

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:

1551

Place of Calibration:

Zurich

Date of Calibration:

May 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:

D. Vetter

Approved by:

Marie Kötter

Probe ET3DV6

SN:1551

Manufactured:	October 16, 2000
Last calibration:	December 19, 2000
Recalibrated:	May 22, 2002

Calibrated for System DASY3

DASY3 - Parameters of Probe: ET3DV6 SN:1551

Sensitivity in Free Space

NormX	1.48 $\mu\text{V}/(\text{V}/\text{m})^2$
NormY	1.53 $\mu\text{V}/(\text{V}/\text{m})^2$
NormZ	1.43 $\mu\text{V}/(\text{V}/\text{m})^2$

Diode Compression

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

Sensitivity in Tissue Simulating Liquid

Head	835 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.90 \pm 5\% \text{ mho/m}$
ConvF X	6.8 $\pm 8.9\%$ (k=2)	Boundary effect:	
ConvF Y	6.8 $\pm 8.9\%$ (k=2)	Alpha	0.34
ConvF Z	6.8 $\pm 8.9\%$ (k=2)	Depth	2.43

Head	1900 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\% \text{ mho/m}$
ConvF X	5.3 $\pm 8.9\%$ (k=2)	Boundary effect:	
ConvF Y	5.3 $\pm 8.9\%$ (k=2)	Alpha	0.50
ConvF Z	5.3 $\pm 8.9\%$ (k=2)	Depth	2.38

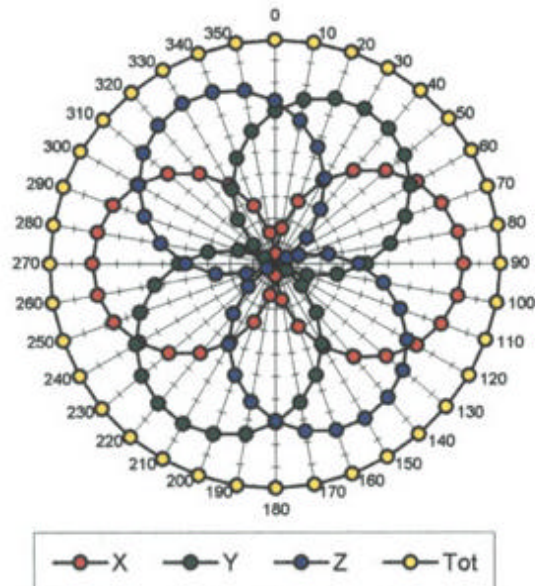
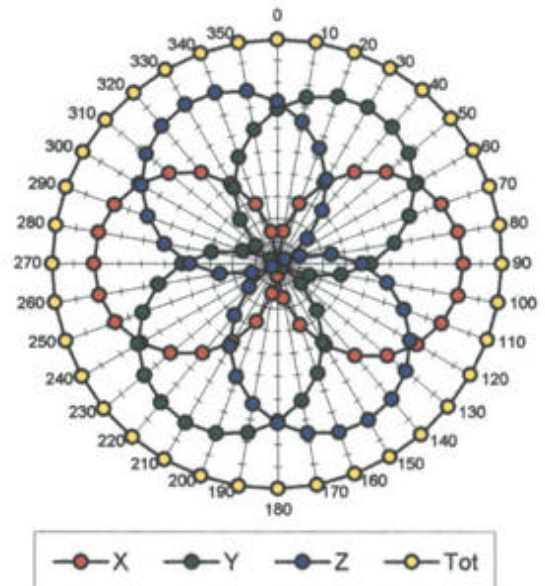
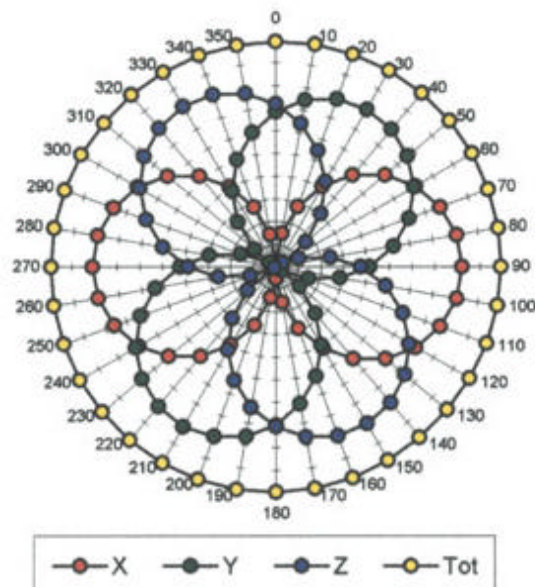
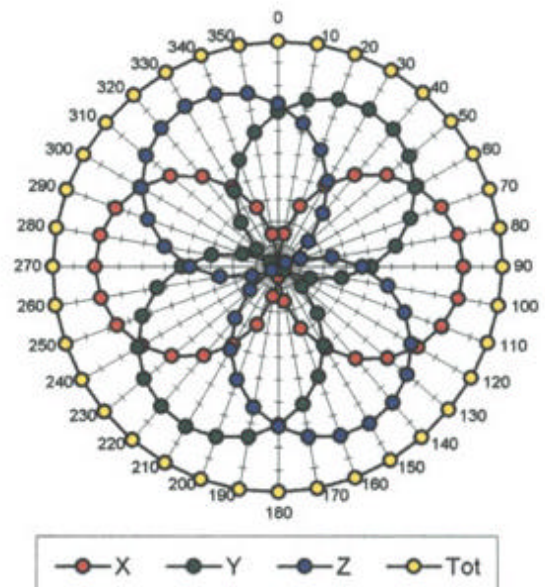
Boundary Effect

