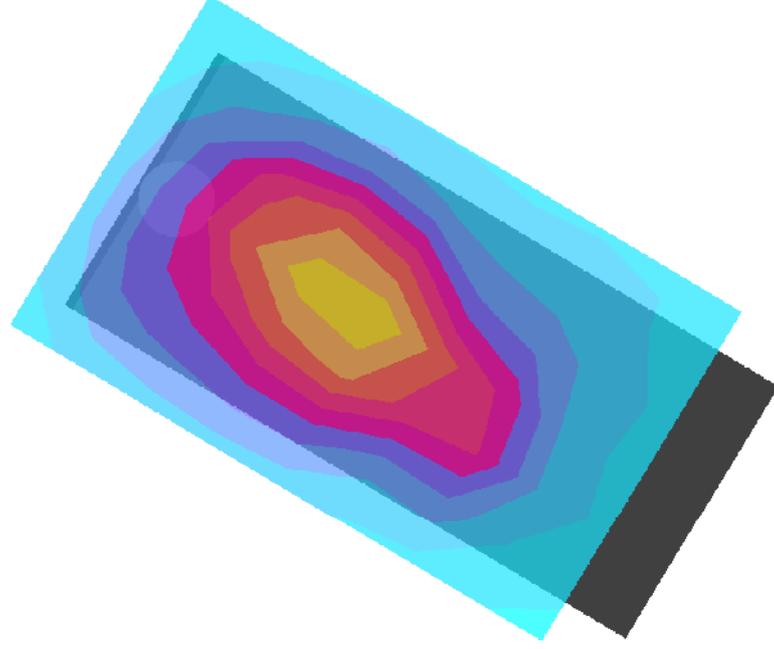


PY7AF052051

SAM 3 Phantom; Left Hand Section; Position: (93°, 59°); Frequency: 824 MHz
Probe: ET3DV6 - SN1585; ConvF(6.95,6.95,6.95); Crest factor: 8.3; Head 835-900MHz: $\sigma = 0.86 \text{ mho/m}$ $\epsilon_r = 40.2 \rho = 1.00 \text{ g/cm}^3$
Cube 5x5x7: SAR (1g): 0.550 mW/g, SAR (10g): 0.354 mW/g, (Worst-case extrapolation)
Coarse: DX = 12.0, Dy = 10.0, Dz = 10.0
Powerdrift: 0.09 dB
Helen: PY7AF052051; S/N: BD3050HQLB/FP2, Frequency 824.2MHz(ch128), Left
Hand Side, Cheek(93°) Phone Position, meas. Power=32.8dBm, Nom.Power=33.0dBm;
ambien temprature 22(c-degree)and humidity 22%; Date:060224



D1900 V2

SAM 4 Phantom; Flat Section; Position: (90°, 90°); Frequency: 1900 MHz

Probe: ET3DV6 - SNI585; ConvF(4.62,4.62,4.62); Crest factor: 1.0; Muscle 1900: $\sigma = 1.56 \text{ mho/m}$, $\epsilon_r = 51.2$, $\rho = 1.00 \text{ g/cm}^3$

Cubes (2): SAR (1g): 4.14 mW/g \pm 0.03 dB, SAR (10g): 2.13 mW/g \pm 0.04 dB, (Worst-case extrapolation)

Coarse: DX = 17.0, Dy = 17.0, Dz = 17.0

Powerdrift: -0.04 dB

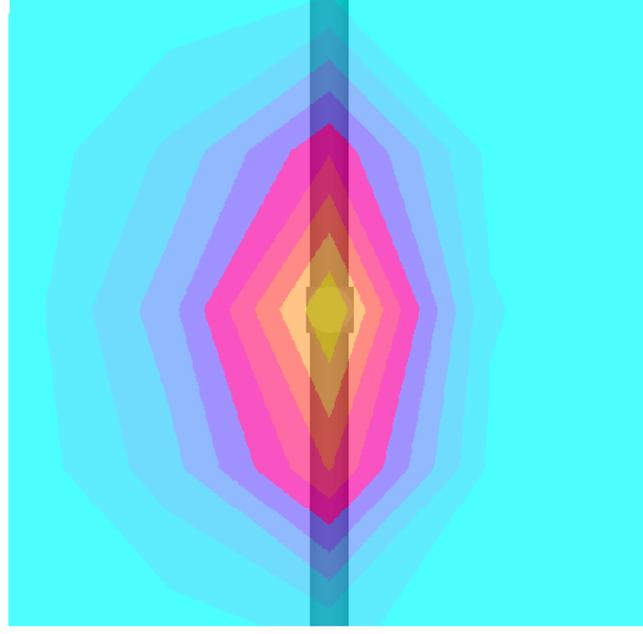
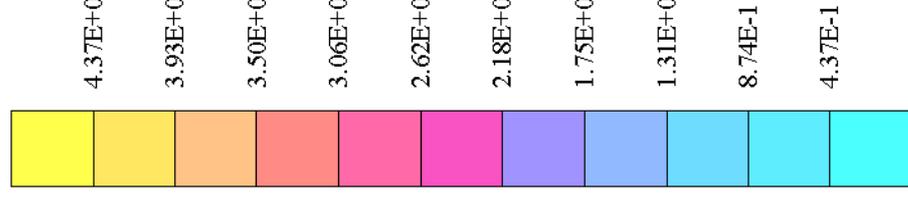
P=100mW, d=10mm, 1900MHz dipol D1900V2 s/n 5d002

Target values: 1g mass 39.6 mW/g, 10g mass 20.9 mW/g

Measured values: 1g mass 41.4mW/g(+4.3%), 10g mass 21.3mW/g(+1.9%)

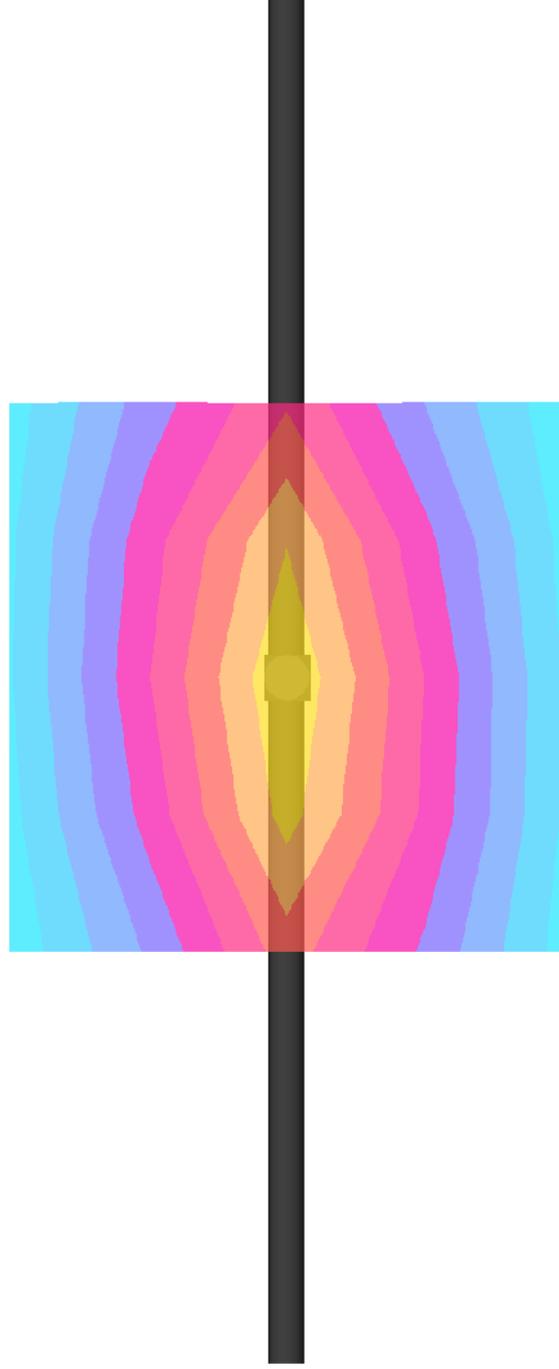
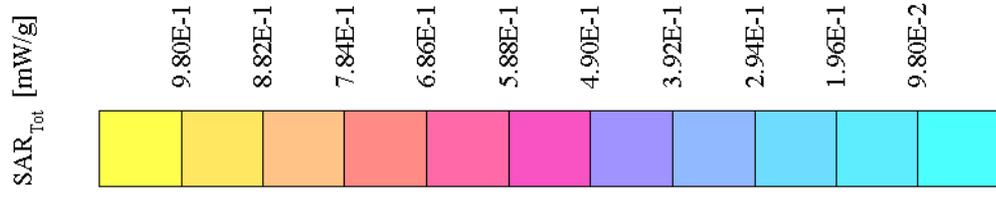
LIQUID'S Temperature 22C, Ambeint Temperature 24C ,humidity 22%

SAR_{Tot} [mW/g]



