



NO.: RZA2008-0695FCC



OET 65

TEST REPORT

Test name	Electromagnetic Field (Specific Absorption Rate)
Product	WCDMA/GPRS/GSM/HSDPA Mobile Phone with Bluetooth
Model	V830/Vodafone 830
FCC ID	QISV830
Client	Huawei Technologies Co., Ltd.

TA Technology (Shanghai) Co., Ltd.



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GENERAL SUMMARY

Product	WCDMA/GPRS/GSM/HSDPA Mobile Phone with Bluetooth	Model	V830/Vodafone 830
Client	Huawei Technologies Co., Ltd.	Type of test	Entrusted
Manufacturer	Huawei Technologies Co., Ltd.	Arrival Date of sample	May.27 th , 2008
Place of sampling	(Blank)	Carrier of the samples	Yan Xie
Quantity of the samples	One	Date of product	(Blank)
Base of the samples	(Blank)	Items of test	SAR
Series number	VF2AB10842800259		
Standard(s)	<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 supplement C, published June 2001 including DA 02-1438, published June 2002: Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits. Transition Period for the Phantom Requirements of Supplement C to OET Bulletin 65.</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>Vodafone SAR_Data_cards_V1.1: Global Test Specification for Terminals for Performance Measurements –Performance TST- Specific Absorption Rate (SAR) for Data Cards and External Antennas.</p>		
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 6.2 of this test report. Maximum localized SAR is below exposure limits specified in the relevant standards cited in Clause 6.1 of this test report.</p> <p>General Judgment: Pass</p> <p style="text-align: right;">(Stamp) Date of issue: June. 2nd, 2008</p>		
Comment	The test result only responds to the measured sample.		

Approved by 钟晨光
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1 COMPETENCE AND WARRANTIES

TA Technology (Shanghai) Co., Ltd. is a test laboratory competent to carry out the tests described in this test report.

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

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3 DESCRIPTION OF EUT

3.1 Addressing Information Related to EUT

Table 1: Applicant (The Client)

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

Table 2: Manufacturer

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

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3.2 Constituents of EUT

Table 3: Constituents of Samples

Description	Model	Serial Number	Manufacturer
Handset	V830/Vodafone 830	VF2AB10842800259	Huawei Technologies Co.,Ltd.
Lithium Battery	HBV550	FMT781337026Y	FMT Electronics Co.,Ltd.
AC/DC Adapter	TPCA-050065UY	TP17A1602842	TECH-POWER INTERNATIONAL CO.,LTD
	CHG5065-3C	HKY7C2200005	Shen Zhen Huntkey Power Technology Co.,Ltd
	HS-050040E2	TPI810600016	TECH-POWER INTERNATIONAL CO.,LTD
	HS-050040E2	HKA812200001	Shen Zhen Huntkey Power Technology Co.,Ltd

Note:

The EUT appearances see ANNEX G.

3.3 Operating conditions

Mode	GSM1900
TX frequency range	1850.2~1909.8MHz
RX frequency range	1930.2 ~1989.8 MHz
Standard output power	30dBm (1W)
Power level	Tested with power level 0
Modulation	GMSK

3.4 General Description

Equipment Under Test (EUT) is a model of WCDMA/GPRS/GSM/HSDPA Mobile Phone with Bluetooth with internal antenna. It consists of Handset, Lithium Battery and AC/DC Adapter. The detail about Mobile phone, Lithium Battery and AC/DC Adapter is in Table 3. SAR is tested for GSM 1900. It has the GPRS and Bluetooth functions, the GPRS class is 10.

The sample undergoing test was selected by the Client.

Components list please refer to documents of the manufacturer.

Under the loop back mode between mobile station and E5515C, the transmitter continuously emits with maximum power more strong than voice mode, so the SAR test was done with loop back mode. To make the mobile emits maximum power; the output power of E5515C would be adjusted to minimum power with the sensitivity of the mobile station to build steady connection with mobile station. The power level control parameter "all up" and it means that requires mobile station to emit with maximum 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 OPERATIONAL CONDITIONS DURING TEST

4.1 GSM Test Configuration

SAR tests for GSM 1900, a communication link is set up with a System Simulator (SS) by air link. Using E5515C the power lever is set to "0" in head SAR and body SAR of GSM1900.

Since the EUT not only has the data transfer function, but also have the speech transfer function.

The tests in the band of GSM 1900 is performed in the mode of speech transfer function and GPRS. And since the GPRS class is 10 for this EUT, it has at most 2 timeslots in uplink. According to specification 3GPP TS 51.010, the maximum power of the GSM can do the power reduction for the multi-slot. The allowed power reduction in the multi-slot configuration is as following:

Number of timeslots in uplink assignment	Permissible nominal reduction of maximum output power,(dB)
1	0
2	0 to 3.0

- 1) Using 1 timeslot in uplink with the power of 33dBm for GSM 850 and 30 dBm for GSM1900
- 2) Using 2 timeslots in uplink with the power reduced 2dB

After drawn the worst case, the tests will be continued to perform with the same EUT setup for the whole tests for GSM 1900 of GPRS.

5 SAR MEASUREMENTS SYSTEM CONFIGURATION

5.1 SAR Measurement Set-up

These measurements were performed with the automated near-field scanning system DASY4 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, 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.

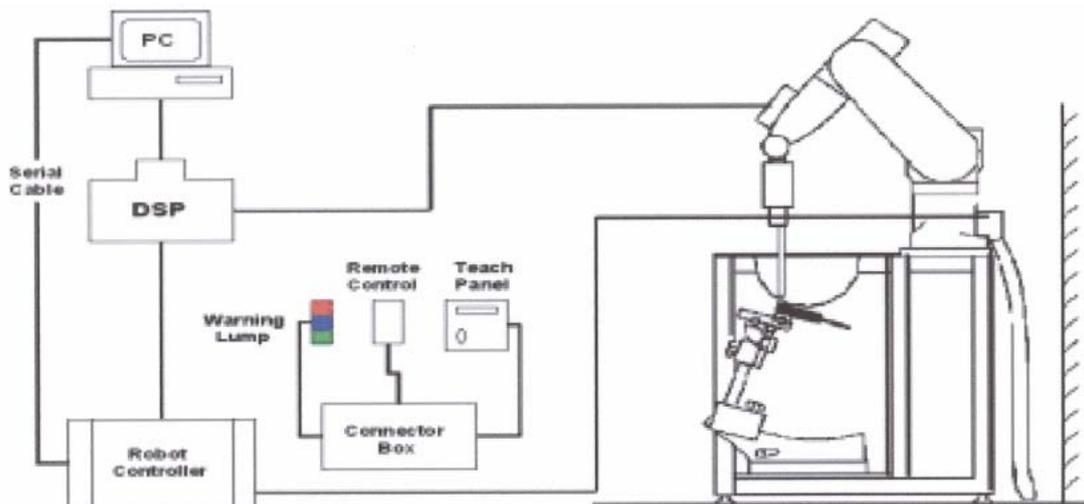


Figure 1. SAR Lab Test Measurement Set-up

The DAE3 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.

5.2 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 900MHz, 1750MHz, 1950MHz and 2450MHz (accuracy $\pm 8\%$) Calibration for other liquids and frequencies upon request
Frequency	10 MHz to > 6 GHz; Linearity: $\pm 0.2\text{ dB}$ (30 MHz to 3 GHz)
Directivity	$\pm 0.2\text{ dB}$ in brain tissue (rotation around probe axis) $\pm 0.4\text{ dB}$ in brain tissue (rotation around probe axis)
Dynamic Range	5u W/g to > 100mW/g; Linearity: $\pm 0.2\text{ dB}$
Surface Detection	$\pm 0.2\text{ mm}$ 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

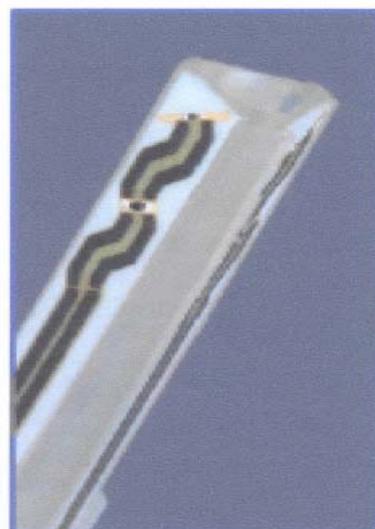


Figure 2. ET3DV6 E-field Probe

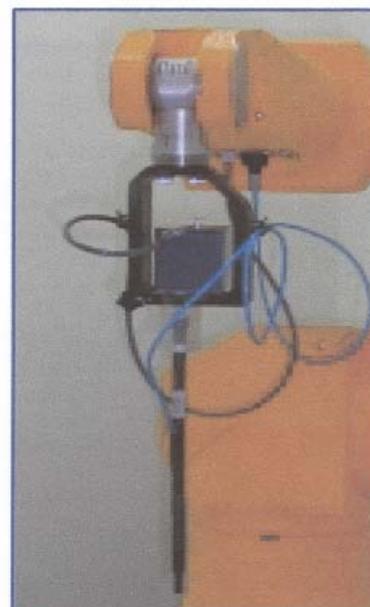


Figure 3. ET3DV6 E-field probe

5.3 E-field Probe Calibration

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

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

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

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

Where: Δt = Exposure time (30 seconds),
C = Heat capacity of tissue (brain or muscle),
 ΔT = Temperature increase due to RF exposure.
Or

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

Where:
 σ = Simulated tissue conductivity,
 ρ = Tissue density (kg/m³).

5.4 Other Test Equipment

5.4.1 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 repeatedly positioned according to the FCC and CENELEC specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).



Figure 4. Device Holder

5.4.2 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



Figure 5. Generic Twin Phantom

5.5 Equivalent Tissues

The liquid used for the frequency range of 1800-2000 MHz consisted of water, salt, and Glycol monobutyl. The liquid has previously been proven to be suited for worst-case. The Table 4 and Table 5 show the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the IEEE 1528.

Table 4: Composition of the Head Tissue Equivalent Matter

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

Table 5: Composition of the Body Tissue Equivalent Matter

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

5.6 System Specifications

5.6.1 Robotic 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 CHARACTERISTICS OF THE TEST

6.1 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.

6.2 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.

It specifies the measurement method for demonstration of compliance with the SAR limits for such equipments.

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

IEC 62209-1: 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)

Vodafone SAR_Data_cards_V1.1: Global Test Specification for Terminals for Performance Measurements –Performance TST- Specific Absorption Rate (SAR) for Data Cards and External Antennas.

7 LABORATORY ENVIRONMENT

Table 6: The Ambient Conditions during Test

Temperature	Min. = 20 °C, Max. = 25 °C
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5 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.	

8 CONDUCTED OUTPUT POWER MEASUREMENT

8.1 Summary

During the process of testing, the EUT was controlled via Digital Radio Communication tester 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.

8.2 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 11 to Table 20 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 0.21dB.

8.3 Conducted Power

8.3.1 Measurement Methods

The EUT was set up for the maximum output power. The channel power was measured. These measurements were done at 3 channels 512,661 and 810 before SAR test and after SAR test.

8.3.2 Measurement result

Table 7: Conducted Power Measurement Results

GSM 1900	Conducted Power		
	Channel 512	Channel 661	Channel 810
Before Test (dBm)	30.5	30.4	30.5
After Test (dBm)	30.4	30.3	30.4
GSM 1900+GPRS	Conducted Power		
	Channel 512	Channel 661	Channel 810
Before Test (dBm)	30.5	30.4	30.4
After Test (dBm)	30.4	30.3	30.3

9 TEST RESULTS

9.1 Dielectric Performance

Table 8: Dielectric Performance of Head Tissue Simulating Liquid

Measurement is made at temperature 22.5 °C and relative humidity 51%. Liquid temperature during the test: 22.3°C					
Frequency (MHz)		Target value	Measurement value	Difference percentage	
1900 (Head)	Permittivity ϵ_r	40.00	39.68	-0.80	%
	Conductivity σ	1.40	1.43	2.14	%

Table 9: Dielectric Performance of Body Tissue Simulating Liquid

Measurement is made at temperature 22.5 °C and relative humidity 51%. Liquid temperature during the test: 22.3°C					
Frequency (MHz)		Target value	Measurement value	Difference percentage	
1900 (Body)	Permittivity ϵ_r	53.30	52.06	-2.32	%
	Conductivity σ	1.52	1.52	0.00	%

9.2 System Validation

Table 10: System Validation

Measurement is made at temperature 23.2 °C, relative humidity 50%, and input power 250 mW. Liquid temperature during the test: 22.3°C							
Liquid parameters	Frequency	Permittivity ϵ		Conductivity σ (S/m)			
	39.68	1.43		39.68			
Verification results	Frequency	Target value (W/kg)		Measurement value (W/kg)		Difference percentage	
		10 g Average	1 g Average	10 g Average	1 g Average	10 g Average	1 g Average
	1900MHz	4.98	9.45	4.93	9.36	-1.00%	-1.06%

Note:

- a. Target Values used derive from the SPEAG calibration certificate and 250 mW is used as feeding power to the validation dipole (SPEAG using).
- b. The graph results see ANNEX D.

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9.3 Summary of Measurement Results

Table 11: SAR Values (GSM1900, Head, Open)

Liquid Temperature: 22.5°C					
Limit of SAR (W/kg)		10 g Average	1 g Average	Power Drift (dB)	Graph Results
		2.0	1.6	± 0.2	
Test Case Of Head		Measurement Result (W/kg)		Power Drift (dB)	
		10 g Average	1 g Average		
Different Test Position	Channel				
Left hand, Touch cheek	High	0.154	0.238	0.005	Figure 7
	Middle	0.171	0.260	-0.105	Figure 9
	Low	0.158	0.241	-0.050	Figure 11
Left hand, Tilt 15 Degree	High	0.131	0.212	-0.028	Figure 13
	Middle	0.149	0.240	-0.034	Figure 15
	Low	0.183	0.291	0.017	Figure 17
Right hand, Touch cheek	High	0.174	0.284	0.007	Figure 19
	Middle	0.192	0.309	0.042	Figure 21
	Low	0.230	0.373	-0.096	Figure 23
Right hand, Tilt 15 Degree	High	0.110	0.167	-0.013	Figure 25
	Middle	0.119	0.180	-0.126	Figure 27
	Low	0.155	0.233	-0.048	Figure 29

Table 12: SAR Values (GSM1900, Body, Open, Distance 15mm)

Liquid Temperature: 22.5°C					
Limit of SAR (W/kg)		10 g Average	1 g Average	Power Drift (dB)	Graph Results
		2.0	1.6	± 0.2	
Test Case Of Body		Measurement Result (W/kg)		Power Drift (dB)	
		10 g Average	1 g Average		
Different Test Position	Channel				
Towards Ground	High	0.221	0.338	-0.051	Figure 31
	Middle	0.249	0.380	0.093	Figure 33
	Low	0.311	0.470	-0.098	Figure 35
Towards Phantom	High	0.095	0.145	-0.183	Figure 37
	Middle	0.098	0.149	0.033	Figure 39
	Low	0.109	0.164	0.020	Figure 41

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Table 13: SAR Values (GSM1900, Body with Earphone, Open, Distance 15mm)

Liquid Temperature: 22.5°C					
Limit of SAR (W/kg)		10 g Average	1 g Average	Power Drift (dB)	Graph Results
		2.0	1.6	± 0.2	
Test Case Of Body		Measurement Result (W/kg)		Power Drift (dB)	
		10 g Average	1 g Average		
Different Test Position	Channel				
Towards Ground	Low	0.278	0.422	0.019	Figure 43

Table 14: SAR Values (GSM1900, Body with Bluetooth Earphone, Open, Distance 15mm)

Liquid Temperature: 22.5°C					
Limit of SAR (W/kg)		10 g Average	1 g Average	Power Drift (dB)	Graph Results
		2.0	1.6	± 0.2	
Test Case Of Body		Measurement Result (W/kg)		Power Drift (dB)	
		10 g Average	1 g Average		
Different Test Position	Channel				
Towards Ground	Low	0.313	0.475	0.040	Figure 45

Table 15: SAR Values [GSM1900 GPRS(2 uplink timeslots), Body, Open, Distance 15mm]

Liquid Temperature: 22.5°C					
Limit of SAR (W/kg)		10 g Average	1 g Average	Power Drift (dB)	Graph Results
		2.0	1.6	± 0.2	
Test Case Of Body		Measurement Result (W/kg)		Power Drift (dB)	
		10 g Average	1 g Average		
Different Test Position	Channel				
Towards Ground	High	0.345	0.597	-0.169	Figure 47
	Middle	0.444	0.680	0.072	Figure 49
	Low	0.460	1.010	0.048	Figure 51
Towards Phantom	High	0.150	0.231	-0.065	Figure 53
	Middle	0.183	0.272	-0.009	Figure 55
	Low	0.259	0.387	-0.081	Figure 57

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Table 16: SAR Values (GSM1900, Head, Close)

Liquid Temperature: 22.5°C					
Limit of SAR (W/kg)		10 g Average	1 g Average	Power Drift (dB)	Graph Results
		2.0	1.6	± 0.2	
Test Case Of Head		Measurement Result (W/kg)		Power Drift (dB)	
		10 g Average	1 g Average		
Different Test Position	Channel				
Left hand, Touch cheek	High	0.156	0.257	0.006	Figure 59
	Middle	0.132	0.213	0.022	Figure 61
	Low	0.125	0.200	-0.002	Figure 63
Left hand, Tilt 15 Degree	High	0.088	0.139	-0.005	Figure 65
	Middle	0.077	0.122	-0.005	Figure 67
	Low	0.085	0.136	0.025	Figure 69
Right hand, Touch cheek	High	0.154	0.238	0.005	Figure 71
	Middle	0.171	0.260	-0.105	Figure 73
	Low	0.158	0.241	-0.500	Figure 75
Right hand, Tilt 15 Degree	High	0.131	0.212	-0.028	Figure 77
	Middle	0.149	0.240	-0.034	Figure 79
	Low	0.183	0.291	0.017	Figure 81

Table 17: SAR Values (GSM1900, Body, Close, Distance 15mm)

Liquid Temperature: 22.5°C					
Limit of SAR (W/kg)		10 g Average	1 g Average	Power Drift (dB)	Graph Results
		2.0	1.6	± 0.2	
Test Case Of Body		Measurement Result (W/kg)		Power Drift (dB)	
		10 g Average	1 g Average		
Different Test Position	Channel				
Towards Ground	High	0.296	0.489	-0.017	Figure 83
	Middle	0.270	0.448	0.004	Figure 85
	Low	0.321	0.542	0.006	Figure 87
Towards Phantom	High	0.073	0.115	-0.026	Figure 89
	Middle	0.069	0.109	-0.013	Figure 91
	Low	0.081	0.129	-0.058	Figure 93

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Table 18: SAR Values (GSM1900, Body with Earphone, Close, Distance 15mm)

Liquid Temperature: 22.5°C					
Limit of SAR (W/kg)		10 g Average	1 g Average	Power Drift (dB)	Graph Results
		2.0	1.6	± 0.2	
Test Case Of Body		Measurement Result (W/kg)		Power Drift (dB)	
		10 g Average	1 g Average		
Different Test Position	Channel	10 g Average	1 g Average	Power Drift (dB)	Graph Results
Towards Ground	Low	0.291	0.485	-0.010	Figure 95

Table 19: SAR Values (GSM1900, Body with Bluetooth Earphone, Close, Distance 15mm)

Liquid Temperature: 22.5°C					
Limit of SAR (W/kg)		10 g Average	1 g Average	Power Drift (dB)	Graph Results
		2.0	1.6	± 0.2	
Test Case Of Body		Measurement Result (W/kg)		Power Drift (dB)	
		10 g Average	1 g Average		
Different Test Position	Channel	10 g Average	1 g Average	Power Drift (dB)	Graph Results
Towards Ground	Low	0.324	0.547	-0.046	Figure 97

Table 20: SAR Values [GSM1900 GPRS(2 uplink timeslots), Body, Close, Distance 15mm]

Liquid Temperature: 22.5°C					
Limit of SAR (W/kg)		10 g Average	1 g Average	Power Drift (dB)	Graph Results
		2.0	1.6	± 0.2	
Test Case Of Body		Measurement Result (W/kg)		Power Drift (dB)	
		10 g Average	1 g Average		
Different Test Position	Channel	10 g Average	1 g Average	Power Drift (dB)	Graph Results
Towards Ground	High	0.548	0.895	-0.023	Figure 99
	Middle	0.509	0.844	-0.046	Figure 101
	Low	0.604	1.030	0.041	Figure 103
Towards Phantom	High	0.128	0.205	-0.038	Figure 105
	Middle	0.119	0.188	-0.018	Figure 107
	Low	0.138	0.217	0.031	Figure 109

Remark: The value with blue color is the maximum SAR Value of each test band.

9.4 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 6.2 of this report. Maximum localized SAR is below exposure limits specified in the relevant standards cited in Clause 6.1 of this test report.

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10 MEASUREMENT UNCERTAINTY

No.	a	Type	c	d	e=f(d, k)	f	h=c×f / e	k
	Uncertainty Component		Tol. (±%)	Prob. Dist	Div.	c ₁ (1g)	1g u (± %)	v ₁
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	$\sqrt{3}$	(1-cp) ^{1/2}	4.3	∞
4	Hemisphere Isotropy	B	9.4	R	$\sqrt{3}$	$\sqrt{C_P}$		∞
5	Boundary Effect	B	0.4	R	$\sqrt{3}$	1	0.23	∞
6	Linearity	B	4.7	R	$\sqrt{3}$	1	2.7	∞
7	System Detection Limits	B	1.0	R	$\sqrt{3}$	1	0.6	∞
8	Readout Electronics	B	1.0	N	1	1	1.0	∞
9	RF Ambient Conditions	B	3.0	R	$\sqrt{3}$	1	1.73	∞
10	Probe Positioner Mechanical Tolerance	B	0.4	R	$\sqrt{3}$	1	0.2	∞
11	Probe Positioning with respect to Phantom Shell	B	2.9	R	$\sqrt{3}$	1	1.7	∞
12	Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	B	3.9	R	$\sqrt{3}$	1	2.3	∞
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	∞
Phantom and Tissue Parameters								
16	Phantom Uncertainty(shape and thickness tolerances)	B	1.0	R	$\sqrt{3}$	1	0.6	∞
17	Liquid Conductivity-deviation from target values	B	5.0	R	$\sqrt{3}$	0.64	1.7	∞
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	∞
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	

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11 MAIN TEST INSTRUMENTS

Table 21: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	Agilent 8753E	US37390326	September 15, 2007	One year
02	Dielectric Probe Kit	Agilent 85070E	US44020115	No Calibration Requested	
03	Power meter	Agilent E4417A	GB41291714	March 14, 2008	One year
04	Power sensor	Agilent 8481H	MY41091316	March 14, 2008	One year
05	Signal Generator	HP 8341B	2730A00804	September 15, 2007	One year
06	Amplifier	IXA-020	0401	No Calibration Requested	
07	BTS	E5515C	GB46490218	September 15, 2007	One year
08	E-field Probe	ET3DV6	1531	January 29, 2008	One year
09	DAE	DAE3	452	September 6, 2007	One year
10	Validation Kit 1900MHz	D1900V2	5d018	March 21, 2008	One year

12 TEST PERIOD

The test is performed from May 27, 2008 to June 1, 2008.

13 TEST LOCATION

The test is performed at TA Technology (Shanghai) Co., Ltd.

*****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 ear 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 head was measured at a distance of 3.9 mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 20 mm x 20 mm. Based on this data, the area of the maximum absorption was determined by spline interpolation.

Step 3: Around this point, a volume of 32 mm x 32 mm x 34 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.

