APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

DUT: CF-Y2; Type: Panasonic Notebook PC with WLAN; Serial: 4DKSA00028

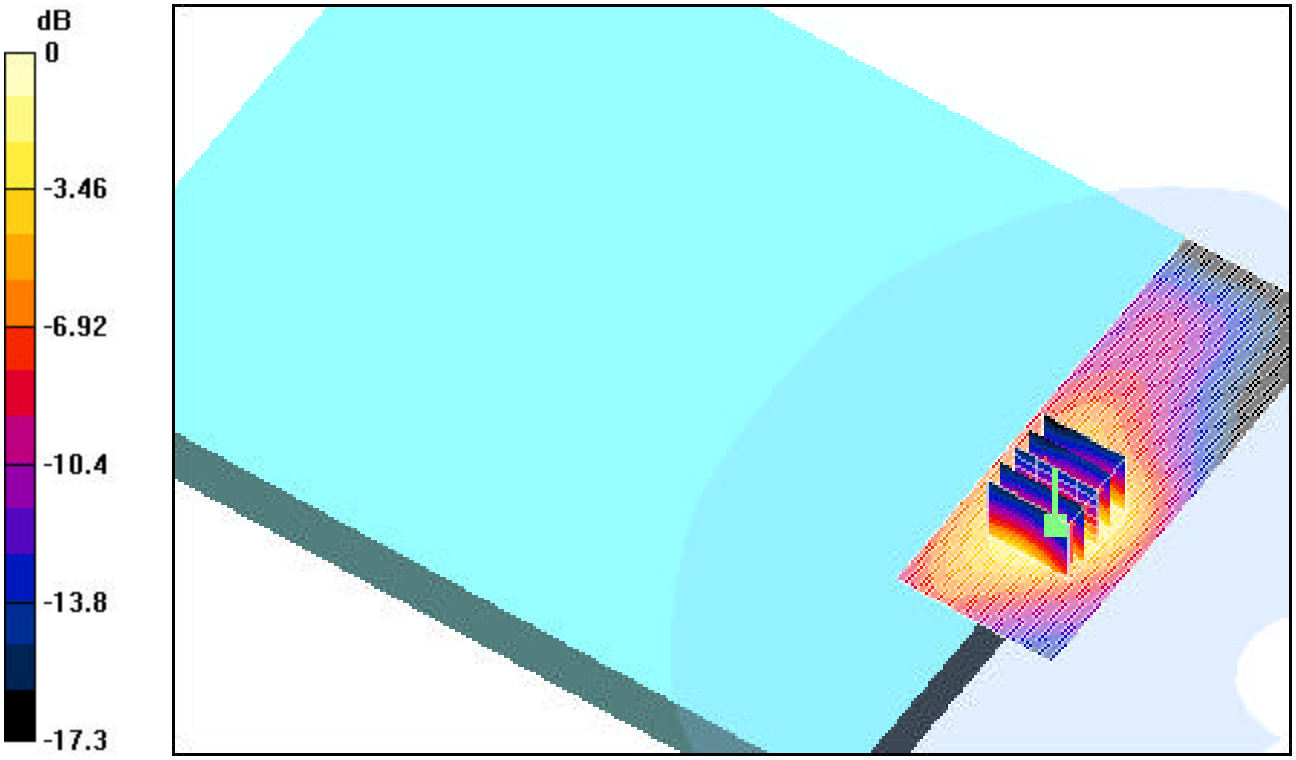
Communication System: 2.4GHz WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: 2450 Muscle (σ = 1.93 mho/m, ε_r = 54.62, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 07-27-2004; Ambient Temp: 23.2°C; Tissue Temp: 21.3°C

Probe: ES3DV2 - SN3022; ConvF(4.2, 4.2, 4.2); Calibrated: 9/23/2003
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE3 Sn330; Calibrated: 6/23/2004
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Mode: IEEE 802.11b, Laptop Position, ch.06, 5.5Mbps, Main antenna

Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.3 V/m
Peak SAR (extrapolated) = 0.529 W/kg
SAR(1 g) = 0.282 mW/g; SAR(10 g) = 0.151 mW/g



0 dB = 0.354mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: CF-Y2; Type: Panasonic Notebook PC with WLAN; Serial: 4DKSA00028

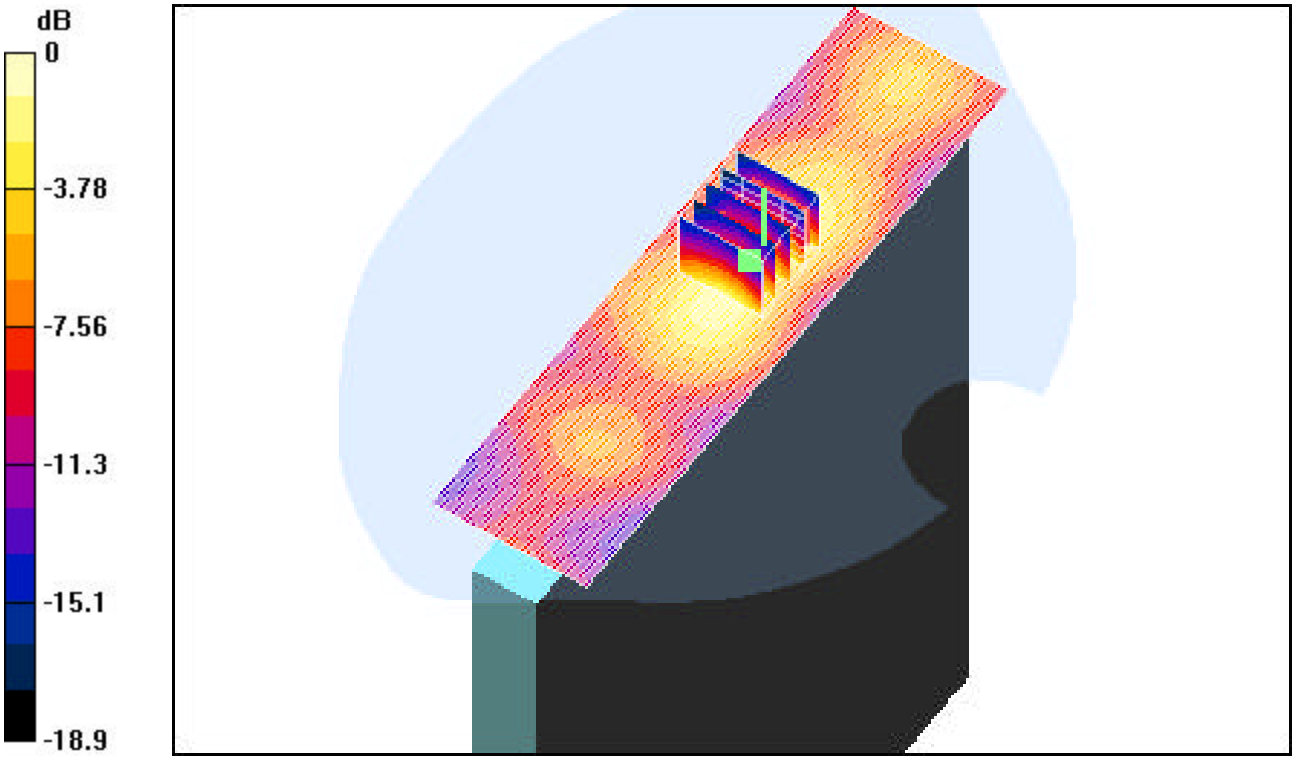
Communication System: 2.4GHz WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: 2450 Muscle (σ = 1.93 mho/m, ε_r = 54.62, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 07-27-2004; Ambient Temp: 23.2°C; Tissue Temp: 21.3°C

Probe: ES3DV2 - SN3022; ConvF(4.2, 4.2, 4.2); Calibrated: 9/23/2003
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE3 Sn330; Calibrated: 6/23/2004
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Mode: IEEE 802.11b, Bystander position, ch.06, 5.5Mbps, Main antenna

Area Scan (41x161x1): 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) = 0.283 W/kg
SAR(1 g) = 0.158 mW/g; SAR(10 g) = 0.085 mW/g



0 dB = 0.196mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: CF-Y2; Type: Panasonic Notebook PC with WLAN; Serial: 4DKSA00028

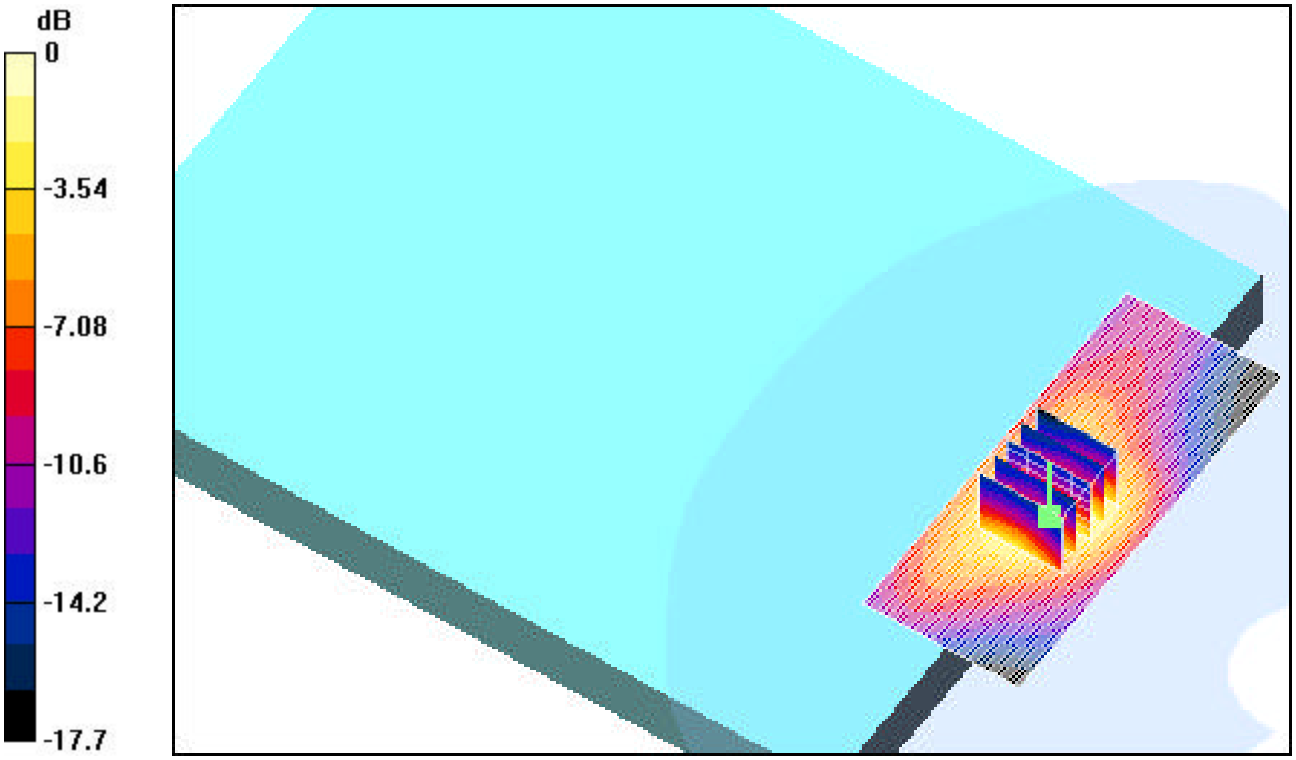
Communication System: 2.4GHz WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: 2450 Muscle (σ = 1.93 mho/m, ε_r = 54.62, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 07-27-2004; Ambient Temp: 23.2°C; Tissue Temp: 21.3°C

Probe: ES3DV2 - SN3022; ConvF(4.2, 4.2, 4.2); Calibrated: 9/23/2003
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE3 Sn330; Calibrated: 6/23/2004
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Mode: IEEE 802.11g, Laptop Position, ch.06, 12Mbps, Main antenna

Area Scan (41x101x1): 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) = 0.349 W/kg
SAR(1 g) = 0.185 mW/g; SAR(10 g) = 0.100 mW/g



0 dB = 0.231mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: CF-Y2; Type: Panasonic Notebook PC with WLAN; Serial: 4DKSA00028

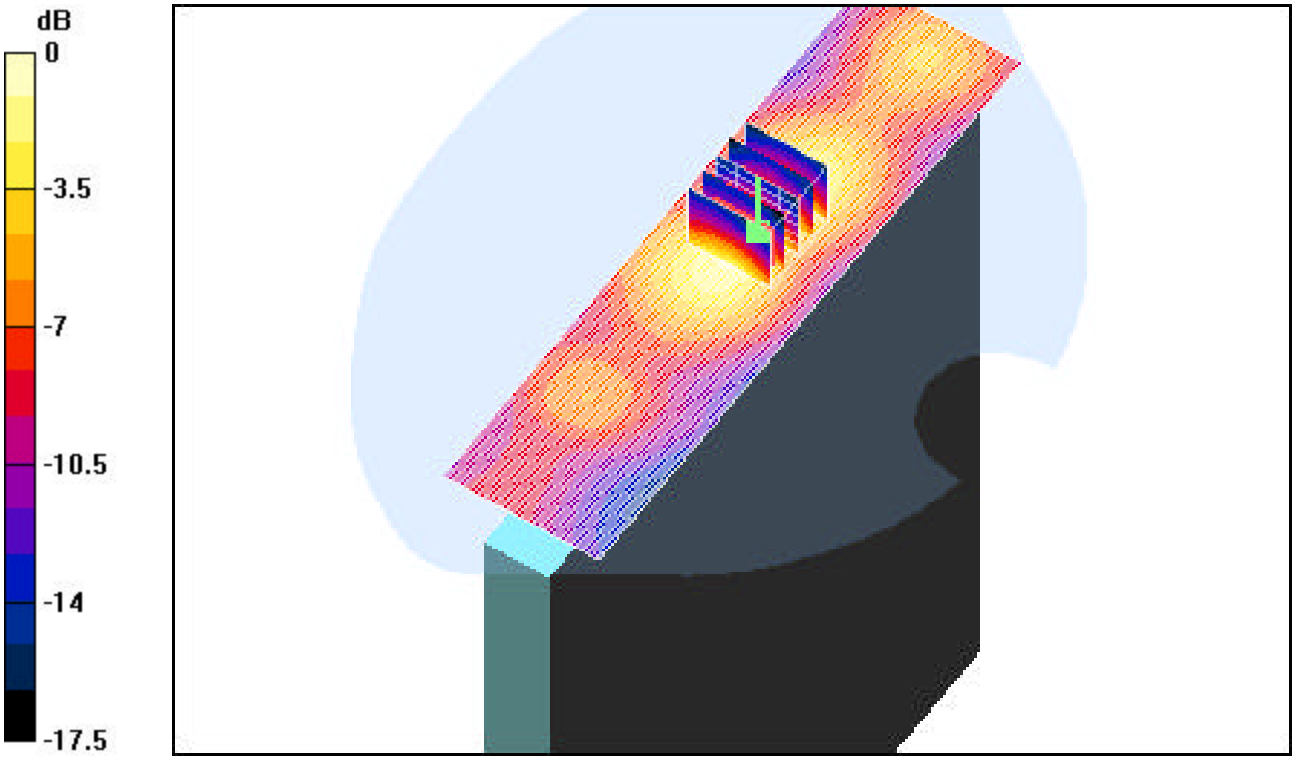
Communication System: 2.4GHz WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: 2450 Muscle (σ = 1.93 mho/m, ε_r = 54.62, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 07-27-2004; Ambient Temp: 23.2°C; Tissue Temp: 21.3°C

