



SAR TEST REPORT

No. 2010EEE03440

For

HUAWEI Technologies Co., Ltd

Cordless Phone

FC312E

With

Hardware Version: WG01FC312EI

Software Version: V100R001

FCCID: QISFC312E

Issued Date: 2010-06-13



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:

TMC Beijing, Telecommunication Metrology Center of MIIT

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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
Postal Code: 100191
Telephone: +86-10-62304633
Fax: +86-10-62304793

1.2 Testing Environment

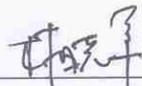
Temperature: 18°C~25 °C,
Relative humidity: 30%~ 70%
Ground system resistance: < 0.5 Ω

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: Qi Dianyuan
Test Engineer: Lin Xiaojun
Testing Start Date: June 10, 2010
Testing End Date: June 11, 2010

1.4 Signature



Lin Xiaojun

(Prepared this test report)



Qi Dianyuan

(Reviewed this test report)



Xiao Li

Deputy Director of the laboratory
(Approved this test report)

2 Client Information

2.1 Applicant Information

Company Name: HUAWEI Technologies Co., Ltd
Address /Post: Bantian, Longgang District
City: Shenzhen
Postal Code: 518129
Country: P.R. China
Telephone: 0755-28780808
Fax: 0755-28780808

2.2 Manufacturer Information

Company Name: HUAWEI Technologies Co., Ltd
Address /Post: Bantian, Longgang District
City: Shenzhen
Postal Code: 518129
Country: P.R. China
Telephone: 0755-28780808
Fax: 0755-28780808

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

3.1 About EUT

EUT Description:	Cordless Phone
Model Name:	FC312E
Frequency Band:	GSM850/PCS1900

3.2 Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	358399030005221	WG01FC312EI	V100R001

*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	HBL3A	GAGA421XB1700293	Huawei Technologies Co., Ltd.
AE2	Charger	HS-050040C1	\	Shenzhen Huntkey Electronic Techonoly Co.,Ltd.
AE3	Headset	FC312E	L02AA11011700094	Huawei Technologies Co., Ltd.

*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)

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.

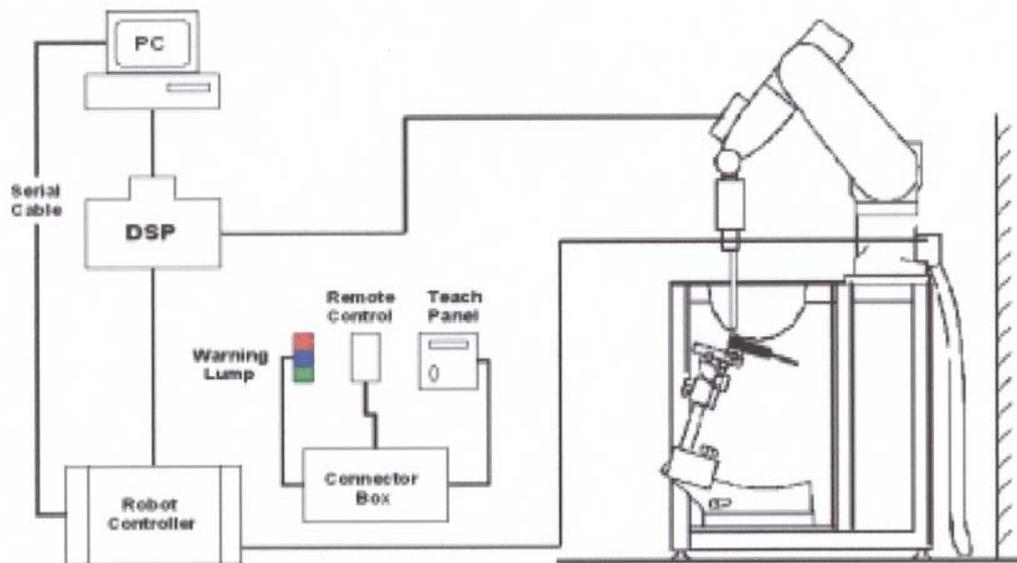
The EUT shall use its internal transmitter. The antenna(s), battery and accessories shall be those specified by the manufacturer. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output. If a wireless link is used, the antenna connected to the 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



Picture 3: ES3DV3 E-field

Frequency 10 MHz to 4 GHz; Linearity: ± 0.2 dB (30 MHz to 4 GHz)

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

Dynamic Range 5 μ W/g to > 100 mW/g; Linearity: ± 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 ± 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: Δt = Exposure time (30 seconds),
 C = Heat capacity of tissue (brain or muscle),
 ΔT = Temperature increase due to RF exposure.

Or

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

Where:

σ = Simulated tissue conductivity,
 ρ = Tissue density (kg/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



Picture 6: Generic Twin Phantom

5.6 Equivalent Tissues

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

Specifications

Positioner: Stäubli Unimation Corp. Robot Model: RX90L

Repeatability: ± 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 Ω
Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surround 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 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 max 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

The conducted power for GSM 850/1900 is as following:

GSM 850MHZ	Conducted Power (dBm)		
	Channel 251(848.8MHz)	Channel 190(836.6MHz)	Channel 128(824.2MHz)
	32.89	32.85	32.81
GSM 1900MHZ	Conducted Power (dBm)		
	Channel 810(1909.8MHz)	Channel 661(1880MHz)	Channel 512(1850.2MHz)
	29.98	29.82	29.79

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 4: 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 June 10, 2010 1900 MHz June 11, 2010			
/	Frequency	Permittivity ϵ	Conductivity σ (S/m)
Target value	850 MHz	41.5	0.90
	1900 MHz	40.0	1.40
Measurement value (Average of 10 tests)	850 MHz	40.2	0.90
	1900 MHz	39.5	1.41

Table 5: 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 June 10, 2010 1900 MHz June 11, 2010			
/	Frequency	Permittivity ϵ	Conductivity σ (S/m)
Target value	850 MHz	55.2	0.97
	1900 MHz	53.3	1.52
Measurement value (Average of 10 tests)	850 MHz	53.9	0.96
	1900 MHz	51.7	1.53

8.2 System Validation

Table 6: 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 June 10, 2010 1900 MHz June 11, 2010								
Liquid parameters	Dipole calibration Target value	Frequency		Permittivity ϵ		Conductivity σ (S/m)		
		835 MHz	1900 MHz	41.6	39.6	0.92	1.40	
	Actual Measurement value	835 MHz	1900 MHz	40.3	39.5	0.88	1.41	
		Frequency		Target value (W/kg)		Measured value (W/kg)		Deviation
Verification results			10 g Average	1 g Average	10 g Average	1 g Average	10 g Average	1 g Average
	835 MHz		1.54	2.38	1.47	2.31	-4.55%	-2.94%
	1900 MHz		5.05	9.91	4.85	9.64	-3.96%	-2.72%

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

Table 7: 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>June 10, 2010</u> 1900 MHz <u>June 11, 2010</u>							
Liquid parameters	Dipole calibration	Frequency		Permittivity ϵ		Conductivity σ (S/m)	
		835 MHz		54.5		0.97	
	Target value	1900 MHz		52.5		1.51	
		Actural Measurement value	835 MHz		54.0		0.94
	1900 MHz		51.7		1.53		
	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		1.57	2.41	1.53	2.44	-2.55%	1.24%
1900 MHz		5.24	10.4	5.37	10.3	2.48%	-0.96%

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

Table 8: SAR Values (850MHz-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.1)	0.703	1.02	-0.056
Left hand, Touch cheek, Mid frequency (See Fig.2)	0.598	0.858	0.003
Left hand, Touch cheek, Bottom frequency (See Fig.3)	0.504	0.722	0.031
Left hand, Tilt 15 Degree, Top frequency (See Fig.4)	0.255	0.363	-0.092
Left hand, Tilt 15 Degree, Mid frequency (See Fig.5)	0.231	0.322	-0.015
Left hand, Tilt 15 Degree, Bottom frequency (See Fig.6)	0.210	0.290	-0.018
Right hand, Touch cheek, Top frequency (See Fig.7)	0.691	0.996	-0.059
Right hand, Touch cheek, Mid frequency (See Fig.8)	0.594	0.854	-0.050
Right hand, Touch cheek, Bottom frequency (See Fig.9)	0.513	0.730	0.022
Right hand, Tilt 15 Degree, Top frequency (See Fig.10)	0.281	0.393	-0.074
Right hand, Tilt 15 Degree, Mid frequency (See Fig.11)	0.255	0.357	-0.010
Right hand, Tilt 15 Degree, Bottom frequency (See Fig.12)	0.233	0.327	0.002

Table 9: 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, Mid frequency (See Fig.13)	0.253	0.397	-0.103
Left hand, Tilt 15 Degree, Mid frequency (See Fig.14)	0.173	0.283	0.033
Right hand, Touch cheek, Top frequency (See Fig.15)	0.284	0.492	0.038
Right hand, Touch cheek, Mid frequency (See Fig.16)	0.280	0.474	0.026
Right hand, Touch cheek, Bottom frequency (See Fig.17)	0.254	0.420	-0.083
Right hand, Tilt 15 Degree, Mid frequency (See Fig.18)	0.219	0.381	0.103

Table 10: 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 (See Fig.19)	0.390	0.540	-0.021
Body, Towards Ground, Mid frequency (See Fig.20)	0.394	0.544	-0.018
Body, Towards Ground, Bottom frequency (See Fig.21)	0.388	0.535	-0.007
Body, Towards Phantom, Top frequency (See Fig.22)	0.274	0.379	-0.063
Body, Towards Phantom, Mid frequency (See Fig.23)	0.293	0.405	0.006
Body, Towards Phantom, Bottom frequency (See Fig.24)	0.315	0.433	-0.037

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 (See Fig.25)	0.210	0.359	-0.032
Body, Towards Ground, Mid frequency (See Fig.26)	0.197	0.334	-0.028
Body, Towards Ground, Bottom frequency (See Fig.27)	0.178	0.302	-0.069

Body, Towards Phantom, Top frequency (See Fig.28)	0.095	0.149	0.085
Body, Towards Phantom, Mid frequency (See Fig.29)	0.096	0.150	0.006
Body, Towards Phantom, Bottom frequency (See Fig.30)	0.095	0.148	-0.001

8.4 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.

9 Measurement Uncertainty

No.	Error source	Type	Uncertainty Value (%)	Probability Distribution	k	c _i	Standard Uncertainty (%) u _i ' (%)	Degree of freedom V _{eff} or v _i
1	System repeatability	A	0.5	N	1	1	0.5	9
Measurement system								
2	– probe calibration	B	7	N	2	1	3.5	∞
3	– axial isotropy of the probe	B	4.7	R	$\sqrt{3}$	0.5	4.3	∞
4	– hemisphere isotropy of the probe	B	9.4	R	$\sqrt{3}$			
5	– space resolution	B	0	R	$\sqrt{3}$	1	0	∞
6	– boundary effect	B	11.0	R	$\sqrt{3}$	1	6.4	∞
7	– probe linearity	B	4.7	R	$\sqrt{3}$	1	2.7	∞
8	– detection limit	B	1.0	R	$\sqrt{3}$	1	0.6	∞
9	– readout electronics	B	1.0	N	1	1	1.0	∞
10	– RF Ambient Conditions	B	3.0	R	$\sqrt{3}$	1	1.73	∞
11	– Probe Positioner Mechanical Tolerance	B	0.4	R	$\sqrt{3}$	1	0.2	∞
12	– Probe Positioning with respect to Phantom Shell	B	2.9	R	$\sqrt{3}$	1	1.7	∞
13	– Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	B	3.9	R	$\sqrt{3}$	1	2.3	∞

Test sample Related								
14	– Test Sample Positioning	A	4.9	N	1	1	4.9	5
15	– Device Holder	A	6.1	N	1	1	6.1	5
16	– Output Power Variation - SAR drift measurement	B	5.0	R	$\sqrt{3}$	1	2.9	∞
Phantom and Tissue Parameters								
17	– Phantom Uncertainty (shape and thickness tolerances)	B	1.0	R	$\sqrt{3}$	1	0.6	∞
18	– liquid conductivity (deviation from target)	B	5.0	R	$\sqrt{3}$	0.6	1.7	∞
19	– liquid conductivity (measurement error)	A	0.23	N	1	1	0.23	9
20	– liquid permittivity (deviation from target)	B	5.0	R	$\sqrt{3}$	0.6	1.7	∞
21	– liquid permittivity (measurement error)	A	0.46	N	1	1	0.46	9
Combined standard uncertainty		$u_c = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$		/		12.2		88.7
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$		N	k=2	24.4		/

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 29,2009	One year
02	Power meter	NRVD	101253	September 4, 2009	One year
03	Power sensor	NRV-Z5	100333		
04	Signal Generator	E4433B	US37230472	September 3, 2009	One Year
05	Amplifier	VTL5400	0505	No Calibration Requested	
06	BTS	CMU 200	113312	August 10, 2009	One year
07	E-field Probe	SPEAG ES3DV3	3149	September 25, 2009	One year
08	DAE	SPEAG DAE4	771	November 19, 2009	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.

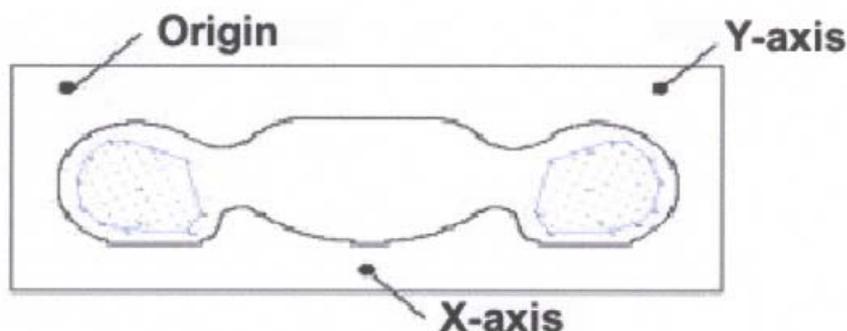
Step 3: Around this point, a volume of 30 mm x 30 mm x 30 mm was assessed by measuring 7 x 7x 7 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

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.

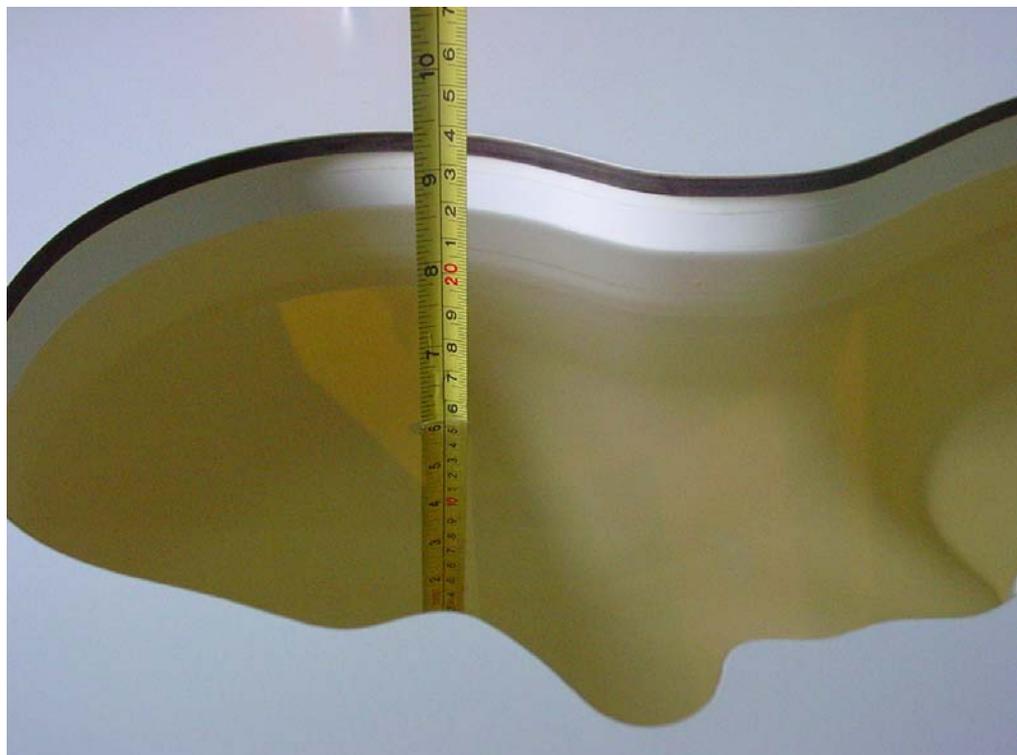


Picture A: SAR Measurement Points in Area Scan

ANNEX B TEST LAYOUT



Picture B1: Specific Absorption Rate Test Layout



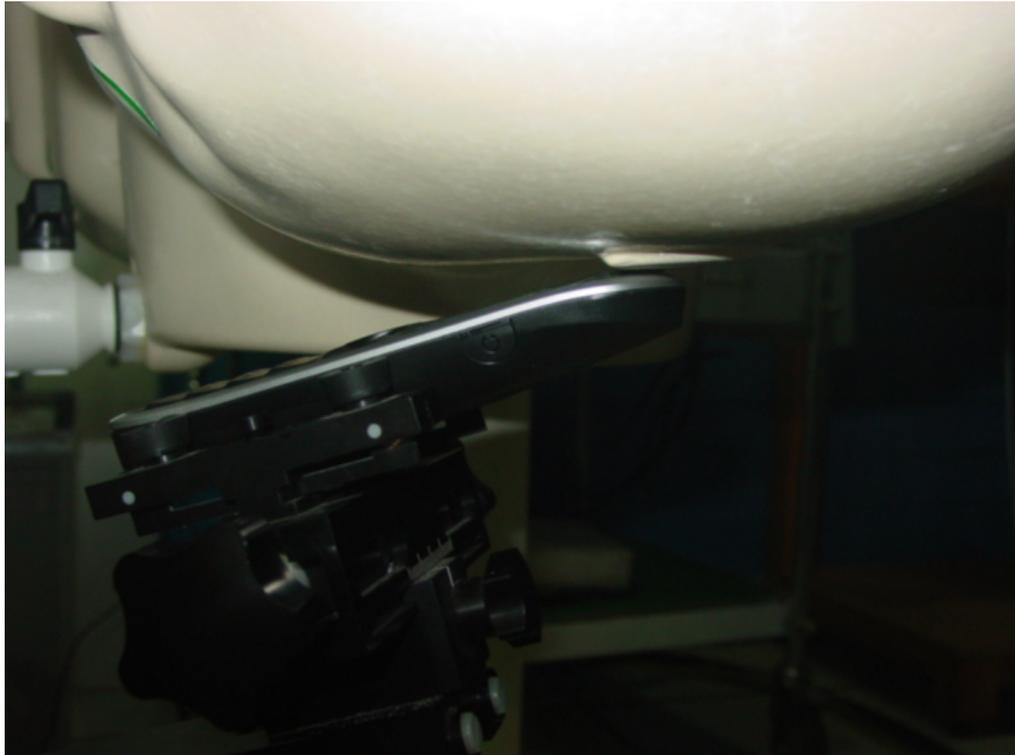
Picture B2: Liquid depth in the Flat Phantom (850 MHz)



