CERTIFICATE OF COMPLIANCE
SAR EVALUATION

Test Lab:	**Applicant Information:**
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FCC Rule Part(s):	**2.1093; ET Docket 96-326**
FCC ID:	**MIVCFS0100PS2C**
Model Name:	**Pocket Spider IIc**
Model No.:	**CFS0100**
EUT Type(s):	**CDPD Wireless Data Modem Module for Sharp SL5000 PDA**
Equipment Classification:	**Licensed Non-Broadcast Station Transmitter (TNB)**
Modulation:	**GMSK**
Tx Frequency Range(s):	**824.04 - 848.97 MHz**
Rated RF Conducted Power:	**28.5 dBm**
Antenna Type(s):	**Fixed Stubby**

Celltech Research Inc. declares under its sole responsibility that this device was found to be in compliance with the Specific Absorption Rate (SAR) RF exposure requirements specified in OET Bulletin 65, Supplement C, Edition 01-01 (uncontrolled exposure / general population), and was tested in accordance with the appropriate measurement standards, guidelines, and recommended practices specified in American National Standards Institute C95.1-1992.

I attest to the accuracy of data. All measurements were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

This test report shall not be reproduced partially, or in full, without the prior written approval of Celltech Research Inc.
The results and statements contained in this report pertain only to the device(s) evaluated.

Shawn McMillen
General Manager
Celltech Research Inc.

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1.0 INTRODUCTION

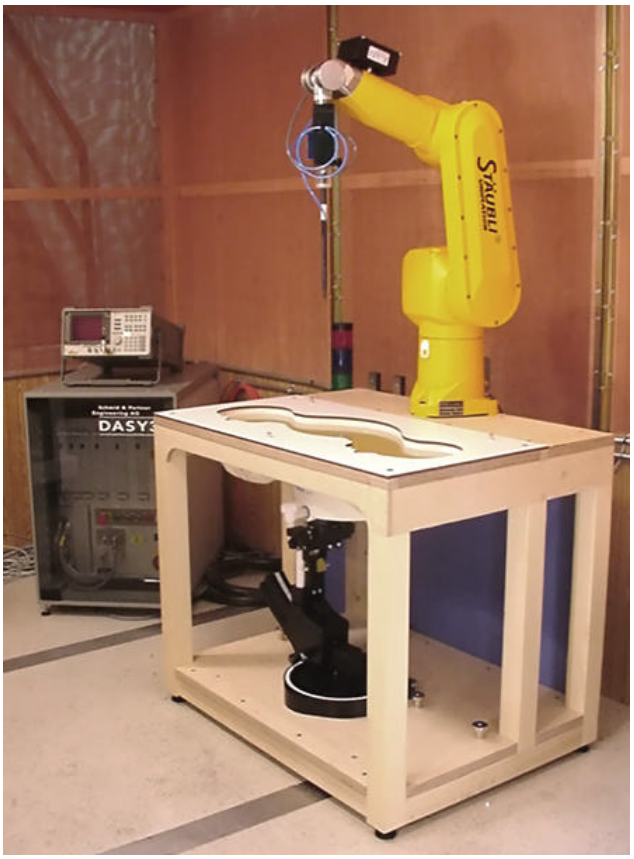
This measurement report shows that the ENFORA INC. Pocket Spider IIc CDPD Wireless Data Modem Module FCC ID: MIVCFS0100PS2C for Sharp SL5000 Handheld PDA complies with the regulations and procedures specified in FCC Rule Part 2.1093, ET Docket 96-326 for mobile and portable devices. The test procedures, as described in American National Standards Institute C95.1-1992 (See Reference [1]), and FCC OET Bulletin 65, Supplement C, Edition 01-01 (See Reference [2]) were employed. A description of the product, operating configuration, detailed summary of the test results, methodology and procedures used in the evaluation, equipment used, and the various provisions of the rules are included within this test report.

2.0 DESCRIPTION of Equipment Under Test (EUT)

Rule Part(s)	FCC 2.1093; ET Docket 96-326
Equipment Classification	Licensed Non-Broadcast Station Transmitter (TNB)
EUT Type	CDPD Wireless Data Modem Module for Sharp SL5000 Handheld PDA
FCC ID	MIVCFS0100PS2C
Model Name	Pocket Spider IIc
Model No.	CFS0100
Serial No.	Pre-production
Modulation	GMSK
Tx Frequency Range	824.04 - 848.97 MHz
Rated RF Conducted Output Power	28.5 dBm
Antenna Type(s)	Fixed Stubby
Battery Type	3.7V 550mAH Lithium-ion

3.0 SAR MEASUREMENT SYSTEM

Celltech Research SAR measurement facility utilizes the Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland. The DASY system is comprised of the robot controller, computer, near-field probe, probe alignment sensor, specific anthropomorphic mannequin (SAM) phantom, and various planar phantoms for brain or body SAR evaluations. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF). A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and remote control, is used to drive the robot motors. The Staubli robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card. The DAE3 utilizes a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16-bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe-mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.



DASY3 SAR Measurement System with SAM phantom

4.0 MEASUREMENT SUMMARY

The measurement results were obtained with the EUT tested in the conditions described in this report. Detailed measurement data and plots showing the maximum SAR location of the EUT are reported in Appendix A, and the detailed SAR test setup photographs are shown in Appendix F.

Body SAR Measurement Results

Freq. (MHz)	Channel	Mode	Cond. Power Before (dBm)	Cond. Power After (dBm)	EUT Position	Separation Distance (cm)	SAR 1g (w/kg)
824.04	991	CW	28.4	28.2	Front of EUT	0.0	0.892
836.49	383	CW	28.1	28.0	Front of EUT	0.0	1.02
848.97	799	CW	27.6	27.4	Front of EUT	0.0	0.759
824.04	991	CW	28.4	28.3	Back of EUT	1.0	0.957
836.49	383	CW	28.1	28.0	Back of EUT	1.0	0.933
848.97	799	CW	27.6	27.5	Back of EUT	1.0	0.720
824.04	991	CW	28.4	28.3	Left Side of EUT (antenna side)	0.5	0.793
836.49	383	CW	28.1	28.0	Left Side of EUT (antenna side)	0.5	0.699
848.97	799	CW	27.6	27.4	Left Side of EUT (antenna side)	0.5	0.451
Mixture Type: Body Dielectric Constant: 54.5 Conductivity: 0.97 (Measured)			**ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak - Uncontrolled Exposure / General Population BODY: 1.6 W/kg (averaged over 1 gram)**				

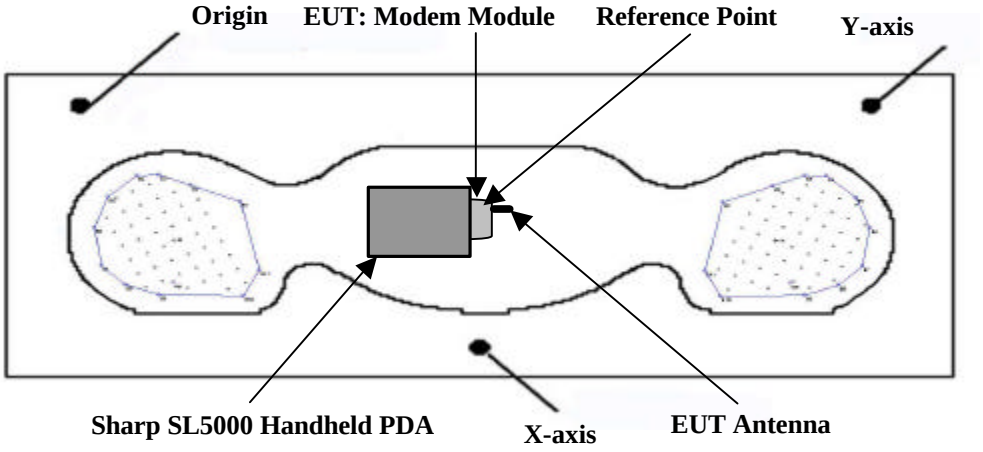
Notes:

1. The body SAR values measured were below the maximum limit of 1.6 w/kg (averaged over 1 gram).
2. The highest body SAR value measured was 1.02 w/kg (front of EUT, mid-channel).
3. The EUT was tested for body SAR with the front of the EUT placed parallel to the outer surface of the planar phantom, and the front of the Sharp SL5000 PDA touching the outer surface of the planar phantom.
4. The EUT was tested for body SAR with the back of the EUT placed parallel to the outer surface of the planar phantom. A 1.0 cm separation distance was maintained between the back of the EUT and the outer surface of the planar phantom.
5. The EUT was tested for body SAR with the left side of the EUT (antenna side) placed parallel to the outer surface of the planar phantom. A 0.5 cm separation distance was maintained between the left side of the Sharp SL5000 PDA and the outer surface of the planar phantom.
6. Ambient TEMPERATURE: 24.4 °C
   Relative HUMIDITY: 31 %
   Atmospheric PRESSURE: 101.93 kPa
   Fluid TEMPERATURE: ˜ 23.0 °C
7. During the entire test the conducted power was maintained to within 5% of the initial conducted power.

