DECLARATION OF COMPLIANCE
SAR RF EXPOSURE 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

PARKERVISION, INC.
8493 Baymeadows Way
Jacksonville, FL 32256
USA

Rule Part(s):	**FCC 47 CFR §2.1093**
Test Procedure(s):	**FCC OET Bulletin 65, Supplement C (01-01)**
Device Classification:	**Digital Transmission System (DTS)**
Device Type:	**802.11b WLAN PCMCIA Card (for Laptop PCs)**
Modulation Type:	**Direct Sequence Spread Spectrum (DSSS)**
FCC IDENTIFIER:	**JFE-D2D00004**
Model Name / No.:	**WLAN3000**
Tx Frequency Range:	**2412 - 2462 MHz**
Max. RF Output Power Tested:	**21.2 dBm Peak Conducted (2437 MHz)**
Power Source(s) Tested:	**Host Laptop PC (Lithium-ion Battery)**
Antenna Type(s) Tested:	**Internal**
Host Laptop PCs Tested:	**HP Compaq nX9010** **DELL Inspiron 5150** **SONY VAIO PCG-8M2R**
Maximum SAR Level:	**0.699 W/kg (with HP Compaq Laptop PC)**

Celltech Labs Inc. declares under its sole responsibility that this wireless portable device was found to be in 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) 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 Pipe
Senior Compliance Technologist
Celltech Labs Inc.

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1.0 INTRODUCTION

This measurement report demonstrates that the ParkerVision, Inc. Model: WLAN3000 802.11b WLAN PCMCIA Card FCC ID: JFE-D2D00004 (for Laptop PCs) 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]) 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				
Test Procedure(s)	FCC OET Bulletin 65, Supplement C (Edition 01-01)				
FCC Device Classification	Digital Transmission System (DTS)				
Device Type	802.11b WLAN PCMCIA Card (for Laptop PCs)				
Modulation Type	DSSS (Direct Sequence Spread Spectrum)				
FCC IDENTIFIER	JFE-D2D00004				
Model No.	WLAN3000				
Serial No.	13C 1-2		Identical Prototype		
Tx Frequency Range	2412 - 2462 MHz				
Max. RF Output Power Tested	21.2 dBm	Peak Conducted	2437 MHz		
Antenna Type(s) Tested	Internal				
Power Source(s) Tested	Host Laptop PC (Lithium-ion Battery)				
Host Laptop PCs Tested	**Manufacturer / Model**	**Serial No.**	**No. of Card Slots**	**Slot Location**	**Slot-to-Base (mm)**
	Dell Inspiron 5150	29017044865	1	Left Rear Side	6
	Sony VAIO PCG-8M2R	3000337	2	Left Rear Side	15
	HP Compaq nx9010	CNF3461VC8	1	Left Front Side	12

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 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

BODY SAR EVALUATION RESULTS

Freq. (MHz)	Chan.	Test Mode	Power Source	Host Laptop Type	Host Laptop PCMCIA Card Slot	Host Laptop Position to Planar Phantom	Host Laptop Slot-to-Base Distance (mm)	Spacing from DUT to Planar Phantom (mm)	Cond. Power Before Test (dBm)	SAR Drift During Test (dB)	Measured SAR 1g (W/kg)	Scaled SAR 1g (W/kg) (+ Drift & 21.5 dBm Cond Pwr)
2437	Mid	DSSS	Host Laptop Li-ion Battery	Dell	Single	Bottom 0.0 cm	6	7	21.2	0.269	0.589	0.631
2437	Mid	DSSS	Host Laptop Li-ion Battery	Sony	Bottom	Bottom 0.0 cm	15	17	21.2	-0.035	0.152	0.164
2437	Mid	DSSS	Host Laptop Li-ion Battery	HP	Single	Bottom 0.0 cm	12	12	21.2	-0.00644	0.651	0.699

ANSI / IEEE C95.1 1999 - SAFETY LIMIT
Spatial Peak - Uncontrolled Exposure / General Population
BODY: 1.6 W/kg (averaged over 1 gram)

Test Date(s)	June 22, 2004			**Relative Humidity**	37	%
Measured Fluid Type	**2450 MHz Body**			**Atmospheric Pressure**	102.0	kPa
Dielectric Constant ε_r	**IEEE Target**		**Measured**	**Ambient Temperature**	25.5	°C
	52.7	**± 5%**	51.1	**Fluid Temperature**	23.8	°C
Conductivity σ (mho/m)	**IEEE Target**		**Measured**	**Fluid Depth**	≥ 15	cm
	1.95	**± 5%**	1.98	**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 levels measured at the mid channel were ≥ 3 dB 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 power drifts measured by the DASY system for the duration of the SAR evaluations were added to the measured SAR levels to report scaled SAR results as shown in the above test data table. The measured SAR results were also scaled to 21.5 dBm peak conducted power, which was the maximum conducted power level measured by the EMC test lab.
4. The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the SAR evaluation. The temperatures reported were consistent for all measurement periods.
5. The dielectric parameters of the simulated body tissue mixture were measured prior to the evaluation using an HP 85070C Dielectric Probe Kit and an HP 8753E Network Analyzer (see Appendix E for printout of measured fluid dielectric parameters).
6. The SAR evaluations were performed within 24 hours of the system performance check.

5.0 DETAILS OF SAR EVALUATION

The ParkerVision, Inc. Model: WLAN3000 802.11b WLAN PCMCIA Card FCC ID: JFE-D2D00004 (for Laptop PCs) was compliant for localized Specific Absorption Rate (Uncontrolled Exposure)) based on the test provisions and conditions described below. The detailed test setup photographs are shown in Appendix H.

1. The DUT was evaluated for body SAR with the bottom side of the Dell Inspiron Laptop PC placed parallel to, and touching, the outer surface of the planar phantom. The DUT was tested in the single PCMCIA card slot of the Dell Inspiron Laptop PC.
2. The DUT was evaluated for body SAR with the bottom side of the Sony VAIO Laptop PC placed parallel to, and touching, the outer surface of the planar phantom. The DUT was tested in the bottom PCMCIA card slot of the Sony VAIO Laptop PC.
3. The DUT was evaluated for body SAR with the bottom side of the HP Compaq Laptop PC placed parallel to, and touching, the surface of the planar phantom. The DUT was tested in the single PCMCIA card slot of the HP Compaq nX9010 Laptop PC.
4. The peak conducted power levels were measured prior to the evaluations using an HP E4408B Spectrum Analyzer integrated over the occupied bandwidth according to the procedures described in FCC 47 CFR §2.1046.
5. The power drifts measured by the DASY system for the duration of the SAR evaluations were added to the measured SAR levels to report scaled SAR results as shown in the test data table (page 5). The measured SAR levels were also scaled to 21.5 dBm peak conducted power, which was the maximum conducted power level measured by the EMC test lab.
6. The DUT was controlled in test mode via the host Laptop PC and tested at maximum power in modulated DSSS continuous transmit mode.
7. The DUT was tested with a fully charged battery in the host Laptop PC.

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 in accordance with FCC OET Bulletin 65, Supplement C (Edition 01-01) 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).

g. A zoom scan volume of 32 mm x 32 mm x 30 mm (5 x 5 x 7 points) centered at the peak SAR location determined from the area scan is used for all zoom scans for devices with a transmit frequency < 800 MHz. Zoom scans for frequencies ≥ 800 MHz are determined with a scan volume of 30 mm x 30 mm x 30 mm (7 x 7 x 7) to ensure complete capture of the peak spatial-average SAR.

7.0 SYSTEM PERFORMANCE CHECK

Prior to the SAR evaluation a system check was performed at the planar section of the SAM phantom with a 2450 MHz dipole (see Appendix C for detailed system validation procedures). The dielectric parameters of the simulated tissue mixture were measured prior to the system performance check using an HP 85070C Dielectric Probe Kit and an HP 8753E Network Analyzer (see Appendix E for printout of measured fluid dielectric parameters). A forward power of 250 mW was applied to the dipole and the system was verified to a tolerance of ±10% (see Appendix B for system performance check test plot).

SYSTEM PERFORMANCE CHECK

Test Date	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)
	2450MHz	IEEE Target	Measured	IEEE Target	Measured	IEEE Target	Measured						
06/22/04	Brain	**13.1 ±10%**	14.2 (+8.4%)	**39.2 ±5%**	37.3	**1.80 ±5%**	1.86	1000	24.9	23.8	≥ 15	35	101.9

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 recorded in the above table were consistent for all measurement periods.

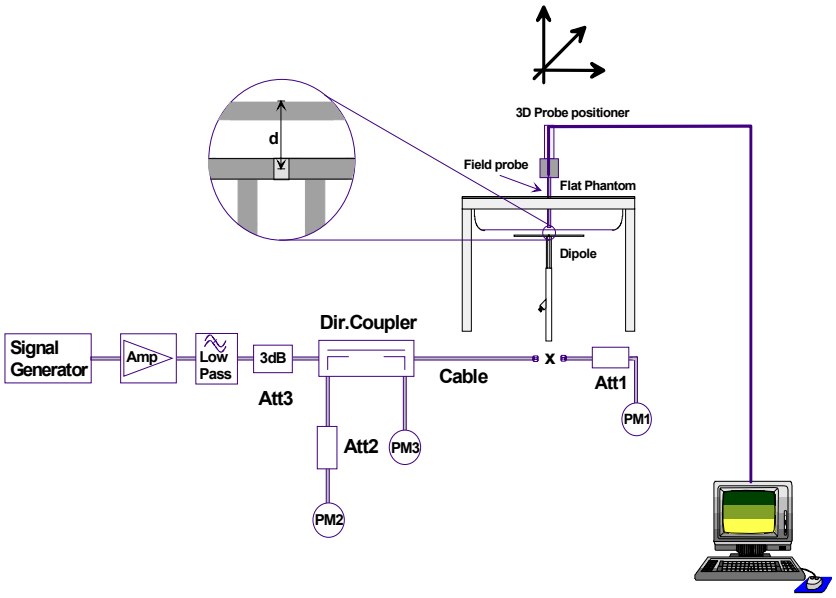


Figure 1. System Performance Check Setup Diagram

2450MHz Dipole Setup

8.0 SIMULATED EQUIVALENT TISSUES

The 2450MHz simulated tissue mixtures consist of Glycol-monobutyl, water, and salt (body mixture only). The tissue mixtures were prepared according to standardized procedures and measured for dielectric parameters (permitivity and conductivity).

SIMULATED EQUIVALENT TISSUE MIXTURES		
INGREDIENT	**2450 MHz Brain**	**2450 MHz Body**
	System Performance Check	DUT Evaluation
Water	52.00 %	69.98 %
Glycol Monobutyl	48.00 %	30.00 %
Salt	-	0.02 %

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.: 1590
Construction: Triangular core fiber optic detection system
Frequency: 10 MHz to 6 GHz
Linearity: ±0.2 dB (30 MHz to 3 GHz)

Phantom

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

Evaluation Phantom: Planar Phantom
Shell Material: Fiberglass
Thickness: 2.0 ±0.1 mm
Volume: Approx. 72 liters

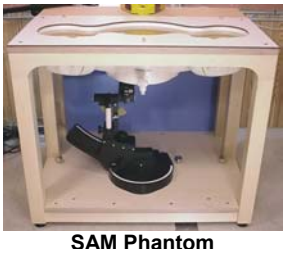
11.0 PROBE SPECIFICATION (ET3DV6)

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 ± 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 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 such as Laptop PCs. 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. For evaluations of larger devices such as Laptop PCs, a Plexiglas platform is attached to the device holder.

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
-DAE3	353	Dec 2003
-DAE3	370	May 2004
-ET3DV6 E-Field Probe	1387	Mar 2004
-ET3DV6 E-Field Probe	1590	May 2004
-300MHz Validation Dipole	135	Oct 2003
-450MHz Validation Dipole	136	Nov 2003
-835MHz Validation Dipole	411	Mar 2004
-900MHz Validation Dipole	054	June 2004
-1800MHz Validation Dipole	247	June 2004
-1900 MHz Validation Dipole	151	June 2004
-2450MHz Validation Dipole	150	Sept 2003
-SAM Phantom V4.0C	1033	N/A
-Barski Planar Phantom	03-01	N/A
-Plexiglas Planar Phantom	161	N/A
-Validation Planar Phantom	137	N/A
HP 85070C Dielectric Probe Kit	N/A	N/A
Gigatronics 8651A Power Meter	8650137	April 2004
Gigatronics 8652A Power Meter	1835267	April 2004
Gigatronics 80701A Power Sensor	1833535	April 2004
Gigatronics 80701A Power Sensor	1833542	April 2004
Gigatronics 80701A Power Sensor	1834350	April 2004
HP E4408B Spectrum Analyzer	US39240170	Dec 2003
HP 8594E Spectrum Analyzer	3543A02721	April 2004
HP 8753E Network Analyzer	US38433013	April 2004
HP 8648D Signal Generator	3847A00611	April 2004
Amplifier Research 5S1G4 Power Amplifier	26235	N/A

16.0 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	± 4.85	Normal	1	1	± 4.85	∞
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					**± 13.32**	
Expanded Uncertainty (k=2)					**± 26.64**	

Measurement Uncertainty Table in accordance with IEEE Std. 1528-2003 (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	± 4.85	Normal	1	1	± 4.85	∞
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					**± 9.97**	
Expanded Uncertainty (k=2)					**± 19.93**	

Measurement Uncertainty Table in accordance with IEEE Std. 1528-2003 (see Reference [3])

17.0 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 Standard 1528-2003, “Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”.

