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:	1514
Place of Calibration:	Zurich
Date of Calibration:	July 25, 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:	D. Veltka
Approved by:	

Schmid & Partner
Engineering AG

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Probe ET3DV6

SN:1514

Manufactured:	November 24, 1999
Last calibration:	October 25, 2002
Repaired:	June 28, 2002
Recalibrated:	July 25, 2002

Calibrated for System DASY3

DASY3 - Parameters of Probe: ET3DV6 SN:1514

Sensitivity in Free Space

NormX	1.70 $\mu V/(V/m)^2$
NormY	1.88 $\mu V/(V/m)^2$
NormZ	1.81 $\mu V/(V/m)^2$

Diode Compression

DCP X	93	mV
DCP Y	93	mV
DCP Z	93	mV

Sensitivity in Tissue Simulating Liquid

Head	**900 MHz**	ε_r = 41.5 ± 5%	σ = 0.97 ± 5% mho/m
Head	**835 MHz**	ε_r = 41.5 ± 5%	σ = 0.90 ± 5% mho/m
	ConvF X	6.2 ± 9.5% (k=2)	Boundary effect:
	ConvF Y	6.2 ± 9.5% (k=2)	Alpha 0.48
	ConvF Z	6.2 ± 9.5% (k=2)	Depth 2.19

Head	**1800 MHz**	ε_r = 40.0 ± 5%	σ = 1.40 ± 5% mho/m
Head	**1900 MHz**	ε_r = 40.0 ± 5%	σ = 1.40 ± 5% mho/m
	ConvF X	5.2 ± 9.5% (k=2)	Boundary effect:
	ConvF Y	5.2 ± 9.5% (k=2)	Alpha 0.57
	ConvF Z	5.2 ± 9.5% (k=2)	Depth 2.30

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	5.4
SAR_{be} [%] With Correction Algorithm	0.2	0.5

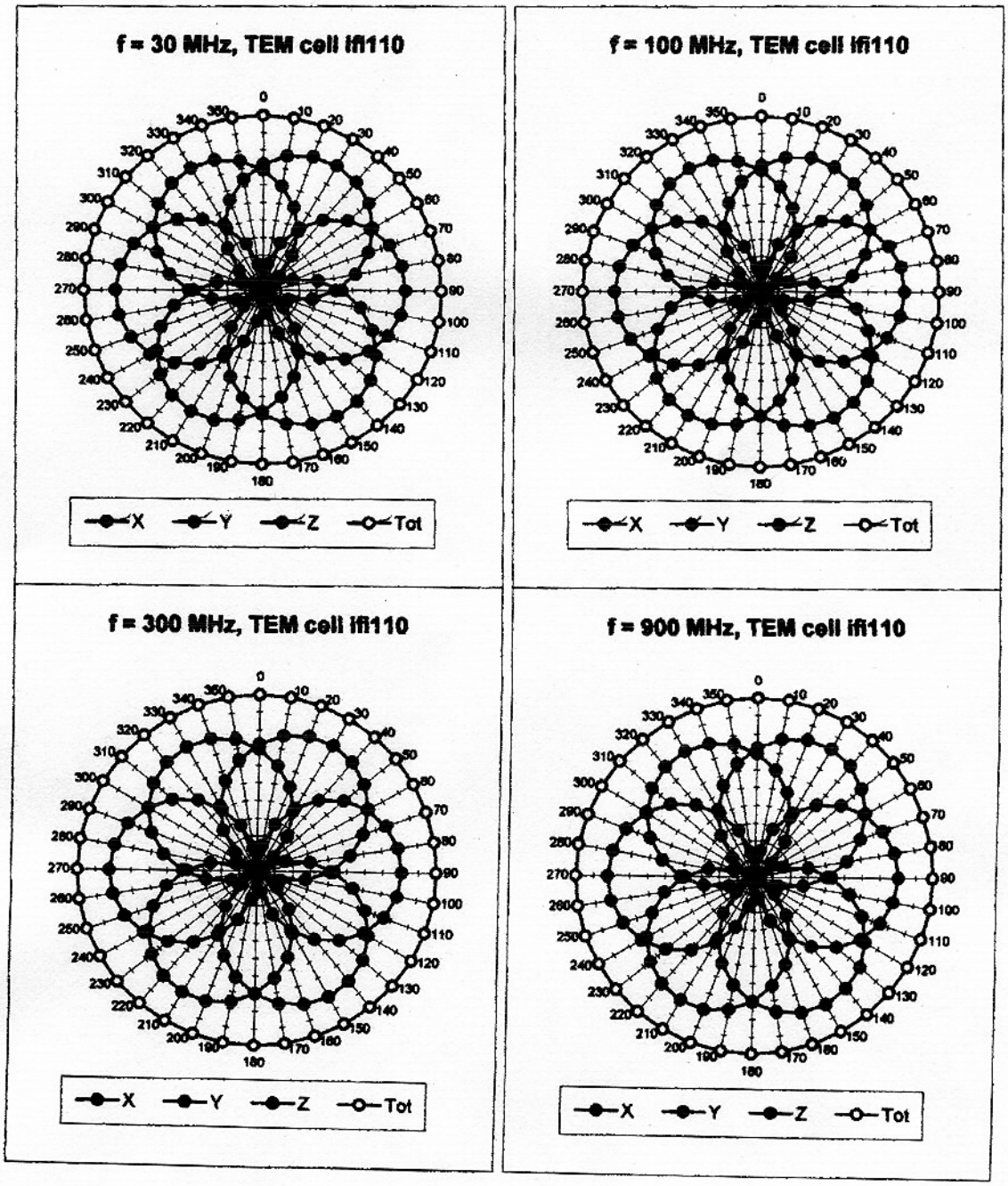
Head **1800 MHz** **Typical SAR gradient: 10 % per mm**

