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:	1503
Place of Calibration:	Zurich
Date of Calibration:	November 20, 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. Vella
Approved by:	

Schmid & Partner
Engineering AG

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Probe ET3DV6

SN:1503

Manufactured:	October 24, 1999
Last calibration:	November 16, 2001
Recalibrated:	November 20, 2002

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1503

Sensitivity in Free Space

Diode Compression

NormX	2.21 $\mu V/(V/m)^2$	DCP X	92	mV
NormY	2.09 $\mu V/(V/m)^2$	DCP Y	92	mV
NormZ	1.91 $\mu V/(V/m)^2$	DCP Z	92	mV

Sensitivity in Tissue Simulating Liquid

Head **900 MHz** $\varepsilon_r = 41.5 \pm 5\%$ $\sigma = 0.97 \pm 5\%$ mho/m
Head **835 MHz** $\varepsilon_r = 41.5 \pm 5\%$ $\sigma = 0.90 \pm 5\%$ mho/m

ConvF X	6.5 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	6.5 ± 9.5% (k=2)	Alpha	0.49
ConvF Z	6.5 ± 9.5% (k=2)	Depth	2.11

Head **1800 MHz** $\varepsilon_r = 40.0 \pm 5\%$ $\sigma = 1.40 \pm 5\%$ mho/m
Head **1900 MHz** $\varepsilon_r = 40.0 \pm 5\%$ $\sigma = 1.40 \pm 5\%$ mho/m

ConvF X	5.3 ± 9.5% (k=2)	Boundary effect:	
ConvF Y	5.3 ± 9.5% (k=2)	Alpha	0.54
ConvF Z	5.3 ± 9.5% (k=2)	Depth	2.47

Boundary Effect

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

Probe Tip to Boundary		1 mm	2 mm
SAR_{be} [%]	Without Correction Algorithm	9.5	5.2
SAR_{be} [%]	With Correction Algorithm	0.2	0.4

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

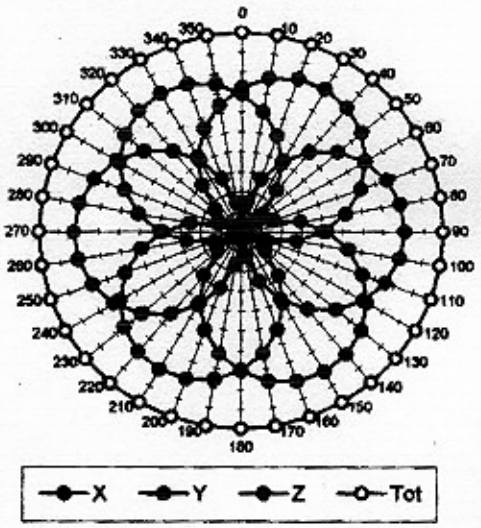
Probe Tip to Boundary		1 mm	2 mm
SAR_{be} [%]	Without Correction Algorithm	13.4	8.9
SAR_{be} [%]	With Correction Algorithm	0.2	0.2

Sensor Offset

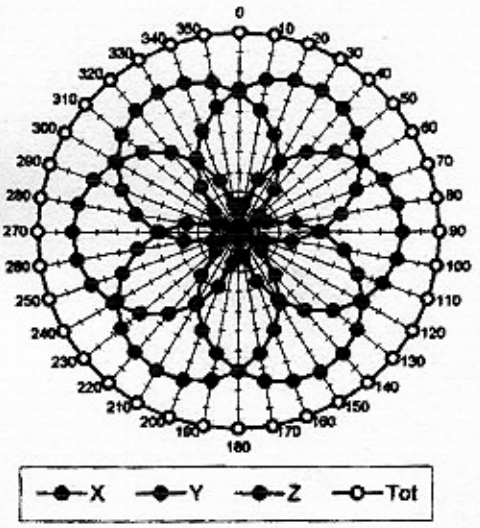
Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	1.3 ± 0.2	mm

