APPENDIX B - E-Field Probe Calibration Data

See attached.

Schmid & Partner
Engineering AG

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

Calibration Certificate

Dosimetric E-Field Probe

Type:	ET3DV6
Serial Number:	1576
Place of Calibration:	Zurich
Date of Calibration:	February 27, 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: [signature]

Approved by: [signature]

Schmid & Partner
Engineering AG

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

Probe ET3DV6

SN:1576

Manufactured:	April 6, 2001
Last calibration:	April 20, 2001
Recalibrated:	February 27, 2002

Calibrated for System DASY3

DASY3 - Parameters of Probe: ET3DV6 SN:1576

Sensitivity in Free Space

NormX	**1.77**	$\mu V/(V/m)^2$
NormY	**1.81**	$\mu V/(V/m)^2$
NormZ	**1.76**	$\mu V/(V/m)^2$

Diode Compression

DCP X	**98**	mV
DCP Y	**98**	mV
DCP Z	**98**	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	**7.0**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**7.0**	± 9.5% (k=2)	Alpha	**0.30**
ConvF Z	**7.0**	± 9.5% (k=2)	Depth	**2.51**

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	**5.4**	± 9.5% (k=2)	Boundary effect:	
ConvF Y	**5.4**	± 9.5% (k=2)	Alpha	**0.45**
ConvF Z	**5.4**	± 9.5% (k=2)	Depth	**2.30**

Boundary Effect

Head 900 MHz Typical SAR gradient: 5 % per mm

Probe Tip to Boundary	**1 mm**	**2 mm**
SAR_{be} [%] Without Correction Algorithm	7.6	4.3
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	9.7	6.6
SAR_{be} [%] With Correction Algorithm	0.2	0.3

Sensor Offset

Probe Tip to Sensor Center	**2.7**	mm
Optical Surface Detection	**1.9 ± 0.2**	mm

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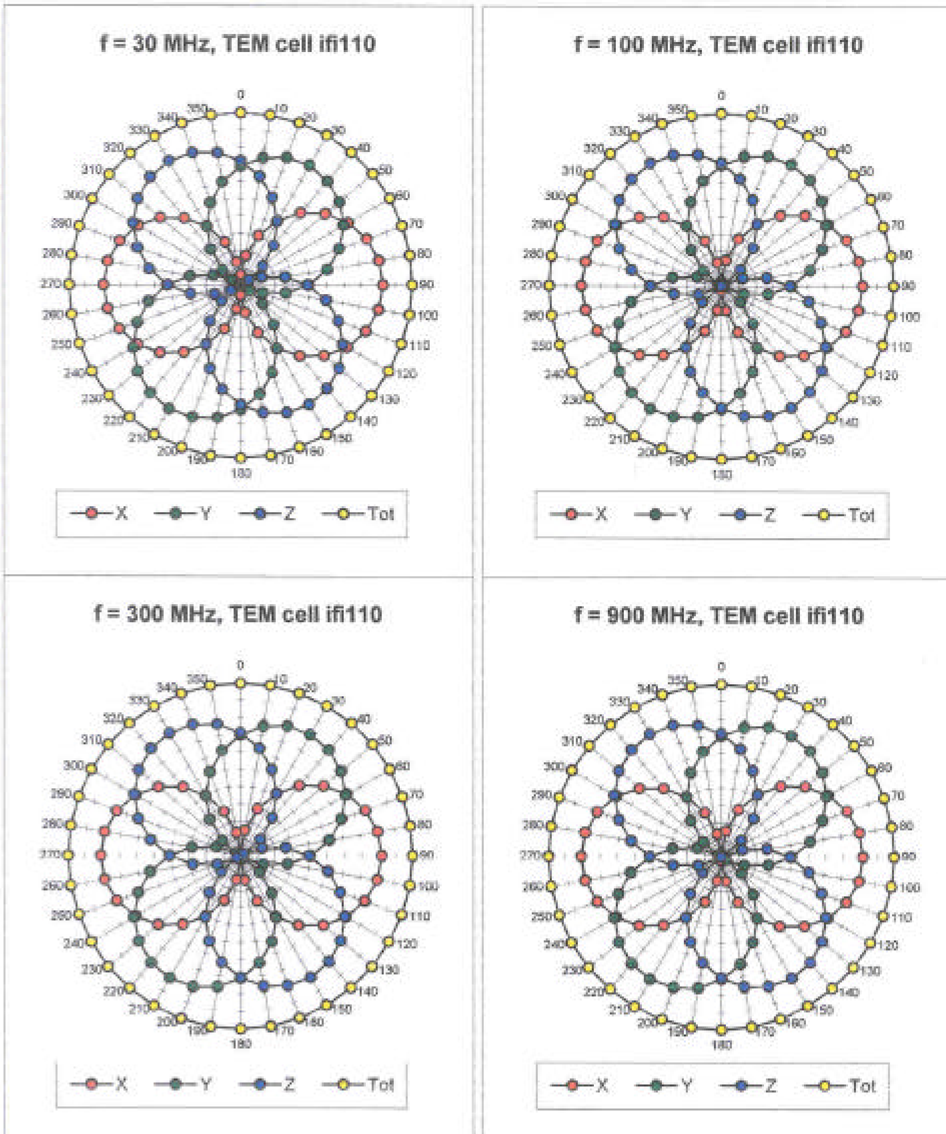
Receiving Pattern (ϕ), θ = 0°



