Certificate Number: 1449-01

MOTOROLA

ELECTROMAGNETIC EXPOSURE (EME) TESTING LABORATORY

8000 West Sunrise Blvd.
Fort-Lauderdale, Florida

S.A.R. TEST REPORT

FCC ID: AZ489FT5811
Model: H54UAA6RR1AN

January 17, 2002 –Rev. A

Tested By:	Andy Gessner SAR Test Technician
Prepared By:	Michael Sailsman EME FCC Regulatory Affairs
Reviewed and Approved By:	Ken Enger Sr. Resource Manager Product Safety and EME Lab Director

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REVISION HISTORY

Date	Revision	Comments
9/14/2001	O	Original release
1/17/02	A	Response to FCC correspondence 21734 dated January 11/2002 and reflects pilot level hardware.

1.0 Introduction

This report details the test setup, test equipment, and test results of the Specific Absorption Rate (SAR) measurement performed at Motorola Florida Research Lab (MFRL) EME laboratory for the iM1100A (PCMCIA Wireless Modem), model number H54UAA6RR1AN (FCC ID: AZ489FT5811).

The applicable exposure environment is General Population/Uncontrolled.

The test results included herein represent the highest SAR levels applicable to this device and clearly demonstrates compliance with FCC General Population/Uncontrolled RF Exposure limits of 1.6 W/kg per the requirements of 47 CFR 2.1093(d).

2.0 Reference Standards and Guidelines

This product is designed to comply with the following national and international standards and guidelines.

- United States Federal Communications Commission, Code of Federal Regulations; 47 CFR part 2 sub-part J
- American National Standards Institute (ANSI) / Institute of Electrical and Electronic Engineers (IEEE) C95. 1-1992
- Institute of Electrical and Electronic Engineers (IEEE) C95.1-1999 Edition
- National Council on Radiation Protection and Measurements (NCRP) of the United States, Report 86, 1986
- International Commission on Non-Ionizing Radiation Protection (ICNIRP) 1998
- Ministry of Health (Canada) Safety Code 6. Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz, 1999
- Australian Communications Authority Radiocommunications (Electromagnetic Radiation - Human Exposure) Standard 2001

3.0 Description of Test Sample

The iM1100A, Model number H54UAA6RR1AN is a product that may be operated in a "push-to-send" manner to send packet data by means of user commands while viewing the display of the host devices such as a laptop or PDA (also known as a Personal Digital Assistant) with this RF modem installed and operating.

The intended use positions are on the lap using a laptop computer or in the hand using a PDA with the antenna and the radio product at least one inch (2.54cm) from any part of the body of the user or bystanders.

This device transmits in the 806-825 MHz band; In the United Sates the frequency band for this device is limited to 806-821MHz. The maximum conducted power, as defined by the production line final test station upper limit, is 0.7 watts. Transmission employs time division multiplexing to support packet data transmission at a maximum duty cycle of 67.5 % occurring with 81/120 time slots.

The sample unit tested for this report is identical to intended production units.

The wireless modem product is offered with accessories listed below. (Refer to appendix D for illustrations of test configurations and how product is used.)

Antenna:

- FAF5055A ¼ wave, non-retractable, freq. range 806-870MHz

Battery:

- NNTN4051A 3.6 volt Lithium Ion, 500 mAh

Optional accessories:

- NKN6557A Adapter cable for external antenna
- HAF9067A Mobile antenna, roof mount, ½ wave, 3 dB gain, 806-900 MHz
- RAF4136AMM Mobile antenna, magnetic mount, ½ wave, 3 dB gain, 806-866 MHz
- FAD5524AA Mobile antenna, window mount, ½ wave, 3 dB gain, 806-869 MHz

3.1 Test Signal

Test Signal Source:

Test Mode [X] Base Station [ ] Simulator [ ] Native Transmission Mode [X]

Signal Modulation:

CW	
TDMA	**X**
Other	

3.2 Test Output Power

The conducted output power was measured across the transmit band using a Gigatronics power meter model 8541C.

4.0 Description of Test Equipment

4.1 Descriptions of SAR Measurement System

The laboratory utilizes a Dosimetric Assessment System (DASY™) SAR measurement system manufactured by Schmid & Partner Engineering AG (SPEAG™), of Zurich Switzerland. The SAR measurements were conducted with the probe ET3DV6 serial number 1417. The system performance check was conducted daily and within 24 hours prior to testing. Copy of the probe calibration certificates are included in appendix C, and the DASY output files of all of the system performance test results are included in appendix B. The table below summarizes the average and range of all system performance checks.

Probe/Serial #	Probe Calibration date	Dipole Kit/ Serial #	System Perf. Result when normalized to 1W (mW/g)	Reference SAR @ 1W (mW/g)
ET3DV6R/1417	Mar. 16, 2001	835-001	8.97 ± 0.04	9.4 ± 10%

The DASY™ system is operated per the instructions in the DASY™ Users Manual. The entire manual is available directly from SPEAG™.

4.2 Description of Phantom

4.2.1 Flat Phantom:

A rectangular shaped box made of Plexi-glass and mounted on a supporting non-metallic structure that has an opening at the center for positioning the device. This phantom is compliant with FCC requirements of Supplement-C Edition 01-01 to OET Bulletin 65.

Length	59 cm
Width	36 cm
Bottom Shell Thickness (mm)	0.2 cm

4.3 Simulated Tissue Properties

The simulated tissue used is compliant to that specified in FCC Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01).

4.3.1 Type of Simulated Tissue

Simulated Tissue
Body

4.3.2 Simulated Tissue Composition

	Tissue Composition
Di-Water	53.06%
Sugar	44.9%
Salt	0.94%
HEC	1%
Dowicil75	0.1%

Note: HEC (HYDROXYETHYL CELLULOSE) is a gelling agent and Dowicil 75 is anti bacterial compound.

Characterization of Simulated tissue materials and ambient conditions:

Simulated tissue prepared for SAR measurements is measured daily and within 24 hours prior to actual SAR testing to verify tissue is within 5% of target parameters at the center of the transmit band. This measurement is done using the Agilent (HP) probe kit model 85070C and a HP8753D Network Analyzer.

Target tissue parameters for 835MHz.