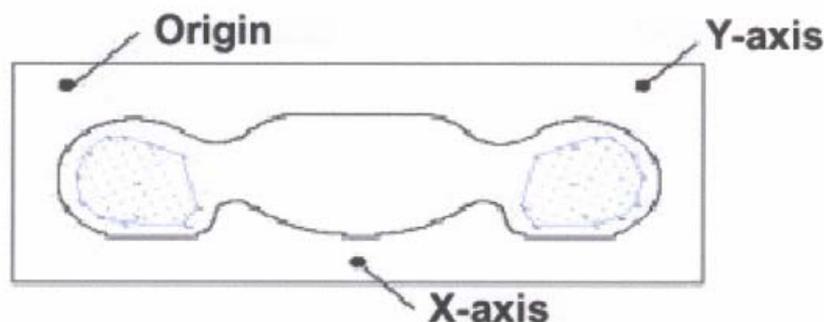
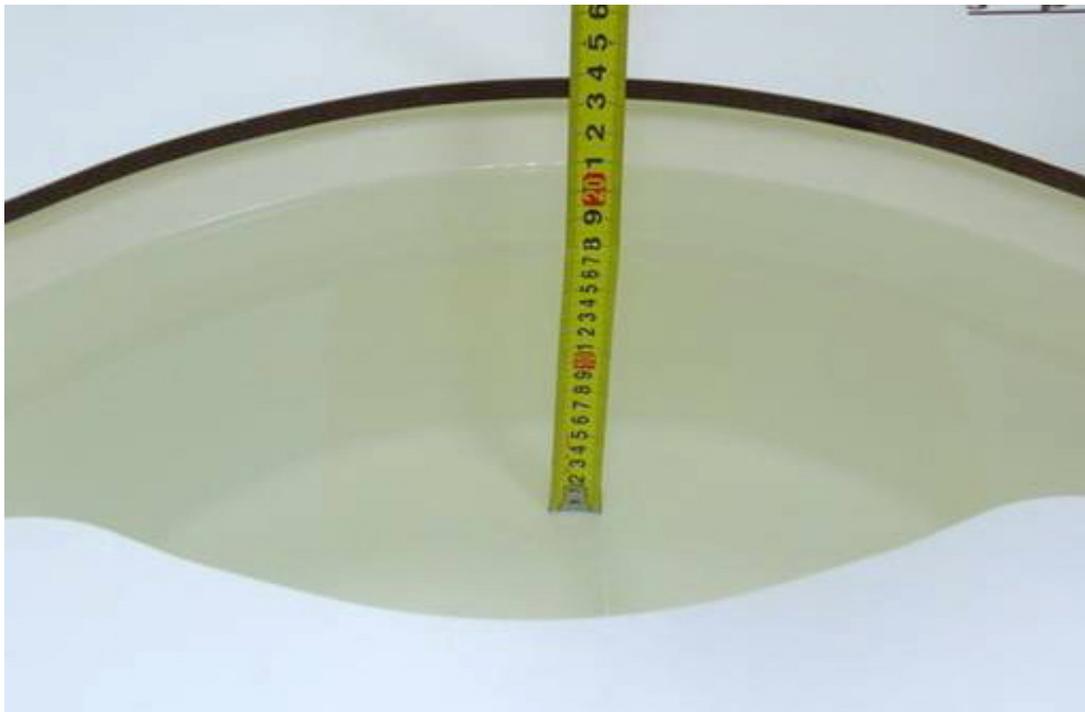


Figure 6 SAR Measurement Points in Area Scan

ANNEX B: TEST LAYOUT



Picture 1 Specific Absorption Rate Test Layout



Picture 2: Liquid depth in the Phantom (1900 MHz)



Picture 3: liquid depth in the head Phantom (1900 MHz)

ANNEX C: GRAPH RESULTS

GSM 1900 Left Cheek High Open

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

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.44$ mho/m; $\epsilon_r = 39.7$; $\rho = 1000$ kg/m³

Probe: ET3DV6 - SN1531; ConvF(5.15, 5.15, 5.15);

Electronics: DAE3 Sn452;

Cheek High/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.262 mW/g

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

Reference Value = 5.95 V/m; Power Drift = 0.005 dB

Peak SAR (extrapolated) = 0.315 W/kg

SAR(1 g) = 0.238 mW/g; SAR(10 g) = 0.154 mW/g

Maximum value of SAR (measured) = 0.262 mW/g

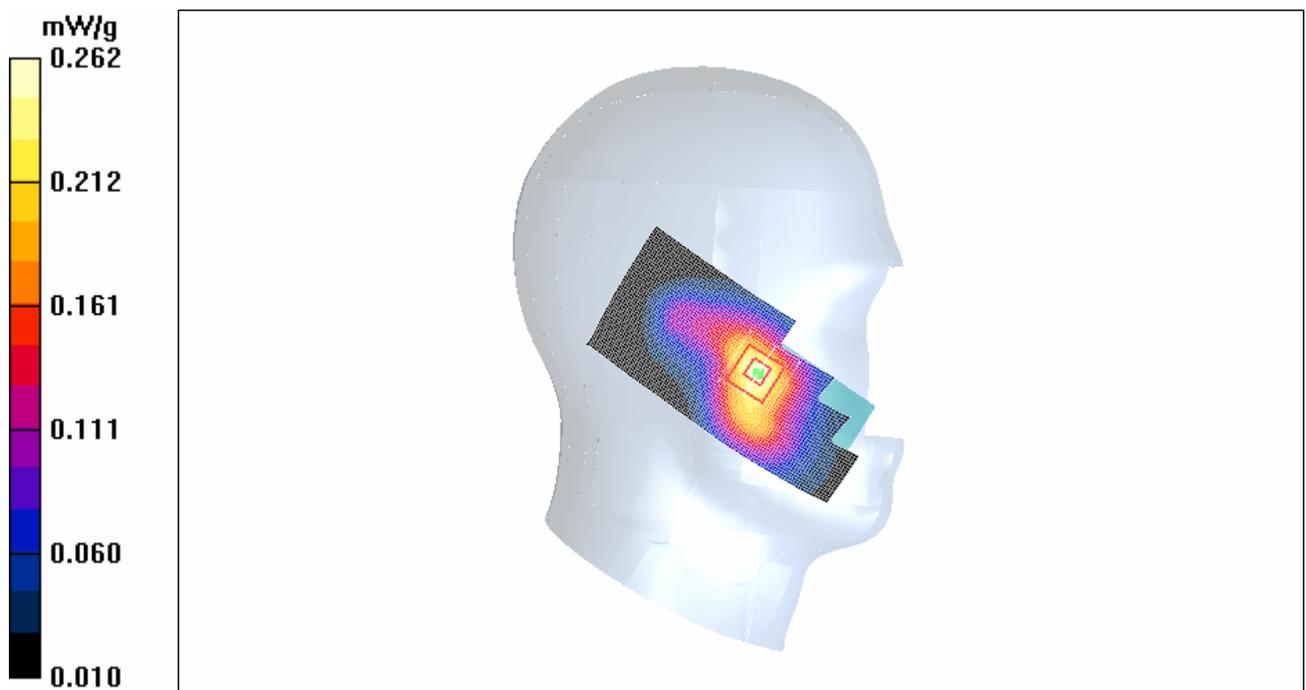


Figure 7 Left Hand Touch Cheek Open GSM 1900 Channel 810

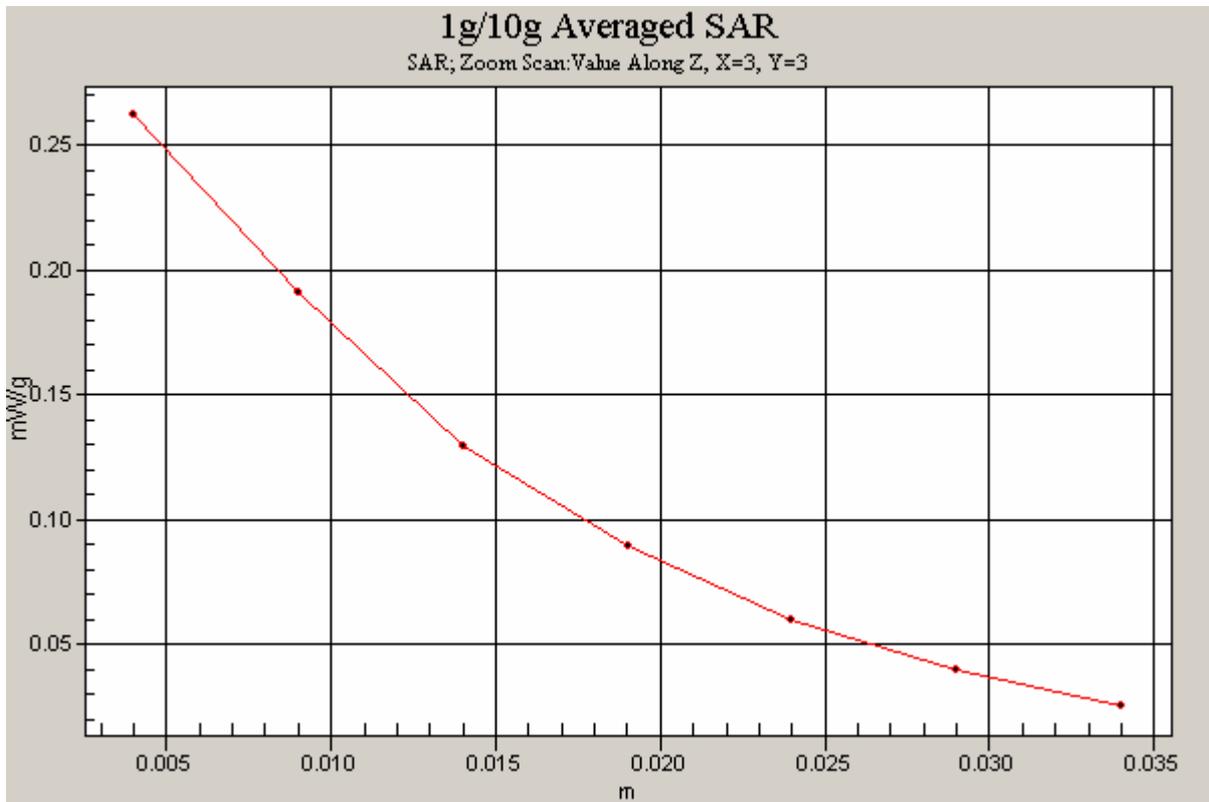


Figure 8 Z-Scan at power reference point (Left Hand Touch Cheek Open GSM 1900 Channel 810)

GSM 1900 Left Cheek Middle Open

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

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.41$ mho/m; $\epsilon_r = 39.7$; $\rho = 1000$ kg/m³

Probe: ET3DV6 - SN1531; ConvF(5.15, 5.15, 5.15);

Electronics: DAE3 Sn452;

Cheek Middle/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.291 mW/g

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

Reference Value = 6.15 V/m; Power Drift = -0.105 dB

Peak SAR (extrapolated) = 0.341 W/kg

SAR(1 g) = 0.260 mW/g; SAR(10 g) = 0.171 mW/g

Maximum value of SAR (measured) = 0.286 mW/g

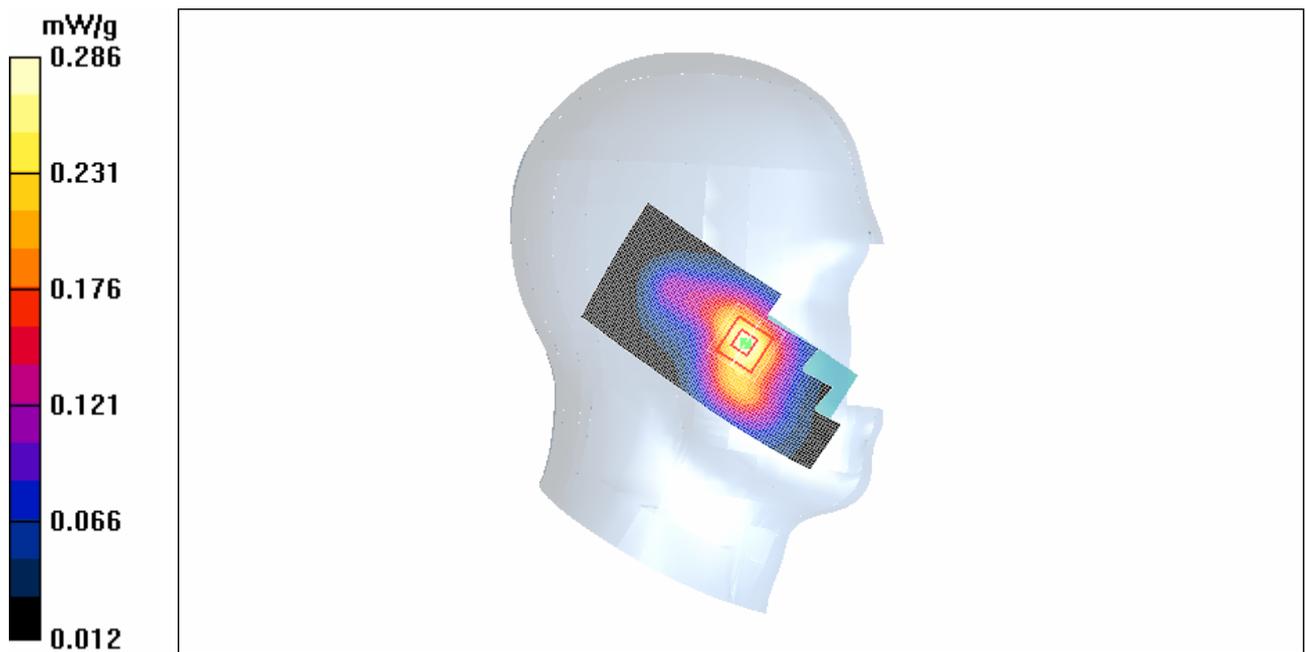


Figure 9 Left Hand Touch Cheek Open GSM 1900 Channel 661

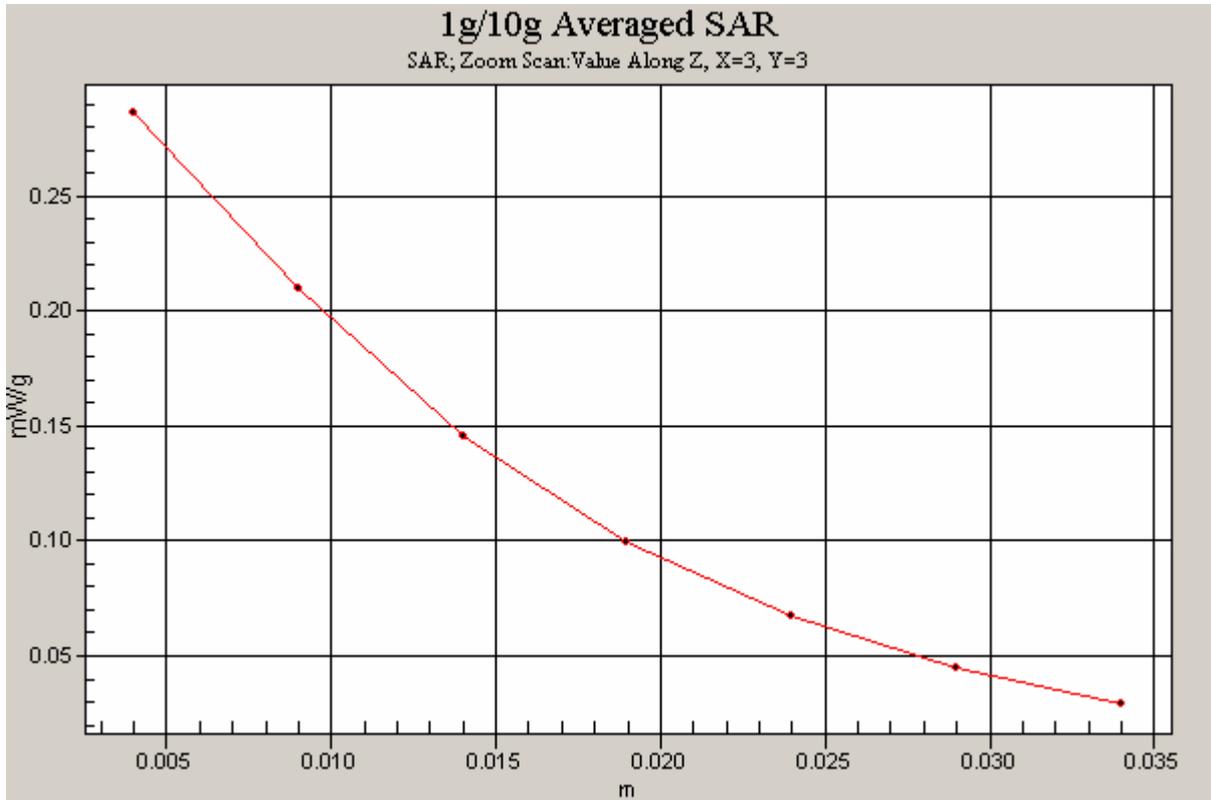


Figure 10 Z-Scan at power reference point (Left Hand Touch Cheek Open GSM 1900 Channel 661)

GSM 1900 Left Cheek Low Open

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

Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.39$ mho/m; $\epsilon_r = 39.9$; $\rho = 1000$ kg/m³

Probe: ET3DV6 - SN1531; ConvF(5.15, 5.15, 5.15);

Electronics: DAE3 Sn452;

Cheek Low/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.257 mW/g

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

Reference Value = 5.33 V/m; Power Drift = -0.050 dB

Peak SAR (extrapolated) = 0.311 W/kg

SAR(1 g) = 0.241 mW/g; SAR(10 g) = 0.158 mW/g

Maximum value of SAR (measured) = 0.263 mW/g

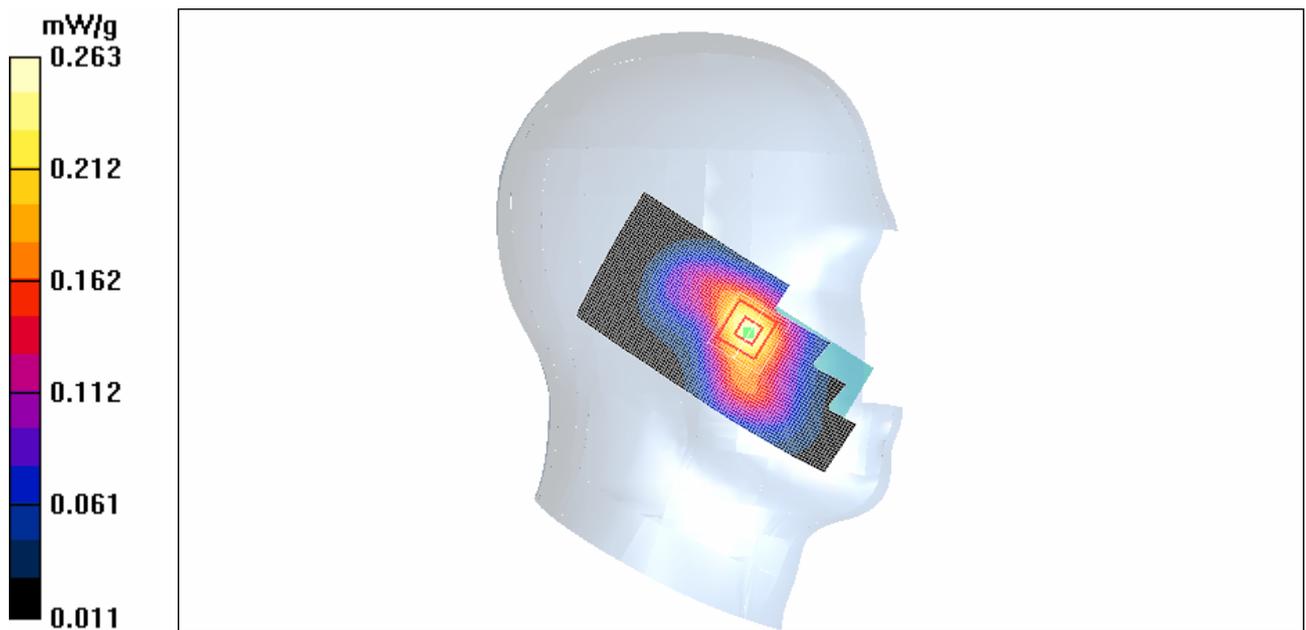


Figure 11 Left Hand Touch Cheek Open GSM 1900 Channel 512

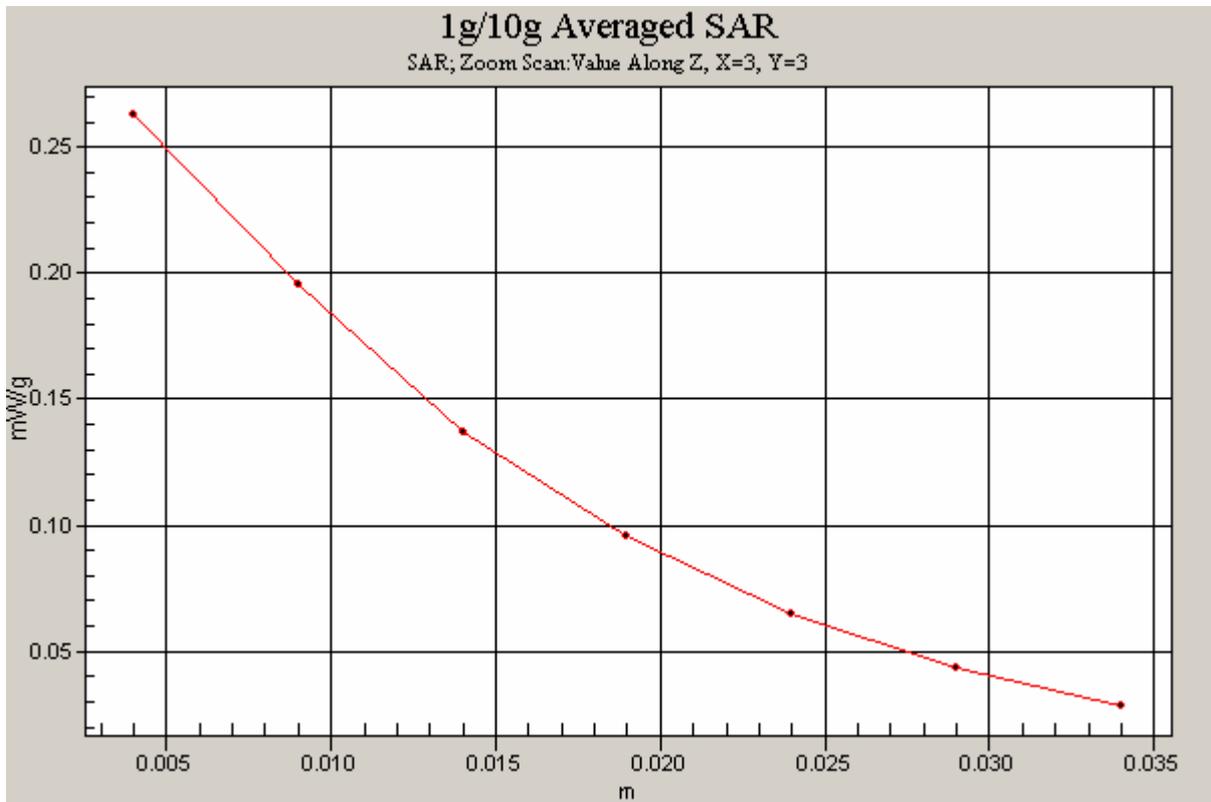


Figure 12 Z-Scan at power reference point (Left Hand Touch Cheek Open GSM 1900 Channel 512)

GSM 1900 Left Tilt High Open

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

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.44$ mho/m; $\epsilon_r = 39.7$; $\rho = 1000$ kg/m³

Probe: ET3DV6 - SN1531; ConvF(5.15, 5.15, 5.15);

Electronics: DAE3 Sn452;

