Exhibit 11: Class 2 Permissive Change SAR Test Report IHDT6BC1

Date of test:	20 & 23 July 2002
Date of Report:	15 August 2002
Laboratory:	Motorola Personal Communications Sector Product Safety & Compliance Laboratory 2001 N. Division Room: AS228 Harvard, Illinois 60033
Test Responsible:	Steven Hauswirth Senior Staff Engineer
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 IHDT6BC1 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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References:

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 IHDT6BC1). 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	Stubby	
Location	External – Top and Right	
Dimensions	Length	21mm
	Width	9mm
Configuration	Helix	

Device description

FCC ID Number	IHDT6BC1		
Serial number	FV0JR222DV		
Mode(s) of Operation	GSM 900	GSM 1800	GSM 1900
Modulation Mode(s)	GSM	GSM	GSM
Maximum Output Power Setting	32.20dBm	29.50dBm	29.00dBm
Duty Cycle	1:8	1:8	1:8
Transmitting Frequency Rang(s)	880.2-914.8MHz	1710.2-1784.8MHz	1850.2-1909.8MHz
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 ±11.7% (K=1) with an expanded uncertainty of ±23.0% (K=2). The measurement uncertainty budget is given in Appendix 6. The list of calibrated equipment used for the measurements is shown below.

Description	Serial Number	Cal Due Date
DASY3 DAE V1	SN385	20-Mar-03
E-Field Probe ETDV6	SN1503	16-Nov-02
Dipole Validation Kit, DV1800V2	284TR	5-Jan-03
S.A.M. Phantom used for 1900MHz	TP-1103	

3.2 Additional Equipment

Description	Serial Number	Cal Due Date
Signal Generator HP8648C	3847A04832	18-Jan-03
Power Meter E4419B	US39250622	8-Oct-02
Power Sensor #1 - 8481A	US37296470	31-Oct-02
Power Sensor #2 - 8481A	3318A25036	31-Oct-02
Network Analyzer HP8753ES	US39171846	2-May-03
Dielectric Probe Kit HP85070B	US99360074	N/A

4. Electrical parameters of the tissue simulating liquid

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

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			ε_r	σ (S/m)	Temp (°C)
1880	**Head**	**Measured,** 20 Jul 2002	38.3	1.43	22.3
		Recommended Limits	40	1.4	20-25
	Body	**Measured,** 23 Jul 2002	51.2	1.57	23
		Recommended Limits	53.3	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 ±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 0.0002 W/kg, which is below the recommended limit.

f (MHz)	Description	SAR (W/kg), 1gram	Dielectric Parameters ε_r	Dielectric Parameters σ (S/m)	Ambient Temp (°C)	Tissue Temp (°C)
1800	**Measured,** 20 Jul 2002	37.39	38.7	1.35	22.3	22.3
	Recommended Limits	38.80	39.6	1.37	20-25	20-25
	Measured, 23 Jul 2002	38.36	38.8	1.36	23	22.6
	Recommended Limits	38.80	39.6	1.37	20-25	20-25

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 ETDV6	SN1503	1800	5.24	2 of 7

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 IHDT6BC1 has Model SNN5705B as the only battery option. 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

The SAR results shown in tables 1 and 2 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 ETDV6	SN1503	1800	5.24	2 of 7

f (MHz)	Description	Conducted Output Power (dBm)	Cheek / Touch Position									
			Left Head					Right Head				
			Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Amb. Temp (°C)	Simulate Temp (°C)	Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Amb. Temp (°C)	Simulate Temp (°C)
Digital 1900MHz	Channel 512	28.95										
	Channel 661	28.98	**0.98**	**0.03**	**0.98**	**22.3**	**20.8**	**0.97**	**-0.02**	**0.97**	**22.3**	**20.9**
	Channel 810	29.00										

Table 1: SAR measurement results for the portable cellular telephone FCC ID IHDT6BC1 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)	Amb. Temp (°C)	Simulate Temp (°C)	Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Amb. Temp (°C)	Simulate Temp (°C)
Digital 1900MHz	Channel 512	28.95	**1.41**	**0.02**	**1.41**	**22.3**	**20.9**	**1.29**	**0.05**	**1.29**	**22.3**	**20.9**
	Channel 661	28.98	1.27	0.09	1.27	22.3	21.6	1.15	0.08	1.15	22.3	20.9
	Channel 810	29.00	1.23	0.02	1.23	22.3	21.0	1.15	0.03	1.15	22.3	21.0

Table 2: SAR measurement results for the portable cellular telephone FCC ID IHDT6BC1 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 3 through 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. SAR measurements were performed in accordance with OET Bulletin 65 Supplement C 01-01. All other test conditions measured lower SAR values than those included in Appendix 3.

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

The tissue stimulant depth was verified to be 15.0cm ±0.5cm. The same device holder described in section 6 was used for positioning the phone. 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 Belt Clip: Model # SYN8834A & SYN8631A
A Plastic Holster and Plastic/Metal Belt Clip: Model # SYN8834A & SYN8763A
A Leather Pouch with Belt Clip: Model #SYN8737A

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 ETDV6	SN1503	1800	4.90	2 of 2

f (MHz)	Description	Conducted Output Power (dBm)	Body Worn				
			Ant Fixed				
			Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Amb. Temp (°C)	Simulate Temp (°C)
Digital 1900MHz	Channel 512	28.95	0.334	-0.03	0.336	23	21.2
	Channel 661	28.98	0.307	-0.03	0.309	23	21.5
	Channel 810	29.00	0.304	-0.06	0.308	23	21.5

Table 3: SAR measurement results for the portable cellular telephone FCC ID IHDT6BC1 at highest possible output power. Measured against the body with Model # SYN8834A & SYN8631A.

f (MHz)	Description	Conducted Output Power (dBm)	Body Worn				
			Ant Fixed				
			Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Amb. Temp (°C)	Simulate Temp (°C)
Digital 1900MHz	Channel 512	28.95	**0.678**	**-0.04**	**0.684**	**23**	**21.5**
	Channel 661	28.98	0.609	-0.02	0.612	23	21.5
	Channel 810	29.00	0.674	0.01	0.674	23	22.0

Table 4: SAR measurement results for the portable cellular telephone FCC ID IHDT6BC1 at highest possible output power. Measured against the body with Model # SYN8834A & SYN8763A.

f (MHz)	Description	Conducted Output Power (dBm)	Body Worn				
			Ant Fixed				
			Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Amb. Temp (°C)	Simulate Temp (°C)
Digital 1900MHz	Channel 512	28.95	0.379	-0.03	0.382	23	21.8
	Channel 661	28.98	0.403	-0.04	0.407	23	21.8
	Channel 810	29.00	0.420	-0.08	0.428	23	21.7

Table 5: SAR measurement results for the portable cellular telephone FCC ID IHDT6BC1 at highest possible output power. Measured against the body with Model #SYN8737A.

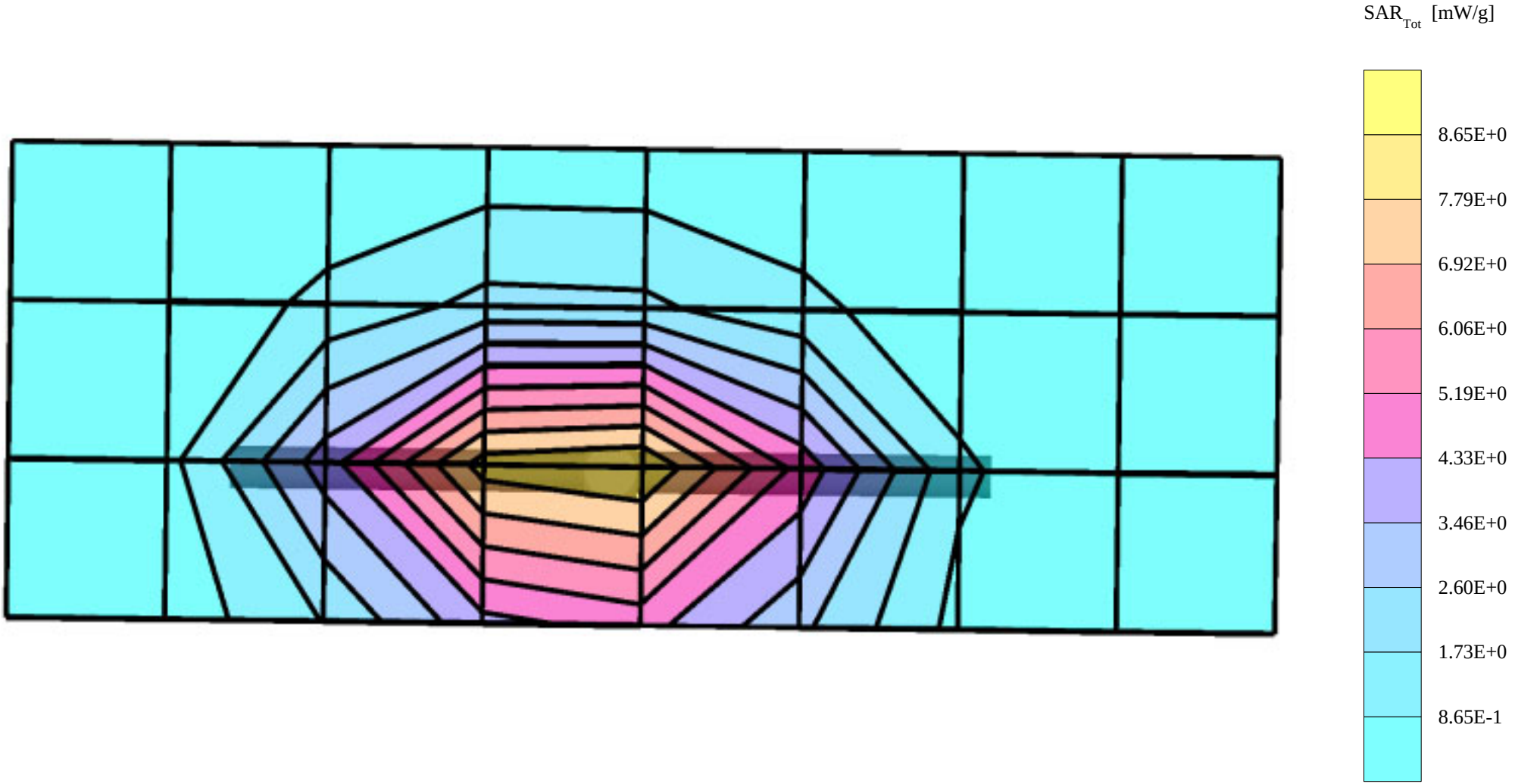
Appendix 1

SAR distribution comparison for the system accuracy verification

07/20/02

Dipole 1800 MHz

1800MHz Dipole Validation / Dipole Sn# 284tr
Forward Power = 249 Reflected Power = -25.45dB
Room Temp at time of measurement = 23 Simulant Temp at time of measurement = 22.3
R2: TP-1103 GLYCOL (rev. 3) ; Flat
Probe: ET3DV6 - SN1503 - Validation; ConvF(5.24,5.24,5.24); Crest factor: 1.0; 1800 MHz VALIDATION: σ = 1.35 mho/m ε_r = 38.7 ρ = 1.00 g/cm^3
Cubes (2): Peak: 16.8 mW/g ± 0.02 dB, SAR (1g): 9.31 mW/g ± 0.06 dB, SAR (10g): 4.98 mW/g ± 0.08 dB, (Worst-case extrapolation)
Penetration depth: 8.5 (8.1, 9.4) [mm]
Powerdrift: 0.02 dB



