APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

DUT: SPH-A680; Type: SAMSUNG Tri Mode Phone Model: SPH-A680; Serial: #1
Program: SPH-A680 AMPS Right; Conducted Power: 26.0 dBm

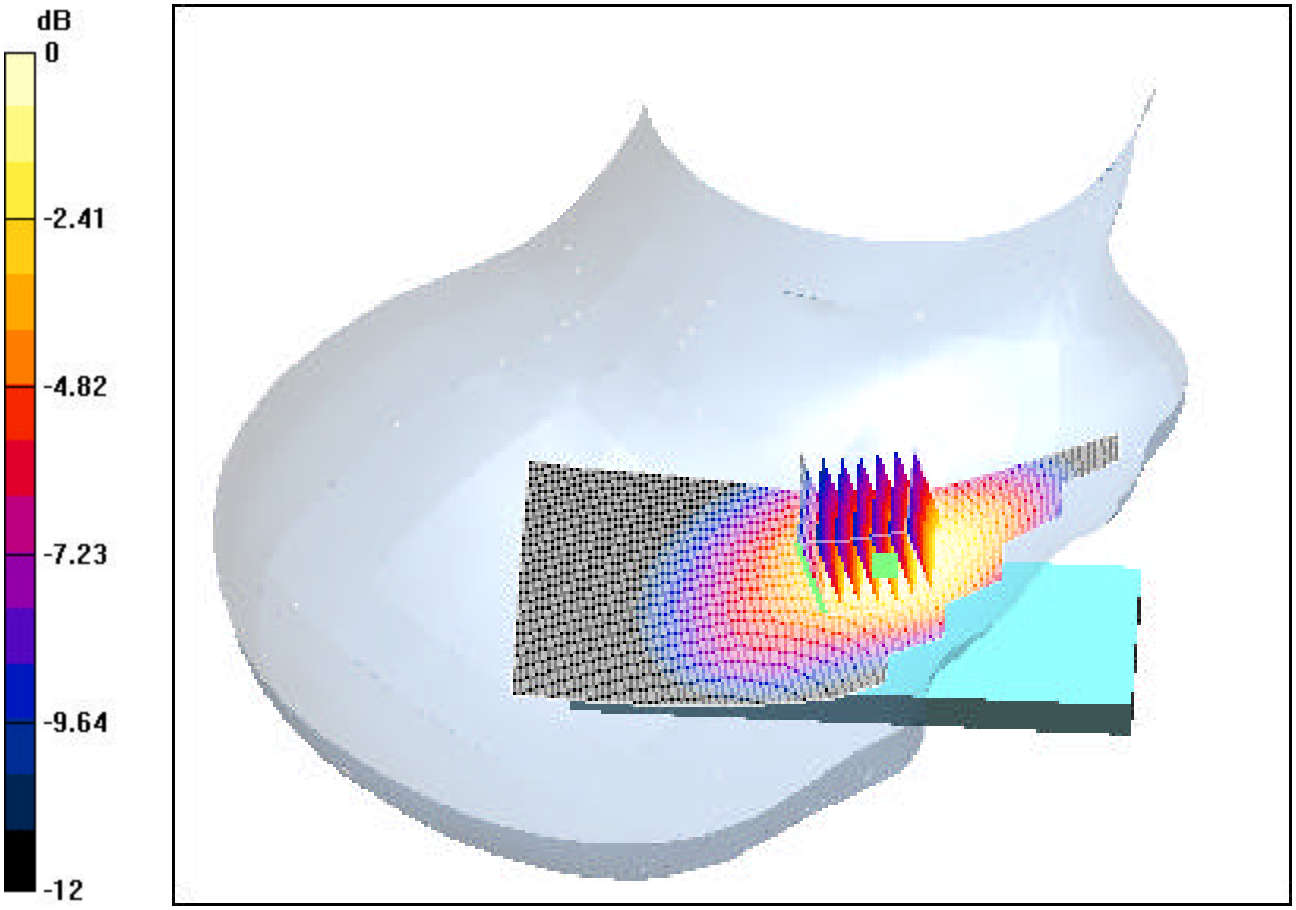
Communication System: AMPS; Frequency: 848.97 MHz;Duty Cycle: 1:1
Medium: 835 Brain (σ = 0.89 mho/m, ε_r = 40.06, ρ = 1000 kg/m^3)
Phantom section: Right Section

Test Date: 09-24-2003; Ambient Temp: 25.5°C; Tissue Temp: 23.2°C

Probe: ET3DV6 - SN1560; ConvF(6.9, 6.9, 6.9); Calibrated: 9/27/2002
Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
Electronics: DAE3 SN330; Calibrated: 12/1/2002
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Ch.0799, Touch, Ant In, Standard Battery

Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 1.64 W/kg
SAR(1 g) = 1.14 mW/g; SAR(10 g) = 0.733 mW/g
Reference Value = 8.35 V/m



0 dB = 1.22mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SPH-A680; Type: SAMSUNG Tri Mode Phone Model: SPH-A680; Serial: #1
Program: SPH-A680 AMPS Right; Conducted Power: 26.0 dBm

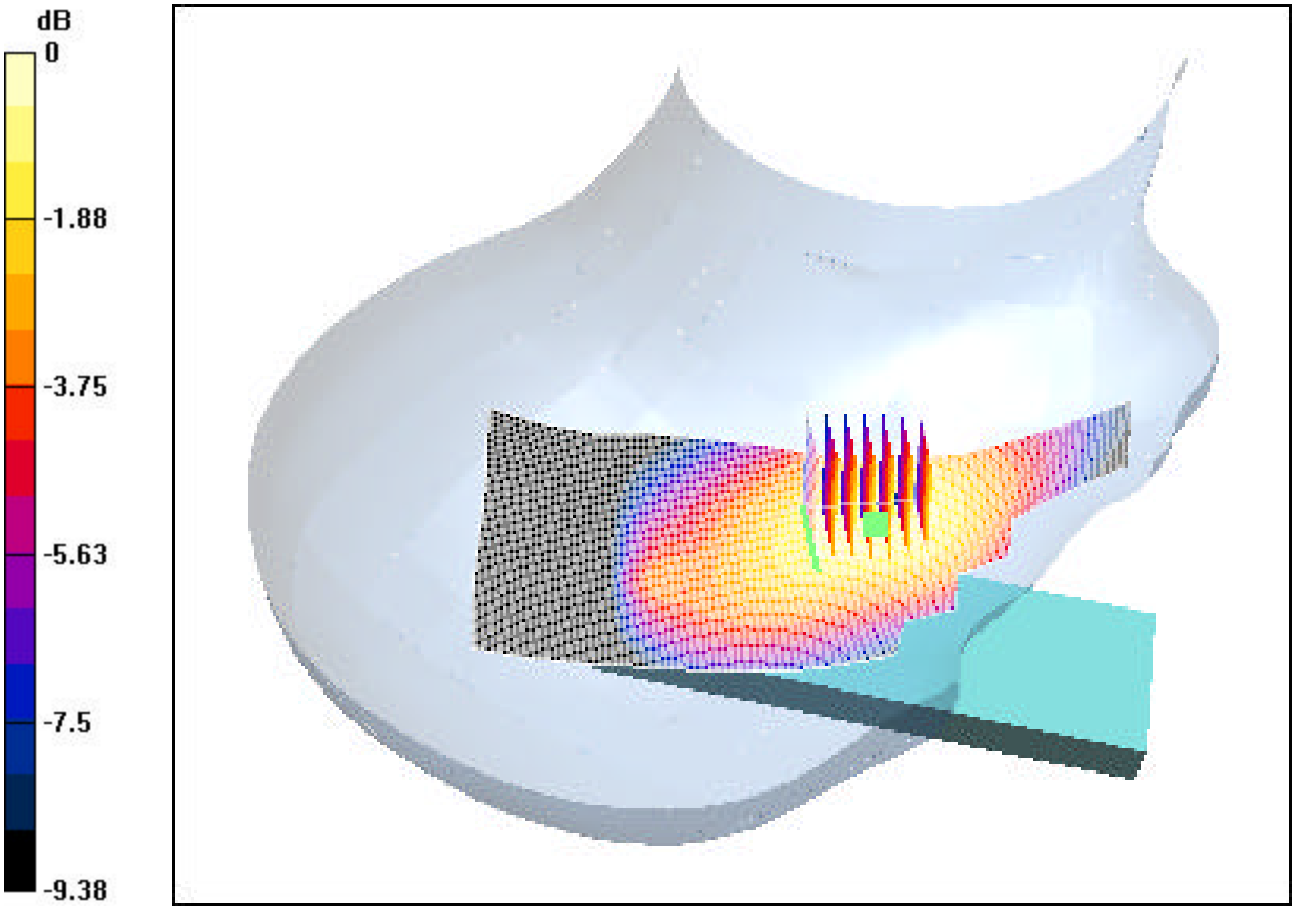
Communication System: AMPS; Frequency: 836.49 MHz;Duty Cycle: 1:1
Medium: 835 Brain (σ = 0.89 mho/m, ε_r = 40.06, ρ = 1000 kg/m^3)
Phantom section: Right Section

Test Date: 09-24-2003; Ambient Temp: 25.5°C; Tissue Temp: 23.2°C

Probe: ET3DV6 - SN1560; ConvF(6.9, 6.9, 6.9); Calibrated: 9/27/2002
Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
Electronics: DAE3 SN330; Calibrated: 12/1/2002
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Ch.0383, Tilt, Ant Out, Standard Battery

Area Scan (51x131x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 0.36 W/kg
SAR(1 g) = 0.268 mW/g; SAR(10 g) = 0.196 mW/g
Reference Value = 10.7 V/m



0 dB = 0.279mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SPH-A680; Type: SAMSUNG Tri Mode Phone Model: SPH-A680; Serial: #1
Program: SPH-A680 AMPS Left; Conducted Power: 26.0 dBm

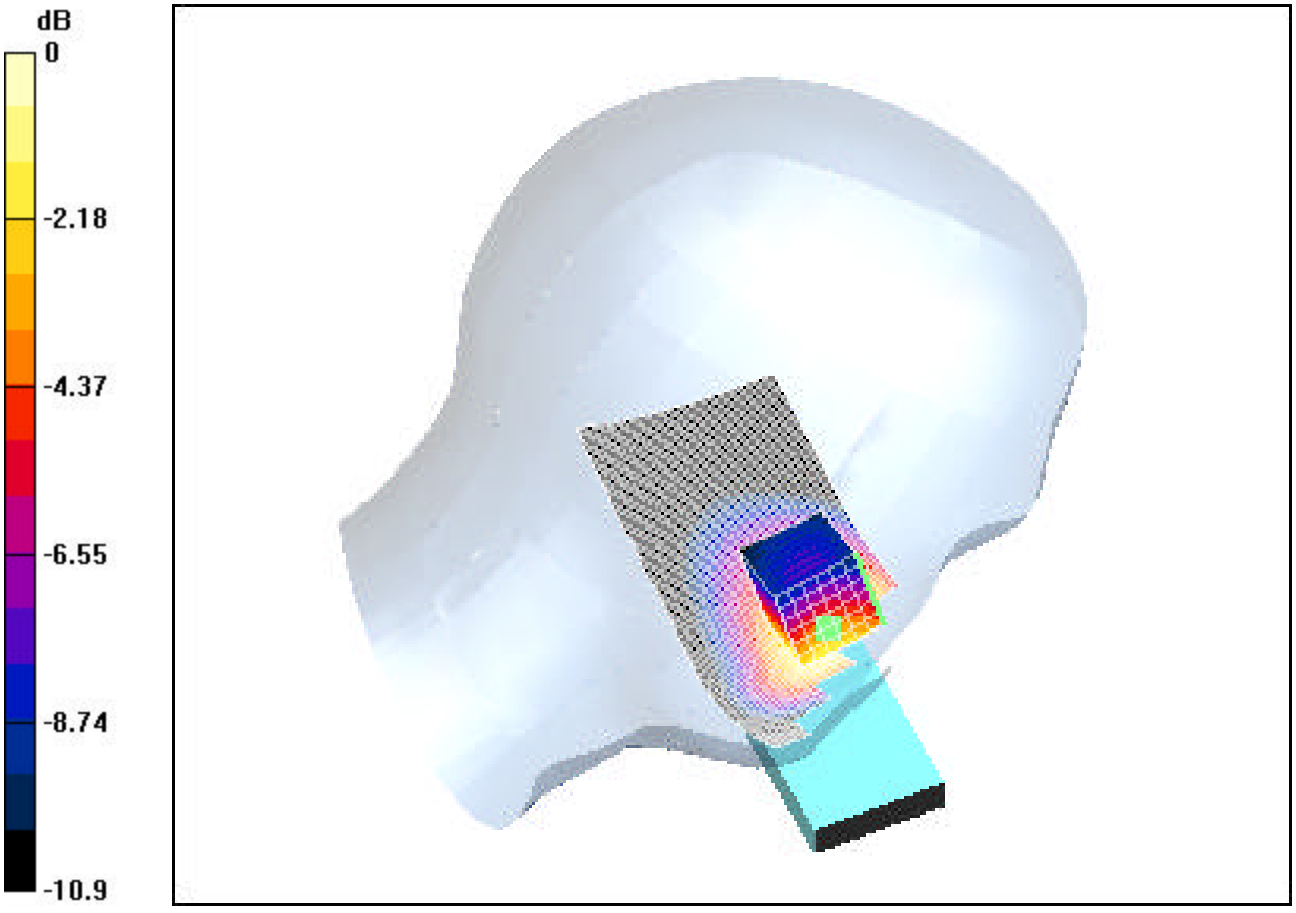
Communication System: AMPS; Frequency: 848.97 MHz;Duty Cycle: 1:1
Medium: 835 Brain (σ = 0.89 mho/m, ε_r = 40.06, ρ = 1000 kg/m^3)
Phantom section: Left Section

Test Date: 09-24-2003; Ambient Temp: 25.5°C; Tissue Temp: 23.2°C

Probe: ET3DV6 - SN1560; ConvF(6.9, 6.9, 6.9); Calibrated: 9/27/2002
Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
Electronics: DAE3 SN330; Calibrated: 12/1/2002
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Ch.0799, Touch, Ant In, Standard Battery

Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 1.64 W/kg
SAR(1 g) = 1.13 mW/g; SAR(10 g) = 0.736 mW/g
Reference Value = 8.43 V/m



0 dB = 1.21mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SPH-A680; Type: SAMSUNG Tri Mode Phone Model: SPH-A680; Serial: #1
Program: SPH-A680 AMPS Left; Conducted Power: 26.0 dBm

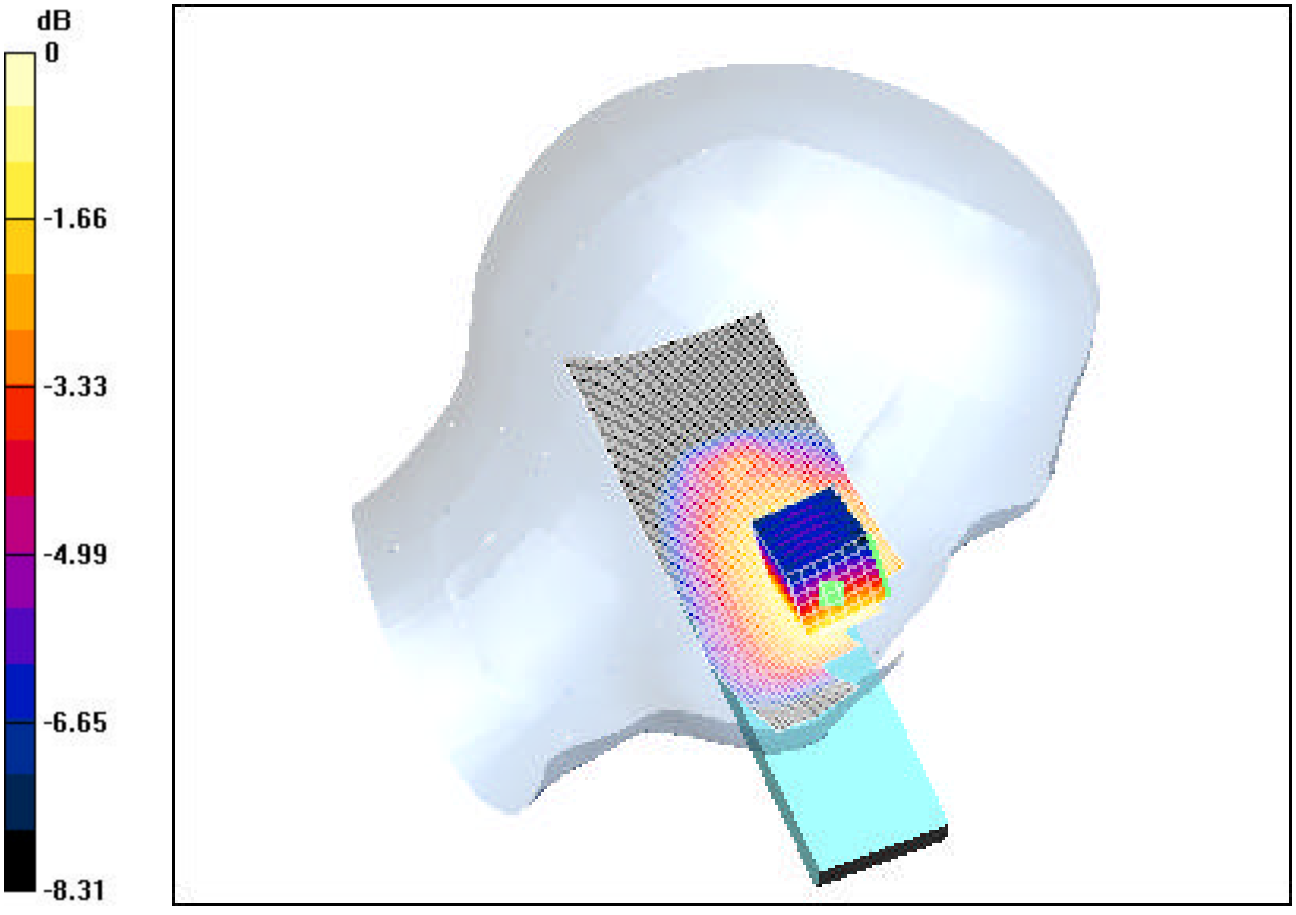
Communication System: AMPS; Frequency: 836.49 MHz;Duty Cycle: 1:1
Medium: 835 Brain (σ = 0.89 mho/m, ε_r = 40.06, ρ = 1000 kg/m^3)
Phantom section: Left Section

