



Exhibit 11: SAR Test Report IHDT56CE1

Date of test: 05/29/2002 – 06/06/2002
Date of Report: 06/27/2002

Laboratory: Motorola Personal Communications Sector Product Safety & Compliance Laboratory
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Accreditation: This laboratory is accredited to ISO/IEC 17025-1999 to perform the following electromagnetic exposure tests:
 System Validation & Interlaboratory Comparison
 Simulated Tissue Specifications and Procedure
 EME Cellular Phone Testing Procedure



On the following 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 IHDT56CE1 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)

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This test report shall not be reproduced in full, without written approval of the laboratory.

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.

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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 IHDT56CE1). 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

Antenna description

Type	Internal Antenna	
Location	Back of Phone	
Dimensions	Length	20mm
	Width	35mm

Device description

FCC ID Number	IHDT56CE1	
Serial number	5630032	
Mode(s) of Operation	GSM 850	GSM 1900
Modulation Mode(s)	GSM	GSM
Maximum Output Power Setting	30.00 dBm	30.00 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. The overall RSS uncertainty of the measurement system is $\pm 12.0\%$ (K=1) with an expanded uncertainty of $\pm 24.0\%$ (K=2). The breakdown of the individual uncertainties is as follows:

Probe Uncertainty	$\pm\%$
Isotropy error	7.2
Calibration error	3.3
Spatial resolution	0.5
SAR Evaluation	$\pm\%$
Conductivity measurement	5.0
Environmental errors	1.0
Peak SAR Evaluation	$\pm\%$
Probe positioning	1.0
Volumetric averaging	4.2
Device positioning	6.0

The list of calibrated equipment used for the measurements is shown below.

Description	Serial Number	Cal Due Date
DASY3 DAE V1	SN 365	09/26/2002
E-Field Probe ETDV6	SN 1508	10/25/2002
Dipole Validation Kit, DV900V2	SN 95	01/03/2003
SAM Phantom used for 800MHz	TP-1005	
Dipole Validation Kit, DV1900V2	SN 277tr	01/04/2003
SAM Phantom used for 1900MHz	TP-1085	

3.2 Additional Equipment

Description	Serial Number	Cal Due Date
Signal Generator HP8648C	3847A04848	01/19/2003
Power Meter E4419B	GB39511090	11/28/2002
Power Sensor #1	US39211007	12/19/2002
Power Sensor #2	US39210929	12/19/2002
Network Analyzer HP8753ES	US39172529	07/05/2002

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 a HP85070 Dielectric Probe Kit. These values 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.

<i>f</i> (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			ϵ_r	σ (S/m)	Temp (°C)
835	Head	Measured, 06/05/2002	41.80	0.92	22.30
		Recommended Limits	41.50	0.90	20-25
		Measured, 06/05/2002	41.60	0.91	23.30
		Recommended Limits	41.50	0.90	20-25
	Body	Measured, 06/05/2002	54.60	0.98	23.30
		Recommended Limits	55.20	0.97	20-25
1880	Head	Measured, 06/04/2002	39.80	1.45	22.70
		Recommended Limits	40.00	1.40	20-25
		Measured, 06/05/2002	38.30	1.45	22.70
		Recommended Limits	40.00	1.40	20-25
	Body	Measured, 06/05/2002	52.90	1.53	22.70
		Recommended Limits	53.30	1.52	20-25

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	47.0	30.80
DGBE	--	--	52.8	68.91
Water	40.45	53.06	0.2	0.29
Salt	1.45	0.94	--	--
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 $\pm$ 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.

Daily, prior to conducting tests, measurements were made with the RF sources powered off to determine the system noise level. The highest system noise was 0.000 W/kg.

f (MHz)	Description	SAR (W/kg), 1gram	Dielectric Parameters		Ambient Temp (°C)	Tissue Temp (°C)
			ϵ_r	s (S/m)		
900	Measured, 06/05/2002	12.22	40.80	0.98	23.00	26.00
	Recommended Limits	11.40	40.30	0.95	20-26	20-26
1800	Measured, 06/04/2002	37.52	38.80	1.38	22.00	21.50
	Recommended Limits	30.80	39.60	1.37	20-26	20-26
	Measured, 06/05/2002	38.32	38.70	1.37	23.00	21.80
	Recommended Limits	30.80	39.60	1.37	20-26	20-26

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 set to the proper channel, transmitter power level and transmit mode of operation. The phone was then placed in the SAR measurement system with a fully charged battery. The phone was tested in the configurations stipulated in OET Bulletin 65 Supplement C 01-01. The phone was positioned into these 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 ($\pm$ 30%) at 850MHz. The Cellular Phone (FCC ID IHDT56CE1) has only one battery option:

SYN9624A (Lithium Ion) – 3.6V

This battery was used to do all of the SAR testing.

6.1 Head Adjacent Test Results

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 and the temperature of the tissue simulate after the test. The SAR measurements were performed using the SAM phantoms listed in section 3.1. The tissue stimulant depth was verified to be 15.0cm $\pm$ 0.5cm at the center of the ear by doing a Z-axis scan during the system accuracy verification.

The test conditions indicated as bold numbers in the following table are included in Appendix 2. All other test conditions measured lower SAR values than those included. The phone has two different housings: “Mini Housing” and “Hour Glass Housing”. All the required testes were performed with the “Mini Housing” and spot-checked with the “Hour Glass Housing”.

f (MHz)	Description	Conducted Output Power (dBm)	Mini Housing (Cheek / Touch Position)					
			Left Head			Right Head		
			Measured (W/kg)	Drift (dB)	Simulate Temp (°C)	Measured (W/kg)	Drift (dB)	Simulate Temp (°C)
850 MHz	Channel 128	30.08						
	Channel 189	30.05	0.698	0.03	21.50	0.717	-0.03	21.50
	Channel 251	29.93						
Digital 1900 MHz	Channel 512	29.90						
	Channel 661	30.07	0.821	-0.13	22.70	0.497	0.03	22.70
	Channel 810	30.00						

Table 1: SAR measurement results for the portable cellular telephone FCC ID IHDT56CE1 at highest possible output power. Measured against the head in the Cheek/Touch Position.

f (MHz)	Description	Conducted Output Power (dBm)	Hour Glass Housing (Cheek / Touch Position)					
			Left Head			Right Head		
			Measured (W/kg)	Drift (dB)	Simulate Temp (°C)	Measured (W/kg)	Drift (dB)	Simulate Temp (°C)
850 MHz	Channel 128	30.08						
	Channel 189	30.05				0.761	-0.05	22.20
	Channel 251	29.93						
Digital 1900 MHz	Channel 512	29.90						
	Channel 661	30.07	0.865	-0.08	22.40			
	Channel 810	30.00						

Table 2: SAR measurement results for the portable cellular telephone FCC ID IHDT56CE1 at highest possible output power. Measured against the head in the Cheek/Touch Position.

f (MHz)	Description	Conducted Output Power (dBm)	Mini Housing (15° Tilt Position)					
			Left Head			Right Head		
			Measured (W/kg)	Drift (dB)	Simulate Temp (°C)	Measured (W/kg)	Drift (dB)	Simulate Temp (°C)
850 MHz	Channel 128	30.08						
	Channel 189	30.05	0.435	0.04	21.50	0.458	-0.02	21.50
	Channel 251	29.93						
Digital 1900 MHz	Channel 512	29.90						
	Channel 661	30.07	0.829	-0.04	22.70	0.574	0.02	22.70
	Channel 810	30.00						

Table 3: SAR measurement results for the portable cellular telephone FCC ID IHDT56CE1 at highest possible output power. Measured against the head in the 15° Tilt Position.

f (MHz)	Description	Conducted Output Power (dBm)	Hour Glass Housing (15° Tilt Position)					
			Left Head			Right Head		
			Measured (W/kg)	Drift (dB)	Simulate Temp (°C)	Measured (W/kg)	Drift (dB)	Simulate Temp (°C)
850 MHz	Channel 128	30.08						
	Channel 189	30.05				0.449	-0.03	22.20
	Channel 251	29.93						
Digital 1900 MHz	Channel 512	29.90						
	Channel 661	30.07	0.769	-0.25	22.40			
	Channel 810	30.00						

Table 4: SAR measurement results for the portable cellular telephone FCC ID IHDT56CE1 at highest possible output power. Measured against the 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 and the temperature of the tissue simulate after the test. 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 no Body-Worn Accessories available for this phone hence the device was tested per the supplement C testing guidelines for devices that do not have body worn accessories. The back part of the phone was placed 1 inch away from a flat phantom per the supplement C standard guidelines to perform SAR measurement. Placing the back of the phone towards the user in this configuration causes the antenna to be closer than with the front of the phone towards the users).

A full data set output of two test conditions with the highest SAR values from the Dasy™ measurement system is included as appendix 3 . The test conditions included are indicated as bold numbers in the following table. All other test conditions measured lower SAR values than those included.

f (MHz)	Description	Conducte d Output Power (dBm)	Back of the Phone 1 inch away from the phantom (Mini Housing)		
			Internal Antenna		
			Measured (W/kg)	Drift (dB)	Simulate Temp (°C)
850 MHz	Channel 128	30.08	0.296	-0.06	22.30
	Channel 189	30.05	0.224	-0.02	22.30
	Channel 251	29.93	0.193	-0.02	22.30
Digital 1900 MHz	Channel 512	29.90	0.144	-0.02	22.10
	Channel 661	30.07	0.169	-0.11	22.10
	Channel 810	30.00	0.166	-0.03	22.10

Table 5: SAR measurement results for the portable cellular telephone FCC ID IHDT56CE1 at highest possible output power. Measured against the body.

f (MHz)	Description	Conducte d Output Power (dBm)	Back of the Phone 1 inch away from the phantom (Hour Glass Housing)		
			Internal Antenna		
			Measured (W/kg)	Drift (dB)	Simulate Temp (°C)
850 MHz	Channel 128	30.08	0.180	-0.02	22.40
	Channel 189	30.05			
	Channel 251	29.93			
Digital 1900 MHz	Channel 512	29.90			
	Channel 661	30.07	0.115	-0.30	22.10
	Channel 810	30.00			

Table 6: SAR measurement results for the portable cellular telephone FCC ID IHDT56CE1 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# 95 / Forward Power = 252 mW / Room Temp at time of measurement = 23 C Simulant Temp at time of measurement = 22.6 C

R1: TP-1005 SUGAR (rev. 3) Phantom; Flat Section; Position: (90°,90°); Frequency: 900 MHz

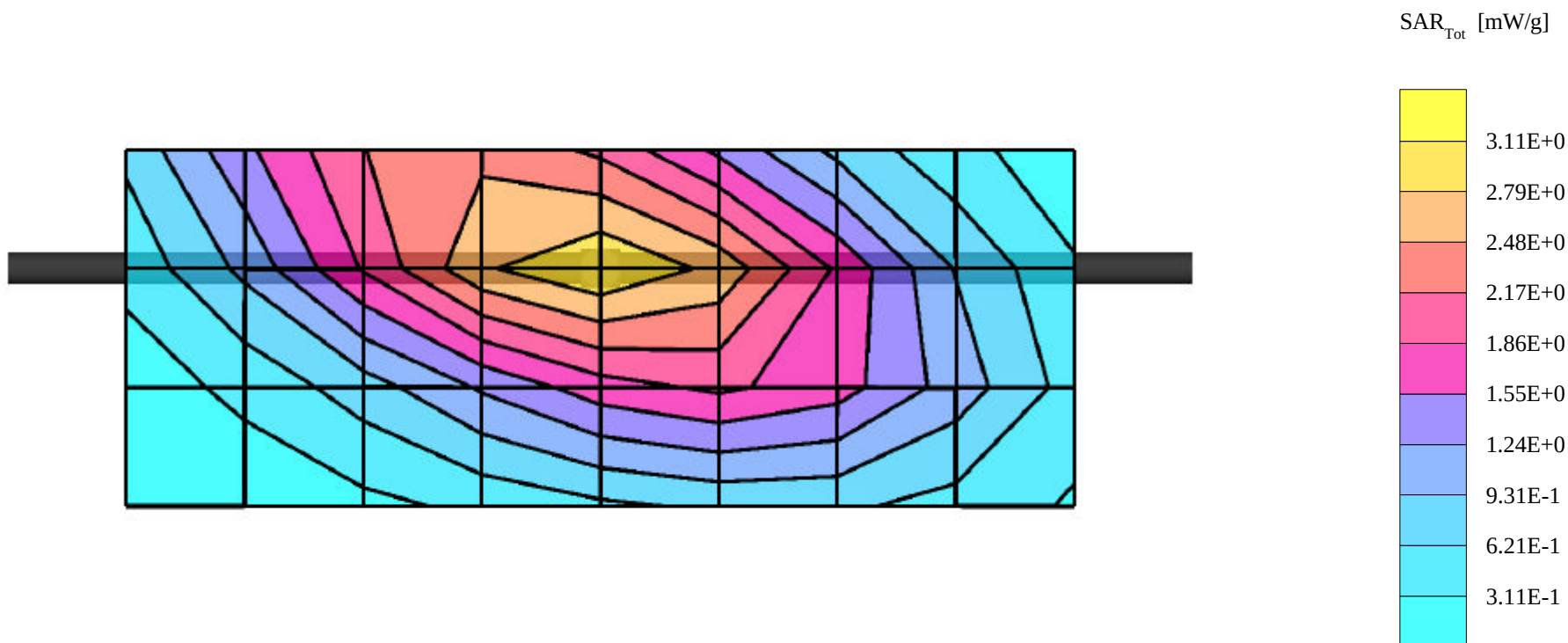
Probe: ET3DV6 - SN1508 - Validation; ConvF(6.35,6.35,6.35); Crest factor: 1.0; 900 MHz VALIDATION: $\sigma = 0.98$ mho/m $\epsilon_r = 40.8$ $\rho = 1.00$ g/cm³

Cubes (2): SAR (1g): 3.08 mW/g ± 0.04 dB, SAR (10g): 1.95 mW/g ± 0.04 dB, (Worst-case extrapolation)

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

Penetration depth: 11.7 (10.8, 12.8) [mm]

Powerdrift: 0.02 dB



Dipole 1800 MHz

1800 MHz Dipole Validation / Dipole Sn# 277tr / Forward Power = 250 mW / Room Temp at time of measurement = 22 C Simulant Temp at time of measurement =21.5 C

R1 Amy Twin Phantom Rev.3 Phantom; section 1 Section; Position: (90°,180°); Frequency: 1800 MHz

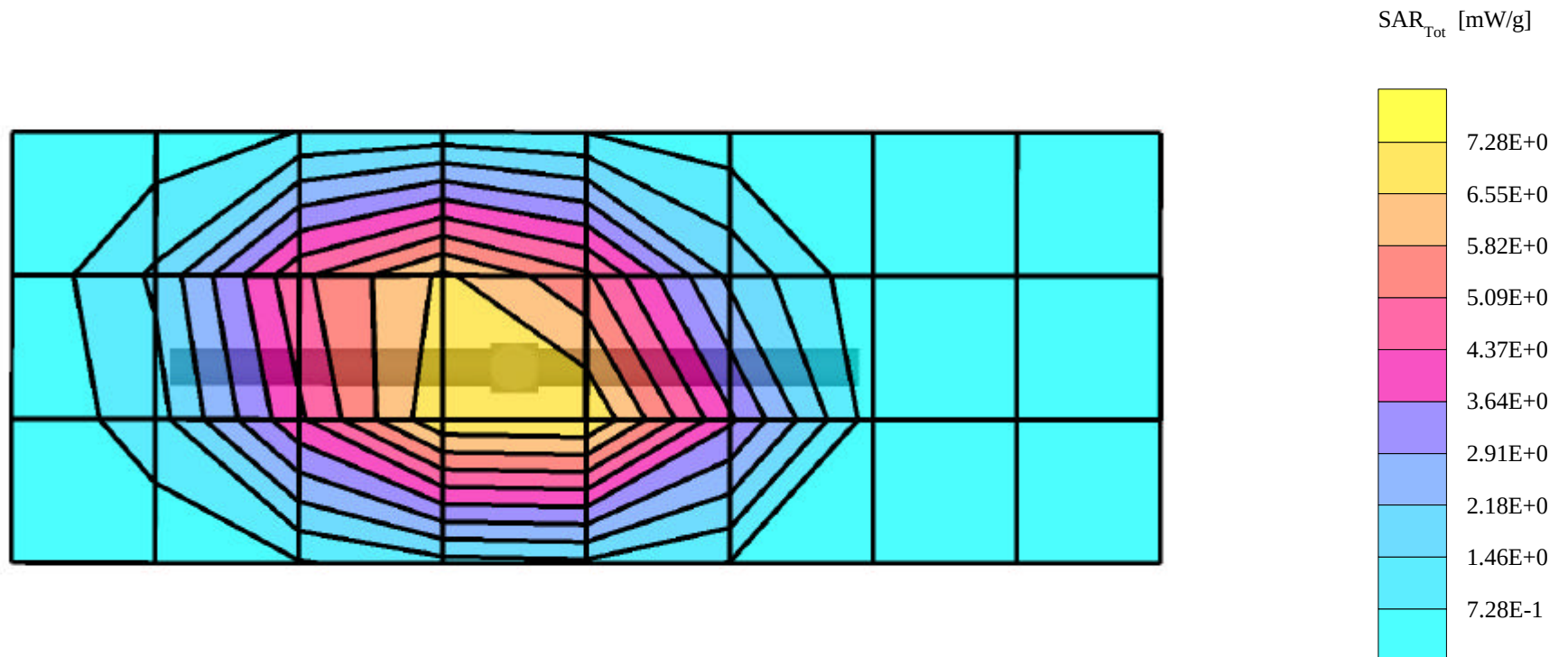
Probe: ET3DV6 - SN1508 - Validation; ConvF(5.41,5.41,5.41); Crest factor: 1.0; 1800 MHz VALIDATION: $\sigma = 1.38$ mho/m $\epsilon_r = 38.8$ $\rho = 1.00$ g/cm³

