10/25/02

Dipole 900 MHz

SAM Phantom; Flat Section

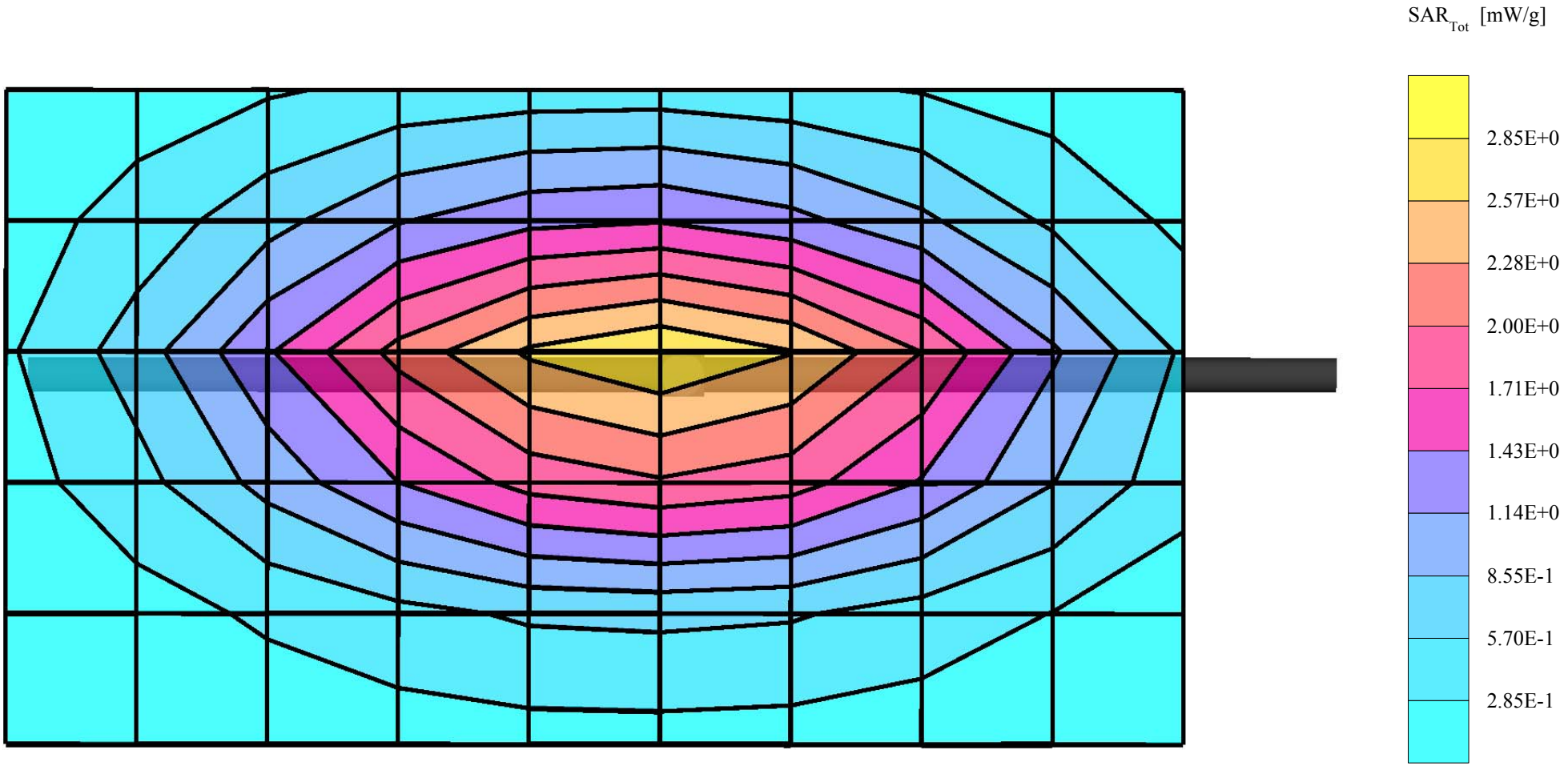
Probe: ET3DV6 - SN1387; ConvF(6.60,6.60,6.60); Crest factor: 1.0; 900 MHz Brain: $\sigma = 0.97$ mho/m $\varepsilon_r = 40.5$ $\rho = 1.00$ g/cm^3

Cube 5x5x7: Peak: 4.40 mW/g, SAR (1g): 2.68 mW/g, SAR (10g): 1.67 mW/g, (Worst-case extrapolation)

Penetration depth: 11.0 (9.9, 12.6) [mm]; Ambient Temp: 21.6°C; Fluid Temp: 22.0°C; Powerdrift: -0.04 dB

Forward Conducted Power: 250 mW

Validation Date: October 25, 2002



Dipole 900 MHz

SAM Phantom; Flat Section

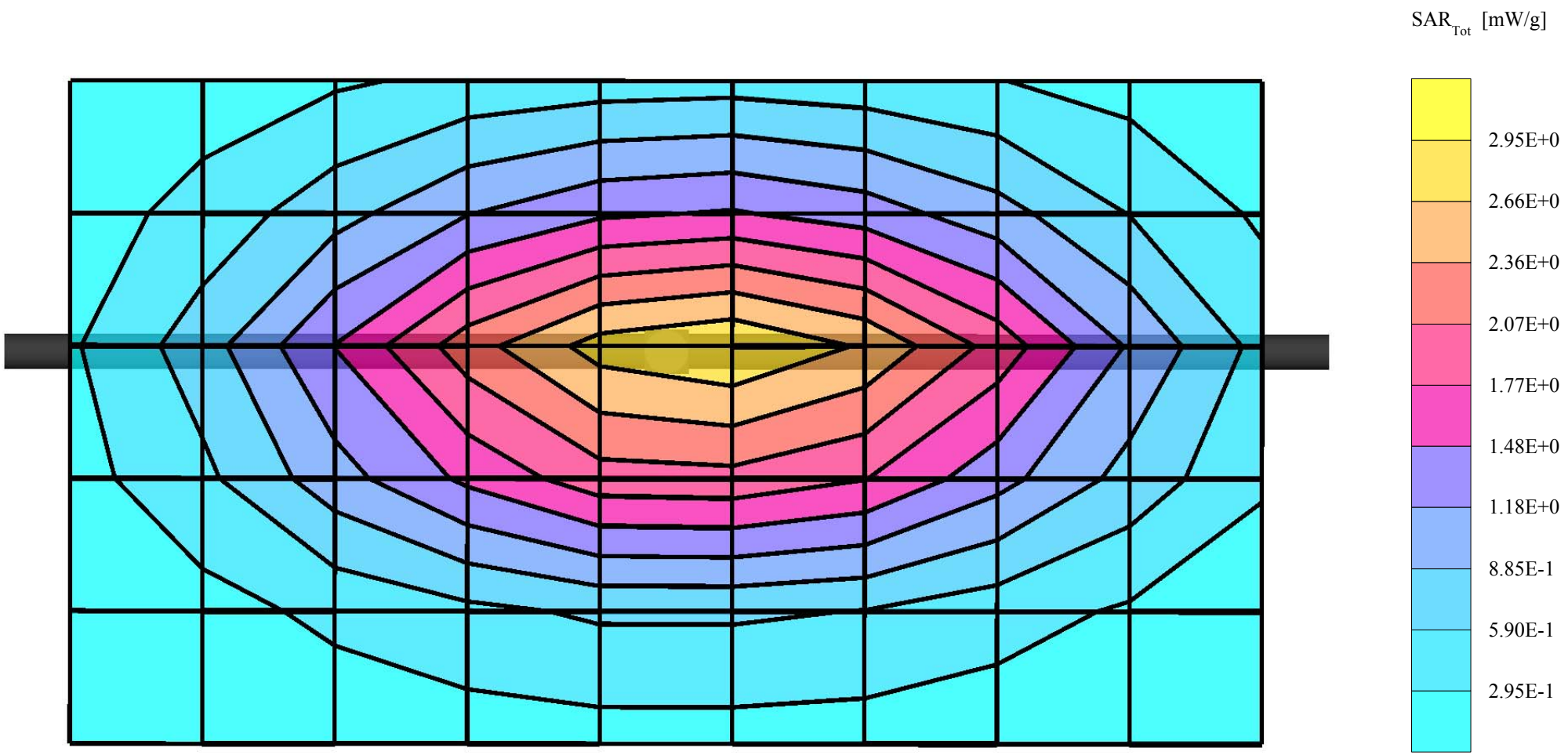
Probe: ET3DV6 - SN1387; ConvF(6.60,6.60,6.60); Crest factor: 1.0; 900 MHz Brain: $\sigma = 0.98$ mho/m $\varepsilon_r = 40.3$ $\rho = 1.00$ g/cm^3

Cube 5x5x7: Peak: 4.45 mW/g, SAR (1g): 2.71 mW/g, SAR (10g): 1.70 mW/g, (Worst-case extrapolation)

Penetration depth: 11.1 (9.9, 12.8) [mm]; Ambient Temp: 21.6°C; Fluid Temp: 22.2°C; Powerdrift: --0.01 dB

Forward Conducted Power: 250 mW

Validation Date: October 26, 2002



10/28/02

Dipole 900 MHz

SAM Phantom; Flat Section

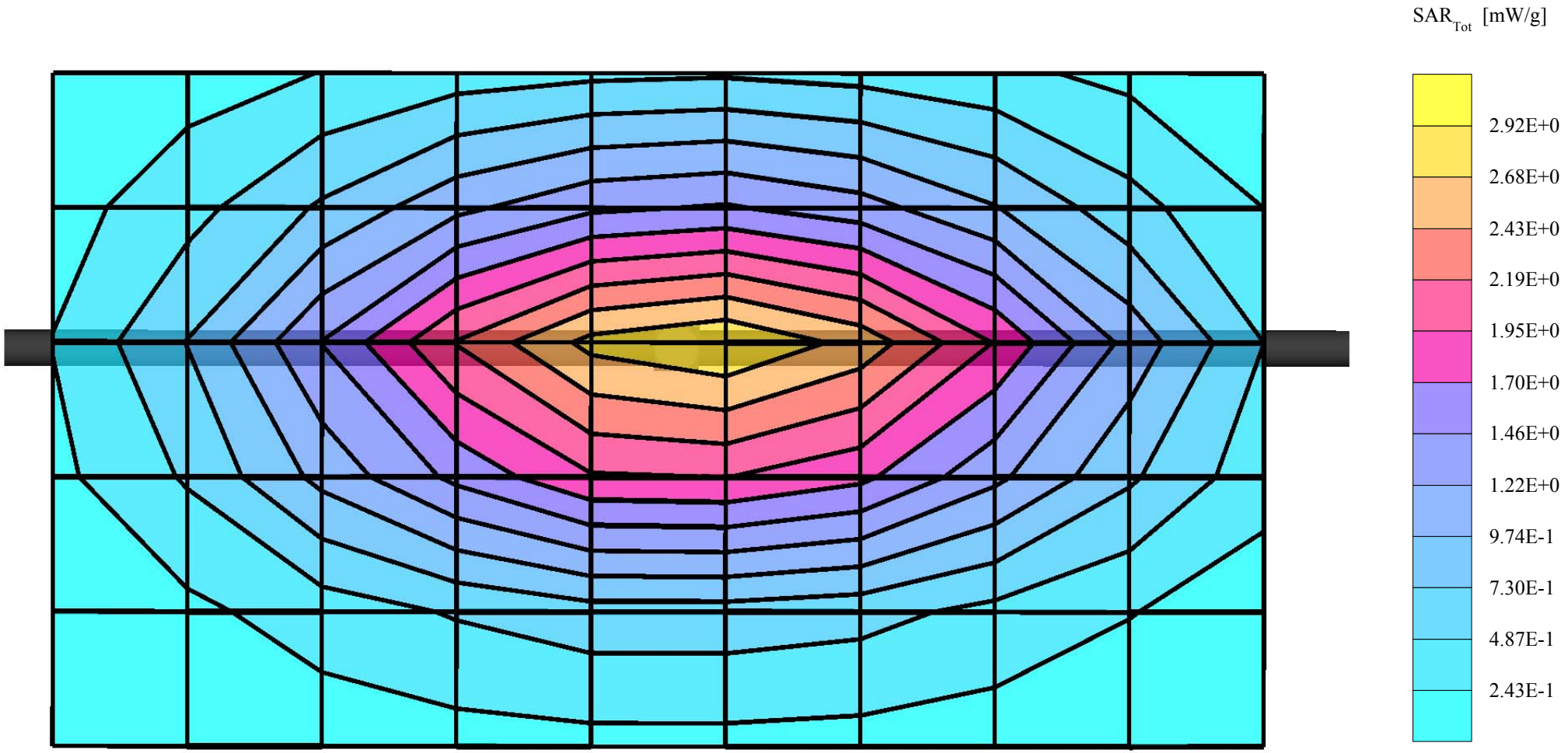
Probe: ET3DV6 - SN1387; ConvF(6.60,6.60,6.60); Crest factor: 1.0; 900 MHz Brain: $\sigma = 0.97$ mho/m $\varepsilon_r = 40.2$ $\rho = 1.00$ g/cm^3