	Body
Di-electric Constant	55.2
Conductivity – S/m	0.97

4.4 Test Conditions

The EME Laboratory ambient environment is well controlled resulting in very stable simulated tissue temperature and therefore stable dielectric properties. Simulated tissue temperature is measured prior to each scan to insure it is within +/- 2°C of the temperature at which the dielectric properties were determined. Additional precautions are routinely taken to ensure the stability of the simulated tissue such as covering the phantoms when scans are not actively in process in order to minimize evaporation. The lab environment is continuously monitored and the table below represents the average environmental conditions during the SAR tests reported herein:

Ambient Temperature	23.3°C
Relative Humidity	40.7 %
Tissue Temperature	22.8°C

The EME Lab RF environment is monitored with a Spectrum Analyzer to preclude extraneous large signal RF contaminants that could possibly affect the test results. If such unwanted signals are discovered the SAR scans are repeated. However, the lab environment is sufficiently protected such that no SAR impacting interference has been experienced to date.

5.0 Description of Test Procedure

The RF modem's portable antenna, battery, and host computers (laptop and PDA) were included in the SAR test plan in order to determine the highest SAR levels. The RF modem's design incorporates power leveling versus frequency circuitry. The device was always placed in continuous transmit mode (packet data maximum duty cycle of 67.5%) for the duration of the scan and each SAR scan was initiated with a fully charged battery. SAR tests were performed at the center of the band as well as at the band edges. The

power measurements were taken and recorded versus time; this data was used for the initial and end power references for each SAR scan. This data is summarized in Table 7.1.

5.1 Device Test Positions

The RF modem was tested in six configurations described below and illustrated in Appendix-D.

Configuration #1:
The RF modem is inserted into a laptop computer with its antenna placed in the horizontal position. The laptop is positioned such that the body of the RF modem is 2.54cm from the phantom and its antenna is oriented parallel to the phantom.

Configuration #2:
The RF modem is inserted into a laptop computer with its antenna placed in the vertical position. The laptop is positioned such that the body of the RF modem is 2.54cm from the phantom and its antenna is oriented perpendicular to the phantom.

Configuration #3:
The RF modem is inserted into a laptop computer with its antenna placed in the vertical position. The laptop is positioned such that the RF modem's antenna is oriented parallel to, and spaced 2.54cm away from the phantom to account for the condition of the user operating the device close to a bystander.

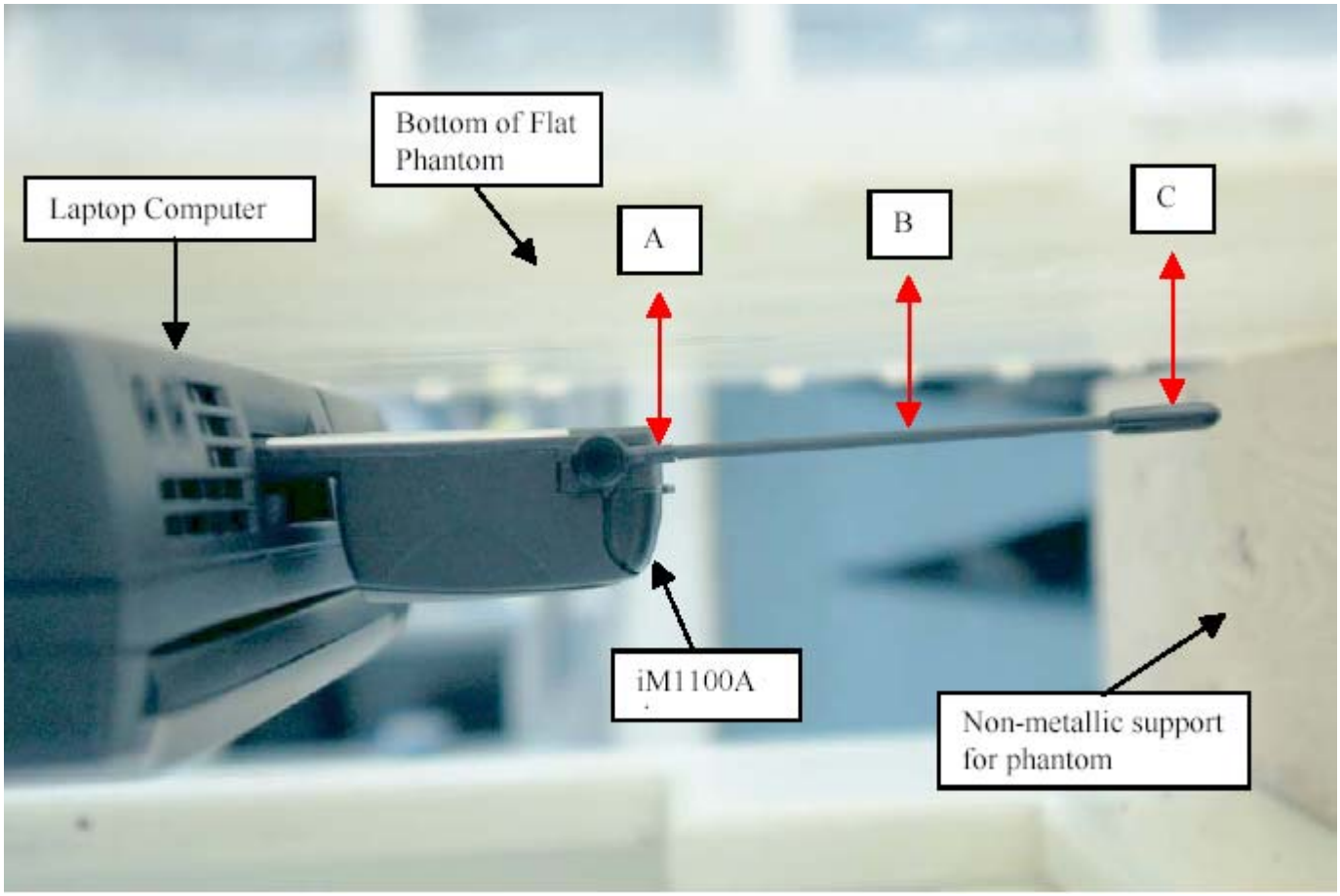
Configuration #4:
The RF modem is inserted into a PDA computer with its antenna placed in the horizontal position. The PDA is positioned such that the body of the RF modem is 2.54cm from the phantom and its antenna is oriented parallel to the phantom.

