

DECLARATION OF COMPLIANCE SAR EVALUATION

Test Lab

CELLTECH LABS INC.
 Testing and Engineering Services
 1955 Moss Court
 Kelowna, B.C.
 Canada V1Y 9L3
 Phone: 250-448-7047
 Fax: 250-448-7046
 e-mail: info@celltechlabs.com
 web site: www.celltechlabs.com

Applicant Information

MOBILTEX DATA LTD.
 3640 - 26th Street N.E.
 Calgary, Alberta T1Y 4T7
 Canada

Rule Part(s):

FCC 47 CFR §2.1093; IC RSS-102 Issue 1 (Provisional)

Test Procedure(s):

FCC OET Bulletin 65, Supplement C (Edition 01-01)

FCC Device Classification:

Licensed Non-Broadcast Station Transmitter (TNB)

IC Device Classification:

Land Mobile Radio Transmitter

FCC ID:

KLU03472

IC Certification No.:

IC: 3079A-03472

Model(s):

OVPC2

Device Type:

Body-worn Data Transmitter with RIM 902 Mobitex Radio Modem

Modulation:

GMSK

Tx Frequency Range:

896.0 - 901.0 MHz

RF Output Power Tested:

33.0 dBm (Conducted)

Antenna Type(s):

Folded Dipole PCB

Battery Type:

7.4V Lithium-ion, 740mAh

Body-worn Accessory:

Belt-worn Holster (P/N: MOB-H7500SW-FX6)

Max. SAR Measured:

1.20 W/kg (1g average)

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 and Health Canada's Safety Code 6. The device was tested in accordance with the measurement standards and procedures specified in FCC OET Bulletin 65, Supplement C (Edition 01-01), and Industry Canada RSS-102 Issue 1 (Provisional) 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.

This test report shall not be reproduced partially, or in full, without the prior written approval of Celltech Labs Inc. The results and statements contained in this report pertain only to the device(s) evaluated.



Russell Pipe
 Senior Compliance Technologist
 Celltech Labs Inc.



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1.0 INTRODUCTION

This measurement report demonstrates that the MOBILTEX DATA LTD. Model: OVPC2 FCC ID: KLU03472 Body-worn Data Transmitter with RIM 902 Mobitex Radio Modem complies with the SAR (Specific Absorption Rate) RF exposure requirements specified in FCC 47 CFR §2.1093 (see reference [1]) and Health Canada's Safety Code 6 (see reference [2]) for the General Population environment. The test procedures described in FCC OET Bulletin 65, Supplement C (Edition 01-01) (see reference [3]) and IC RSS-102 Issue 1 (Provisional) (see reference [4]) were employed. A description of the product, 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)

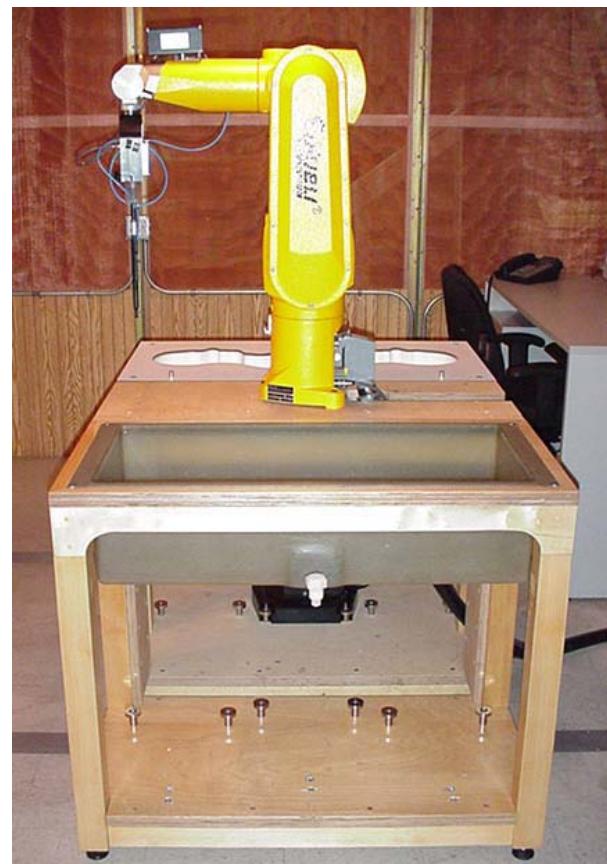
FCC Rule Part(s)	47 CFR §2.1093
IC Rule Part(s)	IC RSS-102 Issue 1 (Provisional)
Test Procedure(s)	FCC OET Bulletin 65, Supplement C (Edition 01-01)
FCC Device Classification	Licensed Non-Broadcast Station Transmitter (TNB)
IC Device Classification	Land Mobile Radio Transmitter
Device Type	Body-worn Data Transmitter with RIM 902 Mobitex Radio Modem
FCC ID	KLU03472
Model(s)	OVPC2
Serial No.	29000006
Modulation	GMSK
Maximum Duty Cycle	25%
Tx Frequency Range	896.0 - 901.0 MHz
Max. RF Output Power Tested	33.0 dBm (Conducted)
Antenna Type	Folded Dipole PCB
Battery Type	7.4V Lithium-ion, 740mAh
Body-worn Accessory	Belt-worn Holster (P/N: MOB-H7500SW-FX6)

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 SAR Measurement System with SAM Phantom



DASY4 SAR Measurement System with Planar Phantom

4.0 MEASUREMENT SUMMARY

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.

BODY SAR MEASUREMENT RESULTS											
Freq. (MHz)	Channel	Test Mode	Conducted Power (dBm)		Phantom Type	Antenna Position to Planar Phantom	Holster Position to Planar Phantom	Separation Distance to Planar Phantom	Measured SAR 1g (W/kg)		
			Before	After							
899.0	720	Modulated	33.0	33.0	Planar	Parallel	Front Side (with Symbol PC)	2.0 cm	1.13		
899.0	720	Modulated	33.0	33.0	Planar	Parallel	Front Side (w/out Symbol PC)	2.0 cm	1.20		
899.0	720	Modulated	33.0	33.0	Planar	Parallel	Back Side (with Symbol PC)	0.0 cm	0.244		
899.0	720	Modulated	33.0	33.0	Planar	Parallel	Back Side (w/out Symbol PC)	0.0 cm	0.434 0.365		
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)		09/25/03			Relative Humidity		47 %				
Measured Fluid Type			900MHz Body			Atmospheric Pressure		101.7 kPa			
Dielectric Constant ϵ_r	IEEE Target		Measured		Ambient Temperature		22.2 °C				
	55.0 ±5%		54.6		Fluid Temperature		21.5 °C				
Conductivity σ (mho/m)	IEEE Target		Measured		Fluid Depth		≥ 15 cm				
	1.05 ±5%		1.07		ρ (Kg/m ³)		1000				

Note(s):

1. The transmission band of the DUT is less than 10 MHz, therefore mid channel data only is reported (per FCC OET Bulletin 65, Supplement C, Edition 01-01 - see reference [3]).
2. Secondary peak SAR levels within 2 dB of the primary SAR level were measured and reported.
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 shown above were consistent for all measurement periods.
4. The dielectric properties of the simulated body fluid were measured prior to the 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 MOBILTEX DATA LTD. Model: OVPC2 FCC ID: KLU03472 Body-worn Data Transmitter with RIM 902 Mobitex Radio Modem was found to be compliant for localized Specific Absorption Rate based on the following test provisions and conditions described below. The detailed test setup photographs are shown in Appendix H.

1. The DUT was tested for body-worn SAR placed inside the holster with the front side of the holster (antenna side) facing parallel to the outer surface of the planar phantom (bystander configuration). A 2.0 cm separation distance was established and maintained between the front side of the holster and the outer surface of the planar phantom. The front side of the holster was tested with and without the Symbol PC (Model: PDT7500-ROX73M01) installed.
2. The DUT was tested for body-worn SAR placed inside the holster with the back side of the holster facing parallel to the outer surface of the planar phantom (user configuration). A 0.0 cm separation distance was maintained between the back side of the holster and the outer surface of the planar phantom. The back side of the holster was tested with and without the Symbol PC (Model: PDT7500-ROX73M01) installed.
3. Due to the dimensions of the DUT, a stack of low-density, low-loss dielectric foamed polystyrene was used in place of the device holder.
4. The conducted power levels were measured before and after each test using a Gigatronics 8652A Universal Power Meter according to the procedures described in FCC 47 CFR §2.1046.
5. The radio transmitter was placed in test mode via PC software and an RF signal was generated using an HP 8920B communications test set. SAR measurements were performed with the radio transmitter operating at a full rated power in modulated carrier mode at a maximum duty cycle of 25% (Crest Factor = 4).
6. 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:

1. 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 from 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.
2. 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).

7.0 SYSTEM PERFORMANCE CHECK

Prior to the SAR evaluation a system check was performed in the planar section of the SAM phantom with a 900MHz dipole (see Appendix C for system validation procedures). The dielectric parameters of the simulated brain tissue fluid were measured prior to the system 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 $\pm 10\%$ (see Appendix B for system check test plot).

SYSTEM PERFORMANCE CHECK											
Test Date	900MHz Equiv. Tissue	SAR 1g (W/kg)		Dielectric Constant ϵ_r		Conductivity σ (mho/m)		ρ (Kg/m ³)	Ambient Temp.	Fluid Temp.	Fluid Depth
		IEEE Target	Measured	IEEE Target	Measured	IEEE Target	Measured				
09/25/03	Brain	2.70 $\pm 10\%$	2.59	41.5 $\pm 5\%$	39.9	0.97 $\pm 5\%$	0.96	1000	22.2 °C	23.1 °C	≥ 15 cm

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.

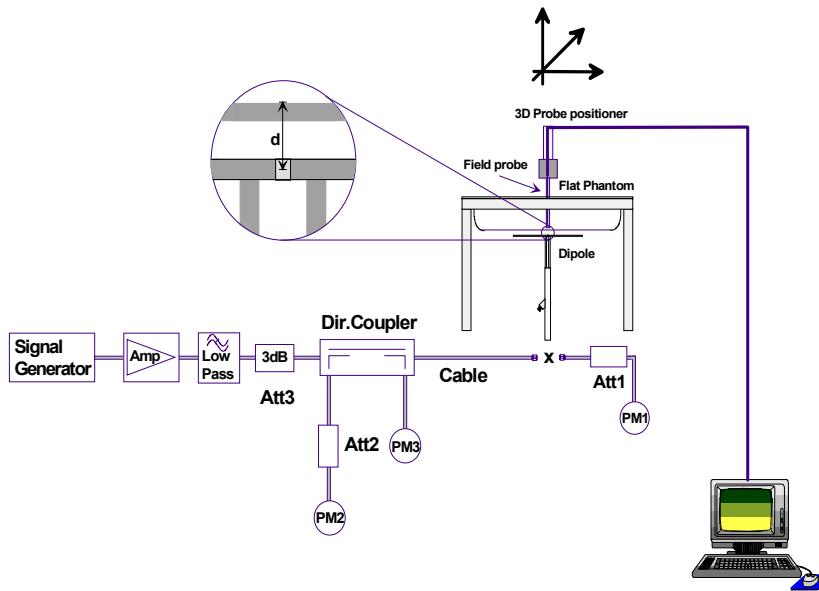


Figure 5. System Check Setup Diagram



900MHz System Check Setup

8.0 EQUIVALENT TISSUES

The 900MHz simulated tissue fluids consist of a viscous gel using hydroxethylcellulose (HEC) gelling agent and saline solution. 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).

SIMULATED TISSUE MIXTURES		
INGREDIENT	900MHz Brain (System Check)	900MHz Body (DUT Evaluation)
Water	40.71 %	53.70 %
Sugar	56.63 %	45.10 %
Salt	1.48 %	0.97 %
HEC	1.00 %	0.13%
Bactericide	0.18 %	0.10 %

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 of 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 1: SAM V4.0C
Shell Material: Fiberglass
Thickness: 2.0 ± 0.1 mm
Volume: Approx. 20 liters

Type 2: Planar Phantom
Shell Material: Fiberglass
Thickness: 2.0 ± 0.1 mm
Volume: Approx. 72 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 \pm 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 μ W/g to >100 mW/g; Linearity: ± 0.2 dB

Surface Detect.: ± 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 mobile 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 (+/-0.2 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 (see Appendix F for specifications of the SAM phantom V4.0C).



SAM Phantom

13.0 PLANAR PHANTOM

The planar phantom is a fiberglass shell phantom with a 2.0 mm (+/-0.2mm) thick device measurement area at the center of the phantom for SAR evaluations of devices with a larger surface area than the planar section of the SAM phantom. The planar phantom is integrated in a wooden table (see Appendix G for dimensions and specifications of the planar phantom).



Planar Phantom

14.0 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

15.0 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 2002
-450MHz Validation Dipole	136	Oct 2002
-900MHz Validation Dipole	054	June 2003
-1800MHz Validation Dipole	247	June 2003
-2450MHz Validation Dipole	150	Sept 2003
-SAM Phantom V4.0C	N/A	N/A
-Barski Planar Phantom	N/A	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 2002
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

16.0 MEASUREMENT UNCERTAINTIES

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

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

MEASUREMENT UNCERTAINTIES (Cont.)

