

Schmid & Partner Engineering AG

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Calibration Certificate

Dosimetric E-Field Probe

Type:

ET3DV6

Serial Number:

1569

Place of Calibration:

Zurich

Date of Calibration:

April 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. Vetter

Approved by:

Alain Katya

Probe ET3DV6

SN:1569

Manufactured:	March 19, 2001
Last calibration:	March 22, 2001
Recalibrated:	April 25, 2002

Calibrated for System DASY3

DASY3 - Parameters of Probe: ET3DV6 SN:1569

Sensitivity in Free Space

NormX	1.76 $\mu\text{V}/(\text{V}/\text{m})^2$
NormY	1.99 $\mu\text{V}/(\text{V}/\text{m})^2$
NormZ	1.89 $\mu\text{V}/(\text{V}/\text{m})^2$

Diode Compression

DCP X	96	mV
DCP Y	96	mV
DCP Z	96	mV

Sensitivity in Tissue Simulating Liquid

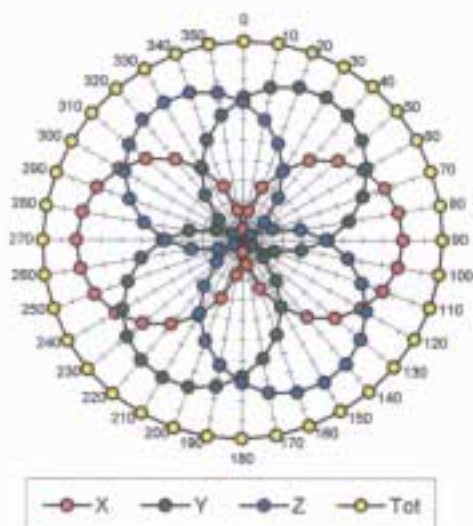
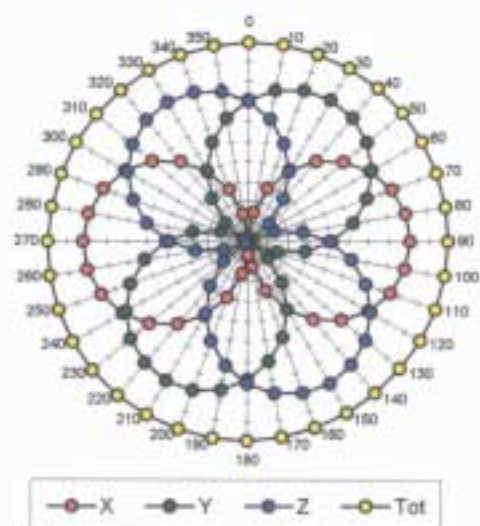
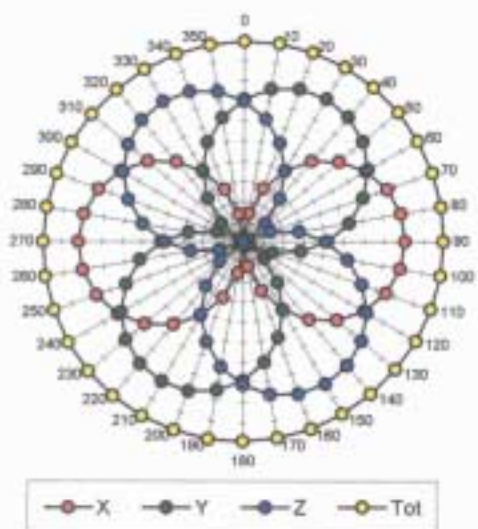
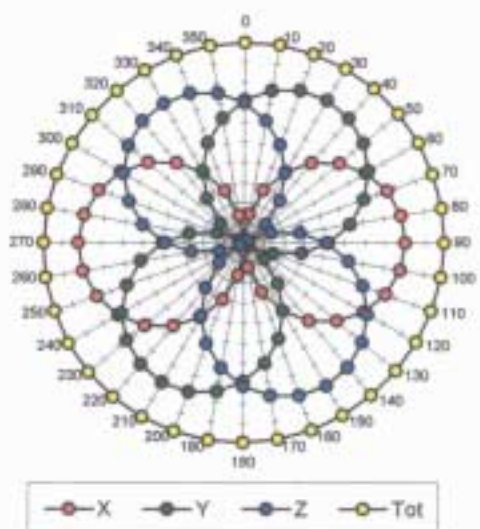
Head	900 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.97 \pm 5\%$ mho/m
Head	835 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.90 \pm 5\%$ mho/m
ConvF X	6.9 $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	6.9 $\pm 9.5\%$ (k=2)	Alpha	0.60
ConvF Z	6.9 $\pm 9.5\%$ (k=2)	Depth	1.66
Head	1800 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\%$ mho/m
ConvF X	5.6 $\pm 8.9\%$ (k=2)	Boundary effect:	
ConvF Y	5.6 $\pm 8.9\%$ (k=2)	Alpha	0.43
ConvF Z	5.6 $\pm 8.9\%$ (k=2)	Depth	2.54