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



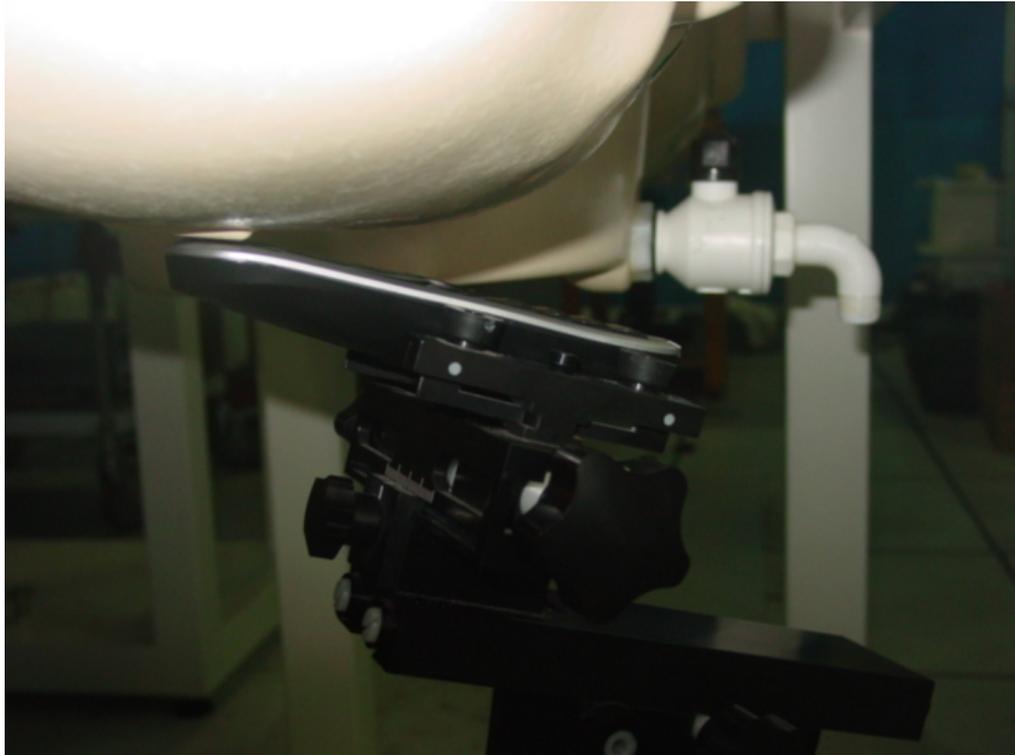
Picture B4: Left Hand Touch Cheek Position



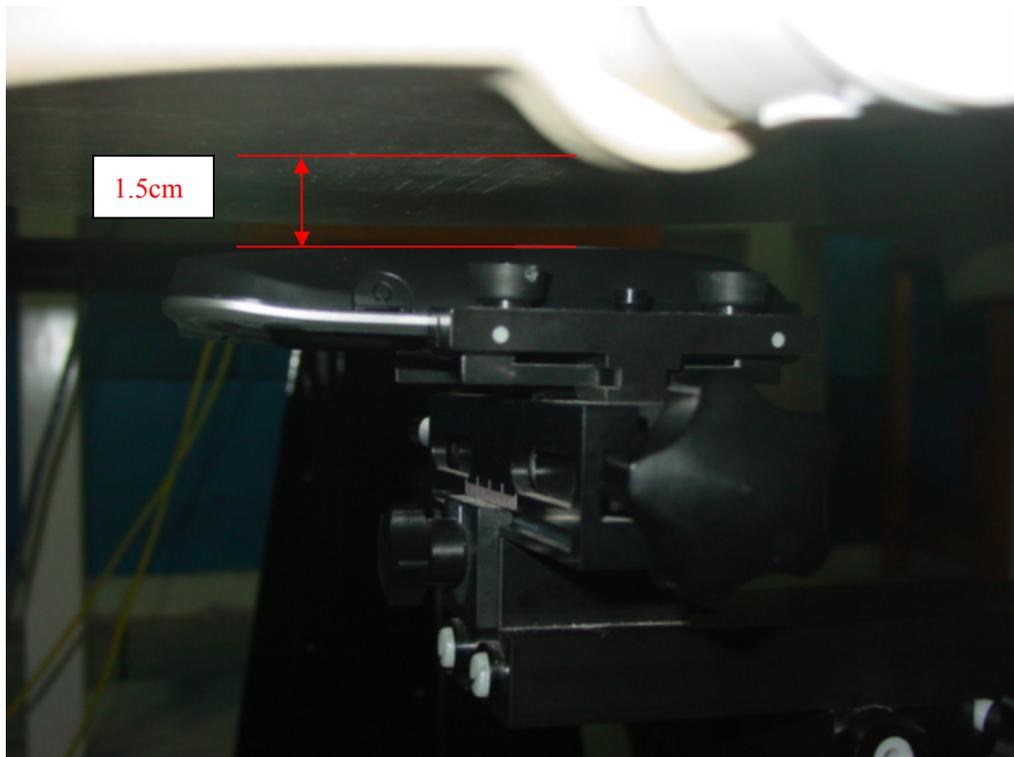
Picture B5: Left Hand Tilt 15° Position



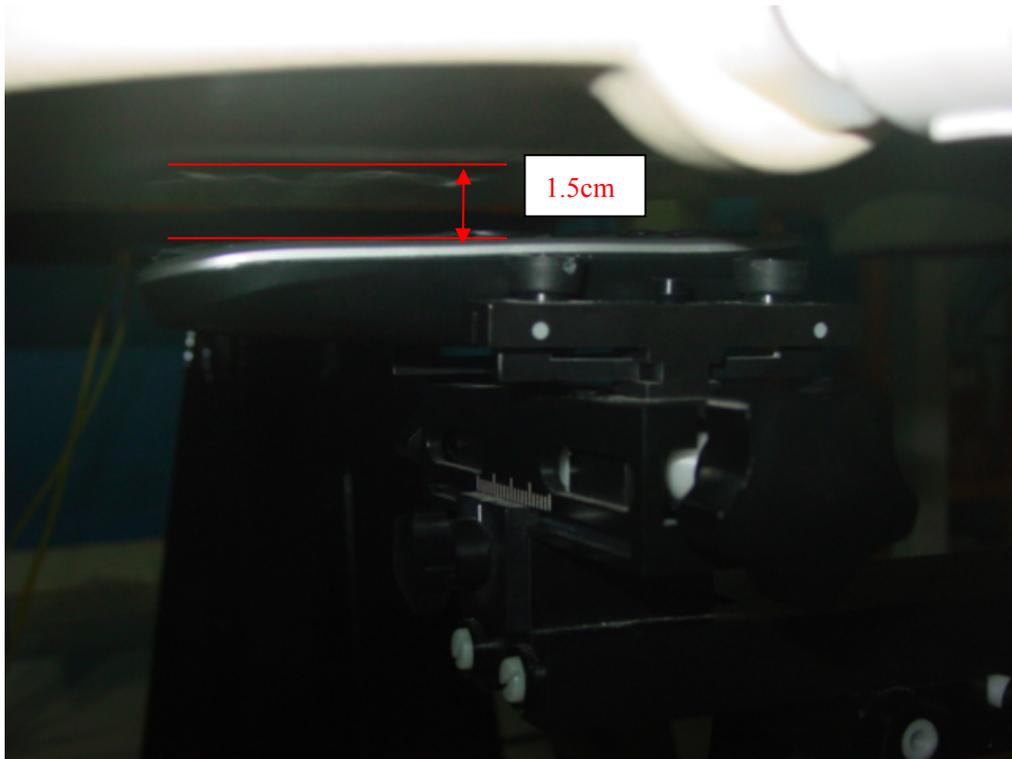
Picture B6: Right Hand Touch Cheek Position



Picture B7: Right Hand Tilt 15° Position



Picture B8: Body-worn Position (towards ground, the distance from handset to the bottom of the Phantom is 1.5cm)



Picture B9: Body-worn Position (towards phantom, the distance from handset to the bottom of the Phantom is 1.5cm)

ANNEX C GRAPH RESULTS

850 Left Cheek High

Date/Time: 2010-6-10 8:10:34

Electronics: DAE4 Sn771

Medium: Head 850

Medium parameters used (interpolated): $f = 848.8$ MHz; $\sigma = 0.90$ mho/m; $\epsilon_r = 40.2$; $\rho = 1000$ kg/m³

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 (51x111x1): Measurement grid: dx=10mm, dy=10mm

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

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

Reference Value = 26.2 V/m; Power Drift = -0.056 dB

Peak SAR (extrapolated) = 1.38 W/kg

SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.703 mW/g

Maximum value of SAR (measured) = 1.10 mW/g

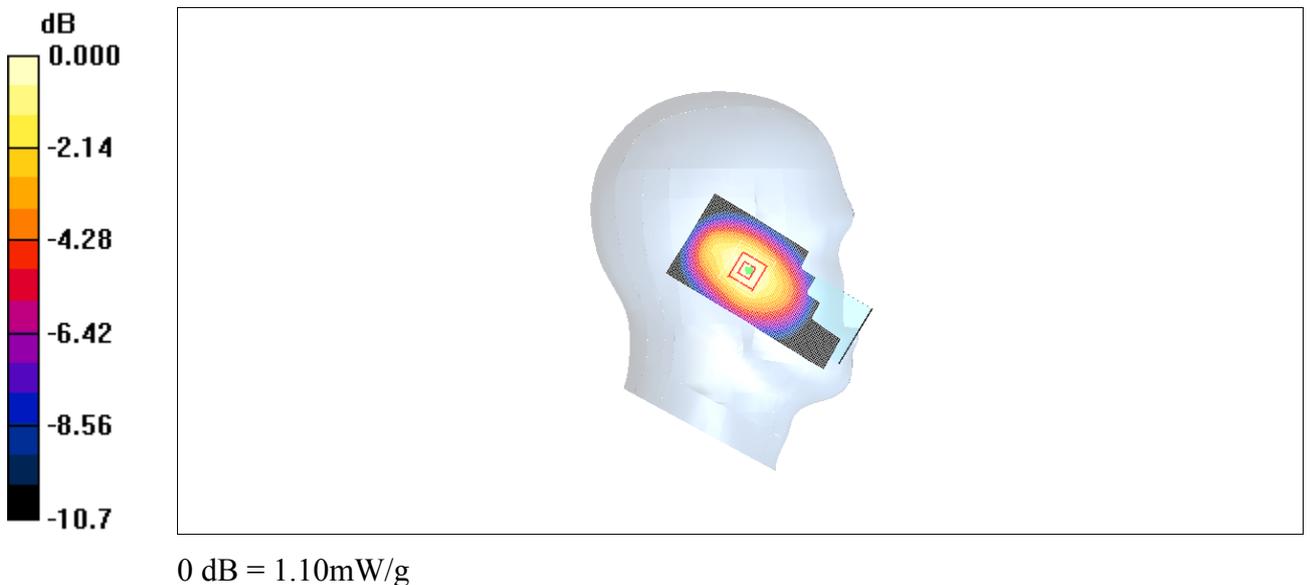


Fig. 1 850MHz CH251

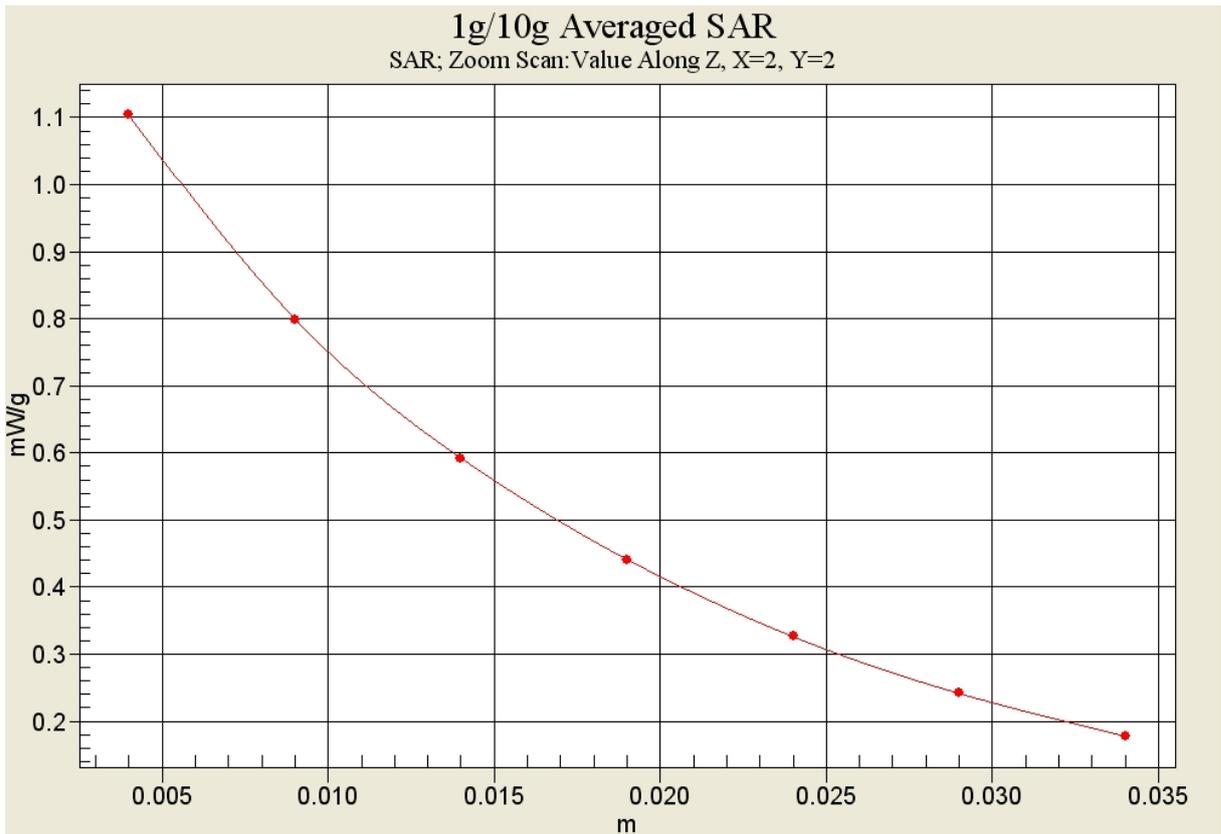


Fig. 1-1 Z-Scan at power reference point (850 MHz CH251)

850 Left Cheek Middle

Date/Time: 2010-6-10 8:24:57

Electronics: DAE4 Sn771

Medium: Head 850

Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.888$ mho/m; $\epsilon_r = 40.3$; $\rho = 1000$ kg/m³

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 (51x111x1): Measurement grid: dx=10mm, dy=10mm