Dipole 1800 MHz

1800MHz Dipole Validation / Dipole Sn# 284tr
Forward Power = 249 Reflected Power = -25.45dB
Room Temp at time of measurement = 23 Simulant Temp at time of measurement = 22.3
R2: TP-1103 GLYCOL (rev. 3) ;
Probe: ET3DV6 - SN1503 - Validation; ConvF(5.24,5.24,5.24); Crest factor: 1.0; 1800 MHz VALIDATION: σ = 1.35 mho/m ε_r = 38.7 ρ = 1.00 g/cm^3
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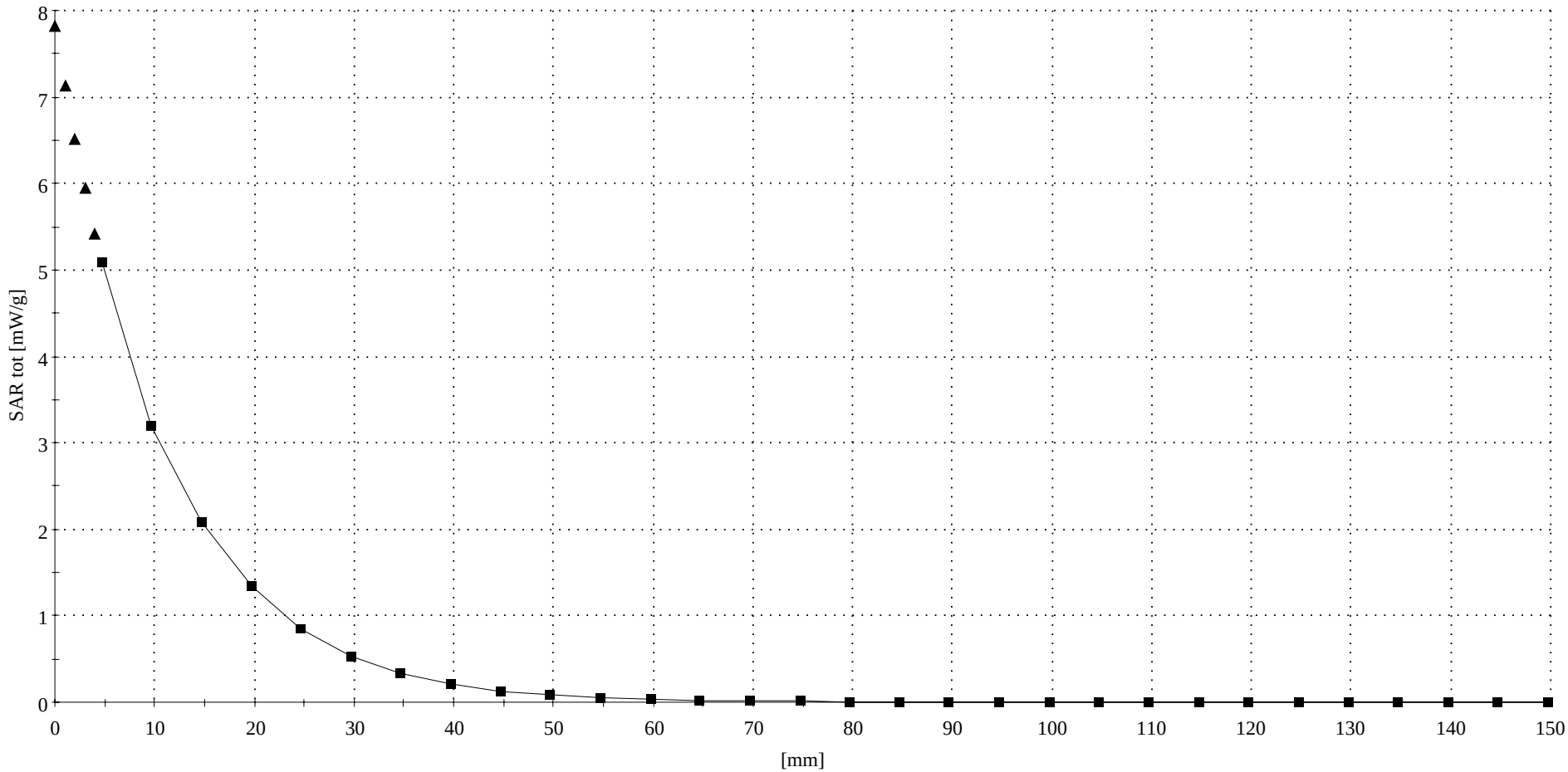
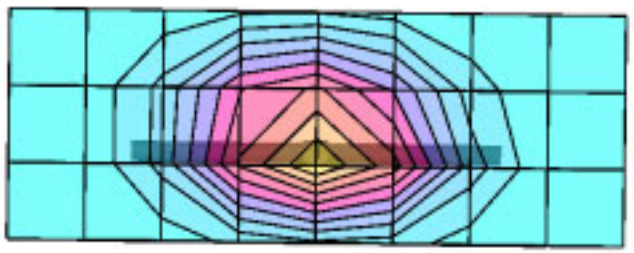
Penetration depth: 11.1 (10.9, 11.5) [mm]

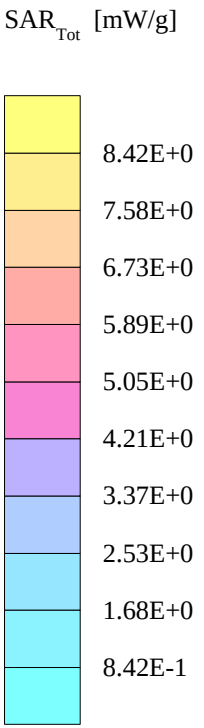


07/23/02

Dipole 1800 MHz

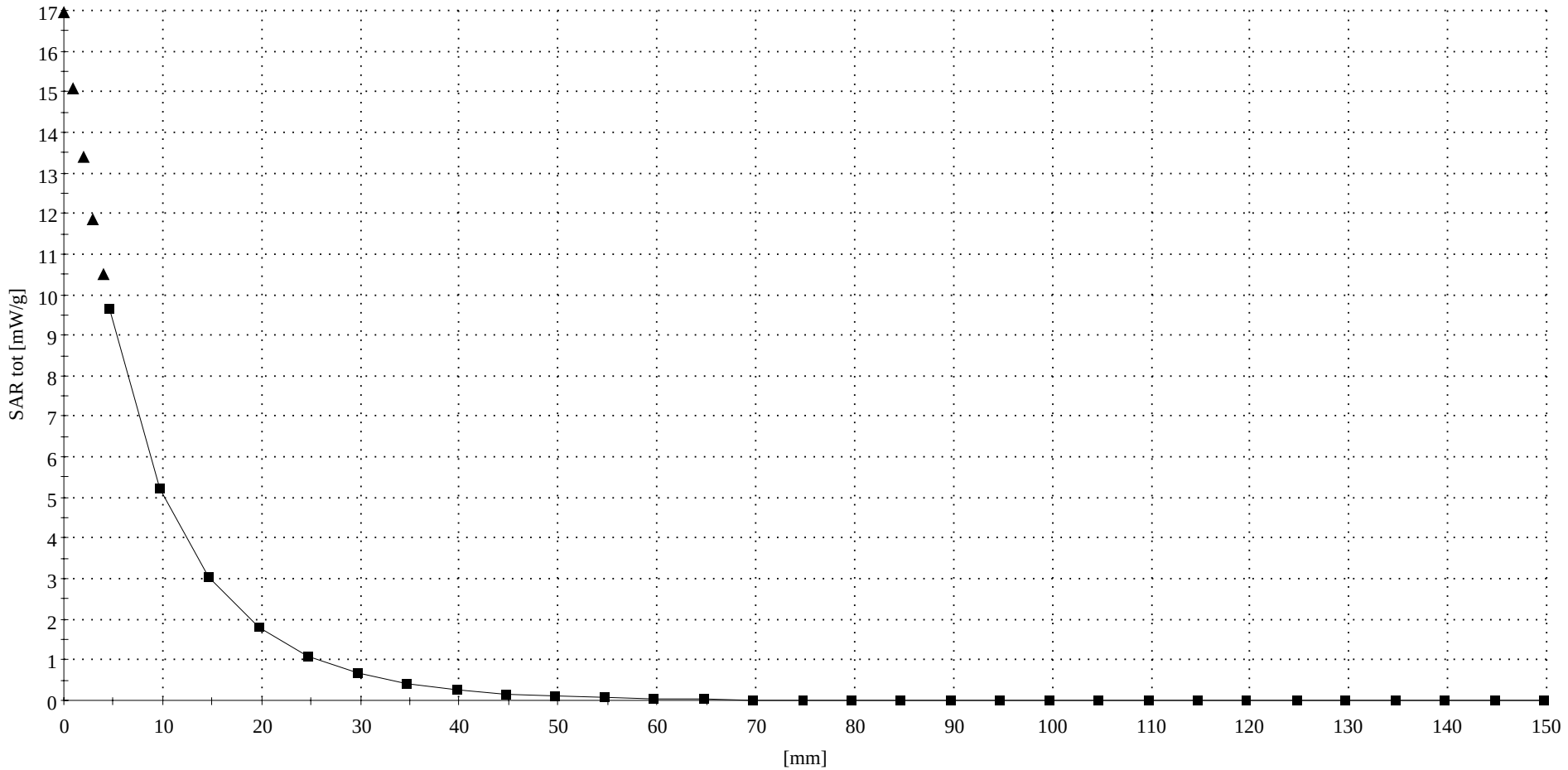
1800 MHz Dipole Validation / Dipole Sn# 284 TR
Forward Power = 250mW Reflected Power = -23.72dB
Room Temp at time of measurement = 23 C. Simulant Temp at time of measurement = 22.6 C.
R2: TP-1103 GLYCOL (rev. 3) ; Flat
Probe: ET3DV6 - SN1503 - Validation; ConvF(5.24,5.24,5.24); Crest factor: 1.0; 1800 MHz VALIDATION: σ = 1.36 mho/m ε_r = 38.8 ρ = 1.00 g/cm^3
Cubes (2): Peak: 17.3 mW/g ± 0.10 dB, SAR (1g): 9.59 mW/g ± 0.08 dB, SAR (10g): 5.10 mW/g ± 0.06 dB, (Worst-case extrapolation)
Penetration depth: 8.8 (8.4, 9.5) [mm]
Powerdrift: 0.00 dB





Dipole 1800 MHz

1800 MHz Dipole Validation / Dipole Sn# 284 TR
Forward Power = 250mW Reflected Power = -23.72dB
Room Temp at time of measurement = 23 C. Simulant Temp at time of measurement = 22.6 C.
R2: TP-1103 GLYCOL (rev. 3) ;
Probe: ET3DV6 - SN1503 - Validation; ConvF(5.24,5.24,5.24); Crest factor: 1.0; 1800 MHz VALIDATION: σ = 1.36 mho/m ε_r = 38.8 ρ = 1.00 g/cm^3
: , , ()
Penetration depth: 8.5 (8.1, 9.3) [mm]