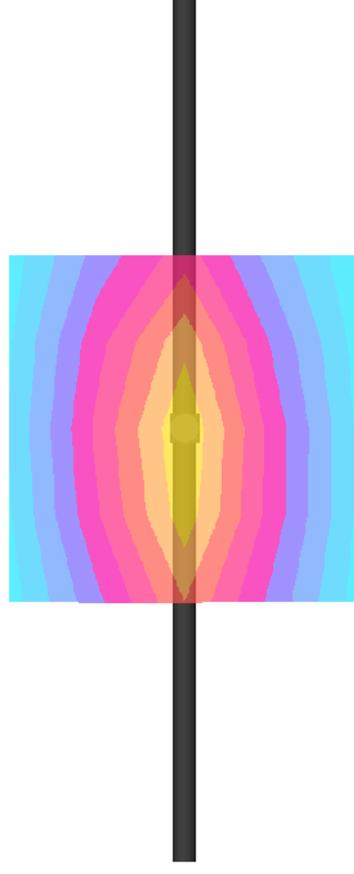
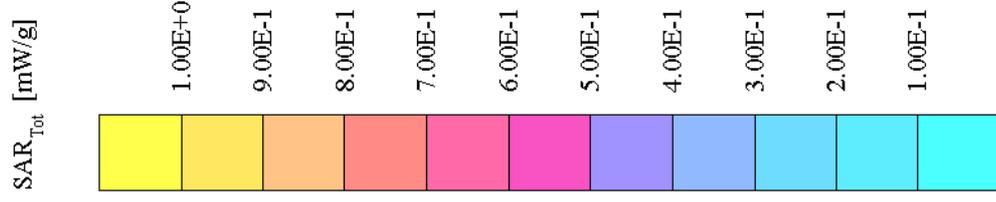
D835 V2

SAM 3 Phantom; Flat Section; Position: (90°, 90°); Frequency: 835 MHz
Probe: ET3DV6 - SNI585; ConvF(6.95,6.95,6.95); Crest factor: 1.0; Head 835-900MHz: $\sigma = 0.86 \text{ mho/m}$ $\epsilon_r = 40.2 \rho = 1.00 \text{ g/cm}^3$
Cubes (2): SAR (1g): 0.900 mW/g $\pm 0.02 \text{ dB}$, SAR (10g): 0.581 mW/g $\pm 0.03 \text{ dB}$, (Worst-case extrapolation)
Coarse: DX = 15.0, Dy = 15.0, Dz = 10.0
Powerdrift: -0.02 dB
P=100mW, d=15mm, 835MHz dipole D835V2 s/n 484
Target values: 1g mass 9.08 mW/g, 10g mass 5.96 mW/g
Measured values: 1g mass 9.00mW/g(-0.9%), 10g mass 5.81mW/g(-2.6%)
LIQUID'S Temperature 22C, Ambient Temperature 24C ,humidity 22%



D835 V2

SAM 3 Phantom; Flat Section; Position: (90°, 90°); Frequency: 835 MHz
Probe: ET3DV6 - SNI585; ConvF(6.95,6.95,6.95); Crest factor: 1.0; Head 835-900MHz: $\sigma = 0.86 \text{ mho/m}$ $\epsilon_r = 40.2 \rho = 1.00 \text{ g/cm}^3$
Cubes (2): SAR (1g): 0.925 mW/g $\pm 0.03 \text{ dB}$, SAR (10g): 0.597 mW/g $\pm 0.02 \text{ dB}$, (Worst-case extrapolation)
Coarse: DX = 15.0, Dy = 15.0, Dz = 10.0
Powerdrift: -0.03 dB
P=100mW, d=15mm, 835MHz dipole D835V2 s/n 484
Target values: 1g mass 9.08 mW/g, 10g mass 5.96 mW/g
Measured values: 1g mass 9.25mW/g(+1.9%), 10g mass 5.97mW/g(+0.2%)
LIQUID'S Temperature 22C, Ambeint Temperature 24C ,humidity 22%



D835 V2

SAM 3 Phantom; Flat Section; Position: (90°, 90°); Frequency: 835 MHz

Probe: ET3DV6 - SNI.585; ConvF(6.65,6.65,6.65); Crest factor: 1.0; Muscle 835: $\sigma = 1.01$ mho/m $\epsilon_r = 55.4$ $\rho = 1.00$ g/cm³

Cubes (2): SAR (1g): 1.01 mW/g ± 0.03 dB, SAR (10g): 0.649 mW/g ± 0.03 dB, (Worst-case extrapolation)

Coarse: DX = 15.0, Dy = 15.0, Dz = 10.0

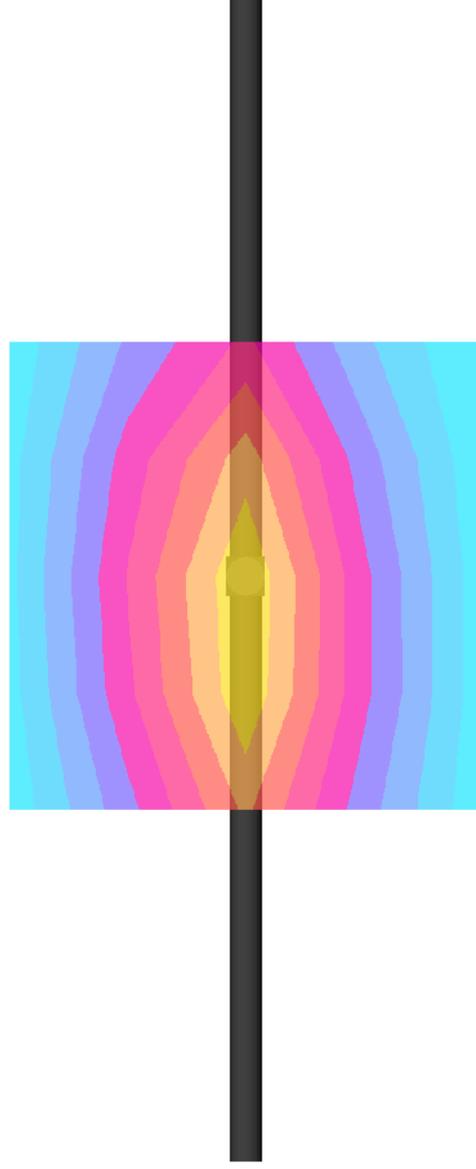
Powerdrift: -0.01 dB

P=100mW, d=15mm, 835MHz dipole D835V2 s/n 484

Target values: 1g mass 9.48mW/g, 10g mass 6.24mW/g

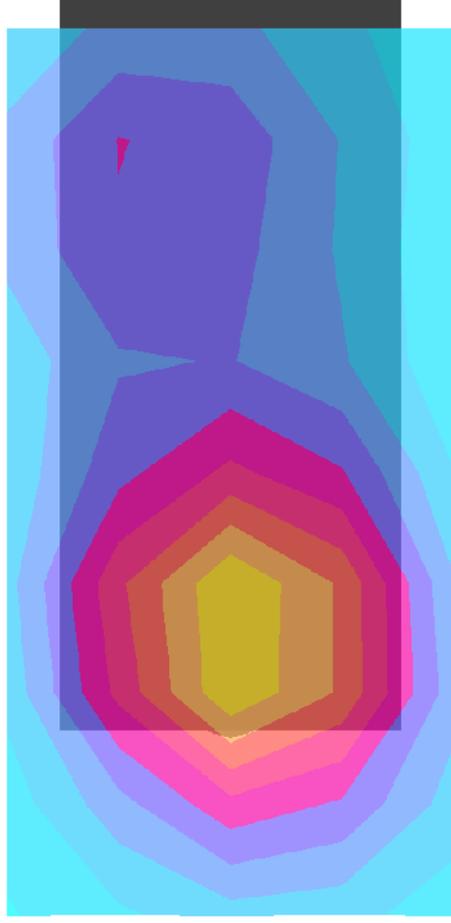
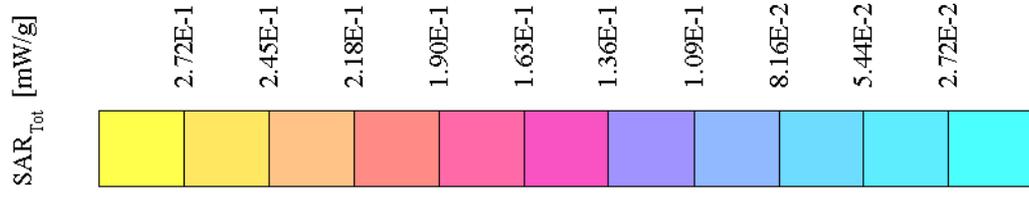
Measured values: 1g mass 10.1mW/g(+6.5%), 10g mass 6.49mW/g(+4%)

LIQUID'S Temperature 22C, Ambeint Temperature 22C ,humidity 22%



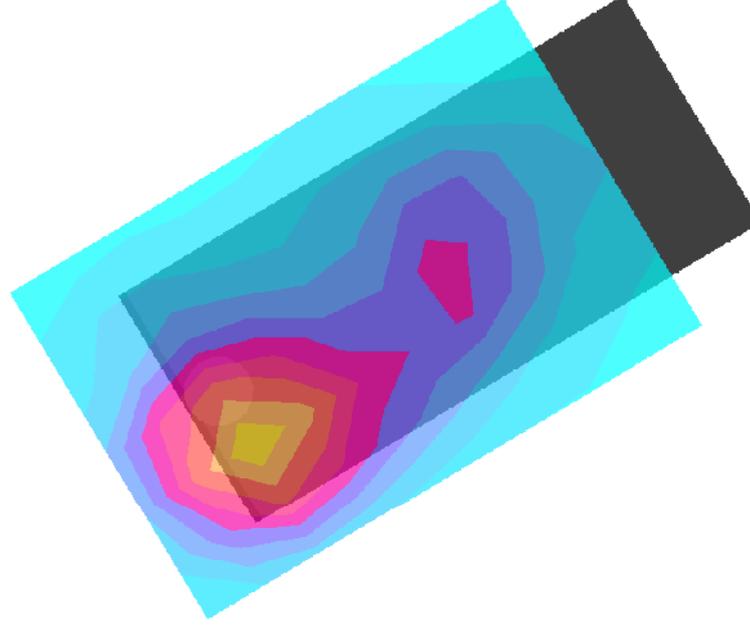
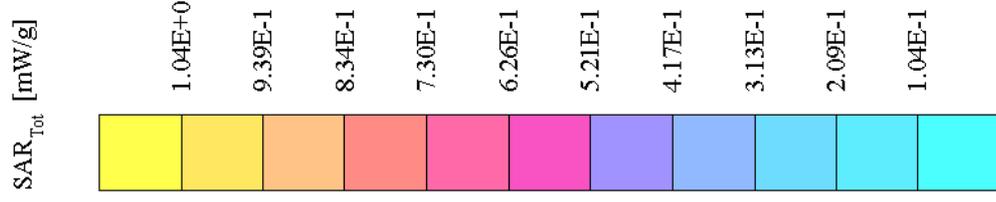
PY7AF052051

