DECLARATION OF COMPLIANCE
SAR RF EXPOSURE EVALUATION

Test Lab

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Applicant Information

AMOI ELECTRONICS CO., LTD.
45 Tiyu Road, Xiamen
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FCC Rule Part(s):	**47 CFR §2.1093**
Test Procedure(s):	**FCC OET Bulletin 65, Supplement C (01-01)** **IEEE Standard 1528-200X (Draft)**
FCC Device Classification:	**PCS Licensed Transmitter held to ear (PCE)**
Device Type:	**PCS GSM/GPRS Handset**
FCC ID:	**RWZAMOIA90**
Model(s):	**A90**
Mode(s) of Operation:	**PCS GSM (Voice) / PCS GPRS (Data)**
Tx Frequency Range(s):	**1850.2 - 1909.8 MHz**
Max. RF Conducted Power Tested:	**29.02 dBm (1850.2 MHz)** **29.18 dBm (1880.0 MHz)** **29.09 dBm (1909.8 MHz)**
Battery Type(s):	**Standard: 3.7 V Lithium-ion (950mAh)** **Slim: 3.7 V Lithium-ion (550mAh)**
Antenna Type(s):	**Stubby**
Body-Worn Accessories Tested:	**Ear-Microphone**
Max. SAR Measured:	**1.06 W/kg (Head) / 0.763 W/kg (Body)**

Celltech Labs Inc. declares under its sole responsibility that this wireless portable device has demonstrated compliance with the Specific Absorption Rate (SAR) RF exposure requirements specified in FCC 47 CFR §2.1093. The device was tested in accordance with the measurement standards and procedures specified in FCC OET Bulletin 65, Supplement C (Edition 01-01), and IEEE Standard 1528-200X (Draft) for the General Population / Uncontrolled Exposure environment. All measurements were performed in accordance with the SAR system manufacturer recommendations.

I attest to the accuracy of data. All measurements were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Russell W. Pipe
Senior Compliance Technologist
Celltech Labs Inc.

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1.0 INTRODUCTION

This measurement report shows that the AMOI ELECTRONICS CO., LTD. Model: A90 PCS GSM/GPRS Portable Handset FCC ID: RWZAMOIA90 complies with the SAR (Specific Absorption Rate) RF exposure requirements specified in FCC 47 CFR §2.1093 (see reference [1]) for the General Population / Uncontrolled Exposure environment. The test procedures described in FCC OET Bulletin 65, Supplement C, Edition 01-01 (see reference [2]), and IEEE Standard 1528-200X (Draft - see reference [3]) were employed. A description of the product and operating configuration, detailed summary of the test results, methodology and procedures used in the evaluation, equipment used, and the various provisions of the rules are included within this test report.

2.0 DESCRIPTION of DEVICE UNDER TEST (DUT)

DUT Type	Single-Mode PCS GSM/GPRS Handset		
FCC Device Classification	PCS Licensed Transmitter held to ear (PCE)		
FCC Rule Part(s)	47 CFR §2.1093		
Test Procedure(s)	FCC OET Bulletin 65, Supplement C (01-01)		
	IEEE Standard 1528-200X (Draft)		
FCC ID	RWZAMOIA90		
Model(s)	A90		
Serial No.	C57358N537X0T9N (Identical Prototype)		
Mode(s) of Operation	PCS GSM (Voice) / PCS GPRS (Data)		
Tx Frequency Range(s)	1850.2 - 1909.8 MHz		
Max. RF Conducted Power Tested	1850.2 MHz	29.02 dBm	
	1880.0 MHz	29.18 dBm	
	1909.8 MHz	29.09 dBm	
Battery Type(s)	Standard	3.7V Lithium-ion	950mAh
	Slim	3.7V Lithium-ion	550mAh
Antenna Type(s)	Stubby	Length: 22 mm	
Body-Worn Accessories Tested	Ear-Microphone		

3.0 SAR MEASUREMENT SYSTEM

Celltech Labs Inc. SAR measurement facility utilizes the Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland. The DASY4 measurement system is comprised of the measurement server, robot controller, computer, near-field probe, probe alignment sensor, specific anthropomorphic mannequin (SAM) phantom, and various planar phantoms for brain and/or body SAR evaluations. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF). A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and remote control, is used to drive the robot motors. The Staubli 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 DASY4 measurement server. The DAE4 utilizes 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 DASY4 measurement server 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. The sensor systems are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.

DASY4 Measurement System with SAM Phantom

DASY4 Measurement System with SAM Phantom

4.0 MEASUREMENT SUMMARY

HEAD SAR MEASUREMENT RESULTS - RIGHT HEAD SECTION

Freq. (MHz)	Channel	Test Mode	Battery Type	Conducted Power			Antenna Position	Phantom Section	Test Position	Measured SAR 1g (W/kg)
				Before (dBm)	After (dBm)	Drift (dB)				
1880.0	661	PCS GSM	Standard	29.15	29.16	0.01	Fixed	Right Ear	Cheek/Touch	0.826
1850.0	512	PCS GSM	Standard	29.02	28.99	-0.03	Fixed	Right Ear	Cheek/Touch	1.06
1909.8	810	PCS GSM	Standard	29.09	29.07	-0.02	Fixed	Right Ear	Cheek/Touch	0.566
1880.0	661	PCS GSM	Slim	29.16	29.09	-0.07	Fixed	Right Ear	Cheek/Touch	0.780
1880.0	661	PCS GSM	Standard	29.13	29.10	-0.03	Fixed	Right Ear	Ear/Tilt (15°)	0.223
1880.0	661	PCS GSM	Slim	29.17	29.16	-0.01	Fixed	Right Ear	Ear/Tilt (15°)	0.196

ANSI / IEEE C95.1 1992 - SAFETY LIMIT
BRAIN: 1.6 W/kg (averaged over 1 gram)
Spatial Peak - Uncontrolled Exposure / General Population

Test Date(s)	11/27/03		**Relative Humidity**	58 %
Measured Fluid Type	1880 MHz Brain		**Atmospheric Pressure**	103.2 kPa
Dielectric Constant ε_r	**IEEE Target**	**Measured**	**Ambient Temperature**	23.9 °C
	40.0 ± 5%	38.5	**Fluid Temperature**	22.5 °C
Conductivity σ (mho/m)	**IEEE Target**	**Measured**	**Fluid Depth**	≥ 15 cm
	1.40 ± 5%	1.41	**ρ (Kg/m^3)**	1000

Note(s):

1. The measurement results were obtained with the DUT tested in the conditions described in this report. Detailed measurement data and plots showing the maximum SAR location of the DUT are reported in Appendix A.
2. If the SAR measurements performed at the mid channel were ≥ 3dB below the SAR limit; SAR evaluation for the low and high channels was optional (per FCC OET Bulletin 65, Supplement C, Edition 01-01 (see reference [2]).
3. The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the SAR evaluation. The temperatures listed in the table above were consistent for all measurement periods.
4. The dielectric parameters of the simulated tissue mixture were measured prior to the SAR evaluation using an 85070C Dielectric Probe Kit and an 8753E Network Analyzer (see Appendix E for printout of measured fluid dielectric parameters).

MEASUREMENT SUMMARY (Cont.)

HEAD SAR MEASUREMENT RESULTS - LEFT HEAD SECTION

Freq. (MHz)	Channel	Test Mode	Battery Type	Conducted Power			Antenna Position	Phantom Section	Test Position	Measured SAR 1g (W/kg)
				Before (dBm)	After (dBm)	Drift (dB)				
1880.00	661	PCS GSM	Standard	29.18	29.12	-0.06	Fixed	Left Ear	Cheek/Touch	0.724
1880.00	661	PCS GSM	Slim	29.14	29.10	-0.04	Fixed	Left Ear	Cheek/Touch	0.778
1880.00	661	PCS GSM	Standard	29.17	29.10	-0.07	Fixed	Left Ear	Ear/Tilt (15°)	0.211
1880.00	661	PCS GSM	Slim	29.16	29.17	0.01	Fixed	Left Ear	Ear/Tilt (15°)	0.223

ANSI / IEEE C95.1 1992 - SAFETY LIMIT
BRAIN: 1.6 W/kg (averaged over 1 gram)
Spatial Peak - Uncontrolled Exposure / General Population

Test Date(s)	11/28/03		**Relative Humidity**	59 %
Measured Fluid Type	1880 MHz Brain		**Atmospheric Pressure**	101.1 kPa
Dielectric Constant ε_r	**IEEE Target**	**Measured**	**Ambient Temperature**	24.4 °C
	40.0 ± 5%	38.3	**Fluid Temperature**	22.4 °C
Conductivity σ (mho/m)	**IEEE Target**	**Measured**	**Fluid Depth**	≥ 15 cm
	1.40 ± 5%	1.41	**ρ (Kg/m^3)**	1000

Note(s):

1. The measurement results were obtained with the DUT tested in the conditions described in this report. Detailed measurement data and plots showing the maximum SAR location of the DUT are reported in Appendix A.
2. If the SAR measurements performed at the mid channel were ≥ 3dB below the SAR limit; SAR evaluation for the low and high channels was optional (per FCC OET Bulletin 65, Supplement C, Edition 01-01 (see reference [2]).
3. The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the SAR evaluation. The temperatures listed in the table above were consistent for all measurement periods.
4. The dielectric parameters of the simulated tissue mixture were measured prior to the SAR evaluation using an 85070C Dielectric Probe Kit and an 8753E Network Analyzer (see Appendix E for printout of measured fluid dielectric parameters).

MEASUREMENT SUMMARY (Cont.)

BODY SAR MEASUREMENT RESULTS

Freq. (MHz)	Channel	Test Mode	Battery Type	Conducted Power			Antenna Position	Body-worn Accessory	DUT Position to Planar Phantom	Separation Distance to Planar Phantom (cm)	Measured SAR 1g (W/kg)
				Before (dBm)	After (dBm)	Drift (dB)					
1880.00	661	PCS GPRS	Standard	29.18	29.14	-0.04	Fixed	Speaker-Mic	Back Side	1.0	0.483
1880.00	661	PCS GPRS	Slim	29.18	29.15	-0.03	Fixed	Speaker-Mic	Back Side	1.0	0.619
1880.00	661	PCS GPRS	Standard	29.18	29.14	-0.04	Fixed	Speaker-Mic	Front Side	0.0	0.753
1880.00	661	PCS GPRS	Slim	29.18	29.14	-0.04	Fixed	Speaker-Mic	Front Side	0.0	0.763

ANSI / IEEE C95.1 1992 - SAFETY LIMIT
BODY: 1.6 W/kg (averaged over 1 gram)
Spatial Peak - Uncontrolled Exposure / General Population

Test Date(s)	12/01/03		**Relative Humidity**	60 %
Measured Fluid Type	1880 MHz Body		**Atmospheric Pressure**	102.6 kPa
Dielectric Constant ε_r	**IEEE Target**	**Measured**	**Ambient Temperature**	24.2 °C
	53.3 ± 5%	51.6	**Fluid Temperature**	22.0 °C
Conductivity σ (mho/m)	**IEEE Target**	**Measured**	**Fluid Depth**	≥ 15 cm
	1.52 ± 5%	1.56	ρ (Kg/m^3)	1000

Note(s):

1. The measurement results were obtained with the DUT tested in the conditions described in this report. Detailed measurement data and plots showing the maximum SAR location of the DUT are reported in Appendix A.
2. If the SAR measurements performed at the mid channel were ≥ 3dB below the SAR limit, SAR evaluation for the low and high channels was optional for each test configuration (per FCC OET Bulletin 65, Supplement C, Edition 01-01 - see reference [2]).
3. The DUT was tested in a body-worn configuration with an “air” spacing of 1.0 cm maintained between the back side of the DUT and the outer surface of the SAM phantom (planar section).
4. The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the SAR evaluation. The temperatures listed in the table above were consistent for all measurement periods.
5. The dielectric parameters of the simulated tissue mixture were measured prior to the SAR evaluation using an 85070C Dielectric Probe Kit and an 8753E Network Analyzer (see Appendix E for printout of measured fluid dielectric parameters).

5.0 DETAILS OF SAR EVALUATION

The AMOI ELECTRONICS CO., LTD. Model: A90 PCS GSM/GPRS Portable Handset FCC ID: RWZAMOIA90 was determined to be compliant for localized Specific Absorption Rate (SAR) based on the test provisions and conditions described below. The detailed test setup photographs are shown in Appendix G.

Ear-held Configuration

1) The DUT was tested in an ear-held configuration on both the left and right sections of the SAM phantom at the middle channel of the operating band. If the SAR value of the middle channel for each test configuration (left ear, right ear, cheek/touch, ear/tilt) was ≥ 3dB below the SAR limit, measurements at the low and high channels were optional (per FCC OET Bulletin 65, Supplement C, Edition 01-01 - see reference [2]).

a) The handset was placed in the device holder in a normal operating position with the test device reference point located along the vertical centerline on the front of the device aligned to the ear reference point, with the center of the earpiece touching the center of the ear spacer of the SAM phantom.

b) With the handset positioned parallel to the cheek, the test device reference point was aligned to the ear reference point on the head phantom, and the vertical centerline was aligned to the phantom reference plane (initial ear position).

c) While maintaining the three alignments, the body of the handset was gradually adjusted to each of the following test positions:

- Cheek/Touch Position: the handset was brought toward the mouth of the head phantom by pivoting against the ear reference point until any point of the mouthpiece or keypad touched the phantom.

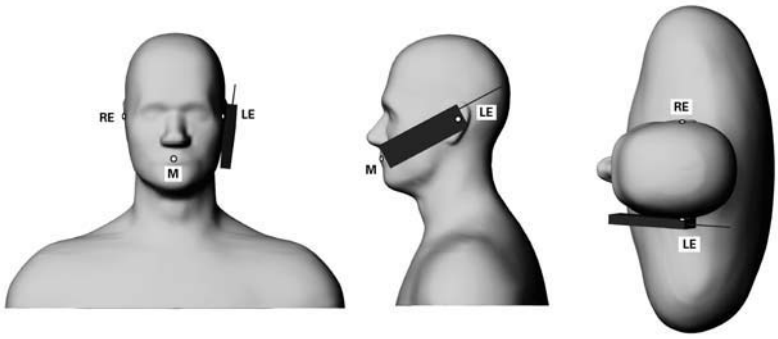


Figure 1. Phone position 1, "cheek" or "touch" position. The reference points for the right ear (RE), left ear (LE) and mouth (M), which define the reference plane for phone positioning, are indicated (Shoulders are shown for illustration only).

- Ear/Tilt Position: With the phone aligned in the Cheek/Touch position, the handset was tilted away from the mouth with respect to the test device reference point by 15 degrees.

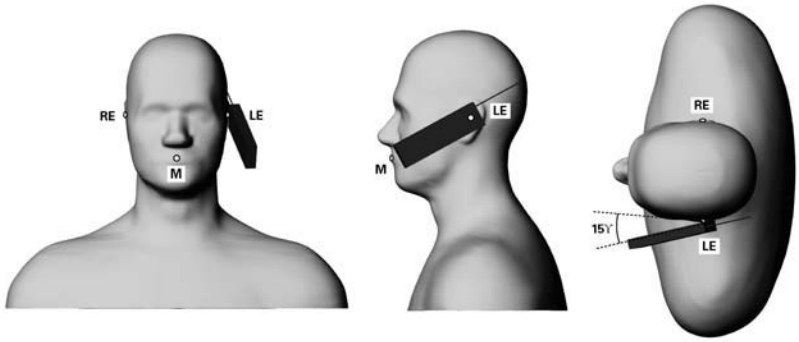


Figure 2. Phone position 2, "tilted position." The reference points for the right ear (RE), left ear (LE) and mouth (M), which define the reference plane for phone positioning, are indicated (Shoulders are shown for illustration only).

DETAILS OF SAR EVALUATION (Cont.)

Body-worn Configuration

2) The DUT was tested in a body-worn configuration with an "air" spacing of 1.0 cm between the back side (battery side) of the DUT and the outer surface of the SAM phantom (planar section). An ear-microphone accessory was connected to the DUT for the duration of the test.
3) The DUT was tested in a body-worn configuration with the front side of the DUT (LCD side) facing parallel to the outer surface of the SAM phantom (planar section) and touching the phantom surface. An ear-microphone accessory was connected to the DUT for the duration of the test.
4) The body-worn SAR evaluations were performed with the DUT LCD display in the "closed" position.

DUT Test Modes & Power Settings

5) The DUT was controlled in test mode via internal software. SAR measurements were performed with the DUT transmitting continuously at maximum power in 5 time slots (crest factor = 5). The DUT is a GSM/GPRS Multislot Class 8 device.
6) The peak conducted power levels were measured before and after each test according to the procedures described in FCC 47 CFR §2.1046 using a Gigatronics 8652A Universal Power Meter.
7) The DUT was tested with a fully charged battery.

6.0 EVALUATION PROCEDURES

a. (i) The evaluation was performed in the applicable area of the phantom depending on the type of device being tested. For devices held to the ear during normal operation, both the left and right ear positions were evaluated using the SAM phantom.
(ii) For body-worn and face-held devices a planar phantom was used.
b. The SAR was determined by a pre-defined procedure within the DASY4 software. Upon completion of a reference and optical surface check, the exposed region of the phantom was scanned near the inner surface with a grid spacing of 15mm x 15mm.

An area scan was determined as follows:

c. Based on the defined area scan grid, a more detailed grid is created to increase the points by a factor of 10. The interpolation function then evaluates all field values between corresponding measurement points.
d. A linear search is applied to find all the candidate maxima. Subsequently, all maxima are removed that are >2 dB from the global maximum. The remaining maxima are then used to position the cube scans.

A 1g and 10g spatial peak SAR was determined as follows:

e. Extrapolation is used to find the points between the dipole center of the probe and the surface of the phantom. This data cannot be measured, since the center of the dipoles is 2.7 mm away form the tip of the probe and the distance between the surface and the lowest measuring point is 1.4 mm (see probe calibration document in Appendix D). The extrapolation was based on trivariate quadratics computed from the previously calculated 3D interpolated points nearest the phantom surface.
f. Interpolated data is used to calculate the average SAR over 1g and 10g cubes by spatially discretizing the entire measured cube. The volume used to determine the averaged SAR is a 1mm grid (42875 interpolated points).

EVALUATION PROCEDURES (Cont.)

