PCTEST ENGINEERING LABORATORY, INC.

DUT: Samsung SGH-ZX20; Type: Dual Band GSM/WCDMA Phone; SN: FD-091-E
Conducted Power: 30.0 dBm

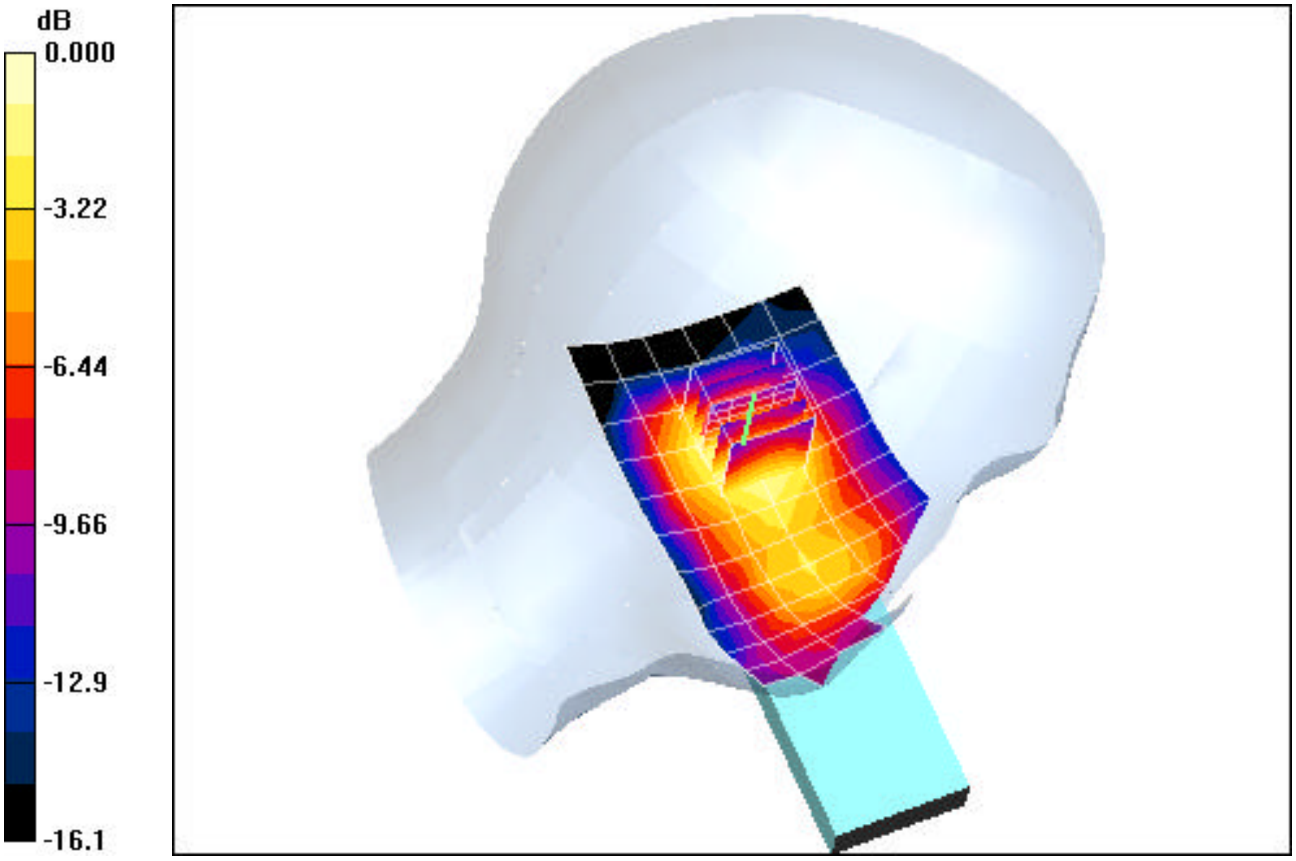
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: 1900 Brain (σ = 1.36 mho/m, ε_r = 41.15, ρ = 1000 kg/m^3)
Phantom section: Left Section

Test Date: 06-30-2006; Ambient Temp: 23.6°C; Tissue Temp: 21.2°C

Probe: EX3DV4 - SN3561; ConvF(7.04, 7.04, 7.04); Calibrated: 8/24/2005
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 9/13/2005
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP:1357
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Mode: GSM1900, Tilt, Ch.661, Standard Battery, Fixed Antenna

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.11 V/m
Peak SAR (extrapolated) = 0.196 W/kg
SAR(1 g) = 0.136 mW/g; SAR(10 g) = 0.087 mW/g



0 dB = 0.157mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Samsung SGH-ZX20; Type: Dual Band GSM/WCDMA Phone; SN: FD-091-E
Conducted Power: 33.0 dBm

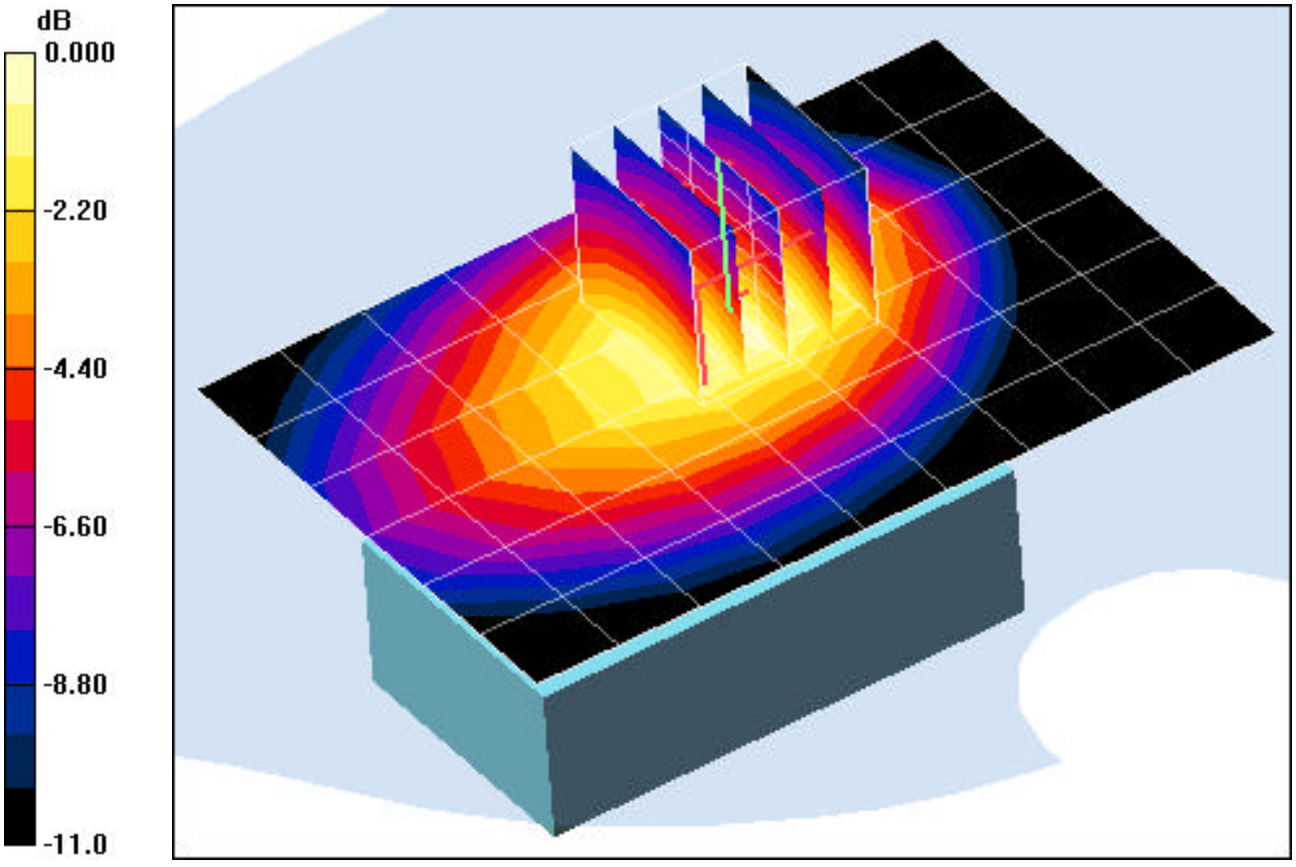
Communication System: GSM850 GPRS; 2 Tx slots; Frequency: 836.6 MHz;Duty Cycle: 1:4.15
Medium: 835 Muscle (σ = 0.98 mho/m, ε_r = 54.83, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Space: 1.8cm from DUT to Flat Phantom

Test Date: 06-29-2006; Ambient Temp: 23.4°C; Tissue Temp: 21.2°C

Probe: EX3DV4 - SN3561; ConvF(7.9, 7.9, 7.9); Calibrated: 8/24/2005
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 9/13/2005
Phantom: SAM Main; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Mode: GSM850, Body, No Beltclip, Ch.190, Standard Battery, Fixed Antenna

Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.6 V/m
Peak SAR (extrapolated) = 1.55 W/kg
SAR(1 g) = 1.08 mW/g; SAR(10 g) = 0.742 mW/g



0 dB = 1.24mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Samsung SGH-ZX20; Type: Dual Band GSM/WCDMA Phone; SN: FD-091-E
Conducted Power: 30.0 dBm

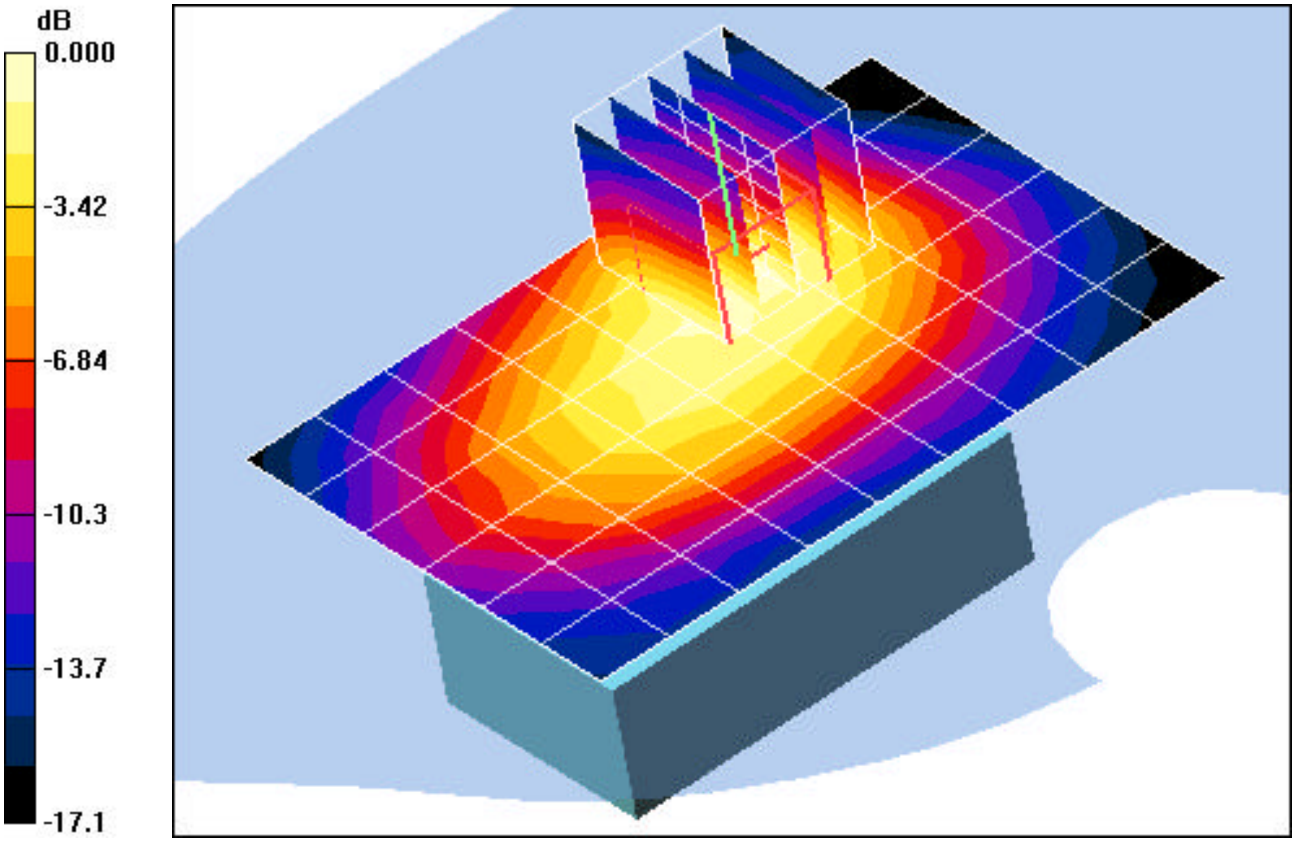
Communication System: GSM1900 GPRS; 2 Tx slots; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium: 1900 Muscle (σ = 1.58 mho/m, ε_r = 52.93, ρ = 1000 kg/m^3)
Phantom section: Flat Section

Test Date: 06-30-2006; Ambient Temp: 23.2°C; Tissue Temp: 21.2°C

Probe: EX3DV4 - SN3561; ConvF(6.48, 6.48, 6.48); Calibrated: 8/24/2005
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 9/13/2005
Phantom: SAM Main; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Mode: GSM1900, Body, No Beltclip, Ch.661, Standard Battery, Fixed Antenna

Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.4 V/m
Peak SAR (extrapolated) = 0.486 W/kg
SAR(1 g) = 0.284 mW/g; SAR(10 g) = 0.165 mW/g



0 dB = 0.337mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Samsung SGH-ZX20; Type: Dual Band GSM/WCDMA Phone; SN: FD-091-E
Conducted Power: 23.0 dBm

