sn771

Medium: Head 850

Medium parameters used (interpolated):  $f = 848.8$  MHz;  $\sigma = 0.92$  mho/m;  $\epsilon_r = 40.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°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 (61x121x1): Measurement grid:  $dx=10$ mm,  $dy=10$ mm

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

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

Reference Value = 8.77 V/m; Power Drift = -0.137 dB

Peak SAR (extrapolated) = 0.601 W/kg

SAR(1 g) = 0.469 mW/g; SAR(10 g) = 0.345 mW/g

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

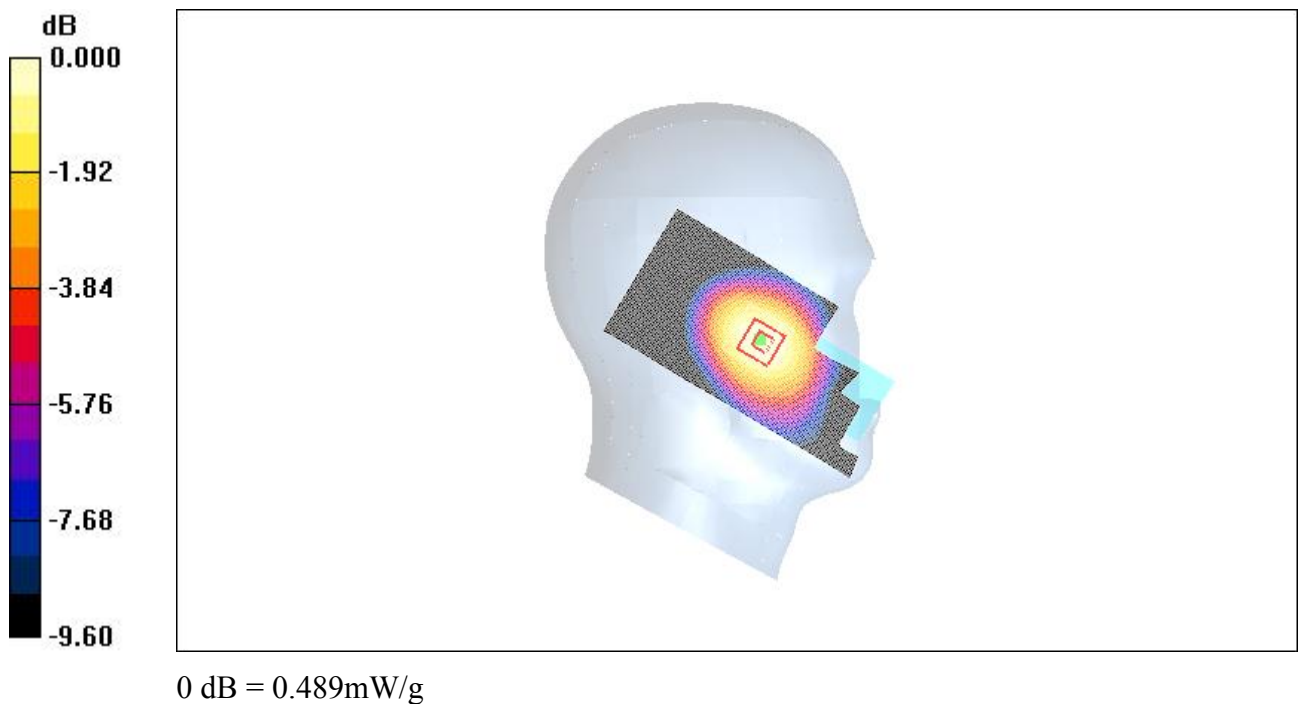


Fig.5 850 MHz CH251

### 850 Left Tilt Middle

Date/Time: 2009-10-23 9:43:59

Electronics: DAE4 Sn771

Medium: Head 850

Medium parameters used (interpolated):  $f = 836.6$  MHz;  $\sigma = 0.908$  mho/m;  $\epsilon_r = 40.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°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 (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.428 mW/g

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

Reference Value = 7.97 V/m; Power Drift = -0.063 dB

Peak SAR (extrapolated) = 0.509 W/kg

SAR(1 g) = 0.401 mW/g; SAR(10 g) = 0.298 mW/g

Maximum value of SAR (measured) = 0.419 mW/g

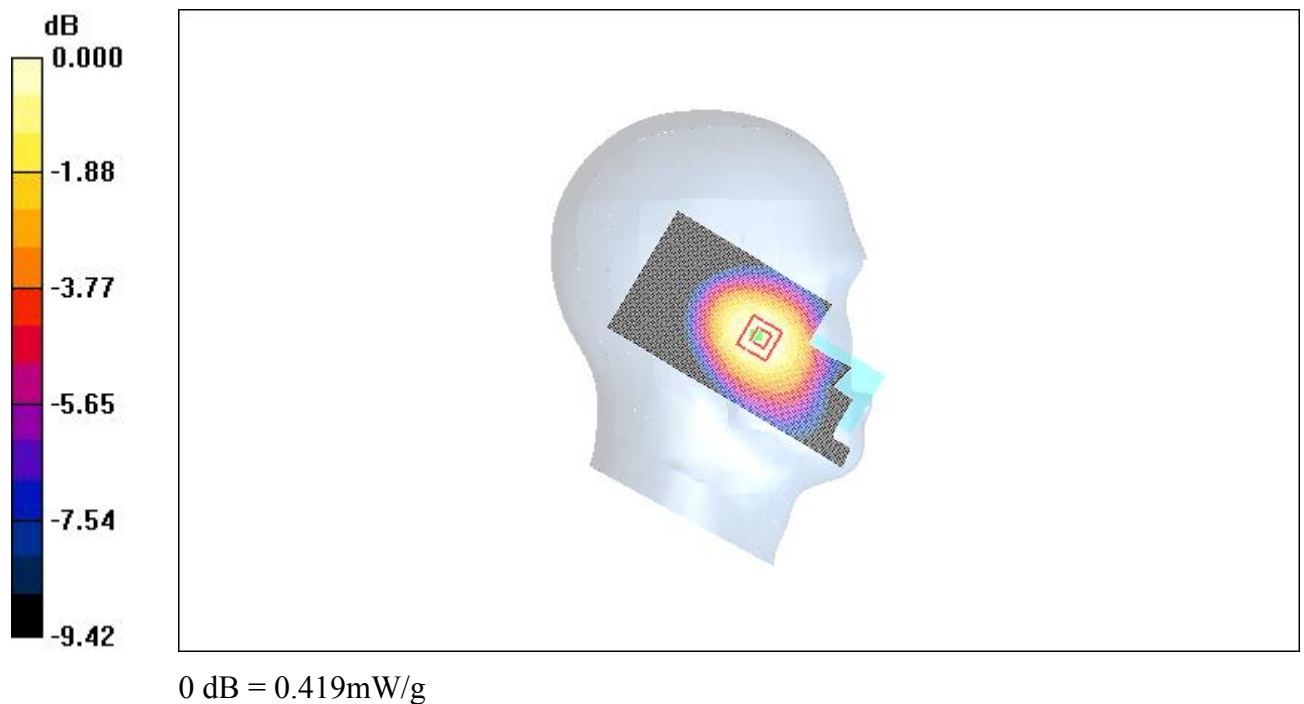


Fig.6 850 MHz CH190

### 850 Left Tilt Low

Date/Time: 2009-10-23 9:59:01

Electronics: DAE4 Sn771

Medium: Head 850

Medium parameters used:  $f = 825$  MHz;  $\sigma = 0.896$  mho/m;  $\epsilon_r = 40.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°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)

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

Maximum value of SAR (interpolated) = 0.486 mW/g

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

Reference Value = 8.97 V/m; Power Drift = -0.088 dB

Peak SAR (extrapolated) = 0.565 W/kg

SAR(1 g) = 0.443 mW/g; SAR(10 g) = 0.330 mW/g

Maximum value of SAR (measured) = 0.464 mW/g

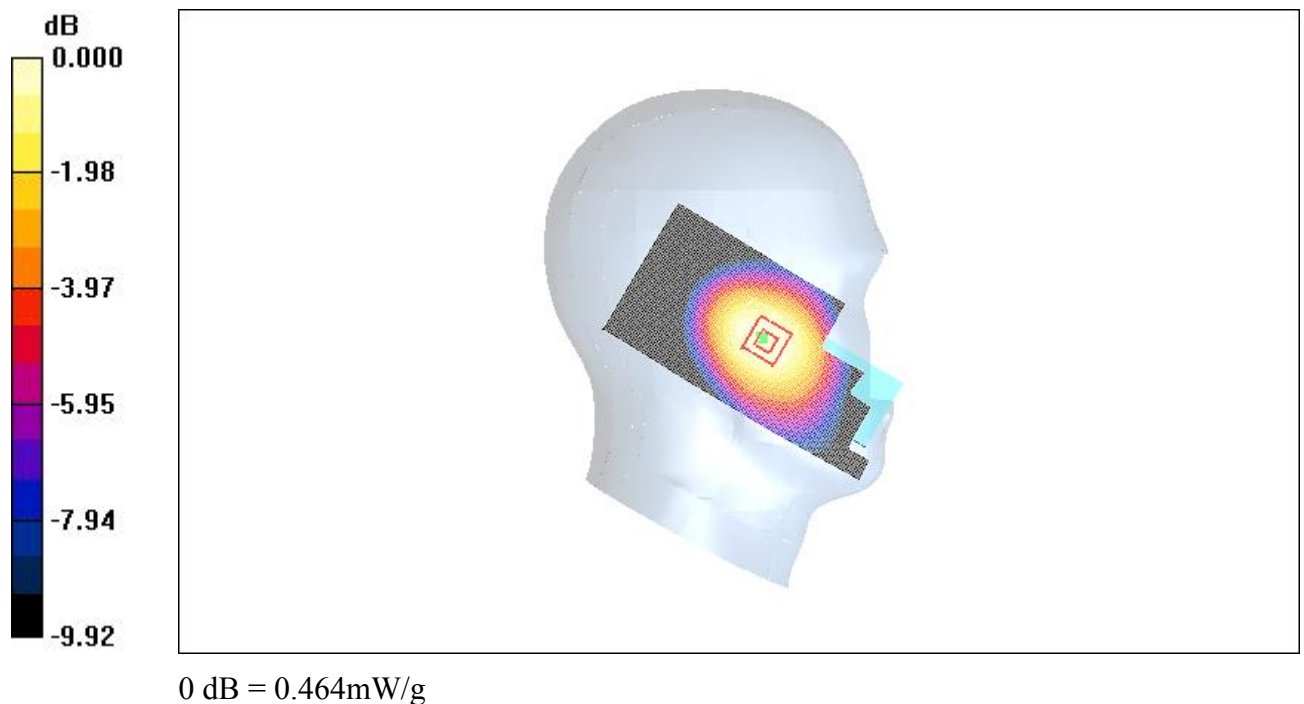


Fig. 7 850 MHz CH128

## 850 Right Cheek High

Date/Time: 2009-10-23 10:16:28

Electronics: DAE4 Sn771

Medium: Head 850

Medium parameters used (interpolated):  $f = 848.8$  MHz;  $\sigma = 0.92$  mho/m;  $\epsilon_r = 40.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°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 (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.900 mW/g