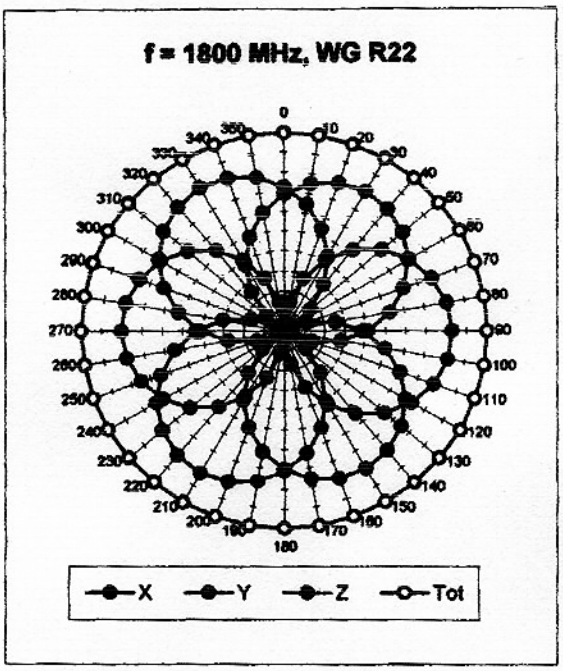
Probe Tip to Boundary	1 mm	2 mm
SAR_{be} [%] Without Correction Algorithm	12.7	8.2
SAR_{be} [%] With Correction Algorithm	0.2	0.2

