

Calibration Certificate

Dosimetric E-Field Probe

Type:

ET3DV6

Serial Number:

1502

Place of Calibration:

Zurich

Date of Calibration:

September 27, 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:

N. Vetter

Approved by:

Thomas Kötter

Probe ET3DV6

SN:1502

Manufactured:	October 24, 1999
Last calibration:	September 26, 2001
Recalibrated:	September 27, 2002

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1502**Sensitivity in Free Space****Diode Compression**

NormX	1.84 $\mu\text{V}/(\text{V}/\text{m})^2$	DCP X	93	mV
NormY	1.89 $\mu\text{V}/(\text{V}/\text{m})^2$	DCP Y	93	mV
NormZ	1.87 $\mu\text{V}/(\text{V}/\text{m})^2$	DCP Z	93	mV

Sensitivity in Tissue Simulating Liquid

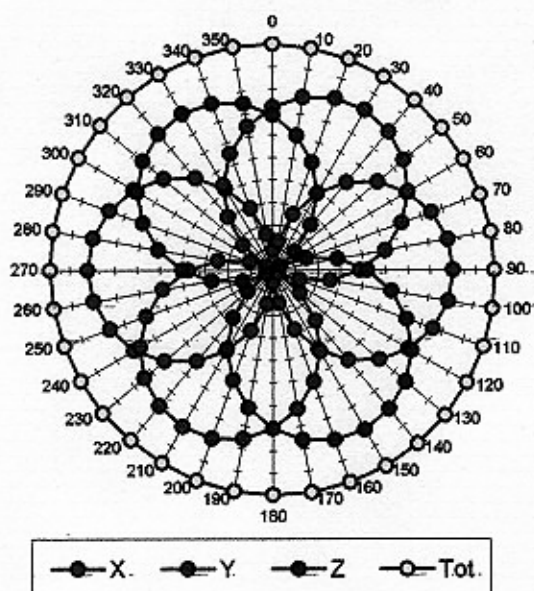
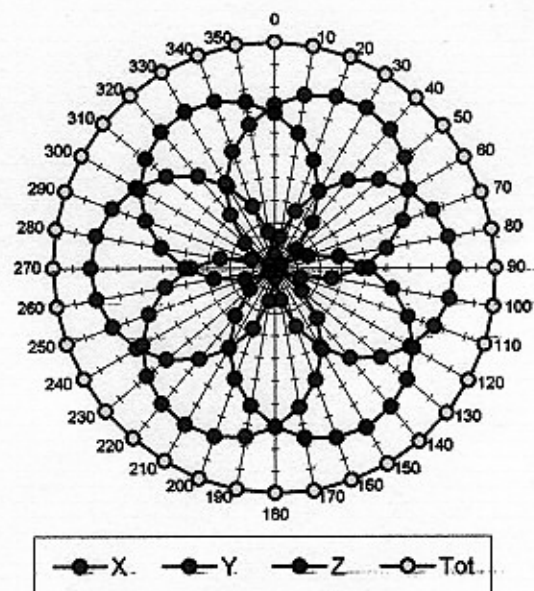
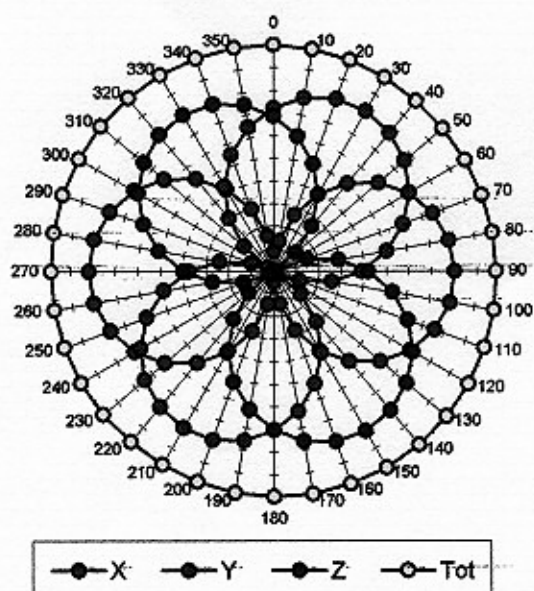
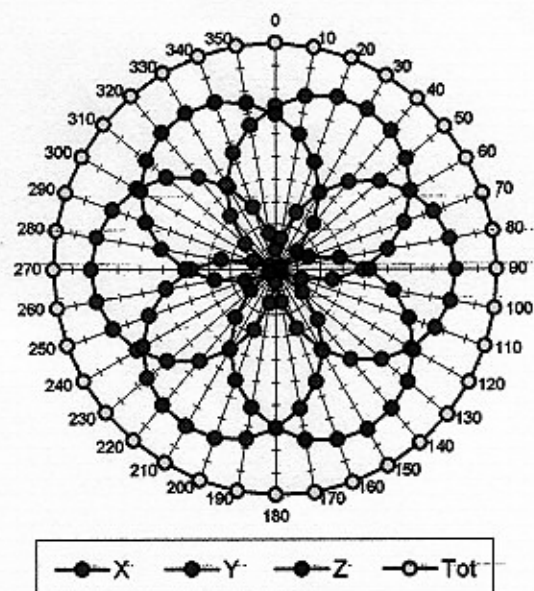
Head	900 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.97 \pm 5\%$ mho/m
Head	835 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.90 \pm 5\%$ mho/m
ConvF X	6.5 $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	6.5 $\pm 9.5\%$ (k=2)	Alpha	0.46
ConvF Z	6.5 $\pm 9.5\%$ (k=2)	Depth	2.27
Head	1800 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\%$ mho/m
Head	1900 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\%$ mho/m
ConvF X	5.6 $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	5.6 $\pm 9.5\%$ (k=2)	Alpha	0.56
ConvF Z	5.6 $\pm 9.5\%$ (k=2)	Depth	2.24

