DECLARATION OF COMPLIANCE
SAR RF EXPOSURE EVALUATION

Test Lab

CELLTECH LABS INC.
Testing and Engineering Services
1955 Moss Court
Kelowna, B.C.
Canada V1Y 9L3
Phone: 250-448-7047
Fax: 250-448-7046
e-mail: info@celltechlabs.com
web site: www.celltechlabs.com

Applicant Information

DTC COMMUNICATIONS, INC.
486 Amherst Street
Nashua, NH 03063
United States

FCC IDENTIFIER:	**H25T2350**
Model(s):	**T-2350**
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 worn on body (TNT)**
Device Description:	**Wireless Body-Worn FM VHF Audio Transmitter**
Modulation Type(s):	**FM (Analog Wideband, Analog Narrowband, Digital)**
Tx Frequency Range:	**150 - 174 MHz**
Max. RF Output Power Tested:	**30.33 dBm - Conducted (162.5 MHz)**
Antenna Type(s) Tested:	**Microphone-Antenna (P/N: 7011149)** **Noodle-Wire Antenna (P/N: 7011151)**
Battery Type(s) Tested:	**Alkaline x6 (1.5 V AAA)** **Type 1: Duracell Procell (1150 mAh)** **Type 2: Energizer E92 (1250 mAh)**
Body-Worn Accessories:	**None**
Audio Accessories:	**External Microphone (with Noodle-Wire Antenna only)**
Max. SAR Level(s) Evaluated:	**Body-worn: 1.33 W/kg (1g average)**

Celltech Labs Inc. declares under its sole responsibility that this wireless portable device has demonstrated 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 (Provisional) for the Occupational / Controlled Exposure environment. All measurements were performed in accordance with the SAR system manufacturer recommendations.

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

Performed By:

Spencer Watson
Compliance Technologist
Celltech Labs Inc.

Reviewed By:

Russell W. Pipe
Senior Compliance Technologist
Celltech Labs Inc.

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1.0 INTRODUCTION

This measurement report demonstrates compliance of the DTC Communications, Inc. Model: T-2350 Wireless Body-Worn FM VHF Audio Transmitter FCC ID: H25T2350 with the SAR (Specific Absorption Rate) RF exposure requirements specified in FCC 47 CFR §2.1093 (see reference [1]), and Health Canada Safety Code 6 (see reference [2]) for the Occupational / Controlled Exposure environment. The test procedures described in FCC OET Bulletin 65, Supplement C (Edition 01-01) (see reference [3]) and IC RSS-102 Issue 1 (Provisional) (see reference [4]), were employed. A description of the product and operating configuration, detailed summary of the test results, methodology and procedures used in the evaluation, equipment used, and the various provisions of the rules are included within this test report.

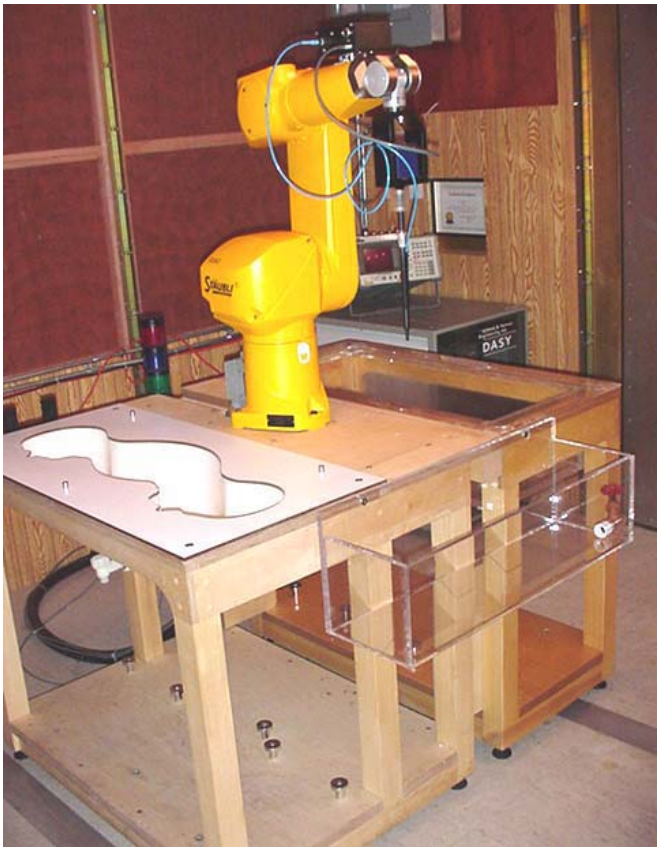
2.0 DESCRIPTION OF DEVICE UNDER TEST (DUT)

FCC Rule Part(s)	FCC 47 CFR §2.1093				
IC Rule Part(s)	RSS-102 Issue 1 (Provisional)				
Test Procedure(s)	FCC OET Bulletin 65, Supplement C (Edition 01-01)				
Device Classification	Licensed Non-Broadcast Transmitter worn on body (TNT)				
Device Description	Wireless Body-Worn FM VHF Audio Transmitter				
FCC IDENTIFIER	H25T2350				
Model(s)	T-2350				
Serial No.	PROTO-1		Identical Prototype		
Tx Frequency Range	150 - 174 MHz				
Modulation Type(s) Tested	FM (Analog Wideband, Digital)				
Max. RF Output Power Measured	30.33 dBm		162.5 MHz		Conducted
Battery Type(s) Tested	Alkaline	1.5V AAA (x6)	Duracell Procell		1150 mAh
			Energizer E92		1250 mAh
Antenna Type(s) Tested	**Type**	**Part No.**	**Length**		**Frequency**
	Mic-Antenna	7011149	311 mm	12.25 inches	150 - 174 MHz
	Noodle-Wire	7011151	461 mm	18.15 inches	150 - 174 MHz
	Note: Noodle-Wire Antenna can be used with internal microphone or external microphone				
Body-Worn Accessories	None				
Audio Accessories	External Microphone (with Noodle-Wire Antenna only)				

3.0 SAR MEASUREMENT SYSTEM

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

DASY4 SAR Measurement System with validation phantom



DASY4 SAR Measurement System with Plexiglas planar phantom

4.0 MEASUREMENT SUMMARY

BODY-WORN SAR EVALUATION RESULTS

Test Date	Freq. (MHz)	Chan.	Test Mode	Antenna Type	Test Mode	Battery Type	Audio Accessories	DUT Position to Planar Phantom	Separ. Distance to Planar Phantom (cm)	Cond. Power Before Test (dBm)	Measured SAR 1g (W/kg)	SAR Drift During Test (dB)	Scaled SAR 1g (W/kg)
Jan 20	162.5	Mid	CW	Mic-Antenna	FM Digital	Duracell Alkaline	none	Back	0.0	30.21	1.03	-0.384	1.13
Jan 20	162.5	Mid	CW	Mic-Antenna	FM Analog Wideband	Duracell Alkaline	none	Back	0.0	30.25	P 1.05	-0.401	P 1.15
										30.24	S 1.00	-0.285	S 1.07
Jan 20	162.5	Mid	CW	Mic-Antenna	FM Analog Wideband	Duracell Alkaline	none	Front	0.0	30.25	1.20	-0.462	1.33
Jan 21	162.5	Mid	CW	Noodle Wire	FM Analog Wideband	Duracell Alkaline	External Mic	Front	0.0	30.17	0.529	-0.319	0.569
Jan 21	162.5	Mid	CW	Noodle Wire	FM Digital	Duracell Alkaline	External Mic	Front	0.0	30.19	0.503	-0.309	0.540
Jan 21	162.5	Mid	CW	Noodle Wire	FM Analog Wideband	Duracell Alkaline	External Mic	Back	0.0	30.18	0.513	-0.0607	0.520
Jan 21	162.5	Mid	CW	Noodle Wire	FM Analog Wideband	Duracell Alkaline	none	Front	0.0	30.21	0.499	-0.315	0.537
Jan 24	162.5	Mid	CW	Mic-Antenna	FM Analog Wideband	Energizer Alkaline	none	Front	0.0	30.33	1.14	-0.499	1.28

ANSI / IEEE C95.1 1999 - SAFETY LIMIT
Spatial Peak - Controlled Exposure / Occupational
BODY: 8.0 W/kg (averaged over 1 gram)

Measured Fluid Type	150 MHz Body					Test Date(s)	Jan-20	Jan-21	Jan-24	Unit
Dielectric Constant ε_r	IEEE Target		Measured			Relative Humidity	32	30	31	%
	61.9	± 5%	Jan-20	Jan-21	Jan-24	Atmospheric Pressure	101.6	101.9	102.1	kPa
			62.1	61.5	62.9	Ambient Temperature	22.0	22.9	22.9	°C
Conductivity σ (mho/m)	IEEE Target		Measured			Fluid Temperature	21.7	20.7	22.6	°C
	0.80	± 5%	Jan-20	Jan-21	Jan-24	Fluid Depth	≥ 15	≥ 15	≥ 15	cm
			0.80	0.79	0.82	ρ (Kg/m^3)	1000			

Note(s):

1. The measurement results were obtained with the DUT tested in the conditions described in this report. Detailed measurement data and plots showing the maximum SAR location of the DUT are reported in Appendix A.
2. If the scaled SAR levels evaluated at the mid channel were ≥ 3 dB below the SAR limit, SAR evaluation for the low and high channels was optional per FCC OET Bulletin 65, Supplement C, Edition 01-01 (see reference [3]).
3. Secondary peak SAR levels measured within 2 dB of the primary were reported (P = Primary, S = Secondary).
4. The DUT was evaluated for SAR with Duracell Procell alkaline batteries. To report a SAR comparison between alternate alkaline battery types, the maximum scaled SAR level configuration evaluated with Duracell Procell alkaline batteries was repeated using Energizer E92 alkaline batteries as shown in the above table.
5. The power drifts measured by the DASY4 system during the evaluations were added to the measured SAR levels to report scaled SAR results as shown in the above test data table.
6. The SAR evaluations were performed within 24 hours of the system performance check.

5.0 DETAILS OF SAR EVALUATION

The DTC Communications, Inc. Model: T-2350 Wireless Body-Worn FM VHF Audio Transmitter FCC ID: H25T2350 was compliant for localized Specific Absorption Rate (Occupational / Controlled Exposure) based on the test provisions and conditions described below. The detailed test setup photographs are shown in Appendix F.

1. The DUT was evaluated in a body-worn configuration with the back side of the transmitter and the microphone-antenna wire placed parallel to, and touching, the outer surface of the planar phantom. The back side of the transmitter with microphone-antenna was evaluated for body-worn SAR in both digital and analog-wide FM modes.
2. The worst-case SAR test configuration with the back side of the transmitter and the microphone-antenna (analog-wide FM mode) was subsequently evaluated with the front side of the transmitter placed parallel, to and touching, the outer surface of the planar phantom.
3. The DUT was evaluated in a body-worn configuration with the front side of the transmitter and the noodle-wire antenna placed parallel to, and touching, the outer surface of the planar phantom. The front side of the transmitter with noodle-wire antenna was evaluated for body-worn SAR in both digital and analog-wide FM modes. An external microphone accessory was connected to the transmitter's multi-pin connector for the duration of the SAR evaluations.
4. The worst-case SAR test configuration with the front side of the transmitter and the noodle-wire antenna (analog-wide FM Mode) was subsequently evaluated with the back side of the transmitter placed parallel, to and touching, the outer surface of the planar phantom. An external microphone accessory was connected to the transmitter's multi-pin connector for the duration of the SAR evaluation.
5. The worst-case SAR test configuration with the transmitter, noodle-wire antenna, and external microphone accessory (front side, analog-wide FM Mode) was subsequently re-evaluated utilizing the internal microphone (external microphone accessory disconnected) to report a SAR comparison with and without the external microphone.
6. The DUT was evaluated for SAR with Duracell Procell alkaline batteries. The worst-case SAR test configuration with Duracell Procell alkaline batteries (front side of transmitter with microphone-antenna, analog-wide FM mode) was subsequently re-evaluated with Energizer E92 alkaline batteries to report a SAR comparison between alternate alkaline battery types.
7. A 2nd SAR scan was performed over the battery housing section of the transmitter for each of the noodle-wire antenna test configurations to show there was no SAR distribution over that area of the DUT, which was not evaluated in the original scans.
8. The conducted power levels were measured prior to each test using a Gigatronics 8652A Universal Power Meter according to the procedures described in FCC 47 CFR §2.1046.
9. The power drifts measured by the DASY4 system during the SAR evaluations were subsequently added to the measured SAR levels to report scaled SAR results as shown in the test data table (page 5).
10. A SAR-versus-Time power drift evaluation was performed in the test configuration that reported the maximum scaled SAR level (front side of transmitter with microphone-antenna, analog-wide FM mode, with Duracell Procell alkaline batteries). See Appendix A (SAR Test Plots) for SAR-versus-Time power drift evaluation plot.
11. The area scan evaluation was performed with fully charged batteries. After the area scan was completed the radio was cooled down to room temperature and the batteries were replaced with fully charged batteries prior to the zoom scan evaluation.
12. The DUT was tested at maximum power in a continuous transmit operation. The DUT was evaluated for SAR in FM digital mode and FM analog-wideband mode. FM analog-narrowband mode was not evaluated based on the FM analog-wideband mode being the worst-case total power mode of operation.
13. The SAR evaluations were performed using a Plexiglas planar phantom mounted on the side of the DASY4 system.
14. The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the SAR evaluation. The temperatures reported were consistent for all measurement periods.
15. The dielectric parameters of the simulated tissue mixture were measured prior to the evaluation using an HP 85070C Dielectric Probe Kit and an HP 8753E Network Analyzer (see Appendix E for printout of measured fluid dielectric parameters).
16. The SAR evaluations were performed within 24 hours of the system performance check.

6.0 EVALUATION PROCEDURES

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

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

An area scan was determined as follows:

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

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

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

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

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

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

Body-Worn Test Setup Configuration

7.0 SYSTEM PERFORMANCE CHECK

Prior to the SAR evaluation a system check was performed using a Plexiglas planar phantom and a 300 MHz dipole (see Appendix C for system validation procedure). The dielectric parameters of the simulated tissue mixture were measured prior to the system performance check using an HP 85070C Dielectric Probe Kit and an HP 8753E Network Analyzer (see Appendix E for printout of measured fluid dielectric parameters). A forward power of 250 mW was applied to the dipole and the system was verified to a tolerance of ±10% (see Appendix B for system performance check test plots).

SYSTEM PERFORMANCE CHECK

Test Date	300MHz Equiv. Tissue	SAR 1g (W/kg)		Dielectric Constant ε_r		Conductivity σ (mho/m)		ρ (Kg/m^3)	Amb. Temp. (°C)	Fluid Temp. (°C)	Fluid Depth (cm)	Humid. (%)	Barom. Press. (kPa)
		IEEE Target	Measured	IEEE Target	Measured	IEEE Target	Measured						
01/20/05	Brain	**0.750 (±10%)**	0.793 (+5.7%)	**45.3 ±5%**	45.2	**0.87 ±5%**	0.85	1000	21.9	21.5	≥ 15	30	101.8
01/21/05	Brain	**0.750 (±10%)**	0.790 (+5.3%)	**45.3 ±5%**	45.0	**0.87 ±5%**	0.85	1000	21.9	21.5	≥ 15	30	102.4
01/24/05	Brain	**0.750 (±10%)**	0.791 (+5.5%)	**45.3 ±5%**	44.8	**0.87 ±5%**	0.84	1000	21.0	21.3	≥ 15	32	102.0

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

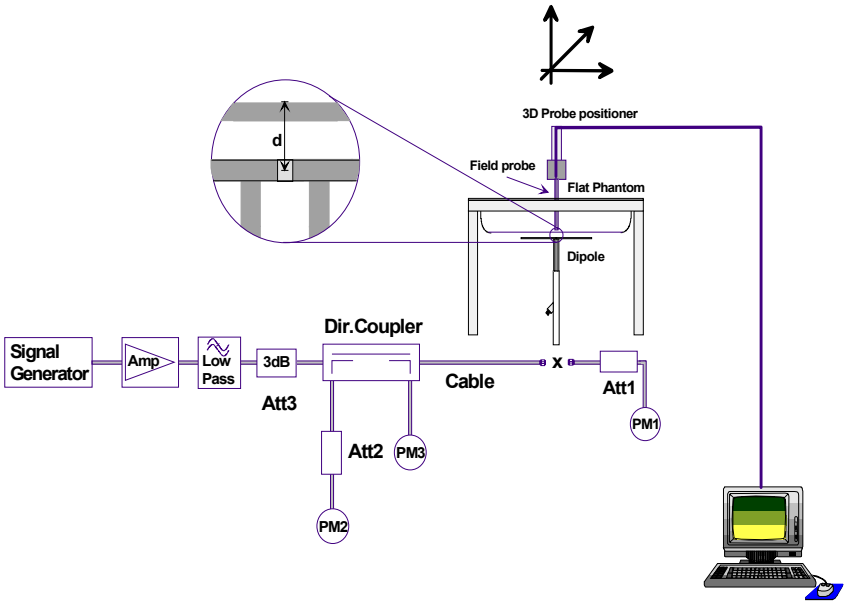


Figure 1. System Performance Check Setup Diagram

300 MHz Dipole Setup

8.0 SIMULATED EQUIVALENT TISSUES

The simulated 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).

SIMULATED TISSUE MIXTURES		
INGREDIENT	300 MHz Brain (%)	150 MHz Body (%)
	System Performance Check	DUT Evaluation
Water	37.56	46.6
Sugar	55.32	49.7
Salt	5.95	2.6
HEC	0.98	1.0
Bactericide	0.19	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 1g of tissue)	1.60	8.0
Spatial Peak (hands/wrists/feet/ankles averaged over 10g)	4.0	20.0

Notes:

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

10.0 ROBOT SYSTEM SPECIFICATIONS

Specifications

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

Data Acquisition Electronic (DAE) System

Cell Controller

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

Data Converter

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

DASY4 Measurement Server

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

E-Field Probe

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

Phantom(s)

Evaluation Phantom

Type: Planar Phantom
Shell Material: Plexiglas
Bottom Thickness: 2.0 mm ± 0.1 mm
Outer Dimensions: 75.0 cm (L) x 22.5 cm (W) x 20.5 cm (H); Back Plane: 25.7 cm (H)

Validation Phantom (≤ 450MHz)

Type: Planar Phantom
Shell Material: Plexiglas
Bottom Thickness: 6.2 mm ± 0.1 mm
Outer Dimensions: 86.0 cm (L) x 39.5 cm (W) x 21.8 cm (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)
Dynamic Range:	5 μW/g to > 100 mW/g; Linearity: ± 0.2 dB
Surface Detection:	± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces
Dimensions:	Overall length: 330 mm Tip length: 16 mm Body diameter: 12 mm Tip diameter: 6.8 mm Distance from probe tip to dipole centers: 2.7 mm
Application:	General dosimetry up to 3 GHz Compliance tests of mobile phone

ET3DV6 E-Field Probe

12.0 PLANAR PHANTOM

The planar phantom is constructed of Plexiglas material with a 2.0 mm shell thickness for face-held and body-worn SAR evaluations of handheld and body-worn radio transceivers. The planar phantom is mounted on the side of the DASY4 compact system table.

Planar Phantom

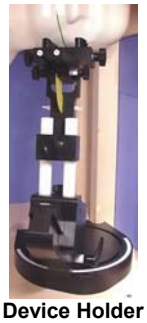
13.0 VALIDATION PLANAR PHANTOM

The validation planar phantom is constructed of Plexiglas material with a 6.0 mm shell thickness for system validations at 450MHz and below. The validation planar phantom is mounted in the table of the DASY4 compact system.

Validation Planar Phantom

14.0 DEVICE HOLDER

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



Device Holder

15.0 TEST EQUIPMENT LIST

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

16.0 MEASUREMENT UNCERTAINTIES

UNCERTAINTY BUDGET FOR DEVICE EVALUATION

Error Description	Uncertainty Value ±%	Probability Distribution	Divisor	c_i 1g	Standard Uncertainty ±% (1g)	v_i or v_{eff}
Measurement System						
Probe calibration	± 4.0	Normal	1	1	± 4.0	∞
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					**± 13.03**	
Expanded Uncertainty (k=2)					**± 26.07**	

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

MEASUREMENT UNCERTAINTIES (Cont.)

UNCERTAINTY BUDGET FOR SYSTEM VALIDATION

Error Description	Uncertainty Value ±%	Probability Distribution	Divisor	c_i 1g	Standard Uncertainty ±% (1g)	v_i or v_{eff}
Measurement System						
Probe calibration	± 4.0	Normal	1	1	± 4.0	∞
Axial isotropy of the probe	± 4.7	Rectangular	√3	$(1-c_p)$	± 1.9	∞
Spherical isotropy of the probe	± 9.6	Rectangular	√3	(c_p)	± 3.9	∞
Spatial resolution	± 0.0	Rectangular	√3	1	± 0.0	∞
Boundary effects	± 5.5	Rectangular	√3	1	± 3.2	∞
Probe linearity	± 4.7	Rectangular	√3	1	± 2.7	∞
Detection limit	± 1.0	Rectangular	√3	1	± 0.6	∞
Readout electronics	± 1.0	Normal	1	1	± 1.0	∞
Response time	± 0.8	Rectangular	√3	1	± 0.5	∞
Integration time	± 1.4	Rectangular	√3	1	± 0.8	∞
RF ambient conditions	± 3.0	Rectangular	√3	1	± 1.7	∞
Mech. constraints of robot	± 0.4	Rectangular	√3	1	± 0.2	∞
Probe positioning	± 2.9	Rectangular	√3	1	± 1.7	∞
Extrapolation & integration	± 3.9	Rectangular	√3	1	± 2.3	∞
Dipole						
Dipole Axis to Liquid Distance	± 2.0	Rectangular	√3	1	± 1.2	∞
Input Power	± 4.7	Rectangular	√3	1	± 2.7	∞
Phantom and Setup						
Phantom uncertainty	± 4.0	Rectangular	√3	1	± 2.3	∞
Liquid conductivity (target)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid conductivity (measured)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid permittivity (target)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid permittivity (measured)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Combined Standard Uncertainty					**± 9.58**	
Expanded Uncertainty (k=2)					**± 19.16**	

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

17.0 REFERENCES

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

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

[3] Federal Communications Commission, “Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields”, OET Bulletin 65, Supplement C (Edition 01-01), FCC, Washington, D.C.: June 2001.

[4] Industry Canada, “Evaluation Procedure for Mobile and Portable Radio Transmitters with respect to Health Canada’s Safety Code 6 for Exposure of Humans to Radio Frequency Fields”, Radio Standards Specification RSS-102 Issue 1 (Provisional): September 1999.

[5] IEEE Std 1528-2003, “Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”: June 2003.