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

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

17.0 REFERENCES

- [1] Federal Communications Commission, "Radiofrequency radiation exposure evaluation: portable devices", Rule Part 47 CFR §2.1093: 1999.
- [2] Health Canada, "Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz", Safety Code 6.
- [3] Federal Communications Commission, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields", OET Bulletin 65, Supplement C (Edition 01-01), FCC, Washington, D.C.: June 2001.
- [4] Industry Canada, "Evaluation Procedure for Mobile and Portable Radio Transmitters with respect to Health Canada's Safety Code 6 for Exposure of Humans to Radio Frequency Fields", Radio Standards Specification RSS-102 Issue 1 (Provisional): September 1999.
- [5] 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".
- [6] W. Gander, *Computermathematick*, Birkhaeuser, Basel: 1992.

APPENDIX A - SAR MEASUREMENT DATA

Test Date: 09/25/03

DUT: Mobiltex Data Ltd. Model: OVPC2; Type: Waist-Worn Data Communication Device; Serial: 29000006

Ambient Temp: 22.2°C; Fluid Temp: 21.5°C; Barometric Pressure: 101.7 kPa; Humidity: 47%

Communication System: Mobitex

Conducted Power: 33.0 dBm

Frequency: 899 MHz; Duty Cycle: 1:4

Medium: M900 ($\sigma = 1.07 \text{ mho/m}$, $\epsilon_r = 54.6$, $\rho = 1000 \text{ kg/m}^3$)

- Probe: ET3DV6 - SN1387; ConvF(6.4, 6.4, 6.4); Calibrated: 26/02/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn370; Calibrated: 19/05/2003
- Phantom: Planar back; Type: Barski Industries; Serial: 03-01
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

Holster Front Side with Symbol PC/Area Scan (9x19x1): Measurement grid: dx=15mm, dy=15mm

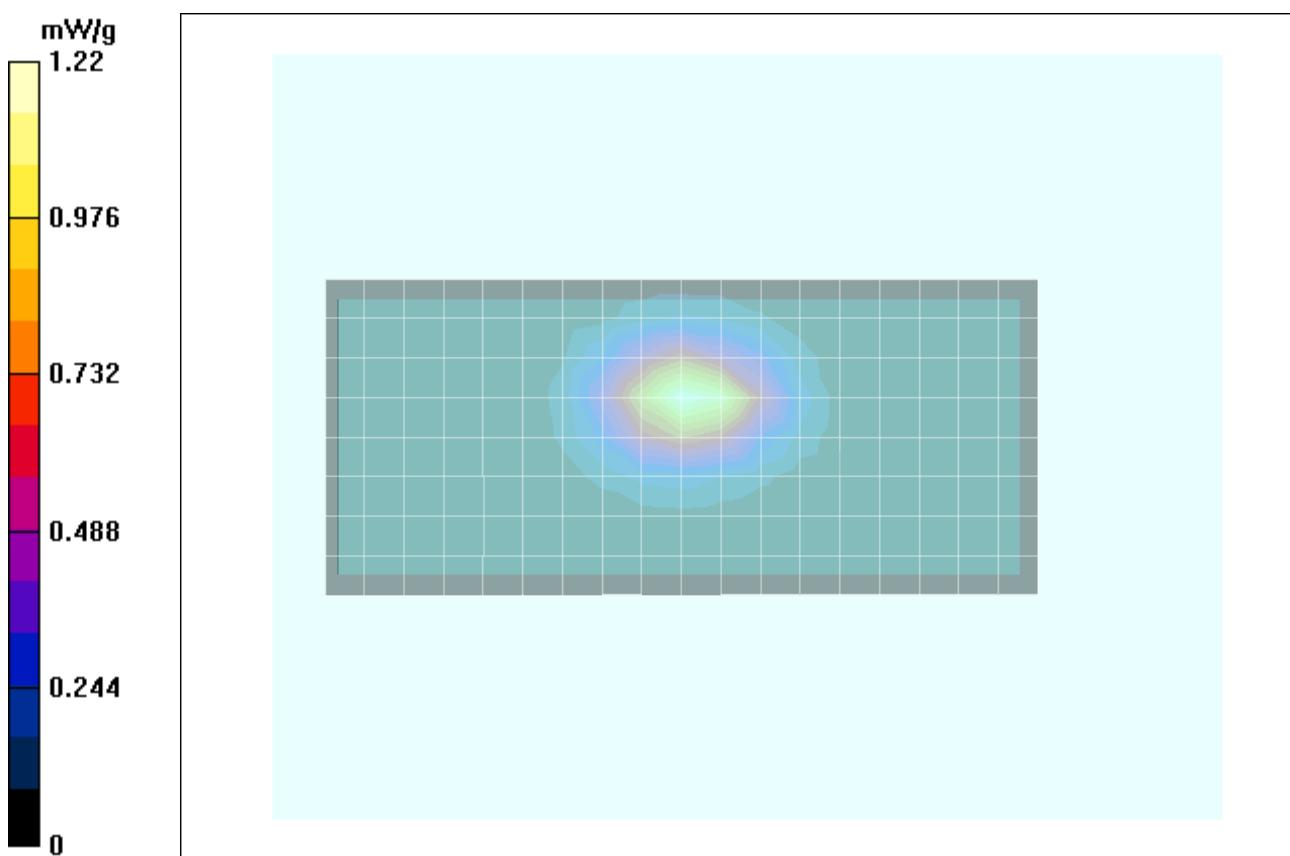
Holster Front Side with Symbol PC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Peak SAR (extrapolated) = 2.25 W/kg

SAR(1 g) = 1.13 mW/g; SAR(10 g) = 0.714 mW/g

Reference Value = 21.8 V/m

Power Drift = -0.04 dB



Test Date: 09/25/03

DUT: Mobiltex Data Ltd. Model: OVPC2; Type: Waist-Worn Data Communication Device; Serial: 29000006

Ambient Temp: 22.2°C; Fluid Temp: 21.5°C; Barometric Pressure: 101.7 kPa; Humidity: 47%

Communication System: Mobiltex

Conducted Power: 33.0 dBm

Frequency: 899 MHz; Duty Cycle: 1:4

Medium: M900 ($\sigma = 1.07 \text{ mho/m}$, $\epsilon_r = 54.6$, $\rho = 1000 \text{ kg/m}^3$)

- Probe: ET3DV6 - SN1387; ConvF(6.4, 6.4, 6.4); Calibrated: 26/02/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn370; Calibrated: 19/05/2003
- Phantom: Planar back; Type: Barski Industries; Serial: 03-01
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

Holster Front Side without Symbol PC/Area Scan (9x19x1): Measurement grid: dx=15mm, dy=15mm

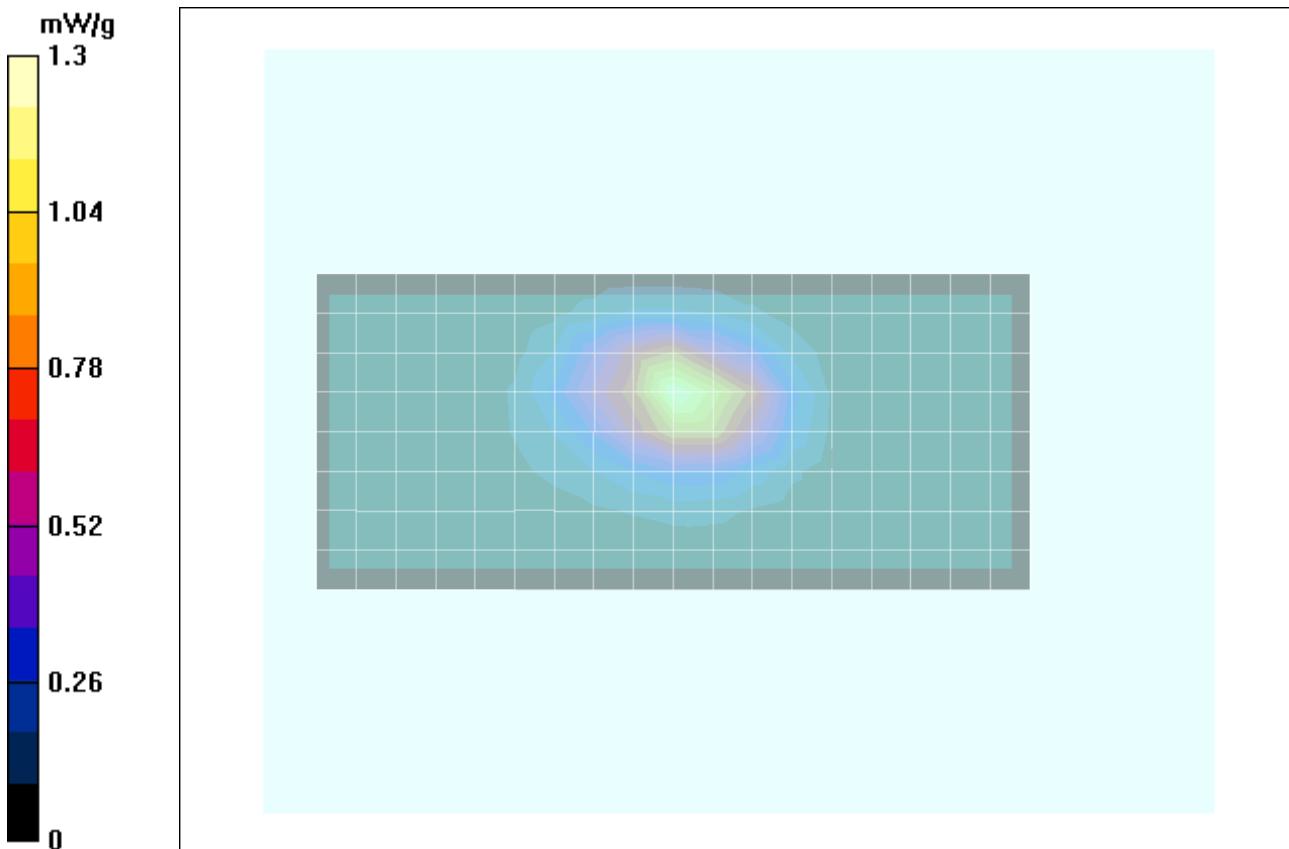
Holster Front Side without Symbol PC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

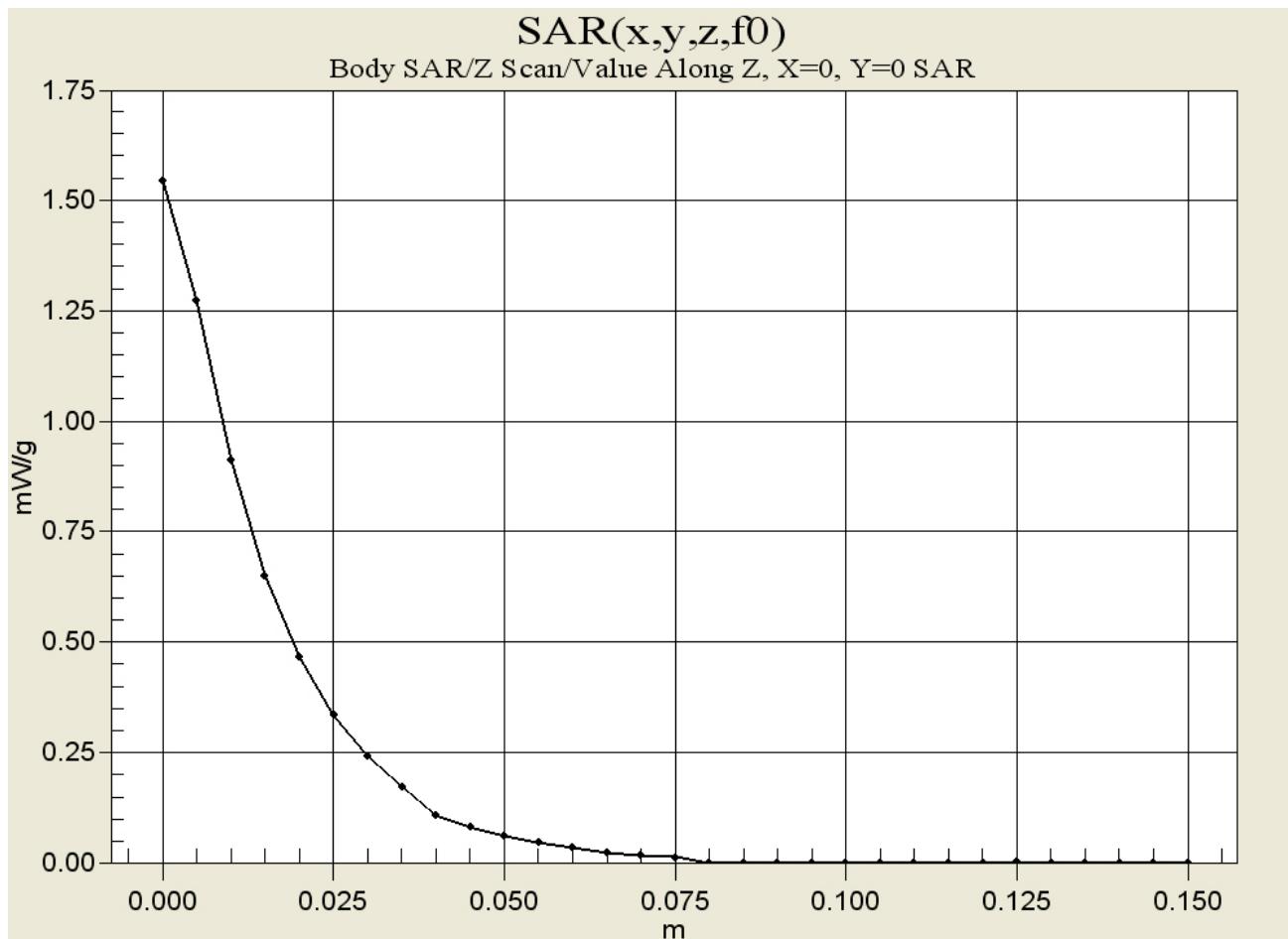
Peak SAR (extrapolated) = 1.98 W/kg

SAR(1 g) = 1.2 mW/g; SAR(10 g) = 0.781 mW/g

Reference Value = 26.2 V/m

Power Drift = -0.02 dB





Test Date: 09/25/03

DUT: Mobiltex Data Ltd. Model: OVPC2; Type: Waist-Worn Data Communication Device; Serial: 29000006