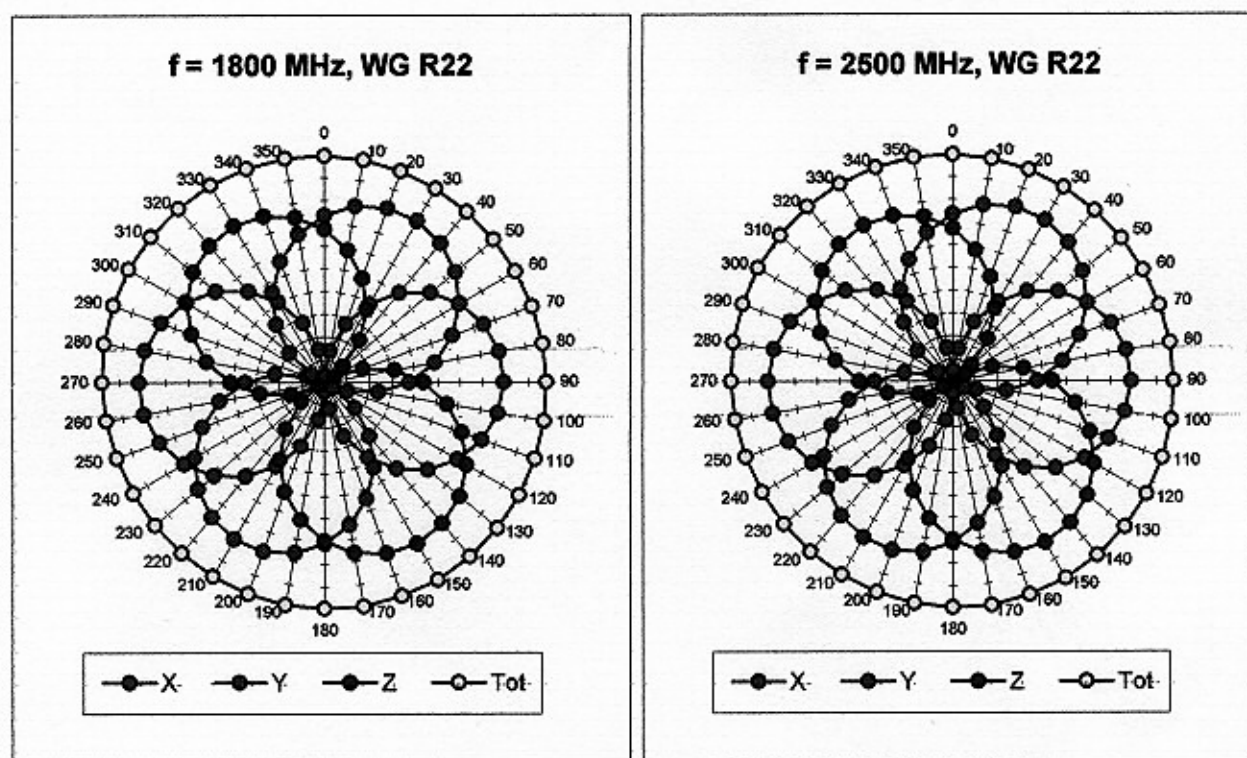
Boundary Effect

Head	900 MHz	Typical SAR gradient: 5 % per mm	
Probe Tip to Boundary		1 mm	2 mm
SAR _{be} [%] Without Correction Algorithm		10.2	5.7
SAR _{be} [%] With Correction Algorithm		0.3	0.4
Head	1800 MHz	Typical SAR gradient: 10 % per mm	
