



MOTOROLA

May 7, 2002

Supplement to SAR Test Report for Motorola portable cellular phone (FCC ID IHDT56CA1)

Prepared by:

Steven Hauswirth, Senior Staff Engineer

Motorola Personal Communications Sector Product Safety Laboratory

Harvard, Illinois

Summary of FCC request for additional information

There was a request for additional information regarding Motorola's SAR Test Report for Motorola portable cellular phone (FCC ID IHDT56CA1). The requested information is addressed below in the same numbering sequence received.

1) Statement detailing "extrapolation" performed on SAR values reported in the summary tables. Please justify the power levels used for testing. SAR testing at or above EMC testing power levels is recommended by Supplement C.

The exact method of extrapolation is $\text{New SAR} = \text{Old SAR} * 10^{(\text{drift}/10)}$. The SAR reported at the end of the measurement process by DASY can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process (this is the worst case SAR because it corresponds to the average output power before the SAR test). The device is operating properly and does have an output level that is reduced over time. This is verified by measuring the SAR drift after the test.

This process does not contradict the Supplement C 01-01 section "Test Device Operating Conditions" statement of "Transmitters should be tested at the maximum output level for normal operation within the intended wireless networks, to avoid undesirable performance issues that could lead to SAR changes. The measured SAR values may be scaled to cover certain output tolerances expected among production units during normal use provided the scaled values are within 5% of the measured values." This device was tested at the maximum output level for normal operation. The measured drift is not due to manufacturing tolerances expected among production units. We are not scaling the measured SAR up to account for low initial output power. We are following the section "Device operating capabilities" statement of "If a device or its battery is not designed to maintain a constant average output power, SAR should be evaluated with respect to the highest exposure expected based on battery capacity. The measured SAR should typically correspond to the average output power measured before and after the SAR measurement." By using the measured drift to extrapolate the measured SAR the resulting value corresponds to the average output power before the SAR test.

3) Statement of compliance with FCC RF exposure requirements. Such a statement could not be located.

The statement of compliance is on the cover page of Exhibit 11: SAR Test Report IHDT56CA1. It states "Motorola declares under its sole responsibility that portable cellular telephone FCC ID IHDT56CA1 to which this declaration relates, is in conformity with the appropriate 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."

4) Justification for the body-worn test configurations used. It appears that the leather case was only tested at 1900 MHz while the clip was only tested at 800 MHz. Also, please describe the testing performed for the "rubber" phone cover pictured on page 19. No results or test photographs were located. Please provide all appropriate data/details.

The EUT was tested with the leather case and with the belt clip in both the 800MHz and 1900MHz bands. The SAR Test report only provided the measurement results for the body worn configuration that gave the highest SAR value in each band. All other measurements were found to be lower. The following table shows all other body-worn measurements performed on the radio.

| | | | Body Worn SAR, 1g | | | |
|-------------------|--------------|------------------------------|---|--------------|---------------------|-----------|
| | | | <i>Leather Pouch with belt clip (Body Worn)</i> | | | |
| <i>f</i> (MHz) | Description | Conducted Output Power (dBm) | <i>Ant Fixed</i> | | | |
| | | | Measured (W/kg) | Drift (dB) | Extrapolated (W/kg) | Temp (°C) |
| Analog 800MHz | Channel 991 | 25.48 | 0.56 | -0.13 | 0.58 | 21.5 |
| | Channel 384 | 25.51 | 0.465 | -0.11 | 0.47 | 21.3 |
| | Channel 799 | 25.53 | 0.592 | -0.28 | 0.63 | 21.5 |
| Digital 1900MHz | Channel 2 | 27.06 | 0.354 | -0.06 | 0.36 | 22.7 |
| | Channel 1001 | 27.04 | 0.315 | -0.1 | 0.32 | 22.7 |
| | Channel 1998 | 27.02 | 0.319 | 0.12 | 0.32 | 22.5 |

| | | | Body Worn SAR, 1g | | | |
|-------------------|--------------|------------------------------|------------------------------|--------------|---------------------|-----------|
| | | | <i>Belt Clip (Body Worn)</i> | | | |
| <i>f</i> (MHz) | Description | Conducted Output Power (dBm) | <i>Ant Fixed</i> | | | |
| | | | Measured (W/kg) | Drift (dB) | Extrapolated (W/kg) | Temp (°C) |
| Analog 800MHz | Channel 991 | 25.48 | 0.588 | 0.02 | 0.59 | 21.1 |
| | Channel 384 | 25.51 | 0.453 | -0.09 | 0.46 | 21.1 |
| | Channel 799 | 25.53 | 0.726 | -0.15 | 0.73 | 21 |
| Digital 800MHz | Channel 991 | 27.58 | 0.21 | -0.15 | 0.22 | 21.7 |
| | Channel 384 | 27.63 | 0.213 | 0.02 | 0.21 | 21.7 |
| | Channel 799 | 27.42 | 0.231 | 0.04 | 0.23 | 21.7 |
| Digital 1900MHz | Channel 2 | 27.06 | 0.185 | -0.02 | 0.19 | 22.2 |
| | Channel 1001 | 27.04 | 0.193 | -0.02 | 0.19 | 22.2 |
| | Channel 1998 | 27.02 | 0.184 | -0.01 | 0.18 | 22.2 |

The “rubber” phone cover is a cover that goes on the front of the phone. The phone was tested against the head phantom in a cheek touch position with and without the cover in place in the Left Head - Cheek Touch position. This was to determine the impact of the rubber phone cover on the SAR of the phone. The test photograph is shown figure 14 of the original filing report.

| <i>f</i> (MHz) | Description | Conducted Output Power (dBm) | Cheek Touch SAR, 1g | | | |
|-------------------|--------------|------------------------------|--|------------|---------------------|-----------|
| | | | <i>Rubber Boot On Phone. Measured Against the Left Head in Cheek Touch Position.</i> | | | |
| | | | <i>Ant Fixed</i> | | | |
| | | | Measured (W/kg) | Drift (dB) | Extrapolated (W/kg) | Temp (°C) |
| Analog 800MHz | Channel 991 | 25.48 | 1.20 | 0.03 | 1.20 | 21.10 |
| | Channel 384 | 25.51 | 0.998 | -0.07 | 1.01 | 21.10 |
| | Channel 799 | 25.53 | 1.35 | -0.13 | 1.35 | 20.90 |
| Digital 800MHz | Channel 991 | 27.58 | | | | |
| | Channel 384 | 27.63 | 0.532 | 0.04 | 0.53 | 21.20 |
| | Channel 799 | 27.42 | | | | |
| Digital 1900MHz | Channel 2 | 27.06 | 1.20 | -0.29 | 1.28 | 20.90 |
| | Channel 1001 | 27.04 | 1.19 | -0.28 | 1.27 | 20.90 |
| | Channel 1998 | 27.02 | 1.22 | -0.21 | 1.28 | 20.90 |

5) Discussion of how the EUT was operated/controlled during the test to assure the testing of all appropriate modes, maximum power, and any duty factor driven parameters. Supplement C Appendix B part I 2.

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, by use of the keypad, manually set to the proper channel, transmitter power level and transmit mode of operation.

6) Additional description of the SAR measurement system. Please describe the main components of the system and how the SAR measurements are actually performed once setup: include coarse scan, determination of peak SAR location, scans to measure points in 1 gram volume, and procedure to determine SAR value from the measurement points. Per Supplement C Appendix B part II 7 and 8. Please include additional description/photographs of the phantom.

The DASy v3.1 system specified in section 3.1 of the original filing SAR Test report was utilized within the intended operations as set by the SPEAG™ setup. The default style of “coarse” and “cube” scans were chosen and use for measurements. The grid spacing of the course scan was 15cm as shown in the

SAR plots. Please refer to the DASY manual for additional information on SAR scanning procedures and algorithms used.

7) Justification for use of 6.5 as the conversion factor for 835 MHz head liquid. Calibration certificates suggest 6.4 should have been used.

The 835MHz conversion factor of 6.5 for probe SN1523 is shown on the "Additional Conversion Factors" section of the attached probe calibration sheet. Please see attached calibration certificate.

8) Additional SAR test plots. Plots for at least for the highest SAR point for each band in each test configuration should be provided.

Please see attached addition SAR test plots.

s/n: 021502526

Ch# 383 / Pwr Step: 2 / Type of Modulation: 800 Analog / Battery Model #: SNN5570A

DEVICE POSITION: 15 Degree Tilt / Simulate Temp: When Measured = 22.3 °C After Test = 22.3 °C

R1 SAM Phantom (rev. 3) 2Jan02 SUGAR Phantom; Left Hand Section; Position: (90°,180°); Frequency: 836 MHz

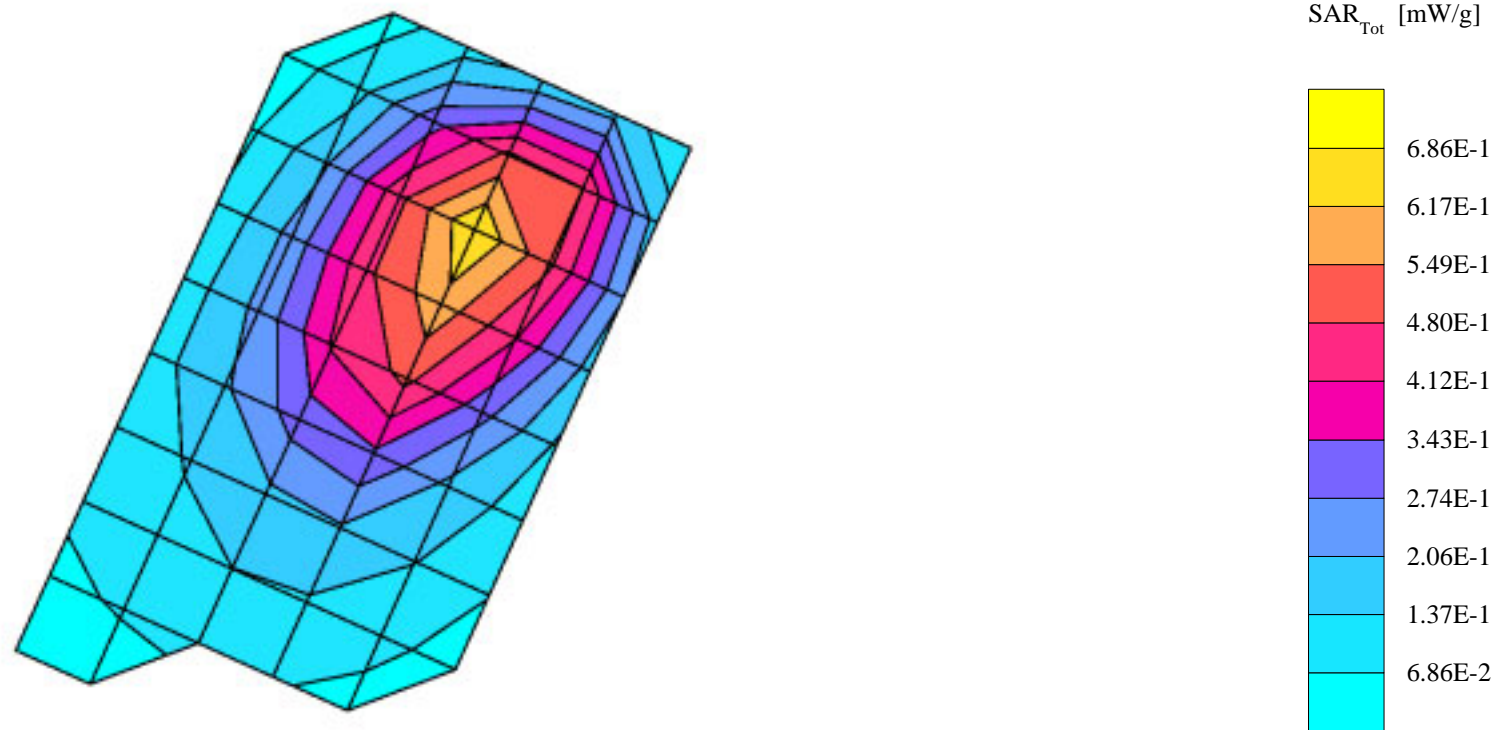
Probe: ET3DV6 - SN1523 - IEEE Head; ConvF(6.50,6.50,6.50); Crest factor: 1.0; 835 MHz Head & Body: $\sigma = 0.92$ mho/m $\epsilon_r = 43.1$ $\rho = 1.00$ g/cm³

