APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

DUT: CF-19; Type: Panasonic Notebook PC with WLAN + Bluetooth + EVDO; Sample #1

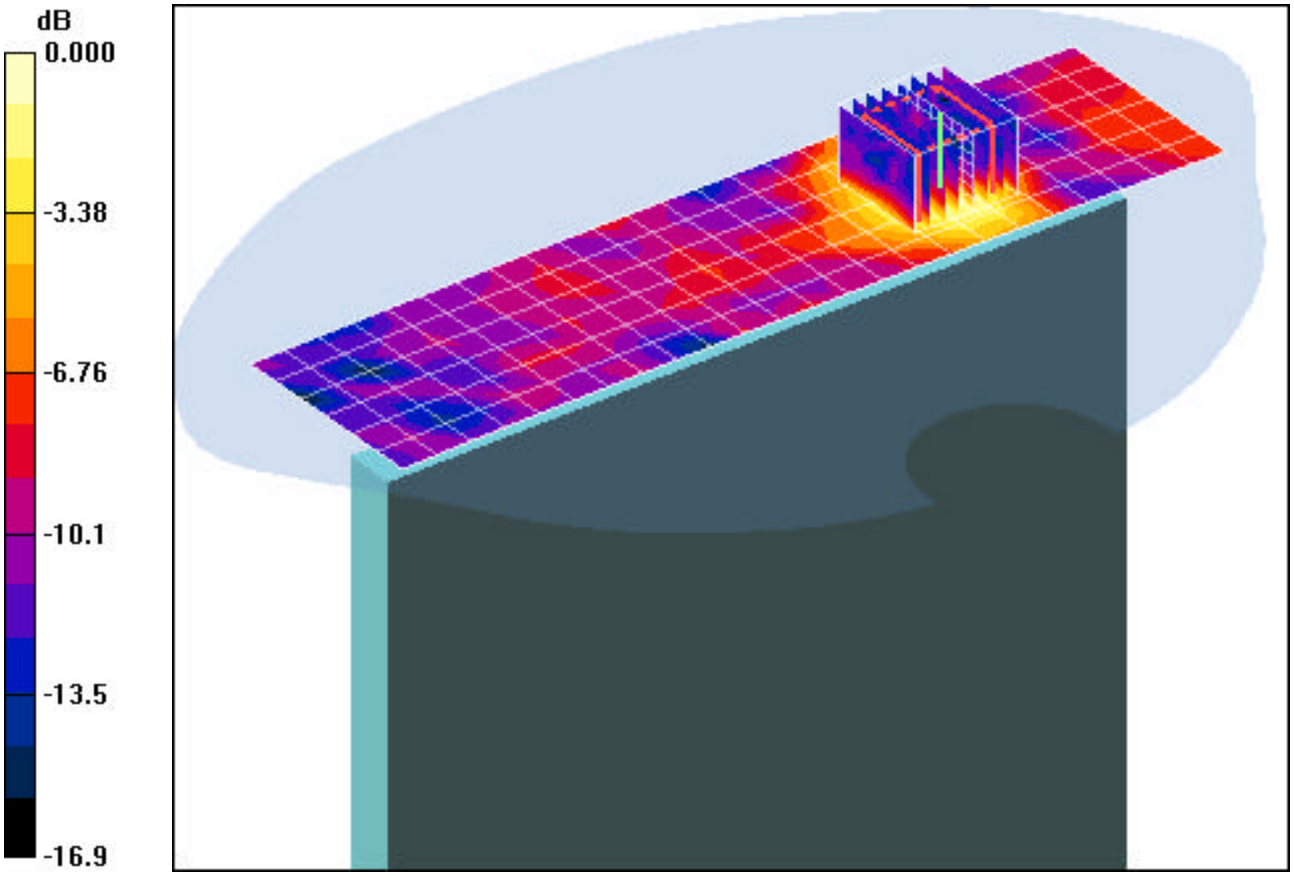
Communication System: IEEE 802.11a 5.3GHz Band; Frequency: 5320 MHz;Duty Cycle: 1:1
Medium: 5300 Muscle (σ = 5.21 mho/m, ε_r = 49.35, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Bystander Position; Space: 1.5 cm

Test Date: 10-13-2006; Ambient Temp: 23.6°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN3550; ConvF(4.19, 4.19, 4.19); Calibrated: 1/18/2006
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 9/4/2006
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Mode: IEEE 802.11a, Bystander position, LCD Open, High.ch, 6Mbps, Main Ant

Area Scan (7x25x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 6.63 V/m
Peak SAR (extrapolated) = 0.665 W/kg
SAR(1 g) = 0.177 mW/g; SAR(10 g) = 0.077 mW/g



0 dB = 0.224mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: CF-19; Type: Panasonic Notebook PC with WLAN + Bluetooth + EVDO; Sample #1

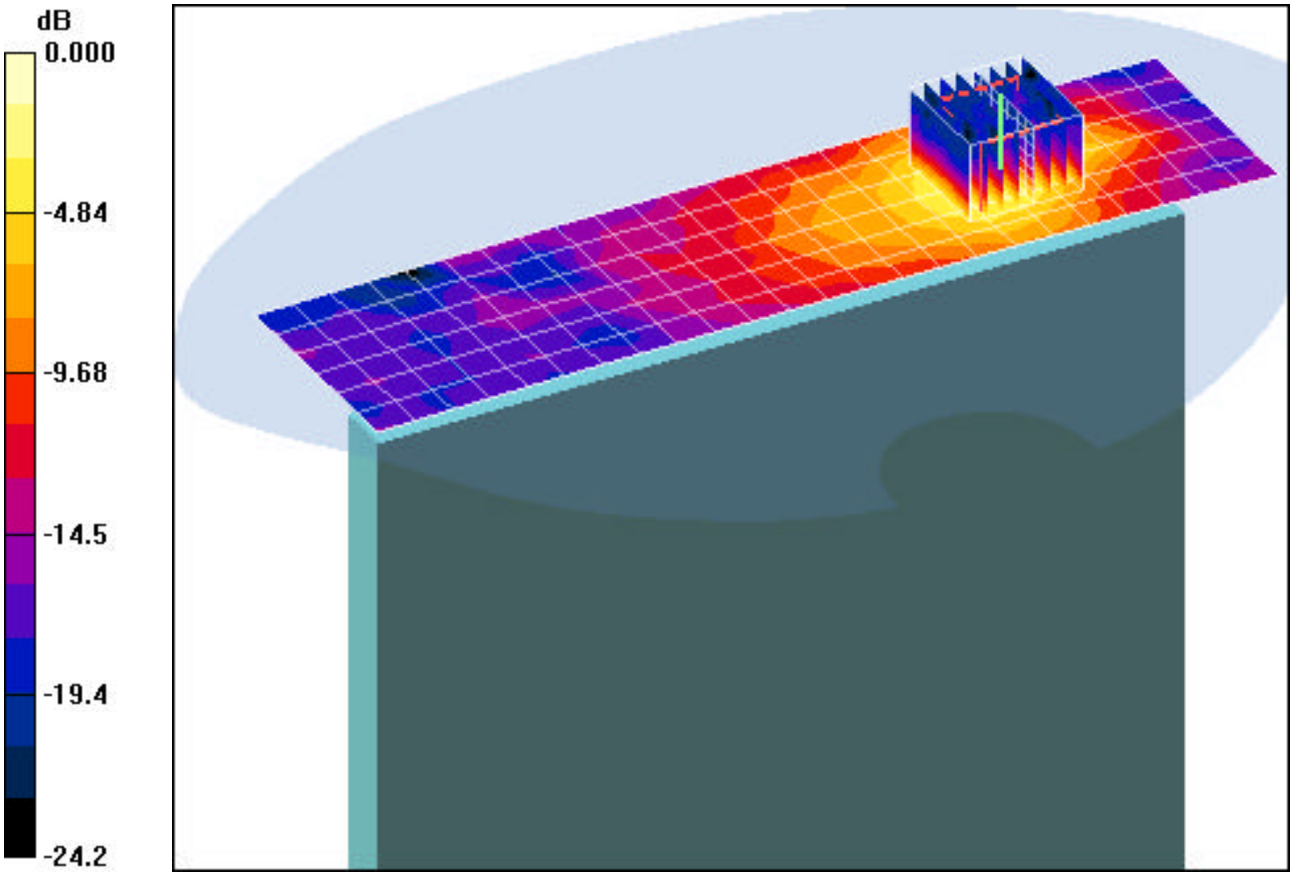
Communication System: IEEE 802.11a 5.3GHz Band; Frequency: 5260 MHz;Duty Cycle: 1:1
Medium: 5300 Muscle (σ = 5.21 mho/m, ε_r = 49.35, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Bystander Position; Space: 1.5 cm

