Exhibit 11: SAR Test Report IHDT5EL1

Date of test: 04/15/2004 to 05/11/2004
Date of Report: 05/13/2004

Laboratory:
Motorola Personal Communications Sector Product Safety & Compliance Laboratory
600 N. US Highway 45
Room: MW113
Libertyville, Illinois 60048

Test Responsible:
Albert Patapack
Senior Staff Engineer

Accreditation: This laboratory is accredited to ISO/IEC 17025-1999 to perform the following tests:

Tests:	Procedures:
Electromagnetic Specific Absorption Rate	ANSI/IEEE C95.1-1992, 1999 (SAR) IEEE C95.3-1991 IEEE P1528 (*DRAFT*) FCC OET Bulletin 65 (*including Supplements A, B, C*) Australian Communications Authority Radio Communications (Electromagnetic Radiation – Human Exposure) Standard 1999 CENELEC EN 50361 (2001)
Simulated Tissue Preparation	APP-0247
RF Power Measurement	DOI-0876, 0900, 0902, 0904, 0915

On the following products or types of products:
Wireless Communications Devices (Examples): Two Way Radios; Portable Phones (including Cellular,
Licensed Non-Broadcast and PCS); Low Frequency Readers; and Pagers

A2LA certificate #1651-01

Statement of Compliance:
Motorola declares under its sole responsibility that portable cellular telephone FCC ID IHDT5EL1 to which this declaration relates, is in conformity with the appropriate General Population/Uncontrolled RF exposure standards, recommendations and guidelines (FCC 47 CFR §2.1093). It also declares that the product was tested in accordance with the appropriate measurement standards, guidelines and recommended practices. Any deviations from these standards, guidelines and recommended practices are noted below:

(none)

The results and statements contained herein relate only to the items tested. The names of individuals involved may be mentioned only in connection with the statements or results from this report.

Motorola encourages all feedback, both positive and negative, on this test report.

Table of Contents

1. INTRODUCTION 3

2. DESCRIPTION OF THE DEVICE UNDER TEST 3

2.1 Antenna description 3

2.2 Device description 3

3. TEST EQUIPMENT USED 3

3.1 Dosimetric System 3

3.2 Additional Equipment 4

4. ELECTRICAL PARAMETERS OF THE TISSUE SIMULATING LIQUID 4

5. SYSTEM ACCURACY VERIFICATION 5

6. TEST RESULTS 6

6.1 Head Adjacent Test Results 6

6.2 Body Worn Test Results 8

APPENDIX 1: SAR DISTRIBUTION COMPARISON FOR SYSTEM ACCURACY VERIFICATION 10

APPENDIX 2: SAR DISTRIBUTION PLOTS FOR PHANTOM HEAD ADJACENT USE 11

APPENDIX 3: SAR DISTRIBUTION PLOTS FOR BODY WORN CONFIGURATION 14

APPENDIX 4: PROBE CALIBRATION CERTIFICATE 16

APPENDIX 5: DIPOLE CHARACTERIZATION CERTIFICATE 17

APPENDIX 6: MEASUREMENT UNCERTAINTY BUDGET 18

APPENDIX 7: PHOTOGRAPHS OF DEVICE UNDER TEST 21

1. Introduction

The Motorola Personal Communications Sector Product Safety Laboratory has performed measurements of the maximum potential exposure to the user of portable cellular phone (FCC ID IHDT5EL1). The Specific Absorption Rate (SAR) of this product was measured. The portable cellular phone was tested in accordance with FCC OET Bulletin 65 Supplement C 01-01.

2. Description of the Device Under Test

2.1 Antenna description

Type	Stubby	
Location	Right Hand Side	
Dimensions	Length	25 mm
	Width	7 mm
Configuration	Helix	

2.2 Device description

FCC ID Number	IHDT5EL1	
Serial number	3473E4AC & 5207595175	
Mode(s) of Operation	AMPS 800	TDMA 800
Modulation Mode(s)	AMPS	TDMA
Maximum Output Power Setting	26.50dBm	27.50dBm
Duty Cycle	1:1	1:3
Transmitting Frequency Rang(s)	824.04 – 848.97 MHz	824.04 – 848.97 MHz
Production Unit or Identical Prototype (47 CFR §2..908)	Identical Prototype	
Device Category	Portable	
RF Exposure Limits	General Population / Uncontrolled	

3. Test Equipment Used

3.1 Dosimetric System

The Motorola Personal Communications Sector Product Safety & Compliance Laboratory utilizes a Dosimetric Assessment System (Dasy3™ v3.1d) manufactured by Schmid & Partner Engineering AG (SPEAG™), of Zurich Switzerland. All the SAR measurements are taken within a shielded enclosure. The overall RSS uncertainty of the measurement system is ±11.7% (K=1) with an expanded uncertainty of ±23.0% (K=2). The measurement uncertainty budget is given in Appendix 6. Per IEEE 1528, this uncertainty budget is applicable to the SAR range of 0.4 W/kg to 10 W/kg. The list of calibrated equipment used for the measurements is shown below.

Description	Serial Number	Cal Due Date
DASY3 DAE V1	378	05/30/04
	437	04/16/05
	440	02/09/05
E-Field Probe ET3DV6	1514	07/31/04
	1398	02/16/05
	3037	10/10/04
Dipole Validation Kit, D835V2	425TR	04/02/05
Dipole Validation Kit, D900V2	80	04/02/05
	96	04/02/05
S.A.M. Phantom used for 800MHz	TP-1131	
	TP-1005	

3.2 Additional Equipment

Description	Serial Number	Cal Due Date
Signal Generator HP8648C	3847A04822	2/6/2005
Power Meter E4419B	GB39511087	4/5/2005
Power Sensor #1 - E9301A	US39211009	8/5/2004
Power Sensor #2 - E9301A	US39210915	8/5/2004
Network Analyzer HP8753ES	US39171846	06/03/04
Dielectric Probe Kit HP85070B	US99360074	N/A

4. Electrical parameters of the tissue simulating liquid

Prior to conducting SAR measurements, the relative permittivity, ε_r, and the conductivity, σ, of the tissue simulating liquids were measured with the HP85070 Dielectric Probe Kit These values, along with the temperature of the tissue simulate are shown in the table below. The recommended limits for maximum permittivity and minimum conductivity are also shown. These come from the Federal Communication Commission, OET Bulletin 65 Supplement C 01-01. It is seen that the measured parameters are satisfactory for compliance testing.

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			ε_r	σ (S/m)	Temp (°C)
835	Head	**Measured,** 04/15/04	42.00	0.92	19.7
		Measured, 04/16/04	41.60	0.91	19.7
		Measured, 04/17/04	41.50	0.90	19.8
		Recommended Limits	41.5 ±5%	0.90 ±5%	18-25
	Body	**Measured,** 04/17/04	54.00	0.97	19.5
		Measured, 05/11/04	54.10	0.98	19.0
		Recommended Limits	55.2 ±5%	0.97 ±5%	18-25

The list of ingredients and the percent composition used for the tissue simulates are indicated in the table below.

Ingredient	800MHz Head	800MHz Body	1900MHz Head	1900MHz Body
Sugar	57.0	44.9	--	30.80
DGBE	--	--	47.0	--
Water	40.45	53.06	52.8	68.91
Salt	1.45	0.94	0.2	0.29
HEC	1.0	1.0	--	--
Bact.	0.1	0.1	--	--

5. System Accuracy Verification

A system accuracy verification of the DASY3 was performed using the measurement equipment listed in Section 3.1. The daily system accuracy verification occurs within center section of the SAM phantom.

A SAR measurement was performed to see if the measured SAR was within +/- 10% from the target SAR indicated on the dipole certification sheet. These tests were done at 900MHz and/or 1800MHz. These frequencies are within 100MHz of the mid-band frequency of the test device. This is within the allowable window given in Supplement C 01-01 *Appendix D System Verification* section item #5. The test was conducted on the same days as the measurement of the DUT. Recommended limits for maximum permittivity, minimum conductivity are shown in the table below. These come from the Federal Communication Commission, OET Bulletin 65 Supplement C 01-01. The obtained results from the system accuracy verification are displayed in the table below. The distributions of SAR compare well with those of the reference measurements (see Appendix 1). The tissue stimulant depth was verified to be 15.0cm ±0.5cm. Z-axis scans showing the SAR penetration are also included in Appendix 1. SAR values are normalized to 1W forward power delivered to the dipole.

f (MHz)	Description	SAR (W/kg), 1gram	Dielectric Parameters		Ambient Temp (°C)	Tissue Temp (°C)
			ε_r	σ (S/m)		
835	**Measured,** 05/11/04	9.95	42.9	0.93	20.0	19.5
	Recommended Limits	10.0	41.5 ±5%	0.90 ±5%	18-25	18-25
900	**Measured,** 04/15/04	11.10	41.20	0.98	20.0	19.8
	Measured, 04/16/04	10.95	40.80	0.97	20.0	19.6
	Measured, 04/17/04	11.35	40.60	0.97	21.0	19.5
	Recommended Limits	11.4	41.5 ±5%	0.97 ±5%	18-25	18-25

The following probe conversion factors were used on the E-Field probe(s) used for the system accuracy verification measurements:

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ET3DV6	1514	900	6.30	2 of 11
	1398	900	6.29	7 of 8
E-Field Probe ES3DV6	3037	900	6.10	2 of 10

6. Test Results

The test sample was operated in a test mode that allows control of the transmitter without the need to place actual phone calls. For the purposes of this test the unit is commanded to test mode and manually set to the proper channel, transmitter power level and transmit mode of operation. The phone was tested in the configurations stipulated in OET Bulletin 65 Supplement C 01-01. Motorola also followed the requirements in Supplement. C / Appendix D: SAR Measurement Procedures, section titled "*Devices Operating Next To A Person's Ear* ". These directions state "The device should be tested on the left and right side of the head phantom in the "Cheek/Touch" and "Ear/Tilt" positions. When applicable, each configuration should be tested with the antenna in its fully extended and fully retracted positions. These test configurations should be tested at the high, middle and low frequency channels of each operating mode; for example, AMPS, CDMA, and TDMA. If the SAR measured at the middle channel for each test configuration (left, right, Cheek/Touch, Tile/Ear, extended and retracted) is at least 2.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s)."

The DASY v3.1d SAR measurement system specified in section 3.1 was utilized within the intended operations as set by the SPEAG™ setup. The phone was positioned into the measurement configurations using the positioner supplied with the DASY 3.1d SAR measurement system. The measured dielectric constant of the material used for the positioner is less than 2.9 and the loss tangent is less than 0.02 (± 30%) at 850MHz. The default settings for the "coarse" and "cube" scans were chosen and use for measurements. The grid spacing of the course scan was set to 15cm as shown in the SAR plots included in appendix 2 and 3. Please refer to the DASY manual for additional information on SAR scanning procedures and algorithms used.

The Cellular Phone (FCC ID IDHT5EL1) has the following battery options:

SNN5588A - 750mAH Battery

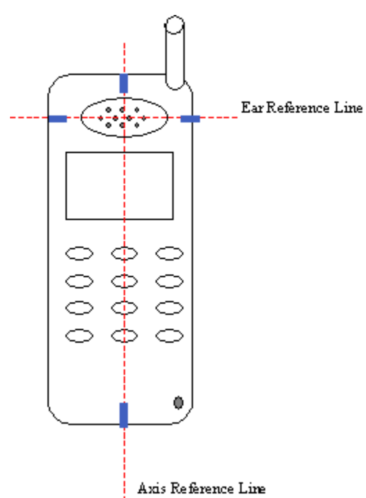
This battery was used to do all of the SAR testing. The phone was placed in the SAR measurement system with a fully charged battery.

6.1 Head Adjacent Test Results

To aid in positioning repeatability, the ear reference line of the device and the axis reference line of the device have been physically added using a non-metallic marker.

- Per Figure 1, the "Ear Reference Line" is centered vertically through the center of the listening area (as defined by the speaker holes in the housing).
- The "Axis Reference Line" bisects the front surface of the device at its top and bottom edges.
- The intersection of these two lines defines the location of the "Ear Reference Point".

The lines drawn on the device extended to the outside edges, as shown in blue in the figure below, & wrap around the sides of the device.



The SAR results shown in tables 1 through 4 are maximum SAR values averaged over 1 gram of phantom tissue. Also shown are the measured conducted output powers, the temperature of the test facility during the test, the temperature of the tissue simulate after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is New SAR = Old SAR * 10^(-drift/10). The SAR reported at the end of the measurement process by the DASY™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test. The test conditions indicated as bold numbers in the following table are included in Appendix 2

The SAR measurements were performed using the SAM phantoms listed in section 3.1. Since same phantoms and tissue simulate are used for the system accuracy verification as the device SAR measurements, the Z-axis scans included in within Appendix 1 are applicable for verification of tissue simulate depth to be 15.0cm ±0.5cm. All other test conditions measured lower SAR values than those included in Appendix 2. Note that 800MHz digital mode SAR measurements were performed in accordance with Supplement C.

The following probe conversion factors were used on the E-Field probe(s) used for the head adjacent measurements:

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ET3DV6	1514	900	6.3	7 of 11
	1398	900	6.29	7 of 8

f (MHz)	Description	Conducted Output Power (dBm)	Left Head (Cheek / Touch Position)			
			Ant Fixed			
			Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)
Analog 800MHz	Channel 991	26.60	**1.07**	**0.03**	**1.07**	**19.5**
	Channel 384	26.55	1.02	0.00	1.02	19.7
	Channel 799	26.49	0.904	-0.1	0.93	19.5
Digital 800MHz	Channel 991	27.55	1.33	-0.01	1.33	19.5
	Channel 384	27.55	**1.43**	**-0.05**	**1.45**	**19.5**
	Channel 799	27.50	1.26	-0.06	1.28	19.5

Table 1: SAR measurement results for the portable cellular telephone FCC ID IHDT5EL1 at highest possible output power. Measured against the left head in the Cheek/Touch Position.

f (MHz)	Description	Conducted Output Power (dBm)	Right Head (Cheek / Touch Position)			
			Ant Fixed			
			Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)
Analog 800MHz	Channel 991	26.60	**1.03**	**-0.06**	**1.04**	**19.8**
	Channel 384	26.55	0.955	0.02	0.96	19.8
	Channel 799	26.49	0.859	-0.13	0.89	19.8
Digital 800MHz	Channel 991	27.55	1.22	0.03	1.22	19.5
	Channel 384	27.55	**1.26**	**0.00**	**1.26**	**19.7**
	Channel 799	27.50	1.18	-0.05	1.19	19.5

Table 2: SAR measurement results for the portable cellular telephone FCC ID IHDT5EL1 at highest possible output power. Measured against the right head in the Cheek/Touch Position.

f (MHz)	Description	Conducted Output Power (dBm)	Left Head (15° Tilt Position)			
			Ant Fixed			
			Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)
Analog 800MHz	Channel 991	26.60				
	Channel 384	26.55	**0.655**	**-0.11**	**0.67**	**19.2**
	Channel 799	26.49				
Digital 800MHz	Channel 991	27.55	0.867	-0.05	0.88	19.5
	Channel 384	27.55	**0.90**	**-0.01**	**0.90**	**19.5**
	Channel 799	27.50	0.798	0.00	0.80	19.5

Table 3: SAR measurement results for the portable cellular telephone FCC ID IHDT5EL1 at highest possible output power. Measured against the left head in the 15° Tilt Position.

f (MHz)	Description	Conducted Output Power (dBm)	Right Head (15° Tilt Position)			
			Ant Fixed			
			Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)
Analog 800MHz	Channel 991	26.60				
	Channel 384	26.55	**0.632**	**0.04**	**0.63**	**19.8**
	Channel 799	26.49				
Digital 800MHz	Channel 991	27.55	0.844	0.05	0.84	19.5
	Channel 384	27.55	**0.854**	**0.06**	**0.85**	**19.7**
	Channel 799	27.50	0.755	0.05	0.76	19.5

Table 4: SAR measurement results for the portable cellular telephone FCC ID IHDT5EL1 at highest possible output power. Measured against the right head in the 15° Tilt Position.

6.2 Body Worn Test Results

The SAR results shown in table 5 are the maximum SAR values averaged over 1 gram of phantom tissue. Also shown are the measured conducted output powers, the temperature of the test facility during the test, the temperature of the tissue simulate after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is New SAR = Old SAR * 10^(-drift/10). The SAR reported at the end of the measurement process by the DASY™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test. The test conditions indicated as bold numbers in the following table are included in Appendix 3. Note that 800MHz digital mode SAR measurements were performed in accordance with OET Bulletin 65 Supplement C 01-01. All other test conditions measured lower SAR values than those included in Appendix 3.

A “flat” phantom was for the body-worn tests. This “flat” phantom is made out of 1” thick natural High Density Polyethylene with a thickness at the bottom equal to 2.0mm. It measures 52.7cm(long) x 26.7cm(wide) x 21.2cm(tall). The measured dielectric constant of the material used is less than 2.3 and the loss tangent is less than 0.0046 all the way up to 2.184GHz.

The tissue stimulant depth was verified to be 15.0cm ±0.5cm. The same device holder described in section 6 was used for positioning the phone. There are no Body-Worn Accessories available for this phone at the time of testing hence the device was tested per the supplement C testing guidelines for devices that do not have body worn accessories. The phone was placed no more than 1 inch away from a flat phantom, per the supplement C standard guidelines, to perform SAR measurement. The cellular phone was tested with a headset connected to the device for all body-worn SAR measurements.

The following probe conversion factors were used on the E-Field probe(s) used for the body worn measurements:

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ET3DV6	1514	900	6.1	8 of 11
	1398	900	5.88	7 of 8
E-Field Probe ES3DV6	3037	900	5.90	8 of 10

f (MHz)	Description	Conducted Output Power (dBm)	Body Worn							
			Front of phone 15 mm away from phantom				Back of phone 15 mm away from phantom			
			Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)	Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)
Analog 800MHz	Channel 991	26.60								
	Channel 384	26.55	**0.53**	**-0.09**	**0.54**	**19.0**	**0.678**	**0.01**	**0.68**	**19.0**
	Channel 799	26.49								
Digital 800MHz	Channel 991	27.55								
	Channel 384	27.55	**0.337**	**-0.06**	**0.239**	**19.5**	**0.443**	**0.02**	**0.44**	**19.5**
	Channel 799	27.50								

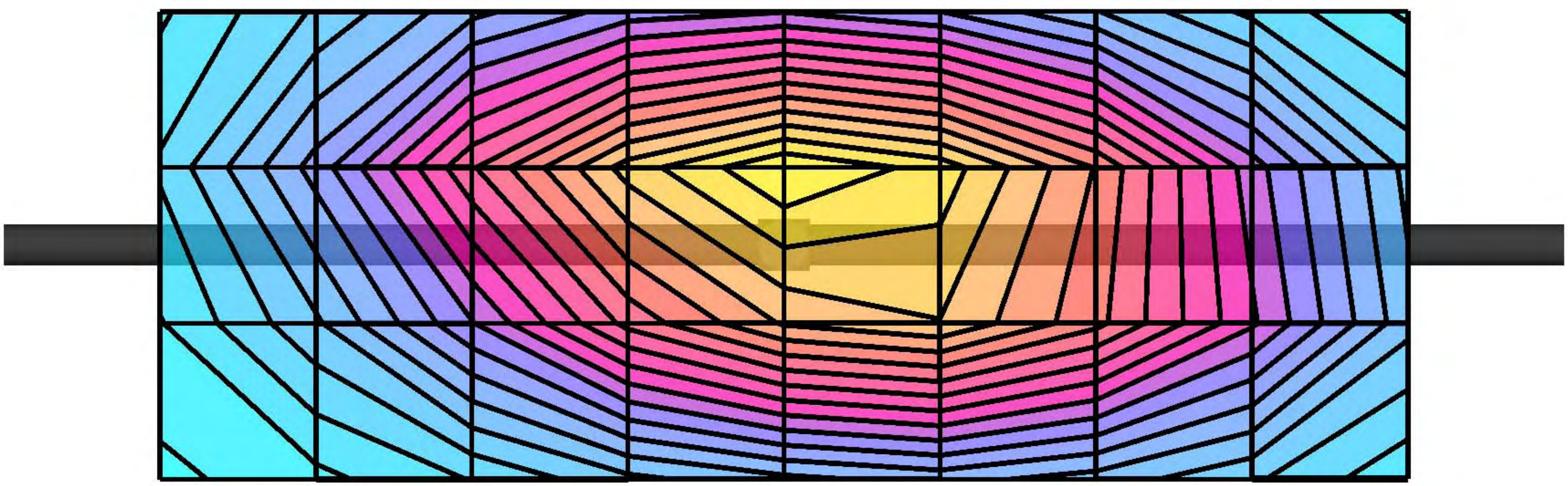
Table 5: SAR measurement results for the portable cellular telephone FCC ID IHDT5EL1 at highest possible output power. Measured against the body.

Appendix 1

SAR distribution comparison for the system accuracy verification

Dipole 900 MHz

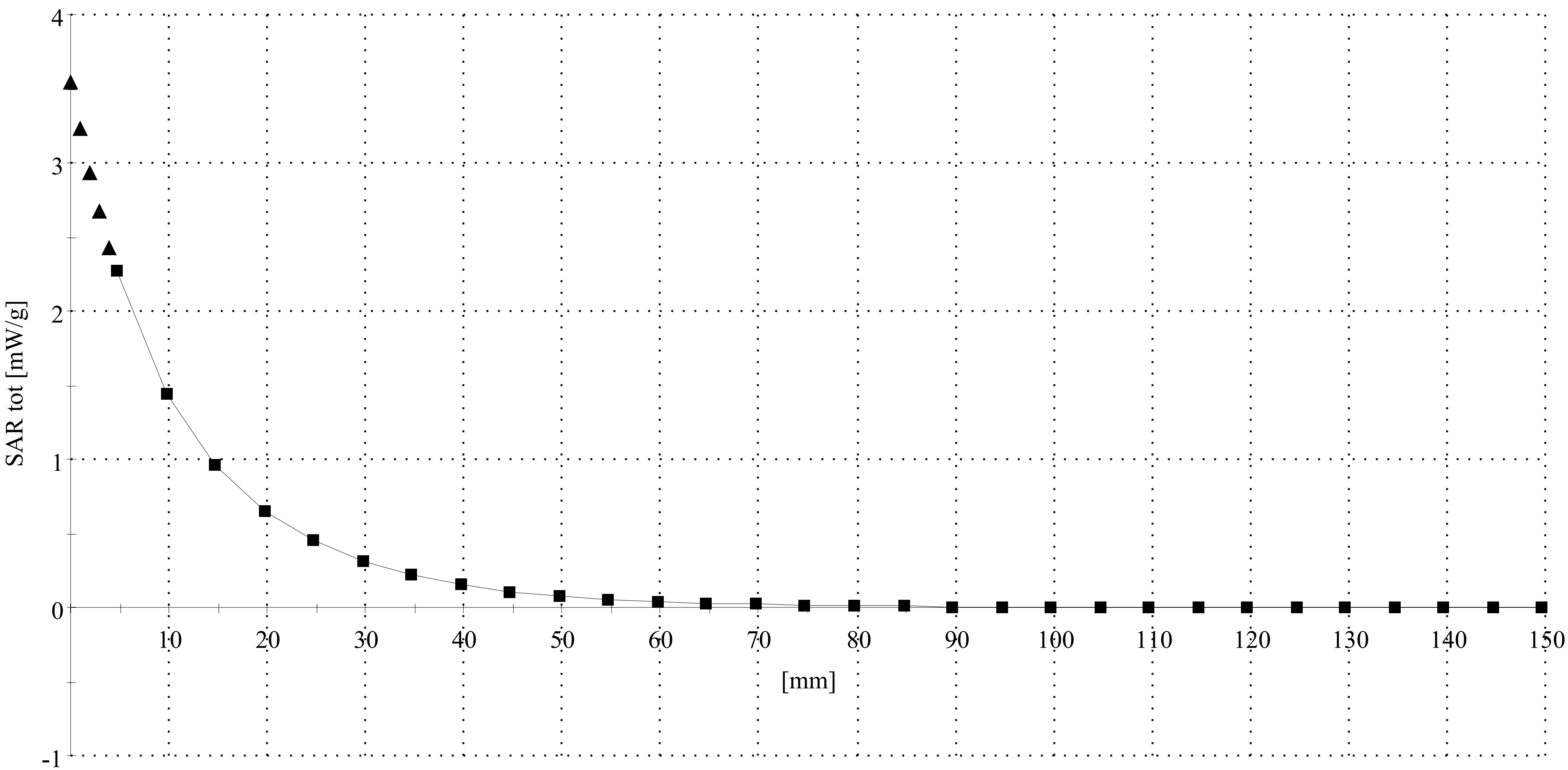
900 MHz System Performance Check / Dipole Sn# 080
PM1 Power = 200mW
Sim.Temp@meas = 19.9C   Sim.Temp@SPC = 19.8C   Room Temp @ SPC = 20C
R3 TP-1153 SAM SUGAR Expanded (Rev. 2)-9Jan03 Phantom; Flat Section; Position: (90°,90°); Frequency: 900 MHz
Probe: ET3DV6 - SN1398 - Validation4; ConvF(6.29,6.29,6.29); Crest factor: 1.0; 900 MHz VALIDATION: σ = 0.98 mho/m ε_r = 41.2 ρ = 1.00 g/cm^3
Cubes (2): SAR (1g): 2.22 mW/g ± 0.01 dB, SAR (10g): 1.40 mW/g ± 0.01 dB, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Penetration depth: 11.5 (10.8, 12.6) [mm]
Powerdrift: -0.04 dB



04/15/04

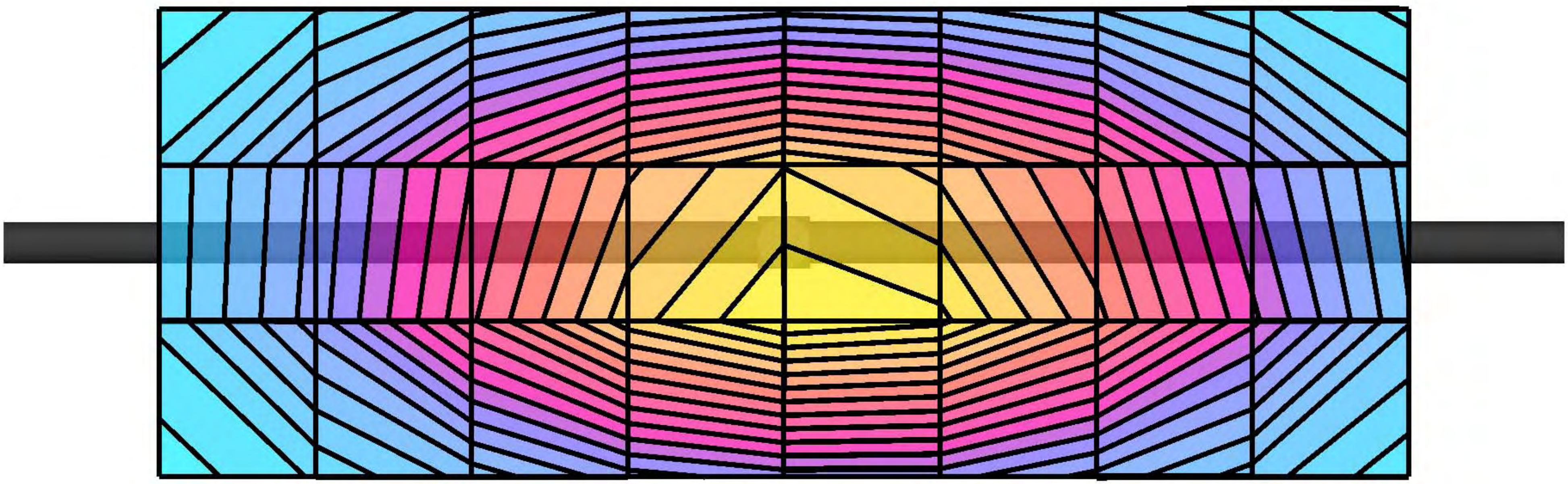
Dipole 900 MHz

900 MHz System Performance Check / Dipole Sn# 080
PM1 Power = 200mW
Sim.Temp@meas = 19.9C Sim.Temp@SPC = 19.8C Room Temp @ SPC = 20C
R3 TP-1153 SAM SUGAR Expanded (Rev. 2)-9Jan03 Phantom; Section; Position: ; Frequency: 900 MHz
Probe: ET3DV6 - SN1398 - Validation4; ConvF(6.29,6.29,6.29); Crest factor: 1.0; 900 MHz VALIDATION: σ = 0.98 mho/m ε_r = 41.2 ρ = 1.00 g/cm^3
: , ()
Z-Axis: Dx = 0.0, Dy = 0.0, Dz = 5.0
Penetration depth: 11.5 (10.7, 12.6) [mm]



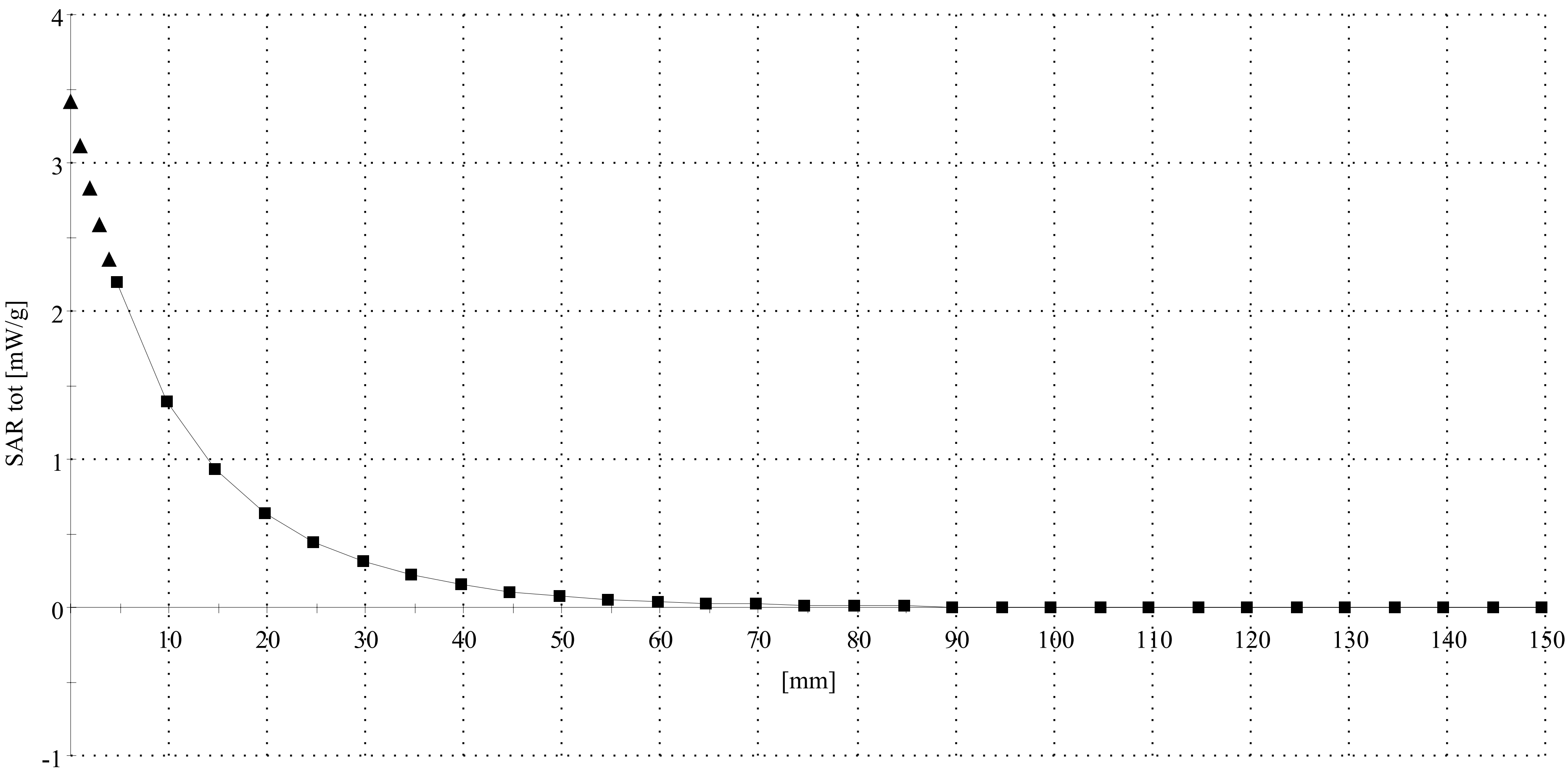
Dipole 900 MHz

900 MHz System Performance Check / Dipole Sn# 96
PM1 Power = 200mW
Sim.Temp@meas=19.7c Sim.Temp@SPC = 19.6c Room Temp @ SPC = 20c
R3 TP-1153 SAM SUGAR Expanded (Rev. 2)-9Jan03 Phantom; Flat Section; Position: (90°,90°); Frequency: 900 MHz
Probe: ET3DV6 - SN1398 - Validation4; ConvF(6.29,6.29,6.29); Crest factor: 1.0; 900 MHz VALIDATION: σ = 0.97 mho/m ε_r = 40.8 ρ = 1.00 g/cm^3
Cubes (2): SAR (1g): 2.19 mW/g ± 0.07 dB, SAR (10g): 1.38 mW/g ± 0.07 dB, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Penetration depth: 11.6 (10.8, 12.7) [mm]
Powerdrift: -0.07 dB