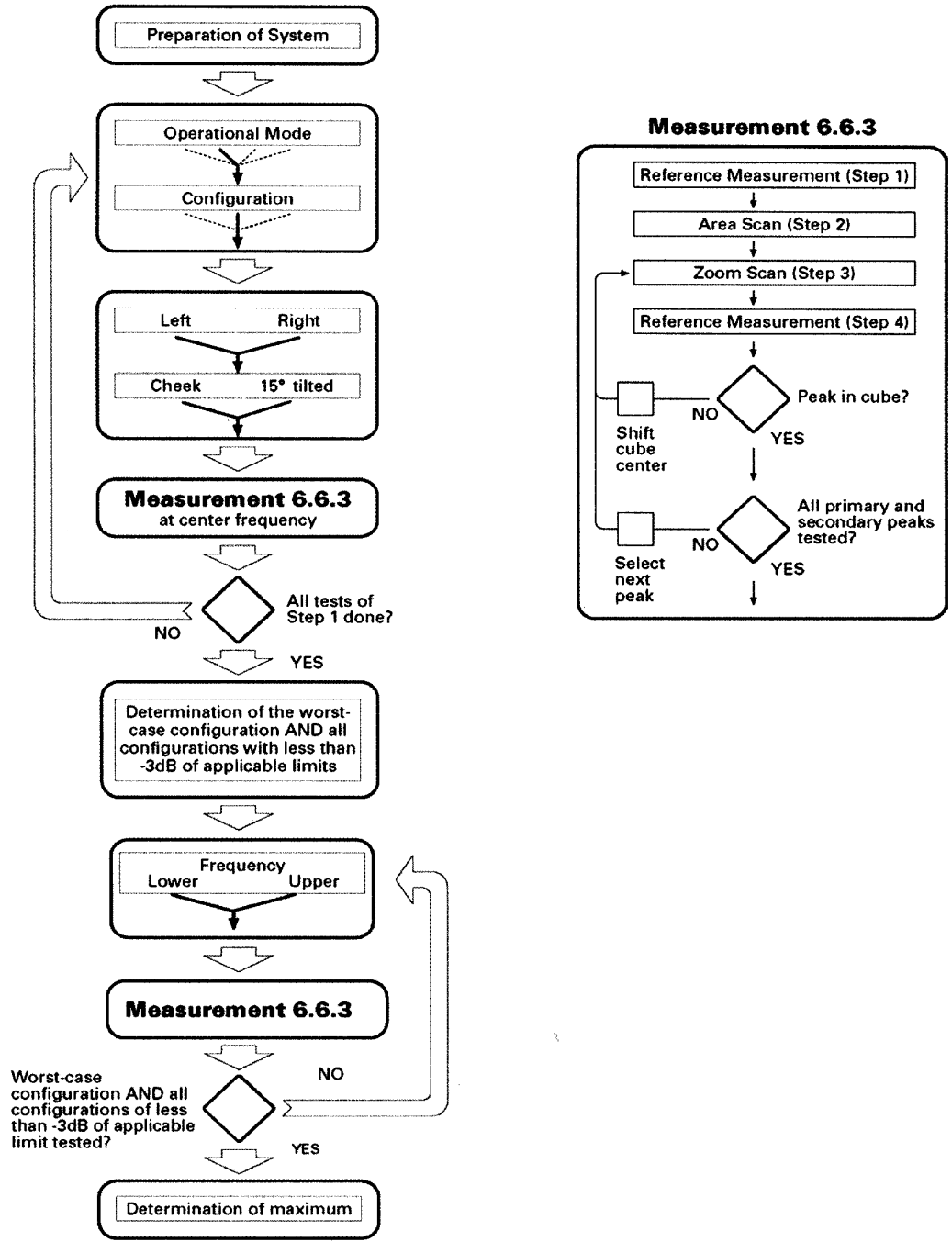


Figure 3. Flow Chart of the recommended practices and procedures per IEEE Standard 1528-200X - Draft (see reference 3])

7.0 SYSTEM PERFORMANCE CHECK

Prior to the SAR evaluation a system check was performed at the planar section of the SAM phantom with an 1800MHz dipole (see Appendix C for system validation procedures). The fluid dielectric parameters were measured prior to the system performance check using an 85070C Dielectric Probe Kit and an 8753E Network Analyzer (see Appendix E for printout of measured fluid dielectric parameters). A forward power of 250mW was applied to the dipole and the system was verified to a tolerance of ±10% (see Appendix B for system performance check test plots).

SYSTEM PERFORMANCE CHECK

Test Date	1800 MHz Equiv. Tissue	SAR 1g (W/kg)		Dielectric Constant ε_r		Conductivity σ (mho/m)		ρ (Kg/m^3)	Amb. Temp. (°C)	Fluid Temp. (°C)	Fluid Depth (cm)	Humid. (%)	Barom. Press. (kPa)
		IEEE Target	Measured	IEEE Target	Measured	IEEE Target	Measured						
11/27/03	Brain	9.53 ±10%	10.0 +4.9%	40.0 ±5%	38.6	1.40 ±5%	1.40	1000	23.9	22.7	≥ 15	58	103.2
11/28/03	Brain	9.53 ±10%	10.3 +8.1%	40.0 ±5%	38.3	1.40 ±5%	1.42	1000	24.4	22.4	≥ 15	59	101.1
12/01/03	Brain	9.53 ±10%	10.1 +6.0%	40.0 ±5%	38.5	1.40 ±5%	1.41	1000	24.0	22.3	≥ 15	60	102.6

Note(s):
1. The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the system performance check. The temperatures listed in the table above were consistent for all measurement periods.

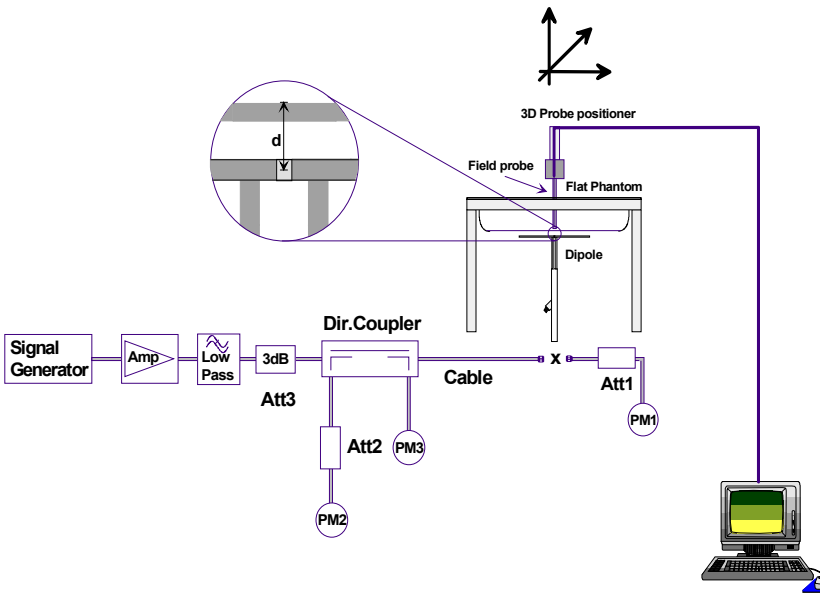


Figure 4. System Performance Check Setup Diagram

1800MHz Dipole Setup

8.0 SIMULATED TISSUE MIXTURES

The 1800MHz and 1880MHz simulated tissue mixtures consist of Glycol-monobutyl, water, and salt. Preservation with a bactericide was added and visual inspection was made to ensure air bubbles were not trapped during the mixing process. The fluids were prepared according to standardized procedures and measured for dielectric parameters (permittivity and conductivity).

1800MHz & 1880MHz TISSUE MIXTURES			
INGREDIENT	**1800MHz Brain (System Check)**	**1880MHz Brain (DUT Evaluation)**	**1880MHz Body (DUT Evaluation)**
Water	548.0 g	552.40 g	716.60 g
Glycol Monobutyl	448.5 g	444.52 g	300.70 g
Salt	3.20 g	3.06 g	3.10 g

9.0 SAR SAFETY LIMITS

EXPOSURE LIMITS	SAR (W/kg)	
	(General Population / Uncontrolled Exposure Environment)	(Occupational / Controlled Exposure Environment)
Spatial Average (averaged over the whole body)	0.08	0.4
Spatial Peak (averaged over any 1 g of tissue)	1.60	8.0
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)	4.0	20.0

Notes:

1. Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.
2. Controlled environments are defined as locations where there is potential exposure individuals who have knowledge of their potential exposure and can exercise control over their exposure.

10.0 ROBOT SYSTEM SPECIFICATIONS

Specifications

POSITIONER: Stäubli Unimation Corp. Robot Model: RX60L
Repeatability: 0.02 mm
No. of axis: 6

Data Acquisition Electronic (DAE) System

Cell Controller

Processor: AMD Athlon XP 2400+
Clock Speed: 2.0 GHz
Operating System: Windows XP Professional

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

DASY4 Measurement Server

Function: Real-time data evaluation for field measurements and surface detection
Hardware: PC/104 166MHz Pentium CPU; 32 MB chipdisk; 64 MB RAM
Connections: COM1, COM2, DAE, Robot, Ethernet, Service Interface

E-Field Probe

Model: ET3DV6
Serial No.: 1387
Construction: Triangular core fiber optic detection system
Frequency: 10 MHz to 6 GHz
Linearity: ±0.2 dB (30 MHz to 3 GHz)

Phantom(s)

Type: SAM V4.0C
Shell Material: Fiberglass
Thickness: 2.0 ±0.1 mm
Volume: Approx. 20 liters

11.0 PROBE SPECIFICATION (ET3DV6)

Construction:	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g. glycol)
Calibration:	In air from 10 MHz to 2.5 GHz In brain simulating tissue at frequencies of 900 MHz and 1.8 GHz (accuracy ± 8%)
Frequency:	10 MHz to >6 GHz; Linearity: ±0.2 dB (30 MHz to 3 GHz)
Directivity:	±0.2 dB in brain tissue (rotation around probe axis) ±0.4 dB in brain tissue (rotation normal to probe axis)
Dynamic Range:	5 μW/g to >100 mW/g; Linearity: ±0.2 dB
Surface Detection:	±0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces
Dimensions:	Overall length: 330 mm Tip length: 16 mm Body diameter: 12 mm Tip diameter: 6.8 mm Distance from probe tip to dipole centers: 2.7 mm
Application:	General dosimetry up to 3 GHz Compliance tests of portable phone

ET3DV6 E-Field Probe

12.0 SAM PHANTOM V4.0C

The SAM phantom V4.0C is a fiberglass shell phantom with a 2.0 mm shell thickness for left and right head and flat planar area integrated in a wooden table. The shape of the fiberglass shell corresponds to the phantom defined by SCC34-SC2. The device holder positions are adjusted to the standard measurement positions in the three sections.

SAM Phantom V4.0C

13.0 DEVICE HOLDER

The DASY4 device holder has two scales for device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The plane between the ear openings and the mouth tip has a rotation angle of 65°. The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections

Device Holder

14.0 TEST EQUIPMENT LIST

TEST EQUIPMENT	SERIAL NO.	CALIBRATION DATE
Schmid & Partner DASY4 System	-	-
DASY4 Measurement Server	1078	N/A
-Robot	599396-01	N/A
-ET3DV6 E-Field Probe	1387	Feb 2003
-300MHz Validation Dipole	135	Oct 2003
-450MHz Validation Dipole	136	Nov 2003
-900MHz Validation Dipole	054	June 2003
-1800MHz Validation Dipole	247	June 2003
-2450MHz Validation Dipole	150	Sept 2003
-SAM Phantom V4.0C	1033	N/A
HP 85070C Dielectric Probe Kit	N/A	N/A
Gigatronics 8651A Power Meter	8650137	April 2003
Gigatronics 8652A Power Meter	1835267	April 2003
Power Sensor 80701A	1833542	Feb 2003
Power Sensor 80701A	1833699	April 2003
HP E4408B Spectrum Analyzer	US39240170	Dec 2003
HP 8594E Spectrum Analyzer	3543A02721	April 2003
HP 8753E Network Analyzer	US38433013	May 2003
HP 8648D Signal Generator	3847A00611	May 2003
Amplifier Research 5S1G4 Power Amplifier	26235	N/A

15.0 MEASUREMENT UNCERTAINTIES

UNCERTAINTY BUDGET FOR DEVICE EVALUATION

Error Description	Uncertainty Value ±%	Probability Distribution	Divisor	c_i 1g	Standard Uncertainty ±% (1g)	v_i or v_{eff}
Measurement System						
Probe calibration	± 4.8	Normal	1	1	± 4.8	∞
Axial isotropy of the probe	± 4.7	Rectangular	√3	$(1-c_p)$	± 1.9	∞
Spherical isotropy of the probe	± 9.6	Rectangular	√3	(c_p)	± 3.9	∞
Spatial resolution	± 0.0	Rectangular	√3	1	± 0.0	∞
Boundary effects	± 5.5	Rectangular	√3	1	± 3.2	∞
Probe linearity	± 4.7	Rectangular	√3	1	± 2.7	∞
Detection limit	± 1.0	Rectangular	√3	1	± 0.6	∞
Readout electronics	± 1.0	Normal	1	1	± 1.0	∞
Response time	± 0.8	Rectangular	√3	1	± 0.5	∞
Integration time	± 1.4	Rectangular	√3	1	± 0.8	∞
RF ambient conditions	± 3.0	Rectangular	√3	1	± 1.7	∞
Mech. constraints of robot	± 0.4	Rectangular	√3	1	± 0.2	∞
Probe positioning	± 2.9	Rectangular	√3	1	± 1.7	∞
Extrapolation & integration	± 3.9	Rectangular	√3	1	± 2.3	∞
Test Sample Related						
Device positioning	± 6.0	Normal	√3	1	± 6.7	12
Device holder uncertainty	± 5.0	Normal	√3	1	± 5.9	8
Power drift	± 5.0	Rectangular	√3		± 2.9	∞
Phantom and Setup						
Phantom uncertainty	± 4.0	Rectangular	√3	1	± 2.3	∞
Liquid conductivity (target)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid conductivity (measured)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid permittivity (target)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid permittivity (measured)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Combined Standard Uncertainty					**± 13.3**	
Expanded Uncertainty (k=2)					**± 26.6**	

Measurement Uncertainty Table in accordance with IEEE Standard 1528-200X (Draft - see reference [3])

MEASUREMENT UNCERTAINTIES (Cont.)

UNCERTAINTY BUDGET FOR SYSTEM VALIDATION

Error Description	Uncertainty Value ±%	Probability Distribution	Divisor	c_i 1g	Standard Uncertainty ±% (1g)	v_i or v_{eff}
Measurement System						
Probe calibration	± 4.8	Normal	1	1	± 4.8	∞
Axial isotropy of the probe	± 4.7	Rectangular	√3	$(1-c_p)$	± 1.9	∞
Spherical isotropy of the probe	± 9.6	Rectangular	√3	(c_p)	± 3.9	∞
Spatial resolution	± 0.0	Rectangular	√3	1	± 0.0	∞
Boundary effects	± 5.5	Rectangular	√3	1	± 3.2	∞
Probe linearity	± 4.7	Rectangular	√3	1	± 2.7	∞
Detection limit	± 1.0	Rectangular	√3	1	± 0.6	∞
Readout electronics	± 1.0	Normal	1	1	± 1.0	∞
Response time	± 0.8	Rectangular	√3	1	± 0.5	∞
Integration time	± 1.4	Rectangular	√3	1	± 0.8	∞
RF ambient conditions	± 3.0	Rectangular	√3	1	± 1.7	∞
Mech. constraints of robot	± 0.4	Rectangular	√3	1	± 0.2	∞
Probe positioning	± 2.9	Rectangular	√3	1	± 1.7	∞
Extrapolation & integration	± 3.9	Rectangular	√3	1	± 2.3	∞
Dipole						
Dipole Axis to Liquid Distance	± 2.0	Rectangular	√3	1	± 1.2	∞
Input Power	± 4.7	Rectangular	√3	1	± 2.7	∞
Phantom and Setup						
Phantom uncertainty	± 4.0	Rectangular	√3	1	± 2.3	∞
Liquid conductivity (target)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid conductivity (measured)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid permittivity (target)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid permittivity (measured)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Combined Standard Uncertainty					**± 9.9**	
Expanded Uncertainty (k=2)					**± 19.8**	

Measurement Uncertainty Table in accordance with IEEE Standard 1528-200X (Draft - see reference [3])

16.0 REFERENCES

[1] Federal Communications Commission, “Radiofrequency radiation exposure evaluation: portable devices”, Rule Part 47 CFR §2.1093: 1999.

[2] Federal Communications Commission, “Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields”, OET Bulletin 65, Supplement C (Edition 01-01), FCC, Washington, D.C.: June 2001.

[3] IEEE Standards Coordinating Committee 34, Std 1528-200X, “DRAFT Recommended Practice for Determining the Spatial-Peak Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques”.