Receiving Pattern (ϕ), θ = 0°

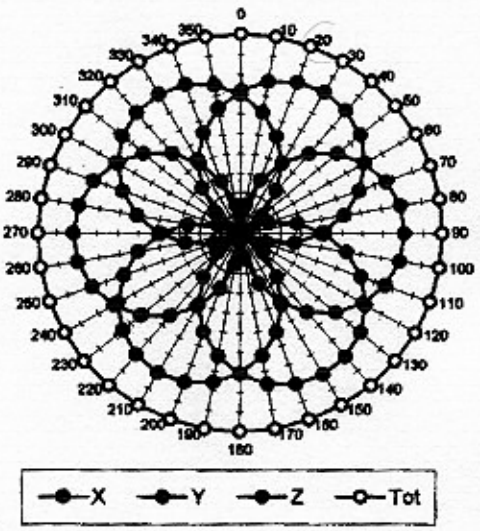
f = 30 MHz, TEM cell ifi110



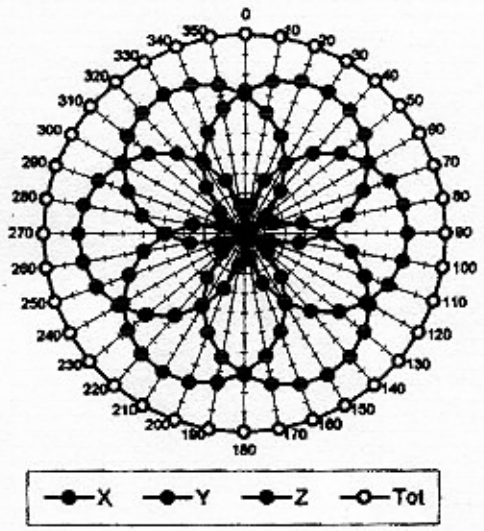
f = 100 MHz, TEM cell ifi110