SAM 4 Phantom; Flat Section; Position: (270°, 90°); Frequency: 1910 MHz
Probe: ET3DV6 - SN1585; ConvF(4.62,4.62,4.62); Crest factor: 4.0; Muscle 1900: $\sigma = 1.56 \text{ mho/m}$, $\epsilon_r = 51.2$, $\rho = 1.00 \text{ g/cm}^3$
Cube 5x5x7: SAR (1g): 0.269 mW/g, SAR (10g): 0.161 mW/g, SAR (10g) (Worst-case extrapolation)
Coarse: DX = 15.0, Dy = 15.0, Dz = 10.0
Powerdrift: -0.02 dB
Helen: PY7AF052051; S/N: BD3050HQLB/FP2, Frequency 1910MHz(ch81.0), FrontPhone +
1.5mm distance from flat section of phantom, meas. Power=26.2dBm, Nom.Power=27dBm;
ambien temprature 22(c-degree)and humidity 22%, BlueTooth; EGPRS Measurement; Date: 060220



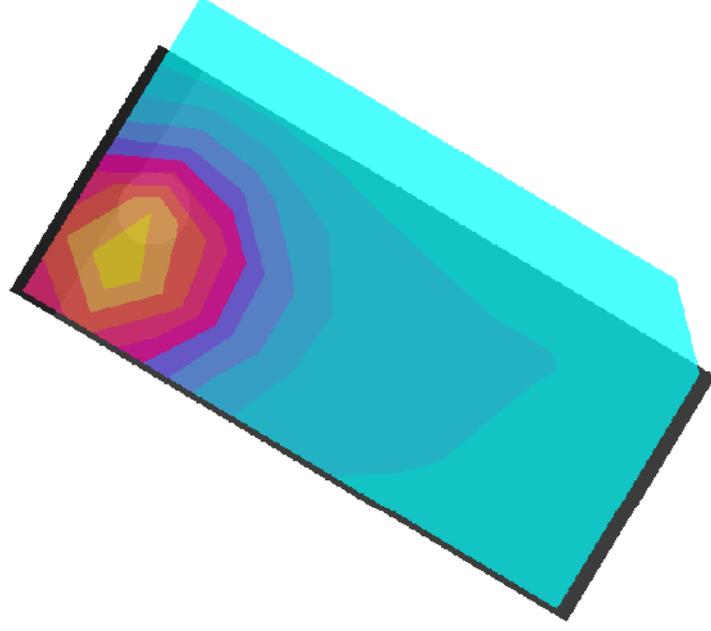
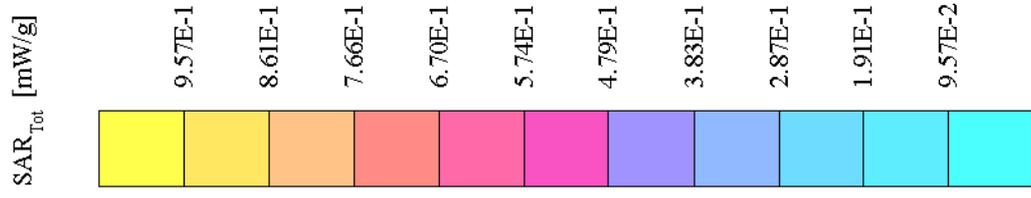
PY7AF052051

SAM 4 Phantom; Righ Hand Section; Position: (93°,301°); Frequency: 1850 MHz
Probe: ET3DV6 - S/N:1585; ConvF(5.03,5.03,5.03); Crest factor: 8.3; Head 1900MHz: $\sigma = 1.47 \text{ mho/m } \epsilon_r = 39.7 \rho = 1.00 \text{ g/cm}^3$
Cube 5x5x7: SAR (1g): 0.944 mW/g, SAR (10g): 0.522 mW/g, (Worst-case extrapolation)
Coarse: DX = 11.0, Dy = 11.0, Dz = 10.0
Powerdrift: -0.01 dB
Helen:PY7AF052051;S/N:BD3050HQLB/FP2,Frequey 1850MHz(ch512),Right
Hand Side,Cheek(93°) Phone Position, meas. Power=30.3dBm, Nom.Power=30.5dBm;
ambient temperature 22(c-degree)and humidity 22%, ;Date:060221



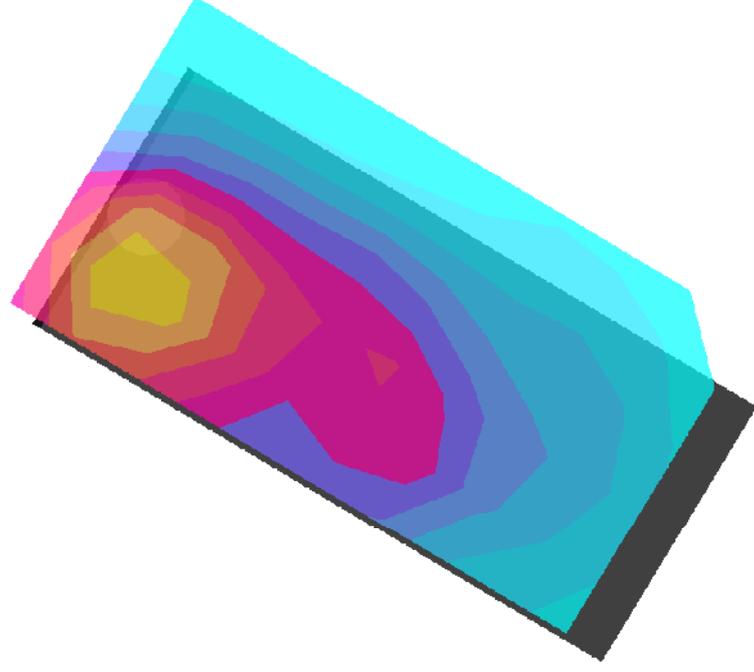
PY7AF052051

SAM 4 Phantom; Left Hand Section; Position: (108°,59°); Frequency: 1850 MHz
Probe: ET3DV6 - SN1585; ConvF(5.03,5.03,5.03); Crest factor: 8.3; Head 1900MHz: $\sigma = 1.47 \text{ mho/m}$ $\epsilon_r = 39.7$ $\rho = 1.00 \text{ g/cm}^3$
Cube 5x5x7: SAR (1g): 0.881 mW/g, SAR (10g): 0.493 mW/g, (Worst-case extrapolation)
Coarse: DX = 11.0, Dy = 11.0, Dz = 11.0
Powerdrift: -0.05 dB
Helen:PY7AF052051;S/N:BD3050HQLB/FP2,Frequency 1850MHz(ch512),Left
Hand Side,Tilt(108°) Phone Position, meas. Power=30.3dBm, Nom.Power=30.5dBm;
ambien temprature 22(c-degree)and humidity 22%;Date:060221



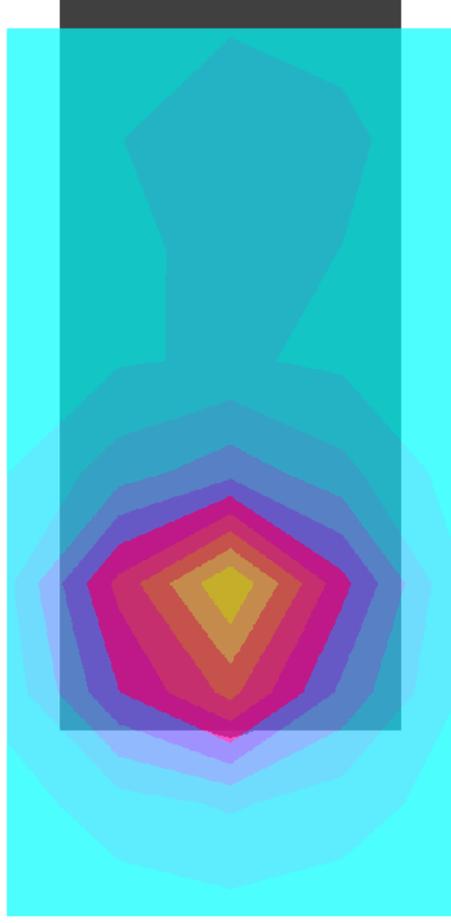
PY7AF052051

SAM 4 Phantom; Left Hand Section; Position: (93°, 59°), Frequency: 1850 MHz
Probe: ET3DV6 - S/N:1585; ConvF(5.03,5.03,5.03); Crest factor: 8.3; Head 1900MHz: $\sigma = 1.47 \text{ mho/m}$, $\epsilon_r = 39.7$, $\rho = 1.00 \text{ g/cm}^3$
Cube 5x5x7: SAR (1g): 0.793 mW/g, SAR (10g): 0.461 mW/g, SAR (Worst-case extrapolation)
Coarse: DX = 11.0, Dy = 11.0, Dz = 11.0
Powerdrift: -0.01 dB
Helen: PY7AF052051; S/N:BD3050HQLB/FP2, Frequency 1850MHz(ch512), Left
Hand Side, Cheek(93°) Phone Position, meas. Power=30.3dBm, Nom.Power=30.5dBm;
ambien temprature 22(c-degree)and humidity 22%; Date:060221



