Author Data	Dates of Test	Test Report No
Daoud S. Attayi	July 18 – August 12, 2002	RIM-0207-04
Approved	Rev	FCC ID : L6AR6510IN

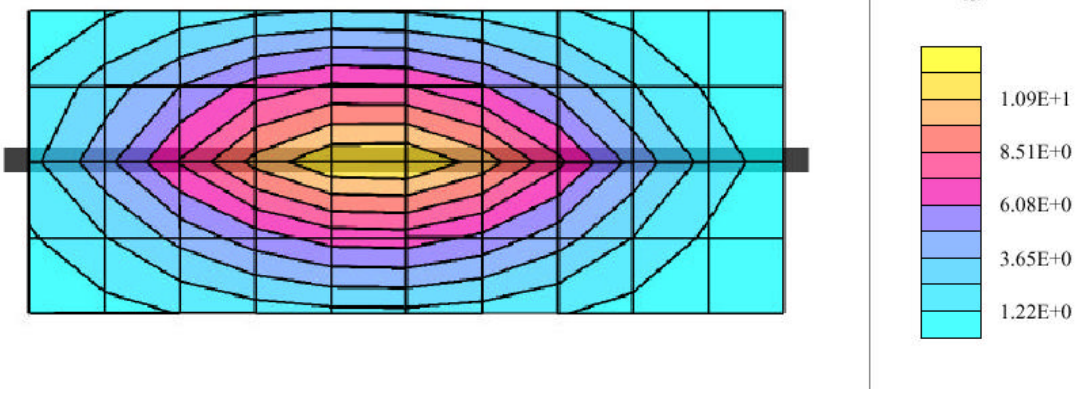
APPENDIX A: SAR DISTRIBUTION COMPARISON FOR THE ACCURACY VERIFICATION

07/18/02

Dipole 835

SAM 1; Flat
Probe: ET3DV6 - SN1644; ConvF(6.51,6.51,6.51); Crest factor: 1.0; Head 835 MHz: σ = 0.94 mho/m ε_r = 42.6 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 18.5 mW/g, SAR (1g): 11.5 mW/g, SAR (10g): 7.23 mW/g, (Worst-case extrapolation)
Penetration depth: 11.6 (10.3, 13.5) [mm]
Powerdrift: -0.00 dB

Tested on July 18, 2002
Ambient temperature: 22.7 deg. cel.
Liquid temperature: 21.6 deg. cel.

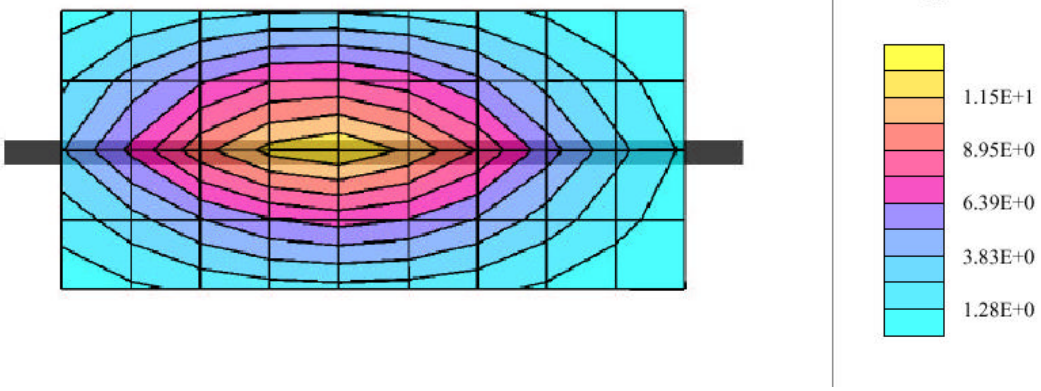


08/12/02

Dipole 835

SAM 1; Flat
Probe: ET3DV6 - SN1642; ConvF(6.50,6.50,6.50); Crest factor: 1.0; Head 835 MHz: σ = 0.91 mho/m ε_r = 40.5 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 19.0 mW/g, SAR (1g): 11.5 mW/g, SAR (10g): 7.18 mW/g, (Worst-case extrapolation)
Penetration depth: 11.4 (9.7, 13.7) [mm]
Powerdrift: -0.02 dB

Tested on August 12, 2002
Ambient temperature: 21.8 deg. cel.
Liquid temperature: 21.0 deg. cel.



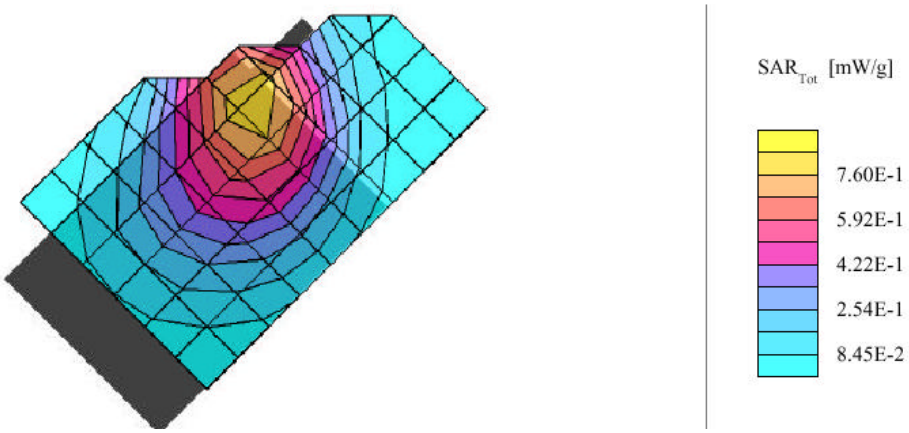
APPENDIX B: SAR DISTRIBUTION PLOTS FOR HEAD CONFIGURATION

07/19/02

BlackBerry Wireless Handheld Model No. R6510IN

SAM 1; Left Hand
Probe: ET3DV6 - SN1644; ConvF(6.51,6.51,6.51); Crest factor: 3.0; Head 835 MHz: σ = 0.94 mho/m ε_r = 42.6 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 1.27 mW/g, SAR (1g): 0.842 mW/g, SAR (10g): 0.576 mW/g, (Worst-case extrapolation)
Penetration depth: 14.3 (12.6, 16.0) [mm]
Powerdrift: -0.04 dB

Tested on July 19, 2002
Tilted left side of head
Retracted antenna
Room temp. 21.7 deg. cel.
Liquid temp. 21.5 deg. cel.
Frequency: 806.0125 MHz

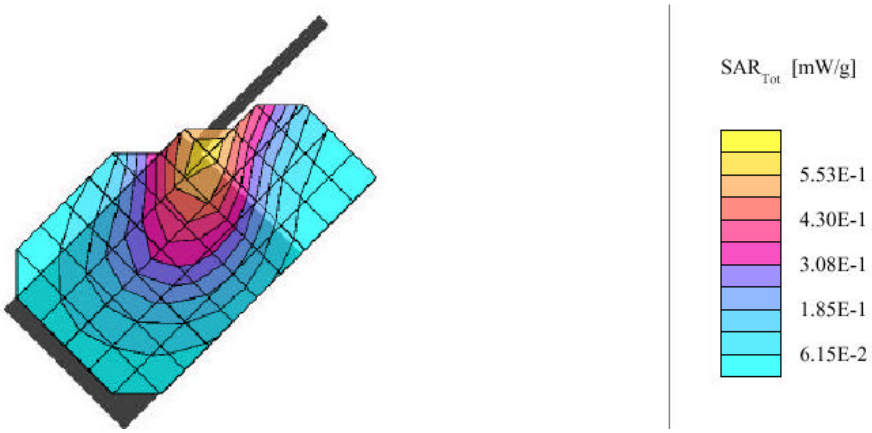


07/19/02

BlackBerry Wireless Handheld Model No. R6510IN

SAM 1; Left Hand
Probe: ET3DV6 - SN1644; ConvF(6.51,6.51,6.51); Crest factor: 3.0; Head 835 MHz: σ = 0.94 mho/m ε_r = 42.6 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 0.911 mW/g, SAR (1g): 0.590 mW/g, SAR (10g): 0.401 mW/g, (Worst-case extrapolation)
Penetration depth: 13.8 (11.4, 16.9) [mm]
Powerdrift: -0.07 dB

Tested on July 19, 2002
Tilted left side of head
Extended antenna
Room temp. 21.7 deg. cel.
Liquid temp. 21.5 deg. cel.
Frequency: 806.0125 MHz

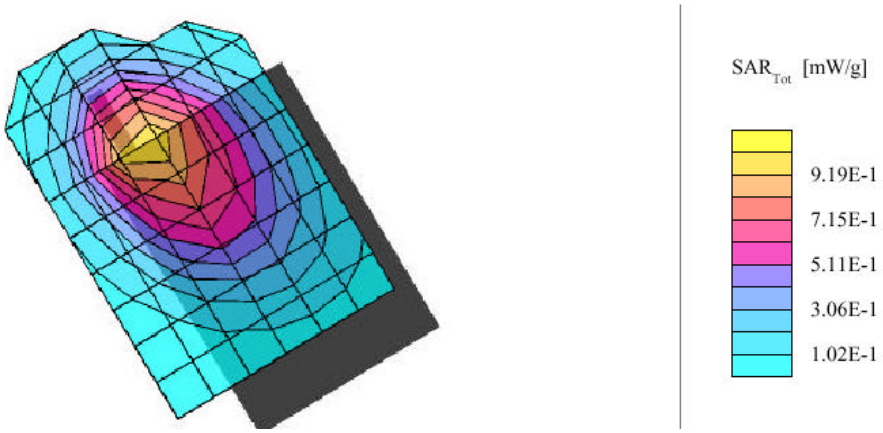


07/19/02

BlackBerry Wireless Handheld Model No. R6510IN

SAM 1; Righ Hand
Probe: ET3DV6 - SN1644; ConvF(6.51,6.51,6.51); Crest factor: 3.0; Head 835 MHz: σ = 0.94 mho/m ε_r = 42.6 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 1.68 mW/g, SAR (1g): 1.03 mW/g, SAR (10g): 0.654 mW/g, (Worst-case extrapolation)
Penetration depth: 12.0 (10.5, 13.9) [mm]
Powerdrift: 0.00 dB

