CERTIFICATE OF COMPLIANCE
SAR EVALUATION

Test Lab:	**Applicant Information:**
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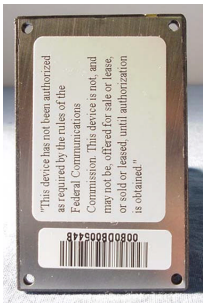
FCC Rule Part(s):	**2.1093; ET Docket 96-326**
FCC ID:	**MIVPRT0100PF**
Model(s):	**Portfolio PRT01**
EUT Type(s):	**CDPD Wireless Data Modem in Portfolio Case for PDA**
Modulation:	**GMSK**
Tx Frequency Range(s):	**824.04 - 848.97 MHz**
Nominal Conducted Power:	**28.0 dBm**
Antenna Type(s):	**Integral**

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 OET Bulletin 65, Supplement C, Edition 01-01 (uncontrolled exposure / general population), and was tested in accordance with the appropriate measurement standards, guidelines, and recommended practices specified in American National Standards Institute C95.1-1992.

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

This test report shall not be reproduced partially, or in full, without the prior written approval of Celltech Research Inc. The results and statements contained in this report pertain only to the device(s) evaluated.

Shawn McMillen
General Manager
Celltech Research Inc.



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1.0 INTRODUCTION

This measurement report shows that the ENFORA INC. Portfolio PRT01 CDPD Wireless Data Modem FCC ID: MIVPRT0100PF complies with the regulations and procedures specified in FCC Rule Part 2.1093, ET Docket 96-326 for mobile and portable devices. The test procedures, as described in American National Standards Institute C95.1-1992 (See Reference [1]), and FCC OET Bulletin 65, Supplement C, Edition 01-01 (See Reference [2]) were employed. A description of the product, operating configuration, detailed summary of the test results, methodology and procedures used in the evaluation, equipment used, and the various provisions of the rules are included within this test report.

2.0 DESCRIPTION of Equipment Under Test (EUT)

Rule Part(s)	FCC 2.1093; ET Docket 96-326	**Modulation**	GMSK
EUT Type	CDPD Wireless Data Modem in Portfolio Case for PDA	**Tx Frequency Range**	824.04 - 848.97 MHz
FCC ID	MIVPRT0100PF	**Nominal RF Conducted Output Power**	28.0 dBm
Model(s)	Portfolio PRT01	**Antenna Type(s)**	Integral
Serial No.	Pre-production	**Battery Type**	Enfora Nexergy 0128 3.6V 1290 MAH

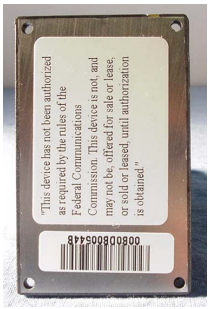
Portfolio Open - Front of Modem
(Inside-Left Cover of Portfolio Case)

Portfolio Closed - Back of Modem
(Outside-Left Cover of Portfolio Case)

Modem installed on PCB

Portfolio Open with PDA
(Modem Inside Left Cover of Portfolio Case)

Front of Modem
(Inside-Left Cover of Portfolio Case)



EUT - CDPD Modem

3.0 SAR MEASUREMENT SYSTEM

Celltech Research SAR measurement facility utilizes the Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland. The DASY system is comprised of the robot controller, computer, near-field probe, probe alignment sensor, specific anthropomorphic mannequin (SAM) phantom, and various planar phantoms for brain or body SAR evaluations. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF). A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and remote control, is used to drive the robot motors. The Staubli robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card. The DAE3 utilizes a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16-bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe-mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.

DASY3 SAR Measurement System with SAM phantom

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, and the detailed SAR test setup photographs are shown in Appendix E.

Body SAR Measurements

Freq. (MHz)	Channel	Mode	Cond. Power Before (dBm)	Cond. Power After (dBm)	EUT Position	Separation Distance (cm)	SAR 1g (w/kg)
824.04	991	CW	27.7	27.5	Front of Modem (Inside-Left Cover of Portfolio Case)	1.0	0.554
836.01	367	CW	27.9	27.6	Front of Modem (Inside-Left Cover of Portfolio Case)	1.0	0.860
848.97	799	CW	27.5	27.3	Front of Modem (Inside-Left Cover of Portfolio Case)	1.0	0.509
824.04	991	CW	27.9	57.6	Back of Modem (Outside-Left Cover of Portfolio Case)	1.0	0.851
836.01	367	CW	27.7	27.5	Back of Modem (Outside-Left Cover of Portfolio Case)	1.0	1.01
848.97	799	CW	27.5	27.4	Back of Modem (Outside-Left Cover of Portfolio Case)	1.0	0.910
Mixture Type: Body Dielectric Constant: 55.0 Conductivity: 0.96			**ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population BODY: 1.6 W/kg (averaged over 1 gram)**				

Notes:

1. The body SAR values found were below the maximum limit of 1.6 w/kg (averaged over 1 gram).
2. The highest body SAR value found was 1.01 w/kg.
3. The front of the modem was tested for body SAR (inside-left cover of portfolio case) with the portfolio case open and a 1.0 cm separation distance between the inside-left cover of the portfolio case and the outer surface of the SAM planar phantom.
4. The back of the modem was tested for body SAR (outside-left cover of portfolio case) with the portfolio case closed and a 1.0 cm separation distance between the outside-left cover of the portfolio case and the outer surface of the SAM planar phantom.
5. Ambient TEMPERATURE: 23.2 °C
   Relative HUMIDITY: 57.1 %
   Atmospheric PRESSURE: 100.2 kPa
6. Fluid Temperature 23.0 °C
7. During the entire test the conducted power was maintained to within 5% of the initial conducted power.

Hand SAR Measurements

Freq. (MHz)	Channel	Mode	Cond. Power Before (dBm)	Cond. Power After (dBm)	EUT Position	Separation Distance (cm)	SAR 10g (w/kg)
824.04	991	CW	27.7	27.4	Front of Modem (Inside-Left Cover of Portfolio Case)	0.0	1.31
836.01	367	CW	27.9	27.6	Front of Modem (Inside-Left Cover of Portfolio Case)	0.0	1.21
848.97	799	CW	27.5	27.2	Front of Modem (Inside-Left Cover of Portfolio Case)	0.0	1.03
824.04	991	CW	27.7	27.5	Back of Modem (Outside-Left Cover of Portfolio Case)	0.0	0.795
836.01	367	CW	27.9	27.5	Back of Modem (Outside-Left Cover of Portfolio Case)	0.0	0.952
848.97	799	CW	27.5	27.3	Back of Modem (Outside-Left Cover of Portfolio Case)	0.0	0.743
Mixture Type: Body Dielectric Constant: 55.0 Conductivity: 0.96			**ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population HAND: 4.0 W/kg (averaged over 10 grams)**				

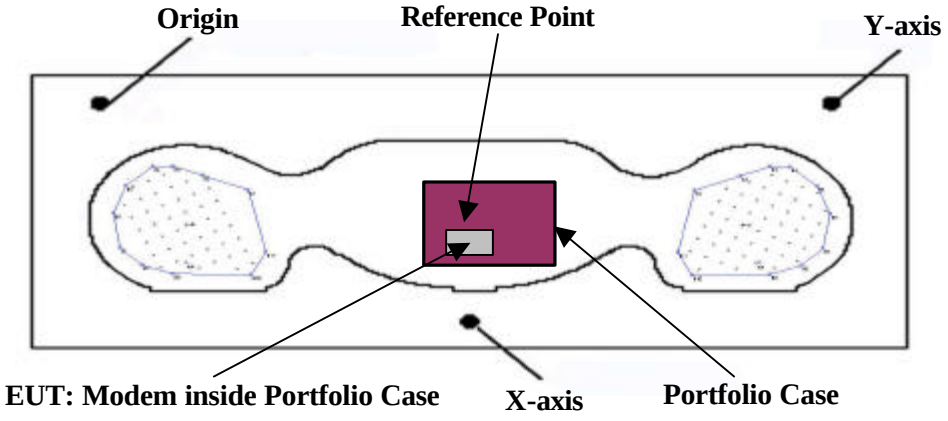
Notes:

1. The hand SAR values found were below the maximum limit of 4.0 w/kg (averaged over 10 grams).
2. The highest hand SAR value found was 1.31 w/kg.
3. The front of the modem was tested for hand SAR (inside-left cover of portfolio case) with the portfolio case open and the inside-left cover of the portfolio case touching the outer surface of the SAM planar phantom.
4. The back of the modem was tested for hand SAR (inside-left cover of portfolio case) with the portfolio case closed and the outside-left cover of the portfolio case touching the outer surface of the SAM planar phantom.
5. Ambient TEMPERATURE: 23.2 °C
   Relative HUMIDITY: 57.1 %
   Atmospheric PRESSURE: 100.2 kPa
6. Fluid Temperature 23.0 °C
7. During the entire test the conducted power was maintained to within 5% of the initial conducted power.

5.0 DETAILS OF SAR EVALUATION

The ENFORA INC. Portfolio PRT01 CDPD Wireless Data Modem FCC ID: MIVPRT0100PF was found to be compliant for localized Specific Absorption Rate based on the following test provisions and conditions:

1. The EUT was tested for body SAR (modem installed on the host PCB inside the left-hand cover of the Portfolio case) with the front of the modem (inside-left cover of Portfolio case) placed parallel to the outer surface of the SAM planar phantom. A 1.0 cm separation distance was maintained between the inside-left cover of the Portfolio case and the outer surface of the SAM planar phantom.
2. The EUT was tested for body SAR (modem installed on the host PCB inside the left-hand cover of the Portfolio case) with the back of the modem (outside-left cover of Portfolio case) placed parallel to the outer surface of the SAM planar phantom. A 1.0 cm separation distance was maintained between the outside-left cover of the Portfolio case and the outer surface of the SAM planar phantom.
3. The EUT was tested for hand SAR (modem installed on the host PCB inside the left-hand cover of the Portfolio case) with the front of the modem (inside-left cover of Portfolio case) placed parallel to the outer surface of the SAM planar phantom. The inside-left cover of the Portfolio case was touching the outer surface of the SAM planar phantom for the duration of the test.
4. The EUT was tested for hand SAR (modem installed on the host PCB inside the left-hand cover of the Portfolio case) with the back of the modem (outside-left cover of Portfolio case) placed parallel to the outer surface of the SAM planar phantom. The outside-left cover of the Portfolio case was touching the outer surface of the SAM planar phantom for the duration of the test.
5. The EUT was evaluated for 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. If the conducted power level dropped more than 5% of the initial power level, then the EUT was retested. Any unusual anomalies over the course of the test also warranted a re-evaluation.
6. The conducted power was measured according to the procedures described in FCC Part 2.1046.
7. The device was operated continuously in transmit mode for the duration of the test.
8. The location of the maximum spatial SAR distribution (Hot Spot) was determined relative to the device and its antenna.
9. The EUT was tested with a fully-charged battery.



Phantom Reference Point & EUT Positioning

6.0 EVALUATION PROCEDURES

The Specific Absorption Rate (SAR) evaluation was performed as follows:

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. Depending on the phantom used for the evaluation, all other phantoms were drained of fluid.

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.

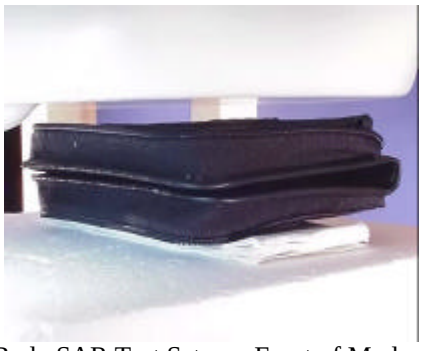
c. A 5x5x7 matrix was performed around the greatest spatial SAR distribution found during the area scan of the applicable exposed region. SAR values were then calculated using a 3-D spline interpolation algorithm and averaged over spatial volumes of 1 and 10 grams.

d. The depth of the simulating tissue in the planar phantom used for the SAR evaluation was no less than 15.0 cm.

e. The target tissue parameters for 835MHz were used in the SAR evaluation software. If there was any appreciable variation in the measured tissue parameters from the target values specified then the SAR was adjusted using the sensitivities to SAR (see "Appendix D - SAR Sensitivities").

The E-field probe conversion factors for 835MHz were determined as follows:

- In brain and muscle tissue between 750MHz and 1GHz, the conversion factor decreases approximately 1.3% per 100MHz frequency increase.
- In brain and muscle tissue between 1.6GHz and 2GHz, the conversion factor decreases approximately 1% per 100MHz frequency increase.



Body SAR Test Setup – Front of Modem
(Portfolio Case Open - Left Side - 1.0cm Separation)

Body SAR Test Setup - Back of Modem
(Portfolio Case Closed - Left Side - 1.0cm Separation)

Hand SAR Test Setup – Front of Modem
(Portfolio Case Open - Left Side – 0.0cm Separation)

Hand SAR Test Setup - Back of Modem
(Portfolio Case Closed - Left Side – 0.0cm Separation)

7.0 SYSTEM VALIDATION

Prior to the assessment, the system was verified in the planar section of the SAM phantom with a 900MHz dipole. A forward power of 250 mW was applied to the dipole and system was verified to a tolerance of ±10%. The applicable verifications are as follows (see Appendix B for validation test plots):

Dipole Validation Kit	Target SAR 1g (w/kg)	Measured SAR 1g (w/kg)	Validation Date
D900V2	2.78	2.77	11/05/01

8.0 TISSUE PARAMETERS

The dielectric parameters of the fluids were verified prior to the SAR evaluation using an 85070C Dielectric Probe Kit and an 8753E Network Analyzer. The dielectric parameters of the fluid are as follows:

BRAIN TISSUE PARAMETERS - DIPOLE VALIDATION			
Equivalent Tissue	**Dielectric Constant e_r**	**Conductivity s (mho/m)**	**r (Kg/m^3)**
900MHz Brain (Target)	41.5 ±5%	0.97 ±5%	1000
900MHz Brain (Measured) 11/05/01	41.6 ±5%	0.98 ±5%	1000

BODY TISSUE PARAMETERS - EUT EVALUATION			
Equivalent Tissue	**Dielectric Constant e_r**	**Conductivity s (mho/m)**	**r (Kg/m^3)**
835MHz Body (Target)	55.2 ±5%	0.97 ±5%	1000
835MHz Body (Measured) 11/05/01	55.0 ±5%	0.96 ±5%	1000

9.0 EQUIVALENT TISSUES

The brain and body 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 (permitivity and conductivity).

TISSUE MIXTURE DIPOLE VALIDATION & EUT EVALUATION		
INGREDIENT	**900MHz Validation Brain Mixture (%)**	**835MHz Evaluation Body Mixture (%)**
Water	40.71	53.79
Sugar	56.63	45.13
Salt	1.48	0.98
HEC	0.99	-
Bactericide	0.19	0.1

10.0 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.