5.0 DETAILS OF SAR EVALUATION

The ENFORA INC. Pocket Spider IIc CDPD Wireless Data Modem Module FCC ID: MIVCFS0100PS2C for Sharp SL5000 Handheld PDA was found to be compliant for localized Specific Absorption Rate based on the following test provisions and conditions:

1. The EUT was tested for body SAR with the front of the modem module placed parallel to the outer surface of the planar phantom. The front of the Sharp SL5000 PDA was touching the outer surface of the planar phantom.
2. The EUT was tested for body SAR with the back of the modem module placed parallel to the outer surface of the planar phantom. A 1.0 cm separation distance was maintained between the back of the modem module and the outer surface of the planar phantom.
3. The EUT was tested for body SAR with the left side of the modem module (antenna side) and Sharp SL5000 PDA placed parallel to the outer surface of the planar phantom. A 0.5 cm separation distance was maintained between the left side of the Sharp SL5000 PDA and the outer surface of the planar phantom.
4. The EUT was evaluated for SAR at maximum power and the unit was operated for an appropriate period prior to the evaluation in order to minimize drift. The conducted power levels were checked before and after each test. If the conducted power level dropped more than 5% of the initial power level, then the EUT was retested. Any unusual anomalies over the course of the test also warranted a re-evaluation.
5. The device was operated continuously in transmit mode for the duration of the test.
6. The location of the maximum spatial SAR distribution (Hot Spot) was determined relative to the device and its antenna.
7. The EUT was tested with a fully-charged battery.
8. It was noted in the SAR evaluation for the antenna side of the EUT that the peak SAR was in a different location then expected. The hot spot occurred along the bottom side of the handheld PDA at the opposite end of the antenna as shown in the SAR plots. This can be attributed to the fact that the exterior casing of the handheld PDA was completely metalized.

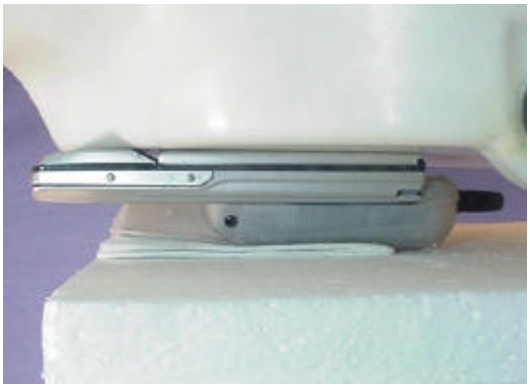


Phantom Reference Point & EUT Positioning

6.0 EVALUATION PROCEDURES

The Specific Absorption Rate (SAR) evaluation was performed as follows:
a. (i) The evaluation was performed in the applicable area of the phantom depending on the type of device being tested. For devices held to the ear during normal operation, both the left and right ear positions were evaluated in accordance with FCC OET Bulletin 65, Supplement C (Edition 01-01) using the SAM phantom.
(ii) For body-worn and face-held devices a planar phantom was used. Depending on the phantom used for the evaluation, all other phantoms were drained of fluid.
b. The SAR was determined by a pre-defined procedure within the DASY3 software. Upon completion of a reference and optical surface check, the exposed region of the phantom was scanned near the inner surface with a grid spacing of 20mm x 20mm.
c. A 5x5x7 matrix was performed around the greatest spatial SAR distribution found during the area scan of the applicable exposed region. SAR values were then calculated using a 3-D spline interpolation algorithm and averaged over spatial volumes of 1 and 10 grams.
d. The depth of the simulating tissue in the planar phantom used for the SAR evaluation and system validation was no less than 15.0 cm.
e. Due to the shape of the EUT, a stack of low-density, low-loss dielectric foamed polystyrene was used in place of the device holder.


Body SAR Test Setup


Body SAR Test Setup - Front of EUT
(PDA touching planar phantom surface)


Body SAR Test Setup - Back of EUT
(1.0 cm Separation Distance)


Body SAR Test Setup - Antenna Side of EUT
(0.5 cm Separation Distance from PDA)

7.0 SYSTEM VALIDATION

Prior to the assessment, the system was verified in the planar section of the SAM phantom with a 900MHz dipole. A forward power of 250 mW was applied to the dipole and system was verified to a tolerance of ±10%. The applicable verifications are as follows (see Appendix B for validation test plot):

Dipole Validation Kit	Target SAR 1g (w/kg)	Measured SAR 1g (w/kg)	Fluid Temperature	Validation Date
D900V2	2.78	2.82	~ 23.0 °C	03/15/02

8.0 TISSUE PARAMETERS

The dielectric parameters of the fluids were verified prior to the SAR evaluation using an 85070C Dielectric Probe Kit and an 8753E Network Analyzer. The dielectric parameters of the fluid are listed below (see Appendix D for measured liquid dielectric parameters).

BRAIN TISSUE PARAMETERS - DIPOLE VALIDATION			
Equivalent Tissue	**Dielectric Constant e_r**	**Conductivity s (mho/m)**	**r (Kg/m^3)**
900MHz Brain (Target)	41.5 ±5%	0.97 ±5%	1000
900MHz Brain (Measured - 03/15/02)	41.9	0.97	1000

BODY TISSUE PARAMETERS - EUT EVALUATION			
Equivalent Tissue	**Dielectric Constant e_r**	**Conductivity s (mho/m)**	**r (Kg/m^3)**
835MHz Body (Target)	55.2 ±5%	0.97 ±5%	1000
835MHz Body (Measured - 03/15/02)	54.5	0.97	1000

9.0 EQUIVALENT TISSUES

The brain and body mixtures consist of a viscous gel using hydroxethylcellulose (HEC) gelling agent and saline solution. Preservation with a bactericide is added and visual inspection is made to ensure air bubbles are not trapped during the mixing process. The fluid was prepared according to standardized procedures and measured for dielectric parameters (permitivity and conductivity).

TISSUE MIXTURE DIPOLE VALIDATION & EUT EVALUATION		
INGREDIENT	**900MHz Brain Mixture (System Validation)**	**835MHz Body Mixture (EUT Evaluation)**
Water	40.71 %	53.70 %
Sugar	56.63 %	45.10 %
Salt	1.48 %	0.97 %
HEC	1.00 %	0.13%
Bactericide	0.18 %	0.10 %

10.0 SAR SAFETY LIMITS

EXPOSURE LIMITS	**SAR (W/Kg)**	
	(General Population / Uncontrolled Exposure Environment)	**(Occupational / Controlled Exposure Environment)**
Spatial Average (averaged over the whole body)	0.08	0.4
Spatial Peak (averaged over any 1 g of tissue)	1.60	8.0
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)	4.0	20.0

Notes:

1. Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.
2. Controlled environments are defined as locations where there is potential exposure of individuals who have knowledge of their potential exposure and can exercise control over their exposure.

11.0 ROBOT SYSTEM SPECIFICATIONS

Specifications

POSITIONER:	Stäubli Unimation Corp. Robot Model: RX60L
Repeatability:	0.02 mm
No. of axis:	6

Data Acquisition Electronic (DAE) System

Cell Controller

Processor:	Pentium III
Clock Speed:	450 MHz
Operating System:	Windows NT
Data Card:	DASY3 PC-Board

Data Converter

Features:	Signal Amplifier, multiplexer, A/D converter, and control logic
Software:	DASY3 software
Connecting Lines:	Optical downlink for data and status info. Optical uplink for commands and clock

PC Interface Card

Function:	24 bit (64 MHz) DSP for real time processing Link to DAE3 16-bit A/D converter for surface detection system serial link to robot direct emergency stop output for robot

E-Field Probe

Model:	ET3DV6
Serial No.:	1387
Construction:	Triangular core fiber optic detection system
Frequency:	10 MHz to 6 GHz
Linearity:	±0.2 dB (30 MHz to 3 GHz)

Phantom

Type:	SAM V4.0C
Shell Material:	Fiberglass
Thickness:	2.0 ±0.1 mm
Volume:	Approx. 20 liters

12.0 PROBE SPECIFICATION (ET3DV6)

Construction:	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g. glycol)
Calibration:	In air from 10 MHz to 2.5 GHz In brain simulating tissue at frequencies of 900 MHz and 1.8 GHz (accuracy ± 8%)
Frequency:	10 MHz to >6 GHz; Linearity: ±0.2 dB (30 MHz to 3 GHz)
Directivity:	±0.2 dB in brain tissue (rotation around probe axis) ±0.4 dB in brain tissue (rotation normal to probe axis)
Dynam. Rnge:	5 µW/g to >100 mW/g; Linearity: ±0.2 dB
Srfce. Detect.	±0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces
Dimensions:	Overall length: 330 mm Tip length: 16 mm Body diameter: 12 mm Tip diameter: 6.8 mm Distance from probe tip to dipole centers: 2.7 mm
Application:	General dosimetry up to 3 GHz Compliance tests of mobile phone


ET3DV6 E-Field Probe

13.0 SAM PHANTOM V4.0C

The SAM phantom V4.0C is a fiberglass shell phantom with a 2.0 mm shell thickness for left and right head and flat planar area integrated in a wooden table. The shape of the fiberglass shell corresponds to the phantom defined by SCC34-SC2. The device holder positions are adjusted to the standard measurement positions in the three sections.


SAM Phantom

14.0 DEVICE HOLDER

The DASY3 device holder has two scales for device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The plane between the ear openings and the mouth tip has a rotation angle of 65°. The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections.