Tested on July 19, 2002
Tilted right side of head
Retracted antenna
Room temp. 22.2 deg. cel.
Liquid temp. 21.5 deg. cel.
Frequency: 815.5000 MHz

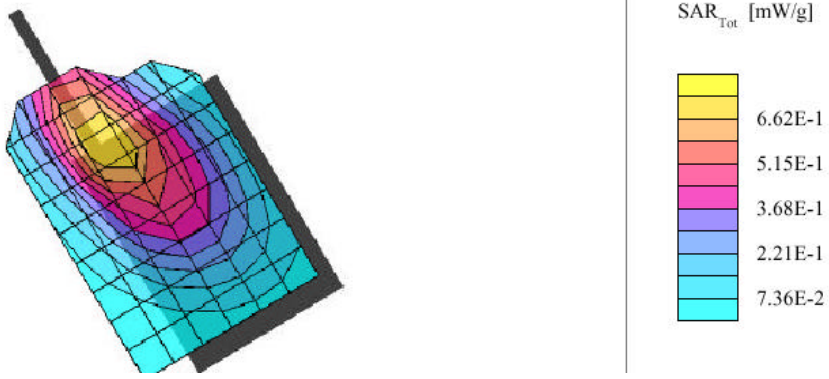


07/19/02

BlackBerry Wireless Handheld Model No. R6510IN

SAM 1; Righ Hand
Probe: ET3DV6 - SN1644; ConvF(6.51,6.51,6.51); Crest factor: 3.0; Head 835 MHz: σ = 0.94 mho/m ε_r = 42.6 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 1.21 mW/g, SAR (1g): 0.755 mW/g, SAR (10g): 0.492 mW/g, (Worst-case extrapolation)
Penetration depth: 12.2 (10.7, 14.4) [mm]
Powerdrift: 0.07 dB

Tested on July 19, 2002
Tilted right side of head
Extended antenna
Room temp. 22.2 deg. cel.
Liquid temp. 21.5 deg. cel.
Frequency: 815.5000 MHz



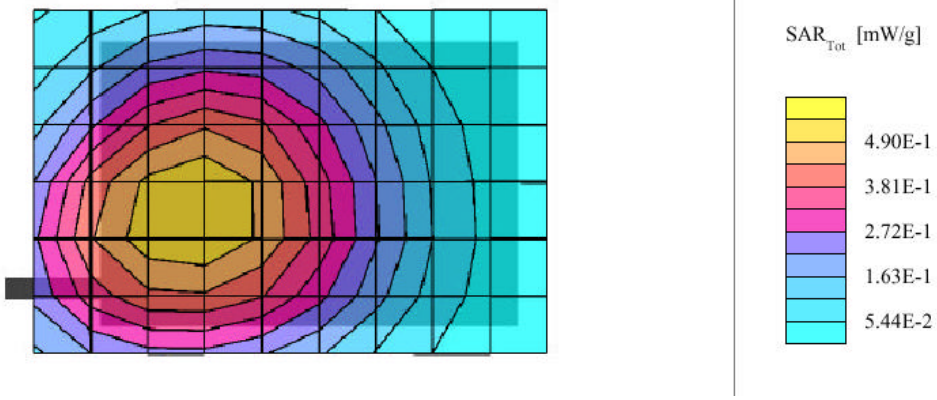
APPENDIX C: SAR DISTRIBUTION PLOTS FOR BODY-WORN AND HAND SAR CONFIGURATION

08/12/02

BlckBerry Wireless Handheld Model No. R6510IN

SAM 2; Flat
Probe: ET3DV6 - SN1642; ConvF(6.40,6.40,6.40); Crest factor: 3.0; Muscle 835 MHz: $\sigma = 0.99$ mho/m $\varepsilon_r = 56.5$ $\rho = 1.00$ g/cm^3
Cube 5x5x7: Peak: 0.742 mW/g, SAR (1g): 0.529 mW/g, SAR (10g): 0.386 mW/g, (Worst-case extrapolation)
Penetration depth: 17.0 (14.9, 19.5) [mm]
Powerdrift: -0.12 dB

Tested on August 12, 2002
Ambient temperature: 22.7 deg. cel.
Liquid temperature: 20.8 deg. cel.
Body worn with holster
Retracted antenna
Frequency: 806.0125 MHz

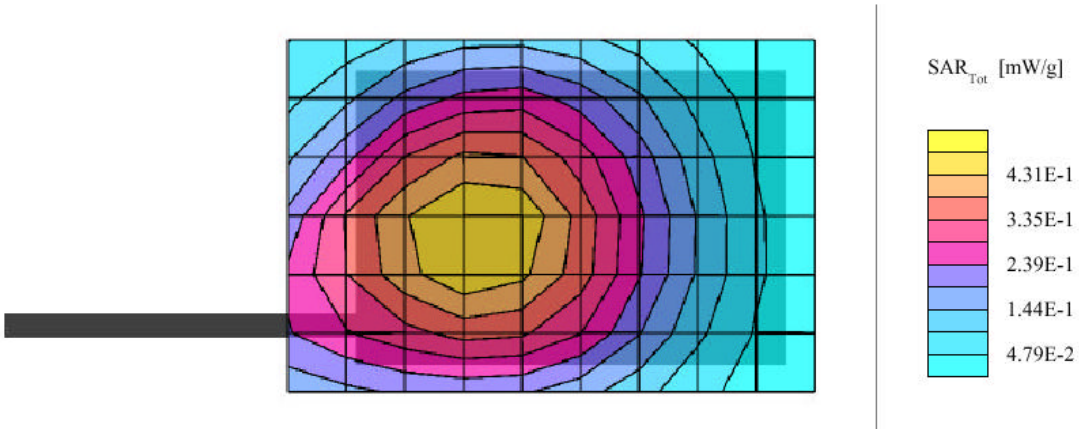


08/12/02

BlckBerry Wireless Handheld Model No. R6510IN

SAM 2; Flat
Probe: ET3DV6 - SN1642; ConvF(6.40,6.40,6.40); Crest factor: 3.0; Muscle 835 MHz: $\sigma = 0.99$ mho/m $\varepsilon_r = 56.5$ $\rho = 1.00$ g/cm^3
Cube 5x5x7: Peak: 0.695 mW/g, SAR (1g): 0.465 mW/g, SAR (10g): 0.341 mW/g, (Worst-case extrapolation)
Penetration depth: 18.0 (15.7, 20.4) [mm]
Powerdrift: -0.10 dB

Tested on August 12, 2002
Ambient temperature: 22.7 deg. cel.
Liquid temperature: 20.8 deg. cel.
Body worn with holster
Extended antenna
Frequency: 806.0125 MHz

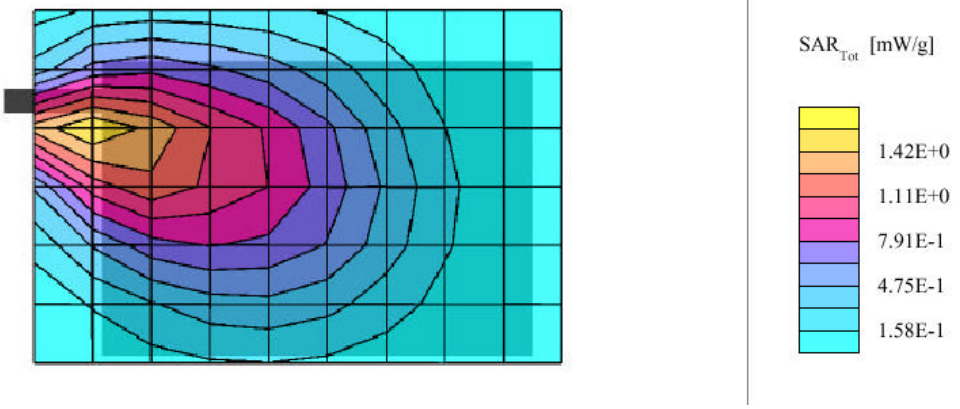


08/12/02

BlckBerry Wireless Handheld Model No. R6510IN

SAM 2; Flat
Probe: ET3DV6 - SN1642; ConvF(6.40,6.40,6.40); Crest factor: 3.0; Muscle 835 MHz: σ = 0.99 mho/m ε_r = 56.5 ρ = 1.00 g/cm^3
Cube 5x5x7: Peak: 2.60 mW/g, SAR (1g): 1.42 mW/g, SAR (10g): 0.869 mW/g * Max outside, (Worst-case extrapolation)
Penetration depth: 9.8 (7.8, 13.2) [mm]
Powerdrift: -0.00 dB

Tested on August 12, 2002
Ambient temperature: 22.9 deg. cel.
Liquid temperature: 20.9 deg. cel.
Hand SAR, device back touching flat phantom
Retracted antenna
Frequency: 806.0125 MHz



APPENDIX D: PROBES AND VALIDATION 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

Dosimetric E-Field Probe

Type:	ET3DV6
Serial Number:	1642
Place of Calibration:	Zurich
Date of Calibration:	July 26, 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:	U. Kellei
Approved by:	

Schmid & Partner
Engineering AG

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

Probe ET3DV6

SN:1642

Manufactured: November 7, 2001
Last calibration: November 26, 2001
Recalibrated: July 26, 2002

