DECLARATION OF COMPLIANCE
SAR RF EXPOSURE EVALUATION

Test Lab

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Applicant Information

ITRONIX CORPORATION
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FCC IDENTIFIER:	**KBCIX100XA775WLBT**
IC IDENTIFER:	**1943A-IX100Xe**
Model(s):	**IX100XA775WLBT**
Rule Part(s):	**FCC 47 CFR §2.1093; IC RSS-102 Issue 1 (Provisional)**
Test Procedure(s):	**FCC OET Bulletin 65, Supplement C (Edition 01-01)**
FCC Device Classification:	**PCS Licensed Transmitter worn on body (PCT)**
IC Device Classification:	**2 GHz Personal Communication Services (RSS-133 Issue 2)** **800MHz Cellular Transmitter (RSS-132 Issue 1)**
Device Description:	**Rugged Handheld PC with Sierra Wireless AirCard 775 PCS/Cellular GSM GPRS/EDGE Modem**
Co-located Transmitter(s):	**USI WM-BB-AG-01 802.11b/Bluetooth Combo Transmitter (GSM co-transmit with Bluetooth only)**
Mode(s) of Operation:	**PCS GPRS/EDGE, Cellular GPRS/EDGE**
Tx Frequency Range(s):	**1850.2 - 1909.8 MHz (PCS Band)** **824.2 - 848.8 MHz (Cellular Band)** **2402 - 2480 MHz (Bluetooth)**
Max. RF Output Power Tested:	**28.9 dBm Peak Conducted (PCS GPRS)** **32.1 dBm Peak Conducted (Cellular GPRS)** **4.3 dBm Peak Conducted (Bluetooth)**
Max. No. of Time Slots Tested:	**4 (Class 12)**
Source-Based Time-Av. Duty Cycle:	**50 %**
Max. Source-Based Time-Av. Power:	**25.9 dBm Peak (PCS GPRS)** **29.1 dBm Peak (Cellular GPRS)**
Battery Type(s) Tested:	**Lithium-ion 7.4 V, 3.0 Ah (P/N: 46-0136-001)**
Antenna Type(s) Tested:	**External Nearson ¼-Wave Helix (Dual-Band GSM)** **Internal Printed Circuit - Front Right Side (Bluetooth)**
Body-Worn Accessories Tested:	**Nylon Carry Case (P/N: 54-0644-001)** **Ear-Microphone (Model: JABRA)**
Max. SAR Level(s) Evaluated:	**PCS Band: 0.414 W/kg (1g average)** **Cellular Band: 1.40 W/kg (1g average)**

Celltech Labs Inc. declares under its sole responsibility that this wireless portable device was compliant with the Specific Absorption Rate (SAR) RF exposure requirements specified in FCC 47 CFR §2.1093 and Health Canada's Safety Code 6. The device was tested in accordance with the measurement standards and procedures specified in FCC OET Bulletin 65, Supplement C (Edition 01-01) and Industry Canada RSS-102 Issue 1 (Provisional) for the General Population / Uncontrolled Exposure environment. All measurements were performed in accordance with the SAR system manufacturer recommendations.

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

Performed By:

Spencer Watson
Compliance Technologist
Celltech Labs Inc.

Reviewed By:

Russell W. Pipe
Senior Compliance Technologist
Celltech Labs Inc.

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1.0 INTRODUCTION

This measurement report demonstrates that ITRONIX CORPORATION Model: IX100XA775WLBT Rugged Handheld PC FCC ID: KBCIX100XA775WLBT incorporating the Sierra Wireless AirCard 775 Dual-Band PCS/Cellular GSM GPRS/EDGE PCMCIA Modem co-located with the USI WM-BB-AG-01 802.11b/Bluetooth Combo Transmitter complies with the SAR (Specific Absorption Rate) RF exposure requirements specified in FCC 47 CFR §2.1093 (see reference [1]), and Health Canada's Safety Code 6 (see reference [2]) for the General Population / Uncontrolled Exposure 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 and operating configuration, detailed summary of the test results, methodology and procedures used in the evaluation, equipment used, and the various provisions of the rules are included within this test report.

2.0 DESCRIPTION of DEVICE UNDER TEST (DUT)

FCC Rule Part(s)	47 CFR §2.1093					
IC Rule Part(s)	RSS-102 Issue 1 (Provisional)					
Test Procedure(s)	FCC OET Bulletin 65, Supplement C (01-01)					
FCC Device Classification	PCS Licensed Transmitter worn on body (PCT)					
IC Device Classification	2 GHz Personal Communication Services (RSS 133 Issue 2)					
	800MHz Cellular Transmitter (RSS-132 Issue 1)					
Device Description	Rugged Handheld PC with Sierra Wireless AirCard 775 Dual-Band GSM GPRS/EDGE Modem					
Co-located Transmitter(s)	USI WM-BB-AG-01 802.11b/Bluetooth Combo Transmitter					
Co-located Transmit Operation	GSM & Bluetooth co-located transmitters can transmit simultaneously					
	GSM & 802.11b co-located transmitters do not transmit simultaneously					
FCC IDENTIFIER	KBCIX100XA775WLBT					
IC IDENTIFIER	1943A-IX100Xe					
Model(s)	IX100XA775WLBT					
Serial No.(s)	MH002			IX100X PC		Identical Prototype
	X04072701619010			AirCard 775		Production Unit
Mode(s) of Operation	Dual-Band GSM	GPRS/EDGE		PCS		
		GPRS/EDGE		Cellular		
	Bluetooth	FHSS		2.4 GHz		
Tx Frequency Range(s)	1850.2 - 1909.8 MHz			PCS Band		
	824.2 - 848.8 MHz			Cellular Band		
	2402 - 2480 MHz			Bluetooth		
Max. RF Output Power(s) Tested	28.9 dBm Peak	PCS GPRS		Source-Based Time-Averaged Cond. Power:		25.9 dBm
	32.1 dBm Peak	Cellular GPRS		Source-Based Time-Averaged Cond. Power:		29.1 dBm
	4.3 dBm Peak	Bluetooth		Modulated Fixed Frequency		2441 MHz
Antenna Type(s)	External	¼-Wave Helix		Dual-Band GSM		
	Internal	Printed Circuit		Bluetooth		
Battery Type(s)	Lithium-ion	7.4V, 3.0 Ah		P/N: 46-0136-001		
Body-worn Accessories Tested	Nylon Carry Case			P/N: 54-0644-001		
	Ear-Microphone			Model: JABRA		

3.0 SAR MEASUREMENT SYSTEM

Celltech Labs Inc. SAR measurement facility utilizes the Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland. The DASY4 measurement system is comprised of the measurement server, robot controller, computer, near-field probe, probe alignment sensor, specific anthropomorphic mannequin (SAM) phantom, and various planar phantoms for brain and/or body SAR evaluations. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF). A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and remote control, is used to drive the robot motors. The Staubli robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the DASY4 measurement server. The DAE4 utilizes a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16-bit AD-converter and a command decoder and control logic unit. Transmission to the DASY4 measurement server is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe-mounting device includes two different sensor systems for frontal and sidewise probe contacts. The sensor systems are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.

DASY4 SAR Measurement System with planar phantom

DASY4 SAR Measurement System with SAM phantom

4.0 MEASUREMENT SUMMARY

BODY-WORN SAR EVALUATION RESULTS (PCS GPRS)

Test Mode		Freq. (MHz)	Chan.	Antenna Position	Battery Type	Body-worn Accessories	DUT Position to Planar Phantom	Separation Distance to Planar Phantom (cm)	Cond Power Before Test (dBm)	Measured SAR 1g (W/kg)	SAR Drift During Test (dB)	Scaled SAR 1g (W/kg) by drift
PCS GPRS	4 Slots	1880.0	661	Fixed	Li-ion	Carry Case	Back Side to phantom	0.0	28.9	0.396	0.0004	0.396
						Ear-Microphone						
PCS GPRS	4 Slots	1880.0	661	Fixed	Li-ion	Carry Case	Front Side to phantom	0.0	28.9	0.380	-0.369	0.414
						Ear-Microphone						
PCS GPRS	4 Slots	1880.0	661	Fixed	Li-ion	Carry Case	Back Side to phantom	0.0	28.9	0.401	-0.0105	0.402
Bluetooth	Modulated Fixed Freq.	2441.0	Mid	Internal		Ear-Microphone			4.3			
PCS GPRS	4 Slots	1880.0	661	Fixed	Li-ion	Carry Case	Front Side to phantom	0.0	28.9	0.373	-0.002	0.373
Bluetooth	Modulated Fixed Freq.	2441.0	Mid	Internal		Ear-Microphone			4.3			

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

Test Date(s)	December 1, 2004			Relative Humidity	30	%
Dielectric Constant ε_r	1880 MHz Body			Atmospheric Pressure	102.8	kPa
	IEEE Target		Measured	Ambient Temperature	24.7	°C
	53.3	± 5%	51.0	Fluid Temperature	22.5	°C
Conductivity σ (mho/m)	IEEE Target		Measured	Fluid Depth	≥ 15	cm
	1.52	± 5%	1.53	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 scaled SAR levels evaluated 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 [3]).
3. The power drifts measured by the DASY4 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.
4. The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the SAR evaluation. The temperatures listed in the table above were consistent for all measurement periods.
5. The dielectric parameters of the simulated tissue mixture were measured prior to the SAR evaluation using an HP 85070C Dielectric Probe Kit and an HP 8753E Network Analyzer (see Appendix C for printout of measured fluid dielectric parameters).
6. The SAR evaluations were performed within 24 hours of the system performance check.
7. This device supports data transmit operation only. The ear-microphone accessory is intended for standard PC operating system program purposes only, and is not intended for uses with voice transmit operation.

