

Client **EMC Technologies Pty**

## CALIBRATION CERTIFICATE

Object(s) **ET3DV6 - SN:1377**

Calibration procedure(s) **QA CAL-01.v2  
Calibration procedure for dosimetric E-field probes**

Calibration date: **September 19, 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 (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM E4419B	GB41293874	2-Apr-03 (METAS, No 252-0250)	Apr-04
Power sensor E4412A	MY41495277	2-Apr-03 (METAS, No 252-0250)	Apr-04
Reference 20 dB Attenuator	SN: 5086 (20b)	3-Apr-03 (METAS No. 251-0340)	Apr-04
Fluke Process Calibrator Type 702	SN: 6295803	8-Sep-03 (Sintrel SCS No. E-030020)	Sep-04
Power sensor HP 8481A	MY41092180	18-Sep-02 (Agilent, No. 20020918)	In house check: Oct 03
RF generator HP 8684C	US3642U01700	4-Aug-99 (SPEAG, in house check Aug-02)	In house check: Aug-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (Agilent, No. 24BR1033101)	In house check: Oct 03

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Laboratory Director	
Approved by:	Fin Bomholt	R&D Director	

Date issued: September 20, 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.

# Probe ET3DV6

## SN:1377

Manufactured:	August 16, 1999
Last calibration:	September 6, 2002
Recalibrated:	September 19, 2003

Calibrated for DASYS Systems

(Note: non-compatible with DASYS2 system!)

## DASY - Parameters of Probe: ET3DV6 SN:1377

### Sensitivity in Free Space

NormX	<b>1.78</b> $\mu\text{V}/(\text{V}/\text{m})^2$
NormY	<b>1.81</b> $\mu\text{V}/(\text{V}/\text{m})^2$
NormZ	<b>1.87</b> $\mu\text{V}/(\text{V}/\text{m})^2$

### Diode Compression

DCP X	<b>92</b>	mV
DCP Y	<b>92</b>	mV
DCP Z	<b>92</b>	mV

### Sensitivity in Tissue Simulating Liquid

Head                      900 MHz                       $\epsilon_r = 41.5 \pm 5\%$                        $\sigma = 0.97 \pm 5\%$  mho/m

Valid for f=800-1000 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	<b>6.2</b> $\pm 9.5\%$ (k=2)	Boundary effect:
ConvF Y	<b>6.2</b> $\pm 9.5\%$ (k=2)	Alpha <b>0.30</b>
ConvF Z	<b>6.2</b> $\pm 9.5\%$ (k=2)	Depth <b>3.18</b>

Head                      1800 MHz                       $\epsilon_r = 40.0 \pm 5\%$                        $\sigma = 1.40 \pm 5\%$  mho/m

Valid for f=1710-1910 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	<b>5.1</b> $\pm 9.5\%$ (k=2)	Boundary effect:
ConvF Y	<b>5.1</b> $\pm 9.5\%$ (k=2)	Alpha <b>0.46</b>
ConvF Z	<b>5.1</b> $\pm 9.5\%$ (k=2)	Depth <b>2.70</b>

### Boundary Effect

Head                      900 MHz                      Typical SAR gradient: 5 % per mm

Probe Tip to Boundary		<b>1 mm</b>	<b>2 mm</b>
SAR <sub>be</sub> [%]	Without Correction Algorithm	10.8	6.6
SAR <sub>be</sub> [%]	With Correction Algorithm	0.5	0.6

