

DECLARATION OF COMPLIANCE SAR EVALUATION

Test Lab

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Applicant Information

ITRONIX CORPORATION

801 South Stevens Street Spokane, WA 99210-0179

Rule Part(s): FCC 47 CFR §2.1093; IC RSS-102 Issue 1 (Provisional)

Test Procedure(s): FCC OET Bulletin 65, Supplement C (01-01) FCC Device Classification: Part 15 Spread Spectrum Transmitter (DSS)

IC Device Classification: Low Power License-Exempt Radiocommunication Device

FCC ID: KBCIX260MPI350

Model(s): IX260

Device Type: Rugged Laptop PC with Cisco MPI-350 Mini-PCI DSSS WLAN Card

Tx Frequency Range: 2412 - 2462 MHz

RF Output Power Tested: 21.2 dBm Peak Conducted (2412 MHz) 21.1 dBm Peak Conducted (2437 MHz)

21.1 dBm Peak Conducted (2457 MHz)

Antenna Type: Internal (Dual)

Battery Type: 11.1V Lithium-Ion. 6.0Ah (Model: A2121-2)

Max. SAR Measured: 0.369 W/kg (1g average)

Celltech Research Inc. declares under its sole responsibility that this device was found to be in 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 (General Population / Uncontrolled Exposure).

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 Research Inc. The results and statements contained in this report pertain only to the device(s) evaluated.

Russell Pipe

Senior Compliance Technologist Celltech Research Inc.





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1.0 INTRODUCTION

This measurement report demonstrates that the ITRONIX CORPORATION Model: IX260 Rugged Laptop PC with internal Cisco MPI-350 Mini-PCI DSSS WLAN Card FCC ID: KBCIX260MPI350 complies with the RF exposure requirements specified in FCC 47 CFR §2.1093 (see reference [1]) and Health Canada 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.

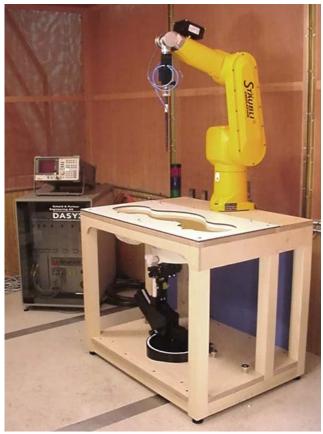
2.0 DESCRIPTION of Equipment Under Test (EUT)

FCC Rule Part(s)	art(s) 47 CFR §2.1093	
IC Rule Part(s)	IC RSS-102 Issue 1 (Provisional)	
Test Procedure	FCC OET Bulletin 65, Supplement C (01-01)	
FCC Device Classification	Part 15 Spread Spectrum Transmitter (DSS)	
IC Device Classification	Low Power License-Exempt Radiocommunication Device	
Device Type	Rugged Laptop PC with Cisco MPI-350 Mini-PCI DSSS WLAN Card	
FCC ID	KBCIX260MPI350	
Model(s)	IX260	
Serial No.	Pre-production	
Tx Frequency Range	2412 - 2462 MHz	
RF Output Power Tested	21.2 dBm Peak Conducted (2412 MHz) 21.1 dBm Peak Conducted (2437 MHz) 21.1 dBm Peak Conducted (2462 MHz)	
Antenna Type	Internal (Dual)	
Battery Type	11.1V Lithium-Ion, 6.0Ah (Model: A2121-2)	



3.0 SAR MEASUREMENT SYSTEM

Celltech Research SAR measurement facility utilizes the Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland. The DASY 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 PC plug-in card. The DAE3 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 PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe-mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.



DASY3 SAR Measurement System with SAM phantom

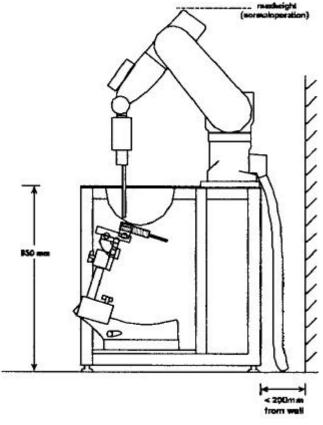


Figure 1. DASY3 Compact Version - Side View



4.0 MEASUREMENT SUMMARY

The measurement results were obtained with the EUT tested in the conditions described in this report. Detailed measurement data and plots showing the maximum SAR location of the EUT are reported in Appendix A.

	BODY SAR MEASUREMENT RESULTS								
Freq. (MHz)	Channel	Mode	Peak Co Power Before		Phantor Section	Antonna	Laptop PC Position to Planar Phantom	Separation Distance (cm)	Measured SAR 1g (W/kg)
2412	Low	CW	21.2	21.1	l Planar	Left Side	Back of LCD (LCD Closed)	1.5	0.296
2437	Mid	CW	21.1	20.9) Planar	Left Side	Back of LCD (LCD Closed)	1.5	0.297
2462	High	CW	21.1	21.0) Planar	Left Side	Back of LCD (LCD Closed)	1.5	0.284
2412	Low	CW	21.2	21.1	Planar	Right Side	Back of LCD (LCD Closed)	1.5	0.315
2437	Mid	CW	21.1	20.9) Planar	Right Side	Back of LCD (LCD Closed)	1.5	0.369
2462	High	CW	21.1	20.9) Planar	Right Side	Back of LCD (LCD Closed)	1.5	0.356
2437	Mid	CW	21.1	21.0) Planar	Left Side	Bottom of Laptop (LCD Closed)	0.0	0.0119
2437	Mid	CW	21.1	21.0) Planar	Right Side	Bottom of Laptop (LCD Closed)	0.0	0.0179
2437	Mid	CW	21.1	21.0) Planar	Left Side	Left Side of LCD (LCD Open)	0.0	0.0532
2437	Mid	CW	21.1	21.0) Planar	Right Side	Right Side of LCD (LCD Open)	0.0	0.0696
	ANSI / IEEE C95.1 1992 - SAFETY LIMIT BODY: 1.6 W/kg (averaged over 1 gram) Spatial Peak - Uncontrolled Exposure / General Population								
	Test Date(s)		12/10/02			Relative Humidity		52 %	
Measu	red Mixture	Туре	245	MHz N	Muscle	Atmospheric Pressure		101.0	kPa
Diel	ectric Const	ant	Target		Measured	Ambient	Temperature	23.3	
	ε _r		52.7 ±10		47.7		emperature	22.8	
(Conductivity		Target		Measured		d Depth	≥ 15	cm
σ (mho/m)		1.95 ±59	%	2.01	ρ (Kg/m³)		1000		

Note(s):

1. If the SAR measurements performed at the middle channel were ≥ 3dB below the SAR limit, SAR evaluation for the low and high channels was optional (per FCC OET Bulletin 65, Supplement C, Edition 01-01 (see reference

The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and 2. the SAR evaluation. The temperatures listed in the table above were consistent for all measurement periods.



5.0 DETAILS OF SAR EVALUATION

The ITRONIX CORPORATION Model: IX260 Rugged Laptop PC with internal Cisco MPI-350 Mini-PCI DSSS WLAN Card FCC ID: KBCIX260MPI350 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 G.

- 1. The EUT was tested for body SAR with the LCD display closed and the back of the LCD display facing parallel to the outer surface of the planar phantom. A 1.5 cm separation distance was maintained between the back of the LCD display and the outer surface of the planar phantom. Both the left and right sides of the back of the LCD display were evaluated due to the dual antenna placement internal to the back of the LCD display.
- The EUT was tested for body SAR with the LCD display closed and the bottom of the Laptop PC facing parallel to, and touching, the outer surface of the planar phantom. Both the left and right sides of the bottom of the Laptop PC were evaluated due to the dual antenna placement internal to the back of the LCD display.
- 3. The EUT was tested for body SAR with the LCD display open and the left side of the LCD display facing parallel to, and touching, the outer surface of the planar phantom.
- 4. The EUT was tested for body SAR with the LCD display open and the right side of the LCD display facing parallel to, and touching, the outer surface of the planar phantom.
- 5. The EUT was operated for an appropriate period prior to the evaluation to minimize power drift.
- 6. A 1.3 dB cable offset was entered into the Gigatronics 8652A Universal Power Meter prior to the conducted power measurements. The peak conducted power levels were measured before and after each test according to the procedures described in FCC 47 CFR §2.1046. If the conducted power level measured after the evaluation varied more than 5% from the initial power level, then the EUT was retested. Any unusual anomalies over the course of the test also warranted a re-evaluation.
- 7. The EUT was controlled via internal software and was tested in unmodulated continuous transmit operation (Continuous Wave mode at 100% duty cycle).
- 8. The location of the maximum spatial SAR distribution (Hot Spot) was determined relative to the device and its antenna.
- 9. The EUT was tested with a fully charged battery.
- 10. Due to the dimensions of the EUT, a stack of low-density, low-loss dielectric foamed polystyrene was used in place of the device holder.