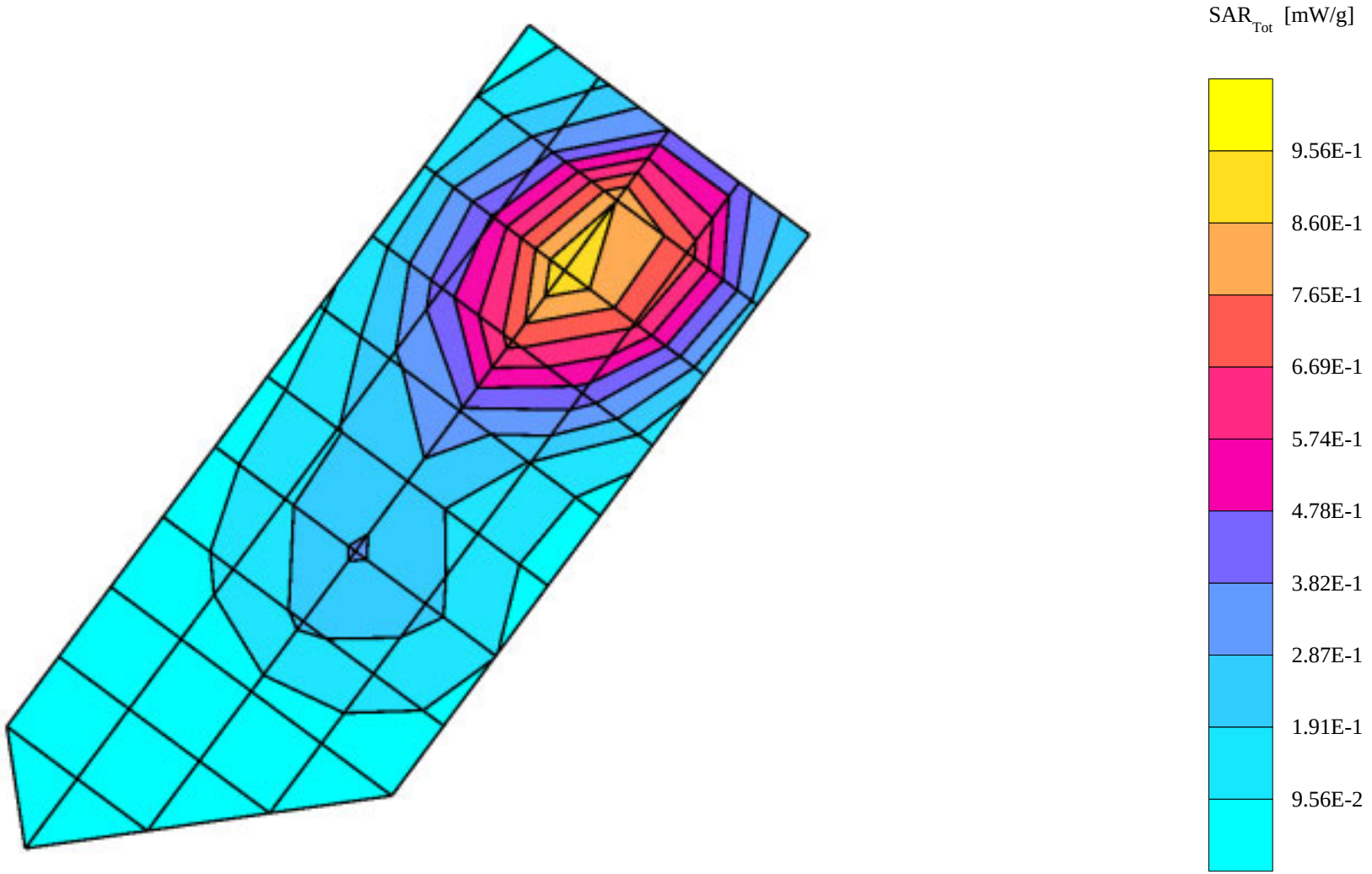
Appendix 2

SAR distribution plots for Phantom Head Adjacent Use

07/20/02

s/n FV0JR222DV

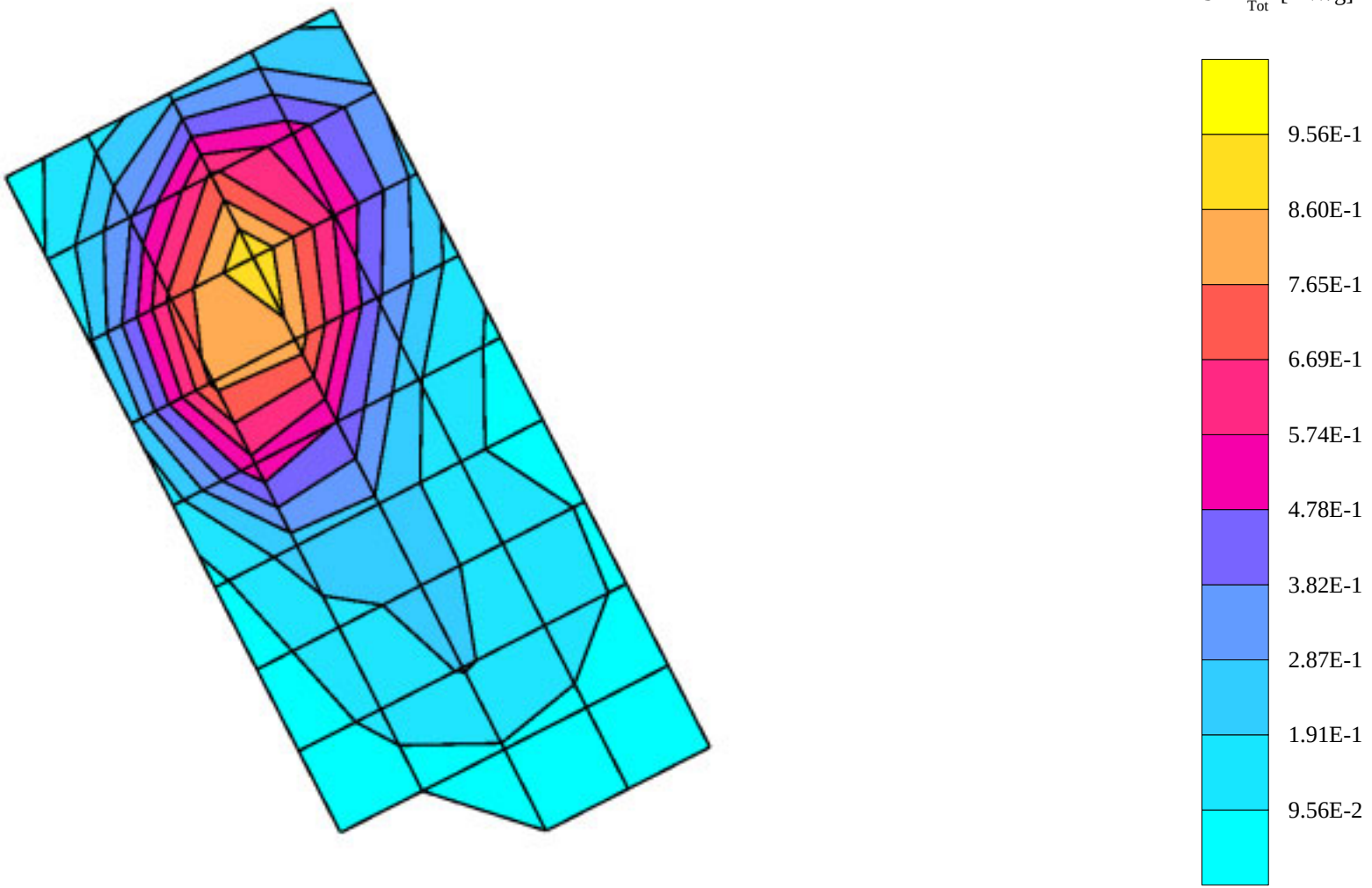
Ch# 661 / Pwr Step: 00 / Type of Modulation: GSM1900 / Battery Model #:SNN5705B
DEVICE POSITION:Cheek Touch
R2: TP-1103 GLYCOL (rev. 3) Phantom; R7 George Left Hand Section; Position: (90°,180°); Frequency: 1880 MHz
Probe: ET3DV6 - SN1503 - IEEE Head; ConvF(5.24,5.24,5.24); Crest factor: 8.0; 1880 MHz Head & Body: σ = 1.43 mho/m ε_r = 38.3 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 0.979 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 10.0 (9.6, 10.5) [mm]
Powerdrift: 0.03 dB



07/20/02

s/n FV0JR222DV

Ch# 661/ Pwr Step: 00 / Type of Modulation: GSM1900 / Battery Model #:SNN5705B
DEVICE POSITION:Cheek Touch
R2: TP-1103 GLYCOL (rev. 3) Phantom; R7 Weezie Right Hand Section; Position: (90°,180°); Frequency: 1880 MHz
Probe: ET3DV6 - SN1503 - IEEE Head; ConvF(5.24,5.24,5.24); Crest factor: 8.0; 1880 MHz Head & Body: σ = 1.43 mho/m ε_r = 38.3 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 0.970 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 10.4 (10.2, 10.6) [mm]
Powerdrift: -0.02 dB



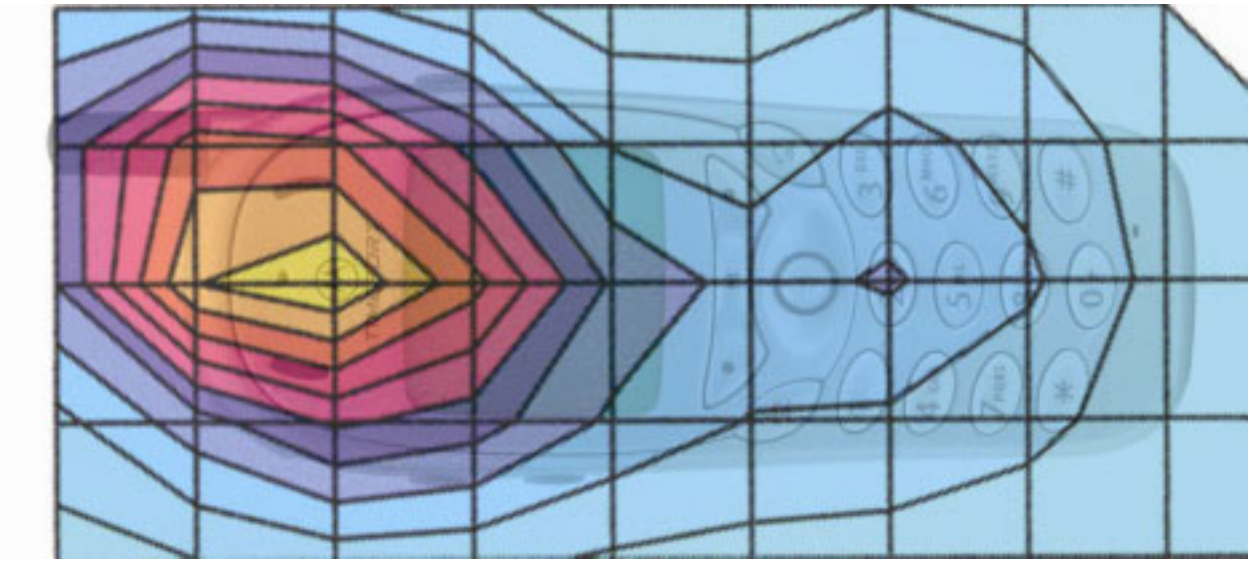


Figure 1.Typical 1900MHz Left Head Adjacent Contour Overlaid on Phone (Cheek Touch)