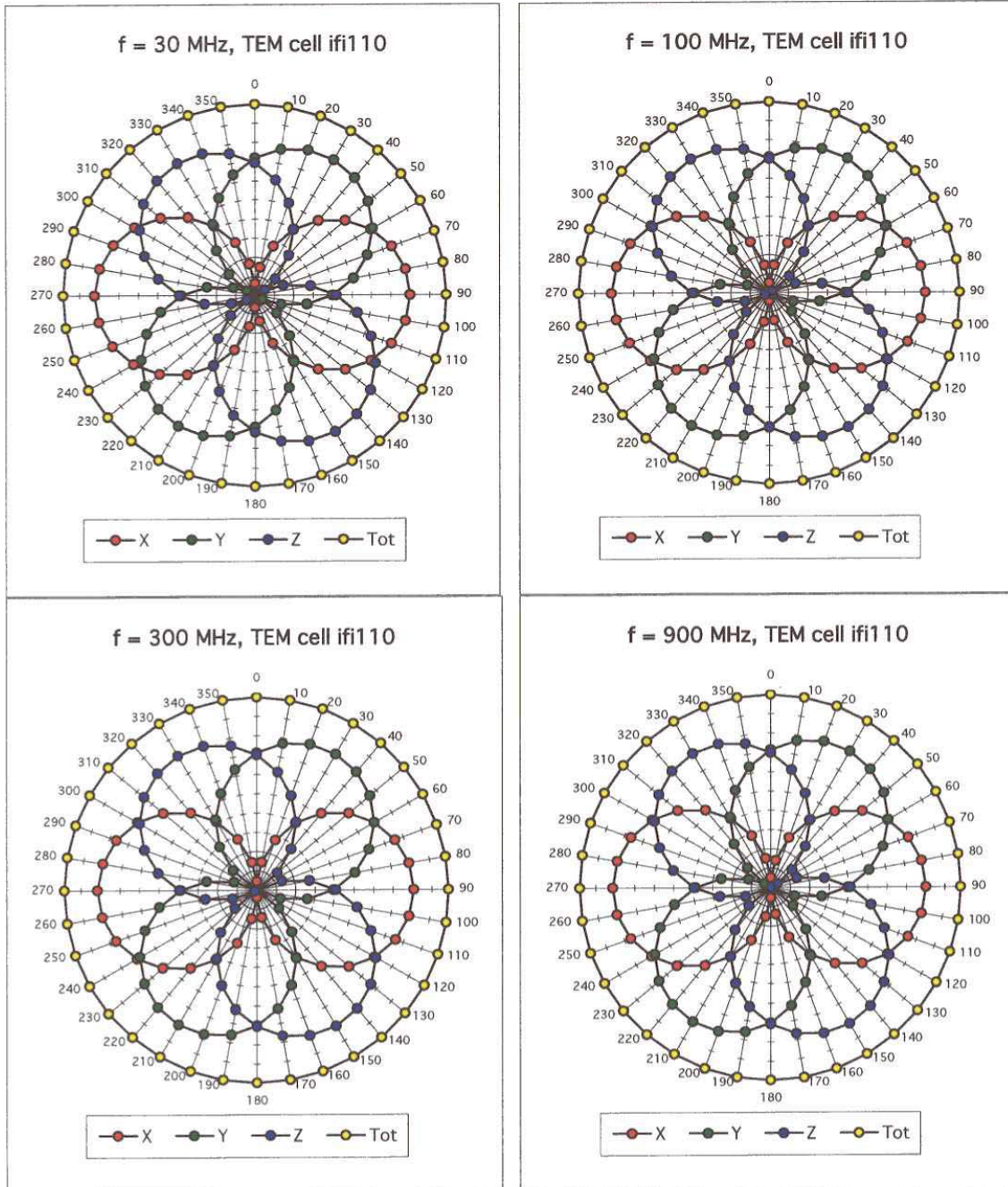
Head                      1800 MHz                      Typical SAR gradient: 10 % per mm

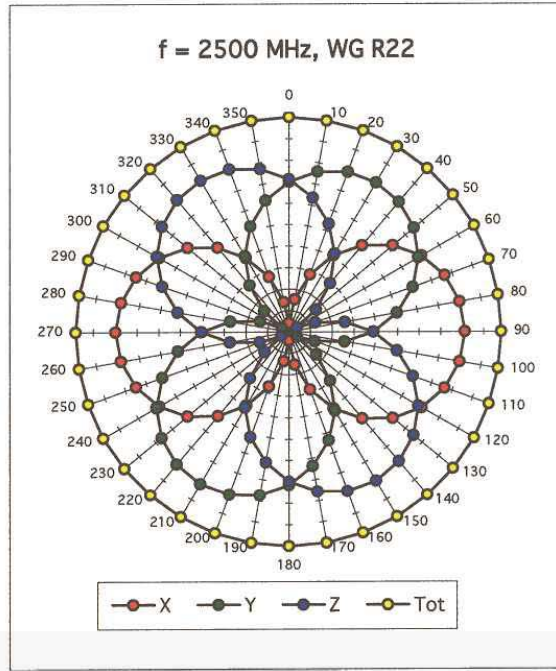
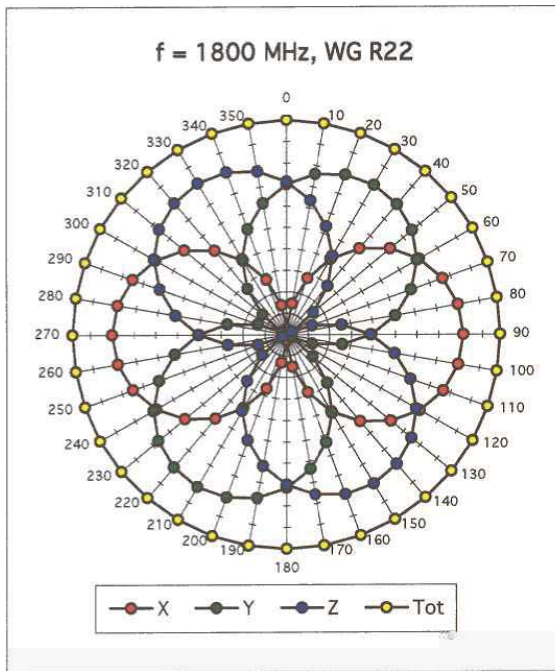
Probe Tip to Boundary		<b>1 mm</b>	<b>2 mm</b>
SAR <sub>be</sub> [%]	Without Correction Algorithm	12.9	9.0
SAR <sub>be</sub> [%]	With Correction Algorithm	0.3	0.2