APPENDIX A - SAR MEASUREMENT DATA

Date Tested: 11/27/03

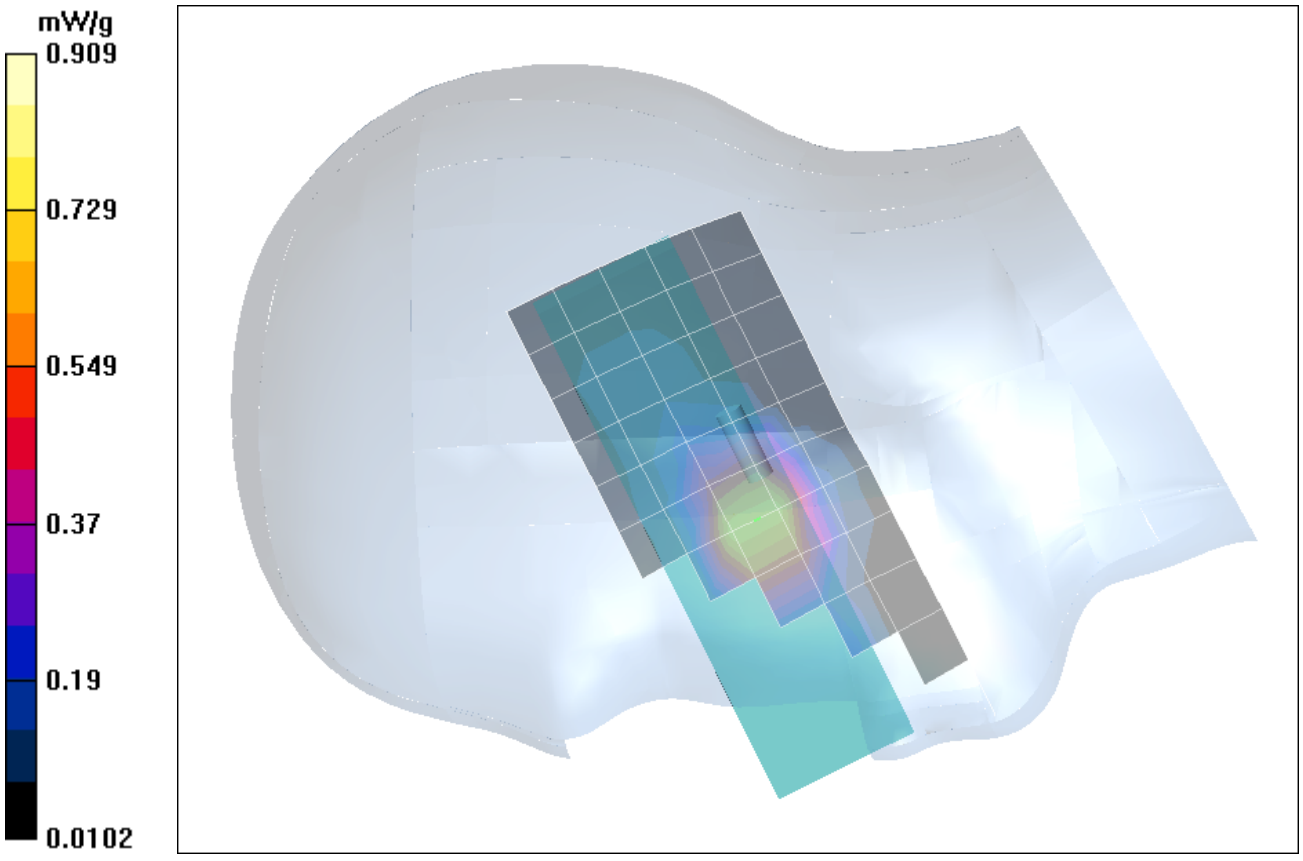
DUT: Amoi Electronics Model: A90; Type: Portable Handset; Serial: C57358N537X0T9N
Ambient Temp: 23.9 °C; Fluid Temp: 22.5 °C; Barometric Pressure: 103.2 kPa; Humidity: 58%

Communication System: PCS GSM
3.7 V Lithium-ion Battery Pack (Standard)
RF Output Power: 29.16 dBm (Conducted)
Frequency: 1880 MHz; Channel 661; Duty Cycle: 1:5
Medium: HSL1880 (σ = 1.41 mho/m, ε_r = 38.5, ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(5.2, 5.2, 5.2); Calibrated: 26/02/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 13/10/2003
- Phantom: SAM front; Type: SAM 4.0; Serial: 1033
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

Head SAR - Right Ear Cheek/Touch Position with Standard Battery - Mid Ch/Area Scan (6x13x1):
Measurement grid: dx=15mm, dy=15mm

Head SAR - Right Ear Cheek/Touch Touch with Standard Battery - Mid Ch/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 1.28 W/kg
SAR(1 g) = 0.826 mW/g; SAR(10 g) = 0.458 mW/g
Reference Value = 7.71 V/m



Date Tested: 11/27/03

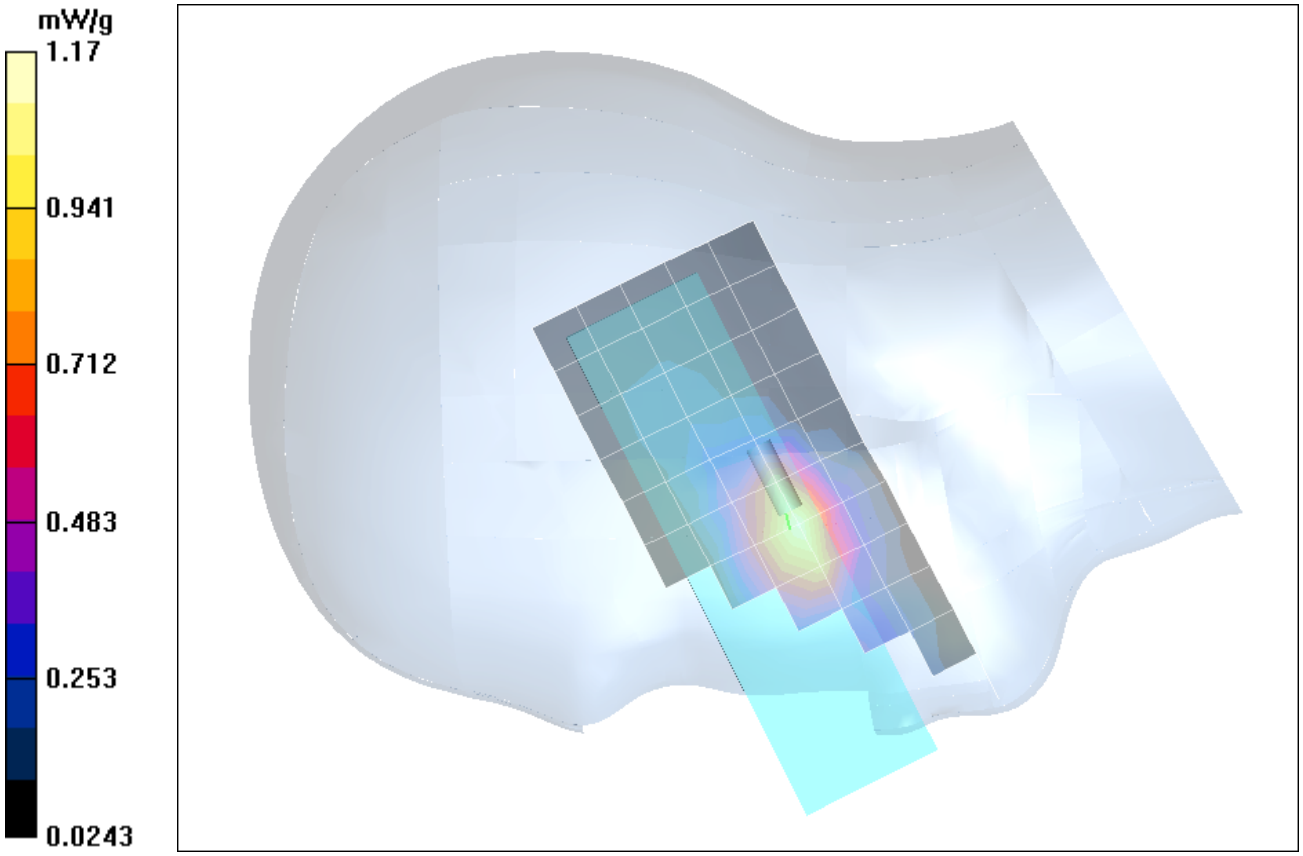
DUT: Amoi Electronics Model: A90; Type: Portable Handset; Serial: C57358N537X0T9N
Ambient Temp: 23.9 °C; Fluid Temp: 22.5 °C; Barometric Pressure: 103.2 kPa; Humidity: 58%

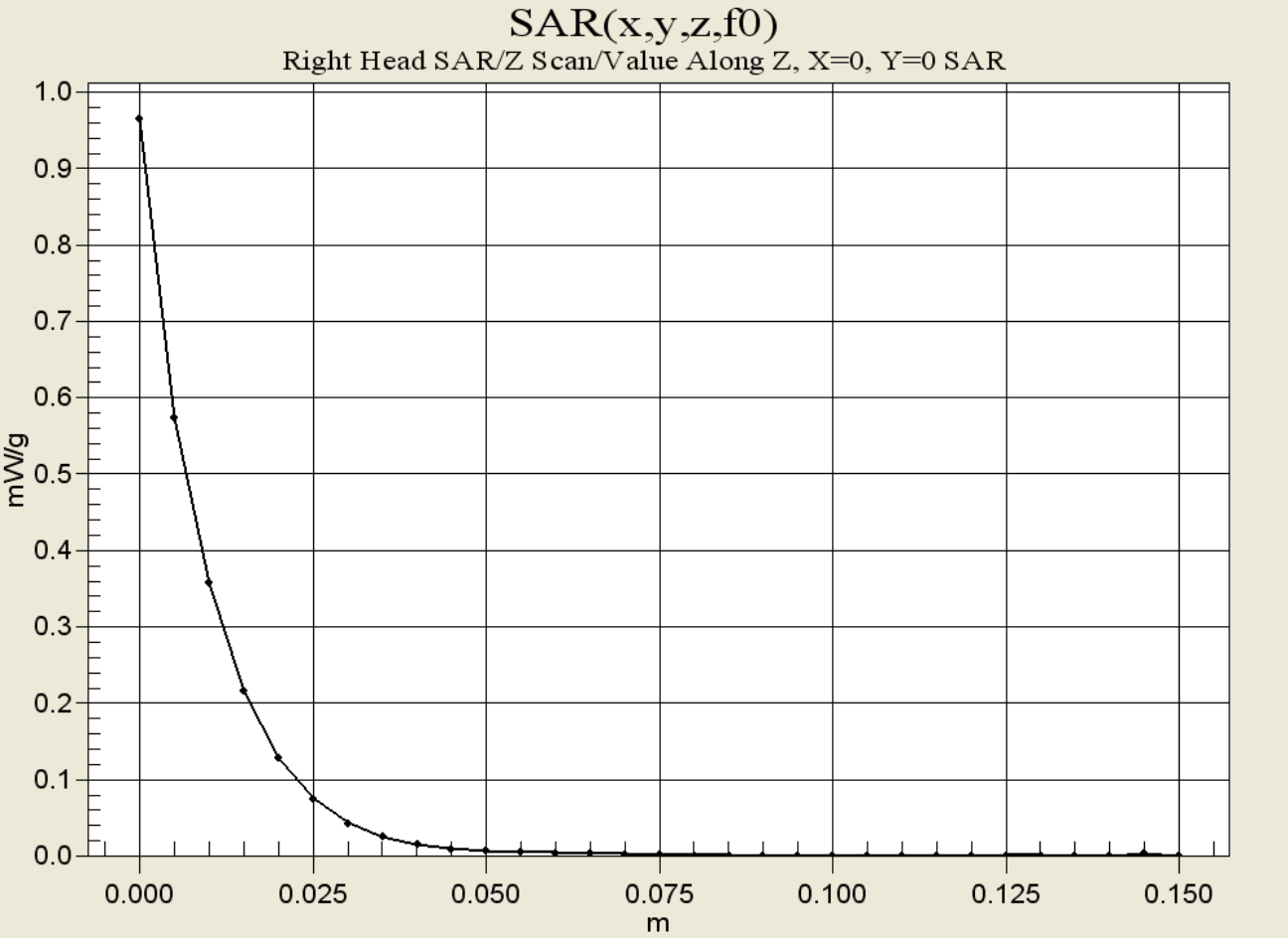
Communication System: PCS GSM
3.7 V Lithium-ion Battery Pack (Standard)
RF Output Power: 29.02 dBm (Conducted)
Frequency: 1850.2 MHz; Channel 512; Duty Cycle: 1:5
Medium: HSL1880 (σ = 1.41 mho/m, ε_r = 38.5, ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(5.2, 5.2, 5.2); Calibrated: 26/02/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 13/10/2003
- Phantom: SAM front; Type: SAM 4.0; Serial: 1033
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

Head SAR - Right Ear Cheek/Touch Position with Standard Battery - Low Ch/Area Scan (6x13x1):
Measurement grid: dx=15mm, dy=15mm

Head SAR - Right Ear Cheek/Touch Position with Standard Battery - Low Ch/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 1.63 W/kg
SAR(1 g) = 1.06 mW/g; SAR(10 g) = 0.591 mW/g
Reference Value = 8.2 V/m




SAR(x,y,z,f0)
Right Head SAR/Z Scan/Value Along Z, X=0, Y=0 SAR
mW/g
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.000
0.025
0.050
0.075
0.100
0.125
0.150
m

Date Tested: 11/27/03

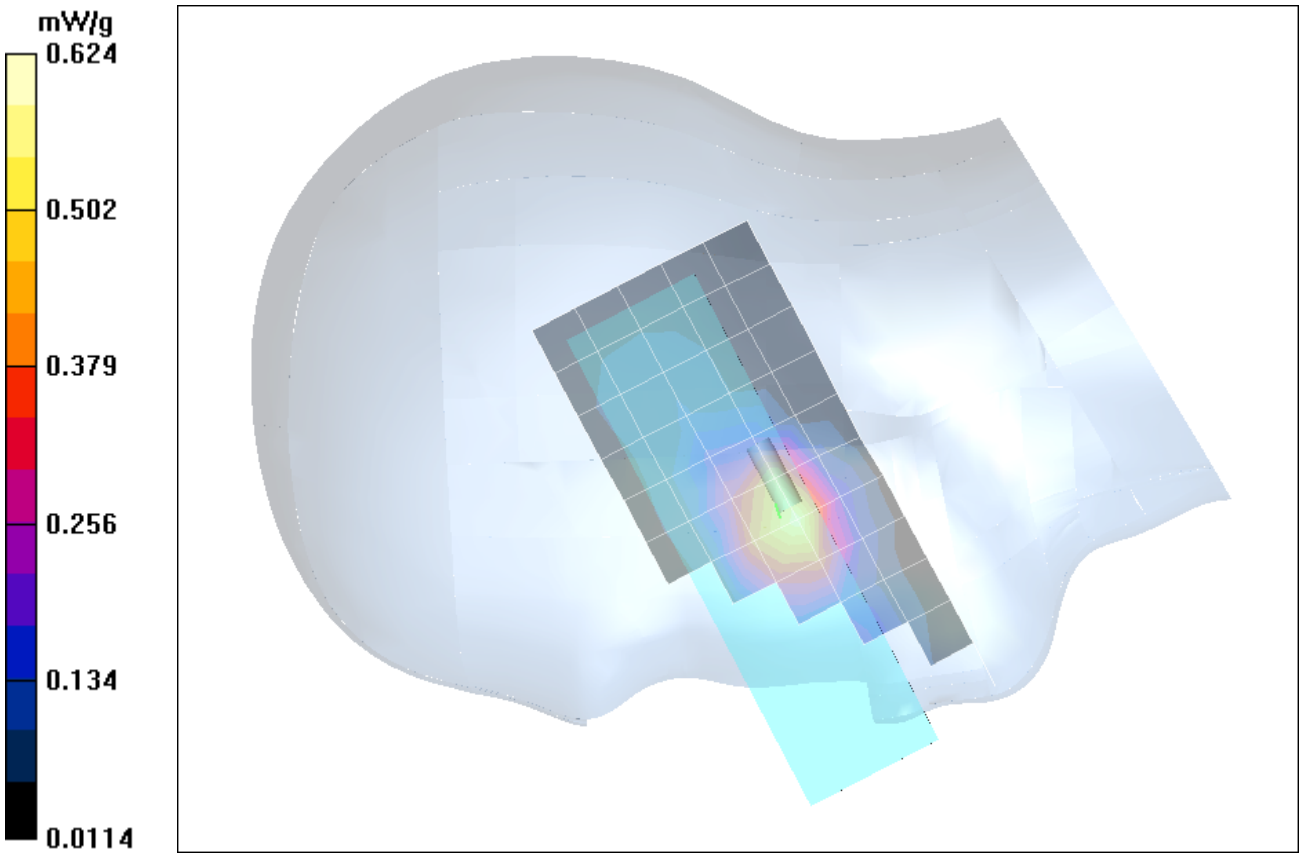
DUT: Amoi Electronics Model: A90; Type: Portable Handset; Serial: C57358N537X0T9N
Ambient Temp: 23.9 °C; Fluid Temp: 22.5 °C; Barometric Pressure: 103.2 kPa; Humidity: 58%

Communication System: PCS GSM
3.7 V Lithium-ion Battery Pack (Standard)
RF Output Power: 29.09 dBm (Conducted)
Frequency: 1909.8 MHz; Channel 810; Duty Cycle: 1:5
Medium: HSL1880 (σ = 1.41 mho/m, ε_r = 38.5, ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(5.2, 5.2, 5.2); Calibrated: 26/02/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 13/10/2003
- Phantom: SAM front; Type: SAM 4.0; Serial: 1033
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

Head SAR - Right Ear Cheek/Touch Position with Standard Battery - High Ch/Area Scan (6x13x1):
Measurement grid: dx=15mm, dy=15mm

Head SAR - Right Ear Cheek/Touch Position with Standard Battery - High Ch/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 0.896 W/kg
SAR(1 g) = 0.566 mW/g; SAR(10 g) = 0.314 mW/g
Reference Value = 7.5 V/m



Date Tested: 11/27/03

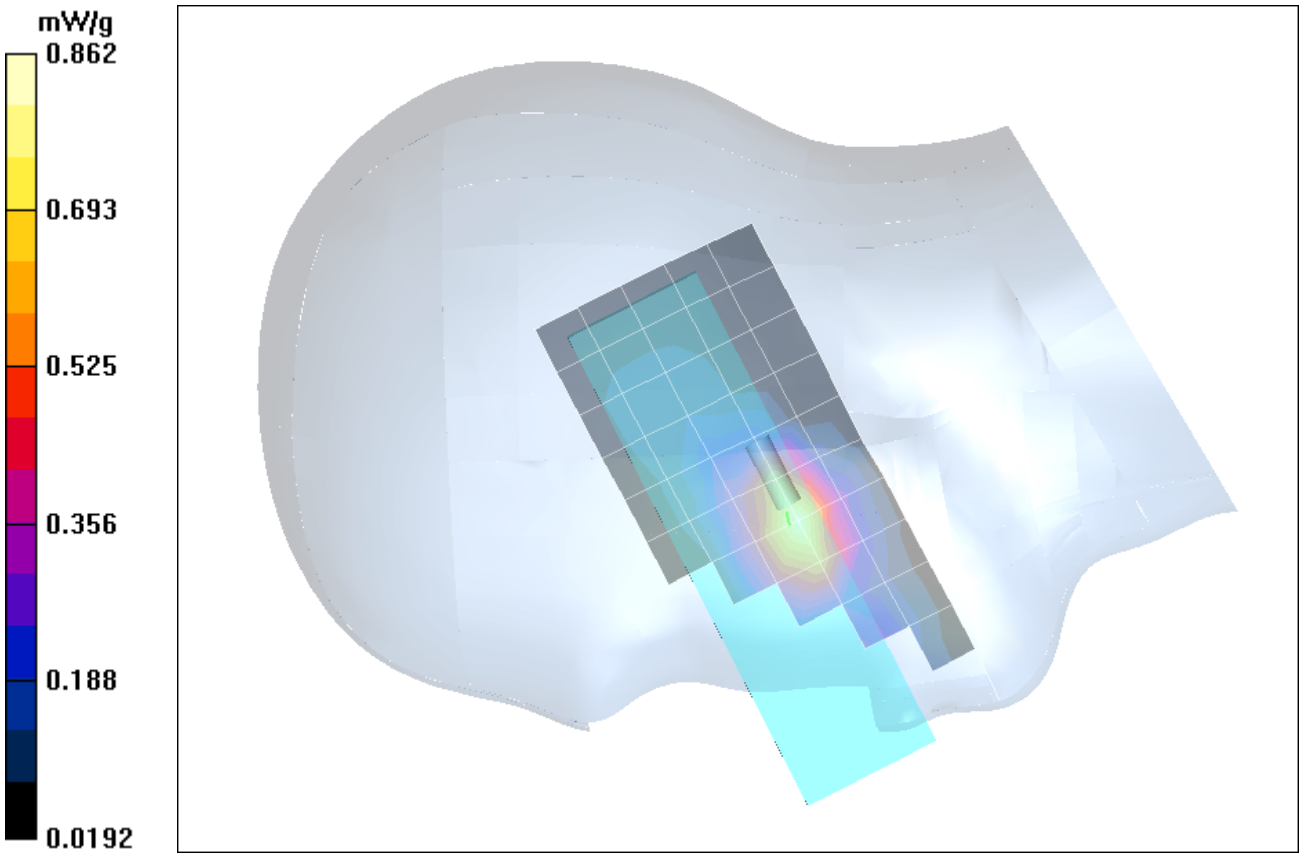
DUT: Amoi Electronics Model: A90; Type: Portable Handset; Serial: C57358N537X0T9N
Ambient Temp: 23.9 °C; Fluid Temp: 22.5 °C; Barometric Pressure: 103.2 kPa; Humidity: 58%