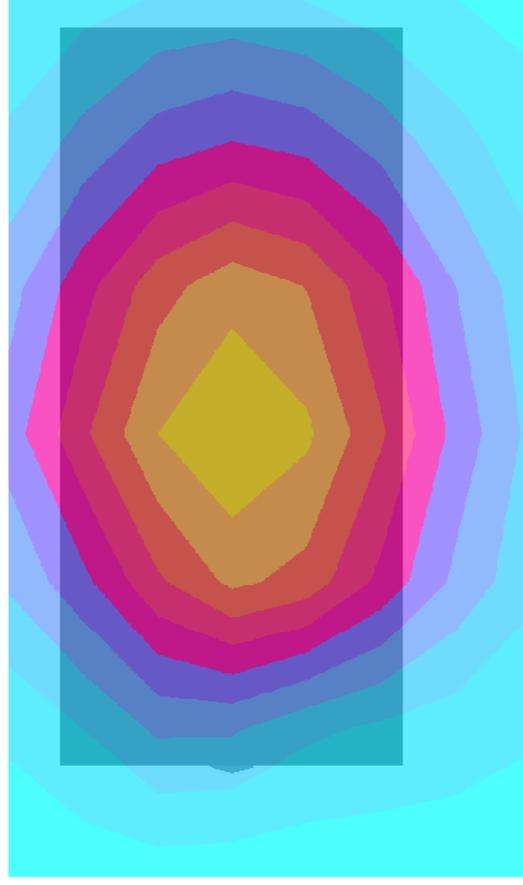
PY7AF052051

SAM 4 Phantom; Flat Section; Position: (270°, 90°); Frequency: 1850 MHz
Probe: ET3DV6 - SNI585; ConvF(4.62,4.62,4.62); Crest factor: 8.3; Muscle 1900: $\sigma = 1.56 \text{ mho/m}$ $\epsilon_r = 51.2$ $\rho = 1.00 \text{ g/cm}^3$
Cube 5x5x7: SAR (1g): 1.12 mW/g, SAR (10g): 0.611 mW/g, (Worst-case extrapolation)
Coarse: DX = 15.0, Dy = 15.0, Dz = 10.0
Powerdrift: -0.04 dB
Helen;PY7AF052051;S/N:BD3050HQLB/FP2,Frequency 1850MHz(ch512),Back Phone +
1.5mm distance from flat section of phantom, meas. Power=30.3 dBm, Nom.Power=30.5dBm;
ambien temprature 22(c-degree)and humidity 22%, Bluetooth;Date:060220



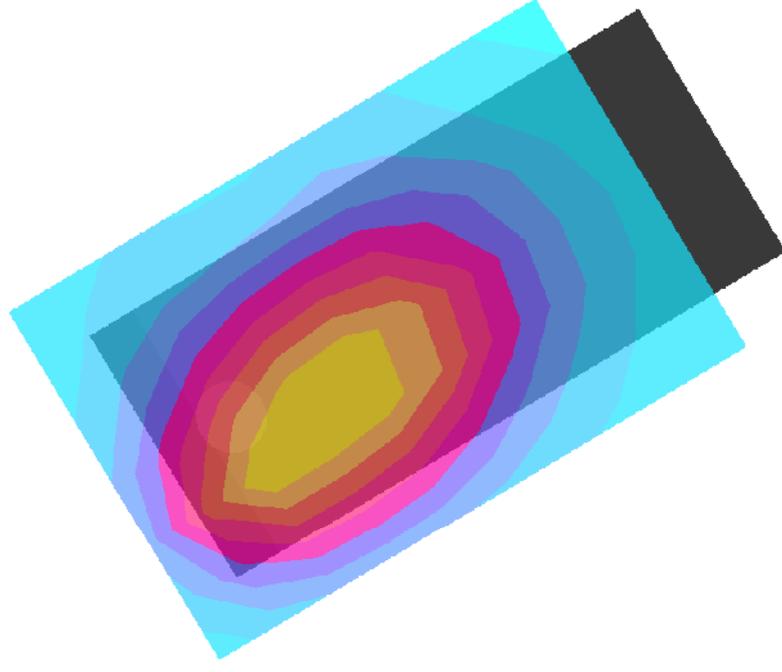
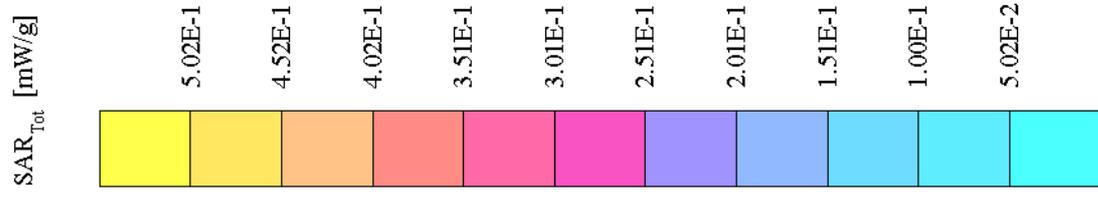
PY7AF052051

SAM 3 Phantom; Flat Section; Position: (270°, 90°); Frequency: 849 MHz
Probe: ET3DV6 - SNI.585; ConvF(6.65,6.65,6.65); Crest factor: 8.0; Muscle 835: $\sigma = 1.01$ mho/m $\epsilon_r = 55.4$ $\rho = 1.00$ g/cm³
Cube 5x5x7: SAR (1g): 0.780 mW/g, SAR (10g): 0.552 mW/g, SAR (Worst-case extrapolation)
Coarse: DX = 10.0, Dy = 20.0, Dz = 10.0
Powerdrift: -0.09 dB
Helen;PY7AF052051;S/N:BD3050HQLB/FP2,Frequency 848MHz(ch251),Back Phone +
1.5mm distance from flat section of phantom, meas. Power=32.9dBm, Nom.Power=33.0dBm;
ambien temprature 22(c-degree)and humidity 22%;Hands Free Cable ;Date:060221



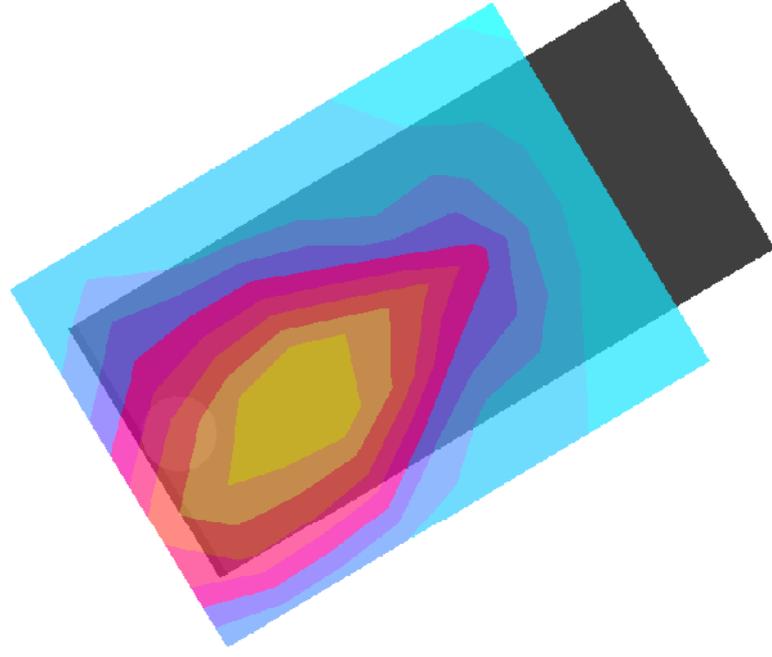
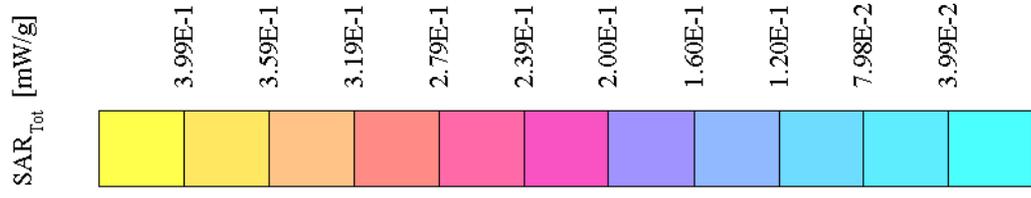
PY7AF052051

SAM 3 Phantom; Right Hand Section; Position: (108°,301°); Frequency: 824 MHz
Probe: ET3DV6 - SNI585; ConvF(6.95,6.95,6.95); Crest factor: 8.3; Head 835-900MHz: $\sigma = 0.86 \text{ mho/m}$ $\epsilon_r = 40.2$ $\rho = 1.00 \text{ g/cm}^3$
Cubes (2): SAR (1g): 0.478 mW/g ± 0.00 dB, SAR (10g): 0.316 mW/g ± 0.08 dB, (Worst-case extrapolation)
Coarse: DX = 11.0, Dy = 11.0, Dz = 11.0
Powerdrift: -0.03 dB