Test Date: 09-24-2003; Ambient Temp: 25.5°C; Tissue Temp: 23.2°C

Probe: ET3DV6 - SN1560; ConvF(6.9, 6.9, 6.9); Calibrated: 9/27/2002
Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
Electronics: DAE3 SN330; Calibrated: 12/1/2002
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Ch.0383, Tilt, Ant Out, Standard Battery

Area Scan (51x131x1): Measurement grid: dx=15mm, dy=15mm
Reference **Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 0.317 W/kg
SAR(1 g) = 0.245 mW/g; SAR(10 g) = 0.18 mW/g
Reference Value = 10.8 V/m



0 dB = 0.257mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SPH-A680; Type: SAMSUNG Tri Mode Phone Model: SPH-A680; Serial: #1
Program: SPH-A680 CDMA Right; Conducted Power: 25.5 dBm

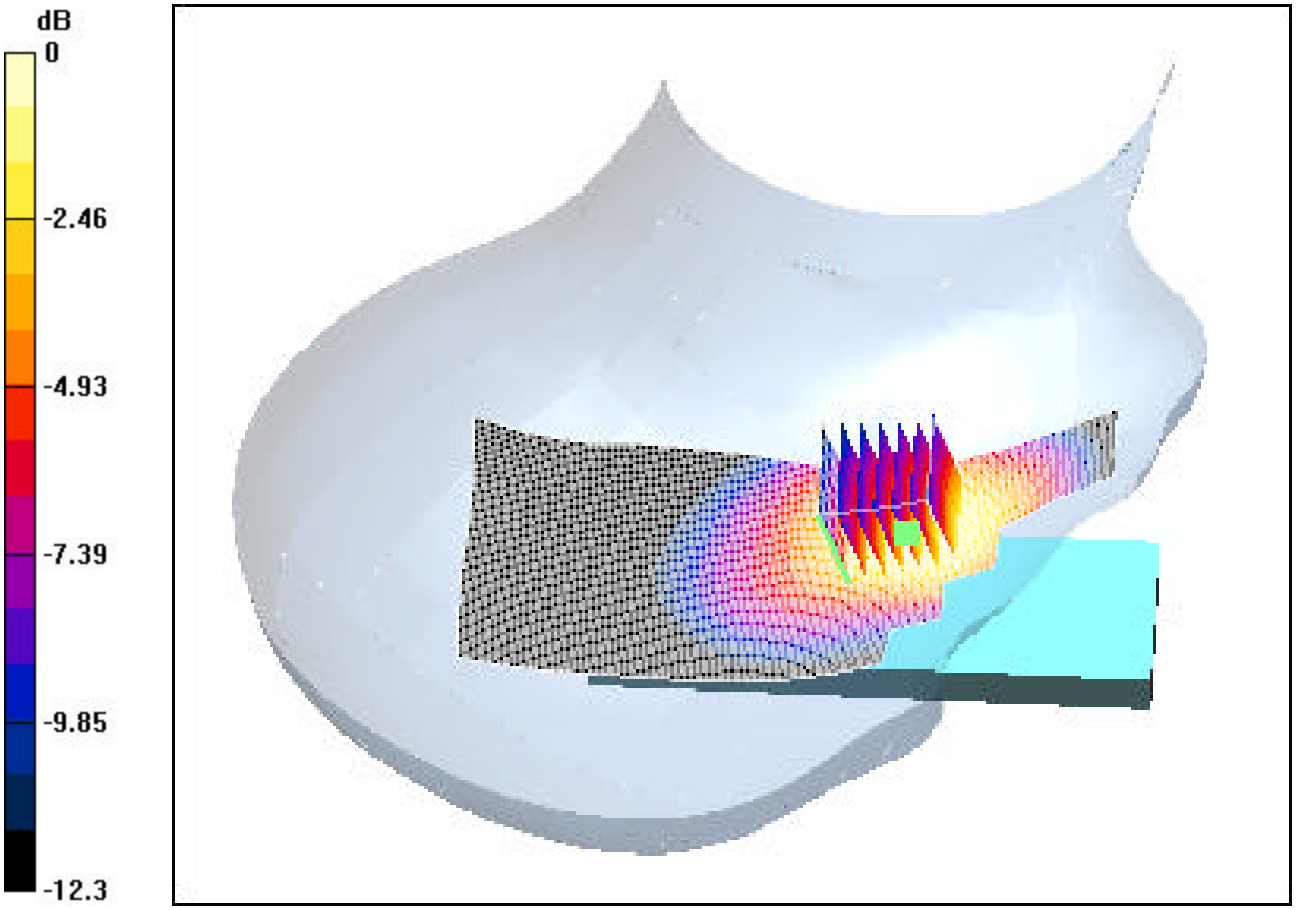
Communication System: Cellular CDMA; Frequency: 848.31 MHz;Duty Cycle: 1:1
Medium: 835 Brain (σ = 0.89 mho/m, ε_r = 40.06, ρ = 1000 kg/m^3)
Phantom section: Right Section

Test Date: 09-24-2003; Ambient Temp: 25.5°C; Tissue Temp: 23.2°C

Probe: ET3DV6 - SN1560; ConvF(6.9, 6.9, 6.9); Calibrated: 9/27/2002
Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
Electronics: DAE3 SN330; Calibrated: 12/1/2002
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Ch.0777, Touch, Ant In, Standard Battery

Area Scan (51x131x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 1.23 W/kg
SAR(1 g) = 0.797 mW/g; SAR(10 g) = 0.546 mW/g
Reference Value = 7.01 V/m



0 dB = 0.912mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SPH-A680; Type: SAMSUNG Tri Mode Phone Model: SPH-A680; Serial: #1
Program: SPH-A680 CDMA Right; Conducted Power: 25.5 dBm

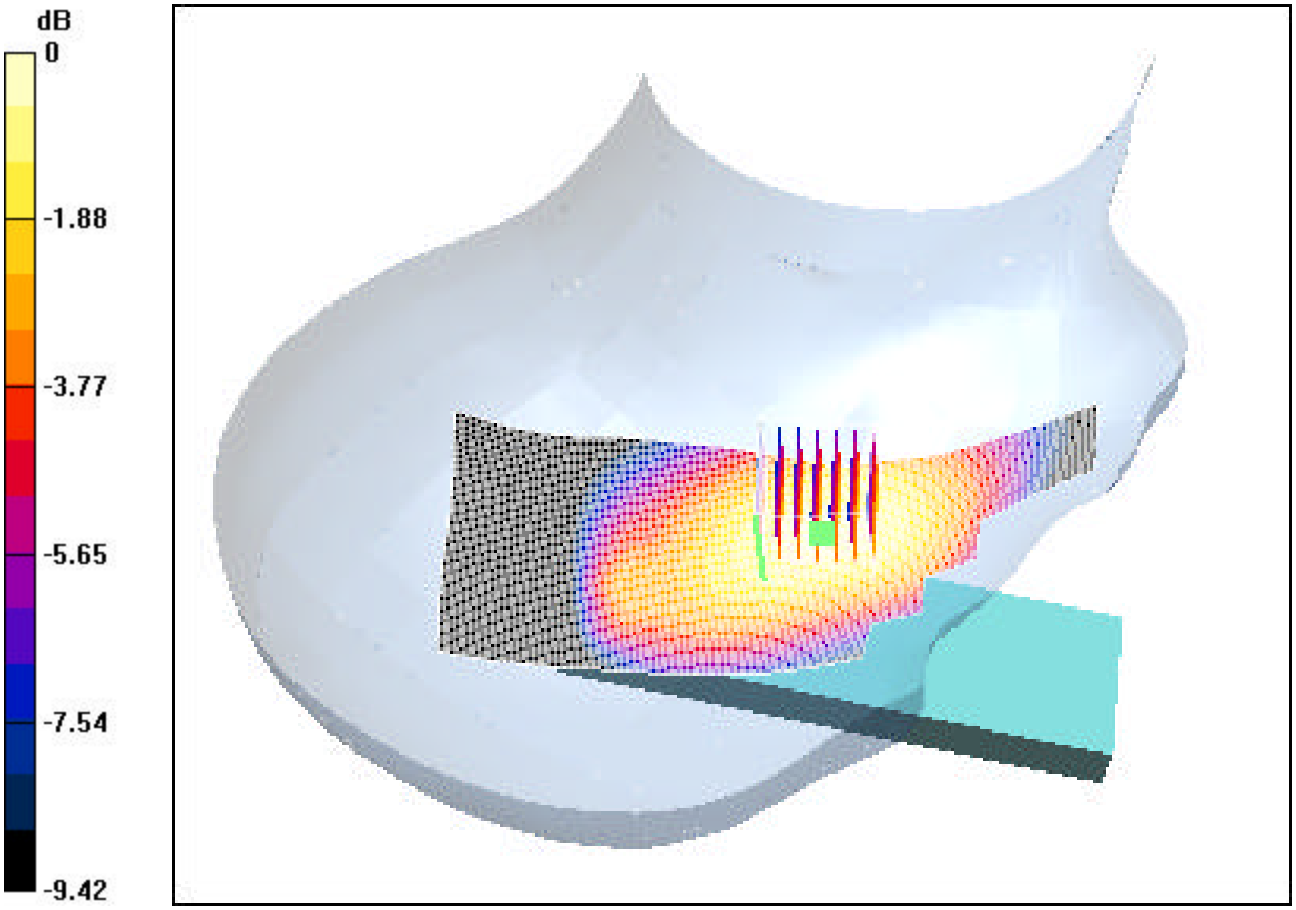
Communication System: Cellular CDMA; Frequency: 835.89 MHz;Duty Cycle: 1:1
Medium: 835 Brain (σ = 0.89 mho/m, ε_r = 40.06, ρ = 1000 kg/m^3)
Phantom section: Right Section

Test Date: 09-24-2003; Ambient Temp: 25.5°C; Tissue Temp: 23.2°C

Probe: ET3DV6 - SN1560; ConvF(6.9, 6.9, 6.9); Calibrated: 9/27/2002
Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
Electronics: DAE3 SN330; Calibrated: 12/1/2002
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Ch.0363, Tilt, Ant Out, Standard Battery

Area Scan (51x131x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 0.273 W/kg
SAR(1 g) = 0.207 mW/g; SAR(10 g) = 0.15 mW/g
Reference Value = 10.2 V/m



0 dB = 0.217mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SPH-A680; Type: SAMSUNG Tri Mode Phone Model: SPH-A680; Serial: #1
Program: SPH-A680 CDMA Left; Conducted Power: 25.5 dBm

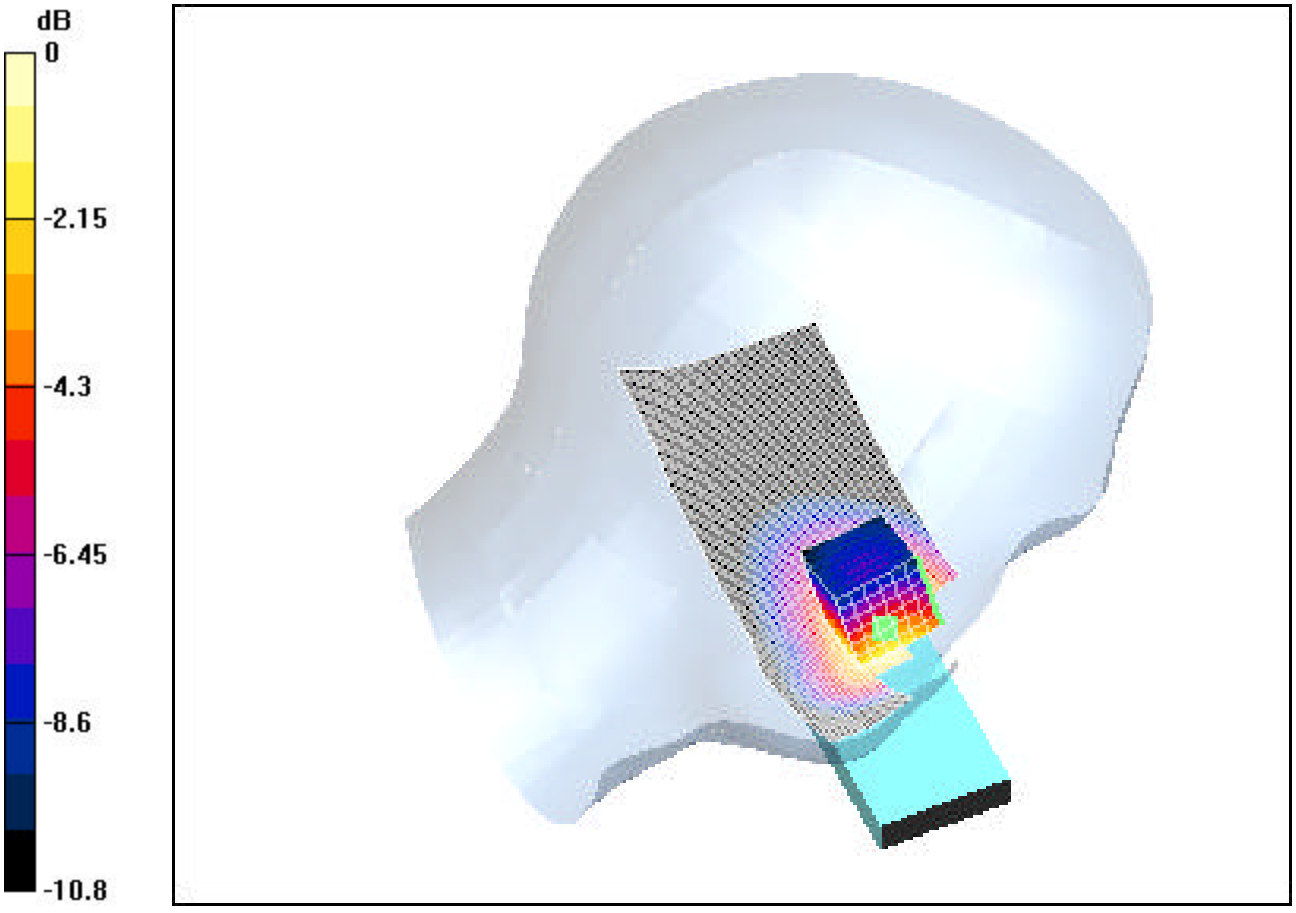
Communication System: Cellular CDMA; Frequency: 848.31 MHz;Duty Cycle: 1:1
Medium: 835 Brain (σ = 0.89 mho/m, ε_r = 40.06, ρ = 1000 kg/m^3)
Phantom section: Left Section

Test Date: 09-24-2003; Ambient Temp: 25.5°C; Tissue Temp: 23.2°C

Probe: ET3DV6 - SN1560; ConvF(6.9, 6.9, 6.9); Calibrated: 9/27/2002
Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
Electronics: DAE3 SN330; Calibrated: 12/1/2002
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Ch.0777, Touch, Ant In, Standard Battery