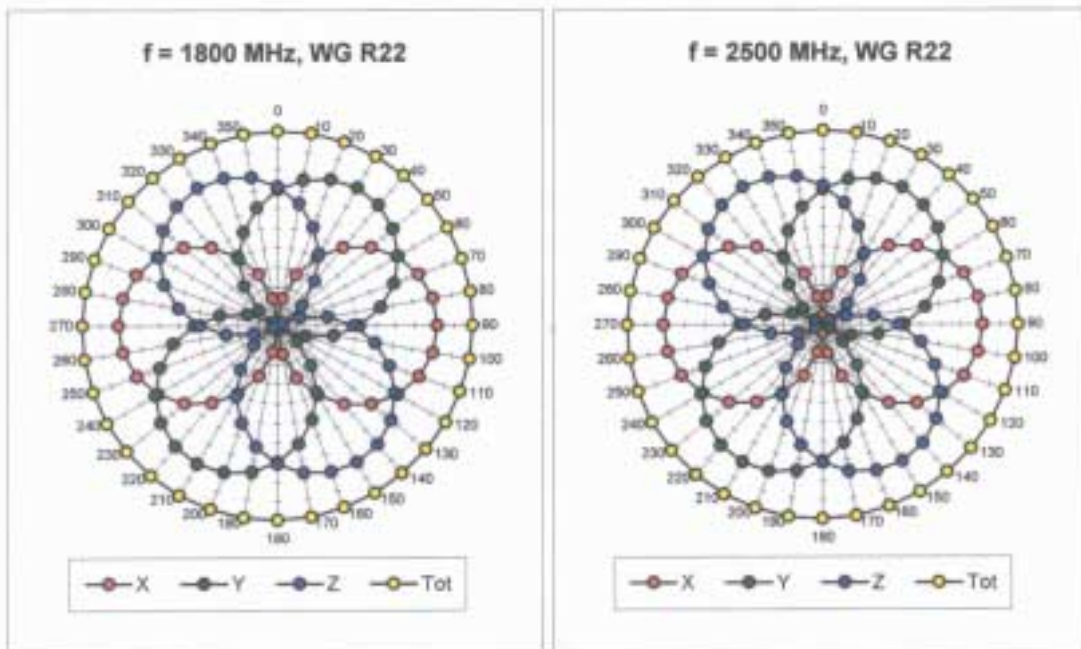
Boundary Effect

Head	900 MHz	Typical SAR gradient: 5 % per mm		
Probe Tip to Boundary		1 mm	2 mm	
SAR _{iso} [%]	Without Correction Algorithm	7.0	3.6	
SAR _{iso} [%]	With Correction Algorithm	0.0	0.1	
Head	1800 MHz	Typical SAR gradient: 10 % per mm		
Probe Tip to Boundary		1 mm	2 mm	
SAR _{iso} [%]	Without Correction Algorithm	10.8	7.4	
SAR _{iso} [%]	With Correction Algorithm	0.2	0.2	

