DECLARATION OF COMPLIANCE
SAR RF EXPOSURE EVALUATION

Test Lab

CELLTECH LABS INC.
Testing and Engineering Services
1955 Moss Court
Kelowna, B.C.
Canada V1Y 9L3
Phone: 250-448-7047
Fax: 250-448-7046
e-mail: info@celltechlabs.com
web site: www.celltechlabs.com

Applicant Information

Enfora, L.P.
661 E. 18th St.
Plano, TX 75074
United States

FCC IDENTIFIER:	**MIVLBH0107**
IC IDENTIFIER:	**4160A-LBH0107**
Model No.:	**LBH0107**
Model Name:	**Pinehurst**
Rule Part(s):	**47 CFR §2.1093; IC RSS-102 Issue 1 (Provisional)**
Test Procedure(s):	**FCC OET Bulletin 65, Supplement C (01-01)** **IEEE Standard 1528-2003**
Device Description:	**Portable PCS GSM Communicator**
FCC Classification:	**PCS Licensed Transmitter Held to Face (PCF)**
Mode(s) of Operation:	**PCS GSM (Voice)**
Modulation Scheme:	**GMSK**
Tx Frequency Range(s):	**1850.2 - 1909.8 MHz**
Max. RF Output Power:	**29.9 dBm Peak Conducted (1880.2 MHz)**
Antenna Type(s) Tested:	**Internal Helical Coil**
Battery Type(s) Tested:	**Internal Lithium-ion 3.7 V, 870 mAh**
Body-Worn Accessories Tested:	**Generic Earbud with Lapel-Microphone** **Nitelze Small Clip Case Phone Holster with Plastic Belt-Clip**
Max. SAR Level(s) Evaluated:	**Face: 0.182 W/kg (1g average)** **Body: 0.418 W/kg (1g average)**

Celltech Labs Inc. declares under its sole responsibility that this wireless portable device has demonstrated compliance with the Specific Absorption Rate (SAR) RF exposure requirements specified in FCC 47 CFR §2.1093 and Health Canada's Safety Code 6. The device was tested in accordance with the measurement standards and procedures specified in FCC OET Bulletin 65, Supplement C (Edition 01-01), Industry Canada RSS-102 Issue 1 (Provisional) and IEEE Standard 1528-2003 for the General Population / Uncontrolled Exposure environment. All measurements were performed in accordance with the SAR system manufacturer recommendations.

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.

Performed By:

Spencer Watson
Compliance Technologist
Celltech Labs Inc.

Reviewed By:

Russell W. Pipe
Senior Compliance Technologist
Celltech Labs Inc.

TABLE OF CONTENTS

1.0 INTRODUCTION

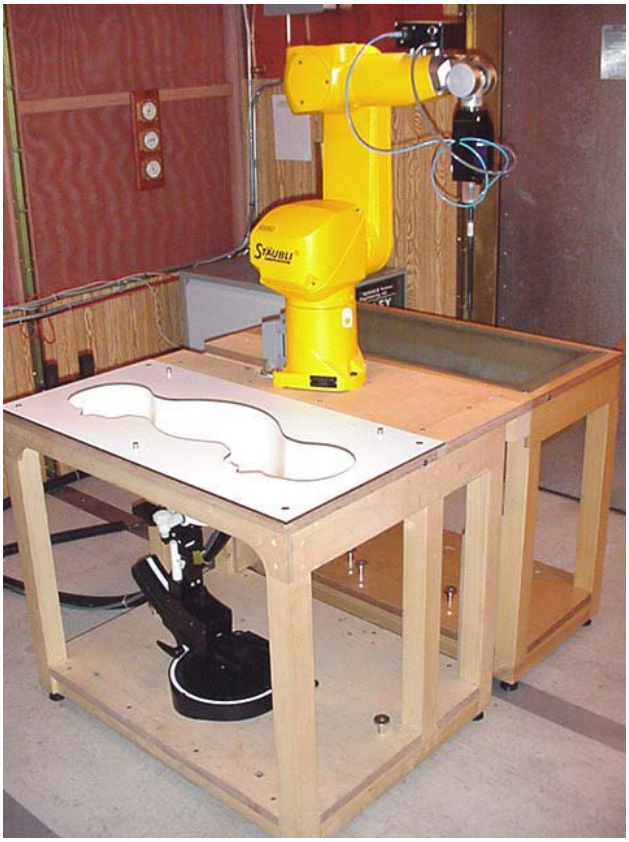
This measurement report demonstrates that the Enfora, L.P. Model: LBH0107 Portable PCS GSM Communicator FCC ID: MIVLBH0107 complies with the SAR (Specific Absorption Rate) RF exposure requirements specified in FCC 47 CFR §2.1093 (see reference [1]) and Health Canada's Safety Code 6 (see reference [2]) for the General Population / Uncontrolled Exposure environment. The test procedures described in FCC OET Bulletin 65, Supplement C, Edition 01-01 (see reference [3]), IC RSS-102 Issue 1 (Provisional) (see reference [4]), and IEEE Standard 1528-2003 (see reference [5]) were employed. A description of the product and 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 Device Under Test (DUT)

FCC Rule Part(s)	47 CFR §2.1093		
IC Rule Part(s)	RSS-102 Issue 1 (Provisional)		
Device Classification	PCS Licensed Transmitter held to face (PCF)		
Test Procedure(s)	FCC OET Bulletin 65, Supplement C (01-01)		
	IC RSS-102 Issue 1 (Provisional)		
	IEEE Standard 1528-2003		
Device Description	Portable PCS GSM Communicator		
FCC IDENTIFIER	MIVLBH0107		
IC IDENTIFIER	4160A-LBH0107		
Model No.	LBH0107		
Model Name	Pinehurst		
Serial No.	SAR 1	Production Unit	
Tx Frequency Range(s)	1850.2 - 1909.8 MHz		
Mode(s) of Operation	PCS GSM (Voice)		
Modulation Scheme	GMSK		
Max. RF Output Power Tested	29.9 dBm (PL0)	Peak Conducted	1880.2 MHz
Battery Type(s) Tested	Internal Lithium-ion	3.7 V	870 mAh
Antenna Type(s) Tested	Internal Helical Coil		
Body-Worn Accessories Tested	Generic Earbud with Lapel-Microphone		
	Nitelze Small Clip Case Phone Holster with Plastic Belt-Clip		

3.0 SAR MEASUREMENT SYSTEM

Celltech Labs Inc. SAR measurement facility utilizes the Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland. The DASY4 measurement system is comprised of the measurement server, robot controller, computer, near-field probe, probe alignment sensor, specific anthropomorphic mannequin (SAM) phantom, and various planar phantoms for brain and/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 DASY4 measurement server. The DAE4 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 DASY4 measurement server 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. The sensor systems are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.



DASY4 Measurement System with SAM Phantom

DASY4 Measurement System with SAM Phantom

4.0 MEASUREMENT SUMMARY

SAR EVALUATION RESULTS - PCS GSM

Test Type	Freq. (MHz)	Channel		Test Mode	Antenna Type	Battery Type	Body-Worn Accessory	DUT Position to Planar Phantom	Separation Distance to Planar Phantom (cm)	Cond. Power Before Test		Measured SAR 1g (W/kg)	SAR Drift During Test (dB)	Scaled SAR 1g (W/kg) by drift
										PL	dBm			
Face	1880.2	662	Mid	GSM	Internal	Li-ion	--	Front Side (LCD Side)	2.5	0	29.9	0.181	-0.029	0.182
Body	1880.2	662	Mid	GSM	Internal	Li-ion	Earbud-Mic Belt-Holster	Back Side	2.5	0	29.9	0.405	-0.137	0.418

ANSI / IEEE C95.1 1999 - SAFETY LIMIT
BRAIN / BODY: 1.6 W/kg (averaged over 1 gram)
Spatial Peak - Uncontrolled Exposure / General Population

