Schmid & Partner
Engineering AG

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

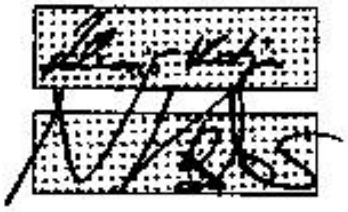
Calibration Certificate

Dosimetric E-Field Probe

Type:	ET3DV6
Serial Number:	1391
Place of Calibration:	Zurich
Date of Calibration:	November 23, 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:1397

Manufactured:	October 24, 1999
Repaired:	November 15, 2001
Recalibrated:	November 23, 2001

Calibrated for System DASY3

DASY3 - Parameters of Probe: ET3DV6 SN:1397

Sensitivity in Free Space

Diode Compression

NormX	2.05 μV/(V/m)²	DCP X	97 mV
NormY	2.01 μV/(V/m)²	DCP Y	97 mV
NormZ	2.03 μV/(V/m)²	DCP Z	97 mV

Sensitivity in Tissue Simulating Liquid

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

ConvF X	7.17 extrapolated	Boundary effect:	
ConvF Y	7.17 extrapolated	Alpha	0.40
ConvF Z	7.17 extrapolated	Depth	2.15

Head 800 - 1000 MHz ε_r = 39.0 - 43.5 σ = 0.90 - 1.10 mho/m

ConvF X	6.61 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	6.61 ± 9.5% (k=2)	Alpha	0.46
ConvF Z	6.61 ± 9.5% (k=2)	Depth	2.18

Head 1800 MHz ε_r = 40.4 ± 5% σ = 1.23 ± 10% mho/m

ConvF X	5.85 interpolated	Boundary effect:	
ConvF Y	5.85 interpolated	Alpha	0.54
ConvF Z	5.85 interpolated	Depth	2.21

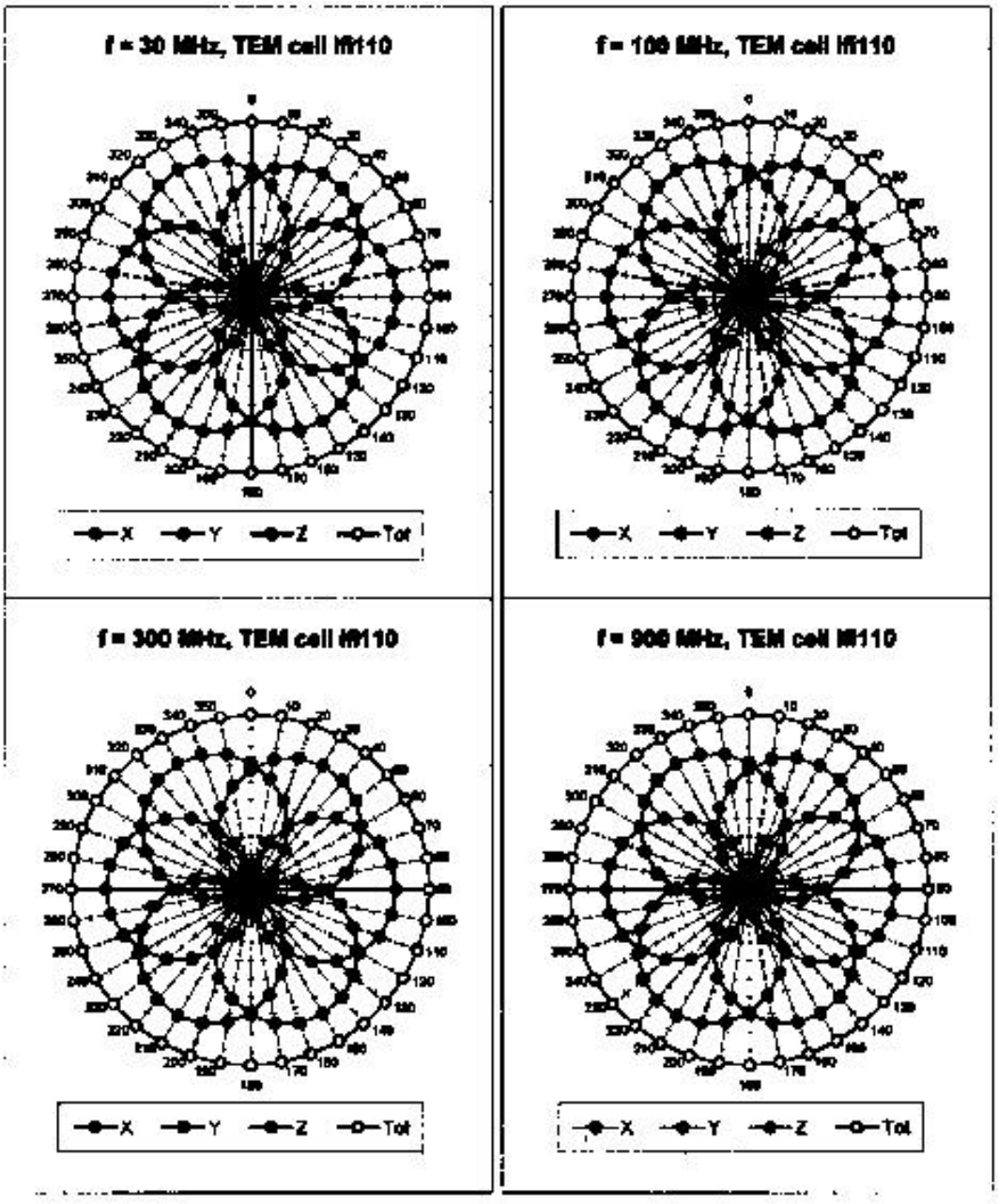
Head 1700 - 1910 MHz ε_r = 39.8 - 41.8 σ = 1.30 - 1.58 mho/m

