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:	**1578**
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:	Polonić Katja
Approved by:	

Schmid & Partner
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Probe ET3DV6

SN:1578

Manufactured:	April 6, 2001
Last calibration:	April 20, 2001
Recalibrated:	February 22, 2002

Calibrated for System DASY3

DASY3 - Parameters of Probe: ET3DV6 SN:1578

Sensitivity in Free Space

Diode Compression

NormX	**1.72** $\mu V/(V/m)^2$	DCP X	**99**	mV
NormY	**1.83** $\mu V/(V/m)^2$	DCP Y	**99**	mV
NormZ	**1.68** $\mu V/(V/m)^2$	DCP Z	**99**	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	**7.0** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**7.0** ± 9.5% (k=2)	Alpha	**0.33**
ConvF Z	**7.0** ± 9.5% (k=2)	Depth	**2.34**

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	**5.5** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**5.5** ± 9.5% (k=2)	Alpha	**0.47**
ConvF Z	**5.5** ± 9.5% (k=2)	Depth	**2.20**

Boundary Effect

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

Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	7.6	4.3
SAR_{be} [%]	With Correction Algorithm	0.2	0.4

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

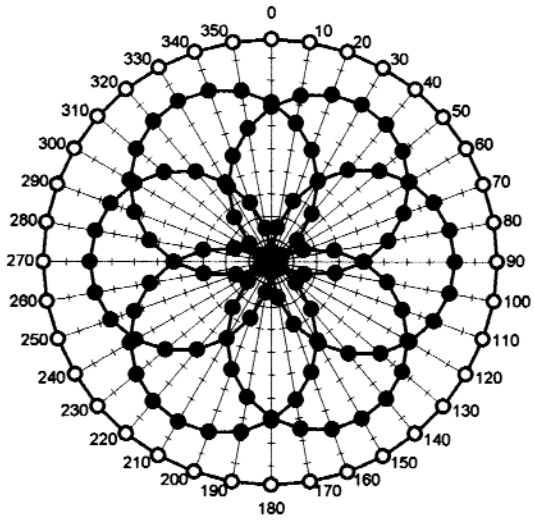
Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	9.5	6.3
SAR_{be} [%]	With Correction Algorithm	0.2	0.3

Sensor Offset

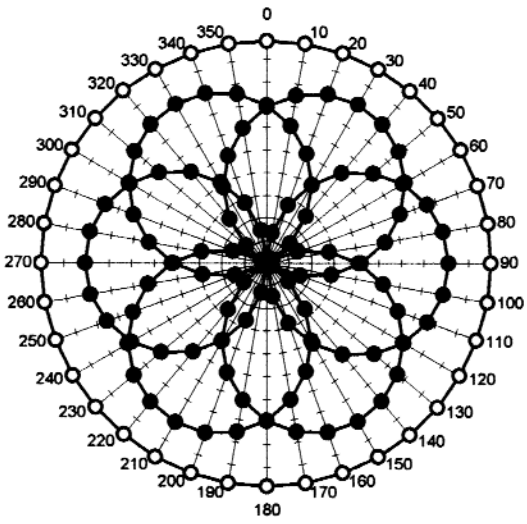
Probe Tip to Sensor Center	**2.7**	mm
Optical Surface Detection	**1.5 ± 0.2**	mm