Test Date(s)	February 9, 2005			February 9, 2005			Measured Fluid Type	Brain	Body	Unit
Dielectric Constant ε_r	1880 MHz Brain Fluid			1880 MHz Body Fluid			Relative Humidity	30	30	%
	IEEE Target		Measured	IEEE Target		Measured	Atmospheric Pressure	102.8	102.7	kPa
	40.0	± 5%	38.1	53.3	± 5%	50.7	Ambient Temperature	22.3	23.7	°C
Conductivity σ (mho/m)	1880 MHz Brain Fluid			1880 MHz Body Fluid			Fluid Temperature	23.9	23.8	°C
	IEEE Target		Measured	IEEE Target		Measured	Fluid Depth	≥ 15	≥ 15	cm
	1.40	± 5%	1.40	1.52	± 5%	1.57	ρ (Kg/m^3)	1000		

Note(s):

1. The measurement results were obtained with the DUT tested in the conditions described in this report. Detailed measurement data and plots showing the maximum SAR location of the DUT are reported in Appendix A.
2. If the scaled SAR levels at the mid channel were ≥ 3 dB below the SAR limit, SAR evaluation for the low and high channels was optional per FCC OET Bulletin 65, Supplement C, Edition 01-01 (see reference [3]).
3. The power drifts measured by the DASY4 system for the duration of the SAR evaluations were added to the measured SAR levels to report scaled SAR results as shown in the above test data table.
4. The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the SAR evaluation. The temperatures reported were consistent for all measurement periods.
5. The dielectric parameters of the simulated tissue mixtures were measured prior to the evaluations using an HP 85070C Dielectric Probe Kit and an HP 8753E Network Analyzer (see Appendix C for printout of measured fluid dielectric parameters).
6. The SAR measurements were performed within 24 hours of the system performance check.

5.0 DETAILS OF SAR EVALUATION

The Enfora, L.P. Model: LBH0107 Portable PCS GSM Communicator FCC ID: MIVLBH0107 was compliant for localized Specific Absorption Rate (Uncontrolled Exposure / General Population) based on the test provisions and conditions described below. The detailed test setup photographs are shown in Appendix D.

1. The DUT was evaluated in a face-held configuration with the front of the device placed parallel to the outer surface of the planar phantom. A 2.5 cm separation distance was maintained between the front side of the DUT and the outer surface of the planar phantom.
2. The DUT was evaluated in a body-worn configuration with the DUT placed inside the Nitelze Small Clip Case Phone Holster accessory. The back side of the DUT was facing the back side of the Nitelze Small Clip Case Phone Holster accessory. The plastic belt-clip attached to the back side of the Nitelze Small Clip Case Phone Holster accessory was placed parallel to, and touching, the outer surface of the planar phantom. The belt-clip provided a 2.5 cm separation distance between the back side of the DUT and the outer surface of the planar phantom. An earbud with lapel-microphone accessory was connected to the audio port of the DUT for the duration of the body-worn SAR evaluations.
3. The power levels were set prior to the SAR evaluations using the PCTM software program provided by the manufacturer. The PCS band (1900 MHz) was set to the maximum power level (PL0).
4. The DUT was put in test mode via internal software from Laptop PC. The SAR measurements were performed with the DUT transmitting continuously at maximum power in 1 time slot (crest factor = 8.3).
5. The power drifts measured by the DASY4 system during the SAR evaluations were added to the measured SAR levels to report scaled SAR results as shown in the test data table (page 5).
6. The SAR evaluations were performed with a fully charged battery prior to each test.
7. The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the SAR evaluation. The temperatures reported were consistent for all measurement periods.
8. The dielectric parameters of the simulated tissue mixtures were measured prior to the evaluations using an HP 85070C Dielectric Probe Kit and an HP 8753E Network Analyzer (see Appendix C for printout of measured fluid dielectric parameters).
9. The SAR measurements were performed within 24 hours of the system performance check.
10. The SAR evaluations were performed using the planar section of the SAM phantom.

6.0 EVALUATION PROCEDURES

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 using the SAM phantom.
(ii) For body-worn and face-held devices a planar phantom was used.

b. The SAR was determined by a pre-defined procedure within the DASY4 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 15mm x 15mm.
An area scan was determined as follows:

c. Based on the defined area scan grid, a more detailed grid is created to increase the points by a factor of 10. The interpolation function then evaluates all field values between corresponding measurement points.

d. A linear search is applied to find all the candidate maxima. Subsequently, all maxima are removed that are >2 dB from the global maximum. The remaining maxima are then used to position the cube scans.
A 1g and 10g spatial peak SAR was determined as follows:

e. Extrapolation is used to find the points between the dipole center of the probe and the surface of the phantom. This data cannot be measured, since the center of the dipoles is 2.7 mm away form the tip of the probe and the distance between the surface and the lowest measuring point is 1.4 mm (see probe calibration document in Appendix D). The extrapolation was based on trivariate quadratics computed from the previously calculated 3D interpolated points nearest the phantom surface.

f. Interpolated data is used to calculate the average SAR over 1g and 10g cubes by spatially discretizing the entire measured cube. The volume used to determine the averaged SAR is a 1mm grid (42875 interpolated points).

g. A zoom scan volume of 32 mm x 32 mm x 30 mm (5x5x7 points) centered at the peak SAR location determined from the area scan is used for all zoom scans for devices with a transmit frequency < 800 MHz. Zoom scans for frequencies ≥ 800 MHz are determined with a scan volume of 30 mm x 30 mm x 30 mm (7x7x7 points) to ensure complete capture of the peak spatial-average SAR.

7.0 SYSTEM PERFORMANCE CHECK

Prior to the SAR evaluations a system check was performed at the planar section of the SAM phantom using a 1900MHz dipole (see Appendix E for system validation procedures). The dielectric parameters of the simulated brain tissue mixture were measured prior to the system performance check using an HP 85070C Dielectric Probe Kit and an HP 8753E Network Analyzer (see Appendix C for printout of measured fluid dielectric parameters). A forward power of 250 mW was applied to the dipole and the system was verified to a tolerance of ±10% (see Appendix B for system performance check test plot).

SYSTEM PERFORMANCE CHECK

Test Date	1900MHz Equiv. Tissue	SAR 1g (W/kg)		Dielectric Constant ε_r		Conductivity σ (mho/m)		ρ (Kg/m^3)	Amb. Temp. (°C)	Fluid Temp. (°C)	Fluid Depth (cm)	Humid. (%)	Barom. Press. (kPa)
		IEEE Target	Measured	IEEE Target	Measured	IEEE Target	Measured						
02/09/05	**Brain**	**9.93 ±10%**	10.0 (+0.7%)	**40.0±5%**	38.0	**1.40 ±5%**	1.42	1000	22.3	23.9	≥ 15	30	102.8

Note(s):
1. The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the system performance check. The temperatures listed in the above table were consistent for all measurement periods.

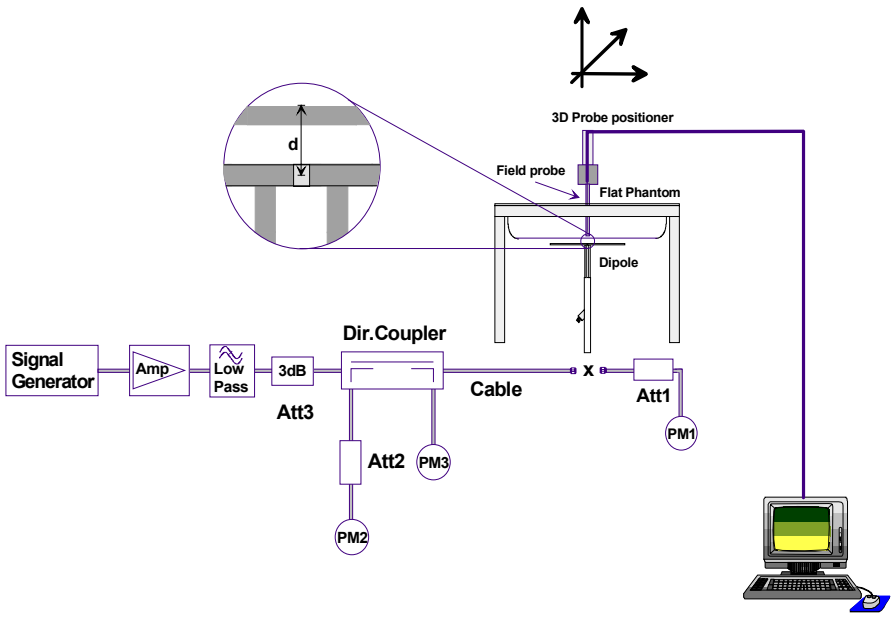


Figure 1. System Performance Check Setup Diagram

1900MHz Dipole Setup

8.0 SIMULATED EQUIVALENT TISSUES

The 1880/1900MHz simulated equivalent tissue mixtures consist of Glycol-monobutyl, water, and salt. The fluids were prepared according to standardized procedures and measured for dielectric parameters (permittivity and conductivity).