Area Scan (51x131x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 1.15 W/kg
SAR(1 g) = 0.793 mW/g; SAR(10 g) = 0.517 mW/g
Reference Value = 7.28 V/m



0 dB = 0.846mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SPH-A680; Type: SAMSUNG Tri Mode Phone Model: SPH-A680; Serial: #1
Program: SPH-A680 CDMA Left; Conducted Power: 25.5 dBm

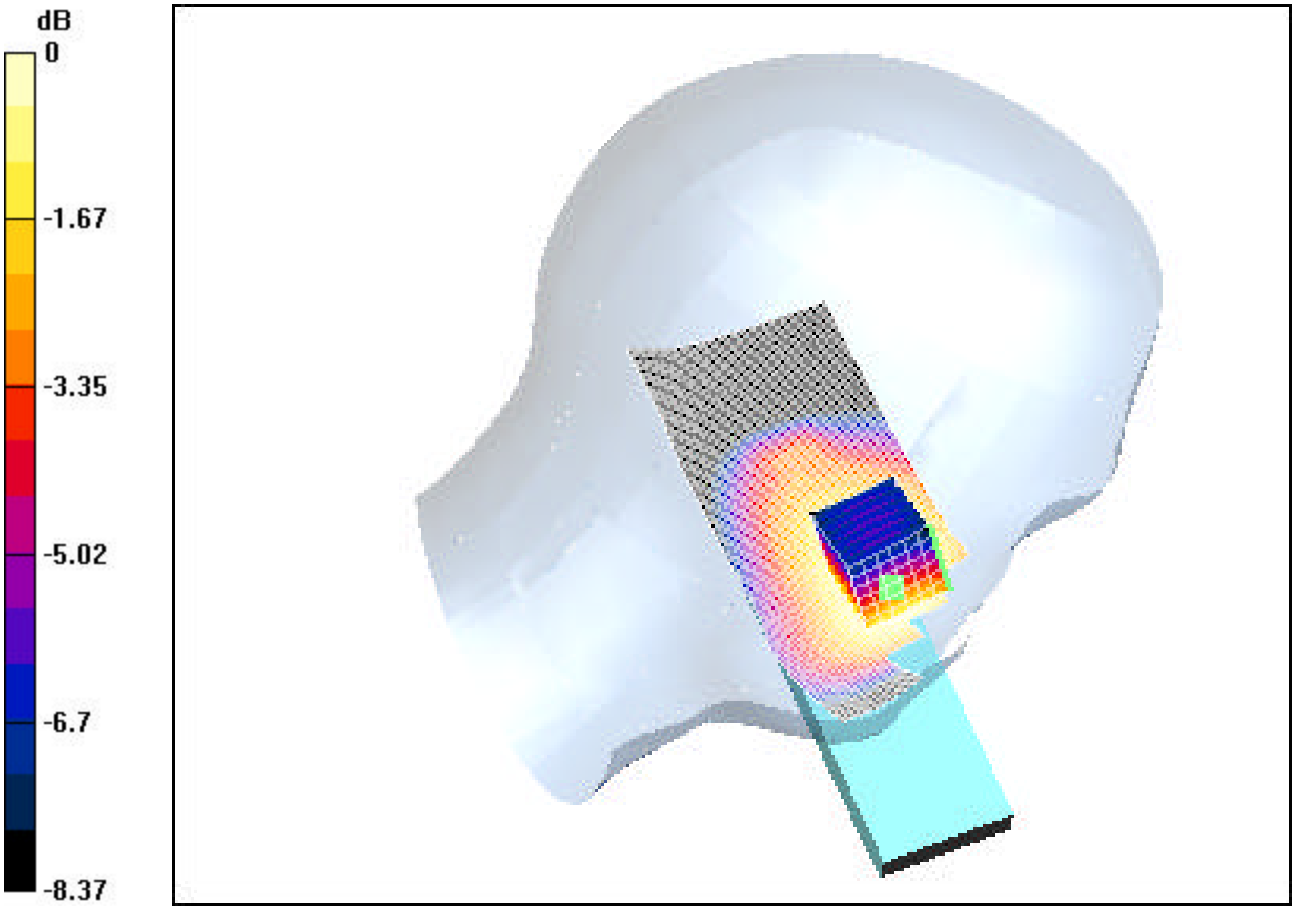
Communication System: Cellular CDMA; Frequency: 835.89 MHz;Duty Cycle: 1:1
Medium: 835 Brain (σ = 0.89 mho/m, ε_r = 40.06, ρ = 1000 kg/m^3)
Phantom section: Left Section

Test Date: 09-24-2003; Ambient Temp: 25.5°C; Tissue Temp: 23.2°C

Probe: ET3DV6 - SN1560; ConvF(6.9, 6.9, 6.9); Calibrated: 9/27/2002
Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
Electronics: DAE3 SN330; Calibrated: 12/1/2002
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Ch.0363, Tilt, Ant Out, Standard Battery

Area Scan (51x131x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 0.246 W/kg
SAR(1 g) = 0.189 mW/g; SAR(10 g) = 0.138 mW/g
Reference Value = 10 V/m



0 dB = 0.198mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SPH-A680; Type: SAMSUNG Tri Mode Phone Model: SPH-A680; Serial: #1
Program: SPH-A680 PCS Right; Conducted Power: 25.0 dBm

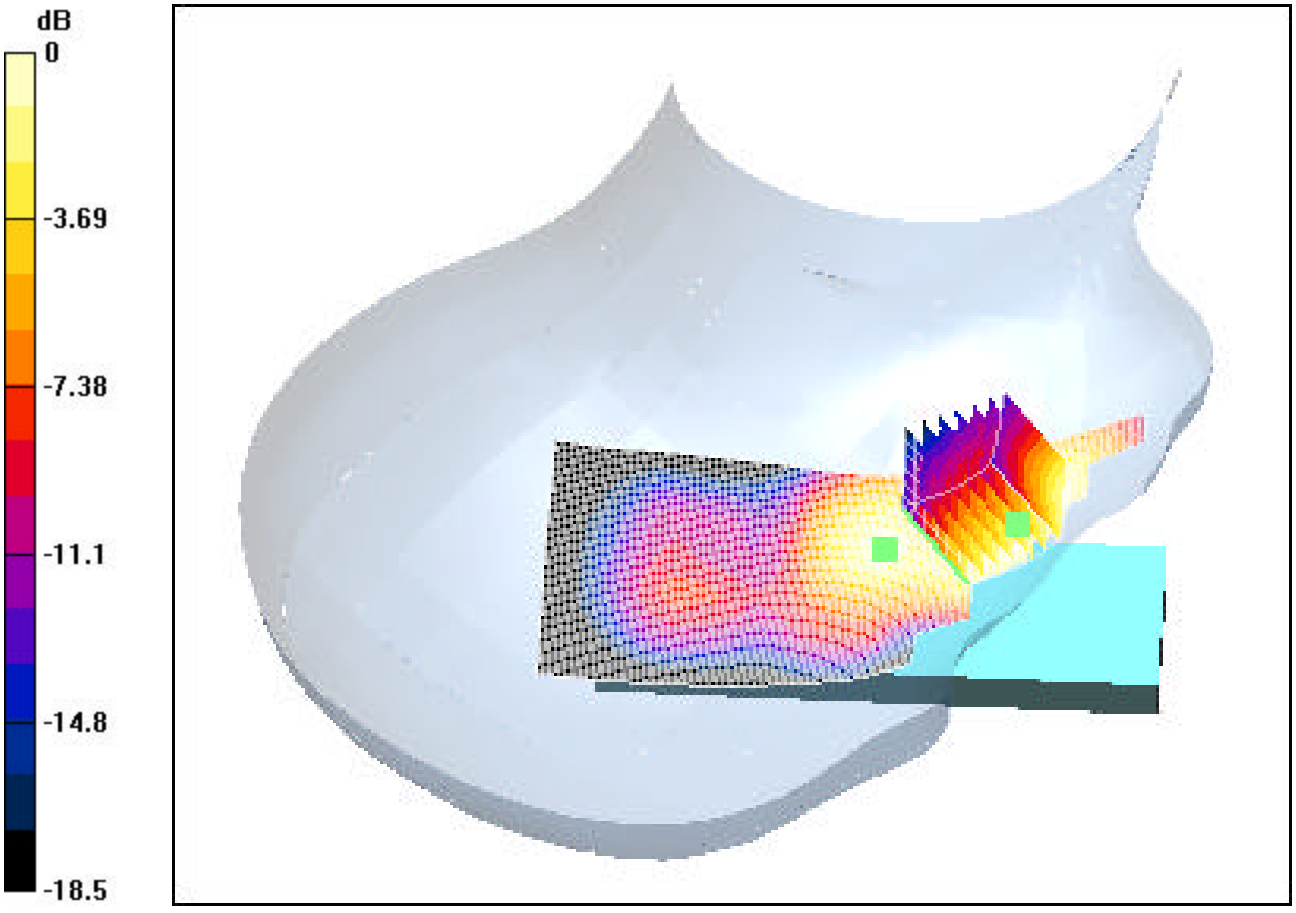
Communication System: PCS CDMA; Frequency: 1851.25 MHz;Duty Cycle: 1:1
Medium: 1900 Brain (σ = 1.39 mho/m, ε_r = 39.52, ρ = 1000 kg/m^3)
Phantom section: Right Section

Test Date: 09-25-2003; Ambient Temp: 22.4°C; Tissue Temp: 21.6°C

Probe: ET3DV6 - SN1560; ConvF(5.4, 5.4, 5.4); Calibrated: 9/27/2002
Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
Electronics: DAE3 SN330; Calibrated: 12/1/2002
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Ch.0025, Touch, Ant In, Standard Battery

Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 1.42 W/kg
SAR(1 g) = 0.947 mW/g; SAR(10 g) = 0.593 mW/g
Reference Value = 9.01 V/m



0 dB = 1.02mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SPH-A680; Type: SAMSUNG Tri Mode Phone Model: SPH-A680; Serial: #1
Program: SPH-A680 PCS Right; Conducted Power: 25.0 dBm

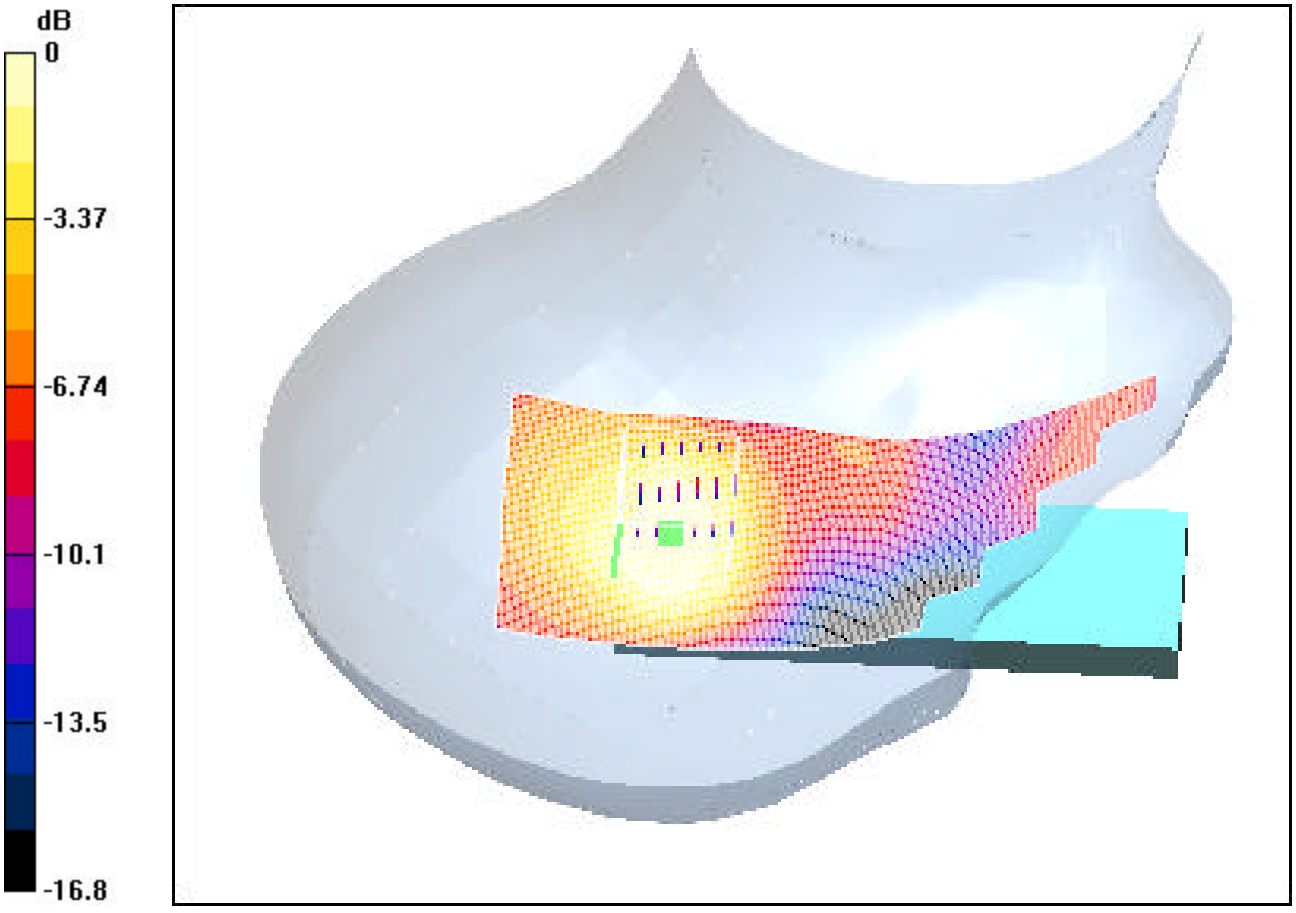
Communication System: PCS CDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Brain (σ = 1.39 mho/m, ε_r = 39.52, ρ = 1000 kg/m^3)
Phantom section: Right Section

Test Date: 09-25-2003; Ambient Temp: 22.4°C; Tissue Temp: 21.6°C

Probe: ET3DV6 - SN1560; ConvF(5.4, 5.4, 5.4); Calibrated: 9/27/2002
Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
Electronics: DAE3 SN330; Calibrated: 12/1/2002
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Ch.0600, Tilt, Ant Out, Standard Battery

Area Scan (51x131x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 0.314 W/kg
SAR(1 g) = 0.175 mW/g; SAR(10 g) = 0.111 mW/g
Reference Value = 12 V/m



0 dB = 0.189mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SPH-A680; Type: SAMSUNG Tri Mode Phone Model: SPH-A680; Serial: #1
Program: SPH-A680 PCS Left; Conducted Power: 25.0 dBm

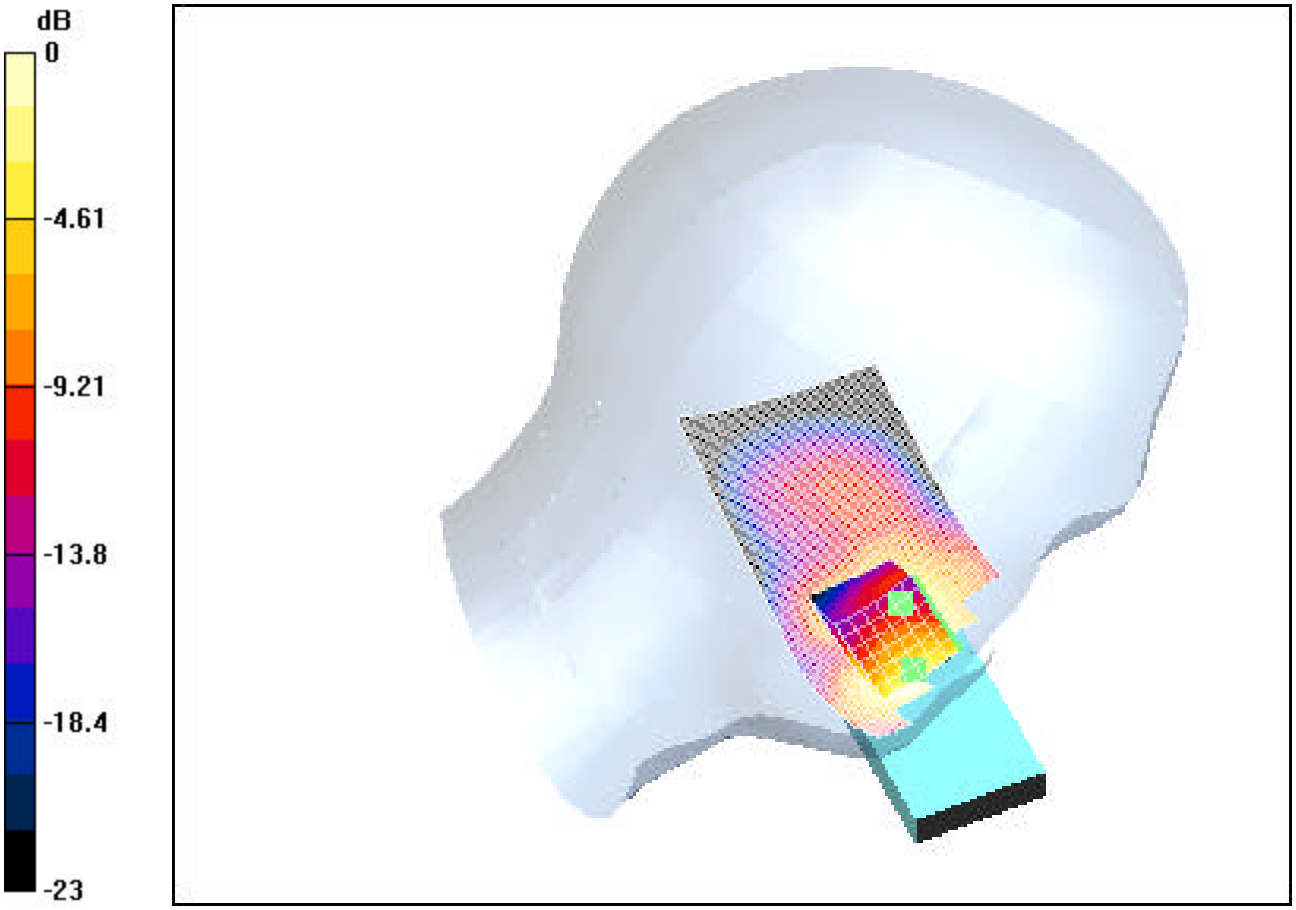
Communication System: PCS CDMA; Frequency: 1851.25 MHz;Duty Cycle: 1:1
Medium: 1900 Brain (σ = 1.39 mho/m, ε_r = 39.52, ρ = 1000 kg/m^3)
Phantom section: Left Section