Cubes (2): SAR (1g): 9.38 mW/g ± 0.06 dB, SAR (10g): 4.96 mW/g ± 0.06 dB, (Worst-case extrapolation)

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

Penetration depth: 8.3 (7.9, 9.1) [mm]

Powerdrift: 0.03 dB



Dipole 1800 MHz

1800 MHz Dipole Validation / Dipole Sn# 277tr / Forward Power = 251 mW / Room Temp at time of measurement = 23 C Simulant Temp at time of measurement = 21.8 C

R1 Amy Twin Phantom Rev.3 Phantom; section 1 Section; Position: (90°,180°); Frequency: 1800 MHz

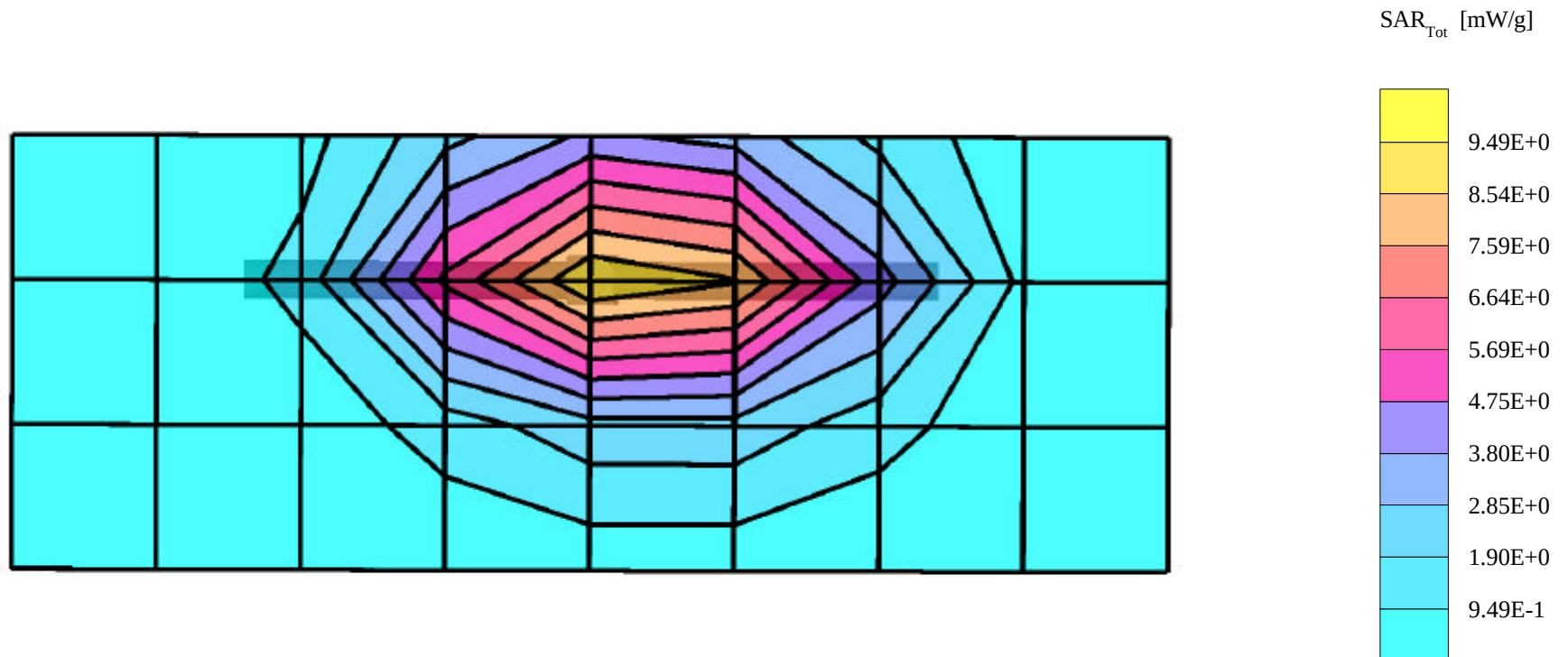
Probe: ET3DV6 - SN1508 - Validation; ConvF(5.41,5.41,5.41); Crest factor: 1.0; 1800 MHz VALIDATION: $\sigma = 1.37$ mho/m $\epsilon_r = 38.7$ $\rho = 1.00$ g/cm³

Cubes (2): SAR (1g): 9.62 mW/g ± 0.05 dB, SAR (10g): 5.08 mW/g ± 0.05 dB, (Worst-case extrapolation)

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

Penetration depth: 8.4 (8.1, 9.2) [mm]

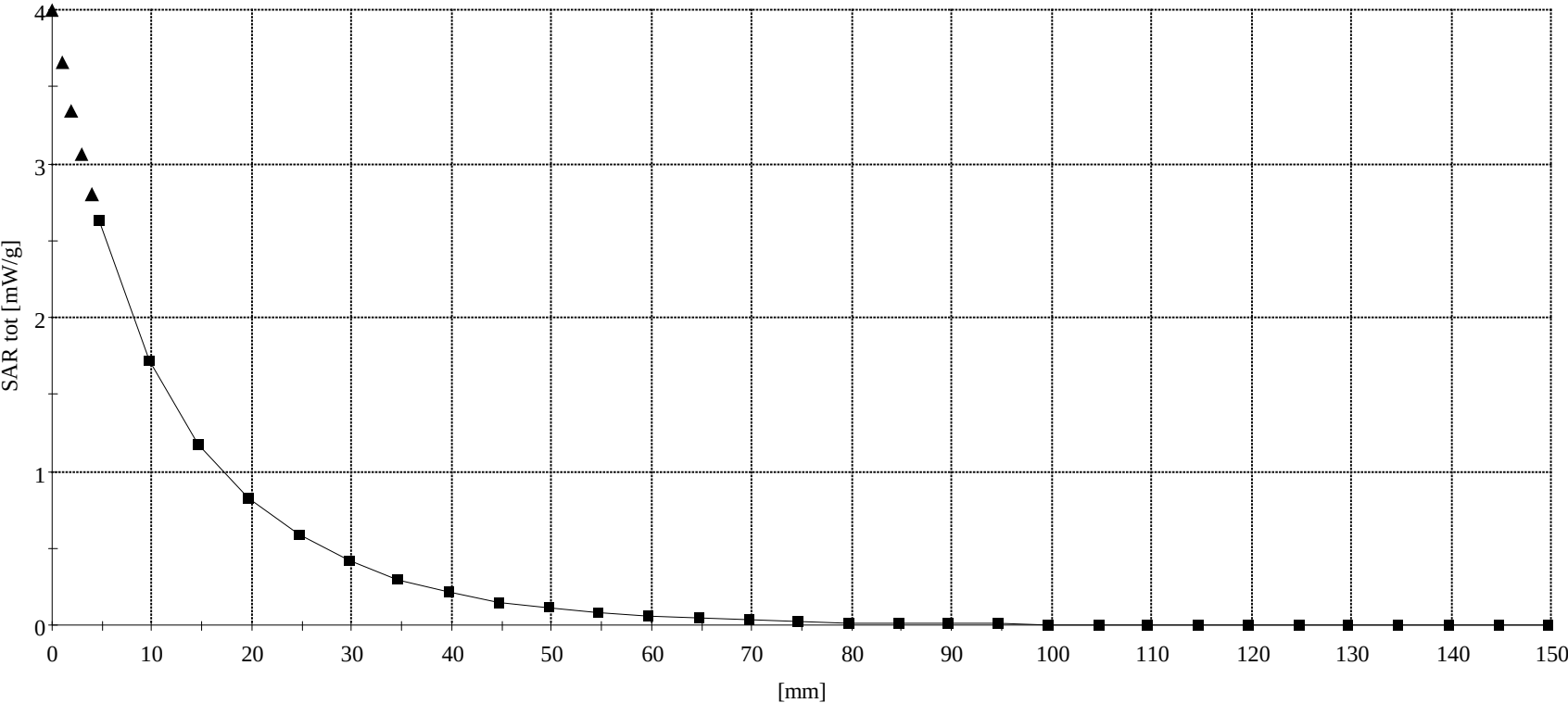
Powerdrift: 0.04 dB



Dipole 900 MHz

900 MHz Dipole Validation / Dipole Sn# 95 / Forward Power = 252 mW / Room Temp at time of measurement = 23 C Simulant Temp at time of measurement = 22.6 C
R1: TP-1005 SUGAR (rev. 3) Phantom; Section; Position: ; Frequency: 900 MHz
Probe: ET3DV6 - SN1508 - Validation; ConvF(6.35,6.35,6.35); Crest factor: 1.0; 900 MHz VALIDATION: $\sigma = 0.98$ mho/m $\epsilon_r = 40.8$ $\rho = 1.00$ g/cm³

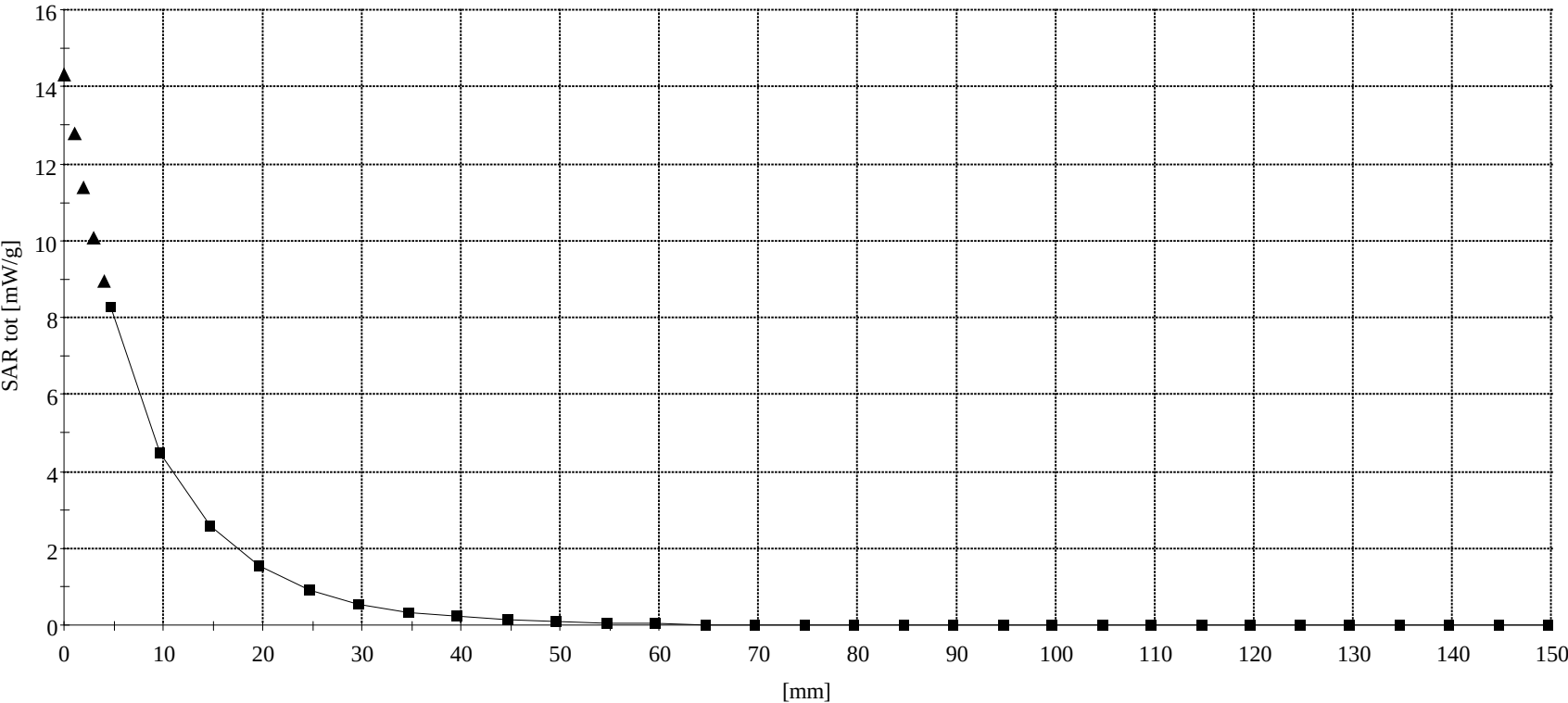
Z-Axis: Dx = 0.0, Dy = 0.0, Dz = 5.0
Penetration depth: 12.3 (11.5, 13.4) [mm]



Dipole 1800 MHz

1800 MHz Dipole Validation / Dipole Sn# 277tr / Forward Power = 250 mW / Room Temp at time of measurement = 22 C Simulant Temp at time of measurement =21.5 C
R1 Amy Twin Phantom Rev.3 Phantom; Section; Position: ; Frequency: 1800 MHz
Probe: ET3DV6 - SN1508 - Validation; ConvF(5.41,5.41,5.41); Crest factor: 1.0; 1800 MHz VALIDATION: $\sigma = 1.38 \text{ mho/m}$ $\epsilon_r = 38.8$ $\rho = 1.00 \text{ g/cm}^3$

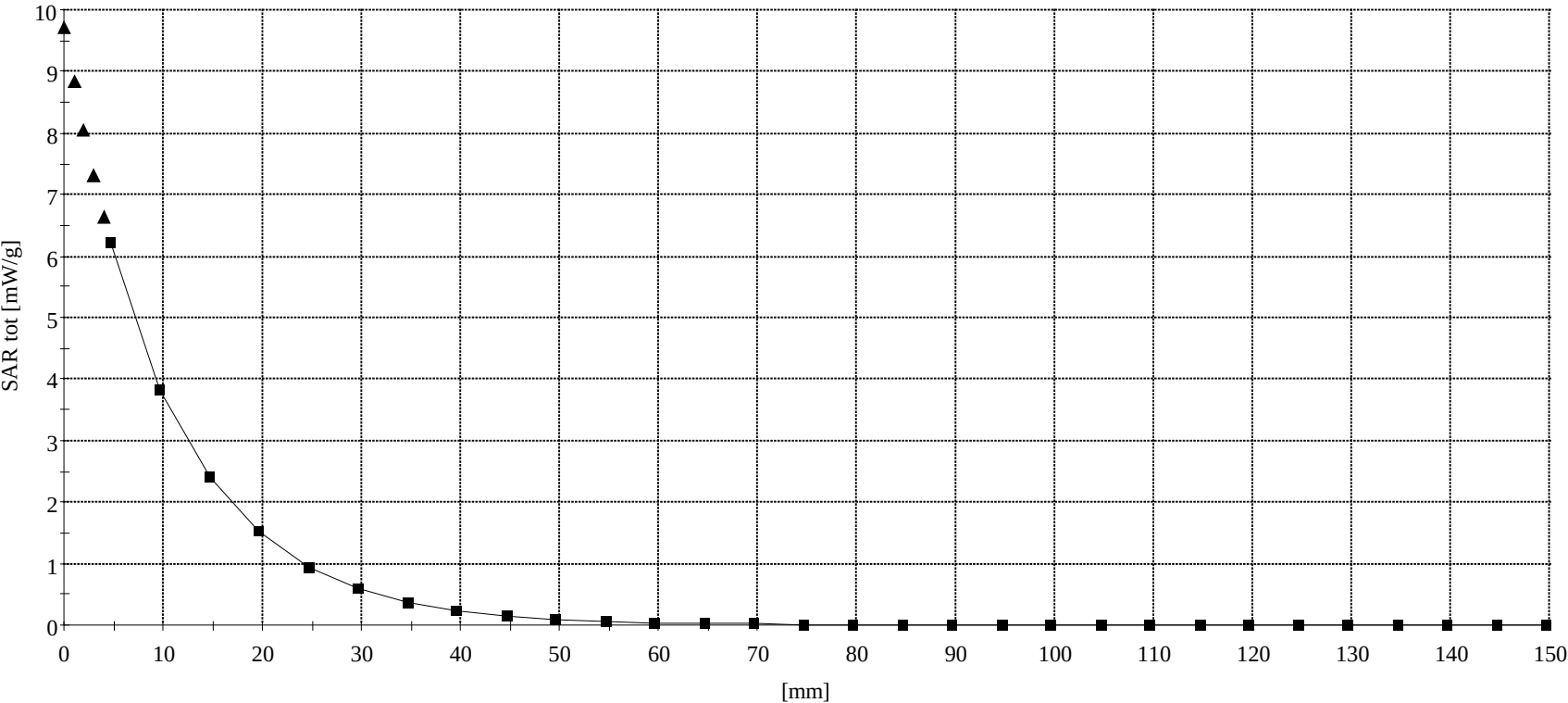
Z-Axis: Dx = 0.0, Dy = 0.0, Dz = 5.0
Penetration depth: 8.5 (8.3, 9.1) [mm]