1880/1900 MHz TISSUE MIXTURES			
INGREDIENT	1900 MHz Brain	1880 MHz Brain	1880 MHz Body
	System Check	DUT Evaluation	DUT Evaluation
Water	55.85 %	55.85 %	69.85 %
Glycol Monobutyl	44.00 %	44.00 %	29.89 %
Salt	0.15 %	0.15 %	0.26 %

9.0 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.

10.0 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: AMD Athlon XP 2400+
Clock Speed: 2.0 GHz
Operating System: Windows XP Professional

Data Converter

Features: Signal Amplifier, multiplexer, A/D converter, and control logic
Software: DASY4 software
Connecting Lines: Optical downlink for data and status info.
Optical uplink for commands and clock

DASY4 Measurement Server

Function: Real-time data evaluation for field measurements and surface detection
Hardware: PC/104 166MHz Pentium CPU; 32 MB chipdisk; 64 MB RAM
Connections: COM1, COM2, DAE, Robot, Ethernet, Service Interface

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(s)

Type: SAM V4.0C
Shell Material: Fiberglas
Thickness: 2.0 ±0.1 mm
Volume: Approx. 25 liters

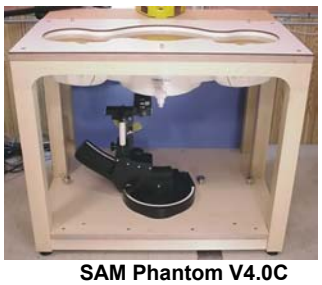
11.0 PROBE SPECIFICATION (ET3DV6)

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)
Dynamic Range:	5 μW/g to >100 mW/g; Linearity: ±0.2 dB
Surface Detection	±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 portable phone

ET3DV6 E-Field Probe

12.0 SAM PHANTOM V4.0C

The SAM phantom V4.0C is a fiberglass shell phantom with a 2.0 mm (+/-0.2 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 (see Appendix F for specifications of the SAM phantom V4.0C).



SAM Phantom V4.0C

13.0 DEVICE HOLDER

The DASY4 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

14.0 TEST EQUIPMENT LIST

TEST EQUIPMENT	SERIAL NO.	DATE CALIBRATED	CALIBRATION DUE DATE
Schmid & Partner DASY4 System	-	-	-
-DASY4 Measurement Server	1078	N/A	N/A
-Robot	599396-01	N/A	N/A
-DAE3	353	July 2004	July 2005
-DAE3	370	January 2005	January 2006
-ET3DV6 E-Field Probe	1387	March 2004	March 2005
-ET3DV6 E-Field Probe	1590	May 2004	May 2005
-EX3DV4 E-Field Probe	3547	January 2005	January 2006
-300MHz Validation Dipole	135	October 2004	October 2005
-450MHz Validation Dipole	136	November 2004	November 2005
-835MHz Validation Dipole	411	March 2004	March 2005
-900MHz Validation Dipole	054	June 2004	June 2005
-1800MHz Validation Dipole	247	June 2004	June 2005
-1900MHz Validation Dipole	151	June 2004	June 2005
-2450MHz Validation Dipole	150	September 2004	September 2005
-5000MHz Validation Dipole	1031	January 2005	January 2006
-SAM Phantom V4.0C	1033	N/A	N/A
-Barski Planar Phantom	03-01	N/A	N/A
-Plexiglas Planar Phantom	161	N/A	N/A
-Validation Planar Phantom	137	N/A	N/A
HP 85070C Dielectric Probe Kit	N/A	N/A	N/A
Gigatronics 8651A Power Meter	8650137	April 2004	April 2005
Gigatronics 8652A Power Meter	1835267	April 2004	April 2005
Gigatronics 80701A Power Sensor	1833535	April 2004	April 2005
Gigatronics 80701A Power Sensor	1833542	April 2004	April 2005
Gigatronics 80701A Power Sensor	1834350	April 2004	April 2005
HP 8594E Spectrum Analyzer	3543A02721	April 2004	April 2005
HP 8753E Network Analyzer	US38433013	April 2004	April 2005
HP 8648D Signal Generator	3847A00611	April 2004	April 2005
Amplifier Research 5S1G4 Power Amplifier	26235	N/A	N/A

15.0 MEASUREMENT UNCERTAINTIES

UNCERTAINTY BUDGET FOR DEVICE EVALUATION

Error Description	Uncertainty Value ±%	Probability Distribution	Divisor	c_i 1g	Standard Uncertainty ±% (1g)	v_i or v_{eff}
Measurement System						
Probe calibration (1900 MHz)	± 4.85	Normal	1	1	± 4.85	∞
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	√3	1	± 6.7	12
Device holder uncertainty	± 5.0	Normal	√3	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)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
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					**± 13.32**	
Expanded Uncertainty (k=2)					**± 26.64**	

Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 (see reference [5])

MEASUREMENT UNCERTAINTIES (Cont.)

UNCERTAINTY BUDGET FOR SYSTEM VALIDATION

Error Description	Uncertainty Value ±%	Probability Distribution	Divisor	c_i 1g	Standard Uncertainty ±% (1g)	v_i or v_{eff}
Measurement System						
Probe calibration (1900 MHz)	± 4.85	Normal	1	1	± 4.85	∞
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	∞
Dipole						
Dipole Axis to Liquid Distance	± 2.0	Rectangular	√3	1	± 1.2	∞
Input Power	± 4.7	Rectangular	√3	1	± 2.7	∞
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)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
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					**± 9.97**	
Expanded Uncertainty (k=2)					**± 19.93**	

Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 (see reference [5])

16.0 REFERENCES

[1] Federal Communications Commission, “Radiofrequency radiation exposure evaluation: portable devices”, Rule Part 47 CFR §2.1093: 1999.

[2] Health Canada, “Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz”, Safety Code 6.

[3] 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.

[4] Industry Canada, “Evaluation Procedure for Mobile and Portable Radio Transmitters with respect to Health Canada’s Safety Code 6 for Exposure of Humans to Radio Frequency Fields”, Radio Standards Specification RSS-102 Issue 1 (Provisional): September 1999.

[5] IEEE Std 1528-2003, “Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”: December 2003.

APPENDIX A - SAR MEASUREMENT DATA

Date Tested: 02/09/05

Face-Held SAR - Front Side of DUT (LCD Side)

DUT: Enfora Model: LBH0107; Type: Portable PCS GSM Communicator; Serial: SAR 1

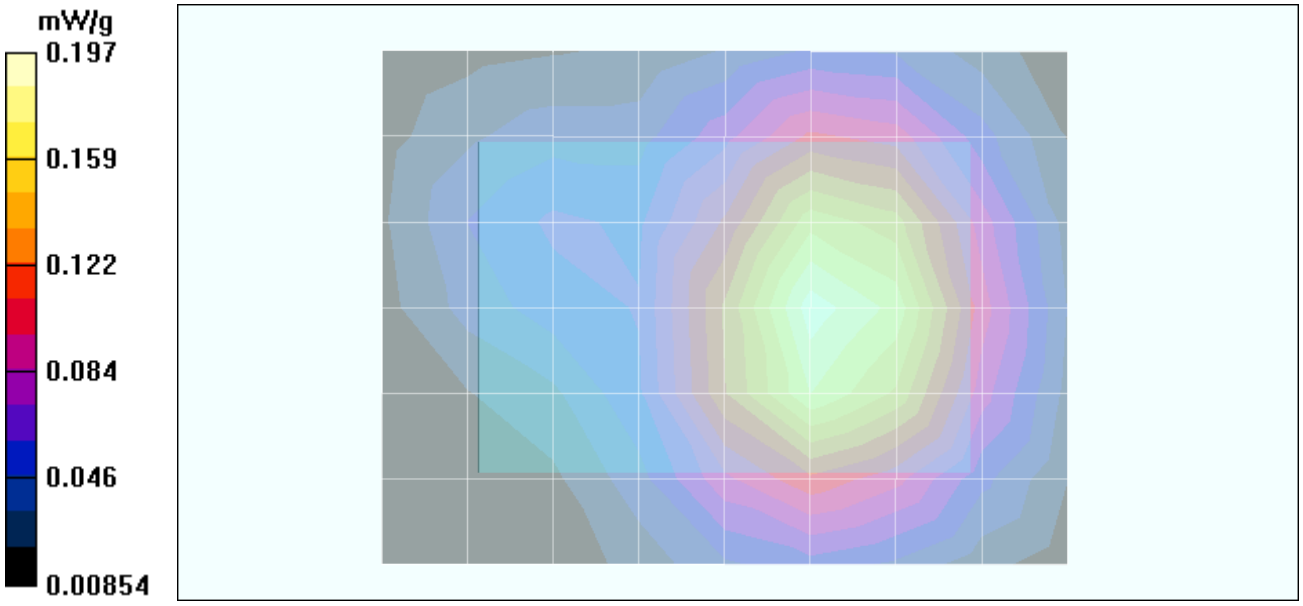
Ambient Temp: 22.3 °C; Fluid Temp: 23.9 °C; Barometric Pressure: 102.8 kPa; Humidity: 30%

