APPENDIX 3

Dosimetric E-Field Probe - ET3DV6, S/N: 1678

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

Client JQA (MITC)

CALIBRATION CERTIFICATE

Object(s)	ET3DV6 - SN:1678
Calibration procedure(s)	QA CAL-01.v2 Calibration procedure for dosimetric E-field probes
Calibration date:	February 7, 2003
Condition of the calibrated item	In Tolerance (according to the specific calibration document)

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Model Type	ID #	Cal Date	Scheduled Calibration
RF generator HP 8684C	US3642U01700	4-Aug-99 (in house check Aug-02)	In house check: Aug-05
Power sensor E4412A	MY41495277	8-Mar-02	Mar-03
Power sensor HP 8481A	MY41092180	18-Sep-02	Sep-03
Power meter EPM E4419B	GB41293874	13-Sep-02	Sep-03
Network Analyzer HP 8753E	US38432426	3-May-00	In house check: May 03
Fluke Process Calibrator Type 702	SN: 6295803	3-Sep-01	Sep-03

	Name	Function	Signature
Calibrated by:	Nico Vetterli	Technician	D.Vetterli
Approved by:	Katja Pokovic	Laboratory Director	Pokovic Katja

Date issued: February 7, 2003

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

Schmid & Partner
Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland, Telephone +41 1 245 97 00, Fax +41 1 245 97 79

Probe ET3DV6

SN:1678

Manufactured: March 7, 2002
Last calibration: May 22, 2002
Recalibrated: February 7, 2003

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1678

Sensitivity in Free Space

NormX	**1.35**	$\mu V/(V/m)^2$
NormY	**1.77**	$\mu V/(V/m)^2$
NormZ	**1.72**	$\mu V/(V/m)^2$

Diode Compression

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

Sensitivity in Tissue Simulating Liquid

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	**6.6**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.6**	± 9.5% (k=2)	Alpha	**0.38**
ConvF Z	**6.6**	± 9.5% (k=2)	Depth	**2.56**

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	**0.50**
ConvF Z	**5.3**	± 9.5% (k=2)	Depth	**2.71**

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	5.8
SAR_{be} [%]	With Correction Algorithm	0.4	0.6

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

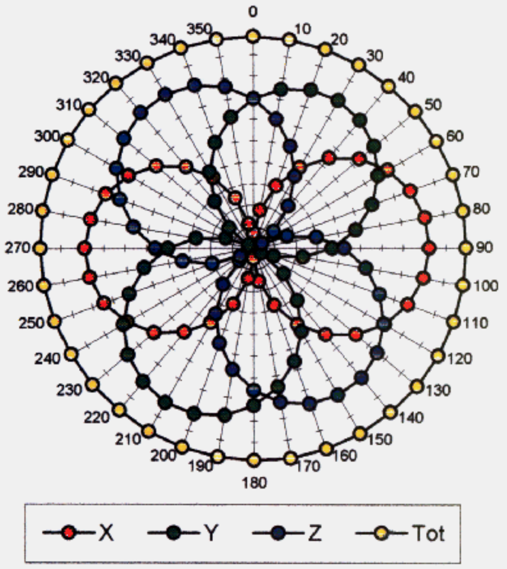
Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	14.5	9.9
SAR_{be} [%]	With Correction Algorithm	0.2	0.2

Sensor Offset

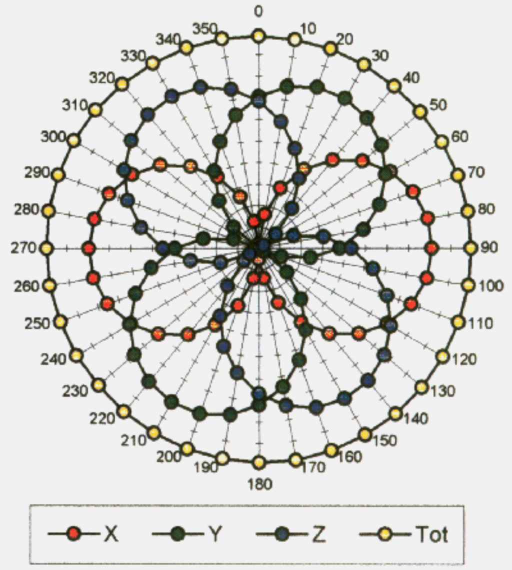
Probe Tip to Sensor Center	**2.7**	mm
Optical Surface Detection	**1.5 ± 0.2**	mm