Probe Tip to Boundary		1 mm	2 mm
SAR _{be} [%] Without Correction Algorithm		11.9	7.7
SAR _{be} [%] With Correction Algorithm		0.1	0.3

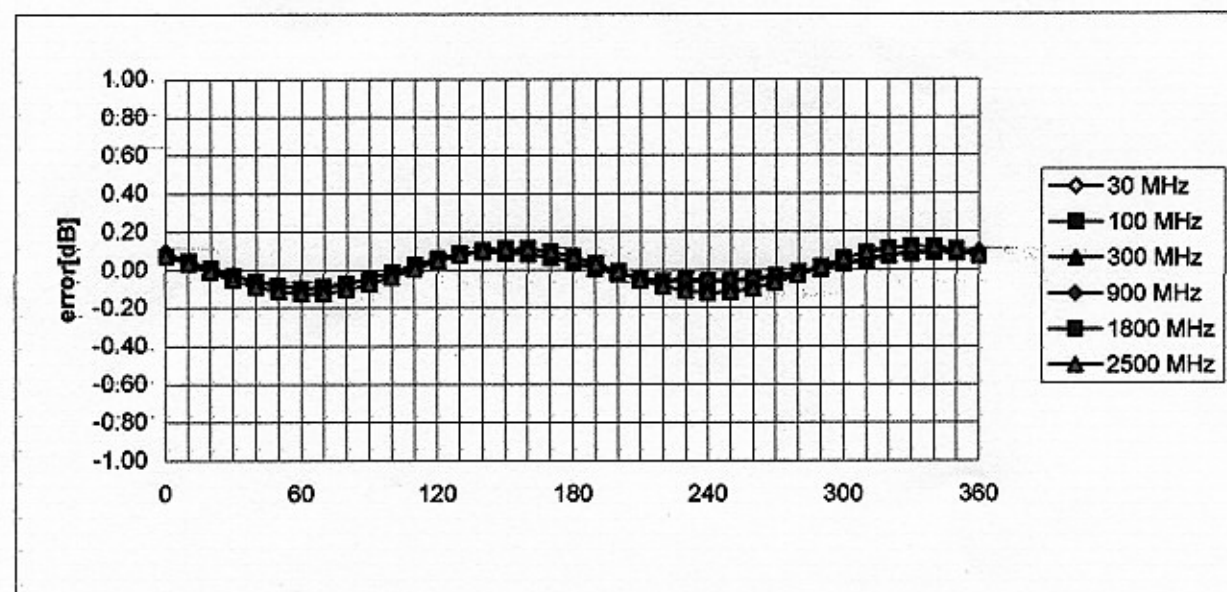
Sensor Offset

Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	1.4 $\pm$ 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**

