APPENDIX A: FCC PART 1.1307, 1.1310, 2.1091, 2.1093: RF EXPOSURES

Please see the SAR Evaluation that follows.

DECLARATION OF COMPLIANCE
SAR EVALUATION

Test Lab

CELLTECH RESEARCH INC.
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Applicant Information

M/A-COM PRIVATE RADIO SYSTEMS, INC.
3315 Old Forest Road
Lynchburg, VA 24501

Rule Part(s):	**FCC §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 VHF PTT Radio Transceiver**
FCC ID:	**OWDTR-0013-E**
Model Name / No.:	**P7100(IP)**
Modulation:	**FM (VHF Band)**
Tx Frequency Range:	**136 - 174 MHz**
Max. Cond. Power Tested:	**37.68 dBm**
Antenna Type(s):	**Helical Coil**
Antenna Part No.(s):	**KRE1011219/1 (136-151 MHz) / KRE1011219/2 (150-162 MHz) / KRE1011219/3 (162-174 MHz)**
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)**

Celltech Research Inc. declares under its sole responsibility that this device was found to be in compliance with the Specific Absorption Rate (SAR) RF exposure requirements specified in FCC 47 CFR §2.1093 and Health Canada's Safety Code 6. The device was tested in accordance with the measurement standards and procedures specified in FCC OET Bulletin 65, Supplement C, Edition 01-01 and Industry Canada RSS-102 Issue 1 (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.

Russell Pipe
Senior Compliance Technologist
Celltech Research Inc.

TABLE OF CONTENTS

1.0 INTRODUCTION

This measurement report demonstrates that the M/A-COM PRS INC. Model: P7100(IP) Portable VHF PTT Radio Transceiver FCC ID: OWDTR-0013-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.

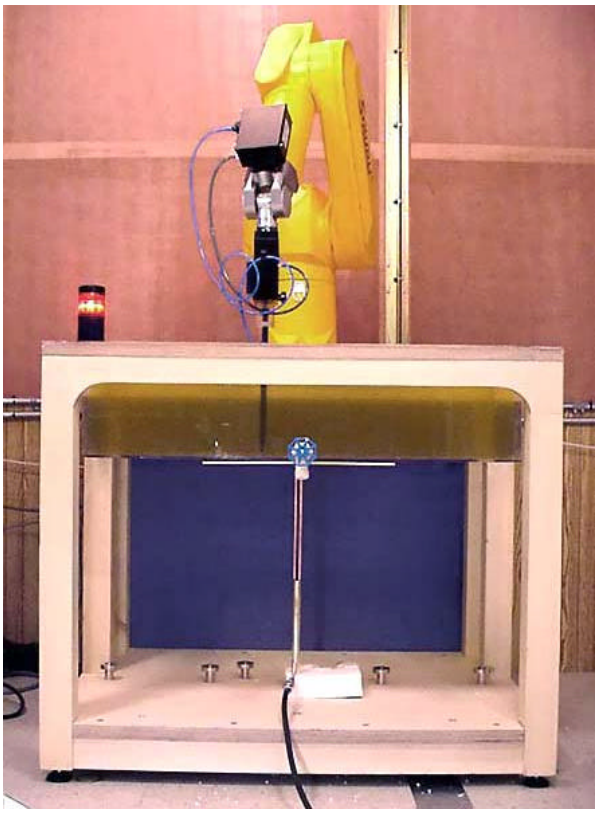
2.0 DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

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 VHF PTT Radio Transceiver
FCC ID	OWDTR-0013-E
Model Name / No.	P7100(IP)
Serial No.	Pre-production
Modulation	FM (VHF)
Tx Frequency Range	136 - 174 MHz
Max. RF Conducted Power Tested	37.68 dBm
Antenna Type(s)	Helical Coil
Antenna Part No.(s)	KRE1011219/1 (136-151 MHz) KRE1011219/2 (150-162 MHz) KRE1011219/3 (162-174 MHz)
Antenna Length(s)	KRE1011219/1 - 171 mm KRE1011219/2 - 151 mm KRE1011219/3 - 141 mm
Available 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 Research 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 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 small planar phantom



DASY3 SAR Measurement System with validation phantom

4.0 MEASUREMENT SUMMARY

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

FACE-HELD SAR MEASUREMENT RESULTS

Freq. (MHz)	Channel	Test Mode	Conducted Pwr. (dBm)		Antenna Part No.	Accessory Type	Battery Type	Phantom Section	Separ. Dist. (cm)	SAR 1g (w/kg)	
			Before	After						100% Duty Cycle	50% Duty Cycle
155.00	Mid	CW	37.68	37.60	KRE1011219/2	None	NiMH	Planar	2.5	1.54	0.770
155.00	Mid	CW	37.68	37.58	KRE1011219/2	None	NiCD	Planar	2.5	2.00	1.00
136.00	Low	CW	37.68	37.51	KRE1011219/1	None	NiCD	Planar	2.5	0.125	0.0625
174.00	High	CW	37.40	37.26	KRE1011219/3	None	NiCD	Planar	2.5	0.308	0.154
155.00	Mid	CW	37.68	37.52	KRE1011219/2	SM with Ant.	NiMH	Planar	2.5	1.84	0.920
155.00	Mid	CW	37.68	37.53	KRE1011219/2	SM with Ant.	NiCD	Planar	2.5	2.34	1.17
136.00	Low	CW	37.68	37.68	KRE1011219/1	SM with Ant.	NiCD	Planar	2.5	0.673	0.337
174.00	High	CW	37.40	37.30	KRE1011219/3	SM with Ant.	NiCD	Planar	2.5	1.09	0.545

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

Test Date(s)	08/22/02		**r (Kg/m^3)**	1000
Measured Mixture Type	150MHz Brain		**Relative Humidity**	48 %
Dielectric Constant	**Target**	**Measured**	**Atmospheric Pressure**	101.7 kPa
	52.3 (+/- 5%)	53.3		
Conductivity	**Target**	**Measured**	**Fluid Temperature**	23.5 °C
	0.76 (+/- 5%)	0.77		
Ambient Temperature	23.3 °C		**Fluid Depth**	≥ 15 cm

Abbreviation(s): SM = Speaker-Microphone

MEASUREMENT SUMMARY (Cont.)

BODY-WORN SAR MEASUREMENT RESULTS

Test Date	Freq. (MHz)	Chan	Test Mode	Conducted Pwr. (dBm)		Antenna Part No.	Accessory Type	Battery Type	Phantom Section	Access. Separ. Dist. (cm)	SAR 1g (w/kg)	
				Before	After						100% Duty Cycle	50% Duty Cycle
8/21/02	155.00	Mid	CW	37.68	37.64	KRE1011219/2	SM with Ant.	NiMH	Planar	1.3	3.39	1.70
8/21/02	155.00	Mid	CW	37.68	37.63	KRE1011219/2	SM with Ant.	NiCD	Planar	1.3	3.76	1.88
8/21/02	136.00	Low	CW	37.68	37.66	KRE1011219/1	SM with Ant.	NiCD	Planar	1.3	2.35	1.18
8/21/02	174.00	High	CW	37.40	37.37	KRE1011219/3	SM with Ant.	NiCD	Planar	1.3	1.08	0.54
8/21/02	155.00	Mid	CW	37.68	37.60	KRE1011219/2	LC with BL	NiMH	Planar	1.7	2.29	1.15
8/21/02	155.00	Mid	CW	37.68	37.56	KRE1011219/2	LC with BL	NiCD	Planar	1.7	2.46	1.23
8/21/02	136.00	Low	CW	37.68	37.53	KRE1011219/1	LC with BL	NiCD	Planar	1.7	0.481	0.241
8/21/02	174.00	High	CW	37.40	37.23	KRE1011219/3	LC with BL	NiCD	Planar	1.7	0.494	0.247
8/21/02	155.00	Mid	CW	37.68	37.58	KRE1011219/2	LC w/ BL & S	NiMH	Planar	4.5	1.47	0.735
8/21/02	155.00	Mid	CW	37.68	37.52	KRE1011219/2	LC w/ BL & S	NiCD	Planar	4.5	1.52	0.76
8/21/02	136.00	Low	CW	37.68	37.53	KRE1011219/1	LC w/ BL & S	NiCD	Planar	4.5	0.363	0.182
8/21/02	174.00	High	CW	37.40	37.26	KRE1011219/3	LC w/ BL & S	NiCD	Planar	4.5	0.303	0.152
8/21/02	155.00	Mid	CW	37.68	37.56	KRE1011219/2	NC w/ BL & S	NiMH	Planar	4.0	1.74	0.870
8/21/02	155.00	Mid	CW	37.68	37.54	KRE1011219/2	NC w/ BL & S	NiCD	Planar	4.0	1.83	0.915
8/21/02	136.00	Low	CW	37.68	37.57	KRE1011219/1	NC w/ BL & S	NiCD	Planar	4.0	0.140	0.070
8/21/02	174.00	High	CW	37.40	37.27	KRE1011219/3	NC w/ BL & S	NiCD	Planar	4.0	0.246	0.123
8/30/02	155.00	Mid	CW	37.68	37.68	KRE1011219/2	Metal BC	NiMH	Planar	1.1	4.97	2.49
8/30/02	155.00	Mid	CW	37.68	37.68	KRE1011219/2	Metal BC	NiCD	Planar	1.1	4.60	2.30
8/30/02	136.00	Low	CW	37.68	37.68	KRE1011219/1	Metal BC	NiMH	Planar	1.1	0.918	0.459
8/30/02	174.00	High	CW	37.40	37.31	KRE1011219/3	Metal BC	NiMH	Planar	1.1	0.852	0.426
8/30/02	155.00	Mid	CW	37.68	37.52	KRE1011219/2	BL & S	NiMH	Planar	3.5	2.17	1.09
8/30/02	155.00	Mid	CW	37.68	37.64	KRE1011219/2	BL & S	NiCD	Planar	3.5	2.62	1.31
8/30/02	136.00	Low	CW	37.68	37.68	KRE1011219/1	BL & S	NiCD	Planar	3.5	0.309	0.155
8/30/02	174.00	High	CW	37.40	37.34	KRE1011219/3	BL & S	NiCD	Planar	3.5	0.270	0.135

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

Measured Mixture Type	150MHz Body		Date	08/21/02	08/30/02
Dielectric Constant	Target	Measured	Relative Humidity	73 %	48 %
	61.9 (+/- 5%)	08/21/02: 61.1 / 08/30/02: 60.7	Atmospheric Pressure	101.2 kPa	101.7 kPa
Conductivity	Target	Measured	Fluid Temperature	23.3 °C	22.5 °C
	0.80 (+/- 5%)	08/21/02: 0.81 / 08/30/02: 0.79	Fluid Depth	≥ 15 cm	≥ 15 cm
Ambient Temperature	08/21/02: 23.1 °C	08/30/02: 23.3 °C	r (Kg/m^3)	1.000	1.000

Abbreviations: **SM = Speaker-Microphone** **BC = Belt-Clip**
BL = Belt-Loop **S = Swivel**
LC = Leather Case **NC = Nylon Case**

5.0 DETAILS OF SAR EVALUATION

The M/A-COM PRS INC. Model: P7100(IP) Portable VHF PTT Radio Transceiver FCC ID: OWDTR-0013-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 (radio transceiver P/N: T1H-V042) 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.
2. The EUT (speaker-microphone with antenna P/N: KRY1011617/84R1A, KRY1011617/184R1A) 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.
3. The EUT (speaker-microphone with antenna P/N: KRY1011617/84R1A, KRY1011617/184R1A) 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 and the outer surface of the planar phantom.
4. The EUT was tested in a body-worn configuration with the radio transceiver placed inside the leather case (P/N: KRY1011638/1) 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.
5. The EUT was tested in a body-worn configuration with the radio transceiver placed inside the leather case (P/N: KRY1011639/1) with rear swivel mount attached to the belt-loop (P/N: KRY1011609/1), 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 provided a 4.5 cm separation distance between the back of the radio transceiver and the outer surface of the planar phantom.
6. The EUT was tested in a body-worn configuration with the radio transceiver placed inside the nylon case (P/N: KRY1011648/1) with rear swivel mount attached to the belt-loop (P/N: KRY1011609/1), 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 provided a 4.0 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 back of the radio transceiver placed parallel to the outer surface of the planar phantom. The attached metal belt-clip (P/N: KRY1011647/1) 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.
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 (P/N: KRY1011609/1) 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. A speaker-microphone accessory (P/N: KRY1011617/83R1A, KRY1011617/183R1A) was attached to the EUT for tests #4-#8.
10. The EUT was evaluated for body SAR at maximum power and the unit was operated for an appropriate period prior to the evaluation in order to minimize drift. The conducted power levels were checked before and after each test according to the procedures described in FCC Part 2.1046. During the entire test the conducted power was maintained to within 5% of the initial conducted power. Any unusual anomalies over the course of the test warranted a re-evaluation.
11. The EUT was tested with the transmit button depressed and the transmitter placed 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.
12. The location of the maximum spatial SAR distribution (Hot Spot) was determined relative to the EUT and its antenna.
13. The EUT was tested with fully charged NiCD and NiMH batteries.

