
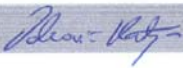


Client **Sony Ericsson Lund**

CALIBRATION CERTIFICATE																															
Object(s)	ET3DV6 - SN:1582																														
Calibration procedure(s)	QA CAL-01.v2 Calibration procedure for dosimetric E-field probes																														
Calibration date:	April 16, 2003																														
Condition of the calibrated item	In Tolerance (according to the specific calibration document)																														
<p>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.</p> <p>All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.</p> <p>Calibration Equipment used (M&TE critical for calibration)</p> <table border="1"> <thead> <tr> <th>Model Type</th> <th>ID #</th> <th>Cal Date</th> <th>Scheduled Calibration</th> </tr> </thead> <tbody> <tr> <td>RF generator HP 8684C</td> <td>US3642U01700</td> <td>4-Aug-99 (in house check Aug-02)</td> <td>In house check: Aug-05</td> </tr> <tr> <td>Power sensor E4412A</td> <td>MY41495277</td> <td>2-Apr-03</td> <td>Apr-04</td> </tr> <tr> <td>Power sensor HP 8481A</td> <td>MY41092180</td> <td>18-Sep-02</td> <td>Sep-03</td> </tr> <tr> <td>Power meter EPM E4419B</td> <td>GB41293874</td> <td>13-Sep-02</td> <td>Sep-03</td> </tr> <tr> <td>Network Analyzer HP 8753E</td> <td>US38432426</td> <td>3-May-00</td> <td>In house check: May 03</td> </tr> <tr> <td>Fluke Process Calibrator Type 702</td> <td>SN: 6295803</td> <td>3-Sep-01</td> <td>Sep-03</td> </tr> </tbody> </table>				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	2-Apr-03	Apr-04	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
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Calibrated by:	Name Nico Vetterli	Function Technician	Signature 																												
Approved by:	Katja Pokovic	Laboratory Director																													
Date issued: April 16, 2003																															
<p>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.</p>																															

Probe ET3DV6

SN:1582

Manufactured:	May 7, 2001
Last calibration:	June 20, 2002
Recalibrated:	April 16, 2003

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1582**Sensitivity in Free Space**

NormX	1.97 $\mu\text{V}/(\text{V}/\text{m})^2$
NormY	1.84 $\mu\text{V}/(\text{V}/\text{m})^2$
NormZ	2.02 $\mu\text{V}/(\text{V}/\text{m})^2$

Diode Compression

DCP X	97	mV
DCP Y	97	mV
DCP Z	97	mV

Sensitivity in Tissue Simulating Liquid

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

ConvF X	7.2 $\pm 8.9\%$ (k=2)	Boundary effect:
ConvF Y	7.2 $\pm 8.9\%$ (k=2)	Alpha 0.30
ConvF Z	7.2 $\pm 8.9\%$ (k=2)	Depth 2.59

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

ConvF X	5.5 $\pm 8.9\%$ (k=2)	Boundary effect:
ConvF Y	5.5 $\pm 8.9\%$ (k=2)	Alpha 0.45
ConvF Z	5.5 $\pm 8.9\%$ (k=2)	Depth 2.62

Boundary Effect

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

Probe Tip to Boundary		1 mm	2 mm
SAR _{be} [%] Without Correction Algorithm		8.2	4.7
SAR _{be} [%] With Correction Algorithm		0.3	0.5

