DECLARATION OF COMPLIANCE
SAR EVALUATION

Test Lab

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Applicant Information

M/A-COM PRIVATE RADIO SYSTEMS, INC.
221 Jefferson Ridge Parkway
Lynchburg, VA 24501

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)**
Device Classification:	**Licensed Non-Broadcast Transmitter Held to Face (TNF)**
Device Type:	**Portable UHF PTT Radio Transceiver (P/N: T1-HSAR01, T1-HSAR02)**
FCC ID:	**OWDTR-0015-E**
Model Name / No.:	**P7100(PI)**
Modulation:	**FM (UHF Band)**
Tx Frequency Range:	**450 - 512 MHz**
Max. Cond. Power Tested:	**4.15 Watts**
Antenna Part No.(s):	**KRE1011219/12 (450-470 MHz) / KRE1011219/13 (470-512 MHz) / KRE1011223/12 (450-512 MHz)**
Antenna Type(s):	**Spring Whip (KRE1011219/12, KRE1011219/13), Quarter-Wave Whip (KRE1011223/12)**
Battery Type(s):	**1. 7.5V Nickel Cadmium - Immersion (BKB191210/3)**
	2. 7.5V Nickel Metal Hydride - Immersion (BKB191210/4)
	3. 7.5V Nickel Cadmium - Immersion - Intrinsically Safe (BKB191210/5)
	4. 7.5V Nickel Metal Hydride - Immersion - Intrinsically Safe (BKB191210/6)
	5. 7.5V Nickel Cadmium (BKB191210/23)
	6. 7.5V Nickel Metal Hydride (BKB191210/24)
	7. 7.5V Nickel Cadmium - Intrinsically Safe (BKB191210/25)
	8. 7.5V Nickel Metal Hydride - Intrinsically Safe (BKB191210/26)
Body-Worn Accessories:	**1. Speaker Microphone Antenna Version Plus (KRY1011617/84R1A, KRY1011617/184R1A)**
	2. Speaker-Microphone (KRY1011617/83R1A, KRY1011617/183R1A)
	3. Metal Belt-Clip (KRY1011647/1)
	4. Belt-Loop with Swivel (KRY1011609/1)
	5. Leather Case with Belt-Loop (KRY1011638/1)
	6. Leather Case with Swivel & Belt-Loop (KRY1011639/1)
	7. Nylon Case with Swivel & Belt-Loop (KRY1011648/1)
Max. SAR Measured:	**Face-held: 2.62 W/kg (50% Duty Cycle) / Body-worn: 7.35 W/kg (50% Duty Cycle)**

Celltech Labs 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 (Occupational Environment/Controlled 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 Labs Inc. The results and statements contained in this report pertain only to the device(s) evaluated.

Russell Pipe
Senior Compliance Technologist
Celltech Labs Inc.

TABLE OF CONTENTS

1.0 INTRODUCTION

This measurement report demonstrates that the M/A-COM PRS INC. Model: P7100(PI) Portable UHF PTT Radio Transceiver FCC ID: OWDTR-0015-E complies with FCC 47 CFR §2.1093 (see reference [1]) and Health Canada Safety Code 6 (see reference [2]) (Occupational Environment / Controlled Exposure limits). The test procedures described in FCC OET Bulletin 65, Supplement C, Edition 01-01 (see reference [3]) and Industry Canada 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.

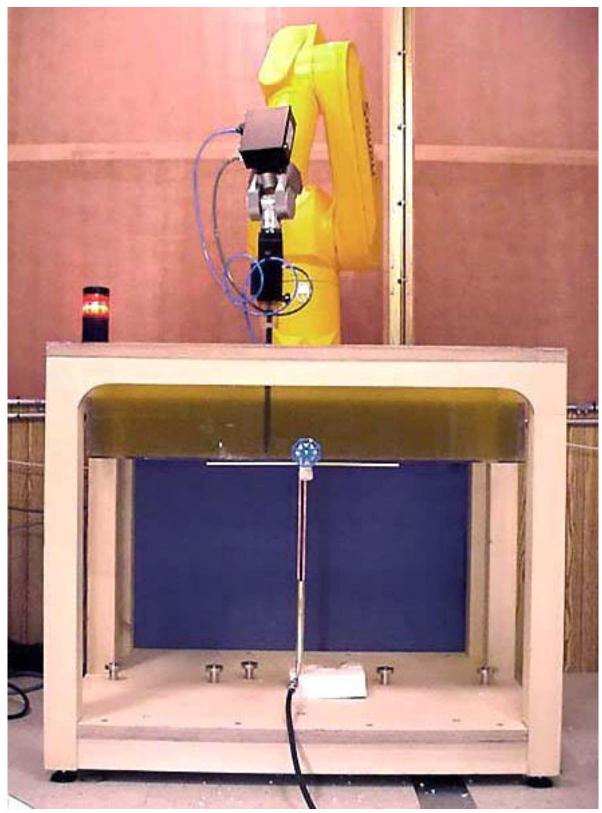
2.0 DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

Rule Part(s)	FCC 47 CFR §2.1093; IC RSS-102 Issue 1
Test Procedure(s)	FCC OET Bulletin 65, Supplement C (01-01)
Device Classification	Licensed Non-Broadcast Transmitter Held to Face (TNF)
Device Type	Portable UHF PTT Radio Transceiver (P/Ns: T1-HSAR01, T1-HSAR02)
FCC ID	OWDTR-0015-E
Model Name / No.	P7100(PI)
Serial No.	Pre-production
Modulation	FM (UHF)
Tx Frequency Range	450 - 512 MHz
Max. Conducted Power Tested	4.15 Watts
Antenna Part No.(s)	KRE1011219/12 (450-470 MHz) KRE1011219/13 (470-512 MHz) KRE1011223/12 (450-512 MHz)
Antenna Type(s)	Spring Whip (KRE1011219/12, KRE1011219/13) Quarter-Wave Whip (KRE1011223/12)
Antenna Length(s)	KRE1011219/12 - 70 mm KRE1011219/13 - 69 mm KRE1011223/12 - 158 mm
Battery Type(s)	1. 7.5V Nickel Cadmium - Immersion (BKB191210/3) 2. 7.5V Nickel Metal Hydride - Immersion (BKB191210/4) 3. 7.5V Nickel Cadmium - Immersion - Intrinsically Safe (BKB191210/5) 4. 7.5V Nickel Metal Hydride - Immersion - Intrinsically Safe (BKB191210/6) 5. 7.5V Nickel Cadmium (BKB191210/23) 6. 7.5V Nickel Metal Hydride (BKB191210/24) 7. 7.5V Nickel Cadmium - Intrinsically Safe (BKB191210/25) 8. 7.5V Nickel Metal Hydride - Intrinsically Safe (BKB191210/26)
Body-Worn Accessories	1. Speaker Microphone Antenna Version Plus (KRY1011617/84R1A, KRY1011617/184R1A) 2. Speaker Microphone (KRY1011617/83R1A, KRY1011617/183R1A) 3. Metal Belt-Clip (KRY1011647/1) 4. Belt-Loop with Swivel (KRY1011609/1) 5. Leather Case with Belt-Loop (KRY1011638/1) 6. Leather Case with Swivel Belt-Loop (KRY1011639/1) 7. Nylon Case with Swivel Belt-Loop (KRY1011648/1)

3.0 SAR MEASUREMENT SYSTEM

Celltech Labs SAR measurement facility utilizes the Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland. The SAR measurement system is comprised of the robot controller, computer, near-field probe, probe alignment sensor, specific anthropomorphic mannequin (SAM) phantom, and various planar phantoms for face 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 Planar Phantom



DASY3 SAR Measurement System with validation phantom

4.0 BATTERY CONFIGURATIONS

The eight battery types have the same voltage (7.5V). The NiMH battery has a nominal capacity of 2400mAh and the NiCd battery has a nominal capacity of 1600mAh. The non-immersion rated battery pack is manufactured identically to the immersion rated pack. The only difference involves immersion testing (the immersion rated packs are subjected to statistical sample testing of immersion performance), and warranty (the immersion rated packs are warranted not to leak). The non-immersion battery pack is electrically and mechanically identical to the originally tested immersion type battery packs and does not require additional SAR evaluation. The non-intrinsically safe battery pack uses a copper wire (0Ω? resistance) to connect between the positive terminal of the cell stack and the flex board within the pack. The intrinsically safe battery pack uses a Nichrome wire (0.23? resistance) in place of the copper wire. Due to the electrical differences between the intrinsically safe and non-intrinsically safe batteries, both battery types were tested for the NiCd and NiMH.

5.0 SAR COMPARISON

SAR measurements were performed with radio P/N: T1-HSAR02. The only difference between radio P/N: T1-HSAR01 and P/N: T1-HSAR02 is the number of keys on the front keypad (see Appendix F for EUT photographs). The test configuration with the highest SAR level for face-held and body-worn measurements with radio P/N: T1-HSAR02 were also performed for radio P/N: T1-HSAR01. As shown in the comparison table below, the SAR results were lower for radio P/N: T1-HSAR01, therefore no further measurements were performed (see next pages for SAR comparison plots).

SAR COMPARISON								
Radio P/N	Test Type	Antenna P/N	Battery Type	Accessory Type	Max. SAR 1g (W/kg)			
					100% Duty Cycle		50% Duty Cycle	
					Without Scaling	Scaled by Drift	Without Scaling	Scaled by Drift
T1-HSAR01	Face-held	KRE1011219/13	NiMH IS	-	5.15	5.21	2.58	2.62
T1-HSAR02	Face-held	KRE1011219/13	NiMH IS	-	5.24	-	2.62	-
T1-HSAR01	Body-worn	KRE1011219/13	NiCd NIS	Metal Belt-Clip	14.2	14.7	7.10	7.35
T1-HSAR02	Body-worn	KRE1011219/13	NiCd NIS	Metal Belt-Clip	14.7	15.2	7.35	7.60
ANSI / IEEE C95.1 1992 - SAFETY LIMIT BRAIN / BODY: 8.0 W/kg (averaged over 1 gram) Spatial Peak - Controlled Exposure / Occupational								

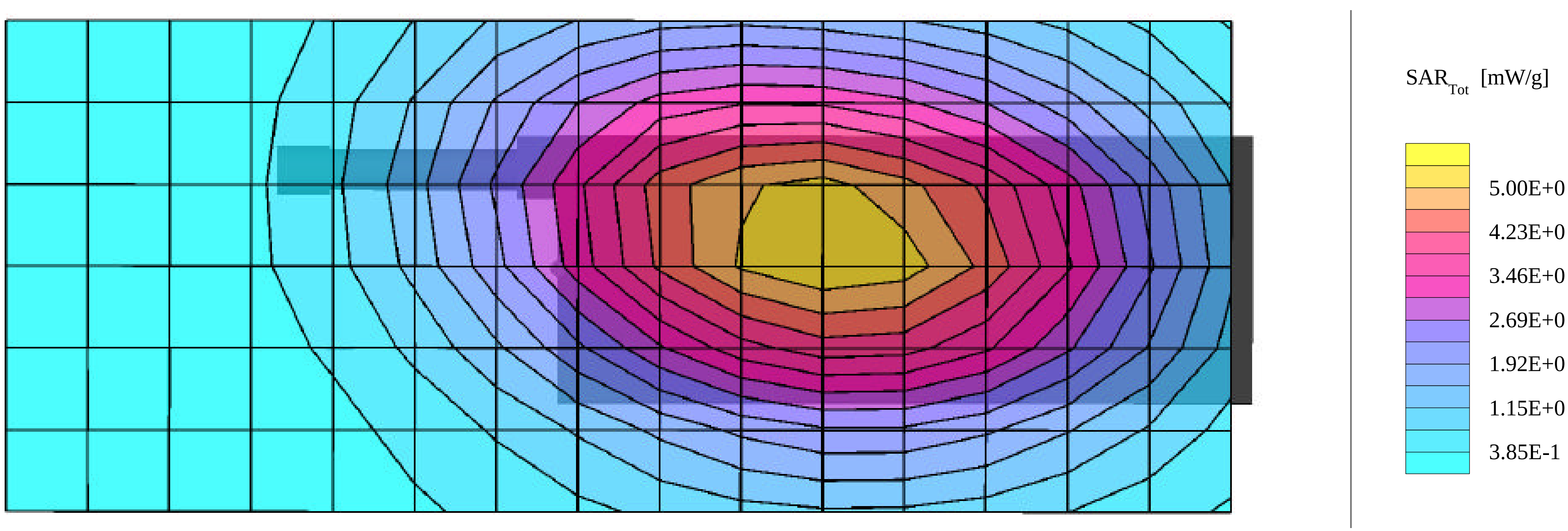
Notes:

1. Abbreviation(s): IS = Intrinsically Safe
   NIS = Non-Intrinsically Safe
2. Antenna Type(s): Spring Whip P/N: KRE1011219/12 (450-470 MHz)
   Spring Whip P/N: KRE1011219/13 (470-512 MHz)
   Quarter-Wave Whip P/N: KRE1011223/12 (450-512 MHz)

M/A-COM PRS INC. FCC ID: OWDTR-0015-E

Small Planar Phantom; Planar Section; Position: (90°,0°)
Probe: ET3DV6 - SN1590; ConvF(7.80,7.80,7.80); Crest factor: 1.0
450 MHz Brain: σ = 0.86 mho/m ε_r = 43.6 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7
SAR (1g): 5.15 mW/g, SAR (10g): 3.80 mW/g

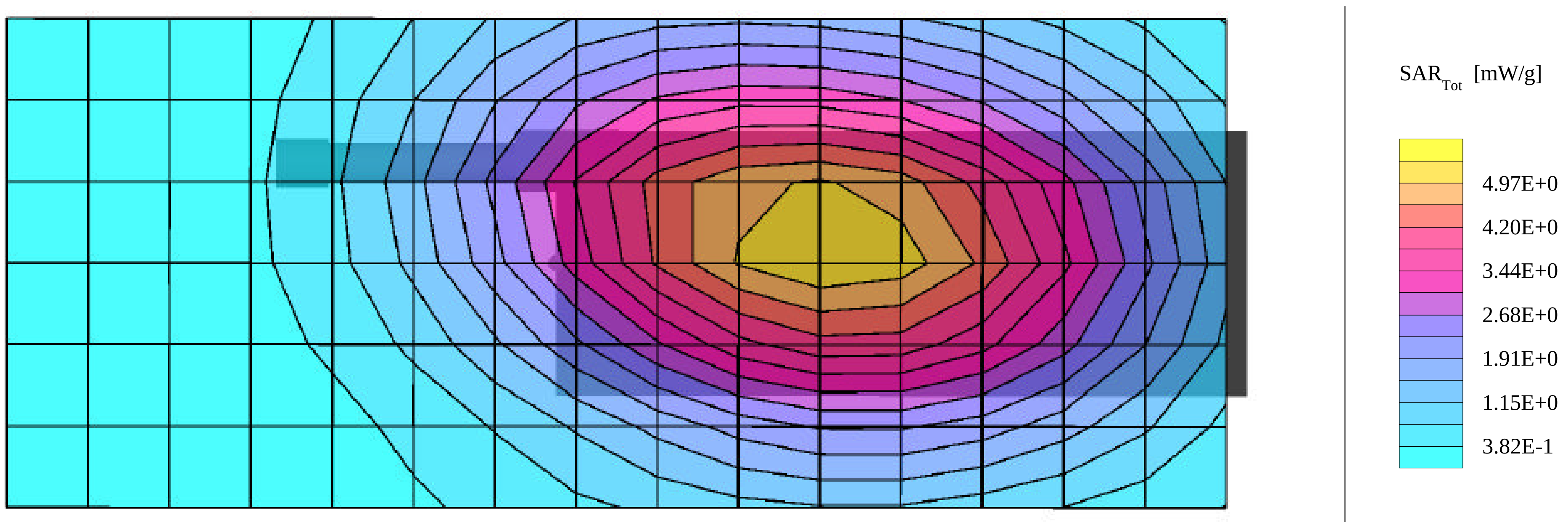
Face-Held SAR at 2.5 cm Separation Distance
P7100(PI) Portable UHF PTT Radio Transceiver (P/N: T1-HSAR01)
Spring Whip Antenna (KRE1011219/13)
NiMH Battery (BKB191210/6) Intrinsically Safe
Continuous Wave Mode
Mid Channel [481.000 MHz]
Conducted Power: 4.15 Watts
Ambient Temp: 22.8°C; Fluid Temp: 22.5°C
Date Tested: March 03, 2003



M/A-COM PRS INC. FCC ID: OWDTR-0015-E

Small Planar Phantom; Planar Section; Position: (90°,0°)
Probe: ET3DV6 - SN1590; ConvF(7.80,7.80,7.80); Crest factor: 1.0
450 MHz Brain: σ = 0.86 mho/m ε_r = 43.6 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7
SAR (1g): 5.24 mW/g, SAR (10g): 3.85 mW/g