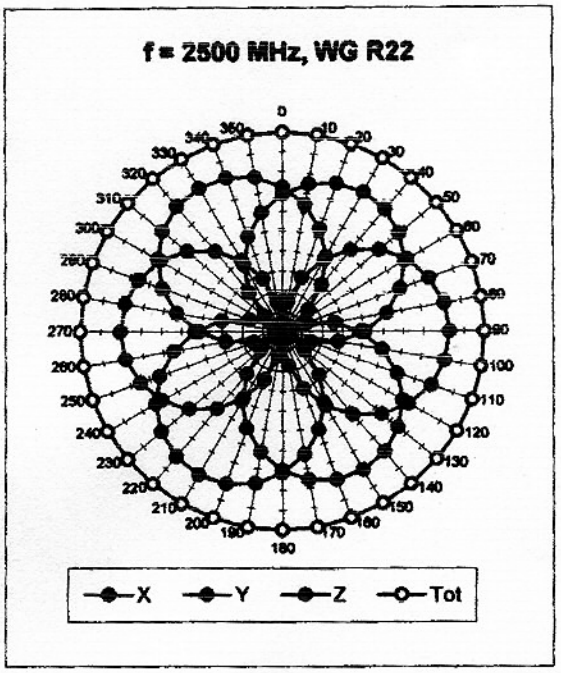
Sensor Offset

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

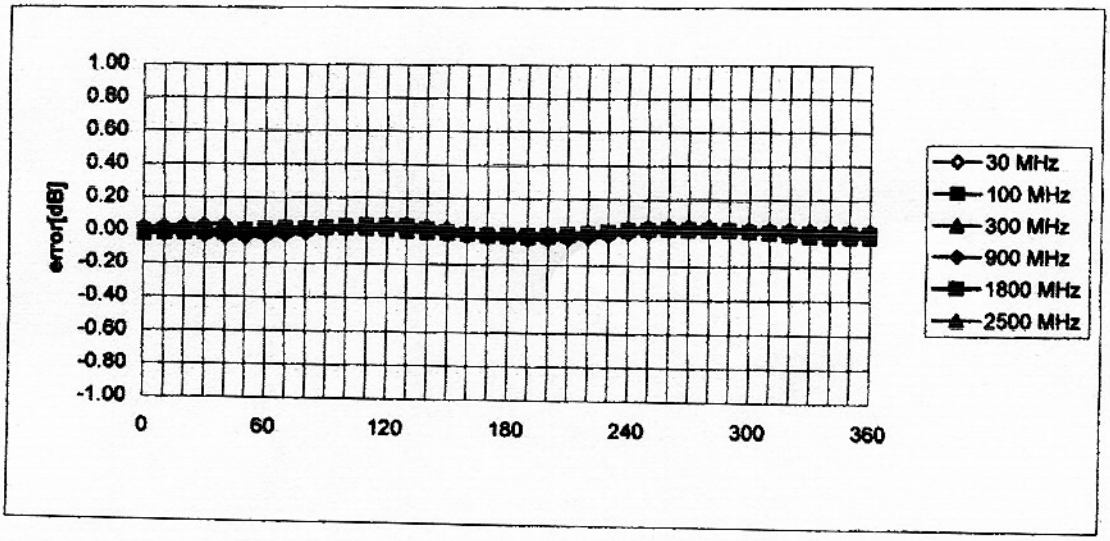
Receiving Pattern (ϕ), θ = 0°