Device Holder

15.0 TEST EQUIPMENT LIST

SAR MEASUREMENT SYSTEM		
EQUIPMENT	***SERIAL NO.***	***DATE CALIBRATED***
DASY3 System -Robot -ET3DV6 E-Field Probe -300MHz Validation Dipole -450MHz Validation Dipole -900MHz Validation Dipole -1800MHz Validation Dipole -2450MHz Validation Dipole -SAM Phantom V4.0C	 599396-01 1387 135 136 054 247 150 N/A	 N/A Feb 2002 Oct 2001 Oct 2001 June 2001 June 2001 Oct 2001 N/A
85070C Dielectric Probe Kit	N/A	N/A
Gigatronics 8652A Power Meter -Power Sensor 80701A -Power Sensor 80701A	1835272 1833535 1833542	Oct 2001 Feb 2002 Mar 2002
E4408B Spectrum Analyzer	US39240170	Nov 2001
8594E Spectrum Analyzer	3543A02721	Mar 2002
8753E Network Analyzer	US38433013	Nov 2001
8648D Signal Generator	3847A00611	Aug 2001
5S1G4 Amplifier Research Power Amplifier	26235	N/A

16.0 MEASUREMENT UNCERTAINTIES

Error Description	Uncertainty Value ±%	Probability Distribution	Divisor	c_i 1g	Standard Uncertainty ±% (1g)	v_i or v_{eff}
Measurement System						
Probe calibration	± 4.8	Normal	1	1	± 4.8	∞
Axial isotropy of the probe	± 4.7	Rectangular	√3	$(1-c_p)$	± 1.9	∞
Spherical isotropy of the probe	± 9.6	Rectangular	√3	(c_p)	± 3.9	∞
Spatial resolution	± 0.0	Rectangular	√3	1	± 0.0	∞
Boundary effects	± 5.5	Rectangular	√3	1	± 3.2	∞
Probe linearity	± 4.7	Rectangular	√3	1	± 2.7	∞
Detection limit	± 1.0	Rectangular	√3	1	± 0.6	∞
Readout electronics	± 1.0	Normal	1	1	± 1.0	∞
Response time	± 0.8	Rectangular	√3	1	± 0.5	∞
Integration time	± 1.4	Rectangular	√3	1	± 0.8	∞
RF ambient conditions	± 3.0	Rectangular	√3	1	± 1.7	∞
Mech. constraints of robot	± 0.4	Rectangular	√3	1	± 0.2	∞
Probe positioning	± 2.9	Rectangular	√3	1	± 1.7	∞
Extrapolation & integration	± 3.9	Rectangular	√3	1	± 2.3	∞
Test Sample Related						
Device positioning	± 6.0	Normal	0.89	1	± 6.7	12
Device holder uncertainty	± 5.0	Normal	0.84	1	± 5.9	8
Power drift	± 5.0	Rectangular	√3		± 2.9	∞
Phantom and Setup						
Phantom uncertainty	± 4.0	Rectangular	√3	1	± 2.3	∞
Liquid conductivity (target)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid conductivity (measured)	± 10.0	Rectangular	√3	0.6	± 3.5	∞
Liquid permittivity (target)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid permittivity (measured)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Combined Standard Uncertainty					± **13.6**	
Expanded Uncertainty (k=2)					± **27.1**	

The divisor for device positioning uncertainty and holder uncertainty are based on the procedure defined in IEEE Std 1528 (draft) (see reference [5]), or based on the degrees of freedom for each error source.

For estimation of Device Positioning Uncertainty (divisor=0.89) 12 different devices were used (see last column - i.e. degrees of freedom). The corresponding k_p factor for v_{eff}=12 is 2.23, therefore the divisor is 2/2.23=0.89.

For estimation of Device Holder Uncertainty (divisor=0.84) 8 different devices were used (see last column - i.e. degrees of freedom). The corresponding k_p factor for v_{eff}=8 is 2.37, therefore the divisor is 2/2.37=0.84.

17.0 REFERENCES

[1] ANSI, ANSI/IEEE C95.1: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300 GHz, The Institute of Electrical and Electronics Engineers, Inc., New York, NY: 1992.

[2] Federal Communications Commission, “Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields”, OET Bulletin 65, Supplement C (Edition 01-01), FCC, Washington, D.C.: June 2001.

[3] Thomas Schmid, Oliver Egger, and Niels Kuster, “Automated E-field scanning system for dosimetric assessments”, IEEE Transaction on Microwave Theory and Techniques, Vol. 44, pp. 105 - 113: January 1996.

[4] Niels Kuster, Ralph Kastle, and Thomas Schmid, “Dosimetric evaluation of mobile communications equipment with know precision”, IEICE Transactions of Communications, vol. E80-B, no. 5, pp. 645 – 652: May 1997.

[5] IEEE Standards Coordinating Committee 34, Std 1528, DRAFT Recommended Practice for Determining the Spatial-Peak Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques: Draft, December 2001.

APPENDIX B - DIPOLE VALIDATION

Dipole 900MHz

SAM Phantom; Flat Section

Probe: ET3DV6 - SN1387; ConvF(6.60,6.60,6.60); Crest factor: 1.0; 900 MHz Brain: σ = 0.97 mho/m ε_r = 41.9 ρ = 1.00 g/cm^3

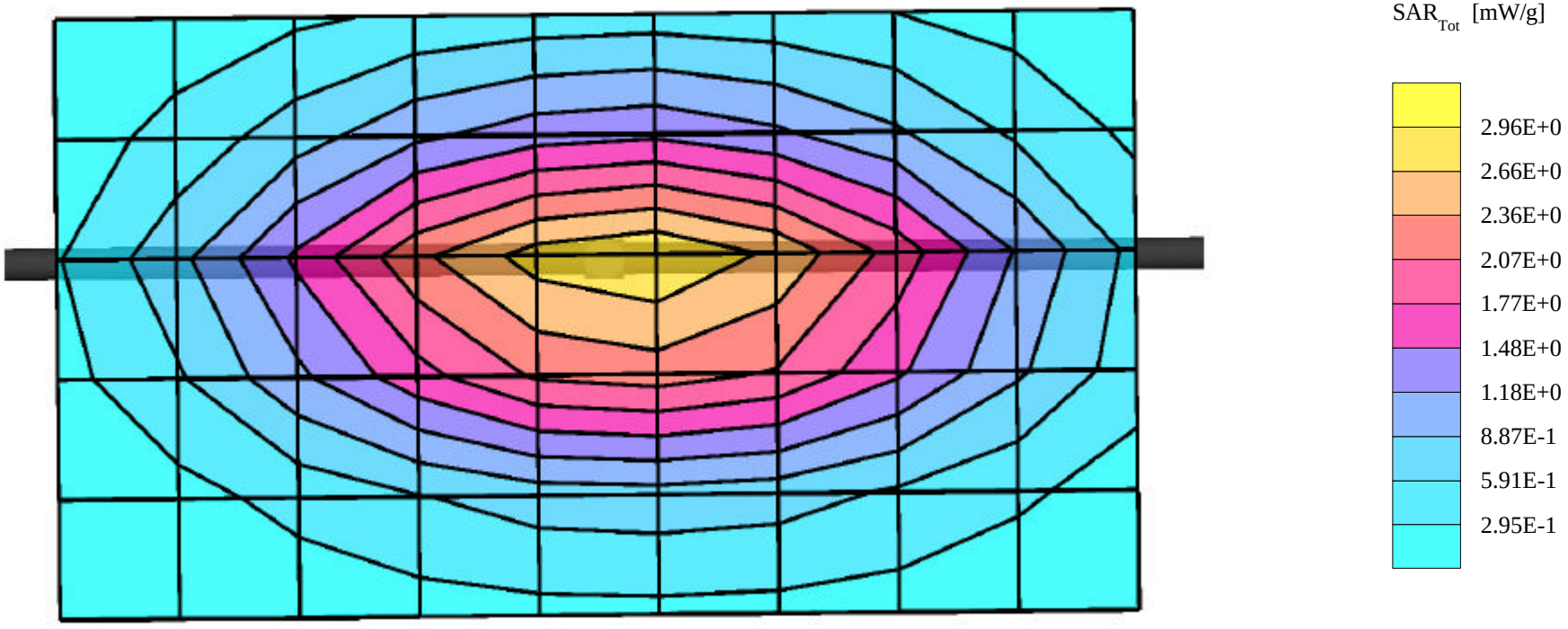
Cube 5x5x7: Peak: 4.61 mW/g, SAR (1g): 2.82 mW/g, SAR (10g): 1.77 mW/g, (Worst-case extrapolation)

Penetration depth: 11.2 (10.0, 12.8) [mm]

