

Probe ET3DV6

SN: 1560

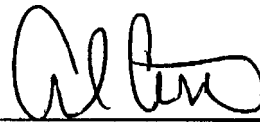
Manufactured:
Calibrated:

December 1, 2000
February 20, 2002

Calibrated for System DASY3

PCTEST Calibration Laboratory

Approved By:



Alfred Cirwithian
Vice President Engineering

DASY3 - Parameters of Probe: ET3DV6 SN:1560

Sensitivity in Free Space

NormX	1.48 $\mu\text{V}/(\text{V}/\text{m})^2$
NormY	1.51 $\mu\text{V}/(\text{V}/\text{m})^2$
NormZ	1.43 $\mu\text{V}/(\text{V}/\text{m})^2$

Diode Compression

DCP X	98 mV
DCP Y	98 mV
DCP Z	98 mV

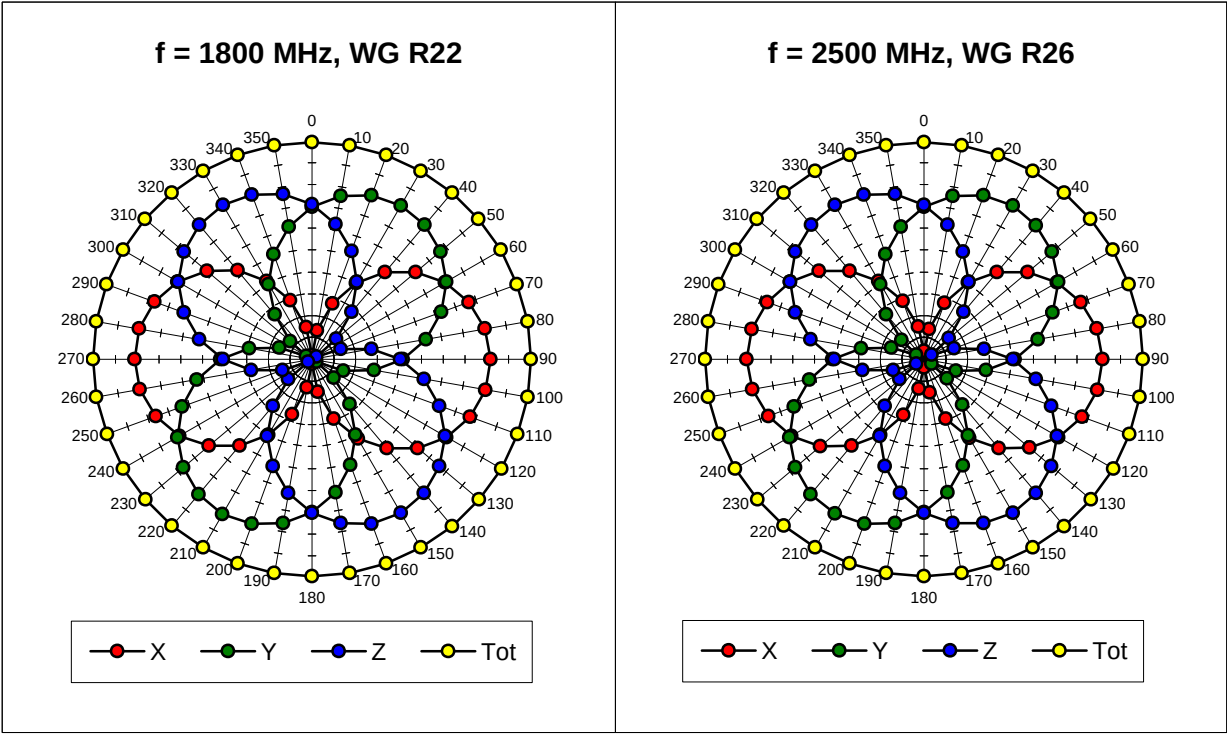
Sensitivity in Tissue Simulating Liquid

Head	835 MHz Brain	$\epsilon_r = 41.5 \pm 5\%$	$s = 0.90 \pm 5\% \text{ mho/m}$
	ConvF X	6.78	Boundary effect:
	ConvF Y	6.78	Alpha 0.30
	ConvF Z	6.78	Depth 2.90
Body	835 MHz Muscle	$\epsilon_r = 56.2 \pm 5\%$	$s = 0.95 \pm 5\% \text{ mho/m}$
	ConvF X	6.52 $\pm 7\%$ (k=2)	Boundary effect:
	ConvF Y	6.52 $\pm 7\%$ (k=2)	Alpha 0.30
	ConvF Z	6.52 $\pm 7\%$ (k=2)	Depth 2.90
Head	1900 MHz Brain	$\epsilon_r = 40.0 \pm 5\%$	$s = 1.40 \pm 5\% \text{ mho/m}$
	ConvF X	5.16	Boundary effect:
	ConvF Y	5.16	Alpha 0.48
	ConvF Z	5.16	Depth 2.40
Body	1900 MHz Muscle	$\epsilon_r = 54.2 \pm 5\%$	$s = 1.50 \pm 5\% \text{ mho/m}$
	ConvF X	4.70 $\pm 7\%$ (k=2)	Boundary effect:
	ConvF Y	4.70 $\pm 7\%$ (k=2)	Alpha 0.48
	ConvF Z	4.70 $\pm 7\%$ (k=2)	Depth 2.40