### Sensor Offset

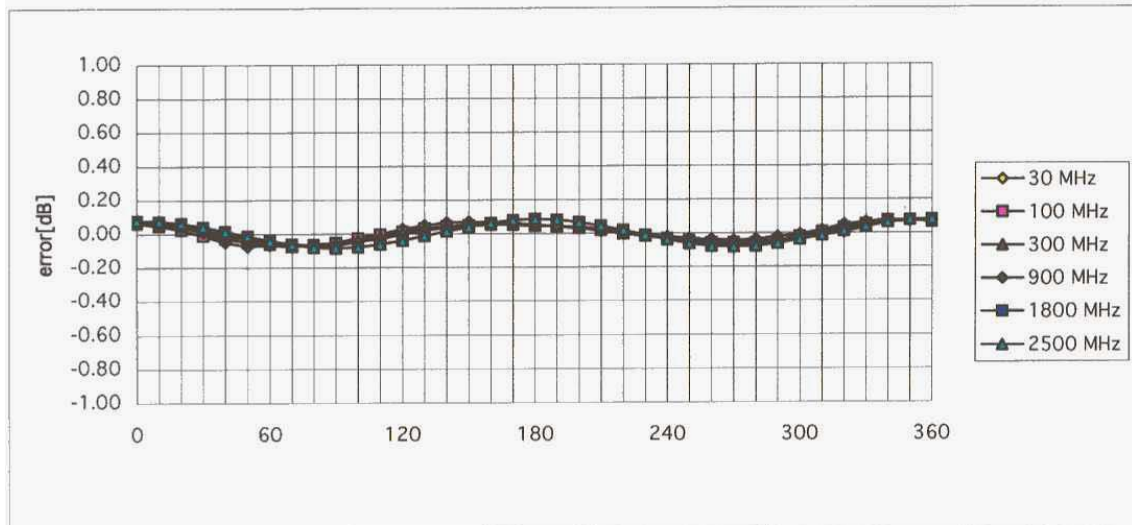
Probe Tip to Sensor Center	<b>2.7</b>	mm
Optical Surface Detection	<b>1.3 <math>\pm</math> 0.2</b>	mm