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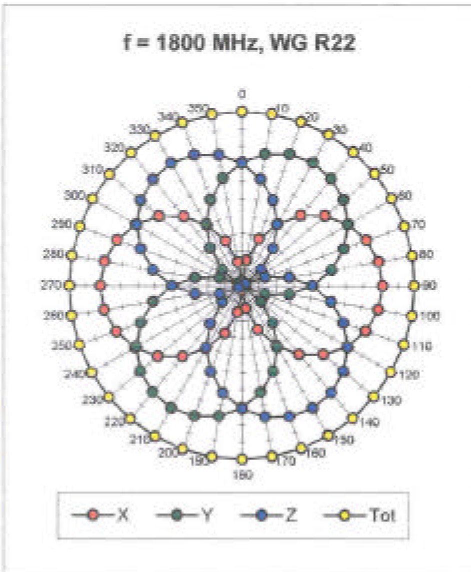
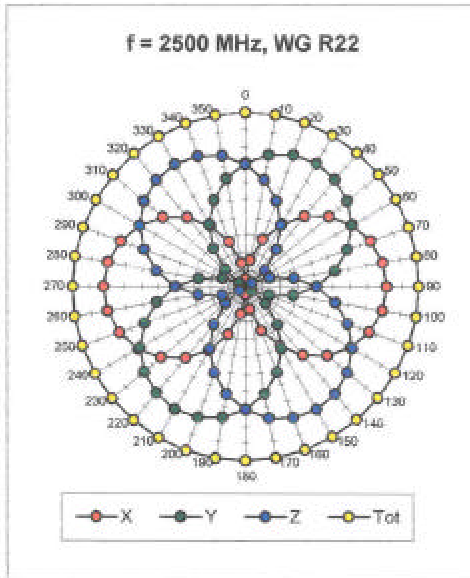
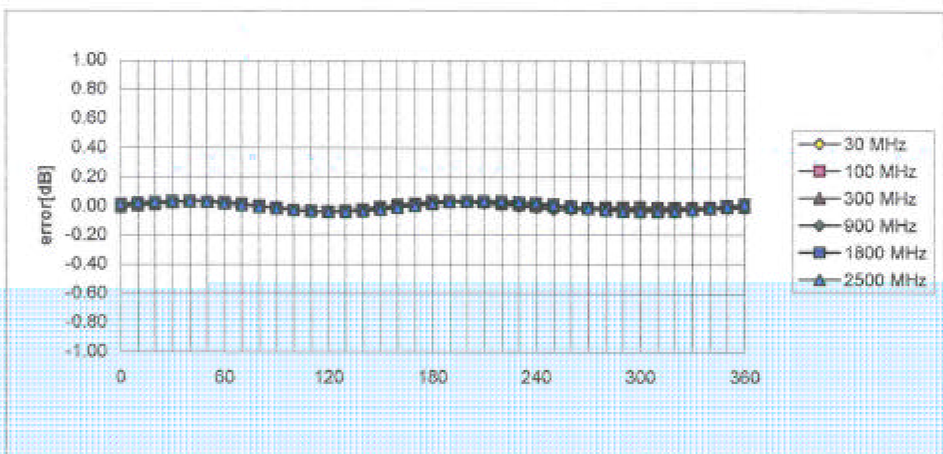