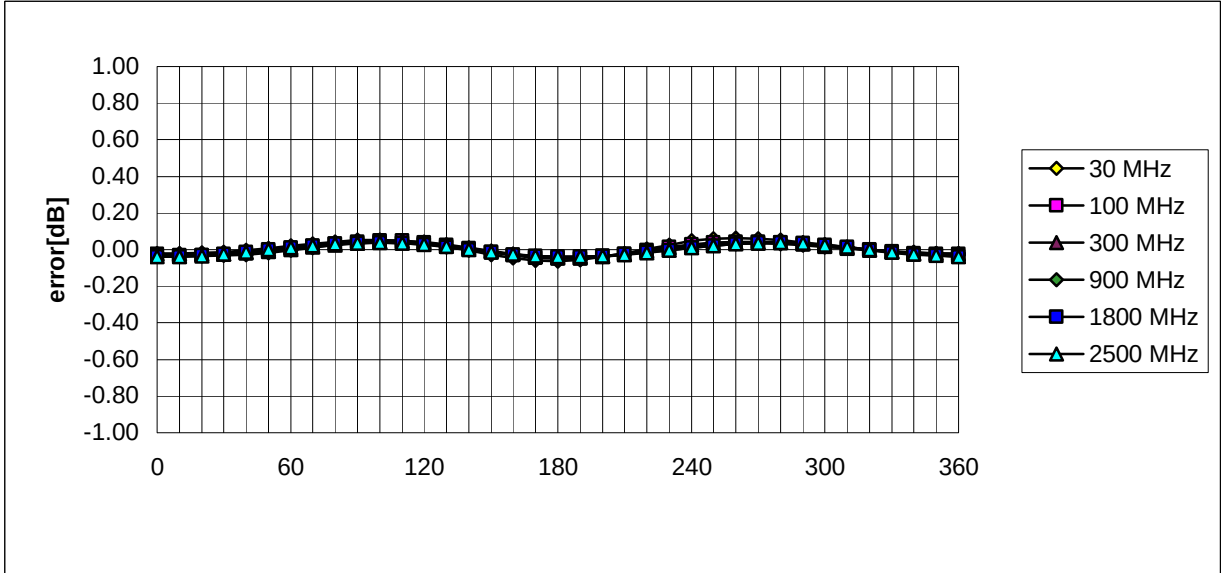
Sensor Offset

Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	2.0 $\pm$ 0.2	mm

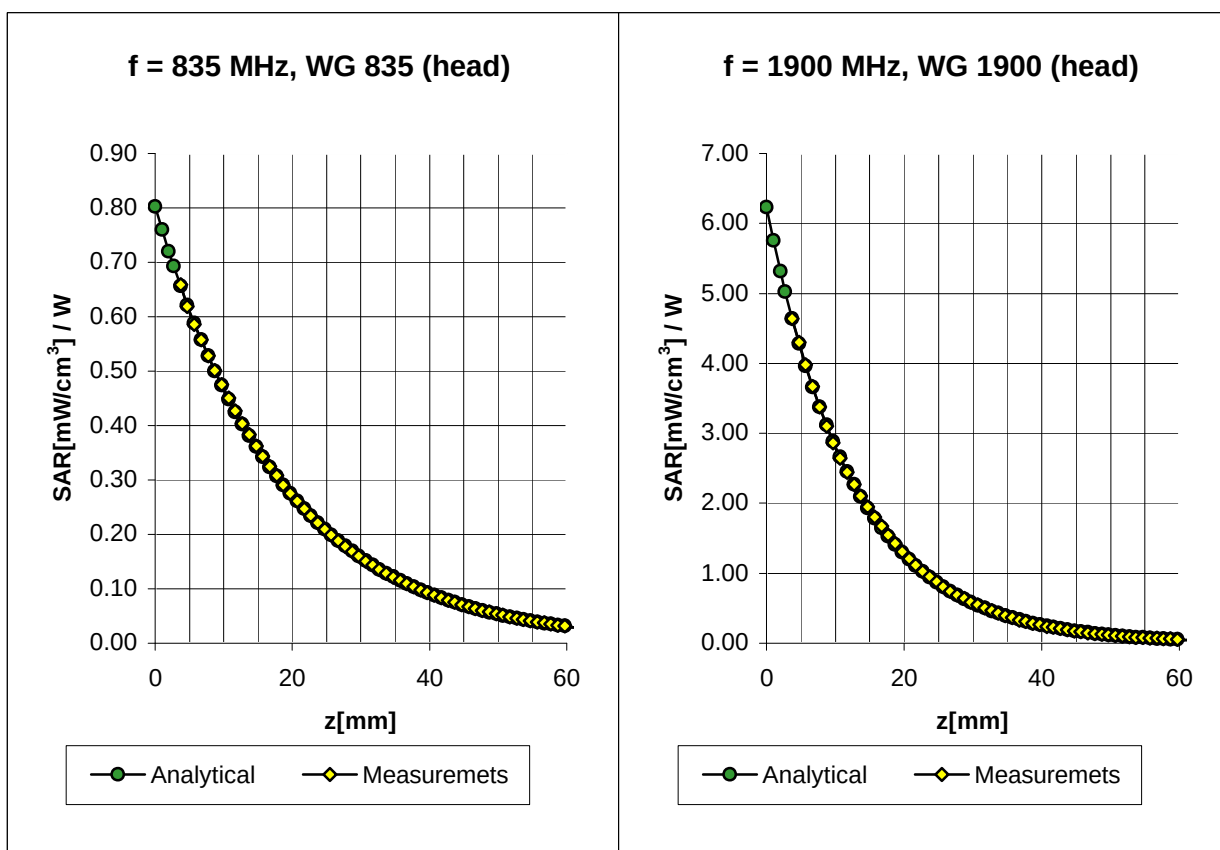
ET3DV6 SN:1560



Isotropy Error (f), q = 0°



Conversion Factor Assessment



Head	835 MHz Brain	$\epsilon_r = 42 \pm 5\%$	$s = 0.90 \pm 5\% \text{ mho/m}$
	ConvF X	6.78 $\pm 7\%$ (k=2)	Boundary effect:
	ConvF Y	6.78 $\pm 7\%$ (k=2)	Alpha 0.30
	ConvF Z	6.78 $\pm 7\%$ (k=2)	Depth 2.90
Head	1900 MHz Brain	$\epsilon_r = 40 \pm 5\%$	$s = 1.40 \pm 5\% \text{ mho/m}$
	ConvF X	5.16 $\pm 7\%$ (k=2)	Boundary effect:
	ConvF Y	5.16 $\pm 7\%$ (k=2)	Alpha 0.48
	ConvF Z	5.16 $\pm 7\%$ (k=2)	Depth 2.40