APPENDIX A - SAR MEASUREMENT DATA

Body SAR - DUT with Dell Inspiron Laptop PC - Single PCMCIA Slot - Laptop Battery Power

Date Tested: 06/22/04

DUT: ParkerVision Model: WLAN3000; Type: PCMCIA WLAN (802.11b) Card for Laptop PCs; Serial: 13C 1-2

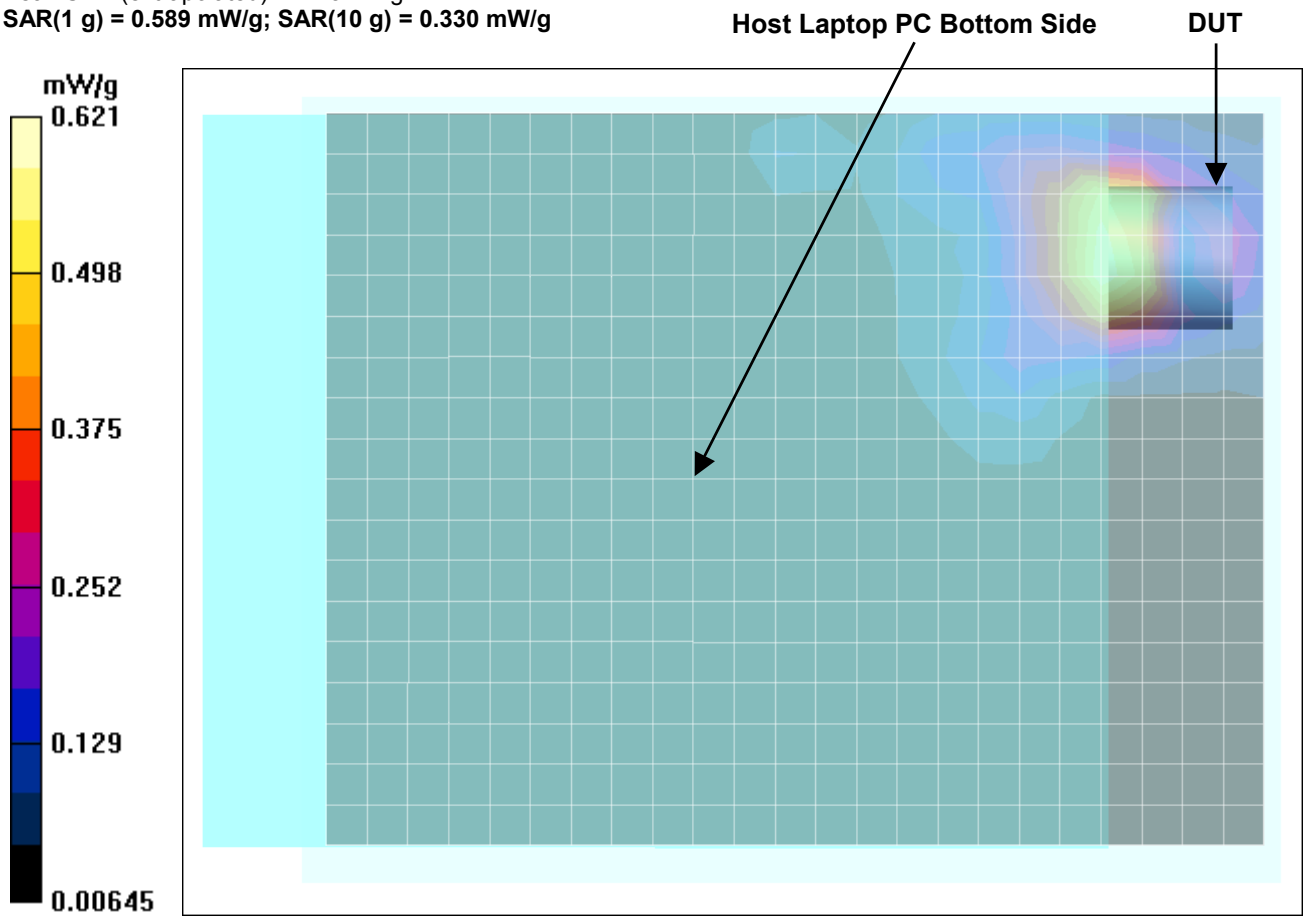
Ambient Temp: 25.5 °C; Fluid Temp: 23.8 °C; Barometric Pressure: 102.0 kPa; Humidity: 37%

Communication System: DSSS
Frequency: 2437 MHz; Duty Cycle: 1:1
Power Source: Host Laptop PC (Li-ion Battery)
RF Output Power: 21.2 dBm (Peak Conducted)
Medium: M2450 (σ = 1.98 mho/m; ε_r = 51.1; ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1590; ConvF(4.22, 4.22, 4.22); Calibrated: 24/05/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn370; Calibrated: 14/05/2004
- Phantom: Barski Industries; Type: Fiberglas Planar; Serial: 03-01
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Body SAR - Bottom of Dell Inspiron Laptop PC Touching Planar Phantom
(7 mm Spacing from Bottom of DUT to Planar Phantom) - Mid Channel
Area Scan (19x25x1): Measurement grid: dx=15mm, dy=15mm

Body SAR - Bottom of Dell Inspiron Laptop PC Touching Planar Phantom
(7 mm Spacing from Bottom of DUT to Planar Phantom) - Mid Channel
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.85 V/m; Power Drift = 0.269 dB
Peak SAR (extrapolated) = 1.23 W/kg
SAR(1 g) = 0.589 mW/g; SAR(10 g) = 0.330 mW/g



Body SAR - DUT with Sony VAIO Laptop PC - Bottom PCMCIA Slot - Laptop Battery Power

Date Tested: 06/22/04

DUT: ParkerVision Model: WLAN3000; Type: PCMCIA WLAN (802.11b) Card for Laptop PCs; Serial: 13C 1-2

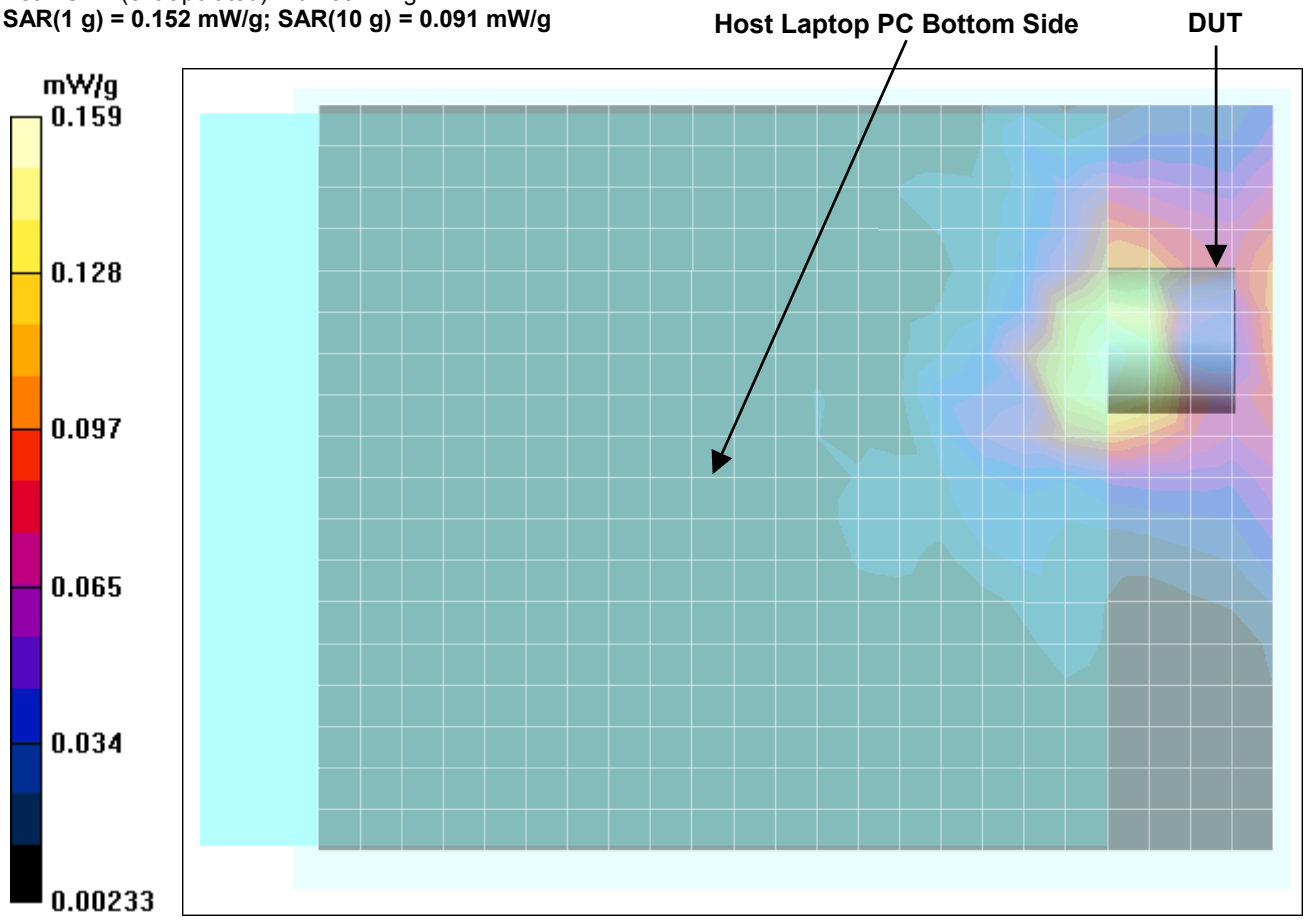
Ambient Temp: 25.5 °C; Fluid Temp: 23.8 °C; Barometric Pressure: 102.0 kPa; Humidity: 37%

Communication System: DSSS
Frequency: 2437 MHz; Duty Cycle: 1:1
Power Source: Host Laptop PC (Li-ion Battery)
RF Output Power: 21.2 dBm (Peak Conducted)
Medium: M2450 (σ = 1.98 mho/m; ε_r = 51.1; ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1590; ConvF(4.22, 4.22, 4.22); Calibrated: 24/05/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn370; Calibrated: 14/05/2004
- Phantom: Barski Industries; Type: Fiberglas Planar; Serial: 03-01
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Body SAR - Bottom of Sony VAIO Laptop PC Touching Planar Phantom (17 mm Spacing from Bottom of DUT to Planar Phantom) - Mid Channel
Area Scan (19x25x1): Measurement grid: dx=15mm, dy=15mm

Body SAR - Bottom of Sony VAIO Laptop PC Touching Planar Phantom (17 mm Spacing from Bottom of DUT to Planar Phantom) - Mid Channel
/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.87 V/m; Power Drift = -0.035 dB
Peak SAR (extrapolated) = 0.289 W/kg
SAR(1 g) = 0.152 mW/g; SAR(10 g) = 0.091 mW/g



Body SAR - DUT with Sony VAIO Laptop PC - Bottom PCMCIA Slot - Laptop Battery Power

Date Tested: 06/22/04

DUT: ParkerVision Model: WLAN3000; Type: PCMCIA WLAN (802.11b) Card for Laptop PCs; Serial: 13C 1-2

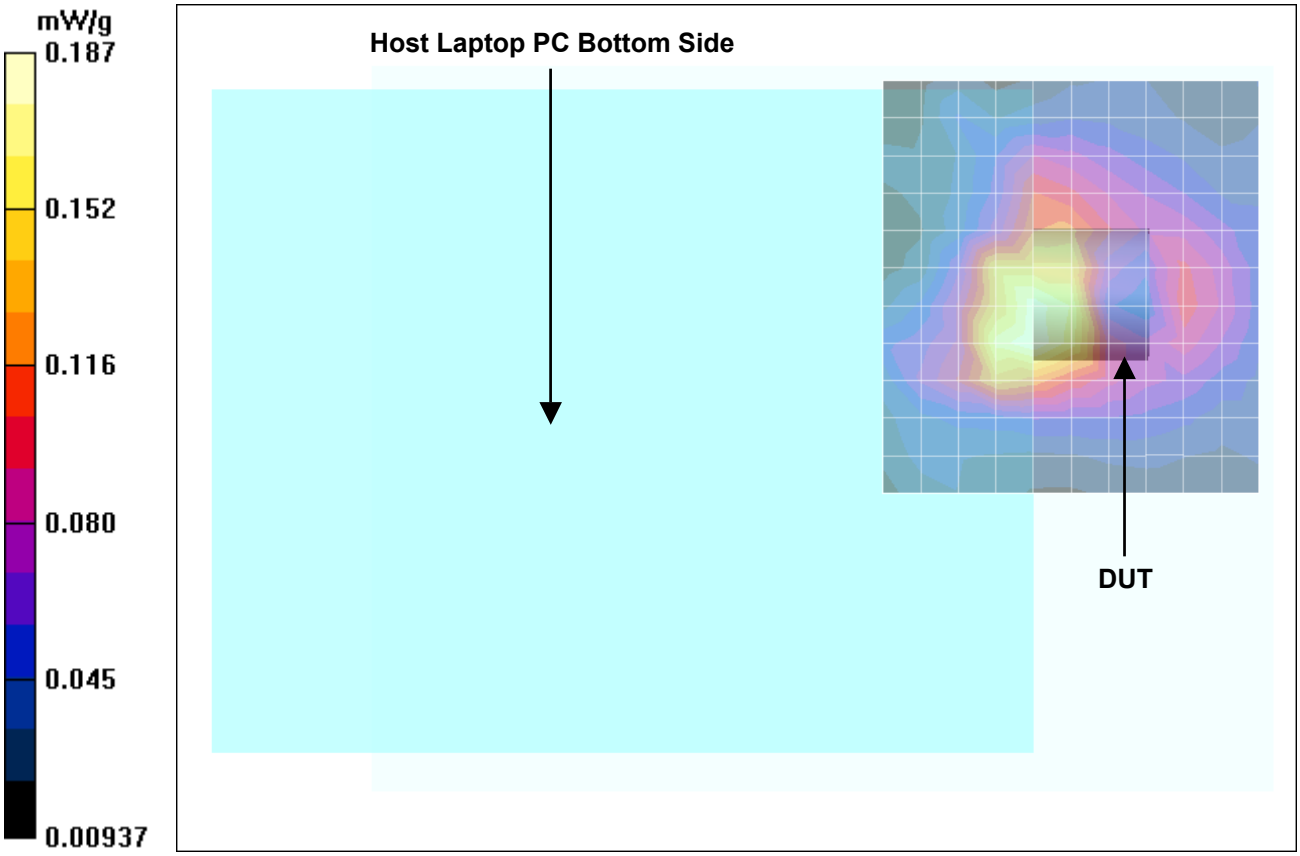
Ambient Temp: 25.5 °C; Fluid Temp: 23.8 °C; Barometric Pressure: 102.0 kPa; Humidity: 37%