Ambient Temp: 22.2°C; Fluid Temp: 21.5°C; Barometric Pressure: 101.7 kPa; Humidity: 47%

Communication System: Mobitex

Conducted Power: 33.0 dBm

Frequency: 899 MHz; Duty Cycle: 1:4

Medium: M900 ($\sigma = 1.07 \text{ mho/m}$, $\epsilon_r = 54.6$, $\rho = 1000 \text{ kg/m}^3$)

- Probe: ET3DV6 - SN1387; ConvF(6.4, 6.4, 6.4); Calibrated: 26/02/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn370; Calibrated: 19/05/2003
- Phantom: Planar back; Type: Barski Industries; Serial: 03-01
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

Holster Back Side with Symbol PC/Area Scan (9x19x1): Measurement grid: dx=15mm, dy=15mm

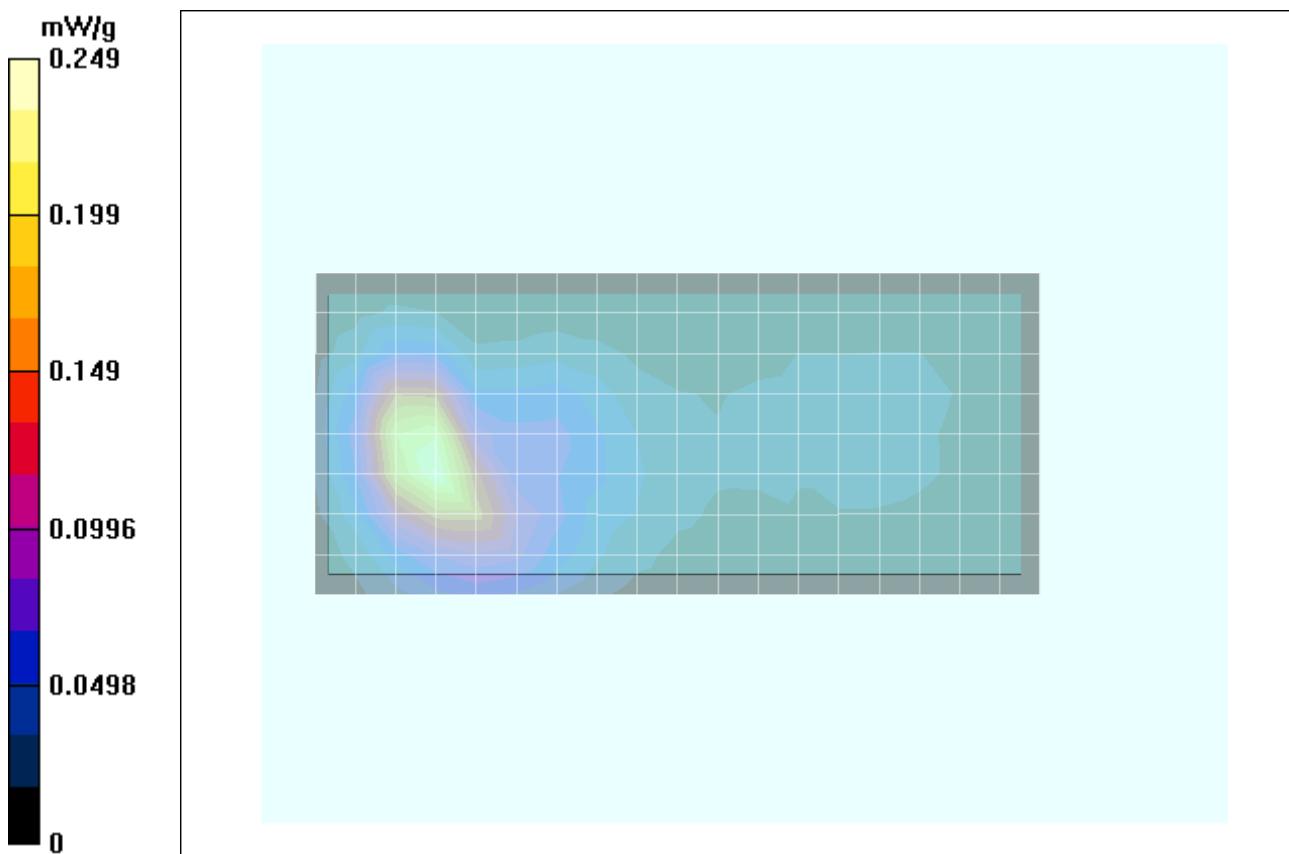
Holster Back Side with Symbol PC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Peak SAR (extrapolated) = 0.444 W/kg

SAR(1 g) = 0.244 mW/g; SAR(10 g) = 0.149 mW/g

Reference Value = 4.23 V/m

Power Drift = 0.05 dB



Test Date: 09/25/03

DUT: Mobiltex Data Ltd. Model: OVPC2; Type: Waist-Worn Data Communication Device; Serial: 29000006

Ambient Temp: 22.2°C; Fluid Temp: 21.5°C; Barometric Pressure: 101.7 kPa; Humidity: 47%

Communication System: Mobiltex

Conducted Power: 33.0 dBm

Frequency: 899 MHz; Duty Cycle: 1:4

Medium: M900 ($\sigma = 1.07 \text{ mho/m}$, $\epsilon_r = 54.6$, $\rho = 1000 \text{ kg/m}^3$)

- Probe: ET3DV6 - SN1387; ConvF(6.4, 6.4, 6.4); Calibrated: 26/02/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn370; Calibrated: 19/05/2003
- Phantom: Planar back; Type: Barski Industries; Serial: 03-01
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

Holster Back Side without Symbol PC/Area Scan (9x19x1): Measurement grid: dx=15mm, dy=15mm

Holster Back Side without Symbol PC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Peak SAR (extrapolated) = 0.645 W/kg

SAR(1 g) = 0.434 mW/g; SAR(10 g) = 0.288 mW/g

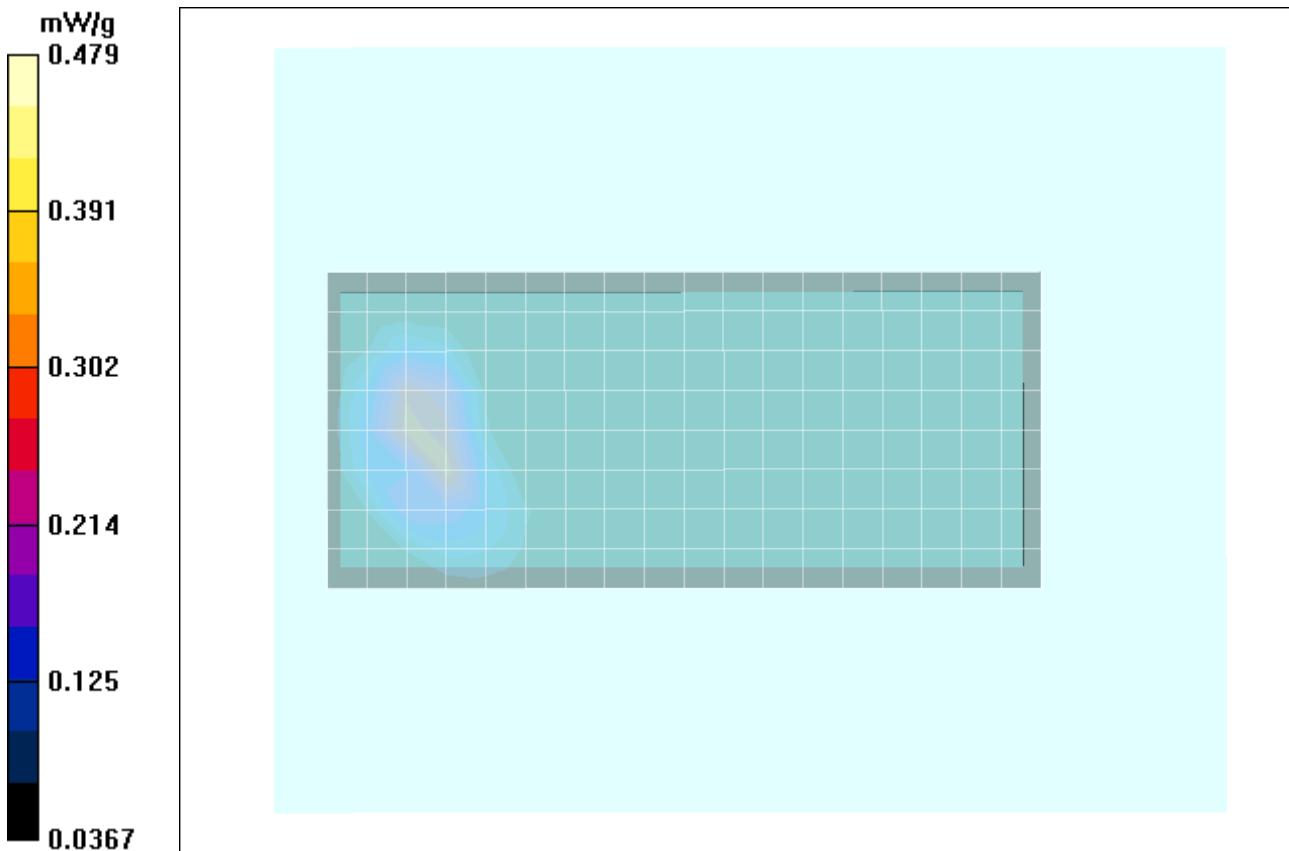
Holster Back Side without Symbol PC/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Peak SAR (extrapolated) = 2.02 W/kg

SAR(1 g) = 0.365 mW/g; SAR(10 g) = 0.16 mW/g

Reference Value = 4.28 V/m

Power Drift = -0.01 dB



APPENDIX B - SYSTEM PERFORMANCE CHECK DATA

Test Date: 09/25/03

DUT: Dipole 900 MHz; Model: D900V2; Type: System Performance Check; Serial: 054

Ambient Temp: 22.2°C; Fluid Temp: 23.1°C; Barometric Pressure: 101.7 kPa; Humidity: 47%

Communication System: CW

Frequency: 900 MHz; Duty Cycle: 1:1

Medium: HSL900 ($\sigma = 0.96 \text{ mho/m}$, $\epsilon_r = 39.9$, $\rho = 1000 \text{ kg/m}^3$)

- Probe: ET3DV6 - SN1387; ConvF(6.6, 6.6, 6.6); Calibrated: 26/02/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn370; Calibrated: 19/05/2003
- Phantom: SAM front; Type: SAM 4.0; Serial: 1033
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 116

System Performance Check at 900 MHz/Area Scan (6x10x1): Measurement grid: dx=10mm, dy=10mm

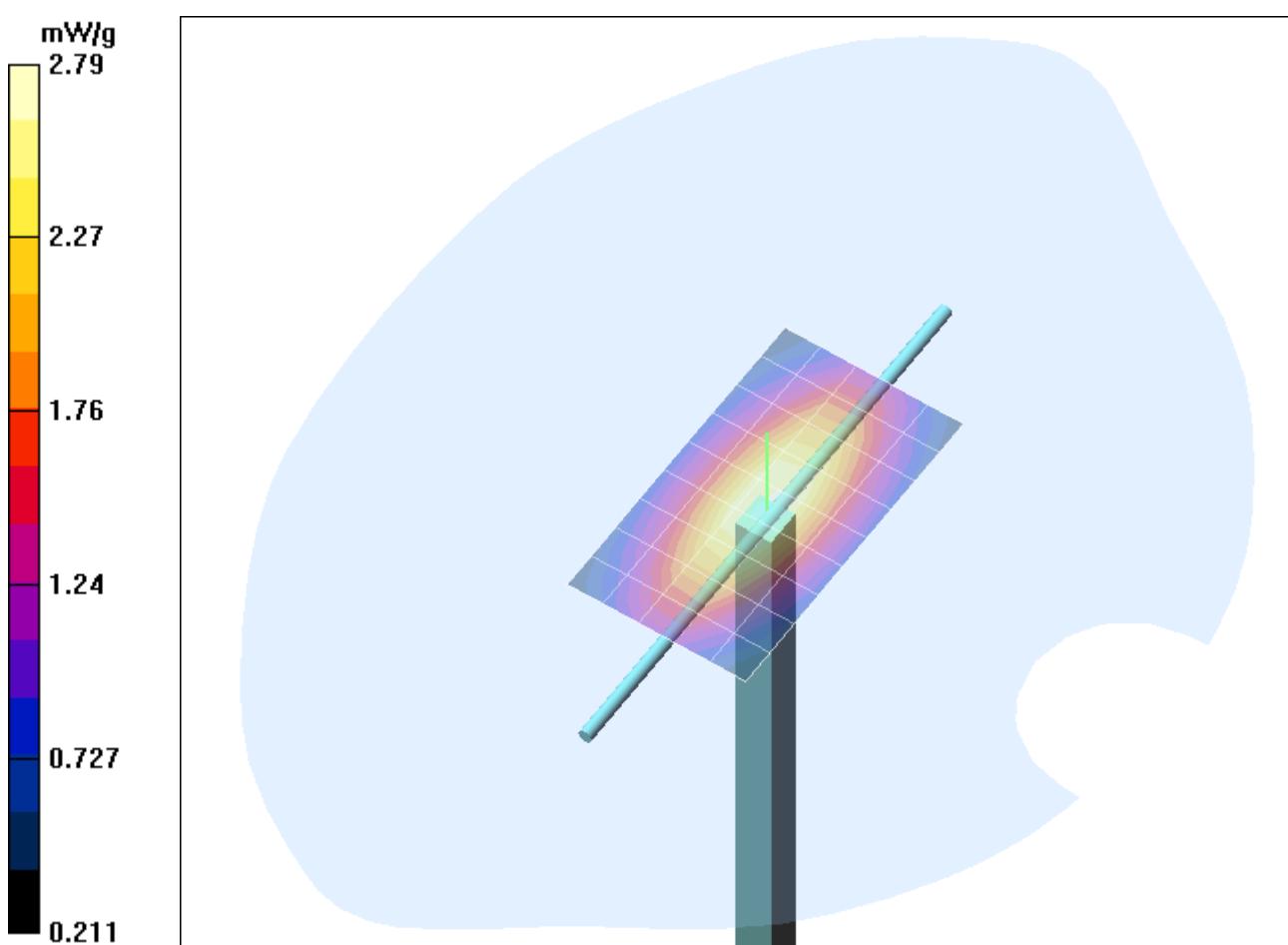
System Performance Check at 900 MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 3.69 W/kg