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

Reference Value = 7.55 V/m; Power Drift = -0.070 dB

Peak SAR (extrapolated) = 1.60 W/kg

SAR(1 g) = 0.803 mW/g; SAR(10 g) = 0.482 mW/g

Maximum value of SAR (measured) = 0.870 mW/g

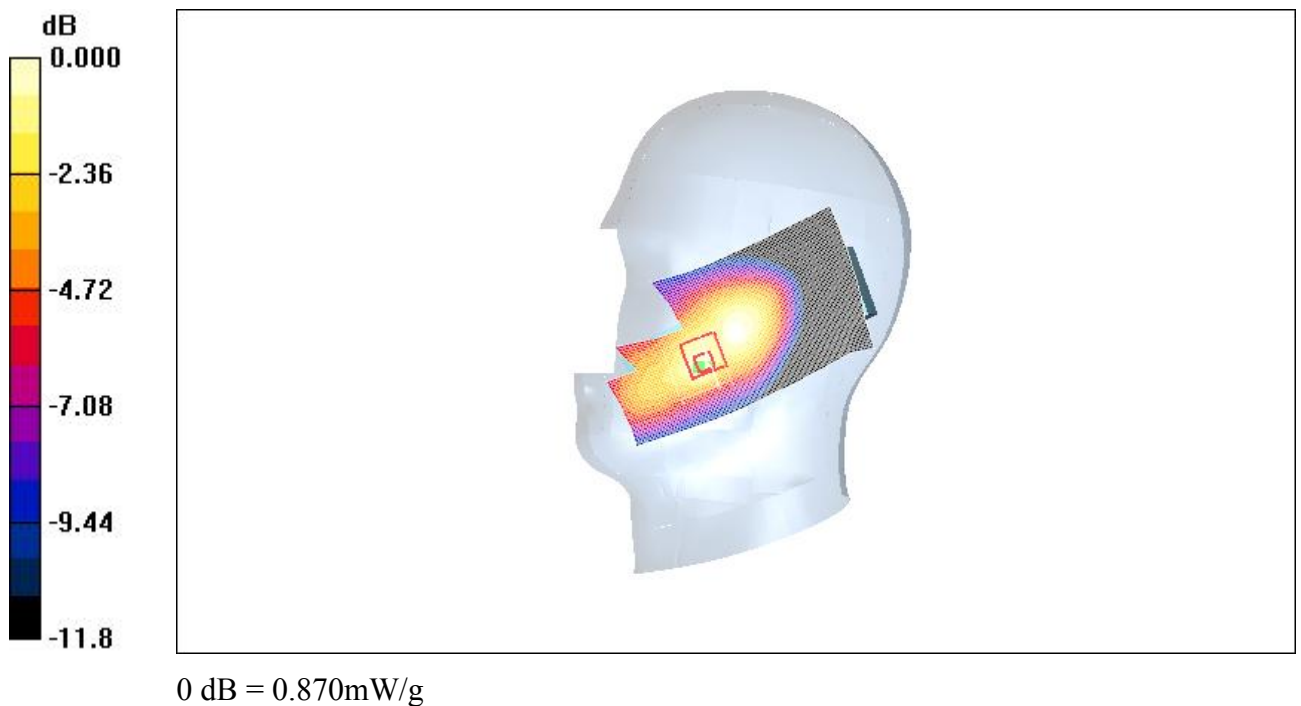


Fig. 8 850 MHz CH251

### 850 Right Cheek Middle

Date/Time: 2009-10-23 10:32:11

Electronics: DAE4 Sn771

Medium: Head 850

Medium parameters used (interpolated):  $f = 836.6$  MHz;  $\sigma = 0.908$  mho/m;  $\epsilon_r = 40.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°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 (61x121x1): Measurement grid:  $dx=10$ mm,  $dy=10$ mm

Maximum value of SAR (interpolated) = 0.672 mW/g

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

Reference Value = 6.26 V/m; Power Drift = 0.105 dB

Peak SAR (extrapolated) = 0.857 W/kg

SAR(1 g) = 0.623 mW/g; SAR(10 g) = 0.429 mW/g

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

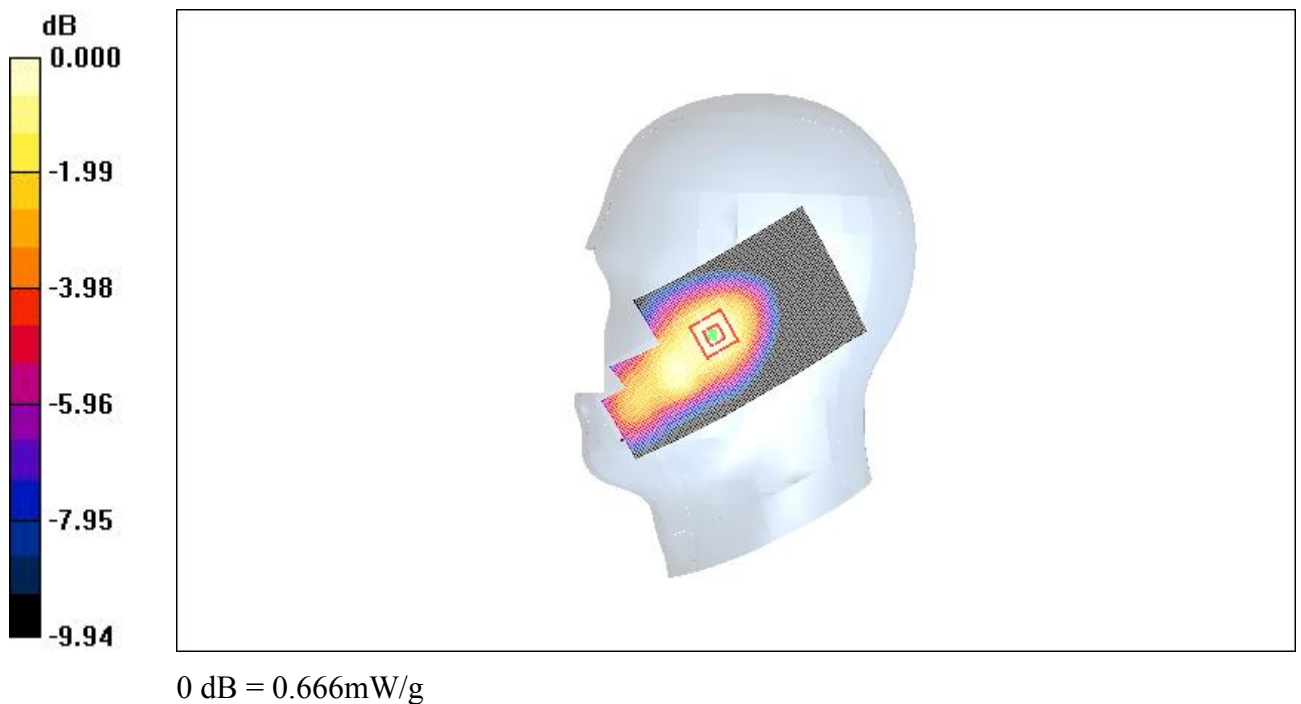


Fig. 9 850 MHz CH128

### 850 Right Cheek Low

Date/Time: 2009-10-23 10:47:36

Electronics: DAE4 Sn771

Medium: Head 850

Medium parameters used:  $f = 825$  MHz;  $\sigma = 0.896$  mho/m;  $\epsilon_r = 40.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°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 (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.855 mW/g

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

Reference Value = 7.25 V/m; Power Drift = 0.069 dB

Peak SAR (extrapolated) = 1.53 W/kg

SAR(1 g) = 0.751 mW/g; SAR(10 g) = 0.445 mW/g

Maximum value of SAR (measured) = 0.824 mW/g

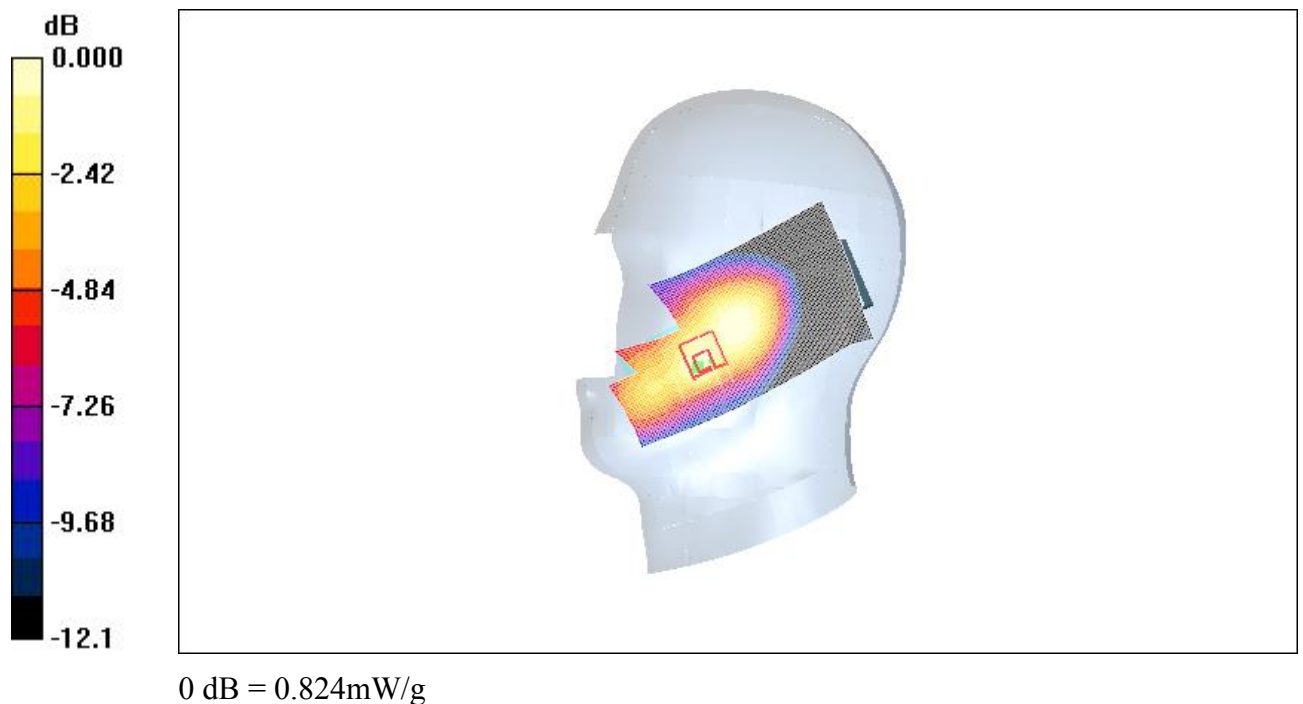


Fig. 10 850 MHz CH128



### 850 Right Tilt High

Date/Time: 2009-10-23 11:02:49

Electronics: DAE4 Sn771

Medium: Head 850

Medium parameters used (interpolated):  $f = 848.8$  MHz;  $\sigma = 0.92$  mho/m;  $\epsilon_r = 40.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°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 (61x121x1): Measurement grid:  $dx=10$ mm,  $dy=10$ mm

