APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

DUT: PTX-938; Type: Cellular CDMA Phone with Bluetooth; Serial: SSOFC001535

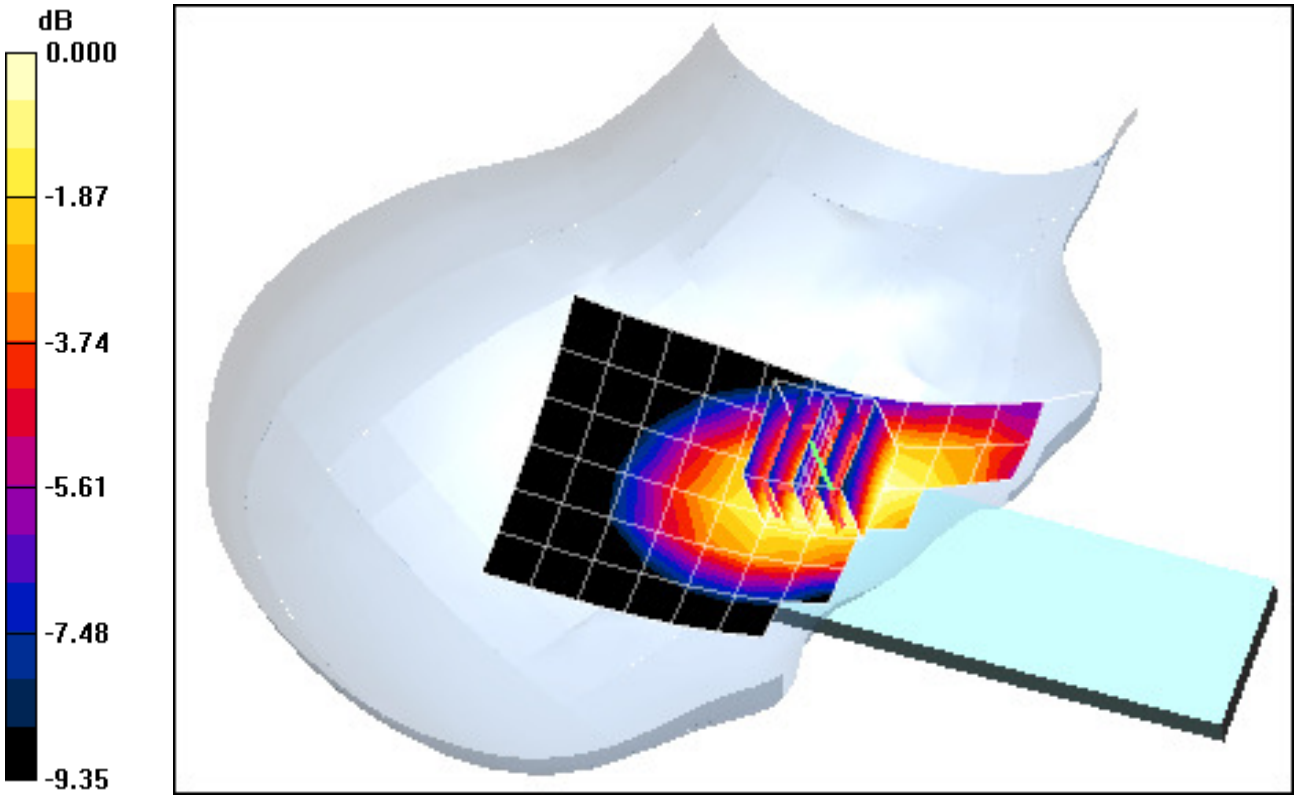
Communication System: Cellular CDMA; Frequency: 824.7 MHz;Duty Cycle: 1:1
Medium: 835 Brain; Medium parameters used (interpolated):
f = 824.7 MHz; σ = 0.885 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 09-11-2009; Ambient Temp: 24.5 °C; Tissue Temp: 22.8 °C

Probe: ES3DV3 - SN3213; ConvF(5.94, 5.94, 5.94); Calibrated: 4/15/2009
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 1/21/2009
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 172

Mode: Cellular CDMA, Right Head, Touch, Low.ch, Standard Battery

Area Scan (7x17x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.32 V/m
Peak SAR (extrapolated) = 0.737 W/kg
SAR(1 g) = 0.548 mW/g; SAR(10 g) = 0.390 mW/g



0 dB = 0.611mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: PTX-938; Type: Cellular CDMA Phone with Bluetooth; Serial: SSOFC001535

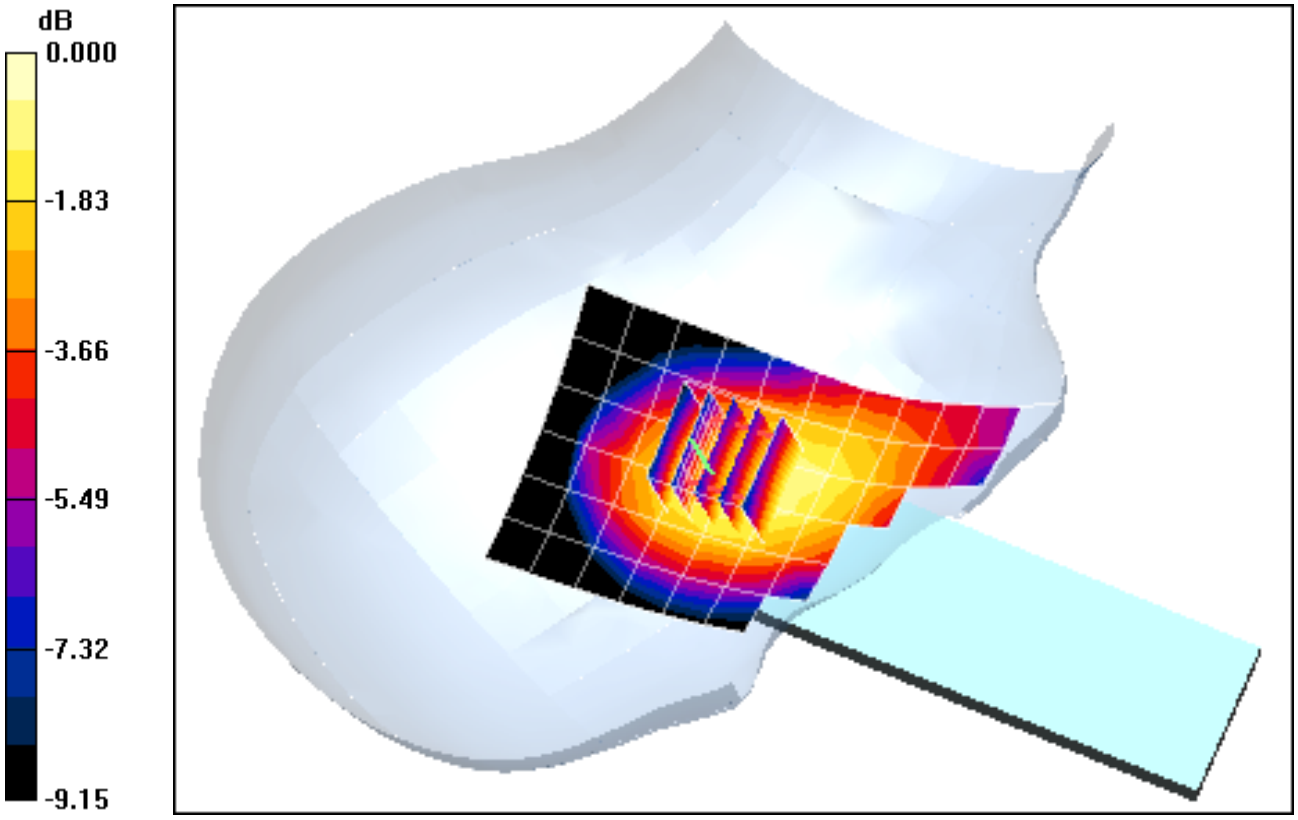
Communication System: Cellular CDMA; Frequency: 824.7 MHz;Duty Cycle: 1:1
Medium: 835 Brain; Medium parameters used (interpolated):
f = 824.7 MHz; σ = 0.885 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 09-11-2009; Ambient Temp: 24.5 °C; Tissue Temp: 22.8 °C