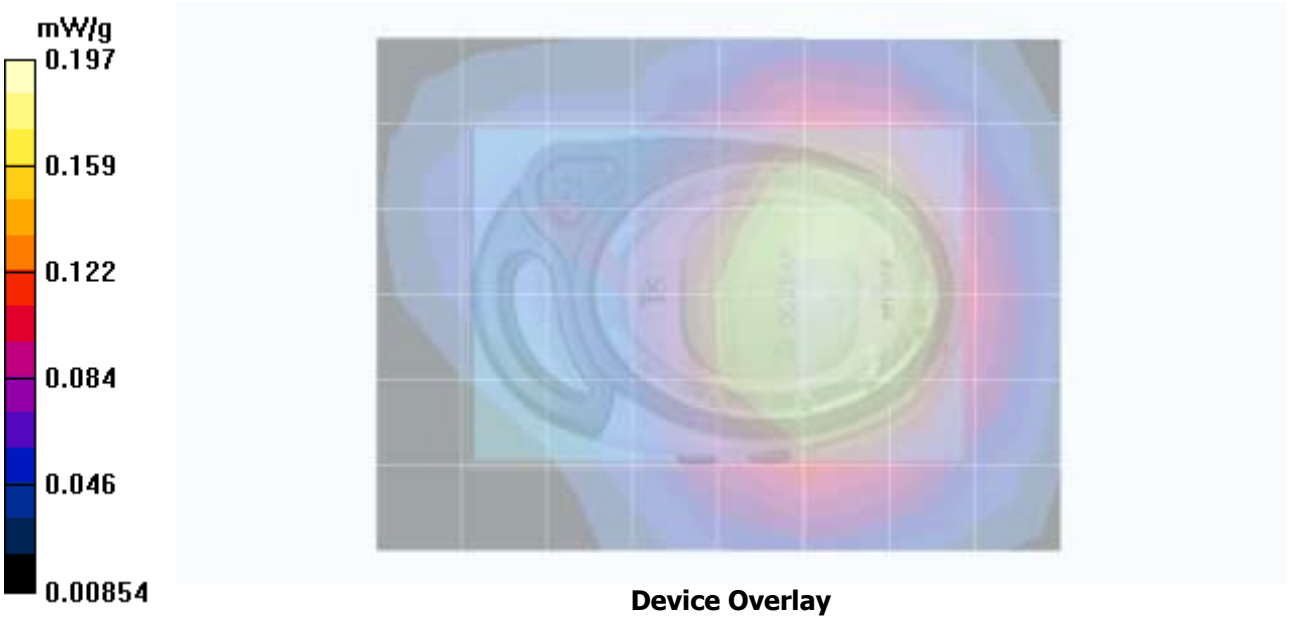
RF Conducted Power: 29.9 dBm (PL0)
Communication System: PCS GSM
3.7V 870mAH Li-ion Internal Battery
Frequency: 1880.2 MHz; Duty Cycle: 1:8.3
Medium: HSL1880 (σ = 1.40 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(5.25, 5.25, 5.25); Calibrated: 18/03/2004
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 06/07/2004
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

Face-Held - 2.5 cm Separation Distance to planar phantom - Mid Channel/Area Scan (7x9x1):
Measurement grid: dx=15mm, dy=15mm

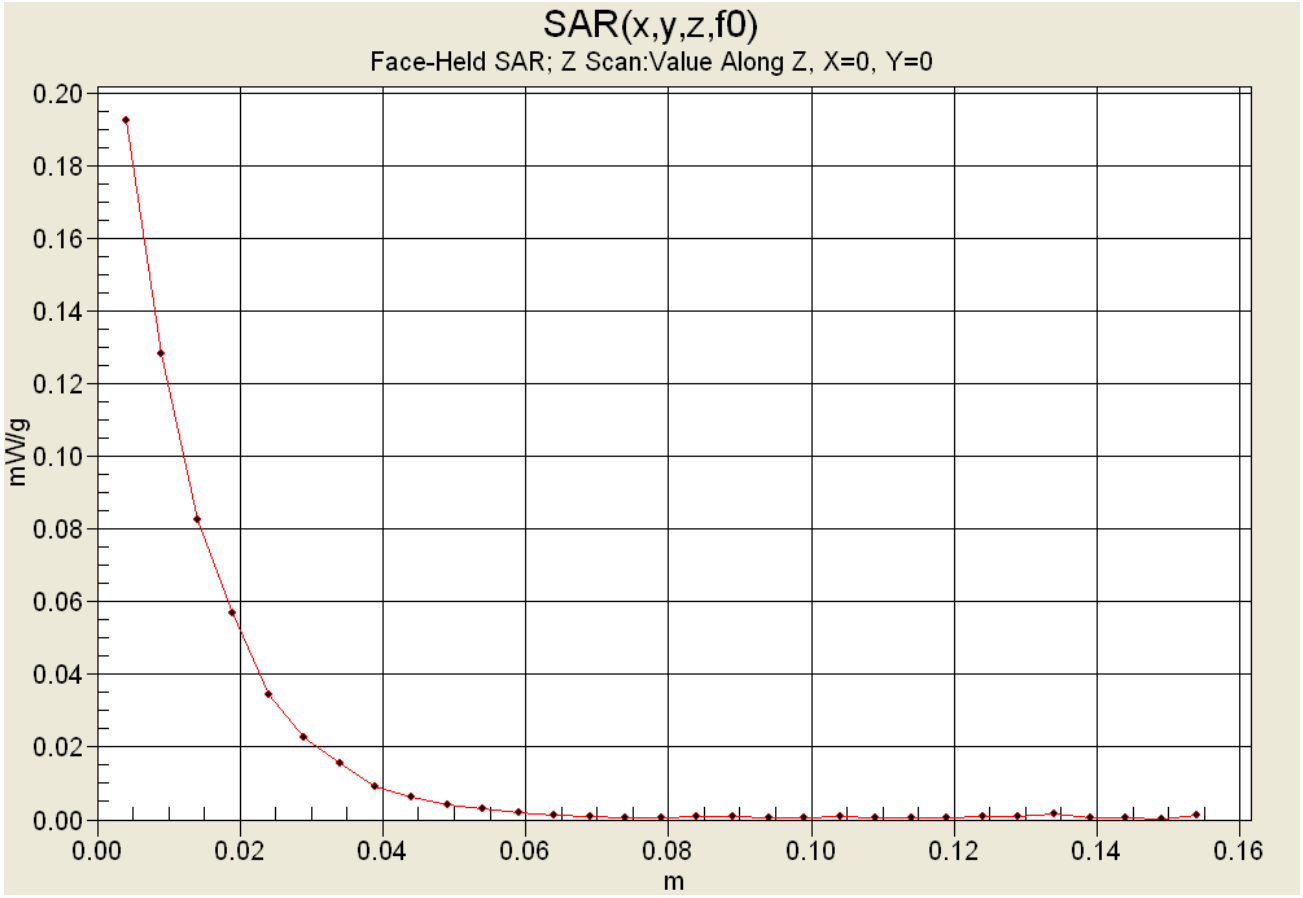
Face-Held - 2.5 cm Separation Distance to planar phantom - Mid Channel/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.7 V/m; Power Drift = -0.029 dB
Peak SAR (extrapolated) = 0.269 W/kg
SAR(1 g) = 0.181 mW/g; SAR(10 g) = 0.116 mW/g