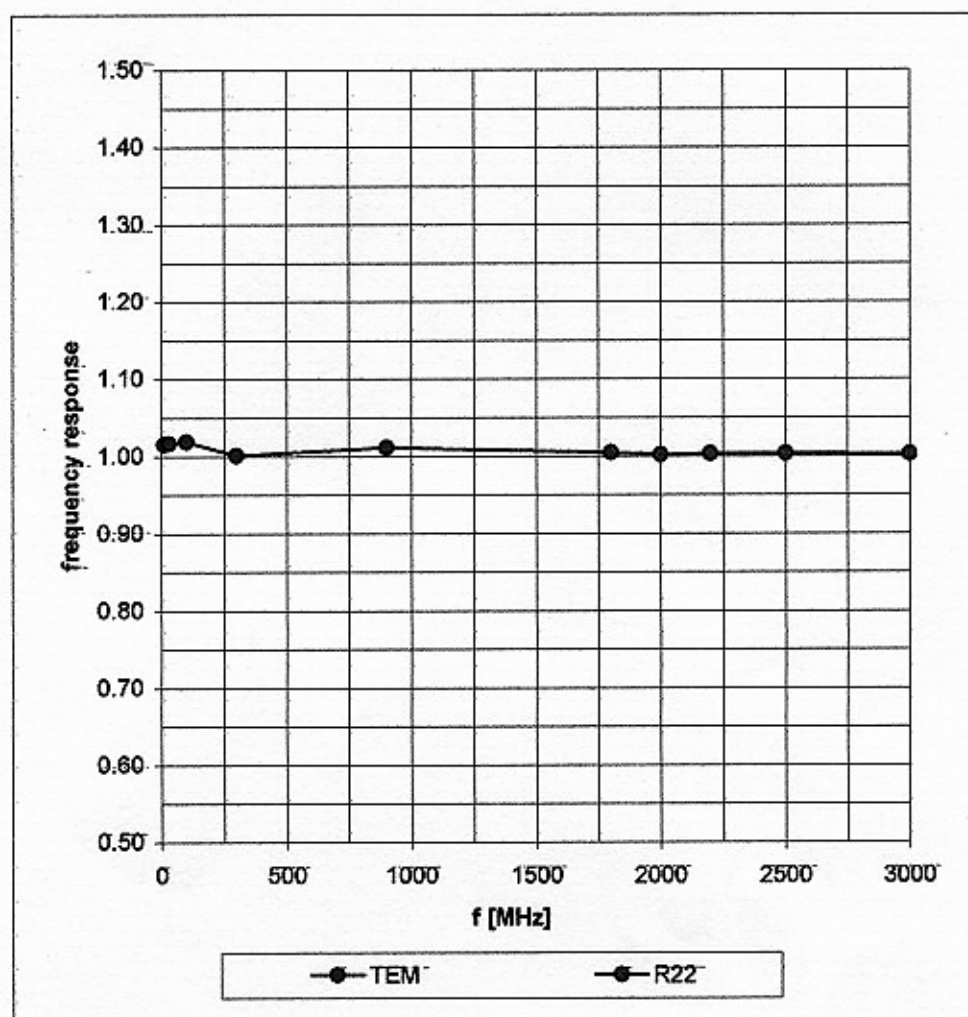


Isotropy Error (ϕ), $\theta = 0^\circ$