Test Date: 10-13-2006; Ambient Temp: 23.6°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN3550; ConvF(4.19, 4.19, 4.19); Calibrated: 1/18/2006
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 9/4/2006
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Mode: IEEE 802.11a, Bystander position, LCD Open, Low.ch, 6Mbps, Aux Ant

Area Scan (7x25x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 14.4 V/m
Peak SAR (extrapolated) = 2.45 W/kg
SAR(1 g) = 0.712 mW/g; SAR(10 g) = 0.267 mW/g



0 dB = 0.998mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: CF-19; Type: Panasonic Notebook PC with WLAN + Bluetooth + EVDO; Sample #1

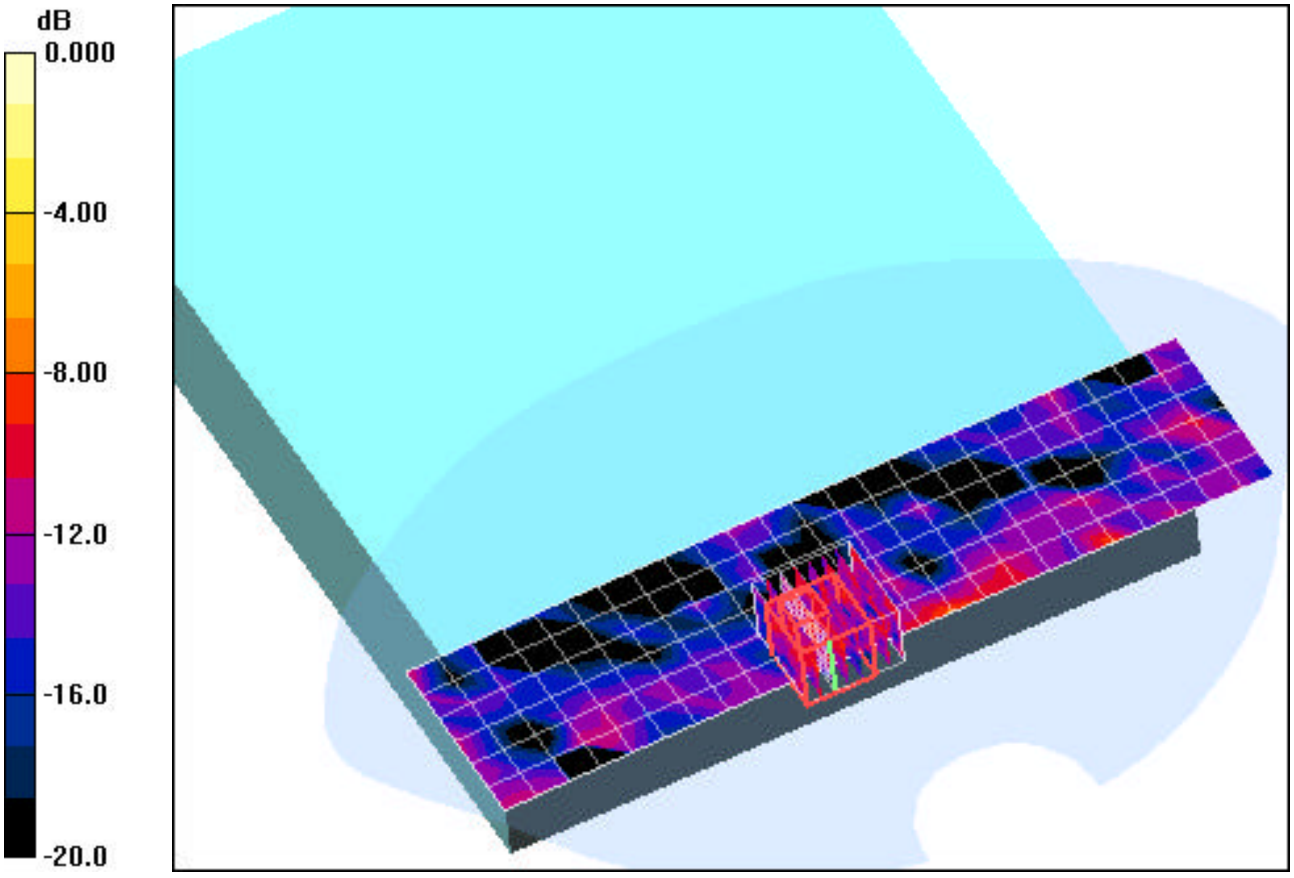
Communication System: IEEE 802.11a 5.3GHz Band; Frequency: 5320 MHz;Duty Cycle: 1:1
Medium: 5300 Muscle (σ = 5.21 mho/m, ε_r = 49.35, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Laptop Position; Space: 0.0 cm

Test Date: 10-13-2006; Ambient Temp: 23.6°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN3550; ConvF(4.19, 4.19, 4.19); Calibrated: 1/18/2006
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 9/4/2006
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Mode: IEEE 802.11a, Laptop position, LCD Flip, High.ch, 6Mbps, Main Ant

Area Scan (7x25x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 0.610 V/m
Peak SAR (extrapolated) = 0.070 W/kg
SAR(1 g) = 0.019 mW/g; SAR(10 g) = 0.012 mW/g



0 dB = 0.200mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: CF-19; Type: Panasonic Notebook PC with WLAN + Bluetooth + EVDO; Sample #1