Test Date: 09-25-2003; Ambient Temp: 22.4°C; Tissue Temp: 21.6°C

Probe: ET3DV6 - SN1560; ConvF(5.4, 5.4, 5.4); Calibrated: 9/27/2002
Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
Electronics: DAE3 SN330; Calibrated: 12/1/2002
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Ch.0025, Touch, Ant In, Standard Battery

Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 1.78 W/kg
SAR(1 g) = 1.2 mW/g; SAR(10 g) = 0.731 mW/g
Reference Value = 7.43 V/m



0 dB = 1.3mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SPH-A680; Type: SAMSUNG Tri Mode Phone Model: SPH-A680; Serial: #1
Program: SPH-A680 PCS Left; Conducted Power: 25.0 dBm

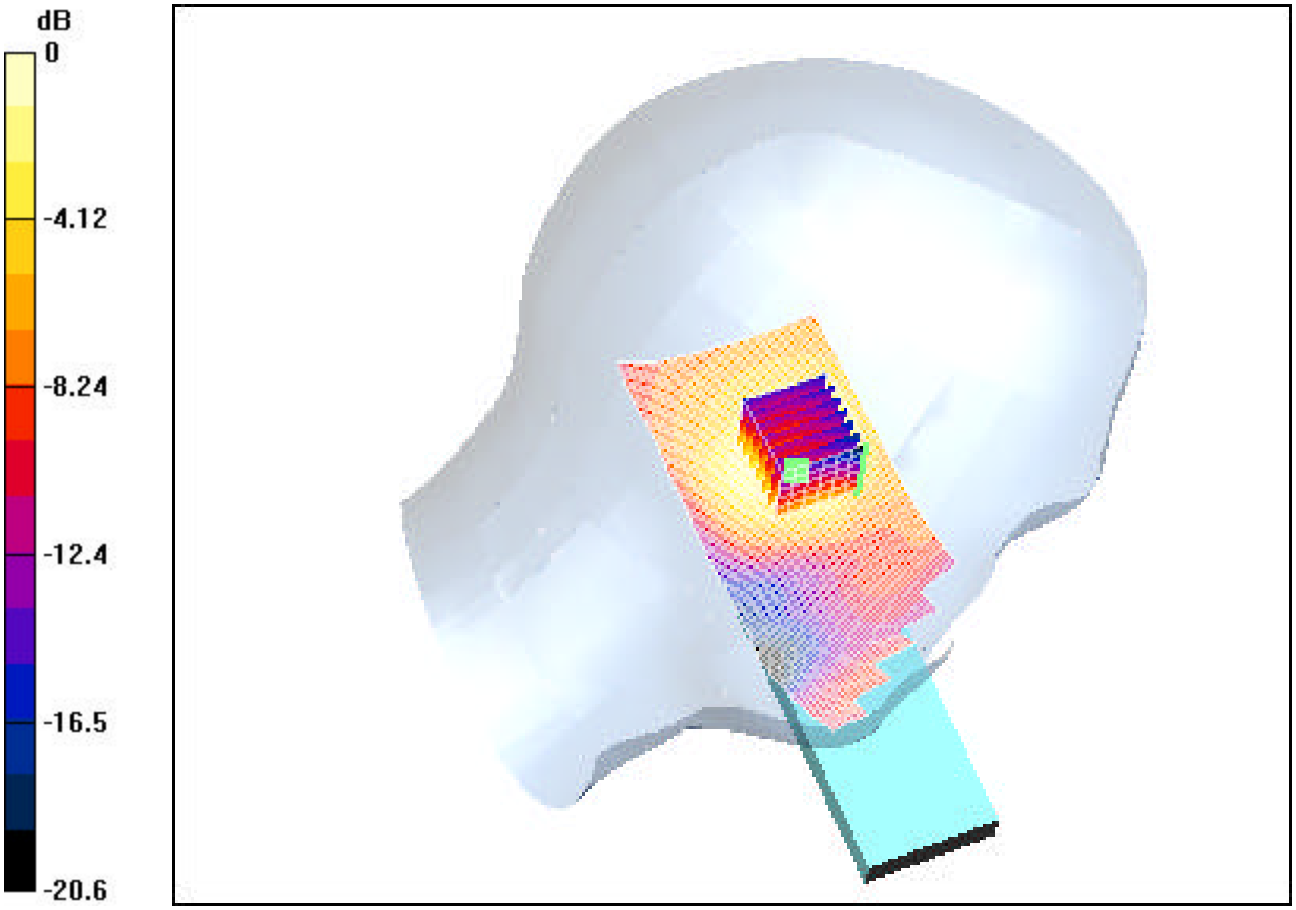
Communication System: PCS CDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Brain (σ = 1.39 mho/m, ε_r = 39.52, ρ = 1000 kg/m^3)
Phantom section: Left Section

Test Date: 09-25-2003; Ambient Temp: 22.4°C; Tissue Temp: 21.6°C

Probe: ET3DV6 - SN1560; ConvF(5.4, 5.4, 5.4); Calibrated: 9/27/2002
Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
Electronics: DAE3 SN330; Calibrated: 12/1/2002
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Ch.0600, Tilt, Ant Out, Standard Battery

Area Scan (51x131x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 0.299 W/kg
SAR(1 g) = 0.186 mW/g; SAR(10 g) = 0.108 mW/g
Reference Value = 11.9 V/m



0 dB = 0.202mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SPH-A680; Type: SAMSUNG Tri Mode Phone Model: SPH-A680; Serial: #1
Program: SPH-A680 AMPS Body; Conducted Power: 26.0 dBm

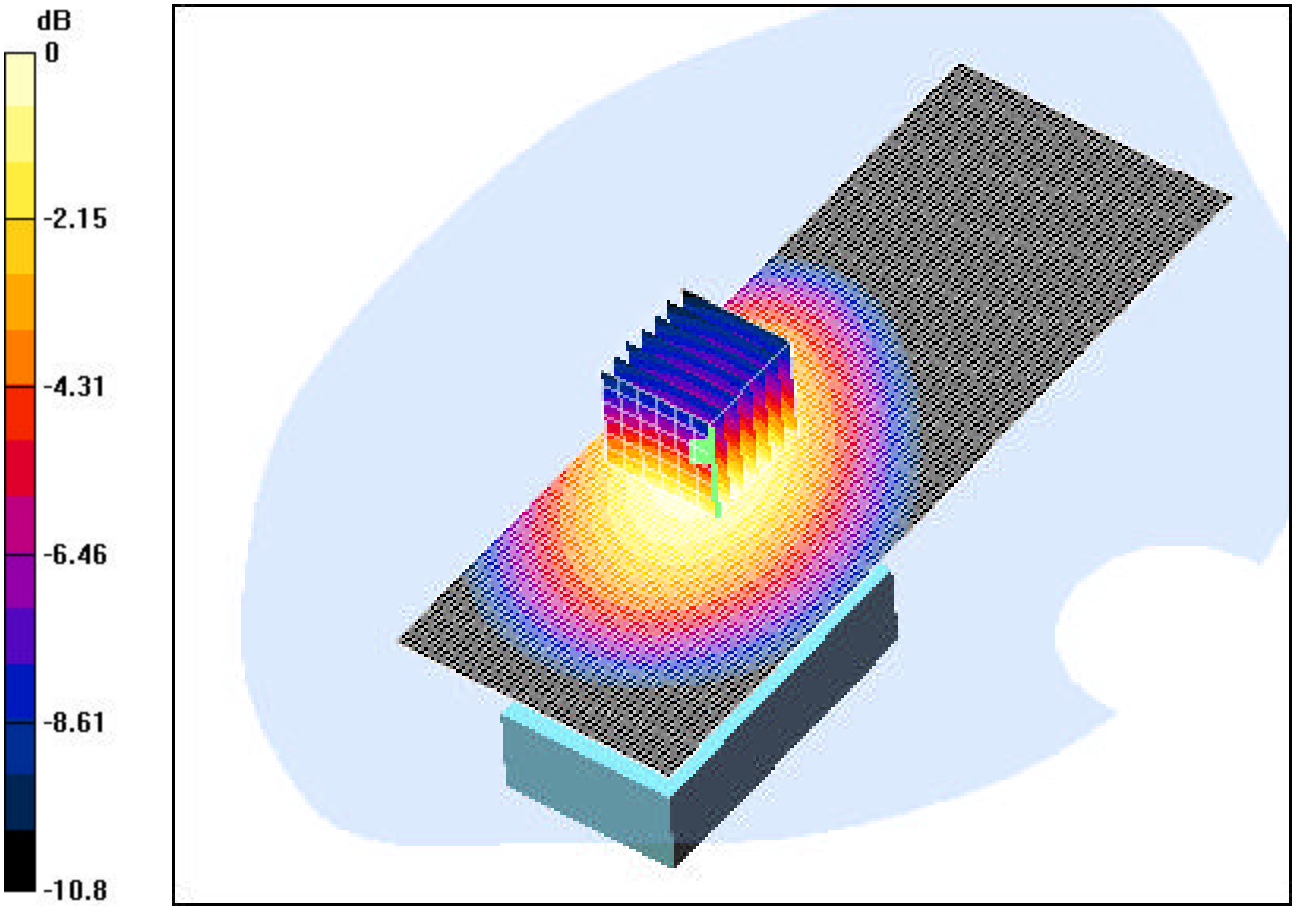
Communication System: AMPS; Frequency: 848.97 MHz;Duty Cycle: 1:1
Medium: 835 Muscle (σ = 0.98 mho/m, ε_r = 53.78, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-26-2003; Ambient Temp: 23.8°C; Tissue Temp: 21.5°C

Probe: ET3DV6 - SN1560; ConvF(6.6, 6.6, 6.6); Calibrated: 9/27/2002
Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
Electronics: DAE3 SN330; Calibrated: 12/1/2002
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Ch.0799, Ant Out, Standard Battery

Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.846 mW/g; SAR(10 g) = 0.575 mW/g
Reference Value = 24.4 V/m



0 dB = 0.905mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SPH-A680; Type: SAMSUNG Tri Mode Phone Model: SPH-A680; Serial: #1
Program: SPH-A680 CDMA Body ; Conducted Power: 25.5 dBm

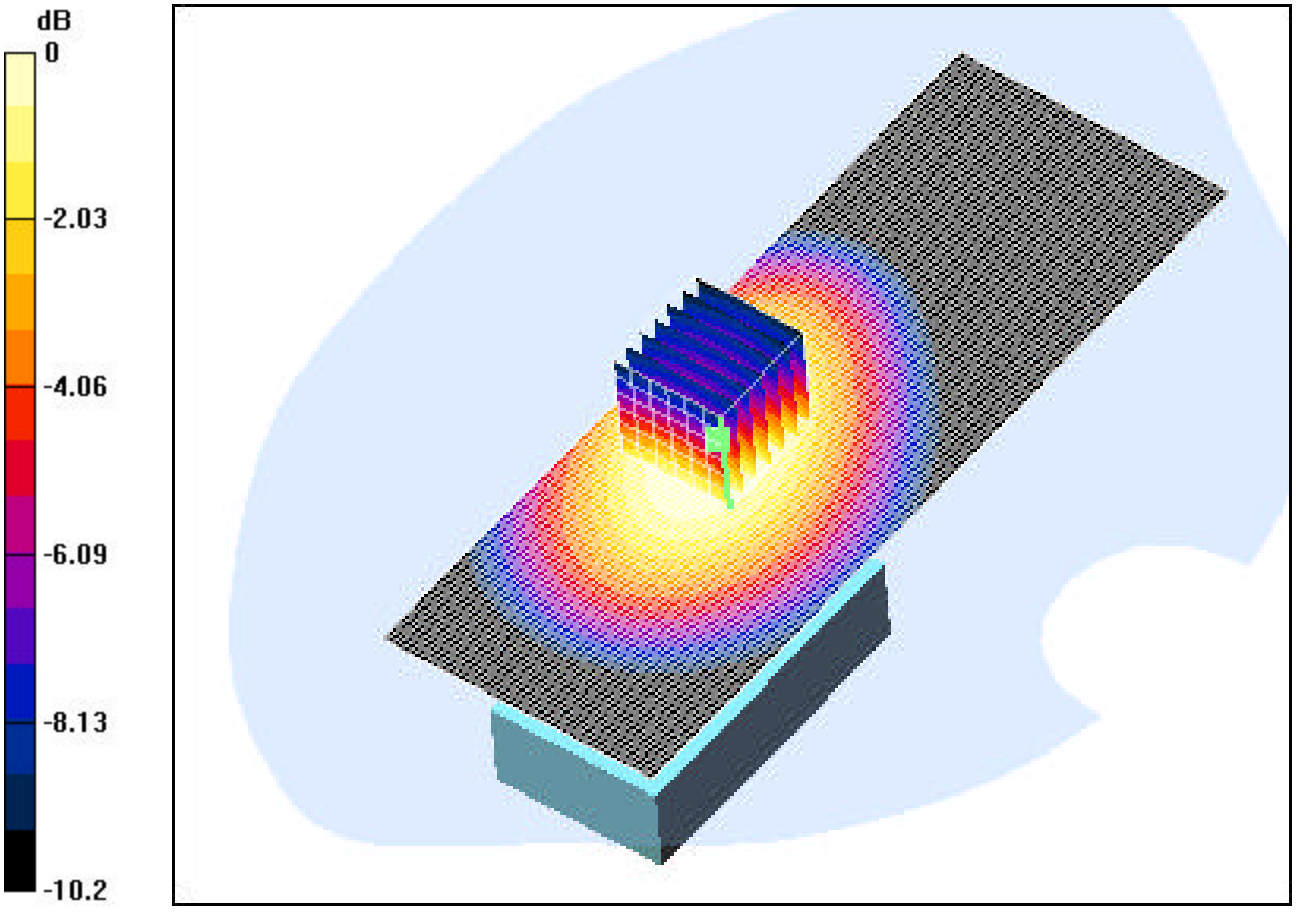
Communication System: Cellular CDMA; Frequency: 848.31 MHz;Duty Cycle: 1:1
Medium: 835 Muscle (σ = 0.98 mho/m, ε_r = 53.78, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-26-2003; Ambient Temp: 23.8°C; Tissue Temp: 21.5°C

Probe: ET3DV6 - SN1560; ConvF(6.6, 6.6, 6.6); Calibrated: 9/27/2002
Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
Electronics: DAE3 SN330; Calibrated: 12/1/2002
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Ch.0777, Ant Out, Standard Battery

Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 0.919 W/kg
SAR(1 g) = 0.67 mW/g; SAR(10 g) = 0.46 mW/g
Reference Value = 24.9 V/m



0 dB = 0.706mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SPH-A680; Type: SAMSUNG Tri Mode Phone Model: SPH-A680; Serial: #1
Program: SPH-A680 PCS Body; Conducted Power: 25.0 dBm

