MOTOROLA

Exhibit 11: SAR Test Report IHDT56DX1

Date of test: 1-3 Oct, 2003
Date of Report: 8 Oct, 2003

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

Test Responsible:
Steven Hauswirth
Principal Staff Engineer

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

Tests:	Procedures:
Electromagnetic Specific Absorption Rate (SAR)	ANSI/IEEE C95.1-1992, 1999 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 IHDT56DX1 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.a Antenna description 3

2.b 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 5

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 17

APPENDIX 5: DIPOLE CHARACTERIZATION CERTIFICATE 18

APPENDIX 6: MEASUREMENT UNCERTAINTY BUDGET 19

APPENDIX 7: PHOTOGRAPHS OF DEVICE UNDER TEST 22

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 IHDT56DX1). 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

a. Antenna description

Type	Internal Antenna	
Location	Back of phone	
Dimensions	Length	23mm
	Width	37mm
Configuration	Internal Patch	

b. Device description

FCC ID Number	IHDT56DX1	
Serial number	01100302	
Mode(s) of Operation	GSM 850	GSM 1900
Modulation Mode(s)	GSM	GSM
Maximum Output Power Setting	33.00 dBm	31.00 dBm
Duty Cycle	1:8	1:8
Transmitting Frequency Rang(s)	824.20 - 848.80 MHz	1850.20 – 1909.80 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	SN386	18-Mar-04
E-Field Probe ET3DV6	SN1514	31-Jul-04
Dipole Validation Kit, D900V2	SN092	24-Jun-03
S.A.M. Phantom used for 800MHz	TP-1131	
Dipole Validation Kit, D1800V2	SN272TR	24-Jun-03
S.A.M. Phantom used for 1900MHz	TP-1250	

3.2 Additional Equipment

Description	Serial Number	Cal Due Date
Signal Generator HP8648C	3847A04632	10-Oct-04
Power Meter E4419B	GB39511090	6-Feb-04
Power Sensor #1 - 8481A	US39210931	5-Aug-04
Power Sensor #2 - 8481A	US39211007	6-Feb-04
Network Analyzer HP8753ES	US39172529	18-Jun-04
Dielectric Probe Kit HP85070B	US33020235	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,** 1-Oct-03	43.0	0.92	18.5
		Recommended Limits	41.5 ±5%	0.90 ±5%	18-25
	Body	**Measured,** 3-Oct-03	53.7	0.97	19.3
		Recommended Limits	55.2 ±5%	0.97 ±5%	18-25
1880	**Head**	**Measured,** 2-Oct-03	38.7	1.46	20.0
		Recommended Limits	40.0 ±5%	1.40 ±5%	18-25
	Body	**Measured,** 3-Oct-03	51.1	1.58	20.0
		Recommended Limits	53.3 ±5%	1.52 ±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)		
900	**Measured,** 1-Oct-03	10.9	42.1	0.98	20	20.0
	Measured, 3-Oct-03	10.9	41.8	0.97	20	20.0
	Recommended Limits	11.6	41.5 ±5%	0.97 ±5%	18-25	18-25
1800	**Measured,** 2-Oct-03	39.9	39.1	1.37	20	20.0
	Measured, 3-Oct-03	39.2	38.8	1.36	20	19.5
	Recommended Limits	39.7	40.0 ±5%	1.4 ±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	SN1514	900	6.3	2 of 11
		1800	5.1	2 of 11

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.

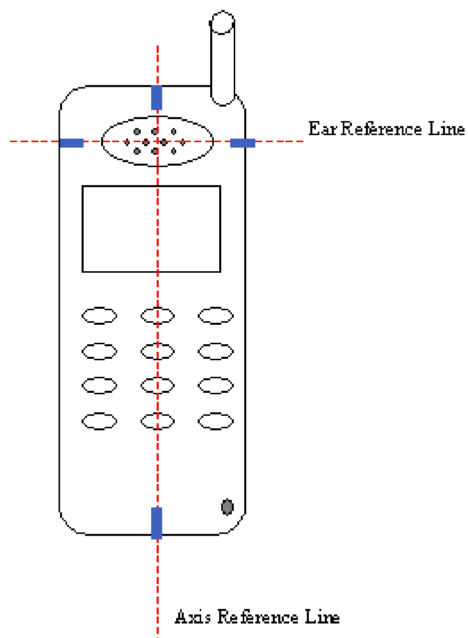
The Cellular Phone (FCC ID IHDT56DX1) has the SNN5677A as the only available battery options. This battery was used to do all of the SAR testing. The phone was placed in the SAR measurement system with a fully charged battery.

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 3 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.

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	SN1514	835	6.3	2 of 11
		1900	5.1	2 of 11

f (MHz)	Description	Conducted Output Power (dBm)	Cheek / Touch Position							
			Left Head				Right Head			
			Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)	Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)
Digital 800MHz	Channel 128	32.90	1.10	-0.07	1.12	20.0	**1.11**	**-0.07**	**1.13**	**20.0**
	Channel 190	32.91	0.892	-0.12	0.92	20.0	0.935	-0.09	0.95	20.0
	Channel 251	32.90	0.893	-0.14	0.92	20.0	0.947	-0.11	0.97	20.0
Digital 1900MHz	Channel 512	30.92								
	Channel 661	30.91	0.645	-0.07	0.65	20.0	**0.662**	**0.0**	**0.66**	**18.4**
	Channel 810	30.90								

Table 1: SAR measurement results for the portable cellular telephone FCC ID IHDT56DX1 at highest possible output power. Measured against the left head in the Cheek/Touch Position.

f (MHz)	Description	Conducted Output Power (dBm)	15° Tilt Position							
			Left Head				Right Head			
			Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)	Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)
Digital 800MHz	Channel 128	32.90								
	Channel 190	32.91	**0.502**	**-0.02**	**0.50**	**20.0**	0.471	0.0	0.47	18.2
	Channel 251	32.90								
Digital 1900MHz	Channel 512	30.92								
	Channel 661	30.91	**0.642**	**0.18**	**0.64**	**20.0**	0.638	-0.01	0.64	18.5
	Channel 810	30.90								

Table 2: SAR measurement results for the portable cellular telephone FCC ID IHDT56DX1 at highest possible output power. Measured against the left head in the 15° Tilt Position.

There are two Body-Worn Accessories available for this phone that can be on the phone when the phone is placed against the head. These are:
A Plastic Holster and Plastic Belt Clip: Model # MOTFL0076K
A Plastic Holster and Metal Belt Clip: Model # MOTPL0205K

The portable cellular phone (FCC ID IHDT56DX1) was measured in the highest SAR configuration with these accessory on to determine SAR impact of these accessories..

f (MHz)	Description	Conducted Output Power (dBm)	**Right Head - Cheek / Touch Position w/ Accessories**							
			w/ MOTFL0076K Accessory				w/ MOTPL0205K Accessory			
			Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)	Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)
Digital 800MHz	Channel 128	32.90	**0.996**	**0.06**	**1.00**	**18.1**				
	Channel 190	32.91	0.833	-008	0.85	18.2	0.732	-0.02	0.74	18.1
	Channel 251	32.90	0.941	-0.01	0.94	18.3				
Digital 1900MHz	Channel 512	30.92								
	Channel 661	30.91	0.734	-0.03	0.74	18.3	**0.757**	**-0.15**	**0.78**	**18.4**
	Channel 810	30.90								

Table 3: SAR measurement results for the portable cellular telephone FCC ID IHDT56DX1 at highest possible output power. Measured against the left head in the 15° Tilt Position.

6.2 Body Worn Test Results

The SAR results shown in tables 4 & 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.

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. The functional accessories were divided into two categories, the ones with metal components and the ones with non-metal components. For non-metallic component accessories’, testing was performed on the accessory that displayed the closest proximity to the flat phantom. Each metallic component accessory, if any, was checked for uniqueness of metal component so that each is tested with the device. If multiple accessories shared an identical metal component, only the accessory that dictates the closest spacing to the body was tested. The cellular phone was tested with a headset connected to the device for all body-worn SAR measurements.

There are three Body-Worn Accessories available for this phone:
A Plastic Holster and Plastic Belt Clip: Model # MOTFL0076K
A Plastic Holster and Metal Belt Clip: Model # MOTPL0205K
A Leather Pouch with Belt Loop: Model # MT-04193

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	SN1514	835	6.1	8 of 11
		1900	4.7	8 of 11

f (MHz)	Description	Conducted Output Power (dBm)	Body Worn							
			w/ MOTFL0076K Accessory				w/ MOTPL0205K Accessory			
			Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)	Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)
Digital 800MHz	Channel 128	32.90								
	Channel 190	32.91	0.378	-0.07	0.38	19.5	0.525	0.04	0.53	19.5
	Channel 251	32.90								
Digital 1900MHz	Channel 512	30.92								
	Channel 661	30.91	0.418	-0.09	0.43	20.0	0.672	-0.16	0.70	20.0
	Channel 810	30.90								

Table 4: SAR measurement results for the portable cellular telephone FCC ID IHDT56DX1 at highest possible output power. Measured against the body.

f (MHz)	Description	Conducted Output Power (dBm)	Body Worn			
			w/ MT-04193 Accessory			
			Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)
Digital 800MHz	Channel 128	32.90	0.845	0.05	0.85	19.2
	Channel 190	32.91	**0.939**	**-0.04**	**0.95**	**19.3**
	Channel 251	32.90	0.868	-0.22	0.91	19.3
Digital 1900MHz	Channel 512	30.92	**1.46**	**-0.10**	**1.49**	**20.0**
	Channel 661	30.91	0.997	-0.37	1.09	20.0
	Channel 810	30.90	1.13	-0.27	1.20	20.0

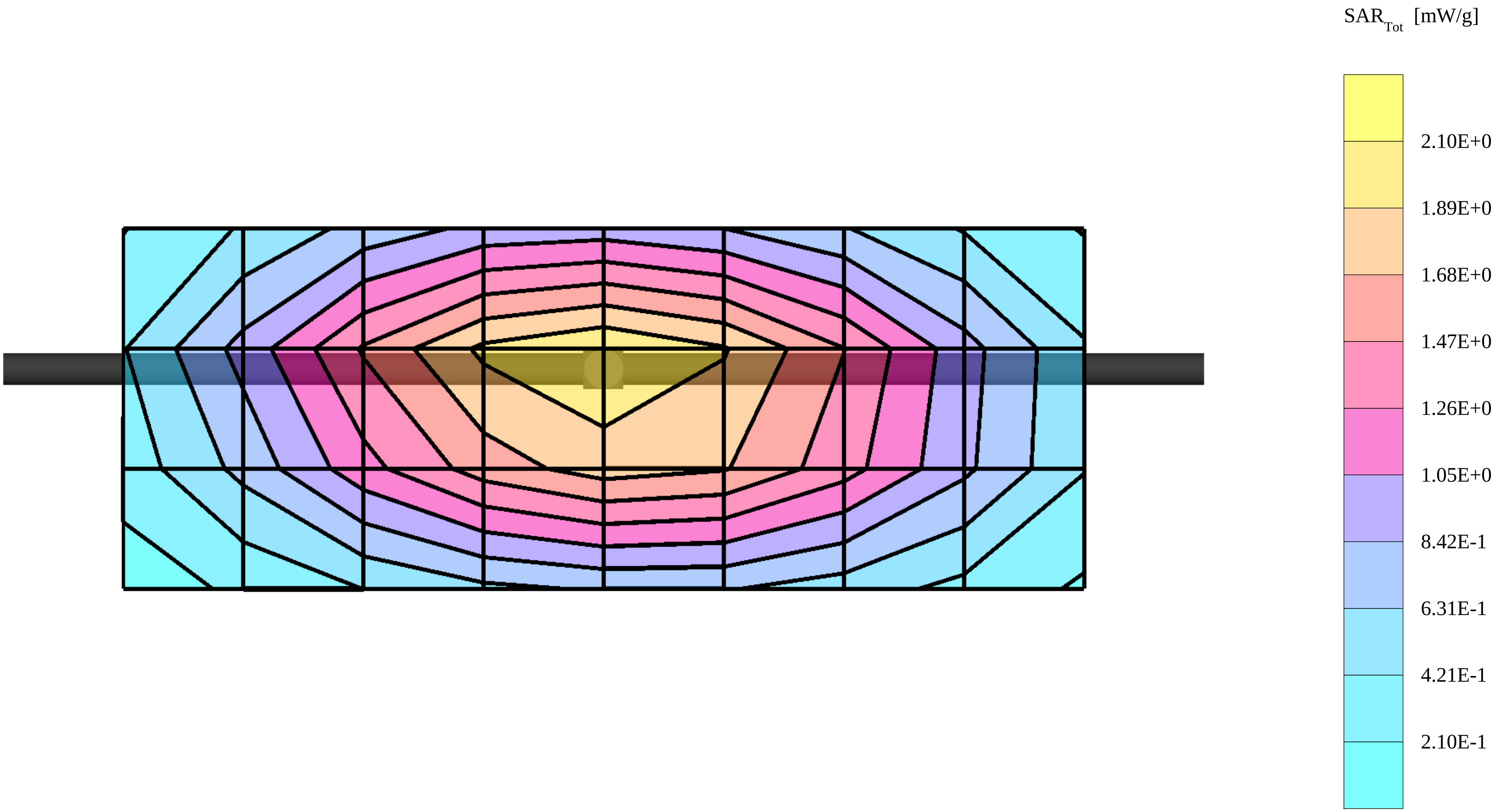
Table 5: SAR measurement results for the portable cellular telephone FCC ID IHDT56DX1 at highest possible output power. Measured against the body.

Appendix 1

SAR distribution comparison for the system accuracy verification

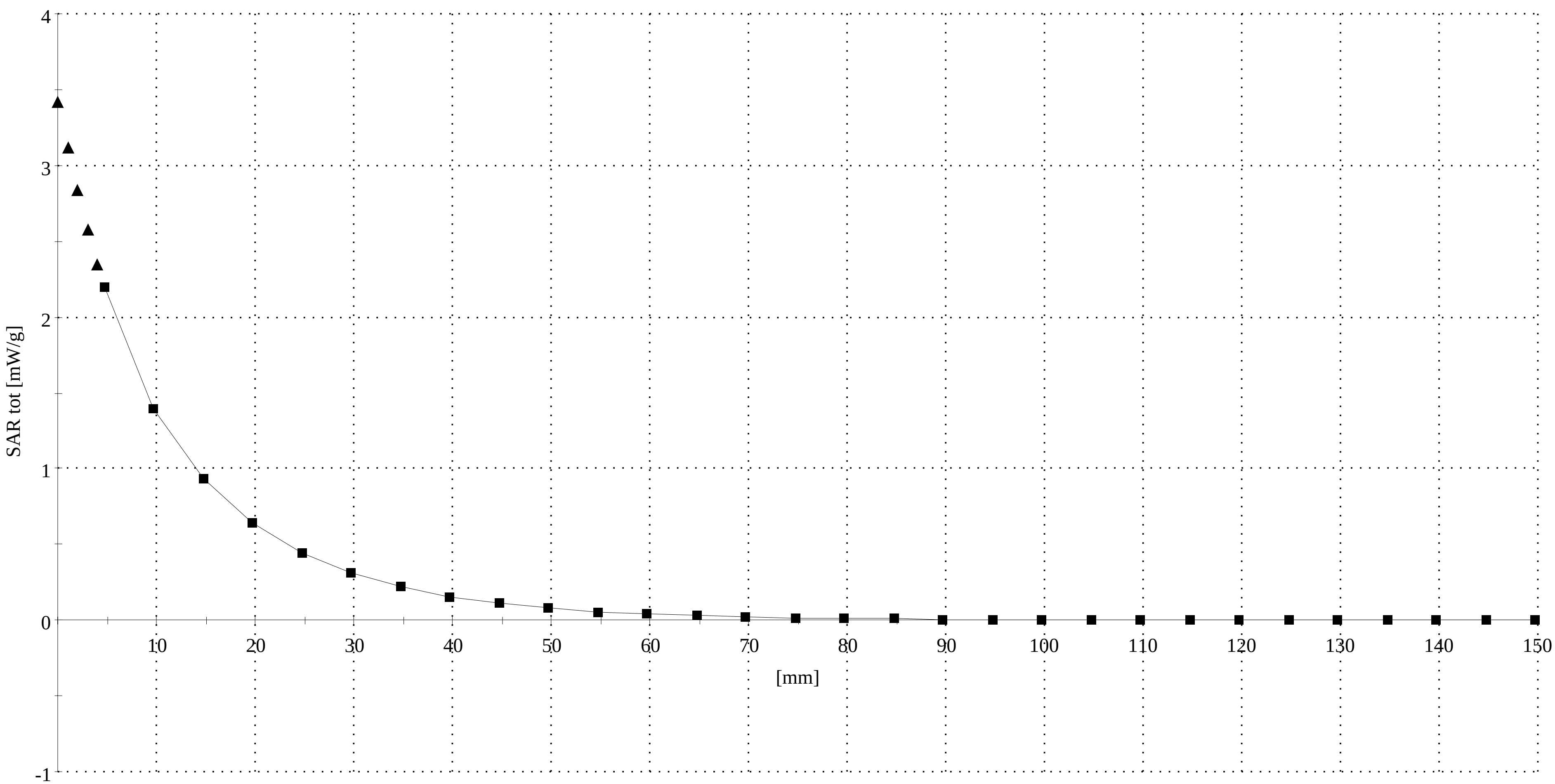
Dipole   900 MHz

900 MHz Dipole Validation / Dipole Sn# 096
Forward Power = 200mW   Reflected Power = -23.50dB
Room Temp at time of measurement = 20.0*C. Simulant Temp at time of measurement = 20.0*C
R4 TP-1131   SUGAR sam expanded (Rev. 2)-9Jan03; Flat
Probe: ET3DV6 - SN1514 - Validation.2; ConvF(6.30,6.30,6.30); Crest factor: 1.0;   900 MHz VALIDATION: σ = 0.98 mho/m ϵ_r = 42.1 ρ = 1.00 g/cm^3
Cubes (2): Peak: 3.43   mW/g ± 0.04 dB, SAR (1g): 2.18   mW/g ± 0.03 dB, SAR (10g): 1.38   mW/g ± 0.03 dB, (Worst-case extrapolation)
Penetration depth: 11.6 (10.8, 12.7) [mm]
Powerdrift: -0.08 dB