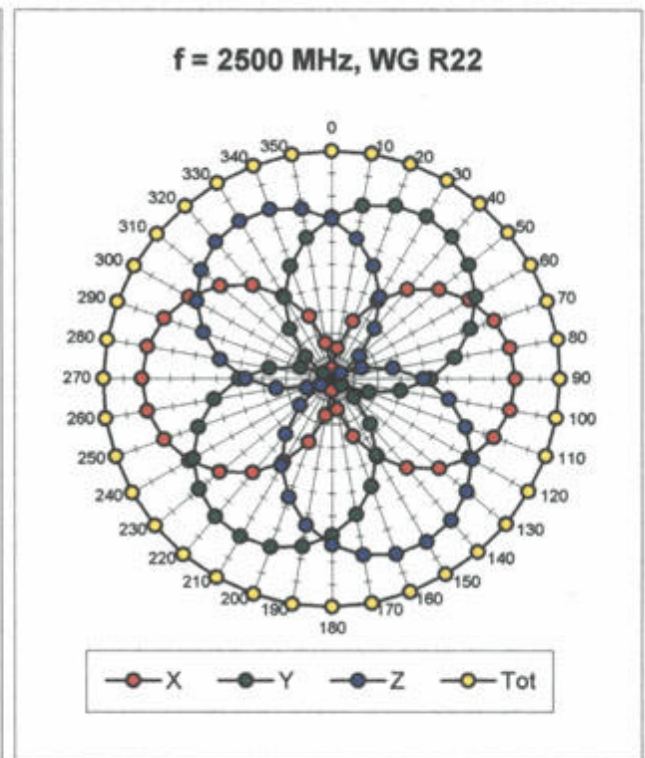
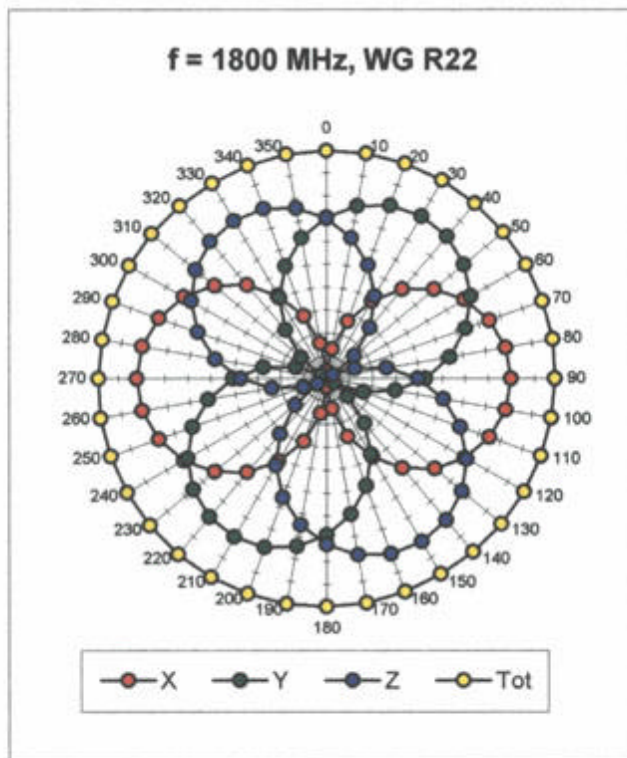
Head	835 MHz	Typical SAR gradient: 5 % per mm	
Probe Tip to Boundary		1 mm	2 mm
SAR _{be} [%] Without Correction Algorithm		8.3	4.6
SAR _{be} [%] With Correction Algorithm		0.3	0.5