MEASUREMENT SUMMARY (Cont.)

BODY-WORN SAR EVALUATION RESULTS (Cellular GPRS)

Test Mode		Freq. (MHz)	Chan.	Antenna Position	Battery Type	Body-worn Accessories	DUT Position to Planar Phantom	Separation Distance to Planar Phantom (cm)	Cond. Power Before Test (dBm)	Measured SAR 1g (W/kg)	SAR Drift During Test (dB)	Scaled SAR 1g (W/kg) by drift
GPRS-850	4 Slots	836.6	190	Fixed	Li-ion	Carry Case Ear-Mic	Front Side to phantom	0.0	32.0	0.982	-0.0230	0.987
GPRS-850	4 Slots	824.2	128	Fixed	Li-ion	Carry Case Ear-Mic	Front Side to phantom	0.0	32.1	0.982	-0.0119	0.985
GPRS-850	4 Slots	848.8	251	Fixed	Li-ion	Carry Case Ear-Mic	Front Side to phantom	0.0	32.0	0.921	0.00149	0.921
GPRS-850	4 Slots	836.6	190	Fixed	Li-ion	Carry Case Ear-Mic	Back Side to phantom	0.0	32.0	1.33	-0.0132	1.33
GPRS-850	4 Slots	824.2	128	Fixed	Li-ion	Carry Case Ear-Mic	Back Side to phantom	0.0	32.1	1.37	-0.00747	1.37
GPRS-850	4 Slots	848.8	251	Fixed	Li-ion	Carry Case Ear-Mic	Back Side to phantom	0.0	32.0	1.39	-0.0171	1.40
GPRS-850	4 Slots	848.8	251	Fixed	Li-ion	Carry Case	Back Side to phantom	0.0	32.0	1.37	0.00384	1.37
Bluetooth	Modulated Fixed Freq.	2441.0	Mid	Internal		Ear-Mic			4.3			
GPRS-850	4 Slots	836.6	190	Fixed	Li-ion	Carry Case	Front Side to phantom	0.0	32.0	0.978	-0.00547	0.979
Bluetooth	Modulated Fixed Freq.	2441.0	Mid	Internal		Ear-Mic			4.3			

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

Test Date(s)	December 2, 2004			Relative Humidity	30	%
Measured Fluid Type	835 MHz Body			Atmospheric Pressure	103.0	kPa
Dielectric Constant ε_r	IEEE Target		Measured	Ambient Temperature	25.1	°C
	55.2	± 5%	53.6	Fluid Temperature	22.2	°C
Conductivity σ (mho/m)	IEEE Target		Measured	Fluid Depth	≥ 15	cm
	0.97	± 5%	1.00	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 scaled SAR levels evaluated 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 [3]).
3. The power drifts measured by the DASY4 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.
4. The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the SAR evaluation. The temperatures listed in the table above were consistent for all measurement periods.
5. The dielectric parameters of the simulated tissue mixture were measured prior to the SAR evaluation using an HP 85070C Dielectric Probe Kit and an HP 8753E Network Analyzer (see Appendix C for printout of measured fluid dielectric parameters).
6. The SAR evaluations were performed within 24 hours of the system performance check.
7. This device supports data transmit operation only. The ear-microphone accessory is intended for standard PC operating system program purposes only, and is not intended for uses with voice transmit operation.

5.0 DETAILS OF SAR EVALUATION

The ITRONIX CORPORATION Model: IX100XA775WLBT Rugged Handheld PC FCC ID: KBCIX100XA775WLBT with the Sierra Wireless AirCard 775 Dual-Band PCS/Cellular GSM GPRS/EDGE PCMCIA Modem co-located with the USI WM-BB-AG-01 802.11b/Bluetooth Combo Transmitter 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 D.

Body-Worn SAR Configuration

1. The DUT was tested for body-worn SAR with the shoulder-worn nylon carry case and ear-microphone accessories. The front side of the DUT (keypad/LCD side) was facing the front of the carry case. The front side of the DUT and carry case was facing parallel to the outer surface of the planar phantom. The front of the carry case was touching the outer surface of the planar phantom.
2. The DUT was tested for body-worn SAR with the shoulder-worn nylon carry case and ear-microphone accessories. The back side of the DUT (battery side) was facing the front of the carry case. The back side of the DUT and front of carry case was facing parallel to the outer surface of the planar phantom. The front of the carry case was touching the outer surface of the planar phantom.
3. Co-located transmitter tests were performed with the GPRS and Bluetooth transmitting simultaneously in the worst-case single-transmit GPRS test configurations for front and back side of DUT in both the PCS and Cellular bands.
4. This device supports data transmit operation only. The ear-microphone accessory is intended for standard PC operating system program purposes only, and is not intended for uses with voice transmit operation.
5. Due to the dimensions of the DUT, a stack of low-density, low-loss dielectric foamed polystyrene was used in place of the device holder.
6. The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the SAR evaluation. The temperatures listed were consistent for all measurement periods.
7. The dielectric parameters of the simulated tissue mixture were measured prior to the SAR evaluation using an HP 85070C Dielectric Probe Kit and an HP 8753E Network Analyzer (see Appendix C for printout of measured fluid dielectric parameters).
8. The SAR evaluations were performed within 24 hours of the daily system performance check.

Test Modes & Power Settings

9. The conducted power levels of the DUT were measured at the PCMCIA modem antenna connector prior to the SAR evaluations using a Gigatronics 8652A Universal Power Meter according to the procedures described in FCC 47 CFR §2.1046.
10. The power drifts measured by the DASY4 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 tables (pages 5-6).
11. The DUT was controlled in test mode via internal software. SAR measurements were performed with the DUT transmitting continuously at maximum power in 4 time slots in both PCS and cellular GPRS mode (Crest factor: 2). This is the maximum output condition since the DUT is a Class 12 multi-slot GSM GPRS/EDGE modem.
12. For the co-located simultaneous transmit tests the Bluetooth transmitter was in a continuous transmit operation at maximum power on a fixed frequency with the frequency hopping disabled and a modulated signal.
13. The DUT was tested with a fully charged battery for each test.

DETAILS OF SAR EVALUATION (Cont.)

Back Side of DUT facing body - worst-case antenna configuration relative to left torso

Front Side of DUT facing body - worst-case antenna configuration relative to right torso

6.0 EVALUATION PROCEDURES

a. (i) The evaluation was performed in the applicable area of the phantom depending on the type of device being tested. For devices held to the ear during normal operation, both the left and right ear positions were evaluated using the SAM phantom.

(ii) For body-worn and face-held devices a planar phantom was used.

b. The SAR was determined by a pre-defined procedure within the DASY4 software. Upon completion of a reference and optical surface check, the exposed region of the phantom was scanned near the inner surface with a grid spacing of 15mm x 15mm.

An area scan was determined as follows:

c. Based on the defined area scan grid, a more detailed grid is created to increase the points by a factor of 10. The interpolation function then evaluates all field values between corresponding measurement points.

d. A linear search is applied to find all the candidate maxima. Subsequently, all maxima are removed that are >2 dB from the global maximum. The remaining maxima are then used to position the cube scans.

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

e. Extrapolation is used to find the points between the dipole center of the probe and the surface of the phantom. This data cannot be measured, since the center of the dipoles is 2.7 mm away form the tip of the probe and the distance between the surface and the lowest measuring point is 1.4 mm (see probe calibration document in Appendix D). The extrapolation was based on trivariate quadratics computed from the previously calculated 3D interpolated points nearest the phantom surface.

f. Interpolated data is used to calculate the average SAR over 1g and 10g cubes by spatially discretizing the entire measured cube. The volume used to determine the averaged SAR is a 1mm grid (42875 interpolated points).

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 evaluations a daily system check was performed at the planar section of the SAM phantom with a 1900MHz dipole and an 835MHz dipole (see Appendix C for system validation procedures). The fluid dielectric parameters were measured prior to the system performance check using an HP 85070C Dielectric Probe Kit and an HP 8753E Network Analyzer (see Appendix C for printout of measured fluid dielectric parameters). A forward power of 250mW was applied to the dipole and the system was verified to a tolerance of ±10% (see Appendix B for system performance check test plots).