Powerdrift: -0.05 dB

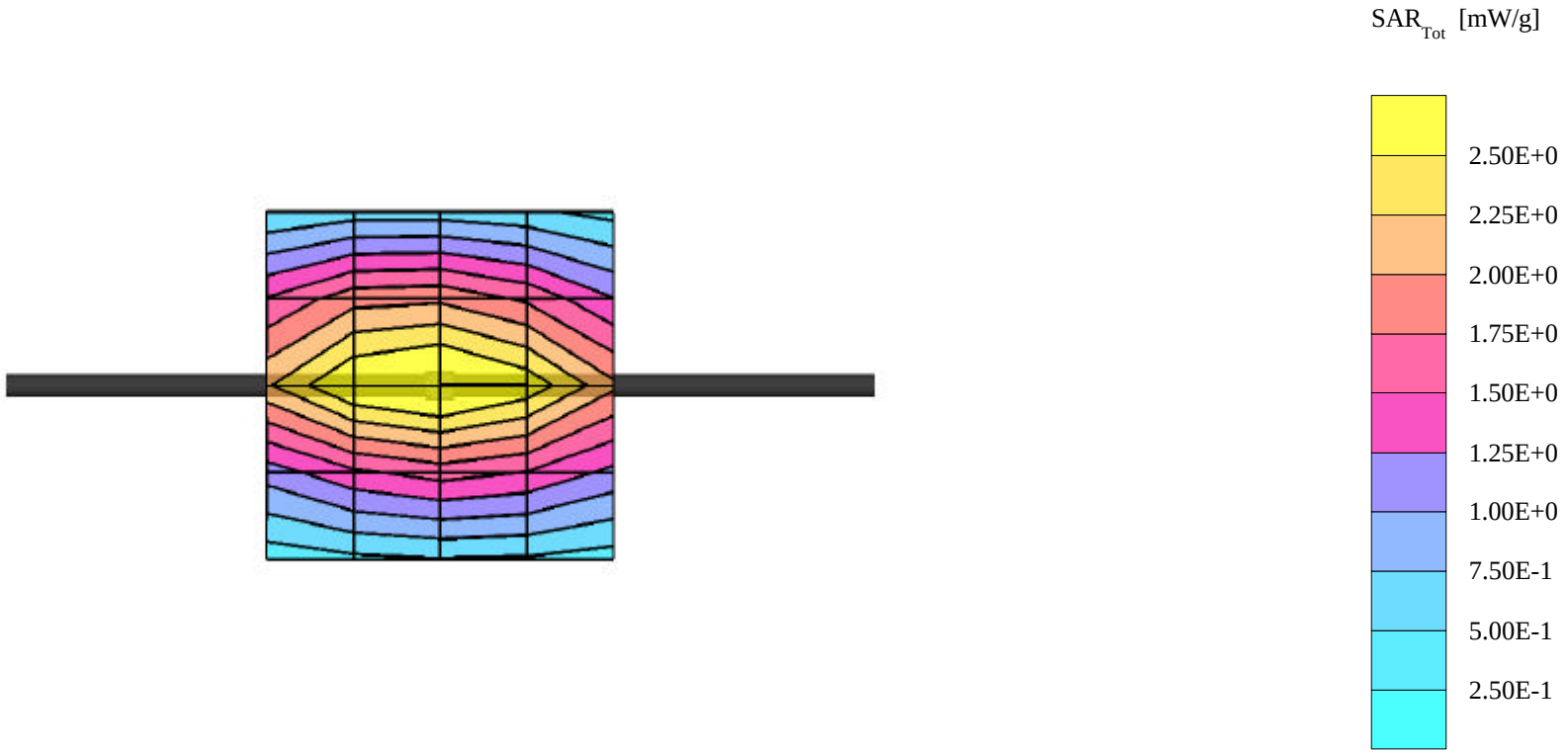
Conducted Power: 250mW

Validation Date: March 15, 2002



Validation Dipole D900V2 SN:054, d = 15 mm

Frequency: 900 MHz; Antenna Input Power: 250 [mW]
Generic Twin Phantom; Flat Section; Grid Spacing:Dx = 15.0, Dy = 15.0, Dz = 10.0
Probe: ET3DV6 - SN1507; ConvF(6.27,6.27,6.27); Crest factor: 1.0; IEEE1528 900 MHz: σ = 0.97 mho/m ε_r = 42.4 ρ = 1.00 g/cm^3
Cubes (2): Peak: 4.47 mW/g ± 0.05 dB, SAR (1g): 2.78 mW/g ± 0.04 dB, SAR (10g): 1.76 mW/g ± 0.02 dB, (Worst-case extrapolation)
Penetration depth: 11.5 (10.3, 13.2) [mm]
Powerdrift: -0.00 dB



APPENDIX C - PROBE CALIBRATION

Schmid & Partner
Engineering AG

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

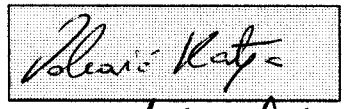
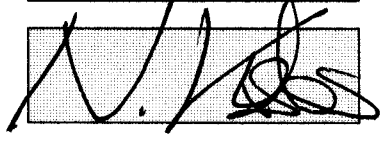
Calibration Certificate

Dosimetric E-Field Probe

Type:	**ET3DV6**
Serial Number:	**1387**
Place of Calibration:	**Zurich**
Date of Calibration:	**February 22, 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:1387

Manufactured:	September 21, 1999
Last calibration:	September 22, 1999
Recalibrated:	February 22, 2002

Calibrated for System DASY3

DASY3 - Parameters of Probe: ET3DV6 SN:1387

Sensitivity in Free Space

Diode Compression

NormX	**1.58**	$\mu V/(V/m)^2$	DCP X	**97**	mV
NormY	**1.67**	$\mu V/(V/m)^2$	DCP Y	**97**	mV
NormZ	**1.67**	$\mu V/(V/m)^2$	DCP Z	**97**	mV

Sensitivity in Tissue Simulating Liquid

Head **900 MHz** e_r **= 41.5 ± 5%** s **= 0.97 ± 5% mho/m**
Head **835 MHz** e_r **= 41.5 ± 5%** s **= 0.90 ± 5% mho/m**

ConvF X	**6.6** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**6.6** ± 9.5% (k=2)	Alpha	**0.40**
ConvF Z	**6.6** ± 9.5% (k=2)	Depth	**2.38**

Head **1800 MHz** e_r **= 40.0 ± 5%** s **= 1.40 ± 5% mho/m**
Head **1900 MHz** e_r **= 40.0 ± 5%** s **= 1.40 ± 5% mho/m**

ConvF X	**5.4** ± 9.5% (k=2)	Boundary effect:	
ConvF Y	**5.4** ± 9.5% (k=2)	Alpha	**0.57**
ConvF Z	**5.4** ± 9.5% (k=2)	Depth	**2.18**

Boundary Effect

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

Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	9.7	5.4
SAR_{be} [%]	With Correction Algorithm	0.3	0.6

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

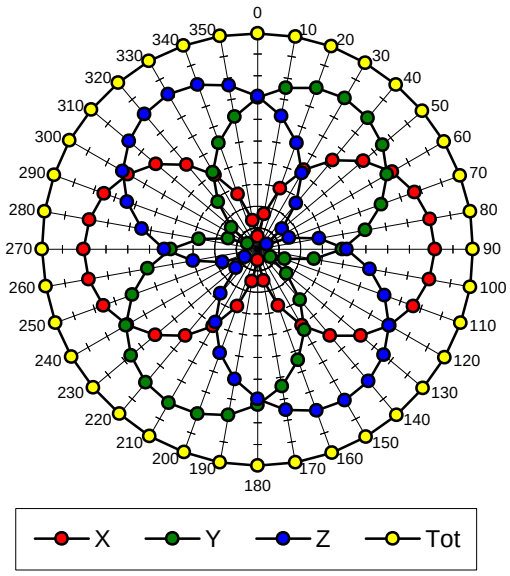
Probe Tip to Boundary		**1 mm**	**2 mm**
SAR_{be} [%]	Without Correction Algorithm	11.5	7.3
SAR_{be} [%]	With Correction Algorithm	0.1	0.3

Sensor Offset

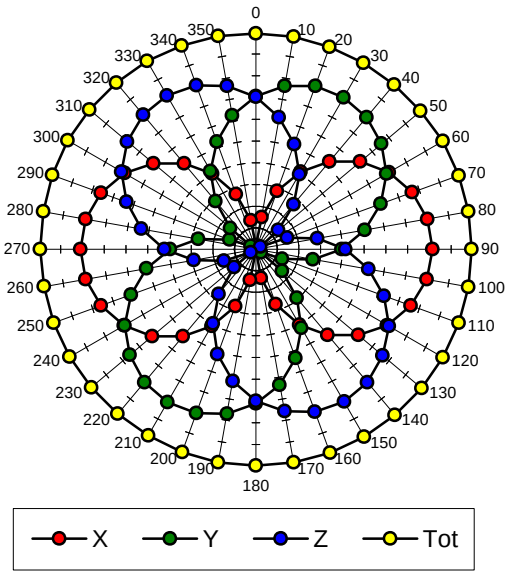
Probe Tip to Sensor Center	**2.7**	mm
Optical Surface Detection	**1.3 ± 0.2**	mm

