APPENDIX A

SAR Definition

Specific Absorption Rate (SAR) is defined as the time derivative (rate) of the incremental energy (*dU*) absorbed by (dissipated in) an incremental mass (*dm*) contained in a volume element (*dV*) of a given density (*p*). It is also defined as the rate of RF energy absorption pet unit mass at a point in an absorbing body (see Fig. A.1)**.**

$$SAR = \frac{d}{dt}\left(\frac{dU}{dm}\right) = \frac{d}{dt}\left(\frac{dU}{pdv}\right)$$

Figure A.1 SAR Mathematical Equation

SAR is expressed in units of Watts per Kilogram (W/kg).

$$SAR = \sigma E^2 / p$$

Where :

σ = conductivity of the tissue-simulant material (S/m)
p = mass density of the tissue-simulant material (kg/m^3)
E = Total RMS electric field strength (V/m)

Note: The primary factors that control rate or energy absorption were found to be the wavelength of the incident field in relations to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.

APPENDIX B

Probe Calibration Process

Dosimetric Assessment Procedure

Each probe is calibrated according to a dosimetric assessment procedure described in **K. Pokovic, T.Schmid, N. Kuster, *Robust setup for precise calibration of E-field probes in tissue simulating liquids at mobile communications frequencies*, ICECOM97, Oct. 1997, pp. 120-124** with an accuracy better than +/-10%. The spherical isotropy was evaluated with the procedure described in **K. Pokovic, T.Schmid, N. Kuster, *E-field Probe with improved isotropy in brain simulating liquids*, Proceedings of the ELMAR, Zadar, June 23-25, 1996, pp. 172-175** and found to be better than +/-0.25dB. The sensitivity parameters (NormX, NormY, NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe is tested.

Free Space Assessment

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies bellow 1 GHz (see Fig. B.1), and in a waveguide above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees.

Temperature Assessment

E-field temperature correlation calibration is performed in a flat phantom flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium correlates to temperature rise in a dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe (see Fig. B.2).

$$\text{SAR} = C\frac{?T}{?t}$$

where:

Δt = exposure time (30 seconds)

C = heat capacity of tissue (brain or muscle).

ΔT = temperature increase due to RF exposure.

SAR is proportional to ΔT/ Δt, the initial rate of tissue heating, before thermal diffusion takes place. Now it's possible to quantify the electric field in the simulated tissue by equating the thermally derived SAR to the E-field;

$$\text{SAR} = \frac{|E|^2 ??}{p}$$

where:

σ = simulated tissue conductivity

p = Tissue density (1.25 g/cm^3 for brain tissue)

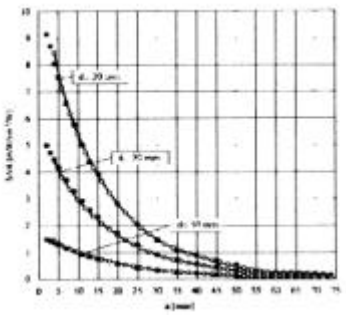


Figure B.1. E-Field and Temperature measurements at 900MHz

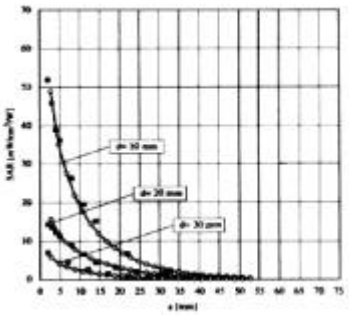


Figure B.2. E-Field and temperature measurements at 1.9GHz

APPENDIX C

ANSI/IEEE C95.1 – 1992 RF EXPOSURE LIMITS

Uncontrolled Environment

UNCONTROLLED ENVIRONMENTS are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

Controlled Environment

CONTROLLED ENVIRONMENTS are defined as locations where there is the exposure that may be incurred by persons who are aware of the potential for exposure,(i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Table C.1 Safety Limits for Partial Body Exposure

	UNCONTROLLED ENVIRONMENT General Population (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT General Population (W/kg) or (mW/g)
SPATIAL PEAK SAR [1] Brain	1.60	8.00
SPATIAL PEAK SAR [2] Whole Body	0.08	0.40
SPATIAL PEAK SAR [3] Hands,Feet,Ankles, Wrists	4.00	20.00

[1] The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as tissue volume in the shape of a cube) and over the appropriate averaging time.
[2] The Spatial Average value of the SAR averaged over the whole body.
[3] The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

APPENDIX D

Test Sample Photographs

APPENDIX E

Test Setup Photographs

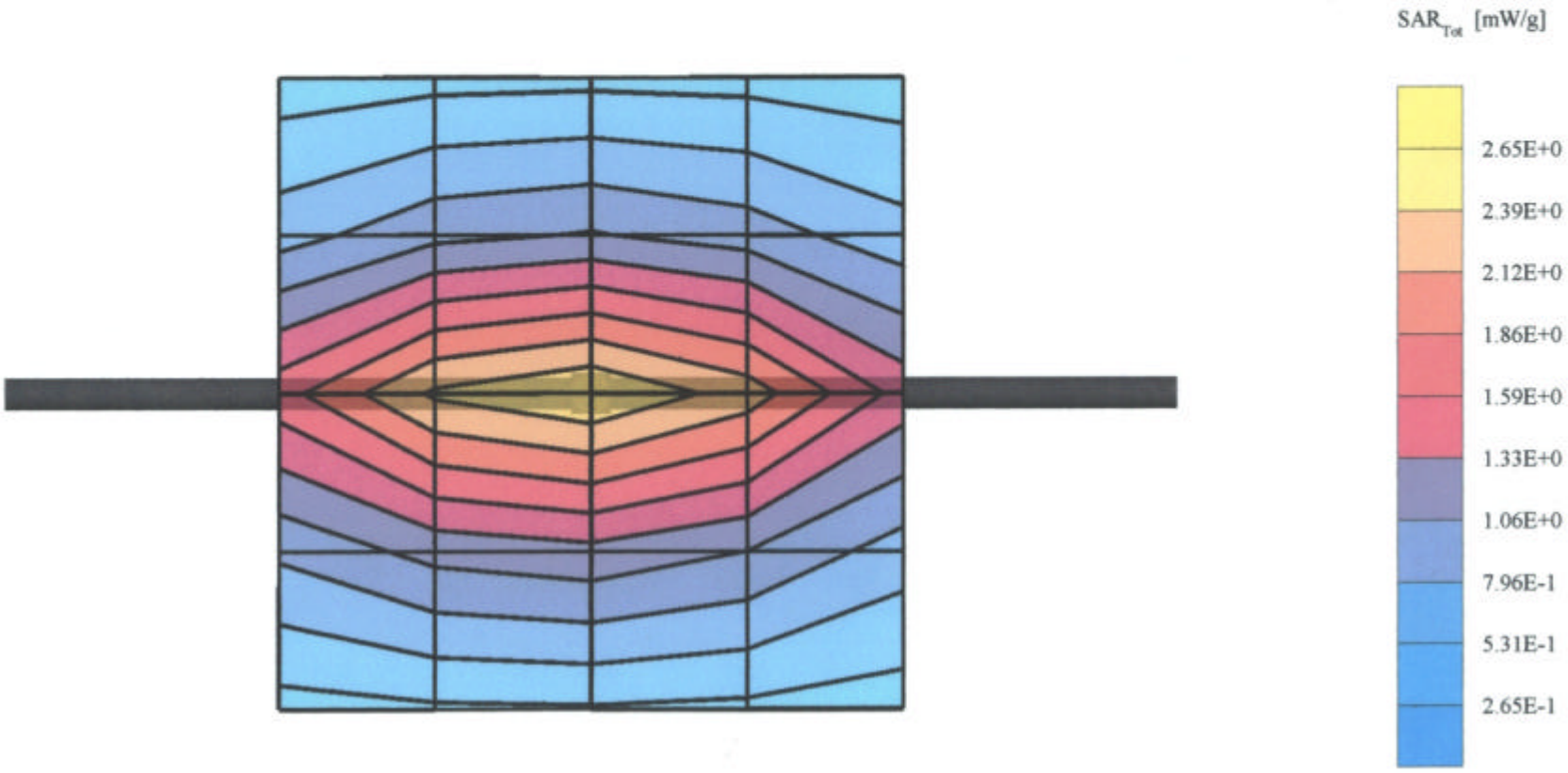
APPENDIX F

The Validation Measurements

835MHz Brain Dipole Validation

SAM Phantom; FlatSection; Probe: ET3DV6 - SN1551 -- ConvF(6.80,6.80,6.80)
Head 835 MHz: $\sigma = 0.87$ mho/m $\varepsilon_r = 39.8$ $\rho = 1.00$ g/cm^3;Crest factor: 1.0
SAR (1g): 2.45 mW/g

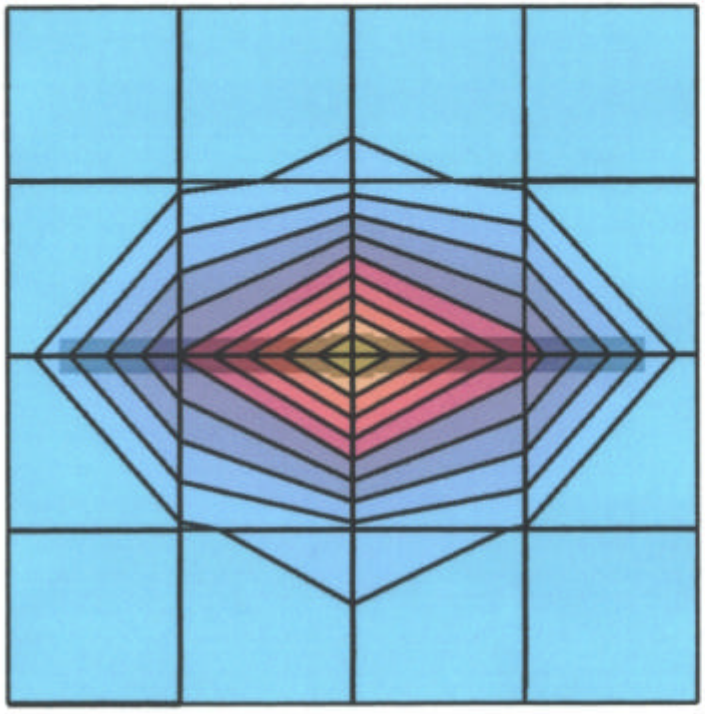
835MHz Brain Dipole Validation (D835V2 S/N:451)
Frequency: 835 MHz; Antenna Input Power: 250 [mW]; Ambient Temp. (°C) - 22.2; Tissue Temp. (°C) - 20.9
Brain Tissue Simulating Liquid [04/24/2003]

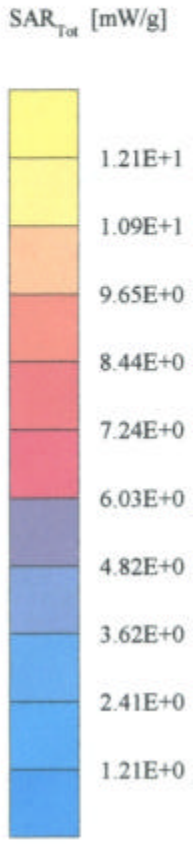


1900MHz Brain Dipole Validation

SAM Phantom; FlatSection; Probe: ET3DV6 - SN1551 -- ConvF(5.30,5.30,5.30)
Head 1900 MHz: σ = 1.41 mho/m ε_r = 38.6 ρ = 1.00 g/cm^3;Crest factor: 1.0
SAR (1g): 10.4 mW/g

1900MHz Brain Dipole Validation (D1900V2 S/N:548)
Frequency: 1900 MHz; Antenna Input Power: 250 [mW]; Ambient Temp. (°C) - 21.9; Tissue Temp. (°C) - 20.8
Brain Tissue Simulating Liquid [04/23/2003]





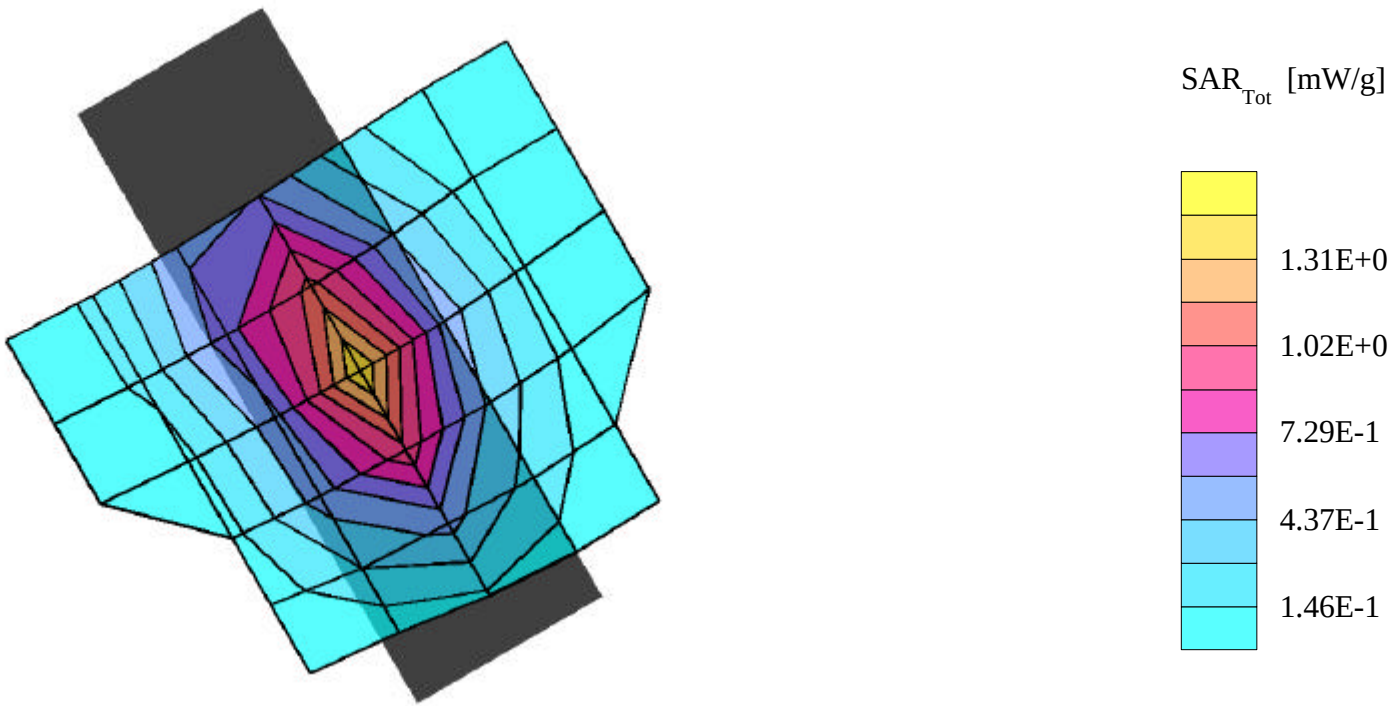
APPENDIX G

Plots of The SAR Measurements

SAMSUNG FCC ID: A3LSPHA640 -- 835MHz. AMPS Head SAR

SAM Phantom; Right Cheek(CRP) Section; Probe:ET3DV6 - SN1551; ConvF(6.80,6.80,6.80)
Head 835 MHz: σ = 0.87 mho/m ε_r = 39.8 ρ = 1.00 g/cm^3; Antenna: Fixed; Crest Factor 1.0
SAR (1g): 1.28 mW/g