Receiving Pattern (ϕ), θ = 0°

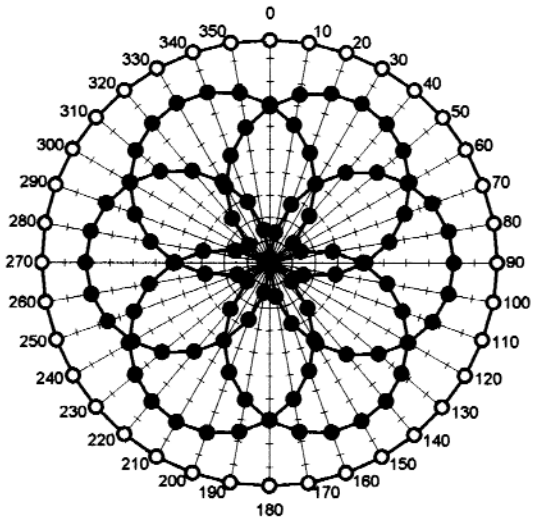
f = 30 MHz, TEM cell ifi110



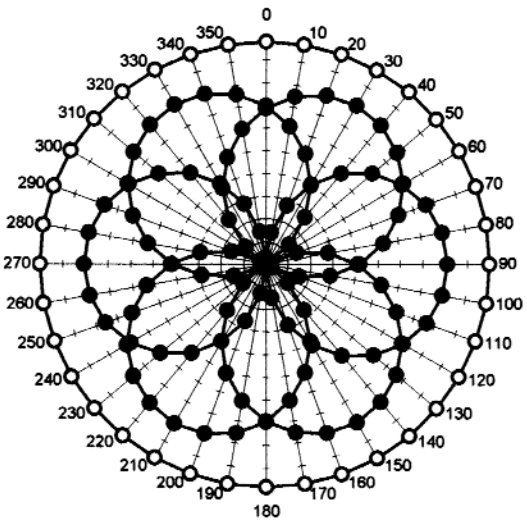
f = 100 MHz, TEM cell ifi110