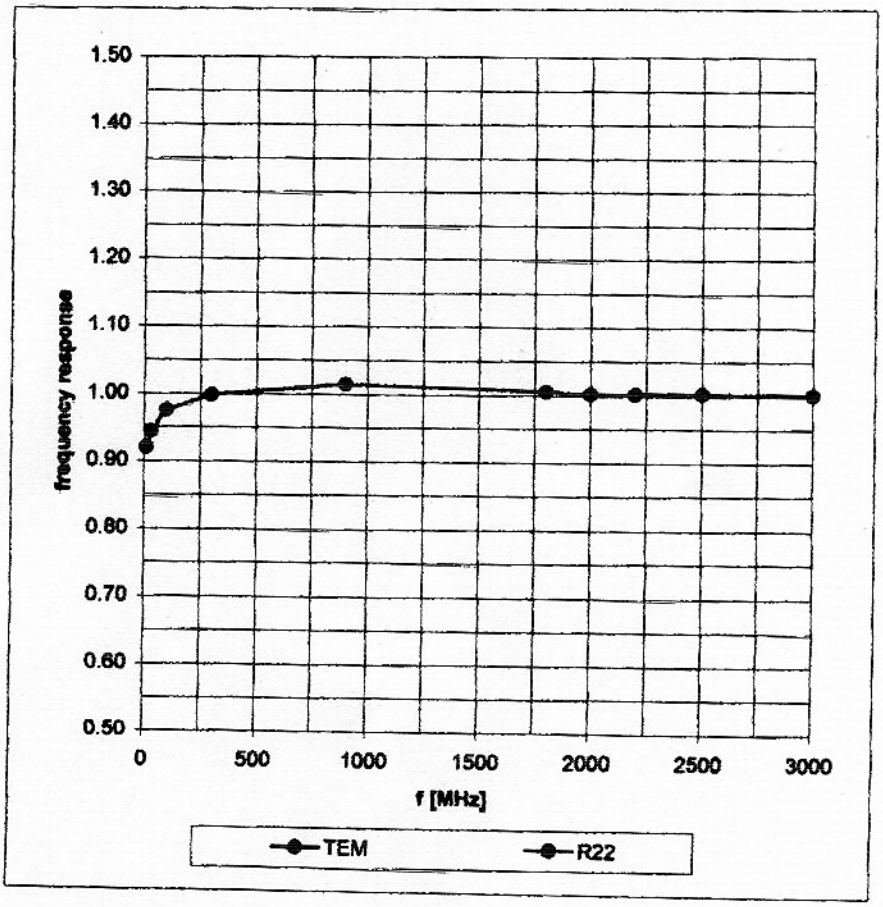


Isotropy Error (ϕ), θ = 0°



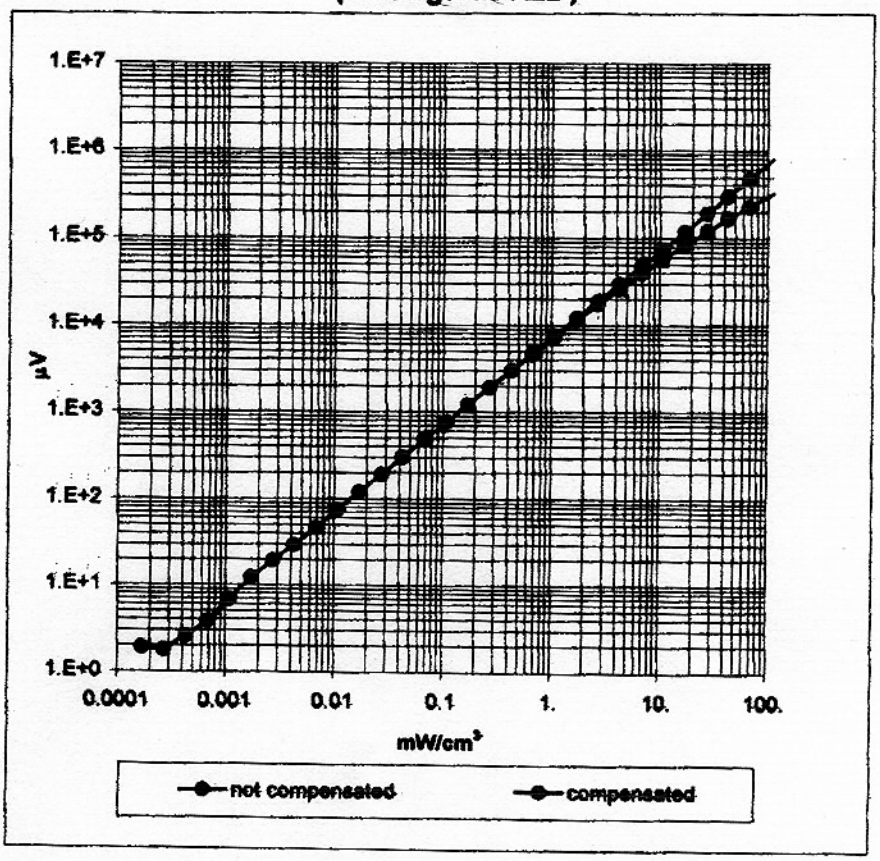
Frequency Response of E-Field

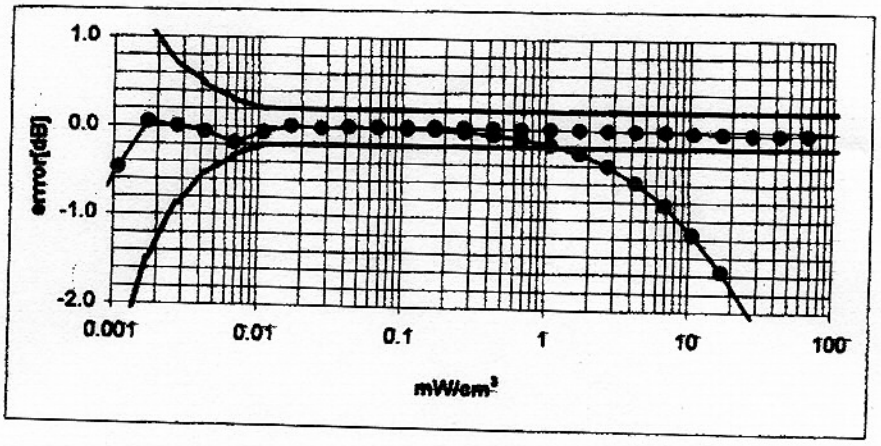