Dipole 1800 MHz

1800 MHz Dipole Validation / Dipole Sn# 277tr / Forward Power = 251 mW / Room Temp at time of measurement = 23 C Simulant Temp at time of measurement = 21.8 C
R1 Amy Twin Phantom Rev.3 Phantom; Section; Position: ; Frequency: 1800 MHz
Probe: ET3DV6 - SN1508 - Validation; ConvF(5.41,5.41,5.41); Crest factor: 1.0; 1800 MHz VALIDATION: $\sigma = 1.37 \text{ mho/m}$ $\epsilon_r = 38.7$ $\rho = 1.00 \text{ g/cm}^3$

Z-Axis: Dx = 0.0, Dy = 0.0, Dz = 5.0
Penetration depth: 10.5 (10.4, 10.7) [mm]



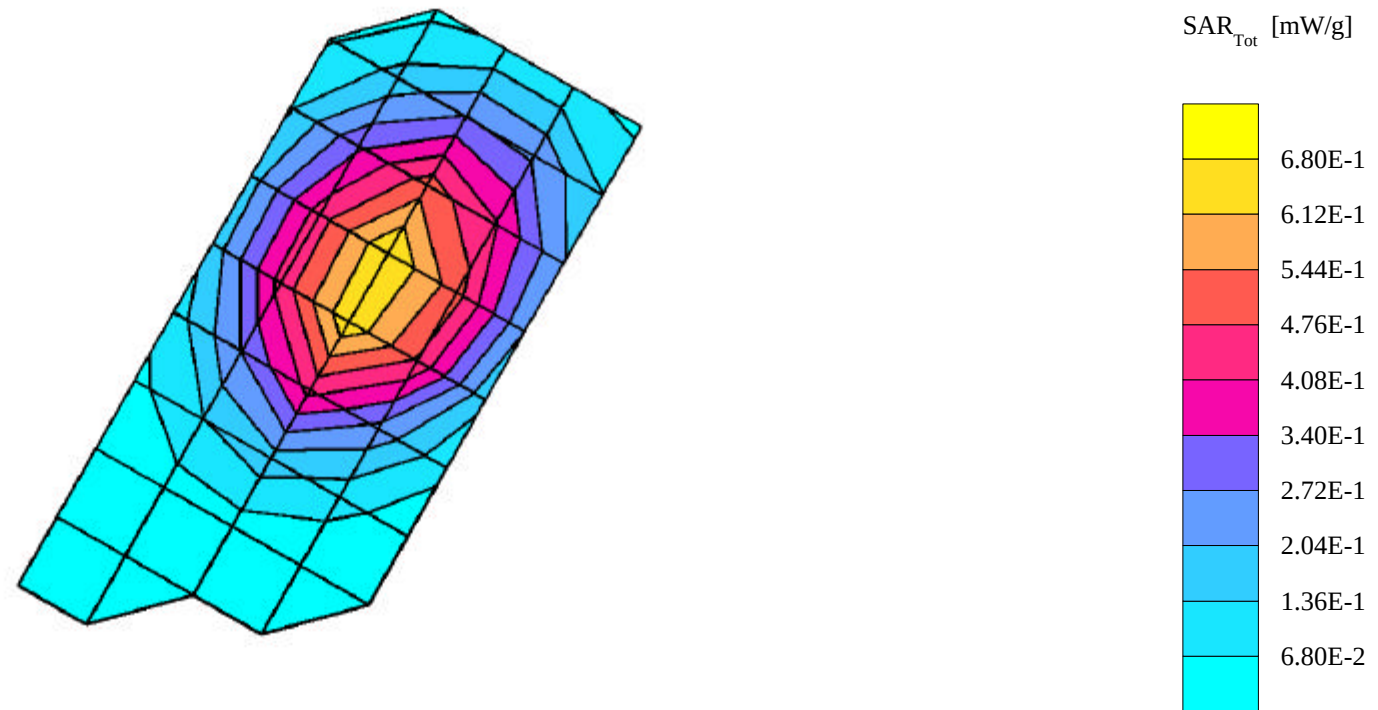
Appendix 2

SAR distribution plots for Phantom Head Adjacent Use

SN 5630032 (Mini Housing)

Ch# 189 / Pwr Step: 7 / Antenna Position: Internal / Type of Modulation: 850 GSM / Battery Model #: SYN9624A / SIM'T TEMP: When Measured = 21.2 °C After Test = 21.5 °C

R1: TP-1005 SUGAR (rev. 3) Phantom; R2 Homer Left Head Section; Position: (90°,180°); Frequency: 836 MHz
Probe: ET3DV6 - SN1508 - IEEE Head; ConvF(6.50,6.50,6.50); Crest factor: 8.0; 835 MHz Head & Body: $\sigma = 0.91$ mho/m $\epsilon_r = 41.6$ $\rho = 1.00$ g/cm³
Cube 7x7x7: SAR (1g): 0.698 mW/g, SAR (10g): 0.465 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 14.1 (13.6, 14.7) [mm]
Powerdrift: 0.03 dB



SN 5630032 (Mini Housing)

Ch# 189 / Pwr Step: 7 / Antenna Position: Internal / Type of Modulation: 850 GSM / Battery Model #: SYN9624A / SIM'T TEMP: When Measured = 21.2 °C After Test = 21.5 °C

R1: TP-1005 SUGAR (rev. 3) Phantom; R2 Homer Left Head Section; Position: (90°,180°); Frequency: 836 MHz

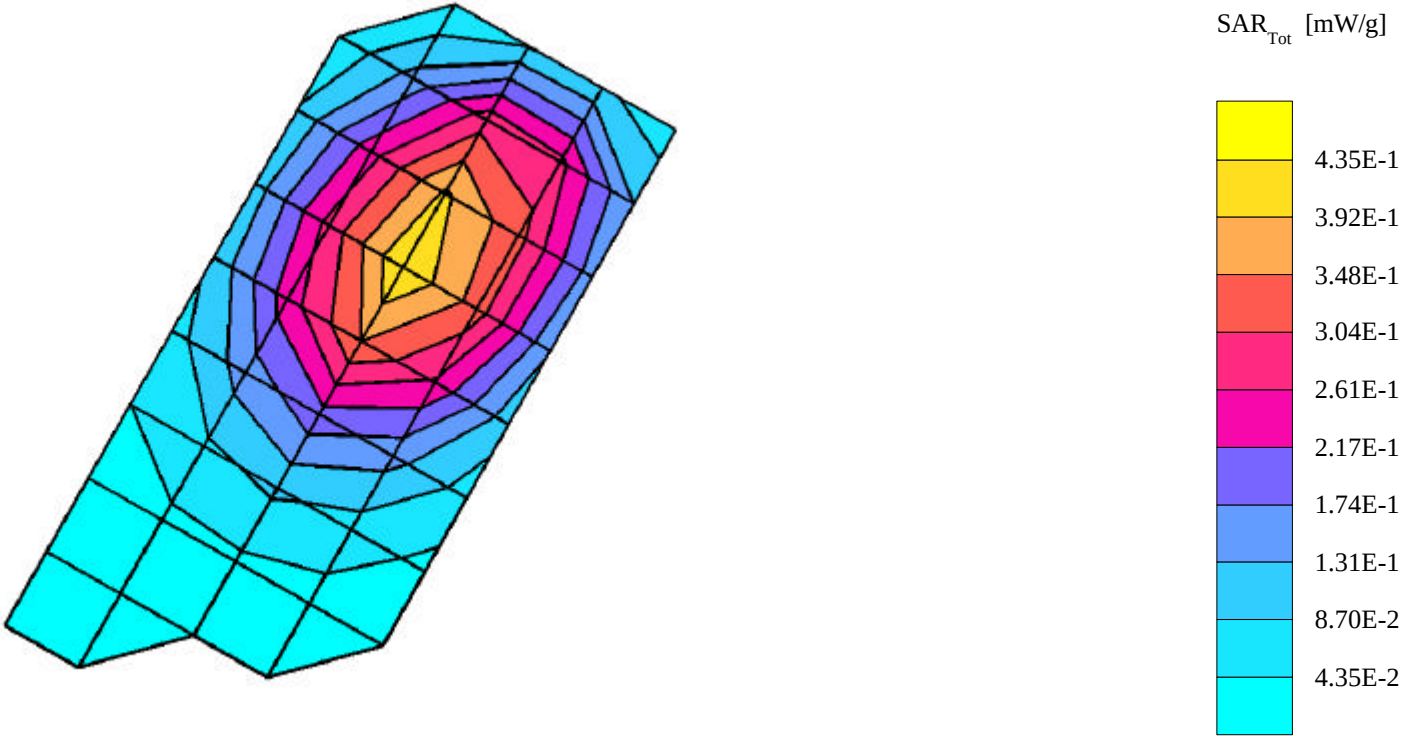
Probe: ET3DV6 - SN1508 - IEEE Head; ConvF(6.50,6.50,6.50); Crest factor: 8.0; 835 MHz Head & Body: $\sigma = 0.91 \text{ mho/m}$ $\epsilon_r = 41.6$ $\rho = 1.00 \text{ g/cm}^3$

Cube 7x7x7: SAR (1g): 0.435 mW/g, SAR (10g): 0.292 mW/g, (Worst-case extrapolation)

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

Penetration depth: 14.0 (13.0, 15.1) [mm]

Powerdrift: 0.04 dB



SN 5630032 (Mini Housing)

Ch# 189 / Pwr Step: 7 / Antenna Position: Internal / Type of Modulation: 850 GSM / Battery Model #:SYN9624A / SIM'T TEMP: When Measured = 21.2 °C After Test = 21.5 °C

R1: TP-1005 SUGAR (rev. 3) Phantom; R2 Marge Right Head Section; Position: (90°,180°); Frequency: 836 MHz

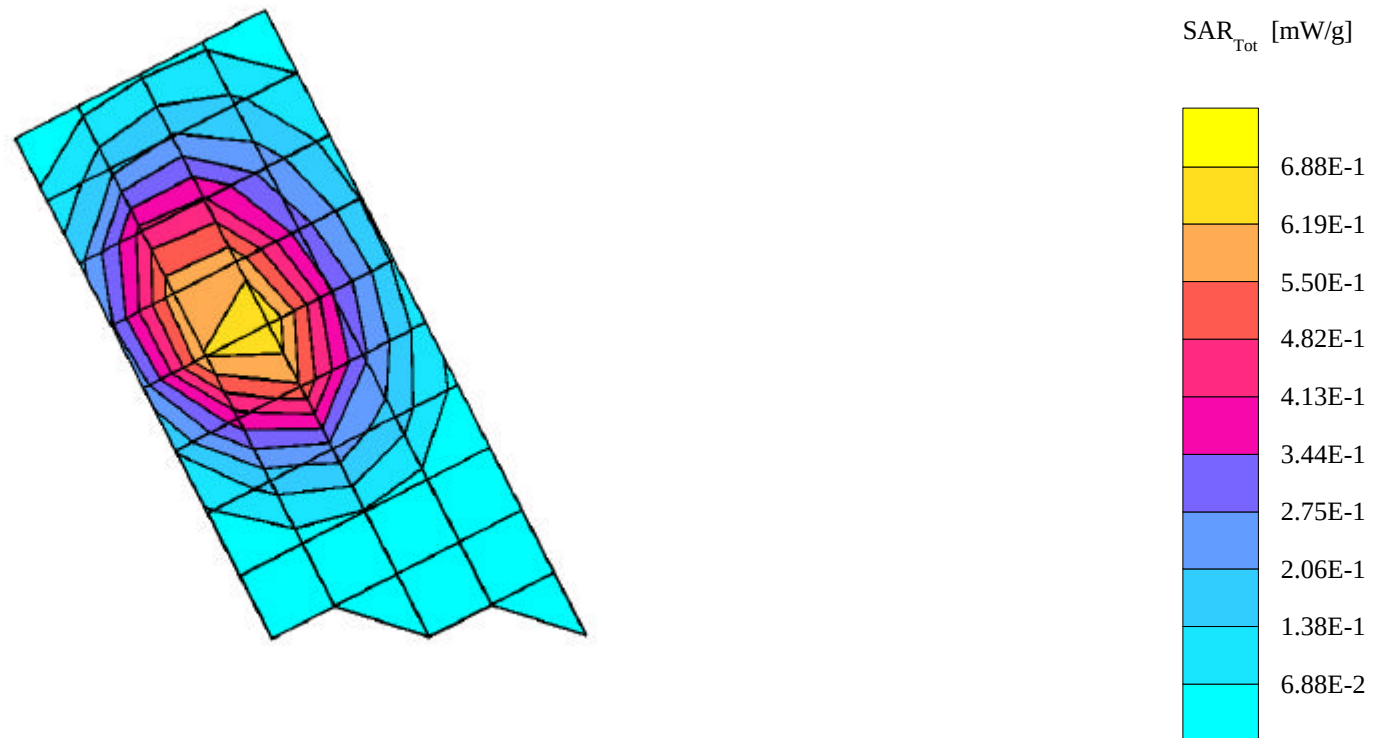
Probe: ET3DV6 - SN1508 - IEEE Head; ConvF(6.50,6.50,6.50); Crest factor: 8.0; 835 MHz Head & Body: $\sigma = 0.91$ mho/m $\epsilon_r = 41.6$ $\rho = 1.00$ g/cm³

Cube 7x7x7: SAR (1g): 0.717 mW/g, SAR (10g): 0.477 mW/g, (Worst-case extrapolation)

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

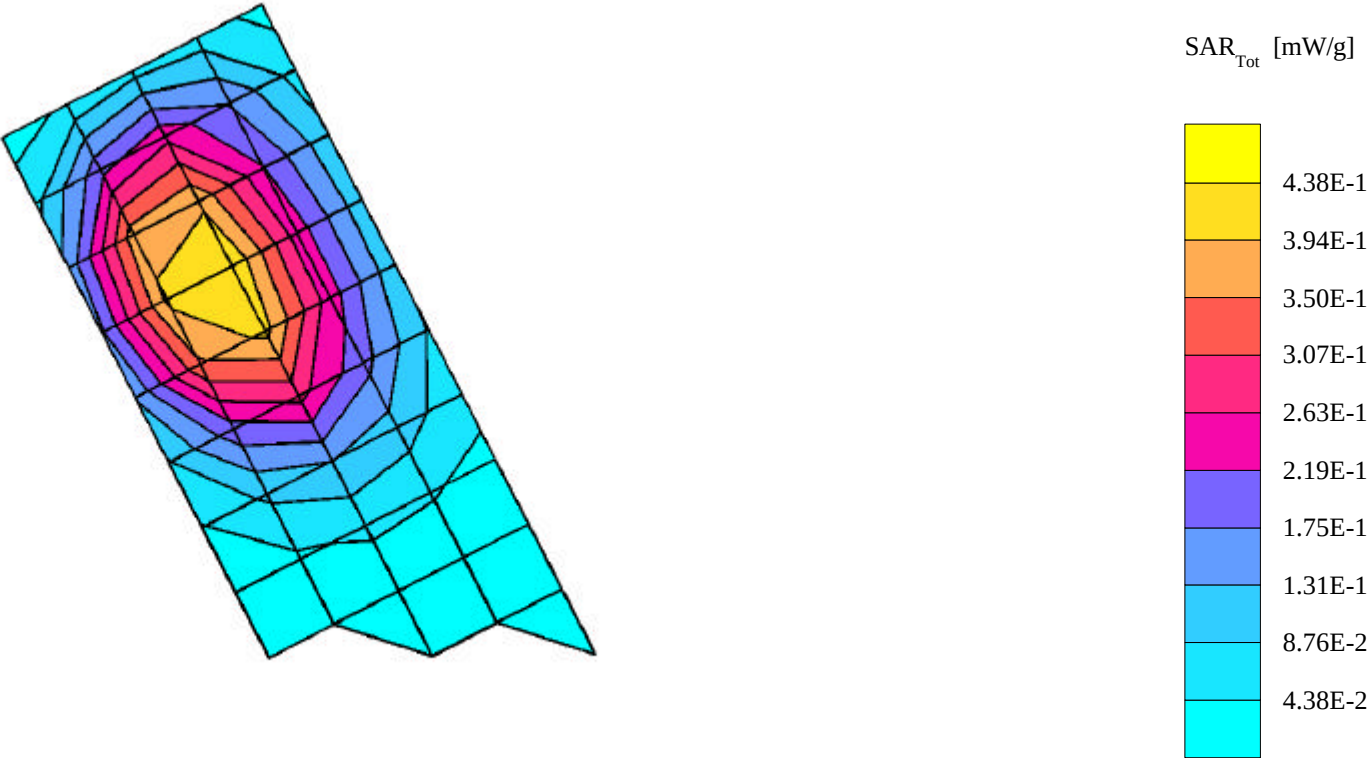
Penetration depth: 14.2 (13.3, 15.1) [mm]