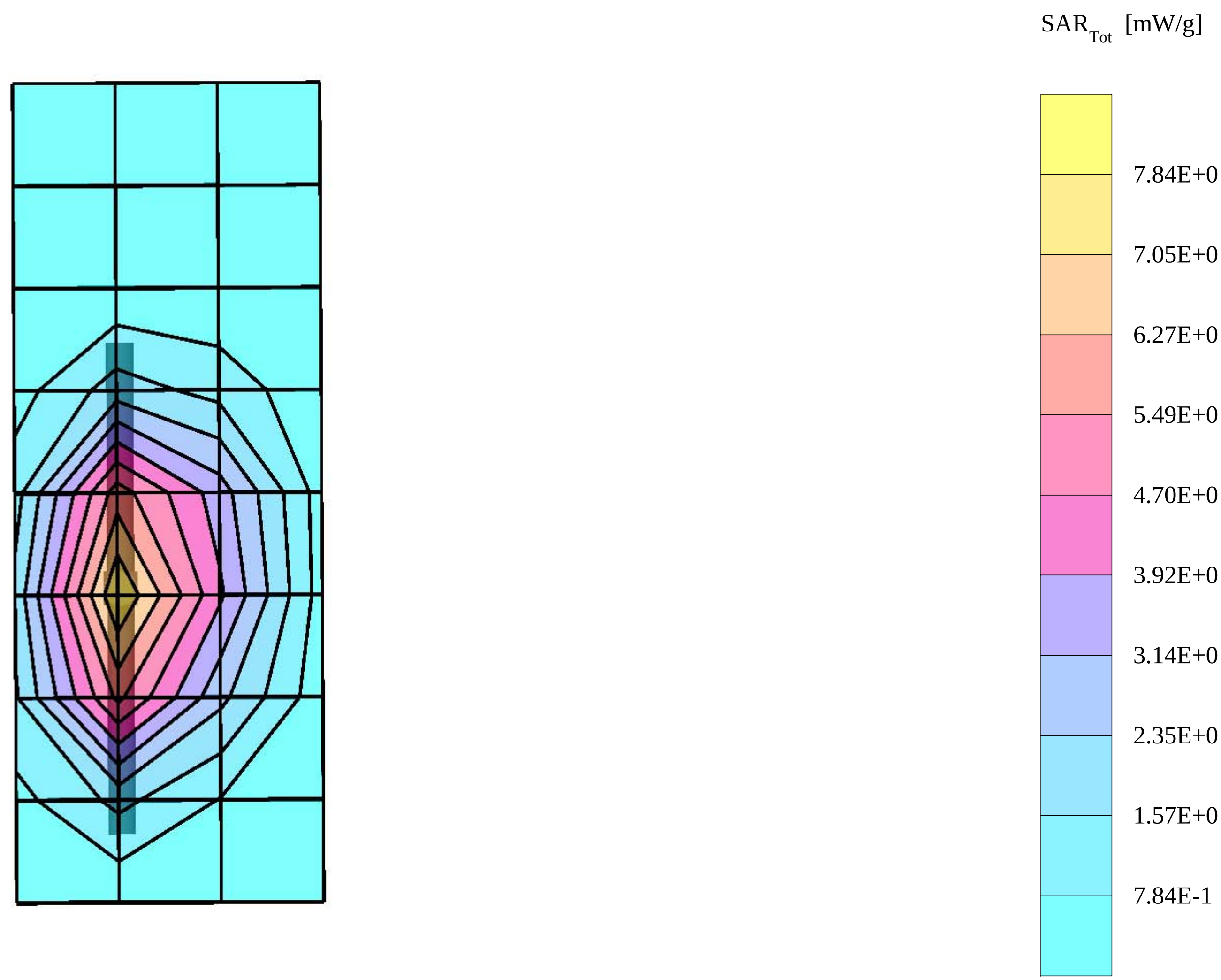
Dipole 900 MHz

900 MHz Dipole Validation / Dipole Sn# 096
Forward Power = 200mW Reflected Power = -23.50dB
Room Temp at time of measurement = 20.0*C. Simulant Temp at time of measurement = 20.0*C
R4 TP-1131 SUGAR sam expanded (Rev. 2)-9Jan03;
Probe: ET3DV6 - SN1514 - Validation.2; ConvF(6.30,6.30,6.30); Crest factor: 1.0; 900 MHz VALIDATION: σ = 0.98 mho/m ε_r = 42.1 ρ = 1.00 g/cm³
: , , ()
Penetration depth: 11.6 (10.8, 12.8) [mm]



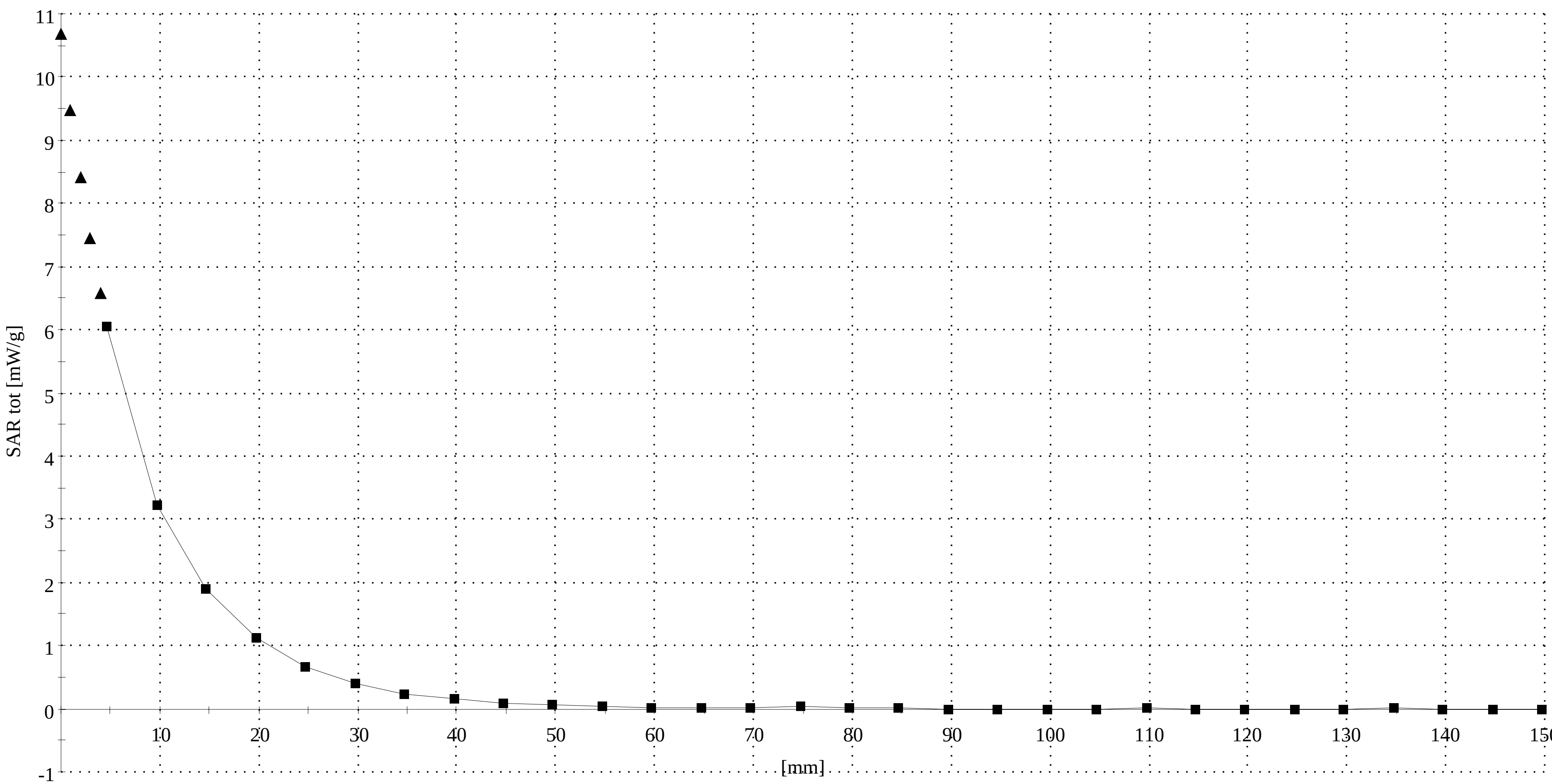
Dipole 1800 MHz

1800 MHz Dipole Validation / Dipole Sn# 272tr
Forward Power = 203mW Reflected Power = -24.30dB
Room Temp at time of measurement = 20.0*C. Simulant Temp at time of measurement =20.0*C.
R4 - Amy Twin Phantom Rev.4 (22Aug02); section 2
Probe: ET3DV6 - SN1514 - Validation.2; ConvF(5.10,5.10,5.10); Crest factor: 1.0; 1800 MHz VALIDATION: σ = 1.37 mho/m ε_r = 39.1 ρ = 1.00 g/cm^3
Cubes (2): Peak: 14.9 mW/g ± 0.16 dB, SAR (1g): 8.09 mW/g ± 0.11 dB, SAR (10g): 4.26 mW/g ± 0.07 dB, (Worst-case extrapolation)
Penetration depth: 8.6 (8.2, 9.4) [mm]
Powerdrift: 0.07 dB



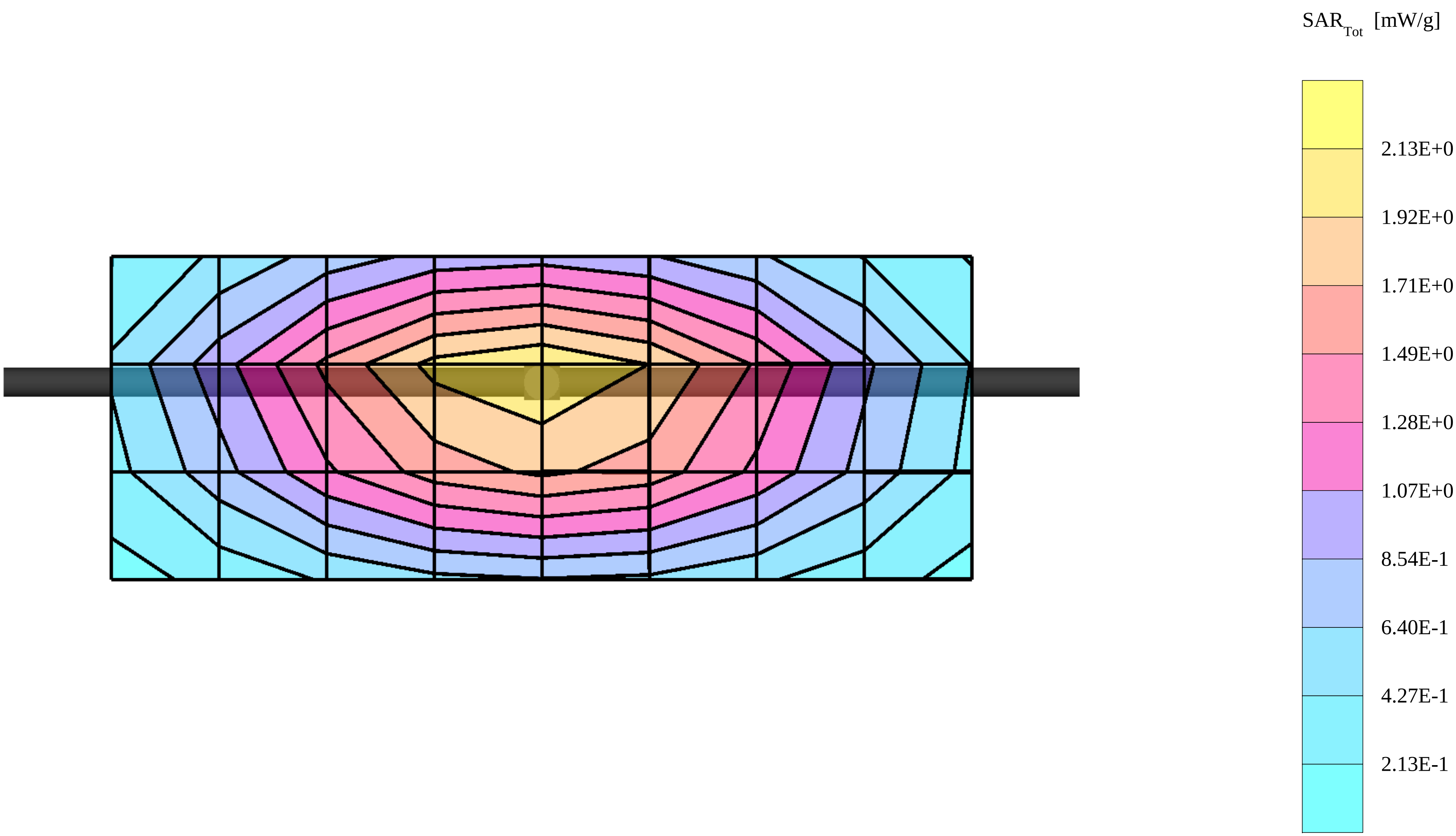
Dipole 1800 MHz

1800 MHz Dipole Validation / Dipole Sn# 272tr
Forward Power = 203mW   Reflected Power = -24.30dB
Room Temp at time of measurement = 20.0*C. Simulant Temp at time of measurement =20.0*C.
R4 - Amy Twin Phantom Rev.4 (22Aug02);
Probe: ET3DV6 - SN1514 - Validation.2; ConvF(5.10,5.10,5.10); Crest factor: 1.0; 1800 MHz VALIDATION: σ = 1.37 mho/m ε_r = 39.1 ρ = 1.00 g/cm³
: , , ()
Penetration depth: 8.5 (8.1, 9.3) [mm]



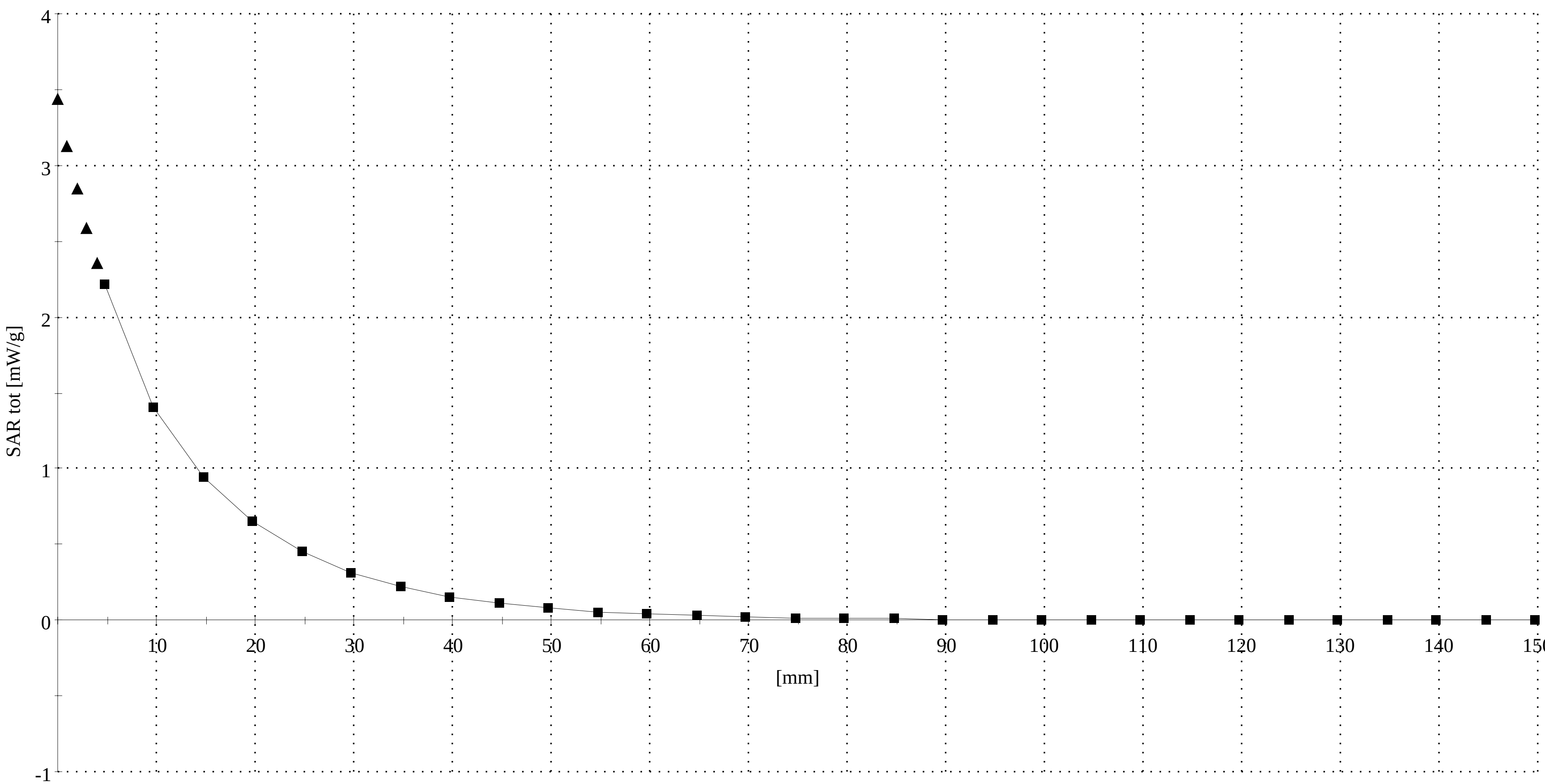
Dipole   900 MHz

900 MHz Dipole Validation / Dipole Sn# 096
Forward Power = 201mW   Reflected Power = -23.90dB
Room Temp at time of measurement = 20.0*C. Simulant Temp at time of measurement = 20.0*C
R4 TP-1131   SUGAR sam expanded (Rev. 2)-9Jan03; Flat
Probe: ET3DV6 - SN1514 - Validation.2; ConvF(6.30,6.30,6.30); Crest factor: 1.0;   900 MHz VALIDATION: σ = 0.97 mho/m ε_r = 41.8 ρ = 1.00 g/cm^3
Cubes (2): Peak: 3.50   mW/g ± 0.00 dB, SAR (1g): 2.20   mW/g ± 0.02 dB, SAR (10g): 1.39   mW/g ± 0.03 dB, (Worst-case extrapolation)
Penetration depth: 11.5 (10.7, 12.7) [mm]
Powerdrift: -0.04 dB