Isotropy Error (ϕ), θ = 0°



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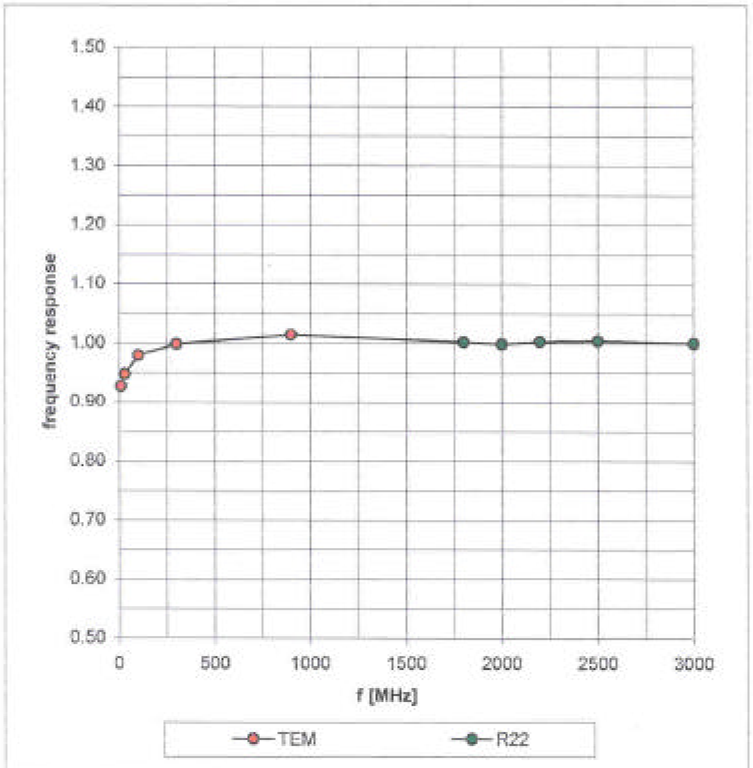
Frequency Response of E-Field

(TEM-Cell:ifi110, Waveguide R22)



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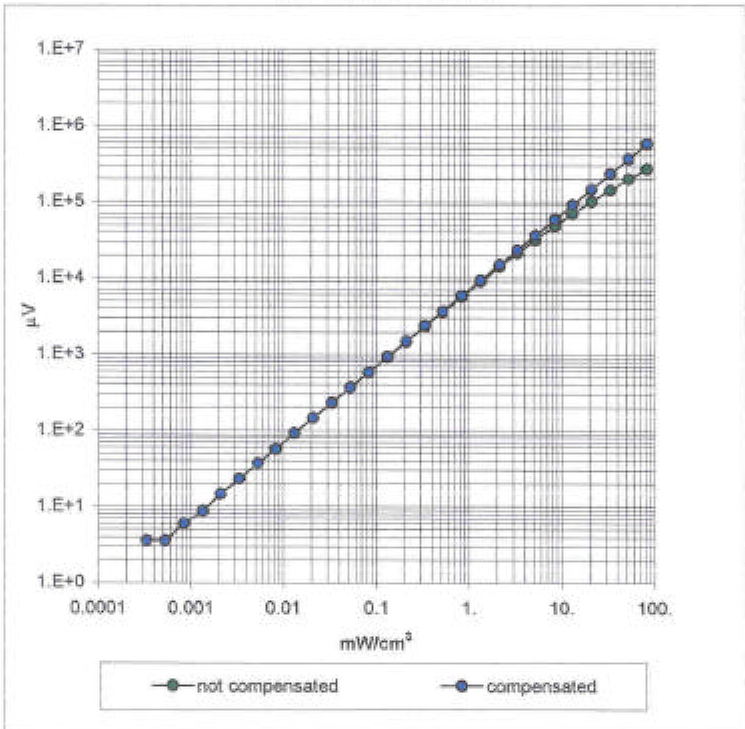
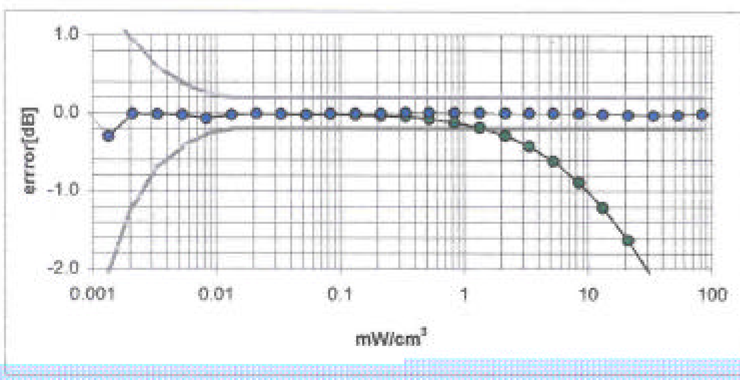
Dynamic Range f(SAR_{brain})