11.0 ROBOT SYSTEM SPECIFICATIONS

Specifications

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

Data Acquisition Electronic (DAE) System

Cell Controller

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

Data Converter

Features:	Signal Amplifier, multiplexer, A/D converter, and control logic
Software:	DASY3 software
Connecting Lines:	Optical downlink for data and status info. Optical uplink for commands and clock

PC Interface Card

Function:	24 bit (64 MHz) DSP for real time processing Link to DAE3 16-bit A/D converter for surface detection system serial link to robot direct emergency stop output for robot

E-Field Probe

Model:	ET3DV6
Serial No.:	1590
Construction:	Triangular core fiber optic detection system
Frequency:	10 MHz to 6 GHz
Linearity:	±0.2 dB (30 MHz to 3 GHz)

Phantom

Type:	SAM V4.0C
Shell Material:	Fiberglass
Thickness:	2.0 ±0.1 mm
Volume:	Approx. 20 liters

12.0 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

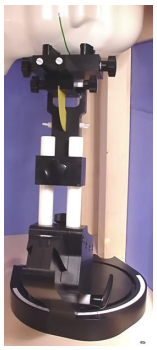
13.0 SAM PHANTOM V4.0C

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


SAM Phantom

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 -ET3DV6 E-Field Probe -DAE -900MHz Validation Dipole -1800MHz Validation Dipole -SAM Phantom V4.0C -Small Planar Phantom	 599396-01 1590 370 054 247 N/A N/A	 N/A Mar 2001 Sept 1999 June 2001 June 2001 N/A N/A
85070C Dielectric Probe Kit	N/A	N/A
Gigatronics 8652A Power Meter -Power Sensor 80701A -Power Sensor 80701A	1835272 1833535 1833542	Oct 1999 Jan 2001 Feb 2001
E4408B Spectrum Analyzer	US39240170	Nov 1999
8594E Spectrum Analyzer	3543A02721	Mar 2000
8753E Network Analyzer	US38433013	Nov 1999
8648D Signal Generator	3847A00611	N/A
5S1G4 Amplifier Research Power Amplifier	26235	N/A

16.0 MEASUREMENT UNCERTAINTIES

Uncertainty Description	Error	Distribution	Weight	Standard Deviation	Offset
Probe Uncertainty					
Axial isotropy	±0.2 dB	U-Shaped	0.5	±2.4 %	
Spherical isotropy	±0.4 dB	U-Shaped	0.5	±4.8 %	
Isotropy from gradient	±0.5 dB	U-Shaped	0	±	
Spatial resolution	±0.5 %	Normal	1	±0.5 %	
Linearity error	±0.2 dB	Rectangle	1	±2.7 %	
Calibration error	±3.3 %	Normal	1	±3.3 %	
SAR Evaluation Uncertainty					
Data acquisition error	±1 %	Rectangle	1	±0.6 %	
ELF and RF disturbances	±0.25 %	Normal	1	±0.25 %	
Conductivity assessment	±5 %	Rectangle	1	±5.8 %	
Spatial Peak SAR Evaluation Uncertainty					
Extrapolated boundary effect	±3 %	Normal	1	±3 %	±5 %
Probe positioning error	±0.1 mm	Normal	1	±1 %	
Integrated and cube orientation	±3 %	Normal	1	±3 %	
Cube Shape inaccuracies	±2 %	Rectangle	1	±1.2 %	
Device positioning	±6 %	Normal	1	±6 %	
Combined Uncertainties				±11.7 %	±5 %

Measurement uncertainties in SAR measurements are difficult to quantify due to several variables including biological, physiological, and environmental.

According to ANSI/IEEE C95.3, the overall uncertainties are difficult to assess and will vary with the type of meter and usage situation. However, accuracy's of ±1 to 3 dB can be expected in practice, with greater uncertainties in near-field situations and at higher frequencies (shorter wavelengths), or areas where large reflecting objects are present. Under optimum measurement conditions, SAR measurement uncertainties of at least ±2dB can be expected.

According to CENELEC, typical worst-case uncertainty of field measurements is ±5 dB.
For well-defined modulation characteristics the uncertainty can be reduced to ±3 dB.

17.0 REFERENCES

(1) ANSI, *ANSI/IEEE C95.1: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300 Ghz, The Institute of Electrical and Electronics Engineers, Inc., New York, NY: 1992.*

(2) 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.

(3) Thomas Schmid, Oliver Egger, and Neils Kuster, "Automated E-field scanning system for dosimetric assessments", IEEE *Transaction on Microwave Theory and Techniques*, Vol. 44, pp. 105 – 113: January 1996.

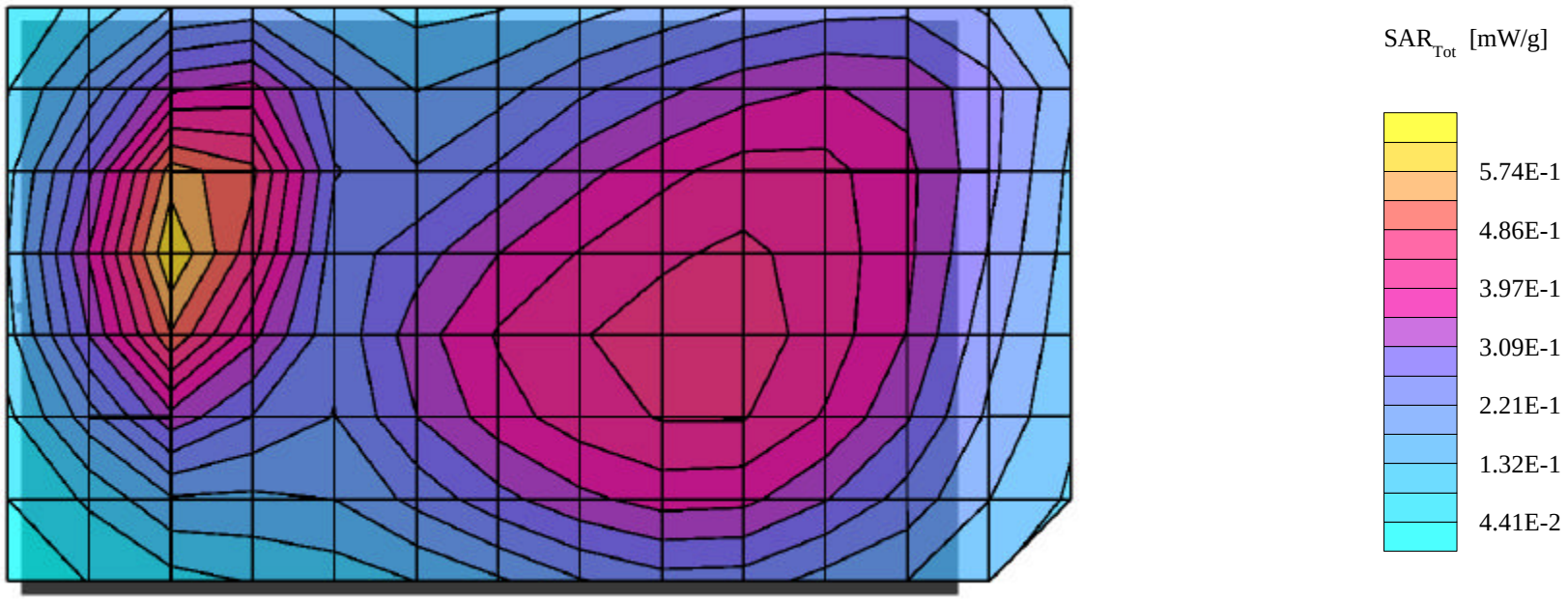
(4) Niels Kuster, Ralph Kastle, and Thomas Schmid, "Dosimetric evaluation of mobile communications equipment with know precision", IEICE Transactions of Communications, vol. E80-B, no. 5, pp. 645 – 652: May 1997.

APPENDIX A - SAR MEASUREMENT DATA

Enfora Inc. FCC ID: MIVPRT0100PF

SAM Phantom; Flat Section; Position: (270°,90°)
Probe: ET3DV6 - SN1590; ConvF(6.70,6.70,6.70); Crest factor: 1.0
835 MHz Muscle: σ = 0.97 mho/m ε_r = 55.2 ρ = 1.00 g/cm^3
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Cube 5x5x7
SAR (1g): 0.554 mW/g, SAR (10g): 0.368 mW/g

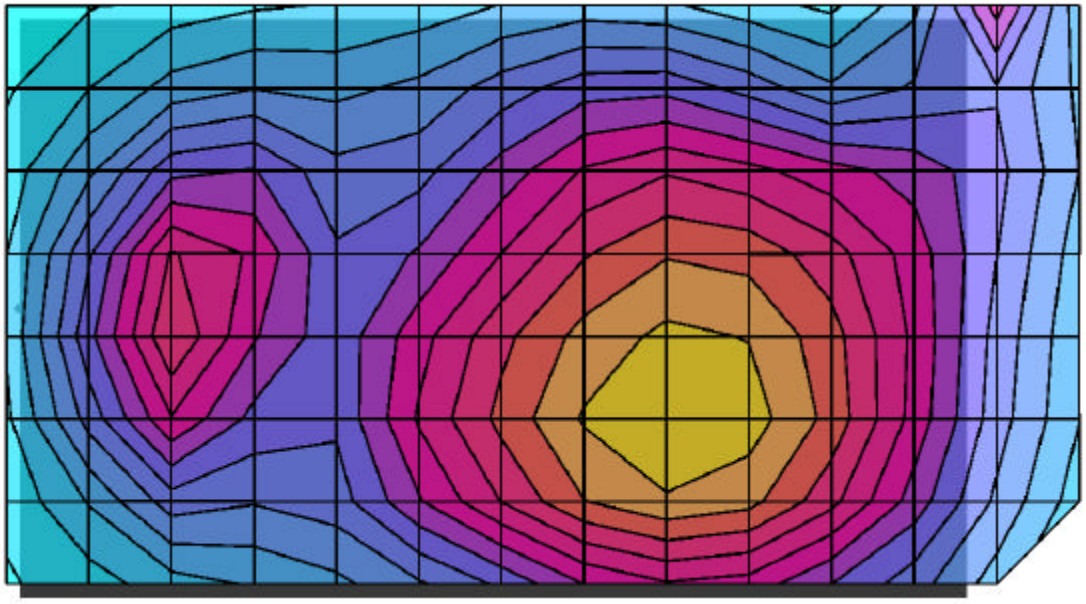
Body SAR with 1.0 cm Separation Distance
Front of Modem - Inside-Left Cover of Portfolio Case
(CDPD Modem inside the left cover of Portfolio Case)
Enfora Model: Portfolio PRT01
CW Mode
Channel 991 [824.04 MHz]
Conducted Power: 27.7 dBm
Date Tested: Nov. 5, 2001



Enfora Inc. FCC ID: MIVPRT0100PF

SAM Phantom; Flat Section; Position: (270°,90°)
Probe: ET3DV6 - SN1590; ConvF(6.70,6.70,6.70); Crest factor: 1.0
835 MHz Muscle: σ = 0.97 mho/m ε_r = 55.2 ρ = 1.00 g/cm^3
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Cube 5x5x7
SAR (1g): 0.860 mW/g, SAR (10g): 0.640 mW/g

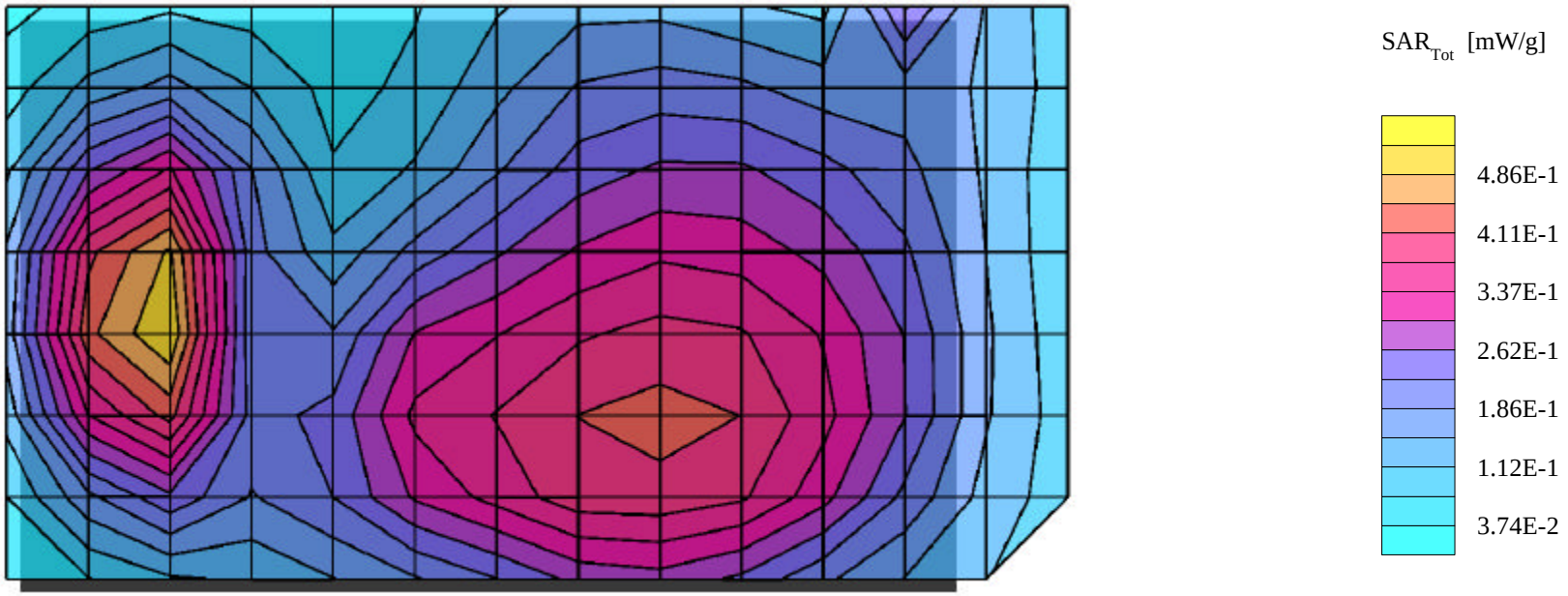
Body SAR with 1.0 cm Separation Distance
Front of Modem - Inside-Left Cover of Portfolio Case
(CDPD Modem inside the left cover of Portfolio Case)
Enfora Model: Portfolio PRT01
CW Mode
Channel 367 [836.01 MHz]
Conducted Power: 27.9 dBm
Date Tested: Nov. 5, 2001



Enfora Inc. FCC ID: MIVPRT0100PF

SAM Phantom; Flat Section; Position: (270°,90°)
Probe: ET3DV6 - SN1590; ConvF(6.70,6.70,6.70); Crest factor: 1.0
835 MHz Muscle: σ = 0.97 mho/m ε_r = 55.2 ρ = 1.00 g/cm^3
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Cube 5x5x7
SAR (1g): 0.509 mW/g, SAR (10g): 0.329 mW/g