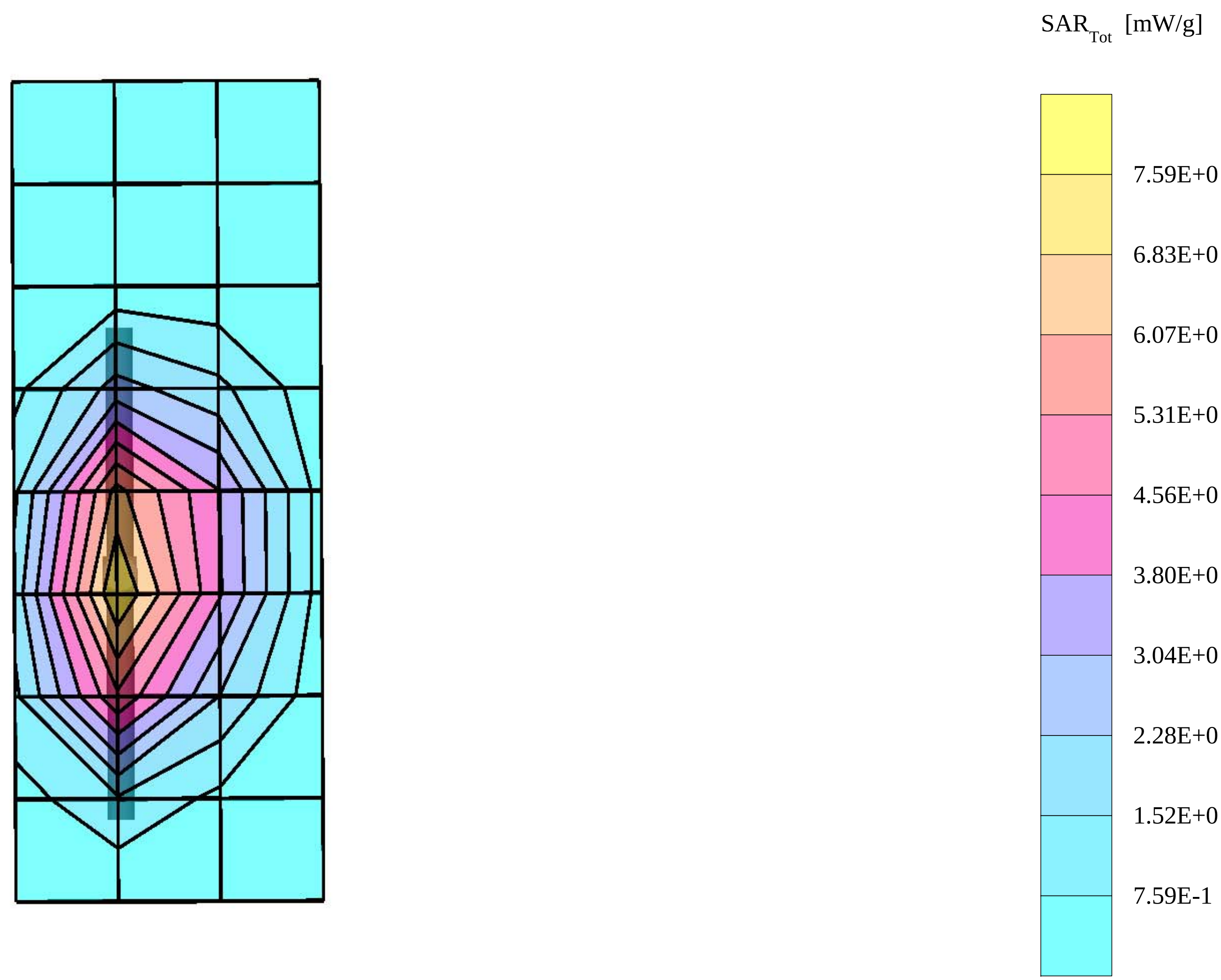
Dipole   900 MHz

900 MHz Dipole Validation / Dipole Sn# 096
Forward Power = 201mW   Reflected Power = -23.90dB
Room Temp at time of measurement = 20.0*C. Simulant Temp at time of measurement = 20.0*C
R4 TP-1131   SUGAR sam expanded (Rev. 2)-9Jan03;
Probe: ET3DV6 - SN1514 - Validation.2; ConvF(6.30,6.30,6.30); Crest factor: 1.0;   900 MHz VALIDATION: σ = 0.97 mho/m ε_r = 41.8 ρ = 1.00 g/cm³
: , , ()
Penetration depth: 11.7 (10.8, 12.8) [mm]



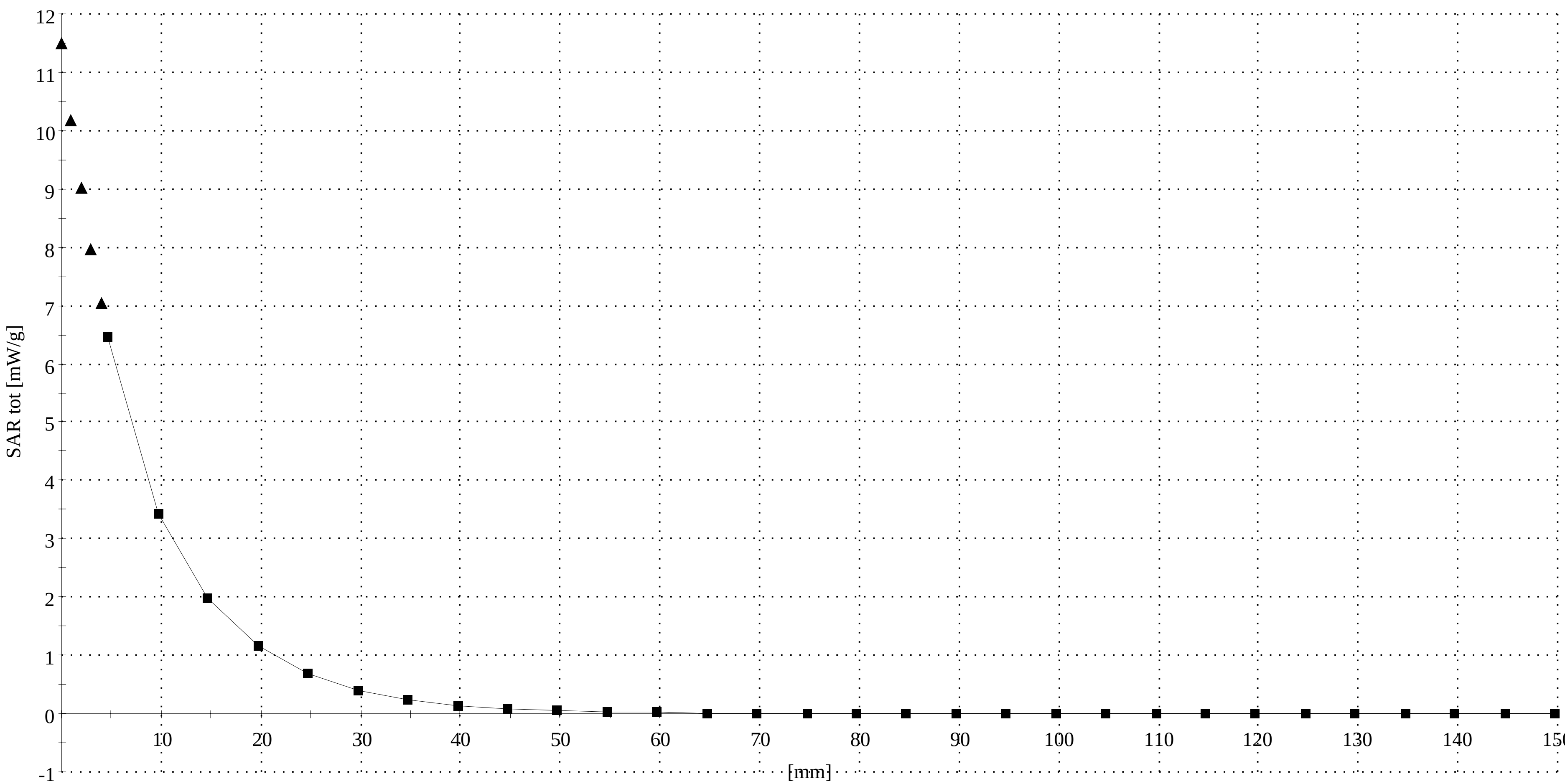
Dipole 1800 MHz

1800 MHz Dipole Validation / Dipole Sn# 272tr
Forward Power = 201mW Reflected Power = -21.70dB
Room Temp at time of measurement = 20.0*C. Simulant Temp at time of measurement =19.5*C.
R4 - Amy Twin Phantom Rev.4 (22Aug02); section 2
Probe: ET3DV6 - SN1514 - Validation.2; ConvF(5.10,5.10,5.10); Crest factor: 1.0; 1800 MHz VALIDATION: σ = 1.36 mho/m ε_r = 38.8 ρ = 1.00 g/cm³
Cubes (2): Peak: 14.6 mW/g ± 0.11 dB, SAR (1g): 7.88 mW/g ± 0.09 dB, SAR (10g): 4.14 mW/g ± 0.06 dB, (Worst-case extrapolation)
Penetration depth: 8.2 (7.9, 9.0) [mm]
Powerdrift: -0.10 dB



Dipole 1800 MHz

1800 MHz Dipole Validation / Dipole Sn# 272tr
Forward Power = 201mW Reflected Power = -21.70dB
Room Temp at time of measurement = 20.0*C. Simulant Temp at time of measurement =19.5*C.
R4 - Amy Twin Phantom Rev.4 (22Aug02);
Probe: ET3DV6 - SN1514 - Validation.2; ConvF(5.10,5.10,5.10); Crest factor: 1.0; 1800 MHz VALIDATION: σ = 1.36 mho/m ε_r = 38.8 ρ = 1.00 g/cm³
: , , ()
Penetration depth: 8.3 (8.0, 9.1) [mm]



Appendix 2

SAR distribution plots for Phantom Head Adjacent Use

s/n: 01100302

Ch# 128 Pwr Step: 5 (OTA)
Antenna Position: INTERNAL
Type of Modulation: 850 GSM
Battery Model #: SNN5677A
DEVICE POSITION: CHEEK

R4 TP-1131 SUGAR sam expanded (Rev. 2)-9Jan03 Phantom; Right Hand Section; Position: (90°,180°); Frequency: 824 MHz

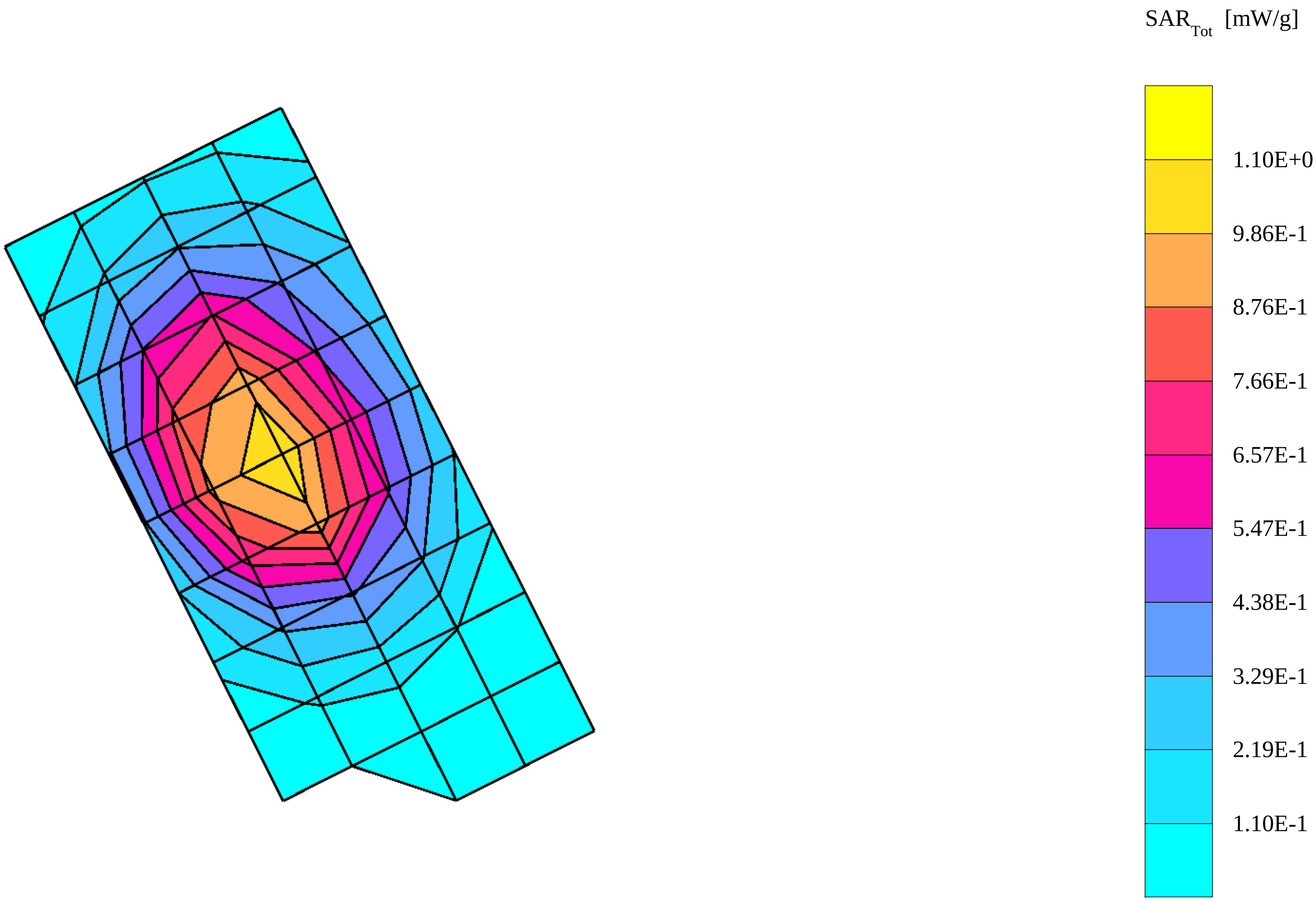
Probe: ET3DV6 - SN1514 - IEEE Head; ConvF(6.30,6.30,6.30); Crest factor: 8.0; 835 MHz Head & Body: $\sigma = 0.92$ mho/m $\varepsilon_r = 43.0$ $\rho = 1.00$ g/cm^3

Cube 7x7x7: SAR (1g): 1.11 mW/g, SAR (10g): 0.738 mW/g, (Worst-case extrapolation)

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

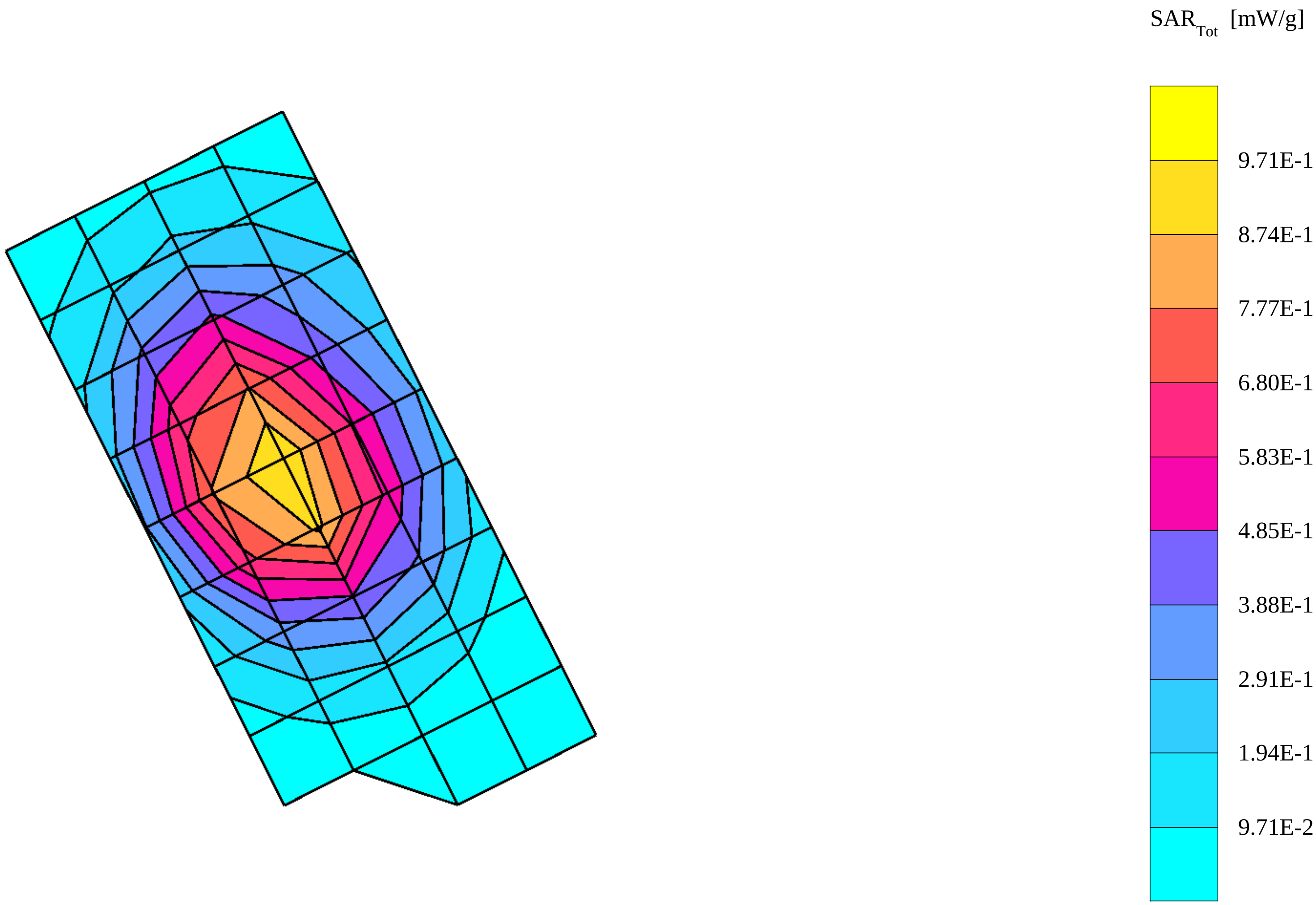
Penetration depth: 13.9 (13.0, 14.9) [mm]