Calibrated for System DASY3

ET3DV6 SN:1642 **July 26, 2002**

DASY3 - Parameters of Probe: ET3DV6 SN:1642

Sensitivity in Free Space

Diode Compression

NormX	**1.62** $\mu V/(V/m)^2$	DCP X	**96**	mV
NormY	**1.85** $\mu V/(V/m)^2$	DCP Y	**96**	mV
NormZ	**1.61** $\mu V/(V/m)^2$	DCP Z	**96**	mV

Sensitivity in Tissue Simulating Liquid

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

ConvF X	**6.5** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**6.5** ± 8.9% (k=2)	Alpha	**0.34**
ConvF Z	**6.5** ± 8.9% (k=2)	Depth	**2.68**

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

ConvF X	**5.4** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**5.4** ± 8.9% (k=2)	Alpha	**0.53**
ConvF Z	**5.4** ± 8.9% (k=2)	Depth	**2.33**

Boundary Effect

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

Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	9.9	5.7
SAR_{be} [%]	With Correction Algorithm	0.4	0.5

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

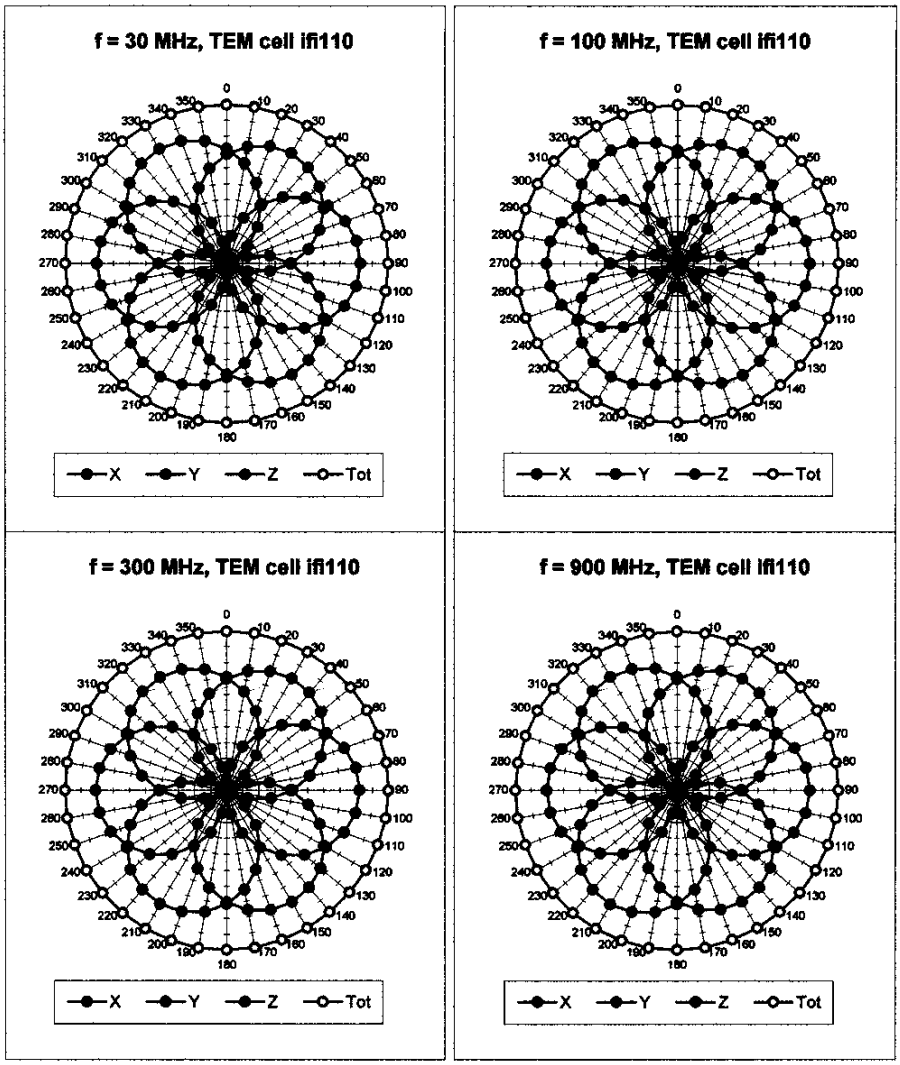
Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	12.0	7.8
SAR_{be} [%]	With Correction Algorithm	0.2	0.2

Sensor Offset

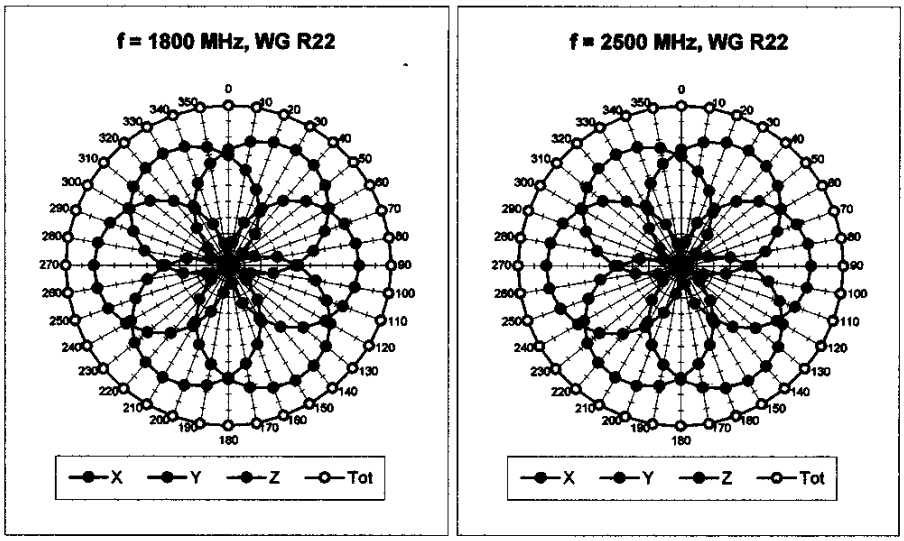
Probe Tip to Sensor Center	**2.7**	mm
Optical Surface Detection	**1.1 ± 0.2**	mm

ET3DV6 SN:1642 **July 26, 2002**

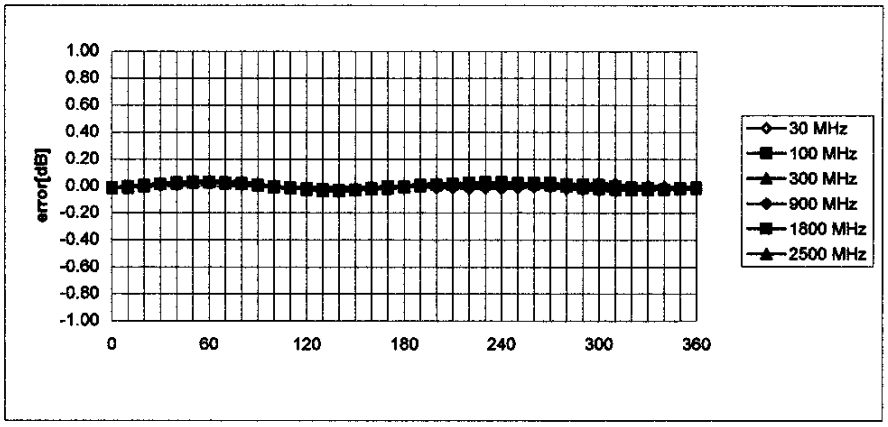
Receiving Pattern (ϕ), θ = 0°



ET3DV6 SN:1642 **July 26, 2002**



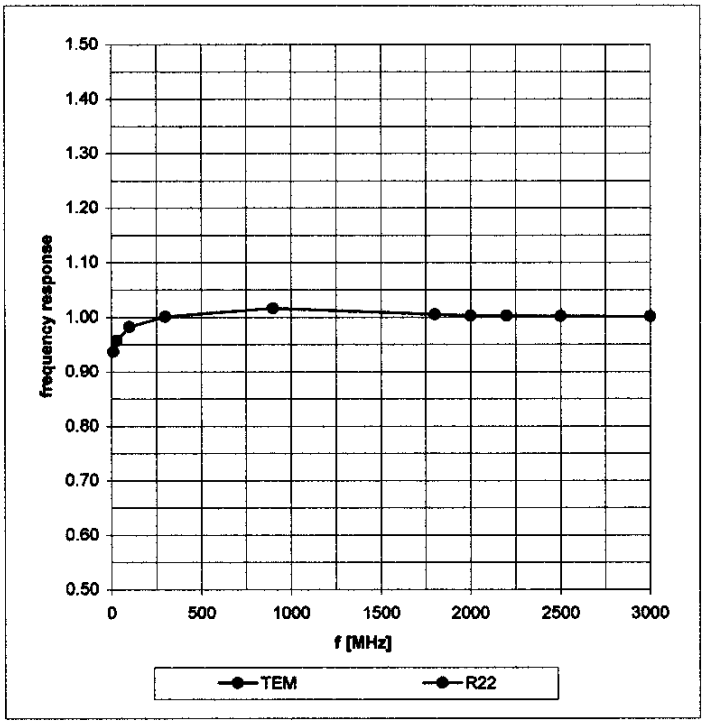
Isotropy Error (ϕ), θ = 0°



ET3DV6 SN:1642 **July 26, 2002**

Frequency Response of E-Field

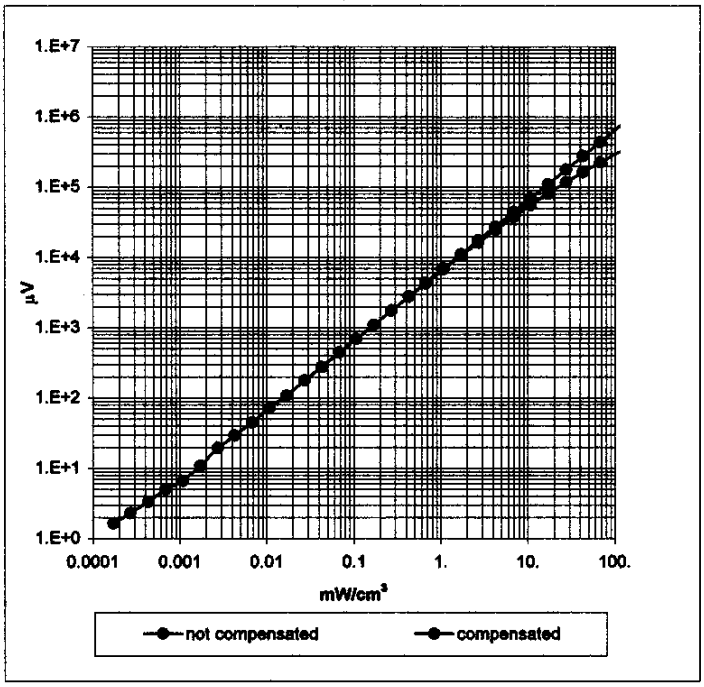
(TEM-Cell:ifi110, Waveguide R22)

