

# SAR TEST REPORT

No. 2007SAR00049

for

**Amoi Mobile Co., Ltd.**

**GSM Mobile Phone**

**GSM6711A**

**With**

**Hardware Version: V1.2**

**Software Version: V1.2**

**Issued Date: 2007-11-09**



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.

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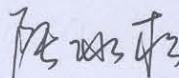
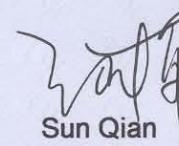
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## 信息产业部通信计量中心

Telecommunication Metrology Center of MII



## SAR TEST REPORT

Test report No.	2007SAR00049	Date of report	November 9 <sup>th</sup> , 2007		
Test laboratory	TMC Beijing, Telecommunication Metrology Center of MII	Client	Amoi Mobile Co., Ltd.		
Test device	Product name: GSM Mobile Phone Model type: GSM6711A Series number: 359079010000025 GPRS Class: 10				
Test reference documents	<p>EN 50360-2001: Product standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones.</p> <p>EN 50361-2001: Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones.</p> <p>ANSI C95.1-1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.</p> <p>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.</p> <p>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.</p> <p>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)</p> <p>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</p>				
Test conclusion	<p>Localized Specific Absorption Rate (SAR) of this portable wireless equipment has been measured in all cases requested by the relevant standards cited in Clause 5.2 of this test report. Maximum localized SAR is below exposure limits specified in the relevant standards cited in Clause 5.1 of this test report.</p> <p>General Judgment: Pass</p>				
Signature	 Lu Bingsong Deputy Director of the laboratory (Approved for this report)	 Sun Qian SAR Project Leader (Reviewed for this report)	 Lin Xiaojun SAR Test Engineer (Prepared for this report)		

## 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: 00861062303288  
Fax: 00861062304793

### 1.2 Testing Environment

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 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: November 6, 2007  
Testing End Date: November 6, 2007

## 2 Client Information

### 2.1 Applicant Information

Company Name: Amoi Mobile Co., Ltd.  
Address /Post: 45 Tiyu Road, Xiamen, Fujian, 361012, China  
City: Xiamen  
Postal Code: 361012  
Country: P. R. China  
Telephone: +86-592-6516777-3316  
Fax: +86-592-6516007

### 2.2 Manufacturer Information

Company Name: Amoi Mobile Co., Ltd.  
Address /Post: 45 Tiyu Road, Xiamen, Fujian, 361012, China  
City: Xiamen  
Postal Code: 361012  
Country: P. R. China  
Telephone: +86-592-6516777-3316  
Fax: +86-592-6516007

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

#### 3.1 About EUT

Description: GSM Mobile Phone  
Model: GSM6711A  
Frequency Band: 1900MHz



Picture 1: Constituents of the sample (Lithium Battery is in the Handset)

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

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	359079010000025	V1.2	V1.2

\*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	Travel Adapter	TA7	\	Danyang Chenyang Tech-Electorn Co., Ltd.
AE2	Battery	GSM6711A	\	BYD Co.,Ltd

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

## 4 OPERATIONAL CONDITIONS DURING TEST

### 4.1 Schematic Test Configuration

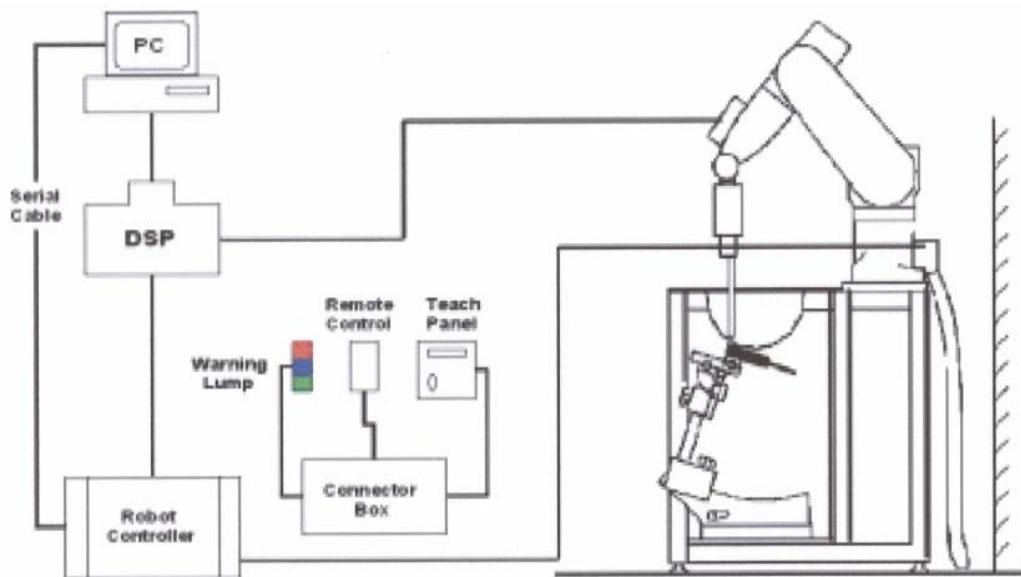
During SAR test, EUT is in Traffic Mode (Channel Allocated) at Normal Voltage Condition. A communication link is set up with a System Simulator (SS) by air link, and a call is established. The Absolute Radio Frequency Channel Number (ARFCN) is allocated to 512, 661 and 810 respectively in the case of 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.

### 4.2 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**

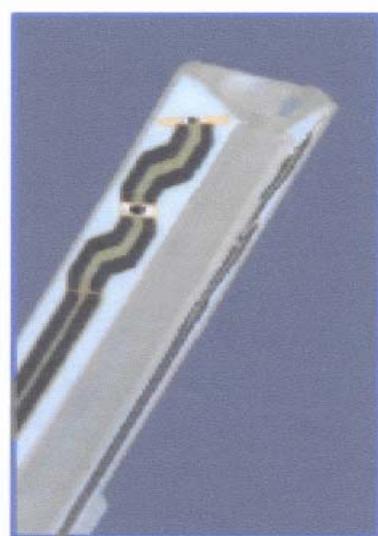
The DAE consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information 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.

#### 4.3 Dasy4 E-field Probe System

The SAR measurements were conducted with the dosimetric probe ET3DV6 (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  $\pm 0.25\text{dB}$ .

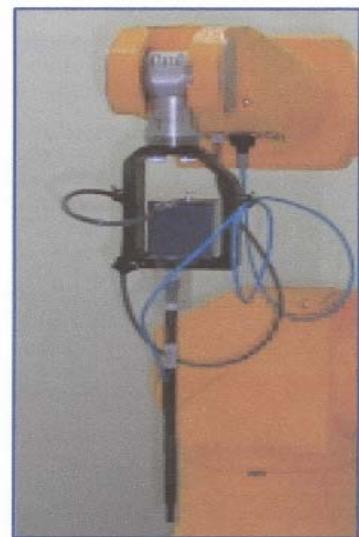
#### ET3DV6 Probe Specification

Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection System(ET3DV6 only) Built-in shielding against static charges PEEK enclosure material(resistant to organic solvents, e.q., glycol)
Calibration	In air from 10 MHz to 2.5 GHz In brain and muscle simulating tissue at frequencies of 450MHz, 900MHz and 1.8GHz (accuracy $\pm 8\%$ ) Calibration for other liquids and frequencies upon request



**Picture 3: ET3DV6 E-field Probe**

Frequency	10 MHz to > 6 GHz; Linearity: $\pm 0.2$ dB (30 MHz to 3 GHz)
Directivity	$\pm 0.2$ dB in brain tissue (rotation around probe axis) $\pm 0.4$ dB in brain tissue (rotation normal probe axis)
Dynamic Range	5u W/g to > 100mW/g; Linearity: $\pm 0.2$ dB
Surface Detection	$\pm 0.2$ mm repeatability in air and clear liquids over diffuse reflecting surface(ET3DV6 only)
Dimensions	Overall length: 330mm Tip length: 16mm Body diameter: 12mm Tip diameter: 6.8mm Distance from probe tip to dipole centers: 2.7mm
Application	General dosimetry up to 3GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms



**Picture 4: ET3DV6 E-field**

#### 4.4 E-field Probe Calibration

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

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

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

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

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

Or

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

Where:

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

Note: Please check Annex E to see the Probe Certificate.



**Picture 5: Device Holder**

## 4.5 Other Test Equipment

### 4.5.1 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).

### 4.5.2 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



## 4.6 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 1900MHz
Water	55.242
Glycol monobutyl	44.452
Salt	0.306
Dielectric Parameters Target Value	f=1900MHz ε=40.0 σ=1.40

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

MIXTURE %	FREQUENCY 1900MHz
Water	69.91
Glycol monobutyl	29.96
Salt	0.13
Dielectric Parameters Target Value	f=1900MHz ε=53.3 σ=1.52

## 4.7 System Specifications

### 4.7.1 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

## 5 CHARACTERISTICS OF THE TEST

### 5.1 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.

### 5.2 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 62209-1-2005:** 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.