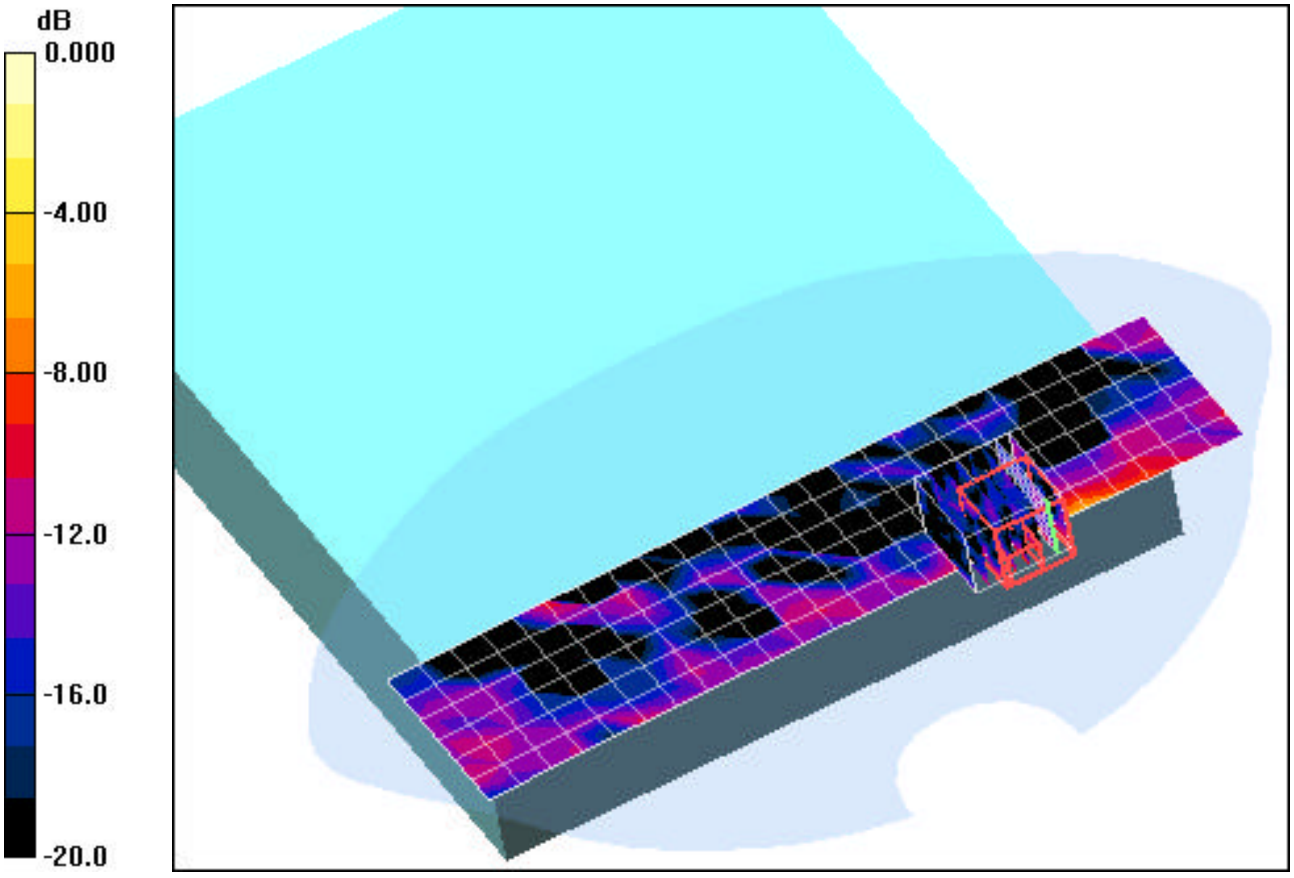
Communication System: IEEE 802.11a 5.3GHz Band; Frequency: 5320 MHz;Duty Cycle: 1:1
Medium: 5300 Muscle (σ = 5.21 mho/m, ε_r = 49.35, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Laptop Position; Space: 0.0 cm

Test Date: 10-13-2006; Ambient Temp: 23.6°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN3550; ConvF(4.19, 4.19, 4.19); Calibrated: 1/18/2006
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 9/4/2006
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Mode: IEEE 802.11a, Laptop position, LCD Flip, High.ch, 6Mbps, Aux Ant

Area Scan (7x25x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 1.58 V/m
Peak SAR (extrapolated) = 0.167 W/kg
SAR(1 g) = 0.024 mW/g; SAR(10 g) = 0.00902 mW/g



0 dB = 0.200mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: CF-19; Type: Panasonic Notebook PC with WLAN + Bluetooth + EVDO; Sample #1

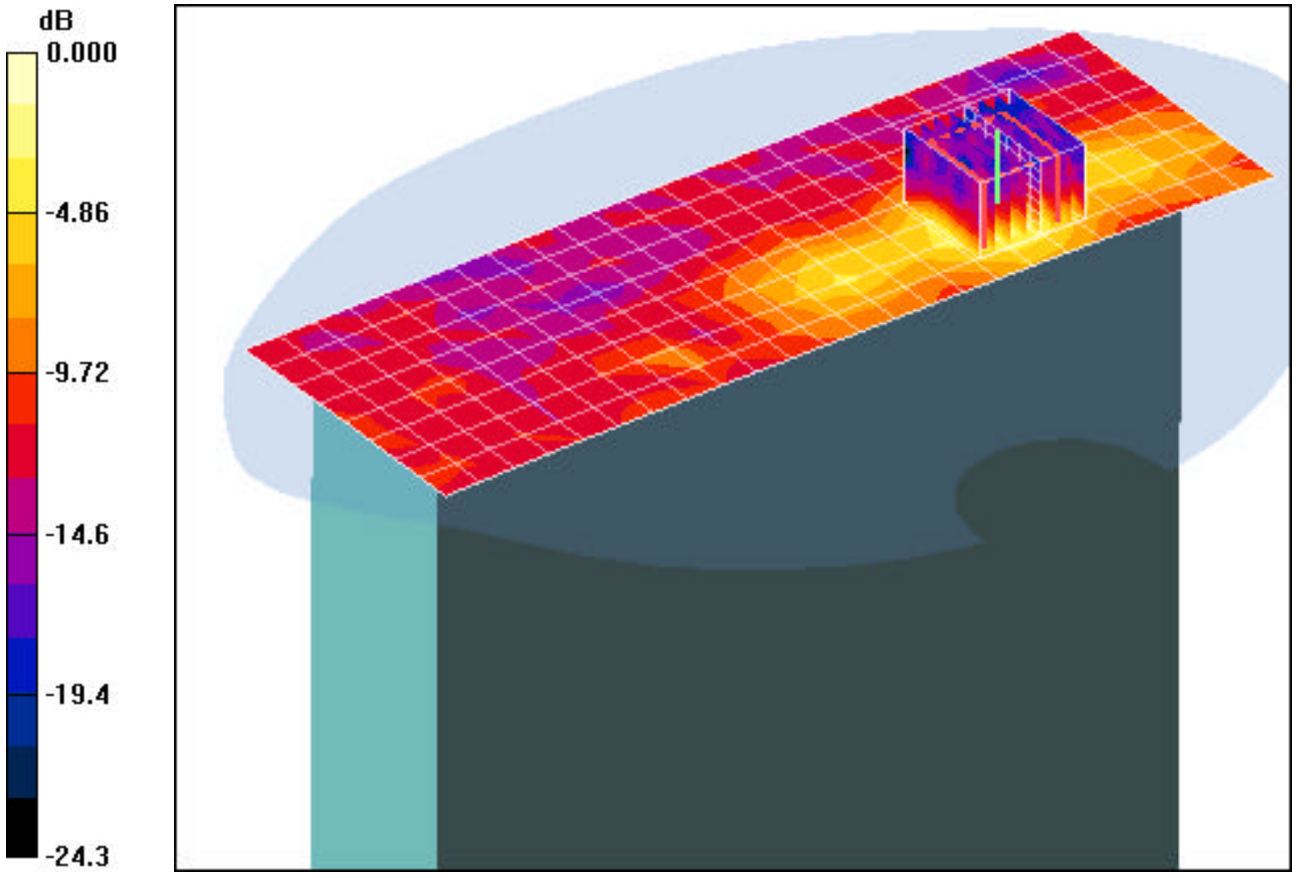
Communication System: IEEE 802.11a 5.3GHz Band; Frequency: 5260 MHz;Duty Cycle: 1:1
Medium: 5300 Muscle (σ = 5.21 mho/m, ε_r = 49.35, ρ = 1000 kg/m^3)
Phantom section: Flat Section; LCD Left Side; Space: 0.0 cm