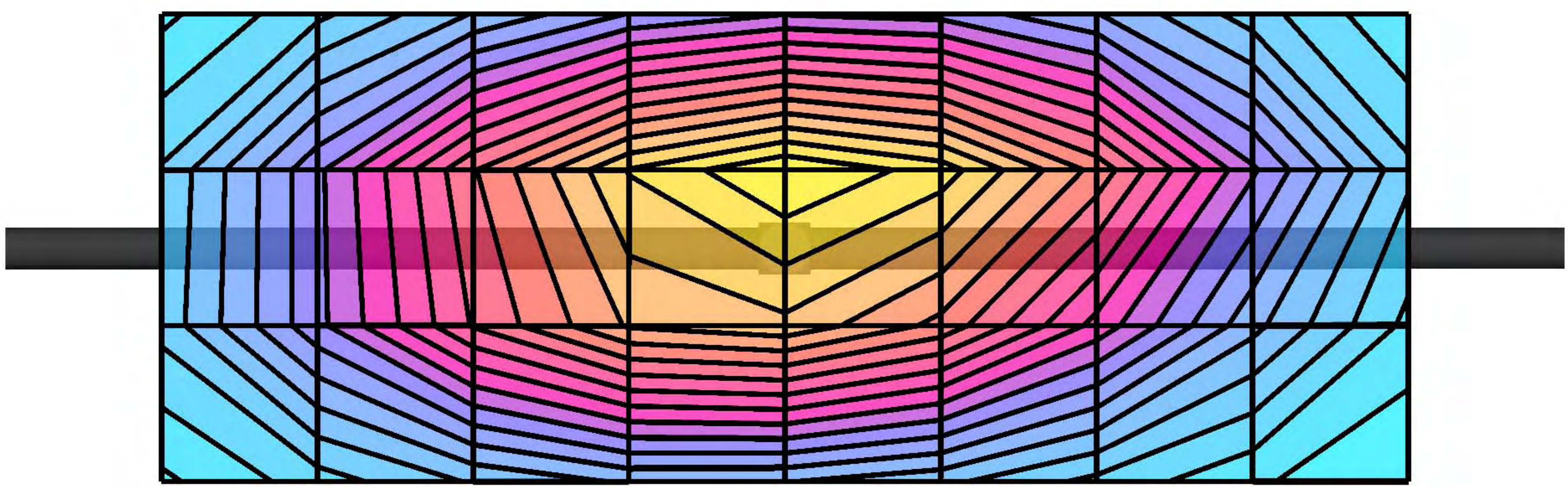
Dipole 900 MHz

900 MHz System Performance Check / Dipole Sn# 96
PM1 Power = 200mW
Sim.Temp@meas=19.7c Sim.Temp@SPC = 19.6c Room Temp @ SPC = 20c
R3 TP-1153 SAM SUGAR Expanded (Rev. 2)-9Jan03 Phantom; Section; Position: ; Frequency: 900 MHz
Probe: ET3DV6 - SN1398 - Validation4; ConvF(6.29,6.29,6.29); Crest factor: 1.0; 900 MHz VALIDATION: $\sigma = 0.97$ mho/m $\varepsilon_r = 40.8$ $\rho = 1.00$ g/cm^3
: , ()
Z-Axis: Dx = 0.0, Dy = 0.0, Dz = 5.0
Penetration depth: 11.5 (10.8, 12.6) [mm]



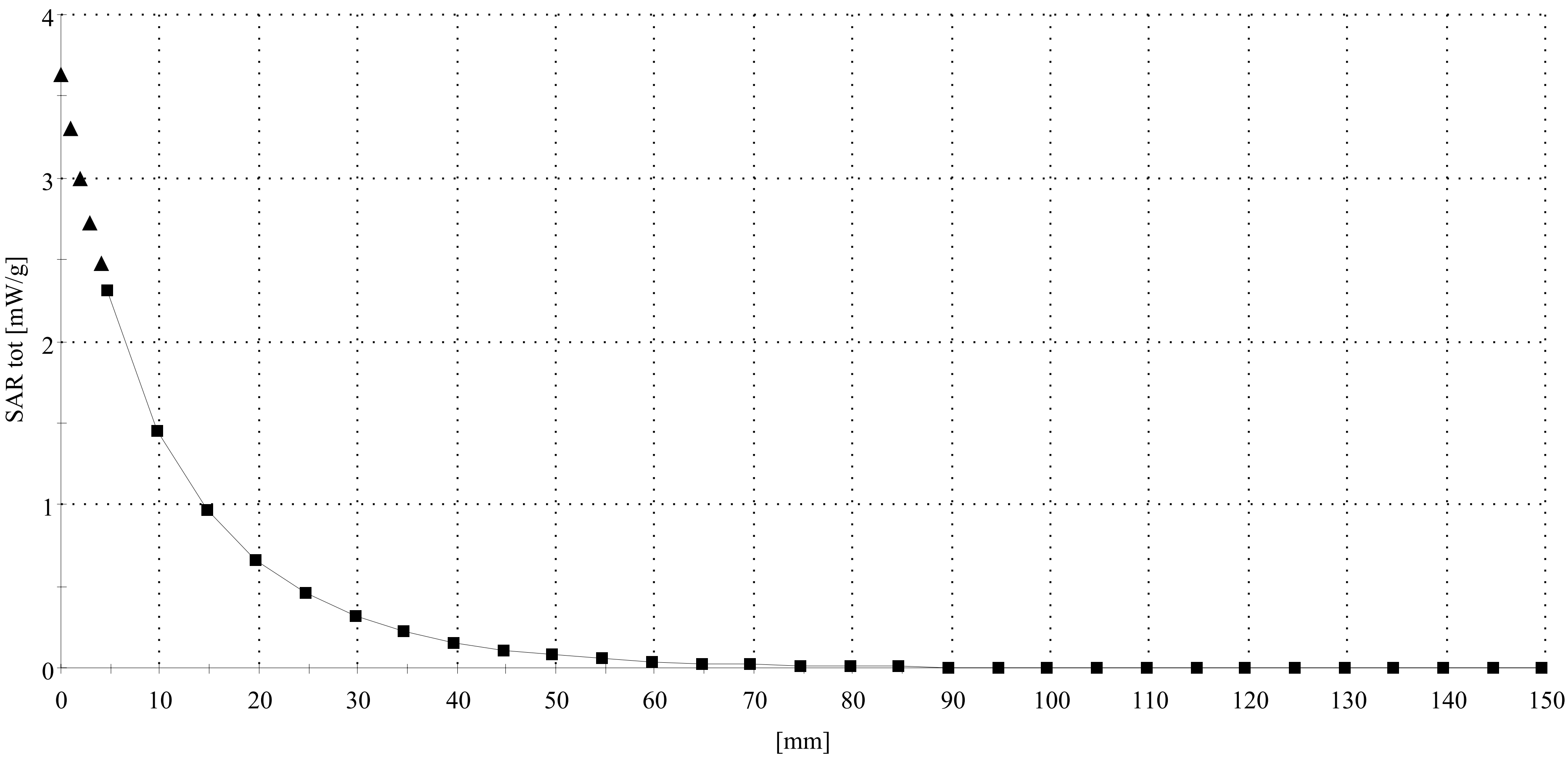
Dipole 900 MHz

900 MHz System Performance Check / Dipole Sn# 96
PM1 Power = 200mW
Sim.Temp@meas=19.5*C Sim.Temp@SPC = 19.5*C Room Temp @ SPC = 21.0*C
R4 TP-1131 SUGAR sam expanded (Rev. 2)-9Jan03 Phantom; Flat Section; Position: (90°,90°); Frequency: 900 MHz
Probe: ET3DV6 - SN1514 - Validation4; ConvF(6.30,6.30,6.30); Crest factor: 1.0; 900 MHz VALIDATION: $\sigma = 0.97$ mho/m $\varepsilon_r = 40.6$ $\rho = 1.00$ g/cm^3
Cubes (2): SAR (1g): 2.27 mW/g ± 0.01 dB, SAR (10g): 1.43 mW/g ± 0.01 dB, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Penetration depth: 11.5 (10.7, 12.6) [mm]
Powerdrift: -0.05 dB



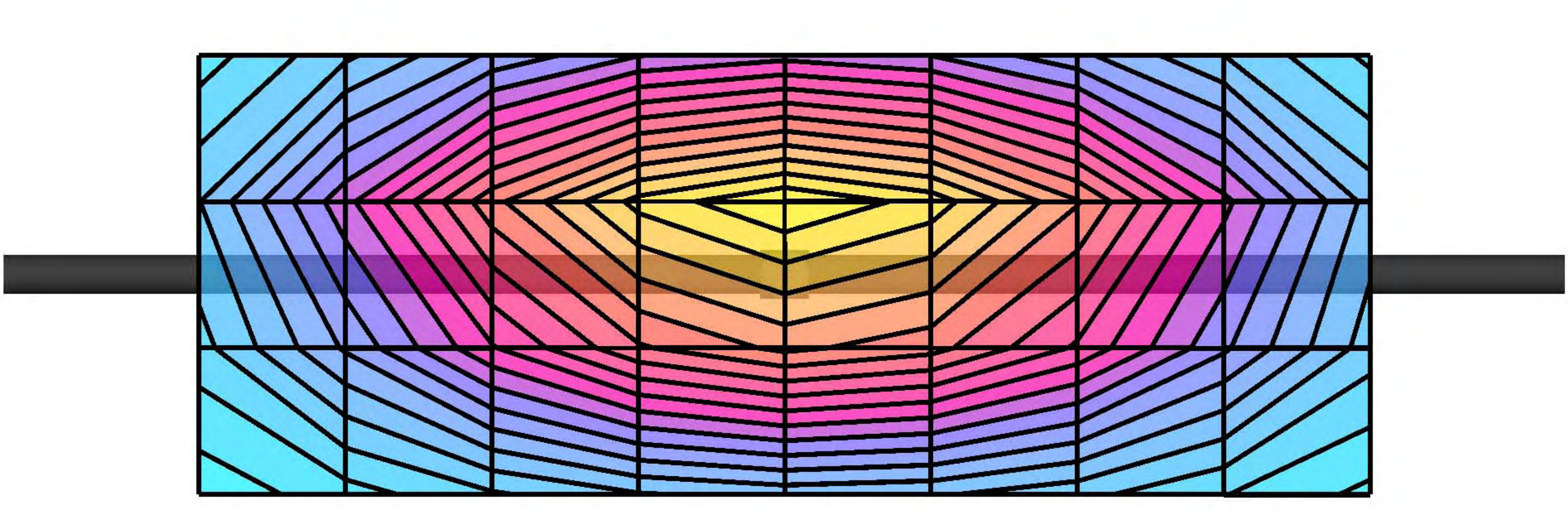
Dipole 900 MHz

900 MHz System Performance Check / Dipole Sn# 96
PM1 Power = 200mW
Sim.Temp@meas=19.5*C Sim.Temp@SPC = 19.5*C Room Temp @ SPC = 21.0*C
R4 TP-1131 SUGAR sam expanded (Rev. 2)-9Jan03 Phantom; Section; Position: ; Frequency: 900 MHz
Probe: ET3DV6 - SN1514 - Validation4; ConvF(6.30,6.30,6.30); Crest factor: 1.0; 900 MHz VALIDATION: σ = 0.97 mho/m ε_r = 40.6 ρ = 1.00 g/cm³
: , ()
Z-Axis: Dx = 0.0, Dy = 0.0, Dz = 5.0
Penetration depth: 11.4 (10.5, 12.6) [mm]



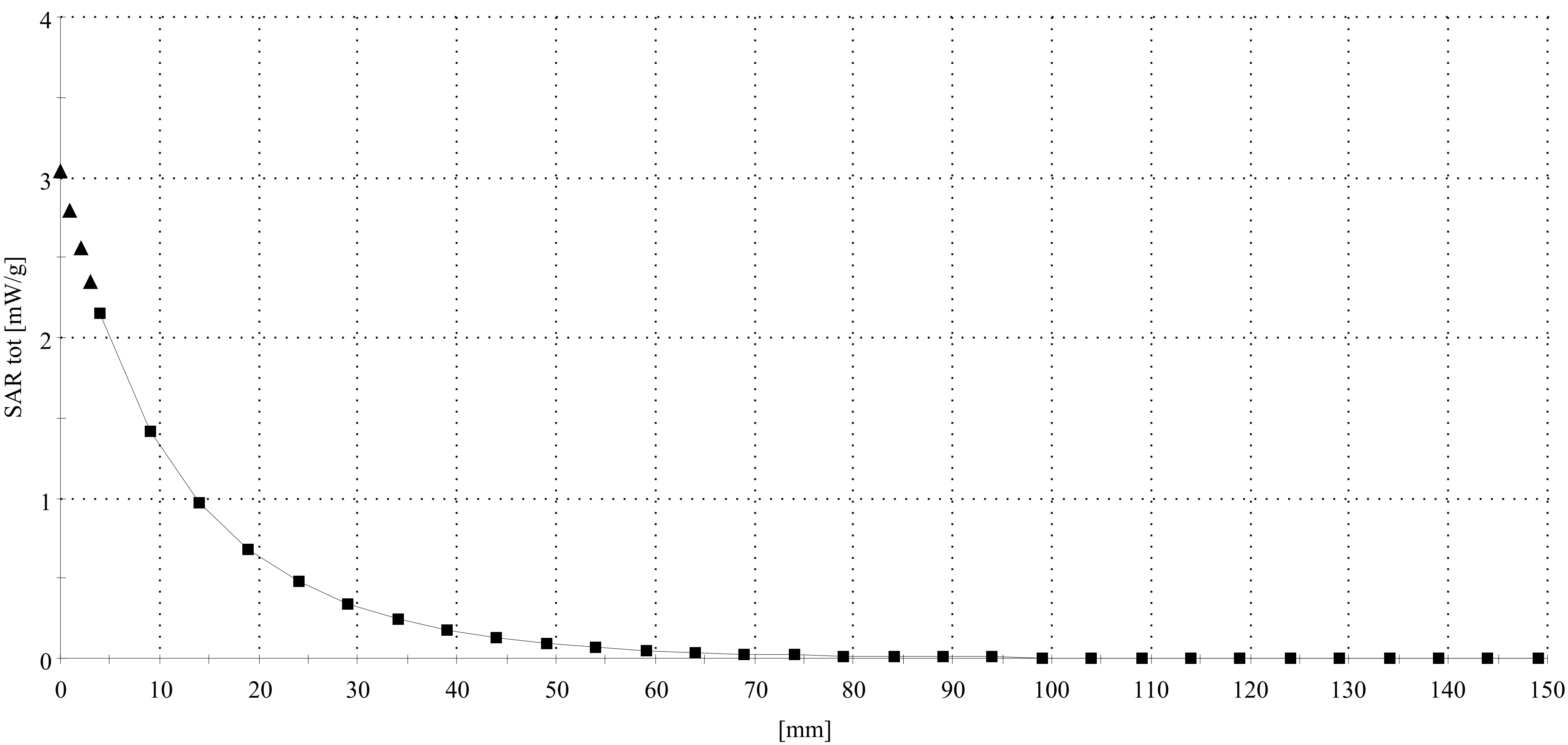
Dipole 835 MHz

835 MHz System Performance Check / Dipole Sn# 425TR
PM1 Power =200?mW
Sim.Temp@meas=19.5 Sim.Temp@SPC =19.5 Room Temp @ SPC = 20
R1 TP-1005 SUGAR SAM Expanded (Rev. 2)-9Jan03 Phantom; Flat Section; Position: (90°,90°); Frequency: 835 MHz
Probe: ES3DV3 - SN3037 - Validation4; ConvF(6.10,6.10,6.10); Crest factor: 1.0; 835 MHz VALIDATION: σ = 0.93 mho/m ε_r = 42.9 ρ = 1.00 g/cm^3
Cubes (2): SAR (1g): 1.99 mW/g ± 0.03 dB, SAR (10g): 1.29 mW/g ± 0.02 dB, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Penetration depth: 12.6 (11.8, 13.6) [mm]
Powerdrift: -0.02 dB



Dipole 835 MHz

835 MHz System Performance Check / Dipole Sn# 425TR
PM1 Power =200?mW
Sim.Temp@meas=19.5 Sim.Temp@SPC =19.5 Room Temp @ SPC = 20
R1 TP-1005 SUGAR SAM Expanded (Rev. 2)-9Jan03 Phantom; Section; Position: ; Frequency: 835 MHz
Probe: ES3DV3 - SN3037 - Validation4; ConvF(6.10,6.10,6.10); Crest factor: 1.0; 835 MHz VALIDATION: σ = 0.93 mho/m ε_r = 42.9 ρ = 1.00 g/cm^3
: , ()
Z-Axis: Dx = 0.0, Dy = 0.0, Dz = 5.0
Penetration depth: 12.5 (11.8, 13.5) [mm]

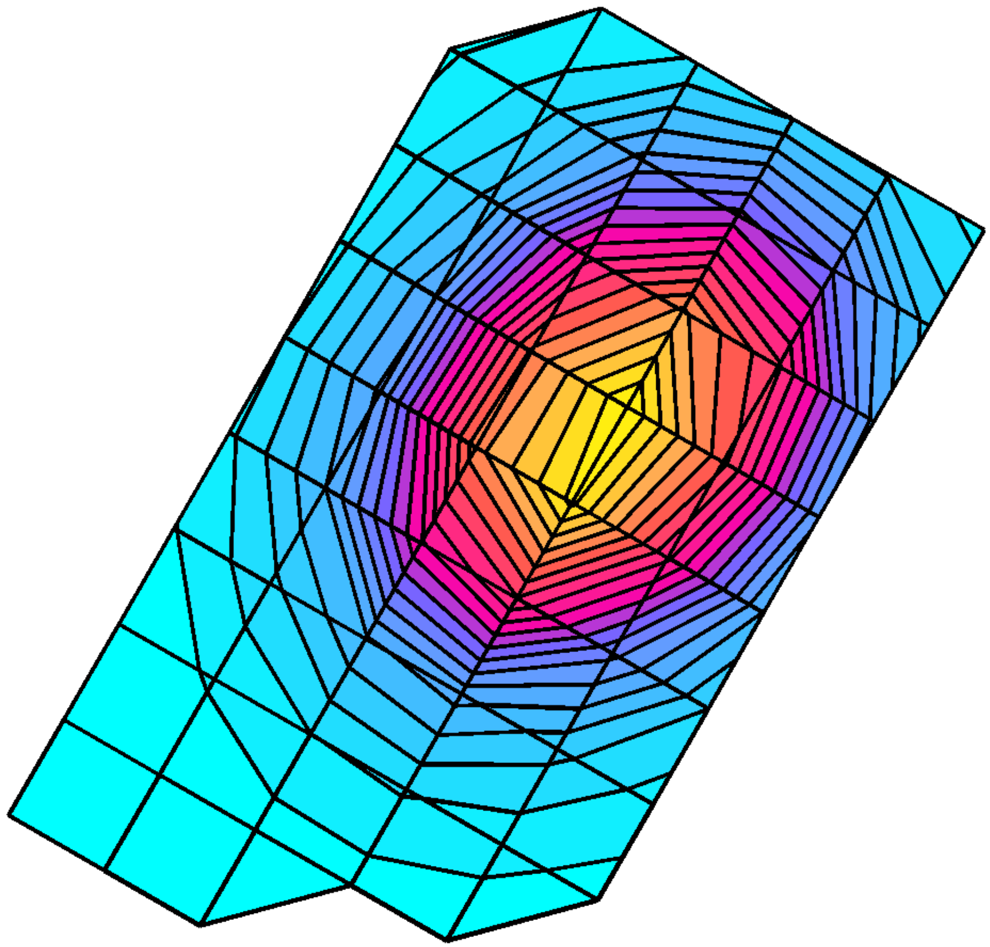


Appendix 2

SAR distribution plots for Phantom Head Adjacent Use

3473E4AC

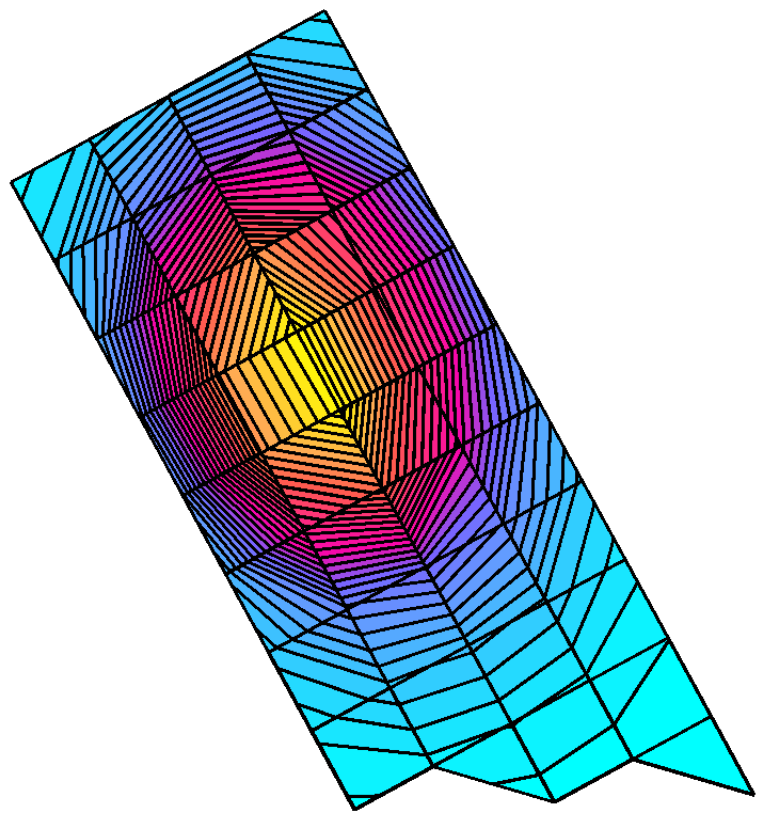
Ch# 384 Pwr Step: 2 OTA Antenna Position: FIXED
Type of Modulation: 800 TDMA Battery Model #: SNN5588A
DEVICE POSITION: Cheek
Accessory Model #: none
R4 TP-1131 SUGAR sam expanded (Rev. 2)-9Jan03 Phantom; Left Hand Section; Position: (90°,180°); Frequency: 837 MHz
Probe: ET3DV6 - SN1514 - IEEE Head.2; ConvF(6.30,6.30,6.30); Crest factor: 3.0; 835 MHz Head & Body: σ = 0.90 mho/m ϵ_r = 41.5 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 1.43 mW/g, SAR (10g): 0.987 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 15.4 (14.3, 16.5) [mm]
Powerdrift: -0.05 dB



04/15/04 11:20

3473E4AC

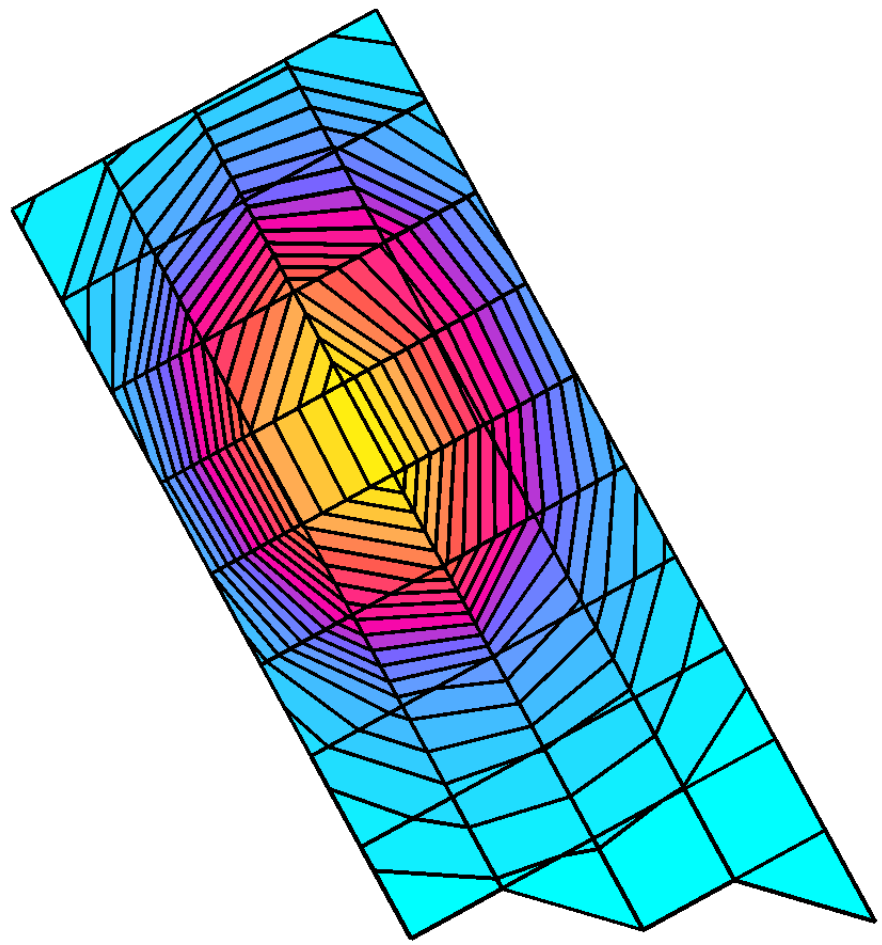
Ch# 991 / Pwr Step: 02 (OTA) Antenna Position: FIXED
Type of Modulation: 800 AMPS Battery Model #: SNN5588A
DEVICE POSITION: Cheek touch
Accessory Model #: N/A
R3 TP-1153 SAM SUGAR Expanded (Rev. 2)-9Jan03 Phantom; Right Hand Section; Position: (90°,180°); Frequency: 824 MHz
Probe: ET3DV6 - SN1398 - IEEE Head2; ConvF(6.29,6.29,6.29); Crest factor: 1.0; 835 MHz Head & Body: σ = 0.92 mho/m ε_r = 42.0 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 1.03 mW/g, SAR (10g): 0.718 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 16.2 (15.3, 16.9) [mm]
Powerdrift: -0.06 dB



04/15/04 10:46

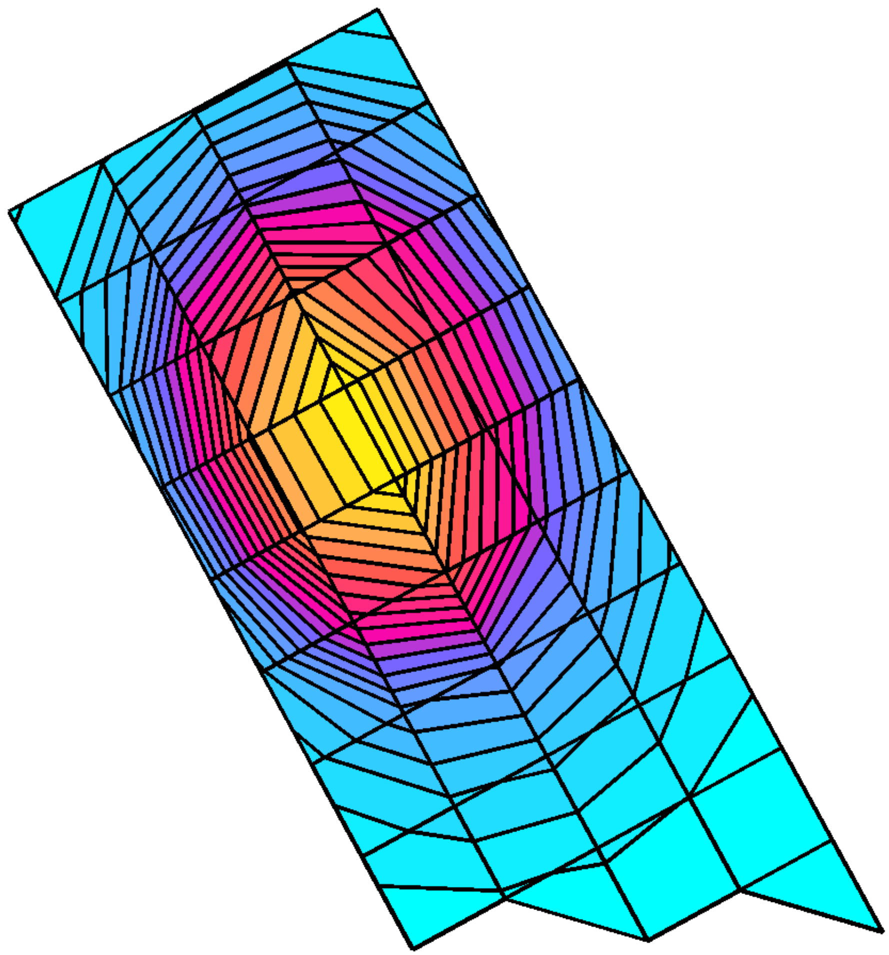
3473E4AC

Ch# 799 / Pwr Step: 02 (OTA) Antenna Position: FIXED
Type of Modulation: 800 AMPS Battery Model #: SNN5588A
DEVICE POSITION: Cheek touch
Accessory Model #: N/A
R3 TP-1153 SAM SUGAR Expanded (Rev. 2)-9Jan03 Phantom; Right Hand Section; Position: (90°,180°); Frequency: 849 MHz
Probe: ET3DV6 - SN1398 - IEEE Head2; ConvF(6.29,6.29,6.29); Crest factor: 1.0; 835 MHz Head & Body: σ = 0.92 mho/m ε_r = 42.0 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 0.859 mW/g, SAR (10g): 0.595 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 15.8 (15.2, 16.5) [mm]
Powerdrift: -0.13 dB