Tilt High/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.254 mW/g

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

Reference Value = 10.5 V/m; Power Drift = -0.028 dB

Peak SAR (extrapolated) = 0.296 W/kg

SAR(1 g) = 0.212 mW/g; SAR(10 g) = 0.131 mW/g

Maximum value of SAR (measured) = 0.232 mW/g

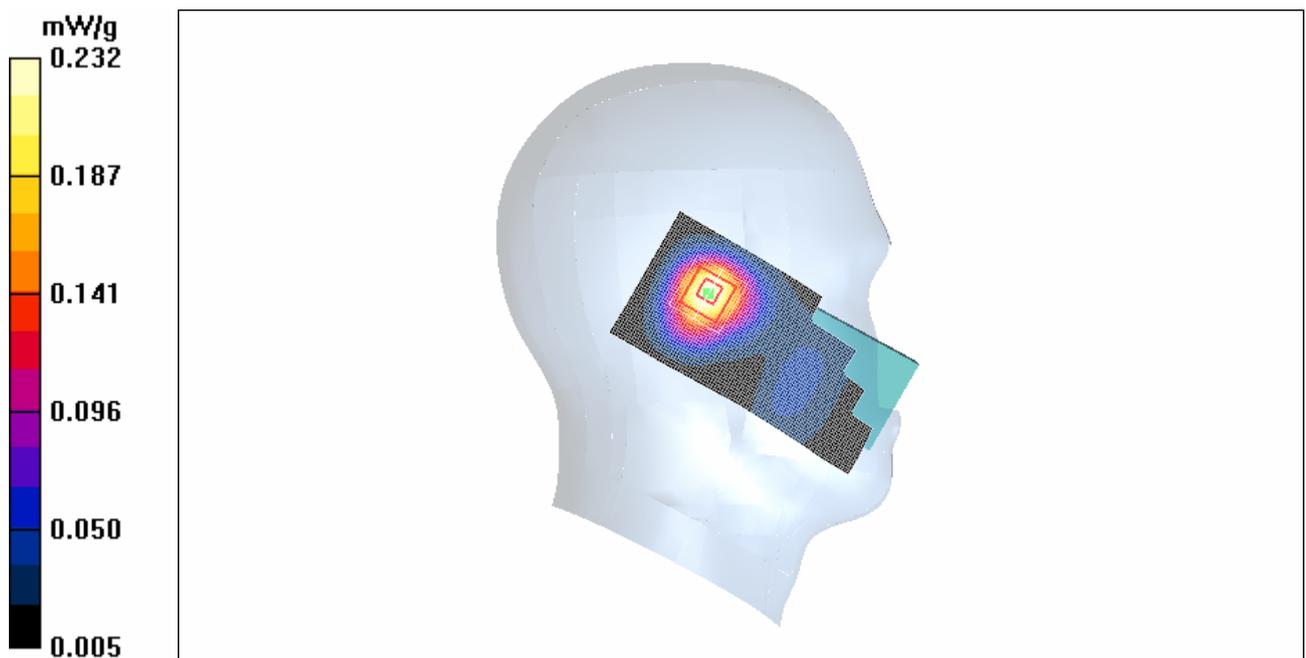


Figure 13 Left Hand Tilt 15°Open GSM 1900 Channel 810

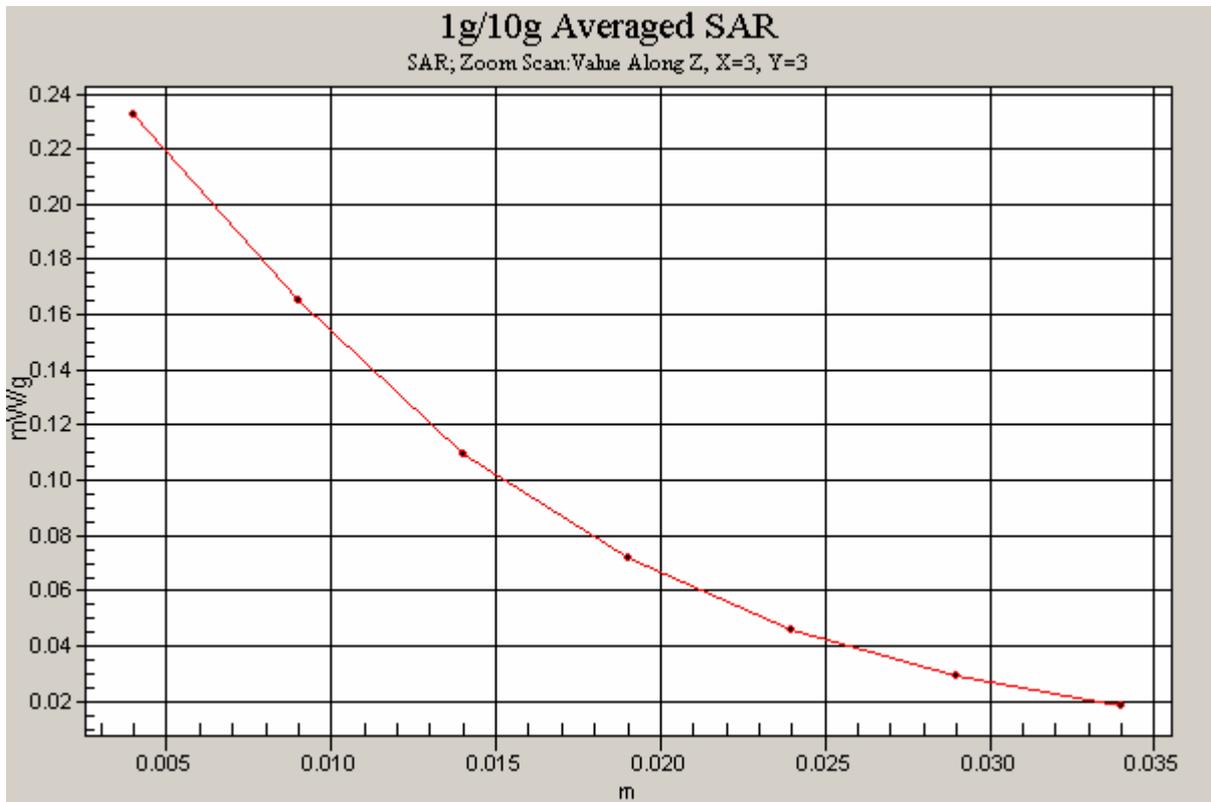


Figure 14 Z-Scan at power reference point (Left Hand Tilt 15° Open GSM 1900 Channel 810)

GSM 1900 Left Tilt Middle Open

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

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.41$ mho/m; $\epsilon_r = 39.7$; $\rho = 1000$ kg/m³

Probe: ET3DV6 - SN1531; ConvF(5.15, 5.15, 5.15);

Electronics: DAE3 Sn452;

Tilt Middle/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.290 mW/g

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

Reference Value = 11.1 V/m; Power Drift = -0.034 dB

Peak SAR (extrapolated) = 0.334 W/kg

SAR(1 g) = 0.240 mW/g; SAR(10 g) = 0.149 mW/g

Maximum value of SAR (measured) = 0.262 mW/g

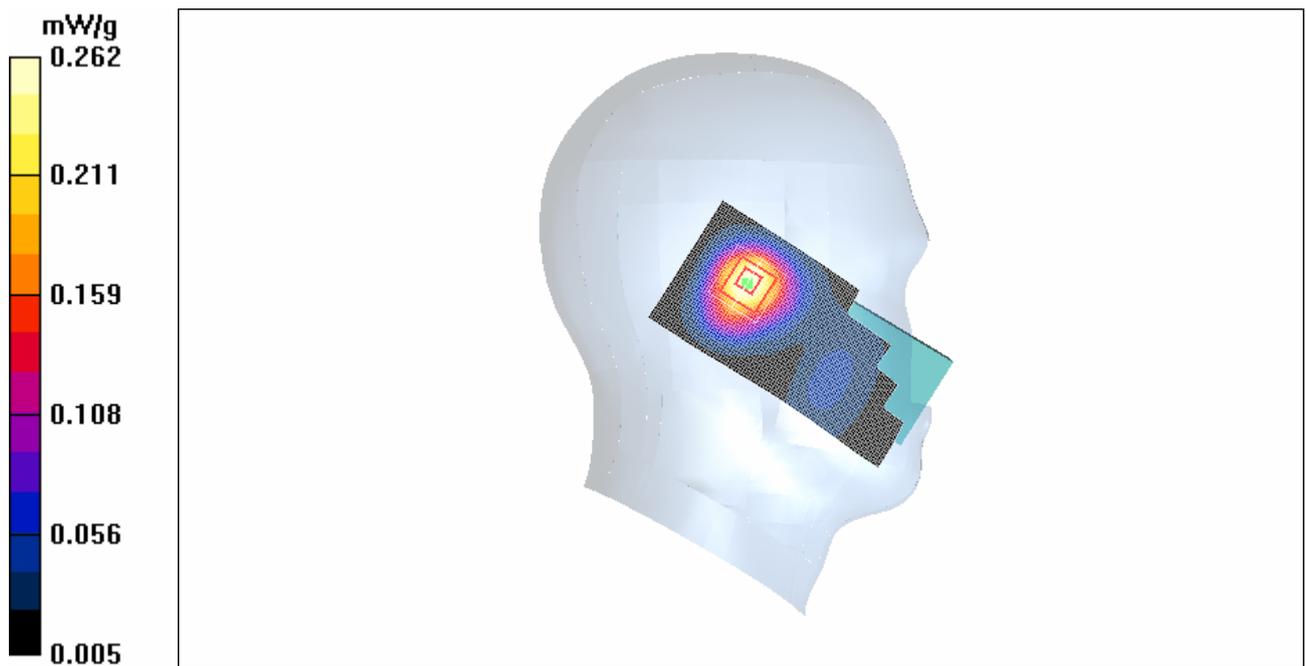


Figure 15 Left Hand Tilt 15° Open GSM 1900 Channel 661

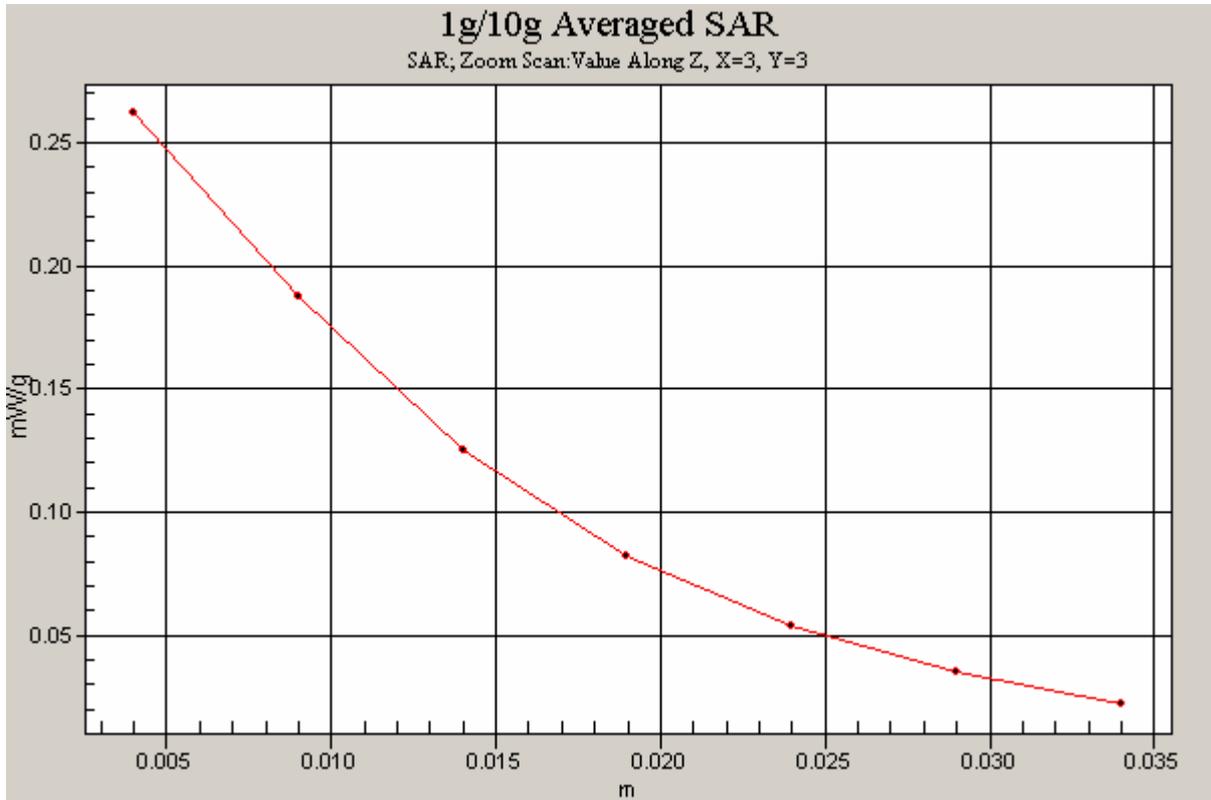


Figure 16 Z-Scan at power reference point (Left Hand Tilt 15° Open GSM 1900 Channel 661)

GSM 1900 Left Tilt Low Open

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

Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.39$ mho/m; $\epsilon_r = 39.9$; $\rho = 1000$ kg/m³

Probe: ET3DV6 - SN1531; ConvF(5.15, 5.15, 5.15);

Electronics: DAE3 Sn452;

Tilt Low/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 12.2 V/m; Power Drift = 0.017 dB

Peak SAR (extrapolated) = 0.400 W/kg

SAR(1 g) = 0.291 mW/g; SAR(10 g) = 0.183 mW/g

Maximum value of SAR (measured) = 0.317 mW/g

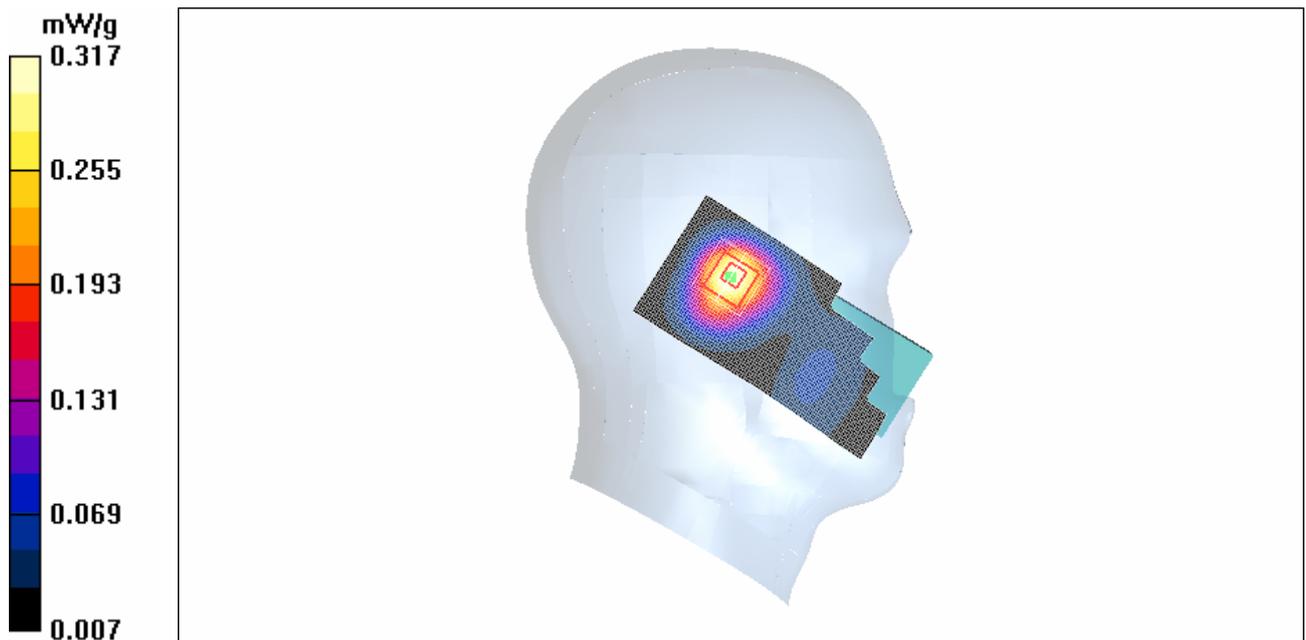


Figure 17 Left Hand Tilt 15° Open GSM 1900 Channel 512

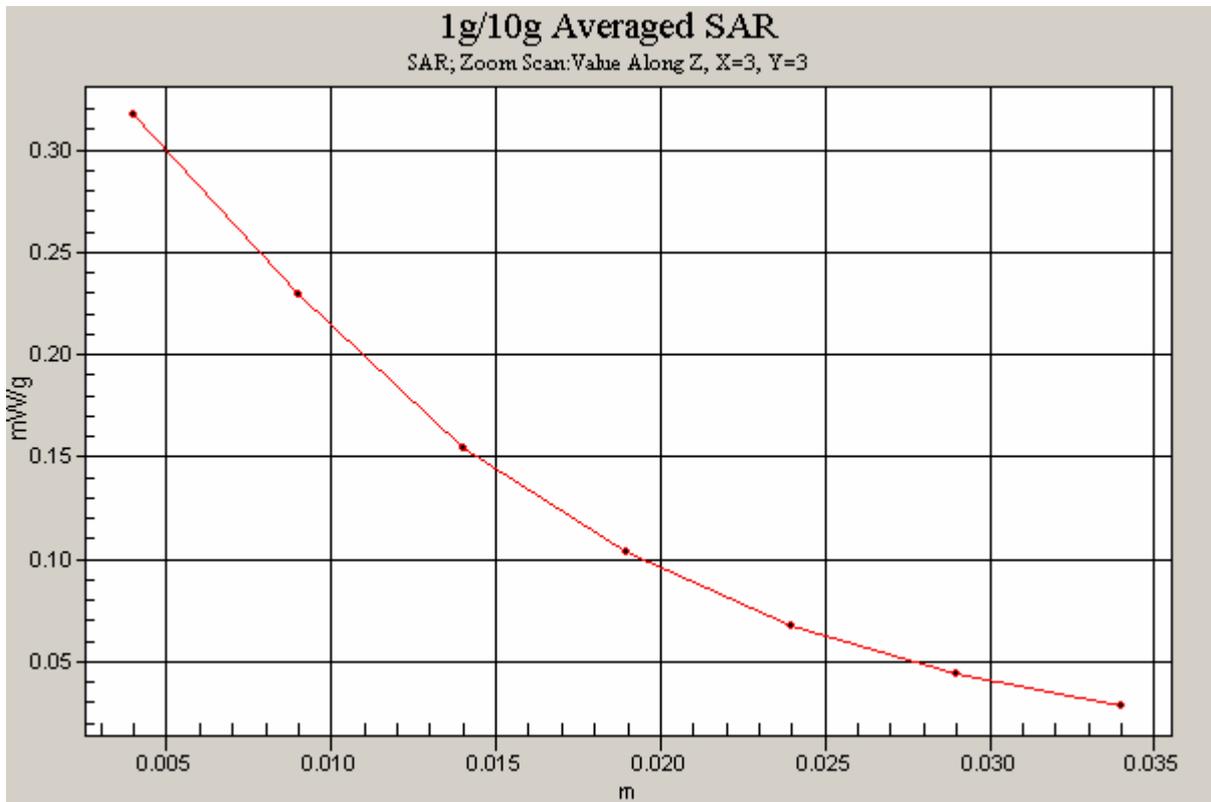


Figure 18 Z-Scan at power reference point (Left Hand Tilt 15° Open GSM 1900 Channel 512)

GSM 1900 Right Cheek High Open

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

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.44$ mho/m; $\epsilon_r = 39.7$; $\rho = 1000$ kg/m³ Probe: ET3DV6 - SN1531; ConvF(5.15, 5.15, 5.15);

Electronics: DAE3 Sn452;

Cheek High/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 6.86 V/m; Power Drift = 0.007 dB

Peak SAR (extrapolated) = 0.399 W/kg

SAR(1 g) = 0.284 mW/g; SAR(10 g) = 0.174 mW/g

Maximum value of SAR (measured) = 0.316 mW/g

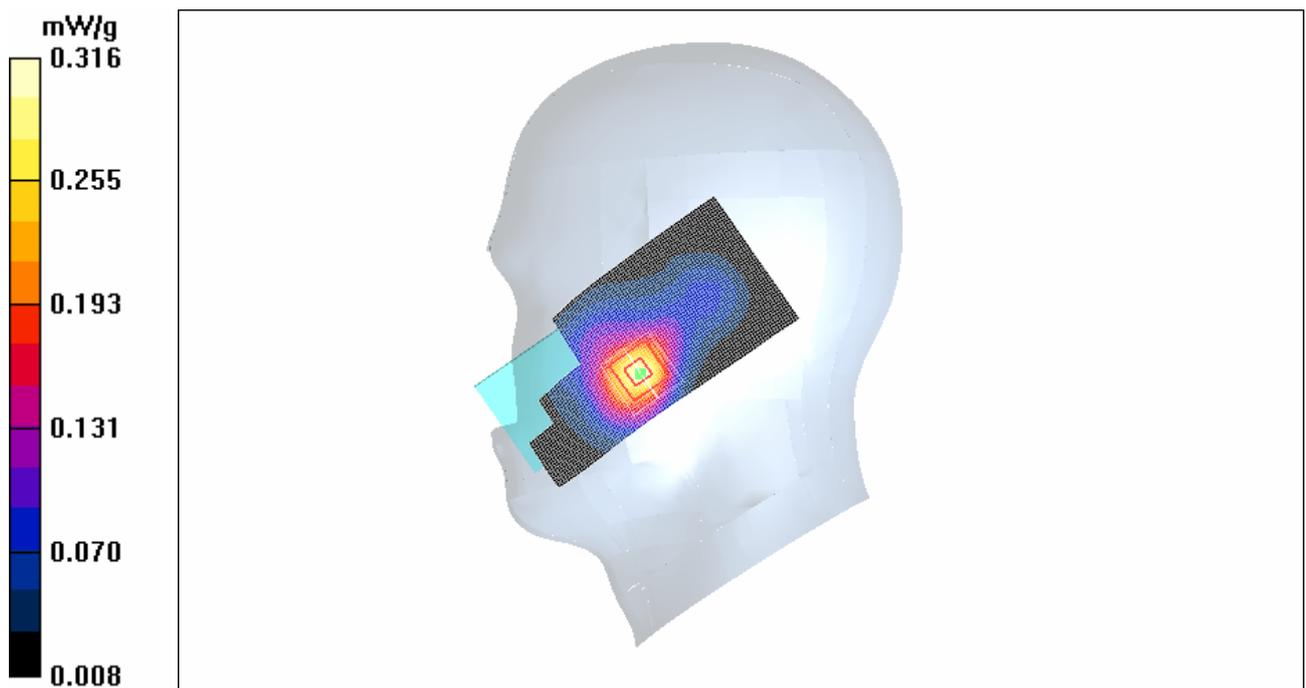


Figure 19 Right Hand Touch Cheek Open GSM 1900 Channel 810

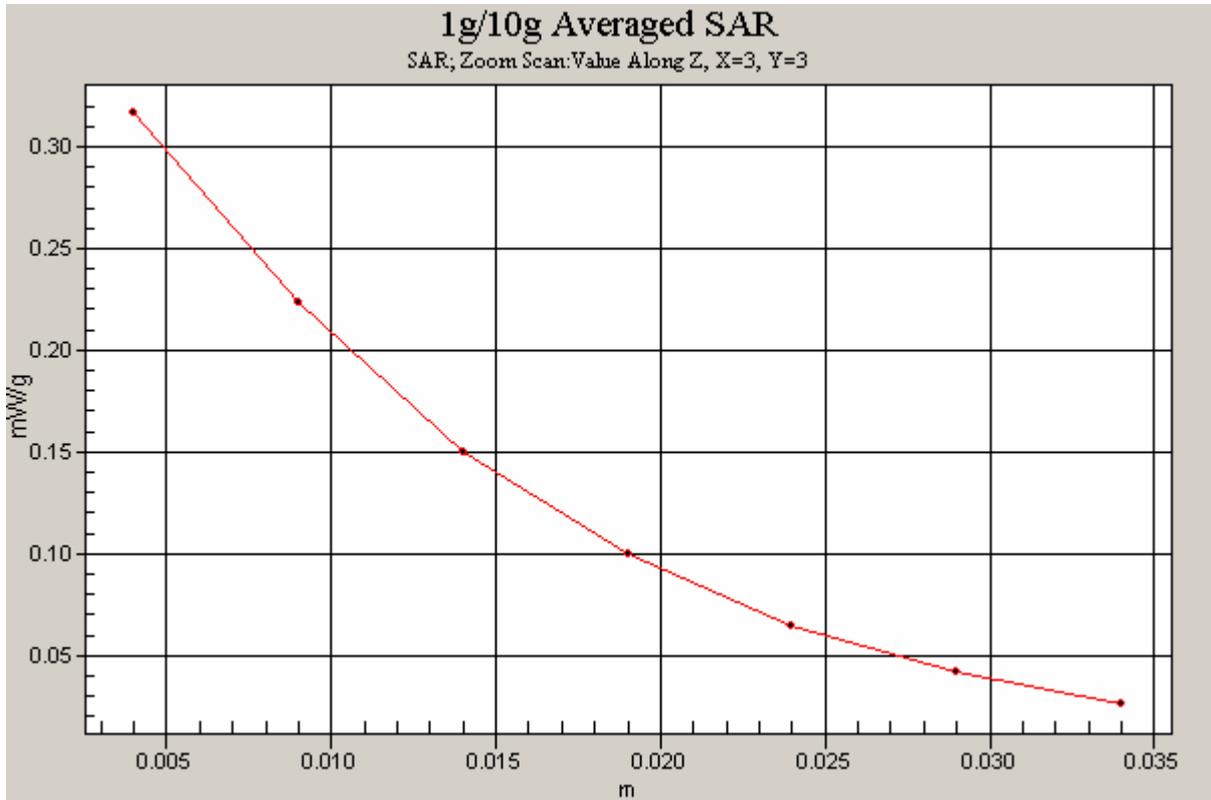


Figure 20 Z-Scan at power reference point (Right Hand Touch Cheek Open GSM 1900 Channel 810)

GSM 1900 Right Cheek Middle Open

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

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.41$ mho/m; $\epsilon_r = 39.7$; $\rho = 1000$ kg/m³

Probe: ET3DV6 - SN1531; ConvF(5.15, 5.15, 5.15);

Electronics: DAE3 Sn452;