## 6 CONDUCTED OUTPUT POWER MEASUREMENT

### 6.1 Summary

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

### 6.2 Conducted Power

#### 6.2.1 Measurement Methods

The EUT was set up for the maximum output power. The channel power was measured with Agilent Spectrum Analyzer E4440A.

#### 6.2.2 Measurement result

**Table 3: Conducted Power Measurement Results**

1900MHz	Conducted Power (dBm)		
	Channel 810 (1909.8MHz)	Channel 661 (1880MHz)	Channel 512 (1850.2MHz)
Before SAR Test	29.1	29.7	29.5
After SAR Test	29.2	29.6	29.5

#### 6.2.3 Power Drift

To control the output power stability during the SAR test, DASY4 system calculates the power drift by measuring the E-field at the same location at the beginning and at the end of the measurement for each test position. These drift values can be found in Table 7 and 10 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 5%.

## 7 TEST RESULTS

### 7.1 Dielectric Performance

**Table 4: 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			
/	Frequency	Permittivity $\epsilon$	Conductivity $\sigma$ (S/m)
<b>Target value</b>	1900 MHz	40.0	1.40
<b>Measurement value (Average of 10 tests)</b>	1900 MHz	39.3	1.37

**Table 5: 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			
/	Frequency	Permittivity $\epsilon$	Conductivity $\sigma$ (S/m)
<b>Target value</b>	1900 MHz	53.3	1.52
<b>Measurement value (Average of 10 tests)</b>	1900 MHz	52.2	1.49

### 7.2 System Validation

**Table 6: System Validation**

Measurement is made at temperature 23.3 °C, relative humidity 49%, input power 250 mW. Liquid temperature during the test: 22.5°C							
<b>Liquid parameters</b>	Frequency		Permittivity $\epsilon$		Conductivity $\sigma$ (S/m)		
	1900 MHz		39.3		1.37		
<b>Verification results</b>	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
	1900 MHz	5.09	9.73	5.27	9.91	3.3%	1.9%

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

### 7.3 Summary of Measurement Results

Table 7: SAR Values (1900MHz-Head)

Limit of SAR (W/kg)	10 g	1 g	Power Drift (dB)
	Average	Average	
Test Case	Measurement Result (W/kg)		
	10 g	1 g	
Left hand, Touch cheek, Top frequency(See Fig.1)	0.541	1.09	-0.071
Left hand, Touch cheek, Mid frequency(See Fig.3)	0.520	1.03	-0.002
Left hand, Touch cheek, Bottom frequency(See Fig.5)	0.518	1.01	-0.053
Left hand, Tilt 15 Degree, Top frequency(See Fig.7)	0.554	1.1	0.003
Left hand, Tilt 15 Degree, Mid frequency(See Fig.9)	0.515	1.01	-0.011
Left hand, Tilt 15 Degree, Bottom frequency(See Fig.11)	0.506	0.990	-0.051
Right hand, Touch cheek, Top frequency(See Fig.13)	0.355	0.653	0.092
Right hand, Touch cheek, Mid frequency(See Fig.15)	0.434	0.718	0.044
Right hand, Touch cheek, Bottom frequency(See Fig.17)	0.468	0.778	-0.003
Right hand, Tilt 15 Degree, Top frequency(See Fig.19)	0.401	0.748	0.031
Right hand, Tilt 15 Degree, Mid frequency(See Fig.21)	0.429	0.769	-0.033
Right hand, Tilt 15 Degree, Bottom frequency(See Fig.23)	0.478	0.863	-0.095

Table 8: SAR Values (1900MHz-GPRS)

Limit of SAR (W/kg)	10 g	1 g	Power Drift (dB)
	Average	Average	
Test Case	Measurement Result (W/kg)		
	10 g	1 g	
Body, Towards Phantom, Top frequency(See Fig.25)	0.237	0.380	-0.023
Body, Towards Phantom, Mid frequency(See Fig.27)	0.250	0.400	0.096
Body, Towards Phantom, Bottom frequency(See Fig.29)	0.246	0.391	0.060
Body, Towards Ground, Top frequency(See Fig.31)	0.300	0.481	0.028
Body, Towards Ground, Mid frequency(See Fig.33)	0.314	0.500	0.005
Body, Towards Ground, Bottom frequency(See Fig.35)	0.326	0.517	-0.003

After found the worst case for Body GPRS, the EGPRS function is tested for that case.

**Table 9: SAR Values (Body, 1900 MHz Band with EGPRS)**

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
	10 g Average	1 g Average	
Body, Towards Ground, Bottom frequency (See Fig.37)	0.188	0.299	0.064

Since the EUT is tested in body position with the dominant transmitter ON and co-located Bluetooth transmitter OFF first, with the results in Table 8. After that, the worst case can be derived, and the test is repeated with dominant transmitter and co-located Bluetooth transmitter both ON under the same conditions. The following result is derived from the EUT with its Bluetooth function under the same conditions with the worst cases.

**Table 10: SAR Values (Body, 1900 MHz Band with Bluetooth)**

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
	10 g Average	1 g Average	
Body, Towards Ground, Bottom frequency(See Fig.39)	0.353	0.547	0.004

## 7.4 Conclusion

Localized Specific Absorption Rate (SAR) of this fixed terminal station has been measured in all cases requested by the relevant standards cited in Clause 5.2 of this report. Maximum localized SAR is below exposure limits specified in the relevant standards cited in Clause 5.1 of this test report.

## 8 Measurement Uncertainty

SN	a	Type	c	d	e = f(d,k)	f	h = c x f / e	k
	Uncertainty Component		Tol. (± %)	Prob. Dist.	Div.	$c_i$ (1 g)	1 g $u_i$ (±%)	$v_i$
1	System repetivity	A	0.5	N	1	1	0.5	9
	Measurement System							
2	Probe Calibration	B	5	N	2	1	2.5	∞
3	Axial Isotropy	B	4.7	R	$\sqrt{3}$	$\frac{(1-c_p)^{1/2}}{2}$	4.3	∞
4	Hemispherical Isotropy	B	9.4	R	$\sqrt{3}$	$\sqrt{c_p}$		∞

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 uncertainty	B	5.0	N	1	0.64	1.7	M
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	

## 9 MAIN TEST INSTRUMENTS

Table 11: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	HP 8753E	US38433212	August 30,2007	One year
02	Power meter	NRVD	101253	June 21, 2007	One year
03	Power sensor	NRV-Z5	100333		
04	Power sensor	NRV-Z6	100011	September 2, 2007	One year
05	Signal Generator	E4433B	US37230472	September 4, 2007	One Year
06	Amplifier	VTL5400	0505	No Calibration Requested	
07	BTS	CMU 200	105948	August 15, 2007	One year
08	E-field Probe	SPEAG ET3DV6	1736	December 1, 2006	One year
09	DAE	SPEAG DAE4	777	July 12, 2007	One year
10	Dipole Validation Kit	SPEAG D1900V2	541	February 20, 2007	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.

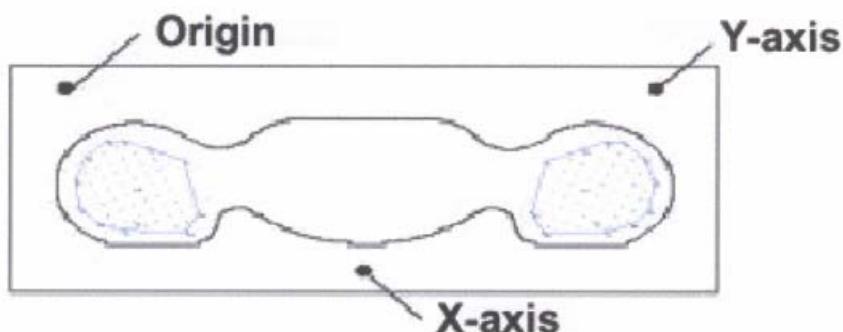
Step 3: Around this point, a volume of 30 mm x 30 mm x 30 mm was assessed by measuring 7 x 7 x 7 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

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 (1900MHz)