ConvF X	5.47 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	5.47 ± 9.5% (k=2)	Alpha	0.57
ConvF Z	5.47 ± 9.5% (k=2)	Depth	2.23

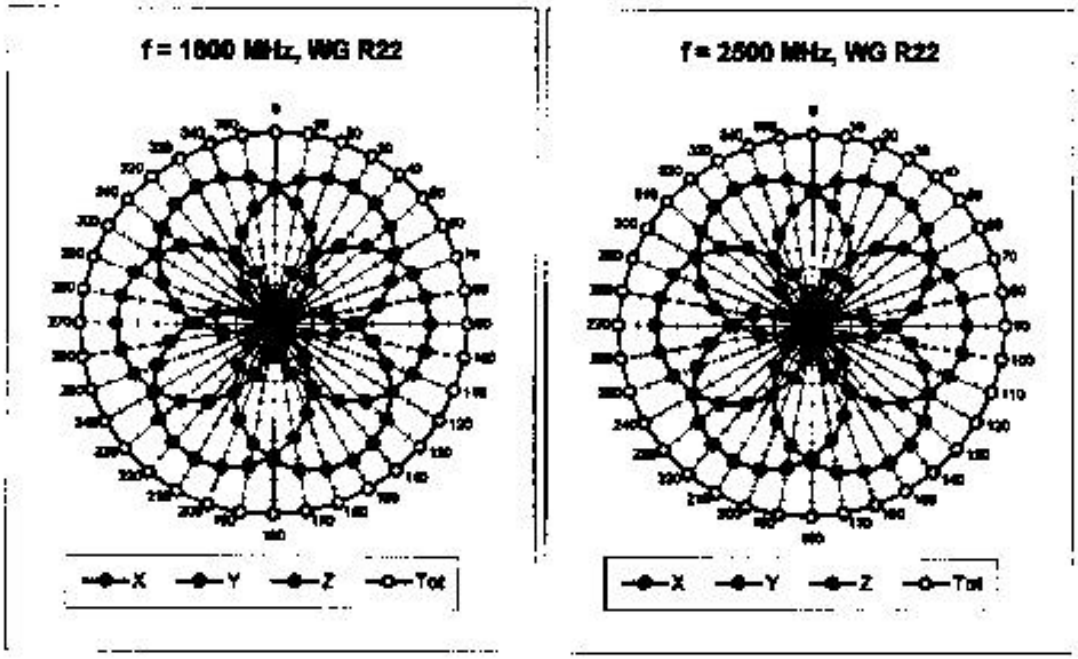
Sensor Offset

Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	1.5 ± 0.2	mm

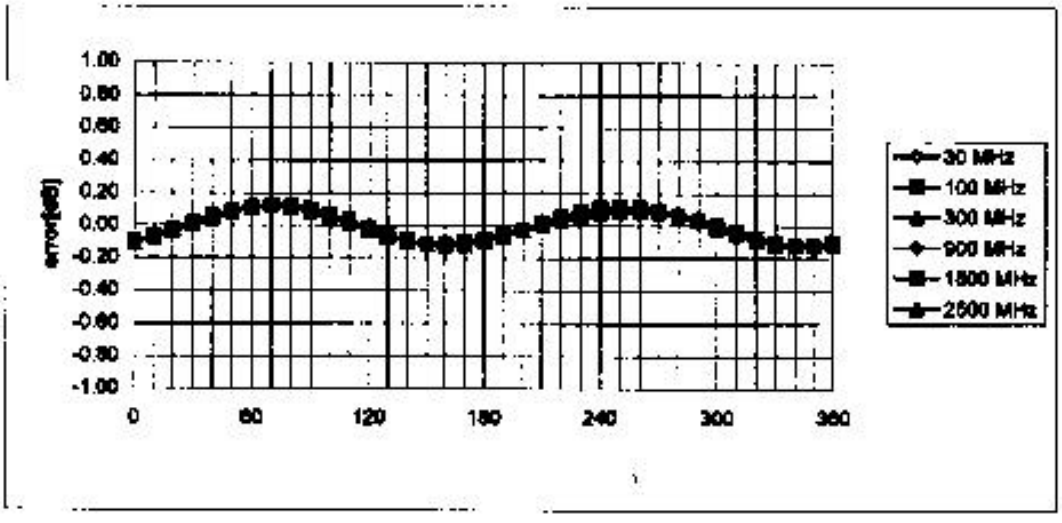