6.0 EVALUATION PROCEDURES

a. (i) The evaluation was performed in the applicable area of the phantom depending on the type of device being tested. For devices held to the ear during normal operation, both the left and right ear positions were evaluated in accordance with FCC OET Bulletin 65, Supplement C (Edition 01-01) using the SAM phantom.
(ii) For body-worn and face-held devices a planar phantom was used.
b. The SAR was determined by a pre-defined procedure within the DASY3 software. Upon completion of a reference and optical surface check, the exposed region of the phantom was scanned near the inner surface with a grid spacing of 20mm x 20mm.
c. Based on the area scan data, the area of maximum absorption was determined by spline interpolation. Around this point, a volume of 40 x 40 x 35 mm (fine resolution volume scan, zoom scan) was assessed by measuring 5 x 5 x 7 points.
d. The 1g and 10g spatial peak SAR was determined as follows:
1. The first step was an extrapolation to find the points between the dipole center of the probe and the surface of the phantom. This data cannot be measured, since the center of the dipoles is 2.7 mm away form the tip of the probe and the distance between the surface and the lowest measuring point is 1.3 mm (see probe calibration document in Appendix D). The extrapolation was based on a least square algorithm [W. Gander, Computermathematik, p.168-180] (see reference [6]). Through the points in the first 3 cm in all z-axis, polynomials of the fourth order were calculated. This polynomial was then used to evaluate the points between the surface and the probe tip.
2. The next step used 3D-spline interpolation to get all points within the measured volume in a 1mm grid (35000 points). The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition [W. Gander, Computermathematik, p.141-150] (x, y and z -direction) [Numerical Recipes in C, Second Edition, p.123ff] (see reference [6]).
3. The maximal interpolated value was searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1g or 10g) were computed using the 3D-spline interpolation algorithm. 8000 points (20x20x20) were interpolated to calculate the average.

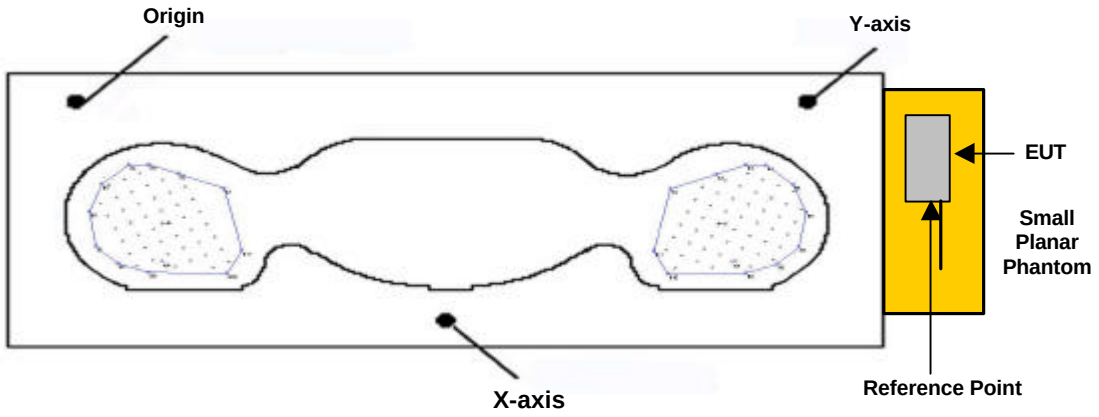


Figure 1. Phantom Reference Point & EUT Positioning
Radio Transceiver - Body-Worn Configuration

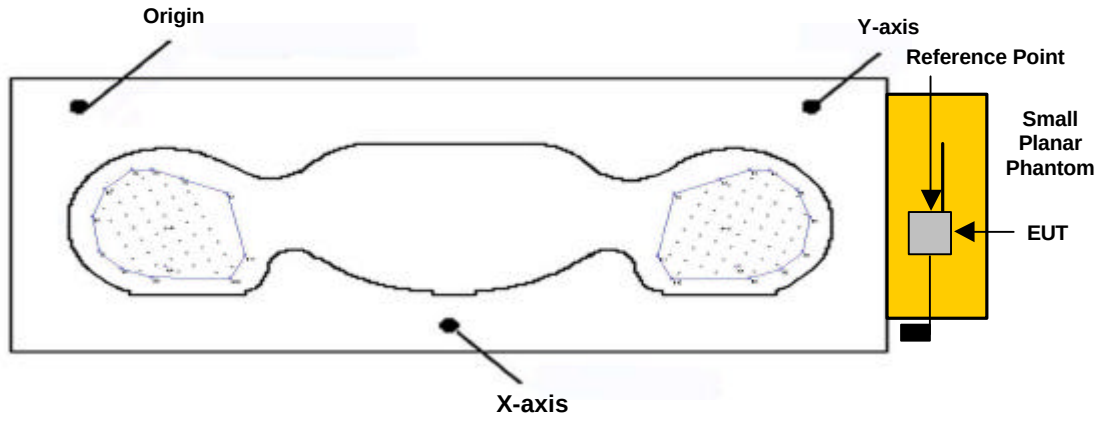


Figure 2. Phantom Reference Point & EUT Positioning
Speaker-Microphone with Antenna – Face-Held Configuration

7.0 SYSTEM PERFORMANCE CHECK

Prior to the evaluation a system performance check was performed using a planar phantom and a 300MHz 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	Target SAR 1g (w/kg)	Measured SAR 1g (w/kg)	Dielectric Constant e_r		Conductivity s (mho/m)		r (Kg/m^3)	Ambient Temp.	Fluid Temp.	Fluid Depth
				Target	Measured	Target	Measured				
08/21/02	300MHz (Brain)	**0.877**	0.883	**45.3 ±5%**	45.8	**0.87 ±5%**	0.87	1000	23.1 °C	23.3 °C	≥ 15 cm
08/22/02			0.897		45.5		0.87		23.3 °C	23.5 °C	
08/30/02			0.904		45.7		0.88		23.3 °C	22.5 °C	

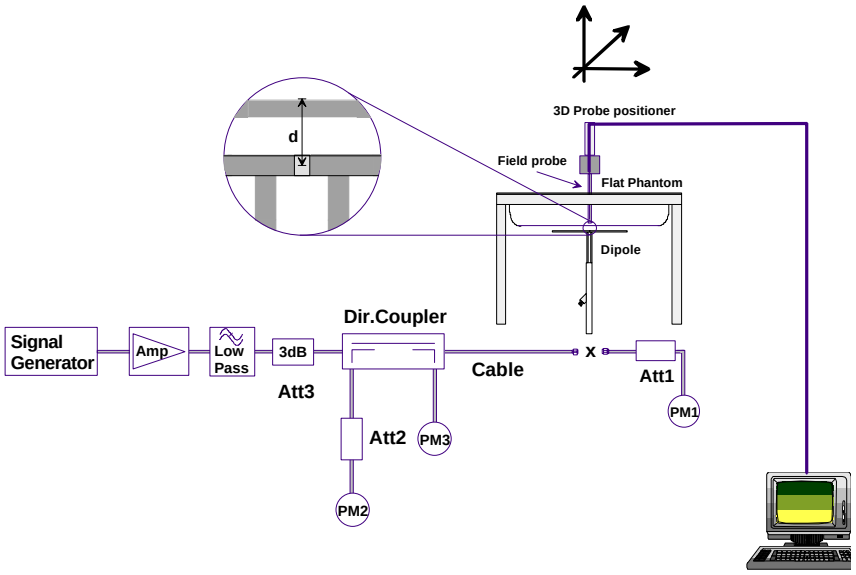


Figure 3. System Check Measurement Setup Diagram

300MHz System Check Setup Photograph

8.0 EQUIVALENT TISSUES

The 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	**300MHz Brain (%) (System Check)**	**150MHz Brain (%) (EUT Evaluation)**	**150MHz Body (%) (EUT Evaluation)**
Water	37.56	38.35	46.6
Sugar	55.32	55.5	49.7
Salt	5.95	5.15	2.6
HEC	0.98	0.9	1.0
Bactericide	0.19	0.1	0.1

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:	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.:	1387
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)

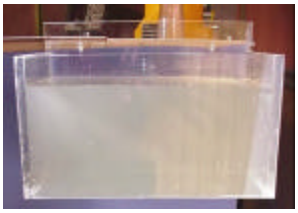
11.0 PROBE SPECIFICATION (ET3DV6)

Construction:	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g. glycol)
Calibration:	In air from 10 MHz to 2.5 GHz In brain simulating tissue at frequencies of 900 MHz and 1.8 GHz (accuracy ± 8%)
Frequency:	10 MHz to >6 GHz; Linearity: ±0.2 dB (30 MHz to 3 GHz)
Directivity:	±0.2 dB in brain tissue (rotation around probe axis) ±0.4 dB in brain tissue (rotation normal to probe axis)
Dynam. Rnge:	5 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

12.0 SMALL PLANAR PHANTOM

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



Small Planar Phantom

13.0 LARGE PLANAR PHANTOM

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

Large Planar Phantom

14.0 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

15.0 TEST EQUIPMENT LIST

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

16.0 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)	± 10.0	Rectangular	√3	0.6	± 3.5	∞
Liquid permitivity (target)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid permitivity (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])

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 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”.

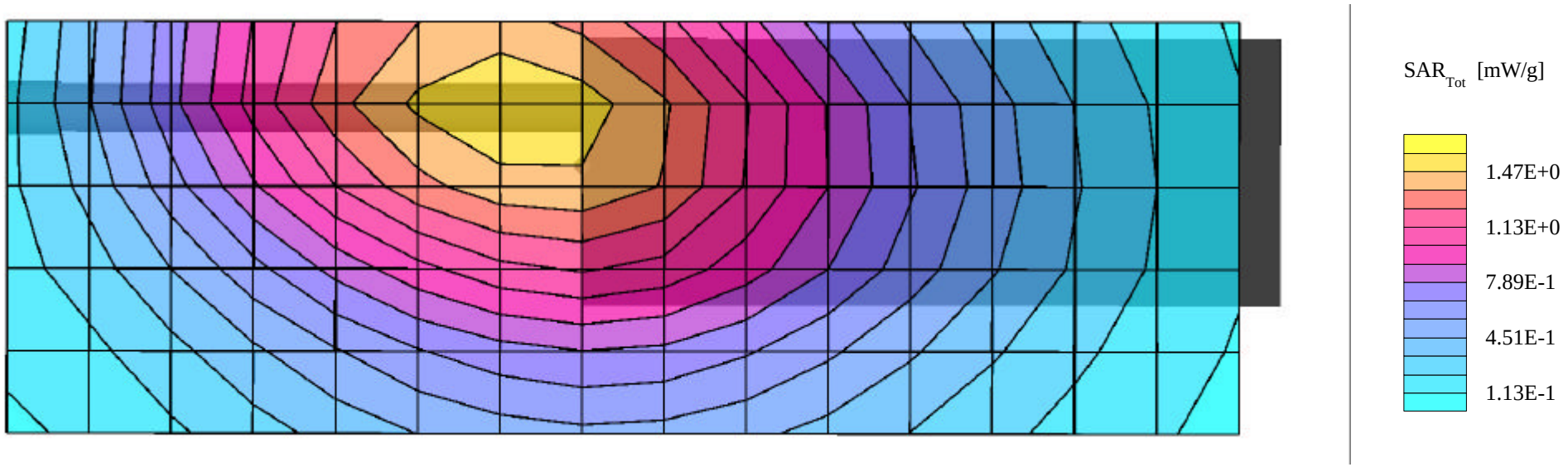
[6] W. Gander, *Computermathematick*, Birkhaeuser, Basel: 1992.