Cube 7x7x7: SAR (1g): 0.695 mW/g, SAR (10g): 0.445 mW/g, (Worst-case extrapolation)

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

Penetration depth: 14.0 (13.9, 14.1) [mm]

Powerdrift: 0.10 dB



s/n: 021502526

Ch# 799 / Pwr Step: 2 / Type of Modulation: 800 Analog / Battery Model #: SNN5570A

DEVICE POSITION: Cheek Touch / Simulate Temp: When Measured = 20.92 °C After Test = 21.1 °C

R1 SAM Phantom (rev. 3) 2Jan02 SUGAR Phantom; Left Hand Section; Position: (90°,0°); Frequency: 848 MHz

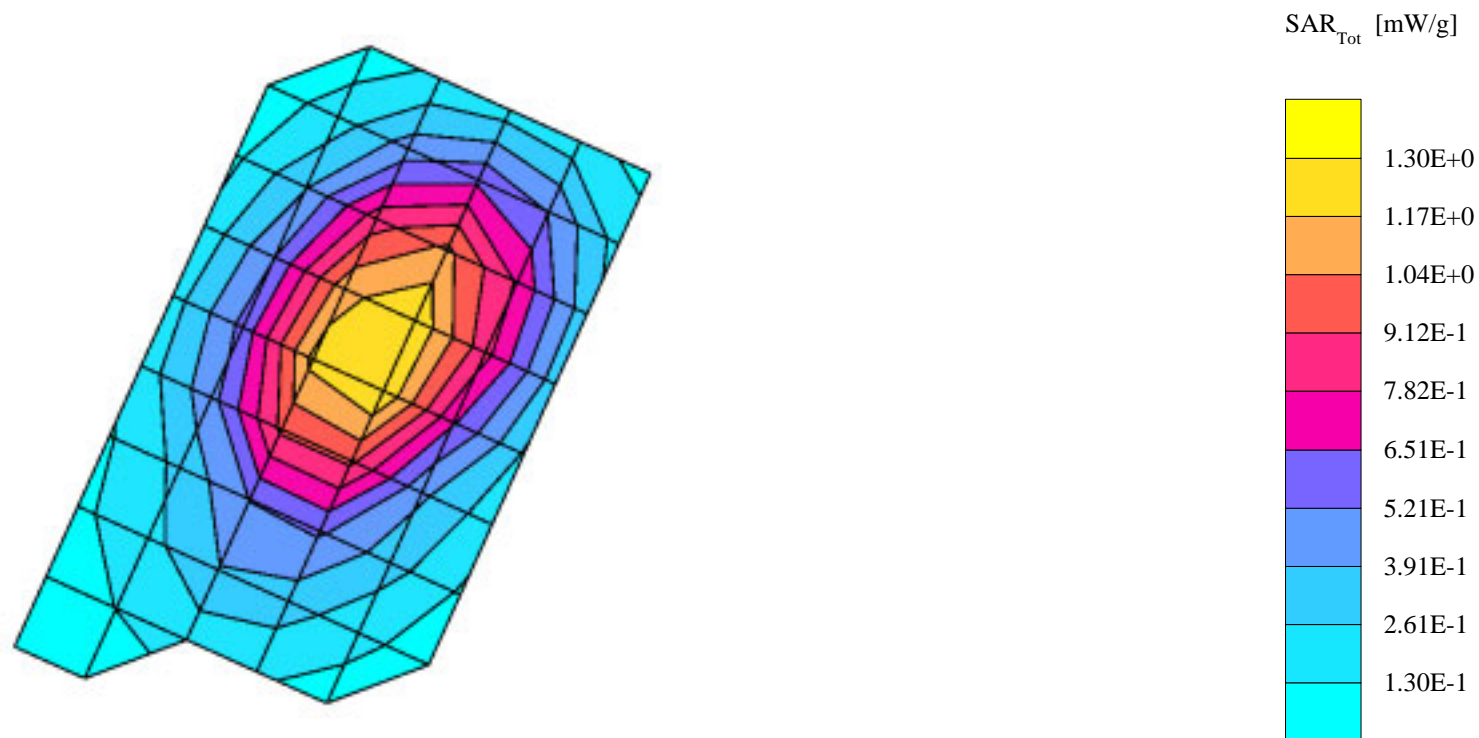
Probe: ET3DV6 - SN1523 - IEEE Head; ConvF(6.50,6.50,6.50); Crest factor: 1.0; 835 MHz Head & Body: $\sigma = 0.91$ mho/m $\epsilon_r = 42.2$ $\rho = 1.00$ g/cm³

Cube 7x7x7: SAR (1g): 1.33 mW/g, SAR (10g): 0.918 mW/g, (Worst-case extrapolation)

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

Penetration depth: 15.8 (15.0, 16.6) [mm]

Powerdrift: -0.22 dB



s/n: 021502526

Ch# 383/ Pwr Step: 2 / Type of Modulation: 800 Analog / Battery Model #: SNN5570A

DEVICE POSITION: Cheek Touch / Simualte Temp: When Measured = 22.3 °C After Test = 21.4°C

R1 SAM Phantom (rev. 3) 2Jan02 SUGAR Phantom; Right Hand Section; Position: (90°,180°); Frequency: 836 MHz

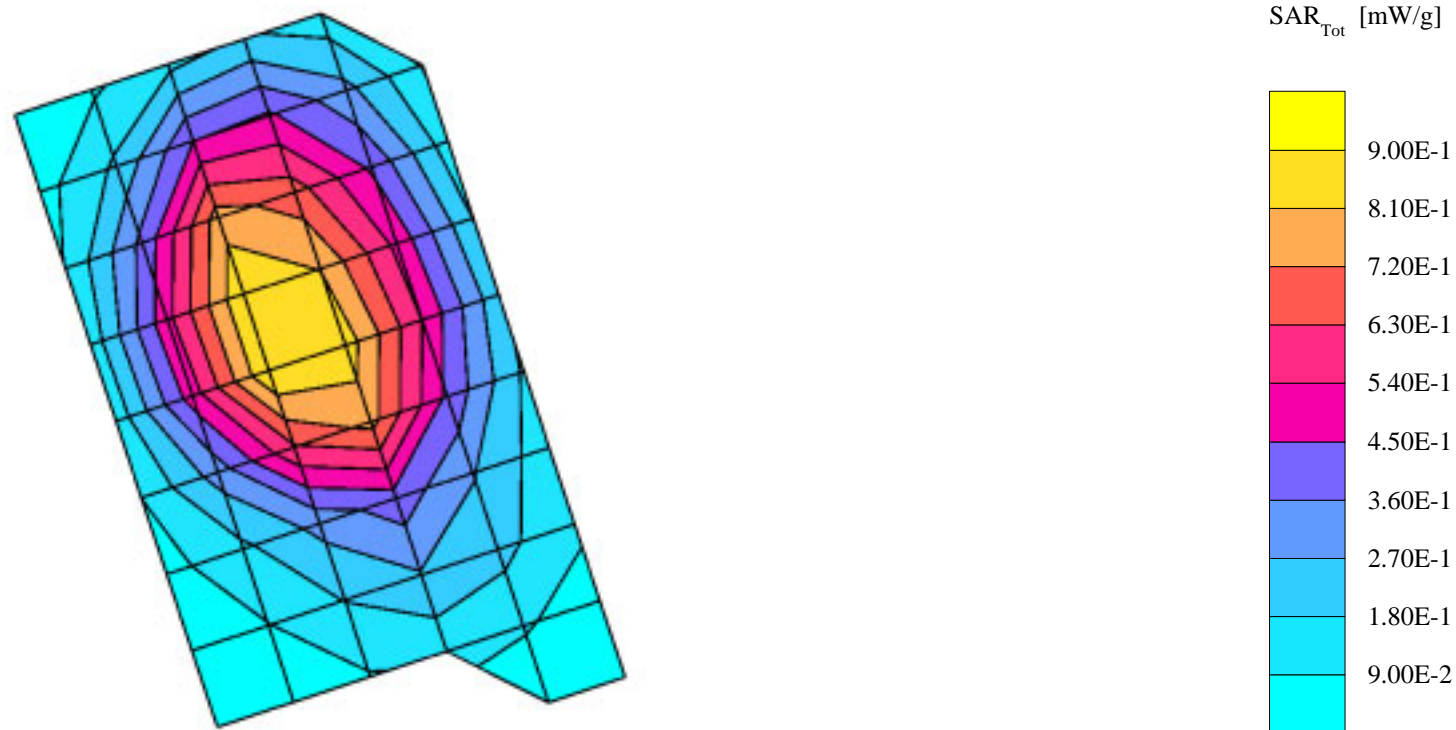
Probe: ET3DV6 - SN1523 - IEEE Head; ConvF(6.50,6.50,6.50); Crest factor: 1.0; 835 MHz Head & Body: $\sigma = 0.92$ mho/m $\epsilon_r = 43.1$ $\rho = 1.00$ g/cm³

Cube 7x7x7: SAR (1g): 0.936 mW/g, SAR (10g): 0.655 mW/g, (Worst-case extrapolation)

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

Penetration depth: 16.9 (16.5, 17.3) [mm]

Powerdrift: -0.17 dB



s/n: 021502526

Ch# 383/ Pwr Step: 2 / Type of Modulation: 800 Analog / Battery Model #: SNN5570A

DEVICE POSITION: 15 Degree Tilt / Simulate Temp: When Measured = 22.3 °C After Test = 21.4°C

R1 SAM Phantom (rev. 3) 2Jan02 SUGAR Phantom; Right Hand Section; Position: (90°,180°); Frequency: 836 MHz