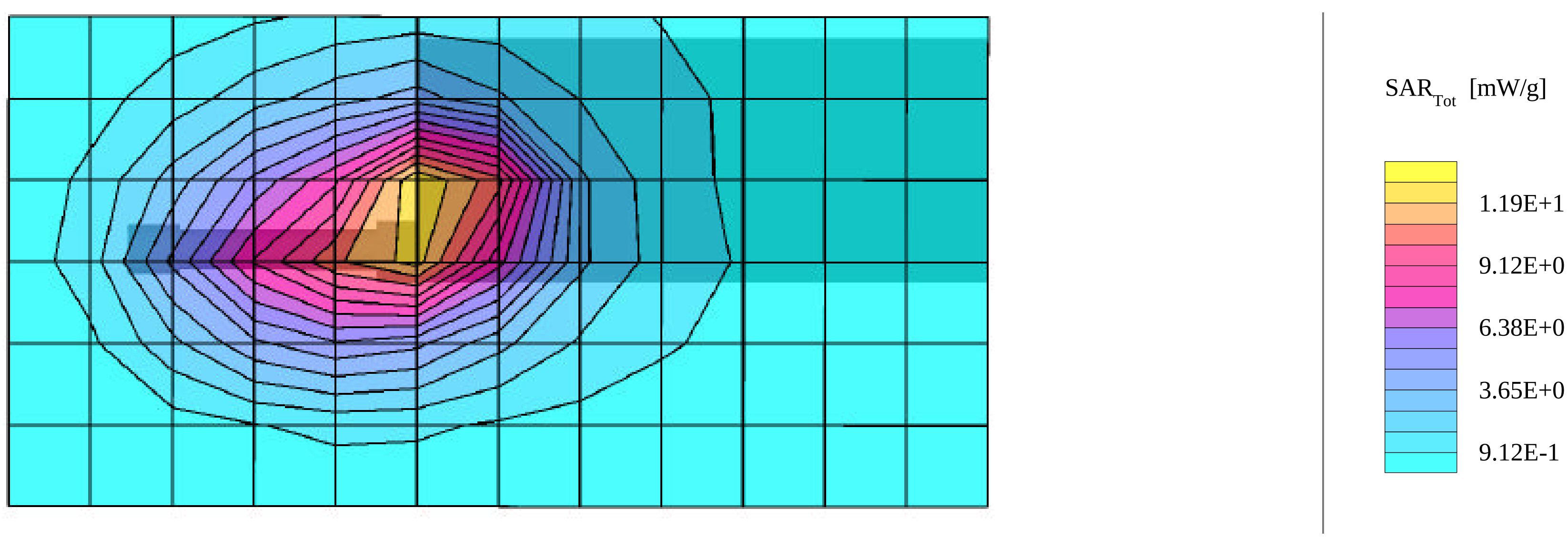
Face-Held SAR at 2.5 cm Separation Distance
P7100(PI) Portable UHF PTT Radio Transceiver (P/N: T1-HSAR02)
Spring Whip Antenna (KRE1011219/13)
NiMH Battery (BKB191210/6) Intrinsically Safe
Continuous Wave Mode
Mid Channel [481.000 MHz]
Conducted Power: 4.15 Watts
Ambient Temp: 22.8°C; Fluid Temp: 22.5°C
Date Tested: March 03, 2003



M/A-COM PRS INC. FCC ID: OWDTR-0015-E

Small Planar Phantom; Planar Section; Position: (270°,180°)
Probe: ET3DV6 - SN1590; ConvF(7.90,7.90,7.90); Crest factor: 1.0
450 MHz Muscle: σ = 0.93 mho/m ε_r = 57.7 ρ = 1.00 g/cm³
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7
SAR (1g): 14.2 mW/g, SAR (10g): 8.52 mW/g

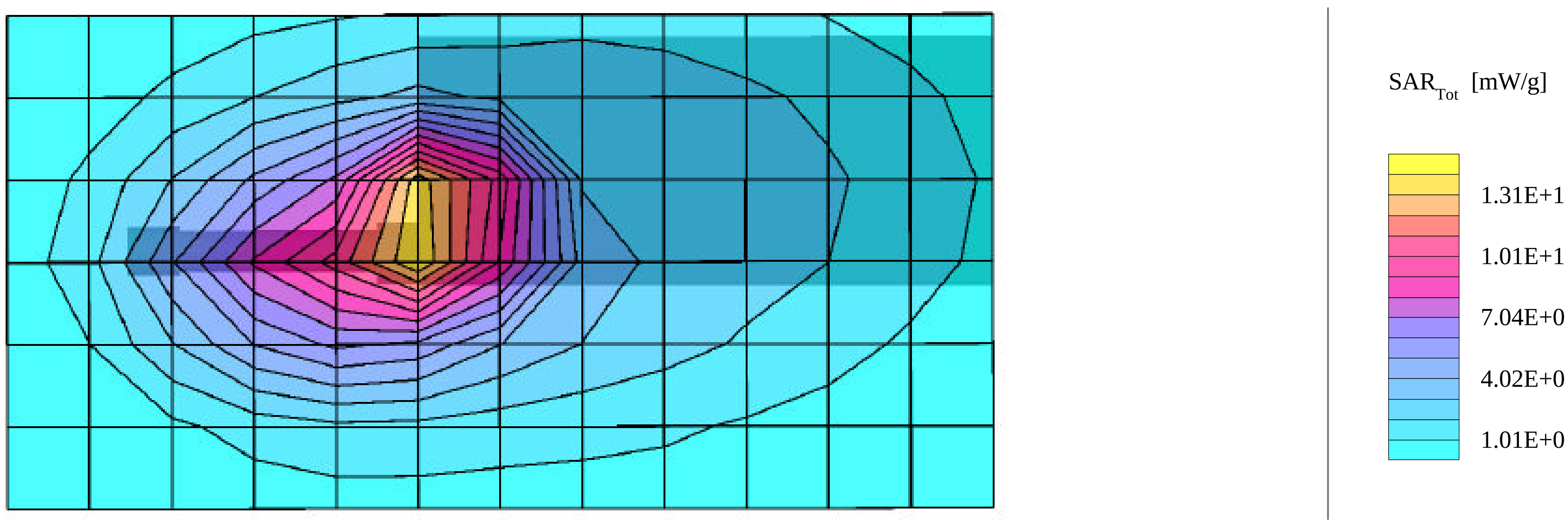
Body-Worn SAR with Metal Belt-Clip (KRY1011647/1)
1.1cm Belt-Clip Separation Distance to Planar Phantom
P7100(PI) Portable UHF PTT Radio Transceiver (P/N: T1-HSAR01)
with Speaker-Microphone (KRY1011617/183R1A)
Spring Whip Antenna (KRE1011219/13)
NiCd Battery (BKB191210/3) Non-Intrinsically Safe
Continuous Wave Mode
Mid Channel [481.000 MHz]
Conducted Power: 4.15 Watts
Ambient Temp: 23.2°C; Fluid Temp: 22.7°C
Date Tested: March 06, 2003



M/A-COM PRS INC. FCC ID: OWDTR-0015-E

Small Planar Phantom; Planar Section; Position: (270°,180°)
Probe: ET3DV6 - SN1590; ConvF(7.90,7.90,7.90); Crest factor: 1.0
450 MHz Muscle: σ = 0.93 mho/m ε_r = 57.7 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7
SAR (1g): 14.7 mW/g, SAR (10g): 8.11 mW/g

Body-Worn SAR with Metal Belt-Clip (KRY1011647/1)
1.1cm Belt-Clip Separation Distance to Planar Phantom
P7100(PI) Portable UHF PTT Radio Transceiver (P/N: T1-HSAR02)
with Speaker-Microphone (KRY1011617/183R1A)
Spring Whip Antenna (KRE1011219/13)
NiCd Battery (BKB191210/3) Non-Intrinsically Safe
Continuous Wave Mode
Mid Channel [481.000 MHz]
Conducted Power: 4.15 Watts
Ambient Temp: 23.2°C; Fluid Temp: 22.7°C
Date Tested: March 06, 2003



6.0 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.

FACE-HELD SAR MEASUREMENT RESULTS

Freq. (MHz)	Chan.	Test Mode	Conducted Power (Watts)		Antenna Part No.	Accessory Type	Battery Type	Separ. Dist. (cm)	SAR 1g (W/kg)			
									100% Duty Cycle		50% Duty Cycle	
			Before	After					Without Scaling	Scaled by Drift	Without Scaling	Scaled by Drift
450.00	Low	CW	4.15	4.14	KRE1011219/12	None	NiMH NIS	2.5	4.94	4.96	2.47	2.48
450.00	Low	CW	4.15	4.12	KRE1011219/12	None	NiCd NIS	2.5	4.93	4.97	2.47	2.49
450.00	Low	CW	4.15	4.15	KRE1011219/12	None	NiMH IS	2.5	4.48	4.48	2.24	2.24
450.00	Low	CW	4.15	4.13	KRE1011219/12	None	NiCd IS	2.5	4.83	4.84	2.42	2.42
481.00	Mid	CW	4.15	4.12	KRE1011219/13	None	NiMH NIS	2.5	3.22	3.24	1.61	1.62
481.00	Mid	CW	4.15	4.12	KRE1011219/13	None	NiCd NIS	2.5	3.44	3.47	1.72	1.74
481.00	Mid	CW	4.15	4.15	KRE1011219/13	None	NiMH IS	2.5	5.24	5.24	2.62	2.62
481.00	Mid	CW	4.15	4.04	KRE1011219/13	None	NiCd IS	2.5	5.14	5.28	2.57	2.64
481.00	Mid	CW	4.15	4.14	KRE1011223/12	None	NiMH NIS	2.5	2.98	2.99	1.47	1.50
481.00	Mid	CW	4.15	4.12	KRE1011223/12	None	NiCd NIS	2.5	2.96	2.98	1.49	1.49
481.00	Mid	CW	4.15	3.98	KRE1011223/12	None	NiMH IS	2.5	2.94	3.06	1.47	1.53
481.00	Mid	CW	4.15	4.10	KRE1011223/12	None	NiCd IS	2.5	2.96	2.99	1.48	1.50

ANSI / IEEE C95.1 1992 - SAFETY LIMIT
BRAIN: 8.0 W/kg (averaged over 1 gram)
Spatial Peak - Controlled Exposure / Occupational

Test Date(s)	03/03/03		**ρ (Kg/m^3)**	1000
Measured Mixture Type	450MHz Brain		**Relative Humidity**	38 %
Dielectric Constant	**IEEE Target**	**Measured**	**Atmospheric Pressure**	103.1 kPa
	43.5 (+/- 5%)	43.6	**Ambient Temperature**	22.8 °C
Conductivity	**IEEE Target**	**Measured**	**Fluid Temperature**	22.5 °C
	0.87 (+/- 5%)	0.86	**Fluid Depth**	≥ 15 cm

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 [3]).
2. 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.
3. The dielectric properties of the simulated body fluid were verified prior to the evaluation using an 85070C Dielectric Probe Kit and an 8753E Network Analyzer (see Appendix E for printout of measured fluid dielectric parameters).
4. Abbreviation(s): IS = Intrinsically Safe
   NIS = Non-Intrinsically Safe
5. Antenna Type(s): Spring Whip P/N: KRE1011219/12 (450-470 MHz)
   Spring Whip P/N: KRE1011219/13 (470-512 MHz)
   Quarter-Wave Whip P/N: KRE1011223/12 (450-512 MHz)

MEASUREMENT SUMMARY (Cont.)

FACE-HELD SAR MEASUREMENT RESULTS												
Freq. (MHz)	Chan.	Test Mode	Conducted Power (Watts)		Antenna Part No.	Accessory Type	Battery Type	Separ. Dist. (cm)	SAR 1g (W/kg)			
									100% Duty Cycle		50% Duty Cycle	
			Before	After					Without Scaling	Scaled by Drift	Without Scaling	Scaled by Drift
450.00	Low	CW	4.15	3.92	KRE1011219/12	SM AVP	NiMH NIS	2.5	1.46	1.55	0.73	0.78
450.00	Low	CW	4.15	3.94	KRE1011219/12	SM AVP	NiCd NIS	2.5	1.55	1.63	0.78	0.82
450.00	Low	CW	4.15	3.97	KRE1011219/12	SM AVP	NiMH IS	2.5	1.15	1.20	0.58	0.58
450.00	Low	CW	4.15	4.11	KRE1011219/12	SM AVP	NiCd IS	2.5	1.27	1.28	0.64	0.64
481.00	Mid	CW	4.15	4.15	KRE1011219/13	SM AVP	NiMH NIS	2.5	3.57	3.57	1.79	1.79
481.00	Mid	CW	4.15	4.12	KRE1011219/13	SM AVP	NiCd NIS	2.5	3.59	3.61	1.59	1.81
481.00	Mid	CW	4.15	4.14	KRE1011219/13	SM AVP	NiMH IS	2.5	3.62	3.63	1.81	1.82
481.00	Mid	CW	4.15	4.11	KRE1011219/13	SM AVP	NiCd IS	2.5	3.46	3.49	1.73	1.75
481.00	Mid	CW	4.15	4.10	KRE1011223/12	SM AVP	NiMH NIS	2.5	2.80	2.83	1.40	1.42
481.00	Mid	CW	4.15	4.15	KRE1011223/12	SM AVP	NiCd NIS	2.5	2.68	2.68	1.34	1.34
481.00	Mid	CW	4.15	4.13	KRE1011223/12	SM AVP	NiMH IS	2.5	3.04	3.06	1.52	1.53
481.00	Mid	CW	4.15	4.12	KRE1011223/12	SM AVP	NiCd IS	2.5	3.12	3.14	1.56	1.57
ANSI / IEEE C95.1 1992 - SAFETY LIMIT BRAIN: 8.0 W/kg (averaged over 1 gram) Spatial Peak - Controlled Exposure / Occupational												

Test Date(s)	03/04/03		r (Kg/m^3)	1000
Measured Mixture Type	450MHz Brain		Relative Humidity	60 %
Dielectric Constant	IEEE Target	Measured	Atmospheric Pressure	102.2 kPa
	43.5 (+/- 5%)	44.8	Ambient Temperature	23.2 °C
Conductivity	IEEE Target	Measured	Fluid Temperature	20.4 °C
	0.87 (+/- 5%)	0.88	Fluid Depth	≥ 15 cm

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 [3]).
2. 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.
3. The dielectric properties of the simulated body fluid were verified prior to the evaluation using an 85070C Dielectric Probe Kit and an 8753E Network Analyzer (see Appendix E for printout of measured fluid dielectric parameters).
4. Abbreviation(s): IS = Intrinsically Safe
   NIS = Non-Intrinsically Safe
   SM AVP = Speaker-Microphone Antenna Version Plus
5. Antenna Type(s): Spring Whip P/N: KRE1011219/12 (450-470 MHz)
   Spring Whip P/N: KRE1011219/13 (470-512 MHz)
   Quarter-Wave Whip P/N: KRE1011223/12 (450-512 MHz)

MEASUREMENT SUMMARY (Cont.)

BODY-WORN SAR MEASUREMENT RESULTS												
Freq. (MHz)	Chan	Test Mode	Conducted Power (Watts)		Antenna Part No.	Accessory Type	Battery Type	Access. Separ. Dist. (cm)	SAR 1g (W/kg)			
									100% Duty Cycle		50% Duty Cycle	
			Before	After					Without Scaling	Scaled by Drift	Without Scaling	Scaled by Drift
450.00	Low	CW	4.15	4.12	KRE1011219/12	SM AVP	NiMH NIS	1.3	3.91	3.94	1.96	1.97
450.00	Low	CW	4.15	4.10	KRE1011219/12	SM AVP	NiCd NIS	1.3	4.17	4.22	2.09	2.11
450.00	Low	CW	4.15	4.14	KRE1011219/12	SM AVP	NiMH IS	1.3	3.76	3.77	1.88	1.89
450.00	Low	CW	4.15	4.12	KRE1011219/12	SM AVP	NiCd IS	1.3	3.74	3.77	1.87	1.89
481.00	Mid	CW	4.15	4.15	KRE1011219/13	SM AVP	NiMH NIS	1.3	7.26	7.26	3.63	3.63
481.00	Mid	CW	4.15	4.12	KRE1011219/13	SM AVP	NiCd NIS	1.3	6.97	7.02	3.49	1.75
481.00	Mid	CW	4.15	4.15	KRE1011219/13	SM AVP	NiMH IS	1.3	7.25	7.25	3.63	3.63
481.00	Mid	CW	4.15	4.14	KRE1011219/13	SM AVP	NiCd IS	1.3	7.34	7.36	3.67	3.68
512.00	High	CW	4.15	4.03	KRE1011219/13	SM AVP	NiCd IS	1.3	7.70	7.93	3.85	3.97
481.00	Mid	CW	4.15	4.15	KRE1011223/12	SM AVP	NiMH NIS	1.3	7.89	7.89	3.95	3.95
481.00	Mid	CW	4.15	4.09	KRE1011223/12	SM AVP	NiCd NIS	1.3	8.03	8.15	4.02	4.08
481.00	Mid	CW	4.15	3.94	KRE1011223/12	SM AVP	NiMH IS	1.3	8.24	8.69	4.12	4.35
481.00	Mid	CW	4.15	4.08	KRE1011223/12	SM AVP	NiCd IS	1.3	8.14	8.28	4.07	4.14
450.00	Low	CW	4.15	3.72	KRE1011223/12	SM AVP	NiMH IS	1.3	4.55	5.08	2.28	2.76
512.00	High	CW	4.15	4.06	KRE1011223/12	SM AVP	NiMH IS	1.3	7.92	8.11	3.96	4.06
ANSI / IEEE C95.1 1992 - SAFETY LIMIT BODY: 8.0 W/kg (averaged over 1 gram) Spatial Peak - Controlled Exposure / Occupational												

Test Date	03/05/03		**r (Kg/m^3)**	1000
Measured Mixture Type	450MHz Body		**Relative Humidity**	68 %
Dielectric Constant	**Target**	**Measured**	**Atmospheric Pressure**	102.3 kPa
	56.7 (+/- 5%)	57.9	**Ambient Temperature**	23.2 °C
Conductivity	**Target**	**Measured**	**Fluid Temperature**	22.4 °C
	0.94 (+/- 5%)	0.93	**Fluid Depth**	≥ 15 cm

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 [3]).
2. 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.
3. The dielectric properties of the simulated body fluid were verified prior to the evaluation using an 85070C Dielectric Probe Kit and an 8753E Network Analyzer (see Appendix E for printout of measured fluid dielectric parameters).
4. Abbreviation(s): IS = Intrinsically Safe
   NIS = Non-Intrinsically Safe
   SM AVP = Speaker-Microphone Antenna Version Plus
5. Antenna Type(s): Spring Whip P/N: KRE1011219/12 (450-470 MHz)
   Spring Whip P/N: KRE1011219/13 (470-512 MHz)
   Quarter-Wave Whip P/N: KRE1011223/12 (450-512 MHz)

MEASUREMENT SUMMARY (Cont.)