### Receiving Pattern ( $\phi$ ), $\theta = 0^\circ$



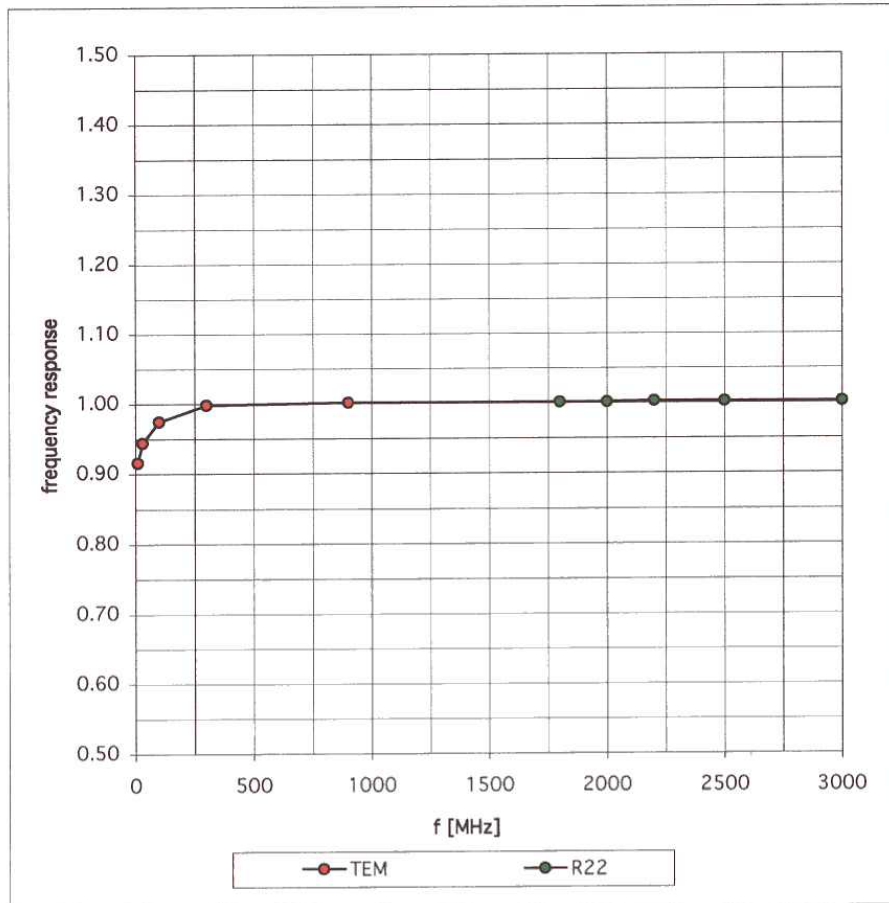


**Isotropy Error ( $\phi$ ),  $\theta = 0^\circ$**

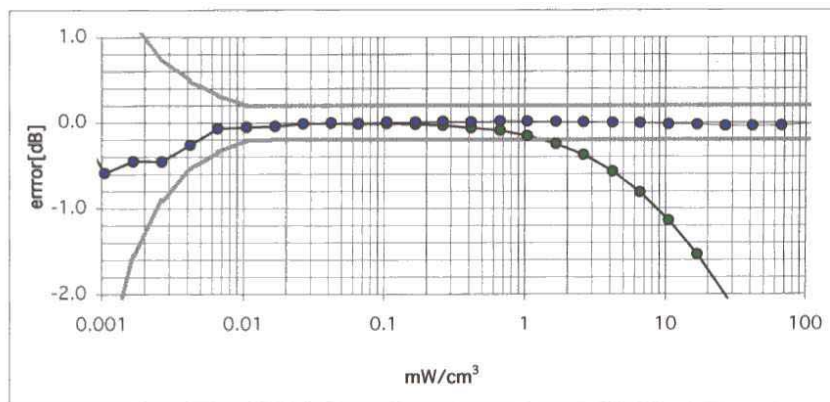
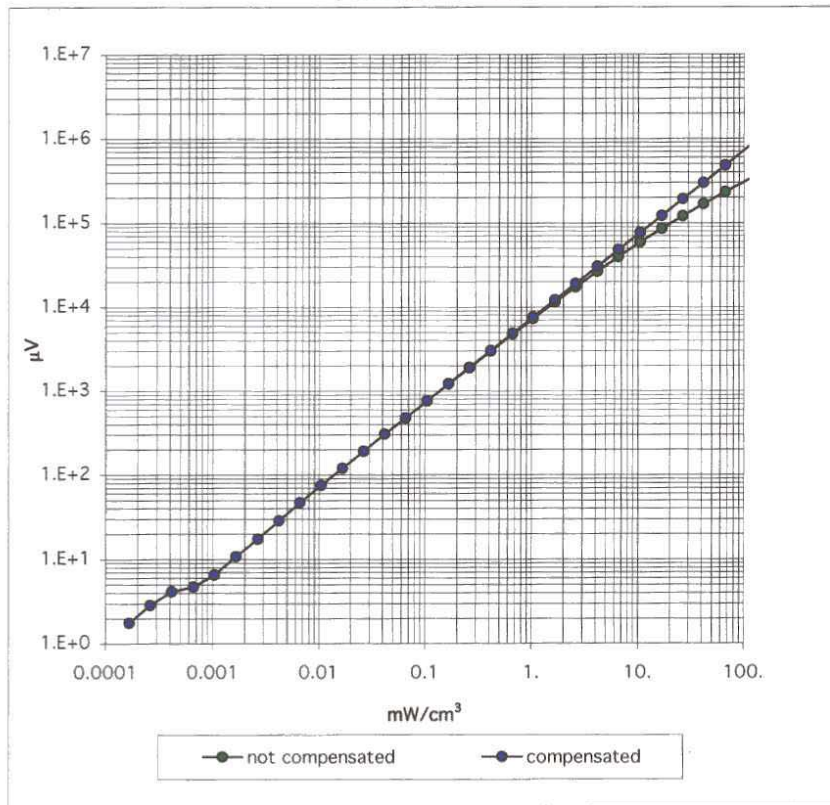