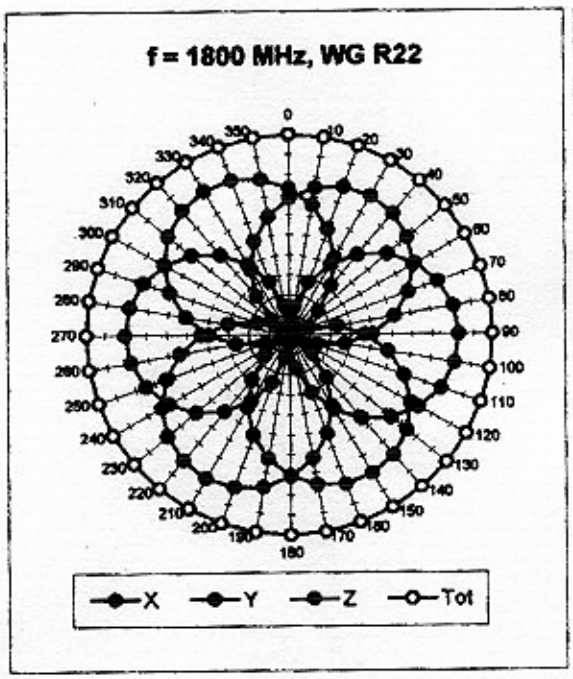


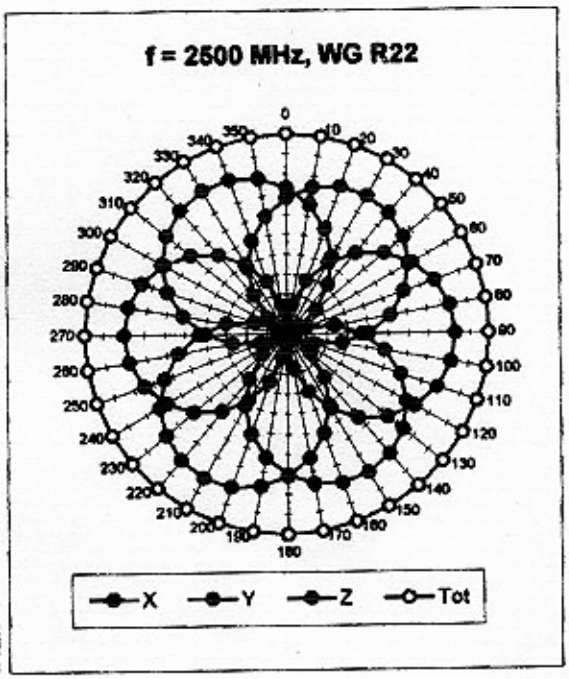
f = 300 MHz, TEM cell ifi110



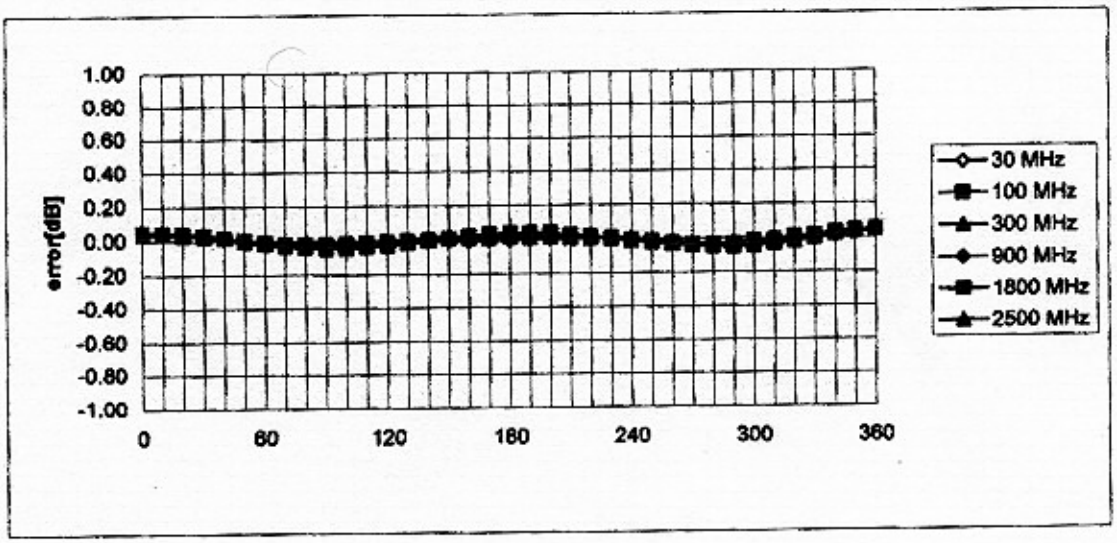
