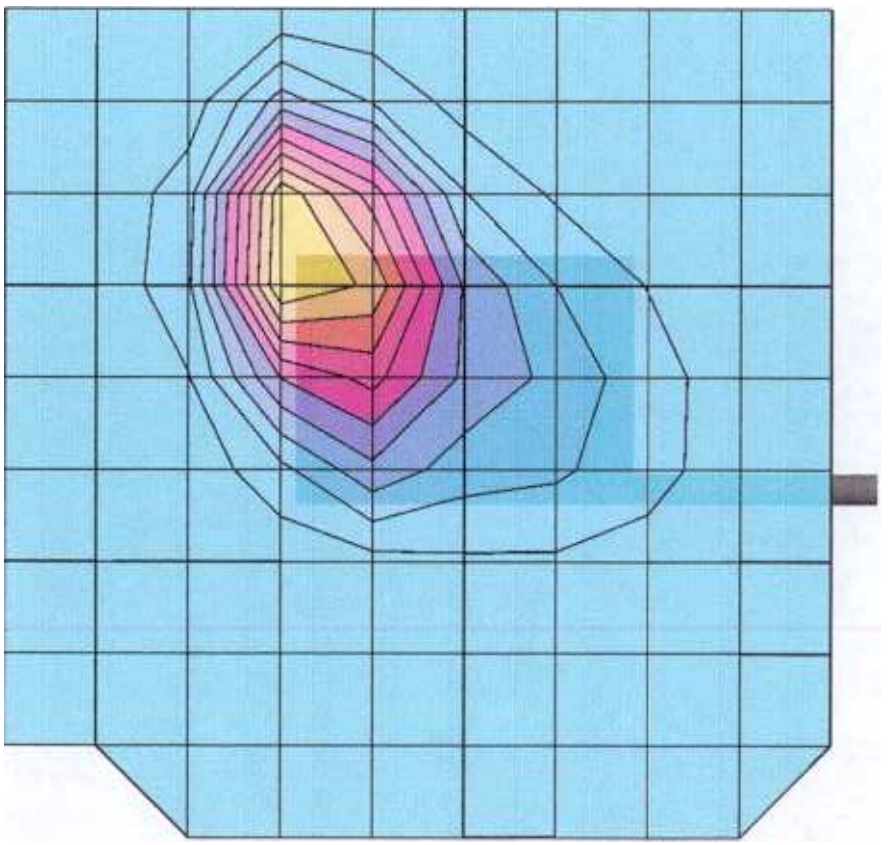
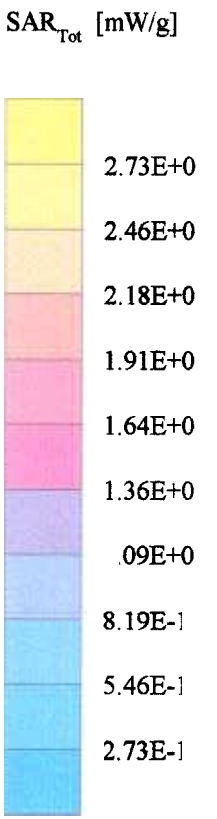
plot #5

WipClip -V131C

Generic Twin Phantom; Flat Section; Position: (90°,90°); Frequency: 836 MHz
Probe: ET3DV5 - SN1333; ConvF(5.70,5.70,5.70); Crest factor: 1.0; Muscle 835 MHz: σ = 0.88 mho/m ε_r = 51. ρ = 1.00 g/cm^3
Cube 5x5x7: SAR (1g): 3.56 mW/g, SAR (10g): 2.13 mW/g, (Worst-case extrapolation)
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Powerdrift: -0.00 dB; Face Up, 836.01MHz, Antenna tilted left side