Configuration #5:
The RF modem is inserted into a PDA computer with its antenna placed in the vertical position. The PDA is positioned such that the body of the RF modem is 2.54cm from the phantom and its antenna is oriented perpendicular to the phantom.

Configuration #6:
The RF modem is inserted into a PDA computer with its antenna placed in the vertical position. The PDA is positioned such that the RF modem's antenna is oriented parallel to, and spaced 2.54cm away from the phantom to account for the condition of the user operating the device close to a bystander.

Reference figures 1 and 2 for iM1100A modem with antenna orientation and distances relative to phantoms. Figure 3 provides an overall perspective of the Robot test system. The non-metalic support structures referenced in these figures are made of material with loss tangents < 0.05.

Figure 1: iM1100A with Laptop Computer

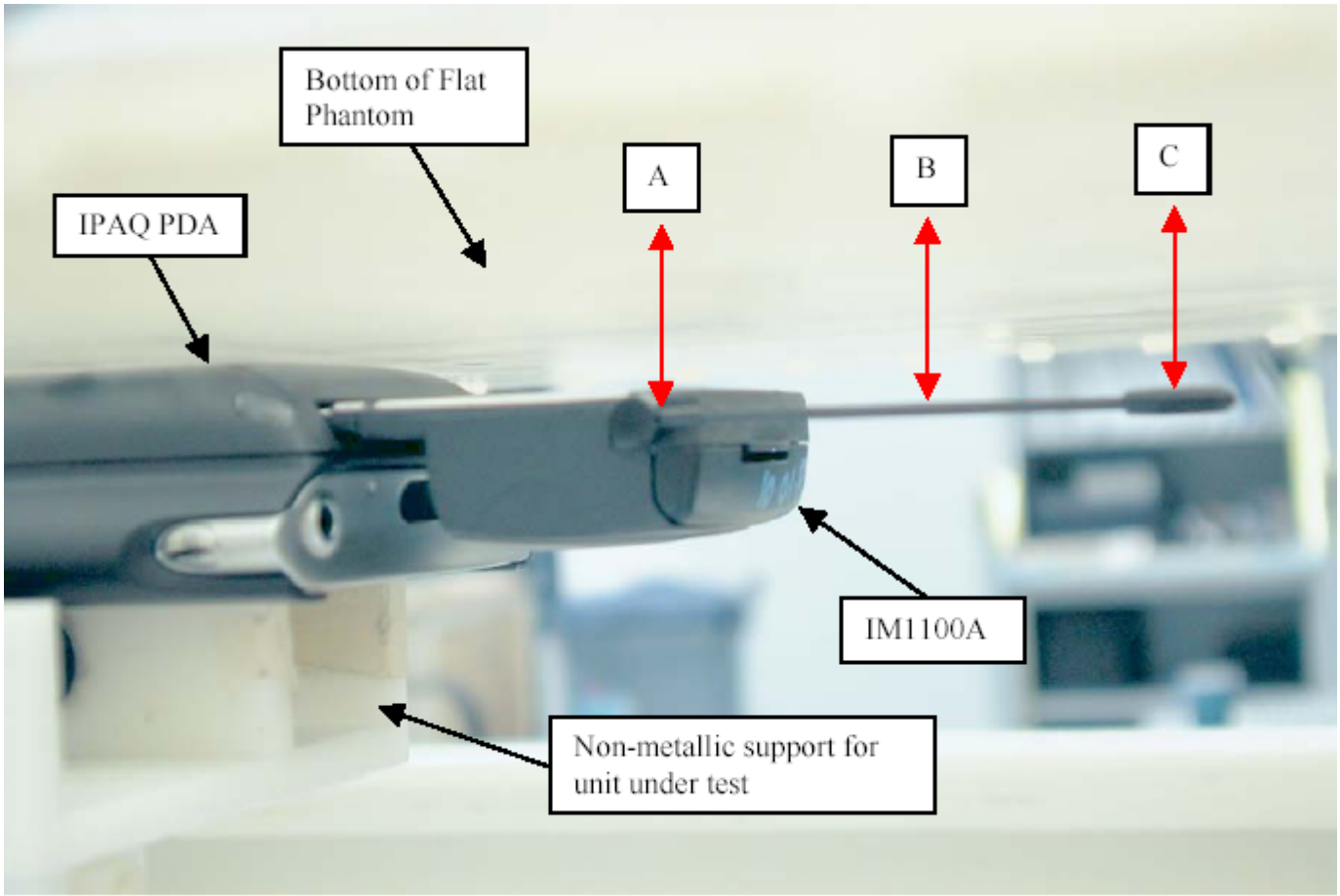


Dim A = Distance from surface of antenna base to phantom surface = 28mm

Dim B= Distance from surface of antenna center to phantom surface = 28mm

Dim C= Distance from antenna surface tip to phantom surface = 28mm

Figure 2: iM1100A with iPAQ PDA Palm/Pocket Computer

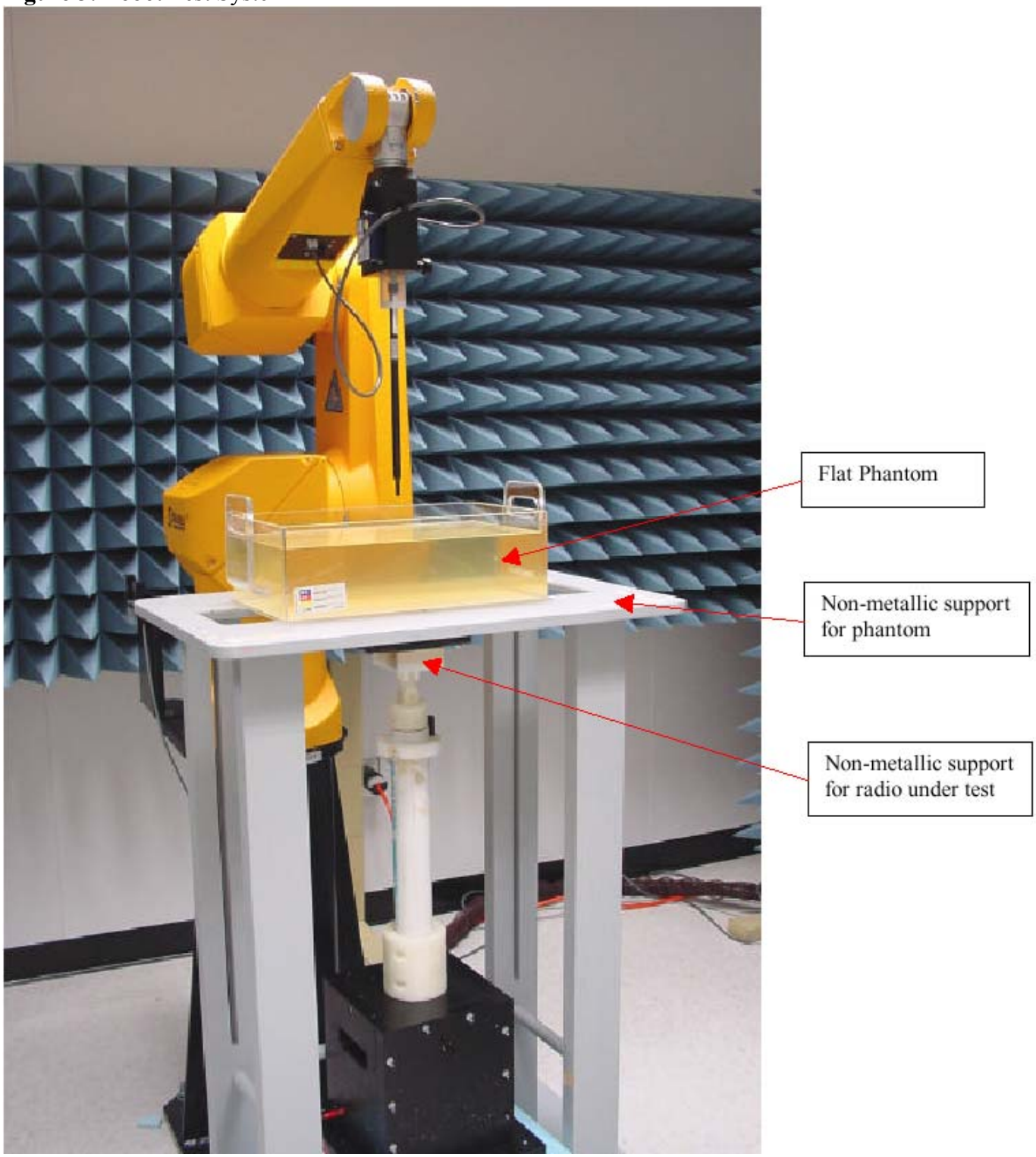


Dim A = Distance from surface of antenna base to phantom surface = 28mm

Dim B= Distance from surface of antenna center to phantom surface = 28mm

Dim C= Distance from antenna surface tip to phantom surface = 28mm

Figure 3: Robot Test System



5.2 Probe Scan Procedures

The E-field probe is first scanned in a coarse grid over a large area inside the phantom in order to locate the interpolated maximum SAR distribution. After the coarse scan measurement, the probe is automatically moved to a position at the interpolated maximum. The subsequent scan can directly use this position for reference for the cube evaluations.

6.0 Measurement Uncertainty:

The table below list the uncertainty estimate of the possible errors that are associated with the measurement system.

Uncertainty Description	Standard Uncertainty
Probe Uncertainty	
- Axial Isotropy	± 2.4 %
- Spherical Isotropy	± 4.8 %
- Spatial Resolution	± 0.5 %
- Linearity Error	± 2.7 %
- Calibration Error	± 8 %
Evaluation Uncertainty	
- Data Acquisition Error	± 0.60 %
- ELF and RF Disturbances	± 0.25 %
- Conductivity Assessment	± 5 %
Spatial Peak SAR Evaluation Uncertainty	
- Extrapolation and boundary effects	± 3%
- Probe positioning	± 1 %
- Integration and cube orientation	± 3 %
- Cube shape inaccuracies	± 1.2 %