**Picture B3: Left Hand Touch Cheek Position**



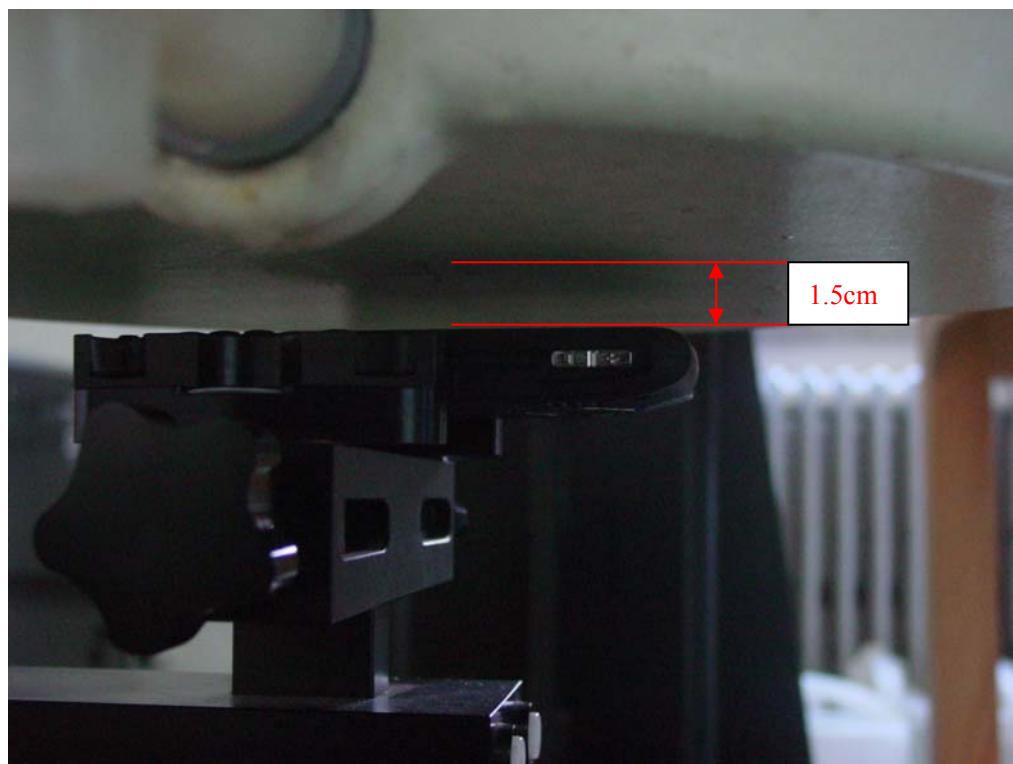
**Picture B4: Left Hand Tilt 15° Position**



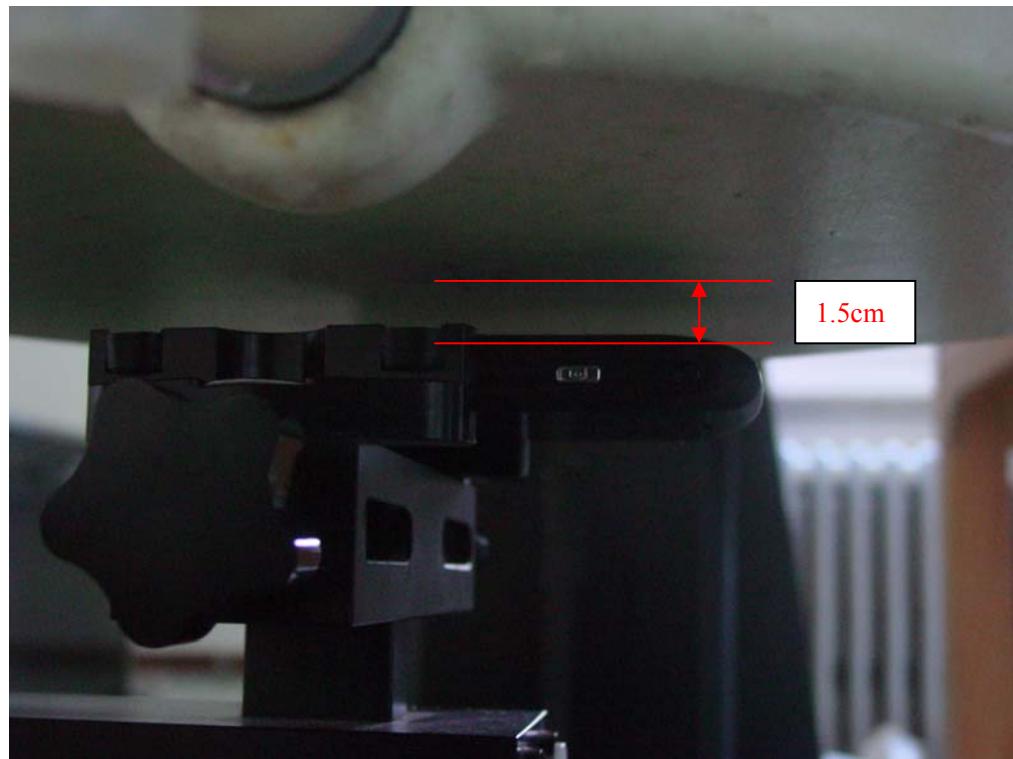
**Picture B5: Right Hand Touch Cheek Position**



**Picture B6: Right Hand Tilt 15° Position**



**Picture B7: Body-worn Position (toward phantom, the distance from handset to the bottom of the Phantom is 1.5cm)**



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

## ANNEX C: GRAPH RESULTS

### 1900 Left Cheek High

Date/Time: 2007-11-6 11:16:52

Electronics: DAE4 Sn777

Medium: Head 1900 MHz

Medium parameters used:  $f = 1910$  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 new Frequency: 1909.8 MHz Duty Cycle: 1:8.3

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

**Cheek High/Area Scan (61x101x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.25 mW/g

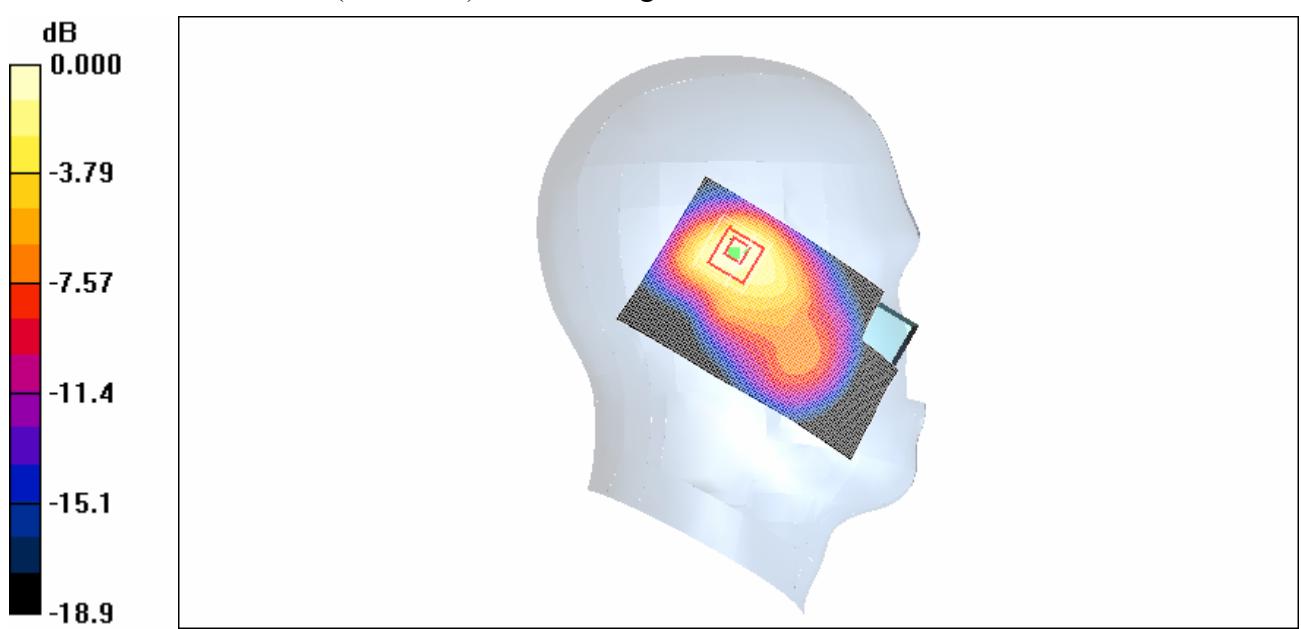
**Cheek High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 20.2 V/m; Power Drift = -0.071 dB