Cube 5x5x7: Peak: 4.37 mW/g, SAR (1g): 2.66 mW/g, SAR (10g): 1.66 mW/g, (Worst-case extrapolation)

Penetration depth: 11.1 (9.9, 12.7) [mm]; Ambient Temp: 21.4°C; Fluid Temp: 21.9°C; Powerdrift: -0.02 dB

Forward Conducted Power: 250 mW

Validation Date: October 28, 2002



Dipole 900 MHz

SAM Phantom; Flat Section

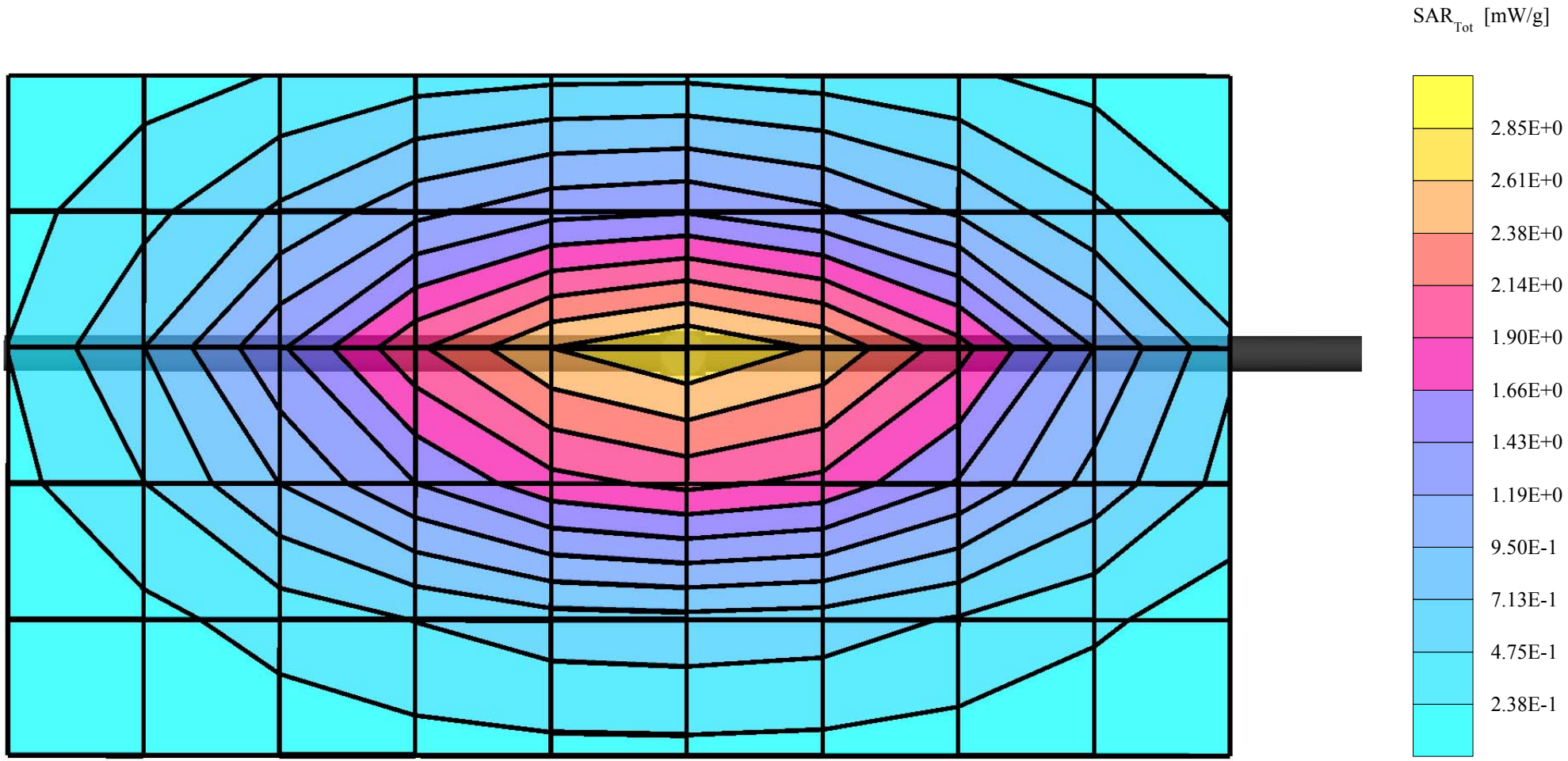
Probe: ET3DV6 - SN1387; ConvF(6.60,6.60,6.60); Crest factor: 1.0; 900 MHz Brain: $\sigma = 0.96$ mho/m $\varepsilon_r = 40.1$ $\rho = 1.00$ g/cm^3

Cube 5x5x7: Peak: 4.38 mW/g, SAR (1g): 2.69 mW/g, SAR (10g): 1.68 mW/g, (Worst-case extrapolation)

Penetration depth: 11.4 (10.2, 13.0) [mm]; Ambient Temp: 21.4°C; Fluid Temp: 21.5°C; Powerdrift: -0.02 dB

Forward Conducted Power: 250 mW

Validation Date: October 29, 2002



10/30/02

Dipole 900 MHz

SAM Phantom; Flat Section

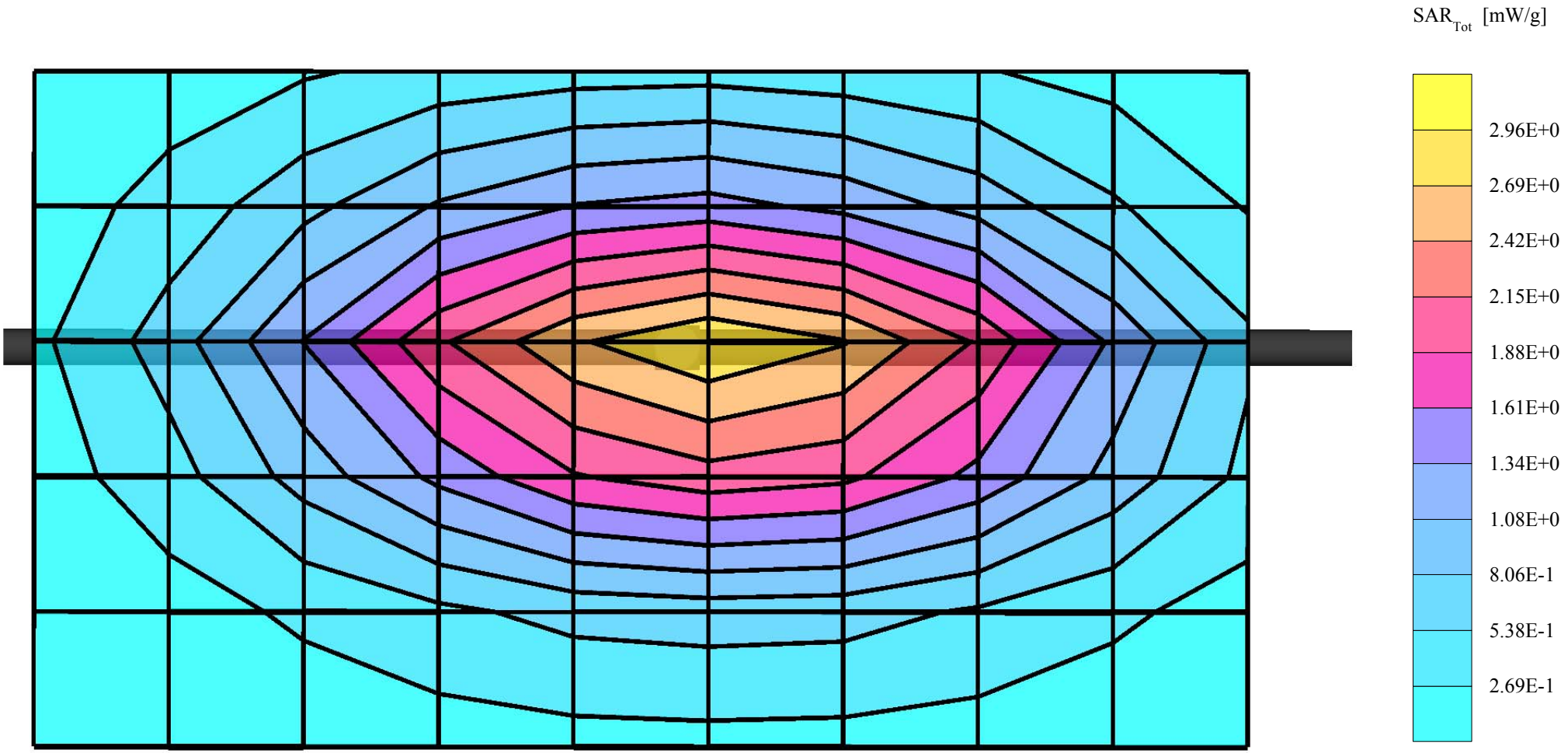
Probe: ET3DV6 - SN1387; ConvF(6.60,6.60,6.60); Crest factor: 1.0; 900 MHz Brain: $\sigma = 0.98$ mho/m $\varepsilon_r = 40.2$ $\rho = 1.00$ g/cm^3

Cube 5x5x7: Peak: 4.45 mW/g, SAR (1g): 2.68 mW/g, SAR (10g): 1.67 mW/g, (Worst-case extrapolation)

Penetration depth: 10.9 (9.7, 12.7) [mm]; Ambient Temp: 21.5°C; Fluid Temp: 21.3°C; Powerdrift: -0.00 dB

Forward Conducted Power: 250 mW

Validation Date: October 30, 2002



10/31/02

Dipole 900 MHz

SAM Phantom; Flat Section

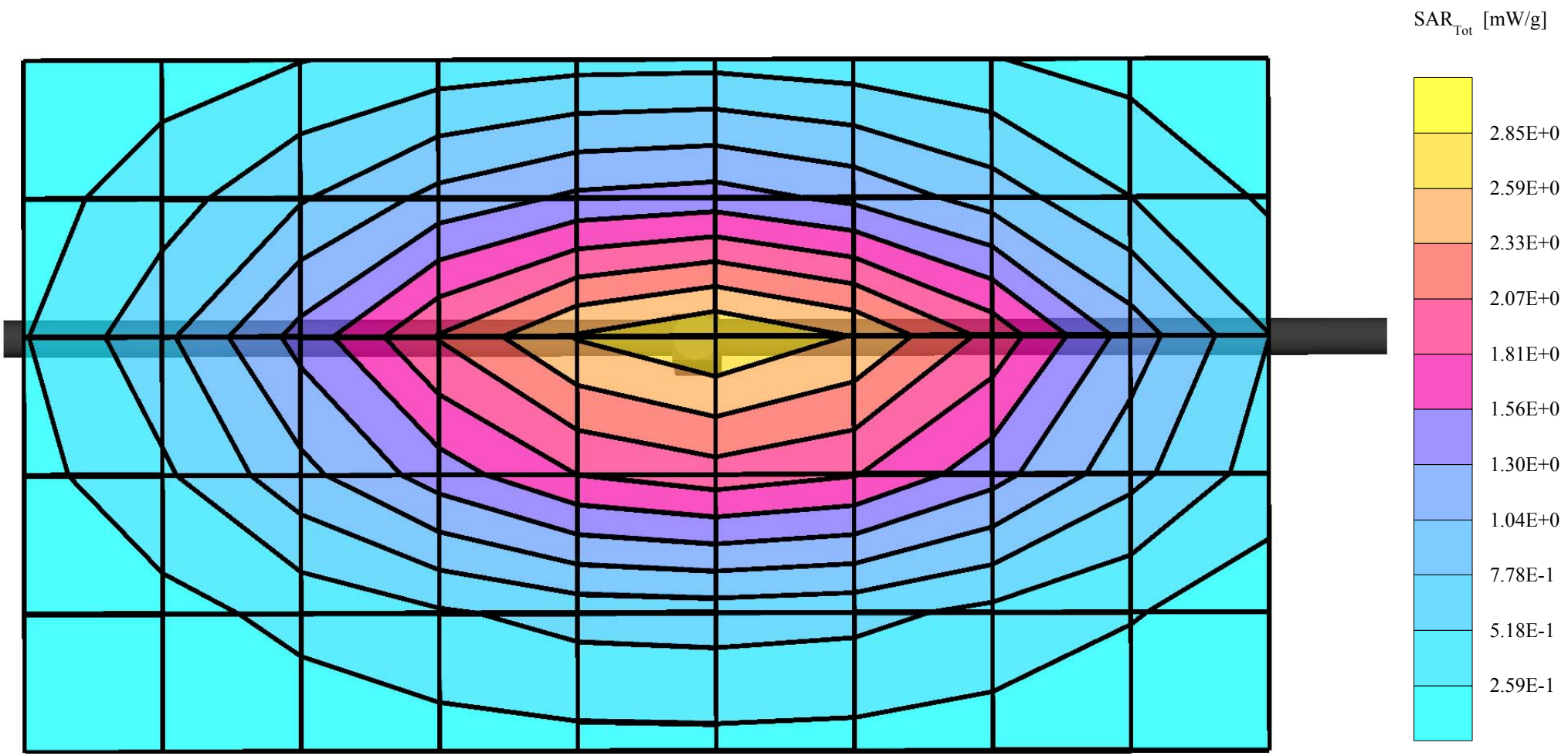
Probe: ET3DV6 - SN1387; ConvF(6.60,6.60,6.60); Crest factor: 1.0; 900 MHz Brain: $\sigma = 0.97$ mho/m $\varepsilon_r = 40.3$ $\rho = 1.00$ g/cm^3