Cheek Middle/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.344 mW/g

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

Reference Value = 6.65 V/m; Power Drift = 0.042 dB

Peak SAR (extrapolated) = 0.439 W/kg

SAR(1 g) = 0.309 mW/g; SAR(10 g) = 0.192 mW/g

Maximum value of SAR (measured) = 0.347 mW/g

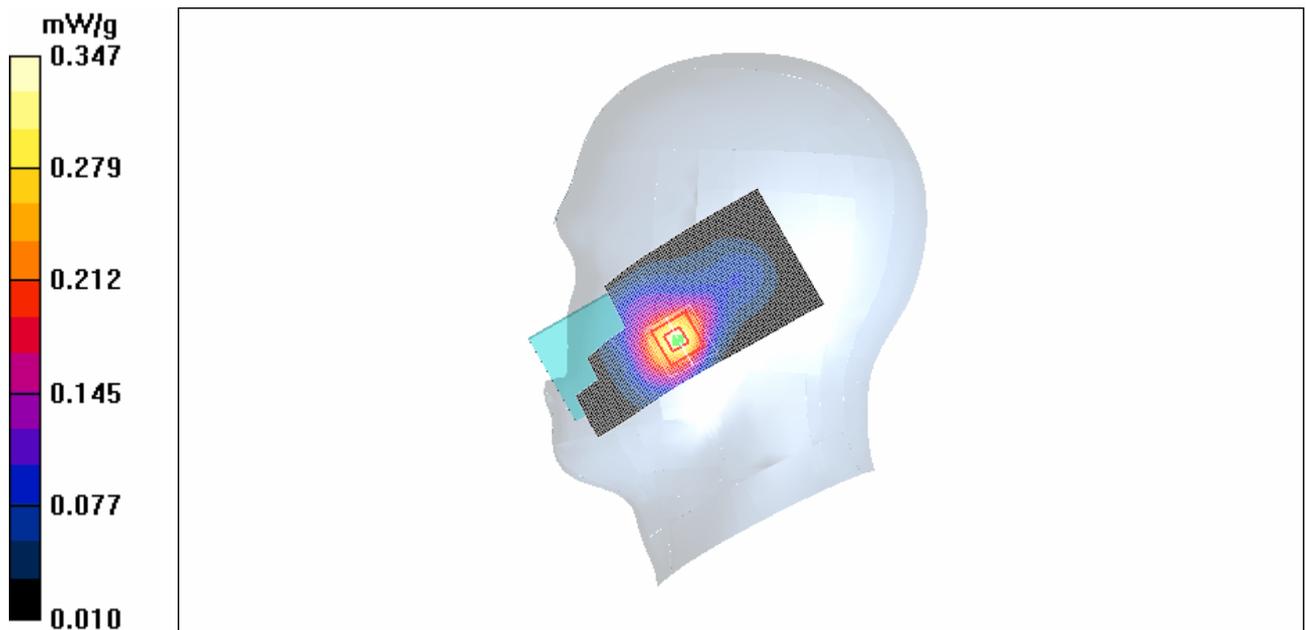


Figure 21 Right Hand Touch Cheek Open GSM 1900 Channel 661

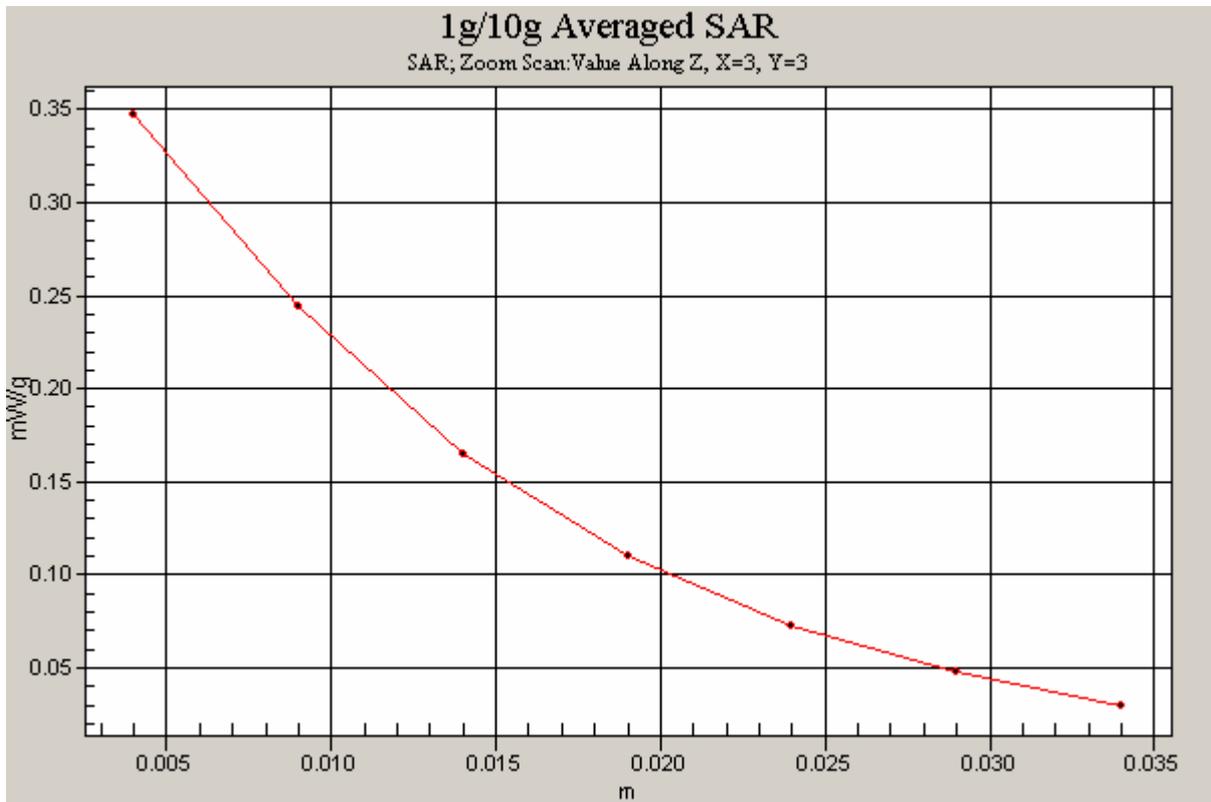


Figure 22 Z-Scan at power reference point (Right Hand Touch Cheek Open GSM 1900 Channel 661)

GSM 1900 Right Cheek Low Open

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

Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.39$ mho/m; $\epsilon_r = 39.9$; $\rho = 1000$ kg/m³

Probe: ET3DV6 - SN1531; ConvF(5.15, 5.15, 5.15);

Electronics: DAE3 Sn452;

Cheek Low/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 6.20 V/m; Power Drift = -0.096 dB

Peak SAR (extrapolated) = 0.538 W/kg

SAR(1 g) = 0.373 mW/g; SAR(10 g) = 0.230 mW/g

Maximum value of SAR (measured) = 0.418 mW/g

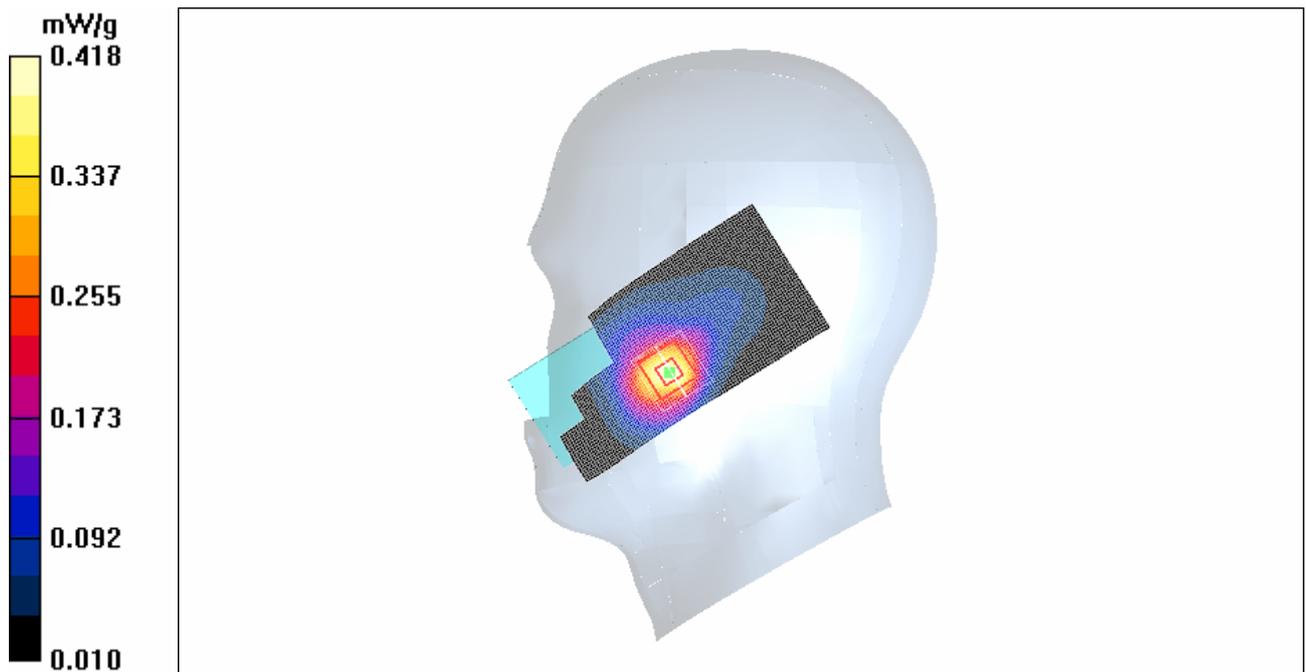


Figure 23 Right Hand Touch Cheek Open GSM 1900 Channel 512

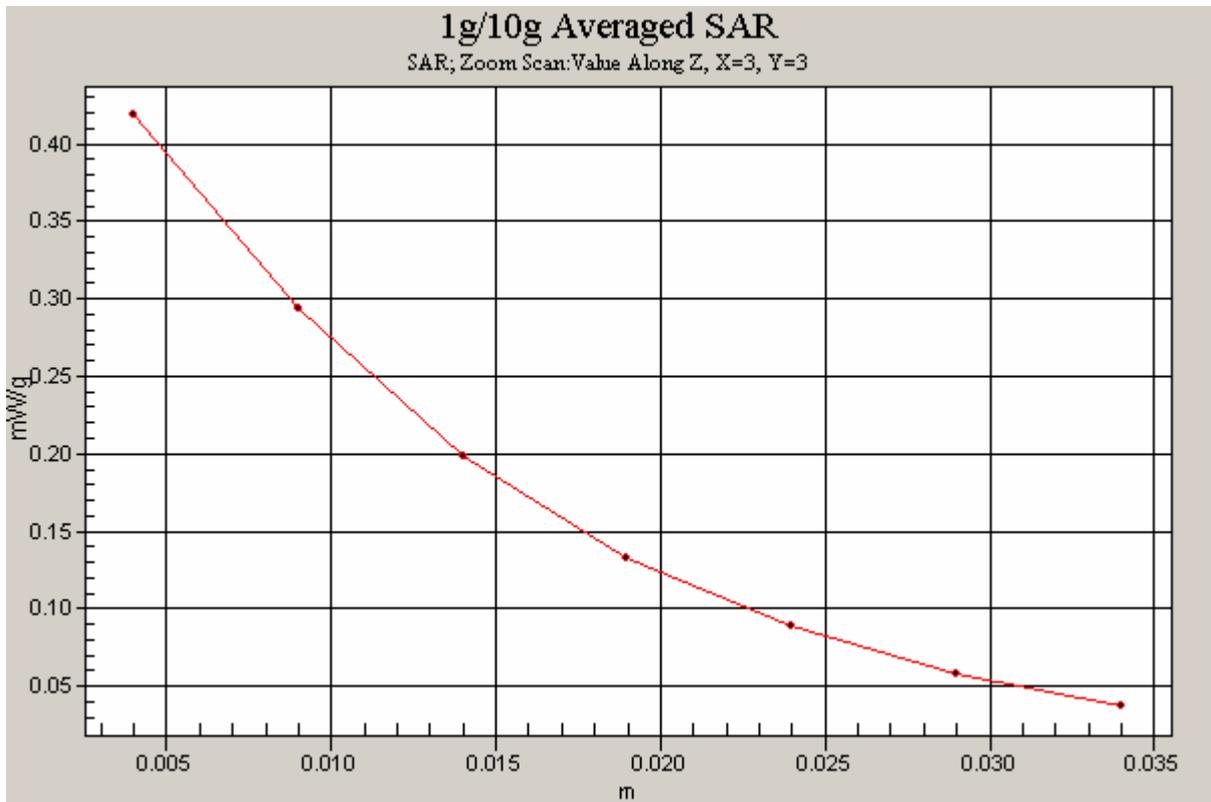


Figure 24 Z-Scan at power reference point (Right Hand Touch Cheek Open GSM 1900 Channel 512)

GSM 1900 Right Tilt High Open

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

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.44$ mho/m; $\epsilon_r = 39.7$; $\rho = 1000$ kg/m³

Probe: ET3DV6 - SN1531; ConvF(5.15, 5.15, 5.15);

Electronics: DAE3 Sn452;

Tilt High/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.203 mW/g

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

Reference Value = 11.3 V/m; Power Drift = -0.013 dB

Peak SAR (extrapolated) = 0.222 W/kg

SAR(1 g) = 0.167 mW/g; SAR(10 g) = 0.110 mW/g

Maximum value of SAR (measured) = 0.178 mW/g

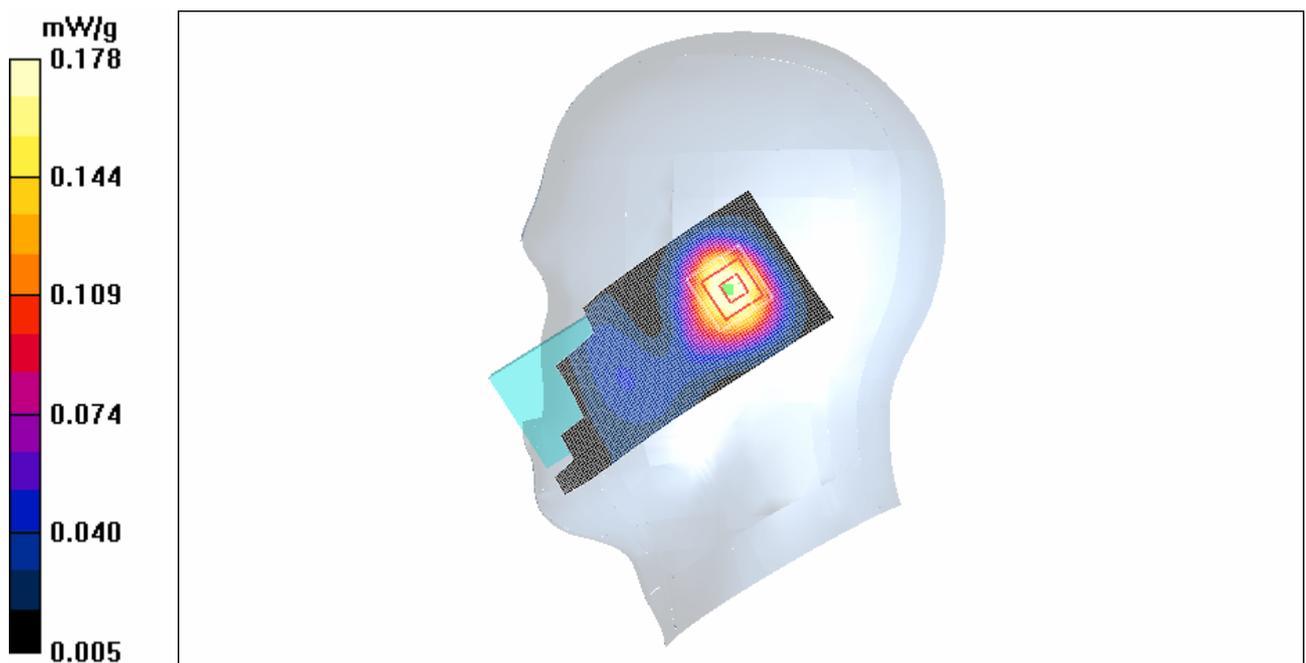


Figure 25 Right Hand Tilt 15° Open GSM 1900 Channel 810

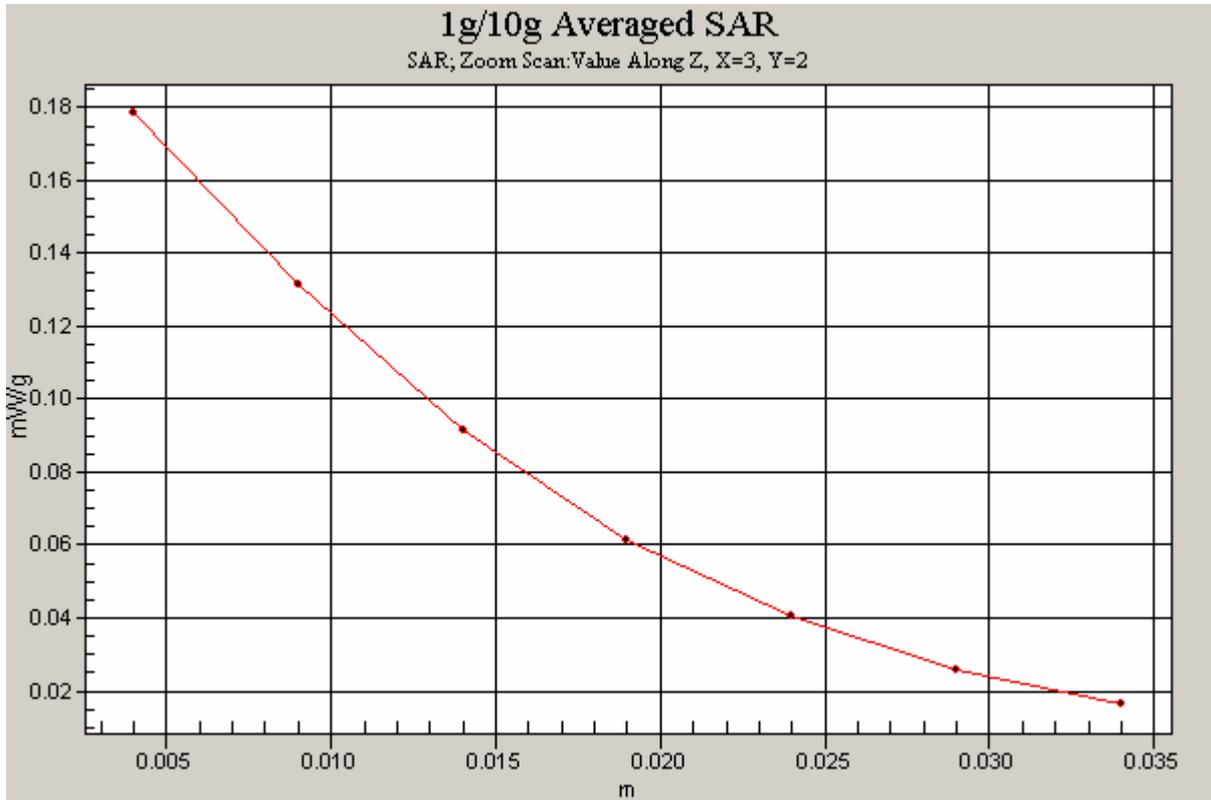


Figure 26 Z-Scan at power reference point (Right Hand Tilt 15° Open GSM 1900 Channel 810)

GSM 1900 Right Tilt Middle Open

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

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.41$ mho/m; $\epsilon_r = 39.7$; $\rho = 1000$ kg/m³

Probe: ET3DV6 - SN1531; ConvF(5.15, 5.15, 5.15);

Electronics: DAE3 Sn452;

Tilt Middle/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 11.9 V/m; Power Drift = -0.126 dB

Peak SAR (extrapolated) = 0.228 W/kg

SAR(1 g) = 0.180 mW/g; SAR(10 g) = 0.119 mW/g

Maximum value of SAR (measured) = 0.192 mW/g

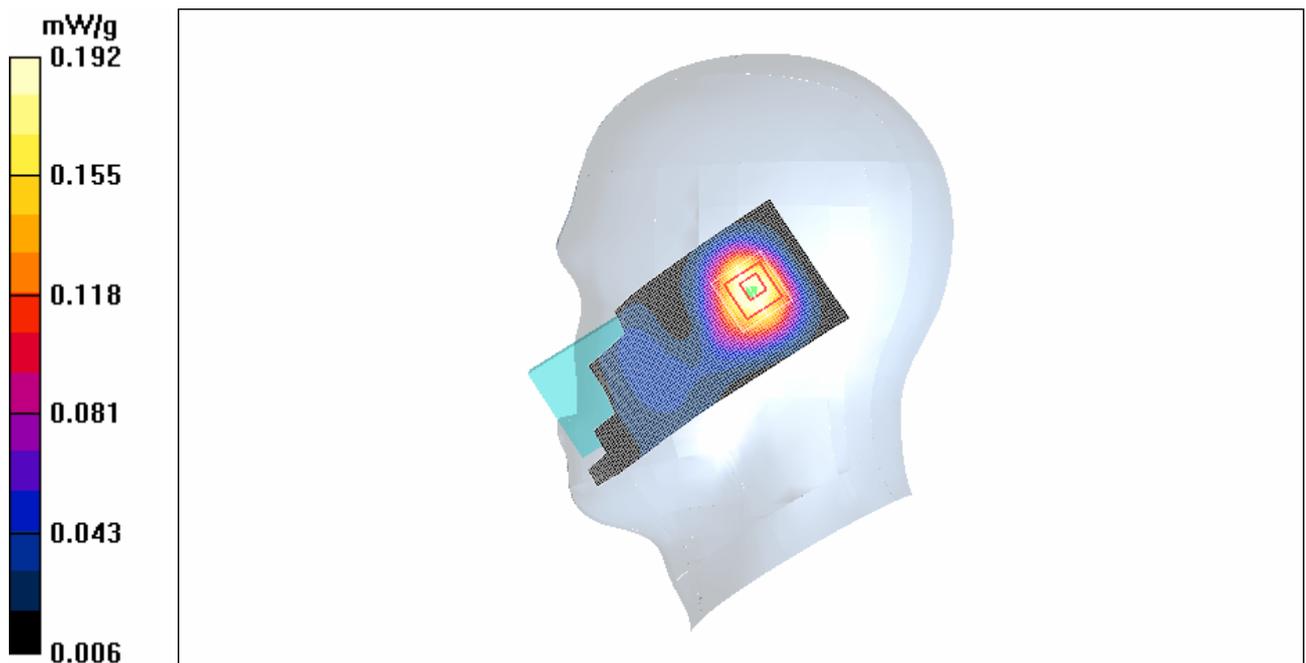


Figure 27 Right Hand Tilt 15° Open GSM 1900 Channel 661

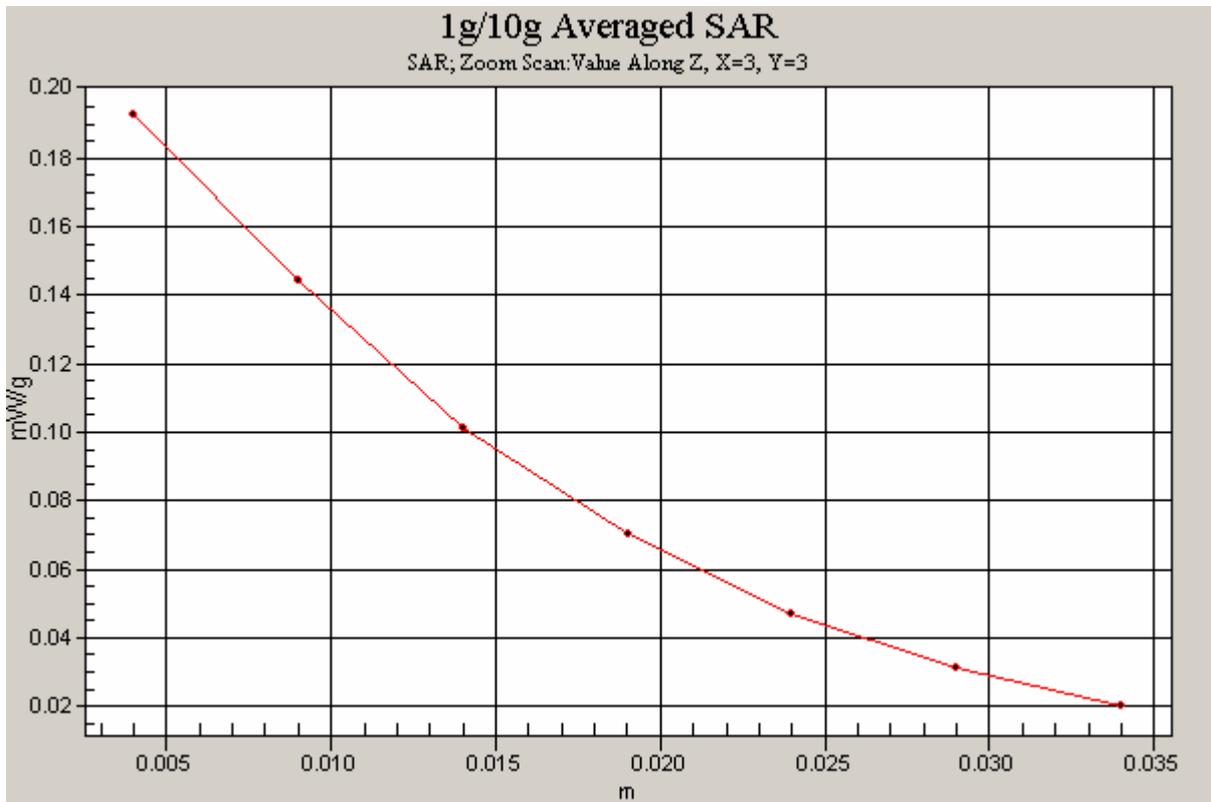


Figure 28 Z-Scan at power reference point (Right Hand Tilt 15° Open GSM 1900 Channel 661)