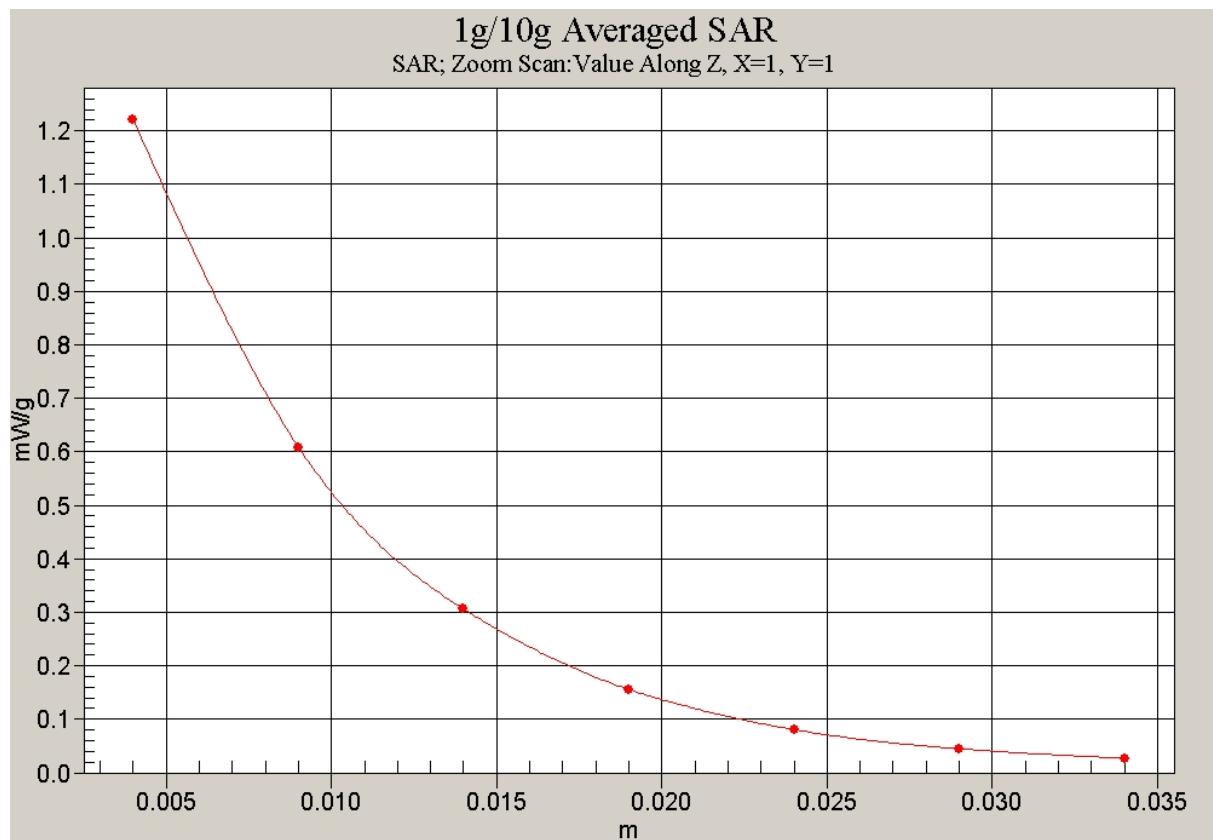
Peak SAR (extrapolated) = 2.29 W/kg

**SAR(1 g) = 1.09 mW/g; SAR(10 g) = 0.541 mW/g**

Maximum value of SAR (measured) = 1.22 mW/g



**Fig. 1 1900 MHz CH810**



**Fig. 2 Z-Scan at power reference point (1900 MHz CH810)**

**1900 Left Cheek Middle**

Date/Time: 2007-11-6 11:46:49

Electronics: DAE4 Sn777

Medium: Head 1900 MHz

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.35$  mho/m;  $\epsilon_r = 39.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°C      Liquid Temperature: 22.5°C

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

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

**Cheek Middle/Area Scan (61x101x1):** Measurement grid: dx=10mm, dy=10mm

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

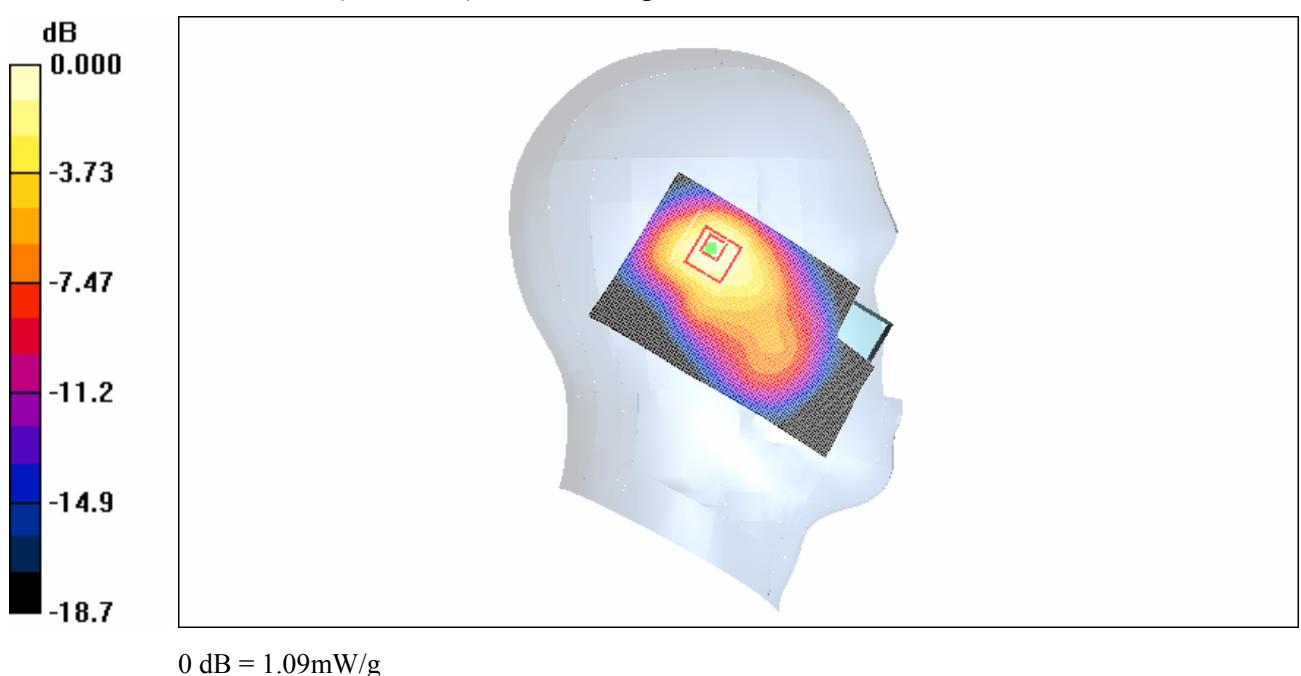
**Cheek Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

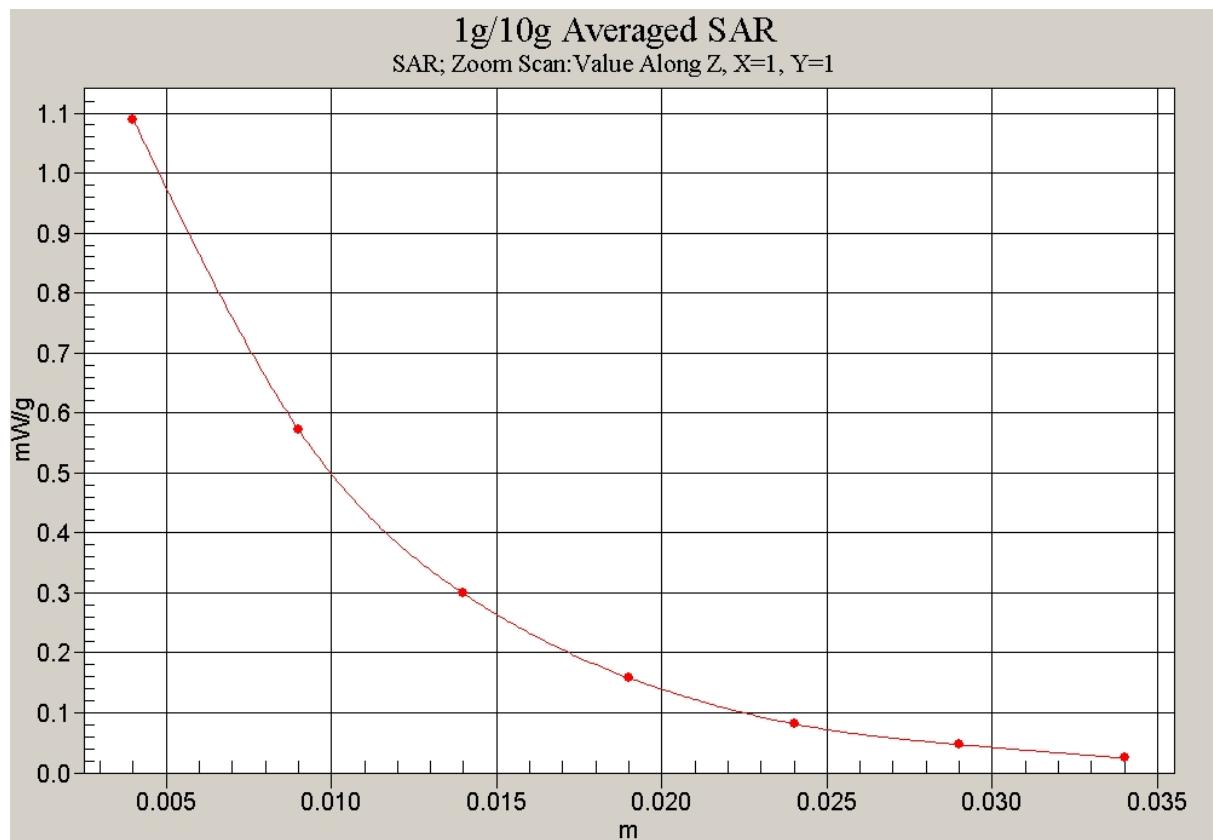
Reference Value = 20.4 V/m; Power Drift = -0.002 dB