Communication System: PCS GSM
3.7 V Lithium-ion Battery Pack (Slim)
RF Output Power: 29.16 dBm (Conducted)
Frequency: 1880 MHz; Channel 661; Duty Cycle: 1:5
Medium: HSL1880 (σ = 1.41 mho/m, ε_r = 38.5, ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(5.2, 5.2, 5.2); Calibrated: 26/02/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 13/10/2003
- Phantom: SAM front; Type: SAM 4.0; Serial: 1033
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

Head SAR - Right Ear Cheek/Touch Position with Slim Battery - Mid Ch/Area Scan (6x13x1):
Measurement grid: dx=15mm, dy=15mm

Head SAR - Right Ear Cheek/Touch Position with Slim Battery - Mid Ch/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 1.21 W/kg
SAR(1 g) = 0.780 mW/g; SAR(10 g) = 0.432 mW/g
Reference Value = 7.84 V/m



Date Tested: 11/27/03

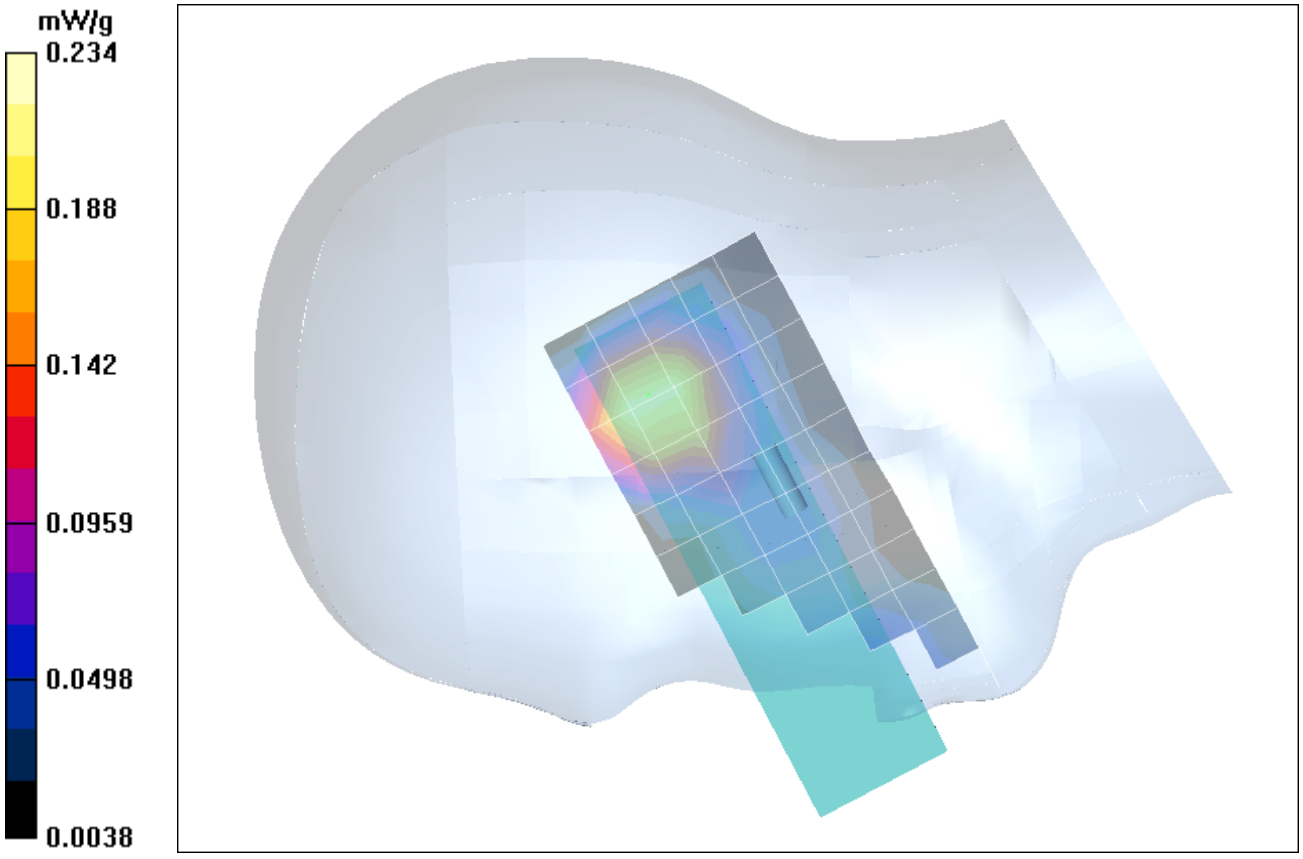
DUT: Amoi Electronics Model: A90; Type: Portable Handset; Serial: C57358N537X0T9N
Ambient Temp: 23.9 °C; Fluid Temp: 22.5 °C; Barometric Pressure: 103.2 kPa; Humidity: 58%

Communication System: PCS GSM
3.7 V Lithium-ion Battery Pack (Standard)
RF Output Power: 29.13 dBm (Conducted)
Frequency: 1880 MHz; Channel 661; Duty Cycle: 1:5
Medium: HSL1880 (σ = 1.41 mho/m, ε_r = 38.5, ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(5.2, 5.2, 5.2); Calibrated: 26/02/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 13/10/2003
- Phantom: SAM front; Type: SAM 4.0; Serial: 1033
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

Head SAR - Right Ear Ear/Tilt (15°) Position with Standard Battery - Mid Ch/Area Scan (6x13x1):
Measurement grid: dx=15mm, dy=15mm

Head SAR - Right Ear Ear/Tilt (15°) Position with Standard Battery - Mid Ch/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 0.338 W/kg
SAR(1 g) = 0.223 mW/g; SAR(10 g) = 0.134 mW/g
Reference Value = 11.8 V/m



Date Tested: 11/27/03

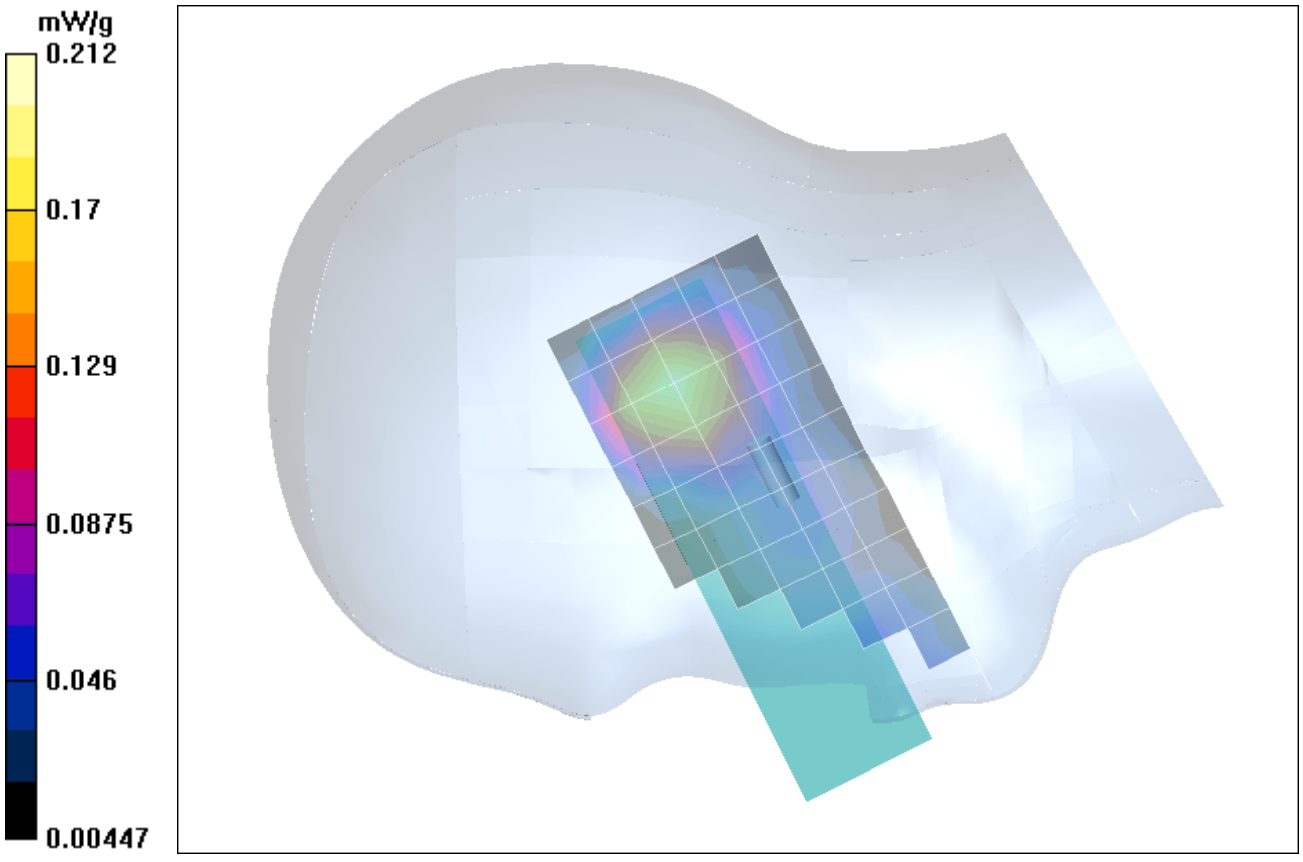
DUT: Amoi Electronics Model: A90; Type: Portable Handset; Serial: C57358N537X0T9N I
Ambient Temp: 23.9 °C; Fluid Temp: 22.5 °C; Barometric Pressure: 103.2 kPa; Humidity: 58%

Communication System: GSM PCS
3.7 V Lithium-ion Battery Pack (Slim)
RF Output Power: 29.17 dBm (Conducted)
Frequency: 1880 MHz; Channel 661; Duty Cycle: 1:5
Medium: HSL1880 (σ = 1.41 mho/m, ε_r = 38.5, ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(5.2, 5.2, 5.2); Calibrated: 26/02/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 13/10/2003
- Phantom: SAM front; Type: SAM 4.0; Serial: 1033
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

Head-SAR - Right Ear Ear/Tilt (15°) Position with Slim Battery - Mid Ch/Area Scan (6x13x1):
Measurement grid: dx=15mm, dy=15mm

Head-SAR - Right Ear Ear/Tilt (15°) Position with Slim Battery - Mid Ch/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 0.268 W/kg
SAR(1 g) = 0.196 mW/g; SAR(10 g) = 0.124 mW/g
Reference Value = 11.8 V/m



Date Tested: 11/28/03

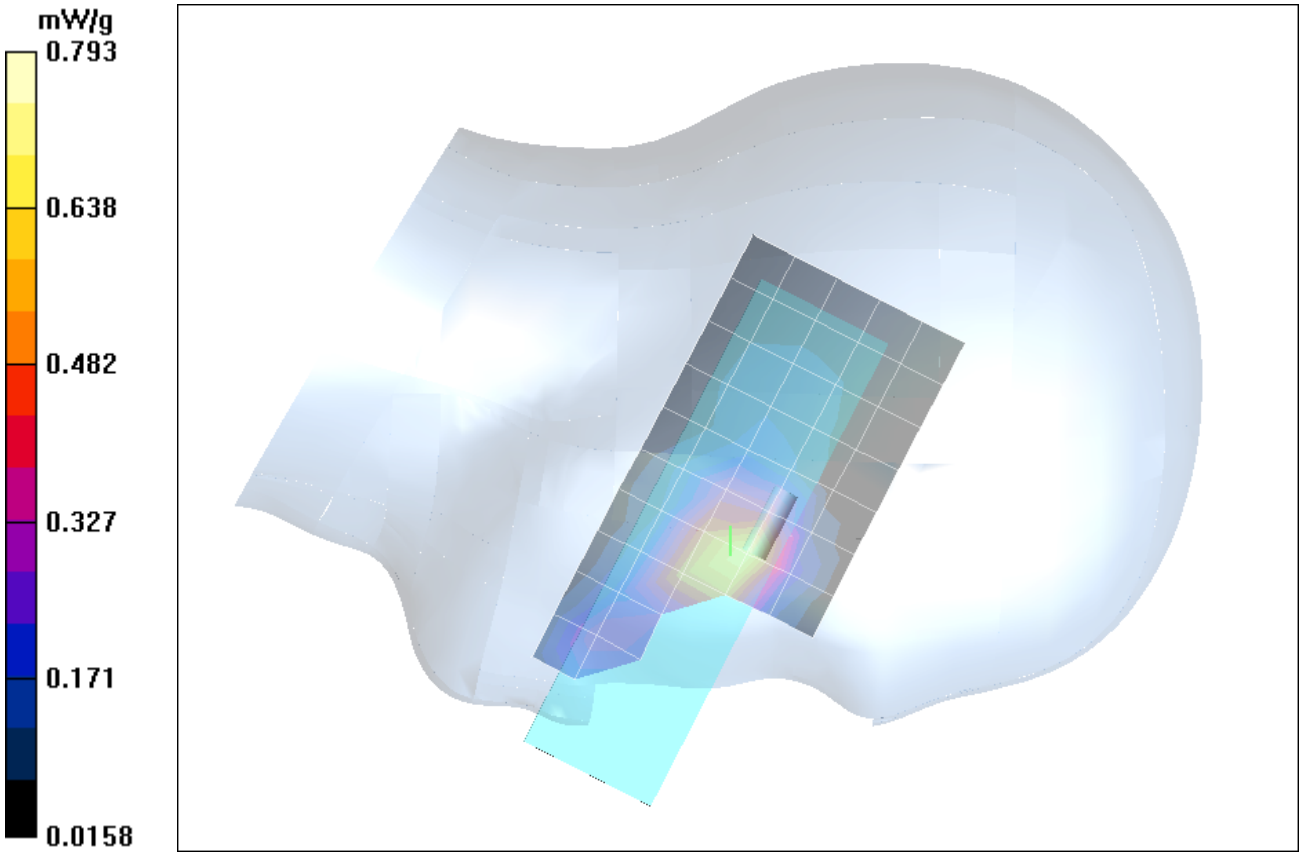
DUT: Amoi Electronics Model: A90; Type: Portable Handset; Serial: C57358N537X0T9N
Ambient Temp: 24.4 °C; Fluid Temp: 22.4 °C; Barometric Pressure: 101.1 kPa; Humidity: 59%

Communication System: PCS GSM
3.7 V Lithium-ion Battery Pack (Standard)
RF Output Power: 29.18 dBm (Conducted)
Frequency: 1880 MHz; Channel: 661; Duty Cycle: 1:5
Medium: HSL1880 (σ = 1.41 mho/m, ε_r = 38.3, ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(5.2, 5.2, 5.2); Calibrated: 26/02/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 13/10/2003
- Phantom: SAM front; Type: SAM 4.0; Serial: 1033
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

Head SAR - Left Ear Cheek/Touch Position with Standard Battery - Mid Ch/Area Scan (6x13x1):
Measurement grid: dx=15mm, dy=15mm

Head SAR - Left Ear Cheek/Touch Position with Standard Battery - Mid Ch/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 1.16 W/kg
SAR(1 g) = 0.724 mW/g; SAR(10 g) = 0.4 mW/g
Reference Value = 7.27 V/m



Date Tested: 11/28/03

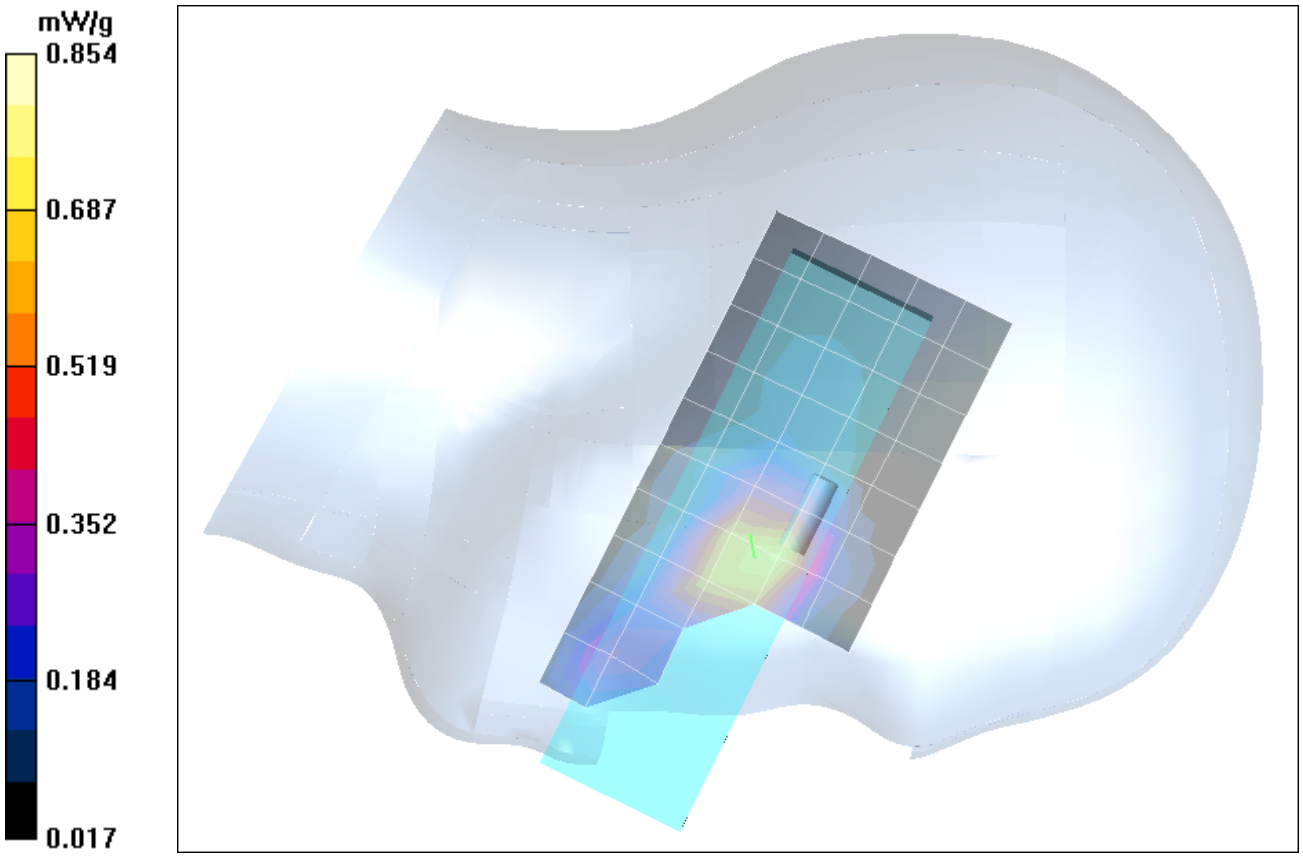
DUT: Amoi Electronics Model: A90; Type: Portable Handset; Serial: C57358N537X0T9N
Ambient Temp: 24.4 °C; Fluid Temp: 22.4 °C; Barometric Pressure: 101.1 kPa; Humidity: 59%