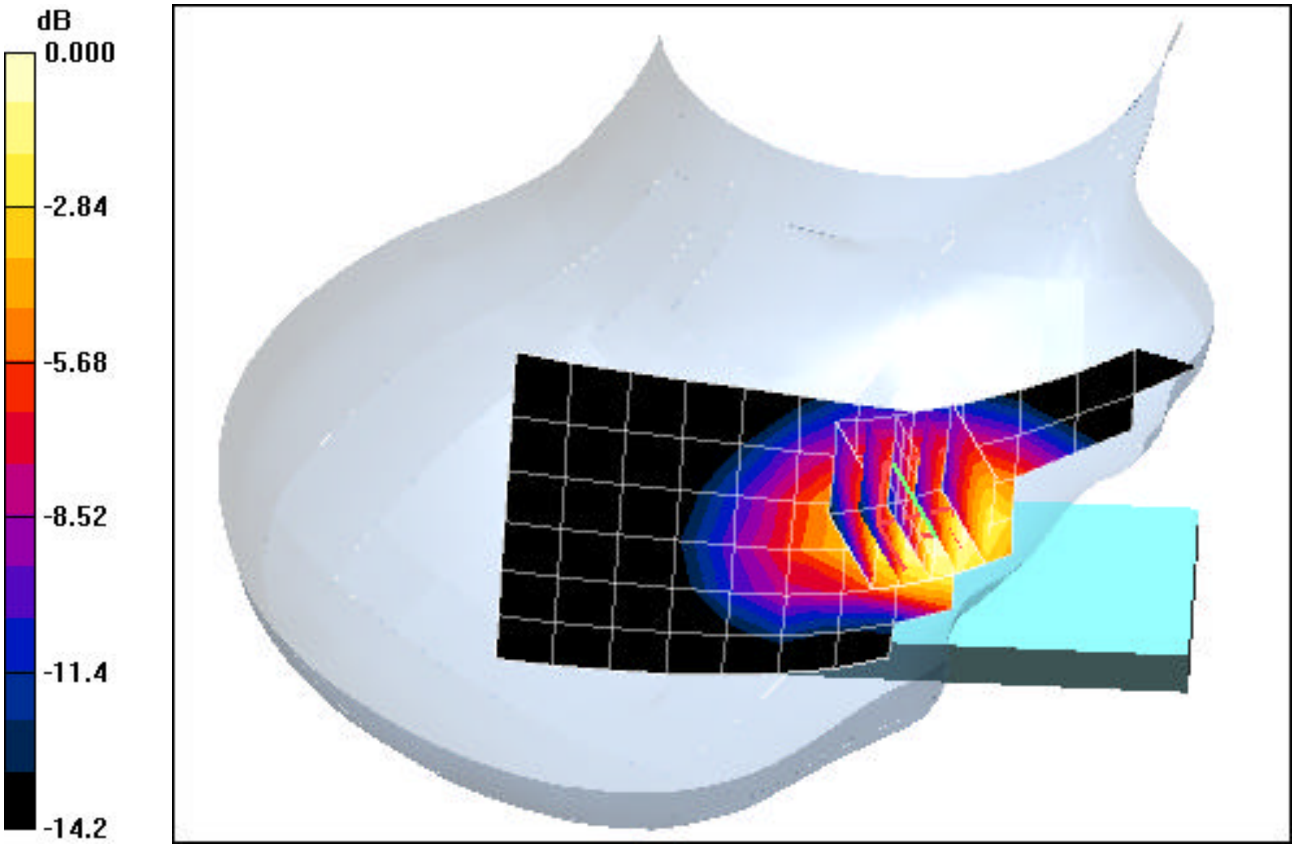
Communication System: WCDMA850; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: 835 Brain (σ = 0.88 mho/m, ε_r = 41.60, ρ = 1000 kg/m^3)
Phantom section: Right Section

Test Date: 07-01-2006; Ambient Temp: 23.1°C; Tissue Temp: 21.2°C

Probe: EX3DV4 - SN3561; ConvF(7.91, 7.91, 7.91); Calibrated: 8/24/2005
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 9/13/2005
Phantom: SAM Main; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Mode: WCDMA850, Touch, Ch.4182, Standard Battery, Fixed Antenna

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.90 V/m
Peak SAR (extrapolated) = 1.23 W/kg
SAR(1 g) = 0.785 mW/g; SAR(10 g) = 0.494 mW/g



0 dB = 0.932mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Samsung SGH-ZX20; Type: Dual Band GSM/WCDMA Phone; SN: FD-091-E
Conducted Power: 23.0 dBm

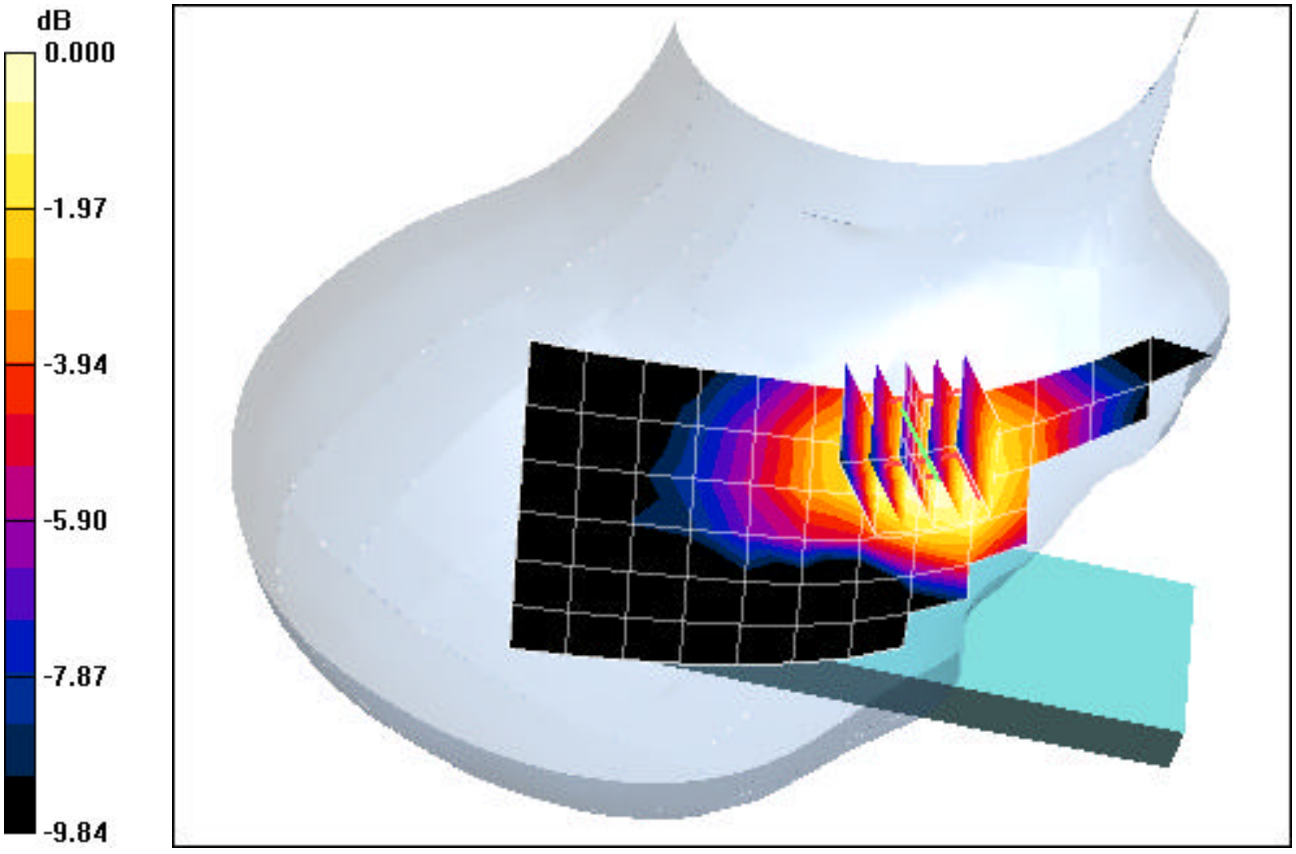
Communication System: WCDMA850; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: 835 Brain (σ = 0.88 mho/m, ε_r = 41.60, ρ = 1000 kg/m^3)
Phantom section: Right Section

Test Date: 07-01-2006; Ambient Temp: 23.1°C; Tissue Temp: 21.2°C

Probe: EX3DV4 - SN3561; ConvF(7.91, 7.91, 7.91); Calibrated: 8/24/2005
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 9/13/2005
Phantom: SAM Main; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Mode: WCDMA850, Tilt, Ch.4182, Standard Battery, Fixed Antenna

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.05 V/m
Peak SAR (extrapolated) = 0.132 W/kg
SAR(1 g) = 0.099 mW/g; SAR(10 g) = 0.073 mW/g



0 dB = 0.111mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Samsung SGH-ZX20; Type: Dual Band GSM/WCDMA Phone; SN: FD-091-E
Conducted Power: 23.0 dBm

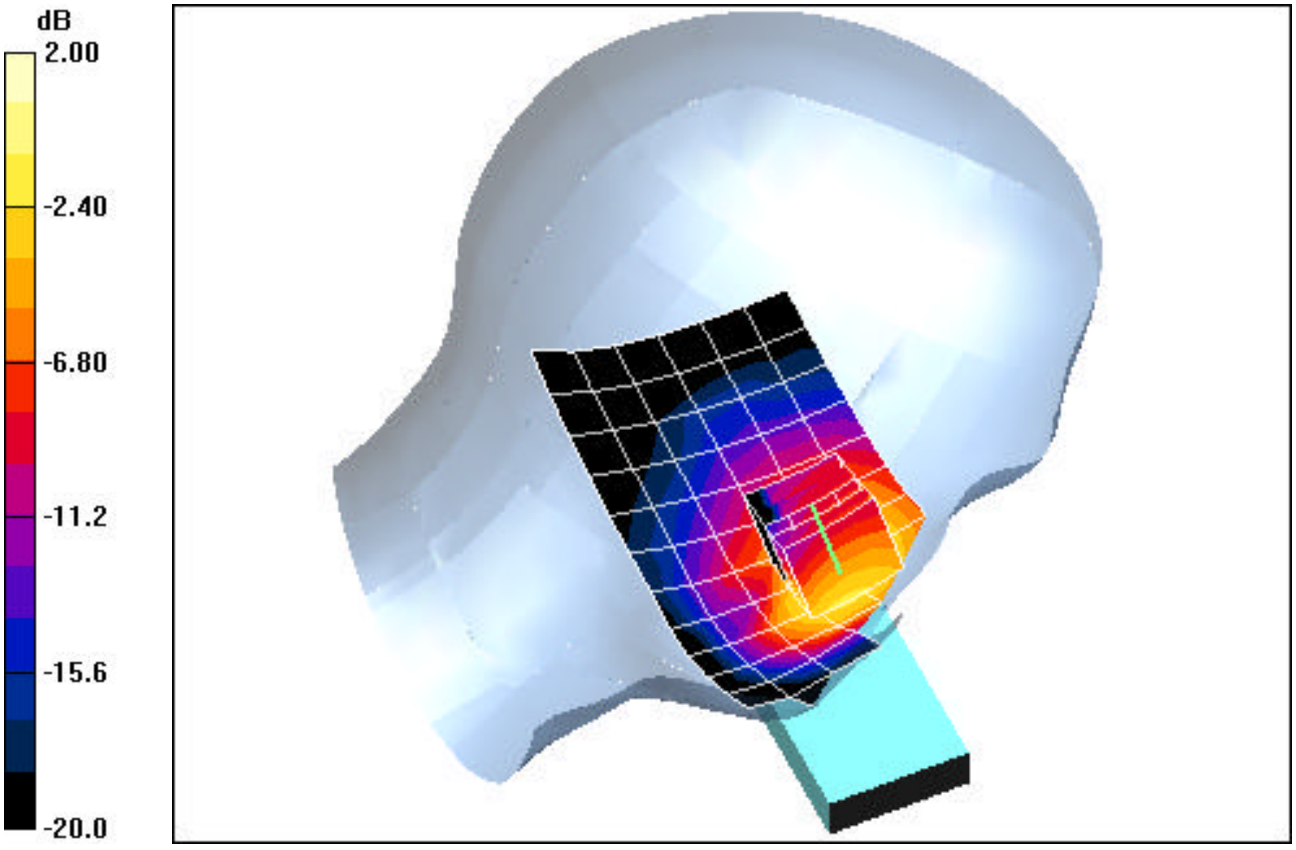
Communication System: WCDMA850; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: 835 Brain (σ = 0.88 mho/m, ε_r = 41.60, ρ = 1000 kg/m^3)
Phantom section: Left Section

Test Date: 07-01-2006; Ambient Temp: 23.1°C; Tissue Temp: 21.2°C

Probe: EX3DV4 - SN3561; ConvF(7.91, 7.91, 7.91); Calibrated: 8/24/2005
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 9/13/2005
Phantom: SAM Main; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Mode: WCDMA850, Touch, Ch.4182, Standard Battery, Fixed Antenna

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.12 V/m
Peak SAR (extrapolated) = 1.42 W/kg
SAR(1 g) = 0.753 mW/g; SAR(10 g) = 0.453 mW/g



0 dB = 0.804mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Samsung SGH-ZX20; Type: Dual Band GSM/WCDMA Phone; SN: FD-091-E
Condcuted Power: 23.0 dBm