- Device positioning	± 1.0 %

The Total Measurement Uncertainty is ± 12.1 %. The Expanded Measurement Uncertainty is ± 24.2 % (k=2

7.0 SAR Test Results:

All SAR results yielded by the tests described in Section 5.0 are listed in the tables below for each body position. The DASY™ measurement system's output files for bolded data indicated in tables below are provided in appendix A.

Note: Run # 020117-16 and 020117-14 were tested per the device test positions outlined in sec 5.1. However, due to the limitation of the DASY3 software the relevant output files depicting the location of the antenna relative to the phantom in appendix A could not be accurately portrayed.

7.1 SAR results at the abdomen:

Antenna/ Run Number	Freq. (MHz)	Battery	Configuration	Antenna Position	Dist. @ Antenna Base to Phantom (mm)	Initial Power (W)	End Power (W)	Measured 1g-SAR (mW/g)
Configuration-1: iM1100 in a laptop PC, bottom of RF modem 2.5cm from the flat phantom, and antenna horizontal.								
FAF5055A/ 020117-04	806.0125	NNTN4051A	Laptop Computer	Horizontal	28	0.70	0.63	0.46
FAF5055A/ 020117-06	813.5625	NNTN4051A	Laptop Computer	Horizontal	28	0.70	0.63	0.51
FAF5055A/ 020117-08	820.9875	NNTN4051A	Laptop Computer	Horizontal	28	0.70	0.63	**0.55**
FAF5055A/ 020117-09	825	NNTN4051A	Laptop Computer	Horizontal	28	0.70	0.63	0.46
Configuration-2: iM1100 in a laptop PC, bottom of RF modem 2.5cm from the flat phantom, and antenna Vertical.								
FAF5055A/ 020117-03	806.0125	NNTN4051A	Laptop Computer	Vertical	28	0.70	0.63	0.27
FAF5055A/ 020117-05	813.5625	NNTN4051A	Laptop Computer	Vertical	28	0.70	0.63	0.24
FAF5055A/ 020117-07	820.9875	NNTN4051A	Laptop Computer	Vertical	28	0.70	0.63	**0.29**
Configuration-3: iM1100 in a laptop PC with iM1100 antenna in Vertical position and 2.5 cm from flat phantom.								
FAF5055A/ 020117-11	806.0125	NNTN4051A	Laptop Computer	Vertical	28	0.70	0.63	0.16
FAF5055A/ 020117-15	813.5625	NNTN4051A	Laptop Computer	Vertical	28	0.70	0.63	0.18
FAF5055A/ 020117-16	820.9875	NNTN4051A	Laptop Computer	Vertical	28	0.70	0.63	**0.18**
Configuration-4: iM1100 in PDA computer, bottom RF modem 2.5cm from flat phantom, and antenna horizontal.								
FAF5055A/ 020118-03	806.0125	NNTN4051A	Palm/Pocket Computer	Horizontal	28	0.70	0.63	0.41
FAF5055A/ 020116-10	813.5625	NNTN4051A	Palm/Pocket Computer	Horizontal	28	0.70	0.63	0.45
FAF5055A/ 020118-02	820.9875	NNTN4051A	Palm/Pocket Computer	Horizontal	28	0.70	0.63	0.44
FAF5055A/ 020118-04	825	NNTN4051A	Palm/Pocket Computer	Horizontal	28	0.70	0.63	**0.46**