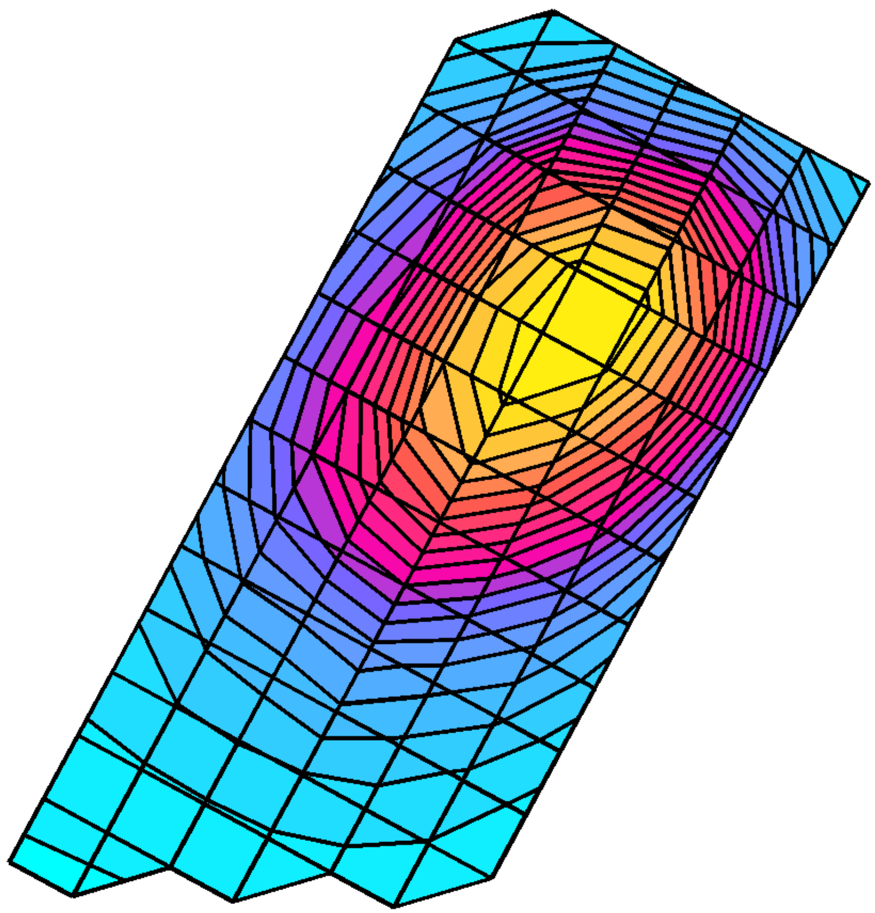
3473E4AC

Ch# 384 / Pwr Step: 02 (OTA) Antenna Position: FIXED
Type of Modulation: 800 AMPS Battery Model #: SNN5588A
DEVICE POSITION: Cheek touch
Accessory Model #: N/A
R3 TP-1153 SAM SUGAR Expanded (Rev. 2)-9Jan03 Phantom; Right Hand Section; Position: (90°,180°); Frequency: 837 MHz
Probe: ET3DV6 - SN1398 - IEEE Head2; ConvF(6.29,6.29,6.29); Crest factor: 1.0; 835 MHz Head & Body: σ = 0.92 mho/m ε_r = 42.0 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 0.955 mW/g, SAR (10g): 0.663 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 15.9 (15.2, 16.6) [mm]
Powerdrift: 0.02 dB



3473E4AC

Ch# 384 / Pwr Step: 2 Antenna Position: Fixed
Type of Modulation: Analog 800 Battery Model #: SNN5588A
DEVICE POSITION (cheek or rotated): Rotated
Accessory Model #: N/A
Simulate Temp when Measured: 19.7C Simulate Temp after Test: 19.2C
R3 TP-1153 SAM SUGAR Expanded (Rev. 2)-9Jan03 Phantom; Left Hand Section; Position: (90°,180°); Frequency: 837 MHz
Probe: ET3DV6 - SN1398 - IEEE Head2; ConvF(6.29,6.29,6.29); Crest factor: 1.0; 835 MHz Head & Body: σ = 0.91 mho/m ε_r = 41.6 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 0.655 mW/g, SAR (10g): 0.451 mW/g, (Worst-case extrapolation)
Coarse: Dx = 10.0, Dy = 10.0, Dz = 10.0
Penetration depth: 14.7 (14.7, 14.7) [mm]
Powerdrift: -0.11 dB



04/16/04 23:47

3473E4AC

Ch# 991 / Pwr Step: 2 Antenna Position: Fixed

Type of Modulation: Analog 800 Battery Model #: SNN5588A

DEVICE POSITION (cheek or rotated): Cheek

Accessory Model #: N/A

Simulate Temp when Measured: 19.7C Simulate Temp after Test: 19.5C

R3 TP-1153 SAM SUGAR Expanded (Rev. 2)-9Jan03 Phantom; Left Hand Section; Position: (90°,180°); Frequency: 824 MHz

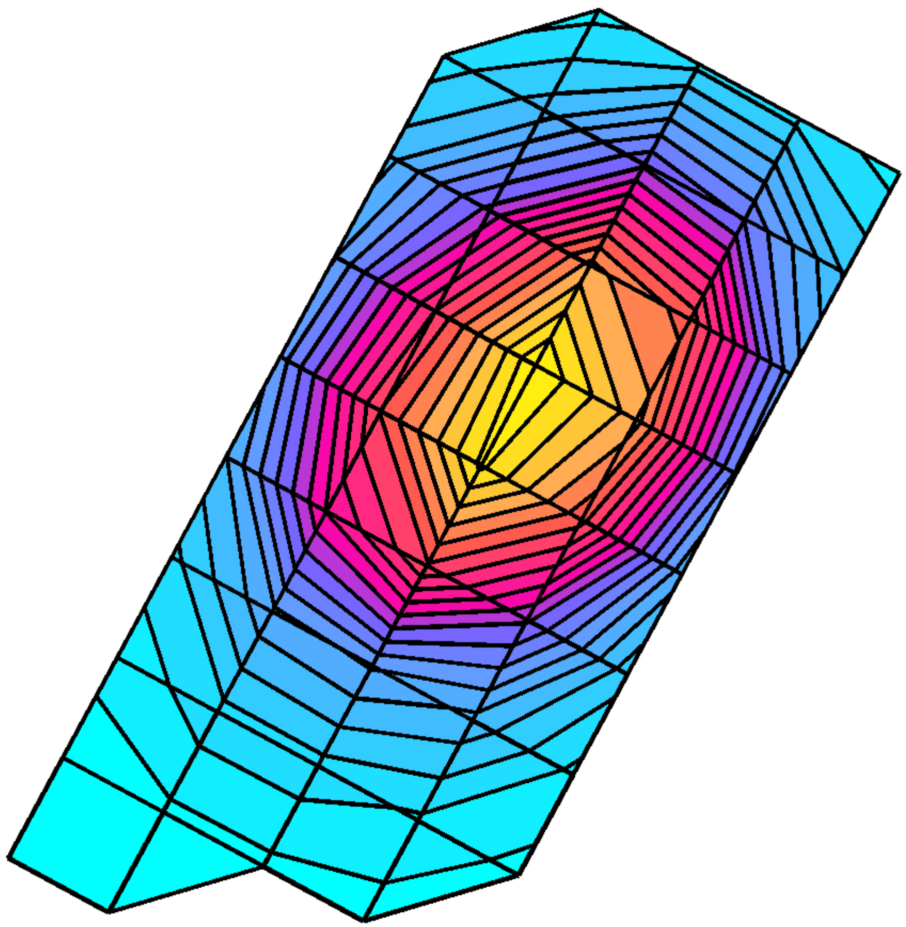
Probe: ET3DV6 - SN1398 - IEEE Head2; ConvF(6.29,6.29,6.29); Crest factor: 1.0; 835 MHz Head & Body: $\sigma = 0.91$ mho/m $\varepsilon_r = 41.6$ $\rho = 1.00$ g/cm^3

Cube 7x7x7: SAR (1g): 1.07 mW/g, SAR (10g): 0.743 mW/g, (Worst-case extrapolation)

Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0

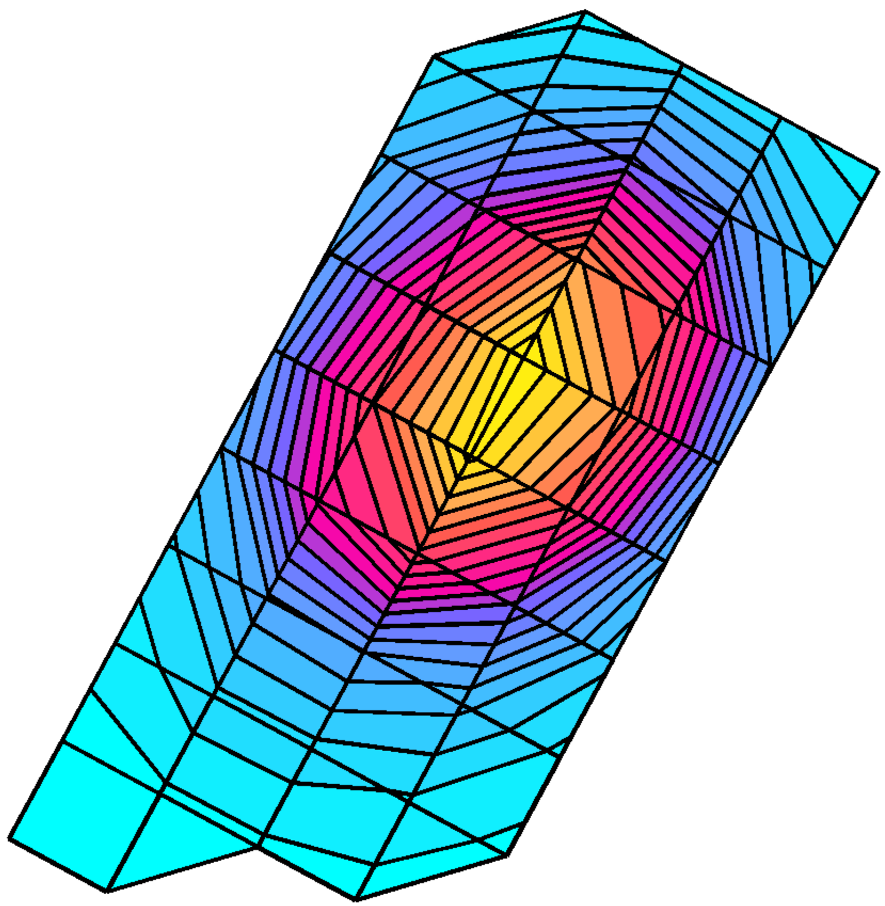
Penetration depth: 15.5 (14.7, 16.3) [mm]

Powerdrift: 0.03 dB



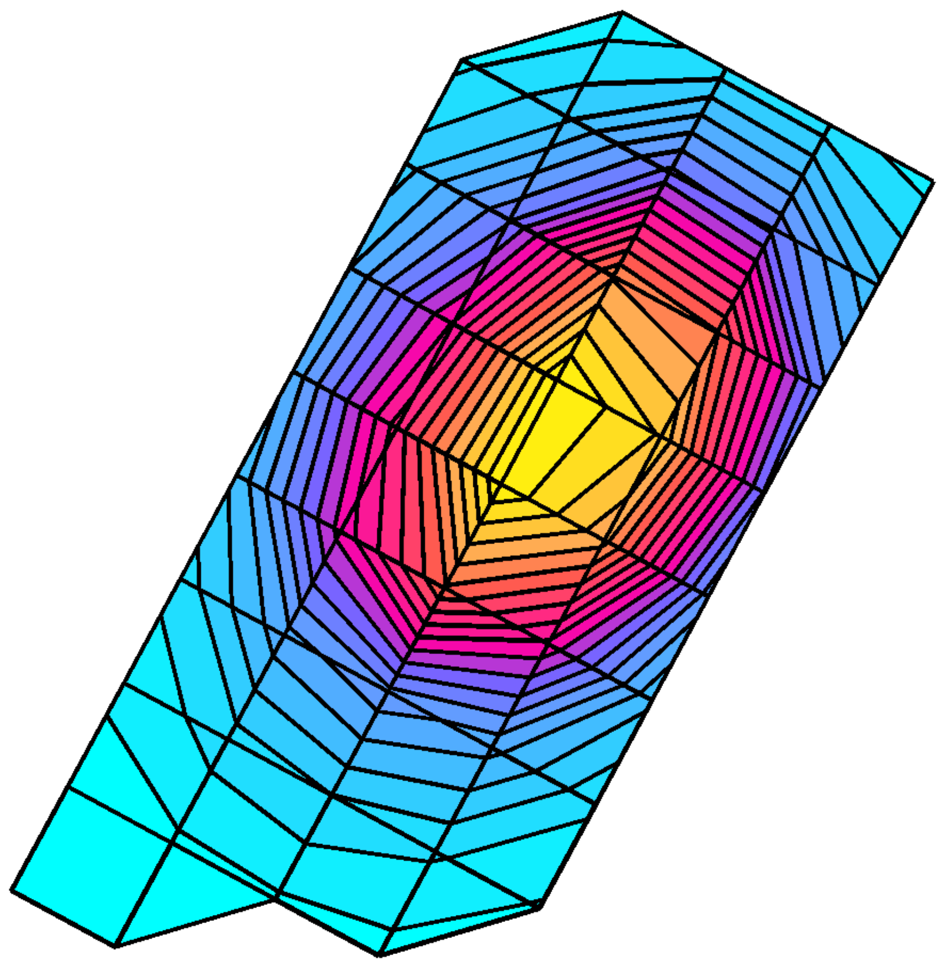
3473E4AC

Ch# 799 / Pwr Step: 2 Antenna Position: Fixed
Type of Modulation: Analog 800 Battery Model #: SNN5588A
DEVICE POSITION (cheek or rotated): Cheek
Accessory Model #: N/A
Simulate Temp when Measured: 19.7C Simulate Temp after Test: 19.5C
R3 TP-1153 SAM SUGAR Expanded (Rev. 2)-9Jan03 Phantom; Left Hand Section; Position: (90°,180°); Frequency: 849 MHz
Probe: ET3DV6 - SN1398 - IEEE Head2; ConvF(6.29,6.29,6.29); Crest factor: 1.0; 835 MHz Head & Body: σ = 0.91 mho/m ε_r = 41.6 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 0.904 mW/g, SAR (10g): 0.624 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 15.2 (14.5, 15.9) [mm]
Powerdrift: -0.10 dB



3473E4AC

Ch# 384 / Pwr Step: 2 O.T.A. Antenna Position: Fix
Type of Modulation: ANALOG 800 Battery Model #: SNN5588A
DEVICE POSITION (cheek or rotated): Cheek
Accessory Model #: None
R3 TP-1153 SAM SUGAR Expanded (Rev. 2)-9Jan03 Phantom; Left Hand Section; Position: (90°,180°); Frequency: 837 MHz
Probe: ET3DV6 - SN1398 - IEEE Head2; ConvF(6.29,6.29,6.29); Crest factor: 1.0; 835 MHz Head & Body: σ = 0.91 mho/m ε_r = 41.6 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 1.02 mW/g, SAR (10g): 0.707 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 15.4 (14.6, 16.1) [mm]
Powerdrift: 0.00 dB



04/15/04 14:26

3473E4AC

Ch# 991 / Pwr Step: 02 (OTA) Antenna Position: FIXED

Type of Modulation: 800 TDMA Battery Model #: SNN5588A

DEVICE POSITION: 15 deg TILT

Accessory Model #: N/A

R3 TP-1153 SAM SUGAR Expanded (Rev. 2)-9Jan03 Phantom; Right Hand Section; Position: (90°,180°); Frequency: 824 MHz

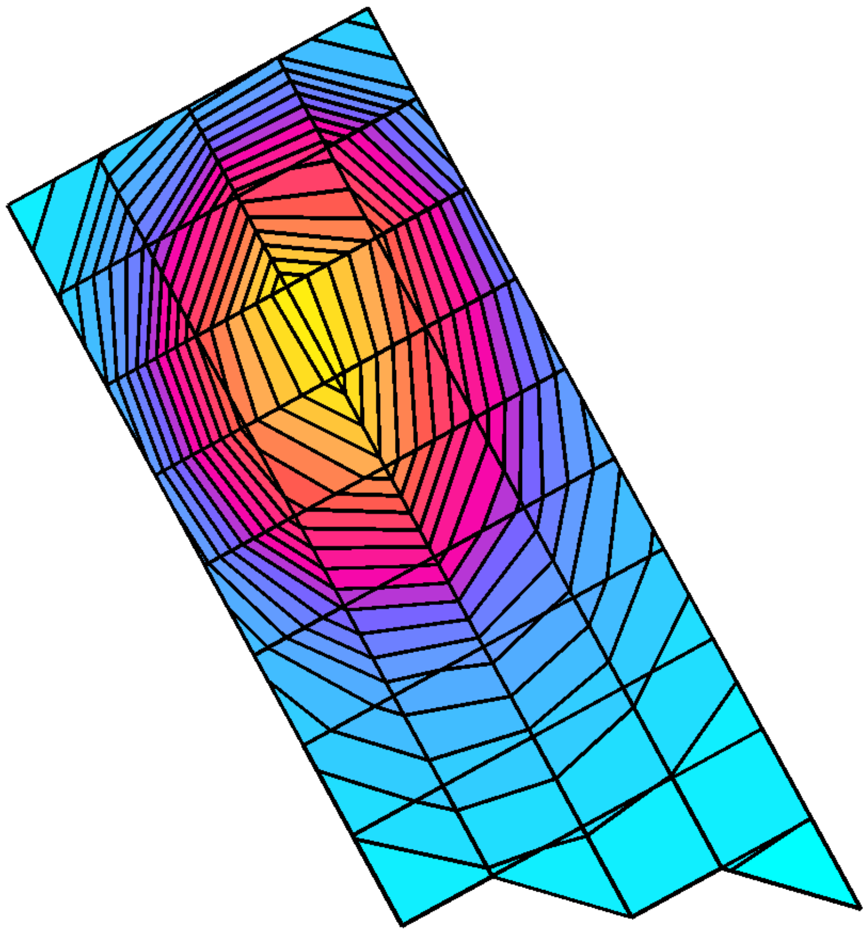
Probe: ET3DV6 - SN1398 - IEEE Head2; ConvF(6.29,6.29,6.29); Crest factor: 3.0; 835 MHz Head & Body: σ = 0.92 mho/m ε_r = 42.0 ρ = 1.00 g/cm^3

Cube 7x7x7: SAR (1g): 0.844 mW/g, SAR (10g): 0.589 mW/g, (Worst-case extrapolation)

Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0

Penetration depth: 14.6 (14.5, 14.8) [mm]

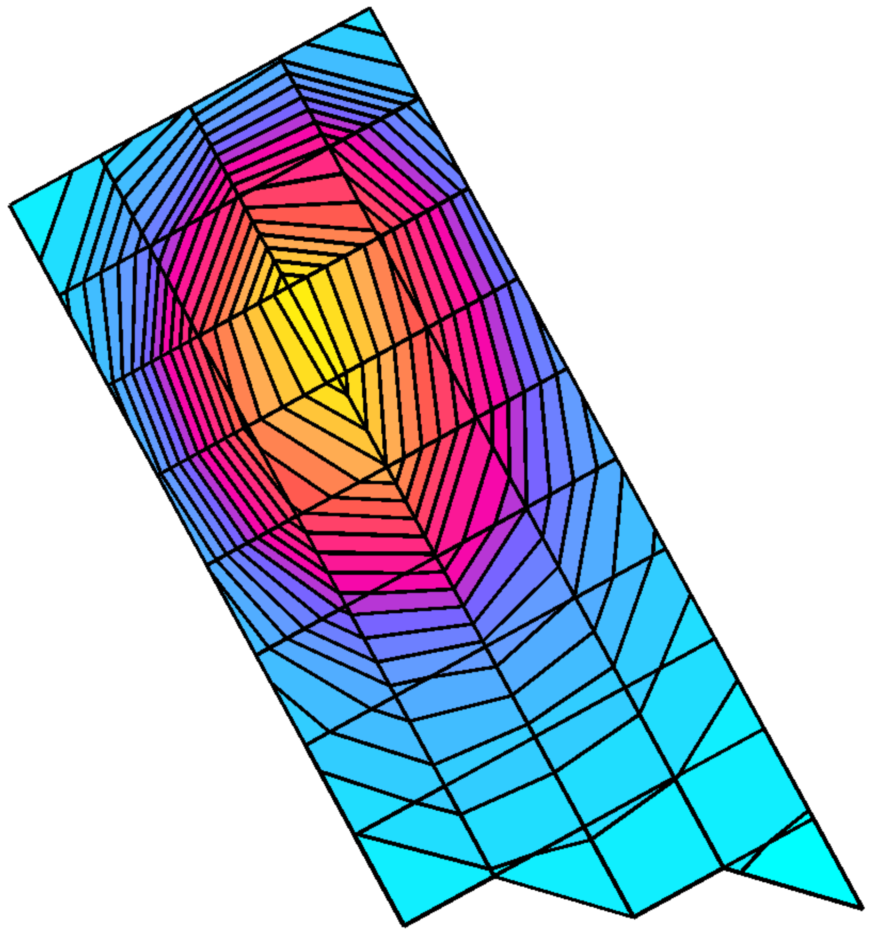
Powerdrift: 0.05 dB



04/15/04 15:55

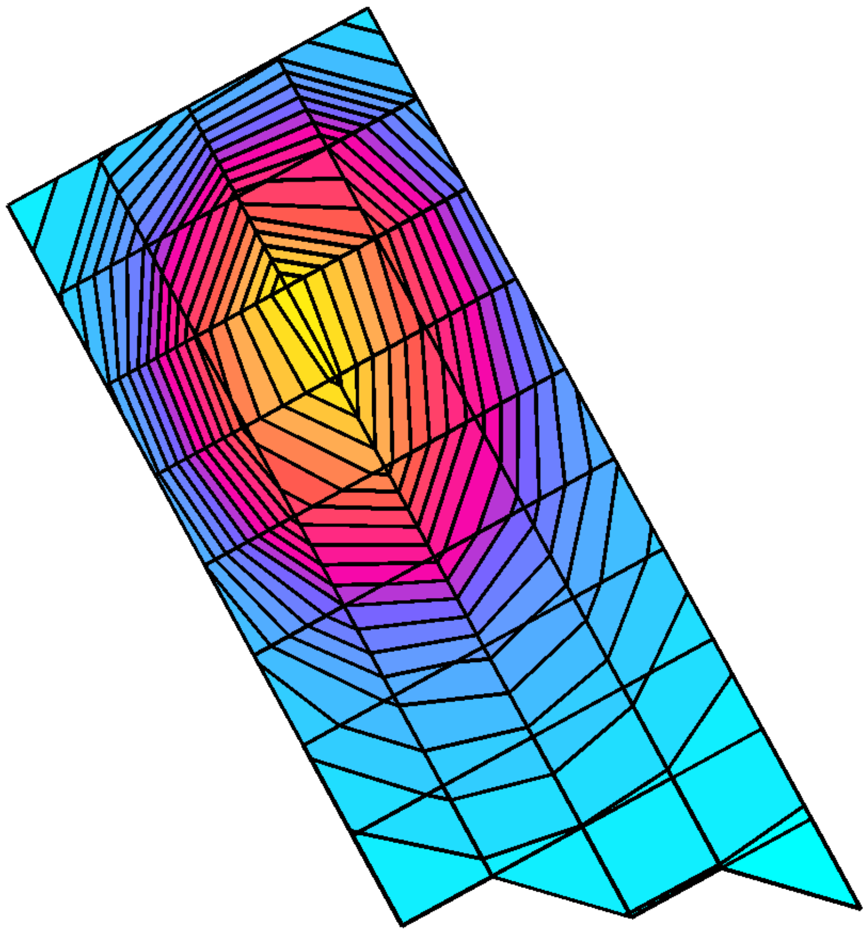
3473E4AC

Ch# 799 / Pwr Step: 02 (OTA)
Antenna Position: FIXED
Type of Modulation: 800 TDMA
Battery Model #: SNN5588A
DEVICE POSITION: 15 deg TILT
Accessory Model #: N/A
R3 TP-1153 SAM SUGAR Expanded (Rev. 2)-9Jan03 Phantom; Right Hand Section; Position: (90°,180°); Frequency: 849 MHz
Probe: ET3DV6 - SN1398 - IEEE Head2; ConvF(6.29,6.29,6.29); Crest factor: 3.0; 835 MHz Head & Body: σ = 0.92 mho/m ε_r = 42.0 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 0.755 mW/g, SAR (10g): 0.529 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 15.3 (15.2, 15.5) [mm]
Powerdrift: 0.05 dB



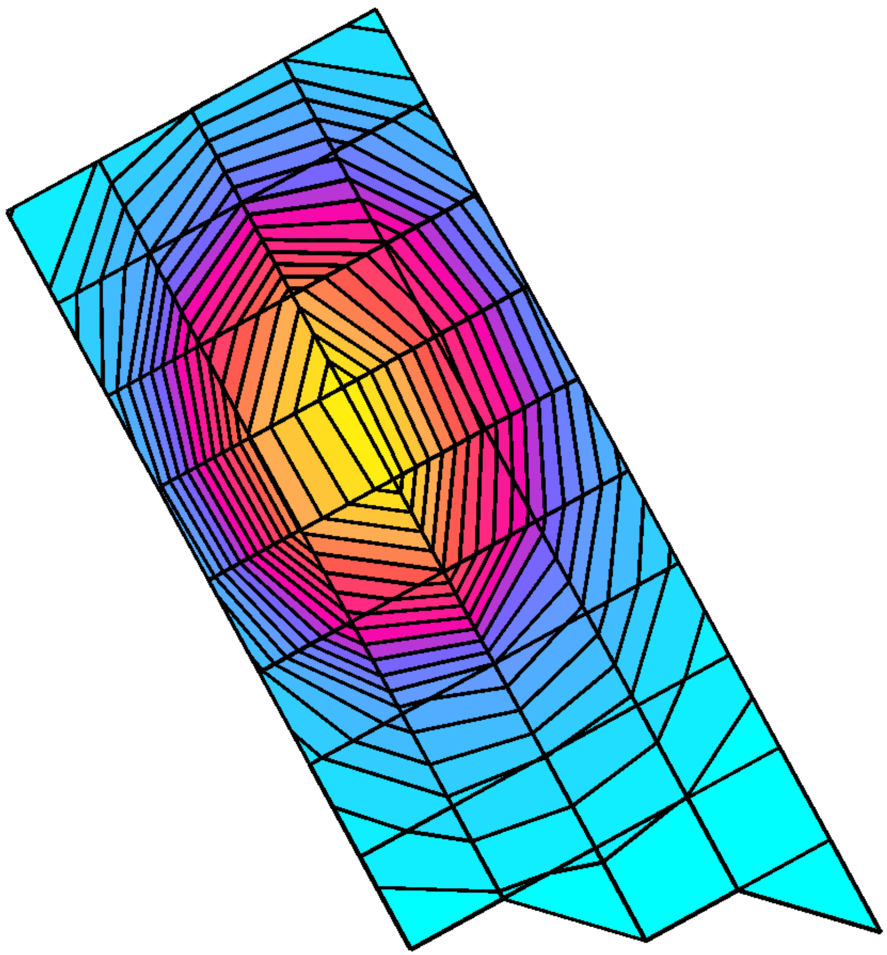
3473E4AC

Ch# 384 / Pwr Step: 02 (OTA) Antenna Position: FIXED
Type of Modulation: 800 TDMA Battery Model #: SNN5588A
DEVICE POSITION: 15 deg TILT
Accessory Model #: N/A
R3 TP-1153 SAM SUGAR Expanded (Rev. 2)-9Jan03 Phantom; Right Hand Section; Position: (90°,180°); Frequency: 837 MHz
Probe: ET3DV6 - SN1398 - IEEE Head2; ConvF(6.29,6.29,6.29); Crest factor: 3.0; 835 MHz Head & Body: σ = 0.92 mho/m ε_r = 42.0 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 0.854 mW/g, SAR (10g): 0.598 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 15.2 (15.1, 15.5) [mm]
Powerdrift: 0.06 dB



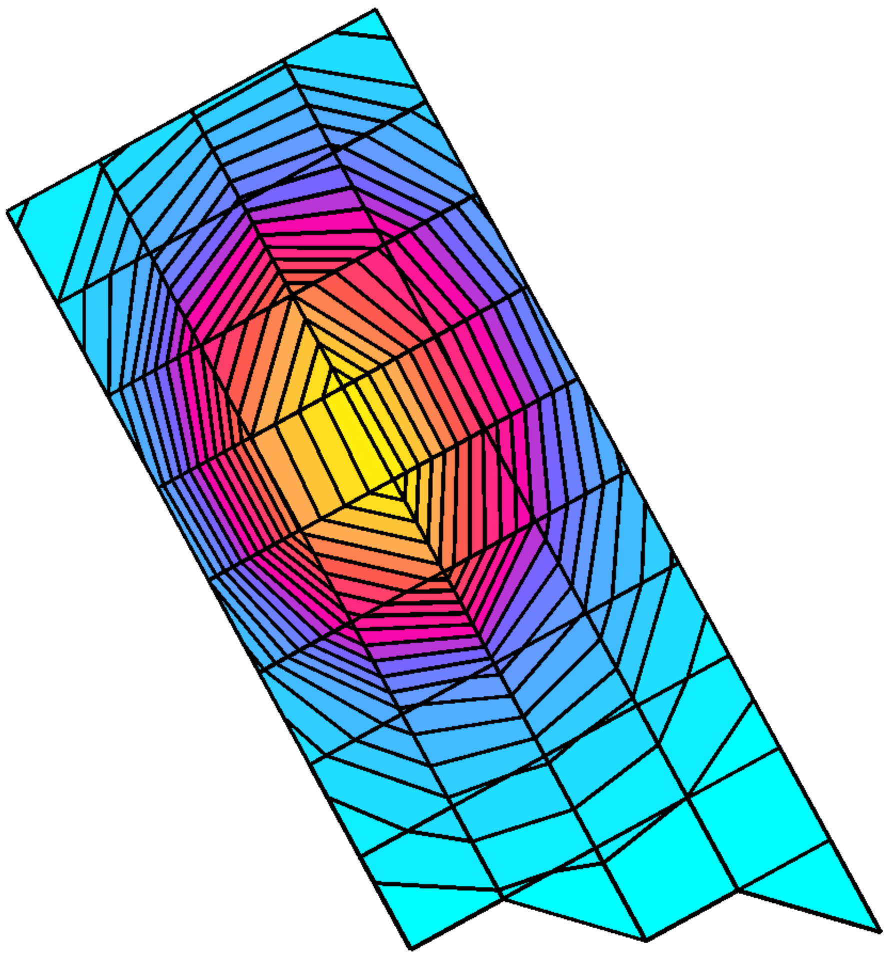
3473E4AC

Ch# 991 / Pwr Step: 02 (OTA) Antenna Position: FIXED
Type of Modulation: 800 TDMA Battery Model #: SNN5588A
DEVICE POSITION: Cheek touch
Accessory Model #: N/A
R3 TP-1153 SAM SUGAR Expanded (Rev. 2)-9Jan03 Phantom; Right Hand Section; Position: (90°,180°); Frequency: 824 MHz
Probe: ET3DV6 - SN1398 - IEEE Head2; ConvF(6.29,6.29,6.29); Crest factor: 3.0; 835 MHz Head & Body: $\sigma = 0.92$ mho/m $\varepsilon_r = 42.0$ $\rho = 1.00$ g/cm^3
Cube 7x7x7: SAR (1g): 1.22 mW/g, SAR (10g): 0.853 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 16.2 (15.3, 17.0) [mm]
Powerdrift: 0.03 dB



