

Appendix C: probe calibration parameters

Please see separate attachment

039877

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:

1712

Place of Calibration:

Zurich

Date of Calibration:

September 6, 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:



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:1712

Manufactured: August 7, 2002
Last calibration: September 6, 2002

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

ET3DV6 SN:1712

September 6, 2002

DASY - Parameters of Probe: ET3DV6 SN:1712

Sensitivity in Free Space

NormX	1.59 $\mu\text{V}/(\text{V}/\text{m})^2$
NormY	1.53 $\mu\text{V}/(\text{V}/\text{m})^2$
NormZ	1.61 $\mu\text{V}/(\text{V}/\text{m})^2$

Diode Compression

DCP X	95	mV
DCP Y	95	mV
DCP Z	95	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	6.5 $\pm 9.5\%$ (k=2)		Boundary effect:
ConvF Y	6.5 $\pm 9.5\%$ (k=2)		Alpha 0.33
ConvF Z	6.5 $\pm 9.5\%$ (k=2)		Depth 2.72
Head	1800 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\%$ mho/m
Head	1900 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\%$ mho/m
ConvF X	5.4 $\pm 9.5\%$ (k=2)		Boundary effect:
ConvF Y	5.4 $\pm 9.5\%$ (k=2)		Alpha 0.48
ConvF Z	5.4 $\pm 9.5\%$ (k=2)		Depth 2.52

Boundary Effect

Head	900 MHz	Typical SAR gradient: 5 % per mm	
	Probe Tip to Boundary	1 mm	2 mm
	SAR _{be} [%] Without Correction Algorithm	9.8	5.7
	SAR _{be} [%] With Correction Algorithm	0.4	0.6
Head	1800 MHz	Typical SAR gradient: 10 % per mm	
	Probe Tip to Boundary	1 mm	2 mm
	SAR _{be} [%] Without Correction Algorithm	12.3	8.2
	SAR _{be} [%] With Correction Algorithm	0.1	0.2

Sensor Offset

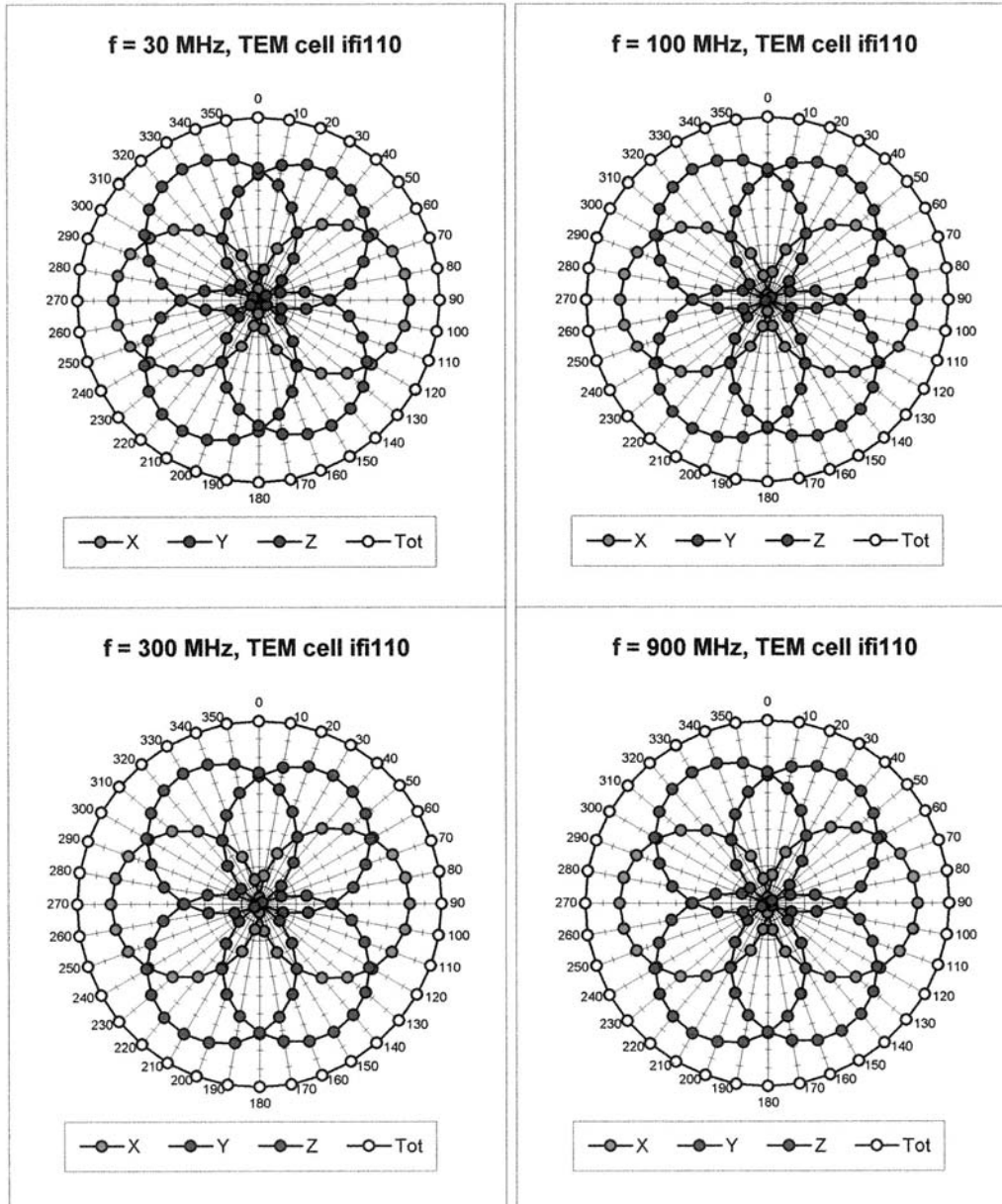
Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	1.3 \pm 0.2	mm