Powerdrift: -0.03 dB



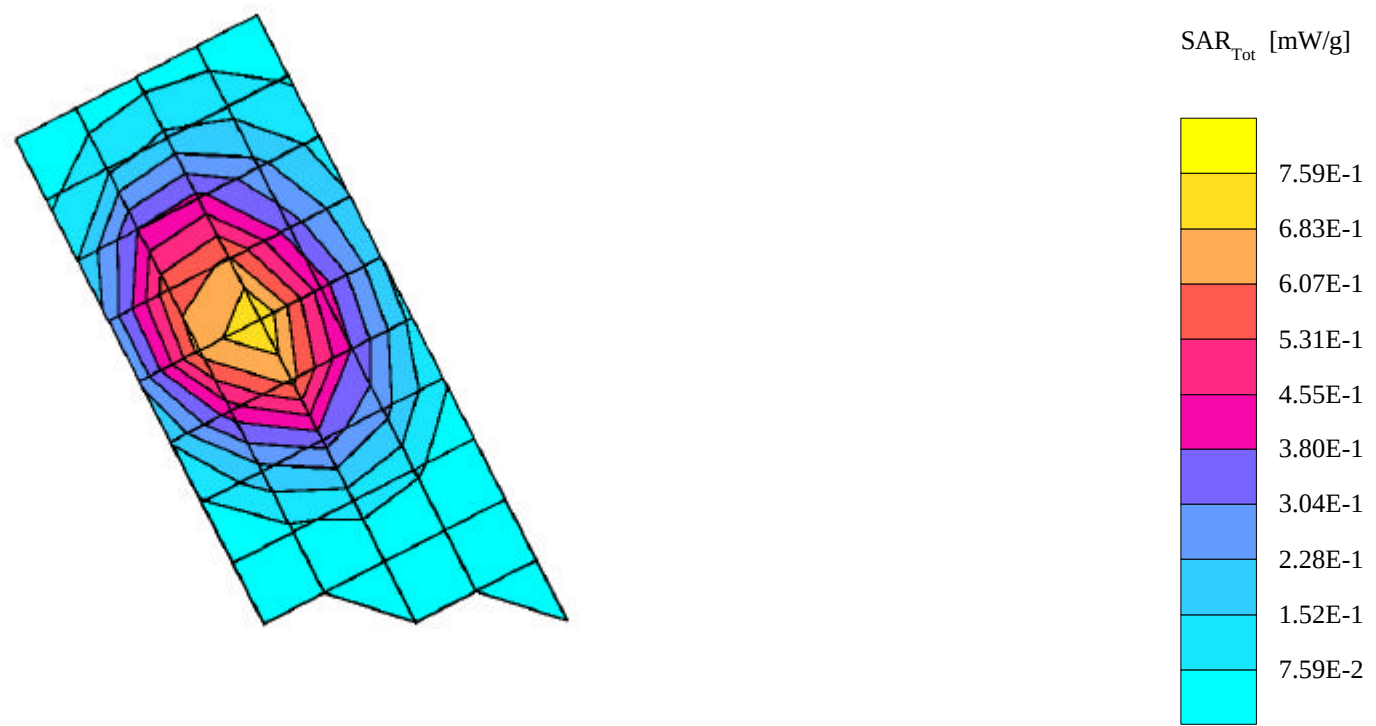
SN 5630032 (Mini Housing)

Ch# 189 / Pwr Step: 7 / Antenna Position: Internal / Type of Modulation: 850 GSM Battery Model #: SYN9624A / SIM'T TEMP: When Measured = 21.2 °C After Test = 21.5 °C
R1: TP-1005 SUGAR (rev. 3) Phantom; R2 Marge Right Head Section; Position: (90°,180°); Frequency: 836 MHz
Probe: ET3DV6 - SN1508 - IEEE Head; ConvF(6.50,6.50,6.50); Crest factor: 8.0; 835 MHz Head & Body: $\sigma = 0.91$ mho/m $\epsilon_r = 41.6$ $\rho = 1.00$ g/cm³
Cube 7x7x7: SAR (1g): 0.458 mW/g, SAR (10g): 0.312 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 14.8 (13.8, 15.8) [mm]
Powerdrift: -0.02 dB



SN 5630032 (Hour Glass Housing)

Ch# 189 / Pwr Step: 7 / Antenna Position: Internal / Type of Modulation: 850 GSM / Battery Model #: SYN9624A / SIM'T TEMP: When Measured = 22.6 °C After Test = 22.2 °C / Accessory Model # = HOUR GLASS HOUSING
R1: TP-1005 SUGAR (rev. 3) Phantom; R2 Marge Right Head Section; Position: (90°,180°); Frequency: 836 MHz
Probe: ET3DV6 - SN1508 - IEEE Head; ConvF(6.50,6.50,6.50); Crest factor: 8.0; 835 MHz Head & Body: $\sigma = 0.92 \text{ mho/m}$ $\epsilon_r = 41.8$ $\rho = 1.00 \text{ g/cm}^3$
Cube 7x7x7: SAR (1g): 0.761 mW/g, SAR (10g): 0.506 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 14.3 (13.7, 15.0) [mm]
Powerdrift: -0.05 dB



SN 5630032 (Mini Housing)

Ch#661 / Pwr Step: 00 / Antenna Position: Internal / Type of Modulation: 1900 GSM / Battery Model #: SYN9624A / SIM'T TEMP: When Measured = 22.6 °C After Test = 22.7 °C

R1: TP-1085 GLYCOL (rev. 3) Phantom; R2 Bart Left Head Section; Position: (90°,180°); Frequency: 1880 MHz

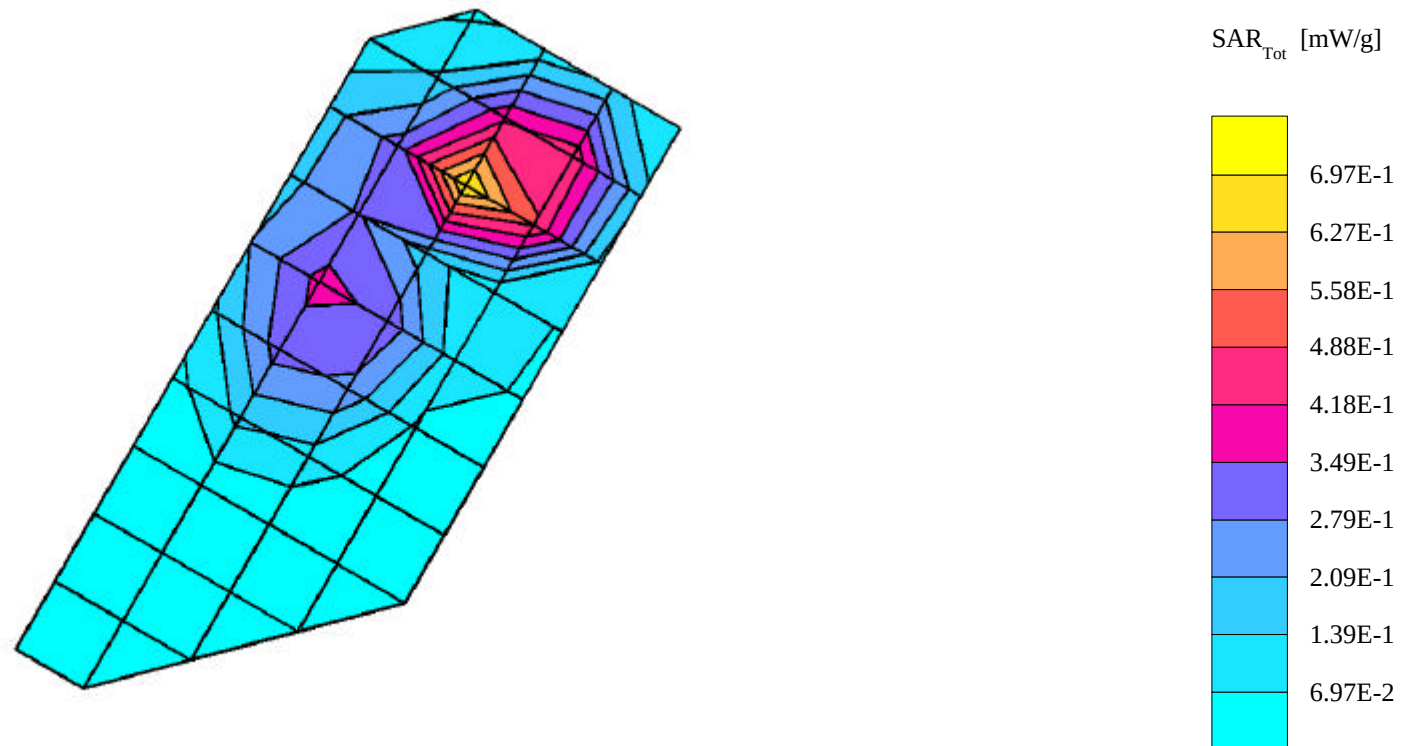
Probe: ET3DV6 - SN1508 - IEEE Head; ConvF(5.41,5.41,5.41); Crest factor: 8.0; 1880 MHz Head & Body: $\sigma = 1.45$ mho/m $\epsilon_r = 39.8$ $\rho = 1.00$ g/cm³

Cube 7x7x7: SAR (1g): 0.821 mW/g, SAR (10g): 0.388 mW/g, (Worst-case extrapolation)

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

Penetration depth: 9.1 (8.9, 9.4) [mm]

Powerdrift: -0.13 dB



SN 5630032 (Mini Housing)

Ch#661 / Pwr Step: 00 / Antenna Position: Internal / Type of Modulation: 1900 GSM / Battery Model #:SYN9624A / SIM'T TEMP: When Measured = 22.6 °C After Test = 22.7 °C

R1: TP-1085 GLYCOL (rev. 3) Phantom; R2 Bart Left Head Section; Position: (90°,180°); Frequency: 1880 MHz

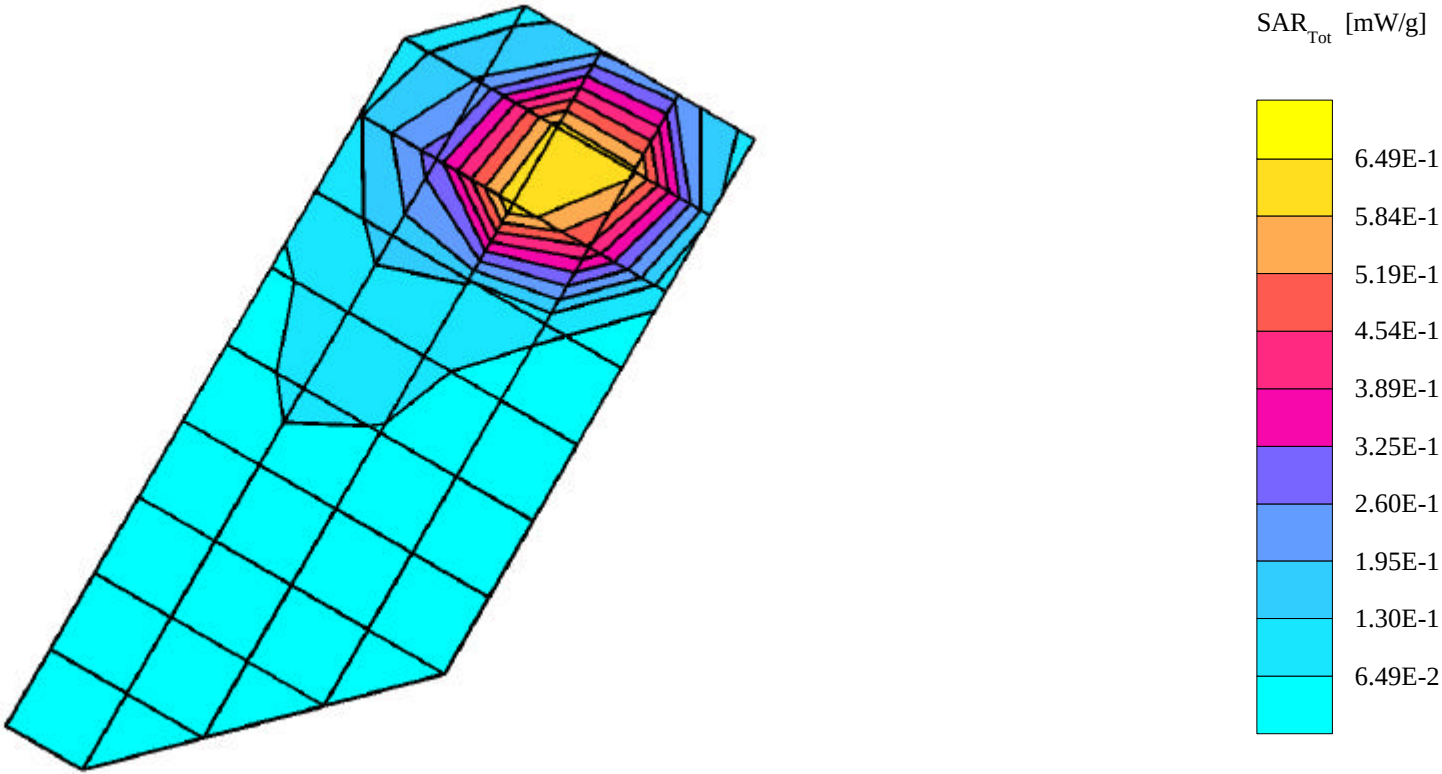
Probe: ET3DV6 - SN1508 - IEEE Head; ConvF(5.41,5.41,5.41); Crest factor: 8.0; 1880 MHz Head & Body: $\sigma = 1.45 \text{ mho/m}$ $\epsilon_r = 39.8$ $\rho = 1.00 \text{ g/cm}^3$

Cube 7x7x7: SAR (1g): 0.829 mW/g, SAR (10g): 0.428 mW/g, (Worst-case extrapolation)

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

Penetration depth: 8.9 (8.8, 9.1) [mm]

Powerdrift: -0.04 dB



SN 5630032 (Mini Housing)

Ch#661 / Pwr Step: 00 / Antenna Position: Internal / Type of Modulation: 1900 GSM / Battery Model #: SYN9624A / SIM'T TEMP: When Measured = 22.6 °C After Test = 22.7 °C

R1: TP-1085 GLYCOL (rev. 3) Phantom; R2 Lisa Right Head Section; Position: (90°,180°); Frequency: 1880 MHz