Probe: ES3DV2 - SN3022; ConvF(4.2, 4.2, 4.2); Calibrated: 9/23/2003
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE3 Sn330; Calibrated: 6/23/2004
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Mode: IEEE 802.11g, Bystander position, ch.06, 12Mbps, Main antenna

Area Scan (41x161x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.16 V/m
Peak SAR (extrapolated) = 0.196 W/kg
SAR(1 g) = 0.109 mW/g; SAR(10 g) = 0.058 mW/g



0 dB = 0.138mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: CF-Y2; Type: Panasonic Notebook PC with WLAN; Serial: 4DKSA00028

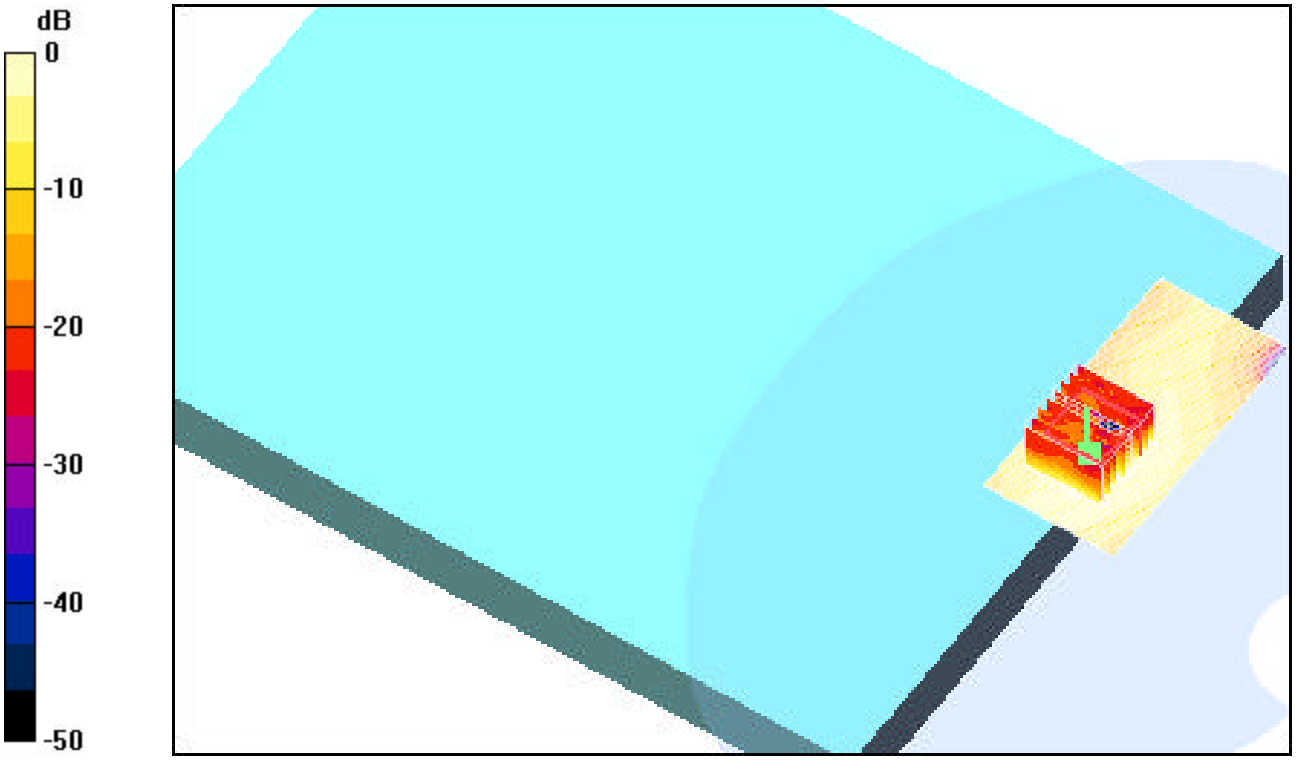
Communication System: IEEE 802.11a WLAN; Frequency: 5260 MHz;Duty Cycle: 1:1
Medium: 5300 Muscle (σ = 5.21 mho/m, ε_r = 46.92, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 07-26-2004; Ambient Temp: 23.4°C; Tissue Temp: 21.5°C

Probe: ES3DV2 - SN3022; ConvF(1.8, 1.8, 1.8); Calibrated: 9/23/2003
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE3 Sn455; Calibrated: 1/6/2004
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Mode: IEEE 802.11a, Laptop position, ch.52, 6Mbps, Main antenna

Area Scan (51x101x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 7.88 V/m
Peak SAR (extrapolated) = 2.2 W/kg
SAR(1 g) = 0.659 mW/g; SAR(10 g) = 0.246 mW/g



0 dB = 0.957mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: CF-Y2; Type: Panasonic Notebook PC with WLAN; Serial: 4DKSA00028

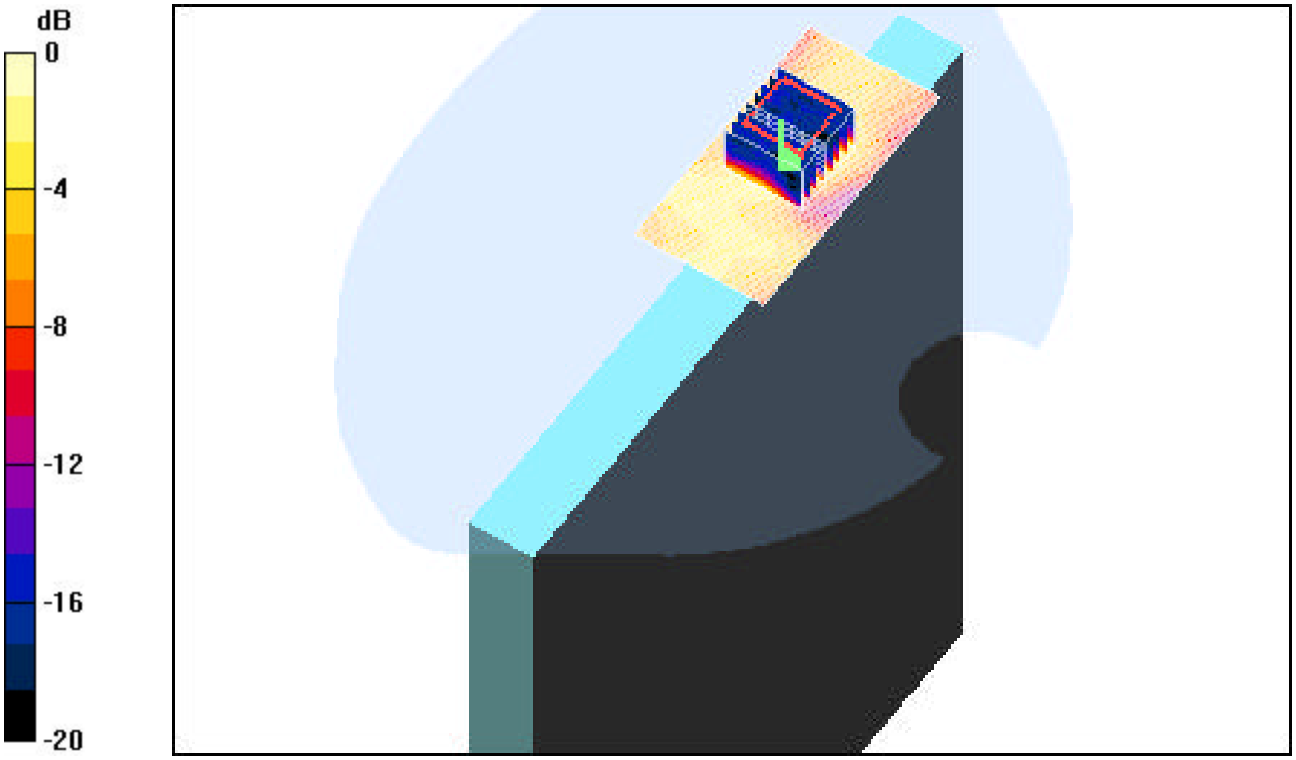
Communication System: IEEE 802.11a WLAN; Frequency: 5260 MHz;Duty Cycle: 1:1
Medium: 5300 Muscle (σ = 5.21 mho/m, ε_r = 46.92, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 07-26-2004; Ambient Temp: 23.4°C; Tissue Temp: 21.5°C

Probe: ES3DV2 - SN3022; ConvF(1.8, 1.8, 1.8); Calibrated: 9/23/2003
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE3 Sn330; Calibrated: 6/23/2004
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Mode: IEEE 802.11a, Bystander position, ch.52, 6Mbps, Main antenna

Area Scan (51x101x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 4.69 V/m
Peak SAR (extrapolated) = 1.24 W/kg
SAR(1 g) = 0.361 mW/g; SAR(10 g) = 0.146 mW/g



0 dB = 0.501mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: CF-Y2; Type: Panasonic Notebook PC with WLAN; Serial: 4DKSA00028

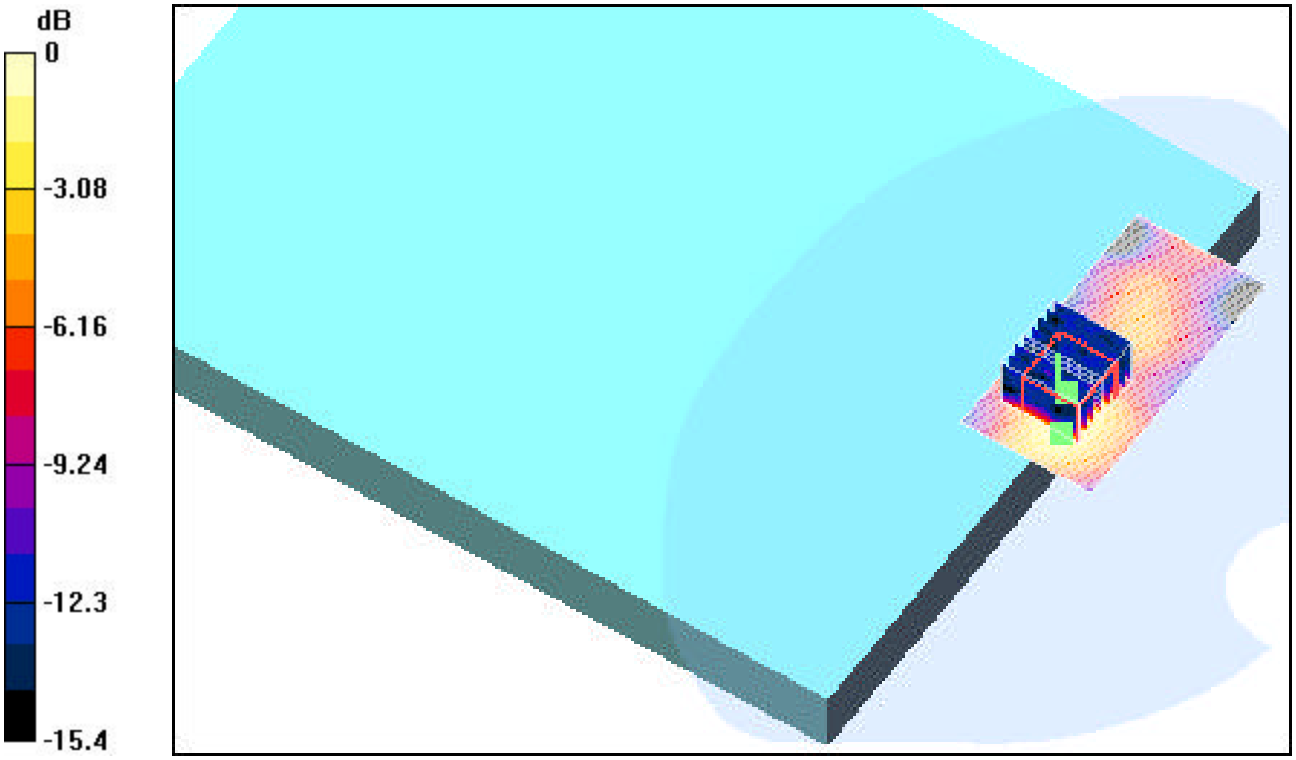
Communication System: IEEE 802.11a WLAN; Frequency: 5785 MHz;Duty Cycle: 1:1
Medium: 5800 Muscle (σ = 5.71 mho/m, ε_r = 46.29, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 07-26-2004; Ambient Temp: 23.1°C; Tissue Temp: 21.8°C