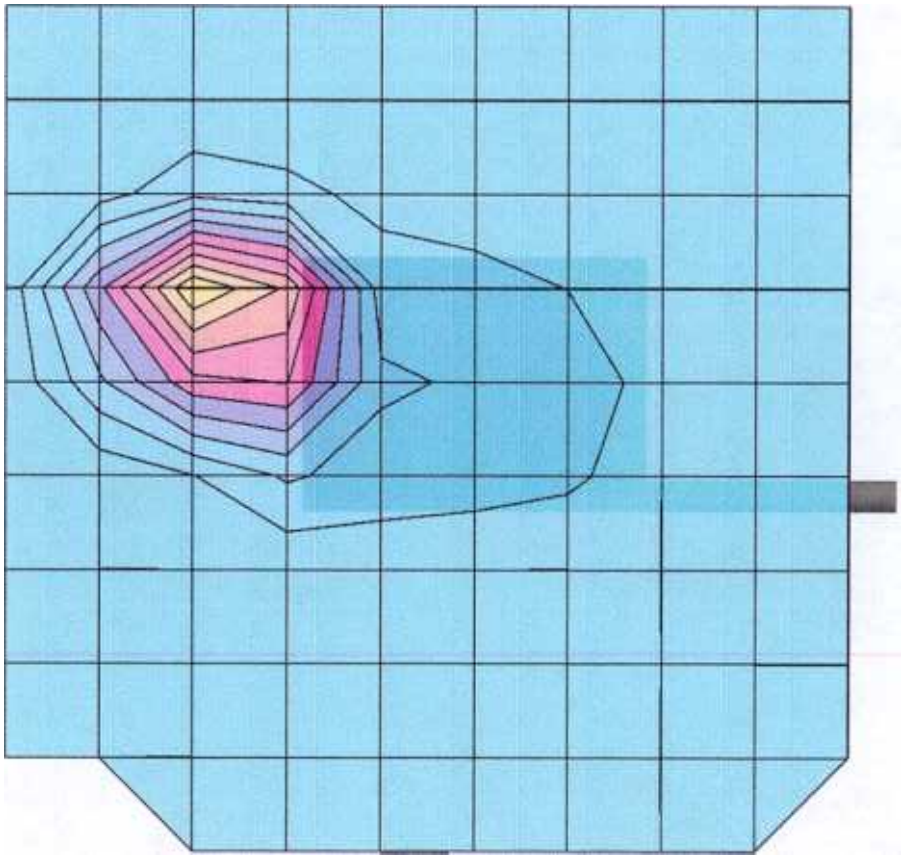


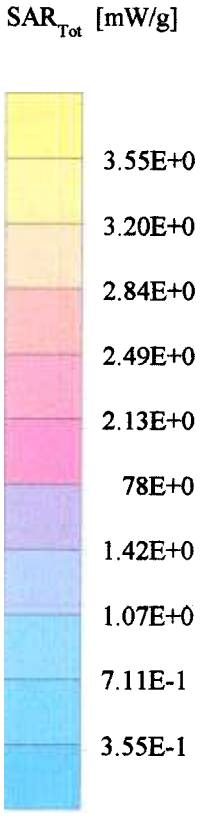


plot # 6

WipClip -V131C

Generic Twin Phantom; Flat Section; Position: (90°,90°); Frequency: 849 MHz
Probe: ET3DV5 - SN1333; ConvF(5.70,5.70,5.70); Crest factor: 1.0; Muscle 849MHz: σ = 0.90 mho/m ε_r = 51.0 ρ = 1.00 g/cm^3
Cube 5x5x7: SAR (1g): 3.97 mW/g, SAR (10g): 2.31 mW/g, (Worst-case extrapolation)
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Powerdrift: 0.11 dB; Face Up, 848.97MHz, Antenna tilted 90 deg Left





3.0 TEST EQUIPMENT

3.1 Equipment List

The Specific Absorption Rate (SAR) tests were performed with the SPEAG model DASY 3 automated near-field scanning system which is package optimized for dosimetric evaluation of mobile radios [3].