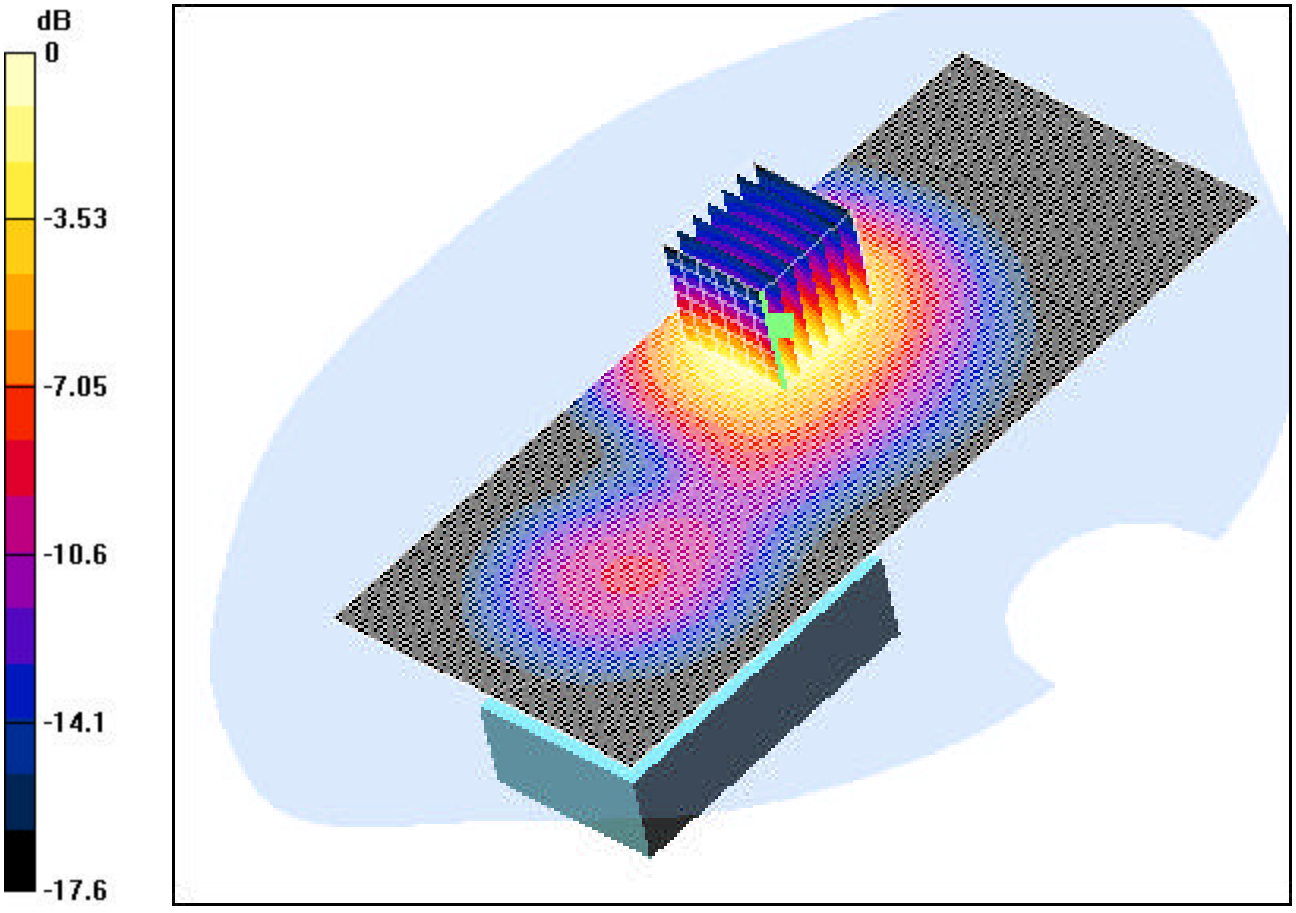
Communication System: PCS CDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Muscle (σ = 1.58 mho/m, ε_r = 51.02, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-26-2003; Ambient Temp: 23.9°C; Tissue Temp: 22.9°C

Probe: ET3DV6 - SN1560; ConvF(4.9, 4.9, 4.9); Calibrated: 9/27/2002
Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
Electronics: DAE3 SN330; Calibrated: 12/1/2002
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Ch.0600, Ant Out, Standard Battery

Area Scan (61x141x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 1.36 W/kg
SAR(1 g) = 0.775 mW/g; SAR(10 g) = 0.424 mW/g
Reference Value = 12.3 V/m



0 dB = 0.836mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SPH-A680; Type: SAMSUNG Tri Mode Phone Model: SPH-A680; Serial: #1
Program: SPH-A680 AMPS Right; Conducted Power: 26.0 dBm

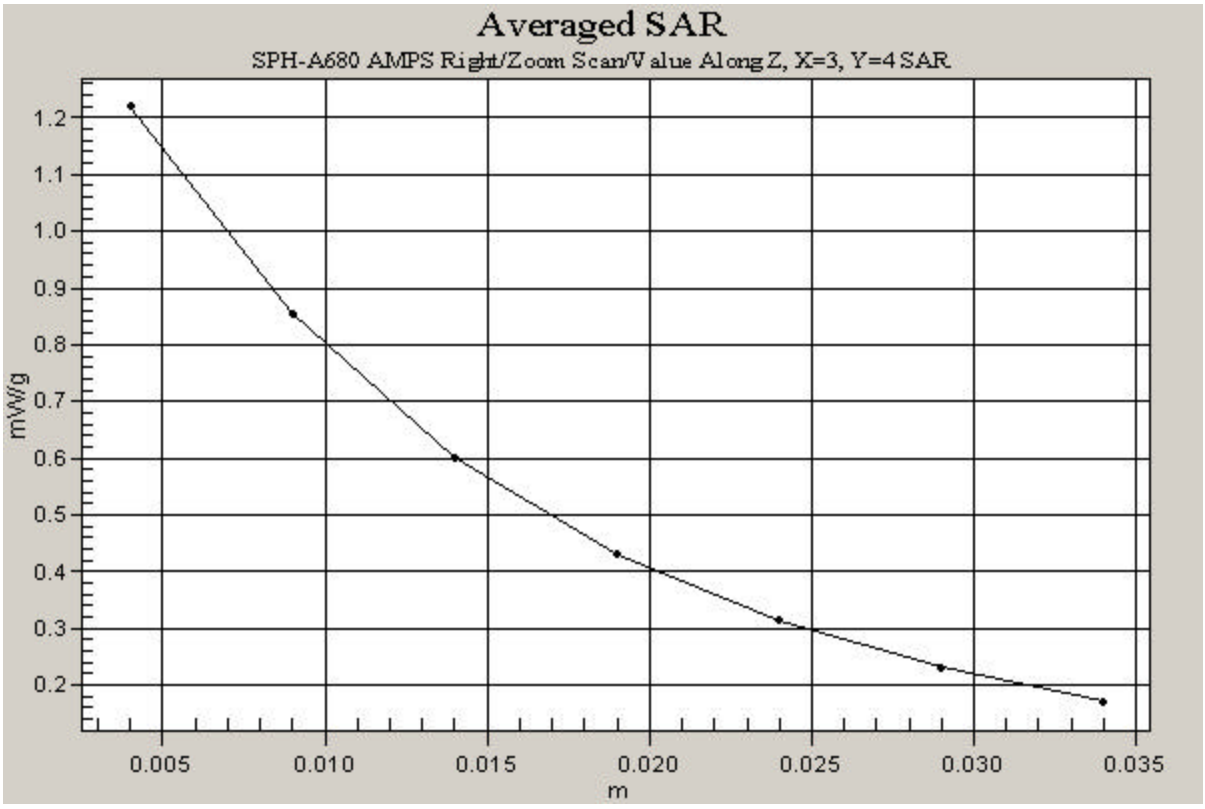
Communication System: AMPS; Frequency: 848.97 MHz;Duty Cycle: 1:1
Medium: 835 Brain (σ = 0.89 mho/m, ε_r = 40.06, ρ = 1000 kg/m^3)
Phantom section: Right Section

Test Date: 09-24-2003; Ambient Temp: 25.5°C; Tissue Temp: 23.2°C

Probe: ET3DV6 - SN1560; ConvF(6.9, 6.9, 6.9); Calibrated: 9/27/2002
Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
Electronics: DAE3 SN330; Calibrated: 12/1/2002
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Ch.0799, Touch, Ant In, Standard Battery

Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 1.64 W/kg
SAR(1 g) = 1.14 mW/g; SAR(10 g) = 0.733 mW/g
Reference Value = 8.35 V/m



PCTEST ENGINEERING LABORATORY, INC.

DUT: SPH-A680; Type: SAMSUNG Tri Mode Phone Model: SPH-A680; Serial: #1
Program: SPH-A680 PCS Left; Conducted Power: 25.0 dBm

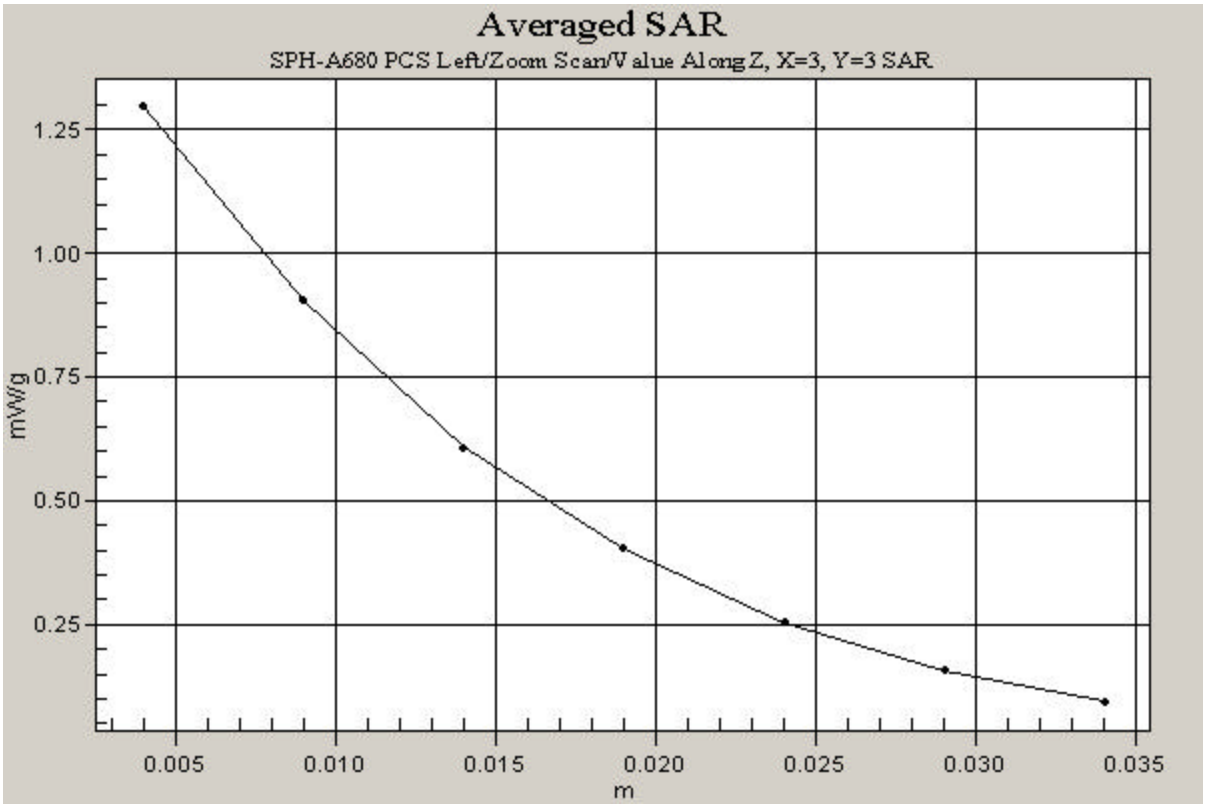
Communication System: PCS CDMA; Frequency: 1851.25 MHz;Duty Cycle: 1:1
Medium: 1900 Brain (σ = 1.39 mho/m, ε_r = 39.52, ρ = 1000 kg/m^3)
Phantom section: Left Section

Test Date: 09-25-2003; Ambient Temp: 22.4°C; Tissue Temp: 21.6°C

Probe: ET3DV6 - SN1560; ConvF(5.4, 5.4, 5.4); Calibrated: 9/27/2002
Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
Electronics: DAE3 SN330; Calibrated: 12/1/2002
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Ch.0025, Touch, Ant In, Standard Battery

Area Scan (51x121x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 1.78 W/kg
SAR(1 g) = 1.2 mW/g; SAR(10 g) = 0.731 mW/g
Reference Value = 7.43 V/m



PCTEST ENGINEERING LABORATORY, INC.

DUT: SPH-A680; Type: SAMSUNG Tri Mode Phone Model: SPH-A680; Serial: #1
Program: SPH-A680 AMPS Body; Conducted Power: 26.0 dBm

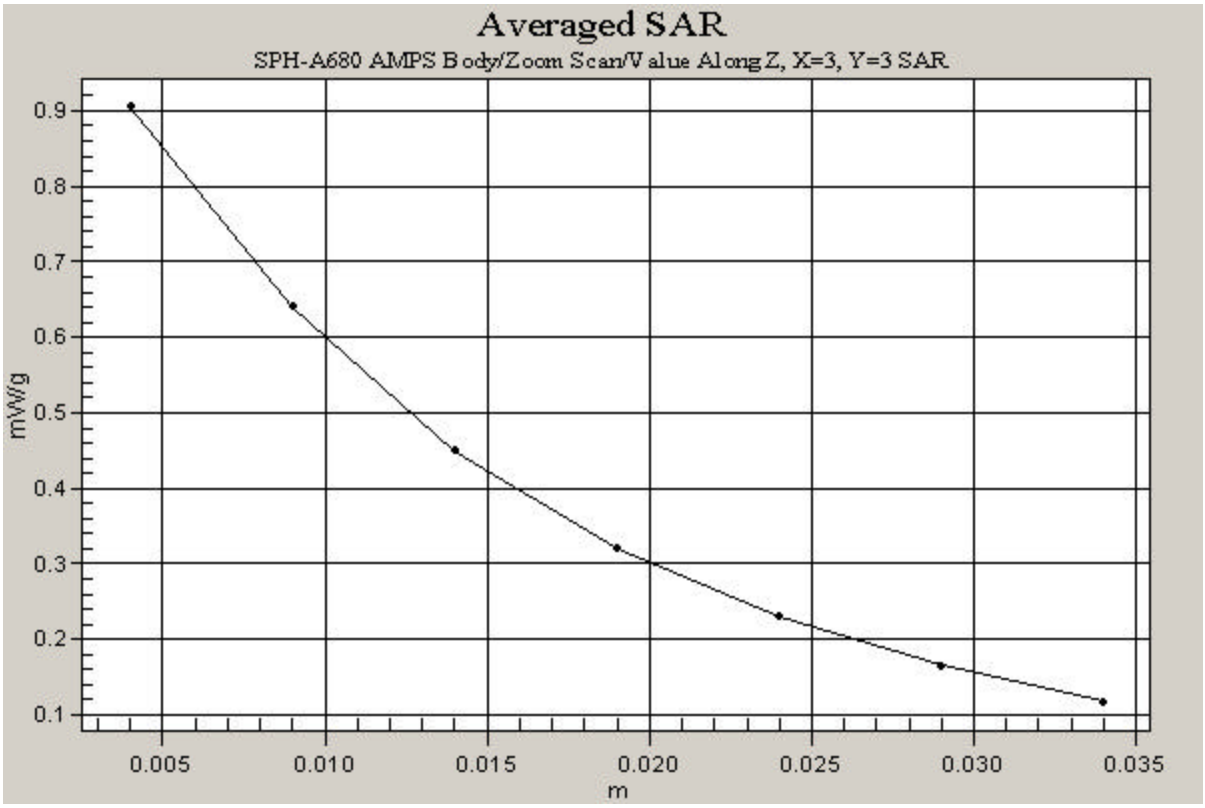
Communication System: AMPS; Frequency: 848.97 MHz;Duty Cycle: 1:1
Medium: 835 Muscle (σ = 0.98 mho/m, ε_r = 53.78, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-26-2003; Ambient Temp: 23.8°C; Tissue Temp: 21.5°C

Probe: ET3DV6 - SN1560; ConvF(6.6, 6.6, 6.6); Calibrated: 9/27/2002
Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
Electronics: DAE3 SN330; Calibrated: 12/1/2002
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Ch.0799, Ant Out, Standard Battery

Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.846 mW/g; SAR(10 g) = 0.575 mW/g
Reference Value = 24.4 V/m



PCTEST ENGINEERING LABORATORY, INC.

