S-039-19

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

Client **EMC Technologies**

CALIBRATION CERTIFICATE

Object(s)	ES3DV3 - SN:3029
Calibration procedure(s)	QA CAL-01.v2 Calibration procedure for dosimetric E-field probes
Calibration date:	September 23, 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:	Niels Kuster	Quality Manager	

Date issued: October 5, 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

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Probe ES3DV3

SN:3029

Manufactured: August 18, 2003
Last calibration: September 23, 2003

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ES3DV3 SN:3029

Sensitivity in Free Space

NormX	**0.91**	$\mu V/(V/m)^2$
NormY	**1.02**	$\mu V/(V/m)^2$
NormZ	**1.04**	$\mu V/(V/m)^2$

Diode Compression

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

Sensitivity in Tissue Simulating Liquid

Body **5200 MHz** ε_r **= 53.3 ± 5%** σ **= 1.52 ± 5% mho/m**

Valid for f=4940-5460 MHz with Body Tissue Simulating Liquid according to OET65-SuppC

ConvF X	**2.05**	± 16.6% (k=2)	Boundary effect:
ConvF Y	**2.05**	± 16.6% (k=2)	Alpha **0.95**
ConvF Z	**2.05**	± 16.6% (k=2)	Depth **1.75**

Body **5800 MHz** ε_r **= 48.2 ± 5%** σ **= 6.0 ± 5% mho/m**

Valid for f=5510-6090 MHz with Body Tissue Simulating Liquid according to OET65-SuppC

ConvF X	**1.80**	± 16.6% (k=2)	Boundary effect:
ConvF Y	**1.80**	± 16.6% (k=2)	Alpha **1.10**
ConvF Z	**1.80**	± 16.6% (k=2)	Depth **1.70**

Boundary Effect

Body **5200 MHz** **Typical SAR gradient: 25 % per mm**

Probe Tip to Boundary	**1 mm**	**2 mm**
SAR_{be} [%] Without Correction Algorithm	27.8	10.0
SAR_{be} [%] With Correction Algorithm	0.1	0.0

Body **5800 MHz** **Typical SAR gradient: 30 % per mm**

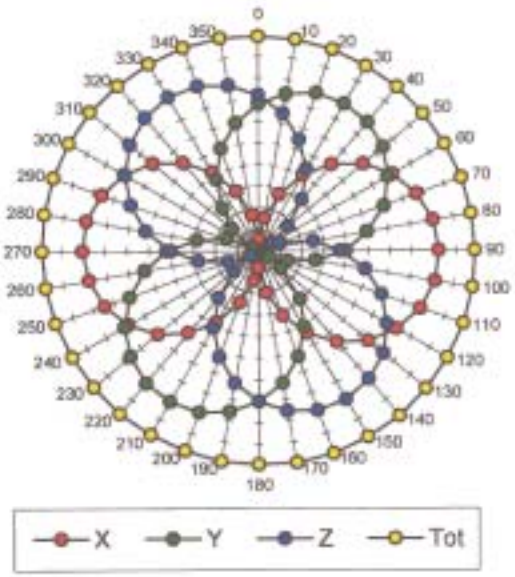
Probe Tip to Boundary	**1 mm**	**2 mm**
SAR_{be} [%] Without Correction Algorithm	30.1	10.1
SAR_{be} [%] With Correction Algorithm	0.1	0.0