Communication System: DSSS
Frequency: 2437 MHz; Duty Cycle: 1:1
Power Source: Host Laptop PC (Li-ion Battery)
RF Output Power: 21.2 dBm (Peak Conducted)
Medium: M2450 (σ = 1.98 mho/m; ε_r = 51.1; ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1590; ConvF(4.22, 4.22, 4.22); Calibrated: 24/05/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn370; Calibrated: 14/05/2004
- Phantom: Barski Industries; Type: Fiberglas Planar; Serial: 03-01

Body SAR - Bottom of Sony VAIO Laptop PC Touching Planar Phantom (17 mm Spacing from Bottom of DUT to Planar Phantom) - Mid Channel
Area Scan (12x11x1): Measurement grid: dx=15mm, dy=15mm

Course Scan to show SAR at Outer Section of DUT



Body SAR - DUT with HP Compaq Laptop PC - Single PCMCIA Slot - Laptop Battery Power

Date Tested: 06/22/04

DUT: ParkerVision Model: WLAN3000; Type: PCMCIA WLAN (802.11b) Card for Laptop PCs; Serial: 13C 1-2

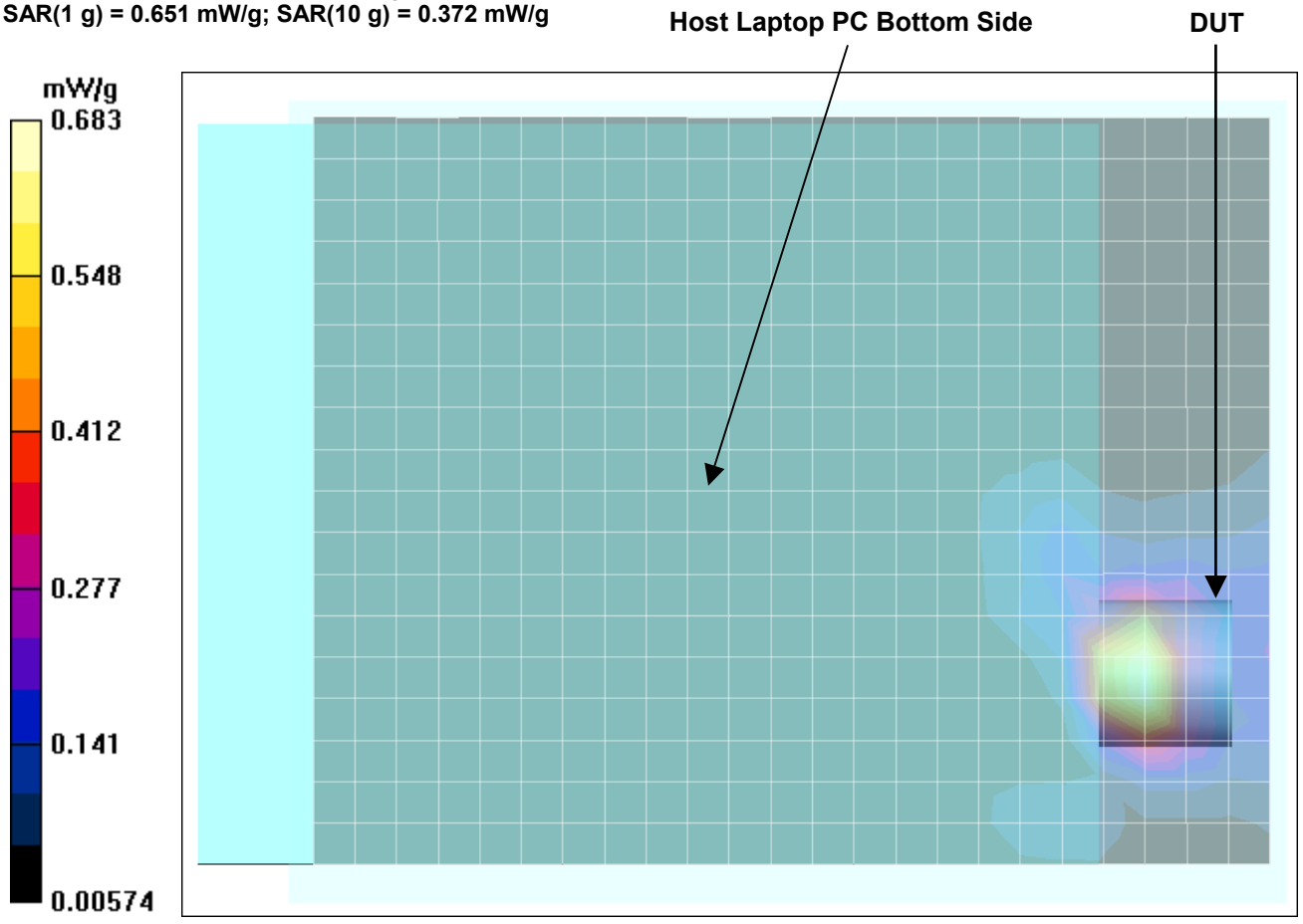
Ambient Temp: 25.5 °C; Fluid Temp: 23.8 °C; Barometric Pressure: 102.0 kPa; Humidity: 37%

Communication System: DSSS
Frequency: 2437 MHz; Duty Cycle: 1:1
Power Source: Host Laptop PC (Li-ion Battery)
RF Output Power: 21.2 dBm (Peak Conducted)
Medium: M2450 (σ = 1.98 mho/m; ε_r = 51.1; ρ = 1000 kg/m^3)

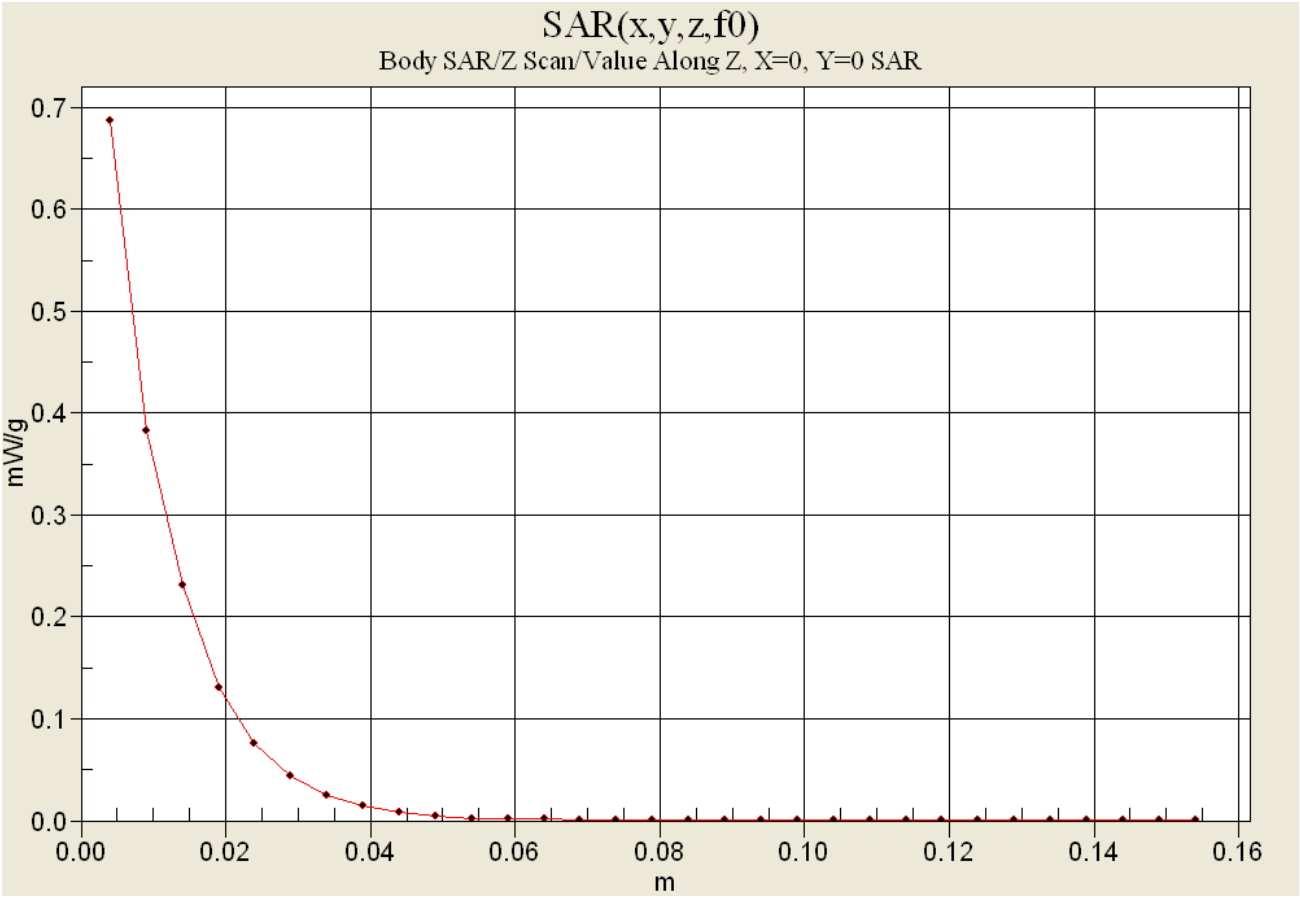
- Probe: ET3DV6 - SN1590; ConvF(4.22, 4.22, 4.22); Calibrated: 24/05/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn370; Calibrated: 14/05/2004
- Phantom: Barski Industries; Type: Fiberglas Planar; Serial: 03-01
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Body SAR - Bottom of HP Compaq Laptop PC Touching Planar Phantom (12 mm Spacing from Bottom of DUT to Planar Phantom) - Mid Channel
Area Scan (19x25x1): Measurement grid: dx=15mm, dy=15mm

Body SAR - Bottom of HP Compaq Laptop PC Touching Planar Phantom (12 mm Spacing from Bottom of DUT to Planar Phantom) - Mid Channel
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.8 V/m; Power Drift = -0.00644 dB
Peak SAR (extrapolated) = 1.24 W/kg
SAR(1 g) = 0.651 mW/g; SAR(10 g) = 0.372 mW/g



Z-Axis Scan


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
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
m

APPENDIX B - SYSTEM PERFORMANCE CHECK DATA

System Performance Check - 2450 MHz Dipole

Date Tested: 06/22/04

DUT: Dipole 2450 MHz; Model: D2450V2; Type: System Performance Check; Serial: 150

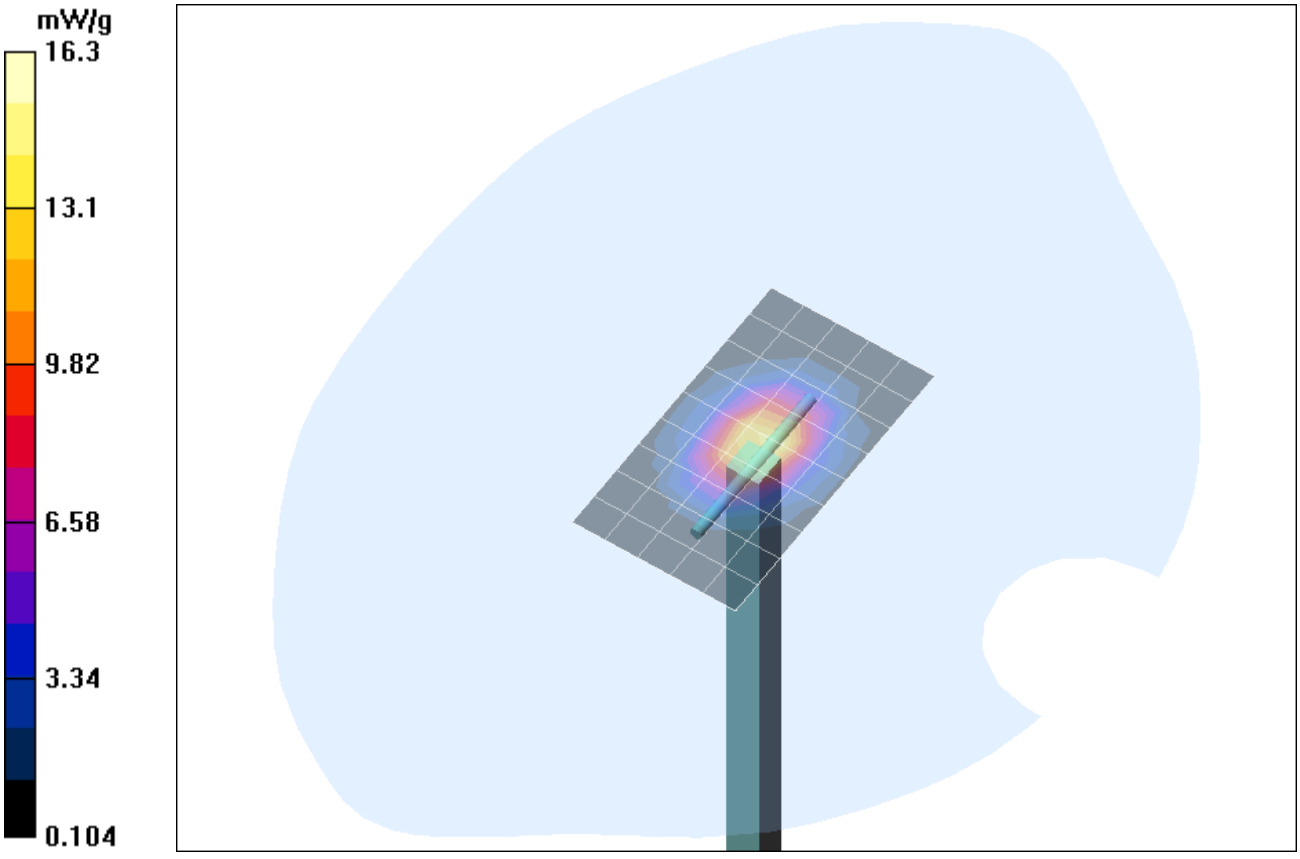
Ambient Temp: 24.9 °C; Fluid Temp: 23.8 °C; Barometric Pressure: 101.9 kPa; Humidity: 35%