APPENDIX A - SAR MEASUREMENT DATA

Date Tested: 01/20/05

Body-Worn SAR - Microphone-Antenna - FM Digital Mode - Back Side of DUT - Duracell Batteries

DUT: DTC Communications Model: T-2350; Type: Wireless Body-Worn FM VHF Audio Transmitter; Serial: PROTO-1

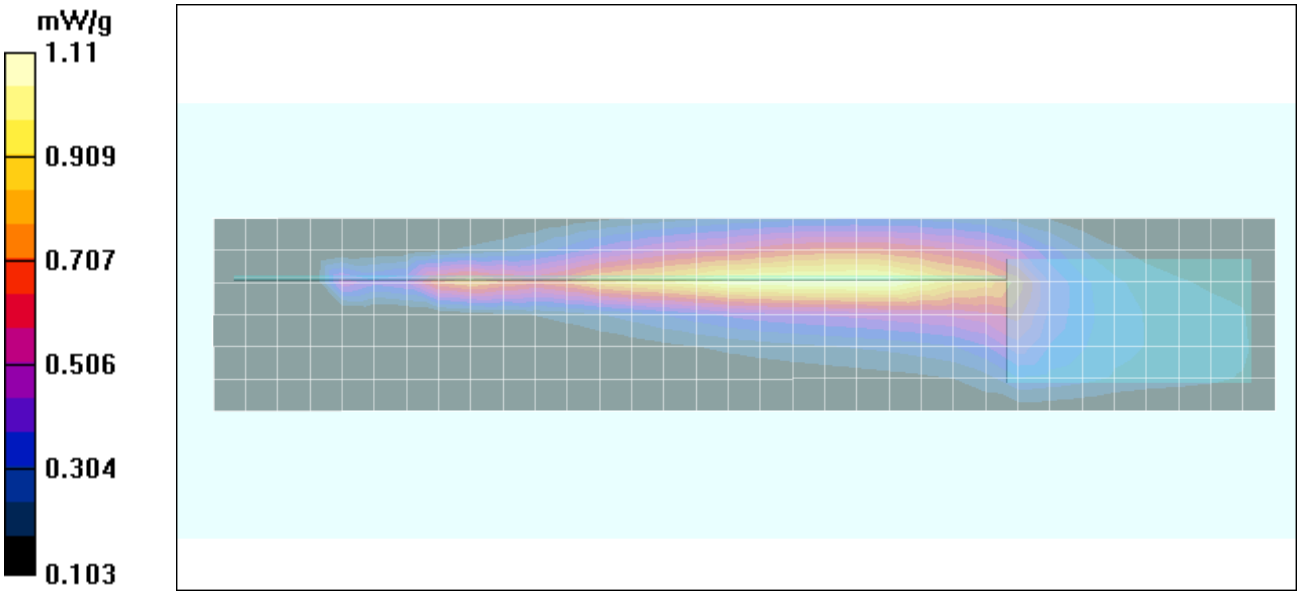
Ambient Temp: 22.0 °C; Fluid Temp: 21.7 °C; Barometric Pressure: 101.6 kPa; Humidity: 32%

Communication System: FM Digital
Frequency: 162.5 MHz; Duty Cycle: 1:1
RF Output Power: 30.21 dBm (Conducted)
1.5V 1150mAh Duracell ProCell AAA Alkaline Batteries (x6)
Medium: M150 (σ =0.80 mho/m; ε_r = 62.1; ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(8.7, 8.7, 8.7); Calibrated: 18/03/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 06/07/2004
- Phantom: Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

Body-Worn - 0.0 cm Separation Distance - Mid Channel/Area Scan (7x34x1):
Measurement grid: dx=15mm, dy=15mm

Body-Worn - 0.0 cm Separation Distance - Mid Channel/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 21.3 V/m; Power Drift = -0.384 dB
Peak SAR (extrapolated) = 2.16 W/kg
SAR(1 g) = 1.03 mW/g; SAR(10 g) = 0.617 mW/g



Date Tested: 01/20/05

Body-Worn SAR - Microphone-Antenna - FM Analog-Wide Mode - Back Side of DUT - Duracell Batteries

DUT: DTC Communications Model: T-2350; Type: Wireless Body-Worn FM VHF Audio Transmitter; Serial: PROTO-1

Ambient Temp: 22.0 °C; Fluid Temp: 21.7 °C; Barometric Pressure: 101.6 kPa; Humidity: 32%

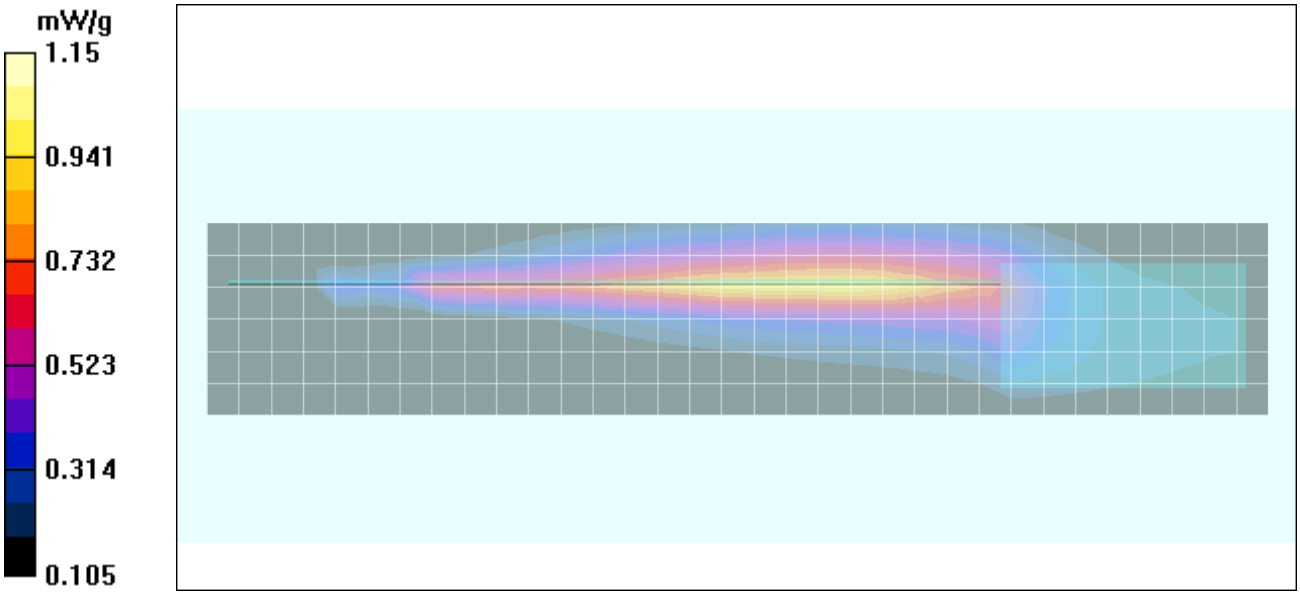
Communication System: FM Analog-Wide
Frequency: 162.5 MHz; Duty Cycle: 1:1
RF Output Power: 30.25 dBm (Conducted)
RF Output Power: 30.24 dBm (Conducted) 2nd Maximum
1.5V 1150mAh Duracell ProCell AAA Alkaline Batteries (x6)
Medium: M150 (σ =0.80 mho/m; ε_r = 62.1; ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(8.7, 8.7, 8.7); Calibrated: 18/03/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 06/07/2004
- Phantom: Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

Body-Worn - 0.0 cm Separation Distance - Mid Channel/Area Scan (7x34x1):
Measurement grid: dx=15mm, dy=15mm

Body-Worn - 0.0 cm Separation Distance - Mid Channel/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 21.5 V/m; Power Drift = -0.401 dB
Peak SAR (extrapolated) = 2.24 W/kg
SAR(1 g) = 1.05 mW/g; SAR(10 g) = 0.619 mW/g

Body-Worn - 0.0 cm Separation Distance - Mid Channel/Zoom Scan 2 (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 21.1 V/m; Power Drift = -0.285 dB
Peak SAR (extrapolated) = 2.33 W/kg
SAR(1 g) = 1.00 mW/g; SAR(10 g) = 0.588 mW/g



Date Tested: 01/20/05

Body-Worn SAR - Microphone-Antenna - FM Analog-Wide Mode - Front Side of DUT - Duracell Batteries

DUT: DTC Communications Model: T-2350; Type: Wireless Body-Worn FM VHF Audio Transmitter; Serial: PROTO-1

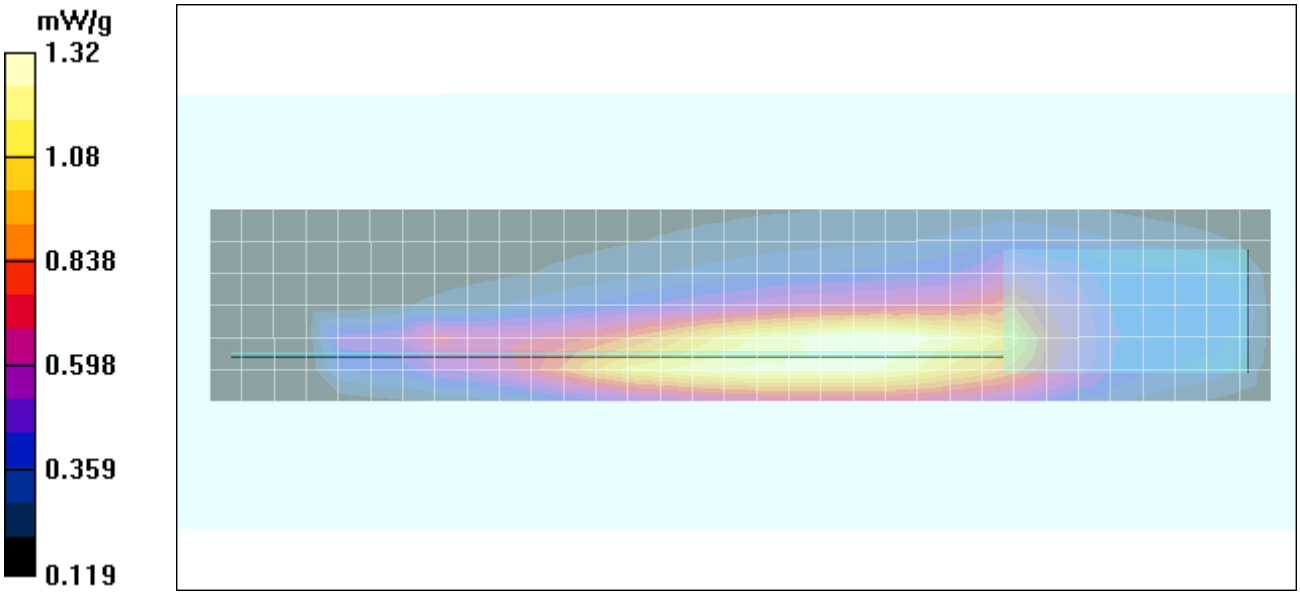
Ambient Temp: 22.0 °C; Fluid Temp: 21.7 °C; Barometric Pressure: 101.6 kPa; Humidity: 32%

Communication System: FM Analog-Wide
Frequency: 162.5 MHz; Duty Cycle: 1:1
RF Output Power: 30.25 dBm (Conducted)
1.5V 1150mAh Duracell ProCell AAA Alkaline Batteries (x6)
Medium: M150 (σ =0.80 mho/m; ε_r = 62.1; ρ = 1000 kg/m^3)

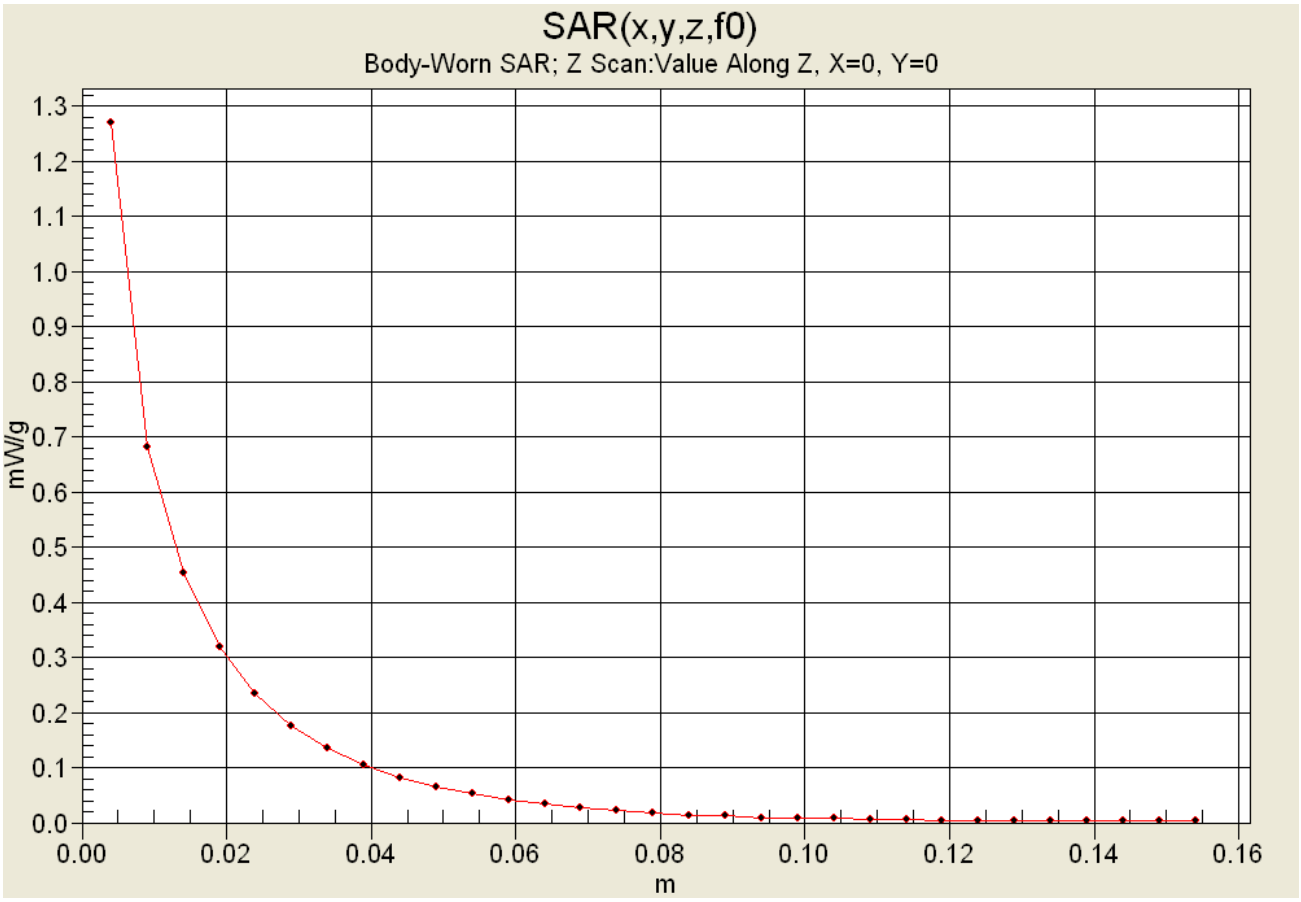
- Probe: ET3DV6 - SN1387; ConvF(8.7, 8.7, 8.7); Calibrated: 18/03/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 06/07/2004
- Phantom: Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

Body-Worn - 0.0 cm Separation Distance - Mid Channel/Area Scan (7x34x1):
Measurement grid: dx=15mm, dy=15mm

Body-Worn - 0.0 cm Separation Distance - Mid Channel/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 23.3 V/m; Power Drift = -0.462 dB
Peak SAR (extrapolated) = 2.62 W/kg
SAR(1 g) = 1.20 mW/g; SAR(10 g) = 0.698 mW/g

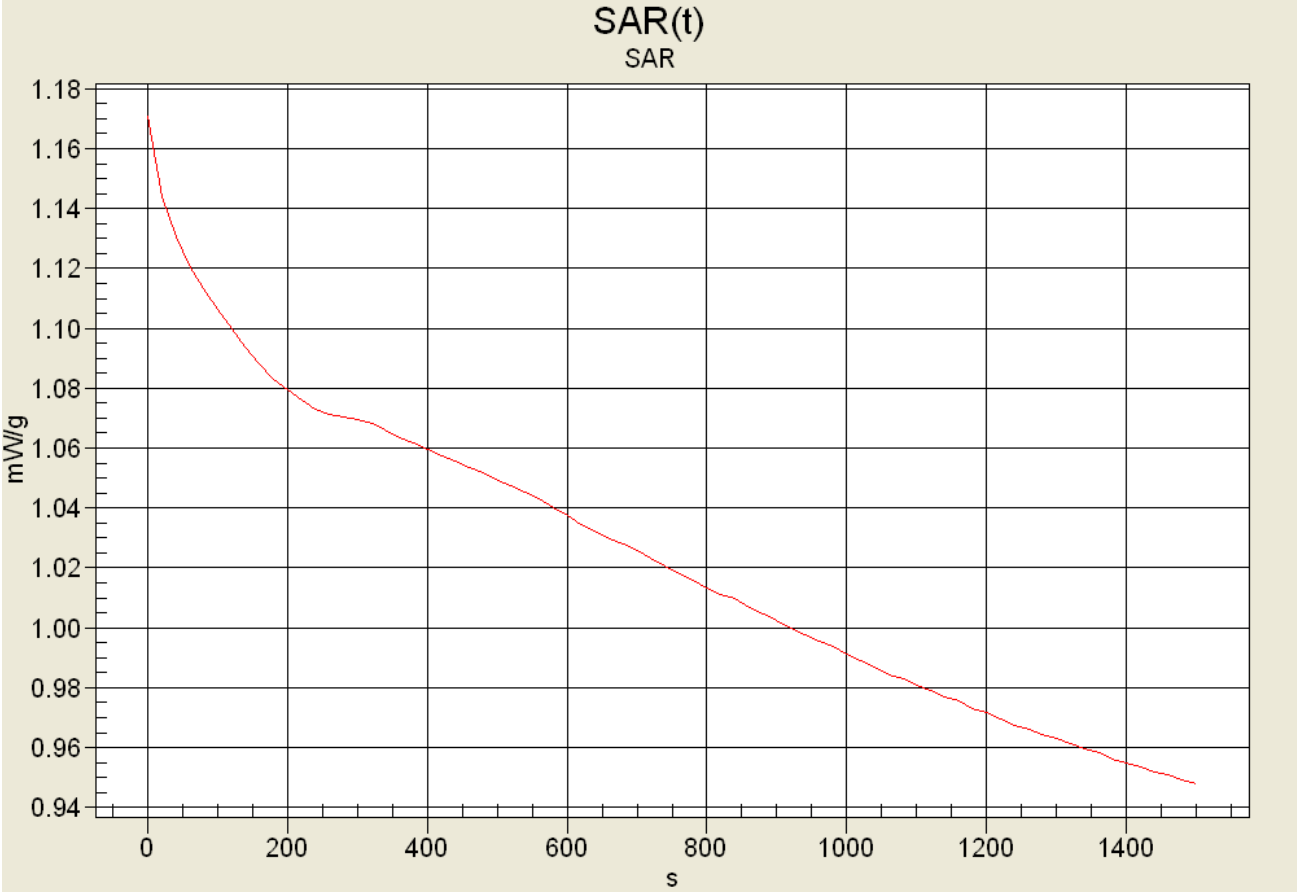


Z-axis Scan



SAR-versus-Time Power Drift Evaluation

Front Side of DUT
Alkaline Batteries (Duracell)
Microphone-Antenna
FM Analog-Wide Mode
Mid Channel - 162.5 MHz



High SAR: 1.1707 mW/g
Low SAR: 0.948041 mW/g (-0.916 dB)
SAR after 340s: 1.06597 mW/g (-0.407 dB)
(340s = Zoom Scan Duration)
(1500s = Area Scan Duration)

Date Tested: 01/21/05

Body-Worn SAR - Noodle-Wire Antenna - FM Analog-Wide Mode - Front Side of DUT - Duracell Batteries

DUT: DTC Communications Model: T-2350; Type: Wireless Body-Worn FM VHF Audio Transmitter; Serial: PROTO-1

With External Microphone Audio Accessory

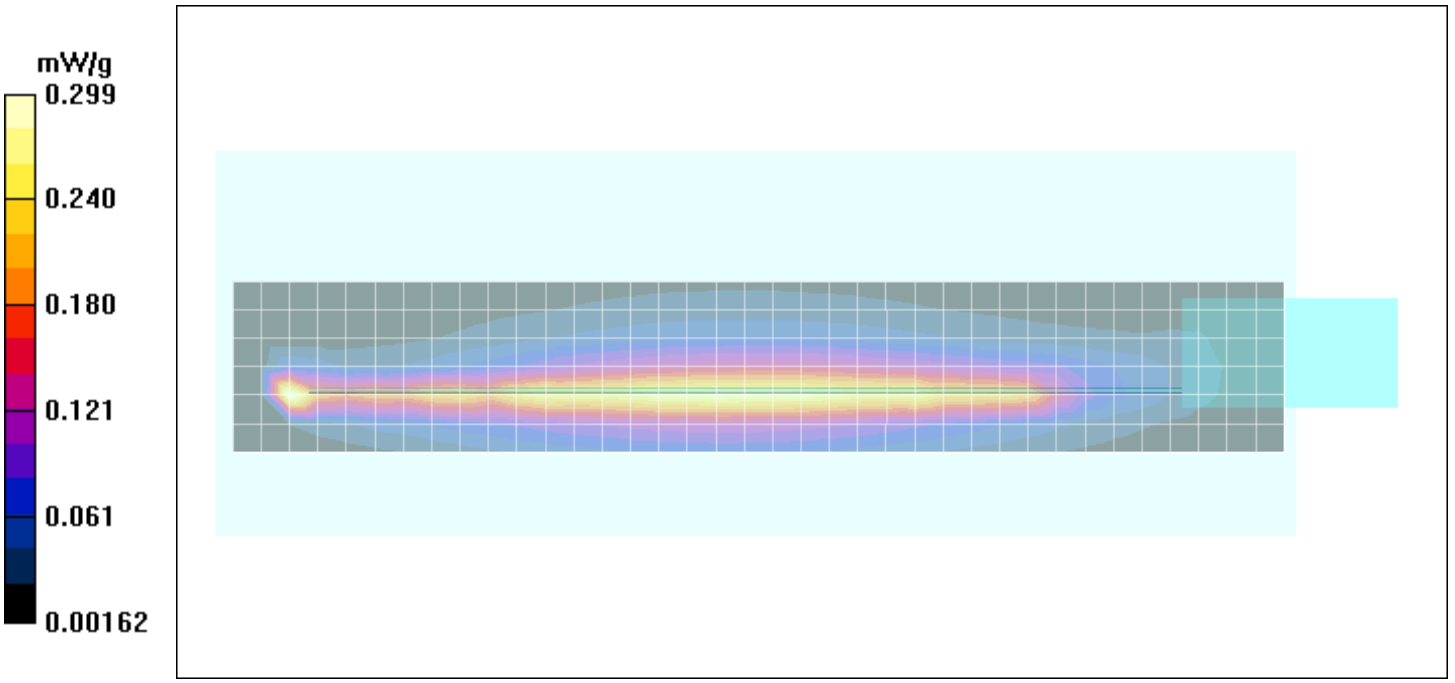
Ambient Temp: 22.9 °C; Fluid Temp: 20.7 °C; Barometric Pressure: 101.9 kPa; Humidity: 30%

Communication System: FM Analog-Wide
Frequency: 162.5 MHz; Duty Cycle: 1:1
RF Output Power: 30.17 dBm (Conducted)
1.5V 1150mAh Duracell ProCell AAA Alkaline Batteries (x6)
Medium: M150 (σ = 0.79 mho/m; ε_r = 61.5; ρ = 1000 kg/m^3)

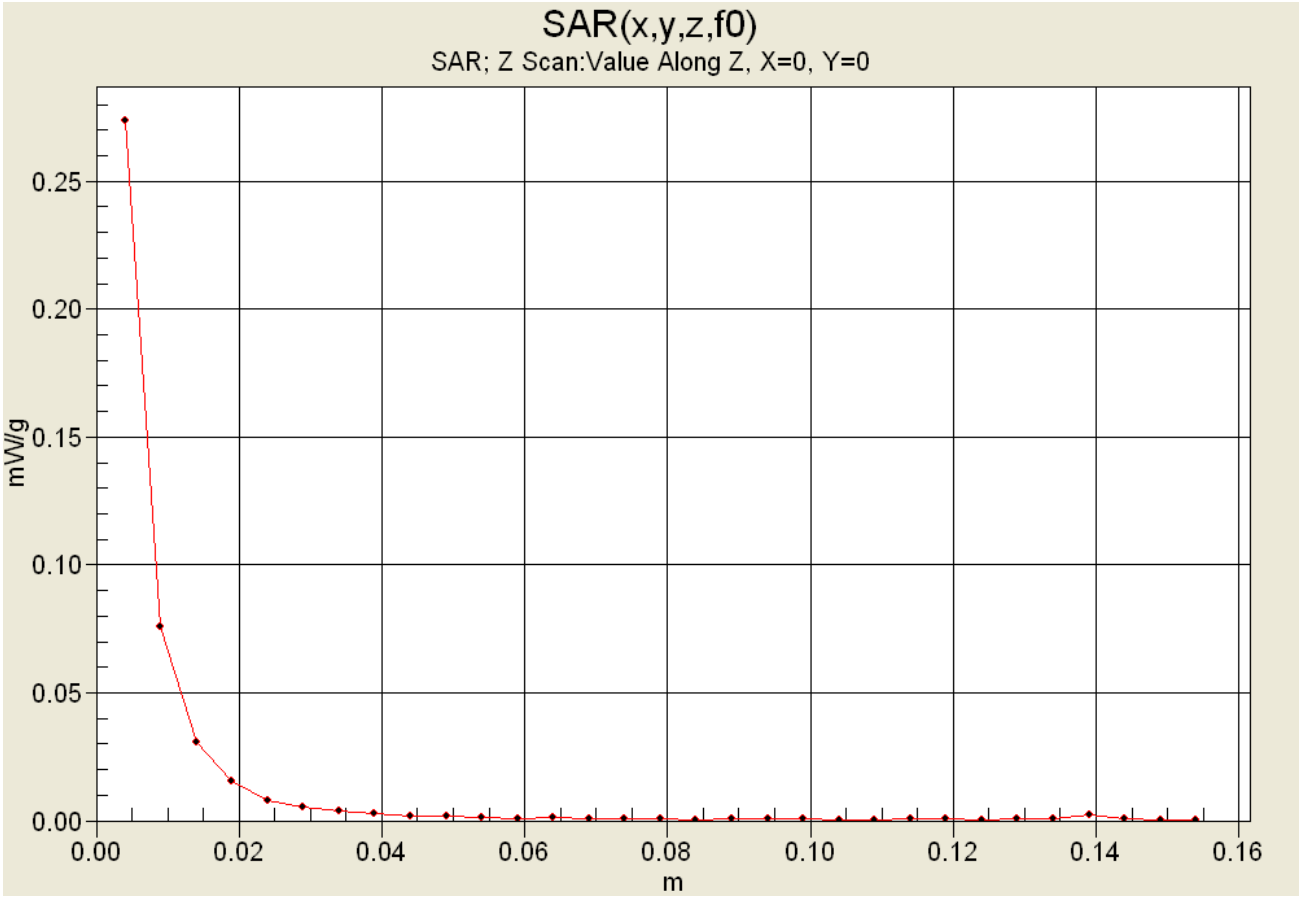
- Probe: ET3DV6 - SN1387; ConvF(8.7, 8.7, 8.7); Calibrated: 18/03/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 06/07/2004
- Phantom: Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

Body-Worn - 0.0 cm Separation Distance - Mid Channel/Area Scan (7x38x1):
Measurement grid: dx=15mm, dy=15mm

Body-Worn - 0.0 cm Separation Distance - Mid Channel/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 9.97 V/m; Power Drift = -0.319 dB
Peak SAR (extrapolated) = 7.6 W/kg
SAR(1 g) = 0.529 mW/g; SAR(10 g) = 0.143 mW/g



Z-Axis Scan



Date Tested: 01/21/05

2nd Scan

Body-Worn SAR - Noodle-Wire Antenna - FM Analog-Wide Mode - Front Side of DUT - Duracell Batteries

DUT: DTC Communications Model: T-2350; Type: Wireless Body-Worn FM VHF Audio Transmitter; Serial: PROTO-1