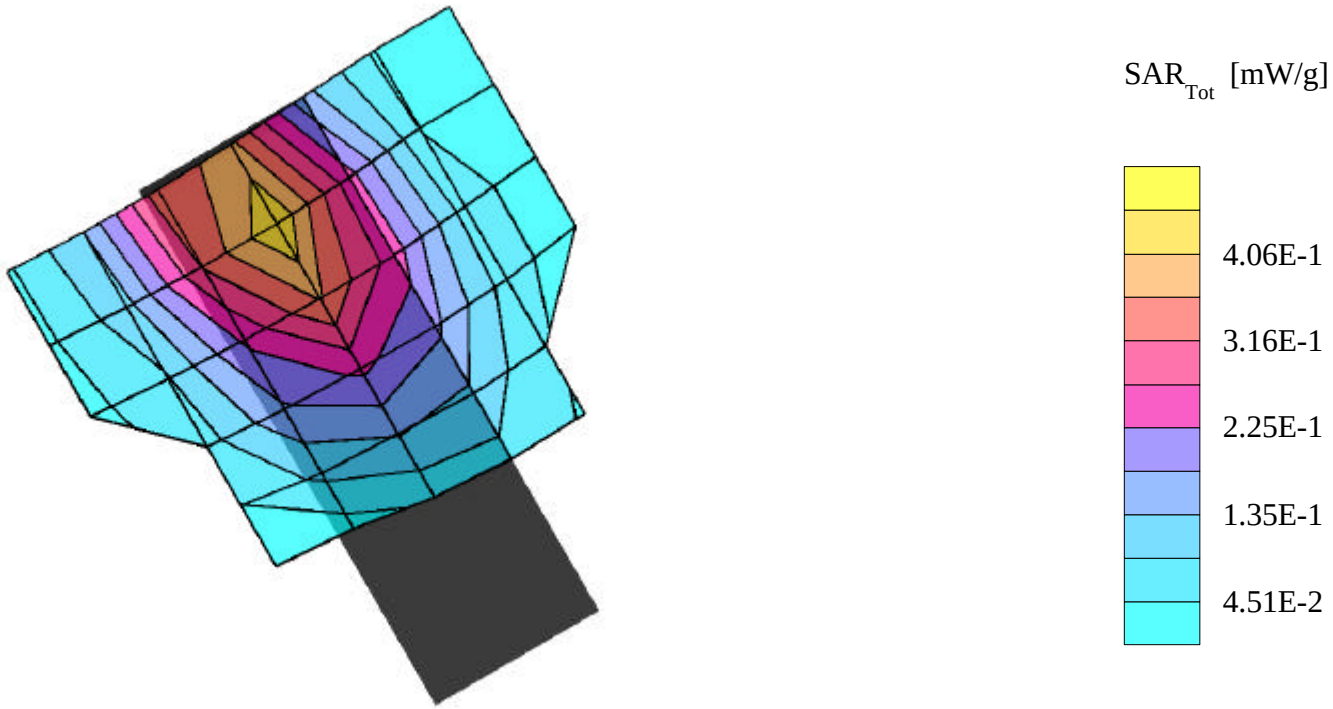
SAMSUNG Tri Mode/Dual-Band Phone (AMPS/CDMA/PCS); Model: SPH-A640
AMPS Mode, Ch. 991[1824.04MHz.]; Standard Battery; Ambient Temp. (°C) - 22.1 Meas.Tissue Temp.(°C) - 20.9
Conducted Power = 26.0dBm; Right Head Phantom, Cheek/Touch Position; Flip = Open
Test Date -- 04/24/2003 [FCC/OET Bulletin 65 - Supplement C, July 2001]



SAMSUNG FCC ID: A3LSPHA640 -- 835MHz. AMPS Head SAR

SAM Phantom; Right Cheek(CRP) Section; Probe:ET3DV6 - SN1551; ConvF(6.80,6.80,6.80)
Head 835 MHz: σ = 0.87 mho/m ε_r = 39.8 ρ = 1.00 g/cm^3; Antenna; Fixed; Crest Factor 1.0
SAR (1g): 0.419 mW/g

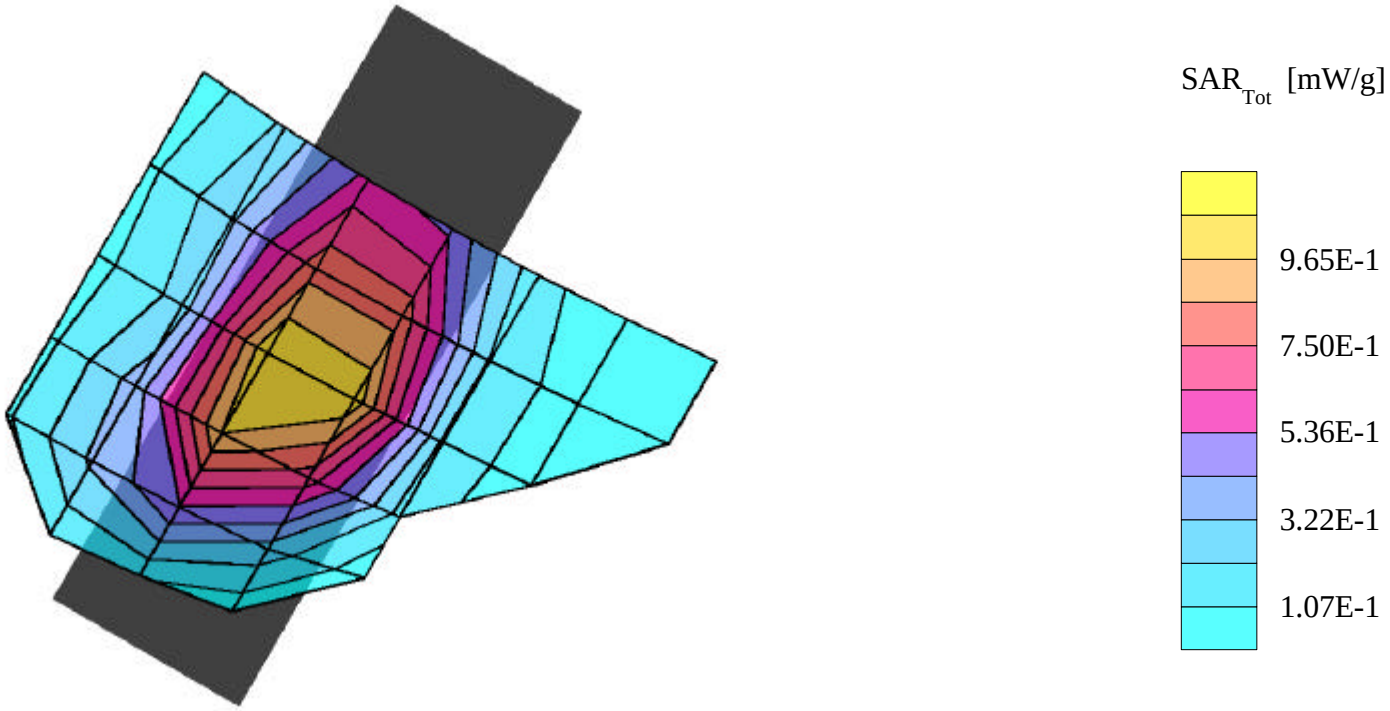
SAMSUNG Tri Mode/Dual-Band Phone (AMPS/CDMA/PCS); Model: SPH-A640
AMPS Mode, Ch. 991[1824.04MHz.]; Standard Battery; Ambient Temp. (°C) - 22.1 Meas.Tissue Temp.(°C) - 20.9
Conducted Power = 26.0dBm; Right Head Phantom, Ear/Tilt 15 deg position; Flip = Open
Test Date -- 04/24/2003 [FCC/OET Bulletin 65 - Supplement C, July 2001]



SAMSUNG FCC ID: A3LSPHA640 -- 835MHz. AMPS Head SAR

SAM Phantom; Left Cheek(CRP) Section; Probe:ET3DV6 - SN1551; ConvF(6.80,6.80,6.80)
Head 835 MHz: σ = 0.87 mho/m ε_r = 39.8 ρ = 1.00 g/cm^3 ; Antenna: fixed; Crest Factor 1.0
SAR (1g): 1.17 mW/g

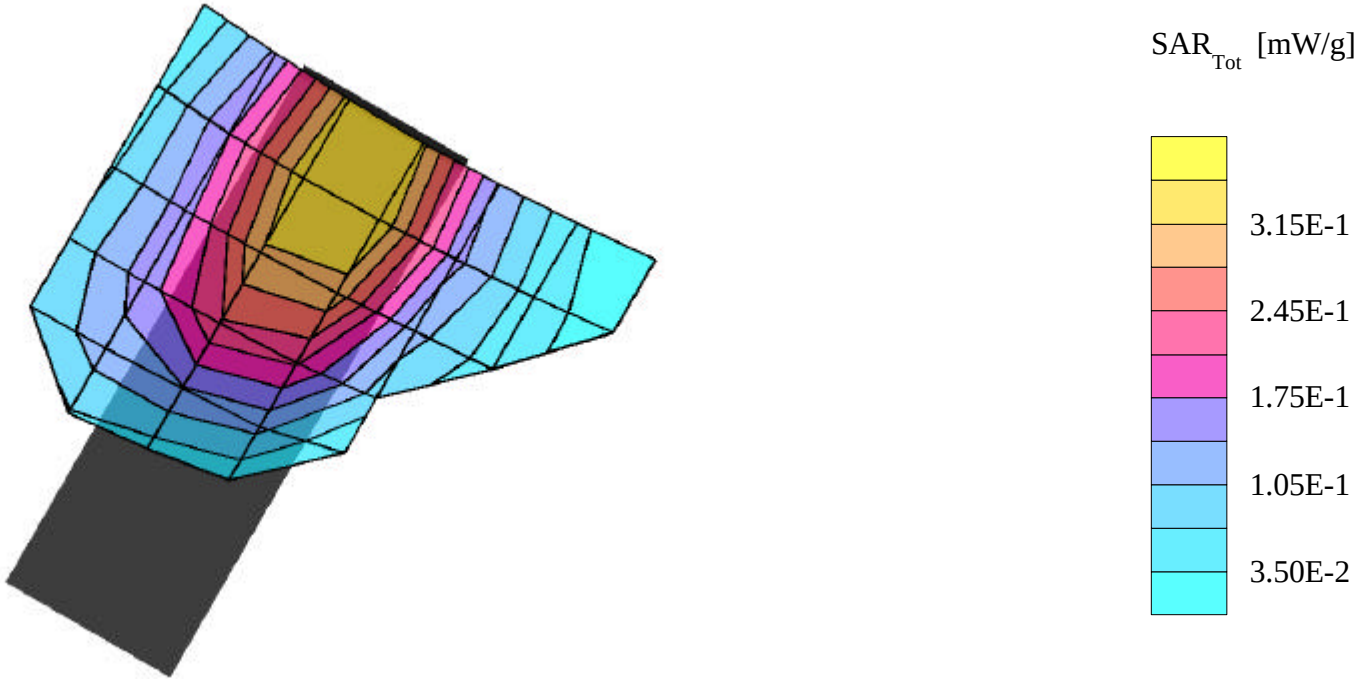
SAMSUNG Tri Mode/Dual-Band Phone (AMPS/CDMA/PCS); Model: SPH-A640
AMPS Mode, Ch. 991[1824.04MHz.]; Standard Battery; Ambient Temp. (°C) - 22.1 Meas.Tissue Temp.(°C) - 20.9
Conducted Power = 26.0dBm; Left Head Phantom, Cheek/Touch Position; Flip = Open
Test Date -- 04/24/2003 [FCC/OET Bulletin 65 - Supplement C, July 2001]



SAMSUNG FCC ID: A3LSPHA640 -- 835MHz. AMPS Head SAR

SAM Phantom; Left Cheek(CRP) Section; Probe:ET3DV6 - SN1551; ConvF(6.80,6.80,6.80)
Head 835 MHz: σ = 0.87 mho/m ε_r = 39.8 ρ = 1.00 g/cm^3; Antenna: Fixed; Crest Factor 1.0
SAR (1g): 0.360 mW/g

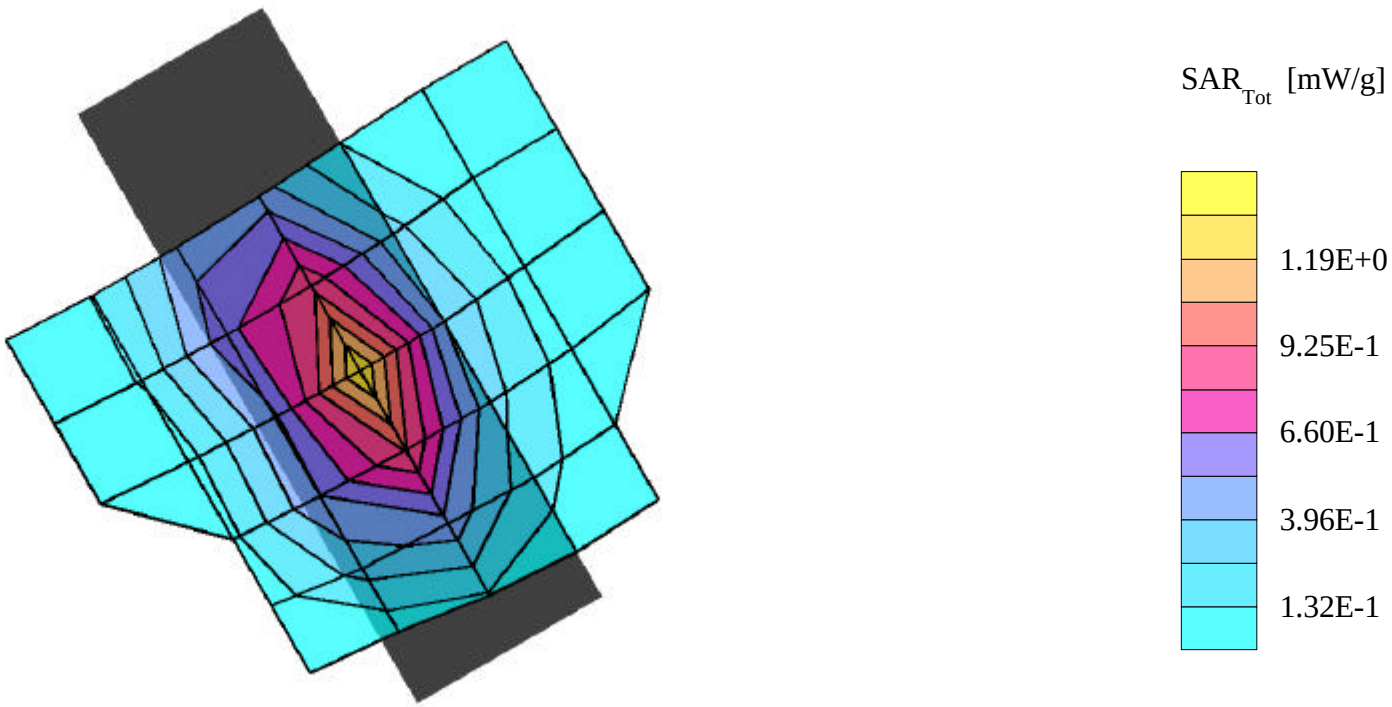
SAMSUNG Tri Mode/Dual-Band Phone (AMPS/CDMA/PCS); Model: SPH-A640
AMPS Mode, Ch. 991[1824.04MHz.]; Standard Battery; Ambient Temp. (°C) - 22.1 Meas.Tissue Temp. (°C) - 20.9
Conducted Power = 26.0dBm; Left Head Phantom, Ear/Tilt 15 deg position; Flip = Open
Test Date -- 04/24/2003 [FCC/OET Bulletin 65 - Supplement C, July 2001]



SAMSUNG FCC ID: A3LSPHA640 -- 835MHz. CDMA Head SAR

SAM Phantom; Right Cheek(CRP) Section; Probe:ET3DV6 - SN1551; ConvF(6.80,6.80,6.80)
Head 835 MHz: σ = 0.87 mho/m ε_r = 39.8 ρ = 1.00 g/cm^3 ; Antenna: Fixed; Crest Factor 1.0
SAR (1g): 1.16 mW/g