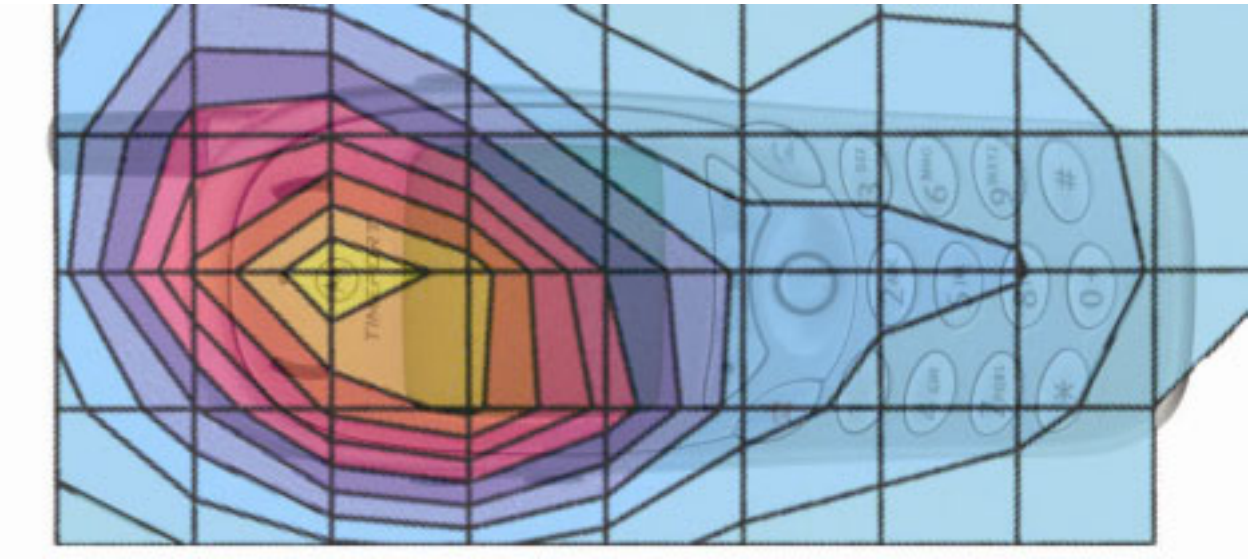
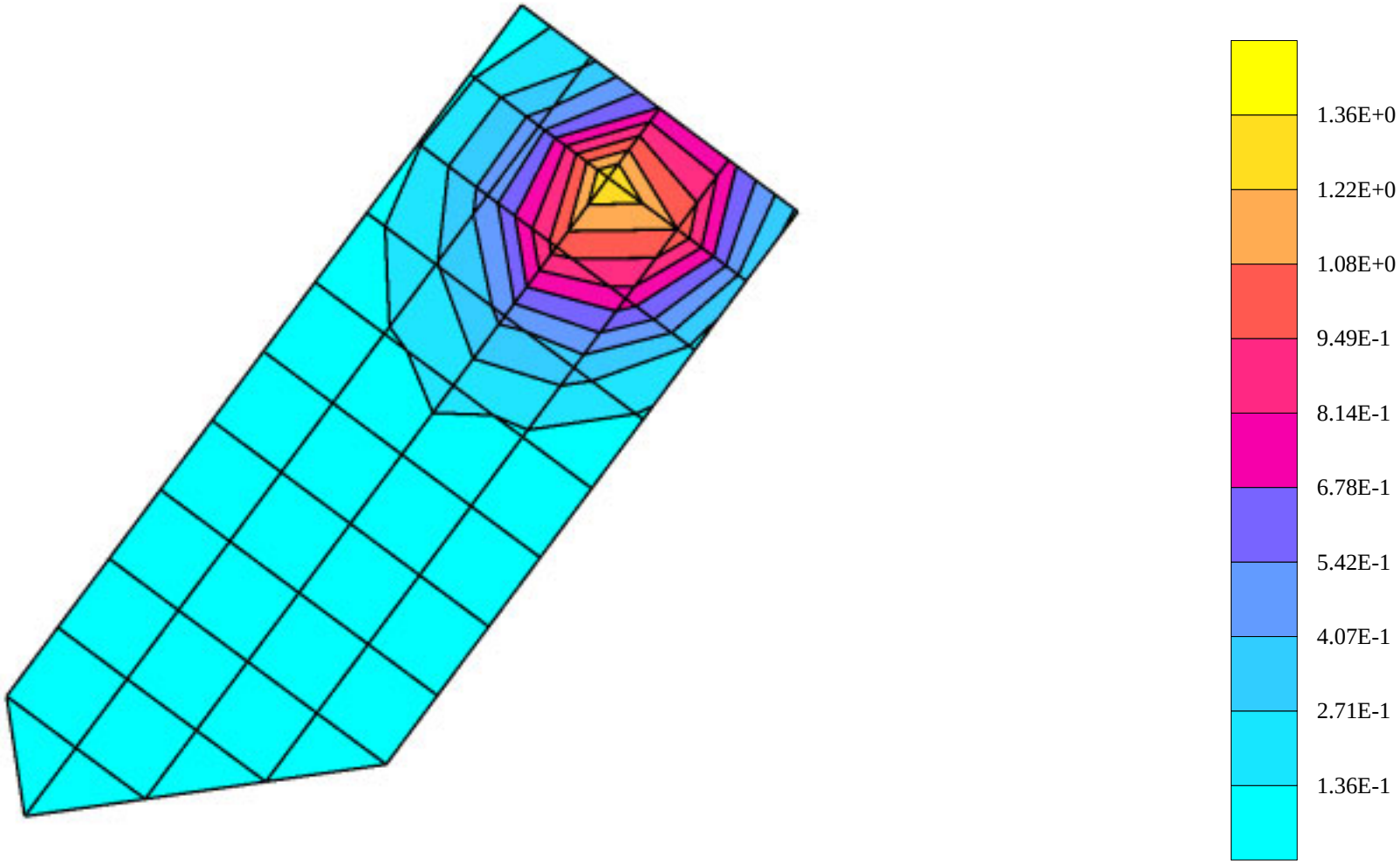


Figure 2.Typical 1900MHz Right Head Adjacent Contour Overlaid on Phone (Cheek Touch)

07/20/02

s/n FV0JR222DV

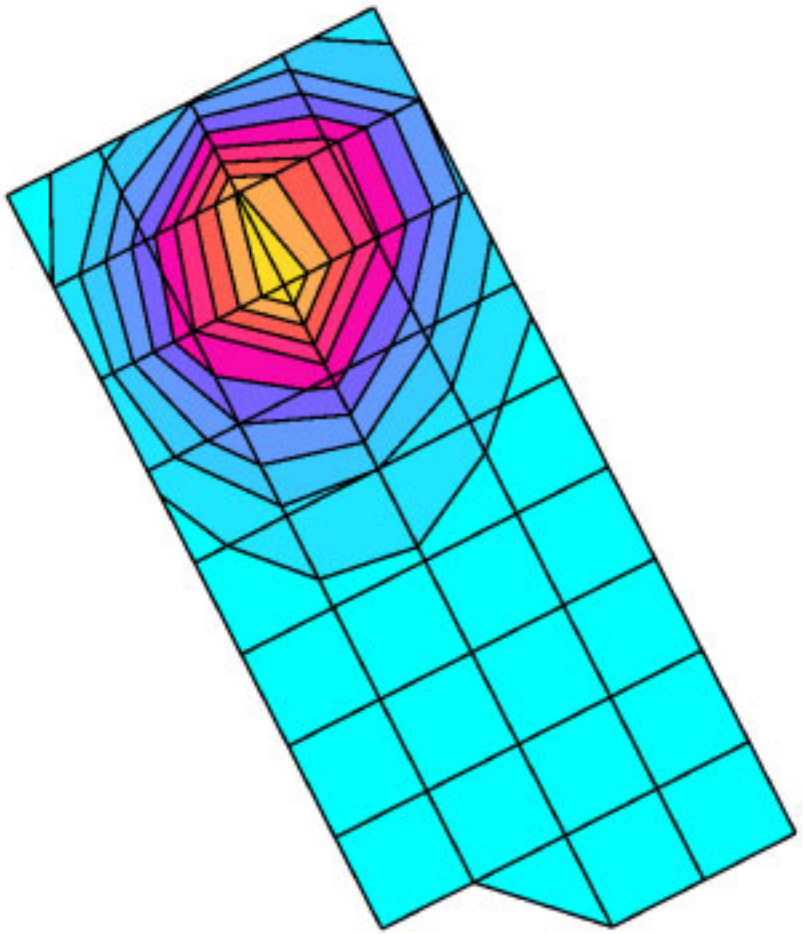
Ch# 512 / Pwr Step: 00 / Type of Modulation: GSM1900 / Battery Model #:SNN5705B
DEVICE POSITION:15 Degree Tilted
R2: TP-1103 GLYCOL (rev. 3) Phantom; R7 George Left Hand Section; Position: (90°,180°); Frequency: 1850 MHz
Probe: ET3DV6 - SN1503 - IEEE Head; ConvF(5.24,5.24,5.24); Crest factor: 8.0; 1880 MHz Head & Body: σ = 1.43 mho/m ε_r = 38.3 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 1.41 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 9.0 (8.7, 9.7) [mm]
Powerdrift: 0.02 dB

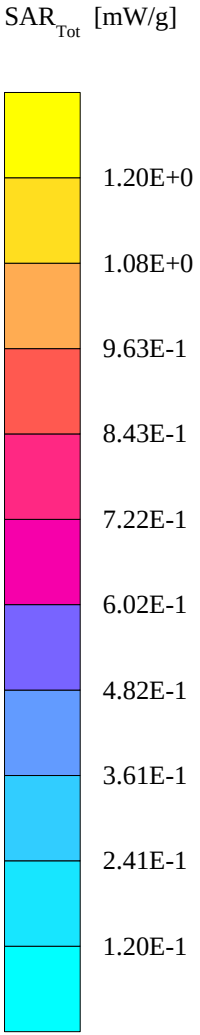


07/20/02

s/n FV0JR222DV

Ch# 512 / Pwr Step: 00 / Type of Modulation: GSM1900 / Battery Model #:SNN5705B
DEVICE POSITION:15 Degree Tilted
R2: TP-1103 GLYCOL (rev. 3) Phantom; R7 Weezie Right Hand Section; Position: (90°,180°); Frequency: 1850 MHz
Probe: ET3DV6 - SN1503 - IEEE Head; ConvF(5.24,5.24,5.24); Crest factor: 8.0; 1880 MHz Head & Body: σ = 1.43 mho/m ε_r = 38.3 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 1.29 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 15.0
Penetration depth: 9.2 (8.8, 10.0) [mm]
Powerdrift: 0.05 dB





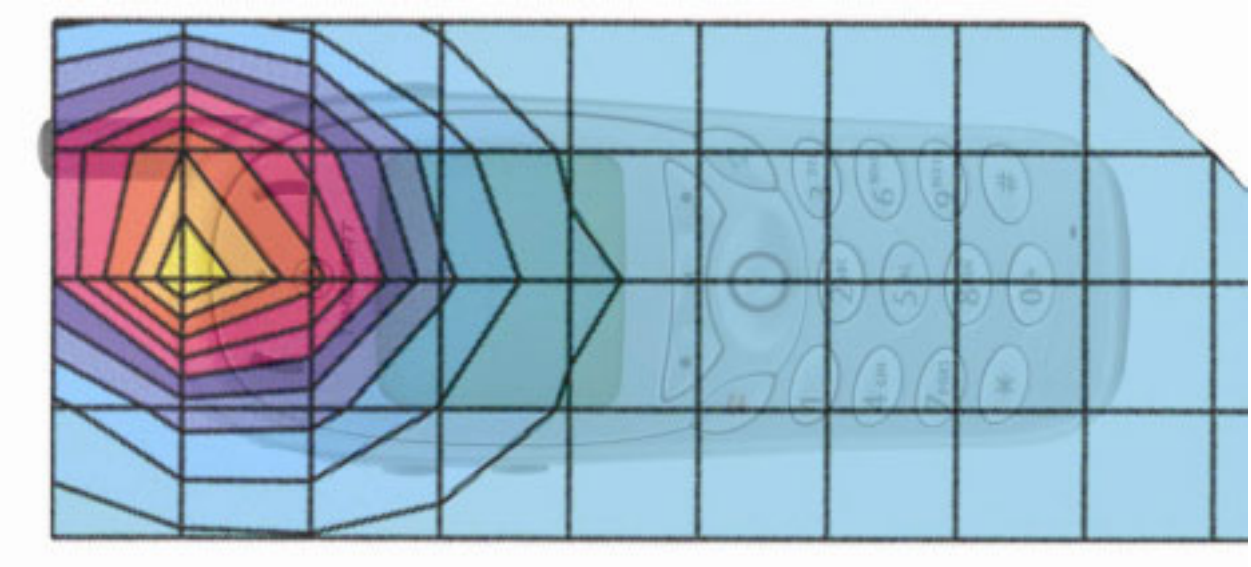


Figure 3.Typical 1900MHz Left Head Adjacent Contour Overlaid on Phone (15 ˚ Tilt)

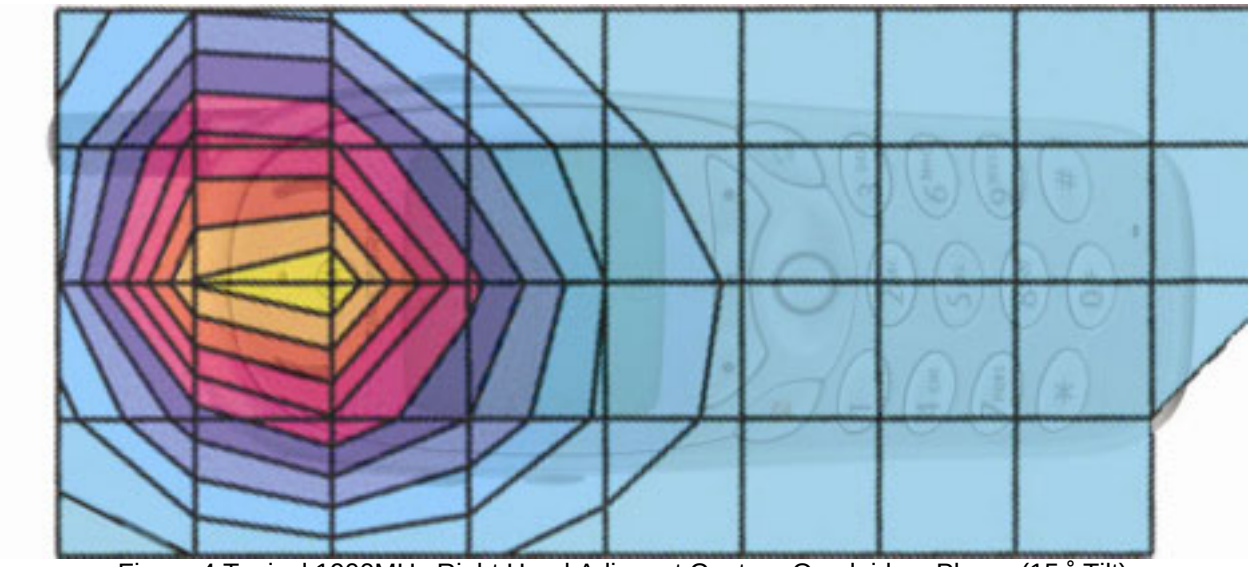


Figure 4.Typical 1900MHz Right Head Adjacent Contour Overlaid on Phone (15 ˚ Tilt)