Maximum value of SAR (interpolated) = 0.572 mW/g

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

Reference Value = 9.11 V/m; Power Drift = 0.040 dB

Peak SAR (extrapolated) = 0.691 W/kg

SAR(1 g) = 0.535 mW/g; SAR(10 g) = 0.388 mW/g

Maximum value of SAR (measured) = 0.567 mW/g

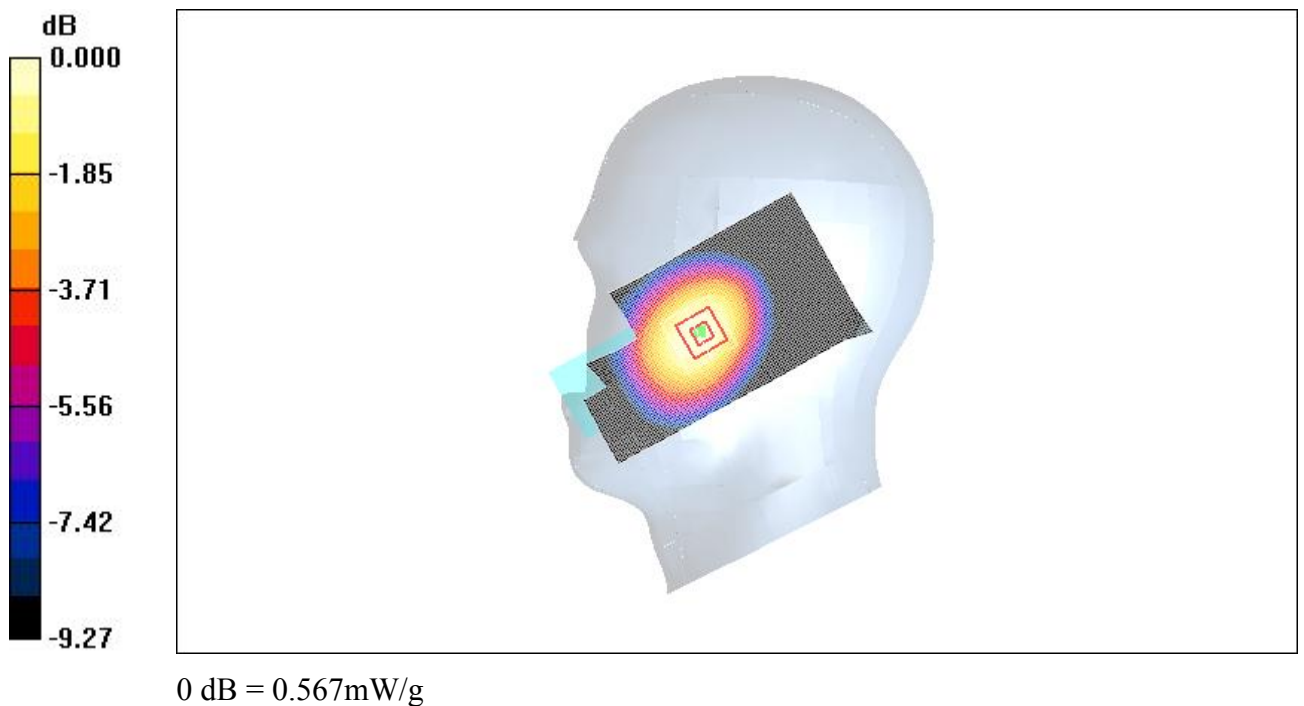


Fig.11 850 MHz CH251

## 850 Right Tilt Middle

Date/Time: 2009-10-23 11:17:22

Electronics: DAE4 Sn771

Medium: Head 850

Medium parameters used (interpolated):  $f = 836.6$  MHz;  $\sigma = 0.908$  mho/m;  $\epsilon_r = 40.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°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 (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.512 mW/g

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

Reference Value = 9.09 V/m; Power Drift = -0.074 dB

Peak SAR (extrapolated) = 0.604 W/kg

SAR(1 g) = 0.475 mW/g; SAR(10 g) = 0.349 mW/g

Maximum value of SAR (measured) = 0.504 mW/g

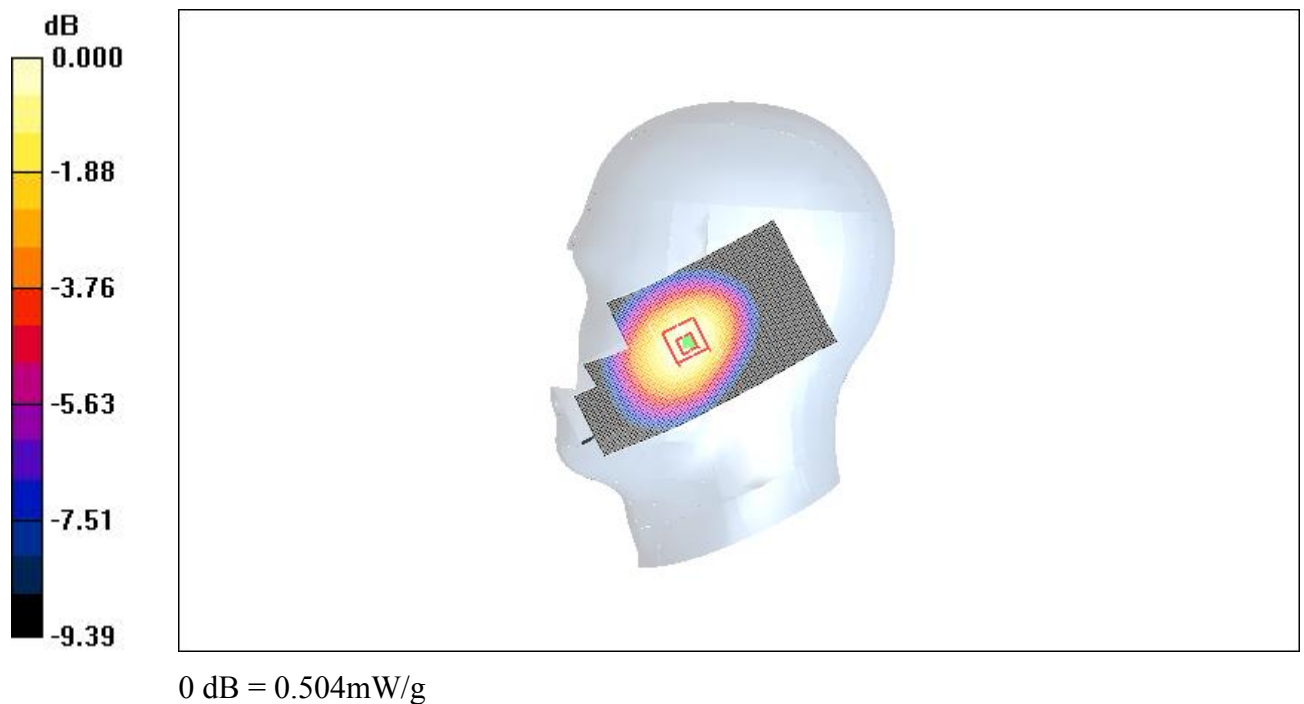


Fig.12 850 MHz CH190

### 850 Right Tilt Low

Date/Time: 2009-10-23 11:33:02

Electronics: DAE4 Sn771

Medium: Head 850

Medium parameters used:  $f = 825$  MHz;  $\sigma = 0.896$  mho/m;  $\epsilon_r = 40.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°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)