GSM 1900 Right Tilt Low Open

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

Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.39$ mho/m; $\epsilon_r = 39.9$; $\rho = 1000$ kg/m³

Probe: ET3DV6 - SN1531; ConvF(5.15, 5.15, 5.15);

Electronics: DAE3 Sn452;

Tilt Low/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.281 mW/g

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

Reference Value = 13.4 V/m; Power Drift = -0.048 dB

Peak SAR (extrapolated) = 0.300 W/kg

SAR(1 g) = 0.233 mW/g; SAR(10 g) = 0.155 mW/g

Maximum value of SAR (measured) = 0.250 mW/g

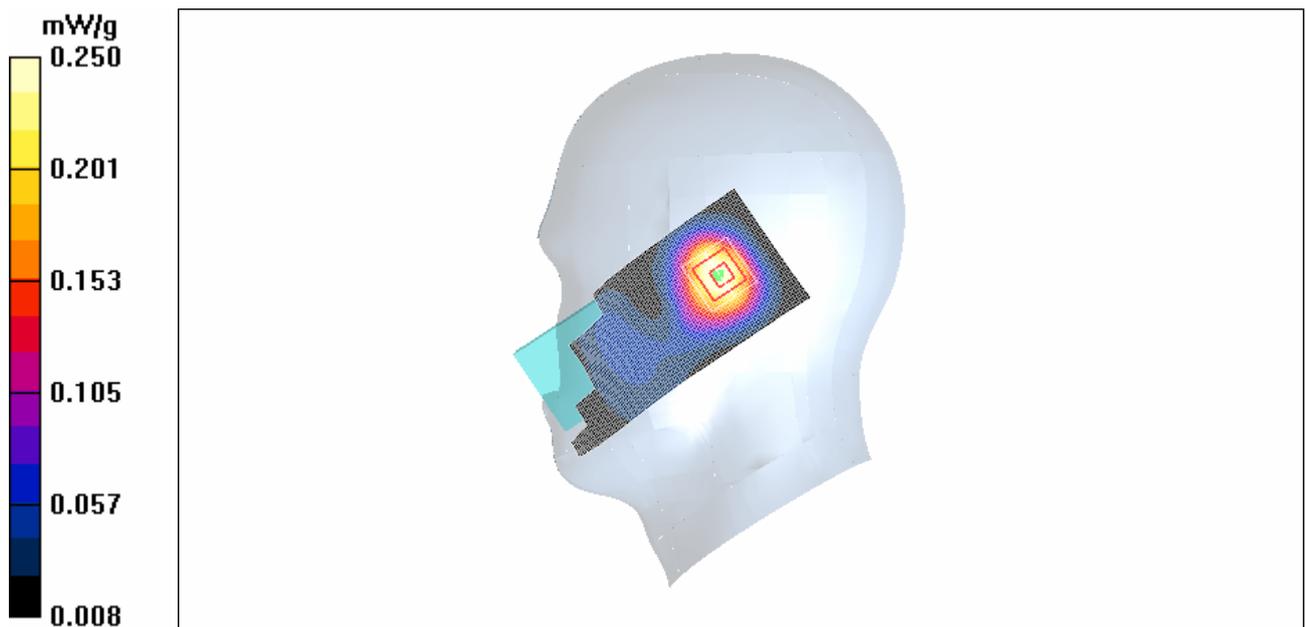


Figure 29 Right Hand Tilt 15° Open GSM 1900 Channel 512

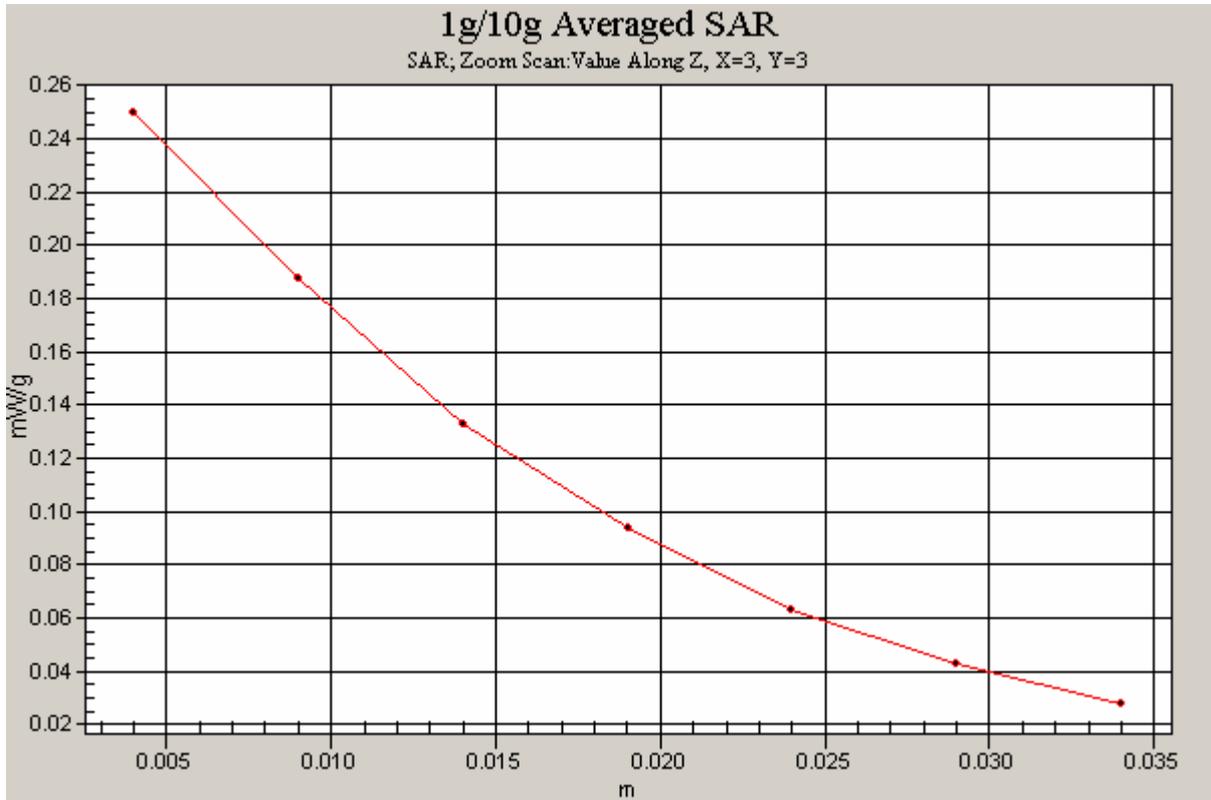


Figure 30 Z-Scan at power reference point (Right Hand Tilt 15° Open GSM 1900 Channel 512)

GSM 1900 Towards Ground High Open

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

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 52.1$; $\rho = 1000$ kg/m³

Probe: ET3DV6 - SN1531; ConvF(4.64, 4.64, 4.64);

Electronics: DAE3 Sn452;

Towards Ground High/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.366 mW/g

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

Reference Value = 7.46 V/m; Power Drift = -0.051 dB

Peak SAR (extrapolated) = 0.510 W/kg

SAR(1 g) = 0.338 mW/g; SAR(10 g) = 0.221 mW/g

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

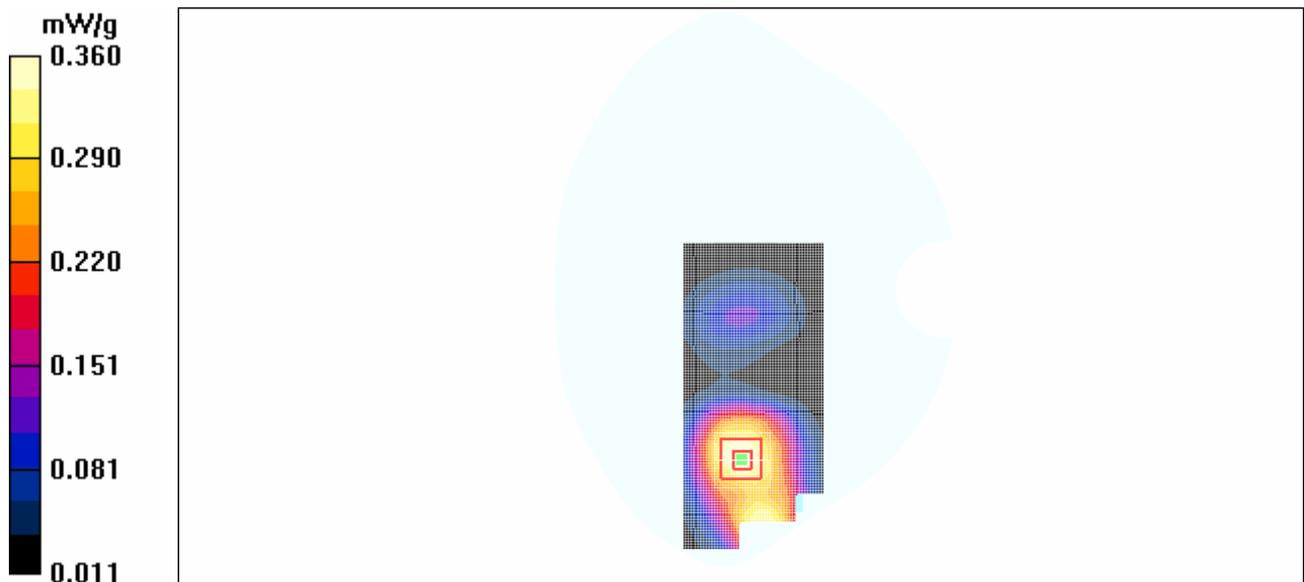


Figure 31 Body, Towards Ground, Open GSM 1900 Channel 810

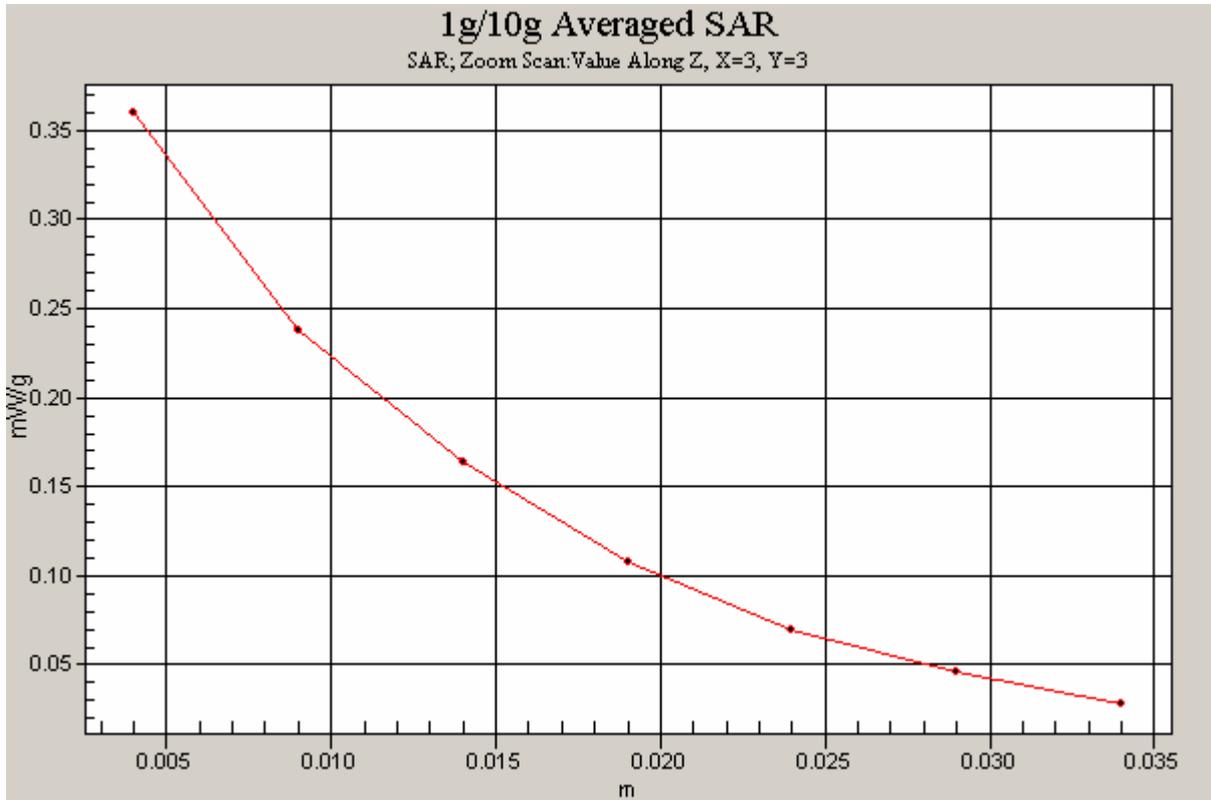


Figure 32 Z-Scan at power reference point (Body, Towards Ground, Open GSM 1900 Channel 810)

GSM 1900 Towards Ground Middle Open

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

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.52$ mho/m; $\epsilon_r = 52.1$; $\rho = 1000$ kg/m³

Probe: ET3DV6 - SN1531; ConvF(4.64, 4.64, 4.64);

Electronics: DAE3 Sn452;

Towards Ground Middle/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.406 mW/g

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

Reference Value = 7.92 V/m; Power Drift = 0.093 dB

Peak SAR (extrapolated) = 0.566 W/kg

SAR(1 g) = 0.380 mW/g; SAR(10 g) = 0.249 mW/g

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

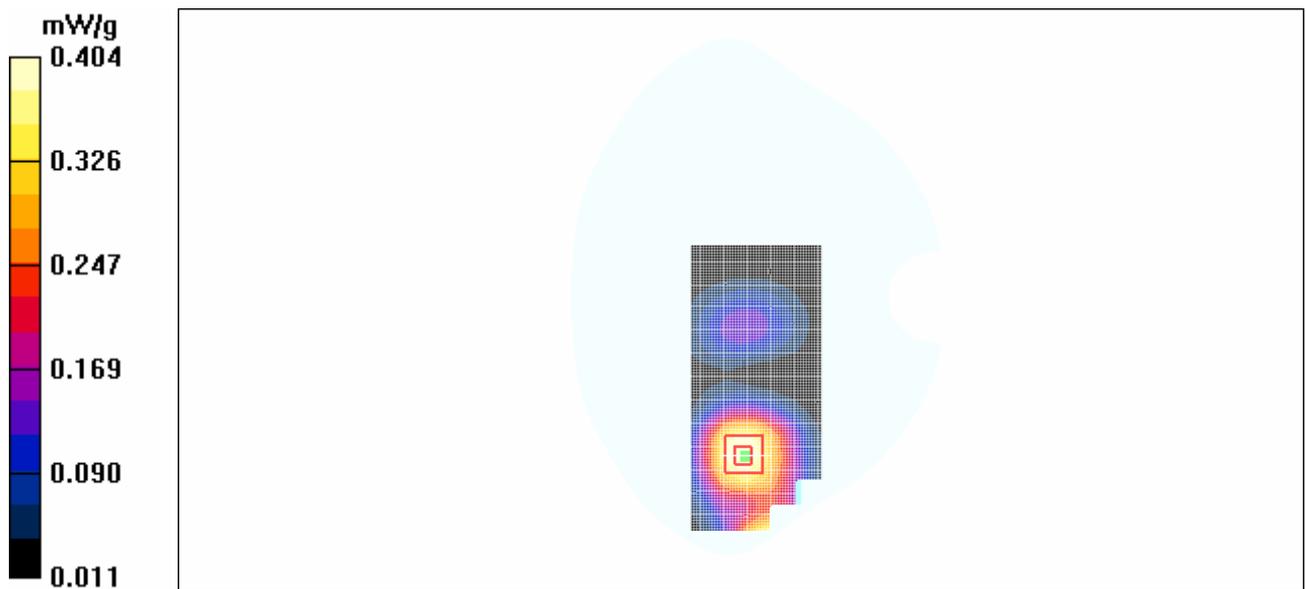


Figure 33 Body, Towards Ground, Open GSM 1900 Channel 661

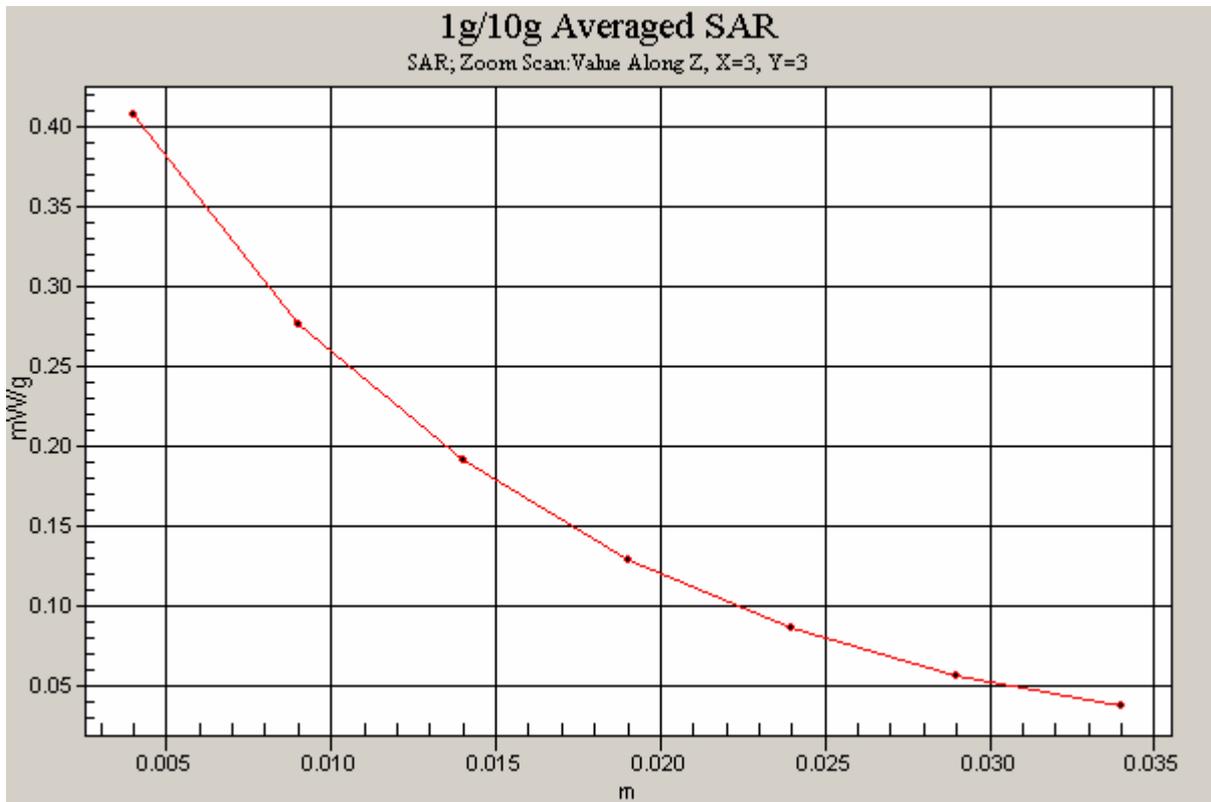


Figure 34 Z-Scan at power reference point (Body, Towards Ground, Open GSM 1900 Channel 661)

GSM 1900 Towards Ground Low Open

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

Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.47$ mho/m; $\epsilon_r = 52.2$; $\rho = 1000$ kg/m³

Probe: ET3DV6 - SN1531; ConvF(4.64, 4.64, 4.64);

Electronics: DAE3 Sn452;

Towards Ground Low/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 9.41 V/m; Power Drift = -0.098 dB

Peak SAR (extrapolated) = 0.675 W/kg

SAR(1 g) = 0.470 mW/g; SAR(10 g) = 0.311 mW/g

Maximum value of SAR (measured) = 0.501 mW/g

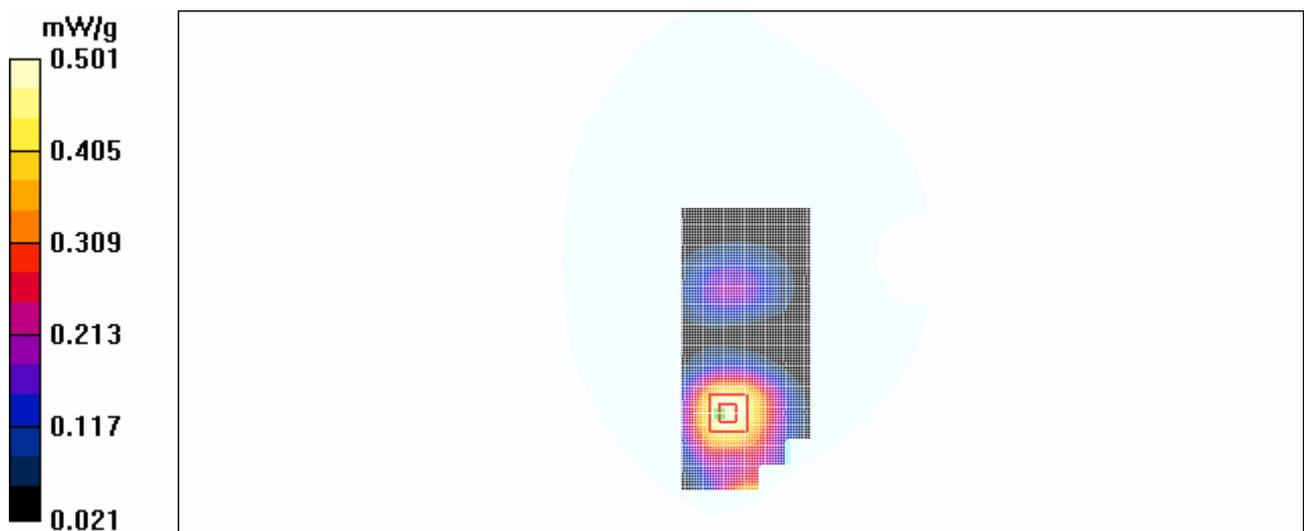


Figure 35 Body, Towards Ground, Open GSM 1900 Channel 512

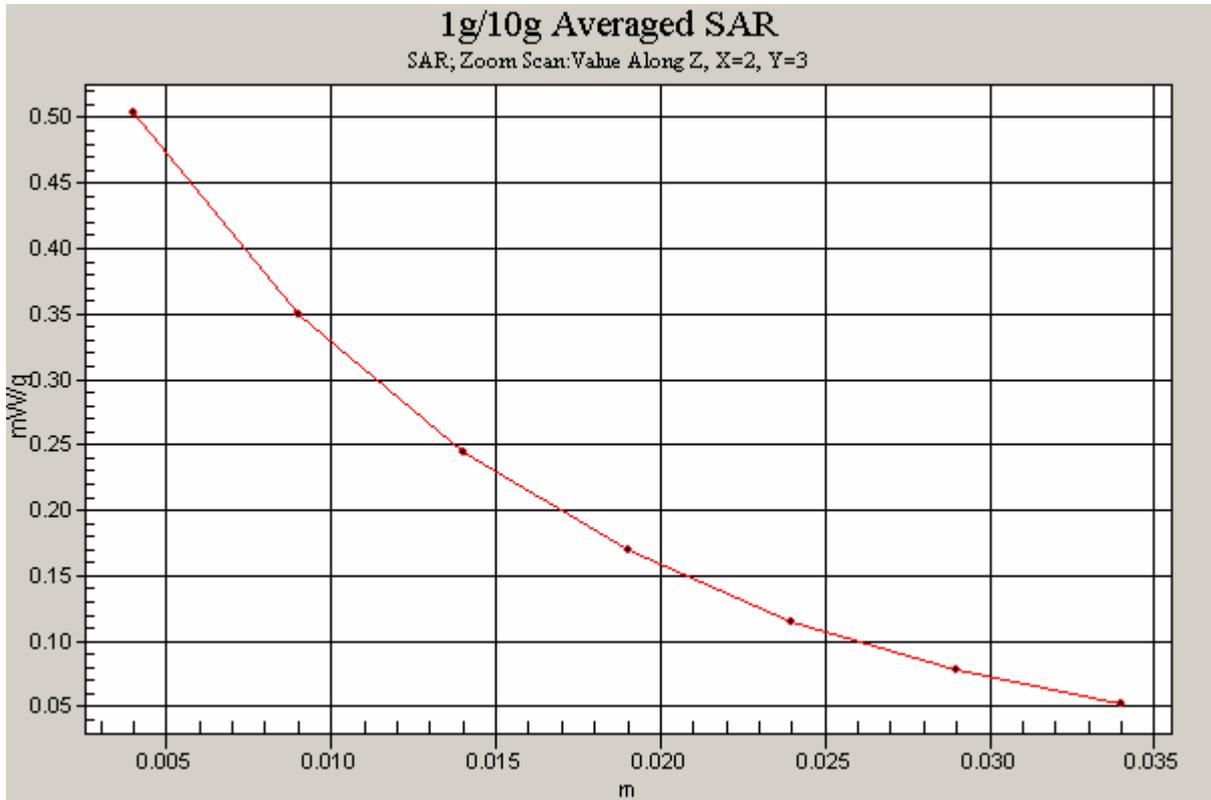


Figure 36 Z-Scan at power reference point (Body, Towards Ground, Open GSM 1900 Channel 512)