- - -

ET3DV6 SN:1712

September 6, 2002

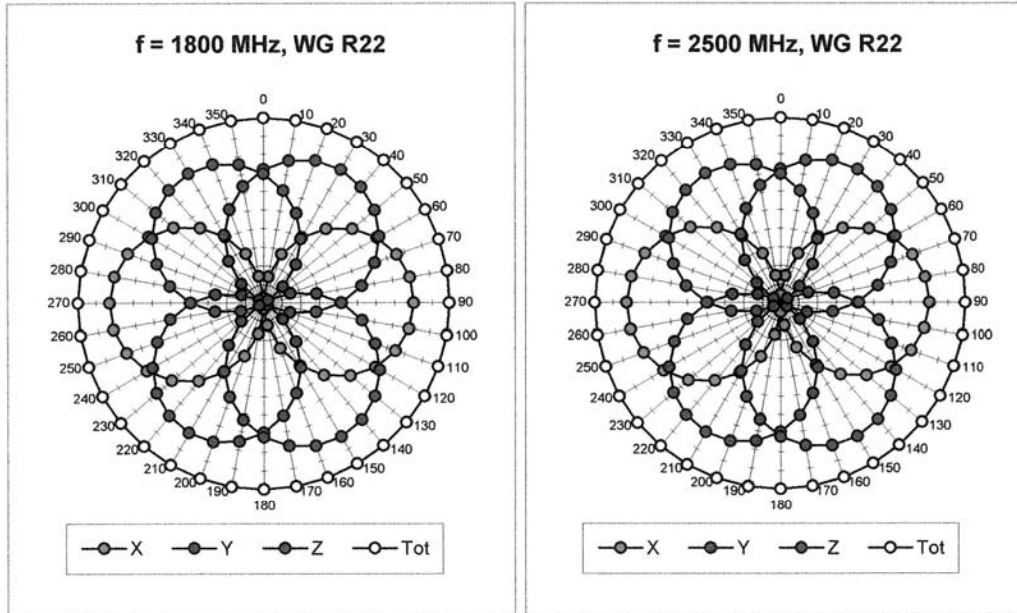
Receiving Pattern (ϕ), $\theta = 0^\circ$