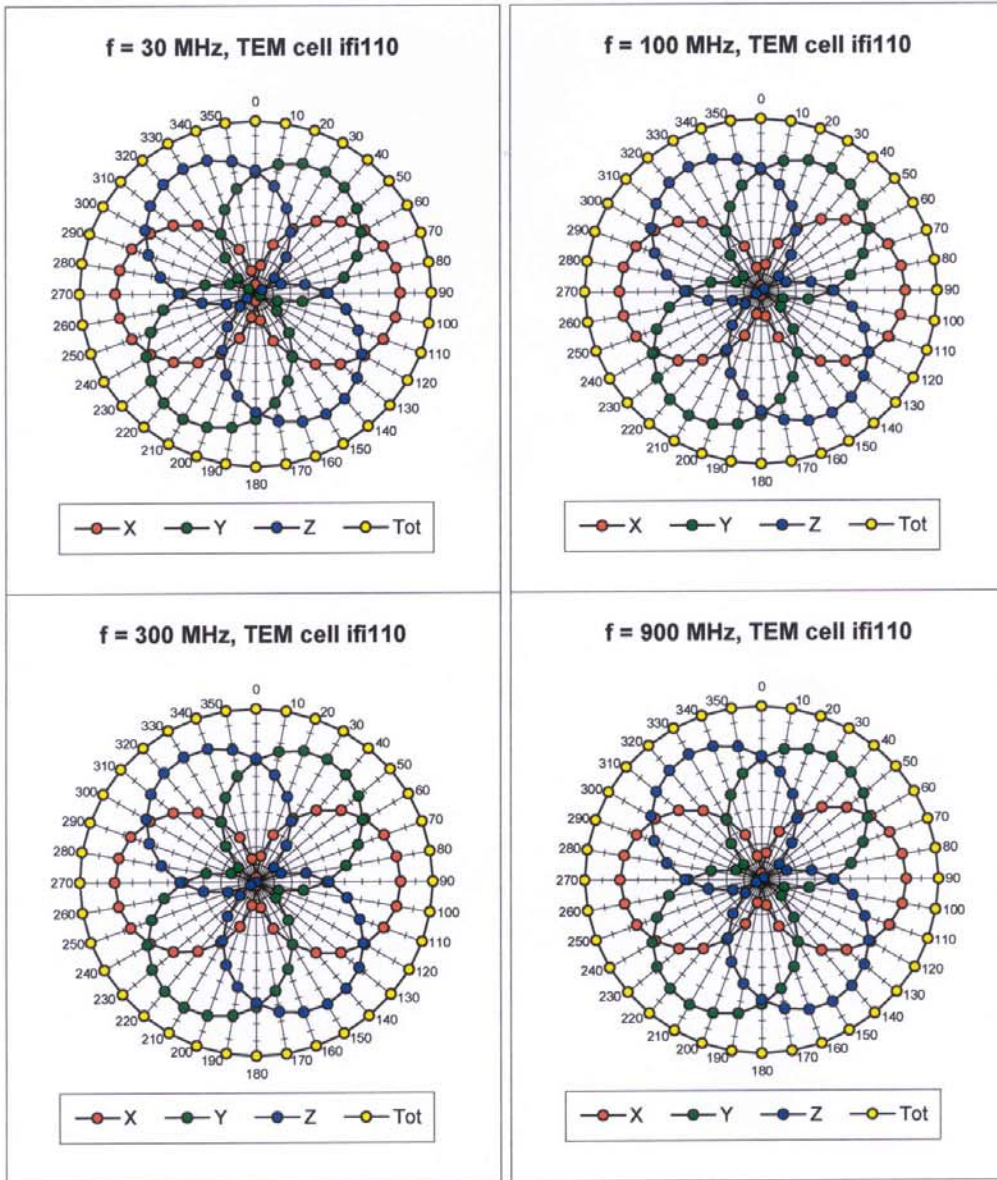
Head **1800 MHz** **Typical SAR gradient: 10 % per mm**

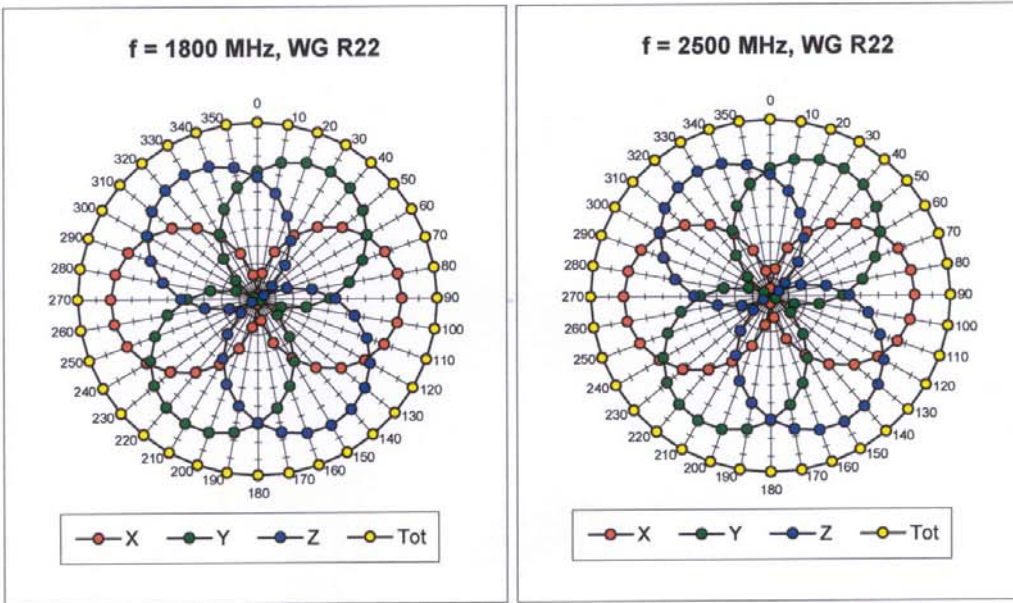
Probe Tip to Boundary		1 mm	2 mm
SAR _{be} [%] Without Correction Algorithm		12.1	8.4
SAR _{be} [%] With Correction Algorithm		0.2	0.3