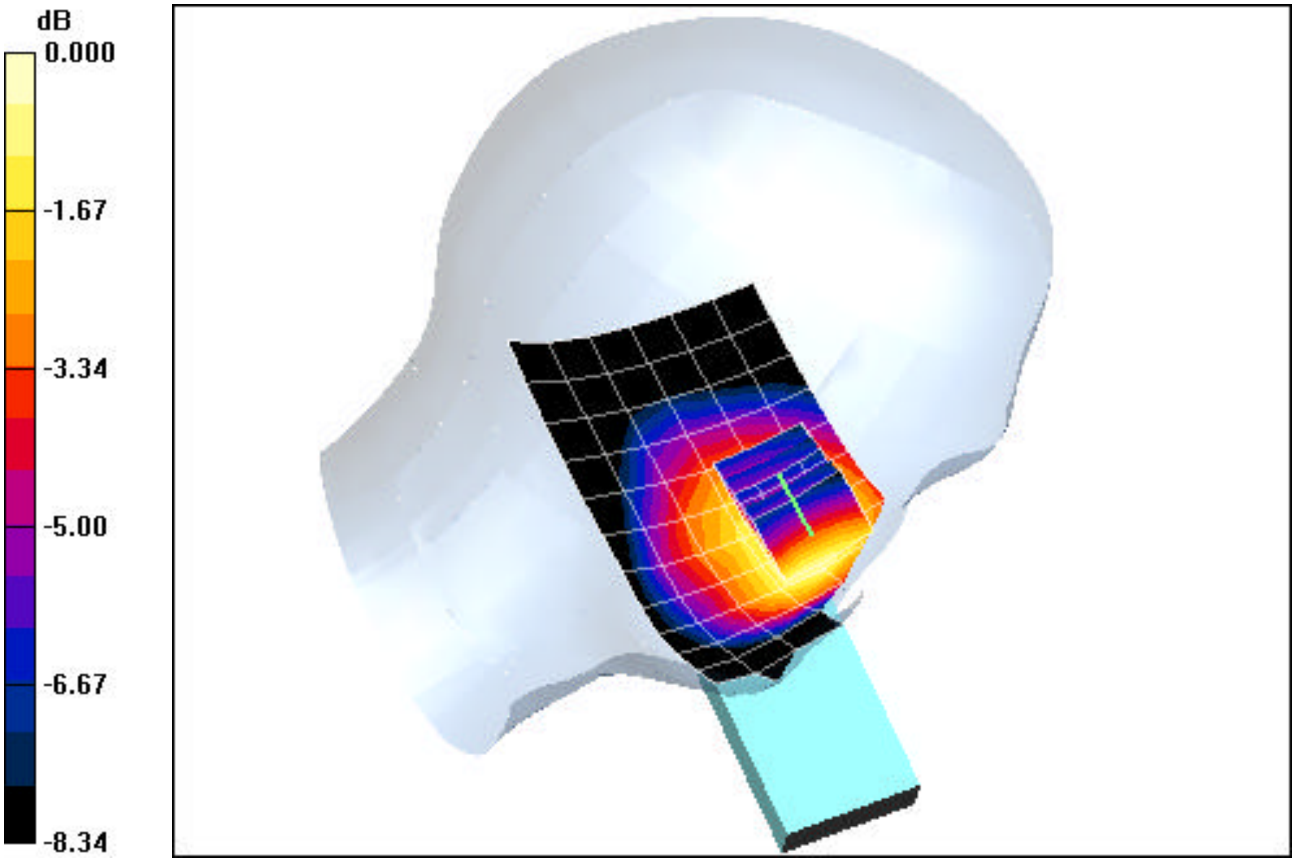
Communication System: WCDMA850; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: 835 Brain (σ = 0.88 mho/m, ε_r = 41.60, ρ = 1000 kg/m^3)
Phantom section: Left Section

Test Date: 07-01-2006; Ambient Temp: 23.1°C; Tissue Temp: 21.2°C

Probe: EX3DV4 - SN3561; ConvF(7.91, 7.91, 7.91); Calibrated: 8/24/2005
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 9/13/2005
Phantom: SAM Main; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Mode: WCDMA850, Tilt, Ch.4182, Standard Battery, Fixed Antenna

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.85 V/m
Peak SAR (extrapolated) = 0.128 W/kg
SAR(1 g) = 0.096 mW/g; SAR(10 g) = 0.070 mW/g



0 dB = 0.107mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Samsung SGH-ZX20; Type: Dual Band GSM/WCDMA Phone; SN: FD-091-E
Conducted Power: 23.0 dBm

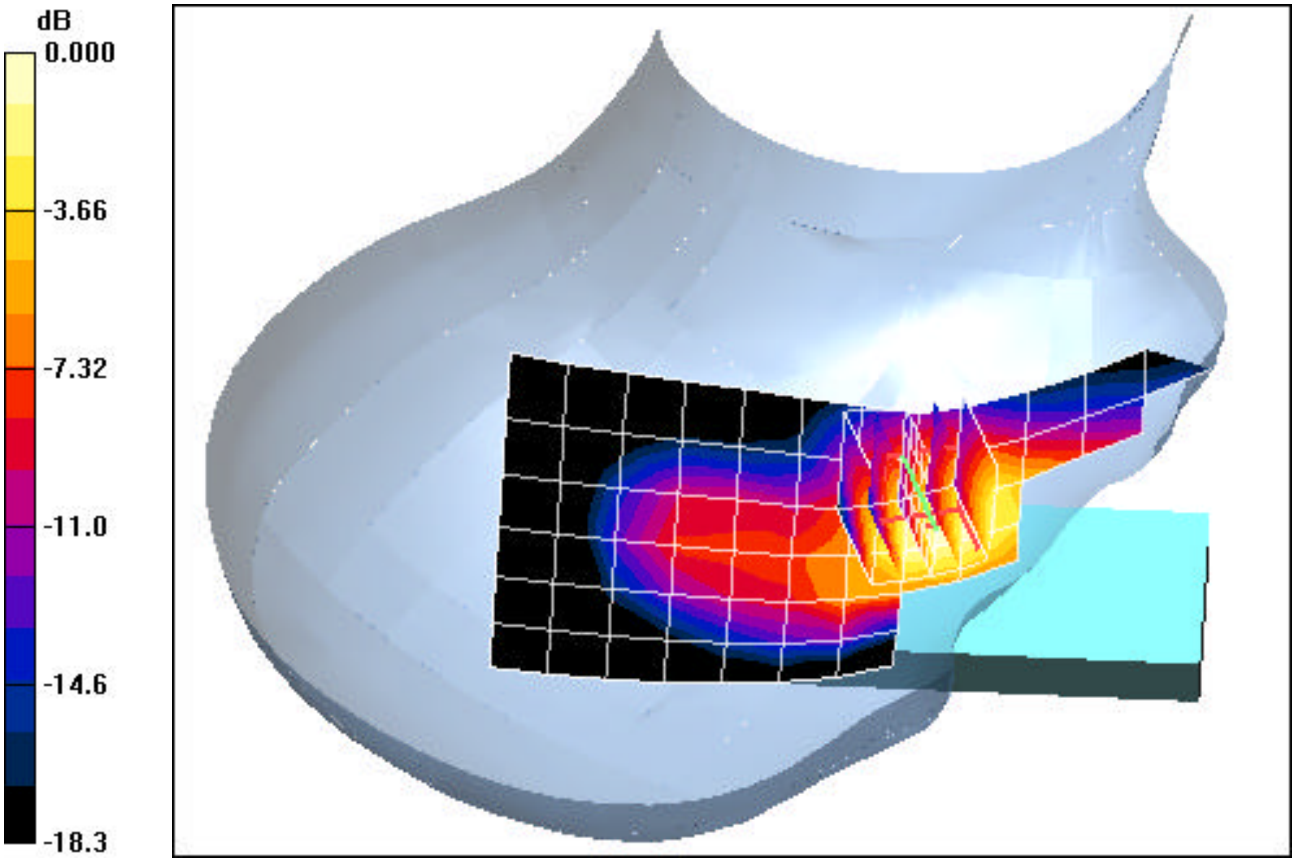
Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Brain (σ = 1.36 mho/m, ε_r = 41.15, ρ = 1000 kg/m^3)
Phantom section: Right Section

Test Date: 07-01-2006; Ambient Temp: 23.1°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN3561; ConvF(7.04, 7.04, 7.04); Calibrated: 8/24/2005
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 9/13/2005
Phantom: SAM Main; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Mode: WCDMA1900, Touch, Ch.9400, Standard Battery, Fixed Antenna

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.67 V/m
Peak SAR (extrapolated) = 2.01 W/kg
SAR(1 g) = 1.29 mW/g; SAR(10 g) = 0.762 mW/g



0 dB = 1.55mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Samsung SGH-ZX20; Type: Dual Band GSM/WCDMA Phone; SN: FD-091-E
Conducted Power: 23.0dBm

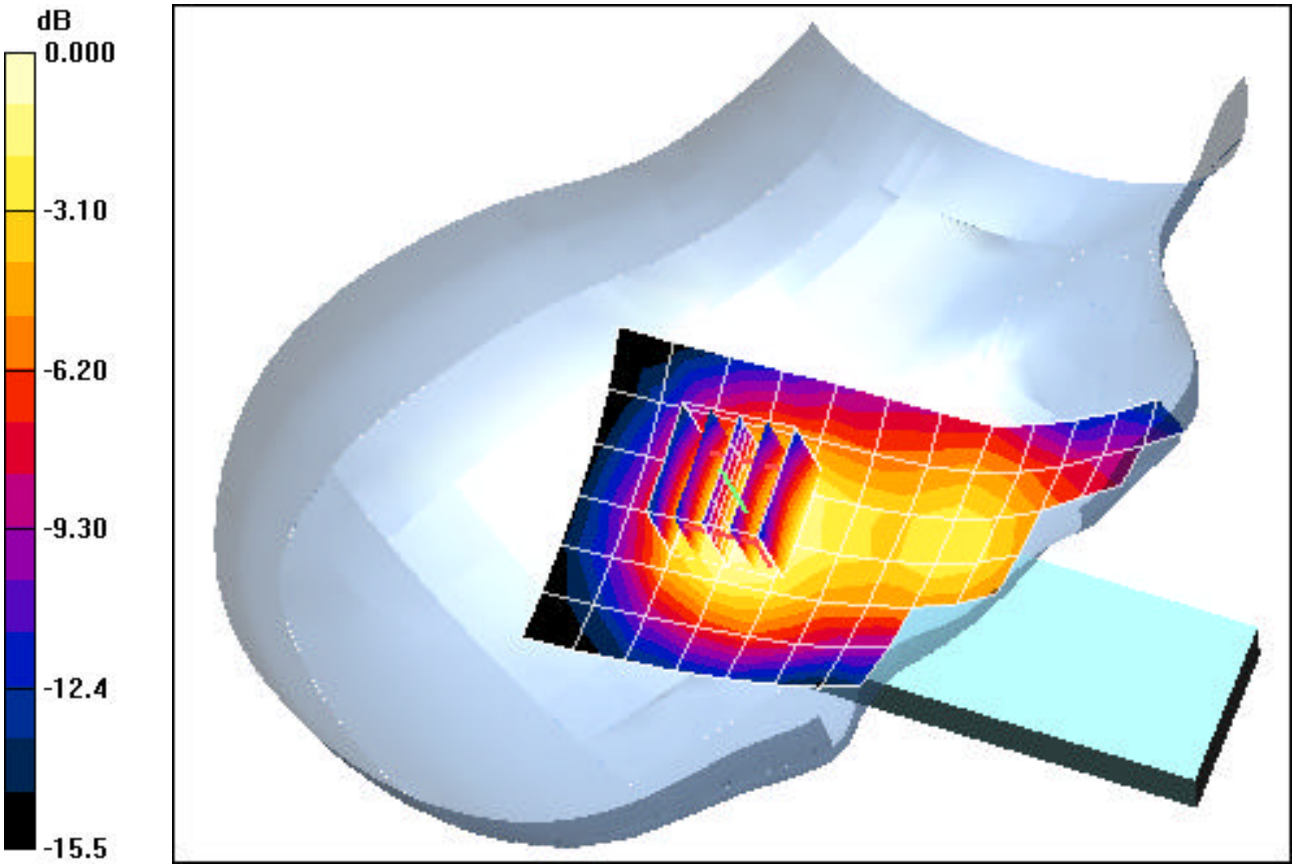
Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Brain (σ = 1.36 mho/m, ε_r = 41.15, ρ = 1000 kg/m^3)
Phantom section: Right Section

Test Date: 07-01-2006; Ambient Temp: 23.1°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN3561; ConvF(7.04, 7.04, 7.04); Calibrated: 8/24/2005
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 9/13/2005
Phantom: SAM Main; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Mode: WCDMA1900, Tilt, Ch.9400, Standard Battery, Fixed Antenna

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.5 V/m; Power Drift = -0.613 dB
Peak SAR (extrapolated) = 0.310 W/kg
SAR(1 g) = 0.214 mW/g; SAR(10 g) = 0.135 mW/g



0 dB = 0.245mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Samsung SGH-ZX20; Type: Dual Band GSM/WCDMA Phone; SN: FD-091-E
Conducted Power: 23.00 dBm

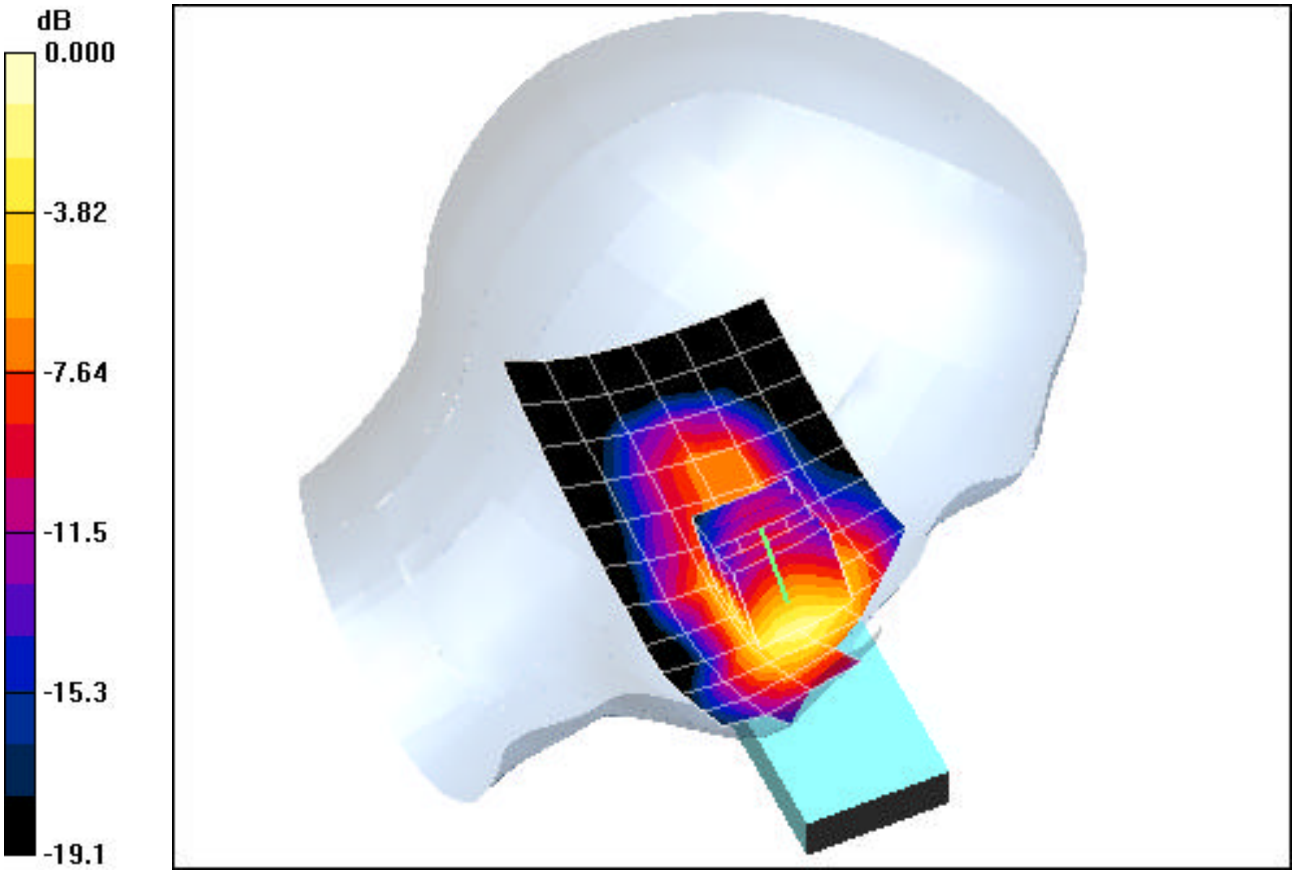
Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Brain (σ = 1.36 mho/m, ε_r = 41.15, ρ = 1000 kg/m^3)
Phantom section: Left Section