Test Date: 10-13-2006; Ambient Temp: 23.6°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN3550; ConvF(4.19, 4.19, 4.19); Calibrated: 1/18/2006
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 9/4/2006
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Mode: IEEE 802.11a, Tablet position, Left side, LCD Flip, Low.ch, 6Mbps, Main Ant

Area Scan (9x25x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 8.84 V/m
Peak SAR (extrapolated) = 0.863 W/kg
SAR(1 g) = 0.276 mW/g; SAR(10 g) = 0.107 mW/g



0 dB = 0.377mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: CF-19; Type: Panasonic Notebook PC with WLAN + Bluetooth + EVDO; Sample #1

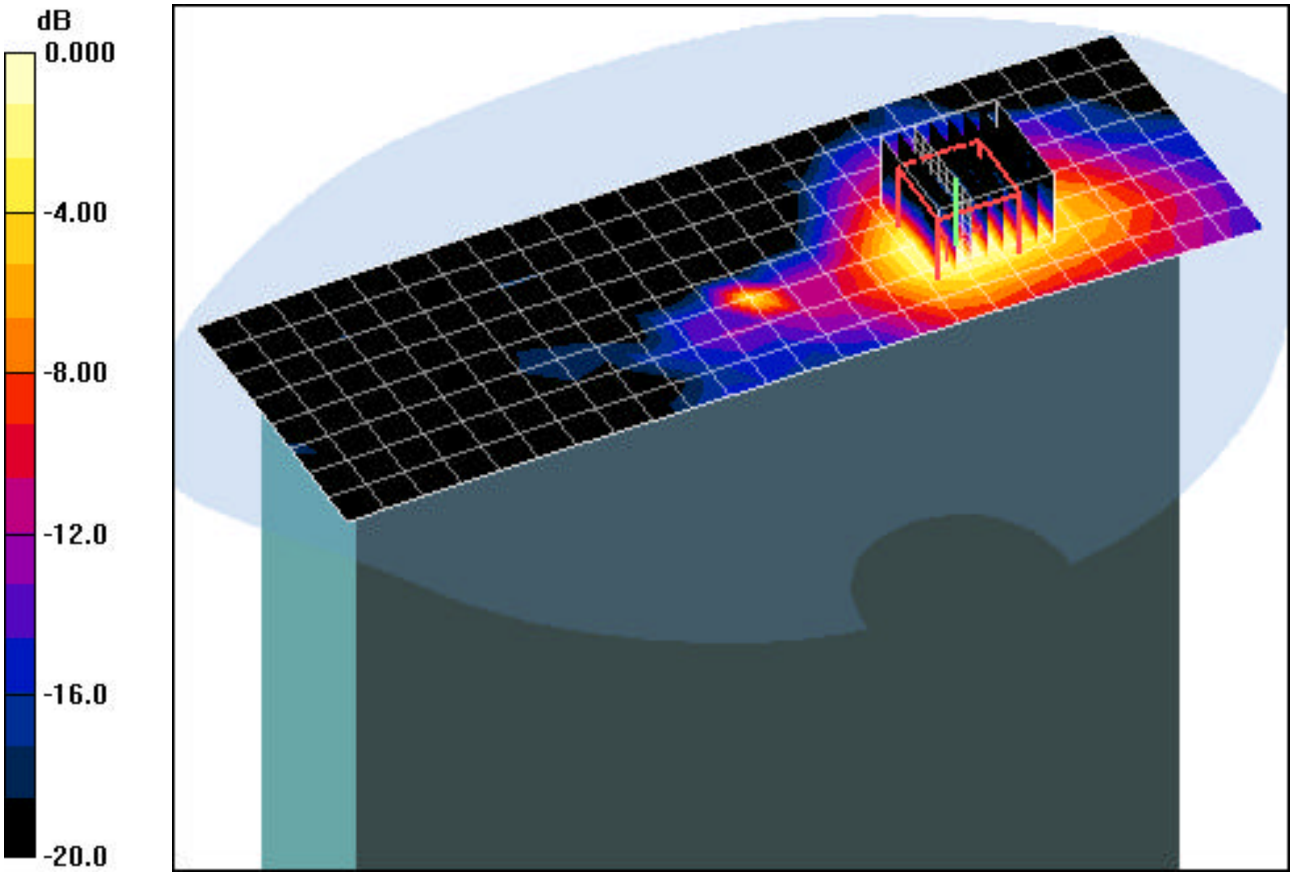
Communication System: IEEE 802.11a 5.3GHz Band; Frequency: 5320 MHz;Duty Cycle: 1:1
Medium: 5300 Muscle (σ = 5.21 mho/m, ε_r = 49.35, ρ = 1000 kg/m^3)
Phantom section: Flat Section; LCD Right Side; Space: 0.0 cm

Test Date: 10-13-2006; Ambient Temp: 23.6°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN3550; ConvF(4.19, 4.19, 4.19); Calibrated: 1/18/2006
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 9/4/2006
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Mode: IEEE 802.11a, Tablet position, Right side, LCD Flip, High.ch, 6Mbps, Aux Ant

Area Scan (9x25x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 15.5 V/m
Peak SAR (extrapolated) = 2.82 W/kg
SAR(1 g) = 0.818 mW/g; SAR(10 g) = 0.311 mW/g



0 dB = 1.16mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: CF-19; Type: Panasonic Notebook PC with WLAN + Bluetooth + EVDO; Sample #1