Device Overlay

Z-Axis Scan



Date Tested: 02/09/05

Body-Worn SAR - Back Side of DUT

DUT: Enfora Model: LBH0107; Type: Portable PCS GSM Communicator; Serial: SAR 1

Body-Worn Accessories: DUT with Nitelze Small Clip Case Phone Holster & Belt-Clip; Generic Earbud w/ Lapel-Microphone

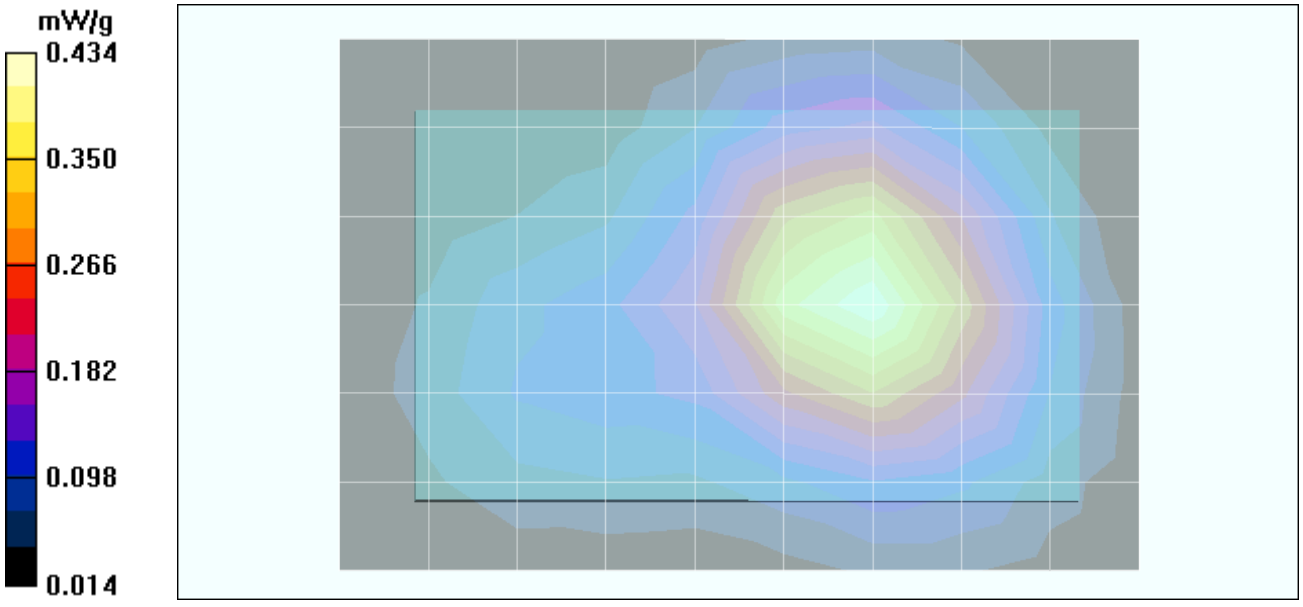
Ambient Temp: 23.7 °C; Fluid Temp: 23.8 °C; Barometric Pressure: 102.7 kPa; Humidity: 30%

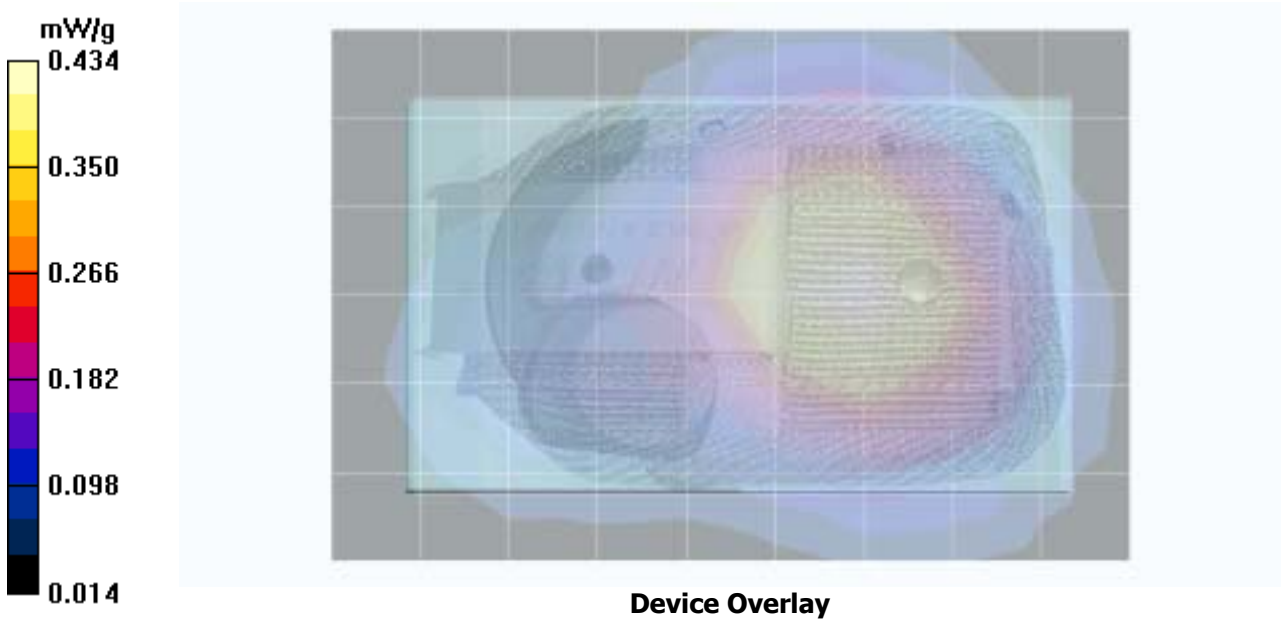
RF Conducted Power: 29.9 dBm (PL0)
Communication System: PCS GSM
3.7V 870mAH Li-ion Internal Battery
Frequency: 1880.2 MHz; Duty Cycle: 1:8.3
Medium: M1880 (σ = 1.57 mho/m; ε_r = 50.7; ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(4.57, 4.57, 4.57); Calibrated: 18/03/2004
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 06/07/2004
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

Body-Worn - 2.5 cm Belt-Clip & Holster Separation Distance to planar phantom - Mid Channel/Area Scan (7x10x1):
Measurement grid: dx=15mm, dy=15mm