Receiving Pattern (ϕ), θ = 0°



ET3DV6 SN:1397

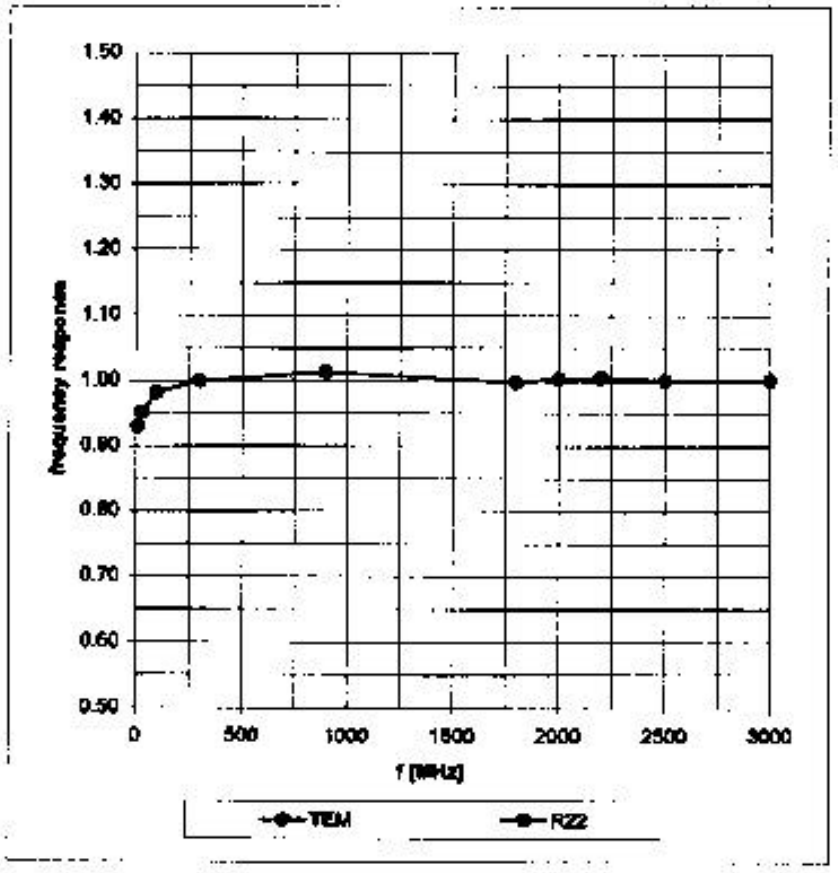


Isotropy Error (ϕ), θ = 0°



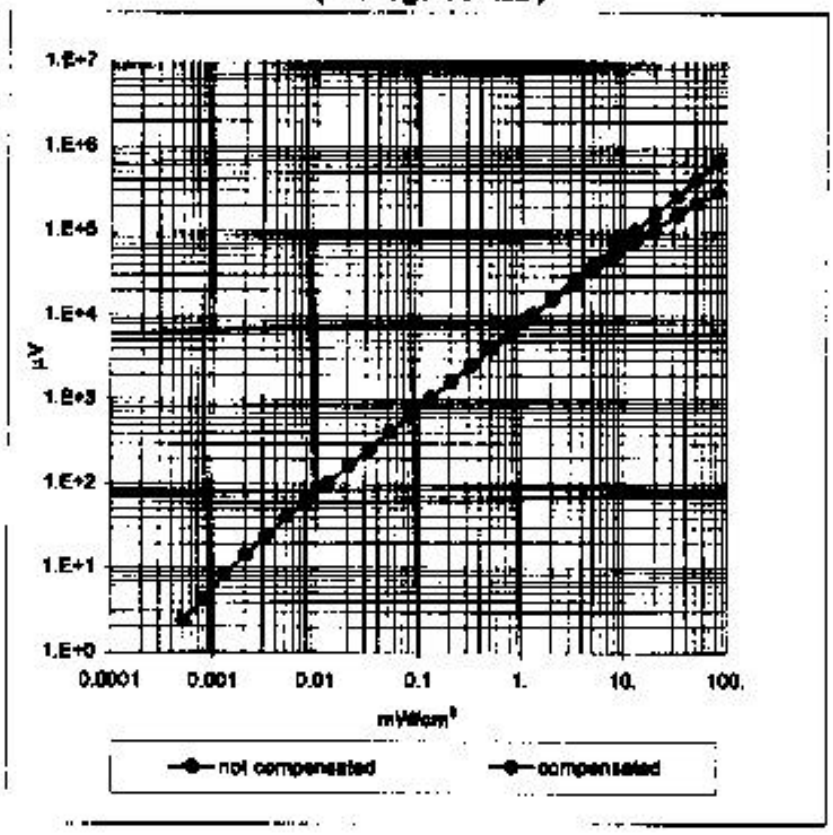
Frequency Response of E-Field

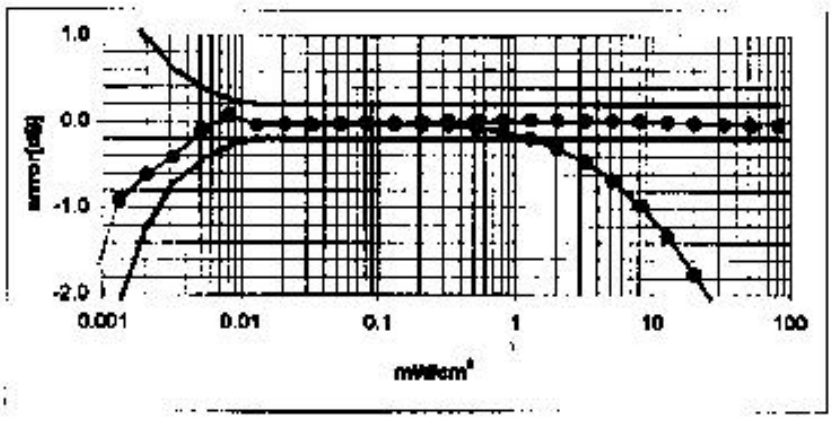
(TEM-Cell:ifi110, Waveguide R22)