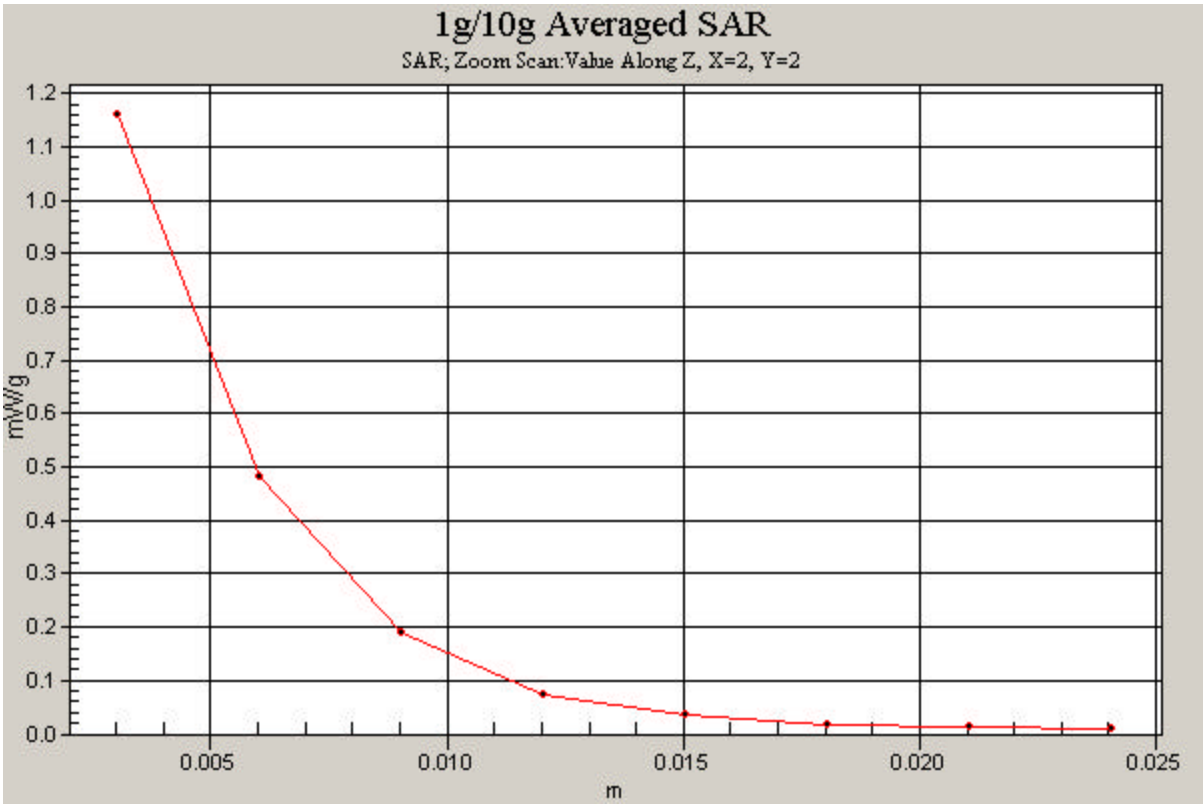
Communication System: IEEE 802.11a 5.3GHz Band; Frequency: 5320 MHz;Duty Cycle: 1:1
Medium: 5300 Muscle (σ = 5.21 mho/m, ε_r = 49.35, ρ = 1000 kg/m^3)
Phantom section: Flat Section; LCD Right Side; Space: 0.0 cm

Date: 10-13-2006; Ambient Temp: 23.6°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN3550; ConvF(4.19, 4.19, 4.19); Calibrated: 1/18/2006
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 9/4/2006
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Mode: IEEE 802.11a, Tablet position, Right side, LCD Flip, High.ch, 6Mbps, Aux Ant

Area Scan (9x25x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 15.5 V/m
Peak SAR (extrapolated) = 2.82 W/kg
SAR(1 g) = 0.818 mW/g; SAR(10 g) = 0.311 mW/g



APPENDIX B: DIPOLE VALIDATION

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5200 MHz; Type: D5GHzV2; Serial: 1007

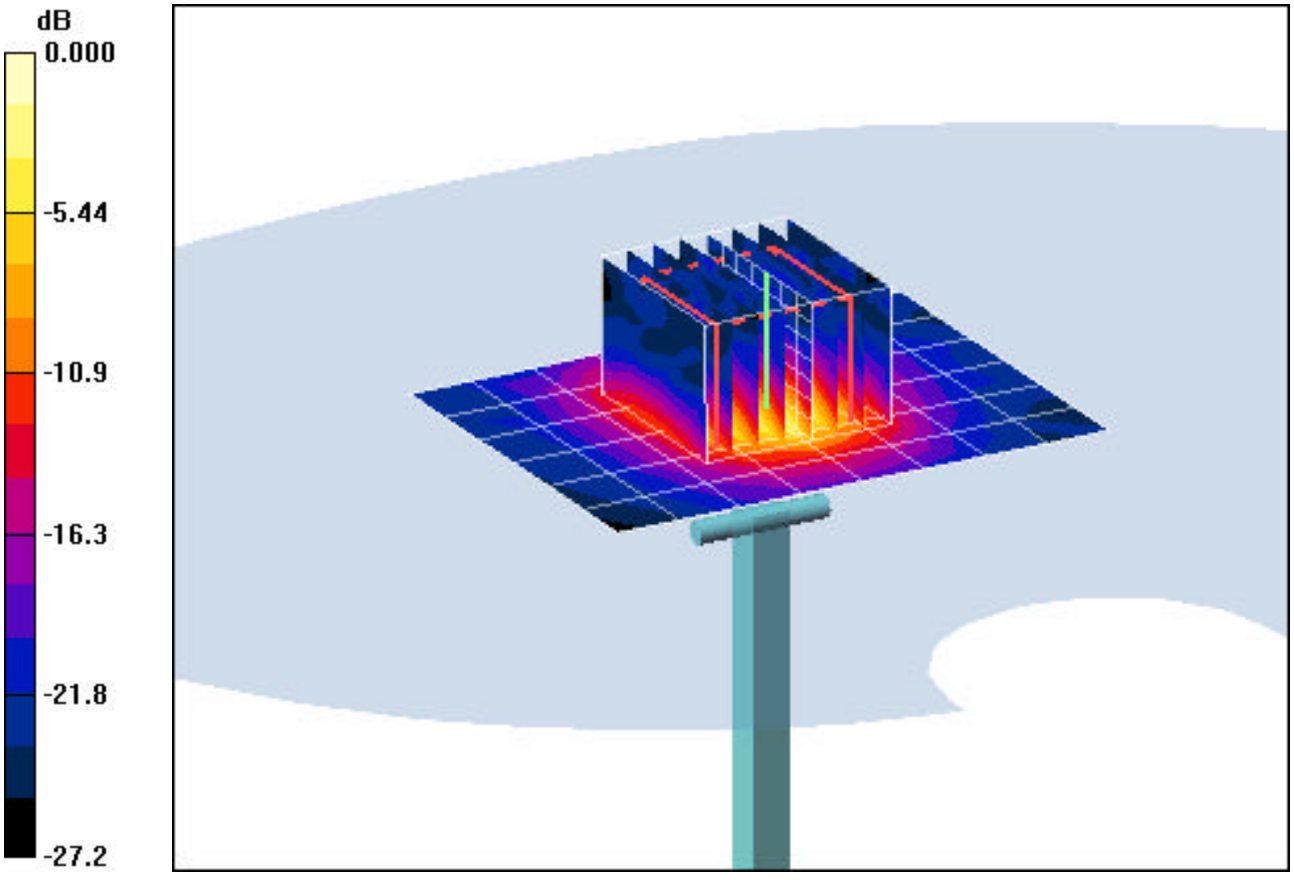
Communication System: CW; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: 5300 Brain (σ = 4.58 mho/m, ε_r = 36.18, ρ = 1000 kg/m^3)
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-13-2006; Ambient Temp: 23.2°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN3550; ConvF(4.39, 4.39, 4.39); Calibrated: 1/18/2006
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 9/4/2006
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