APPENDIX A - SAR MEASUREMENT DATA

M/A-COM PRS INC. FCC ID: OWDTR-0013-E

Small Planar Phantom; Planar Section; Position: (90°,0°)
Probe: ET3DV6 - SN1387; ConvF(9.20,9.20,9.20); Crest factor: 1.0
150 MHz Brain : σ = 0.77 mho/m ε_r = 53.3 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.11 dB
SAR (1g): 1.54 mW/g, SAR (10g): 1.18 mW/g

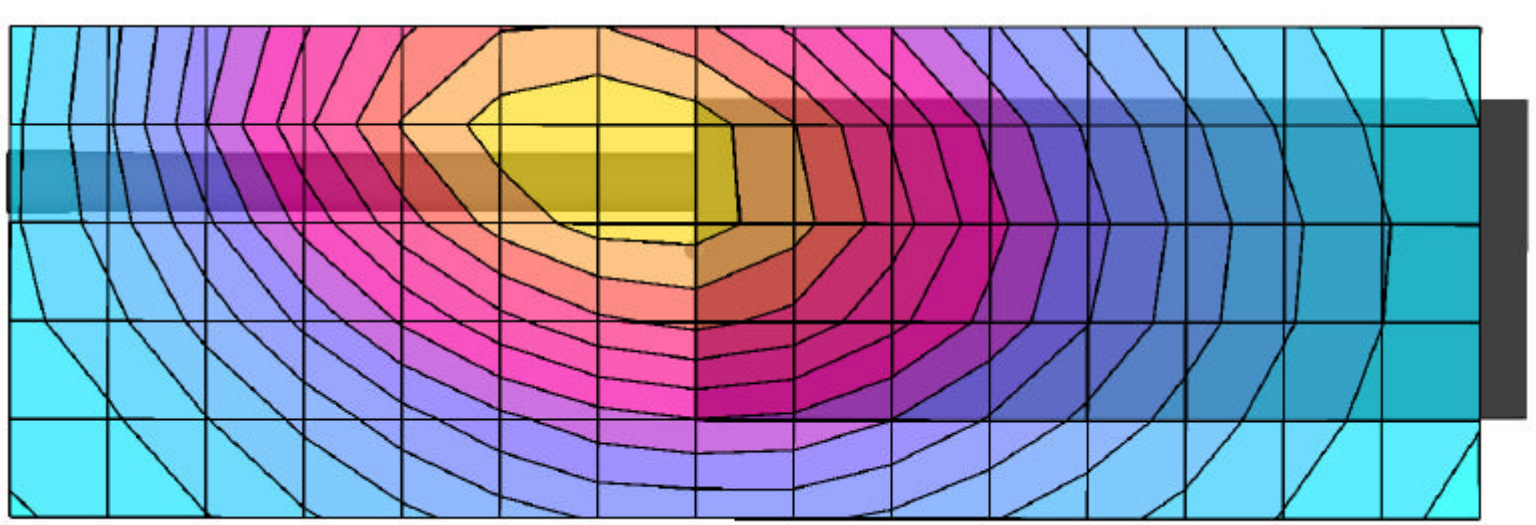
Face-Held SAR at 2.5cm Separation Distance
Portable VHF PTT Radio Transceiver Model: P7100(IP)
Helical Coil Antenna (KRE1011219/2)
NiMH Battery (BKB191210/4/6)
Continuous Wave Mode
Mid Channel [155.00 MHz]
Conducted Power: 37.68 dBm
Ambient Temp. 23.3°C; Fluid Temp. 23.5°C
Date Tested: August 22, 2002



M/A-COM PRS INC. FCC ID: OWDTR-0013-E

Small Planar Phantom; Planar Section; Position: (90°,0°)
Probe: ET3DV6 - SN1387; ConvF(9.20,9.20,9.20); Crest factor: 1.0
150 MHz Brain : σ = 0.77 mho/m ε_r = 53.3 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.12 dB
SAR (1g): 2.00 mW/g, SAR (10g): 1.49 mW/g

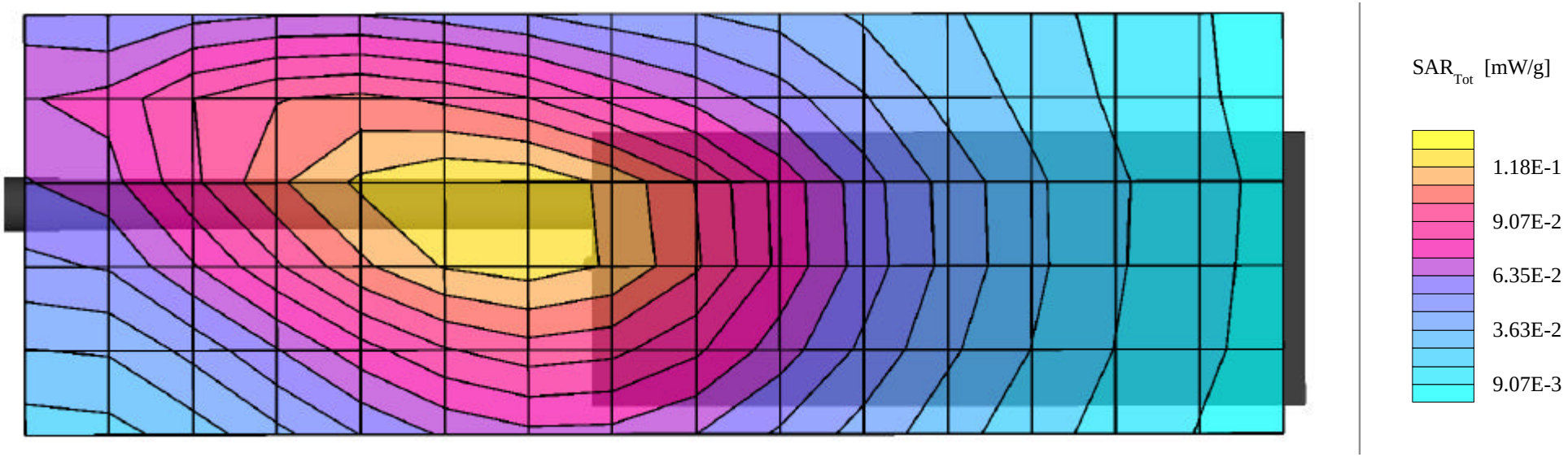
Face-Held SAR at 2.5cm Separation Distance
Portable VHF PTT Radio Transceiver Model: P7100(IP)
Helical Coil Antenna (KRE1011219/2)
NiCD Battery (BKB191210/3/5)
Continuous Wave Mode
Mid Channel [155.00 MHz]
Conducted Power: 37.68 dBm
Ambient Temp. 23.3°C; Fluid Temp. 23.5°C
Date Tested: August 22, 2002



M/A-COM PRS INC. FCC ID: OWDTR-0013-E

Small Planar Phantom; Planar Section; Position: (90°,0°)
Probe: ET3DV6 - SN1387; ConvF(9.20,9.20,9.20); Crest factor: 1.0
150 MHz Brain : σ = 0.77 mho/m ε_r = 53.3 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.20 dB
SAR (1g): 0.125 mW/g, SAR (10g): 0.0921 mW/g

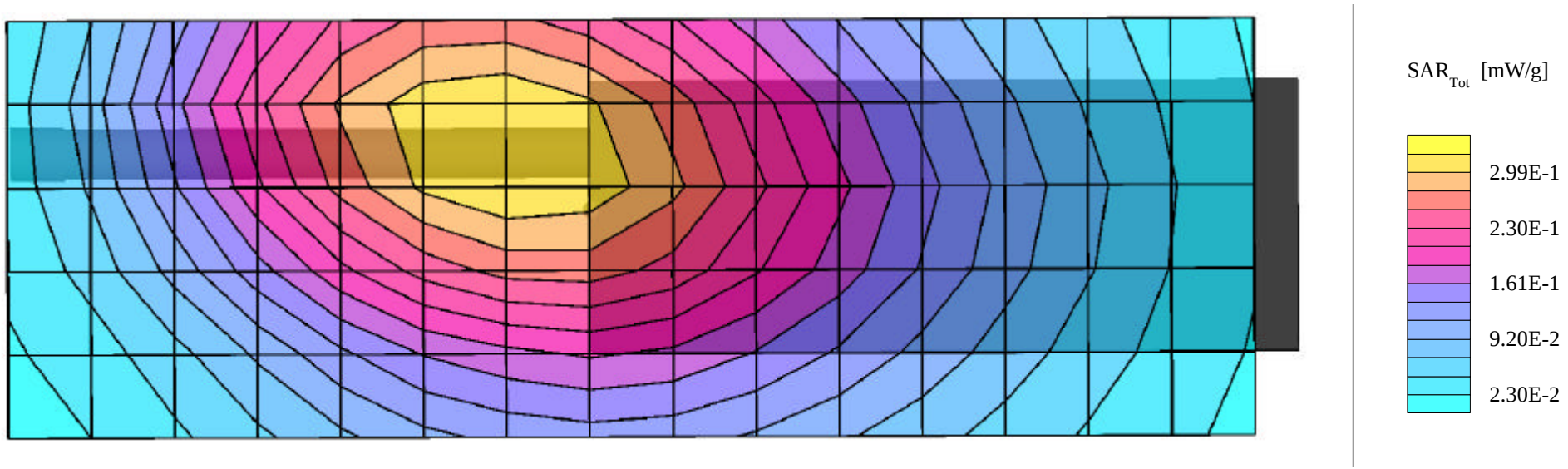
Face-Held SAR at 2.5cm Separation Distance
Portable VHF PTT Radio Transceiver Model: P7100(IP)
Helical Coil Antenna (KRE1011219/1)
NiCD Battery (BKB191210/3/5)
Continuous Wave Mode
Low Channel [136.00 MHz]
Conducted Power: 37.68 dBm
Ambient Temp. 23.3°C; Fluid Temp. 23.5°C
Date Tested: August 22, 2002



M/A-COM PRS INC. FCC ID: OWDTR-0013-E

Small Planar Phantom; Planar Section; Position: (90°,0°)
Probe: ET3DV6 - SN1387; ConvF(9.20,9.20,9.20); Crest factor: 1.0
150 MHz Brain : σ = 0.77 mho/m ε_r = 53.3 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.17 dB
SAR (1g): 0.308 mW/g, SAR (10g): 0.232 mW/g

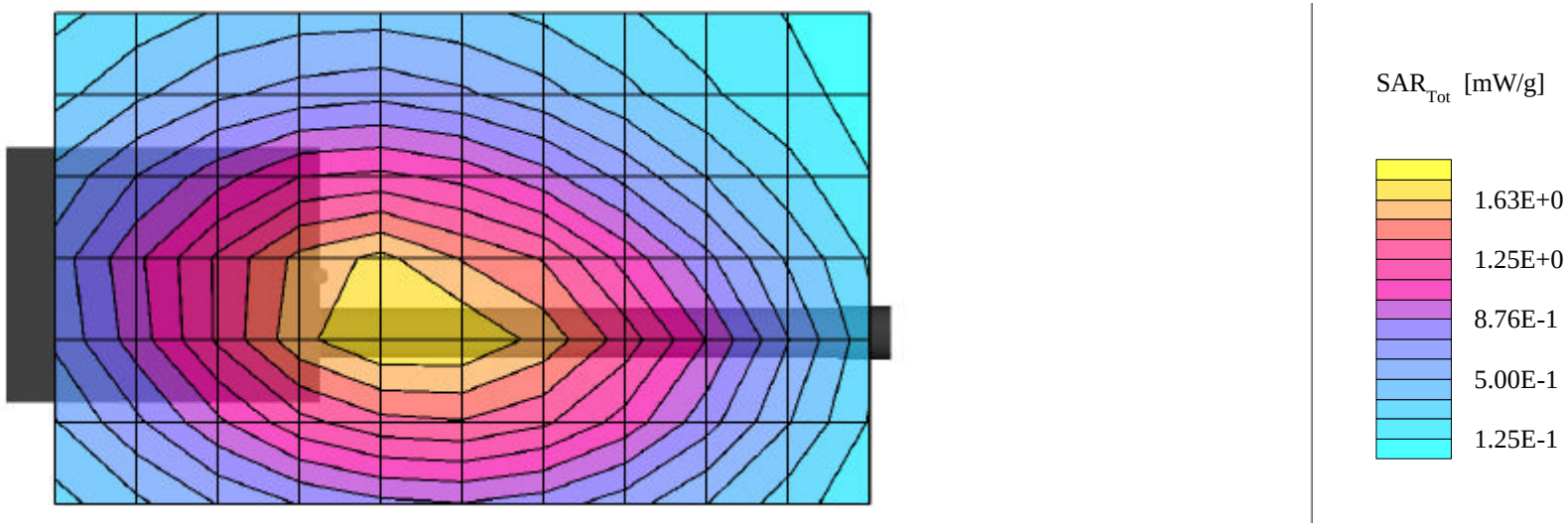
Face-Held SAR at 2.5cm Separation Distance
Portable VHF PTT Radio Transceiver Model: P7100(IP)
Helical Coil Antenna (KRE1011219/3)
NiCD Battery (BKB191210/3/5)
Continuous Wave Mode
High Channel [174.00 MHz]
Conducted Power: 37.40 dBm
Ambient Temp. 23.3°C; Fluid Temp. 23.5°C
Date Tested: August 22, 2002