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

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

Reference Value = 24.4 V/m; Power Drift = 0.003 dB

Peak SAR (extrapolated) = 1.15 W/kg

SAR(1 g) = 0.858 mW/g; SAR(10 g) = 0.598 mW/g

Maximum value of SAR (measured) = 0.923 mW/g

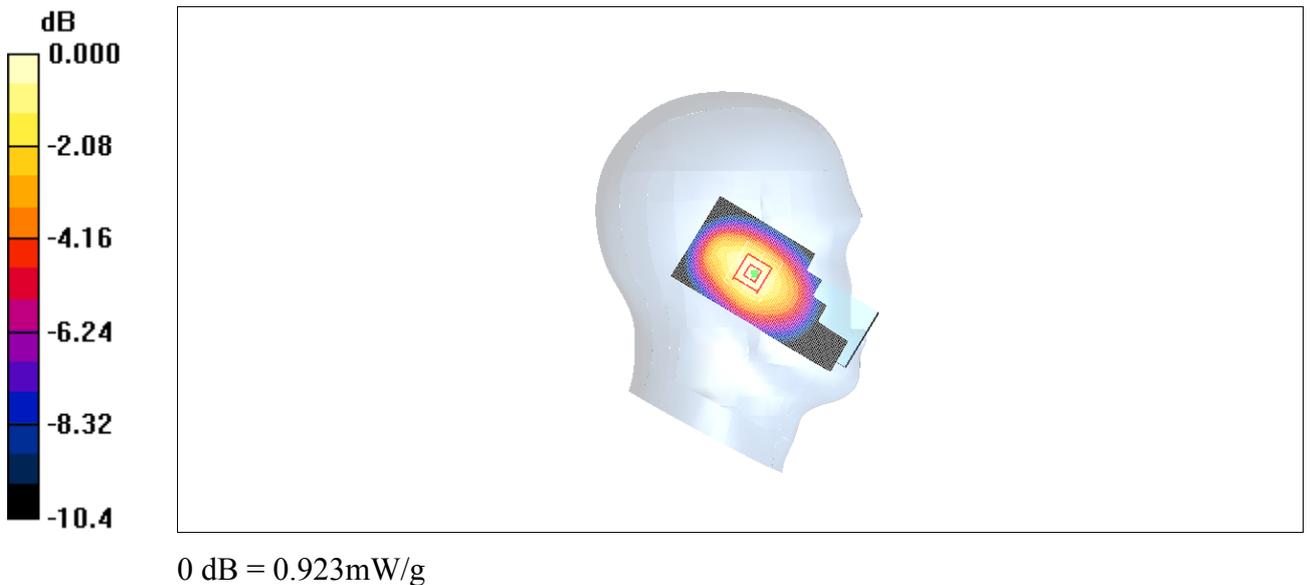


Fig. 2 850 MHz CH190

850 Left Cheek Low

Date/Time: 2010-6-10 8:39:29

Electronics: DAE4 Sn771

Medium: Head 850

Medium parameters used: $f = 825$ MHz; $\sigma = 0.876$ mho/m; $\epsilon_r = 40.3$; $\rho = 1000$ kg/m³

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 (51x111x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.750 mW/g

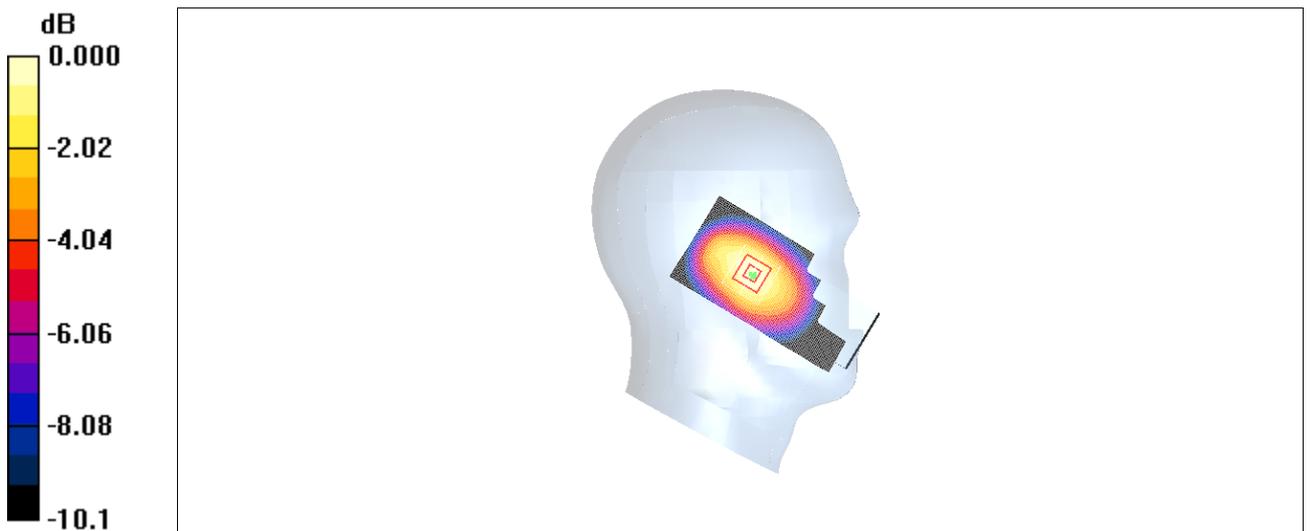
Cheek Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 22.6 V/m; Power Drift = 0.031 dB

Peak SAR (extrapolated) = 0.973 W/kg

SAR(1 g) = 0.722 mW/g; SAR(10 g) = 0.504 mW/g

Maximum value of SAR (measured) = 0.773 mW/g



0 dB = 0.773mW/g

Fig. 3 850 MHz CH128

850 Left Tilt High

Date/Time: 2010-6-10 8:53:58

Electronics: DAE4 Sn771

Medium: Head 850

Medium parameters used (interpolated): $f = 848.8$ MHz; $\sigma = 0.90$ mho/m; $\epsilon_r = 40.2$; $\rho = 1000$ kg/m³

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 (51x111x1): Measurement grid: dx=10mm, dy=10mm

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

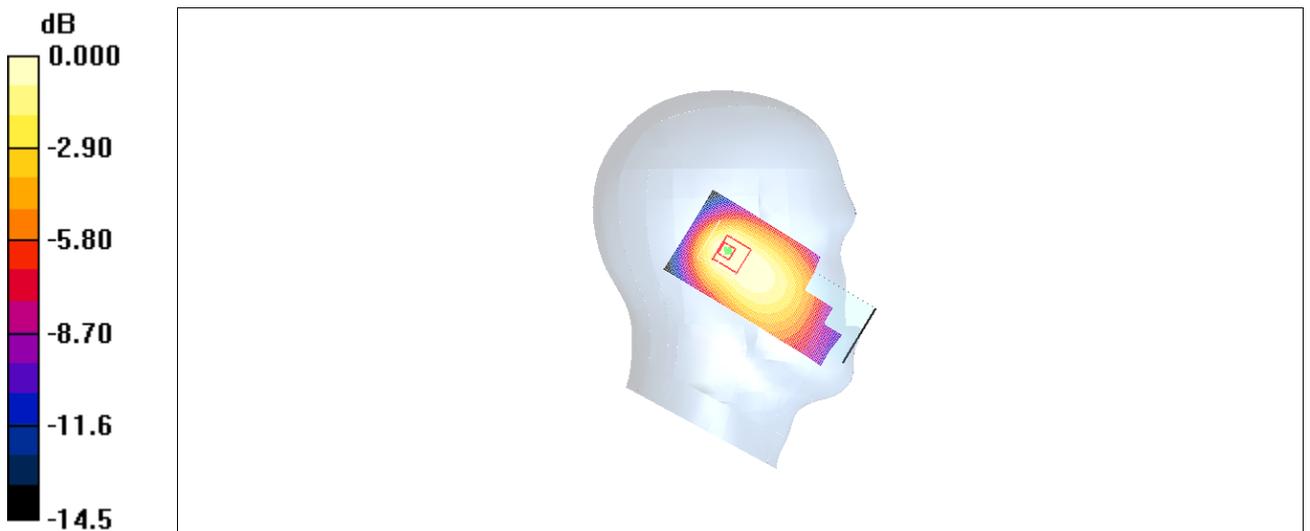
Tilt High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 19.8 V/m; Power Drift = -0.092 dB

Peak SAR (extrapolated) = 0.563 W/kg

SAR(1 g) = 0.363 mW/g; SAR(10 g) = 0.255 mW/g

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



0 dB = 0.388mW/g

Fig.4 850 MHz CH251

850 Left Tilt Middle

Date/Time: 2010-6-10 9:08:15

Electronics: DAE4 Sn771

Medium: Head 850

Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.888$ mho/m; $\epsilon_r = 40.3$; $\rho = 1000$ kg/m³

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 (51x111x1): Measurement grid: dx=10mm, dy=10mm

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

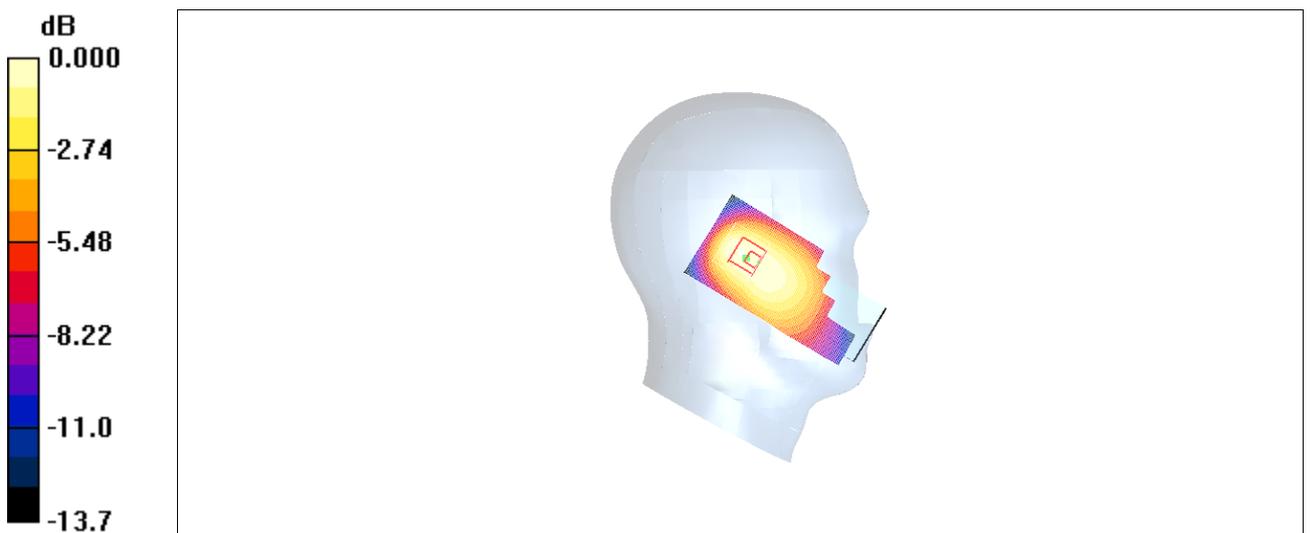
Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 18.6 V/m; Power Drift = -0.015 dB

Peak SAR (extrapolated) = 0.486 W/kg

SAR(1 g) = 0.322 mW/g; SAR(10 g) = 0.231 mW/g

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



0 dB = 0.349mW/g

Fig.5 850 MHz CH190

850 Left Tilt Low

Date/Time: 2010-6-10 9:22:30

Electronics: DAE4 Sn771

Medium: Head 850

Medium parameters used: $f = 825 \text{ MHz}$; $\sigma = 0.876 \text{ mho/m}$; $\epsilon_r = 40.3$; $\rho = 1000 \text{ kg/m}^3$

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)

Tilt Low/Area Scan (51x111x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.323 mW/g

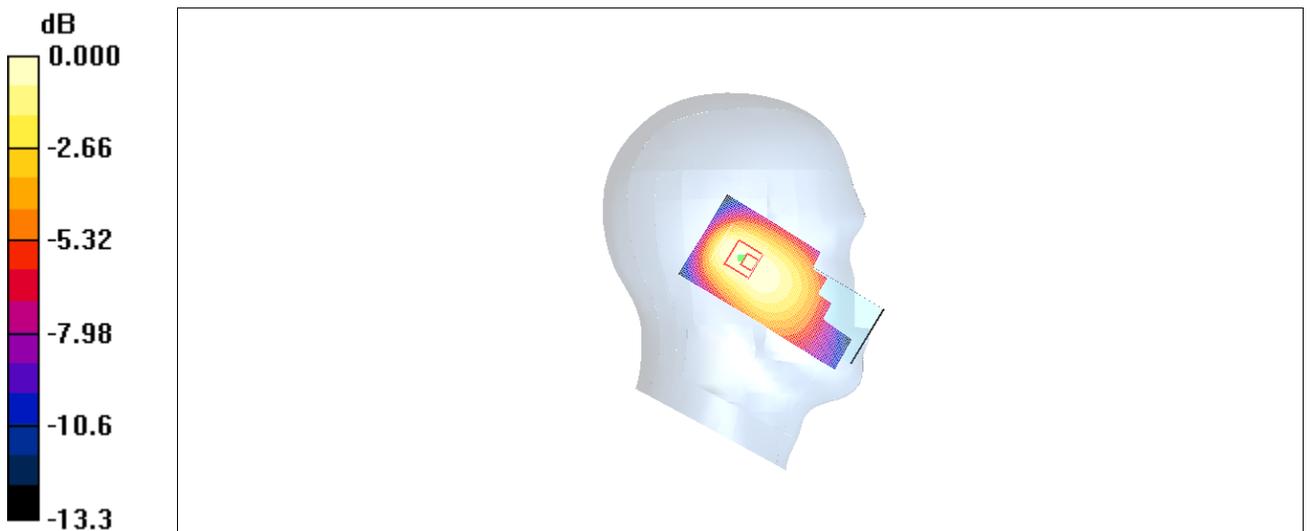
Tilt Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 17.6 V/m ; Power Drift = -0.018 dB

Peak SAR (extrapolated) = 0.424 W/kg

SAR(1 g) = 0.290 mW/g ; SAR(10 g) = 0.210 mW/g

Maximum value of SAR (measured) = 0.313 mW/g



0 dB = 0.313mW/g

Fig. 6 850 MHz CH128

850 Right Cheek High

Date/Time: 2010-6-10 9:37:26

Electronics: DAE4 Sn771

Medium: Head 850

Medium parameters used (interpolated): $f = 848.8$ MHz; $\sigma = 0.90$ mho/m; $\epsilon_r = 40.2$; $\rho = 1000$ kg/m³

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 (51x111x1): Measurement grid: dx=10mm, dy=10mm

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

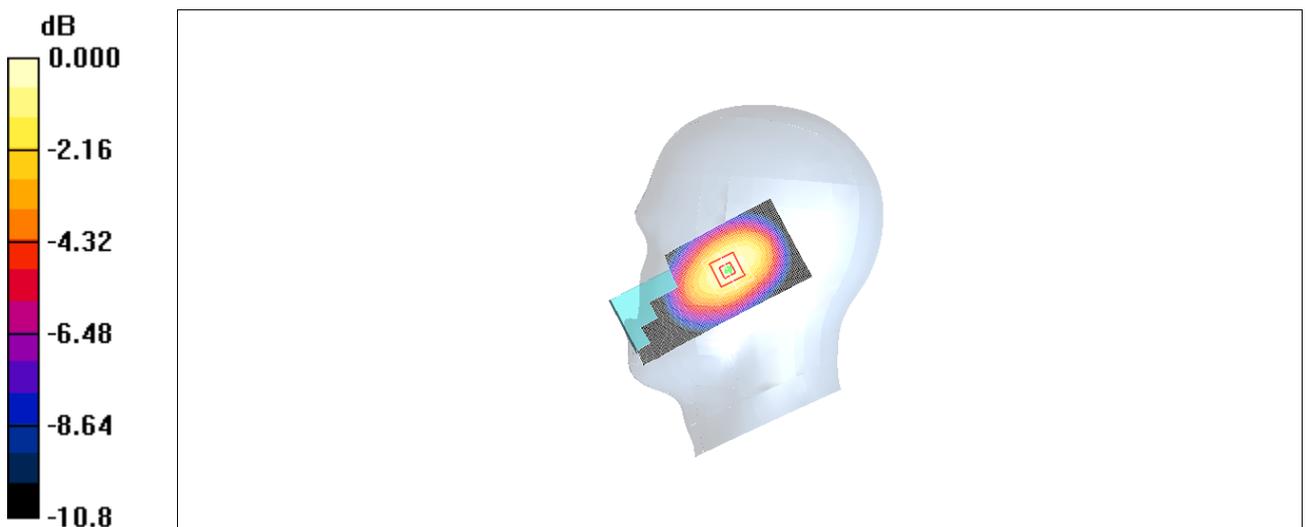
Cheek High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 25.5 V/m; Power Drift = -0.059 dB

Peak SAR (extrapolated) = 1.35 W/kg

SAR(1 g) = 0.996 mW/g; SAR(10 g) = 0.691 mW/g

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



0 dB = 1.07mW/g

Fig. 7 850 MHz CH251

850 Right Cheek Middle

Date/Time: 2010-6-10 9:51:40

Electronics: DAE4 Sn771

Medium: Head 850

Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.888$ mho/m; $\epsilon_r = 40.3$; $\rho = 1000$ kg/m³

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 (51x111x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.910 mW/g

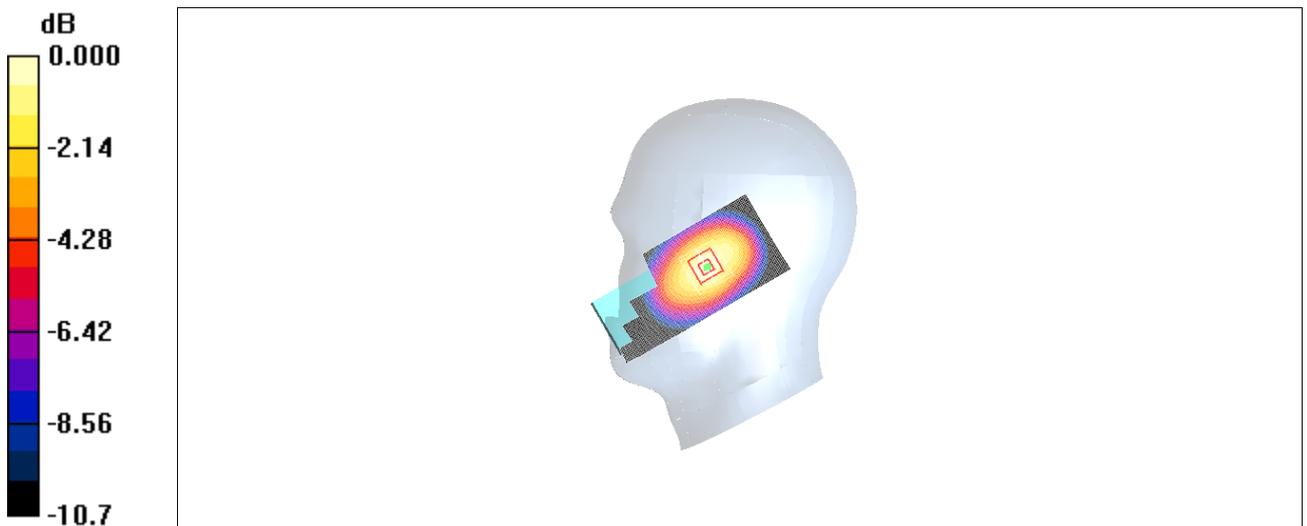
Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 23.6 V/m; Power Drift = -0.050 dB