Powerdrift: -0.07 dB



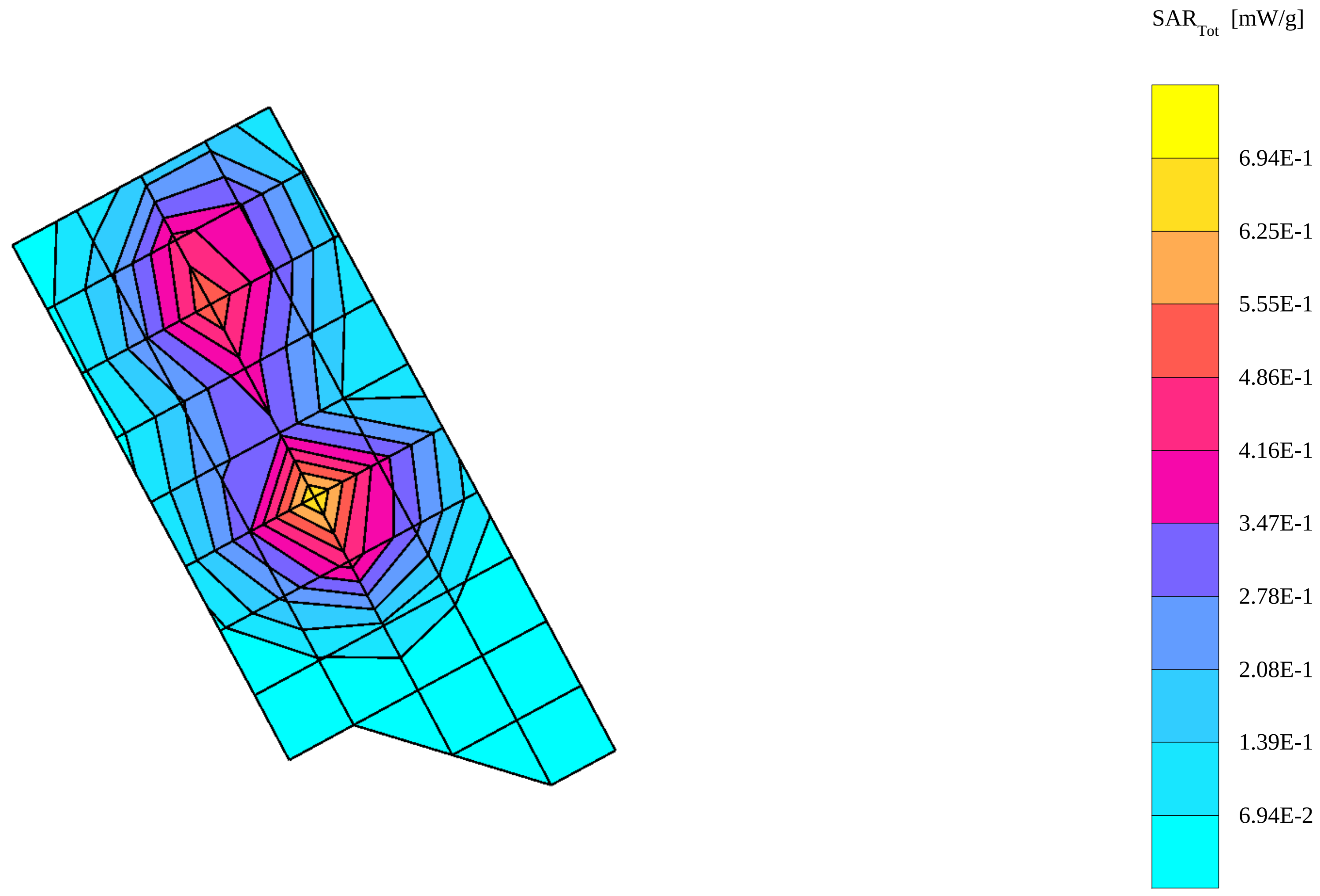
s/n: 01100302

Ch# 128 / Pwr Step: 5 Antenna Position: Internal
Type of Modulation: GSM 850 Battery Model #: SNN5677A
DEVICE POSITION (cheek or rotated): Cheek Accessory Model #: MOTFL0076K
R4 TP-1131 SUGAR sam expanded (Rev. 2)-9Jan03 Phantom; Right Hand Section; Position: (90°,180°); Frequency: 824 MHz
Probe: ET3DV6 - SN1514 - IEEE Head; ConvF(6.30,6.30,6.30); Crest factor: 8.0; 835 MHz Head & Body: σ = 0.92 mho/m ε_r = 43.0 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 0.996 mW/g, SAR (10g): 0.666 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 14.3 (13.3, 15.4) [mm]
Powerdrift: 0.06 dB



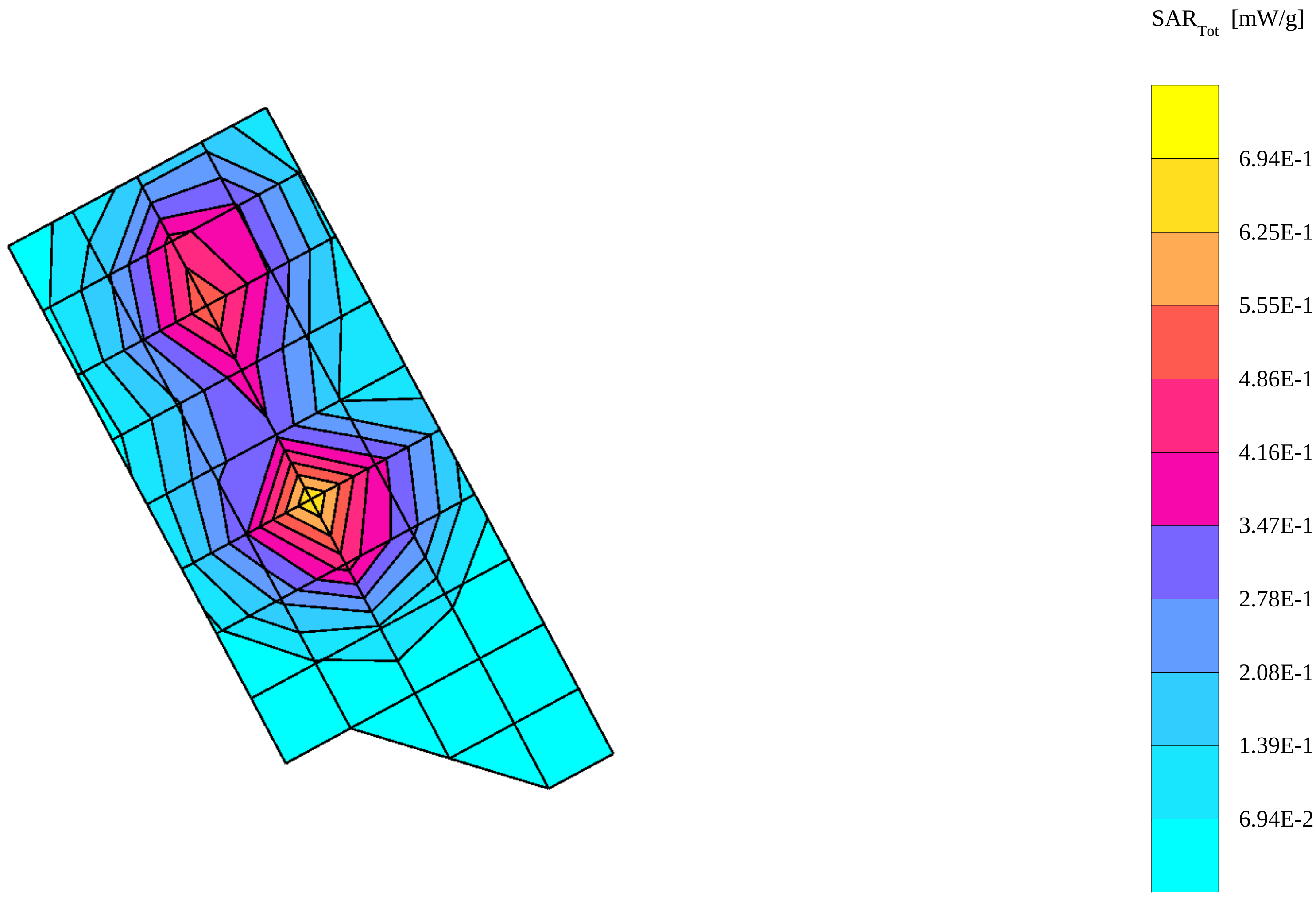
s/n: 01100302

Ch# 661 / Pwr Step: 0 Antenna Position: Internal
Type of Modulation: GSM 1900 Battery Model #: SNN5677A
DEVICE POSITION (cheek or rotated): Cheek
R4 TP-1250 GLYCOL sam expanded (Rev. 2)-9Jan03 Phantom; Right Hand Section; Position: (90°,180°); Frequency: 1880 MHz
Probe: ET3DV6 - SN1514 - IEEE Head; ConvF(5.10,5.10,5.10); Crest factor: 8.0; 1880 MHz Head & Body: σ = 1.46 mho/m ε_r = 38.7 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 0.662 mW/g, SAR (10g): 0.376 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 11.4 (11.3, 11.6) [mm]
Powerdrift: -0.00 dB



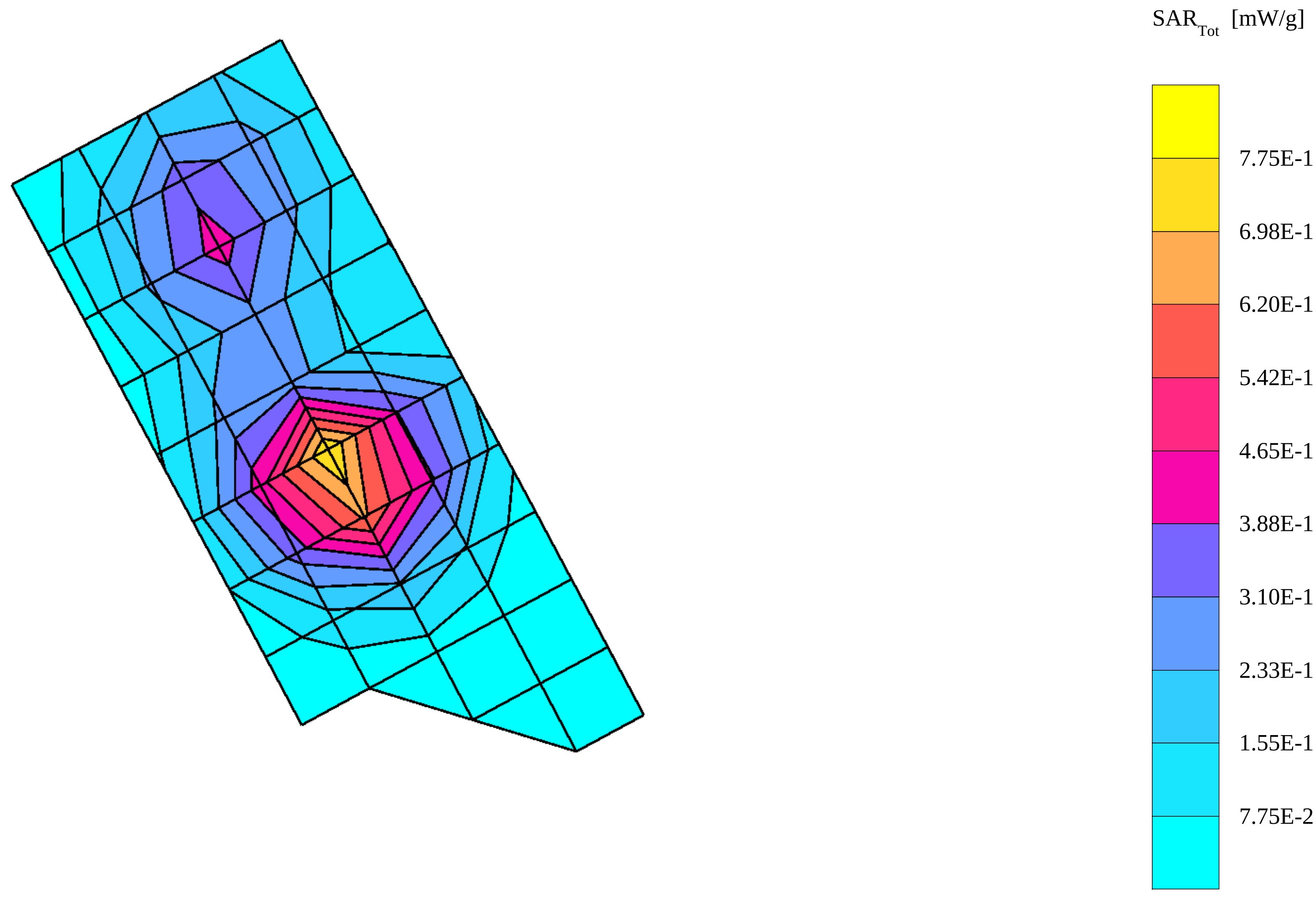
s/n: 01100302

Ch# 661 / Pwr Step: 0 Antenna Position: Internal
Type of Modulation: GSM 1900 Battery Model #: SNN5677A
DEVICE POSITION (cheek or rotated): Cheek 2nd Hot Spot
R4 TP-1250 GLYCOL sam expanded (Rev. 2)-9Jan03 Phantom; Right Hand Section; Position: (90°,180°); Frequency: 1880 MHz
Probe: ET3DV6 - SN1514 - IEEE Head; ConvF(5.10,5.10,5.10); Crest factor: 8.0; 1880 MHz Head & Body: σ = 1.46 mho/m ε_r = 38.7 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 0.550 mW/g, SAR (10g): 0.312 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 9.9 (9.6, 10.5) [mm]
Powerdrift: -0.34 dB



s/n: 01100302

Ch# 661 / Pwr Step: 0
Antenna Position: Internal
Type of Modulation: GSM 1900
Battery Model #: SNN5677A
DEVICE POSITION (cheek or rotated): Cheek
Accessory Model #: MOTPL0205K
R4 TP-1250 GLYCOL sam expanded (Rev. 2)-9Jan03 Phantom; Right Hand Section; Position: (90°,180°); Frequency: 1880 MHz
Probe: ET3DV6 - SN1514 - IEEE Head; ConvF(5.10,5.10,5.10); Crest factor: 8.0; 1880 MHz Head & Body: σ = 1.46 mho/m ε_r = 38.7 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 0.757 mW/g, SAR (10g): 0.438 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 11.4 (11.0, 11.9) [mm]
Powerdrift: -0.15 dB



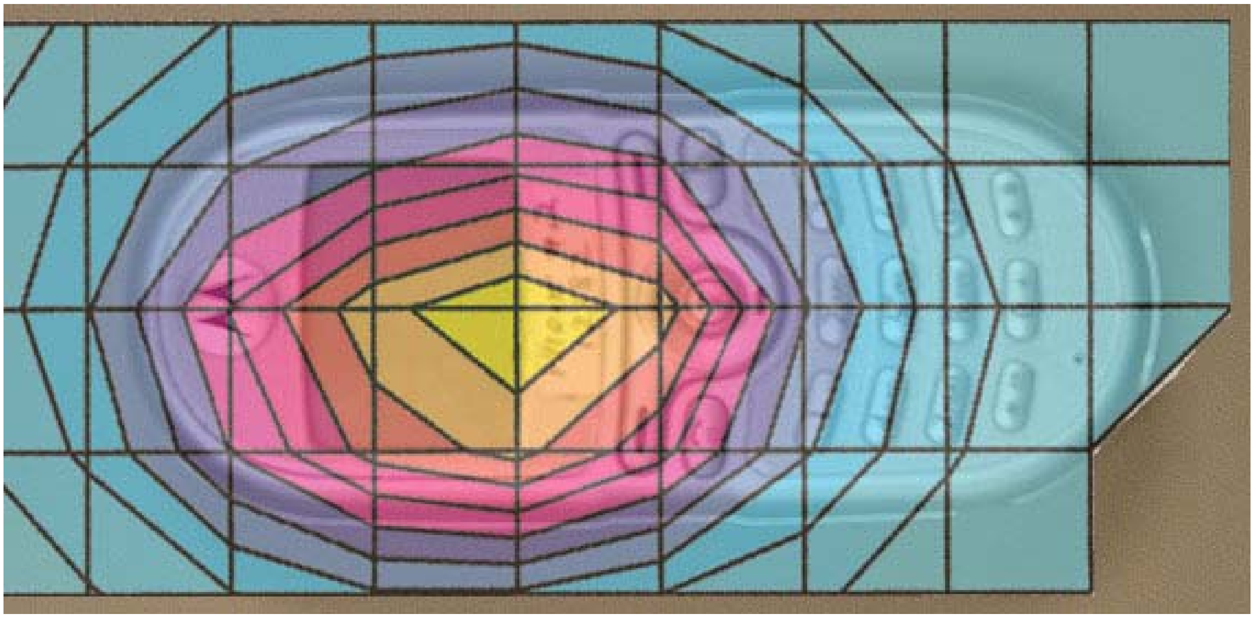


Figure 1.Typical 800MHz Head Adjacent Contour Overlaid on Phone (Cheek Touch)