(Waveguide R22)





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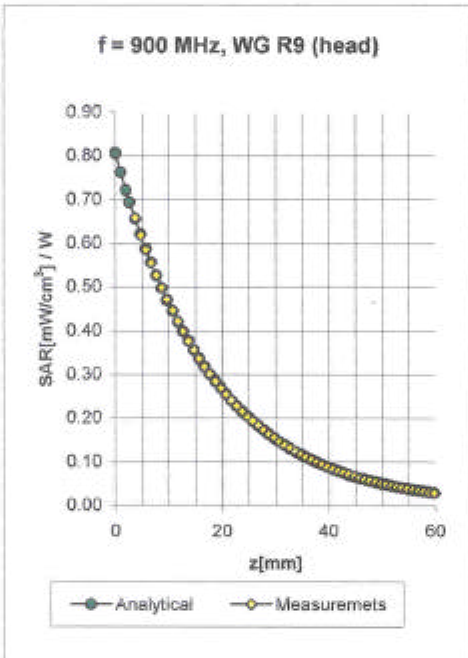
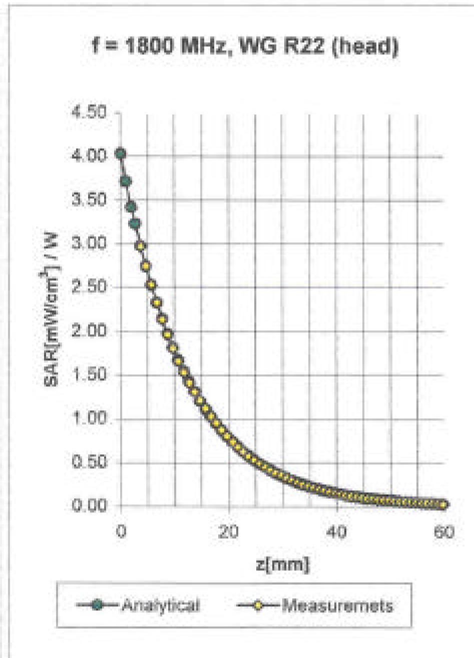
Conversion Factor Assessment





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	7.0	± 9.5% (k=2)	Boundary effect:	
	ConvF Y	7.0	± 9.5% (k=2)	Alpha	0.30
	ConvF Z	7.0	± 9.5% (k=2)	Depth	2.51

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	5.4	± 9.5% (k=2)	Boundary effect:	
	ConvF Y	5.4	± 9.5% (k=2)	Alpha	0.45
	ConvF Z	5.4	± 9.5% (k=2)	Depth	2.30

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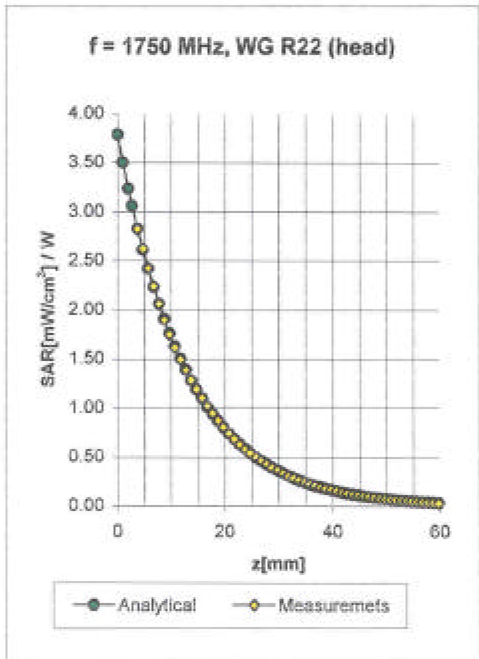
Conversion Factor Assessment



Head	1750 MHz	ε_r = 40.0 ± 5%	σ = 1.40 ± 5% mho/m

ConvF X	**5.4** ± 8.9% (k=2)		Boundary effect:	
ConvF Y	**5.4** ± 8.9% (k=2)		Alpha	**0.45**
ConvF Z	**5.4** ± 8.9% (k=2)		Depth	**2.27**