Peak SAR (extrapolated) = 2.14 W/kg

**SAR(1 g) = 1.03 mW/g; SAR(10 g) = 0.520 mW/g**

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

**Fig. 3 1900 MHz CH661**



**Fig. 4 Z-Scan at power reference point (1900 MHz CH661)**

**1900 Left Cheek Low**

Date/Time: 2007-11-6 11:58:46

Electronics: DAE4 Sn777

Medium: Head 1900 MHz

Medium parameters used (interpolated):  $f = 1850.2$  MHz;  $\sigma = 1.32$  mho/m;  $\epsilon_r = 39.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°C      Liquid Temperature: 22.5°C

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

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

**Cheek Low/Area Scan (61x101x1):** Measurement grid: dx=10mm, dy=10mm

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

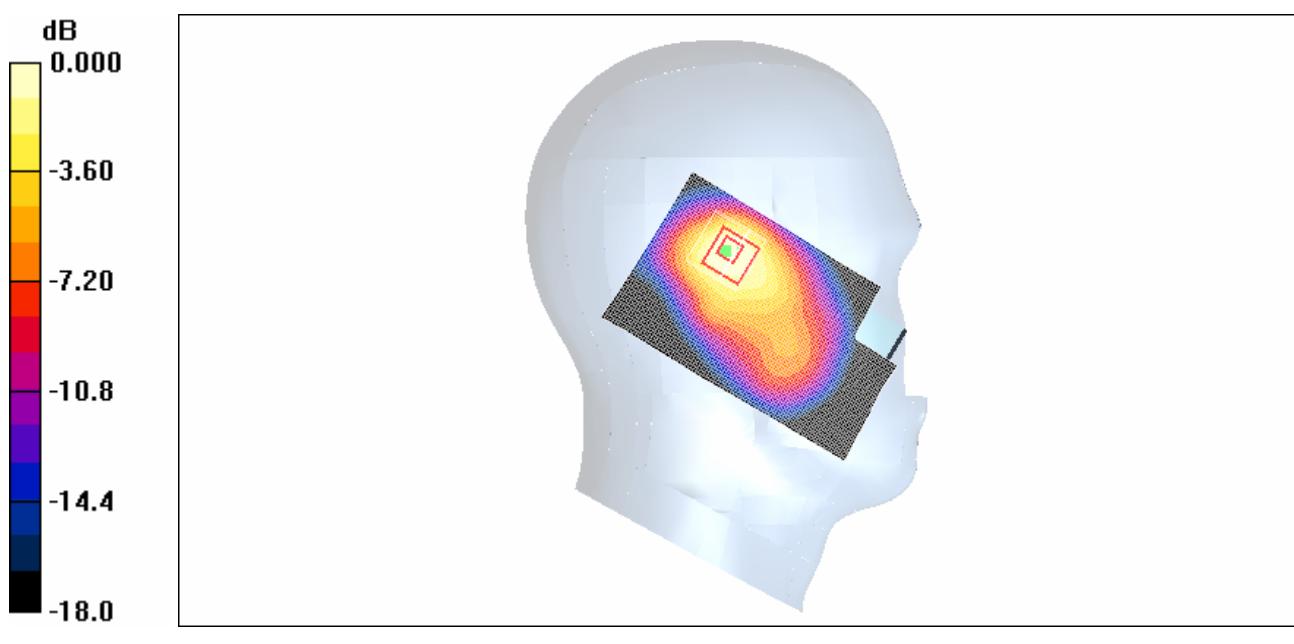
**Cheek Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 21.3 V/m; Power Drift = -0.053 dB

Peak SAR (extrapolated) = 2.06 W/kg

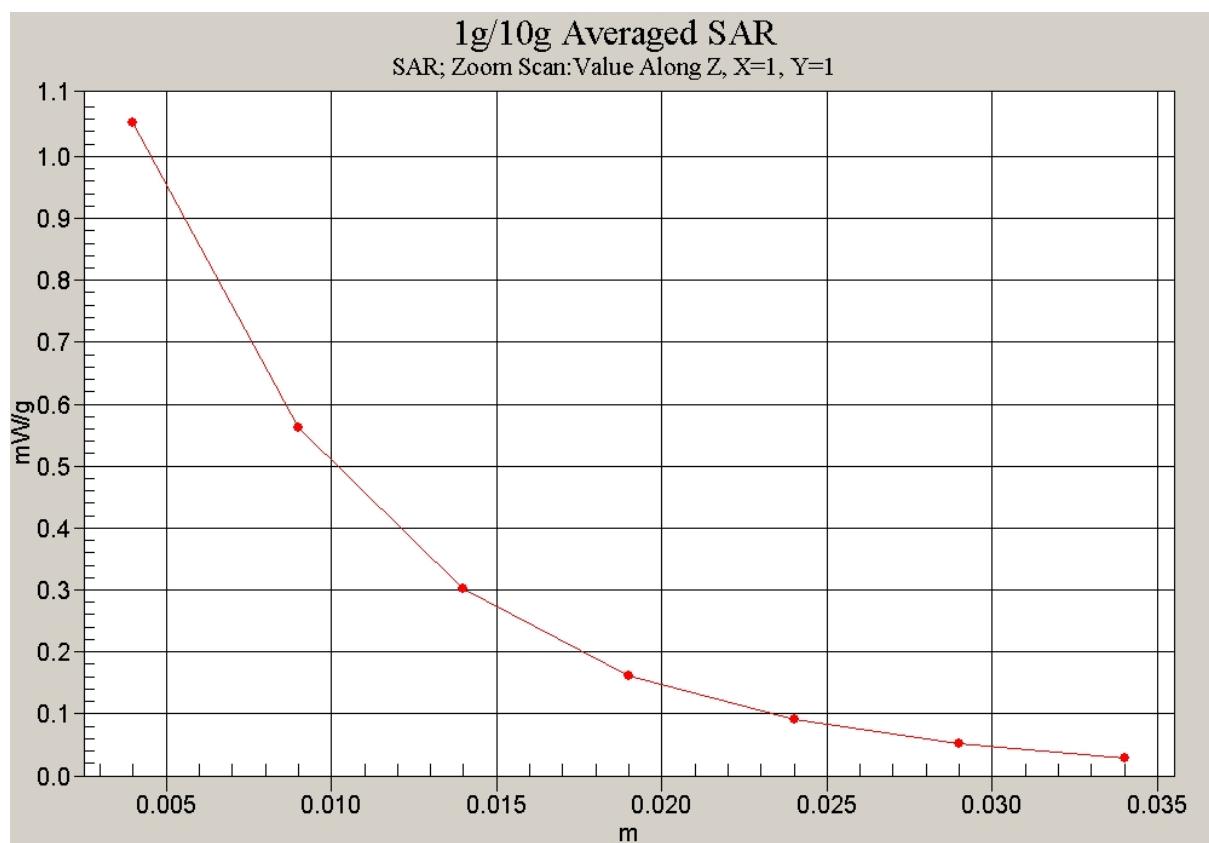
**SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.518 mW/g**

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



0 dB = 1.05mW/g

**Fig. 5 1900 MHz CH512**



**Fig. 6 Z-Scan at power reference point (1900 MHz CH512)**

**1900 Left Tilt High**

Date/Time: 2007-11-6 12:36:43

Electronics: DAE4 Sn777

Medium: Head 1900 MHz

Medium parameters used:  $f = 1910$  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 new Frequency: 1909.8 MHz Duty Cycle: 1:8.3