GSM 1900 Towards Phantom High Open

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

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 52.1$; $\rho = 1000$ kg/m³

Probe: ET3DV6 - SN1531; ConvF(4.64, 4.64, 4.64);

Electronics: DAE3 Sn452;

Towards Phantom High/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.158 mW/g

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

Reference Value = 7.47 V/m; Power Drift = -0.183 dB

Peak SAR (extrapolated) = 0.203 W/kg

SAR(1 g) = 0.145 mW/g; SAR(10 g) = 0.095 mW/g

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

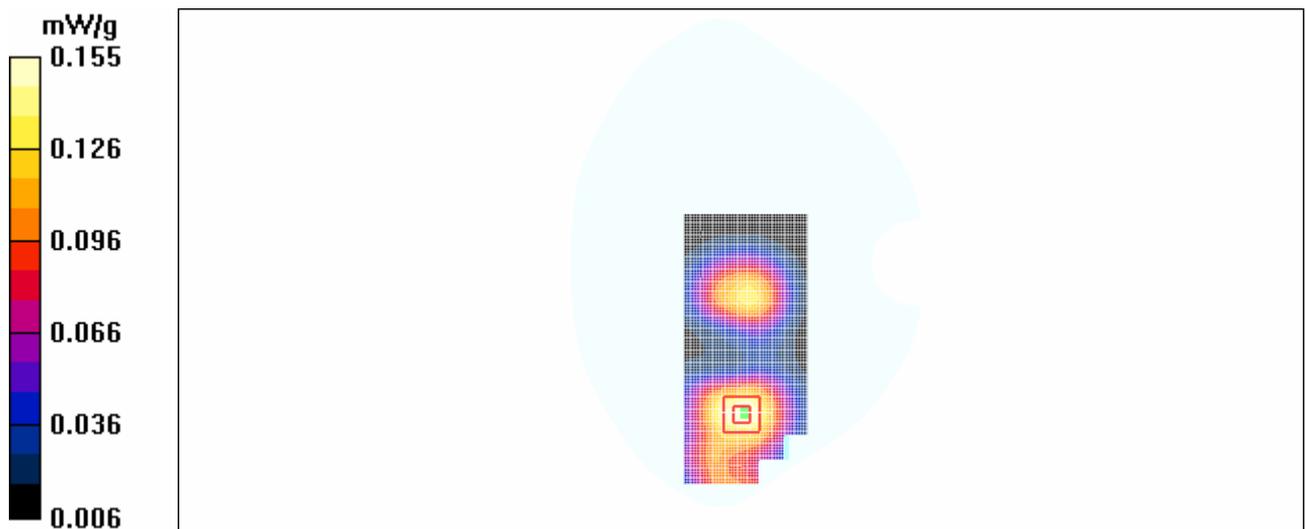


Figure 37 Body, Towards Phantom, Open GSM 1900 Channel 810

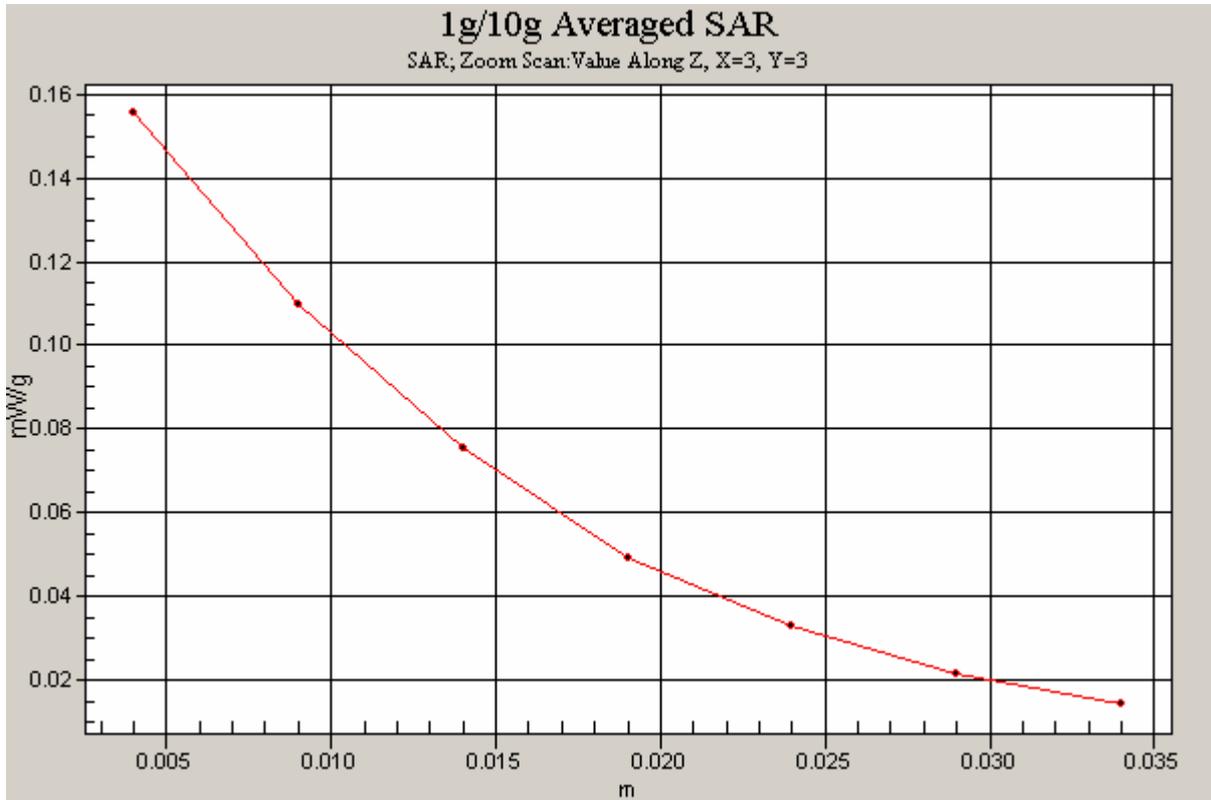


Figure 38 Z-Scan at power reference point (Body, Towards Phantom, Open GSM 1900 Channel 810)

GSM 1900 Towards Phantom Middle Open

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

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.52$ mho/m; $\epsilon_r = 52.1$; $\rho = 1000$ kg/m³

Probe: ET3DV6 - SN1531; ConvF(4.64, 4.64, 4.64);

Electronics: DAE3 Sn452;

Towards Phantom Middle/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 7.62 V/m; Power Drift = 0.033 dB

Peak SAR (extrapolated) = 0.210 W/kg

SAR(1 g) = 0.149 mW/g; SAR(10 g) = 0.098 mW/g

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

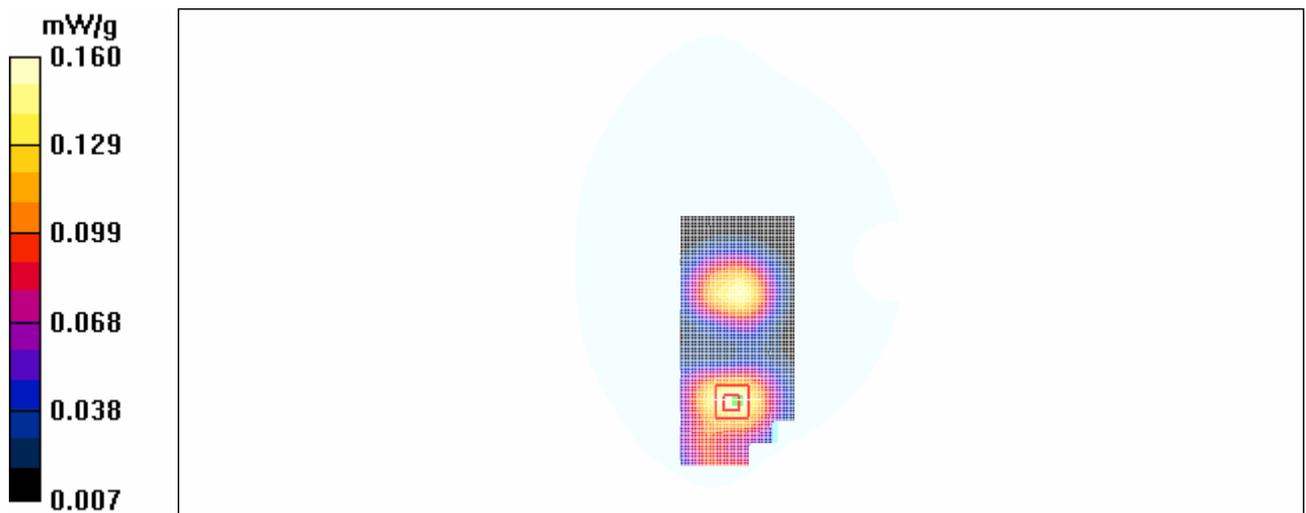


Figure 39 Body, Towards Phantom, Open GSM 1900 Channel 661

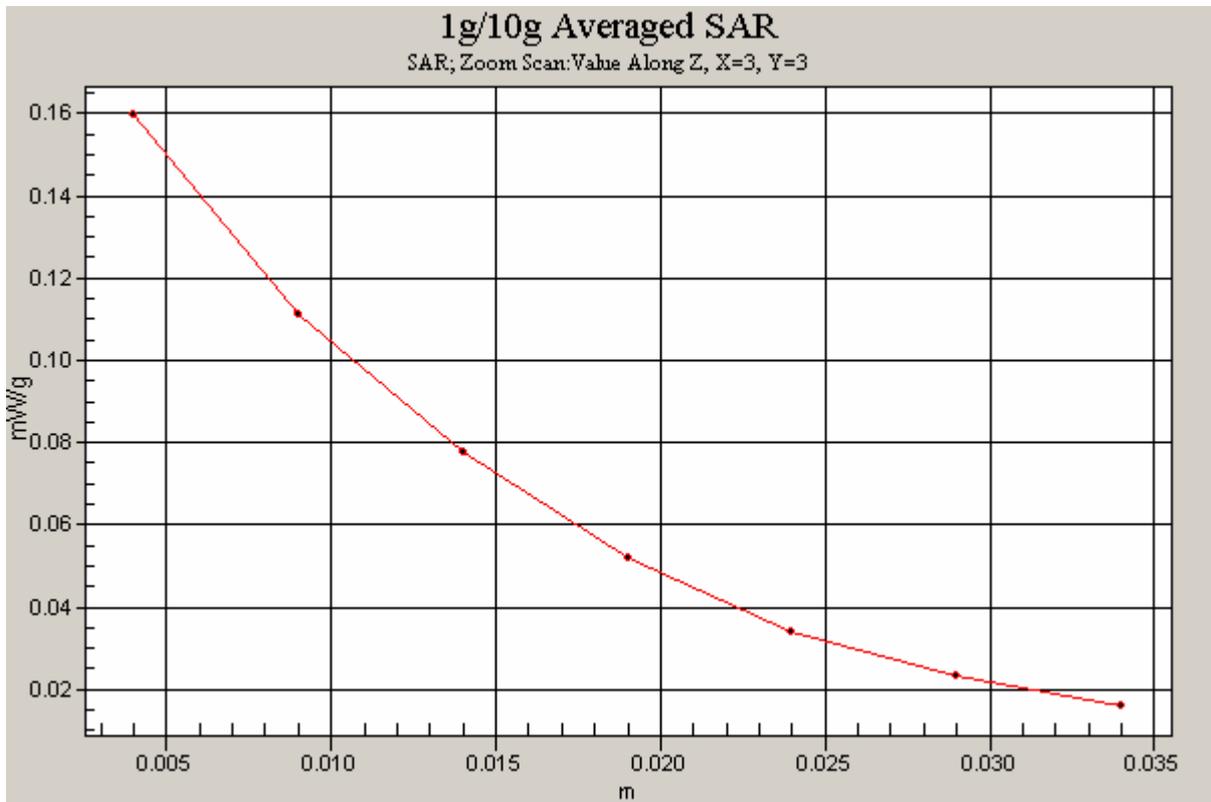


Figure 40 Z-Scan at power reference point (Body, Towards Phantom, Open GSM 1900 Channel 661)

GSM 1900 Towards Phantom Low Open

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

Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.47$ mho/m; $\epsilon_r = 52.2$; $\rho = 1000$ kg/m³

Probe: ET3DV6 - SN1531; ConvF(4.64, 4.64, 4.64);

Electronics: DAE3 Sn452;

Towards Phantom Low/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.182 mW/g

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

Reference Value = 8.36 V/m; Power Drift = 0.020 dB

Peak SAR (extrapolated) = 0.227 W/kg

SAR(1 g) = 0.164 mW/g; SAR(10 g) = 0.109 mW/g

Maximum value of SAR (measured) = 0.176 mW/g

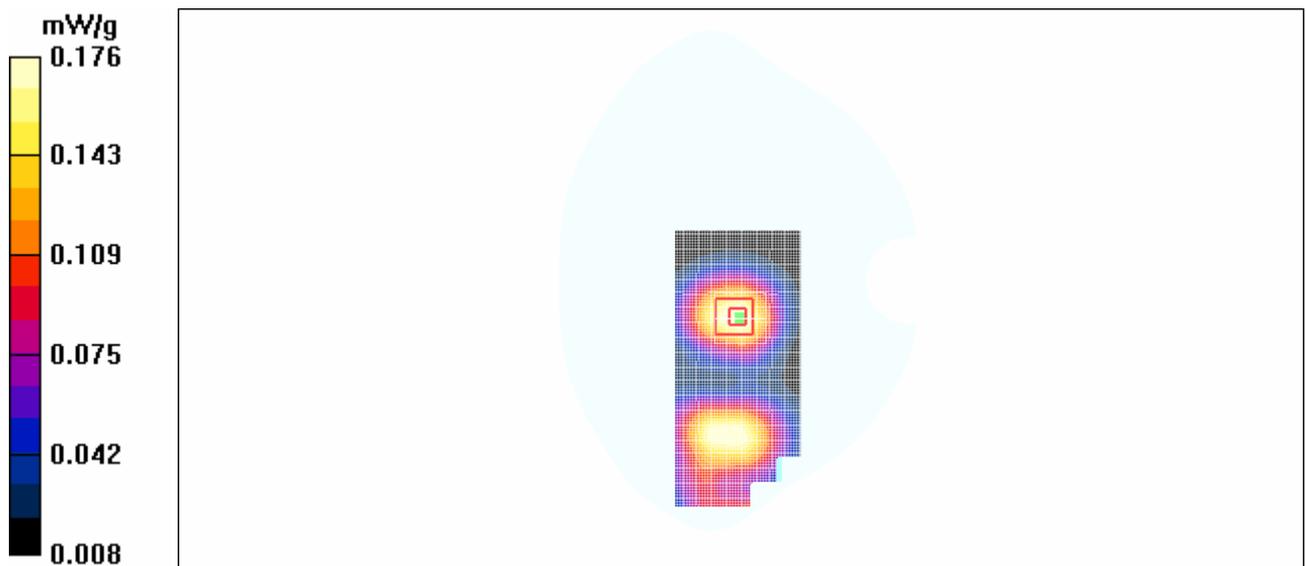


Figure 41 Body, Towards Phantom, Open GSM 1900 Channel 512

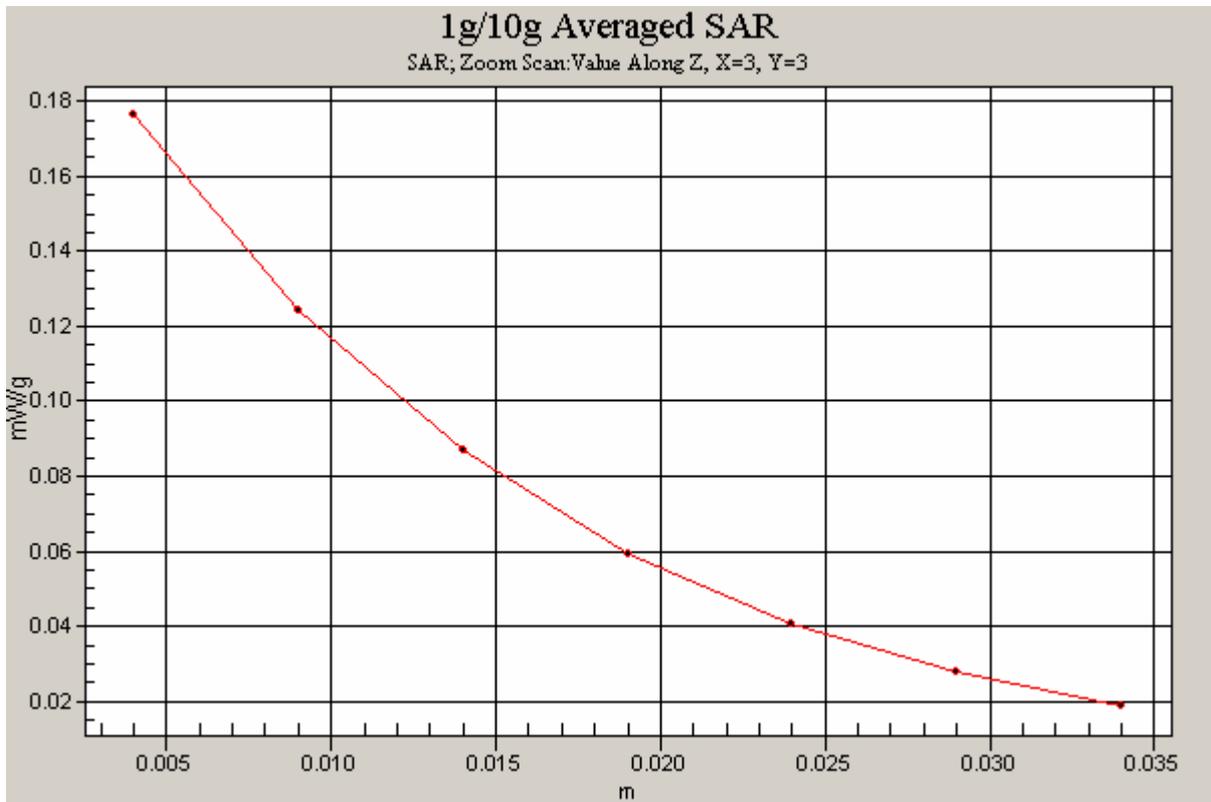


Figure 42 Z-Scan at power reference point (Body with Earphone, Towards Ground, Open GSM 1900, Channel 661)

GSM 1900 Earphone Towards Ground Middle Open

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

Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.47$ mho/m; $\epsilon_r = 52.2$; $\rho = 1000$ kg/m³

Probe: ET3DV6 - SN1531; ConvF(4.64, 4.64, 4.64);

Electronics: DAE3 Sn452;

Towards Ground Low/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 8.63 V/m; Power Drift = 0.019 dB

Peak SAR (extrapolated) = 0.619 W/kg

SAR(1 g) = 0.422 mW/g; SAR(10 g) = 0.278 mW/g

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

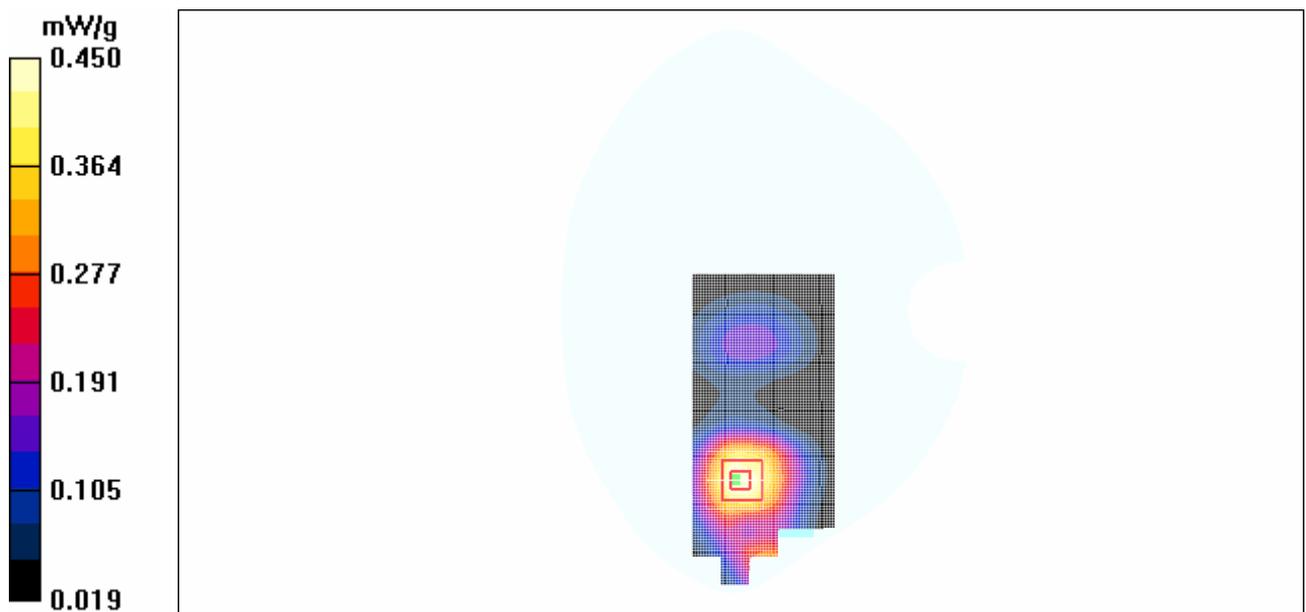


Figure 43 Body with Earphone, Towards Ground, Open GSM 1900, Channel 661

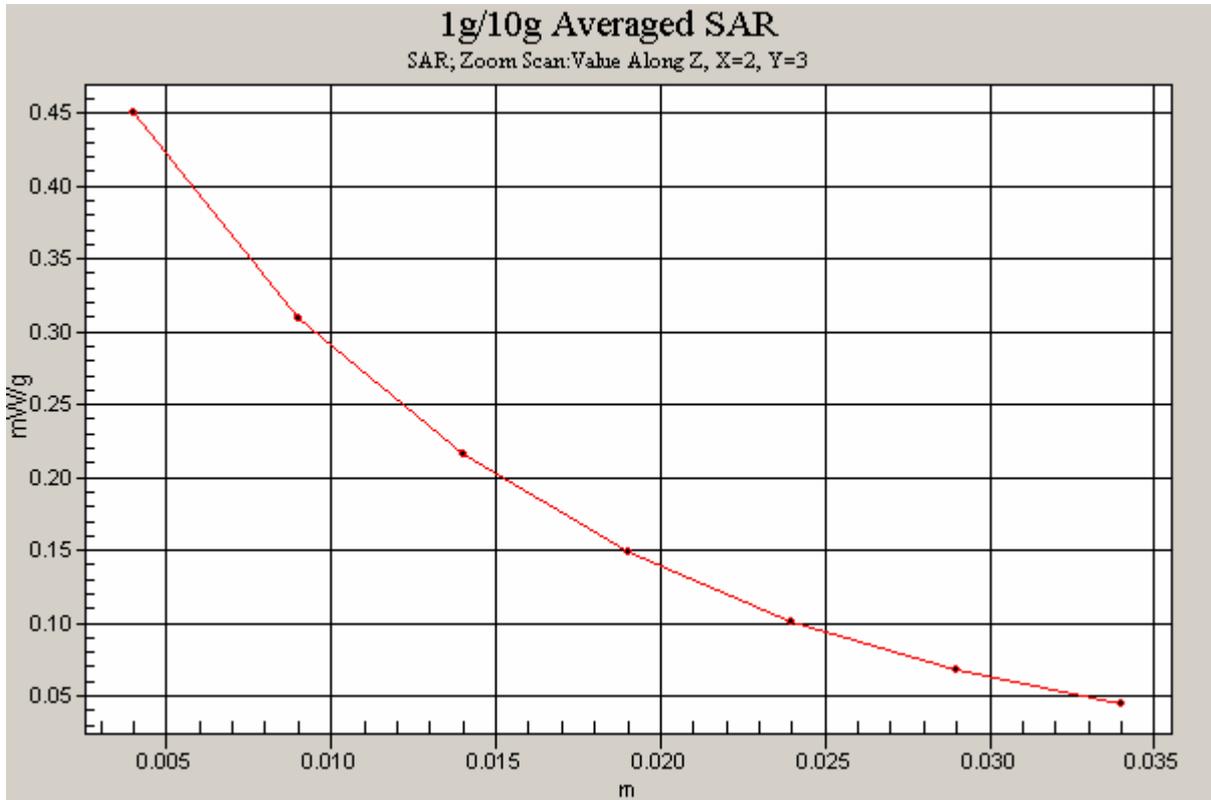


Figure 44 Z-Scan at power reference point (Body with Earphone, Towards Ground, Open GSM 1900, Channel 661)

GSM 1900 Bluetooth Earphone Towards Ground Middle Open

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

Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.47$ mho/m; $\epsilon_r = 52.2$; $\rho = 1000$ kg/m³

Probe: ET3DV6 - SN1531; ConvF(4.64, 4.64, 4.64);

Electronics: DAE3 Sn452;

Towards Ground Low/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 9.27 V/m; Power Drift = 0.040 dB