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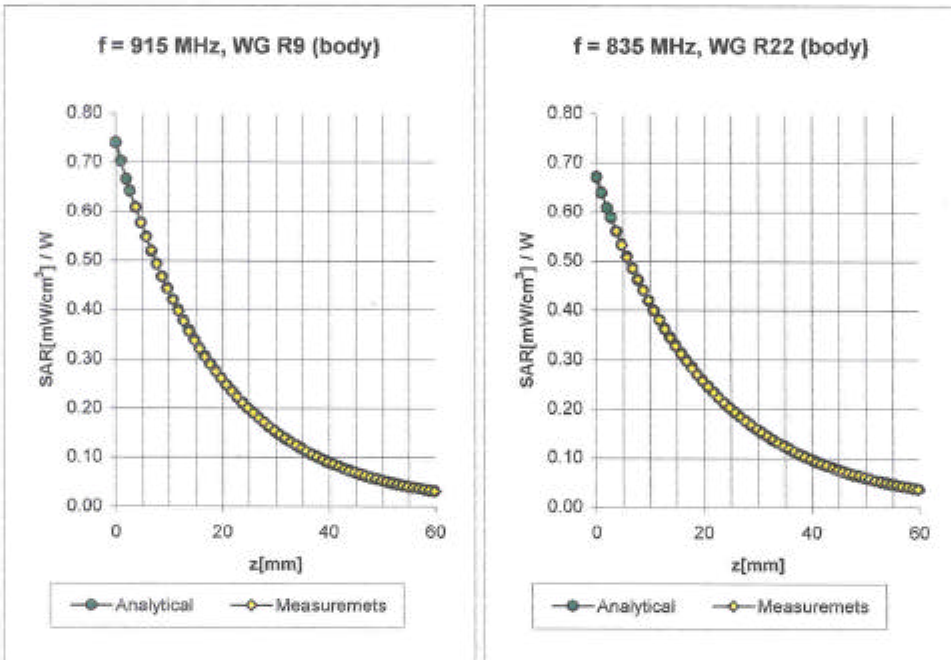
Conversion Factor Assessment

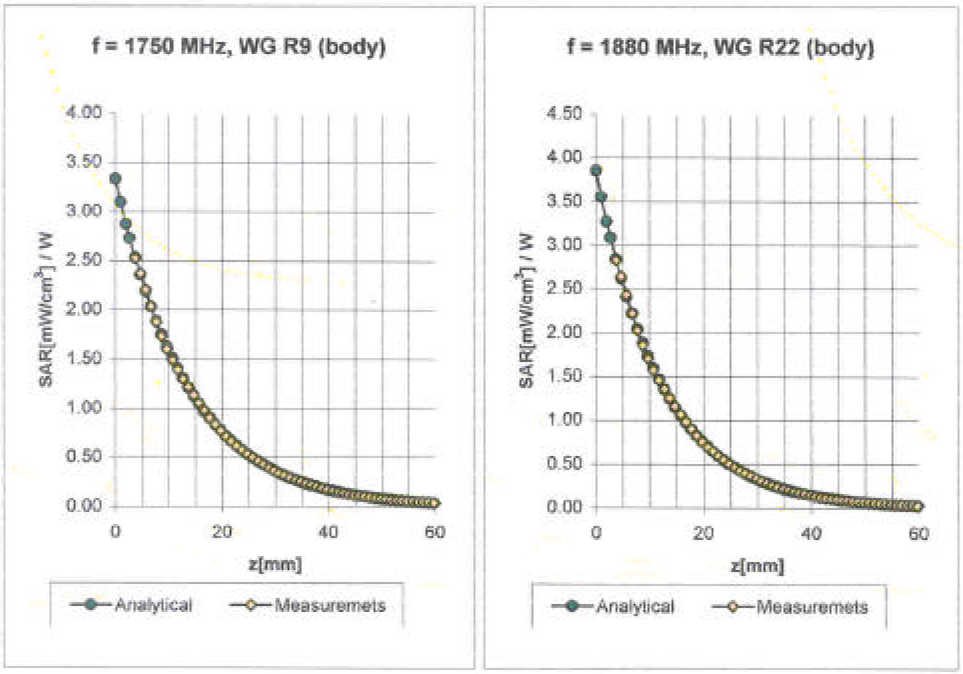


Body	**915 MHz**	ε_r = **55.0 ± 5%**	σ = **1.06 ± 5% mho/m**	
ConvF X	**6.7** ± 8.9% (k=2)		Boundary effect:	
ConvF Y	**6.7** ± 8.9% (k=2)		Alpha	**0.45**
ConvF Z	**6.7** ± 8.9% (k=2)		Depth	**2.01**