Sensor Offset

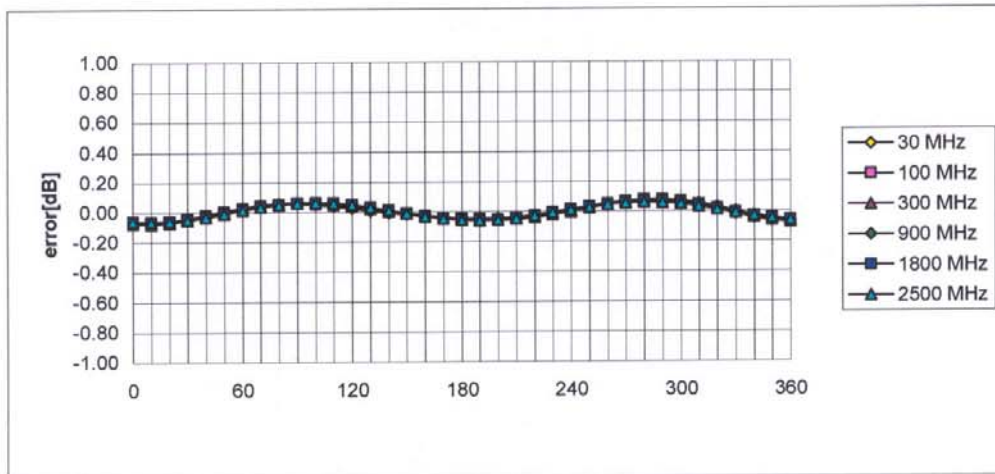
Probe Tip to Sensor Center	2.7	mm
Optical Surface Detection	0.9 \pm 0.2	mm