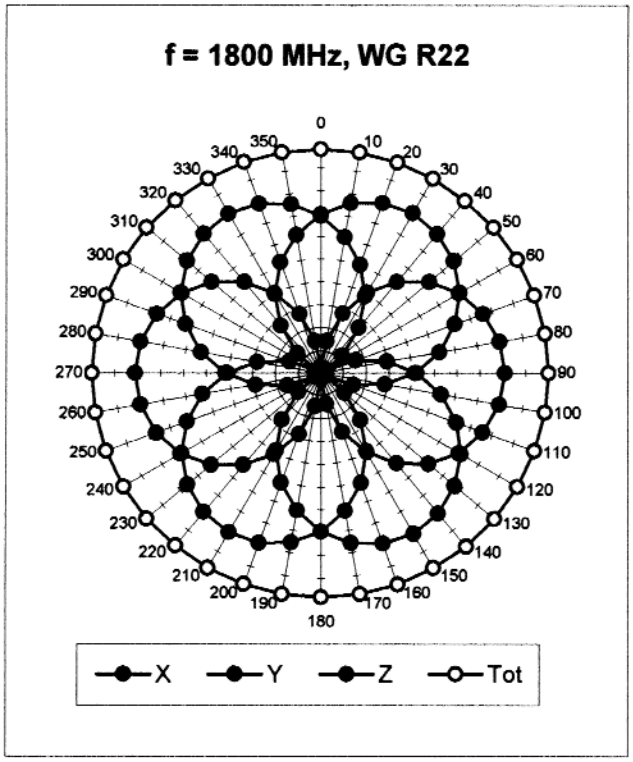


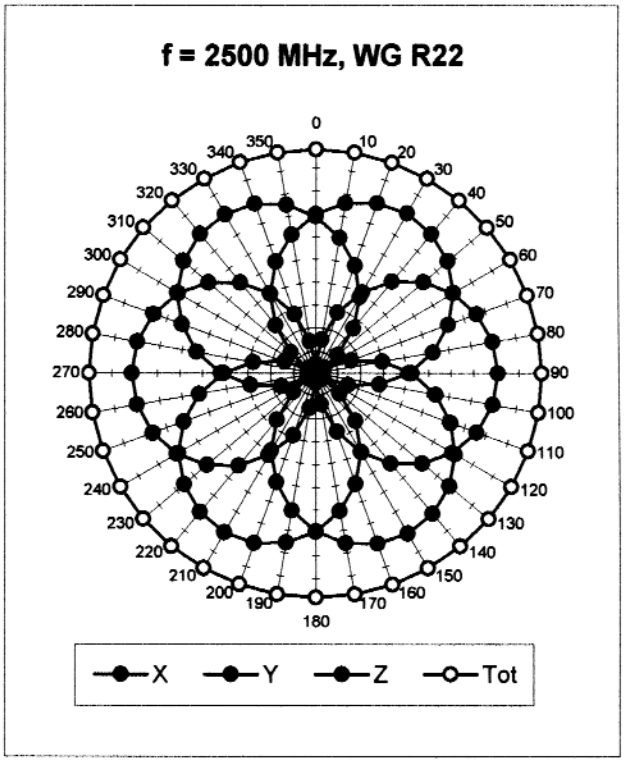
f = 300 MHz, TEM cell ifi110



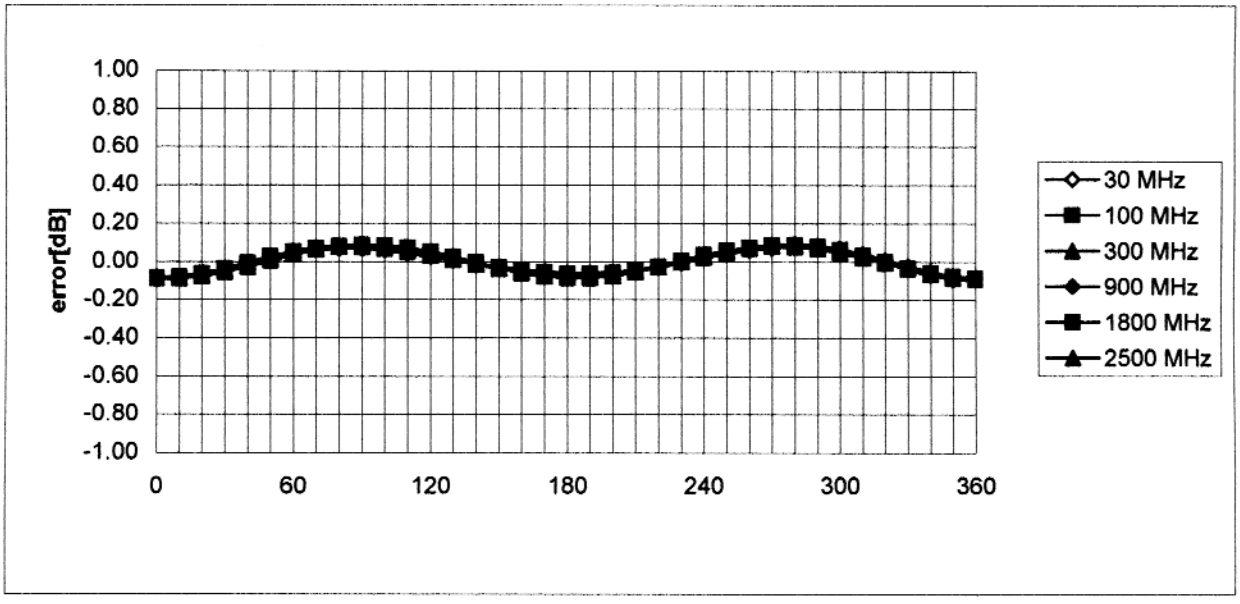