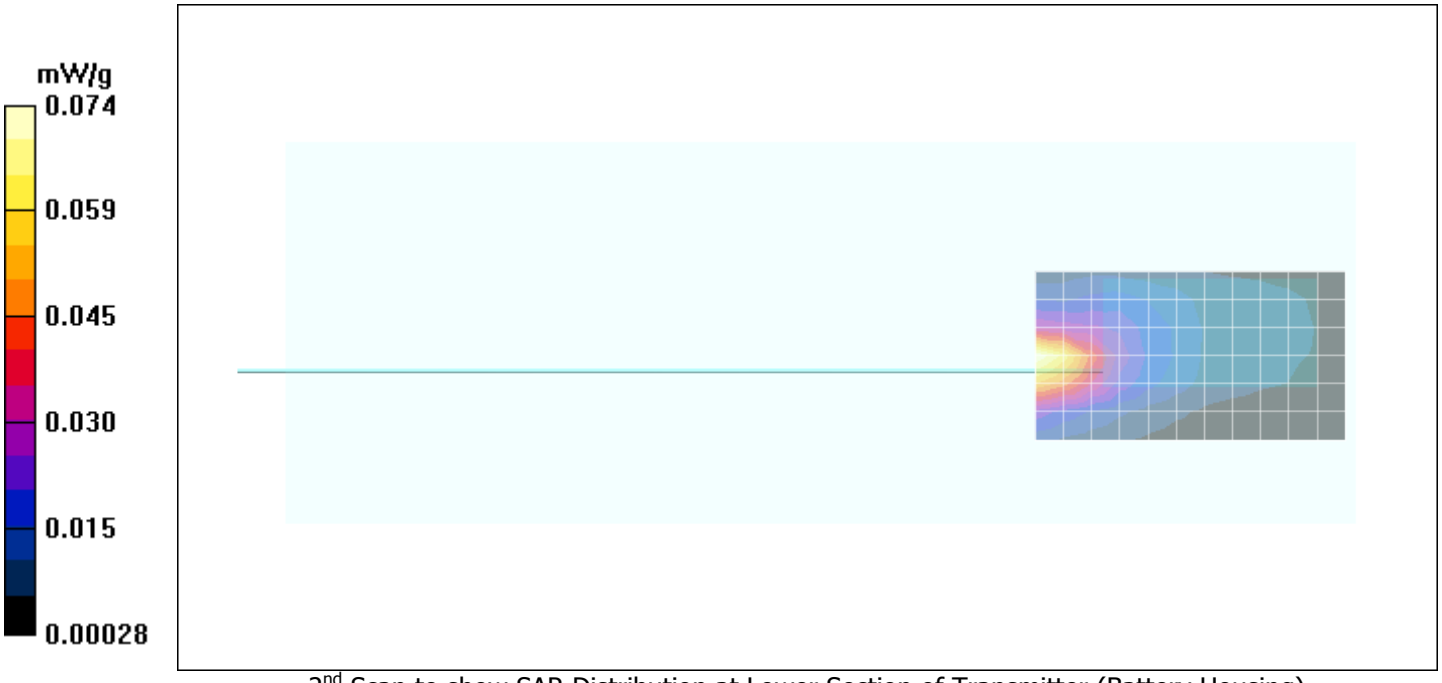
With External Microphone Audio Accessory

Ambient Temp: 22.9 °C; Fluid Temp: 20.7 °C; Barometric Pressure: 101.9 kPa; Humidity: 30%

Communication System: FM Analog-Wide
Frequency: 162.5 MHz; Duty Cycle: 1:1
1.5V 1150mAh Duracell ProCell AAA Alkaline Batteries (x6)
Medium: M150 (σ = 0.79 mho/m; ε_r = 61.5; ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(8.7, 8.7, 8.7); Calibrated: 18/03/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 06/07/2004
- Phantom: Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

Body-Worn - 0.0 cm Separation Distance - Mid Channel - 2nd scan/Area Scan (7x12x1):
Measurement grid: dx=15mm, dy=15mm



2nd Scan to show SAR Distribution at Lower Section of Transmitter (Battery Housing)

Date Tested: 01/21/05

Body-Worn SAR - Noodle-Wire Antenna - FM Digital Mode - Front Side of DUT - Duracell Batteries

DUT: DTC Communications Model: T-2350; Type: Wireless Body-Worn FM VHF Audio Transmitter; Serial: PROTO-1

With External Microphone Audio Accessory

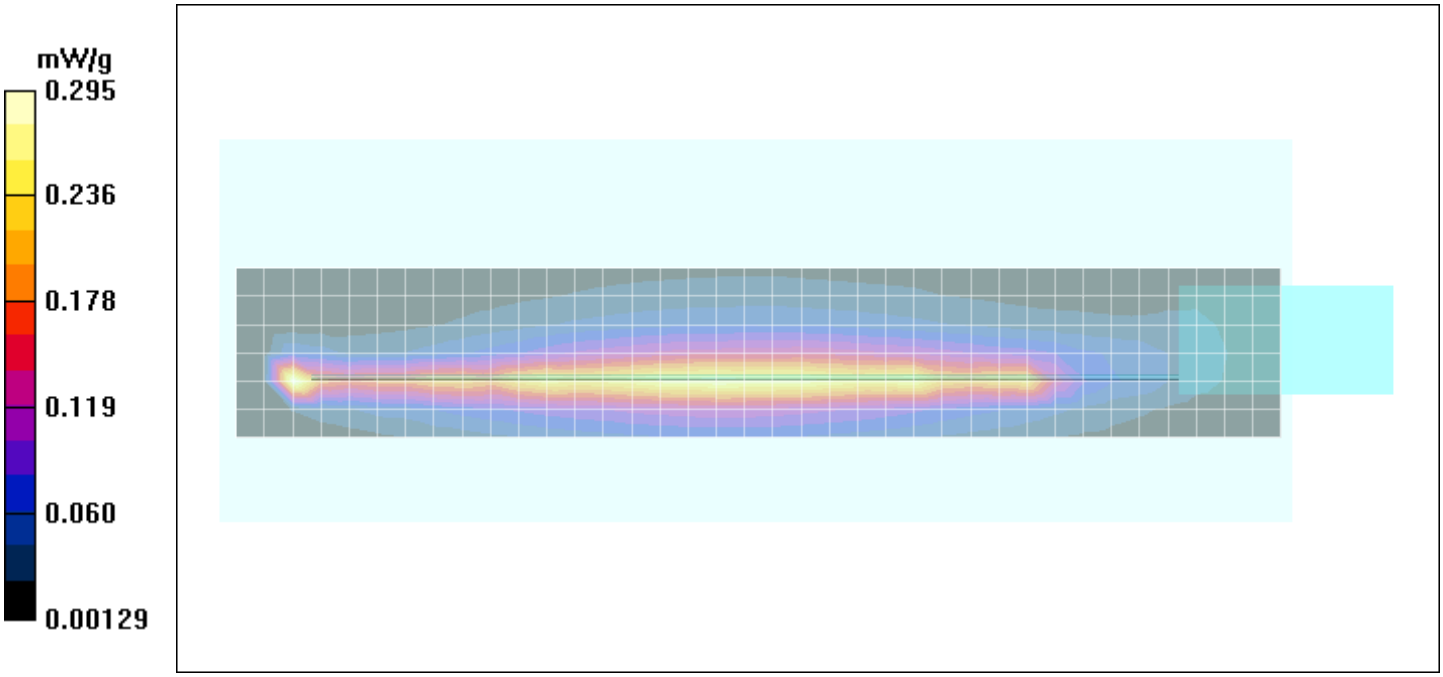
Ambient Temp: 22.9 °C; Fluid Temp: 20.7 °C; Barometric Pressure: 101.9 kPa; Humidity: 30%

Communication System: FM Digital
Frequency: 162.5 MHz; Duty Cycle: 1:1
RF Output Power: 30.19 dBm (Conducted)
1.5V 1150mAh Duracell ProCell AAA Alkaline Batteries (x6)
Medium: M150 (σ = 0.79 mho/m; ε_r = 61.5; ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(8.7, 8.7, 8.7); Calibrated: 18/03/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 06/07/2004
- Phantom: Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

Body-Worn - 0.0 cm Separation Distance - Mid Channel/Area Scan (7x38x1):
Measurement grid: dx=15mm, dy=15mm

Body-Worn - 0.0 cm Separation Distance - Mid Channel/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 9.91 V/m; Power Drift = -0.309 dB
Peak SAR (extrapolated) = 6.61 W/kg
SAR(1 g) = 0.503 mW/g; SAR(10 g) = 0.140 mW/g



Date Tested: 01/21/05

2nd Scan

Body-Worn SAR - Noodle-Wire Antenna - FM Digital Mode - Front Side of DUT - Duracell Batteries

DUT: DTC Communications Model: T-2350; Type: Wireless Body-Worn FM VHF Audio Transmitter; Serial: PROTO-1

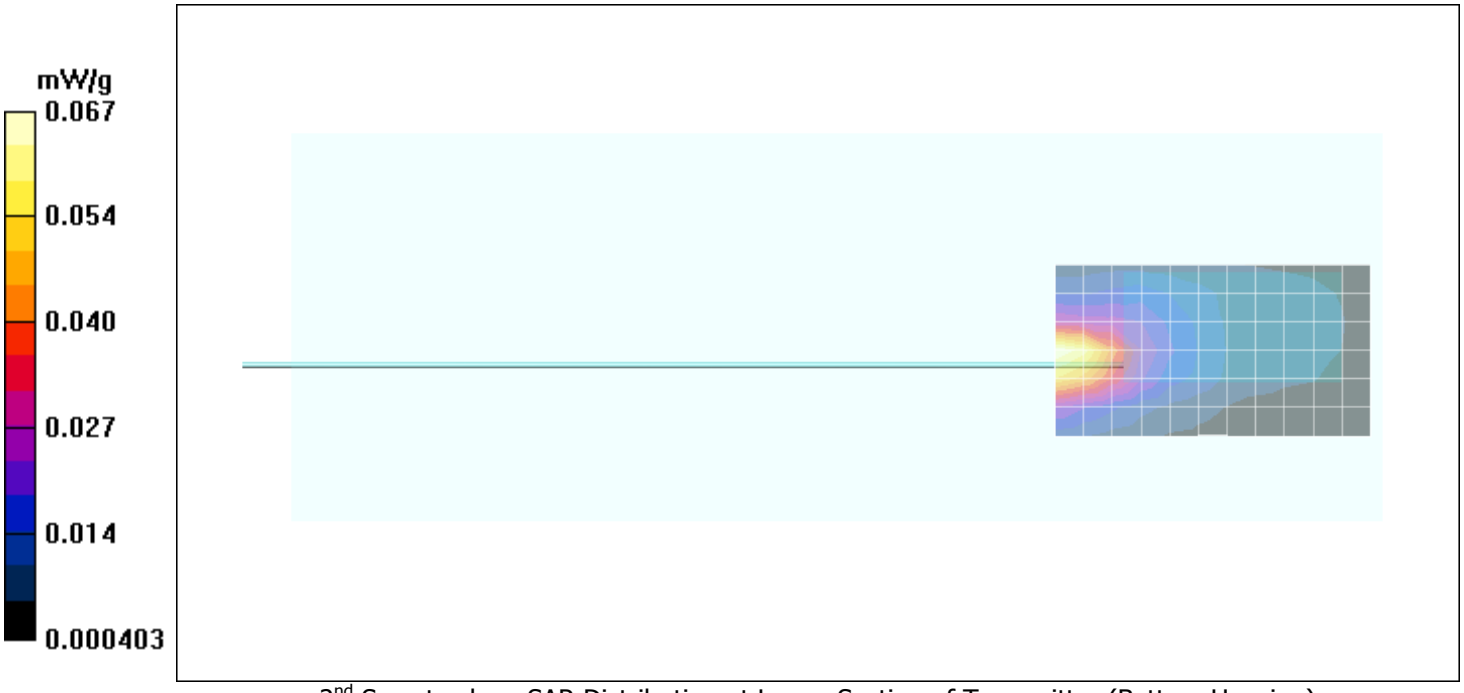
With External Microphone Audio Accessory

Ambient Temp: 22.9 °C; Fluid Temp: 20.7 °C; Barometric Pressure: 101.9 kPa; Humidity: 30%

Communication System: FM Digital
Frequency: 162.5 MHz; Duty Cycle: 1:1
1.5V 1150mAh Duracell ProCell AAA Alkaline Batteries (x6)
Medium: M150 (σ = 0.79 mho/m; ε_r = 61.5; ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(8.7, 8.7, 8.7); Calibrated: 18/03/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))
- Electronics: DAE3 Sn353; Calibrated: 06/07/2004
- Phantom: Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

Body-Worn - 0.0 cm Separation Distance - Mid Channel - 2nd scan/Area Scan (7x12x1):
Measurement grid: dx=15mm, dy=15mm



2nd Scan to show SAR Distribution at Lower Section of Transmitter (Battery Housing)

Date Tested: 01/21/05

Body-Worn SAR - Noodle-Wire Antenna - FM Analog-Wide Mode - Back Side of DUT - Duracell Batteries

DUT: DTC Communications Model: T-2350; Type: Wireless Body-Worn FM VHF Audio Transmitter; Serial: PROTO-1

With External Microphone Audio Accessory

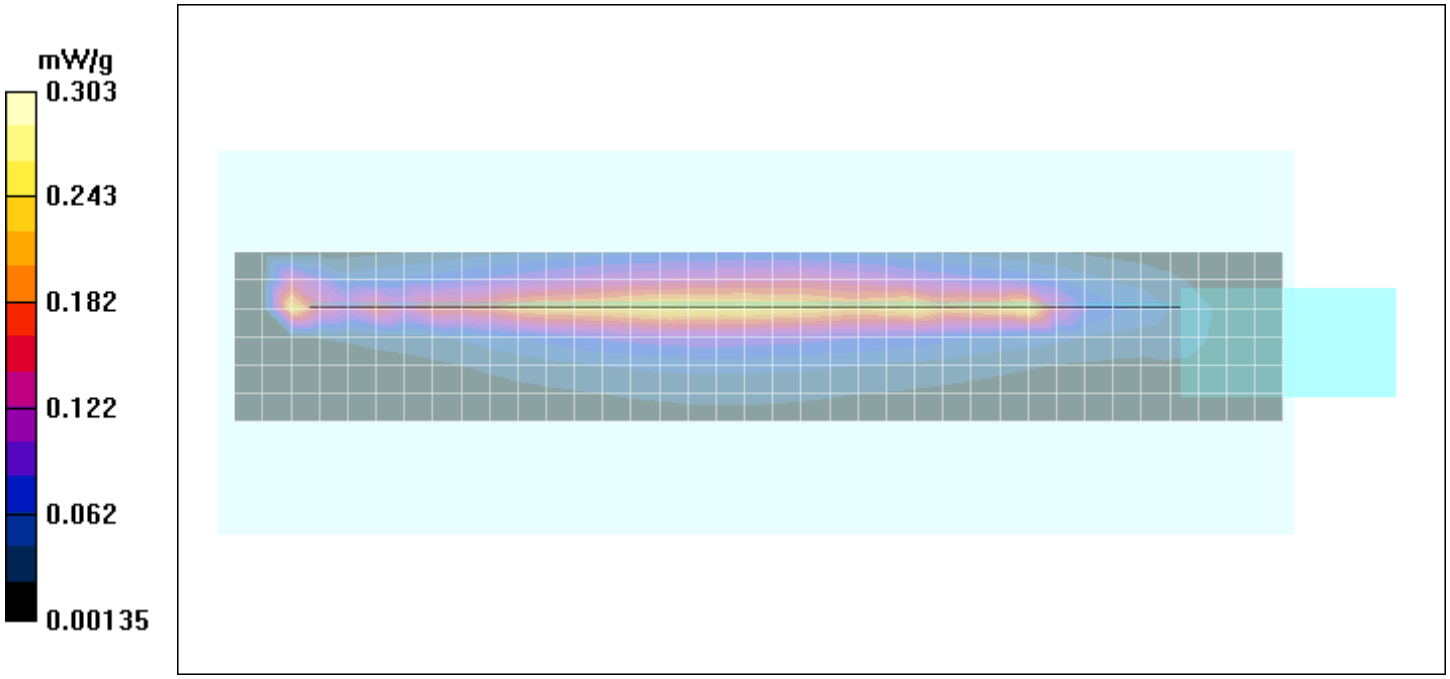
Ambient Temp: 22.9 °C; Fluid Temp: 20.7 °C; Barometric Pressure: 101.9 kPa; Humidity: 30%

Communication System: FM Analog-Wide
Frequency: 162.5 MHz; Duty Cycle: 1:1
RF Output Power: 30.18 dBm (Conducted)
1.5V 1150mAh Duracell ProCell AAA Alkaline Batteries (x6)
Medium: M150 (σ = 0.79 mho/m; ε_r = 61.5; ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(8.7, 8.7, 8.7); Calibrated: 18/03/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 06/07/2004
- Phantom: Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

Body-Worn - 0.0 cm Separation Distance - Mid Channel/Area Scan (7x38x1):
Measurement grid: dx=15mm, dy=15mm

Body-Worn - 0.0 cm Separation Distance - Mid Channel/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 10.9 V/m; Power Drift = -0.0607 dB
Peak SAR (extrapolated) = 6.09 W/kg
SAR(1 g) = 0.513 mW/g; SAR(10 g) = 0.148 mW/g



Date Tested: 01/21/05

2nd Scan

Body-Worn SAR - Noodle-Wire Antenna - FM Analog-Wide Mode - Back Side of DUT - Duracell Batteries

DUT: DTC Communications Model: T-2350; Type: Wireless Body-Worn FM VHF Audio Transmitter; Serial: PROTO-1

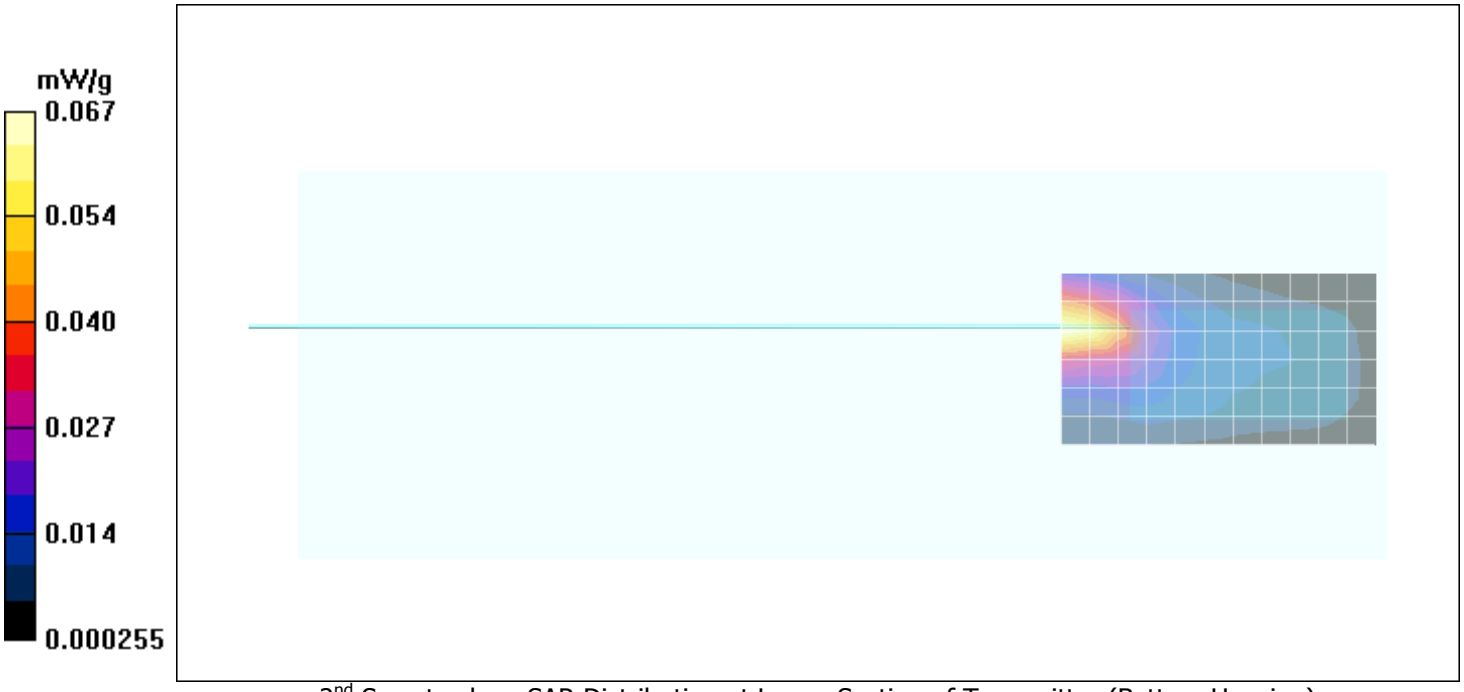
With External Microphone Audio Accessory

Ambient Temp: 22.9 °C; Fluid Temp: 20.7 °C; Barometric Pressure: 101.9 kPa; Humidity: 30%

Communication System: FM Analog-Wide
Frequency: 162.5 MHz; Duty Cycle: 1:1
1.5V 1150mAh Duracell ProCell AAA Alkaline Batteries (x6)
Medium: (σ = 0.79 mho/m; ε_r = 61.5; ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(8.7, 8.7, 8.7); Calibrated: 18/03/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 06/07/2004
- Phantom: Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

Body-Worn - 0.0 cm Separation Distance - Mid Channel - 2nd scan/Area Scan (7x12x1):
Measurement grid: dx=15mm, dy=15mm



2nd Scan to show SAR Distribution at Lower Section of Transmitter (Battery Housing)

Date Tested: 01/21/05

Body-Worn SAR - Noodle-Wire Antenna - FM Analog-Wide Mode - Front Side of DUT - Duracell Batteries

DUT: DTC Communications Model: T-2350; Type: Wireless Body-Worn FM VHF Audio Transmitter; Serial: PROTO-1

With Internal Microphone

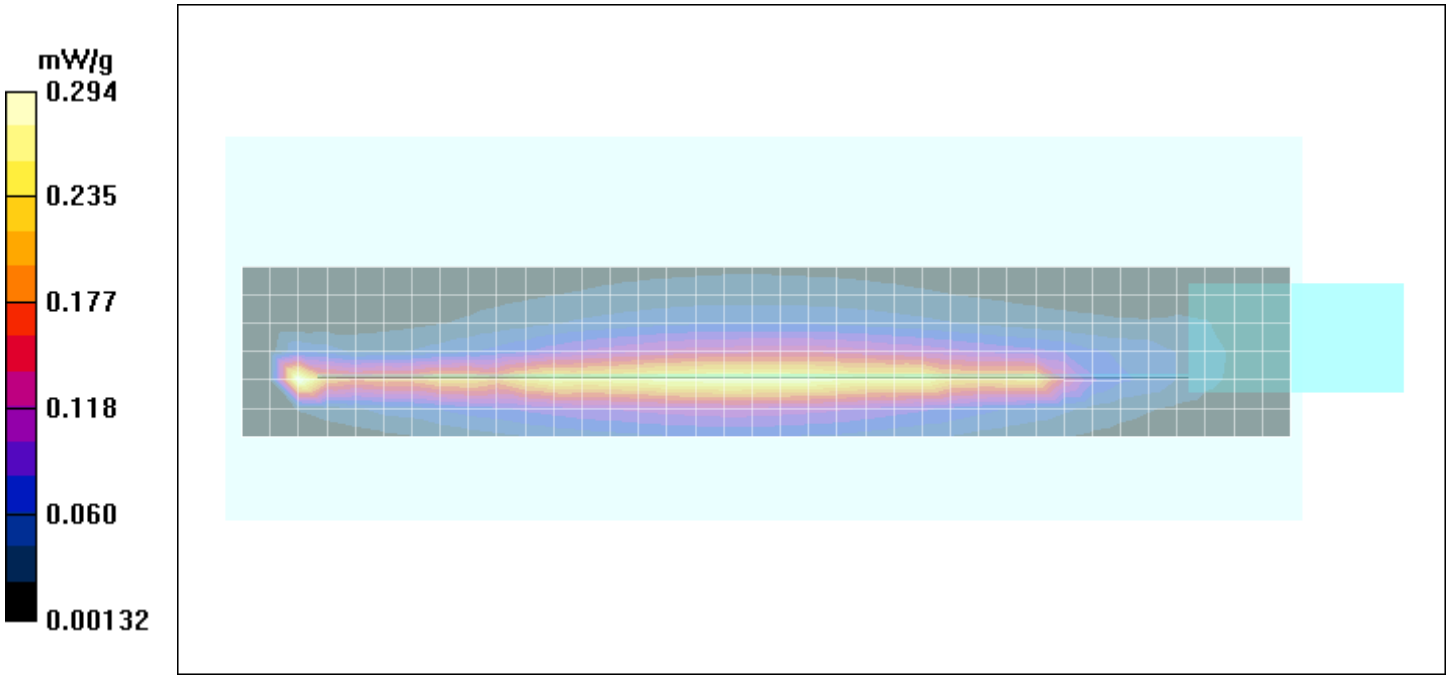
Ambient Temp: 22.9 °C; Fluid Temp: 20.7 °C; Barometric Pressure: 101.9 kPa; Humidity: 30%

Communication System: FM Analog-Wide
Frequency: 162.5 MHz; Duty Cycle: 1:1
RF Output Power: 30.21 dBm (Conducted)
1.5V 1150mAh Duracell ProCell AAA Alkaline Batteries (x6)
Medium: M150 (σ = 0.79 mho/m; ε_r = 61.5; ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(8.7, 8.7, 8.7); Calibrated: 18/03/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 06/07/2004
- Phantom: Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

Body-Worn - 0.0 cm Separation Distance - Mid Channel/Area Scan (7x38x1):
Measurement grid: dx=15mm, dy=15mm

Body-Worn - 0.0 cm Separation Distance - Mid Channel/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 9.87 V/m; Power Drift = -0.315 dB
Peak SAR (extrapolated) = 6.54 W/kg
SAR(1 g) = 0.499 mW/g; SAR(10 g) = 0.138 mW/g



Date Tested: 01/21/05

2nd Scan

Body-Worn SAR - Noodle-Wire Antenna - FM Analog-Wide Mode - Front Side of DUT - Duracell Batteries

DUT: DTC Communications Model: T-2350; Type: Wireless Body-Worn FM VHF Audio Transmitter; Serial: PROTO-1

With Internal Microphone

Ambient Temp: 22.9 °C; Fluid Temp: 20.7 °C; Barometric Pressure: 101.9 kPa; Humidity: 30%

Communication System: FM Analog-Wide
Frequency: 162.5 MHz; Duty Cycle: 1:1
1.5V 1150mAh Duracell ProCell AAA Alkaline Batteries (x6)
Medium: M150 (σ = 0.79 mho/m; ε_r = 61.5; ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(8.7, 8.7, 8.7); Calibrated: 18/03/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))
- Electronics: DAE3 Sn353; Calibrated: 06/07/2004
- Phantom: Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