Tilt Low/Area Scan (61x121x1): Measurement grid:  $dx=10$ mm,  $dy=10$ mm

Maximum value of SAR (interpolated) = 0.528 mW/g

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

Reference Value = 9.13 V/m; Power Drift = -0.119 dB

Peak SAR (extrapolated) = 0.635 W/kg

SAR(1 g) = 0.498 mW/g; SAR(10 g) = 0.365 mW/g

Maximum value of SAR (measured) = 0.523 mW/g

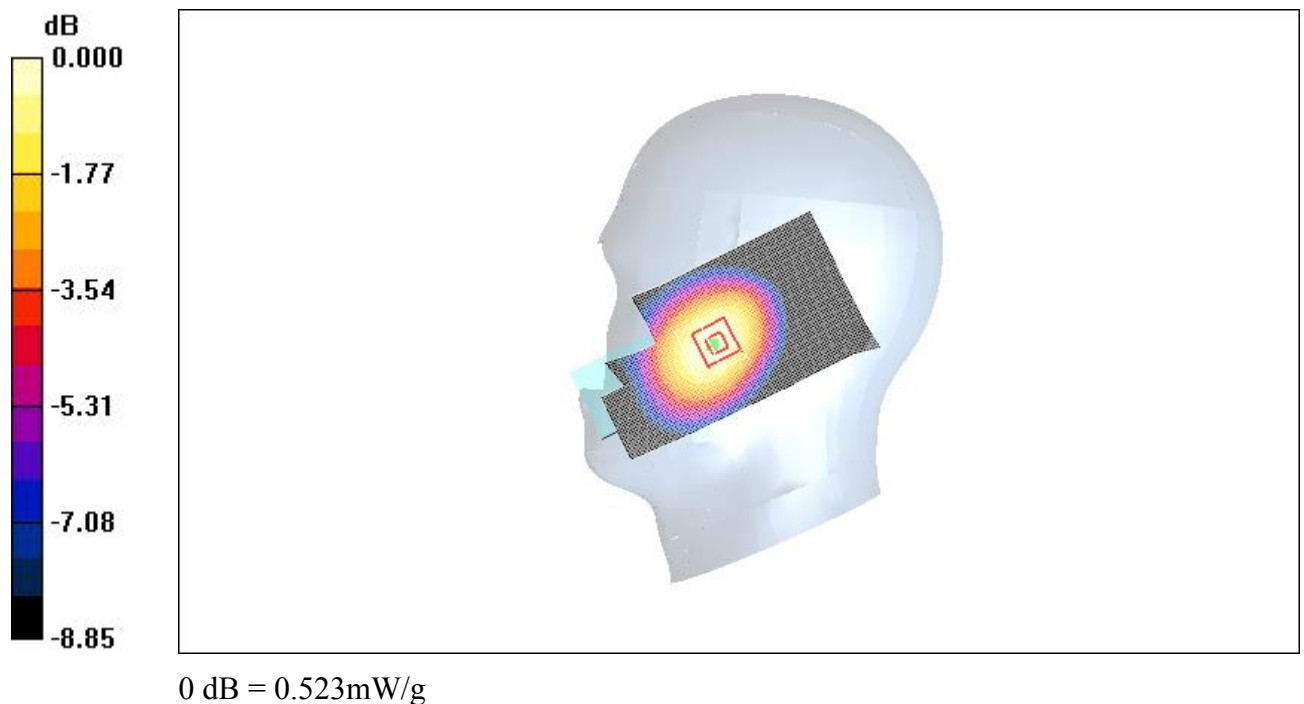


Fig. 13 850 MHz CH128

## 850 Body Towards Ground High With GPRS

Date/Time: 2009-10-23 13:14:30

Electronics: DAE4 Sn771

Medium: 850 Body

Medium parameters used (interpolated):  $f = 848.8$  MHz;  $\sigma = 1.01$  mho/m;  $\epsilon_r = 53.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°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)

Towards Ground High/Area Scan (51x131x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.27 mW/g

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

Reference Value = 36.1 V/m; Power Drift = -0.092 dB

Peak SAR (extrapolated) = 1.46 W/kg

SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.756 mW/g

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

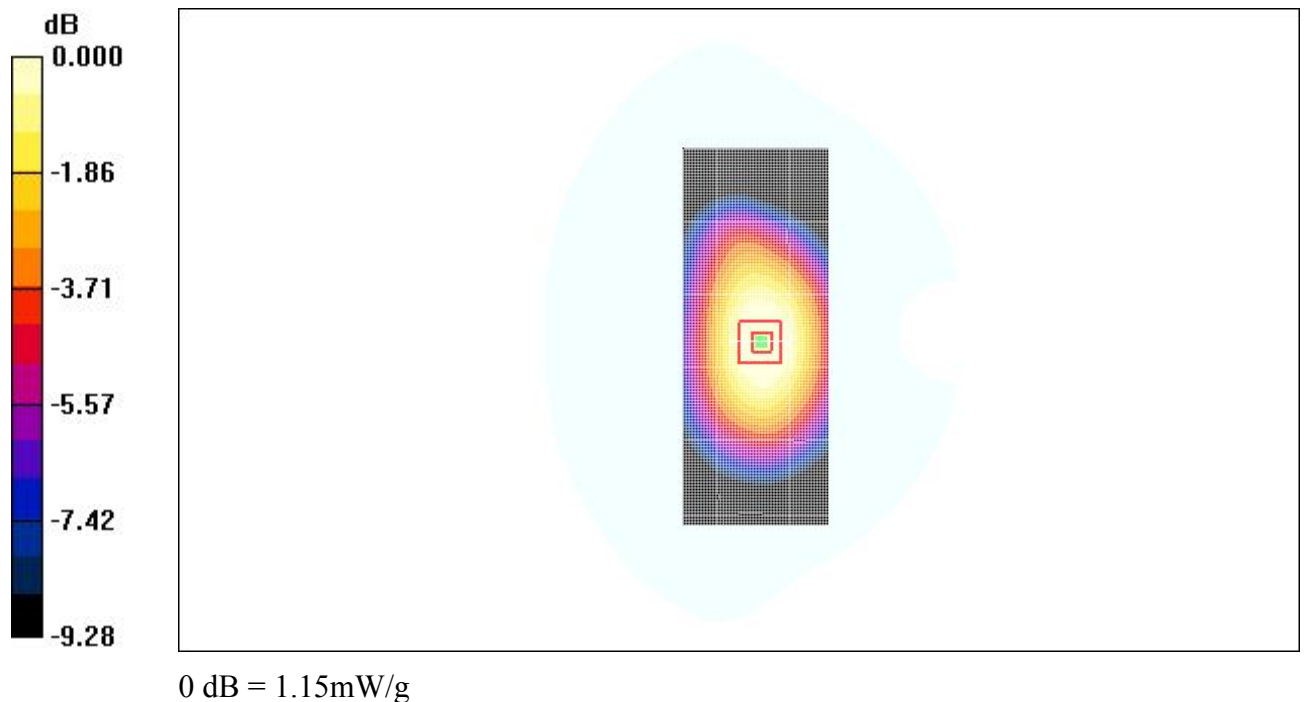


Fig. 14 850 MHz CH251

## 850 Body Towards Ground Middle With GPRS

Date/Time: 2009-10-23 13:31:13

Electronics: DAE4 Sn771

Medium: 850 Body

Medium parameters used (interpolated):  $f = 836.6$  MHz;  $\sigma = 1.00$  mho/m;  $\epsilon_r = 53.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°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)

Towards Ground Middle/Area Scan (51x131x1): Measurement grid: dx=10mm, dy=10mm

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

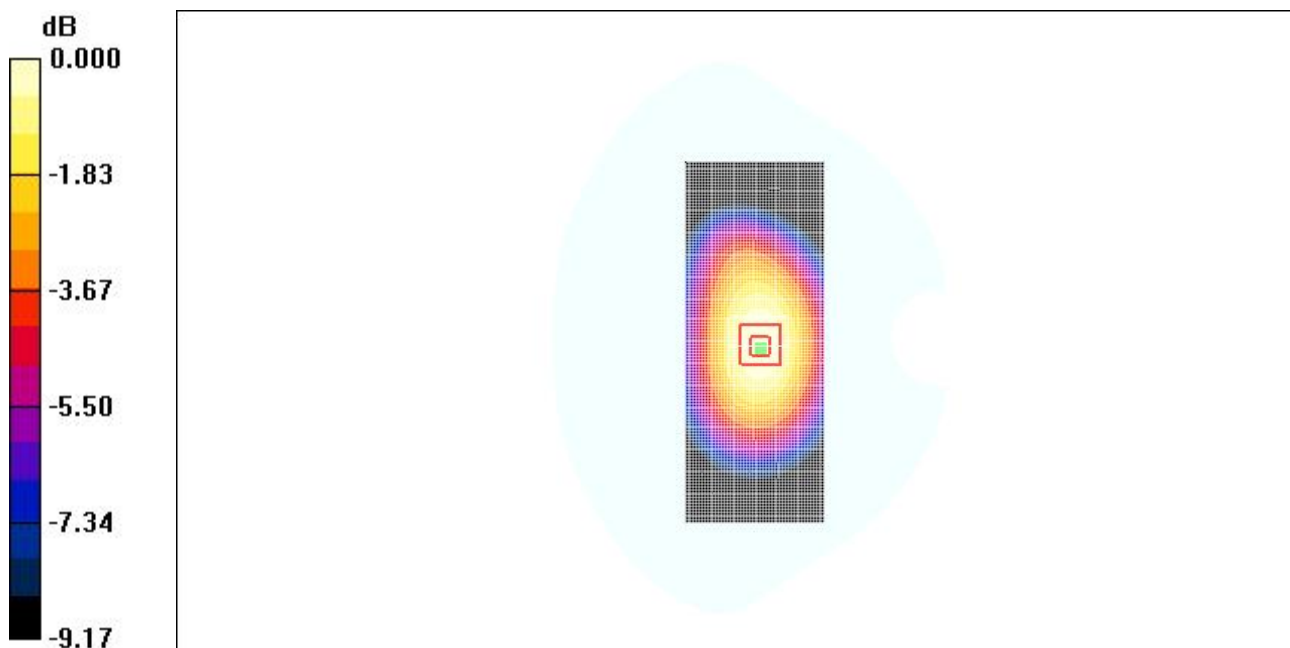
Towards Ground Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 34.0 V/m; Power Drift = -0.146 dB

Peak SAR (extrapolated) = 1.48 W/kg

SAR(1 g) = 1.1 mW/g; SAR(10 g) = 0.780 mW/g

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



0 dB = 1.16mW/g

Fig. 15 850 MHz CH190

## 850 Body Towards Ground Low With GPRS

Date/Time: 2009-10-23 13:47:25

Electronics: DAE4 Sn771

Medium: 850 Body

Medium parameters used:  $f = 825 \text{ MHz}$ ;  $\sigma = 0.983 \text{ mho/m}$ ;  $\epsilon_r = 53.9$ ;  $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature:  $23.3^\circ\text{C}$

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

Communication System: GSM 850 GPRS Frequency:  $824.2 \text{ MHz}$  Duty Cycle: 1:4

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

Towards Ground Low/Area Scan (51x131x1): Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) =  $1.22 \text{ mW/g}$