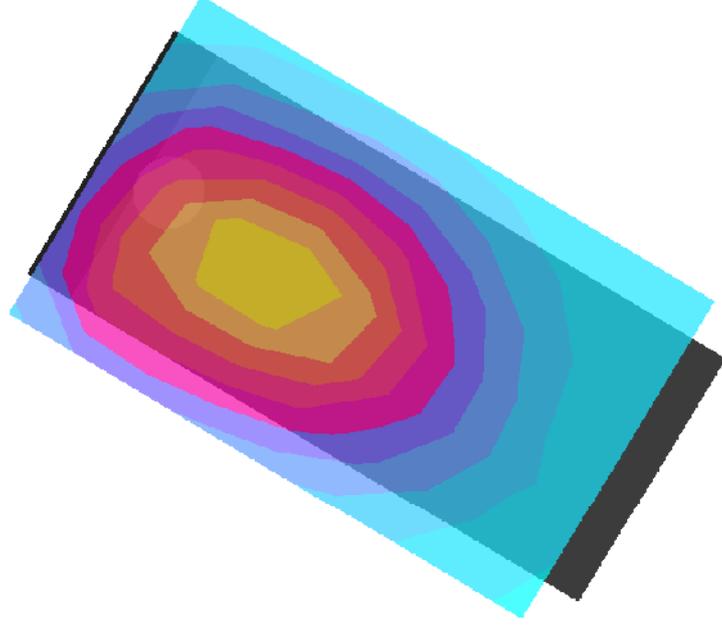
PY7AF052051

SAM 3 Phantom; Righ Hand Section; Position: (93°,301°); Frequency: 824 MHz
Probe: ET3DV6 - SNI585; ConvF(6.95,6.95,6.95); Crest factor: 8.0; Head 835-900MHz: $\sigma = 0.86$ mho/m $\epsilon_r = 40.2$ $\rho = 1.00$ g/cm³
Cube 5x5x7: SAR (1g): 0.397 mW/g, SAR (10g): 0.259 mW/g, SAR (Worst-case extrapolation)
Coarse: DX = 11.0, Dy = 11.0, Dz = 11.0
Powerdrift: -0.10 dB
Helen:PY7AF052051;S/N:BD3050HQLB/FP2,Frequency 824.2MHz(ch128),Right
Hand Side,Cheek(93°) Phone Position, meas. Power=32.8dBm, Nom.Power=33.0dBm;
ambien temprature 22(c-degree)and humidity 22%;Date:060223



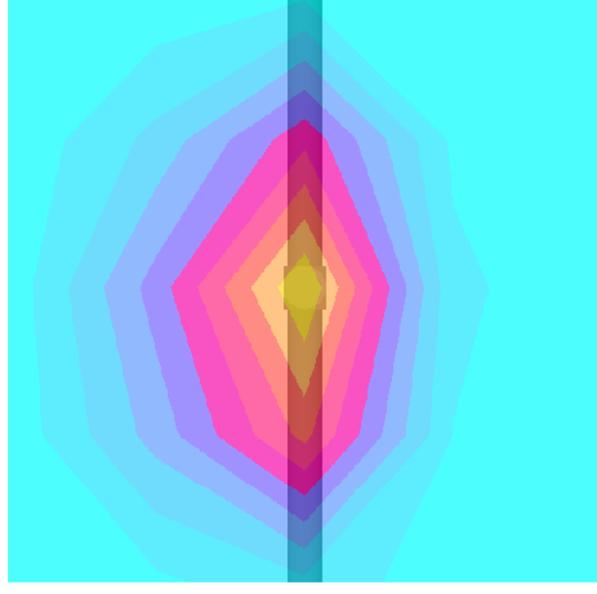
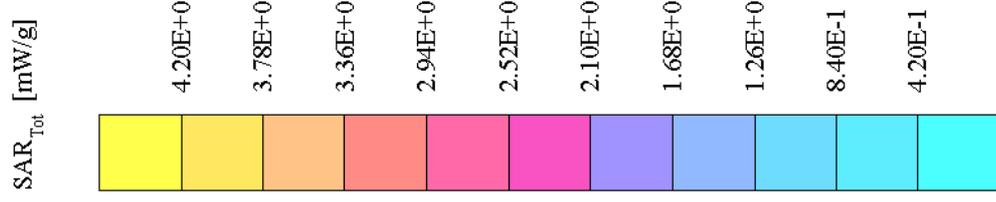
PY7AF052051

SAM 3 Phantom; Left Hand Section; Position: (108°,59°); Frequency: 824 MHz
Probe: ET3DV6 - SNI585; ConvF(6.95,6.95,6.95); Crest factor: 8.3; Head 835-900MHz: $\sigma = 0.86 \text{ mho/m}$ $\epsilon_r = 40.2 \rho = 1.00 \text{ g/cm}^3$
Cube 5x5x7: SAR (1g): 0.469 mW/g, SAR (10g): 0.319 mW/g, SAR (Worst-case extrapolation)
Coarse: DX = 12.0, Dy = 10.0, Dz = 10.0
Powerdrift: -0.00 dB
Helen:PY7AF052051;S/N:BD3050HQLB/FP2,Frequency 824.2MHz(ch128),Left
Hand Side,Tilt(108°) Phone Position, meas. Power=32.8dBm, Norm.Power=33.0dBm;
ambien temprature 22(c-degree)and humidity 22%;Date:060224



D1900 V2

SAM 4 Phantom; Flat Section; Position: (90°, 90°); Frequency: 1900 MHz
 Probe: ET3DV6 - SNI585; ConvF(5.03,5.03,5.03); Crest factor: 1.0; Head 1900MHz: $\sigma = 1.47 \text{ mho/m } \epsilon_r = 39.7 \rho = 1.00 \text{ g/cm}^3$
 Cubes (2): SAR (1g): 4.05 mW/g $\pm 0.02 \text{ dB}$, SAR (10g): 2.07 mW/g $\pm 0.04 \text{ dB}$, (Worst-case extrapolation)
 Coarse: DX = 17.0, Dy = 17.0, Dz = 17.0
 Powerdrift: -0.02 dB
 P=100mW, d=10mm, 1900MHz dipol D1900V2 s/n 5d002
 Target values: 1g mass 39.2 mW/g, 10g mass 20.6 mW/g
 Measured values: 1g mass 40.5mW/g(+3.3%), 10g mass 20.7mW/g(+0.5%)
 LIQUID'S Temperature 23C, Ambeint Temperature 22C ,humidity 25%)



DASY4 Validation Report for Body TSL

Date/Time: 15.03.2005 15:20:32

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d002

Communication System: CW-1900; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: MSL 1900 MHz;

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.57$ mho/m; $\epsilon_r = 52.2$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(4.43, 4.43, 4.43); Calibrated: 26.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.01.2005
- Phantom: Flat Phantom 5.0; Type: QD000P50AA; Serial: 1001;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 11.4 mW/g

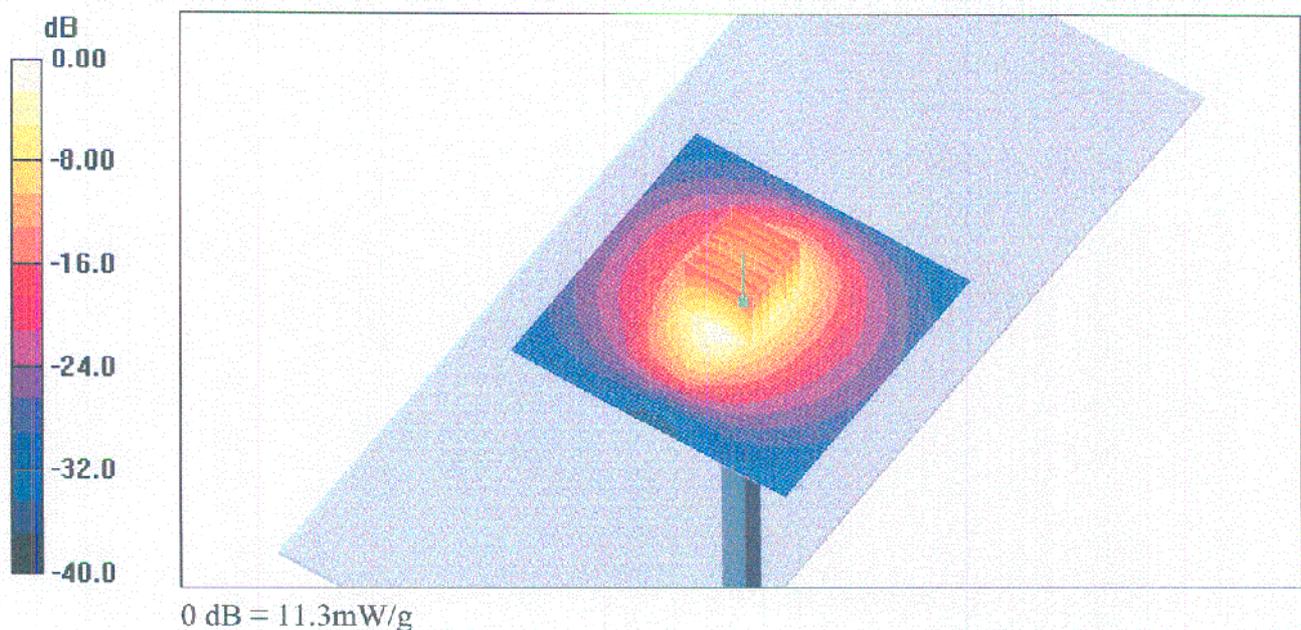
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 87.3 V/m; Power Drift = 0.061 dB

Peak SAR (extrapolated) = 16.8 W/kg

SAR(1 g) = 9.91 mW/g; SAR(10 g) = 5.23 mW/g

Maximum value of SAR (measured) = 11.3 mW/g



DASY4 Validation Report for Head TSL

Date/Time: 08.03.2005 10:35:22

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN484

Communication System: CW-835; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: HSL 835 MHz;