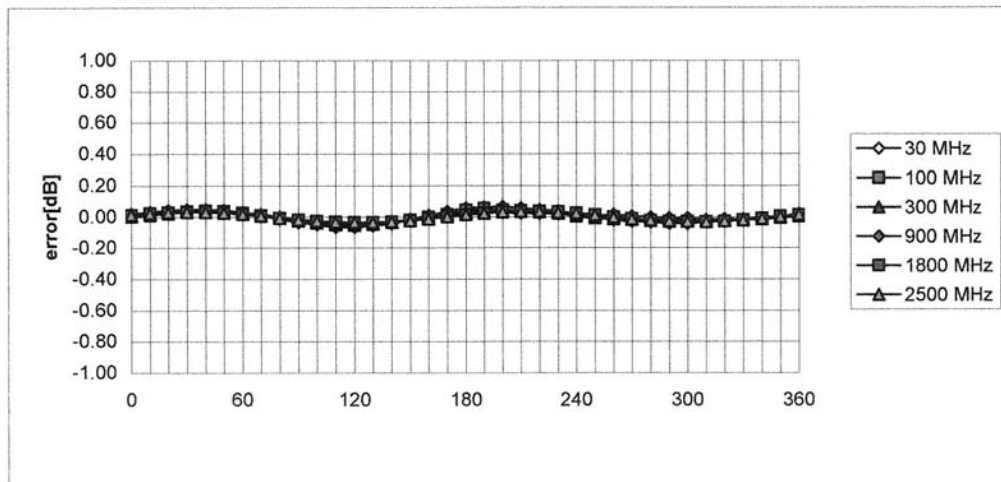
- - -

ET3DV6 SN:1712

September 6, 2002



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

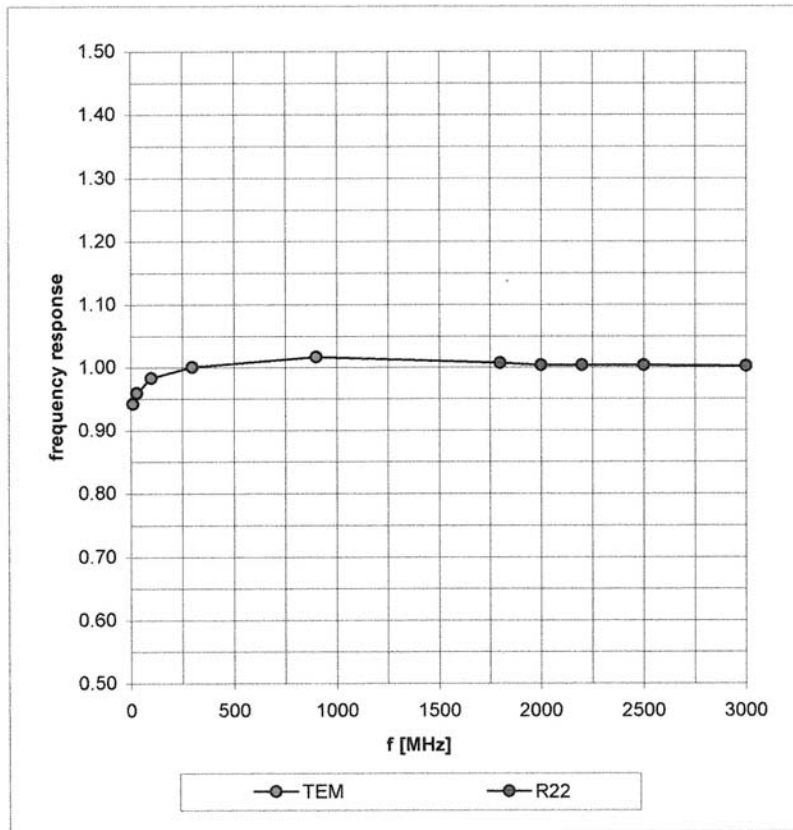


ET3DV6 SN:1712

September 6, 2002

Frequency Response of E-Field