### Frequency Response of E-Field

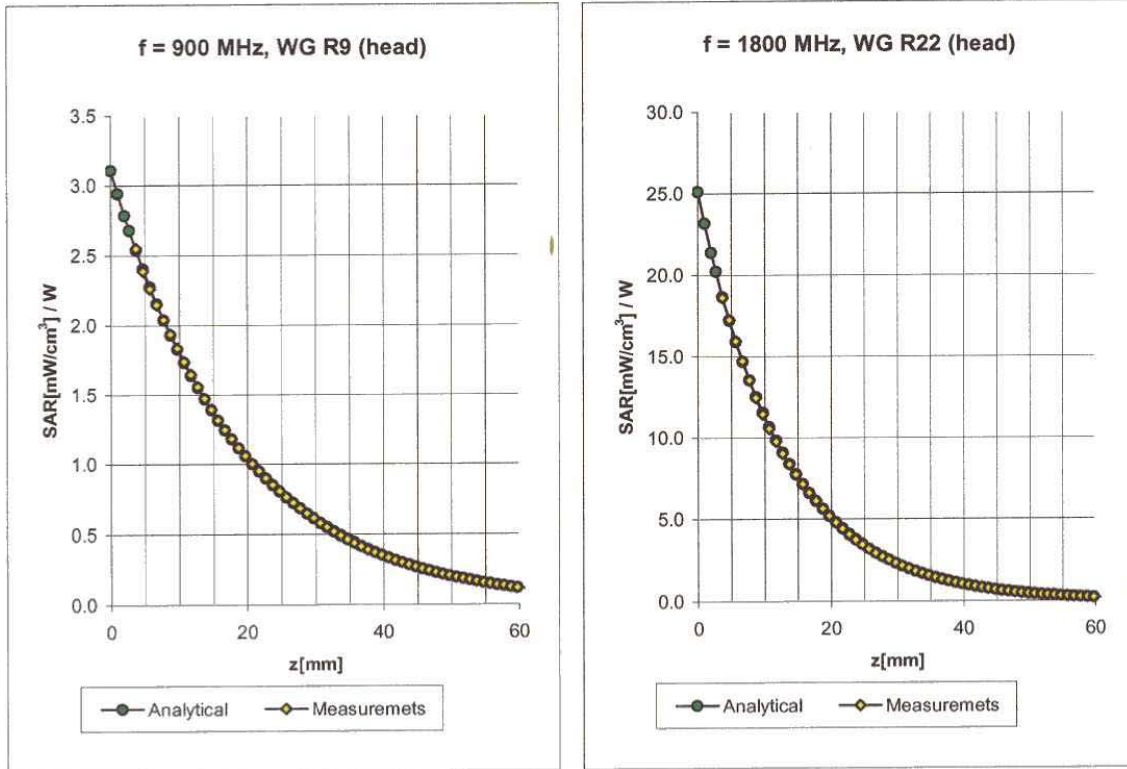
( TEM-Cell:ifi110, Waveguide R22)



### Dynamic Range f(SARhead) ( Waveguide R22 )



### Conversion Factor Assessment



Head                      900 MHz                       $\epsilon_r = 41.5 \pm 5\%$                        $\sigma = 0.97 \pm 5\%$  mho/m

Valid for f=800-1000 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	<b>6.2</b> $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	<b>6.2</b> $\pm 9.5\%$ (k=2)	Alpha	<b>0.30</b>
ConvF Z	<b>6.2</b> $\pm 9.5\%$ (k=2)	Depth	<b>3.18</b>