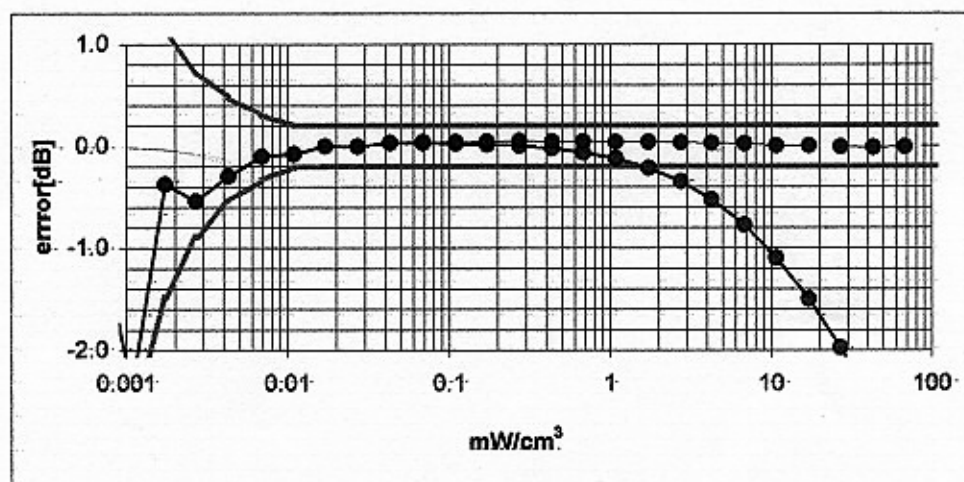
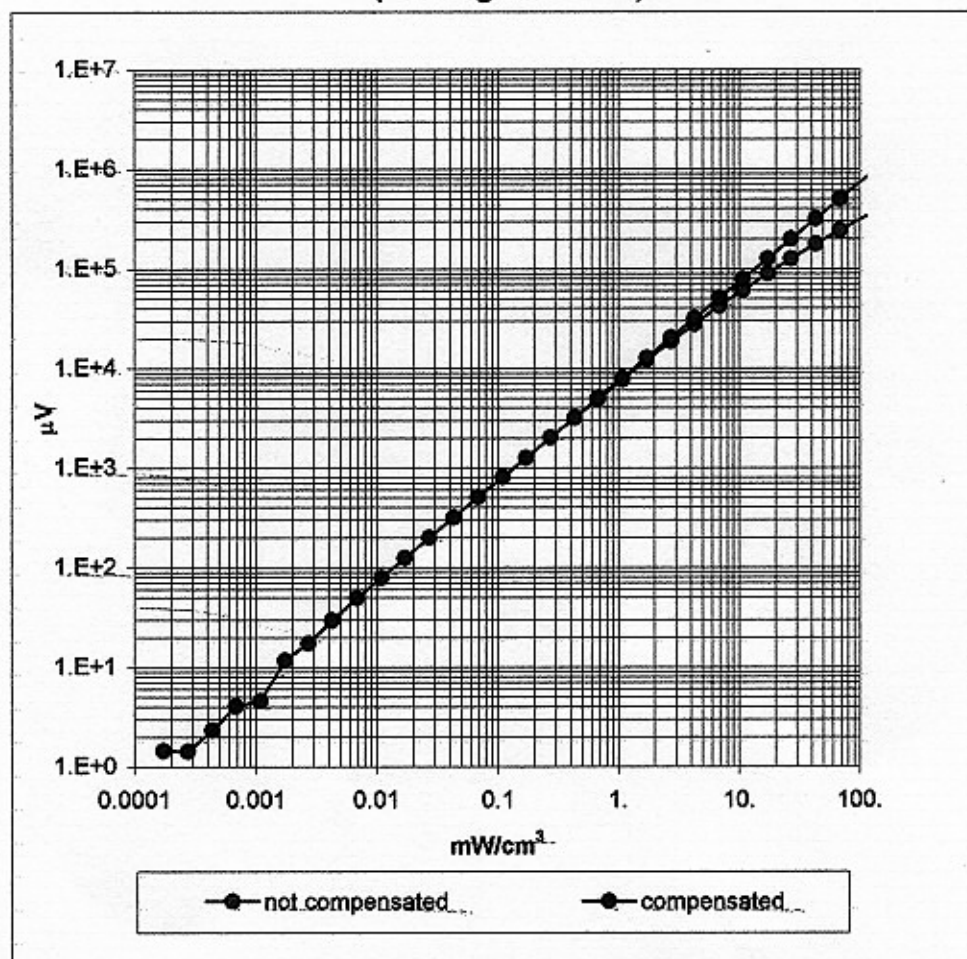