Head	1900 MHz	Typical SAR gradient: 10 % per mm	
Probe Tip to Boundary		1 mm	2 mm
SAR _{be} [%] Without Correction Algorithm		11.6	7.9
SAR _{be} [%] With Correction Algorithm		0.2	0.4

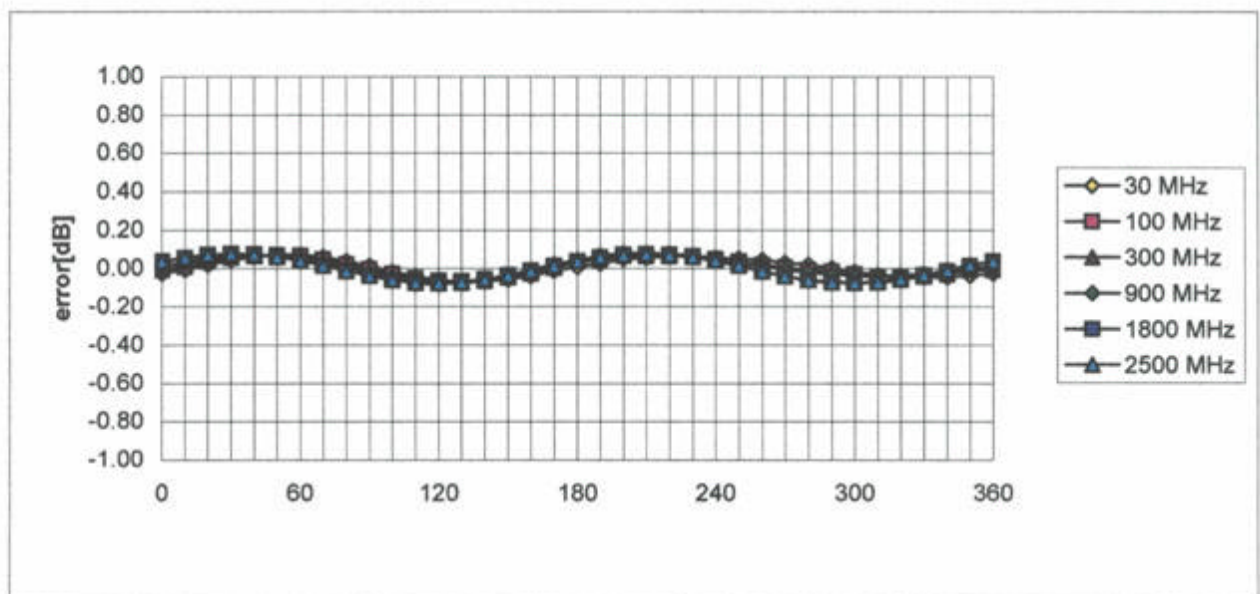
Sensor Offset

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