Body	**835 MHz**	ε_r = **55.2 ± 5%**	σ = **0.97 ± 5% mho/m**	
ConvF X	**6.7** ± 8.9% (k=2)		Boundary effect:	
ConvF Y	**6.7** ± 8.9% (k=2)		Alpha	**0.34**
ConvF Z	**6.7** ± 8.9% (k=2)		Depth	**2.37**

ET3DV6 SN:1576 **February 27, 2002**

Conversion Factor Assessment



Body	1750 MHz	ε_r = 53.3 ± 5%	σ = 1.52 ± 5% mho/m	
ConvF X	**5.1** ± 8.9% (k=2)		Boundary effect:	
ConvF Y	**5.1** ± 8.9% (k=2)		Alpha	**0.51**
ConvF Z	**5.1** ± 8.9% (k=2)		Depth	**2.31**

Body	1880 MHz	ε_r = 53.3 ± 5%	σ = 1.52 ± 5% mho/m	
ConvF X	**4.8** ± 8.9% (k=2)		Boundary effect:	
ConvF Y	**4.8** ± 8.9% (k=2)		Alpha	**0.63**
ConvF Z	**4.8** ± 8.9% (k=2)		Depth	**2.10**

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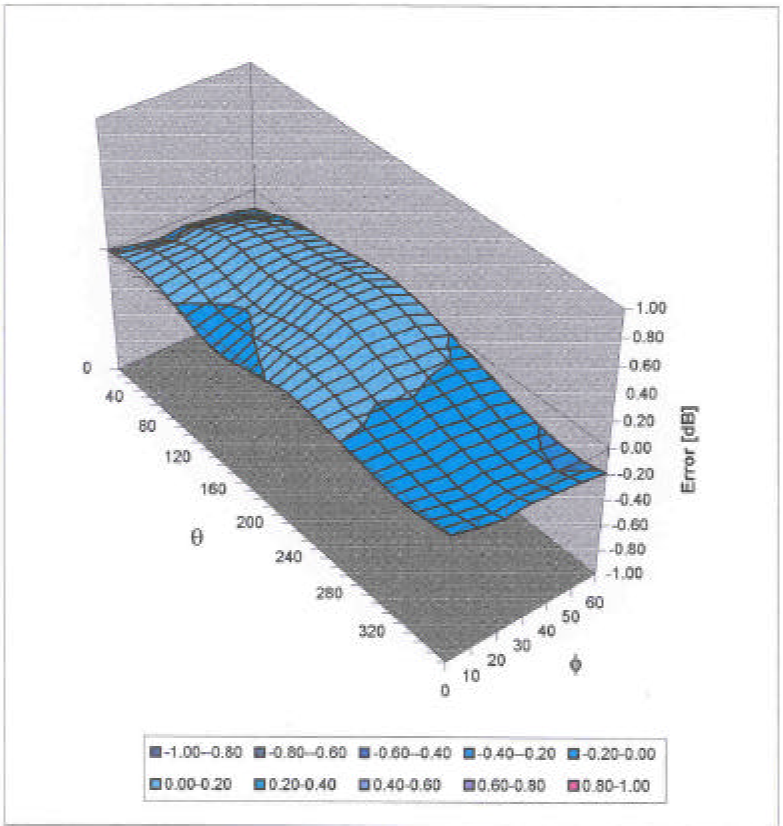
Deviation from Isotropy in HSL

Error (θ,φ), f = 900 MHz



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APPENDIX C – Calibration Certificate, 1800 MHz Dipole

See attached.

Schmid & Partner
Engineering AG

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

Calibration Certificate

1800 MHz System Validation Dipole

Type:	D1800V2
Serial Number:	224
Place of Calibration:	Zurich
Date of Calibration:	September 23, 2001
Calibration Interval:	24 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:

**Schmid & Partner
Engineering AG**

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

DASY

Dipole Validation Kit

Type: D1800V2

Serial: 224

Manufactured: January 15, 1998
Calibrated: September 23, 2001

1. Measurement Conditions

The measurements were performed in the flat section of the new generic twin phantom filled with head simulating glycol solution of the following electrical parameters at 1800 MHz:

Relative Dielectricity	**40.2**	± 5%
Conductivity	**1.38 mho/m**	± 5%

The DASY3 System (Software version 3.1c) with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 5.57 at 1800 MHz) was used for the measurements.