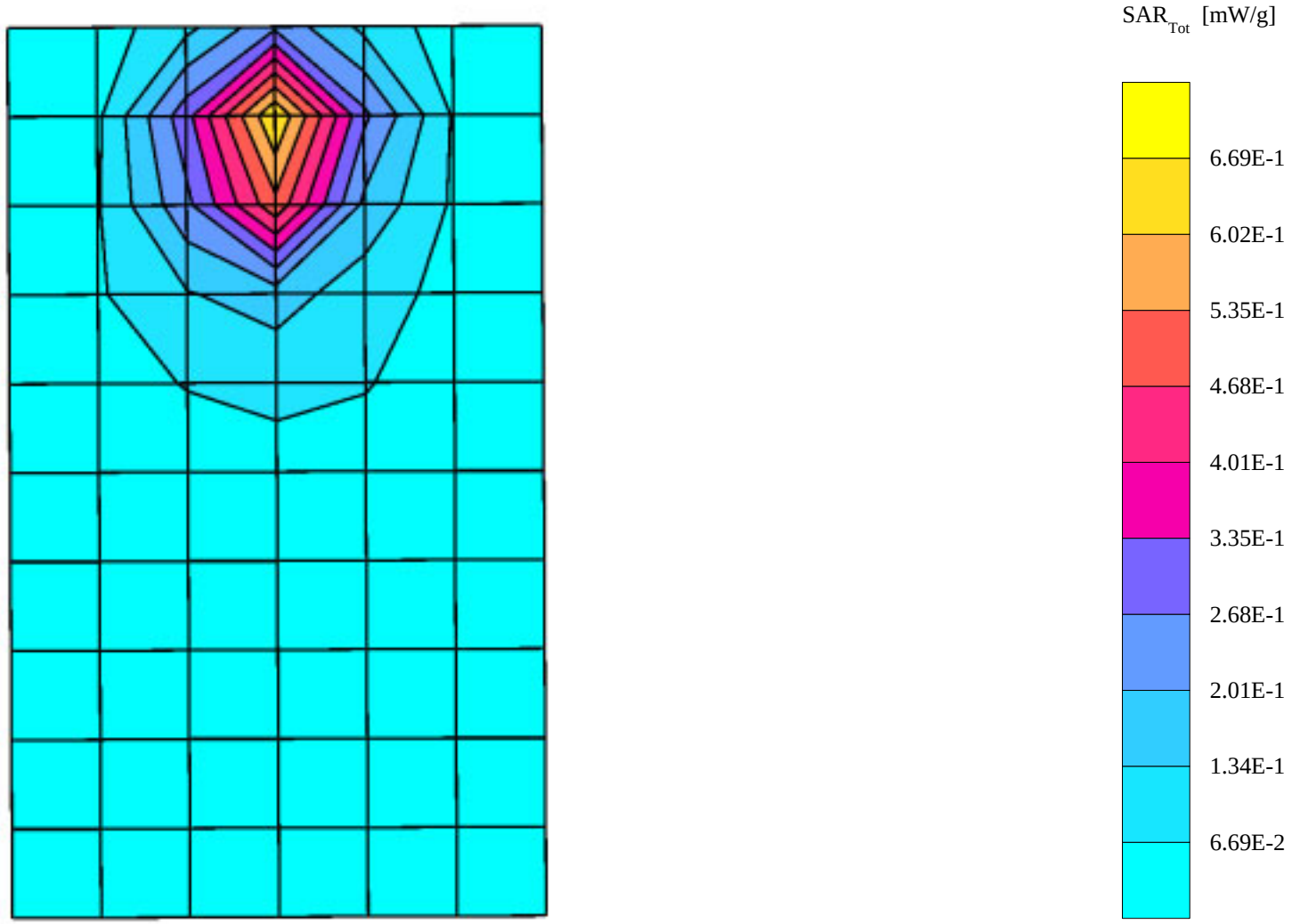
Appendix 3

SAR distribution plots for Body Worn Configuration

07/23/02

s/n FV0JR222DV

Ch# 512 / Pwr Step: 00 / Type of Modulation: GSM1900 / Battery Model #: SNN5705B
Accessory Model #: Grabber SYN8834A / Beltclip SYN8763A
R2 Amy Twin Phantom Rev.3 Phantom; section 2 Section; Position: (0°,0°); Frequency: 1850 MHz
Probe: ET3DV6 - SN1503 - FCC Body; ConvF(4.90,4.90,4.90); Crest factor: 8.0; 1880 MHz Head & Body: σ = 1.57 mho/m ε_r = 51.2 ρ = 1.00 g/cm^3
Cube 7x7x7: SAR (1g): 0.678 mW/g, (Worst-case extrapolation)
Coarse: Dx = 15.0, Dy = 15.0, Dz = 10.0
Penetration depth: 7.3 (7.0, 8.0) [mm]
Powerdrift: -0.04 dB



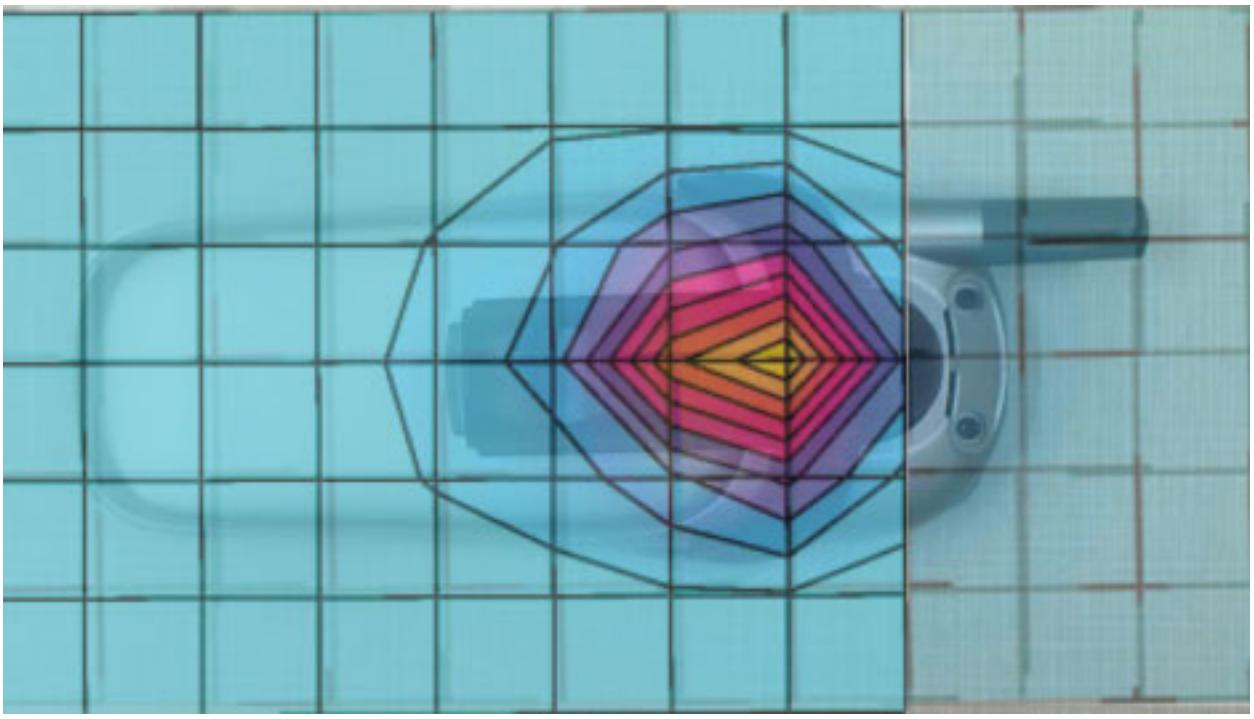


Figure 5. Typical 1900 MHz Body-Worn Contour Overlaid on Phone

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:	**1503**
Place of Calibration:	**Zurich**
Date of Calibration:	**November 16, 2001**
Calibration Interval:	**12 months**

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

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

Calibrated by:	Nikolova Neviana
Approved by:	Niels Kuster

Schmid & Partner
Engineering AG

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

Probe ET3DV6

SN:1503

Manufactured: October 24, 1999
Remade: November 2, 2001
Calibrated: November 16, 2001

Calibrated for System DASY3

DASY3 - Parameters of Probe: ET3DV6 SN:1503

Sensitivity in Free Space

Diode Compression

NormX	**2.25**	$\mu V/(V/m)^2$	DCP X	**95**	mV
NormY	**2.10**	$\mu V/(V/m)^2$	DCP Y	**95**	mV
NormZ	**1.95**	$\mu V/(V/m)^2$	DCP Z	**95**	mV

Sensitivity in Tissue Simulating Liquid

Head **450 MHz** e_r **= 40.4 ± 5%** s **= 0.87 ± 5% mho/m**

ConvF X	**6.92**	extrapolated	Boundary effect:	
ConvF Y	**6.92**	extrapolated	Alpha	**0.31**
ConvF Z	**6.92**	extrapolated	Depth	**2.46**

Head **900 MHz** e_r **= 41.5 ± 5%** s **= 0.97 ± 5% mho/m**

Head **835 MHz** e_r **= 41.5 ± 5%** s **= 0.90 ± 5% mho/m**

ConvF X	**6.36**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.36**	± 9.5% (k=2)	Alpha	**0.39**
ConvF Z	**6.36**	± 9.5% (k=2)	Depth	**2.42**

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

ConvF X	**5.61**	interpolated	Boundary effect:	
ConvF Y	**5.61**	interpolated	Alpha	**0.49**
ConvF Z	**5.61**	interpolated	Depth	**2.36**

Head **1800 MHz** e_r **= 40.0 ± 5%** s **= 1.40 ± 5% mho/m**

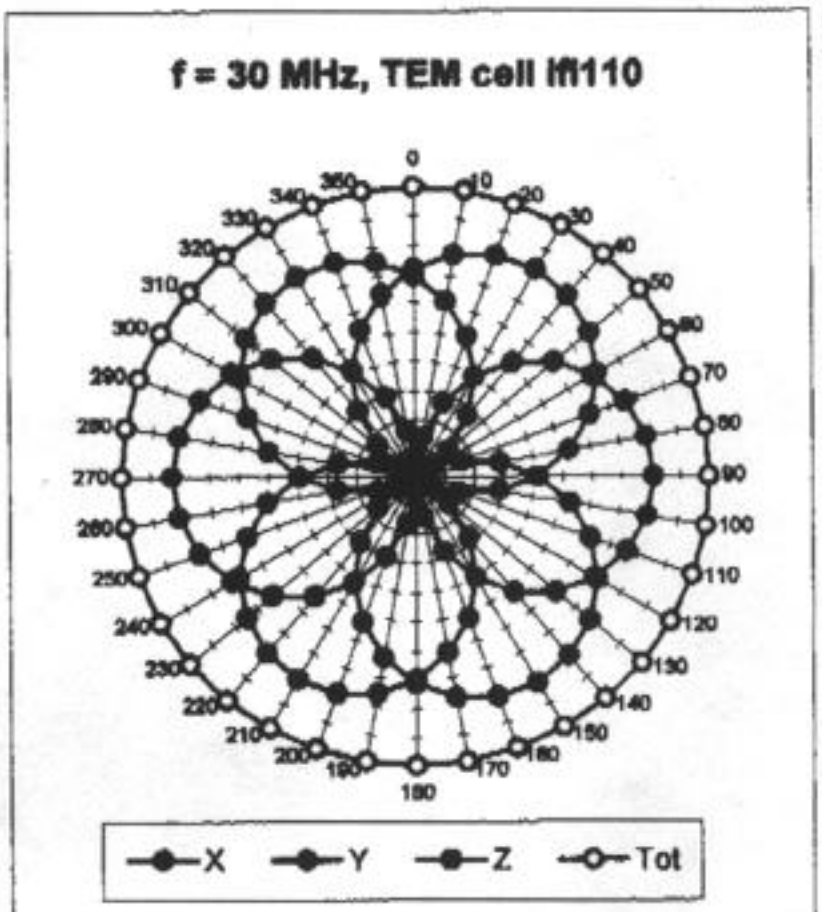
Head **1900 MHz** e_r **= 40.0 ± 5%** s **= 1.40 ± 5% mho/m**