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



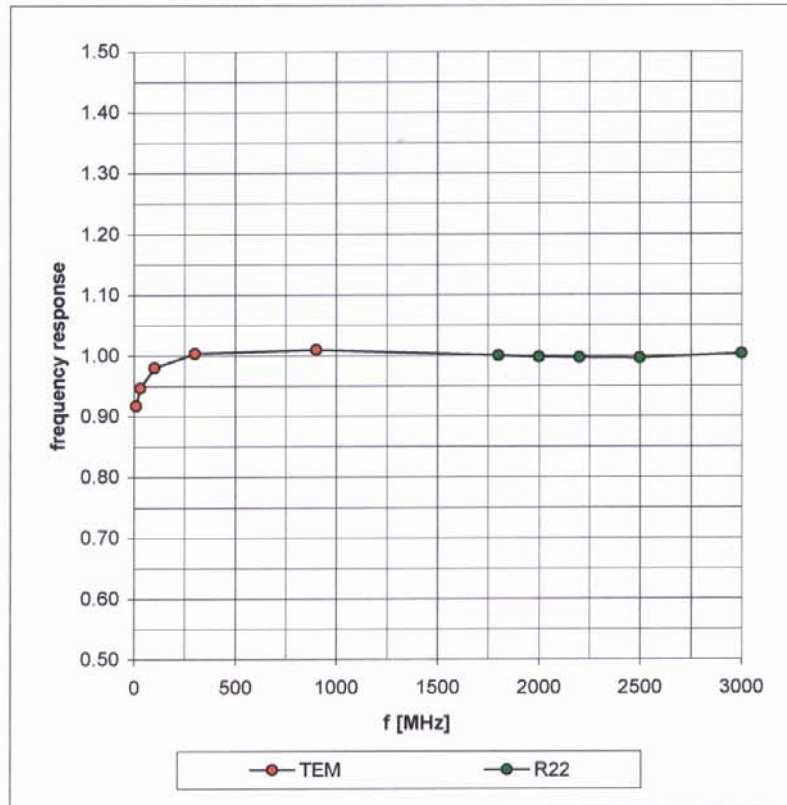


Isotropy Error (ϕ), $\theta = 0^\circ$

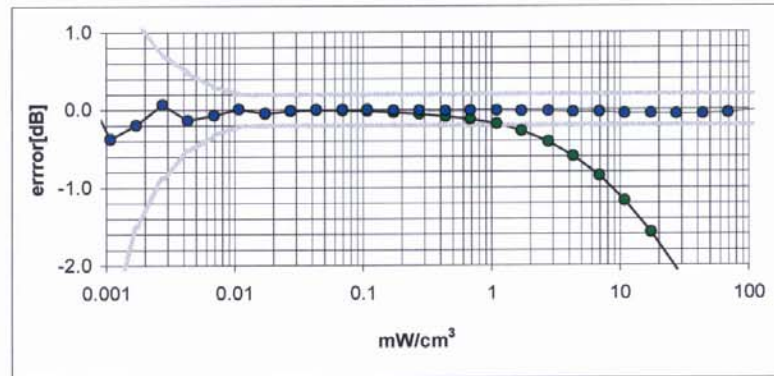
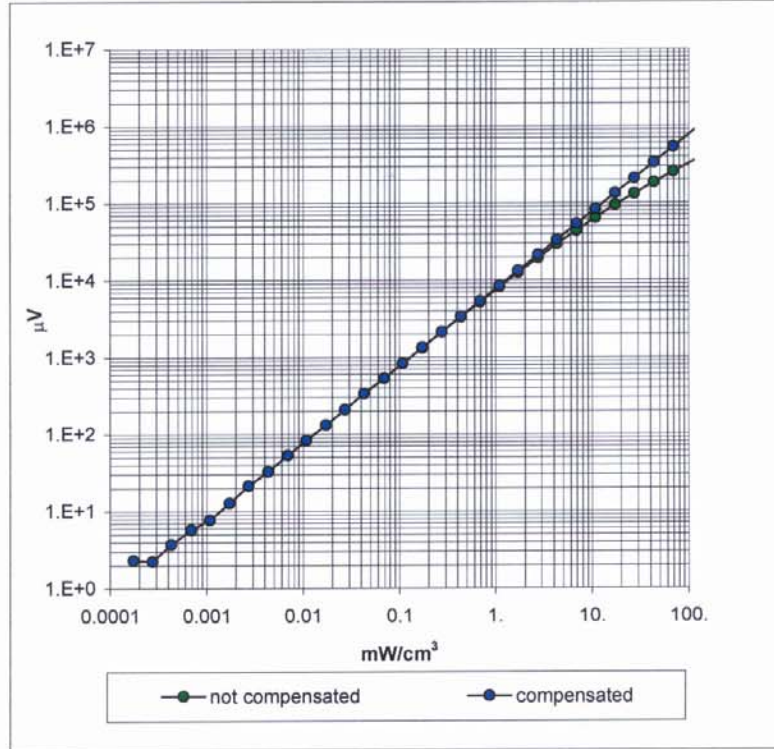