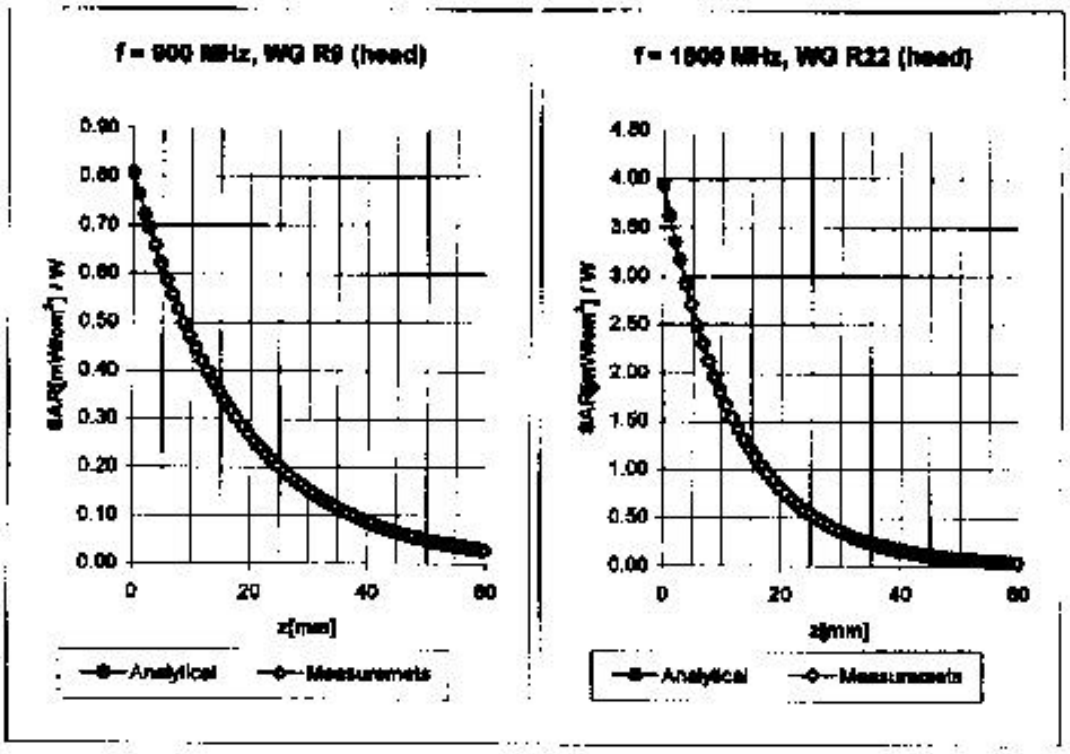
Dynamic Range f(SAR_{brain})

(Waveguide R22)





Conversion Factor Assessment



Head	800 - 1000 MHz		ε_r = 39.0 - 43.0	σ = 0.90 - 1.10 mho/m	
	ConvF X	6.61 ± 9.5% (k=2)		Boundary effect:	
	ConvF Y	6.61 ± 9.5% (k=2)		Alpha	0.46
	ConvF Z	6.61 ± 9.5% (k=2)		Depth	2.18

Head	1700 - 1910 MHz		ε_r = 38.5 - 41.0	σ = 1.20 - 1.55 mho/m	
	ConvF X	5.47 ± 9.5% (k=2)		Boundary effect:	
	ConvF Y	5.47 ± 9.5% (k=2)		Alpha	0.57
	ConvF Z	5.47 ± 9.5% (k=2)		Depth	2.23

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Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ET3DV6**
Serial Number:	**1897**
Place of Assessment:	**Zurich**
Date of Assessment:	**November 25, 2001**
Probe Calibration Date:	**November 23, 2001**

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:1397

Conversion factor (± standard deviation)

835 MHz	ConvF	**6.7 ± 8%**	ε_r = 41.5 σ = 0.90 mho/m (head tissue)
1950 MHz	ConvF	**5.2 ± 8%**	ε_r = 40.0 σ = 1.40 mho/m (head tissue)
835 MHz	ConvF	**6.5 ± 8%**	ε_r = 55.2 σ = 0.97 mho/m (body tissue)
900 MHz	ConvF	**6.4 ± 8%**	ε_r = 55.0 σ = 1.05 mho/m (body tissue)
1800 MHz	ConvF	**5.1 ± 8%**	ε_r = 53.3 σ = 1.52 mho/m (body tissue)
1950 MHz	ConvF	**4.9 ± 8%**	ε_r = 53.3 σ = 1.52 mho/m (body tissue)

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Calibration Certificate

Dosimetric E-Field Probe

Type:	ET3DV6
Serial Number:	1398
Place of Calibration:	Zurich
Date of Calibration:	August 31, 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

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Probe ET3DV6

SN:1398

Manufactured:	October 24, 1999
Repaired:	August 24, 2001
Calibrated:	August 31, 2001