f = 900 MHz, TEM cell ifi110





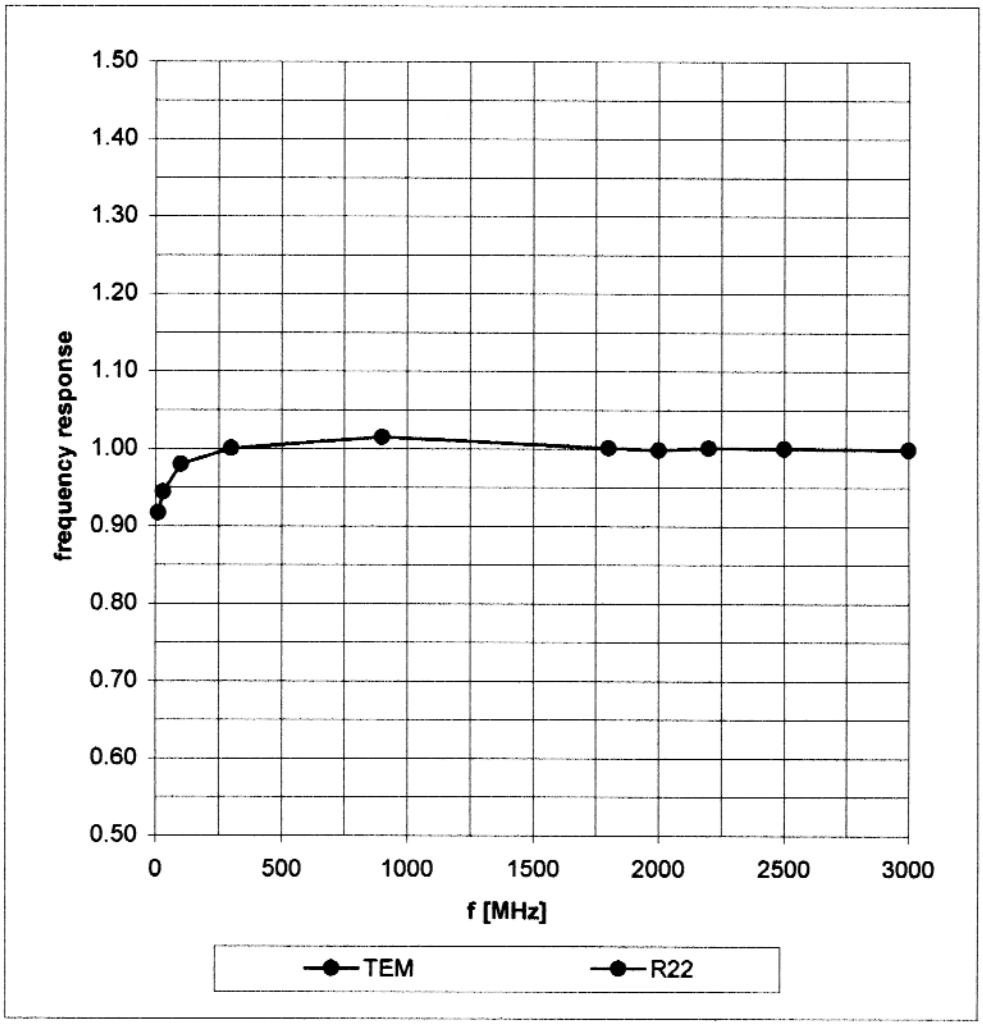


Isotropy Error (ϕ), θ = 0°



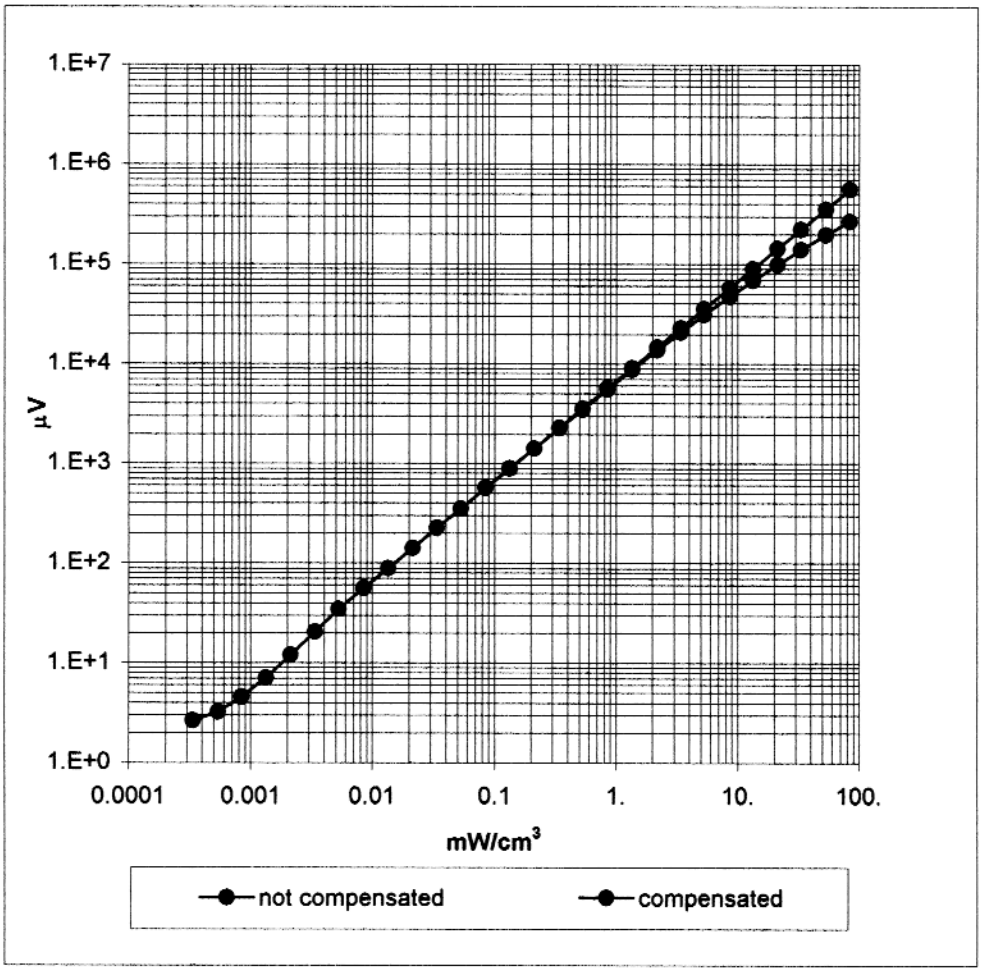