5200MHz Dipole Validation

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Input Power = 14.0 dBm (25 mW)
SAR(1 g) = 1.97 mW/g; SAR(10 g) = 0.556 mW/g
Target SAR(1g) = 2.17 mW/g; Deviation = -9.21 %



0 dB = 2.77mW/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: EX3-3550_Jan06

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3550
Calibration procedure(s)	QA CAL-01.v5, QA CAL-12.v4 and QA CAL-14.v3 Calibration procedure for dosimetric E-field probes
Calibration date:	January 18, 2006
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	2-Jan-06 (SPEAG, No. ES3-3013_Jan06)	Jan-07
DAE4	SN: 654	27-Oct-05 (SPEAG, No. DAE4-654_Oct05)	Oct-06

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-05)	In house check: Nov 06

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Fin Bomholt	R&D Director	

Issued: January 21, 2006

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., $\vartheta = 0$ 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 $\vartheta = 0$ ($f \leq 900$ 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 $f \leq 800$ 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:3550

Manufactured:	May 19, 2004
Last calibrated:	October 26, 2004
Recalibrated:	January 18, 2006

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: EX3DV4 SN:3550

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

NormX	**0.483** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**92** mV
NormY	**0.485** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**92** mV
NormZ	**0.494** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**92** 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	3.3	1.0
SAR_{be} [%]	With Correction Algorithm	0.1	0.3

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	4.2	2.2
SAR_{be} [%]	With Correction Algorithm	0.8	0.6

Sensor Offset

Probe Tip to Sensor Center	**1.0** mm

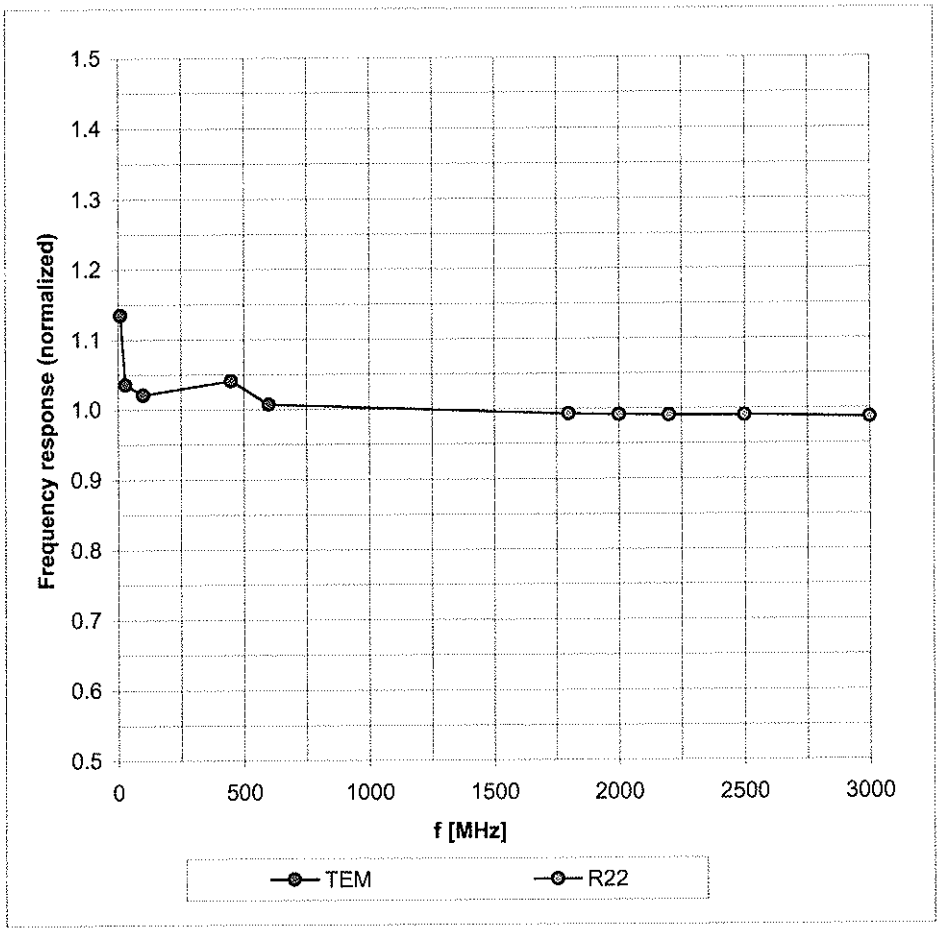
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[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.