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

Reference Value =  $34.6 \text{ V/m}$ ; Power Drift =  $-0.126 \text{ dB}$

Peak SAR (extrapolated) =  $1.53 \text{ W/kg}$

SAR(1 g) =  $1.13 \text{ mW/g}$ ; SAR(10 g) =  $0.803 \text{ mW/g}$

Maximum value of SAR (measured) =  $1.20 \text{ mW/g}$

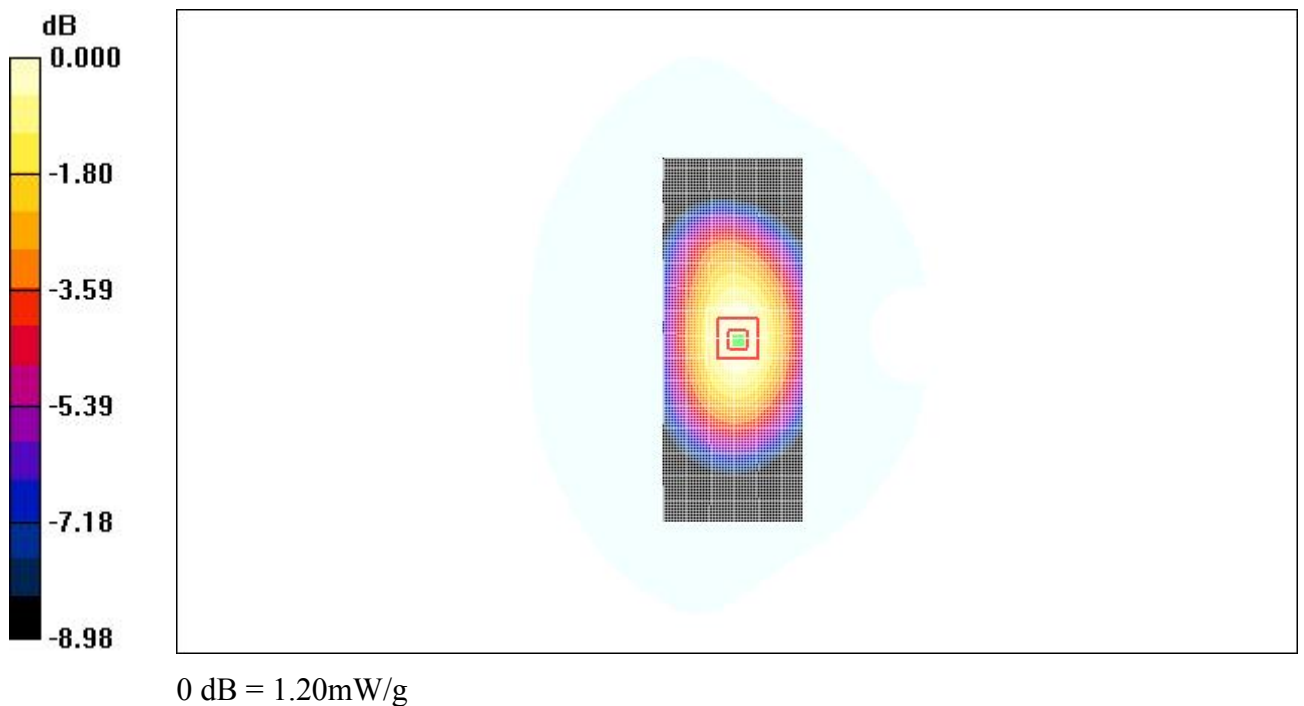
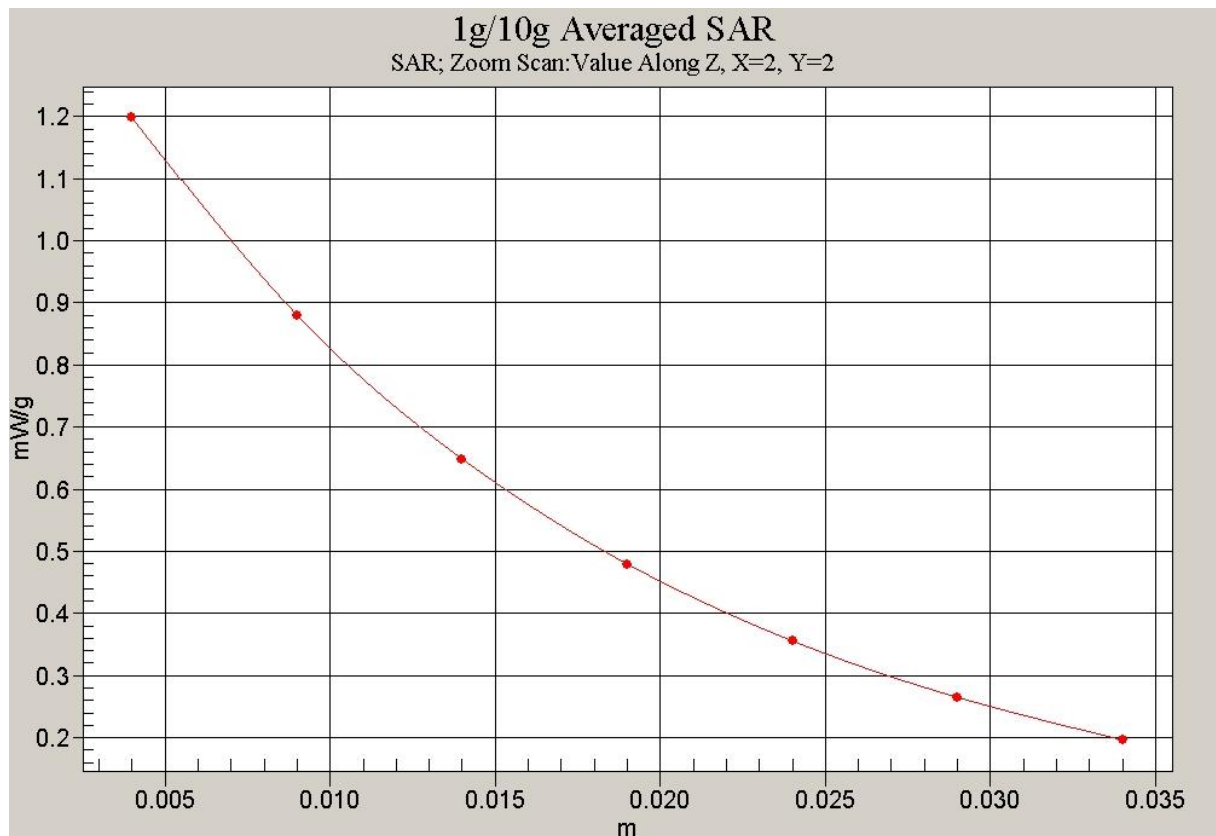


Fig. 16 850 MHz CH128



**Fig. 17 Z-Scan at power reference point (850 MHz CH128)**

## 850 Body Towards Ground Low with Headset

Date/Time: 2009-10-23 13:05:38

Electronics: DAE4 Sn771

Medium: 850 Body

Medium parameters used:  $f = 825$  MHz;  $\sigma = 0.983$  mho/m;  $\epsilon_r = 53.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°C

Liquid Temperature: 22.5°C

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

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

Towards Ground Low/Area Scan (51x131x1): Measurement grid: dx=10mm, dy=10mm

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

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

Reference Value = 25.1 V/m; Power Drift = -0.094 dB

Peak SAR (extrapolated) = 0.788 W/kg

SAR(1 g) = 0.589 mW/g; SAR(10 g) = 0.421 mW/g

Maximum value of SAR (measured) = 0.624 mW/g

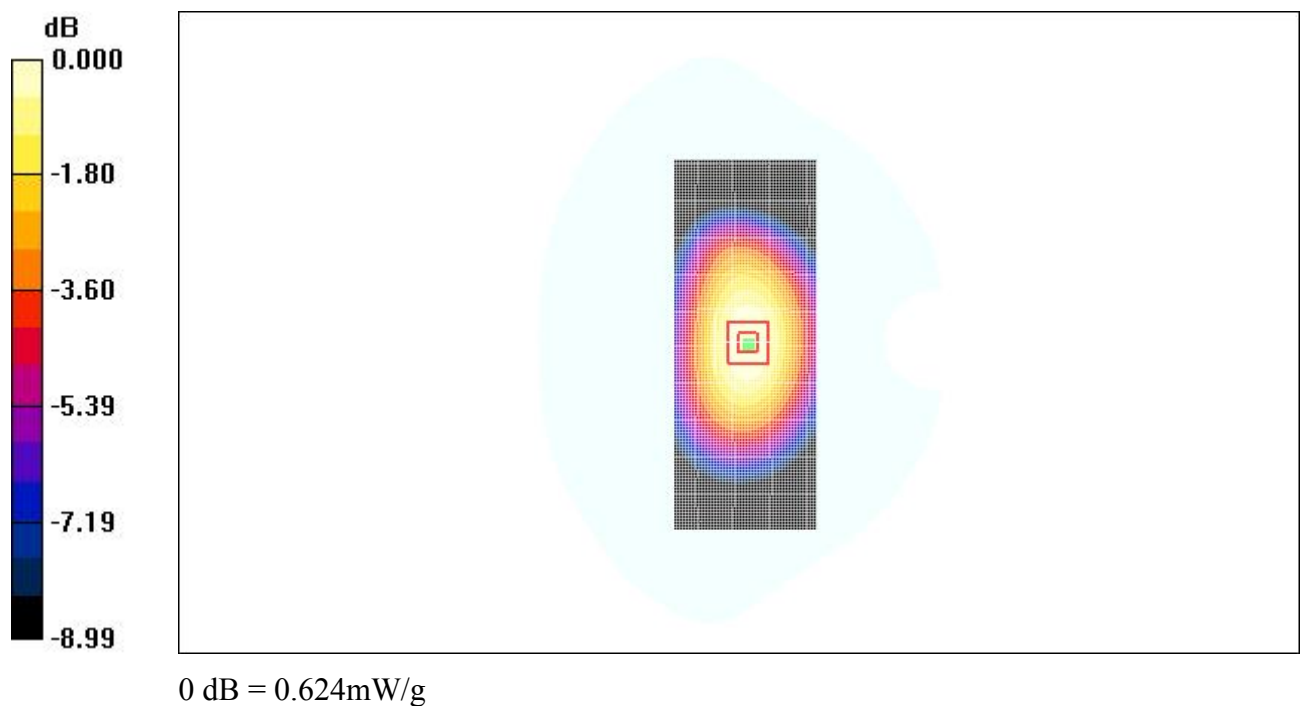


Fig. 18 850 MHz CH128



### 1900 Left Cheek High

Date/Time: 2009-10-24 8:54:10

Electronics: DAE4 Sn771

Medium: 1900 Head

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.43$  mho/m;  $\epsilon_r = 39.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°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 (51x121x1): Measurement grid:  $dx=10$ mm,  $dy=10$ mm