ET3DV6 SN:1560

Schmid & Partner Engineering AG

Zughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

Certificate of conformity / First Article Inspection

Item	SAM Twin Phantom V4.0
Type No	QD 000 P40 BA
Series No	TP-1002 and higher
Manufacturer / Origin	Untersee Composites Hauptstr. 69 CH-8559 Fruthwilen Switzerland

Tests

The series production process used allows the limitation to test of first articles.
Complete tests were made on the pre-series Type No. QD 000 P40 AA, Serial No. TP-1001 and on the series first article Type No. QD 000 P40 BA, Serial No. TP-1006. Certain parameters have been retested using further series units (called samples).

Test	Requirement	Details	Units tested
Shape	Compliance with the geometry according to the CAD model.	IT'IS CAD File (*)	First article, Samples
Material thickness	Compliant with the requirements according to the standards	2mm +/- 0.2mm in specific areas	First article, Samples
Material parameters	Dielectric parameters for required frequencies	200 MHz - 3 GHz Relative permittivity < 5 Loss tangent < 0.05.	Material sample TP 104-5
Material resistivity	The material has been tested to be compatible with the liquids defined in the standards	Liquid type HSL 1800 and others according to the standard.	Pre-series, First article

Standards

- [1] CENELEC EN 50361
- [2] IEEE P1528-200x draft 6.5
- [3] IEC PT 62209 draft 0.9
- (*) The IT'IS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of [1] and [3].

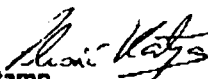
Conformity

Based on the sample tests above, we certify that this item is in compliance with the uncertainty requirements of SAR measurements specified in standard [1] and draft standards [2] and [3].

Date

18.11.2001

Signature / Stamp



**Schmid & Partner
Engineering AG**



Zughausstrasse 43, CH-8004 Zurich
Tel. +41 1 245 97 00, Fax +41 1 245 97 79

Calibration Certificate

Dosimetric E-Field Probe

Type:

ET3DV6

Serial Number:

1677

Place of Calibration:

Zurich

Date of Calibration:

April 10, 2002

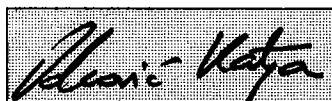
Calibration Interval:

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:



Approved by:



Probe ET3DV6

SN:1677

Manufactured:	March 7, 2002
Last calibration:	April 10, 2002

Calibrated for System DASY3

DASY3 - Parameters of Probe: ET3DV6 SN:1677

Sensitivity in Free Space

NormX	1.70 $\mu\text{V}/(\text{V}/\text{m})^2$
NormY	1.76 $\mu\text{V}/(\text{V}/\text{m})^2$
NormZ	1.67 $\mu\text{V}/(\text{V}/\text{m})^2$