f = 900 MHz, TEM cell ifi110





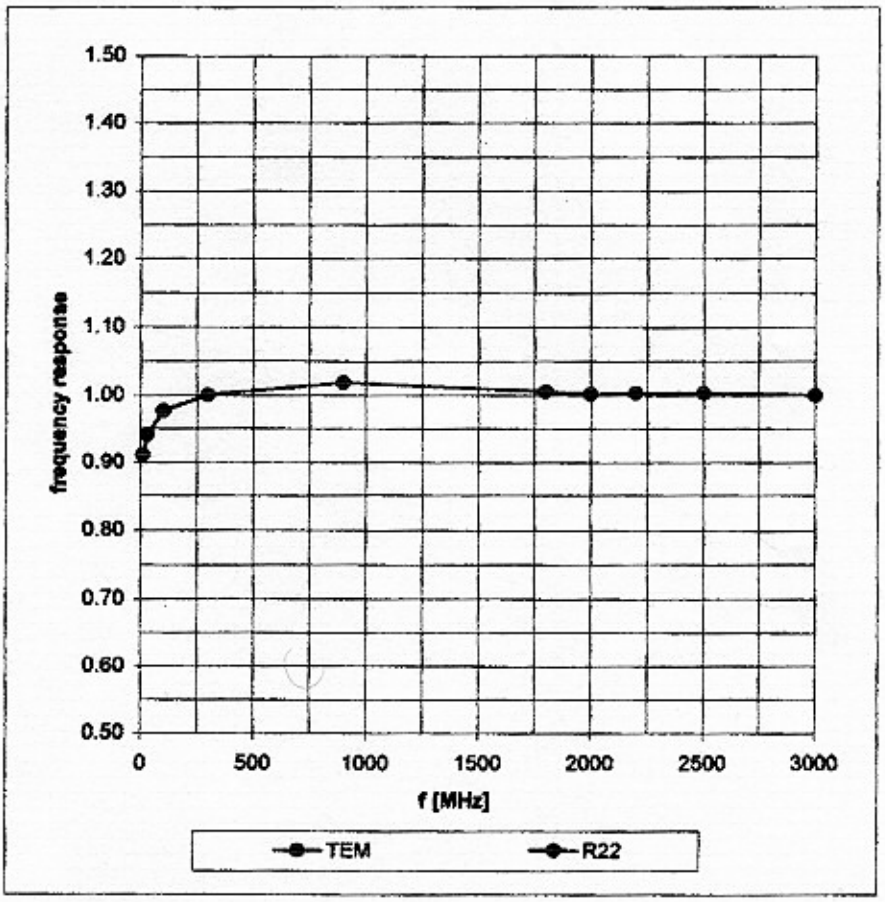


Isotropy Error (ϕ), θ = 0°



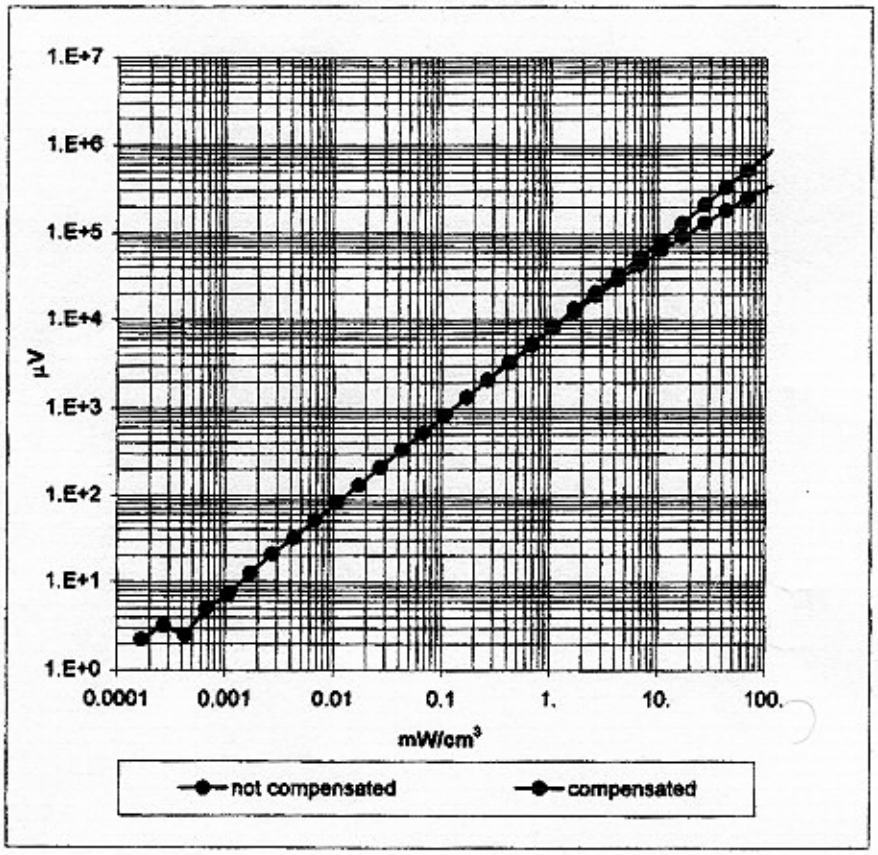
Frequency Response of E-Field