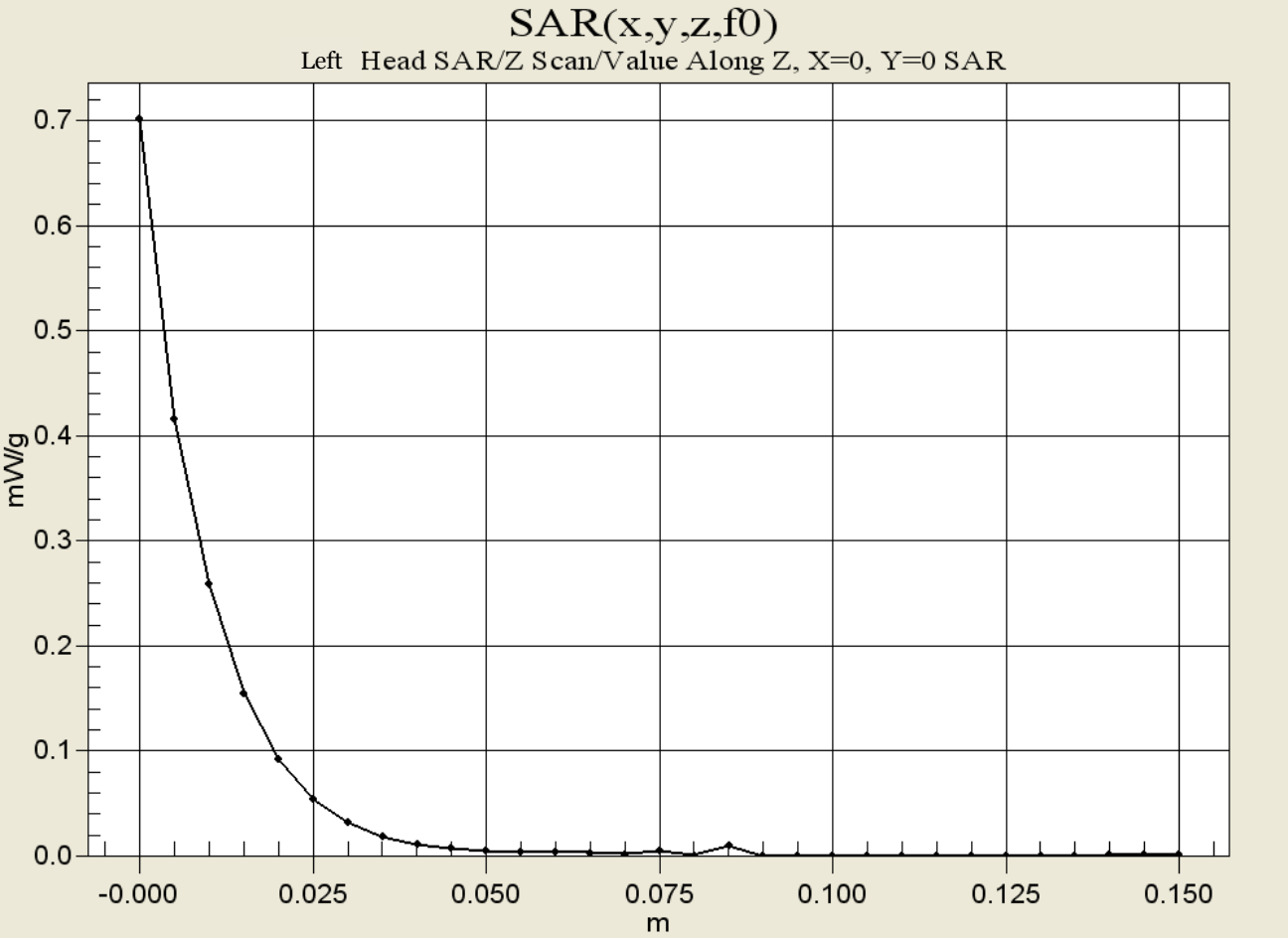
Communication System: PCS GSM
3.7 V Lithium-ion Battery Pack (Slim)
RF Output Power: 29.14 dBm (Conducted)
Frequency: 1880 MHz; Channel 661; Duty Cycle: 1:5
Medium: HSL1880 (σ = 1.41 mho/m, ε_r = 38.3, ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(5.2, 5.2, 5.2); Calibrated: 26/02/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 13/10/2003
- Phantom: SAM front; Type: SAM 4.0; Serial: 1033
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

Head SAR - Left Ear Cheek/Touch Position with Slim Battery - Mid Ch/Area Scan (6x13x1):
Measurement grid: dx=15mm, dy=15mm

Head SAR - Left Ear Cheek/Touch Position with Slim Battery - Mid Ch/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 1.24 W/kg
SAR(1 g) = 0.778 mW/g; SAR(10 g) = 0.432 mW/g
Reference Value = 6.94 V/m




SAR(x,y,z,f0)
Left Head SAR/Z Scan/Value Along Z, X=0, Y=0 SAR
mW/g
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.000
0.025
0.050
0.075
0.100
0.125
0.150
m

Date Tested: 11/28/03

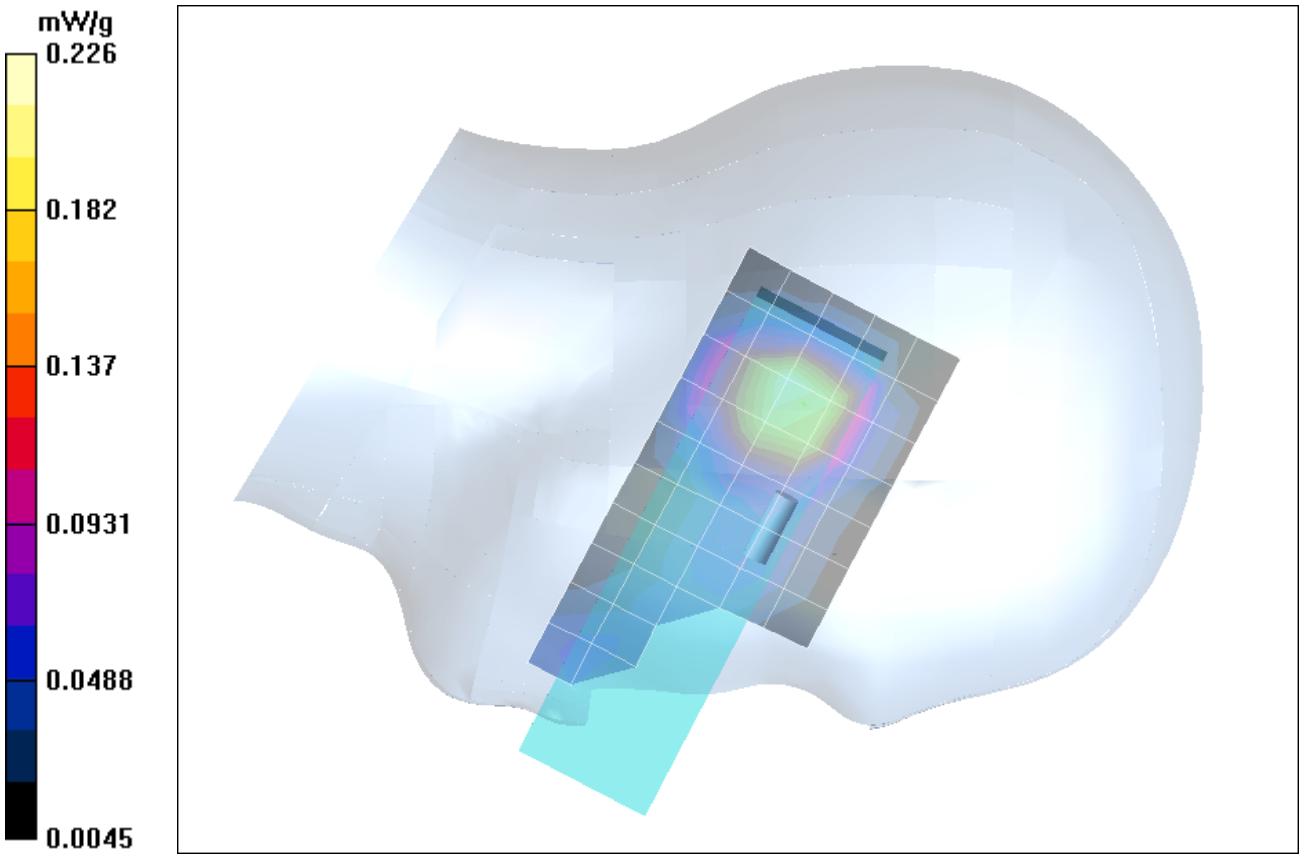
DUT: Amoi Electronics Model: A90; Type: Portable Handset; Serial: C57358N537X0T9N
Ambient Temp: 24.4 °C; Fluid Temp: 22.4 °C; Barometric Pressure: 101.1 kPa; Humidity: 59%

Communication System: PCS GSM
3.7 V Lithium-ion Battery Pack (Standard)
RF Output Power: 29.17 dBm (Conducted)
Frequency: 1880 MHz; Channel 661; Duty Cycle: 1:5
Medium: HSL1880 (σ = 1.41 mho/m, ε_r = 38.3, ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(5.2, 5.2, 5.2); Calibrated: 26/02/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 13/10/2003
- Phantom: SAM front; Type: SAM 4.0; Serial: 1033
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

Head SAR - Left Ear Ear/Tilt (15°) Position with Standard Battery - Mid Ch/Area Scan (6x13x1):
Measurement grid: dx=15mm, dy=15mm

Head SAR - Left Ear Ear/Tilt (15°) Position with Standard Battery - Mid Ch/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 0.297 W/kg
SAR(1 g) = 0.211 mW/g; SAR(10 g) = 0.131 mW/g
Reference Value = 11 V/m



Date Tested: 11/28/03

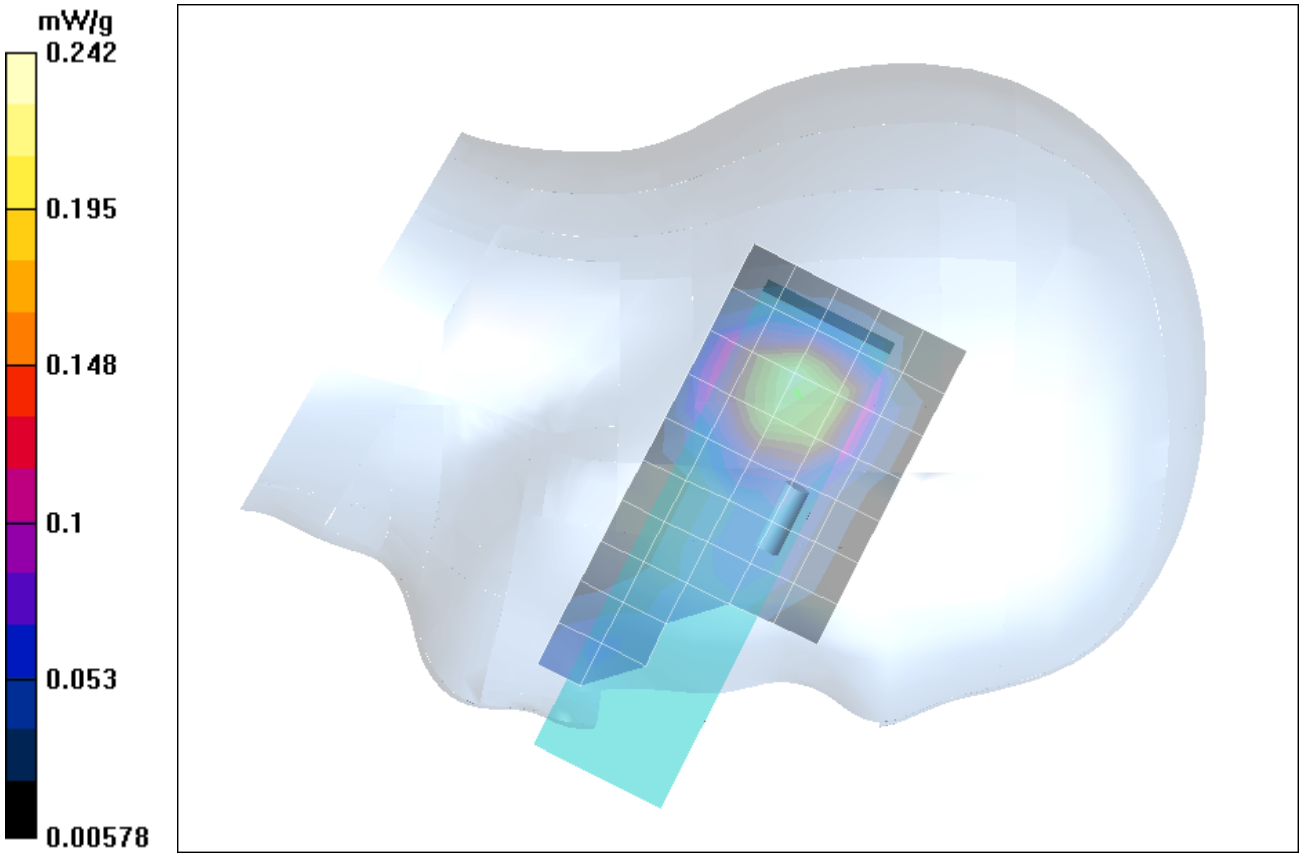
DUT: Amoi Electronics Model: A90; Type: Portable Handset; Serial: C57358N537X0T9N
Ambient Temp: 24.4 °C; Fluid Temp: 22.4 °C; Barometric Pressure: 101.1 kPa; Humidity: 59%

Communication System: PCS GSM
3.7 V Lithium-ion Battery Pack (Slim)
RF Output Power: 29.17 dBm (Conducted)
Frequency: 1880 MHz; Channel 661; Duty Cycle: 1:5
Medium: HSL1880 (σ = 1.41 mho/m, ε_r = 38.3, ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(5.2, 5.2, 5.2); Calibrated: 26/02/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 13/10/2003
- Phantom: SAM front; Type: SAM 4.0; Serial: 1033
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

Head SAR - Left Ear Ear/Tilt (15°) Position with Slim Battery - Mid Ch/Area Scan (6x13x1):
Measurement grid: dx=15mm, dy=15mm

Head SAR - Left Ear Ear/Tilt (15°) Position with Slim Battery - Mid Ch/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 0.315 W/kg
SAR(1 g) = 0.223 mW/g; SAR(10 g) = 0.138 mW/g
Reference Value = 11.2 V/m



Date Tested: 12/01/03

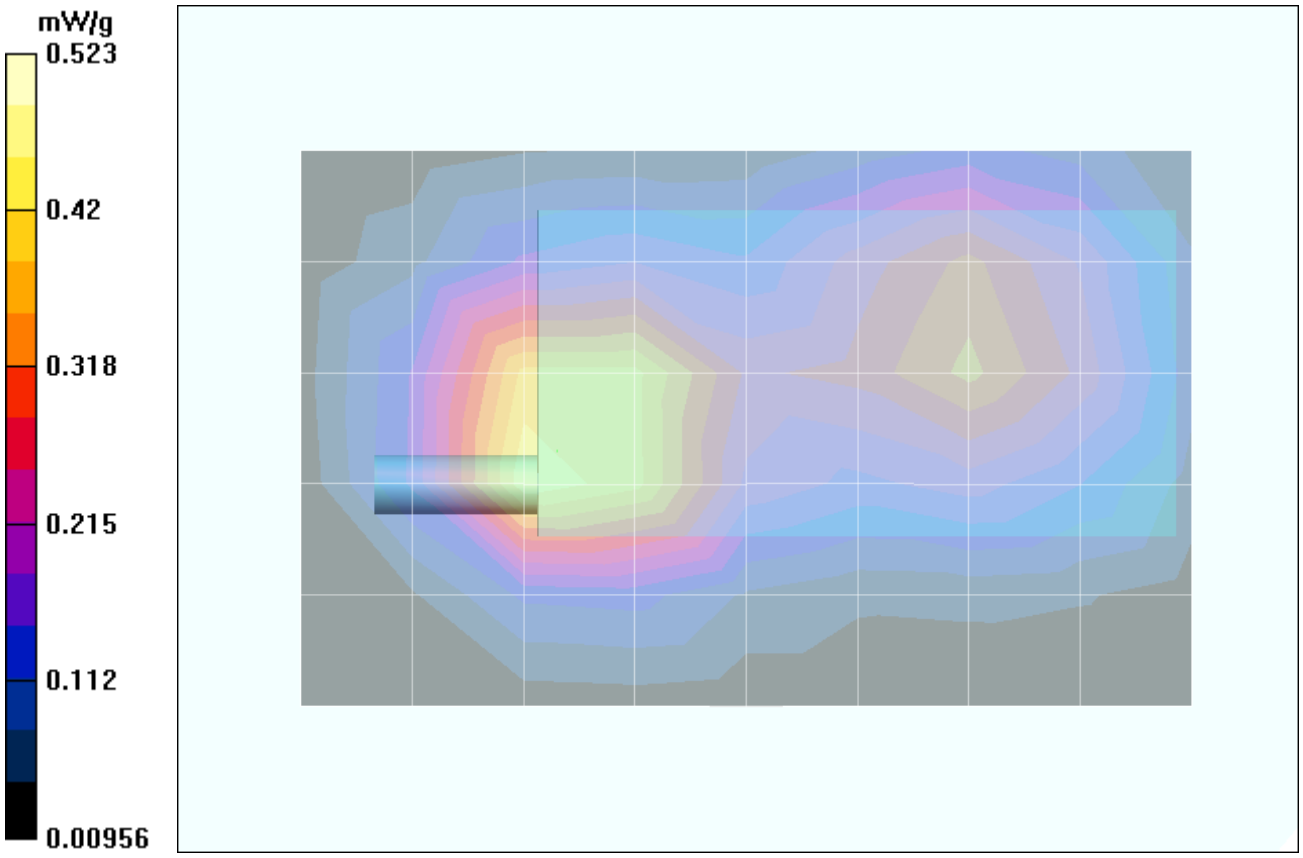
DUT: Amoi Electronics Model: A90; Type: Portable Handset; Serial: C57358N537X0T9N; Accessory: Ear-Microphone
Ambient Temp: 24.2 °C; Fluid Temp: 22.0 °C; Barometric Pressure: 102.6 kPa; Humidity: 60%