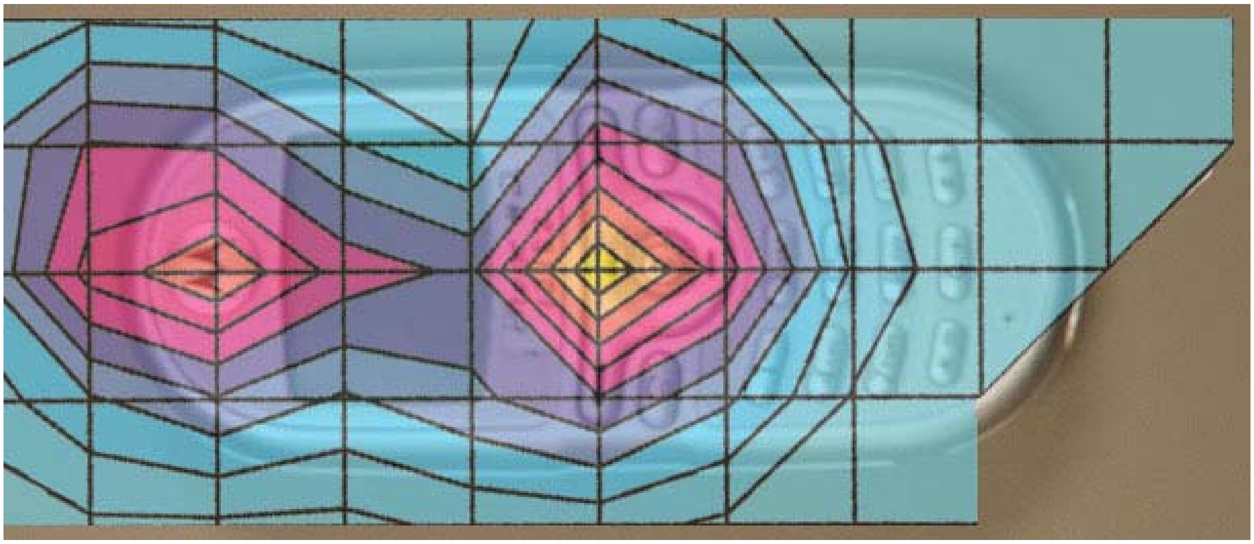
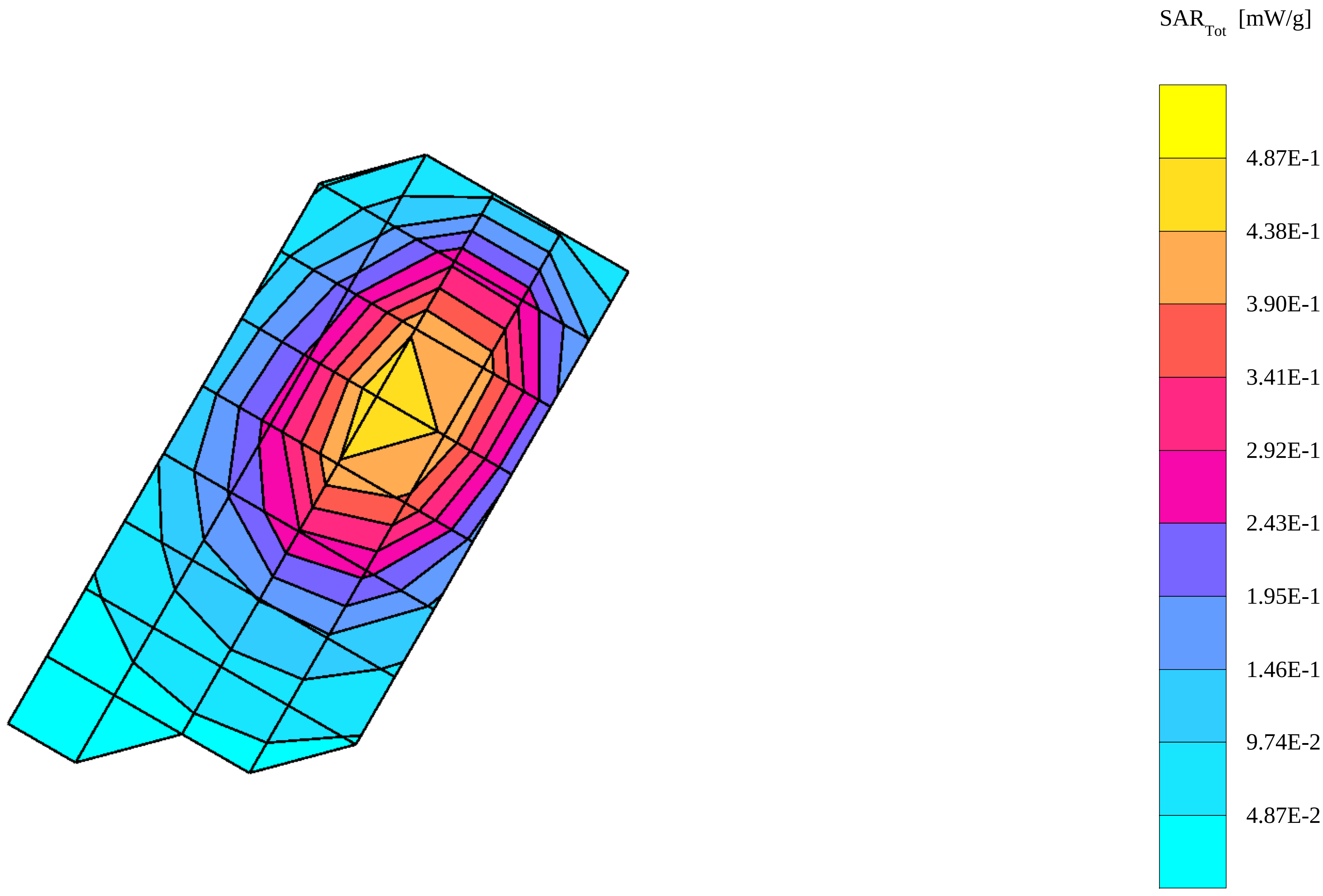


Figure 2.Typical 1900MHz Head Adjacent Contour Overlaid on Phone (Cheek Touch)

s/n: 01100302

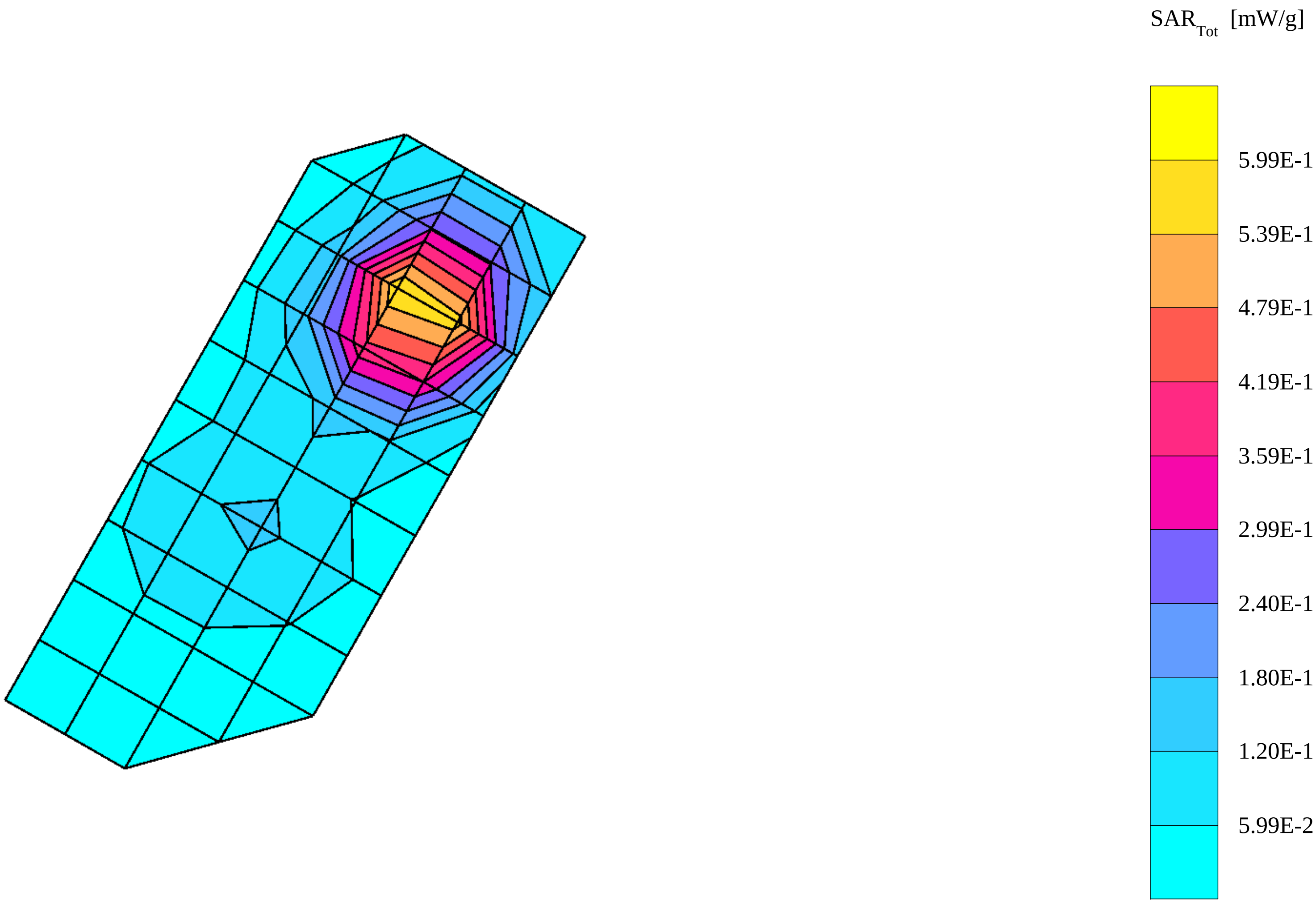
Ch# 190 Pwr Step: 5 (OTA)
Antenna Position: INTERNAL
Type of Modulation: 850 GSM
Battery Model #: SNN5677A
DEVICE POSITION: TILT

R4 TP-1131 SUGAR sam expanded (Rev. 2)-9Jan03 Phantom; Left Hand Section; Position: (90°,180°); Frequency: 837 MHz
Probe: ET3DV6 - SN1514 - IEEE Head; ConvF(6.30,6.30,6.30); Crest factor: 8.0; 835 MHz Head & Body: σ = 0.92 mho/m ϵ_r = 43.0 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 0.502 mW/g, SAR (10g): 0.333 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 13.4 (12.0, 15.0) [mm]
Powerdrift: -0.02 dB



s/n: 01100302

Ch# 661 Pwr Step: 0 (OTA) Antenna Position: INTERNAL
Type of Modulation: 1900 GSM Battery Model #: SNN5677A
DEVICE POSITION: TILT
R4 TP-1250 GLYCOL sam expanded (Rev. 2)-9Jan03 Phantom; Left Hand Section; Position: (90°,180°); Frequency: 1880 MHz
Probe: ET3DV6 - SN1514 - IEEE Head; ConvF(5.10,5.10,5.10); Crest factor: 8.0; 1880 MHz Head & Body: σ = 1.46 mho/m ε_r = 38.7 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 0.642 mW/g, SAR (10g): 0.340 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 8.7 (8.4, 9.3) [mm]
Powerdrift: 0.18 dB



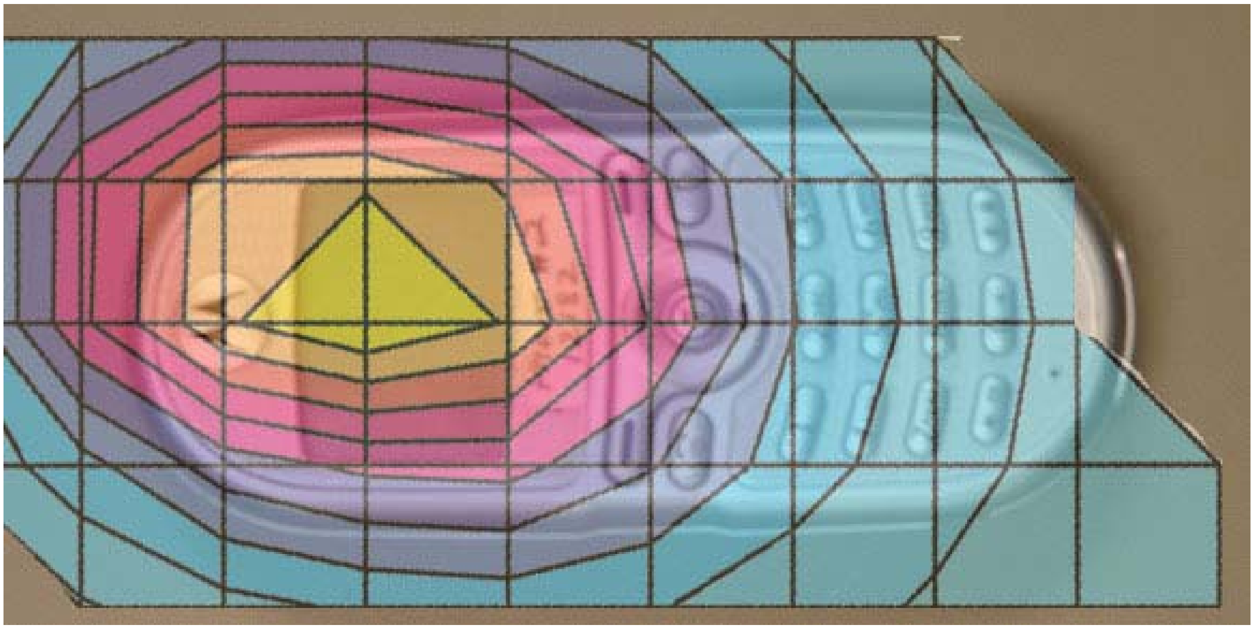


Figure 3.Typical 800MHz Head Adjacent Contour Overlaid on Phone (15 ˚ Tilt)