The following major equipment/components were used for the SAR evaluations:

SAR Measurement System			
EQUIPMENT	SPECIFICATIONS	S/N #	CAL. DATE
Robot	**Stäubi RX60L**	597412-01	N/A
	Repeatability: ± 0.025mm Accuracy: 0.806×10^{-3} degree Number of Axes: 6		
E-Field Probe	**ET3DV5**	1334	04/10/00
	Frequency Range: 10 MHz to 6 GHz Linearity: ± 0.2 dB Directivity: ± 0.1 dB in brain tissue		
Data Acquisition	**DAE3**	317	N/A
	Measurement Range: 1µV to >200mV Input offset Voltage: < 1µV (with auto zero) Input Resistance: 200 M		
Phantom	**Generic Twin V3.0**	N/A	N/A
	Type: Generic Twin, Homogenous Shell Material: Fiberglass Thickness: 2 ± 0.1 mm Capacity: 20 liter Ear spacer: 4 mm (between EUT ear piece and tissue simulating liquid)		
Simulated Tissue	**Mixture**	N/A	01/12/00
	Please see section 6.2 for details		
Power Meter	**HP** 435A w/ 8481H sensor	1312A01255	2/16/00
	Frequency Range: 100kHz to 18 GHz Power Range: 300µW to 3W		

3.2 Muscle Tissue Simulating Liquid

Ingredient	Frequency (824-849 MHz)
Water	54.05%
Sugar	45.05%
Salt	0.1%
Bactericide	0.8 %

The dielectric parameters were verified prior to assessment using the HP 85070A dielectric probe kit and the HP 8753C network Analyzer. The dielectric parameters were:

Frequency (MHz)	$_r$*	*(mho/m)	**(kg/m^3)
835	51.1 ± 5%	0.88 ± 10%	1000

* *Worst case uncertainty of the HP 85070A dielectric probe kit*

** *Worst case assumption*

3.3 E-Field Probe Calibration

Probes were calibrated by the manufacturer in the TEM cell IFI 110. To ensure consistency, a strict protocol was followed. The conversion factor (ConF) between this calibration and the measurement in the tissue simulation solution was performed by comparison with temperature measurement and computer simulations. Probe calibration factors are included in Appendix C.

3.4 Measurement Uncertainty

The uncertainty budget has been determined for the DASY3 measurement system according to the NIS81 [5] and the NIST 1297 [6] documents and is given in the following table. The extended uncertainty (K=2) was assessed to be 23.5 %

UNCERTAINTY BUDGET				
Uncertainty Description	**Error**	**Distrib.**	**Weight**	**Std.Dev.**
Probe Uncertainty				
Axial isotropy	±0.2 dB	U-shape	0.5	±2.4 %
Spherical isotropy	±0.4 dB	U-shape	0.5	±4.8 %
Isotropy from gradient	±0.5 dB	U-shape	0	
Spatial resolution	±0.5 %	Normal	1	±0.5 %
Linearity error	±0.2 dB	Rectang.	1	±2.7 %
Calibration error	±3.3 %	Normal	1	±3.3 %
SAR Evaluation Uncertainty				
Data acquisition error	±1 %	Rectang.	1	±0.6 %
ELF and RF disturbances	±0.25 %	Normal	1	±0.25 %
Conductivity assessment	±10 %	Rectang.	1	±5.8 %
Spatial Peak SAR Evaluation Uncertainty				
Extrapol boundary effect	±3 %	Normal	1	±3 %
Probe positioning error	±0.1 mm	Normal	1	±1 %
Integrat. and cube orient	±3 %	Normal	1	±3 %
Cube shape inaccuracies	±2 %	Rectang.	1	±1.2 %
Device positioning	±6 %	Normal	1	±6 %
Combined Uncertainties				**±11.7 %**

3.5 Measurement Tractability

All measurements described in this report are traceable to National Institute of Standards and Technology (NIST) standards or appropriate national standards.

4.0 WARNING LABEL INFORMATION - USA

See attached page of the User Manual.

5.0 REFERENCES

[1] ANSI, *ANSI/IEEE C95.1-1991: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300 GHz*, The Institute of electrical and Electronics Engineers, Inc., New York, NY 10017, 1992

[2] Federal Communications Commission, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields", OET Bulletin 65, FCC, Washington, D.C. 20554, 1997

[3] Thomas Schmid, Oliver Egger, and Niels Kuster, "Automated E-field scanning system for dosimetric assessments", *IEEE Transaction on Microwave Theory and Techniques*, vol. 44, pp. 105-113, Jan. 1996.