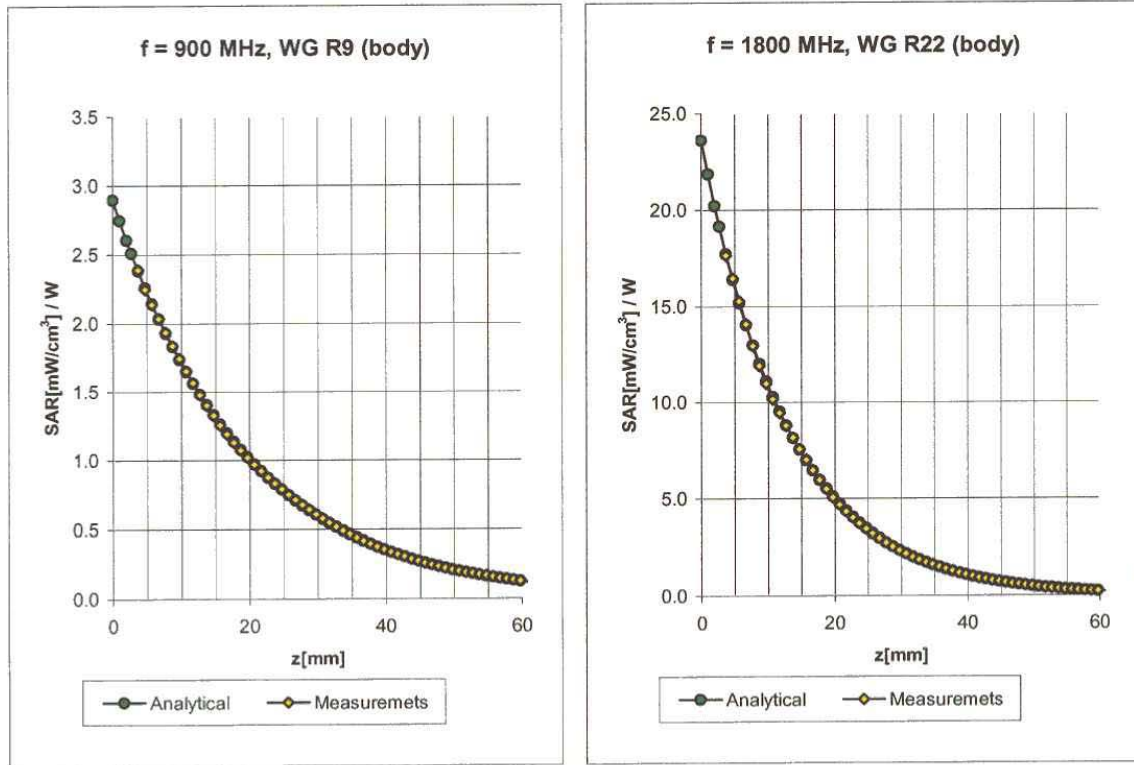
Head                      1800 MHz                       $\epsilon_r = 40.0 \pm 5\%$                        $\sigma = 1.40 \pm 5\%$  mho/m

Valid for f=1710-1910 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X

ConvF X	<b>5.1</b> $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	<b>5.1</b> $\pm 9.5\%$ (k=2)	Alpha	<b>0.46</b>
ConvF Z	<b>5.1</b> $\pm 9.5\%$ (k=2)	Depth	<b>2.70</b>



### Conversion Factor Assessment



Body                      900 MHz                       $\epsilon_r = 55.0 \pm 5\%$                        $\sigma = 1.05 \pm 5\%$  mho/m

Valid for f=800-1000 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	<b>6.1</b> $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	<b>6.1</b> $\pm 9.5\%$ (k=2)	Alpha	<b>0.37</b>
ConvF Z	<b>6.1</b> $\pm 9.5\%$ (k=2)	Depth	<b>2.65</b>

Body                      1800 MHz                       $\epsilon_r = 53.3 \pm 5\%$                        $\sigma = 1.52 \pm 5\%$  mho/m

Valid for f=1710-1910 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C

ConvF X	<b>4.6</b> $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	<b>4.6</b> $\pm 9.5\%$ (k=2)	Alpha	<b>0.50</b>
ConvF Z	<b>4.6</b> $\pm 9.5\%$ (k=2)	Depth	<b>3.00</b>

### Deviation from Isotropy in HSL

Error ( $\theta, \phi$ ),  $f = 900$  MHz