Antenna/ Run Number	Freq. (MHz)	Battery	Configuration	Antenna Position	Dist. @ Antenna Base to Phantom (mm)	Initial Power (W)	End Power (W)	Measured 1g-SAR (mW/g)
Configuration-5: iM1100 in PDA computer, bottom of RF modem 2.5cm from flat phantom, and antenna vertical.								
FAF5055A/ 020116-07	806.0125	NNTN4051A	Palm/Pocket Computer	Vertical	28	0.70	0.63	0.35
FAF5055A/ 020116-09	813.5625	NNTN4051A	Palm/Pocket Computer	Vertical	28	0.70	0.63	0.34
FAF5055A/ 020116-11	820.9875	NNTN4051A	Palm/Pocket Computer	Vertical	28	0.70	0.63	**0.38**
Configuration-5: iM1100 in PDA computer with iM1100 antenna in Vertical position and 2.5cm from flat								
FAF5055A/ 020117-12	806.0125	NNTN4051A	Palm/Pocket Computer	Vertical	28	0.70	0.63	0.20
FAF5055A/ 020117-13	813.5625	NNTN4051A	Palm/Pocket Computer	Vertical	28	0.70	0.63	0.18
FAF5055A/ 020117-14	820.9875	NNTN4051A	Palm/Pocket Computer	Vertical	28	0.70	0.63	**0.21**

8.0 Conclusion

The highest Operational Measured 1-gram average SAR values found for the iM1100A wireless modem model number H54UAA6RR1AN was:

0.55 mW/g

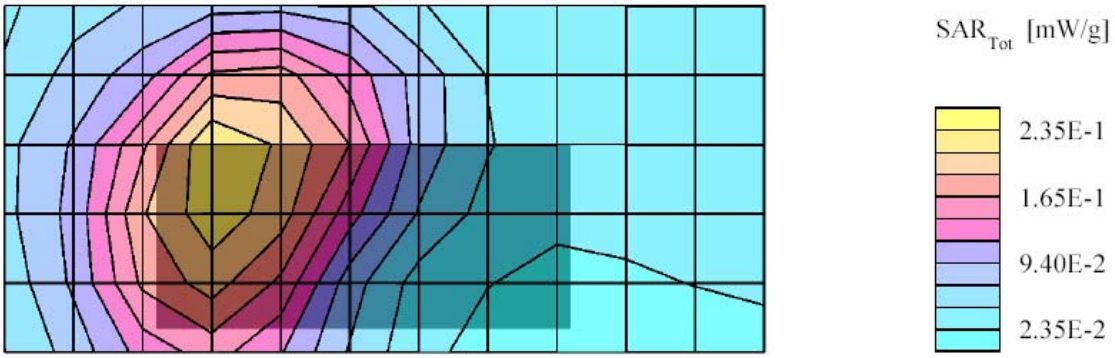
These test results clearly demonstrate compliance with FCC General Population/Uncontrolled RF Exposure limits of 1.6 W/kg per the requirements of 47 CFR 2.1093(d).

Appendix A: Data Results

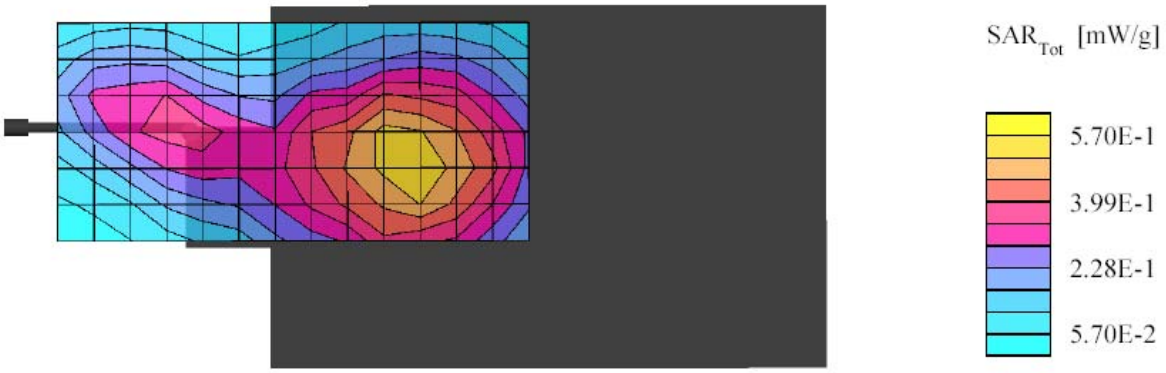
iM1100A; Test Date: 01/17/02 Motorola MFRL Lab
RUN:020117-08
Flat Phantom; Position: (90°,270°);
Probe: ET3DV6R - SN1417; ConvF(5.90,5.90,5.90); Probe cal date: 16/03/01; Crest factor: 1.5; 835 Body: σ = 0.92 mho/m ε= 52.7 ρ = 1.00 g/cm3
Cube 7x7x7: SAR (1g): 0.547 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 51.0, 61.5, 2.7

iM1100A; Test Date: 01/17/02; Motorola MFRL Lab
RUN:020117-07
Flat Phantom; Position: (90°,270°);
Probe: ET3DV6R - SN1417; ConvF(5.90,5.90,5.90); Probe cal date: 16/03/01; Crest factor: 1.5; 835 Body: σ = 0.92 mho/m ε= 52.7 ρ= 1.00 g/cm3
Cube 7x7x7: SAR (1g): 0.294 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 58.5, 64.5, 2.7