Peak SAR (extrapolated) = 1.16 W/kg

SAR(1 g) = 0.854 mW/g; SAR(10 g) = 0.594 mW/g

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



0 dB = 0.922mW/g

Fig. 8 850 MHz CH190

850 Right Cheek Low

Date/Time: 2010-6-10 10:06:08

Electronics: DAE4 Sn771

Medium: Head 850

Medium parameters used: $f = 825$ MHz; $\sigma = 0.876$ mho/m; $\epsilon_r = 40.3$; $\rho = 1000$ kg/m³

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 (51x111x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.782 mW/g

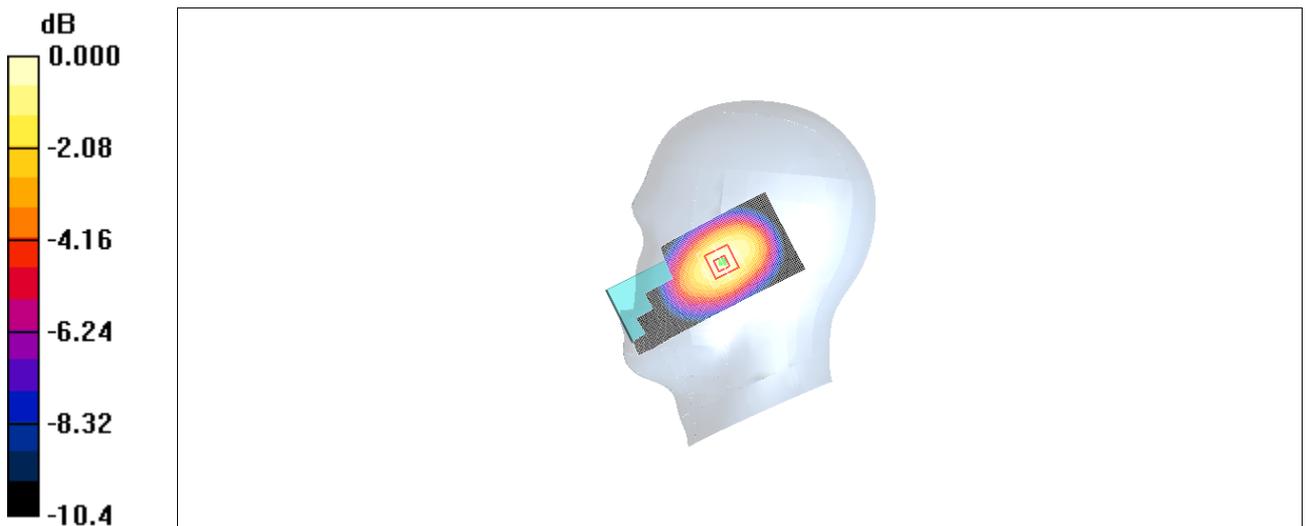
Cheek Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 22.1 V/m; Power Drift = 0.022 dB

Peak SAR (extrapolated) = 0.976 W/kg

SAR(1 g) = 0.730 mW/g; SAR(10 g) = 0.513 mW/g

Maximum value of SAR (measured) = 0.783 mW/g



0 dB = 0.783mW/g

Fig. 9 850 MHz CH128

850 Right Tilt High

Date/Time: 2010-6-10 10:20:43

Electronics: DAE4 Sn771

Medium: Head 850

Medium parameters used (interpolated): $f = 848.8$ MHz; $\sigma = 0.90$ mho/m; $\epsilon_r = 40.2$; $\rho = 1000$ kg/m³

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 (51x111x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.450 mW/g

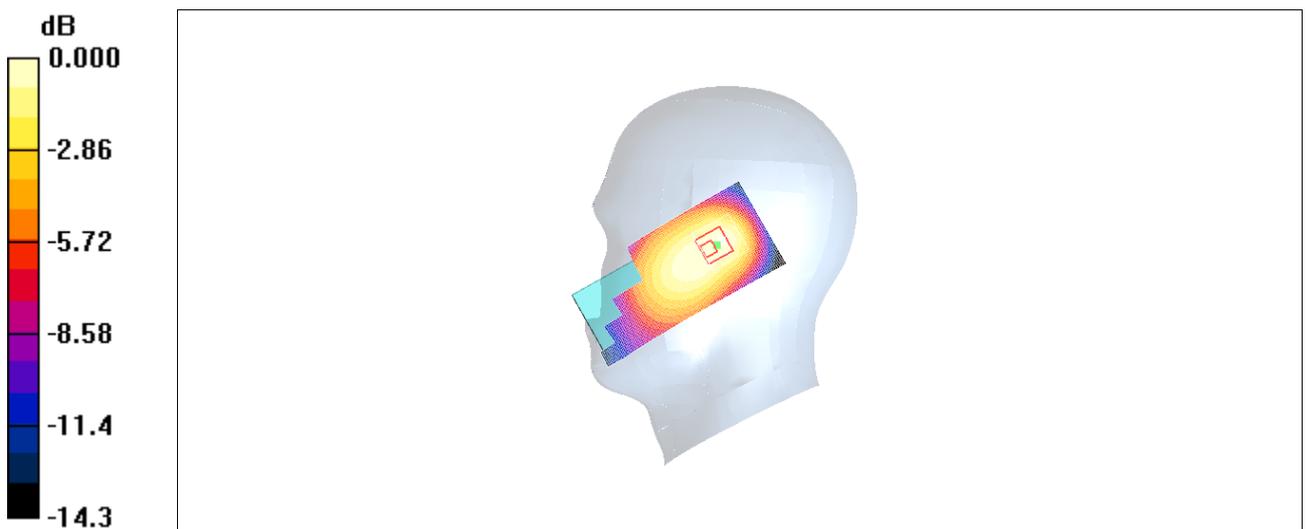
Tilt High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 20.5 V/m; Power Drift = -0.074 dB

Peak SAR (extrapolated) = 0.591 W/kg

SAR(1 g) = 0.393 mW/g; SAR(10 g) = 0.281 mW/g

Maximum value of SAR (measured) = 0.425 mW/g



0 dB = 0.425mW/g

Fig.10 850 MHz CH251

850 Right Tilt Middle

Date/Time: 2010-6-10 10:34:57

Electronics: DAE4 Sn771

Medium: Head 850

Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.888$ mho/m; $\epsilon_r = 40.3$; $\rho = 1000$ kg/m³

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 (51x111x1): Measurement grid: dx=10mm, dy=10mm

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

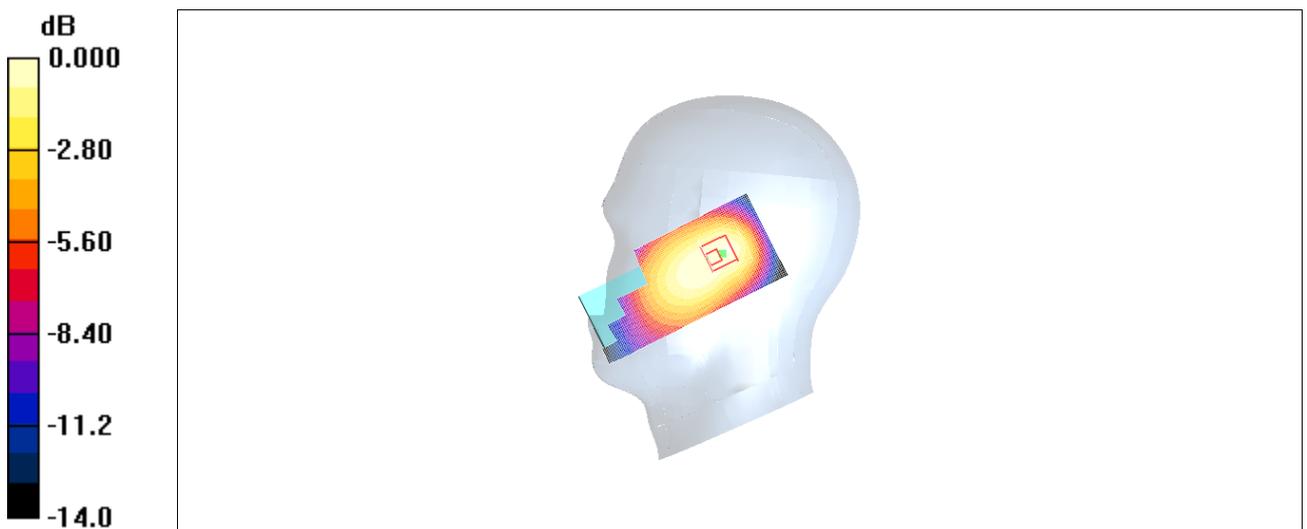
Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 19.4 V/m; Power Drift = -0.010 dB

Peak SAR (extrapolated) = 0.517 W/kg

SAR(1 g) = 0.357 mW/g; SAR(10 g) = 0.255 mW/g

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



0 dB = 0.388mW/g

Fig.11 850 MHz CH190

850 Right Tilt Low

Date/Time: 2010-6-10 10:49:12

Electronics: DAE4 Sn771

Medium: Head 850

Medium parameters used: $f = 825$ MHz; $\sigma = 0.876$ mho/m; $\epsilon_r = 40.3$; $\rho = 1000$ kg/m³

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)

Tilt Low/Area Scan (51x111x1): Measurement grid: dx=10mm, dy=10mm

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

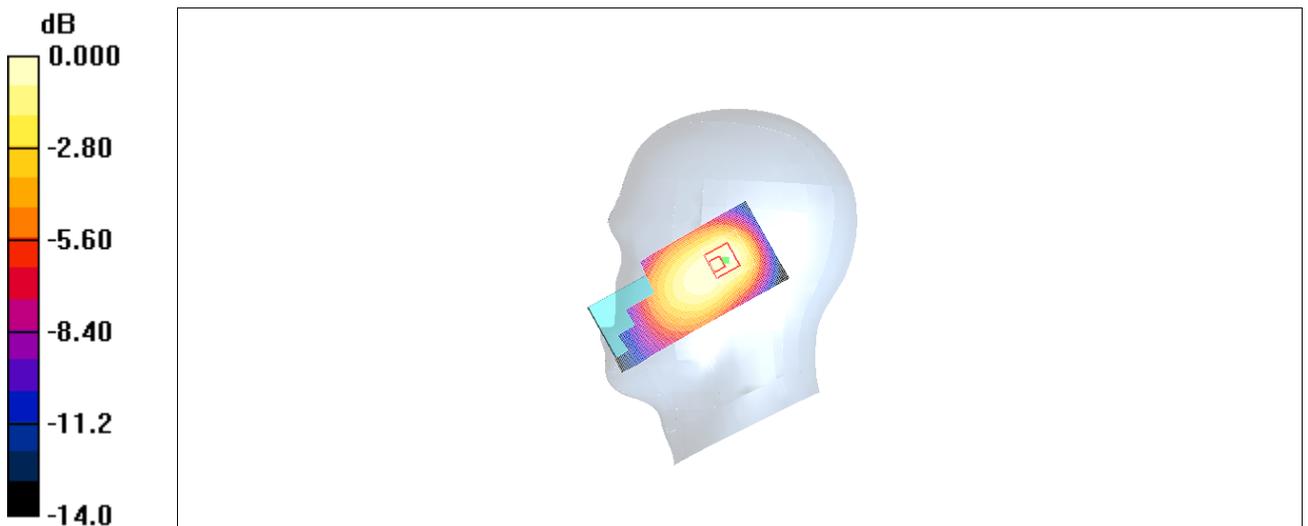
Tilt Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 18.3 V/m; Power Drift = 0.002 dB

Peak SAR (extrapolated) = 0.468 W/kg

SAR(1 g) = 0.327 mW/g; SAR(10 g) = 0.233 mW/g

Maximum value of SAR (measured) = 0.356 mW/g



0 dB = 0.356mW/g

Fig. 12 850 MHz CH128

1900 Left Cheek Middle

Date/Time: 2010-6-11 8:13:22

Electronics: DAE4 Sn771

Medium: Head 1900 MHz

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.40$ mho/m; $\epsilon_r = 39.5$; $\rho = 1000$ kg/m³

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 (51x111x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.439 mW/g

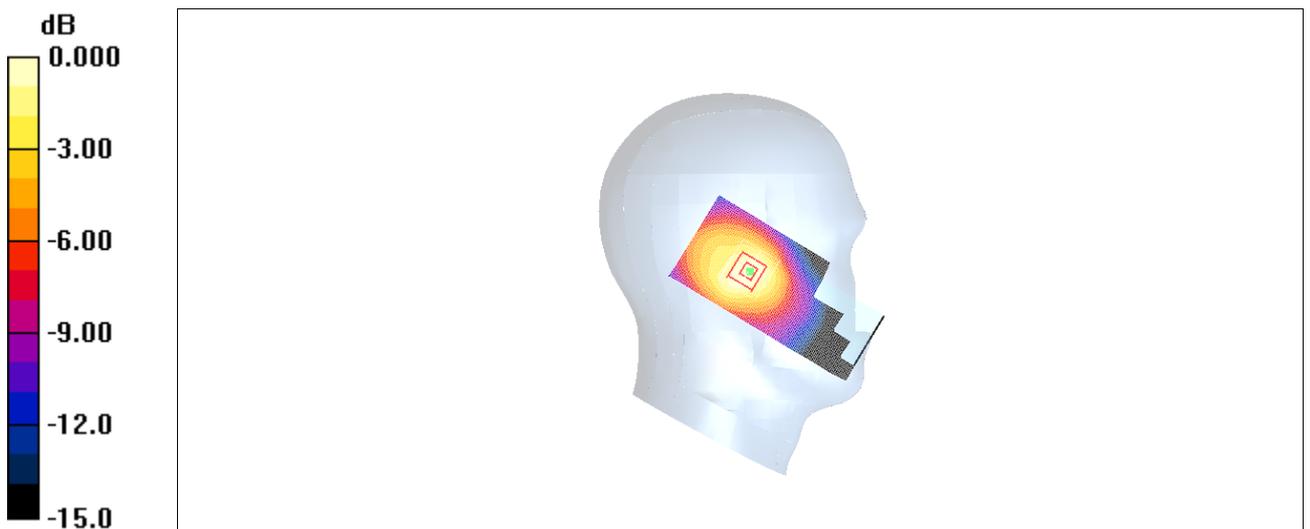
Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.4 V/m; Power Drift = -0.103 dB

Peak SAR (extrapolated) = 0.577 W/kg

SAR(1 g) = 0.397 mW/g; SAR(10 g) = 0.253 mW/g

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



0 dB = 0.427mW/g

Fig. 13 1900 MHz CH661

1900 Left Tilt Middle

Date/Time: 2010-6-11 8:27:41

Electronics: DAE4 Sn771

Medium: 1900 Head

Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.40 \text{ mho/m}$; $\epsilon_r = 39.5$; $\rho = 1000 \text{ kg/m}^3$

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 (51x111x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.295 mW/g

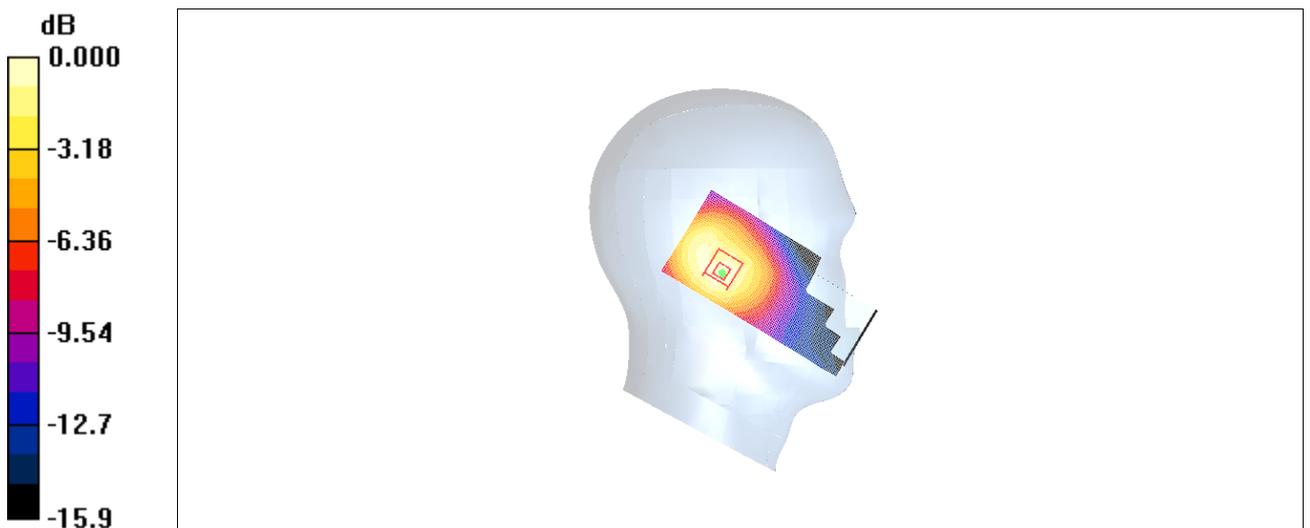
Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 12.6 V/m; Power Drift = 0.033 dB