Receiving Pattern (f) , q = 0°

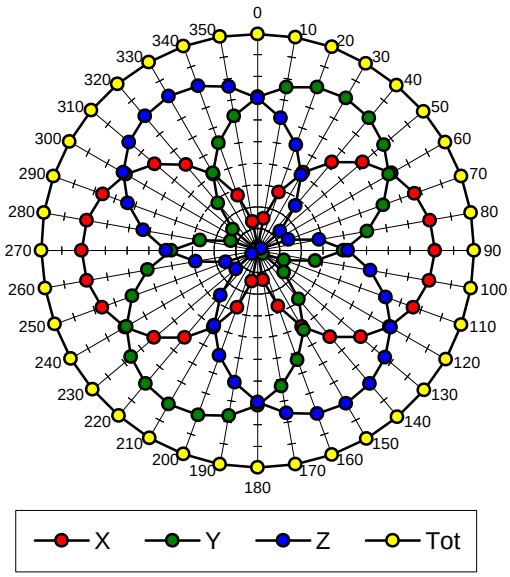
f = 30 MHz, TEM cell ifi110



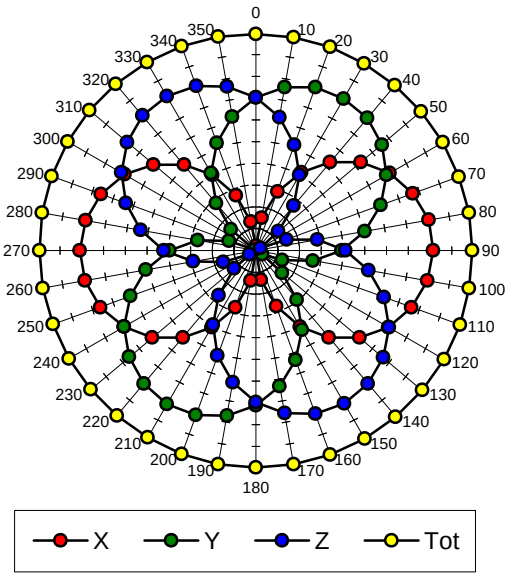
f = 100 MHz, TEM cell ifi110

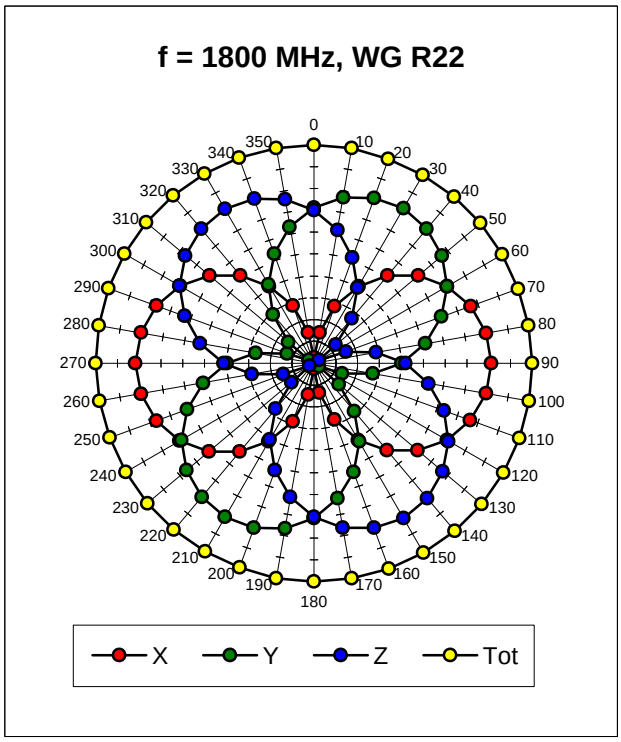


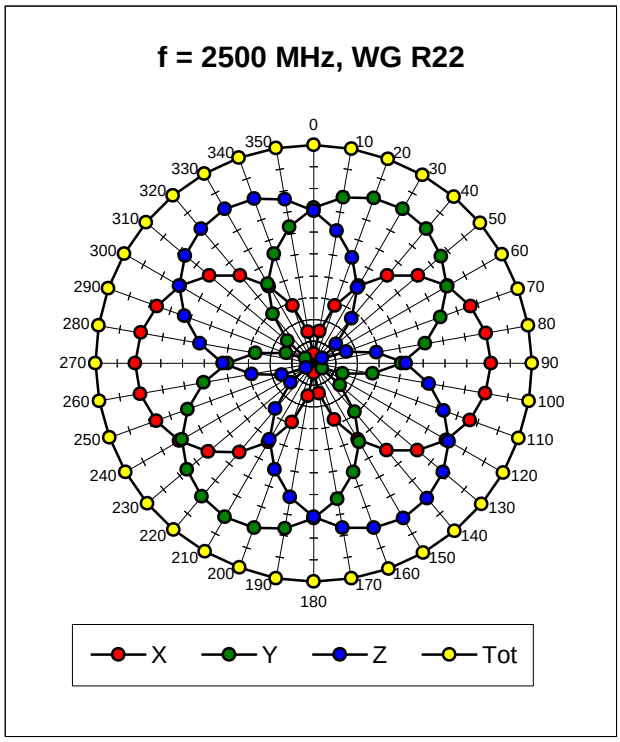
f = 300 MHz, TEM cell ifi110



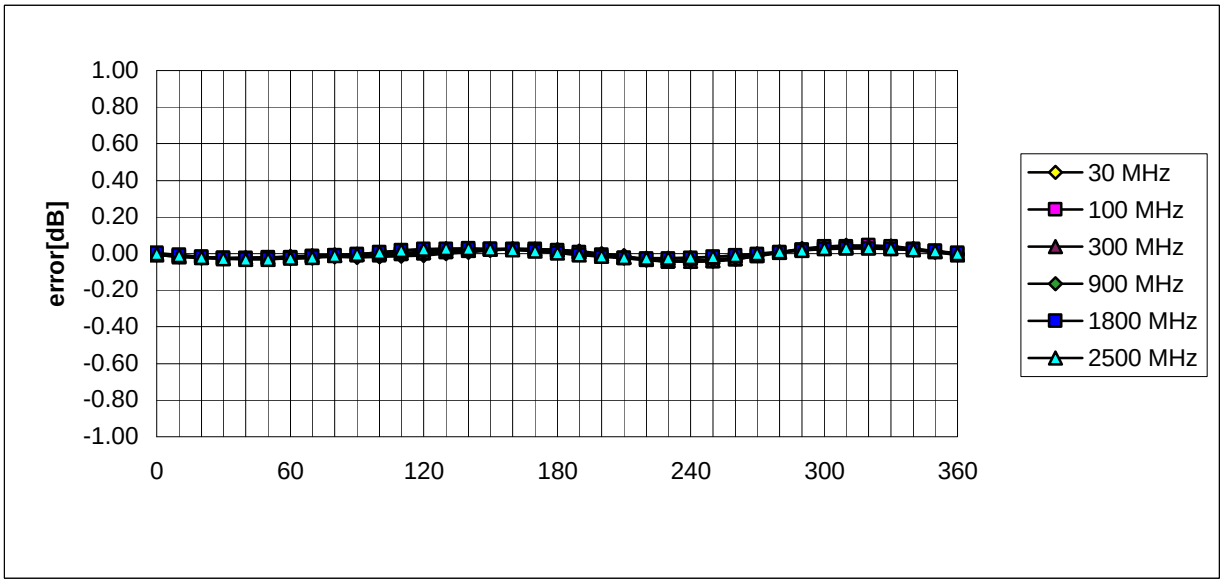
f = 900 MHz, TEM cell ifi110





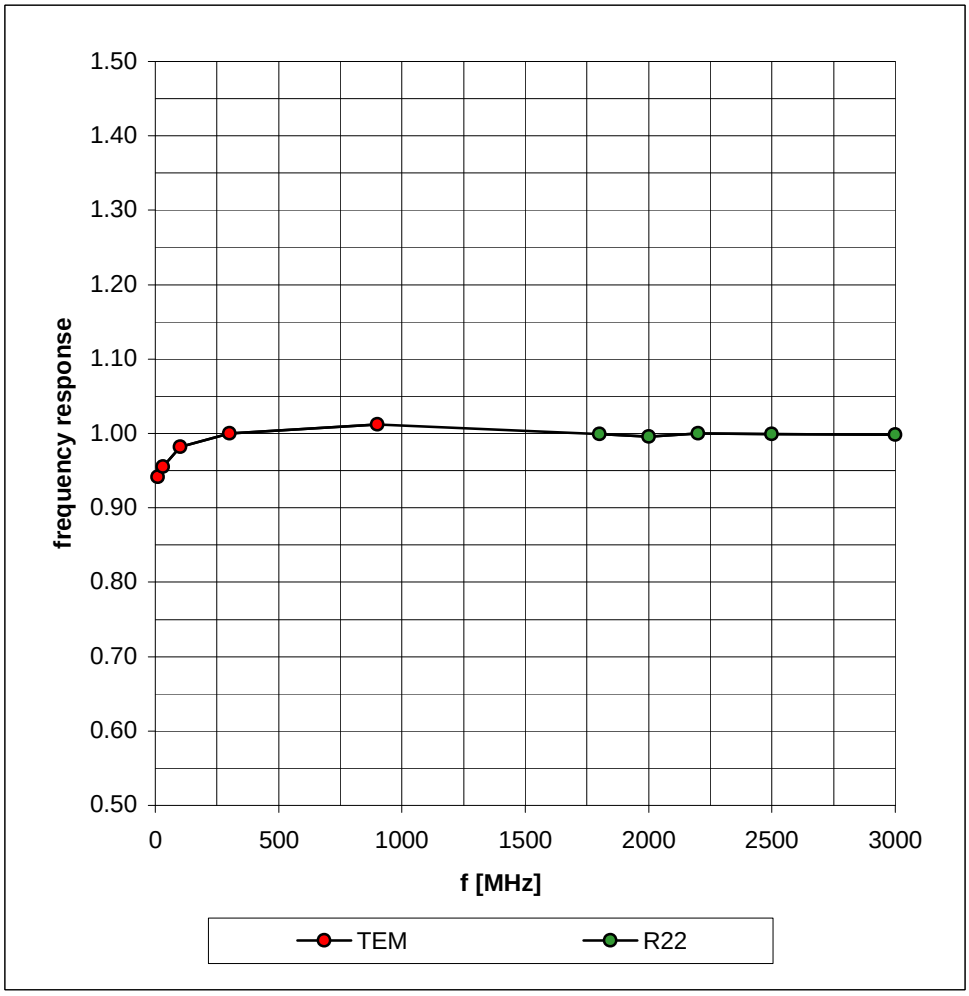


Isotropy Error (f), q = 0°



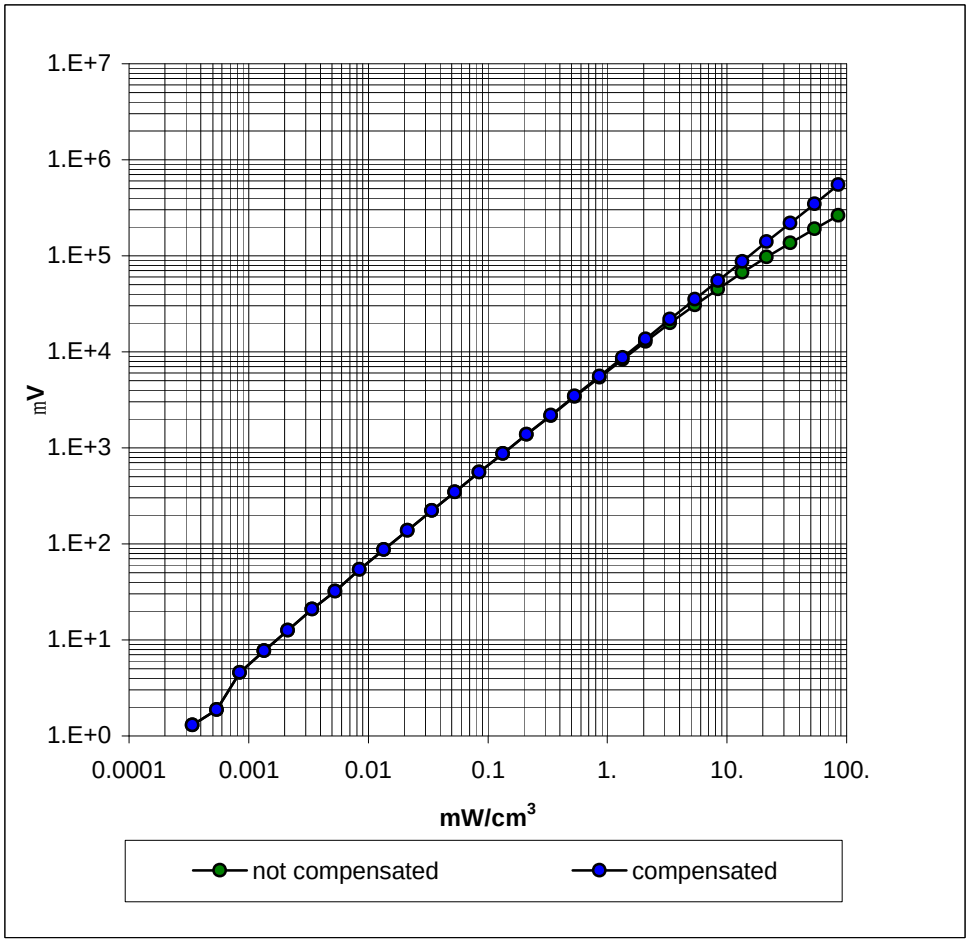
Frequency Response of E-Field

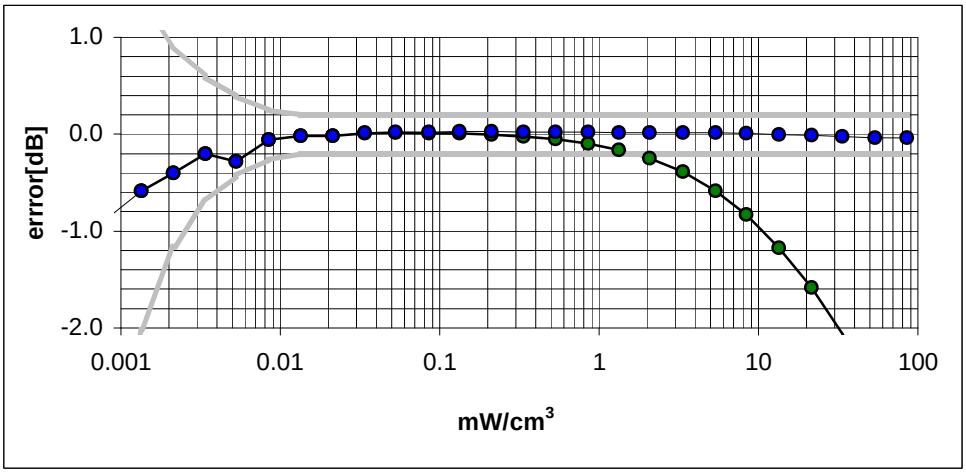