Probe: ES3DV3 - SN3213; ConvF(5.94, 5.94, 5.94); Calibrated: 4/15/2009
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 1/21/2009
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 172

Mode: Cellular CDMA, Right Head, Tilt, Low.ch, Standard Battery

Area Scan (7x17x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan 2 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.2 V/m
Peak SAR (extrapolated) = 0.359 W/kg
SAR(1 g) = 0.279 mW/g; SAR(10 g) = 0.210 mW/g



0 dB = 0.307mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: PTX-938; Type: Cellular CDMA Phone with Bluetooth; Serial: SSOFC001535

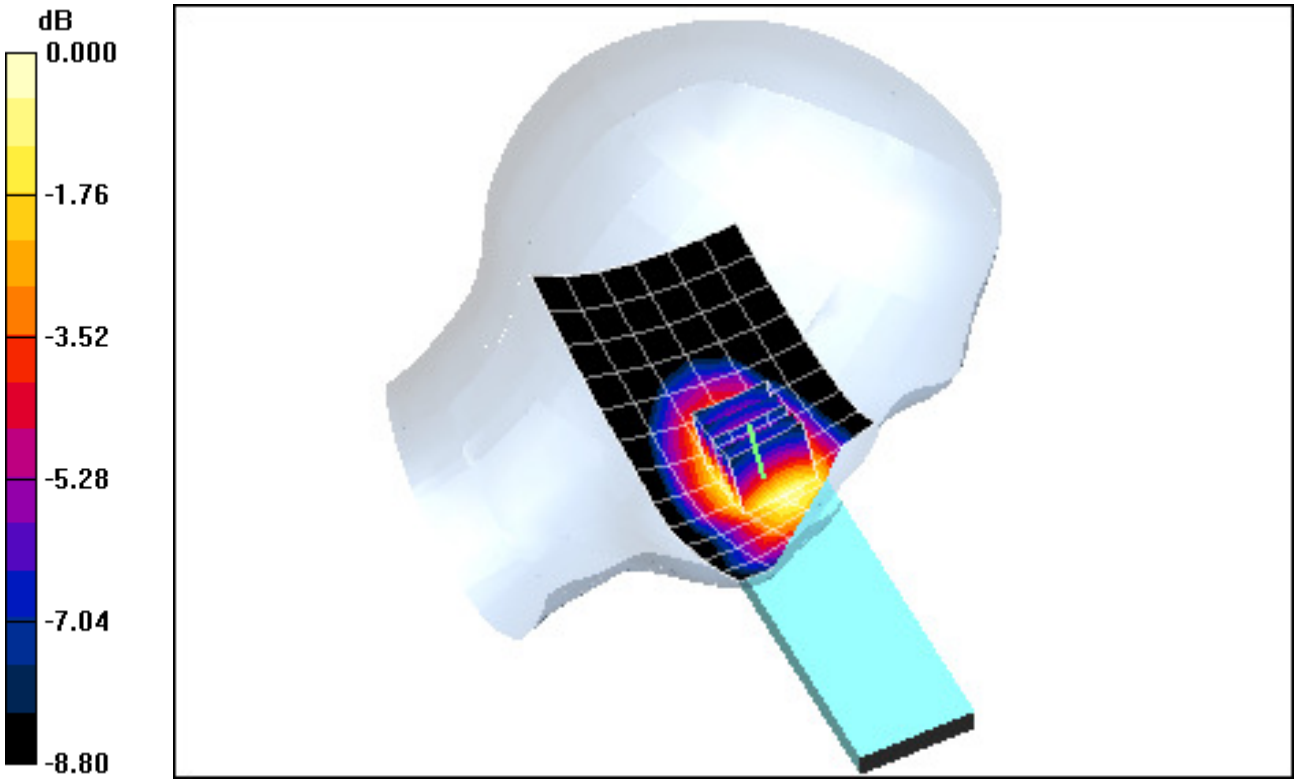
Communication System: Cellular CDMA; Frequency: 824.7 MHz;Duty Cycle: 1:1
Medium: 835 Brain; Medium parameters used (interpolated):
f = 824.7 MHz; σ = 0.885 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 09-11-2009; Ambient Temp: 24.5 °C; Tissue Temp: 22.8 °C

Probe: ES3DV3 - SN3213; ConvF(5.94, 5.94, 5.94); Calibrated: 4/15/2009
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 1/21/2009
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 172

Mode: Cellular CDMA, Left Head, Touch, Low.ch, Standard Battery

Area Scan (7x17x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.85 V/m
Peak SAR (extrapolated) = 0.751 W/kg
SAR(1 g) = 0.557 mW/g; SAR(10 g) = 0.404 mW/g



0 dB = 0.624mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: PTX-938; Type: Cellular CDMA Phone with Bluetooth; Serial: SSOFC001535