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 DASY3 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 20mm x 20mm.
- c. Based on the area scan data, the area of maximum absorption was determined by spline interpolation. Around this point, a volume of 40 x 40 x 35 mm (fine resolution volume scan, zoom scan) was assessed by measuring 5 x 5 x 7 points.
- d. The 1g and 10g spatial peak SAR was determined as follows:
- 1. The first step was an extrapolation 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 1.3 mm (see probe calibration document in Appendix D). The extrapolation was based on a least square algorithm [W. Gander, Computermathematik, p.168-180] (see reference [6]). Through the points in the first 3 cm in all z-axis, polynomials of the fourth order were calculated. This polynomial was then used to evaluate the points between the surface and the probe tip.
- 2. The next step used 3D-spline interpolation to get all points within the measured volume in a 1mm grid (35000 points). The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition [W. Gander, Computermathematik, p.141-150] (x, y and z -direction) [Numerical Recipes in C, Second Edition, p.123ff] (see reference [6]).
- 3. The maximal interpolated value was searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1g or 10g) were computed using the 3D-spline interpolation algorithm. 8000 points (20x20x20) were interpolated to calculate the average.



EVALUATION PROCEDURES (Cont.)

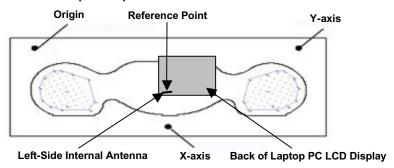


Figure 2. Phantom Reference Point & EUT Positioning Back Top Left Side of LCD Display (Closed)- Left-Side Antenna

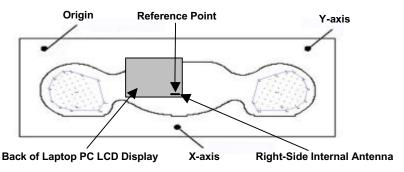


Figure 3. Phantom Reference Point & EUT Positioning Back Top Right Side of LCD Display (Closed)- Right-Side Antenna

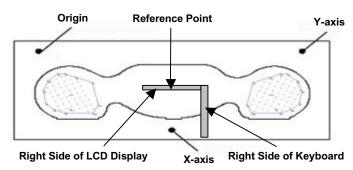


Figure 4. Phantom Reference Point & EUT Positioning Right Side of Laptop PC LCD Display (Open) - Right-Side Antenna

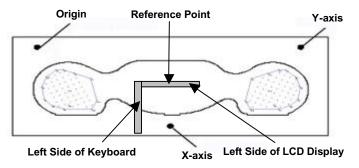


Figure 5. Phantom Reference Point & EUT Positioning Left Side of Laptop PC LCD Display (Open) - Left-Side Antenna



7.0 SYSTEM PERFORMANCE CHECK

Prior to the assessment a system performance check was performed in the planar section of the SAM phantom with a 2450MHz dipole (see Appendix C for detailed system validation procedures). The fluids were verified 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 250 mW was applied to the dipole and system was verified to a tolerance of ±10% (see Appendix B for system check test plot).

	SYSTEM PERFORMANCE CHECK										
Test Date	Equiv. Tissue		R 1g /kg)		Constant ε _r		ictivity ho/m)	ρ (Kg/m³)	Ambient Temp.	Fluid Temp.	Fluid Depth
12/10/02 2450MHz (Brain)	Target	Measured	Target	Measured	Target	Measured	4000	23.5 °C*	24.0 °C*	. 45	
	(Brain)	13.1 ±10%	13.5	39.2 ±10%	36.4	1.80 ±5%	1.85	1000	23.3 °C**	23.8 °C**	≥ 15 cm

^{*} Fluid Parameter Check

^{**} System Performance Check

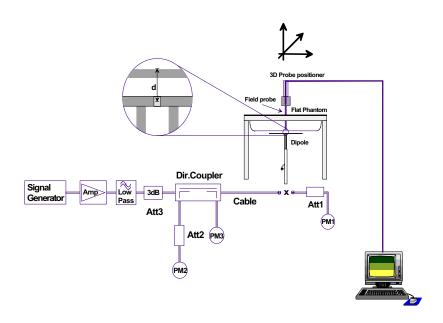


Figure 6. System Check Setup Diagram



2450MHz System Check Setup Photograph



8.0 EQUIVALENT TISSUES

The 2450MHz brain and body mixtures consist of Glycol-monobutyl, water, and salt (body mixture only). The fluid was prepared according to standardized procedures and measured for dielectric parameters (permittivity and conductivity).

TISSUE MIXTURES							
INGREDIENT 2450MHz Brain Mixture (System Performance Check) 2450MHz Body Mix (EUT Evaluation							
Water	55.20 %	69.95 %					
Glycol Monobutyl	44.80 %	30.00 %					
Salt	-	0.05 %					

9.0 SAR SAFETY LIMITS

	SAR (W/Kg)			
EXPOSURE LIMITS	(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:

Data Acquisition Electronic (DAE) System

Cell Controller

Processor: Pentium III Clock Speed: 450 MHz **Operating System:** Windows NT DASY3 PC-Board Data Card:

Data Converter

Features: Signal Amplifier, multiplexer, A/D converter, and control logic

Software: DASY3 software

Connecting Lines: Optical downlink for data and status info.

Optical uplink for commands and clock

PC Interface Card

Function: 24 bit (64 MHz) DSP for real time processing

Link to DAE3

16-bit A/D converter for surface detection system

serial link to robot

direct emergency stop output for robot

E-Field Probe

Model: ET3DV6 Serial No.: 1387

Construction: Triangular core fiber optic detection system

Frequency: 10 MHz to 6 GHz

±0.2 dB (30 MHz to 3 GHz) Linearity:

Phantom

Type: SAM V4.0C **Shell Material:** Fiberglass Thickness: $2.0 \pm 0.1 \; mm$ Volume: Approx. 20 liters



11.0 PROBE SPECIFICATION (ET3DV6)

Construction: Symmetrical design with triangular core

Built-in shielding against static charges

PEEK enclosure material (resistant to organic solvents, e.g. glycol)

Calibration: In air from 10 MHz to 2.5 GHz

In brain simulating tissue at frequencies of 900 MHz

and 1.8 GHz (accuracy ± 8%)

Frequency: 10 MHz to >6 GHz; Linearity: ±0.2 dB

(30 MHz to 3 GHz)

Directivity: ± 0.2 dB in brain tissue (rotation around probe axis)

±0.4 dB in brain tissue (rotation normal to probe axis)

Dynam. Rnge: $5 \mu W/g$ to >100 mW/g; Linearity: $\pm 0.2 dB$

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



SAM Phantom

13.0 DEVICE HOLDER

The DASY3 device holder has two scales for device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The plane between the ear openings and the mouth tip has a rotation angle of 65° . The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections.



Device Holder



14.0 TEST EQUIPMENT LIST

SAR MEASUREMENT SYSTEM						
EQUIPMENT	SERIAL NO.	CALIBRATION DATE				
DASY3 System	500000.04					
-Robot -ET3DV6 E-Field Probe	599396-01 1387	N/A Feb 2002				
	135	Oct 2002				
-300MHz Validation Dipole -450MHz Validation Dipole	136	Oct 2002 Oct 2002				
-900MHz Validation Dipole	054	June 2001				
-1800MHz Validation Dipole	247	June 2001				
-2450MHz Validation Dipole	150	Oct 2002				
-SAM Phantom V4.0C	N/A	N/A				
-Small Planar Phantom	N/A	N/A				
-Medium Planar Phantom	N/A	N/A				
-Large Planar Phantom	N/A	N/A				
85070C Dielectric Probe Kit	N/A	N/A				
Gigatronics 8652A Power Meter	1835272	Feb 2002				
-Power Sensor 80701A	1833535	Feb 2002				
-Power Sensor 80701A	1833542	Mar 2002				
E4408B Spectrum Analyzer	US39240170	Nov 2002				
8594E Spectrum Analyzer	3543A02721	Feb 2002				
8753E Network Analyzer	US38433013	Feb 2002				
8648D Signal Generator	3847A00611	Feb 2002				
5S1G4 Amplifier Research Power Amplifier	26235	N/A				