Receiving Pattern (ϕ), $\theta = 0°$

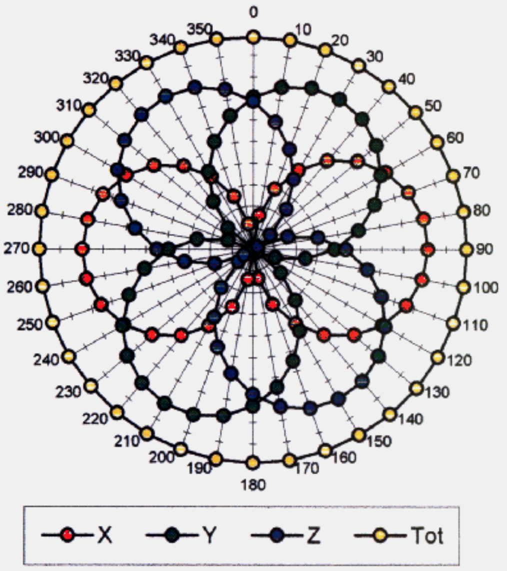
f = 30 MHz, TEM cell ifi110



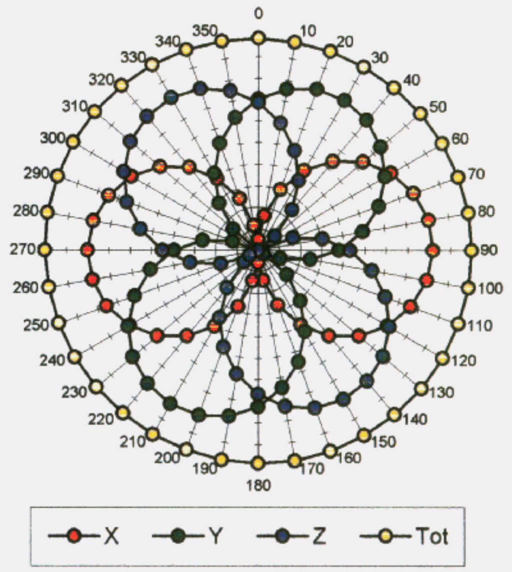