3473E4AC

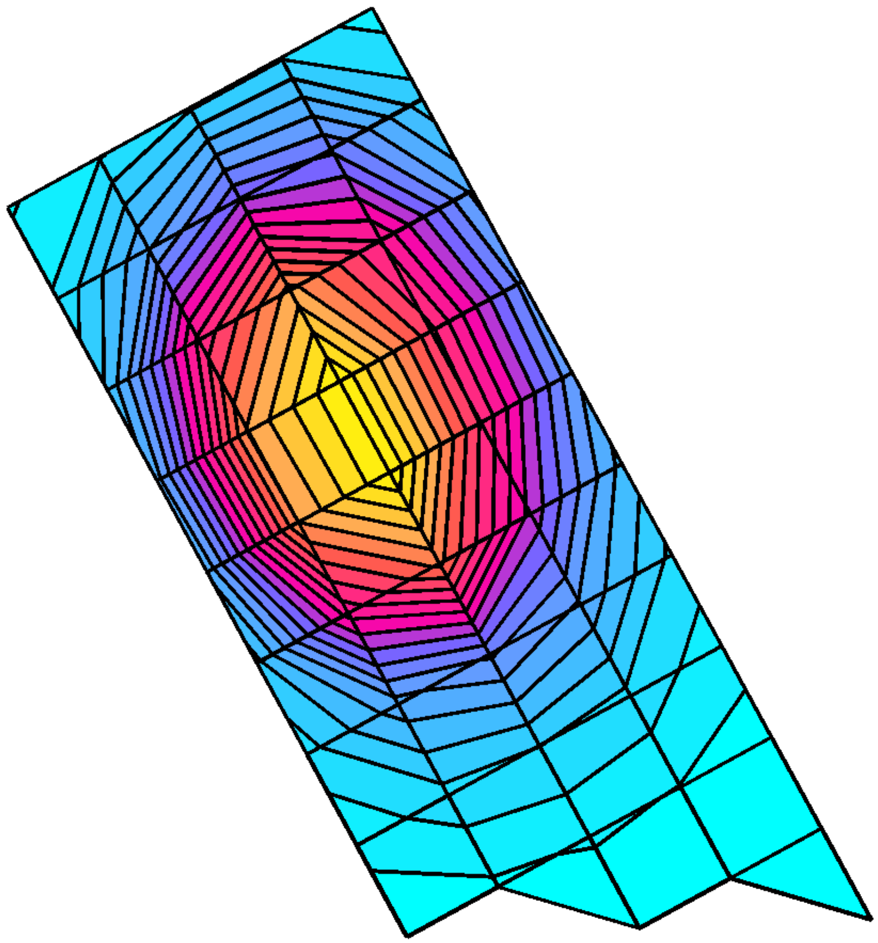
Ch# 799 / Pwr Step: 02 (OTA)
Antenna Position: FIXED
Type of Modulation: 800 TDMA
Battery Model #: SNN5588A
DEVICE POSITION: Cheek touch
Accessory Model #: N/A
R3 TP-1153 SAM SUGAR Expanded (Rev. 2)-9Jan03 Phantom; Right Hand Section; Position: (90°,180°); Frequency: 849 MHz
Probe: ET3DV6 - SN1398 - IEEE Head2; ConvF(6.29,6.29,6.29); Crest factor: 3.0; 835 MHz Head & Body: σ = 0.92 mho/m ε_r = 42.0 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 1.18 mW/g, SAR (10g): 0.818 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 16.0 (15.6, 16.5) [mm]
Powerdrift: -0.05 dB



04/15/04 12:48

3473E4AC

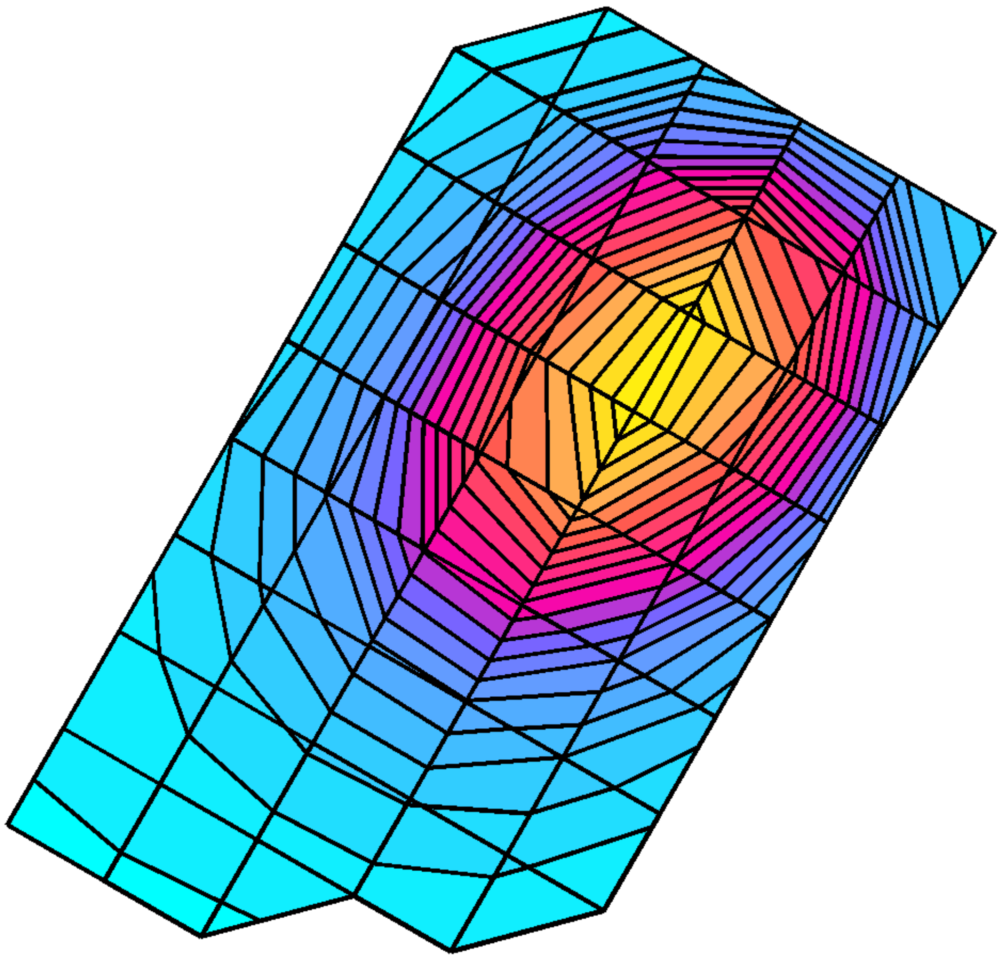
Ch# 384 / Pwr Step: 02 (OTA) Antenna Position: FIXED
Type of Modulation: 800 TDMA Battery Model #: SNN5588A
DEVICE POSITION: Cheek touch
Accessory Model #: N/A
R3 TP-1153 SAM SUGAR Expanded (Rev. 2)-9Jan03 Phantom; Right Hand Section; Position: (90°,180°); Frequency: 824 MHz
Probe: ET3DV6 - SN1398 - IEEE Head2; ConvF(6.29,6.29,6.29); Crest factor: 3.0; 835 MHz Head & Body: $\sigma = 0.92$ mho/m $\varepsilon_r = 42.0$ $\rho = 1.00$ g/cm^3
Cube 7x7x7: SAR (1g): 1.26 mW/g, SAR (10g): 0.882 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 16.1 (15.1, 17.0) [mm]
Powerdrift: 0.00 dB



04/17/04 12:20

3473E4AC

Ch# 991 Pwr Step: 2 OTA
Antenna Position: FIXED
Type of Modulation: 800 TDMA
Battery Model #: SNN5588A
DEVICE POSITION: TILT
Accessory Model #: none
R4 TP-1131 SUGAR sam expanded (Rev. 2)-9Jan03 Phantom; Left Hand Section; Position: (90°,180°); Frequency: 824 MHz
Probe: ET3DV6 - SN1514 - IEEE Head.2; ConvF(6.30,6.30,6.30); Crest factor: 3.0; 835 MHz Head & Body: σ = 0.90 mho/m ε_r = 41.5 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 0.867 mW/g, SAR (10g): 0.606 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 15.8 (14.7, 16.8) [mm]
Powerdrift: -0.05 dB



04/17/04 12:50

3473E4AC

Ch# 799   Pwr Step: 2 OTA   Antenna Position: FIXED

Type of Modulation: 800 TDMA   Battery Model #:   SNN5588A

DEVICE POSITION: TILT

Accessory Model #:   none

R4 TP-1131   SUGAR sam expanded (Rev. 2)-9Jan03 Phantom; Left Hand Section; Position: (90°,180°); Frequency: 849 MHz

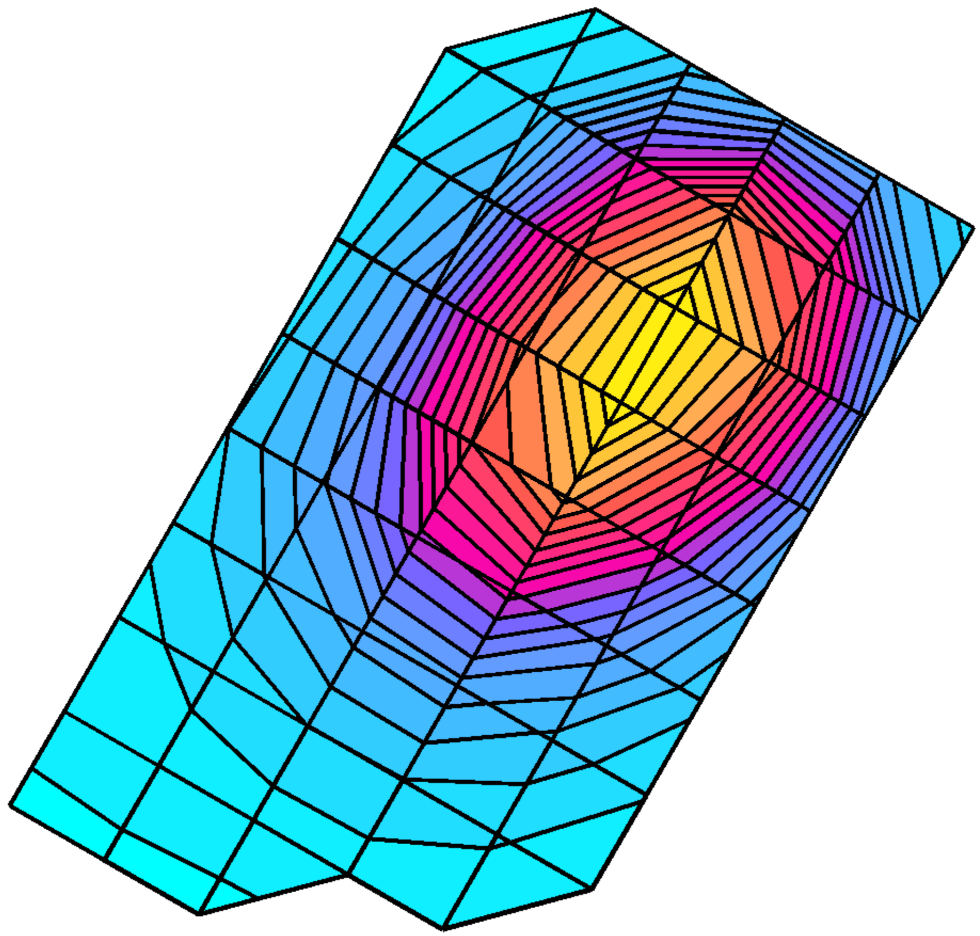
Probe: ET3DV6 - SN1514 - IEEE Head.2; ConvF(6.30,6.30,6.30); Crest factor: 3.0;   835 MHz Head & Body: σ = 0.90 mho/m ε_r = 41.5 ρ = 1.00 g/cm^3

Cube 7x7x7: SAR (1g): 0.798 mW/g, SAR (10g): 0.552 mW/g, (Worst-case extrapolation)

Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0

Penetration depth: 15.5 (14.8, 16.1) [mm]

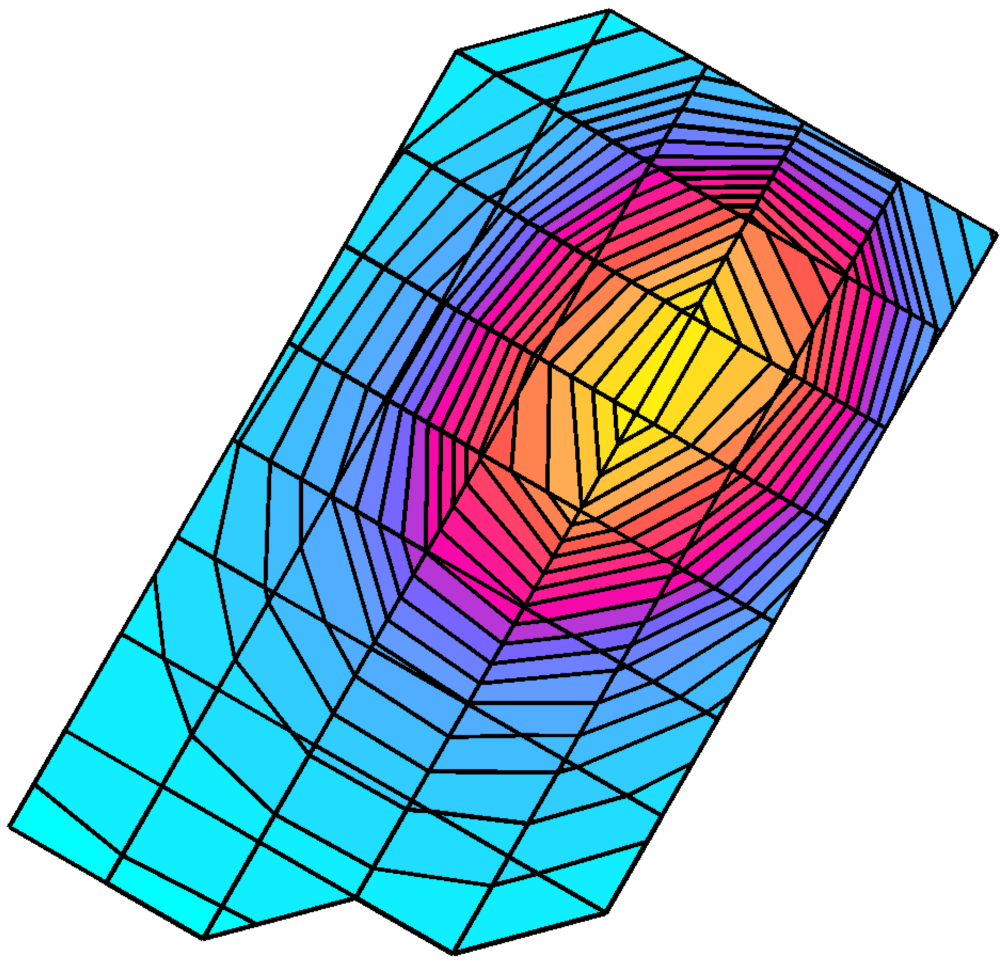
Powerdrift: 0.00 dB



04/17/04 10:36

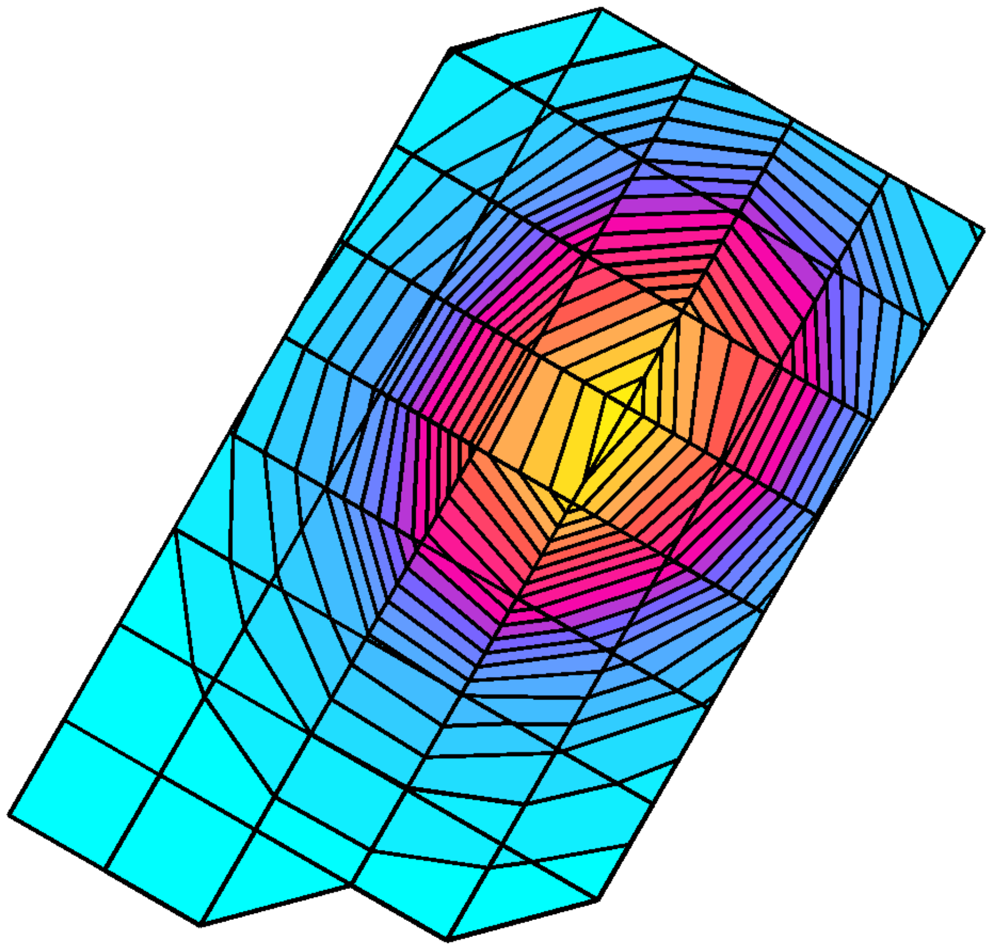
3473E4AC

Ch# 384   Pwr Step: 2 OTA   Antenna Position: FIXED
Type of Modulation: 800 TDMA   Battery Model #:   SNN5588A
DEVICE POSITION: TILT
Accessory Model #:   none
R4 TP-1131   SUGAR sam expanded (Rev. 2)-9Jan03 Phantom; Left Hand Section; Position: (90°,180°); Frequency: 837 MHz
Probe: ET3DV6 - SN1514 - IEEE Head.2; ConvF(6.30,6.30,6.30); Crest factor: 3.0;   835 MHz Head & Body: $\sigma = 0.90$ mho/m $\varepsilon_r = 41.5$ $\rho = 1.00$ g/cm^3
Cube 7x7x7: SAR (1g): 0.900 mW/g, SAR (10g): 0.631 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 15.9 (15.2, 16.6) [mm]
Powerdrift: -0.01 dB



3473E4AC

Ch# 991   Pwr Step: 2 OTA   Antenna Position: FIXED
Type of Modulation: 800 TDMA   Battery Model #:   SNN5588A
DEVICE POSITION: Cheek
Accessory Model #:   none
R4 TP-1131   SUGAR sam expanded (Rev. 2)-9Jan03 Phantom; Left Hand Section; Position: (90°,180°); Frequency: 824 MHz
Probe: ET3DV6 - SN1514 - IEEE Head.2; ConvF(6.30,6.30,6.30); Crest factor: 3.0;   835 MHz Head & Body: σ = 0.90 mho/m ε_r = 41.5 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 1.33   mW/g, SAR (10g): 0.920 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 15.5 (14.4, 16.5) [mm]
Powerdrift: -0.01 dB



04/17/04 11:48

3473E4AC

Ch# 799   Pwr Step: 2 OTA   Antenna Position: FIXED

Type of Modulation: 800 TDMA   Battery Model #:   SNN5588A

DEVICE POSITION: Cheek

Accessory Model #:   none

R4 TP-1131   SUGAR sam expanded (Rev. 2)-9Jan03 Phantom; Left Hand Section; Position: (90°,180°); Frequency: 849 MHz

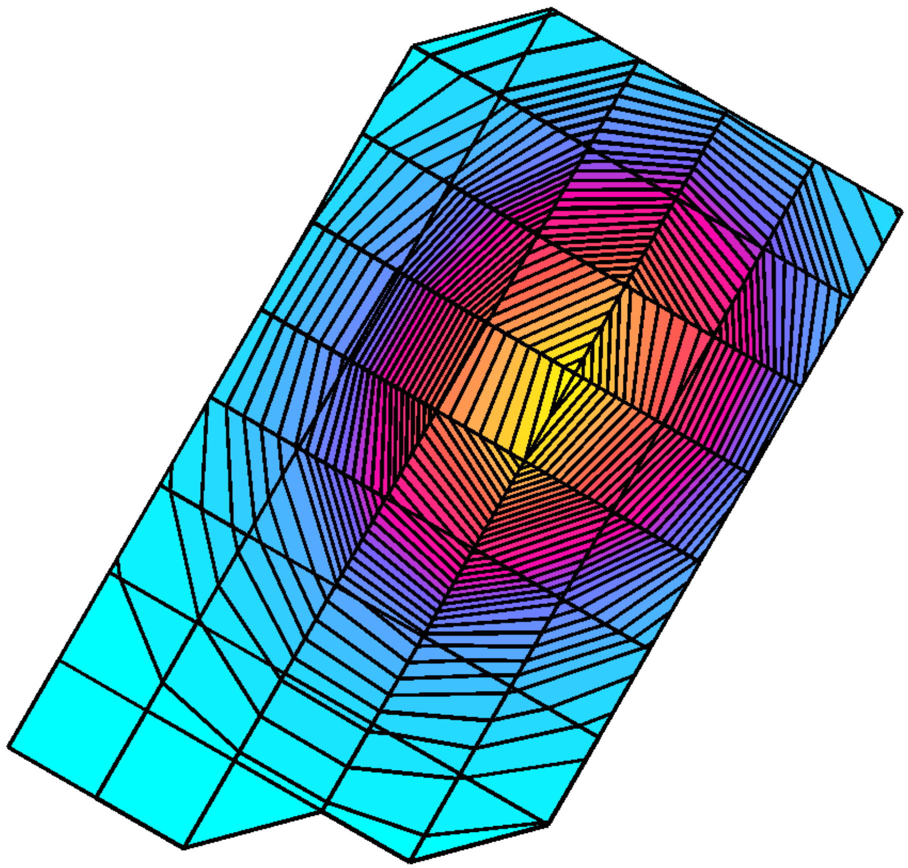
Probe: ET3DV6 - SN1514 - IEEE Head.2; ConvF(6.30,6.30,6.30); Crest factor: 3.0;   835 MHz Head & Body: σ = 0.90 mho/m ε_r = 41.5 ρ = 1.00 g/cm^3

Cube 7x7x7: SAR (1g): 1.26   mW/g, SAR (10g): 0.868 mW/g, (Worst-case extrapolation)

Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0

Penetration depth: 15.3 (14.5, 16.2) [mm]

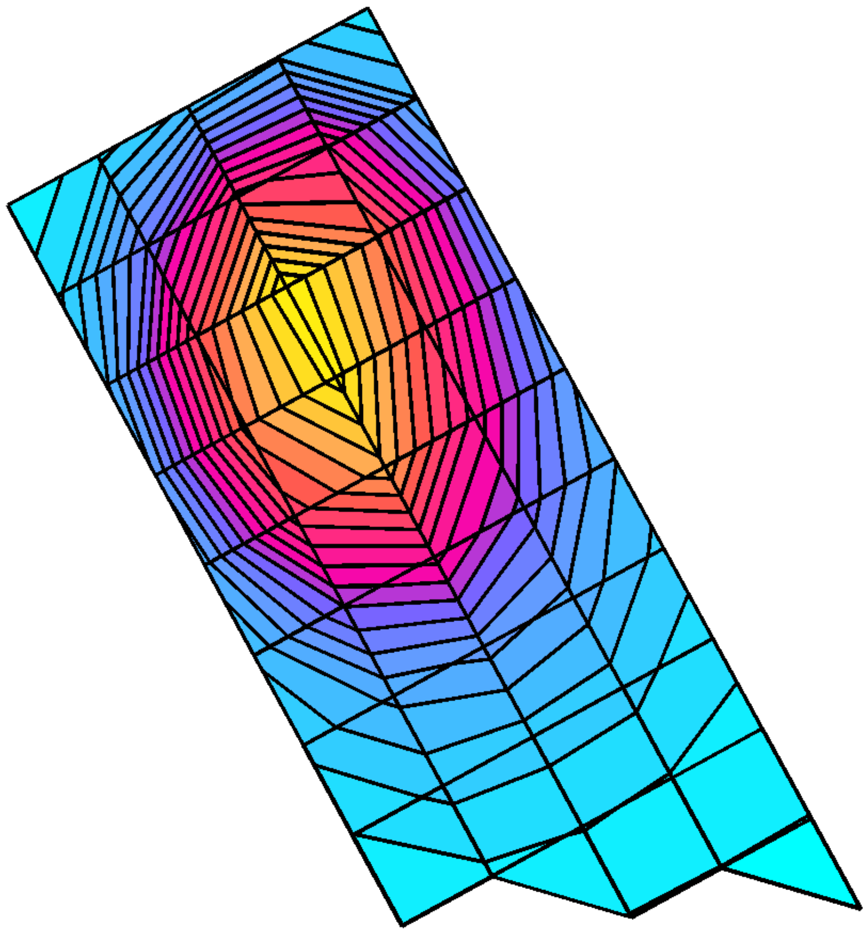
Powerdrift: -0.06 dB



04/15/04 10:08

3473E4AC

Ch# 384 / Pwr Step: 02 (OTA) Antenna Position: FIXED
Type of Modulation: 800 AMPS Battery Model #: SNN5588A
DEVICE POSITION: 15 deg TILT
Accessory Model #: N/A
R3 TP-1153 SAM SUGAR Expanded (Rev. 2)-9Jan03 Phantom; Right Hand Section; Position: (90°,180°); Frequency: 837 MHz
Probe: ET3DV6 - SN1398 - IEEE Head2; ConvF(6.29,6.29,6.29); Crest factor: 1.0; 835 MHz Head & Body: σ = 0.92 mho/m ε_r = 42.0 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 0.632 mW/g, SAR (10g): 0.442 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 15.3 (15.1, 15.5) [mm]
Powerdrift: 0.04 dB



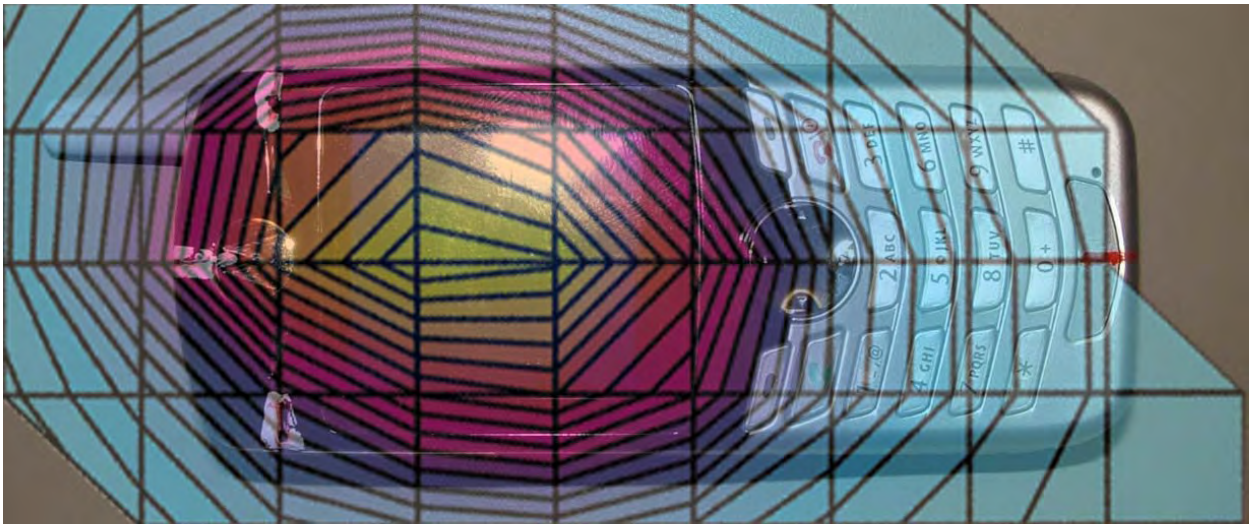


Figure 1.Typical 800MHz Left Head Adjacent Contour Overlaid on Phone (Cheek Touch)

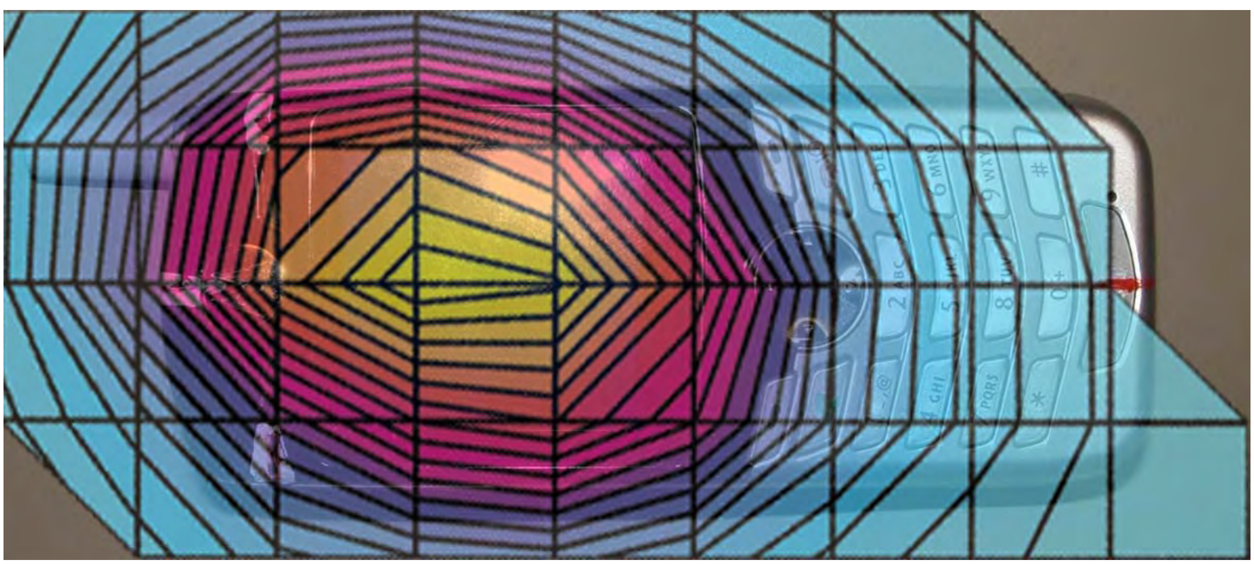


Figure 2.Typical 800MHz Right Head Adjacent Contour Overlaid on Phone (Cheek Touch)