Peak SAR (extrapolated) = 0.692 W/kg

SAR(1 g) = 0.475 mW/g; SAR(10 g) = 0.313 mW/g

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

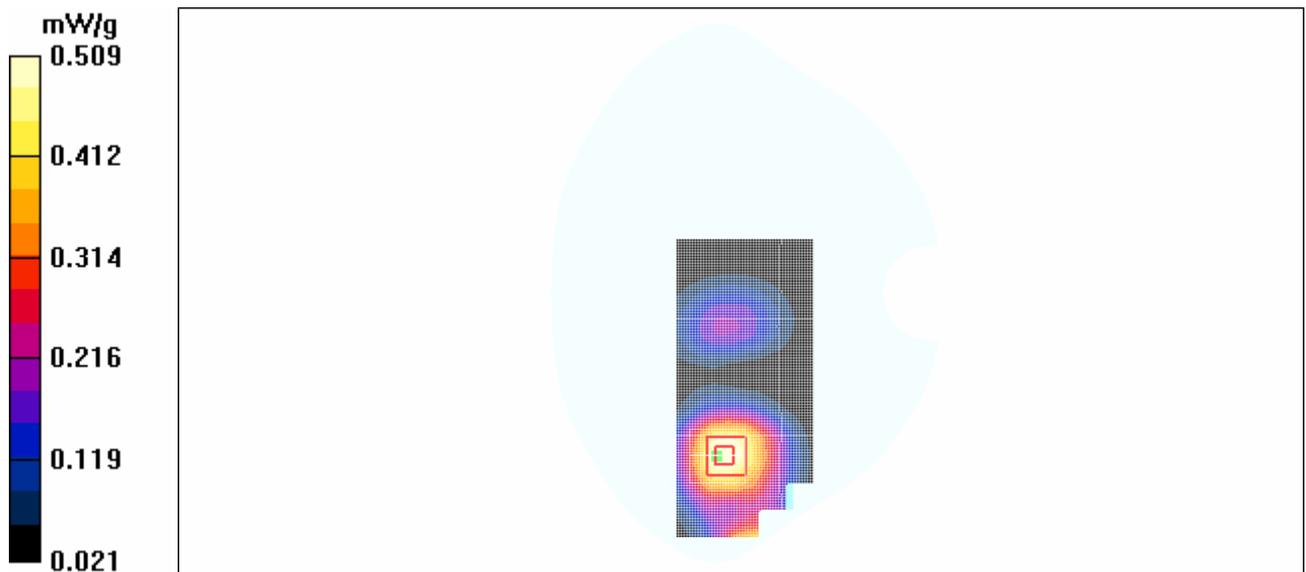


Figure 45 Body with Bluetooth earphone, Towards Ground, Open GSM 1900, Channel 661

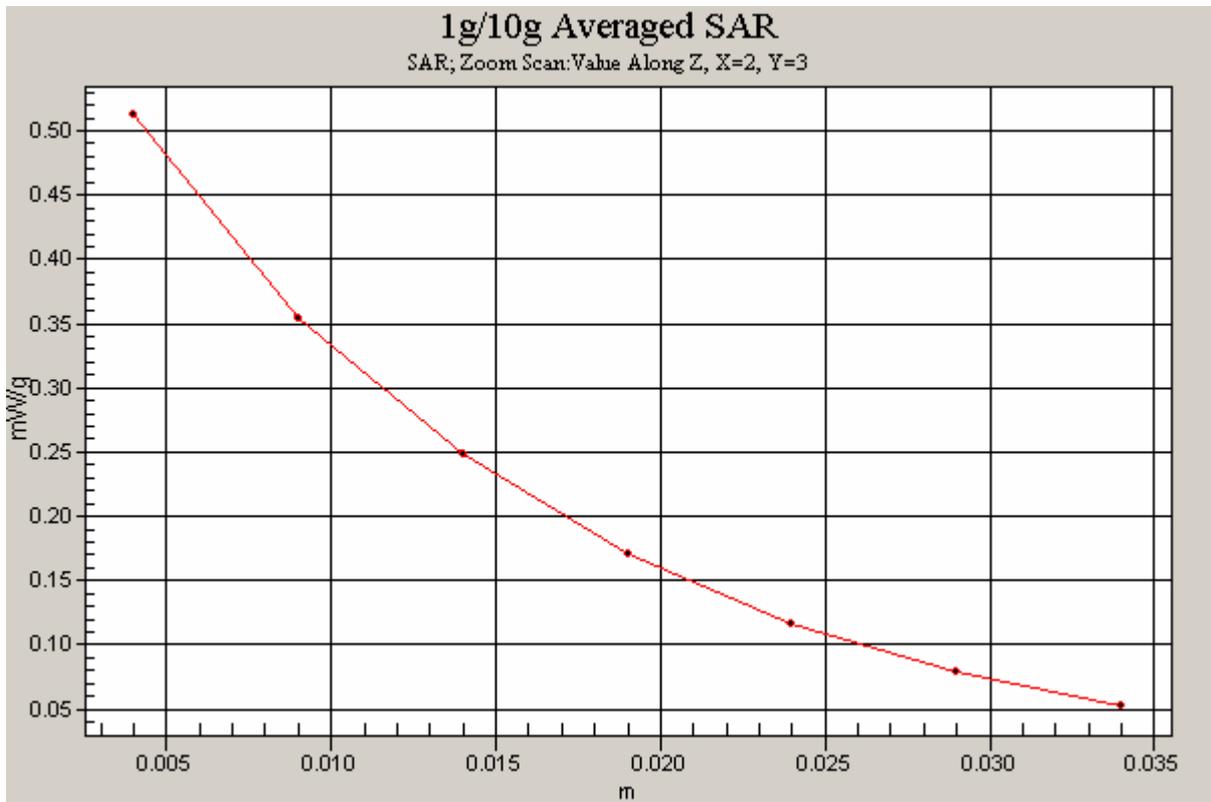


Figure 46 Z-Scan at power reference point (Body with Bluetooth earphone, Towards Ground, Open GSM 1900, Channel 661)

GSM 1900 GPRS Towards Ground High Open

Communication System: GSM 1900+GPRS(2Up); Frequency: 1909.8 MHz; Duty Cycle: 1:4

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 52.1$; $\rho = 1000$ kg/m³

Probe: ET3DV6 - SN1531; ConvF(4.64, 4.64, 4.64);

Electronics: DAE3 Sn452;

Towards Ground High/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.663 mW/g

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

Reference Value = 11.7 V/m; Power Drift = -0.169 dB

Peak SAR (extrapolated) = 1.03 W/kg

SAR(1 g) = 0.597 mW/g; SAR(10 g) = 0.345 mW/g

Maximum value of SAR (measured) = 0.661 mW/g

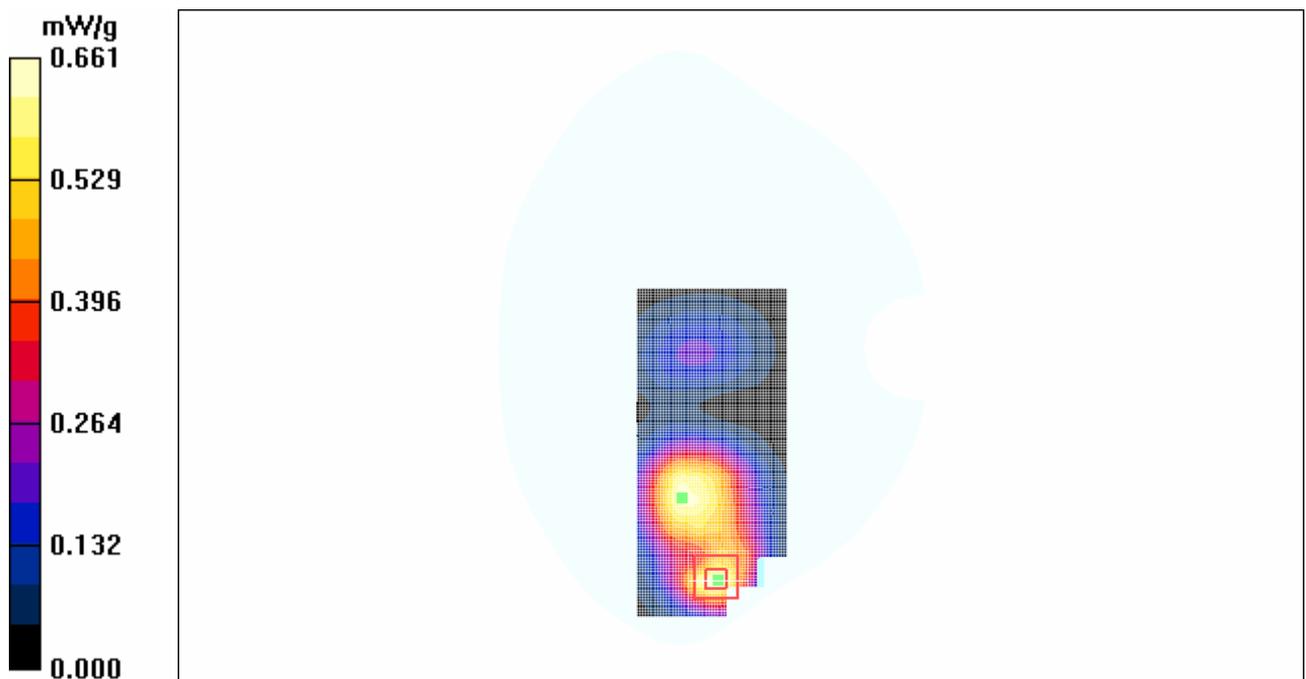


Figure 47 Body, Towards Ground, Open GSM 1900 GPRS, Channel 810

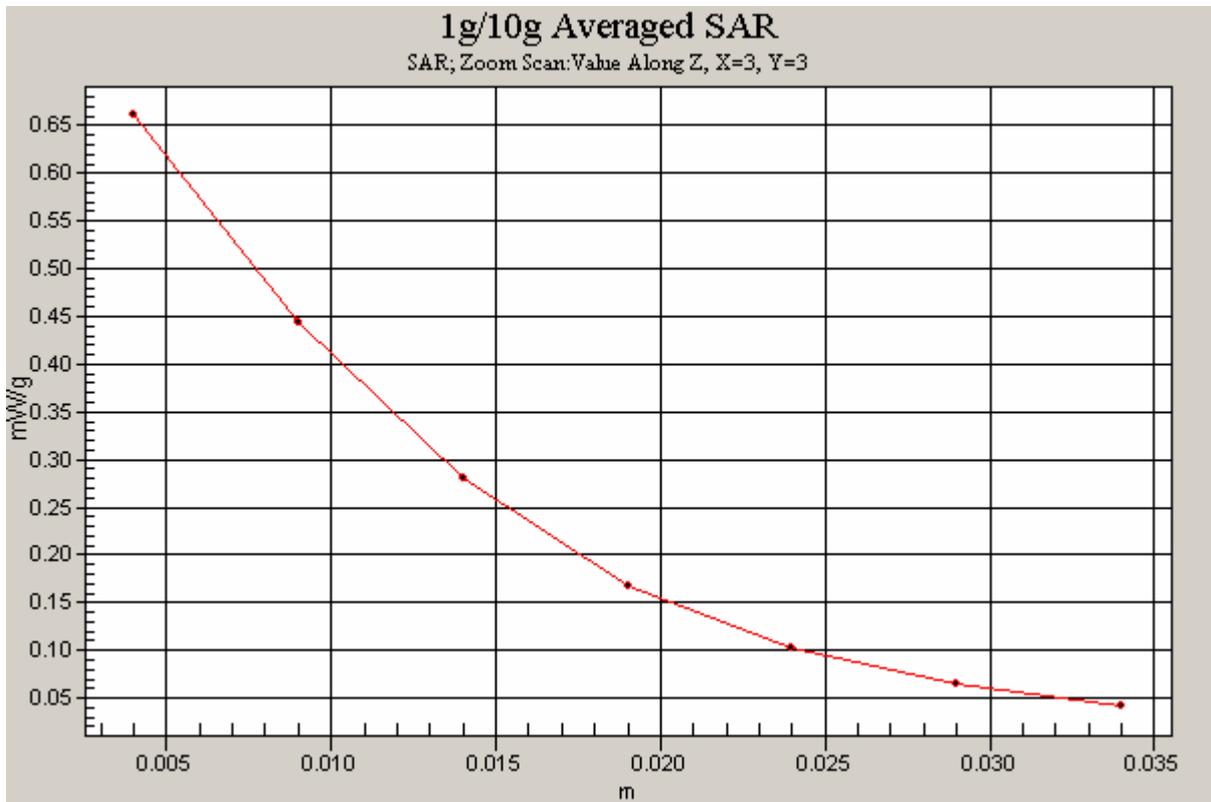


Figure 48 Z-Scan at power reference point (Body, Towards Ground, Open GSM 1900 GPRS, Channel 810)

GSM 1900 GPRS Towards Ground Middle Open

Communication System: GSM 1900+GPRS(2Up); Frequency: 1880 MHz; Duty Cycle: 1:4

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.52$ mho/m; $\epsilon_r = 52.1$; $\rho = 1000$ kg/m³

Probe: ET3DV6 - SN1531; ConvF(4.64, 4.64, 4.64);

Electronics: DAE3 Sn452;

Towards Ground Middle/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 12.8 V/m; Power Drift = 0.072 dB

Peak SAR (extrapolated) = 1.02 W/kg

SAR(1 g) = 0.680 mW/g; SAR(10 g) = 0.444 mW/g

Maximum value of SAR (measured) = 0.727 mW/g

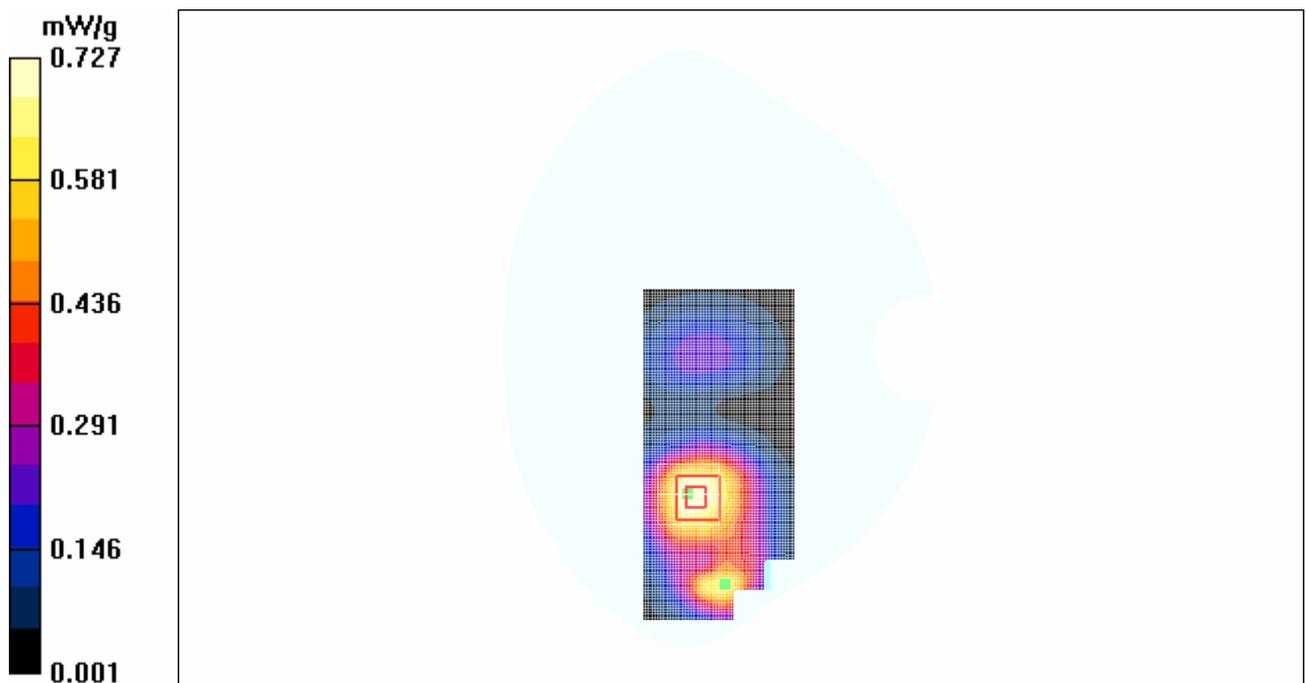


Figure 49 Body, Towards Ground, Open GSM 1900 GPRS Channel 661

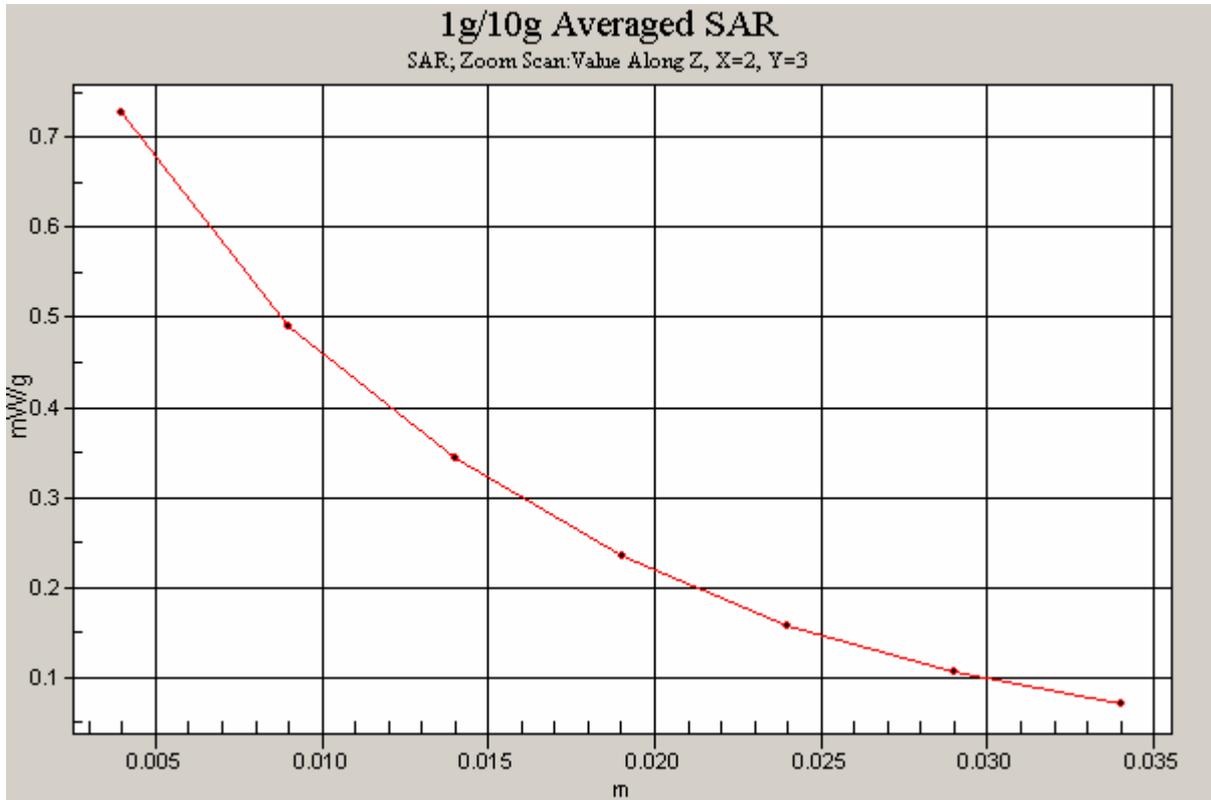


Figure 50 Z-Scan at power reference point (Body, Towards Ground, Open GSM 1900 GPRS Channel 661)

GSM 1900 GPRS Towards Ground Low Open

Communication System: GSM 1900+GPRS(2Up); Frequency: 1850.2 MHz; Duty Cycle: 1:4

Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.47$ mho/m; $\epsilon_r = 52.2$; $\rho = 1000$ kg/m³

Probe: ET3DV6 - SN1531; ConvF(4.64, 4.64, 4.64);

Electronics: DAE3 Sn452;

Towards Ground Low/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 15.4 V/m; Power Drift = 0.048 dB

Peak SAR (extrapolated) = 2.28 W/kg

SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.460 mW/g

Maximum value of SAR (measured) = 0.927 mW/g

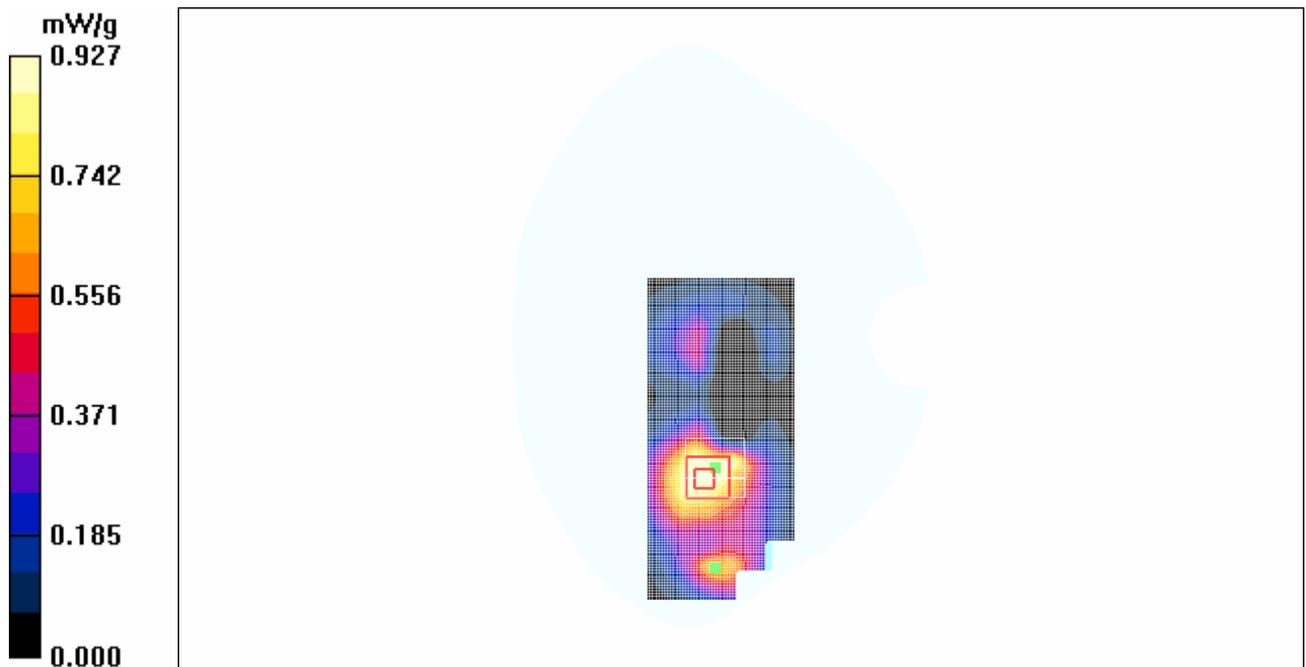


Figure 51 Body, Towards Ground, Open GSM 1900 GPRS Channel 512

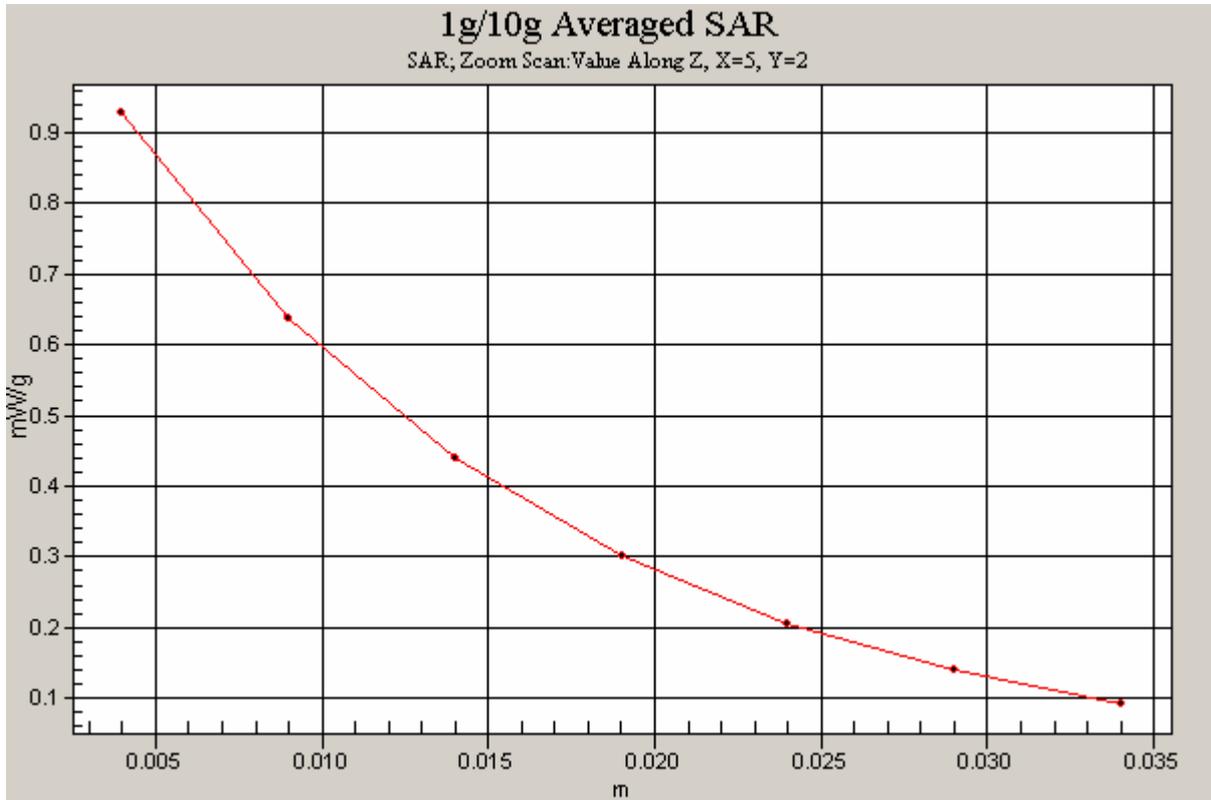


Figure 52 Z-Scan at power reference point (Body, Towards Ground, Open GSM 1900 GPRS Channel 512)