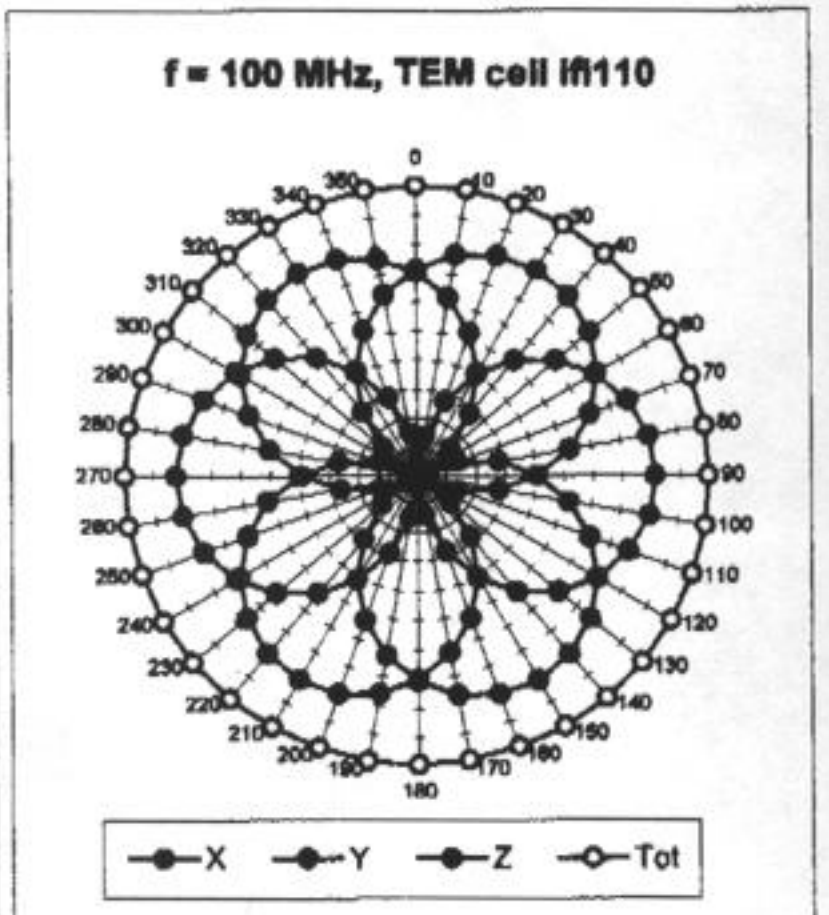
ConvF X	**5.24**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**5.24**	± 9.5% (k=2)	Alpha	**0.54**
ConvF Z	**5.24**	± 9.5% (k=2)	Depth	**2.33**

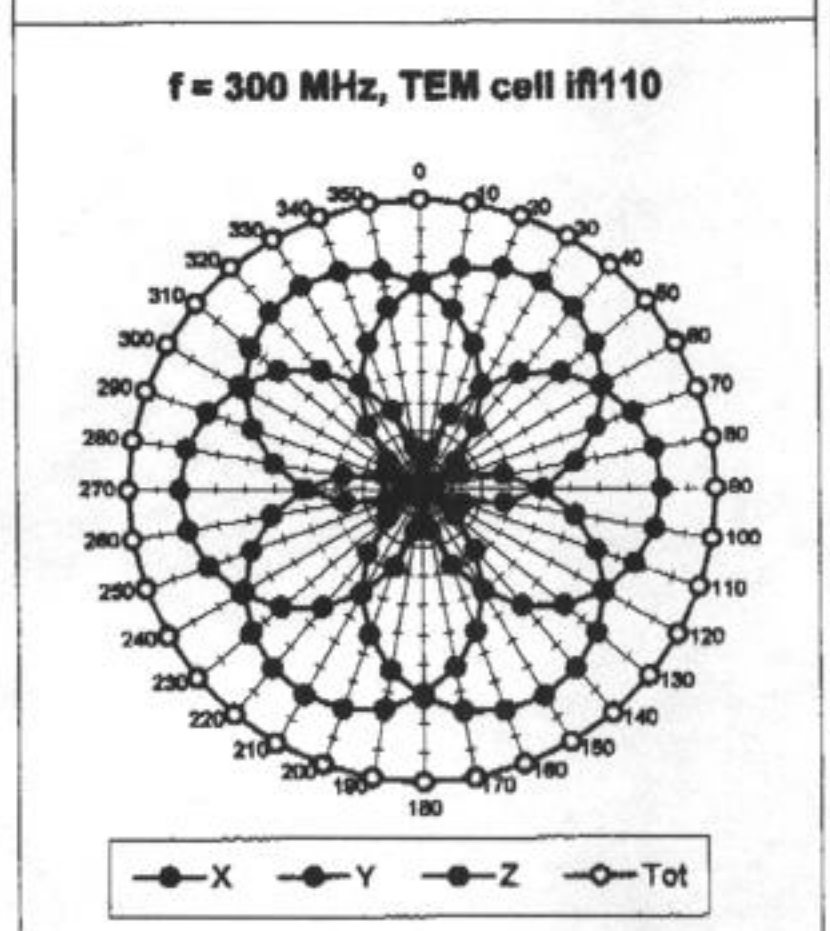
Sensor Offset

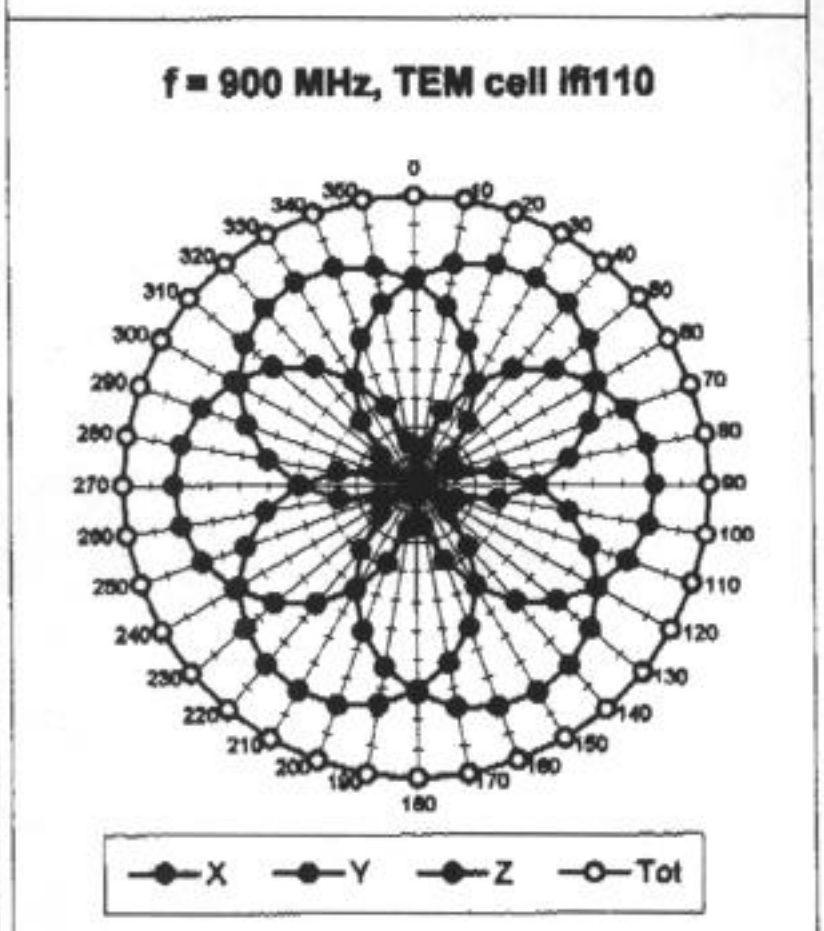
Probe Tip to Sensor Center	**2.7**	mm
Optical Surface Detection	**1.6 ± 0.2**	mm