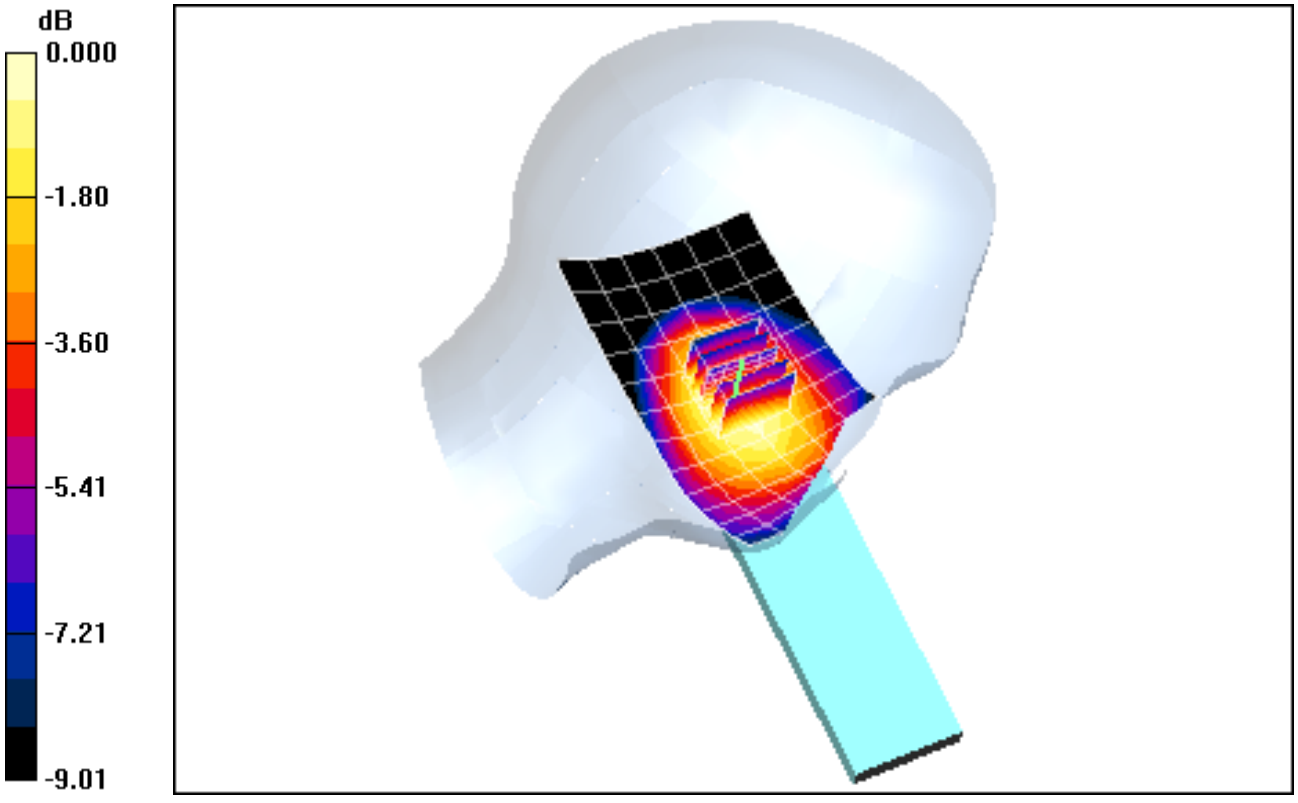
Communication System: Cellular CDMA; Frequency: 824.7 MHz;Duty Cycle: 1:1
Medium: 835 Brain; Medium parameters used (interpolated):
f = 824.7 MHz; σ = 0.885 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 09-11-2009; Ambient Temp: 24.5 °C; Tissue Temp: 22.8 °C

Probe: ES3DV3 - SN3213; ConvF(5.94, 5.94, 5.94); Calibrated: 4/15/2009
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 1/21/2009
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 172

Mode: Cellular CDMA, Left Head, Tilt, Low.ch, Standard Battery

Area Scan (7x17x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.6 V/m
Peak SAR (extrapolated) = 0.310 W/kg
SAR(1 g) = 0.241 mW/g; SAR(10 g) = 0.182 mW/g



0 dB = 0.264mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: PTX-938 new; Type: Cellular CDMA Phone with Bluetooth; Serial: SSOFC001535

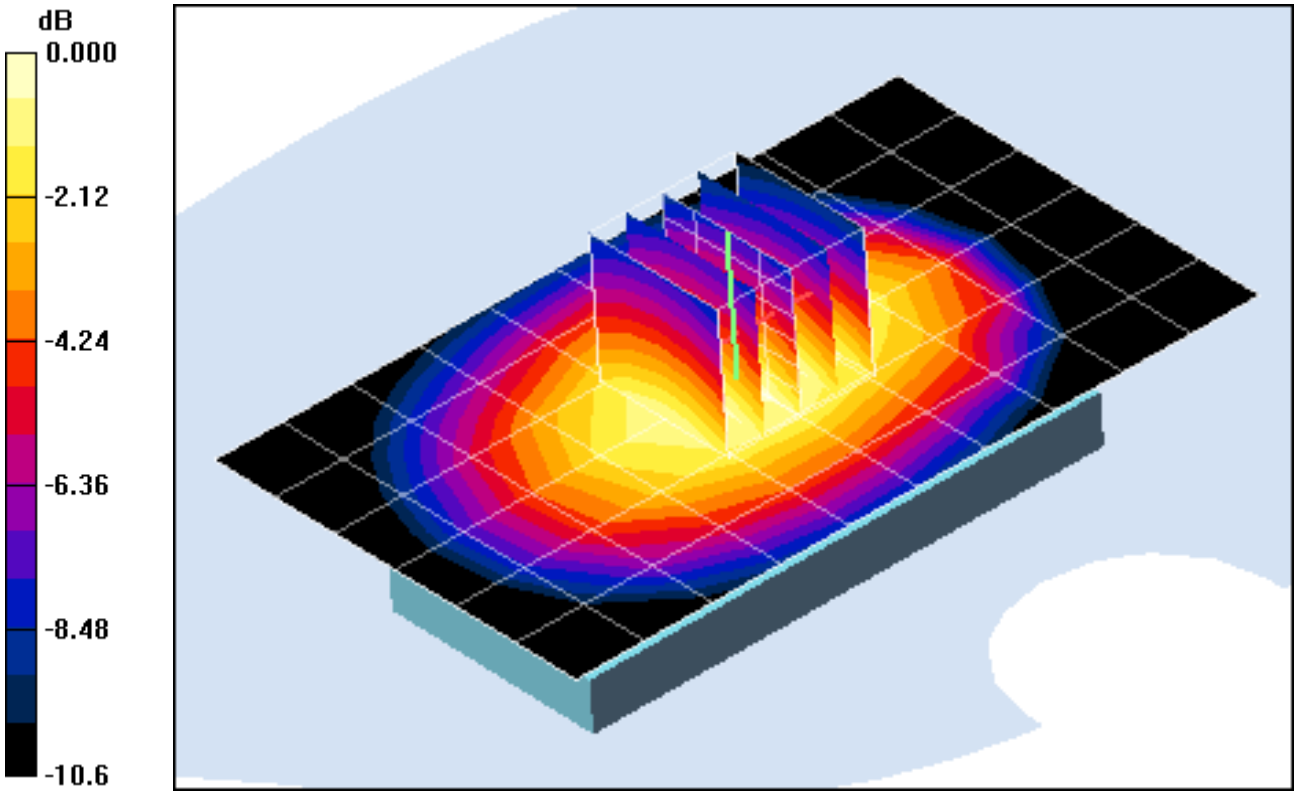
Communication System: Cellular CDMA; Frequency: 824.7 MHz;Duty Cycle: 1:1
Medium: 835 Muscle; Medium parameters used (interpolated):
f = 824.7 MHz; σ = 0.952 mho/m; ε_r = 52.8; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-11-2009; Ambient Temp: 24.7 °C; Tissue Temp: 22.9 °C

Probe: ES3DV3 - SN3213; ConvF(5.92, 5.92, 5.92); Calibrated: 4/15/2009
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 1/21/2009
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 172

Mode: Cellular CDMA, Body SAR, Back side, Low.ch, Standard Battery

Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 28.2 V/m
Peak SAR (extrapolated) = 0.873 W/kg
SAR(1 g) = 0.632 mW/g; SAR(10 g) = 0.448 mW/g



0 dB = 0.716mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: PTX-938; Type: Cellular CDMA Phone with Bluetooth; Serial: SSOFC001535