The dipole was mounted on the small tripod so that the dipole feedpoint was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10mm from dipole center to the solution surface. The included distance holder was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 15mm was aligned with the dipole. The 5x5x7 fine cube was chosen for cube integration. Probe isotropy errors were cancelled by measuring the SAR with normal and 90° turned probe orientations and averaging.
The dipole input power (forward power) was 250mW ± 3 %. The results are normalized to 1W input power.

2. SAR Measurement

Standard SAR-measurements were performed with the phantom according to the measurement conditions described in section 1. The results have been normalized to a dipole input power of 1W (forward power). The resulting averaged SAR-values are:

averaged over 1 cm^3 (1 g) of tissue:	**39.04 mW/g**
averaged over 10 cm^3 (10 g) of tissue:	**20.36 mW/g**

Note: If the liquid parameters for validation are slightly different from the ones used for initial calibration, the SAR-values will be different as well. The estimated sensitivities of SAR-values and penetration depths to the liquid parameters are listed in the DASY Application Note 4: 'SAR Sensitivities'.

3. Dipole Impedance and Return Loss

The impedance was measured at the SMA-connector with a network analyzer and numerically transformed to the dipole feedpoint. The transformation parameters from the SMA-connector to the dipole feedpoint are:

Electrical delay:	**1.217 ns**	(one direction)
Transmission factor:	**0.998**	(voltage transmission, one direction)

The dipole was positioned at the flat phantom sections according to section 1 and the distance holder was in place during impedance measurements.

Feedpoint impedance at 1800 MHz:	Re{Z} = **47.5 Ω**
	Im {Z} = **-6.5 Ω**
Return Loss at 1800 MHz	**-22.9 dB**