f = 100 MHz, TEM cell ifi110

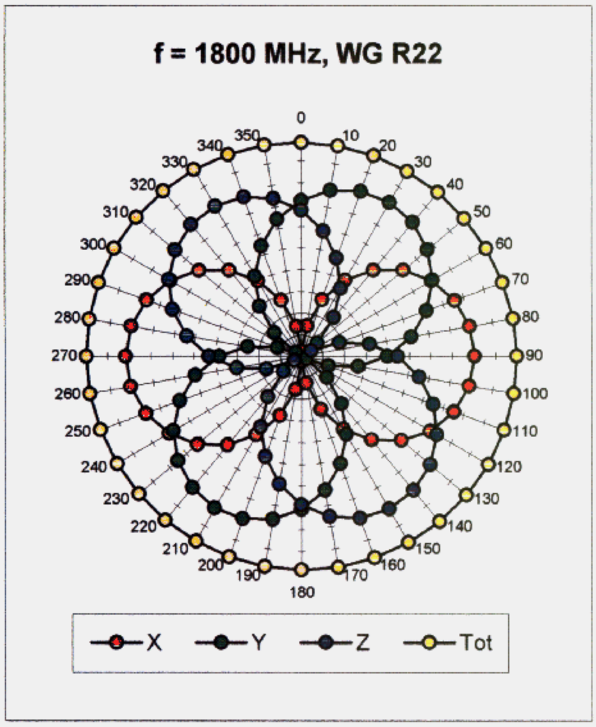


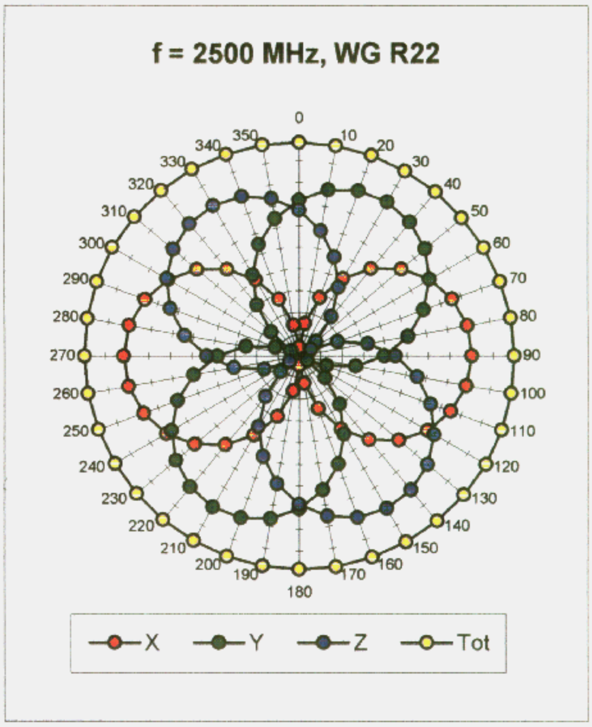
f = 300 MHz, TEM cell ifi110