Diode Compression

DCP X	93	mV
DCP Y	93	mV
DCP Z	93	mV

Sensitivity in Tissue Simulating Liquid

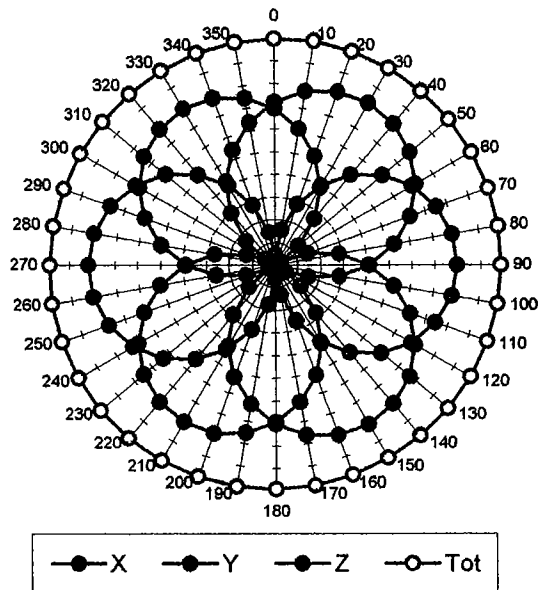
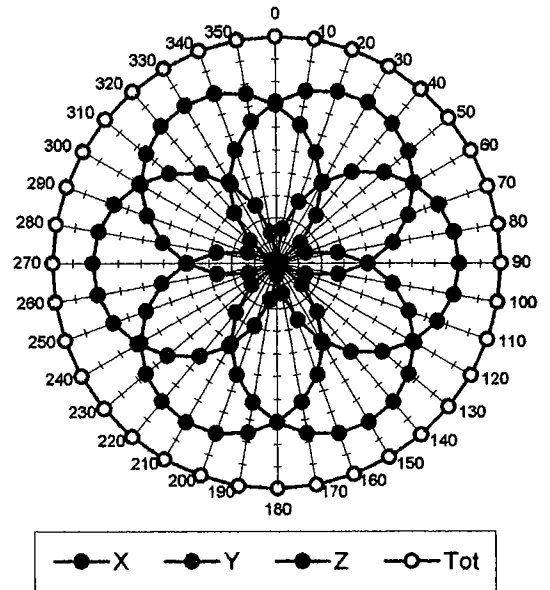
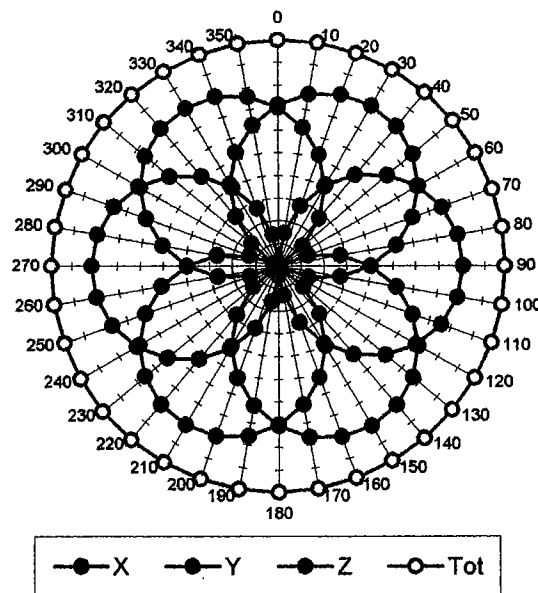
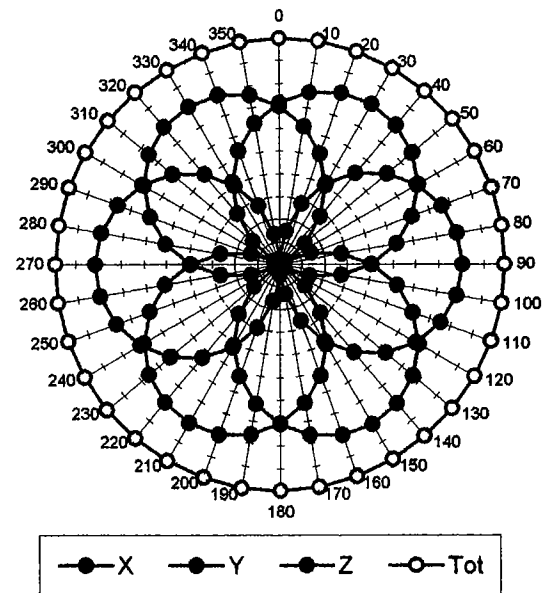
Head	835 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.90 \pm 5\% \text{ mho/m}$
Head	900 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.97 \pm 5\% \text{ mho/m}$
ConvF X	6.7 $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	6.7 $\pm 9.5\%$ (k=2)	Alpha	0.33
ConvF Z	6.7 $\pm 9.5\%$ (k=2)	Depth	2.62
Head	1900 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\% \text{ mho/m}$
Head	1800 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\% \text{ mho/m}$
ConvF X	5.3 $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	5.3 $\pm 9.5\%$ (k=2)	Alpha	0.54
ConvF Z	5.3 $\pm 9.5\%$ (k=2)	Depth	2.35