Cube 5x5x7: Peak: 4.44 mW/g, SAR (1g): 2.70 mW/g, SAR (10g): 1.68 mW/g, (Worst-case extrapolation)

Penetration depth: 11.1 (9.9, 12.7) [mm]; Ambient Temp: 21.0°C; Fluid Temp: 21.4°C; Powerdrift: -0.04 dB

Forward Conducted Power: 250 mW

Validation Date: October 31, 2002



Dipole 900 MHz

SAM Phantom; Flat Section

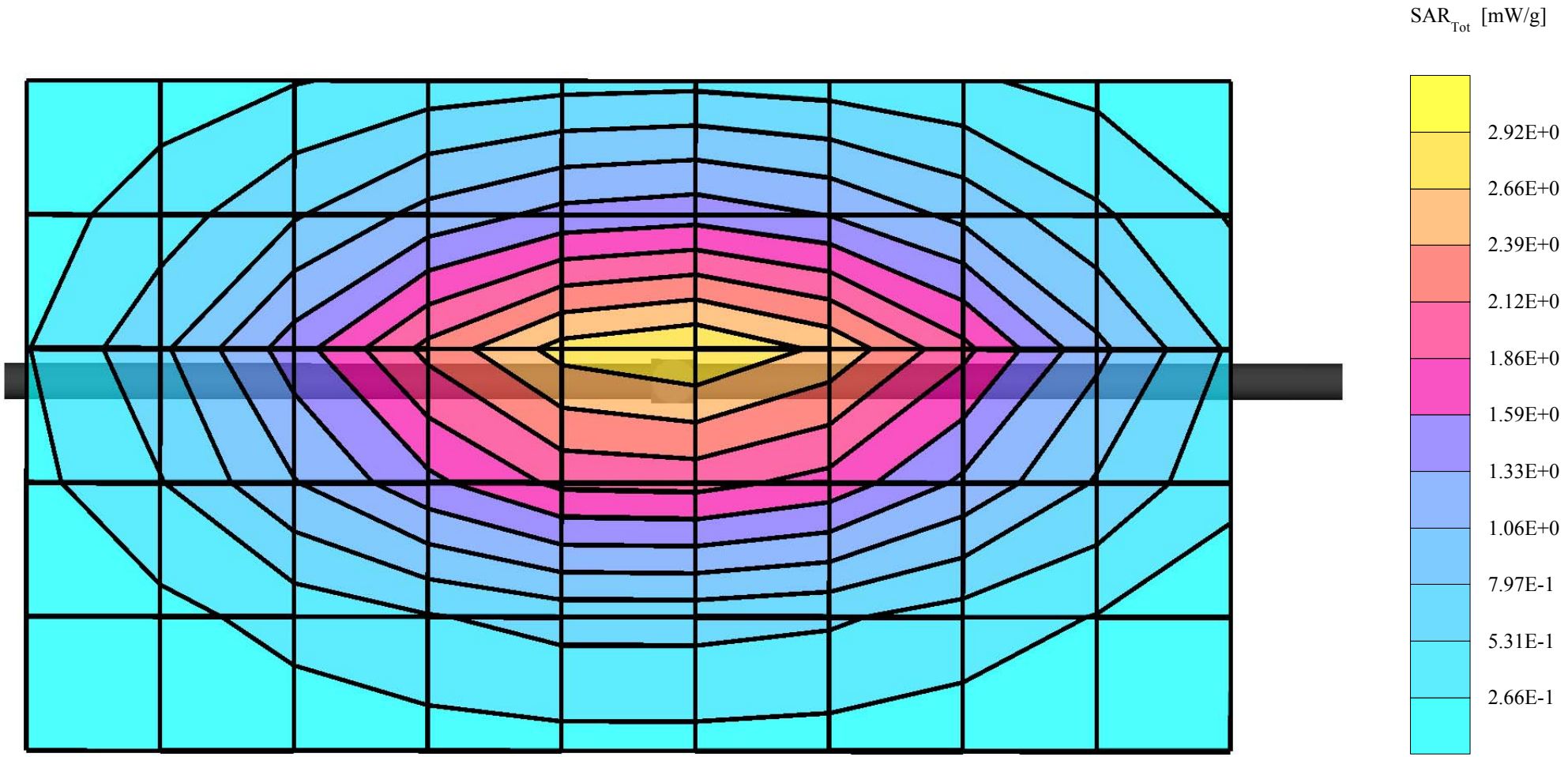
Probe: ET3DV6 - SN1387; ConvF(6.60,6.60,6.60); Crest factor: 1.0; 900 MHz Brain: $\sigma = 0.97$ mho/m $\varepsilon_r = 40.2$ $\rho = 1.00$ g/cm^3

Cube 5x5x7: Peak: 4.47 mW/g, SAR (1g): 2.71 mW/g, SAR (10g): 1.69 mW/g, (Worst-case extrapolation)

Penetration depth: 11.0 (9.8, 12.8) [mm]; Ambient Temp: 22.0°C; Fluid Temp: 21.8°C; Powerdrift: -0.00 dB

Forward Conducted Power: 250 mW

Validation Date: November 01, 2002



APPENDIX C - DIPOLE CALIBRATION

Schmid & Partner
Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

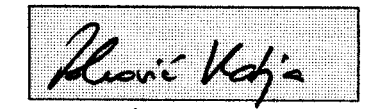
Calibration Certificate

900 MHz System Validation Dipole

Type:	**D900V2**
Serial Number:	**054**
Place of Calibration:	**Zurich**
Date of Calibration:	**June 20, 2001**
Calibration Interval:	**24 months**

Schmid & Partner Engineering AG hereby certifies, that this device has been calibrated on the date indicated above. The calibration was performed in accordance with specifications and procedures of Schmid & Partner Engineering AG.

Wherever applicable, the standards used in the calibration process are traceable to international standards. In all other cases the standards of the Laboratory for EMF and Microwave Electronics at the Swiss Federal Institute of Technology (ETH) in Zurich, Switzerland have been applied.

Calibrated by:	
Approved by:	

Schmid & Partner
Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

DASY

Dipole Validation Kit

Type: D900V2

Serial: 054

Manufactured: August 25, 1999
Calibrated: June 20, 2001

1. Measurement Conditions

The measurements were performed in the flat section of the new generic twin phantom filled with head simulating solution of the following electrical parameters at 900 MHz:

Relative Dielectricity	**42.4**	± 5%
Conductivity	**0.97 mho/m**	± 5%

The DASY3 System (Software version 3.1c) with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 6.27 at 900 MHz) was used for the measurements.

The dipole was mounted on the small tripod so that the dipole feedpoint was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 15mm from dipole center to the solution surface. The included distance holder was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 15mm was aligned with the dipole. The 5x5x7 fine cube was chosen for cube integration. Probe isotropy errors were cancelled by measuring the SAR with normal and 90° turned probe orientations and averaging.
The dipole input power (forward power) was 250mW ± 3 %. The results are normalized to 1W input power.

2. SAR Measurement

Standard SAR-measurements were performed with the phantom according to the measurement conditions described in section 1. The results have been normalized to a dipole input power of 1W (forward power). The resulting averaged SAR-values are:

averaged over 1 cm^3 (1 g) of tissue:	**11.12 mW/g**
averaged over 10 cm^3 (10 g) of tissue:	**7.04 mW/g**

Note: If the liquid parameters for validation are slightly different from the ones used for initial calibration, the SAR-values will be different as well.

3. Dipole Impedance and Return Loss

The impedance was measured at the SMA-connector with a network analyzer and numerically transformed to the dipole feedpoint. The transformation parameters from the SMA-connector to the dipole feedpoint are:

Electrical delay:	**1.413 ns**	(one direction)
Transmission factor:	**0.989**	(voltage transmission, one direction)

The dipole was positioned at the flat phantom sections according to section 1 and the distance holder was in place during impedance measurements.

Feedpoint impedance at 900 MHz:	Re{Z} = **51.3 Ω**
	Im {Z} = **-0.5 Ω**
Return Loss at 900 MHz	**-36.9 dB**

4. Measurement Conditions

The measurements were performed in the flat section of the new generic twin phantom filled with brain simulating solution of the following electrical parameters at 900 MHz:

Relative Dielectricity	**41.0**	± 5%
Conductivity	**0.86 mho/m**	± 5%

The DASY3 System (Software version 3.1c) with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 6.22 at 900 MHz) was used for the measurements.

The dipole was mounted on the small tripod so that the dipole feedpoint was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 15mm from dipole center to the solution surface. The included distance holder was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 15mm was aligned with the dipole. The 5x5x7 fine cube was chosen for cube integration. Probe isotropy errors were cancelled by measuring the SAR with normal and 90° turned probe orientations and averaging.
The dipole input power (forward power) was 250mW ± 3 %. The results are normalized to 1W input power.

5. SAR Measurement

Standard SAR-measurements were performed with the phantom according to the measurement conditions described in section 4. The results have been normalized to a dipole input power of 1W (forward power). The resulting averaged SAR-values are:

averaged over 1 cm^3 (1 g) of tissue:	**10.12 mW/g**
averaged over 10 cm^3 (10 g) of tissue:	**6.52 mW/g**

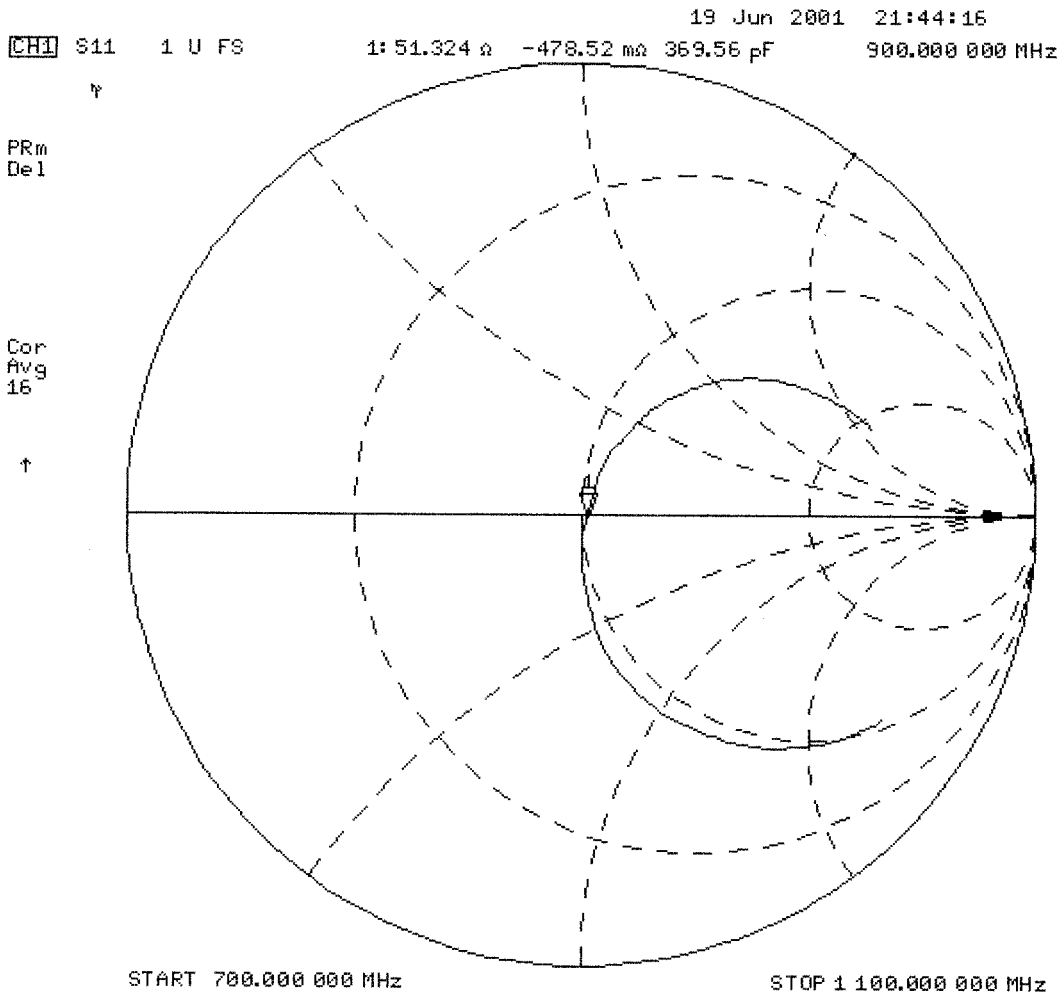
Note: If the liquid parameters for validation are slightly different from the ones used for initial calibration, the SAR-values will be different as well.