Probe: ES3DV2 - SN3022; ConvF(1.57, 1.57, 1.57); Calibrated: 9/23/2003
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE3 Sn455; Calibrated: 1/6/2004
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Mode: IEEE 802.11a, Laptop position, ch.157, 6Mbps, Main antenna

Area Scan (51x101x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 5.38 V/m
Peak SAR (extrapolated) = 0.992 W/kg
SAR(1 g) = 0.253 mW/g; SAR(10 g) = 0.101 mW/g



0 dB = 0.344mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: CF-Y2; Type: Panasonic Notebook PC with WLAN; Serial: 4DKSA00028

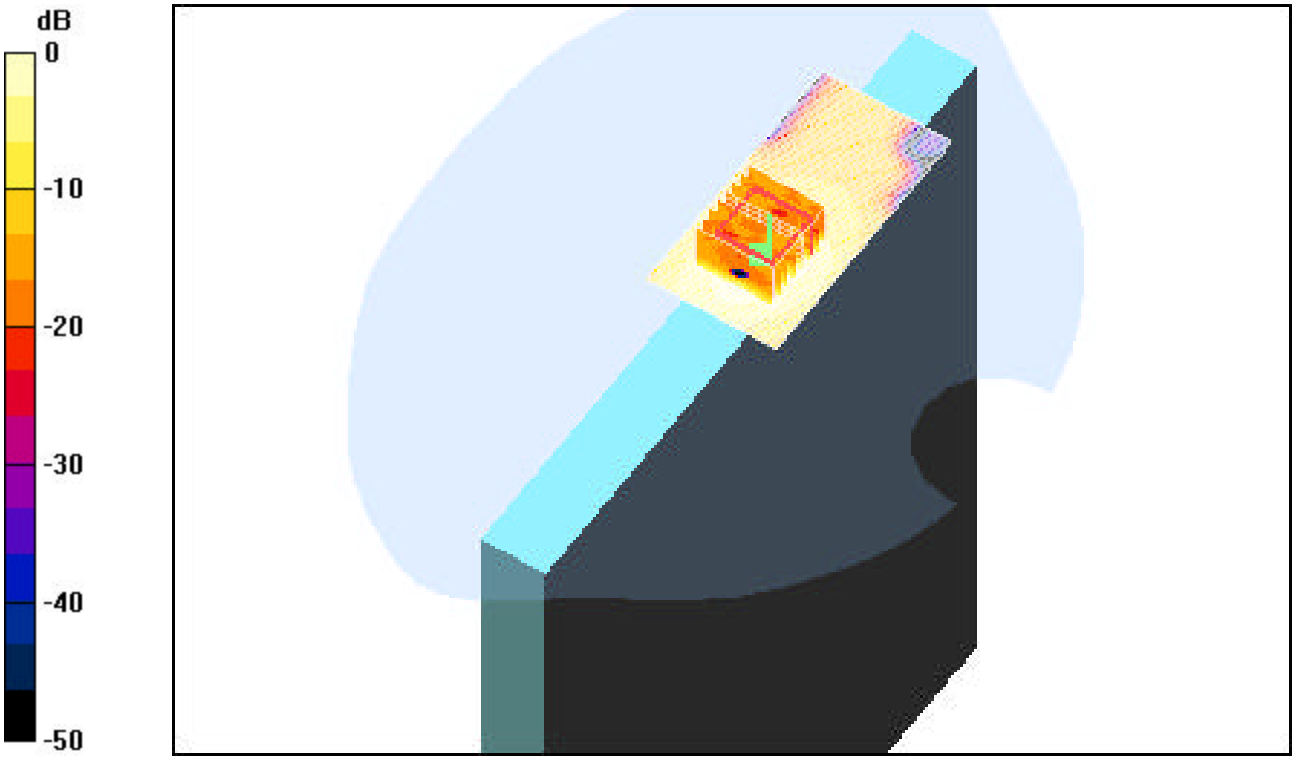
Communication System: IEEE 802.11a WLAN; Frequency: 5785 MHz;Duty Cycle: 1:1
Medium: 5800 Muscle (σ = 5.71 mho/m, ε_r = 46.29, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 07-26-2004; Ambient Temp: 23.1°C; Tissue Temp: 21.8°C

Probe: ES3DV2 - SN3022; ConvF(1.57, 1.57, 1.57); Calibrated: 9/23/2003
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE3 Sn330; Calibrated: 6/23/2004
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Mode: IEEE 802.11a, Bystander position, ch.157, 6Mbps, Aux antenna

Area Scan (51x101x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 5.68 V/m
Peak SAR (extrapolated) = 1.21 W/kg
SAR(1 g) = 0.315 mW/g; SAR(10 g) = 0.119 mW/g



0 dB = 0.433mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: CF-Y2; Type: Panasonic Notebook PC with WLAN; Serial: 4DKSA00028

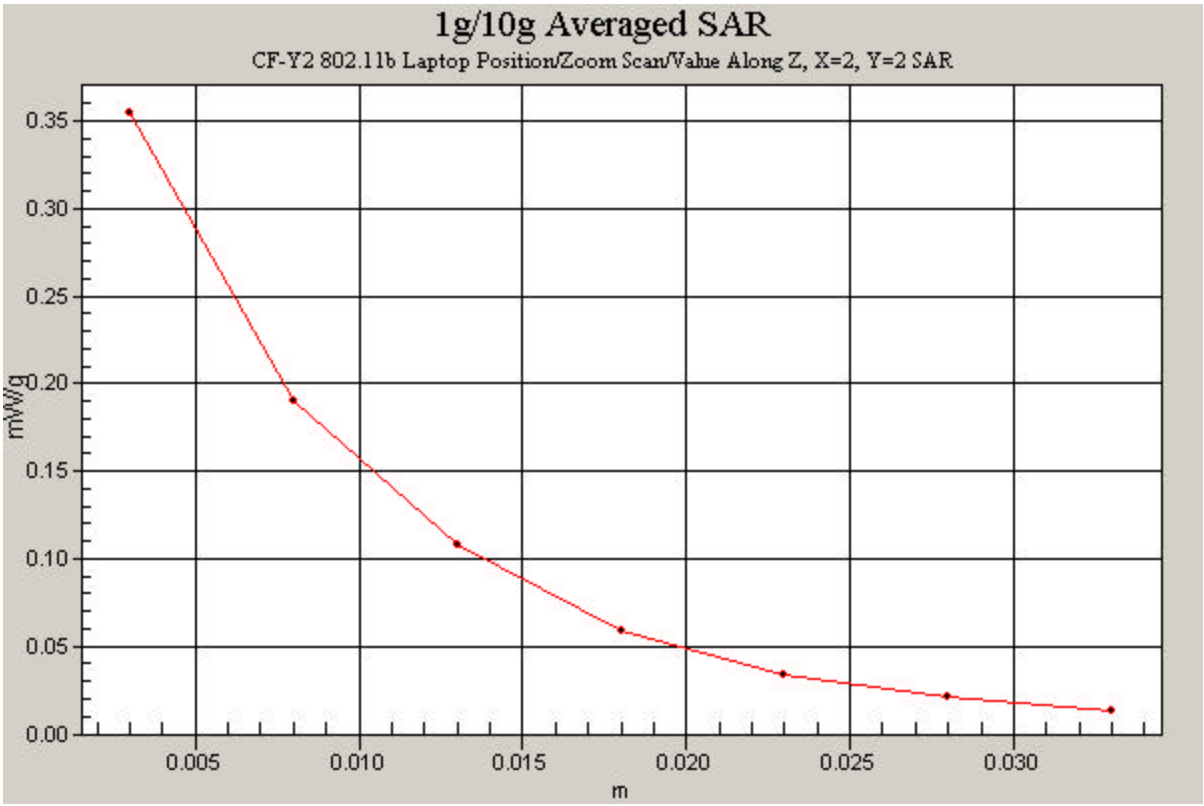
Communication System: 2.4GHz WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: 2450 Muscle (σ = 1.93 mho/m, ε_r = 54.62, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 07-27-2004; Ambient Temp: 23.2°C; Tissue Temp: 21.3°C

Probe: ES3DV2 - SN3022; ConvF(4.2, 4.2, 4.2); Calibrated: 9/23/2003
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE3 Sn330; Calibrated: 6/23/2004
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Mode: IEEE 802.11b, Laptop Position, ch.06, 5.5Mbps, Main antenna

Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.3 V/m
Peak SAR (extrapolated) = 0.529 W/kg
SAR(1 g) = 0.282 mW/g; SAR(10 g) = 0.151 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: CF-Y2; Type: Panasonic Notebook PC with WLAN; Serial: 4DKSA00028

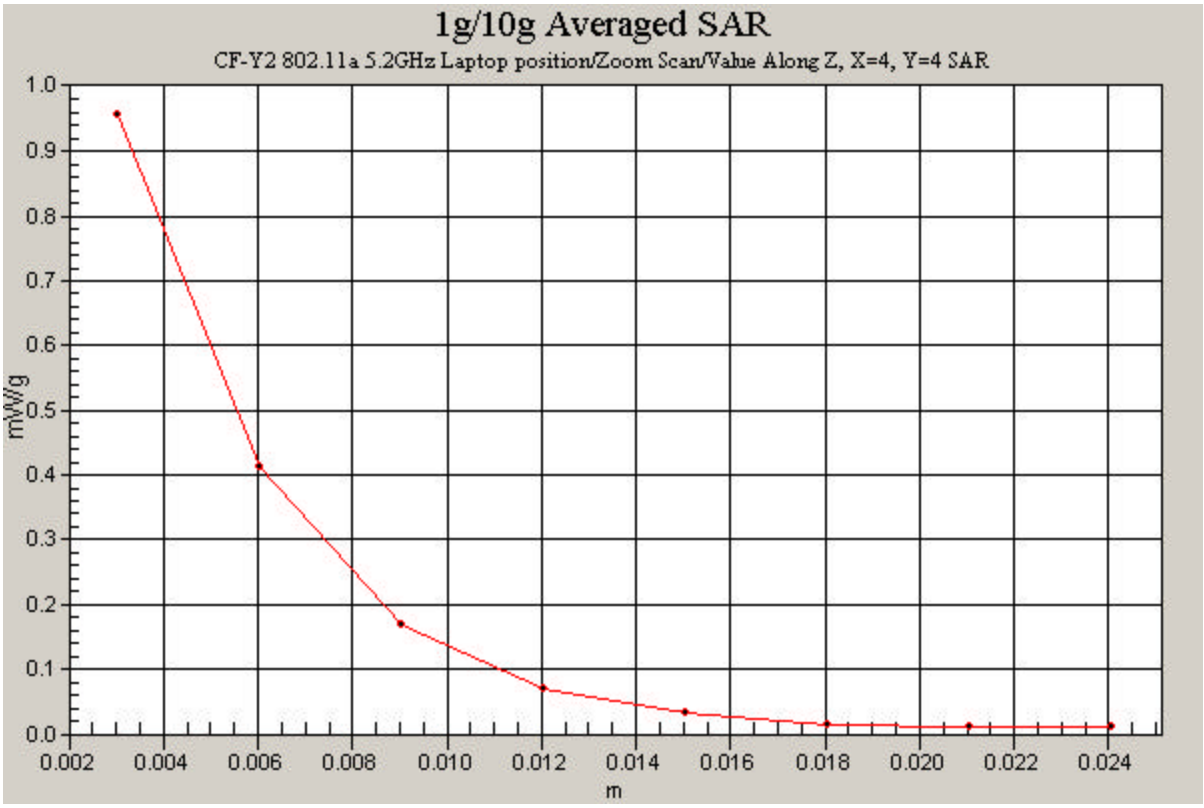
Communication System: IEEE 802.11a WLAN; Frequency: 5260 MHz;Duty Cycle: 1:1
Medium: 5300 Muscle (σ = 5.21 mho/m, ε_r = 46.92, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 07-26-2004; Ambient Temp: 23.4°C; Tissue Temp: 21.5°C

Probe: ES3DV2 - SN3022; ConvF(1.8, 1.8, 1.8); Calibrated: 9/23/2003
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE3 Sn455; Calibrated: 1/6/2004
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Mode: IEEE 802.11a, Laptop position, ch.52, 6Mbps, Main antenna

Area Scan (51x101x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 7.88 V/m
Peak SAR (extrapolated) = 2.2 W/kg
SAR(1 g) = 0.659 mW/g; SAR(10 g) = 0.246 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: CF-Y2; Type: Panasonic Notebook PC with WLAN; Serial: 4DKSA00028