Sensor Offset

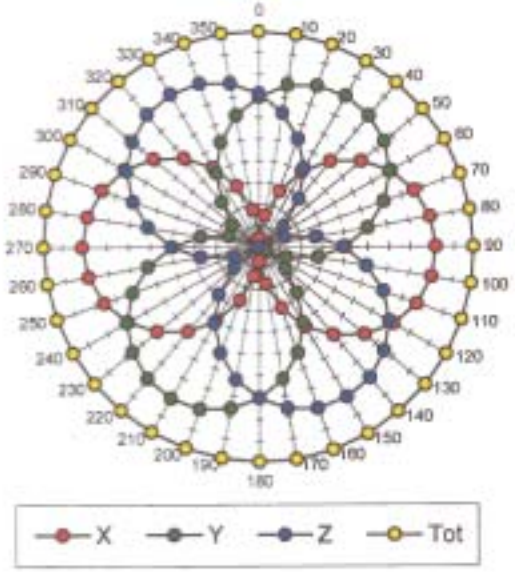
Probe Tip to Sensor Center	**2.0**	mm

Receiving Pattern (ϕ , θ = 0°

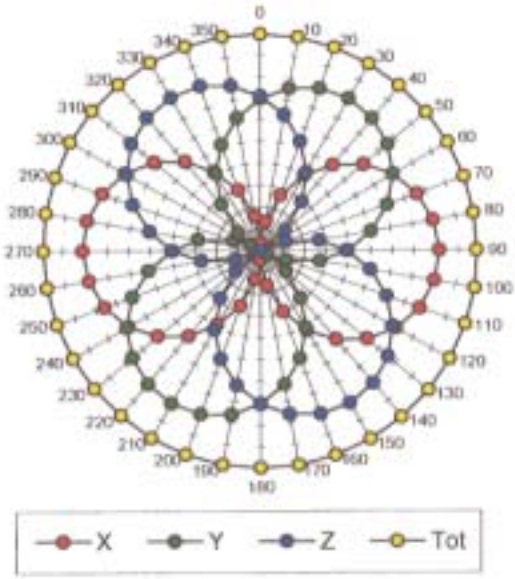