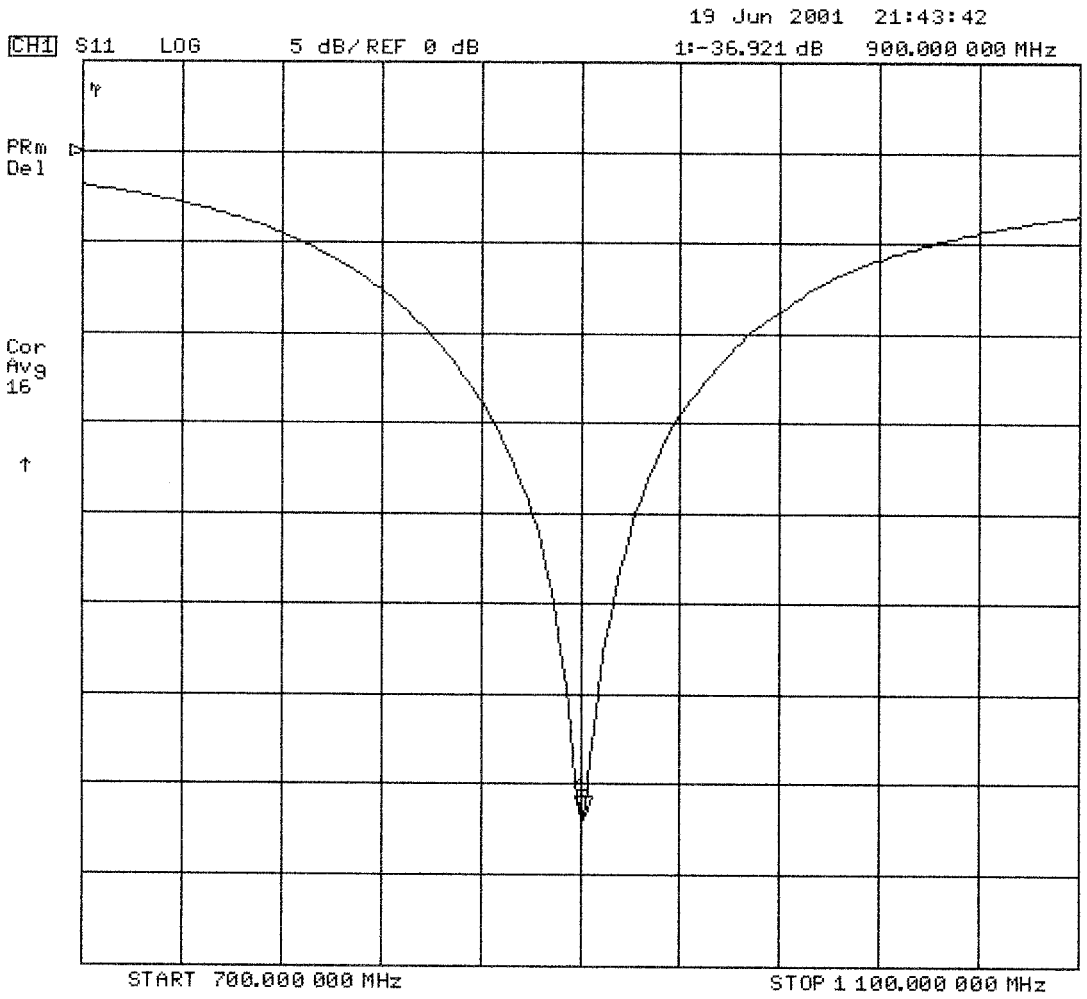
6. Handling

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

Do not apply excessive force to the dipole arms, because they might bend. If the dipole arms have to be bent back, take care to release stress to the soldered connections near the feedpoint; they might come off.

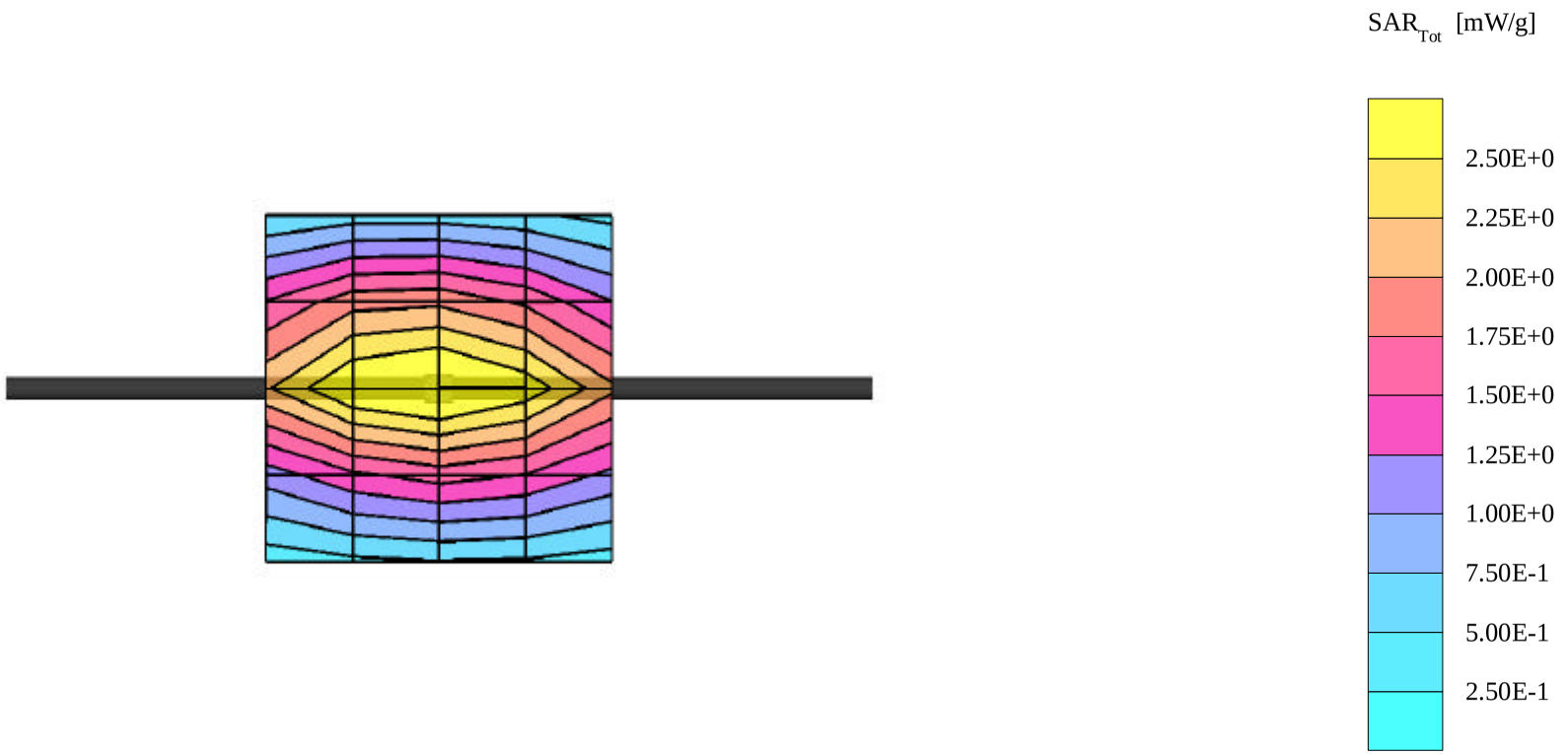
After prolonged use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.


19 Jun 2001 21:44:16
CH1 S11 1 U FS
1: 51.324 Ω -478.52 mΩ 369.56 pF
900.000 000 MHz
PRm
Del
Cor
Avg
16
START 700.000 000 MHz
STOP 1 100.000 000 MHz


19 Jun 2001 21:43:42
CH1 S11 LOG 5 dB/ REF 0 dB
1:-36.921 dB 900.000 000 MHz
PRm
Del
Cor
Avg
16
START 700.000 000 MHz
STOP 1 100.000 000 MHz

Validation Dipole D900V2 SN:054, d = 15 mm

Frequency: 900 MHz; Antenna Input Power: 250 [mW]
Generic Twin Phantom; Flat Section; Grid Spacing:Dx = 15.0, Dy = 15.0, Dz = 10.0
Probe: ET3DV6 - SN1507; ConvF(6.27,6.27,6.27); Crest factor: 1.0; IEEE1528 900 MHz: σ = 0.97 mho/m ε_r = 42.4 ρ = 1.00 g/cm^3
Cubes (2): Peak: 4.47 mW/g ± 0.05 dB, SAR (1g): 2.78 mW/g ± 0.04 dB, SAR (10g): 1.76 mW/g ± 0.02 dB, (Worst-case extrapolation)
Penetration depth: 11.5 (10.3, 13.2) [mm]
Powerdrift: -0.00 dB



APPENDIX D - PROBE CALIBRATION

Schmid & Partner
Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

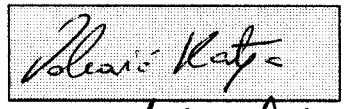
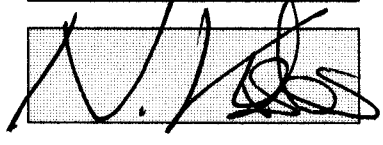
Calibration Certificate

Dosimetric E-Field Probe

Type:	**ET3DV6**
Serial Number:	**1387**
Place of Calibration:	**Zurich**
Date of Calibration:	**February 22, 2002**
Calibration Interval:	**12 months**

Schmid & Partner Engineering AG hereby certifies, that this device has been calibrated on the date indicated above. The calibration was performed in accordance with specifications and procedures of Schmid & Partner Engineering AG.

Wherever applicable, the standards used in the calibration process are traceable to international standards. In all other cases the standards of the Laboratory for EMF and Microwave Electronics at the Swiss Federal Institute of Technology (ETH) in Zurich, Switzerland have been applied.

Calibrated by:	
Approved by:	

Probe ET3DV6

SN:1387

Manufactured:	September 21, 1999
Last calibration:	September 22, 1999
Recalibrated:	February 22, 2002

Calibrated for System DASY3

DASY3 - Parameters of Probe: ET3DV6 SN:1387

Sensitivity in Free Space

Diode Compression

NormX	**1.58**	$\mu V/(V/m)^2$	DCP X	**97**	mV
NormY	**1.67**	$\mu V/(V/m)^2$	DCP Y	**97**	mV
NormZ	**1.67**	$\mu V/(V/m)^2$	DCP Z	**97**	mV

Sensitivity in Tissue Simulating Liquid

Head **900 MHz** e_r **= 41.5 ± 5%** s **= 0.97 ± 5% mho/m**
Head **835 MHz** e_r **= 41.5 ± 5%** s **= 0.90 ± 5% mho/m**

ConvF X	**6.6**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.6**	± 9.5% (k=2)	Alpha	**0.40**
ConvF Z	**6.6**	± 9.5% (k=2)	Depth	**2.38**

Head **1800 MHz** e_r **= 40.0 ± 5%** s **= 1.40 ± 5% mho/m**
Head **1900 MHz** e_r **= 40.0 ± 5%** s **= 1.40 ± 5% mho/m**

ConvF X	**5.4**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**5.4**	± 9.5% (k=2)	Alpha	**0.57**
ConvF Z	**5.4**	± 9.5% (k=2)	Depth	**2.18**

Boundary Effect

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

Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	9.7	5.4
SAR_{be} [%]	With Correction Algorithm	0.3	0.6

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

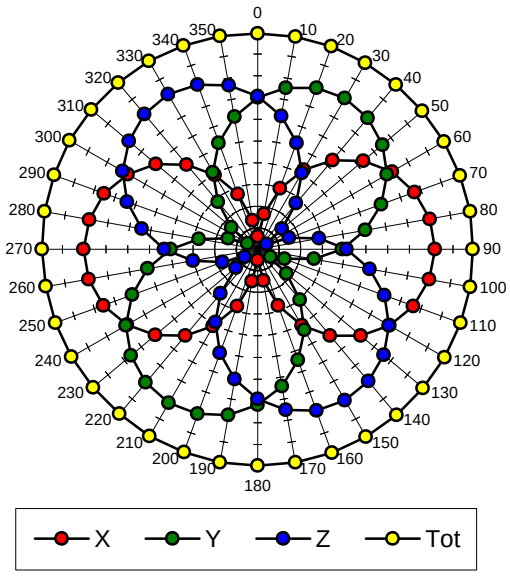
Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	11.5	7.3
SAR_{be} [%]	With Correction Algorithm	0.1	0.3