Medium parameters used: $f = 835$ MHz; $\sigma = 0.91$ mho/m; $\epsilon_r = 42$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(6.24, 6.24, 6.24); Calibrated: 26.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.01.2005
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 144

Pin = 250 mW; d = 15 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.46 mW/g

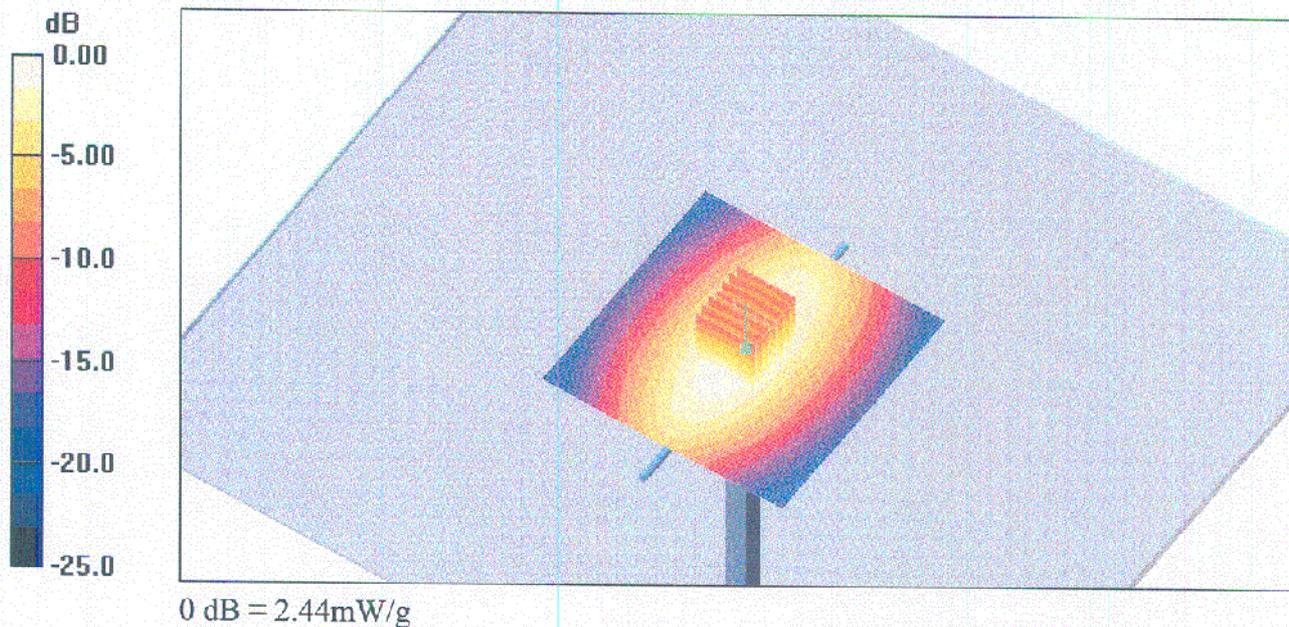
Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.0 V/m; Power Drift = 0.015 dB

Peak SAR (extrapolated) = 3.29 W/kg

SAR(1 g) = 2.27 mW/g; SAR(10 g) = 1.49 mW/g

Maximum value of SAR (measured) = 2.44 mW/g



DASY4 Validation Report for Body TSL

Date/Time: 14.03.2005 10:51:59

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN484

Communication System: CW-835; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: M900;

Medium parameters used: $f = 835$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 54.9$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(5.98, 5.98, 5.98); Calibrated: 26.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.01.2005
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Pin = 250 mW; d = 15 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.57 mW/g

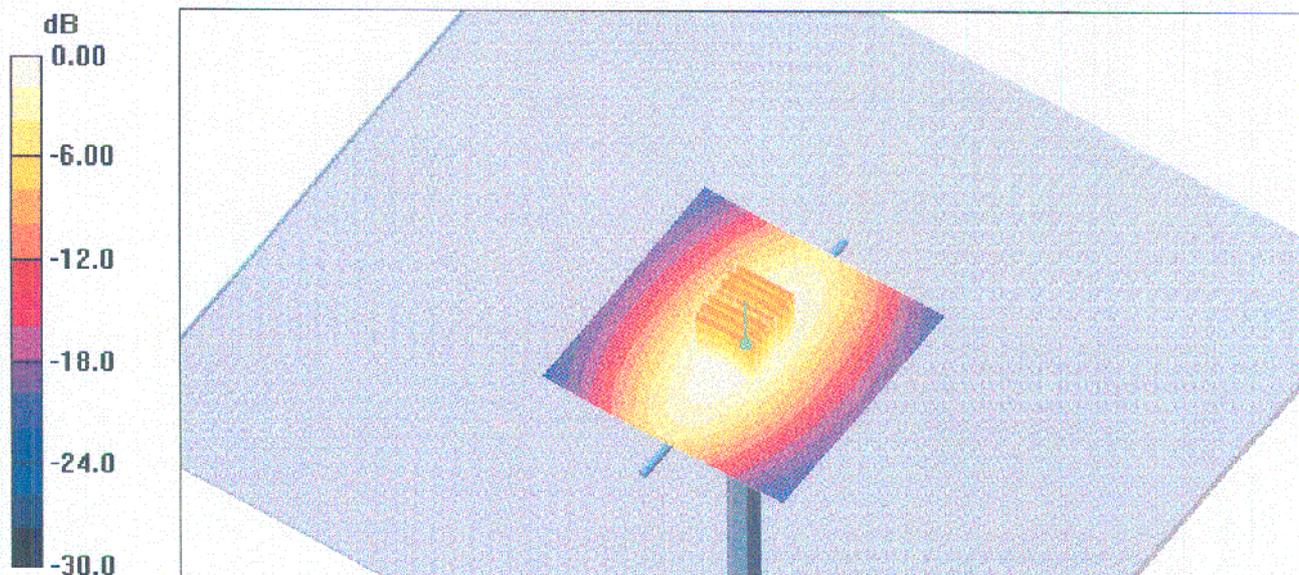
Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 52.6 V/m; Power Drift = 0.025 dB

Peak SAR (extrapolated) = 3.36 W/kg

SAR(1 g) = 2.37 mW/g; SAR(10 g) = 1.56 mW/g

Maximum value of SAR (measured) = 2.58 mW/g



DASY4 Validation Report for Head TSL

Date/Time: 09.03.2005 15:20:45

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d002

Communication System: CW-1900; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: HSL 1900 MHz;

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.46$ mho/m; $\epsilon_r = 39.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(4.96, 4.96, 4.96); Calibrated: 26.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.01.2005
- Phantom: Flat Phantom 5.0; Type: QD000P50AA; Serial: 1001;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 11.4 mW/g

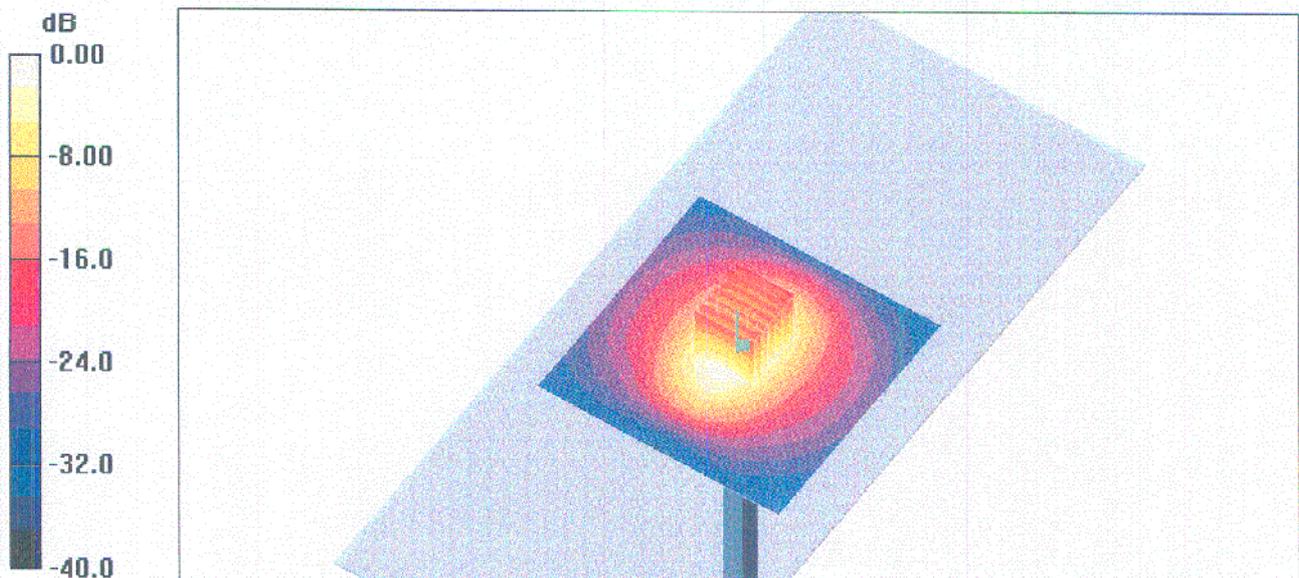
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 91.4 V/m; Power Drift = 0.037 dB

Peak SAR (extrapolated) = 16.9 W/kg

SAR(1 g) = 9.81 mW/g; SAR(10 g) = 5.15 mW/g

Maximum value of SAR (measured) = 11.0 mW/g



0 dB = 11.0mW/g



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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 **Sony Ericsson Lund**