Body-Worn - 0.0 cm Separation Distance - Mid Channel - 2nd scan/Area Scan (7x12x1):
Measurement grid: dx=15mm, dy=15mm

2nd Scan to show SAR Distribution at Lower Section of Transmitter (Battery Compartment)

Date Tested: 01/24/05

Body-Worn SAR - Microphone-Antenna - FM Analog-Wide Mode - Front Side of DUT - Energizer Batteries

DUT: DTC Communications Model: T-2350; Type: Wireless Body-Worn FM VHF Audio Transmitter; Serial: PROTO-1

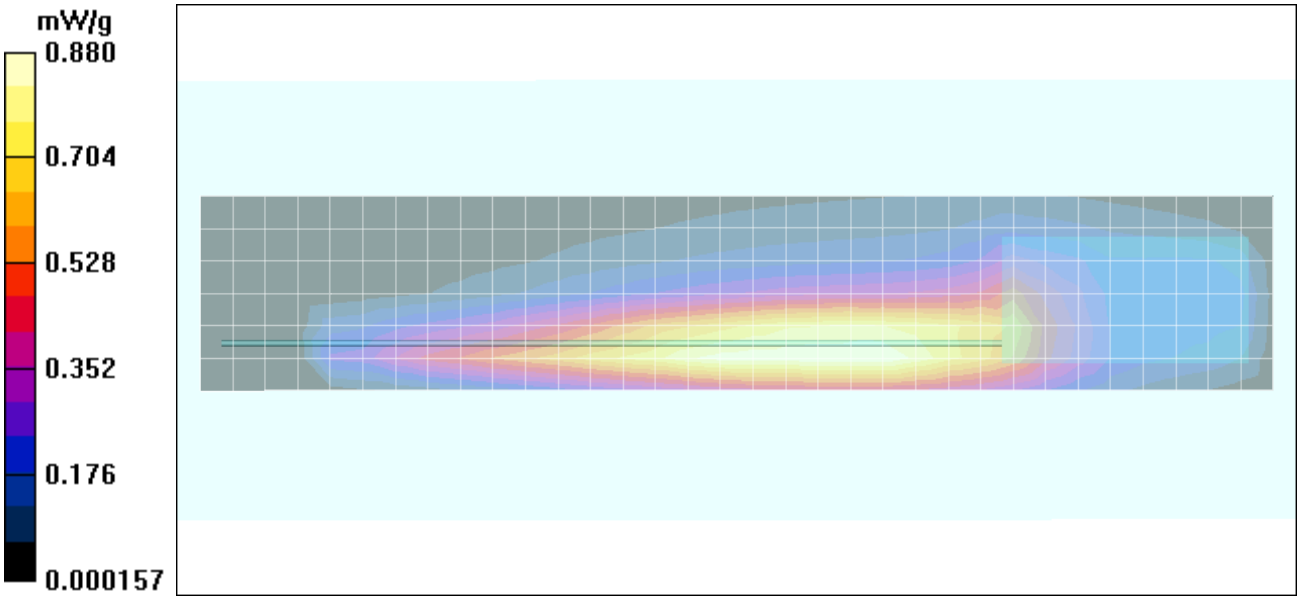
Ambient Temp: 22.9 °C; Fluid Temp: 22.6 °C; Barometric Pressure: 102.1 kPa; Humidity: 31%

Communication System: FM Analog-Wide
Frequency: 162.5 MHz; Duty Cycle: 1:1
RF Output Power: 30.33 dBm (Conducted)
1.5V 1250mAh Energizer E91 AAA Alkaline Batteries (x6)
Medium: M150 (σ = 0.82 mho/m; ε_r = 62.9; ρ = 1000 kg/m^3)

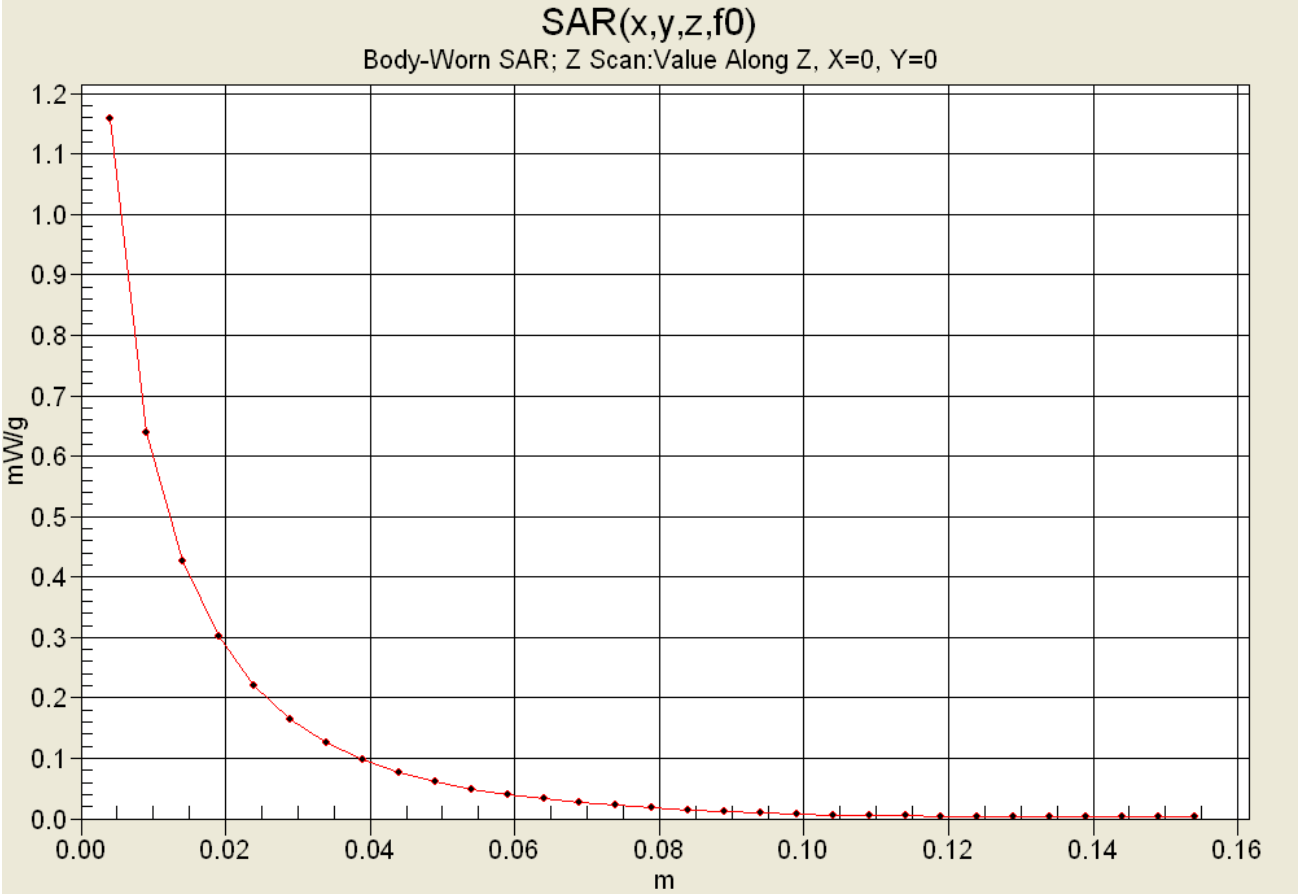
- Probe: ET3DV6 – SN1387; ConvF(8.7, 8.7, 8.7); Calibrated: 18/03/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 06/07/2004
- Phantom: Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

Body-Worn - 0.0 cm Separation Distance - Mid Channel/Area Scan (7x34x1):
Measurement grid: dx=15mm, dy=15mm

Body-Worn - 0.0 cm Separation Distance - Mid Channel/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 22.7 V/m; Power Drift = -0.499 dB
Peak SAR (extrapolated) = 2.48 W/kg
SAR(1 g) = 1.14 mW/g; SAR(10 g) = 0.666 mW/g



Z-Axis Scan



APPENDIX B - SYSTEM PERFORMANCE CHECK DATA

Date Tested: 01/20/05

System Performance Check - 300 MHz Dipole

DUT: Dipole 300 MHz; Model: D300V2; Type: System Performance Check; Serial: 135; Calibrated: 10/26/2004

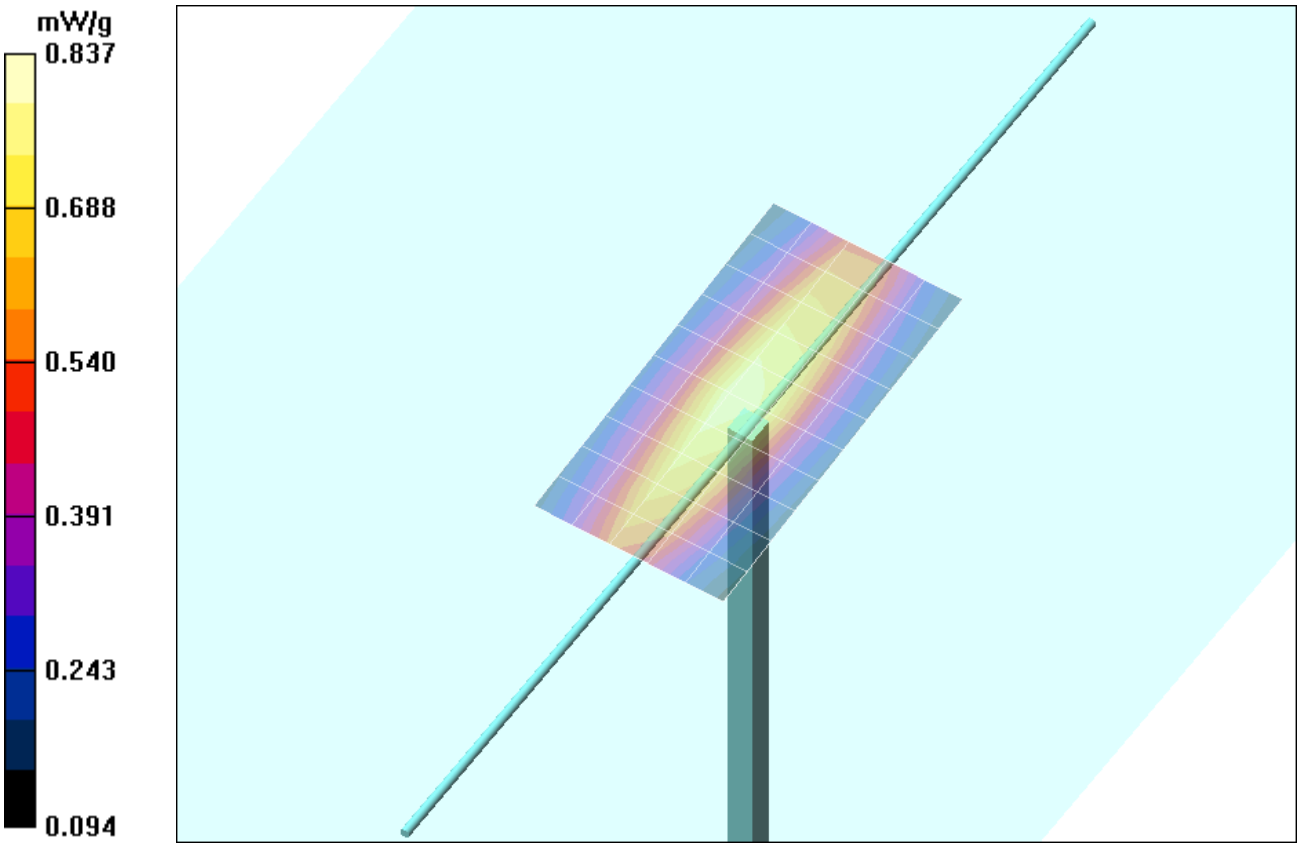
Ambient Temp: 21.9 °C; Fluid Temp: 21.5 °C; Barometric Pressure: 101.8 kPa; Humidity: 30%

Communication System: CW
Forward Conducted Power: 250 mW
Frequency: 300 MHz; Duty Cycle: 1:1
Medium: 300 HSL (σ = 0.85 mho/m; ε_r = 45.2; ρ = 1000 kg/m^3)

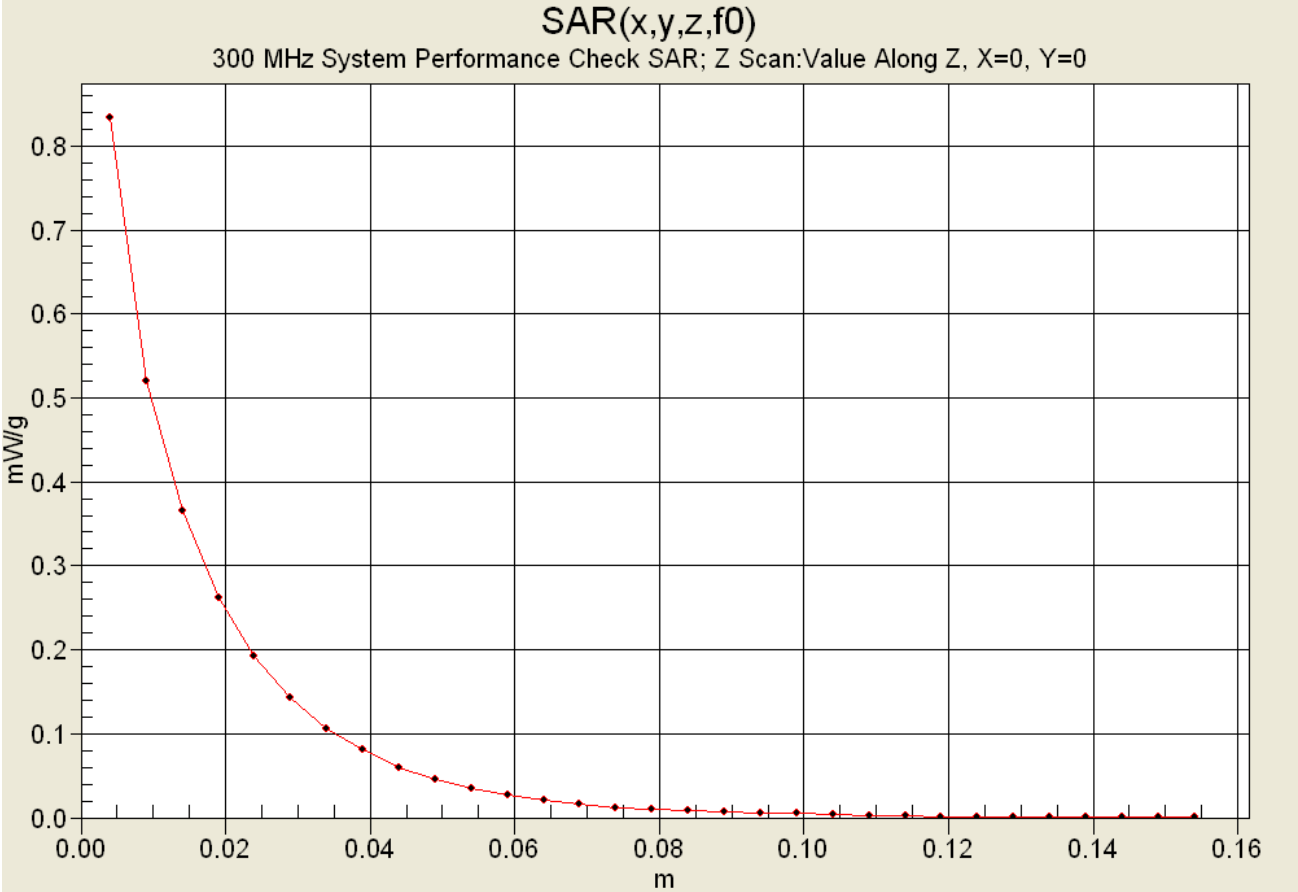
- Probe: ET3DV6 - SN1387; ConvF(7.8, 7.8, 7.8); Calibrated: 18/03/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 06/07/2004
- Phantom: Validation Planar; Type: Plexiglas; Serial: 137
- Measurement SW: DASY4, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

300 MHz Dipole - System Performance Check/Area Scan (6x11x1):
Measurement grid: dx=15mm, dy=15mm

300 MHz Dipole - System Performance Check/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 31.7 V/m; Power Drift = -0.1 dB
Peak SAR (extrapolated) = 1.39 W/kg
SAR(1 g) = 0.793 mW/g; SAR(10 g) = 0.518 mW/g



Z-Axis Scan



Date Tested: 01/21/05

System Performance Check - 300 MHz Dipole

DUT: Dipole 300 MHz; Model: D300V2; Type: System Performance Check; Serial: 135; Calibrated: 10/26/2004

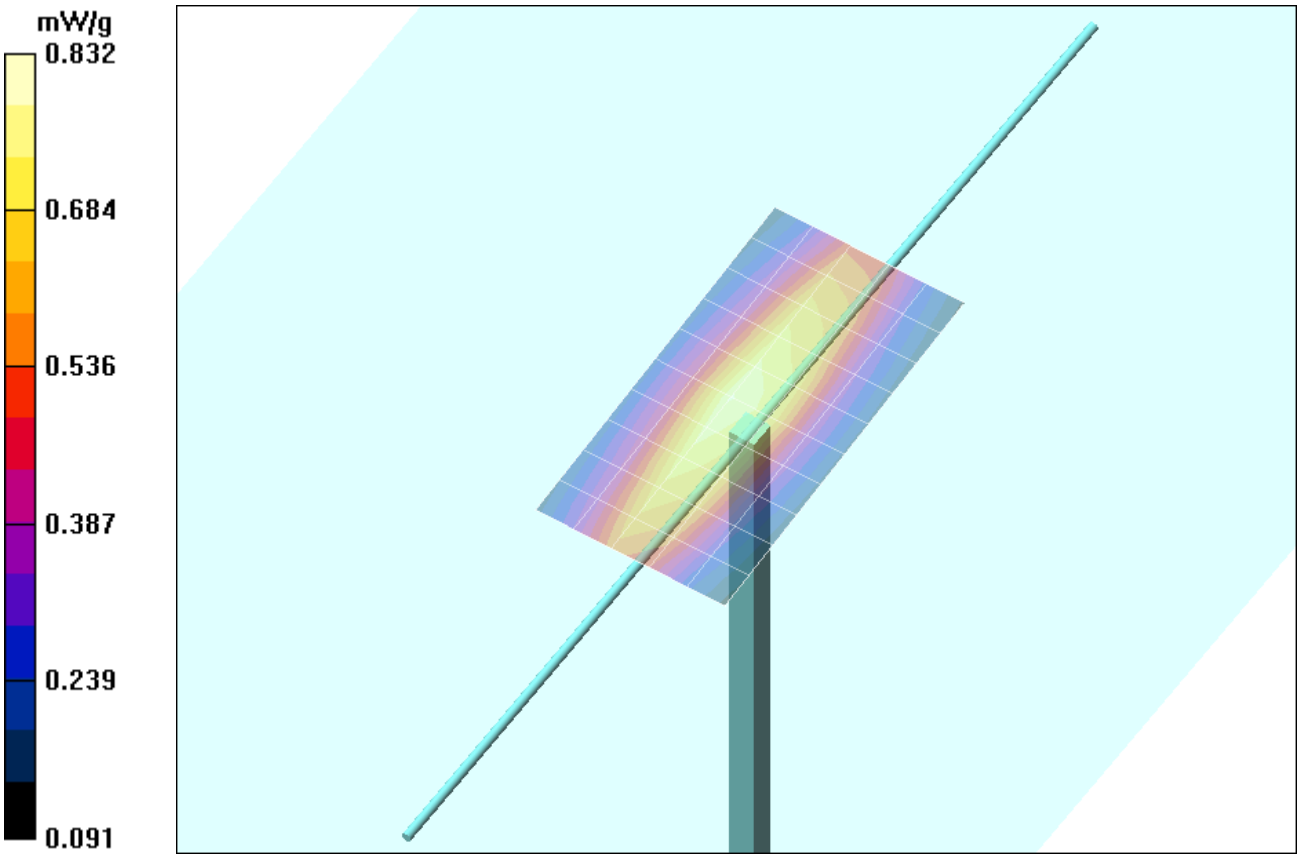
Ambient Temp: 21.9 °C; Fluid Temp: 21.5 °C; Barometric Pressure: 102.4 kPa; Humidity: 30%

Communication System: CW
Forward Conducted Power: 250 mW
Frequency: 300 MHz; Duty Cycle: 1:1
Medium: 300 HSL (σ = 0.85 mho/m; ε_r = 45.0; ρ = 1000 kg/m^3)

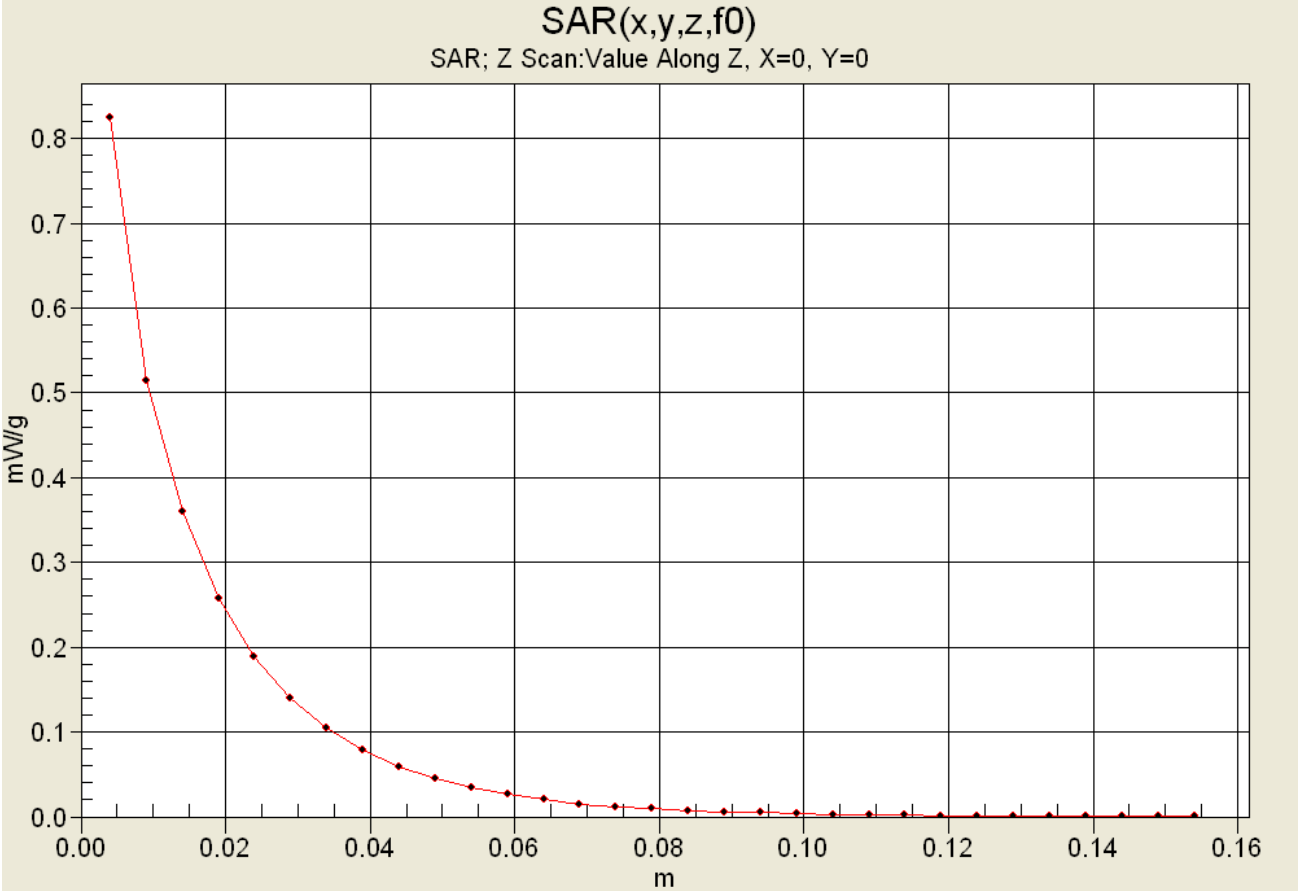
- Probe: ET3DV6 - SN1387; ConvF(7.8, 7.8, 7.8); Calibrated: 18/03/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 06/07/2004
- Phantom: Validation Planar; Type: Plexiglas; Serial: 137
- Measurement SW: DASY4, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

300 MHz Dipole - System Performance Check/Area Scan (6x11x1):
Measurement grid: dx=15mm, dy=15mm

300 MHz Dipole - System Performance Check/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 31.4 V/m; Power Drift = -0.1 dB
Peak SAR (extrapolated) = 1.4 W/kg
SAR(1 g) = 0.790 mW/g; SAR(10 g) = 0.513 mW/g



Z-Axis Scan



Date Tested: 01/24/05

System Performance Check - 300 MHz Dipole

DUT: Dipole 300 MHz; Model: D300V2; Type: System Performance Check; Serial: 135; Calibrated: 10/26/2004