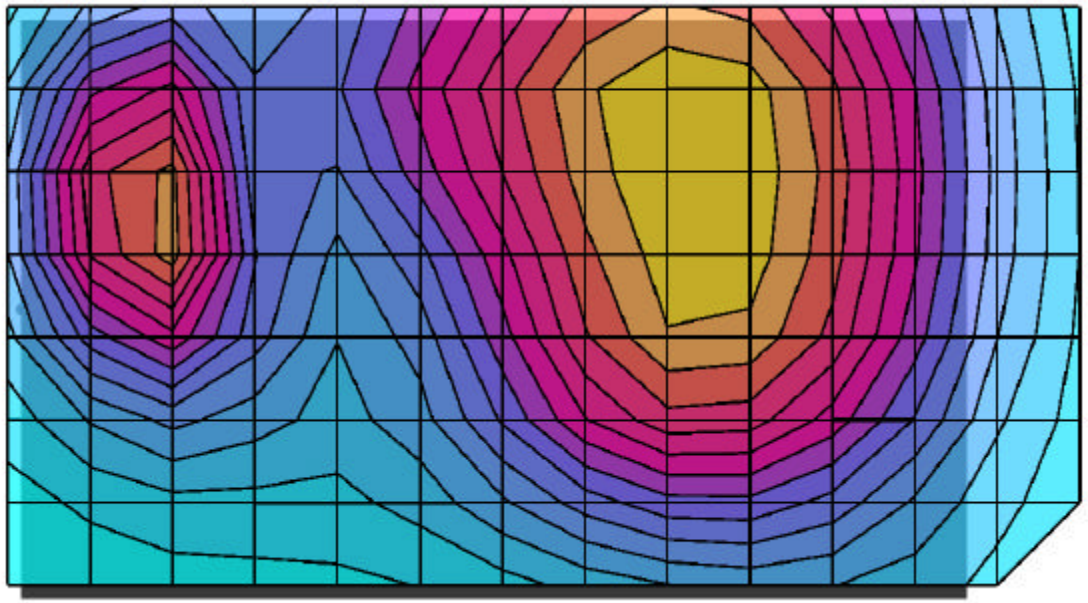
Body SAR with 1.0 cm Separation Distance
Front of Modem - Inside-Left Cover of Portfolio Case
(CDPD Modem inside the left cover of Portfolio Case)
Enfora Model: Portfolio PRT01
CW Mode
Channel 799 [848.97 MHz]
Conducted Power: 27.5 dBm
Date Tested: Nov. 5, 2001



Enfora Inc. FCC ID: MIVPRT0100PF

SAM Phantom; Flat Section; Position: (270°,90°)
Probe: ET3DV6 - SN1590; ConvF(6.70,6.70,6.70); Crest factor: 1.0
835 MHz Muscle: σ = 0.97 mho/m ε_r = 55.2 ρ = 1.00 g/cm^3
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Cube 5x5x7
SAR (1g): 0.851 mW/g, SAR (10g): 0.639 mW/g

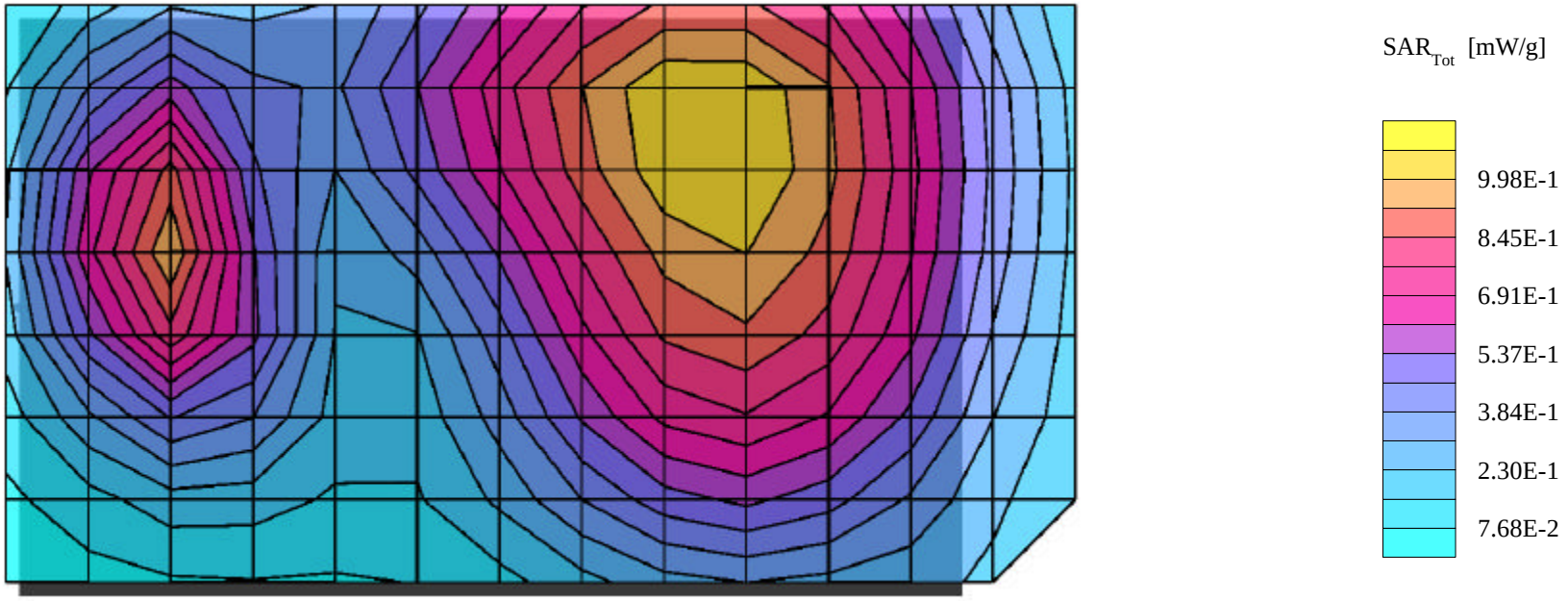
Body SAR with 1.0 cm Separation Distance
Back of Modem - Outside-Left Cover of Portfolio Case
(CDPD Modem inside the left cover of Portfolio Case)
Enfora Model: Portfolio PRT01
CW Mode
Channel 991 [824.04 MHz]
Conducted Power: 27.7 dBm
Date Tested: Nov. 5, 2001



Enfora Inc. FCC ID: MIVPRT0100PF

SAM Phantom; Flat Section; Position: (270°,90°)
Probe: ET3DV6 - SN1590; ConvF(6.70,6.70,6.70); Crest factor: 1.0
835 MHz Muscle: σ = 0.97 mho/m ε_r = 55.2 ρ = 1.00 g/cm^3
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Cube 5x5x7
SAR (1g): 1.01 mW/g, SAR (10g): 0.752 mW/g

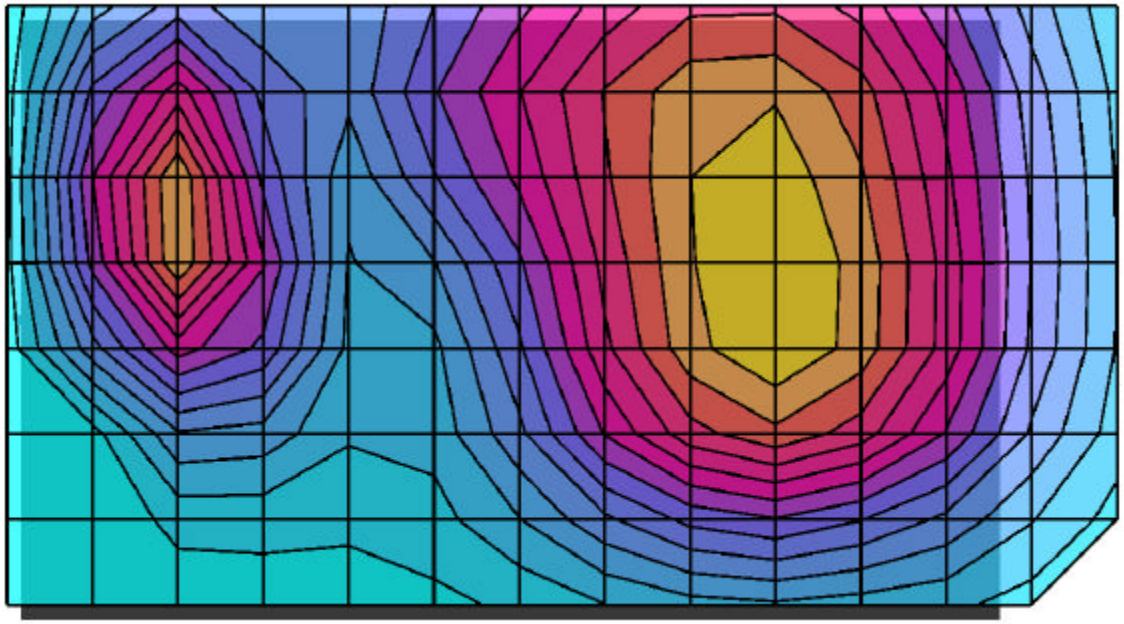
Body SAR with 1.0 cm Separation Distance
Back of Modem (Outside-Left Cover of Portfolio Case)
(CDPD Modem inside the left cover of Portfolio Case)
Enfora Model: Portfolio PRT01
CW Mode
Channel 367 [836.01 MHz]
Conducted Power: 27.9 dBm
Date Tested: Nov. 5, 2001



Enfora Inc. FCC ID: MIVPRT0100PF

SAM Phantom; Flat Section; Position: (270°,90°)
Probe: ET3DV6 - SN1590; ConvF(6.70,6.70,6.70); Crest factor: 1.0
835 MHz Muscle: σ = 0.97 mho/m ε_r = 55.2 ρ = 1.00 g/cm^3
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Cube 5x5x7
SAR (1g): 0.910 mW/g, SAR (10g): 0.680 mW/g

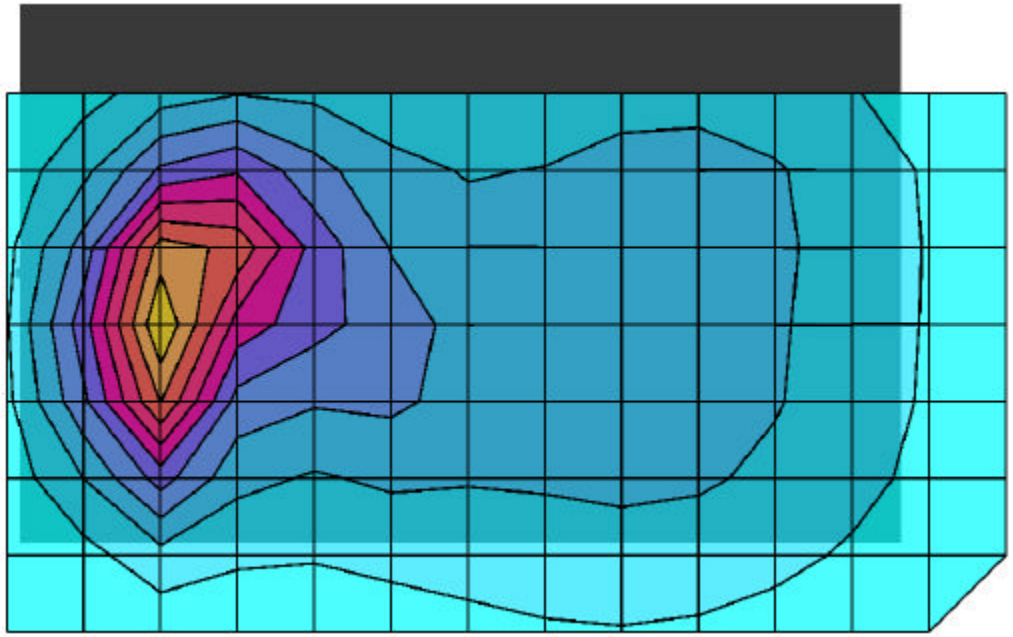
Body SAR with 1.0 cm Separation Distance
Back of Modem (Outside-Left Cover of Portfolio Case)
(CDPD Modem inside the left cover of Portfolio Case)
Enfora Model: Portfolio PRT01
CW Mode
Channel 799 [848.97 MHz]
Conducted Power: 27.5 dBm
Date Tested: Nov. 5, 2001



Enfora Inc. FCC ID: MIVPRT0100PF

SAM Phantom; Flat Section; Position: (270°,90°)
Probe: ET3DV6 - SN1590; ConvF(6.70,6.70,6.70); Crest factor: 1.0
835 MHz Muscle: σ = 0.97 mho/m ε_r = 55.2 ρ = 1.00 g/cm^3
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Cube 5x5x7
SAR (10g): 1.31 mW/g

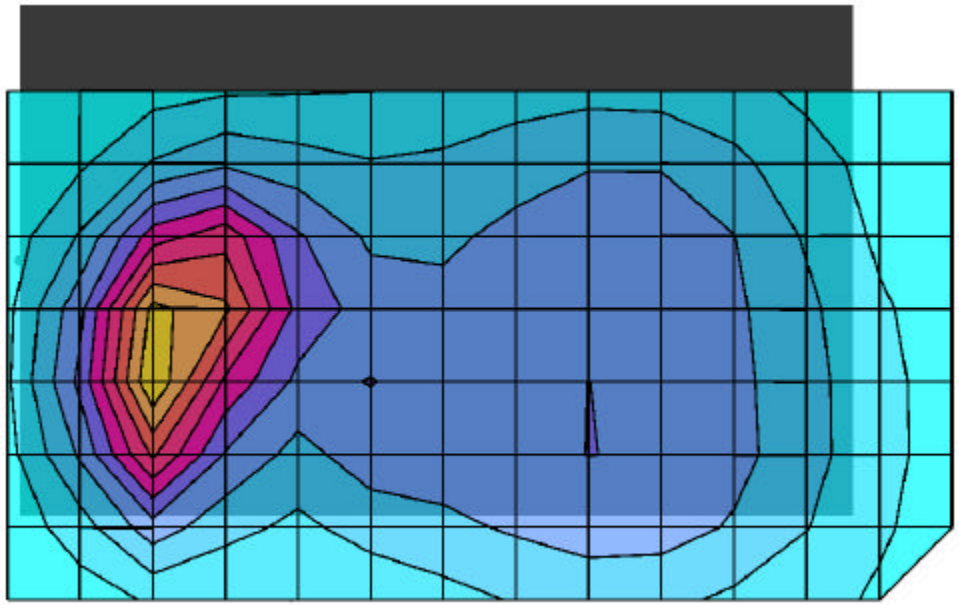
Hand SAR with 0.0 cm Separation Distance
Front of Modem - Inside-Left Cover of Portfolio Case
(CDPD Modem inside the left cover of Portfolio Case)
Enfora Model: Portfolio PRT01
CW Mode
Channel 991 [824.04 MHz]
Conducted Power: 27.7 dBm
Date Tested: Nov. 5, 2001