Frequency Response of E-Field

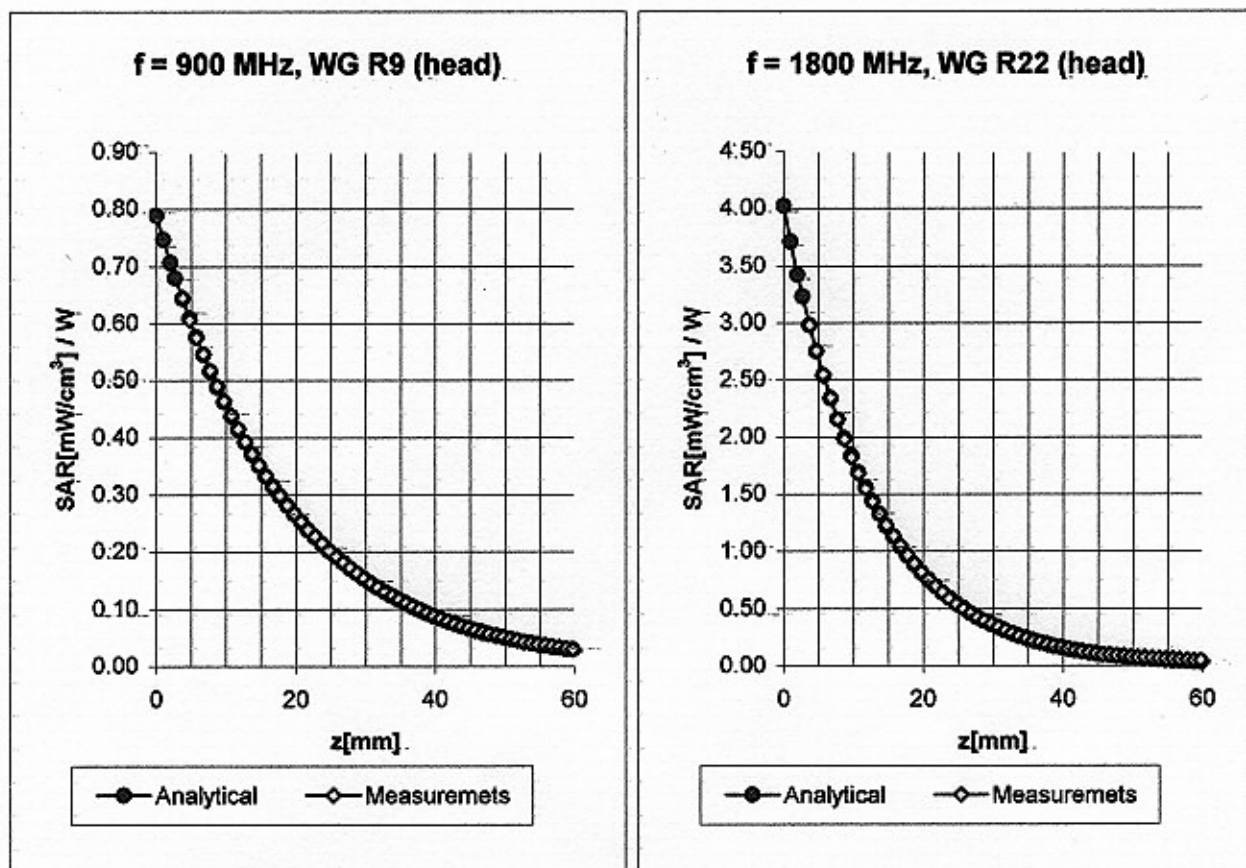
(TEM-Cell:ifi110, Waveguide R22)