M/A-COM PRS INC. FCC ID: OWDTR-0013-E

Small Planar Phantom; Planar Section; Position: (90°,180°)
Probe: ET3DV6 - SN1387; ConvF(9.20,9.20,9.20); Crest factor: 1.0
150 MHz Brain : σ = 0.77 mho/m ε_r = 53.3 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.19 dB
SAR (1g): 1.84 mW/g, SAR (10g): 1.33 mW/g

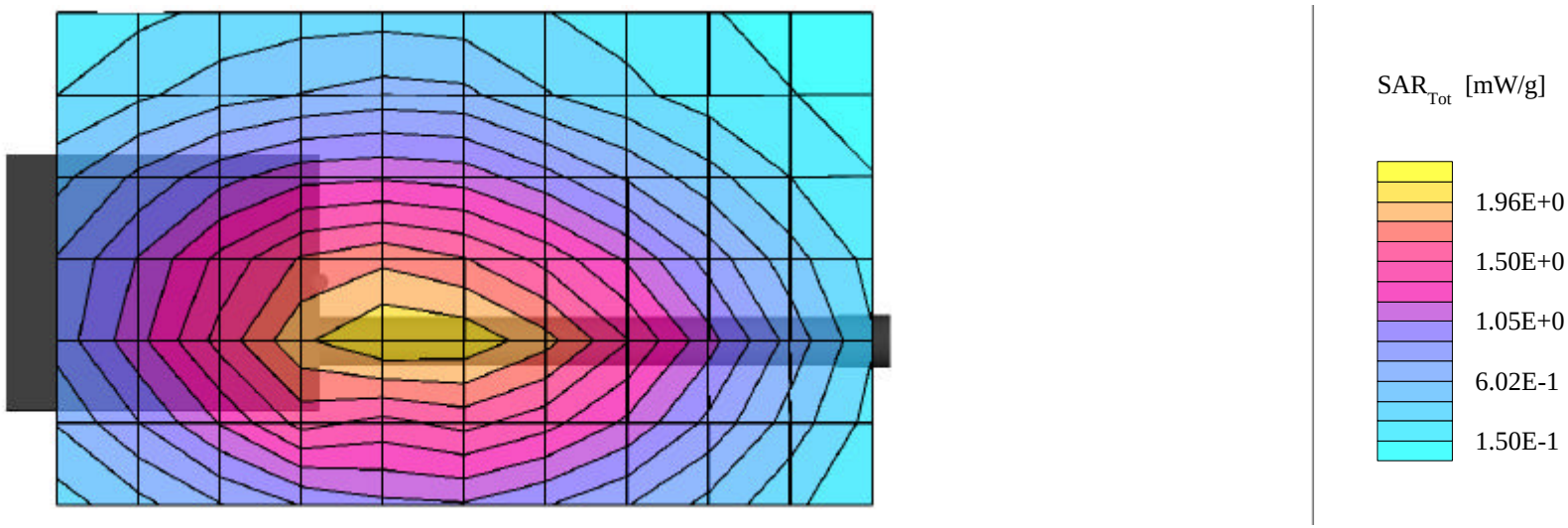
Face-Held SAR with Speaker-Microphone & Antenna (KRY1011617/84R1A, KRY1011617/184R1A)
2.5cm Separation Distance from planar phantom
Portable VHF PTT Radio Transceiver Model: P7100(IP)
Helical Coil Antenna (KRE1011219/2)
NiMH Battery (BKB191210/4/6)
Continuous Wave Mode
Mid Channel [155.00 MHz]
Conducted Power: 37.68 dBm
Ambient Temp. 23.3°C; Fluid Temp. 23.5°C
Date Tested: August 22, 2002



M/A-COM PRS INC. FCC ID: OWDTR-0013-E

Small Planar Phantom; Planar Section; Position: (90°,180°)
Probe: ET3DV6 - SN1387; ConvF(9.20,9.20,9.20); Crest factor: 1.0
150 MHz Brain : σ = 0.77 mho/m ε_r = 53.3 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.20 dB
SAR (1g): 2.34 mW/g, SAR (10g): 1.67 mW/g

Face-Held SAR with Speaker-Microphone & Antenna (KRY1011617/84R1A, KRY1011617/184R1A)
2.5cm Separation Distance from planar phantom
Portable VHF PTT Radio Transceiver Model: P7100(IP)
Helical Coil Antenna (KRE1011219/2)
NiCD Battery (BKB191210/3/5)
Continuous Wave Mode
Mid Channel [155.00 MHz]
Conducted Power: 37.68 dBm
Ambient Temp. 23.3°C; Fluid Temp. 23.5°C
Date Tested: August 22, 2002

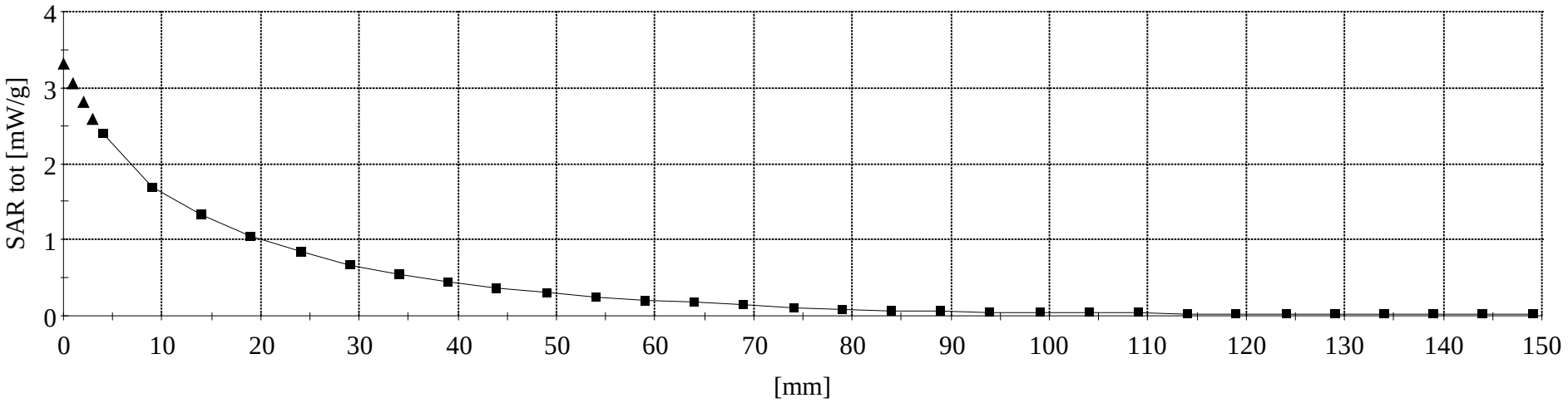


M/A-COM PRS INC. FCC ID: OWDTR-0013-E

Small Planar Phantom; Planar Section
Probe: ET3DV6 - SN1387; ConvF(9.20,9.20,9.20); Crest factor: 1.0
150 MHz Brain : σ = 0.77 mho/m ε_r = 53.3 ρ = 1.00 g/cm^3

Z-Axis Extrapolation at Peak SAR Location

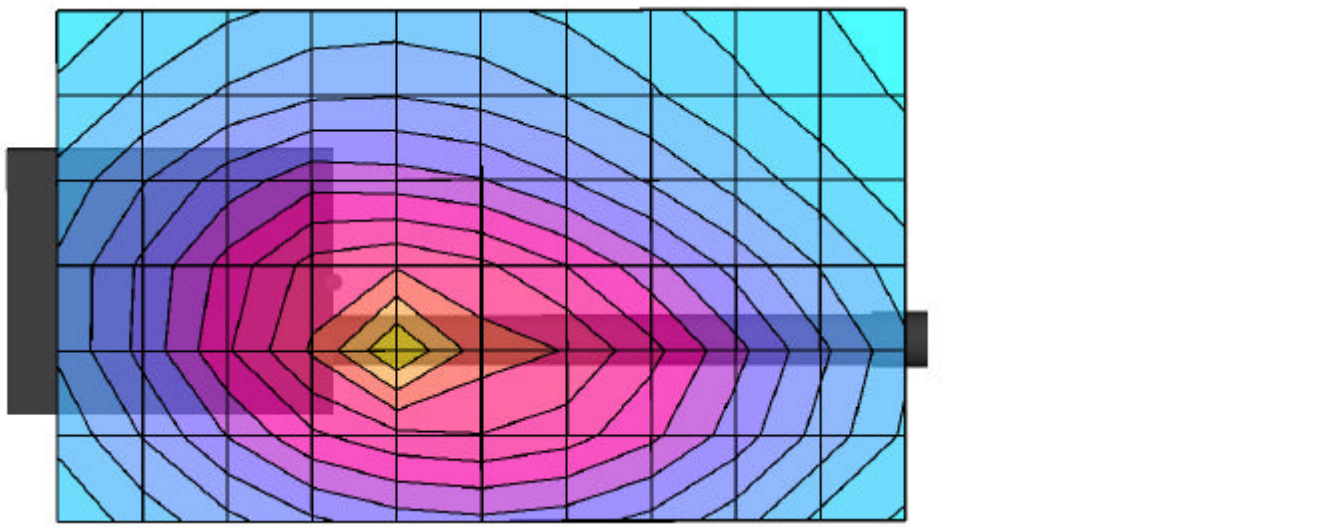
Face-Held SAR with Speaker-Microphone & Antenna (KRY1011617/84R1A, KRY1011617/184R1A)
2.5cm Separation Distance from planar phantom
Portable VHF PTT Radio Transceiver Model: P7100(IP)
Helical Coil Antenna (KRE1011219/2)
NiCD Battery (BKB191210/3/5)
Continuous Wave Mode
Mid Channel [155.00 MHz]
Conducted Power: 37.68 dBm
Ambient Temp. 23.3°C; Fluid Temp. 23.5°C
Date Tested: August 22, 2002



M/A-COM PRS INC. FCC ID: OWDTR-0013-E

Small Planar Phantom; Planar Section; Position: (90°,180°)
Probe: ET3DV6 - SN1387; ConvF(9.20,9.20,9.20); Crest factor: 1.0
150 MHz Brain : σ = 0.77 mho/m ε_r = 53.3 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.02 dB
SAR (1g): 0.673 mW/g, SAR (10g): 0.498 mW/g

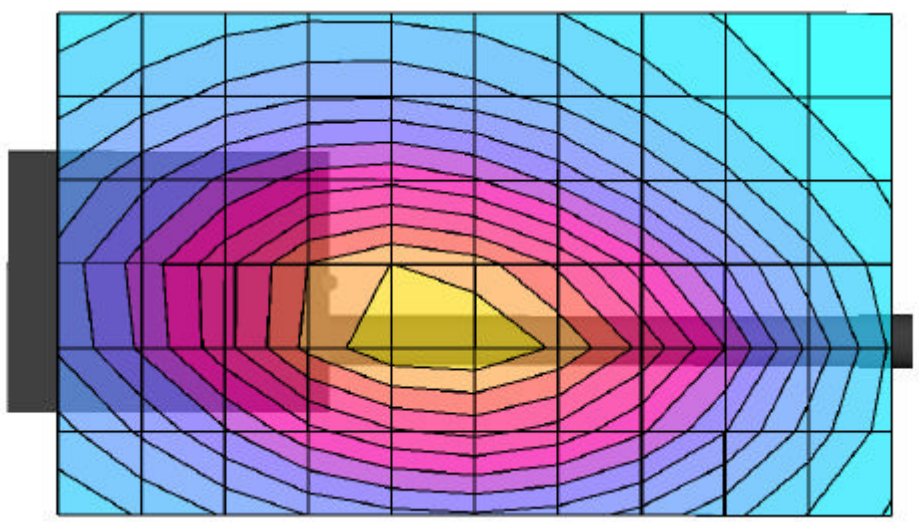
Face-Held SAR with Speaker-Microphone & Antenna (KRY1011617/84R1A, KRY1011617/184R1A)
2.5cm Separation Distance from planar phantom
Portable VHF PTT Radio Transceiver Model: P7100(IP)
Helical Coil Antenna (KRE1011219/1)
NiCD Battery (BKB191210/3/5)
Continuous Wave Mode
Low Channel [136.00 MHz]
Conducted Power: 37.68 dBm
Ambient Temp. 23.3°C; Fluid Temp. 23.5°C
Date Tested: August 22, 2002