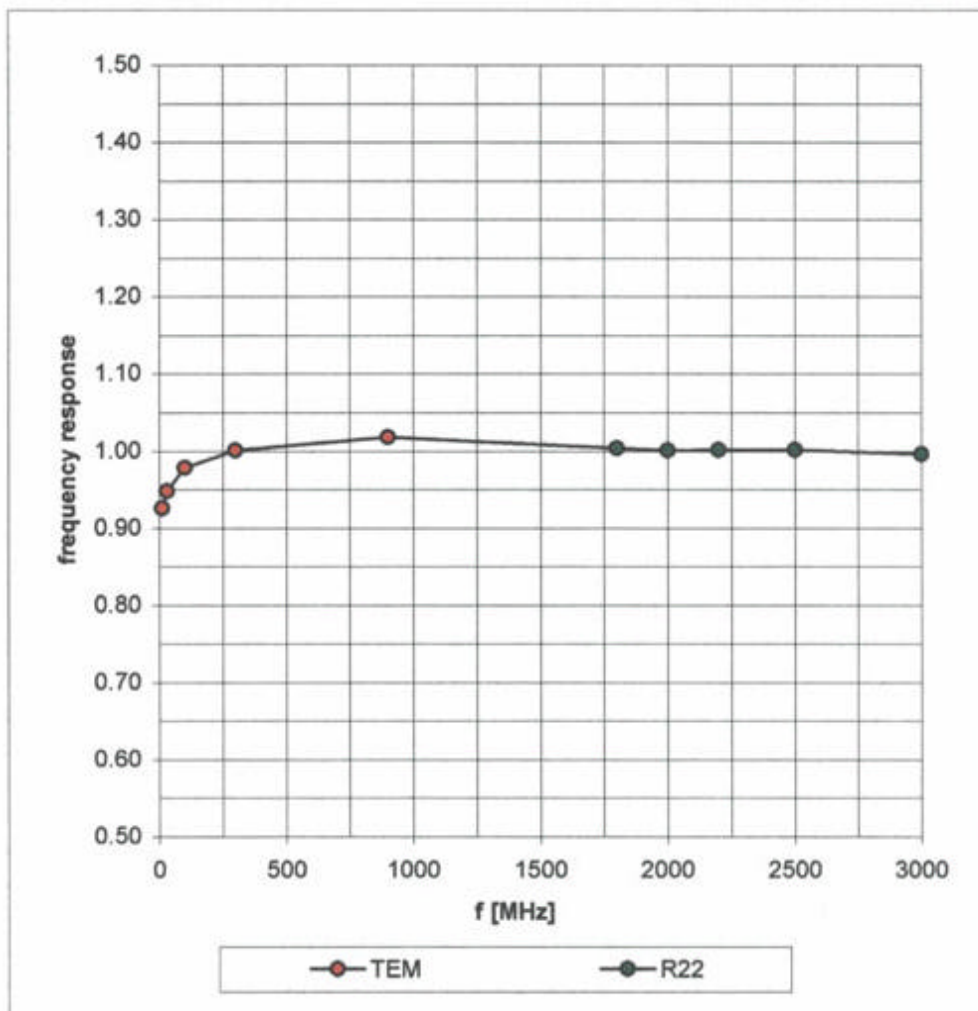


Isotropy Error (ϕ), $\theta = 0^\circ$

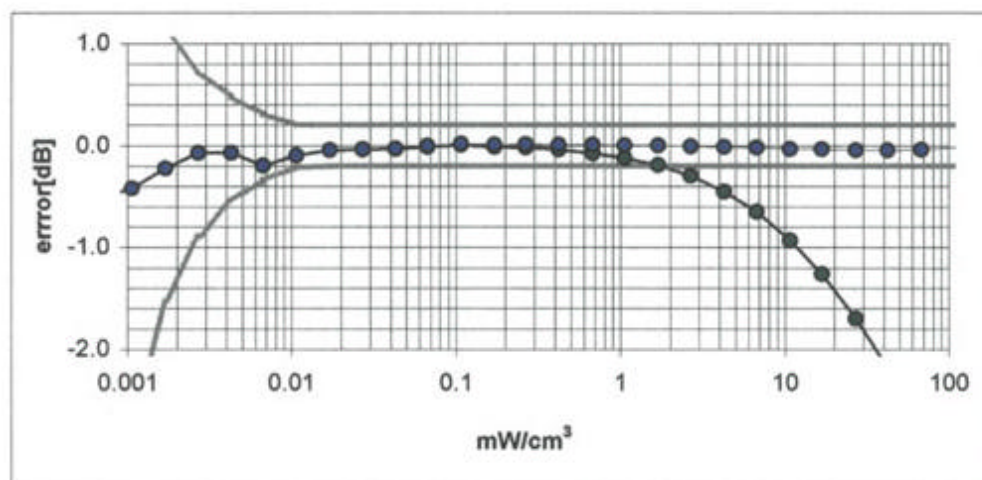
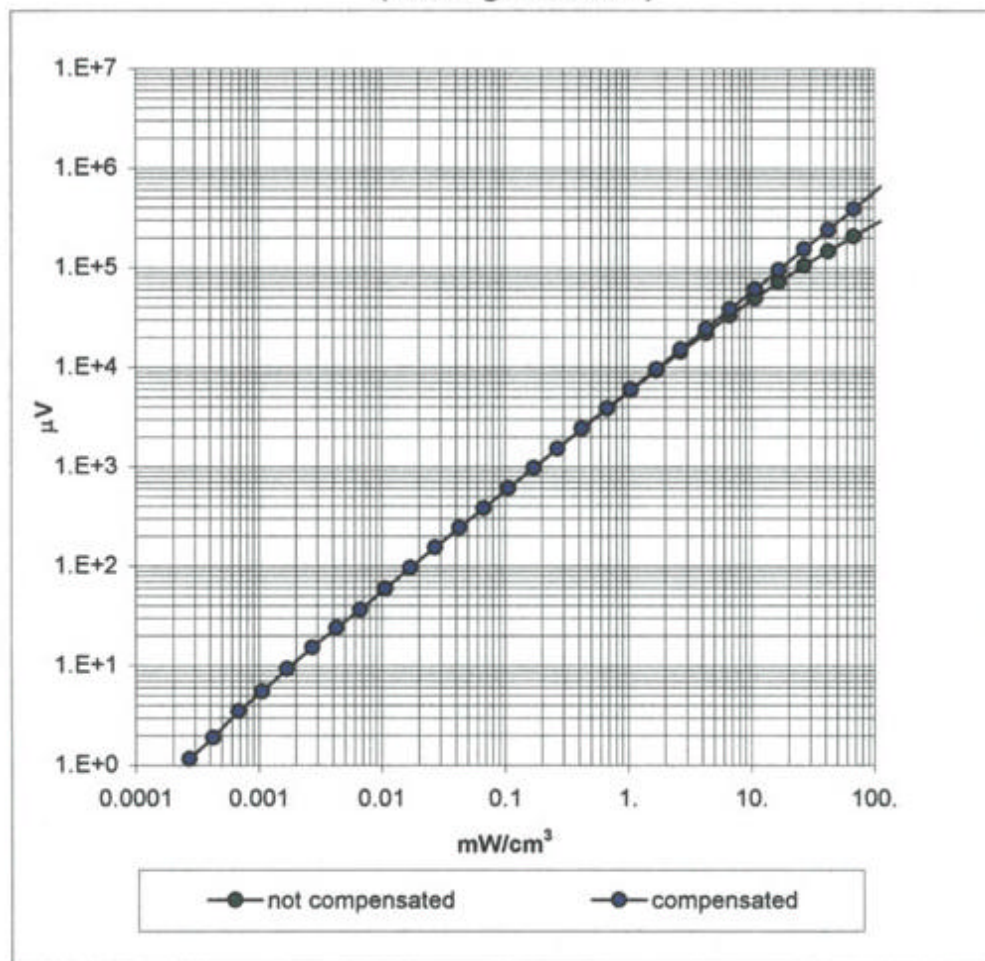