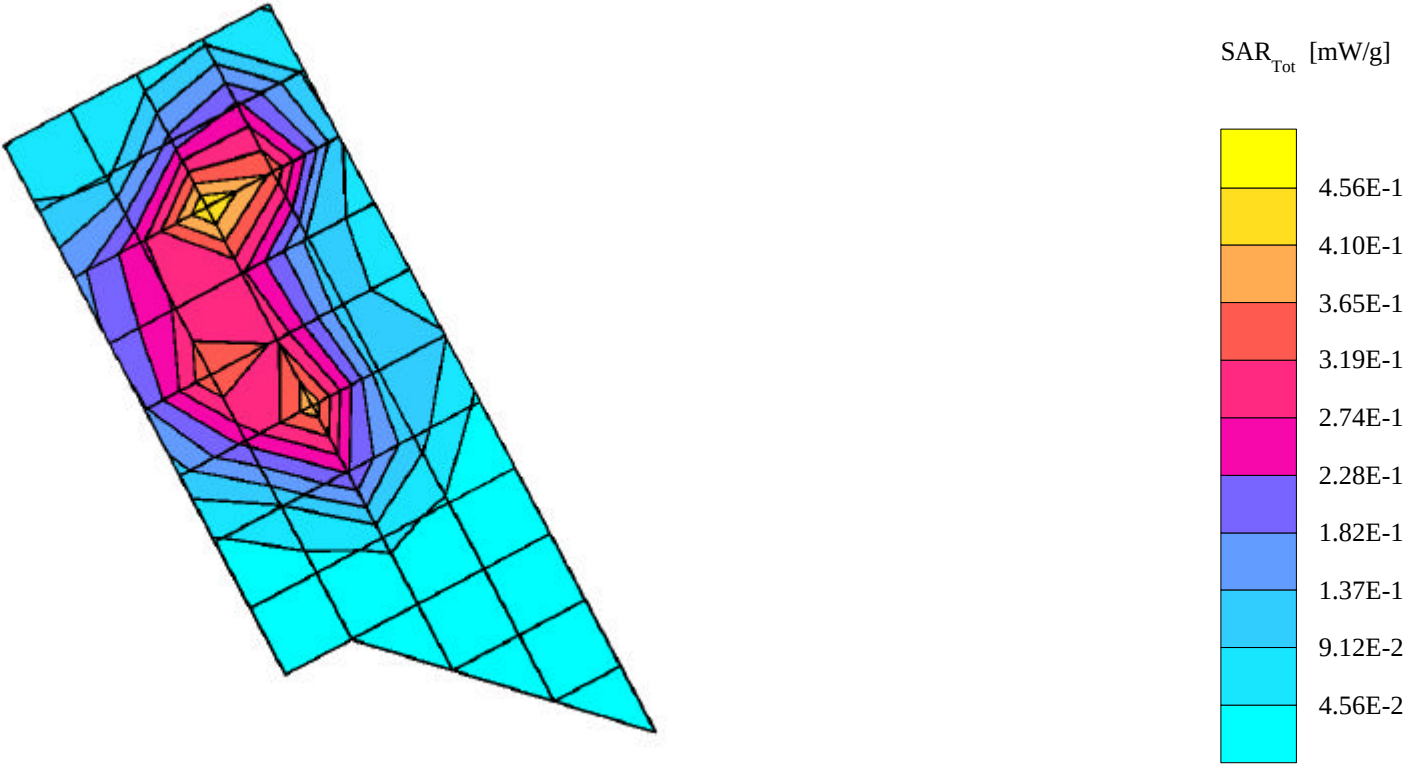
Probe: ET3DV6 - SN1508 - IEEE Head; ConvF(5.41,5.41,5.41); Crest factor: 8.0; 1880 MHz Head & Body: $\sigma = 1.45 \text{ mho/m}$ $\epsilon_r = 39.8$ $\rho = 1.00 \text{ g/cm}^3$

Cube 7x7x7: SAR (1g): 0.497 mW/g, SAR (10g): 0.258 mW/g, (Worst-case extrapolation)

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

Penetration depth: 9.7 (9.6, 9.9) [mm]

Powerdrift: 0.03 dB



SN 5630032 (Mini Housing)

Ch#661 / Pwr Step: 00 / Antenna Position: Internal / Type of Modulation: 1900 GSM / Battery Model #:SYN9624A / SIM'T TEMP: When Measured = 22.6 °C After Test = 22.7 °C

R1: TP-1085 GLYCOL (rev. 3) Phantom; R2 Lisa Right Head Section; Position: (90°,180°); Frequency: 1880 MHz

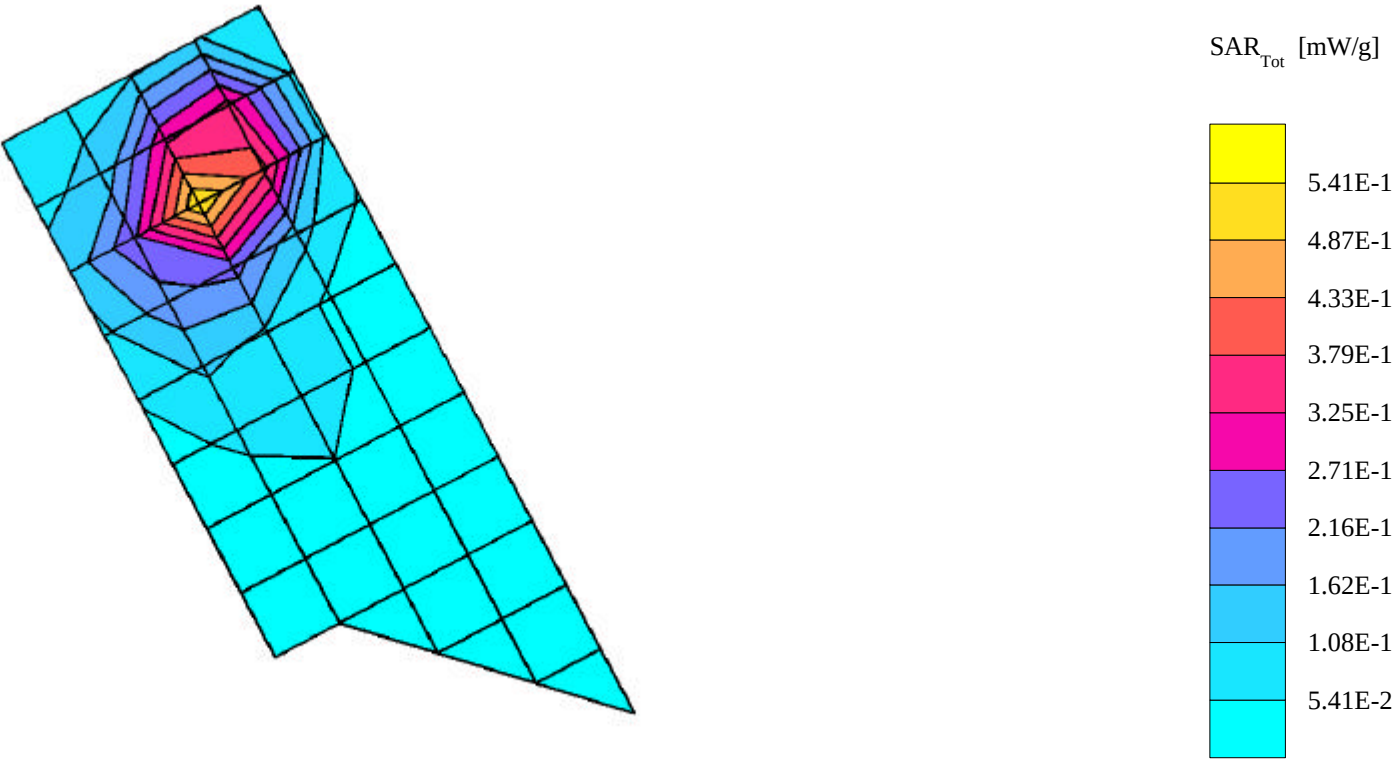
Probe: ET3DV6 - SN1508 - IEEE Head; ConvF(5.41,5.41,5.41); Crest factor: 8.0; 1880 MHz Head & Body: $\sigma = 1.45 \text{ mho/m}$ $\epsilon_r = 39.8$ $\rho = 1.00 \text{ g/cm}^3$

Cube 7x7x7: SAR (1g): 0.574 mW/g, SAR (10g): 0.304 mW/g, (Worst-case extrapolation)

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

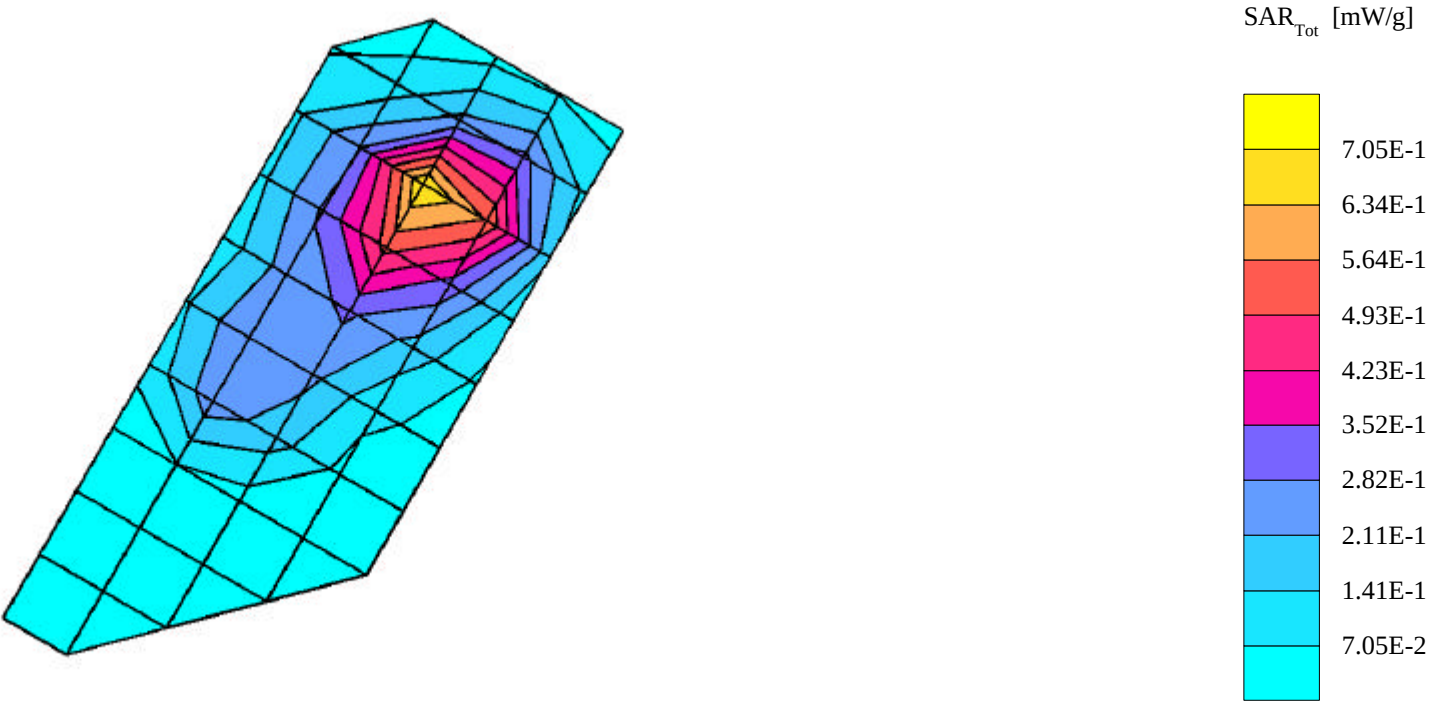
Penetration depth: 9.0 (8.9, 9.4) [mm]

Powerdrift: 0.02 dB



SN 5630032 (Hour Glass Housing)

Ch# 661 / Pwr Step: 0 / Antenna Position: Internal / Type of Modulation: 1900 GSM / Battery Model #: SYN9624A / SIM'T TEMP: When Measured = 21.8 °C After Test = 22.4 °C / Accessory Model # = Hourglass Housing
R1: TP-1085 GLYCOL (rev. 3) Phantom; R2 Bart Left Head Section; Position: (90°,180°); Frequency: 1880 MHz
Probe: ET3DV6 - SN1508 - IEEE Head; ConvF(5.41,5.41,5.41); Crest factor: 8.0; 1880 MHz Head & Body: $\sigma = 1.45 \text{ mho/m}$ $\epsilon_r = 38.3$ $\rho = 1.00 \text{ g/cm}^3$
Cube 7x7x7: SAR (1g): 0.865 mW/g, SAR (10g): 0.422 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 8.9 (8.8, 9.0) [mm]
Powerdrift: -0.08 dB



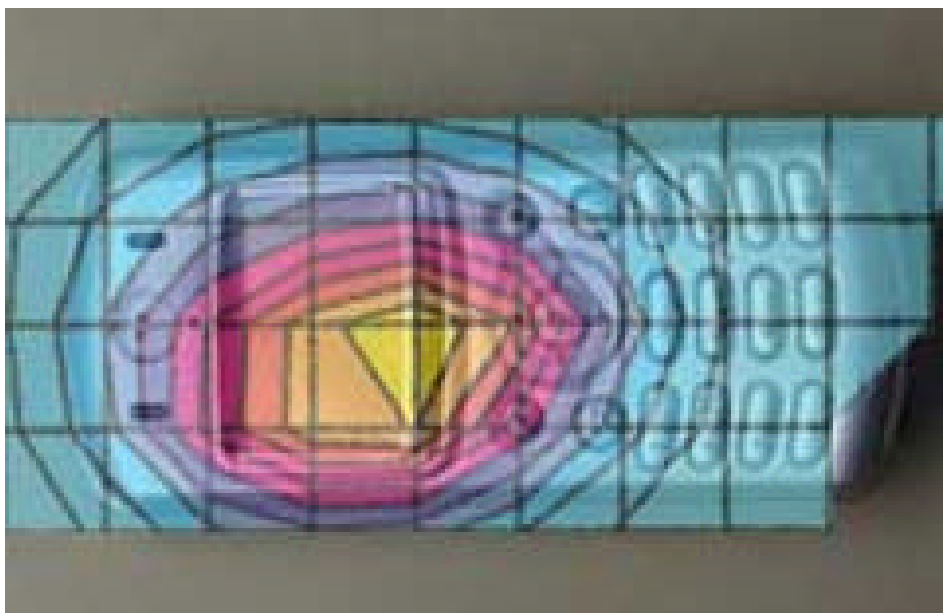


Figure 1. Typical 850MHz Right Head Cheek Touch Contour Overlaid on Face of Phone.

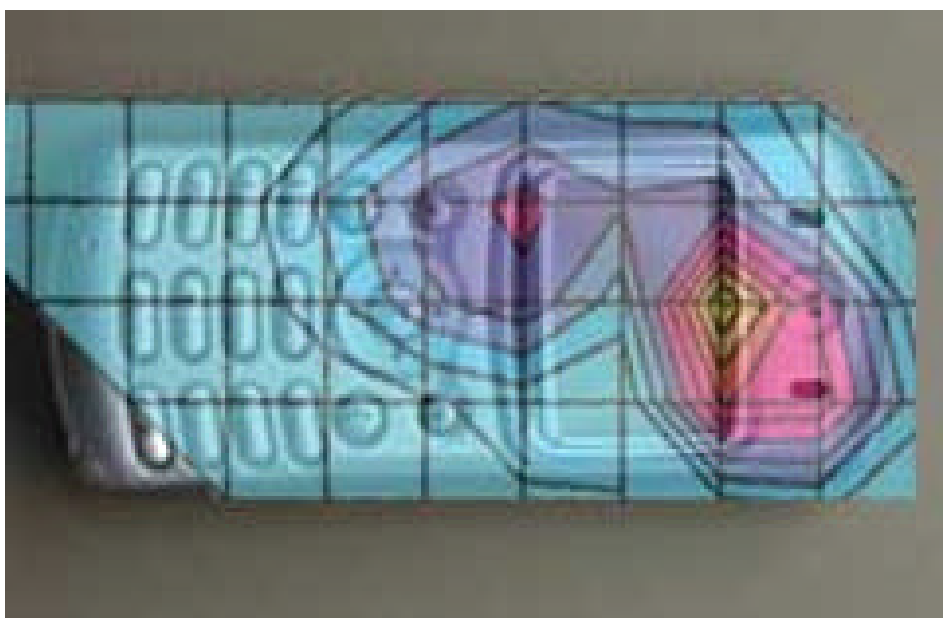


Figure 2. Typical 850MHz Left Head Cheek Touch Contour Overlaid on Face of Phone.

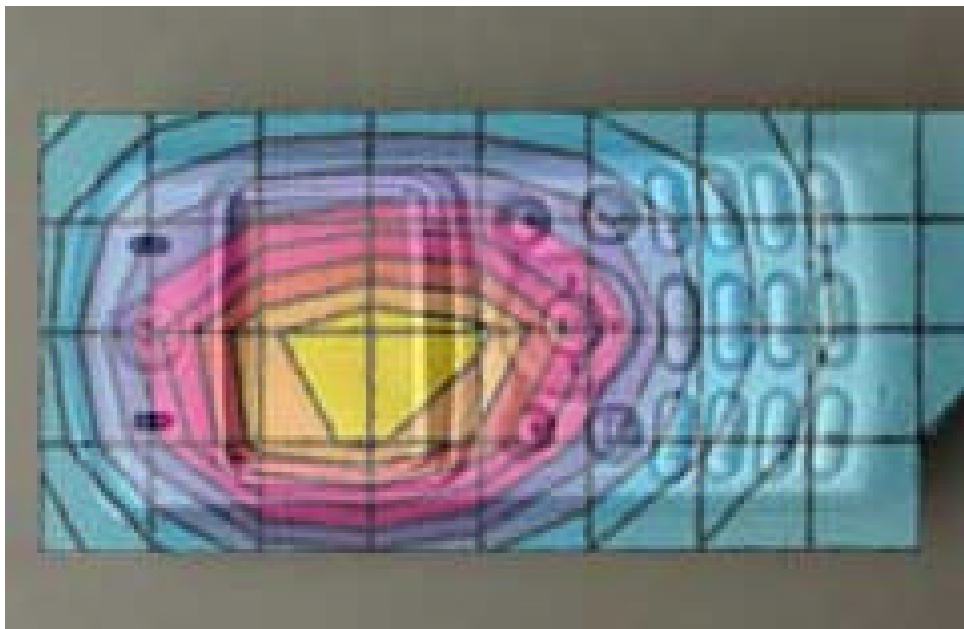


Figure 3. Typical 1900MHz Right Head 15° Tilt Contour Overlaid on Face of Phone.