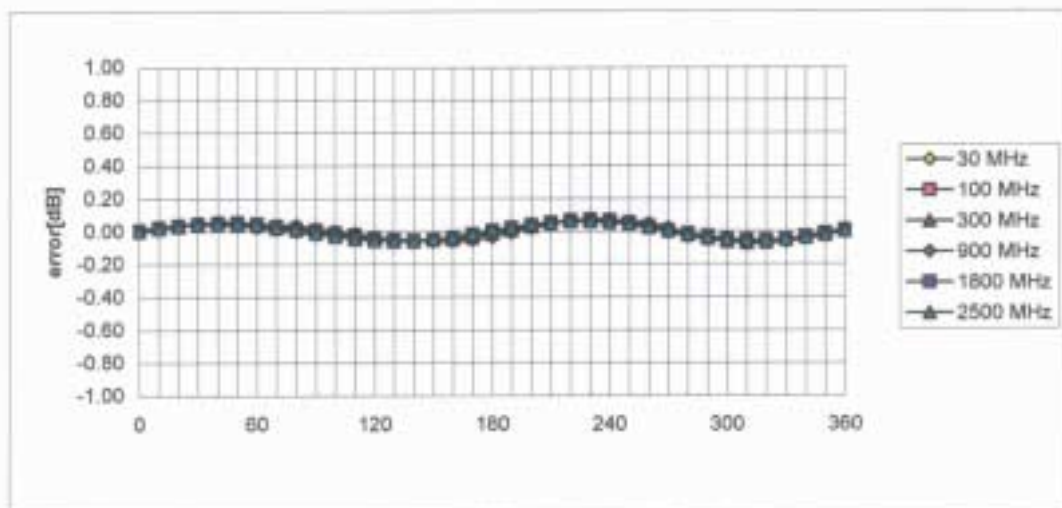
Sensor Offset

Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	1.5 $\pm$ 0.2	mm

Receiving Pattern (ϕ), $\theta = 0^\circ$ $f = 30$ MHz, TEM cell if110 $f = 100$ MHz, TEM cell if110 $f = 300$ MHz, TEM cell if110 $f = 900$ MHz, TEM cell if110