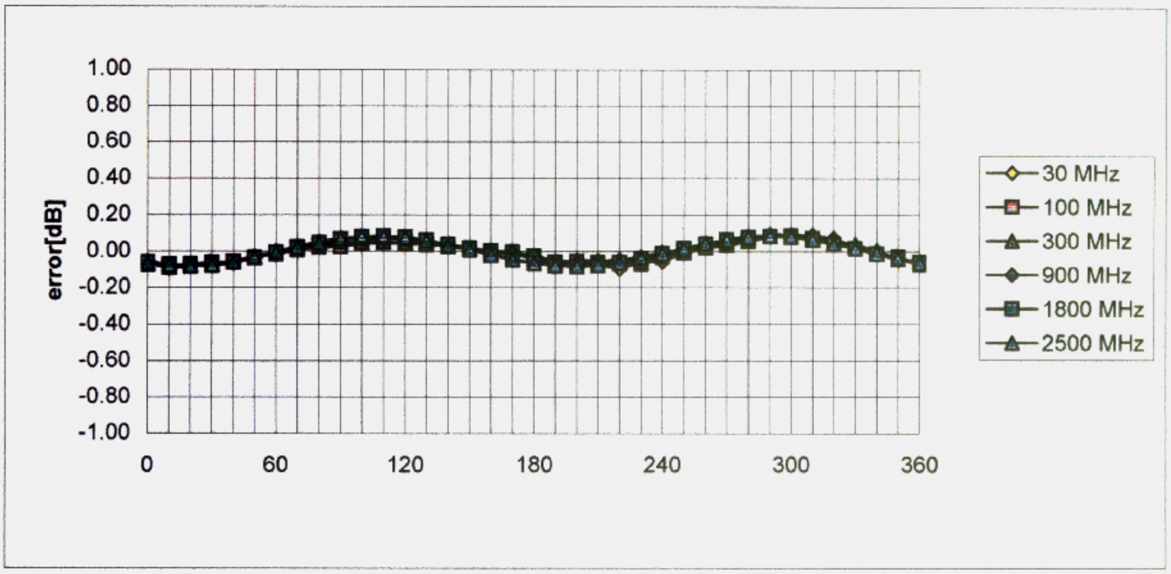
f = 900 MHz, TEM cell ifi110





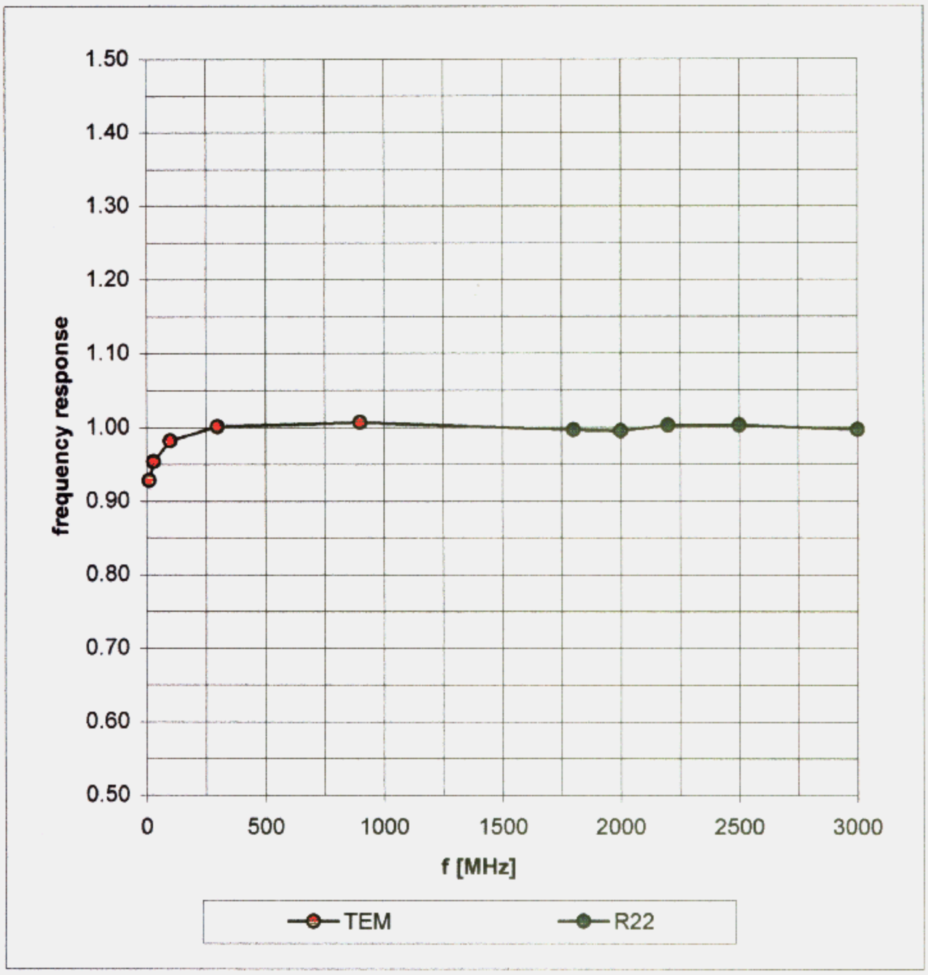


Isotropy Error (ϕ), θ = 0°