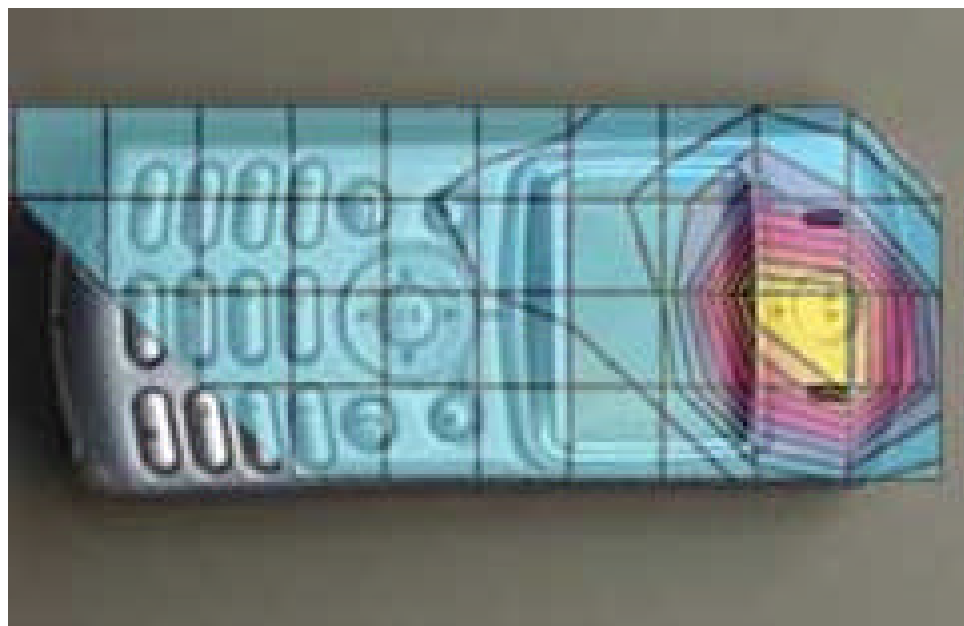


Figure 4. Typical 1900MHz Left Head 15° Tilt Contour Overlaid on Face of Phone.

Appendix 3

SAR distribution plots for Body Worn Configuration

SN 5630032 (Mini Housing)

Ch# 128 / Pwr Step: 05 / Antenna Position: Internal / Type of Modulation: 835 GSM / Battery Model #: SYN9624A / SIM'T TEMP: When Measured = 22.6 °C After Test = 22.3 °C / Tested with backside of phone 1 inch from phantom

R1 Amy Twin Phantom Rev.3 Phantom; section 2 Section; Position: (0°,0°); Frequency: 824 MHz

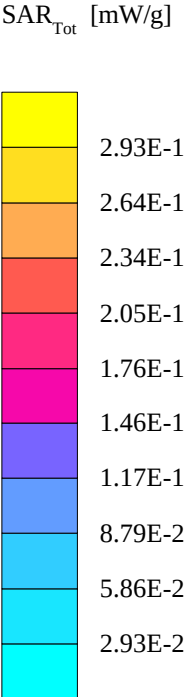
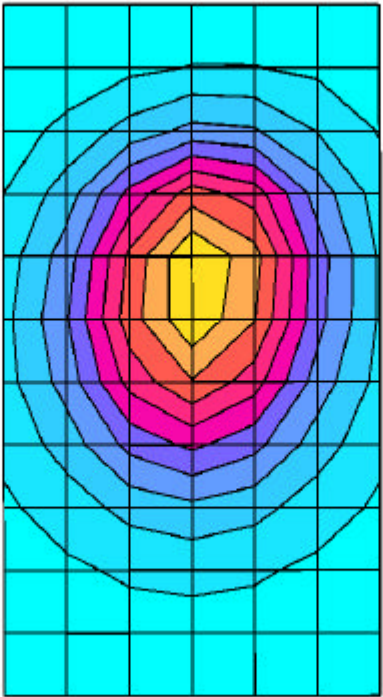
Probe: ET3DV6 - SN1508 - FCC Body; ConvF(6.20,6.20,6.20); Crest factor: 8.0; 835 MHz Head & Body: $\sigma = 0.98 \text{ mho/m}$ $\epsilon_r = 54.6$ $\rho = 1.00 \text{ g/cm}^3$

Cube 7x7x7: SAR (1g): 0.296 mW/g, SAR (10g): 0.209 mW/g, (Worst-case extrapolation)

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

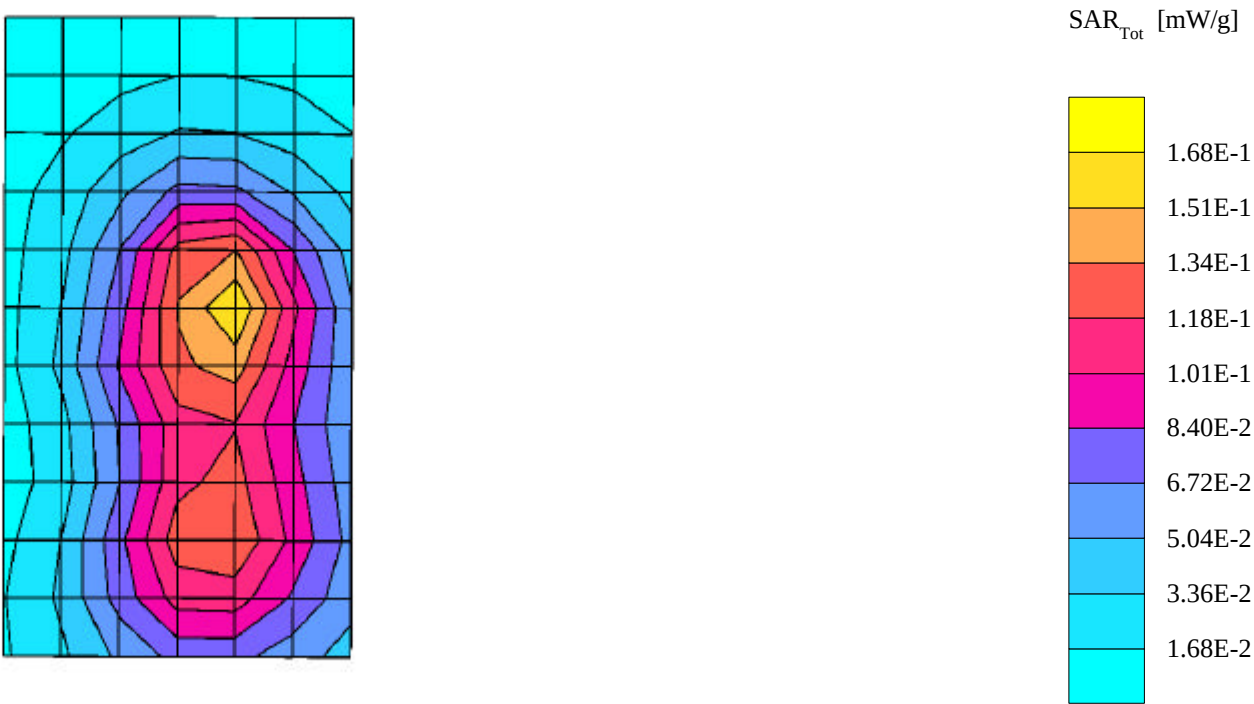
Penetration depth: 16.0 (14.9, 17.2) [mm]

Powerdrift: -0.06 dB



SN 5630032 (Mini Housing)

Ch# 661 / Pwr Step: 0 / Antenna Position: Internal / Type of Modulation: 1900 GSM / Battery Model #: SYN9624A / SIM'T TEMP: When Measured = 22.8 °C After Test = 22.1 °C / Tested with backside of phone 1 inch from phantom
R1 Amy Twin Phantom Rev.3 Phantom; section 2 Section; Position: (0°,0°); Frequency: 1880 MHz
Probe: ET3DV6 - SN1508 - FCC Body; ConvF(5.00,5.00,5.00); Crest factor: 8.0; 1880 MHz Head & Body: $\sigma = 1.53 \text{ mho/m}$ $\epsilon_r = 52.9$ $\rho = 1.00 \text{ g/cm}^3$
Cube 7x7x7: SAR (1g): 0.169 mW/g, SAR (10g): 0.103 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Penetration depth: 10.2 (9.0, 11.9) [mm]
Powerdrift: -0.11 dB



SN 5630032 (Hour Glass Housing)

Ch# 128 / Pwr Step: 7 / Antenna Position: Internal / Battery Model #: SYN9624A / SIM'T TEMP: When Measured = 22.7 °C After Test = 22.4 °C / Tested with backside of phone 1 inch from phantom

R1 Amy Twin Phantom Rev.3 Phantom; section 1 Section; Position: (0°,0°); Frequency: 824 MHz

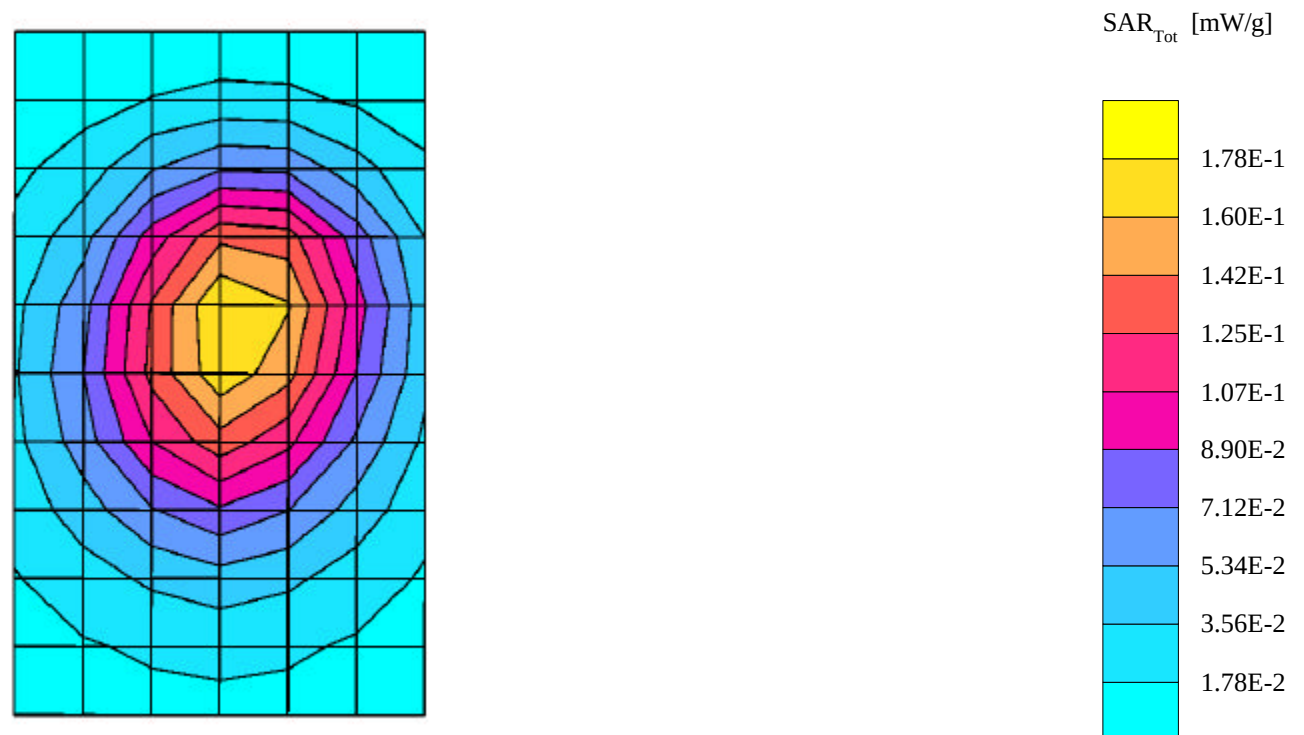
Probe: ET3DV6 - SN1508 - FCC Body; ConvF(6.20,6.20,6.20); Crest factor: 8.0; 835 MHz Head & Body: $\sigma = 0.98$ mho/m $\epsilon_r = 54.6$ $\rho = 1.00$ g/cm³

Cube 7x7x7: SAR (1g): 0.180 mW/g, SAR (10g): 0.128 mW/g, (Worst-case extrapolation)

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

Penetration depth: 16.1 (14.9, 17.4) [mm]

Powerdrift: -0.02 dB



SN 5630032 (Hour Glass Housing)

Ch# 661 / Pwr Step: 00 / Antenna Position: Internal / Battery Model #: SYN9624A / SIM'T TEMP: When Measured = 22.8 °C After Test = 22.1 °C / Tested with backside of phone 1 inch from phantom

R1 Amy Twin Phantom Rev.3 Phantom; section 2 Section; Position: (0°,0°); Frequency: 1880 MHz

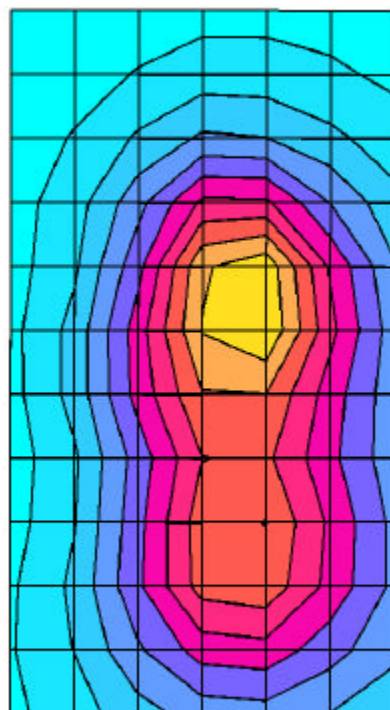
Probe: ET3DV6 - SN1508 - FCC Body; ConvF(5.00,5.00,5.00); Crest factor: 8.0; 1880 MHz Head & Body: $\sigma = 1.53$ mho/m $\epsilon_r = 52.9$ $\rho = 1.00$ g/cm³

Cube 7x7x7: SAR (1g): 0.115 mW/g, SAR (10g): 0.0704 mW/g, (Worst-case extrapolation)

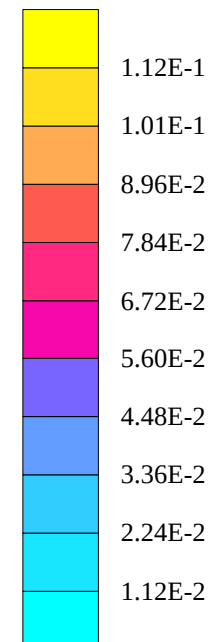
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0

Penetration depth: 10.0 (8.9, 11.7) [mm]

Powerdrift: -0.30 dB



SAR_{Tot} [mW/g]



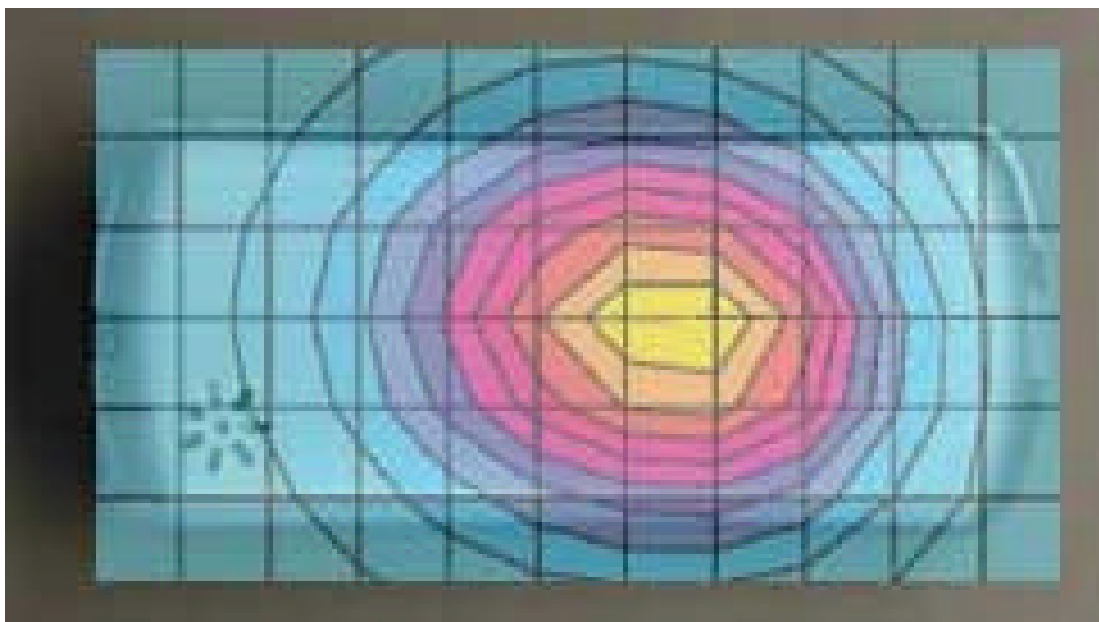


Figure 5. Typical 850MHz Body Worn Contour Overlaid on Back of Phone.