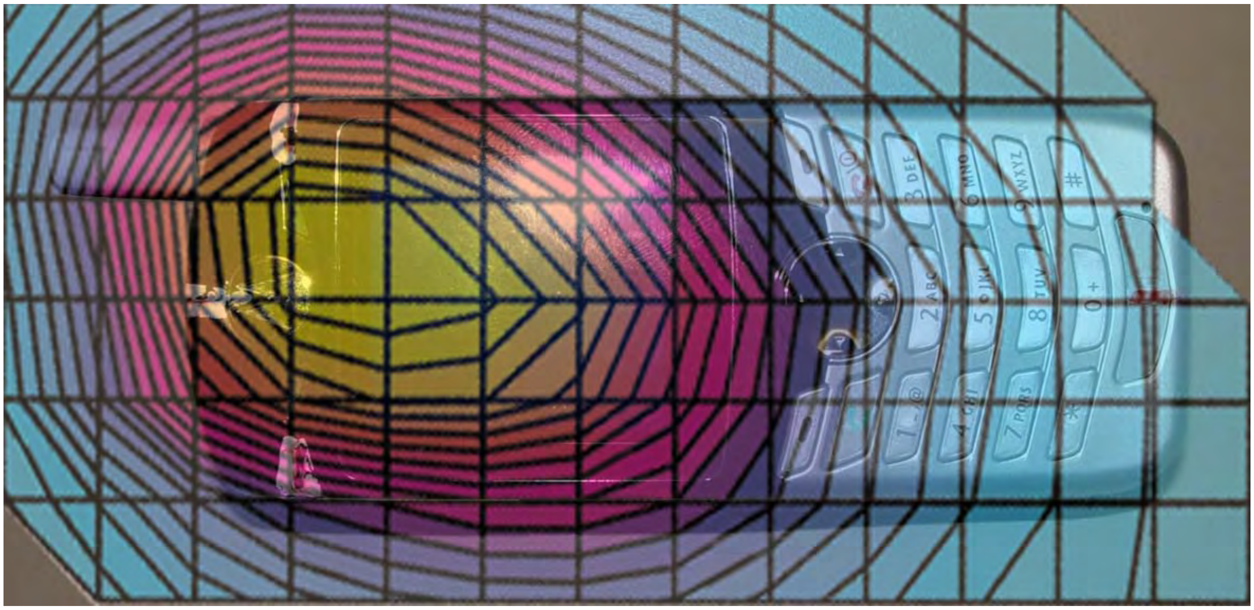


Figure 3.Typical 800MHz Left Head Adjacent Contour Overlaid on Phone (15 ˚ Tilt)

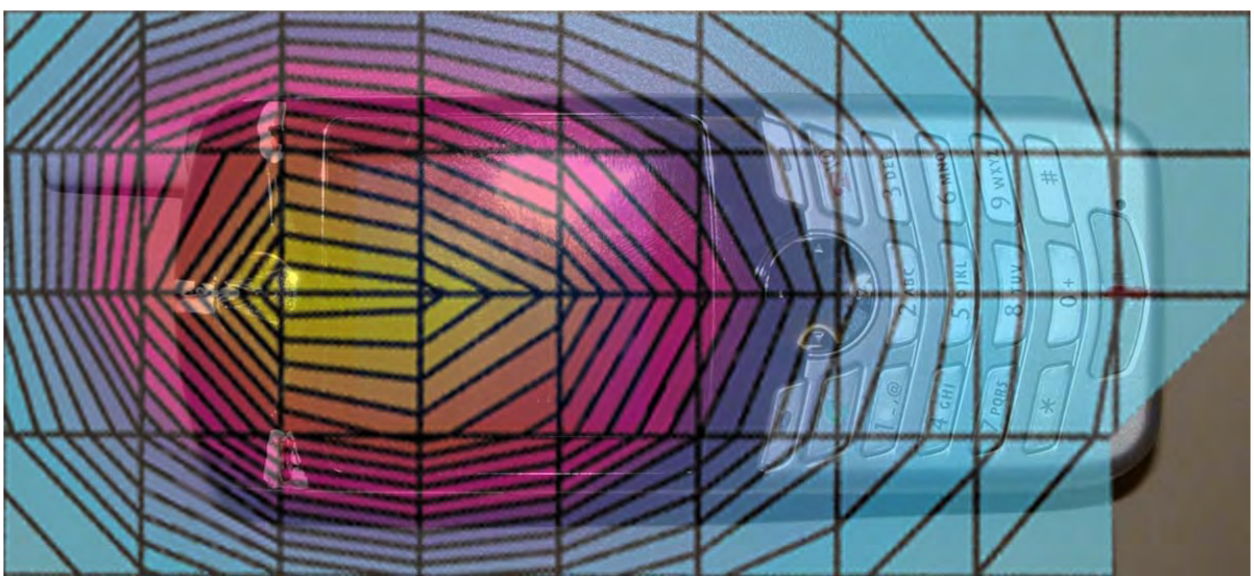


Figure 4.Typical 800MHz Right Head Adjacent Contour Overlaid on Phone (15 ˚ Tilt)

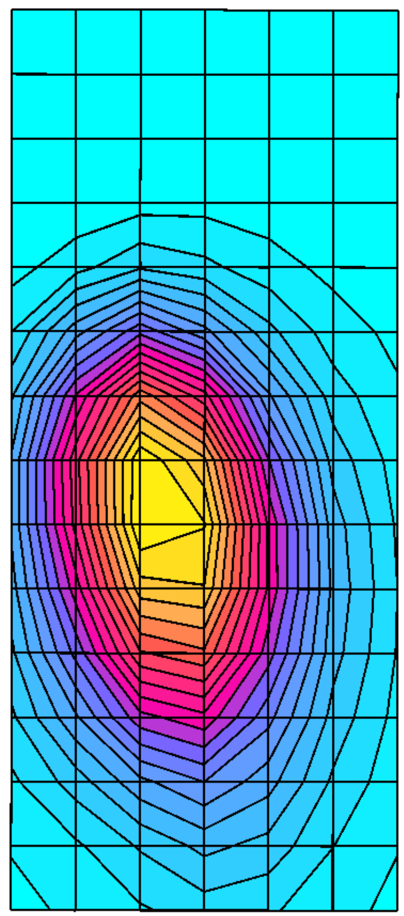
Appendix 3

SAR distribution plots for Body Worn Configuration

3473E4AC

Ch# 384 / Pwr Step: 2 Antenna Position: fxd
Type of Modulation: tdma Battery Model #:5588
15mm rear

R4 - Amy Twin Phantom Rev.4 (22Aug02) Phantom; section 1 Section; Position: (0°,0°); Frequency: 836 MHz
Probe: ET3DV6 - SN1514 - FCC Body.2; ConvF(6.10,6.10,6.10); Crest factor: 3.0; 835 MHz Head & Body: σ = 0.97 mho/m ε_r = 54.0 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 0.443 mW/g, SAR (10g): 0.310 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Penetration depth: 15.3 (14.1, 16.7) [mm]
Powerdrift: 0.02 dB

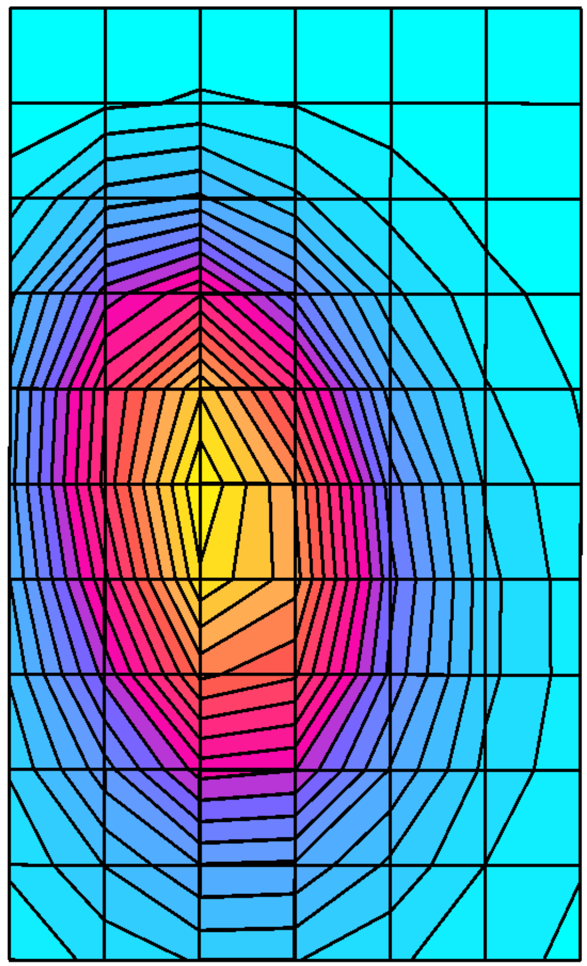


05/11/04 14:33

5207595175

Ch# 384 / Pwr Step: 02   Antenna Position:FIXED
Type of Modulation: ANALOG   Battery Model #: SNN5588A
Accessory Model # = BACK OF PHONE 15 MM AWAY

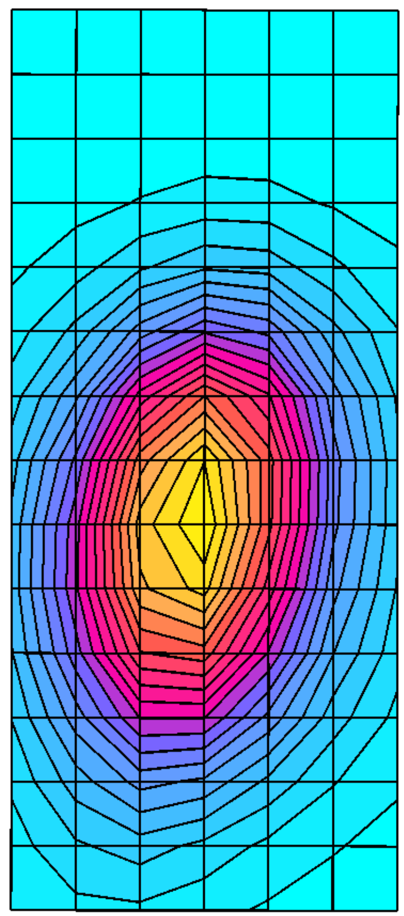
R1 Amy Twin Phantom Rev.4 (22Aug02) Phantom; section 1 Section; Position: (0°,0°); Frequency: 837 MHz
Probe: ES3DV3 - SN3037 - FCC Body; ConvF(5.90,5.90,5.90); Crest factor: 1.0; 835 MHz Head & Body: σ = 0.98 mho/m ε_r = 54.1 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 0.678 mW/g, SAR (10g): 0.483 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Penetration depth: 16.8 (16.1, 17.6) [mm]
Powerdrift: 0.01 dB



3473E4AC

Ch# 384 / Pwr Step: 2 Antenna Position: fxd
Type of Modulation: tdma Battery Model #:5588
15mm front

R4 - Amy Twin Phantom Rev.4 (22Aug02) Phantom; section 1 Section; Position: (0°,0°); Frequency: 836 MHz
Probe: ET3DV6 - SN1514 - FCC Body.2; ConvF(6.10,6.10,6.10); Crest factor: 3.0; 835 MHz Head & Body: σ = 0.97 mho/m ε_r = 54.0 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 0.337 mW/g, SAR (10g): 0.239 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Penetration depth: 16.0 (14.6, 17.5) [mm]
Powerdrift: -0.06 dB



5207595175

Ch# 384 / Pwr Step: 02   Antenna Position:FIXED

Type of Modulation: ANALOG   Battery Model #: SNN5588A

Accessory Model # = FRON OF PHONE 15 MM AWAY

R1 Amy Twin Phantom Rev.4 (22Aug02) Phantom; section 1 Section; Position: (0°,0°); Frequency: 837 MHz

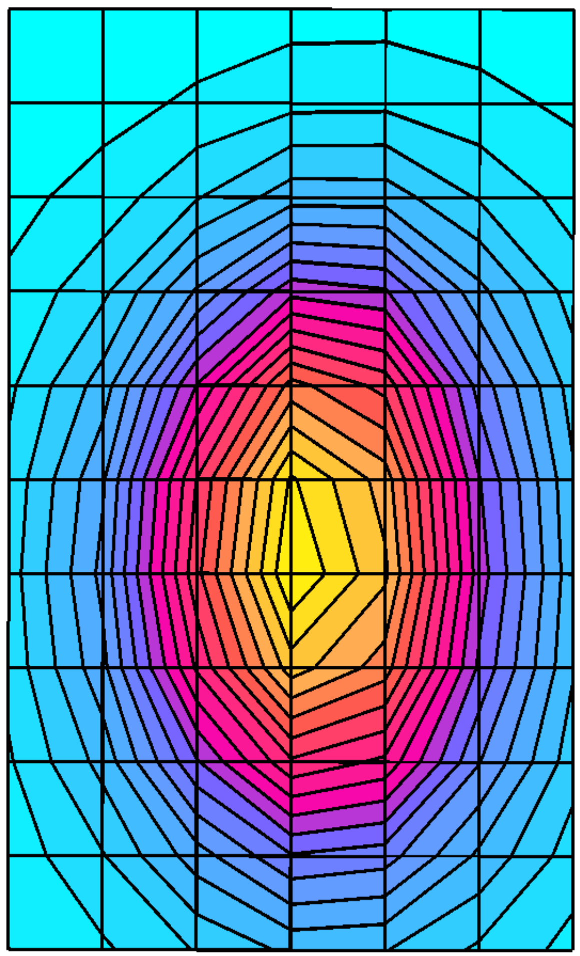
Probe: ES3DV3 - SN3037 - FCC Body; ConvF(5.90,5.90,5.90); Crest factor: 1.0; 835 MHz Head & Body: σ = 0.98 mho/m ε_r = 54.1 ρ = 1.00 g/cm^3

Cube 7x7x7: SAR (1g): 0.530 mW/g, SAR (10g): 0.382 mW/g, (Worst-case extrapolation)

Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0

Penetration depth: 17.4 (16.4, 18.3) [mm]

Powerdrift: -0.09 dB



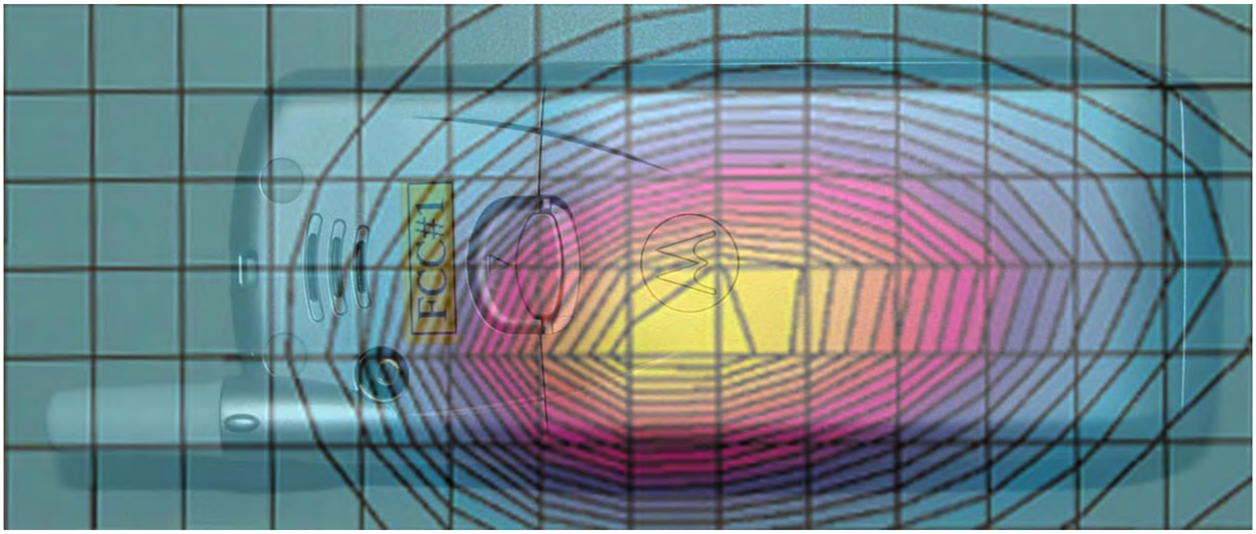


Figure 5.Typical 800 MHz Body-Worn Contour Overlaid on Phone

Appendix 4

Probe Calibration Certificate

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

Client Motorola MRO

CALIBRATION CERTIFICATE

Object(s)	ES3DV3 - SN 3037
Calibration procedure(s)	QA CAL-01.v2 Calibration procedure for dosimetric E-field probes
Calibration date:	October 10, 2003
Condition of the calibrated item	In Tolerance (according to the specific calibration document)

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

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 (Agilent, No. 20020918)	In house check: Oct 03
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 (Agilent, No. 24BR1033101)	In house check: Oct 03

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Laboratory Director	
Approved by:	Fin Bomholt	R&D Director	

Date issued: October 10, 2003

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.

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

Probe ES3DV3

SN:3037

Manufactured: August 21, 2003
Last calibration: October 10, 2003

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ES3DV3 SN:3037

Sensitivity in Free Space

NormX	**1.13**	$\mu V/(V/m)^2$
NormY	**0.85**	$\mu V/(V/m)^2$
NormZ	**0.95**	$\mu V/(V/m)^2$

Diode Compression

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

Sensitivity in Tissue Simulating Liquid

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

Valid for f=800-1000 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**6.1**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.1**	± 9.5% (k=2)	Alpha	**0.31**
ConvF Z	**6.1**	± 9.5% (k=2)	Depth	**1.75**

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

Valid for f=1710-1910 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**4.9**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**4.9**	± 9.5% (k=2)	Alpha	**0.24**
ConvF Z	**4.9**	± 9.5% (k=2)	Depth	**2.68**

Boundary Effect

Head 900 MHz Typical SAR gradient: 5 % per mm

Probe Tip to Boundary	**1 mm**	**2 mm**
SAR_{be} [%] Without Correction Algorithm	6.0	3.0
SAR_{be} [%] With Correction Algorithm	0.1	0.3

Head 1800 MHz Typical SAR gradient: 10 % per mm

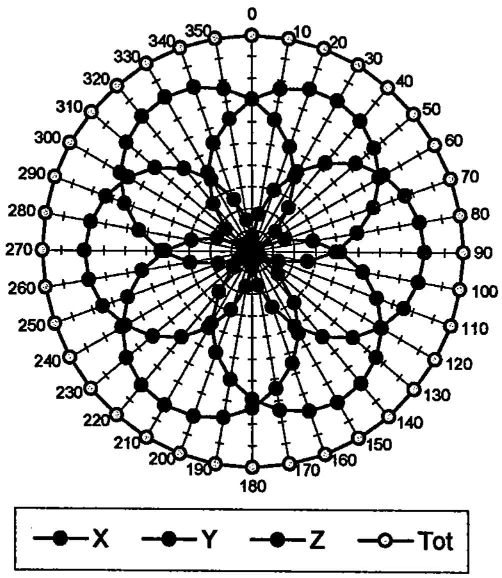
Probe Tip to Boundary	**1 mm**	**2 mm**
SAR_{be} [%] Without Correction Algorithm	8.5	5.5
SAR_{be} [%] With Correction Algorithm	0.1	0.2

Sensor Offset

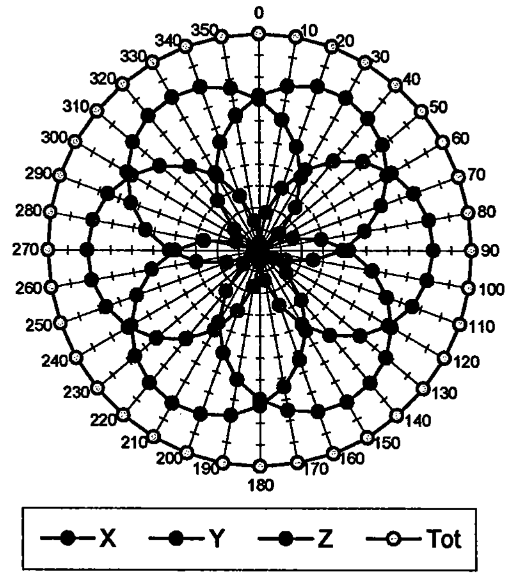
Probe Tip to Sensor Center **2.0** mm

Receiving Pattern (ϕ, θ = 0°)

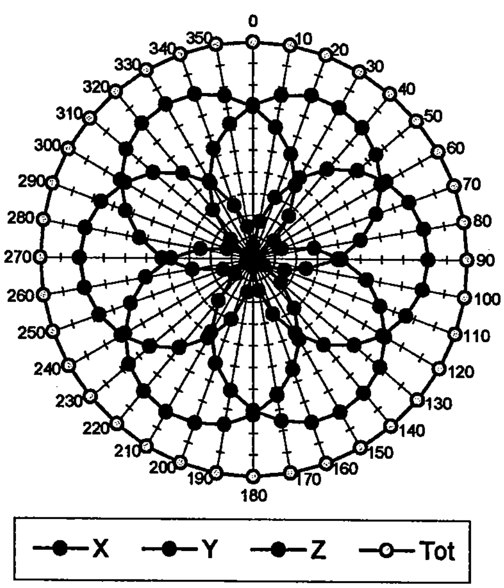
f = 30 MHz, TEM cell ifi110



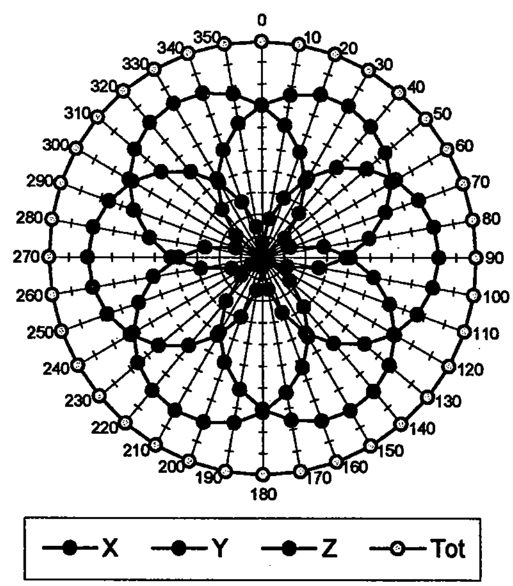
f = 100 MHz, TEM cell ifi110

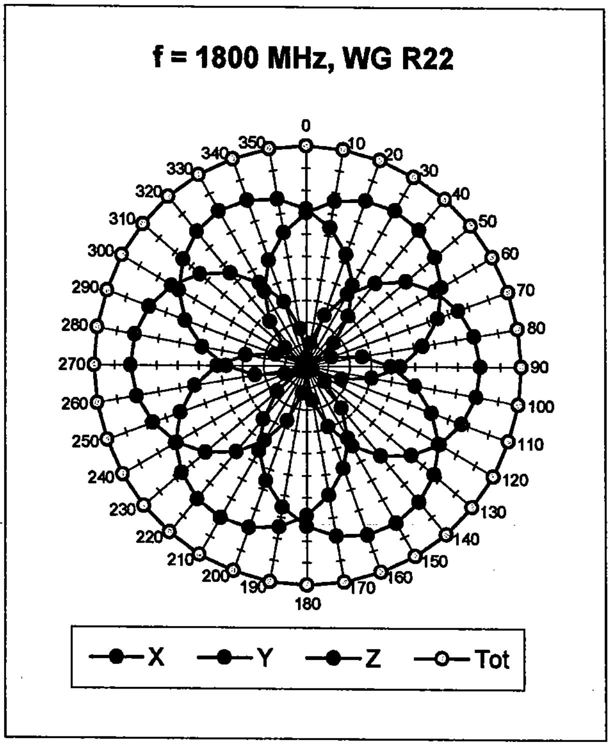


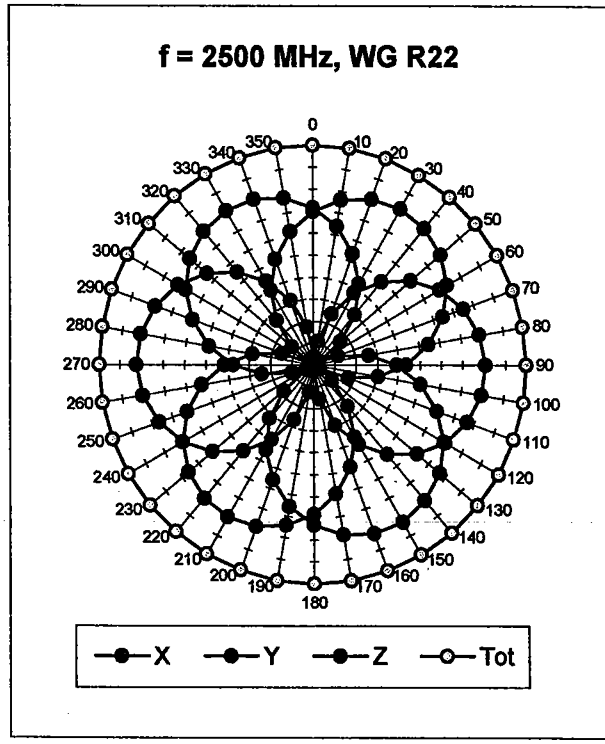
f = 300 MHz, TEM cell ifi110



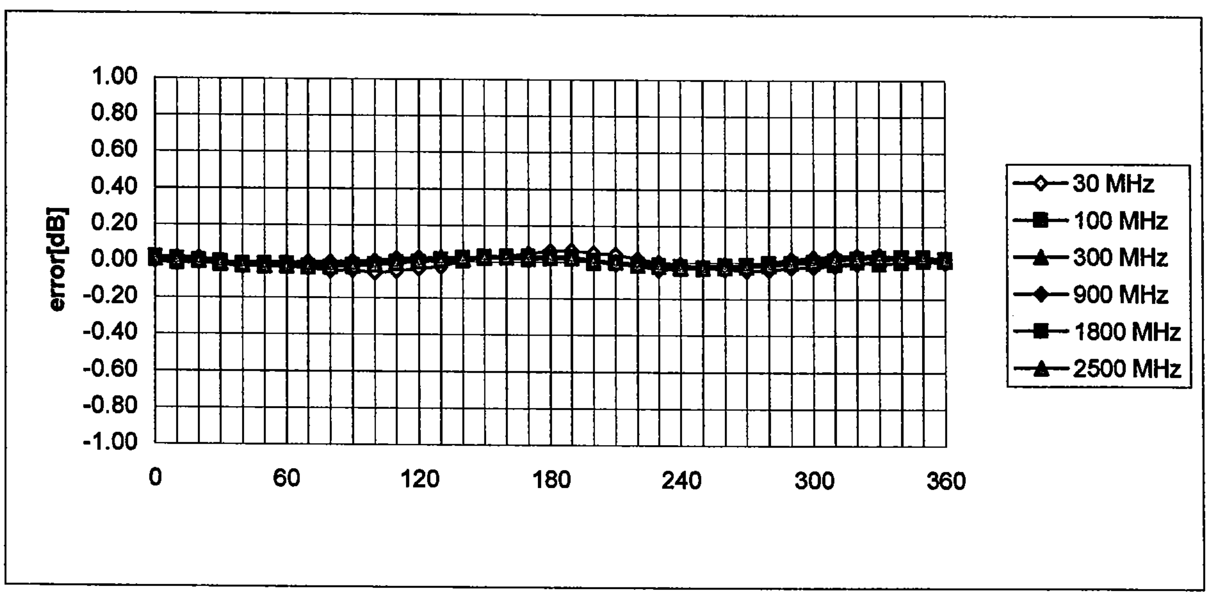
f = 900 MHz, TEM cell ifi110





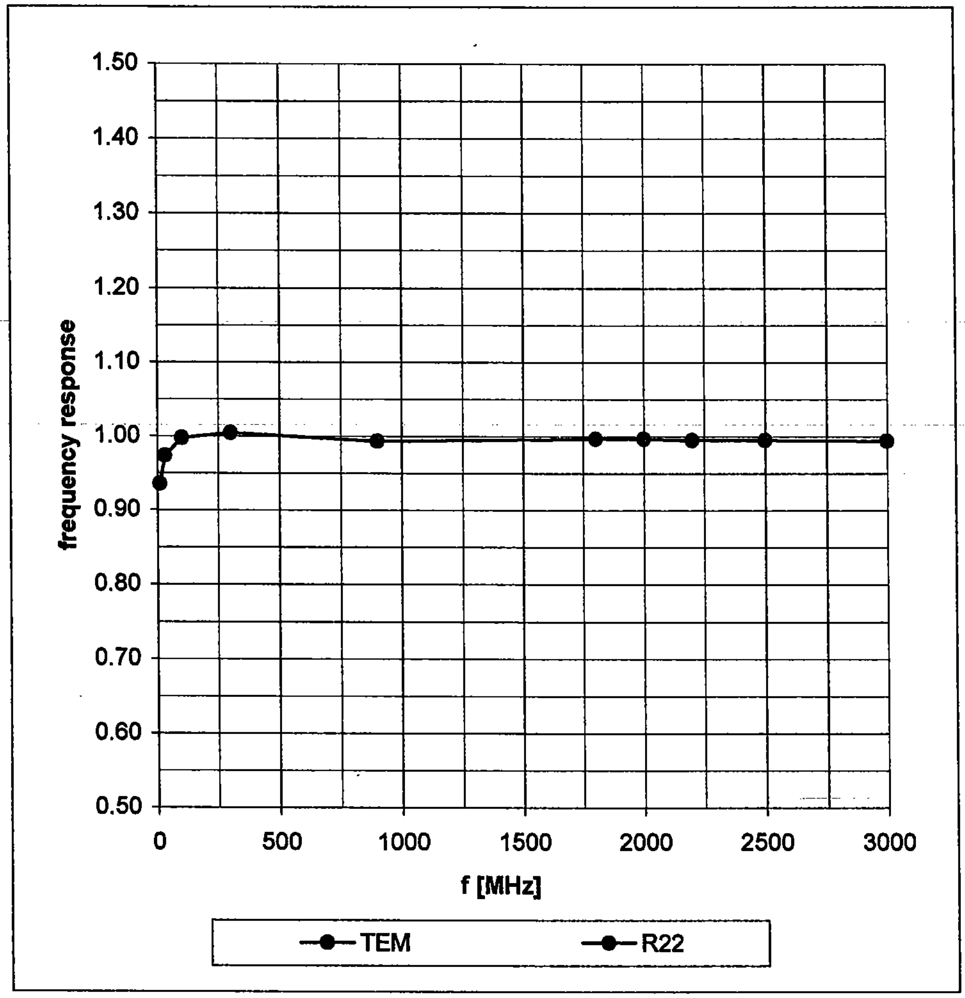


Isotropy Error (ϕ), θ = 0°



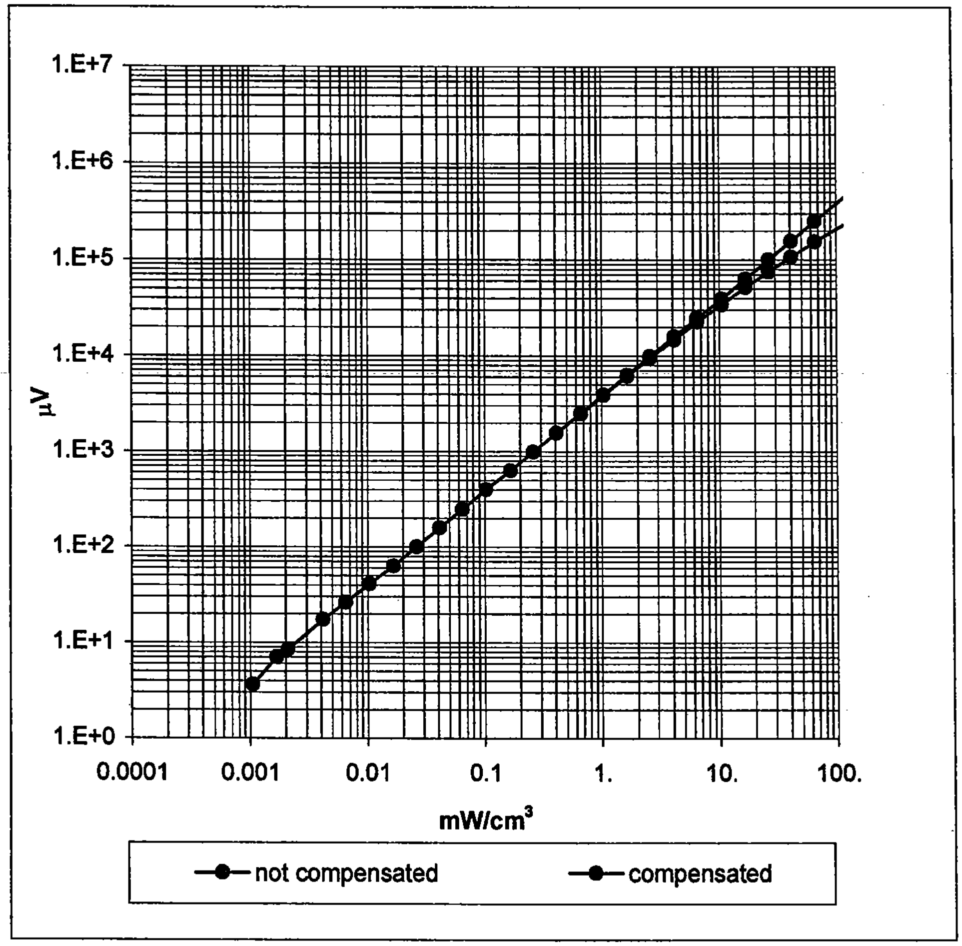
Frequency Response of E-Field

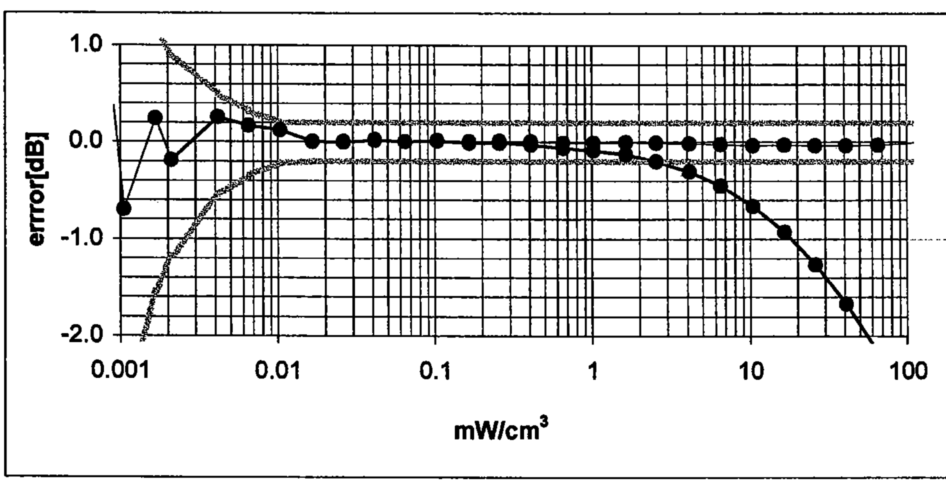
(TEM-Cell:ifi110, Waveguide R22)