Communication System: PCS GPRS
3.7 V Lithium-ion Battery Pack (Standard)
RF Output Power: 29.18 dBm (Conducted)
Frequency: 1880 MHz; Channel 661; Duty Cycle: 1:5
Medium: M1880 (σ = 1.56 mho/m, ε_r = 51.6, ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(4.9, 4.9, 4.9); Calibrated: 26/02/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 13/10/2003
- Phantom: SAM front; Type: SAM 4.0; Serial: 1033
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

Body-Worn - Back of Device with Standard Battery - 1.0 cm Separation Distance - Mid Ch/Area Scan (6x9x1):
Measurement grid: dx=15mm, dy=15mm

Body-Worn - Back of Device with Standard Battery - 1.0 cm Separation Distance - Mid Ch/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 0.781 W/kg
SAR(1 g) = 0.483 mW/g; SAR(10 g) = 0.279 mW/g
Reference Value = 17.3 V/m



Date Tested: 12/01/03

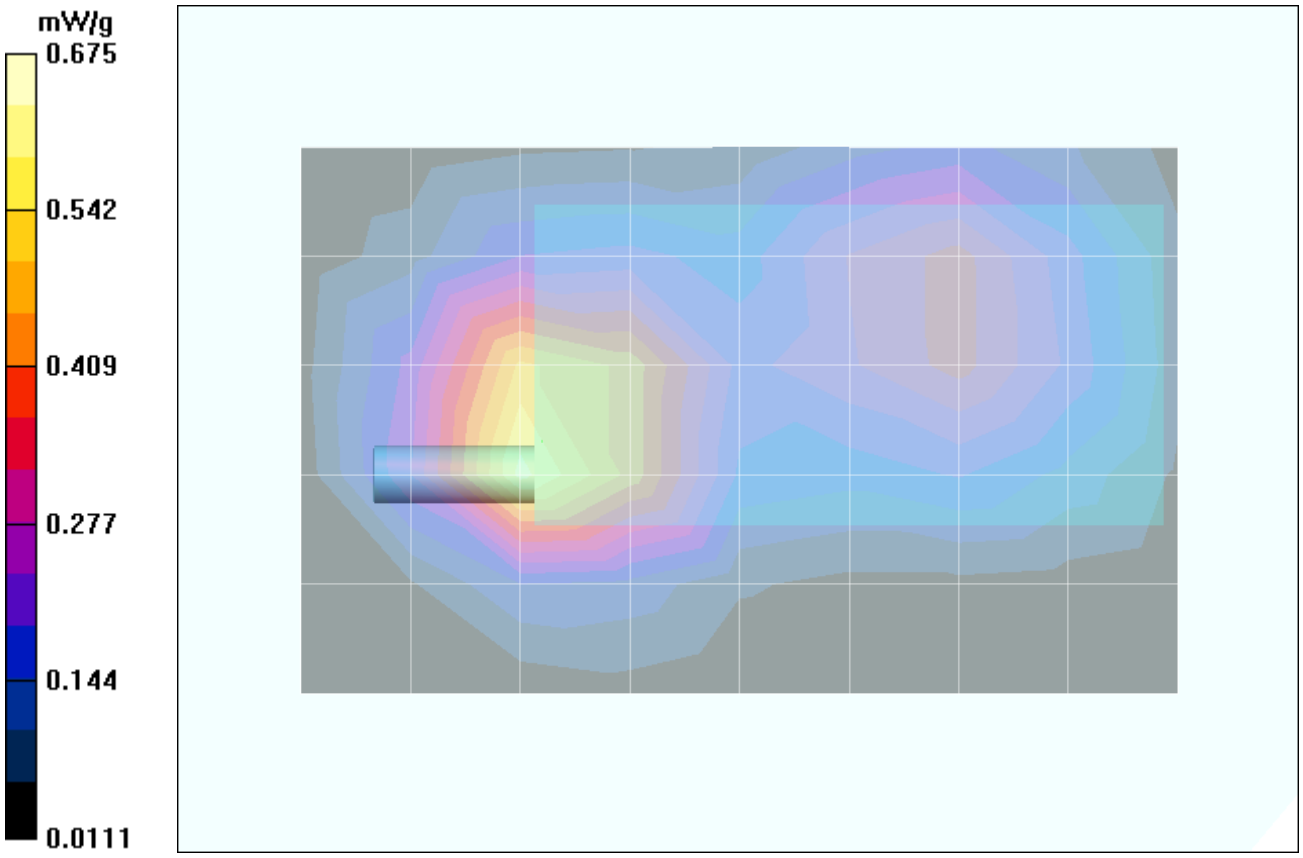
DUT: Amoi Electronics Model: A90; Type: Portable Handset; Serial: C57358N537X0T9N; Accessory: Ear-Microphone
Ambient Temp: 24.2 °C; Fluid Temp: 22.0 °C; Barometric Pressure: 102.6 kPa; Humidity: 60%

Communication System: PCS GPRS
3.7 V Lithium-ion Battery Pack (Slim)
RF Output Power: 29.18 dBm (Conducted)
Frequency: 1880 MHz; Channel: 661; Duty Cycle: 1:5
Medium: M1880 (σ = 1.56 mho/m, ε_r = 51.6, ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(4.9, 4.9, 4.9); Calibrated: 26/02/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 13/10/2003
- Phantom: SAM front; Type: SAM 4.0; Serial: 1033
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

Body-Worn - Back of Device with Slim Battery - 1.0 cm Separation Distance - Mid Ch/Area Scan (6x9x1):
Measurement grid: dx=15mm, dy=15mm

Body-Worn - Back of Device with Slim Battery - 1.0 cm Separation Distance - Mid Ch/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 1.02 W/kg
SAR(1 g) = 0.619 mW/g; SAR(10 g) = 0.347 mW/g
Reference Value = 19.4 V/m



Date Tested: 12/01/03

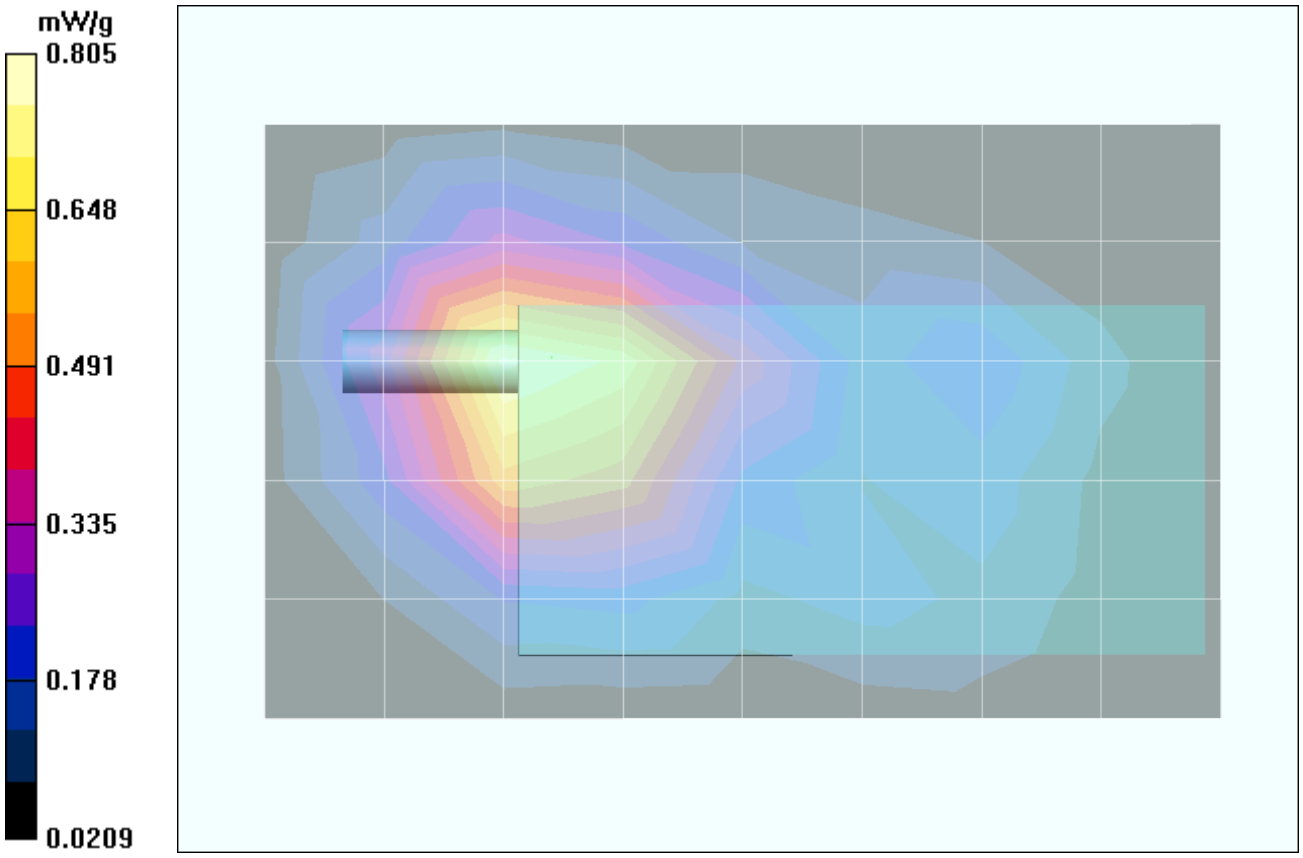
DUT: Amoi Electronics Model: A90; Type: Portable Handset; Serial: C57358N537X0T9N; Accessory: Ear-Microphone
Ambient Temp: 24.2 °C; Fluid Temp: 22.0 °C; Barometric Pressure: 102.6 kPa; Humidity: 60%

Communication System: PCS GPRS
3.7 V Lithium-ion Battery Pack (Standard)
RF Output Power: 29.18 dBm (Conducted)
Frequency: 1880 MHz; Channel 661; Duty Cycle: 1:5
Medium: M1880 (σ = 1.56 mho/m, ε_r = 51.6, ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(4.9, 4.9, 4.9); Calibrated: 26/02/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 13/10/2003
- Phantom: SAM front; Type: SAM 4.0; Serial: 1033
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

Body-Worn - Front of Device with Standard Battery - 0.0 cm Separation Distance - Mid Ch/Area Scan (6x9x1):
Measurement grid: dx=15mm, dy=15mm

Body-Worn - Front of Device with Standard Battery - 0.0 cm Separation Distance - Mid Ch/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 1.25 W/kg
SAR(1 g) = 0.753 mW/g; SAR(10 g) = 0.436 mW/g
Reference Value = 21 V/m



Date Tested: 12/01/03

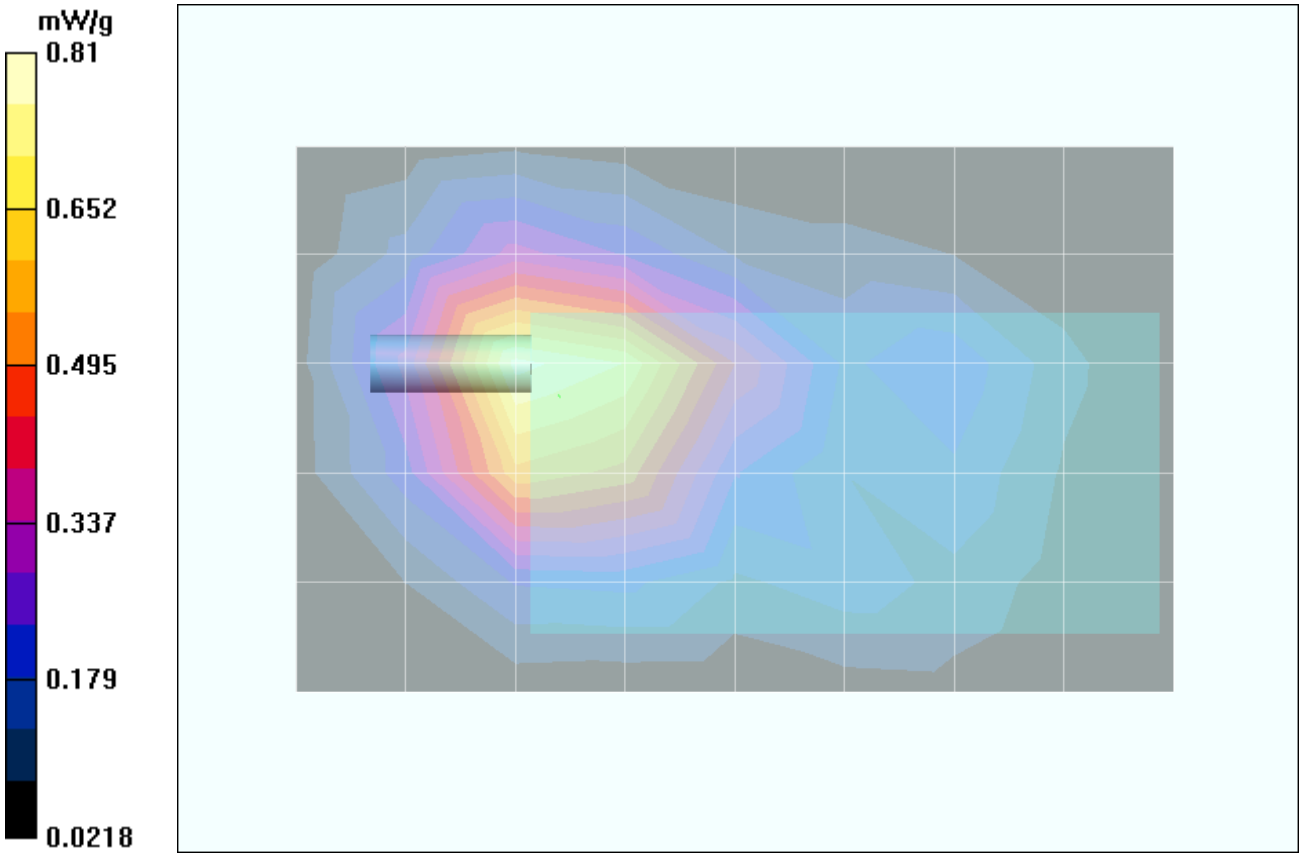
DUT: Amoi Electronics Model: A90; Type: Portable Handset; Serial: C57358N537X0T9N; Accessory: Ear-Microphone
Ambient Temp: 24.2 °C; Fluid Temp: 22.0 °C; Barometric Pressure: 102.6 kPa; Humidity: 60%

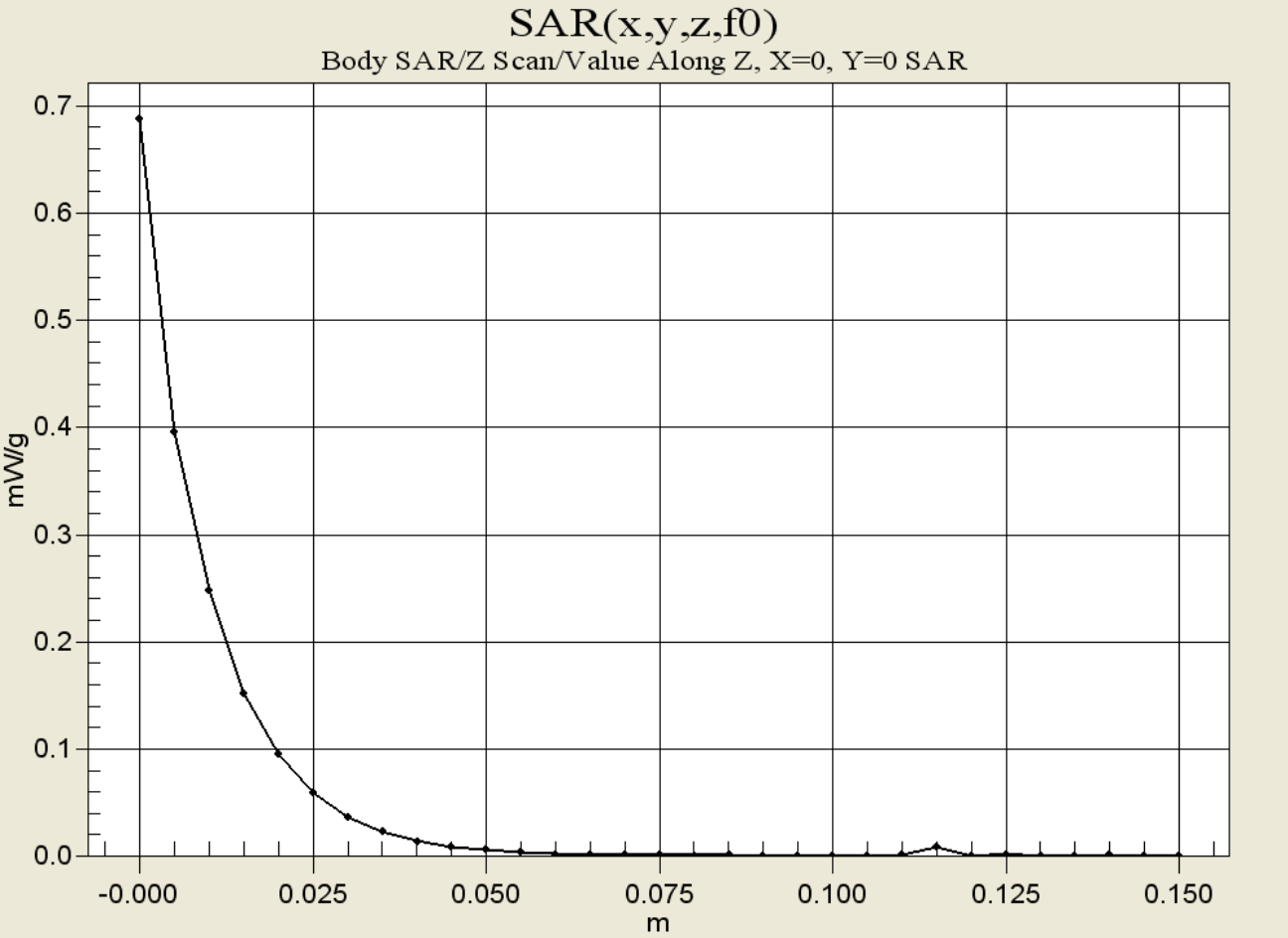
Communication System: PCS GPRS
3.7 V Lithium-ion Battery Pack (Slim)
RF Output Power: 29.18 dBm (Conducted)
Frequency: 1880 MHz; Channel 661; Duty Cycle: 1:5
Medium: M1880 (σ = 1.56 mho/m, ε_r = 51.6, ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(4.9, 4.9, 4.9); Calibrated: 26/02/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 13/10/2003
- Phantom: SAM front; Type: SAM 4.0; Serial: 1033
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