(TEM-Cell:ifi110, Waveguide R22)



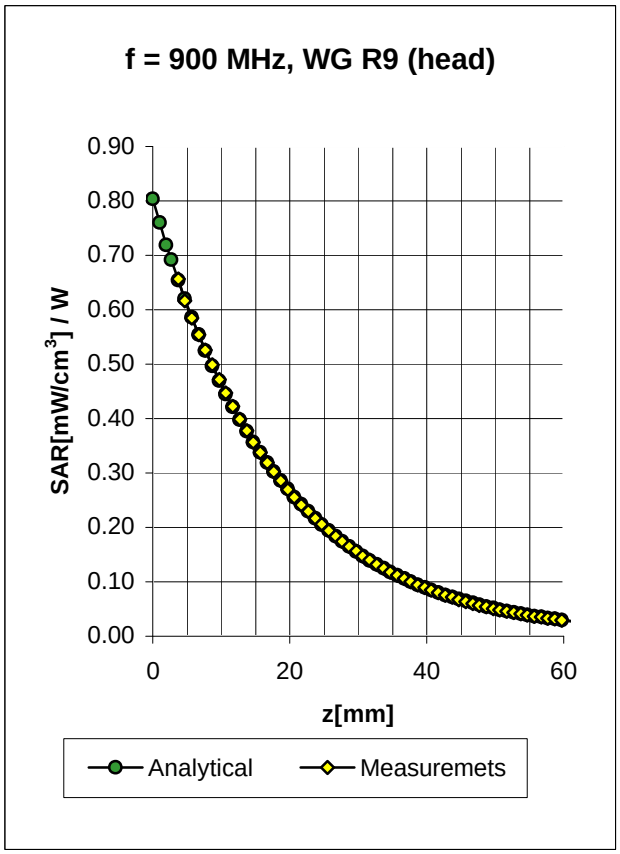
Dynamic Range f(SAR_{brain})

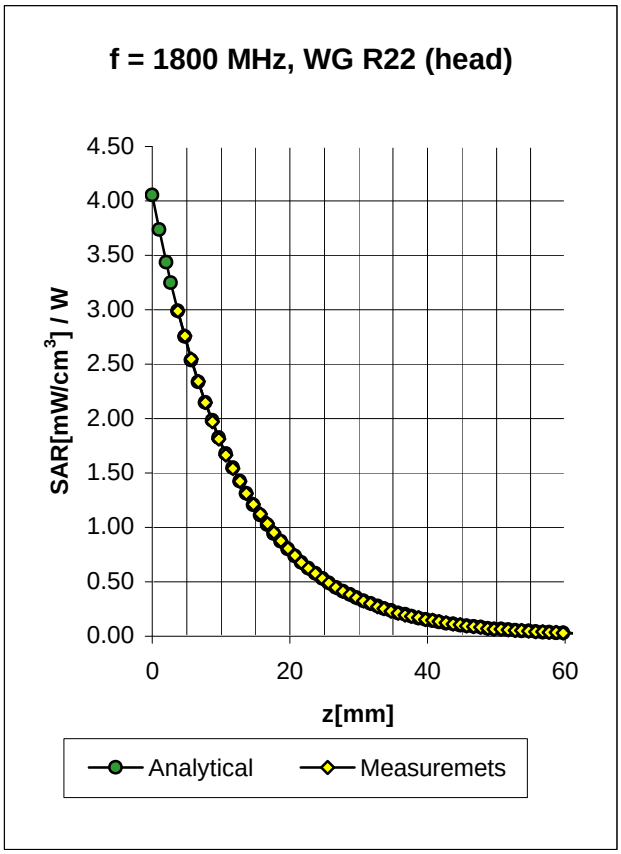
(Waveguide R22)





Conversion Factor Assessment



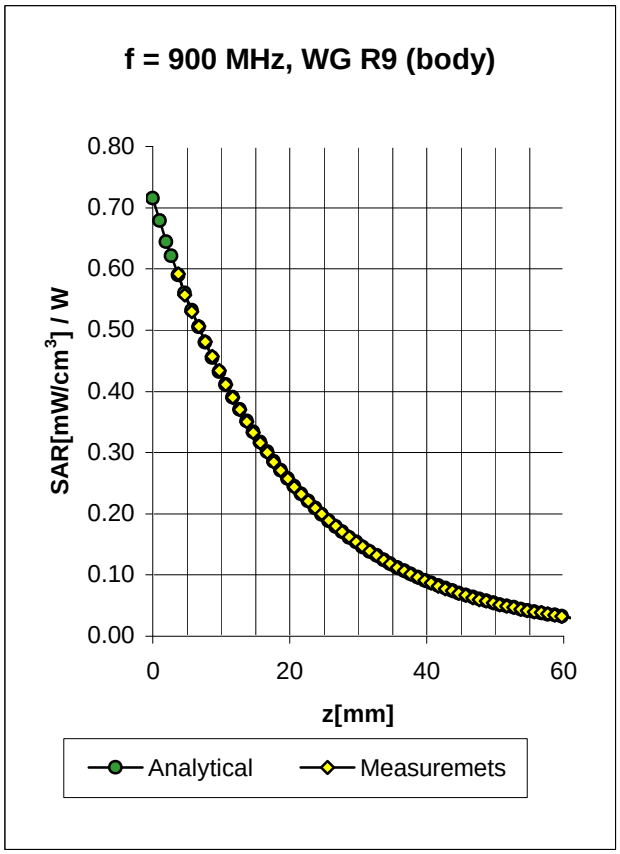


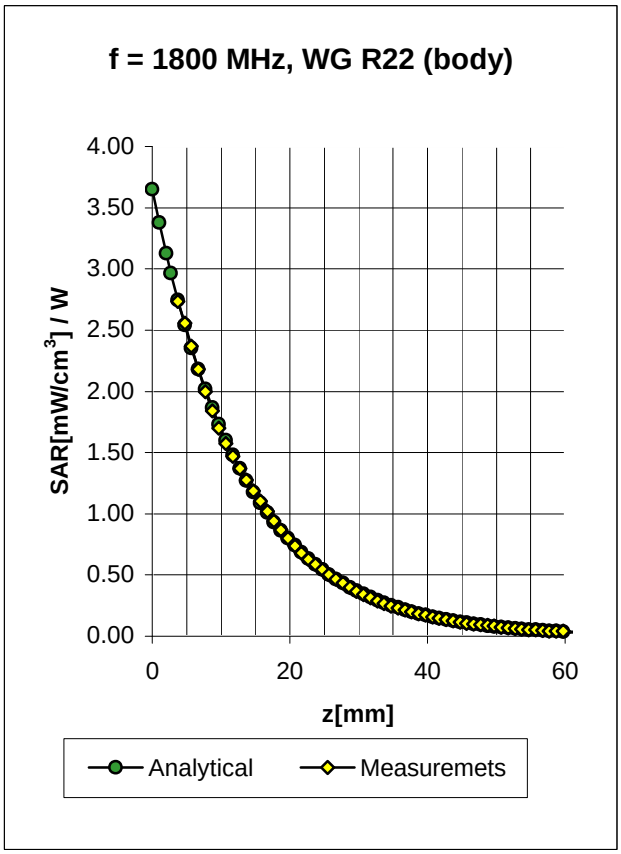
Head	**900 MHz**		e_r **= 41.5 ± 5%**	s **= 0.97 ± 5% mho/m**	
Head	**835 MHz**		e_r **= 41.5 ± 5%**	s **= 0.90 ± 5% mho/m**	
	ConvF X	**6.6** ± 9.5% (k=2)		Boundary effect:	
	ConvF Y	**6.6** ± 9.5% (k=2)		Alpha	**0.40**
	ConvF Z	**6.6** ± 9.5% (k=2)		Depth	**2.38**