[4] Niels Kuster, Ralph Kastle, and Thomas Schmid, "Dosimetic evaluation of mobile communications equipment with know precision", IEICE Transactions on Communications, vol. E80-B, no. 5, pp.645-652, May 1997.

[5] NIS81, NAMAS, "The treatment of uncertainty in EMC measurement", Tech. Rep. NAMAS Executive, National Physical Laboratory, Teddinton, Middlesex, England, 1994.

[6] Barry N. Tayor and Chris E. Kuyatt, "Guidelines for evaluating and expressing the uncertainty of NIST measurement results", Tech. Rep., National Institute of Standards and Technology, 1994.

6.0 DOCUMENT HISTORY

Revision/ Job Number	Writer Initials	Date	Change
1.0 / J20034669	SS	January 25, 2001	Original document

APPENDIX A - E-Field Probe Calibration Data

See attached.

Schmid & Partner
Engineering AG

Staffelstrasse 8, 8045 Zurich, Switzerland, Telefon +41 1 280 08 60, Fax +41 1 280 08 64

Calibration Certificate

Dosimetric E-Field Probe

Type:	**ET3DV5**
Serial Number:	**1333**
Place of Calibration:	**Zurich**
Date of Calibration:	**April 10, 2000**
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:	Nikola Kuster
Approved by:	C. Eyr

Schmid & Partner
Engineering AG

Staffelstrasse 8, 8045 Zurich, Switzerland, Telefon +41 1 280 08 60, Fax +41 1 280 08 64

Probe ET3DV5

SN:1333

Manufactured:	December 20, 1997
Last calibration:	March 18, 1999
Recalibrated:	April 10, 2000

Calibrated for System DASY3

DASY3 - Parameters of Probe: ET3DV5 SN:1333

Sensitivity in Free Space

NormX	2.39 $\mu V/(V/m)^2$
NormY	2.36 $\mu V/(V/m)^2$
NormZ	2.34 $\mu V/(V/m)^2$

Diode Compression

DCP X	100 mV
DCP Y	100 mV
DCP Z	100 mV

Sensitivity in Tissue Simulating Liquid

Brain **450 MHz** ε_r = 48 ± 5% σ = 0.50 ± 10% mho/m

ConvF X	6.03	extrapolated	Boundary effect:	
ConvF Y	6.03	extrapolated	Alpha	0.13
ConvF Z	6.03	extrapolated	Depth	3.57

Brain **900 MHz** ε_r = 42.5 ± 5% σ = 0.86 ± 10% mho/m

ConvF X	5.70	± 7% (k=2)	Boundary effect:	
ConvF Y	5.70	± 7% (k=2)	Alpha	0.34
ConvF Z	5.70	± 7% (k=2)	Depth	3.00

Brain **1500 MHz** ε_r = 41 ± 5% σ = 1.32 ± 10% mho/m

ConvF X	5.25	interpolated	Boundary effect:	
ConvF Y	5.25	interpolated	Alpha	0.61
ConvF Z	5.25	interpolated	Depth	2.23

Brain **1800 MHz** ε_r = 41 ± 5% σ = 1.69 ± 10% mho/m

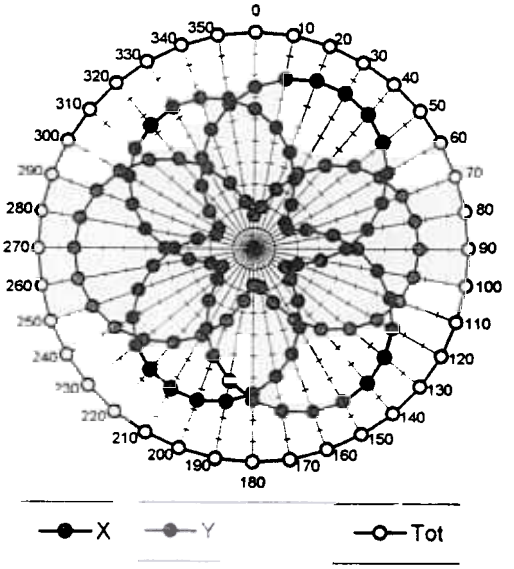
ConvF X	5.03	± 7% (k=2)	Boundary effect:	
ConvF Y	5.03	± 7% (k=2)	Alpha	0.74
ConvF Z	5.03	± 7% (k=2)	Depth	1.85