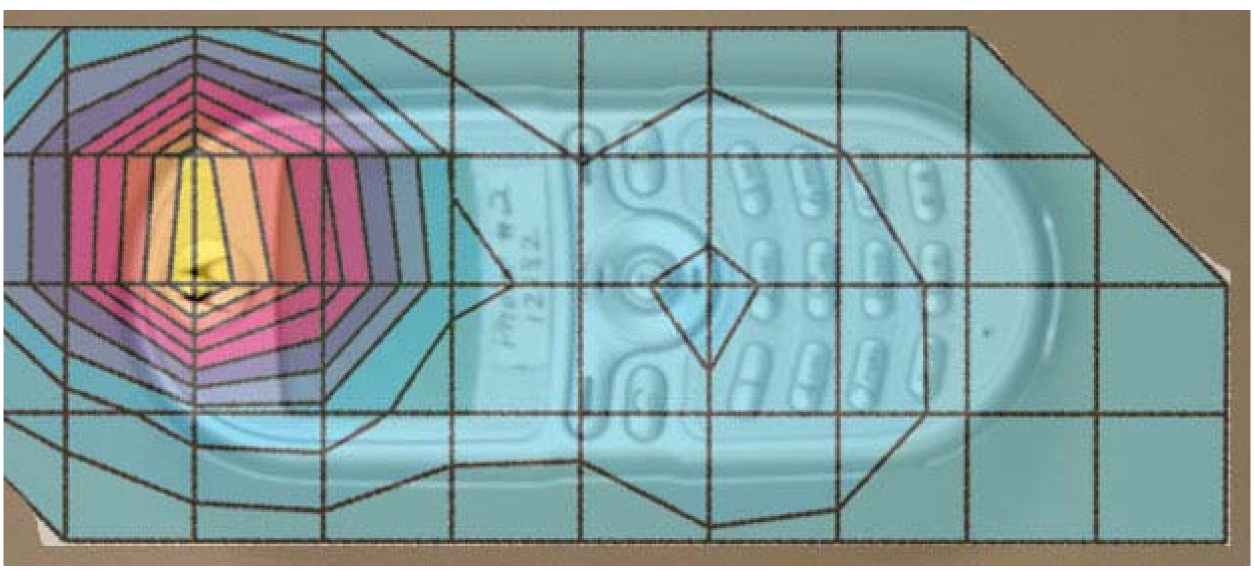


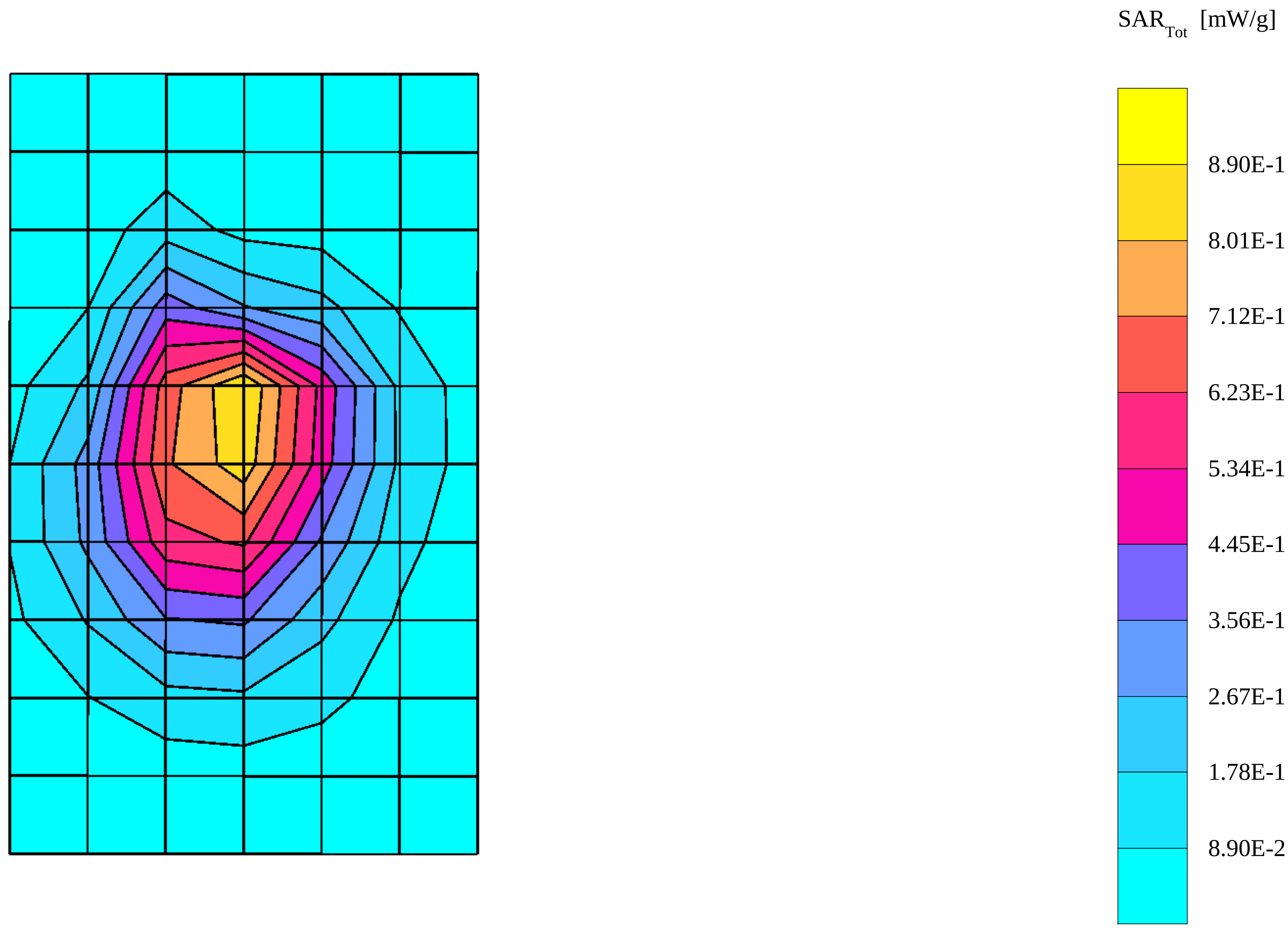
Figure 4.Typical 1900MHz Head Adjacent Contour Overlaid on Phone (15 ˚ Tilt)

Appendix 3

SAR distribution plots for Body Worn Configuration

s/n: 01100302

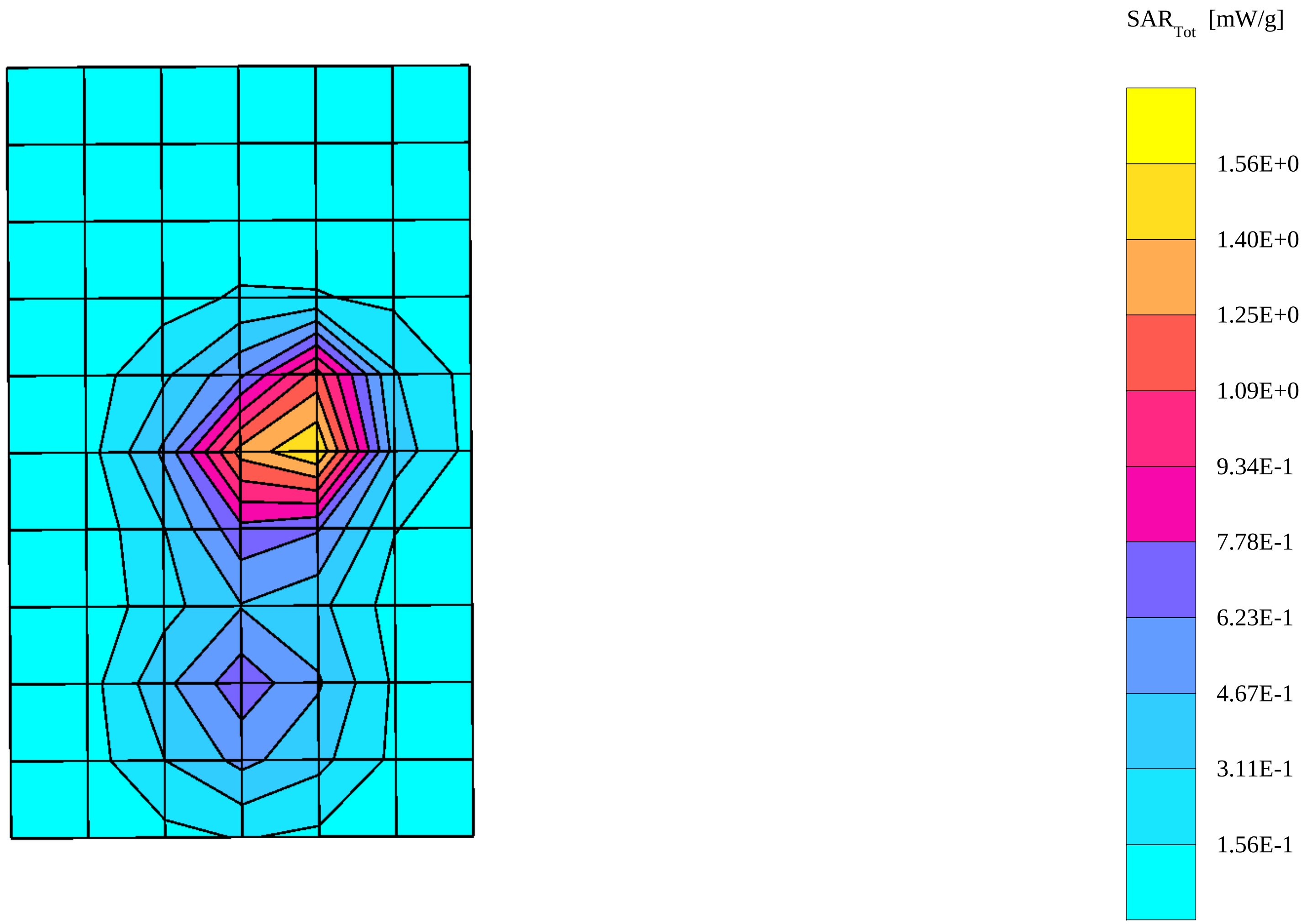
Ch# 190 / Pwr Step: 5 Antenna Position: Internal
Type of Modulation: GSM 850 Battery Model #: SNN5677A
Accessory Model # = MT-04193
R4 - Amy Twin Phantom Rev.4 (22Aug02) Phantom; section 1 Section; Position: (0°,0°); Frequency: 837 MHz
Probe: ET3DV6 - SN1514 - FCC Body; ConvF(6.10,6.10,6.10); Crest factor: 8.0; 835 MHz Head & Body: σ = 0.97 mho/m ε_r = 53.7 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 0.939 mW/g, SAR (10g): 0.603 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Penetration depth: 12.4 (11.7, 13.2) [mm]
Powerdrift: -0.04 dB



10/03/03

s/n: 01100302

Ch# 512 / Pwr Step: 0
Antenna Position: Internal
Type of Modulation: GSM 1900
Battery Model #: SNN5677A
Accessory Model #: MT-04193
R4 - Amy Twin Phantom Rev.4 (22Aug02) Phantom; section 2 Section; Position: (90°,180°); Frequency: 1850 MHz
Probe: ET3DV6 - SN1514 - FCC Body; ConvF(4.70,4.70,4.70); Crest factor: 8.0; 1880 MHz Head & Body: σ = 1.58 mho/m ε_r = 51.1 ρ = 1.00 g/cm^3
Cube 5x5x7: SAR (1g): 1.46 mW/g, SAR (10g): 0.776 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Penetration depth: 8.2 (7.5, 9.5) [mm]
Powerdrift: -0.10 dB



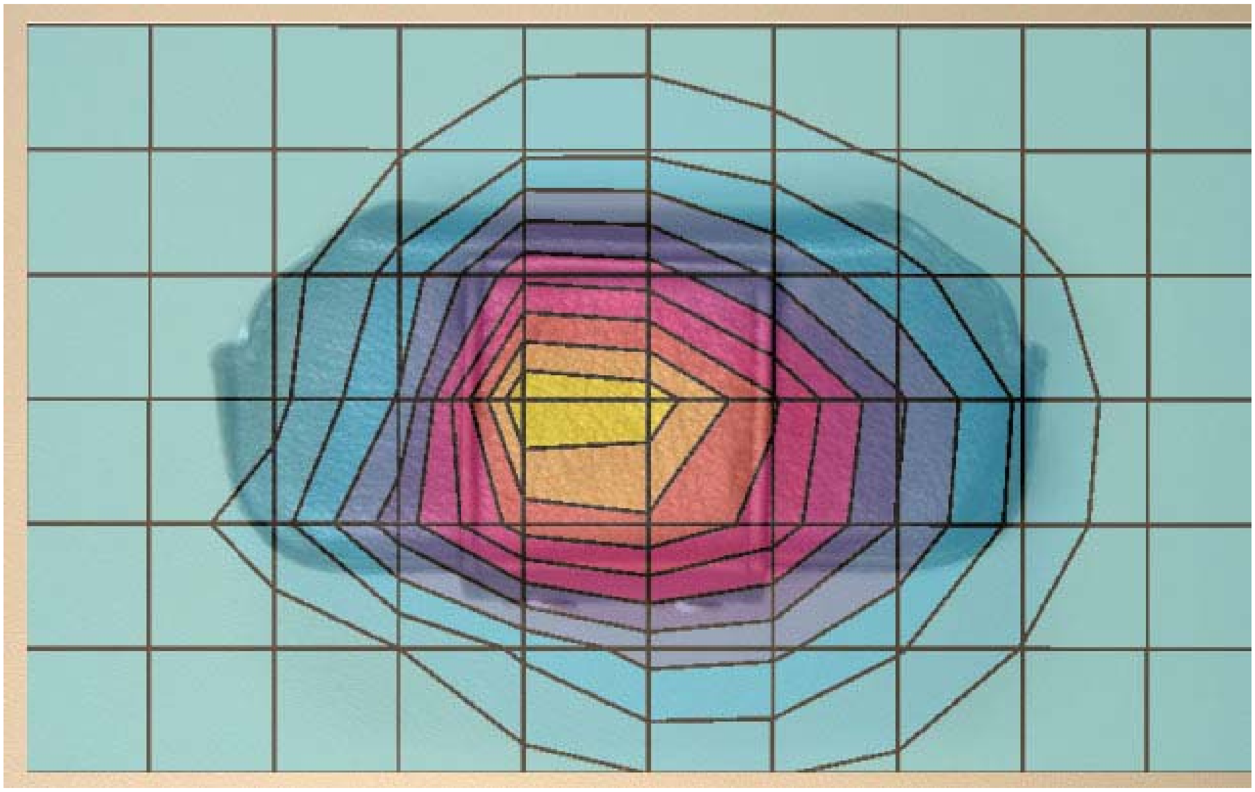


Figure 5.Typical 800 MHz Body-Worn Contour Overlaid on Phone

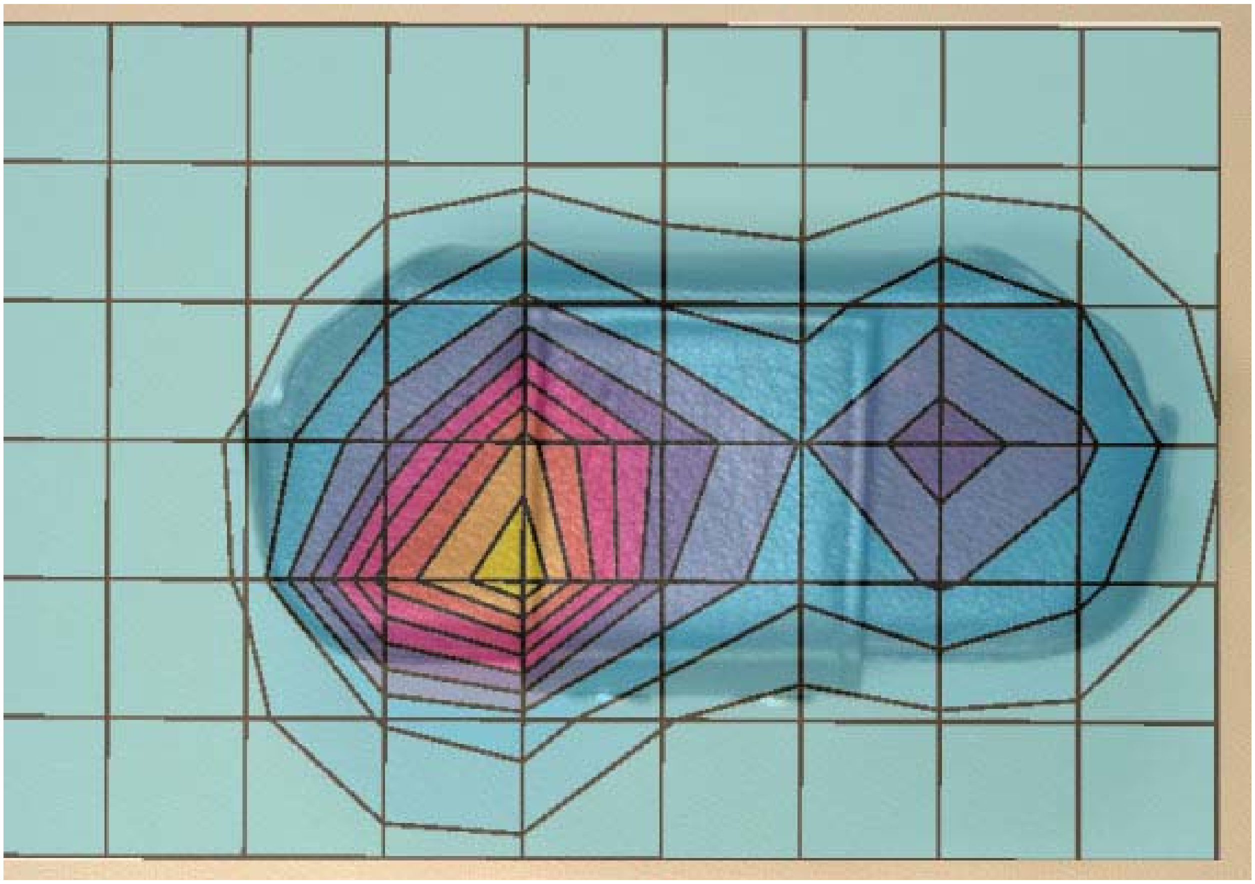


Figure 6. Typical 1900 MHz Body-Worn Contour Overlaid on Phone

Appendix 4

Probe Calibration Certificate

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

Client Motorola MRO

CALIBRATION CERTIFICATE

Object(s)	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.