Receiving Pattern (ϕ), θ = 0°

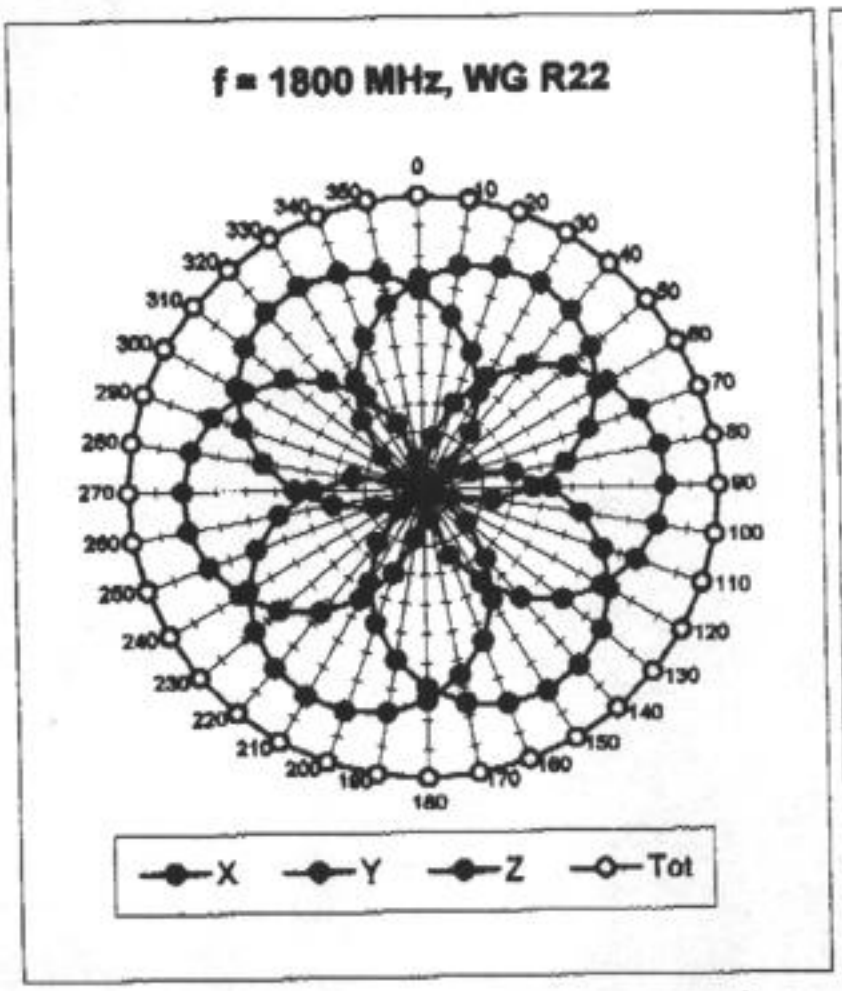


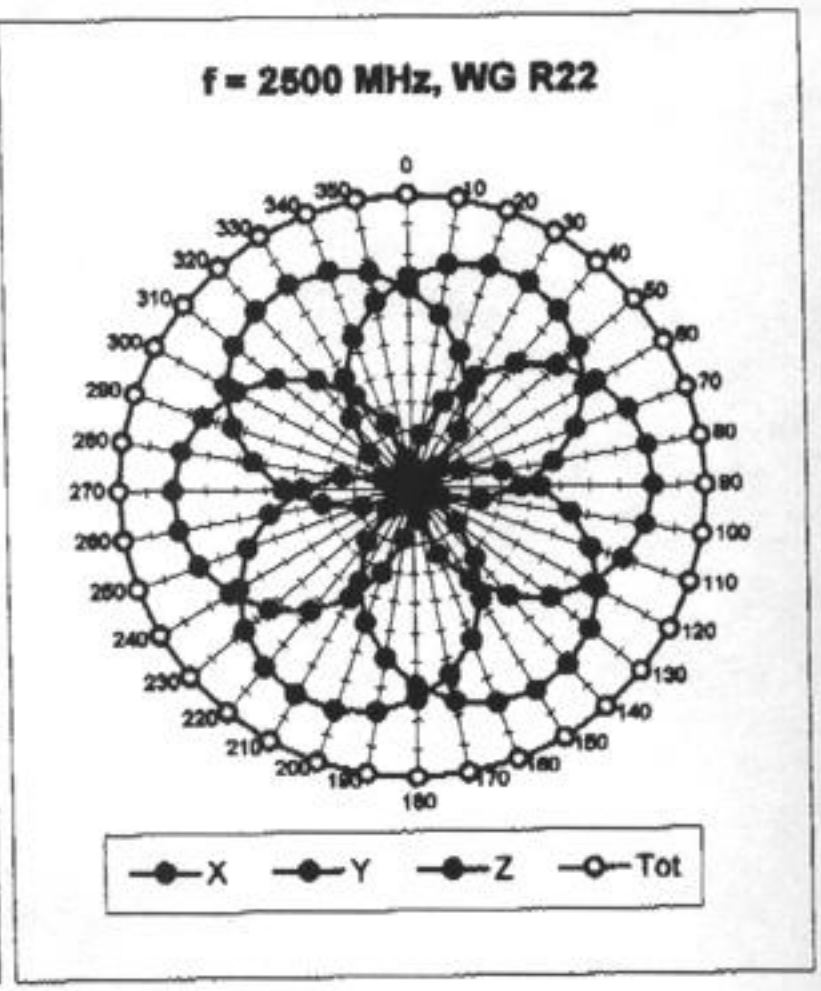




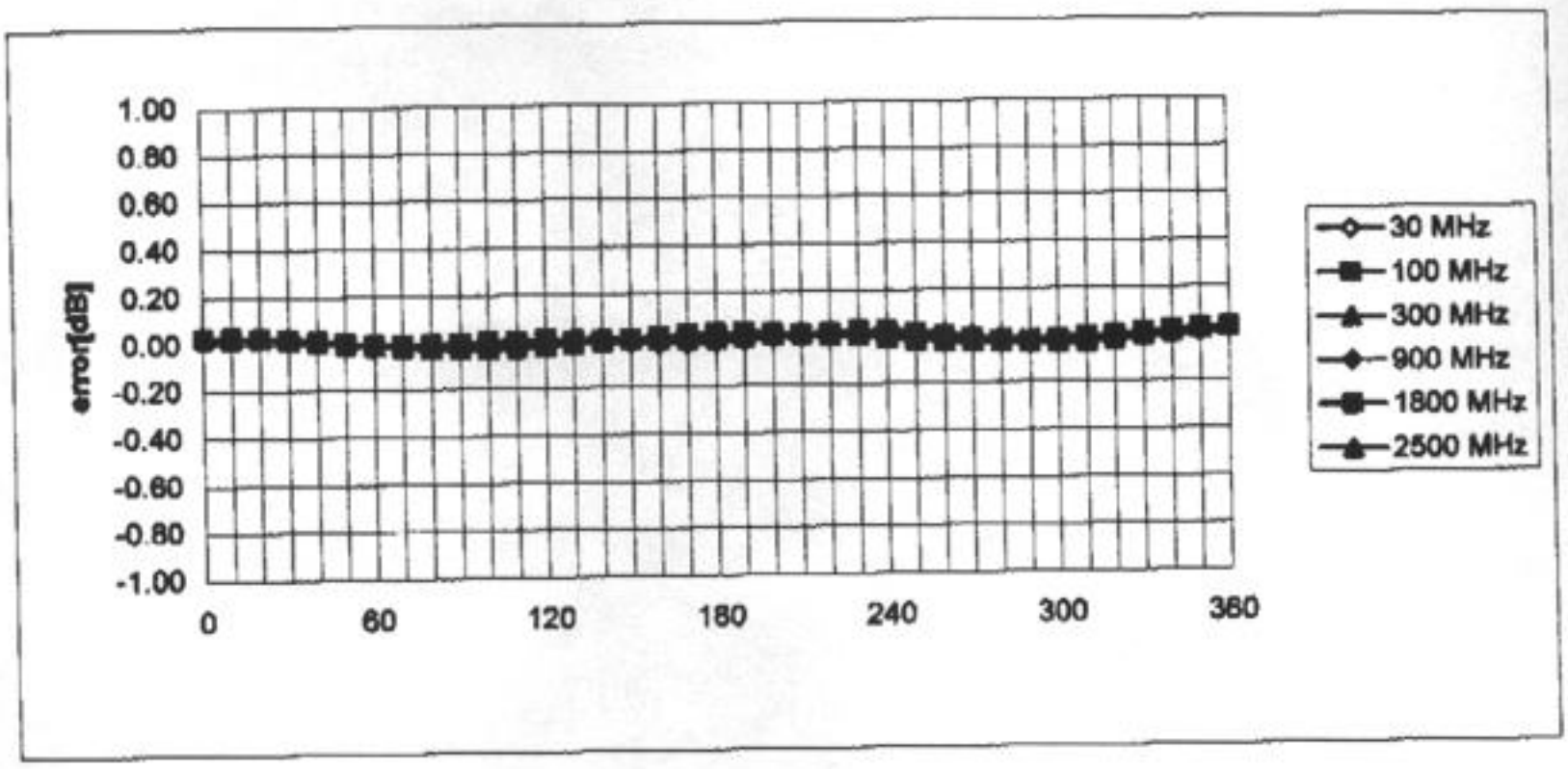


ET3DV6 SN:1503



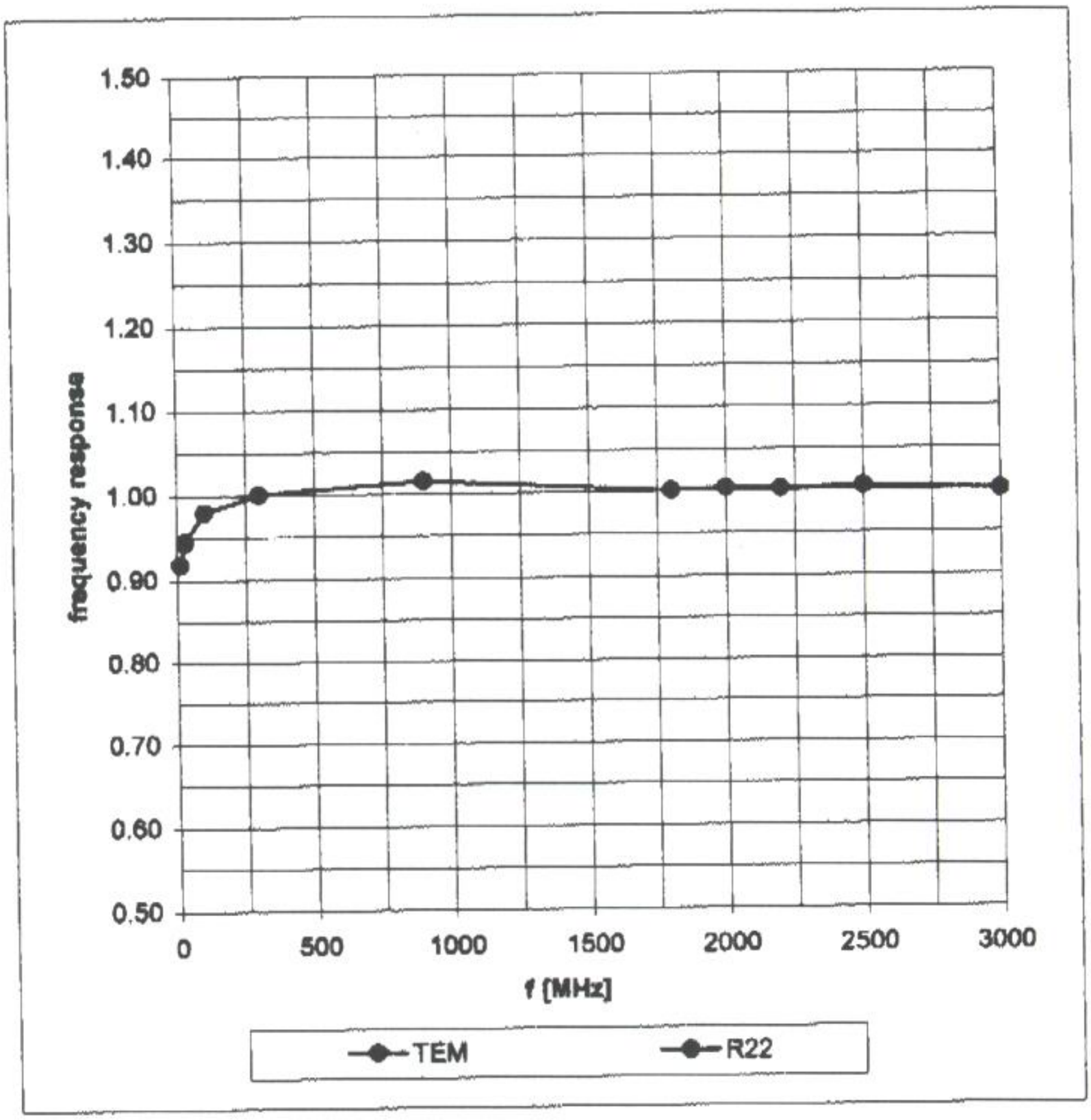


Isotropy Error (ϕ), θ = 0°



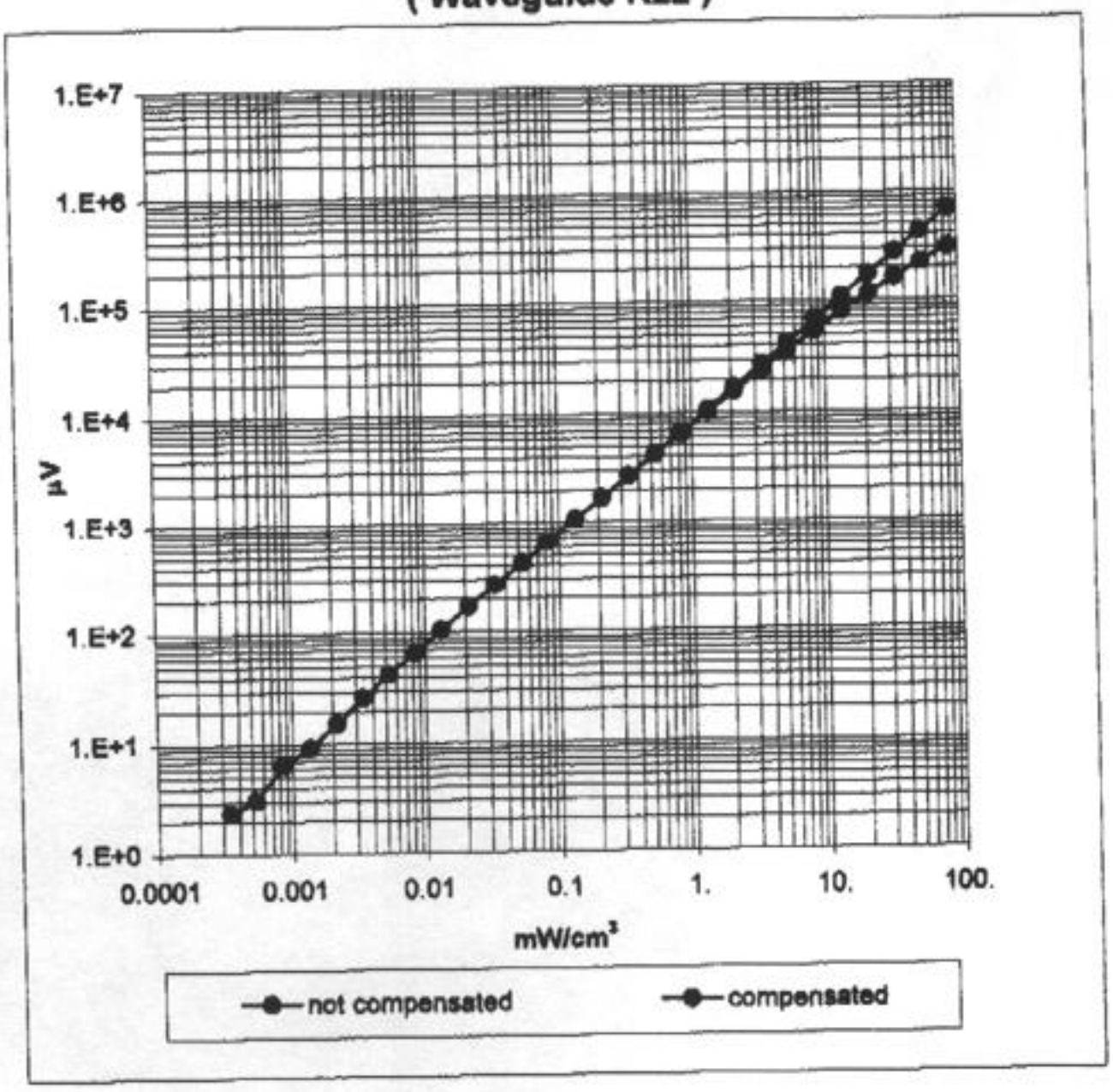
Frequency Response of E-Field

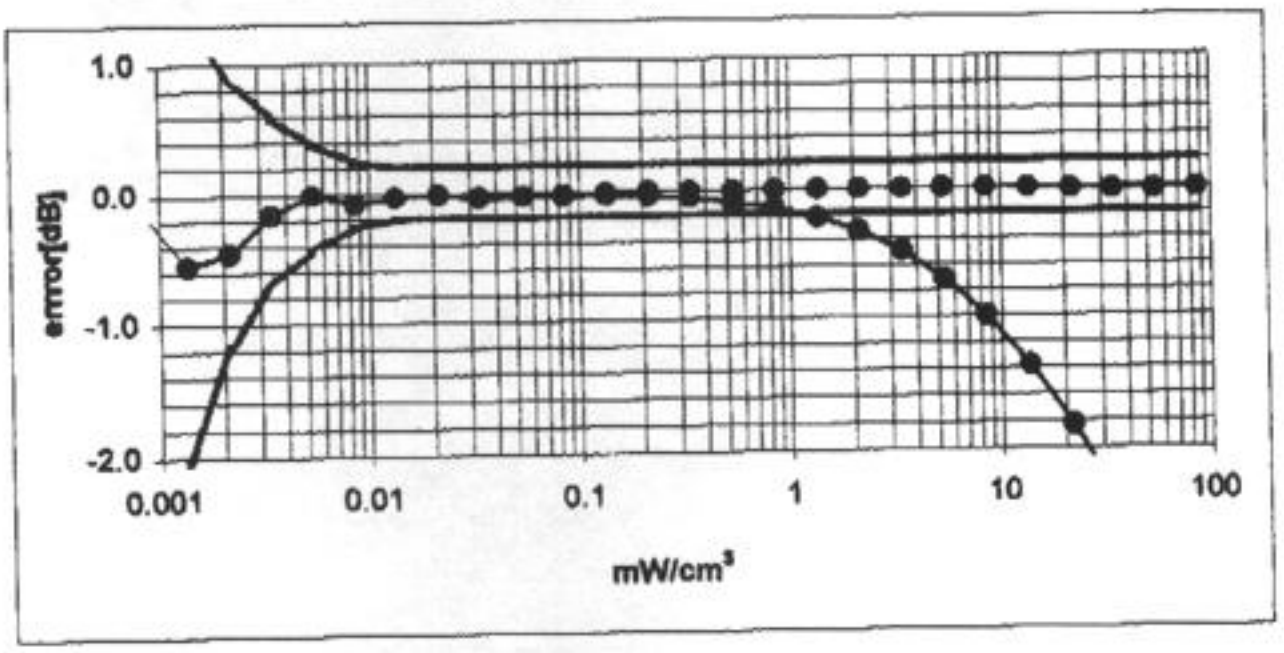
(TEM-Cell:ifi110, Waveguide R22)



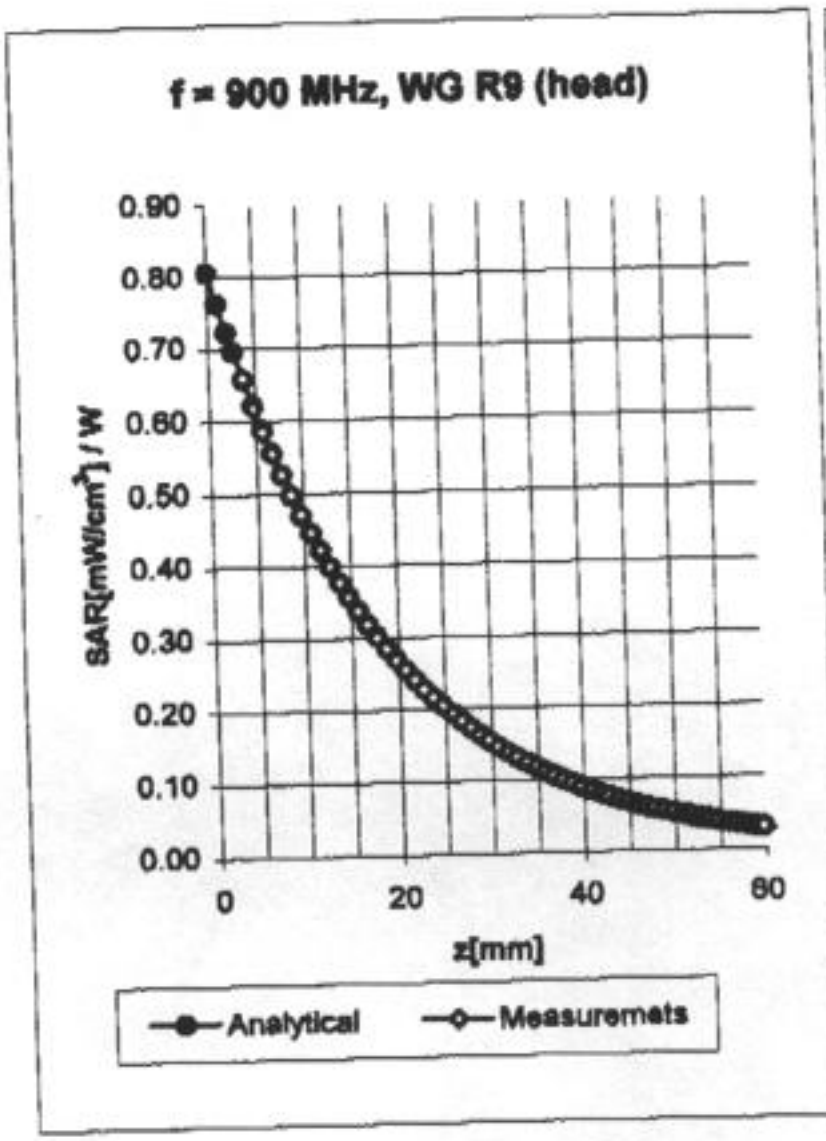
Dynamic Range f(SAR_{brain})

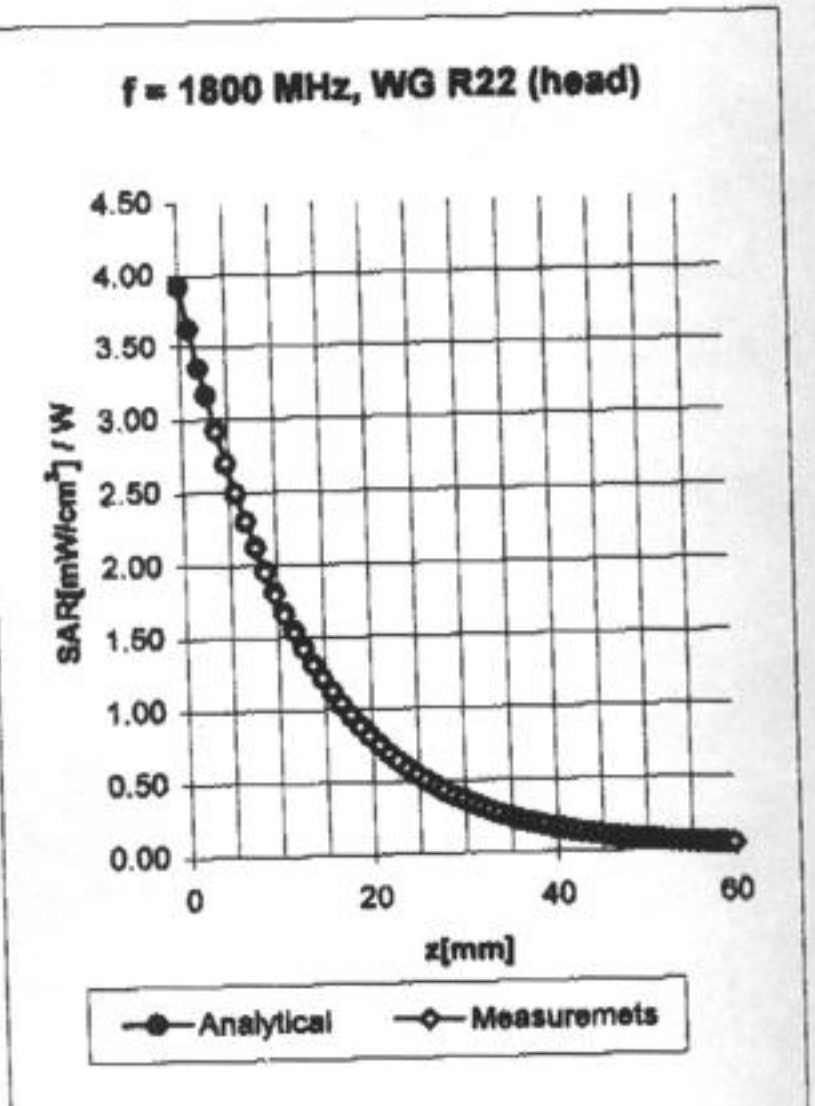
(Waveguide R22)





Conversion Factor Assessment





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

ConvF X	**6.36** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.36** ± 9.5% (k=2)	Alpha	**0.39**
ConvF Z	**6.36** ± 9.5% (k=2)	Depth	**2.42**

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

ConvF X	**5.24** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**5.24** ± 9.5% (k=2)	Alpha	**0.54**
ConvF Z	**5.24** ± 9.5% (k=2)	Depth	**2.33**

Schmid & Partner
Engineering AG

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

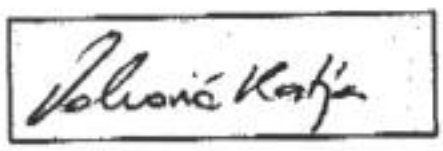
Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ET3DV6**
Serial Number:	**1503**
Place of Assessment:	**Zurich**
Date of Assessment:	**November 22, 2001**
Probe Calibration Date:	**November 16, 2001**

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

Assessed by:



Dosimetric E-Field Probe ET3DV6 SN:1503

Conversion factor (± standard deviation)

835 MHz	ConvF	**6.5 ± 8%**	**ε_r = 41.5** **σ = 0.90 mho/m** (head tissue)
1950 MHz	ConvF	**5.0 ± 8%**	**ε_r = 40.0** **σ = 1.40 mho/m** (head tissue)