Head	**1800 MHz**		e_r **= 40.0 ± 5%**	s **= 1.40 ± 5% mho/m**	
Head	**1900 MHz**		e_r **= 40.0 ± 5%**	s **= 1.40 ± 5% mho/m**	
	ConvF X	**5.4** ± 9.5% (k=2)		Boundary effect:	
	ConvF Y	**5.4** ± 9.5% (k=2)		Alpha	**0.57**
	ConvF Z	**5.4** ± 9.5% (k=2)		Depth	**2.18**

ET3DV6 SN:1387 **February 22, 2002**

Conversion Factor Assessment





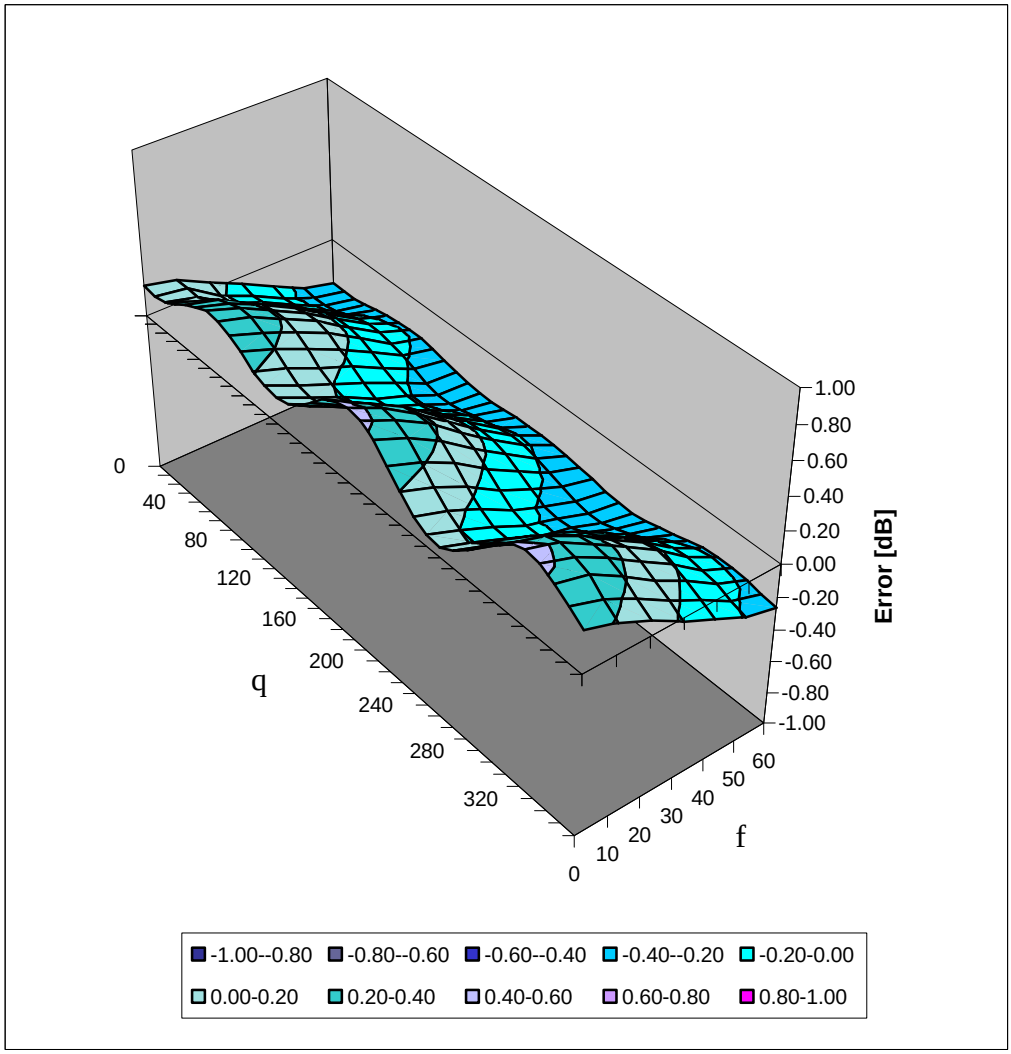
Body	**900 MHz**		e_r **= 55.0 ± 5%**	s **= 1.05 ± 5% mho/m**	
Body	**835 MHz**		e_r **= 55.2 ± 5%**	s **= 0.97 ± 5% mho/m**	
	ConvF X	**6.3** ± 9.5% (k=2)		Boundary effect:	
	ConvF Y	**6.3** ± 9.5% (k=2)		Alpha	**0.42**
	ConvF Z	**6.3** ± 9.5% (k=2)		Depth	**2.44**

Body	**1800 MHz**		e_r **= 53.3 ± 5%**	s **= 1.52 ± 5% mho/m**	
Body	**1900 MHz**		e_r **= 53.3 ± 5%**	s **= 1.52 ± 5% mho/m**	
	ConvF X	**5.0** ± 9.5% (k=2)		Boundary effect:	
	ConvF Y	**5.0** ± 9.5% (k=2)		Alpha	**0.76**
	ConvF Z	**5.0** ± 9.5% (k=2)		Depth	**2.01**

ET3DV6 SN:1387 **February 22, 2002**

Deviation from Isotropy in HSL

Error (q,f), f = 900 MHz



Schmid & Partner
Engineering AG

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

Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ET3DV6**
Serial Number:	**1387**
Place of Assessment:	**Zurich**
Date of Assessment:	**February 25, 2002**
Probe Calibration Date:	**February 22, 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 re-calibration 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:1387

Conversion factor (± standard deviation)

150 MHz	ConvF	**9.2 ± 8%**	ε_r = **52.3** σ = **0.76 mho/m** (head tissue)
300 MHz	ConvF	**8.0 ± 8%**	ε_r = **45.3** σ = **0.87 mho/m** (head tissue)
150 MHz	ConvF	**8.8 ± 8%**	ε_r = **61.9** σ = **0.80 mho/m** (body tissue)
450 MHz	ConvF	**7.7 ± 8%**	ε_r = **56.7** σ = **0.94 mho/m** (body tissue)

APPENDIX D - MEASURED LIQUID DIELECTRIC PARAMETERS

900MHz System Validation

Measured Liquid Dielectric Parameters (Brain)

March 15, 2002

Frequency	e'	e''
800.000000 MHz	43.1105	19.7423
805.000000 MHz	43.0275	19.6980
810.000000 MHz	42.9978	19.7045
815.000000 MHz	42.9304	19.6891
820.000000 MHz	42.9010	19.6526
825.000000 MHz	42.8286	19.6127
830.000000 MHz	42.7481	19.5969
835.000000 MHz	42.6731	19.5959
840.000000 MHz	42.6505	19.5905
845.000000 MHz	42.5816	19.5671
850.000000 MHz	42.4889	19.5302
855.000000 MHz	42.4496	19.5303
860.000000 MHz	42.3837	19.5072
865.000000 MHz	42.3066	19.4776
870.000000 MHz	42.2577	19.4709
875.000000 MHz	42.2059	19.4855
880.000000 MHz	42.1494	19.4813
885.000000 MHz	42.0967	19.4862
890.000000 MHz	42.0457	19.4606
895.000000 MHz	42.0230	19.4267
900.000000 MHz	41.9378	19.3824
905.000000 MHz	41.9118	19.3503
910.000000 MHz	41.8763	19.3658
915.000000 MHz	41.8052	19.3431
920.000000 MHz	41.7472	19.3119
925.000000 MHz	41.6982	19.3075
930.000000 MHz	41.6621	19.2798
935.000000 MHz	41.5740	19.2688
940.000000 MHz	41.4925	19.2754
945.000000 MHz	41.4441	19.2621
950.000000 MHz	41.3905	19.2603
955.000000 MHz	41.3350	19.2497
960.000000 MHz	41.2647	19.2347
965.000000 MHz	41.2066	19.2255
970.000000 MHz	41.1563	19.2235

835MHz EUT Evaluation

Measured Liquid Dielectric Parameters (Body)

March 15, 2002

Frequency	e'	e''
800.000000 MHz	54.8113	21.1624
805.000000 MHz	54.7596	21.1288
810.000000 MHz	54.7024	21.1087
815.000000 MHz	54.6609	21.0665
820.000000 MHz	54.6302	21.0209
825.000000 MHz	54.5648	21.0158
830.000000 MHz	54.5291	20.9670
835.000000 MHz	54.4549	20.9161
840.000000 MHz	54.4153	20.8971
845.000000 MHz	54.3776	20.9103
850.000000 MHz	54.3196	20.8657
855.000000 MHz	54.2888	20.8332
860.000000 MHz	54.2338	20.8206
865.000000 MHz	54.1869	20.8267
870.000000 MHz	54.1398	20.8009
875.000000 MHz	54.1112	20.8215
880.000000 MHz	54.0544	20.8209
885.000000 MHz	53.9952	20.8107
890.000000 MHz	53.9518	20.7843
895.000000 MHz	53.9289	20.7136
900.000000 MHz	53.8996	20.6928
905.000000 MHz	53.8288	20.6830
910.000000 MHz	53.7707	20.6635
915.000000 MHz	53.7207	20.6616
920.000000 MHz	53.6769	20.6472
925.000000 MHz	53.6394	20.6203
930.000000 MHz	53.5762	20.6039
935.000000 MHz	53.5263	20.5925
940.000000 MHz	53.5138	20.5967
945.000000 MHz	53.4412	20.5747
950.000000 MHz	53.3939	20.5629
955.000000 MHz	53.3198	20.5322
960.000000 MHz	53.2871	20.5150
965.000000 MHz	53.2296	20.5081
970.000000 MHz	53.1857	20.4959