Enfora Inc. FCC ID: MIVPRT0100PF

SAM Phantom; Flat Section; Position: (270°,90°)
Probe: ET3DV6 - SN1590; ConvF(6.70,6.70,6.70); Crest factor: 1.0
835 MHz Muscle: σ = 0.97 mho/m ε_r = 55.2 ρ = 1.00 g/cm^3
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Cube 5x5x7
SAR (10g): 1.21 mW/g

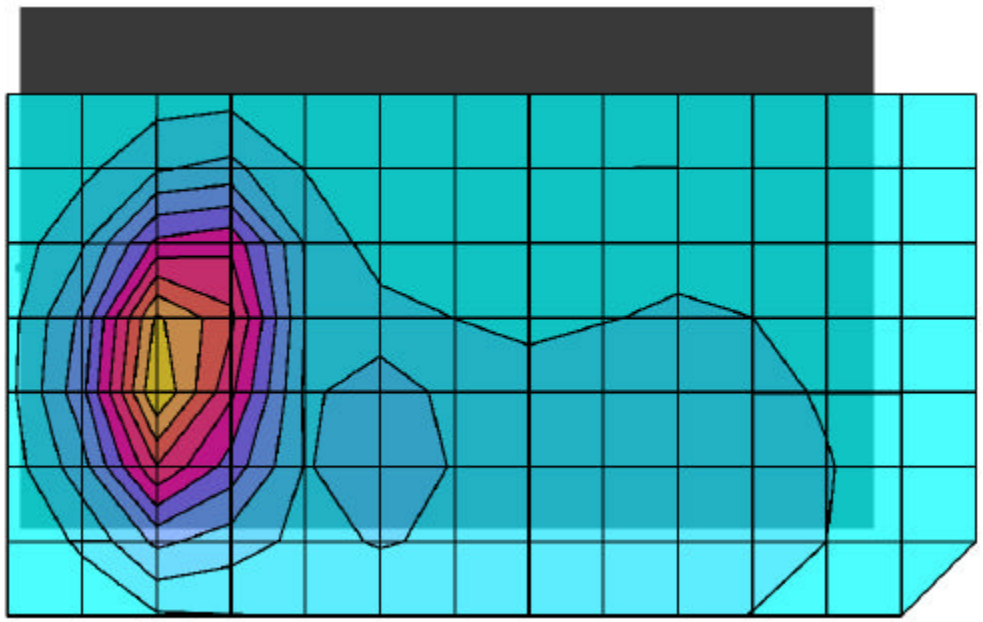
Hand SAR with 0.0 cm Separation Distance
Front of Modem - Inside-Left Cover of Portfolio Case
(CDPD Modem inside the left cover of Portfolio Case)
Enfora Model: Portfolio PRT01
CW Mode
Channel 367 [836.01 MHz]
Conducted Power: 27.9 dBm
Date Tested: Nov. 5, 2001



Enfora Inc. FCC ID: MIVPRT0100PF

SAM Phantom; Flat Section; Position: (270°,90°)
Probe: ET3DV6 - SN1590; ConvF(6.70,6.70,6.70); Crest factor: 1.0
835 MHz Muscle: σ = 0.97 mho/m ε_r = 55.2 ρ = 1.00 g/cm^3
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Cube 5x5x7
SAR (10g): 1.03 mW/g

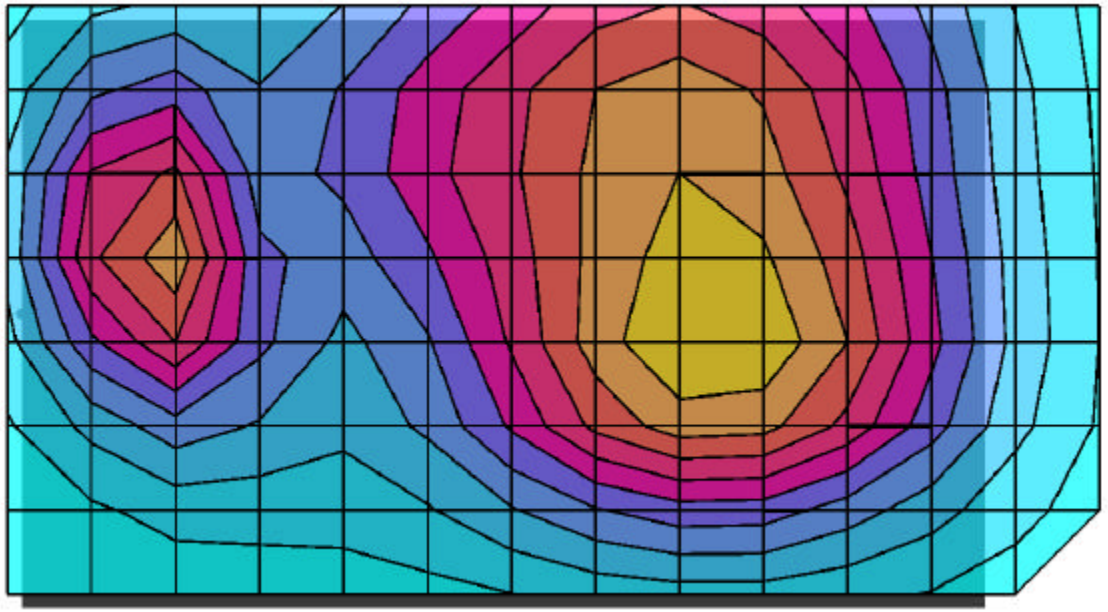
Hand SAR with 0.0 cm Separation Distance
Front of Modem - Inside-Left Cover of Portfolio Case
(CDPD Modem inside the left cover of Portfolio Case)
Enfora Model: Portfolio PRT01
CW Mode
Channel 799 [848.97 MHz]
Conducted Power: 27.5 dBm
Date Tested: Nov. 5, 2001



Enfora Inc. FCC ID: MIVPRT0100PF

SAM Phantom; Flat Section; Position: (270°,90°)
Probe: ET3DV6 - SN1590; ConvF(6.70,6.70,6.70); Crest factor: 1.0
835 MHz Muscle: σ = 0.97 mho/m ε_r = 55.2 ρ = 1.00 g/cm^3
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Cube 5x5x7
SAR (10g): 0.795 mW/g

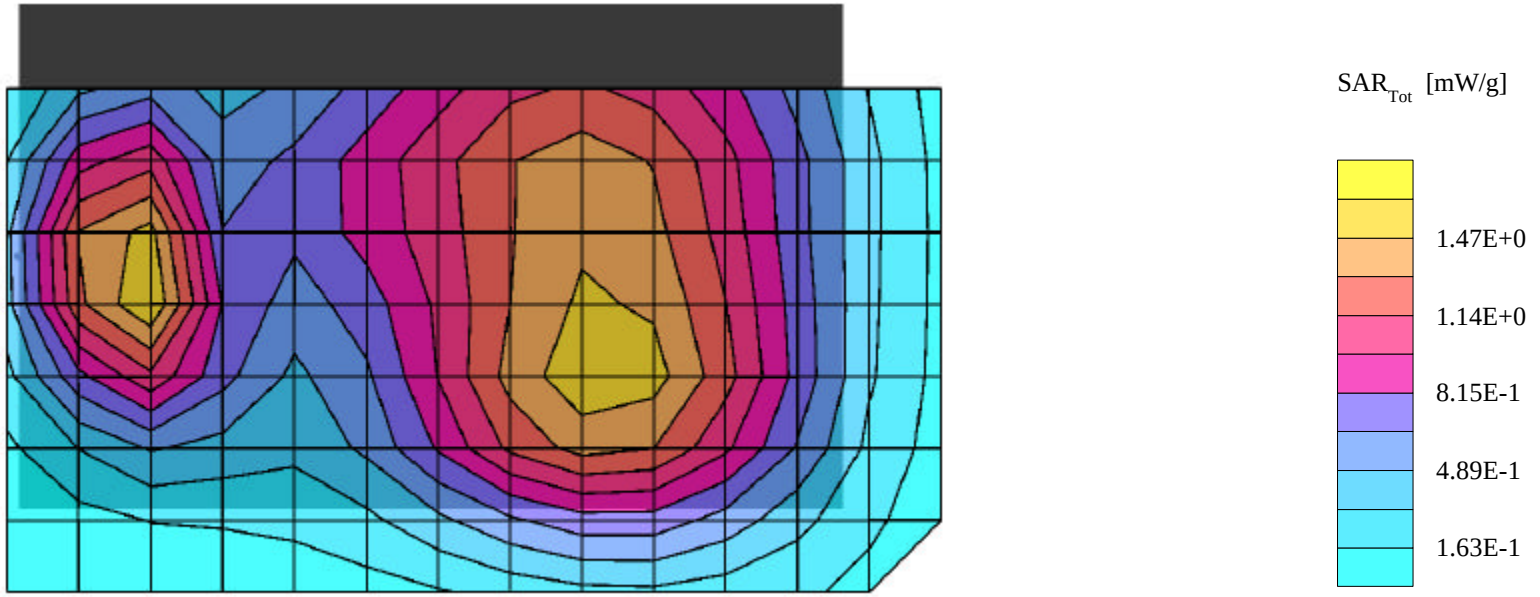
Hand SAR with 0.0 cm Separation Distance
Back of Modem - Outside-Left Cover of Portfolio Case
(CDPD Modem inside the left cover of Portfolio Case)
Enfora Model: Portfolio PRT01
CW Mode
Channel 991 [824.04 MHz]
Conducted Power: 27.7 dBm
Date Tested: Nov. 5, 2001



Enfora Inc. FCC ID: MIVPRT0100PF

SAM Phantom; Flat Section; Position: (270°,90°)
Probe: ET3DV6 - SN1590; ConvF(6.70,6.70,6.70); Crest factor: 1.0
835 MHz Muscle: σ = 0.97 mho/m ε_r = 55.2 ρ = 1.00 g/cm^3
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Cube 5x5x7
SAR (10g): 0.952 mW/g

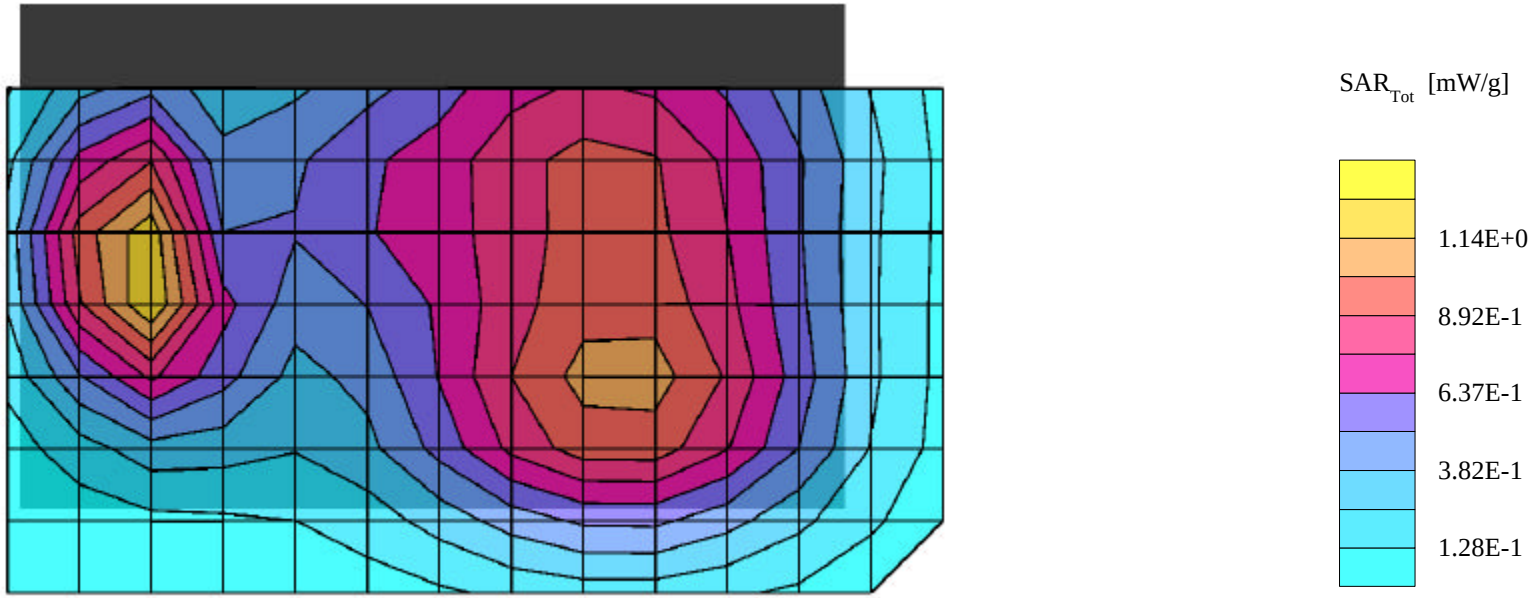
Hand SAR with 0.0 cm Separation Distance
Back of Modem - Outside-Left Cover of Portfolio Case
(CDPD Modem inside the left cover of Portfolio Case)
Enfora Model: Portfolio PRT01
CW Mode
Channel 367 [836.01 MHz]
Conducted Power: 27.9 dBm
Date Tested: Nov. 5, 2001



Enfora Inc. FCC ID: MIVPRT0100PF

SAM Phantom; Flat Section; Position: (270°,90°)
Probe: ET3DV6 - SN1590; ConvF(6.70,6.70,6.70); Crest factor: 1.0
835 MHz Muscle: σ = 0.97 mho/m ε_r = 55.2 ρ = 1.00 g/cm^3
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Cube 5x5x7
SAR (10g): 0.743 mW/g