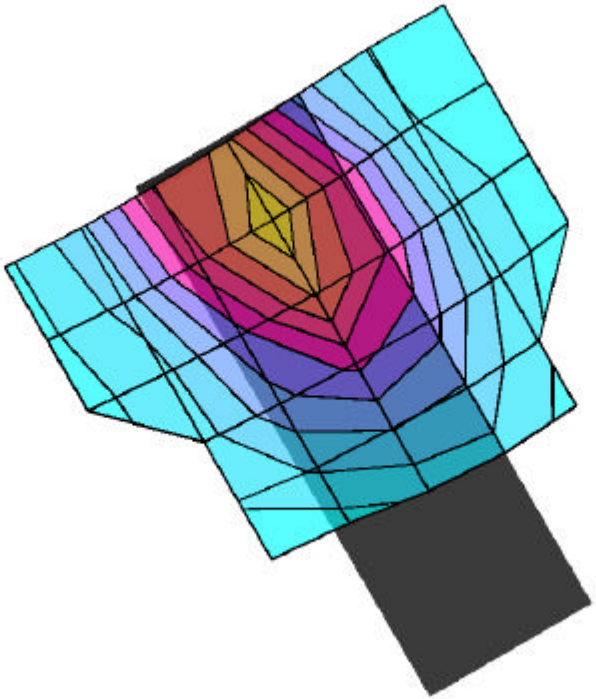
SAMSUNG Tri Mode/Dual-Band Phone (AMPS/CDMA/PCS); Model: SPH-A640
CDMA Mode, Ch.777 [848.31MHz.]; Standard Battery; Ambient Temp. (°C) - 22.1 Meas.Tissue Temp. (°C) - 20.9
Conducted Power = 25.5dBm; Right Head Phantom, Cheek/Touch Position; Flip = Open
Test Date -- 04/24/2003 [FCC/OET Bulletin 65 - Supplement C, July 2001]

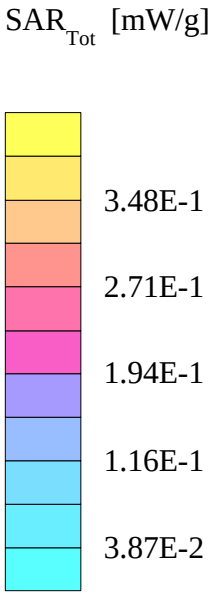


SAMSUNG FCC ID: A3LSPHA640 -- 835MHz. CDMA Head SAR

SAM Phantom; Right Cheek(CRP) Section; Probe:ET3DV6 - SN1551; ConvF(6.80,6.80,6.80)
Head 835 MHz: σ = 0.87 mho/m ε_r = 39.8 ρ = 1.00 g/cm^3; Antenna: Fixed Crest Factor 1.0
SAR (1g): 0.358 mW/g

SAMSUNG Tri Mode/Dual-Band Phone (AMPS/CDMA/PCS); Model: SPH-A640
CDMA Mode, Ch.1013[824.7MHz.]; Standard Battery; Ambient Temp. (°C) - 22.1 Meas.Tissue Temp. (°C) - 20.9
Conducted Power = 25.5dBm; Right Head Phantom, Ear/Tilt 15 deg position; Flip = Open
Test Date -- 04/24/2003 [FCC/OET Bulletin 65 - Supplement C, July 2001]

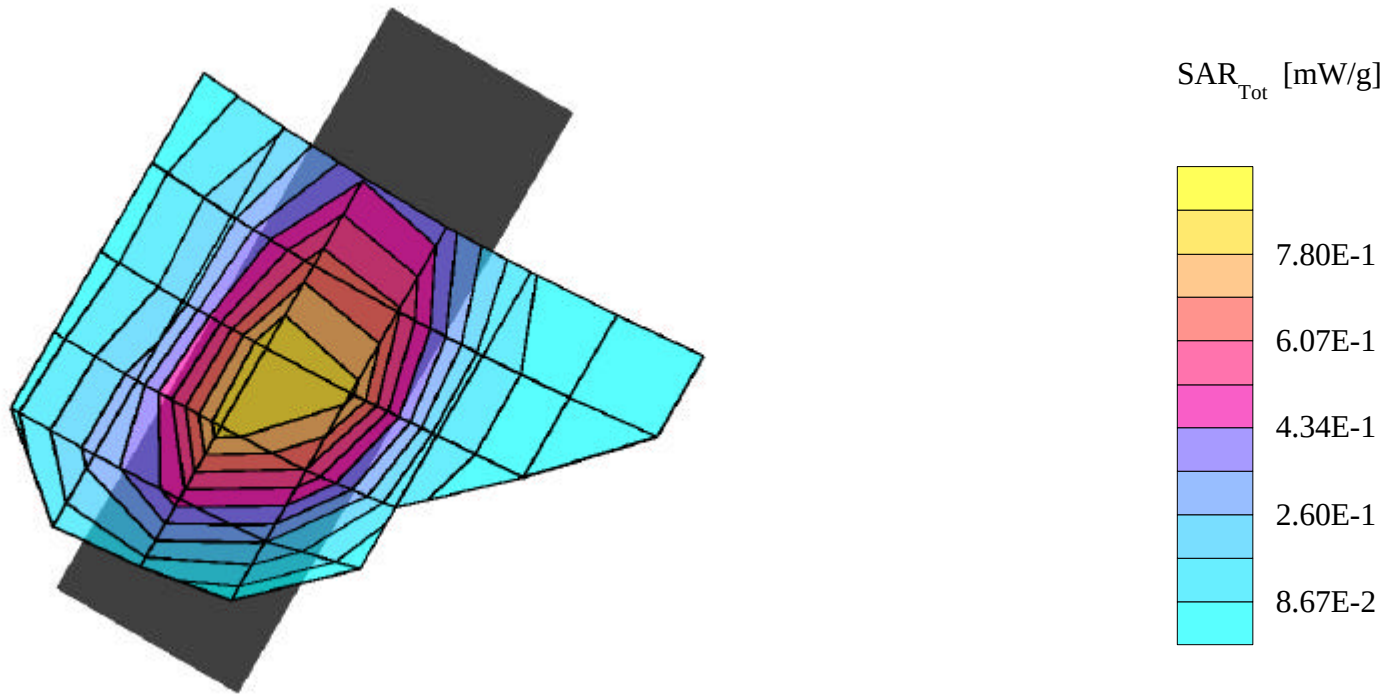




SAMSUNG FCC ID: A3LSPHA640 -- 835MHz. CDMA Head SAR

SAM Phantom; Left Cheek(CRP) Section; Probe:ET3DV6 - SN1551; ConvF(6.80,6.80,6.80)
Head 835 MHz: σ = 0.87 mho/m ε_r = 39.8 ρ = 1.00 g/cm^3; Antenna: Fixed; Crest Factor 1.0
SAR (1g): 0.969 mW/g

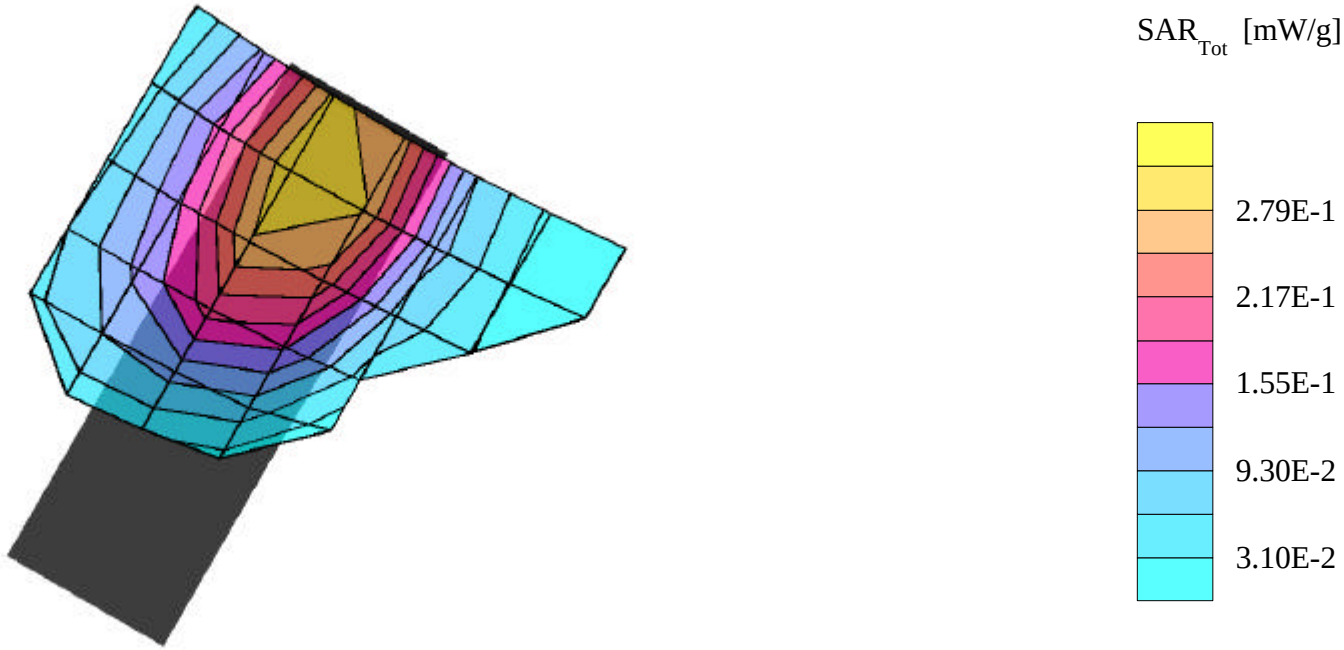
SAMSUNG Tri Mode/Dual-Band Phone (AMPS/CDMA/PCS); Model: SPH-A640
CDMA Mode, Ch.777 [848.31MHz.]; Standard Battery; Ambient Temp. (°C) - 22.1 Meas.Tissue Temp. (°C) - 20.9
Conducted Power = 25.5dBm; Left Head Phantom, Cheek/Touch Position; Flip = Open
Test Date -- 04/24/2003 [FCC/OET Bulletin 65 - Supplement C, July 2001]



SAMSUNG FCC ID: A3LSPHA640 -- 835MHz. CDMA Head SAR

SAM Phantom; Left Cheek(CRP) Section; Probe:ET3DV6 - SN1551; ConvF(6.80,6.80,6.80)
Head 835 MHz: σ = 0.87 mho/m ε_r = 39.8 ρ = 1.00 g/cm^3 ; Antenna; Fixed; Crest Factor 1.0
SAR (1g): 0.313 mW/g

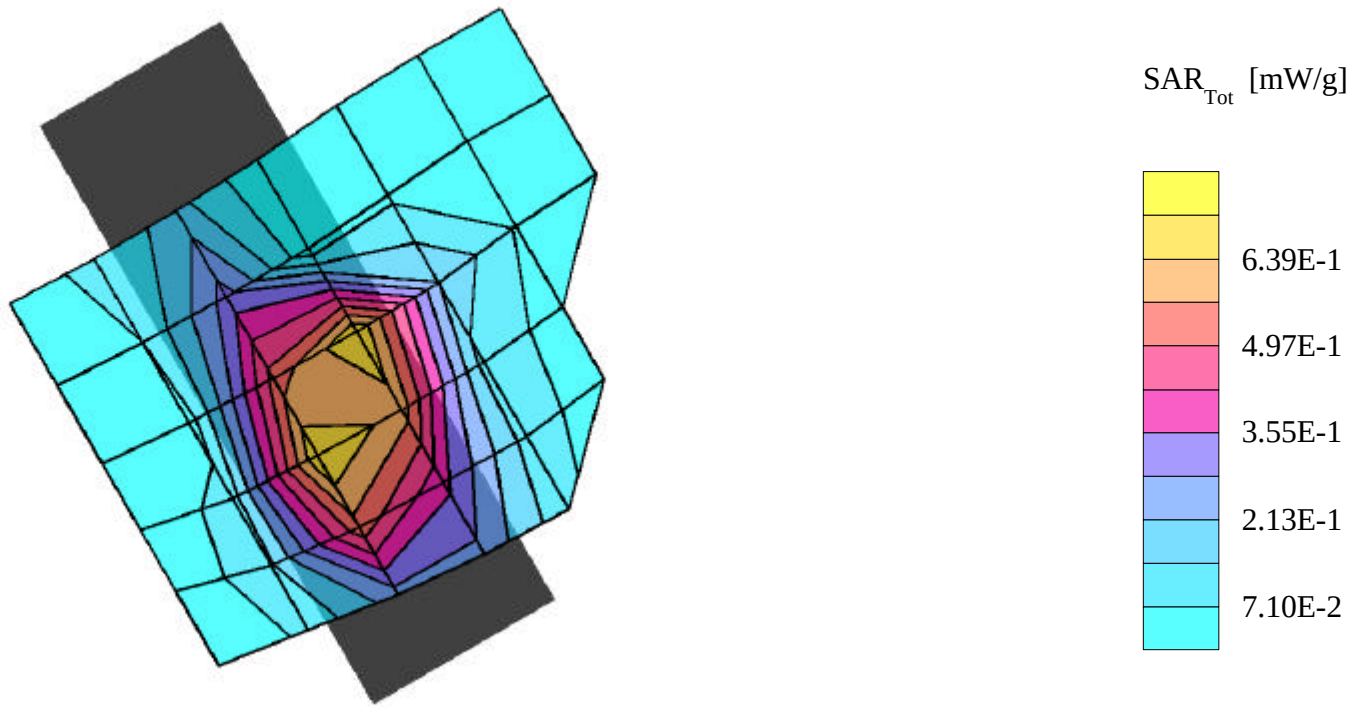
SAMSUNG Tri Mode/Dual-Band Phone (AMPS/CDMA/PCS); Model: SPH-A640
CDMA Mode, Ch.777 [848.31MHz.]; Standard Battery; Ambient Temp. (°C) - 22.1 Meas.Tissue Temp. (°C) - 20.9
Conducted Power = 25.5dBm; Left Head Phantom, Ear/Tilt 15 deg position; Flip = Open
Test Date -- 04/24/2003 [FCC/OET Bulletin 65 - Supplement C, July 2001



SAMSUNG FCC ID: A3LSPHA640 -- 1900MHz.PCS CDMA Head SAR

SAM Phantom; Right Cheek(CRP) Section; Probe:ET3DV6 - SN1551; ConvF(5.30,5.30,5.30)
Head 1900 MHz: σ = 1.41 mho/m ε_r = 38.6 ρ = 1.00 g/cm^3; Antenna: Fixed; Crest Factor 1.0
SAR (1g): 0.993 mW/g

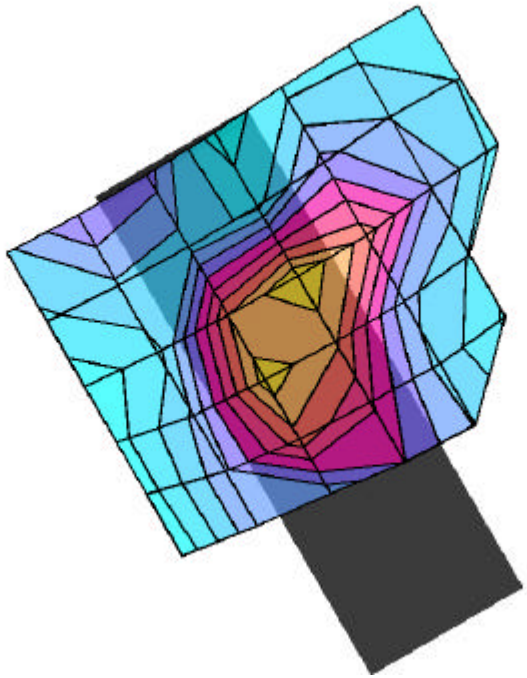
SAMSUNG Tri Mode/Dual-Band Phone (AMPS/CDMA/PCS); Model: SPH-A640
PCS Mode, Ch.600 [1880.00MHz.]; Standard Battery; Ambient Temp. (°C) - 22.0 Meas.Tissue Temp. (°C) - 20.8
Conducted Power = 24.5dBm; Right Head Phantom, Cheek/Touch Position; Flip = Open
Test Date -- 04/23/2003 [FCC/OET Bulletin 65 - Supplement C, July 2001]