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

**Tilt High/Area Scan (61x101x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.32 mW/g

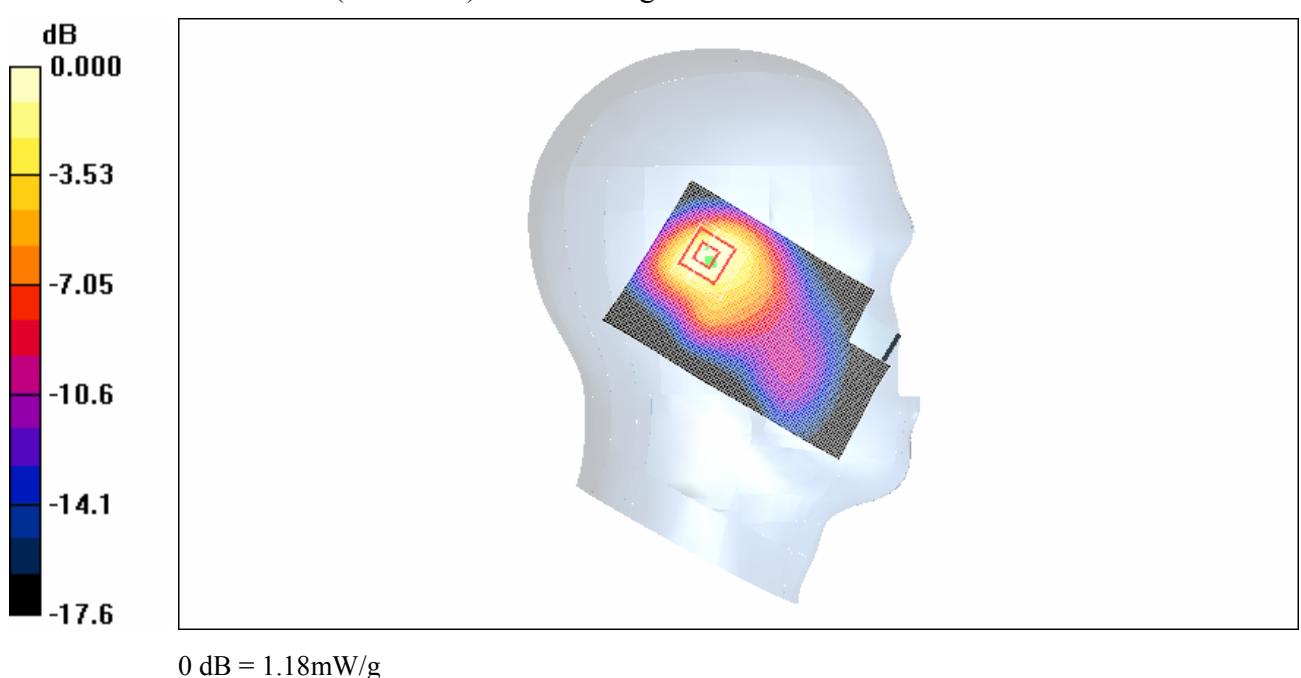
**Tilt High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

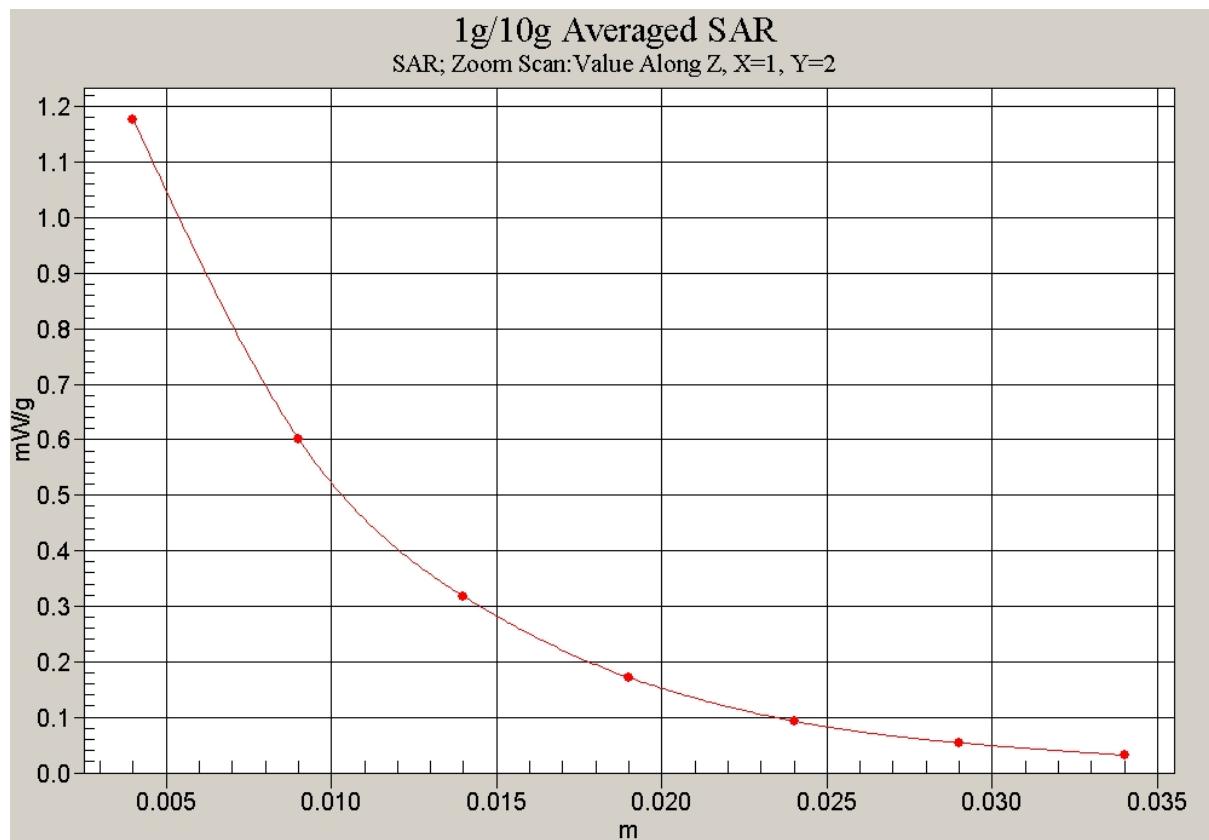
Reference Value = 21.9 V/m; Power Drift = 0.003 dB

Peak SAR (extrapolated) = 2.22 W/kg

**SAR(1 g) = 1.1 mW/g; SAR(10 g) = 0.554 mW/g**

Maximum value of SAR (measured) = 1.18 mW/g

**Fig.7 1900 MHz CH810**



**Fig. 8 Z-Scan at power reference point (1900 MHz CH810)**

**1900 Left Tilt Middle**

Date/Time: 2007-11-6 12:23:31

Electronics: DAE4 Sn777

Medium: Head 1900 MHz

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.35$  mho/m;  $\epsilon_r = 39.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°C      Liquid Temperature: 22.5°C

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

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

**Tilt Middle/Area Scan (61x101x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.23 mW/g

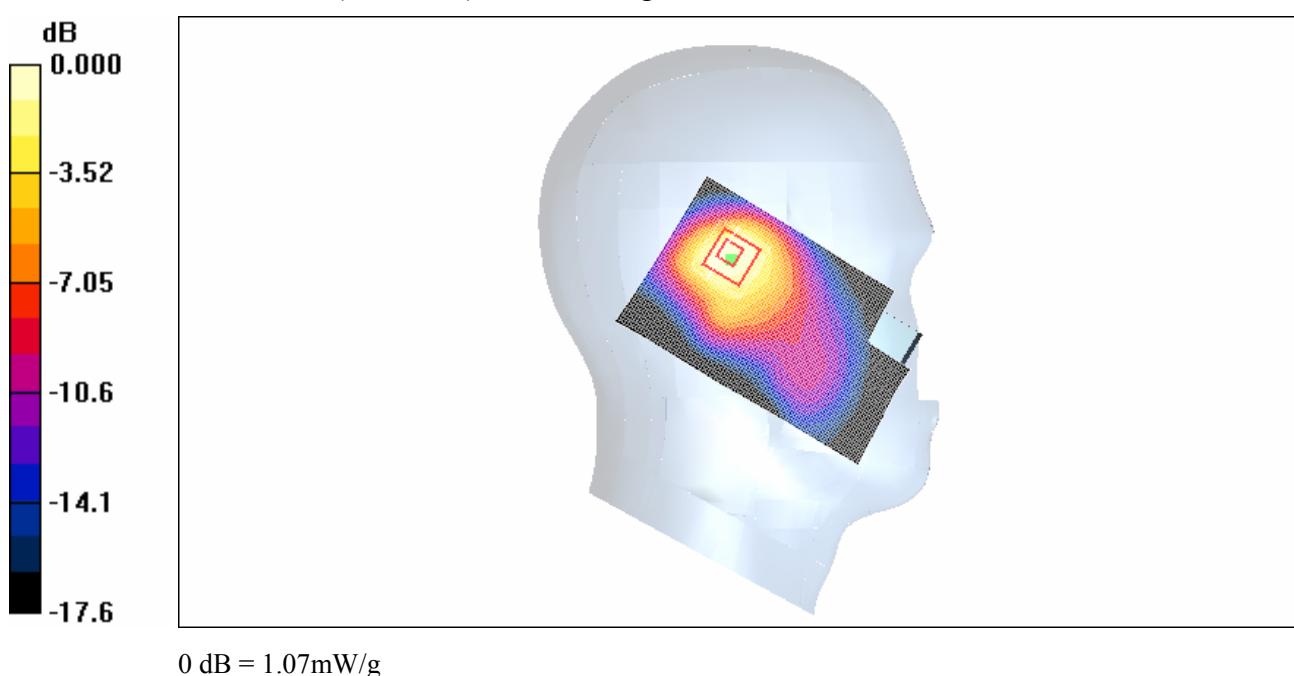
**Tilt Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 22.7 V/m; Power Drift = -0.011 dB