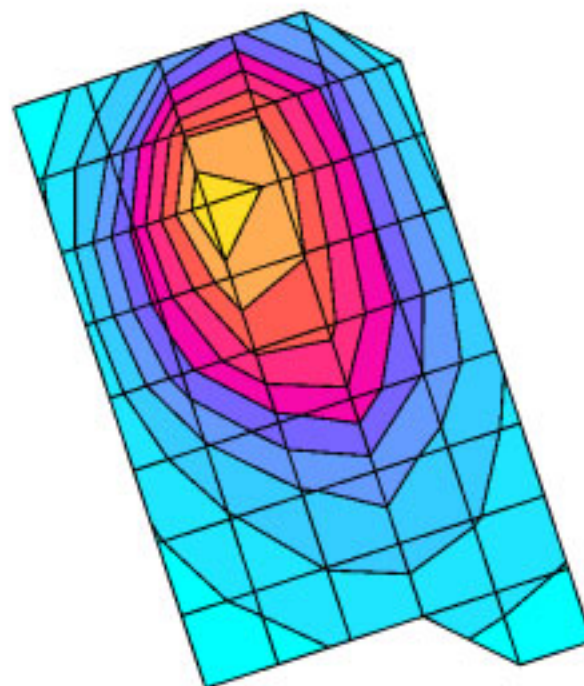
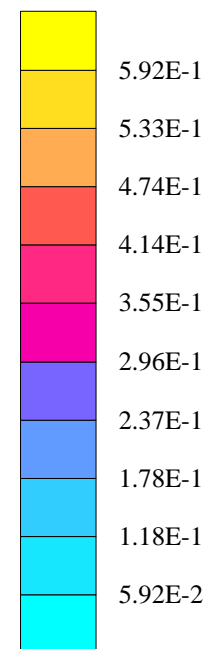
Probe: ET3DV6 - SN1523 - IEEE Head; ConvF(6.50,6.50,6.50); Crest factor: 1.0; 835 MHz Head & Body: $\sigma = 0.92$ mho/m $\epsilon_r = 43.1$ $\rho = 1.00$ g/cm³

Cube 7x7x7: SAR (1g): 0.624 mW/g, SAR (10g): 0.400 mW/g * Max outside, (Worst-case extrapolation)

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

Penetration depth: 14.9 (13.9, 15.8) [mm]

Powerdrift: -0.31 dB

SAR_{Tot} [mW/g]

s/n: 021502526

Ch# 2 / Pwr Step: 2 / Type of Modulation: TDMA / Battery Model #:SNN5570A

DEVICE POSITION: Cheek Touch / Simulate Temp: When Measured = 22 °C After Test = 20.9 °C

R1 SAM Phantom (rev. 3) 2Jan02 Glycol Phantom; Left Hand Section; Position: (90°,180°); Frequency: 1851 MHz

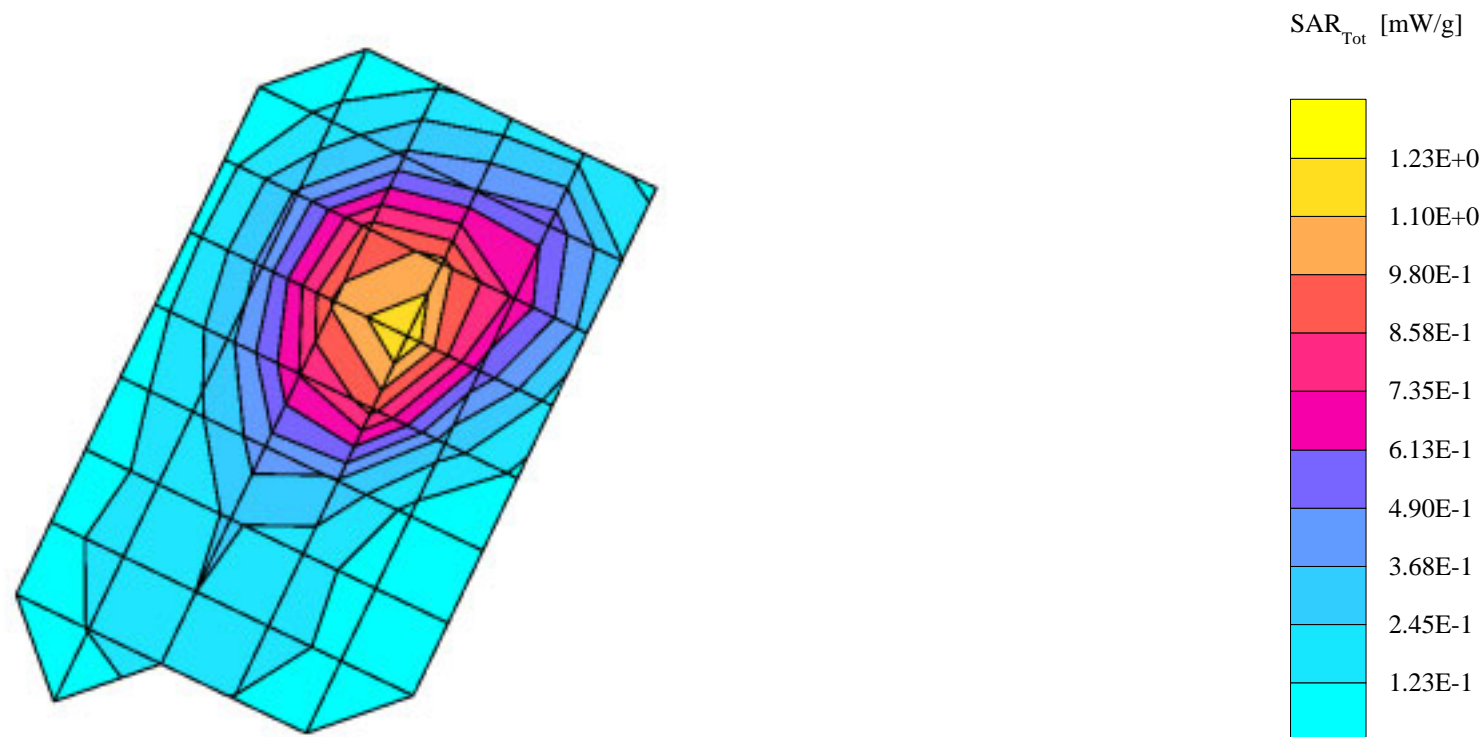
Probe: ET3DV6 - SN1523 - IEEE Head; ConvF(5.20,5.20,5.20); Crest factor: 3.0; 1880 MHz Head & Body: $\sigma = 1.47$ mho/m $\epsilon_r = 38.2$ $\rho = 1.00$ g/cm³

Cube 7x7x7: SAR (1g): 1.26 mW/g, SAR (10g): 0.751 mW/g, (Worst-case extrapolation)

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

Penetration depth: 11.2 (10.9, 11.6) [mm]

Powerdrift: 0.22 dB



s/n: 021502526

Ch# 2 / Pwr Step: 2 / Type of Modulation: TDMA 1900 / Battery Model #:SNN5570A

DEVICE POSITION: 15 Degree Tilt / Simulate Temp: When Measured = 22 °C After Test = 20.9 °C

R1 SAM Phantom (rev. 3) 2Jan02 Glycol Phantom; Left Hand Section; Position: (90°,180°); Frequency: 1851 MHz

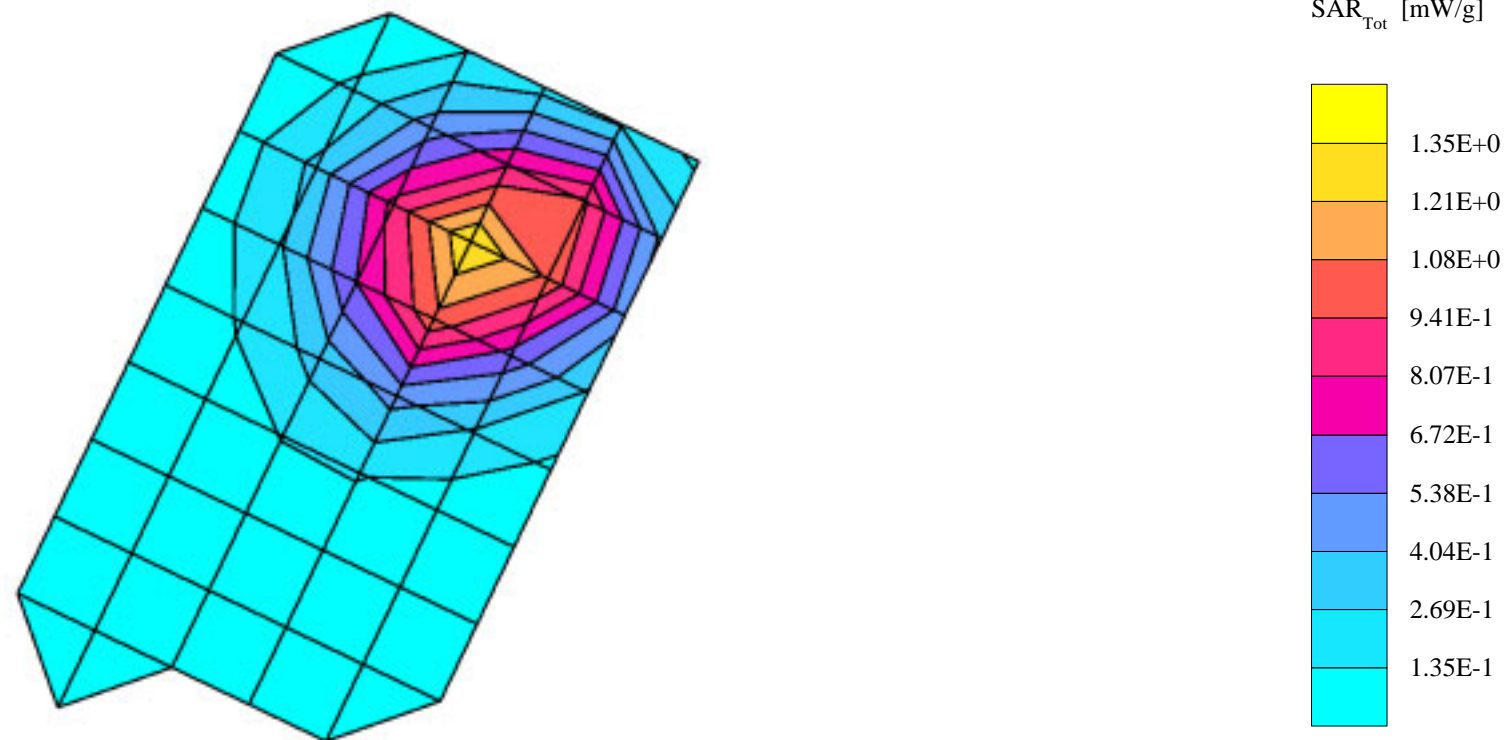
Probe: ET3DV6 - SN1523 - IEEE Head; ConvF(5.20,5.20,5.20); Crest factor: 3.0; 1880 MHz Head & Body: $\sigma = 1.47$ mho/m $\epsilon_r = 38.2$ $\rho = 1.00$ g/cm³