Frequency Response of E-Field

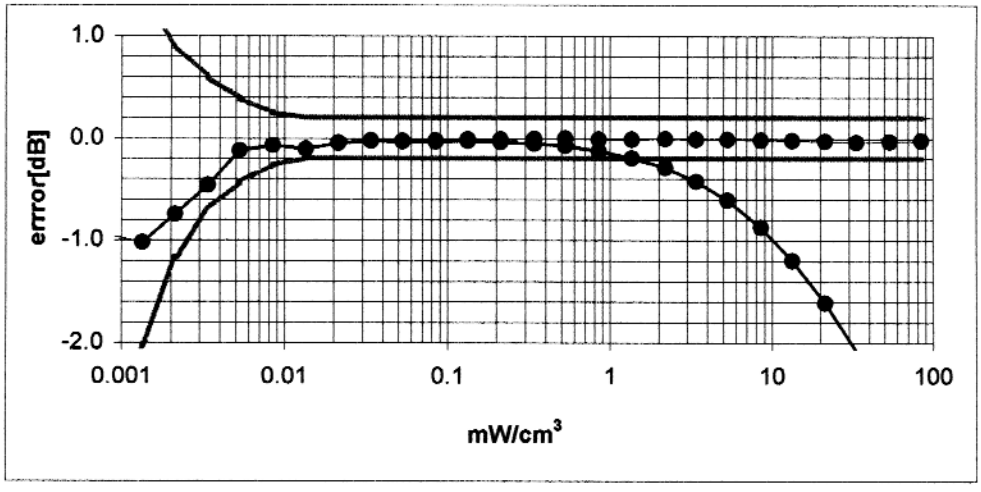
(TEM-Cell:ifi110, Waveguide R22)



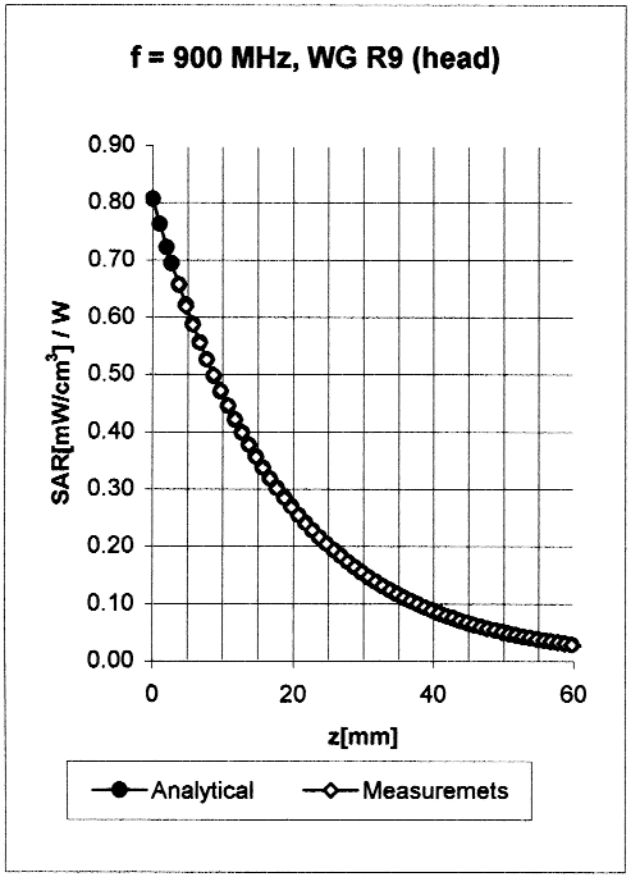
Dynamic Range f(SAR_{brain})