SAR(1 g) = 2.59 mW/g; SAR(10 g) = 1.67 mW/g

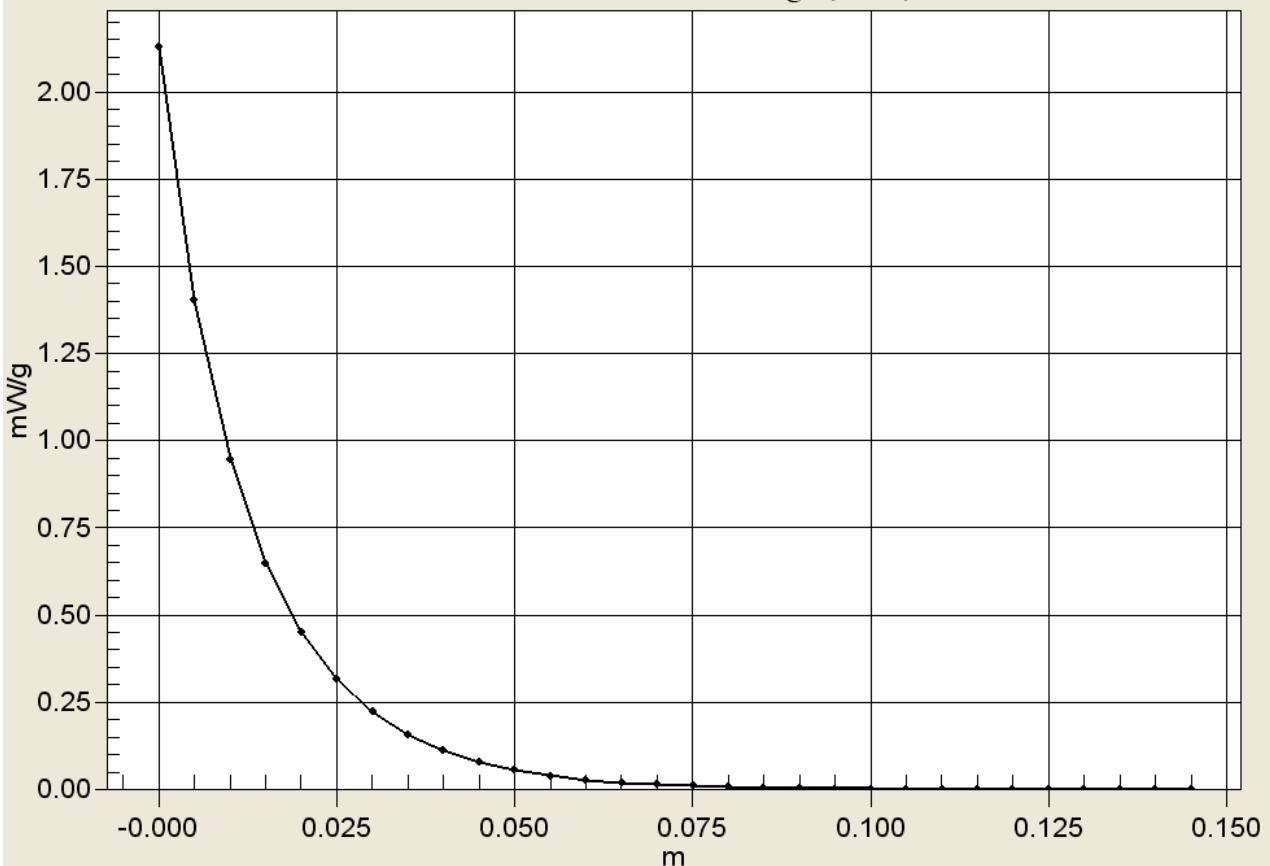
Forward Conducted Power: 250 mW

Reference Value = 57.6 V/m

Power Drift = 0.0009 dB



SAR(x,y,z,f0)
1387 Val at 900 MHz/Z Scan/Value Along Z, X=0, Y=0 SAR



APPENDIX C - SYSTEM VALIDATION

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

Client

Celltech Labs

CALIBRATION CERTIFICATE

Object(s)	D900V2 - SN:054
Calibration procedure(s)	QA CAL-05 v2 Calibration procedure for dipole validation kits
Calibration date:	June 3, 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

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

Date issued: June 3, 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.

DASY

Dipole Validation Kit

Type: D900V2

Serial: 054

Manufactured: August 25, 1999
Calibrated: June 3, 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 900 MHz:

Relative Dielectricity	42.1	$\pm 5\%$
Conductivity	0.95 mho/m	$\pm 5\%$

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 6.6 at 900 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 15mm from dipole center to the solution surface. The included distance holder 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 $250 \text{ mW} \pm 3\%$. 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: **$10.6 \text{ mW/g} \pm 16.8\% \text{ (k=2)}$** ¹

averaged over 10 cm^3 (10 g) of tissue: **$6.84 \text{ mW/g} \pm 16.2\% \text{ (k=2)}$** 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: **1.397 ns** (one direction)
Transmission factor: **0.991** (voltage transmission, one direction)

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

Feedpoint impedance at 900 MHz: $\text{Re}\{Z\} = \text{49.9 } \Omega$

$\text{Im } \{Z\} = \text{-2.0 } \Omega$

Return Loss at 900 MHz **-33.9 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 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

Date/Time: 06/03/03 12:00:32

Test Laboratory: SPEAG, Zurich, Switzerland
File Name: SN054_SN1507_HSL900_030603.da4

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN054
Program: Dipole Calibration

Communication System: CW-900; Frequency: 900 MHz; Duty Cycle: 1:1

Medium: HSL 900 MHz ($\sigma = 0.95 \text{ mho/m}$, $\epsilon_r = 42.07$, $\rho = 1000 \text{ kg/m}^3$)

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(6.6, 6.6, 6.6); 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 = 15 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 56.9 V/m

Power Drift = 0.0004 dB

Maximum value of SAR = 2.84 mW/g

Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

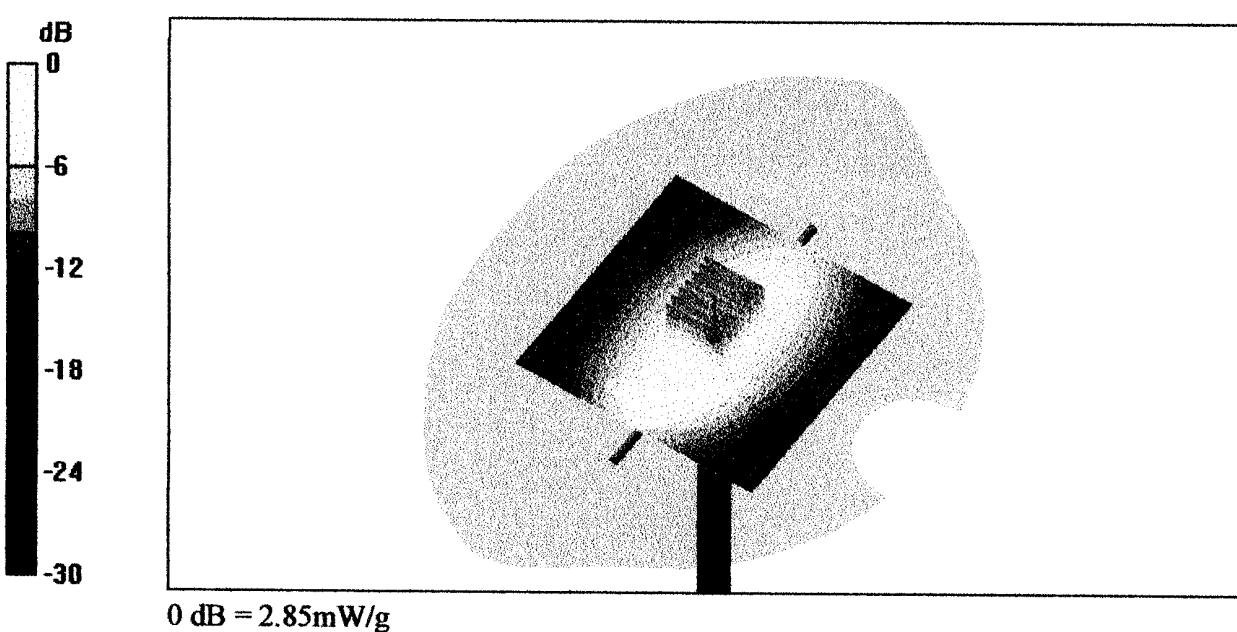
Peak SAR (extrapolated) = 3.92 W/kg

SAR(1 g) = 2.66 mW/g; SAR(10 g) = 1.71 mW/g

Reference Value = 56.9 V/m

Power Drift = 0.0004 dB

Maximum value of SAR = 2.85 mW/g



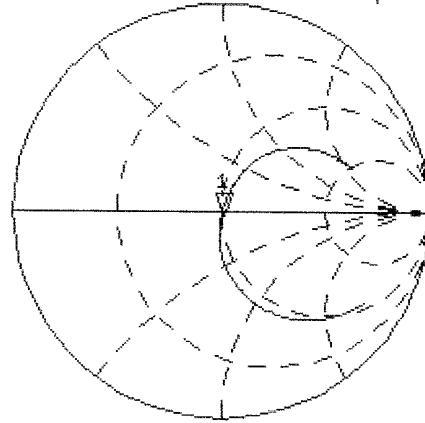
CH1 S11 1 U FS

1: 49.906 Ω -2.0137 Α 87.819 pF 900.000 000 MHz

↑

De1

PRM

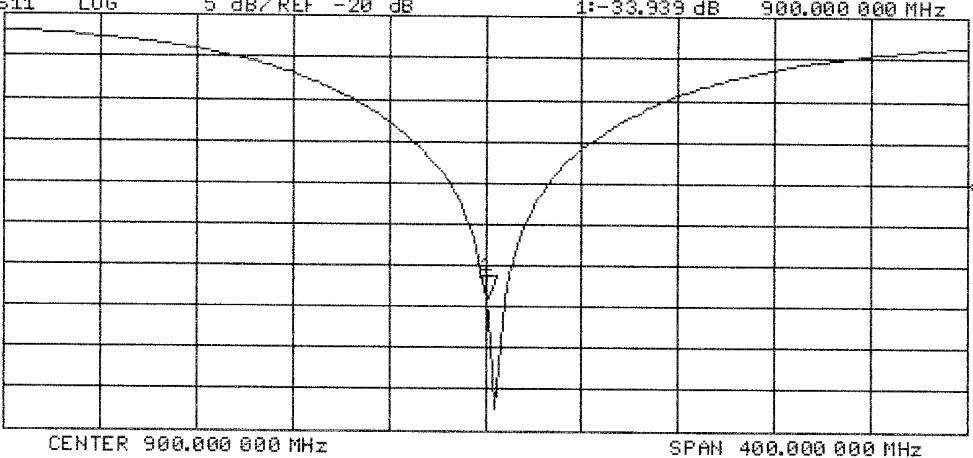
Cor
Avg
16

CH2 S11 LOG 5 dB/REF -20 dB

1:-33.939 dB 900.000 000 MHz

PRM
Cor

↑



CENTER 900.000 000 MHz

SPAN 400,000 000 MHz

APPENDIX D - PROBE CALIBRATION

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

Client

Celltech Labs

CALIBRATION CERTIFICATE

Object(s) **ET3DV6 - SN: 1387**

Calibration procedure(s) **QA CAL-01.v2**
Calibration procedure for dosimetric E-field probes

Calibration date: **February 26, 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	Scheduled Calibration
RF generator HP 8684C	US3642U01700	4-Aug-99 (in house check Aug-02)	In house check: Aug-05
Power sensor E4412A	MY41495277	8-Mar-02	Mar-03
Power sensor HP 8481A	MY41092180	18-Sep-02	Sep-03
Power meter EPM E4419B	GB41293874	13-Sep-02	Sep-03
Network Analyzer HP 8753E	US38432426	3-May-00	In house check: May 03
Fluke Process Calibrator Type 702	SN: 6295803	3-Sep-01	Sep-03

Calibrated by: **Name** **Nico Vetterli** **Function** **Technician** **Signature** **N. Vetterli**

Approved by: **Katja Pokovic** **Laboratory Director** **Signature** **K. Pokovic**

Date issued: February 26, 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.