f = 30 MHz, TEM cell ifi110



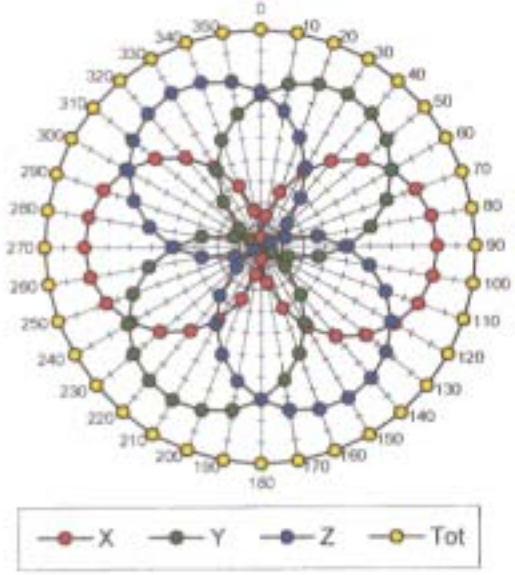
f = 100 MHz, TEM cell ifi110

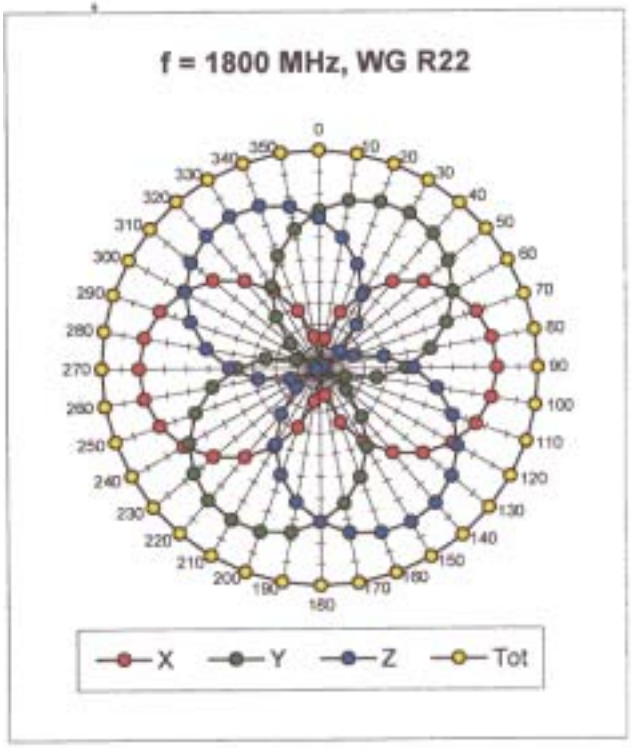


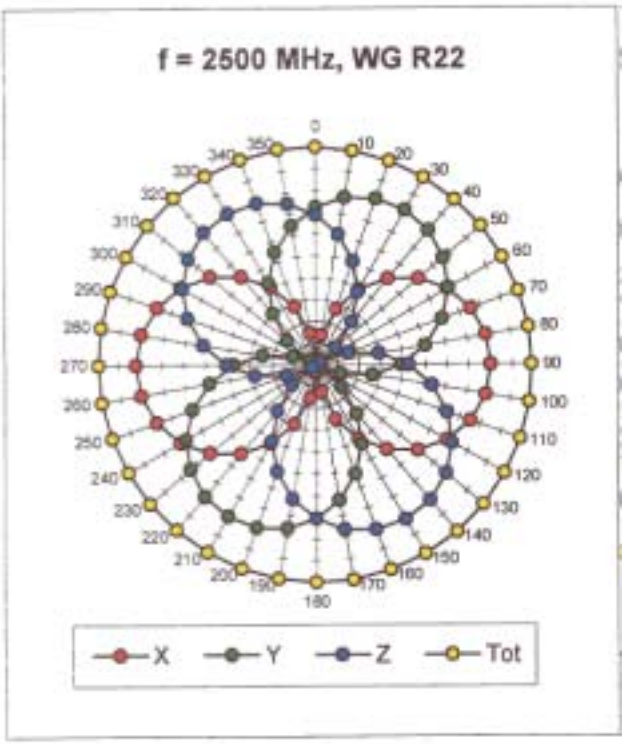