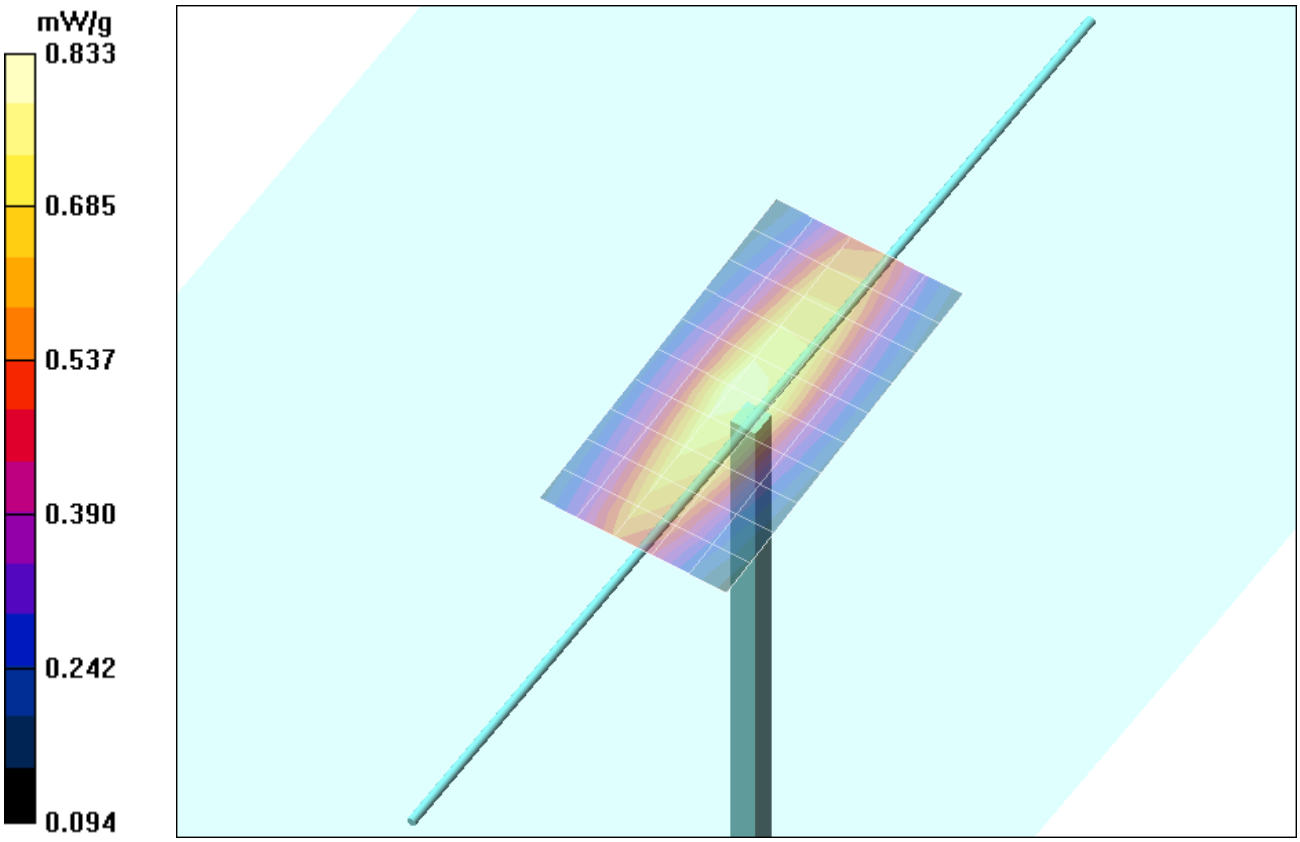
Ambient Temp: 21.0 °C; Fluid Temp: 21.3 °C; Barometric Pressure: 102.0 kPa; Humidity: 32%

Communication System: CW
Forward Conducted Power: 250 mW
Frequency: 300 MHz; Duty Cycle: 1:1
Medium: 300 HSL (σ = 0.84 mho/m; ε_r = 44.8; ρ = 1000 kg/m^3)

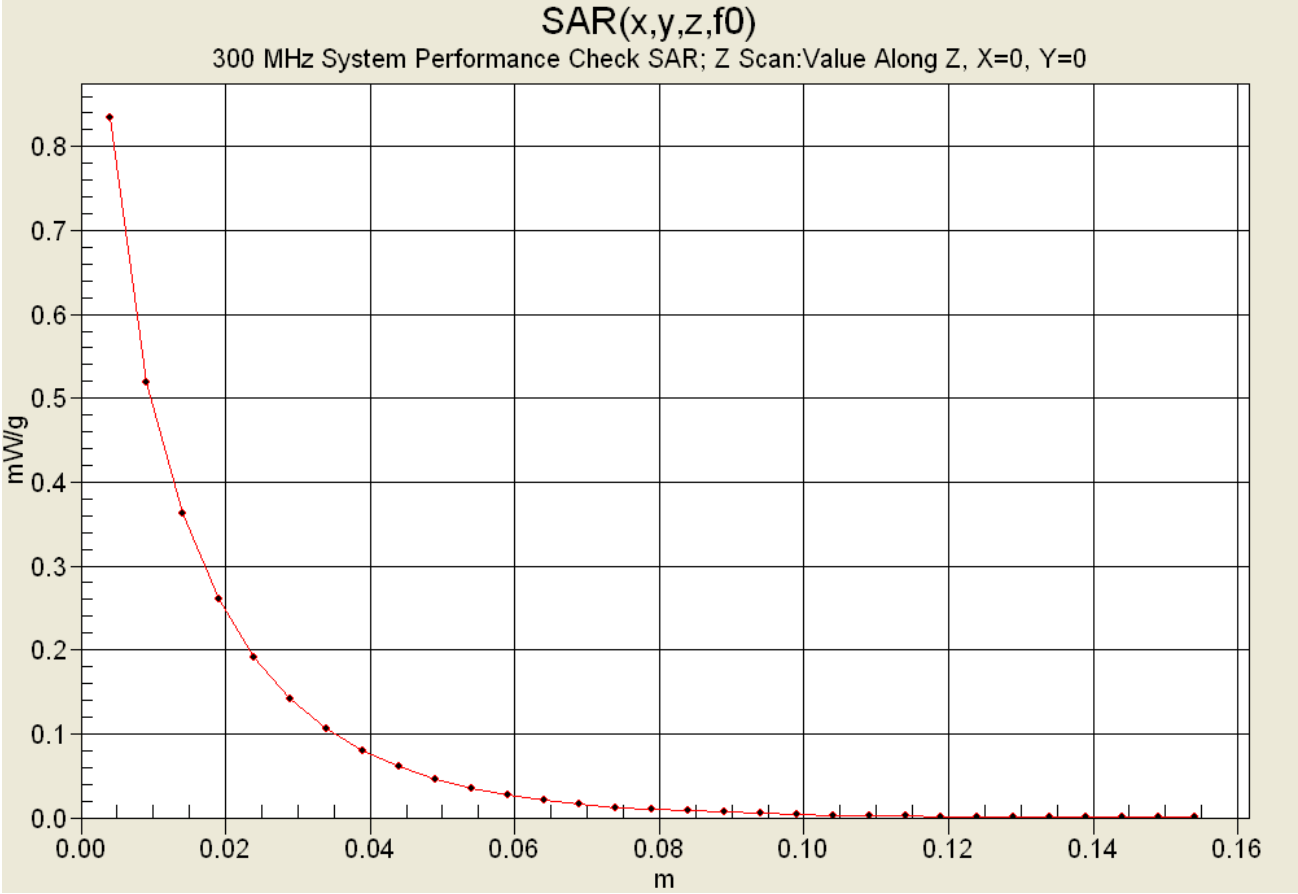
- Probe: ET3DV6 - SN1387; ConvF(7.8, 7.8, 7.8); Calibrated: 18/03/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 06/07/2004
- Phantom: Validation Planar; Type: Plexiglas; Serial: 137
- Measurement SW: DASY4, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

300 MHz Dipole - System Performance Check/Area Scan (6x11x1):
Measurement grid: dx=15mm, dy=15mm

300 MHz Dipole - System Performance Check/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 31.5 V/m; Power Drift = -0.1 dB
Peak SAR (extrapolated) = 1.4 W/kg
SAR(1 g) = 0.791 mW/g; SAR(10 g) = 0.514 mW/g



Z-Axis Scan



APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS

150 MHz DUT Evaluation (Body)

Measured Fluid Dielectric Parameters (Muscle)

January 20, 2005

Frequency	e'	e"
50.000000 MHz	70.3035	267.1977
60.000000 MHz	69.1875	224.1822
70.000000 MHz	67.5524	192.5056
80.000000 MHz	66.3554	170.5559
90.000000 MHz	65.6182	152.3557
100.000000 MHz	64.9074	138.4718
110.000000 MHz	63.7810	127.1574
120.000000 MHz	63.2335	117.2090
130.000000 MHz	62.9564	109.1083
140.000000 MHz	62.6038	102.0659
150.000000 MHz	62.0839	95.9342
160.000000 MHz	61.8403	90.5385
170.000000 MHz	61.6508	86.2967
180.000000 MHz	61.2781	81.9091
190.000000 MHz	60.9051	78.2155
200.000000 MHz	60.7448	75.1344
210.000000 MHz	60.2298	72.1350
220.000000 MHz	59.9192	69.5929
230.000000 MHz	59.5484	67.0731
240.000000 MHz	59.2897	64.9735
250.000000 MHz	58.8822	62.9703

300 MHz System Performance Check

Measured Fluid Dielectric Parameters (Brain)

January 20, 2005

Frequency	e'	e"
200.000000 MHz	49.5364	68.7513
210.000000 MHz	49.0065	66.2896
220.000000 MHz	48.4291	64.1873
230.000000 MHz	47.8285	61.9840
240.000000 MHz	47.2125	60.1569
250.000000 MHz	46.7751	58.3957
260.000000 MHz	46.2831	56.8075
270.000000 MHz	46.0355	55.2219
280.000000 MHz	45.8858	53.9165
290.000000 MHz	45.5703	52.4861
300.000000 MHz	45.2325	51.1111
310.000000 MHz	44.8238	49.9403
320.000000 MHz	44.4315	48.8551
330.000000 MHz	44.0249	47.8130
340.000000 MHz	43.6989	46.8735
350.000000 MHz	43.3493	46.0154
360.000000 MHz	43.0144	45.1457
370.000000 MHz	42.7811	44.3340
380.000000 MHz	42.5378	43.6331
390.000000 MHz	42.3039	42.9239
400.000000 MHz	42.0296	42.3193

150 MHz DUT Evaluation (Body)

Measured Fluid Dielectric Parameters (Muscle)

January 21, 2005

Frequency	e'	e"
50.000000 MHz	69.2168	263.3109
60.000000 MHz	67.2020	221.7275
70.000000 MHz	65.8942	190.2904
80.000000 MHz	65.1935	168.4558
90.000000 MHz	64.4873	150.5423
100.000000 MHz	63.7521	136.7261
110.000000 MHz	63.2313	125.3211
120.000000 MHz	62.6316	115.7375
130.000000 MHz	62.2536	107.5388
140.000000 MHz	62.1004	100.7464
150.000000 MHz	61.4830	94.4928
160.000000 MHz	61.0376	89.5163
170.000000 MHz	60.9001	85.1654
180.000000 MHz	60.6344	80.8598
190.000000 MHz	60.3494	77.3922
200.000000 MHz	59.9351	74.2760
210.000000 MHz	59.5862	71.2471
220.000000 MHz	59.4090	68.6976
230.000000 MHz	59.0643	66.2896
240.000000 MHz	58.7568	64.1086
250.000000 MHz	58.3484	62.1263

300 MHz System Performance Check

Measured Fluid Dielectric Parameters (Brain)

January 21, 2005

Frequency	e'	e"
200.000000 MHz	49.0777	68.9311
210.000000 MHz	48.5906	66.4803
220.000000 MHz	48.1560	64.2853
230.000000 MHz	47.6013	62.0577
240.000000 MHz	47.1068	60.1319
250.000000 MHz	46.6180	58.3107
260.000000 MHz	46.1263	56.8384
270.000000 MHz	45.7654	55.2947
280.000000 MHz	45.5396	53.8772
290.000000 MHz	45.2144	52.5232
300.000000 MHz	44.9572	51.1405
310.000000 MHz	44.7140	50.0469
320.000000 MHz	44.3525	48.8509
330.000000 MHz	43.9622	47.8202
340.000000 MHz	43.6056	46.9216
350.000000 MHz	43.3032	46.0329
360.000000 MHz	42.8975	45.1482
370.000000 MHz	42.6392	44.3860
380.000000 MHz	42.4035	43.6280
390.000000 MHz	42.1404	42.8365
400.000000 MHz	41.8850	42.1899

150 MHz DUT Evaluation (Body)

Measured Fluid Dielectric Parameters (Muscle)

January 24, 2005

Frequency	e'	e"
50.000000 MHz	69.0065	273.5295
60.000000 MHz	67.9718	230.8394
70.000000 MHz	67.4416	197.3646
80.000000 MHz	66.8220	174.3289
90.000000 MHz	65.9232	155.9438
100.000000 MHz	65.0698	141.6277
110.000000 MHz	64.5502	129.5457
120.000000 MHz	63.8049	119.8521
130.000000 MHz	63.3253	111.3688
140.000000 MHz	62.8954	104.1400
150.000000 MHz	62.8730	98.0260
160.000000 MHz	62.2394	92.6552
170.000000 MHz	61.9634	88.0032
180.000000 MHz	61.5945	83.6811
190.000000 MHz	61.2895	80.0192
200.000000 MHz	60.9635	76.7593
210.000000 MHz	60.6277	73.7248
220.000000 MHz	60.4069	70.9862
230.000000 MHz	60.0247	68.4414
240.000000 MHz	59.6714	66.1890
250.000000 MHz	59.4158	64.0847

300 MHz System Performance Check

Measured Fluid Dielectric Parameters (Brain)

January 24, 2005

Frequency	e'	e"
200.000000 MHz	49.1862	67.6903
210.000000 MHz	48.4991	65.3512
220.000000 MHz	48.0870	63.2417
230.000000 MHz	47.6184	61.0152
240.000000 MHz	47.0597	59.2230
250.000000 MHz	46.6318	57.5640
260.000000 MHz	46.1083	55.9784
270.000000 MHz	45.8279	54.5190
280.000000 MHz	45.4844	53.1841
290.000000 MHz	45.1563	51.8248
300.000000 MHz	44.8229	50.4036
310.000000 MHz	44.5317	49.2441
320.000000 MHz	44.2712	48.1273
330.000000 MHz	43.8912	47.0914
340.000000 MHz	43.5736	46.1224
350.000000 MHz	43.2564	45.3413
360.000000 MHz	42.9382	44.5229
370.000000 MHz	42.6169	43.7499
380.000000 MHz	42.2818	43.0204
390.000000 MHz	42.0154	42.3749
400.000000 MHz	41.7246	41.6173

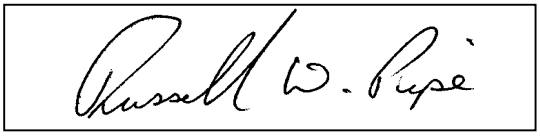
APPENDIX D - SYSTEM VALIDATION

300 MHz SYSTEM VALIDATION DIPOLE

Type:	**300 MHz Validation Dipole**
Serial Number:	**135**
Place of Calibration:	**Celltech Labs Inc.**
Date of Calibration:	**October 26, 2004**

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

Calibrated by: 

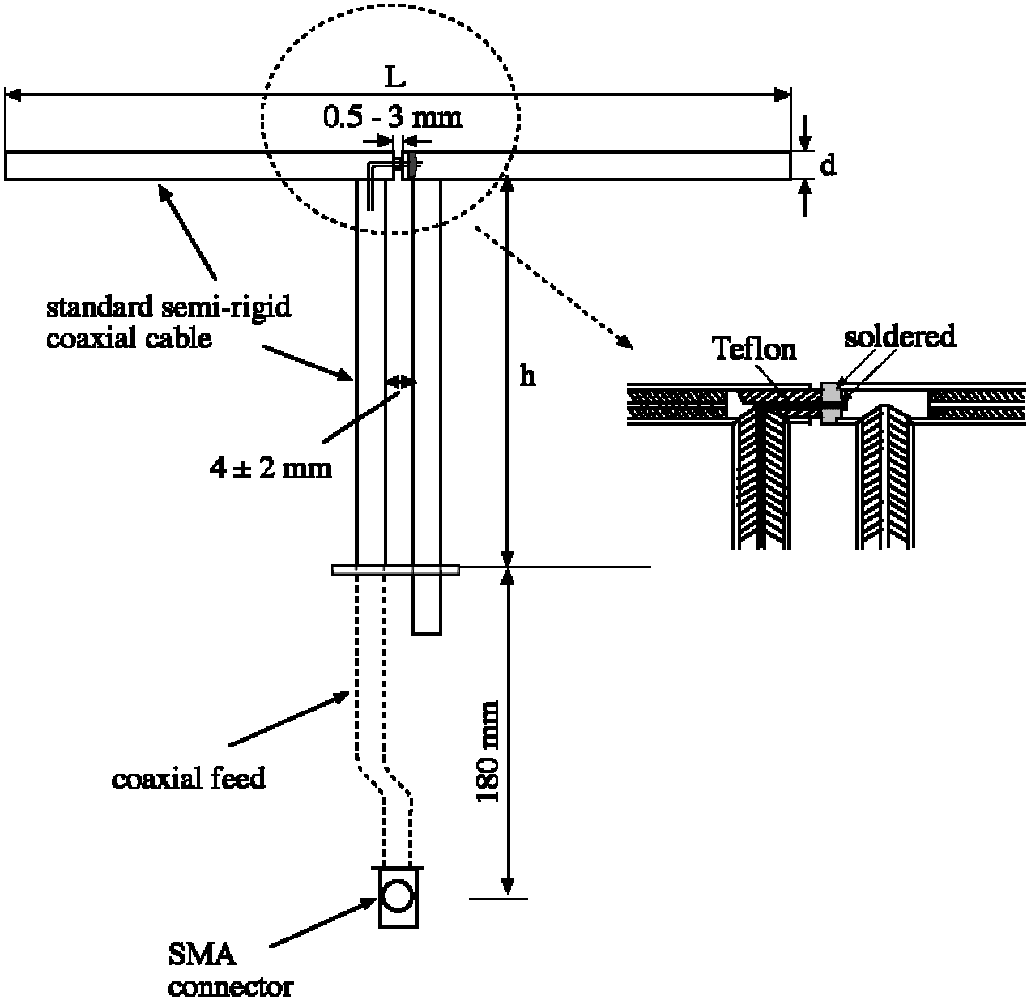
Approved by: 

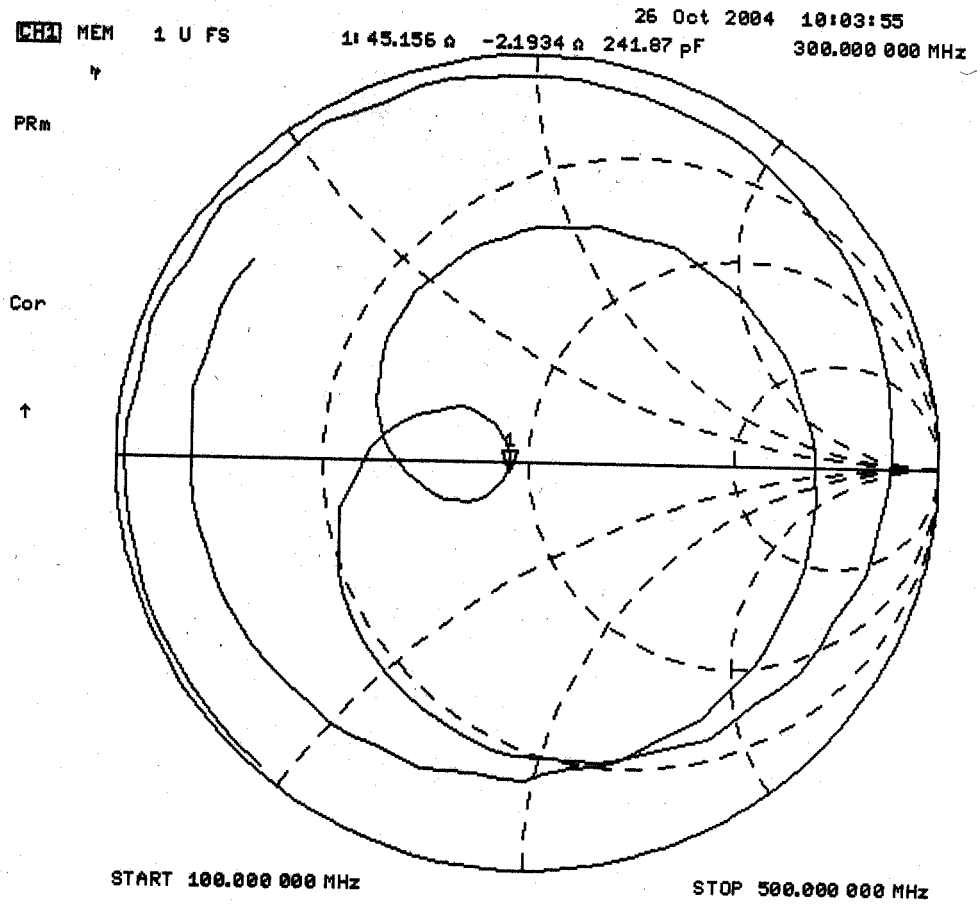
Celltech Labs Inc. 1955 Moss Court, Kelowna, B.C. Canada V1Y 9L3
Tel. 250-448-7047 • Fax. 250-448-7046 • e-mail: info@celltechlabs.com
www.celltechlabs.com

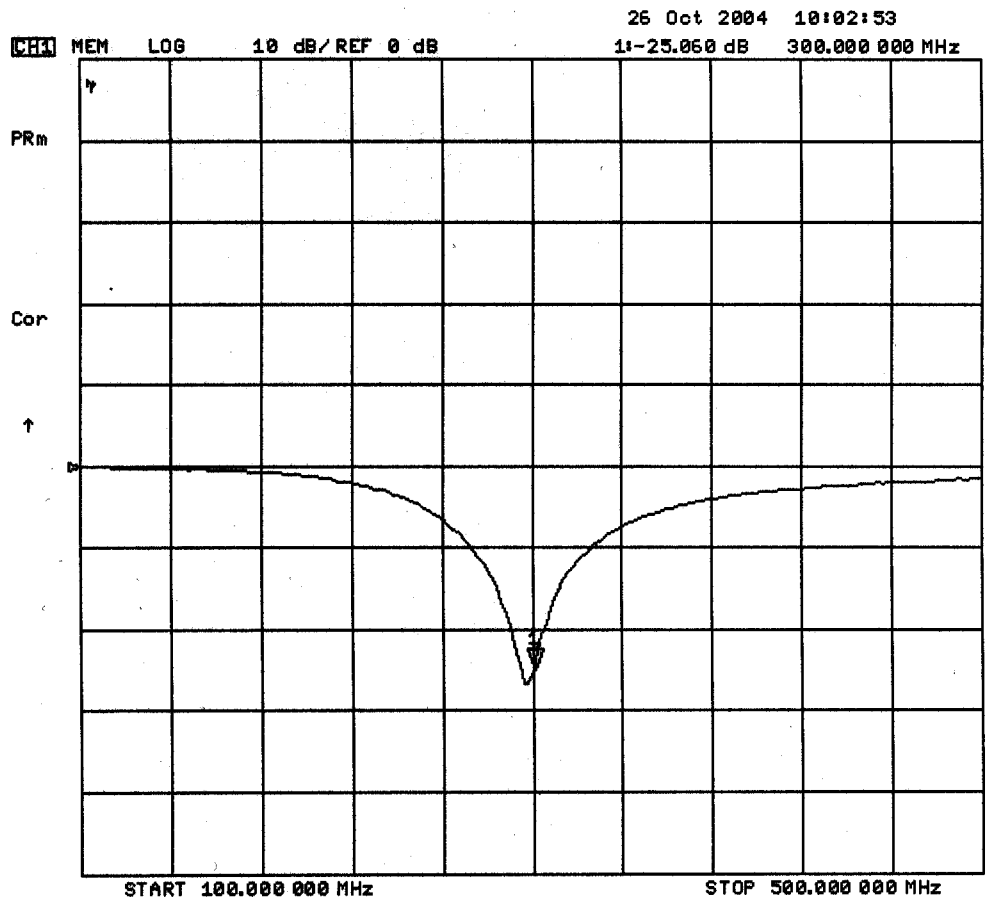
1. Validation Dipole Construction & Electrical Characteristics

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 300MHz	Re{Z} = 45.156Ω
	Im{Z} = -2.1934Ω
Return Loss at 300MHz	-25.060dB




CH1 MEM 1 U FS
1: 45.156 Ω -2.1934 Ω 241.87 pF
26 Oct 2004 10:03:55
300.000 000 MHz
PRm
Cor
START 100.000 000 MHz
STOP 500.000 000 MHz


26 Oct 2004 10:02:53
CH1 MEM LOG 10 dB/ REF 0 dB
1:-25.060 dB 300.000 000 MHz
PRm
Cor
START 100.000 000 MHz
STOP 500.000 000 MHz