Sensor Offset

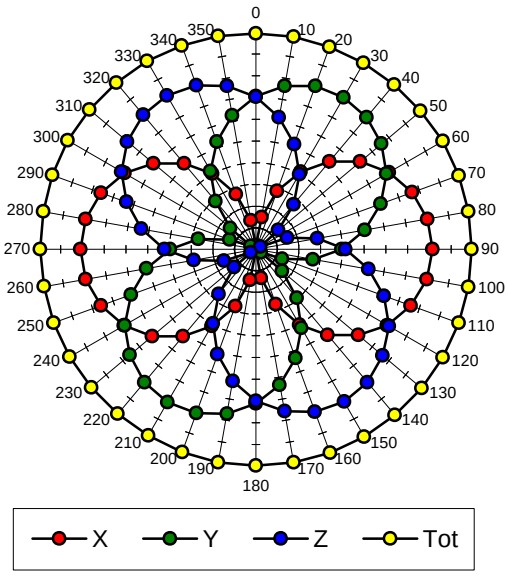
Probe Tip to Sensor Center	**2.7**	mm
Optical Surface Detection	**1.3 ± 0.2**	mm

Receiving Pattern (f) , q = 0°

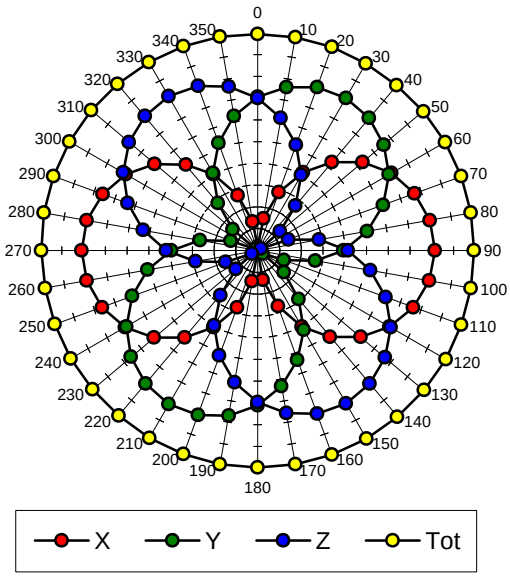
f = 30 MHz, TEM cell ifi110



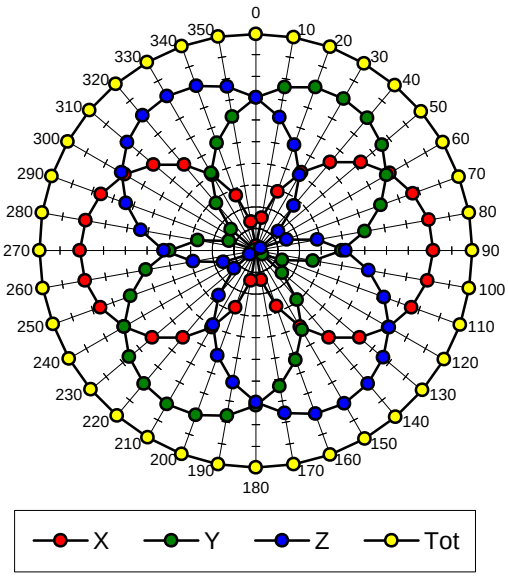
f = 100 MHz, TEM cell ifi110

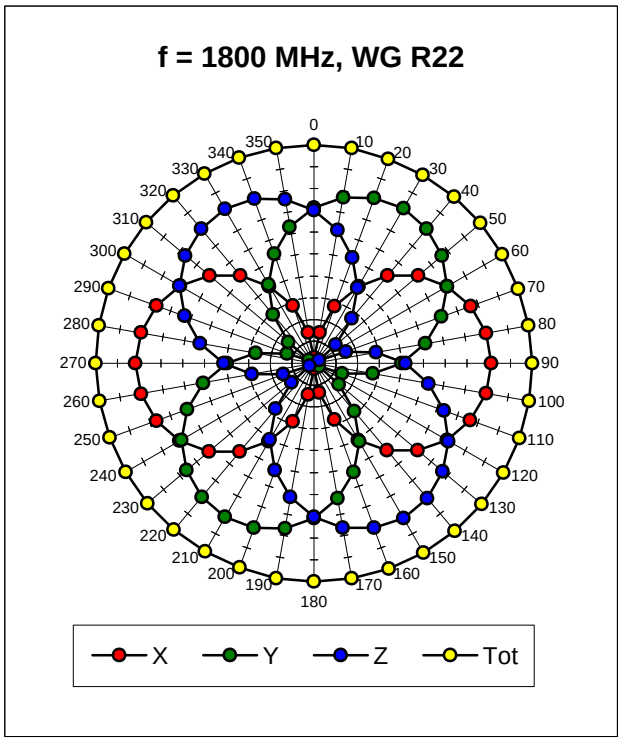


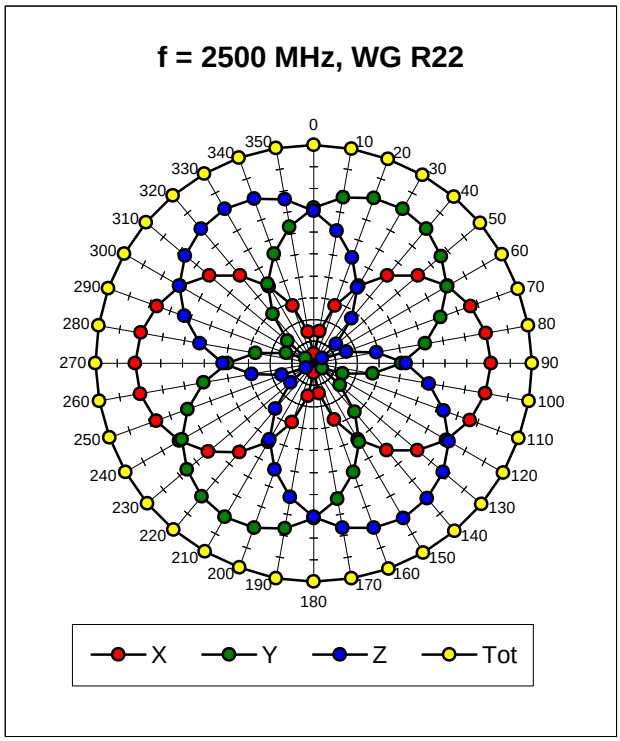
f = 300 MHz, TEM cell ifi110



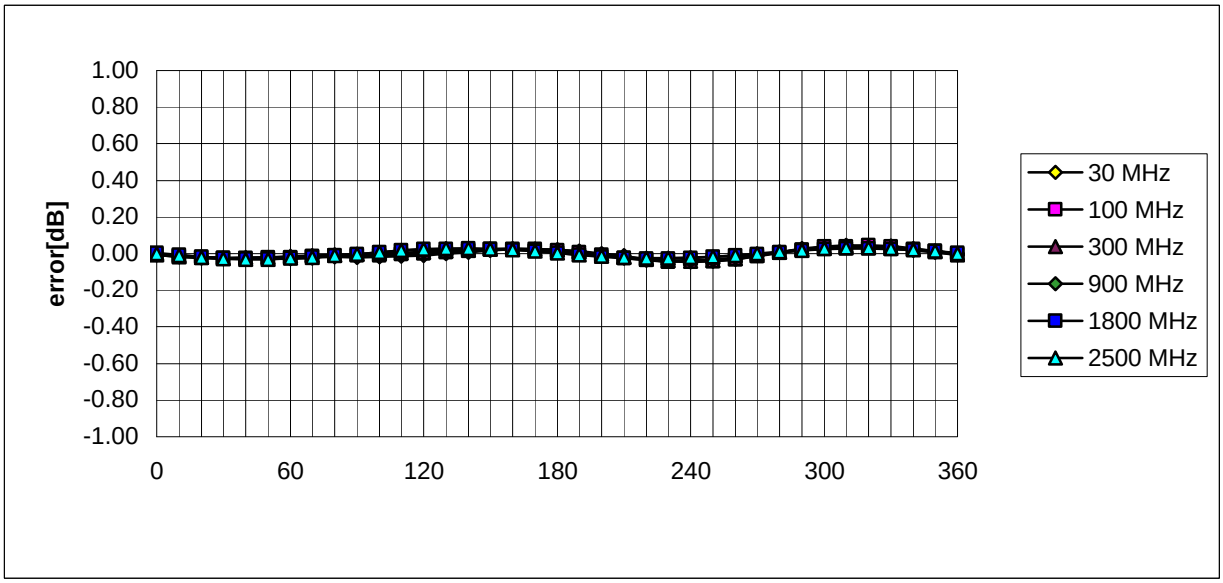
f = 900 MHz, TEM cell ifi110





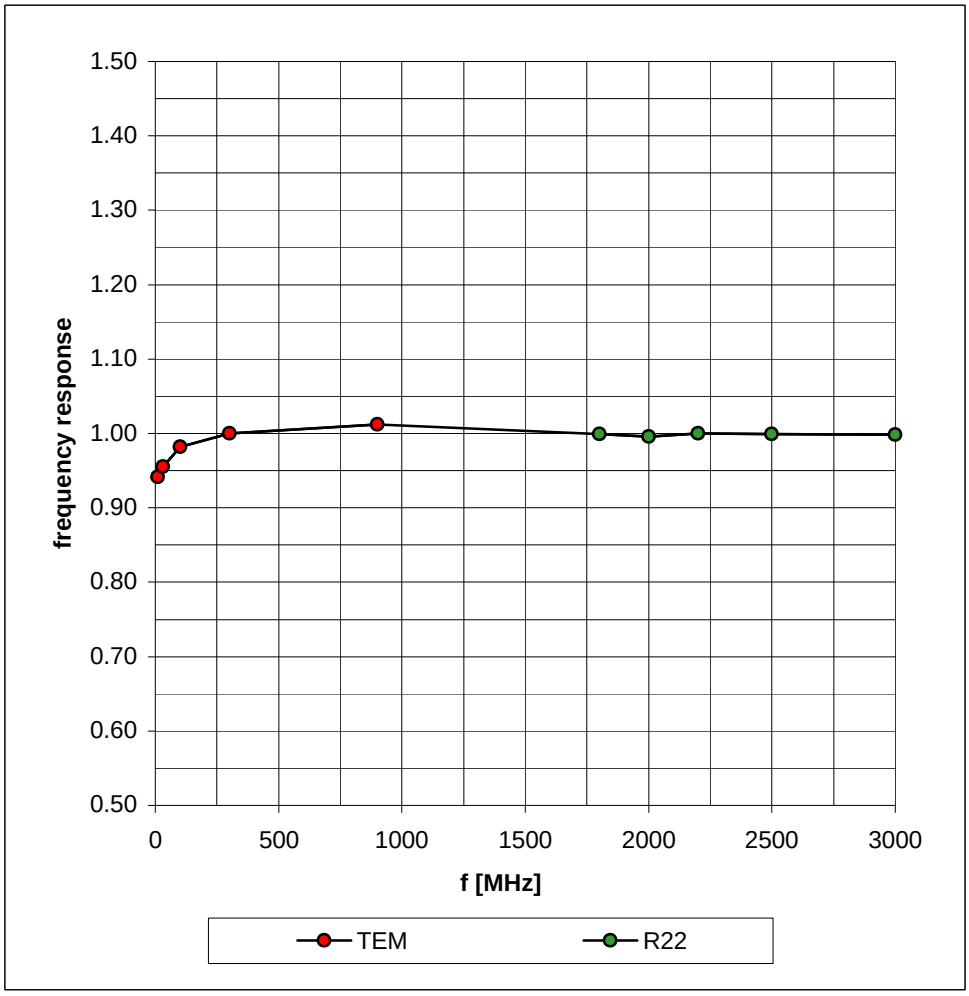


Isotropy Error (f), q = 0°



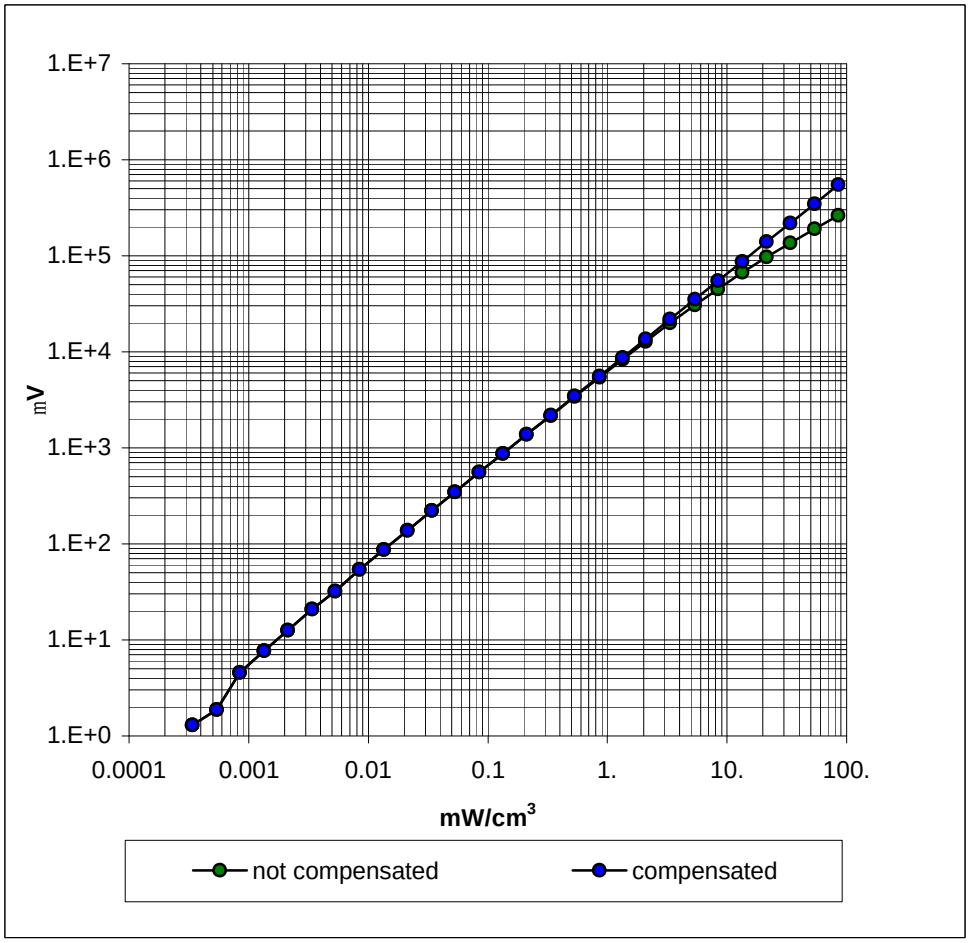
Frequency Response of E-Field

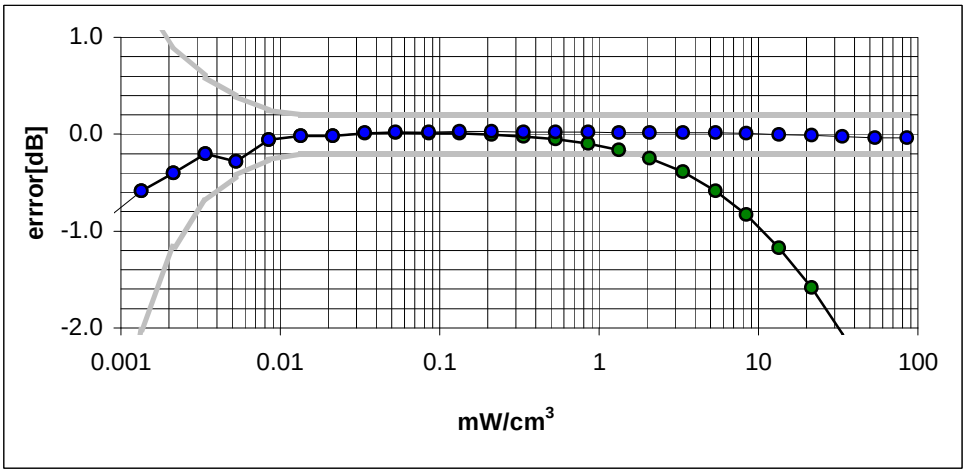
(TEM-Cell:ifi110, Waveguide R22)



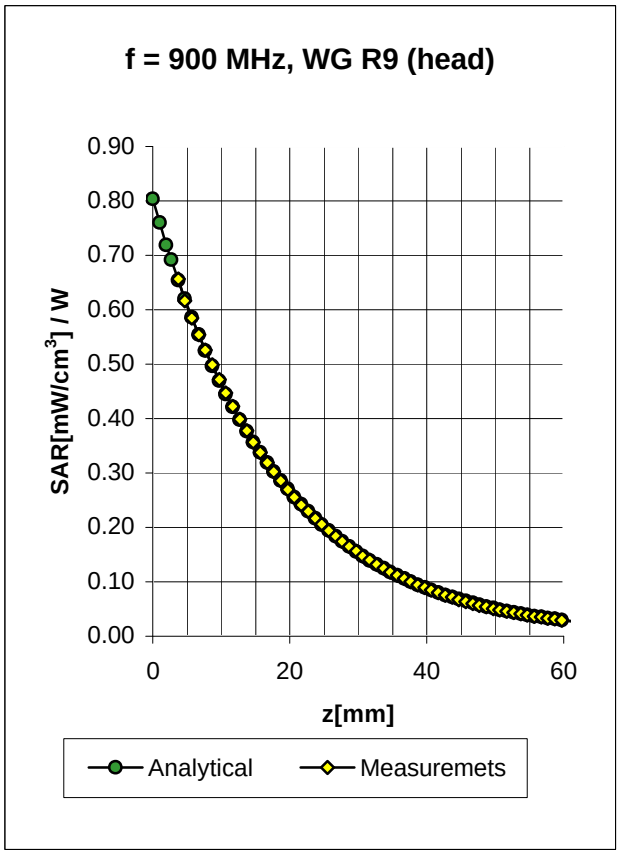