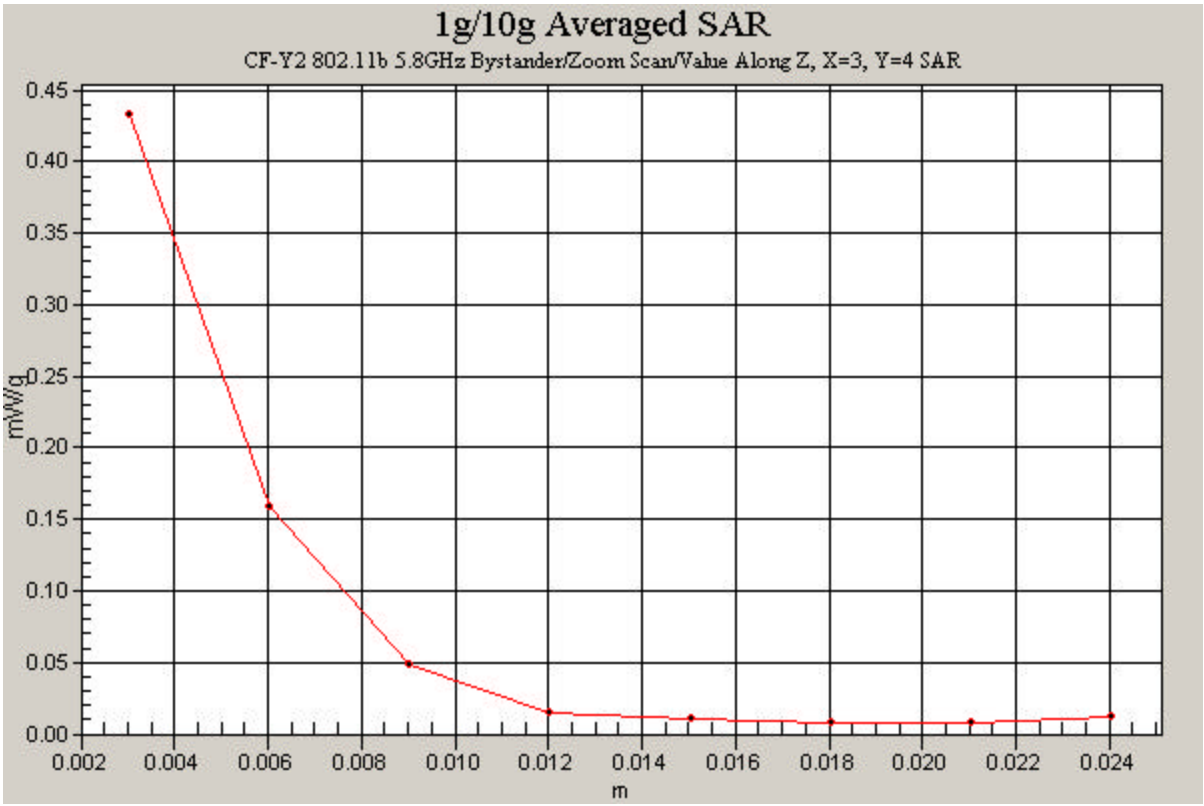
Communication System: IEEE 802.11a WLAN; Frequency: 5785 MHz;Duty Cycle: 1:1
Medium: 5800 Muscle (σ = 5.71 mho/m, ε_r = 46.29, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 07-26-2004; Ambient Temp: 23.1°C; Tissue Temp: 21.8°C

Probe: ES3DV2 - SN3022; ConvF(1.57, 1.57, 1.57); Calibrated: 9/23/2003
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE3 Sn330; Calibrated: 6/23/2004
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Mode: IEEE 802.11a, Bystander position, ch.157, 6Mbps, Aux antenna

Area Scan (51x101x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 5.68 V/m
Peak SAR (extrapolated) = 1.21 W/kg
SAR(1 g) = 0.315 mW/g; SAR(10 g) = 0.119 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: CF-Y2; Type: Panasonic Notebook PC with WLAN; Serial: 4DKSA00028

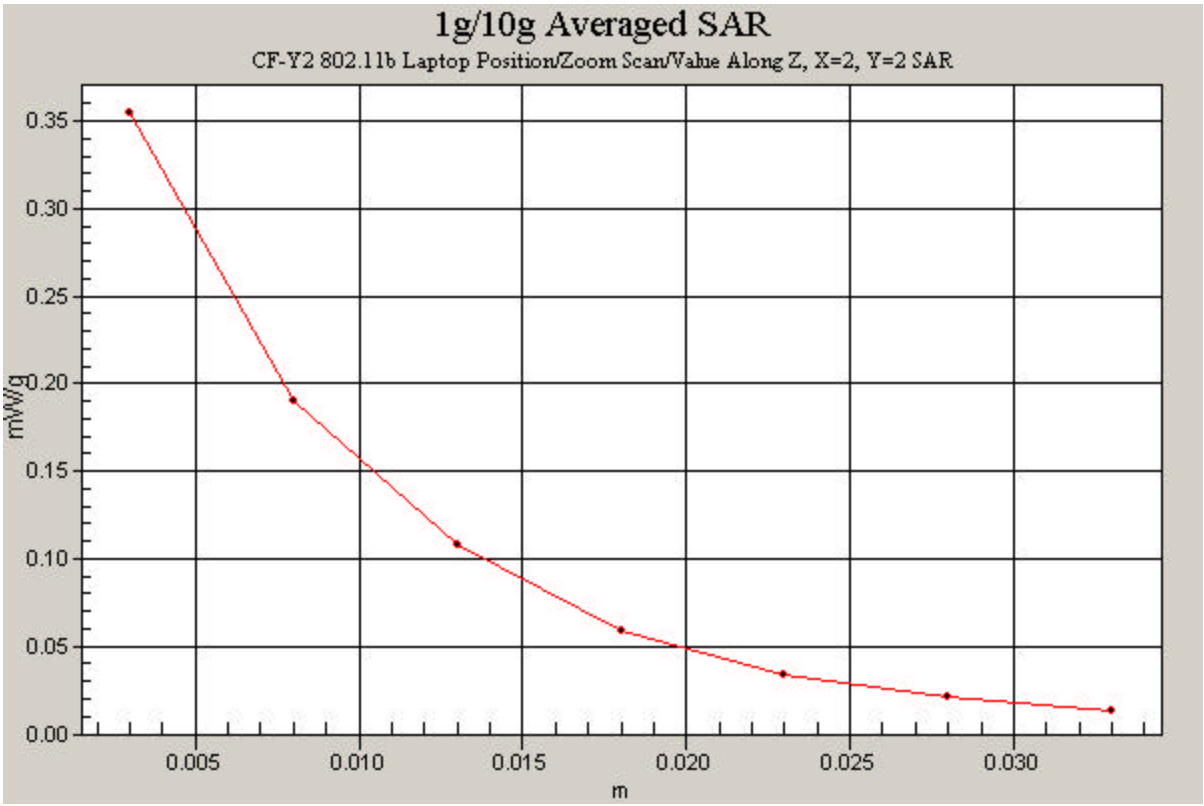
Communication System: 2.4GHz WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: 2450 Muscle (σ = 1.93 mho/m, ε_r = 54.62, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 07-27-2004; Ambient Temp: 23.2°C; Tissue Temp: 21.3°C

Probe: ES3DV2 - SN3022; ConvF(4.2, 4.2, 4.2); Calibrated: 9/23/2003
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE3 Sn330; Calibrated: 6/23/2004
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Mode: IEEE 802.11b, Laptop Position, ch.06, 5.5Mbps, Main antenna

Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.3 V/m
Peak SAR (extrapolated) = 0.529 W/kg
SAR(1 g) = 0.282 mW/g; SAR(10 g) = 0.151 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: CF-Y2; Type: Panasonic Notebook PC with WLAN; Serial: 4DKSA00028

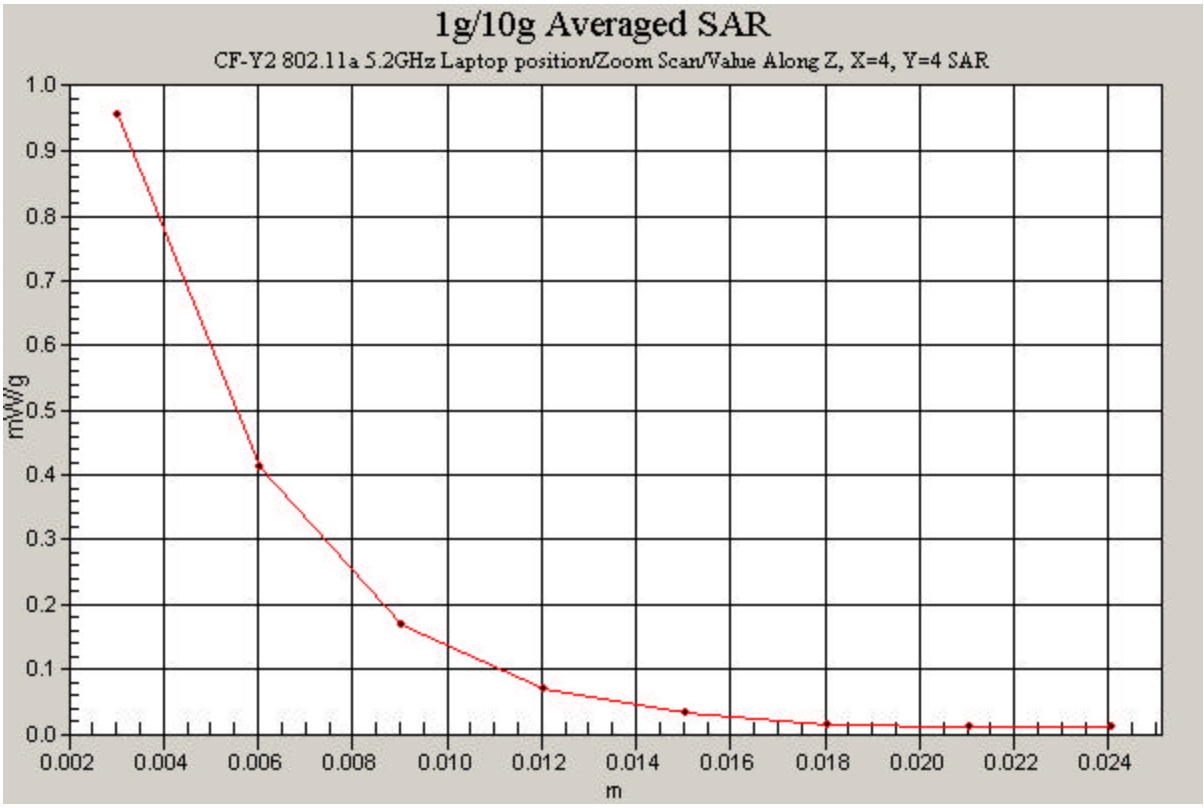
Communication System: IEEE 802.11a WLAN; Frequency: 5260 MHz;Duty Cycle: 1:1
Medium: 5300 Muscle (σ = 5.21 mho/m, ε_r = 46.92, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 07-26-2004; Ambient Temp: 23.4°C; Tissue Temp: 21.5°C

Probe: ES3DV2 - SN3022; ConvF(1.8, 1.8, 1.8); Calibrated: 9/23/2003
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE3 Sn455; Calibrated: 1/6/2004
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Mode: IEEE 802.11a, Laptop position, ch.52, 6Mbps, Main antenna

Area Scan (51x101x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 7.88 V/m
Peak SAR (extrapolated) = 2.2 W/kg
SAR(1 g) = 0.659 mW/g; SAR(10 g) = 0.246 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: CF-Y2; Type: Panasonic Notebook PC with WLAN; Serial: 4DKSA00028

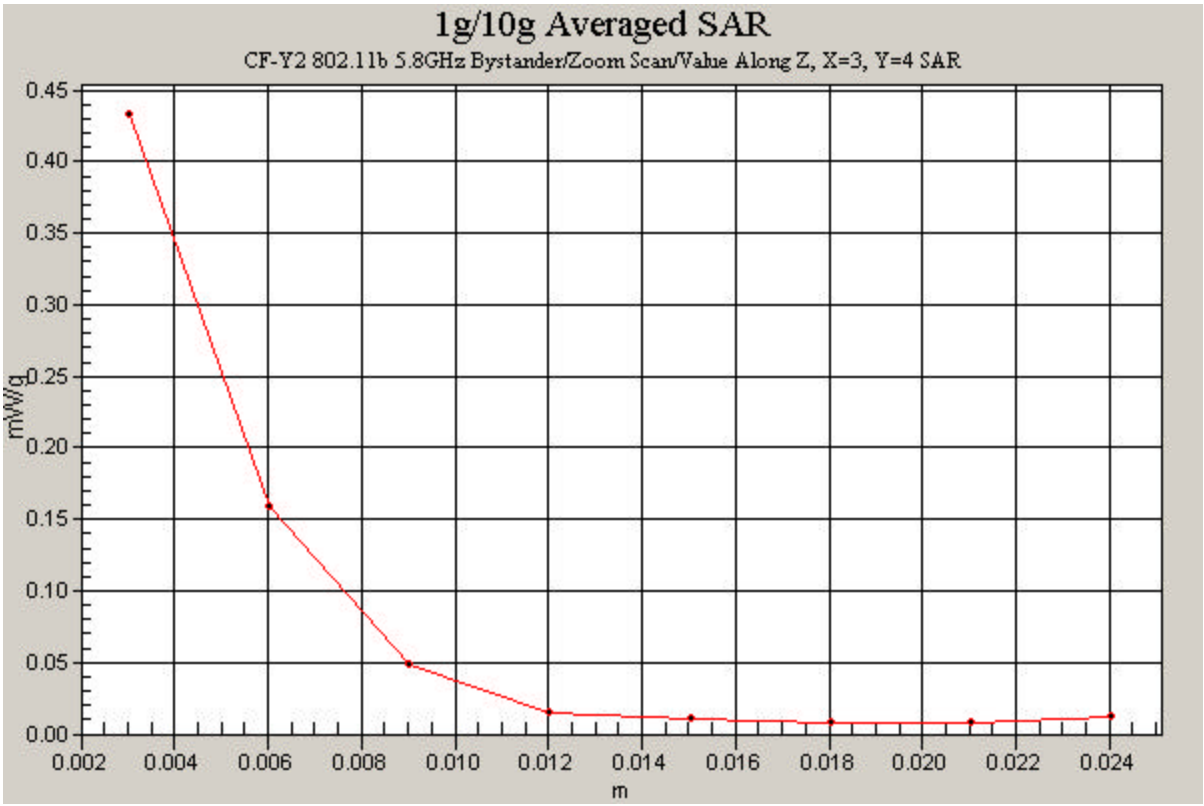
Communication System: IEEE 802.11a WLAN; Frequency: 5785 MHz;Duty Cycle: 1:1
Medium: 5800 Muscle (σ = 5.71 mho/m, ε_r = 46.29, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 07-26-2004; Ambient Temp: 23.1°C; Tissue Temp: 21.8°C