M/A-COM PRS INC. FCC ID: OWDTR-0013-E

Small Planar Phantom; Planar Section; Position: (90°,180°)
Probe: ET3DV6 - SN1387; ConvF(9.20,9.20,9.20); Crest factor: 1.0
150 MHz Brain : σ = 0.77 mho/m ε_r = 53.3 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.13 dB
SAR (1g): 1.09 mW/g, SAR (10g): 0.791 mW/g

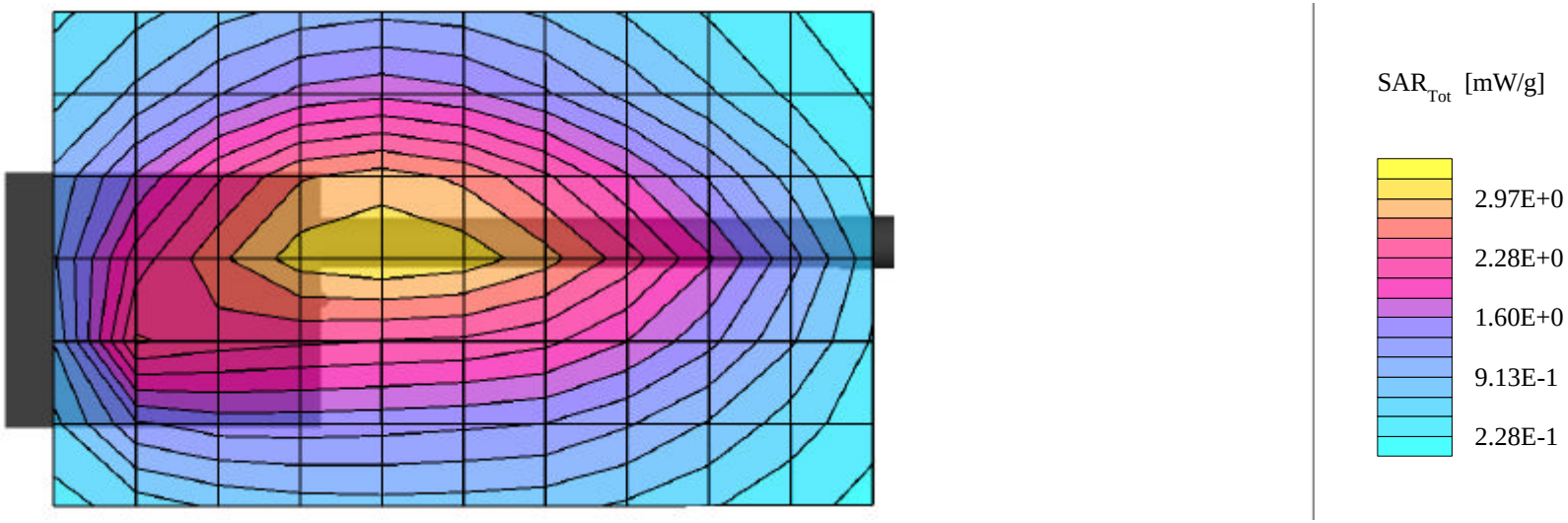
Face-Held SAR with Speaker-Microphone & Antenna (KRY1011617/84R1A, KRY1011617/184R1A)
2.5cm Separation Distance from planar phantom
Portable VHF PTT Radio Transceiver Model: P7100(IP)
Helical Coil Antenna (KRE1011219/3)
NiCD Battery (BKB191210/3/5)
Continuous Wave Mode
High Channel [174.00 MHz]
Conducted Power: 37.40 dBm
Ambient Temp. 23.3°C; Fluid Temp. 23.5°C
Date Tested: August 22, 2002



M/A-COM PRS INC. FCC ID: OWDTR-0013-E

Small Planar Phantom; Planar Section; Position: (270°,0°)
Probe: ET3DV6 - SN1387; ConvF(8.80,8.80,8.80); Crest factor: 1.0
150 MHz Muscle: σ = 0.81 mho/m ε_r = 61.1 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.08 dB
SAR (1g): 3.39 mW/g, SAR (10g): 2.45 mW/g

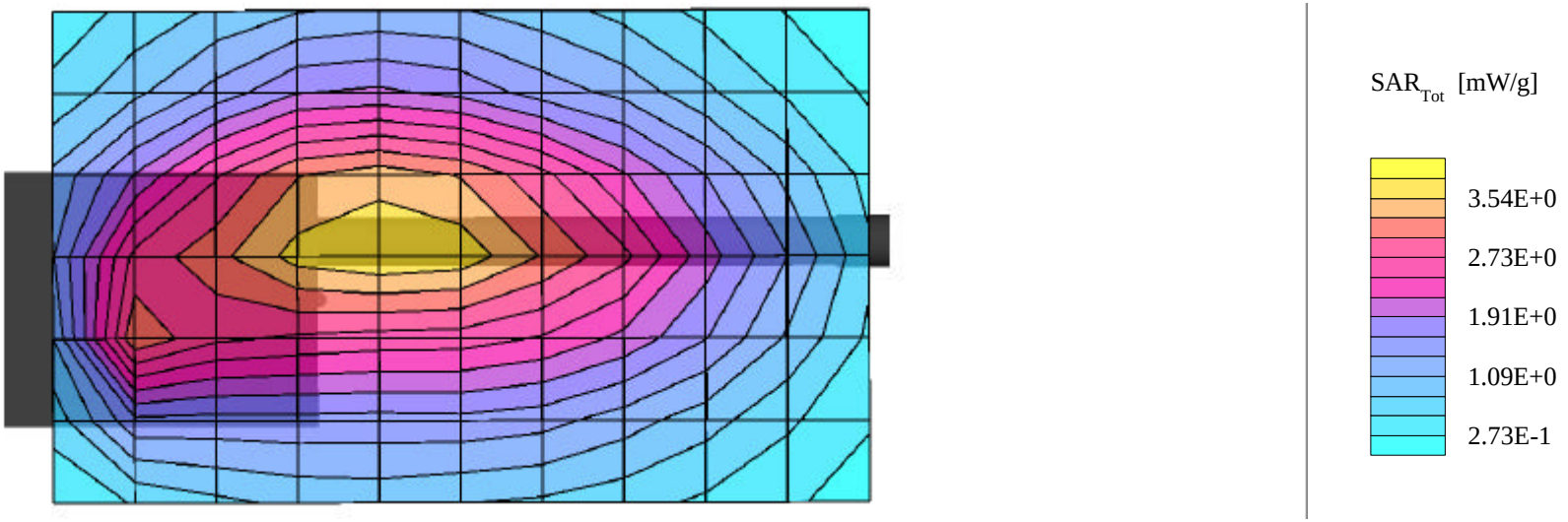
Body-Worn SAR with Speaker-Microphone & Antenna (KRY1011617/84R1A, KRY1011617/184R1A)
(1.3cm Lapel-Clip Separation Distance)
Portable VHF PTT Radio Transceiver Model: P7100(IP)
Helical Coil Antenna (KRE1011219/2)
NiMH Battery (BKB191210/4/6)
Continuous Wave Mode
Mid Channel [155.00 MHz]
Conducted Power: 37.68 dBm
Ambient Temp. 23.1°C; Fluid Temp. 23.3°C
Date Tested: August 21, 2002



M/A-COM PRS INC. FCC ID: OWDTR-0013-E

Small Planar Phantom; Planar Section; Position: (270°,0°)
Probe: ET3DV6 - SN1387; ConvF(8.80,8.80,8.80); Crest factor: 1.0
150 MHz Muscle: σ = 0.81 mho/m ε_r = 61.1 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.08 dB
SAR (1g): 3.76 mW/g, SAR (10g): 2.73 mW/g

Body-Worn SAR with Speaker-Microphone & Antenna (KRY1011617/84R1A, KRY1011617/184R1A)
(1.3cm Lapel-Clip Separation Distance)
Portable VHF PTT Radio Transceiver Model: P7100(IP)
Helical Coil Antenna (KRE1011219/2)
NiCD Battery (BKB191210/3/5)
Continuous Wave Mode
Mid Channel [155.00 MHz]
Conducted Power: 37.68 dBm
Ambient Temp. 23.1°C; Fluid Temp. 23.3°C
Date Tested: August 21, 2002

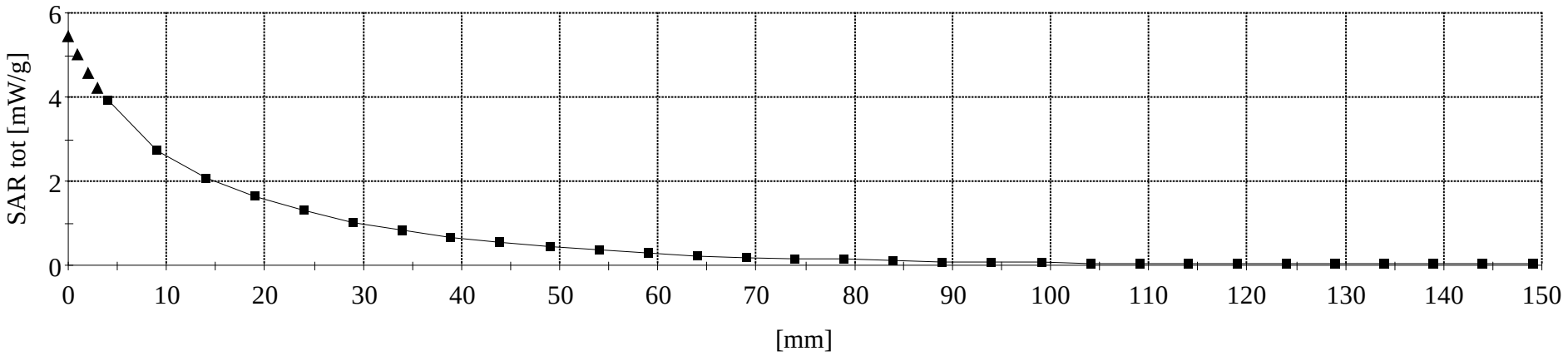


M/A-COM PRS INC. FCC ID: OWDTR-0013-E

Small Planar Phantom; Planar Section
Probe: ET3DV6 - SN1387; ConvF(8.80,8.80,8.80); Crest factor: 1.0
150 MHz Muscle: σ = 0.81 mho/m ε_r = 61.1 ρ = 1.00 g/cm^3