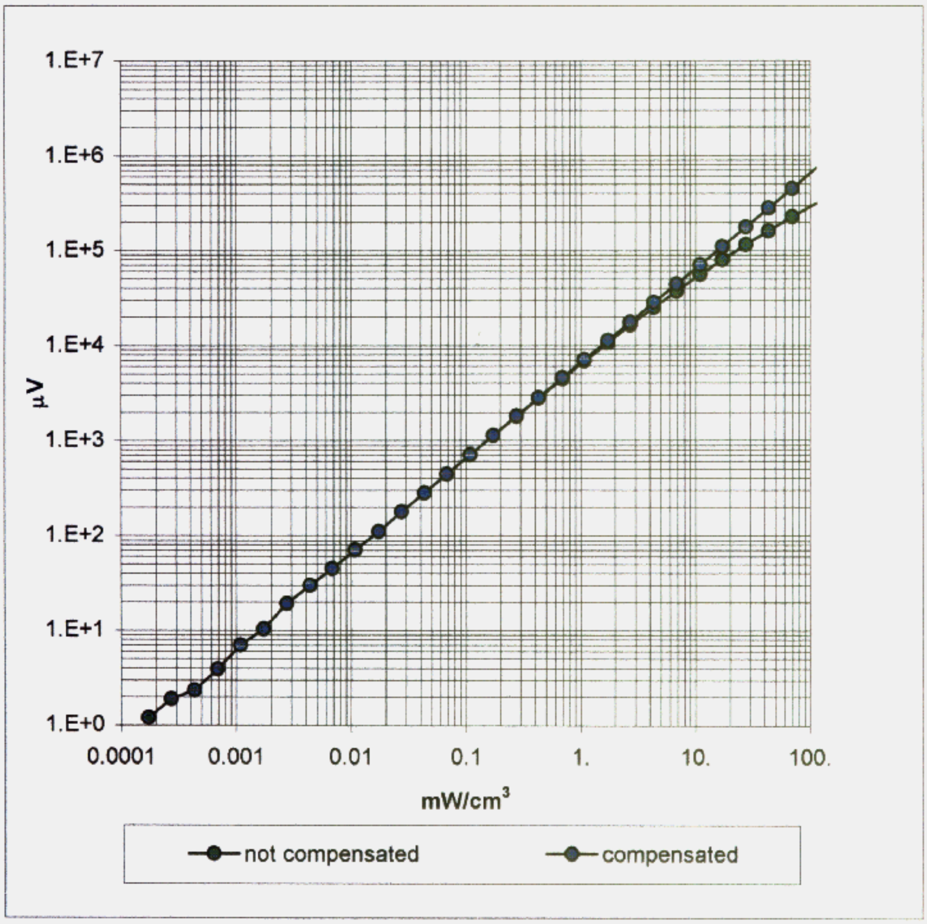
Frequency Response of E-Field

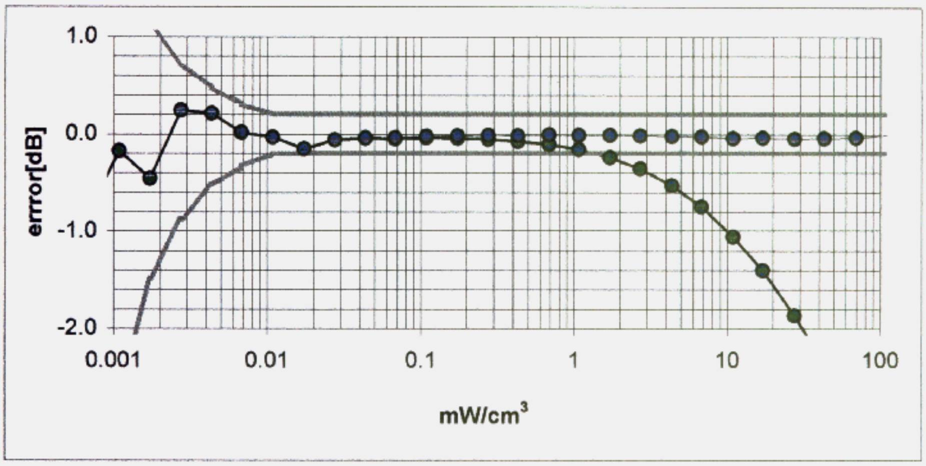
(TEM-Cell:ifi110, Waveguide R22)