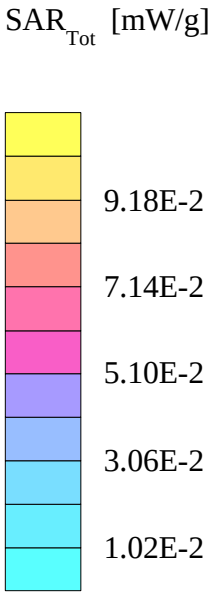


SAMSUNG FCC ID: A3LSPHA640 -- 1900MHz.PCS CDMA Head SAR

SAM Phantom; Right Cheek(CRP) Section; Probe:ET3DV6 - SN1551; ConvF(5.30,5.30,5.30)
Head 1900 MHz: σ = 1.41 mho/m ε_r = 38.6 ρ = 1.00 g/cm^3; Antenna:fixed; Crest Factor 1.0
SAR (1g): 0.110 mW/g

SAMSUNG Tri Mode/Dual-Band Phone (AMPS/CDMA/PCS); Model: SPH-A640
PCS Mode, Ch.600 [1880.00MHz.]; Standard Battery; Ambient Temp. (°C) - 22.0 Meas.Tissue Temp. (°C) - 20.8
Conducted Power = 24.5dBm; Right Head Phantom, Ear/Tilt 15 deg position; Flip = Open
Test Date -- 04/23/2003 [FCC/OET Bulletin 65 - Supplement C, July 2001]

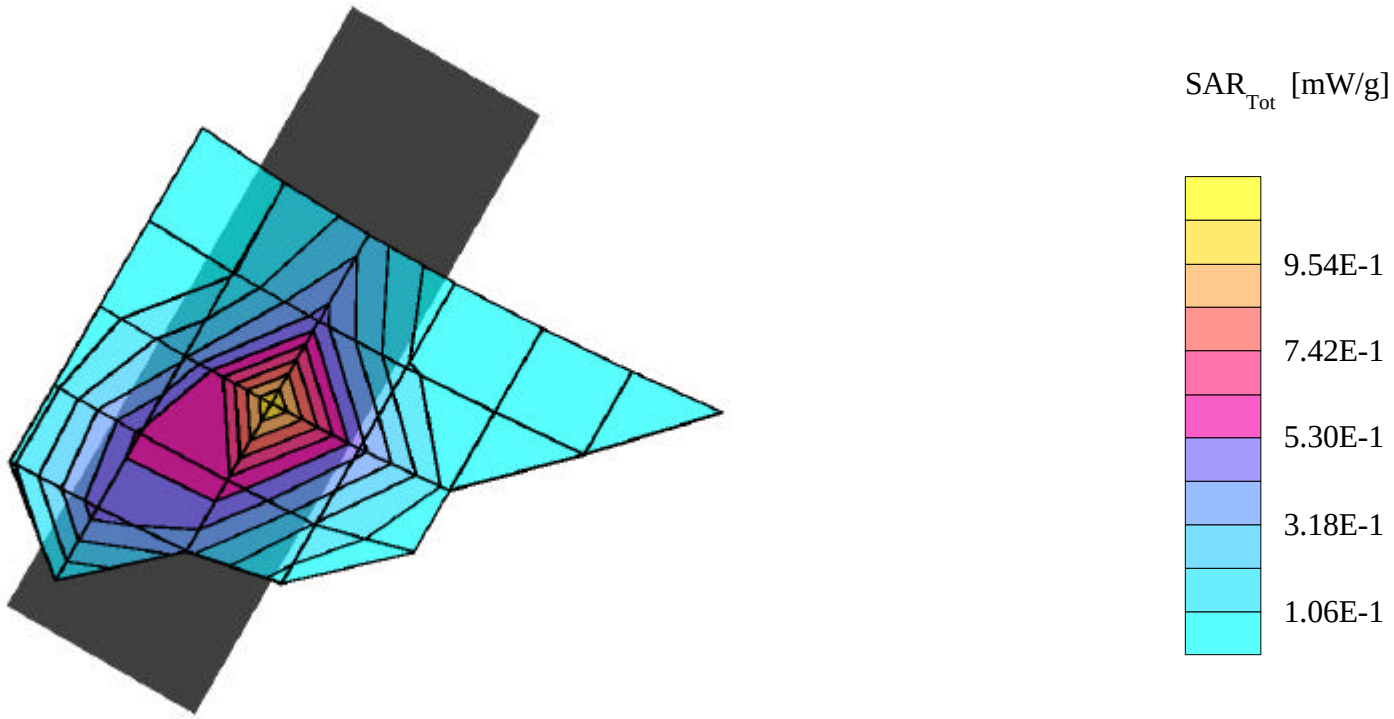




SAMSUNG FCC ID: A3LSPHA640 -- 1900MHz.PCS CDMA Head SAR

SAM Phantom; Left Cheek(CRP) Section; Probe:ET3DV6 - SN1551; ConvF(5.30,5.30,5.30)
Head 1900 MHz: σ = 1.41 mho/m ε_r = 38.6 ρ = 1.00 g/cm^3; Antenna: Fixed; Crest Factor 1.0
SAR (1g): 0.945 mW/g

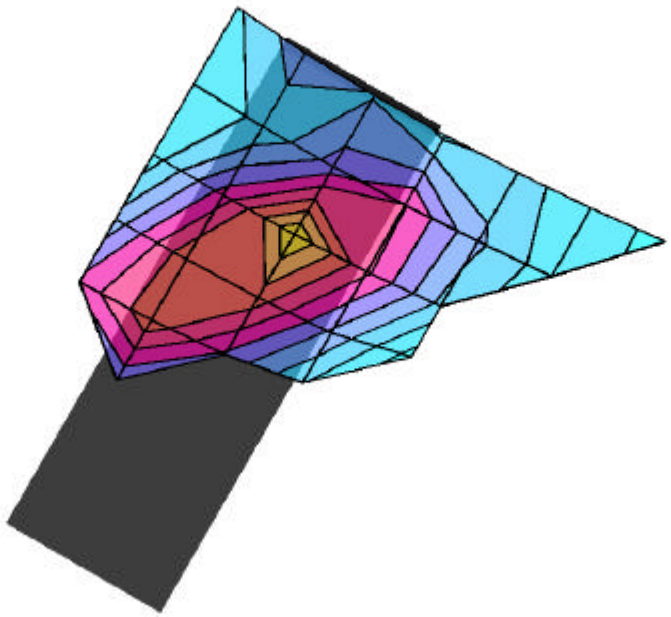
SAMSUNG Tri Mode/Dual-Band Phone (AMPS/CDMA/PCS); Model: SPH-A640
PCS Mode, Ch.600 [1880.00MHz.]; Standard Battery; Ambient Temp. (°C) - 22.0 Meas.Tissue Temp. (°C) - 20.8
Conducted Power = 24.5dBm; Left Head Phantom, Cheek/Touch Position; Flip = Open
Test Date -- 04/23/2003 [FCC/OET Bulletin 65 - Supplement C, July 2001]

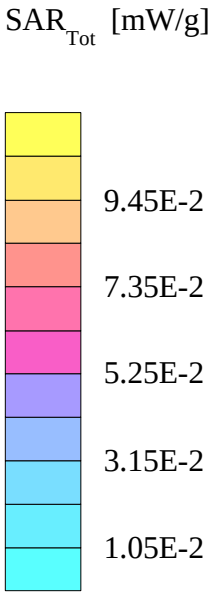


SAMSUNG FCC ID: A3LSPHA640 -- 1900MHz.PCS CDMA Head SAR

SAM Phantom; Left Cheek(CRP) Section; Probe:ET3DV6 - SN1551; ConvF(5.30,5.30,5.30)
Head 1900 MHz: σ = 1.41 mho/m ε_r = 38.6 ρ = 1.00 g/cm^3; Antenna: Fixed; Crest Factor 1.0
SAR (1g): 0.0937 mW/g

SAMSUNG Tri Mode/Dual-Band Phone (AMPS/CDMA/PCS); Model: SPH-A640
PCS Mode, Ch.600 [1880.00MHz.]; Standard Battery; Ambient Temp. (°C) - 22.0 Meas.Tissue Temp.(°C) - 20.9
Conducted Power = 24.5dBm; Left Head Phantom, Ear/Tilt 15 deg position; Flip = Open
Test Date -- 04/23/2003 [FCC/OET Bulletin 65 - Supplement C, July 2001]





SAMSUNG FCC ID: A3LSPHA640 -- 835MHz. AMPS Body SAR

SAM Phantom; Flat Section; Probe:ET3DV6 - SN1551; ConvF(6.60,6.60,6.60)

Body 835 MHz: σ = 0.95 mho/m ε_r = 54.8 ρ = 1.00 g/cm^3; Antenna-Fixed; Crest Factor 1.0

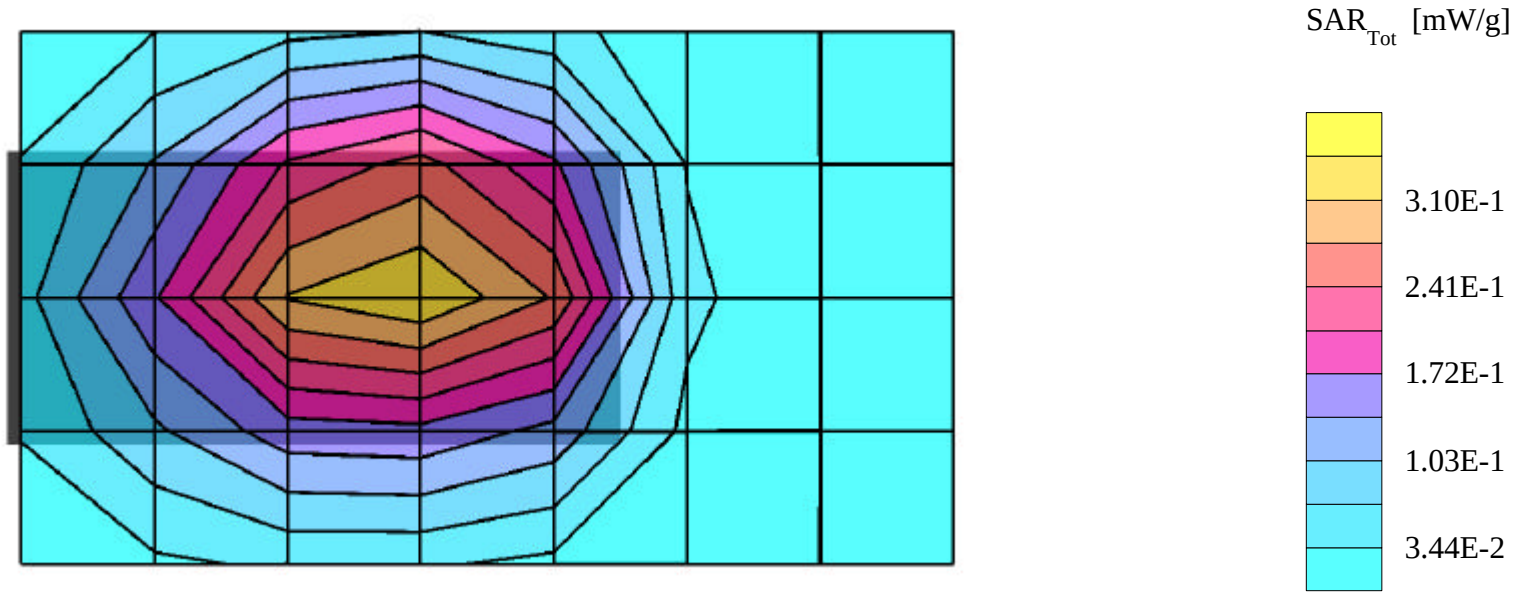
SAR (1g): 0.332 mW/g

SAMSUNG Tri-Mode/Dual Band (AMPS/CDMA/PCS) Phone Model: SCH-A640

Amps Mode, Ch.991 824.04MHz]; Standard Battery; Ambient Temp. (°C) - 21.9 Tissue Temp.(°C) - 20.9

Conducted Power = 26.0dBm; Spacing = 1.5cm from flat phantom to phone, w/o beltclip or holster

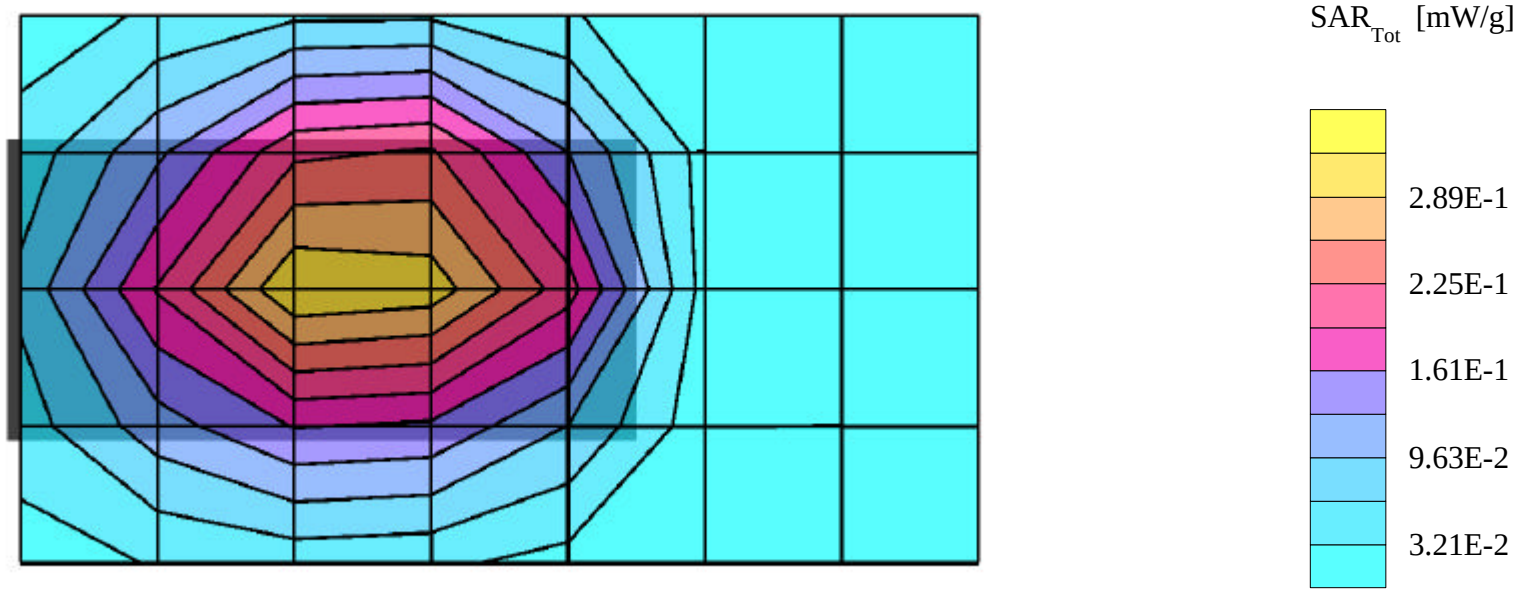
Test Date -- 04/25/2003 [FCC/OET Bulletin 65 - Supplement C, July 2001]



SAMSUNG FCC ID: A3LSPHA640 -- 835MHz. CDMA Body SAR

SAM Phantom; Flat Section; Probe:ET3DV6 - SN1551; ConvF(6.60,6.60,6.60)
Body 835 MHz: σ = 0.95 mho/m ε_r = 54.8 ρ = 1.00 g/cm^3; Antenna-Fixed; Crest Factor 1.0
SAR (1g): 0.307 mW/g

SAMSUNG Tri-Mode/Dual Band (AMPS/CDMA/PCS) Phone Model: SCH-A640
CDMA Mode, Ch.777 [848.31MHz]; Standard Battery; Ambient Temp. (°C) - 21.9 Tissue Temp.(°C) - 20.8
Conducted Power = 25.5dBm; Spacing = 1.5cm from flat phantom to phone, w/o beltclip or holster
Test Date -- 04/25/2003 [FCC/OET Bulletin 65 - Supplement C, July 2001]