Calibrated for System DASY3

DASY3 - Parameters of Probe: ET3DV6 SN:1398

Sensitivity in Free Space

Diode Compression

NormX	1.62 μV/(V/m)^2	DCP X	97 mV
NormY	1.87 μV/(V/m)^2	DCP Y	97 mV
NormZ	1.71 μV/(V/m)^2	DCP Z	97 mV

Sensitivity in Tissue Simulating Liquid

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

ConvF X	6.95 extrapolated	Boundary effect:	
ConvF Y	6.95 extrapolated	Alpha	0.45
ConvF Z	6.95 extrapolated	Depth	2.12

Head 900 MHz ε_r = 42 ± 5% σ = 0.97 ± 10% mho/m

ConvF X	6.43 ± 7% (k=2)	Boundary effect:	
ConvF Y	6.43 ± 7% (k=2)	Alpha	0.49
ConvF Z	6.43 ± 7% (k=2)	Depth	2.18

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

ConvF X	5.74 interpolated	Boundary effect:	
ConvF Y	5.74 interpolated	Alpha	0.54
ConvF Z	5.74 interpolated	Depth	2.26

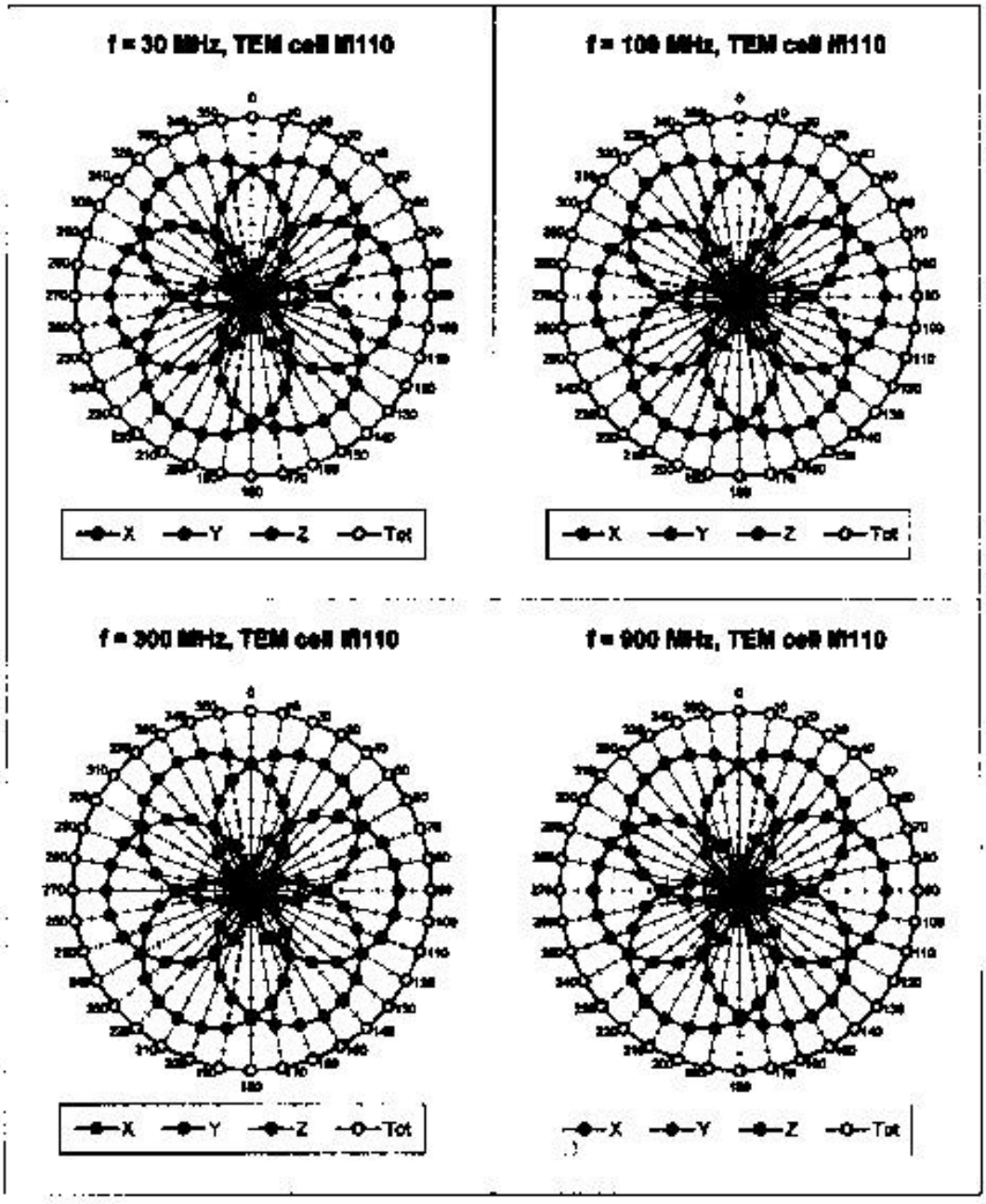
Head 1800 MHz ε_r = 40 ± 5% σ = 1.40 ± 10% mho/m

ConvF X	5.39 ± 7% (k=2)	Boundary effect:	
ConvF Y	5.39 ± 7% (k=2)	Alpha	0.56
ConvF Z	5.39 ± 7% (k=2)	Depth	2.30