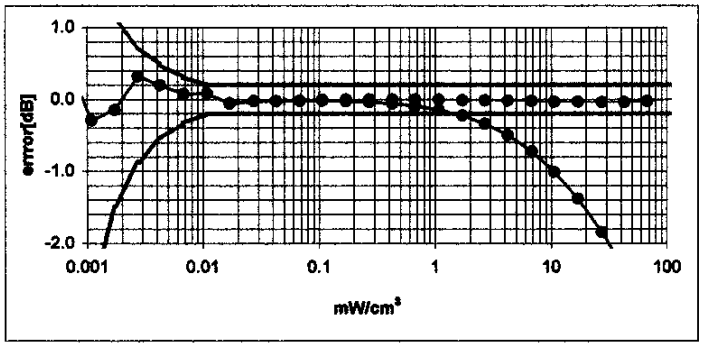


ET3DV6 SN:1642 **July 26, 2002**

Dynamic Range f(SAR_{brain})

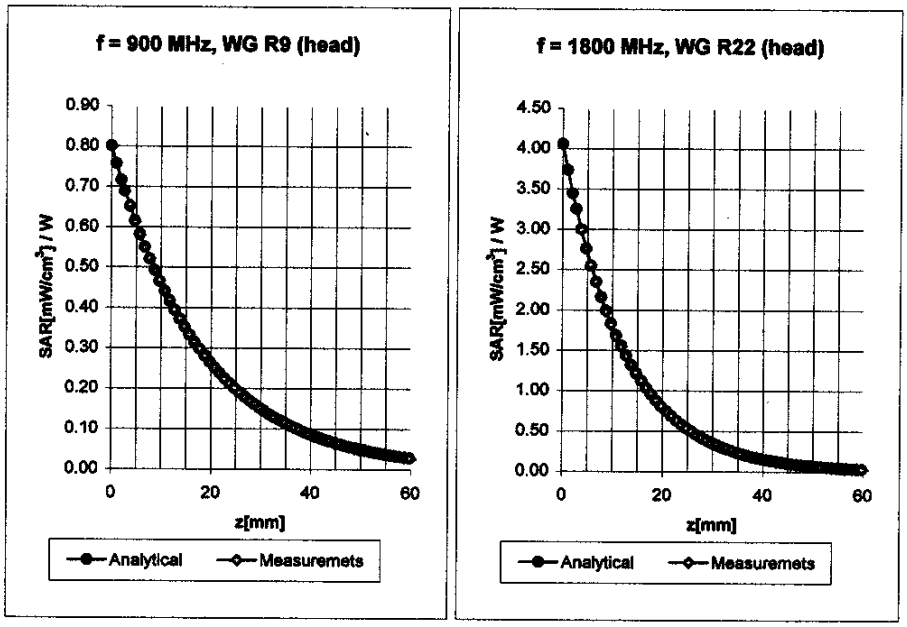
(Waveguide R22)





ET3DV6 SN:1642 **July 26, 2002**

Conversion Factor Assessment



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

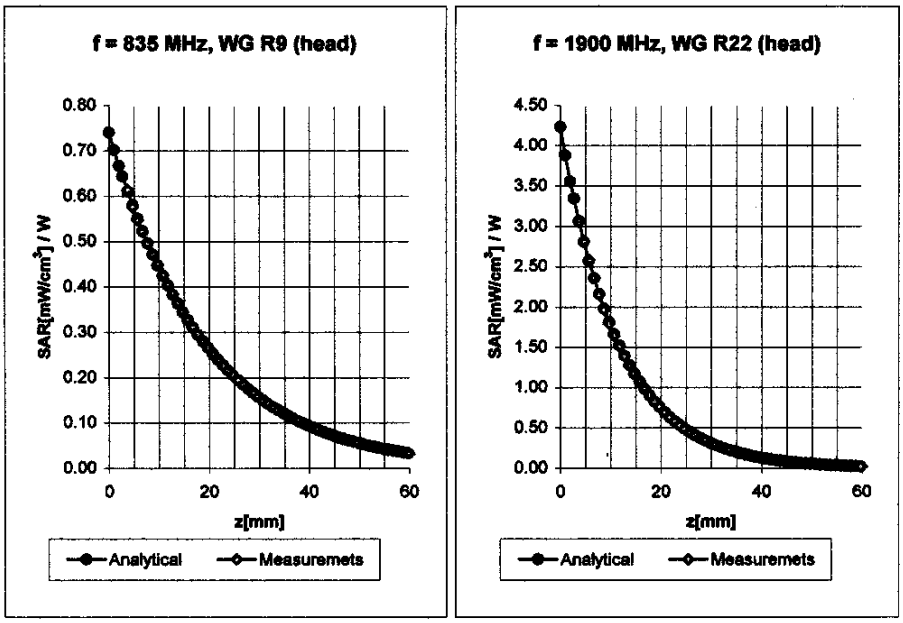
ConvF X	6.5 ± 8.9% (k=2)	Boundary effect:	
ConvF Y	6.5 ± 8.9% (k=2)	Alpha	0.34
ConvF Z	6.5 ± 8.9% (k=2)	Depth	2.68

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

ConvF X	5.4 ± 8.9% (k=2)	Boundary effect:	
ConvF Y	5.4 ± 8.9% (k=2)	Alpha	0.53
ConvF Z	5.4 ± 8.9% (k=2)	Depth	2.33

ET3DV6 SN:1642 **July 26, 2002**

Conversion Factor Assessment



Head **835 MHz** **ε_r = 41.5 ± 5%** **σ = 0.90 ± 5% mho/m**

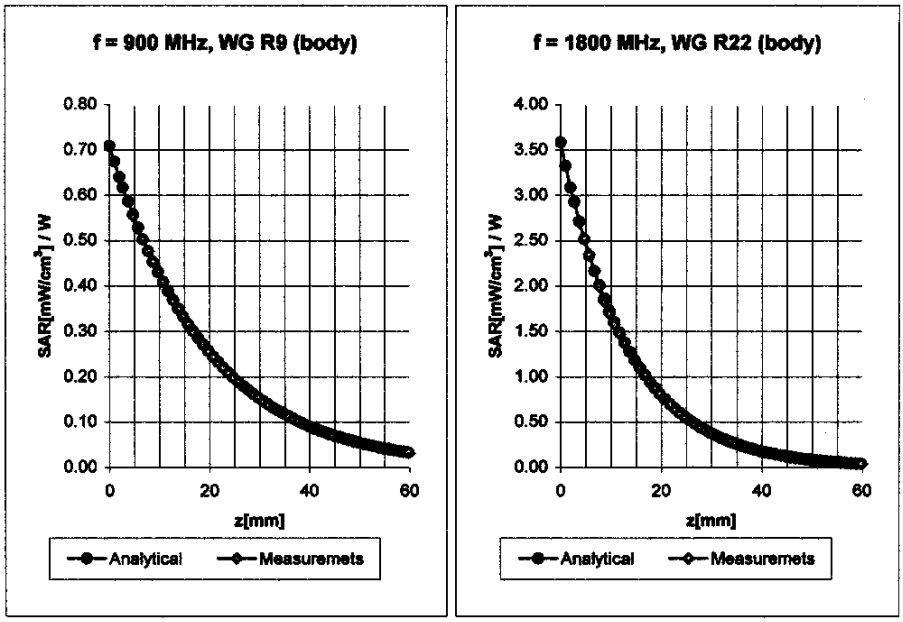
ConvF X	**6.5** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**6.5** ± 8.9% (k=2)	Alpha	**0.34**
ConvF Z	**6.5** ± 8.9% (k=2)	Depth	**2.65**

Head **1900 MHz** **ε_r = 40.0 ± 5%** **σ = 1.40 ± 5% mho/m**

ConvF X	**5.3** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**5.3** ± 8.9% (k=2)	Alpha	**0.57**
ConvF Z	**5.3** ± 8.9% (k=2)	Depth	**2.28**