SAMSUNG FCC ID: A3LSPHA640 -- 1900MHz.PCS CDMA Body SAR

SAM Phantom; Flat Section; Probe:ET3DV6 - SN1551; ConvF(4.90,4.90,4.90)

Body 1900 MHz: σ = 1.56 mho/m ε_r = 51.3 ρ = 1.00 g/cm^3; Antenna-Fixed; Crest Factor 1.0

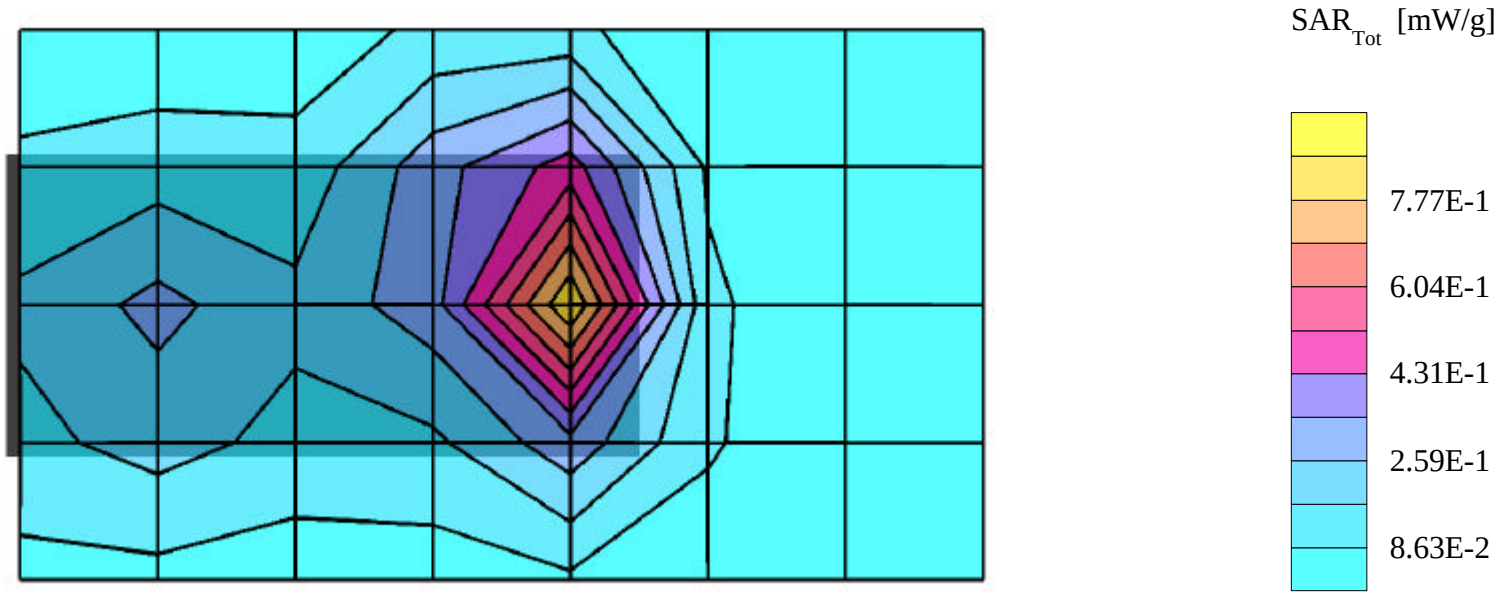
SAR (1g): 0.744 mW/g

SAMSUNG Tri-Mode/Dual Band (AMPS/CDMA/PCS) Phone Model: SCH-A640

PCS Mode, Ch.25 [1851.25MHz]; Standard Battery; Ambient Temp. (°C) - 22.1 Tissue Temp.(°C) - 20.80.8

Conducted Power = 24.5dBm; Spacing = 1.5cm from flat phantom to phone, w/o beltclip or holster;

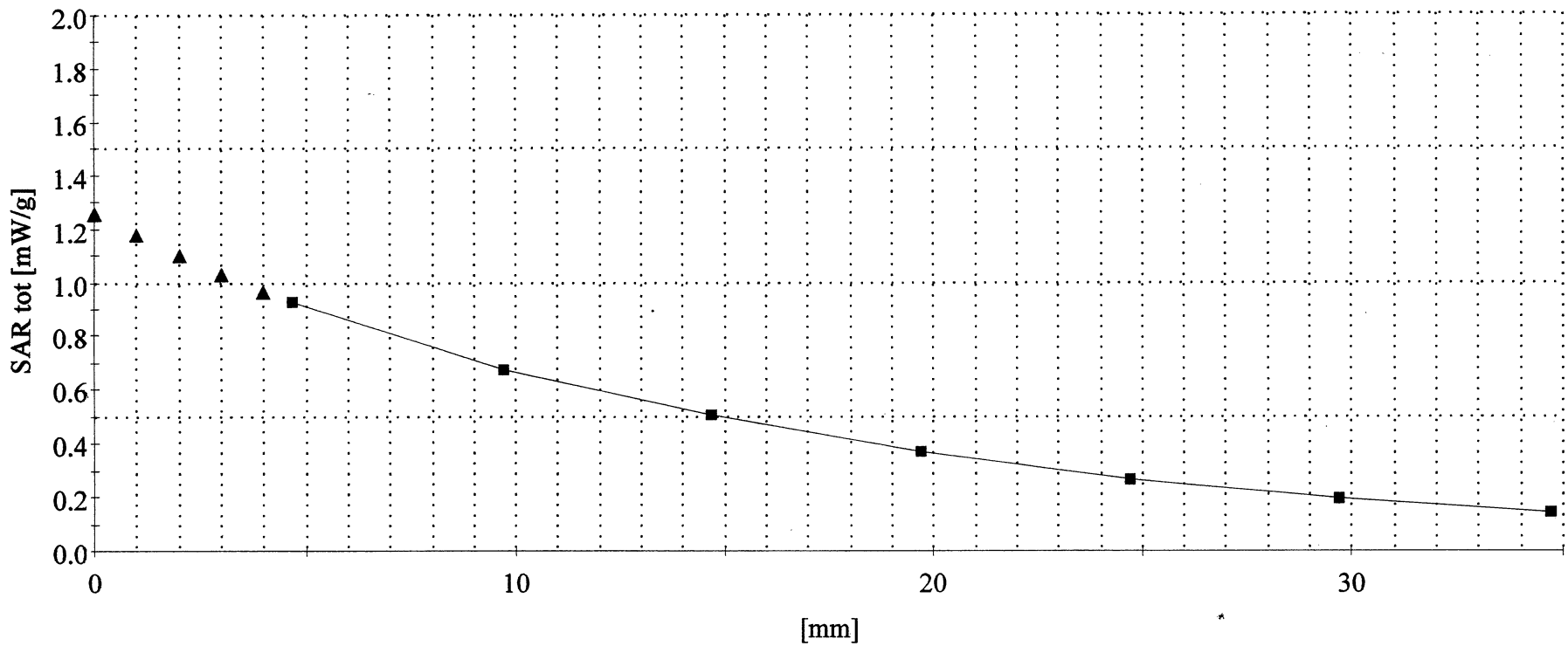
Test Date -- 04/25/2003 [FCC/OET Bulletin 65 - Supplement C, July 2001]



SAMSUNG FCC ID: A3LSPHA640 -- 835MHz. AMPS Head SAR

SAM Phantom; Right Cheek(CRP) Section; Probe:ET3DV6 - SN1551; ConvF(6.80,6.80,6.80)
Head 835 MHz: $\sigma = 0.87$ mho/m $\varepsilon_r = 39.8$ $\rho = 1.00$ g/cm^3 ; Antenna: Fixed; Crest Factor 1.0
SAR (1g): 1.28 mW/g

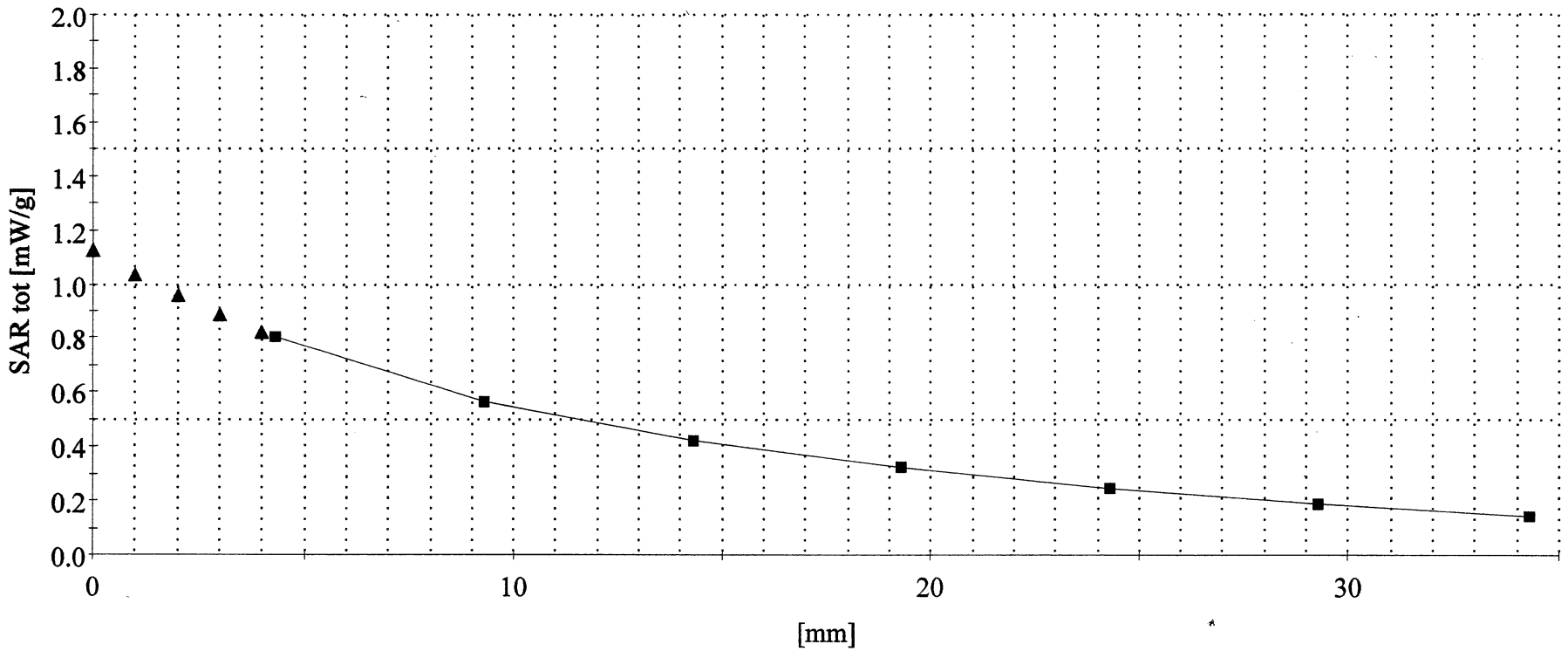
SAMSUNG Tri Mode/Dual-Band Phone (AMPS/CDMA/PCS); Model: SPH-A640
AMPS Mode, Ch. 991[1824.04MHz.]; Standard Battery; Ambient Temp. (°C) - 22.1 Meas.Tissue Temp.(°C) - 20.9
Conducted Power = 26.0dBm; Right Head Phantom, Cheek/Touch Position; Flip = Open
Test Date -- 04/24/2003 [FCC/OET Bulletin 65 - Supplement C, July 2001]



SAMSUNG FCC ID: A3LSPHA640 -- 835MHz. CDMA Head SAR

SAM Phantom; Right Cheek(CRP) Section; Probe:ET3DV6 - SN1551; ConvF(6.80,6.80,6.80)
Head 835 MHz: $\sigma = 0.87$ mho/m $\varepsilon_r = 39.8$ $\rho = 1.00$ g/cm^3 ; Antenna: Fixed; Crest Factor 1.0
SAR (1g): 1.16 mW/g

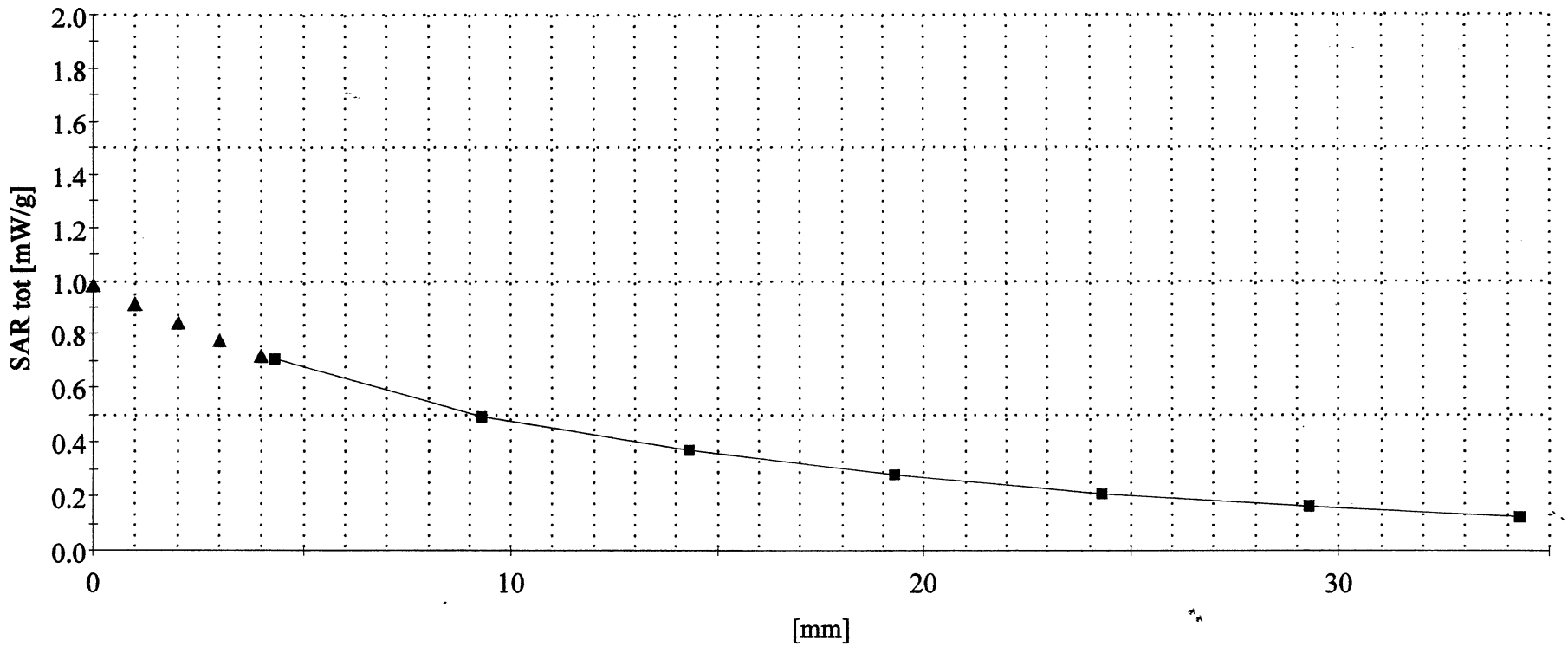
SAMSUNG Tri Mode/Dual-Band Phone (AMPS/CDMA/PCS); Model: SPH-A640
CDMA Mode, Ch.777 [848.31MHz.]; Standard Battery; Ambient Temp. (°C) - 22.1 Meas.Tissue Temp. (°C) - 20.9
Conducted Power = 25.5dBm; Right Head Phantom, Cheek/Touch Position; Flip = Open
Test Date -- 04/24/2003 [FCC/OET Bulletin 65 - Supplement C, July 2001]