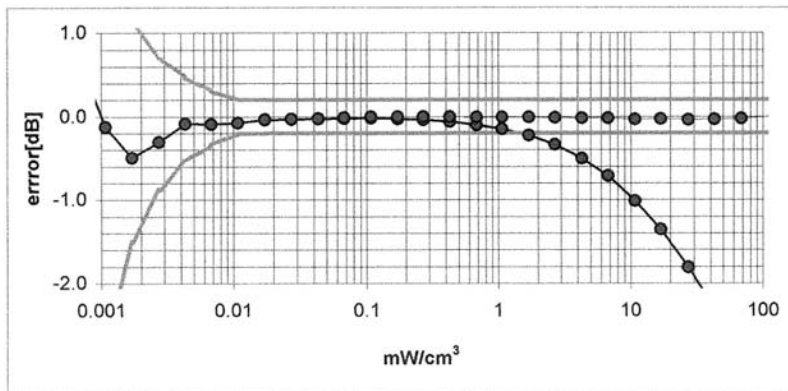
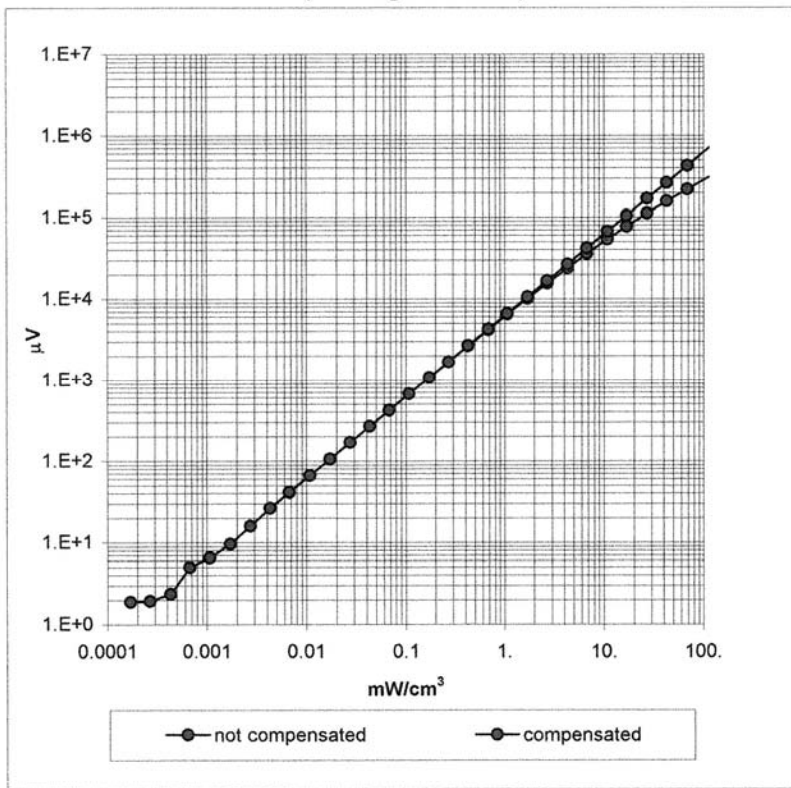
(TEM-Cell:ifi110, Waveguide R22)



ET3DV6 SN:1712

September 6, 2002

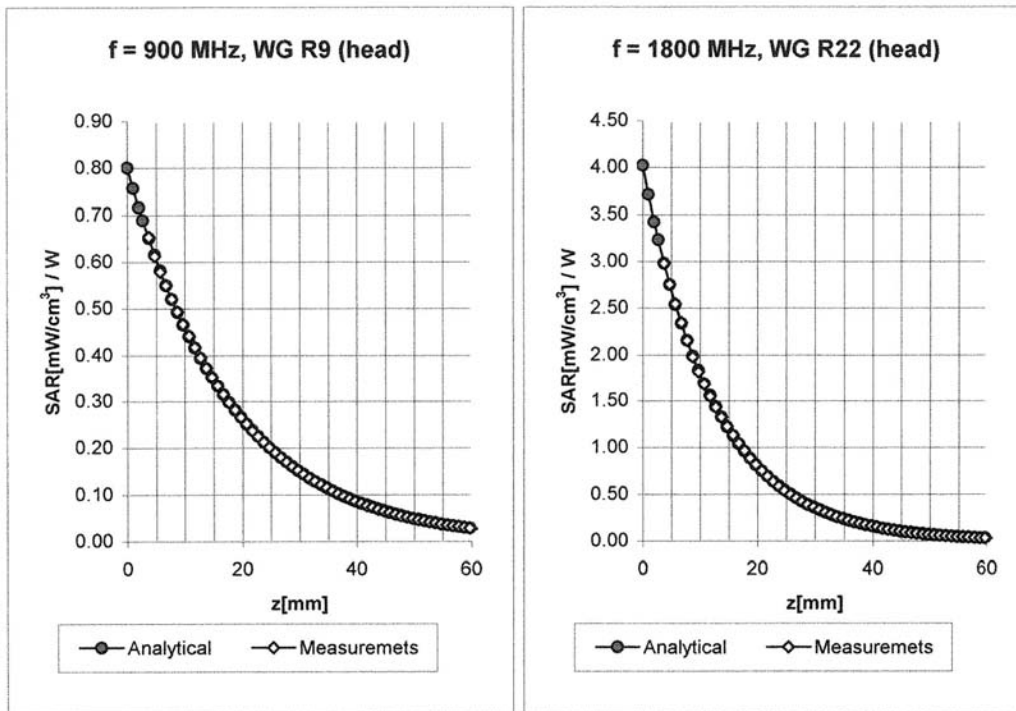
Dynamic Range $f(SAR_{\text{brain}})$ (Waveguide R22)