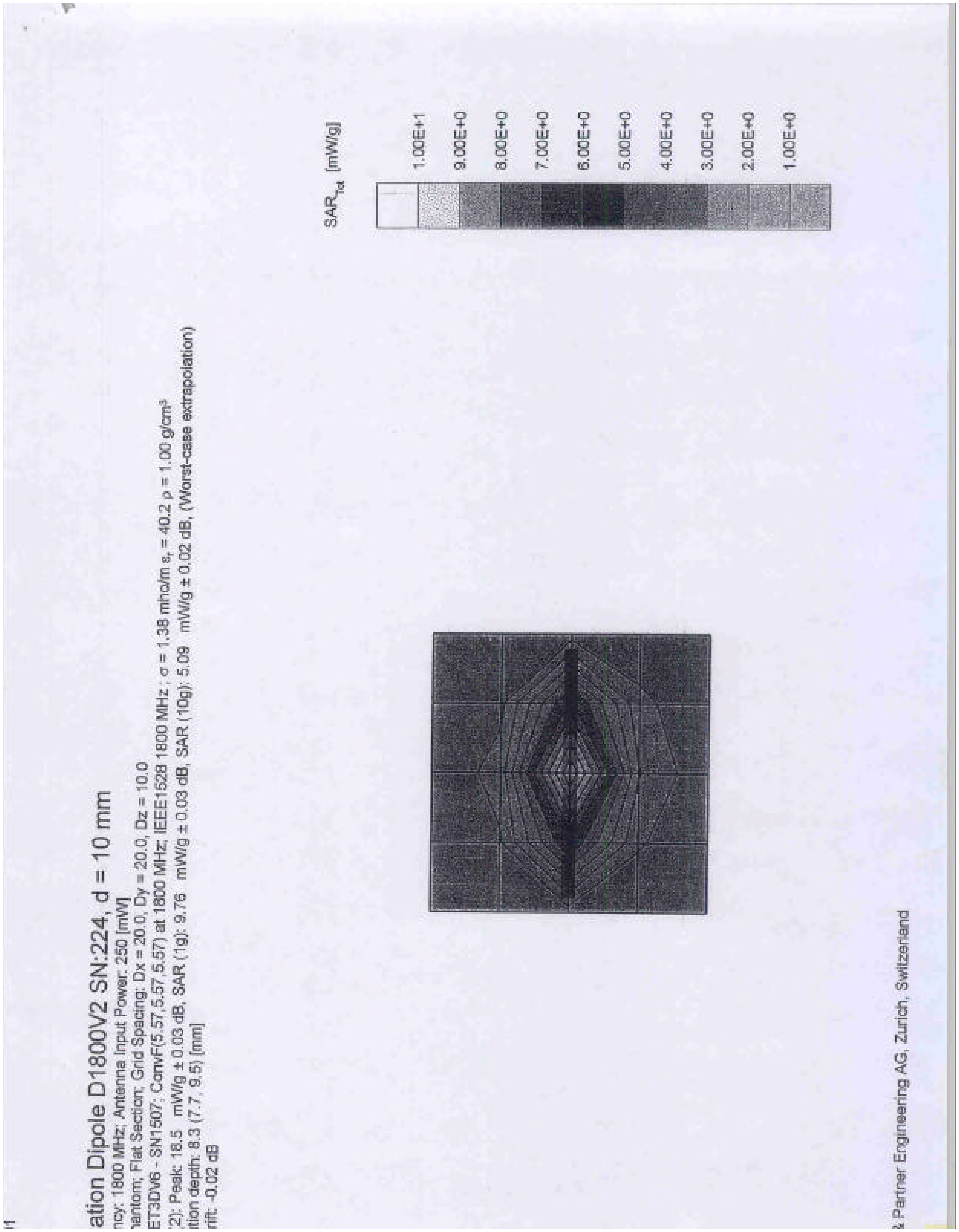
4. Handling

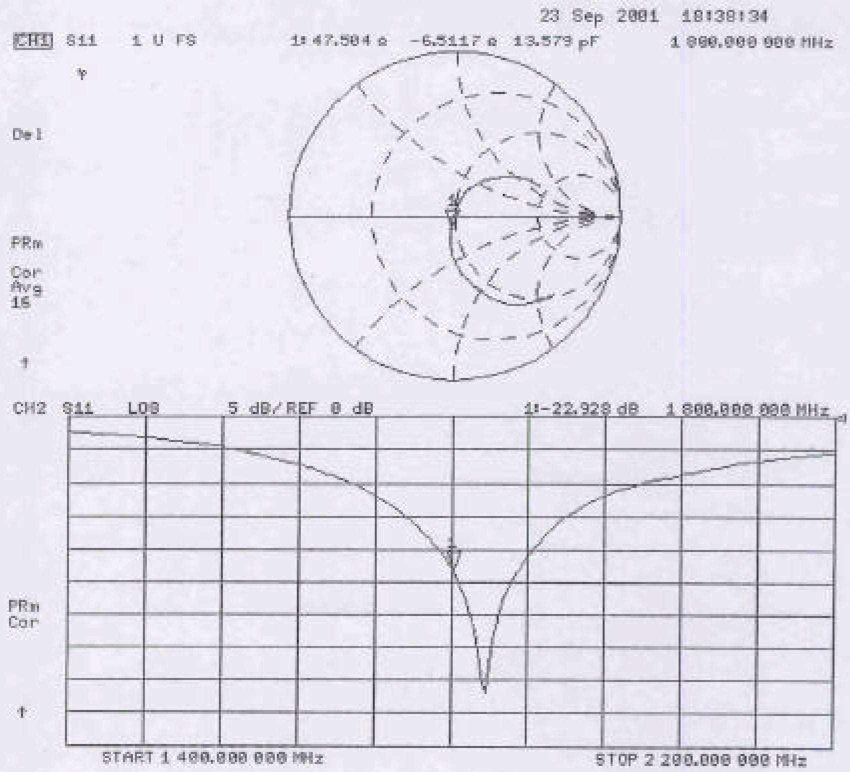
The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

Do not apply excessive force to the dipole arms, because they might bend. If the dipole arms have to be bent back, take care to release stress to the soldered connections near the feedpoint; they might come off.

After prolonged use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

Chi Mei Communications Systems, Inc, Model No: EDS01 Date of Test: March 21 to 22, 2002
FCC ID: QDJ-200205ED01




23 Sep 2001 18:38:34
CH1 S11 1 U FS 1: 47.504 Ω -6.5117 Ω 13.579 pF 1 800.000 000 MHz
Del
PRm
Cor
Avg
16
CH2 S11 LOG 5 dB/ REF 0 dB 1:-22.928 dB 1 800.000 000 MHz
PRm
Cor
START 1 400.000 000 MHz
STOP 2 200.000 000 MHz