SYSTEM PERFORMANCE CHECK

Test Date	Equiv. Tissue	SAR 1g (W/kg)		Dielectric Constant ε_r		Conductivity σ (mho/m)		ρ (Kg/m^3)	Amb. Temp. (°C)	Fluid Temp. (°C)	Fluid Depth (cm)	Humid. (%)	Barom. Press. (kPa)
		IEEE Target	Measured	IEEE Target	Measured	IEEE Target	Measured						
12/01/04	1900MHz Brain	**9.93 (±10%)**	9.93 (+0.0%)	**40.0 ±5%**	38.0	**1.40 ±5%**	1.41	1000	24.3	23.4	≥ 15	30	102.9
12/02/04	835MHz Brain	**2.38 (±10%)**	2.47 (+3.8%)	**41.5 ±5%**	40.7	**0.90 ±5%**	0.90	1000	25.3	22.5	≥ 15	30	103.1

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

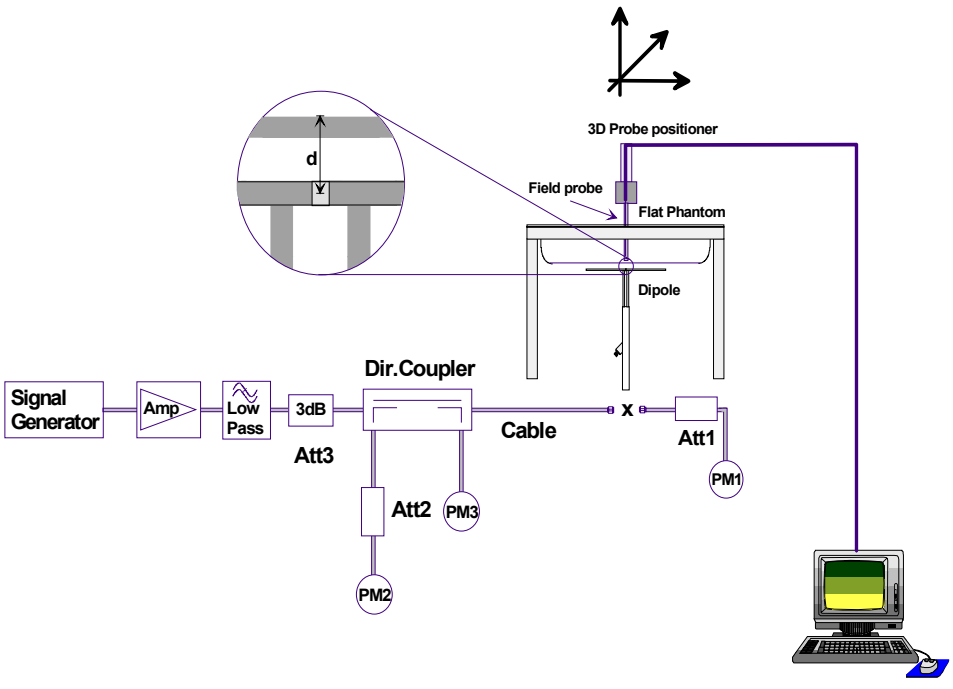


Figure 1. System Performance Check Setup Diagram

1900MHz Dipole Setup

835MHz Dipole Setup

8.0 SIMULATED EQUIVALENT TISSUES

The 1900MHz and 1880MHz simulated equivalent tissue mixtures consist of Glycol-monobutyl, water, and salt. The 835MHz simulated equivalent tissue mixtures consist of a viscous gel using hydroxethylcellulose (HEC) gelling agent and saline solution. Preservation with a bactericide was added and visual inspection was made to ensure air bubbles were not trapped during the mixing process. The fluids were prepared according to standardized procedures and measured for dielectric parameters (permittivity and conductivity).

1900MHz & 1880MHz TISSUE MIXTURES		
INGREDIENT	**1900 MHz Brain**	**1880 MHz Body**
	System Performance Check	DUT Evaluation
Water	55.85 %	69.85 %
Glycol Monobutyl	44.00 %	29.89 %
Salt	0.15 %	0.26 %

835MHz TISSUE MIXTURES		
INGREDIENT	**835 MHz Brain**	**835 MHz Body**
	System Performance Check	DUT Evaluation
Water	40.71 %	53.79 %
Sugar	56.63 %	45.13 %
Salt	1.48 %	0.98 %
HEC	0.99 %	--
Bactericide	0.19 %	0.10 %

9.0 SAR SAFETY LIMITS

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

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

10.0 ROBOT SYSTEM SPECIFICATIONS

Specifications

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

Data Acquisition Electronic (DAE) System

Cell Controller

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

Data Converter

Features: Signal Amplifier, multiplexer, A/D converter, and control logic
Software: DASY4 software
Connecting Lines: Optical downlink for data and status info.
Optical uplink for commands and clock

DASY4 Measurement Server

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

E-Field Probe

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

Phantom(s)

Evaluation Phantom

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

Validation Phantom

Type: SAM V4.0C
Shell Material: Fiberglass
Thickness: 2.0 ±0.1 mm
Volume: Approx. 25 liters

11.0 PROBE SPECIFICATION (ET3DV6)

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

ET3DV6 E-Field Probe

12.0 SAM PHANTOM V4.0C

The SAM phantom V4.0C is a fiberglass shell phantom with a 2.0 mm (+/-0.2 mm) shell thickness for left and right head and flat planar area integrated in a wooden table. The shape of the fiberglass shell corresponds to the phantom defined by SCC34-SC2. The device holder positions are adjusted to the standard measurement positions in the three sections (see Appendix F for specifications of the SAM phantom V4.0C).

SAM Phantom

13.0 PLANAR PHANTOM

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

Planar Phantom

14.0 DEVICE HOLDER

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

Device Holder

15.0 TEST EQUIPMENT LIST

TEST EQUIPMENT	SERIAL NO.	DATE CALIBRATED	CALIBRATION DUE DATE
Schmid & Partner DASY4 System	-	-	-
-DASY4 Measurement Server	1078	N/A	N/A
-Robot	599396-01	N/A	N/A
-DAE3	353	July 2004	July 2005
-DAE3	370	May 2004	May 2005
-ET3DV6 E-Field Probe	1387	March 2004	March 2005
-ET3DV6 E-Field Probe	1590	May 2004	May 2005
-300MHz Validation Dipole	135	October 2004	October 2005
-450MHz Validation Dipole	136	November 2004	November 2005
-835MHz Validation Dipole	411	March 2004	March 2005
-900MHz Validation Dipole	054	June 2004	June 2005
-1800MHz Validation Dipole	247	June 2004	June 2005
-1900MHz Validation Dipole	151	June 2004	June 2005
-2450MHz Validation Dipole	150	September 2004	September 2005
-SAM Phantom V4.0C	1033	N/A	N/A
-Barski Planar Phantom	03-01	N/A	N/A
-Plexiglas Planar Phantom	161	N/A	N/A
-Validation Planar Phantom	137	N/A	N/A
HP 85070C Dielectric Probe Kit	N/A	N/A	N/A
Gigatronics 8651A Power Meter	8650137	April 2004	April 2005
Gigatronics 8652A Power Meter	1835267	April 2004	April 2005
Gigatronics 80701A Power Sensor	1833535	April 2004	April 2005
Gigatronics 80701A Power Sensor	1833542	April 2004	April 2005
Gigatronics 80701A Power Sensor	1834350	April 2004	April 2005
HP 8594E Spectrum Analyzer	3543A02721	April 2004	April 2005
HP 8753E Network Analyzer	US38433013	April 2004	April 2005
HP 8648D Signal Generator	3847A00611	April 2004	April 2005
Amplifier Research 5S1G4 Power Amplifier	26235	N/A	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 (835 MHz)	± 5.95	Normal	1	1	± 5.95	∞
Probe calibration (1900 MHz)	± 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						
835 MHz					**± 13.76**	
1900 MHz					**± 13.32**	
Expanded Uncertainty (k=2)						
835 MHz					**± 27.51**	
1900 MHz					**± 26.64**	

Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 (see reference [5])

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 (835 MHz)	± 5.95	Normal	1	1	± 5.95	∞
Probe calibration (1900 MHz)	± 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						
835 MHz					**± 10.54**	
1900 MHz					**± 9.97**	
Expanded Uncertainty (k=2)						
835 MHz					**± 21.09**	
1900 MHz					**± 19.93**	

Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 (see reference [5])

17.0 REFERENCES

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

[2] Health Canada, “Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz”, Safety Code 6.

[3] Federal Communications Commission, “Evaluating Compliance with FCC Guidelines for Human Exposure to 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 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”: December 2003.