f = 300 MHz, TEM cell ifi110



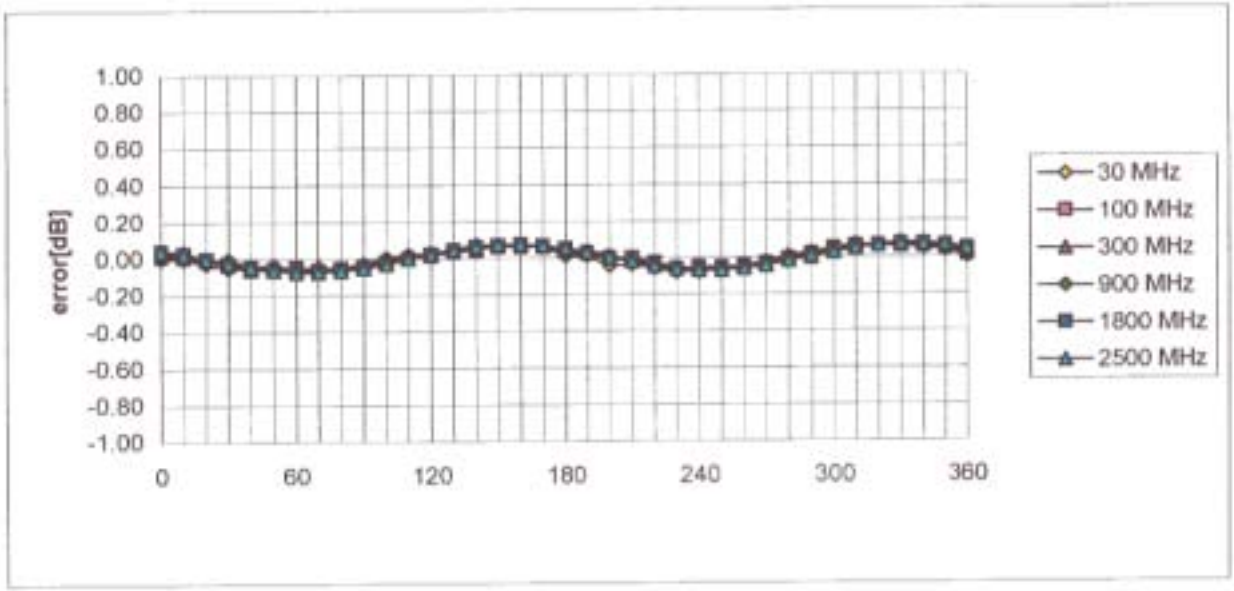
f = 900 MHz, TEM cell ifi110





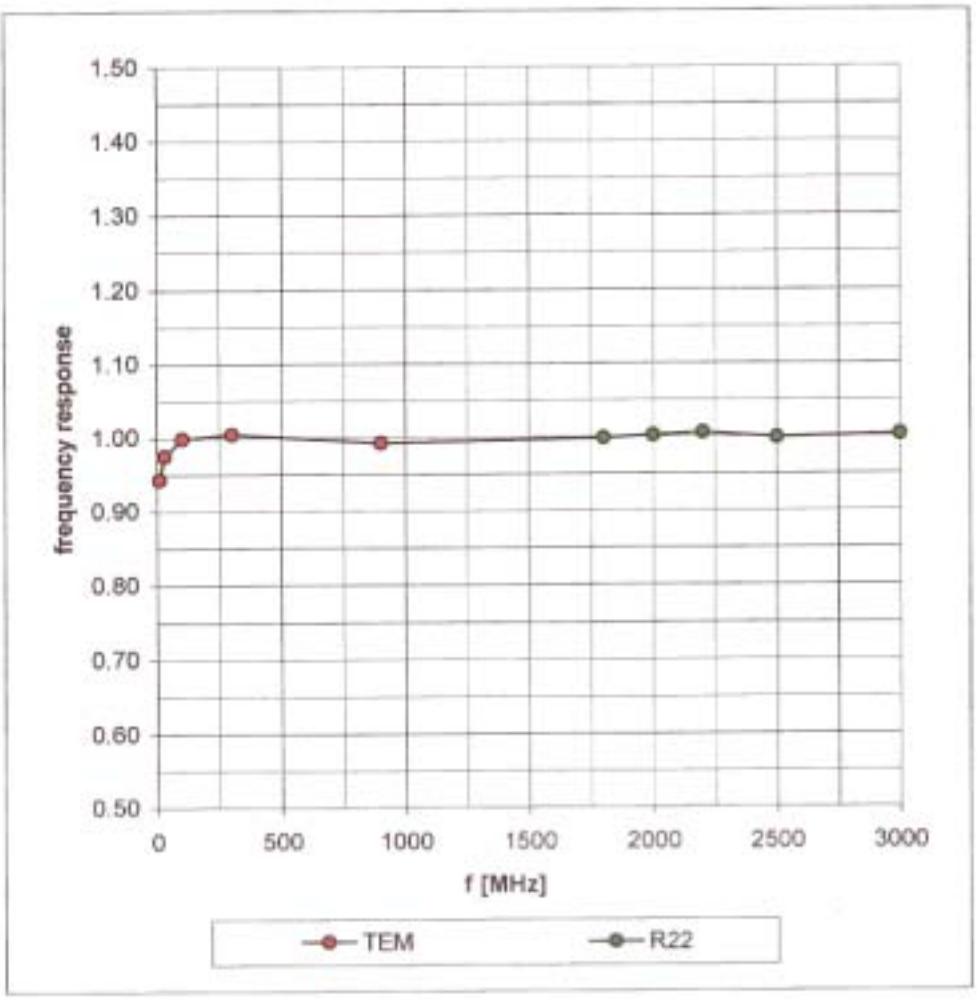