ET3DV6 SN:1642 **July 26, 2002**

Conversion Factor Assessment



Body **900 MHz** ε_r = 55.2 ± 5% σ = 0.97 ± 5% mho/m

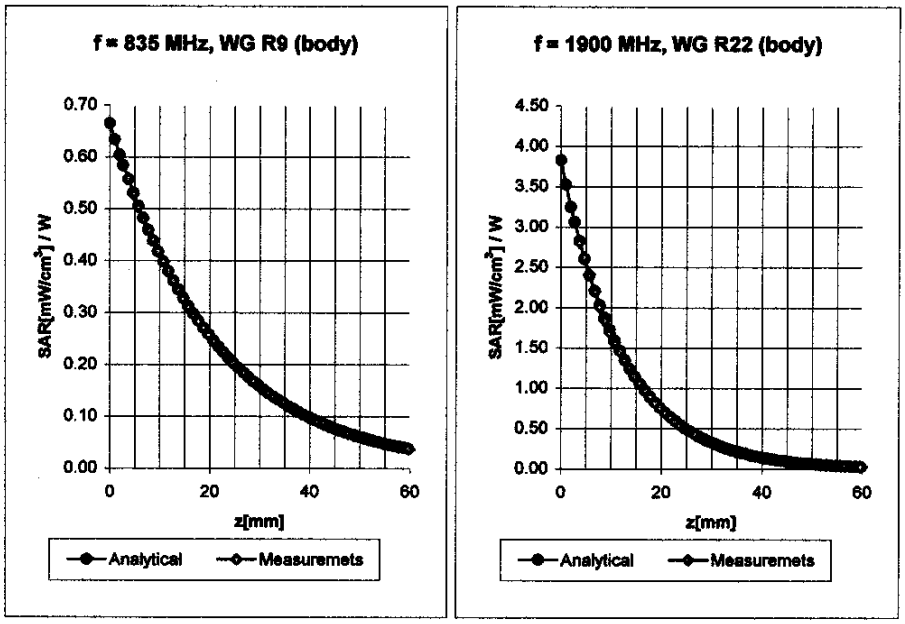
ConvF X	**6.3** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**6.3** ± 8.9% (k=2)	Alpha	**0.36**
ConvF Z	**6.3** ± 8.9% (k=2)	Depth	**2.63**

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

ConvF X	**5.2** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**5.2** ± 8.9% (k=2)	Alpha	**0.61**
ConvF Z	**5.2** ± 8.9% (k=2)	Depth	**2.30**

ET3DV6 SN:1642 **July 26, 2002**

Conversion Factor Assessment



Body **835 MHz** ε_r = 55.0 ± 5% σ = 1.05 ± 5% mho/m

ConvF X	**6.4** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**6.4** ± 8.9% (k=2)	Alpha	**0.36**
ConvF Z	**6.4** ± 8.9% (k=2)	Depth	**2.66**

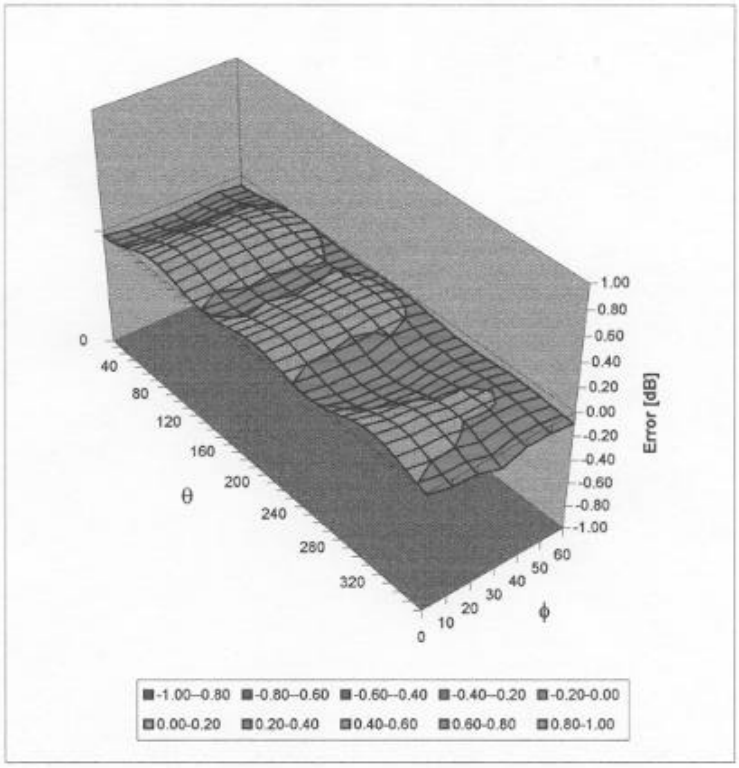
Body **1900 MHz** ε_r = 53.3 ± 5% σ = 1.52 ± 5% mho/m

ConvF X	**4.8** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**4.8** ± 8.9% (k=2)	Alpha	**0.74**
ConvF Z	**4.8** ± 8.9% (k=2)	Depth	**2.07**

ET3DV6 SN:1642 July 26, 2002

Deviation from Isotropy in HSL

Error (θ,ϕ), f = 900 MHz



Schmid & Partner
Engineering AG

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

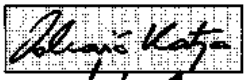
Calibration Certificate

Dosimetric E-Field Probe

Type:	ET3DV6
Serial Number:	1644
Place of Calibration:	Zurich
Date of Calibration:	November 26, 2001
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: 

Schmid & Partner
Engineering AG

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

Probe ET3DV6

SN:1644

Manufactured: November 7, 2001
Calibrated: November 26, 2001

Calibrated for System DASY3

ET3DV6 SN:1644

DASY3 - Parameters of Probe: ET3DV6 SN:1644

Sensitivity in Free Space

Diode Compression

NormX	1.77 $\mu V/(V/m)^2$	DCP X	98 mV
NormY	1.91 $\mu V/(V/m)^2$	DCP Y	98 mV
NormZ	1.85 $\mu V/(V/m)^2$	DCP Z	98 mV

Sensitivity in Tissue Simulating Liquid

Head 450 MHz ε_r = 43.5 ± 5% σ = 0.87 ± 10% mho/m

ConvF X	7.07 extrapolated	Boundary effect:	
ConvF Y	7.07 extrapolated	Alpha	0.37
ConvF Z	7.07 extrapolated	Depth	2.27

Head 800 - 1000 MHz ε_r = 39.0 - 43.5 σ = 0.80 - 1.10 mho/m

ConvF X	6.51 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	6.51 ± 9.5% (k=2)	Alpha	0.43
ConvF Z	6.51 ± 9.5% (k=2)	Depth	2.25

Head 1500 MHz ε_r = 40.4 ± 5% σ = 1.23 ± 10% mho/m

ConvF X	5.76 interpolated	Boundary effect:	
ConvF Y	5.76 interpolated	Alpha	0.52
ConvF Z	5.76 interpolated	Depth	2.22

Head 1700 - 1910 MHz ε_r = 39.5 - 41.0 σ = 1.20 - 1.55 mho/m

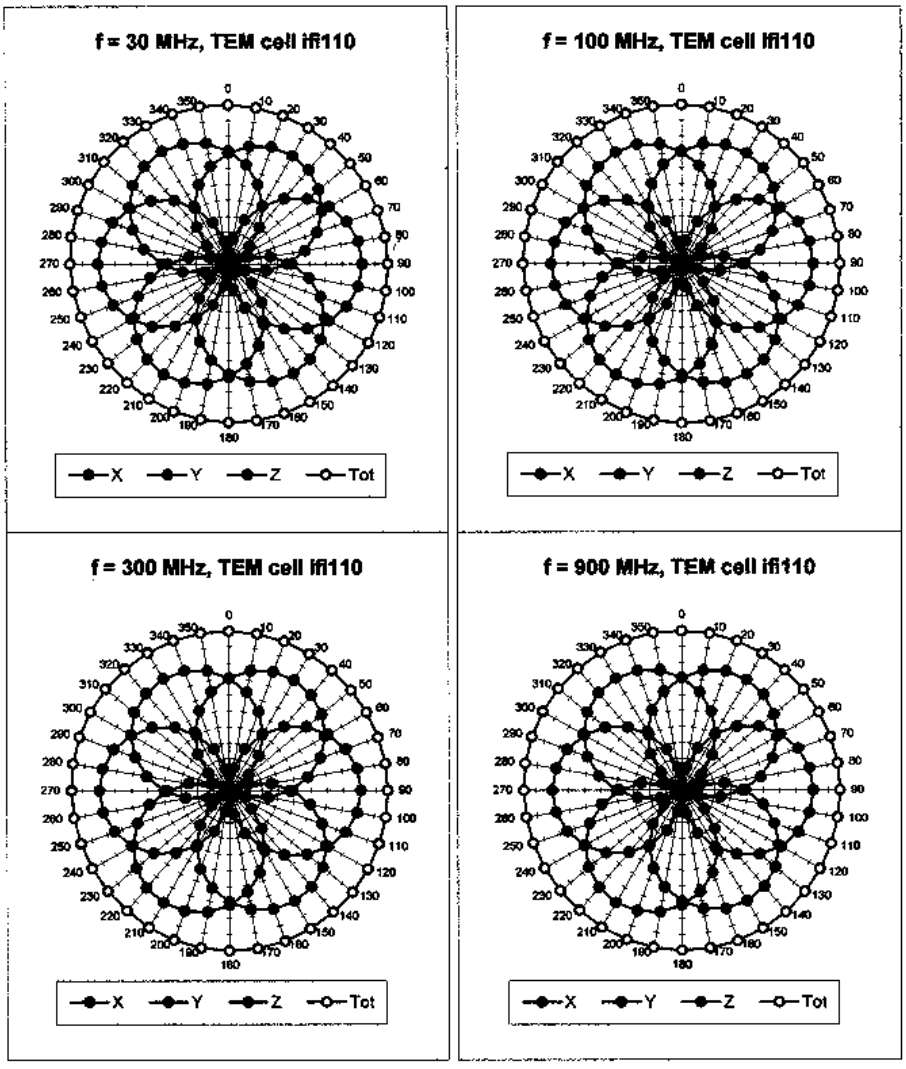
ConvF X	5.39 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	5.39 ± 9.5% (k=2)	Alpha	0.56
ConvF Z	5.39 ± 9.5% (k=2)	Depth	2.20