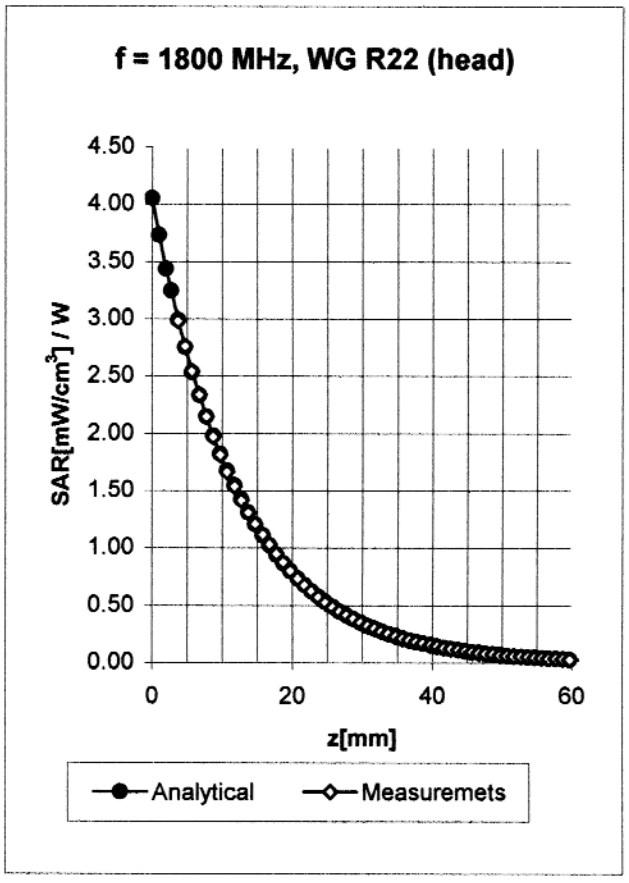
(Waveguide R22)