Frequency Response of E-Field

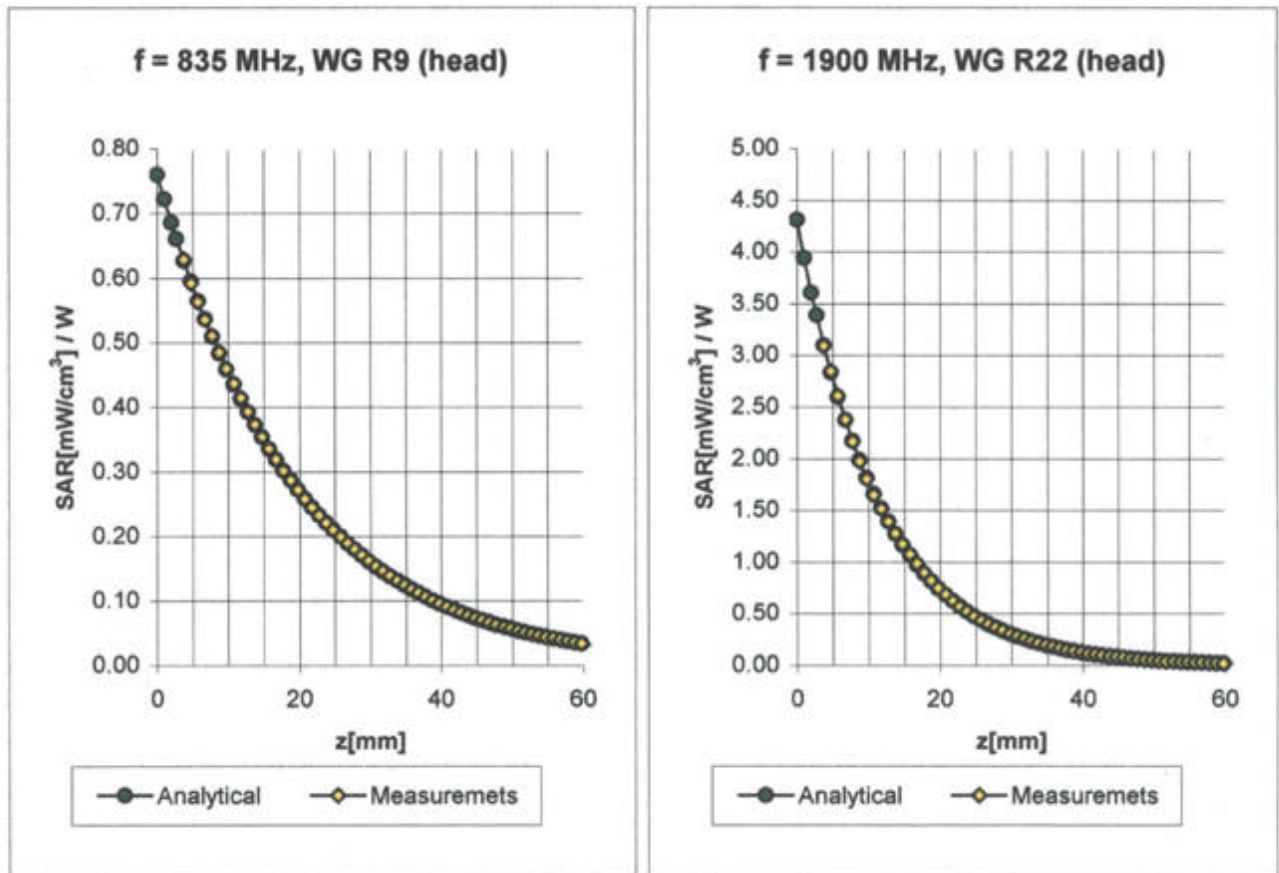
(TEM-Cell:ifi110, Waveguide R22)