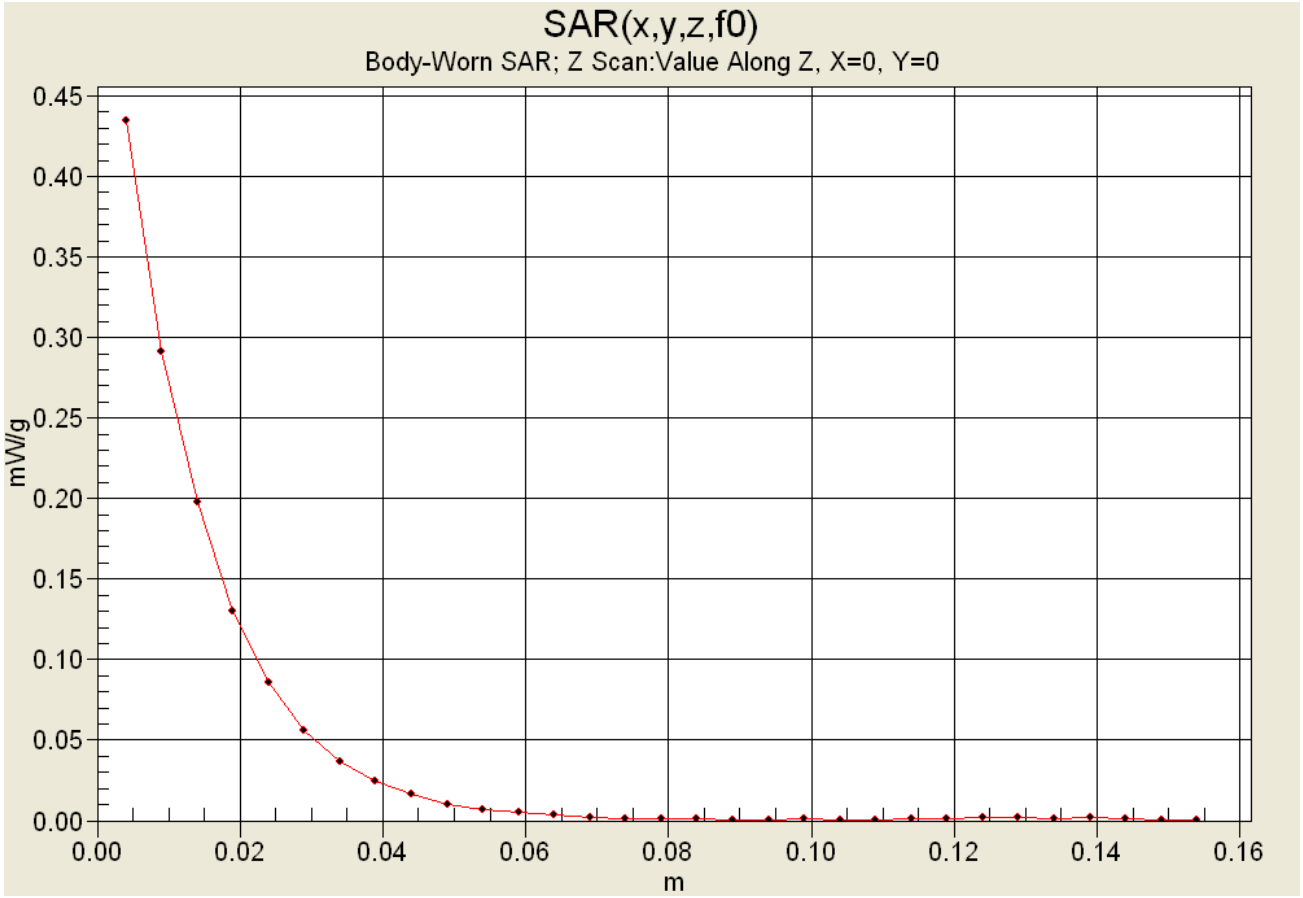
Body-Worn - 2.5 cm Belt-Clip & Holster Separation Distance to planar phantom - Mid Channel/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.8 V/m; Power Drift = -0.137 dB
Peak SAR (extrapolated) = 0.599 W/kg
SAR(1 g) = 0.405 mW/g; SAR(10 g) = 0.259 mW/g





Device Overlay

Z-Axis Scan



APPENDIX B - SYSTEM PERFORMANCE CHECK DATA

Date Tested: 02/09/05

System Performance Check - 1900 MHz Dipole

DUT: Dipole 1900 MHz; Model: D1900V2; Type: System Performance Check; Serial: 151; Calibrated: 06/18/2004

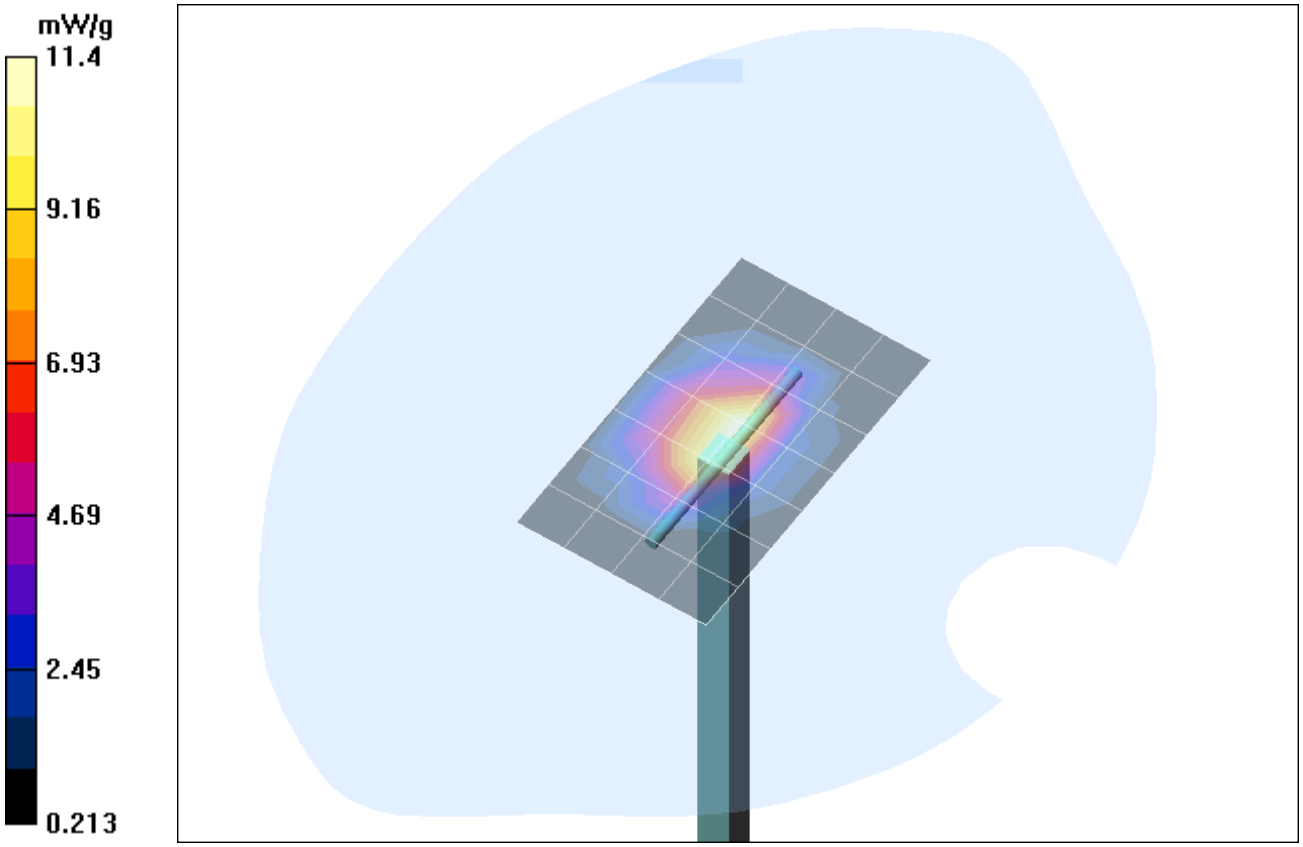
Ambient Temp: 22.3 °C; Fluid Temp: 23.9 °C; Barometric Pressure: 102.8 kPa; Humidity: 30%

Communication System: CW
Forward Conducted Power: 250 mW
Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL1900 (σ = 1.42 mho/m; ε_r = 38.0; ρ = 1000 kg/m^3)