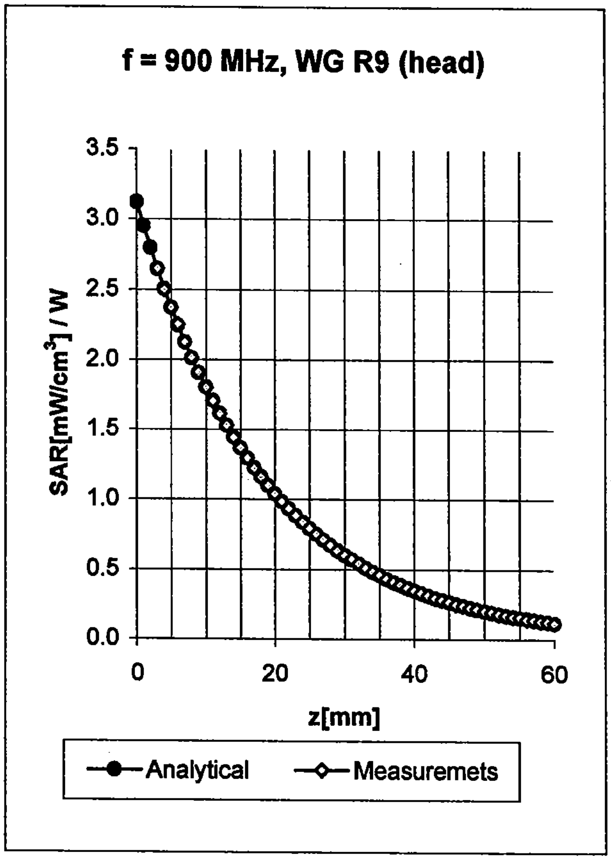
Dynamic Range f(SAR_{brain})

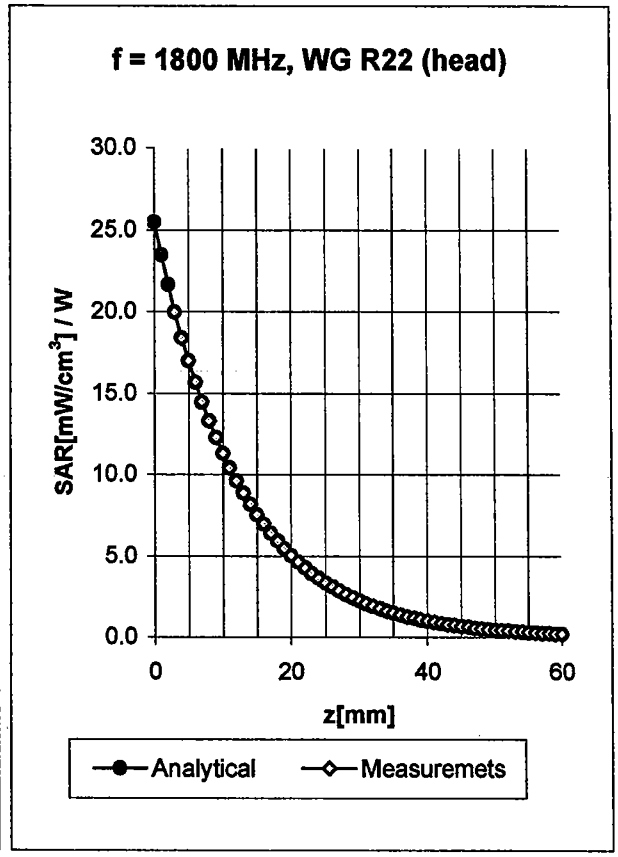
(Waveguide R22)





Conversion Factor Assessment





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

Valid for f=800-1000 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

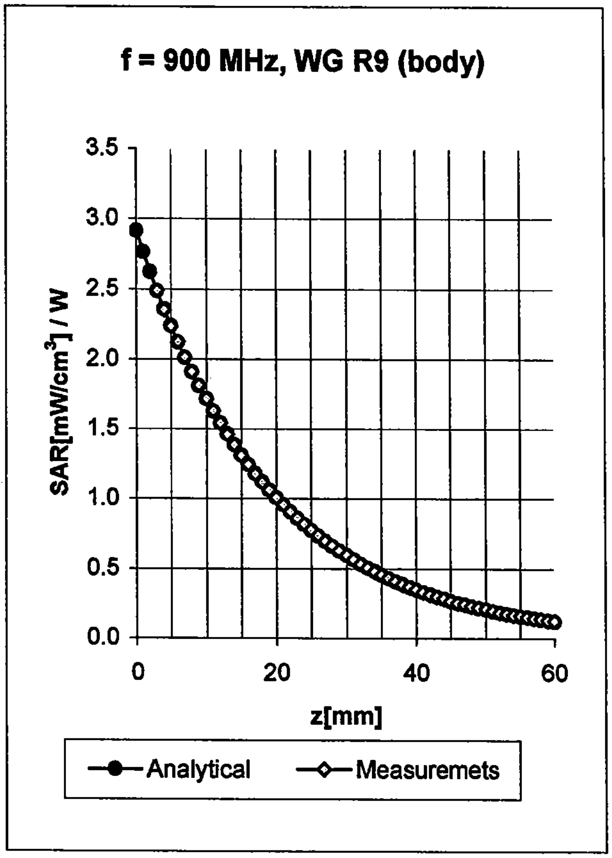
ConvF X	**6.1** ± 9.5% (k=2)		Boundary effect:	
ConvF Y	**6.1** ± 9.5% (k=2)		Alpha	**0.31**
ConvF Z	**6.1** ± 9.5% (k=2)		Depth	**1.75**

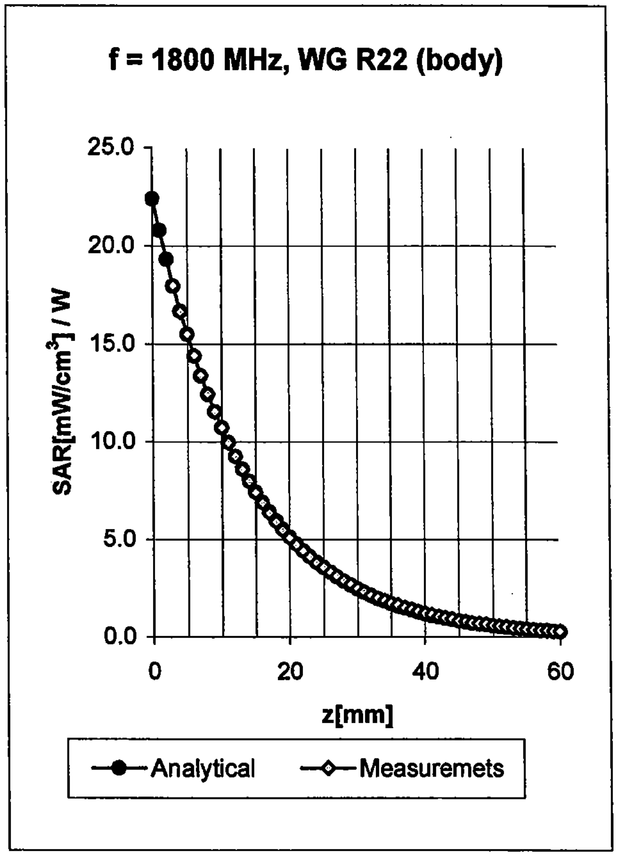
Head **1800 MHz** ε_r **= 40.0 ± 5%** σ **= 1.40 ± 5% mho/m**

Valid for f=1710-1910 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**4.9** ± 9.5% (k=2)		Boundary effect:	
ConvF Y	**4.9** ± 9.5% (k=2)		Alpha	**0.24**
ConvF Z	**4.9** ± 9.5% (k=2)		Depth	**2.68**

Conversion Factor Assessment





Body **900 MHz** ε_r = **55.0 ± 5%** σ = **1.05 ± 5% mho/m**

Valid for f=800-1000 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

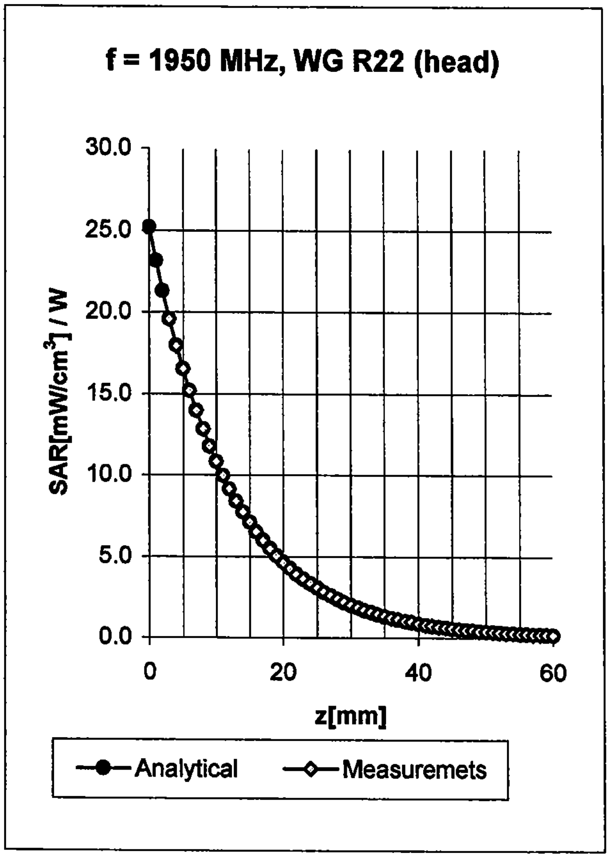
ConvF X	**5.9**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**5.9**	± 9.5% (k=2)	Alpha	**0.29**
ConvF Z	**5.9**	± 9.5% (k=2)	Depth	**1.91**

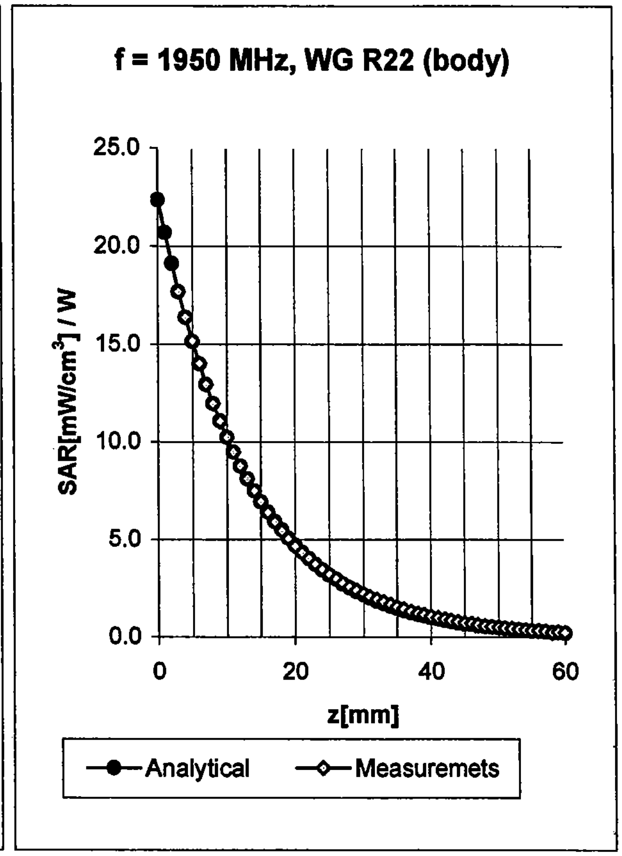
Body **1800 MHz** ε_r = **53.3 ± 5%** σ = **1.52 ± 5% mho/m**

Valid for f=1710-1910 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	**4.7**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**4.7**	± 9.5% (k=2)	Alpha	**0.25**
ConvF Z	**4.7**	± 9.5% (k=2)	Depth	**2.80**

Conversion Factor Assessment





Head **1950 MHz** ε_r **= 40.0 ± 5%** σ **= 1.40 ± 5% mho/m**

Valid for f=1900-2000 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**4.7**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**4.7**	± 9.5% (k=2)	Alpha	**0.28**
ConvF Z	**4.7**	± 9.5% (k=2)	Depth	**2.26**

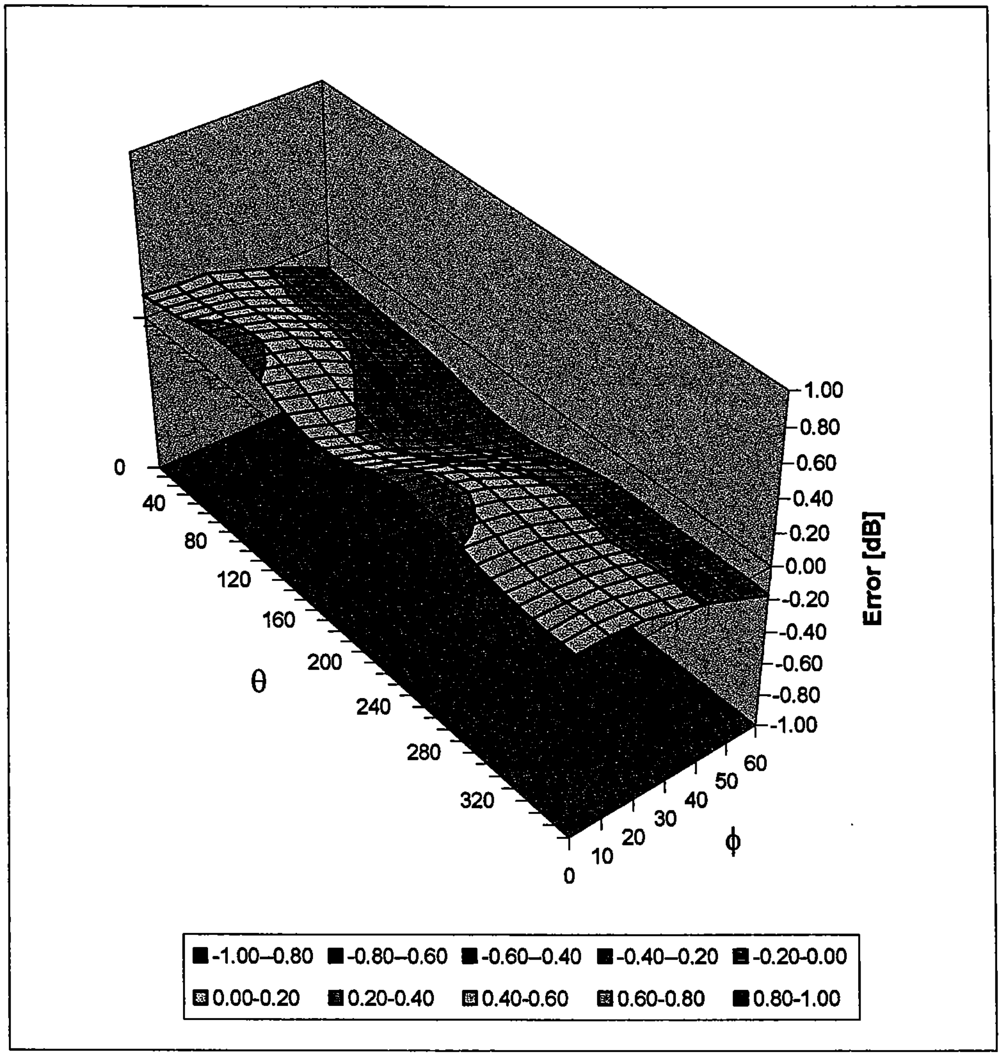
Body **1950 MHz** ε_r **= 53.3 ± 5%** σ **= 1.52 ± 5% mho/m**

Valid for f=1900-2000 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	**4.5**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**4.5**	± 9.5% (k=2)	Alpha	**0.31**
ConvF Z	**4.5**	± 9.5% (k=2)	Depth	**2.24**

Deviation from Isotropy in HSL

Error (θφ), f = 900 MHz



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

Client Motorola Korea (PCS)

CALIBRATION CERTIFICATE

Object(s)	ET3DV6 - SN:1398
Calibration procedure(s)	QA CAL-01.v2 Calibration procedure for dosimetric E-field probes
Calibration date:	February 16, 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:	Katja Pokovic	Laboratory Director	
Approved by:	Niels Kuster	Quality Manager	

Date issued: February 16, 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:1398

Manufactured:	October 24, 1999
Last calibrated:	February 28, 2003
Recalibrated:	February 16, 2004

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1398

Sensitivity in Free Space

NormX	**1.49** $\mu V/(V/m)^2$
NormY	**1.63** $\mu V/(V/m)^2$
NormZ	**1.57** $\mu V/(V/m)^2$

Diode Compression[A]

DCP X	**92**	mV
DCP Y	**92**	mV
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	7.6	3.7
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	12.6	8.4
SAR_{be} [%]	With Correction Algorithm	0.1	0.2

Sensor Offset

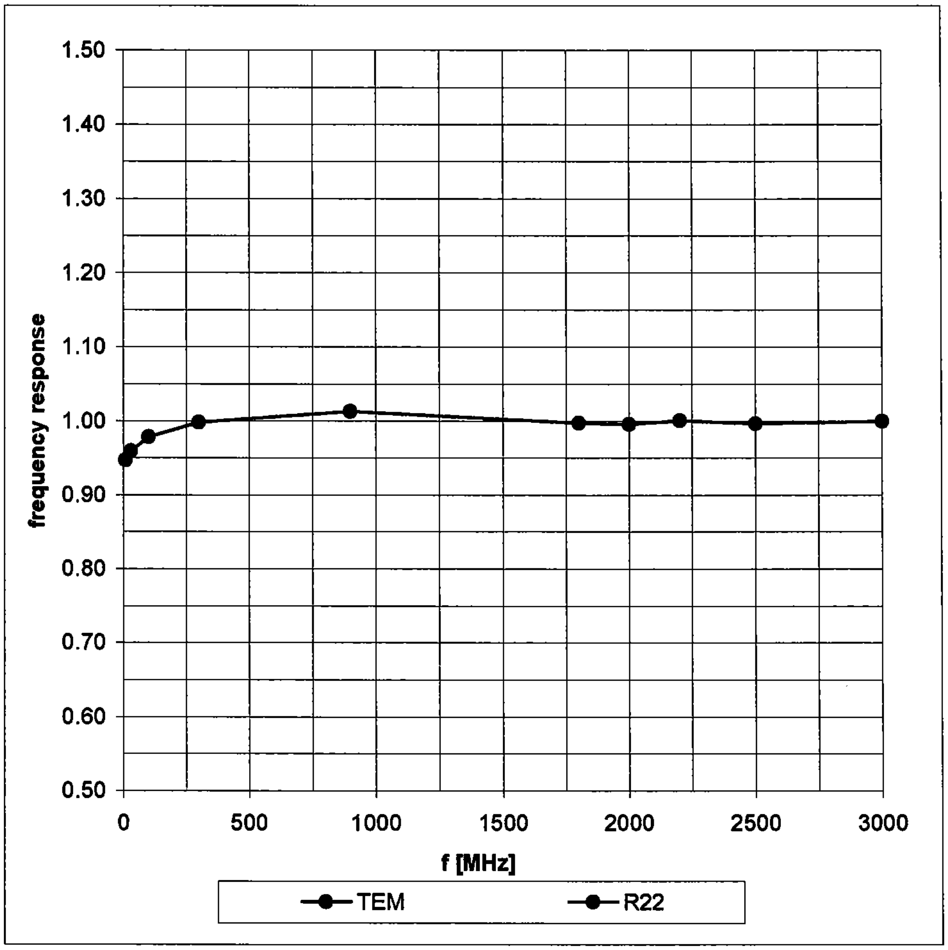
Probe Tip to Sensor Center	**2.7** mm
Optical Surface Detection	**in tolerance**

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%.

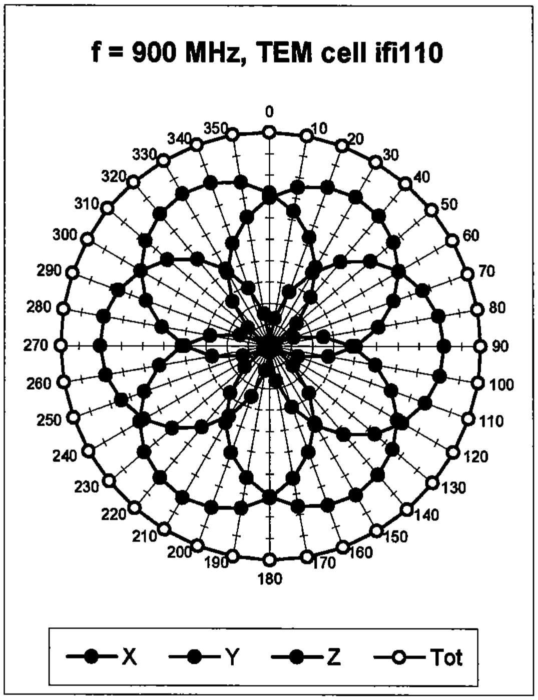
[A] numerical linearization parameter: uncertainty not required

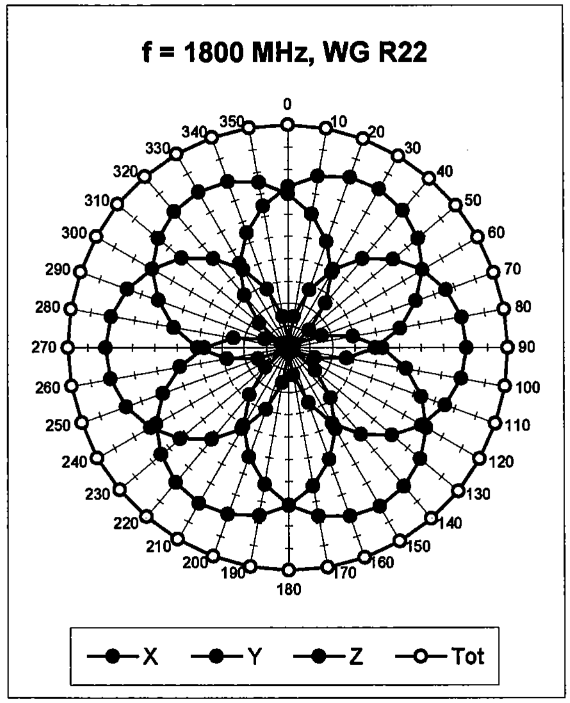
Frequency Response of E-Field

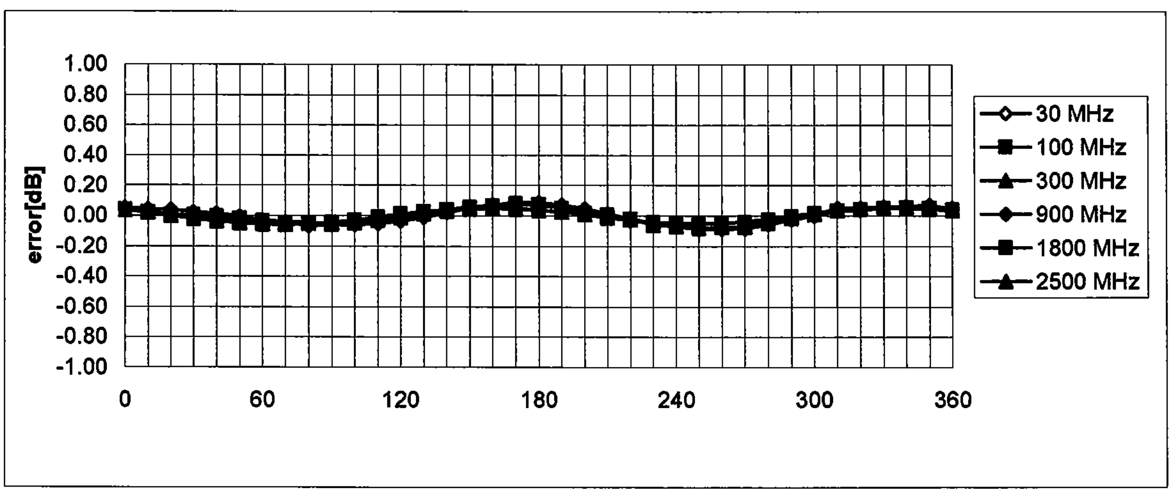
(TEM-Cell:ifi110, Waveguide R22)



Receiving Pattern (ϕ) , θ = 0°



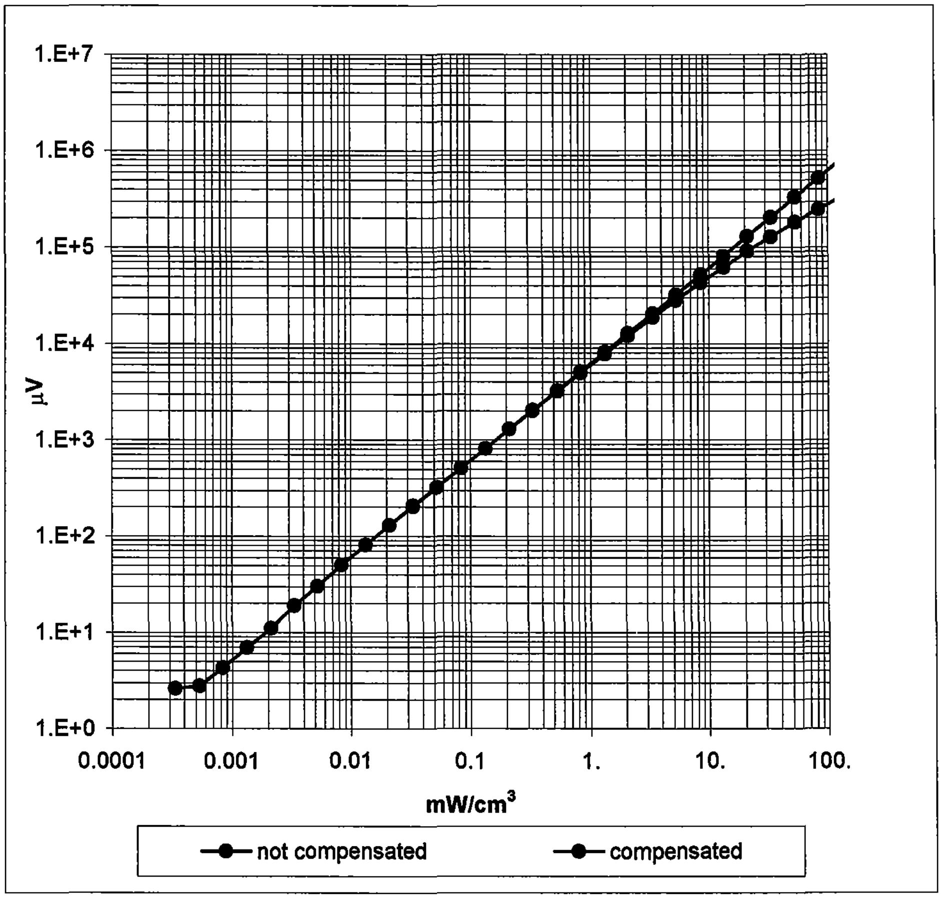


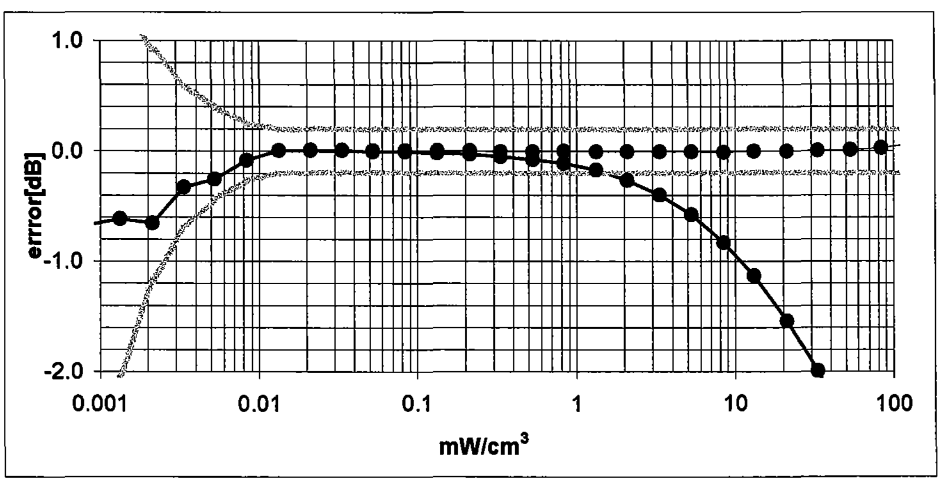


Axial Isotropy Error < ± 0.2 dB

Dynamic Range f(SAR_{head})