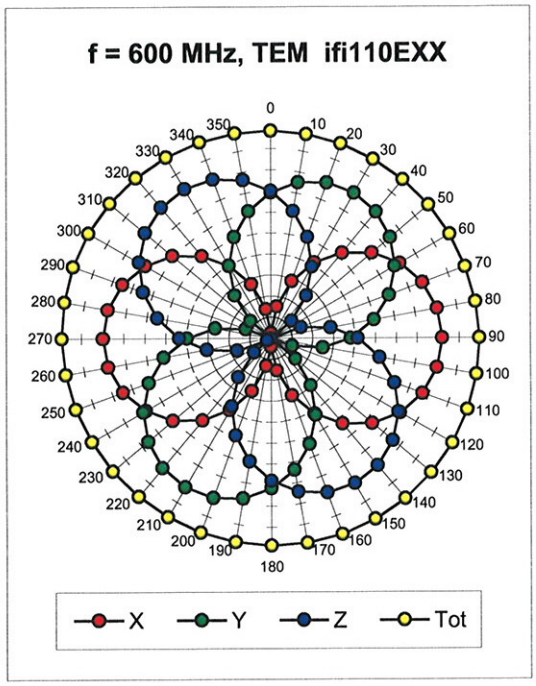
Frequency Response of E-Field

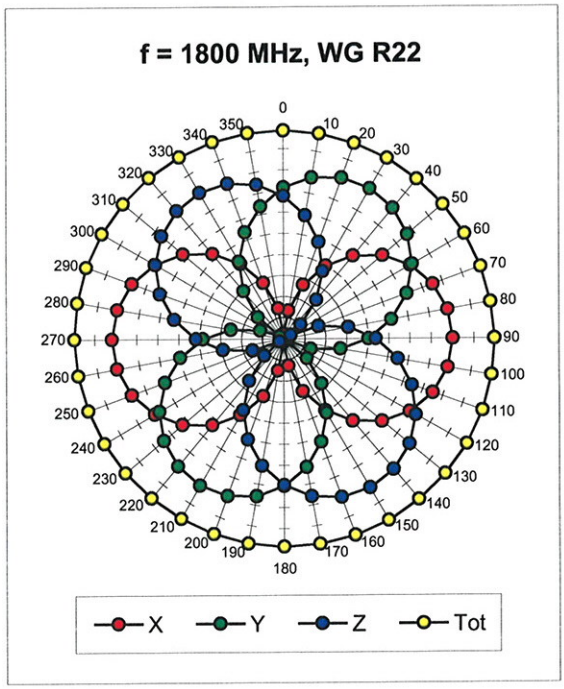
(TEM-Cell:ifi110 EXX, Waveguide: R22)