BODY-WORN SAR MEASUREMENT RESULTS

Freq. (MHz)	Chan	Test Mode	Conducted Power (Watts)		Antenna Part No.	Accessory Type	Battery Type	Access. Separ. Dist. (cm)	SAR 1g (W/kg)			
									100% Duty Cycle		50% Duty Cycle	
			Before	After					Without Scaling	Scaled by Drift	Without Scaling	Scaled by Drift
450.00	Low	CW	4.15	4.04	KRE1011219/12	MBC & SM	NiMH NIS	1.1	14.0	14.4	7.00	7.20
450.00	Low	CW	4.15	4.00	KRE1011219/12	MBC & SM	NiCd NIS	1.1	14.3	14.8	7.20	7.40
450.00	Low	CW	4.15	4.05	KRE1011219/12	MBC & SM	NiMH IS	1.1	10.3	10.6	5.20	5.30
450.00	Low	CW	4.15	4.00	KRE1011219/12	MBC & SM	NiCd IS	1.1	12.4	12.9	6.20	6.50
481.00	Mid	CW	4.15	3.91	KRE1011219/13	MBC & SM	NiMH NIS	1.1	10.0	10.6	5.00	5.30
481.00	Mid	CW	4.15	4.02	KRE1011219/13	MBC & SM	NiCd NIS	1.1	14.7	15.2	7.35	7.60
481.00	Mid	CW	4.15	3.91	KRE1011219/13	MBC & SM	NiMH IS	1.1	11.8	12.5	5.90	6.25
481.00	Mid	CW	4.15	4.06	KRE1011219/13	MBC & SM	NiCd IS	1.1	11.4	11.7	5.70	5.85
512.00	High	CW	4.15	4.00	KRE1011219/13	MBC & SM	NiCd NIS	1.1	8.61	8.93	4.32	4.47
481.00	Mid	CW	4.15	4.13	KRE1011223/12	MBC & SM	NiMH NIS	1.1	10.8	10.8	5.40	5.40
481.00	Mid	CW	4.15	4.11	KRE1011223/12	MBC & SM	NiCd NIS	1.1	9.56	9.64	4.78	4.82
481.00	Mid	CW	4.15	3.98	KRE1011223/12	MBC & SM	NiMH IS	1.1	10.7	11.1	5.35	5.55
481.00	Mid	CW	4.15	4.07	KRE1011223/12	MBC & SM	NiCd IS	1.1	10.4	10.6	5.20	5.30
450.00	Low	CW	4.15	4.05	KRE1011223/12	MBC & SM	NiMH NIS	1.1	14.4	14.8	7.20	7.40
512.00	High	CW	4.15	4.14	KRE1011223/12	MBC & SM	NiMH NIS	1.1	7.71	7.73	3.89	3.87

ANSI / IEEE C95.1 1992 - SAFETY LIMIT
BODY: 8.0 W/kg (averaged over 1 gram)
Spatial Peak - Controlled Exposure / Occupational

Test Date	03/06/03		r (Kg/m^3)	1000
Measured Mixture Type	450MHz Body		Relative Humidity	60 %
Dielectric Constant	IEEE Target	Measured	Atmospheric Pressure	101.8 kPa
	56.7 (+/- 5%)	57.7	Ambient Temperature	23.2 °C
Conductivity	IEEE Target	Measured	Fluid Temperature	22.7 °C
	0.94 (+/- 5%)	0.93	Fluid Depth	≥ 15 cm

Note(s):

1. 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.
2. The dielectric properties of the simulated body fluid were verified prior to the evaluation using an 85070C Dielectric Probe Kit and an 8753E Network Analyzer (see Appendix E for printout of measured fluid dielectric parameters).
3. Abbreviation(s): IS = Intrinsically Safe
   NIS = Non-Intrinsically Safe
   MBC = Metal Belt-Clip
   SM = Speaker-Microphone
4. Antenna Type(s): Spring Whip P/N: KRE1011219/12 (450-470 MHz)
   Spring Whip P/N: KRE1011219/13 (470-512 MHz)
   Quarter-Wave Whip P/N: KRE1011223/12 (450-512 MHz)

MEASUREMENT SUMMARY (Cont.)

BODY-WORN SAR MEASUREMENT RESULTS

Freq. (MHz)	Chan	Test Mode	Conducted Power (Watts)		Antenna Part No.	Accessory Type	Battery Type	Access. Separ. Dist. (cm)	SAR 1g (W/kg)			
									100% Duty Cycle		50% Duty Cycle	
			Before	After					Without Scaling	Scaled by Drift	Without Scaling	Scaled by Drift
450.00	Low	CW	4.15	3.96	KRE1011219/12	LC & SM	NiCd NIS	1.7	5.04	5.30	2.52	2.65
481.00	Mid	CW	4.15	3.93	KRE1011219/13	LC & SM	NiCd NIS	1.7	3.68	3.89	1.84	1.95
481.00	Mid	CW	4.15	4.11	KRE1011223/12	LC & SM	NiMH NIS	1.7	2.85	2.88	1.43	1.44
450.00	Low	CW	4.15	4.00	KRE1011219/12	BL/S & SM	NiCd NIS	3.5	3.42	3.55	1.71	1.78
481.00	Mid	CW	4.15	3.97	KRE1011219/13	BL/S & SM	NiCd NIS	3.5	3.14	3.28	1.57	1.64
481.00	Mid	CW	4.15	3.96	KRE1011223/12	BL/S & SM	NiMH NIS	3.5	2.58	2.70	1.29	1.35
450.00	Low	CW	4.15	4.05	KRE1011219/12	NC/SBL & SM	NiCd NIS	4.0	2.52	2.58	1.26	1.29
481.00	Mid	CW	4.15	3.97	KRE1011219/13	NC/SBL & SM	NiCd NIS	4.0	1.77	1.85	0.89	0.93
481.00	Mid	CW	4.15	4.04	KRE1011223/12	NC/SBL & SM	NiMH NIS	4.0	1.95	2.00	0.98	1.00
450.00	Low	CW	4.15	4.04	KRE1011219/12	LC/SBL & SM	NiCd NIS	4.5	2.26	2.32	1.13	1.16
481.00	Mid	CW	4.15	4.03	KRE1011219/13	LC/SBL & SM	NiCd NIS	4.5	1.08	1.11	0.54	0.56
481.00	Mid	CW	4.15	4.03	KRE1011223/12	LC/SBL & SM	NiMH NIS	4.5	1.27	1.31	0.64	0.66

ANSI / IEEE C95.1 1992 - SAFETY LIMIT
BODY: 8.0 W/kg (averaged over 1 gram)
Spatial Peak - Controlled Exposure / Occupational

Test Date	03/07/03		**ρ (Kg/m^3)**	1000
Measured Mixture Type	450MHz Body		**Relative Humidity**	60 %
Dielectric Constant	**IEEE Target**	**Measured**	**Atmospheric Pressure**	101.8 kPa
	56.7 (+/- 5%)	58.8	**Ambient Temperature**	23.2°C
Conductivity	**IEEE Target**	**Measured**	**Fluid Temperature**	20.5 °C
	0.94 (+/- 5%)	0.91	**Fluid Depth**	≥ 15 cm

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 [3]).
2. 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.
3. The dielectric properties of the simulated body fluid were verified prior to the evaluation using an 85070C Dielectric Probe Kit and an 8753E Network Analyzer (see Appendix E for printout of measured fluid dielectric parameters).
4. Abbreviation(s): IS = Intrinsically Safe
   NIS = Non-Intrinsically Safe
   SM = Speaker-Microphone
   LC = Leather Case
   BL = Belt-Loop
   S = Swivel
   NC = Nylon Case
   SBL = Swivel Belt-Clip
5. Antenna Type(s): Spring Whip P/N: KRE1011219/12 (450-470 MHz)
   Spring Whip P/N: KRE1011219/13 (470-512 MHz)
   Quarter-Wave Whip P/N: KRE1011223/12 (450-512 MHz)

7.0 DETAILS OF SAR EVALUATION

The M/A-COM PRS INC. Model: P7100(PI) Portable UHF PTT Radio Transceiver FCC ID: OWDTR-0015-E was found to be compliant for localized Specific Absorption Rate (Controlled Exposure) based on the test provisions and conditions described below. Detailed photographs of the measurement setup are shown in Appendix F.

1. The EUT was first tested at the mid channel (antenna P/Ns: KRE1011219/13, KRE1011223/12 only) with both NiMH and NiCd Intrinsically Safe and Non-Intrinsically Safe battery options. The battery with the highest SAR level at the mid channel was further tested at the low and high channels (except antenna P/N: KRE1011219/13 high channel only).
2. For the body-worn SAR evaluations (excluding speaker-microphone antenna version plus) the EUT was first tested with the metal belt-clip accessory with all battery options based on the metal belt-clip being the worst-case configuration. The battery that yielded the highest SAR level for each antenna with the metal belt-clip accessory was then determined as worst-case for each of the remaining body-worn accessory tests.
3. The EUT (radio transceiver) was tested in a face-held configuration with the front of the device placed parallel to the outer surface of the planar phantom and a 2.5 cm separation distance was maintained.
4. The EUT (speaker-microphone antenna version plus) was tested in a face-held configuration with the front of the device placed parallel to the outer surface of the planar phantom and a 2.5 cm separation distance was maintained.
5. The EUT (speaker-microphone with antenna) was tested in a body-worn configuration with the back of the device placed parallel to the outer surface of the planar phantom. The attached metal lapel-clip was touching the outer surface of the planar phantom and provided a 1.3 cm separation distance between the back of the speaker-microphone antenna version plus and the outer surface of the planar phantom.
6. The EUT was tested in a body-worn configuration with the back of the radio transceiver placed parallel to the outer surface of the planar phantom. The attached metal belt-clip was touching the outer surface of the planar phantom and provided a 1.1 cm separation distance between the back of the radio transceiver and the outer surface of the planar phantom.
7. The EUT was tested in a body-worn configuration with the radio transceiver placed inside the leather case (belt-loop type) and the back of the EUT facing parallel to the outer surface of the planar phantom. The back of the leather case (belt-loop portion) was touching the outer surface of the planar phantom and provided a 1.7 cm separation distance between the back of the radio transceiver and the outer surface of the planar phantom.
8. The EUT was tested in a body-worn configuration with the back of the radio transceiver placed parallel to the outer surface of the planar phantom. The attached belt-loop with swivel was touching the outer surface of the planar phantom and provided a 3.5 cm separation distance between the back of the radio transceiver and the outer surface of the planar phantom.
9. The EUT was tested in a body-worn configuration with the radio transceiver placed inside the nylon case with the rear swivel mount attached to the belt-loop accessory and the back of the EUT facing parallel to the outer surface of the planar phantom. The back of the belt-loop was touching the outer surface of the planar phantom and combined with the nylon case provided a 4.0 cm separation distance between the back of the radio transceiver and the outer surface of the planar phantom.
10. The EUT was tested in a body-worn configuration with the radio transceiver placed inside the leather case with the rear swivel mount attached to the belt-loop accessory and the back of the EUT facing parallel to the outer surface of the planar phantom. The back of the belt-loop was touching the outer surface of the planar phantom and combined with the leather case provided a 4.5 cm separation distance between the back of the radio transceiver and the outer surface of the planar phantom.
11. A speaker-microphone accessory was connected to the EUT for tests #4-#8 described above.
12. The EUT was evaluated with no turn-on delay at maximum power.
13. The conducted power levels were measured before and after each test according to the procedures described in FCC 47 CFR §2.1046. Included in the measurement data tables are the scaled SAR values by power drift.
14. The EUT was tested with the transmit button depressed and the transmitter in unmodulated continuous transmit mode (Continuous Wave at 100% duty cycle) throughout the SAR evaluation. This is a push-to-talk device; therefore the 50% duty cycle compensation reported assumes a transmit/receive cycle of equal time base.
15. The location of the maximum spatial SAR distribution (Hot Spot) was determined relative to the EUT and its antenna.
16. The EUT was tested with fully charged batteries.
17. Due to the size of the EUT a Plexiglas planar phantom was used in place of the SAM phantom. Please note there is currently no approved phantom available that is twice the dimensions of this device.
18. A stack of low-density, low-loss dielectric foamed polystyrene was used in place of the device holder.

8.0 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.

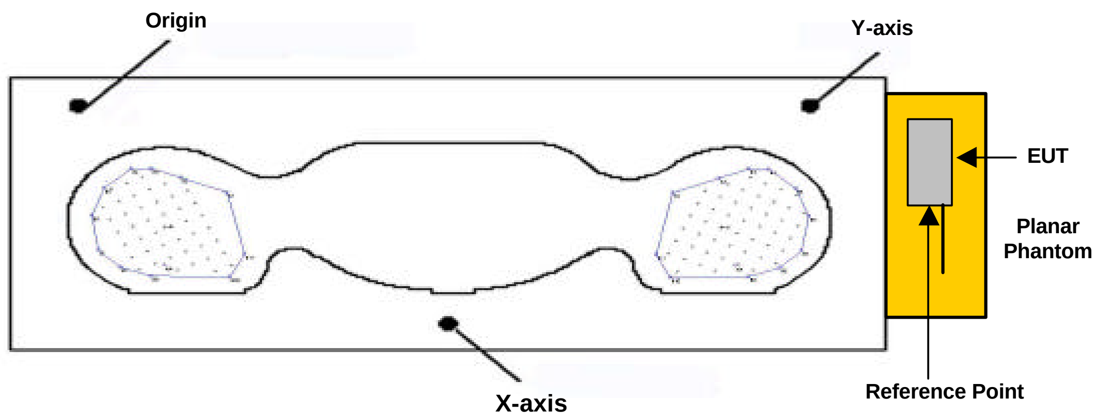


Figure 1. Phantom Reference Point & EUT Positioning
Radio Transceiver - Body-Worn Configuration

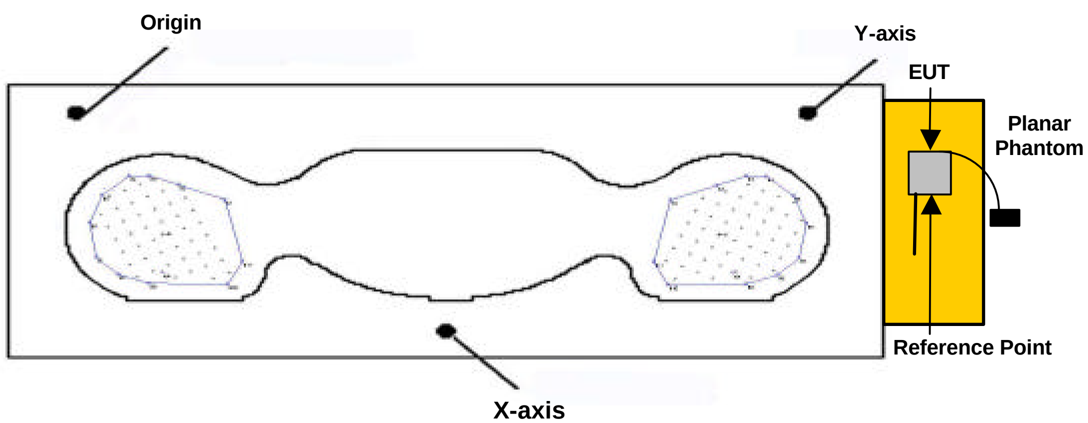


Figure 2. Phantom Reference Point & EUT Positioning
Speaker-Microphone Antenna Version Plus - Face-Held Configuration

9.0 SYSTEM PERFORMANCE CHECK

Prior to the evaluation a system check was performed using a planar phantom and 450MHz dipole (see Appendix C for system validation procedure). The simulated tissue fluids were verified prior to the performance check using an 85070C Dielectric Probe Kit and an 8753E Network Analyzer (see Appendix E for printout of measured fluid dielectric parameters). A forward power of 250mW was applied to the dipole and system was verified to a tolerance of ±10% (see Appendix B for performance check data).

SYSTEM PERFORMANCE CHECK

Test Date	Equiv. Tissue	IEEE Target SAR 1g (W/kg)	Measured SAR 1g (W/kg)	Dielectric Constant ε_r		Conductivity σ (mho/m)		ρ (Kg/m^3)	Ambient Temp.	Fluid Temp.	Fluid Depth
				IEEE Target	Measured	IEEE Target	Measured				
03/03/03			1.20		43.6		0.86		22.8 °C	22.5 °C	
03/04/03			1.23		44.8		0.88		23.2 °C	20.4 °C	
03/05/03	450MHz (Brain)	**1.23 (±10%)**	1.26	**43.5 ±5%**	44.1	**0.87 ±5%**	0.87	1000	23.2 °C	22.4 °C	≥ 15 cm
03/06/03			1.21		44.3		0.86		23.2 °C	22.7 °C	
03/07/03			1.25		44.6		0.89		23.2 °C	20.5 °C	

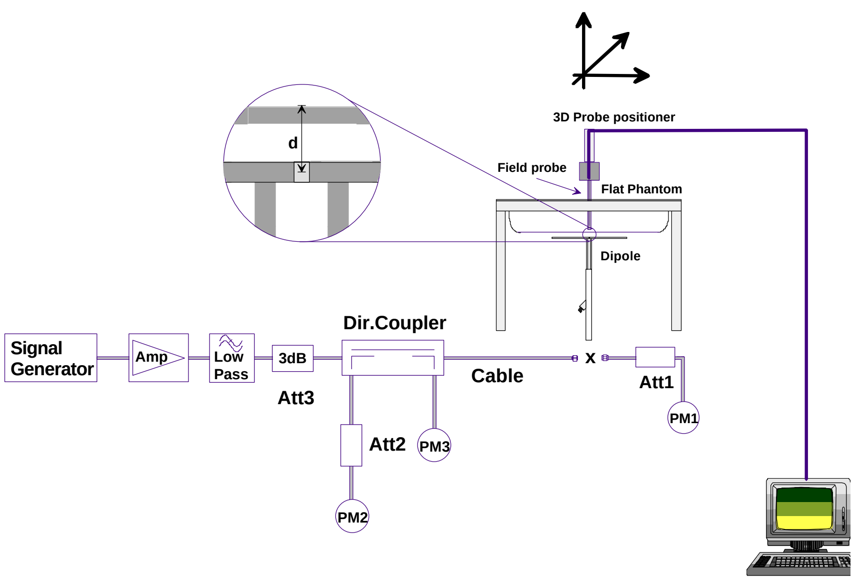


Figure 3. System Check Measurement Setup Diagram

450MHz System Check Setup Photograph

10.0 EQUIVALENT TISSUES

The 450MHz simulated brain and body tissue mixtures consist of a viscous gel using hydroxethylcellulose (HEC) gelling agent and saline solution. Preservation with a bactericide is added and visual inspection is made to ensure air bubbles are not trapped during the mixing process. The fluid was prepared according to standardized procedures and measured for dielectric parameters (permittivity and conductivity).

TISSUE MIXTURES		
INGREDIENT	**450MHz Brain (System Check & EUT Evaluation)**	**450MHz Body (EUT Evaluation)**
Water	38.56 %	52.00 %
Sugar	56.32 %	45.65 %
Salt	3.95 %	1.75 %
HEC	0.98 %	0.50 %
Bactericide	0.19 %	0.10 %

11.0 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.