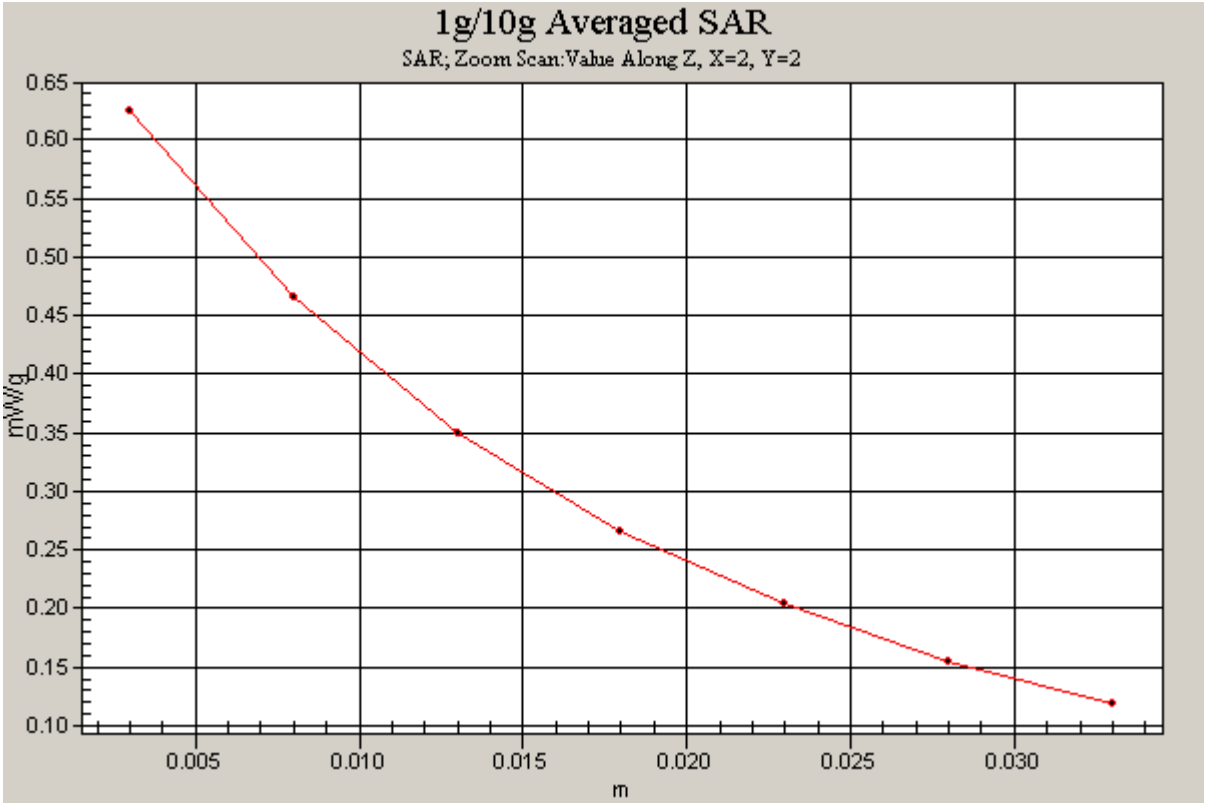
Communication System: Cellular CDMA; Frequency: 824.7 MHz;Duty Cycle: 1:1
Medium: 835 Brain; Medium parameters used (interpolated):
f = 824.7 MHz; σ = 0.885 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 09-11-2009; Ambient Temp: 24.5 °C; Tissue Temp: 22.8 °C

Probe: ES3DV3 - SN3213; ConvF(5.94, 5.94, 5.94); Calibrated: 4/15/2009
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 1/21/2009
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 172

Mode: Cellular CDMA, Left Head, Touch, Low.ch, Standard Battery

Area Scan (7x17x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.85 V/m
Peak SAR (extrapolated) = 0.751 W/kg
SAR(1 g) = 0.557 mW/g; SAR(10 g) = 0.404 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: PTX-938 new; Type: Cellular CDMA Phone with Bluetooth; Serial: SSOFC001535

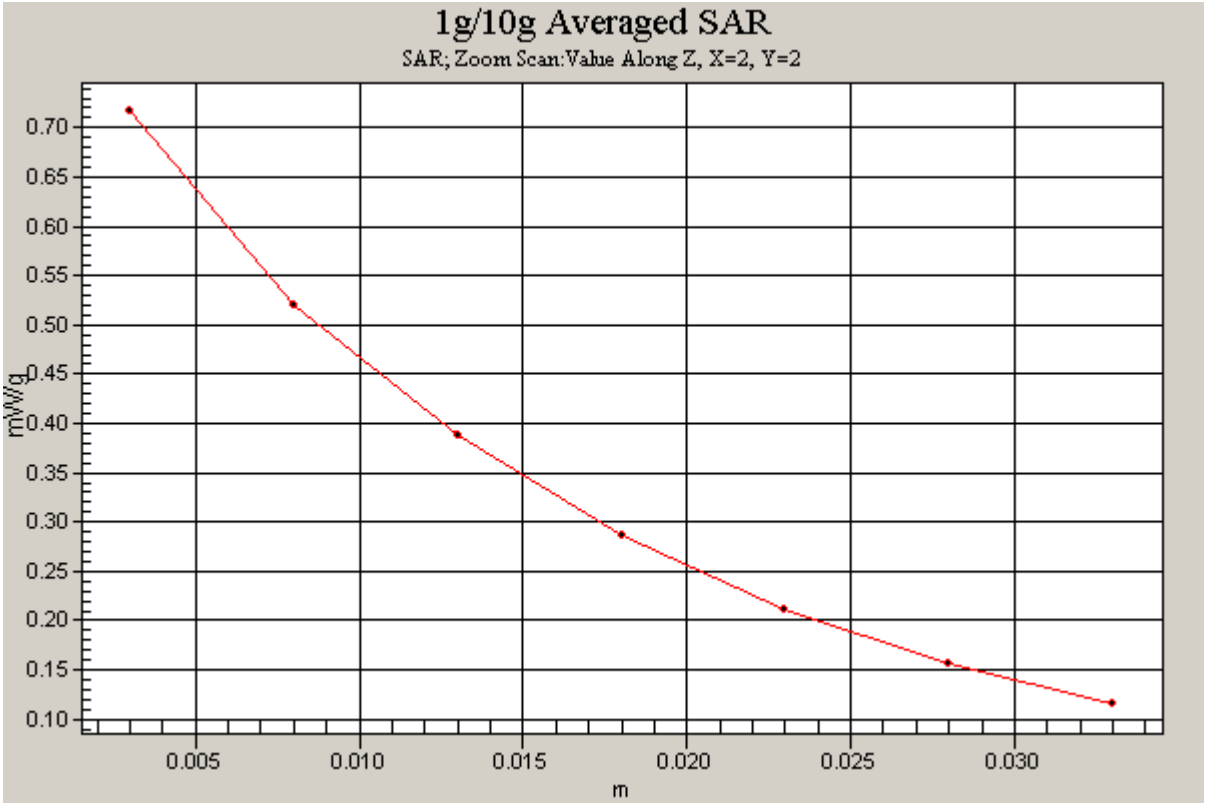
Communication System: Cellular CDMA; Frequency: 824.7 MHz;Duty Cycle: 1:1
Medium: 835 Muscle; Medium parameters used (interpolated):
f = 824.7 MHz; σ = 0.952 mho/m; ε_r = 52.8; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-11-2009; Ambient Temp: 24.6 °C; Tissue Temp: 22.9 °C

Probe: ES3DV3 - SN3213; ConvF(5.92, 5.92, 5.92); Calibrated: 4/15/2009
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 1/21/2009
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 172

Mode: Cellular CDMA, Body SAR, Back side, Low.ch, Standard Battery

Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 28.2 V/m
Peak SAR (extrapolated) = 0.873 W/kg
SAR(1 g) = 0.632 mW/g; SAR(10 g) = 0.448 mW/g



APPENDIX B: DIPOLE VALIDATION

PCTEST ENGINEERING LABORATORY, INC.