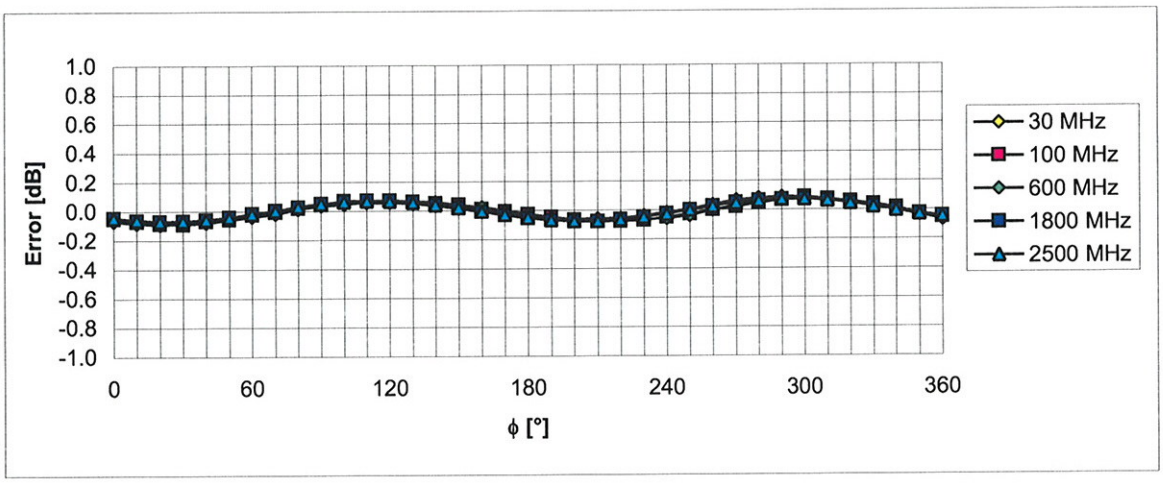


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



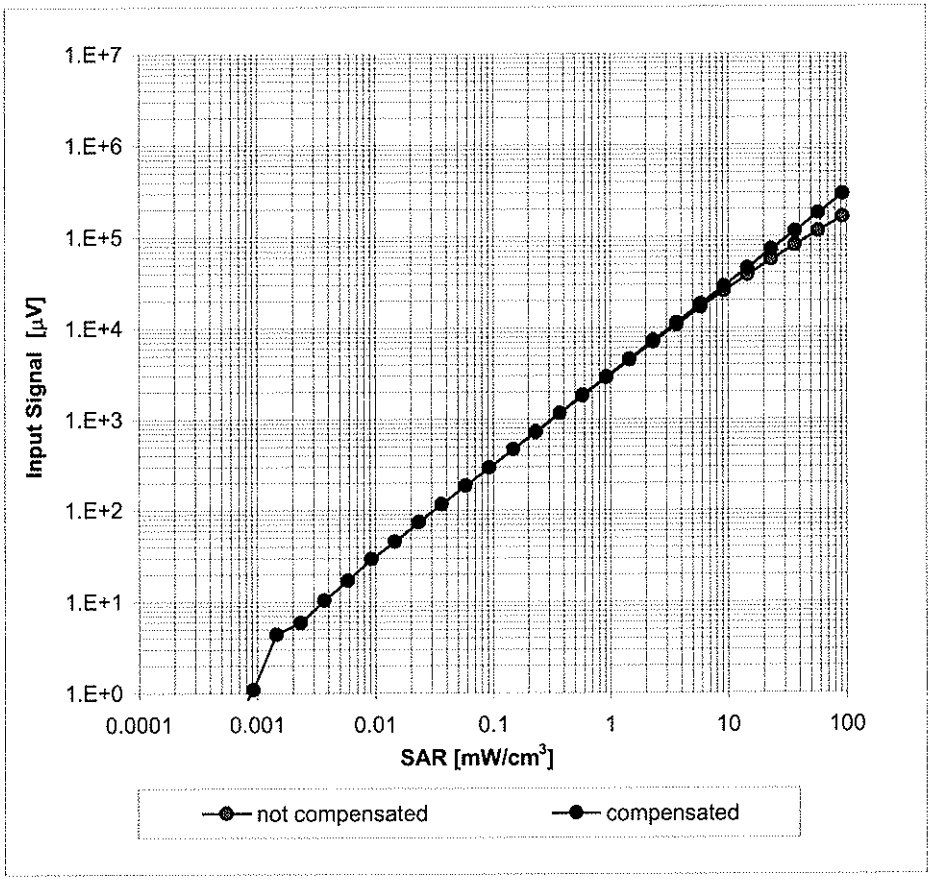


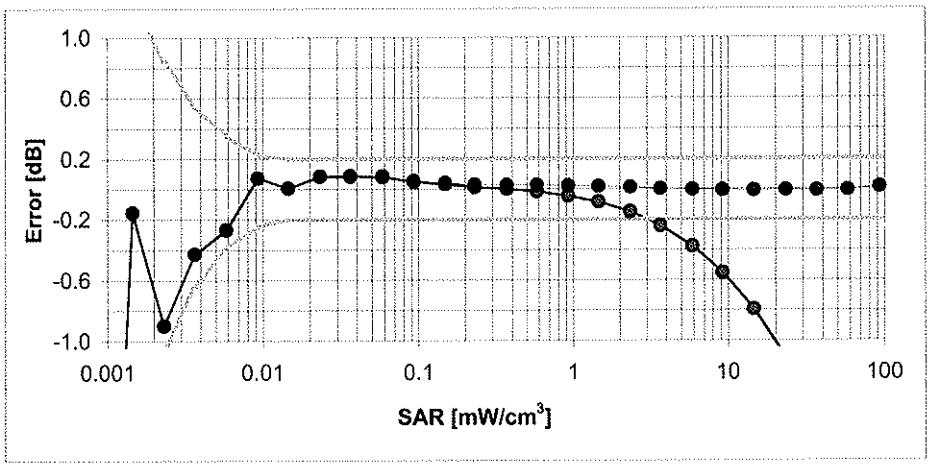


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

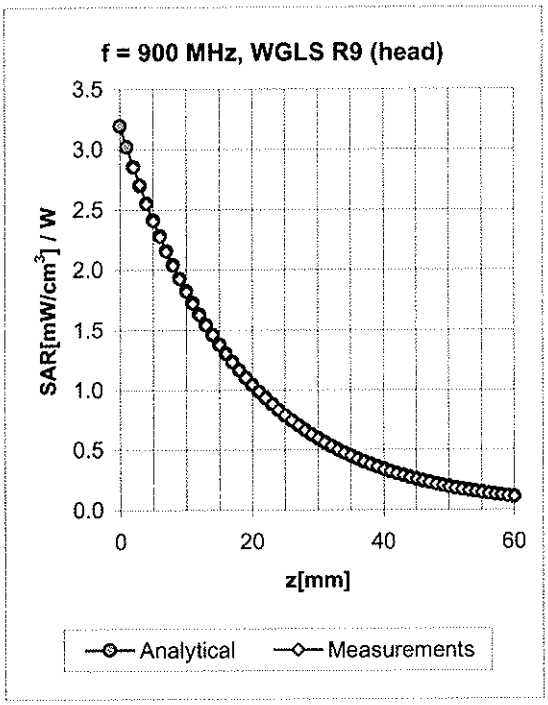
(Waveguide R22, f = 1800 MHz)

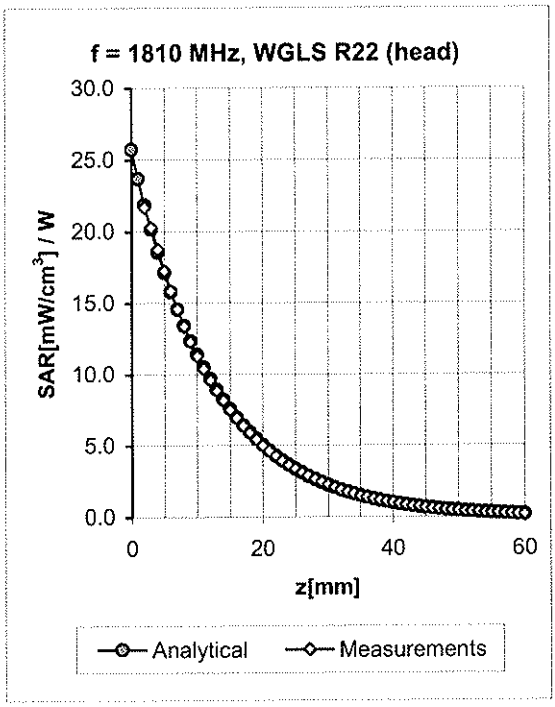




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



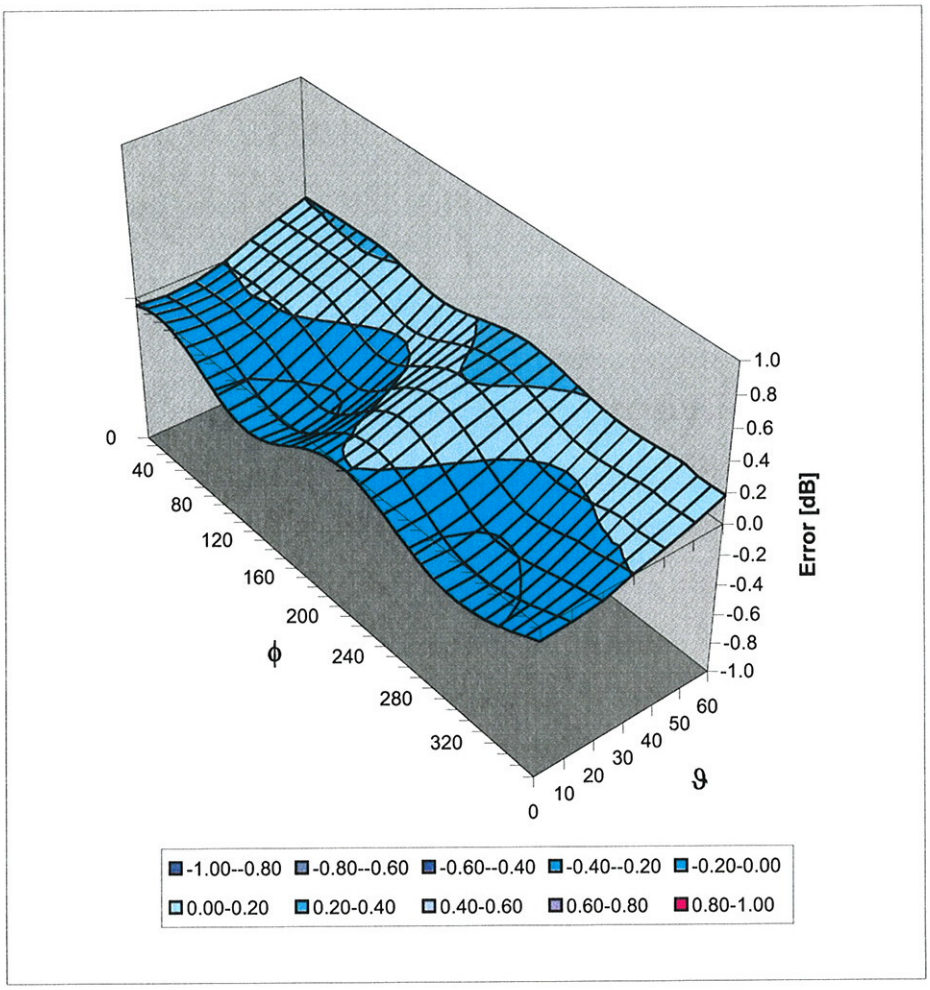


f [MHz]	Validity [MHz][c]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
450	± 50 / ± 100	Head	43.5 ± 5%	0.87 ± 5%	0.15	2.73	7.91 ± 13.3% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.72	0.65	7.71 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.49	0.86	6.65 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.54	0.55	6.19 ± 11.8% (k=2)
5200	± 50 / ± 100	Head	36.0 ± 5%	4.76 ± 5%	0.52	1.05	4.39 ± 13.1% (k=2)
5800	± 50 / ± 100	Head	35.3 ± 5%	5.27 ± 5%	0.56	0.93	3.87 ± 13.1% (k=2)
450	± 50 / ± 100	Body	56.7 ± 5%	0.94 ± 5%	0.12	2.95	8.61 ± 13.3% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.37	0.86	7.56 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.11	4.07	6.30 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	1.73	0.34	6.27 ± 11.8% (k=2)
5200	± 50 / ± 100	Body	49.0 ± 5%	5.30 ± 5%	0.50	1.54	4.19 ± 13.1% (k=2)
5800	± 50 / ± 100	Body	48.2 ± 5%	6.00 ± 5%	0.51	1.48	3.79 ± 13.1% (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)