Peak SAR (extrapolated) = 0.440 W/kg

SAR(1 g) = 0.283 mW/g; SAR(10 g) = 0.173 mW/g

Maximum value of SAR (measured) = 0.313 mW/g



0 dB = 0.313mW/g

Fig. 14 1900 MHz CH661

1900 Right Cheek High

Date/Time: 2010-6-11 8:56:35

Electronics: DAE4 Sn771

Medium: 1900 Head

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.42$ mho/m; $\epsilon_r = 39.4$; $\rho = 1000$ kg/m³

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 (51x111x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.515 mW/g

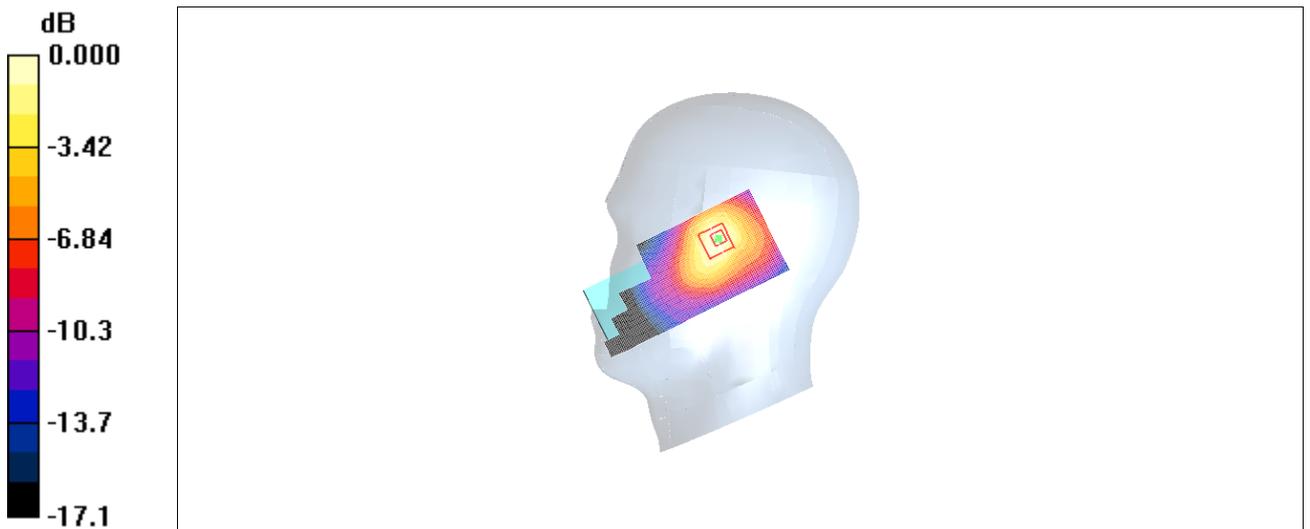
Cheek High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.5 V/m; Power Drift = 0.038 dB

Peak SAR (extrapolated) = 0.798 W/kg

SAR(1 g) = 0.492 mW/g; SAR(10 g) = 0.284 mW/g

Maximum value of SAR (measured) = 0.538 mW/g



0 dB = 0.538mW/g

Fig. 15 1900 MHz CH810

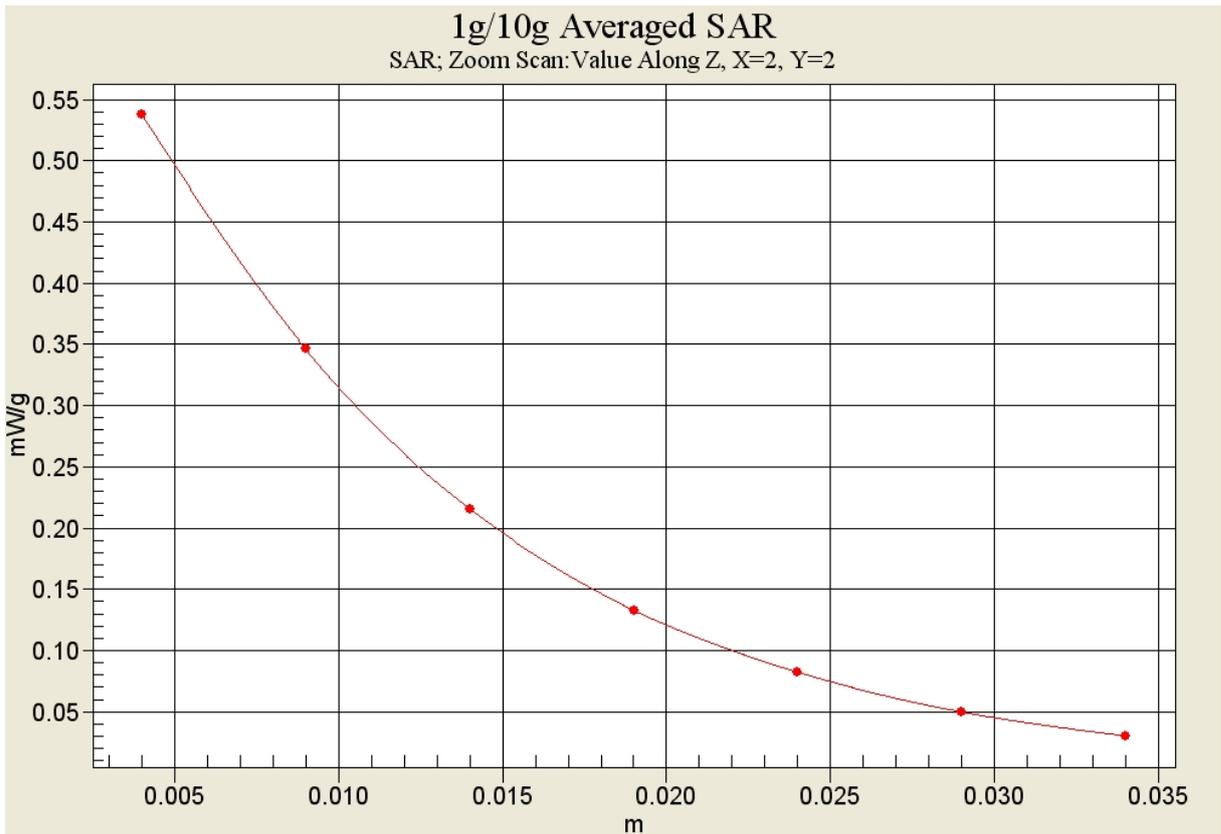


Fig. 15-1 Z-Scan at power reference point (1900 MHz CH810)

1900 Right Cheek Middle

Date/Time: 2010-6-11 8:42:19

Electronics: DAE4 Sn771

Medium: 1900 Head

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.40$ mho/m; $\epsilon_r = 39.5$; $\rho = 1000$ kg/m³

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 (51x111x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.492 mW/g

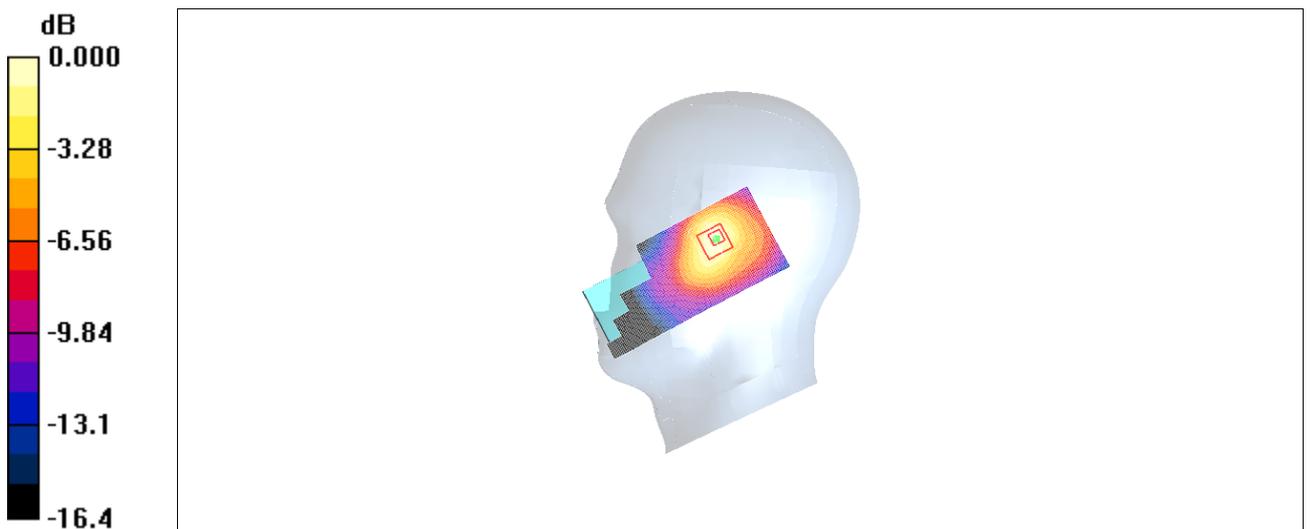
Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.5 V/m; Power Drift = 0.026 dB

Peak SAR (extrapolated) = 0.753 W/kg

SAR(1 g) = 0.474 mW/g; SAR(10 g) = 0.280 mW/g

Maximum value of SAR (measured) = 0.516 mW/g



0 dB = 0.516mW/g

Fig. 16 1900 MHz CH661

1900 Right Cheek Low

Date/Time: 2010-6-11 9:10:58

Electronics: DAE4 Sn771

Medium: 1900 Head

Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.37$ mho/m; $\epsilon_r = 39.6$; $\rho = 1000$ kg/m³

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 (51x111x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.446 mW/g

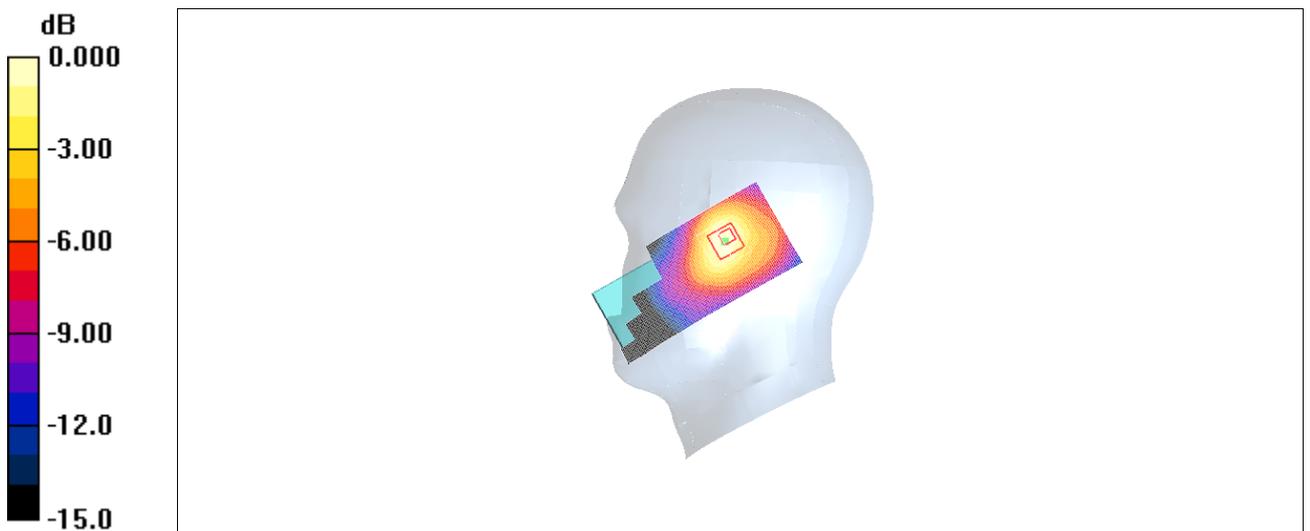
Cheek Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.5 V/m; Power Drift = -0.083 dB

Peak SAR (extrapolated) = 0.652 W/kg

SAR(1 g) = 0.420 mW/g; SAR(10 g) = 0.254 mW/g

Maximum value of SAR (measured) = 0.435 mW/g



0 dB = 0.435mW/g

Fig. 17 1900 MHz CH512

1900 Right Tilt Middle

Date/Time: 2010-6-11 9:25:30

Electronics: DAE4 Sn771

Medium: 1900 Head

Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.40 \text{ mho/m}$; $\epsilon_r = 39.5$; $\rho = 1000 \text{ kg/m}^3$

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 (51x11x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.391 mW/g

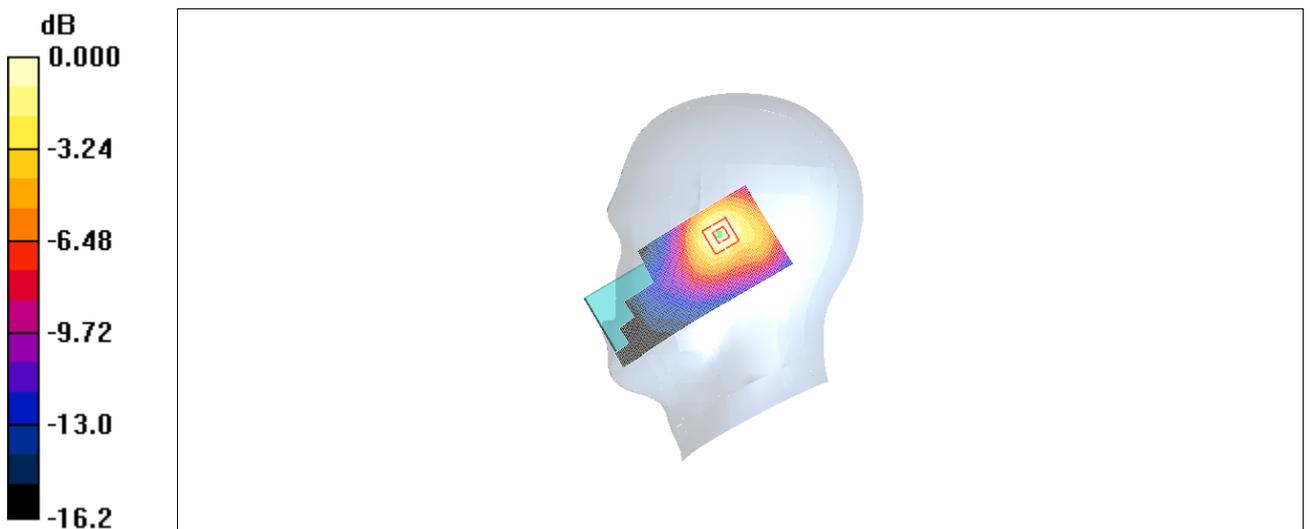
Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 11.5 V/m; Power Drift = 0.103 dB

Peak SAR (extrapolated) = 0.605 W/kg

SAR(1 g) = 0.381 mW/g; SAR(10 g) = 0.219 mW/g

Maximum value of SAR (measured) = 0.416 mW/g



0 dB = 0.416mW/g

Fig.18 1900 MHz CH661

850 Body Towards Ground High

Date/Time: 2010-6-10 13:49:03

Electronics: DAE4 Sn771

Medium: 850 Body

Medium parameters used (interpolated): $f = 848.8$ MHz; $\sigma = 0.96$ mho/m; $\epsilon_r = 53.9$; $\rho = 1000$ kg/m³

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

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

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

Toward Ground High/Area Scan (51x111x1): Measurement grid: dx=10mm, dy=10mm

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

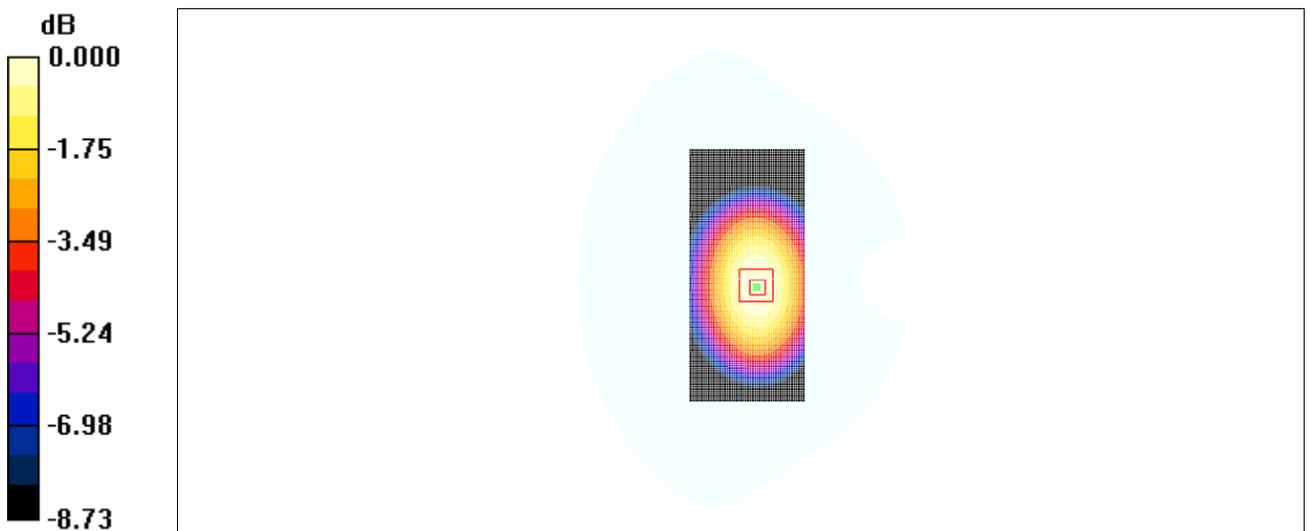
Toward Ground High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 23.2 V/m; Power Drift = -0.021 dB