15.0 MEASUREMENT UNCERTAINTIES

Error Description	Uncertainty Value ±%	Probability Distribution	Divisor	c _i 1g	Standard Uncertainty ±% (1g)	V _i Or V _{eff}
Measurement System						
Probe calibration	± 4.8	Normal	1	1	± 4.8	∞
Axial isotropy of the probe	± 4.7	Rectangular	√3	(1-c _p)	± 1.9	∞
Spherical isotropy of the probe	± 9.6	Rectangular	√3	(c _p)	± 3.9	∞
Spatial resolution	± 0.0	Rectangular	√3	1	± 0.0	∞
Boundary effects	± 5.5	Rectangular	√3	1	± 3.2	∞
Probe linearity	± 4.7	Rectangular	√3	1	± 2.7	∞
Detection limit	± 1.0	Rectangular	√3	1	± 0.6	∞
Readout electronics	± 1.0	Normal	1	1	± 1.0	∞
Response time	± 0.8	Rectangular	√3	1	± 0.5	∞
Integration time	± 1.4	Rectangular	√3	1	± 0.8	∞
RF ambient conditions	± 3.0	Rectangular	√3	1	± 1.7	∞
Mech. constraints of robot	± 0.4	Rectangular	√3	1	± 0.2	∞
Probe positioning	± 2.9	Rectangular	√3	1	± 1.7	∞
Extrapolation & integration	± 3.9	Rectangular	√3	1	± 2.3	∞
Test Sample Related						
Device positioning	± 6.0	Normal	√3	1	± 6.7	12
Device holder uncertainty	± 5.0	Normal	√3	1	± 5.9	8
Power drift	± 5.0	Rectangular	√3		± 2.9	∞
Phantom and Setup						
Phantom uncertainty	± 4.0	Rectangular	√3	1	± 2.3	∞
Liquid conductivity (target)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid conductivity (measured)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid permittivity (target)	± 10.0	Rectangular	√3	0.6	± 3.5	∞
Liquid permittivity (measured)	± 10.0	Rectangular	√3	0.6	± 3.5	∞
Combined Standard Uncertain	ity				± 13.7	
Expanded Uncertainty (k=2)					± 27.5	

Measurement Uncertainty Table in accordance with IEEE Std 1528 (Draft - see reference [5])



16.0 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 Radio frequency 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

Itronix Corporation FCC ID: KBCIX260MPI350

SAM Phantom; Flat Section; Position: $(270^{\circ},0^{\circ})$ Probe: ET3DV6 - SN1387; ConvF(4.30,4.30,4.30); Crest factor: 1.0

2450 MHz Muscle: $\sigma = 2.01$ mho/m $\epsilon_r = 47.7$ $\rho = 1.00$ g/cm³

Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0

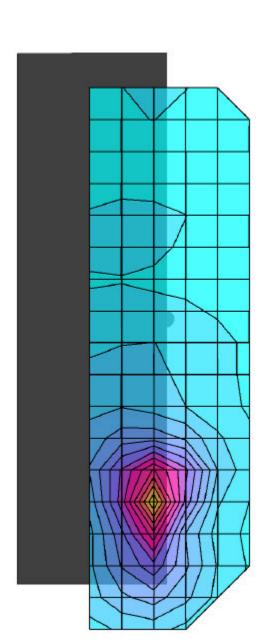
Cube 5x5x7; Powerdrift: -0.11 dB

SAR (1g): 0.296 mW/g, SAR (10g): 0.155 mW/g

Body SAR - Back of Laptop PC LCD Display (Closed) - Left-Side Antenna 1.5 cm Separation Distance from Back of LCD Display to Planar Phantom Itronix IX260 Rugged Laptop PC with Cisco MPI-350 Mini-PCI WLAN Card CW Mode

Low Channel [2412 MHz]
Peak Conducted Power: 21.2 dBm
Ambient Temp: 23.3°C; Fluid Temp: 22.8°C

Date Tested: December 10, 2002



7.35E-2

2.45E-2

1.23E-1

1.72E-1

2.70E-1

3.19E-1

2.21E-1

Itronix Corporation FCC ID: KBCIX260MPI350

Probe: ET3DV6 - SN1387; ConvF(4.30,4.30); Crest factor: 1.0 2450 MHz Muscle: $\sigma = 2.01$ mho/m $\epsilon_{r} = 47.7~\rho = 1.00~g/cm^{3}$ SAM Phantom; Flat Section; Position: (270°,0°)

Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0

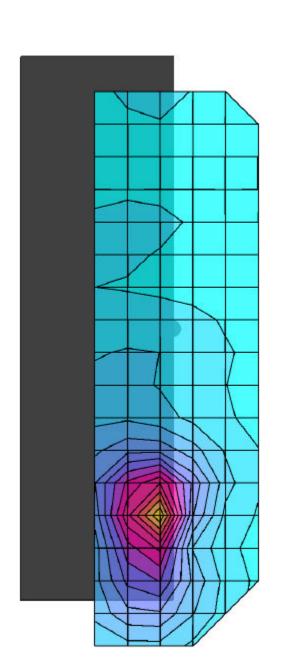
Cube 5x5x7; Powerdrift: -0.18 dB SAR (1g): 0.297 mW/g, SAR (10g): 0.153 mW/g

Body SAR - Back of Laptop PC LCD Display (Closed) - Left-Side Antenna 1.5 cm Separation Distance from Back of LCD Display to Planar Phantom Itronix IX260 Rugged Laptop PC with Cisco MPI-350 Mini-PCI WLAN Card CW Mode

Mid Channel [2437 MHz]

Peak Conducted Power: 21.1 dBm Ambient Temp: 23.3°C; Fluid Temp: 22.8°C

Date Tested: December 10, 2002



 SAR_{Tot} [mW/g]

2.55E-1

3.01E-1

2.08E-1

1.16E-1

6.94E-2

2.31E-2

1.62E-1

Itronix Corporation FCC ID: KBCIX260MPI350

SAM Phantom; Flat Section; Position: $(270^{\circ},0^{\circ})$ Probe: ET3DV6 - SN1387; ConvF(4.30,4.30,4.30); Crest factor: 1.0

2450 MHz Muscle: $\sigma = 2.01$ mho/m $\epsilon_r = 47.7~\rho = 1.00~g/cm^3$

Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0Cube 5x5x7; Powerdrift: -0.12 dB

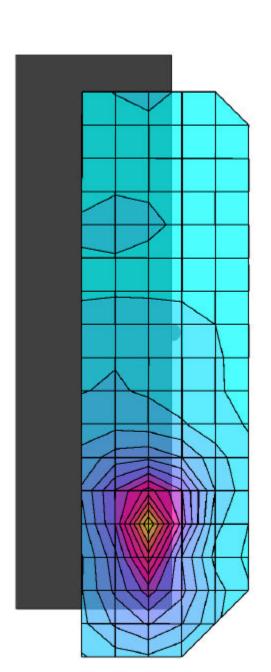
SAR (1g): 0.284 mW/g, SAR (10g): 0.147 mW/g

Body SAR - Back of Laptop PC LCD Display (Closed) - Left-Side Antenna 1.5 cm Separation Distance from Back of LCD Display to Planar Phantom Itronix IX260 Rugged Laptop PC with Cisco MPI-350 Mini-PCI WLAN Card CW Mode

High Channel [2462 MHz]
Peak Conducted Power: 21.1 dBm

Peak Conducted Power: 21.1 dBm Ambient Temp: 23.3°C; Fluid Temp: 22.8°C

Date Tested: December 10, 2002



SAR_{Tot} [mW/g]

2.52E-1

2.98E-1

2.06E-1

1.15E-1

6.88E-2

2.29E-2

1.61E-1

Itronix Corporation FCC ID: KBCIX260MPI350

Probe: ET3DV6 - SN1387; ConvF(4.30,4.30); Crest factor: 1.0 SAM Phantom; Flat Section; Position: (270°,0°)

2450 MHz Muscle: $\sigma = 2.01$ mho/m $\epsilon_{r} = 47.7~\rho = 1.00~g/cm^{3}$

Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0

Cube 5x5x7; Powerdrift: -0.05 dB SAR (1g): 0.315 mW/g, SAR (10g): 0.160 mW/g

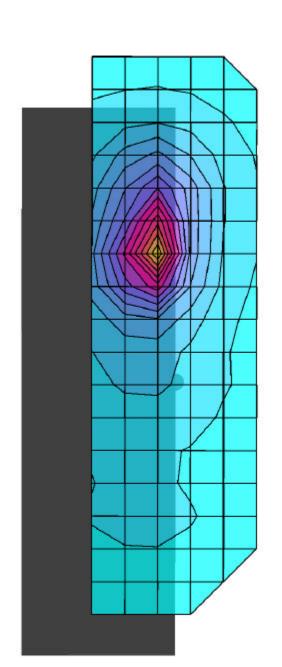
Body SAR - Back of Laptop PC LCD Display (Closed) - Right-Side Antenna 1.5 cm Separation Distance from Back of LCD Display to Planar Phantom Itronix IX260 Rugged Laptop PC with Cisco MPI-350 Mini-PCI WLAN Card

CW Mode

Low Channel [2412 MHz]

Peak Conducted Power: 21.2 dBm Ambient Temp: 23.3°C; Fluid Temp: 22.8°C

Date Tested: December 10, 2002



7.41E-2

2.47E-2

1.24E-1

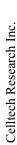
2.72E-1

3.21E-1

2.22E-1

1.73E-1

 SAR_{Tot} [mW/g]