APPENDIX B - SYSTEM PERFORMANCE CHECK DATA

Date Tested: 12/01/04

System Performance Check - 1900 MHz Dipole

DUT: Dipole 1900 MHz; Model: D1900V2; Type: System Performance Check; Serial: 151; Calibrated: 06/18/2004

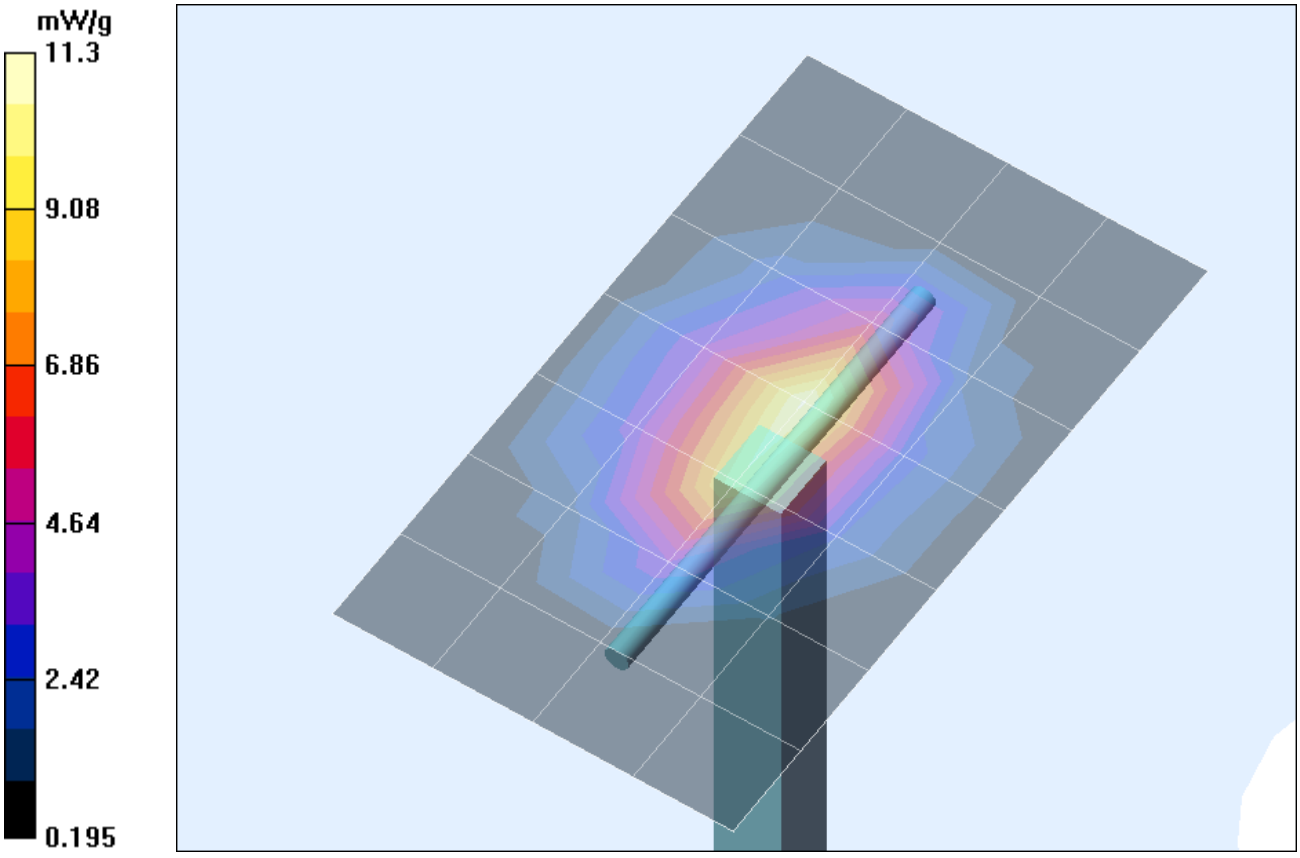
Ambient Temp: 24.3 °C; Fluid Temp: 23.4 °C; Barometric Pressure: 102.9 kPa; Humidity: 30%

Communication System: CW
Forward Conducted Power: 250 mW
Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL1900 (σ = 1.41 mho/m; ε_r = 38.0; ρ = 1000 kg/m^3)

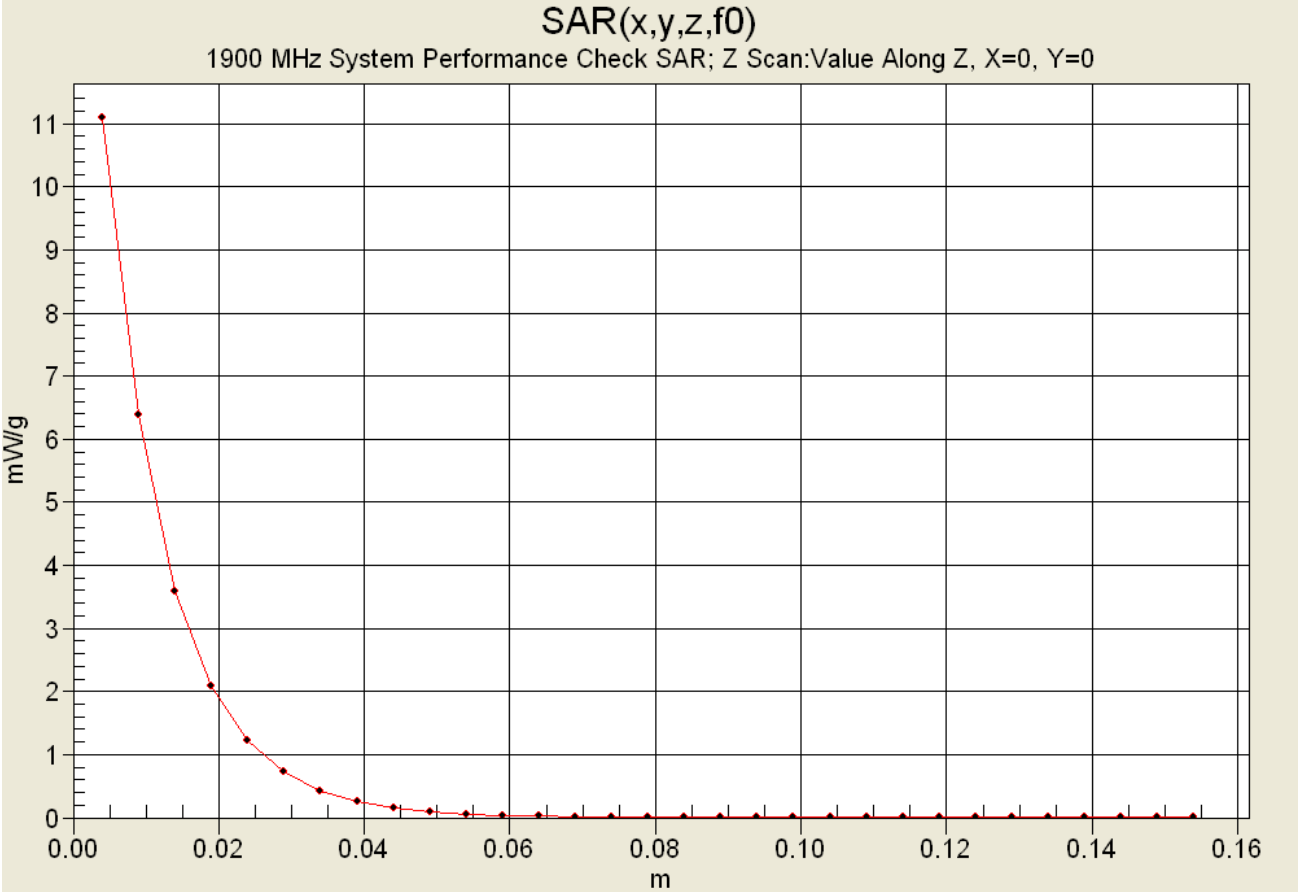
- Probe: ET3DV6 - SN1387; ConvF(5.25, 5.25, 5.25); Calibrated: 18/03/2004
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn370; Calibrated: 14/05/2004
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

1900 MHz Dipole - System Performance Check/Area Scan (5x8x1):
Measurement grid: dx=15mm, dy=15mm

1900 MHz Dipole - System Performance Check/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.5 V/m; Power Drift = -0.1 dB
Peak SAR (extrapolated) = 17.2 W/kg
SAR(1 g) = 9.93 mW/g; SAR(10 g) = 5.2 mW/g



Z-Axis Scan



Date Tested: 12/02/04

System Performance Check - 835 MHz Dipole

DUT: Dipole 835 MHz; Model: D835V2; Type: System Performance Check; Serial: 411; Calibrated: 03/16/2004