DUT: 835MHz SAR Validation Dipole; Type: D835V2; Serial: 4d047

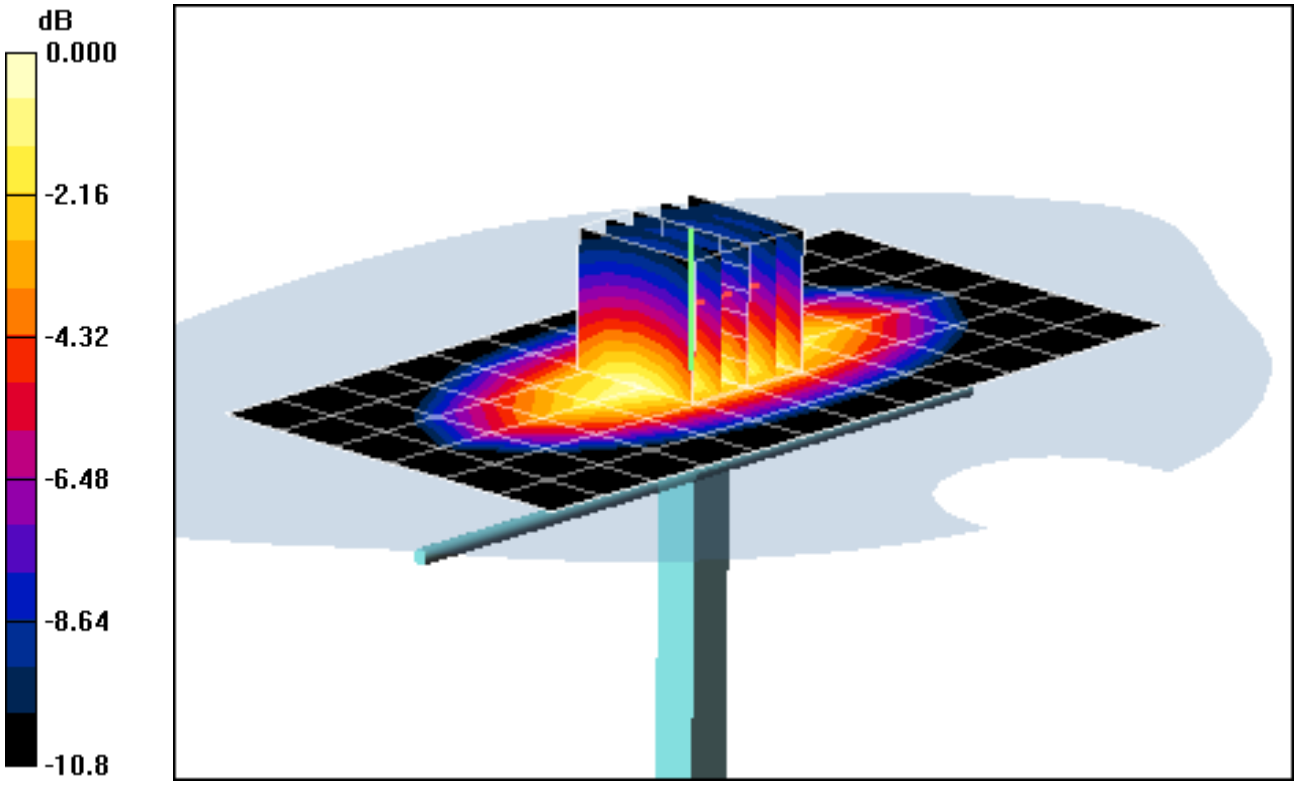
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Brain; Medium parameters used:
f = 835 MHz; σ = 0.893 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-11-2009; Ambient Temp: 24.5 °C; Tissue Temp: 22.8 °C

Probe: ES3DV3 - SN3213; ConvF(5.94, 5.94, 5.94); Calibrated: 4/15/2009
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 1/21/2009
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 172

835MHz SAR 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 = 20.0 dBm (100 mW)
SAR(1 g) = 0.995 mW/g; SAR(10 g) = 0.646 mW/g
Deviation = 2.58 %



0 dB = 1.21mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: 835MHz SAR Validation Dipole; Type: D835V2; Serial: 4d047

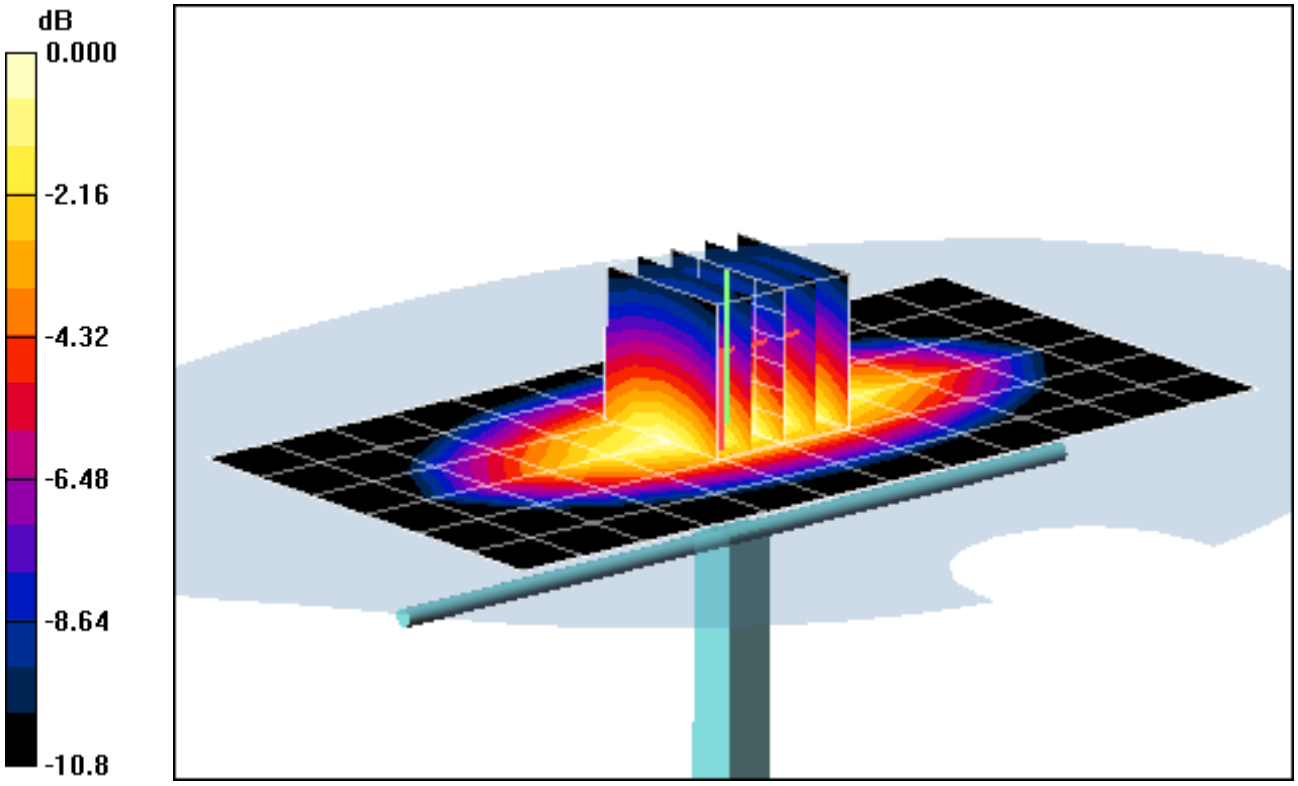
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Brain; Medium parameters used:
f = 835 MHz; σ = 0.893 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-13-2009; Ambient Temp: 24.7 °C; Tissue Temp: 23.1 °C