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

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

Evaluation Phantom

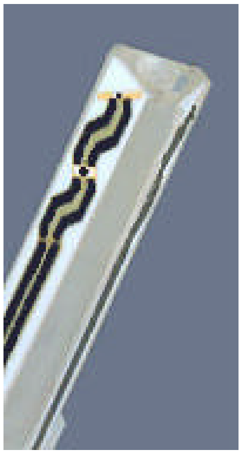
Type:	Planar Phantom (Small)
Shell Material:	Plexiglas
Bottom Thickness:	2.0 mm ± 0.1mm
Dimensions:	Box: 36.5cm (L) x 22.5cm (W) x 20.3cm (H); Back Plane: 25.3cm (H)

Validation Phantom (£ 450MHz)

Type:	Planar Phantom (Large)
Shell Material:	Plexiglas
Bottom Thickness:	6.2 mm ± 0.1mm
Dimensions:	86.0cm (L) x 39.5cm (W) x 21.8cm (H)

13.0 PROBE SPECIFICATION (ET3DV6)

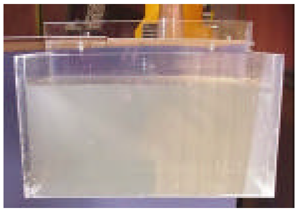
Construction:	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g. glycol)
Calibration:	In air from 10 MHz to 2.5 GHz In brain simulating tissue at frequencies of 900 MHz and 1.8 GHz (accuracy ± 8%)
Frequency:	10 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 μW/g to >100 mW/g; Linearity: ±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

14.0 PLANAR PHANTOM

The planar phantom is constructed of Plexiglas material with a 2.0mm shell thickness for face-held and body-worn SAR evaluations. The planar phantom is mounted onto the outside left head section of the DASY3 system.



Planar Phantom

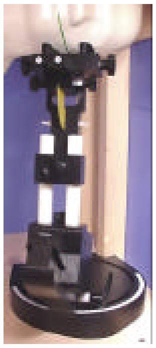
15.0 VALIDATION PLANAR PHANTOM

The validation planar phantom is constructed of Plexiglas material with a 6.0 mm shell thickness for SAR validations at 450MHz and below. The validation planar phantom is mounted in the DASY3 compact system in place of the SAM phantom.

Validation Planar Phantom

16.0 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

17.0 TEST EQUIPMENT LIST

SAR MEASUREMENT SYSTEM		
EQUIPMENT	**SERIAL NO.**	**CALIBRATION DATE**
DASY3 System	-	-
-Robot	599396-01	N/A
-ET3DV6 E-Field Probe	1590	Apr 2002
-300MHz Validation Dipole	135	Oct 2002
-450MHz Validation Dipole	136	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
-Planar Phantom	N/A	N/A
-Validation Planar Phantom	N/A	N/A
85070C Dielectric Probe Kit	N/A	N/A
Gigatronics 8652A Power Meter	1835272	Feb 2003
-Power Sensor 80701A	1833535	Feb 2003
-Power Sensor 80701A	1833542	Mar 2003
E4408B Spectrum Analyzer	US39240170	Nov 2002
8594E Spectrum Analyzer	3543A02721	Feb 2003
8753E Network Analyzer	US38433013	Feb 2003
8648D Signal Generator	3847A00611	Feb 2003
5S1G4 Amplifier Research Power Amplifier	26235	N/A

18.0 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)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid permittivity (measured)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Combined Standard Uncertainty					**± 13.7**	
Expanded Uncertainty (k=2)					**± 27.5**	

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

19.0 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.

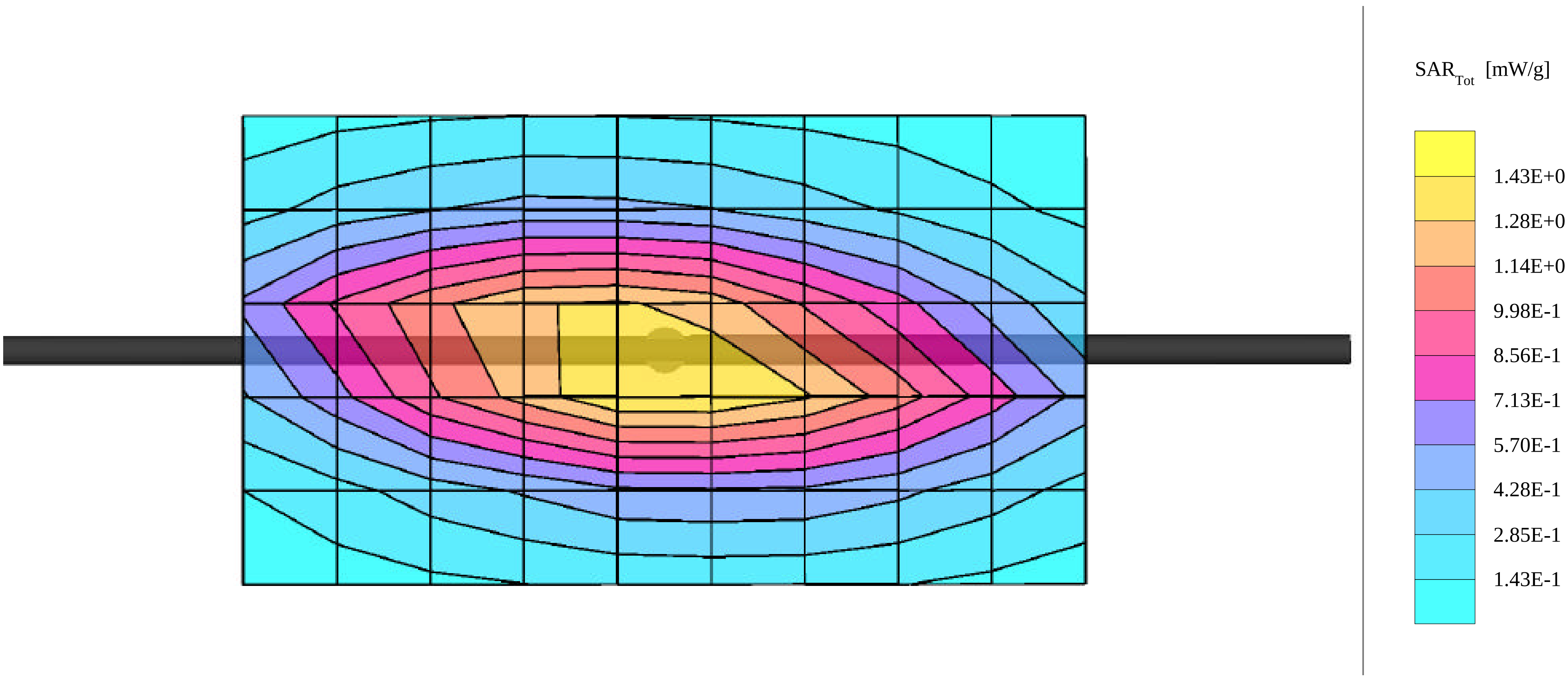
APPENDIX A - SAR MEASUREMENT DATA

APPENDIX B - SYSTEM CHECK DATA

System Performance Check - 450MHz Dipole

Validation Planar Phantom; Planar Section
Probe: ET3DV6 - SN1590; ConvF(7.80,7.80,7.80); Crest factor: 1.0; 450 MHz Brain: σ = 0.86 mho/m ε_r = 43.6 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 1.92 mW/g, SAR (1g): 1.20 mW/g, SAR (10g): 0.783 mW/g, (Worst-case extrapolation)
Penetration depth: 12.2 (10.4, 14.1) [mm]; Powerdrift: -0.02 dB
Ambient Temp: 22.8°C; Fluid Temp: 22.5°C

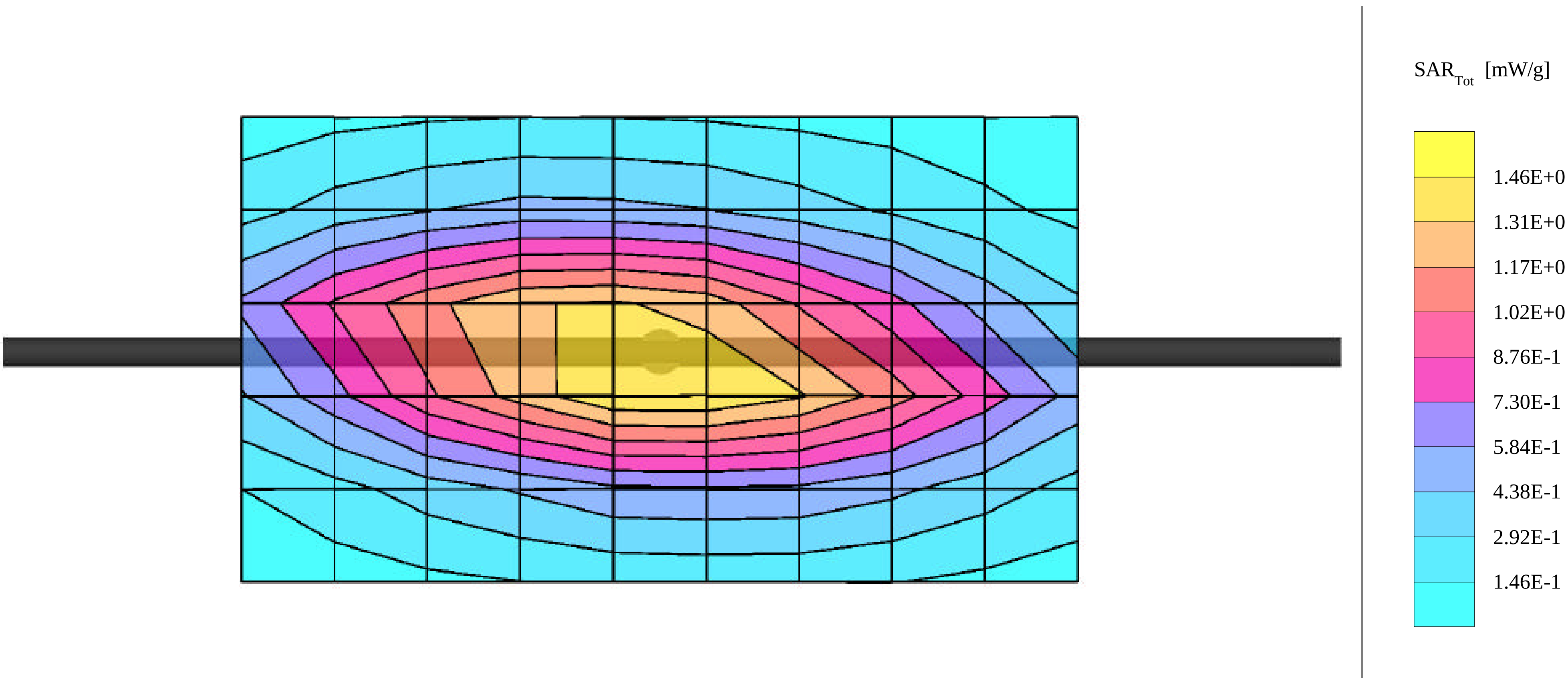
Forward Conducted Power: 250 mW
Date Tested: March 03, 2003



System Performance Check - 450MHz Dipole

Validation Planar Phantom; Planar Section
Probe: ET3DV6 - SN1590; ConvF(7.80,7.80,7.80); Crest factor: 1.0; 450 MHz Brain: σ = 0.88 mho/m ε_r = 44.8 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 1.97 mW/g, SAR (1g): 1.23 mW/g, SAR (10g): 0.800 mW/g, (Worst-case extrapolation)
Penetration depth: 12.1 (10.3, 14.0) [mm]; Powerdrift: -0.01 dB
Ambient Temp: 23.2°C; Fluid Temp: 20.4°C

Forward Conducted Power: 250 mW
Date Tested: March 04, 2003



System Performance Check - 450MHz Dipole

Validation Planar Phantom; Planar Section

Probe: ET3DV6 - SN1590; ConvF(7.80,7.80,7.80); Crest factor: 1.0; 450 MHz Brain: σ = 0.87 mho/m ε_r = 44.1 ρ = 1.00 g/cm^3

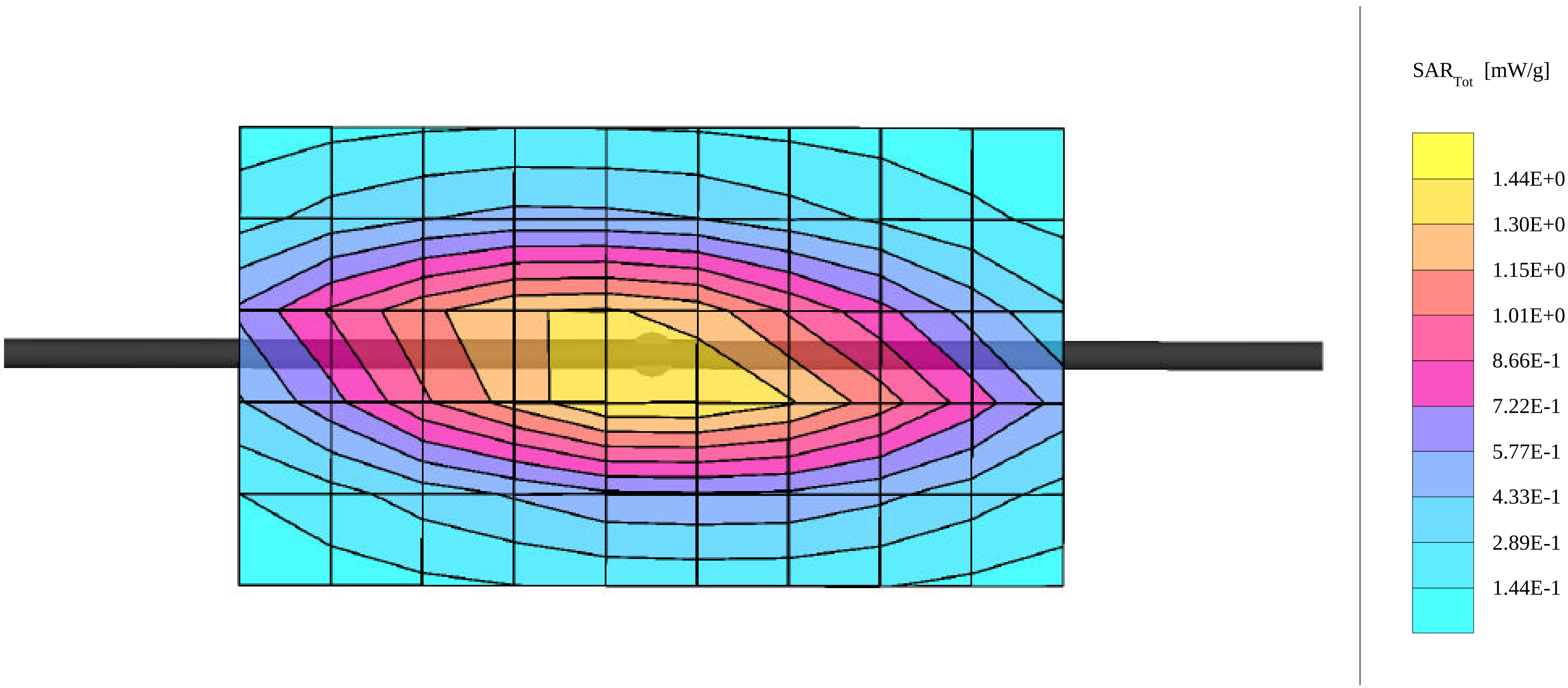
Cube 5x5x7: Peak: 2.03 mW/g, SAR (1g): 1.26 mW/g, SAR (10g): 0.819 mW/g, (Worst-case extrapolation)

Penetration depth: 12.1 (10.1, 14.0) [mm]; Powerdrift: 0.02 dB

Ambient Temp: 23.2°C; Fluid Temp: 22.4°C

Forward Conducted Power: 250 mW

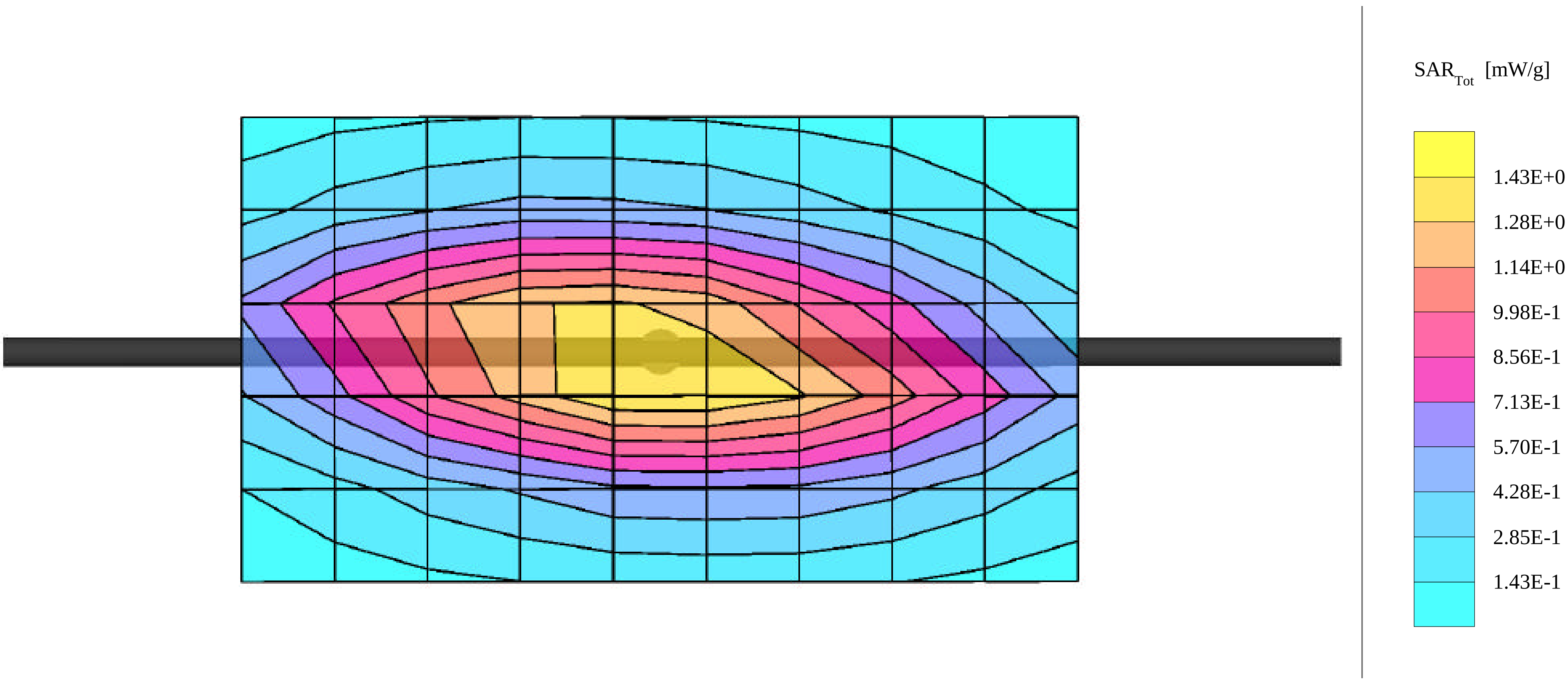
Date Tested: March 05, 2003



System Performance Check - 450MHz Dipole

Validation Planar Phantom; Planar Section
Probe: ET3DV6 - SN1590; ConvF(7.80,7.80,7.80); Crest factor: 1.0; 450 MHz Brain: σ = 0.86 mho/m ε_r = 44.3 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 1.95 mW/g, SAR (1g): 1.21 mW/g, SAR (10g): 0.786 mW/g, (Worst-case extrapolation)
Penetration depth: 11.9 (10.2, 14.0) [mm]; Powerdrift: -0.03 dB
Ambient Temp: 23.2°C; Fluid Temp: 22.7°C