Communication System: CW
Forward Conducted Power: 250mW
Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: HSL2450 (σ = 1.86 mho/m; ε_r = 37.3; ρ = 1000 kg/m^3)

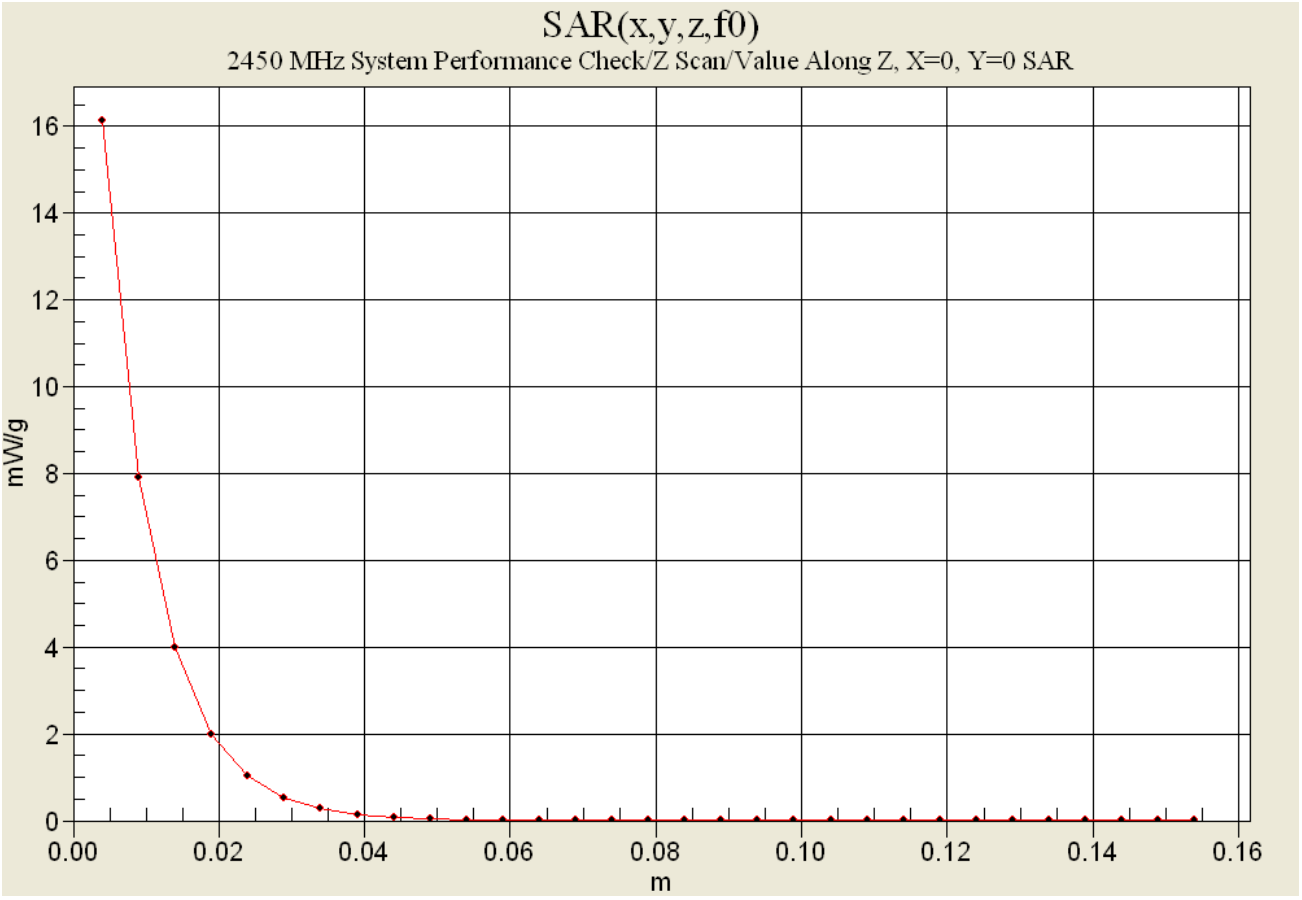
- Probe: ET3DV6 - SN1590; ConvF(4.44, 4.44, 4.44); Calibrated: 24/05/2004
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn370; Calibrated: 14/05/2004
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

2450 MHz System Performance Check/Area Scan (6x10x1):
Measurement grid: dx=10mm, dy=10mm

2450 MHz System Performance Check/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 98.1 V/m; Power Drift = -0.0 dB
Peak SAR (extrapolated) = 30.1 W/kg
SAR(1 g) = 14.2 mW/g; SAR(10 g) = 6.59 mW/g



Z-Axis Scan

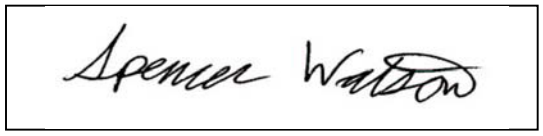

SAR(x,y,z,f0)
2450 MHz System Performance Check/Z Scan/Value Along Z, X=0, Y=0 SAR
mW/g
16
14
12
10
8
6
4
2
0
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
m

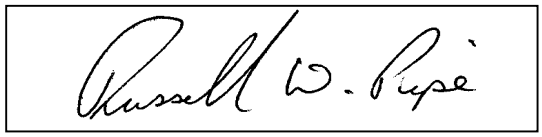
APPENDIX C - SYSTEM VALIDATION

2450MHz SYSTEM VALIDATION DIPOLE

Type:	**2450MHz Validation Dipole**
Serial Number:	**150**
Place of Calibration:	**Celltech Labs Inc.**
Date of Calibration:	**September 17, 2003**

Celltech Labs Inc. hereby certifies that this device has been calibrated on the date indicated above.

Calibrated by: 

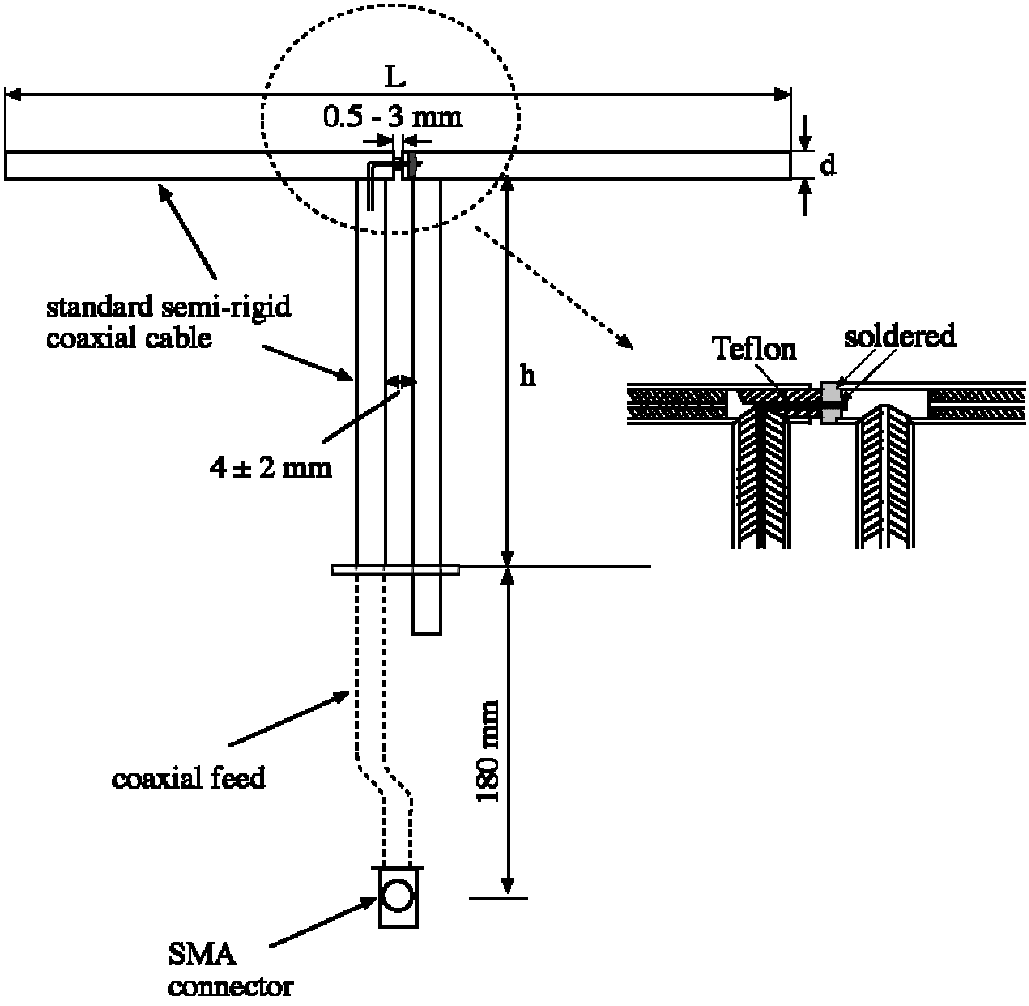
Approved by: 

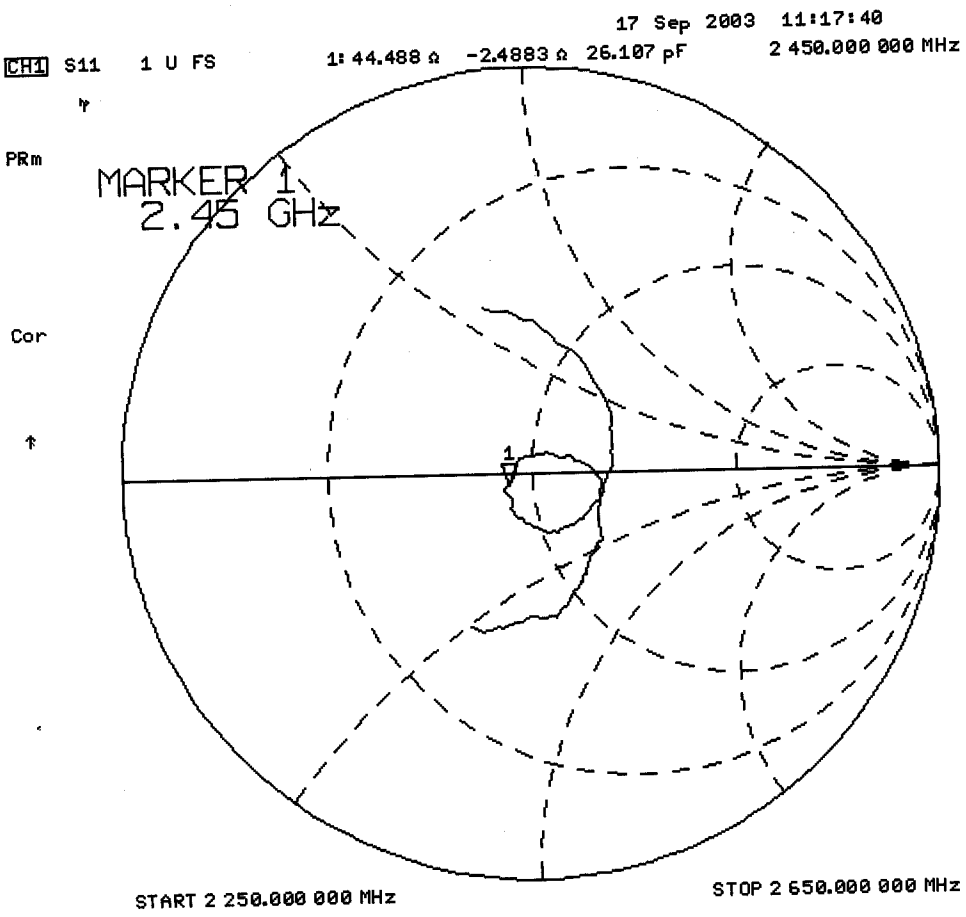
Celltech Labs Inc. 1955 Moss Court, Kelowna, B.C. Canada V1Y 9L3
Tel. 250-448-7047 • Fax. 250-448-7046 • e-mail: info@celltechlabs.com
www.celltechlabs.com