Maximum value of SAR (interpolated) = 0.699 mW/g

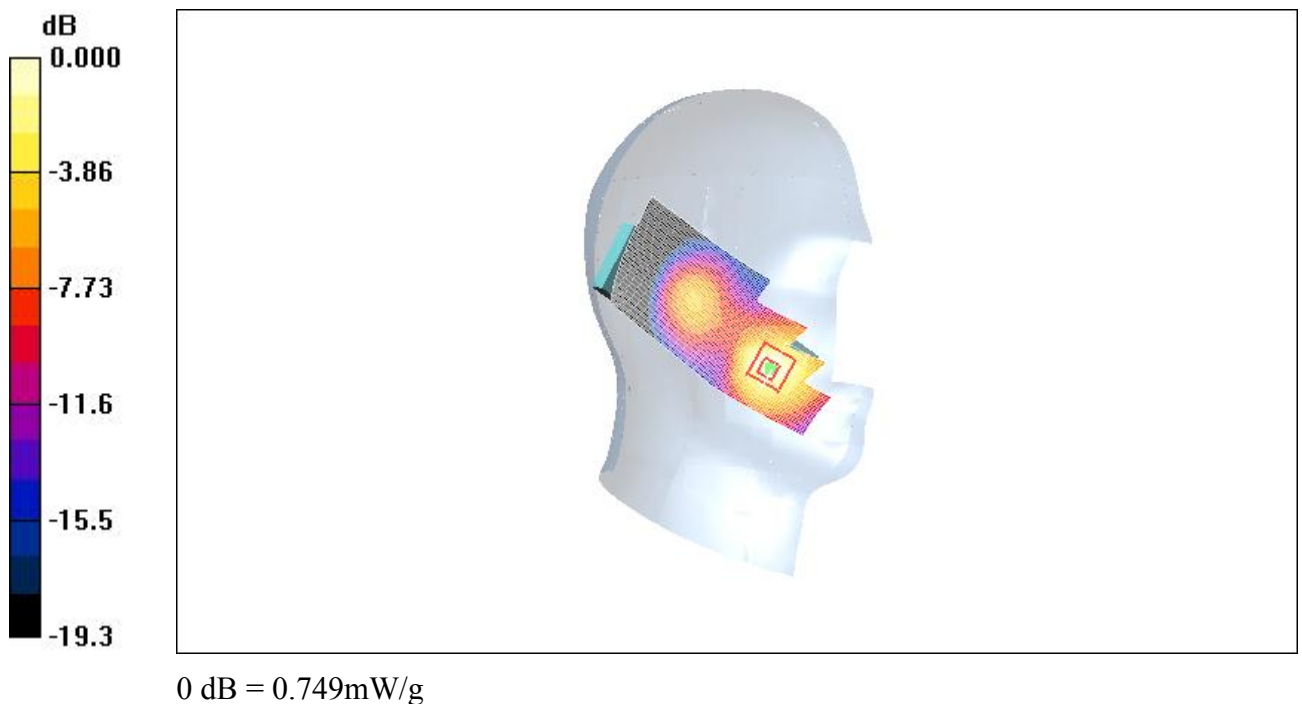
Cheek High/Zoom Scan (7x7x7)/Cube 0: Measurement grid:  $dx=5$ mm,  $dy=5$ mm,  $dz=5$ mm

Reference Value = 5.16 V/m; Power Drift = 0.056 dB

Peak SAR (extrapolated) = 1.13 W/kg

SAR(1 g) = 0.688 mW/g; SAR(10 g) = 0.380 mW/g

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



**Fig. 19 1900 MHz CH810**

### 1900 Left Cheek Middle

Date/Time: 2009-10-24 9:09:32

Electronics: DAE4 Sn771

Medium: Head 1900 MHz

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.41$  mho/m;  $\epsilon_r = 39.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°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 (51x121x1): Measurement grid:  $dx=10$ mm,  $dy=10$ mm

Maximum value of SAR (interpolated) = 0.968 mW/g

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

Reference Value = 5.63 V/m; Power Drift = -0.093 dB

Peak SAR (extrapolated) = 1.39 W/kg

SAR(1 g) = 0.835 mW/g; SAR(10 g) = 0.465 mW/g

Maximum value of SAR (measured) = 0.922 mW/g

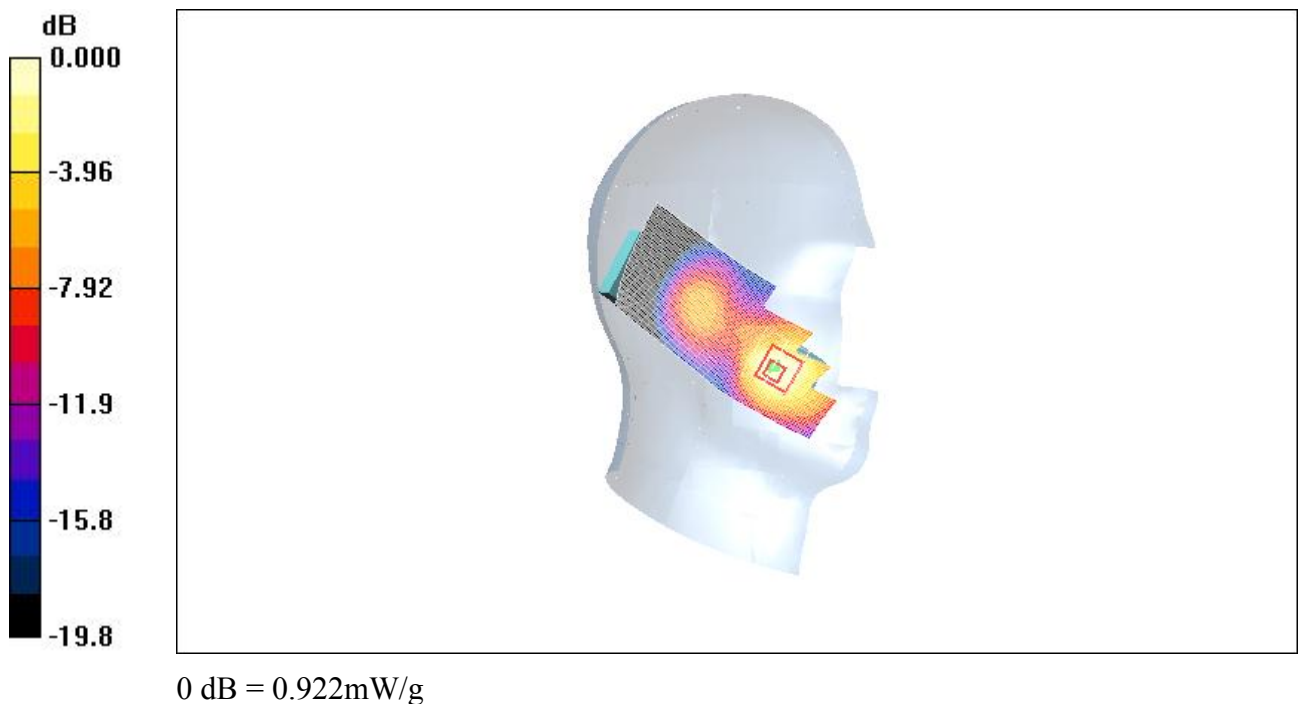


Fig. 20 1900 MHz CH661

### 1900 Left Cheek Low

Date/Time: 2009-10-24 9:25:30

Electronics: DAE4 Sn771

Medium: 1900 Head

Medium parameters used (interpolated):  $f = 1850.2$  MHz;  $\sigma = 1.38$  mho/m;  $\epsilon_r = 39.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°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 (51x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.27 mW/g

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

Reference Value = 5.78 V/m; Power Drift = -0.070 dB

Peak SAR (extrapolated) = 1.97 W/kg

SAR(1 g) = 1.17 mW/g; SAR(10 g) = 0.648 mW/g

Maximum value of SAR (measured) = 1.29 mW/g

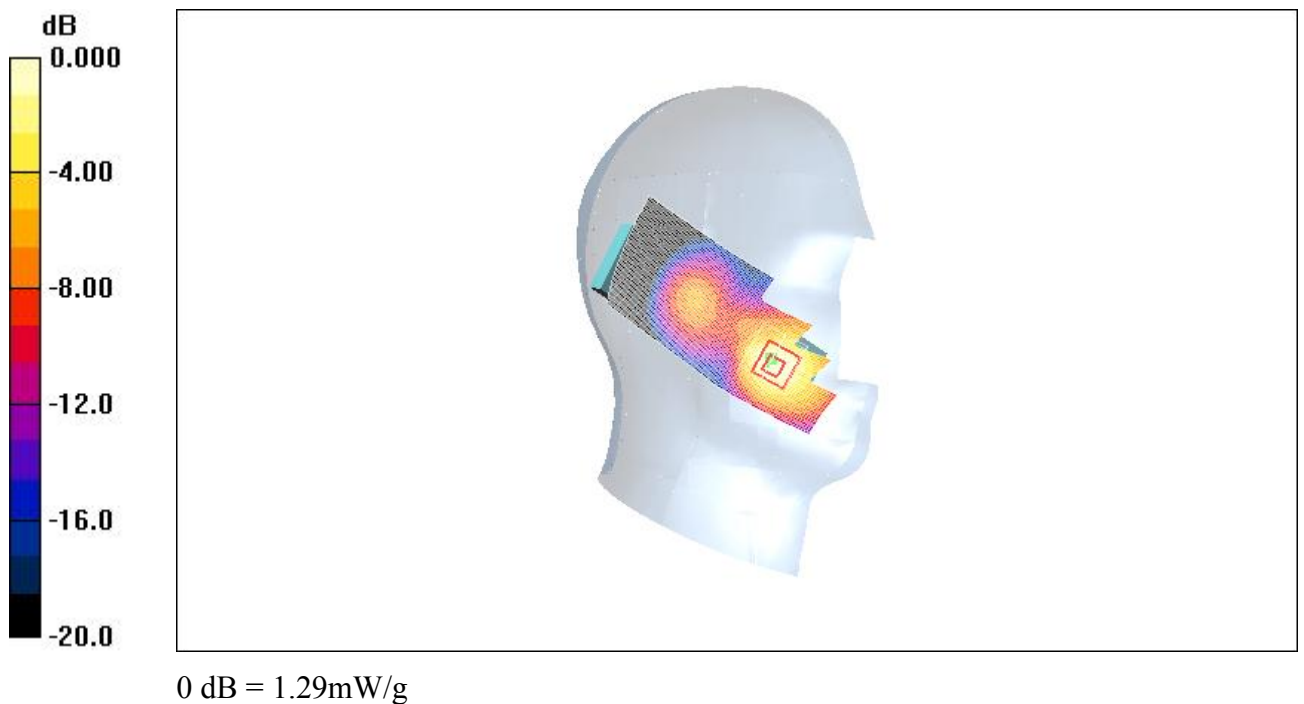
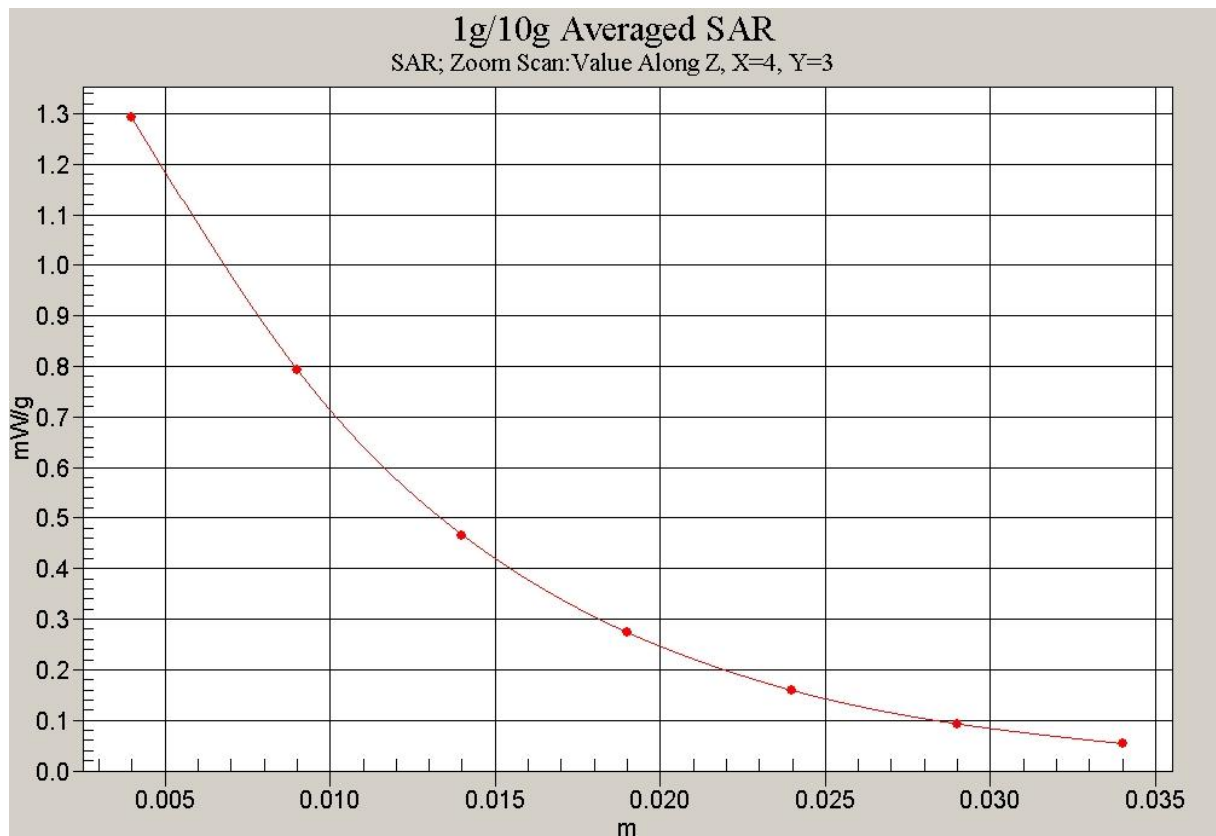