(TEM-Cell:ifi110, Waveguide R22)



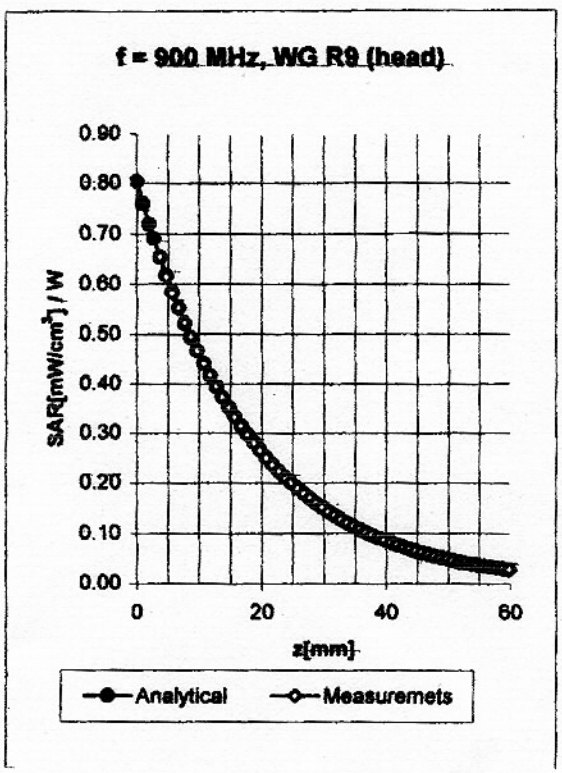
Dynamic Range f(SAR_{brain})

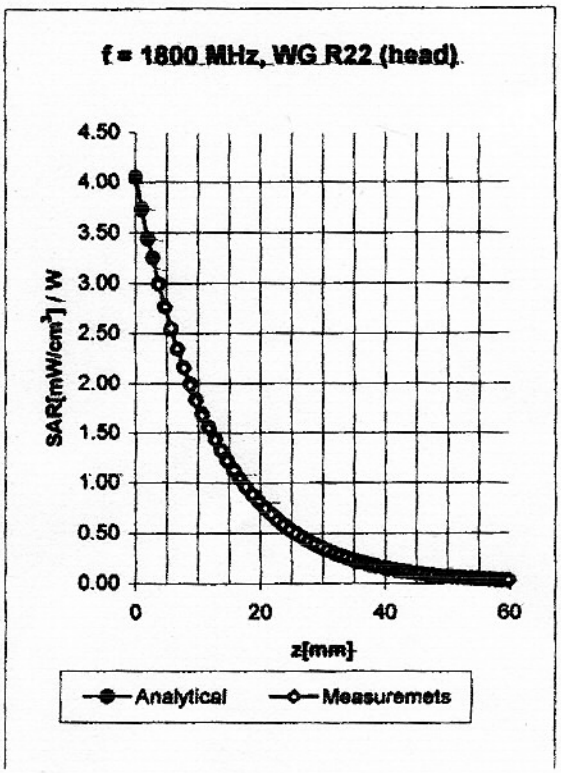
(Waveguide R22)