Probe ET3DV6

SN:1387

Manufactured:	September 21, 1999
Last calibration:	February 22, 2002
Recalibrated:	February 26, 2003

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1387

Sensitivity in Free Space

NormX	1.55 $\mu\text{V}/(\text{V}/\text{m})^2$
NormY	1.65 $\mu\text{V}/(\text{V}/\text{m})^2$
NormZ	1.64 $\mu\text{V}/(\text{V}/\text{m})^2$

Diode Compression

DCP X	92	mV
DCP Y	92	mV
DCP Z	92	mV

Sensitivity in Tissue Simulating Liquid

Head	900 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.97 \pm 5\%$ mho/m
Head	835 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.90 \pm 5\%$ mho/m
	ConvF X	6.6 $\pm 9.5\%$ (k=2)	Boundary effect:
	ConvF Y	6.6 $\pm 9.5\%$ (k=2)	Alpha 0.37
	ConvF Z	6.6 $\pm 9.5\%$ (k=2)	Depth 2.61
Head	1800 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\%$ mho/m
Head	1900 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\%$ mho/m
	ConvF X	5.2 $\pm 9.5\%$ (k=2)	Boundary effect:
	ConvF Y	5.2 $\pm 9.5\%$ (k=2)	Alpha 0.50
	ConvF Z	5.2 $\pm 9.5\%$ (k=2)	Depth 2.73

Boundary Effect

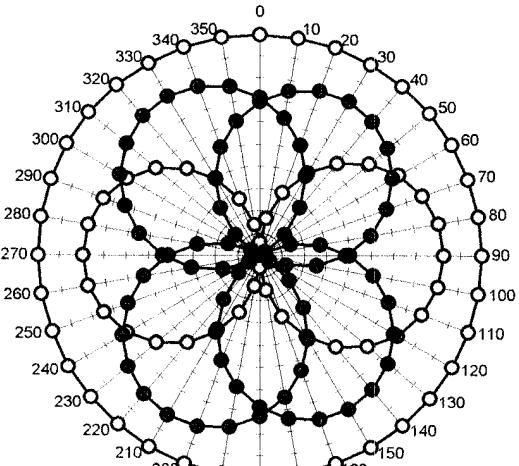
Head	900 MHz	Typical SAR gradient: 5 % per mm		
	Probe Tip to Boundary	1 mm	2 mm	
	SAR _{be} [%] Without Correction Algorithm	10.2	5.9	
	SAR _{be} [%] With Correction Algorithm	0.4	0.6	
Head	1800 MHz	Typical SAR gradient: 10 % per mm		
	Probe Tip to Boundary	1 mm	2 mm	
	SAR _{be} [%] Without Correction Algorithm	14.6	9.8	
	SAR _{be} [%] With Correction Algorithm	0.2	0.0	

Sensor Offset

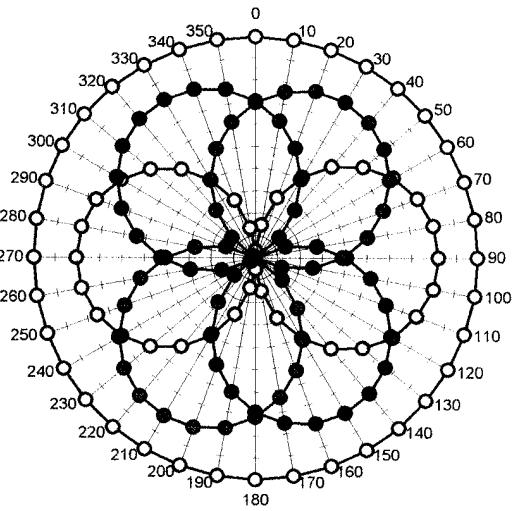
Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	1.4 \pm 0.2	mm