Fig. 21 1900 MHz CH512



**Fig. 22 Z-Scan at power reference point (1900 MHz CH512)**

### 1900 Left Tilt High

Date/Time: 2009-10-24 9:40:09

Electronics: DAE4 Sn771

Medium: 1900 Head

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.43$  mho/m;  $\epsilon_r = 39.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°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 (51x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.233 mW/g

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

Reference Value = 5.96 V/m; Power Drift = 0.142 dB

Peak SAR (extrapolated) = 0.302 W/kg

SAR(1 g) = 0.199 mW/g; SAR(10 g) = 0.120 mW/g

Maximum value of SAR (measured) = 0.214 mW/g

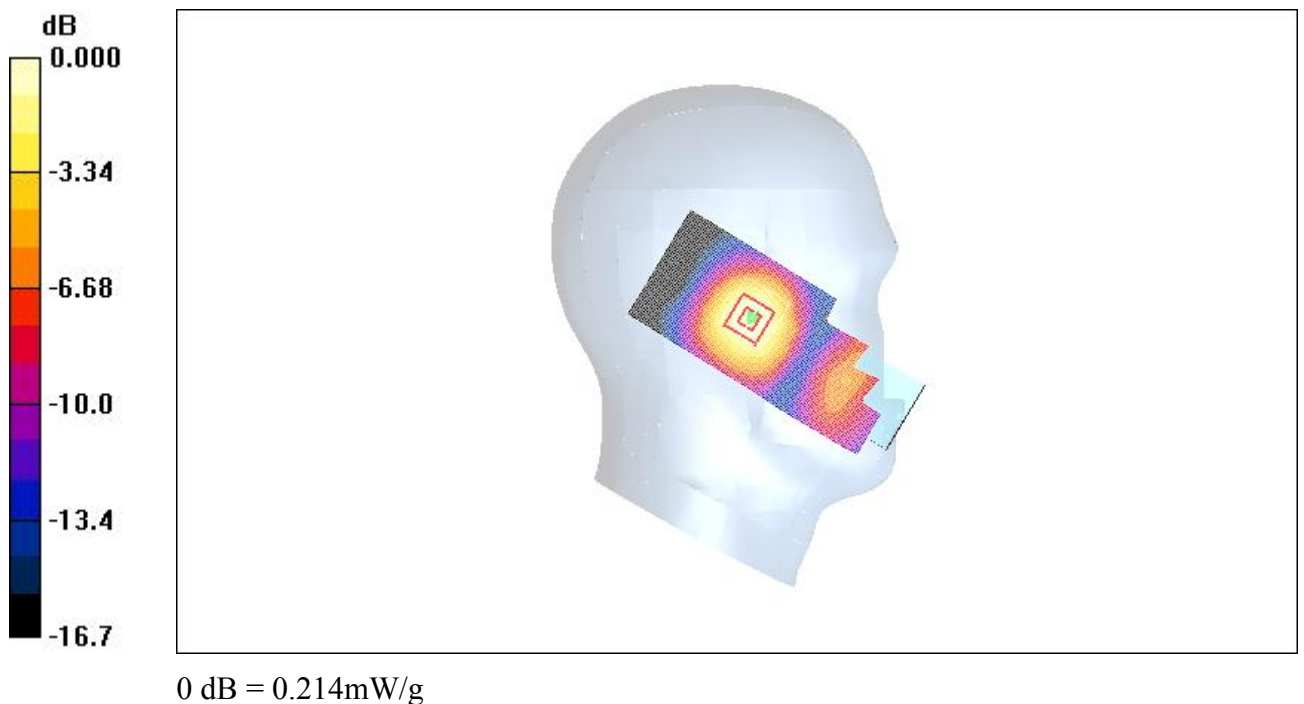


Fig.23 1900 MHz CH810

### 1900 Left Tilt Middle

Date/Time: 2009-10-24 9:56:17

Electronics: DAE4 Sn771

Medium: 1900 Head

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.41$  mho/m;  $\epsilon_r = 39.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°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 (51x121x1): Measurement grid: dx=10mm, dy=10mm

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

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

Reference Value = 6.69 V/m; Power Drift = 0.037 dB

Peak SAR (extrapolated) = 0.380 W/kg

SAR(1 g) = 0.251 mW/g; SAR(10 g) = 0.154 mW/g

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

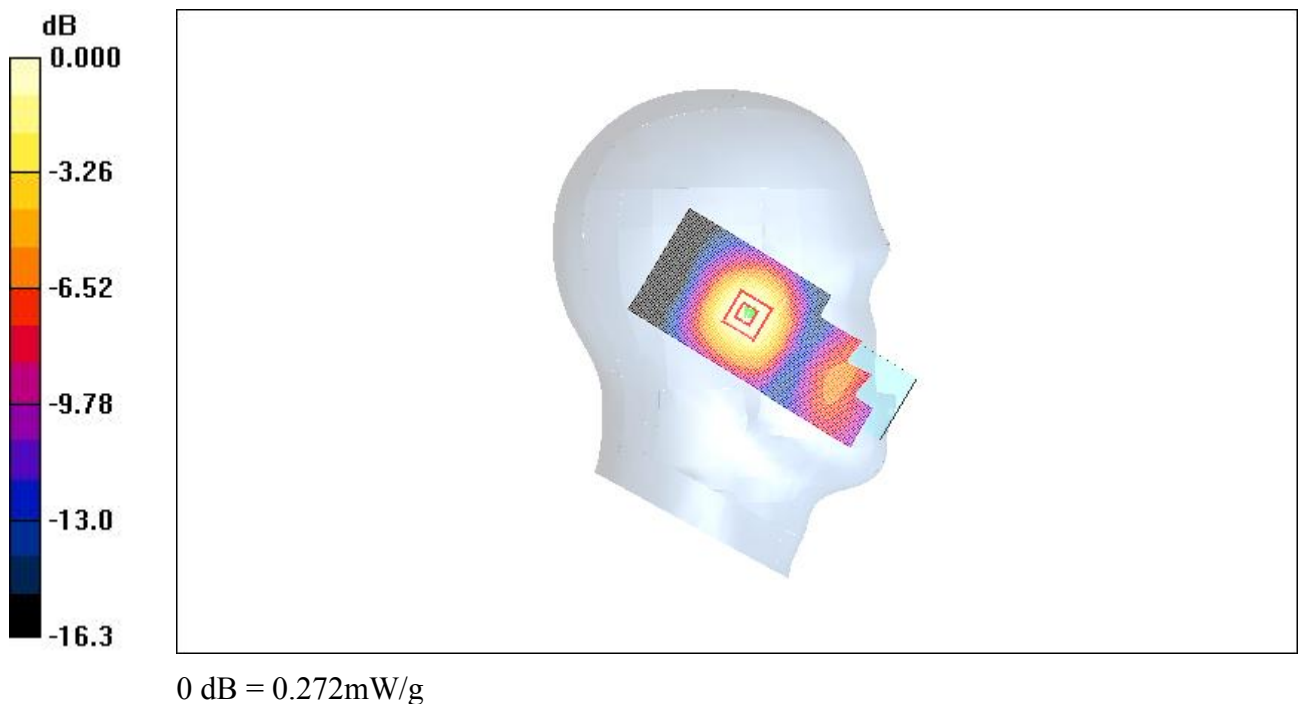


Fig. 24 1900 MHz CH661

### 1900 Left Tilt Low

Date/Time: 2009-10-24 10:11:34

Electronics: DAE4 Sn771

Medium: 1900 Head

Medium parameters used (interpolated):  $f = 1850.2$  MHz;  $\sigma = 1.38$  mho/m;  $\epsilon_r = 39.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°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 (51x121x1): Measurement grid:  $dx=10$ mm,  $dy=10$ mm