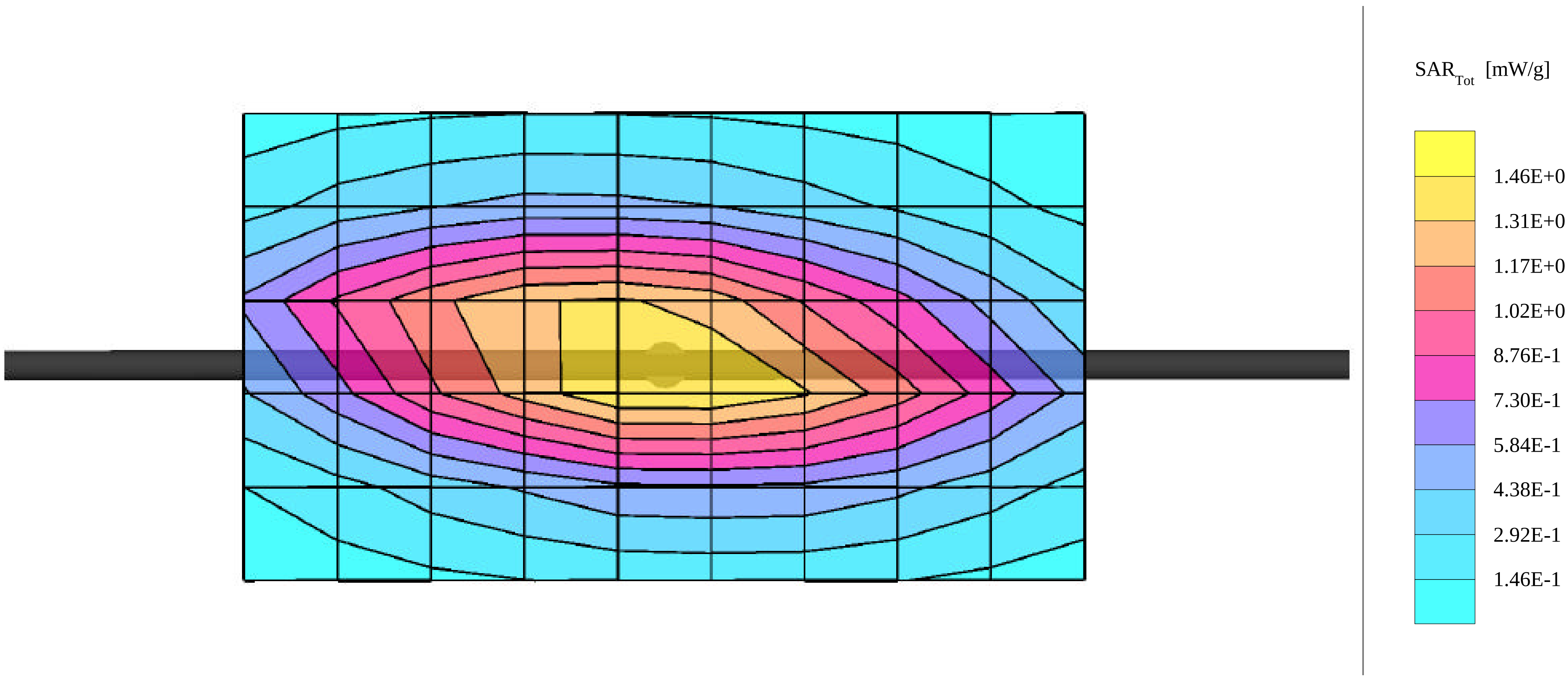
Forward Conducted Power: 250 mW
Date Tested: March 06, 2003



System Performance Check - 450MHz Dipole

Validation Planar Phantom; Planar Section
Probe: ET3DV6 - SN1590; ConvF(7.80,7.80,7.80); Crest factor: 1.0; 450 MHz Brain: σ = 0.89 mho/m ε_r = 44.6 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 2.00 mW/g, SAR (1g): 1.25 mW/g, SAR (10g): 0.810 mW/g, (Worst-case extrapolation)
Penetration depth: 12.0 (10.1, 14.1) [mm]; Powerdrift: -0.01 dB
Ambient Temp: 23.2°C; Fluid Temp: 20.5°C

Forward Conducted Power: 250 mW
Date Tested: March 07, 2003



APPENDIX C - SYSTEM VALIDATION

Celltech
Testing and Engineering Services Lab

450MHz SYSTEM VALIDATION DIPOLE

Type:	**450MHz Validation Dipole**
Serial Number:	**136**
Place of Calibration:	**Celltech Research Inc.**
Date of Calibration:	**October 17, 2002**

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

Calibrated by: Russell W. Pipe

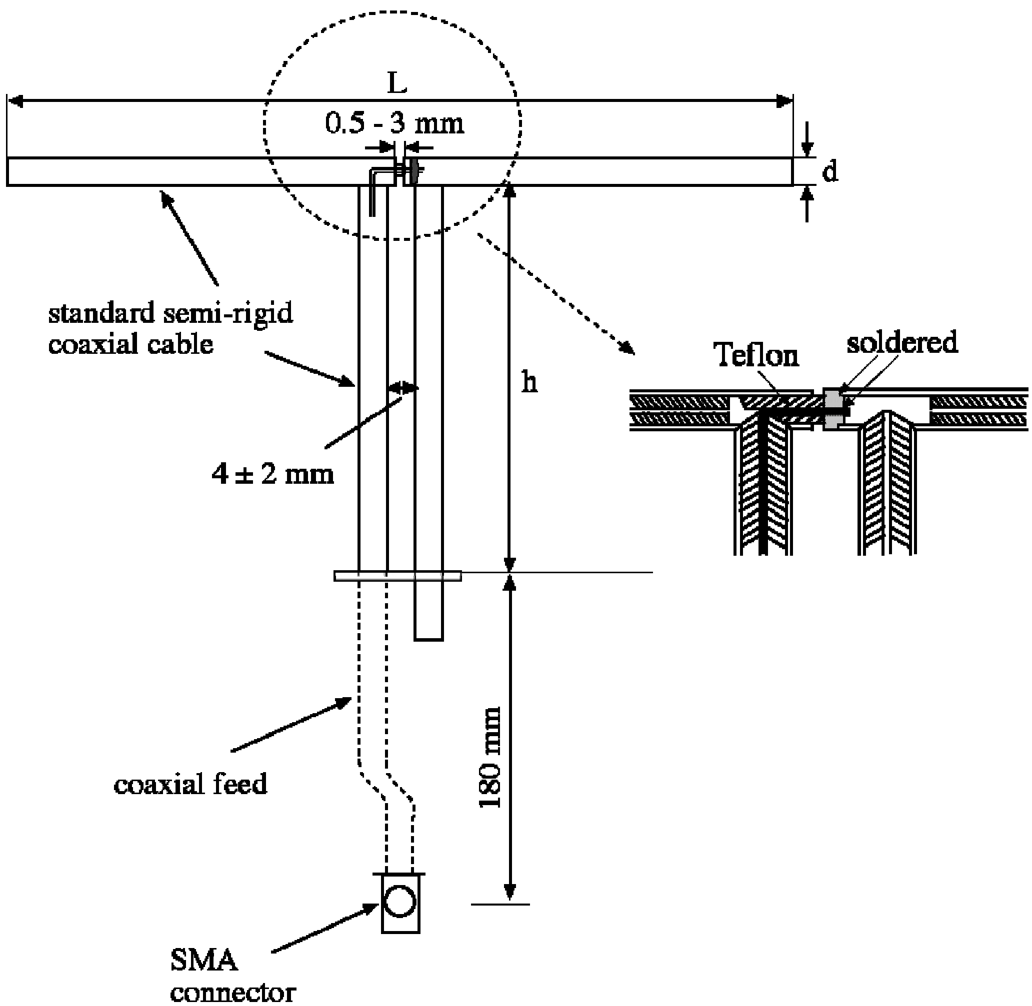
Approved by:

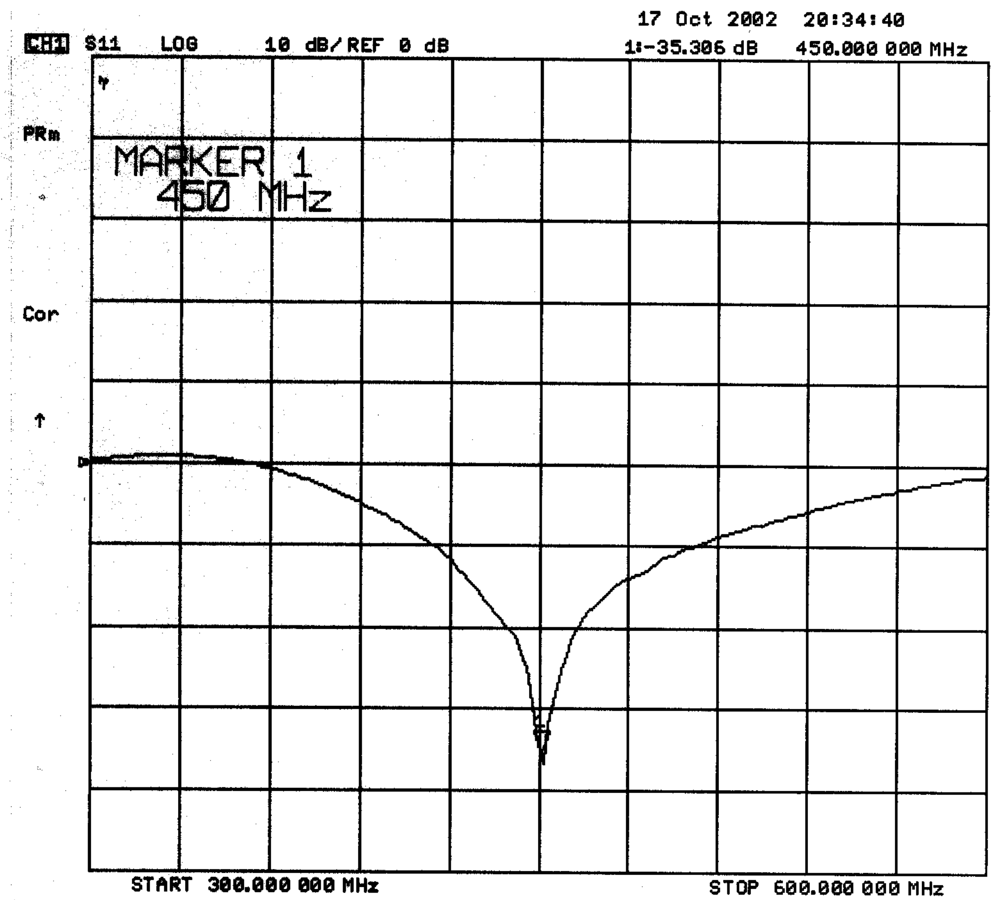
Celltech Research Inc. 1955 Moss Court, Kelowna, B.C. Canada V1Y 9L3
Tel. 250-448-7047 • Fax. 250-448-7046 • e-mail: info@celltechlabs.com
www.celltechlabs.com

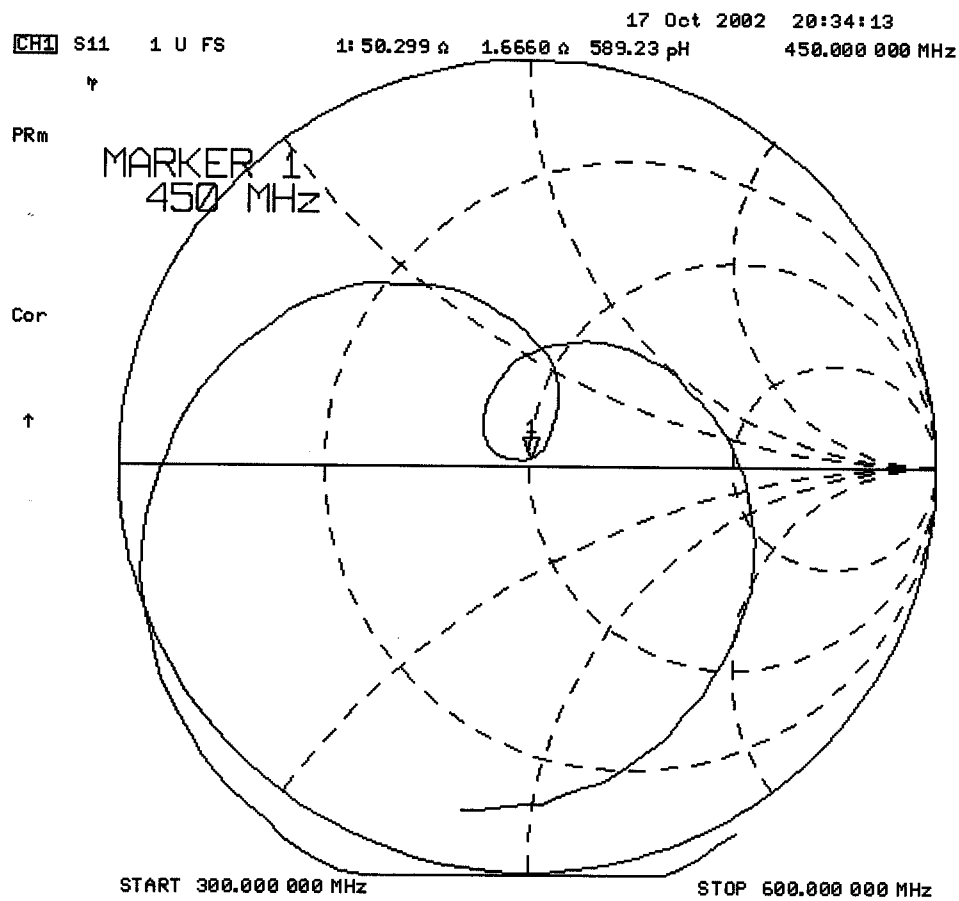
1. Dipole Construction & Electrical Characteristics

The validation dipole was constructed in accordance with the IEEE Std "Recommended Practice for Determining the Spatial-Peak Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques". The electrical properties were measured using an HP 8753E Network Analyzer. The network analyzer was calibrated to the validation dipole N-type connector feed point using an HP85032E Type N calibration kit. The dipole was placed parallel to a planar phantom at a separation distance of 15.0mm from the simulating fluid using a loss-less dielectric spacer. The measured input impedance is:

Feed point impedance at 450MHz	Re{Z} = 50.299Ω
	Im{Z} = 1.6660Ω
Return Loss at 450MHz	-35.306dB




17 Oct 2002 20:34:40
CH1 S11 LOG 10 dB/ REF 0 dB
1:-35.306 dB 450.000 000 MHz
PRm
Cor
MARKER 1
450 MHz
START 300.000 000 MHz
STOP 600.000 000 MHz


17 Oct 2002 20:34:13
CH1 S11 1 U FS
1: 50.299 Ω 1.6660 Ω 589.23 pH
450.000 000 MHz
PRm
Cor
MARKER 1
450 MHz
START 300.000 000 MHz
STOP 600.000 000 MHz

Validation Dipole Dimensions

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

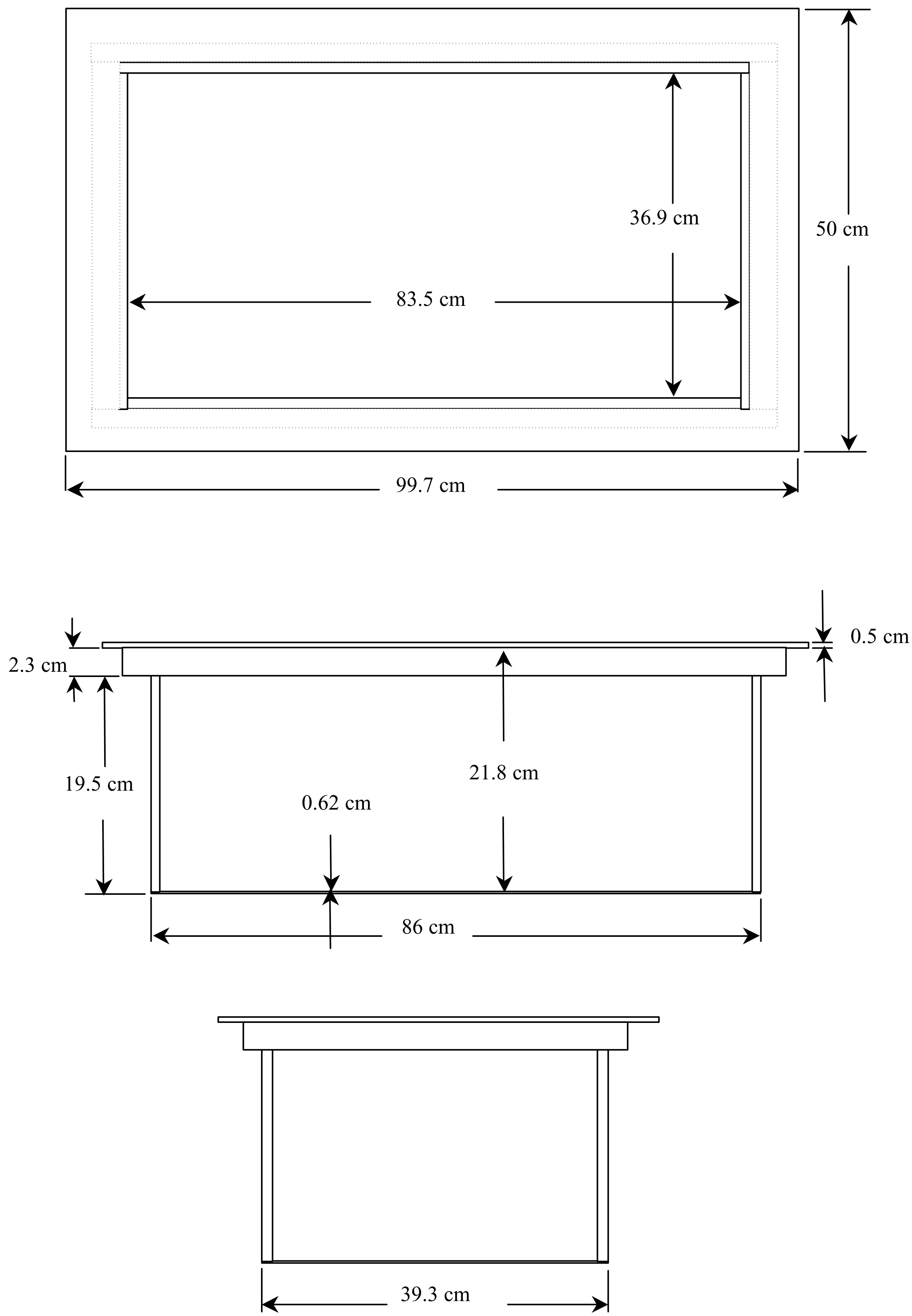
2. Validation Phantom

The validation phantom was constructed using relatively low-loss tangent Plexiglas material. The dimensions of the phantom are as follows:

Length: 83.5 cm
Width: 36.9 cm
Height: 21.8 cm

The bottom of the phantom is constructed of 6.2 ± 0.1mm Plexiglas.