Dynamic Range f(SAR_{brain})

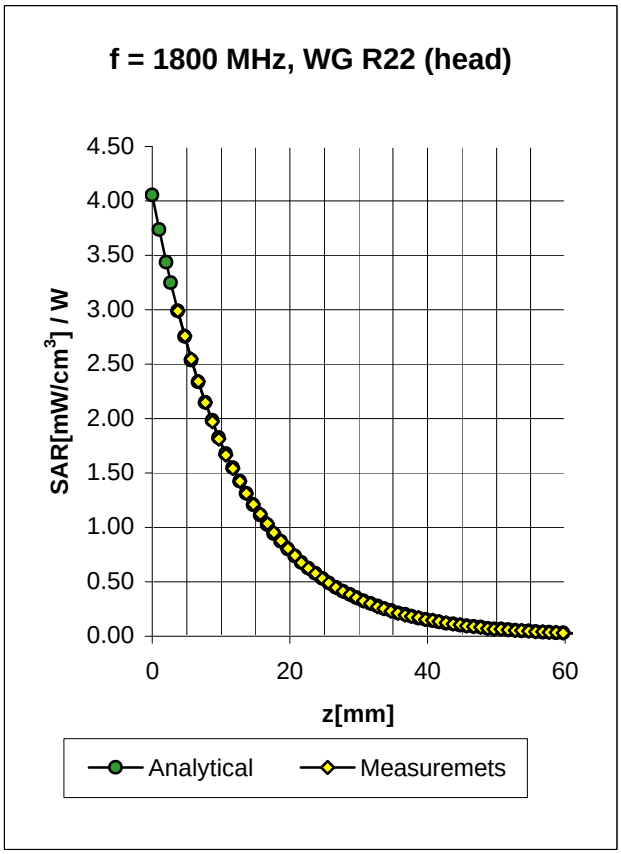
(Waveguide R22)





Conversion Factor Assessment



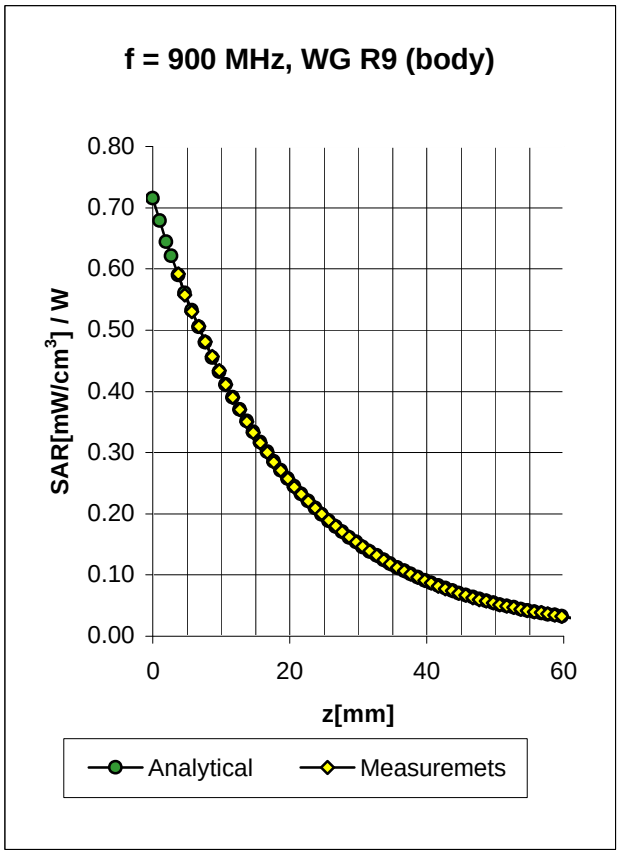


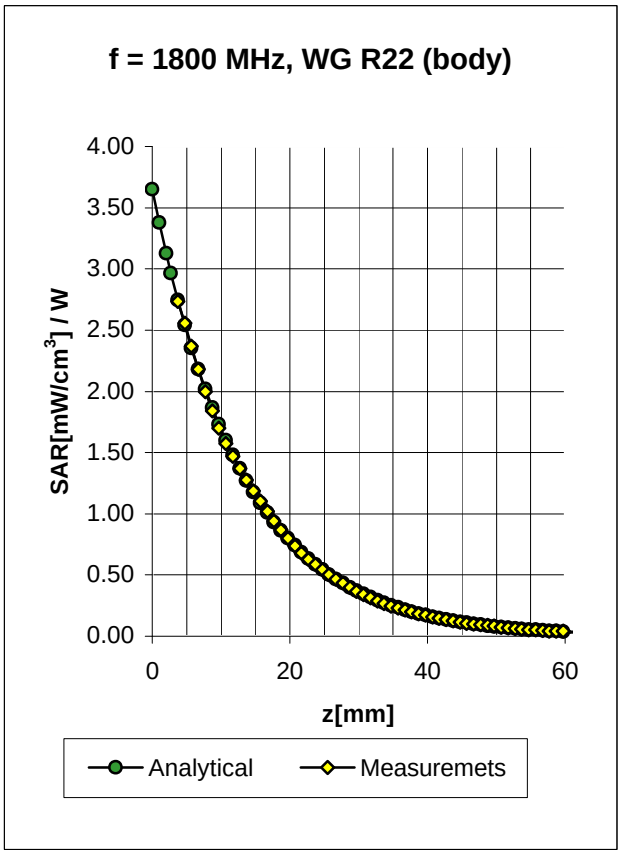
Head	**900 MHz**		e_r **= 41.5 ± 5%**	s **= 0.97 ± 5% mho/m**	
Head	**835 MHz**		e_r **= 41.5 ± 5%**	s **= 0.90 ± 5% mho/m**	
	ConvF X	**6.6** ± 9.5% (k=2)		Boundary effect:	
	ConvF Y	**6.6** ± 9.5% (k=2)		Alpha	**0.40**
	ConvF Z	**6.6** ± 9.5% (k=2)		Depth	**2.38**

Head	**1800 MHz**		e_r **= 40.0 ± 5%**	s **= 1.40 ± 5% mho/m**	
Head	**1900 MHz**		e_r **= 40.0 ± 5%**	s **= 1.40 ± 5% mho/m**	
	ConvF X	**5.4** ± 9.5% (k=2)		Boundary effect:	
	ConvF Y	**5.4** ± 9.5% (k=2)		Alpha	**0.57**
	ConvF Z	**5.4** ± 9.5% (k=2)		Depth	**2.18**