Schmid & Partner Engineering AG
s p e a g

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

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

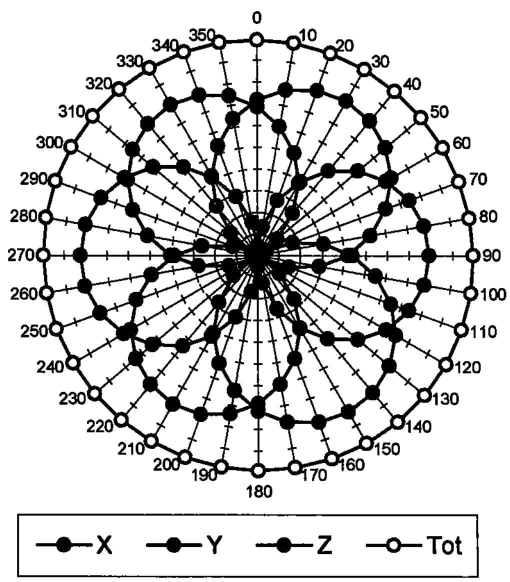
Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	13.9	9.0
SAR_{be} [%]	With Correction Algorithm	0.1	0.0

Sensor Offset

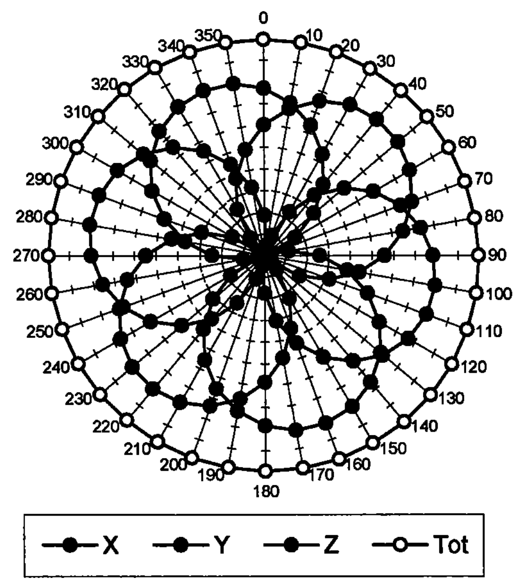
Probe Tip to Sensor Center	**2.7**	mm
Optical Surface Detection	**0.8 ± 0.2**	mm

Receiving Pattern (φ, θ = 0°)

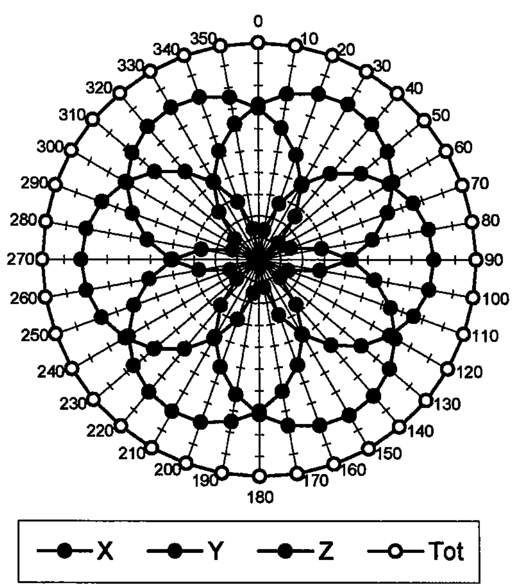
f = 30 MHz, TEM cell ifi110



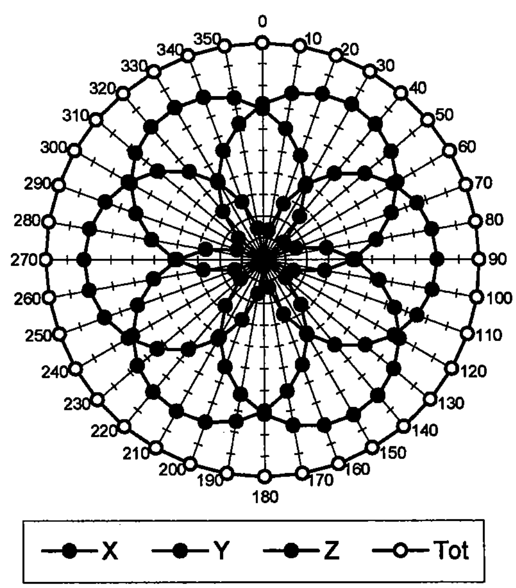
f = 100 MHz, TEM cell ifi110

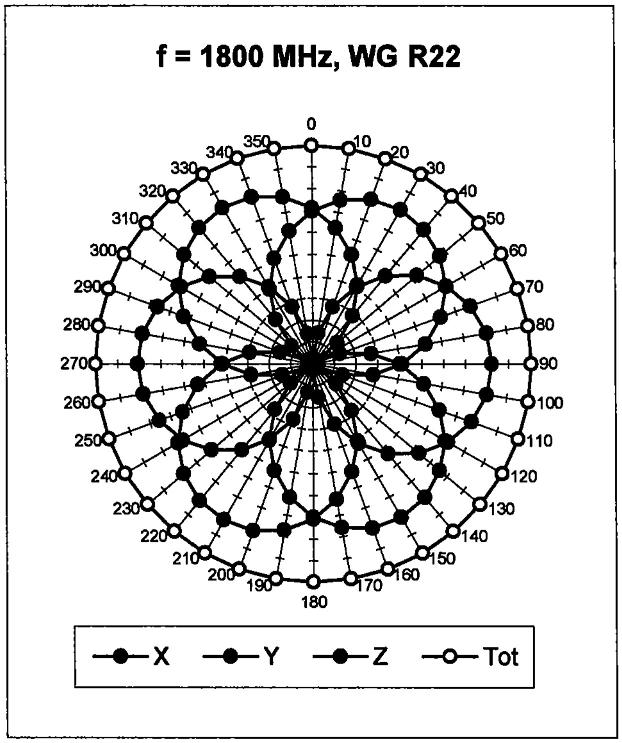


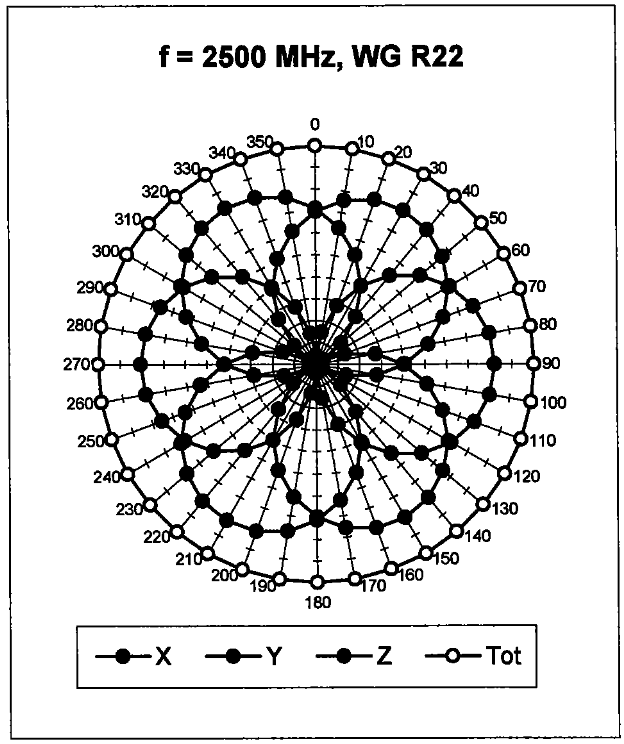
f = 300 MHz, TEM cell ifi110



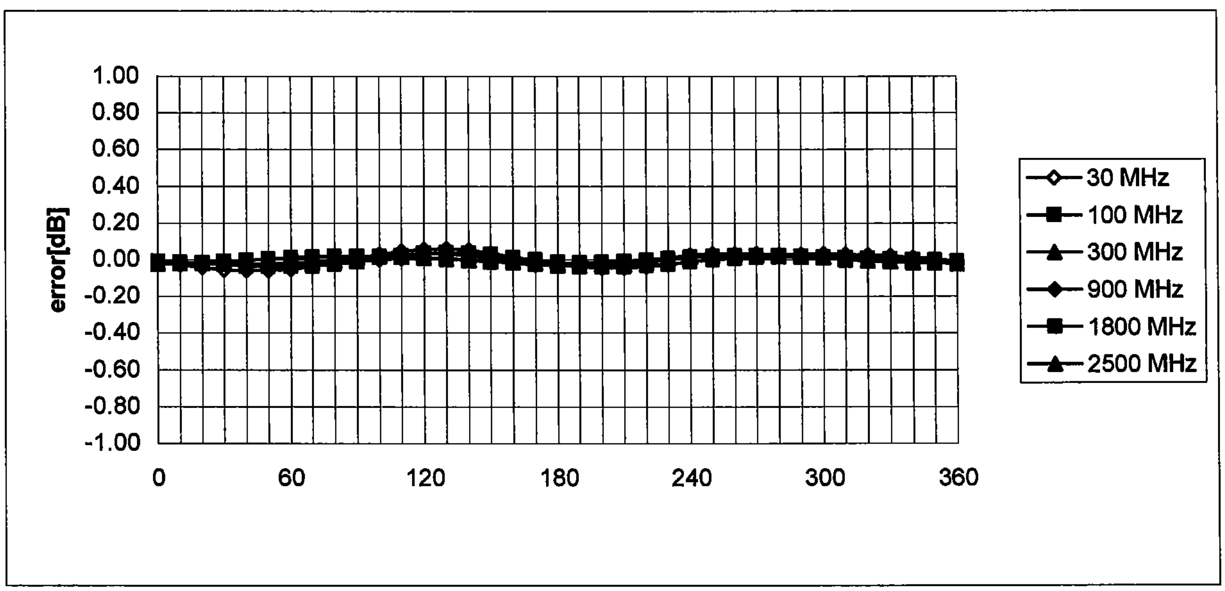
f = 900 MHz, TEM cell ifi110





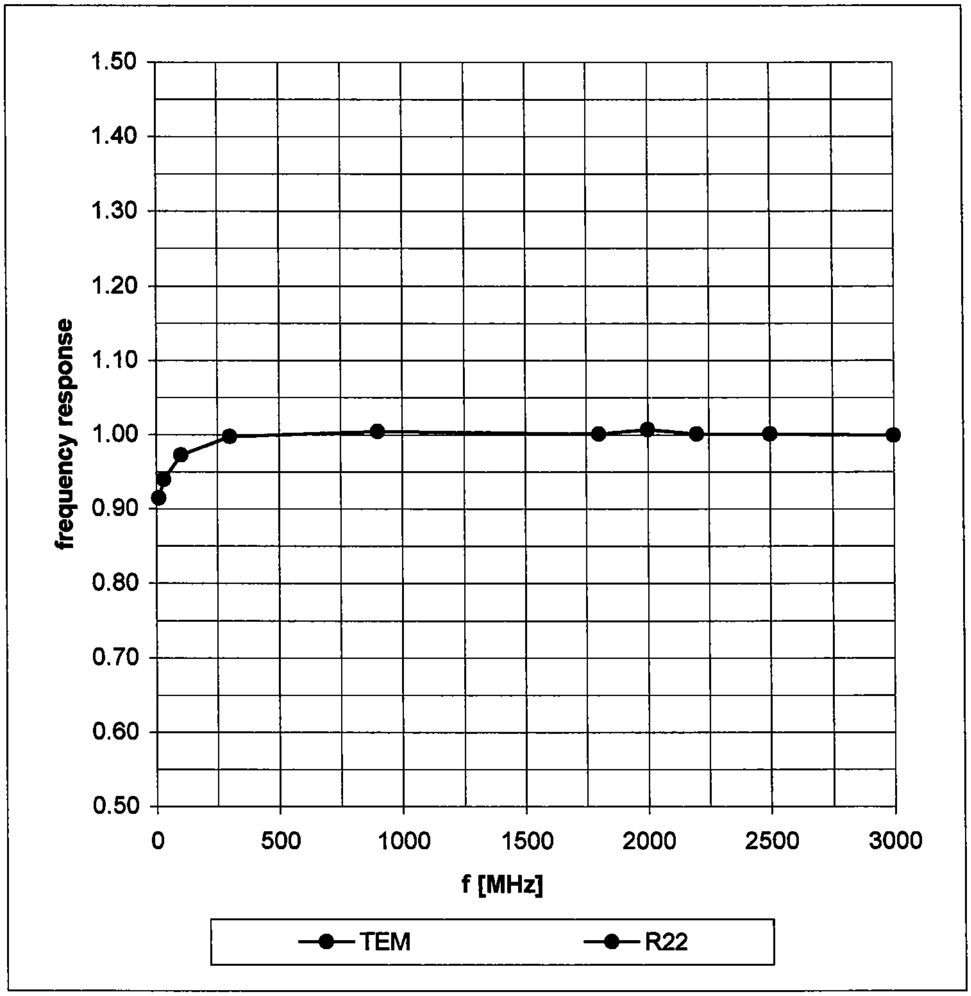


Isotropy Error (ϕ), θ = 0°



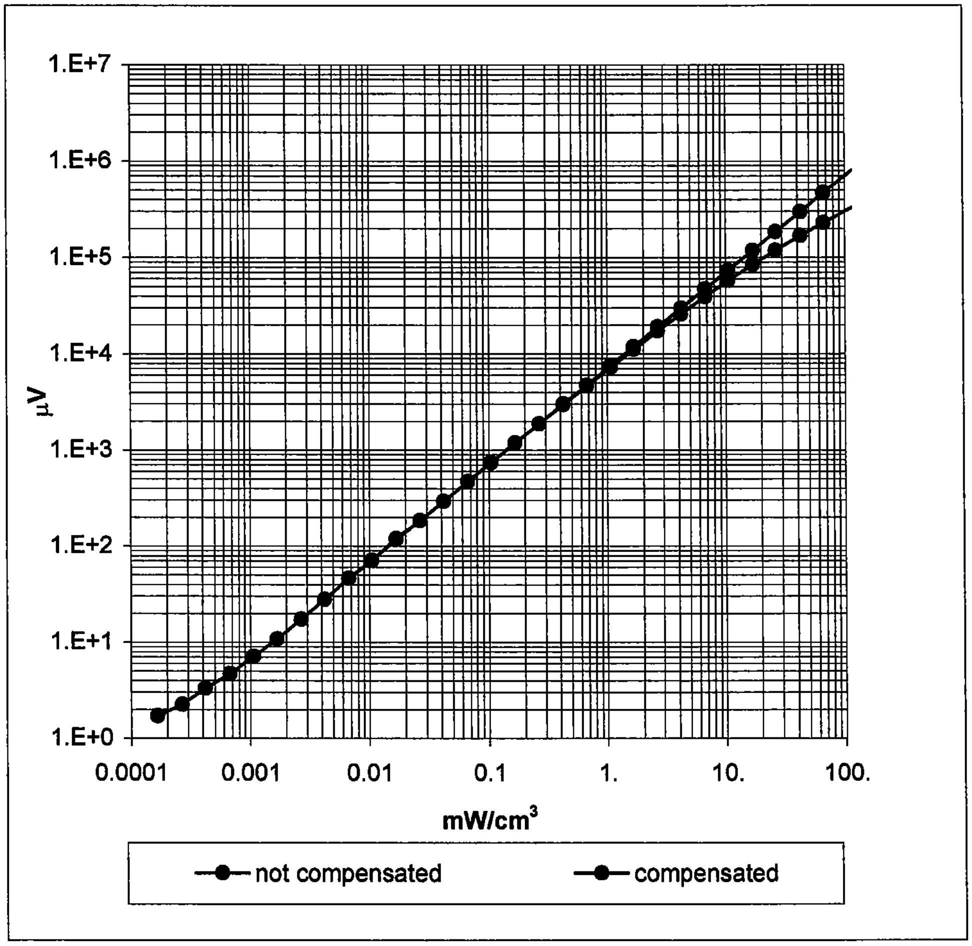
Frequency Response of E-Field

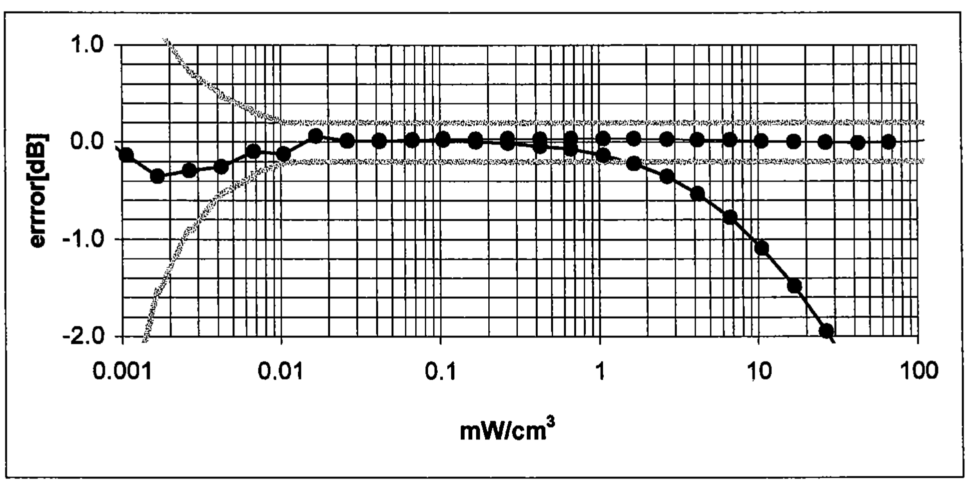
(TEM-Cell:ifi110, Waveguide R22)



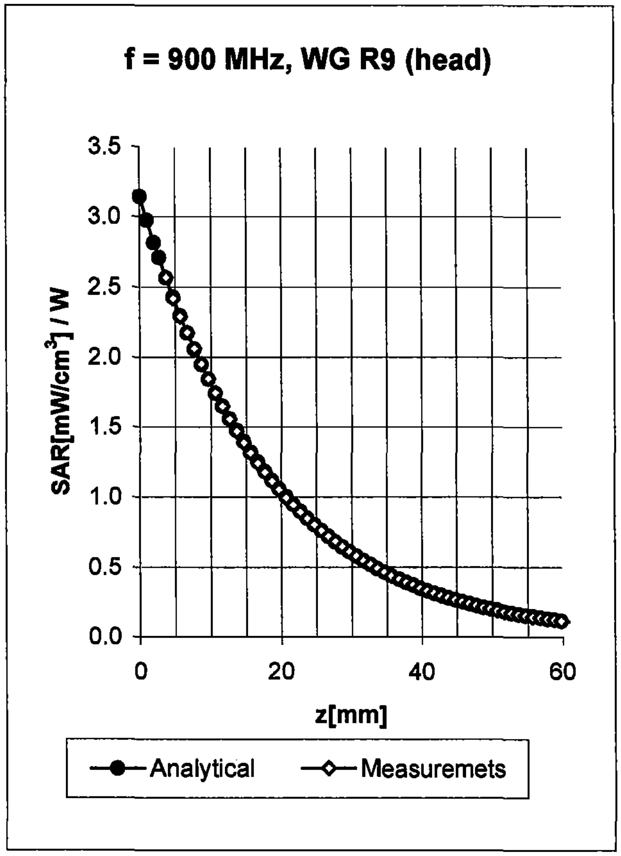
Dynamic Range f(SAR_{brain})