Boundary Effect

Head	835/900 MHz	Typical SAR gradient: 5 % per mm	
Probe Tip to Boundary		1 mm	2 mm
SAR _{be} [%]	Without Correction Algorithm	9.1	5.2
SAR _{be} [%]	With Correction Algorithm	0.3	0.5
Head	1800/1900 MHz	Typical SAR gradient: 10 % per mm	
Probe Tip to Boundary		1 mm	2 mm
SAR _{be} [%]	Without Correction Algorithm	10.4	6.5
SAR _{be} [%]	With Correction Algorithm	0.3	0.3

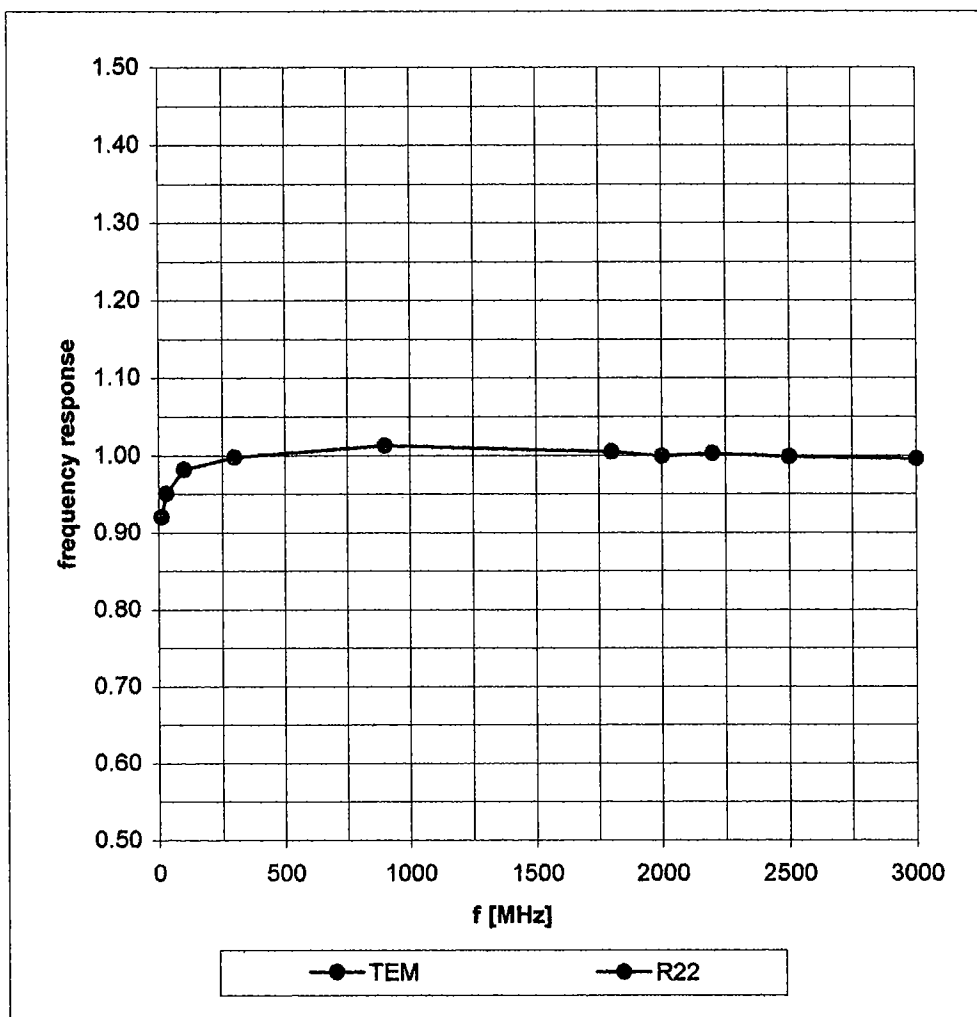
Sensor Offset

Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	1.6 $\pm$ 0.2	mm

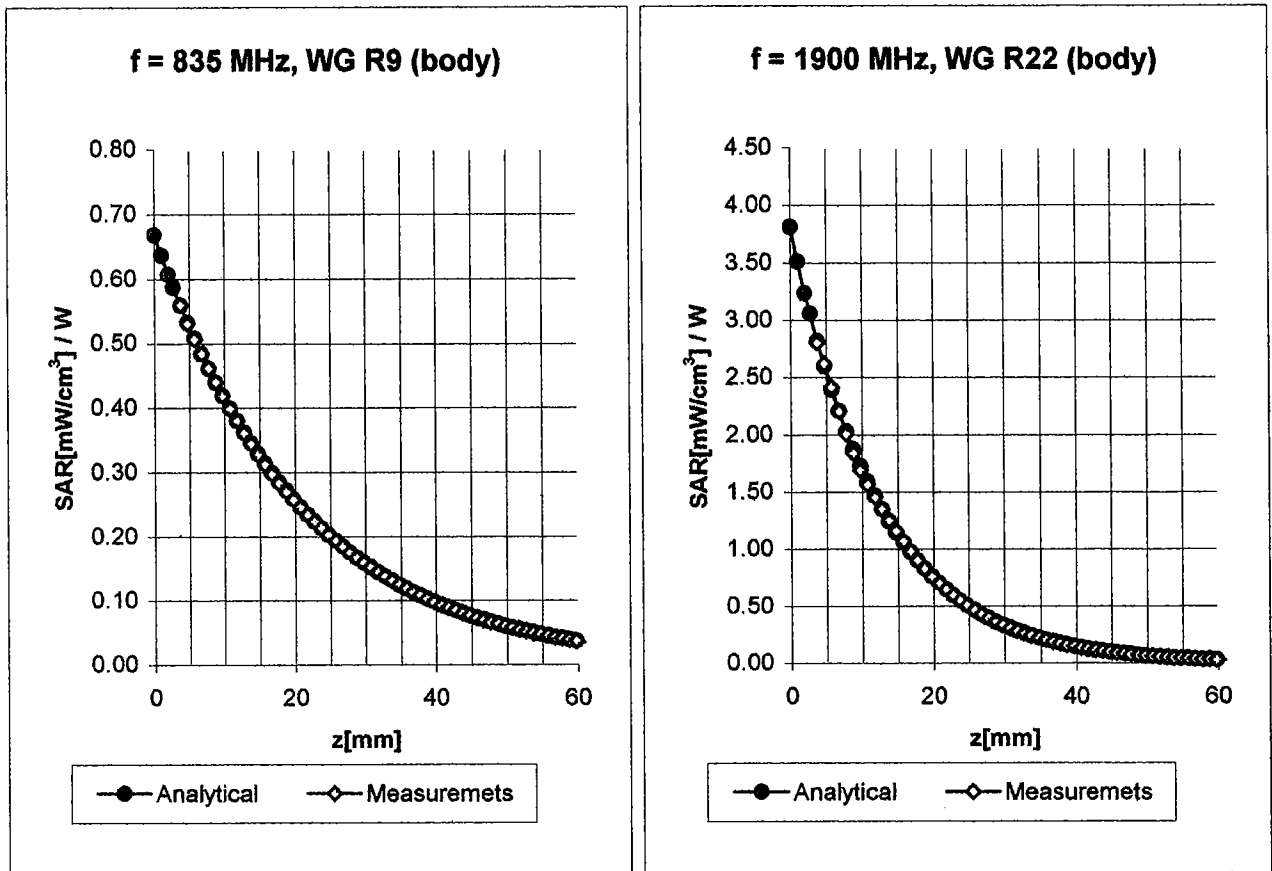
Receiving Pattern (ϕ), $\theta = 0^\circ$ $f = 30 \text{ MHz}$, TEM cell if110 $f = 100 \text{ MHz}$, TEM cell if110 $f = 300 \text{ MHz}$, TEM cell if110 $f = 900 \text{ MHz}$, TEM cell if110