Isotropy Error (ϕ), θ = 0°



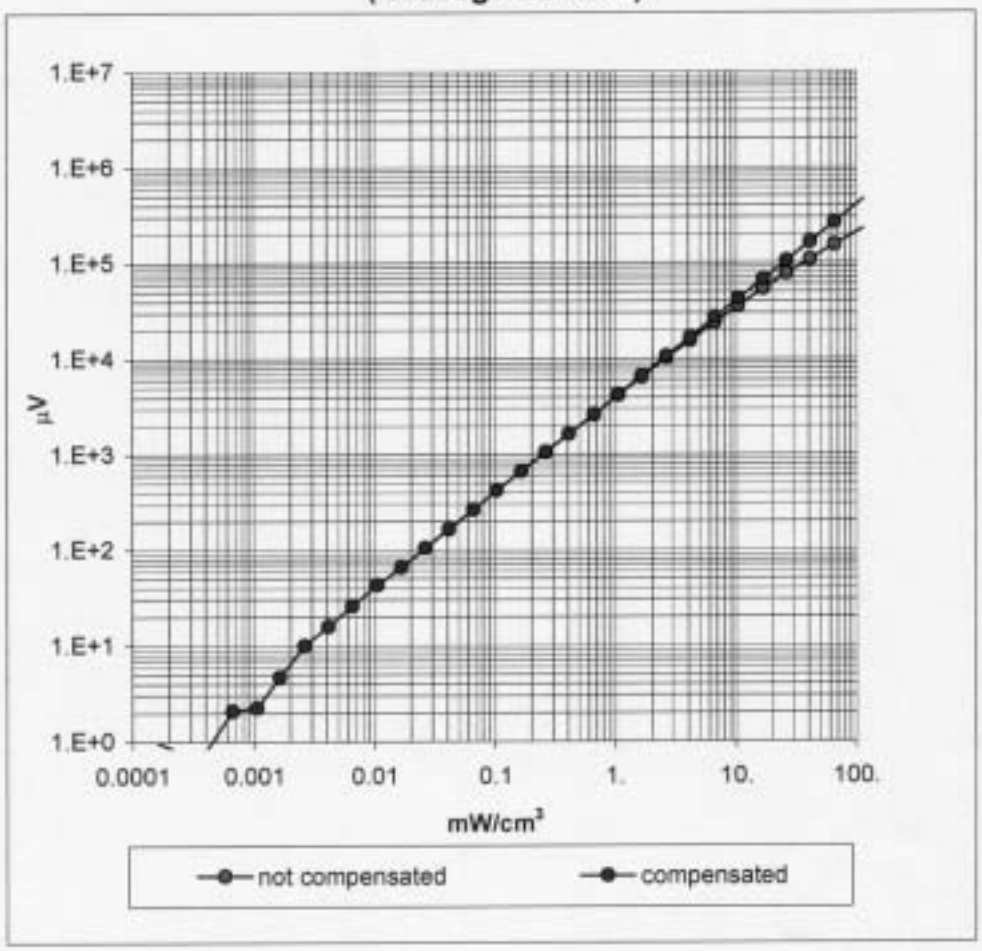
Frequency Response of E-Field

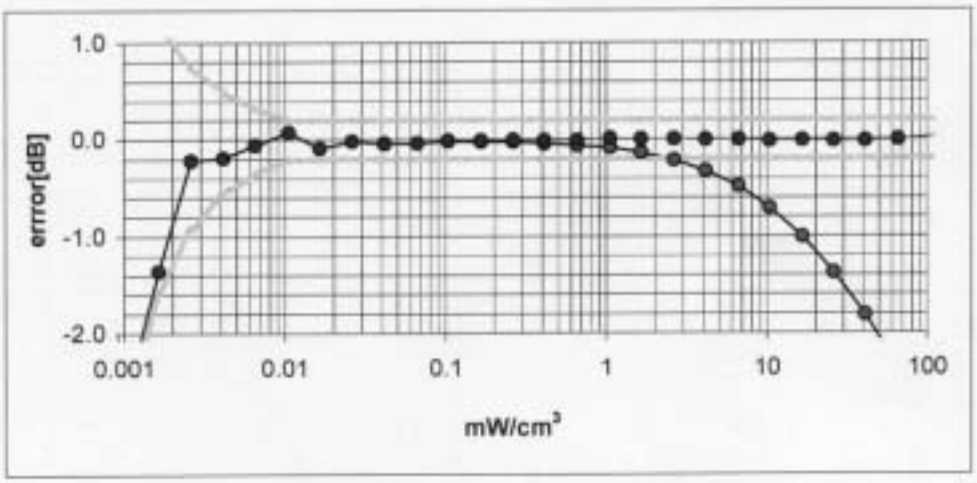
(TEM-Cell:ifi110, Waveguide R22)