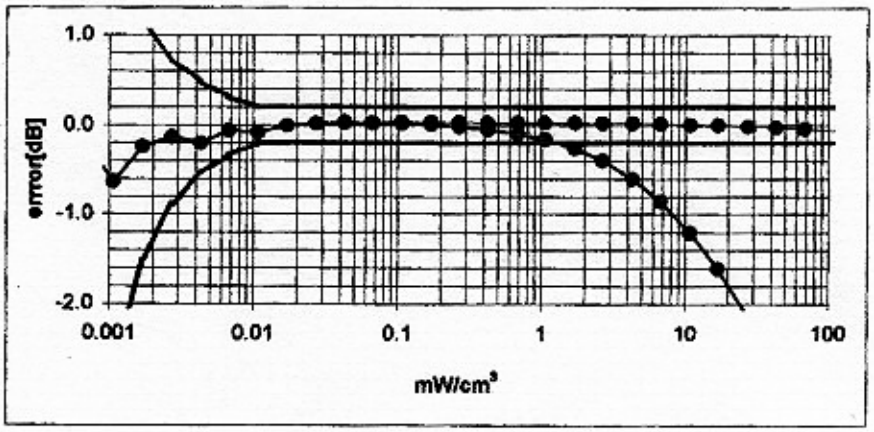
(TEM-Cell:ifi110, Waveguide R22)



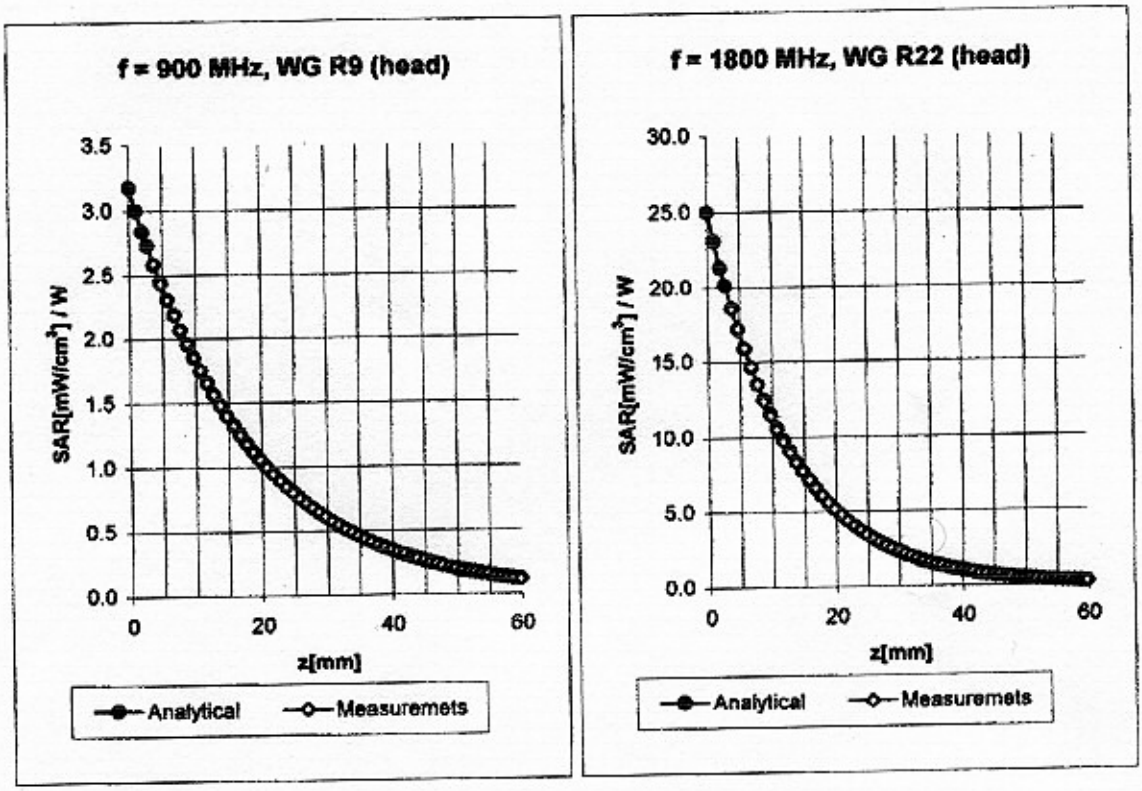
Dynamic Range f(SAR_{brain})

(Waveguide R22)