Z-Axis Extrapolation at Peak SAR Location

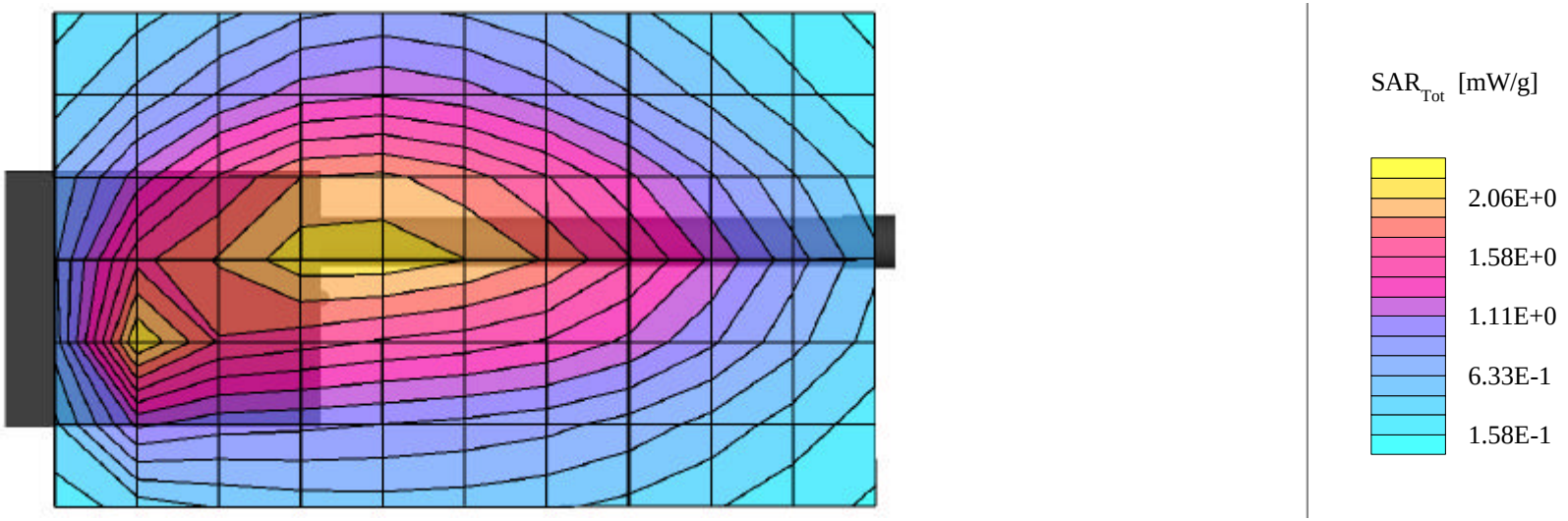
Body-Worn SAR with Speaker-Microphone & Antenna (KRY1011617/84R1A, KRY1011617/184R1A)
(1.3cm Lapel-Clip Separation Distance)
Portable VHF PTT Radio Transceiver Model: P7100(IP)
Helical Coil Antenna (KRE1011219/2)
NiCD Battery (BKB191210/3/5)
Continuous Wave Mode
Mid Channel [155.00 MHz]
Conducted Power: 37.68 dBm
Ambient Temp. 23.1°C; Fluid Temp. 23.3°C
Date Tested: August 21, 2002



M/A-COM PRS INC. FCC ID: OWDTR-0013-E

Small Planar Phantom; Planar Section; Position: (270°,0°)
Probe: ET3DV6 - SN1387; ConvF(8.80,8.80,8.80); Crest factor: 1.0
150 MHz Muscle: σ = 0.81 mho/m ε_r = 61.1 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.05 dB
SAR (1g): 2.35 mW/g, SAR (10g): 1.41 mW/g

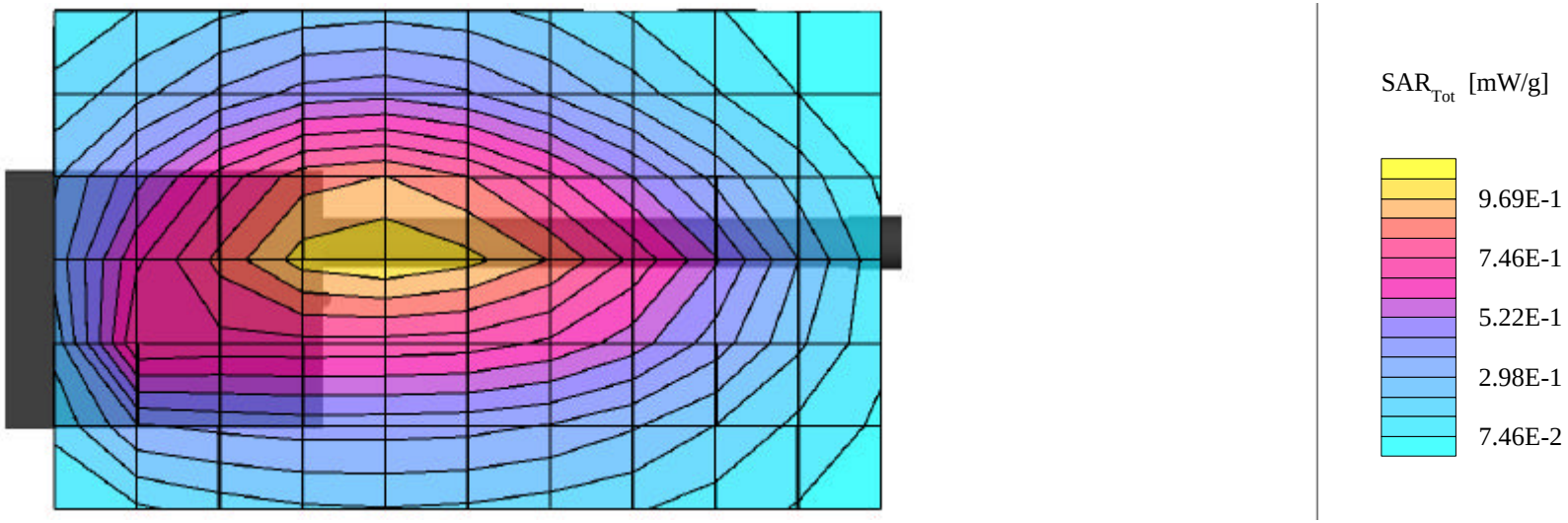
Body-Worn SAR with Speaker-Microphone & Antenna (KRY1011617/84R1A, KRY1011617/184R1A)
(1.3cm Lapel-Clip Separation Distance)
Portable VHF PTT Radio Transceiver Model: P7100(IP)
Helical Coil Antenna (KRE1011219/1)
NiCD Battery (BKB191210/3/5)
Continuous Wave Mode
Low Channel [136.00 MHz]
Conducted Power: 37.68 dBm
Ambient Temp. 23.1°C; Fluid Temp. 23.3°C
Date Tested: August 21, 2002



M/A-COM PRS INC. FCC ID: OWDTR-0013-E

Small Planar Phantom; Planar Section; Position: (270°,0°)
Probe: ET3DV6 - SN1387; ConvF(8.80,8.80,8.80); Crest factor: 1.0
150 MHz Muscle: σ = 0.81 mho/m ε_r = 61.1 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.05 dB
SAR (1g): 1.08 mW/g, SAR (10g): 0.767 mW/g

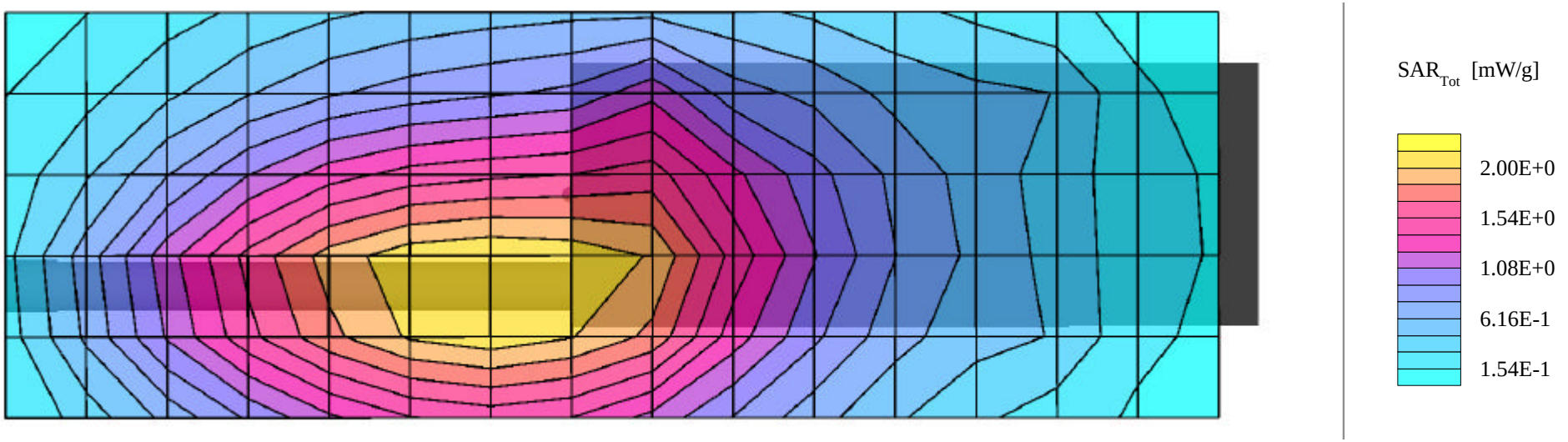
Body-Worn SAR with Speaker-Microphone & Antenna (KRY1011617/84R1A, KRY1011617/184R1A)
(1.3cm Lapel-Clip Separation Distance)
Portable VHF PTT Radio Transceiver Model: P7100(IP)
Helical Coil Antenna (KRE1011219/3)
NiCD Battery (BKB191210/3/5)
Continuous Wave Mode
High Channel [174.00 MHz]
Conducted Power: 37.40 dBm
Ambient Temp. 23.1°C; Fluid Temp. 23.3°C
Date Tested: August 21, 2002



M/A-COM PRS INC. FCC ID: OWDTR-0013-E

Small Planar Phantom; Planar Section; Position: (270°,180°)
Probe: ET3DV6 - SN1387; ConvF(8.80,8.80,8.80); Crest factor: 1.0
150 MHz Muscle: σ = 0.81 mho/m ε_r = 61.1 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.12 dB
SAR (1g): 2.29 mW/g, SAR (10g): 1.70 mW/g

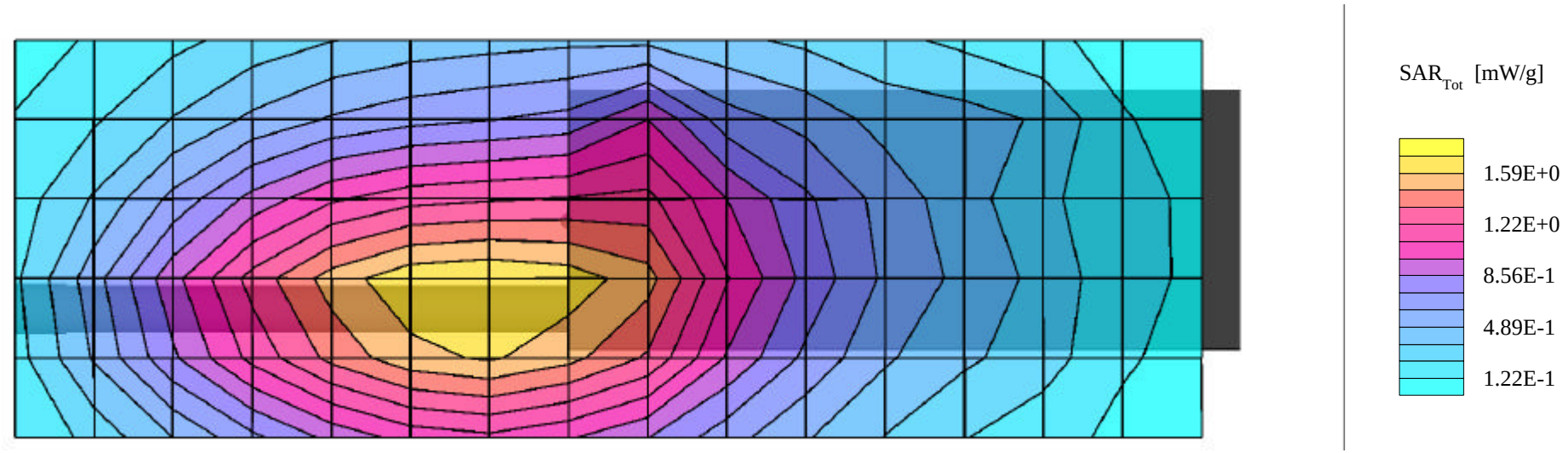
Body-Worn SAR with Leather Case/Belt-Loop (KRY1011638/1)
(1.7cm Leather Case/Belt-Loop Separation Distance)
Portable VHF PTT Radio Transceiver Model: P7100 (IP)
Helical Coil Antenna (KRE1011219/2)
NiMH Battery (BKB191210/4/6)
Continuous Wave Mode
Mid Channel [155.00 MHz]
Conducted Power: 37.68 dBm
Ambient Temp. 23.1°C; Fluid Temp. 23.3°C
Date Tested: August 21, 2002