DUT: SPH-A680; Type: SAMSUNG Tri Mode Phone Model: SPH-A680; Serial: #1
Program: SPH-A680 PCS Body; Conducted Power: 25.0 dBm

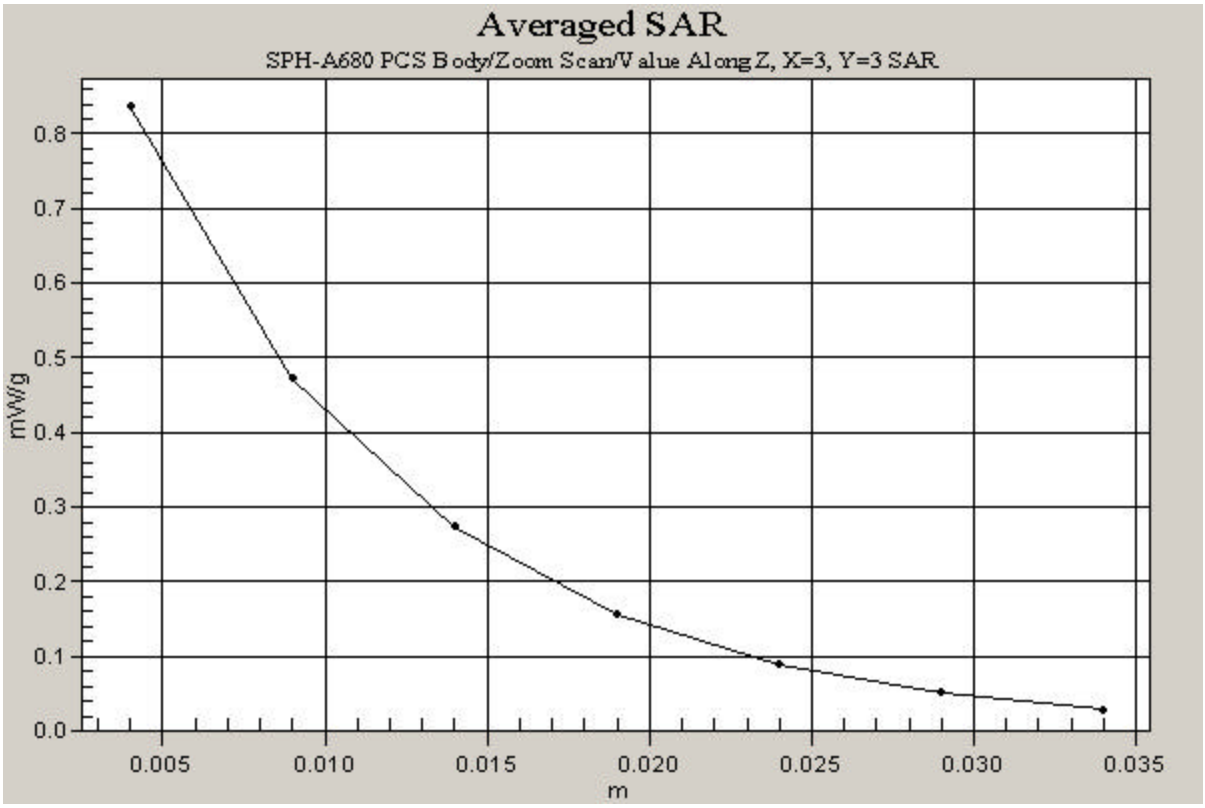
Communication System: PCS CDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Muscle (σ = 1.58 mho/m, ε_r = 51.02, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-26-2003; Ambient Temp: 23.9°C; Tissue Temp: 22.9°C

Probe: ET3DV6 - SN1560; ConvF(4.9, 4.9, 4.9); Calibrated: 9/27/2002
Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
Electronics: DAE3 SN330; Calibrated: 12/1/2002
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Ch.0600, Ant Out, Standard Battery

Area Scan (61x141x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 1.36 W/kg
SAR(1 g) = 0.775 mW/g; SAR(10 g) = 0.424 mW/g
Reference Value = 12.3 V/m



APPENDIX B: DIPOLE VALIDATION

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835MHz; Type: D835V2; SN:406
Program: 835MHz. Dipole Validation - 1560

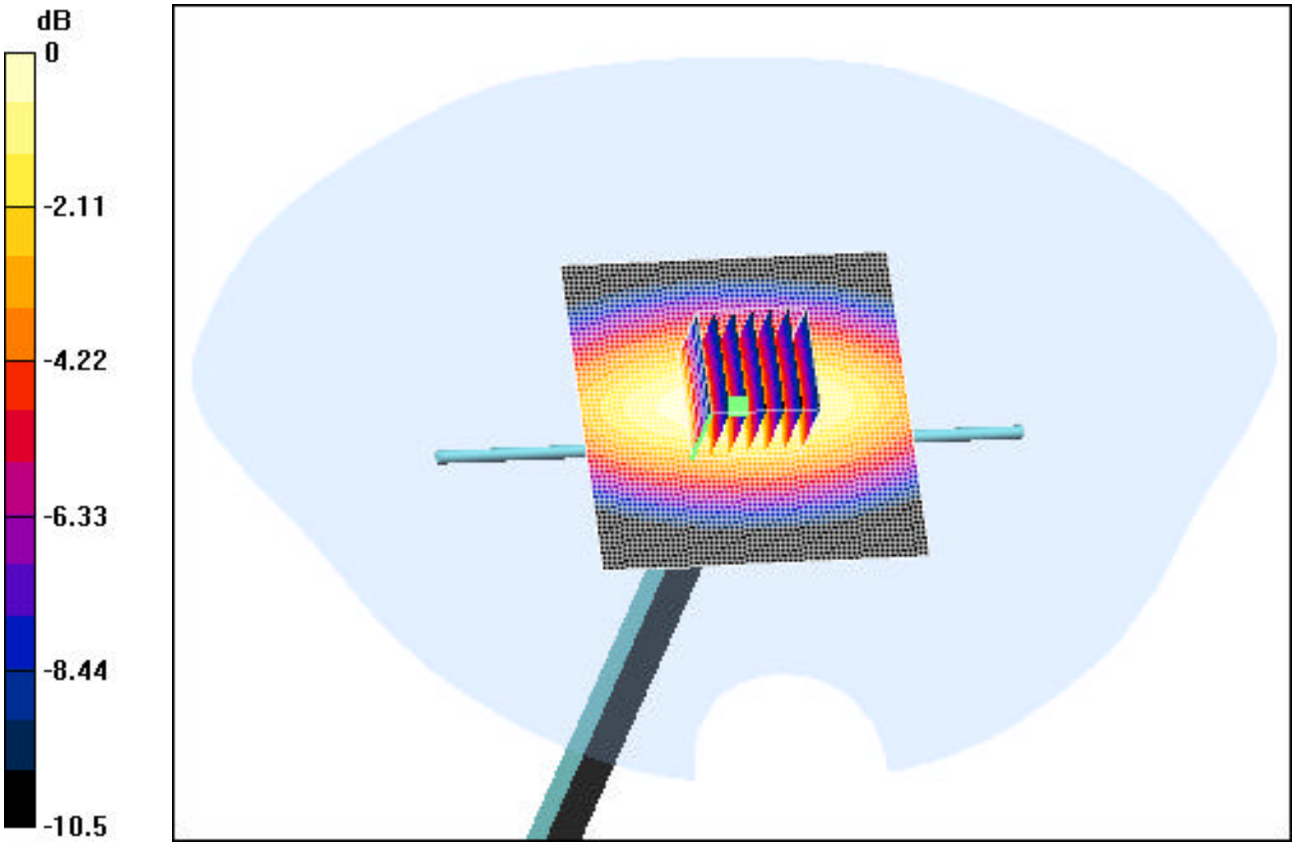
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835MHz. Brain (σ = 0.89 mho/m, ε_r = 40.06, ρ = 1000 kg/m^3)
Phantom section: Flat Section

Test Date: 09-24-2003; Ambient Temp: 22.5°C; Tissue Temp: 20.6°C

Probe: ET3DV6 - SN1560; ConvF(6.9, 6.9, 6.9); Calibrated: 9/27/2002
Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
Electronics: DAE3 SN330; Calibrated: 12/1/2002
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

835MHz. Dipole Validation - 1560

Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 3.65 W/kg
SAR(1 g) = 2.38 mW/g; SAR(10 g) = 1.58 mW/g
Reference Value = 59.34 V/m



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835MHz; Type: D835V2; SN:406
Program: 835MHz. Dipole Validation - 1560

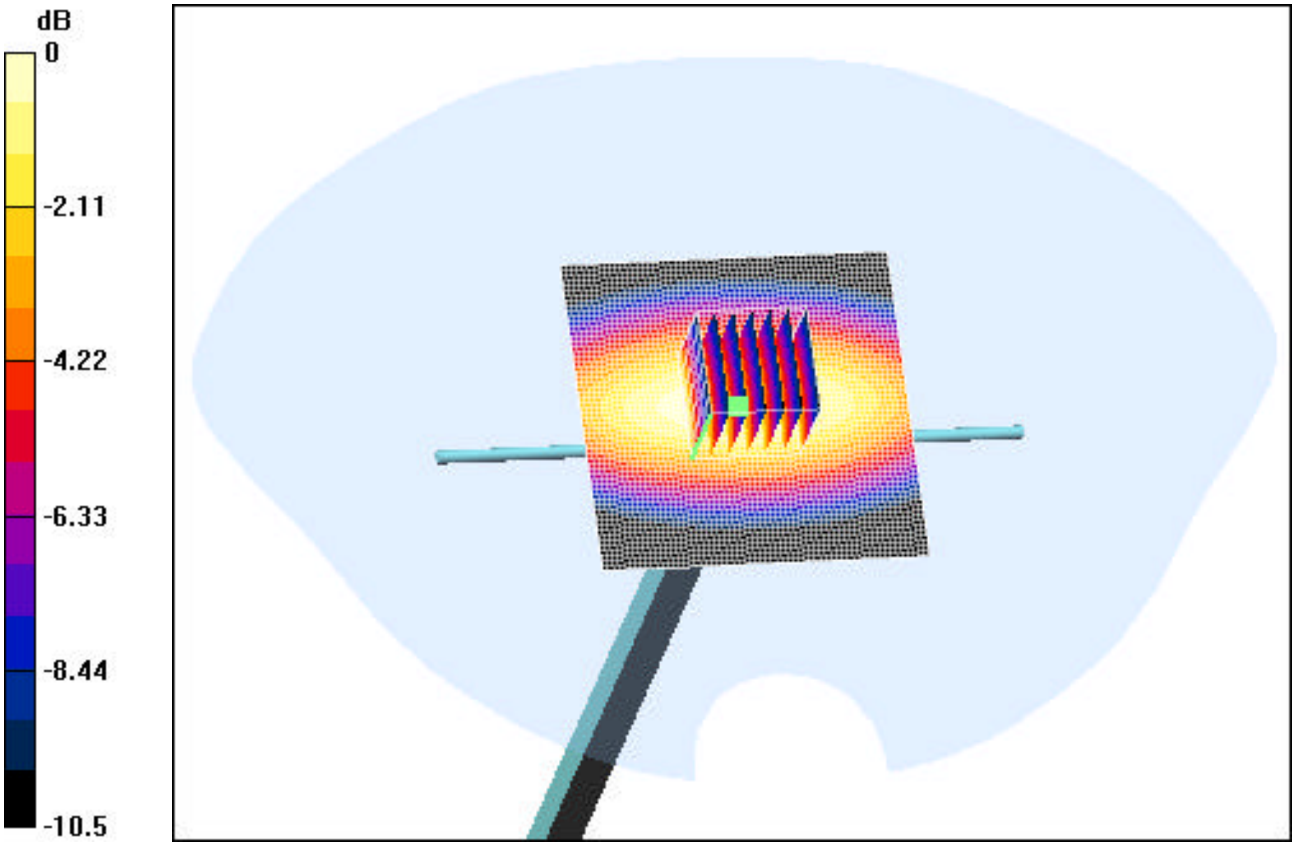
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835MHz. Brain (σ = 0.89 mho/m, ε_r = 40.06, ρ = 1000 kg/m^3)
Phantom section: Flat Section

Test Date: 09-24-2003; Ambient Temp: 22.5°C; Tissue Temp: 20.6°C

Probe: ET3DV6 - SN1560; ConvF(6.9, 6.9, 6.9); Calibrated: 9/27/2002
Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
Electronics: DAE3 SN330; Calibrated: 12/1/2002
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

835MHz. Dipole Validation - 1560

Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 3.65 W/kg
SAR(1 g) = 2.38 mW/g; SAR(10 g) = 1.58 mW/g
Reference Value = 59.34 V/m



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; SN:502
Program: 1900MHz Dipole Validation - 1560

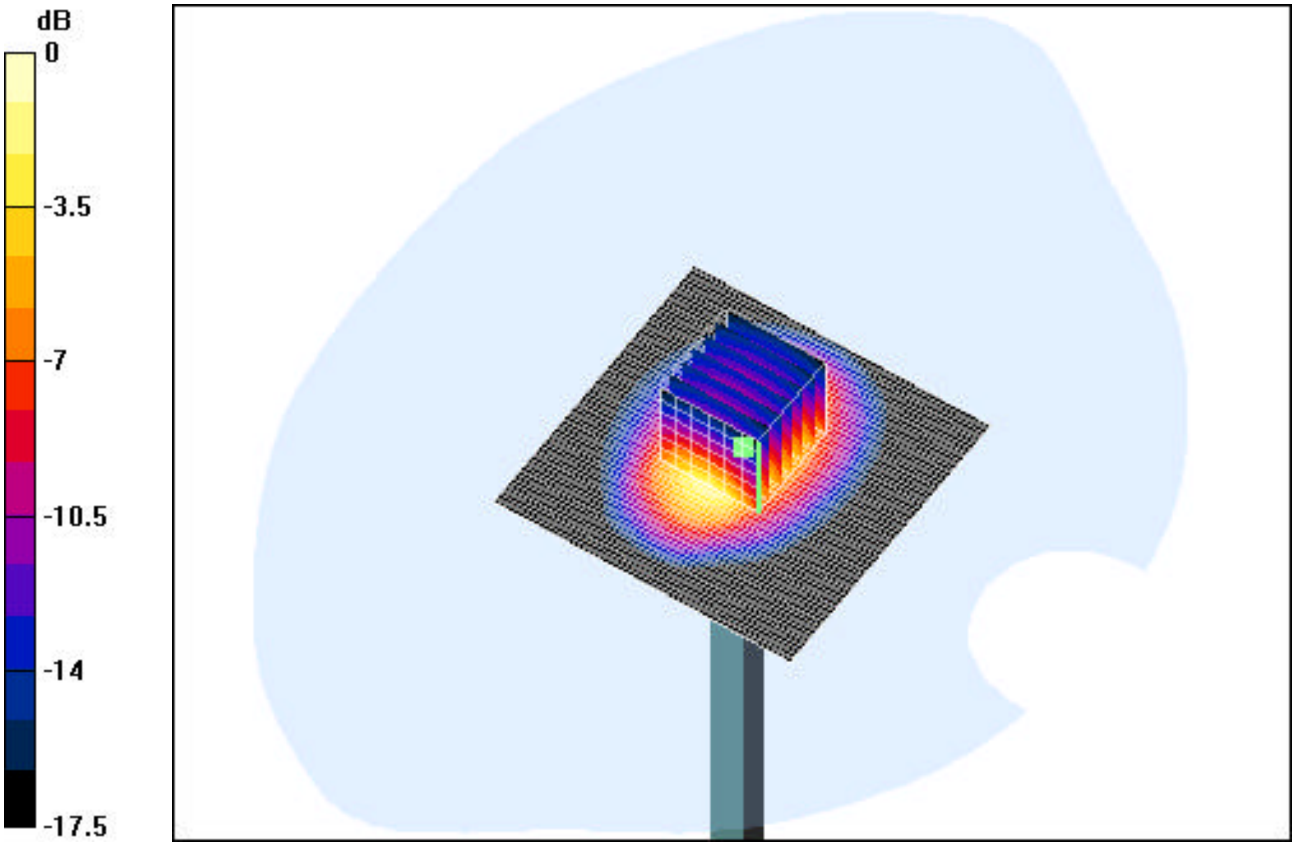
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900MHz. Brain (σ = 1.39 mho/m, ε_r = 39.52, ρ = 1000 kg/m^3)
Phantom section: Flat Section

Test Date: 09-25-2003; Ambient Temp: 22.7°C; Tissue Temp: 20.1°C

Probe: ET3DV6 - SN1560; ConvF(5.4, 5.4, 5.4); Calibrated: 9/27/2002
Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
Electronics: DAE3 SN330; Calibrated: 12/1/2002
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.1 Build 33; Postprocessing SW: SEMCAD, V1.6 Build 115