Cube 7x7x7: SAR (1g): 1.36 mW/g, SAR (10g): 0.796 mW/g, (Worst-case extrapolation)

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

Penetration depth: 10.2 (9.9, 10.6) [mm]

Powerdrift: -0.37 dB



s/n: 021502526

Ch# 1998 / Pwr Step: 2 / Type of Modulation: TDMA 1900 / Battery Model #:SNN5570A

DEVICE POSITION: Cheek Touch / Simulate Temp: When Measured = 22 °C After Test = 20.9 °C

R1 SAM Phantom (rev. 3) 2Jan02 Glycol Phantom; Right Hand Section; Position: (90°,180°); Frequency: 1851 MHz

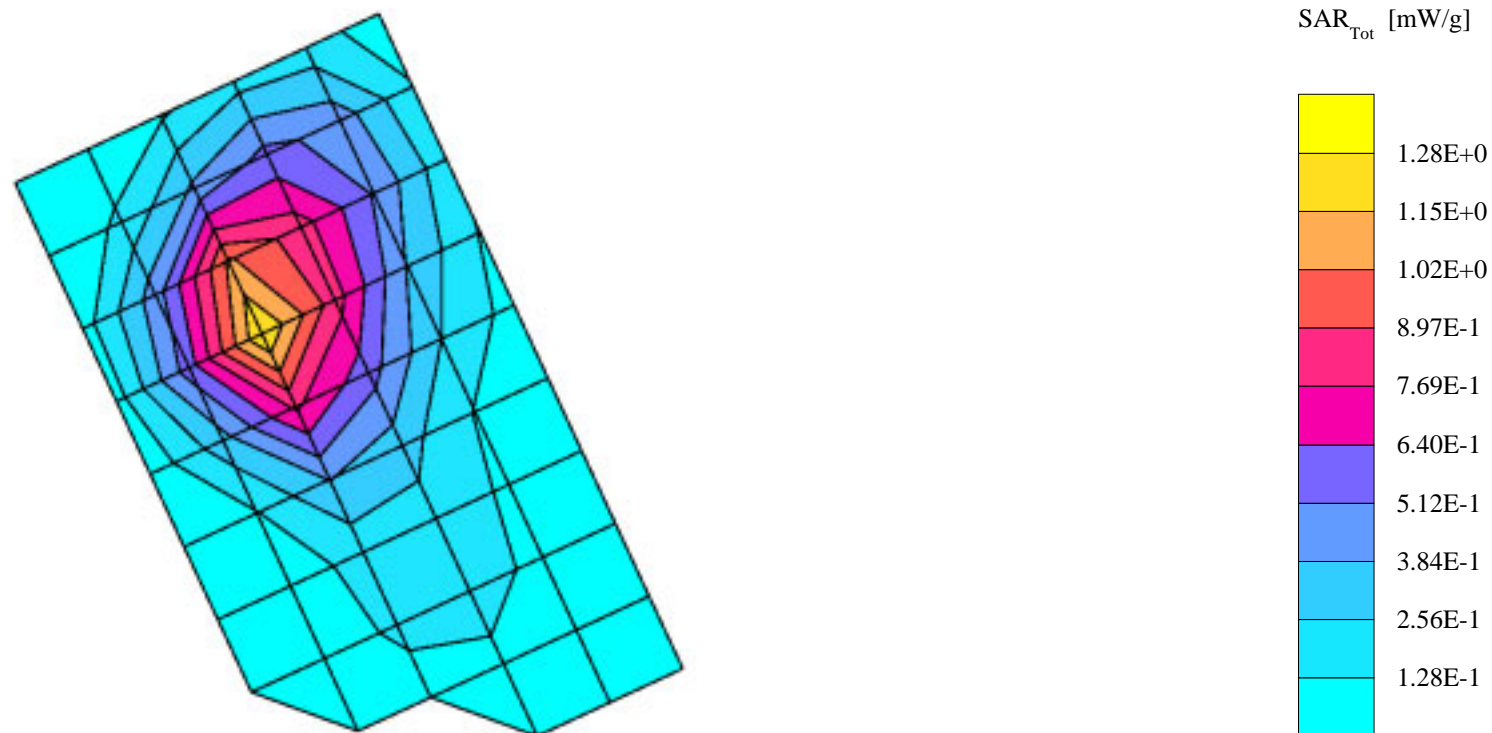
Probe: ET3DV6 - SN1523 - IEEE Head; ConvF(5.20,5.20,5.20); Crest factor: 3.0; 1880 MHz Head & Body: $\sigma = 1.47$ mho/m $\epsilon_r = 38.2$ $\rho = 1.00$ g/cm³

Cube 7x7x7: SAR (1g): 1.30 mW/g, SAR (10g): 0.747 mW/g, (Worst-case extrapolation)

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

Penetration depth: 10.5 (10.1, 11.0) [mm]

Powerdrift: 0.23 dB



s/n: 021502526

Ch# 1998 / Pwr Step: 2 / Type of Modulation: TDMA 1900 / Battery Model #: SNN5570A

DEVICE POSITION: 15 Degree Tilt / Simulate Temp: When Measured = 20.9c After Test = 21.6 °C

R7 SAM Phantom Glycol (rev. 3) 2Jan02 Phantom; R7 Monica Right Hand Section; Position: (90°,180°); Frequency: 1880 MHz

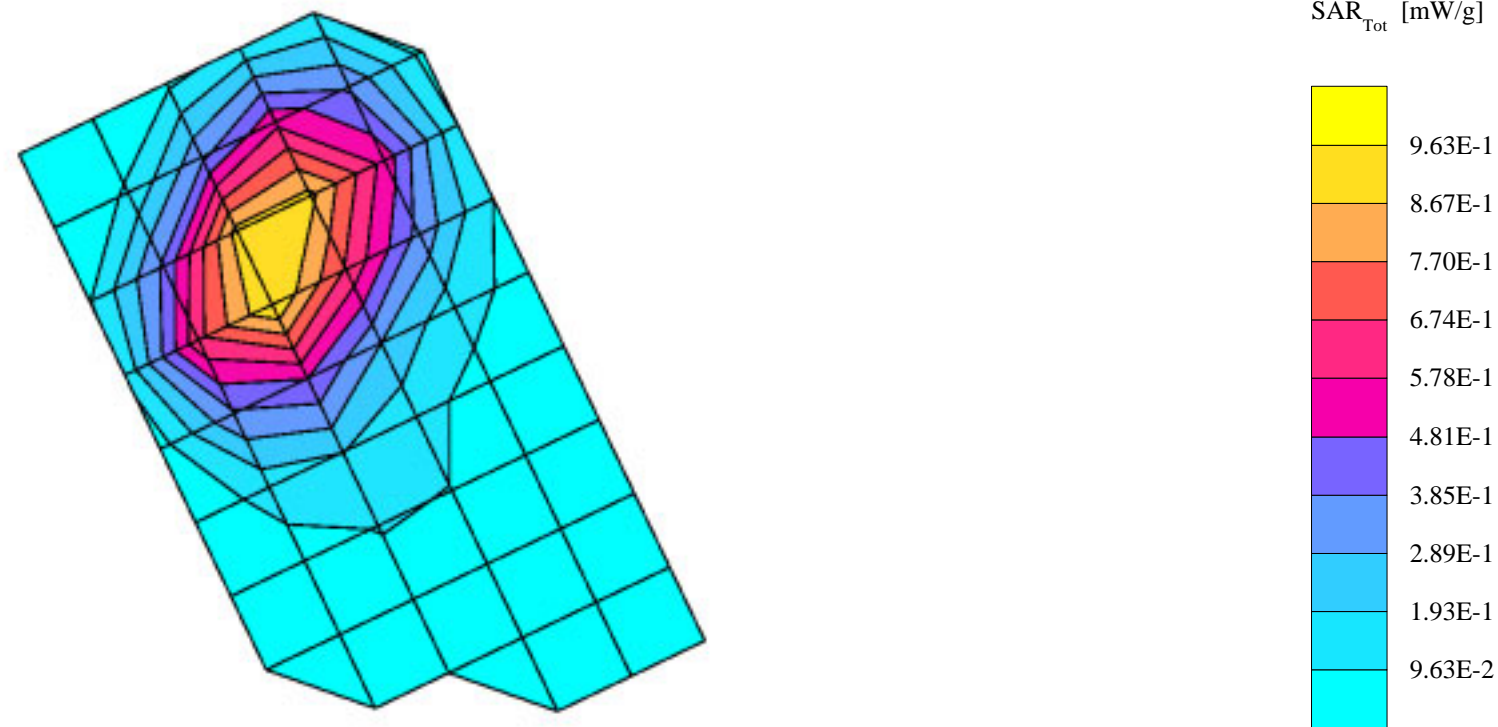
Probe: ET3DV6 - SN1503 - IEEE Head; ConvF(5.24,5.24,5.24); Crest factor: 3.0; 1880 MHz Head & Body: $\sigma = 1.45$ mho/m $\epsilon_r = 38.1$ $\rho = 1.00$ g/cm³

Cube 7x7x7: SAR (1g): 0.992 mW/g, SAR (10g): 0.590 mW/g, (Worst-case extrapolation)

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

Penetration depth: 10.5 (10.4, 10.6) [mm]

Powerdrift: -0.16 dB



s/n: 021502526

Ch#799 / Pwr Step: 2 / Type of Modulation:800 Analog / Battery Model #: SNN5770A

Accessory Name and Model #:BeltClip SHN7175A / Simulate Temp: When Measured = 20.69°C After Test =21.0°C

Amy Twin Phantom 2.3 Phantom; Section2 Section; Position: (0°,0°); Frequency: 849 MHz

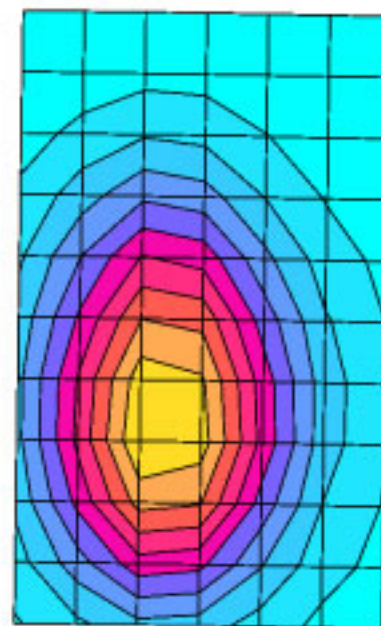
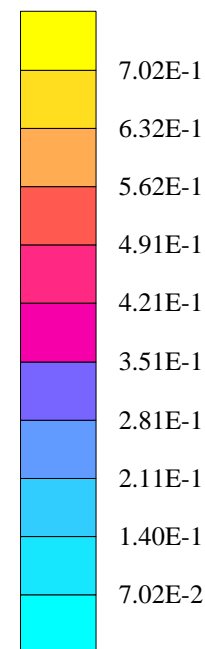
Probe: ET3DV6 - SN1523 - FCC Body; ConvF(6.30,6.30,6.30); Crest factor: 1.0; 835 MHz Head & Body: $\sigma = 0.97$ mho/m $\epsilon_r = 54.4$ $\rho = 1.00$ g/cm³