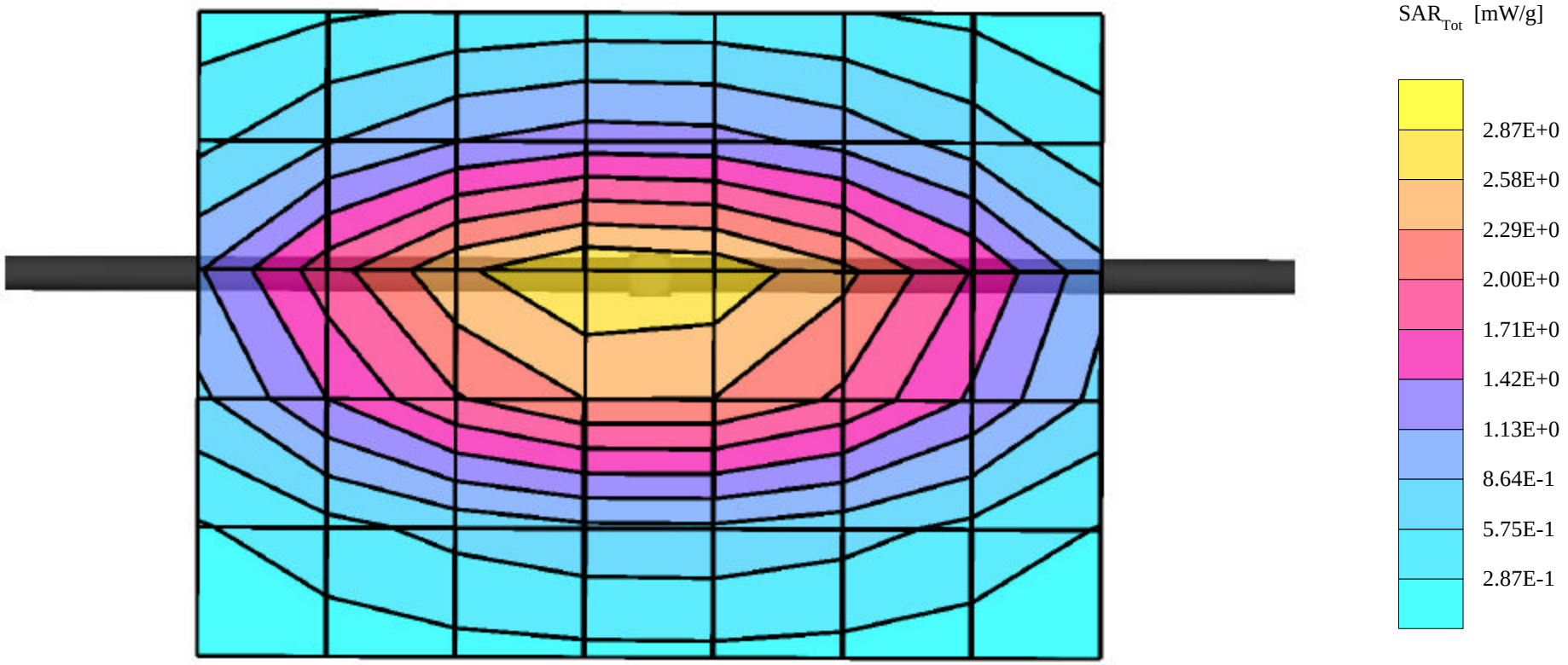
Hand SAR with 0.0 cm Separation Distance
Back of Modem - Outside-Left Cover of Portfolio Case
(CDPD Modem inside the left cover of Portfolio Case)
Enfora Model: Portfolio PRT01
CW Mode
Channel 799 [848.97 MHz]
Conducted Power: 27.5 dBm
Date Tested: Nov. 5, 2001



APPENDIX B - DIPOLE VALIDATION

Dipole 900 MHz

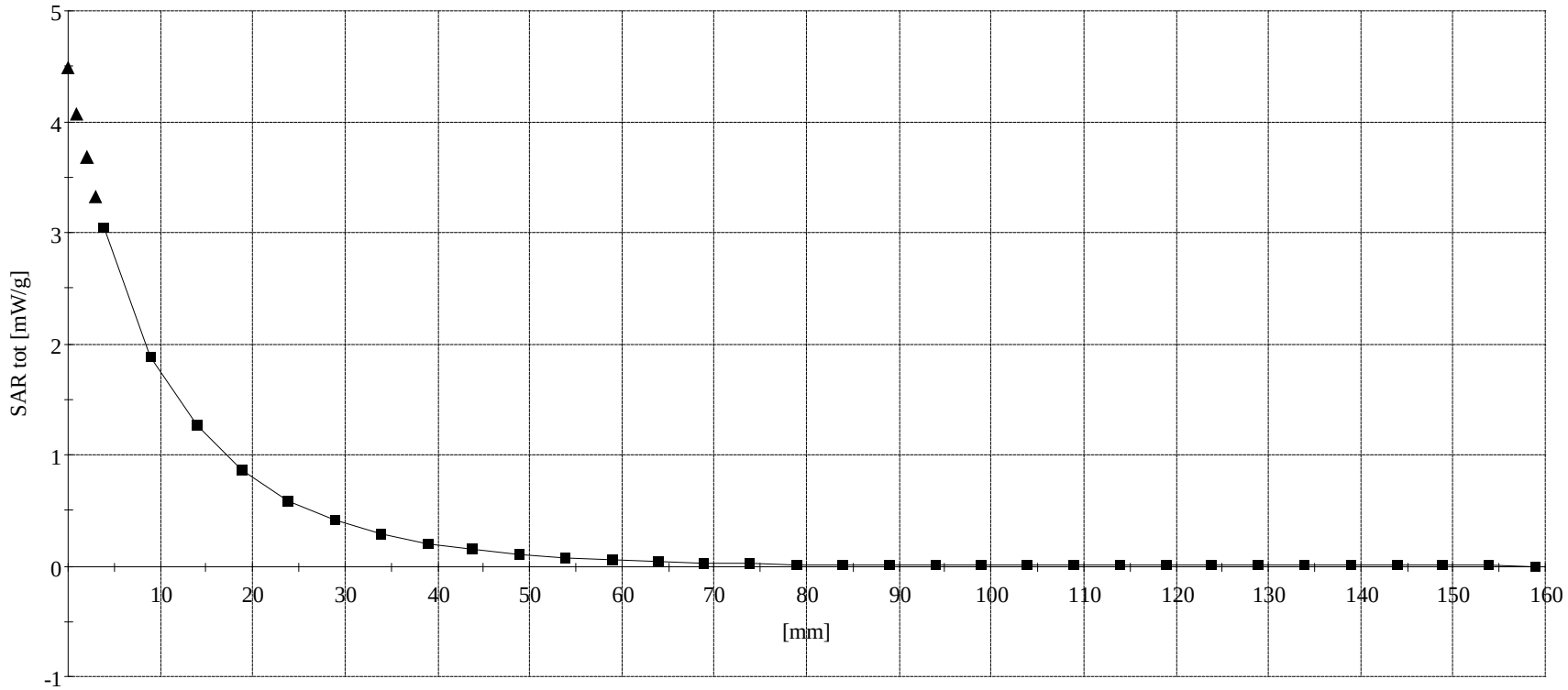
Frequency: 900 MHz; Conducted Input Power: 250 [mW]
SAM Phantom; Planar Section
Probe: ET3DV6 - SN1590; ConvF(6.83,6.83,6.83); Crest factor: 1.0; 900 MHz Brain: σ = 0.97 mho/m ε_r = 41.5 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 4.51 mW/g, SAR (1g): 2.77 mW/g, SAR (10g): 1.75 mW/g, (Worst-case extrapolation)
Penetration depth: 11.4 (10.3, 12.8) [mm]
Powerdrift: -0.02 dB
Calibration Date: Nov. 5, 2001



Dipole 900 MHz

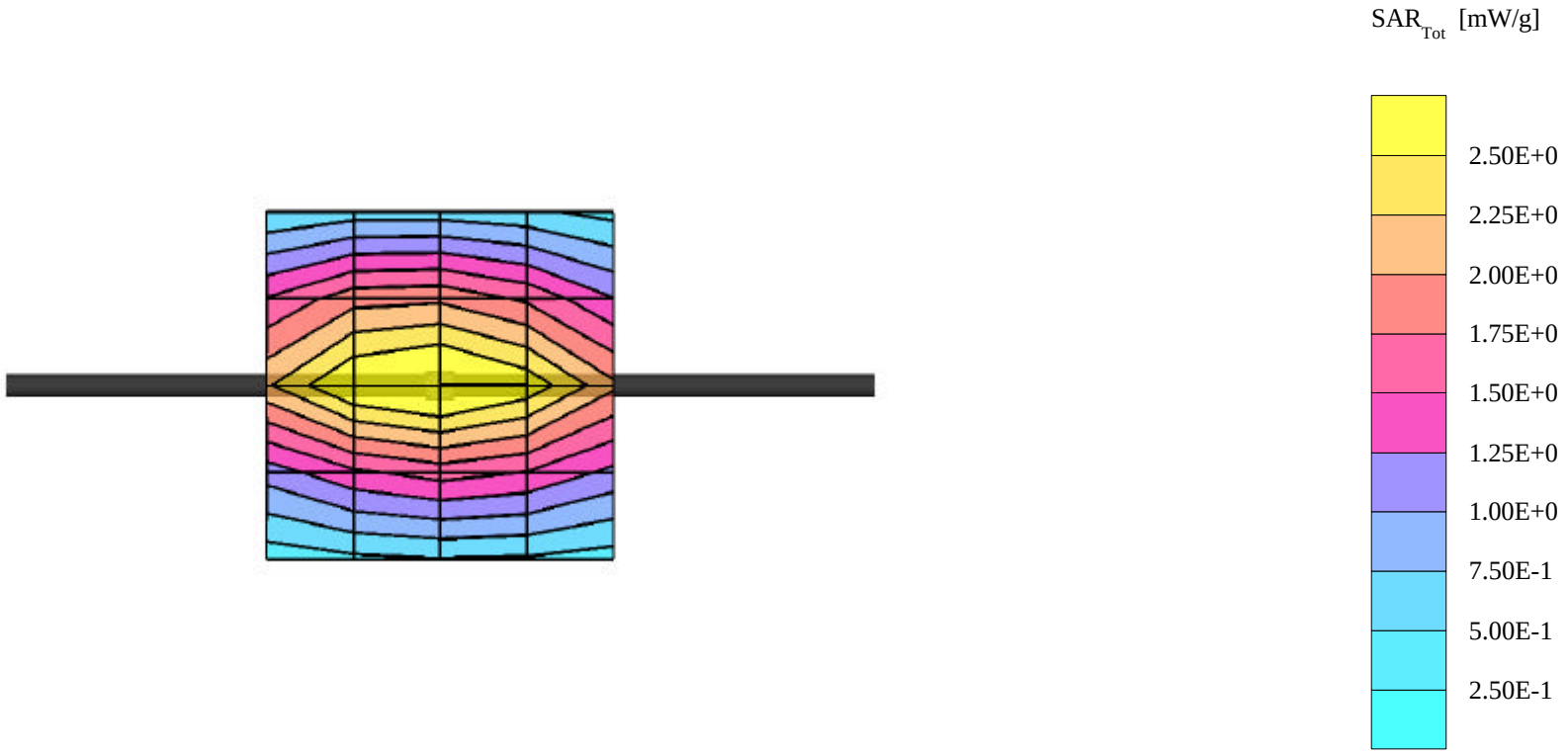
SAM Phantom; Planar Section
Probe: ET3DV6 - SN1590; ConvF(6.83,6.83,6.83); Crest factor: 1.0
900 MHz Brain: σ = 0.97 mho/m ε_r = 41.5 ρ = 1.00 g/cm^3
Z-Axis: Dx = 0.0, Dy = 0.0, Dz = 5.0

Conducted Power: 250 mW
Date Tested: November 5, 2001



Validation Dipole D900V2 SN:054, d = 15 mm

Frequency: 900 MHz; Antenna Input Power: 250 [mW]
Generic Twin Phantom; Flat Section; Grid Spacing:Dx = 15.0, Dy = 15.0, Dz = 10.0
Probe: ET3DV6 - SN1507; ConvF(6.27,6.27,6.27); Crest factor: 1.0; IEEE1528 900 MHz: σ = 0.97 mho/m ε_r = 42.4 ρ = 1.00 g/cm^3
Cubes (2): Peak: 4.47 mW/g ± 0.05 dB, SAR (1g): 2.78 mW/g ± 0.04 dB, SAR (10g): 1.76 mW/g ± 0.02 dB, (Worst-case extrapolation)
Penetration depth: 11.5 (10.3, 13.2) [mm]
Powerdrift: -0.00 dB



APPENDIX C - PROBE CALIBRATION

Probe ET3DV6

SN:1590

Manufactured:	March 19, 2001
Calibrated:	March 26, 2001

Calibrated for System DASY3

DASY3 - Parameters of Probe: ET3DV6 SN:1590

Sensitivity in Free Space

NormX	**1.77**	$\mu V/(V/m)^2$
NormY	**1.91**	$\mu V/(V/m)^2$
NormZ	**1.67**	$\mu V/(V/m)^2$

Diode Compression

DCP X	**100**	mV
DCP Y	**100**	mV
DCP Z	**100**	mV

Sensitivity in Tissue Simulating Liquid

Head **450 MHz** e_r **= 43.5 ± 5%** s **= 0.87 ± 10% mho/m**

ConvF X	**7.36**	extrapolated	Boundary effect:	
ConvF Y	**7.36**	extrapolated	Alpha	**0.29**
ConvF Z	**7.36**	extrapolated	Depth	**2.72**

Head **900 MHz** e_r **= 42 ± 5%** s **= 0.97 ± 10% mho/m**

ConvF X	**6.83**	± 7% (k=2)	Boundary effect:	
ConvF Y	**6.83**	± 7% (k=2)	Alpha	**0.37**
ConvF Z	**6.83**	± 7% (k=2)	Depth	**2.48**

Head **1500 MHz** e_r **= 40.4 ± 5%** s **= 1.23 ± 10% mho/m**

ConvF X	**6.13**	interpolated	Boundary effect:	
ConvF Y	**6.13**	interpolated	Alpha	**0.47**
ConvF Z	**6.13**	interpolated	Depth	**2.17**

Head **1800 MHz** e_r **= 40 ± 5%** s **= 1.40 ± 10% mho/m**

ConvF X	**5.78**	± 7% (k=2)	Boundary effect:	
ConvF Y	**5.78**	± 7% (k=2)	Alpha	**0.53**
ConvF Z	**5.78**	± 7% (k=2)	Depth	**2.01**

Sensor Offset

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

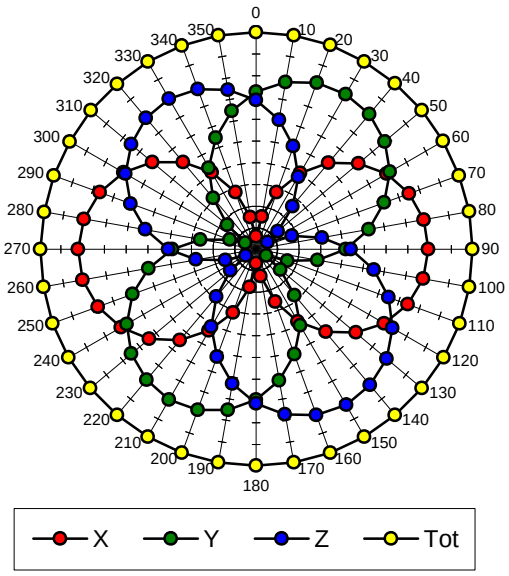
DASY3 - Parameters of Probe: ET3DV6 SN: 1590