Itronix Corporation FCC ID: KBCIX260MPI350

SAM Phantom; Flat Section; Position: $(270^{\circ},0^{\circ})$ Probe: ET3DV6 - SN1387; ConvF(4.30,4.30,4.30); Crest factor: 1.0

2450 MHz Muscle: $\sigma = 2.01$ mho/m $\epsilon_r = 47.7$ $\rho = 1.00$ g/cm³

Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0

Cube 5x5x7; Powerdrift: -0.20 dB

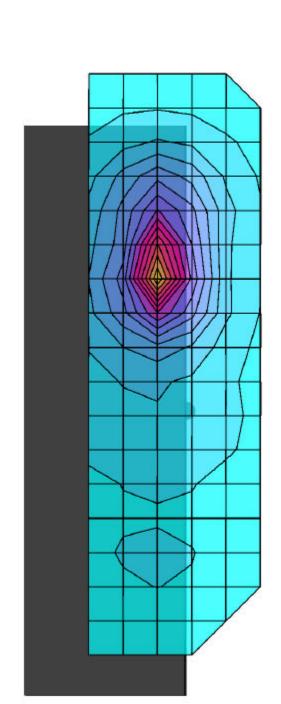
SAR (1g): 0.369 mW/g, SAR (10g): 0.186 mW/g

Body SAR - Back of Laptop PC LCD Display (Closed) - Right-Side Antenna 1.5 cm Separation Distance from Back of LCD Display to Planar Phantom Itronix IX260 Rugged Laptop PC with Cisco MPI-350 Mini-PCI WLAN Card

CW Mode Mid Channel [2437 MHz]

Peak Conducted Power: 21.1 dBm Ambient Temp: 23.3°C; Fluid Temp: 22.8°C

Date Tested: December 10, 2002



SAR_{Tot} [mW/g]

3.25E-1

3.84E-1

2.66E-1

2.07E-1

1.48E-1

8.87E-2

2.96E-2

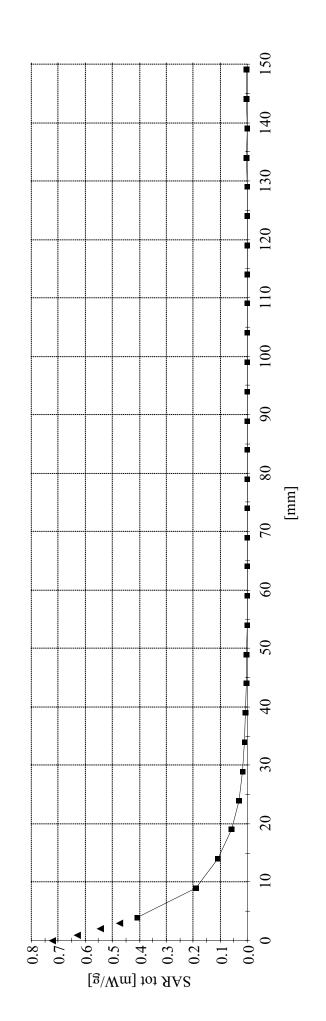
Itronix Corporation FCC ID: KBCIX260MPI350

SAM Phantom; Flat Section Probe: ET3DV6 - SN1387; ConvF(4.30,4.30,4.30); Crest factor: 1.0 2450 MHz Muscle: $\sigma = 2.01$ mho/m $\epsilon_{r} = 47.7~\rho = 1.00~g/cm^{3}$

Z-Axis Extrapolation at Peak SAR Location

Itronix IX260 Rugged Laptop PC with Cisco MPI-350 Mini-PCI WLAN Card Body SAR - Back of Laptop PC LCD Display (Closed) - Right-Side Antenna 1.5 cm Separation Distance from Back of LCD Display to Planar Phantom CW Mode

Ambient Temp: 23.3°C; Fluid Temp: 22.8°C Peak Conducted Power: 21.1 dBm Date Tested: December 10, 2002 Mid Channel [2437 MHz]



Celltech Research Inc.

Itronix Corporation FCC ID: KBCIX260MPI350

SAM Phantom; Flat Section; Position: (90°,180°)

Probe: ET3DV6 - SN1387; ConvF(4.30,4.30,4.30); Crest factor: 1.0 2450 MHz Muscle: $\sigma=2.01$ mho/m $\epsilon_r=47.7~\rho=1.00~g/cm^3$

Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0

Cube 5x5x7; Powerdrift: -0.15 dB

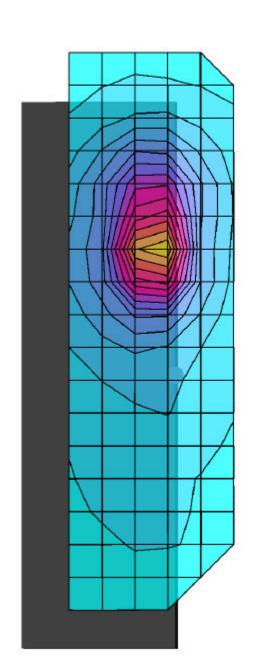
SAR (1g): 0.356 mW/g, SAR (10g): 0.177 mW/g

Body SAR - Back of Laptop PC LCD Display (Closed) - Right-Side Antenna 1.5 cm Separation Distance from Back of LCD Display to Planar Phantom Itronix IX260 Rugged Laptop PC with Cisco MPI-350 Mini-PCI WLAN Card

CW Mode
High Channel [2462 MHz]

Peak Conducted Power: 21.1 dBm Ambient Temp: 23.3°C; Fluid Temp: 22.8°C

Date Tested: December 10, 2002



7.03E-2

2.34E-2

1.17E-1

1.64E-1

SAR_{Tot} [mW/g]

2.58E-1

2.11E-1

3.05E-1

Itronix Corporation FCC ID: KBCIX260MPI350

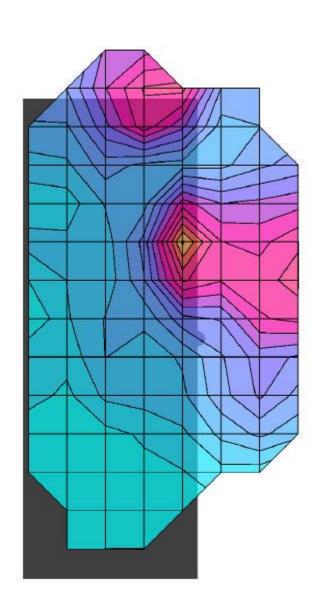
SAM Phantom; Flat Section; Position: $(270^\circ,0^\circ)$ Probe: ET3DV6 - SN1387; ConvF(4.30,4.30,4.30); Crest factor: 1.0 2450 MHz Muscle: $\sigma=2.01$ mho/m $\epsilon_r=47.7$ $\rho=1.00$ g/cm³

Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0

Cube 5x5x7; Powerdrift: -0.03 dB SAR (1g): 0.0119 mW/g, SAR (10g): 0.0069 mW/g Body SAR - Bottom of Laptop PC (LCD Display Closed) - Left-Side Antenna 0.0 cm Separation Distance from Bottom of Laptop PC to Planar Phantom Itronix IX260 Rugged Laptop PC with Cisco MPI-350 Mini-PCI WLAN Card

Mid Channel [2437 MHz]
Peak Conducted Power: 21.1 dBm
Ambient Temp: 23.3°C; Fluid Temp: 22.8°C
Date Tested: December 10, 2002

CW Mode



SAR_{Tot} [mW/g]

1.10E-2

1.30E-2

9.00E-3

5.00E-3

7.00E-3

3.00E-3

1.00E-3

Itronix Corporation FCC ID: KBCIX260MPI350

Probe: ET3DV6 - SN1387; ConvF(4.30,4.30); Crest factor: 1.0 SAM Phantom; Flat Section; Position: (270°,0°)

2450 MHz Muscle: $\sigma = 2.01$ mho/m $\epsilon_{r} = 47.7~\rho = 1.00~g/cm^{3}$

Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0

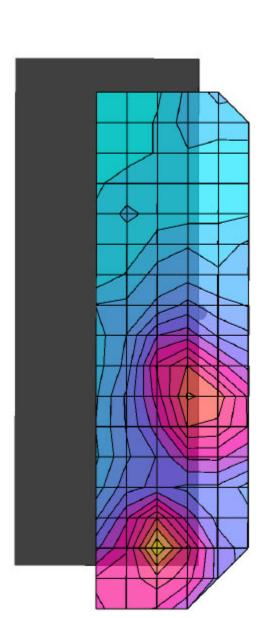
Cube 5x5x7; Powerdrift: -0.04 dB

SAR (1g): 0.0179 mW/g, SAR (10g): 0.0102 mW/g

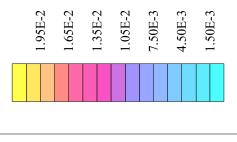
Body SAR - Bottom of Laptop PC (LCD Display Closed) - Right-Side Antenna 0.0 cm Separation Distance from Bottom of Laptop PC to Planar Phantom Itronix IX260 Rugged Laptop PC with Cisco MPI-350 Mini-PCI WLAN Card CW Mode