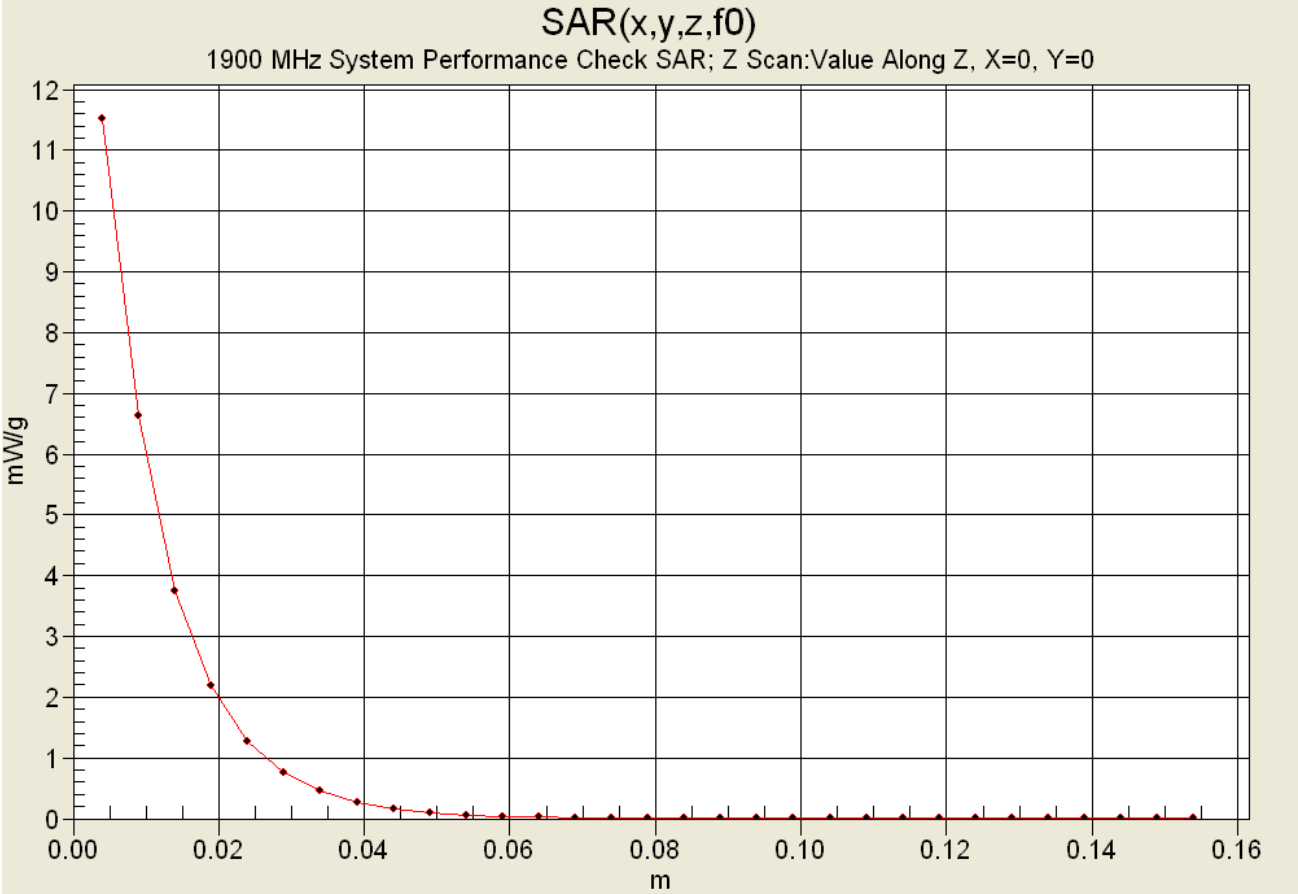
- Probe: ET3DV6 - SN1387; ConvF(5.25, 5.25, 5.25); Calibrated: 18/03/2004
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 06/07/2004
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

1900 MHz Dipole - System Performance Check/Area Scan (5x8x1):
Measurement grid: dx=15mm, dy=15mm

1900 MHz Dipole - System Performance Check/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 93.1 V/m; Power Drift = -0.0 dB
Peak SAR (extrapolated) = 17.3 W/kg
SAR(1 g) = 10.0 mW/g; SAR(10 g) = 5.27 mW/g



Z-Axis Scan



APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS

1900 MHz System Performance Check & 1880 MHz DUT Evaluation (Face)

Measured Fluid Dielectric Parameters (Brain)

February 09, 2005

Frequency	e'	e"
1.800000000 GHz	38.4994	13.1581
1.810000000 GHz	38.4348	13.2016
1.820000000 GHz	38.3864	13.2297
1.830000000 GHz	38.3276	13.2582
1.840000000 GHz	38.2909	13.3064
1.850000000 GHz	38.2486	13.3283
1.860000000 GHz	38.2038	13.3341
1.870000000 GHz	38.1512	13.3742
1.880000000 GHz	38.1182	13.4056
1.890000000 GHz	38.0621	13.4452
1.900000000 GHz	38.0275	13.4747
1.910000000 GHz	37.9795	13.4804
1.920000000 GHz	37.9258	13.5365
1.930000000 GHz	37.8929	13.5537
1.940000000 GHz	37.8381	13.5759
1.950000000 GHz	37.7915	13.6047
1.960000000 GHz	37.7505	13.5899
1.970000000 GHz	37.6786	13.6207
1.980000000 GHz	37.6368	13.6472
1.990000000 GHz	37.5695	13.6815
2.000000000 GHz	37.5106	13.7135

1880 MHz DUT Evaluation (Body)

Measured Fluid Dielectric Parameters (Muscle)

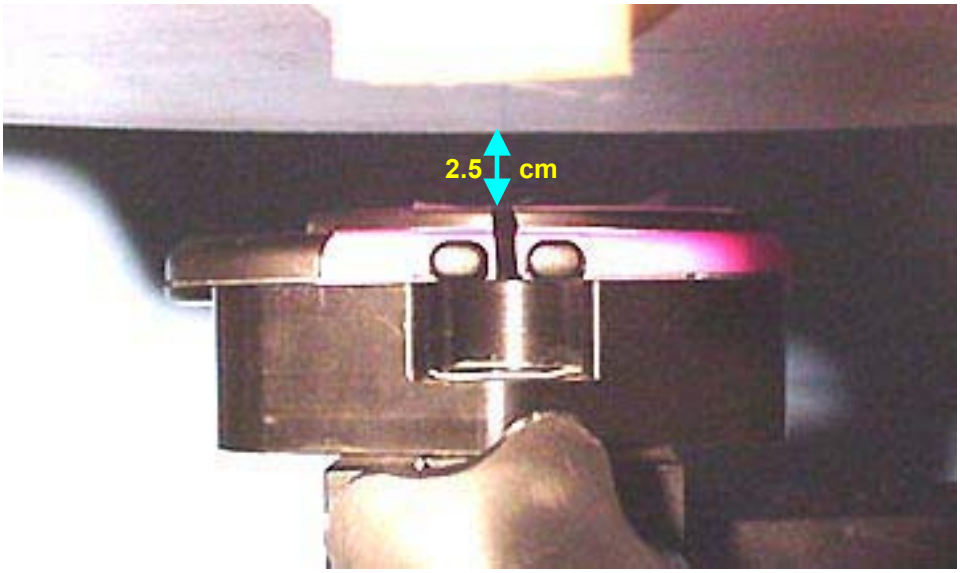
February 09, 2005

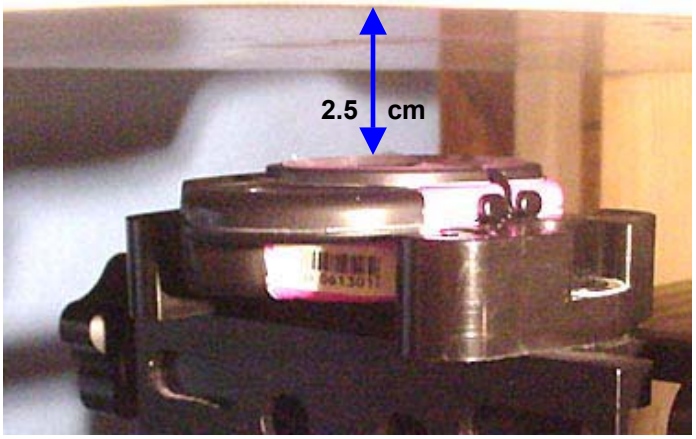
Frequency	e'	e"
1.800000000 GHz	51.0926	14.6806
1.810000000 GHz	51.0539	14.7244
1.820000000 GHz	50.9898	14.7822
1.830000000 GHz	50.9458	14.8060
1.840000000 GHz	50.9003	14.8597
1.850000000 GHz	50.8569	14.8838
1.860000000 GHz	50.8172	14.9227
1.870000000 GHz	50.7648	14.9445
1.880000000 GHz	50.7484	14.9855
1.890000000 GHz	50.7014	15.0175
1.900000000 GHz	50.6592	15.0529
1.910000000 GHz	50.6188	15.0800
1.920000000 GHz	50.5663	15.1075
1.930000000 GHz	50.5411	15.1398
1.940000000 GHz	50.5070	15.1801
1.950000000 GHz	50.4617	15.2095
1.960000000 GHz	50.4182	15.2272
1.970000000 GHz	50.3694	15.2607
1.980000000 GHz	50.3234	15.2992
1.990000000 GHz	50.2716	15.3293
2.000000000 GHz	50.2163	15.3806