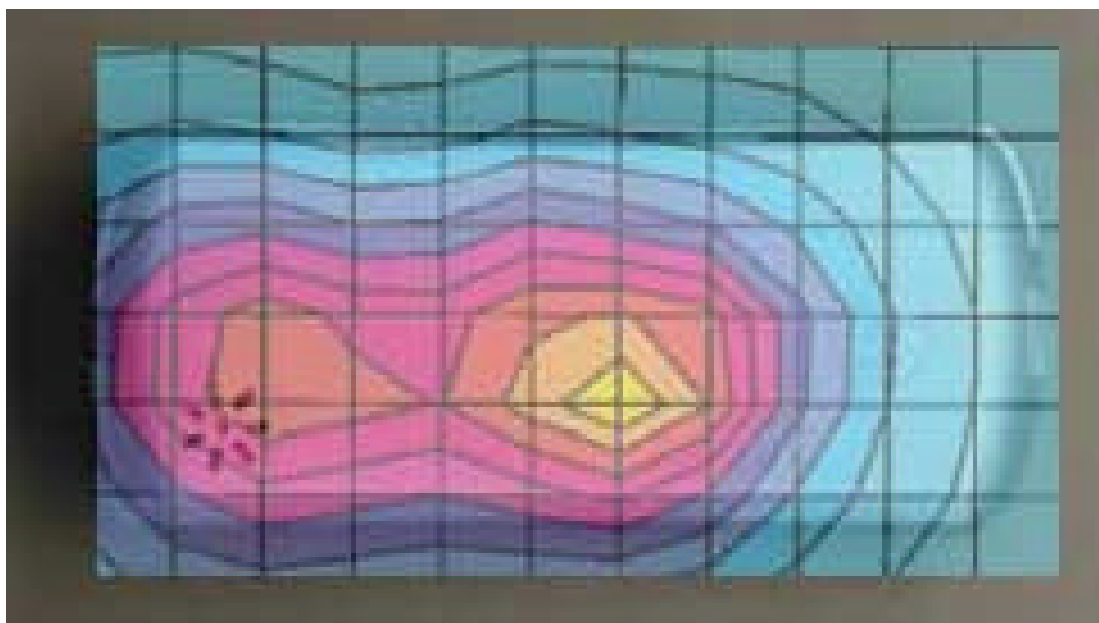


Figure 6. Typical 1900MHz Body Worn Contour Overlaid on Back of Phone.

Appendix 4

Probe Calibration Certificate

Schmid & Partner Engineering AG

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

Calibration Certificate

Dosimetric E-Field Probe

Type:

ET3DV6

Serial Number:

1508

Place of Calibration:

Zurich

Date of Calibration:

October 25, 2001

Calibration Interval:

12 months

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

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

Calibrated by:

N. Edlör & N. Viana

Approved by:

Alain Käfer

Probe ET3DV6

SN:1508

Manufactured:	October 24, 1999
Remade:	October 11, 2001
Recalibrated:	October 25, 2001

Calibrated for System DASY3

DASY3 - Parameters of Probe: ET3DV6 SN:1508

Sensitivity in Free Space

NormX	1.62 $\mu\text{V}/(\text{V}/\text{m})^2$
NormY	1.51 $\mu\text{V}/(\text{V}/\text{m})^2$
NormZ	1.49 $\mu\text{V}/(\text{V}/\text{m})^2$

Diode Compression

DCP X	97 mV
DCP Y	97 mV
DCP Z	97 mV

Sensitivity in Tissue Simulating Liquid

Head **450 MHz** $\epsilon_r = 40.4 \pm 5\%$ $s = 0.87 \pm 5\% \text{ mho/m}$

ConvF X	6.82 extrapolated	Boundary effect:	
ConvF Y	6.82 extrapolated	Alpha	0.25
ConvF Z	6.82 extrapolated	Depth	2.86

Head **900 MHz** $\epsilon_r = 41.5 \pm 5\%$ $s = 0.97 \pm 5\% \text{ mho/m}$

Head **835 MHz** $\epsilon_r = 41.5 \pm 5\%$ $s = 0.90 \pm 5\% \text{ mho/m}$

ConvF X	6.35 $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	6.35 $\pm 9.5\%$ (k=2)	Alpha	0.35
ConvF Z	6.35 $\pm 9.5\%$ (k=2)	Depth	2.68

Head **1500 MHz** $\epsilon_r = 40.4 \pm 5\%$ $s = 1.23 \pm 5\% \text{ mho/m}$

ConvF X	5.72 interpolated	Boundary effect:	
ConvF Y	5.72 interpolated	Alpha	0.47
ConvF Z	5.72 interpolated	Depth	2.43

Head **1800 MHz** $\epsilon_r = 40.0 \pm 5\%$ $s = 1.40 \pm 5\% \text{ mho/m}$

Head **1900 MHz** $\epsilon_r = 40.0 \pm 5\%$ $s = 1.40 \pm 5\% \text{ mho/m}$

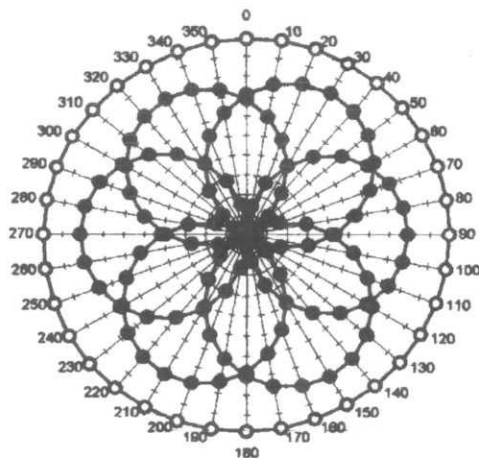
ConvF X	5.41 $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	5.41 $\pm 9.5\%$ (k=2)	Alpha	0.53
ConvF Z	5.41 $\pm 9.5\%$ (k=2)	Depth	2.31

Sensor Offset

Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	1.4 $\pm$ 0.2	mm

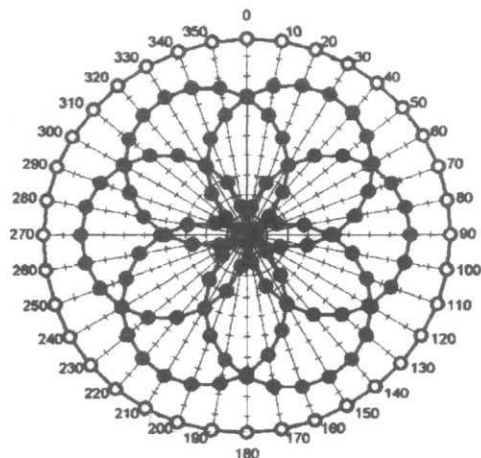
Receiving Pattern (ϕ), $\theta = 0^\circ$

f = 30 MHz, TEM cell if110



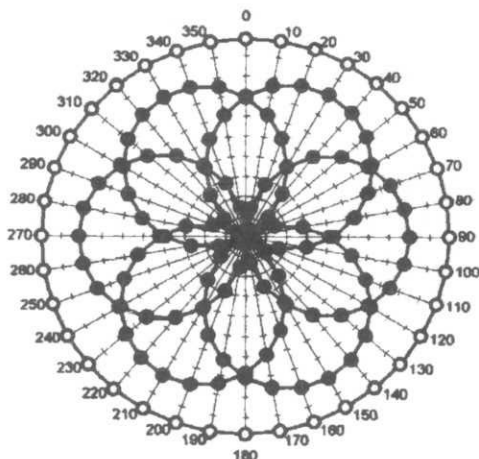
—●— X —●— Y —●— Z —○— Tot

f = 100 MHz, TEM cell if110



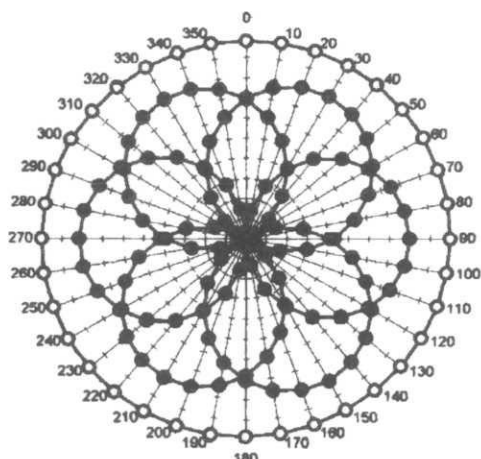
—●— X —●— Y —●— Z —○— Tot

f = 300 MHz, TEM cell if110

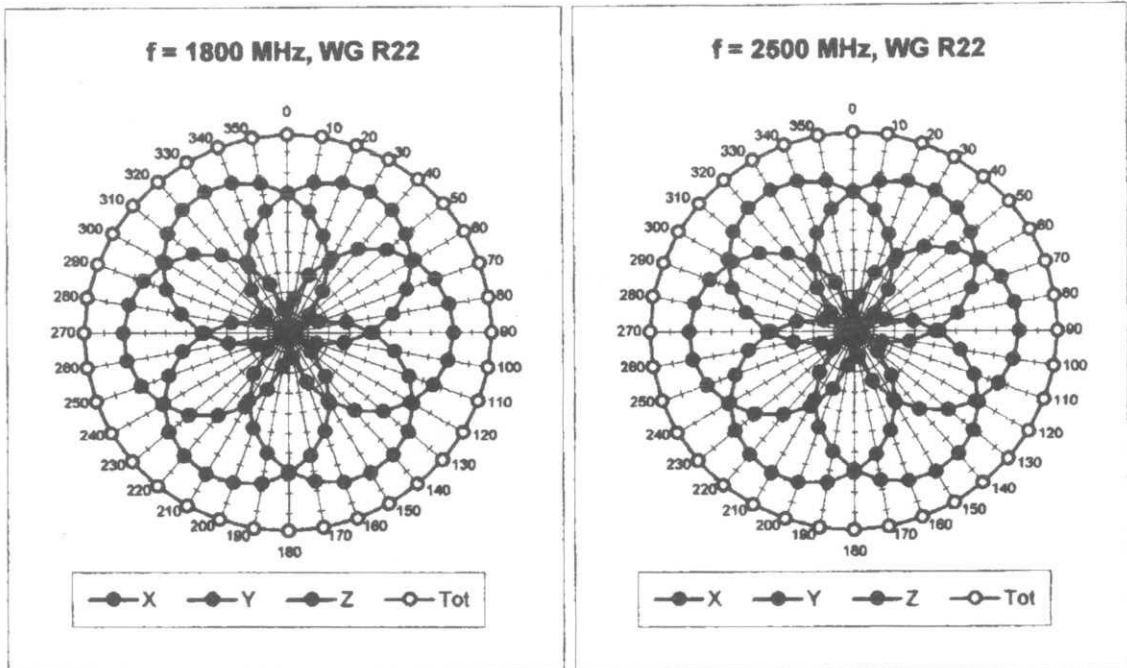


—●— X —●— Y —●— Z —○— Tot

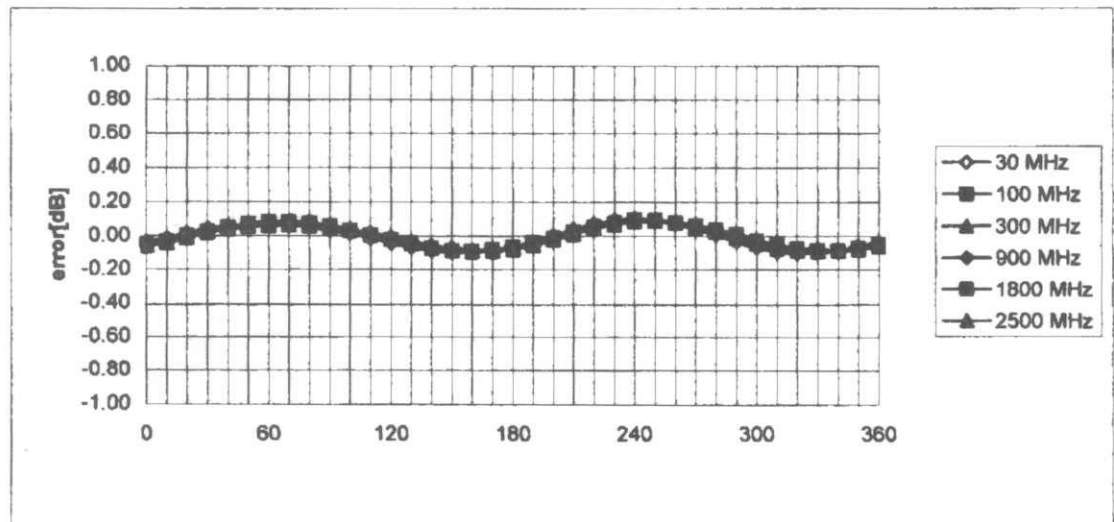
f = 900 MHz, TEM cell if110



—●— X —●— Y —●— Z —○— Tot

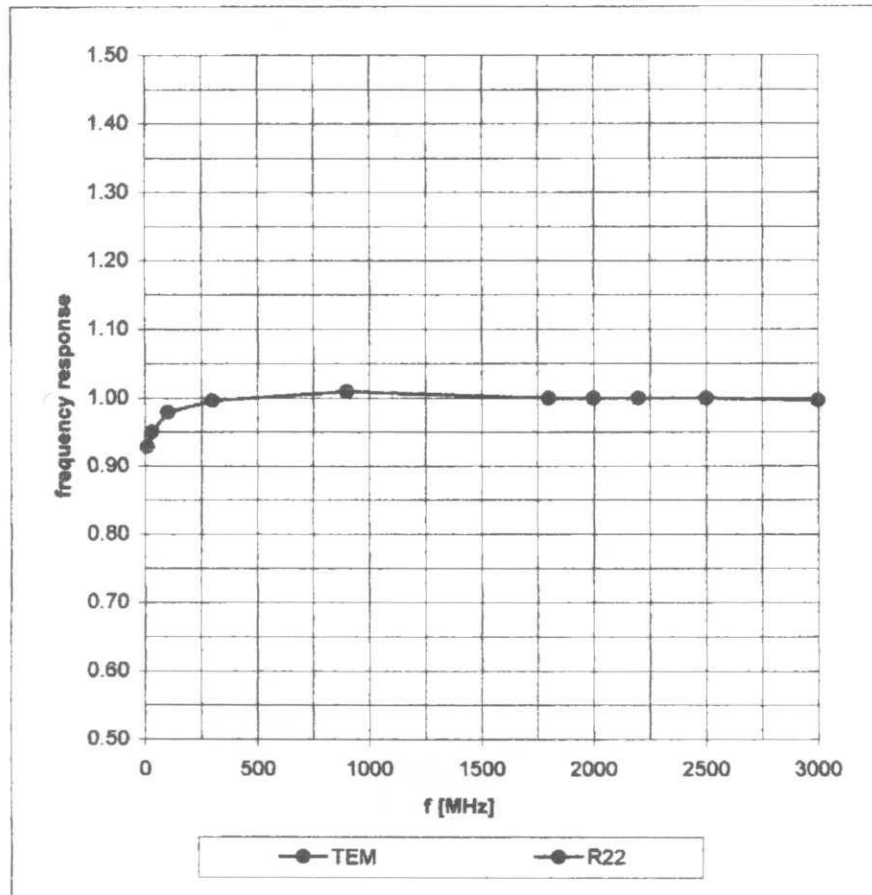


Isotropy Error (ϕ), $\theta = 0^\circ$

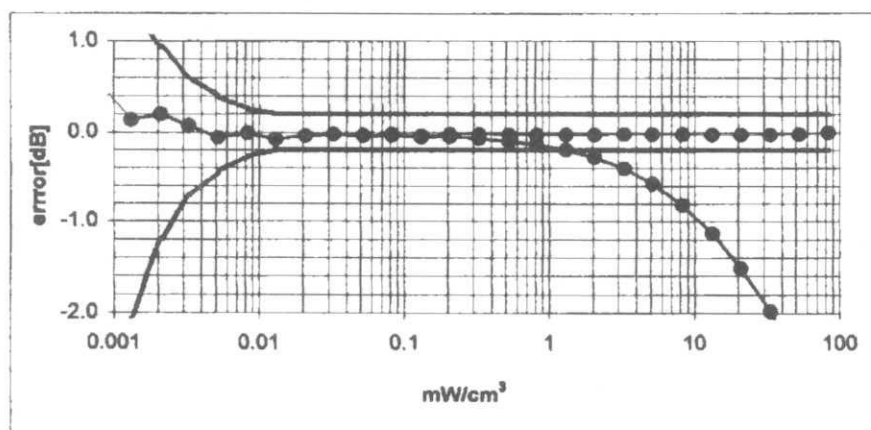
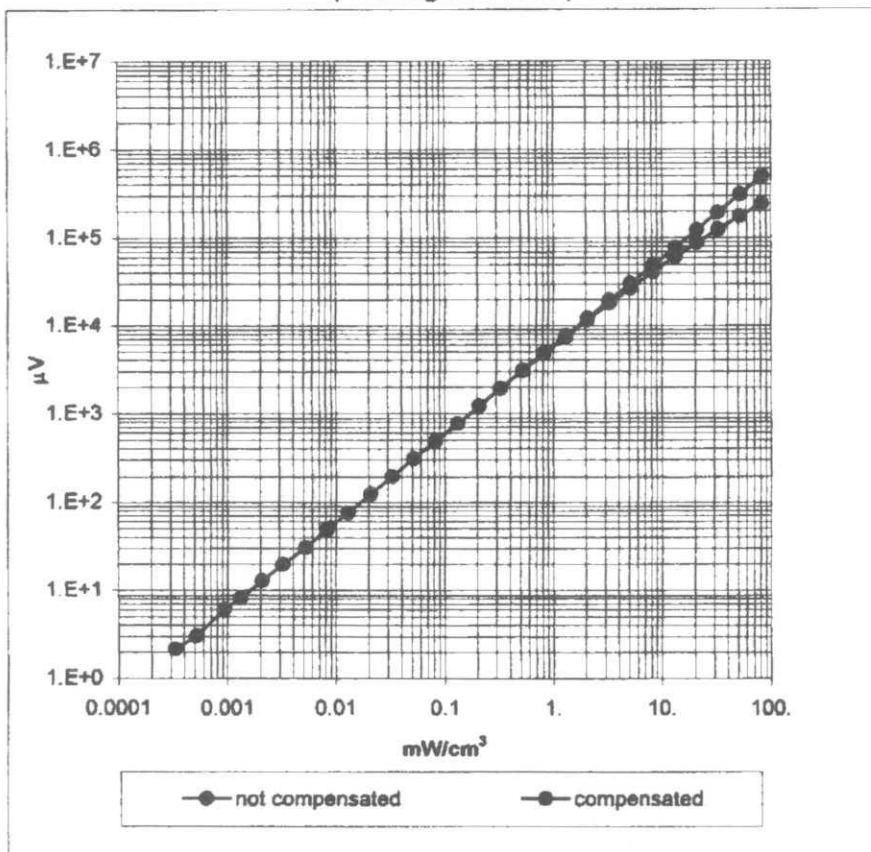