Sensor Offset

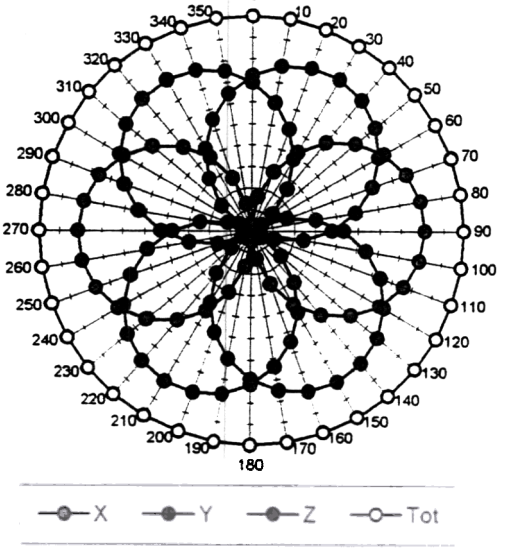
Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	1.9 ± 0.2	mm

Receiving Pattern (ϕ), θ = 0°

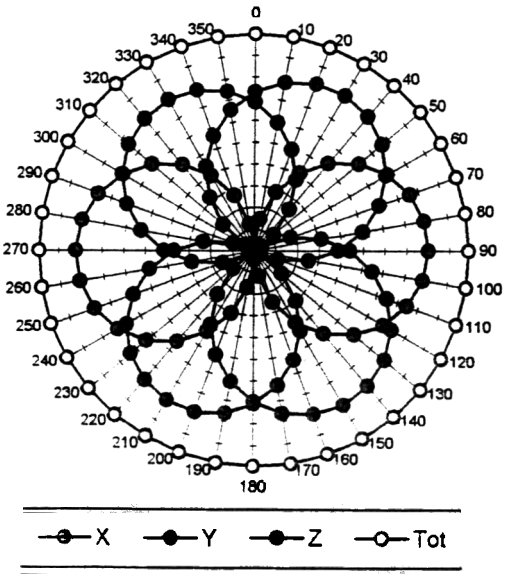
f = 30 MHz, TEM cell ifi110

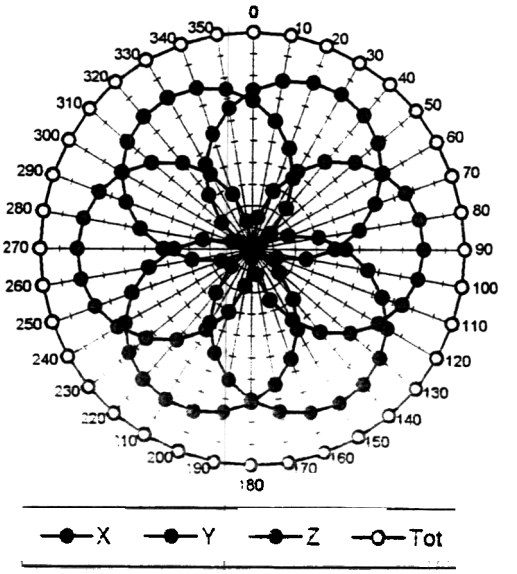