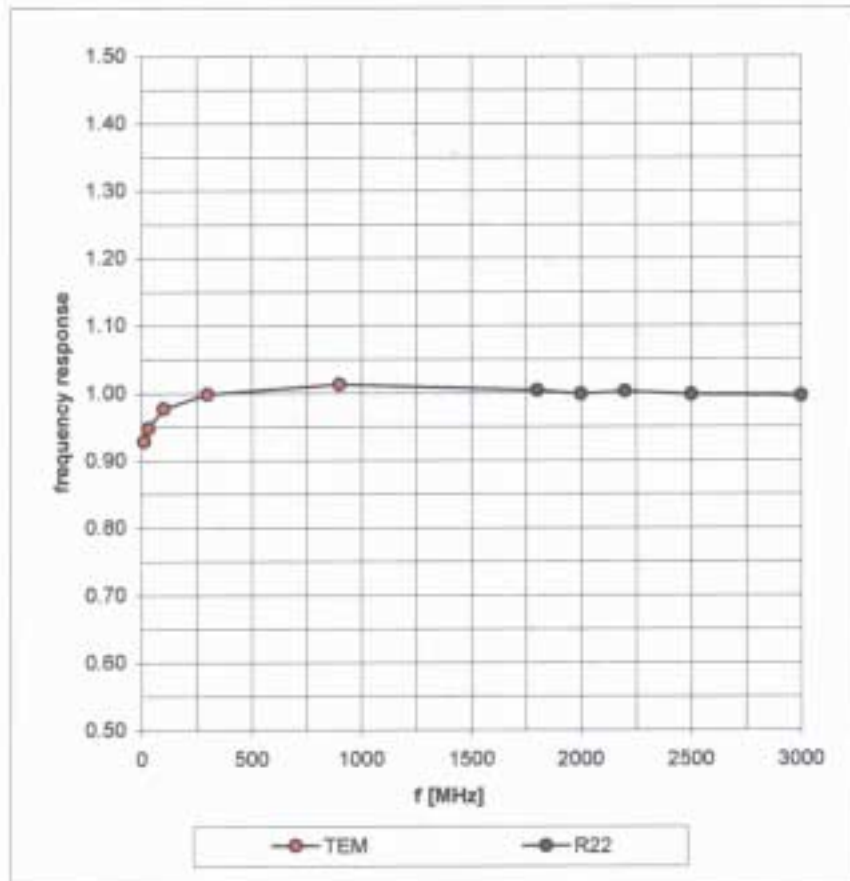


Isotropy Error (ϕ), $\theta = 0^\circ$

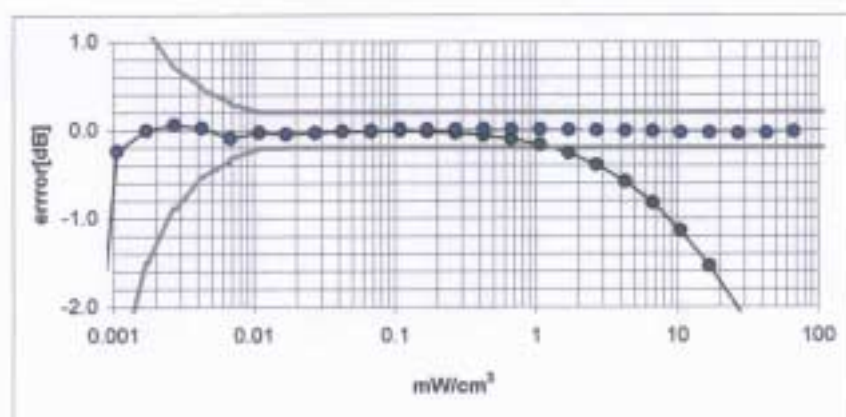
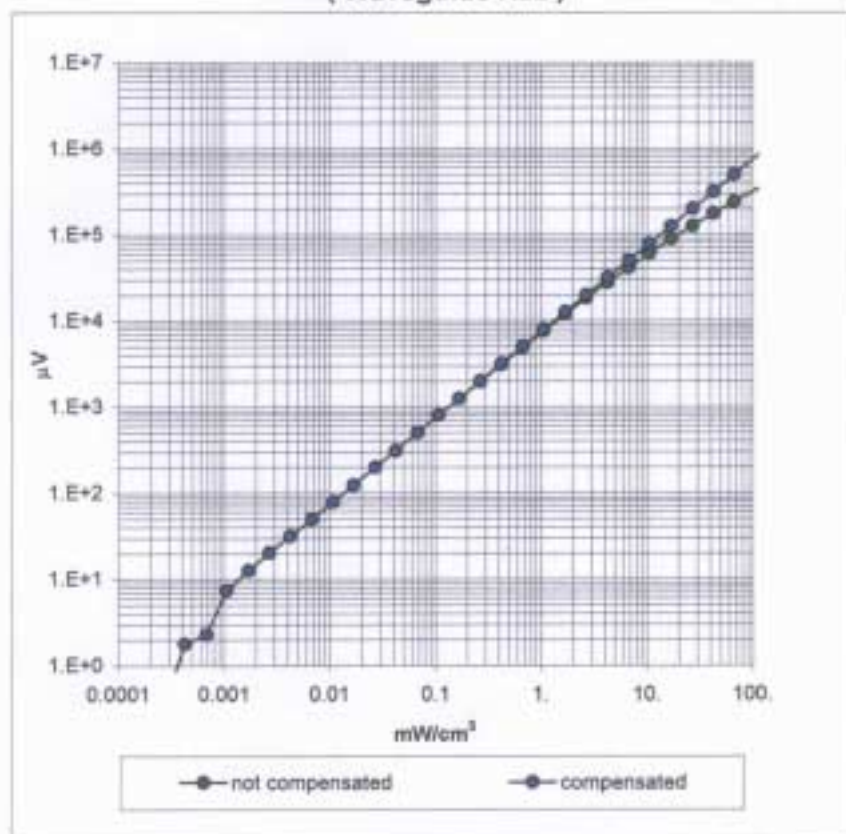