Dimensions of Plexiglas Planar Phantom



450MHz System Validation Setup

450MHz System Validation Setup

3. Measurement Conditions

The planar phantom was filled with brain simulating tissue having the following electrical parameters at 450MHz:

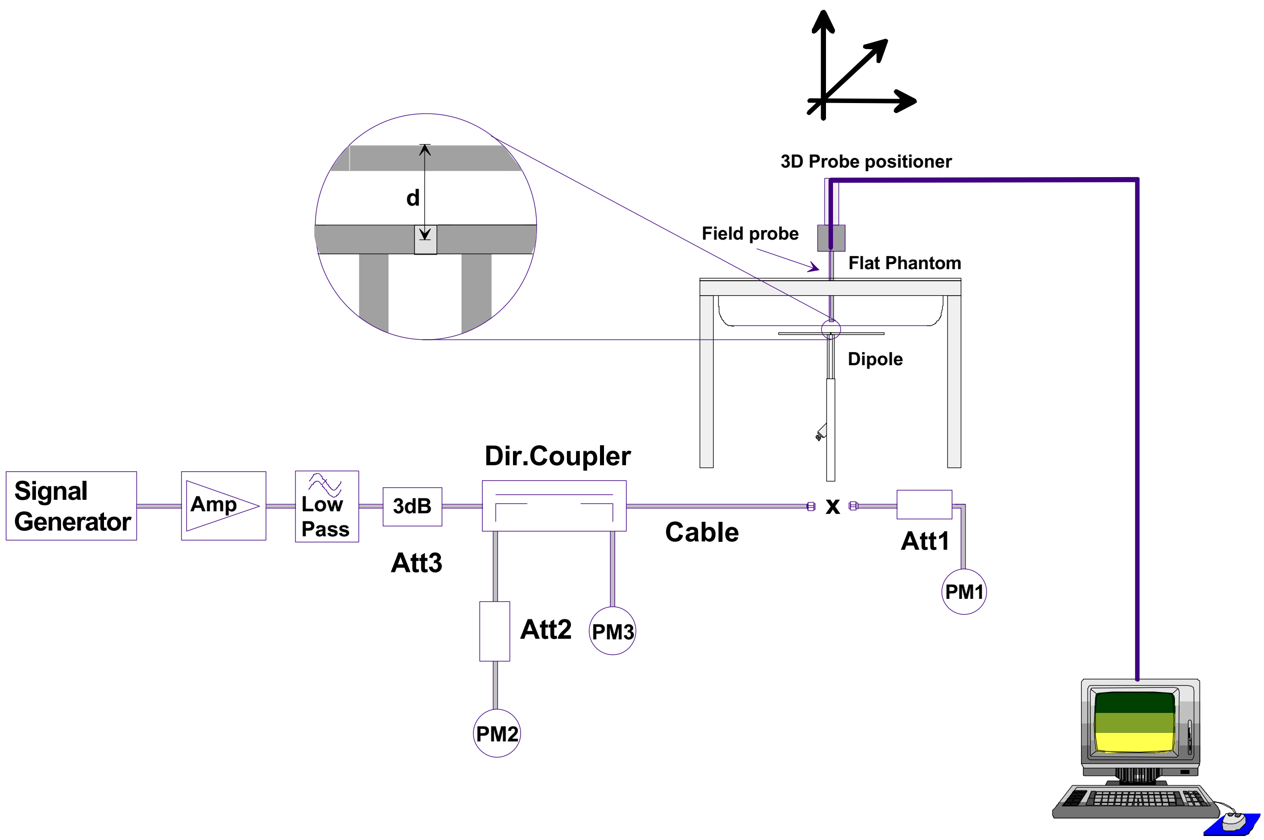
Relative Permittivity:	44.1
Conductivity:	0.88 mho/m
Ambient Temperature:	23.3 °C
Fluid Temperature:	22.2 °C
Fluid Depth:	≥ 15.0 cm

The 450MHz simulating tissue consists of the following ingredients:

Ingredient	Percentage by weight
Water	38.56%
Sugar	56.32%
Salt	3.95%
HEC	0.98%
Dowicil 75	0.19%
Target Dielectric Parameters at 22°C	ε_r = 43.5 σ = 0.87 S/m

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	1.32	5.28	0.887	3.55	2.20
Test 2	1.26	5.04	0.856	3.42	2.09
Test 3	1.38	5.52	0.931	3.72	2.30
Test 4	1.36	5.44	0.917	3.67	2.27
Test 5	1.37	5.48	0.922	3.69	2.28
Test 6	1.33	5.32	0.896	3.58	2.22
Test 7	1.34	5.36	0.902	3.61	2.24
Test 8	1.33	5.32	0.895	3.58	2.21
Test 9	1.39	5.56	0.931	3.72	2.31
Test10	1.36	5.44	0.917	3.67	2.27
Average Value	1.34	5.38	0.905	3.62	2.24

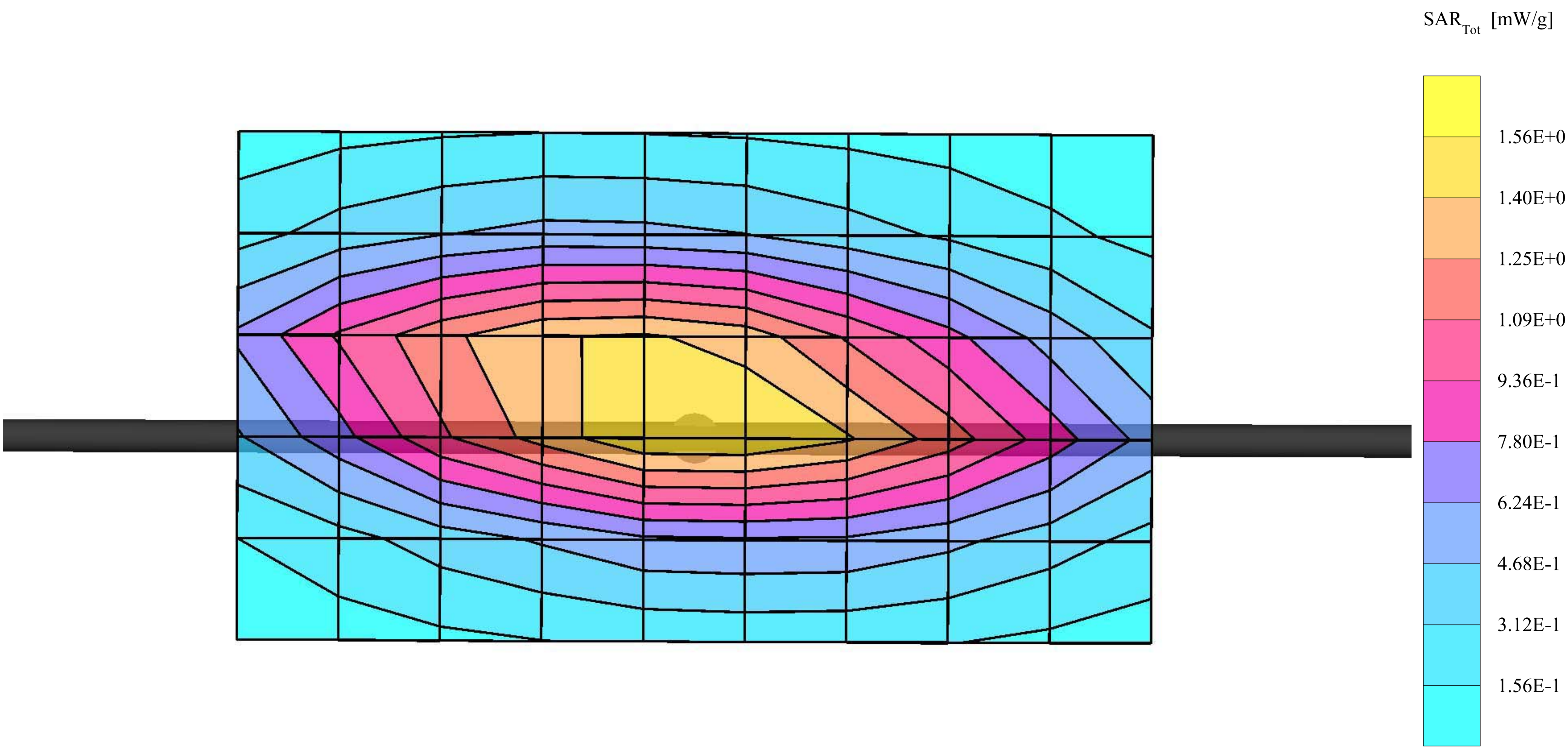
The results have been normalized to 1W (forward power) into the dipole.

Averaged over 1cm (1g) of tissue: 5.38 mW/g

Averaged over 10cm (10g) of tissue: 3.62 mW/g

Dipole 450MHz, d = 15 mm

Frequency: 450 MHz; Antenna Input Power: 250 [mW]
Large Planar Phantom; Planar Section
Probe: ET3DV6 - SN1387; ConvF(7.30,7.30,7.30); Crest factor: 1.0; 450 MHz Brain: σ = 0.88 mho/m ε_r = 44.1 ρ = 1.00 g/cm³
Cube 5x5x7: Peak: 2.24 mW/g, SAR (1g): 1.34 mW/g, SAR (10g): 0.905 mW/g, (Worst-case extrapolation)
Penetration depth: 12.0 (10.5, 14.0) [mm]; Powerdrift: 0.01 dB; Ambient Temp.: 23.3°C; Fluid Temp.: 22.2°C
Calibration Date: October 17, 2002



450MHz System Validation

Measured Fluid Dielectric Parameters (Brain)

October 17, 2002

Frequency	e'	e''
350.000000 MHz	46.6334	40.6323
360.000000 MHz	46.3629	40.0034
370.000000 MHz	46.1498	39.3672
380.000000 MHz	45.8833	38.6723
390.000000 MHz	45.5947	38.0484
400.000000 MHz	45.3226	37.4538
410.000000 MHz	45.0977	36.9636
420.000000 MHz	44.8241	36.4841
430.000000 MHz	44.5839	35.9541
440.000000 MHz	44.3183	35.5098
450.000000 MHz	44.0572	35.0854
460.000000 MHz	43.8600	34.7069
470.000000 MHz	43.6544	34.3371
480.000000 MHz	43.4507	33.9296
490.000000 MHz	43.2880	33.5147
500.000000 MHz	43.0921	33.1731
510.000000 MHz	42.8781	32.7813
520.000000 MHz	42.6765	32.4193
530.000000 MHz	42.5864	32.1000
540.000000 MHz	42.4644	31.7180
550.000000 MHz	42.3042	31.4503

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:	**1590**
Place of Calibration:	**Zurich**
Date of Calibration:	**December 1, 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: D. Vetter

Approved by: [signature]

Schmid & Partner
Engineering AG

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

Probe ET3DV6

SN:1590

Manufactured:	March 19, 2001
Last calibration:	April 26, 2002
Recalibrated:	December 1, 2002

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1590

Sensitivity in Free Space

NormX	**1.75**	$\mu V/(V/m)^2$
NormY	**1.89**	$\mu V/(V/m)^2$
NormZ	**1.63**	$\mu V/(V/m)^2$

Diode Compression

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

Sensitivity in Tissue Simulating Liquid

Head 900 MHz ε_r **= 41.5 ± 5%** σ **= 0.97 ± 5% mho/m**
Head 835 MHz ε_r **= 41.5 ± 5%** σ **= 0.90 ± 5% mho/m**

ConvF X	**6.9**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.9**	± 9.5% (k=2)	Alpha	**0.30**
ConvF Z	**6.9**	± 9.5% (k=2)	Depth	**2.71**

Head 1800 MHz ε_r **= 40.0 ± 5%** σ **= 1.40 ± 5% mho/m**
Head 1900 MHz ε_r **= 40.0 ± 5%** σ **= 1.40 ± 5% mho/m**

ConvF X	**5.6**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**5.6**	± 9.5% (k=2)	Alpha	**0.42**
ConvF Z	**5.6**	± 9.5% (k=2)	Depth	**2.56**

Boundary Effect

Head 900 MHz Typical SAR gradient: 5 % per mm

Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	8.7	5.0
SAR_{be} [%]	With Correction Algorithm	0.3	0.5

Head 1800 MHz Typical SAR gradient: 10 % per mm

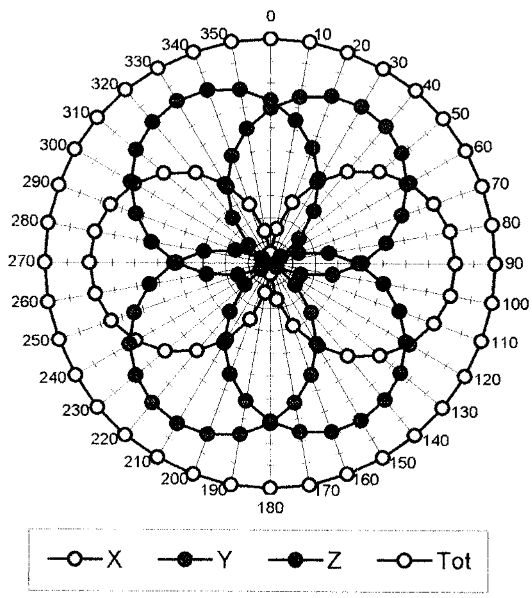
Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	10.7	7.4
SAR_{be} [%]	With Correction Algorithm	0.1	0.3

Sensor Offset

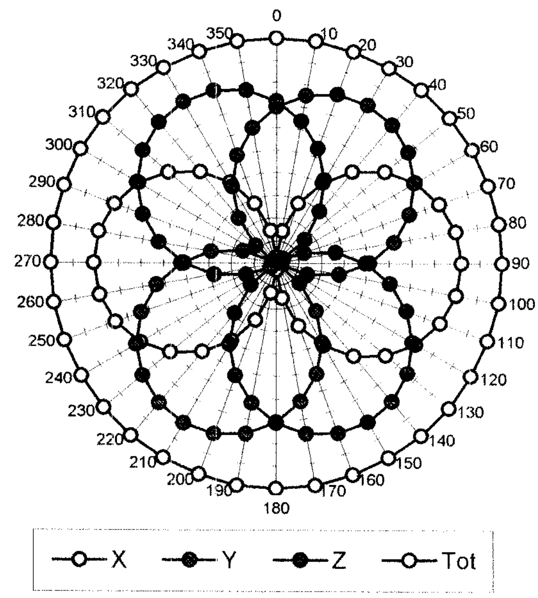
Probe Tip to Sensor Center	**2.7**	mm
Optical Surface Detection	**1.2 ± 0.2**	mm