Frequency Response of E-Field

(TEM-Cell:ifi110, Waveguide R22)



Conversion Factor Assessment



Body	835 MHz	$\epsilon_r = 55.2 \pm 5\%$	$\sigma = 0.97 \pm 5\% \text{ mho/m}$
Body	900 MHz	$\epsilon_r = 55.0 \pm 5\%$	$\sigma = 1.05 \pm 5\% \text{ mho/m}$
	ConvF X	6.4 $\pm 9.5\%$ (k=2)	Boundary effect:
	ConvF Y	6.4 $\pm 9.5\%$ (k=2)	Alpha 0.43
	ConvF Z	6.4 $\pm 9.5\%$ (k=2)	Depth 2.27
Body	1900 MHz	$\epsilon_r = 53.3 \pm 5\%$	$\sigma = 1.52 \pm 5\% \text{ mho/m}$
Body	1800 MHz	$\epsilon_r = 53.3 \pm 5\%$	$\sigma = 1.52 \pm 5\% \text{ mho/m}$
	ConvF X	4.9 $\pm 9.5\%$ (k=2)	Boundary effect:
	ConvF Y	4.9 $\pm 9.5\%$ (k=2)	Alpha 0.78
	ConvF Z	4.9 $\pm 9.5\%$ (k=2)	Depth 2.01

Additional Conversion Factors for Dosimetric E-Field Probe

Type:

ET3DV6

Serial Number:

1677

Place of Assessment:

Zurich

Date of Assessment:

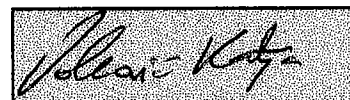
April 11, 2002

Probe Calibration Date:

April 10, 2002

Schmid & Partner Engineering AG hereby certifies that conversion factor(s) of this probe have been evaluated on the date indicated above. The assessment was performed using the FDTD numerical code SEMCAD of Schmid & Partner Engineering AG. Since the evaluation is coupled with measured conversion factors, it has to be recalculated yearly, i.e., following the recalibration schedule of the probe. The uncertainty of the numerical assessment is based on the extrapolation from measured value at 900 MHz or at 1800 MHz.

Assessed by:



Dosimetric E-Field Probe ET3DV6 SN:1677

Conversion factor ($\pm$ standard deviation)

450 MHz ConvF $7.5 \pm 8\%$

$\epsilon_r = 56.7 \pm 5\%$
 $\sigma = 0.94 \pm 5\% \text{ mho/m}$
(body tissue)

2450 MHz ConvF $4.4 \pm 8\%$

$\epsilon_r = 39.2 \pm 5\%$
 $\sigma = 1.80 \pm 5\% \text{ mho/m}$
(head tissue)

2450 MHz ConvF $4.0 \pm 8\%$

$\epsilon_r = 52.7 \pm 5\%$
 $\sigma = 1.95 \pm 5\% \text{ mho/m}$
(body tissue)