f = 100 MHz, TEM cell ifi110

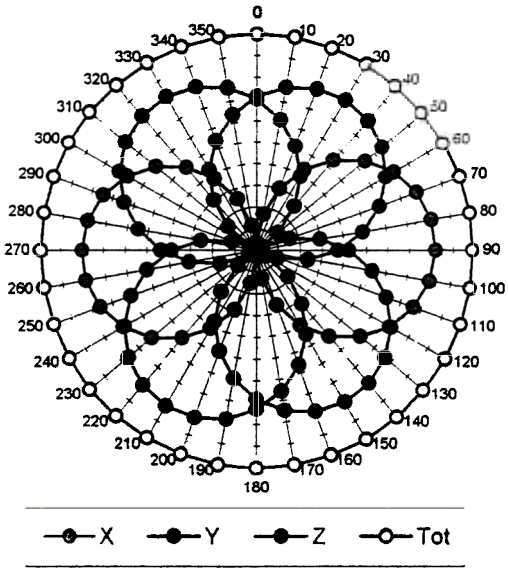


f = 900 MHz, TEM cell ifi110

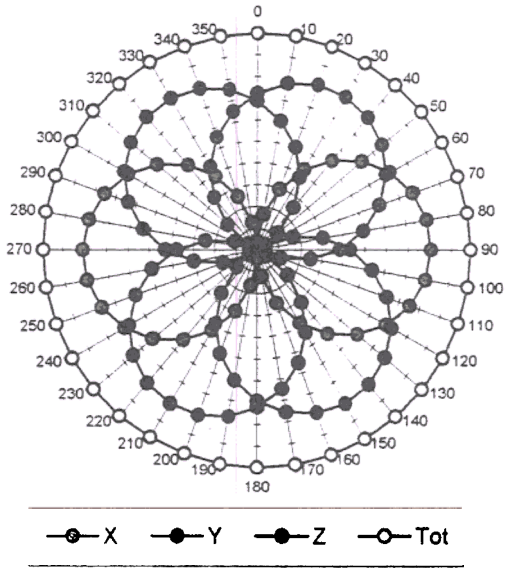




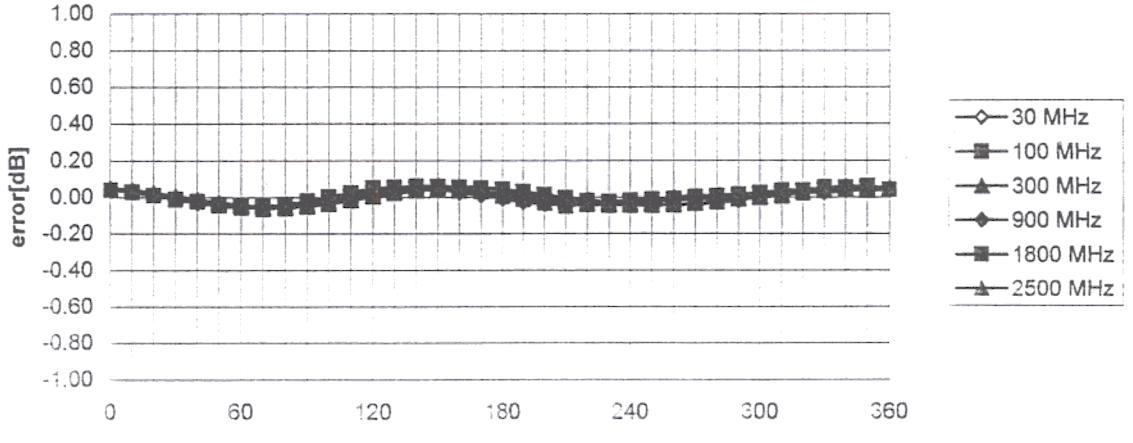
f = 1800 MHz, WG R22



f = 2500 MHz, WG R26