Receiving Pattern (ϕ), θ = 0°

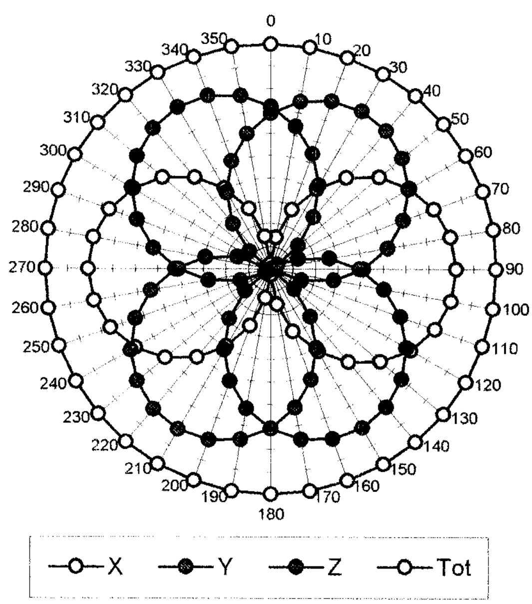
f = 30 MHz, TEM cell ifi110



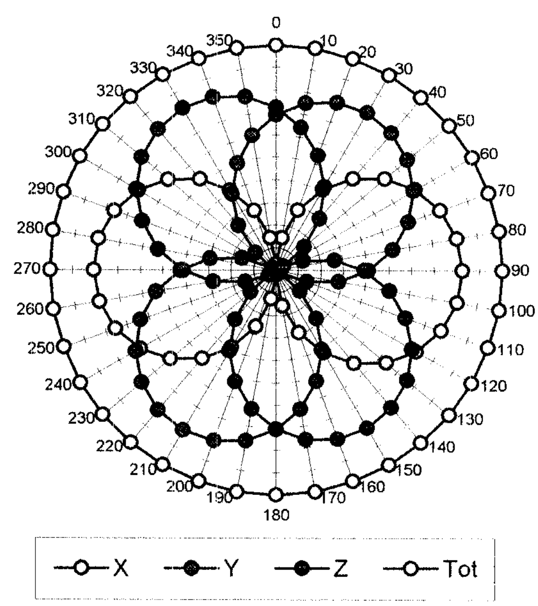
f = 100 MHz, TEM cell ifi110

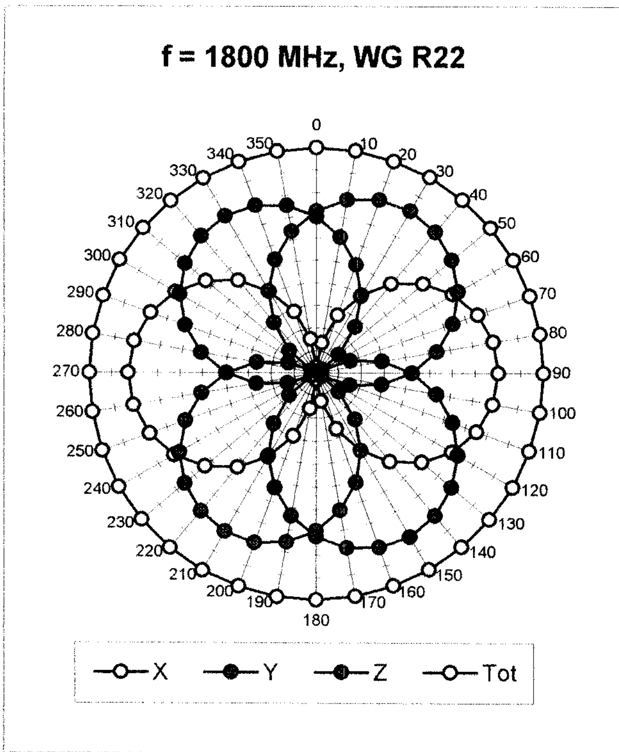


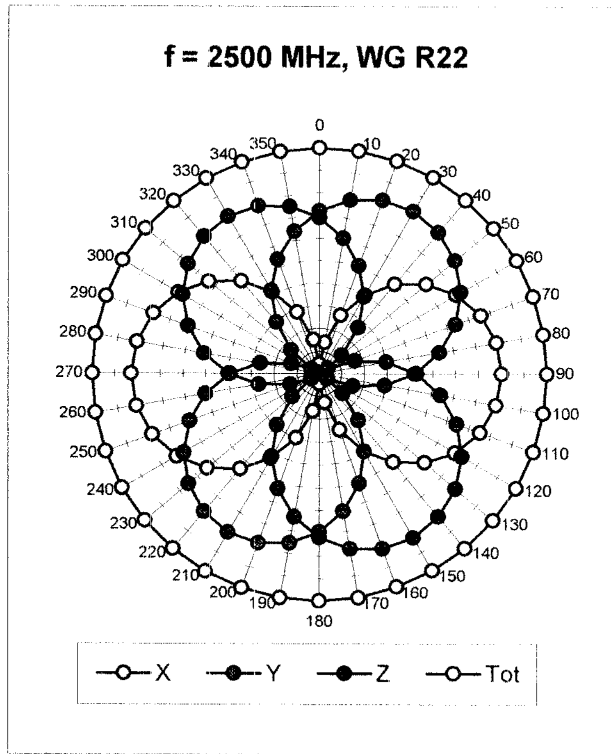
f = 300 MHz, TEM cell ifi110



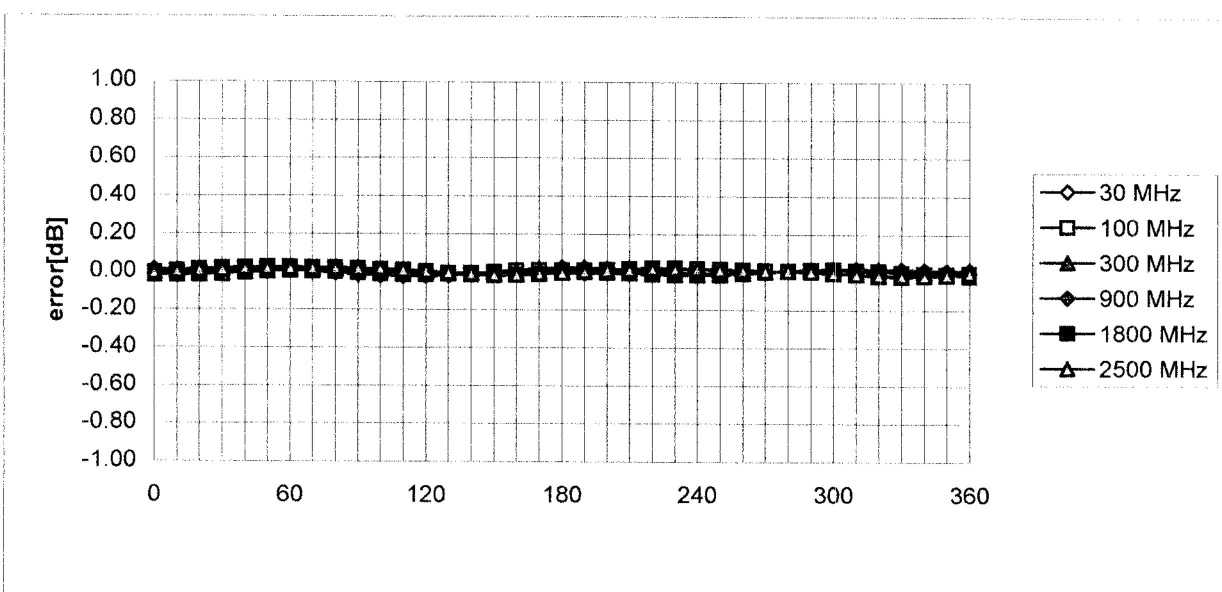
f = 900 MHz, TEM cell ifi110





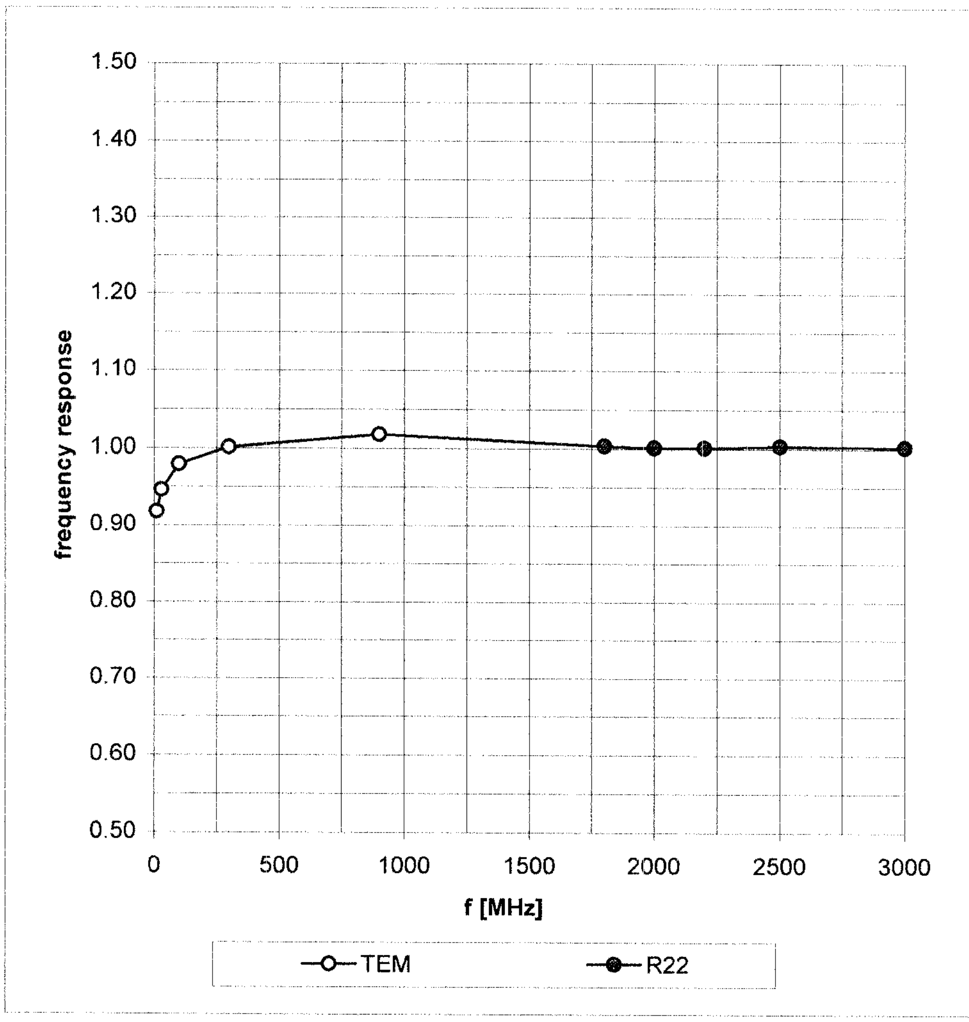


Isotropy Error (ϕ), θ = 0°



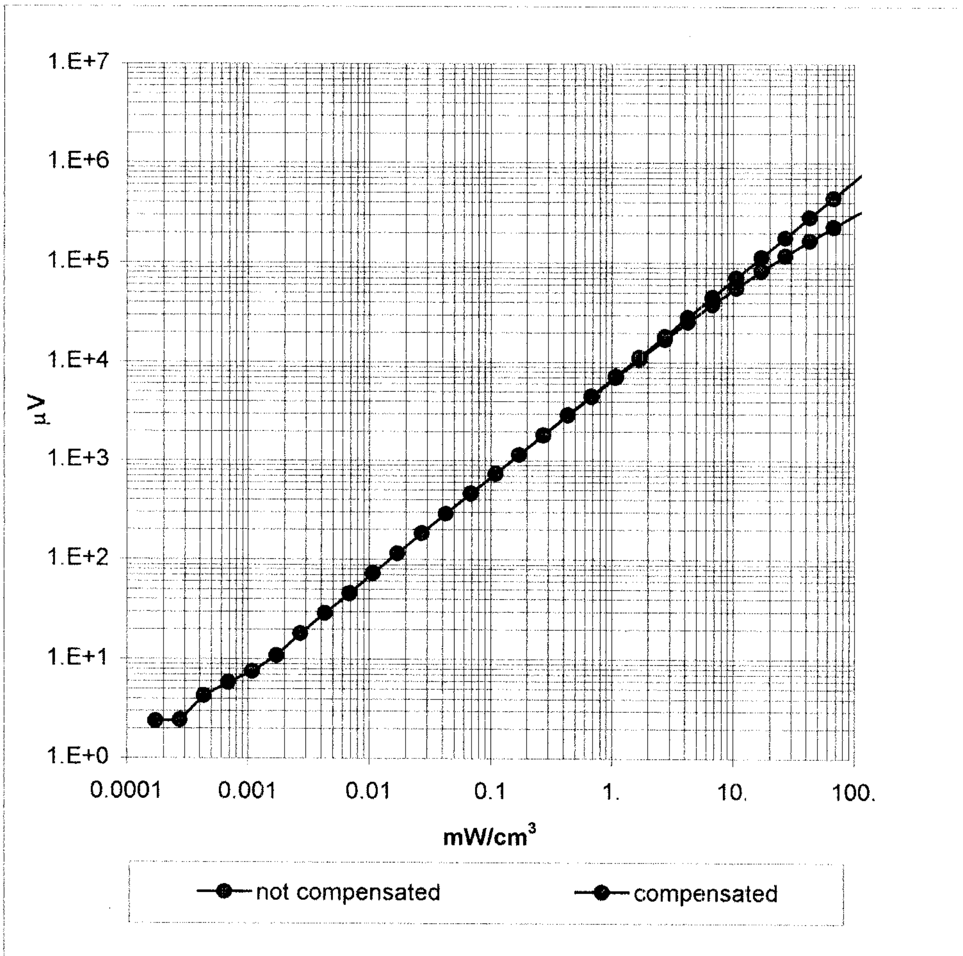
Frequency Response of E-Field

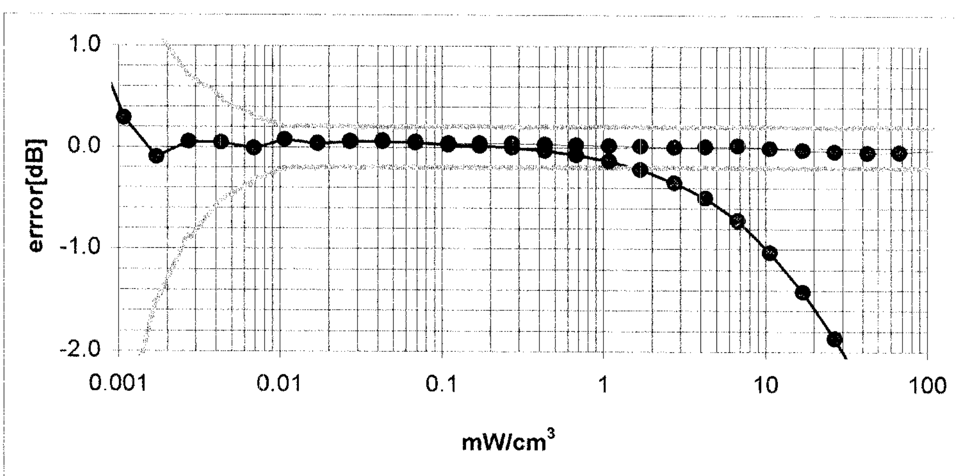
(TEM-Cell:ifi110, Waveguide R22)



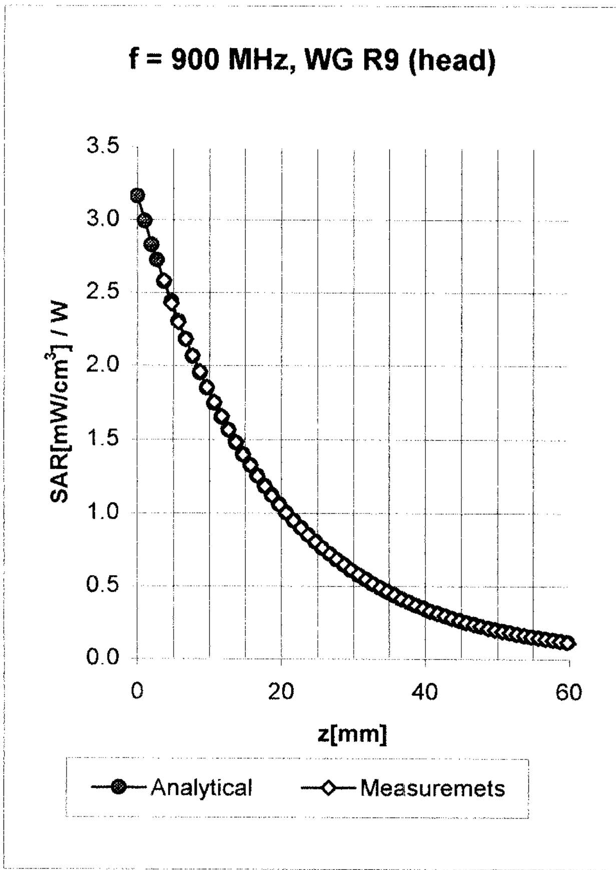
Dynamic Range f(SAR_{brain})

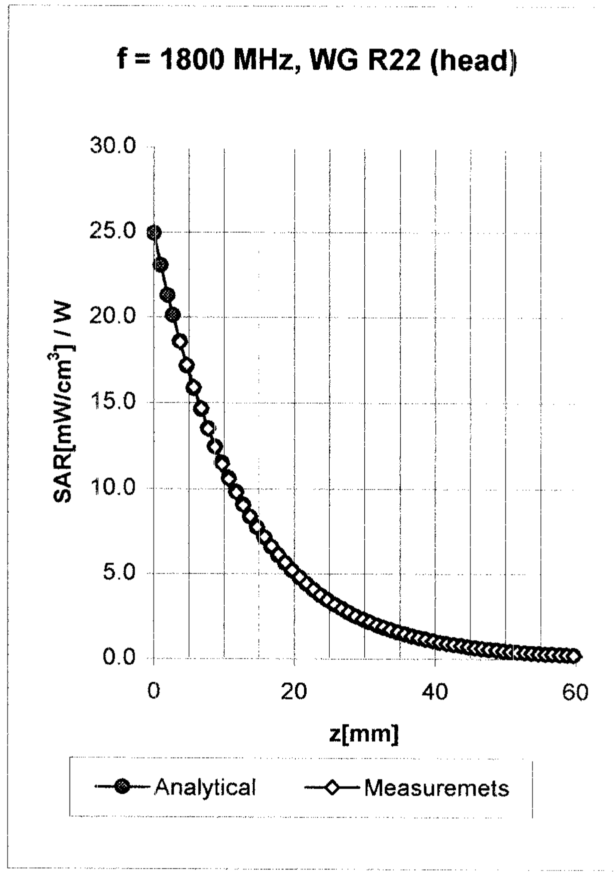
(Waveguide R22)