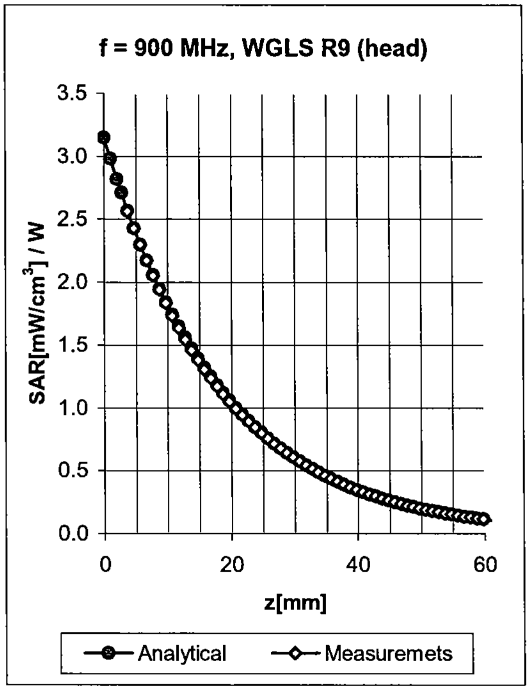
(Waveguide R22)

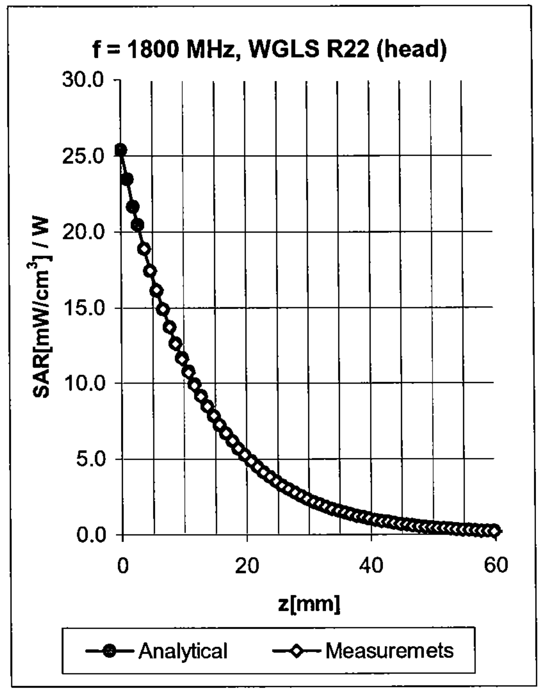




Probe Linearity < ± 0.2 dB

Conversion Factor Assessment



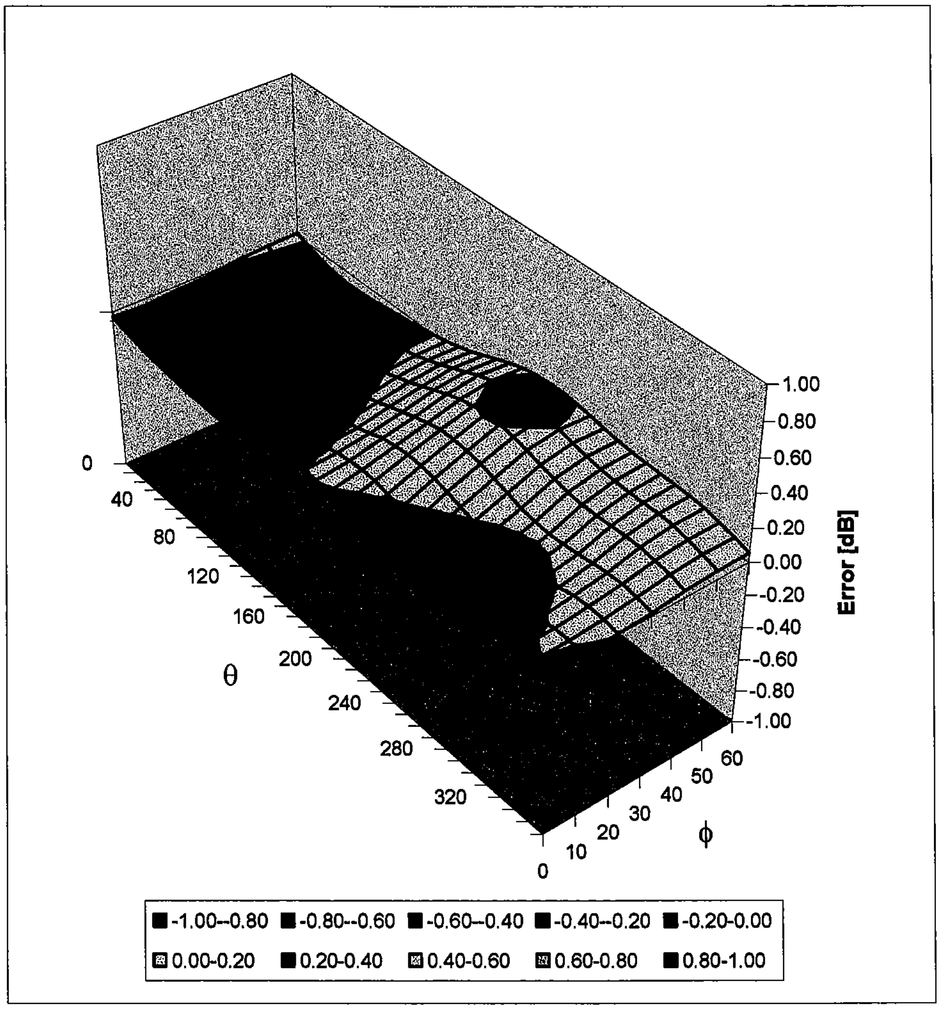


f [MHz]	Validity [MHz][B]	Tissue	Permittivity	Conductivity	Alpha	Depth	ConvF	Uncertainty
900	800-1000	Head	41.5 ± 5%	0.97 ± 5%	1.00	1.39	6.29	± 9.5% (k=2)
1800	1710-1910	Head	40.0 ± 5%	1.40 ± 5%	0.50	2.48	5.04	± 9.5% (k=2)
1950	1900-2000	Head	40.0 ± 5%	1.40 ± 5%	0.47	2.71	4.82	± 9.5% (k=2)
900	800-1000	Body	55.0 ± 5%	1.05 ± 5%	0.43	2.31	5.88	± 9.5% (k=2)
1800	1710-1910	Body	53.3 ± 5%	1.52 ± 5%	0.58	2.67	4.50	± 9.5% (k=2)
1950	1900-2000	Body	53.3 ± 5%	1.52 ± 5%	0.68	2.39	4.29	±9.5% (k=2)

[B] The stated uncertainty of calibration was assessed according to P1528.

Deviation from Isotropy in HSL

Error (θ,φ), f = 900 MHz



Spherical Isotropy Error < ± 0.4 dB

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

Client Motorola MRO

CALIBRATION CERTIFICATE

Object(s)	ET3DV6 - SN:1514
Calibration procedure(s)	QA CAL-01.v2 Calibration procedure for dosimetric E-field probes
Calibration date:	July 31, 2003
Condition of the calibrated item	In Tolerance (according to the specific calibration document)

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

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
RF generator HP 8684C	US3642U01700	4-Aug-99 (SPEAG, in house check Aug-02)	In house check: Aug-05
Power sensor E4412A	MY41495277	2-Apr-03 (METAS, No 252-0250)	Apr-04
Power sensor HP 8481A	MY41092180	18-Sep-02 (Agilent, No. 20020918)	Sep-03
Power meter EPM E4419B	GB41293874	2-Apr-03 (METAS, No 252-0250)	Apr-04
Network Analyzer HP 8753E	US37390585	18-Oct-01 (Agilent, No. 24BR1033101)	In house check: Oct 03
Fluke Process Calibrator Type 702	SN: 6295803	3-Sep-01 (ELCAL, No.2360)	Sep-03

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

Date issued: July 31, 2003

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.

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

Probe ET3DV6

SN:1514

Manufactured:	November 24, 1999
Last calibration:	July 25, 2002
Recalibrated:	July 31, 2003

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1514

Sensitivity in Free Space

NormX	**1.70**	$\mu V/(V/m)^2$
NormY	**1.86**	$\mu V/(V/m)^2$
NormZ	**1.79**	$\mu V/(V/m)^2$

Diode Compression

DCP X	**93**	mV
DCP Y	**93**	mV
DCP Z	**93**	mV

Sensitivity in Tissue Simulating Liquid

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

Valid for f=800-1000 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**6.3**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.3**	± 9.5% (k=2)	Alpha	**0.58**
ConvF Z	**6.3**	± 9.5% (k=2)	Depth	**1.95**

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

Valid for f=1710-1910 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**5.1**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**5.1**	± 9.5% (k=2)	Alpha	**0.55**
ConvF Z	**5.1**	± 9.5% (k=2)	Depth	**2.48**

Boundary Effect

Head 900 MHz Typical SAR gradient: 5 % per mm

Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	9.7	5.1
SAR_{be} [%]	With Correction Algorithm	0.2	0.4

Head 1800 MHz Typical SAR gradient: 10 % per mm

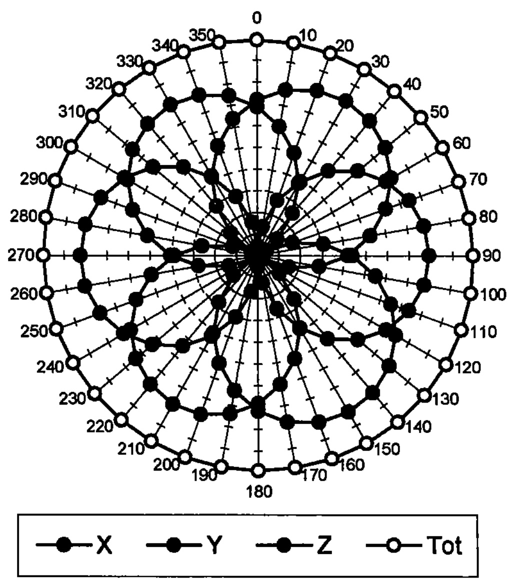
Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	13.9	9.0
SAR_{be} [%]	With Correction Algorithm	0.1	0.0

Sensor Offset

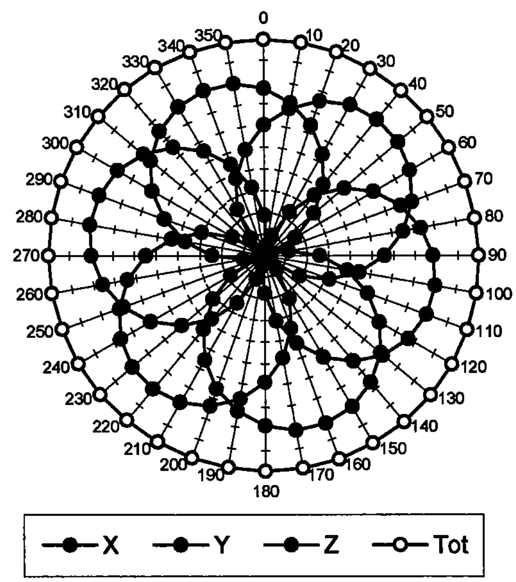
Probe Tip to Sensor Center	**2.7**	mm
Optical Surface Detection	**0.8 ± 0.2**	mm

Receiving Pattern (ϕ , θ = 0°

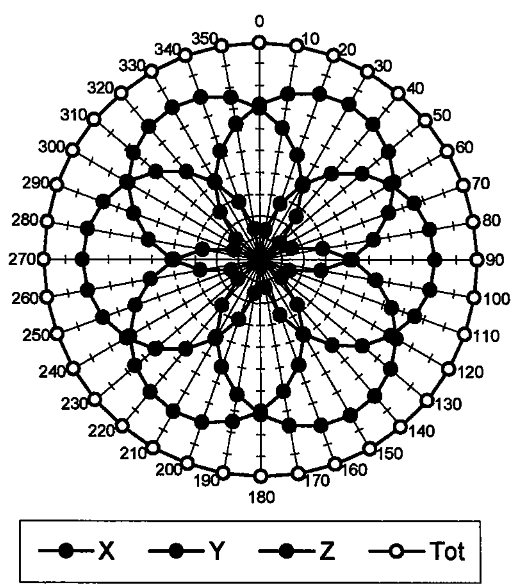
f = 30 MHz, TEM cell ifi110



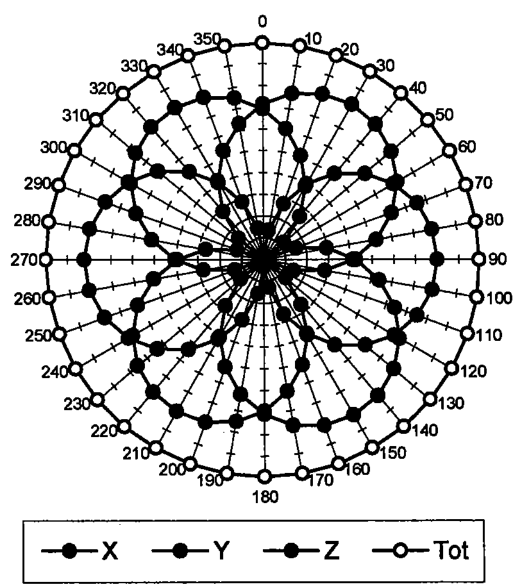
f = 100 MHz, TEM cell ifi110

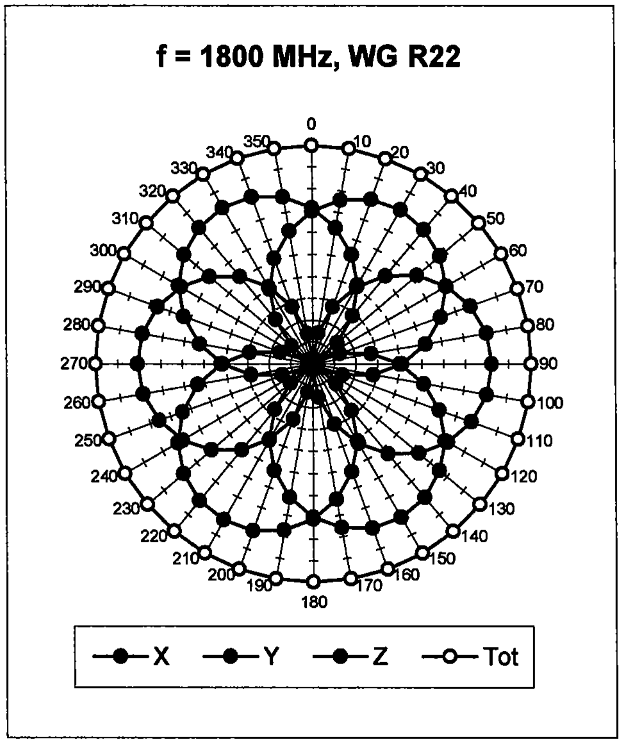


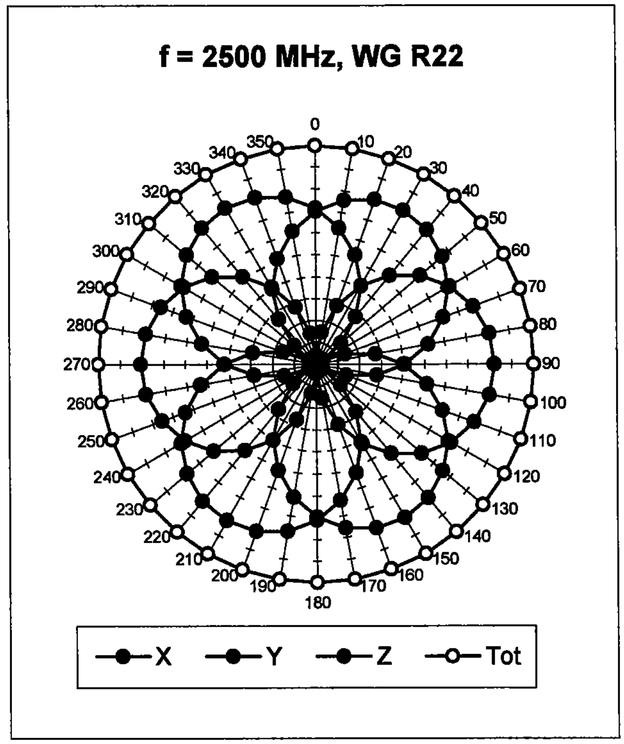
f = 300 MHz, TEM cell ifi110



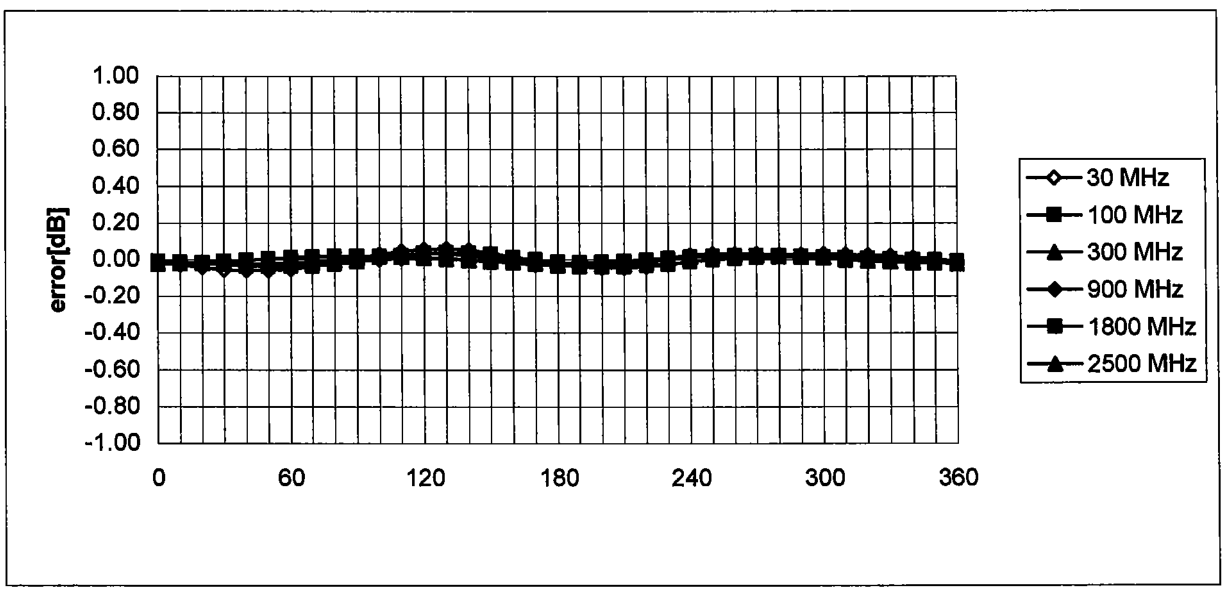
f = 900 MHz, TEM cell ifi110





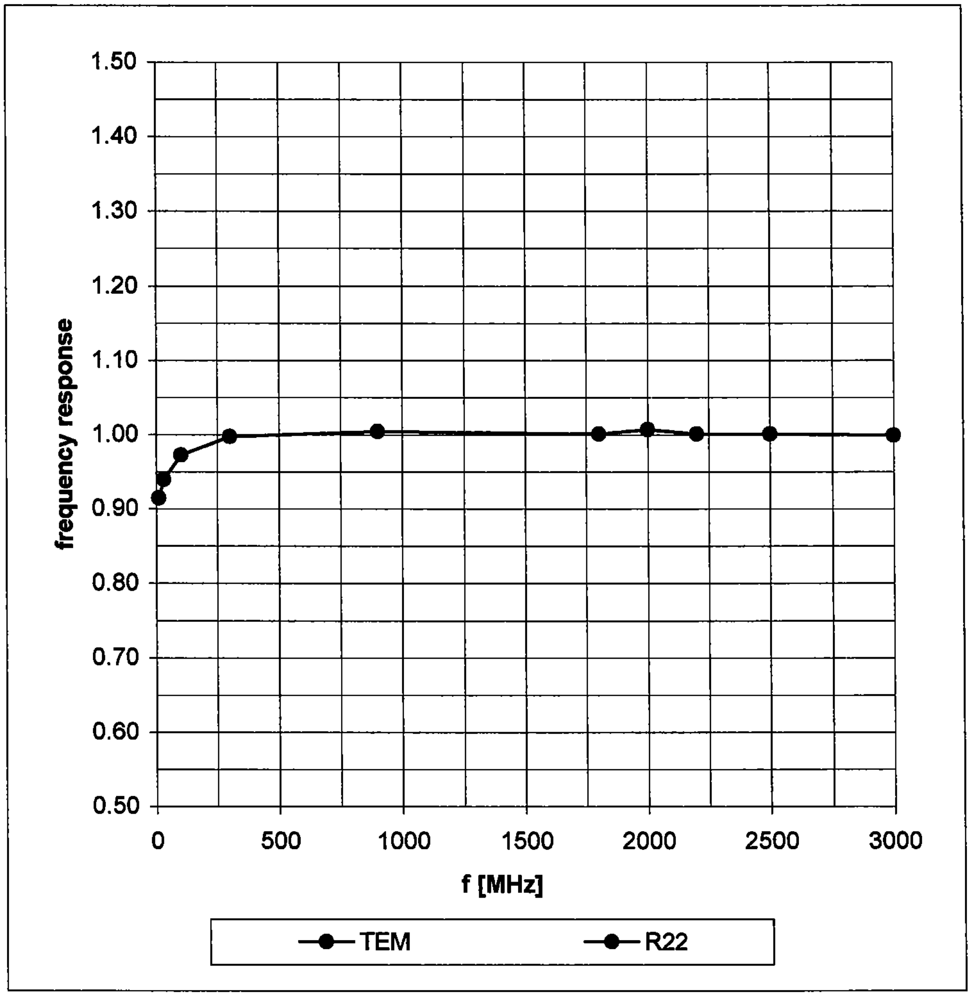


Isotropy Error (ϕ), θ = 0°



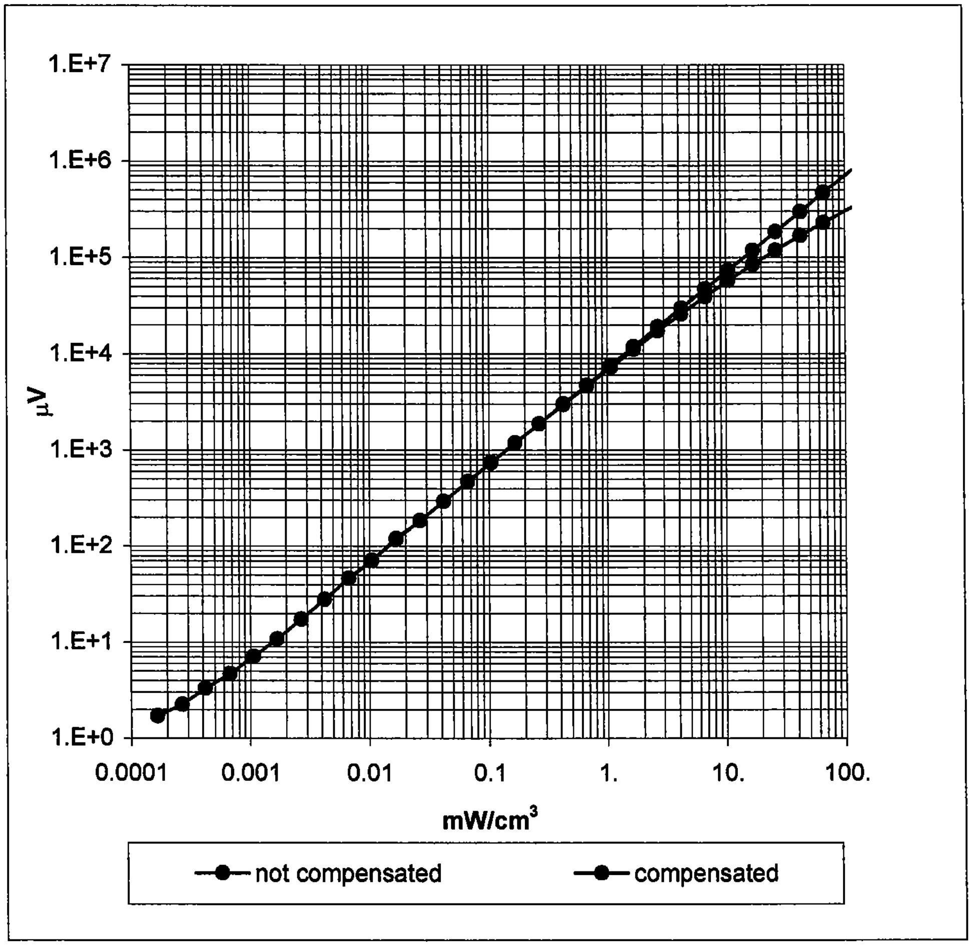
Frequency Response of E-Field

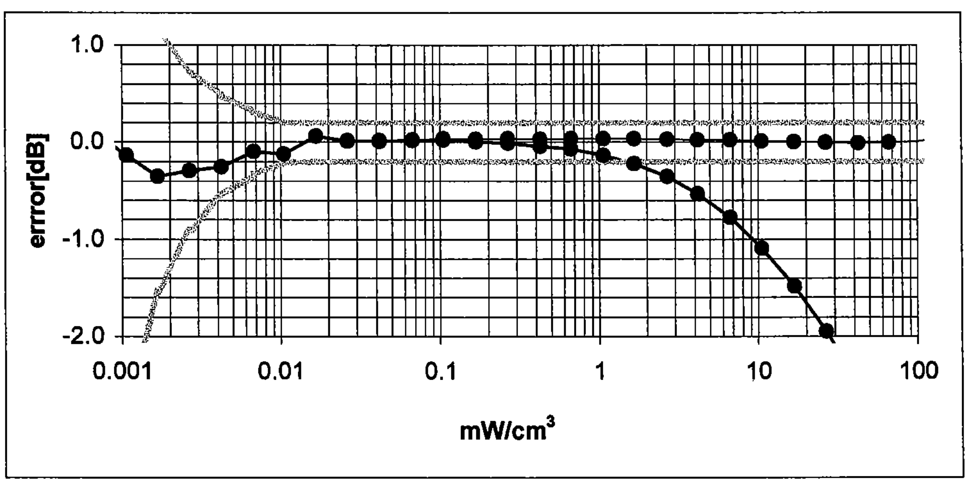
(TEM-Cell:ifi110, Waveguide R22)



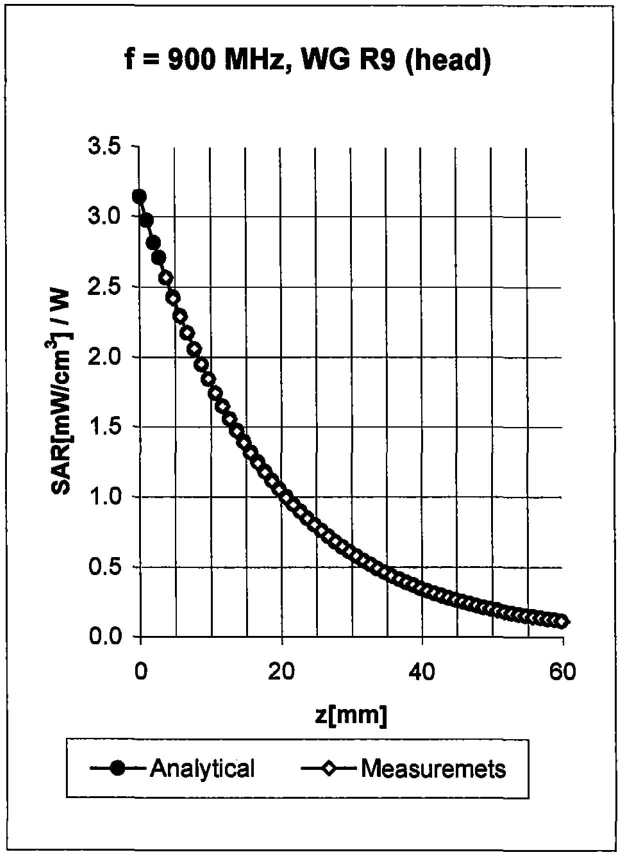
Dynamic Range f(SAR$_{brain}$)

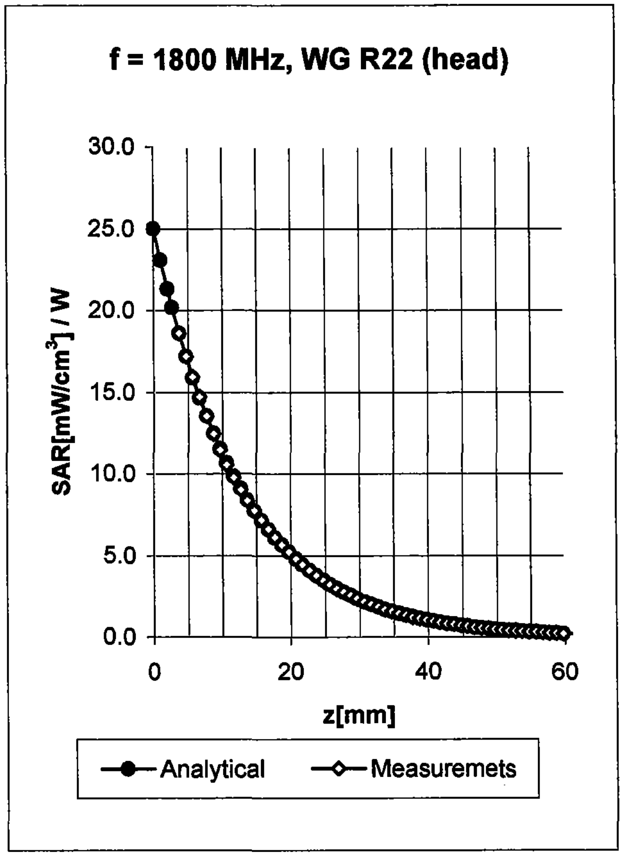
(Waveguide R22)