2. 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

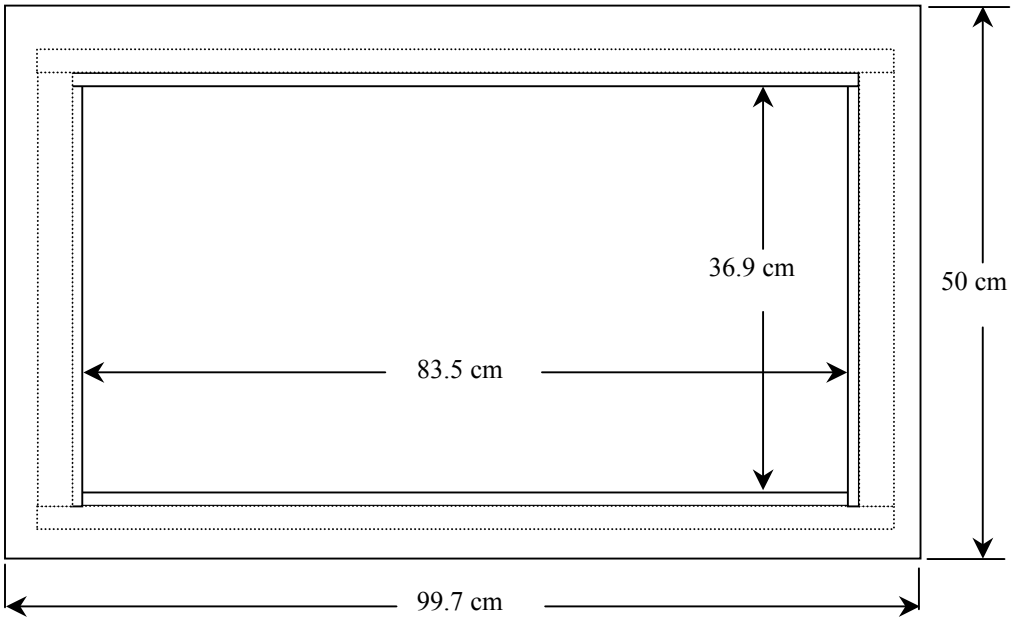
3. Validation Phantom

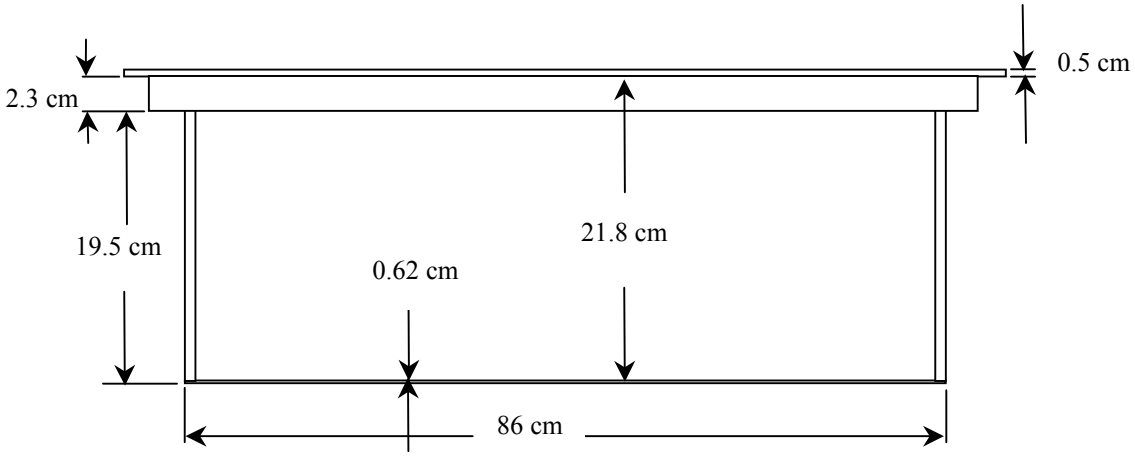
The validation phantom was constructed using relatively low-loss tangent Plexiglas material. The inner dimensions of the phantom are as follows:

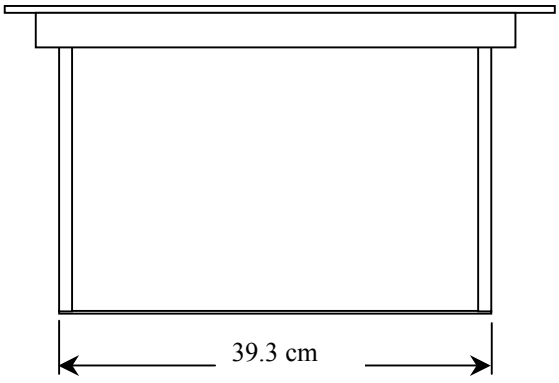
Length: 83.5 cm
Width: 36.9 cm
Height: 21.8 cm

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

4. Dimensions of Plexiglas Planar Phantom







5. 300 MHz System Validation Setup

300 MHz Validation Dipole Setup

6. Measurement Conditions

The planar phantom was filled with simulated brain tissue having the following parameters at 300 MHz:

Relative Permittivity:	45.9
Conductivity:	0.87 mho/m
Fluid Temperature:	22.8 °C
Fluid Depth:	≥ 15 cm

Environmental Conditions:

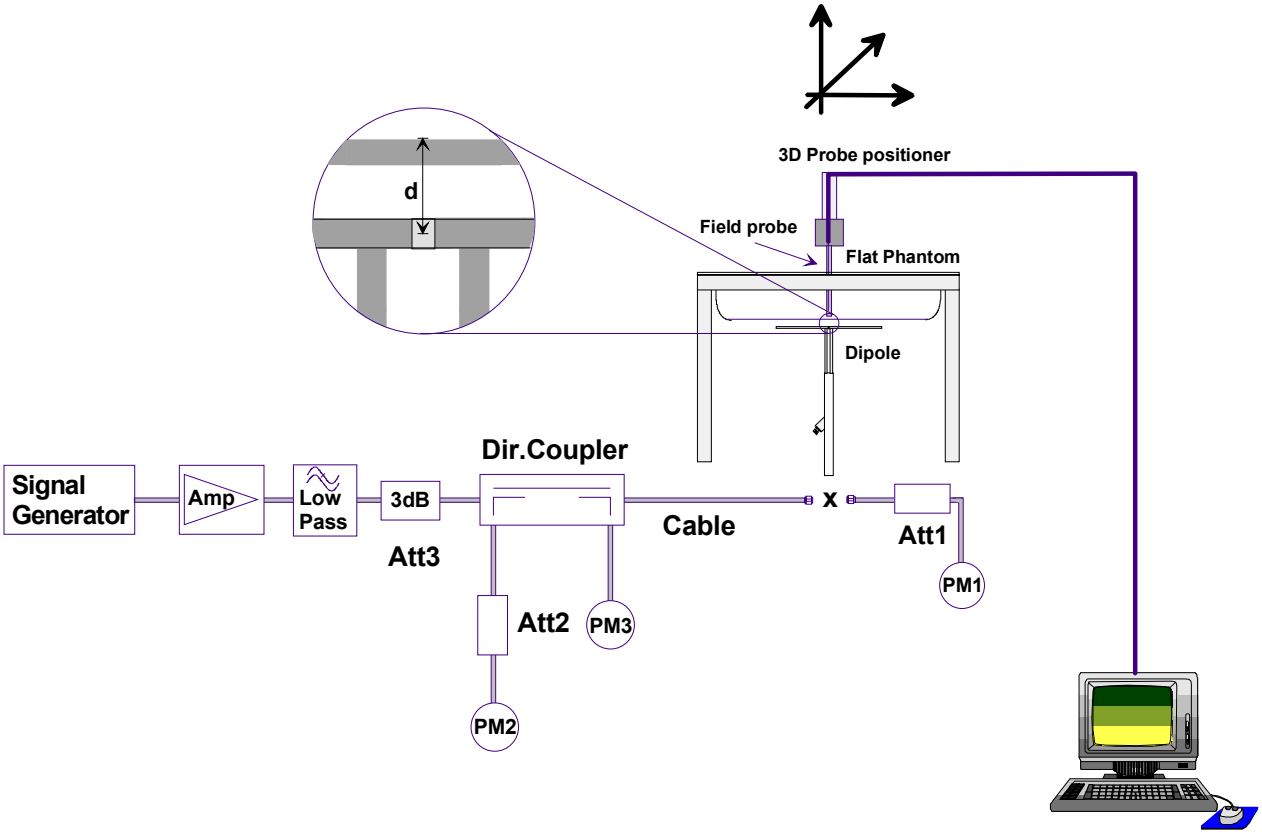
Ambient Temperature:	23.7 °C
Humidity:	33 %
Barometric Pressure:	101.9 kPa

The 300 MHz simulated brain tissue mixture consists of the following ingredients:

Ingredient	Percentage by weight
Water	37.56%
Sugar	55.32%
Salt	5.95%
HEC	0.98%
Dowicil 75	0.19%
300 MHz Target Dielectric Parameters at 22°C	ε_r = 45.3 σ = 0.87 S/m

7. 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.

8. Validation Dipole SAR Test Results

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

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	0.740	2.96	0.478	1.91	0.779
Test 2	0.736	2.94	0.475	1.90	0.773
Test 3	0.747	2.99	0.482	1.93	0.790
Test 4	0.735	2.94	0.476	1.90	0.776
Test 5	0.743	2.97	0.480	1.92	0.781
Test 6	0.741	2.96	0.479	1.92	0.782
Test 7	0.742	2.97	0.480	1.92	0.780
Test 8	0.740	2.96	0.478	1.91	0.777
Test 9	0.748	2.99	0.484	1.94	0.787
Test 10	0.744	2.98	0.481	1.92	0.781
Average Value	0.742	2.97	0.479	1.92	0.781

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

IEEE Target over $1cm^3$ (1g) of tissue: 3.0 mW/g (+/- 10%)

Averaged over $1cm^3$ (1g) of tissue: 2.97 mW/g (-3% deviation)

IEEE Target over $10cm^3$ (10g) of tissue: 2.0 mW/g (+/- 10%)

Averaged over $10cm^3$ (10g) of tissue: 1.92 mW/g (-4% deviation)

300 MHz System Validation - October 26, 2004

DUT: Dipole 300 MHz; Model: D300V2; Serial: 135; Calibrated: 10/26/04
Ambient Temp: 23.7 °C; Fluid Temp: 22.8 °C; Barometric Pressure: 101.9 kPa; Humidity: 33%

Communication System: CW
Frequency: 300 MHz; Duty Cycle: 1:1
Medium: 300 HSL (σ = 0.87 mho/m; ε_r = 45.9; ρ = 1000 kg/m^3)
- Probe: ET3DV6 - SN1387; ConvF(7.8, 7.8, 7.8); Calibrated: 18/03/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn370; Calibrated: 14/05/2004
- Phantom: Validation Planar; Type: Plexiglas; Serial: 137
- Measurement SW: DASY4, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

300 MHz System Validation/Area Scan (6x11x1): Measurement grid: dx=15mm, dy=15mm

300 MHz System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 30 V/m; Power Drift = -0.0 dB
Peak SAR (extrapolated) = 1.32 W/kg
SAR(1 g) = 0.740 mW/g; SAR(10 g) = 0.478 mW/g

300 MHz System Validation/Zoom Scan 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 29.8 V/m; Power Drift = -0.0 dB
Peak SAR (extrapolated) = 1.32 W/kg
SAR(1 g) = 0.736 mW/g; SAR(10 g) = 0.475 mW/g

300 MHz System Validation/Zoom Scan 3 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 30 V/m; Power Drift = 0.0 dB
Peak SAR (extrapolated) = 1.34 W/kg
SAR(1 g) = 0.747 mW/g; SAR(10 g) = 0.482 mW/g

300 MHz System Validation/Zoom Scan 4 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 29.8 V/m; Power Drift = 0.005 dB
Peak SAR (extrapolated) = 1.31 W/kg
SAR(1 g) = 0.735 mW/g; SAR(10 g) = 0.476 mW/g

300 MHz System Validation/Zoom Scan 5 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 30 V/m; Power Drift = -0.0 dB
Peak SAR (extrapolated) = 1.33 W/kg
SAR(1 g) = 0.743 mW/g; SAR(10 g) = 0.480 mW/g

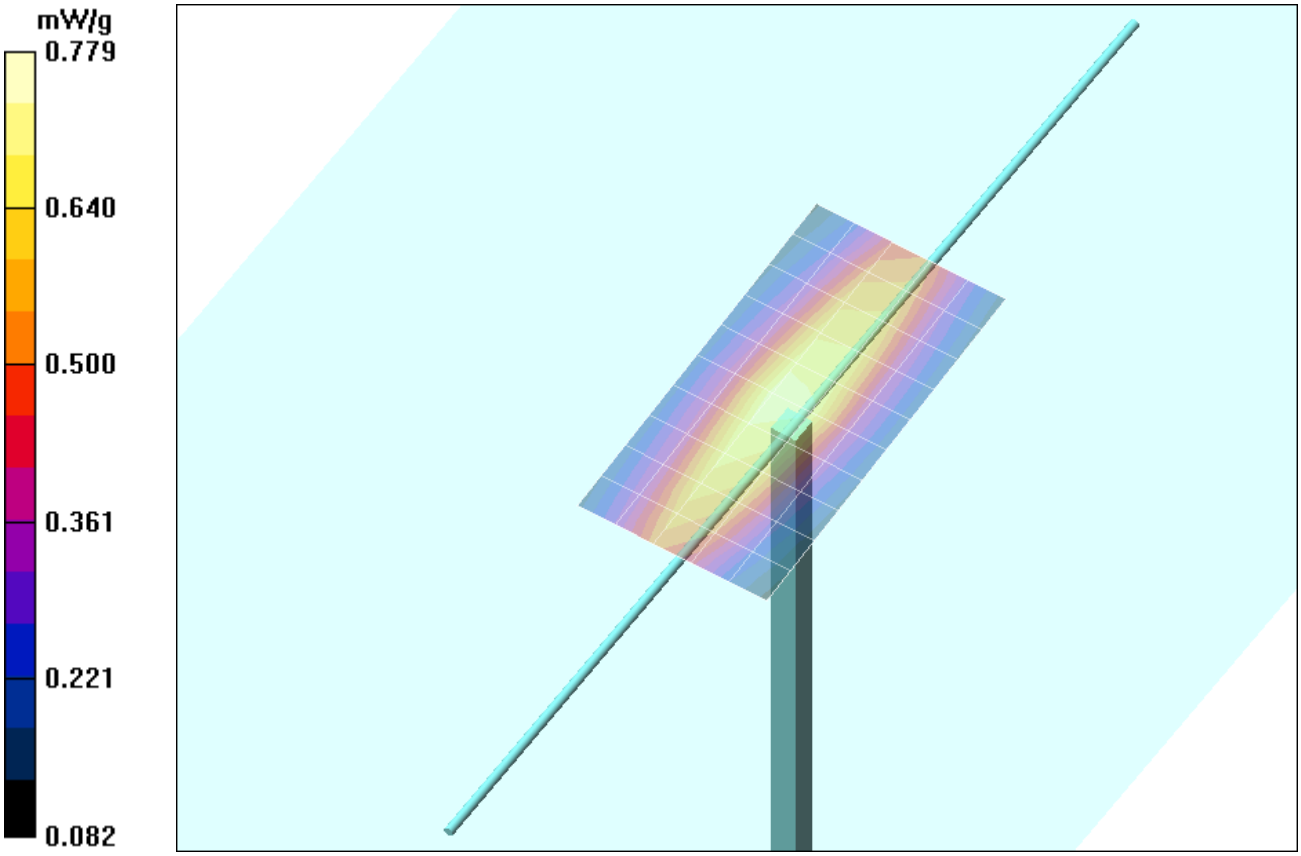
300 MHz System Validation/Zoom Scan 6 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 30 V/m; Power Drift = -0.0 dB
Peak SAR (extrapolated) = 1.33 W/kg
SAR(1 g) = 0.741 mW/g; SAR(10 g) = 0.479 mW/g

300 MHz System Validation/Zoom Scan 7 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 30 V/m; Power Drift = 0.0 dB
Peak SAR (extrapolated) = 1.32 W/kg
SAR(1 g) = 0.742 mW/g; SAR(10 g) = 0.480 mW/g

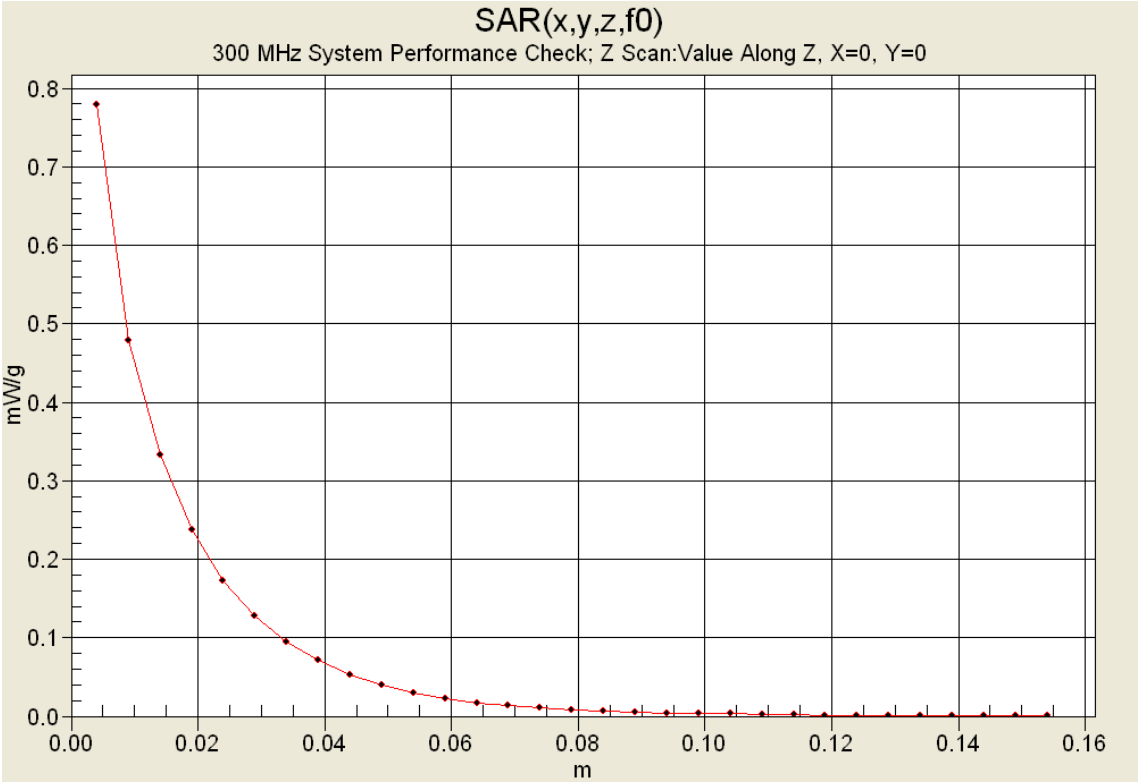
300 MHz System Validation/Zoom Scan 8 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 29.9 V/m; Power Drift = 4e-005 dB
Peak SAR (extrapolated) = 1.32 W/kg
SAR(1 g) = 0.740 mW/g; SAR(10 g) = 0.478 mW/g

300 MHz System Validation/Zoom Scan 9 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 30 V/m; Power Drift = 0.0 dB
Peak SAR (extrapolated) = 1.34 W/kg
SAR(1 g) = 0.748 mW/g; SAR(10 g) = 0.484 mW/g

300 MHz Validation/Zoom Scan 10 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 29.9 V/m; Power Drift = 0.005 dB
Peak SAR (extrapolated) = 1.33 W/kg
SAR(1 g) = 0.744 mW/g; SAR(10 g) = 0.481 mW/g



1 g average of 10 measurements: 0.742 mW/g
10 g average of 10 measurements: 0.479 mW/g



300 MHz System Validation

Measured Fluid Dielectric Parameters (Brain)

October 26, 2004

Frequency	e'	e"
200.000000 MHz	49.9683	70.5699
210.000000 MHz	49.2757	67.8974
220.000000 MHz	49.0561	65.5986
230.000000 MHz	48.5199	63.5063
240.000000 MHz	47.9983	61.3980
250.000000 MHz	47.6116	59.5294
260.000000 MHz	47.1692	57.8735
270.000000 MHz	46.7769	56.3204
280.000000 MHz	46.4409	54.8280
290.000000 MHz	46.0613	53.4572
300.000000 MHz	45.8972	52.0989
310.000000 MHz	45.6039	51.0027
320.000000 MHz	45.2697	49.7697
330.000000 MHz	44.7890	48.6923
340.000000 MHz	44.3811	47.7213
350.000000 MHz	44.0222	46.8979
360.000000 MHz	43.6368	46.0075
370.000000 MHz	43.3432	45.1665
380.000000 MHz	43.1554	44.4459
390.000000 MHz	42.9327	43.7340
400.000000 MHz	42.6580	43.0434

APPENDIX E - PROBE CALIBRATION

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

Client **Celltech**

CALIBRATION CERTIFICATE

Object(s)	ET3DV6 - SN:1387
Calibration procedure(s)	QA CAL-01.v2 Calibration procedure for dosimetric E-field probes
Calibration date:	March 18, 2004
Condition of the calibrated item	In Tolerance (according to the specific calibration document)

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

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Model Type	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM E4419B	GB41293874	2-Apr-03 (METAS, No 252-0250)	Apr-04
Power sensor E4412A	MY41495277	2-Apr-03 (METAS, No 252-0250)	Apr-04
Reference 20 dB Attenuator	SN: 5086 (20b)	3-Apr-03 (METAS, No. 251-0340)	Apr-04
Fluke Process Calibrator Type 702	SN: 6295803	8-Sep-03 (Sintrel SCS No. E-030020)	Sep-04
Power sensor HP 8481A	MY41092180	18-Sep-02 (SPEAG, in house check Oct-03)	In house check: Oct 05
RF generator HP 8684C	US3642U01700	4-Aug-99 (SPEAG, in house check Aug-02)	In house check: Aug-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Oct-03)	In house check: Oct 05

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

Date issued: March 18, 2004

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

Probe ET3DV6

SN:1387

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

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1387

Sensitivity in Free Space

Diode Compression[A]

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

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Plese see Page 7.

Boundary Effect

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

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

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

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

Sensor Offset

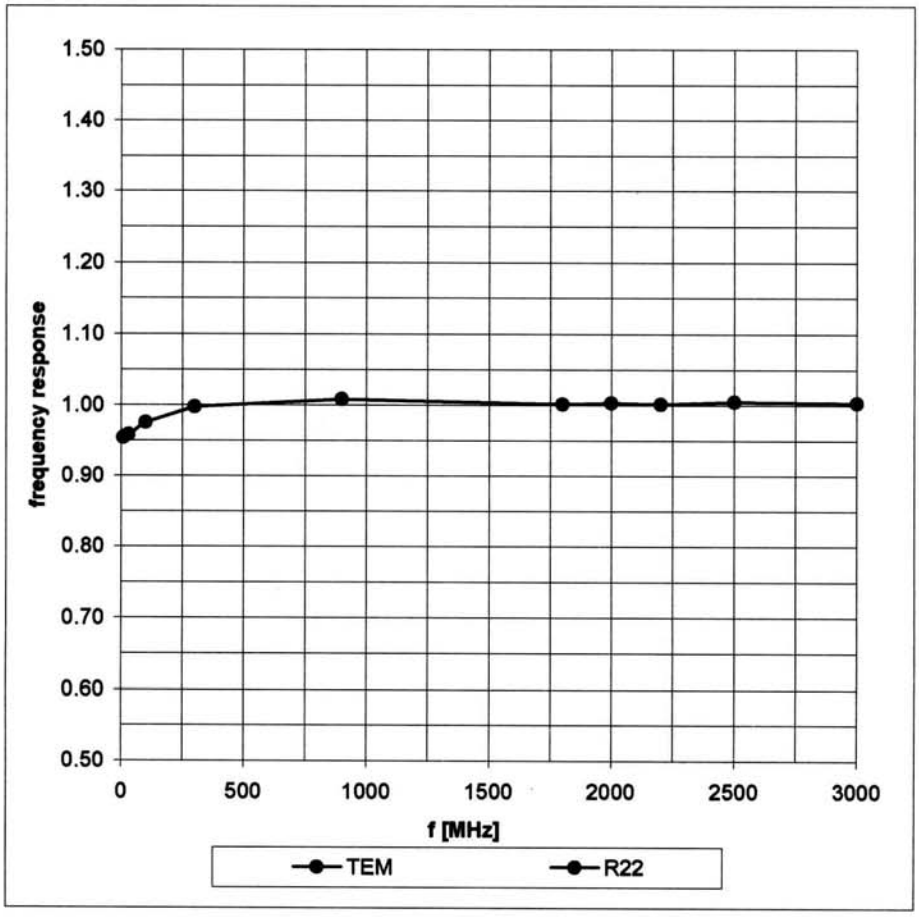
Probe Tip to Sensor Center	**2.7** mm
Optical Surface Detection	**in tolerance**

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

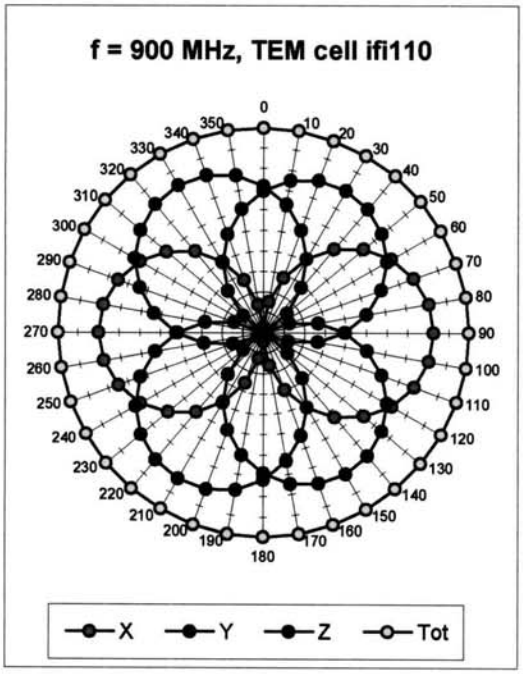
[A] numerical linearization parameter: uncertainty not required