Peak SAR (extrapolated) = 0.700 W/kg

SAR(1 g) = 0.540 mW/g; SAR(10 g) = 0.390 mW/g

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



0 dB = 0.558mW/g

Fig. 19 850 MHz CH251

850 Body Towards Ground Middle

Date/Time: 2010-6-10 14:04:21

Electronics: DAE4 Sn771

Medium: 850 Body

Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.95$ mho/m; $\epsilon_r = 54.0$; $\rho = 1000$ kg/m³

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

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

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

Toward Ground Middle/Area Scan (51x111x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.577 mW/g

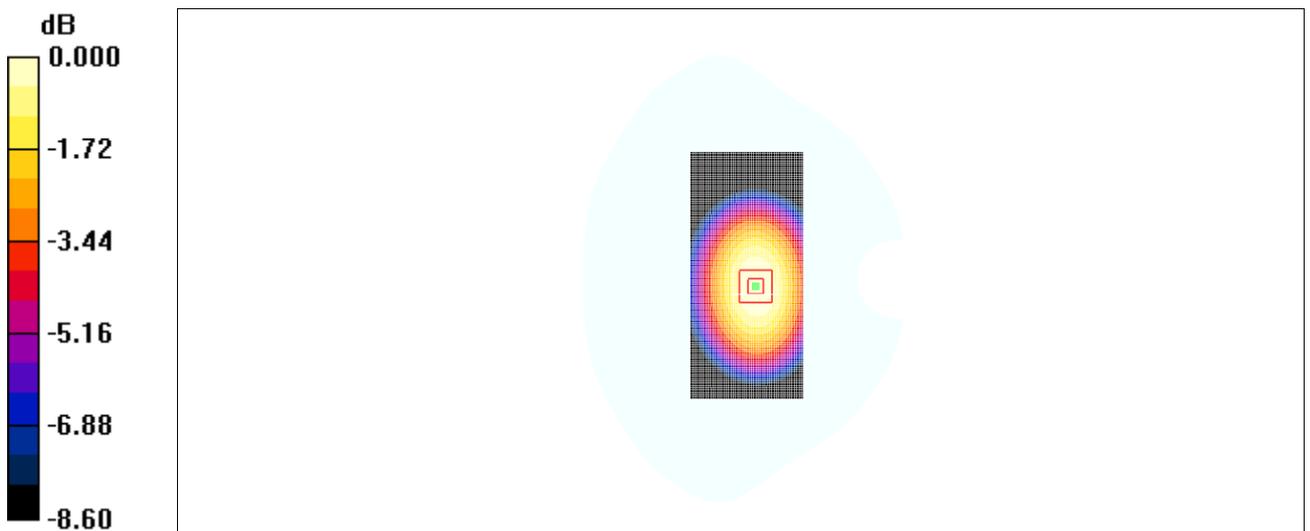
Toward Ground Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 23.4 V/m; Power Drift = -0.018 dB

Peak SAR (extrapolated) = 0.707 W/kg

SAR(1 g) = 0.544 mW/g; SAR(10 g) = 0.394 mW/g

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



0 dB = 0.561mW/g

Fig. 20 850 MHz CH190

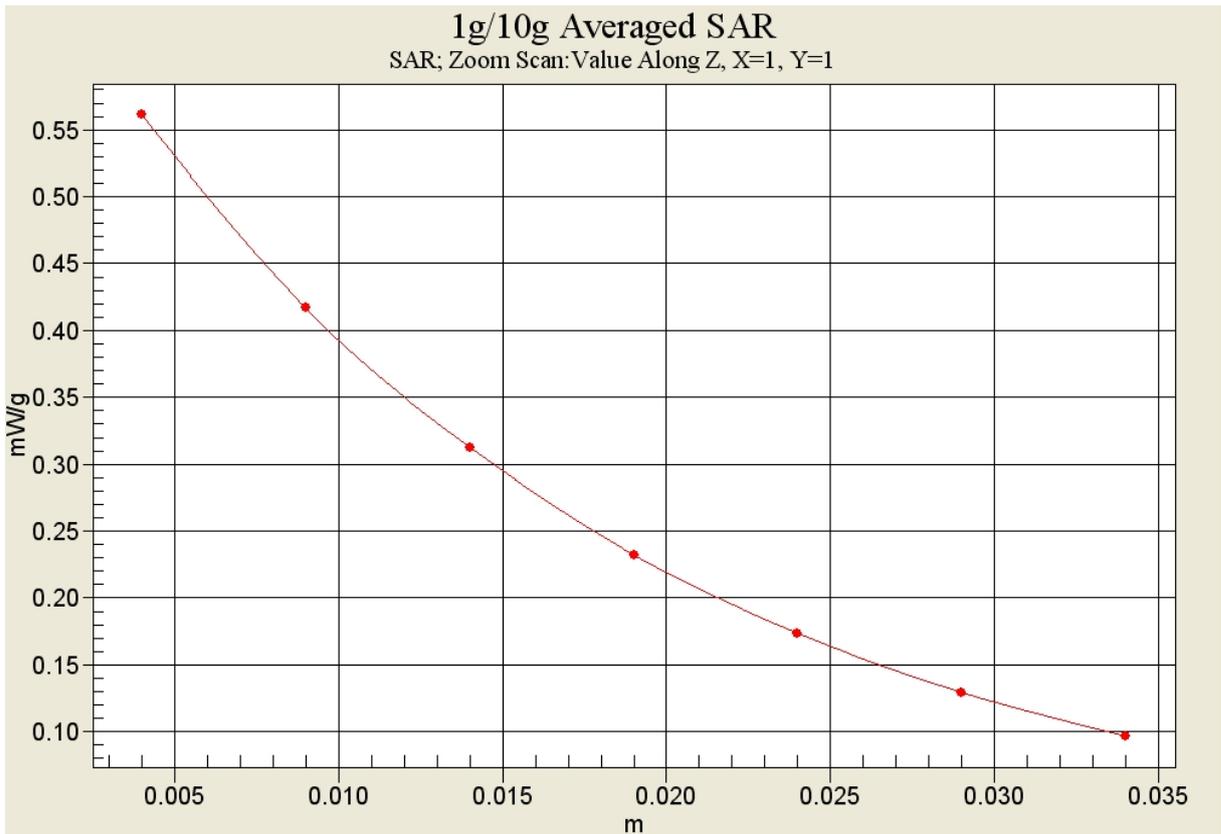


Fig. 20-1 Z-Scan at power reference point (850 MHz CH190)

850 Body Towards Ground Low

Date/Time: 2010-6-10 14:19:39

Electronics: DAE4 Sn771

Medium: 850 Body

Medium parameters used: $f = 825 \text{ MHz}$; $\sigma = 0.933 \text{ mho/m}$; $\epsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature: 23.0°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)

Toward Ground Low/Area Scan (51x111x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.559 mW/g

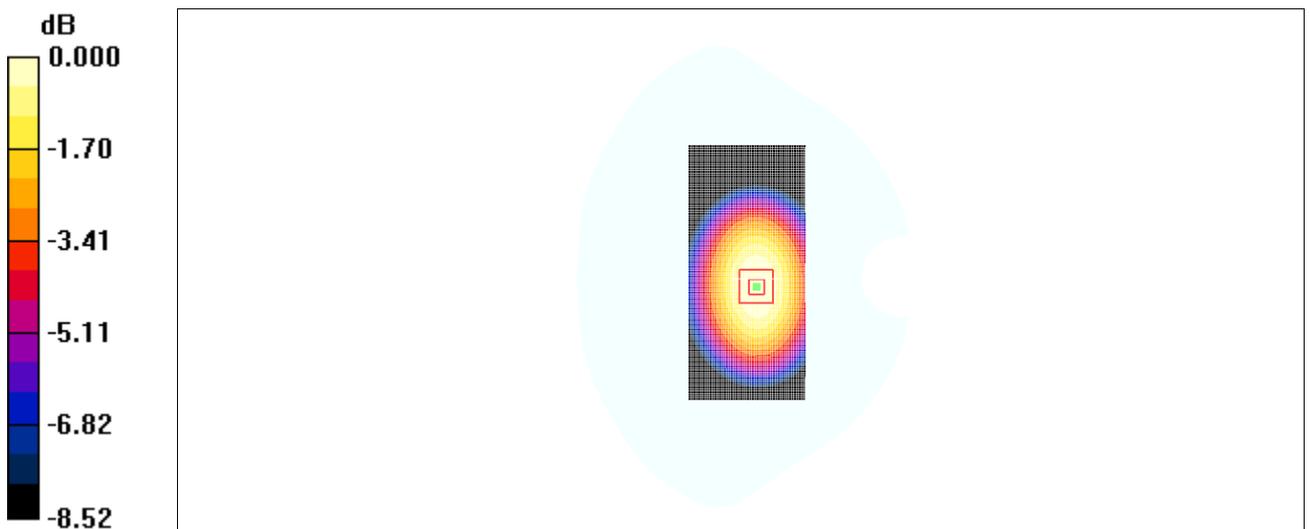
Toward Ground Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 23.3 V/m ; Power Drift = -0.007 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) = 0.550 mW/g



0 dB = 0.550mW/g

Fig. 21 850 MHz CH128

850 Body Towards Phantom High

Date/Time: 2010-6-10 14:34:57

Electronics: DAE4 Sn771

Medium: 850 Body

Medium parameters used (interpolated): $f = 848.8$ MHz; $\sigma = 0.96$ mho/m; $\epsilon_r = 53.9$; $\rho = 1000$ kg/m³

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

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

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

Toward Phantom High/Area Scan (51x111x1): Measurement grid: dx=10mm, dy=10mm

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

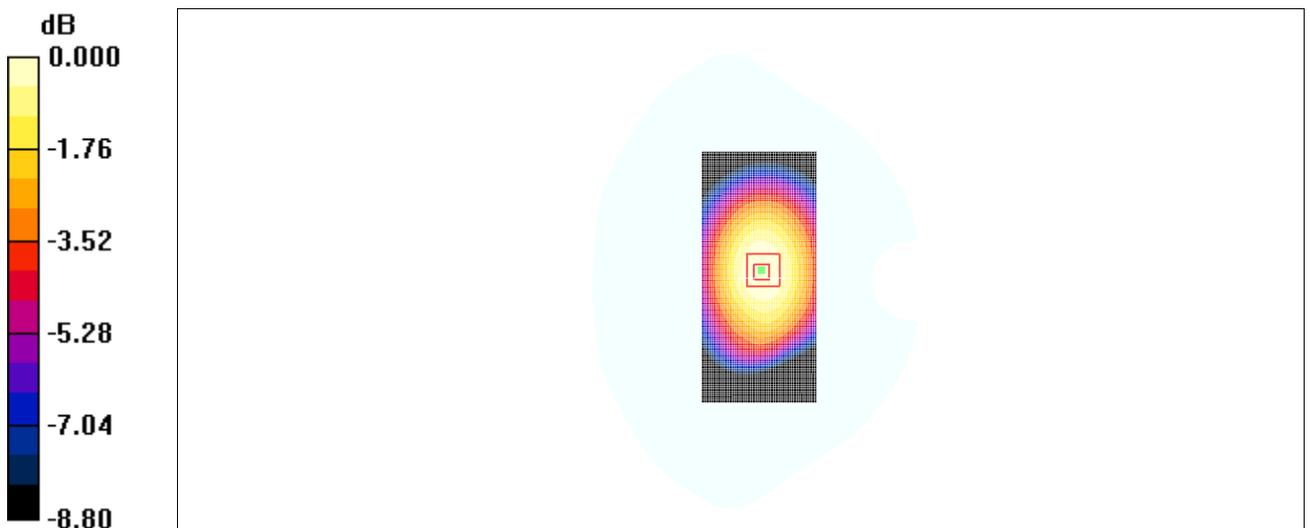
Toward Phantom High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 20.0 V/m; Power Drift = -0.063 dB

Peak SAR (extrapolated) = 0.488 W/kg

SAR(1 g) = 0.379 mW/g; SAR(10 g) = 0.274 mW/g

Maximum value of SAR (measured) = 0.392 mW/g



0 dB = 0.392mW/g

Fig. 22 850 MHz CH251

850 Body Towards Phantom Middle

Date/Time: 2010-6-10 14:50:11

Electronics: DAE4 Sn771

Medium: 850 Body

Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.95$ mho/m; $\epsilon_r = 54.0$; $\rho = 1000$ kg/m³

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

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

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

Toward Phantom Middle/Area Scan (51x111x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.431 mW/g

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

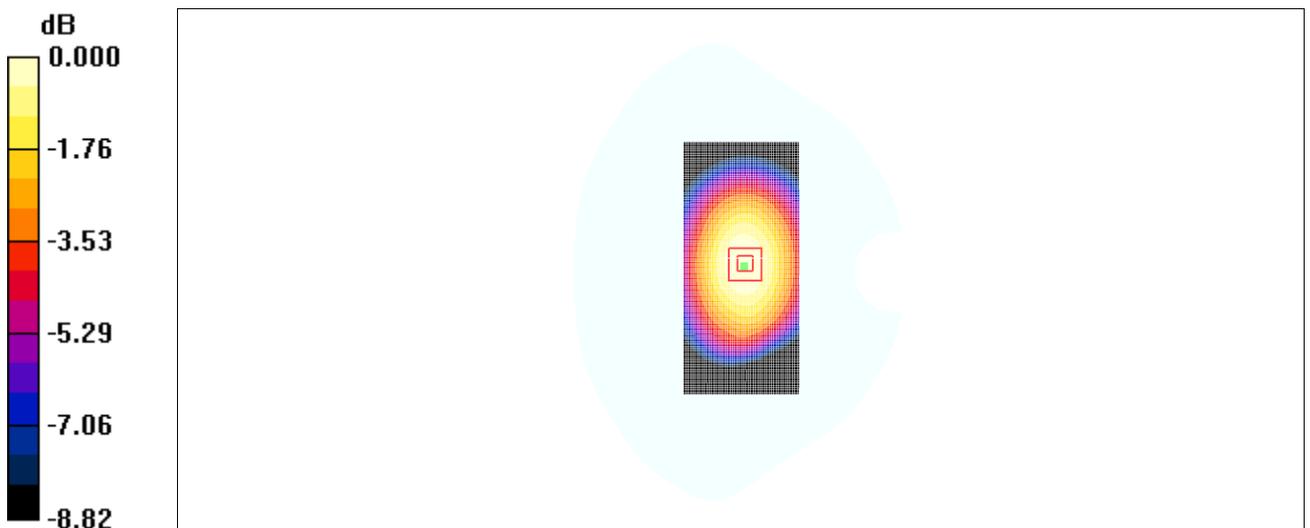
dy=5mm, dz=5mm

Reference Value = 20.7 V/m; Power Drift = 0.006 dB

Peak SAR (extrapolated) = 0.524 W/kg

SAR(1 g) = 0.405 mW/g; SAR(10 g) = 0.293 mW/g

Maximum value of SAR (measured) = 0.421 mW/g



0 dB = 0.421mW/g

Fig. 23 850 MHz CH190

850 Body Towards Phantom Low

Date/Time: 2010-6-10 15:05:34

Electronics: DAE4 Sn771

Medium: 850 Body

Medium parameters used: $f = 825 \text{ MHz}$; $\sigma = 0.933 \text{ mho/m}$; $\epsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature: 23.0°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)

Toward Phantom Low/Area Scan (51x111x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.462 mW/g

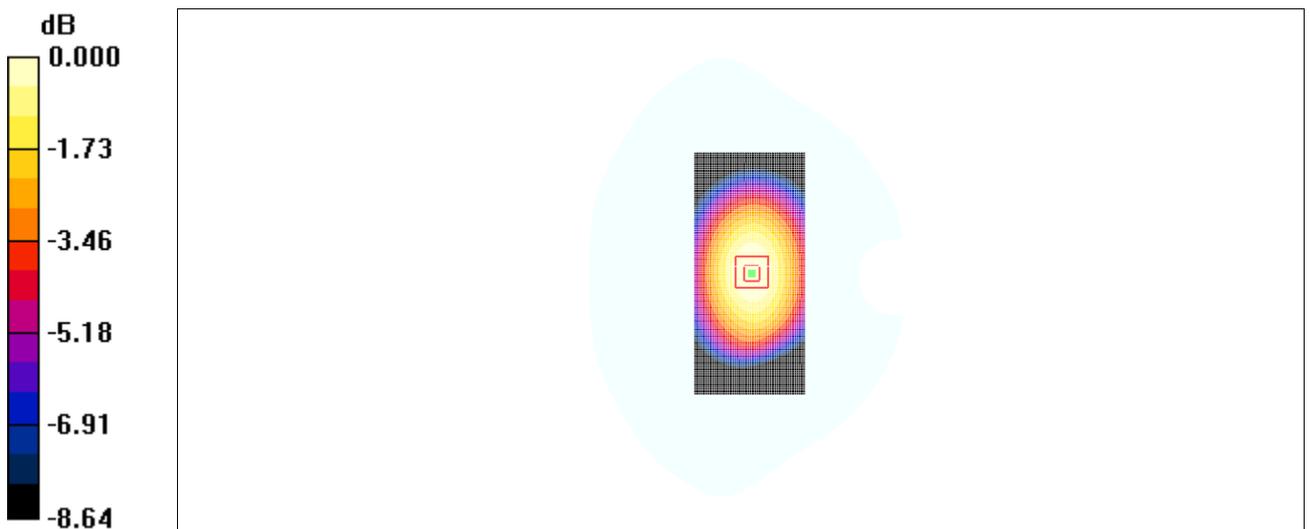
Toward Phantom Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 21.7 V/m ; Power Drift = -0.037 dB