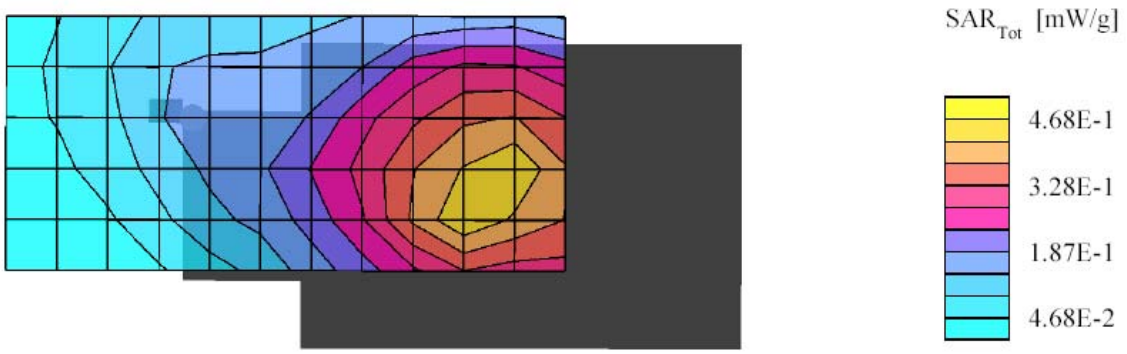
iM1100A; Test Date: 01/17/02; ; Motorola MFRL Lab
RUN :020117-16
Flat Phantom; Position: (180°,0°);
Probe: ET3DV6R - SN1417; ConvF(5.90,5.90,5.90); Probe cal date: 16/03/01; Crest factor: 1.5; 835 Body: σ = 0.92 mho/m ε= 52.7 ρ = 1.00 g/cm3
Cube 7x7x7: SAR (1g): 0.175 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 34.5, 46.5, 2.7



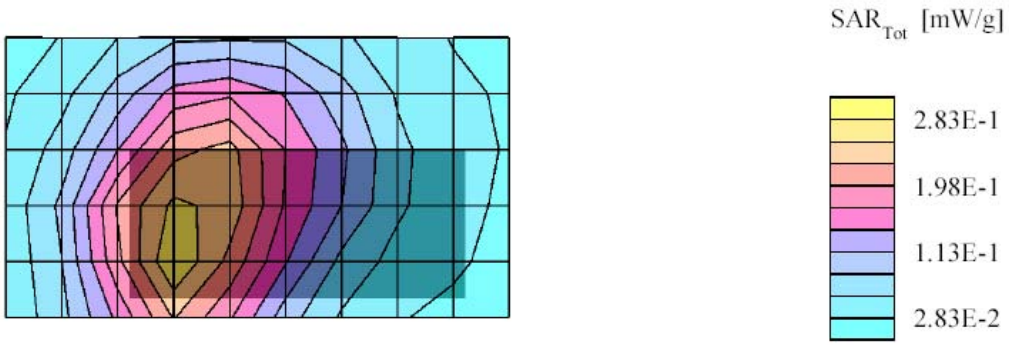
iM1100A; Test Date: 01/18/02; Motorola MFRL Lab
RUN:020118-04
Flat Phantom; Position: (90°,270°);
Probe: ET3DV6R - SN1417; ConvF(5.90,5.90,5.90); Probe cal date: 16/03/01; Crest factor: 1.5; 835 Body: σ = 0.93 mho/m ε= 53.9 ρ = 1.00 g/cm3
Cube 7x7x7: SAR (1g): 0.458 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 60.0, 148.5, 2.7



iM1100A; Test Date: 01/16/02; Motorola MFRL Lab
RUN:020116-11
Flat Phantom; Position: (90°,270°);
Probe: ET3DV6R - SN1417; ConvF(5.90,5.90,5.90); Probe cal date: 16/03/01; Crest factor: 1.5; 835 Body: σ = 0.93 mho/m ε= 53.0 ρ = 1.00 g/cm3
Cube 7x7x7: SAR (1g): 0.375 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 46.5, 150.0, 2.7



iM1100A; Test Date: 01/17/02; Motorola MFRL Lab
RUN:020117-14
Flat Phantom; Position: (90°,270°);
Probe: ET3DV6R - SN1417; ConvF(5.90,5.90,5.90); Probe cal date: 16/03/01; Crest factor: 1.5; 835 Body: σ = 0.92 mho/m ε= 52.7 ρ = 1.00 g/cm3
Cube 7x7x7: SAR (1g): 0.214 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0; Max at 58.5, 45.0, 2.7

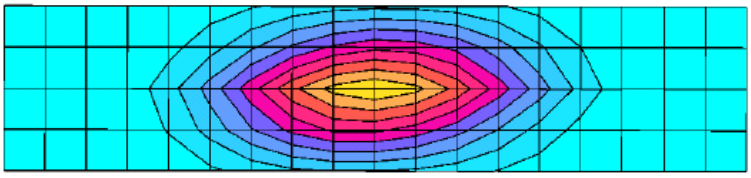


Appendix B: Dipole System Performance Check Results

Validation Dipole 835MHz SN–835-001. Test Date:01/16/02

Motorola MFRL Lab

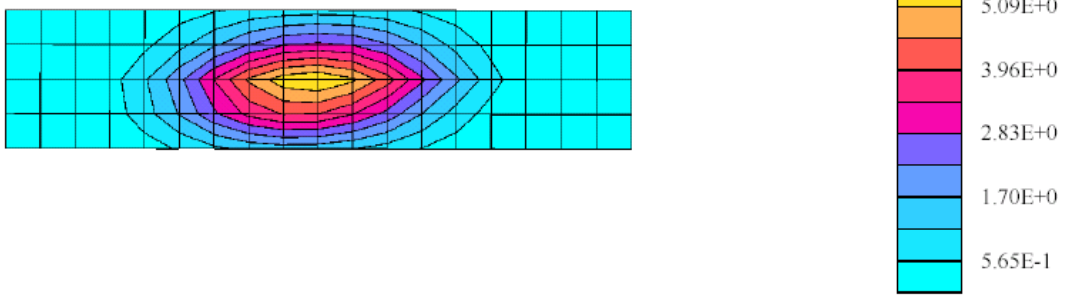
Run: 020116
Target = 9.4mW/g @ 1W
Input power 500mW
Flat phantom
Probe: ET3DV6R - SN1417;Probe Cal Date: 16/03/01ConvF(5.90,5.90,5.90); Crest factor: 1.0; 835 Body: σ = 0.95 mho/m ε = 52.8 ρ = 1.00 g/cm3;
Cube 7x7x7: Peak: 7.68 mW/g, SAR (1g): 4.50 mW/g, SAR (10g): 2.88 mW/g, (Worst-case extrapolation)
Penetration depth: 12.0 (9.3, 15.9) [mm]
Powerdrift: -0.01 dB