Test Date: 07-01-2006; Ambient Temp: 23.1°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN3561; ConvF(7.04, 7.04, 7.04); Calibrated: 8/24/2005
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 9/13/2005
Phantom: SAM Main; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Mode: WCDMA1900, Touch, Ch.9400, Standard Battery, Fixed Antenna

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.4 V/m
Peak SAR (extrapolated) = 2.04 W/kg
SAR(1 g) = 1.36 mW/g; SAR(10 g) = 0.808 mW/g



0 dB = 1.60mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Samsung SGH-ZX20; Type: Dual Band GSM/WCDMA Phone; SN: FD-091-E
Conducted Power: 23.0 dBm

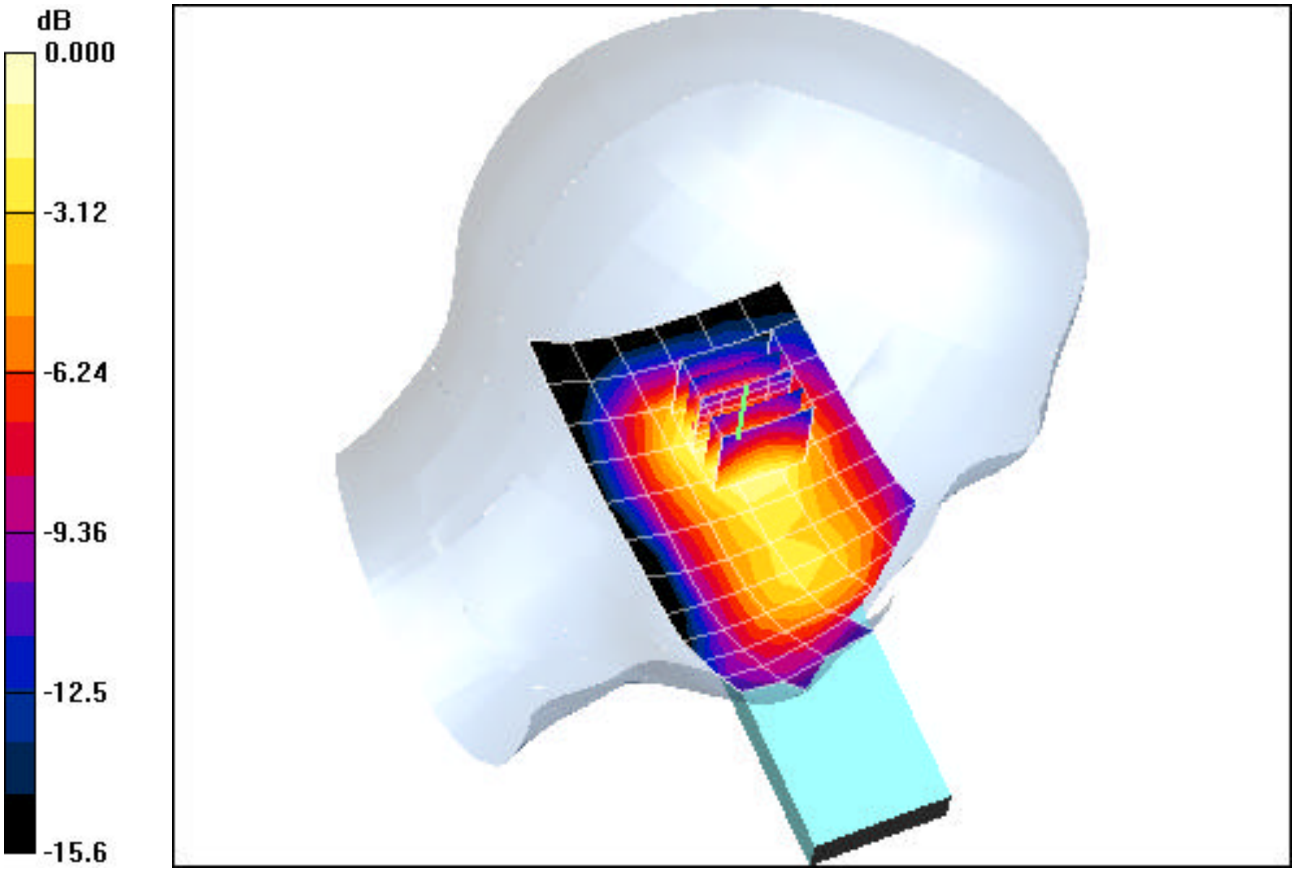
Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Brain (σ = 1.36 mho/m, ε_r = 41.15, ρ = 1000 kg/m^3)
Phantom section: Left Section

Test Date: 07-01-2006; Ambient Temp: 23.1°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN3561; ConvF(7.04, 7.04, 7.04); Calibrated: 8/24/2005
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 9/13/2005
Phantom: SAM Main; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Mode: WCDMA1900, Tilt, Ch.9400, Standard Battery, Fixed Antenna

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.6 V/m
Peak SAR (extrapolated) = 0.358 W/kg
SAR(1 g) = 0.245 mW/g; SAR(10 g) = 0.155 mW/g



0 dB = 0.286mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Samsung SGH-ZX20; Type: Dual Band GSM/WCDMA Phone; SN: FD-091-E
Conducted Power: 23.0 dBm

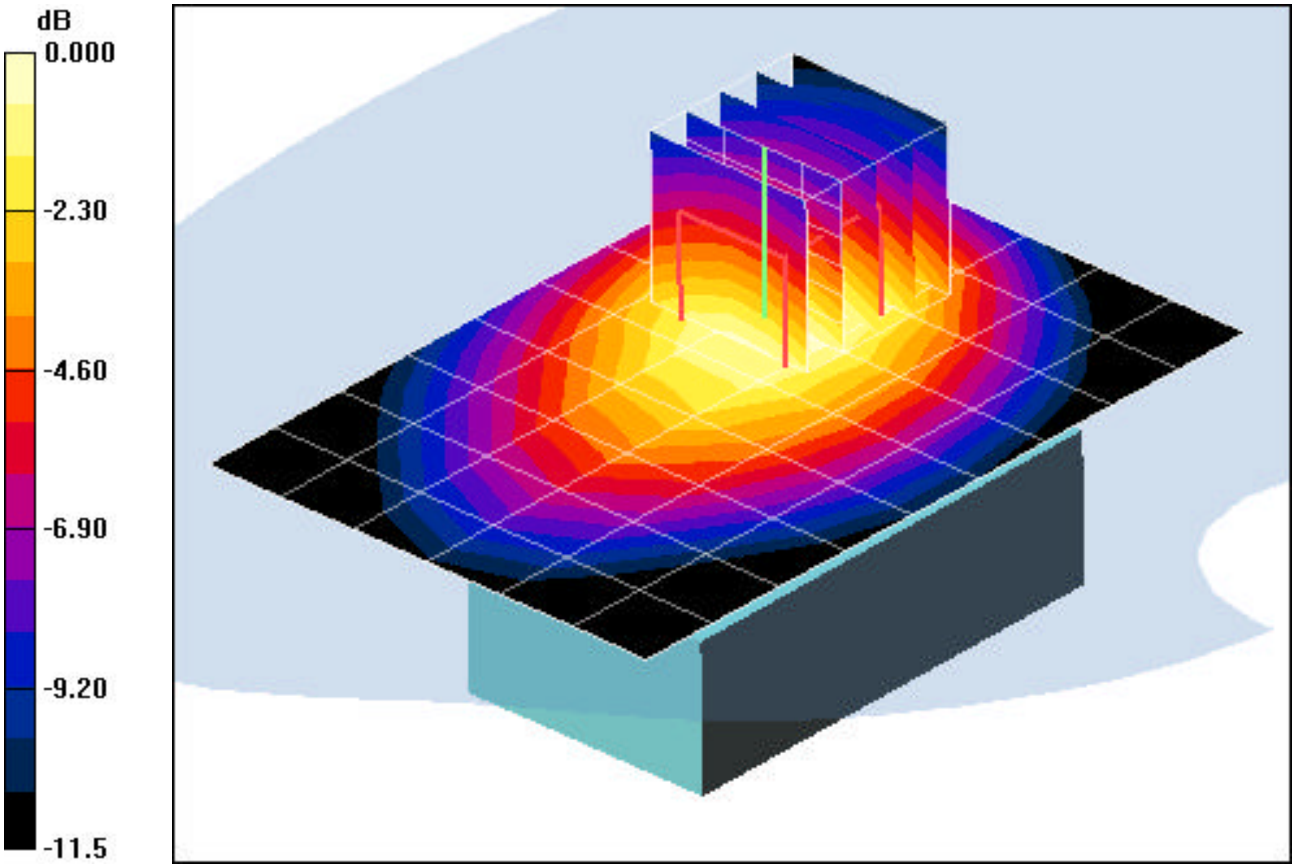
Communication System: WCDMA850; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: 835 Muscle (σ = 0.98 mho/m, ε_r = 54.83, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Space: 1.8cm from DUT to Flat Phantom

Test Date: 06-29-2006; Ambient Temp: 23.4°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN3561; ConvF(7.9, 7.9, 7.9); Calibrated: 8/24/2005
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 9/13/2005
Phantom: SAM Main; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Mode: WCDMA850, Body, No Beltclip, Ch.4182, Standard Battery, Fixed Antenna

Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.0 V/m
Peak SAR (extrapolated) = 0.666 W/kg
SAR(1 g) = 0.475 mW/g; SAR(10 g) = 0.327 mW/g



0 dB = 0.538mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Samsung SGH-ZX20; Type: Dual Band GSM/WCDMA Phone; SN: FD-091-E
Conducted Power: 23.0 dBm

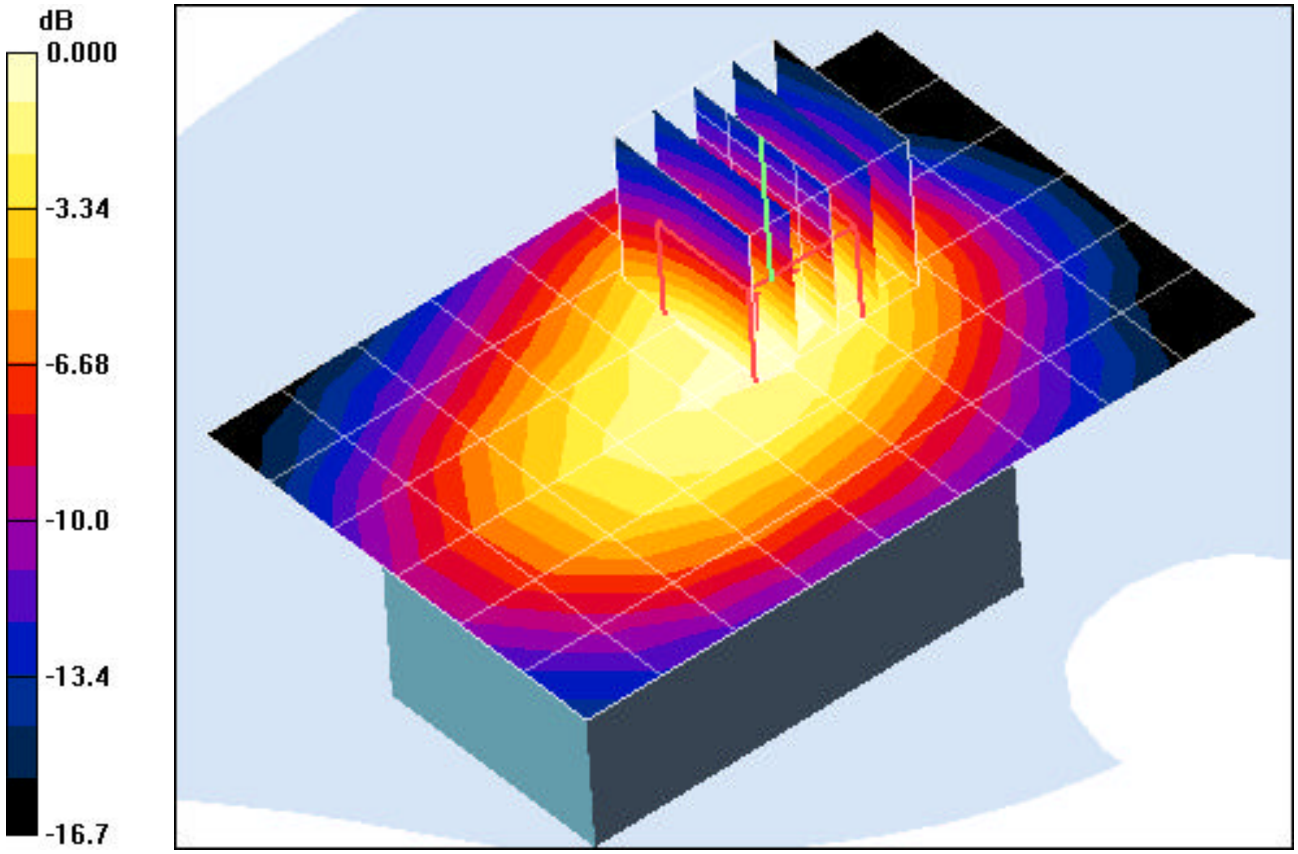
Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Muscle (σ = 1.58 mho/m, ε_r = 52.93, ρ = 1000 kg/m^3)
Phantom section: Flat Section