Body-Worn - Front of Device with Slim Battery - 0.0 cm Separation Distance - Mid Ch/Area Scan (6x9x1):
Measurement grid: dx=15mm, dy=15mm

Body-Worn - Front of Device with Slim Battery - 0.0 cm Separation Distance - Mid Ch/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 1.28 W/kg
SAR(1 g) = 0.763 mW/g; SAR(10 g) = 0.444 mW/g
Reference Value = 21 V/m




SAR(x,y,z,f0)
Body SAR/Z Scan/Value Along Z, X=0, Y=0 SAR
mW/g
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.000
0.025
0.050
0.075
0.100
0.125
0.150
m

APPENDIX B - SYSTEM PERFORMANCE CHECK DATA

Date Tested: 11/27/03

DUT: Dipole 1800 MHz; Model: D1800V2; Type: System Performance Check; Serial: 247

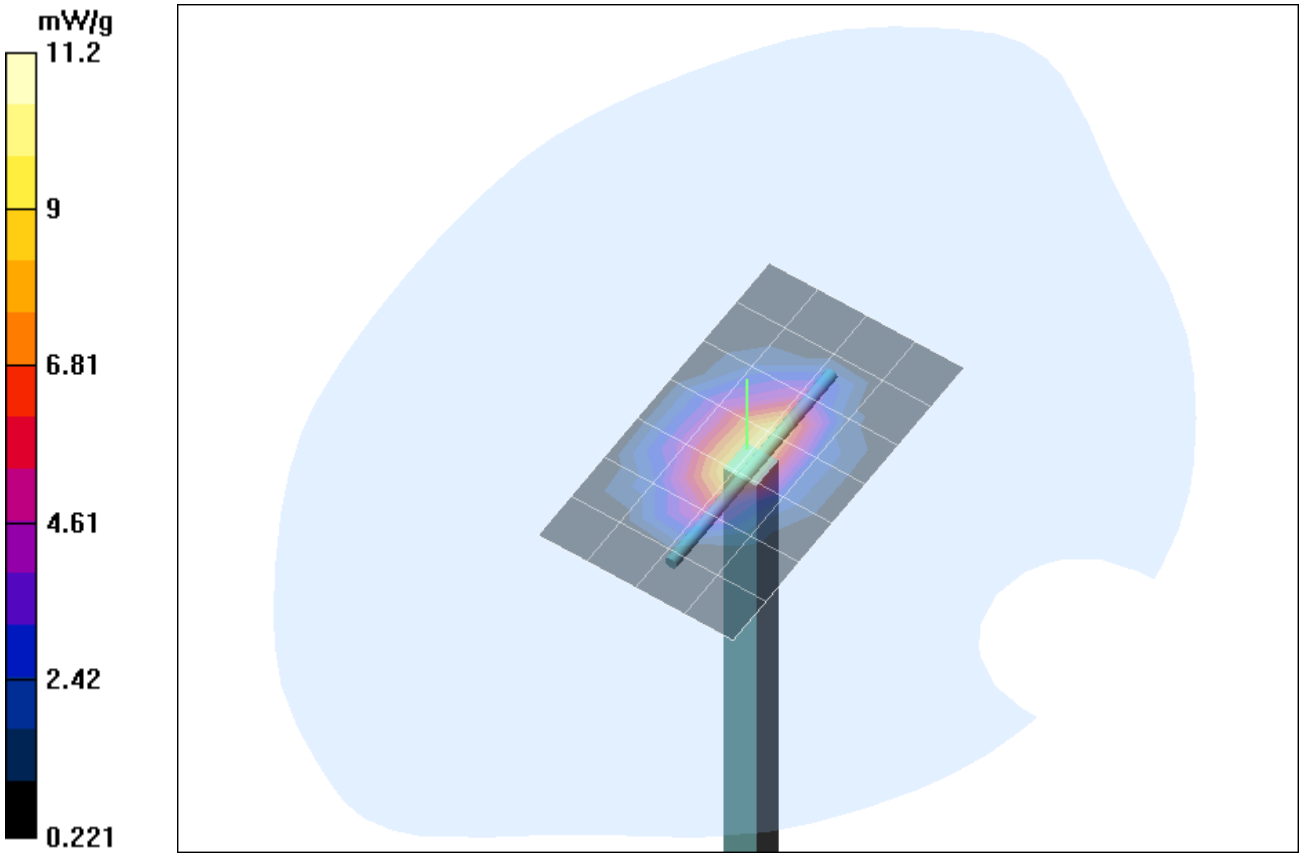
Ambient Temp: 23.9 °C; Fluid Temp: 22.7 °C; Barometric Pressure: 103.2 kPa; Humidity: 58%

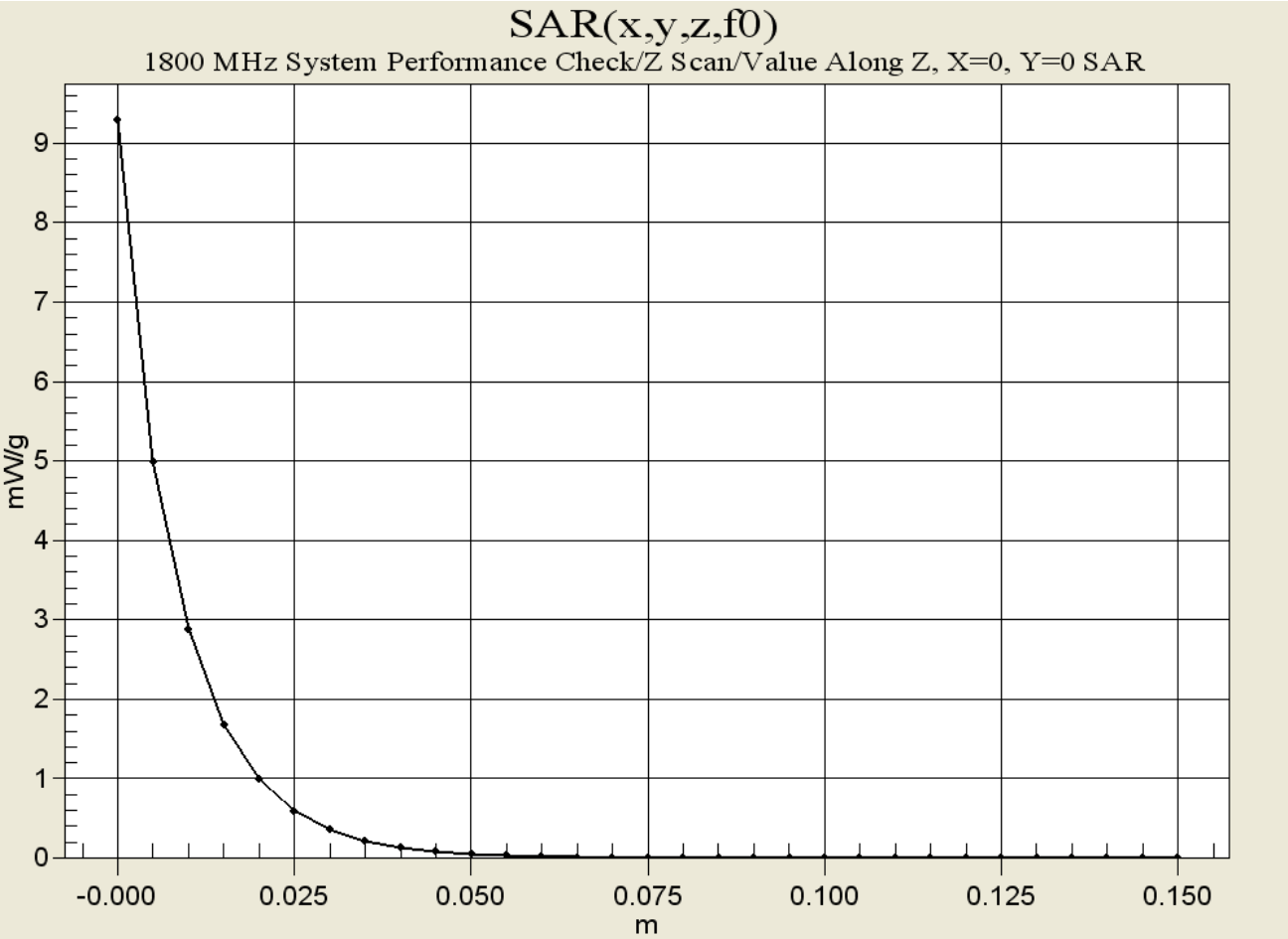
Communication System: CW
Forward Conducted Power: 250 mW
Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: HSL1800 (σ = 1.4 mho/m, ε_r = 38.6, ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(5.2, 5.2, 5.2); Calibrated: 26/02/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 13/10/2003
- Phantom: SAM front; Type: SAM 4.0; Serial: 1033
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

1800 MHz System Performance Check/Area Scan (5x8x1):
Measurement grid: dx=15mm, dy=15mm

1800 MHz System Performance Check/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 17.2 W/kg
SAR(1 g) = 10 mW/g; SAR(10 g) = 5.23 mW/g
Reference Value = 93.5 V/m
Power Drift = -0.03 dB




SAR(x,y,z,f0)
1800 MHz System Performance Check/Z Scan/Value Along Z, X=0, Y=0 SAR
mW/g
0
1
2
3
4
5
6
7
8
9
-0.000
0.025
0.050
0.075
0.100
0.125
0.150
m

Date Tested: 11/28/03

DUT: Dipole 1800 MHz; Model: D1800V2; Type: System Performance Check; Serial: 247

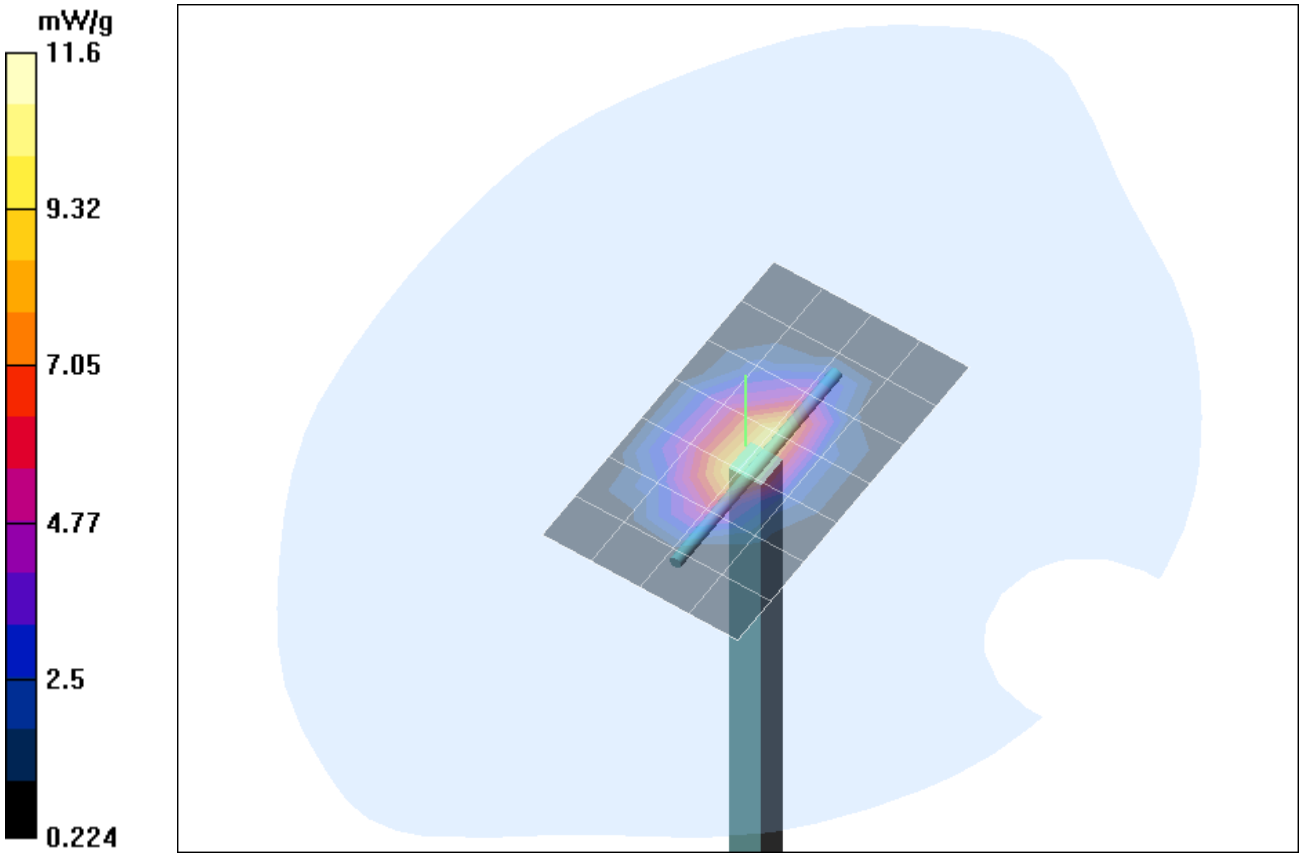
Ambient Temp: 24.4 °C; Fluid Temp: 22.4 °C; Barometric Pressure: 101.1 kPa; Humidity: 59%

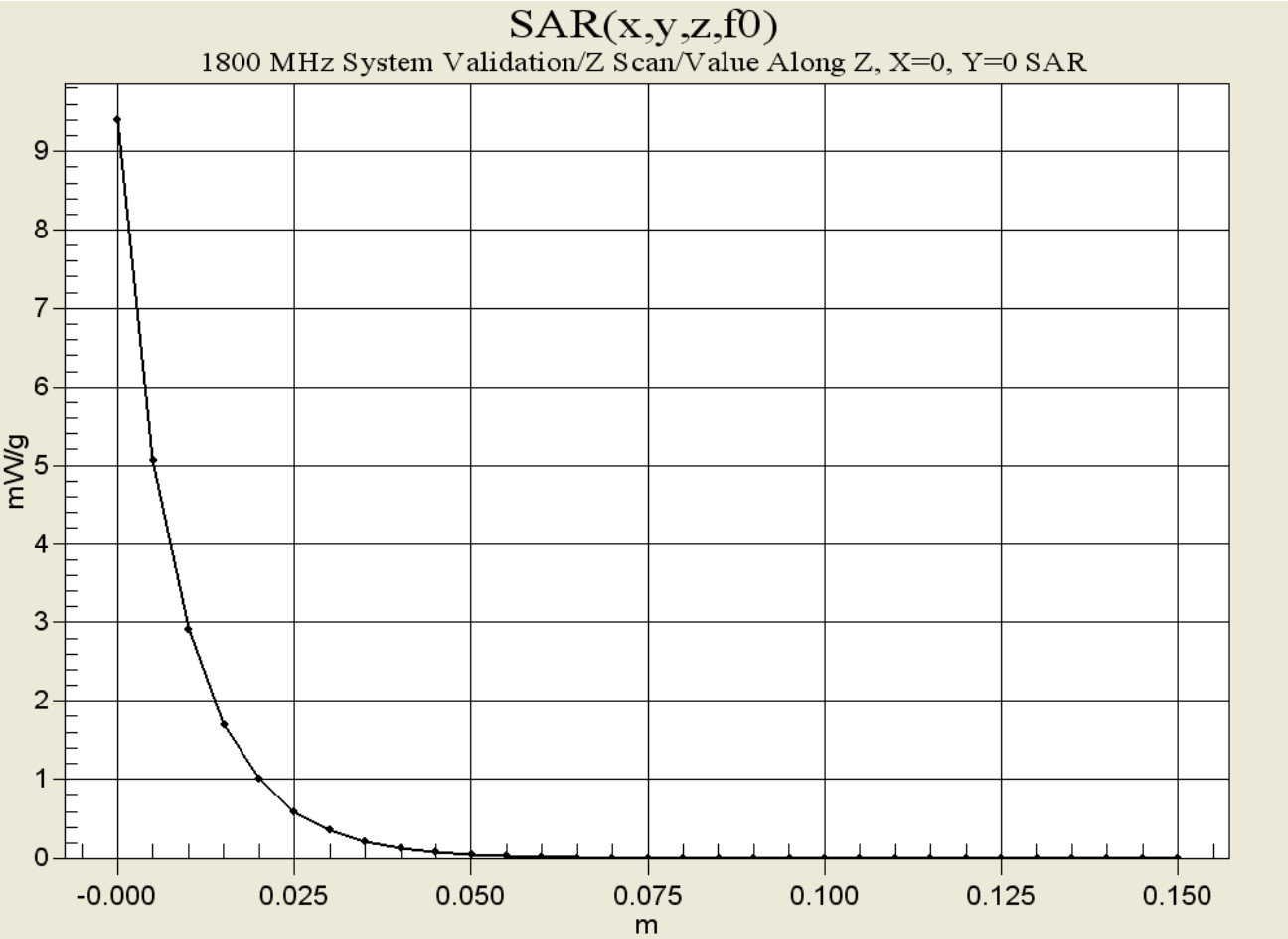
Communication System: CW
Forward Conducted Power: 250 mW
Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: HSL1800 (σ = 1.42 mho/m, ε_r = 38.3, ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(5.2, 5.2, 5.2); Calibrated: 26/02/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 13/10/2003
- Phantom: SAM front; Type: SAM 4.0; Serial: 1033
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