Cube 7x7x7: SAR (1g): 0.726 mW/g, SAR (10g): 0.511 mW/g, (Worst-case extrapolation)

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

Penetration depth: 15.7 (14.2, 17.4) [mm]

Powerdrift: -0.15 dB

SAR_{Tot} [mW/g]

s/n: 021502526

Ch#2 / Pwr Step: 2 / Type of Modulation: TDMA1900 / Battery Model #: SNN5770A

Accessory Name and Model #: BeltClip SYN9170A SYN8763A / Simulate Temp: When Measured = 22.3 °C After Test = 22.2 °C

Amy Twin Phantom 2.3 Phantom; Section2 Section; Position: (0°,0°); Frequency: 1850 MHz

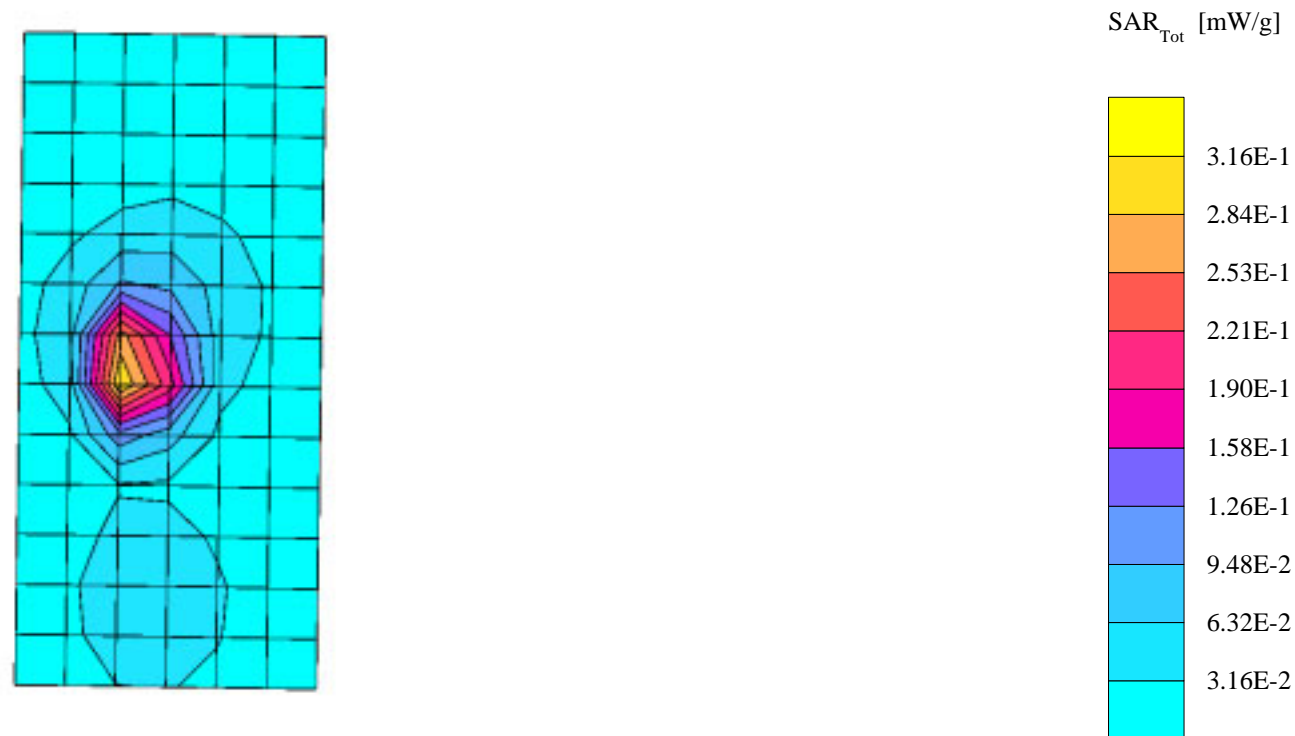
Probe: ET3DV6 - SN1523 - FCC Body; ConvF(4.80,4.80,4.80); Crest factor: 3.0; 1880 MHz Head & Body: $\sigma = 1.58$ mho/m $\epsilon_r = 50.7$ $\rho = 1.00$ g/cm³

Cube 7x7x7: SAR (1g): 0.354 mW/g, SAR (10g): 0.179 mW/g, (Worst-case extrapolation)

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

Penetration depth: 8.4 (8.1, 9.3) [mm]

Powerdrift: -0.06 dB



s/n: 021502526

Ch# 799/ Pwr Step: 2 / Type of Modulation: 800 Analog / Battery Model #: SNN5570A

DEVICE POSITION: Cheek Touch / Simulate Temp: When Measured = 20.92 °C After Test = 20.9°C

Accessories: Rubber Boot SYN8916A

R1 SAM Phantom (rev. 3) 2Jan02 SUGAR Phantom; Left Hand Section; Position: (270°,0°); Frequency: 848 MHz

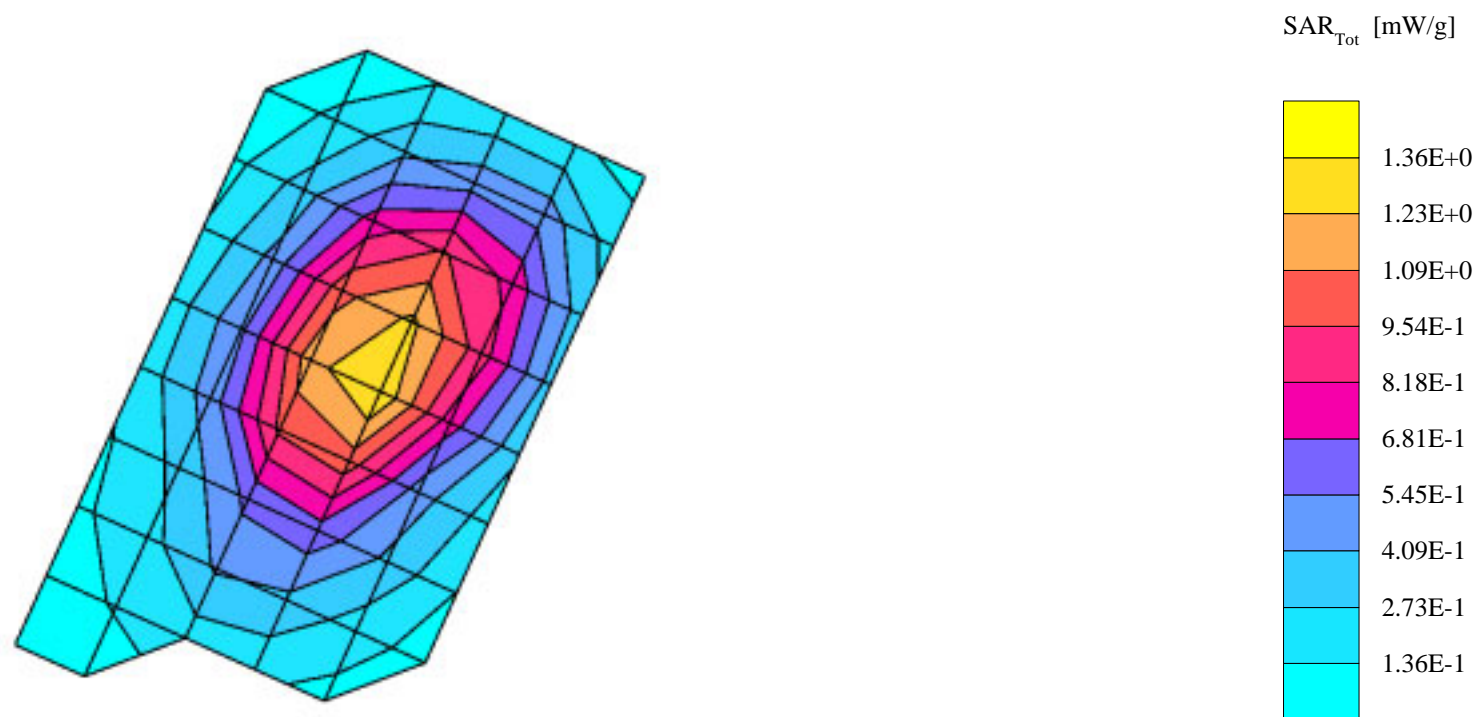
Probe: ET3DV6 - SN1523 - IEEE Head; ConvF(6.50,6.50,6.50); Crest factor: 1.0; 835 MHz Head & Body: $\sigma = 0.91$ mho/m $\epsilon_r = 42.2$ $\rho = 1.00$ g/cm³

Cube 7x7x7: SAR (1g): 1.35 mW/g, SAR (10g): 0.920 mW/g, (Worst-case extrapolation)

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

Penetration depth: 15.8 (14.7, 16.8) [mm]

Powerdrift: -0.13 dB



s/n: 021502526

Ch# 2 / Pwr Step: 2 / Type of Modulation: TDMA1900 / Battery Model #:SNN5570A

DEVICE POSITION: 15 Degree Tilt / Simulate Temp: When Measured = 22 °C After Test = 20.9 °C

Accessory Model # = Rubber Boot SYN8916A

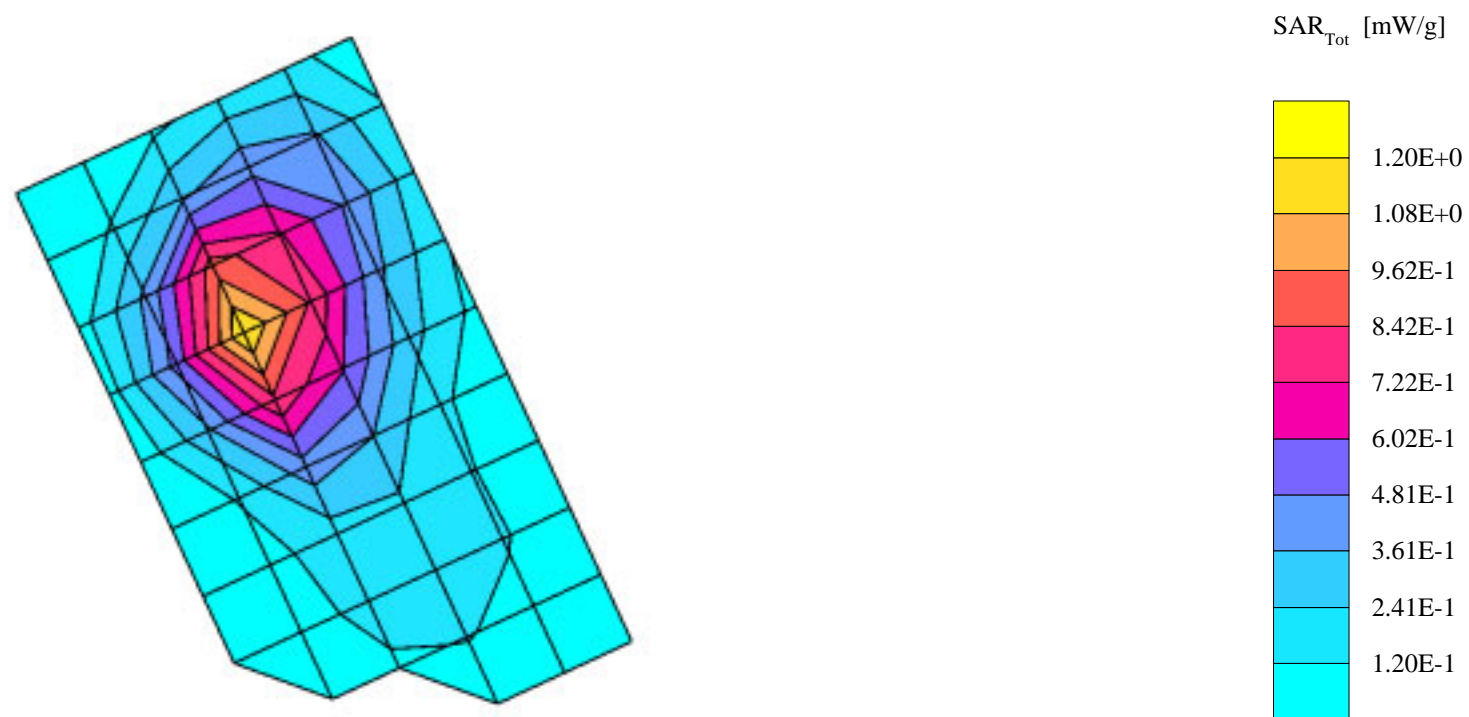
R1 SAM Phantom (rev. 3) 2Jan02 Glycol Phantom; Right Hand Section; Position: (90°,180°); Frequency: 1851 MHz