ET3DV6 SN:1712

September 6, 2002

Conversion Factor Assessment

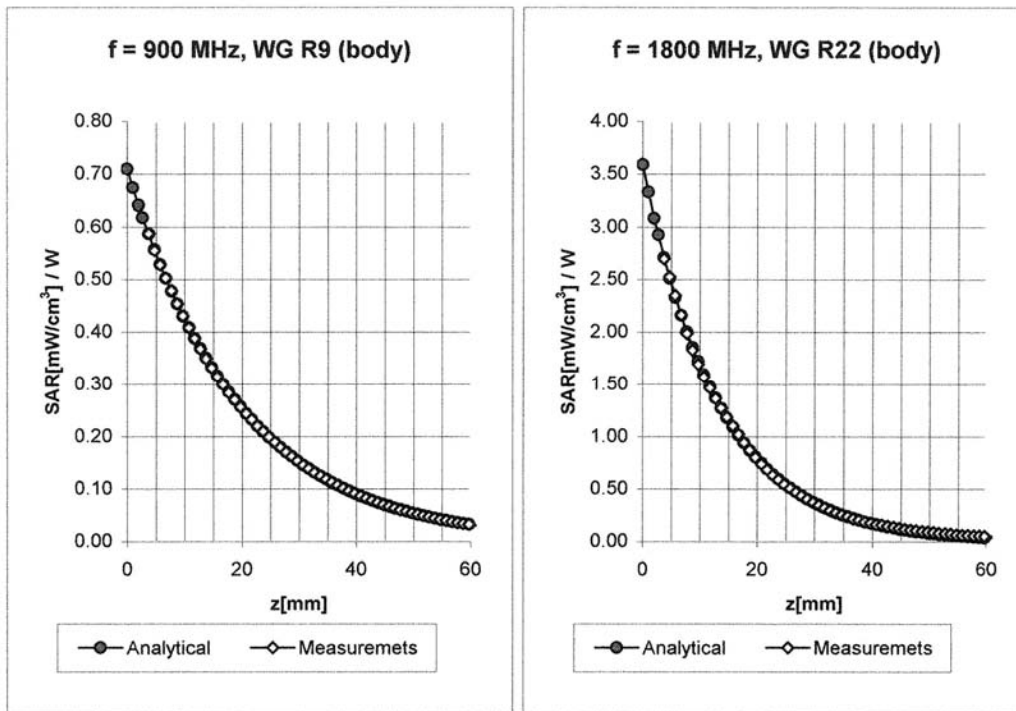


Head	900 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.97 \pm 5\%$ mho/m
Head	835 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.90 \pm 5\%$ mho/m
	ConvF X	6.5 $\pm 9.5\%$ (k=2)	Boundary effect:
	ConvF Y	6.5 $\pm 9.5\%$ (k=2)	Alpha 0.33
	ConvF Z	6.5 $\pm 9.5\%$ (k=2)	Depth 2.72
Head	1800 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\%$ mho/m
Head	1900 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\%$ mho/m
	ConvF X	5.4 $\pm 9.5\%$ (k=2)	Boundary effect:
	ConvF Y	5.4 $\pm 9.5\%$ (k=2)	Alpha 0.48
	ConvF Z	5.4 $\pm 9.5\%$ (k=2)	Depth 2.52

ET3DV6 SN:1712

September 6, 2002

Conversion Factor Assessment



Body	900 MHz	$\epsilon_r = 55.0 \pm 5\%$	$\sigma = 1.05 \pm 5\%$ mho/m
Body	835 MHz	$\epsilon_r = 55.2 \pm 5\%$	$\sigma = 0.97 \pm 5\%$ mho/m
	ConvF X	6.3 $\pm 9.5\%$ (k=2)	Boundary effect:
	ConvF Y	6.3 $\pm 9.5\%$ (k=2)	Alpha 0.41
	ConvF Z	6.3 $\pm 9.5\%$ (k=2)	Depth 2.49
Body	1800 MHz	$\epsilon_r = 53.3 \pm 5\%$	$\sigma = 1.52 \pm 5\%$ mho/m
Body	1900 MHz	$\epsilon_r = 53.3 \pm 5\%$	$\sigma = 1.52 \pm 5\%$ mho/m
	ConvF X	5.0 $\pm 9.5\%$ (k=2)	Boundary effect:
	ConvF Y	5.0 $\pm 9.5\%$ (k=2)	Alpha 0.60
	ConvF Z	5.0 $\pm 9.5\%$ (k=2)	Depth 2.30

ET3DV6 SN:1712

September 6, 2002

Deviation from Isotropy in HSL

Error (θ, ϕ), $f = 900$ MHz