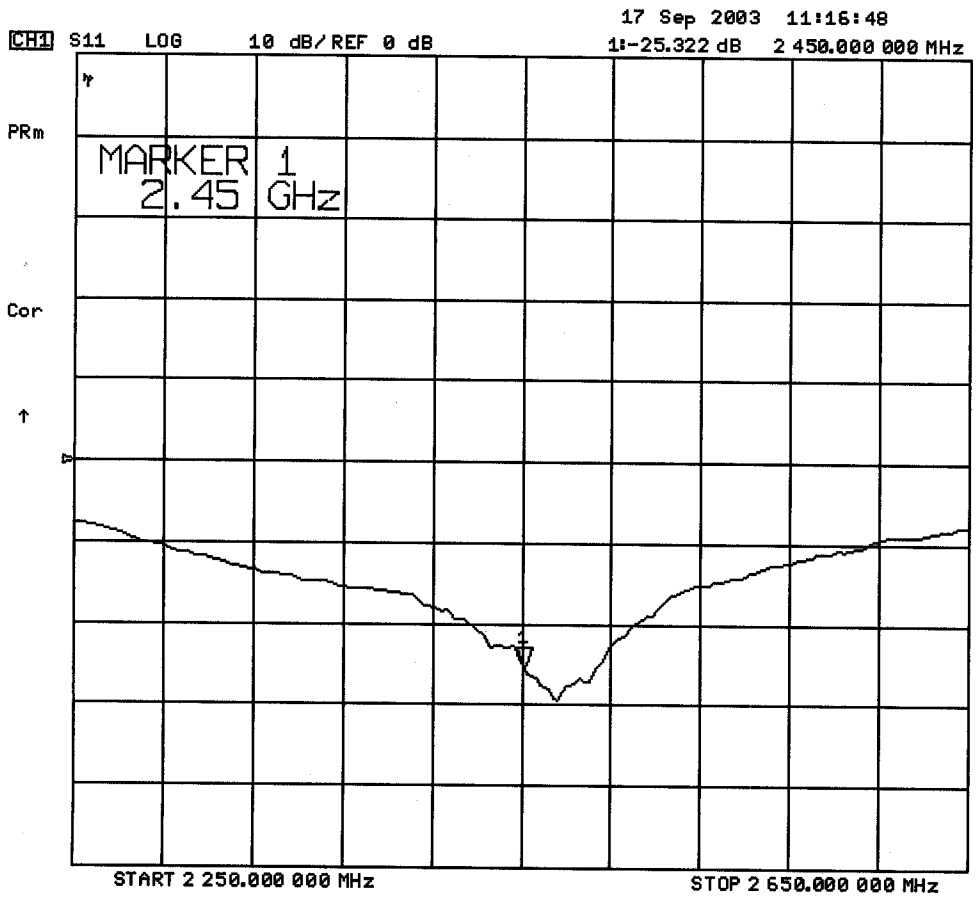
1. Dipole Construction & Electrical Characteristics

The validation dipole was constructed in accordance with the IEEE Std "Recommended Practice for Determining the Spatial-Peak Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques". The electrical properties were measured using an HP 8753E Network Analyzer. The network analyzer was calibrated to the validation dipole N-type connector feed point using an HP85032E Type N calibration kit. The dipole was placed parallel to a planar phantom at a separation distance of 10.0mm from the simulating fluid using a loss-less dielectric spacer. The measured input impedance is:

Feed point impedance at 2450MHz	Re{Z} = 44.488Ω
	Im{Z} = -2.4883Ω
Return Loss at 2450MHz	-25.322 dB




17 Sep 2003 11:17:40
CH1 S11 1 U FS
1: 44.488 Ω -2.4883 Ω 26.107 pF
2 450.000 000 MHz
PRm
MARKER 1
2.45 GHz
Cor
START 2 250.000 000 MHz
STOP 2 650.000 000 MHz


17 Sep 2003 11:16:48
CH1 S11 LOG 10 dB/ REF 0 dB
1:-25.322 dB 2 450.000 000 MHz
PRm
MARKER 1
2.45 GHz
Cor
START 2 250.000 000 MHz
STOP 2 650.000 000 MHz

Validation Dipole Dimensions

Frequency (MHz)	L (mm)	h (mm)	d (mm)
300	420.0	250.0	6.2
450	288.0	167.0	6.2
835	161.0	89.8	3.6
900	149.0	83.3	3.6
1450	89.1	51.7	3.6
1800	72.0	41.7	3.6
1900	68.0	39.5	3.6
2000	64.5	37.5	3.6
2450	51.8	30.6	3.6
3000	41.5	25.0	3.6

2. Validation Phantom

The validation phantom is the SAM (Specific Anthropomorphic Mannequin) phantom manufactured by Schmid & Partner Engineering AG. The SAM phantom is a Fiberglass shell integrated in a wooden table. The shape of the shell corresponds to the phantom defined by SCC34-SC2. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot.

Shell Thickness: 2.0 ± 0.1 mm
Filling Volume: Approx. 20 liters
Dimensions: 50 cm (W) x 100 cm (L)

2450MHz Dipole Calibration

2450MHz Dipole Calibration

3. Measurement Conditions

The planar phantom was filled with brain simulating tissue having the following electrical parameters at 2450MHz:

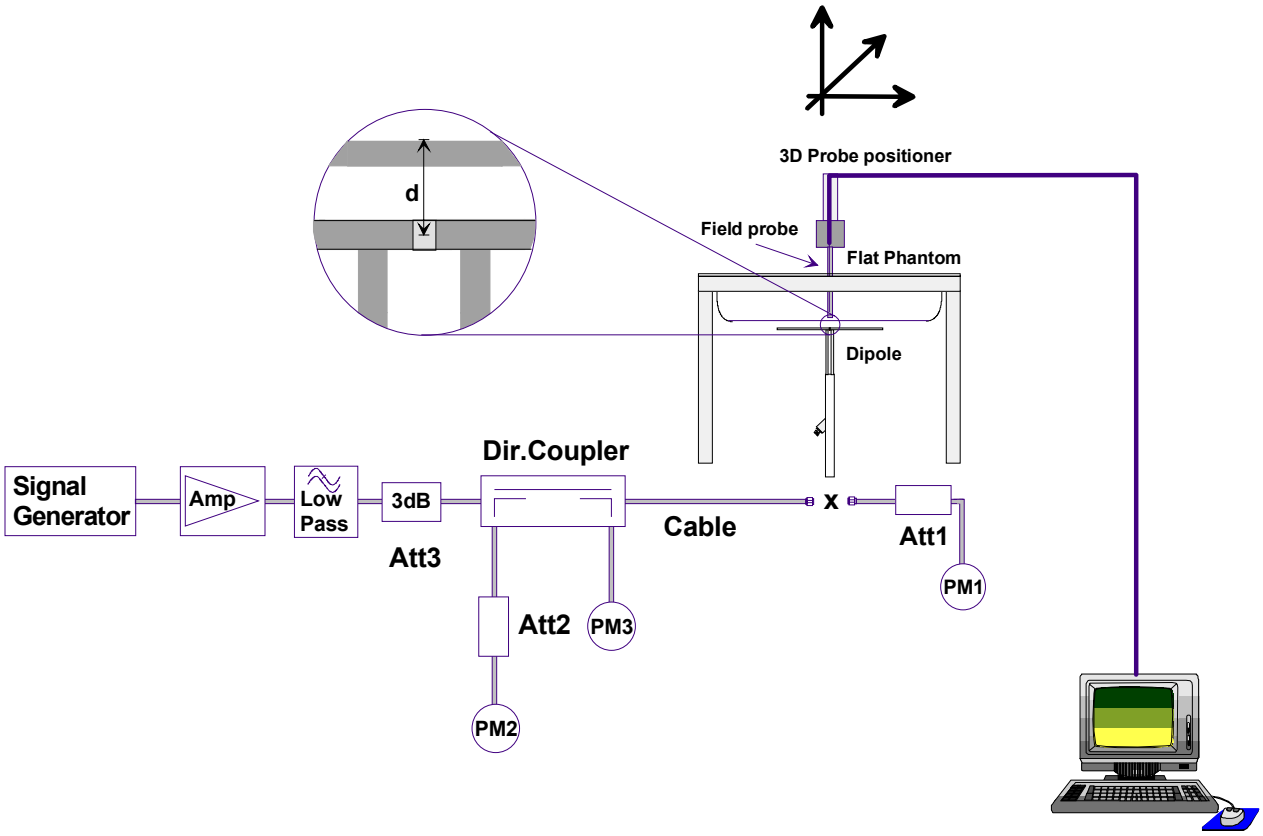
Relative Permittivity:	37.3
Conductivity:	1.88 mho/m
Ambient Temperature:	21.6°C
Fluid Temperature:	23.9°C
Fluid Depth:	≥ 15cm

The 2450MHz simulating tissue consists of the following ingredients:

Ingredient	Percentage by weight
Water	52.00%
Glycol Monobutyl	48.00%
Target Dielectric Parameters at 22°C	ε_r = 39.2 (+/-5%) σ = 1.80 S/m (+/-5%)

4. SAR Measurement

The SAR measurement was performed with the E-field probe in mechanical detection mode only. The setup and determination of the forward power into the dipole was performed using the following procedures.



First, the power meter PM1 (including attenuator Att1) is connected to the cable to measure the forward power at the location of the dipole connector (X). The signal generator is adjusted for the desired forward power at the dipole connector (taking into account the attenuation of Att1) as read by power meter PM2. After connecting the cable to the dipole, the signal generator is readjusted for the same reading at power meter PM2. If the signal generator does not allow adjustment in 0.01dB steps, the remaining difference at PM2 must be taken into consideration. PM3 records the reflected power from the dipole to ensure that the value is not changed from the previous value. The reflected power should be 20dB below the forward power.

Ten SAR measurements were performed in order to achieve repeatability and to establish an average target value.

Validation Dipole SAR Test Results

Validation Measurement	SAR @ 0.25W Input averaged over 1g	SAR @ 1W Input averaged over 1g	SAR @ 0.25W Input averaged over 10g	SAR @ 1W Input averaged over 10g	Peak SAR @ 0.25W Input
Test 1	13.9	55.6	6.27	25.08	29.5
Test 2	13.9	55.6	6.25	25.00	29.1
Test 3	13.9	55.6	6.24	24.96	28.9
Test 4	14.0	56.0	6.31	25.24	29.1
Test 5	14.0	56.0	6.27	25.08	29.7
Test 6	13.8	55.2	6.25	25.00	29.3
Test 7	13.9	55.6	6.22	24.88	29.3
Test 8	13.9	55.6	6.24	24.96	29.4
Test 9	14.0	56.0	6.29	25.16	30.0
Test10	13.8	55.2	6.17	24.68	29.3
Average Value	13.91	55.64	6.251	25.00	29.36

The results have been normalized to 1W (forward power) into the dipole.

Averaged over 1cm (1g) of tissue: 55.64 mW/g

Averaged over 10cm (10g) of tissue: 25.00 mW/g

Test Date: 09/17/03

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:150

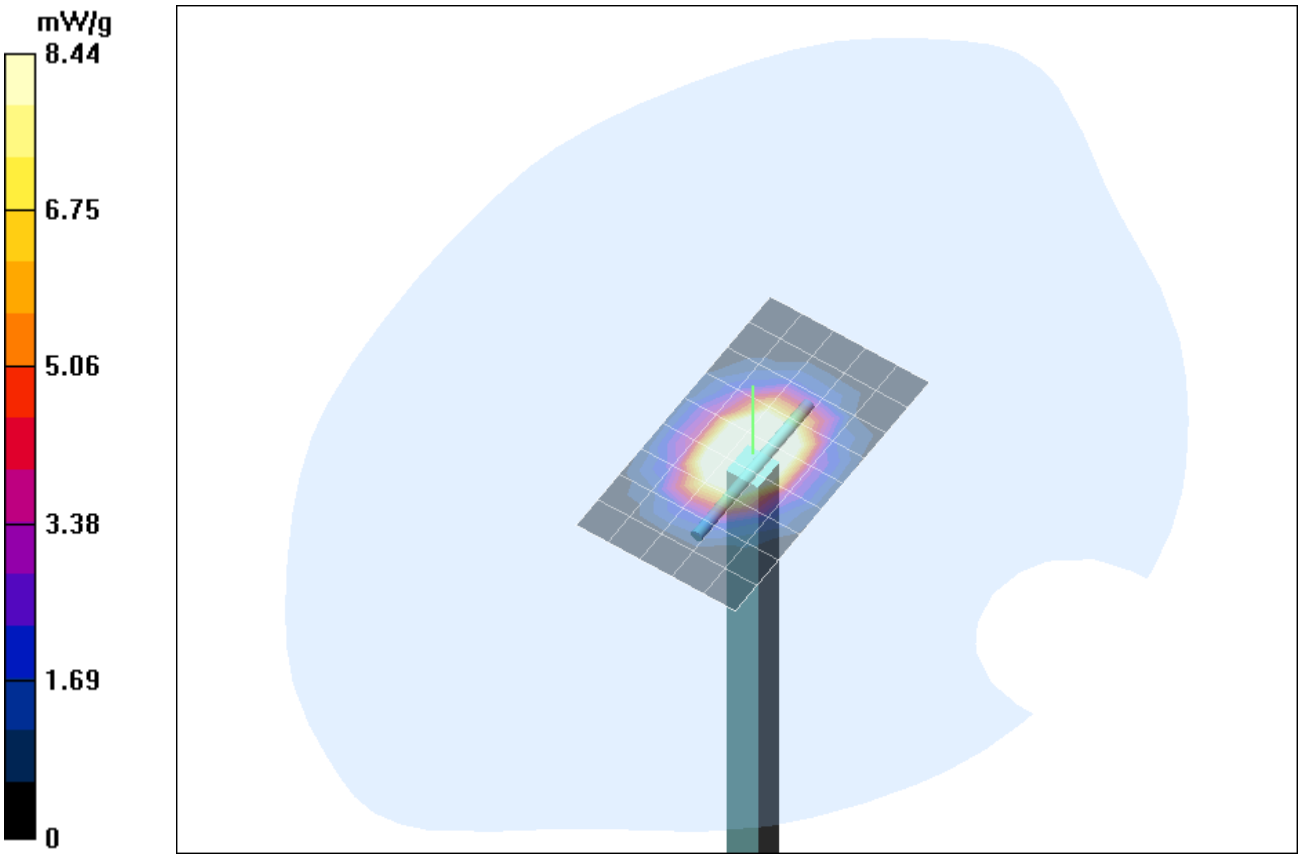
Ambient Temp: 22.2C; Fluid Temp: 23.8C
Barometric Pressure: 101.9 kPa; Humidity: 52%