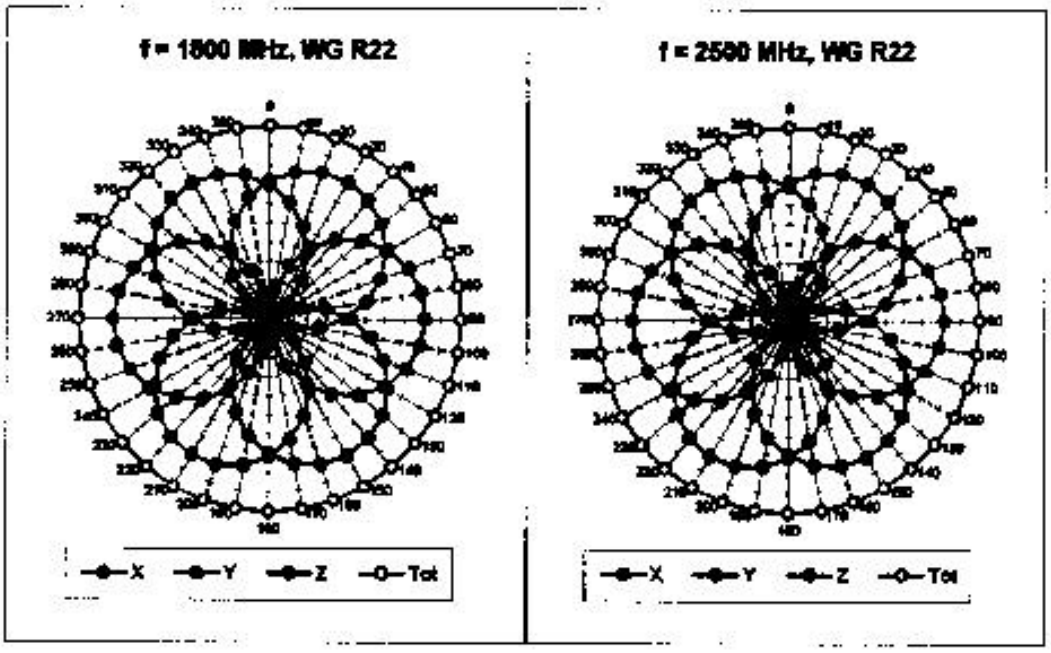
Sensor Offset

Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	1.2 ± 0.2	mm

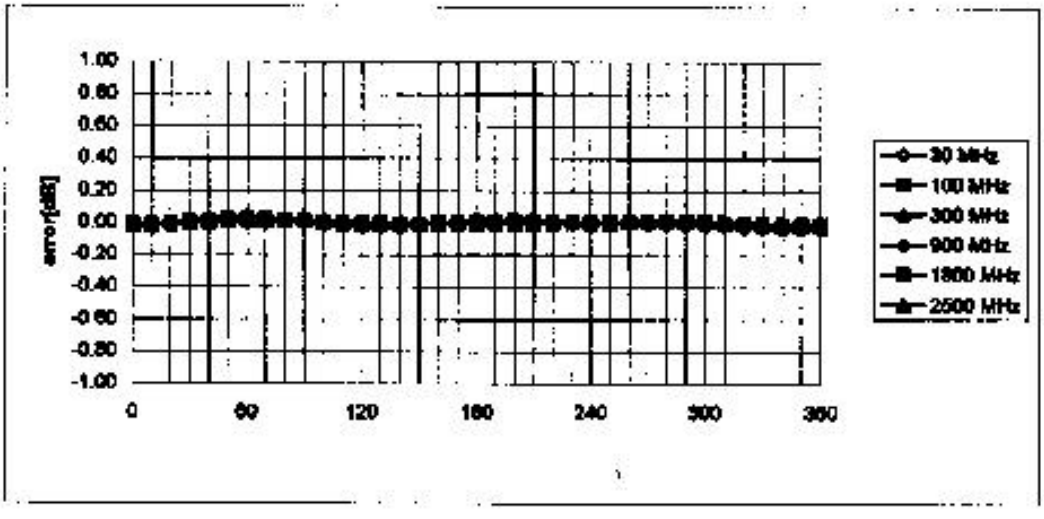
Receiving Pattern (ϕ), θ = 0°



ET3DV6 SN:1398