ET3DV6 SN:1387 **February 22, 2002**

Conversion Factor Assessment





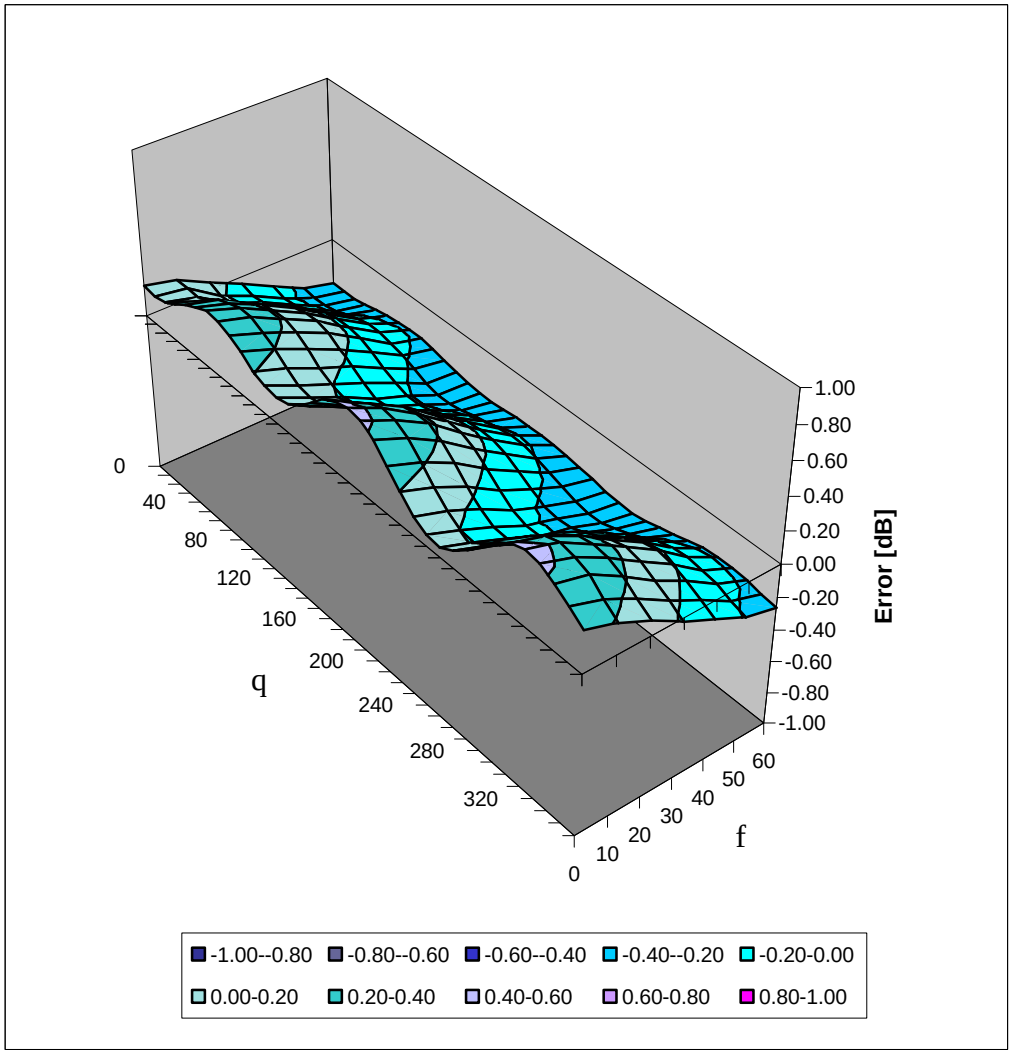
Body	**900 MHz**		e_r **= 55.0 ± 5%**	s **= 1.05 ± 5% mho/m**	
Body	**835 MHz**		e_r **= 55.2 ± 5%**	s **= 0.97 ± 5% mho/m**	
	ConvF X	**6.3** ± 9.5% (k=2)		Boundary effect:	
	ConvF Y	**6.3** ± 9.5% (k=2)		Alpha	**0.42**
	ConvF Z	**6.3** ± 9.5% (k=2)		Depth	**2.44**

Body	**1800 MHz**		e_r **= 53.3 ± 5%**	s **= 1.52 ± 5% mho/m**	
Body	**1900 MHz**		e_r **= 53.3 ± 5%**	s **= 1.52 ± 5% mho/m**	
	ConvF X	**5.0** ± 9.5% (k=2)		Boundary effect:	
	ConvF Y	**5.0** ± 9.5% (k=2)		Alpha	**0.76**
	ConvF Z	**5.0** ± 9.5% (k=2)		Depth	**2.01**

ET3DV6 SN:1387 **February 22, 2002**

Deviation from Isotropy in HSL

Error (q,f), f = 900 MHz



Schmid & Partner
Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ET3DV6**
Serial Number:	**1387**
Place of Assessment:	**Zurich**
Date of Assessment:	**February 25, 2002**
Probe Calibration Date:	**February 22, 2002**

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:

Dosimetric E-Field Probe ET3DV6 SN:1387

Conversion Factor (± standard deviation)

150 MHz	ConvF	**9.2 ± 8%**	e_r = **52.3** s = **0.76 mho/m** (head tissue)
300 MHz	ConvF	**8.0 ± 8%**	e_r = **45.3** s = **0.87 mho/m** (head tissue)
450 MHz	ConvF	**7.3 ± 8%**	e_r = **43.5** s = **0.87 mho/m** (head tissue)
2450 MHz	ConvF	**4.7 ± 8%**	e_r = **39.2** s = **1.80 mho/m** (head tissue)
150 MHz	ConvF	**8.8 ± 8%**	e_r = **61.9** s = **0.80 mho/m** (body tissue)
450 MHz	ConvF	**7.7 ± 8%**	e_r = **56.7** s = **0.94 mho/m** (body tissue)
2450 MHz	ConvF	**4.3 ± 8%**	e_r = **52.7** s = **1.95 mho/m** (body tissue)

APPENDIX E - MEASURED FLUID DIELECTRIC PARAMETERS

900MHz System Validation

Measured Fluid Dielectric Parameters (Brain)

October 24, 2002

Frequency	e'	e''
800.000000 MHz	41.0131	19.7338
810.000000 MHz	40.9428	19.7221
820.000000 MHz	40.8444	19.7126
830.000000 MHz	40.6736	19.7053
840.000000 MHz	40.5065	19.6930
850.000000 MHz	40.3213	19.6353
860.000000 MHz	40.1981	19.5624
870.000000 MHz	40.0262	19.4852
880.000000 MHz	39.9600	19.4106
890.000000 MHz	39.8990	19.4160
900.000000 MHz	39.8233	19.3612
910.000000 MHz	39.7191	19.3549
920.000000 MHz	39.5590	19.3417
930.000000 MHz	39.3766	19.2683
940.000000 MHz	39.2574	19.1886
950.000000 MHz	39.1779	19.1368
960.000000 MHz	39.1035	19.0941
970.000000 MHz	38.9948	19.0537
980.000000 MHz	38.9202	18.9948
990.000000 MHz	38.8314	18.9412
1.000000000 GHz	38.7638	18.9049

900MHz System Validation

Measured Fluid Dielectric Parameters (Brain)

October 25, 2002

Frequency	e'	e''
800.000000 MHz	41.7525	19.7778
810.000000 MHz	41.6923	19.7841
820.000000 MHz	41.5703	19.8069
830.000000 MHz	41.4113	19.8137
840.000000 MHz	41.2167	19.7682
850.000000 MHz	41.0467	19.7182
860.000000 MHz	41.0898	19.6256
870.000000 MHz	40.7452	19.5629
880.000000 MHz	40.6791	19.4799
890.000000 MHz	40.6062	19.4704
900.000000 MHz	40.5463	19.4279
910.000000 MHz	40.4254	19.4875
920.000000 MHz	40.2693	19.4794
930.000000 MHz	40.0870	19.4175
940.000000 MHz	39.9706	19.3383
950.000000 MHz	39.9111	19.2820
960.000000 MHz	39.8253	19.2255
970.000000 MHz	39.6967	19.1740
980.000000 MHz	39.6189	19.1270
990.000000 MHz	39.5456	19.1027
1.000000000 GHz	39.4457	19.0874

900MHz System Validation

Measured Fluid Dielectric Parameters (Brain)

October 26, 2002

Frequency	e'	e''
800.000000 MHz	41.5173	19.8708
810.000000 MHz	41.4700	19.8928
820.000000 MHz	41.3290	19.9130
830.000000 MHz	41.1739	19.9217
840.000000 MHz	40.9724	19.8969
850.000000 MHz	40.8262	19.8273
860.000000 MHz	40.6624	19.7548
870.000000 MHz	40.5072	19.6619
880.000000 MHz	40.4534	19.5932
890.000000 MHz	40.3820	19.5609
900.000000 MHz	40.3146	19.5332
910.000000 MHz	40.1915	19.5913
920.000000 MHz	40.0112	19.5735
930.000000 MHz	39.8524	19.5317
940.000000 MHz	39.7258	19.4246
950.000000 MHz	39.6495	19.3808
960.000000 MHz	39.5815	19.3261
970.000000 MHz	39.4876	19.2712
980.000000 MHz	39.3879	19.2196
990.000000 MHz	39.3180	19.1967
1.000000000 GHz	39.2254	19.1953

900MHz System Validation

Measured Fluid Dielectric Parameters (Brain)

October 28, 2002

Frequency	e'	e''
800.000000 MHz	41.3964	19.8267
810.000000 MHz	41.3485	19.8230
820.000000 MHz	41.2077	19.8605
830.000000 MHz	41.0734	19.8646
840.000000 MHz	40.8604	19.8334
850.000000 MHz	40.7137	19.7964
860.000000 MHz	40.5430	19.6957
870.000000 MHz	40.4010	19.6105
880.000000 MHz	40.3295	19.5479
890.000000 MHz	40.2711	19.5229
900.000000 MHz	40.2006	19.4821
910.000000 MHz	40.0681	19.5391
920.000000 MHz	39.9068	19.5167
930.000000 MHz	39.7312	19.4809
940.000000 MHz	39.6310	19.3956
950.000000 MHz	39.5363	19.3202
960.000000 MHz	39.4632	19.2775
970.000000 MHz	39.3532	19.2286
980.000000 MHz	39.2604	19.1665
990.000000 MHz	39.1762	19.1538
1.000000000 GHz	39.0888	19.1517

900MHz System Validation

Measured Fluid Dielectric Parameters (Brain)

October 29, 2002

Frequency	e'	e''
800.000000 MHz	41.2662	19.6652
810.000000 MHz	41.2314	19.7088
820.000000 MHz	41.1038	19.7337
830.000000 MHz	40.9247	19.7465
840.000000 MHz	40.7396	19.6991
850.000000 MHz	40.5885	19.6444
860.000000 MHz	40.4447	19.5281
870.000000 MHz	40.2887	19.4286
880.000000 MHz	40.2284	19.3349
890.000000 MHz	40.1639	19.3241
900.000000 MHz	40.0967	19.2946
910.000000 MHz	39.9764	19.3598
920.000000 MHz	39.7993	19.3830
930.000000 MHz	39.6051	19.3158
940.000000 MHz	39.5146	19.2297
950.000000 MHz	39.4518	19.1656
960.000000 MHz	39.3739	19.1074
970.000000 MHz	39.2703	19.0490
980.000000 MHz	39.1973	18.9920
990.000000 MHz	39.1346	18.9467
1.000000000 GHz	39.0321	18.9421

900MHz System Validation

Measured Fluid Dielectric Parameters (Brain)

October 30, 2002

Frequency	e'	e''
800.000000 MHz	41.4426	19.8362
810.000000 MHz	41.3882	19.8501
820.000000 MHz	41.2598	19.8945
830.000000 MHz	41.1030	19.8565
840.000000 MHz	40.9199	19.8589
850.000000 MHz	40.7453	19.7980
860.000000 MHz	40.5987	19.7110
870.000000 MHz	40.4252	19.6240
880.000000 MHz	40.3654	19.5679
890.000000 MHz	40.3067	19.5426
900.000000 MHz	40.2491	19.5126
910.000000 MHz	40.1335	19.5444
920.000000 MHz	39.9506	19.5330
930.000000 MHz	39.7860	19.5032
940.000000 MHz	39.6626	19.4052
950.000000 MHz	39.6015	19.3478
960.000000 MHz	39.5082	19.3015
970.000000 MHz	39.4148	19.2470
980.000000 MHz	39.3073	19.1983
990.000000 MHz	39.2435	19.1786
1.000000000 GHz	39.1500	19.1872

900MHz System Validation

Measured Fluid Dielectric Parameters (Brain)

October 31, 2002

Frequency	e'	e''
800.000000 MHz	41.5342	19.8118
810.000000 MHz	41.4889	19.8229
820.000000 MHz	41.3444	19.8126
830.000000 MHz	41.2014	19.8294
840.000000 MHz	40.9995	19.8055
850.000000 MHz	40.8582	19.7561
860.000000 MHz	40.7035	19.6815
870.000000 MHz	40.5571	19.5866
880.000000 MHz	40.4720	19.5173
890.000000 MHz	40.3990	19.5160
900.000000 MHz	40.3442	19.4650
910.000000 MHz	40.2213	19.5088
920.000000 MHz	40.0527	19.4834
930.000000 MHz	39.8845	19.4449
940.000000 MHz	39.7802	19.3508
950.000000 MHz	39.6892	19.2929
960.000000 MHz	39.6088	19.2613
970.000000 MHz	39.5086	19.2181
980.000000 MHz	39.4111	19.1753
990.000000 MHz	39.3562	19.1572
1.000000000 GHz	39.2590	19.1574

900MHz System Validation

Measured Fluid Dielectric Parameters (Brain)