Peak Conducted Power: 21.1 dBm Ambient Temp: 23.3°C; Fluid Temp: 22.8°C Mid Channel [2437 MHz]

Date Tested: December 10, 2002



 SAR_{Tot} [mW/g]



Itronix Corporation FCC ID: KBCIX260MPI350

SAM Phantom; Flat Section; Position: $(270^{\circ},0^{\circ})$ Probe: ET3DV6 - SN1387; ConvF(4.30,4.30,4.30); Crest factor: 1.0

2450 MHz Muscle: $\sigma = 2.01$ mho/m $\epsilon_r = 47.7 \ \rho = 1.00 \ g/cm^3$

Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0

Cube 5x5x7; Powerdrift: -0.14 dB

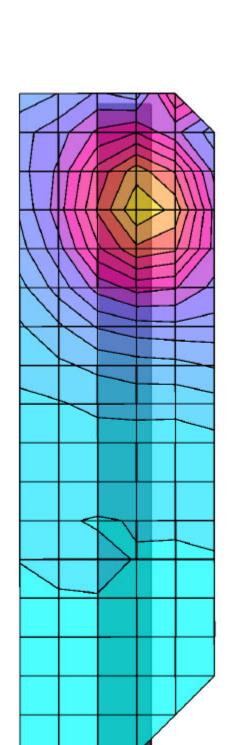
SAR (1g): 0.0532 mW/g, SAR (10g): 0.0313 mW/g

Body SAR - Left Side of Laptop PC LCD Display (Open) - Left-Side Antenna 0.0 cm Separation Distance from Laptop PC to Planar Phantom Itronix IX260 Rugged Laptop PC with Cisco MPI-350 Mini-PCI WLAN Card

CW Mode Mid Channel [2437 MHz]

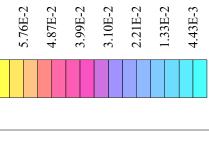
Peak Conducted Power: 21.1 dBm Ambient Temp: 23.3°C; Fluid Temp: 22.8°C

Date Tested: December 10, 2002



Celltech Research Inc.

SAR_{Tot} [mW/g]



Itronix Corporation FCC ID: KBCIX260MPI350

SAM Phantom; Flat Section; Position: (270°,0°)

Probe: ET3DV6 - SN1387; ConvF(4.30,4.30,4.30); Crest factor: 1.0 2450 MHz Muscle: $\sigma = 2.01$ mho/m $\epsilon_r = 47.7$ $\rho = 1.00$ g/cm³

Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0

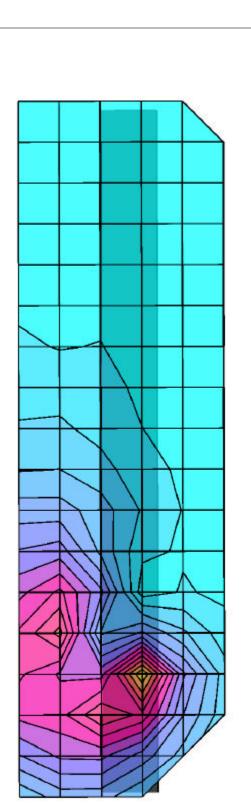
Cube 5x5x7; Powerdrift: -0.11 dB

SAR (1g): 0.0696 mW/g, SAR (10g): 0.0362 mW/g

Body SAR - Right Side of Laptop PC LCD Display (Open) - Right-Side Antenna 0.0 cm Separation Distance from Laptop PC to Planar Phantom Itronix IX260 Rugged Laptop PC with Cisco MPI-350 Mini-PCI WLAN Card CW Mode

Mid Channel [2437 MHz]
Peak Conducted Power: 21.1 dBm
Ambient Temp: 23.3°C; Fluid Temp: 22.8°C

Date Tested: December 10, 2002



4.95E-2

7.15E-2

6.05E-2

3.85E-2

1.65E-2

2.75E-2

5.50E-3

SAR_{Tot} [mW/g]



APPENDIX B - SYSTEM CHECK DATA

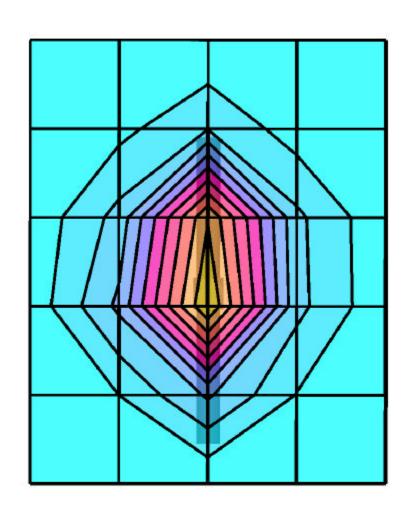
System Performance Check - 2450MHz Dipole

SAM Phantom; Flat Section

Probe: ET3DV6 - SN1387; ConvF(4.70,4.70); Crest factor: 1.0; 2450 MHz Brain: $\sigma = 1.85$ mho/m $\epsilon_r = 36.4$ $\rho = 1.00$ g/cm³

Cube 5x5x7: Peak: 28.7 mW/g, SAR (1g): 13.5 mW/g, SAR (10g): 6.14 mW/g, (Worst-case extrapolation) Penetration depth: 6.3 (6.1, 7.1) [mm]; Powerdrift: -0.15 dB Ambient Temp: 23.3°C; Fluid Temp: 23.8°C

Forward Conducted Power: 250 mW Test Date: December 10, 2002



 $SAR_{Tot}\ [mW/g]$



3.28E+0

1.64E+0



APPENDIX C - SYSTEM VALIDATION



Type:

2450MHz SYSTEM VALIDATION DIPOLE

2450MHz Validation Dipole

Serial Number:	150				
Place of Calibration:	Celltech Research Inc.				
Date of Calibration:	October 24, 2002				
Celltech Research Inc. hereby certifies that this device has been calibrated on the date indicated above					
Calibrated by:	Russell W. Pupie				
Approved by:	GH2-				

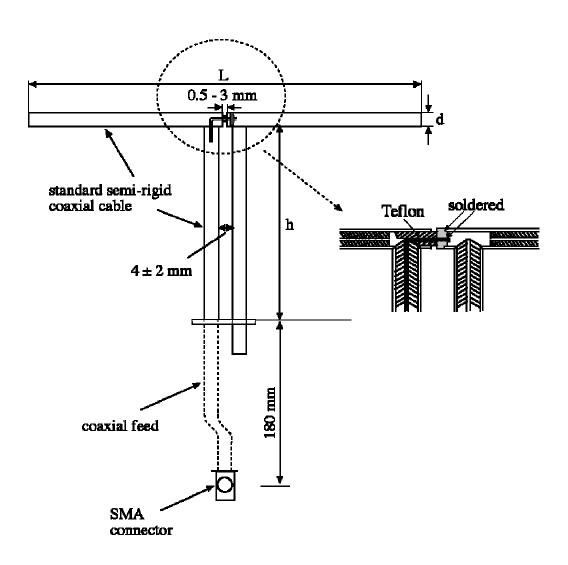
1. Dipole Construction & Electrical Characteristics

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} = 49.838Ω

 $\text{Im}\{Z\}=0.2207\Omega$

Return Loss at 2450MHz -49.398 dB



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

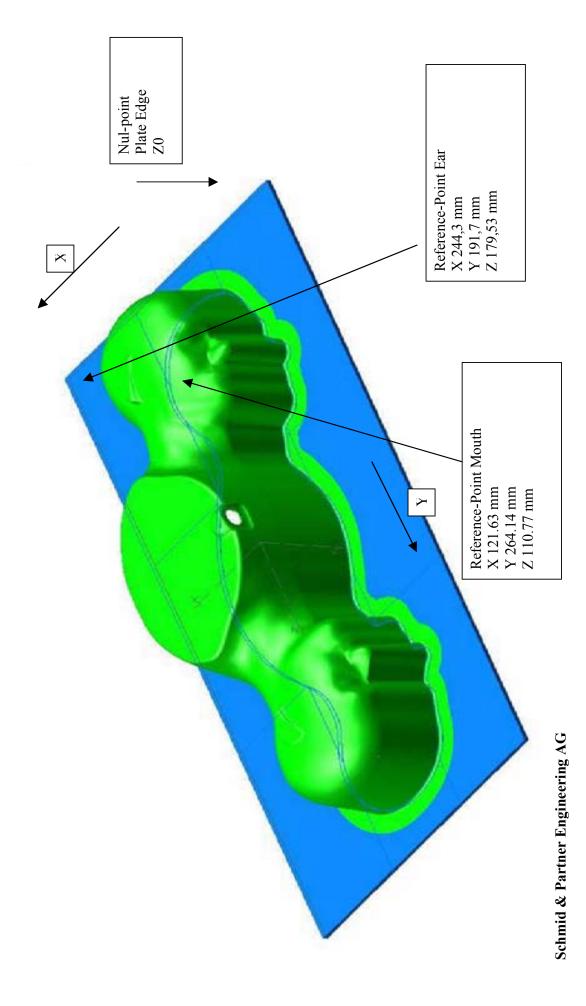
2. Validation Phantom

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: $2.0 \pm 0.1 \text{ mm}$ **Filling Volume:** Approx. 20 liters