Body	**450 MHz**		**ε_r = 56.7 ± 5%**	**σ = 0.94 ± 10% mho/m**	
	ConvF X	**7.23** extrapolated		Boundary effect:	
	ConvF Y	**7.23** extrapolated		Alpha	**0.30**
	ConvF Z	**7.23** extrapolated		Depth	**2.52**
Body	**900 MHz**		**ε_r = 55.0 ± 5%**	**σ = 1.05 ± 10% mho/m**	
	ConvF X	**6.61**	± 7% (k=2)	Boundary effect:	
	ConvF Y	**6.61**	± 7% (k=2)	Alpha	**0.47**
	ConvF Z	**6.61**	± 7% (k=2)	Depth	**2.25**
Body	**1500 MHz**		**ε_r = 54.0 ± 5%**	**σ = 1.30 ± 10% mho/m**	
	ConvF X	**5.78** interpolated		Boundary effect:	
	ConvF Y	**5.78** interpolated		Alpha	**0.69**
	ConvF Z	**5.78** interpolated		Depth	**1.88**
Body	**1800 MHz**		**ε_r = 53.3 ± 5%**	**σ = 1.52 ± 10% mho/m**	
	ConvF X	**5.36**	± 7% (k=2)	Boundary effect:	
	ConvF Y	**5.36**	± 7% (k=2)	Alpha	**0.81**
	ConvF Z	**5.36**	± 7% (k=2)	Depth	**1.70**

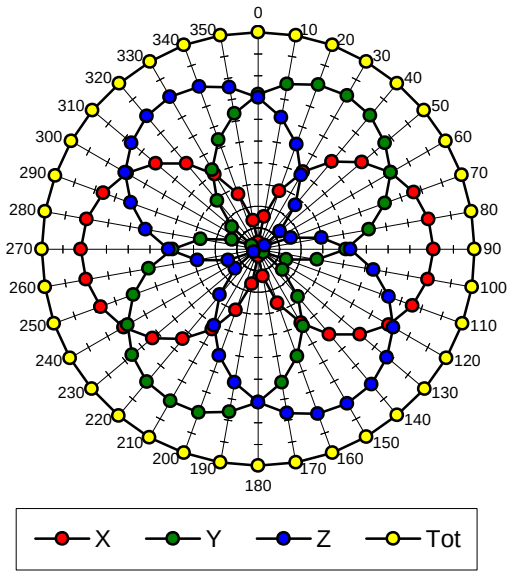
The E-field body conversion numbers were derived experimentally using the following setup. The system was first validated using head simulating tissue and probe conversion numbers supplied by the OEM for both 900MHz and 1800MHz. Using both 900MHz and 1800MHz validation dipoles the system was recorded to be within ± 5% of the target values required. The fluid in the planar phantom was then replaced with body parameter fluid for both 900MHz and 1800MHz. The E-field conversion numbers for the body parameter fluid were then adjusted in order to achieve the same target values as recorded previously. The body conversion numbers derived were slightly lower than 3% for 900MHz and approximately 8% lower for 1800MHz from the head conversion numbers derived by the system manufacturer. The 450MHz and 1500MHz body conversion numbers were derived in the same manner as the head conversion numbers by extrapolation and interpolation respectively. The system's user manual stipulates the frequency independent conversion between body and head conversion numbers to be approximately 3%.