Conversion Factor Assessment





Head	**900 MHz**	ε_r = 41.5 ± 5%	σ = 0.97 ± 5% mho/m	
Head	**835 MHz**	ε_r = 41.5 ± 5%	σ = 0.90 ± 5% mho/m	
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	ConvF Y	**6.2** ± 9.5% (k=2)	Alpha	**0.48**
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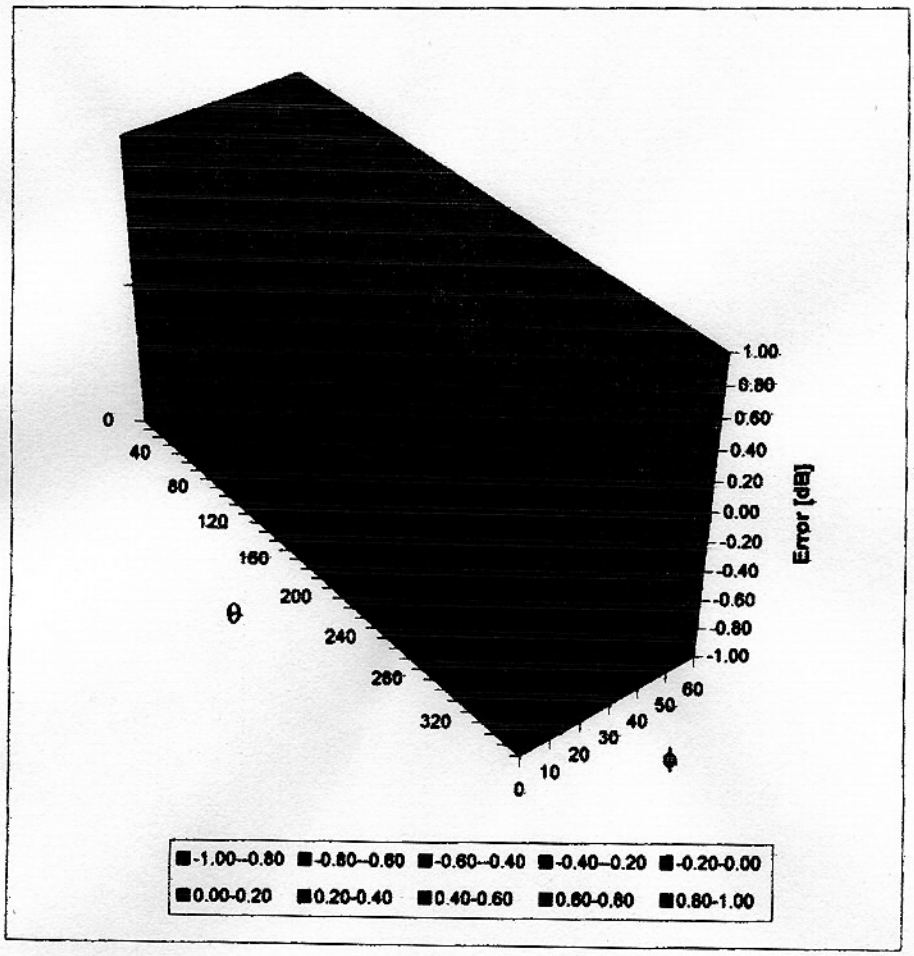
Deviation from Isotropy in HSL

Error (θ,φ), f = 900 MHz



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Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ET3DV6**
Serial Number:	**1514**
Place of Assessment:	**Zurich**
Date of Assessment:	**July 26, 2002**
Probe Calibration Date:	**July 25, 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:1514

Conversion factor (± standard deviation)

835 MHz	ConvF	**6.0 ± 8%**	ε_r = 55.2 ± 5% σ = 0.97 ± 5% mho/m (body tissue)
900 MHz	ConvF	**5.9 ± 8%**	ε_r = 55.0 ± 5% σ = 1.05 ± 5% mho/m (body tissue)
1800 MHz	ConvF	**4.8 ± 8%**	ε_r = 53.3 ± 5% σ = 1.52 ± 5% mho/m (body tissue)
1900 MHz	ConvF	**4.6 ± 8%**	ε_r = 53.3 ± 5% σ = 1.52 ± 5% mho/m (body tissue)
1950 MHz	ConvF	**4.5 ± 8%**	ε_r = 53.3 ± 5% σ = 1.52 ± 5% mho/m (body tissue)
1950 MHz	ConvF	**4.9 ± 8%**	ε_r = 40.0 ± 5% σ = 1.40 ± 5% mho/m (head tissue)