Sensor Offset

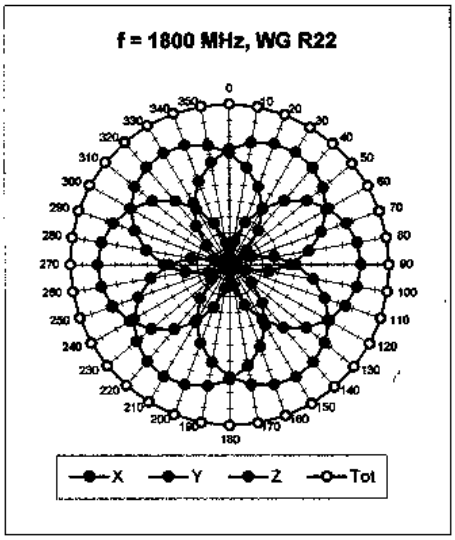
Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	1.4 ± 0.2	mm

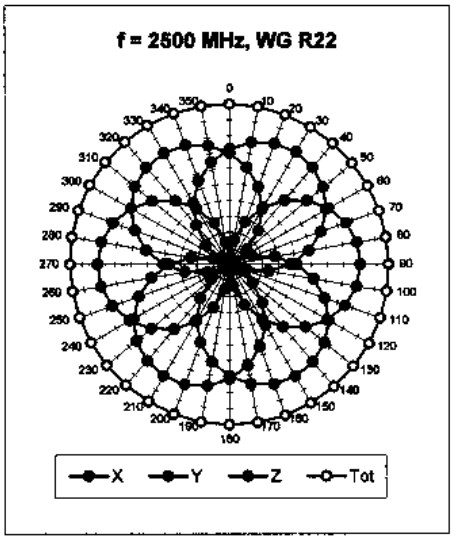
ET3DV6 SN:1644

Receiving Pattern (ϕ), θ = 0°

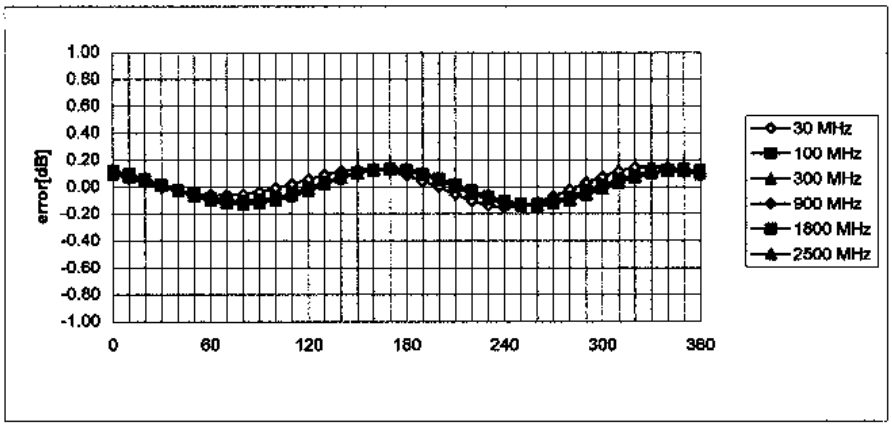


ET3DV6 SN:1644





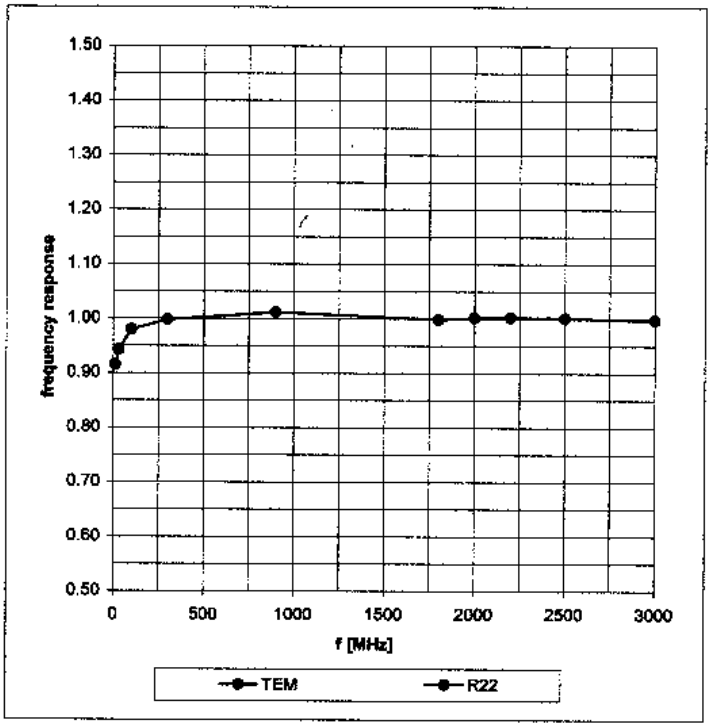
Isotropy Error (ϕ), θ = 0°



ET3DV6 SN:1644

Frequency Response of E-Field

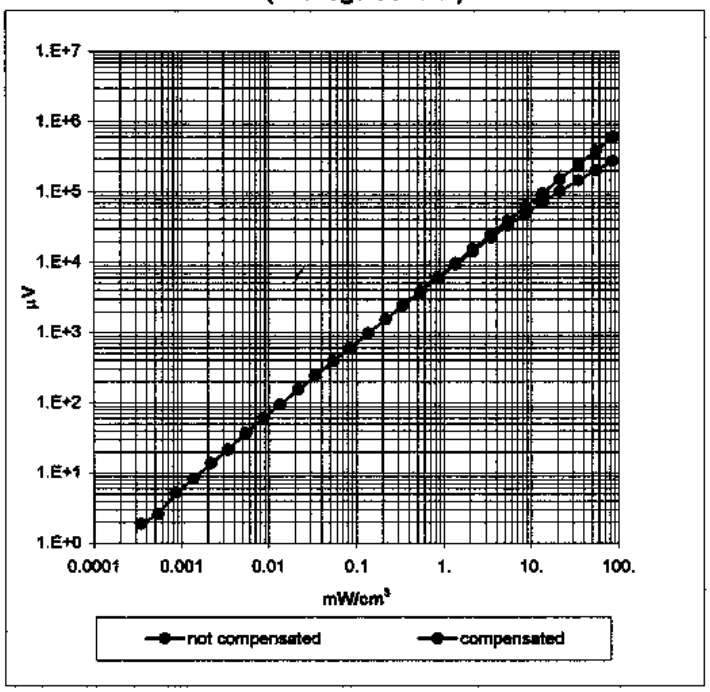
(TEM-Cell:ifi110, Waveguide R22)

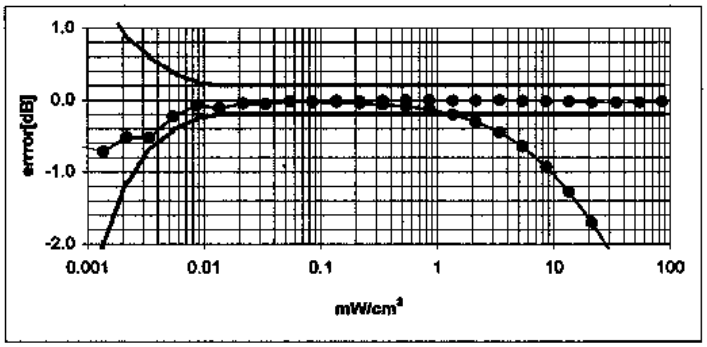


ET3DV6 SN:1644

Dynamic Range f(SAR_{brain})

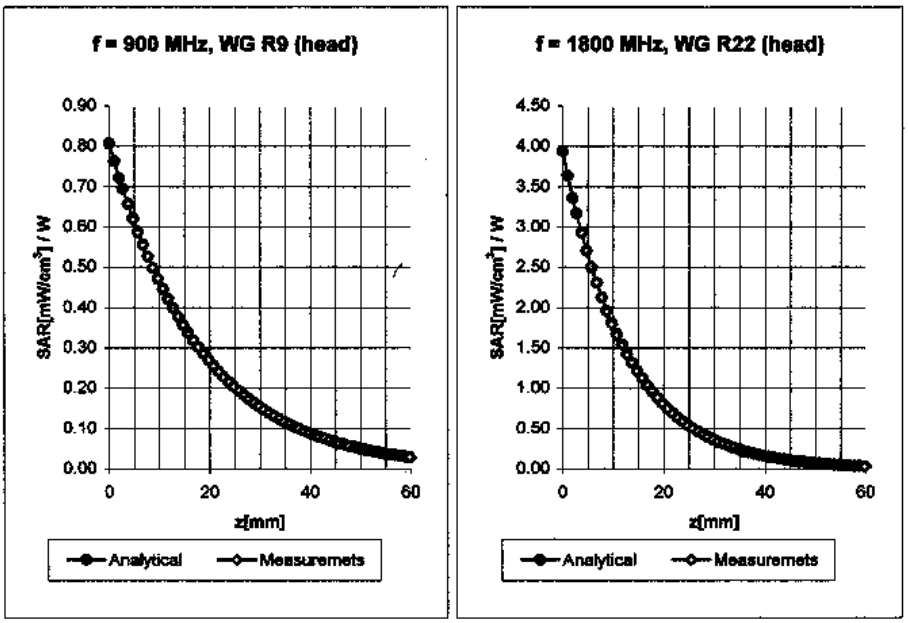
(Waveguide R22)