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

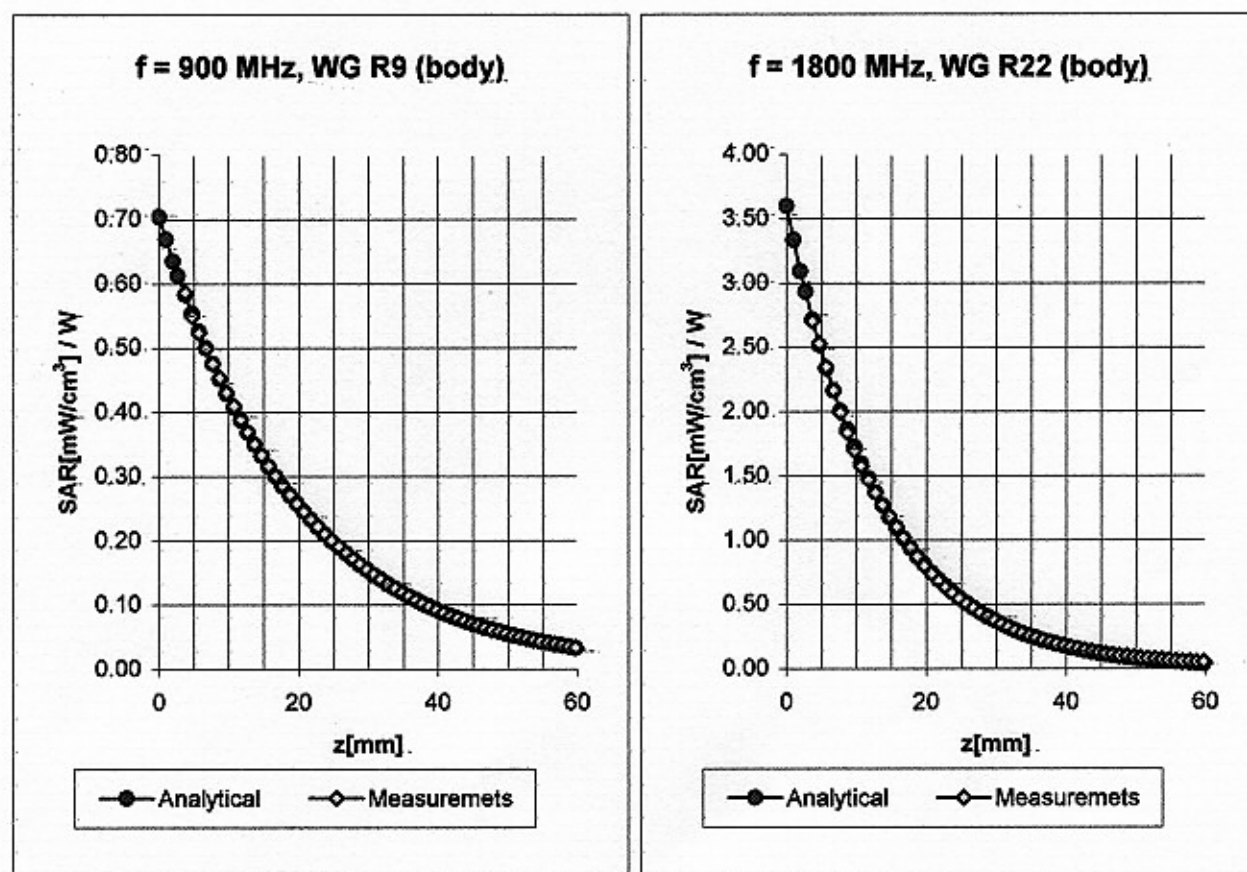


Conversion Factor Assessment



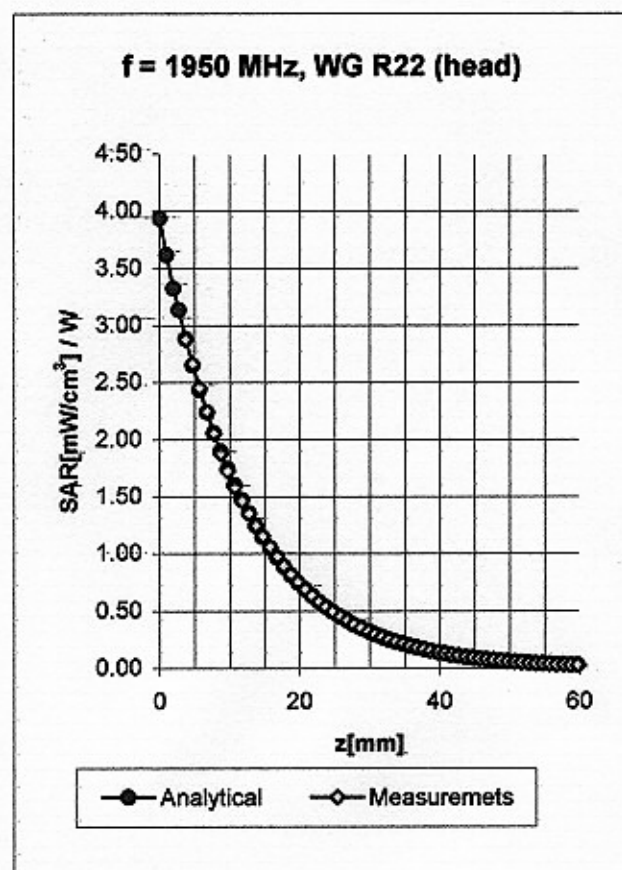
Head	900 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.97 \pm 5\%$ mho/m
Head	835 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.90 \pm 5\%$ mho/m
	ConvF X	$6.5 \pm 9.5\%$ (k=2)	Boundary effect:
	ConvF Y	$6.5 \pm 9.5\%$ (k=2)	Alpha 0.46
	ConvF Z	$6.5 \pm 9.5\%$ (k=2)	Depth 2.27
Head	1800 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\%$ mho/m
Head	1900 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\%$ mho/m
	ConvF X	$5.6 \pm 9.5\%$ (k=2)	Boundary effect:
	ConvF Y	$5.6 \pm 9.5\%$ (k=2)	Alpha 0.56
	ConvF Z	$5.6 \pm 9.5\%$ (k=2)	Depth 2.24

Conversion Factor Assessment



Body	900 MHz	$\epsilon_r = 55.0 \pm 5\%$	$\sigma = 1.05 \pm 5\% \text{ mho/m}$	