Dimensions: 50 cm (W) x 100 cm (L)

SAM Twin-Phantom



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: 36.8

Conductivity: 1.79 mho/m

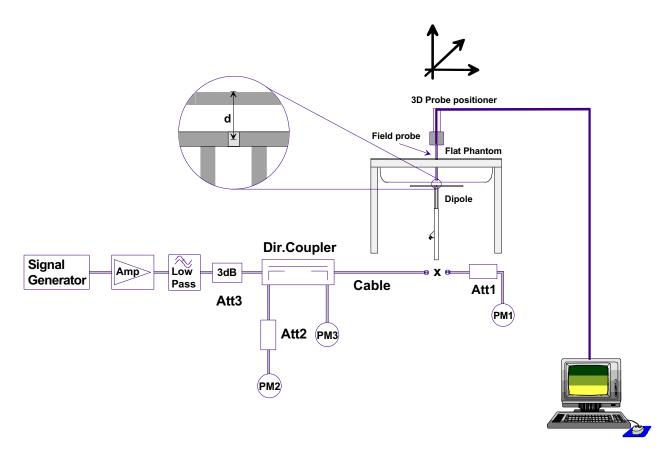
Ambient Temperature: 23.6°C Fluid Temperature: 23.8°C Fluid Depth: \geq 15cm

The 2450MHz simulating tissue consists of the following ingredients:

Ingredient	Percentage by weight
Water	55.20%
Glycol Monobutyl	44.80%
Target Dielectric Parameters at 22°C	$\varepsilon_{\rm r}$ = 39.2 (+/-10%) 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.

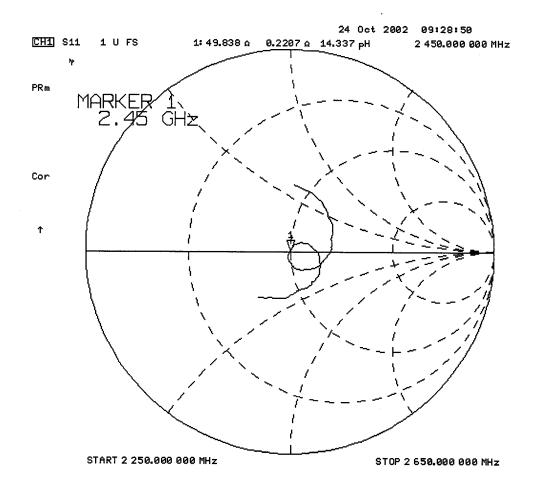
Validation Dipole SAR Test Results

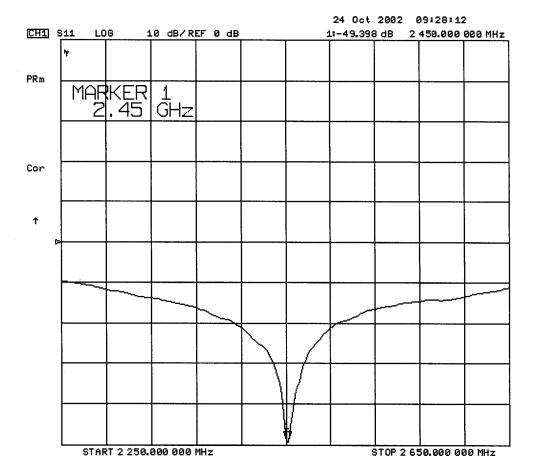
Validation Measurement	SAR @ 0.25W Input averaged over 1g	SAR @ 1W Input averaged over 1g	SAR @ 0.25W Input averaged over 10g	SAR @ 1W Input averaged over 10g	Peak SAR @ 0.25W Input
Test 1	14.4	57.6	6.55	26.20	30.5
Test 2	14.2	56.8	6.44	25.76	30.0
Test 3	14.0	56.0	6.35	25.40	29.7
Test 4	13.9	55.6	6.32	25.28	29.5
Test 5	14.0	56.0	6.33	25.32	29.7
Test 6	14.0	56.0	6.33	25.32	29.7
Test 7	13.9	55.6	6.31	25.24	29.5
Test 8	13.8	55.2	6.28	25.12	29.3
Test 9	13.8	55.2	6.28	25.12	29.4
Test10	14.0	56.0	6.33	25.32	29.7
Average Value	14.0	56.0	6.35	25.41	29.7

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

Averaged over 1cm (1g) of tissue: 56.00 mW/g

Averaged over 10cm (10g) of tissue: 25.41 mW/g





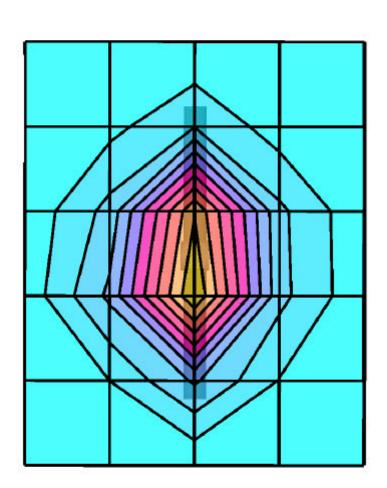
Dipole 2450MHz

SAM Phantom; Flat Section

Probe: ET3DV6 - SN1387; ConvF(4.70,4.70); Crest factor: 1.0; 2450 MHz Brain: $\sigma = 1.79$ mho/m $\epsilon_r = 36.8$ $\rho = 1.00$ g/cm³

Cubes (4): Peak: 29.7 mW/g \pm 0.04 dB, SAR (1g): 14.0 mW/g \pm 0.04 dB, SAR (10g): 6.35 mW/g \pm 0.04 dB, (Worst-case extrapolation) Penetration depth: 6.4 (6.1, 7.2) [mm]; Powerdrift: -0.04 dB Ambient Temp.: 23.6°C; Fluid Temp.: 23.8°C

Forward Conducted Power: 250 mW Calibration Date: October 24, 2002



9.52E+0

7.94E+0

1.43E+1 1.27E+1 1.11E+1

1.59E+1

6.35E+0 4.76E+0 3.17E+01.59E+0

 $SAR_{Tot}\ [mW/g]$

2450MHz System Validation Measured Fluid Dielectric Parameters (Brain) October 24, 2002

Frequency		e¹	e''
2.350000000	${\tt GHz}$	37.2108	12.9039
2.360000000	${\tt GHz}$	37.1695	12.9350
2.370000000	${\tt GHz}$	37.1398	12.9630
2.380000000	GHz	37.1057	12.9945
2.390000000	GHz	37.0746	13.0290
2.400000000	GHz	37.0424	13.0464
2.410000000	GHz	36.9746	13.0743
2.420000000	GHz	36.9322	13.1074
2.430000000	GHz	36.8908	13.1372
2.440000000	GHz	36.8449	13.1527
<mark>2.450000000</mark>	GHz	<mark>36.7983</mark>	13.1767
2.460000000	GHz	36.7651	13.2038
2.470000000	GHz	36.7300	13.2377
2.480000000	GHz	36.7004	13.2677
2.490000000	GHz	36.6658	13.2862
2.500000000	GHz	36.6120	13.2988
2.510000000	${\tt GHz}$	36.5655	13.3268
2.520000000	GHz	36.5147	13.3582
2.530000000	${\tt GHz}$	36.4743	13.3922
2.540000000	${\tt GHz}$	36.4044	13.4131
2.550000000	${\tt GHz}$	36.3807	13.4402



APPENDIX D - PROBE CALIBRATION

Schmid & Partner Engineering AG

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

Calibration Certificate

Dosimetric E-Field Probe

Type:	ET3DV6
Serial Number:	1387
Place of Calibration:	Zurich
Date of Calibration:	February 22, 2002
Calibration Interval:	12 months

Schmid & Partner Engineering AG hereby certifies, that this device has been calibrated on the date indicated above. The calibration was performed in accordance with specifications and procedures of Schmid & Partner Engineering AG.

Wherever applicable, the standards used in the calibration process are traceable to international standards. In all other cases the standards of the Laboratory for EMF and Microwave Electronics at the Swiss Federal Institute of Technology (ETH) in Zurich, Switzerland have been applied.