Test Date: 06-30-2006; Ambient Temp: 23.2°C; Tissue Temp: 21.2°C

Probe: EX3DV4 - SN3561; ConvF(6.48, 6.48, 6.48); Calibrated: 8/24/2005
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 9/13/2005
Phantom: SAM Main; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Mode: WCDMA1900, Body, No Beltclip, Ch.9400, Standard Battery, Fixed Antenna

Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.4 V/m
Peak SAR (extrapolated) = 0.588 W/kg
SAR(1 g) = 0.360 mW/g; SAR(10 g) = 0.214 mW/g



0 dB = 0.433mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Samsung SGH-ZX20; Type: Dual Band GSM/WCDMA Phone; SN: FD-091-E
Conducted Power: 23.0 dBm

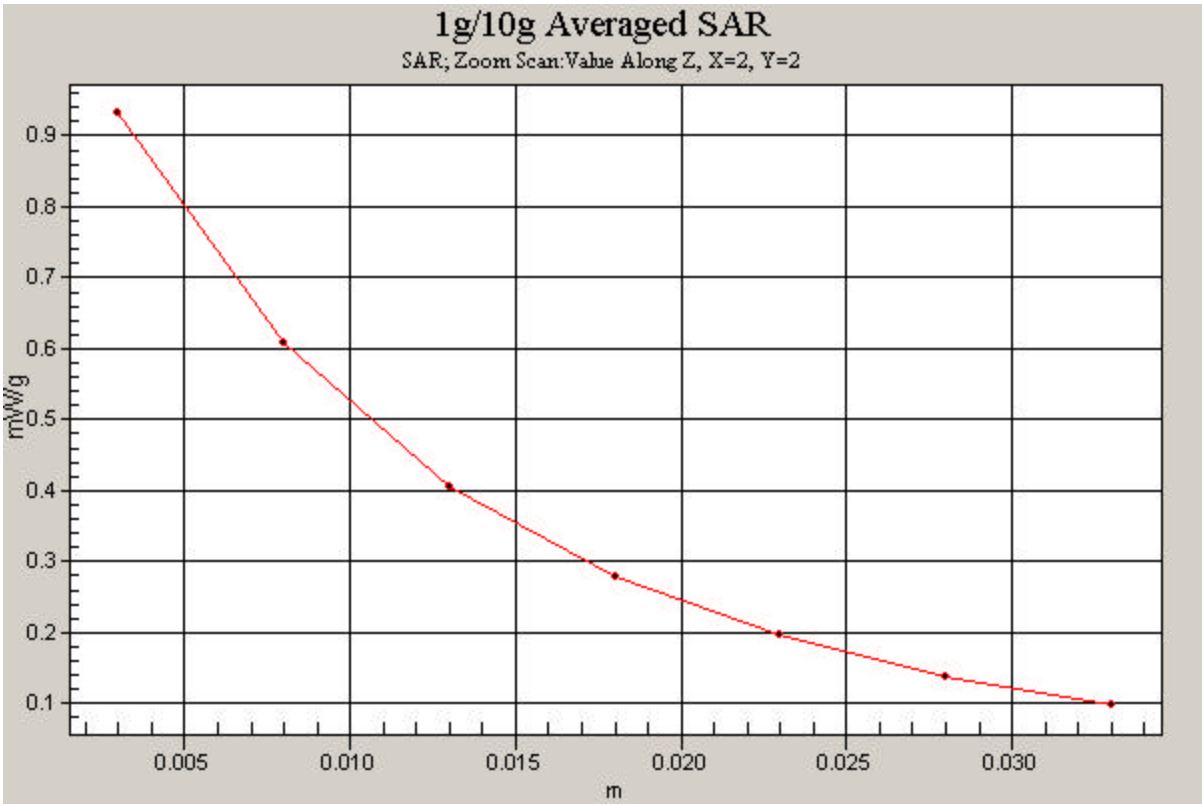
Communication System: WCDMA850; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: 835 Brain (σ = 0.88 mho/m, ε_r = 41.60, ρ = 1000 kg/m^3)
Phantom section: Right Section

Test Date: 07-01-2006 Ambient Temp: 23.2C; Tissue Temp: 21.2C

Probe: EX3DV4 - SN3561; ConvF(7.91, 7.91, 7.91); Calibrated: 8/24/2005
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 9/13/2005
Phantom: SAM Main; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Mode: WCDMA850, Touch, Ch.4182, Standard Battery, Fixed Antenna

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.90 V/m
Peak SAR (extrapolated) = 1.23 W/kg
SAR(1 g) = 0.785 mW/g; SAR(10 g) = 0.494 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: Samsung SGH-ZX20; Type: Dual Band GSM/WCDMA Phone; SN: FD-091-E
Conducted Power: 23.0 dBm

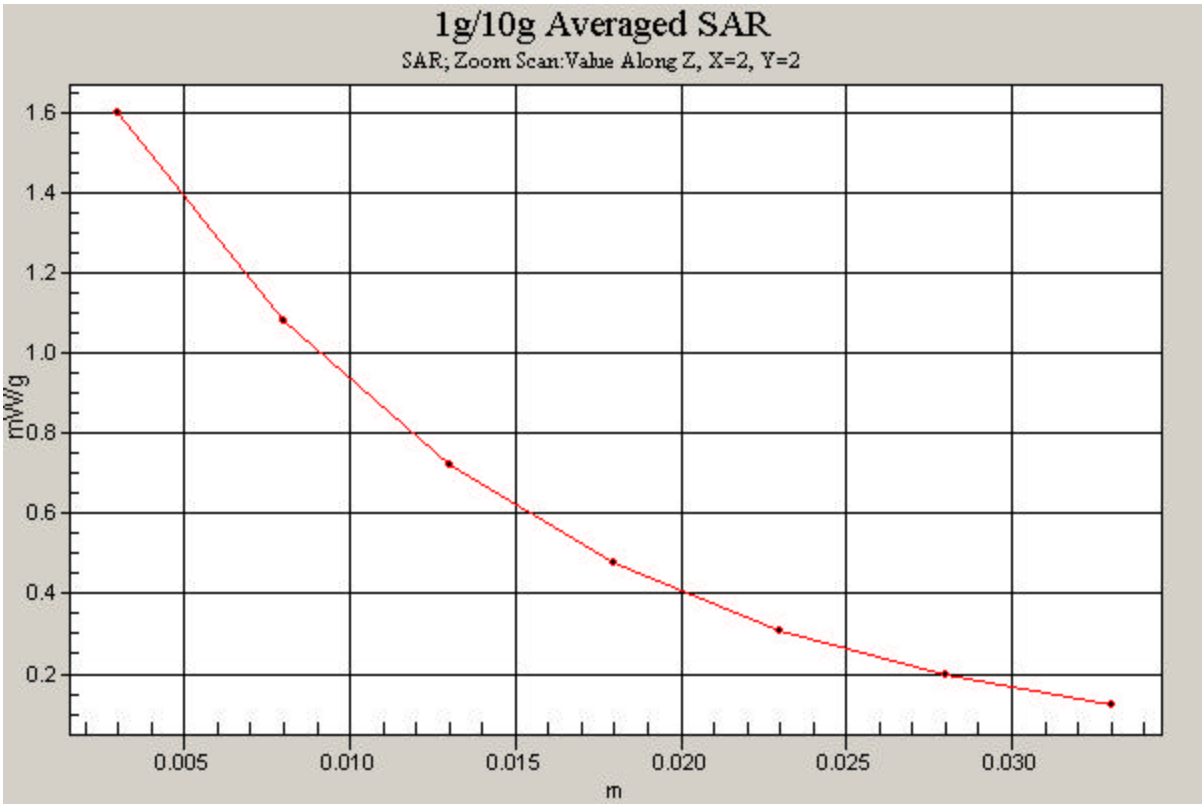
Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Brain (σ = 1.36 mho/m, ε_r = 41.15, ρ = 1000 kg/m^3)
Phantom section: Left Section

Test Date: 07-01-20063; Ambient Temp: 23.1°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN3561; ConvF(7.04, 7.04, 7.04); Calibrated: 8/24/2005
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 9/13/2005
Phantom: SAM Main; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Mode: WCDMA1900, Touch, Ch.9400, Standard Battery, Fixed Antenna

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.4 V/mB
Peak SAR (extrapolated) = 2.04 W/kg
SAR(1 g) = 1.36 mW/g; SAR(10 g) = 0.808 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: Samsung SGH-ZX20; Type: Dual Band GSM/WCDMA Phone; SN: FD-091-E
Conducted Power: 33.0 dBm

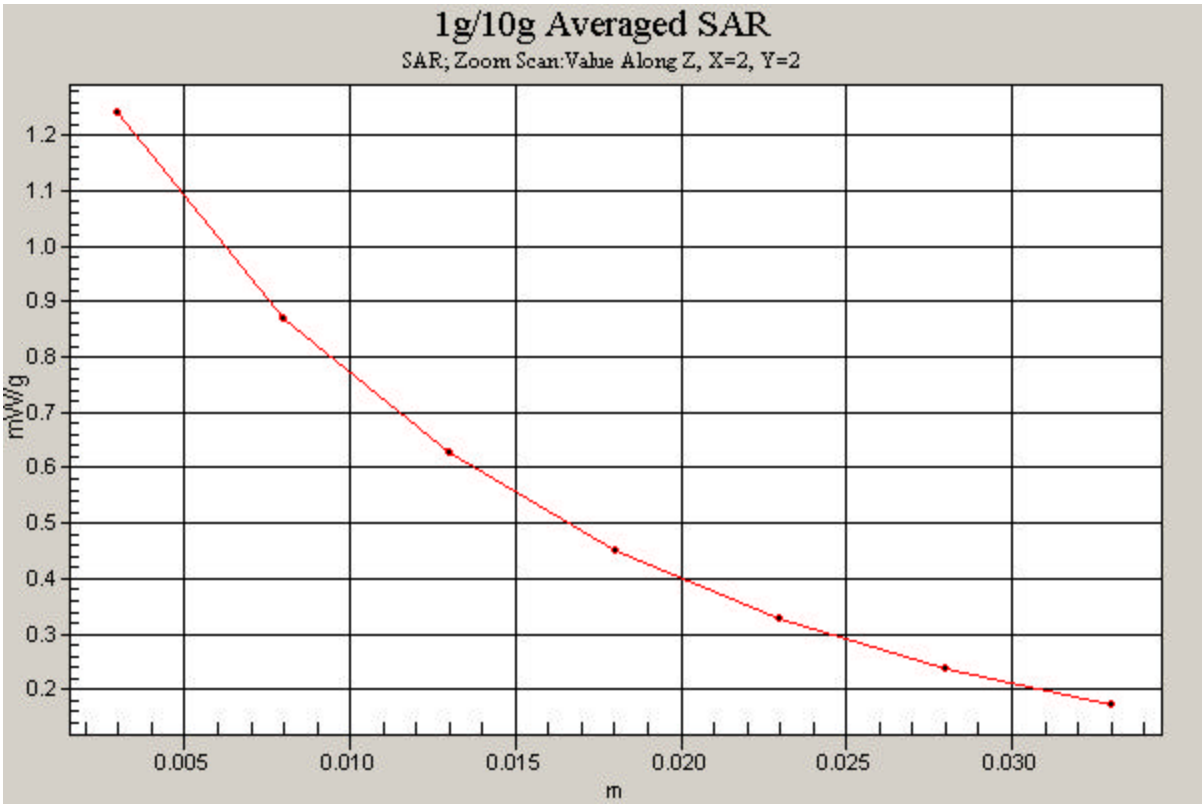
Communication System: GSM850 GPRS; 2 Tx slots; Frequency: 836.6 MHz;Duty Cycle: 1:4.15
Medium: 835 Muscle (σ = 0.98 mho/m, ε_r = 54.83, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Space: 1.8cm from DUT to Flat Phantom

Test Date: 06-29-2006; Ambient Temp: 23.4°C; Tissue Temp: 21.2°C

Probe: EX3DV4 - SN3561; ConvF(7.9, 7.9, 7.9); Calibrated: 8/24/2005
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 9/13/2005
Phantom: SAM Main; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Mode: GSM850, Body, No Beltclip, Ch.190, Standard Battery, Fixed Antenna

Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Mid.ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.6 V/m; Power Drift = 0.097 dB
Peak SAR (extrapolated) = 1.55 W/kg
SAR(1 g) = 1.08 mW/g; SAR(10 g) = 0.742 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: Samsung SGH-ZX20; Type: Dual Band GSM/WCDMA Phone; SN: FD-091-E
Conducted Power: 23.0 dBm