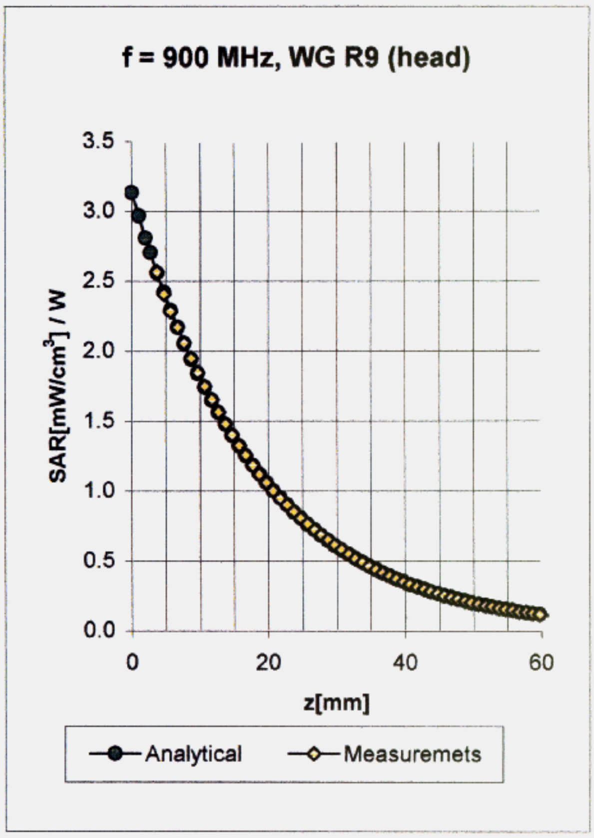
Dynamic Range f(SAR_{brain})

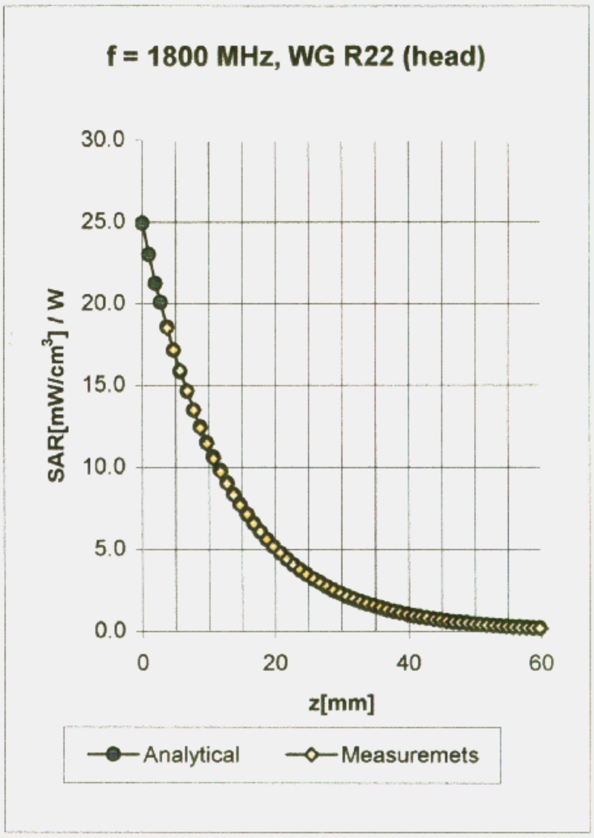
(Waveguide R22)