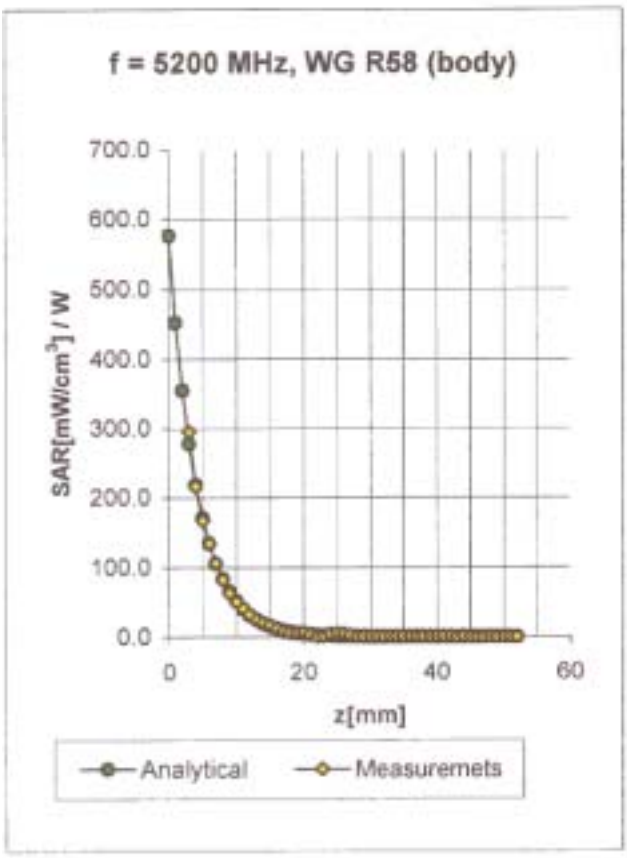
Dynamic Range f(SAR_{brain})

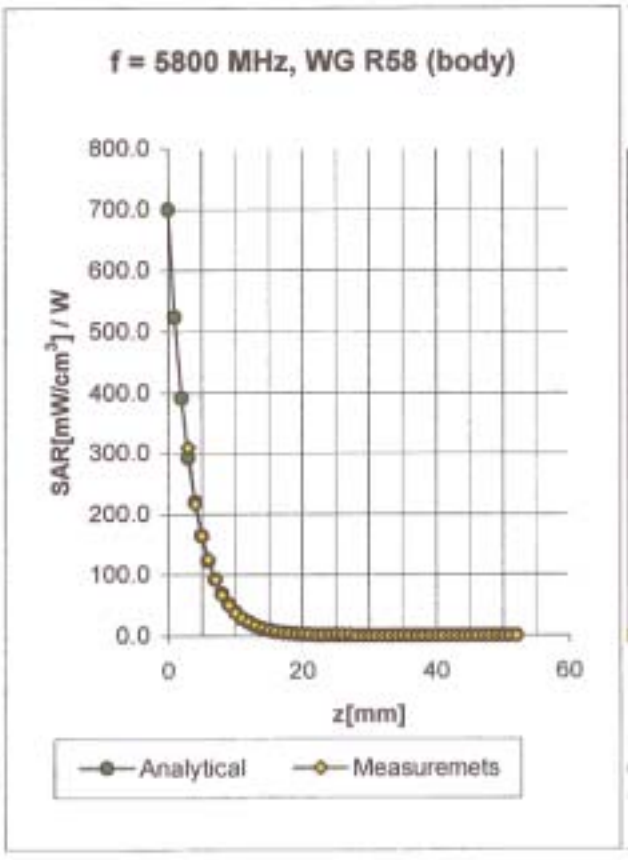
(Waveguide R22)





Conversion Factor Assessment





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Deviation from Isotropy in HSL

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