Conversion Factor Assessment

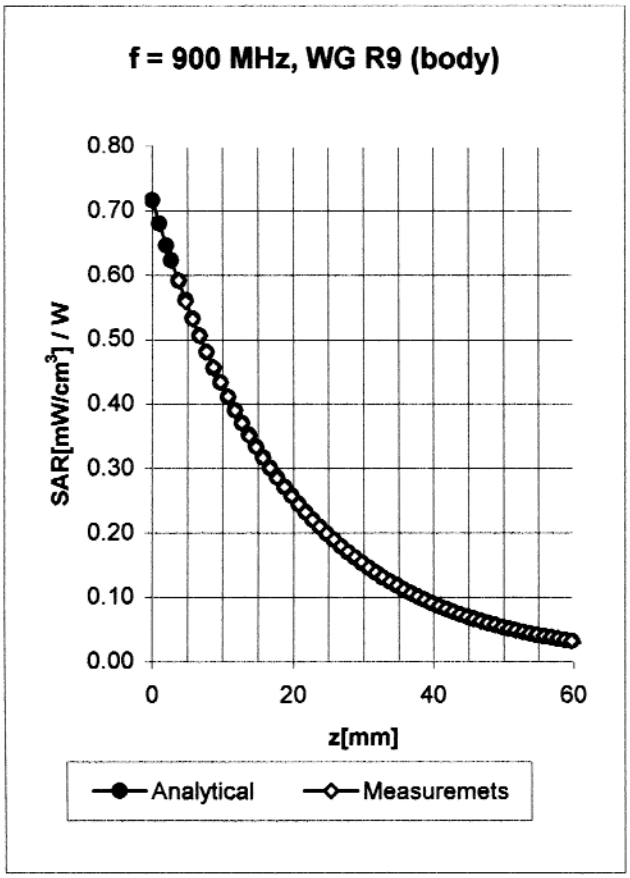


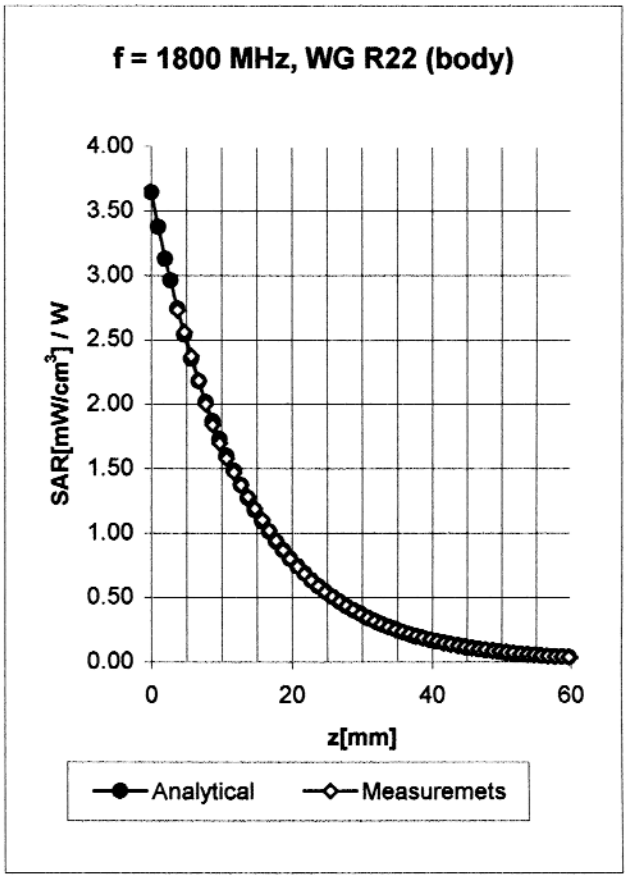


Head	**900 MHz**		ε_r **= 41.5 ± 5%**	σ **= 0.97 ± 5% mho/m**
Head	**835 MHz**		ε_r **= 41.5 ± 5%**	σ **= 0.90 ± 5% mho/m**
	ConvF X	**7.0** ± 9.5% (k=2)		Boundary effect:
	ConvF Y	**7.0** ± 9.5% (k=2)		Alpha **0.33**
	ConvF Z	**7.0** ± 9.5% (k=2)		Depth **2.34**

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	**5.5** ± 9.5% (k=2)		Boundary effect:
	ConvF Y	**5.5** ± 9.5% (k=2)		Alpha **0.47**
	ConvF Z	**5.5** ± 9.5% (k=2)		Depth **2.20**