GSM 1900 GPRS Towards Phantom High Open

Communication System: GSM 1900+GPRS(2Up); Frequency: 1909.8 MHz; Duty Cycle: 1:4

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 52.1$; $\rho = 1000$ kg/m³

Probe: ET3DV6 - SN1531; ConvF(4.64, 4.64, 4.64);

Electronics: DAE3 Sn452;

Towards Phantom High/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.254 mW/g

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

Reference Value = 9.71 V/m; Power Drift = -0.065 dB

Peak SAR (extrapolated) = 0.352 W/kg

SAR(1 g) = 0.231 mW/g; SAR(10 g) = 0.150 mW/g

Maximum value of SAR (measured) = 0.248 mW/g

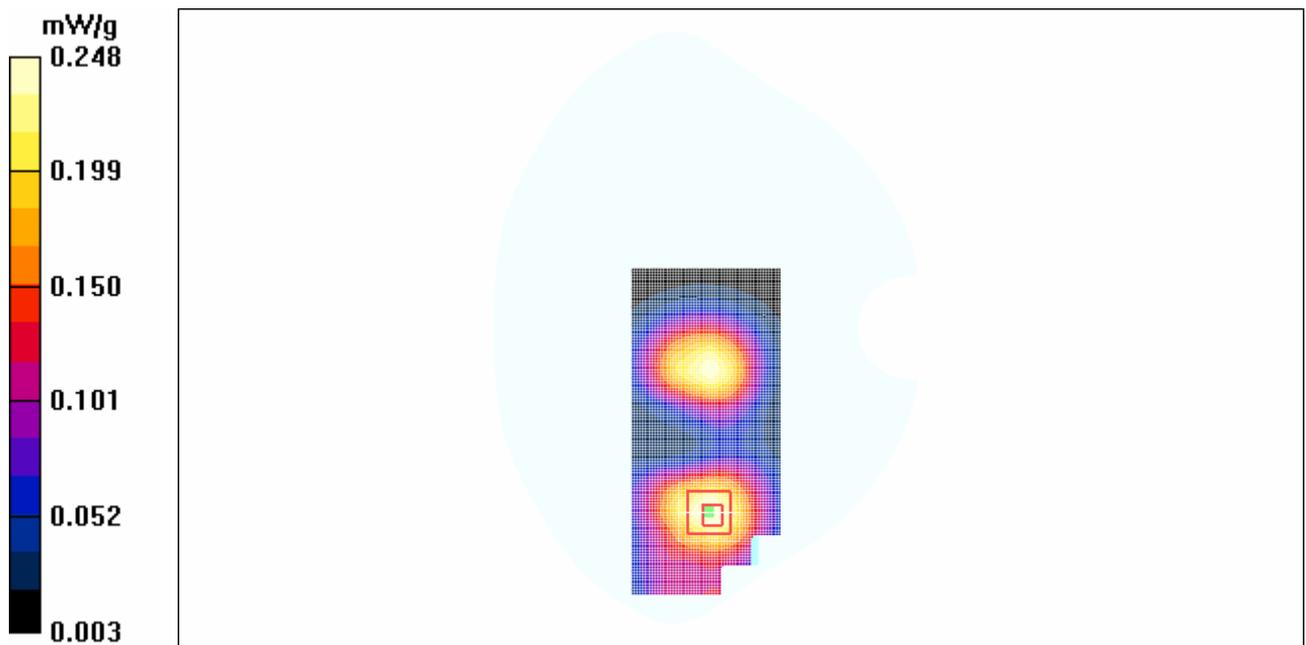


Figure 53 Body, Towards Phantom, Open GSM 1900 GPRS, Channel 810

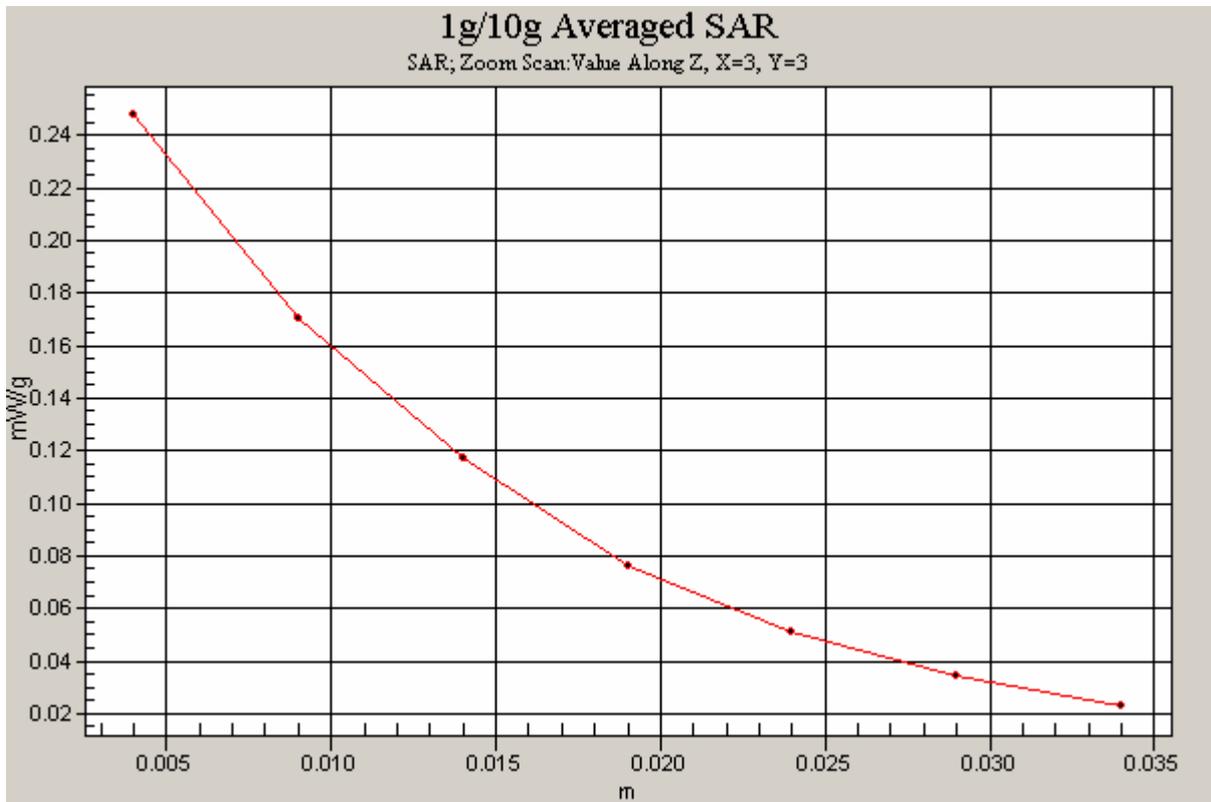


Figure 54 Z-Scan at power reference point (Body, Towards Phantom, Open GSM 1900 GPRS, Channel 810)

GSM 1900 GPRS Towards Phantom Middle Open

Communication System: GSM 1900+GPRS(2Up); Frequency: 1880 MHz; Duty Cycle: 1:4

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.52$ mho/m; $\epsilon_r = 52.1$; $\rho = 1000$ kg/m³

Probe: ET3DV6 - SN1531; ConvF(4.64, 4.64, 4.64);

Electronics: DAE3 Sn452;

Towards Phantom Middle/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 10.9 V/m; Power Drift = -0.009 dB

Peak SAR (extrapolated) = 0.392 W/kg

SAR(1 g) = 0.272 mW/g; SAR(10 g) = 0.183 mW/g

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

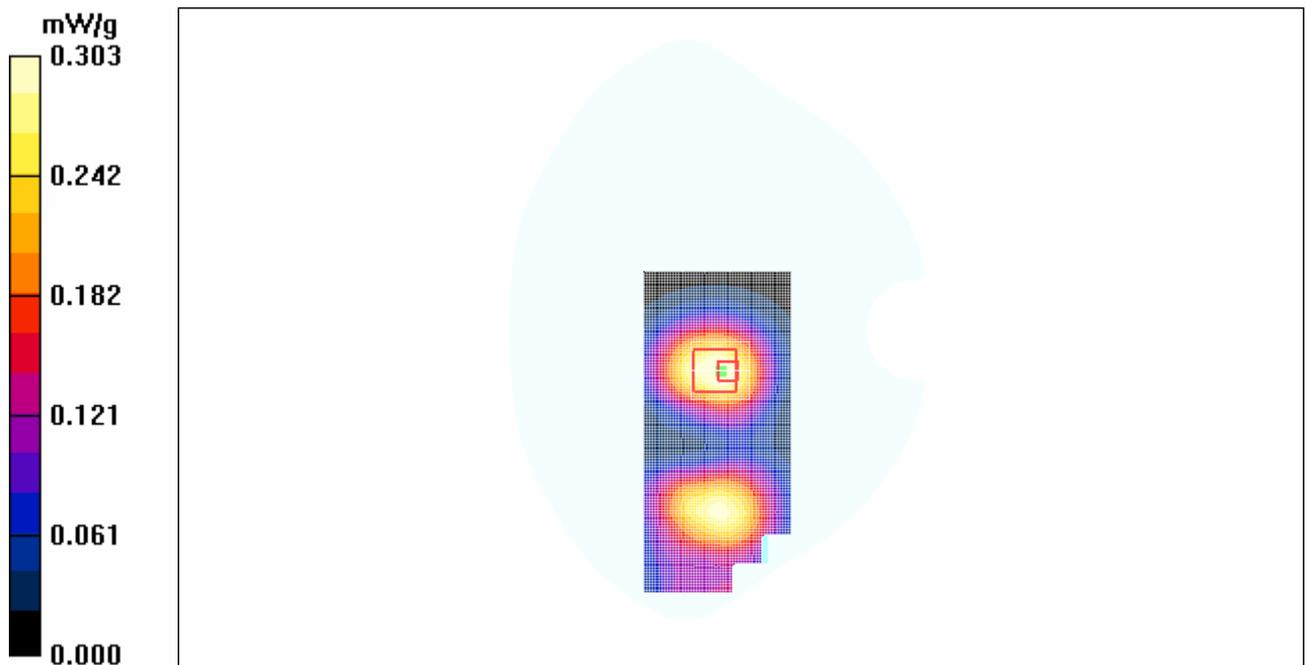


Figure 55 Body, Towards Phantom, Open GSM 1900 GPRS Channel 661

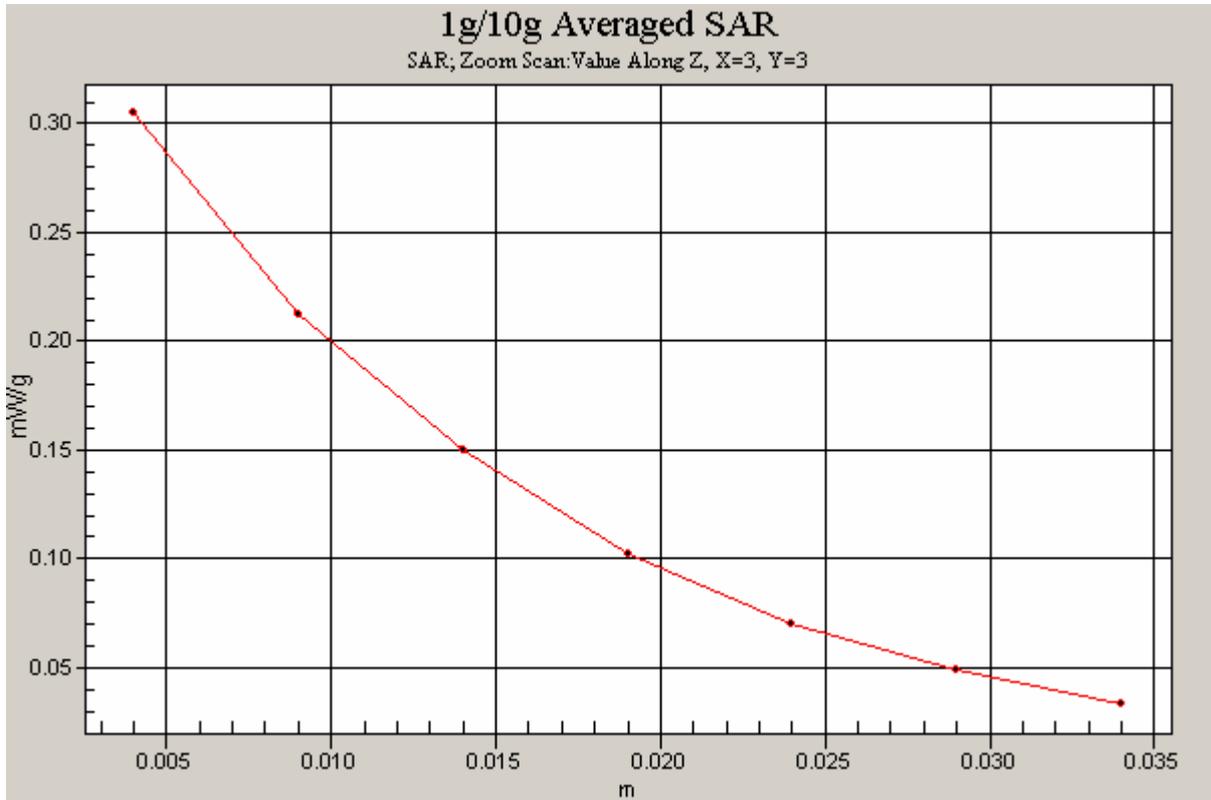


Figure 56 Z-Scan at power reference point (Body, Towards Phantom, Open GSM 1900 GPRS Channel 661)

GSM 1900 GPRS Towards Phantom Low Open

Communication System: GSM 1900+GPRS(2Up); Frequency: 1850.2 MHz; Duty Cycle: 1:4

Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.47$ mho/m; $\epsilon_r = 52.2$; $\rho = 1000$ kg/m³

Probe: ET3DV6 - SN1531; ConvF(4.64, 4.64, 4.64);

Electronics: DAE3 Sn452;

Towards Phantom Low/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 12.9 V/m; Power Drift = -0.081 dB

Peak SAR (extrapolated) = 0.539 W/kg

SAR(1 g) = 0.387 mW/g; SAR(10 g) = 0.259 mW/g

Maximum value of SAR (measured) = 0.414 mW/g

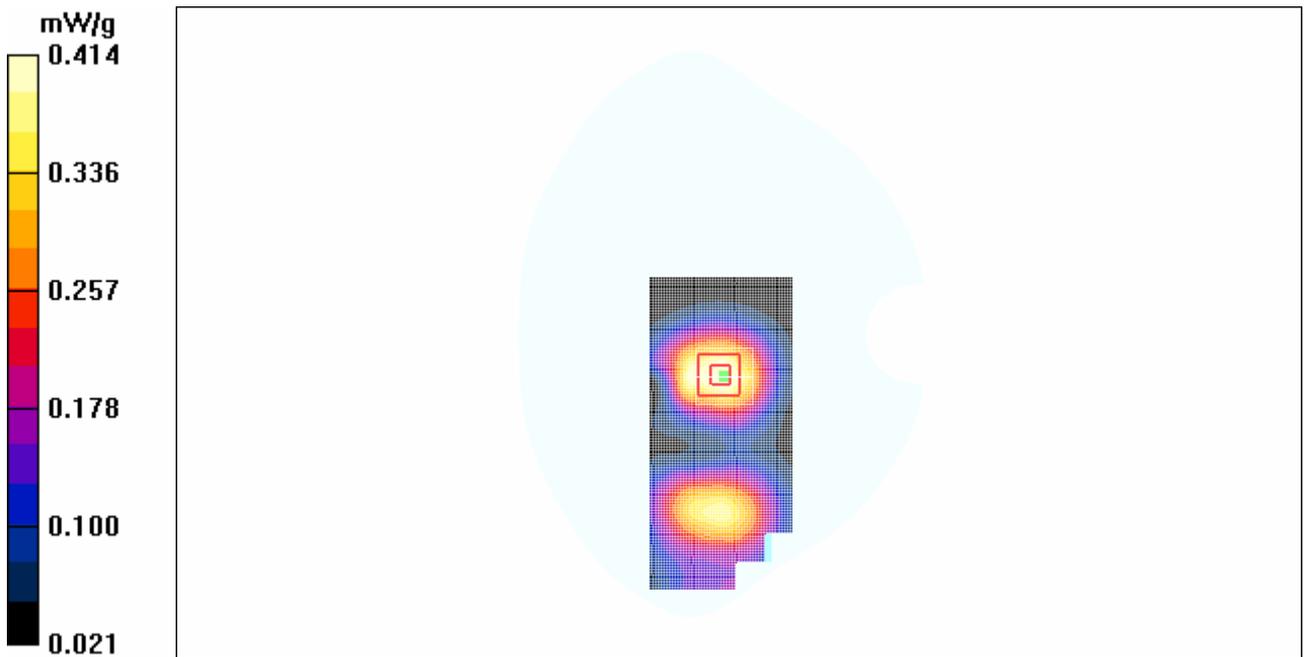


Figure 57 Body, Towards Phantom, Open GSM 1900 GPRS Channel 512

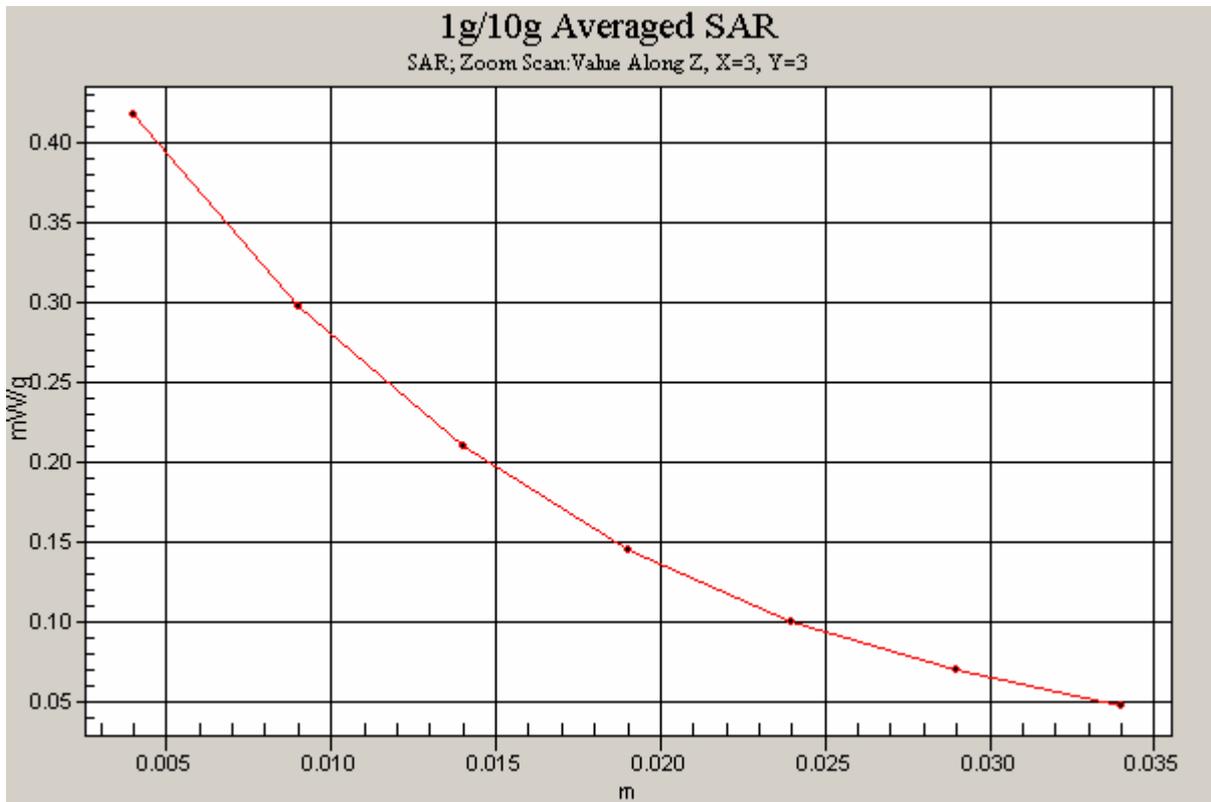


Figure 58 Z-Scan at power reference point (Body, Towards Phantom, Open GSM 1900 GPRS Channel 512)

GSM 1900 Left Cheek High Close

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

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.44$ mho/m; $\epsilon_r = 39.7$; $\rho = 1000$ kg/m³

Probe: ET3DV6 - SN1531; ConvF(5.15, 5.15, 5.15);

Electronics: DAE3 Sn452;

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

Maximum value of SAR (interpolated) = 0.274 mW/g

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

Reference Value = 6.13 V/m; Power Drift = 0.006 dB

Peak SAR (extrapolated) = 0.402 W/kg

SAR(1 g) = 0.257 mW/g; SAR(10 g) = 0.156 mW/g

Maximum value of SAR (measured) = 0.286 mW/g

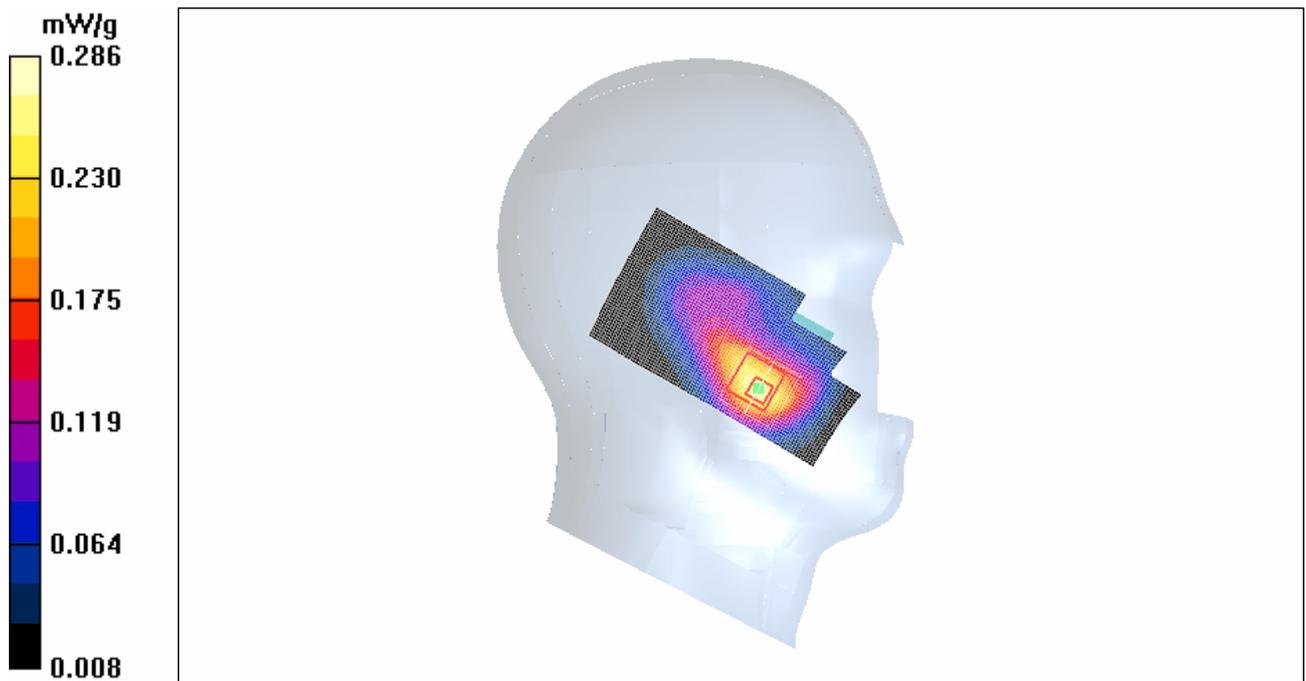


Figure 59 Left Hand Touch Cheek Close GSM 1900 Channel 810