835 MHz	ConvF	**6.2 ± 8%**	**ε_r = 55.2** **σ = 0.97 mho/m** (body tissue)
900 MHz	ConvF	**6.1 ± 8%**	**ε_r = 55.0** **σ = 1.05 mho/m** (body tissue)
1800 MHz	ConvF	**4.9 ± 8%**	**ε_r = 53.3** **σ = 1.52 mho/m** (body tissue)
1950 MHz	ConvF	**4.7 ± 8%**	**ε_r = 53.3** **σ = 1.52 mho/m** (body tissue)

gaeps94

Cpang 94

Appendix 5

Dipole Characterization Certificate

Interim Dipole Correlation Certificate

FCD-0359, Rev.001

Dipole Serial Number:	284(TR)	Last Calibration Date:	5-Jan-01
Dipole Type (MHz):	D1800V2 w/ Teflon Rings	Calibration Due:	5-Jan-03
		Manufacturer:	SPEAG

-Manufacturer's Original Calibration Information-

Dipole to be correlated: [Serial Number: 284(TR)]

1g SAR normalized to 1W forward power (mW/g):	44.4mW/g
Relative Dielectric:	40.0
Conductivity:	1.71
Probe Serial Number:	1307
Forward Power:	250mW

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

1g SAR normalized to 1W forward power (mW/g):	38.5 mW/g
Relative Dielectric:	39.6
Conductivity:	1.37
Probe Serial Number:	1307
Forward Power:	250 mW

-Correlation Method Utilized- per DOI-1265

(select one)

By Similarity: X By Transfer Calibration:

-Measured Data-

Probe S/N:	1307	Conductivity (meas.):	1.38
Robot Cell #:	HWD4	Permittivity (meas.):	38.4

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

2.915 mW/g		
	(if required)	(if required)

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

2.960 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: Asha . Fenech **Date:** 3/8/02

Comments: Secondary dipole measured +1.6 % from primary dipole.

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	