Receiving Pattern (ϕ), $\theta = 0^\circ$

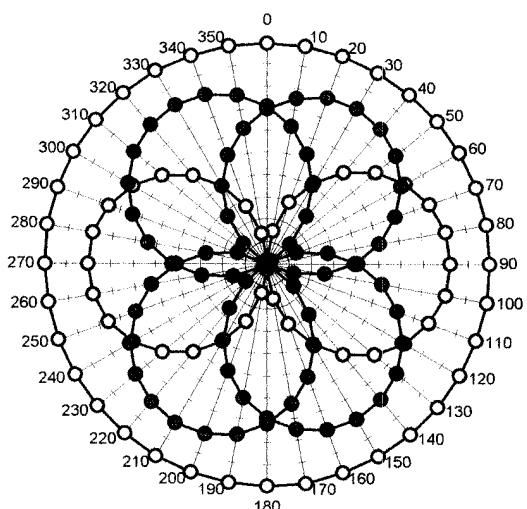
$f = 30$ MHz, TEM cell ifi110



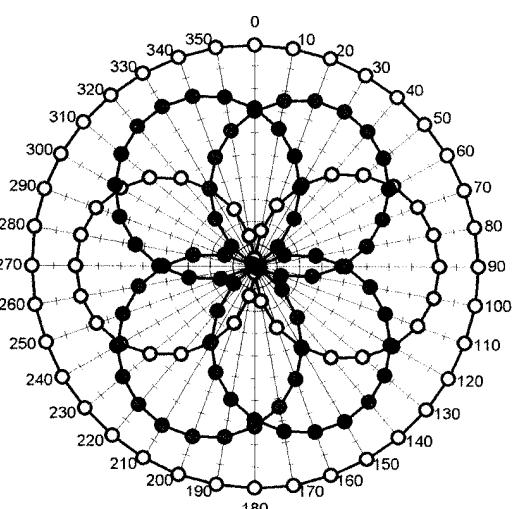
$f = 100$ MHz, TEM cell ifi110

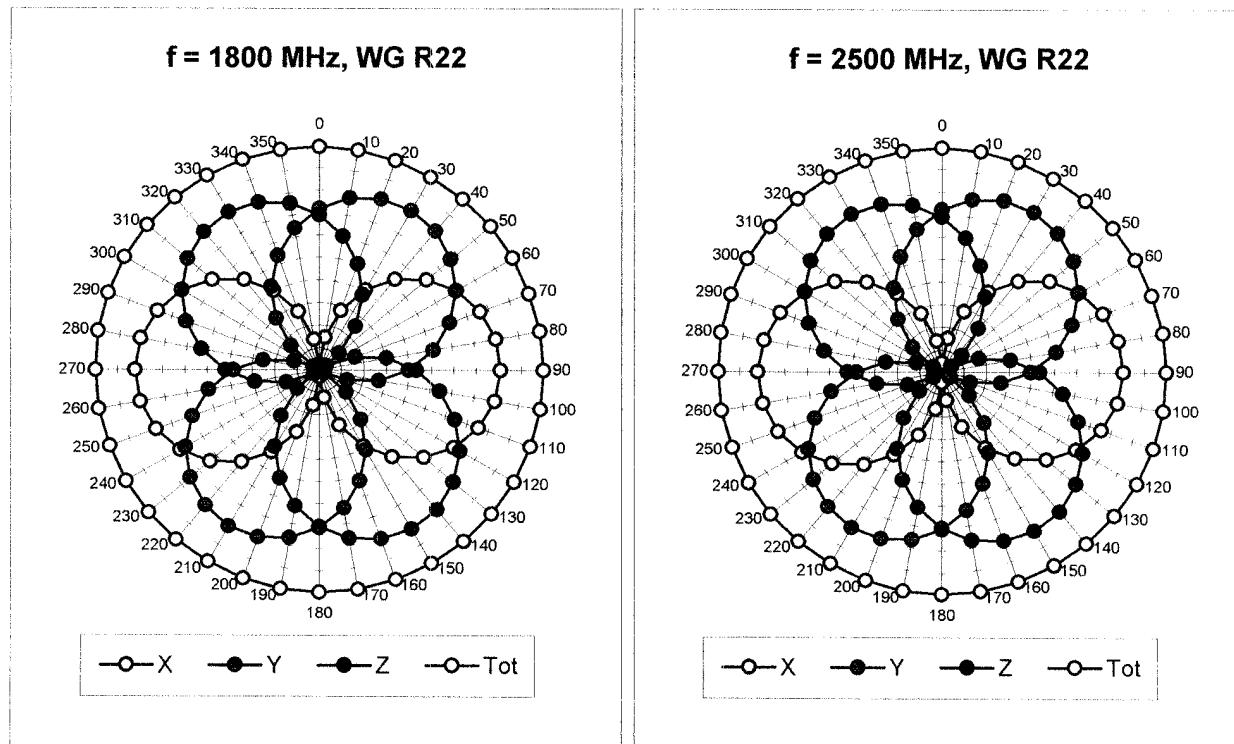


$f = 300$ MHz, TEM cell ifi110

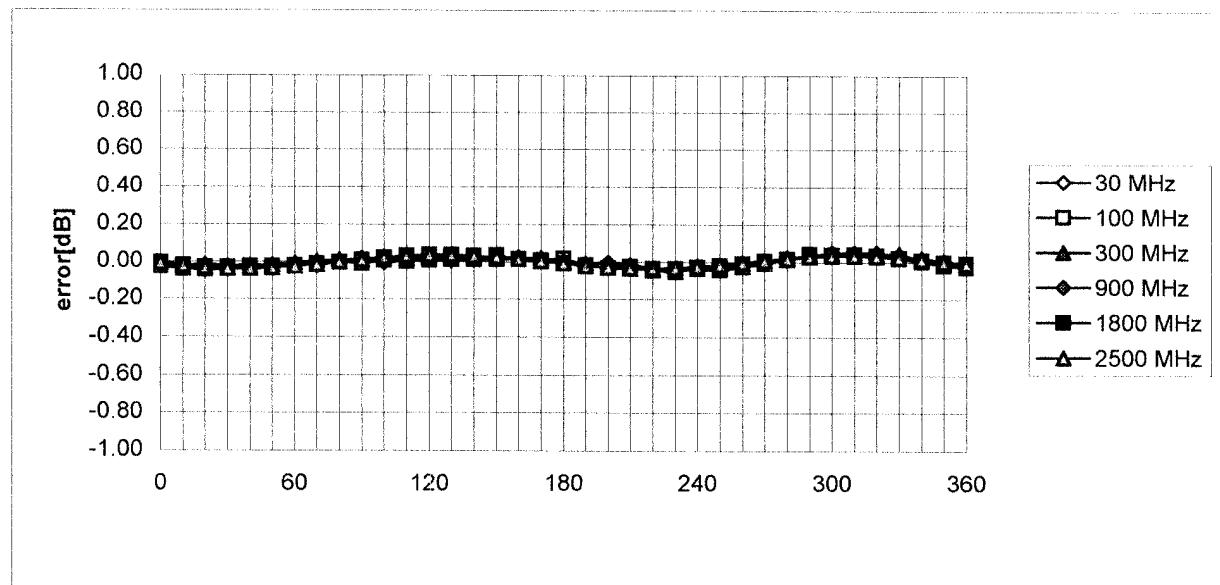


$f = 900$ MHz, TEM cell ifi110



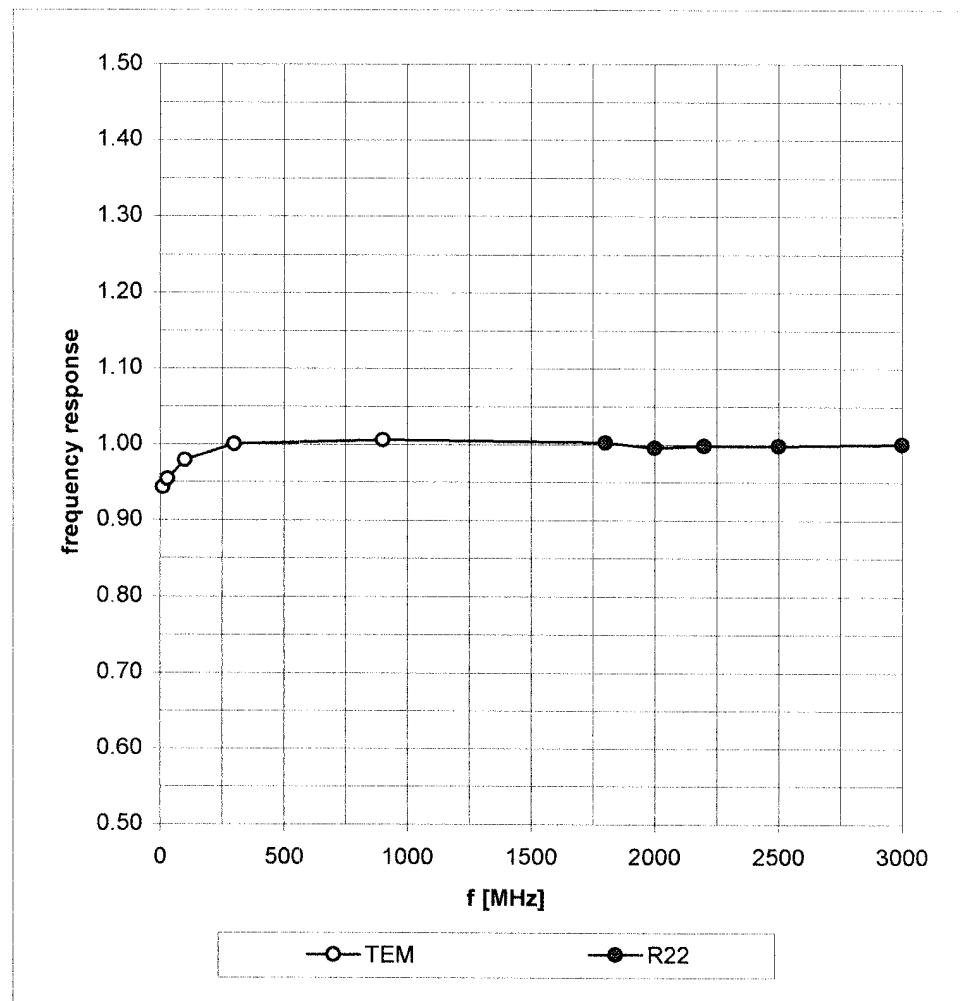


Isotropy Error (ϕ), $\theta = 0^\circ$

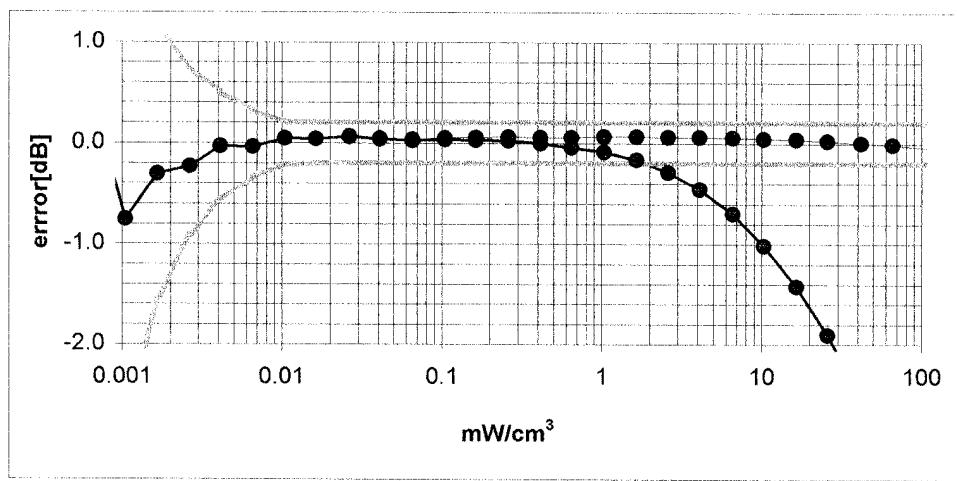
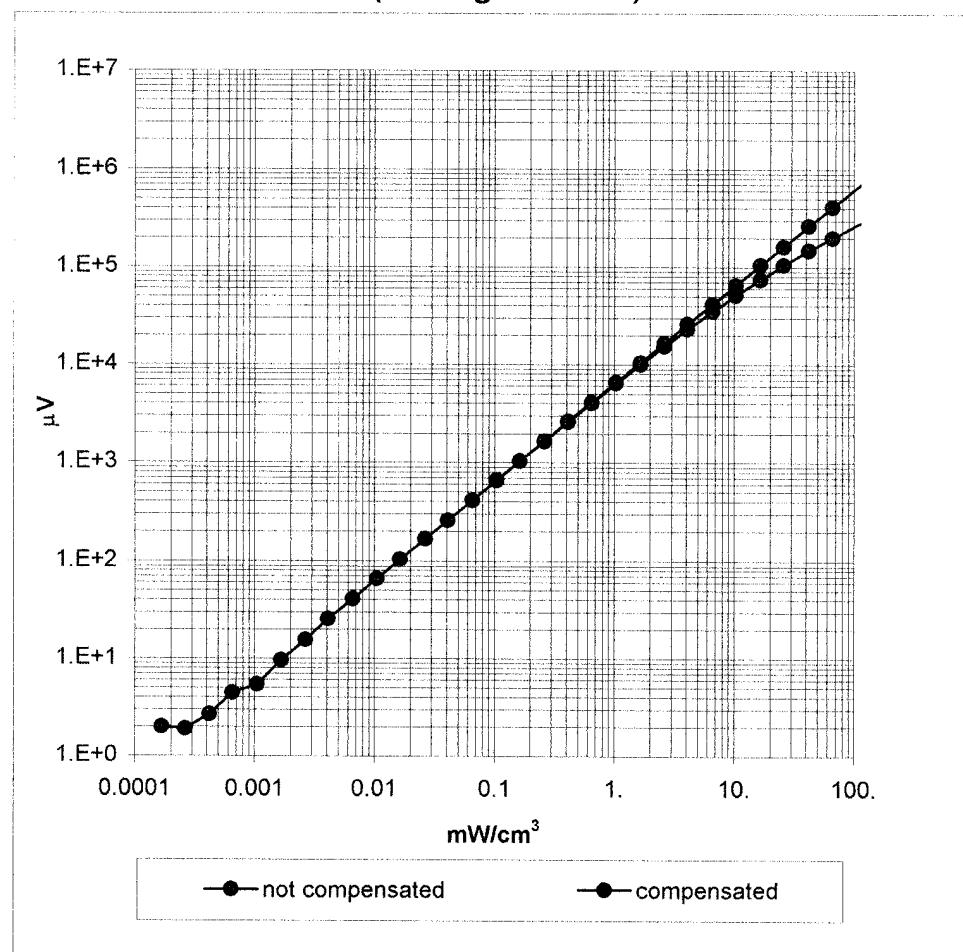


Frequency Response of E-Field

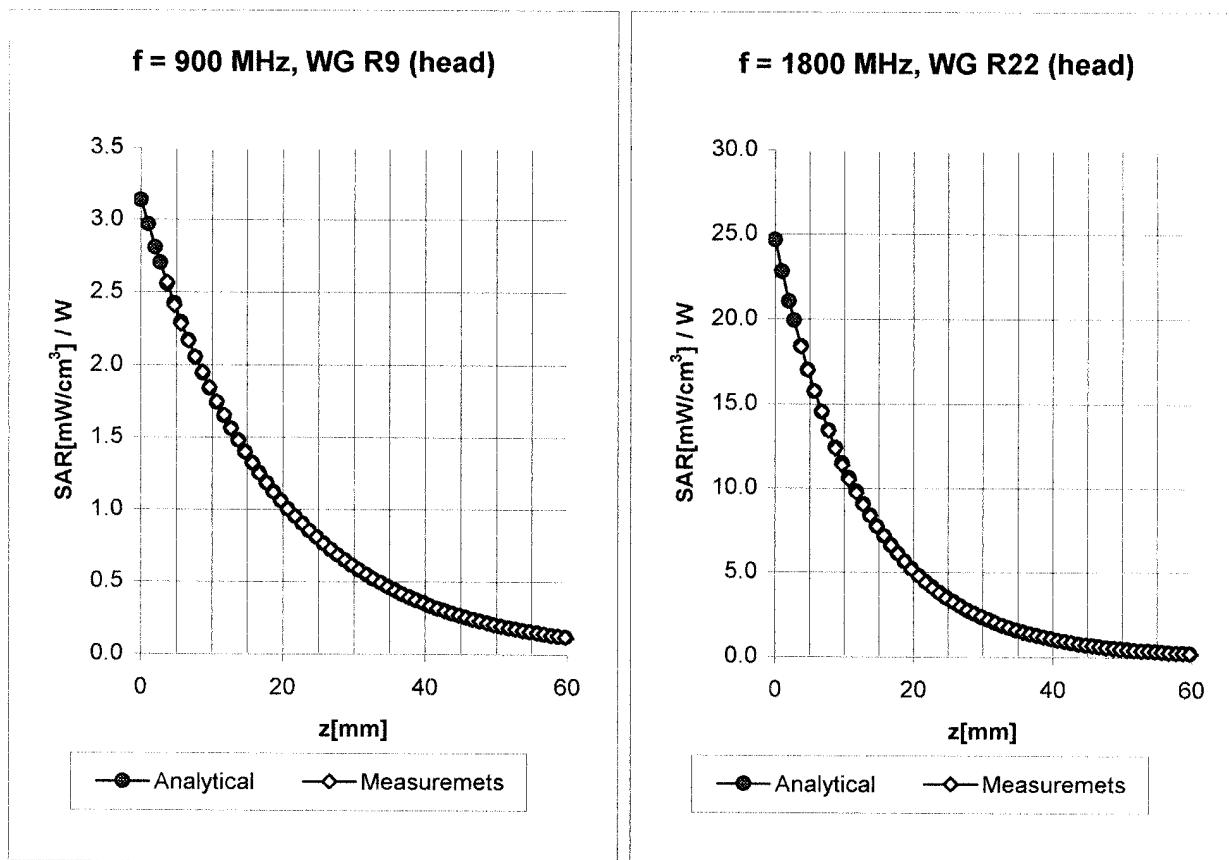
(TEM-Cell:ifi110, Waveguide R22)



Dynamic Range f(SAR_{brain}) (Waveguide R22)

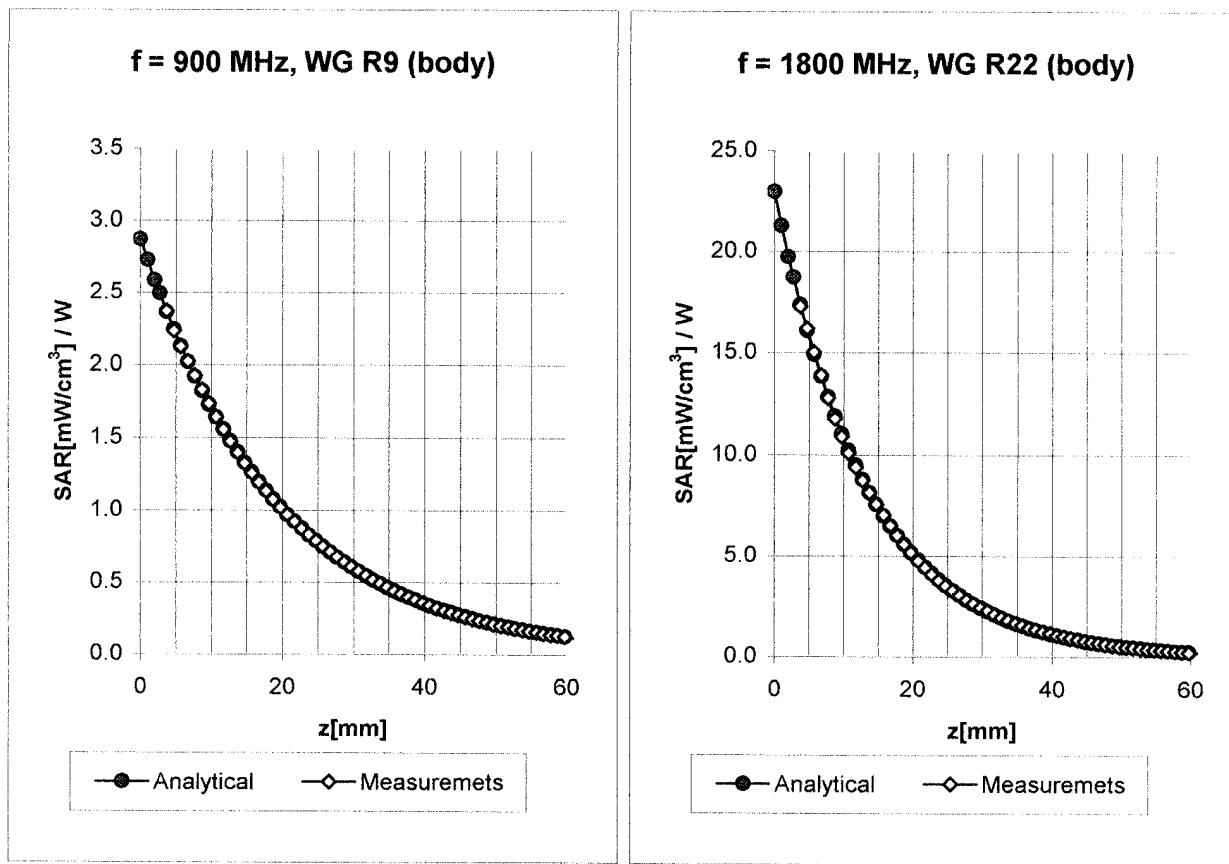


Conversion Factor Assessment



Head	900 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.97 \pm 5\% \text{ mho/m}$
Head	835 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.90 \pm 5\% \text{ mho/m}$
	ConvF X	6.6 $\pm 9.5\%$ (k=2)	Boundary effect:
	ConvF Y	6.6 $\pm 9.5\%$ (k=2)	Alpha 0.37
	ConvF Z	6.6 $\pm 9.5\%$ (k=2)	Depth 2.61
Head	1800 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\% \text{ mho/m}$
Head	1900 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\% \text{ mho/m}$
	ConvF X	5.2 $\pm 9.5\%$ (k=2)	Boundary effect:
	ConvF Y	5.2 $\pm 9.5\%$ (k=2)	Alpha 0.50
	ConvF Z	5.2 $\pm 9.5\%$ (k=2)	Depth 2.73