November 01, 2002

Frequency	e'	e''
800.000000 MHz	41.3767	19.7121
810.000000 MHz	41.3483	19.7421
820.000000 MHz	41.2372	19.7723
830.000000 MHz	41.0366	19.7688
840.000000 MHz	40.8752	19.7350
850.000000 MHz	40.7051	19.6535
860.000000 MHz	40.5654	19.5559
870.000000 MHz	40.4014	19.4679
880.000000 MHz	40.3455	19.3922
890.000000 MHz	40.2865	19.3686
900.000000 MHz	40.2091	19.3411
910.000000 MHz	40.0794	19.3934
920.000000 MHz	39.9072	19.4193
930.000000 MHz	39.7554	19.3676
940.000000 MHz	39.6180	19.2561
950.000000 MHz	39.5769	19.2036
960.000000 MHz	39.5066	19.1421
970.000000 MHz	39.4182	19.1061
980.000000 MHz	39.3109	19.0308
990.000000 MHz	39.2483	19.0029
1.000000000 GHz	39.1444	18.9523

835MHz EUT Evaluation (Face)

Measured Fluid Dielectric Parameters (Brain)

October 24, 2002

Frequency	e'	e''
735.000000 MHz	41.9084	20.0442
745.000000 MHz	41.7771	20.0242
755.000000 MHz	41.5723	19.8754
765.000000 MHz	41.4749	19.8620
775.000000 MHz	41.3101	19.7885
785.000000 MHz	41.2128	19.7441
795.000000 MHz	41.0938	19.7287
805.000000 MHz	40.9891	19.7103
815.000000 MHz	40.9062	19.7192
825.000000 MHz	40.7166	19.6932
835.000000 MHz	40.6178	19.6339
845.000000 MHz	40.4216	19.6445
855.000000 MHz	40.3002	19.5326
865.000000 MHz	40.1776	19.5156
875.000000 MHz	40.0335	19.4451
885.000000 MHz	39.9185	19.4287
895.000000 MHz	39.8489	19.3505
905.000000 MHz	39.7415	19.3046
915.000000 MHz	39.6049	19.3320
925.000000 MHz	39.4947	19.3037
935.000000 MHz	39.3074	19.2466

835MHz EUT Evaluation (Face)

Measured Fluid Dielectric Parameters (Brain)

October 25, 2002

Frequency	e'	e''
735.000000 MHz	42.6108	20.1845
745.000000 MHz	42.4552	20.1422
755.000000 MHz	42.3076	20.1112
765.000000 MHz	42.1596	20.0591
775.000000 MHz	42.0484	20.0442
785.000000 MHz	41.8785	20.0013
795.000000 MHz	41.7856	19.9398
805.000000 MHz	41.6731	19.8743
815.000000 MHz	41.5789	19.8433
825.000000 MHz	41.4675	19.8340
835.000000 MHz	41.3108	19.7800
845.000000 MHz	41.2074	19.7706
855.000000 MHz	41.0297	19.7415
865.000000 MHz	40.9287	19.7129
875.000000 MHz	40.8002	19.6830
885.000000 MHz	40.6504	19.6707
895.000000 MHz	40.6253	19.5932
905.000000 MHz	40.5214	19.5451
915.000000 MHz	40.3931	19.5203
925.000000 MHz	40.2698	19.5001
935.000000 MHz	40.1363	19.4505

835MHz EUT Evaluation (Body)

Measured Fluid Dielectric Parameters (Muscle)

October 26, 2002

Frequency	e'	e''
735.000000 MHz	55.3975	21.5866
745.000000 MHz	55.2874	21.5053
755.000000 MHz	55.1359	21.4993
765.000000 MHz	55.0215	21.4107
775.000000 MHz	54.8807	21.3683
785.000000 MHz	54.7695	21.3287
795.000000 MHz	54.7007	21.2981
805.000000 MHz	54.6777	21.2571
815.000000 MHz	54.5968	21.2032
825.000000 MHz	54.4803	21.2244
835.000000 MHz	54.3399	21.1662
845.000000 MHz	54.2475	21.1357
855.000000 MHz	54.0841	21.0785
865.000000 MHz	53.9929	21.0282
875.000000 MHz	53.8545	21.0398
885.000000 MHz	53.7874	21.0034
895.000000 MHz	53.6923	20.8997
905.000000 MHz	53.6098	20.9128
915.000000 MHz	53.5327	20.8772
925.000000 MHz	53.3714	20.8403
935.000000 MHz	53.2858	20.8152

835MHz EUT Evaluation (Body)

Measured Fluid Dielectric Parameters (Muscle)

October 28, 2002

Frequency	e'	e"
800.000000 MH	53.025	20.5622
805.000000 MH	53.002	20.5412
810.000000 MH	52.937	20.5289
815.000000 MH	52.884	20.5129
820.000000 MH	52.850	20.4850
825.000000 MH	52.778	20.4543
830.000000 MH	52.740	20.4559
835.000000 MH	52.656	20.4352
840.000000 MH	52.636	20.4034
845.000000 MH	52.571	20.3984
850.000000 MH	52.508	20.3932
855.000000 MH	52.464	20.3490
860.000000 MH	52.405	20.3212
865.000000 MH	52.327	20.3226
870.000000 MH	52.284	20.3321
875.000000 MH	52.248	20.3284
880.000000 MH	52.210	20.3152
885.000000 MH	52.163	20.3053
890.000000 MH	52.113	20.2860
895.000000 MH	52.083	20.2183
900.000000 MH	52.046	20.2001
905.000000 MH	51.999	20.1808
910.000000 MH	51.919	20.1537
915.000000 MH	51.894	20.1575
920.000000 MH	51.853	20.1617
925.000000 MH	51.826	20.1560
930.000000 MH	51.762	20.1340
935.000000 MH	51.715	20.1260
940.000000 MH	51.650	20.0953
945.000000 MH	51.594	20.1111
950.000000 MH	51.569	20.1250
955.000000 MH	51.477	20.0957
960.000000 MH	51.447	20.0818
965.000000 MH	51.379	20.0932
970.000000 MH	51.365	20.1025
975.000000 MH	51.290	20.0781
980.000000 MH	51.252	20.0970
985.000000 MH	51.227	20.0720
990.000000 MH	51.185	20.0878
995.000000 MH	51.153	20.0660
1.000000000 GI	51.125	20.0086

835MHz EUT Evaluation (Body)

Measured Fluid Dielectric Parameters (Muscle)

October 29, 2002

Frequency	e'	e''
800.000000 MHz	53.1730	20.7940
805.000000 MHz	53.1704	20.8319
810.000000 MHz	53.0868	20.7796
815.000000 MHz	52.9857	20.8011
820.000000 MHz	53.1000	20.9081
825.000000 MHz	53.0596	20.7028
830.000000 MHz	52.8799	20.7252
835.000000 MHz	53.0464	20.7887
840.000000 MHz	52.7523	20.7871
845.000000 MHz	52.6974	20.7765
850.000000 MHz	52.8401	20.7701
855.000000 MHz	52.7716	20.6889
860.000000 MHz	52.7478	20.7853
865.000000 MHz	52.6603	20.6479
870.000000 MHz	52.6187	20.7183
875.000000 MHz	52.5043	20.5611
880.000000 MHz	52.3240	20.4938
885.000000 MHz	52.2811	20.5914
890.000000 MHz	52.3191	20.5533
895.000000 MHz	52.2456	20.3856
900.000000 MHz	52.2169	20.4977

835MHz EUT Evaluation (Body)

Measured Fluid Dielectric Parameters (Muscle)

October 30, 2002

Frequency	e'	e"
800.000000 MH	53.104	20.7271
805.000000 MH	53.061	20.7120
810.000000 MH	53.017	20.7085
815.000000 MH	52.942	20.6935
820.000000 MH	52.905	20.6711
825.000000 MH	52.849	20.6556
830.000000 MH	52.786	20.6483
835.000000 MH	52.706	20.6037
840.000000 MH	52.676	20.6068
845.000000 MH	52.621	20.5973
850.000000 MH	52.545	20.5850
855.000000 MH	52.486	20.5562
860.000000 MH	52.412	20.5437
865.000000 MH	52.346	20.5499
870.000000 MH	52.296	20.5081
875.000000 MH	52.226	20.5267
880.000000 MH	52.188	20.5126
885.000000 MH	52.120	20.4994
890.000000 MH	52.078	20.4976
895.000000 MH	52.042	20.4261
900.000000 MH	52.003	20.4132
905.000000 MH	51.945	20.4178
910.000000 MH	51.892	20.3901
915.000000 MH	51.842	20.4077
920.000000 MH	51.800	20.3658
925.000000 MH	51.743	20.3607
930.000000 MH	51.669	20.3623
935.000000 MH	51.626	20.3622
940.000000 MH	51.574	20.3358
945.000000 MH	51.538	20.3232
950.000000 MH	51.496	20.2933
955.000000 MH	51.427	20.2941
960.000000 MH	51.377	20.2879
965.000000 MH	51.334	20.2986
970.000000 MH	51.288	20.3004
975.000000 MH	51.222	20.2719
980.000000 MH	51.197	20.2950
985.000000 MH	51.151	20.3021
990.000000 MH	51.121	20.3079
995.000000 MH	51.075	20.2862
1.000000000 G	51.028	20.2942

835MHz EUT Evaluation (Body)

Measured Fluid Dielectric Parameters (Muscle)

October 31, 2002

Frequency	e'	e''
800.000000 MHz	52.7870	20.7570
805.000000 MHz	52.7553	20.7389
810.000000 MHz	52.7029	20.7392
815.000000 MHz	52.6296	20.7078
820.000000 MHz	52.5711	20.6995
825.000000 MHz	52.5173	20.7009
830.000000 MHz	52.4461	20.6809
835.000000 MHz	52.3904	20.6394
840.000000 MHz	52.3398	20.6402
845.000000 MHz	52.2483	20.6448
850.000000 MHz	52.2122	20.6190
855.000000 MHz	52.1416	20.5844
860.000000 MHz	52.0952	20.5843
865.000000 MHz	52.0464	20.5745
870.000000 MHz	51.9765	20.5621
875.000000 MHz	51.9214	20.5867
880.000000 MHz	51.8975	20.5787
885.000000 MHz	51.8492	20.5588
890.000000 MHz	51.8120	20.5663
895.000000 MHz	51.7830	20.4823
900.000000 MHz	51.7694	20.4656

835MHz EUT Evaluation (Body)

Measured Fluid Dielectric Parameters (Muscle)

November 01, 2002

Frequency	e'	e''
735.000000 MHz	55.0109	21.4098
745.000000 MHz	54.8903	21.3606
755.000000 MHz	54.7497	21.2719
765.000000 MHz	54.6392	21.2225
775.000000 MHz	54.5087	21.1346
785.000000 MHz	54.4352	21.0983
795.000000 MHz	54.3895	21.0642
805.000000 MHz	54.3462	21.0746
815.000000 MHz	54.2511	21.0859
825.000000 MHz	54.1234	21.0701
835.000000 MHz	54.0111	21.0220
845.000000 MHz	53.8820	20.9759
855.000000 MHz	53.7491	20.8786
865.000000 MHz	53.6512	20.8349
875.000000 MHz	53.5255	20.7923
885.000000 MHz	53.4516	20.7628
895.000000 MHz	53.3807	20.6646
905.000000 MHz	53.3039	20.6638
915.000000 MHz	53.2019	20.6937
925.000000 MHz	53.0625	20.6567
935.000000 MHz	52.9719	20.6167

APPENDIX F - SAM PHANTOM CERTIFICATE OF CONFORMITY

Schmid & Partner
Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

Certificate of conformity / First Article Inspection

Item	SAM Twin Phantom V4.0
Type No	QD 000 P40 BA
Series No	TP-1002 and higher
Manufacturer / Origin	Untersee Composites Hauptstr. 69 CH-8559 Fruthwilen Switzerland

Tests

The series production process used allows the limitation to test of first articles.
Complete tests were made on the pre-series Type No. QD 000 P40 AA, Serial No. TP-1001 and on the series first article Type No. QD 000 P40 BA, Serial No. TP-1006. Certain parameters have been retested using further series units (called samples).

Test	Requirement	Details	Units tested
Shape	Compliance with the geometry according to the CAD model.	IT'IS CAD File (*)	First article, Samples
Material thickness	Compliant with the requirements according to the standards	2mm +/- 0.2mm in specific areas	First article, Samples
Material parameters	Dielectric parameters for required frequencies	200 MHz – 3 GHz Relative permittivity < 5 Loss tangent < 0.05.	Material sample TP 104-5
Material resistivity	The material has been tested to be compatible with the liquids defined in the standards	Liquid type HSL 1800 and others according to the standard.	Pre-series, First article

Standards

[1] CENELEC EN 50361
[2] IEEE P1528-200x draft 6.5
[3] IEC PT 62209 draft 0.9
(*) The IT'IS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of [1] and [3].

Conformity

Based on the sample tests above, we certify that this item is in compliance with the uncertainty requirements of SAR measurements specified in standard [1] and draft standards [2] and [3].

Date 18.11.2001

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