Validation Dipole 835MHz SN-835-001. Test Date:01/17/02

Motorola MFRL Lab

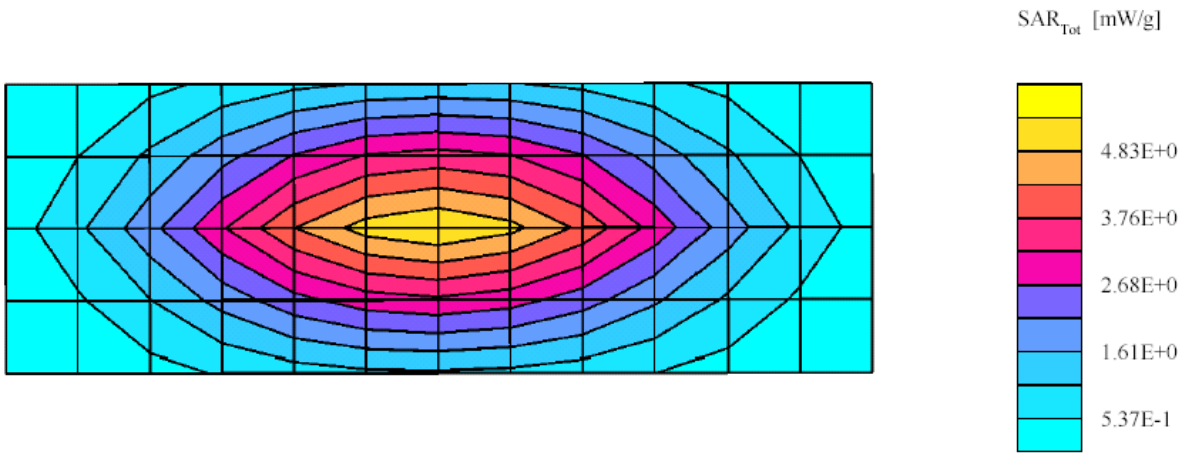
Run: 020117
Target 9.4mW/g @ 1W
Input power 500mW
Flat phantom
Probe: ET3DV6R - SN1417;Probe Cal Date: 16/03/01ConvF(5.90,5.90,5.90); Crest factor: 1.0; 835 Body: σ= 0.95 mho/m ε= 52.5 ρ = 1.00 g/cm3
Cube 7x7x7: Peak: 7.90 mW/g, SAR (1g): 4.58 mW/g, SAR (10g): 2.92 mW/g, (Worst-case extrapolation)
Penetration depth: 12.0 (9.1, 16.1) [mm]
Powerdrift: -0.07 dB



Validation Dipole 835MHz SN-835-001. Test Date:01/18/02

Motorola MFRL Lab

Run: 020118
Target SAR 9.4mW/g @ 1W
Input power 500mW
Flat phantom
Probe: ET3DV6R - SN1417; ConvF(5.90,5.90,5.90); Crest factor: 1.0; 835 Body: σ = 0.95 mho/m ε= 53.7 ρ = 1.00 g/cm3
Cube 7x7x7: Peak: 7.75 mW/g, SAR (1g): 4.53 mW/g, SAR (10g): 2.93 mW/g, (Worst-case extrapolation)
Penetration depth: 12.6 (9.3, 17.2) [mm]
Powerdrift: -0.06 dB



Appendix C: Measurement Probe Calibration Certificate

Schmid & Partner
Engineering AG

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

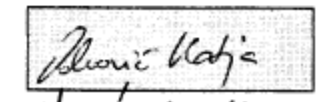
Calibration Certificate

Dosimetric E-Field Probe

Type	**ET3DV6R**
Serial Number:	**1417**
Place of Calibration:	**Zurich**
Date of Calibration:	**Mar. 16, 2001**
Calibration Interval	**12 months**

Schmid & Partner Engineering AG hereby certifies, that this device has been calibrated on the date indicated above. The calibration was performed in accordance with specifications and procedures of Schmid & Partner Engineering AG.

Wherever applicable, the standards used in the calibration process are traceable to international standards. In all other cases the standards of the Laboratory for EMF and Microwave Electronics at the Swiss Federal Institute of Technology (ETH) in Zurich, Switzerland have been applied.

Calibrated by	
Approved by	

DASY3 - Parameters of Probe: ET3DV6R SN:1417

Sensitivity in Free Space

NormX	**2.46**	$\mu V/(V/m)^2$	DCP X	**95**	mV
NormY	**2.35**	$\mu V/(V/m)^2$	DCP Y	**95**	mV
NormZ	**2.47**	$\mu V/(V/m)^2$	DCP Z	**95**	mV

Sensitivity in Tissue Simulating Liquid

Head **800 - 1000 MHz** ε_r **= 39.0 - 43.5** σ **= 0.80 - 1.10 mho/m**

ConvF X	**5.97**	± 7% (k=2)	Boundary effect:	
ConvF Y	**5.97**	± 7% (k=2)	Alpha	**0.37**
ConvF Z	**5.97**	± 7% (k=2)	Depth	**2.76**

Head **1700 - 1910 MHz** ε_r **= 39.5 - 41.0** σ **= 1.20 - 1.55 mho/m**

ConvF X	**5.10**	± 7% (k=2)	Boundary effect:	
ConvF Y	**5.10**	± 7% (k=2)	Alpha	**0.54**
ConvF Z	**5.10**	± 7% (k=2)	Depth	**2.15**