M/A-COM PRS INC. FCC ID: OWDTR-0013-E

Small Planar Phantom; Planar Section; Position: (270°,180°)
Probe: ET3DV6 - SN1387; ConvF(8.80,8.80,8.80); Crest factor: 1.0
150 MHz Muscle: σ = 0.81 mho/m ε_r = 61.1 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.15 dB
SAR (1g): 2.46 mW/g, SAR (10g): 1.82 mW/g

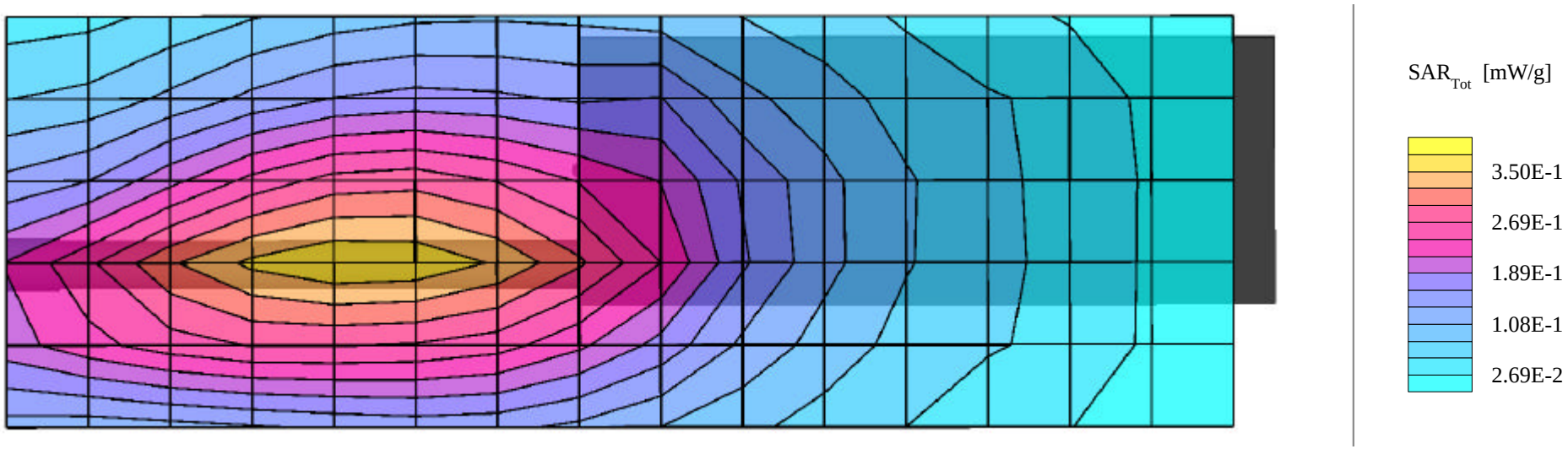
Body-Worn SAR with Leather Case/Belt-Loop (KRY1011638/1)
(1.7cm Leather Case/Belt-Loop Separation Distance)
Portable VHF PTT Radio Transceiver Model: P7100 (IP)
Helical Coil Antenna (KRE1011219/2)
NiCD Battery (BKB191210/3/5)
Continuous Wave Mode
Mid Channel [155.00 MHz]
Conducted Power: 37.68 dBm
Ambient Temp. 23.1°C; Fluid Temp. 23.3°C
Date Tested: August 21, 2002



M/A-COM PRS INC. FCC ID: OWDTR-0013-E

Small Planar Phantom; Planar Section; Position: (270°,180°)
Probe: ET3DV6 - SN1387; ConvF(8.80,8.80,8.80); Crest factor: 1.0
150 MHz Muscle: σ = 0.81 mho/m ε_r = 61.1 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.18 dB
SAR (1g): 0.481 mW/g, SAR (10g): 0.343 mW/g

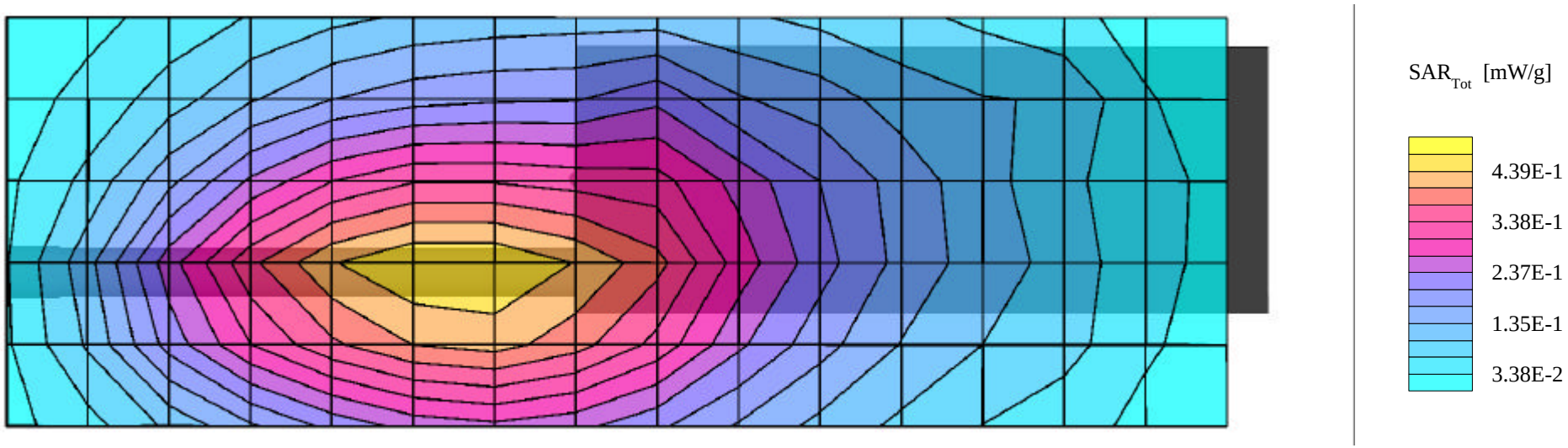
Body-Worn SAR with Leather Case/Belt-Loop (KRY1011638/1)
(1.7cm Leather Case/Belt-Loop Separation Distance)
Portable VHF PTT Radio Transceiver Model: P7100 (IP)
Helical Coil Antenna (KRE1011219/1)
NiCD Battery (BKB191210/3/5)
Continuous Wave Mode
Low Channel [136.00 MHz]
Conducted Power: 37.68 dBm
Ambient Temp. 23.1°C; Fluid Temp. 23.3°C
Date Tested: August 21, 2002



M/A-COM PRS INC. FCC ID: OWDTR-0013-E

Small Planar Phantom; Planar Section; Position: (270°,180°)
Probe: ET3DV6 - SN1387; ConvF(8.80,8.80,8.80); Crest factor: 1.0
150 MHz Muscle: σ = 0.81 mho/m ε_r = 61.1 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.20 dB
SAR (1g): 0.494 mW/g, SAR (10g): 0.359 mW/g

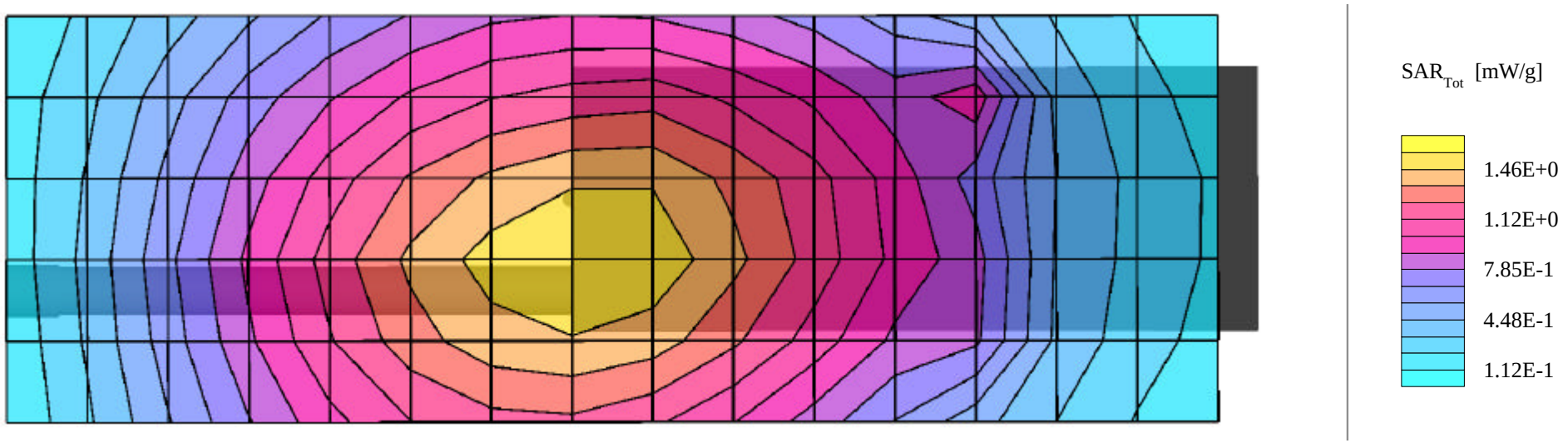
Body-Worn SAR with Leather Case/Belt-Loop (KRY1011638/1)
(1.7cm Leather Case/Belt-Loop Separation Distance)
Portable VHF PTT Radio Transceiver Model: P7100 (IP)
Helical Coil Antenna (KRE1011219/3)
NiCD Battery (BKB191210/3/5)
Continuous Wave Mode
High Channel [174.00 MHz]
Conducted Power: 37.40 dBm
Ambient Temp. 23.1°C; Fluid Temp. 23.3°C
Date Tested: August 21, 2002



M/A-COM PRS INC. FCC ID: OWDTR-0013-E

Small Planar Phantom; Planar Section; Position: (270°,180°)
Probe: ET3DV6 - SN1387; ConvF(8.80,8.80,8.80); Crest factor: 1.0
150 MHz Muscle: σ = 0.81 mho/m ε_r = 61.1 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.14 dB
SAR (1g): 1.47 mW/g, SAR (10g): 1.14 mW/g

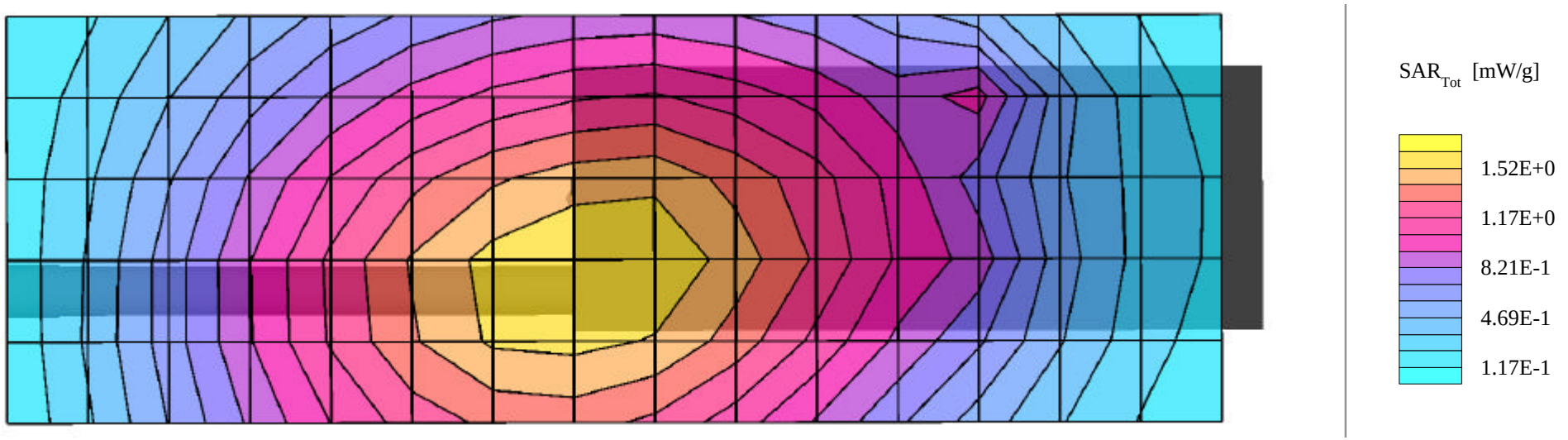
Body-Worn SAR with Leather Case, Swivel, & Belt-Loop (KRY1011639/1)
(4.5cm Leather Case & Belt-Loop Separation Distance)
Portable VHF PTT Radio Transceiver Model: P7100(IP)
Helical Coil Antenna (KRE1011219/2)
NiMH Battery (BKB191210/4/6)
Continuous Wave Mode
Mid Channel [155.00 MHz]
Conducted Power: 37.68 dBm
Ambient Temp. 23.1°C; Fluid Temp. 23.3°C
Date Tested: August 21, 2002