Peak SAR (extrapolated) = 0.559 W/kg

SAR(1 g) = 0.433 mW/g ; SAR(10 g) = 0.315 mW/g

Maximum value of SAR (measured) = 0.446 mW/g



0 dB = 0.446mW/g

Fig. 24 850 MHz CH128

1900 Body Towards Ground High

Date/Time: 2010-6-11 13:50:16

Electronics: DAE4 Sn771

Medium: Body 1900 MHz

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.54$ mho/m; $\epsilon_r = 51.7$; $\rho = 1000$ kg/m³

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

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

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

Toward Ground High/Area Scan (51x111x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.386 mW/g

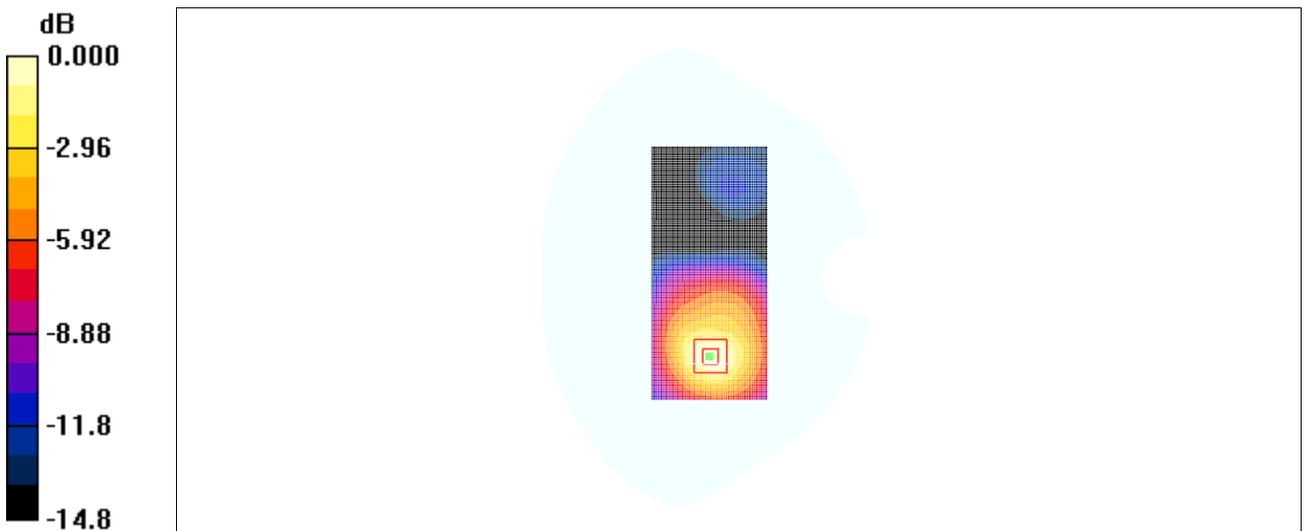
Toward Ground High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.98 V/m; Power Drift = -0.032 dB

Peak SAR (extrapolated) = 0.569 W/kg

SAR(1 g) = 0.359 mW/g; SAR(10 g) = 0.210 mW/g

Maximum value of SAR (measured) = 0.358 mW/g



0 dB = 0.358mW/g

Fig. 25 1900 MHz CH810

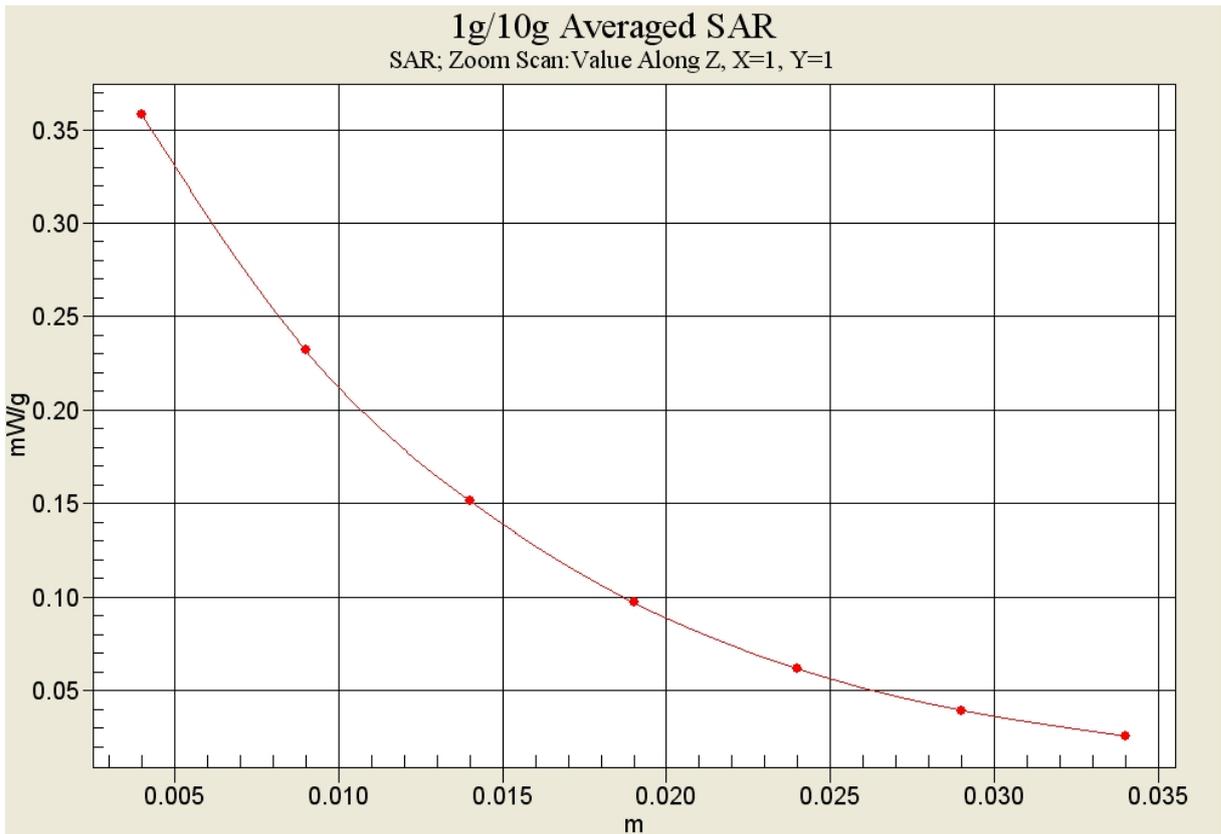


Fig. 26-1 Z-Scan at power reference point (1900 MHz CH810)

1900 Body Towards Ground Middle

Date/Time: 2010-6-11 14:05:33

Electronics: DAE4 Sn771

Medium: Body 1900 MHz

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.51$ mho/m; $\epsilon_r = 51.8$; $\rho = 1000$ kg/m³

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

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

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

Toward Ground Middle/Area Scan (51x111x1): Measurement grid: dx=10mm, dy=10mm

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

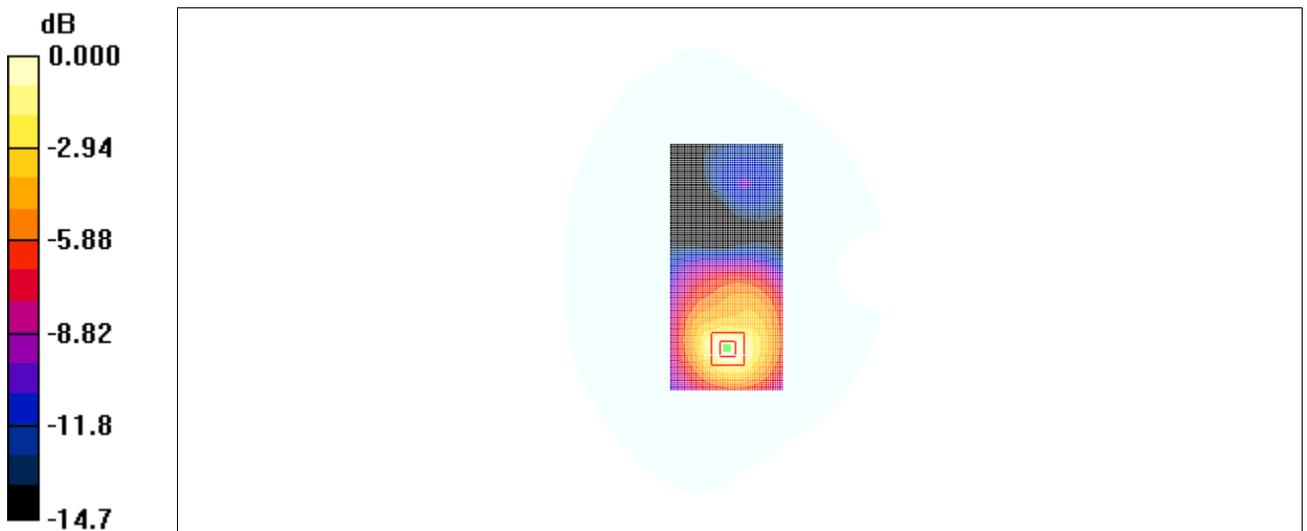
Toward Ground Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.05 V/m; Power Drift = -0.028 dB

Peak SAR (extrapolated) = 0.527 W/kg

SAR(1 g) = 0.334 mW/g; SAR(10 g) = 0.197 mW/g

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



0 dB = 0.346mW/g

Fig. 27 1900 MHz CH661

1900 Body Towards Ground Low

Date/Time: 2010-6-11 14:20:49

Electronics: DAE4 Sn771

Medium: Body 1900 MHz

Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.49$ mho/m; $\epsilon_r = 51.8$; $\rho = 1000$ kg/m³

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

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

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

Toward Ground Low/Area Scan (51x111x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.319 mW/g

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

Reference Value = 6.09 V/m; Power Drift = -0.069 dB

Peak SAR (extrapolated) = 0.474 W/kg

SAR(1 g) = 0.302 mW/g; SAR(10 g) = 0.178 mW/g

Maximum value of SAR (measured) = 0.308 mW/g

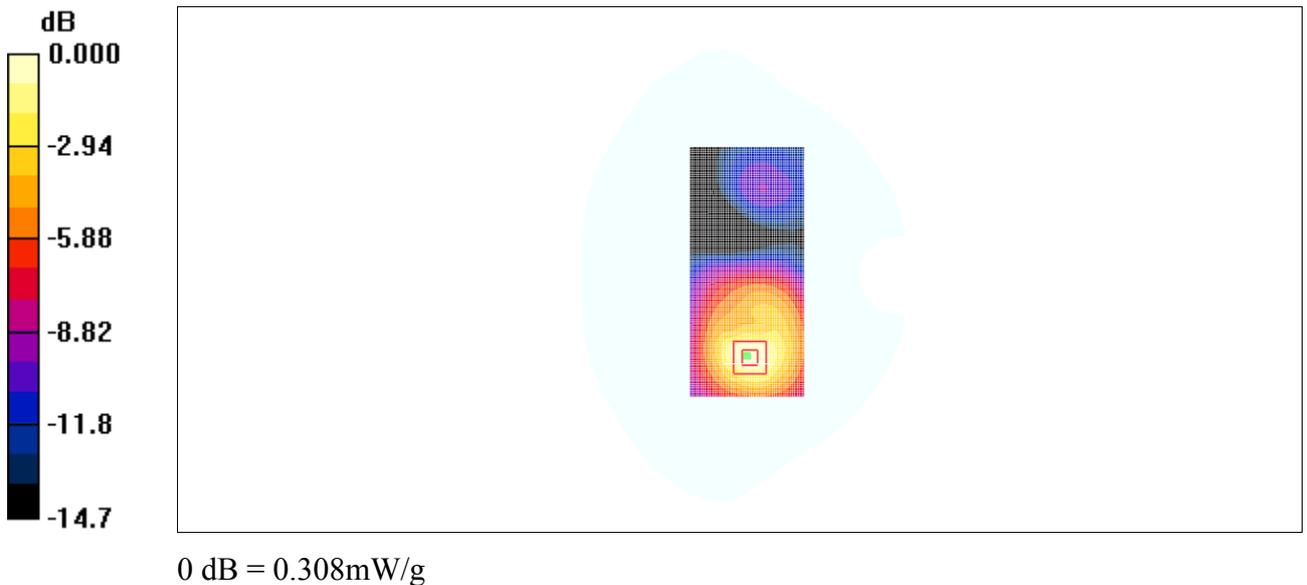


Fig. 28 1900 MHz CH512

1900 Body Towards Phantom High

Date/Time: 2010-6-11 14:36:10

Electronics: DAE4 Sn771

Medium: Body 1900 MHz

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.54$ mho/m; $\epsilon_r = 51.7$; $\rho = 1000$ kg/m³

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

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

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

Toward Phantom High/Area Scan (51x111x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.160 mW/g

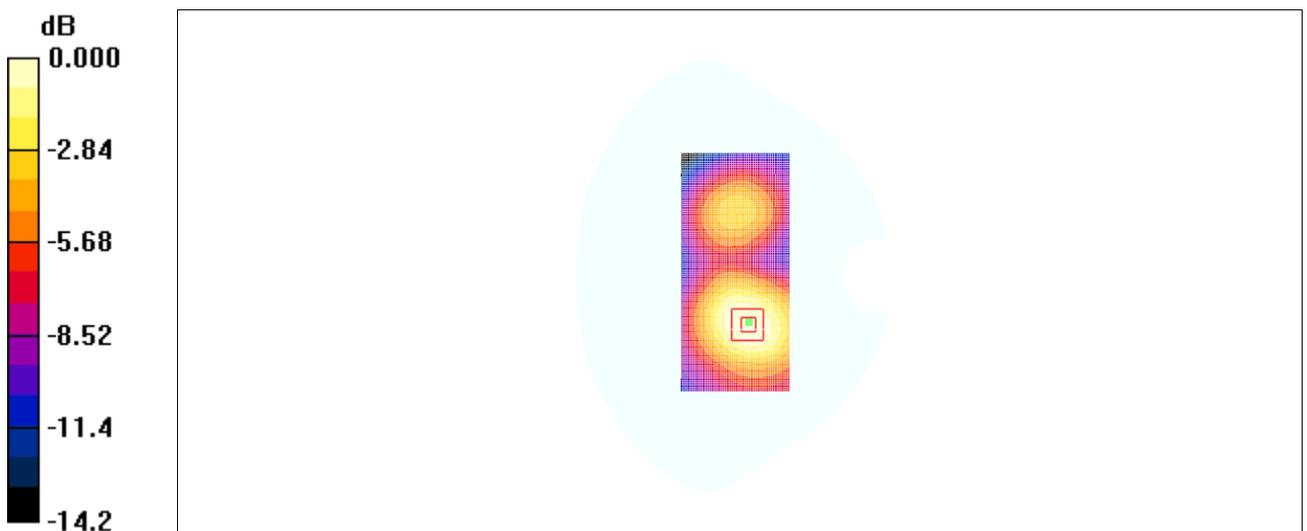
Toward Phantom High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.63 V/m; Power Drift = 0.085 dB

Peak SAR (extrapolated) = 0.232 W/kg

SAR(1 g) = 0.149 mW/g; SAR(10 g) = 0.095 mW/g

Maximum value of SAR (measured) = 0.155 mW/g



0 dB = 0.155mW/g

Fig. 29 1900 MHz CH810

1900 Body Towards Phantom Middle

Date/Time: 2010-6-11 14:51:28

Electronics: DAE4 Sn771

Medium: Body 1900 MHz

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.51$ mho/m; $\epsilon_r = 51.8$; $\rho = 1000$ kg/m³

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

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

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

Toward Phantom Middle/Area Scan (51x111x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.162 mW/g

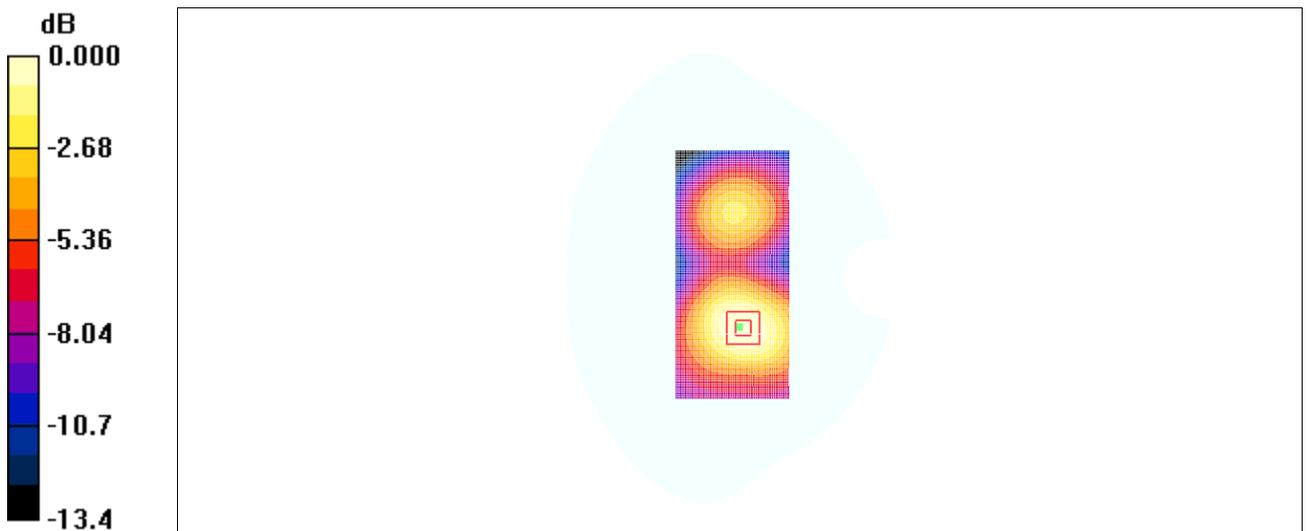
Toward Phantom Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.64 V/m; Power Drift = 0.006 dB