Peak SAR (extrapolated) = 2.04 W/kg

**SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.515 mW/g**

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

**Fig.9 1900 MHz CH661**

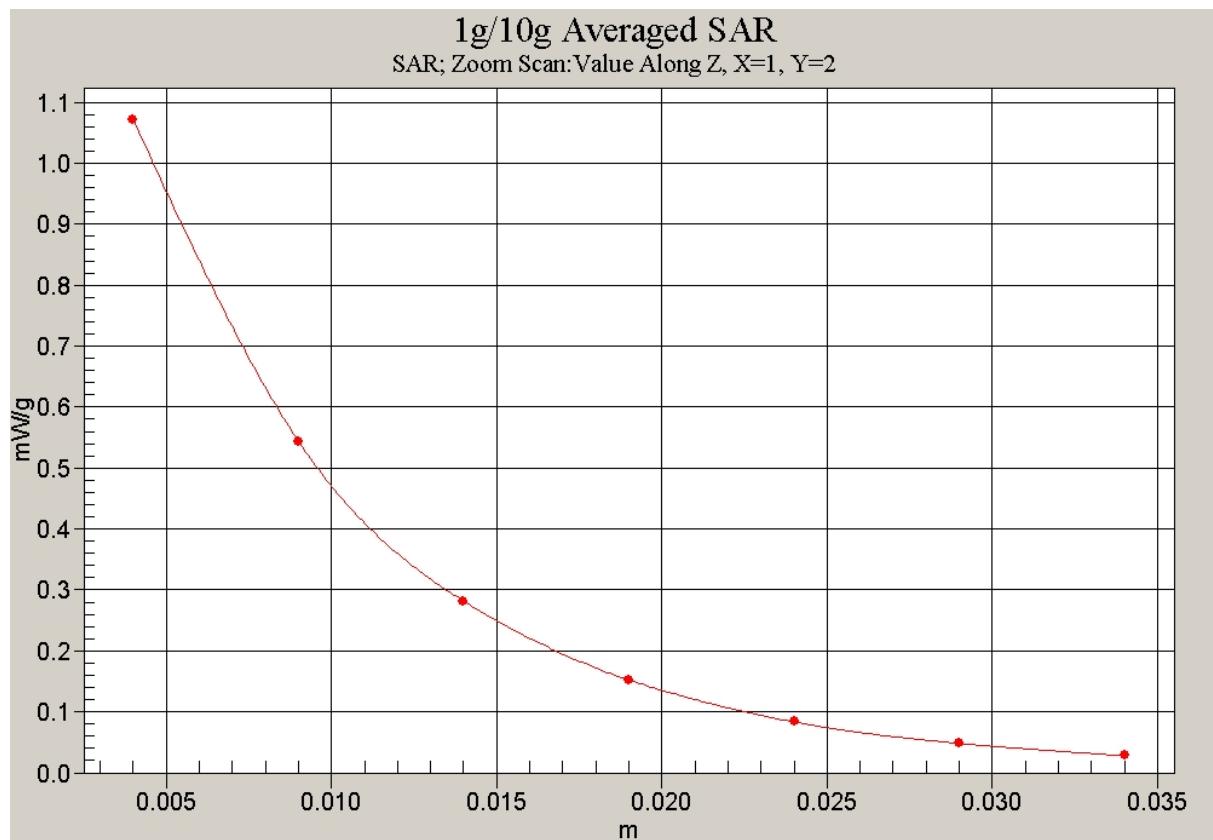


Fig. 10 Z-Scan at power reference point (1900 MHz CH661)

**1900 Left Tilt Low**

Date/Time: 2007-11-6 12:11:21

Electronics: DAE4 Sn777

Medium: Head 1900 MHz

Medium parameters used (interpolated):  $f = 1850.2$  MHz;  $\sigma = 1.32$  mho/m;  $\epsilon_r = 39.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 23.3°C      Liquid Temperature: 22.5°C

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

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

**Tilt Low/Area Scan (61x101x1):** Measurement grid: dx=10mm, dy=10mm

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

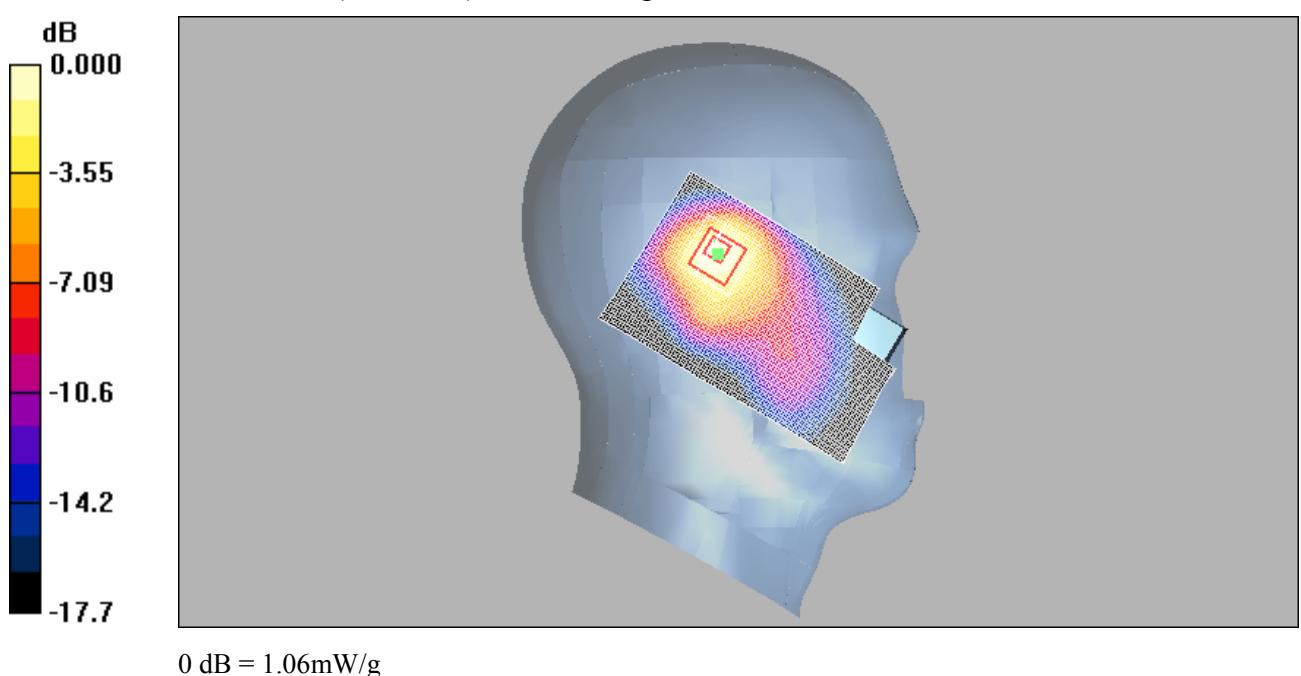
**Tilt Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 23.9 V/m; Power Drift = -0.051 dB