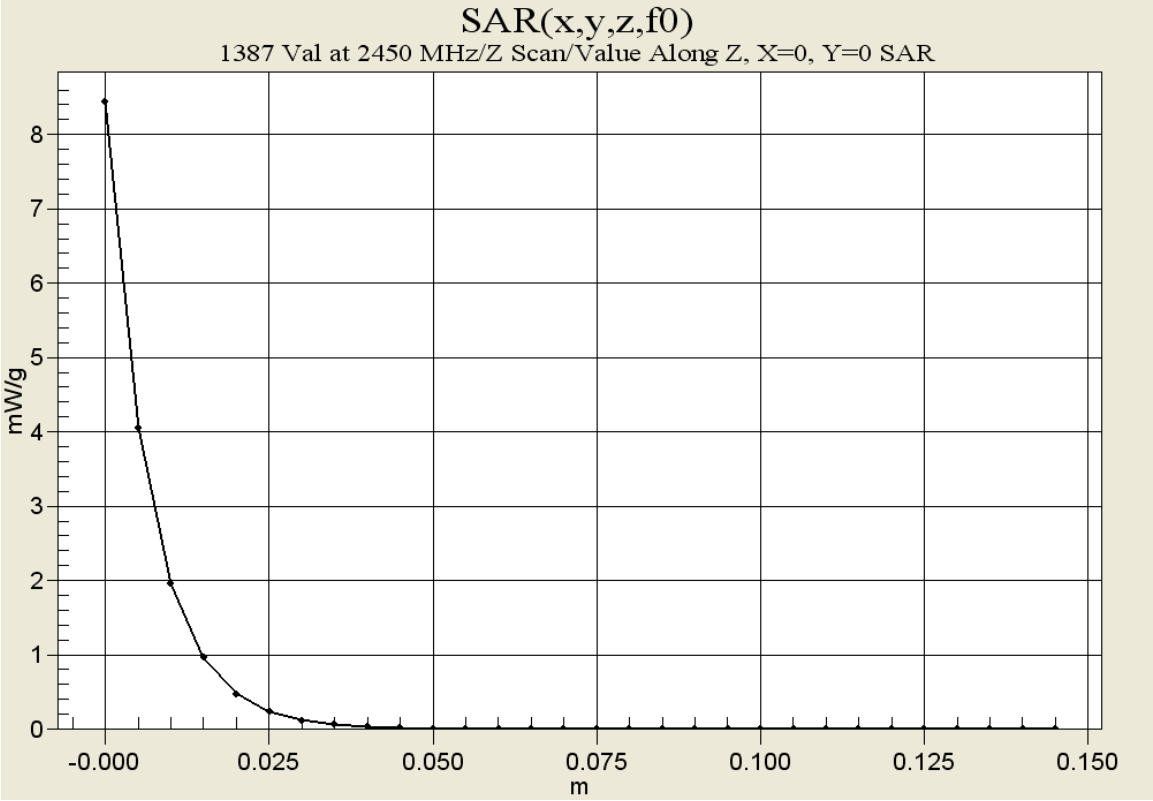
Communication System: CW
Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: HSL2450 (σ = 1.88 mho/m, ε_r = 37.3, ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(5, 5, 5); 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

Probe SN1387 Validation at 2450 MHz/Area Scan (6x10x1): Measurement grid: dx=10mm, dy=10mm

Probe SN1387 Validation at 2450 MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 29.5 W/kg
SAR(1 g) = 13.9 mW/g; SAR(10 g) = 6.27 mW/g
Reference Value = 96.7 V/m
Power Drift = -0.08 dB





2450MHz System Validation

Measured Fluid Dielectric Parameters (Brain)

September 17, 2003

Frequency	e'	e"
2.350000000 GHz	37.7457	13.5170
2.360000000 GHz	37.7101	13.5534
2.370000000 GHz	37.6951	13.5903
2.380000000 GHz	37.6613	13.6228
2.390000000 GHz	37.6411	13.6368
2.400000000 GHz	37.5853	13.6598
2.410000000 GHz	37.5236	13.6742
2.420000000 GHz	37.4573	13.7091
2.430000000 GHz	37.4063	13.7484
2.440000000 GHz	37.3419	13.7798
2.450000000 GHz	37.2875	13.8226
2.460000000 GHz	37.2447	13.8618
2.470000000 GHz	37.2198	13.8951
2.480000000 GHz	37.1940	13.9293
2.490000000 GHz	37.1679	13.9423
2.500000000 GHz	37.1333	13.9571
2.510000000 GHz	37.0990	13.9745
2.520000000 GHz	37.0410	14.0116
2.530000000 GHz	36.9938	14.0375
2.540000000 GHz	36.9185	14.0546
2.550000000 GHz	36.8657	14.0912

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:1590
Calibration procedure(s)	QA CAL-01.v2 Calibration procedure for dosimetric E-field probes
Calibration date:	May 24, 2004
Condition of the calibrated item	In Tolerance (according to the specific calibration document)

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

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
Power meter EPM E4419B	GB41293874	5-May-04 (METAS, No 251-00388)	May-05
Power sensor E4412A	MY41495277	5-May-04 (METAS, No 251-00388)	May-05
Reference 20 dB Attenuator	SN: 5086 (20b)	3-May-04 (METAS, No 251-00389)	May-05
Fluke Process Calibrator Type 702	SN: 6295803	8-Sep-03 (Sintrel SCS No. E-030020)	Sep-04
Power sensor HP 8481A	MY41092180	18-Sep-02 (SPEAG, in house check Oct-03)	In house check: Oct 05
RF generator HP 8684C	US3642U01700	4-Aug-99 (SPEAG, in house check Aug-02)	In house check: Aug-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Oct-03)	In house check: Oct 05

	Name	Function	Signature
Calibrated by:	Nico Vetterli	Technician	
Approved by:	Katja Pokovic	Laboratory Director	

Date issued: May 24, 2004

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:1590

Manufactured:	March 19, 2001
Last calibrated:	May 15, 2003
Recalibrated:	May 24, 2004

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1590

Sensitivity in Free Space

Diode Compression[A]

NormX	**1.85** $\mu V/(V/m)^2$	DCP X	**91**	mV
NormY	**2.01** $\mu V/(V/m)^2$	DCP Y	**91**	mV
NormZ	**1.73** $\mu V/(V/m)^2$	DCP Z	**91**	mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Plese see Page 7.

Boundary Effect

Head **900 MHz** **Typical SAR gradient: 5 % per mm**

Sensor Center to Phantom Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	8.0	4.4
SAR_{be} [%]	With Correction Algorithm	0.1	0.2

Head **1800 MHz** **Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	12.2	8.5
SAR_{be} [%]	With Correction Algorithm	0.2	0.1

Sensor Offset

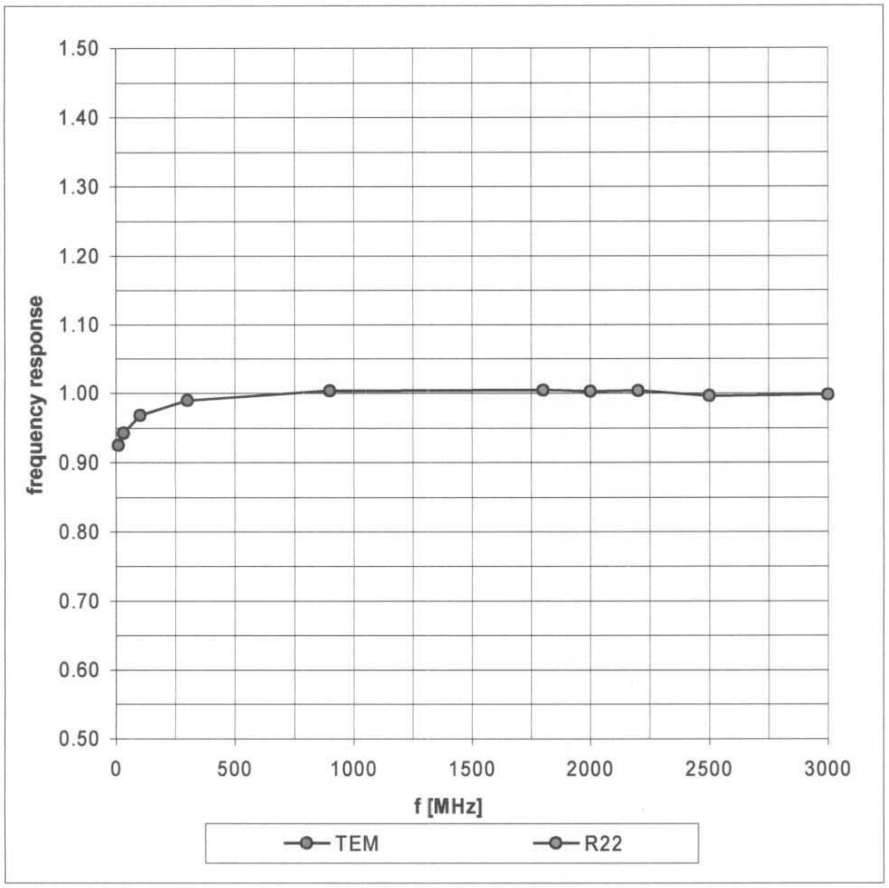
Probe Tip to Sensor Center	**2.7** mm
Optical Surface Detection	**in tolerance**

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

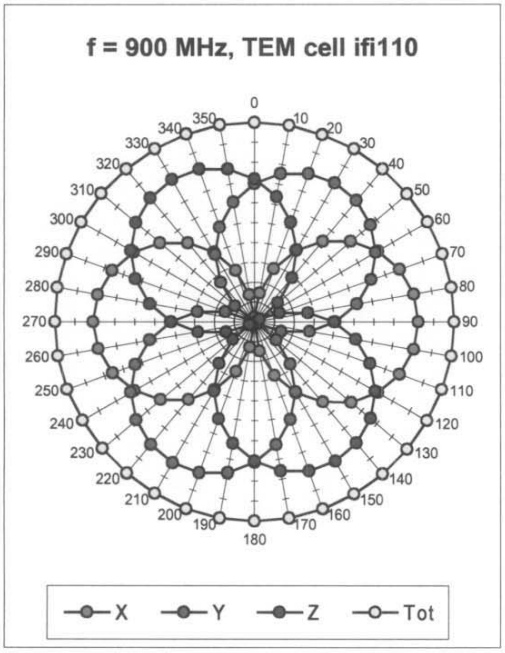
[A] numerical linearization parameter: uncertainty not required

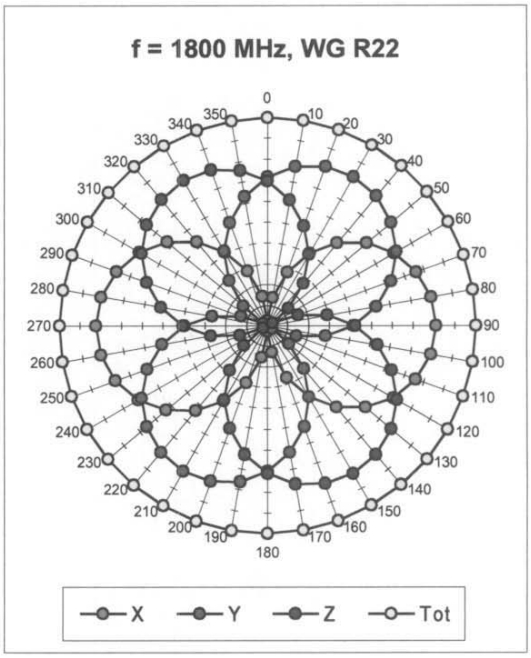
Frequency Response of E-Field

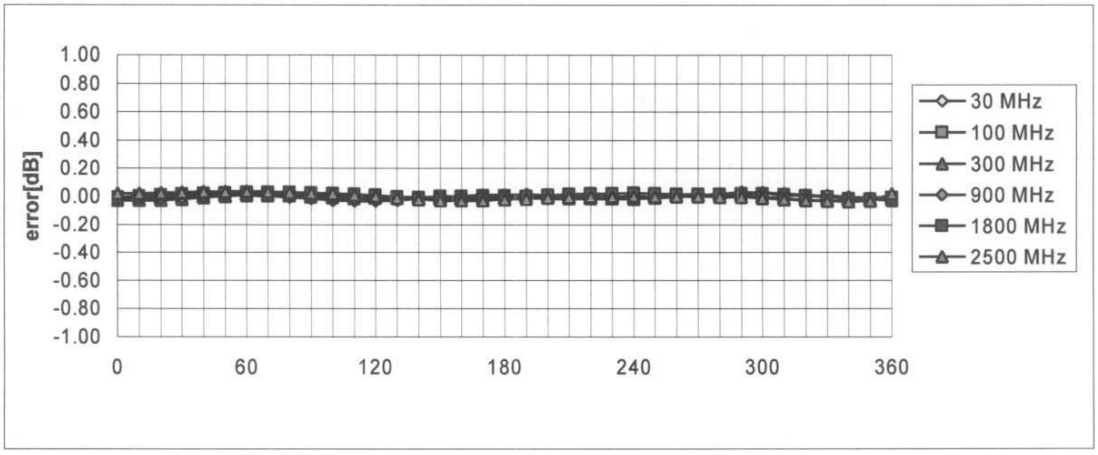
(TEM-Cell:ifi110, Waveguide R22)