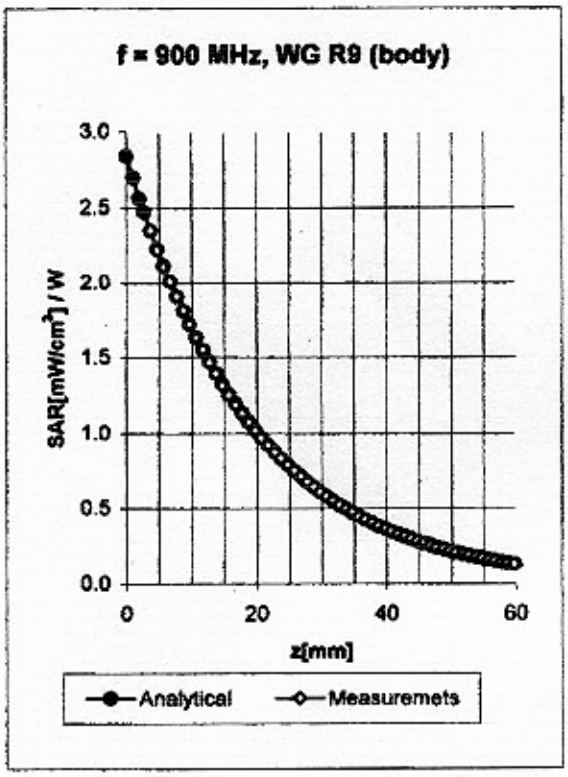
Conversion Factor Assessment

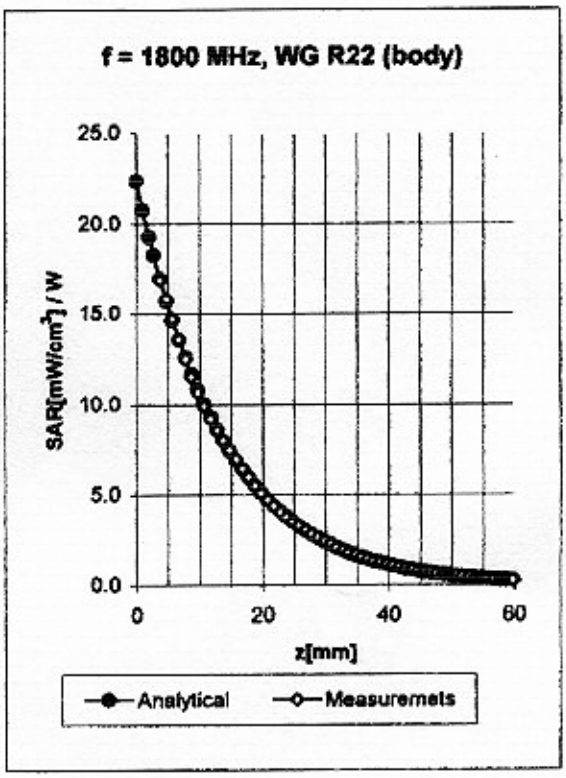


Head	**900 MHz**		ε_r = **41.5 ± 5%**	σ = **0.97 ± 5% mho/m**
Head	**835 MHz**		ε_r = **41.5 ± 5%**	σ = **0.90 ± 5% mho/m**
	ConvF X	**6.5** ± 9.5% (k=2)		Boundary effect:
	ConvF Y	**6.5** ± 9.5% (k=2)		Alpha **0.49**
	ConvF Z	**6.5** ± 9.5% (k=2)		Depth **2.11**

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	**5.3** ± 9.5% (k=2)		Boundary effect:
	ConvF Y	**5.3** ± 9.5% (k=2)		Alpha **0.54**
	ConvF Z	**5.3** ± 9.5% (k=2)		Depth **2.47**