Peak SAR (extrapolated) = 1.99 W/kg

**SAR(1 g) = 0.990 mW/g; SAR(10 g) = 0.506 mW/g**

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

**Fig. 11 1900 MHz CH512**

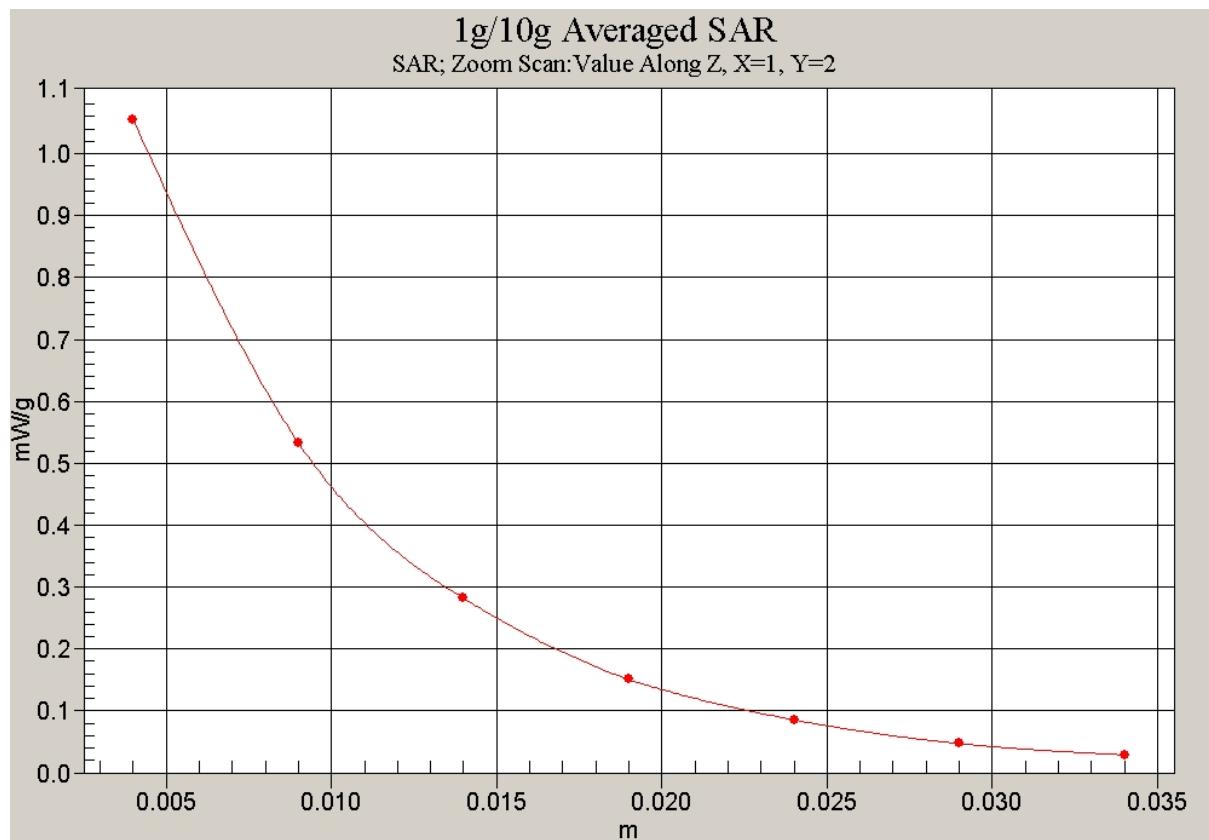


Fig. 12 Z-Scan at power reference point (1900 MHz CH512)

**1900 Right Cheek High**

Date/Time: 2007-11-6 16:43:10

Electronics: DAE4 Sn777

Medium: Head 1900 MHz

Medium parameters used:  $f = 1910$  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 new Frequency: 1909.8 MHz Duty Cycle: 1:8.3

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

**Cheek High/Area Scan (61x101x1):** Measurement grid: dx=10mm, dy=10mm

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

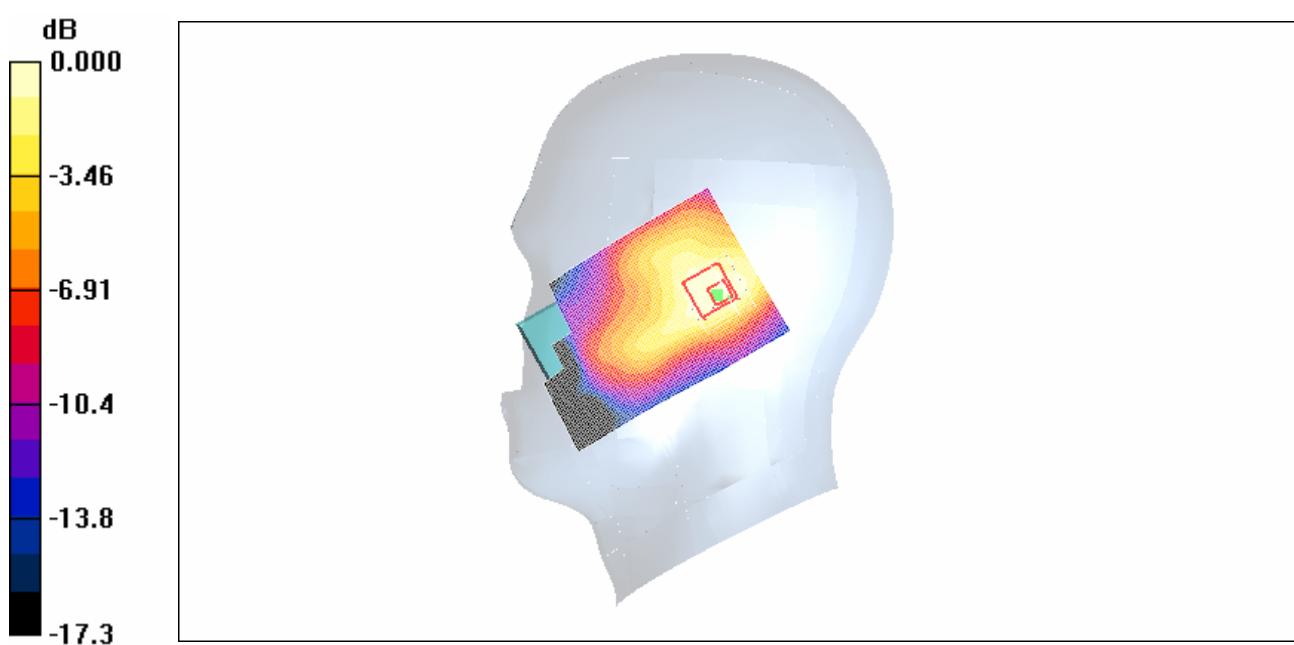
**Cheek High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 21.3 V/m; Power Drift = 0.092 dB

Peak SAR (extrapolated) = 1.25 W/kg

**SAR(1 g) = 0.653 mW/g; SAR(10 g) = 0.355 mW/g**

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



0 dB = 0.721mW/g

**Fig. 13 1900 MHz CH810**

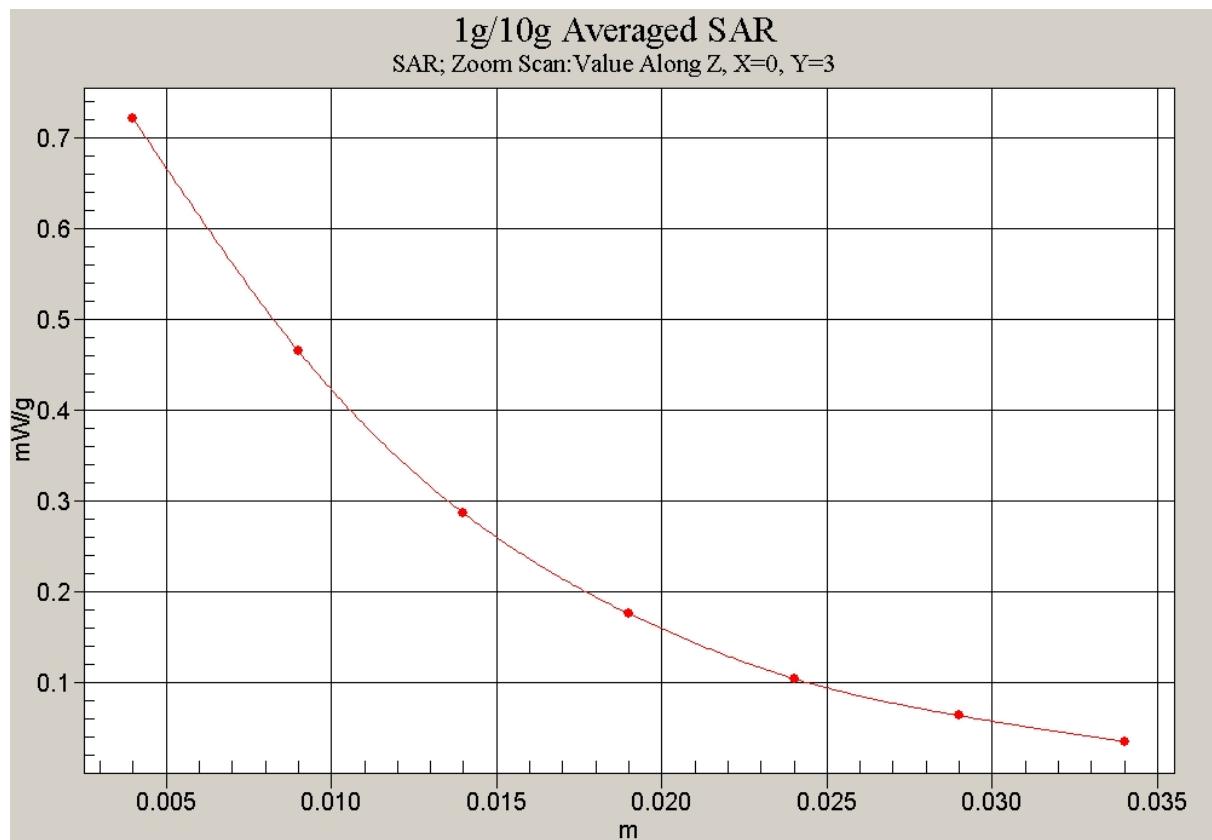


Fig. 14 Z-Scan at power reference point (1900 MHz CH810)