Receiving Pattern (ϕ), θ = 0°



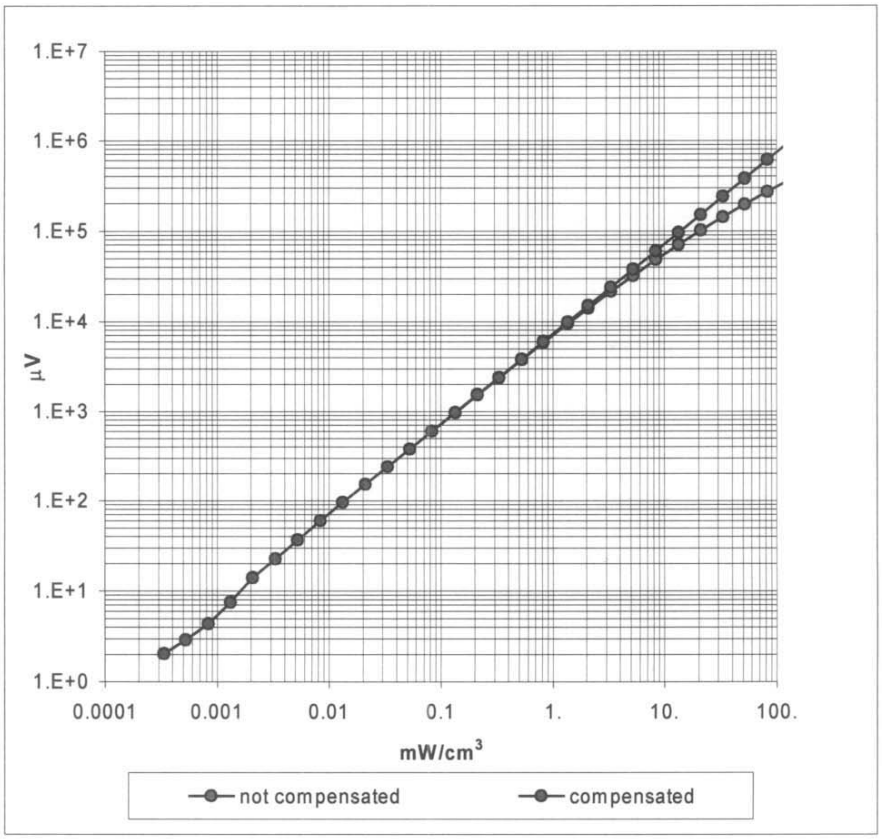


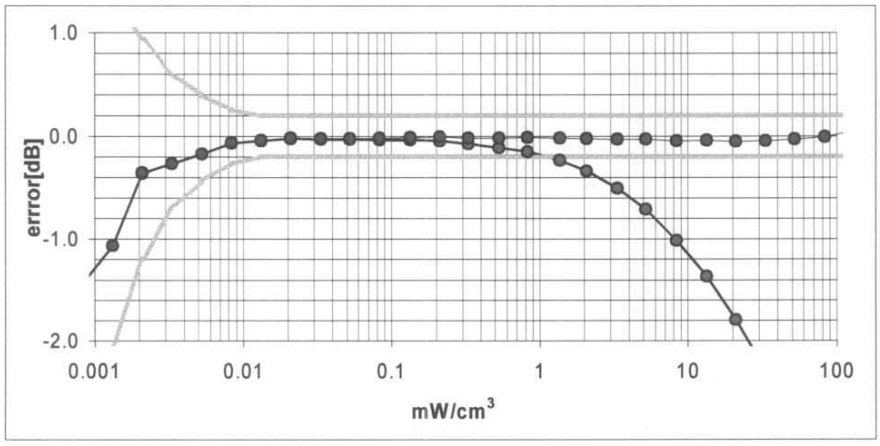


Axial Isotropy Error < ± 0.2 dB

Dynamic Range f(SAR_{head})

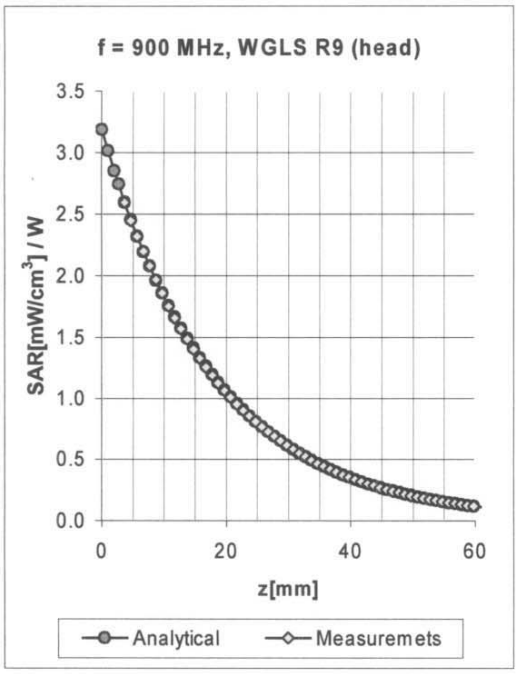
(Waveguide R22)

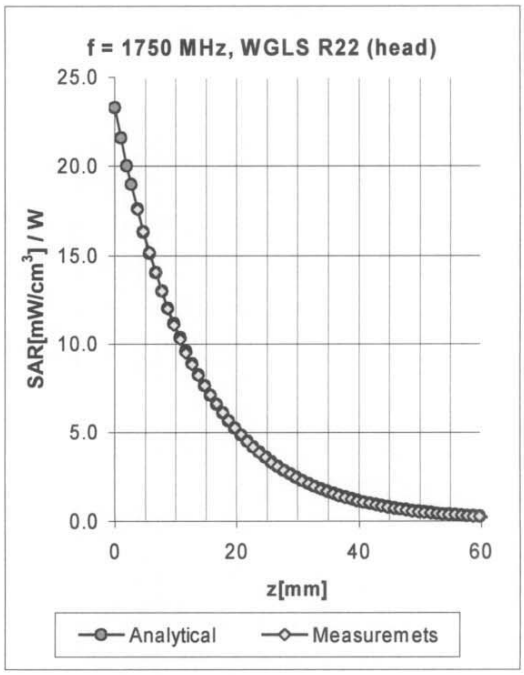




Probe Linearity Error < ± 0.2 dB

Conversion Factor Assessment



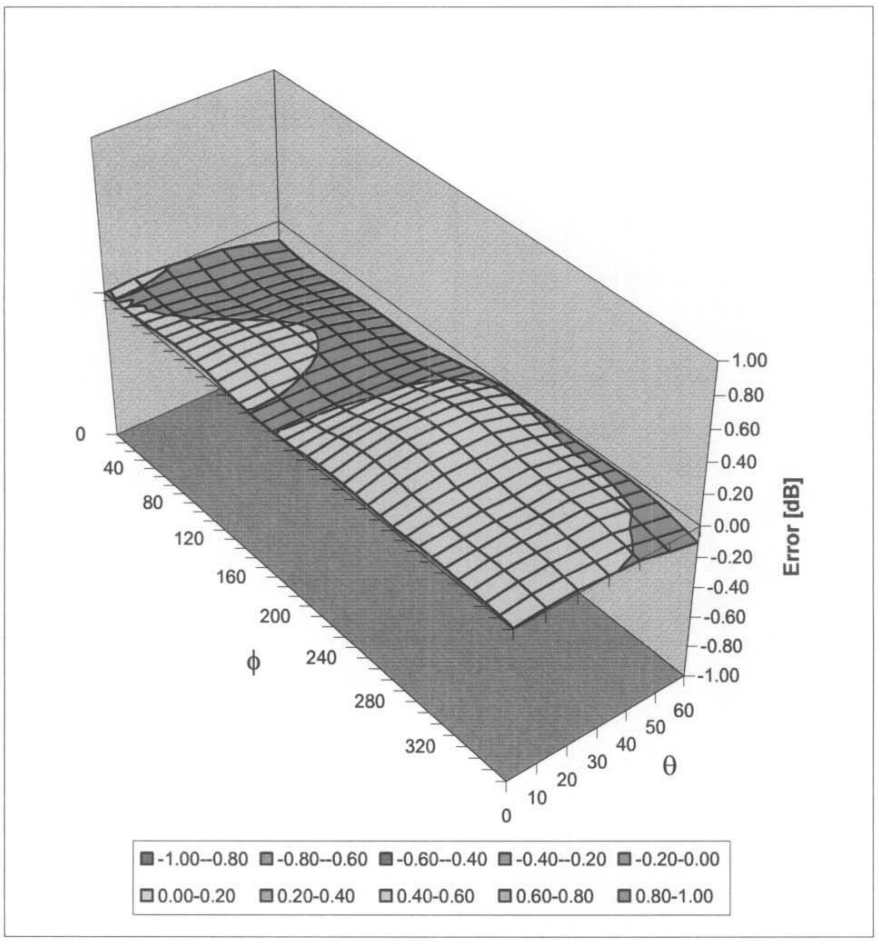


f [MHz]	Validity [MHz][B]	Tissue	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
835	750-950	Head	41.5 ± 5%	0.90 ± 5%	0.68	1.64	6.71 ± 11.9% (k=2)
1750	1700-1800	Head	40.0 ± 5%	1.40 ± 5%	0.43	2.67	5.28 ± 9.7% (k=2)
1900	1850-1950	Head	40.0 ± 5%	1.40 ± 5%	0.46	2.81	5.03 ± 9.7% (k=2)
2450	2400-2500	Head	39.2 ± 5%	1.80 ± 5%	0.81	1.95	4.44 ± 9.7% (k=2)
835	750-950	Body	55.2 ± 5%	0.97 ± 5%	0.49	1.99	6.54 ± 11.9% (k=2)
1750	1700-1800	Body	53.3 ± 5%	1.52 ± 5%	0.50	2.87	4.68 ± 9.7% (k=2)
1900	1850-1950	Body	53.3 ± 5%	1.52 ± 5%	0.52	2.93	4.58 ± 9.7% (k=2)
2450	2400-2500	Body	52.7 ± 5%	1.95 ± 5%	0.91	1.78	4.22 ± 9.7% (k=2)

[B] The total standard uncertainty is calculated as root-sum-square of standard uncertainty of the Conversion Factor at calibration frequency and the standard uncertainty for the indicated frequency band.

Deviation from Isotropy in HSL

Error (θ, ϕ), f = 900 MHz



Spherical Isotropy Error < ± 0.4 dB

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

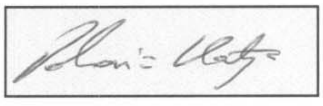
Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ET3DV6**
Serial Number:	**1590**
Place of Assessment:	**Zurich**
Date of Assessment:	**May 25, 2004**
Probe Calibration Date:	**May 24, 2004**

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:



Schmid & Partner Engineering AG

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

Dosimetric E-Field Probe ET3DV6 SN:1590

Conversion factor (± standard deviation)

150 MHz	ConvF	**9.1 ± 8%**	ε_r = **52.3 ± 5%** σ = **0.76 ± 5% mho/m** (head tissue)
300 MHz	ConvF	**7.9 ± 8%**	ε_r = **45.3 ± 5%** σ = **0.87 ± 5% mho/m** (head tissue)
450 MHz	ConvF	**7.5 ± 8%**	ε_r = **43.5 ± 5%** σ = **0.87 ± 5% mho/m** (head tissue)
150 MHz	ConvF	**8.8 ± 8%**	ε_r = **61.9 ± 5%** σ = **0.80 ± 5% mho/m** (body tissue)
450 MHz	ConvF	**7.7 ± 8%**	ε_r = **56.7 ± 5%** σ = **0.94 ± 5% mho/m** (body tissue)

Important Note:

For numerically assessed probe conversion factors, parameters Alpha and Delta in the DASY software must have the following entries: Alpha = 0 and Delta = 1.

Please see also Section 4.7 of the DASY4 Manual.

APPENDIX E - MEASURED FLUID DIELECTRIC PARAMETERS

2450 MHz System Performance Check

Measured Fluid Dielectric Parameters (Brain)

June 22, 2004

Frequency	e'	e"
2.350000000 GHz	37.7140	13.3583
2.360000000 GHz	37.6523	13.3829
2.370000000 GHz	37.6013	13.4240
2.380000000 GHz	37.5482	13.4612
2.390000000 GHz	37.4962	13.4981
2.400000000 GHz	37.4690	13.5212
2.410000000 GHz	37.4182	13.5469
2.420000000 GHz	37.3969	13.5953
2.430000000 GHz	37.3635	13.6243
2.440000000 GHz	37.3416	13.6491
2.450000000 GHz	37.3056	13.6924
2.460000000 GHz	37.2694	13.7144
2.470000000 GHz	37.2315	13.7261
2.480000000 GHz	37.1857	13.7578
2.490000000 GHz	37.1195	13.7822
2.500000000 GHz	37.0710	13.7846
2.510000000 GHz	36.9945	13.8209
2.520000000 GHz	36.9566	13.8635
2.530000000 GHz	36.8961	13.9011
2.540000000 GHz	36.8777	13.9361
2.550000000 GHz	36.8584	13.9565

2450 MHz DUT Evaluation (Body)

Measured Fluid Dielectric Parameters (Muscle)

June 22, 2004

Frequency	e'	e"
2.350000000 GHz	51.4685	14.1406
2.360000000 GHz	51.4253	14.1749
2.370000000 GHz	51.3935	14.2143
2.380000000 GHz	51.3664	14.2563
2.390000000 GHz	51.3252	14.2974
2.400000000 GHz	51.2688	14.3429
2.410000000 GHz	51.2389	14.3755
2.420000000 GHz	51.1963	14.4206
2.430000000 GHz	51.1562	14.4633
2.440000000 GHz	51.1135	14.4878
2.450000000 GHz	51.0928	14.5228
2.460000000 GHz	51.0603	14.5620
2.470000000 GHz	51.0312	14.5938
2.480000000 GHz	51.0298	14.6434
2.490000000 GHz	50.9812	14.6603
2.500000000 GHz	50.9528	14.7155
2.510000000 GHz	50.8975	14.7424
2.520000000 GHz	50.8394	14.7923
2.530000000 GHz	50.8158	14.8475
2.540000000 GHz	50.7697	14.8725
2.550000000 GHz	50.7491	14.9102

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

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

BARSKI INDUSTRIES (1985) LTD.