ET3DV6 SN:1644

Conversion Factor Assessment



Head **800 - 1000 MHz** ε_r = 39.0 - 43.5 σ = 0.80 - 1.10 mho/m

ConvF X	**6.51** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.51** ± 9.5% (k=2)	Alpha	**0.43**
ConvF Z	**6.51** ± 9.5% (k=2)	Depth	**2.25**

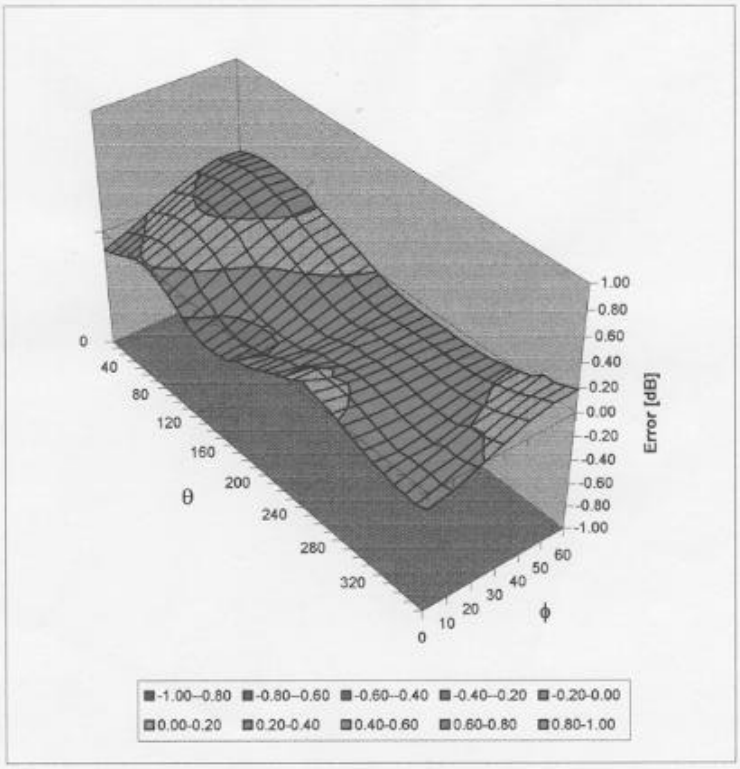
Head **1700 - 1910 MHz** ε_r = 39.5 - 41.0 σ = 1.20 - 1.55 mho/m

ConvF X	**5.39** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**5.39** ± 9.5% (k=2)	Alpha	**0.56**
ConvF Z	**5.39** ± 9.5% (k=2)	Depth	**2.20**

ET3DV6 SN:1644

Deviation from Isotropy in HSL

Error (θ,ϕ), f = 900 MHz



Schmid & Partner
Engineering AG

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

Calibration Certificate

835 MHz System Validation Dipole

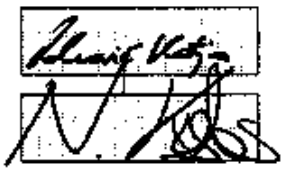
Type:	D835V2
Serial Number:	446
Place of Calibration:	Zurich
Date of Calibration:	November 12, 2001
Calibration Interval:	24 months

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: D835V2

Serial: 446

Manufactured: October 24, 2001
Calibrated: November 12, 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 835 MHz:

Relative Dielectricity	42.3	± 5%
Conductivity	0.91 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 20mm 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:	10.7 mW/g
averaged over 10 cm^3 (10 g) of tissue:	6.84 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:	1.401 ns	(one direction)
Transmission factor:	0.993	(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 835 MHz:	Re{Z} = 49.8 Ω
	Im {Z} = -4.8 Ω
Return Loss at 835 MHz	-26.4 dB

4. Handling

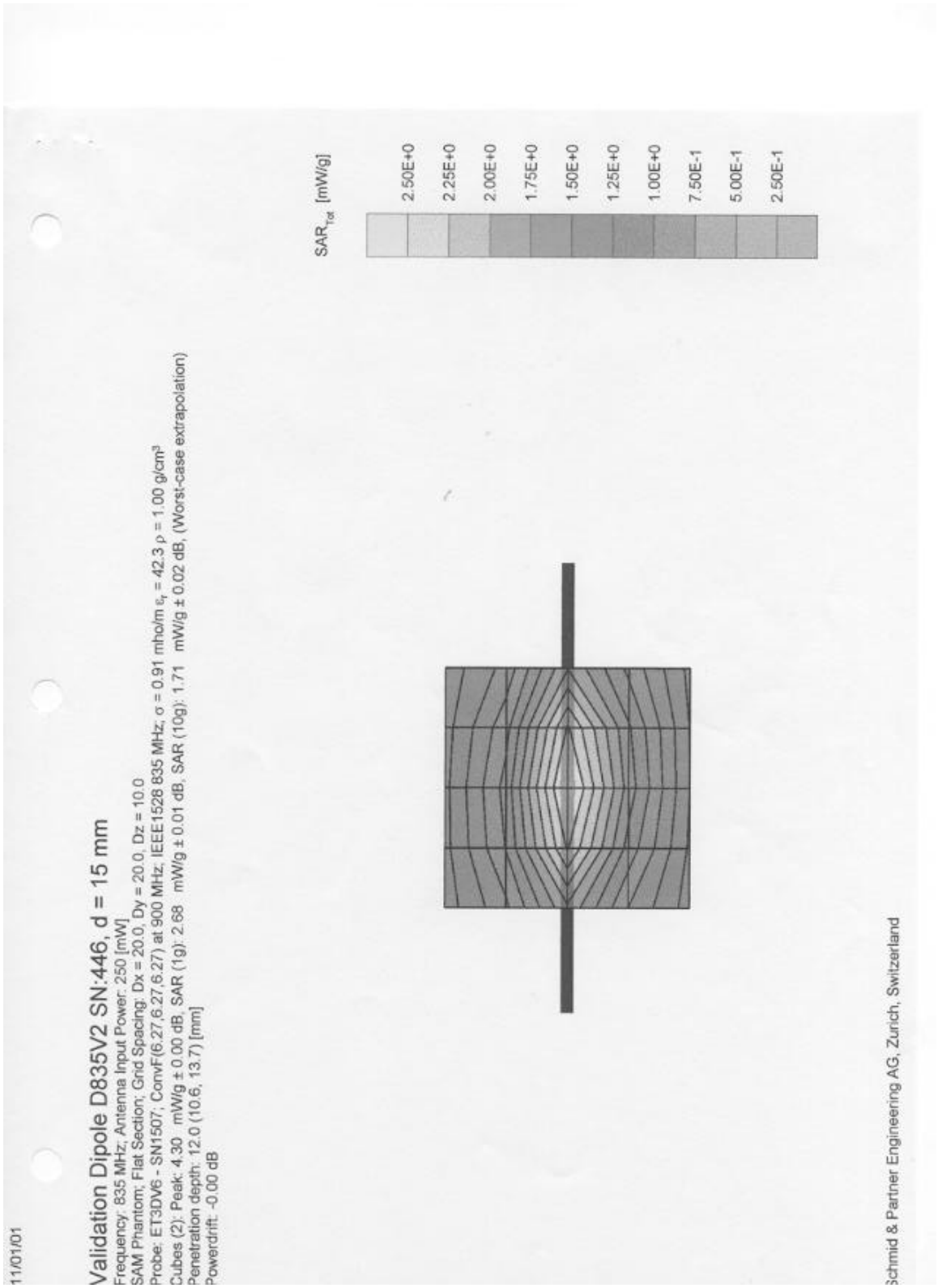
Do not apply excessive force to the dipole arms, because they might bend. Bending of the dipole arms stresses the soldered connections near the feedpoint leading to a damage of the dipole.

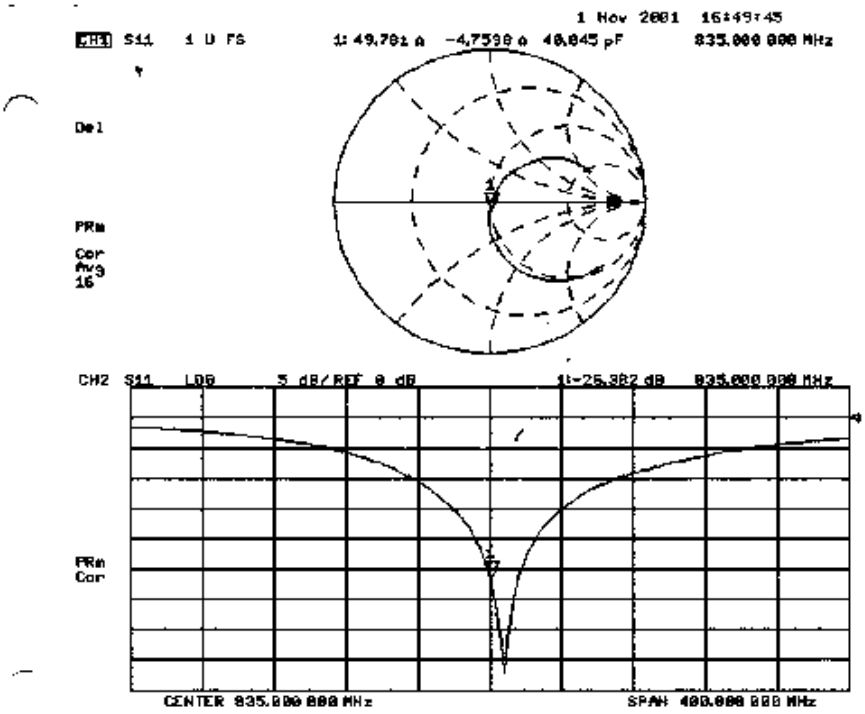
5. Design

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.