Frequency Response of E-Field

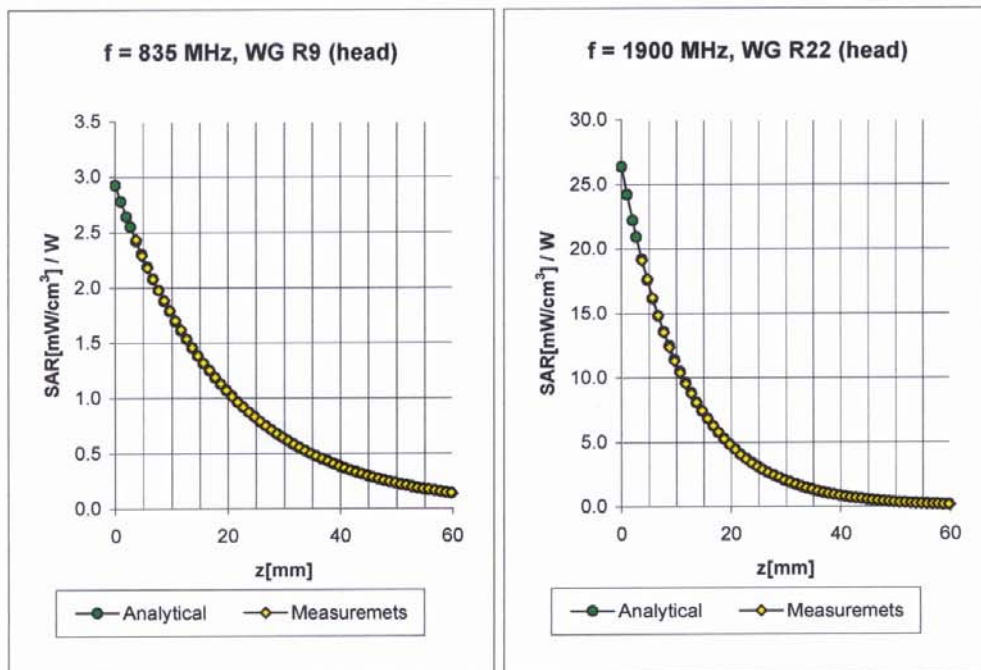
(TEM-Cell:ifi110, Waveguide R22)



Dynamic Range f(SAR_{brain}) (Waveguide R22)



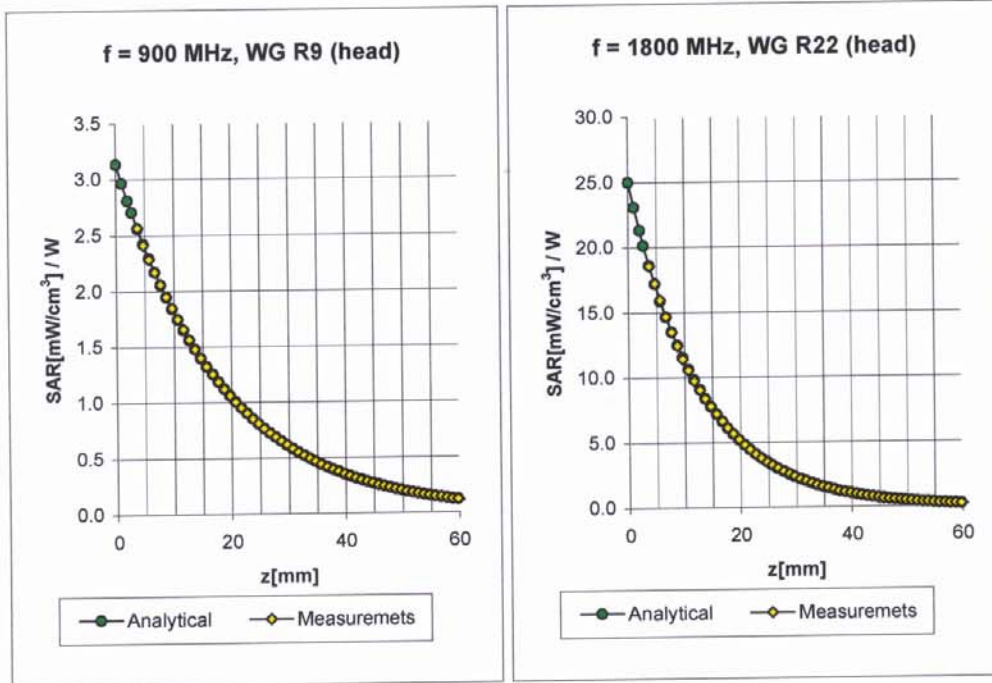
Conversion Factor Assessment



Head	835 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.90 \pm 5\% \text{ mho/m}$
	ConvF X	7.4 $\pm 8.9\%$ (k=2)	Boundary effect:
	ConvF Y	7.4 $\pm 8.9\%$ (k=2)	Alpha 0.28
	ConvF Z	7.4 $\pm 8.9\%$ (k=2)	Depth 2.79

Head	1900 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\% \text{ mho/m}$
	ConvF X	5.3 $\pm 8.9\%$ (k=2)	Boundary effect:
	ConvF Y	5.3 $\pm 8.9\%$ (k=2)	Alpha 0.49
	ConvF Z	5.3 $\pm 8.9\%$ (k=2)	Depth 2.57