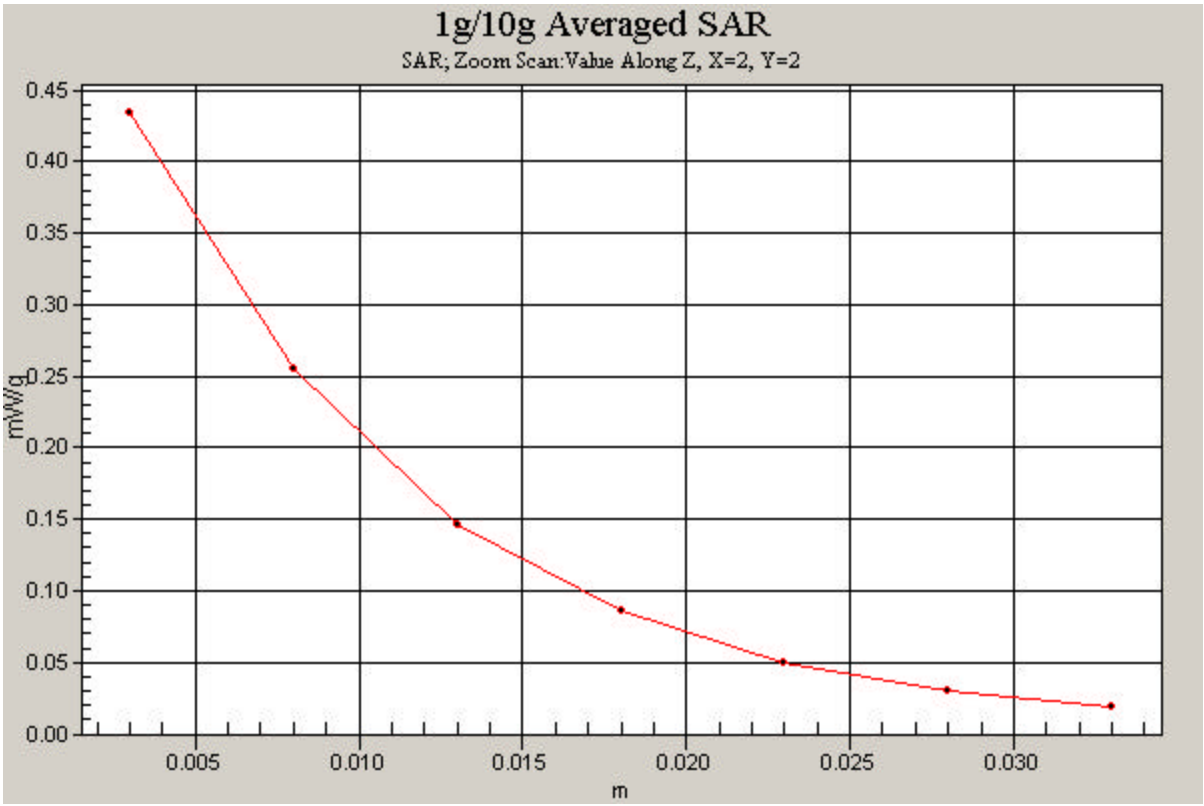
Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Muscle (σ = 1.58 mho/m, ε_r = 52.93, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Space: 1.8cm from DUT to Flat Phantom

Test Date: 06-30-2006; Ambient Temp: 23.2°C; Tissue Temp: 21.2°C

Probe: EX3DV4 - SN3561; ConvF(6.48, 6.48, 6.48); Calibrated: 8/24/2005
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 9/13/2005
Phantom: SAM Main; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Mode: WCDMA1900, Body, No Beltclip, Ch.9400, Standard Battery, Fixed Antenna

Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.4 V/m
Peak SAR (extrapolated) = 0.588 W/kg
SAR(1 g) = 0.360 mW/g; SAR(10 g) = 0.214 mW/g



APPENDIX B: DIPOLE VALIDATION

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835 MHz; Type: D835V2; SN: 4d026

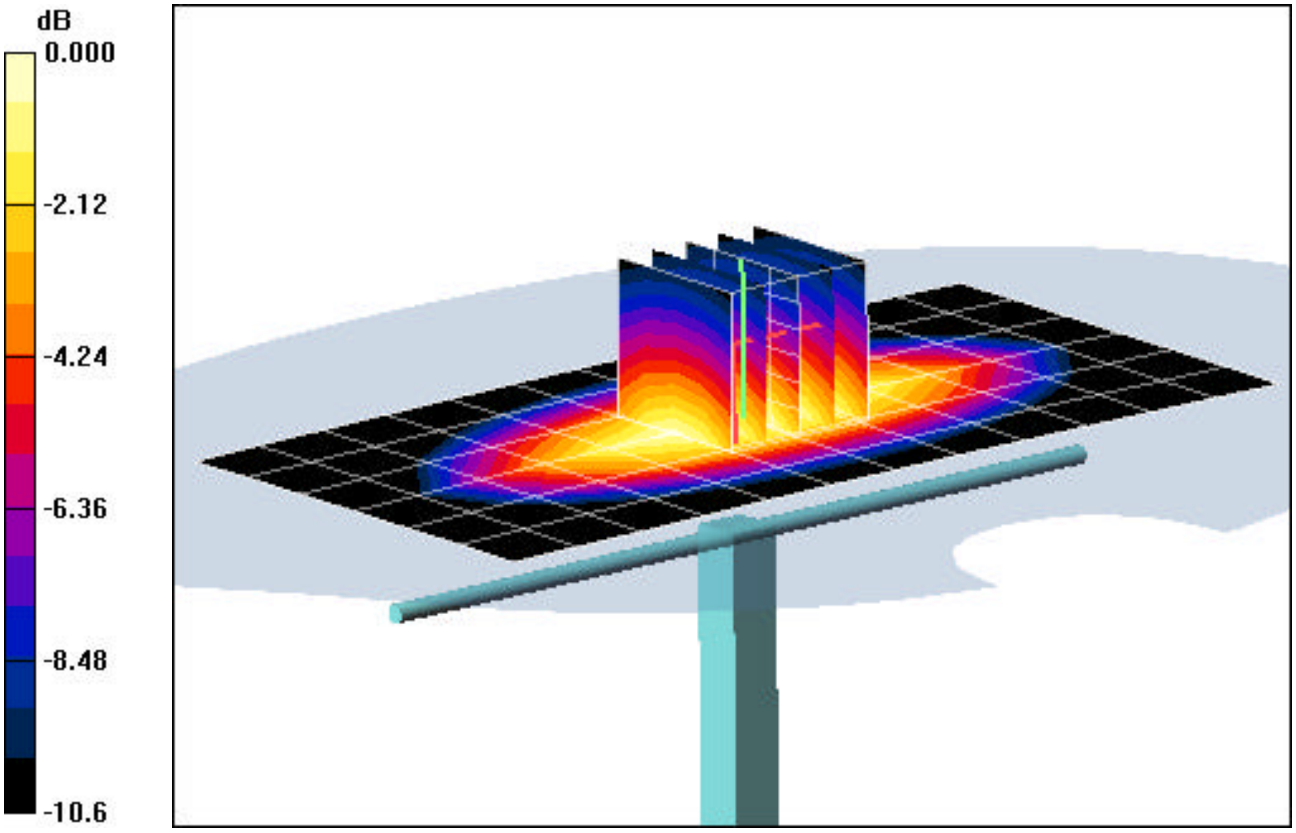
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Brain (σ = 0.88 mho/m, ε_r = 41.60, ρ = 1000 kg/m^3)
Phantom section: Flat Section

Test Date: 06-29-2006; Ambient Temp: 23.4°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN3561; ConvF(7.91, 7.91, 7.91); Calibrated: 8/24/2005
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 9/13/2005
Phantom: SAM Main; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

835MHz Dipole Validation

Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 24.0 dBm (250 mW)
SAR(1 g) = 2.46 mW/g; SAR(10 g) = 1.82 mW/g
Target SAR(1g) = 2.375 mW/g; Deviation = +3.57 %



0 dB = 2.93mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835 MHz; Type: D835V2; SN: 4d026

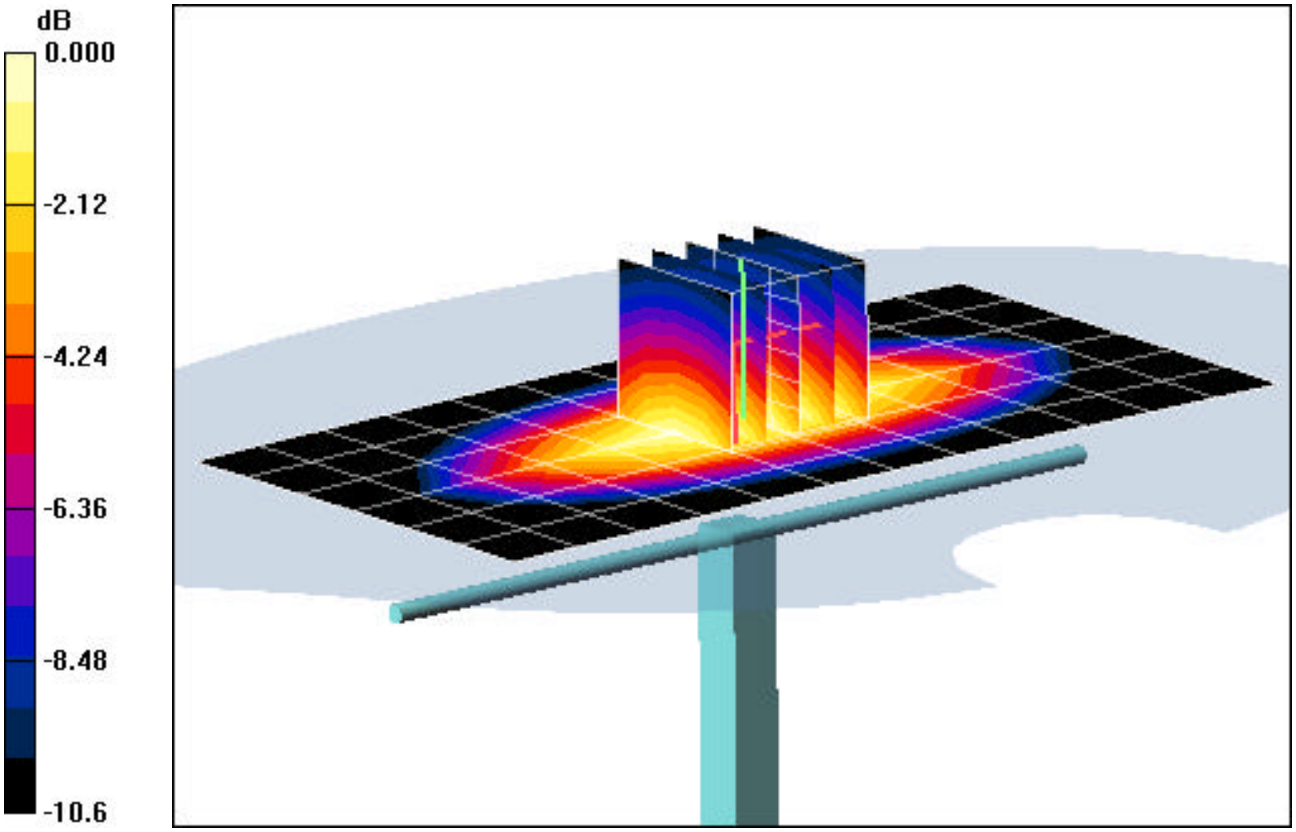
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Brain (σ = 0.88 mho/m, ε_r = 41.60, ρ = 1000 kg/m^3)
Phantom section: Flat Section

Test Date: 07-01-2006; Ambient Temp: 23.1°C; Tissue Temp: 21.2°C

Probe: EX3DV4 - SN3561; ConvF(7.91, 7.91, 7.91); Calibrated: 8/24/2005
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 9/13/2005
Phantom: SAM Main; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

835MHz Dipole Validation

Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 24.0 dBm (250 mW)
SAR(1 g) = 2.44 mW/g; SAR(10 g) = 1.79 mW/g
Target SAR(1g) = 2.375 mW/g; Deviation = + 2.73 %



0 dB = 2.87mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; SN: 502

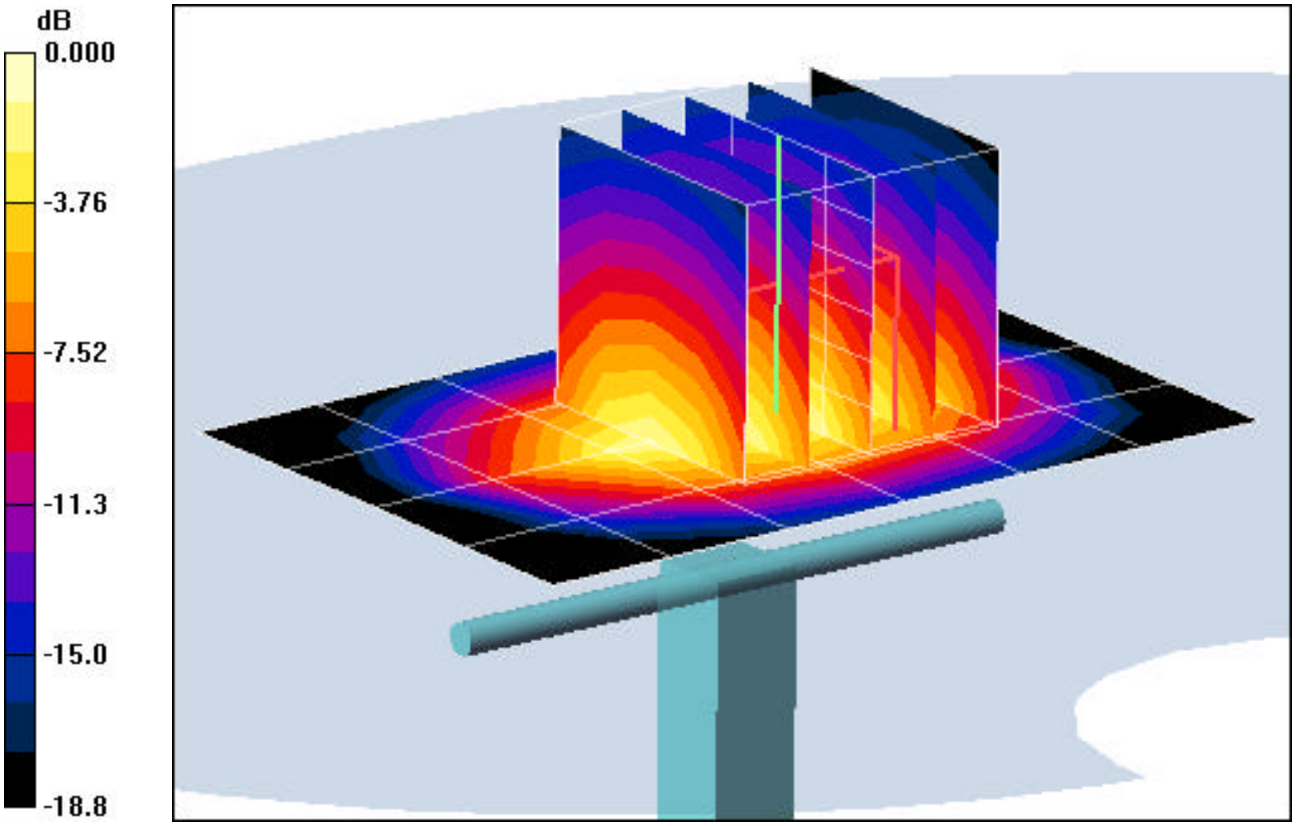
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Brain (σ = 1.36 mho/m, ε_r = 41.15, ρ = 1000 kg/m^3)
Phantom section: Flat Section