Receiving Pattern (ϕ , θ = 0°

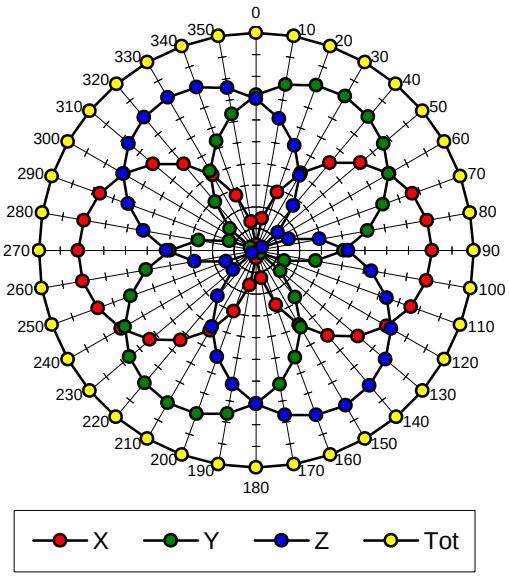
f = 30 MHz, TEM cell ifi110



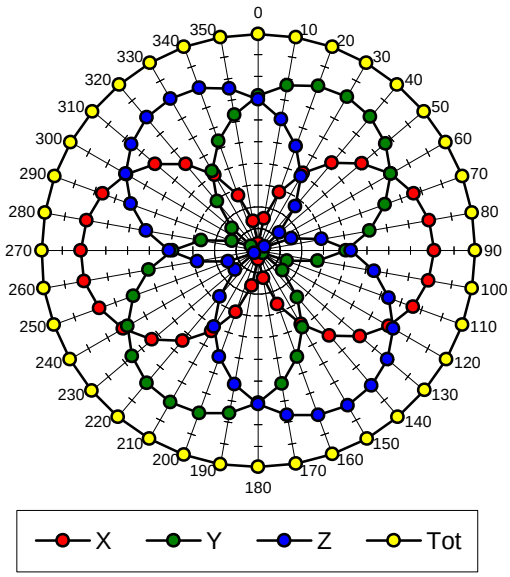
f = 100 MHz, TEM cell ifi110



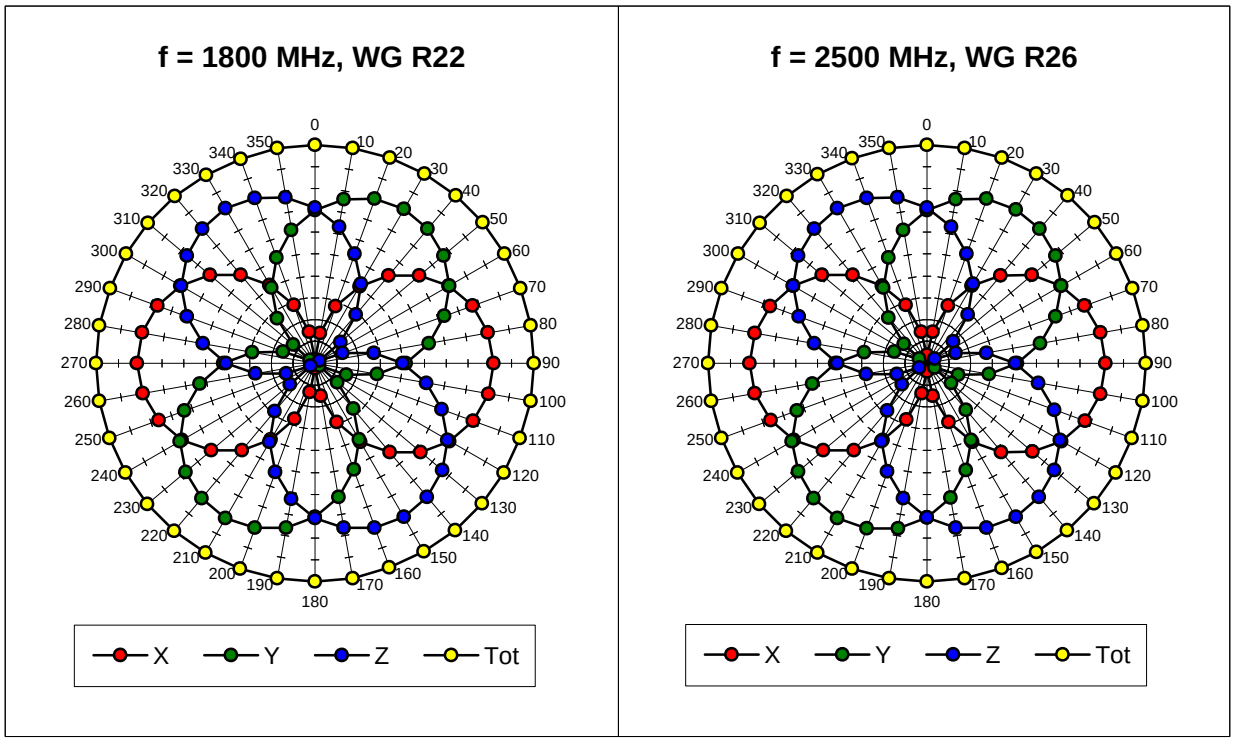
f = 300 MHz, TEM cell ifi110



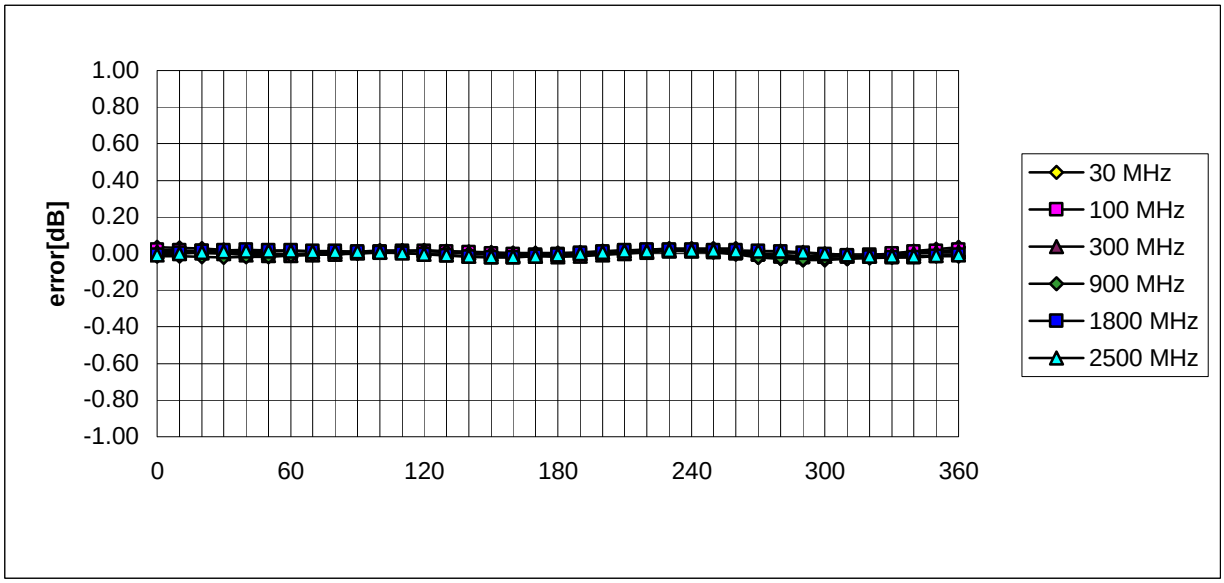
f = 900 MHz, TEM cell ifi110



ET3DV6 SN:1590

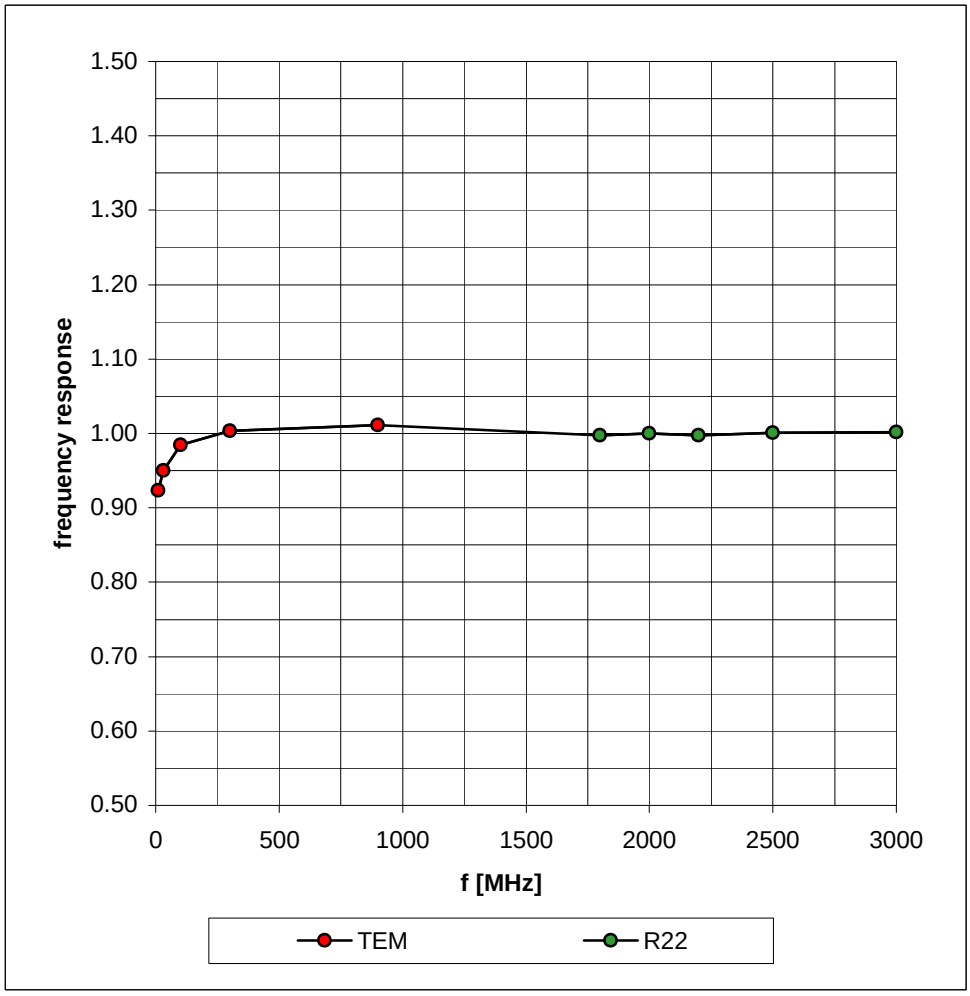


Isotropy Error (f), q = 0°



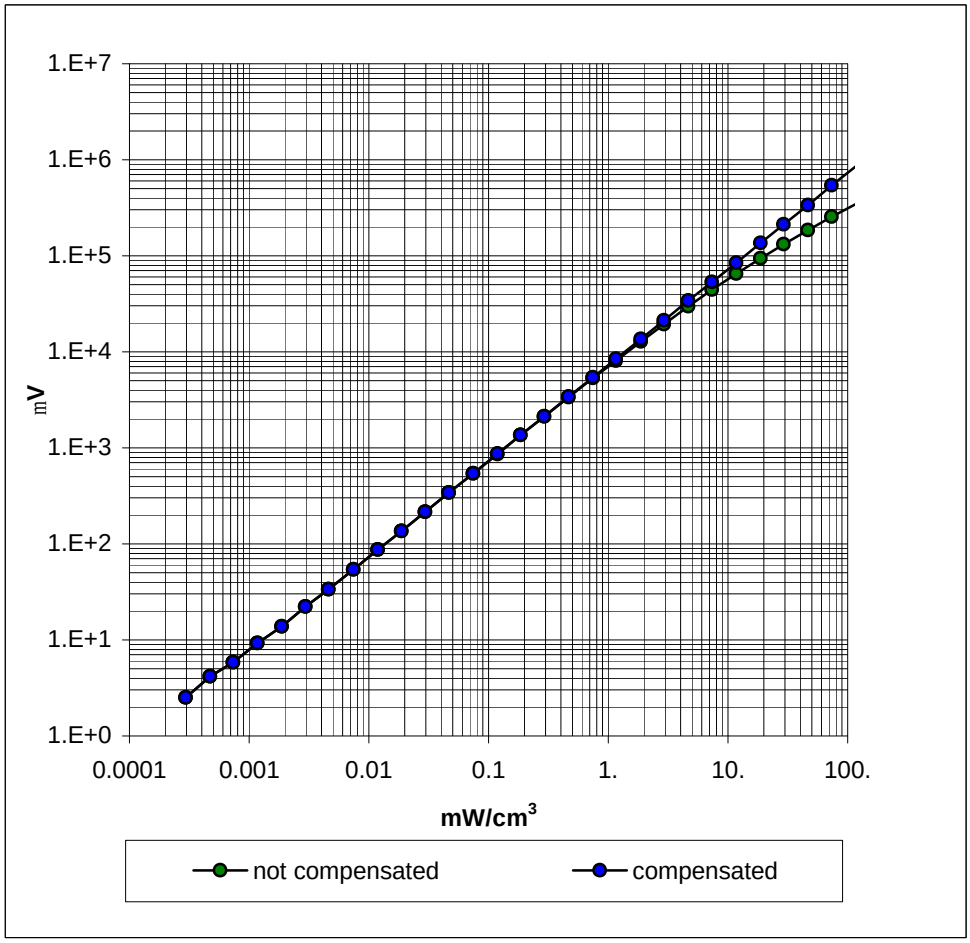
Frequency Response of E-Field

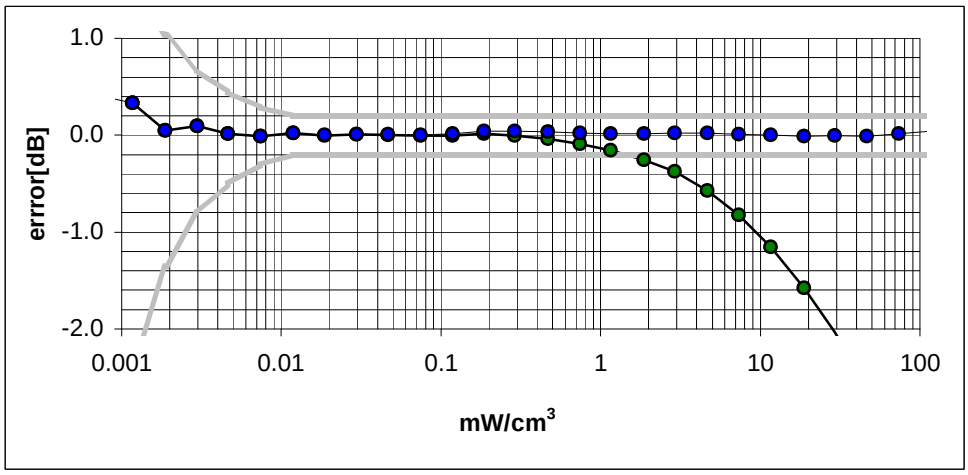
(TEM-Cell:ifi110, Waveguide R22)



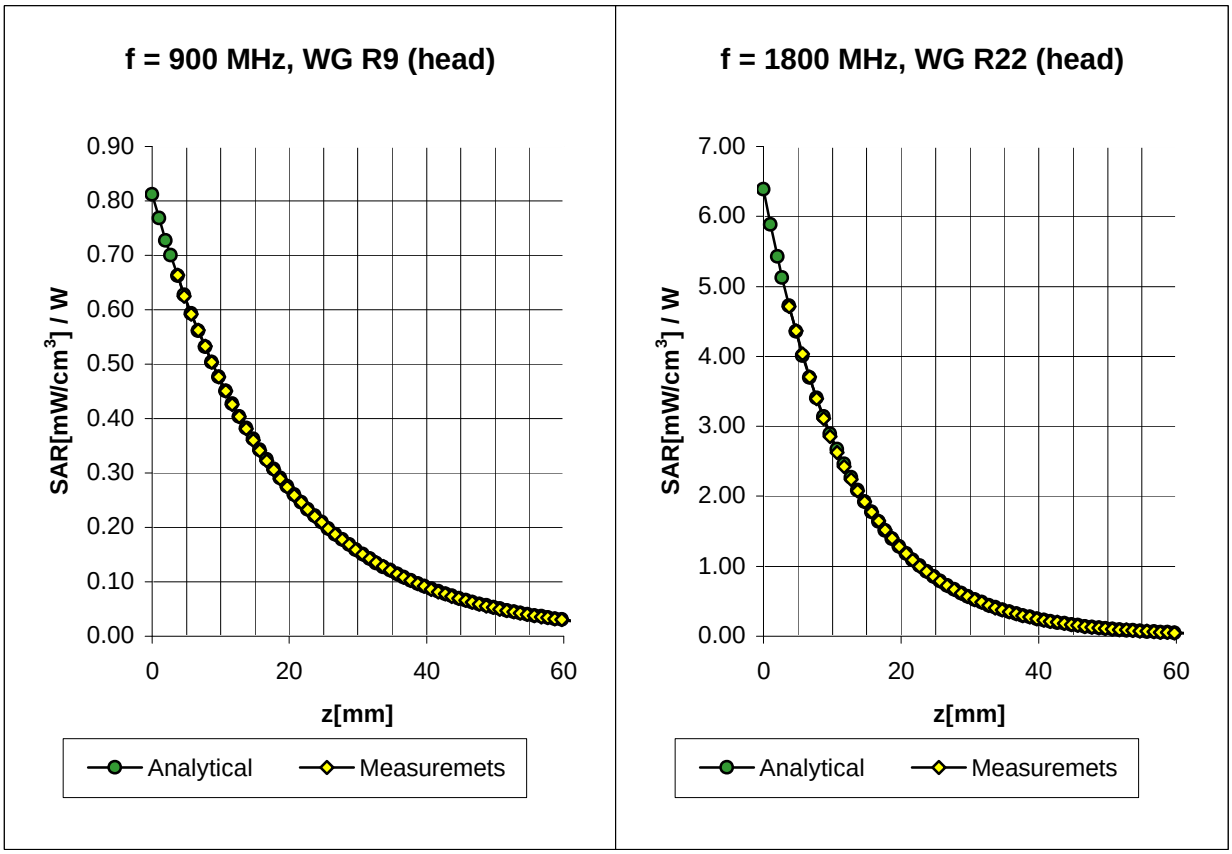
Dynamic Range f(SAR_{brain})

(TEM-Cell:ifi110)





Conversion Factor Assessment



Head **900 MHz** e_r **= 42 ± 5%** s **= 0.97 ± 10% mho/m**

ConvF X	**6.83** ± 7% (k=2)	Boundary effect:	
ConvF Y	**6.83** ± 7% (k=2)	Alpha	**0.37**
ConvF Z	**6.83** ± 7% (k=2)	Depth	**2.48**

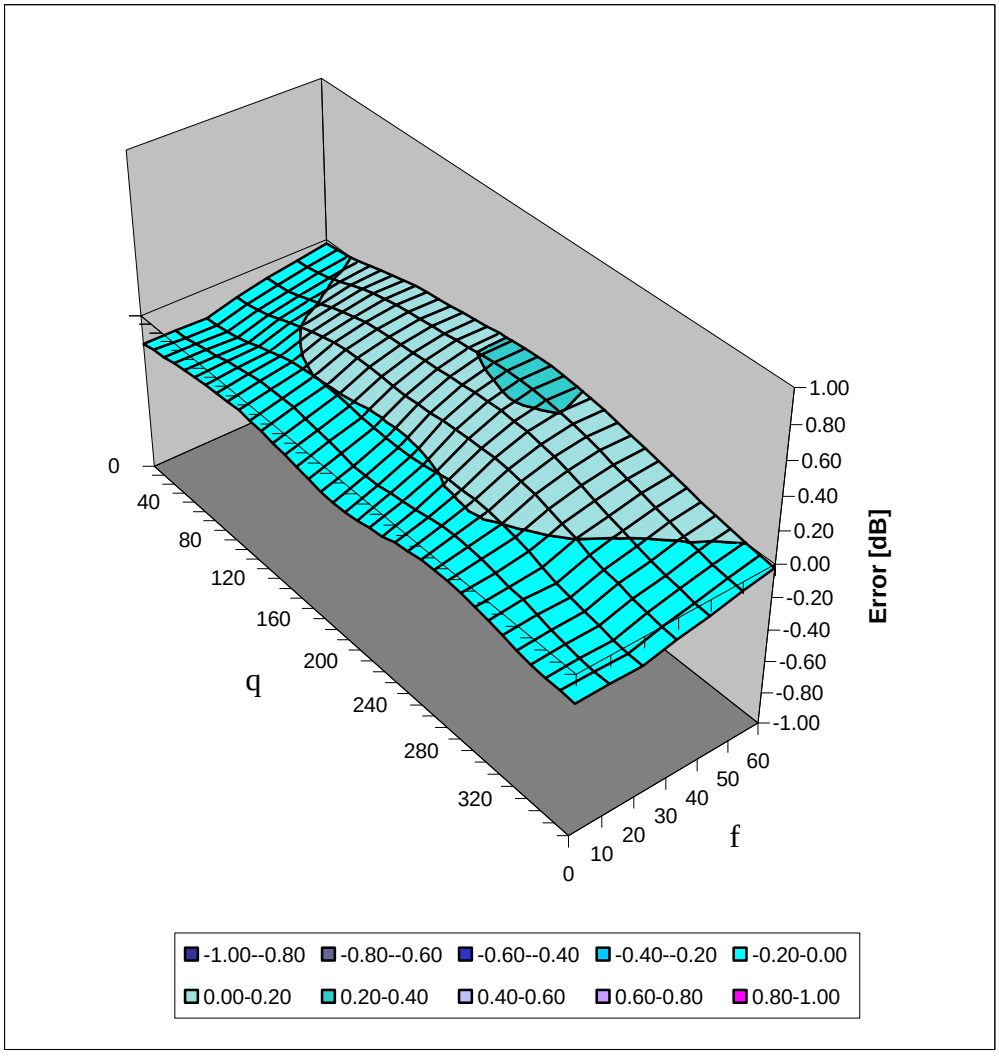
Head **1800 MHz** e_r **= 40 ± 5%** s **= 1.40 ± 10% mho/m**

ConvF X	**5.78** ± 7% (k=2)	Boundary effect:	
ConvF Y	**5.78** ± 7% (k=2)	Alpha	**0.53**
ConvF Z	**5.78** ± 7% (k=2)	Depth	**2.01**

ET3DV6 SN:1590

Deviation from Isotropy in HSL

Error (q,f), f = 900 MHz



APPENDIX D - SAR SENSITIVITIES

Application Note: SAR Sensitivities

Introduction

The measured SAR-values in homogeneous phantoms depend strongly on the electrical parameters of the liquid. Liquids with exactly matching parameters are difficult to produce; there is always a small error involved in the production or measurement of the liquid parameters. The following sensitivities allow the estimation of the influence of small parameter errors on the measured SAR values. The calculations are based on an approximation formula [1] for the SAR of an electrical dipole near the phantom surface and a adapted plane wave approximation for the penetration depth. The sensitivities are given in percent SAR change per percent change in the controlling parameter:

$$S(x) = \frac{d\,SAR / SAR}{d\,x / x}$$

The controlling parameters x are:

- ε : permitivity
- σ : conductivity
- ρ : brain density (= one over integration volume)

For example: If The liquid permitivity increases by 2 percent and the sensitivity of the SAR to permitivity is -0.6 then the SAR will decrease by 1.2 percent.

The sensitivities are given for surface SAR values and averaged SAR values for 1 g and 10 g cubes and for dipole distances d of 10mm (for frequencies below 1000 MHz) and 15mm (for frequencies above 1000 MHz) from the liquid surface.

Liquid parameters are as proposed in the new standards (e.g., IEEE 1528).

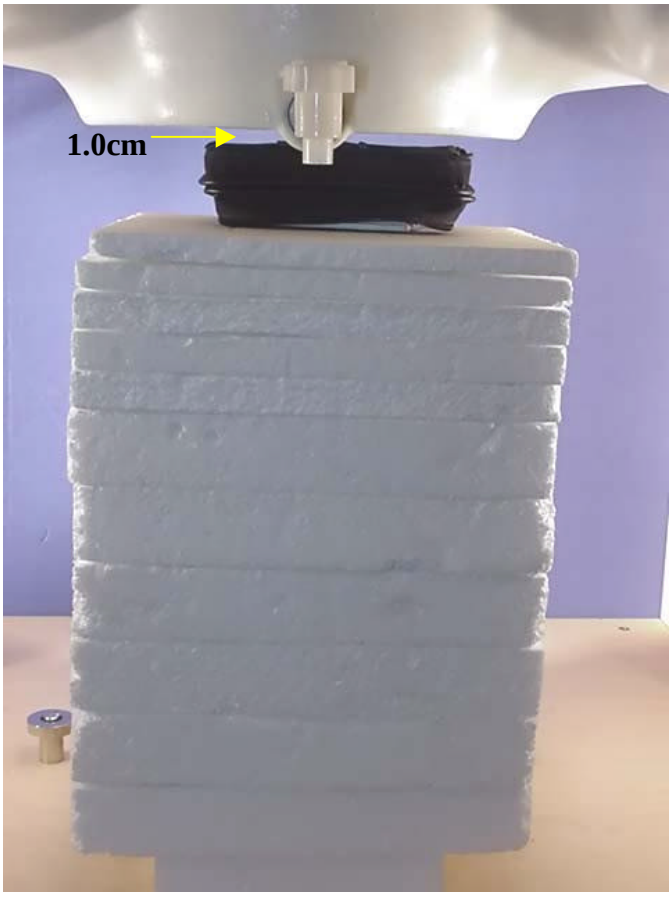
References

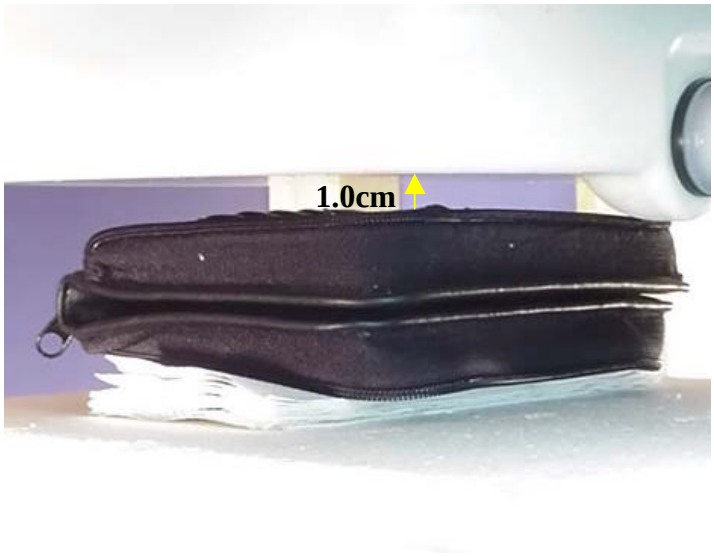
[1] N. Kuster and Q. Balzano, “Energy absorption mechanism by biological bodies in the near field of dipole antennas above 300 MHz”, *IEEE Transacions on Vehicular Technology*, vol. 41(1), pp. 17-23, 1992.