Calibrated by:

Approved by:

Probe ET3DV6

SN:1387

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

Calibrated for System DASY3

DASY3 - Parameters of Probe: ET3DV6 SN:1387

Sensitivity in Free Space

Diode Compression

NormX	1.58 μV/(V/m) ²	DCP X	97	mV
NormY	1.67 μV/(V/m) ²	DCP Y	97	mV
NormZ	1.67 μV/(V/m) ²	DCP Z	97	mV

Sensitivity in Tissue Simulating Liquid

Head Head	900 MHz 835 MHz		$\varepsilon_r = 41.5 \pm 5\%$ $\varepsilon_r = 41.5 \pm 5\%$	0.97 ± 5% ml 0.90 ± 5% ml	
	ConvF X	6.6 ±	± 9.5% (k=2)	Boundary effe	ect:
	ConvF Y	6.6 ±	± 9.5% (k=2)	Alpha	0.40
	ConvF Z	6.6 ±	± 9.5% (k=2)	Depth	2.38
Head Head	1800 MHz 1900 MHz		$\varepsilon_r = 40.0 \pm 5\%$ $\varepsilon_r = 40.0 \pm 5\%$	1.40 ± 5% ml 1.40 ± 5% ml	
	ConvF X	5.4 ±	± 9.5% (k=2)	Boundary effe	ect:
	ConvF Y	5.4 ±	± 9.5% (k=2)	Alpha	0.57

Boundary Effect

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

Probe Tip t	o Boundary	1 mm	2 mm
SAR _{be} [%]	Without Correction Algorithm	9.7	5.4
SAR _{be} [%]	With Correction Algorithm	0.3	0.6

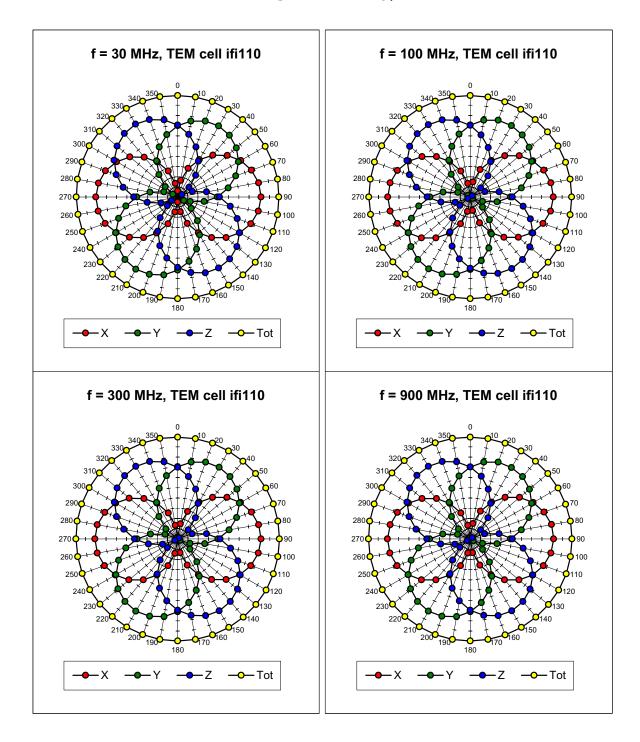
Head 1800 MHz Typical SAR gradient: 10 % per mm

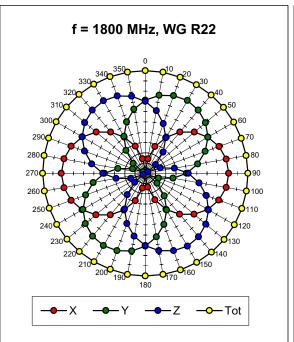
Probe Tip t	o Boundary	1 mm	2 mm
SAR _{be} [%]	Without Correction Algorithm	11.5	7.3
SAR _{be} [%]	With Correction Algorithm	0.1	0.3

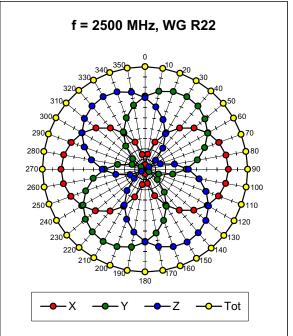
Sensor Offset

Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	1.3 ± 0.2	mm

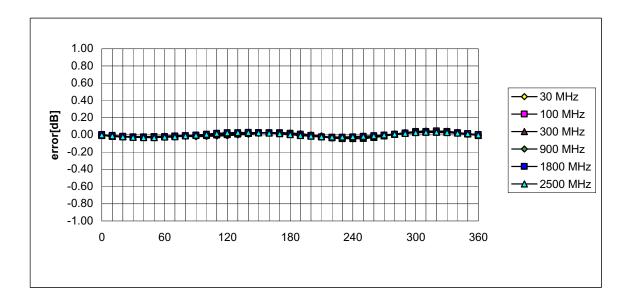
Receiving Pattern (ϕ), θ = 0°





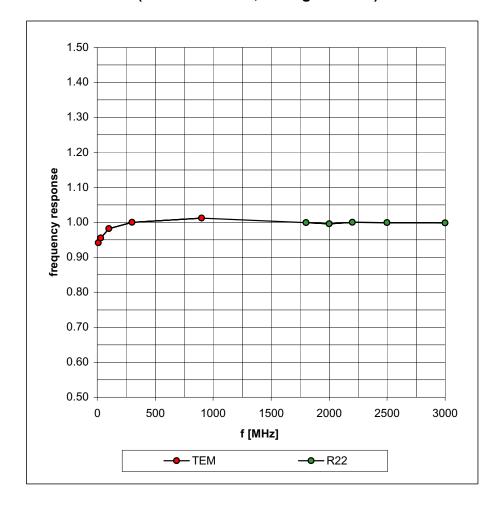


Isotropy Error (ϕ), $\theta = 0^{\circ}$



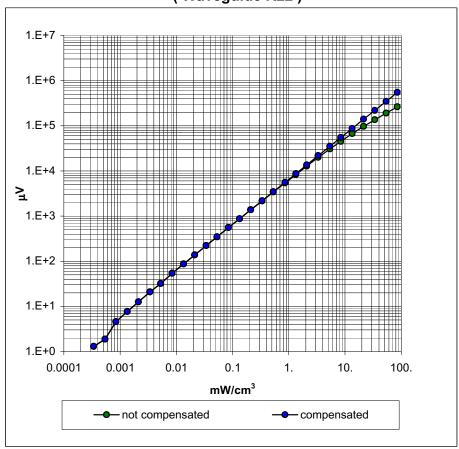
ET3DV6 SN:1387

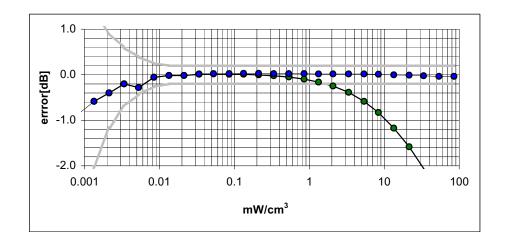
(TEM-Cell:ifi110, Waveguide R22)



Dynamic Range f(SAR_{brain})

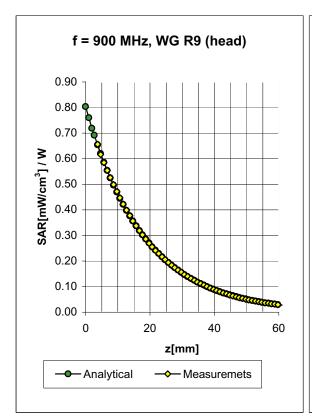
(Waveguide R22)

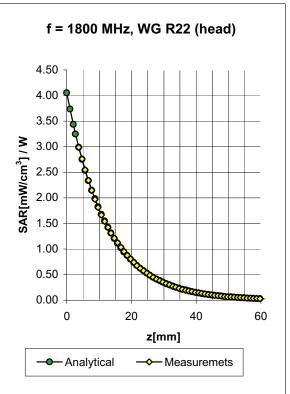




ET3DV6 SN:1387

Conversion Factor Assessment



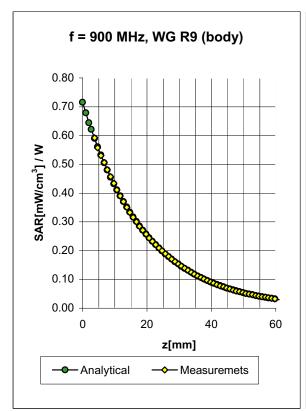


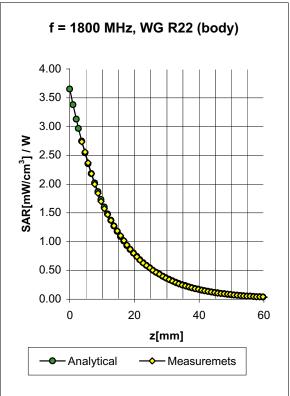
Head	900 MHz	$\varepsilon_{\rm r}$ = 41.5 ± 5%	σ = 0.97 ± 5% mho/m
Head	835 MHz	$\varepsilon_{\rm r}$ = 41.5 ± 5%	σ = 0.90 ± 5% mho/m
	ConvF X	6.6 ± 9.5% (k=2)	Boundary effect:
	ConvF Y	6.6 ± 9.5% (k=2)	Alpha 0.40
	ConvF Z	6.6 ± 9.5% (k=2)	Depth 2.38