Probe: ES3DV2 - SN3022; ConvF(1.57, 1.57, 1.57); Calibrated: 9/23/2003
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE3 Sn330; Calibrated: 6/23/2004
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Mode: IEEE 802.11a, Bystander position, ch.157, 6Mbps, Aux antenna

Area Scan (51x101x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 5.68 V/m
Peak SAR (extrapolated) = 1.21 W/kg
SAR(1 g) = 0.315 mW/g; SAR(10 g) = 0.119 mW/g



APPENDIX B: DIPOLE VALIDATION

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:719

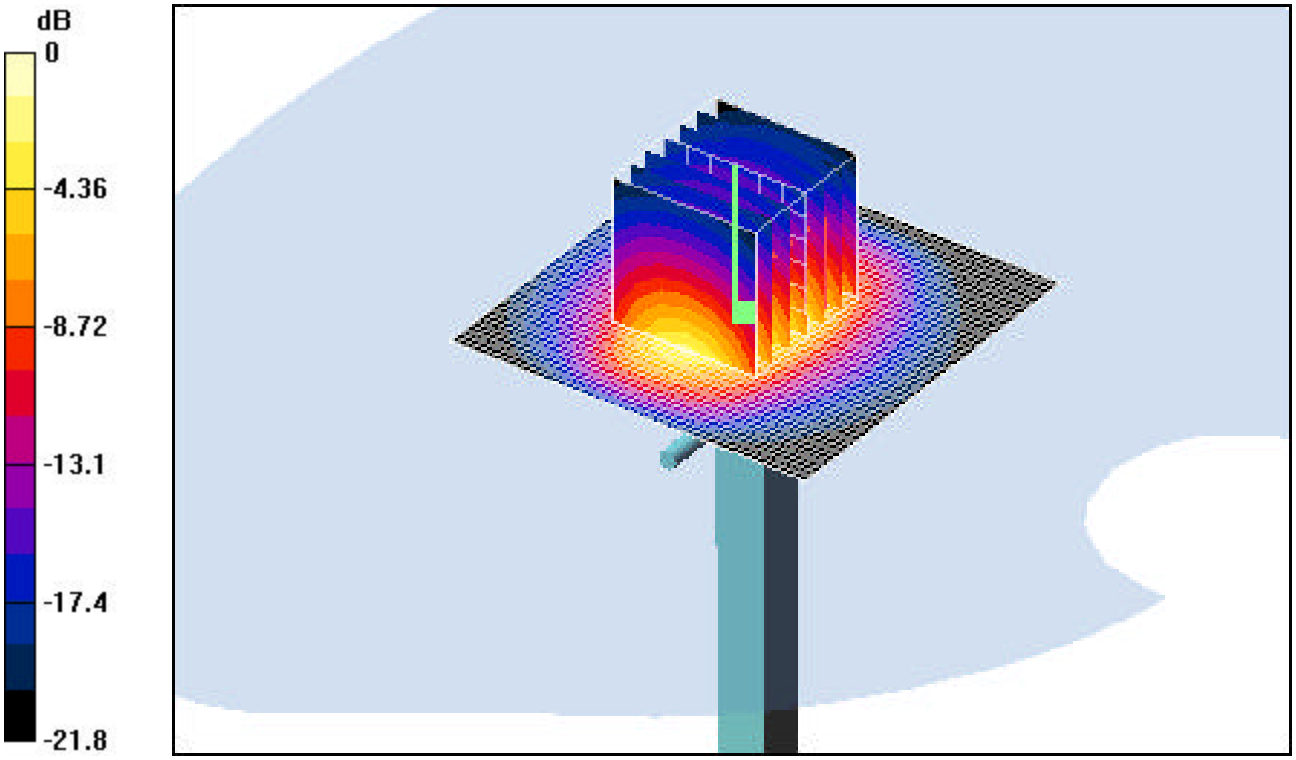
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: 2450 Brain (σ = 1.81 mho/m, ε_r = 39.74, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-27-2004; Ambient Temp: 23.3°C; Tissue Temp: 21.7°C

Probe: ES3DV2 - SN3022; ConvF(4.5, 4.5, 4.5); Calibrated: 9/23/2003
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE3 Sn330; Calibrated: 6/23/2004
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

2450 MHz Dipole Validation

Area Scan (51x51x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Input Power = 24.0 dBm (250 mW)
SAR(1 g) = 12.6 mW/g; SAR(10 g) = 5.8 mW/g
Target SAR(1g) = 13.1 mW/g; Deviation = -3.81 %



0 dB = 16.5mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5800 MHz; Type: D5GHzV2; Serial: 1007

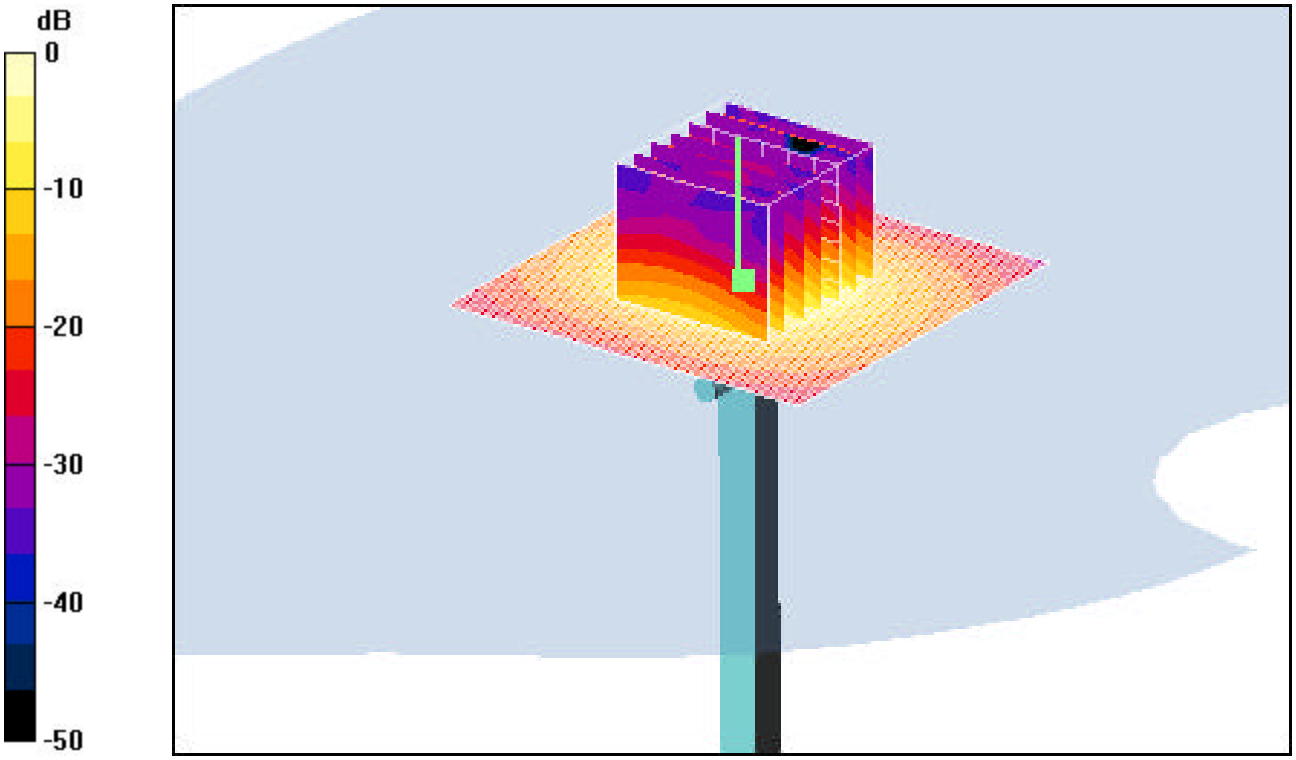
Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: 5800 Brain (σ = 5.39 mho/m, ε_r = 35.25, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-26-2004; Ambient Temp: 23.8°C; Tissue Temp: 21.4°C

Probe: ES3DV2 - SN3022; ConvF(2.15, 2.15, 2.15); Calibrated: 9/23/2003
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE3 Sn455; Calibrated: 1/6/2004
Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

5800 MHz Dipole Validation

Area Scan (61x61x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Input Power = 20.0 dBm (100 mW)
SAR(1 g) = 9.21 mW/g; SAR(10 g) = 2.52 mW/g
Target SAR(1g) = 9.00 mW/g; Deviation = +2.33 %



0 dB = 12.1mW/g

APPENDIX C: PROBE CALIBRATION

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

Client PC Test

CALIBRATION CERTIFICATE

Object(s)	ES3DV2 - SN:3022
Calibration procedure(s)	QA CAL-01.v2 Calibration procedure for dosimetric E-field probes
Calibration date:	September 23, 2003
Condition of the calibrated item	In Tolerance (according to the specific calibration document)

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Model Type	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM E4419B	GB41293874	2-Apr-03 (METAS, No 252-0250)	Apr-04
Power sensor E4412A	MY41495277	2-Apr-03 (METAS, No 252-0250)	Apr-04
Reference 20 dB Attenuator	SN: 5086 (20b)	3-Apr-03 (METAS No. 251-0340	Apr-04
Fluke Process Calibrator Type 702	SN: 6295803	8-Sep-03 (Sintrel SCS No. E-030020)	Sep-04
Power sensor HP 8481A	MY41092180	18-Sep-02 (Agilent, No. 20020918)	In house check: Oct 03
RF generator HP 8684C	US3642U01700	4-Aug-99 (SPEAG, in house check Aug-02)	In house check: Aug-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (Agilent, No. 24BR1033101)	In house check: Oct 03

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

Date issued: October 5, 2003

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

Schmid & Partner Engineering AG

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Probe ES3DV2

SN:3022

Manufactured: April 15, 2003
Last calibration: September 23, 2003

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ES3DV2 SN:3022

Sensitivity in Free Space

NormX	**1.00**	$\mu V/(V/m)^2$
NormY	**1.04**	$\mu V/(V/m)^2$
NormZ	**0.98**	$\mu V/(V/m)^2$

Diode Compression

DCP X	**95**	mV
DCP Y	**95**	mV
DCP Z	**95**	mV

Sensitivity in Tissue Simulating Liquid

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

Valid for f=800-1000 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**6.1**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.1**	± 9.5% (k=2)	Alpha	**0.32**
ConvF Z	**6.1**	± 9.5% (k=2)	Depth	**1.65**

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

Valid for f=1710-1910 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**5.0**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**5.0**	± 9.5% (k=2)	Alpha	**0.25**
ConvF Z	**5.0**	± 9.5% (k=2)	Depth	**2.30**

Boundary Effect

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

Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	5.5	2.5
SAR_{be} [%]	With Correction Algorithm	0.1	0.4

Head **1800 MHz** **Typical SAR gradient: 10 % per mm**

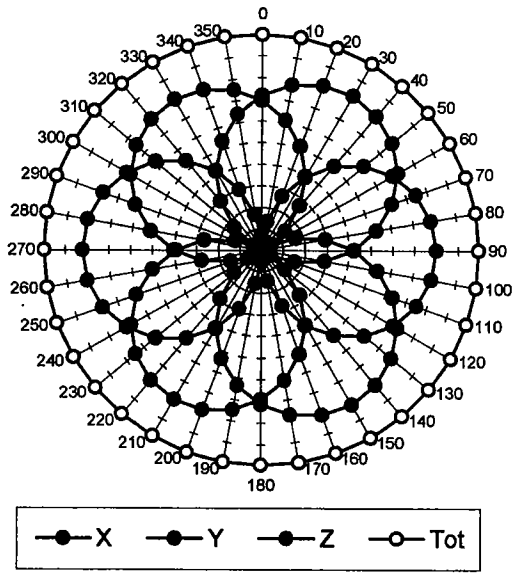
Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	7.1	4.4
SAR_{be} [%]	With Correction Algorithm	0.0	0.1