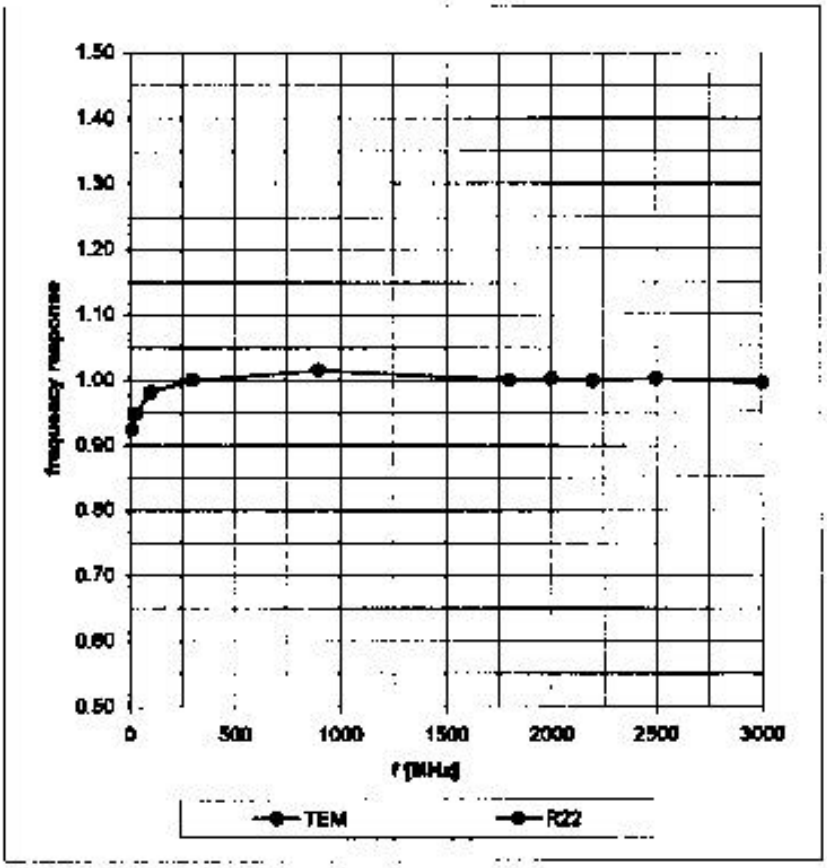


Isotropy Error (ϕ), θ = 0°



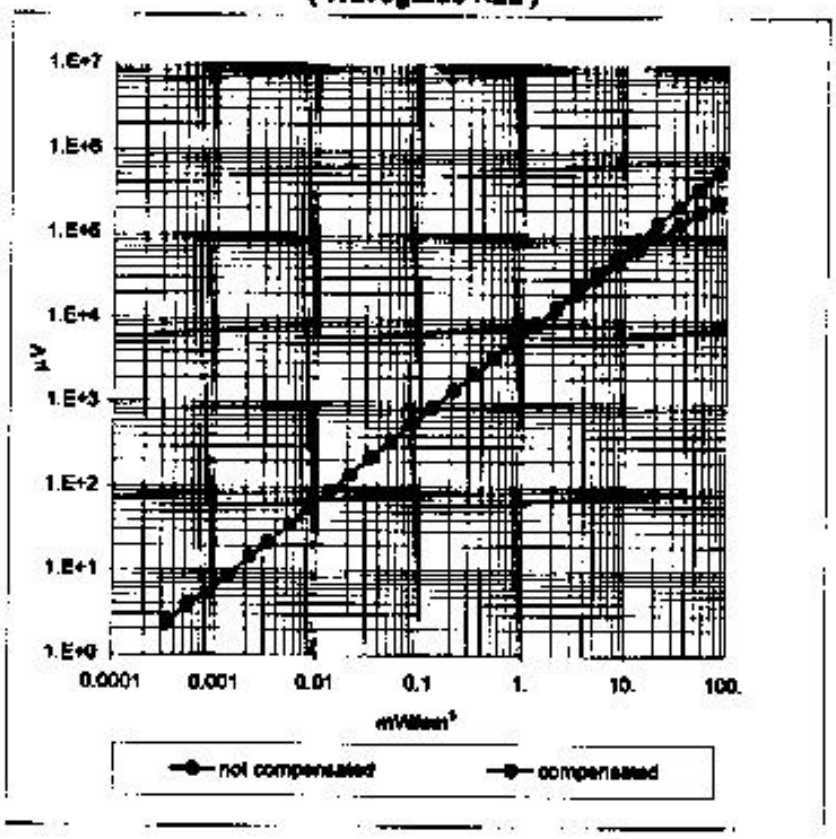
Frequency Response of E-Field

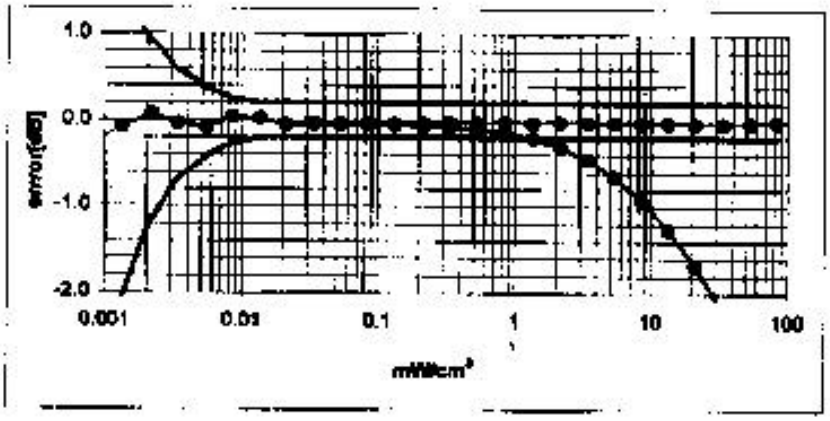
(TEM-Cell:ifi110, Waveguide R22)