Test Date: 06-30-2006; Ambient Temp: 23.2°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN3561; ConvF(7.04, 7.04, 7.04); Calibrated: 8/24/2005
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 9/13/2005
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP:1357
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

1900MHz Dipole Validation

Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
SAR(1 g) = 4.17 mW/g; SAR(10 g) = 2.34 mW/g
Target SAR(1g) = 3.97 mW/g; Deviation = + 5.03 %



0 dB = 5.35mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; SN: 502

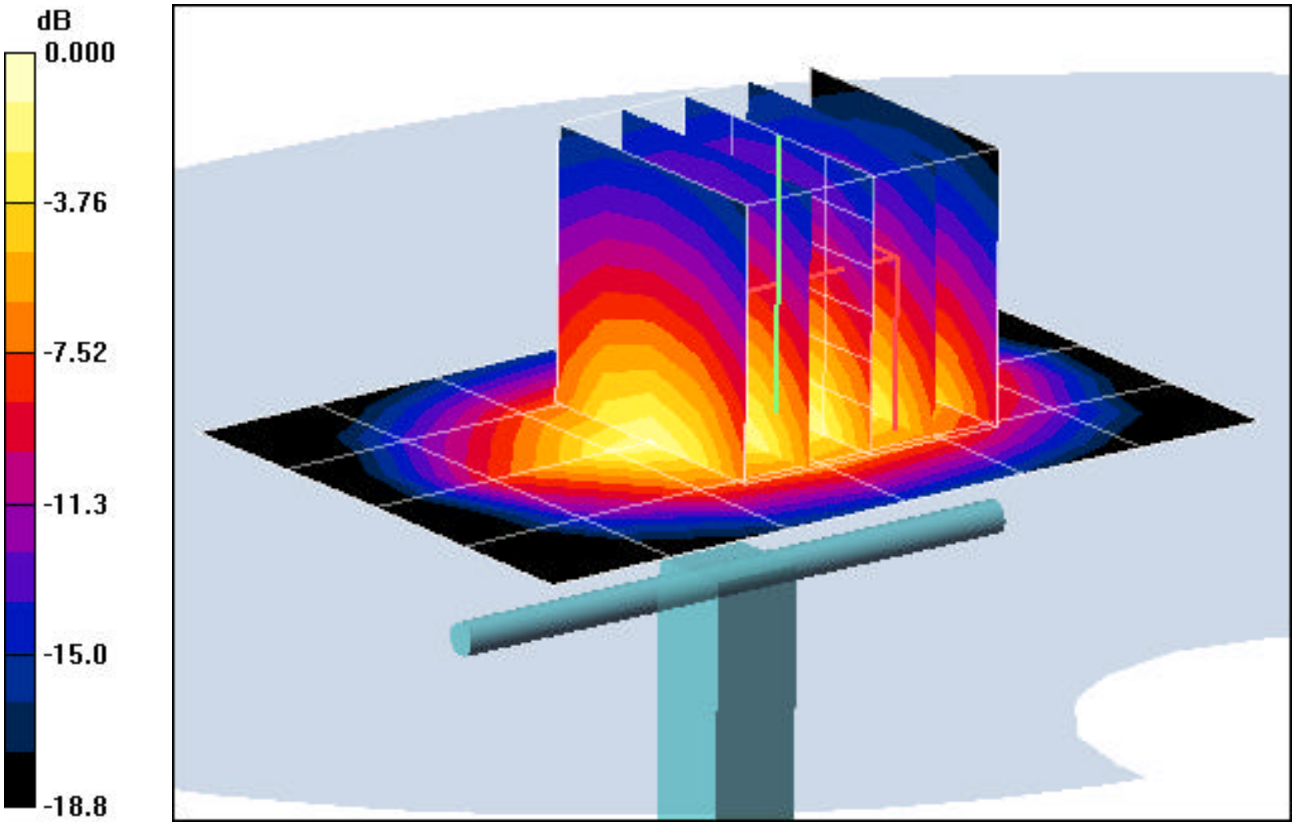
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Brain (σ = 1.36 mho/m, ε_r = 41.15, ρ = 1000 kg/m^3)
Phantom section: Flat Section

Test Date: 07-01-2006; Ambient Temp: 23.1°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN3561; ConvF(7.04, 7.04, 7.04); Calibrated: 8/24/2005
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 9/13/2005
Phantom: SAM Main; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

1900MHz Dipole Validation

Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
SAR(1 g) = 4.14 mW/g; SAR(10 g) = 2.29 mW/g
Target SAR(1g) = 3.97 mW/g; Deviation = + 4.28 %



0 dB = 5.27mW/g

APPENDIX C: PROBE CALIBRATION

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Federal Office of Metrology and Accreditation
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client PC Test

Certificate No: EX3-3561_Aug05

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3561

Calibration procedure(s): QA CAL-01.v5 and QA CAL-14.v2
Calibration procedure for dosimetric E-field probes

Calibration date: August 24, 2005

Condition of the calibrated item: In Tolerance

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41495277	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41498087	3-May-05 (METAS, No. 251-00466)	May-06
Reference 3 dB Attenuator	SN: S5054 (3c)	11-Aug-05 (METAS, No. 251-00499)	Aug-06
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-05 (METAS, No. 251-00467)	May-06
Reference 30 dB Attenuator	SN: S5129 (30b)	11-Aug-05 (METAS, No. 251-00500)	Aug-06
Reference Probe ES3DV2	SN: 3013	7-Jan-05 (SPEAG, No. ES3-3013_Jan05)	Jan-06
DAE4	SN: 654	29-Nov-04 (SPEAG, No. DAE4-654_Nov04)	Nov-05

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Dec-03)	In house check: Dec-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-04)	In house check: Nov 05

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

Issued: August 24, 2005

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Federal Office of Metrology and Accreditation
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe EX3DV4

SN:3561

Manufactured: February 14, 2005
Calibrated: August 24, 2005

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: EX3DV4 SN:3561

Sensitivity in Free Space[A] Diode Compression[B]

NormX	**0.430** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**90** mV
NormY	**0.470** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**90** mV
NormZ	**0.430** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**90** mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL **900 MHz** **Typical SAR gradient: 5 % per mm**

Sensor Center to Phantom Surface Distance		**2.0 mm**	**3.0 mm**
SAR_{be} [%]	Without Correction Algorithm	3.8	1.5
SAR_{be} [%]	With Correction Algorithm	0.0	0.0

TSL **1810 MHz** **Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance		**2.0 mm**	**3.0 mm**
SAR_{be} [%]	Without Correction Algorithm	4.7	2.8
SAR_{be} [%]	With Correction Algorithm	1.1	0.8

Sensor Offset

Probe Tip to Sensor Center	**1.0** mm

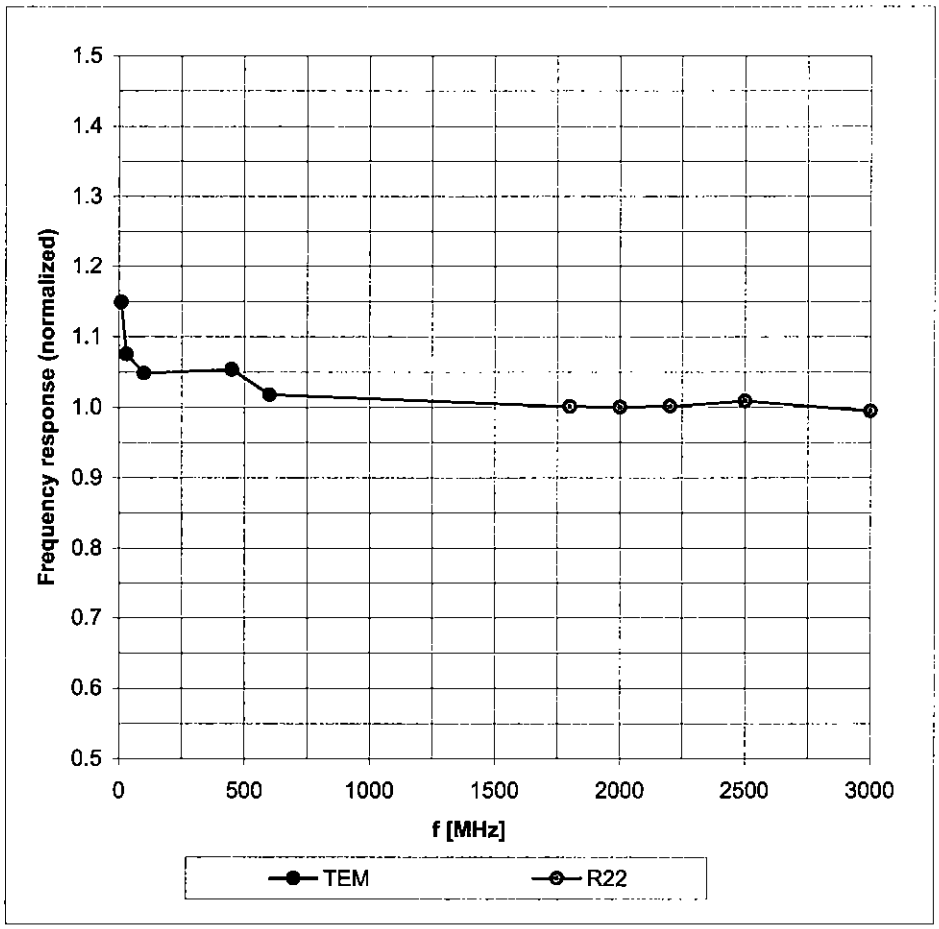
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Page 8).

[B] Numerical linearization parameter: uncertainty not required.

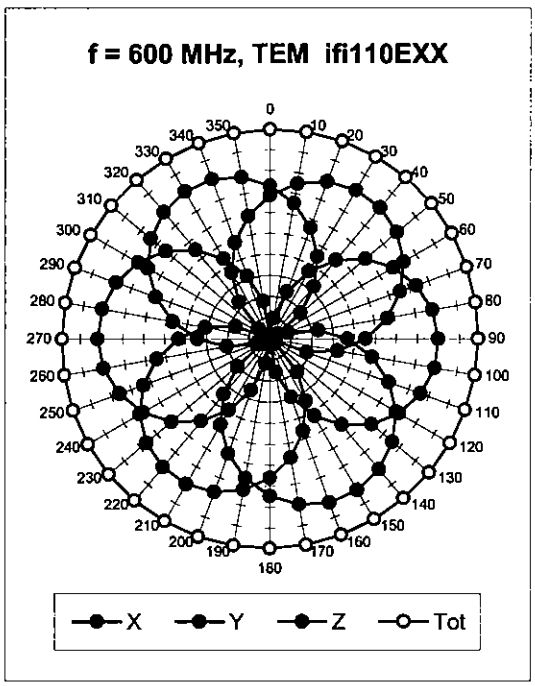
Frequency Response of E-Field

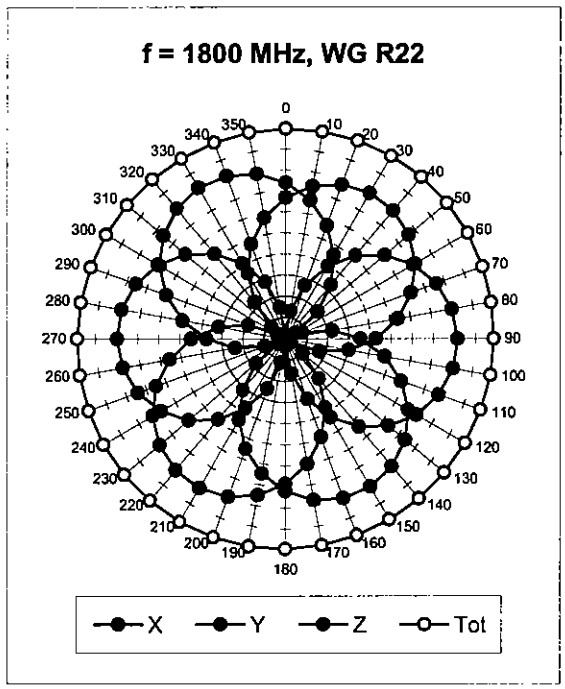
(TEM-Cell:ifi110 EXX, Waveguide: R22)