Probe: ET3DV6 - SN1523 - IEEE Head; ConvF(5.20,5.20,5.20); Crest factor: 3.0; 1880 MHz Head & Body: $\sigma = 1.47$ mho/m $\epsilon_r = 38.2$ $\rho = 1.00$ g/cm³Cubes (2): SAR (1g): 1.20 mW/g ± 0.02 dB, SAR (10g): 0.696 mW/g ± 0.01 dB, (Worst-case extrapolation)

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

Penetration depth: 10.4 (9.8, 11.3) [mm]

Powerdrift: -0.29 dB



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: | 1523 |
| Place of Calibration: | Zurich |
| Date of Calibration: | January 25, 2002 |
| 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:

Nicolos Meriana

Approved by:

Blair Katz

Probe ET3DV6

SN:1523

| | |
|--------------------------|-------------------------|
| Manufactured: | March 21, 2000 |
| Last calibration: | May 11, 2001 |
| Recalibrated: | January 25, 2002 |

Calibrated for System DASY3

DASY3 - Parameters of Probe: ET3DV6 SN:1523

Sensitivity in Free Space

| | |
|-------|---|
| NormX | 1.62 $\mu\text{V}/(\text{V}/\text{m})^2$ |
| NormY | 1.56 $\mu\text{V}/(\text{V}/\text{m})^2$ |
| NormZ | 1.56 $\mu\text{V}/(\text{V}/\text{m})^2$ |

Diode Compression

| | | |
|-------|-----------|----|
| DCP X | 96 | mV |
| DCP Y | 96 | mV |
| DCP Z | 96 | mV |

Sensitivity in Tissue Simulating Liquid

| | | | |
|---------|------------------------------|-----------------------------|--------------------------|
| Head | 900 MHz | $\epsilon_r = 41.5 \pm 5\%$ | $s = 0.97 \pm 5\%$ mho/m |
| Head | 835 MHz | $\epsilon_r = 41.5 \pm 5\%$ | $s = 0.90 \pm 5\%$ mho/m |
| ConvF X | 6.4 $\pm 9.5\%$ (k=2) | | Boundary effect: |
| ConvF Y | 6.4 $\pm 9.5\%$ (k=2) | | Alpha 0.57 |
| ConvF Z | 6.4 $\pm 9.5\%$ (k=2) | | Depth 1.90 |
| Head | 1800 MHz | $\epsilon_r = 40.0 \pm 5\%$ | $s = 1.40 \pm 5\%$ mho/m |
| Head | 1900 MHz | $\epsilon_r = 40.0 \pm 5\%$ | $s = 1.40 \pm 5\%$ mho/m |
| ConvF X | 5.2 $\pm 9.5\%$ (k=2) | | Boundary effect: |
| ConvF Y | 5.2 $\pm 9.5\%$ (k=2) | | Alpha 0.76 |
| ConvF Z | 5.2 $\pm 9.5\%$ (k=2) | | Depth 1.99 |

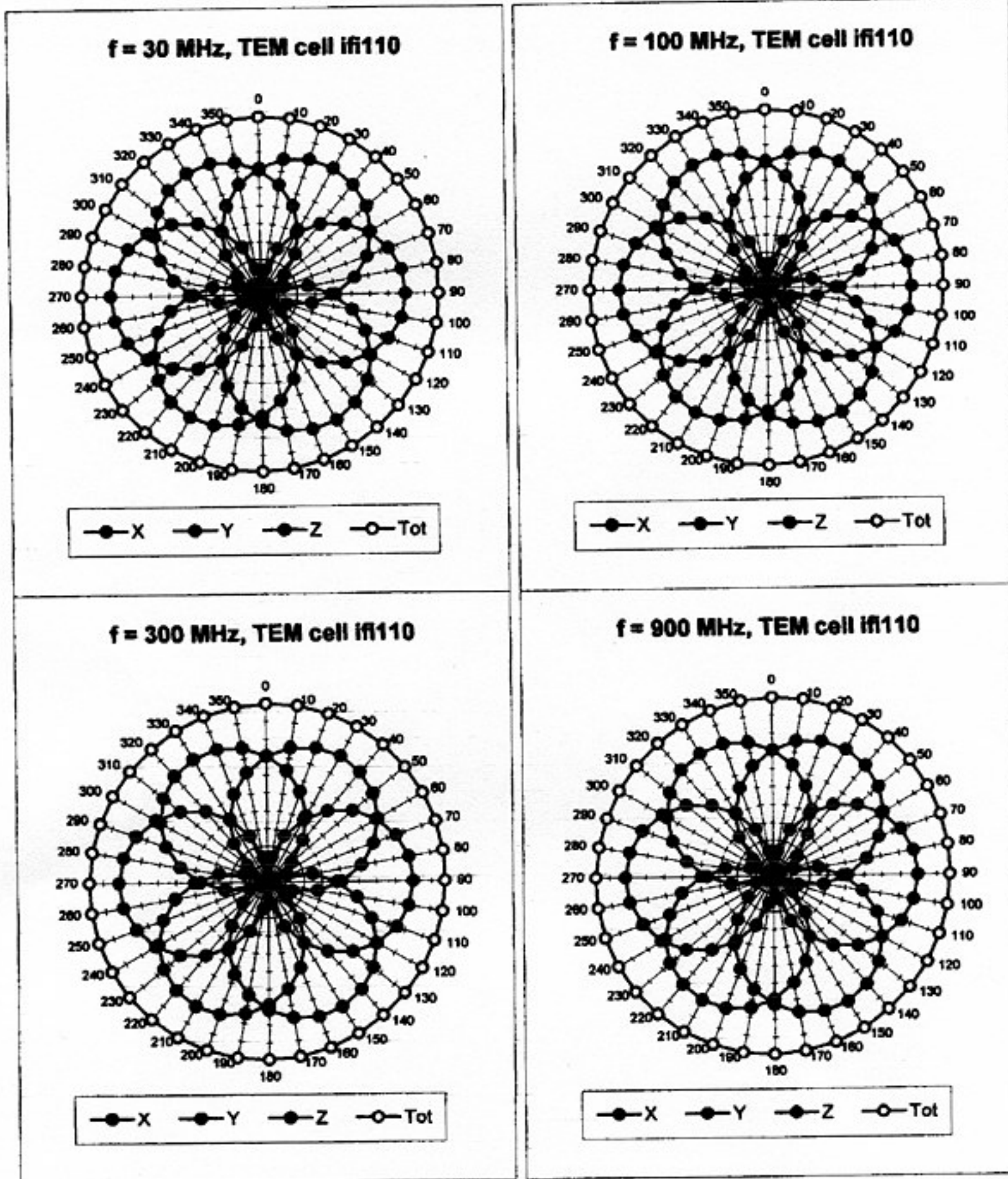
Boundary Effect

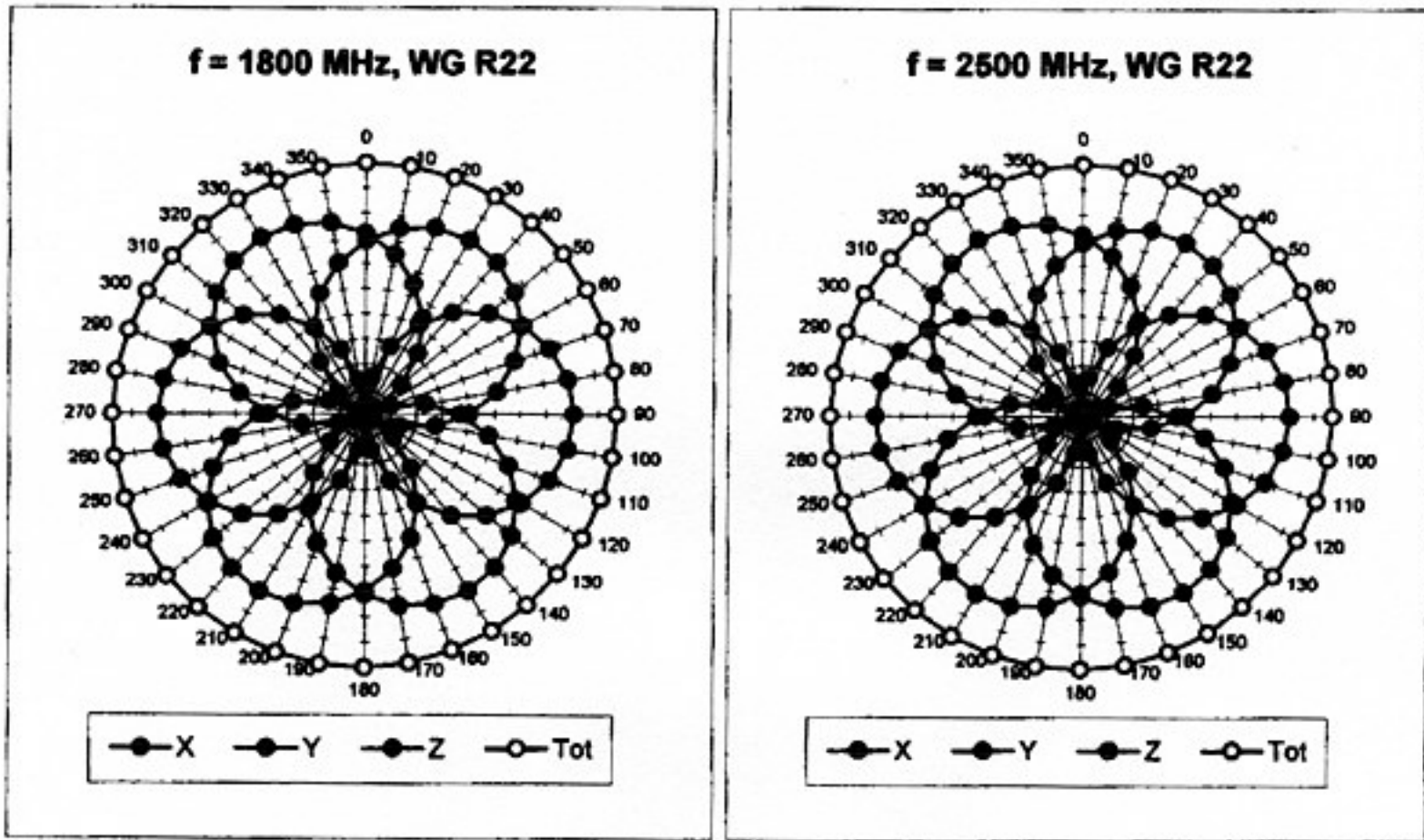
| | | | |
|------|--|-----------------------------------|-------------|
| Head | 900 MHz | Typical SAR gradient: 5 % per mm | |
| | Probe Tip to Boundary | 1 mm | 2 mm |
| | SAR _{be} [%] Without Correction Algorithm | 9.0 | 4.6 |
| | SAR _{be} [%] With Correction Algorithm | 0.2 | 0.4 |
| Head | 1800 MHz | Typical SAR gradient: 10 % per mm | |
| | Probe Tip to Boundary | 1 mm | 2 mm |
| | SAR _{be} [%] Without Correction Algorithm | 11.7 | 7.5 |
| | SAR _{be} [%] With Correction Algorithm | 1.6 | 0.2 |