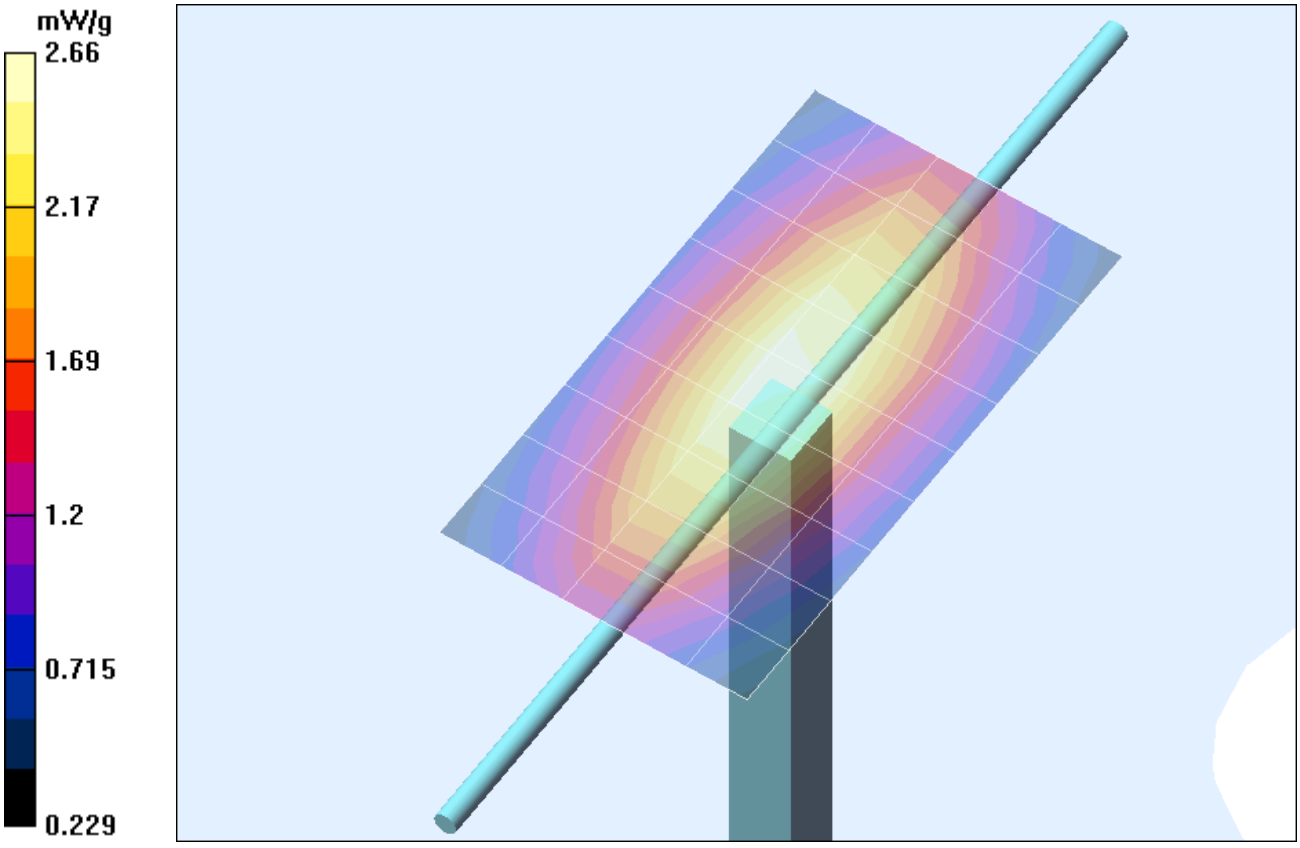
Ambient Temp: 25.3 °C; Fluid Temp: 22.5 °C; Barometric Pressure: 103.1 kPa; Humidity: 30%

Communication System: CW
Forward Conducted Power: 250 mW
Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL835 (σ = 0.90 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3)

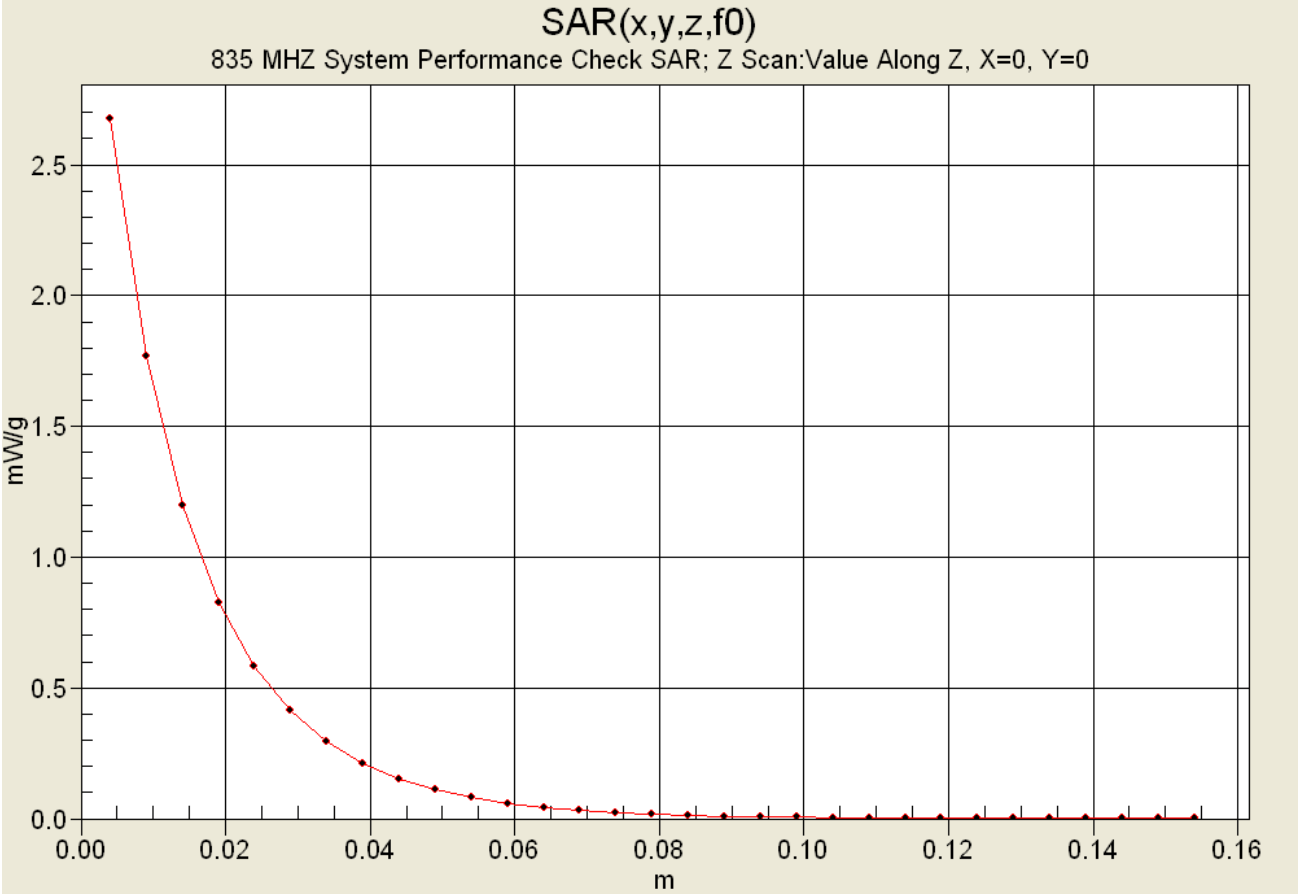
- Probe: ET3DV6 - SN1387; ConvF(6.71, 6.71, 6.71); Calibrated: 18/03/2004
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn370; Calibrated: 14/05/2004
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

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

835 MHz Dipole - System Performance Check/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.1 V/m; Power Drift = -0.0 dB
Peak SAR (extrapolated) = 3.73 W/kg
SAR(1 g) = 2.47 mW/g; SAR(10 g) = 1.6 mW/g



Z-Axis Scan



APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS

1880 MHz DUT Evaluation (Body)

Measured Fluid Dielectric Parameters (Muscle)

December 01, 2004

Frequency	e'	e"
1.780000000 GHz	51.3443	14.4351
1.790000000 GHz	51.3163	14.4546
1.800000000 GHz	51.2509	14.4871
1.810000000 GHz	51.2234	14.5458
1.820000000 GHz	51.1651	14.5733
1.830000000 GHz	51.1249	14.6287
1.840000000 GHz	51.0984	14.6303
1.850000000 GHz	51.0859	14.6380
1.860000000 GHz	51.0878	14.6442
1.870000000 GHz	51.0698	14.6461
1.880000000 GHz	51.0277	14.6511
1.890000000 GHz	51.0023	14.6775
1.900000000 GHz	51.0040	14.6804
1.910000000 GHz	50.9474	14.7520
1.920000000 GHz	50.9256	14.8005
1.930000000 GHz	50.8826	14.8467
1.940000000 GHz	50.8893	14.8632
1.950000000 GHz	50.8890	14.9213
1.960000000 GHz	50.8900	14.9747
1.970000000 GHz	50.8568	15.0272
1.980000000 GHz	50.8093	15.0578

1900 MHz System Performance Check

Measured Fluid Dielectric Parameters (Brain)