APPENDIX E - SAM PHANTOM CERTIFICATE OF CONFORMITY

Schmid & Partner
Engineering AG

Zeughausstrasse 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

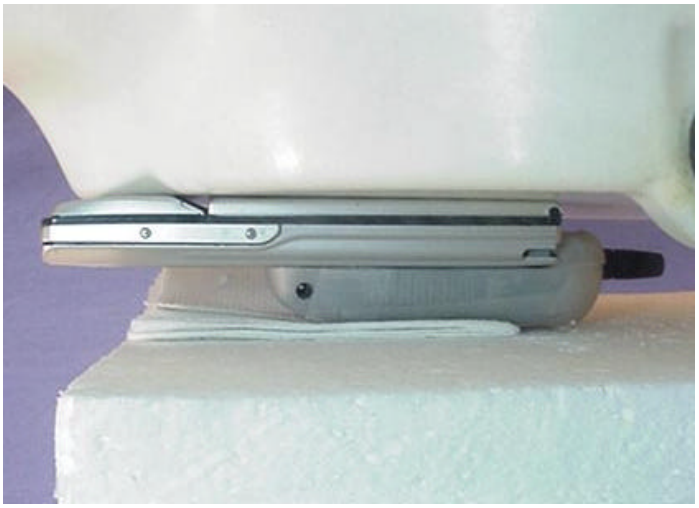
Based on the sample tests above, we certify that this item is in compliance with the uncertainty requirements of SAR measurements specified in standard [1] and draft standards [2] and [3].

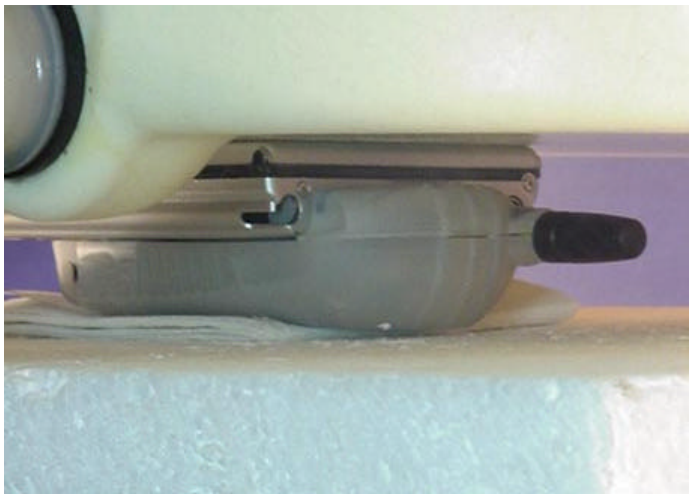
Date 18.11.2001

Signature / Stamp Schmid & Partner Engineering AG
Zeughausstrasse 43, CH-8004 Zurich
Tel. +41 1 245 97 00, Fax +41 1 245 97 79

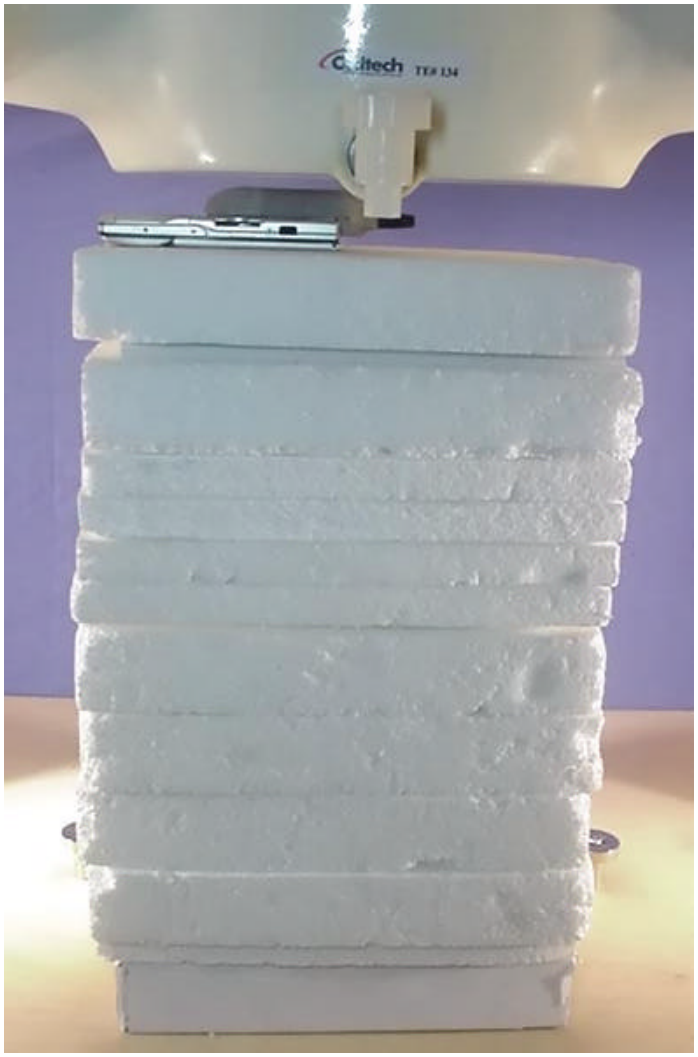
APPENDIX F - SAR TEST SETUP PHOTOGRAPHS

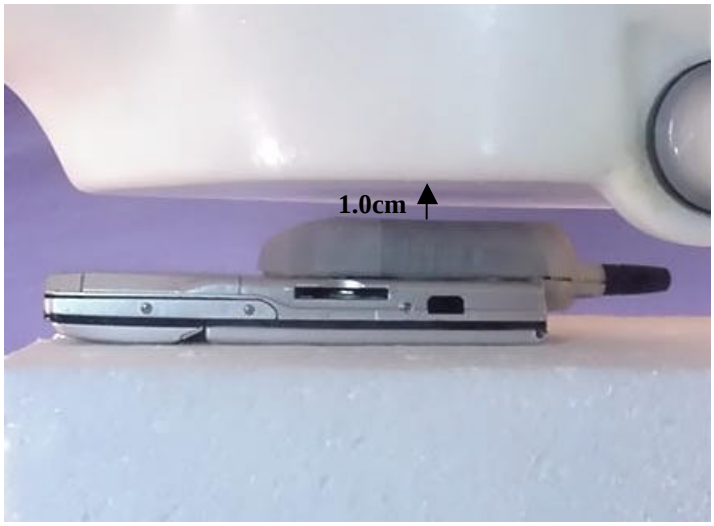
BODY SAR TEST SETUP PHOTOGRAPHS
Front of EUT - Front of PDA Touching Planar Phantom

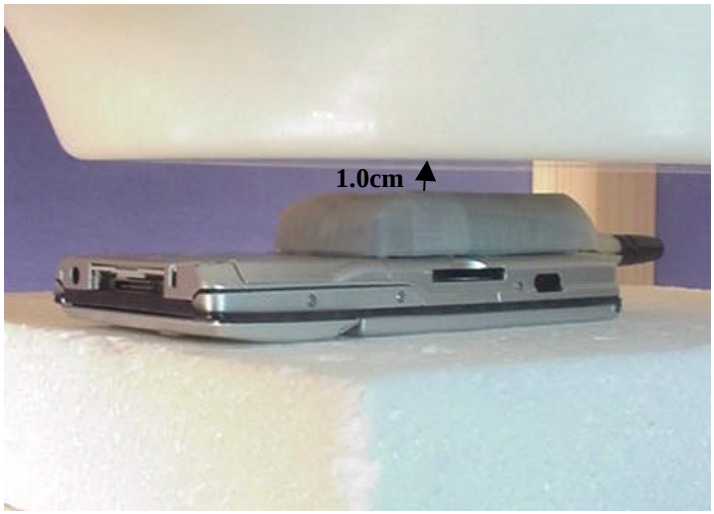


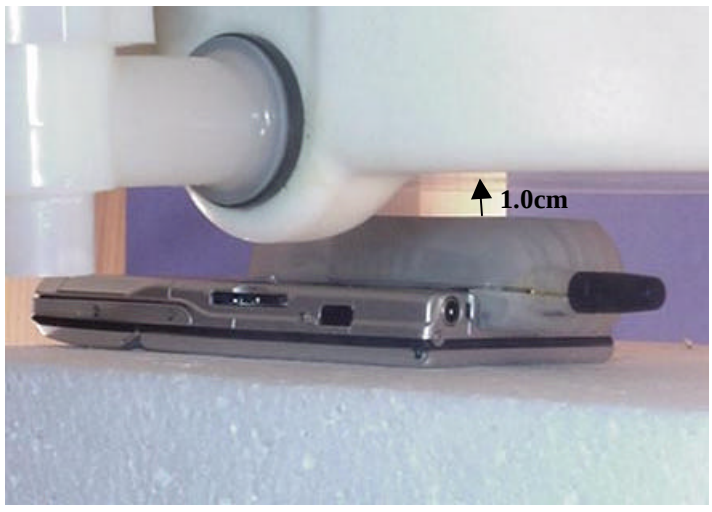


BODY SAR TEST SETUP PHOTOGRAPHS
Back of EUT - 1.0 cm Separation Distance









BODY SAR TEST SETUP PHOTOGRAPHS
Left Side of Modem - Antenna Side
0.5 cm Separation Distance (from PDA)