Conversion Factor Assessment

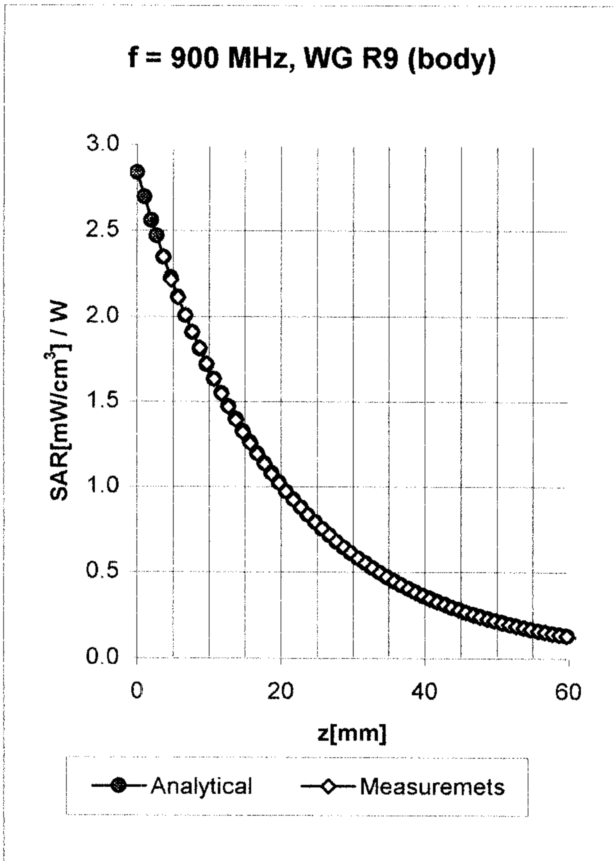


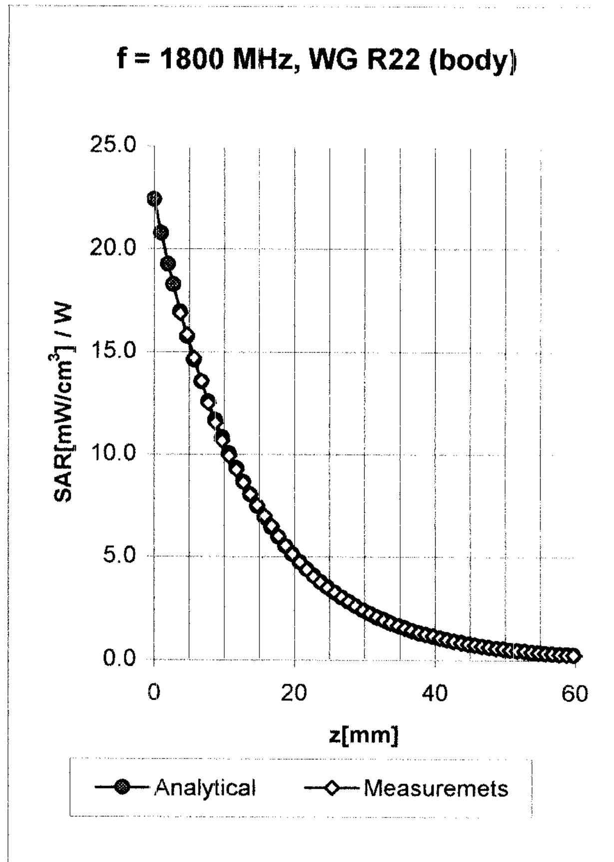


Head	**900 MHz**		ε_r = **41.5 ± 5%**	σ = **0.97 ± 5% mho/m**	
Head	**835 MHz**		ε_r = **41.5 ± 5%**	σ = **0.90 ± 5% mho/m**	
	ConvF X	**6.9**	± 9.5% (k=2)	Boundary effect:	
	ConvF Y	**6.9**	± 9.5% (k=2)	Alpha	**0.30**
	ConvF Z	**6.9**	± 9.5% (k=2)	Depth	**2.71**

Head	**1800 MHz**		ε_r = **40.0 ± 5%**	σ = **1.40 ± 5% mho/m**	
Head	**1900 MHz**		ε_r = **40.0 ± 5%**	σ = **1.40 ± 5% mho/m**	
	ConvF X	**5.6**	± 9.5% (k=2)	Boundary effect:	
	ConvF Y	**5.6**	± 9.5% (k=2)	Alpha	**0.42**
	ConvF Z	**5.6**	± 9.5% (k=2)	Depth	**2.56**

Conversion Factor Assessment



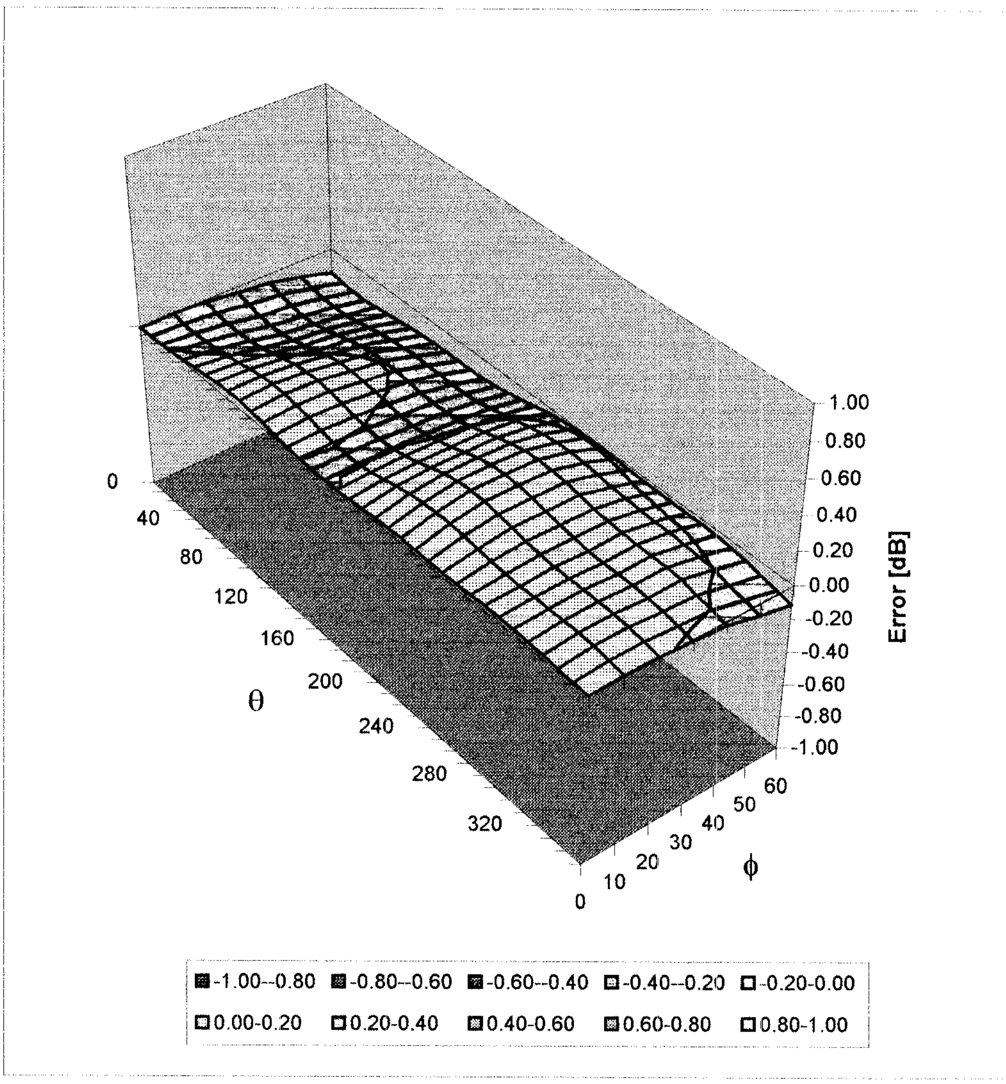


Body	**900 MHz**		ε_r **= 55.0 ± 5%**		σ **= 1.05 ± 5% mho/m**	
Body	**835 MHz**		ε_r **= 55.2 ± 5%**		σ **= 0.97 ± 5% mho/m**	
	ConvF X	**6.7**	± 9.5% (k=2)		Boundary effect:	
	ConvF Y	**6.7**	± 9.5% (k=2)		Alpha	**0.34**
	ConvF Z	**6.7**	± 9.5% (k=2)		Depth	**2.57**

Body	**1800 MHz**		ε_r **= 53.3 ± 5%**		σ **= 1.52 ± 5% mho/m**	
Body	**1900 MHz**		ε_r **= 53.3 ± 5%**		σ **= 1.52 ± 5% mho/m**	
	ConvF X	**5.3**	± 9.5% (k=2)		Boundary effect:	
	ConvF Y	**5.3**	± 9.5% (k=2)		Alpha	**0.52**
	ConvF Z	**5.3**	± 9.5% (k=2)		Depth	**2.46**

Deviation from Isotropy in HSL

Error (θ,ϕ), f = 900 MHz



Schmid & Partner
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Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ET3DV6**
Serial Number:	**1590**
Place of Assessment:	**Zurich**
Date of Assessment:	**May 1, 2002**
Probe Calibration Date:	**April 26, 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:1590

Conversion factor (± standard deviation)

150 MHz	ConvF	**9.4 ± 8%**	**ε_r = 52.3** **σ = 0.76 mho/m** (head tissue)
300 MHz	ConvF	**8.2 ± 8%**	**ε_r = 45.3** **σ = 0.87 mho/m** (head tissue)
450 MHz	ConvF	**7.8 ± 8%**	**ε_r = 43.5** **σ = 0.87mho/m** (head tissue)
150 MHz	ConvF	**9.1 ± 8%**	**ε_r = 61.9** **σ = 0.80 mho/m** (body tissue)
450 MHz	ConvF	**7.9 ± 8%**	**ε_r = 56.7** **σ = 0.94 mho/m** (body tissue)
2450 MHz	ConvF	**4.5 ± 8%**	**ε_r = 39.2** **σ = 1.80 mho/m** (head tissue)
2450 MHz	ConvF	**4.1 ± 8%**	**ε_r = 52.7** **σ = 1.95 mho/m** (body tissue)

APPENDIX E - MEASURED FLUID DIELECTRIC PARAMETERS

450MHz System Performance Check & EUT Evaluation (Face)

Measured Fluid Dielectric Parameters (Brain)

March 03, 2003

Frequency	e'	e''
350.000000 MHz	46.0841	39.7782
360.000000 MHz	45.7201	39.0717
370.000000 MHz	45.4678	38.4009
380.000000 MHz	45.1708	37.8042
390.000000 MHz	44.9872	37.2336
400.000000 MHz	44.7186	36.7448
410.000000 MHz	44.4998	36.2324
420.000000 MHz	44.3551	35.7535
430.000000 MHz	44.0837	35.2369
440.000000 MHz	43.8406	34.8358
450.000000 MHz	43.5681	34.4203
460.000000 MHz	43.3853	34.0372
470.000000 MHz	43.2153	33.6323
480.000000 MHz	42.9671	33.1421
490.000000 MHz	42.7245	32.7408
500.000000 MHz	42.5069	32.4371
510.000000 MHz	42.3130	32.1253
520.000000 MHz	42.1387	31.7896
530.000000 MHz	41.9384	31.4553
540.000000 MHz	41.8385	31.0681
550.000000 MHz	41.6391	30.8060

450MHz System Performance Check & EUT Evaluation (Face)

Measured Fluid Dielectric Parameters (Brain)

March 04, 2003

Frequency	e'	e''
350.000000 MHz	47.3734	40.7493
360.000000 MHz	47.1413	40.0265
370.000000 MHz	46.8594	39.3603
380.000000 MHz	46.6134	38.7023
390.000000 MHz	46.3342	38.1148
400.000000 MHz	46.0803	37.6164
410.000000 MHz	45.8755	37.0943
420.000000 MHz	45.6360	36.6824
430.000000 MHz	45.3460	36.1901
440.000000 MHz	45.0805	35.7173
450.000000 MHz	44.8191	35.3219
460.000000 MHz	44.6387	34.9038
470.000000 MHz	44.3962	34.4504
480.000000 MHz	44.1897	34.0014
490.000000 MHz	43.9285	33.5976
500.000000 MHz	43.7512	33.2305
510.000000 MHz	43.5749	32.9280
520.000000 MHz	43.4205	32.6170
530.000000 MHz	43.2124	32.2465
540.000000 MHz	43.1037	31.9036
550.000000 MHz	42.9139	31.6114

450MHz System Performance Check

Measured Fluid Dielectric Parameters (Brain)

March 05, 2003

Frequency	e'	e''
350.000000 MHz	46.6870	40.3711
360.000000 MHz	46.4549	39.6482
370.000000 MHz	46.1731	38.9824
380.000000 MHz	45.9275	38.3245
390.000000 MHz	45.6478	37.7363
400.000000 MHz	45.3939	37.2381
410.000000 MHz	45.1892	36.7167
420.000000 MHz	44.9496	36.3041
430.000000 MHz	44.6590	35.8118
440.000000 MHz	44.3941	35.3390
450.000000 MHz	44.1327	34.9436
460.000000 MHz	43.9523	34.5255
470.000000 MHz	43.7098	34.0721
480.000000 MHz	44.8762	33.6233
490.000000 MHz	43.2426	33.2192
500.000000 MHz	43.0648	32.8522
510.000000 MHz	42.8885	32.5497
520.000000 MHz	42.7341	32.2388
530.000000 MHz	42.5264	31.8682
540.000000 MHz	42.4173	31.5253
550.000000 MHz	42.2277	31.2331

450MHz EUT Evaluation (Body)

Measured Fluid Dielectric Parameters (Muscle)

March 05, 2003

Frequency	e'	e''
350.000000 MHz	59.5094	43.8435
360.000000 MHz	59.3379	42.9867
370.000000 MHz	59.1902	42.1686
380.000000 MHz	59.0189	41.3830
390.000000 MHz	58.8546	40.6661
400.000000 MHz	58.7221	39.9763
410.000000 MHz	58.5426	39.3468
420.000000 MHz	58.4216	38.7746
430.000000 MHz	58.2519	38.2358
440.000000 MHz	58.0705	37.7514
450.000000 MHz	57.8801	37.2794
460.000000 MHz	57.7962	36.7855
470.000000 MHz	57.6817	36.3071
480.000000 MHz	57.5652	35.8014
490.000000 MHz	57.3786	35.3652
500.000000 MHz	57.3129	34.9704
510.000000 MHz	57.1160	34.5158
520.000000 MHz	56.9793	34.1481
530.000000 MHz	56.8384	33.8106
540.000000 MHz	56.7731	33.3926
550.000000 MHz	56.6477	33.0823

450MHz System Performance Check

Measured Fluid Dielectric Parameters (Brain)

March 06, 2003

Frequency	e'	e''
350.000000 MHz	46.9078	39.8254
360.000000 MHz	46.6884	39.1511
370.000000 MHz	46.4002	38.4771
380.000000 MHz	46.1076	37.9161
390.000000 MHz	45.8356	37.3281
400.000000 MHz	45.5678	36.8319
410.000000 MHz	45.3067	36.2982
420.000000 MHz	45.0463	35.8302
430.000000 MHz	44.7723	35.3279
440.000000 MHz	44.5660	34.9439
450.000000 MHz	44.3123	34.5004
460.000000 MHz	44.1472	34.1452
470.000000 MHz	43.9199	33.7521
480.000000 MHz	43.7411	33.3324
490.000000 MHz	43.5177	32.9199
500.000000 MHz	43.2967	32.5751
510.000000 MHz	43.1022	32.2397
520.000000 MHz	42.9675	31.9235
530.000000 MHz	42.6931	31.6117
540.000000 MHz	42.5678	31.2380
550.000000 MHz	42.3655	30.9775

450MHz EUT Evaluation (Body)

Measured Fluid Dielectric Parameters (Muscle)

March 06, 2003

Frequency	e'	e''
350.000000 MHz	59.3665	43.7827
360.000000 MHz	59.1320	42.9510
370.000000 MHz	58.9691	42.1496
380.000000 MHz	58.8493	41.4355
390.000000 MHz	58.7162	40.6258
400.000000 MHz	58.5946	39.9788
410.000000 MHz	58.4228	39.2654
420.000000 MHz	58.2255	38.7107
430.000000 MHz	58.0542	38.0953
440.000000 MHz	57.8971	37.5713
450.000000 MHz	57.7042	37.1239
460.000000 MHz	57.6019	36.6666
470.000000 MHz	57.4788	36.2215
480.000000 MHz	57.3562	35.7566
490.000000 MHz	57.1904	35.3182
500.000000 MHz	57.0706	34.9031
510.000000 MHz	56.9381	34.4883
520.000000 MHz	56.8204	34.1180
530.000000 MHz	56.6432	33.7576
540.000000 MHz	56.5834	33.2836
550.000000 MHz	56.4438	32.9721

450MHz System Performance Check

Measured Fluid Dielectric Parameters (Brain)

March 07, 2003

Frequency	e'	e''
350.000000 MHz	46.9998	41.3454
360.000000 MHz	46.6875	40.7014
370.000000 MHz	46.4127	40.0539
380.000000 MHz	46.2105	39.4416
390.000000 MHz	45.8527	38.8071
400.000000 MHz	45.6179	38.3348
410.000000 MHz	45.3878	37.6799
420.000000 MHz	45.1793	37.1129
430.000000 MHz	45.0038	36.5179
440.000000 MHz	44.8368	36.0632
450.000000 MHz	44.5876	35.6414
460.000000 MHz	44.4487	35.2116
470.000000 MHz	44.2519	34.7819
480.000000 MHz	44.0376	34.3642
490.000000 MHz	43.7830	33.9708
500.000000 MHz	43.5682	33.6555
510.000000 MHz	43.3551	33.3026
520.000000 MHz	43.1707	32.9752
530.000000 MHz	42.9736	32.6304
540.000000 MHz	42.8826	32.1756
550.000000 MHz	42.6705	31.9470

450MHz EUT Evaluation (Body)

Measured Fluid Dielectric Parameters (Muscle)

March 07, 2003

Frequency	e'	e''
350.000000 MHz	60.4008	42.7545
360.000000 MHz	60.1844	41.9611
370.000000 MHz	59.9905	41.1810
380.000000 MHz	59.8433	40.4977
390.000000 MHz	59.7514	39.8467
400.000000 MHz	59.5817	39.2178
410.000000 MHz	59.4073	38.6388
420.000000 MHz	59.3857	38.0752
430.000000 MHz	59.1729	37.4522
440.000000 MHz	59.0309	36.9486
450.000000 MHz	58.8471	36.4931
460.000000 MHz	58.7212	36.0530
470.000000 MHz	58.5670	35.5435
480.000000 MHz	58.3958	35.0570
490.000000 MHz	58.1946	34.6488
500.000000 MHz	58.0281	34.2831
510.000000 MHz	57.8996	33.9046
520.000000 MHz	57.8023	33.5653
530.000000 MHz	57.6762	33.2272
540.000000 MHz	57.6114	32.8199
550.000000 MHz	57.5153	32.5047