December 01, 2004

Frequency	e'	e"
1.800000000 GHz	38.4619	13.0632
1.810000000 GHz	38.4169	13.0897
1.820000000 GHz	38.3560	13.1226
1.830000000 GHz	38.3028	13.1660
1.840000000 GHz	38.2581	13.2014
1.850000000 GHz	38.2101	13.2242
1.860000000 GHz	38.1691	13.2370
1.870000000 GHz	38.1294	13.2550
1.880000000 GHz	38.0856	13.2933
1.890000000 GHz	38.0662	13.3314
1.900000000 GHz	38.0284	13.3661
1.910000000 GHz	37.9753	13.3927
1.920000000 GHz	37.9212	13.4346
1.930000000 GHz	37.8756	13.4599
1.940000000 GHz	37.8342	13.4856
1.950000000 GHz	37.7981	13.4995
1.960000000 GHz	37.7269	13.5154
1.970000000 GHz	37.6678	13.5212
1.980000000 GHz	37.6063	13.5489
1.990000000 GHz	37.5742	13.5984
2.000000000 GHz	37.5054	13.6198

835 MHz DUT Evaluation (Body)

Measured Fluid Dielectric Parameters (Muscle)

December 02, 2004

Frequency	e'	e"
735.000000 MHz	54.5687	21.9553
745.000000 MHz	54.4479	21.8796
755.000000 MHz	54.3535	21.8328
765.000000 MHz	54.2352	21.7713
775.000000 MHz	54.1290	21.7658
785.000000 MHz	53.9995	21.7107
795.000000 MHz	53.9193	21.6517
805.000000 MHz	53.9094	21.6201
815.000000 MHz	53.7523	21.5616
825.000000 MHz	53.6657	21.5301
835.000000 MHz	53.5578	21.4739
845.000000 MHz	53.4311	21.4150
855.000000 MHz	53.2823	21.4311
865.000000 MHz	53.1742	21.3682
875.000000 MHz	53.0653	21.3498
885.000000 MHz	52.9861	21.3422
895.000000 MHz	52.9161	21.2526
905.000000 MHz	52.8539	21.2030
915.000000 MHz	52.7357	21.1607
925.000000 MHz	52.6568	21.1042
935.000000 MHz	52.5695	21.0826

835 MHz System Performance Check

Measured Fluid Dielectric Parameters (Brain)

December 02, 2004

Frequency	e'	e"
735.000000 MHz	41.9363	19.7801
745.000000 MHz	41.8367	19.7550
755.000000 MHz	41.6336	19.7114
765.000000 MHz	41.5403	19.6758
775.000000 MHz	41.3719	19.6384
785.000000 MHz	41.2687	19.6190
795.000000 MHz	41.1380	19.5639
805.000000 MHz	41.0499	19.5317
815.000000 MHz	40.9679	19.5096
825.000000 MHz	40.8204	19.4688
835.000000 MHz	40.7217	19.4373
845.000000 MHz	40.5592	19.3881
855.000000 MHz	40.4421	19.3386
865.000000 MHz	40.2866	19.3218
875.000000 MHz	40.1195	19.3198
885.000000 MHz	40.0589	19.2885
895.000000 MHz	39.9574	19.2102
905.000000 MHz	39.8500	19.1699
915.000000 MHz	39.7394	19.1416
925.000000 MHz	39.6804	19.1137
935.000000 MHz	39.5174	19.0503

APPENDIX F - PROBE CALIBRATION

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

Client **Celltech**

CALIBRATION CERTIFICATE

Object(s)	ET3DV6 - SN:1387
Calibration procedure(s)	QA CAL-01.v2 Calibration procedure for dosimetric E-field probes
Calibration date:	March 18, 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	2-Apr-03 (METAS, No 252-0250)	Apr-04
Power sensor E4412A	MY41495277	2-Apr-03 (METAS, No 252-0250)	Apr-04
Reference 20 dB Attenuator	SN: 5086 (20b)	3-Apr-03 (METAS, No. 251-0340)	Apr-04
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: March 18, 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:1387

Manufactured:	September 21, 1999
Last calibrated:	February 26, 2003
Recalibrated:	March 18, 2004

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1387

Sensitivity in Free Space

Diode Compression[A]

NormX	**1.62** $\mu V/(V/m)^2$	DCP X	**92**	mV
NormY	**1.71** $\mu V/(V/m)^2$	DCP Y	**92**	mV
NormZ	**1.71** $\mu V/(V/m)^2$	DCP Z	**92**	mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Plese see Page 7.

Boundary Effect

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

Sensor Cener to Phantom Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	9.3	4.4
SAR_{be} [%]	With Correction Algorithm	0.0	0.1

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

Sensor to Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	14.8	10.0
SAR_{be} [%]	With Correction Algorithm	0.2	0.0

Sensor Offset

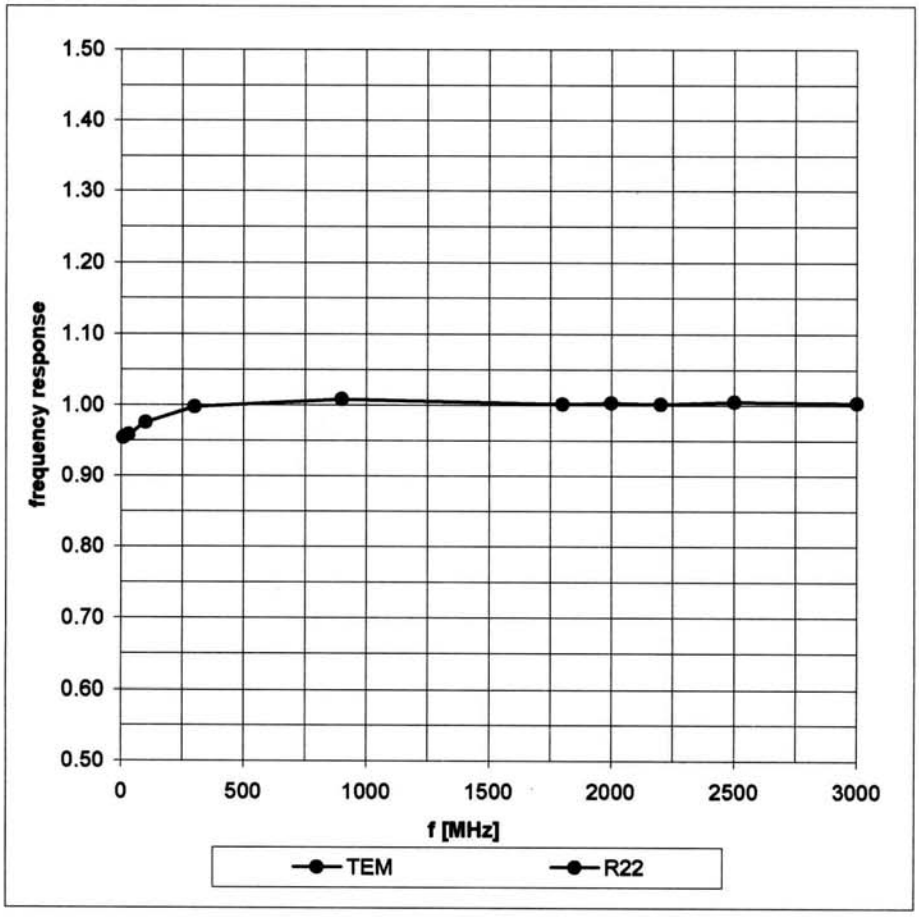
Probe Tip to Sensor Center	**2.7** mm
Optical Surface Detection	**in tolerance**

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%.

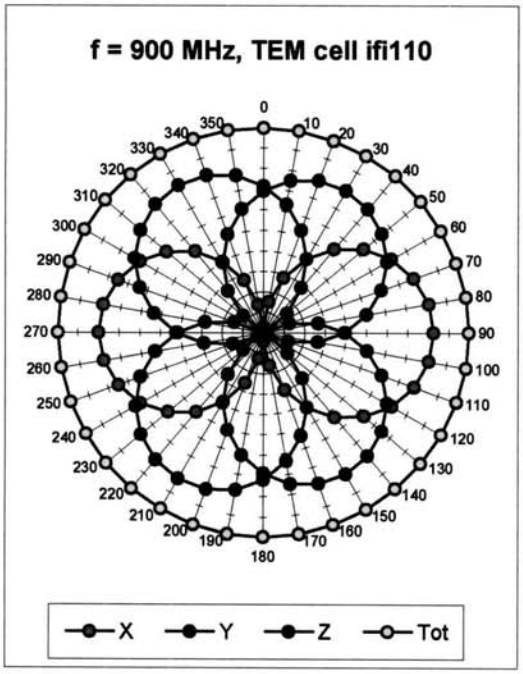
[A] numerical linearization parameter: uncertainty not required