SAMSUNG FCC ID: A3LSPHA640 -- 1900MHz.PCS CDMA Head SAR

SAM Phantom; Right Cheek(CRP) Section; Probe:ET3DV6 - SN1551; ConvF(5.30,5.30,5.30)
Head 1900 MHz: σ = 1.41 mho/m ε_r = 38.6 ρ = 1.00 g/cm^3; Antenna: Fixed; Crest Factor 1.0
SAR (1g): 0.993 mW/g

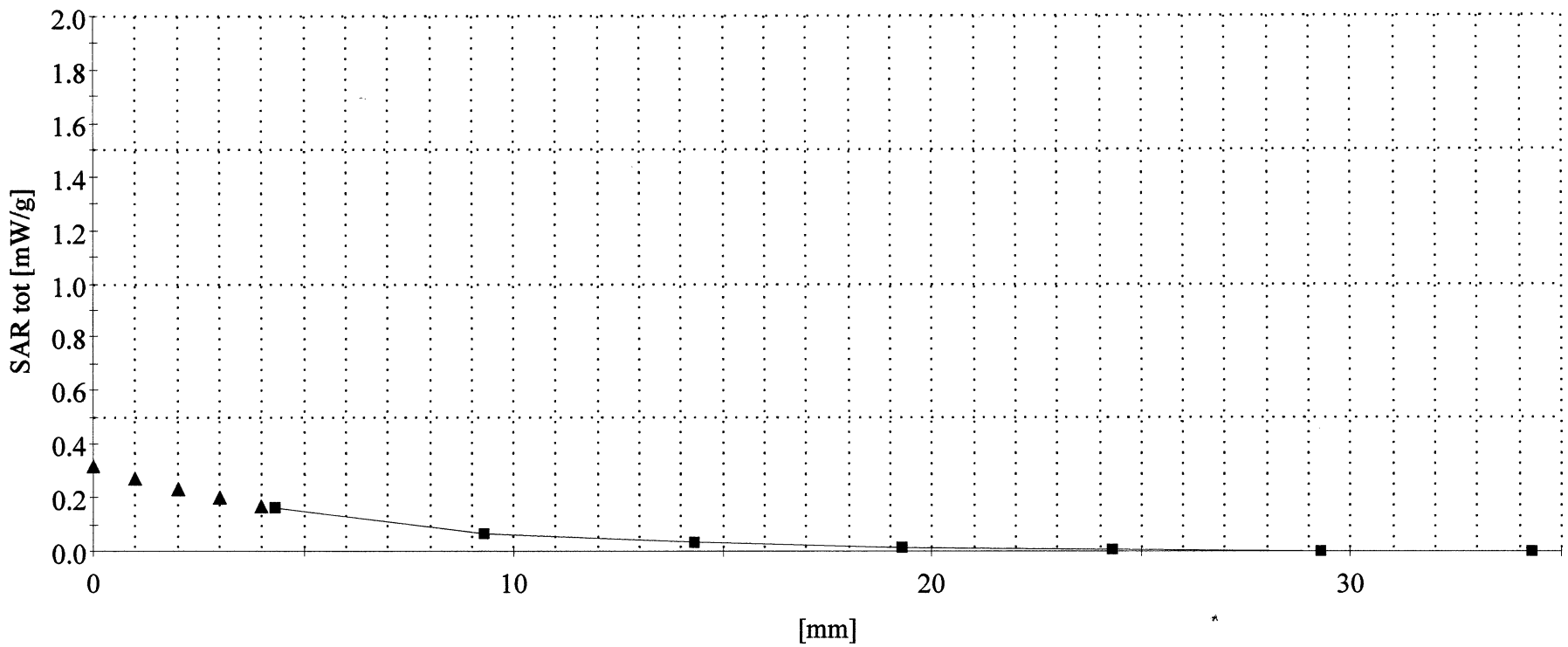
SAMSUNG Tri Mode/Dual-Band Phone (AMPS/CDMA/PCS); Model: SPH-A640
PCS Mode, Ch.600 [1880.00MHz.]; Standard Battery; Ambient Temp. (°C) - 22.0 Meas.Tissue Temp. (°C) - 20.8
Conducted Power = 24.5dBm; Right Head Phantom, Cheek/Touch Position; Flip = Open
Test Date -- 04/23/2003 [FCC/OET Bulletin 65 - Supplement C, July 2001]



SAMSUNG FCC ID: A3LSPHA640 -- 835MHz. AMPS Body SAR

SAM Phantom; Flat Section; Probe:ET3DV6 - SN1551; ConvF(6.60,6.60,6.60)
Body 835 MHz: $\sigma = 0.95$ mho/m $\varepsilon_r = 54.8$ $\rho = 1.00$ g/cm^3; Antenna-Fixed; Crest Factor 1.0
SAR (1g): 0.332 mW/g

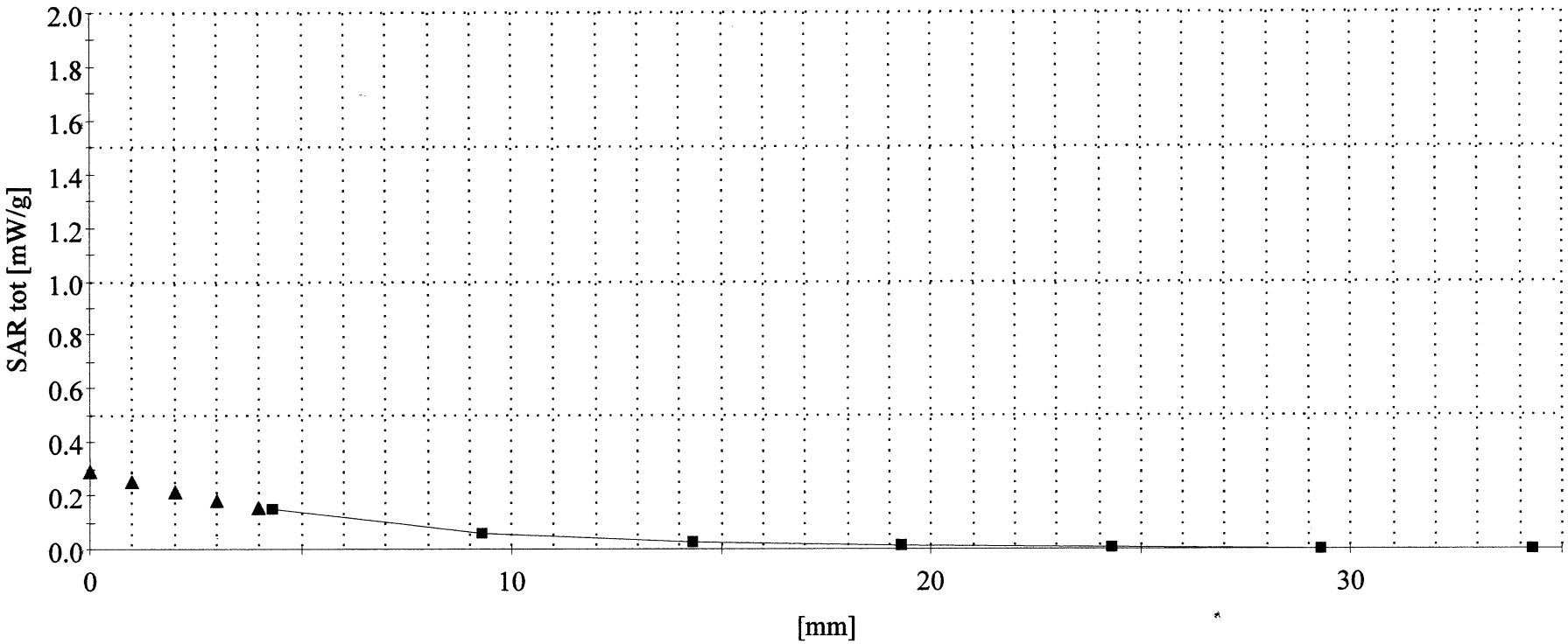
SAMSUNG Tri-Mode/Dual Band Phone (AMPS/CDMA/PCS) Model: SCH-A640
Amps Mode, Ch.991[824.04MHz]; Standard Battery; Ambient Temp. (°C) - 21.9 Tissue Temp.(°C) - 20.9
Conducted Power = 26.0dBm; Spacing = 1.5cm from flat phantom to phone, w/o beltclip or holster
Test Date -- 04/25/2003 [FCC/OET Bulletin 65 - Supplement C, July 2001]



SAMSUNG FCC ID: A3LSPHA640 -- 835MHz. CDMA Body SAR

SAM Phantom; Flat Section; Probe:ET3DV6 - SN1551; ConvF(6.60,6.60,6.60)
Body 835 MHz: $\sigma = 0.95$ mho/m $\varepsilon_r = 54.8$ $\rho = 1.00$ g/cm^3; Antenna-Fixed; Crest Factor 1.0
SAR (1g): 0.307 mW/g

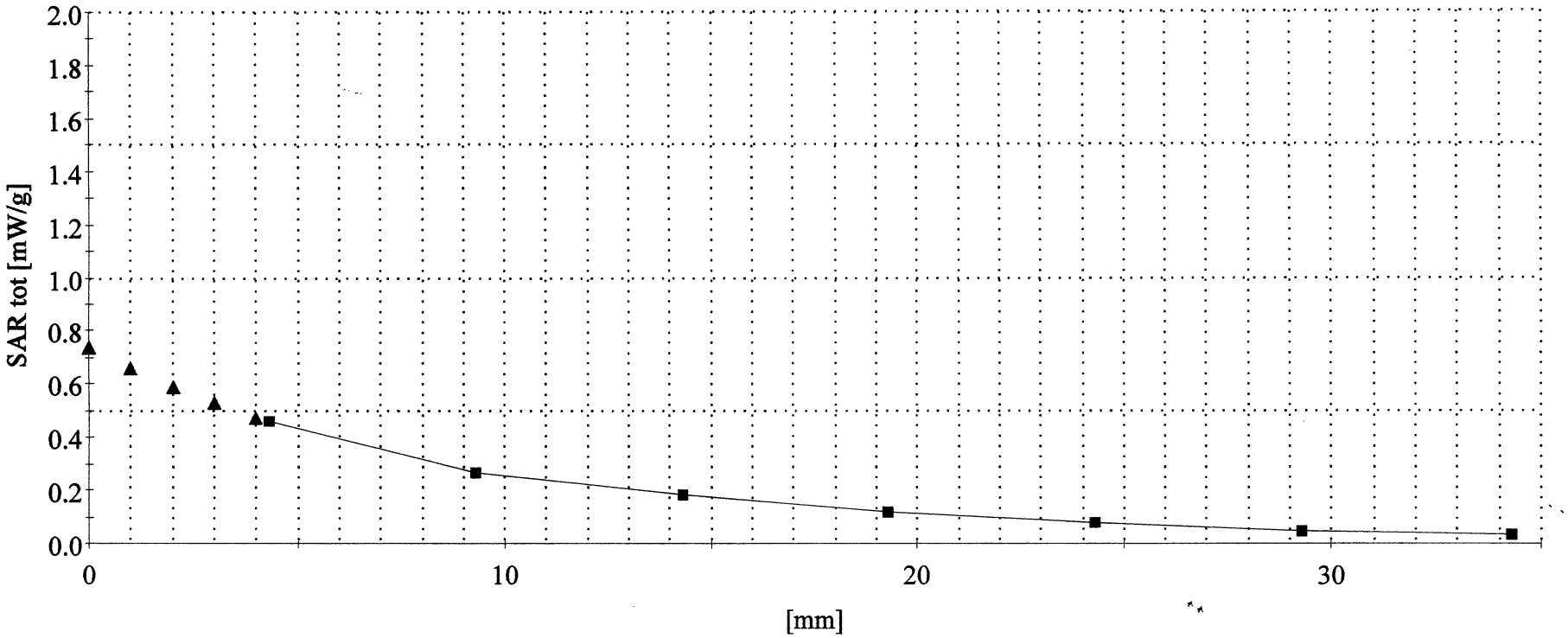
SAMSUNG Tri-Mode/Dual Band Phone (AMPS/CDMA/PCS) Model: SCH-A640
CDMA Mode, Ch.777 [848.31MHz]; Standard Battery; Ambient Temp. (°C) - 21.9 Tissue Temp.(°C) - 20.8
Conducted Power = 25.5dBm; Spacing = 1.5cm from flat phantom to phone, w/o beltclip or holster
Test Date -- 04/25/2003 [FCC/OET Bulletin 65 - Supplement C, July 2001]



SAMSUNG FCC ID: A3LSPHA640 -- 1900MHz.PCS CDMA Body SAR

SAM Phantom; Flat Section; Probe:ET3DV6 - SN1551; ConvF(4.90,4.90,4.90)
Body 1900 MHz: σ = 1.56 mho/m ε_r = 51.3 ρ = 1.00 g/cm^3 ; Antenna-Fixed; Crest Factor 1.0
SAR (1g): 0.744 mW/g

SAMSUNG Tri-Mode/Dual Band (AMPS/CDMA/PCS) Phone Model: SCH-A640
PCS Mode, Ch.25 [1851.25MHz]; Standard Battery; Ambient Temp. (°C) - 22.1 Tissue Temp.(°C) - 20.80.8
Conducted Power = 24.5dBm; Spacing = 1.5cm from flat phantom to phone, w/o beltclip or holster;
Test Date -- 04/25/2003 [FCC/OET Bulletin 65 - Supplement C, July 2001]



APPENDIX H

Probe Calibration

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:	**1551**
Place of Calibration:	**Zurich**
Date of Calibration:	**May 22, 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:	N. Vetter
Approved by:	Claire Katya

Schmid & Partner
Engineering AG

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

Probe ET3DV6

SN:1551

Manufactured:	October 16, 2000
Last calibration:	December 19, 2000
Recalibrated:	May 22, 2002

Calibrated for System DASY3

DASY3 - Parameters of Probe: ET3DV6 SN:1551

Sensitivity in Free Space

NormX	**1.48**	$\mu V/(V/m)^2$
NormY	**1.53**	$\mu V/(V/m)^2$
NormZ	**1.43**	$\mu V/(V/m)^2$

Diode Compression

DCP X	**96**	mV
DCP Y	**96**	mV
DCP Z	**96**	mV

Sensitivity in Tissue Simulating Liquid

Head **835 MHz** ε_r **= 41.5 ± 5%** σ **= 0.90 ± 5% mho/m**

ConvF X	**6.8**	± 8.9% (k=2)	Boundary effect:	
ConvF Y	**6.8**	± 8.9% (k=2)	Alpha	**0.34**
ConvF Z	**6.8**	± 8.9% (k=2)	Depth	**2.43**

Head **1900 MHz** ε_r **= 40.0 ± 5%** σ **= 1.40 ± 5% mho/m**

ConvF X	**5.3**	± 8.9% (k=2)	Boundary effect:	
ConvF Y	**5.3**	± 8.9% (k=2)	Alpha	**0.50**
ConvF Z	**5.3**	± 8.9% (k=2)	Depth	**2.38**

Boundary Effect

Head **835 MHz** **Typical SAR gradient: 5 % per mm**

Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	8.3	4.6
SAR_{be} [%]	With Correction Algorithm	0.3	0.5

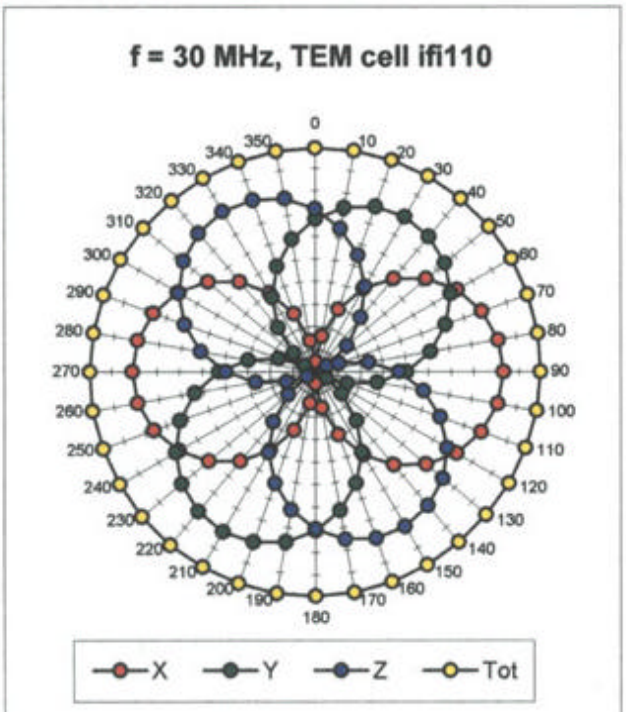
Head **1900 MHz** **Typical SAR gradient: 10 % per mm**