1900MHz Dipole Validation - 1560

Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 17.9 W/kg
SAR(1 g) = 3.92 mW/g; SAR(10 g) = 5.08 mW/g
Reference Value = 93.5 V/m



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; SN:502
Program: 1900MHz Dipole Validation - 1560

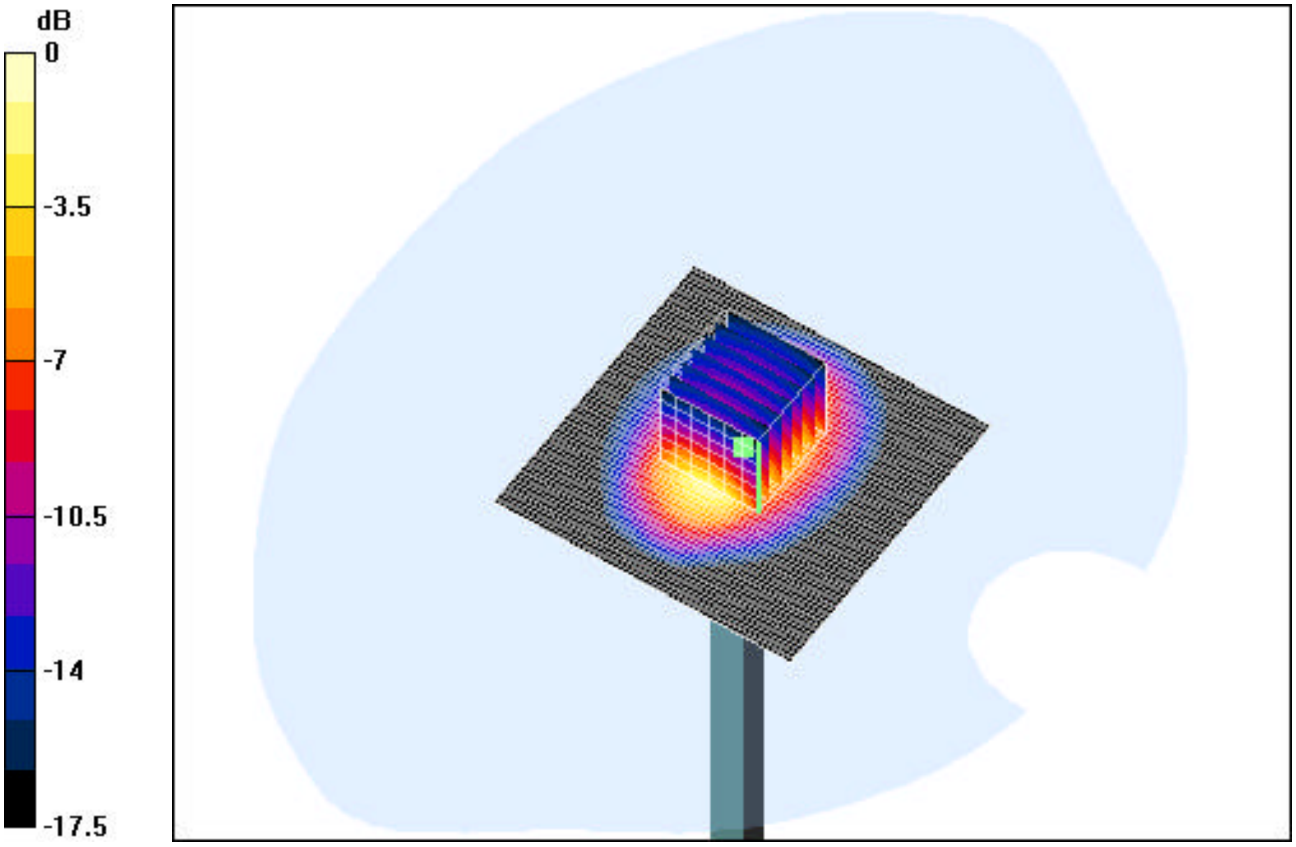
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900MHz. Brain (σ = 1.39 mho/m, ε_r = 39.52, ρ = 1000 kg/m^3)
Phantom section: Flat Section

Test Date: 09-26-2003; Ambient Temp: 22.5°C; Tissue Temp: 20.6°C

Probe: ET3DV6 - SN1560; ConvF(5.4, 5.4, 5.4); Calibrated: 9/27/2002
Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
Electronics: DAE3 SN330; Calibrated: 12/1/2002
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.1 Build 33; Postprocessing SW: SEMCAD, V1.6 Build 115

1900MHz Dipole Validation - 1560

Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 17.9 W/kg
SAR(1 g) = 3.92 mW/g; SAR(10 g) = 5.08 mW/g
Reference Value = 93.5 V/m



APPENDIX C: 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:	**1560**
Place of Calibration:	**Zurich**
Date of Calibration:	**September 27, 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:	D. Veller
Approved by:	Katja Pokovic

Schmid & Partner
Engineering AG

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

Probe ET3DV6

SN:1560

Manufactured:	December 1, 2000
Last calibration:	February 20, 2001
Recalibrated:	September 27, 2002

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1560

Sensitivity in Free Space

Diode Compression

NormX	**1.48** $\mu V/(V/m)^2$	DCP X	**93**	mV
NormY	**1.50** $\mu V/(V/m)^2$	DCP Y	**93**	mV
NormZ	**1.42** $\mu V/(V/m)^2$	DCP Z	**93**	mV

Sensitivity in Tissue Simulating Liquid

Head **835 MHz** ε_r **= 41.5 ± 5%** σ **= 0.90 ± 5% mho/m**
Head **900 MHz** ε_r **= 41.5 ± 5%** σ **= 0.97 ± 5% mho/m**

ConvF X	**6.9** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.9** ± 9.5% (k=2)	Alpha	**0.60**
ConvF Z	**6.9** ± 9.5% (k=2)	Depth	**1.69**

Head **1900 MHz** ε_r **= 40.0 ± 5%** σ **= 1.40 ± 5% mho/m**
Head **1800 MHz** ε_r **= 40.0 ± 5%** σ **= 1.40 ± 5% mho/m**

ConvF X	**5.4** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**5.4** ± 9.5% (k=2)	Alpha	**0.49**
ConvF Z	**5.4** ± 9.5% (k=2)	Depth	**2.36**

Boundary Effect

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

Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	7.3	3.7
SAR_{be} [%]	With Correction Algorithm	0.0	0.2

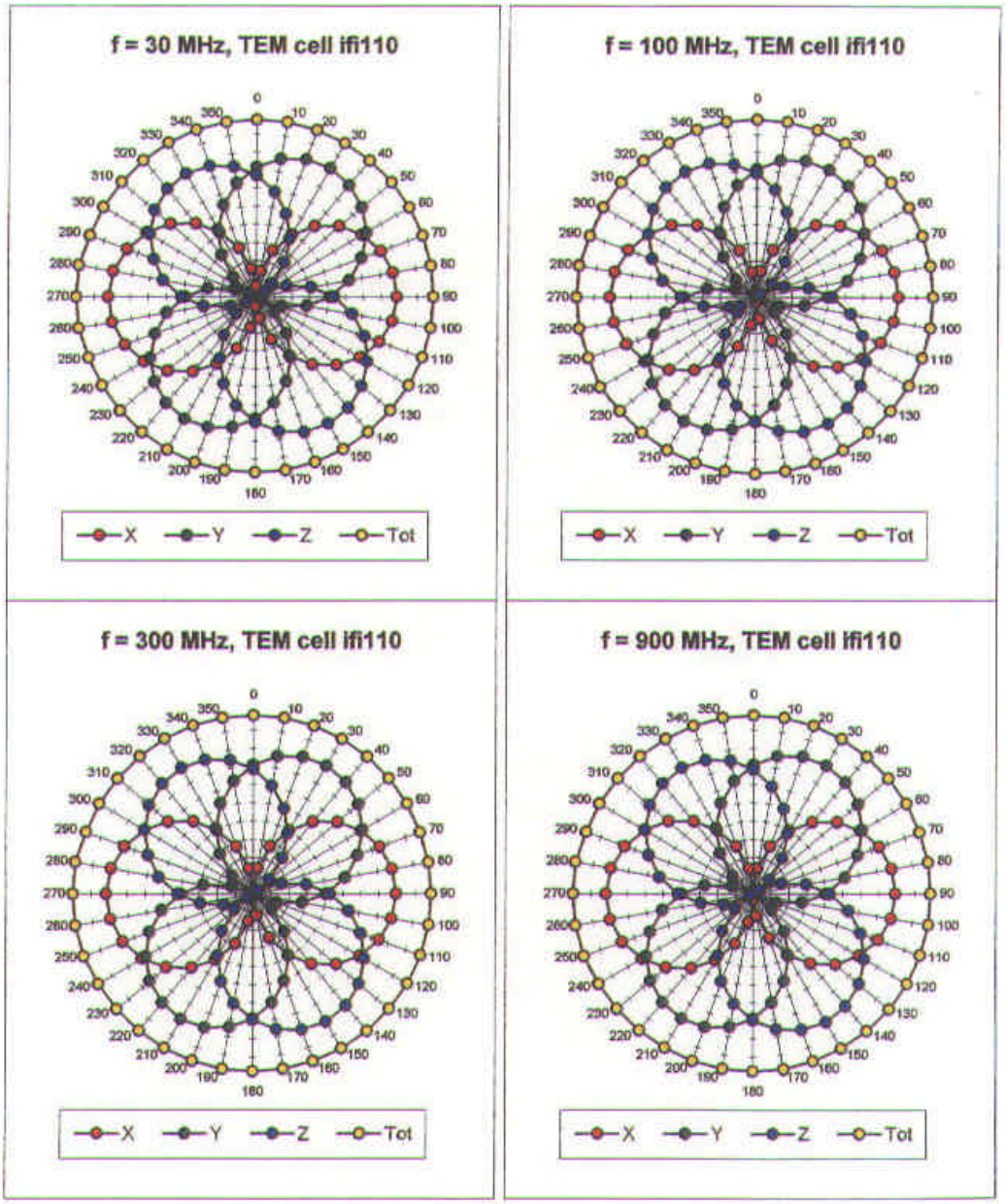
Head **1900 MHz** **Typical SAR gradient: 10 % per mm**

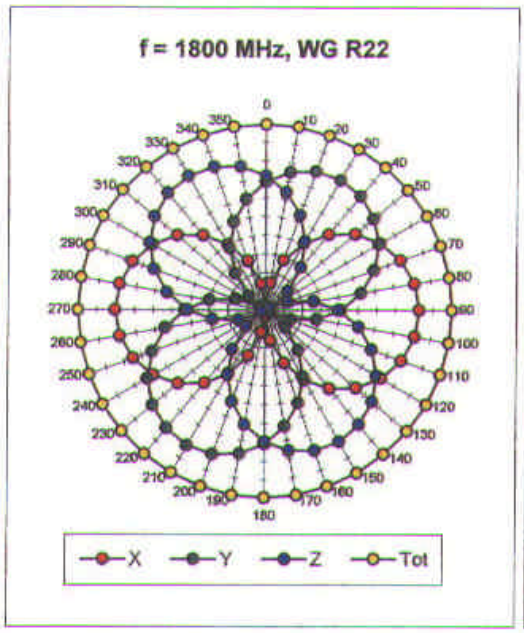
Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	11.1	7.6
SAR_{be} [%]	With Correction Algorithm	0.2	0.4