Boundary Effect

Head **800 - 1000 MHz** **Typical SAR gradient: 5 % per mm**

Probe Tip to Boundary	**1 mm**	**2 mm**
SAR_{be} [%] Without Correction Algorithm	11.1	6.8
SAR_{be} [%] With Correction Algorithm	0.3	0.5

Head **1700 - 1910 MHz** **Typical SAR gradient: 10 % per mm**

Probe Tip to Boundary	**1 mm**	**2 mm**
SAR_{be} [%] Without Correction Algorithm	10.6	6.8
SAR_{be} [%] With Correction Algorithm	0.1	0.3

Sensor Offset

Probe Tip to Sensor Center	**2.7**	mm

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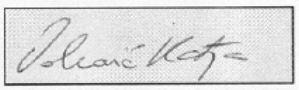
Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ET3DV6R**
Serial Number:	**1417**
Place of Assessment:	**Zurich**
Date of Summary:	**November 28, 2001**
Probe Calibration Date:	**March 16, 2001**

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

Assessed by: 

Dosimetric E-Field Probe ET3DV6R SN:1417

Conversion factor (± standard deviation)

150 MHz	ConvF	**8.2 ± 8%**	ε_r = 52.3 ±5% σ = 0.76 ±5% mho/m (head tissue)
300 MHz	ConvF	**7.2 ± 8%**	ε_r = 45.3 ±5% σ = 0.87 ±5% mho/m (head tissue)
368 MHz	ConvF	**7.0 ± 8%**	ε_r = 44.5 ±5% σ = 0.87 ±5% mho/m (head tissue)
450 MHz	ConvF	**6.8 ± 8%**	ε_r = 43.5 ±5% σ = 0.87 ±5% mho/m (head tissue)
1750 MHz	ConvF	**5.2 ± 8%**	ε_r = 40.0 ±5% σ = 1.37 ±5% mho/m (head tissue)
1900 MHz	ConvF	**4.9 ± 8%**	ε_r = 40.0 ±5% σ = 1.40 ±5% mho/m (head tissue)
2000 MHz	ConvF	**4.9 ± 8%**	ε_r = 37.0 ±5% σ = 1.40 ±5% mho/m (head tissue)
2450 MHz	ConvF	**4.5 ± 8%**	ε_r = 32.0 ±5% σ = 1.80 ±5% mho/m (head tissue)

Dosimetric E-Field Probe ET3DV6R SN:1417

Conversion factor (± standard deviation)

35 MHz	ConvF	**8.2 ± 15%**	**ε_r = 78.0 ±5%** **σ = 0.65 ±5% mho/m** (body tissue)
75 MHz	ConvF	**8.1 ± 10%**	**ε_r = 70.0 ±5%** **σ = 0.70 ±5% mho/m** (body tissue)
150 MHz	ConvF	**7.9 ± 8%**	**ε_r = 61.9 ±5%** **σ = 0.80 ±5% mho/m** (body tissue)
300 MHz	ConvF	**7.3 ± 8%**	**ε_r = 58.2 ±5%** **σ = 0.92 ±5% mho/m** (body tissue)
368 MHz	ConvF	**7.2 ± 8%**	**ε_r = 57.5 ±5%** **σ = 0.93 ±5% mho/m** (body tissue)
450 MHz	ConvF	**7.0 ± 8%**	**ε_r = 56.7 ±5%** **σ = 0.94 ±5% mho/m** (body tissue)
835 MHz	ConvF	**5.9± 8%**	**ε_r = 55.2 ±5%** **σ = 0.97 ±5% mho/m** (body tissue)
900 MHz	ConvF	**5.8 ± 8%**	**ε_r = 55.0 ±5%** **σ = 1.05 ±5% mho/m** (body tissue)
925 MHz	ConvF	**5.7 ± 8%**	**ε_r = 55.0 ±5%** **σ = 1.06 ±5% mho/m** (body tissue)
1500 MHz	ConvF	**5.1 ± 8%**	**ε_r = 53.9 ±5%** **σ = 1.33 ±5% mho/m** (body tissue)

Dosimetric E-Field Probe ET3DV6R SN:1417

Conversion factor (± standard deviation)

1750 MHz	ConvF	**4.8 ± 8%**	**ε_r = 53.4 ±5%** **σ = 1.49 ±5% mho/m** (body tissue)
1800 MHz	ConvF	**4.6 ± 8%**	**ε_r = 53.3 ±5%** **σ = 1.52 ±5% mho/m** (body tissue)
1900 MHz	ConvF	**4.5 ± 8%**	**ε_r = 53.3 ±5%** **σ = 1.52 ±5% mho/m** (body tissue)
2000 MHz	ConvF	**4.4 ± 8%**	**ε_r = 53.3 ±5%** **σ = 1.52 ±5% mho/m** (body tissue)
2450 MHz	ConvF	**3.8 ± 8%**	**ε_r = 52.7 ±5%** **σ = 1.95 ±5% mho/m** (body tissue)

Appendix D: Illustrations of Test Configurations

Configuration #1:

<u>Antenna Horizontal and parallel to phantom.</u>
iM1100 in a laptop PC. The bottom of the RF modem is separated from the phantom by 2.54cm

Flat Phantom

Configuration #2:

<u>Antenna Vertical and perpendicular to the phantom.</u>
iM1100 in a laptop PC. The bottom of the RF modem is separated from the phantom by 2.54cm.

Flat Phantom

Configuration #3:

<u>Antenna vertical and parallel to the phantom.</u>

iM1100 in a laptop PC. The RF modem's antenna is separated from the flat phantom by 2.54cm.

Flat Phantom

Configuration #4:

Antenna vertical and perpendicular to the phantom.

iM1100 in a Compaq iPAQ PDA. The bottom of the RF modem is separated from the phantom by 2.54cm

Flat Phantom

Configuration #5:

Antenna horizontal and parallel to the phantom.

iM1100 in a Compaq iPAQ PDA. The bottom of the RF modem is separated from the phantom by 2.54cm

Flat Phantom

Configuration #6:

<u>Antenna Horizontal and parallel to the phantom.</u>
iM1100 in a Compaq iPAQ PDA. The RF modem's antenna is separated from the flat phantom by 2.54cm.

Flat Phantom