Sensor Offset

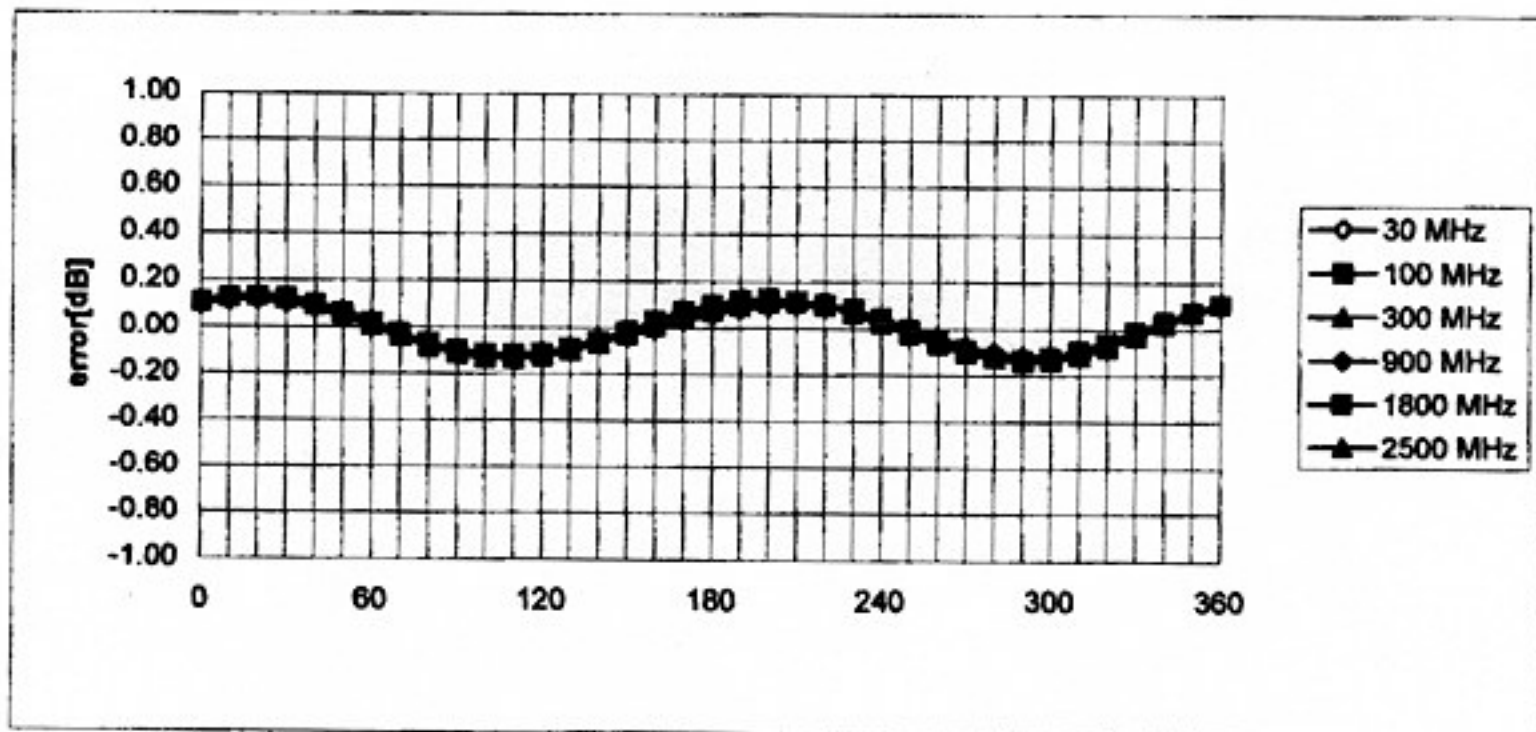
| | | |
|----------------------------|---------------------------------|----|
| Probe Tip to Sensor Center | 2.7 | mm |
| Optical Surface Detection | 1.5 \pm 0.2 | mm |