Maximum value of SAR (interpolated) = 0.303 mW/g

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

Reference Value = 6.91 V/m; Power Drift = -0.090 dB

Peak SAR (extrapolated) = 0.395 W/kg

SAR(1 g) = 0.256 mW/g; SAR(10 g) = 0.153 mW/g

Maximum value of SAR (measured) = 0.276 mW/g

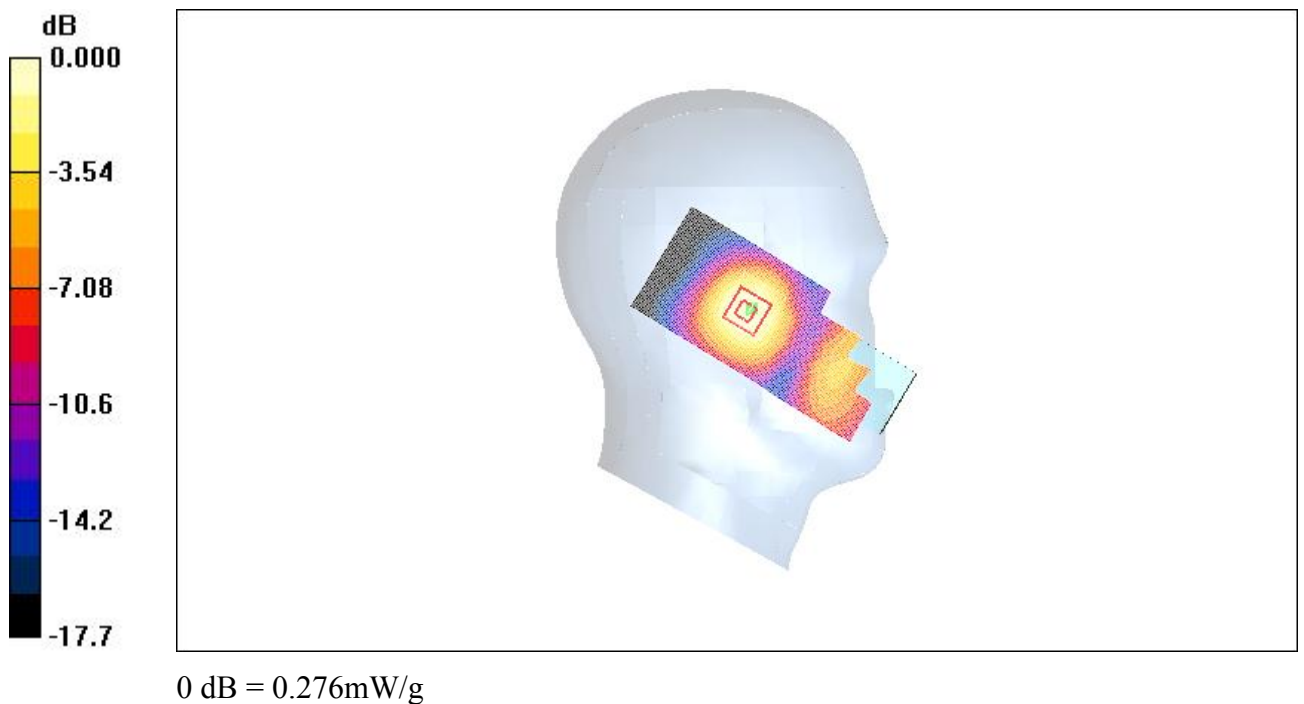


Fig. 25 1900 MHz CH512

### 1900 Right Cheek High

Date/Time: 2009-10-24 10:26:55

Electronics: DAE4 Sn771

Medium: 1900 Head

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.43$  mho/m;  $\epsilon_r = 39.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°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 (51x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.561 mW/g

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

Reference Value = 2.79 V/m; Power Drift = 0.044 dB

Peak SAR (extrapolated) = 0.789 W/kg

SAR(1 g) = 0.525 mW/g; SAR(10 g) = 0.316 mW/g

Maximum value of SAR (measured) = 0.565 mW/g

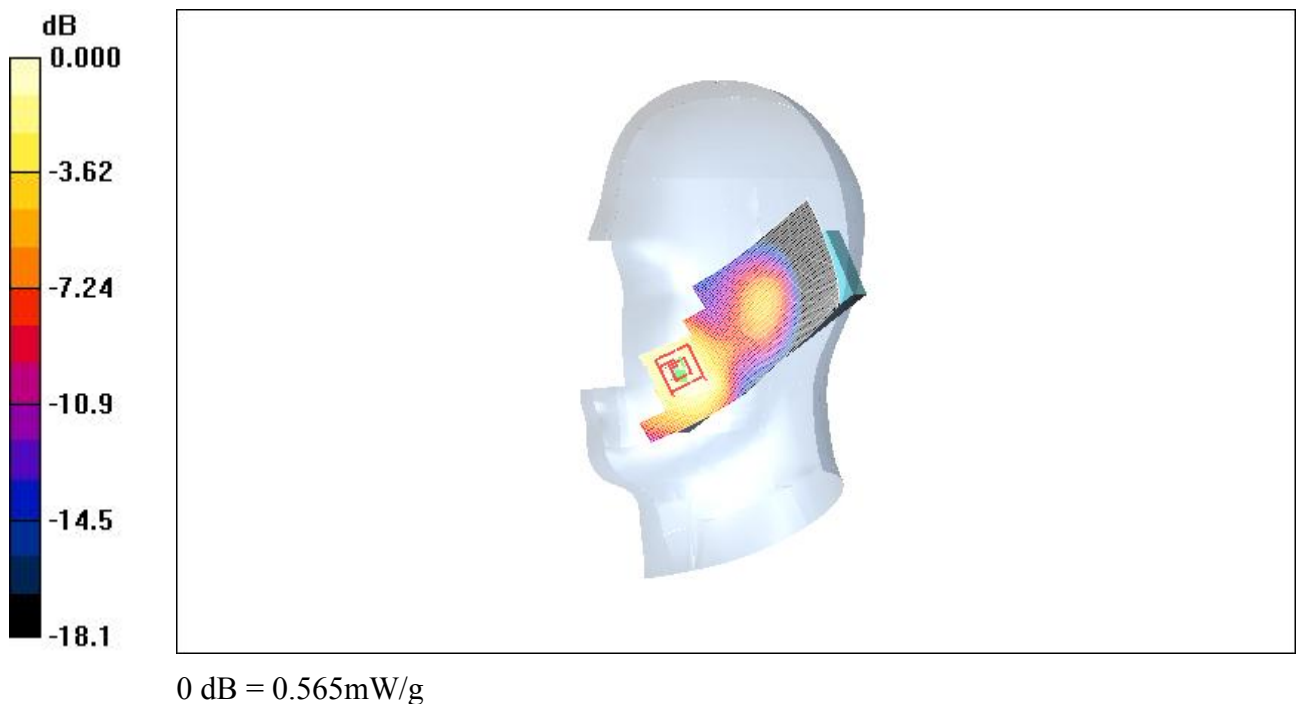


Fig. 26 1900 MHz CH810



### 1900 Right Cheek Middle

Date/Time: 2009-10-24 10:42:05

Electronics: DAE4 Sn771

Medium: 1900 Head

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.41$  mho/m;  $\epsilon_r = 39.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°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 (51x121x1): Measurement grid:  $dx=10$ mm,  $dy=10$ mm

Maximum value of SAR (interpolated) = 0.709 mW/g

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

Reference Value = 4.14 V/m; Power Drift = 0.131 dB

Peak SAR (extrapolated) = 1.05 W/kg

SAR(1 g) = 0.671 mW/g; SAR(10 g) = 0.409 mW/g

Maximum value of SAR (measured) = 0.729 mW/g

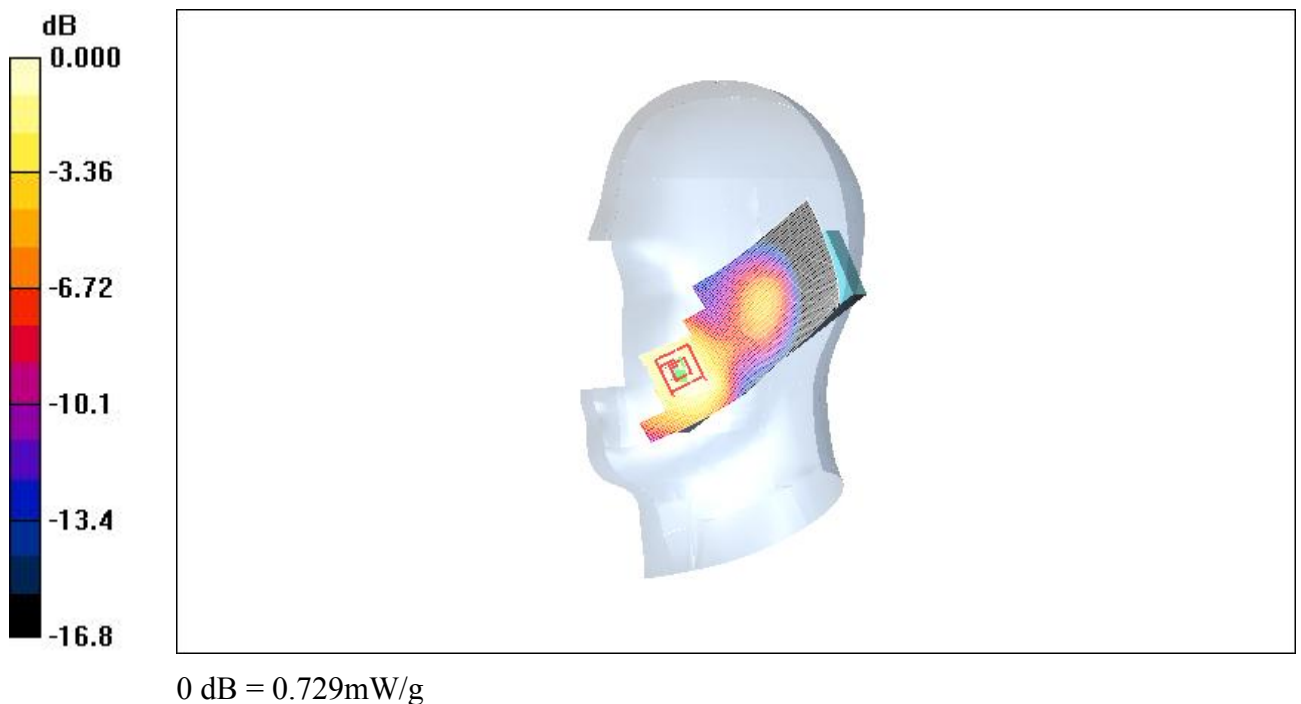


Fig. 27 1900 MHz CH661