Conversion Factor Assessment



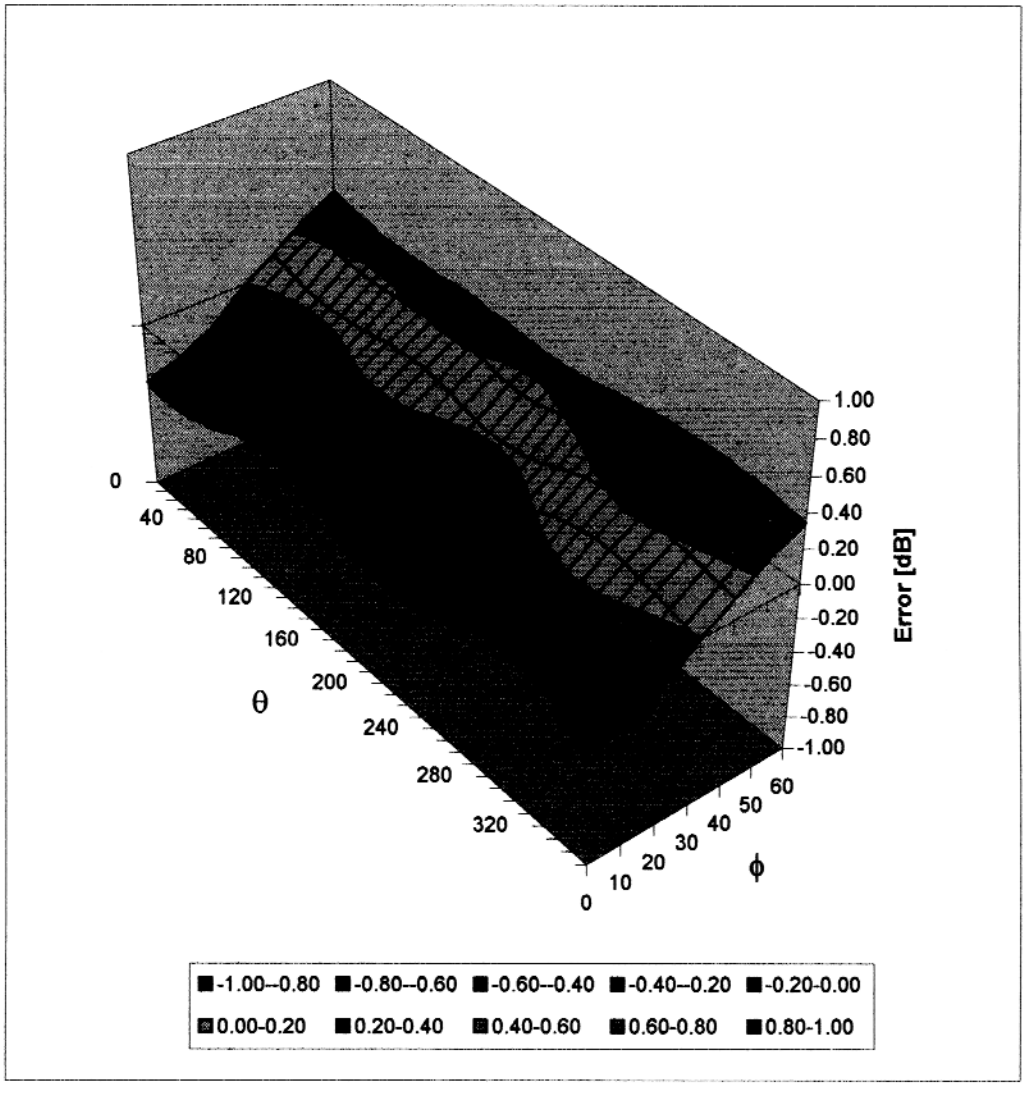


Body	**900 MHz**		ε_r **= 55.0 ± 5%**	σ **= 1.05 ± 5% mho/m**
Body	**835 MHz**		ε_r **= 55.2 ± 5%**	σ **= 0.97 ± 5% mho/m**
	ConvF X	**6.7** ± 9.5% (k=2)		Boundary effect:
	ConvF Y	**6.7** ± 9.5% (k=2)		Alpha **0.29**
	ConvF Z	**6.7** ± 9.5% (k=2)		Depth **2.76**

Body	**1800 MHz**		ε_r **= 53.3 ± 5%**	σ **= 1.52 ± 5% mho/m**
Body	**1900 MHz**		ε_r **= 53.3 ± 5%**	σ **= 1.52 ± 5% mho/m**
	ConvF X	**5.1** ± 9.5% (k=2)		Boundary effect:
	ConvF Y	**5.1** ± 9.5% (k=2)		Alpha **0.58**
	ConvF Z	**5.1** ± 9.5% (k=2)		Depth **2.19**

Deviation from Isotropy in HSL

Error (θ,ϕ), f = 900 MHz



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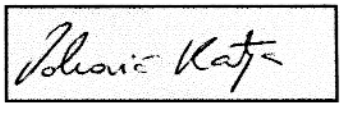
Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ET3DV6**
Serial Number:	**1578**
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:1578

Conversion factor (± standard deviation)

450 MHz	ConvF	**8.0± 8%**	ε_r = **43.5** σ = **0.87 mho/m** (head tissue)
450 MHz	ConvF	**8.1 ± 8%**	ε_r = **56.7** σ = **0.94 mho/m** (body tissue)
2450 MHz	ConvF	**4.5 ± 8%**	ε_r = **39.2** σ = **1.80 mho/m** (head tissue)
2450 MHz	ConvF	**4.1 ± 8%**	ε_r = **52.7** σ = **1.95 mho/m** (body tissue)