Probe: ES3DV3 - SN3213; ConvF(5.94, 5.94, 5.94); Calibrated: 4/15/2009
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 1/21/2009
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 172

835MHz SAR 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 = 20.0 dBm (100 mW)
SAR(1 g) = 0.987 mW/g; SAR(10 g) = 0.640 mW/g
Deviation = -1.24 %



0 dB = 1.16mW/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 Accreditation Service (SAS)
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: ES3-3213_Apr09

CALIBRATION CERTIFICATE

Object	ES3DV3 - SN:3213
Calibration procedure(s)	QA CAL-01.v6 and QA CAL-23.v3 Calibration procedure for dosimetric E-field probes
Calibration date:	April 15, 2009
Condition of the calibrated item	In Tolerance

OK 4/23/09

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 (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41495277	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41498087	1-Apr-09 (No. 217-01030)	Apr-10
Reference 3 dB Attenuator	SN: S5054 (3c)	31-Mar-09 (No. 217-01026)	Mar-10
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-09 (No. 217-01028)	Mar-10
Reference 30 dB Attenuator	SN: S5129 (30b)	31-Mar-09 (No. 217-01027)	Mar-10
Reference Probe ES3DV2	SN: 3013	2-Jan-09 (No. ES3-3013_Jan09)	Jan-10
DAE4	SN: 660	9-Sep-08 (No. DAE4-660_Sep08)	Sep-09

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

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

Issued: April 15, 2009

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 Accreditation Service (SAS) Accreditation No.: **SCS 108**
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	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) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

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 ES3DV3

SN:3213

Manufactured: October 14, 2008
Calibrated: April 15, 2009

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ES3DV3 SN:3213

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

NormX	**1.23** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**90** mV
NormY	**1.40** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**92** mV
NormZ	**1.36** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**94** mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

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

Sensor Center to Phantom Surface Distance		**3.0 mm**	**4.0 mm**
SAR_{be} [%]	Without Correction Algorithm	10.4	6.1
SAR_{be} [%]	With Correction Algorithm	0.8	0.5

TSL **1750 MHz** **Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance		**3.0 mm**	**4.0 mm**
SAR_{be} [%]	Without Correction Algorithm	9.6	5.8
SAR_{be} [%]	With Correction Algorithm	0.8	0.6

Sensor Offset

Probe Tip to Sensor Center	**2.0** mm

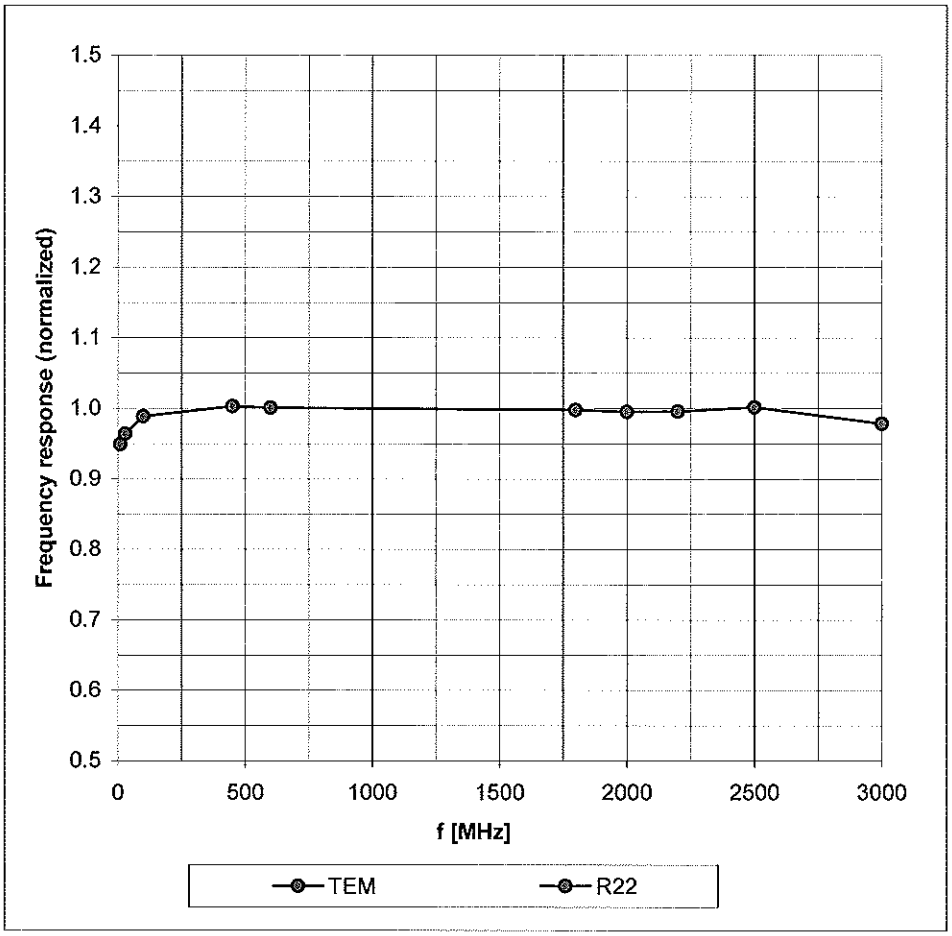
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[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.