Frequency Response of E-Field

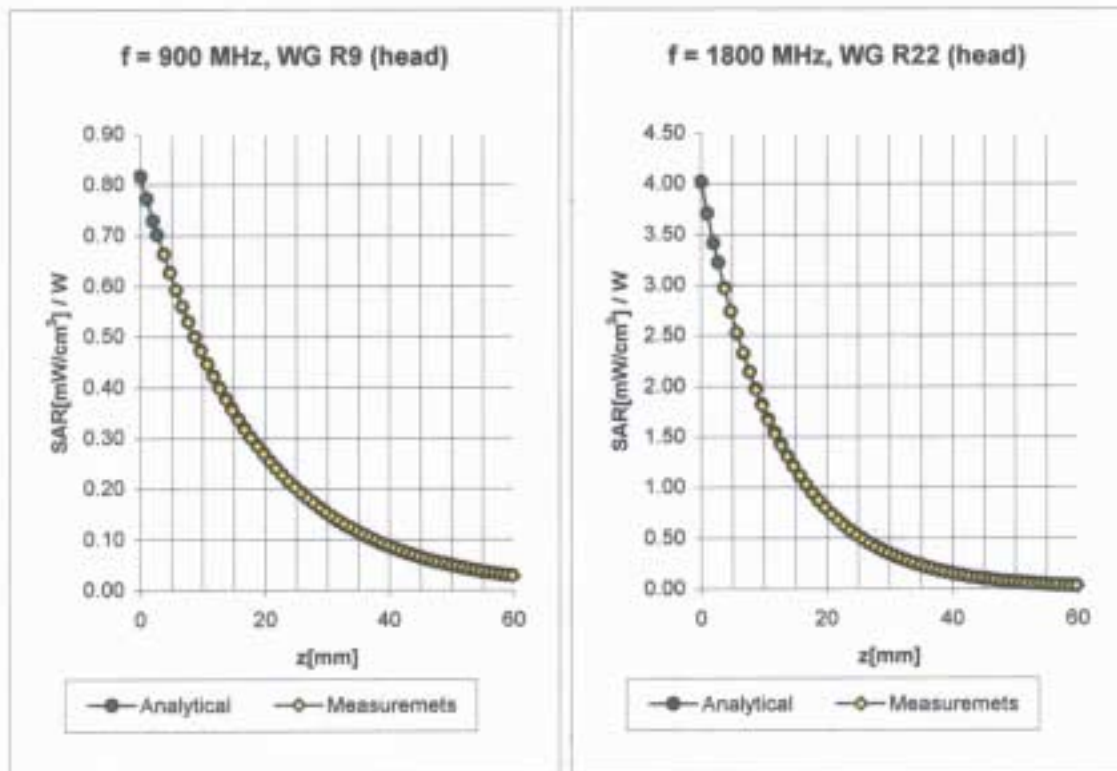
(TEM-Cell:ifi110, Waveguide R22)



Dynamic Range $f(\text{SAR}_{\text{brain}})$ (Waveguide R22)