Certificate No: **ET3-1585_Mar05**

CALIBRATION CERTIFICATE

Object **ET3DV6 - SN:1585**

Calibration procedure(s) **QA CAL-01.v5
Calibration procedure for dosimetric E-field probes**

Calibration date: **March 16, 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 $(22 \pm 3)^\circ\text{C}$ 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	5-May-04 (METAS, No. 251-00388)	May-05
Power sensor E4412A	MY41495277	5-May-04 (METAS, No. 251-00388)	May-05
Reference 3 dB Attenuator	SN: S5054 (3c)	10-Aug-04 (METAS, No. 251-00403)	Aug-05
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-04 (METAS, No. 251-00389)	May-05
Reference 30 dB Attenuator	SN: S5129 (30b)	10-Aug-04 (METAS, No. 251-00404)	Aug-05
Reference Probe ES3DV2	SN: 3013	7-Jan-05 (SPEAG, No. ES3-3013_Jan05)	Jan-06
DAE4	SN: 617	19-Jan-05 (SPEAG, No. DAE4-617_Jan05)	Jan-06

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092180	18-Sep-02 (SPEAG, in house check Oct-03)	In house check: Oct 05
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:	Nico Vetterli	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: March 16, 2005

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConF	sensitivity in TSL / NORM _{x,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:

- 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
- 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:

- NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not effect the E²-field uncertainty inside TSL (see below *ConvF*).
- NORM(f)_{x,y,z}** = NORM_{x,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*.
- DCP_{x,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 NORM_{x,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 ET3DV6

SN:1585

Manufactured:	May 7, 2001
Last calibrated:	March 18, 2004
Recalibrated:	March 16, 2005

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1585

Sensitivity in Free Space^A

NormX	1.85 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$
NormY	1.72 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$
NormZ	1.90 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$

Diode Compression^B

DCP X	93 mV
DCP Y	93 mV
DCP Z	93 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		3.7 mm	4.7 mm
SAR _{be} [%]	Without Correction Algorithm	7.8	4.0
SAR _{be} [%]	With Correction Algorithm	0.4	0.1

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

Sensor Center to Phantom Surface Distance		3.7 mm	4.7 mm
SAR _{be} [%]	Without Correction Algorithm	12.7	8.7
SAR _{be} [%]	With Correction Algorithm	0.4	0.3

Sensor Offset

Probe Tip to Sensor Center **2.7 mm**

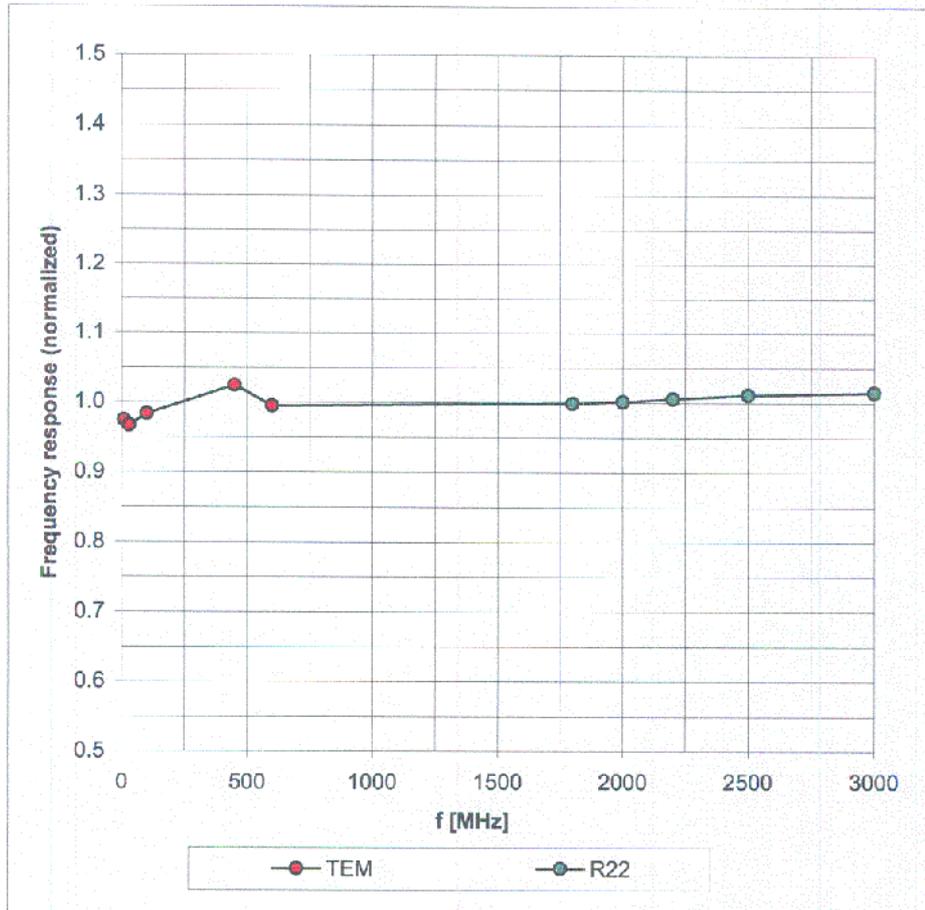
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

^A The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Page 8).

^B Numerical linearization parameter: uncertainty not required.

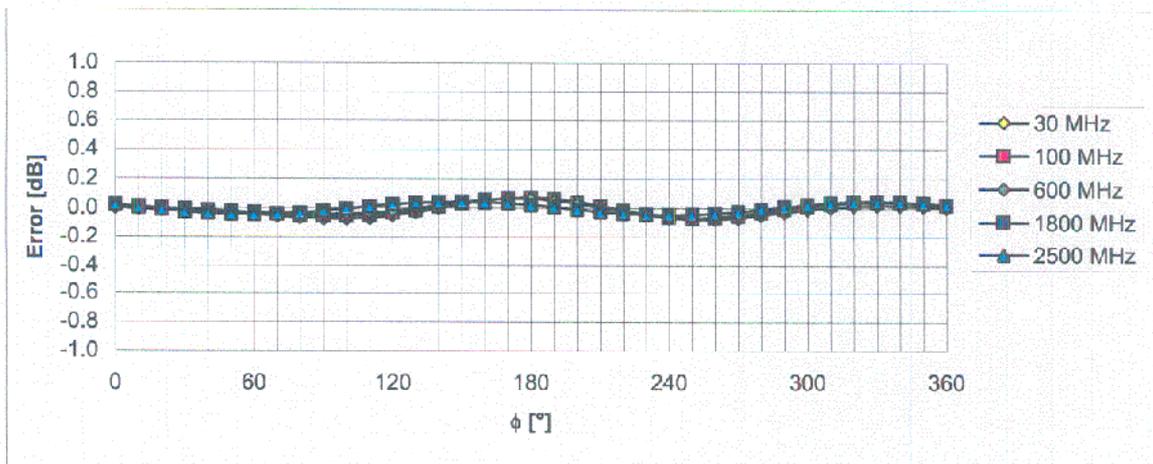
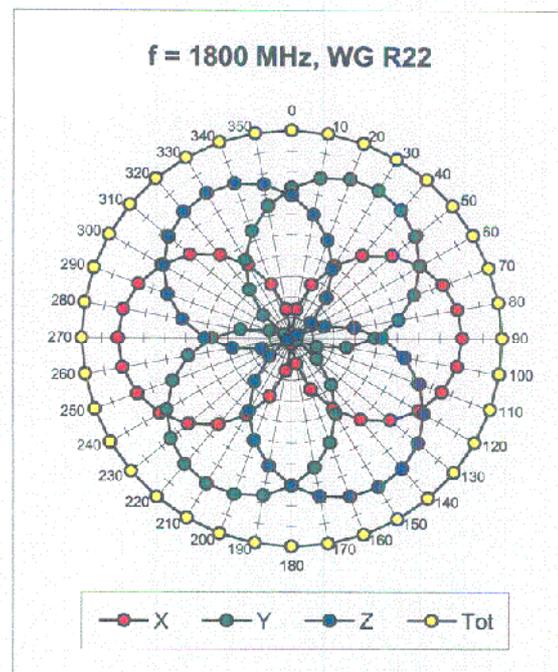
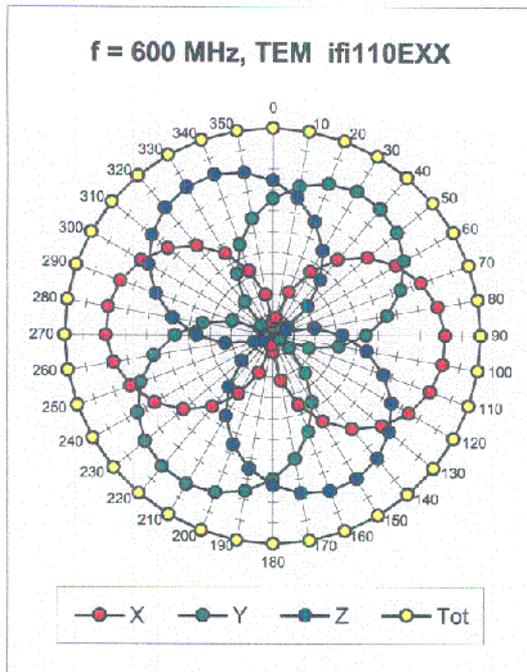
Frequency Response of E-Field