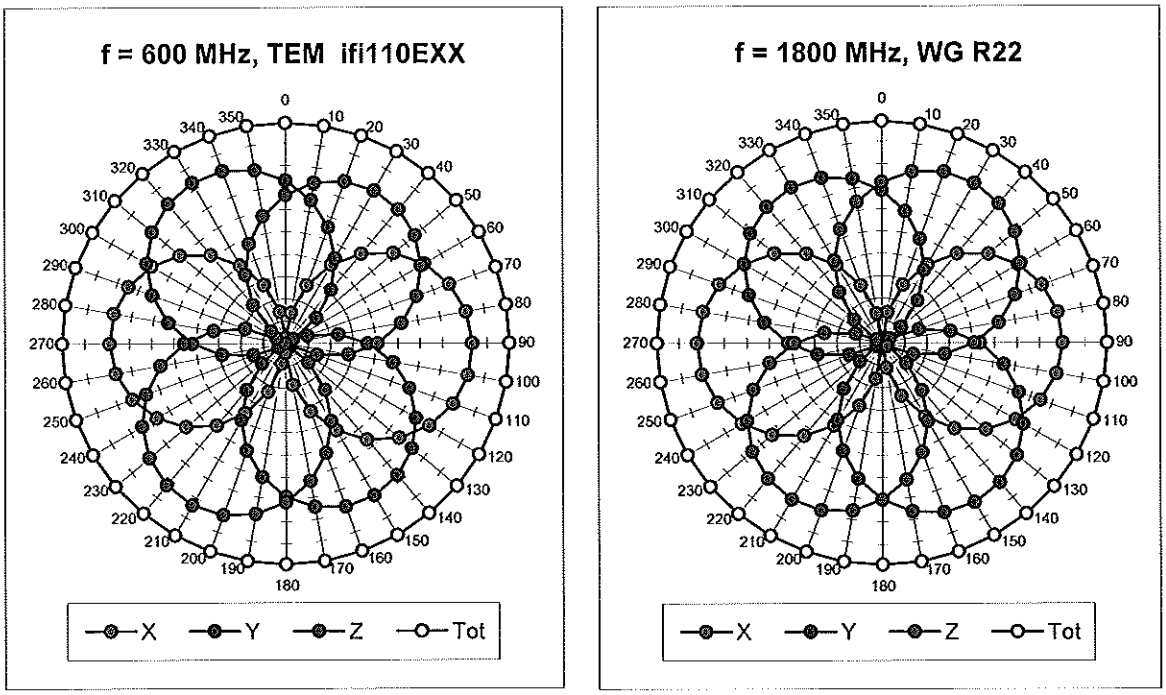
Frequency Response of E-Field

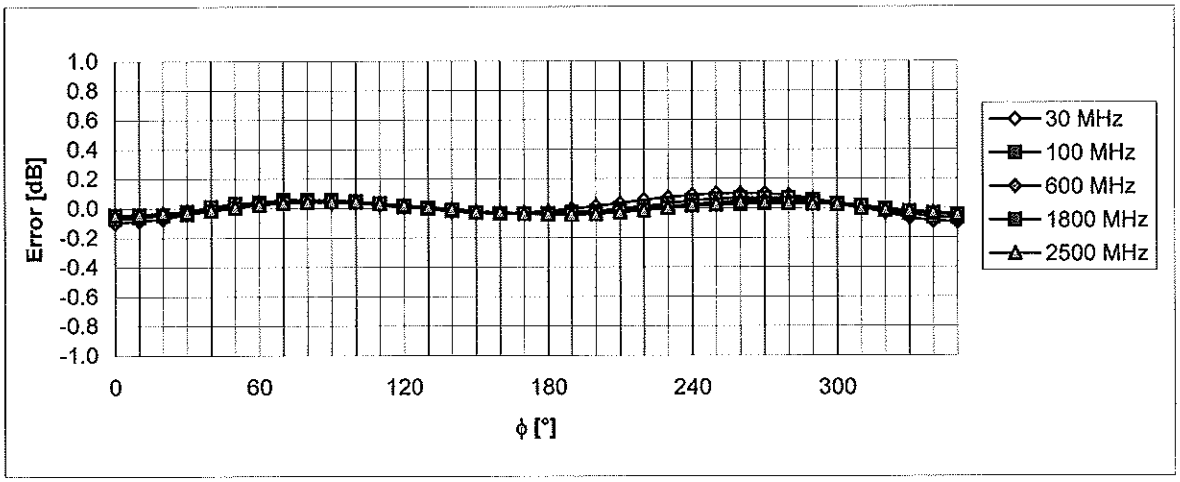
(TEM-Cell:ifi110 EXX, Waveguide: R22)