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: 

Daniel Chailler

Fiberglass Planar Phantom - Top View

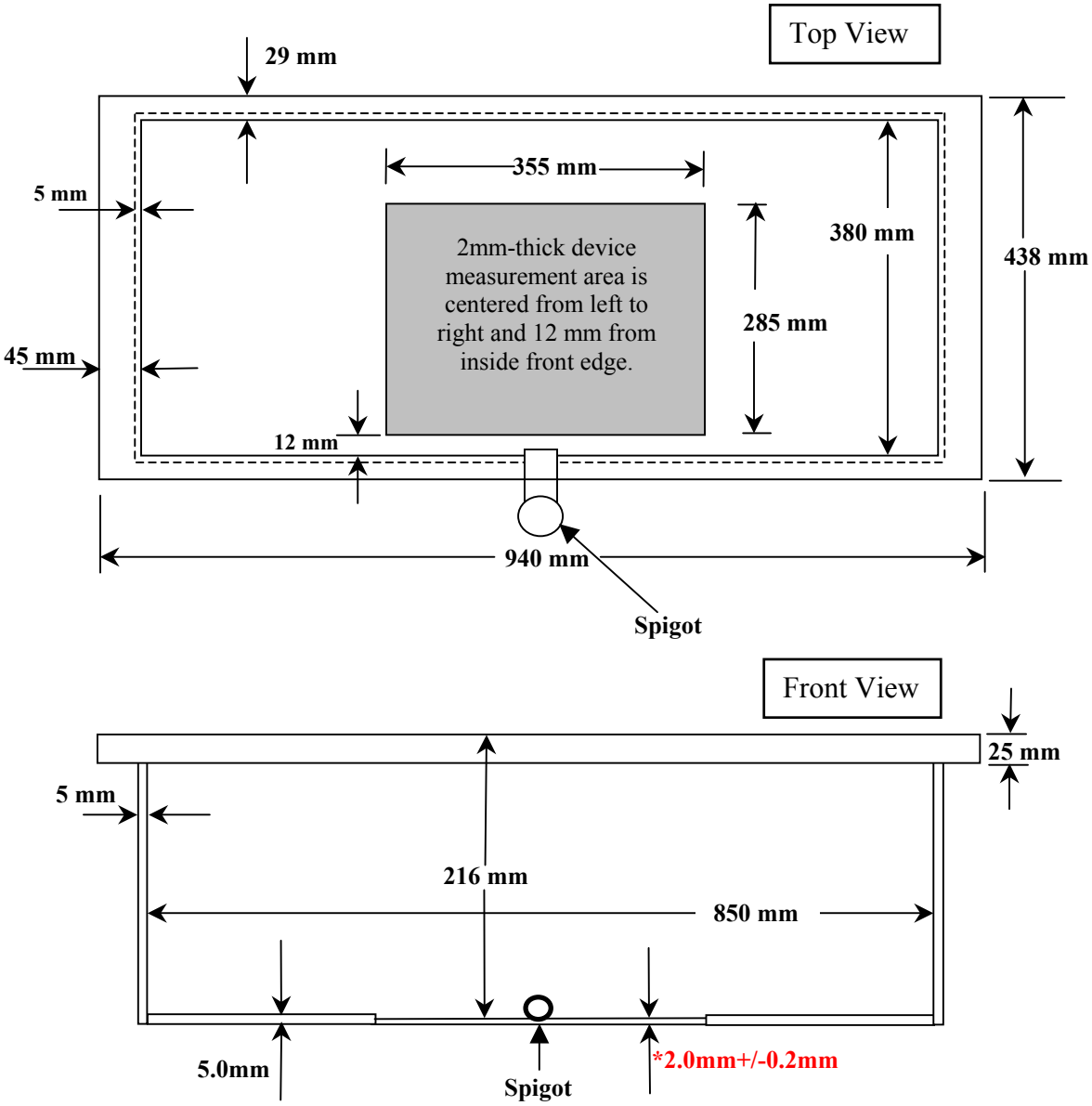
Fiberglass Planar Phantom - Front View

Fiberglass Planar Phantom - Back View

Fiberglass Planar Phantom - Bottom View

Dimensions of Fiberglass Planar Phantom

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

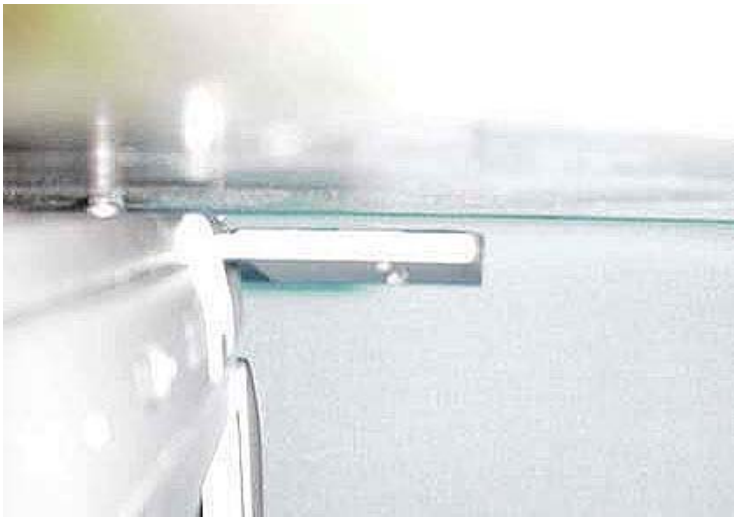


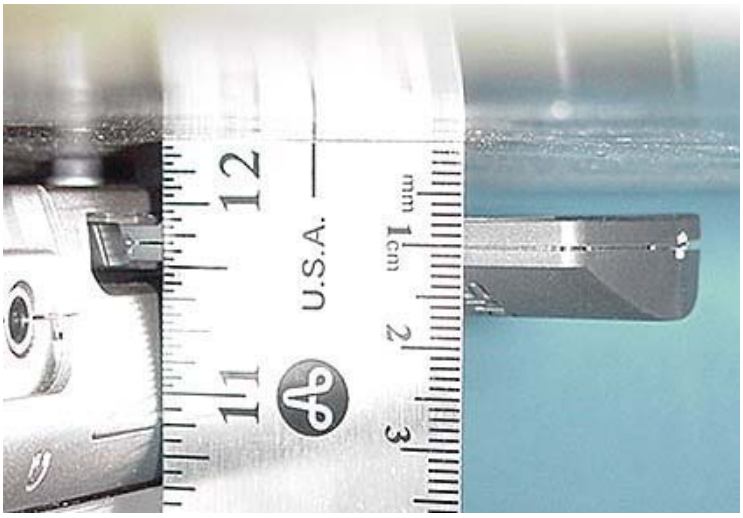
Note: Measurements that aren't repeated for the opposite sides are the same as the side measured. This drawing is not to scale.

APPENDIX H - SAR TEST SETUP & DUT PHOTOGRAPHS

BODY SAR TEST SETUP PHOTOGRAPHS

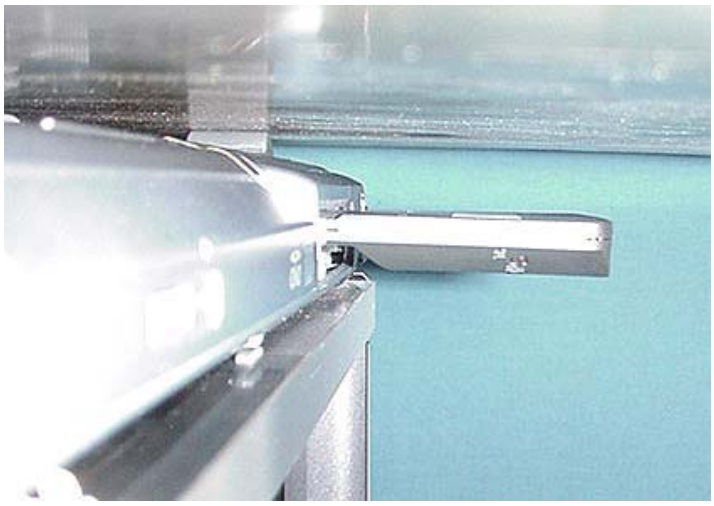
DUT with DELL INSPIRON Laptop PC - Single PCMCIA Slot
Bottom Side of Host Laptop PC Touching Planar Phantom
7 mm Separation Distance from DUT to Planar Phantom

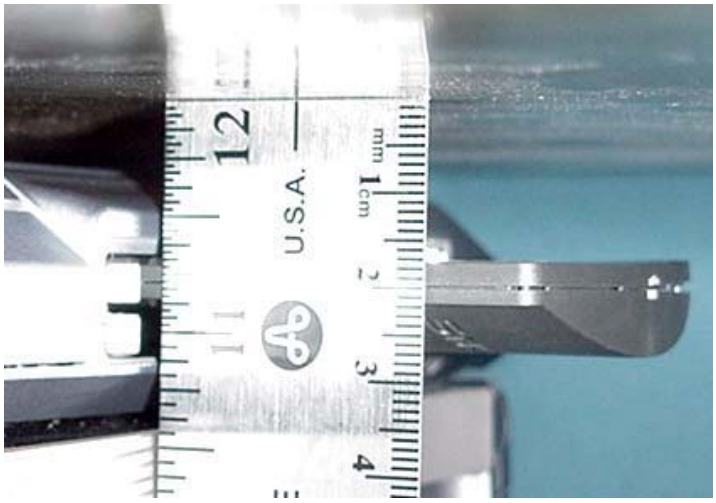




BODY SAR TEST SETUP PHOTOGRAPHS

DUT with SONY VAIO Laptop PC - Bottom PCMCIA Slot
Bottom Side of Host Laptop PC Touching Planar Phantom
17 mm Separation Distance from DUT to Planar Phantom



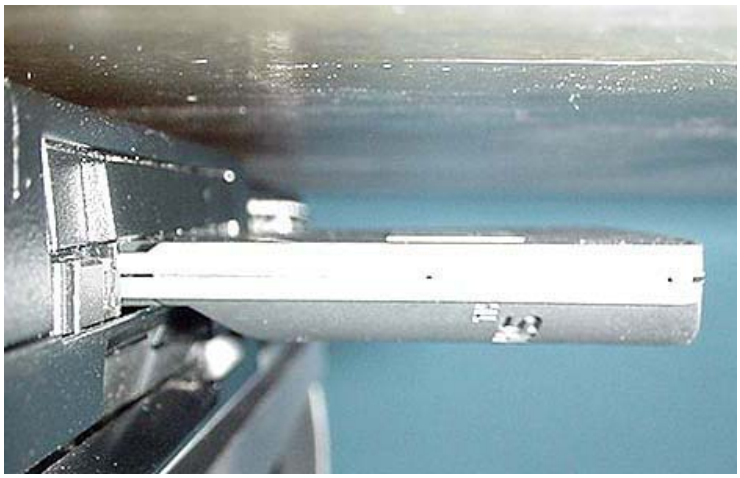


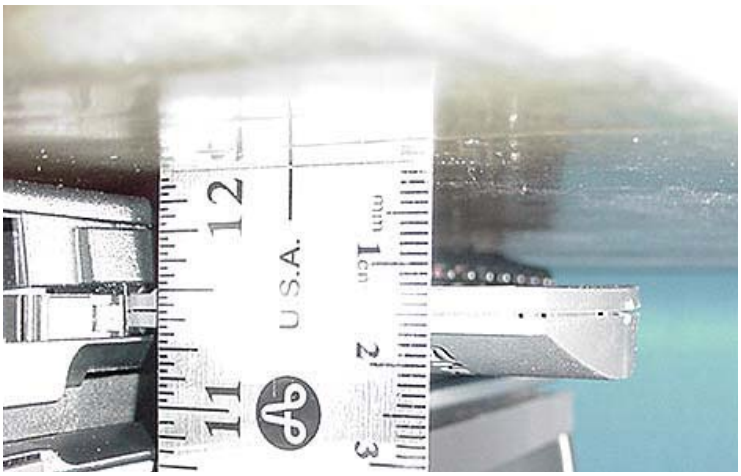
BODY SAR TEST SETUP PHOTOGRAPHS

DUT with SONY VAIO Laptop PC - Bottom PCMCIA Slot - 2nd Course Scan
Bottom Side of Host Laptop PC Touching Planar Phantom
17 mm Separation Distance from DUT to Planar Phantom

BODY SAR TEST SETUP PHOTOGRAPHS

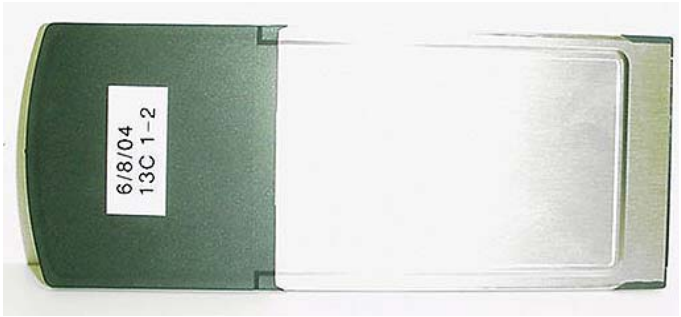
DUT with HP COMPAQ Laptop PC - Single PCMCIA Slot
Bottom Side of Host Laptop PC Touching Planar Phantom
12 mm Separation Distance from DUT to Planar Phantom





DUT PHOTOGRAPHS

WLAN3000 802.11b PCMCIA Card



DUT PHOTOGRAPHS

DUT with Dell Inspiron Laptop PC - Single PCMCIA Slot

6 mm Slot-to-Base Distance

DUT PHOTOGRAPHS

DUT with Sony VAIO Laptop PC - Bottom PCMCIA Card Slot

15 mm Slot-to-Base Distance

DUT PHOTOGRAPHS

DUT with HP Compaq Laptop PC - Single PCMCIA Slot

12 mm Slot-to-Base Distance