Conversion Factor Assessment

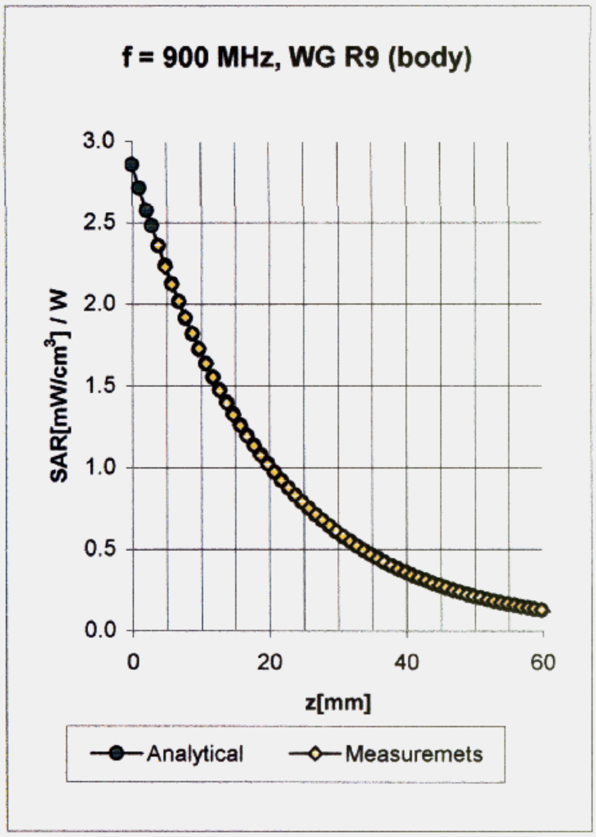


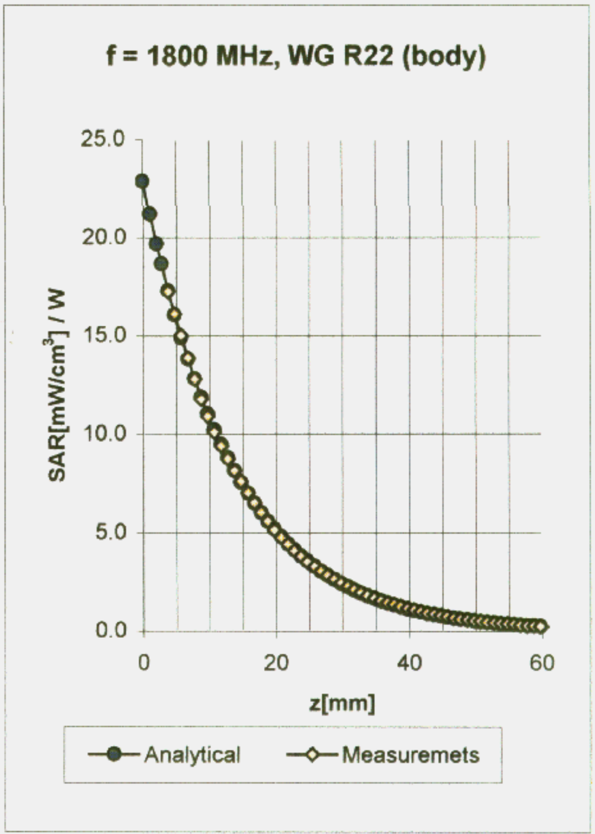


Head	**900 MHz**		ε_r = **41.5 ± 5%**	σ = **0.97 ± 5% mho/m**	
Head	**835 MHz**		ε_r = **41.5 ± 5%**	σ = **0.90 ± 5% mho/m**	
	ConvF X	**6.6** ± 9.5% (k=2)		Boundary effect:	
	ConvF Y	**6.6** ± 9.5% (k=2)		Alpha	**0.38**
	ConvF Z	**6.6** ± 9.5% (k=2)		Depth	**2.56**

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	**0.50**
	ConvF Z	**5.3** ± 9.5% (k=2)		Depth	**2.71**