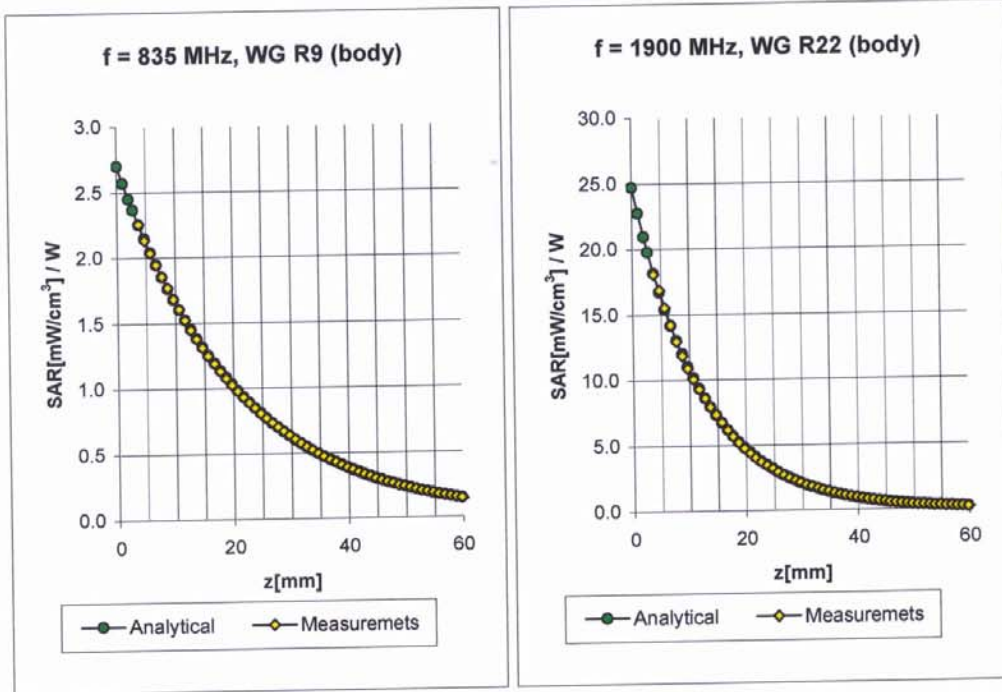
Conversion Factor Assessment



Head	900 MHz	$\epsilon_r = 41.5 \pm 5\%$	$\sigma = 0.97 \pm 5\%$ mho/m
	ConvF X	7.2 $\pm 8.9\%$ (k=2)	Boundary effect:
	ConvF Y	7.2 $\pm 8.9\%$ (k=2)	Alpha 0.30
	ConvF Z	7.2 $\pm 8.9\%$ (k=2)	Depth 2.59

Head	1800 MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\%$ mho/m
	ConvF X	5.5 $\pm 8.9\%$ (k=2)	Boundary effect:
	ConvF Y	5.5 $\pm 8.9\%$ (k=2)	Alpha 0.45
	ConvF Z	5.5 $\pm 8.9\%$ (k=2)	Depth 2.62