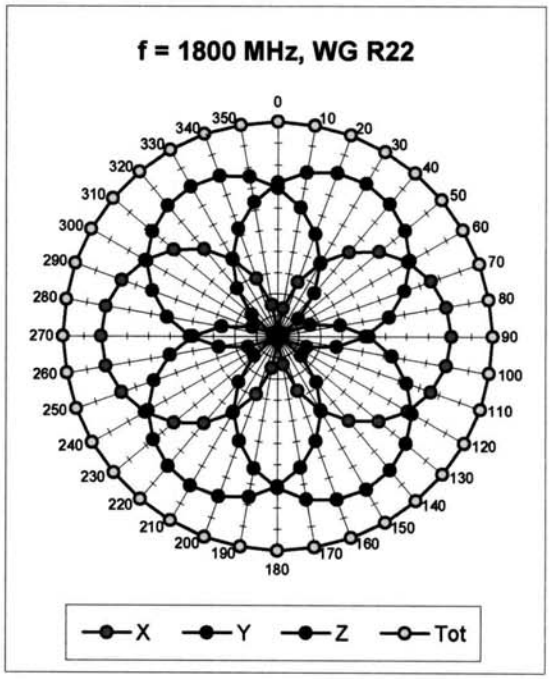
Frequency Response of E-Field

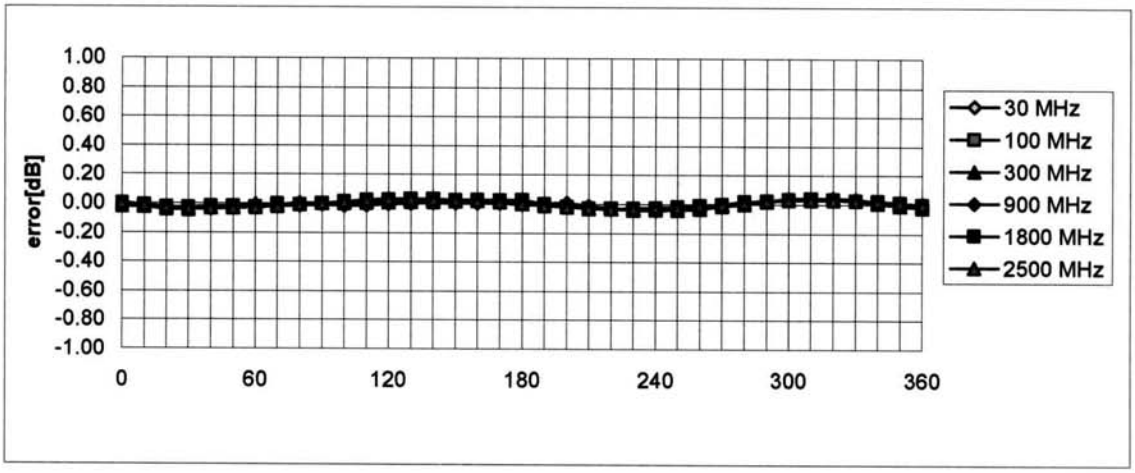
(TEM-Cell:ifi110, Waveguide R22)



Receiving Pattern (ϕ) , θ = 0°



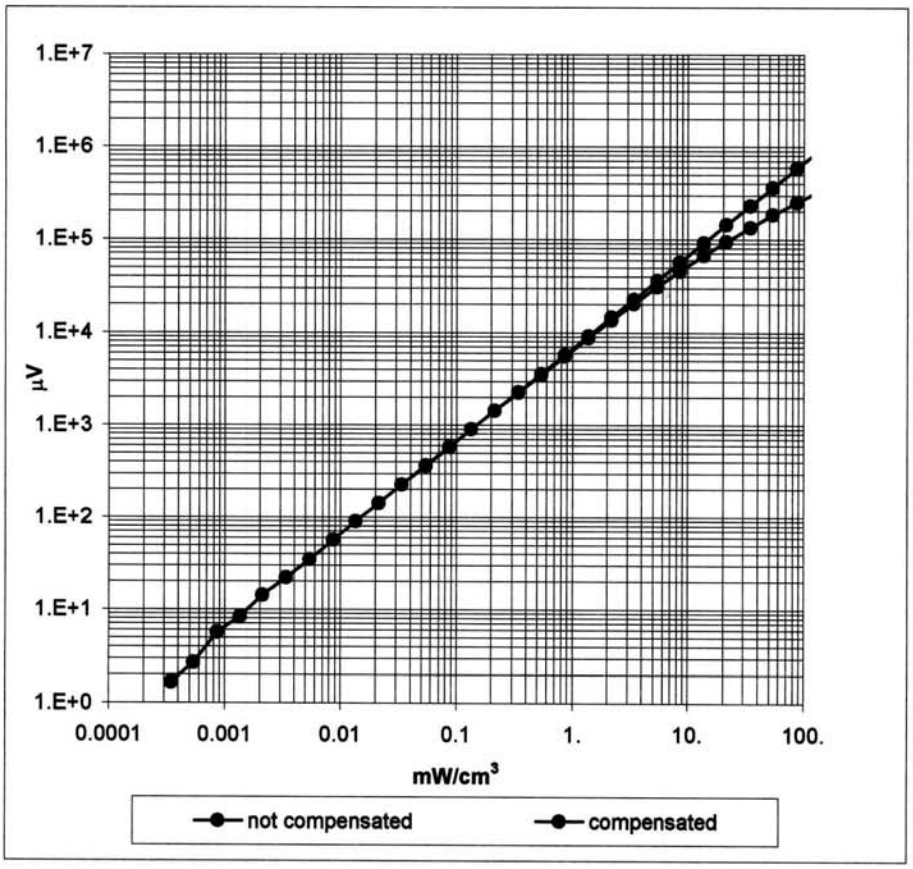


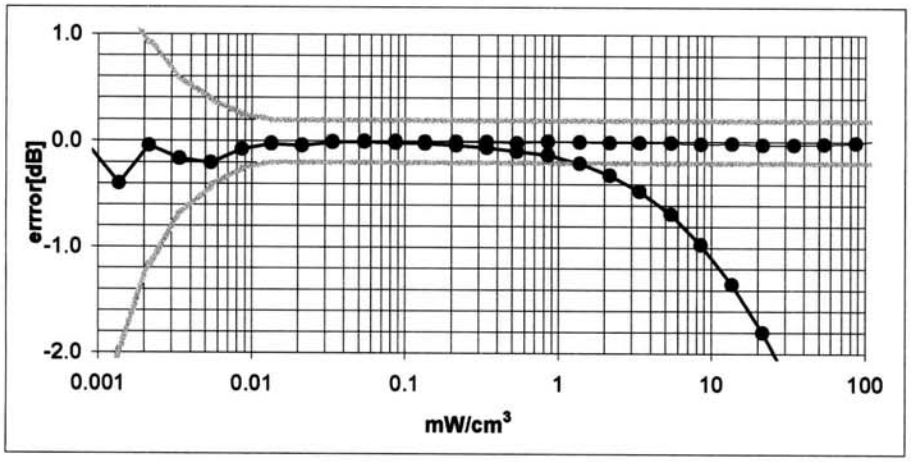


Axial Isotropy Error < ± 0.2 dB

Dynamic Range f(SAR_{head})

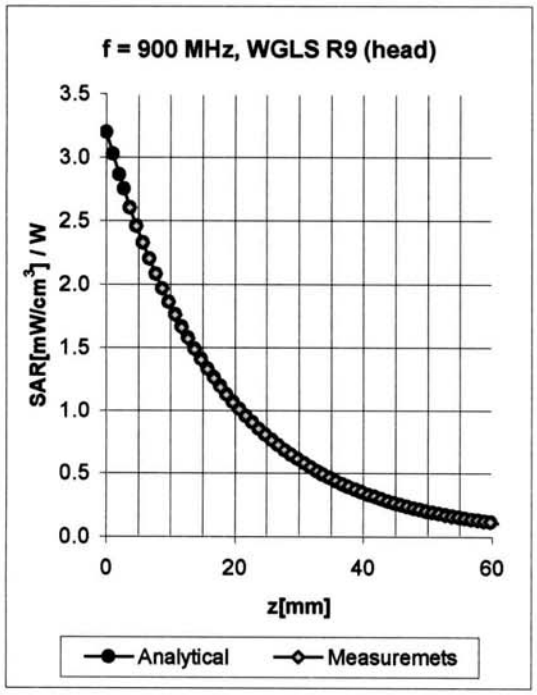
(Waveguide R22)

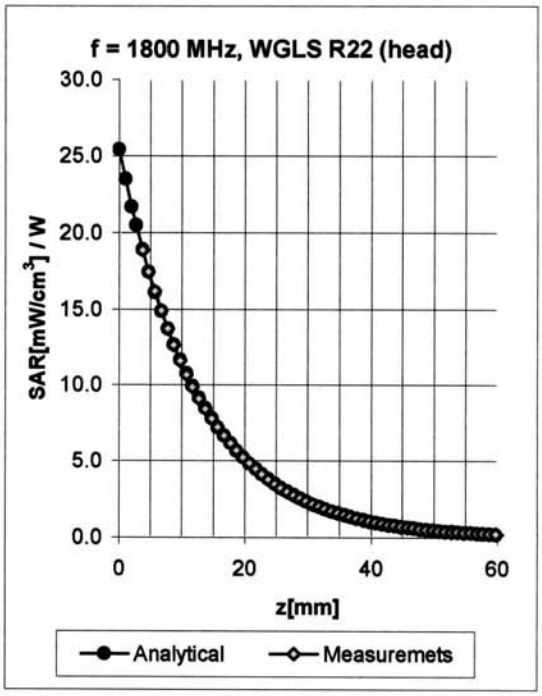




Probe Linearity < ± 0.2 dB

Conversion Factor Assessment



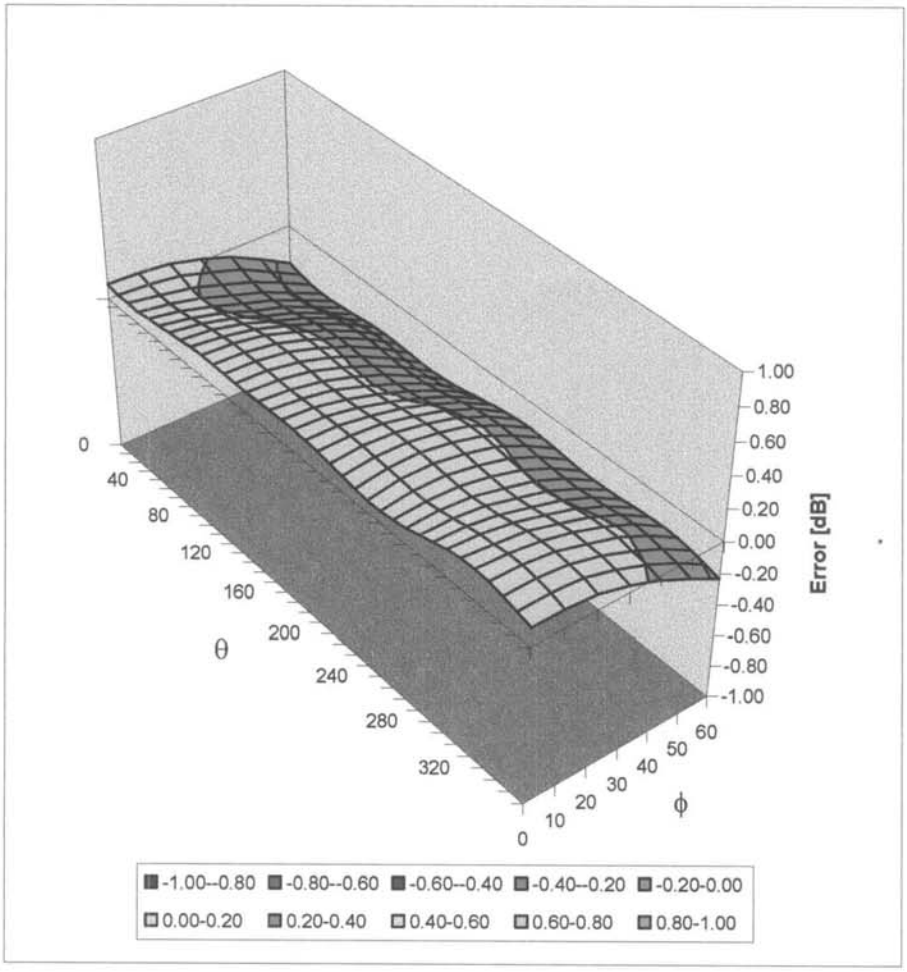


f [MHz]	Validity [MHz][B]	Tissue	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
835	750-950	Head	41.5 ± 5%	0.90 ± 5%	0.72	1.78	6.71 ± 11.9% (k=2)
1750	1700-1800	Head	40.0 ± 5%	1.40 ± 5%	0.51	2.67	5.38 ± 9.7% (k=2)
1900	1850-1950	Head	40.0 ± 5%	1.40 ± 5%	0.55	2.66	5.25 ± 9.7% (k=2)
2450	2400-2500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

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

Deviation from Isotropy in HSL

Error (θ,ϕ), f = 900 MHz



Spherical Isotropy Error < ± 0.4 dB

Schmid & Partner Engineering AG

s p e a g

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

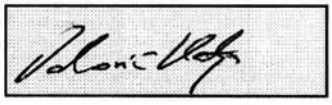
Additional Conversion Factors

for Dosimetric E-Field Probe

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

Schmid & Partner Engineering AG hereby certifies that conversion factor(s) of this probe have been evaluated on the date indicated above. The assessment was performed using the FDTD numerical code SEMCAD of Schmid & Partner Engineering AG. Since the evaluation is coupled with measured conversion factors, it has to be recalculated yearly, i.e., following the re-calibration schedule of the probe. The uncertainty of the numerical assessment is based on the extrapolation from measured value at 900 MHz or at 1800 MHz.

Assessed by:



Schmid & Partner Engineering AG

s p e a g

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

Dosimetric E-Field Probe ET3DV6 SN:1387

Conversion factor (± standard deviation)

150 MHz	ConvF	**9.1 ± 8%**	ε_r = 52.3 ± 5% σ = 0.76 ± 5% mho/m (head tissue)
300 MHz	ConvF	**7.8 ± 8%**	ε_r = 45.3 ± 5% σ = 0.87 ± 5% mho/m (head tissue)
450 MHz	ConvF	**7.5 ± 8%**	ε_r = 43.5 ± 5% σ = 0.87 ± 5% mho/m (head tissue)
150 MHz	ConvF	**8.7 ± 8%**	ε_r = 61.9 ± 5% σ = 0.80 ± 5% mho/m (body tissue)
450 MHz	ConvF	**7.6 ± 8%**	ε_r = 56.7 ± 5% σ = 0.94 ± 5% mho/m (body tissue)

Important Note:

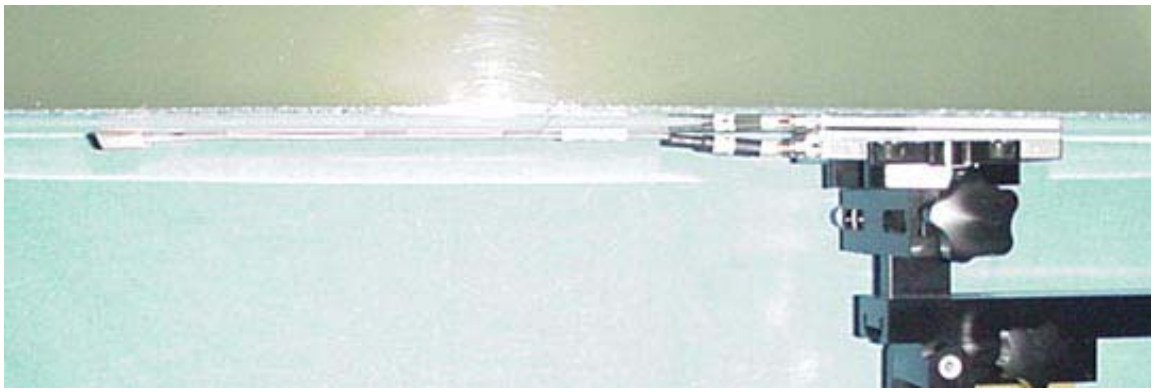
For numerically assessed probe conversion factors, parameters Alpha and Delta in the DASY software must have the following entries: Alpha = 0 and Delta = 1.

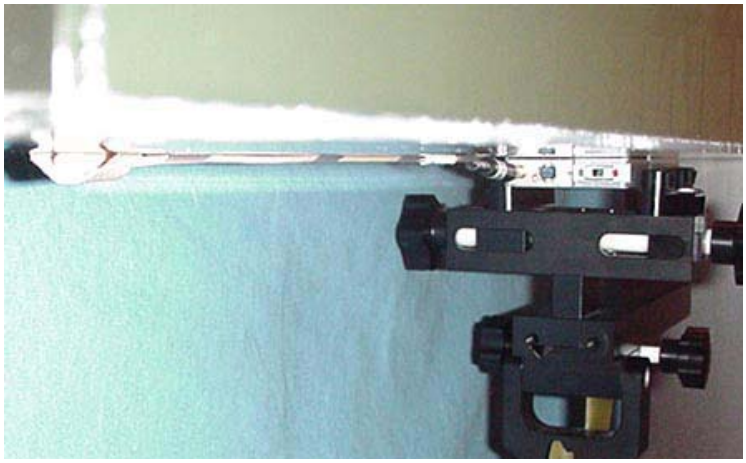
Please see also Section 4.7 of the DASY4 Manual.

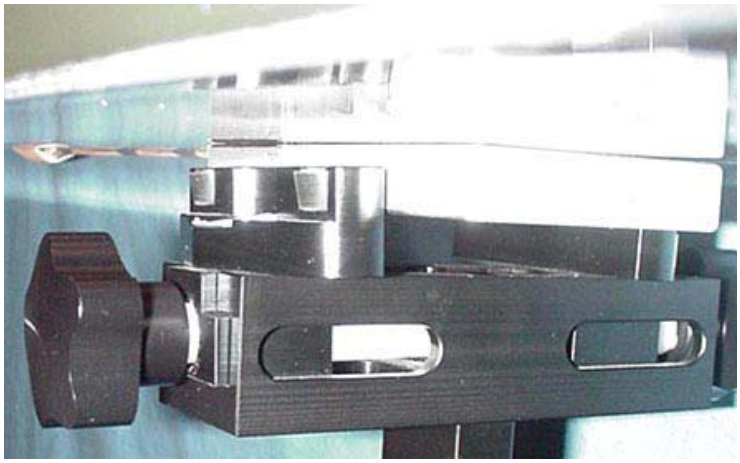
APPENDIX F - SAR TEST SETUP & DUT PHOTOGRAPHS

BODY-WORN SAR TEST SETUP PHOTOGRAPHS

0.0 cm Separation Distance from Back of DUT to Planar Phantom with Microphone-Antenna (P/N: 7011149)

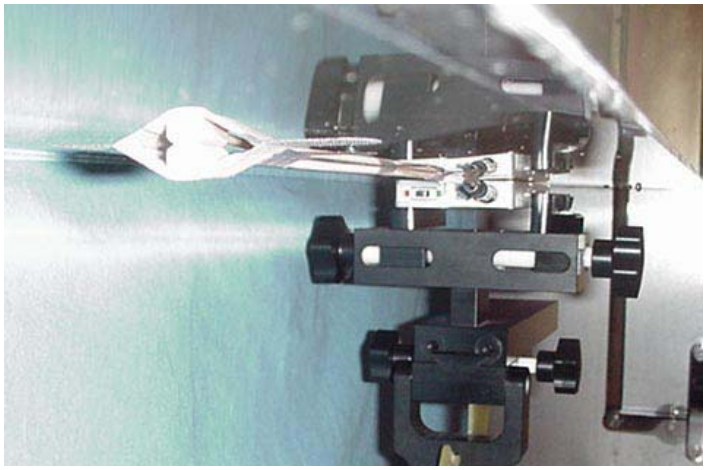


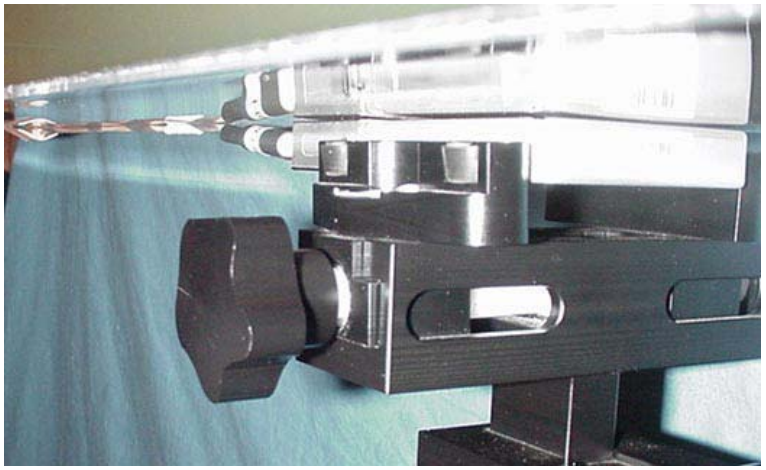




BODY-WORN SAR TEST SETUP PHOTOGRAPHS

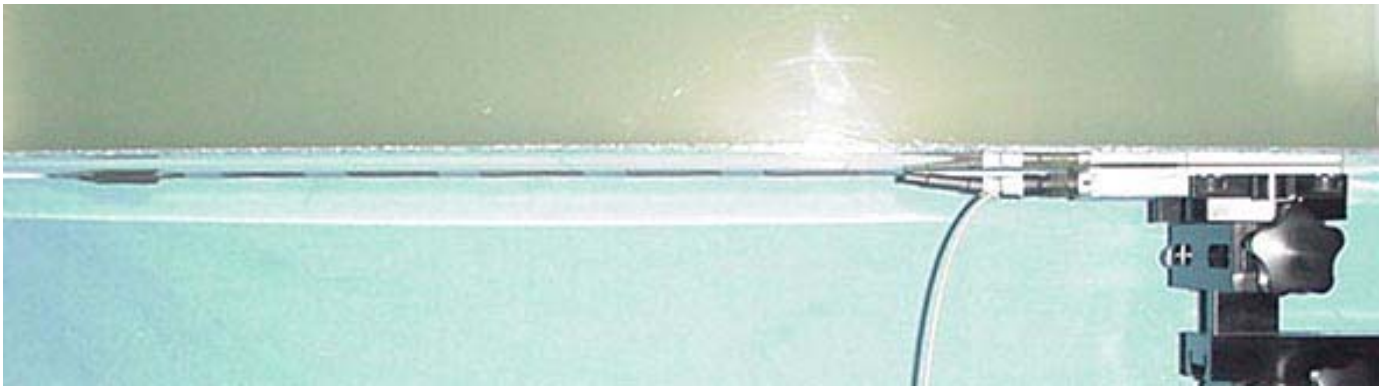
0.0 cm Separation Distance from Front of DUT to Planar Phantom with Microphone-Antenna (P/N: 7011149)

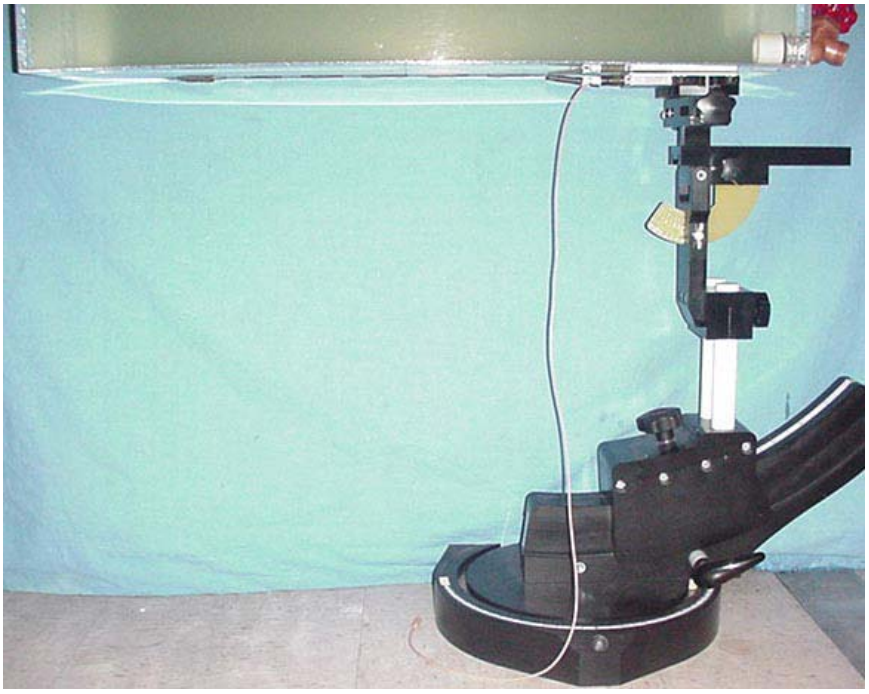


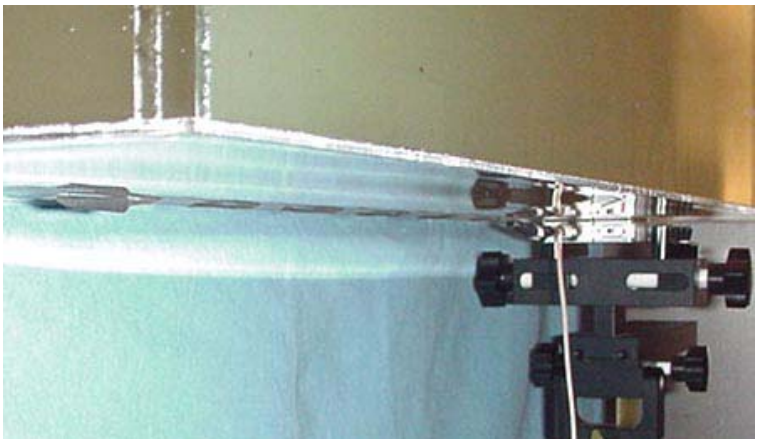


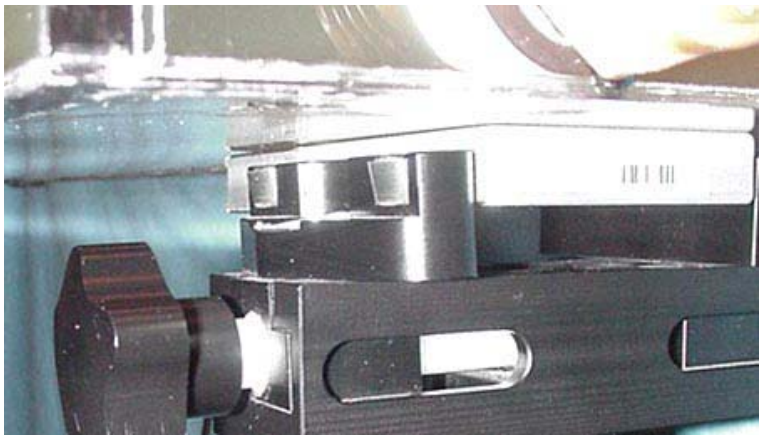
BODY-WORN SAR TEST SETUP PHOTOGRAPHS

0.0 cm Separation Distance from Back of DUT to Planar Phantom with Noodle-Wire Antenna (P/N: 7011151) & External Microphone