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



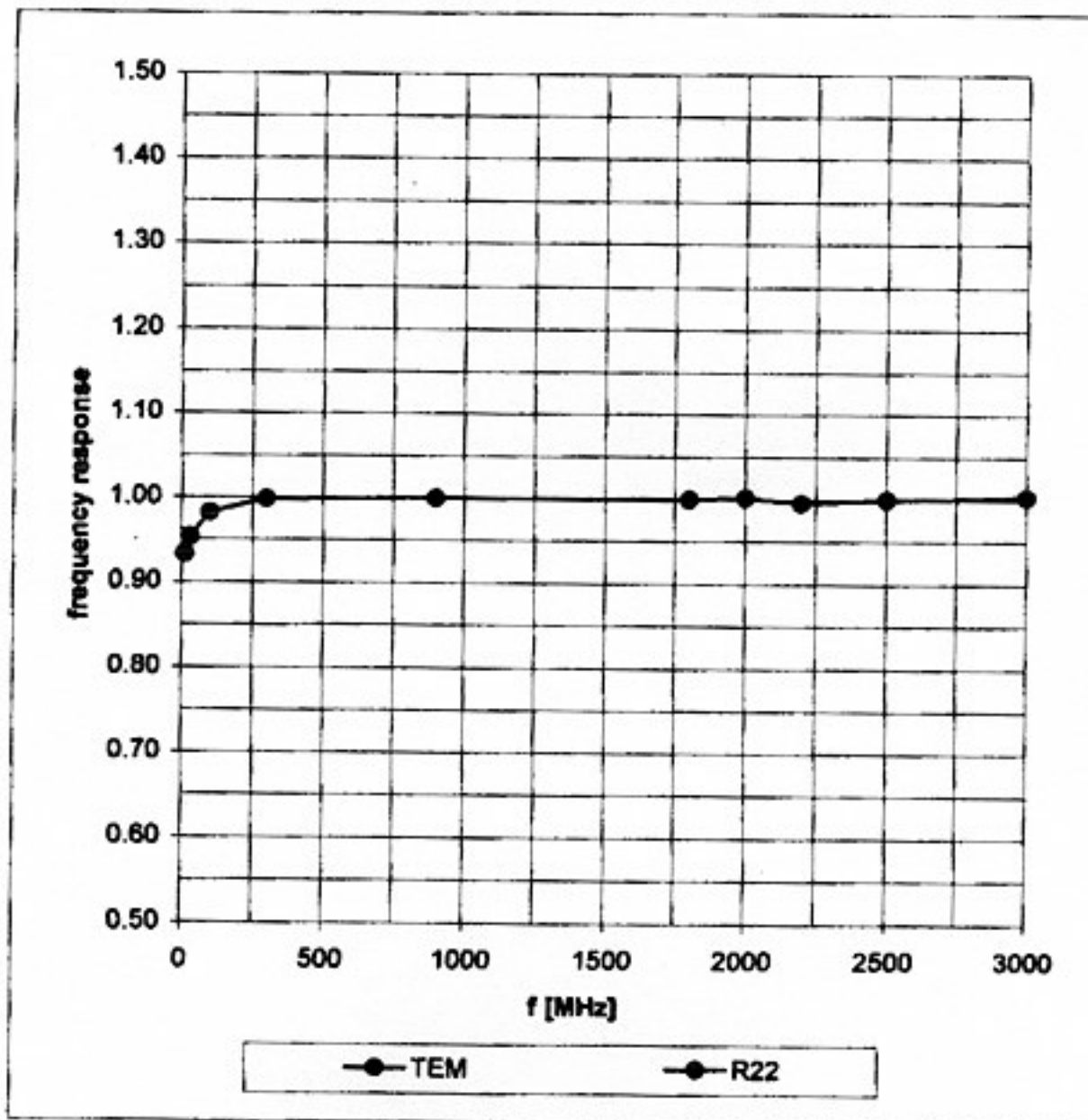


Isotropy Error (ϕ), $\theta = 0^\circ$

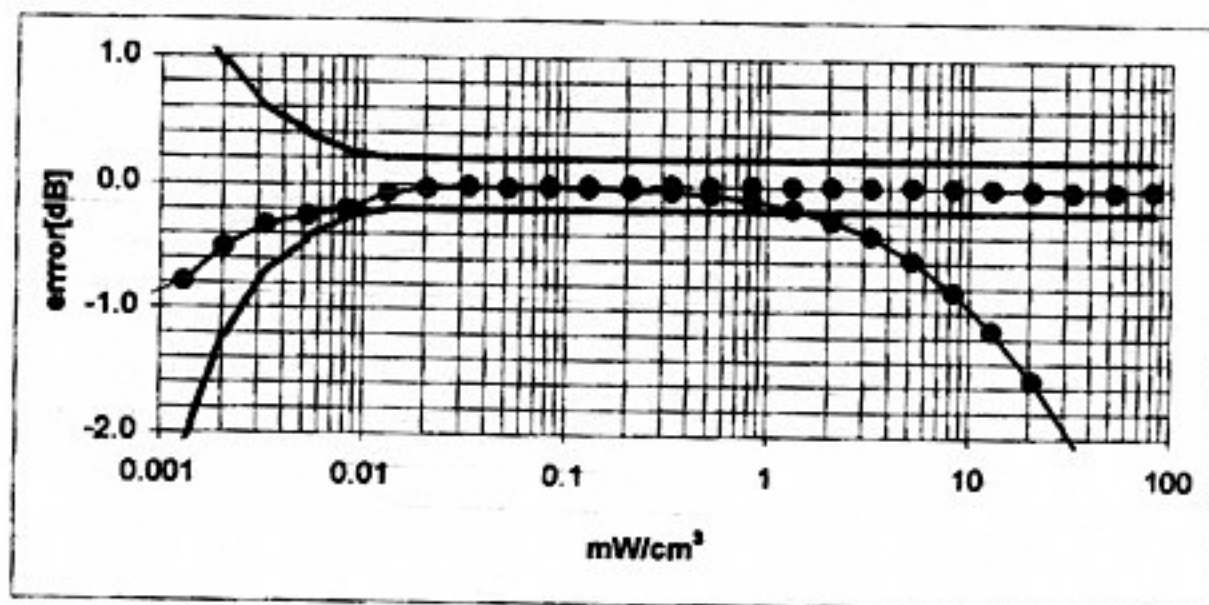
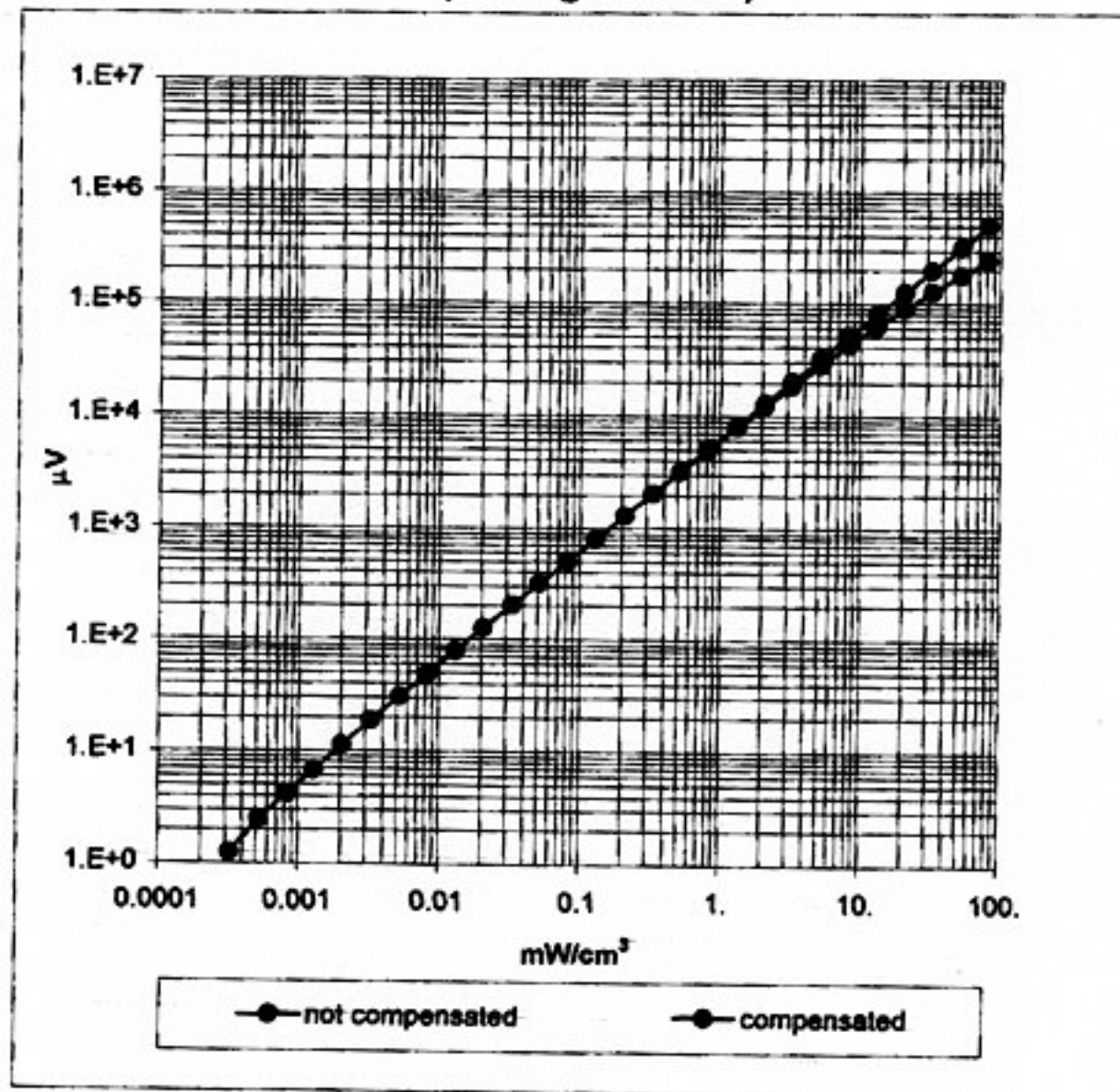


Frequency Response of E-Field

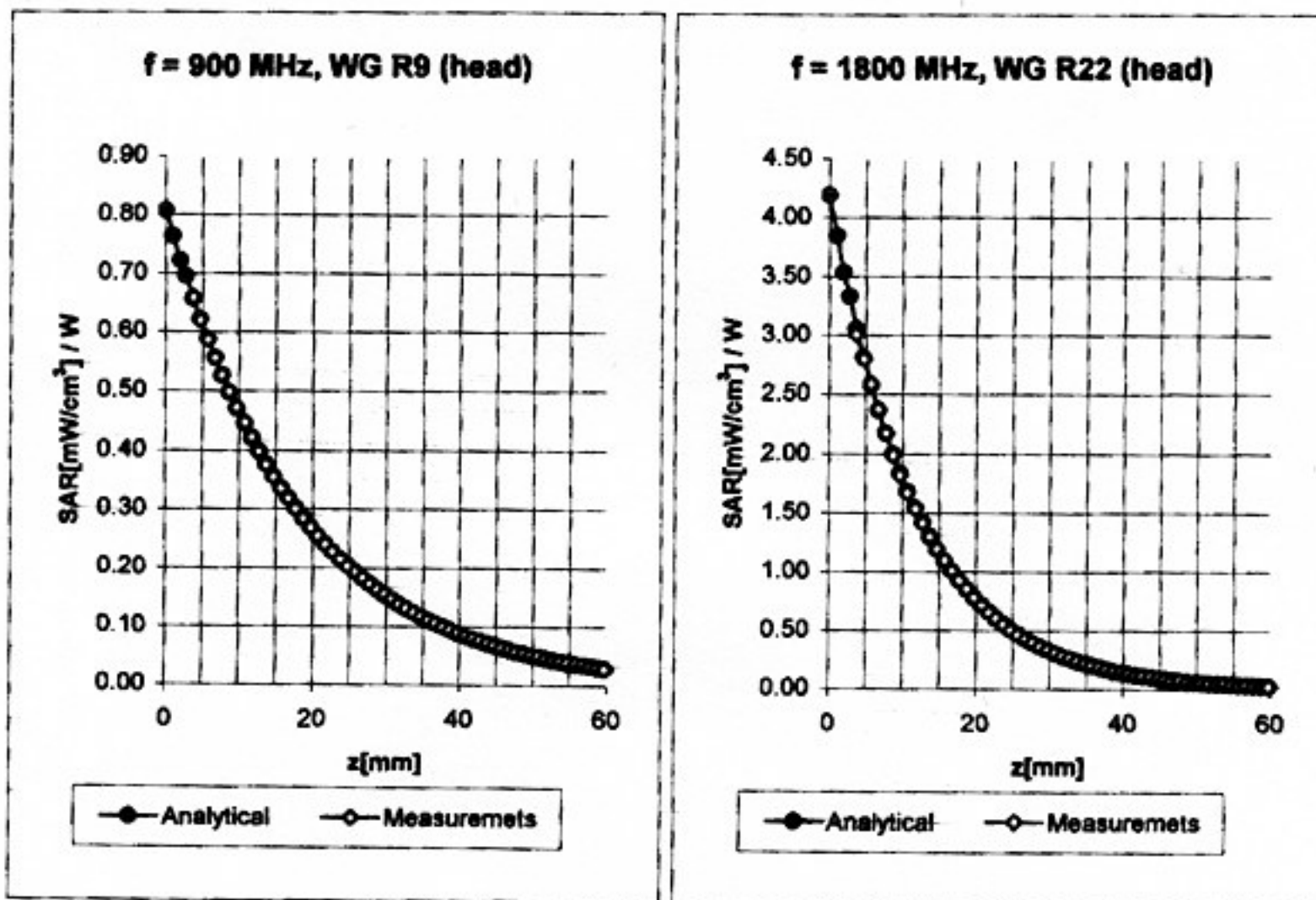
(TEM-Cell:ifi110, Waveguide R22)



Dynamic Range f(SAR_{brain}) (Waveguide R22)



Conversion Factor Assessment



| | | | |
|-------------|------------------------|-----------------------------|------------------------------|
| Head | 800 - 1000 MHz | $\epsilon_r = 39.0 - 43.5$ | $\sigma = 0.80 - 1.10$ mho/m |
| | ConvF X | 6.4 \pm 9.5% (k=2) | Boundary effect: |
| | ConvF Y | 6.4 \pm 9.5% (k=2) | Alpha 0.57 |
| | ConvF Z | 6.4 \pm 9.5% (k=2) | Depth 1.90 |
| Head | 1700 - 1910 MHz | $\epsilon_r = 39.5 - 41.0$ | $\sigma = 1.20 - 1.55$ mho/m |
| | ConvF X | 5.2 \pm 9.5% (k=2) | Boundary effect: |
| | ConvF Y | 5.2 \pm 9.5% (k=2) | Alpha 0.76 |
| | ConvF Z | 5.2 \pm 9.5% (k=2) | Depth 1.99 |

Additional Conversion Factors for Dosimetric E-Field Probe

Type:

ET3DVs

Serial Number:

1523

Place of Assessment:

Zurich

Date of Assessment:

January 28, 2002

Probe Calibration Date:

January 23, 2003

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:1523

Conversion factor (\pm standard deviation)

| | | | |
|----------|-------|--------------|---|
| 835 MHz | ConvF | 6.5 \pm 8% | $\epsilon_r = 41.5$ $\sigma = 0.90$ mho/m (head tissue) |
| 1950 MHz | ConvF | 4.9 \pm 8% | $\epsilon_r = 40.0$ $\sigma = 1.40$ mho/m (head tissue) |
| 835 MHz | ConvF | 6.3 \pm 8% | $\epsilon_r = 55.2$ $\sigma = 0.97$ mho/m (body tissue) |
| 900 MHz | ConvF | 6.2 \pm 8% | $\epsilon_r = 55.0$ $\sigma = 1.05$ mho/m (body tissue) |
| 1800 MHz | ConvF | 4.8 \pm 8% | $\epsilon_r = 53.3$ $\sigma = 1.52$ mho/m (body tissue) |
| 1950 MHz | ConvF | 4.6 \pm 8% | $\epsilon_r = 53.3$ $\sigma = 1.52$ mho/m (body tissue) |