Conversion Factor Assessment





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

Valid for f=800-1000 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

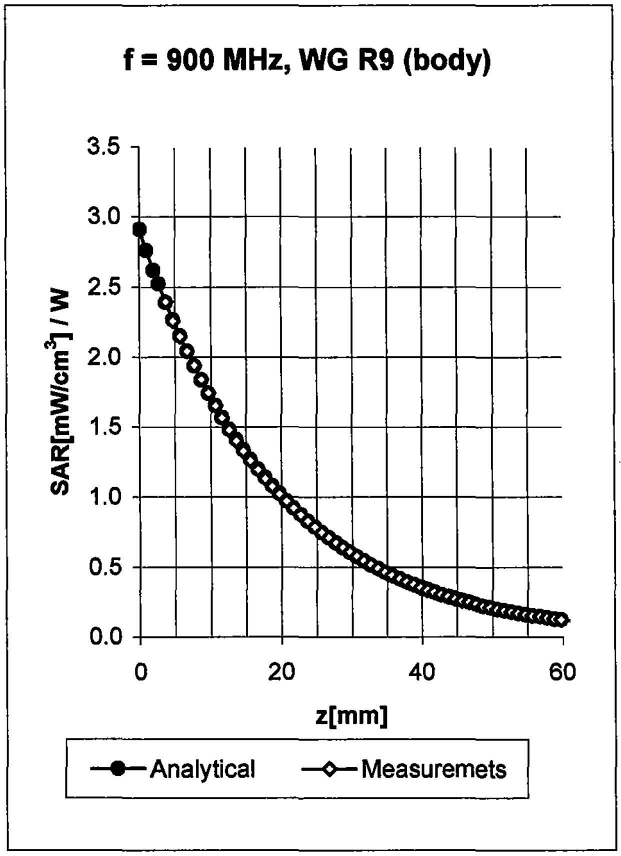
ConvF X	**6.3**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.3**	± 9.5% (k=2)	Alpha	**0.58**
ConvF Z	**6.3**	± 9.5% (k=2)	Depth	**1.95**

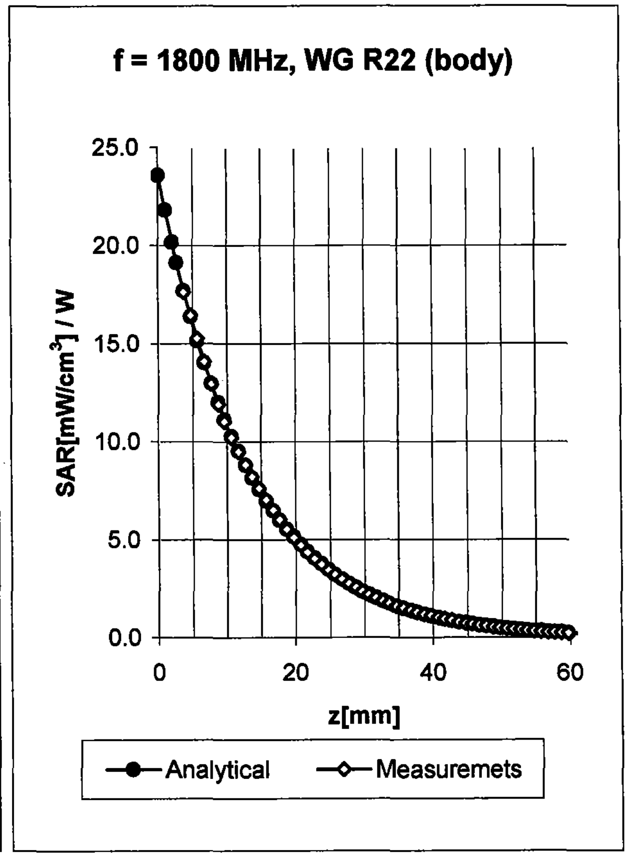
Head	**1800 MHz**	ε_r **= 40.0 ± 5%**	σ **= 1.40 ± 5% mho/m**

Valid for f=1710-1910 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**5.1**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**5.1**	± 9.5% (k=2)	Alpha	**0.55**
ConvF Z	**5.1**	± 9.5% (k=2)	Depth	**2.48**

Conversion Factor Assessment





Body **900 MHz** ε_r **= 55.0 ± 5%** σ **= 1.05 ± 5% mho/m**

Valid for f=800-1000 MHz with Head Tissue Simulating Liquid according to OET 65 Suppl. C

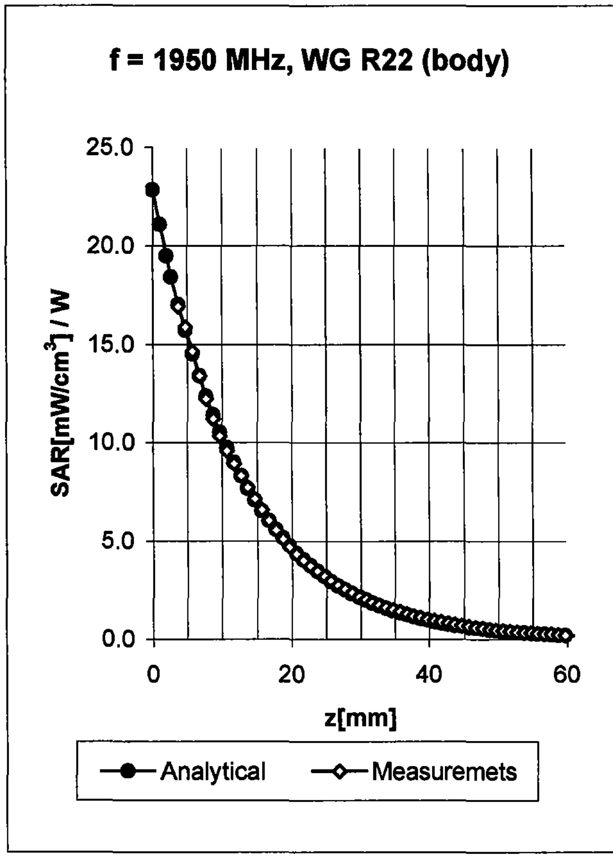
ConvF X	**6.1**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.1**	± 9.5% (k=2)	Alpha	**0.51**
ConvF Z	**6.1**	± 9.5% (k=2)	Depth	**2.18**

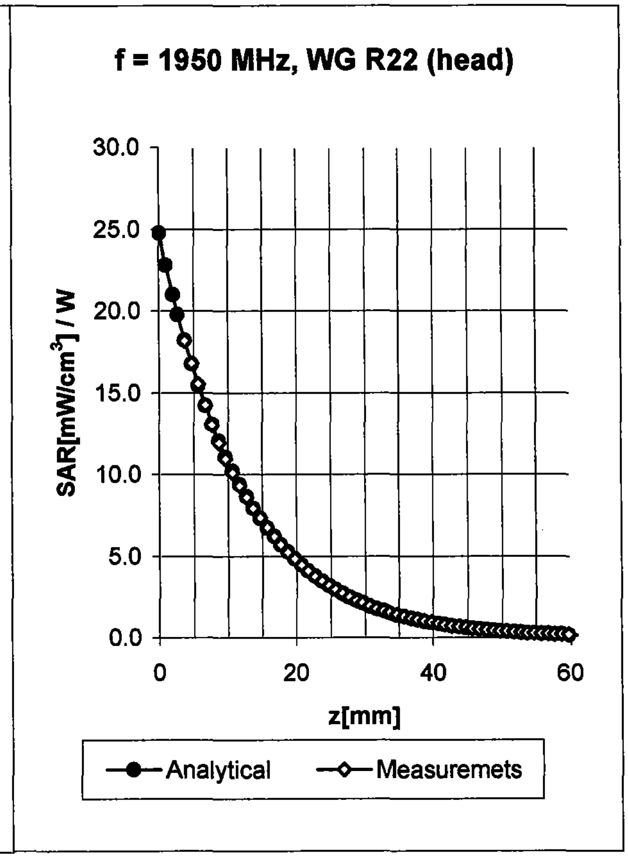
Body **1800 MHz** ε_r **= 53.3 ± 5%** σ **= 1.52 ± 5% mho/m**

Valid for f=1710-1910 MHz with Head Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	**4.7**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**4.7**	± 9.5% (k=2)	Alpha	**0.57**
ConvF Z	**4.7**	± 9.5% (k=2)	Depth	**2.85**

Conversion Factor Assessment

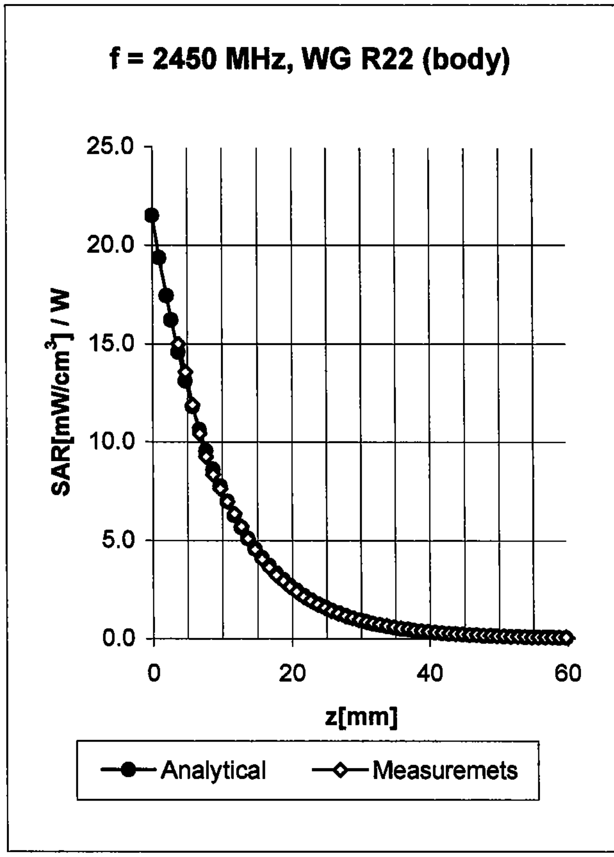


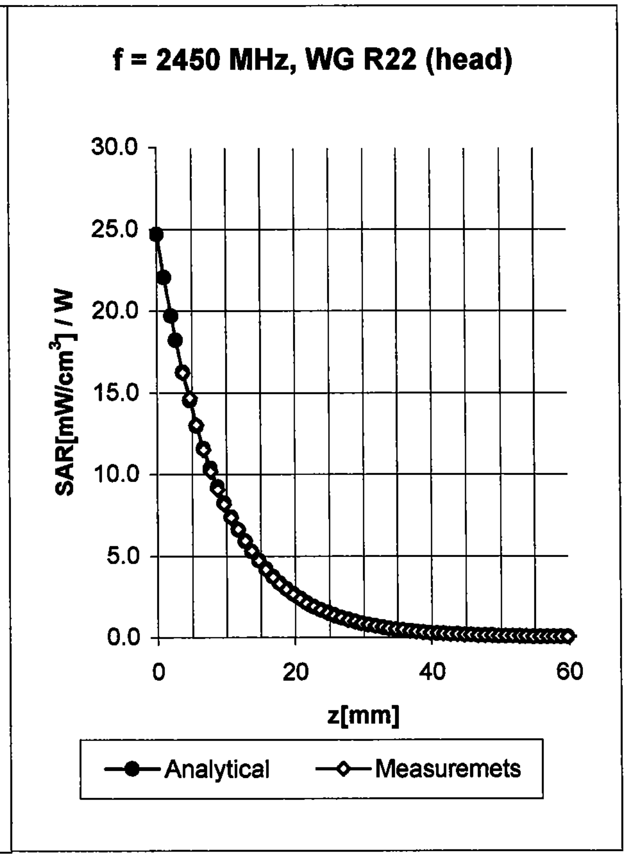


Body	**1950 MHz**	ε_r **= 53.3 ± 5%**	σ **= 1.52 ± 5% mho/m**	
	ConvF X	**4.5** ± 9.5% (k=2)	Boundary effect:	
	ConvF Y	**4.5** ± 9.5% (k=2)	Alpha	**0.80**
	ConvF Z	**4.5** ± 9.5% (k=2)	Depth	**2.23**

Head	**1950 MHz**	ε_r **= 40.0 ± 5%**	σ **= 1.40 ± 5% mho/m**	
	ConvF X	**5.0** ± 8.9% (k=2)	Boundary effect:	
	ConvF Y	**5.0** ± 8.9% (k=2)	Alpha	**0.60**
	ConvF Z	**5.0** ± 8.9% (k=2)	Depth	**2.44**

Conversion Factor Assessment





Body **2450 MHz** ε_r **= 52.7 ± 5%** σ **= 1.95 ± 5% mho/m**

Valid for f=2400-2500 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	**4.4**	± 8.9% (k=2)	Boundary effect:	
ConvF Y	**4.4**	± 8.9% (k=2)	Alpha	**1.55**
ConvF Z	**4.4**	± 8.9% (k=2)	Depth	**1.45**

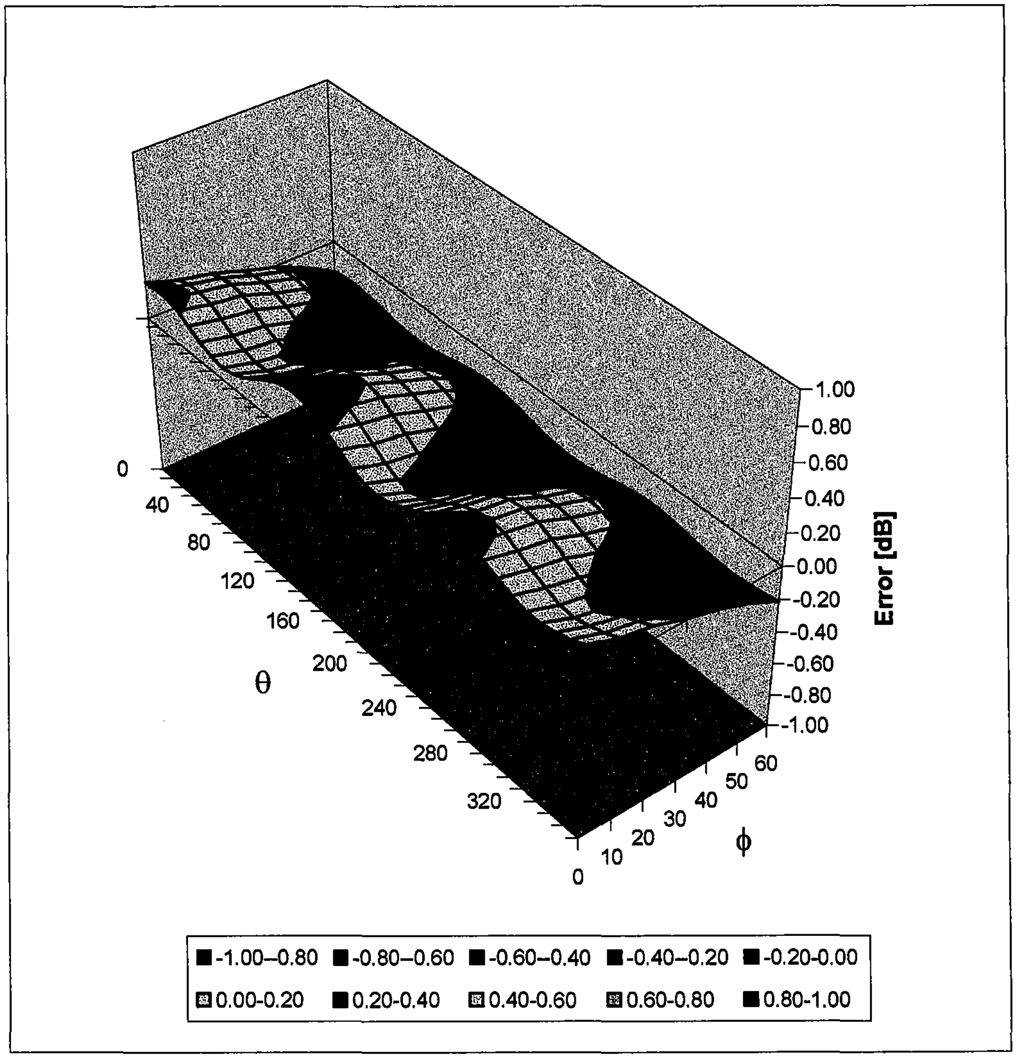
Head **2450 MHz** ε_r **= 39.2 ± 5%** σ **= 1.80 ± 5% mho/m**

Valid for f=2400-2500 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**4.7**	± 8.9% (k=2)	Boundary effect:	
ConvF Y	**4.7**	± 8.9% (k=2)	Alpha	**1.24**
ConvF Z	**4.7**	± 8.9% (k=2)	Depth	**1.67**

Deviation from Isotropy in HSL

Error (θφ), f = 900 MHz



Appendix 5

Dipole Characterization Certificate

Certification of System Performance Check Targets
Based on APP-0396

-Historical Data-

	835MHz	900MHz	1800MHz	1900MHz	
IEEE1528 Target: Advanced Extrapolation	9.5	10.8	38.1	39.7	**(W/kg)**
Measurement Uncertainty (k=1):	9.0%	9.0%	9.0%	9.0%	
Measurement Period:	*1-July-03 to 1-Apr-04*	*1-July-03 to 1-Apr-04*	*1-July-03 to 1-Apr-04*	*1-July-03 to 1-Apr-04*	
# of tests performed:	214	1148	1135	62	
Grand Average: Worst Case Extrapolation	10.0	11.4	40.7	42.0	**(W/kg)**
% Delta (Average - IEEE1528 Target)	5.3%	5.6%	6.8%	5.8%	
Is % Delta <= Measurement Uncertainty?	**Yes**	**Yes**	**Yes**	**Yes**	
Accept/Reject Average as new system performance check target?	**ACCEPT**	**ACCEPT**	**ACCEPT**	**ACCEPT**	
	Applicable 835MHz Dipole Serial Numbers:	**Applicable 900MHz Dipole Serial Numbers:**	**Applicable 1800MHz Dipole Serial Numbers:**	**Applicable 1900Mhz Dipole Serial Numbers:**	
	420(TR), 421(TR)	77, 78	246(TR), 250(TR)	514(TR), 518(TR)	
	422(TR), 423(TR)	79, 80	251(TR), 258(TR)	519(TR), 520(TR)	
	424(TR), 425(TR)	91, 92	259(TR), 262(TR)	523(TR), 524(TR)	
	431(TR), 432(TR)	93, 94	263(TR), 271(TR)	526(TR), 527(TR)	
	433(TR), 434(TR)	95, 96	272(TR), 273(TR)	528(TR), 529(TR)	
	436(TR)	97, 55	276(TR), 277(TR)	530(TR), 533(TR)	
			279(TR), 280(TR)		
			281(TR), 282(TR)		
			283(TR), 284(TR)		

-New System Performance Check Targets- per APP-0396
(based on analysis of historical data)

Frequency	SAR Target (W/kg)	Permittivity	Conductivity (S/m)
835MHz	**10.0**	41.5 ± 5%	0.90 ± 5%
900MHz	**11.4**	41.5 ± 5%	0.97 ± 5%
1800MHz	**40.7**	40.0 ± 5%	1.40 ± 5%
1900MHz	**42.0**	40.0 ± 5%	1.40 ± 5%

-Approvals-

Submitted by: Marge Kaunas — Date: 2-Apr-04

Signed: Marge Kaunas

Comments: Spreadsheet detailing all historical measurements available upon request.

Approved by: Mark Douglas — **Date:** 2-Apr-04

Signed: Mark Douglas

Comments: Targets and associated simulant properties are derived from the IEEE 1528 standard.

Appendix 6

Measurement Uncertainty Budget

Uncertainty Budget for Device Under Test									
a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	Sec.	**Tol. (± %)**	**Prob. Dist.**	**Div.**	c_i (1 g)	c_i (10 g)	1 g u_i (±%)	10 g u_i (±%)	v_i
Measurement System									
Probe Calibration	E.2.1	9.5	N	2.00	1	1	4.8	4.8	∞
Axial Isotropy	E.2.2	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
Spherical Isotropy	E.2.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	E.2.3	5.8	R	1.73	1	1	3.3	3.3	∞
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1.0	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	1.0	N	1.00	1	1	1.0	1.0	∞
Response Time	E.2.7	0.8	R	1.73	1	1	0.5	0.5	∞
Integration Time	E.2.8	1.3	R	1.73	1	1	0.8	0.8	∞
RF Ambient Conditions	E.6.1	3.0	R	1.73	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.3	R	1.73	1	1	0.2	0.2	∞
Probe Positioning with respect to Phantom Shell	E.6.3	1.1	R	1.73	1	1	0.6	0.6	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	E.5	3.9	R	1.73	1	1	2.3	2.3	∞
Test sample Related									
Test Sample Positioning	E.4.2	3.6	N	1.00	1	1	3.6	3.6	29
Device Holder Uncertainty	E.4.1	2.8	N	1.00	1	1	2.8	2.8	8
Output Power Variation - SAR drift measurement	6.6.2	5.0	R	1.73	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (shape and thickness tolerances)	E.3.1	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity - measurement uncertainty	E.3.3	10.0	R	1.73	0.64	0.43	3.7	2.5	∞
Liquid Permittivity - deviation from target values	E.3.2	10.0	R	1.73	0.6	0.49	3.5	2.8	∞
Liquid Permittivity - measurement uncertainty	E.3.3	5.0	R	1.73	0.6	0.49	1.7	1.4	∞
Combined Standard Uncertainty			RSS				11.72	11.09	1363
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k* =2				22.98	21.75	

Uncertainty Budget for System Performance Check (dipole & flat phantom)

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	Sec.	**Tol. (± %)**	**Prob. Dist.**	**Div.**	c_i **(1 g)**	c_i **(10 g)**	**1 g** u_i **(±%)**	**10 g** u_i **(±%)**	v_i
Measurement System									
Probe Calibration	E.2.1	9.5	N	2.00	1	1	4.8	4.8	∞
Axial Isotropy	E.2.2	4.7	R	1.73	1	1	2.7	2.7	∞
Spherical Isotropy	E.2.2	9.6	R	1.73	0	0	0.0	0.0	∞
Boundary Effect	E.2.3	5.8	R	1.73	1	1	3.3	3.3	∞
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1.0	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	1.0	N	1.00	1	1	1.0	1.0	∞
Response Time	E.2.7	0.0	R	1.73	1	1	0.0	0.0	∞
Integration Time	E.2.8	0.0	R	1.73	1	1	0.0	0.0	∞
RF Ambient Conditions	E.6.1	3.0	R	1.73	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.3	R	1.73	1	1	0.2	0.2	∞
Probe Positioning with respect to Phantom Shell	E.6.3	1.1	R	1.73	1	1	0.6	0.6	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	E.5	3.9	R	1.73	1	1	2.3	2.3	∞
Dipole									
Dipole Axis to Liquid Distance	8, E.4.2	1.0	R	1.73	1	1	0.6	0.6	∞
Input Power and SAR Drift Measurement	8, 6.6.2	4.7	R	1.73	1	1	2.7	2.7	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (shape and thickness tolerances)	E.3.1	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity - measurement uncertainty	E.3.3	10.0	R	1.73	0.64	0.43	3.7	2.5	∞
Liquid Permittivity - deviation from target values	E.3.2	10.0	R	1.73	0.6	0.49	3.5	2.8	∞
Liquid Permittivity - measurement uncertainty	E.3.3	5.0	R	1.73	0.6	0.49	1.7	1.4	∞
Combined Standard Uncertainty			RSS				10.16	9.43	99999
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				19.92	18.48	

Appendix 7

Photographs of the device under test

Figure 6. Front of Phone

Figure 7. Back of Phone

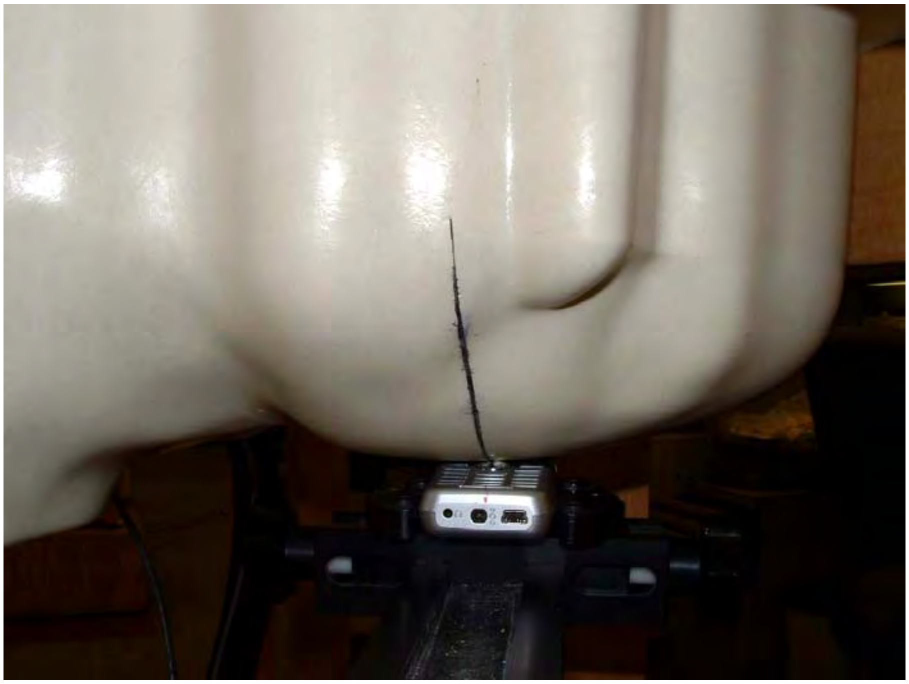


Figure 8. Phone Against the Head (Front View – Cheek Touch)

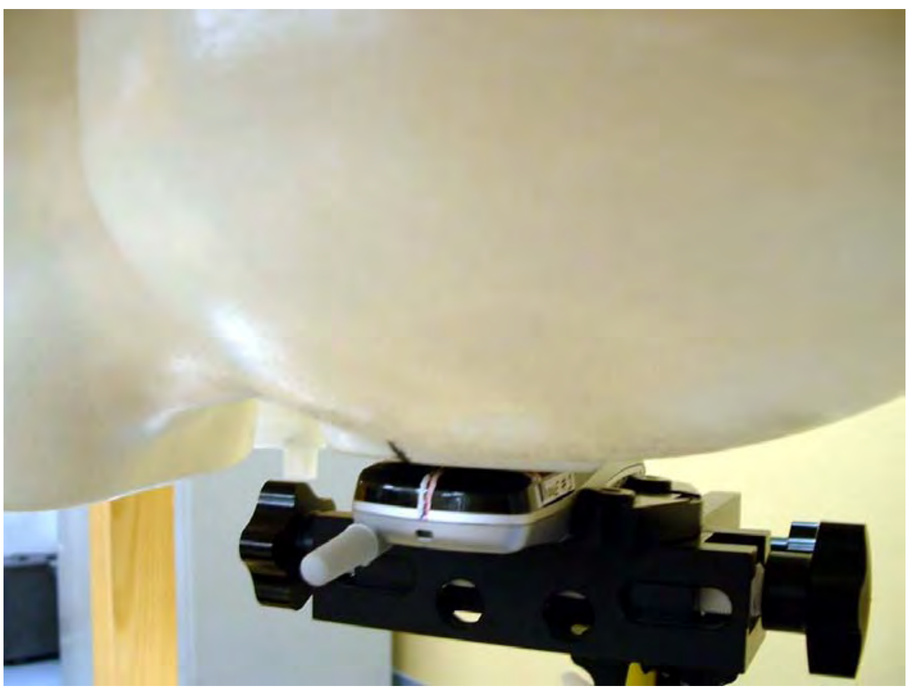


Figure 9. Phone Against the Head (Back View – Cheek Touch)

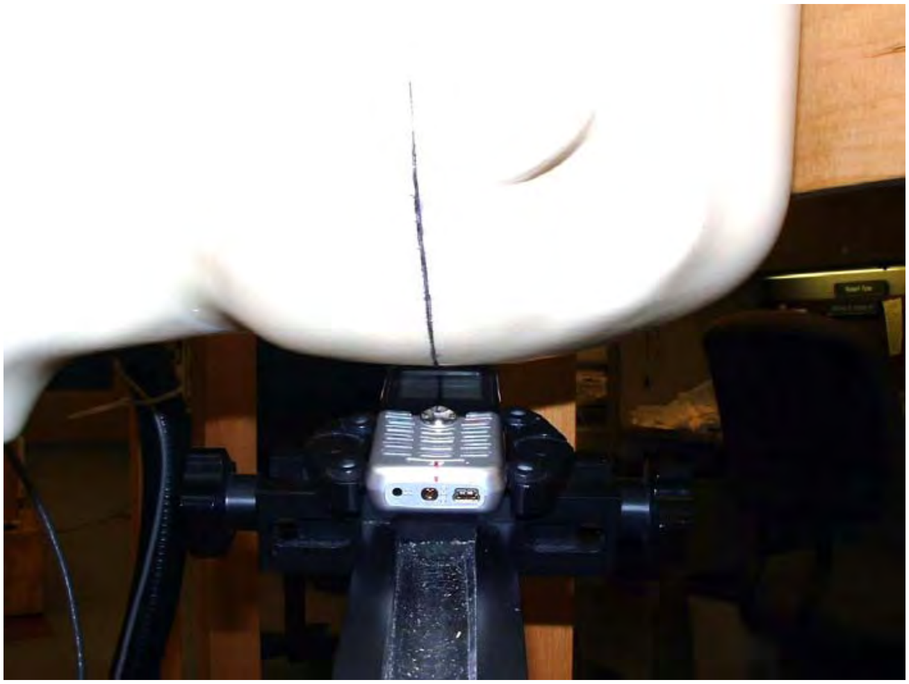


Figure 10. Phone Against the Head (Front View – 15°Tilt)

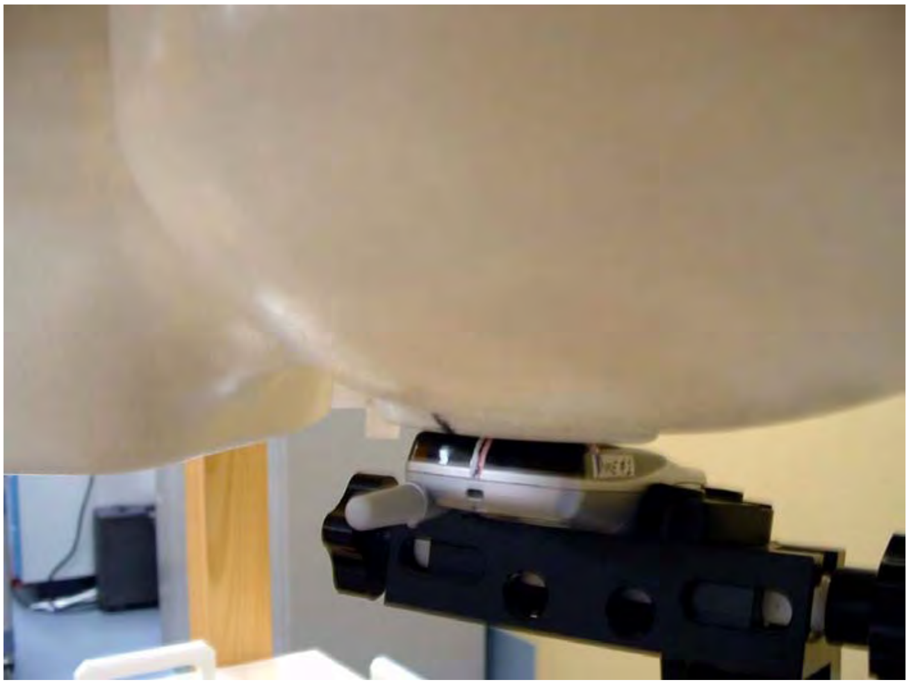


Figure 11. Phone Against the Head (Back View – 15°Tilt)

Figure 12. Phone in Against the Flat Phantom