M/A-COM PRS INC. FCC ID: OWDTR-0013-E

Small Planar Phantom; Planar Section; Position: (270°,180°)
Probe: ET3DV6 - SN1387; ConvF(8.80,8.80,8.80); Crest factor: 1.0
150 MHz Muscle: σ = 0.81 mho/m ε_r = 61.1 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.20 dB
SAR (1g): 1.52 mW/g, SAR (10g): 1.18 mW/g

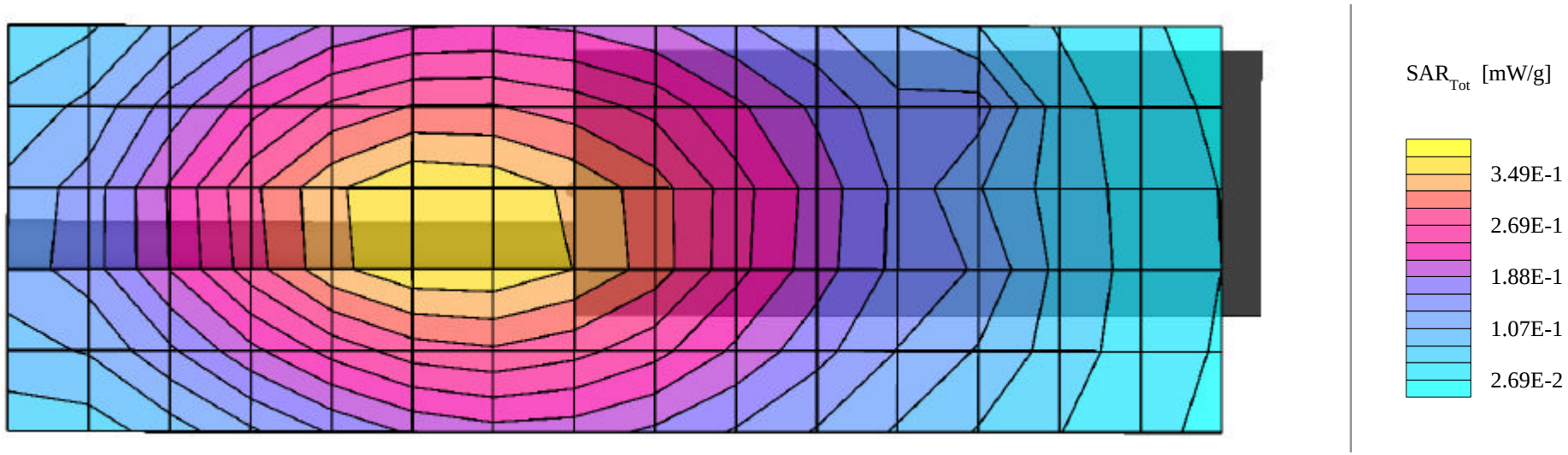
Body-Worn SAR with Leather Case, Swivel, & Belt-Loop (KRY1011639/1)
(4.5cm Leather Case & Belt-Loop Separation Distance)
Portable VHF PTT Radio Transceiver Model: P7100(IP)
Helical Coil Antenna (KRE1011219/2)
NiCD Battery (BKB191210/3/5)
Continuous Wave Mode
Mid Channel [155.00 MHz]
Conducted Power: 37.68 dBm
Ambient Temp. 23.1°C; Fluid Temp. 23.3°C
Date Tested: August 21, 2002



M/A-COM PRS INC. FCC ID: OWDTR-0013-E

Small Planar Phantom; Planar Section; Position: (270°,180°)
Probe: ET3DV6 - SN1387; ConvF(8.80,8.80,8.80); Crest factor: 1.0
150 MHz Muscle: σ = 0.81 mho/m ε_r = 61.1 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.19 dB
SAR (1g): 0.363 mW/g, SAR (10g): 0.277 mW/g

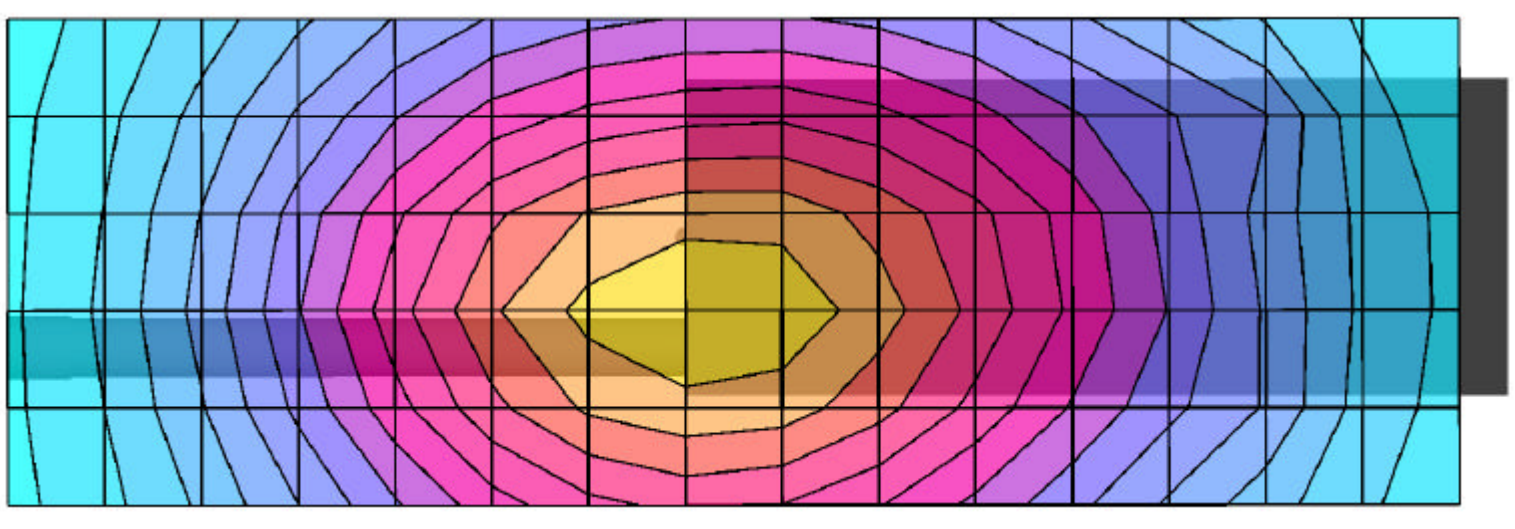
Body-Worn SAR with Leather Case, Swivel, & Belt-Loop (KRY1011639/1)
(4.5cm Leather Case & Belt-Loop Separation Distance)
Portable VHF PTT Radio Transceiver Model: P7100(IP)
Helical Coil Antenna (KRE1011219/1)
NiCD Battery (BKB191210/3/5)
Continuous Wave Mode
Low Channel [136.00 MHz]
Conducted Power: 37.68 dBm
Ambient Temp. 23.1°C; Fluid Temp. 23.3°C
Date Tested: August 21, 2002



M/A-COM PRS INC. FCC ID: OWDTR-0013-E

Small Planar Phantom; Planar Section; Position: (270°,180°)
Probe: ET3DV6 - SN1387; ConvF(8.80,8.80,8.80); Crest factor: 1.0
150 MHz Muscle: σ = 0.81 mho/m ε_r = 61.1 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.18 dB
SAR (1g): 0.303 mW/g, SAR (10g): 0.231 mW/g

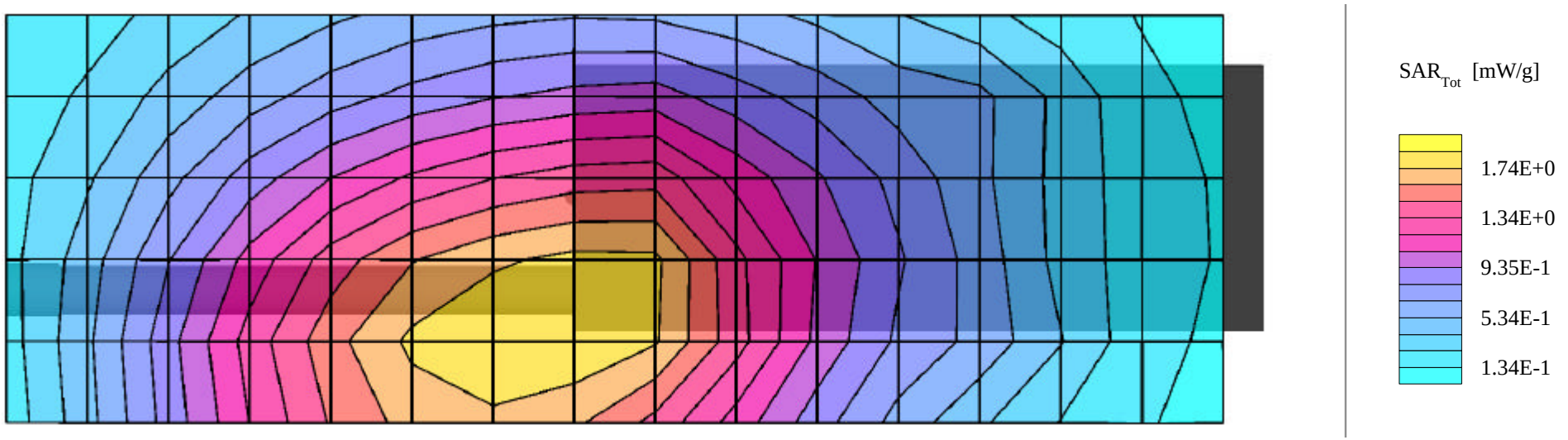
Body-Worn SAR with Leather Case, Swivel, & Belt-Loop (KRY1011639/1)
(4.5cm Leather Case & Belt-Loop Separation Distance)
Portable VHF PTT Radio Transceiver Model: P7100(IP)
Helical Coil Antenna (KRE1011219/3)
NiCD Battery (BKB191210/3/5)
Continuous Wave Mode
High Channel [174.00 MHz]
Conducted Power: 37.40 dBm
Ambient Temp. 23.1°C; Fluid Temp. 23.3°C
Date Tested: August 21, 2002



M/A-COM PRS INC. FCC ID: OWDTR-0013-E

Small Planar Phantom; Planar Section; Position: (270°,180°)
Probe: ET3DV6 - SN1387; ConvF(8.80,8.80,8.80); Crest factor: 1.0
150 MHz Muscle: σ = 0.81 mho/m ε_r = 61.1 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.15 dB
SAR (1g): 1.74 mW/g, SAR (10g): 1.35 mW/g

Body-Worn SAR with Nylon Case & Swivel Belt-Loop (KRY1011648/1)
(4.0cm Nylon Case/Swivel Belt-Loop Separation Distance)
Portable VHF PTT Radio Transceiver Model: P7100 (IP)
Helical Coil Antenna (KRE1011219/2)
NiMH Battery (BKB191210/4/6)
Continuous Wave Mode
Mid Channel [155.00 MHz]
Conducted Power: 37.68 dBm
Ambient Temp. 23.1°C; Fluid Temp. 23.3°C
Date Tested: August 21, 2002



M/A-COM PRS INC. FCC ID: OWDTR-0013-E

Small Planar Phantom; Planar Section; Position: (270°,180°)
Probe: ET3DV6 - SN1387; ConvF(8.80,8.80,8.80); Crest factor: 1.0
150 MHz Muscle: σ = 0.81 mho/m ε_r = 61.1 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7; Powerdrift: -0.19 dB
SAR (1g): 1.83 mW/g, SAR (10g): 1.42 mW/g

Body-Worn SAR with Nylon Case & Swivel Belt-Loop (KRY1011648/1)
(4.0cm Nylon Case/Swivel Belt-Loop Separation Distance)
Portable VHF PTT Radio Transceiver Model: P7100 (IP)
Helical Coil Antenna (KRE1011219/2)
NiCD Battery (BKB191210/3/5)
Continuous Wave Mode
Mid Channel [155.00 MHz]
Conducted Power: 37.68 dBm
Ambient Temp. 23.1°C; Fluid Temp. 23.3°C
Date Tested: August 21, 2002