Body	835 MHz	$\epsilon_r = 55.2 \pm 5\%$	$\sigma = 0.97 \pm 5\% \text{ mho/m}$	
	ConvF X	$6.3 \pm 9.5\% (k=2)$	Boundary effect:	
	ConvF Y	$6.3 \pm 9.5\% (k=2)$	Alpha	0.29
	ConvF Z	$6.3 \pm 9.5\% (k=2)$	Depth	3.55
Body	1800 MHz	$\epsilon_r = 53.3 \pm 5\%$	$\sigma = 1.52 \pm 5\% \text{ mho/m}$	
Body	1900 MHz	$\epsilon_r = 53.3 \pm 5\%$	$\sigma = 1.52 \pm 5\% \text{ mho/m}$	
	ConvF X	$5.3 \pm 9.5\% (k=2)$	Boundary effect:	
	ConvF Y	$5.3 \pm 9.5\% (k=2)$	Alpha	0.63
	ConvF Z	$5.3 \pm 9.5\% (k=2)$	Depth	2.34

Conversion Factor Assessment



Head

1950 MHz

 $\epsilon_r = 40.0 \pm 5\%$ $\sigma = 1.40 \pm 5\%$ mho/mConvF X **5.2** $\pm 9.5\%$ (k=2)

Boundary effect:

ConvF Y **5.2** $\pm 9.5\%$ (k=2)Alpha **0.60**ConvF Z **5.2** $\pm 9.5\%$ (k=2)Depth **2.21**

Deviation from Isotropy in HSL

Error (θ, ϕ), $f = 900$ MHz