1800 MHz System Performance Check/Area Scan (5x8x1):
Measurement grid: dx=15mm, dy=15mm

1800 MHz System Performance Check/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 18 W/kg
SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.35 mW/g
Reference Value = 94.1 V/m
Power Drift = -0.03 dB




SAR(x,y,z,f0)
1800 MHz System Validation/Z Scan/Value Along Z, X=0, Y=0 SAR
mW/g
0
1
2
3
4
5
6
7
8
9
-0.000
0.025
0.050
0.075
0.100
0.125
0.150
m

Date Tested: 12/01/03

DUT: Dipole 1800 MHz; Model: D1800V2; Type: System Performance Check; Serial: 247

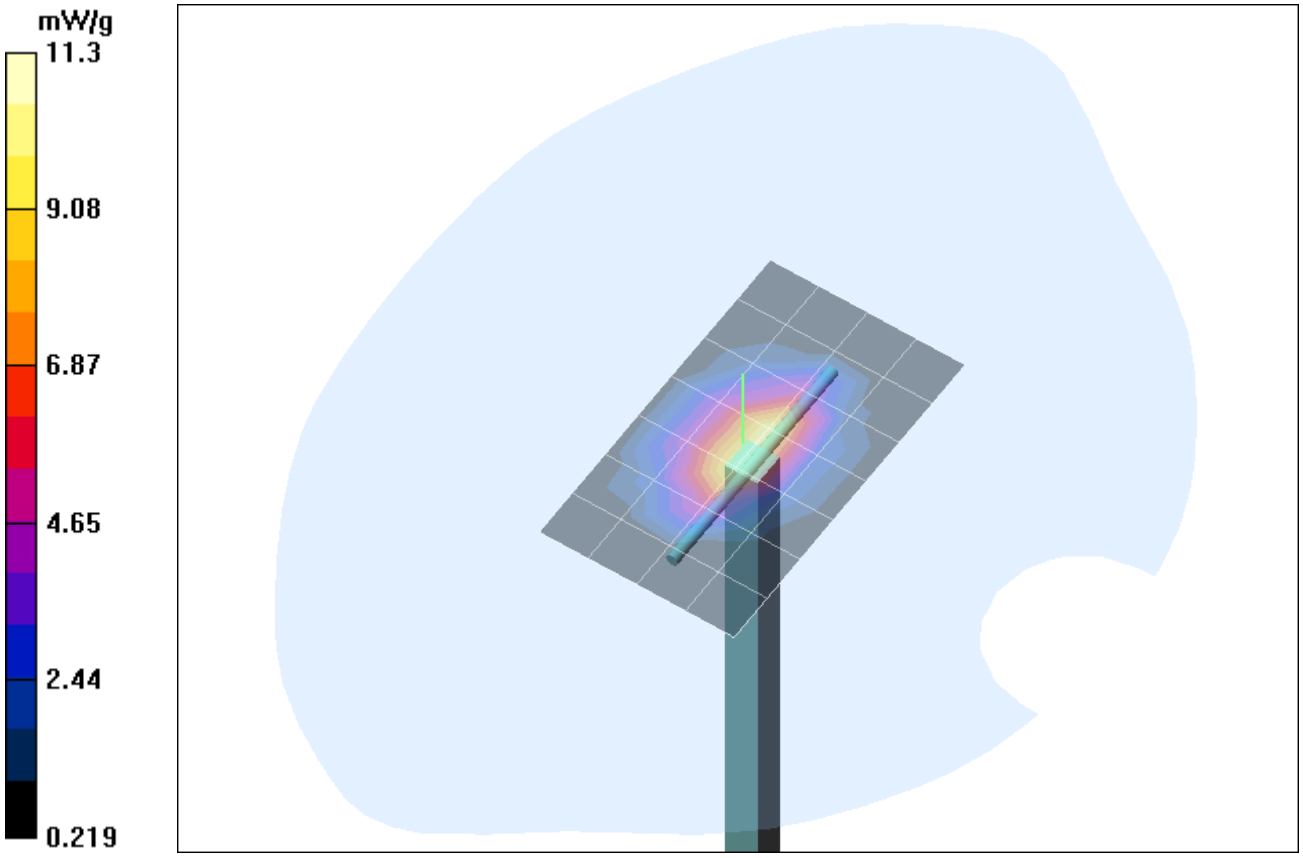
Ambient Temp: 24.0 °C; Fluid Temp: 22.3 °C; Barometric Pressure: 102.6 kPa; Humidity: 60%

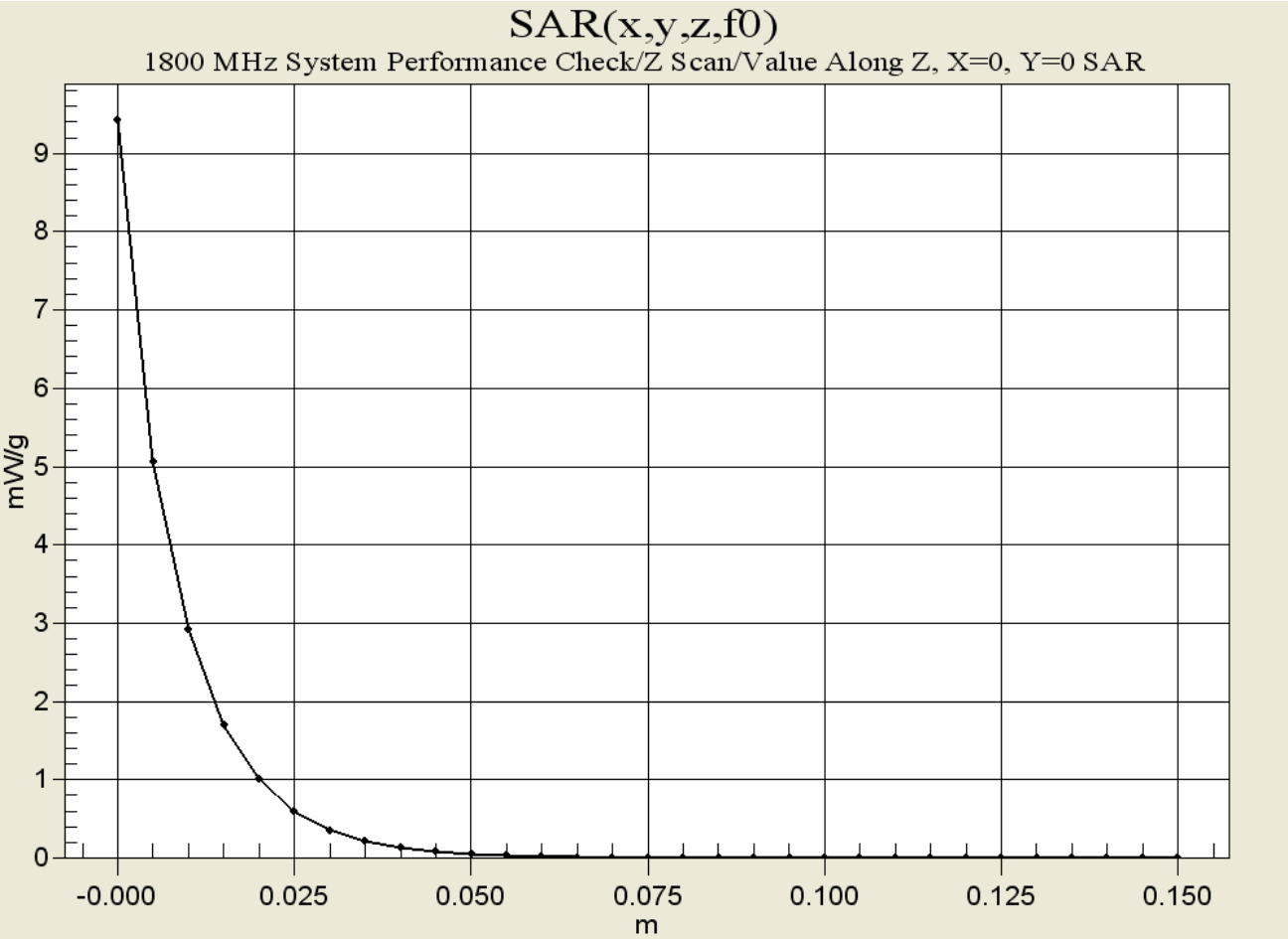
Communication System: CW
Forward Conducted Power: 250 mW
Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: HSL1800 (σ = 1.41 mho/m, ε_r = 38.5, ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(5.2, 5.2, 5.2); Calibrated: 26/02/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 13/10/2003
- Phantom: SAM front; Type: SAM 4.0; Serial: 1033
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

1800 MHz System Performance Check/Area Scan (5x8x1):
Measurement grid: dx=15mm, dy=15mm

1800 MHz System Performance Check/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 17.5 W/kg
SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.25 mW/g
Reference Value = 94.7 V/m
Power Drift = -0.04 dB




SAR(x,y,z,f0)
1800 MHz System Performance Check/Z Scan/Value Along Z, X=0, Y=0 SAR
mW/g
0
1
2
3
4
5
6
7
8
9
-0.000
0.025
0.050
0.075
0.100
0.125
0.150
m

APPENDIX C - SYSTEM VALIDATION

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

Client Celltech Labs

CALIBRATION CERTIFICATE

Object(s)	D1800V2 - SN:247
Calibration procedure(s)	QA CAL-05.v2 Calibration procedure for dipole validation kits
Calibration date:	June 4, 2003
Condition of the calibrated item	In Tolerance (according to the specific calibration document)

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Model Type	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
RF generator R&S SML-03	100698	27-Mar-2002 (R&S, No. 20-92389)	In house check: Mar-05
Power sensor HP 8481A	MY41092317	18-Oct-02 (Agilent, No. 20021018)	Oct-04
Power sensor HP 8481A	US37292783	30-Oct-02 (METAS, No. 252-0236)	Oct-03
Power meter EPM E442	GB37480704	30-Oct-02 (METAS, No. 252-0236)	Oct-03
Network Analyzer HP 8753E	US37390585	18-Oct-01 (Agilent, No. 24BR1033101)	In house check: Oct 03

	Name	Function	Signature
Calibrated by:	Judith Mueller	Technician	
Approved by:	Katja Pokovic	Laboratory Director	

Date issued: June 4, 2003

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

Schmid & Partner Engineering AG

s p e a g

Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 1 245 9700, Fax +41 1 245 9779
info@speag.com, http://www.speag.com

DASY

Dipole Validation Kit

Type: D1800V2

Serial: 247

Manufactured: August 25, 1999
Calibrated: June 4, 2003

1. Measurement Conditions

The measurements were performed in the flat section of the SAM twin phantom filled with **head simulating solution** of the following electrical parameters at 1800 MHz:

Relative Dielectricity	**39.2**	± 5%
Conductivity	**1.36 mho/m**	± 5%

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 5.3 at 1800 MHz) was used for the measurements.

The dipole was mounted on the small tripod so that the dipole feedpoint was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10mm from dipole center to the solution surface. The included distance spacer was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 15mm was aligned with the dipole. The 7x7x7 fine cube was chosen for cube integration.
The dipole input power (forward power) was 250mW ± 3 %. The results are normalized to 1W input power.

2. SAR Measurement with DASY4 System

Standard SAR-measurements were performed according to the measurement conditions described in section 1. The results (see figure supplied) have been normalized to a dipole input power of 1W (forward power). The resulting averaged SAR-values measured with the dosimetric probe ET3DV6 SN:1507 and applying the advanced extrapolation are:

averaged over 1 cm^3 (1 g) of tissue:	**39.6 mW/g** ± 16.8 % (k=2)[1]
averaged over 10 cm^3 (10 g) of tissue:	**20.9 mW/g** ± 16.2 % (k=2)[1]

[1] validation uncertainty

3. Dipole Impedance and Return Loss

The impedance was measured at the SMA-connector with a network analyzer and numerically transformed to the dipole feedpoint. The transformation parameters from the SMA-connector to the dipole feedpoint are:

Electrical delay:	**1.190 ns**	(one direction)
Transmission factor:	**0.998**	(voltage transmission, one direction)

The dipole was positioned at the flat phantom sections according to section 1 and the distance spacer was in place during impedance measurements.

Feedpoint impedance at 1800 MHz:	Re{Z} = **48.5 Ω**
	Im {Z} = **-6.5 Ω**
Return Loss at 1800 MHz	**-23.3 dB**

4. Handling

Do not apply excessive force to the dipole arms, because they might bend. Bending of the dipole arms stresses the soldered connections near the feedpoint leading to a damage of the dipole.

5. Design

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

6. Power Test

After long term use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

Date/Time: 06/04/03 14:55:26

Test Laboratory: SPEAG, Zurich, Switzerland
File Name: SN247_SN1507_HSL1800_040603.da4

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN247
Program: Dipole Calibration

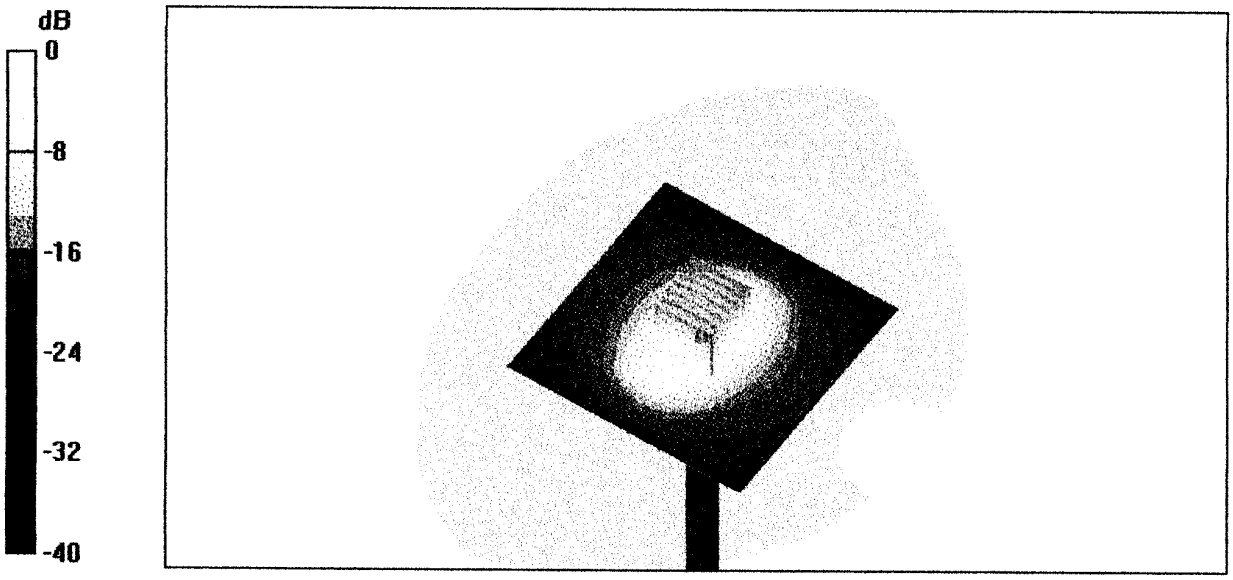
Communication System: CW-1800; Frequency: 1800 MHz;Duty Cycle: 1:1
Medium: HSL 1800 MHz (σ = 1.36 mho/m, ε_r = 39.22, ρ = 1000 kg/m^3)
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

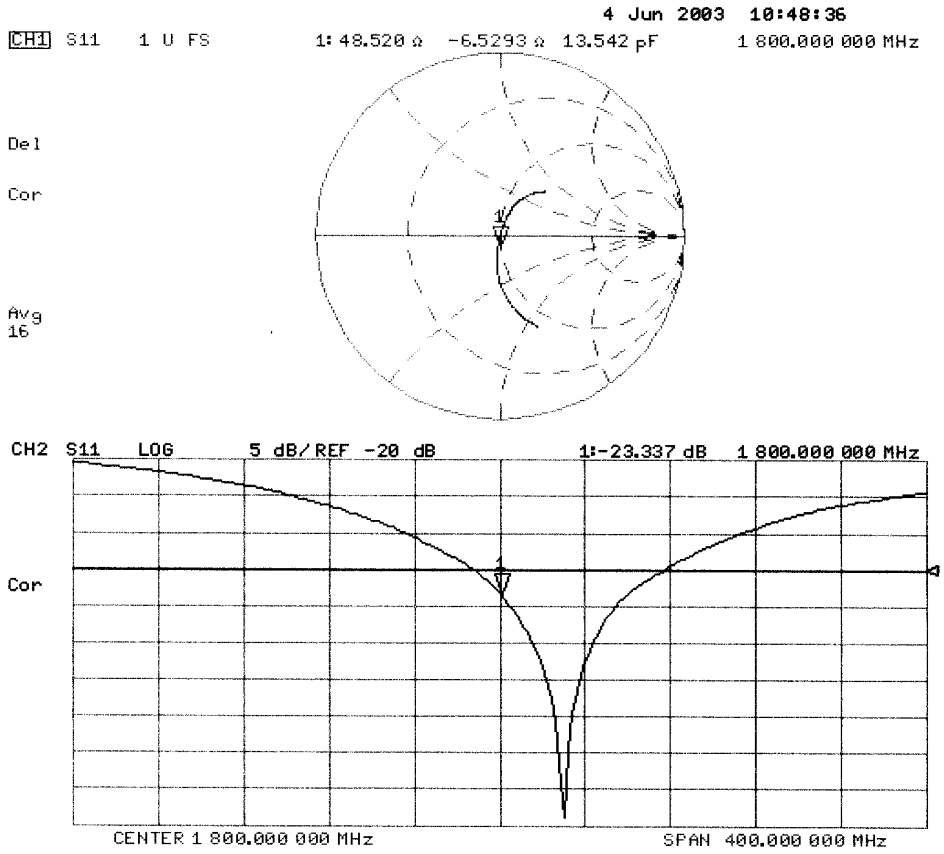
- Probe: ET3DV6 - SN1507; ConvF(5.3, 5.3, 5.3); Calibrated: 1/18/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 - SN411; Calibrated: 1/16/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006
- *Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115*

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 96 V/m
Power Drift = -0.004 dB
Maximum value of SAR = 11 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 16.9 W/kg
SAR(1 g) = 9.9 mW/g; SAR(10 g) = 5.22 mW/g
Reference Value = 96 V/m
Power Drift = -0.004 dB
Maximum value of SAR = 11.1 mW/g



0 dB = 11.1mW/g


4 Jun 2003 10:48:36
CH1 S11 1 U FS
1: 48.520 Ω -6.5293 Ω 13.542 pF
1 800.000 000 MHz
Del
Cor
Avg
16
CH2 S11 LOG
5 dB/ REF -20 dB
1:-23.337 dB 1 800.000 000 MHz
Cor
CENTER 1 800.000 000 MHz
SPAN 400.000 000 MHz