Conversion Factor Assessment



Body 900 MHz $\epsilon_r = 55.0 \pm 5\%$ $\sigma = 1.05 \pm 5\% \text{ mho/m}$

Body 835 MHz $\epsilon_r = 55.2 \pm 5\%$ $\sigma = 0.97 \pm 5\% \text{ mho/m}$

ConvF X **6.4** $\pm 9.5\%$ (k=2) Boundary effect:

ConvF Y **6.4** $\pm 9.5\%$ (k=2) Alpha **0.45**

ConvF Z **6.4** $\pm 9.5\%$ (k=2) Depth **2.35**

Body 1800 MHz $\epsilon_r = 53.3 \pm 5\%$ $\sigma = 1.52 \pm 5\% \text{ mho/m}$

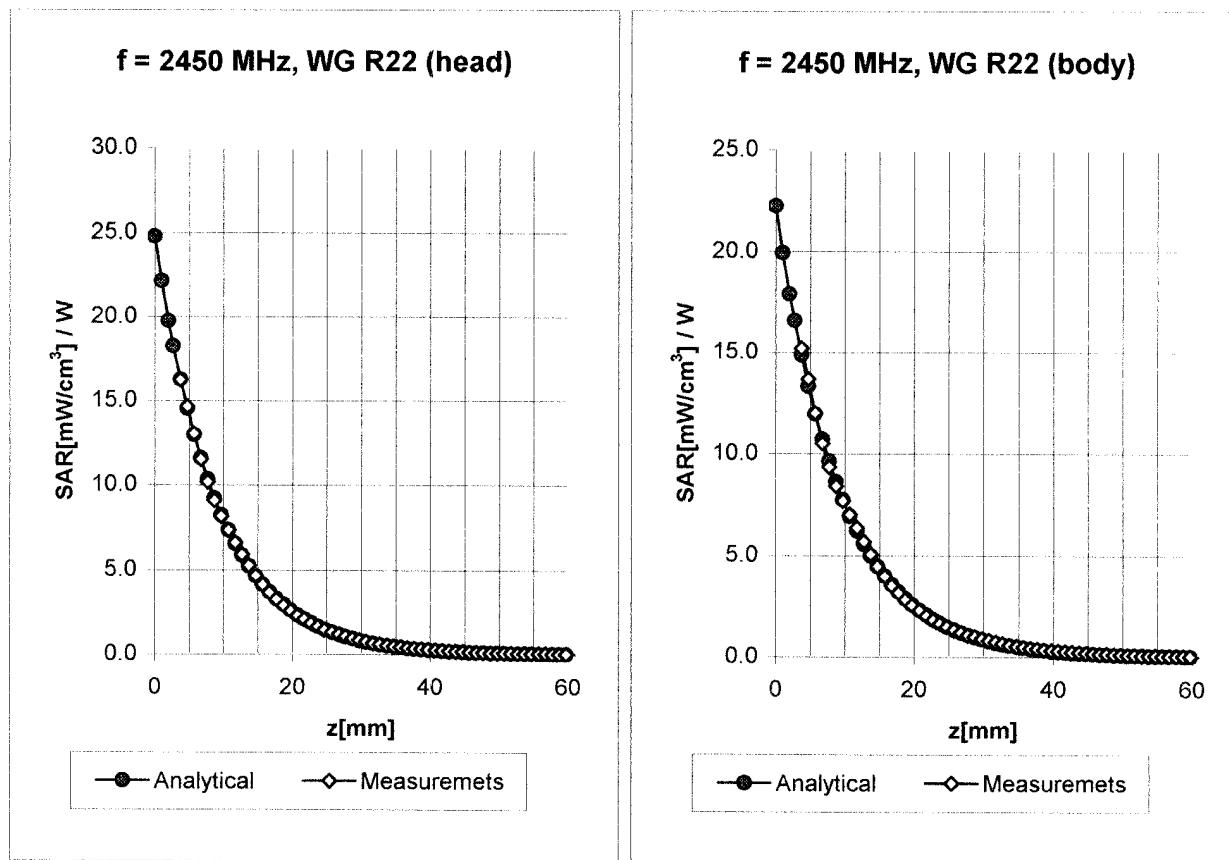
Body 1900 MHz $\epsilon_r = 53.3 \pm 5\%$ $\sigma = 1.52 \pm 5\% \text{ mho/m}$

ConvF X **4.9** $\pm 9.5\%$ (k=2) Boundary effect:

ConvF Y **4.9** $\pm 9.5\%$ (k=2) Alpha **0.60**

ConvF Z **4.9** $\pm 9.5\%$ (k=2) Depth **2.59**

Conversion Factor Assessment



Head 2450 MHz $\epsilon_r = 39.2 \pm 5\%$ $\sigma = 1.80 \pm 5\% \text{ mho/m}$

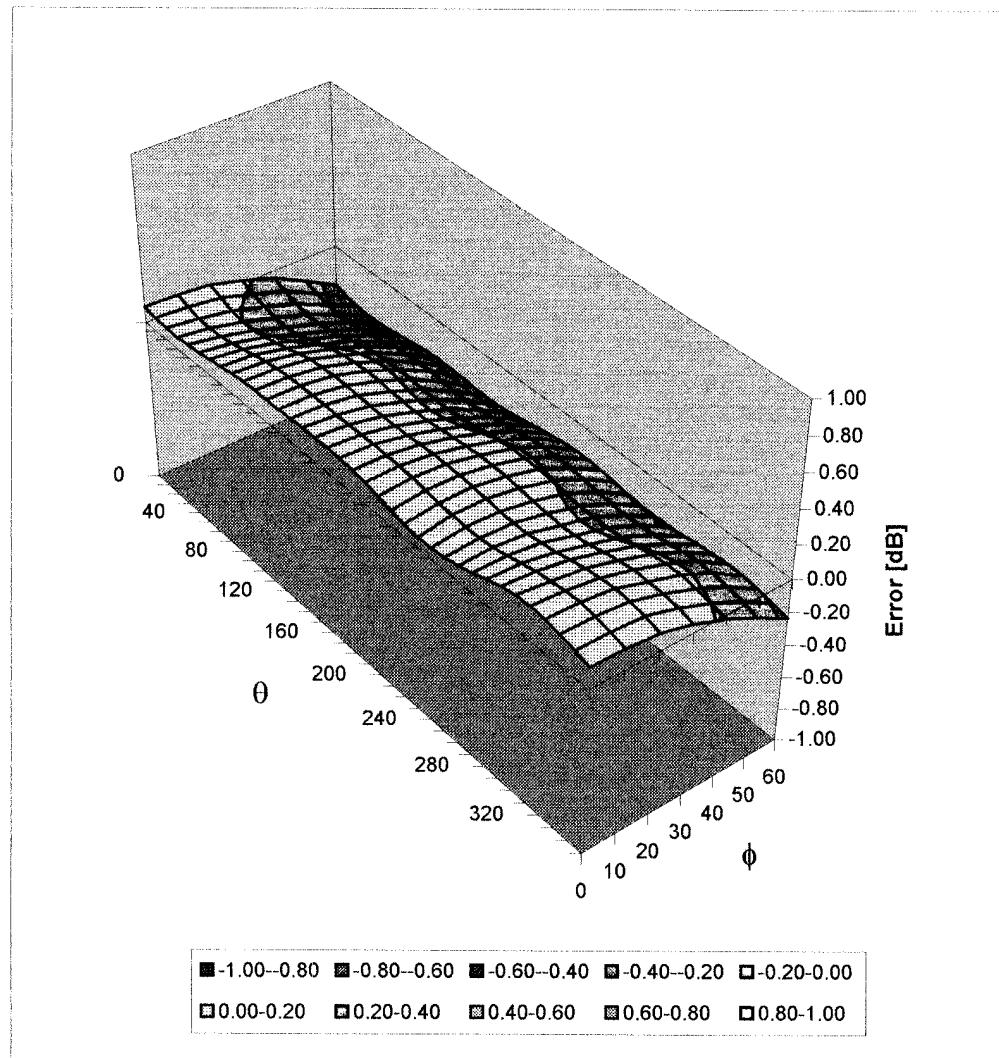
ConvF X	5.0 $\pm 8.9\%$ (k=2)	Boundary effect:	
ConvF Y	5.0 $\pm 8.9\%$ (k=2)	Alpha	1.04
ConvF Z	5.0 $\pm 8.9\%$ (k=2)	Depth	1.85

Body 2450 MHz $\epsilon_r = 52.7 \pm 5\%$ $\sigma = 1.95 \pm 5\% \text{ mho/m}$

ConvF X	4.6 $\pm 8.9\%$ (k=2)	Boundary effect:	
ConvF Y	4.6 $\pm 8.9\%$ (k=2)	Alpha	1.20
ConvF Z	4.6 $\pm 8.9\%$ (k=2)	Depth	1.60

Deviation from Isotropy in HSL

Error (θ, ϕ), $f = 900$ MHz



**Schmid & Partner
Engineering AG**

Zeughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

**Additional Conversion Factors
for Dosimetric E-Field Probe**

Type:

ET3DV6

Serial Number:

1387

Place of Assessment:

Zurich

Date of Assessment:

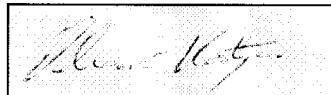
February 28, 2003

Probe Calibration Date:

February 26, 2003

Schmid & Partner Engineering AG hereby certifies that conversion factor(s) of this probe have been evaluated on the date indicated above. The assessment was performed using the FDTD numerical code SEMCAD of Schmid & Partner Engineering AG. Since the evaluation is coupled with measured conversion factors, it has to be recalculated yearly, i.e., following the re-calibration schedule of the probe. The uncertainty of the numerical assessment is based on the extrapolation from measured value at 900 MHz or at 1800 MHz.

Assessed by:



Dosimetric E-Field Probe ET3DV6 SN:1387

Conversion factor (\pm standard deviation)

150 MHz	ConvF	9.1 ± 8%	$\epsilon_r = 52.3$ $\sigma = 0.76 \text{ mho/m}$ (head tissue)
300 MHz	ConvF	7.9 ± 8%	$\epsilon_r = 45.3$ $\sigma = 0.87 \text{ mho/m}$ (head tissue)
450 MHz	ConvF	7.5 ± 8%	$\epsilon_r = 43.5$ $\sigma = 0.87 \text{ mho/m}$ (head tissue)
150 MHz	ConvF	8.8 ± 8%	$\epsilon_r = 61.9$ $\sigma = 0.80 \text{ mho/m}$ (body tissue)
300 MHz	ConvF	8.0 ± 8%	$\epsilon_r = 58.2$ $\sigma = 0.92 \text{ mho/m}$ (body tissue)
450 MHz	ConvF	7.7 ± 8%	$\epsilon_r = 56.7$ $\sigma = 0.94 \text{ mho/m}$ (body tissue)

APPENDIX E - MEASURED FLUID DIELECTRIC PARAMETERS

900MHz System Performance Check

Measured Fluid Dielectric Parameters (Brain)

September 25, 2003

Frequency	e'	e"
800.000000 MHz	41.0914	19.5810
810.000000 MHz	40.9797	19.5338
820.000000 MHz	40.8684	19.5146
830.000000 MHz	40.7181	19.4541
840.000000 MHz	40.5427	19.4393
850.000000 MHz	40.4054	19.3947
860.000000 MHz	40.2489	19.3776
870.000000 MHz	40.1130	19.3460
880.000000 MHz	40.0091	19.3067
890.000000 MHz	39.9163	19.2953
900.000000 MHz	39.8591	19.2250
910.000000 MHz	39.7498	19.1712
920.000000 MHz	39.6642	19.1216
930.000000 MHz	39.5599	19.0981
940.000000 MHz	39.4561	19.0658
950.000000 MHz	39.3320	19.0503
960.000000 MHz	39.1974	19.0202
970.000000 MHz	39.0604	19.0015
980.000000 MHz	38.9599	19.0005
990.000000 MHz	38.8508	18.9615
1.000000000 GHz	38.7688	18.9427

900MHz DUT Evaluation (Body)

Measured Fluid Dielectric Parameters (Muscle)

September 25, 2003

Frequency	e'	e"
800.000000 MHz	55.5581	21.7417
810.000000 MHz	55.5054	21.6893
820.000000 MHz	55.4127	21.6409
830.000000 MHz	55.2865	21.6114
840.000000 MHz	55.1215	21.5536
850.000000 MHz	55.0411	21.5315
860.000000 MHz	54.8990	21.4793
870.000000 MHz	54.8078	21.4630
880.000000 MHz	54.7297	21.4421
890.000000 MHz	54.6205	21.4127
900.000000 MHz	54.6007	21.3066
910.000000 MHz	54.5217	21.2566
920.000000 MHz	54.4388	21.1885
930.000000 MHz	54.3470	21.1663
940.000000 MHz	54.2850	21.1326
950.000000 MHz	54.2000	21.1089
960.000000 MHz	54.0923	21.0704
970.000000 MHz	54.0062	21.0738
980.000000 MHz	53.8894	21.0660
990.000000 MHz	53.8030	21.0507
1.000000000 GHz	53.7456	21.0039

APPENDIX F - SAM PHANTOM CERTIFICATE OF CONFORMITY

Schmid & Partner Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

Certificate of conformity / First Article Inspection

Item	SAM Twin Phantom V4.0
Type No	QD 000 P40 BA
Series No	TP-1002 and higher
Manufacturer / Origin	Untersee Composites Hauptstr. 69 CH-8559 Fruthwilen Switzerland

Tests

The series production process used allows the limitation to test of first articles.