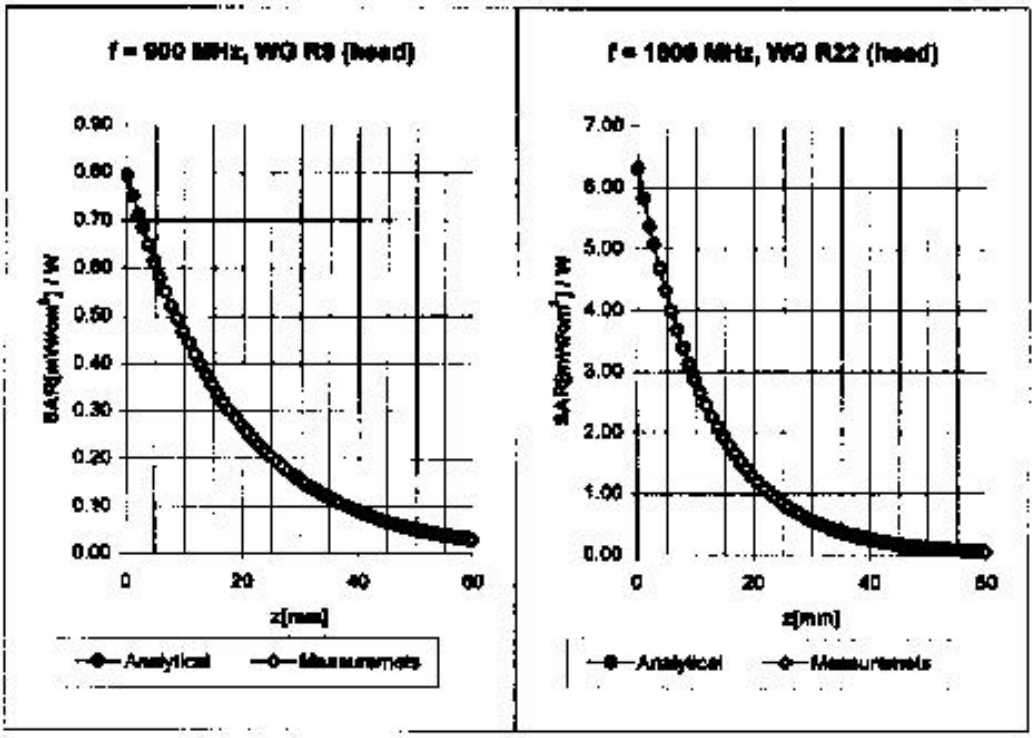
Dynamic Range f(SAR_{brain})

(Waveguide R22)





Conversion Factor Assessment



Head	900 MHz	ε_r = 42 ± 5%	σ = 0.97 ± 10% mho/m
ConvF X	6.43 ± 7% (k=2)	Boundary effect:	
ConvF Y	6.43 ± 7% (k=2)	Alpha	0.49
ConvF Z	6.43 ± 7% (k=2)	Depth	2.16

Head	1800 MHz	ε_r = 40 ± 5%	σ = 1.40 ± 10% mho/m
ConvF X	6.39 ± 7% (k=2)	Boundary effect:	
ConvF Y	6.39 ± 7% (k=2)	Alpha	0.56
ConvF Z	6.39 ± 7% (k=2)	Depth	2.30

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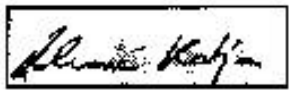
Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ET3DV6**
Serial Number:	**1398**
Place of Assessment:	**Zurich**
Date of Assessment:	**September 7, 2001**
Probe Calibration Date:	**August 31, 2001**

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:1398

Conversion factor (= standard deviation)

835 MHz	ConvF	6.5 ± 8%	ε_r = 41.5 σ = 0.90 mho/m (head tissue)
835 MHz	ConvF	6.3 ± 8%	ε_r = 55.2 σ = 0.97 mho/m (body tissue)
900 MHz	ConvF	6.2 ± 8%	ε_r = 55.0 σ = 1.05 mho/m (body tissue)
1950 MHz	ConvF	5.1 ± 8%	ε_r = 40.0 σ = 1.40 mho/m (head tissue)
1800 MHz	ConvF	5.0 ± 8%	ε_r = 53.3 σ = 1.52 mho/m (body tissue)
1950 MHz	ConvF	4.7 ± 8%	ε_r = 53.3 σ = 1.52 mho/m (body tissue)

Dosimetric E-Field Probe ET3DV6 SN:1398

Conversion factor (± standard deviation)

835 MHz	ConvF	6.5 ± 8%	ε_r = 44.0 σ = 0.90 mho/m (brain tissue)
835 MHz	ConvF	6.4 ± 8%	ε_r = 52.0 σ = 1.10 mho/m (muscle tissue)
900 MHz	ConvF	6.4 ± 8%	ε_r = 42.5 σ = 0.86 mho/m (brain tissue)
925 MHz	ConvF	6.3 ± 8%	ε_r = 44.8 σ = 0.93 mho/m (brain tissue)
925 MHz	ConvF	6.3 ± 8%	ε_r = 52.8 σ = 1.20 mho/m (muscle tissue)
1800 MHz	ConvF	5.4 ± 8%	ε_r = 40.3 σ = 1.35 mho/m (brain tissue)
1800 MHz	ConvF	5.5 ± 8%	ε_r = 41.0 σ = 1.69 mho/m (brain tissue)
1900 MHz	ConvF	5.2 ± 8%	ε_r = 39.9 σ = 1.42 mho/m (brain tissue)
1800 MHz	ConvF	5.1 ± 8%	ε_r = 50.0 σ = 1.58 mho/m (muscle tissue)
1900 MHz	ConvF	5.0 ± 8%	ε_r = 50.0 σ = 1.64 mho/m (muscle tissue)