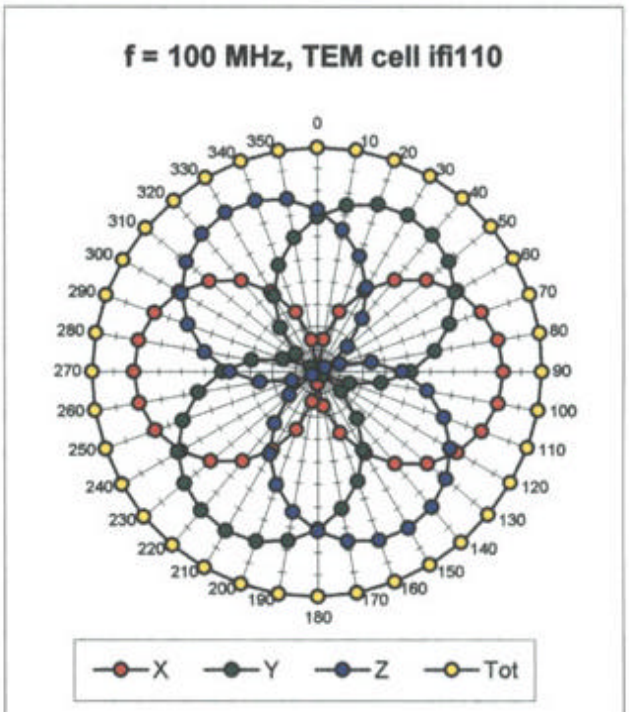
Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	11.6	7.9
SAR_{be} [%]	With Correction Algorithm	0.2	0.4

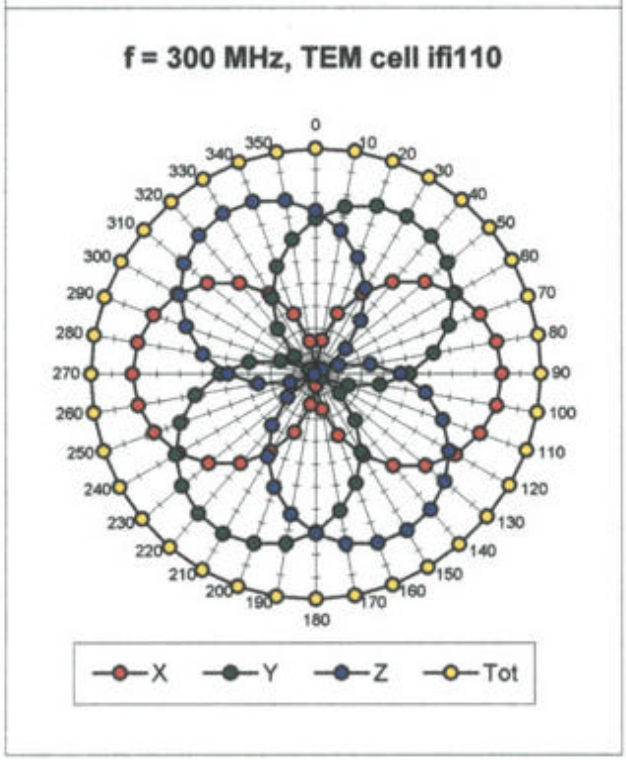
Sensor Offset

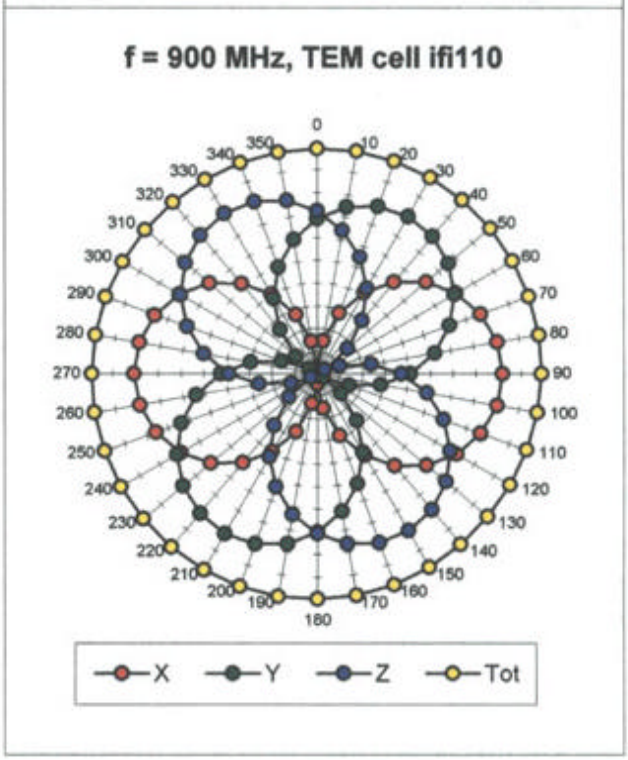
Probe Tip to Sensor Center	**2.7**	mm
Optical Surface Detection	**1.3 ± 0.2**	mm