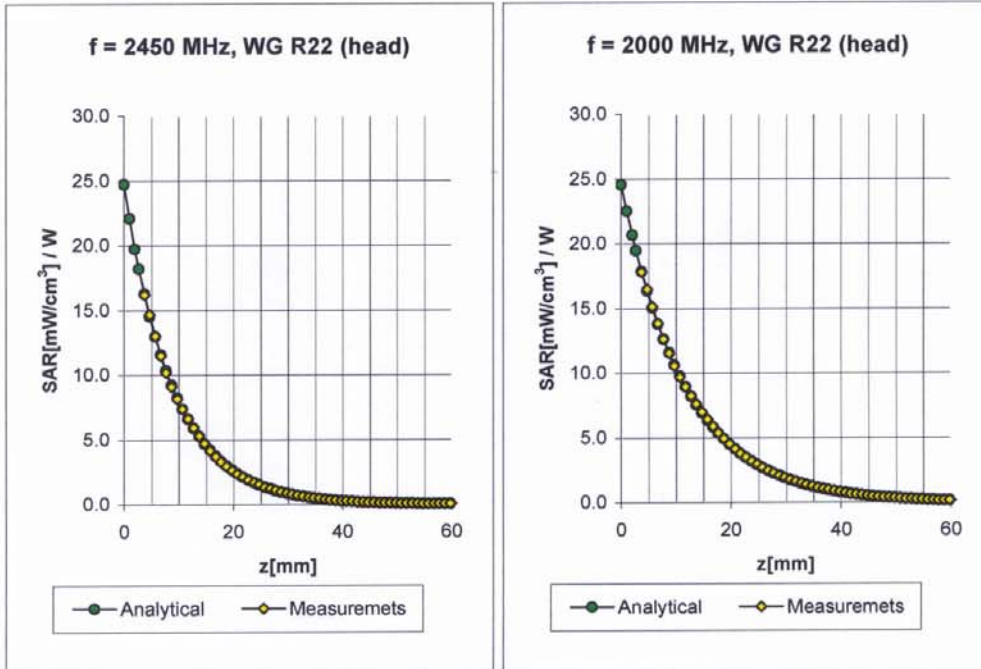
Conversion Factor Assessment



Body	835 MHz	$\epsilon_r = 55.2 \pm 5\%$	$\sigma = 0.97 \pm 5\% \text{ mho/m}$
Valid for f=800-1000 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C			
ConvF X	6.9 $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	6.9 $\pm 9.5\%$ (k=2)	Alpha	0.33
ConvF Z	6.9 $\pm 9.5\%$ (k=2)	Depth	2.50

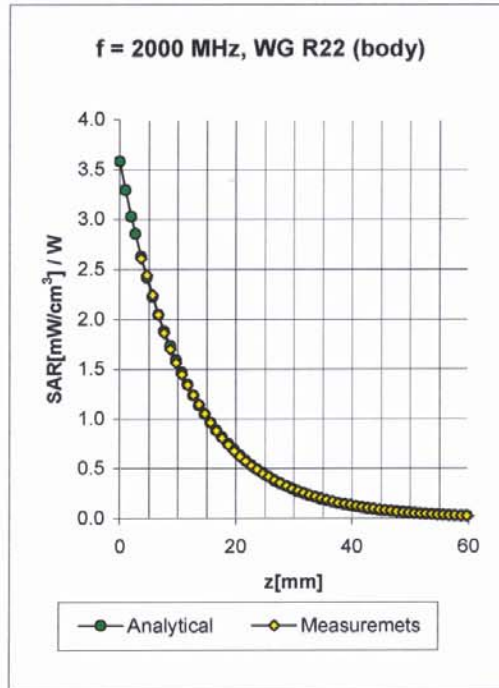
Body	1900 MHz	$\epsilon_r = 53.3 \pm 5\%$	$\sigma = 1.52 \pm 5\% \text{ mho/m}$
Valid for f=1710-1910 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C			
ConvF X	5.0 $\pm 9.5\%$ (k=2)	Boundary effect:	
ConvF Y	5.0 $\pm 9.5\%$ (k=2)	Alpha	0.56
ConvF Z	5.0 $\pm 9.5\%$ (k=2)	Depth	2.57

Conversion Factor Assessment



Head	2450	MHz	$\epsilon_r = 39.2 \pm 5\%$	$\sigma = 1.80 \pm 5\%$ mho/m
	ConvF X		5.0 $\pm 8.9\%$ (k=2)	Boundary effect:
	ConvF Y		5.0 $\pm 8.9\%$ (k=2)	Alpha 0.87
	ConvF Z		5.0 $\pm 8.9\%$ (k=2)	Depth 1.91
Head	2000	MHz	$\epsilon_r = 40.0 \pm 5\%$	$\sigma = 1.40 \pm 5\%$ mho/m
	ConvF X		5.3 $\pm 8.9\%$ (k=2)	Boundary effect:
	ConvF Y		5.3 $\pm 8.9\%$ (k=2)	Alpha 0.47
	ConvF Z		5.3 $\pm 8.9\%$ (k=2)	Depth 2.80

Conversion Factor Assessment



Body	2000 MHz	$\epsilon_r = 53.3 \pm 5\%$	$\sigma = 1.52 \pm 5\% \text{ mho/m}$
ConvF X	4.8 $\pm 8.9\%$ (k=2)	Boundary effect:	
ConvF Y	4.8 $\pm 8.9\%$ (k=2)	Alpha	0.64
ConvF Z	4.8 $\pm 8.9\%$ (k=2)	Depth	2.42

Deviation from Isotropy in HSL

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