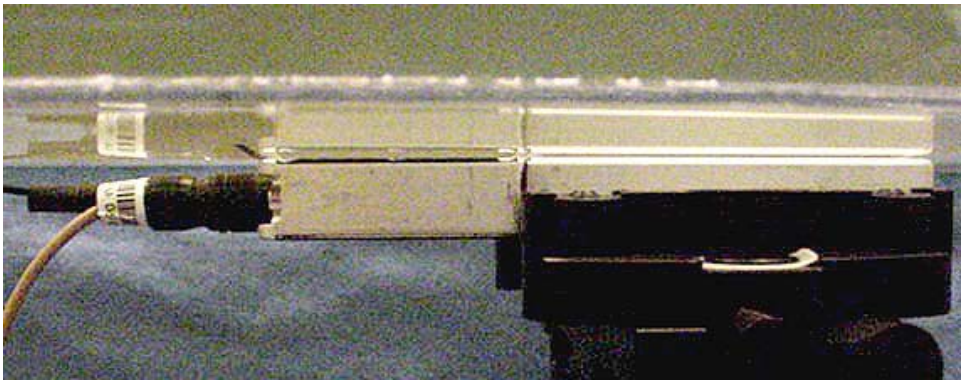


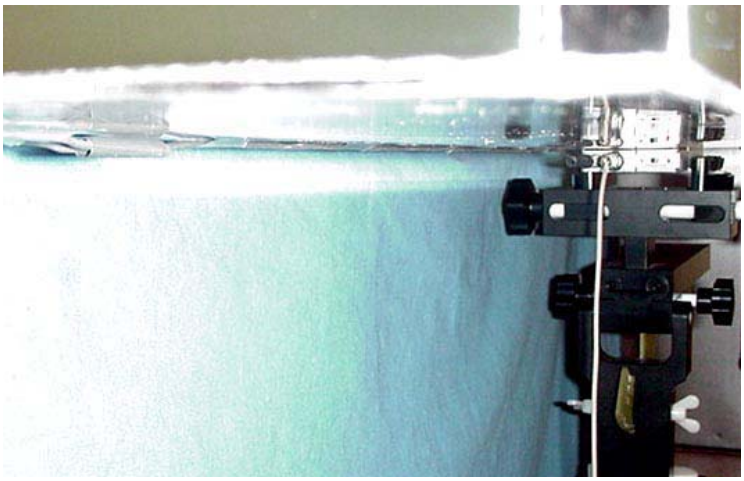


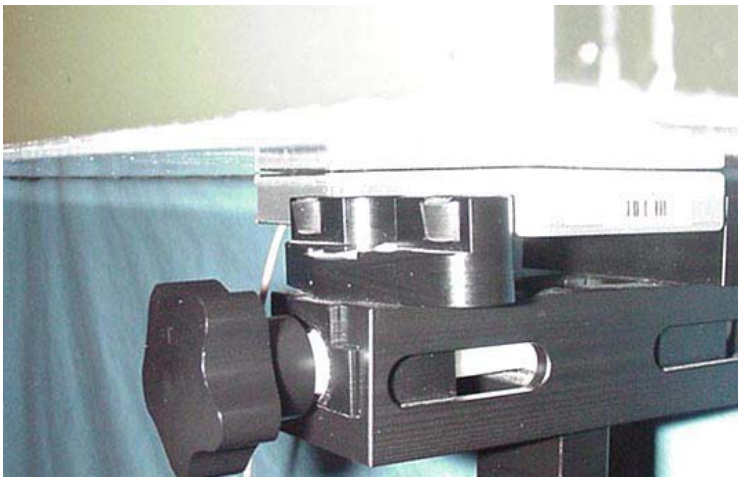


BODY-WORN SAR TEST SETUP PHOTOGRAPHS - 2nd Scan

0.0 cm Separation Distance from Back of DUT to Planar Phantom
with Noodle-Wire Antenna (P/N: 7011151) & External Microphone

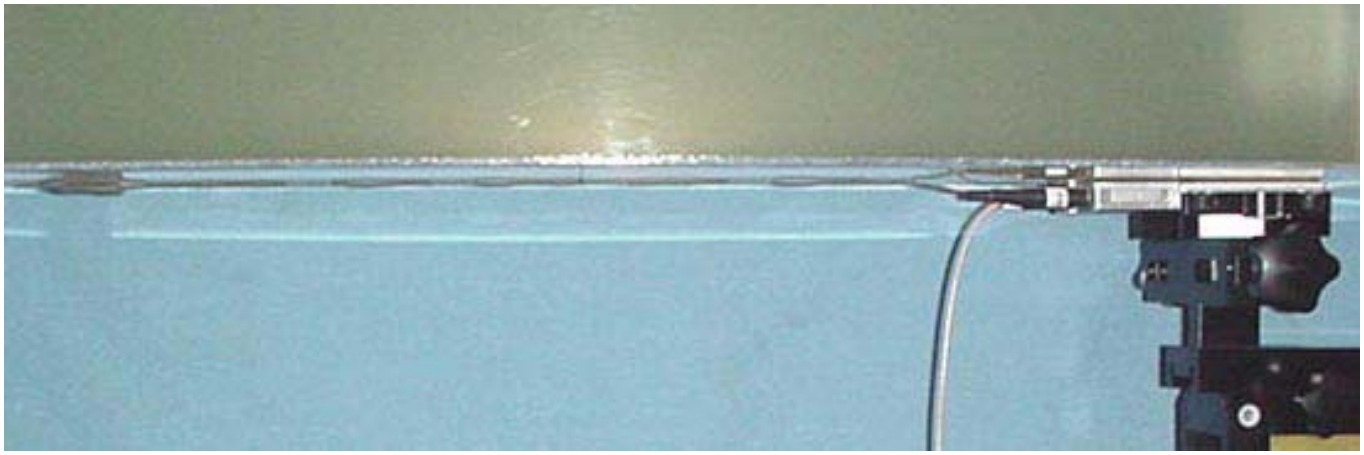


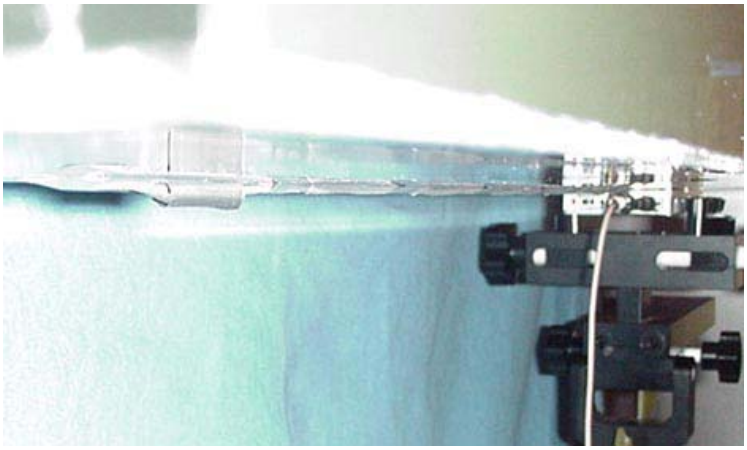


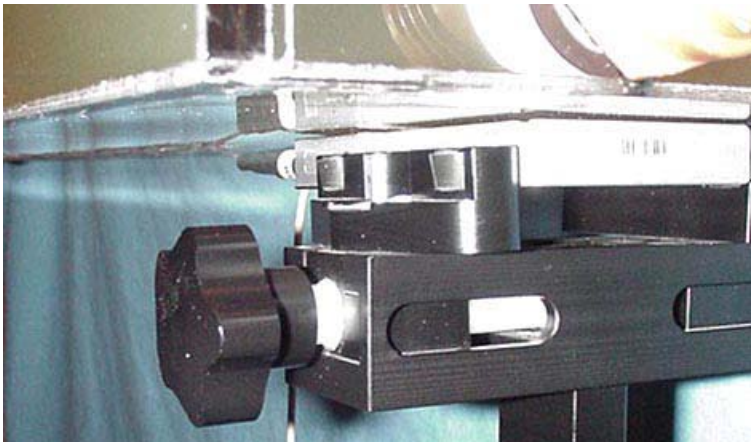


BODY-WORN SAR TEST SETUP PHOTOGRAPHS

0.0 cm Separation Distance from Front of DUT to Planar Phantom with Noodle-Wire Antenna (P/N: 7011151) & External Microphone

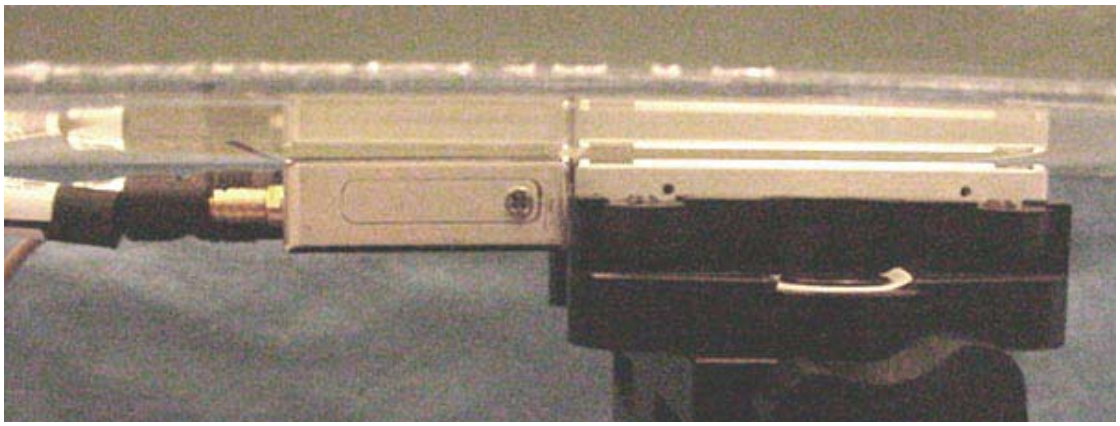


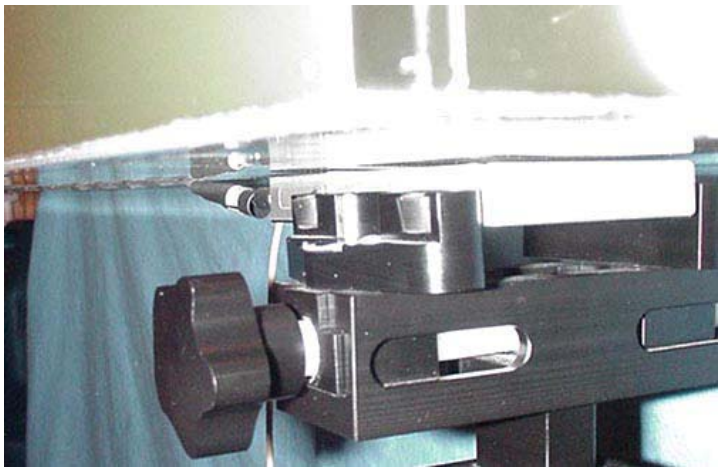




BODY-WORN SAR TEST SETUP PHOTOGRAPHS - 2nd Scan

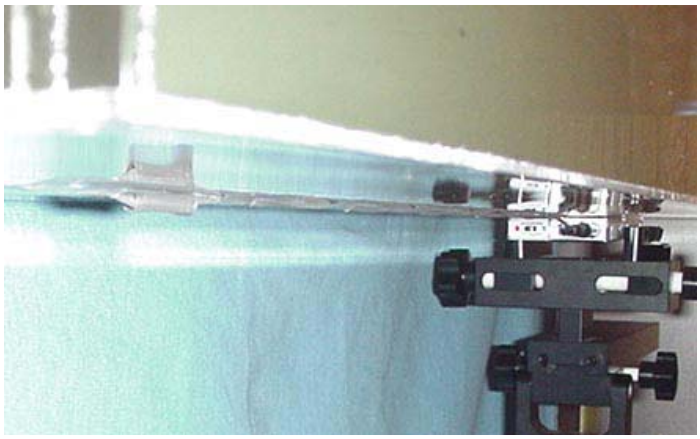
0.0 cm Separation Distance from Front of DUT to Planar Phantom with Noodle-Wire Antenna (P/N: 7011151) & External Microphone

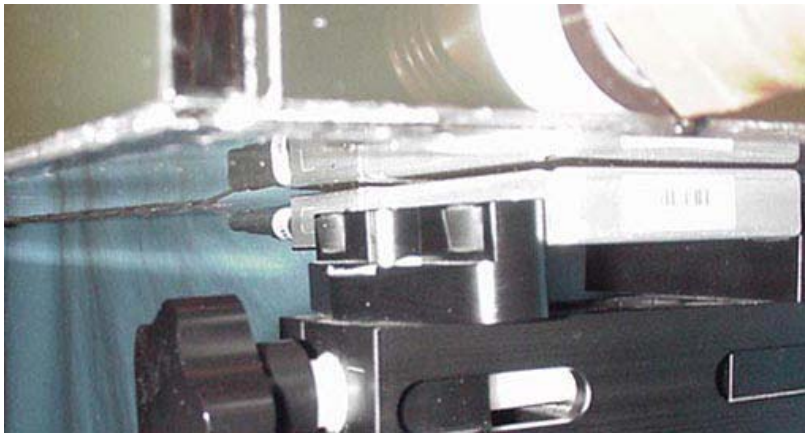




BODY-WORN SAR TEST SETUP PHOTOGRAPHS

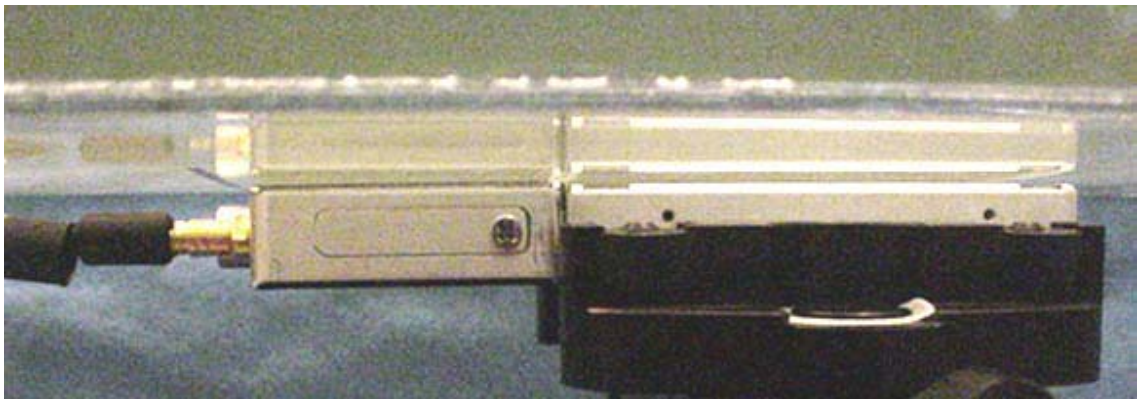
0.0 cm Separation Distance from Front of DUT to Planar Phantom with Noodle-Wire Antenna (P/N: 7011151) & Internal Microphone

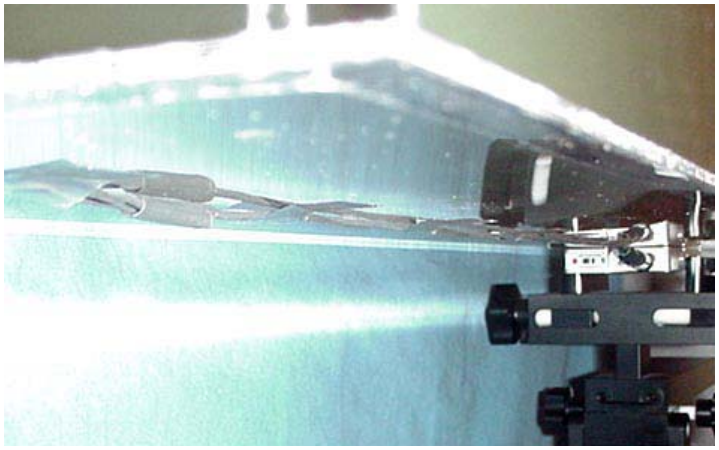


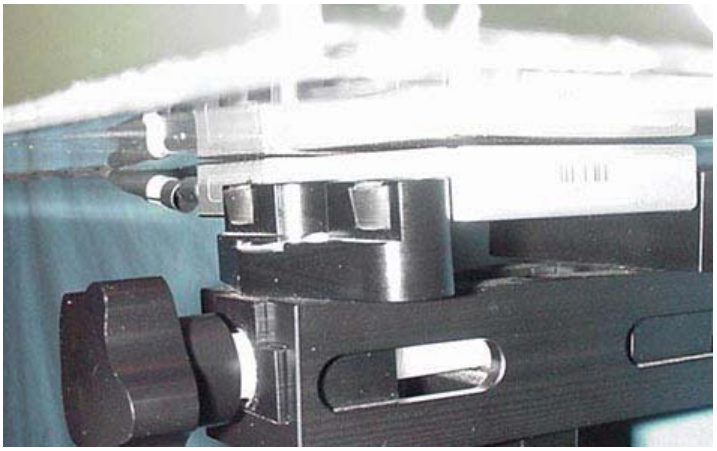


BODY-WORN SAR TEST SETUP PHOTOGRAPHS - 2nd Scan

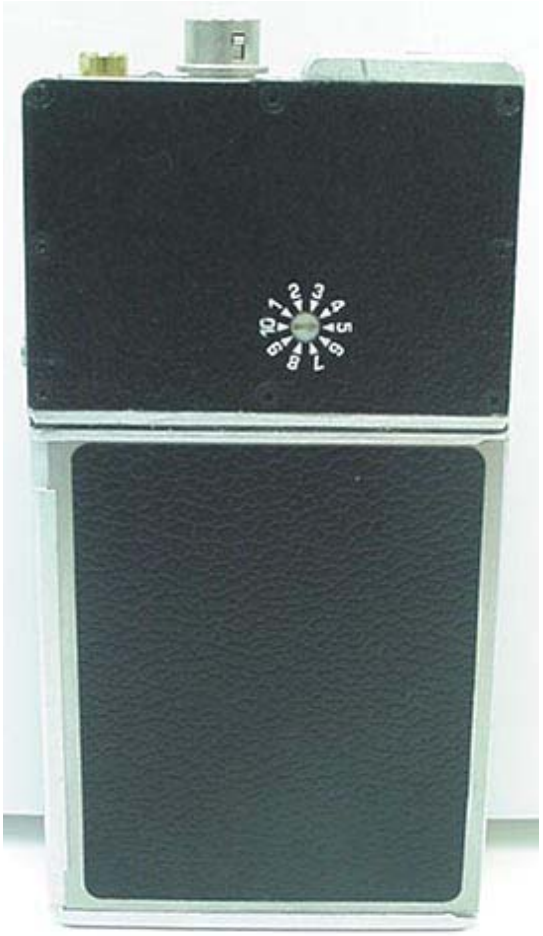
0.0 cm Separation Distance from Front of DUT to Planar Phantom
with Noodle-Wire Antenna (P/N: 7011151) & Internal Microphone







DUT PHOTOGRAPHS



Front of DUT

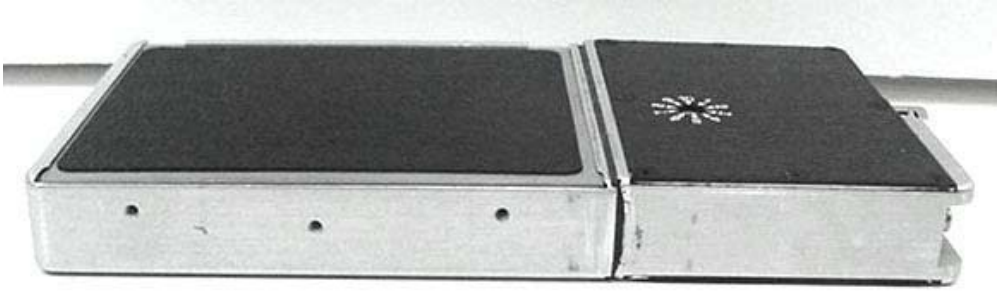
Back of DUT

DUT PHOTOGRAPHS

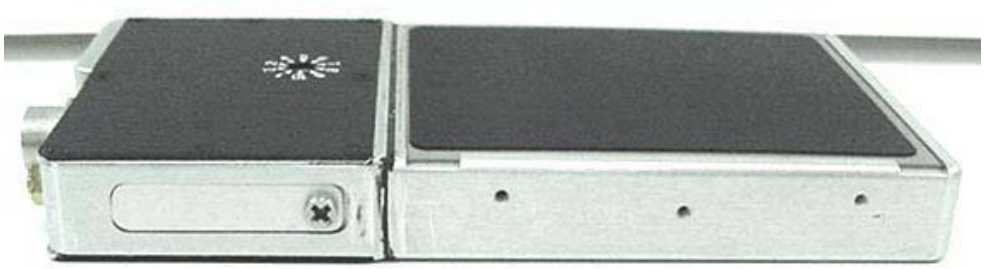
Top of DUT

Bottom of DUT

DUT PHOTOGRAPHS

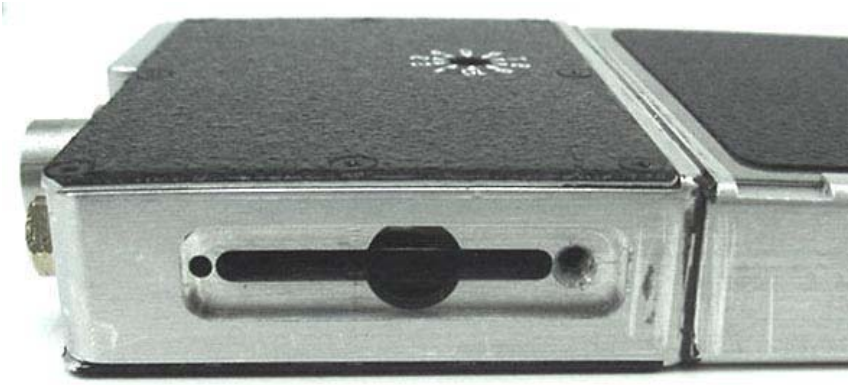


Right Side of DUT



Left Side of DUT

miniSD™ Card Slot

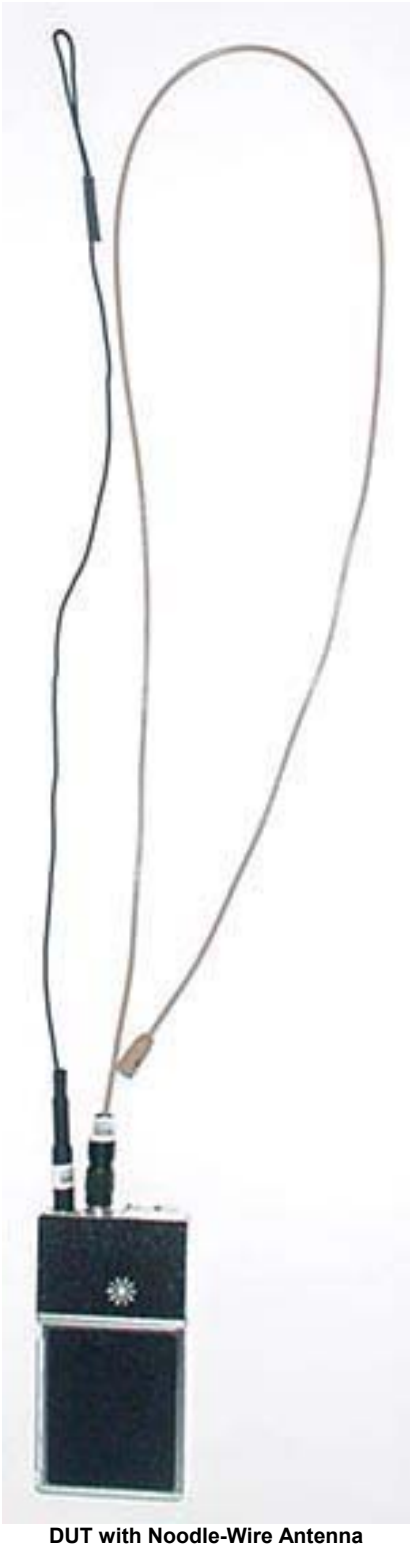


miniSD™ Card Slot

DUT PHOTOGRAPHS

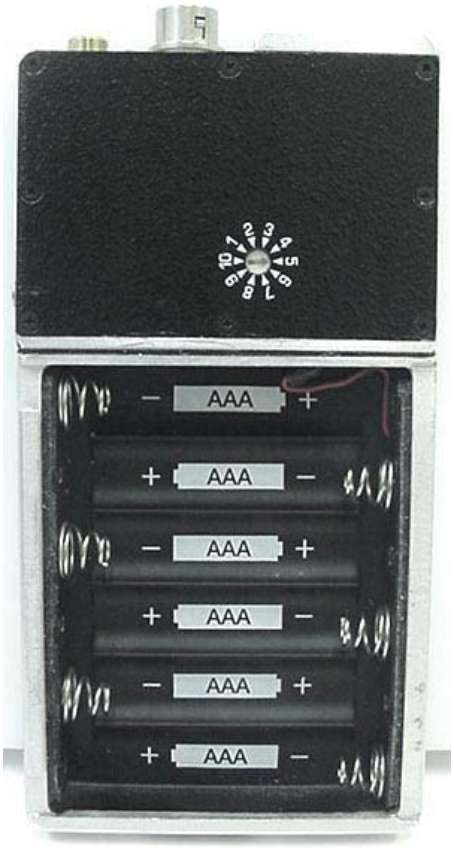
DUT with Microphone-Antenna

DUT with Noodle-Wire Antenna



DUT with Noodle-Wire Antenna & External Microphone

DUT PHOTOGRAPHS



DUT Battery Compartment

Duracell Procell Batteries

Energizer E92 Batteries

DUT PHOTOGRAPHS

Microphone-Antenna (P/N: 7011149)

Microphone-Antenna (P/N: 7011149)

Noodle-Wire Antenna (P/N: 7011151)

Noodle-Wire Antenna (P/N: 7011151)