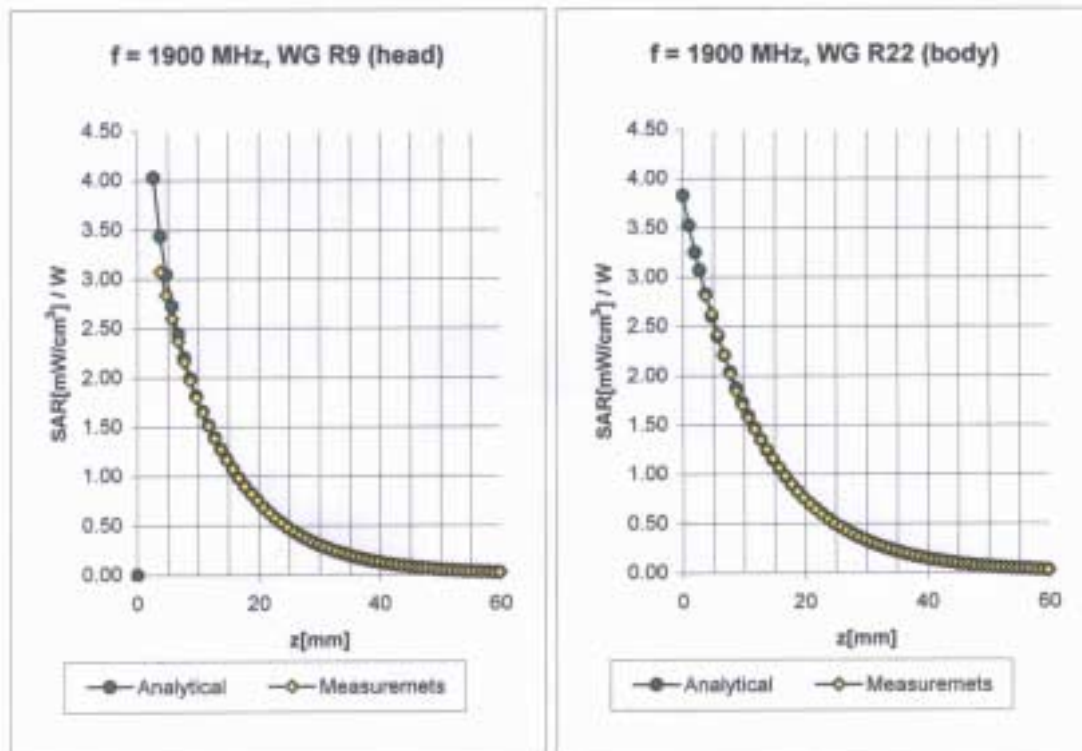


Conversion Factor Assessment



Head	900 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.97 \pm 5\%$ mho/m	
Head	835 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.90 \pm 5\%$ mho/m	
	ConvF X	$6.9 \pm 9.5\%$ (k=2)	Boundary effect:	
	ConvF Y	$6.9 \pm 9.5\%$ (k=2)	Alpha	0.60
	ConvF Z	$6.9 \pm 9.5\%$ (k=2)	Depth	1.66
Head	1800 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\%$ mho/m	
	ConvF X	$5.6 \pm 8.9\%$ (k=2)	Boundary effect:	
	ConvF Y	$5.6 \pm 8.9\%$ (k=2)	Alpha	0.43
	ConvF Z	$5.6 \pm 8.9\%$ (k=2)	Depth	2.54

Conversion Factor Assessment



Head 1900 MHz $\epsilon_r = 40.0 \pm 5\%$ $\sigma = 1.40 \pm 5\%$ mho/m

ConvF X **5.4** $\pm 8.9\%$ (k=2)
 ConvF Y **5.4** $\pm 8.9\%$ (k=2)
 ConvF Z **5.4** $\pm 8.9\%$ (k=2)

Boundary effect:
 Alpha **0.47**
 Depth **2.44**

Body 1900 MHz $\epsilon_r = 53.3 \pm 5\%$ $\sigma = 1.52 \pm 5\%$ mho/m

ConvF X **5.0** $\pm 8.9\%$ (k=2)
 ConvF Y **5.0** $\pm 8.9\%$ (k=2)
 ConvF Z **5.0** $\pm 8.9\%$ (k=2)

Boundary effect:
 Alpha **0.65**
 Depth **2.16**

Deviation from Isotropy in HSL

Error (θ, ϕ), $f = 900$ MHz