Frequency Response of E-Field

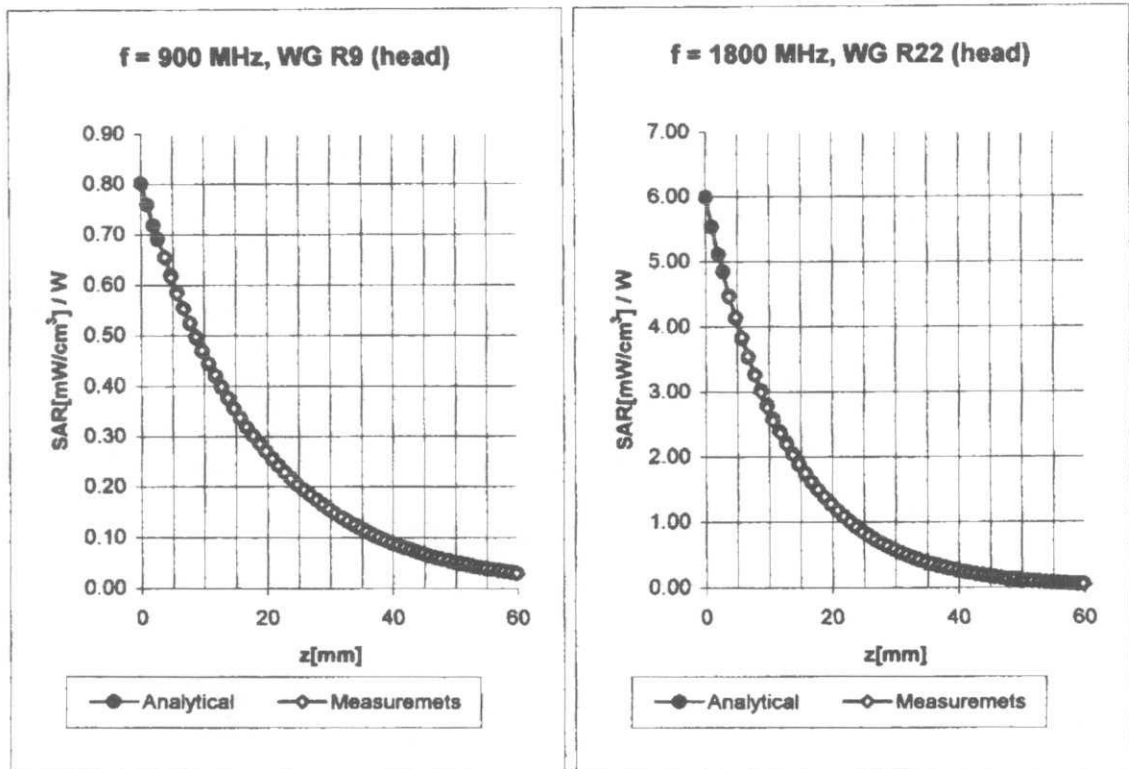
(TEM-Cell:ifi110, Waveguide R22)



Dynamic Range $f(\text{SAR}_{\text{brain}})$ (Waveguide R22)



Conversion Factor Assessment



Head 800 - 1000 MHz

$\epsilon_r = 39.0 - 43.5$

$\sigma = 0.80 - 1.10 \text{ mho/m}$

ConvF X **6.35** $\pm 9.5\%$ (k=2)

Boundary effect:

ConvF Y **6.35** $\pm 9.5\%$ (k=2)

Alpha **0.35**

ConvF Z **6.35** $\pm 9.5\%$ (k=2)

Depth **2.68**

Head 1700 - 1910 MHz

$\epsilon_r = 39.5 - 41.0$

$\sigma = 1.20 - 1.55 \text{ mho/m}$

ConvF X **5.41** $\pm 9.5\%$ (k=2)

Boundary effect:

ConvF Y **5.41** $\pm 9.5\%$ (k=2)

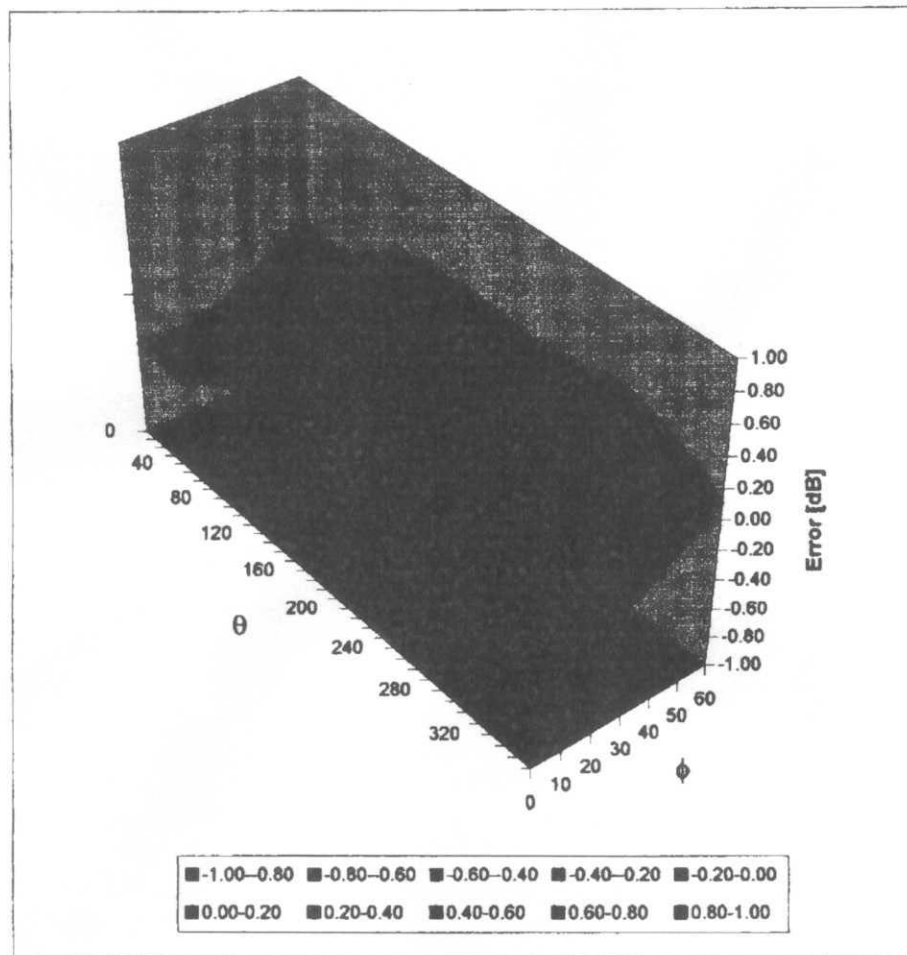
Alpha **0.53**

ConvF Z **5.41** $\pm 9.5\%$ (k=2)

Depth **2.31**

Deviation from Isotropy in HSL

Error (θ, ϕ), $f = 900$ MHz



Additional Conversion Factors
for Dosimetric E-Field Probe

Type:

ET3DV6

Serial Number:

1508

Place of Assessment:

Zurich

Date of Assessment:

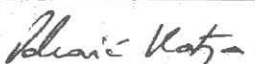
November 14, 2001

Probe Calibration Date:

October 25, 2001

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

Assessed by:



Dosimetric E-Field Probe ET3DV6 SN:1508

Conversion factor ($\pm$ standard deviation)

835 MHz	ConvF	$6.5 \pm 8\%$	$\epsilon_r = 41.5$ $\sigma = 0.90 \text{ mho/m}$ (head tissue)
1950 MHz	ConvF	$5.1 \pm 8\%$	$\epsilon_r = 40.0$ $\sigma = 1.40 \text{ mho/m}$ (head tissue)
835 MHz	ConvF	$6.2 \pm 8\%$	$\epsilon_r = 55.2$ $\sigma = 0.97 \text{ mho/m}$ (body tissue)
900 MHz	ConvF	$6.1 \pm 8\%$	$\epsilon_r = 55.0$ $\sigma = 1.05 \text{ mho/m}$ (body tissue)
1800 MHz	ConvF	$5.0 \pm 8\%$	$\epsilon_r = 53.3$ $\sigma = 1.52 \text{ mho/m}$ (body tissue)
1950 MHz	ConvF	$4.7 \pm 8\%$	$\epsilon_r = 53.3$ $\sigma = 1.52 \text{ mho/m}$ (body tissue)

Appendix 5

Photographs of the device under test



Figure 7. Front of Phone "Mini Housing"



Figure 8. Front of Phone “Hour Glass Housing”



Figure 9. Back of Phone "Mini Housing"



Figure 10. Back of Phone "Hour Glass Housing"



Figure 11. Separation Distance between Phone and Flat Phantom

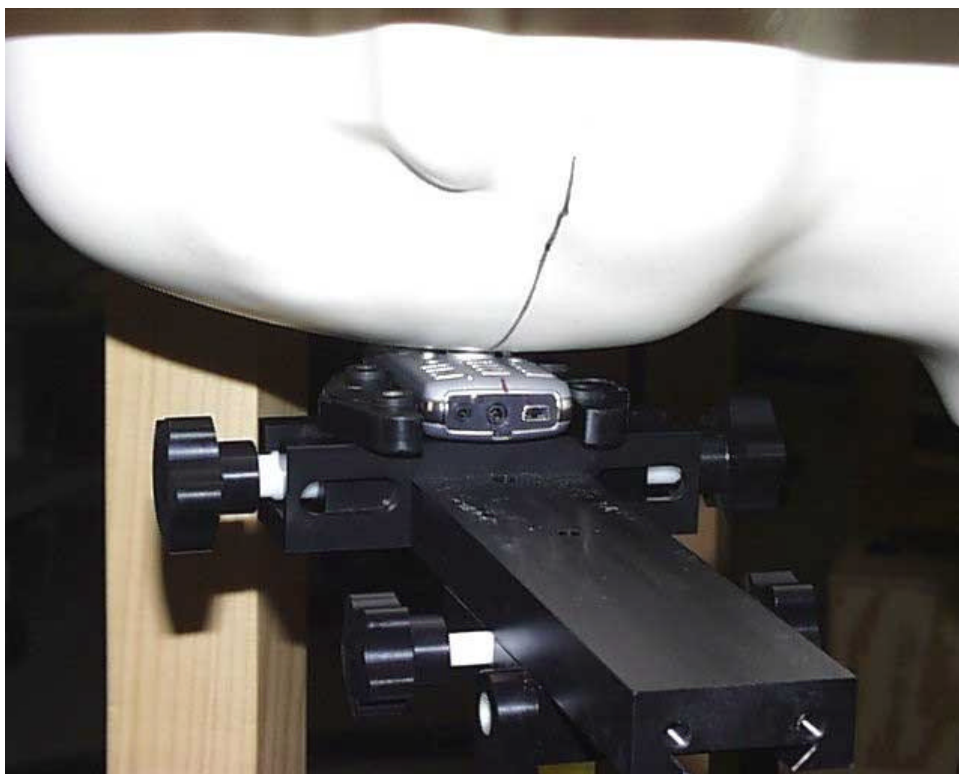


Figure 12. Phone Adjacent to head phantom (Front View)



Figure 13. Phone Adjacent to head phantom (Back View)



Figure 14. Phone Against head phantom (15°Tilt) (Front View)



Figure 15. Phone Against head phantom (15°Tilt) (Back View)

Appendix 6

Dipole Correlation Certificate

Interim Dipole Correlation Certificate

FCD-0359, Rev.001

Dipole Serial Number:

0095

Last Calibration Date:

3-Jan-01

Dipole Type (MHz):

900 MHz

Calibration Due:

3-Jan-03

Manufacturer:

SPRAG

-Manufacturer's Original Calibration Information-

Dipole to be correlated: [Serial Number: 095]

1g SAR normalized to 1W forward power (mW/g):	10.24 mW/g
Relative Dielectric:	40.6
Conductivity:	0.85
Probe Serial Number:	SN 1307
Forward Power:	230mW +/- 3%

Primary Dipole Referenced: [Serial Number: 077]

1g SAR normalized to 1W forward power (mW/g):	11.4 mW/g
Relative Dielectric:	40.3
Conductivity:	0.95
Probe Serial Number:	SN 1307
Forward Power:	230mW +/- 3%

-Correlation Method Utilized- per DOI-1265

(select one)

By Similarity: ☒

By Transfer Calibration: ☐

-Measured Data-

Probe S/N:

SN 1315

Conductivity (meas.):

0.97

Robot Cell #:

EVD 08

Permittivity (meas.):

42.5

Primary Standard (average of 0-degree & 90-degree 1g cubes):

2.875 mW/g	N/R	N/R
(if required)	(if required)	(if required)

Secondary Standard (average of 0-degree & 90-degree 1g cubes):

2.88 mW/g	N/R	N/R
(if required)	(if required)	(if required)

-NEW Correlated Target-

1g SAR normalized to 1W forward power (mW/g):	11.4 mW/g
Relative Dielectric:	40.3
Conductivity:	0.95

Approved by:

Antonio Feneane

Date:

11/13/2001

Comments:

Secondary dipole measured -1.2% from primary dipole.

Interim Dipole Correlation Certificate

FCD-0359, Rev.001

Dipole Serial Number:

277(TR)

Last Calibration Date:

4-Jan-01

Dipole Type (MHz):

D180V2 w/ Teflon Rings

Calibration Due:

4-Jan-03

Manufacturer:

SPEAG

-Manufacturer's Original Calibration Information-

Dipole to be correlated: [Serial Number: 277(TR)]

1g SAR normalized to 1W forward power (mW/g):	45.2mW/g
Relative Dielectric:	40.0
Conductivity:	1.71
Probe Serial Number:	1507
Forward Power:	250mW

Primary Dipole Referenced: [Serial Number: 246(TR)]

1g SAR normalized to 1W forward power (mW/g):	38.8 mW/g
Relative Dielectric:	39.6
Conductivity:	1.37
Probe Serial Number:	1507
Forward Power:	250 mW

-Correlation Method Utilized- per DOI-1265

(select one)

By Similarity:



By Transfer Calibration:



-Measured Data-

Probe S/N:

1375

Conductivity (meas.):

1.38

Robot Cell #:

BYD-4

Permittivity (meas.):

38.4

Primary Standard (average of 0-degree & 90-degree 1g cubes):

9.515 mW/g

(if required)

(if required)

Secondary Standard (average of 0-degree & 90-degree 1g cubes):

9.655 mW/g

(if required)

(if required)

-NEW Correlated Target-

1g SAR normalized to 1W forward power (mW/g):	38.8 mW/g
Relative Dielectric:	39.6
Conductivity:	1.37

Approved by:

Antoine Ferrel

Date:

3/8/02

Comments:

Secondary dipole measured +1.5 % from primary dipole.