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



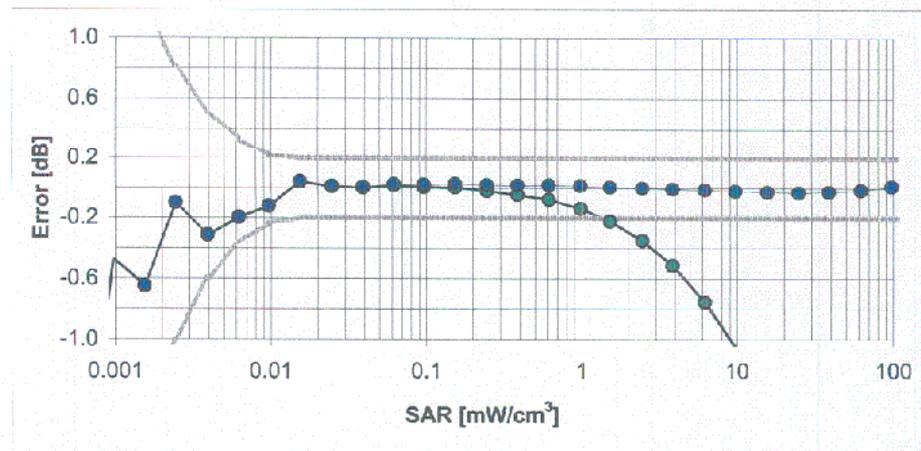
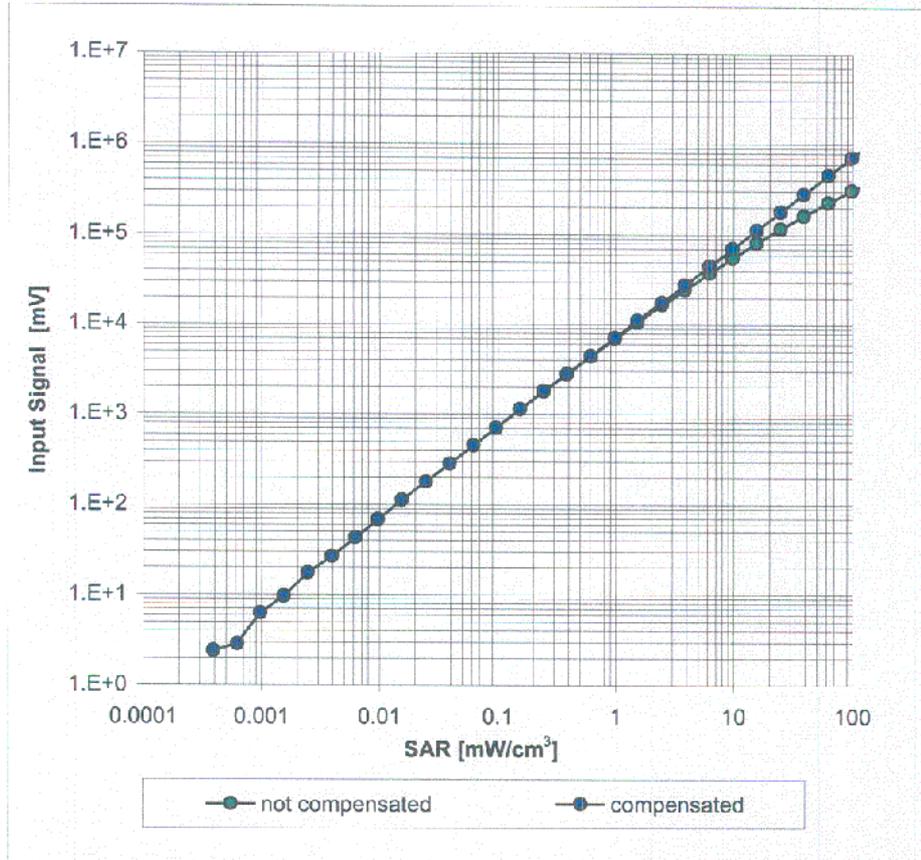
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

Receiving Pattern (ϕ), $\vartheta = 0^\circ$



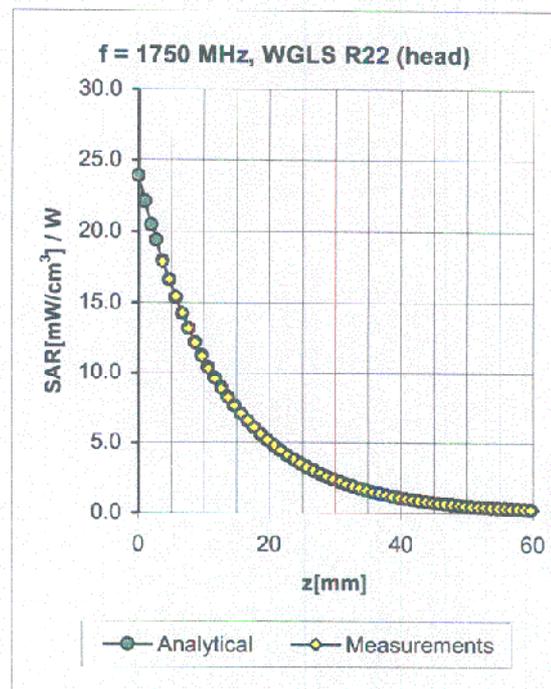
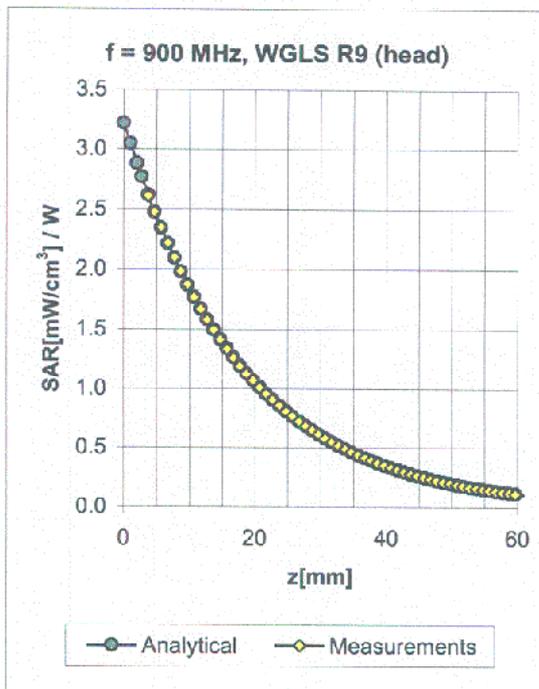
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

Dynamic Range f(SAR_{head}) (Waveguide R22, f = 1800 MHz)



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

Conversion Factor Assessment

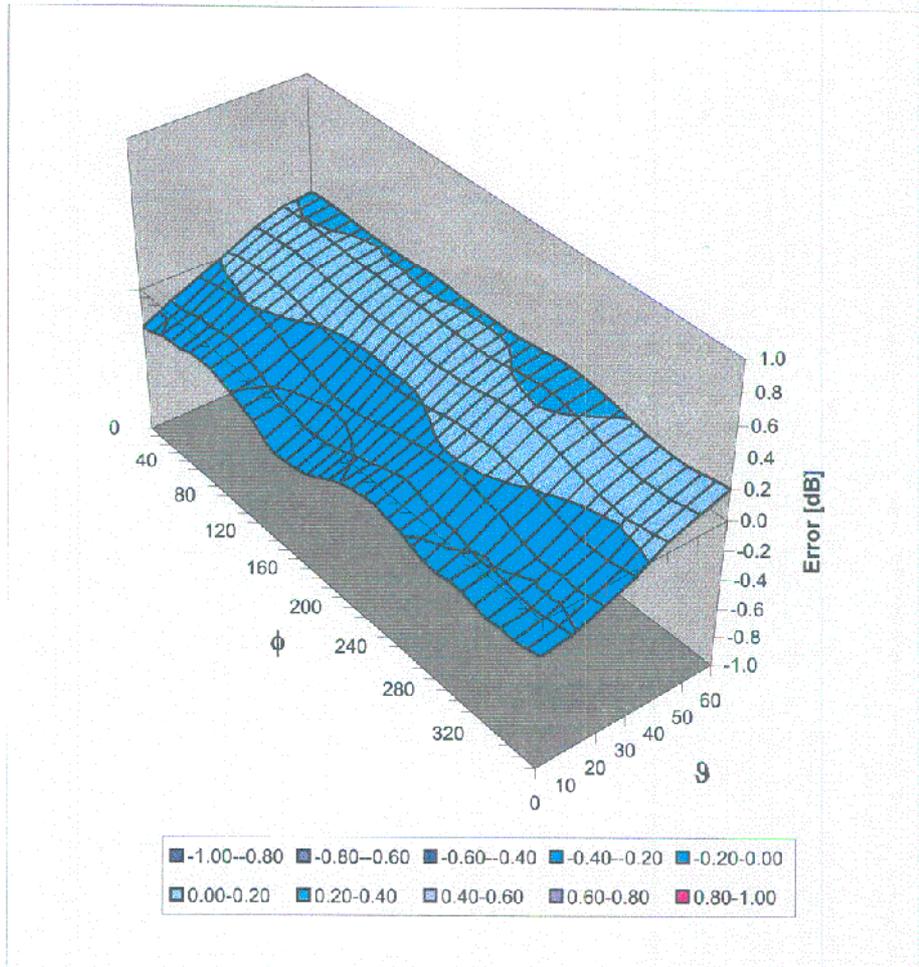


f [MHz]	Validity [MHz] ^c	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.99	1.46	6.95 ± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.91	1.49	6.73 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.53	2.45	5.30 ± 11.0% (k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.51	2.64	5.03 ± 11.0% (k=2)
2000	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.51	2.70	4.87 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.59	2.38	4.60 ± 11.8% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.96	1.54	6.65 ± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.50	2.96	4.62 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.58	2.20	4.16 ± 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: $\pm 2.6\%$ (k=2)