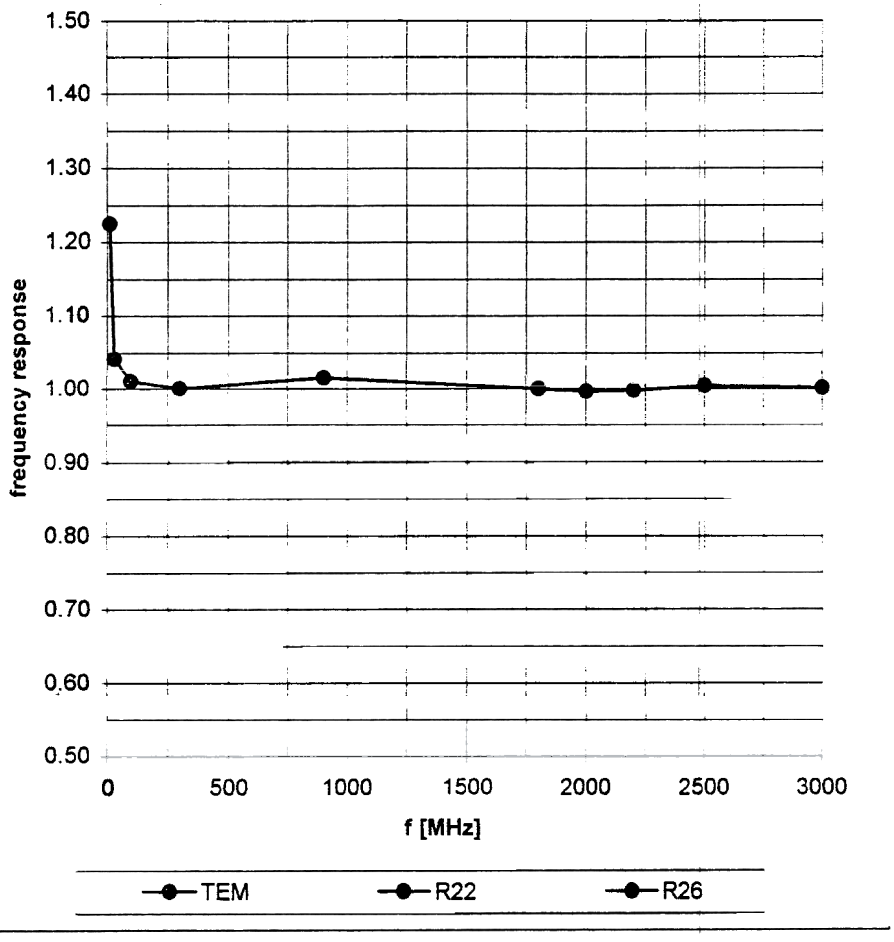


Isotropy Error (ϕ), θ = 0°



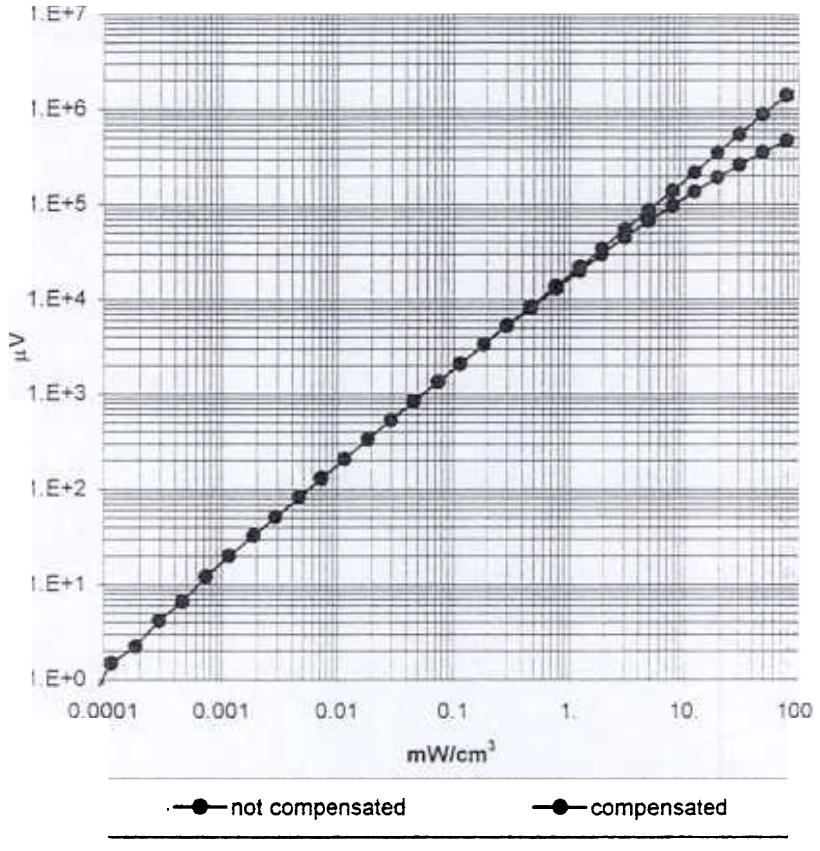
Frequency Response of E-Field

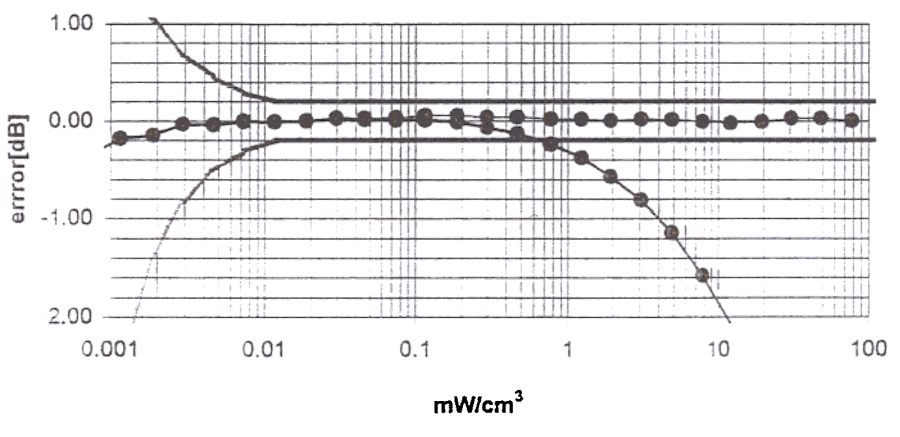
(TEM-Cell:ifi110, Waveguide R22, R26)