Sensor Offset

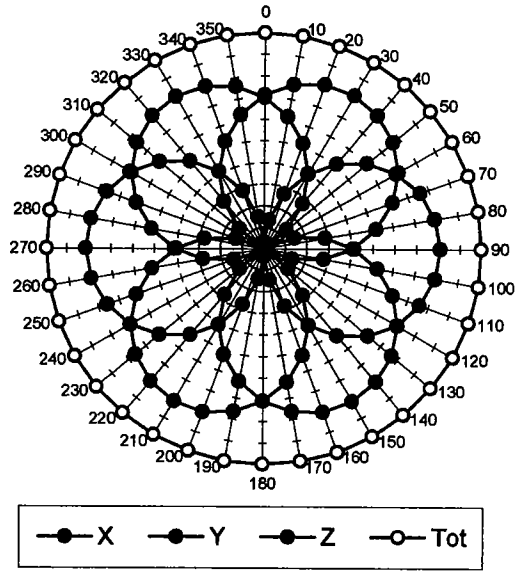
Probe Tip to Sensor Center	**2.0**	mm

Receiving Pattern (ϕ , θ = 0°

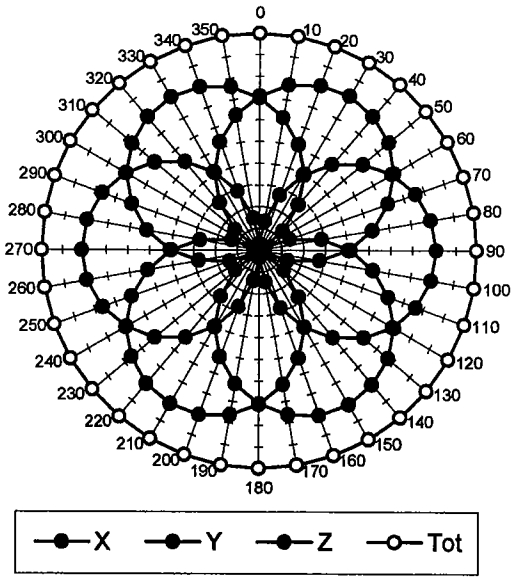
f = 30 MHz, TEM cell ifi110



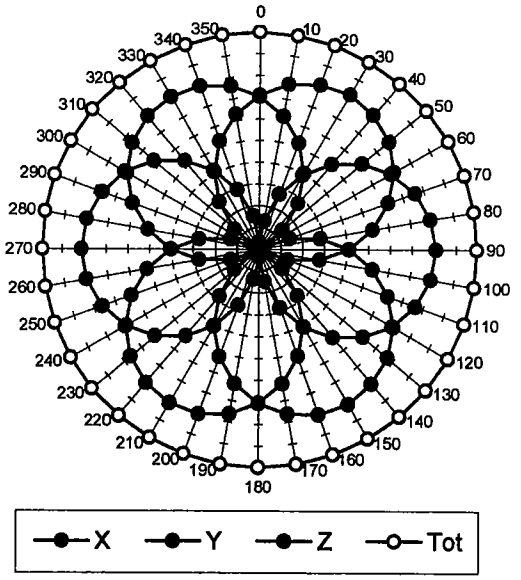
f = 100 MHz, TEM cell ifi110

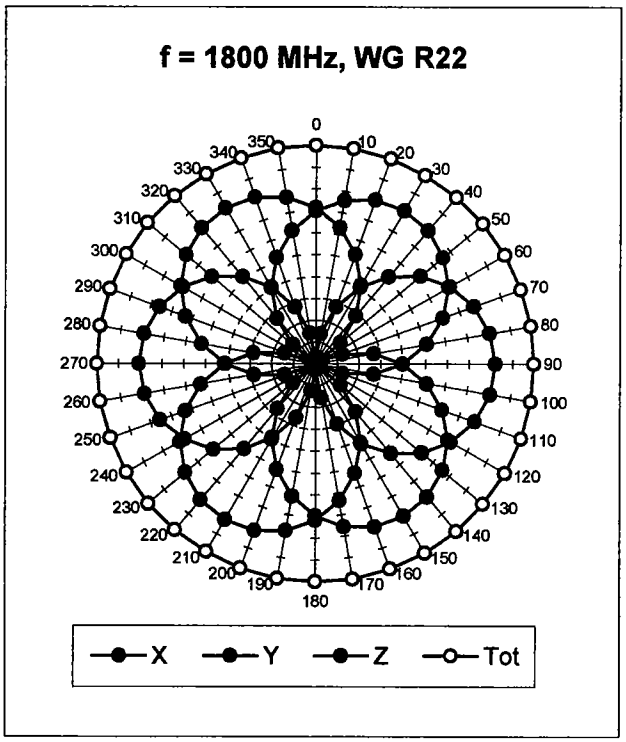


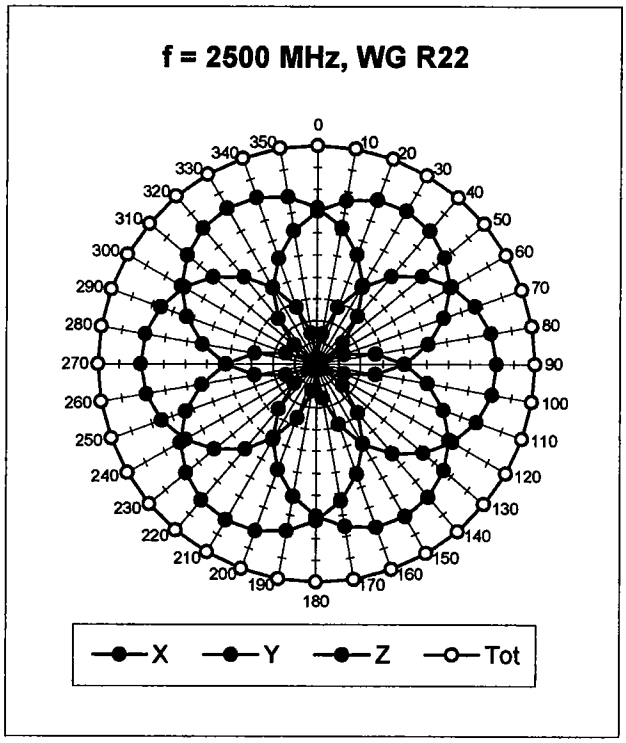
f = 300 MHz, TEM cell ifi110



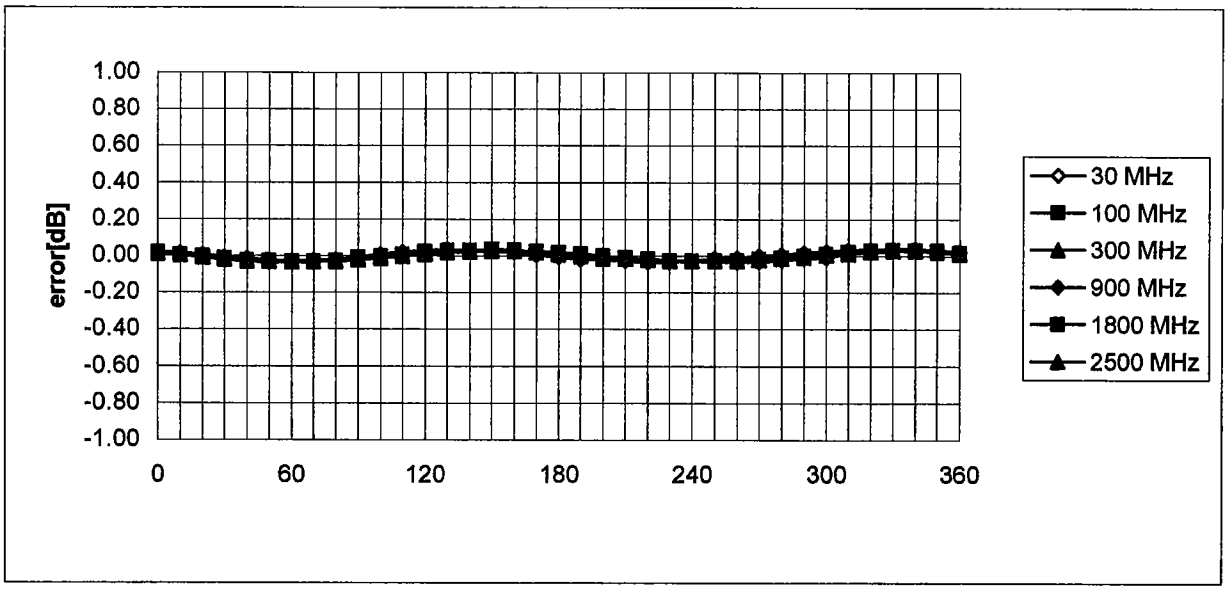
f = 900 MHz, TEM cell ifi110





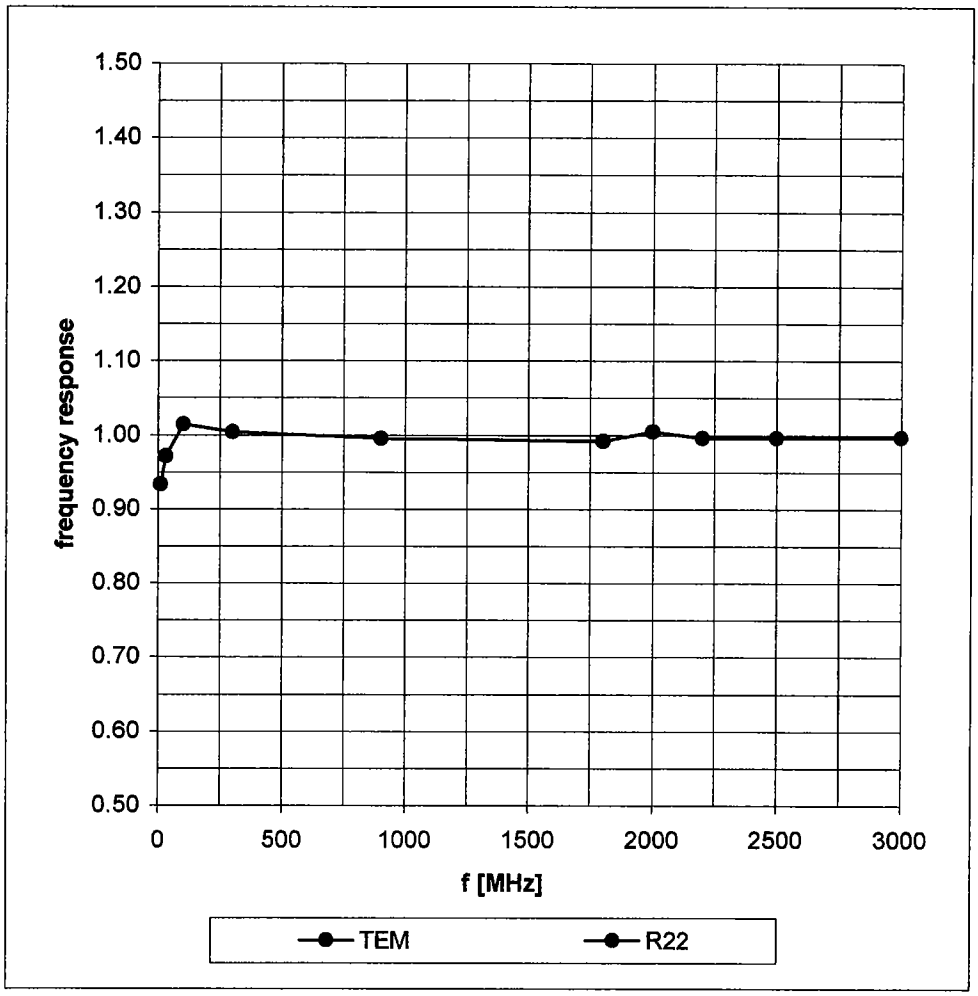


Isotropy Error (ϕ), θ = 0°



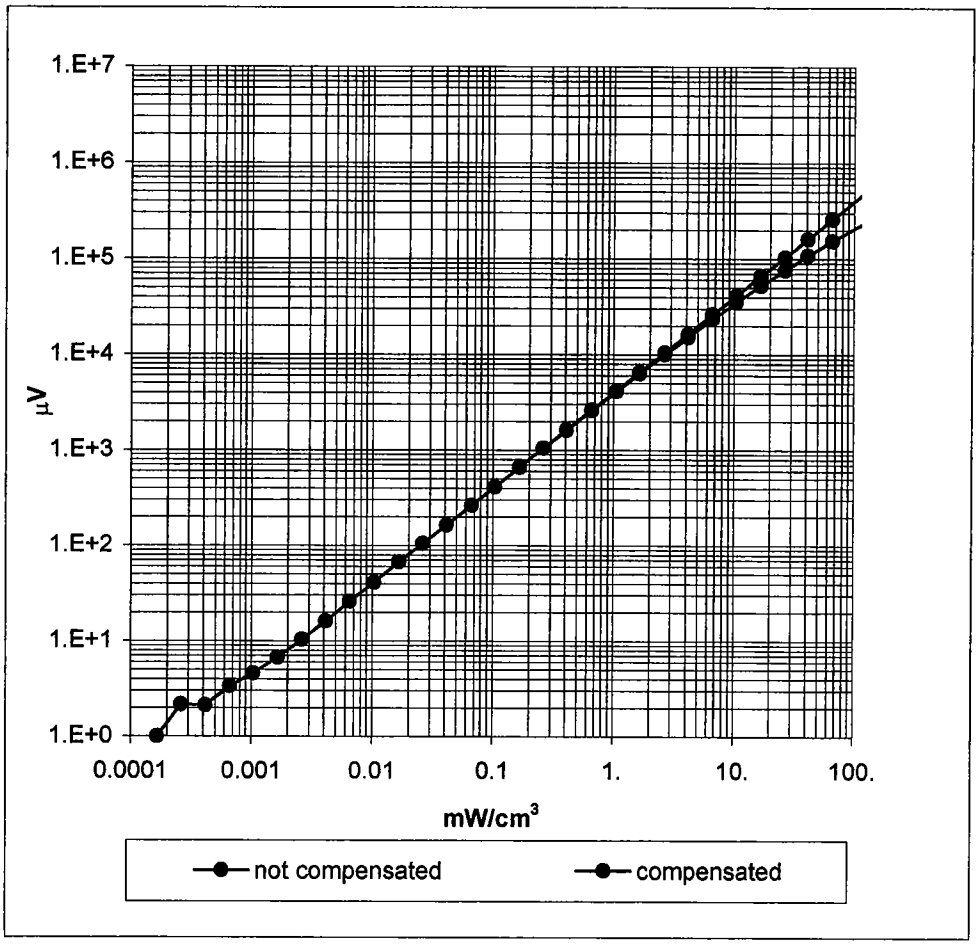
Frequency Response of E-Field

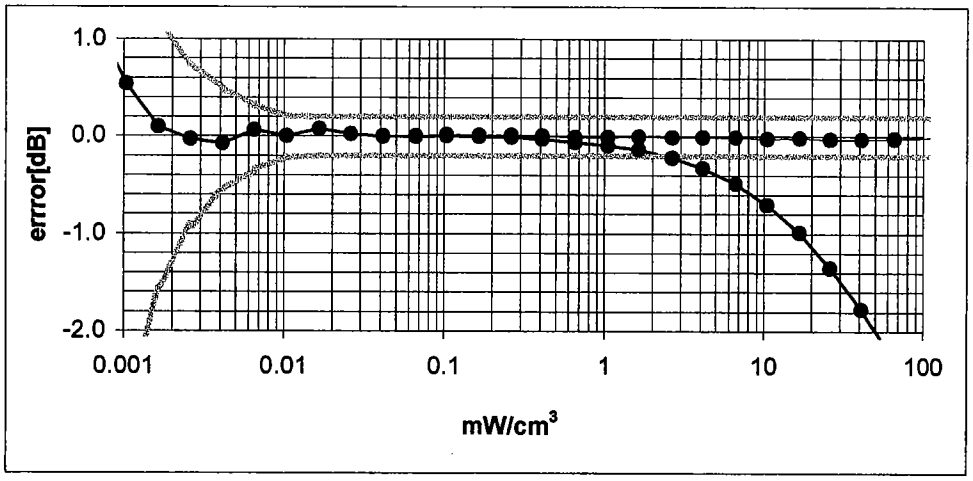
(TEM-Cell:ifi110, Waveguide R22)