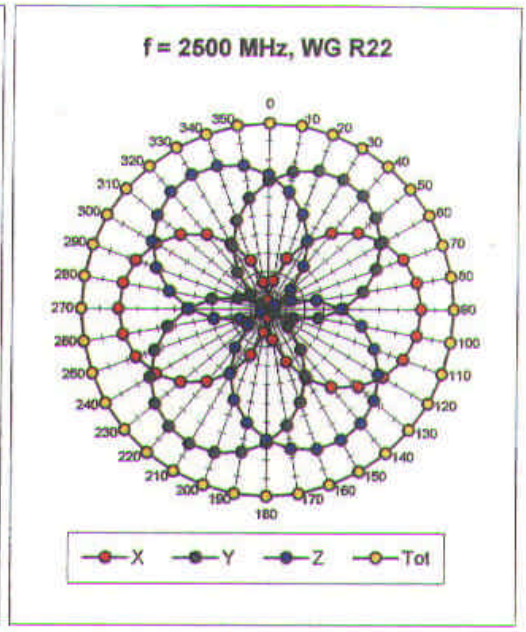
Sensor Offset

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

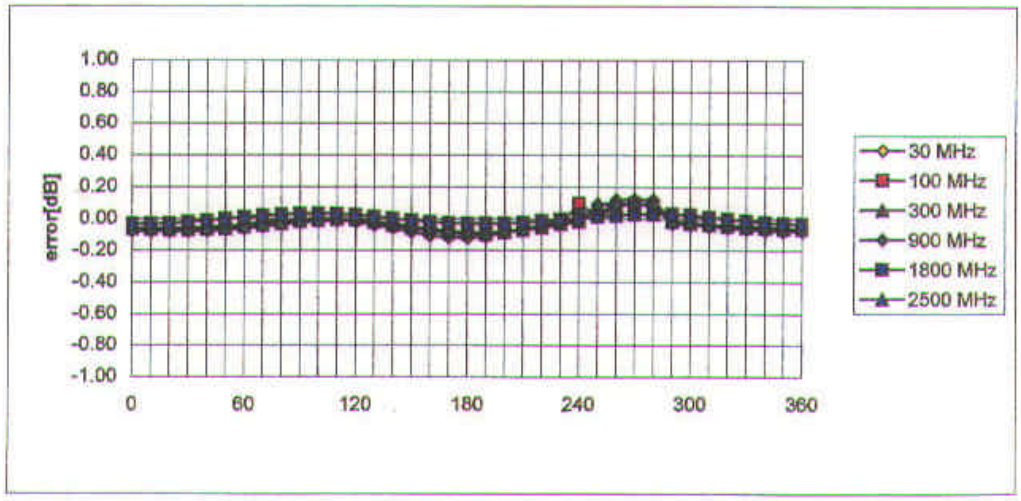
Receiving Pattern (ϕ), θ = 0°





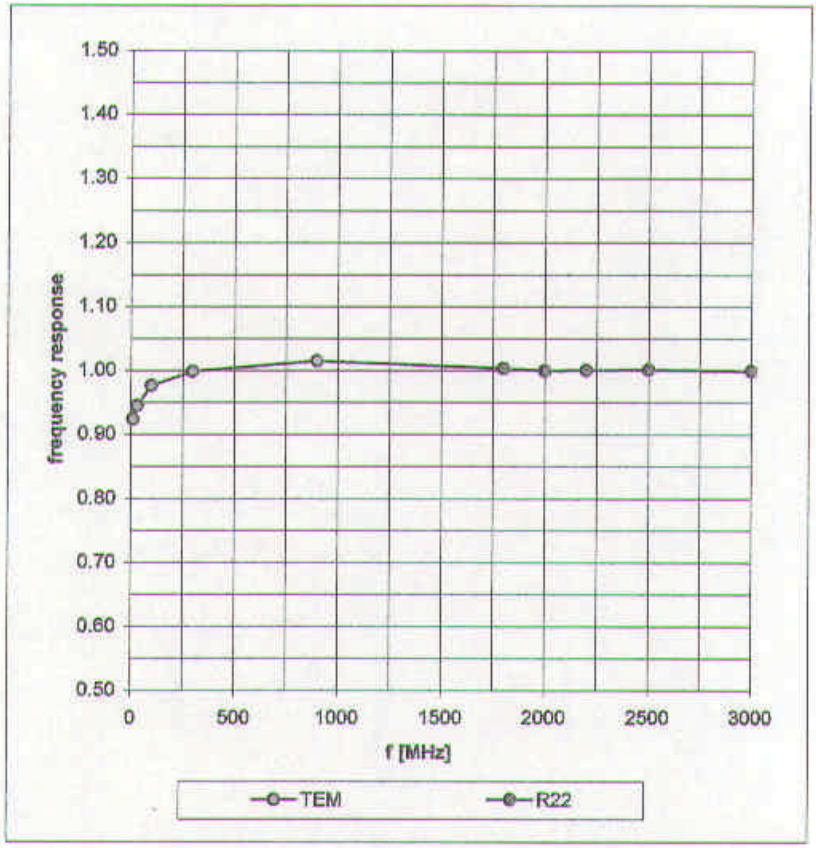


Isotropy Error (ϕ), θ = 0°



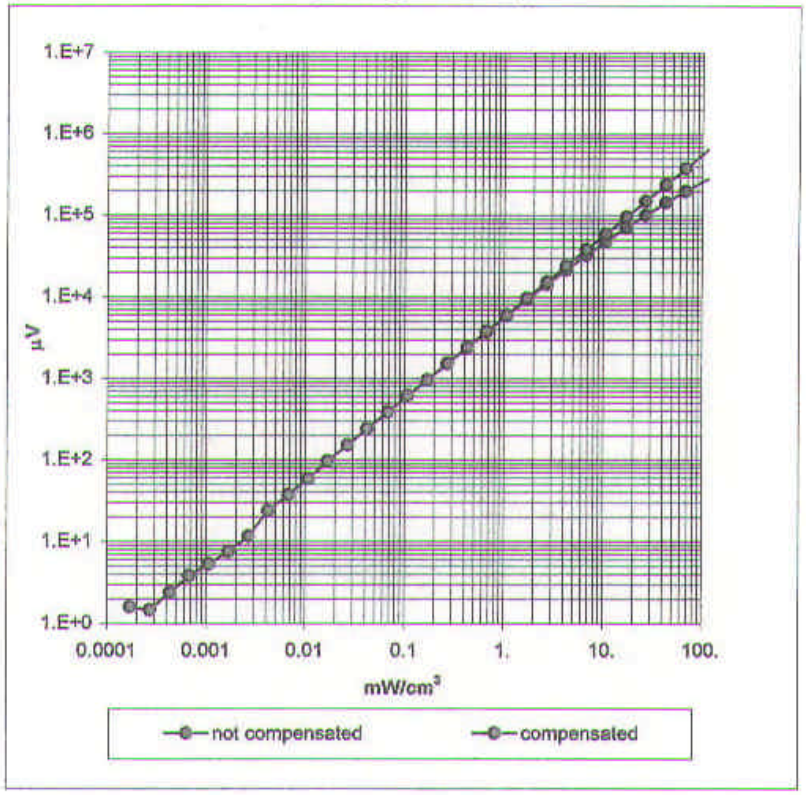
Frequency Response of E-Field

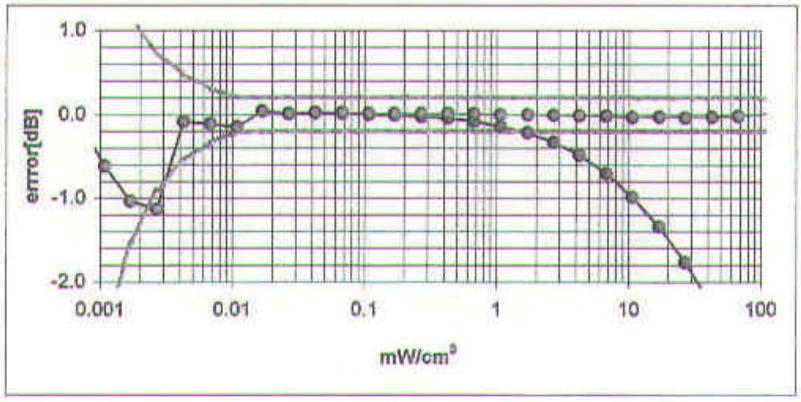
(TEM-Cell:ifi110, Waveguide R22)



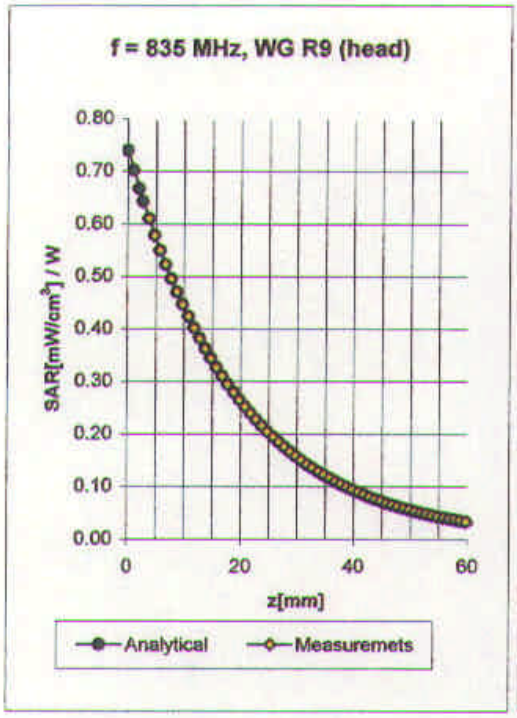
Dynamic Range f(SAR_{brain})

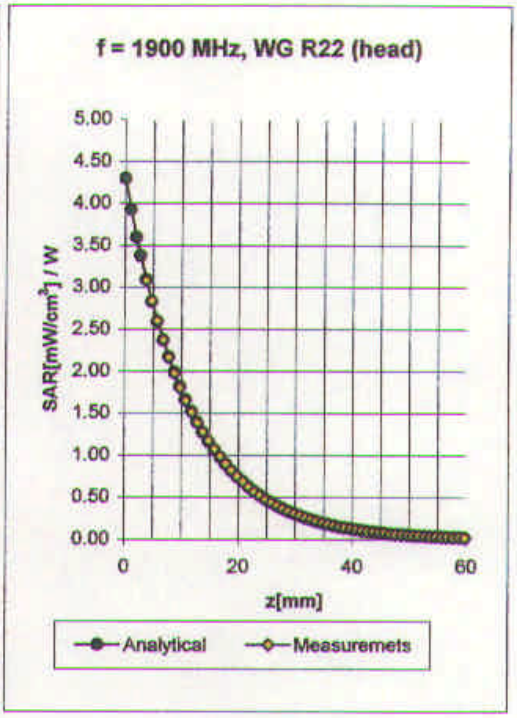
(Waveguide R22)





Conversion Factor Assessment

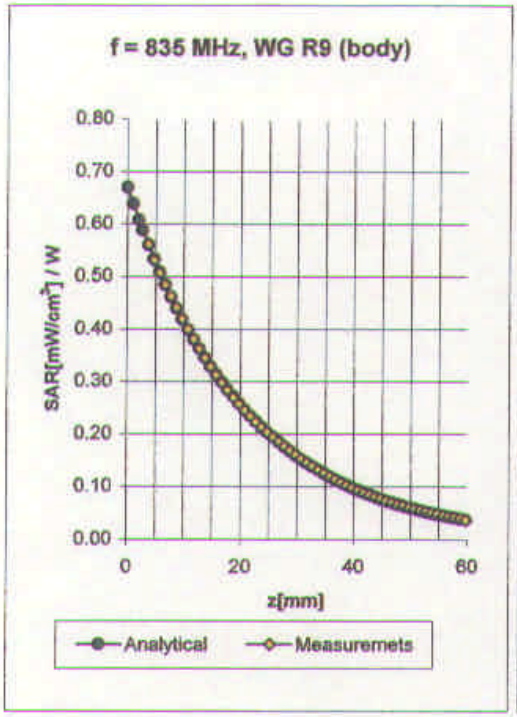


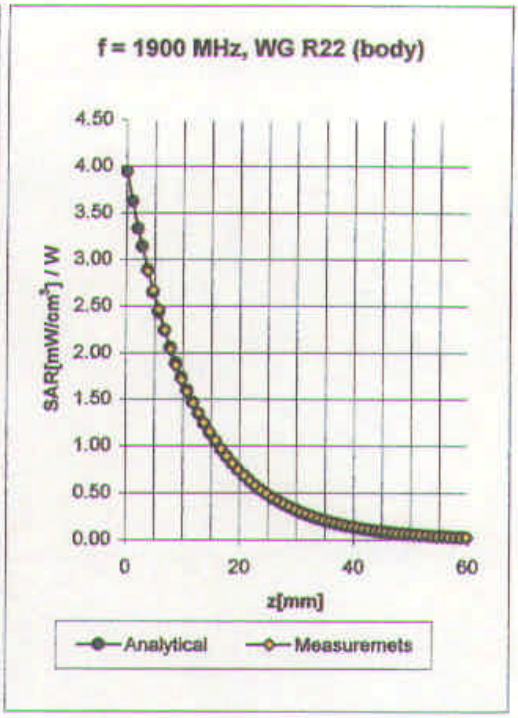


Head	**835 MHz**		ε_r = 41.5 ± 5%	σ = 0.90 ± 5% mho/m	
Head	**900 MHz**		ε_r = 41.5 ± 5%	σ = 0.97 ± 5% mho/m	
	ConvF X	**6.9** ± 9.5% (k=2)		Boundary effect:	
	ConvF Y	**6.9** ± 9.5% (k=2)		Alpha	**0.60**
	ConvF Z	**6.9** ± 9.5% (k=2)		Depth	**1.69**

Head	**1900 MHz**		ε_r = 40.0 ± 5%	σ = 1.40 ± 5% mho/m	
Head	**1800 MHz**		ε_r = 40.0 ± 5%	σ = 1.40 ± 5% mho/m	
	ConvF X	**5.4** ± 9.5% (k=2)		Boundary effect:	
	ConvF Y	**5.4** ± 9.5% (k=2)		Alpha	**0.49**
	ConvF Z	**5.4** ± 9.5% (k=2)		Depth	**2.36**

Conversion Factor Assessment

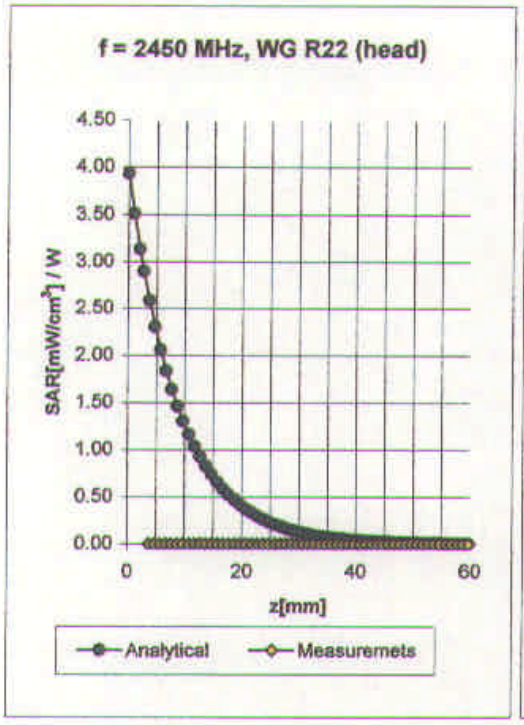


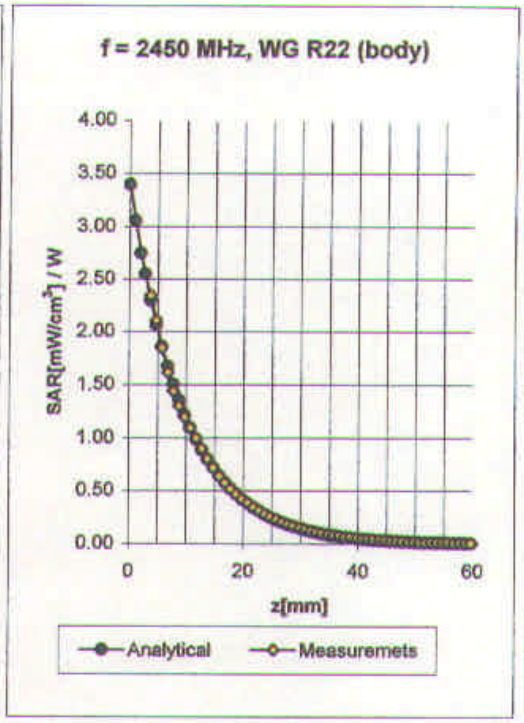


Body	**835 MHz**		ε_r = 55.2 ± 5%	σ = 0.97 ± 5% mho/m	
Body	**900 MHz**		ε_r = 55.0 ± 5%	σ = 1.05 ± 5% mho/m	
	ConvF X	**6.6** ± 9.5% (k=2)		Boundary effect:	
	ConvF Y	**6.6** ± 9.5% (k=2)		Alpha	**0.33**
	ConvF Z	**6.6** ± 9.5% (k=2)		Depth	**2.60**

Body	**1900 MHz**		ε_r = 53.3 ± 5%	σ = 1.52 ± 5% mho/m	
Body	**1800 MHz**		ε_r = 53.3 ± 5%	σ = 1.52 ± 5% mho/m	
	ConvF X	**4.9** ± 9.5% (k=2)		Boundary effect:	
	ConvF Y	**4.9** ± 9.5% (k=2)		Alpha	**0.64**
	ConvF Z	**4.9** ± 9.5% (k=2)		Depth	**2.24**

Conversion Factor Assessment





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

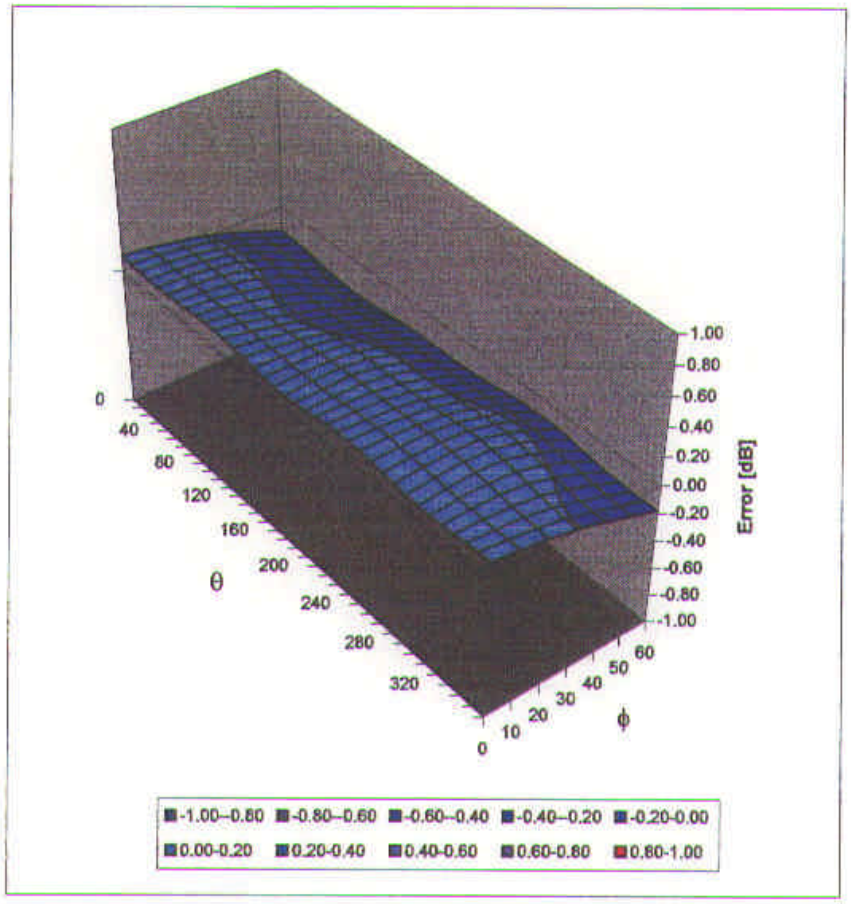
ConvF X	**4.9** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**4.9** ± 8.9% (k=2)	Alpha	**1.00**
ConvF Z	**4.9** ± 8.9% (k=2)	Depth	**1.60**

2450	**Body**	**MHz**	ε_r = 52.7 ± 5%	σ = 1.95 ± 5% mho/m

ConvF X	**4.4** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**4.4** ± 8.9% (k=2)	Alpha	**1.00**
ConvF Z	**4.4** ± 8.9% (k=2)	Depth	**1.50**

Deviation from Isotropy in HSL

Error (θ,ϕ), f = 900 MHz



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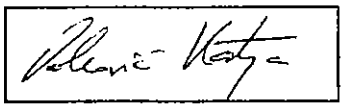
Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ET3DV6**
Serial Number:	**1560**
Place of Assessment:	**Zurich**
Date of Assessment:	**September 30, 2002**
Probe Calibration Date:	**September 27, 2002**

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: 1560

Conversion factor (± standard deviation)

150 MHz	ConvF	**8.6± 8%**	ε_r **= 52.3** ± **5%** **s = 0.76** ± **5% mho/m** (Head tissue)
150 MHz	ConvF	**8.5± 8%**	ε_r **= 61.9** ± **5%** **s = 0.80** ± **5% mho/m** (Body tissue)
300 MHz	ConvF	**7.4± 8%**	ε_r **= 45.3** ± **5%** **s = 0.87** ± **5% mho/m** (Head tissue)
450 MHz	ConvF	**7.9± 8%**	ε_r **= 45.1** ± **5%** **s = 0.85** ± **5% mho/m** (Head tissue)
450 MHz	ConvF	**7.7± 8%**	ε_r **= 56.7** ± **5%** **s = 0.94** ± **5% mho/m** (Body tissue)