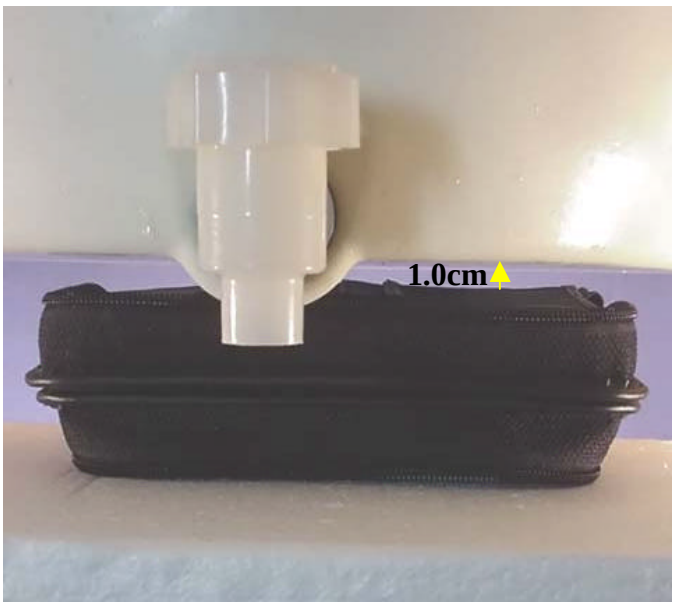
Parameter	ε	σ	ρ
f=300 MHz (εr=45.3, σ=0.87S/m, ρ=1g/cm³)			
d=15mm: Surface	- 0.41	+ 0.48	—
1 g	- 0.33	+ 0.28	0.08
10 g	- 0.26	+ 0.09	0.16
f=450 MHz (εr=43.5, σ=0.87S/m, ρ=1g/cm³)			
d=15mm: Surface	- 0.56	+ 0.67	—
1 g	- 0.46	+ 0.43	0.09
10 g	- 0.37	+ 0.22	0.17
f=835 MHz (εr=41.5, σ=0.90S/m, ρ=1g/cm³)			
d=15mm: Surface	- 0.70	+ 0.86	—
1 g	- 0.57	+ 0.59	0.10
10 g	- 0.45	+ 0.35	0.18
f=900 MHz (εr=41.5, σ=0.97S/m, ρ=1g/cm³)			
d=15mm: Surface	- 0.69	+ 0.86	—
1 g	- 0.55	+ 0.57	0.10
10 g	- 0.44	+ 0.32	0.19
f=1450 MHz (εr=40.5, σ=1.20/m, ρ=1g/cm³)			
d=10mm: Surface	- 0.73	+ 0.91	—
1 g	- 0.55	+ 0.55	0.12
10 g	- 0.42	+ 0.27	0.22
f=1800 MHz (εr=40.0, σ=1.40S/m, ρ=1g/cm³)			
d=10mm: Surface	- 0.73	+ 0.92	—
1 g	- 0.52	+ 0.51	0.14
10 g	- 0.38	+ 0.21	0.24
f=1900 MHz (εr=40.0, σ=1.40S/m, ρ=1g/cm³)			
d=10mm: Surface	- 0.73	+ 0.93	—
1 g	- 0.53	+ 0.51	0.14
10 g	- 0.39	+ 0.22	0.24
f=2000 MHz (εr=40.0, σ=1.40S/m, ρ=1g/cm³)			
d=10mm: Surface	- 0.74	+ 0.94	—
1 g	- 0.53	+ 0.52	0.14
10 g	- 0.39	+ 0.22	0.24
f=2450 MHz (εr=39.2, σ=1.80S/m, ρ=1g/cm³)			
d=10mm: Surface	- 0.74	+ 0.93	—
1 g	- 0.49	+ 0.41	0.17
10 g	- 0.34	+ 0.12	0.28
f=3000 MHz (εr=38.5, σ=2.40S/m, ρ=1g/cm³)			
d=10mm: Surface	- 0.75	+ 0.90	—
1 g	- 0.45	+ 0.28	0.21
10 g	- 0.32	+ 0.02	0.31

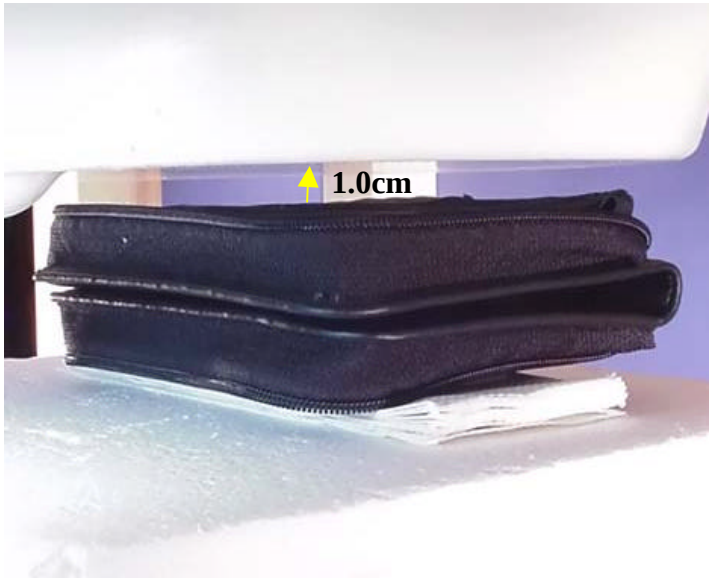
APPENDIX E - SAR TEST SETUP PHOTOGRAPHS

BODY SAR TEST SETUP PHOTOGRAPHS
Front Side of Modem – Portfolio Case Open (Inside-Left Cover)
1.0cm Separation Distance between Portfolio Case & Planar Phantom

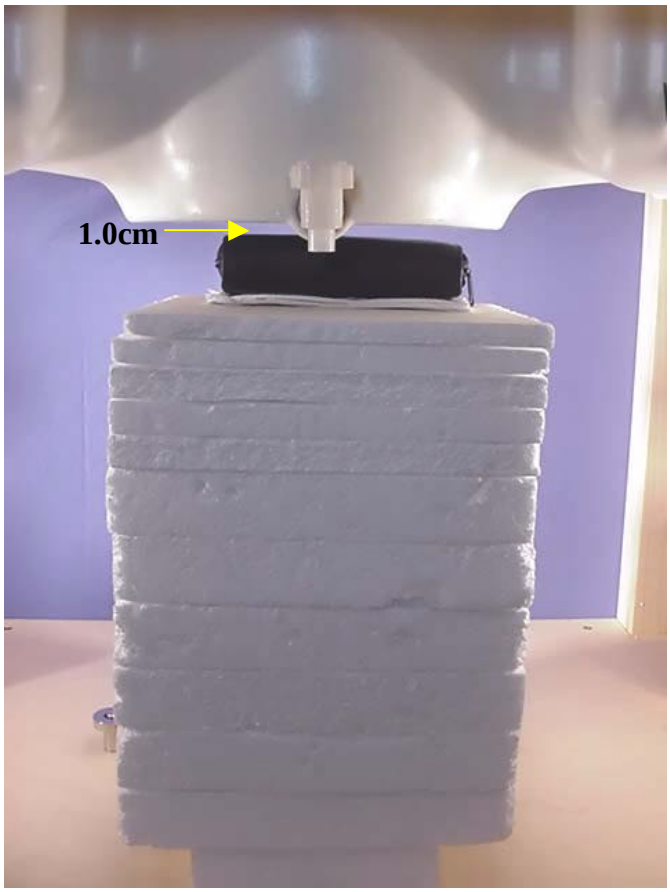


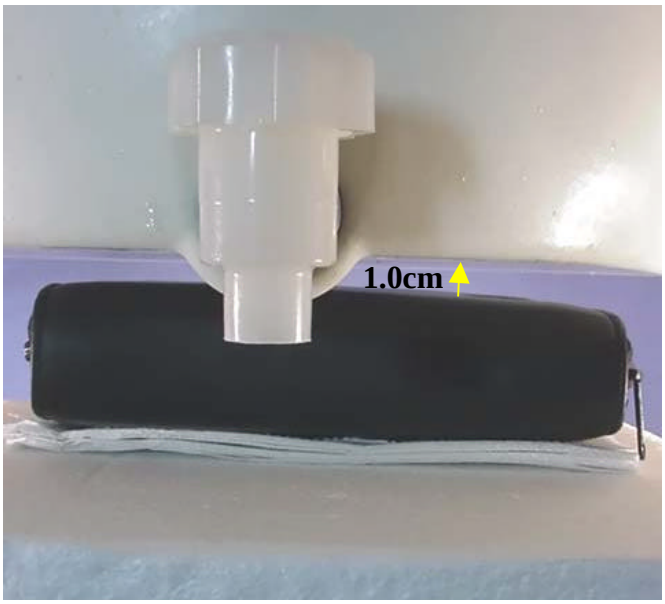




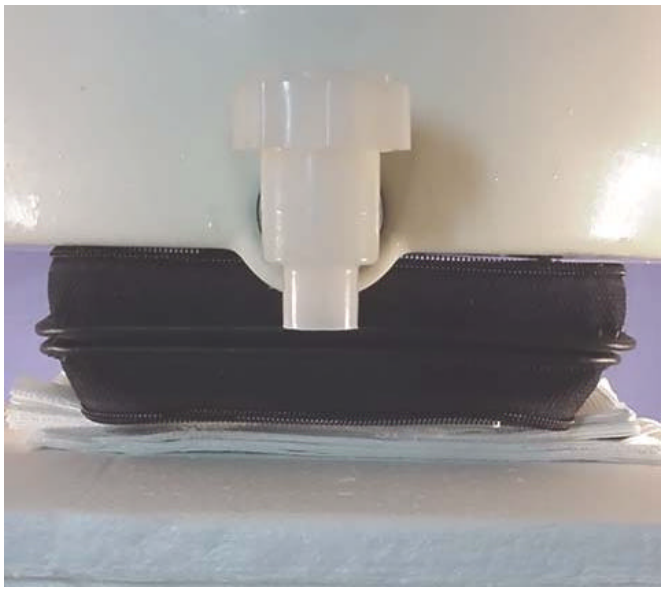


BODY SAR TEST SETUP PHOTOGRAPHS
Back Side of Modem – Portfolio Case Closed (Outside-Left Cover)
1.0cm Separation Distance between Portfolio Case & Planar Phantom

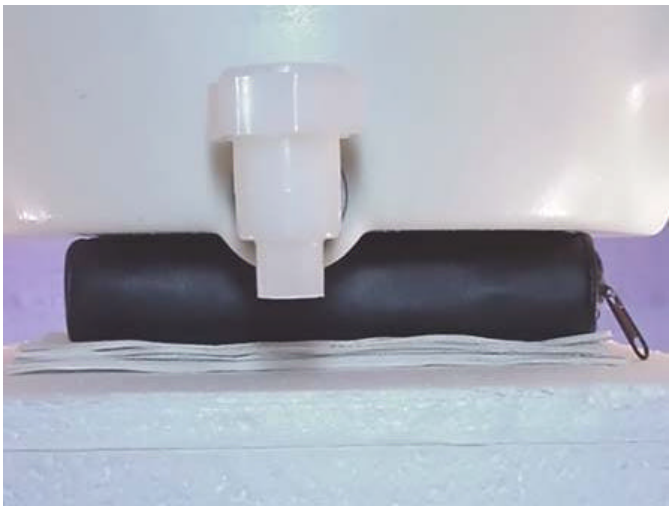




HAND SAR TEST SETUP PHOTOGRAPHS
Front Side of Modem – Portfolio Case Open (Inside-Left Cover)
0.0cm Separation Distance between Portfolio Case & Planar Phantom



HAND SAR TEST SETUP PHOTOGRAPHS
Back Side of Modem – Portfolio Case Closed (Outside-Left Cover)
0.0cm Separation Distance between Portfolio Case & Planar Phantom

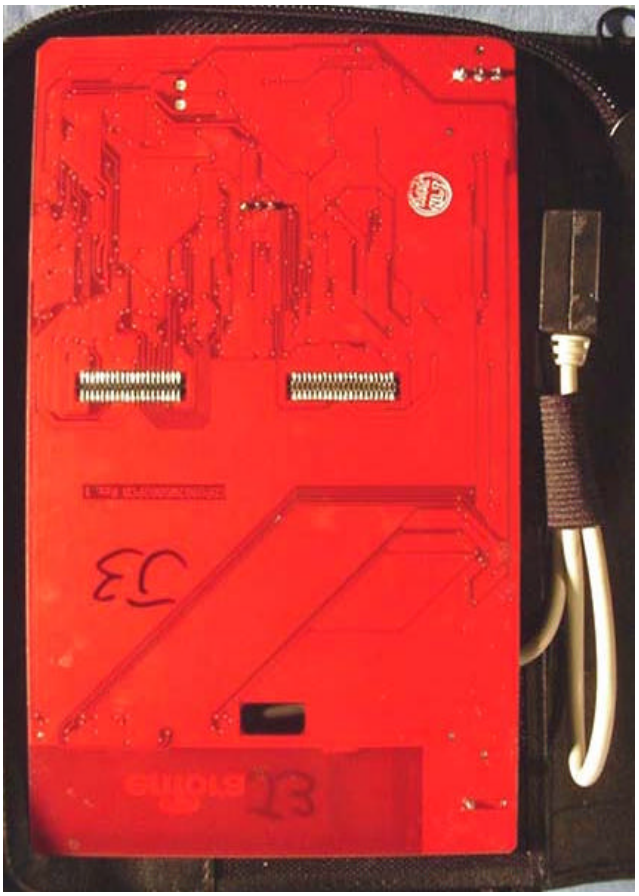


APPENDIX F - EUT PHOTOGRAPHS

EUT PHOTOGRAPHS
Portfolio Case

EUT PHOTOGRAPHS
PCB & Modem inside Portfolio Case

EUT PHOTOGRAPHS
PCB, Modem, & Antenna



EUT PHOTOGRAPHS
Modem