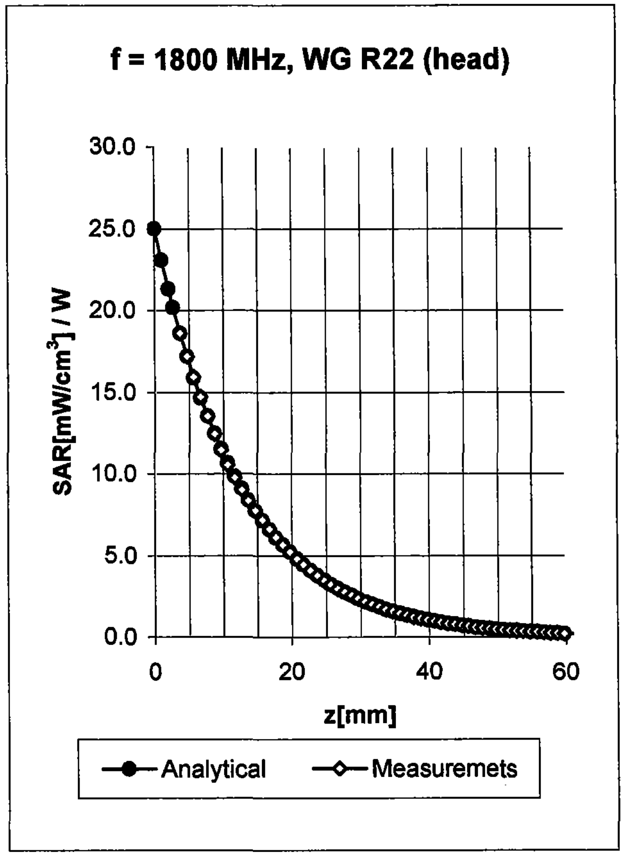
(Waveguide R22)





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

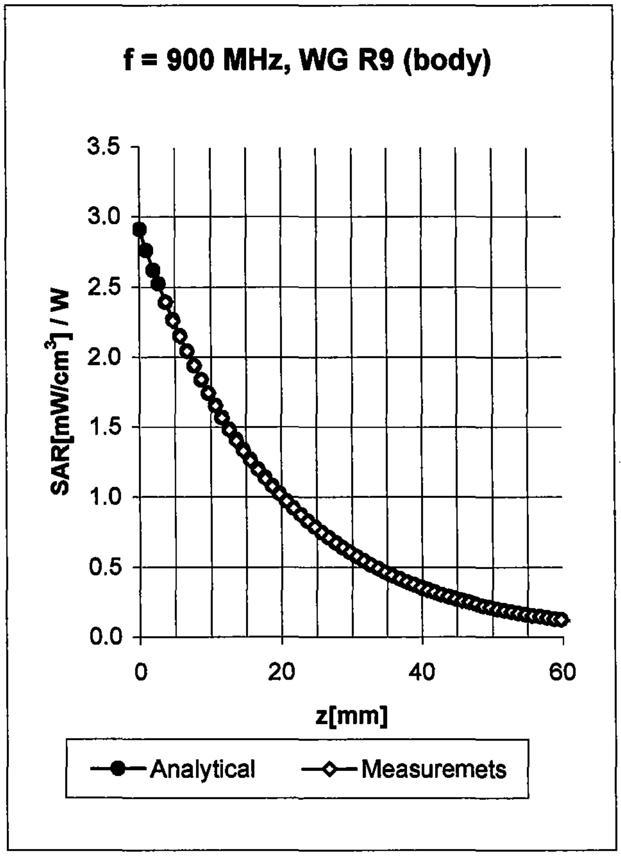
ConvF X	**6.3**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.3**	± 9.5% (k=2)	Alpha	**0.58**
ConvF Z	**6.3**	± 9.5% (k=2)	Depth	**1.95**

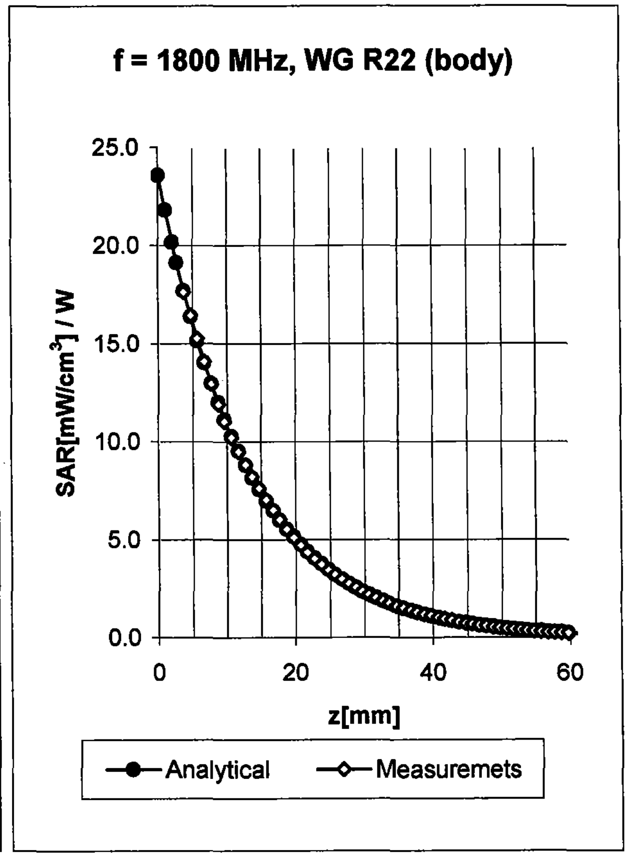
Head **1800 MHz** ε_r **= 40.0 ± 5%** **σ = 1.40 ± 5% mho/m**

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

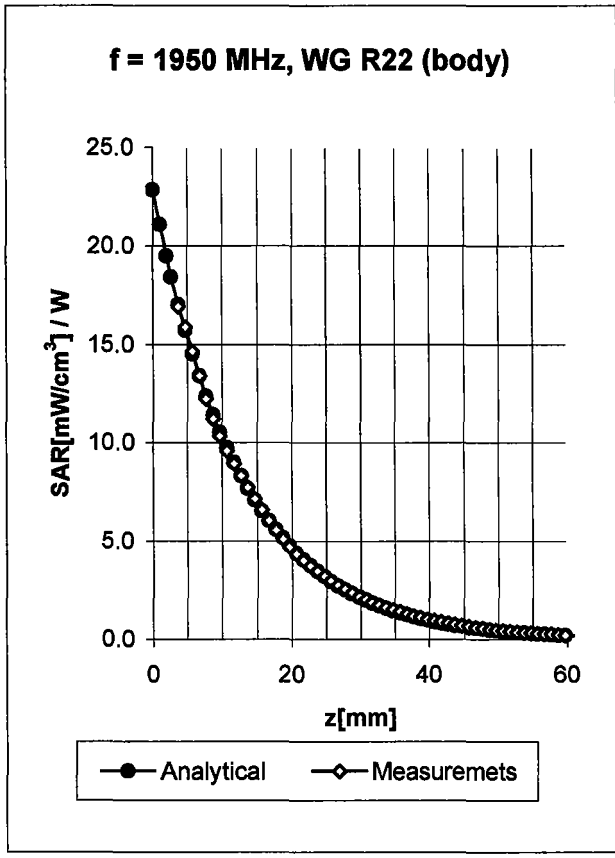
ConvF X	**6.1**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.1**	± 9.5% (k=2)	Alpha	**0.51**
ConvF Z	**6.1**	± 9.5% (k=2)	Depth	**2.18**

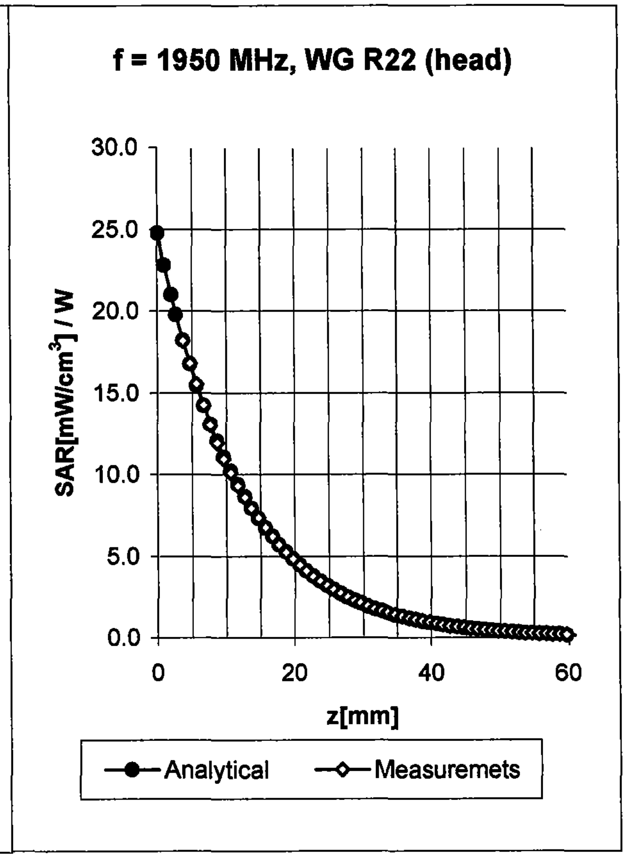
Body **1800 MHz** ε_r **= 53.3 ± 5%** σ **= 1.52 ± 5% mho/m**

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

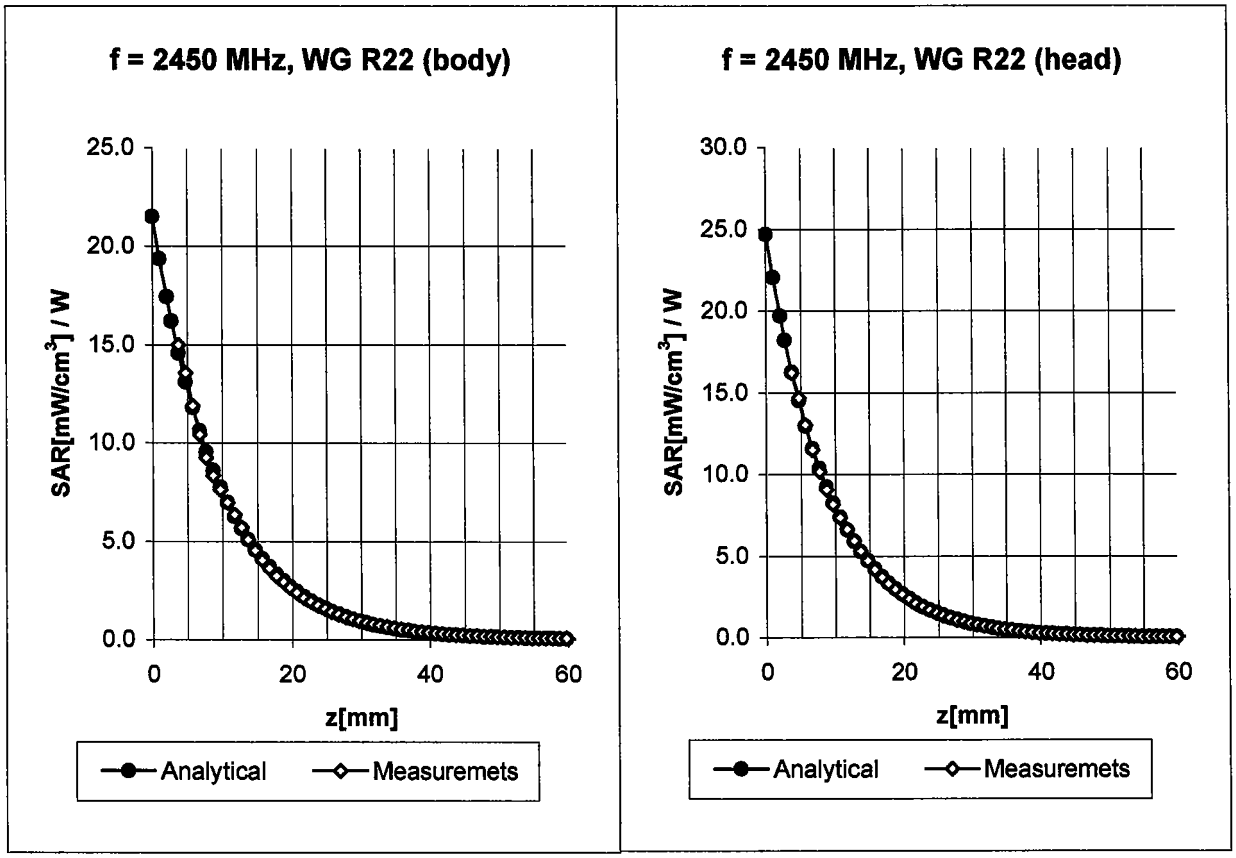




Body	**1950 MHz**	ε_r **= 53.3 ± 5%**	**σ = 1.52 ± 5% mho/m**	
	ConvF X	**4.5** ± 9.5% (k=2)	Boundary effect:	
	ConvF Y	**4.5** ± 9.5% (k=2)	Alpha	**0.80**
	ConvF Z	**4.5** ± 9.5% (k=2)	Depth	**2.23**

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**

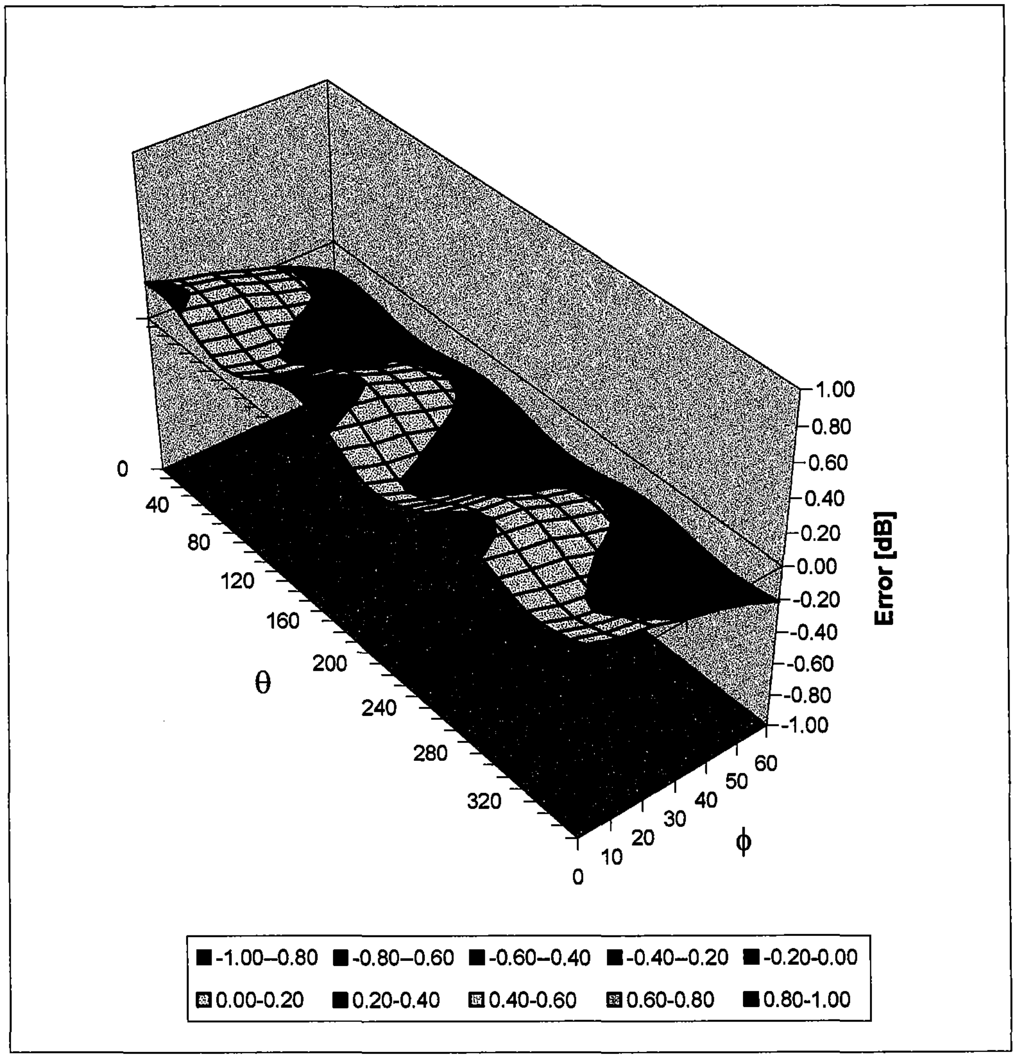
Head **2450 MHz** **ε_r = 39.2 ± 5%** **σ = 1.80 ± 5% mho/m**

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	
P1528 Target: Advanced Extrapolation	9.5	10.8	38.1	39.7	**(W/kg)**
Measurement Uncertainty (k=1):	10.2%	10.2%	10.2%	10.2%	
Measurement Period:	*November '02 - June '03*	*November '02 - June '03*	*November '02 - June '03*	*November '02 - June '03*	
# of tests performed:	169	728	868	26	
Grand Average: Worst Case Extrapolation	10.1	11.6	39.7	42.0	**(W/kg)**
% Delta (Average - P1528 Target)	6.5%	7.7%	4.2%	5.9%	
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	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	**10.1**	41.5 ± 5%	0.90 ± 5%
900MHz	**11.6**	41.5 ± 5%	0.97 ± 5%
1800MHz	**39.7**	40.0 ± 5%	1.40 ± 5%
1900MHz	**42.0**	40.0 ± 5%	1.40 ± 5%

-Approvals-

Submitted by: Marge Kaunas — Date: 24-Jun-03

Signed: Marge Kaunas

Comments: spreadsheet detailing all measurements available upon request

Approved by: Antonio Faraone — **Date:** 24-Jun-03

Signed: Antonio Faraone

Comments: Targets and associated simulant properties are derived from the IEEE P1528 draft 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

Front of Phone

Rear of Phone

Phone in MOT-04193 Accessory (Front View)

Phone in MOT-04193 Accessory (Rear View)

Phone in MOT-04193 Accessory (Side View)

Phone in MOTFL0076K Accessory (Front View)

Phone in MOTFL0076K Accessory (Rear View)

Phone in MOTFL0076K Accessory (Side View)

Phone in MOTPT0205K Accessory (Front View)

Phone in MOTPT0205K Accessory (Rear View)

Phone in MOTPT0205K Accessory (Side View)