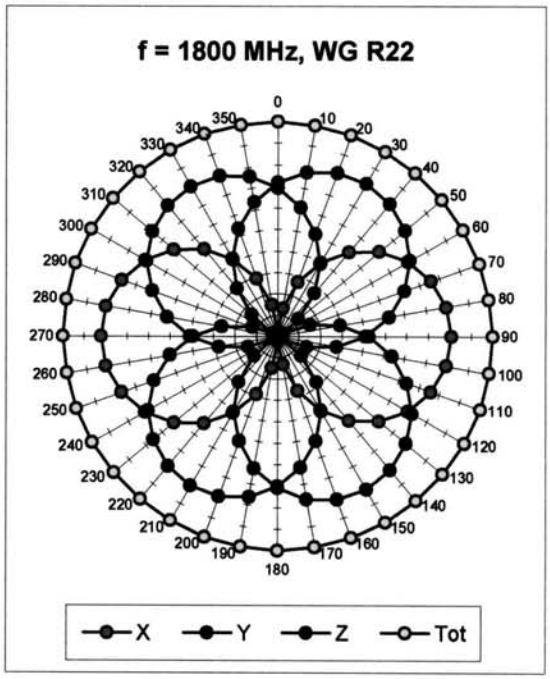
Frequency Response of E-Field

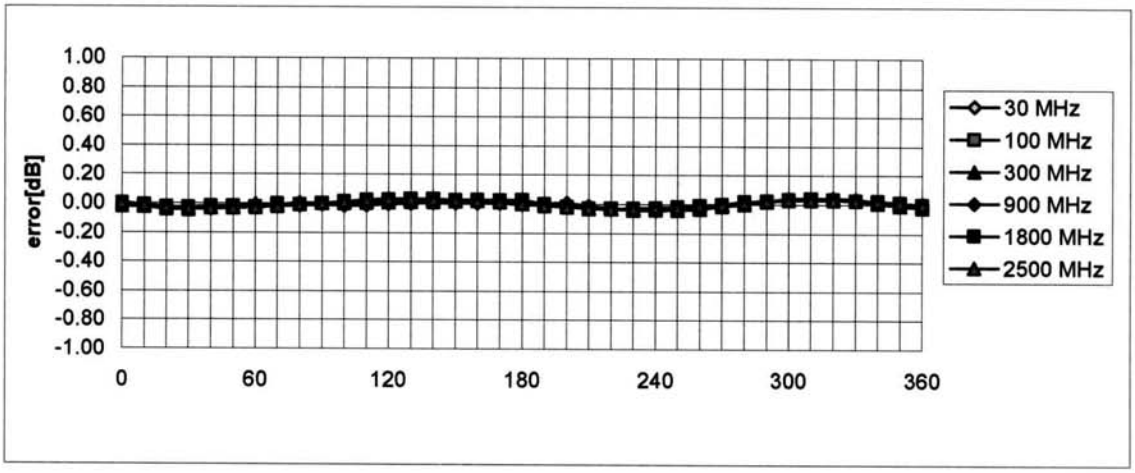
(TEM-Cell:ifi110, Waveguide R22)



Receiving Pattern (ϕ) , θ = 0°



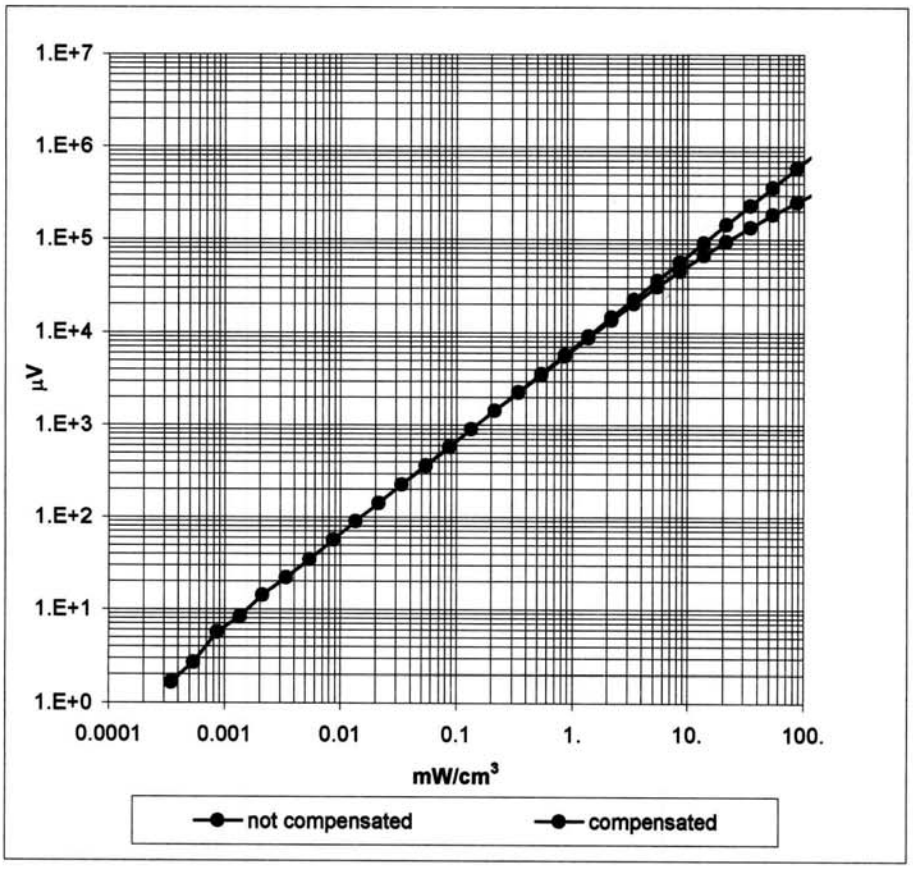


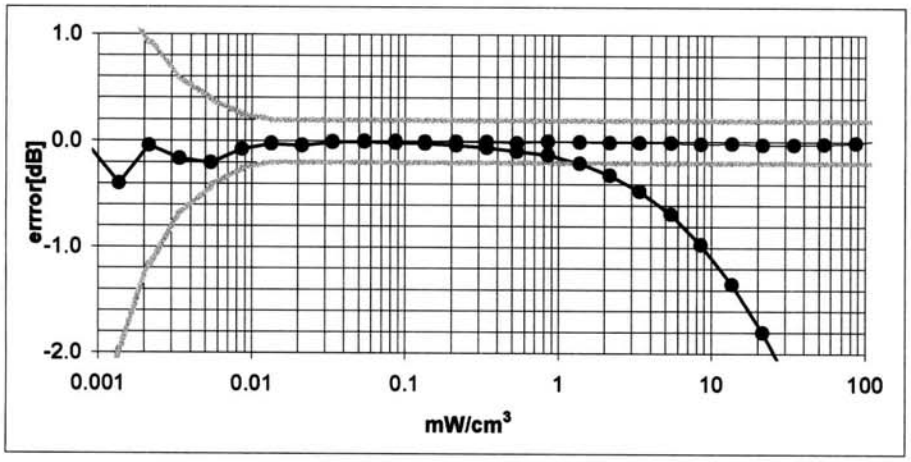


Axial Isotropy Error < ± 0.2 dB

Dynamic Range f(SAR_{head})

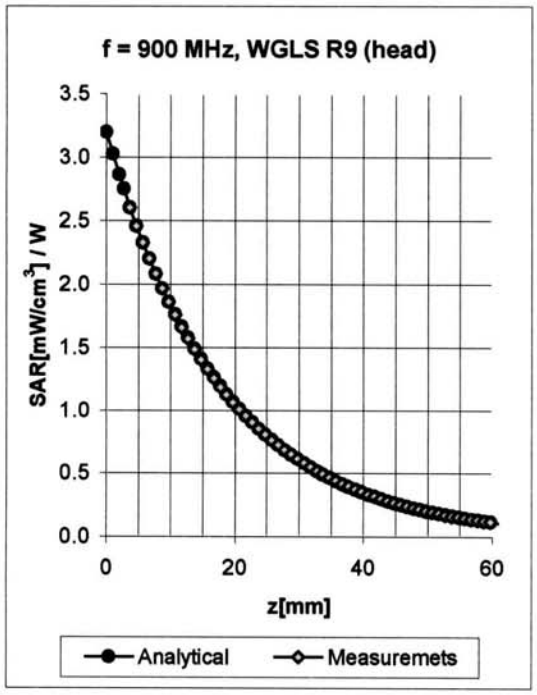
(Waveguide R22)