6. Power Test

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





APPENDIX E: SAR SET UP PHOTOS

Figure E1. Left ear touch configuration

Figure E2. Left ear tilted configuration

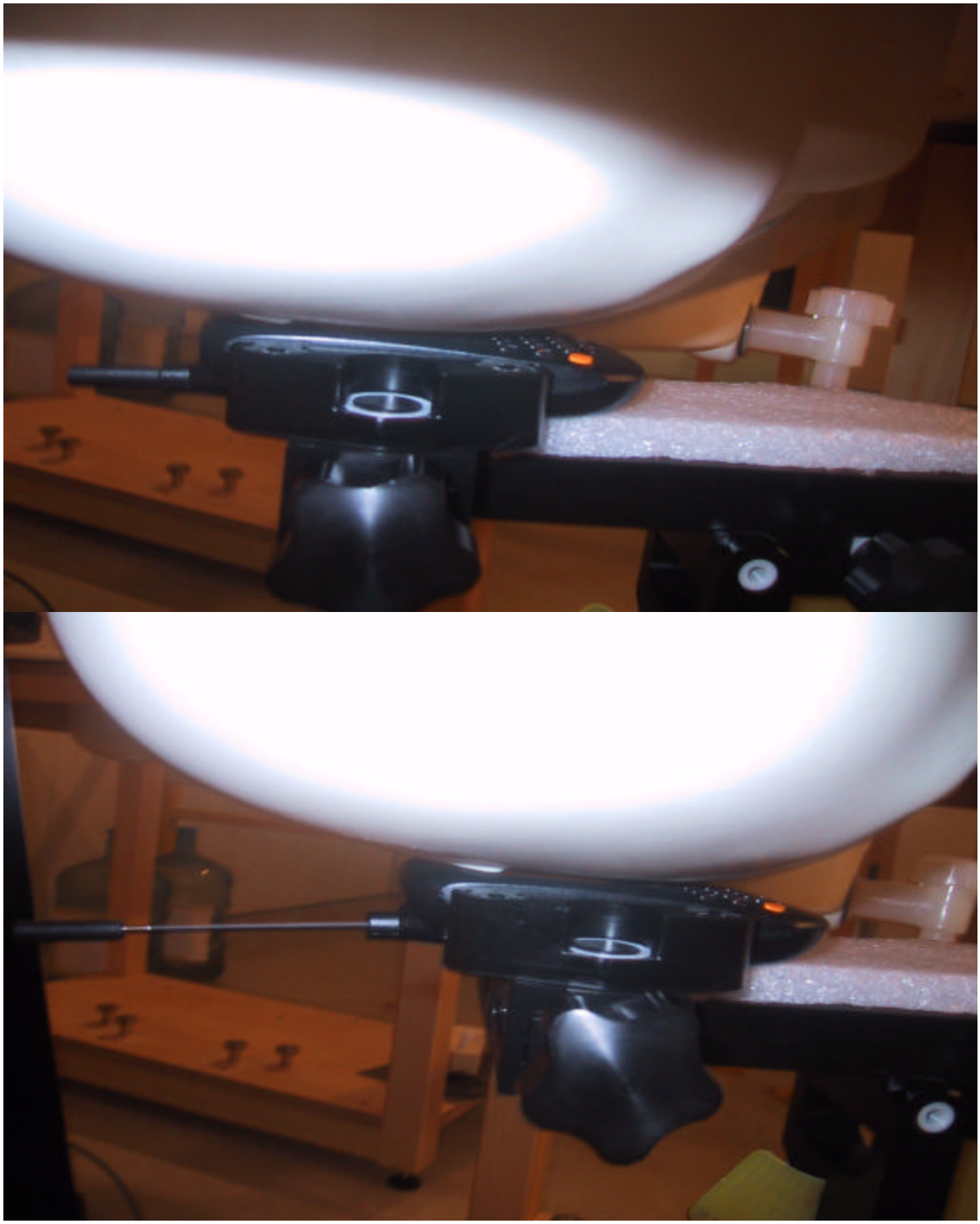


Figure E3. Right ear touch configuration

Figure E4. Right ear tilted configuration

Figure E5. Body worn configuration retracted antenna with holster and headset

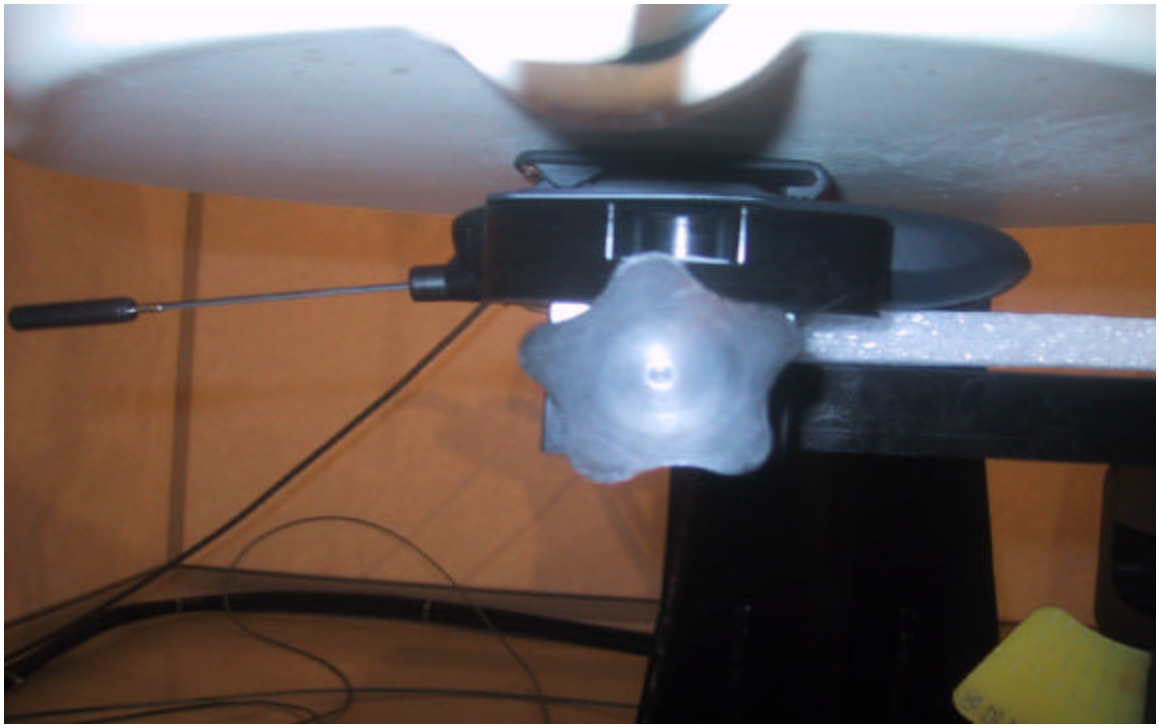


Figure E6. Body worn configuration extended antenna with holster and headset

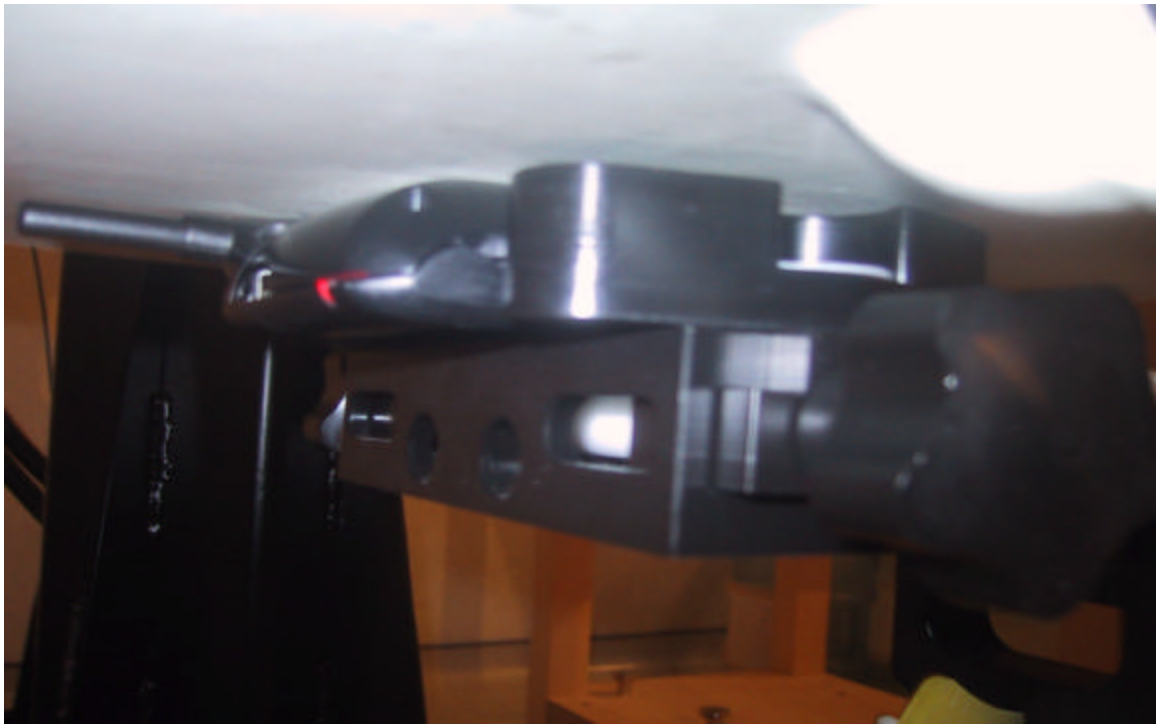


Figure E7. Hand SAR configuration, unit back touching flat phantom