Conversion Factor Assessment

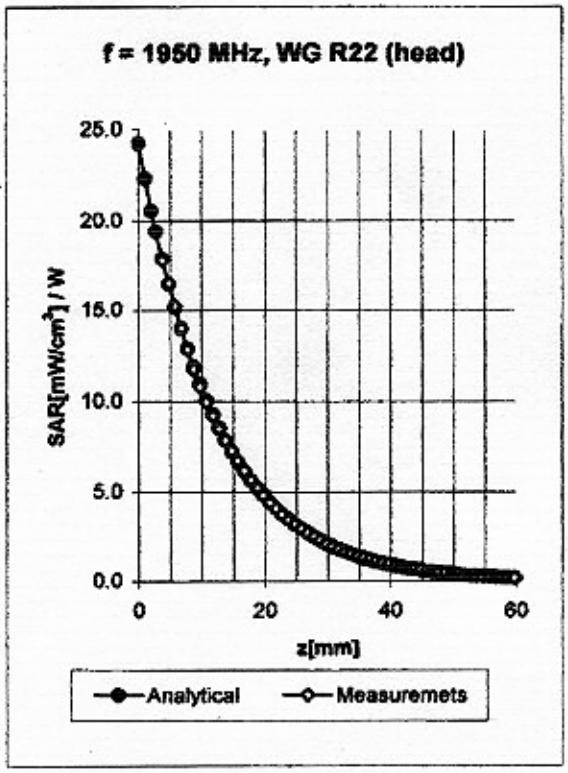


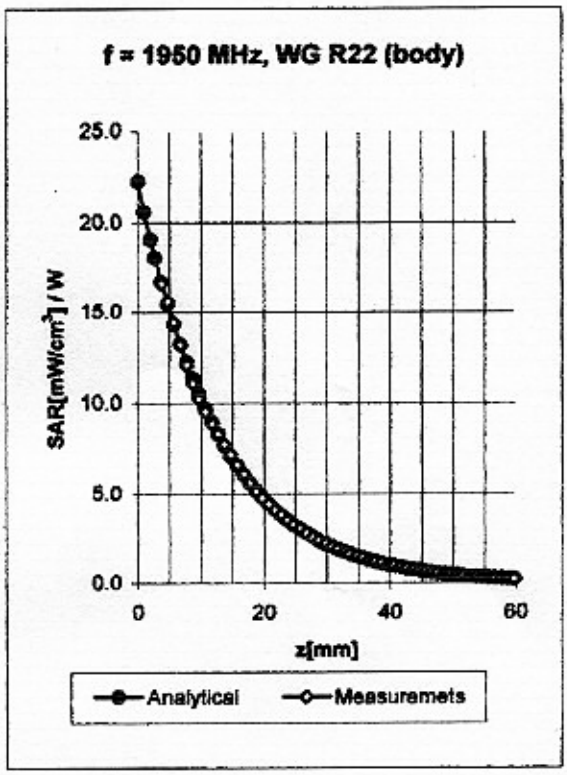


Body	**900 MHz**		ε_r = 55.0 ± 5%	σ = 1.05 ± 5% mho/m
Body	**835 MHz**		ε_r = 55.2 ± 5%	σ = 0.97 ± 5% mho/m
	ConvF X	**6.2** ± 9.5% (k=2)		Boundary effect:
	ConvF Y	**6.2** ± 9.5% (k=2)		Alpha **0.47**
	ConvF Z	**6.2** ± 9.5% (k=2)		Depth **2.30**

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	**5.0** ± 9.5% (k=2)		Boundary effect:
	ConvF Y	**5.0** ± 9.5% (k=2)		Alpha **0.66**
	ConvF Z	**5.0** ± 9.5% (k=2)		Depth **2.21**

Conversion Factor Assessment





1950	Head	MHz	ε_r = 40.0 ± 5%	σ = 1.40 ± 5% mho/m

ConvF X	**5.1** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**5.1** ± 8.9% (k=2)	Alpha	**0.61**
ConvF Z	**5.1** ± 8.9% (k=2)	Depth	**2.25**

1950	Body	MHz	ε_r = 53.3 ± 5%	σ = 1.52 ± 5% mho/m

ConvF X	**4.6** ± 8.9% (k=2)	Boundary effect:	
ConvF Y	**4.6** ± 8.9% (k=2)	Alpha	**0.89**
ConvF Z	**4.6** ± 8.9% (k=2)	Depth	**1.88**

Deviation from Isotropy in HSL

Error (θ,ϕ), f = 900 MHz