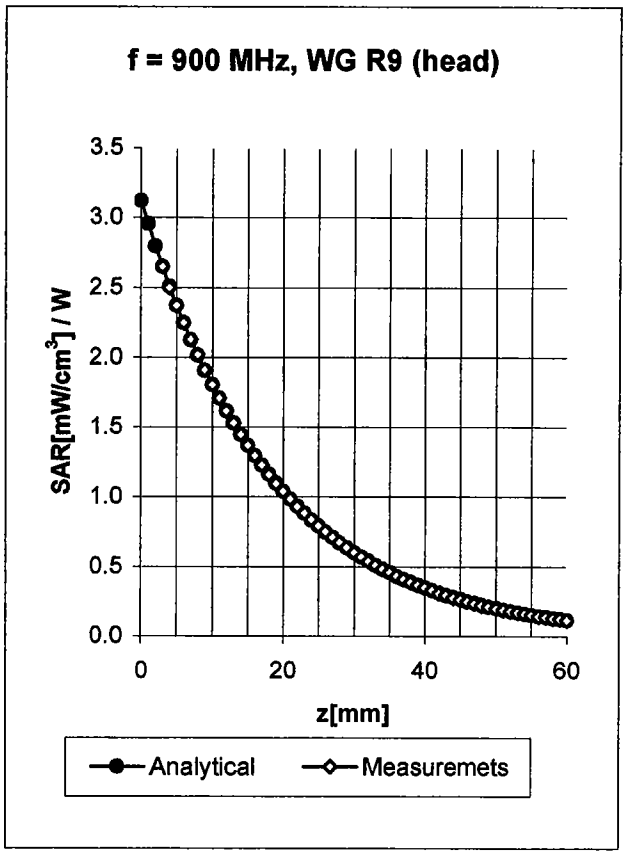
Dynamic Range f(SAR_{brain})

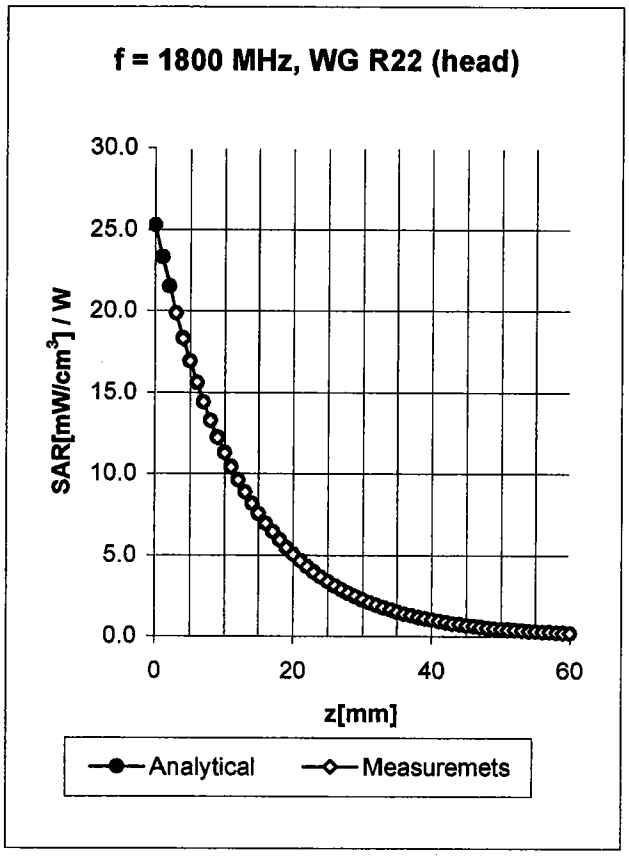
(Waveguide R22)





Conversion Factor Assessment





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

Valid for f=800-1000 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

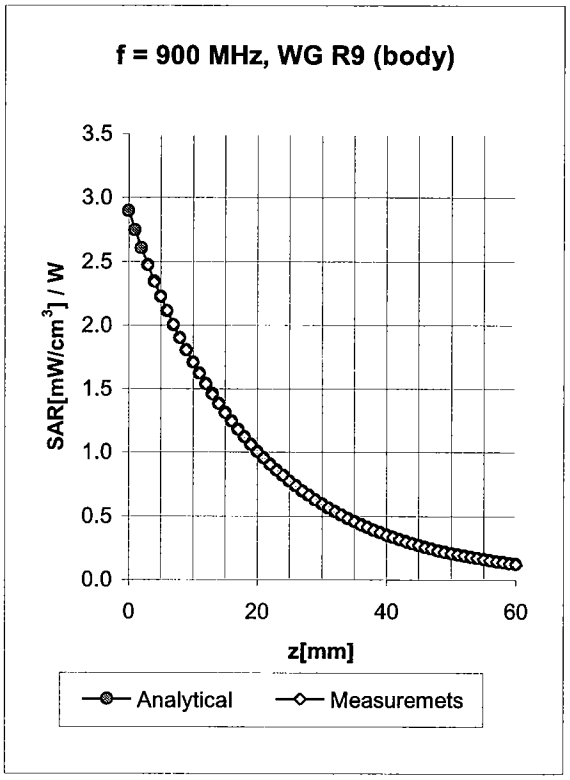
ConvF X	**6.1**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.1**	± 9.5% (k=2)	Alpha	**0.32**
ConvF Z	**6.1**	± 9.5% (k=2)	Depth	**1.65**

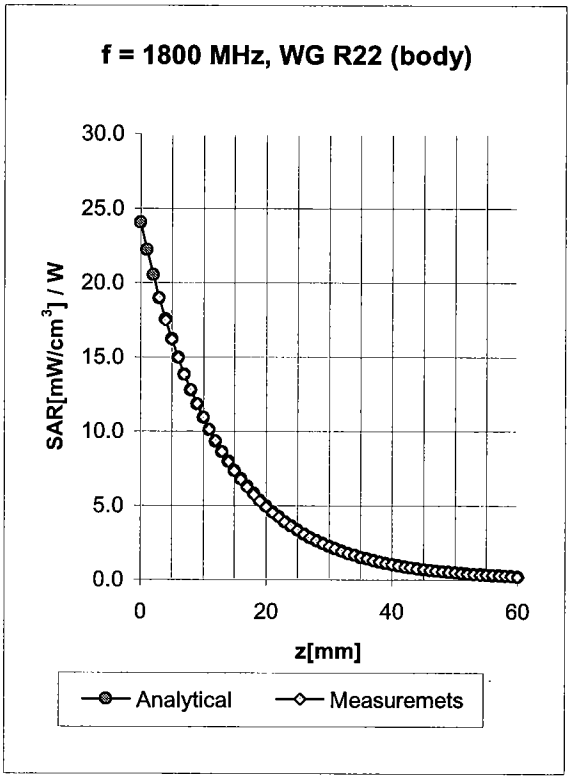
Head **1800 MHz** ε_r **= 40.0 ± 5%** σ **= 1.40 ± 5% mho/m**

Valid for f=1710-1910 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	**5.0**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**5.0**	± 9.5% (k=2)	Alpha	**0.25**
ConvF Z	**5.0**	± 9.5% (k=2)	Depth	**2.30**

Conversion Factor Assessment





Body **900 MHz** ε_r **= 55.0 ± 5%** σ **= 1.05 ± 5% mho/m**

Valid for f=800-1000 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

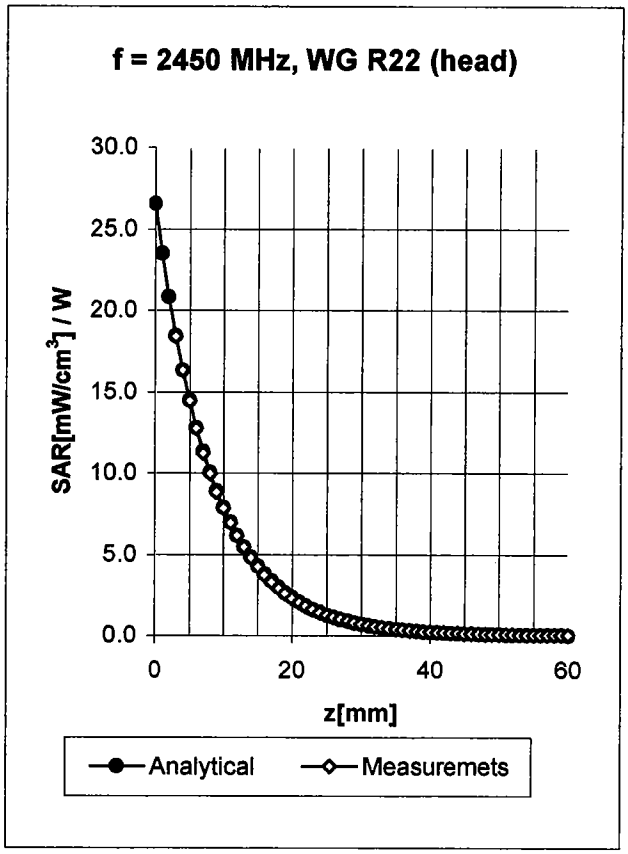
ConvF X	**6.0** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.0** ± 9.5% (k=2)	Alpha	**0.38**
ConvF Z	**6.0** ± 9.5% (k=2)	Depth	**1.47**

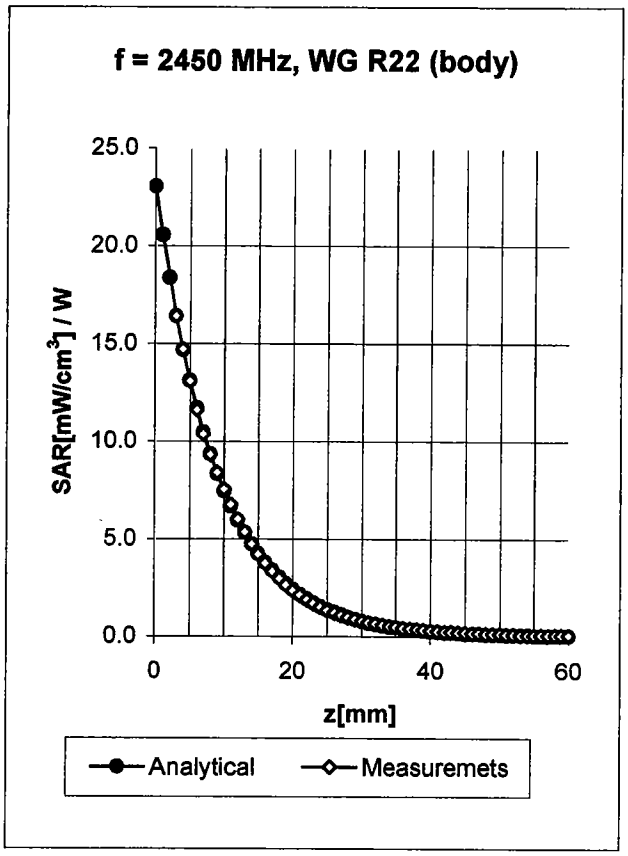
Body **1800 MHz** ε_r **= 53.3 ± 5%** σ **= 1.52 ± 5% mho/m**

Valid for f=1710-1910 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	**4.5** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**4.5** ± 9.5% (k=2)	Alpha	**0.22**
ConvF Z	**4.5** ± 9.5% (k=2)	Depth	**3.42**

Conversion Factor Assessment





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

Valid for f=2400-2500 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

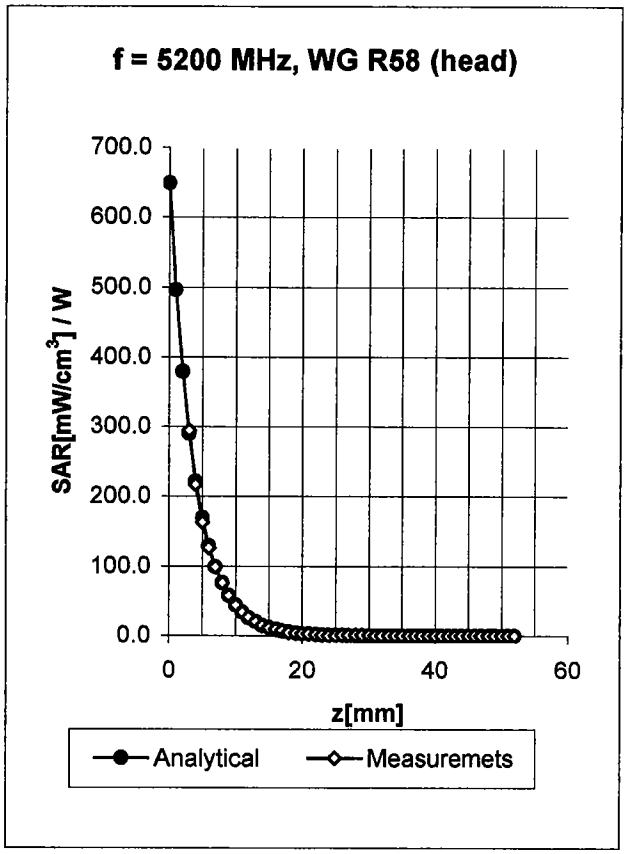
ConvF X	**4.5** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**4.5** ± 9.5% (k=2)	Alpha	**0.42**
ConvF Z	**4.5** ± 9.5% (k=2)	Depth	**1.56**