Peak SAR (extrapolated) = 0.230 W/kg

SAR(1 g) = 0.150 mW/g; SAR(10 g) = 0.096 mW/g

Maximum value of SAR (measured) = 0.157 mW/g



0 dB = 0.157mW/g

Fig. 30 1900 MHz CH661

1900 Body Towards Phantom Low

Date/Time: 2010-6-11 15:06:47

Electronics: DAE4 Sn771

Medium: Body 1900 MHz

Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.49$ mho/m; $\epsilon_r = 51.8$; $\rho = 1000$ kg/m³

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

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

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

Toward Phantom Low/Area Scan (51x111x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.160 mW/g

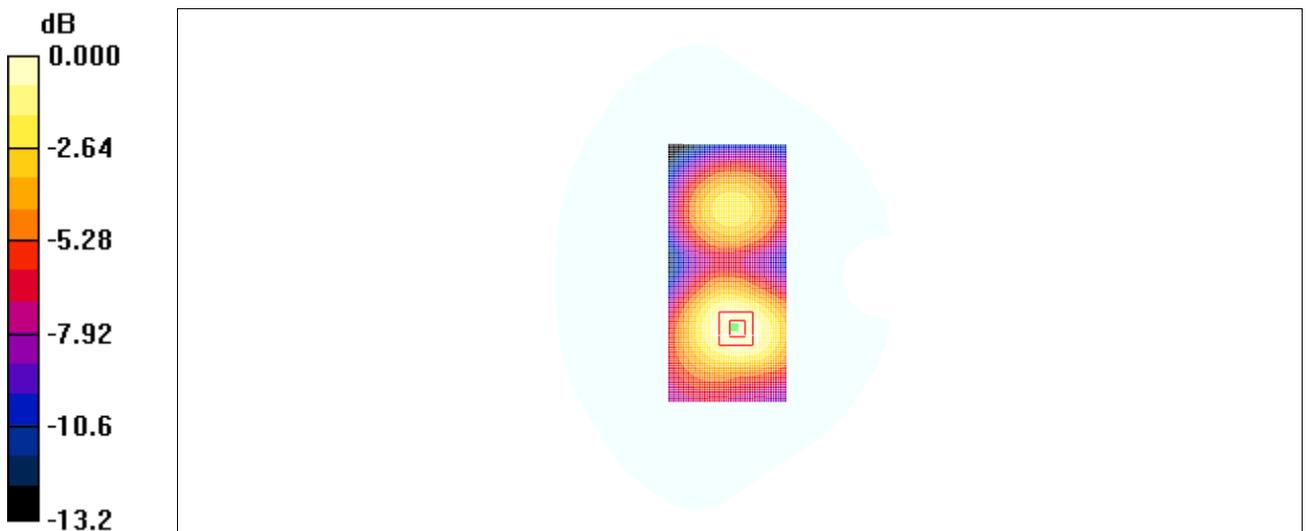
Toward Phantom Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.47 V/m; Power Drift = -0.001 dB

Peak SAR (extrapolated) = 0.222 W/kg

SAR(1 g) = 0.148 mW/g; SAR(10 g) = 0.095 mW/g

Maximum value of SAR (measured) = 0.154 mW/g



0 dB = 0.154mW/g

Fig. 31 1900 MHz CH512

ANNEX D SYSTEM VALIDATION RESULTS

835MHz

Date/Time: 2010-6-10 7:24:55

Electronics: DAE4 Sn771

Medium: Head 850

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.88 \text{ mho/m}$; $\epsilon_r = 40.3$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature: 23.0°C Liquid Temperature: 22.5°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) = 2.54 mW/g

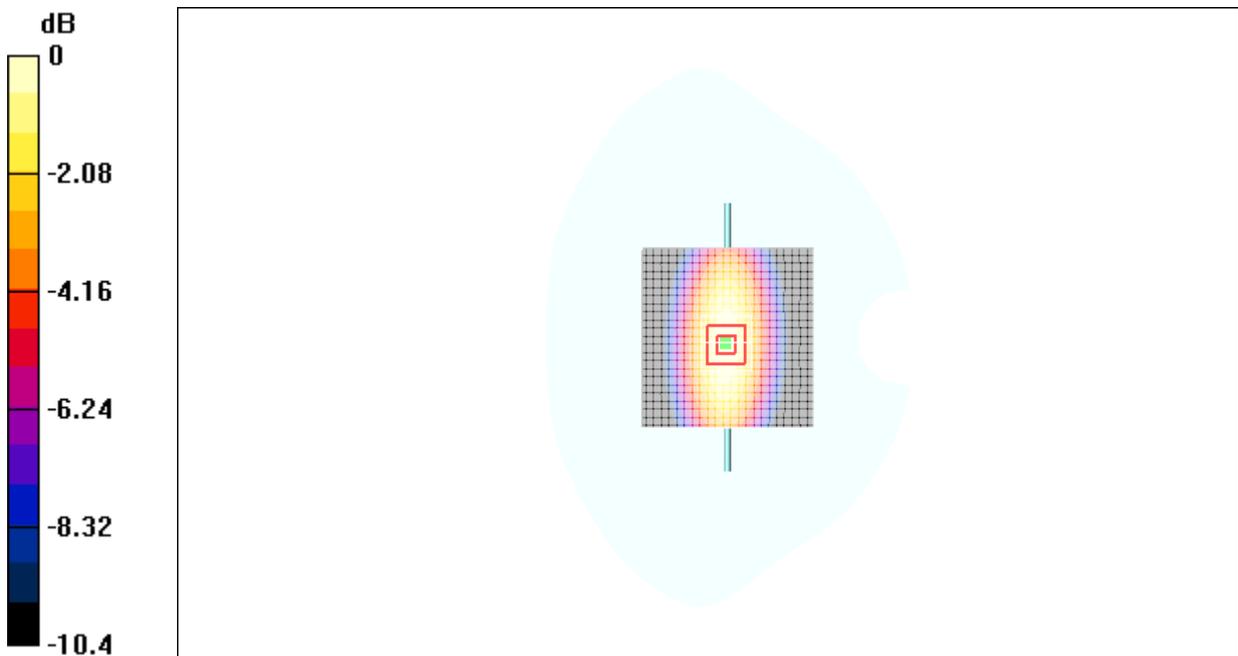
System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 54.7 V/m; Power Drift = 0.056 dB

Peak SAR (extrapolated) = 3.38 W/kg

SAR(1 g) = 2.31 mW/g; SAR(10 g) = 1.47 mW/g

Maximum value of SAR (measured) = 2.45 mW/g



0 dB = 2.45mW/g

Fig.32 validation 835MHz 250mW

835MHz

Date/Time: 2010-6-10 13:17:36

Electronics: DAE4 Sn771

Medium: 850 Body

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.94 \text{ mho/m}$; $\epsilon_r = 54.0$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature: 23.0°C Liquid Temperature: 22.5°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) = 2.61 mW/g

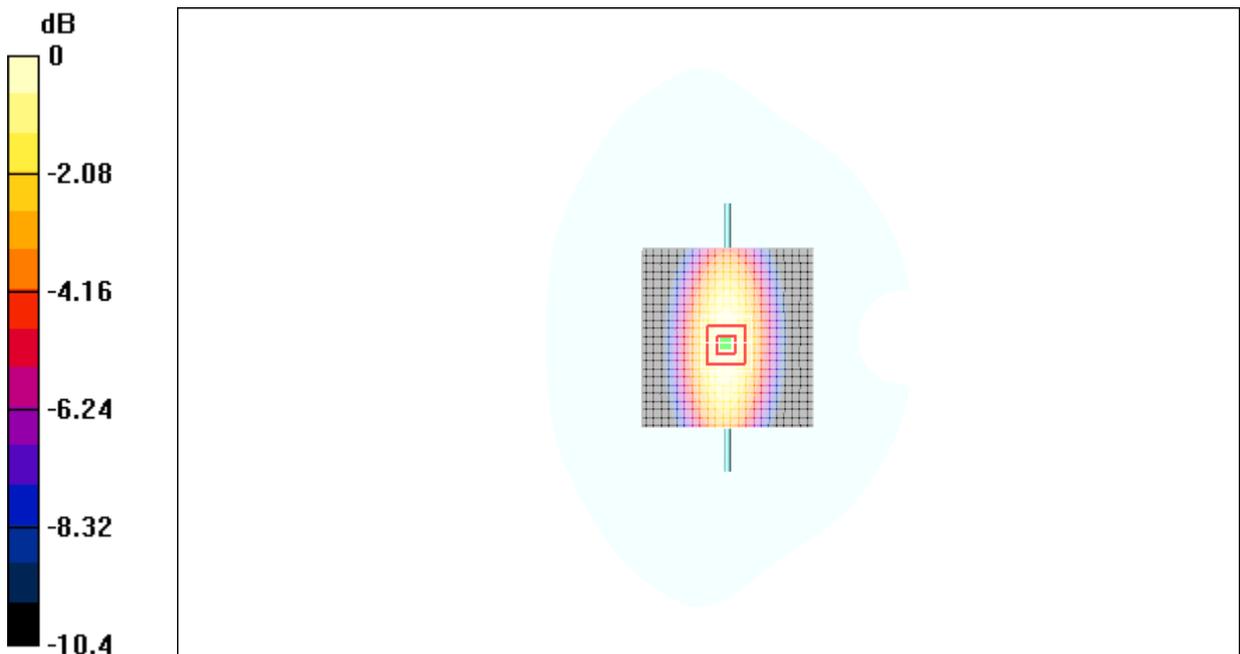
System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$,
 $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 53.2 V/m; Power Drift = -0.071 dB

Peak SAR (extrapolated) = 3.35 W/kg

SAR(1 g) = 2.44 mW/g; SAR(10 g) = 1.53 mW/g

Maximum value of SAR (measured) = 2.53 mW/g



0 dB = 2.53mW/g

Fig.33 validation 835MHz 250mW

1900MHz

Date/Time: 2010-6-11 7:25:08

Electronics: DAE4 Sn771

Medium: Head 1900 MHz

Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.41 \text{ mho/m}$; $\epsilon_r = 39.5$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature: 23.0°C Liquid Temperature: 22.5°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) = 11.3 mW/g

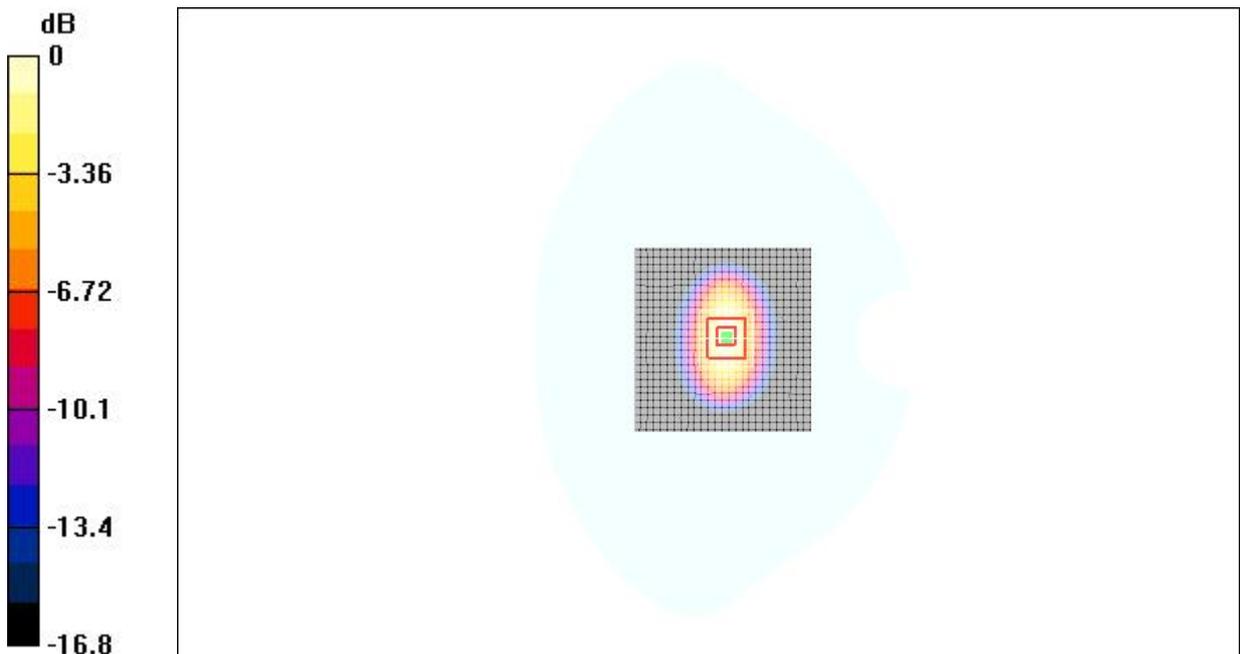
System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$,
 $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 87.9 V/m ; Power Drift = -0.039 dB

Peak SAR (extrapolated) = 14.8 W/kg

SAR(1 g) = 9.64 mW/g ; SAR(10 g) = 4.85 mW/g

Maximum value of SAR (measured) = 10.3 mW/g



0 dB = 10.3mW/g

Fig.34 validation 1900MHz 250mW

1900MHz

Date/Time: 2010-6-11 13:18:20

Electronics: DAE4 Sn771

Medium: Body 1900 MHz

Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.53 \text{ mho/m}$; $\epsilon_r = 51.7$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature: 23.0°C Liquid Temperature: 22.5°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 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 = 93.4 V/m ; Power Drift = 0.098 dB

Peak SAR (extrapolated) = 16.1 W/kg

SAR(1 g) = 10.3 mW/g ; SAR(10 g) = 5.37 mW/g

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

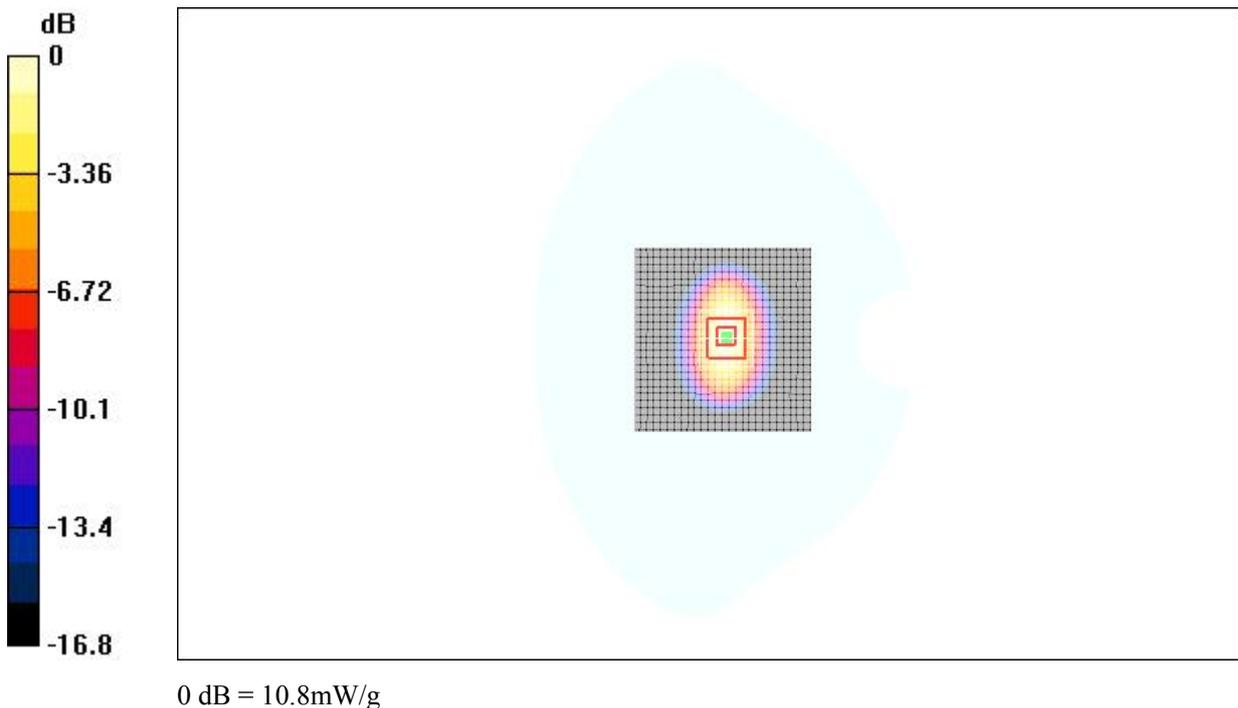


Fig.35 validation 1900MHz 250mW