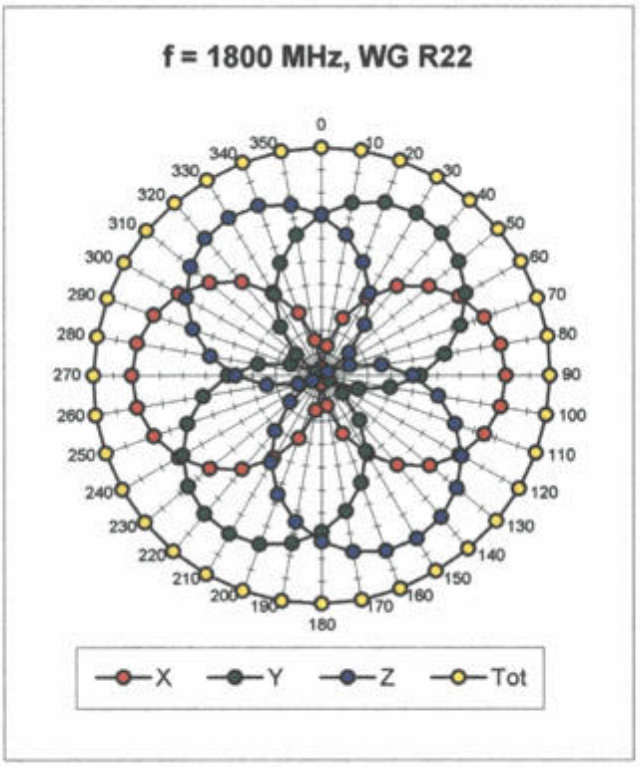
Receiving Pattern (ϕ), θ = 0°

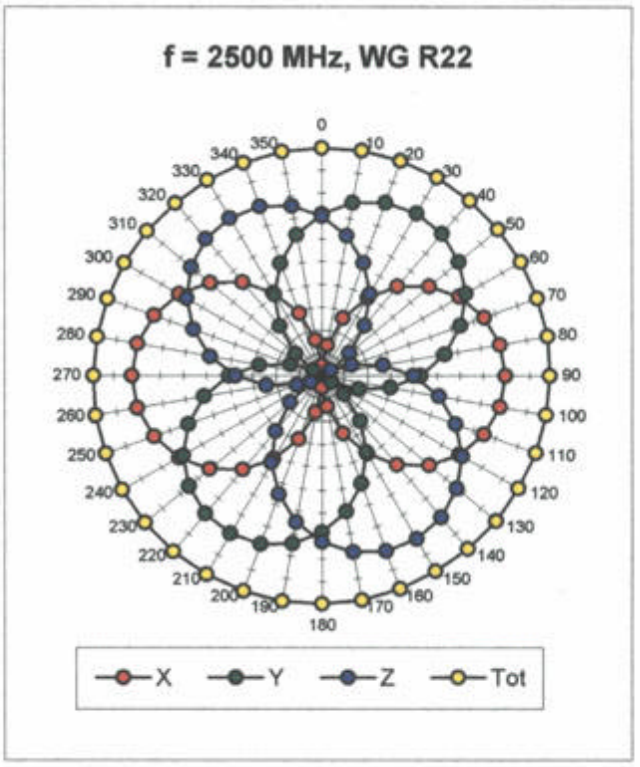




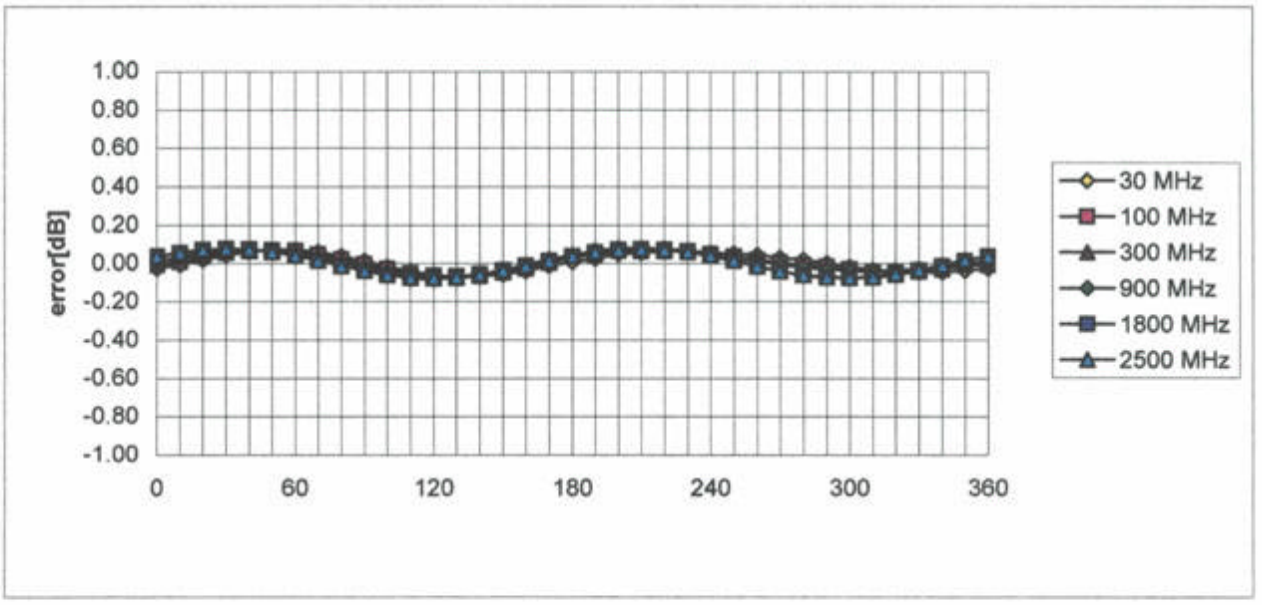






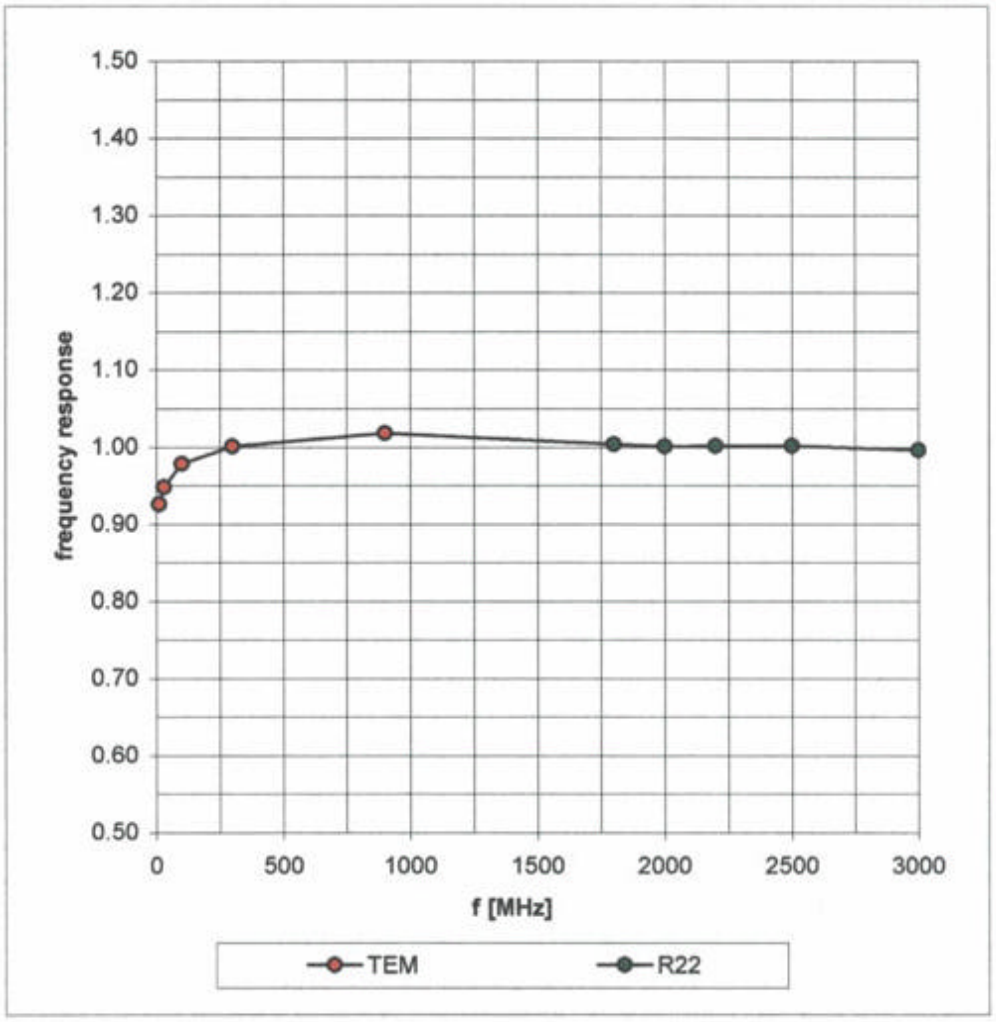


Isotropy Error (ϕ), θ = 0°



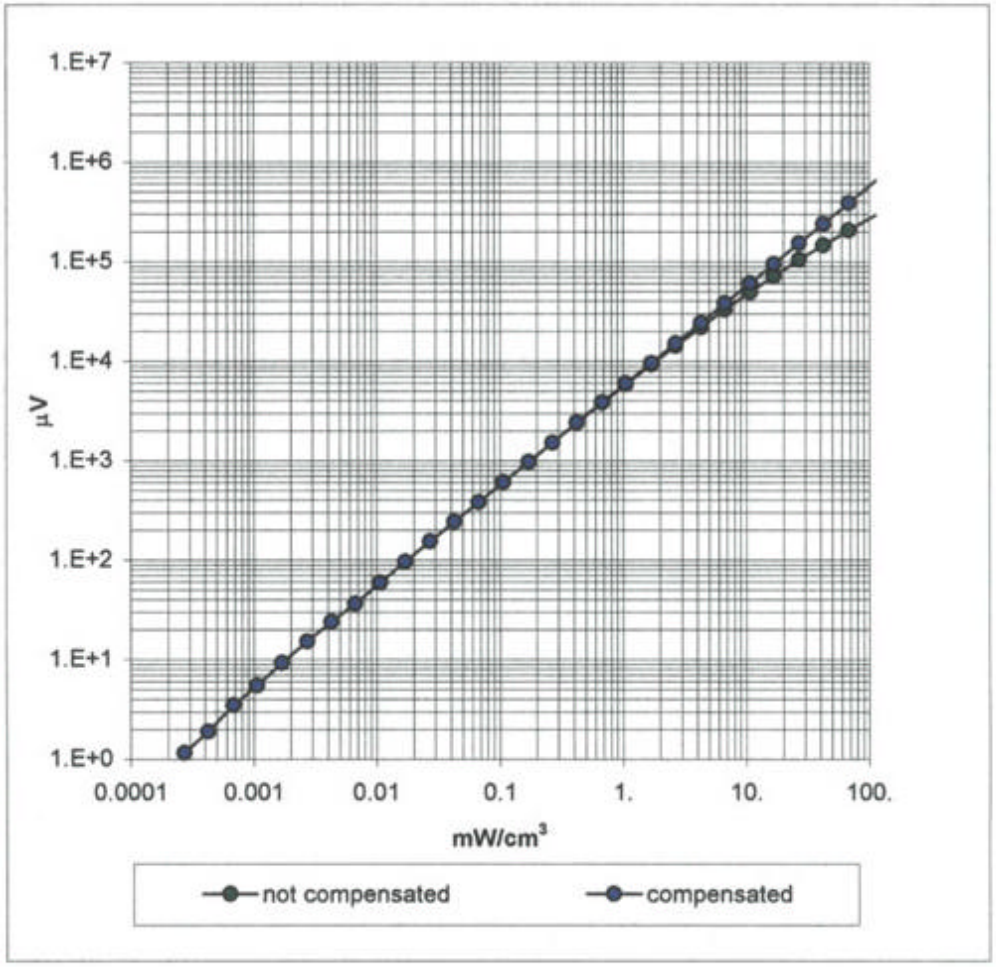
Frequency Response of E-Field

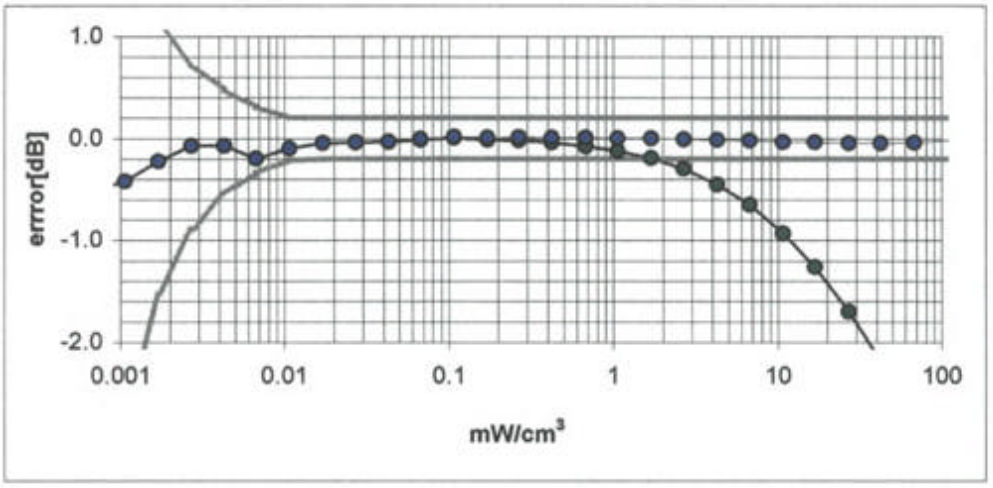
(TEM-Cell:ifi110, Waveguide R22)



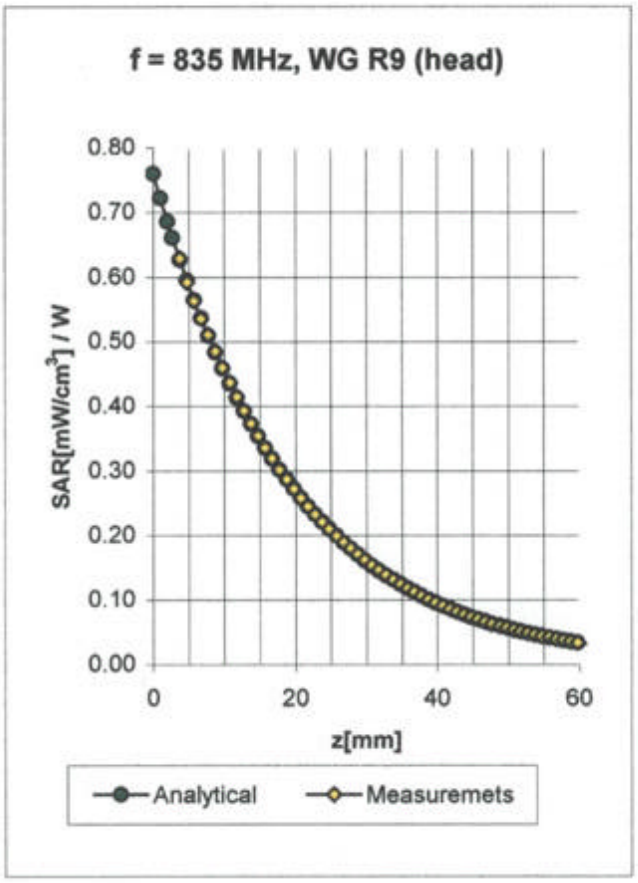
Dynamic Range f(SAR_{brain})

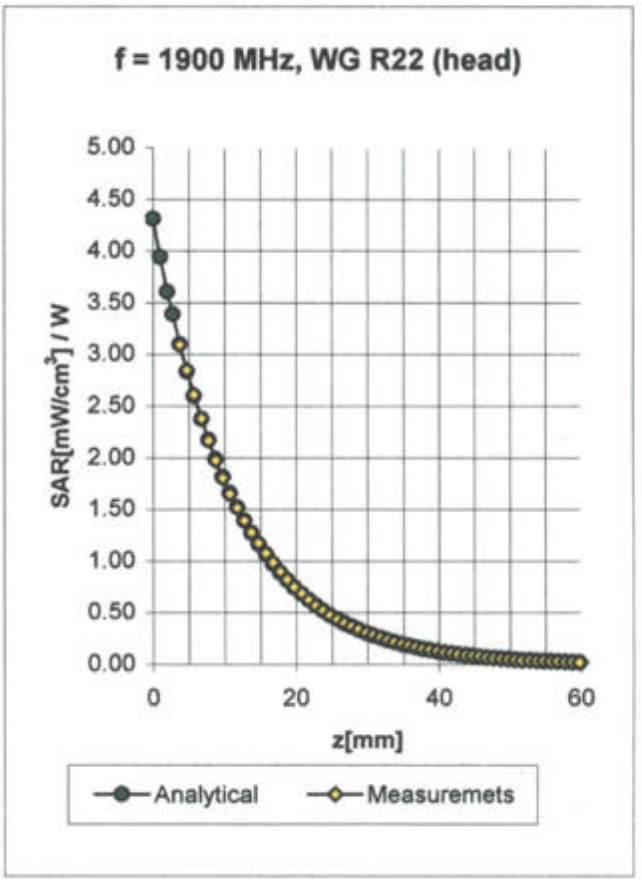
(Waveguide R22)





Conversion Factor Assessment

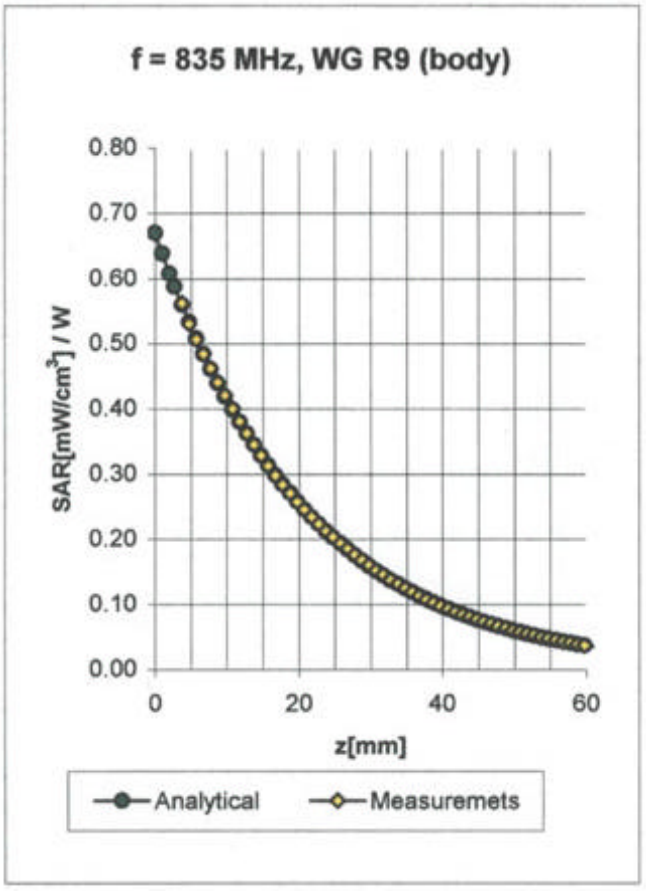


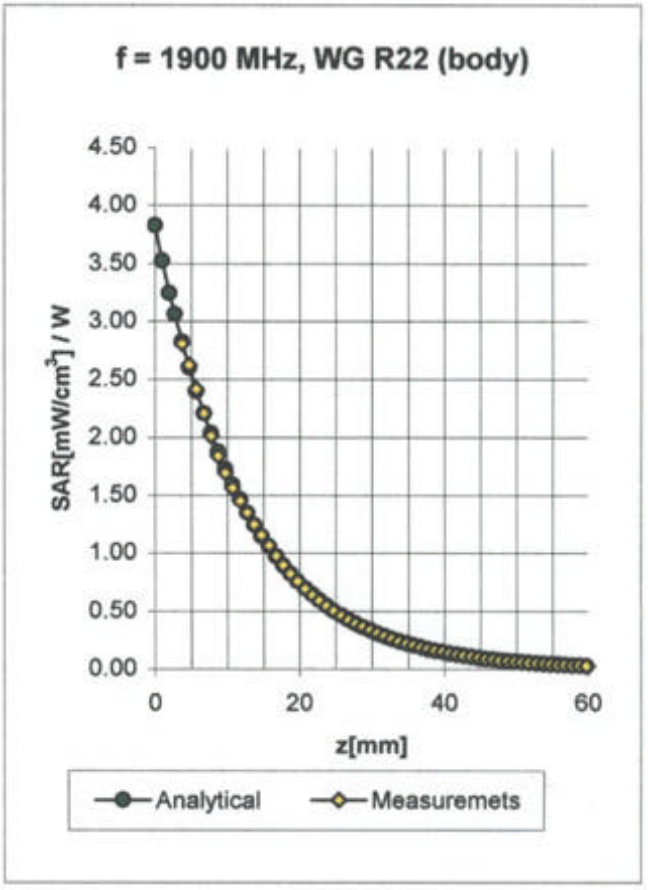


Head	835 MHz	ε_r = 41.5 ± 5%	σ = 0.90 ± 5% mho/m
	ConvF X	**6.8** ± 8.9% (k=2)	Boundary effect:
	ConvF Y	**6.8** ± 8.9% (k=2)	Alpha **0.34**
	ConvF Z	**6.8** ± 8.9% (k=2)	Depth **2.43**

Head	1900 MHz	ε_r = 40.0 ± 5%	σ = 1.40 ± 5% mho/m
	ConvF X	**5.3** ± 8.9% (k=2)	Boundary effect:
	ConvF Y	**5.3** ± 8.9% (k=2)	Alpha **0.50**
	ConvF Z	**5.3** ± 8.9% (k=2)	Depth **2.38**

Conversion Factor Assessment



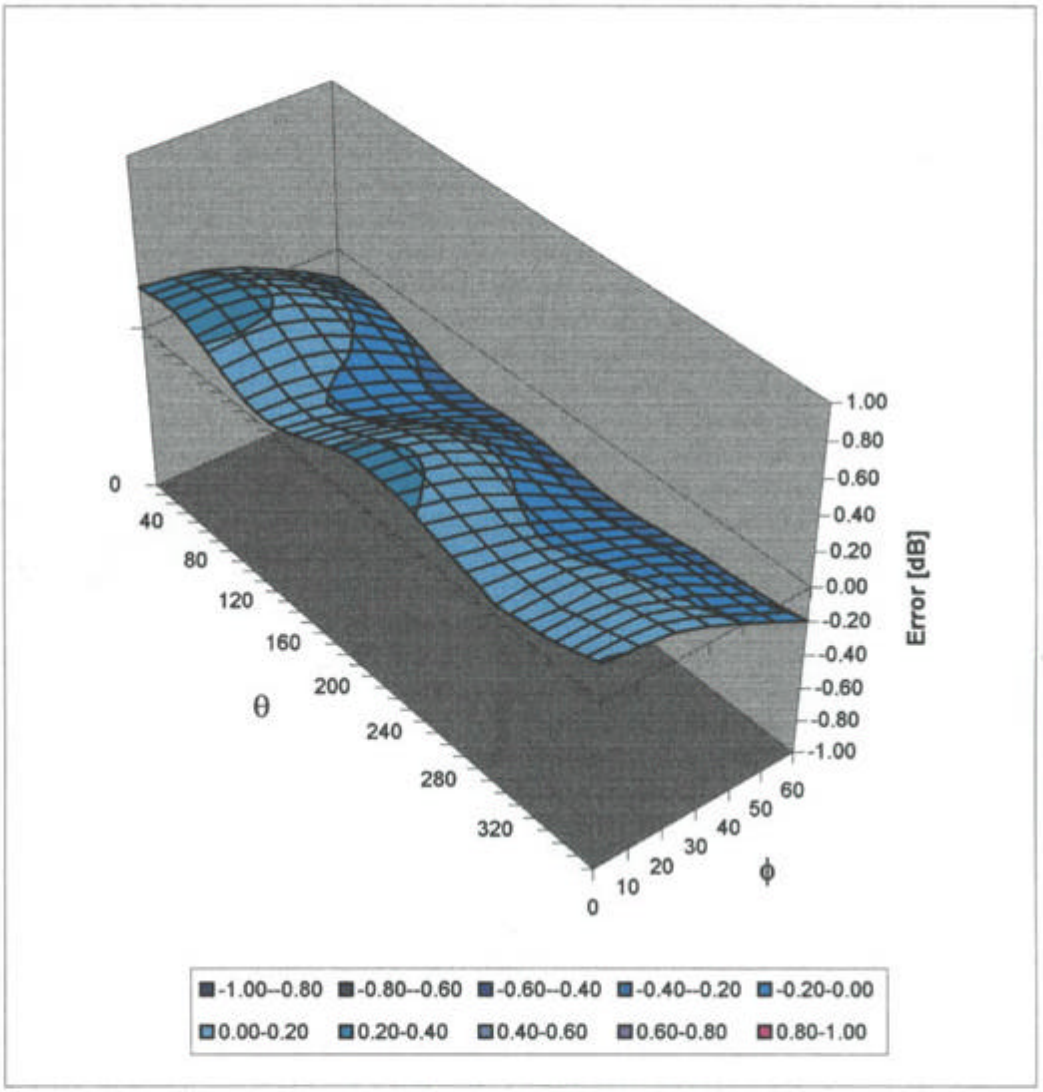


Body	**835 MHz**	ε_r **= 55.2 ± 5%**	σ **= 0.97 ± 5% mho/m**	
	ConvF X	**6.6** ± 8.9% (k=2)	Boundary effect:	
	ConvF Y	**6.6** ± 8.9% (k=2)	Alpha	**0.31**
	ConvF Z	**6.6** ± 8.9% (k=2)	Depth	**2.72**

Body	**1900 MHz**	ε_r **= 53.3 ± 5%**	σ **= 1.52 ± 5% mho/m**	
	ConvF X	**4.9** ± 8.9% (k=2)	Boundary effect:	
	ConvF Y	**4.9** ± 8.9% (k=2)	Alpha	**0.66**
	ConvF Z	**4.9** ± 8.9% (k=2)	Depth	**2.19**

Deviation from Isotropy in HSL

Error (θ,ϕ), f = 900 MHz



APPENDIX I

Calibration of The Validation Dipole