Conversion Factor Assessment

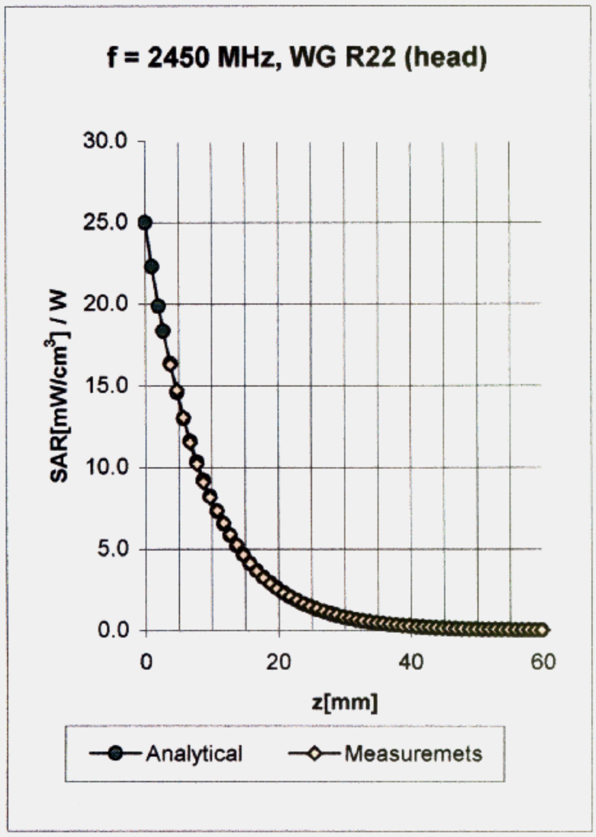


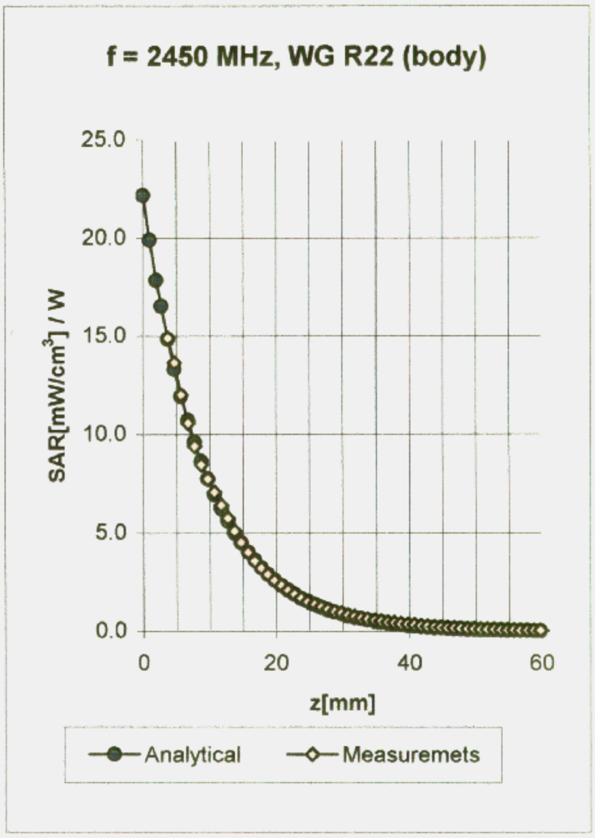


Body	**900 MHz**		ε_r = **55.0 ± 5%**	σ = **1.05 ± 5% mho/m**	
Body	**835 MHz**		ε_r = **55.2 ± 5%**	σ = **0.97 ± 5% mho/m**	
	ConvF X	**6.5**	± 9.5% (k=2)	Boundary effect:	
	ConvF Y	**6.5**	± 9.5% (k=2)	Alpha	**0.45**
	ConvF Z	**6.5**	± 9.5% (k=2)	Depth	**2.29**

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	**4.8**	± 9.5% (k=2)	Boundary effect:	
	ConvF Y	**4.8**	± 9.5% (k=2)	Alpha	**0.55**
	ConvF Z	**4.8**	± 9.5% (k=2)	Depth	**2.72**

Conversion Factor Assessment





2450	**Head**	**MHz**	ε_r = **39.2 ± 5%**		σ = **1.80 ± 5% mho/m**	
	ConvF X	**5.0** ± 8.9% (k=2)			Boundary effect:	
	ConvF Y	**5.0** ± 8.9% (k=2)			Alpha	**0.97**
	ConvF Z	**5.0** ± 8.9% (k=2)			Depth	**1.88**
2450	**Body**	**MHz**	ε_r = **52.7 ± 5%**		σ = **1.95 ± 5% mho/m**	
	ConvF X	**4.6** ± 8.9% (k=2)			Boundary effect:	
	ConvF Y	**4.6** ± 8.9% (k=2)			Alpha	**1.48**
	ConvF Z	**4.6** ± 8.9% (k=2)			Depth	**1.53**

Deviation from Isotropy in HSL

Error (θ,φ), f = 900 MHz