Complete tests were made on the pre-series Type No. QD 000 P40 AA, Serial No. TP-1001 and on the series first article Type No. QD 000 P40 BA, Serial No. TP-1006. Certain parameters have been retested using further series units (called samples).

Test	Requirement	Details	Units tested
Shape	Compliance with the geometry according to the CAD model.	IT'IS CAD File (*)	First article, Samples
Material thickness	Compliant with the requirements according to the standards	2mm +/- 0.2mm in specific areas	First article, Samples
Material parameters	Dielectric parameters for required frequencies	200 MHz – 3 GHz Relative permittivity < 5 Loss tangent < 0.05.	Material sample TP 104-5
Material resistivity	The material has been tested to be compatible with the liquids defined in the standards	Liquid type HSL 1800 and others according to the standard.	Pre-series, First article

Standards

- [1] CENELEC EN 50361
- [2] IEEE P1528-200x draft 6.5
- [3] IEC PT 62209 draft 0.9

(*) The IT'IS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of [1] and [3].

Conformity

Based on the sample tests above, we certify that this item is in compliance with the uncertainty requirements of SAR measurements specified in standard [1] and draft standards [2] and [3].

Date 18.11.2001

Signature / Stamp


Schmid & Partner
Engineering AG

Zeughausstrasse 43, CH-8004 Zurich
Tel. +41 1 245 97 00, Fax +41 1 245 97 79

APPENDIX G - PLANAR PHANTOM CERTIFICATE OF CONFORMITY & DIMENSIONS

2378 Westlake Road
Kelowna, B.C. Canada
V1Z-2V2



Ph. # 250-769-6848
Fax # 250-769-6334
E-mail: barskiind@shaw.ca
Web: www.bcfiberglass.com

FIBERGLASS FABRICATORS

Certificate of Conformity

Item : Flat Planar Phantom Unit # 03-01
Date: June 16, 2003
Manufacturer: Barski Industries (1985 Ltd)

Test	Requirement	Details
Shape	Compliance to geometry according to drawing	Supplied CAD drawing
Material Thickness	Compliant with the requirements	2mm +/- 0.2mm in measurement area
Material Parameters	Dielectric parameters for required frequencies Based on Dow Chemical technical data	100 MHz-5 GHz Relative permittivity < 5 Loss Tangent < 0.05

Conformity

Based on the above information, we certify this product to be compliant to the requirements specified.

Signature: A handwritten signature in black ink, appearing to read 'Daniel Chailler', is placed over a horizontal line.

Daniel Chailler



Fiberglass Planar Phantom - Top View



Fiberglass Planar Phantom - Front View



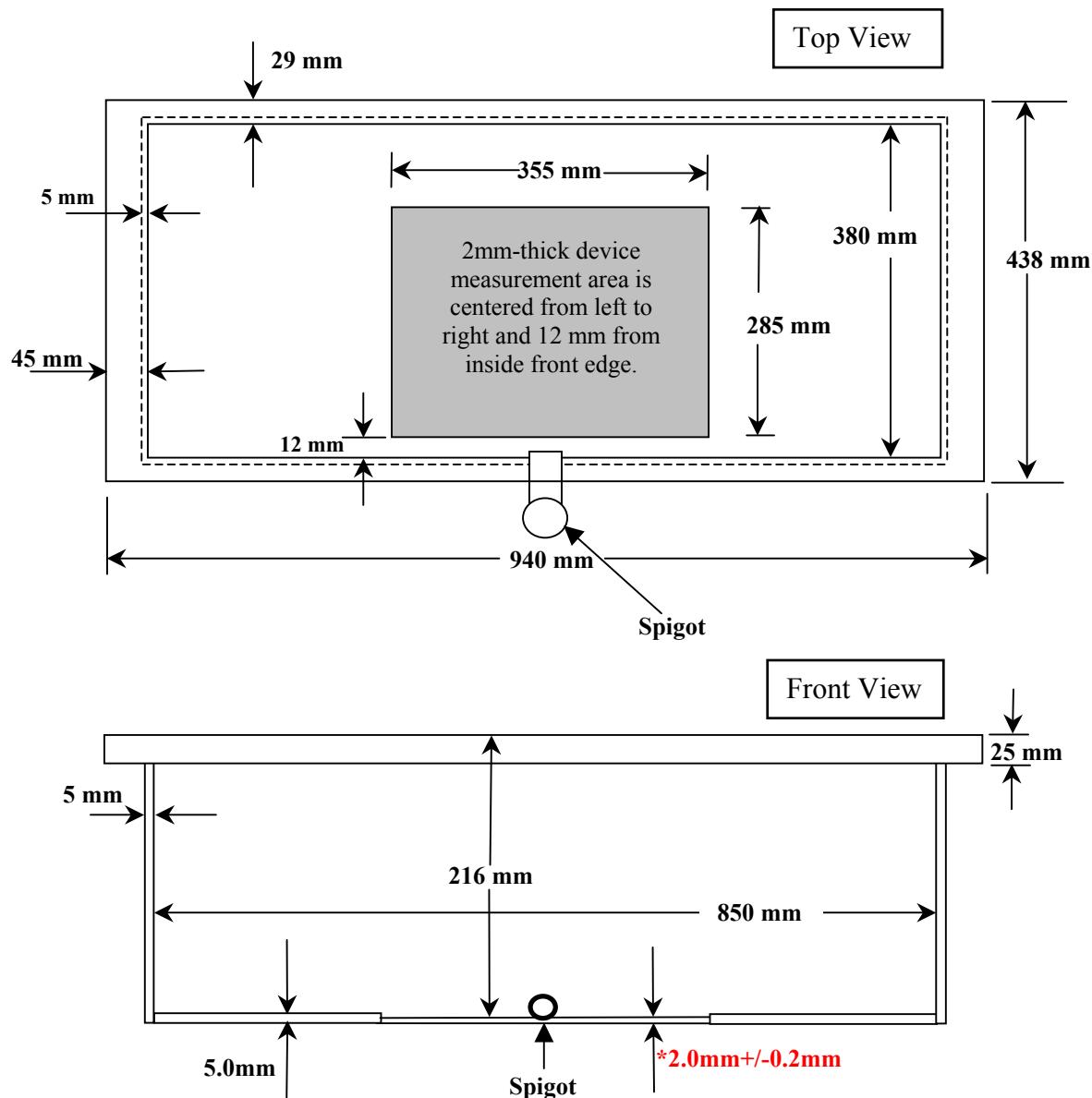
Fiberglass Planar Phantom - Back View



Fiberglass Planar Phantom - Bottom View

Dimensions of Fiberglass Planar Phantom

(Manufactured by Barski Industries Ltd. - Unit# 03-01)



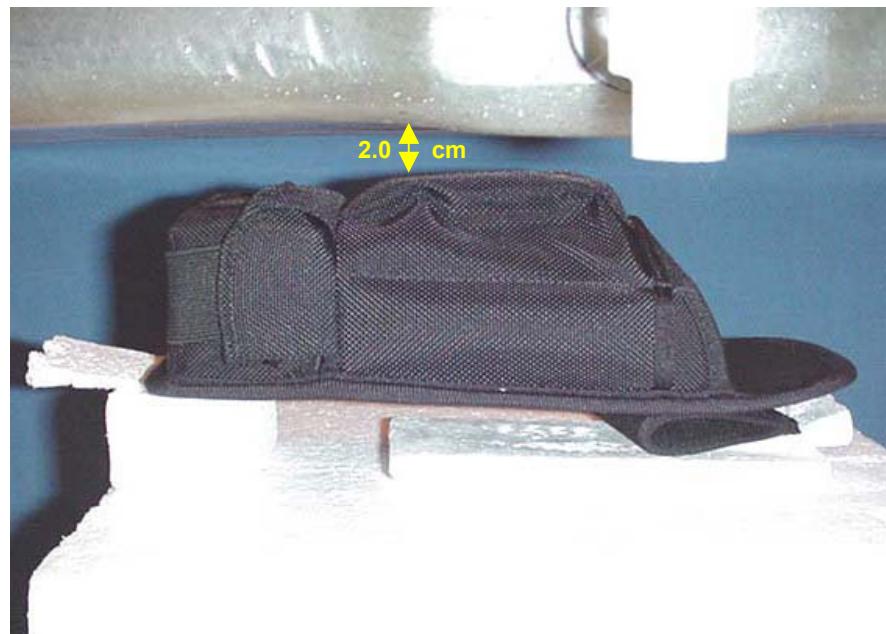
Note: Measurements that aren't repeated for the opposite sides are the same as the side measured.
This drawing is not to scale.

APPENDIX H - SAR TEST SETUP PHOTOGRAPHS

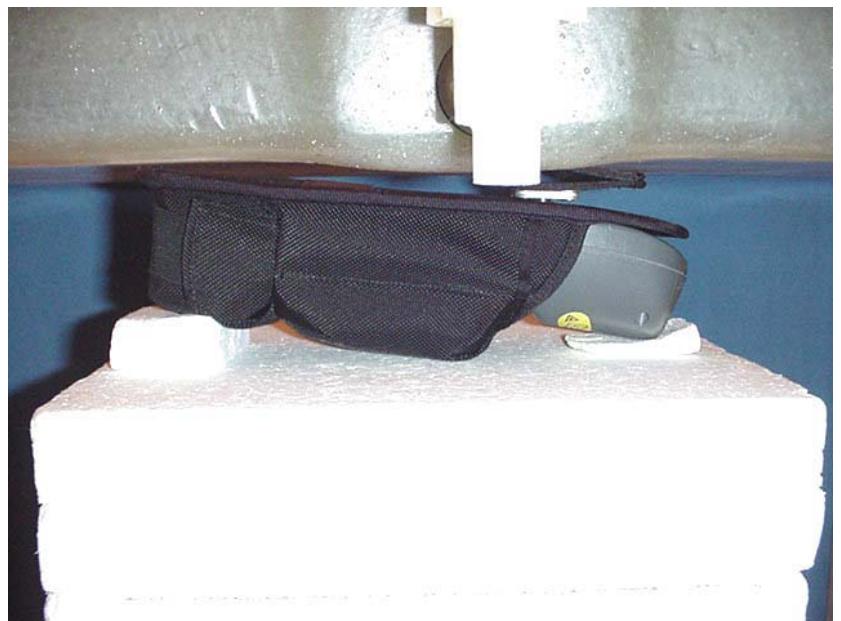
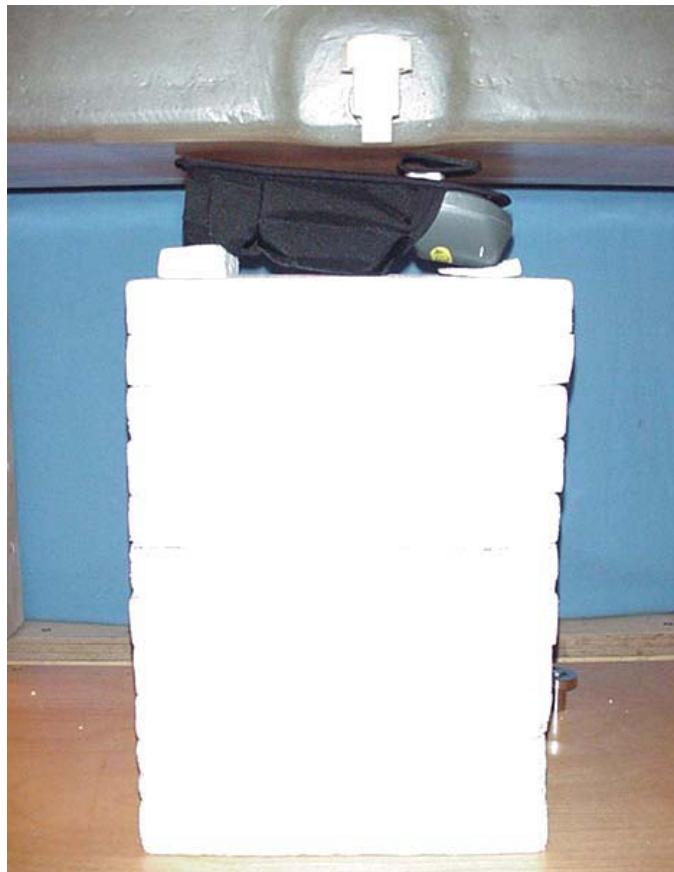
BODY-WORN SAR TEST SETUP PHOTOGRAPHS
2.0 cm Separation Distance from Front Side of Belt-Holster to Planar Phantom
(with Symbol PC Model: PDT7500-ROX73M01)



BODY-WORN SAR TEST SETUP PHOTOGRAPHS
2.0 cm Separation Distance from Front Side of Belt-Holster to Planar Phantom
(without Symbol PC)



BODY-WORN SAR TEST SETUP PHOTOGRAPHS
0.0 cm Separation Distance from Back Side of Belt-Holster to Planar Phantom
(with Symbol PC Model: PDT7500-ROX73M01)



BODY-WORN SAR TEST SETUP PHOTOGRAPHS
0.0 cm Separation Distance from Back Side of Belt-Holster to Planar Phantom
(without Symbol PC)