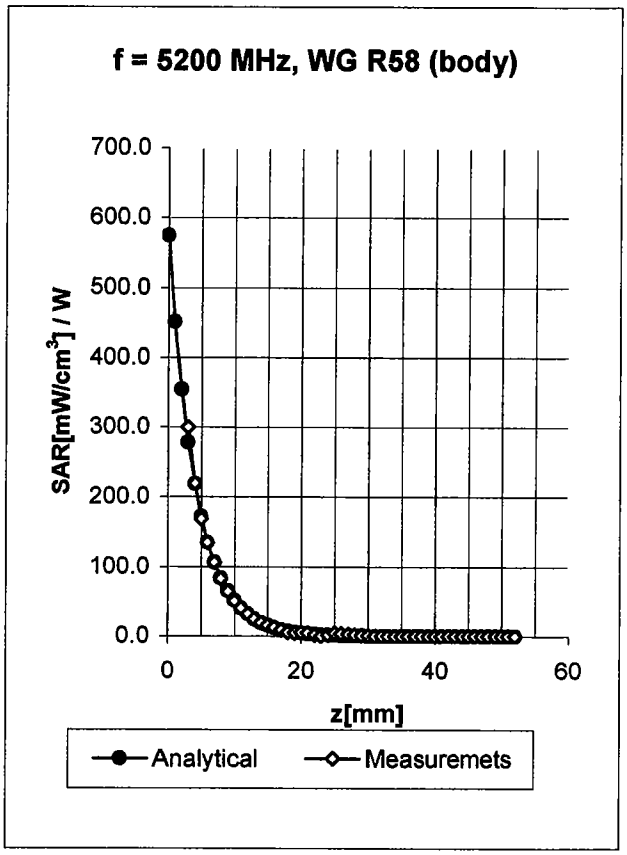
Body **2450 MHz** **ε_r = 52.7 ± 5%** **σ = 1.95 ± 5% mho/m**

Valid for f=2400-2500 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	**4.2** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**4.2** ± 9.5% (k=2)	Alpha	**0.42**
ConvF Z	**4.2** ± 9.5% (k=2)	Depth	**1.65**

Conversion Factor Assessment





Head **5200 MHz** ε_r **= 36.0 ± 5%** σ **= 4.66 ± 5% mho/m**

Valid for f=4940-5460 MHz with Head Tissue Simulating Liquid according to OET65-SuppC

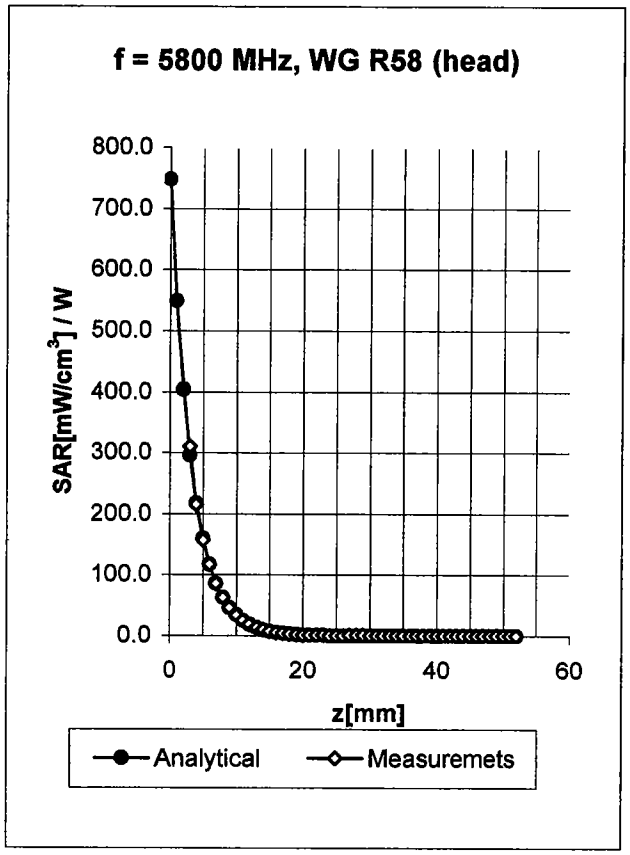
ConvF X	**2.60**	± 16.6% (k=2)	Boundary effect:	
ConvF Y	**2.60**	± 16.6% (k=2)	Alpha	**0.93**
ConvF Z	**2.60**	± 16.6% (k=2)	Depth	**1.50**

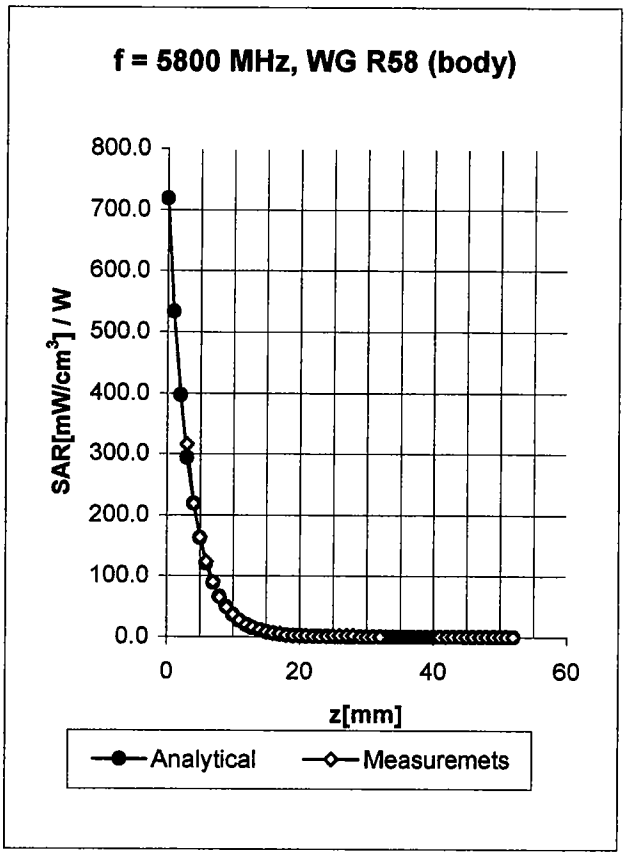
Body **5200 MHz** ε_r **= 49.0 ± 5%** σ **= 5.30 ± 5% mho/m**

Valid for f=4940-5460 MHz with Body Tissue Simulating Liquid according to OET65-SuppC

ConvF X	**1.80**	± 16.6% (k=2)	Boundary effect:	
ConvF Y	**1.80**	± 16.6% (k=2)	Alpha	**1.05**
ConvF Z	**1.80**	± 16.6% (k=2)	Depth	**1.60**

Conversion Factor Assessment





Head **5800 MHz** ε_r **= 35.3 ± 5%** σ **= 5.27 ± 5% mho/m**

Valid for f=5510-6090 MHz with Head Tissue Simulating Liquid according to OET65-SuppC

ConvF X	**2.15**	± 16.6% (k=2)	Boundary effect:	
ConvF Y	**2.15**	± 16.6% (k=2)	Alpha	**1.04**
ConvF Z	**2.15**	± 16.6% (k=2)	Depth	**1.50**

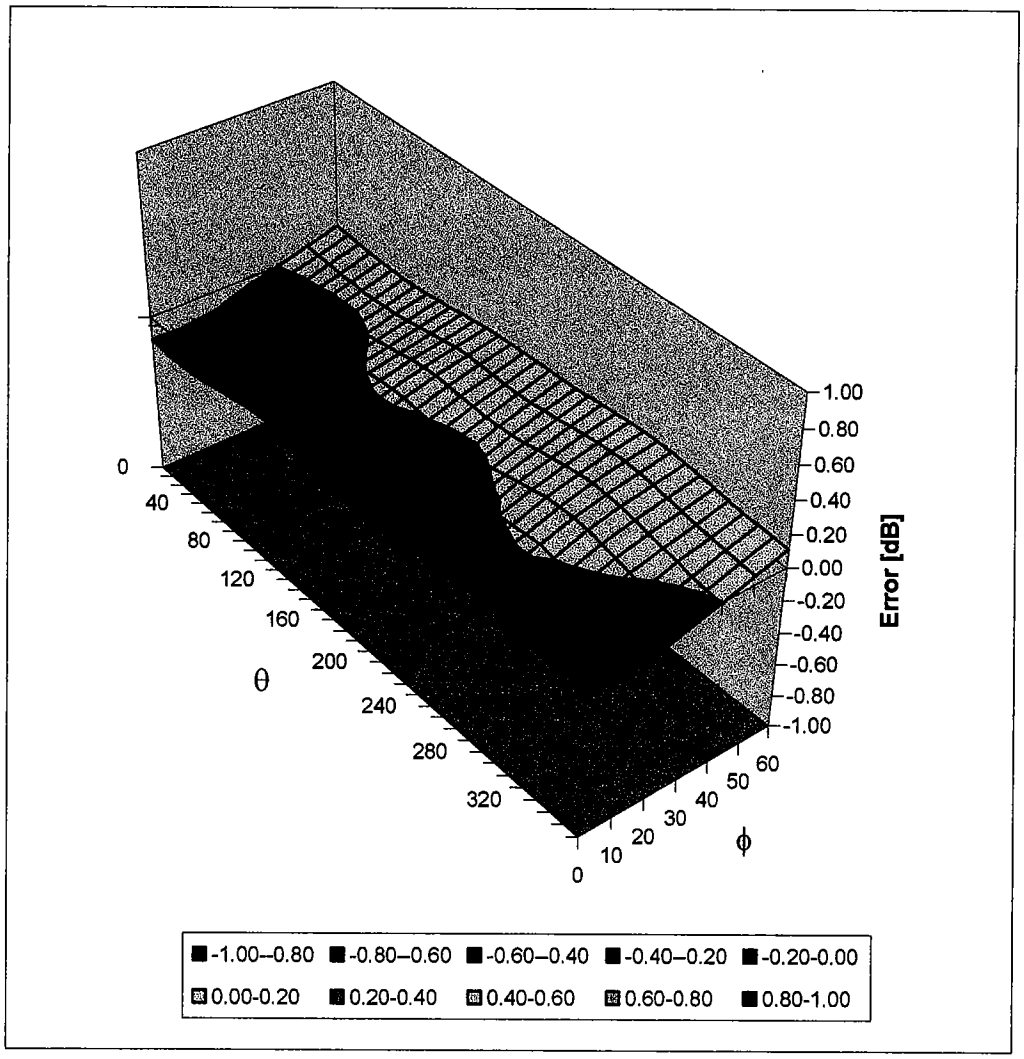
Body **5800 MHz** ε_r **= 48.2 ± 5%** σ **= 6.0 ± 5% mho/m**

Valid for f=5510-6090 MHz with Body Tissue Simulating Liquid according to OET65-SuppC

ConvF X	**1.57**	± 16.6% (k=2)	Boundary effect:	
ConvF Y	**1.57**	± 16.6% (k=2)	Alpha	**1.15**
ConvF Z	**1.57**	± 16.6% (k=2)	Depth	**1.70**

Deviation from Isotropy in HSL

Error (θϕ), f = 900 MHz



Schmid & Partner Engineering AG

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info@speag.com, http://www.speag.com

Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ES3DV2**
Serial Number:	**3022**
Place of Assessment:	**Zurich**
Date of Assessment:	**December 3, 2003**
Probe Calibration Date:	**September 23, 2003**

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

Assessed by:

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info@speag.com, http://www.speag.com

Dosimetric E-Field Probe ES3DV2 SN:3022

Conversion factor (± standard deviation)

1950 MHz	ConvF	**4.7 ± 9.5%**	**[illegible] = 40.0 ± 5%** **[illegible] = 1.40 ± 5% mho/m** (head tissue)
1950 MHz	ConvF	**4. 3± 9.5%**	**[illegible] = 53.3 ± 5%** **[illegible] = 1.52 ± 5% mho/m** (body tissue)

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info@speag.com, http://www.speag.com

Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ES3DV2**
Serial Number:	**3022**
Place of Assessment:	**Zurich**
Date of Assessment:	**October 3, 2003**
Probe Calibration Date:	**September 23, 2003**

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

Assessed by:

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info@speag.com, http://www.speag.com

Dosimetric E-Field Probe ES3DV2 SN:3022

Conversion factor (± standard deviation)

150 MHz	ConvF	**8.5 ± 8%**	ε_r = **52.3 ± 5%** σ = **0.76 ± 5% mho/m** (head tissue)
150 MHz	ConvF	**8.0 ± 8%**	ε_r = **61.9 ± 5%** σ = **0.80 ± 5% mho/m** (body tissue)
450 MHz	ConvF	**7.1 ± 8%**	ε_r = **43.5 ± 5%** σ = **0.87 ± 5% mho/m** (head tissue)
450 MHz	ConvF	**7.2 ± 8%**	ε_r = **56.7 ± 5%** σ = **0.94 ± 5% mho/m** (body tissue)

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info@speag.com, http://www.speag.com

Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ES3DV2**
Serial Number:	**3022**
Place of Assessment:	**Zurich**
Date of Assessment:	**November 28, 2003**
Probe Calibration Date:	**September 23, 2003**

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

Assessed by:

Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 1 245 9700, Fax +41 1 245 9779
info@speag.com, http://www.speag.com

Dosimetric E-Field Probe ES3DV2 SN:3022

Conversion factor (± standard deviation)

1600 MHz	ConvF	**5.2 ± 8%**	**ε = 40.3 ± 5%** **σ = 1.29 ± 5% mho/m** (head tissue)
1600 MHz	ConvF	**4.9 ± 8%**	**ε = 53.8 ± 5%** **σ = 1.40 ± 5% mho/m** (body tissue)

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Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ES3DV2**
Serial Number:	**3022**
Place of Assessment:	**Zurich**
Date of Assessment:	**December 9, 2003**
Probe Calibration Date:	**September 23, 2003**

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

Assessed by:

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Dosimetric E-Field Probe ES3DV2 SN:3022

Conversion factor (± standard deviation)

2140 MHz	ConvF	**4.5 ± 8%**	**= 39.8 ± 5%** **= 1.49 ± 5% mho/m** (brain tissue)