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



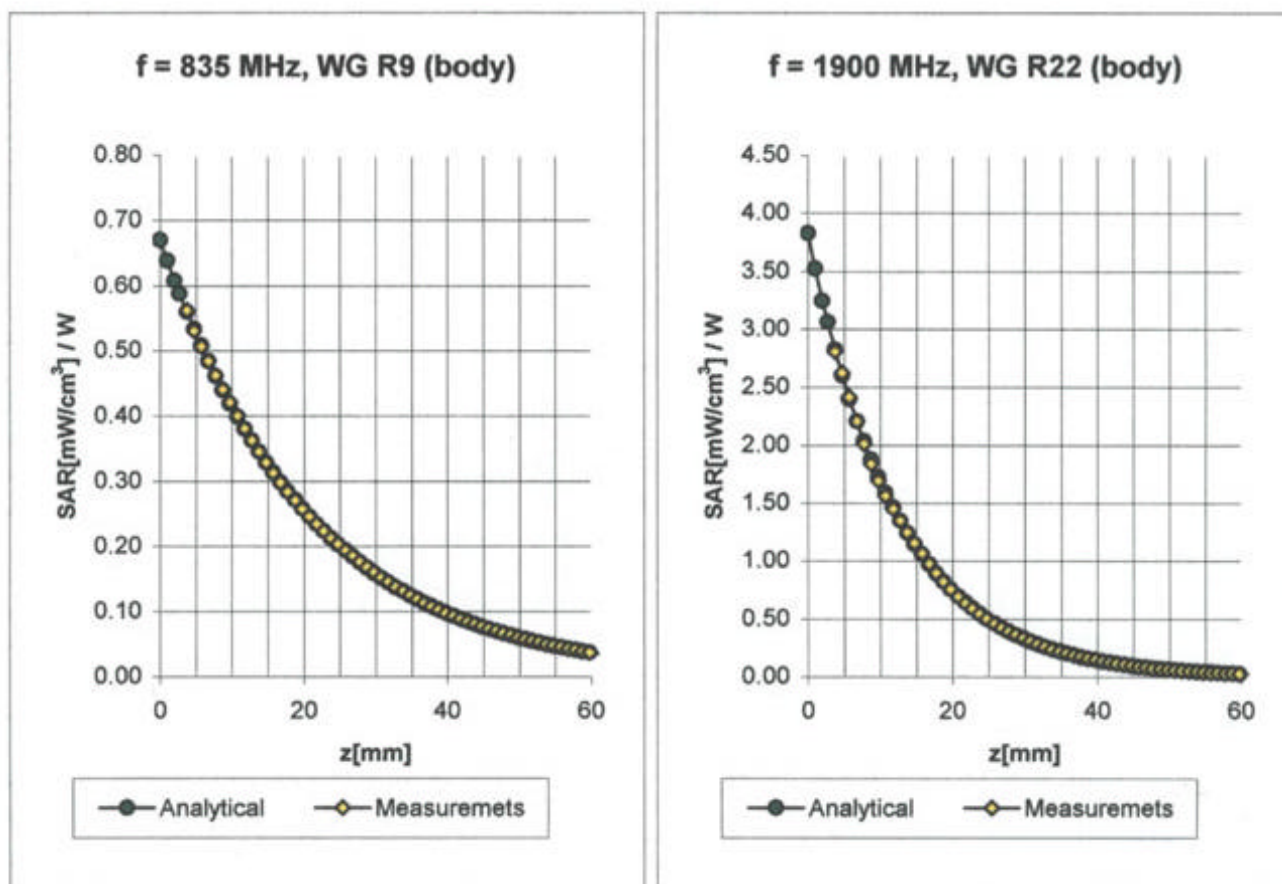
Conversion Factor Assessment



Head	835 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.90 \pm 5\% \text{ mho/m}$
ConvF X	6.8 $\pm 8.9\%$ (k=2)		Boundary effect:
ConvF Y	6.8 $\pm 8.9\%$ (k=2)		Alpha 0.34
ConvF Z	6.8 $\pm 8.9\%$ (k=2)		Depth 2.43

Head	1900 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\% \text{ mho/m}$
ConvF X	5.3 $\pm 8.9\%$ (k=2)		Boundary effect:
ConvF Y	5.3 $\pm 8.9\%$ (k=2)		Alpha 0.50
ConvF Z	5.3 $\pm 8.9\%$ (k=2)		Depth 2.38

Conversion Factor Assessment



Body	835 MHz	$\epsilon_r = 55.2 \pm 5\%$	$\sigma = 0.97 \pm 5\% \text{ mho/m}$
ConvF X	6.6 $\pm 8.9\%$ (k=2)		Boundary effect:
ConvF Y	6.6 $\pm 8.9\%$ (k=2)		Alpha 0.31
ConvF Z	6.6 $\pm 8.9\%$ (k=2)		Depth 2.72

Body	1900 MHz	$\epsilon_r = 53.3 \pm 5\%$	$\sigma = 1.52 \pm 5\% \text{ mho/m}$
ConvF X	4.9 $\pm 8.9\%$ (k=2)		Boundary effect:
ConvF Y	4.9 $\pm 8.9\%$ (k=2)		Alpha 0.66
ConvF Z	4.9 $\pm 8.9\%$ (k=2)		Depth 2.19

Deviation from Isotropy in HSL

Error (θ, ϕ), $f = 900$ MHz