Dynamic Range f(SAR_{brain})

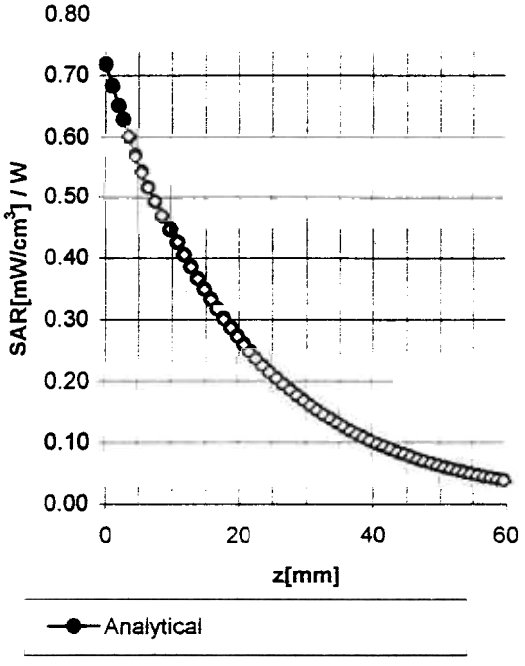
(TEM-Cell:ifi110)



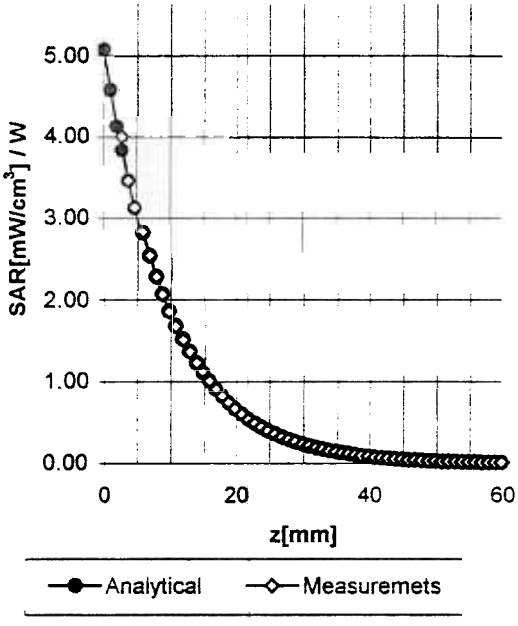


Conversion Factor Assessment

f = 900 MHz, WG R9



f = 1800 MHz, WG R22



Receiving Pattern (ϕ)

(in brain tissue, z = 5 mm)