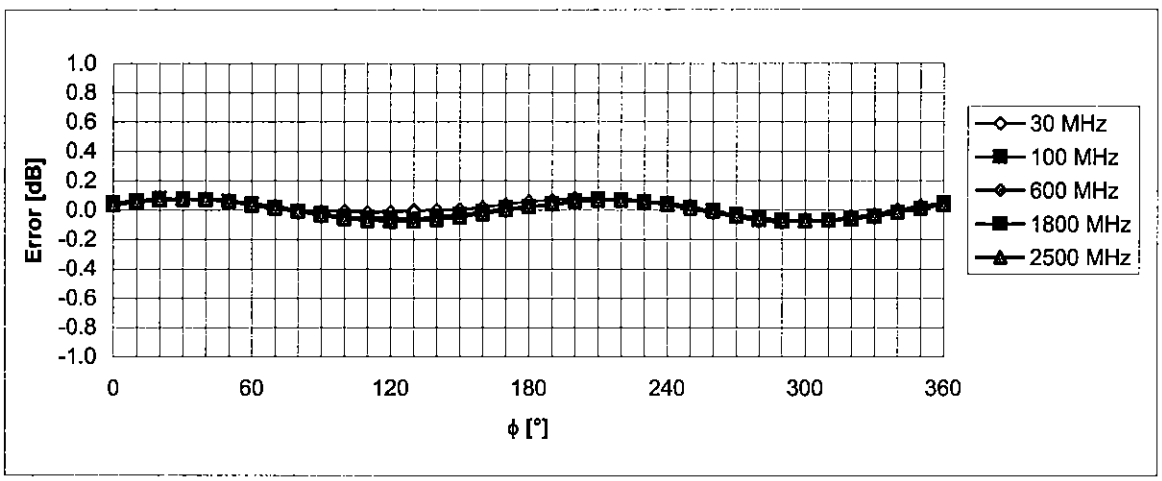


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



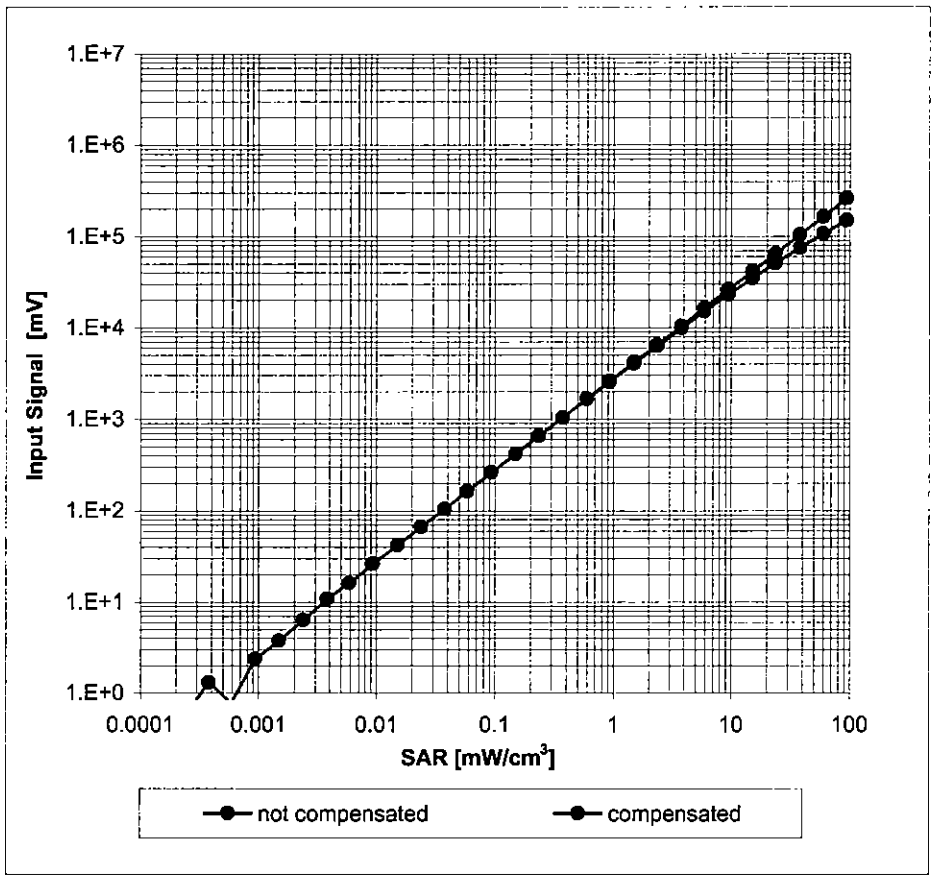


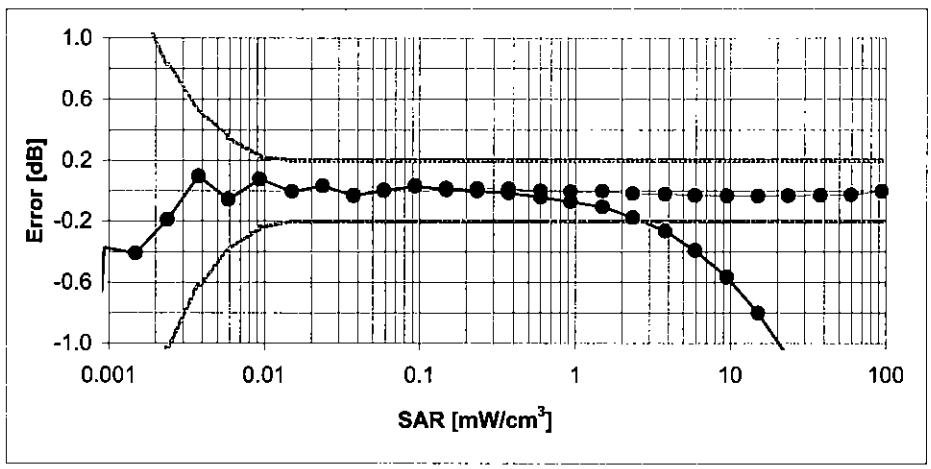


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

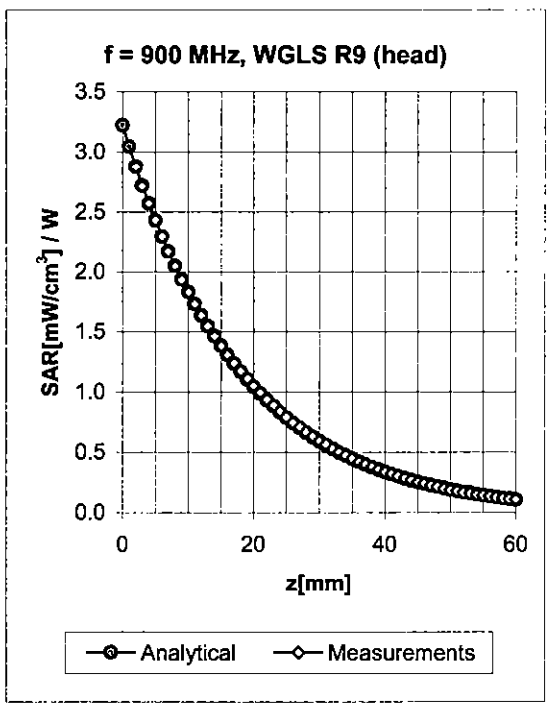
(Waveguide R22, f = 1800 MHz)

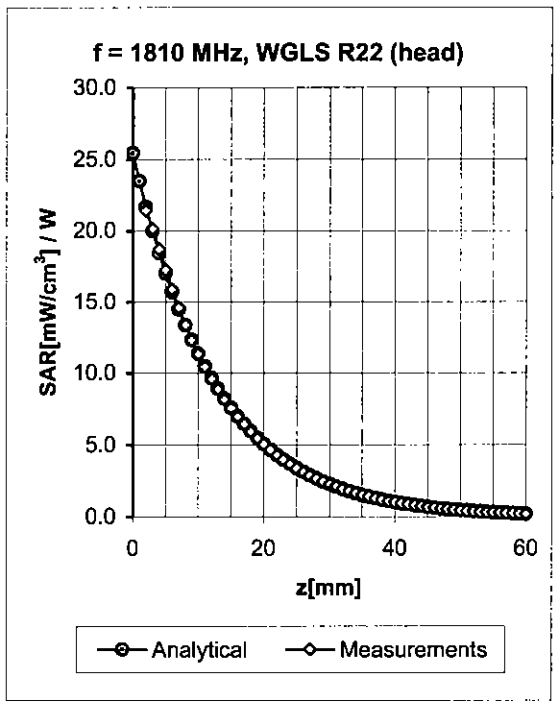




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



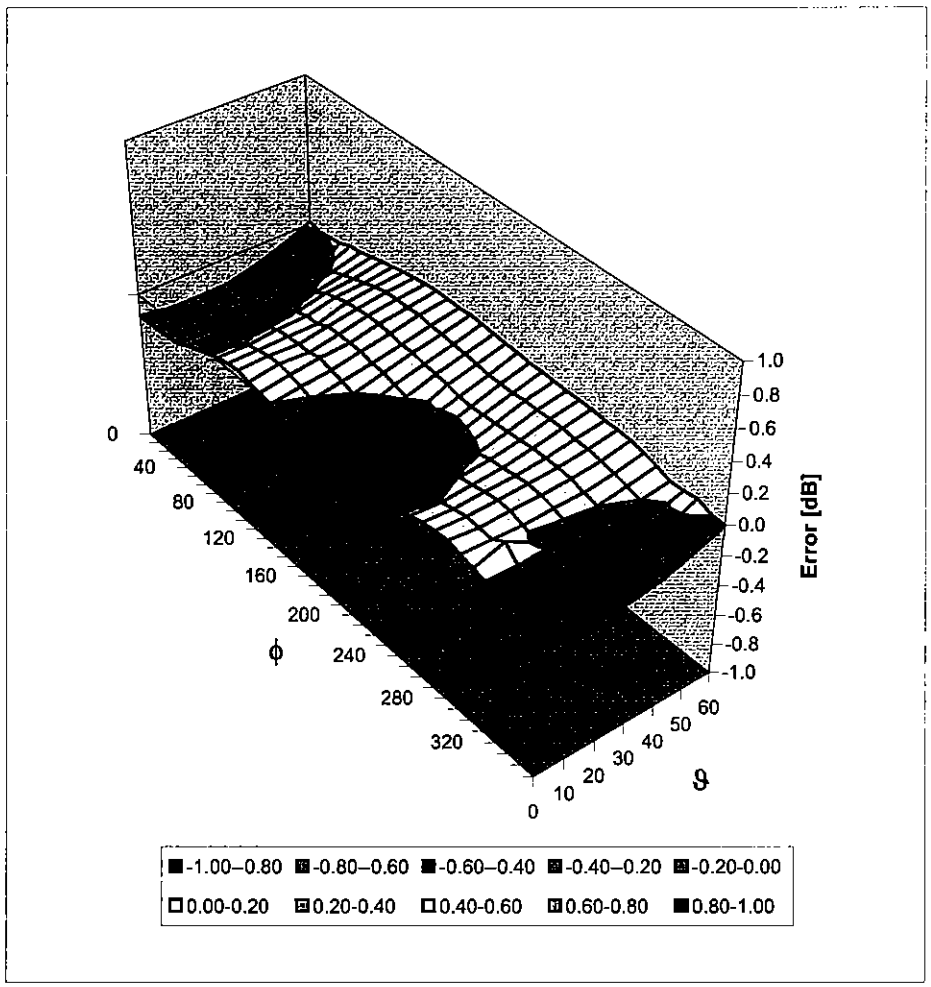


f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.21	1.13	7.91 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.47	0.94	7.04 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.61	0.71	6.37 ± 11.8% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.32	0.93	7.90 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.34	1.60	6.48 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.75	0.62	6.30 ± 11.8% (k=2)

[C] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

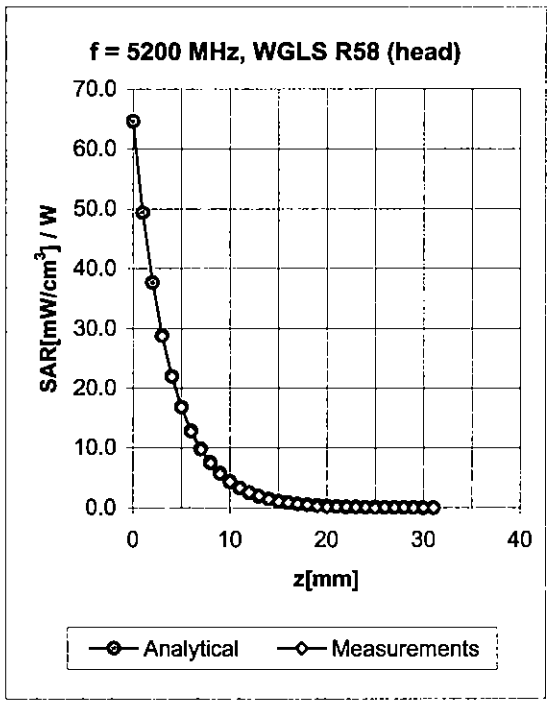
Deviation from Isotropy in HSL

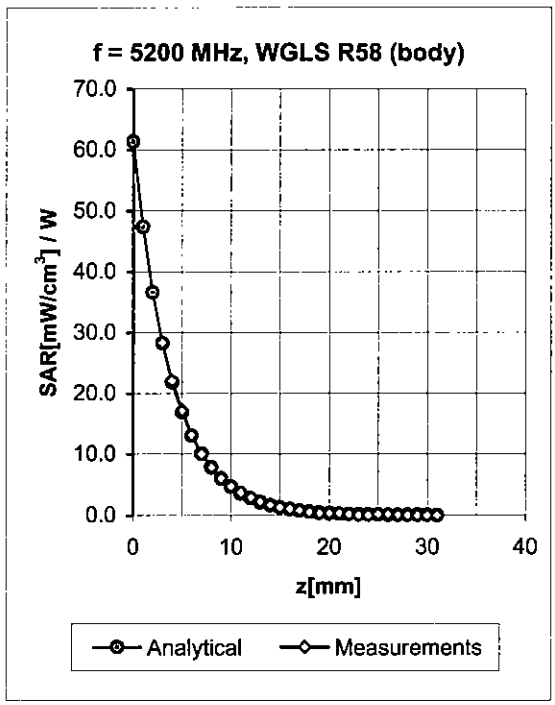
Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

Appendix[D]





f [MHz][D]	Validity [MHz]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
5200	± 50	Head	36.0 ± 5%	4.76 ± 5%	0.49	1.36	4.26 ± 13.6% (k=2)
5800	± 50	Head	35.3 ± 5%	5.27 ± 5%	0.52	1.42	3.75 ± 13.6% (k=2)
5200	± 50	Body	49.0 ± 5%	5.30 ± 5%	0.50	1.63	4.10 ± 13.6% (k=2)
5800	± 50	Body	48.2 ± 5%	6.00 ± 5%	0.49	1.70	3.63 ± 13.6% (k=2)

[D] Accreditation for ConvF assessment above 3000 MHz is currently applied for.