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

Receiving Pattern (ϕ), ϑ = 0°

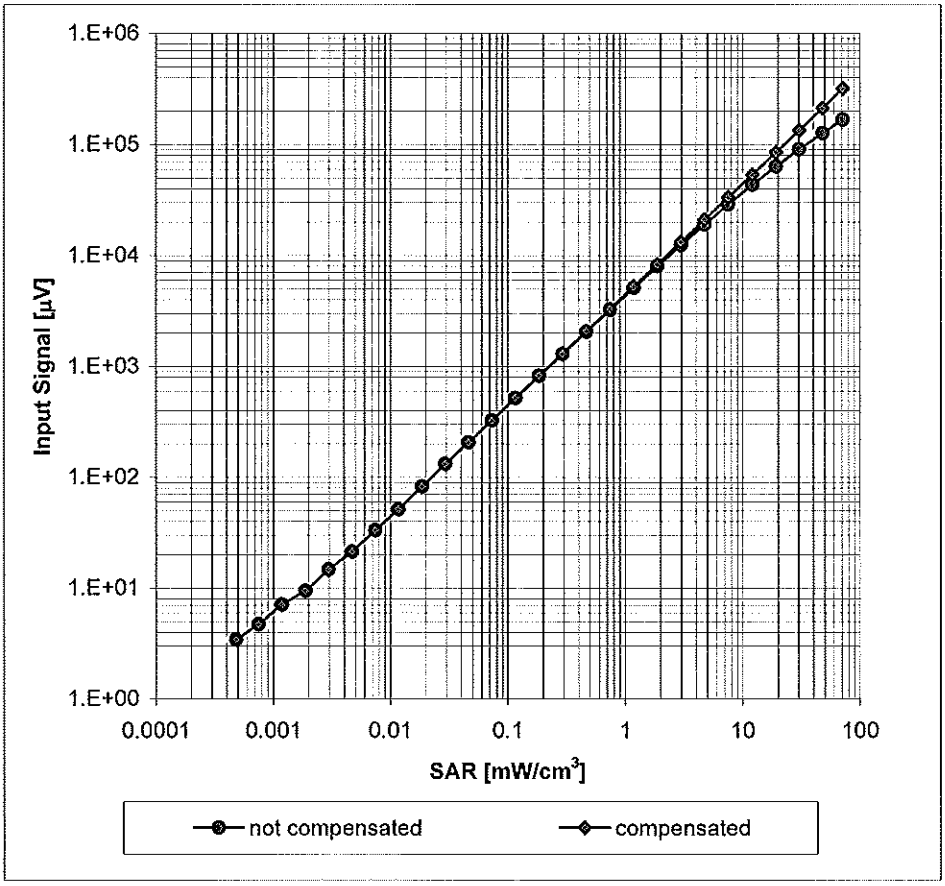


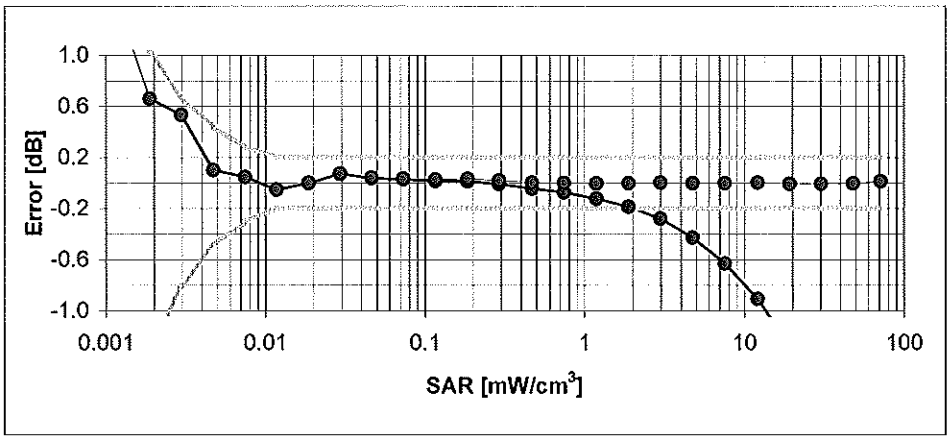


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

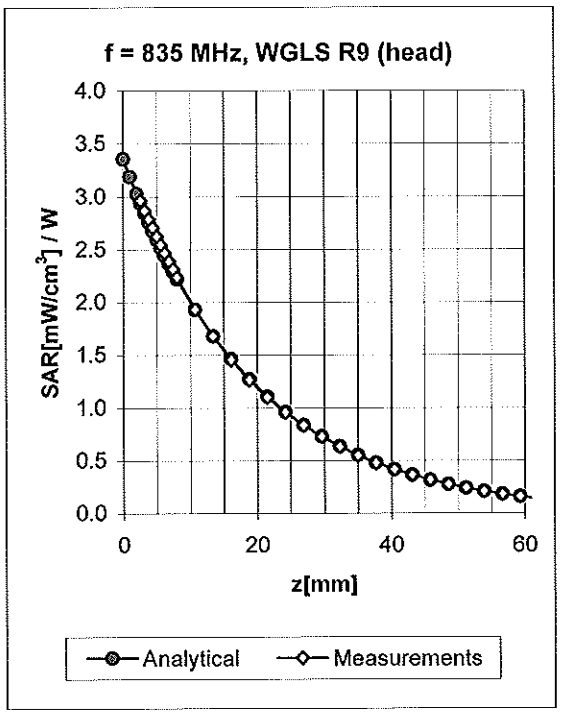
(Waveguide R22, f = 1800 MHz)

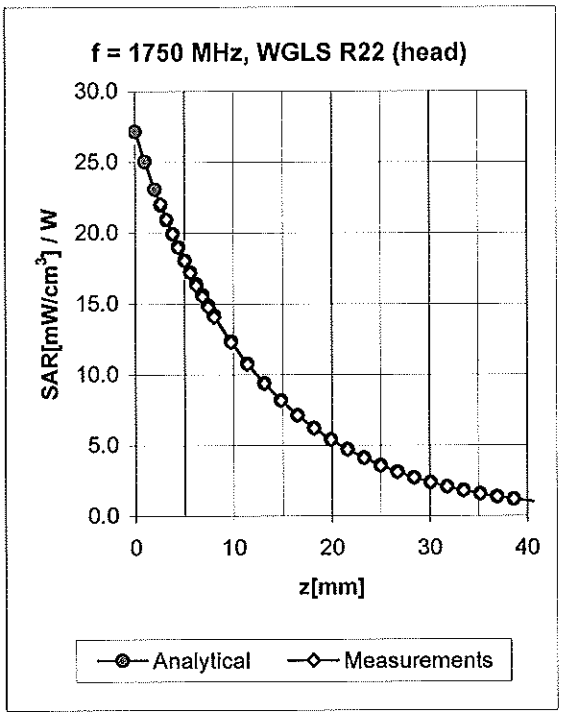




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



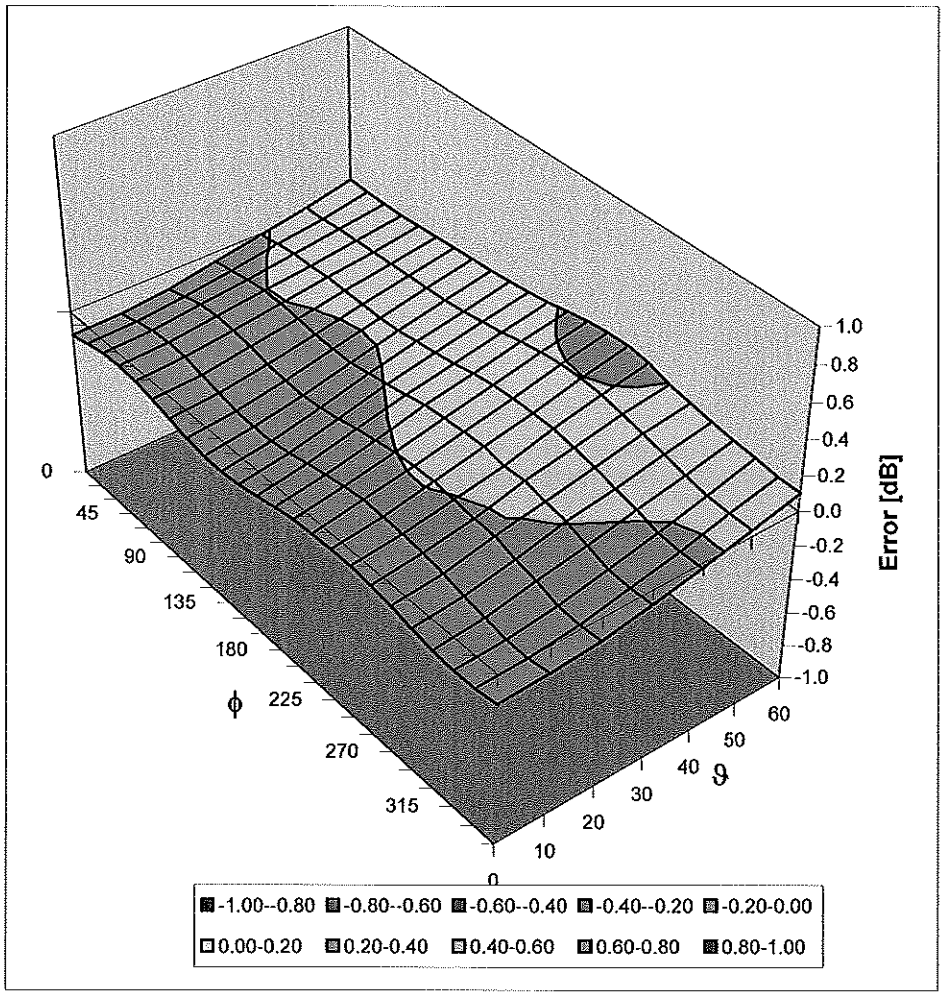


f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.85	1.13	5.94 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.51	1.48	5.23 ± 11.0% (k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.46	1.60	5.02 ± 11.0% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.75	1.21	5.92 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.35	2.08	4.82 ± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.33	2.33	4.52 ± 11.0% (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)