Head	1800 MHz	$\varepsilon_{\rm r}$ = 40.0 ± 5%	σ = 1.40 ± 5% mho/m	
Head	1900 MHz	$\varepsilon_{\rm r}$ = 40.0 ± 5%	σ = 1.40 ± 5% mho/m	
	ConvF X	5.4 ± 9.5% (k=2)	Boundary effect:	
	ConvF Y	5.4 ± 9.5% (k=2)	Alpha 0.57	7
	ConvF Z	5.4 ± 9.5% (k=2)	Depth 2.18	3

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Conversion Factor Assessment





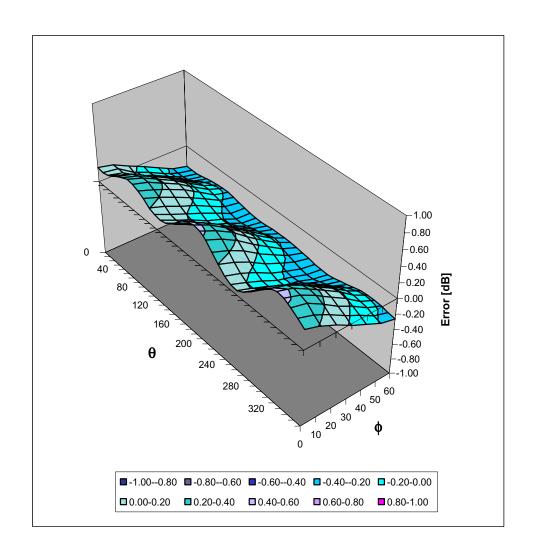
Body	900 MHz	$\varepsilon_{\rm r}$ = 55.0 ± 5%	σ = 1.05 ± 5% mho/m
Body	835 MHz	$\varepsilon_{\rm r}$ = 55.2 ± 5%	σ = 0.97 ± 5% mho/m
	ConvF X	6.3 ± 9.5% (k=2)	Boundary effect:
	ConvF Y	6.3 ± 9.5% (k=2)	Alpha 0.42
	ConvF Z	6.3 \pm 9.5% (k=2)	Depth 2.44

Body	1800 MHz	$\varepsilon_{\rm r}$ = 53.3 ± 5%	σ = 1.52 ± 5% mho/m
Body	1900 MHz	$\varepsilon_{\rm r}$ = 53.3 ± 5%	σ = 1.52 ± 5% mho/m
	ConvF X	5.0 ± 9.5% (k=2)	Boundary effect:
	ConvF Y	5.0 ± 9.5% (k=2)	Alpha 0.76
	ConvF Z	5.0 ± 9.5% (k=2)	Depth 2.01

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Deviation from Isotropy in HSL

Error ($\theta \phi$), f = 900 MHz



Schmid & Partner Engineering AG

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Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	ET3DV6
Serial Number:	1387
Place of Assessment:	Zurich
Date of Assessment:	February 25, 2002
Probe Calibration Date:	February 22, 2002

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	9.2 <u>+</u> 8%	$\epsilon_r = 52.3$ $\sigma = 0.76 \text{ mho/m}$ (head tissue)
300 MHz	ConvF	8.0 ± 8%	$\epsilon_{\rm r} = 45.3$ $\sigma = 0.87 \; mho/m \; (head \; tissue)$
450 MHz	ConvF	7.3 <u>+</u> 8%	$\epsilon_{\rm r} = 43.5$ $\sigma = 0.87 \ mho/m$ (head tissue)
2450 MHz	ConvF	4.7 <u>+</u> 8%	$\epsilon_{\rm r} = 39.2$ $\sigma = 1.80 \ mho/m$ (head tissue)
150 MHz	ConvF	8.8 <u>+</u> 8%	$\epsilon_{\rm r} = 61.9$ $\sigma = 0.80 \ mho/m$ (body tissue)
450 MHz	ConvF	7.7 <u>+</u> 8%	$\epsilon_{\rm r} = 56.7$ $\sigma = 0.94 \ mho/m$ (body tissue)
2450 MHz	ConvF	4.3 ± 8%	$\epsilon_{\rm r} = 52.7$ $\sigma = 1.95 \ mho/m$ (body tissue)



APPENDIX E - MEASURED FLUID DIELECTRIC PARAMETERS

2450MHz System Performance Check Measured Fluid Dielectric Parameters (Brain) December 10, 2002

Frequency		e¹	e''
2.350000000	GHz	36.8272	13.3406
2.360000000	GHz	36.7859	13.3717
2.370000000	GHz	36.7562	13.3997
2.380000000	GHz	36.7221	13.4312
2.390000000	GHz	36.6910	13.4657
2.400000000	GHz	36.6588	13.4831
2.410000000	GHz	36.5910	13.5110
2.420000000	GHz	36.5486	13.5441
2.430000000	GHz	36.5072	13.5739
2.440000000	GHz	36.4613	13.5894
2.450000000	GHz	36.4147	13.6134
2.460000000	GHz	36.3815	13.6405
2.470000000	GHz	36.3464	13.6744
2.480000000	GHz	36.3168	13.7044
2.490000000	GHz	36.2822	13.7229
2.500000000	GHz	36.2284	13.7355
2.510000000	GHz	36.1819	13.7635
2.520000000	GHz	36.1311	13.7949
2.530000000	GHz	36.0907	13.8289
2.540000000	GHz	36.0208	13.8498
2.550000000	GHz	35.9971	13.8769

2450MHz EUT Evaluation (Body) Measured Fluid Dielectric Parameters (Muscle) December 10, 2002

Frequency		e¹	ell
2.350000000	${\tt GHz}$	48.1454	14.4131
2.360000000	${\tt GHz}$	48.1126	14.4703
2.370000000	GHz	48.0801	14.5106
2.380000000	GHz	48.0451	14.5473
2.390000000	GHz	48.0106	14.5704
2.400000000	GHz	47.9610	14.6036
2.410000000	GHz	47.9172	14.6346
2.420000000	GHz	47.8604	14.6804
2.430000000	GHz	47.8023	14.7113
2.440000000	GHz	47.7464	14.7678
2.450000000	GHz	47.7097	14.8002
2.460000000	GHz	47.6605	14.8540
2.470000000	GHz	47.6371	14.8898
2.480000000	GHz	47.5999	14.9213
2.490000000	GHz	47.5731	14.9517
2.500000000	GHz	47.5573	14.9667
2.510000000	GHz	47.4852	14.9882
2.520000000	GHz	47.4566	15.0257
2.530000000	GHz	47.3898	15.0528
2.540000000	GHz	47.3346	15.0947
2.550000000	GHz	47.2979	15.1160



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 Fin Boulott

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

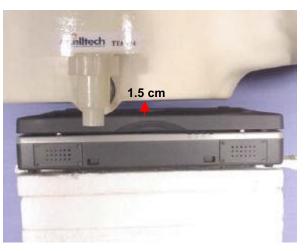


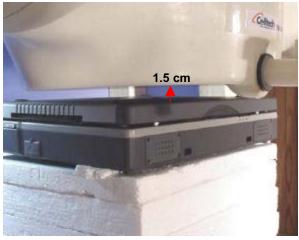
APPENDIX G - SAR TEST SETUP PHOTOGRAPHS



Back Side of LCD Display - Left Side Internal Antenna LCD Display Closed Position - 1.5cm Separation Distance







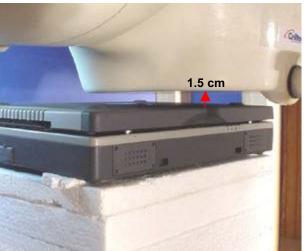




Back Side of LCD Display - Right Side Internal Antenna LCD Display Closed Position - 1.5cm Separation Distance











Bottom Side of Laptop PC - Left Side Internal Antenna LCD Display Closed Position - 0.0cm Separation Distance











Bottom Side of Laptop PC - Right Side Internal Antenna LCD Display Closed Position - 0.0cm Separation Distance











Left Side of LCD Display - Left Side Internal Antenna LCD Display Open Position - 0.0cm Separation Distance











Right Side of LCD Display - Right Side Internal Antenna LCD Display Open Position - 0.0cm Separation Distance