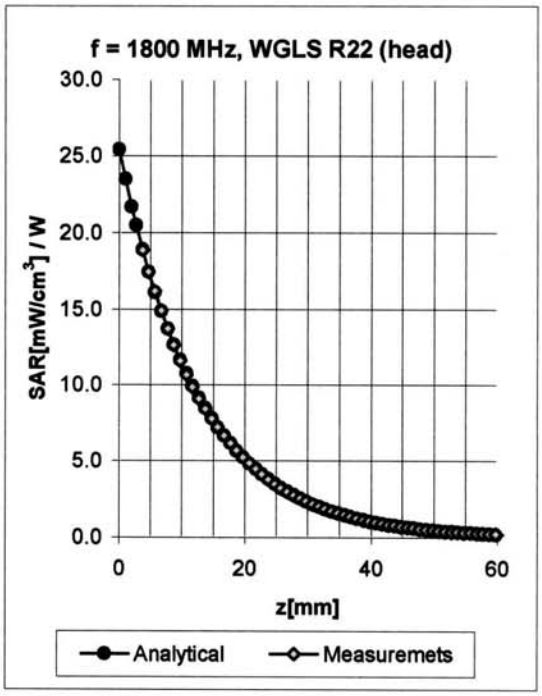




Probe Linearity < ± 0.2 dB

Conversion Factor Assessment



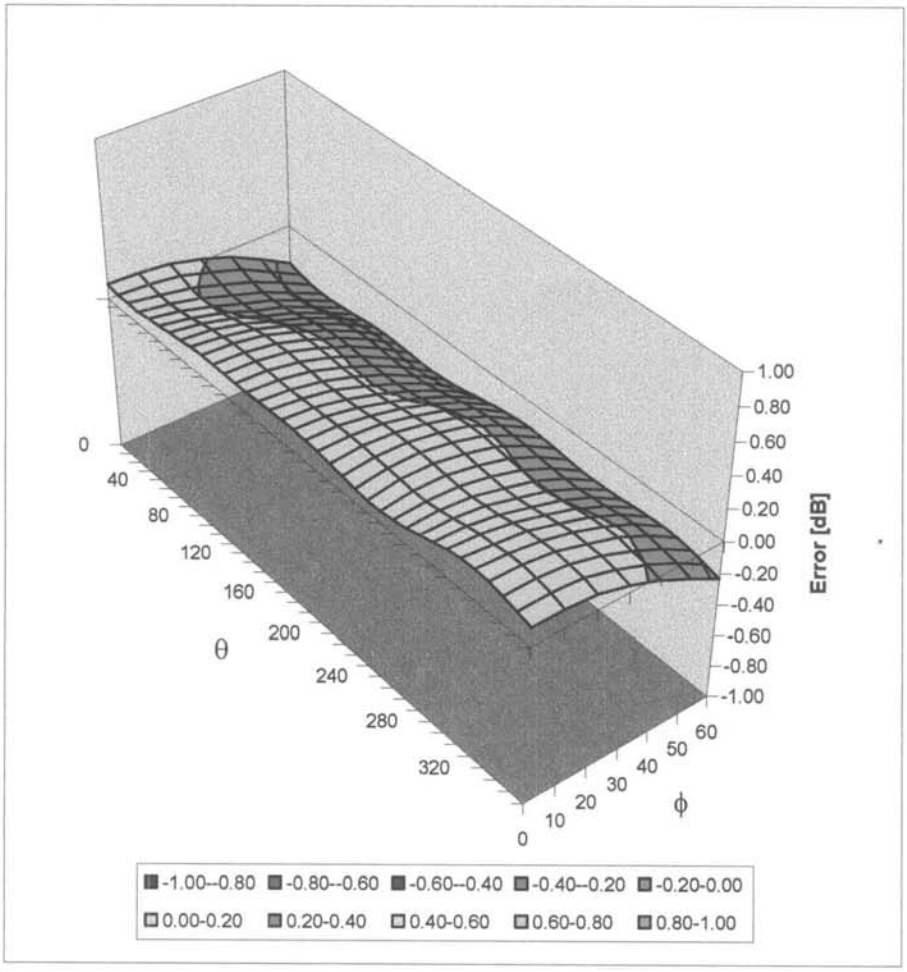


f [MHz]	Validity [MHz][B]	Tissue	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
835	750-950	Head	41.5 ± 5%	0.90 ± 5%	0.72	1.78	6.71 ± 11.9% (k=2)
1750	1700-1800	Head	40.0 ± 5%	1.40 ± 5%	0.51	2.67	5.38 ± 9.7% (k=2)
1900	1850-1950	Head	40.0 ± 5%	1.40 ± 5%	0.55	2.66	5.25 ± 9.7% (k=2)
2450	2400-2500	Head	39.2 ± 5%	1.80 ± 5%	0.99	1.89	4.77 ± 9.7% (k=2)
835	750-950	Body	55.2 ± 5%	0.97 ± 5%	0.56	2.04	6.24 ± 11.9% (k=2)
1750	1700-1800	Body	53.3 ± 5%	1.52 ± 5%	0.58	2.82	4.68 ± 9.7% (k=2)
1900	1850-1950	Body	53.3 ± 5%	1.52 ± 5%	0.62	2.77	4.57 ± 9.7% (k=2)
2450	2400-2500	Body	52.7 ± 5%	1.95 ± 5%	1.75	1.28	4.50 ± 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

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info@speag.com, http://www.speag.com

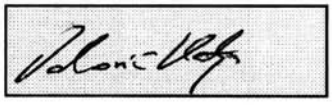
Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ET3DV6**
Serial Number:	**1387**
Place of Assessment:	**Zurich**
Date of Assessment:	**March 22, 2004**
Probe Calibration Date:	**March 18, 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

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

Dosimetric E-Field Probe ET3DV6 SN:1387

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	**7.8 ± 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	**8.7 ± 8%**	ε_r = 61.9 ± 5% σ = 0.80 ± 5% mho/m (body tissue)
450 MHz	ConvF	**7.6 ± 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 G - 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 H - 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

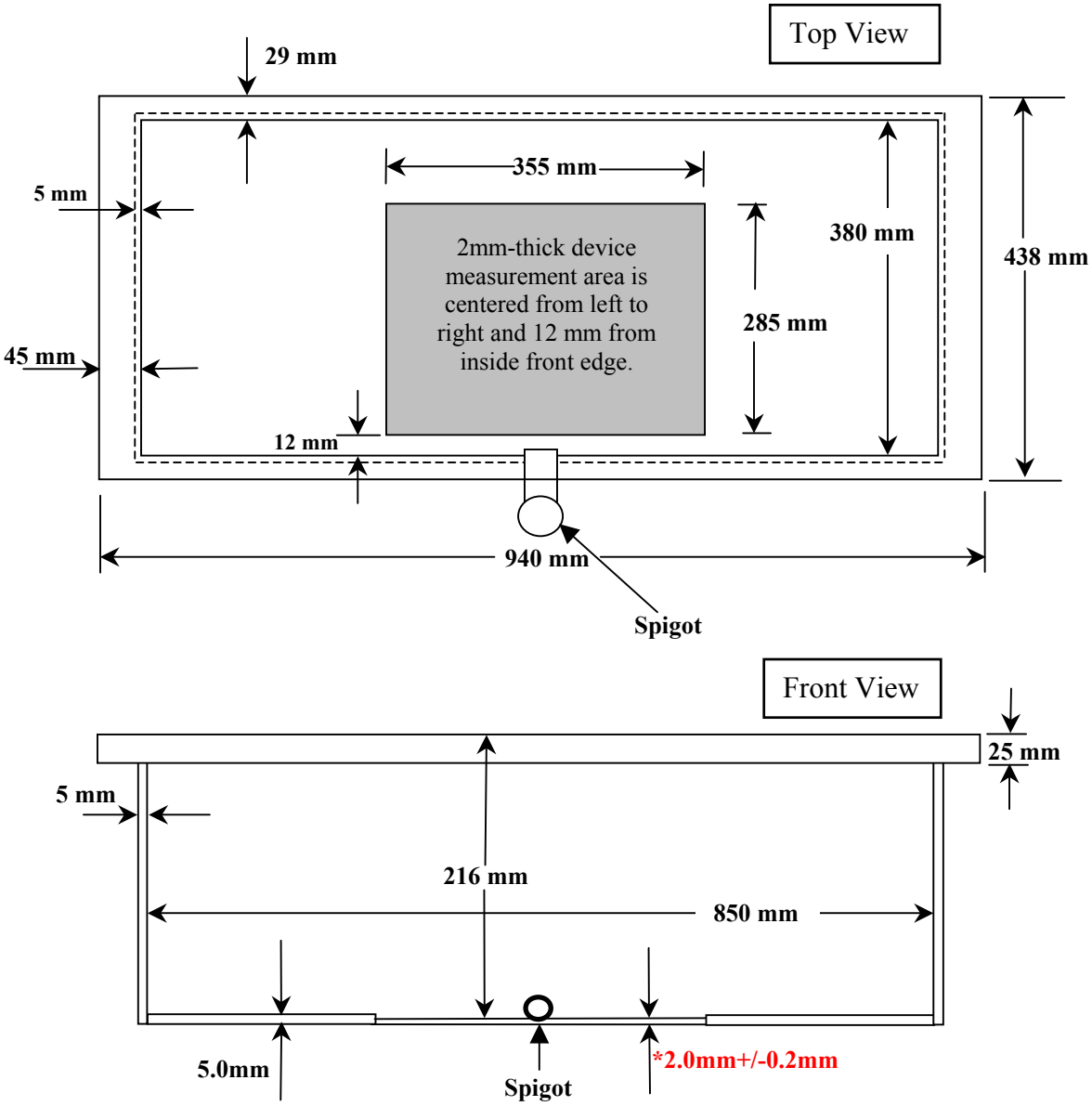
Fiberglass Planar Phantom - Front View

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.