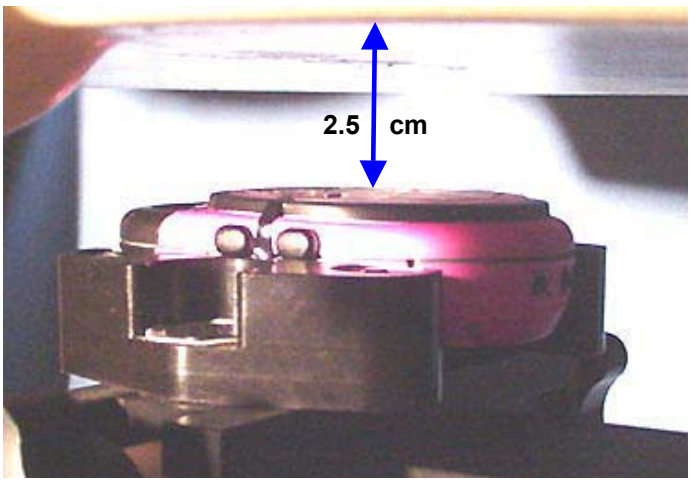
APPENDIX D - SAR TEST SETUP & DUT PHOTOGRAPHS

FACE-HELD SAR TEST SETUP PHOTOGRAPHS

2.5 cm Separation Distance from Front of DUT to Planar Phantom



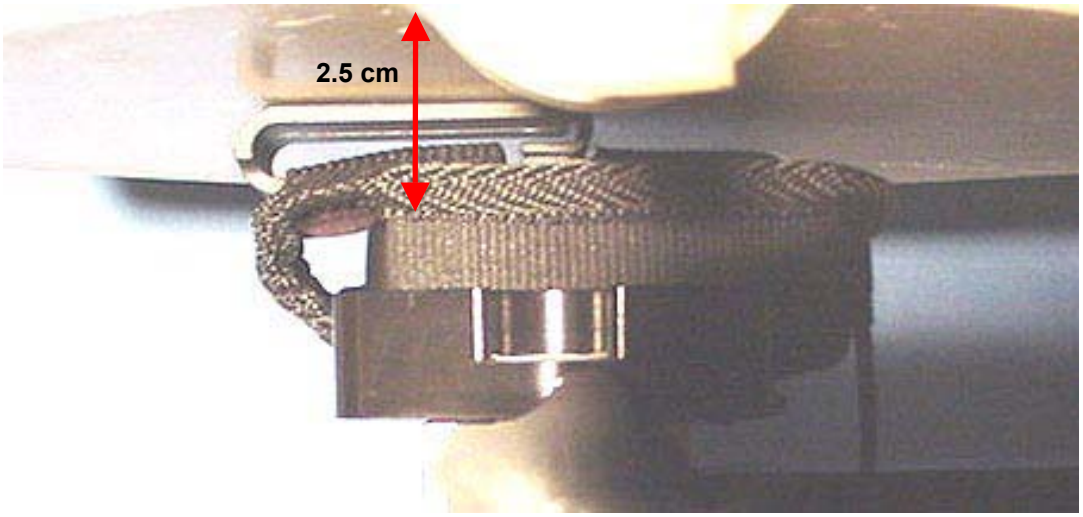


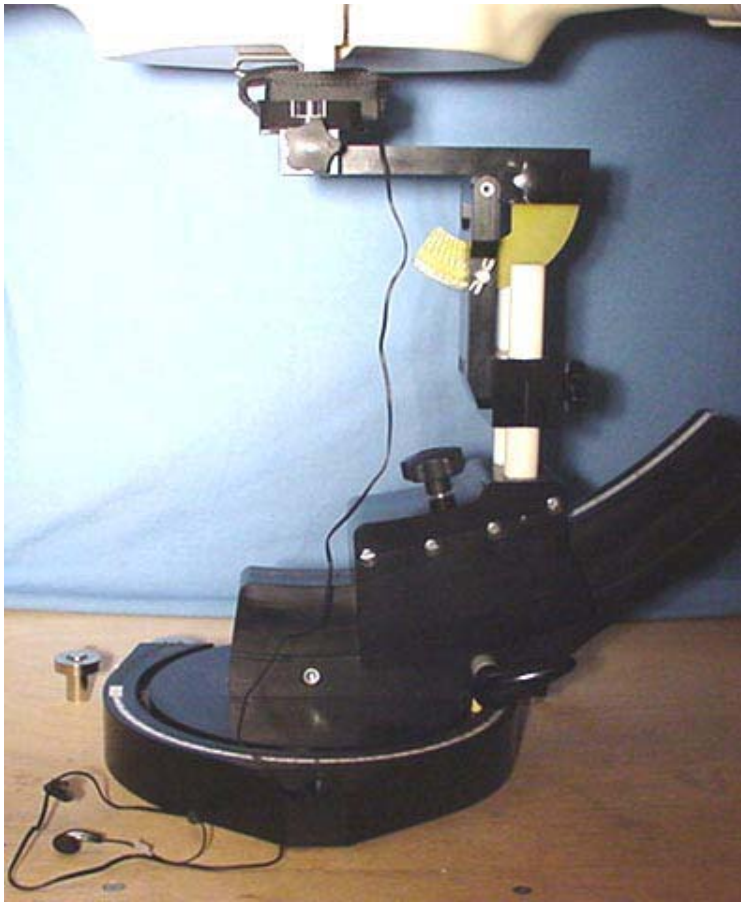


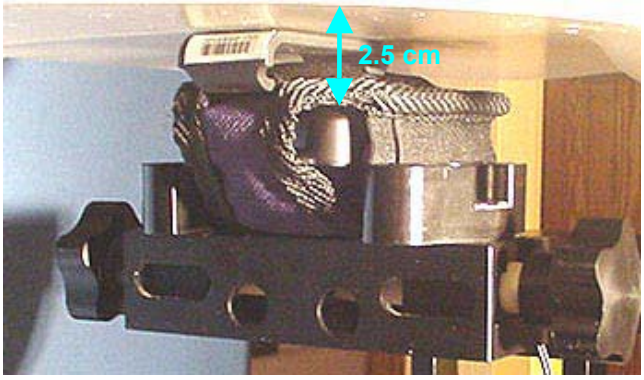
BODY-WORN SAR TEST SETUP PHOTOGRAPHS

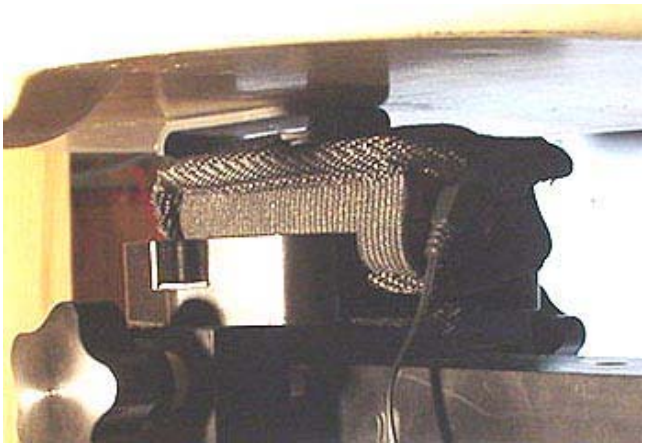
2.5 cm Belt-Clip Separation Distance from Back of DUT to Planar Phantom

With Nitelze Small Clip Case Phone Holster and Generic Earbud/Lapel-Microphone









DUT PHOTOGRAPHS

Front of DUT

Back of DUT

Top of DUT

Bottom of DUT

DUT PHOTOGRAPHS

Right Side of DUT

Left Side of DUT

DUT PHOTOGRAPHS

Front of Nitelze Small Clip Case Phone Holster

Back of Nitelze Small Clip Case Phone Holster

Left Side of Nitelze Small Clip Case Phone Holster

Right Side of Nitelze Small Clip Case Phone Holster

Plastic Belt-Clip

DUT PHOTOGRAPHS

DUT with Nitelze Small Clip Case Phone Holster & Generic Earbud with Lapel Microphone

APPENDIX E - SYSTEM VALIDATION

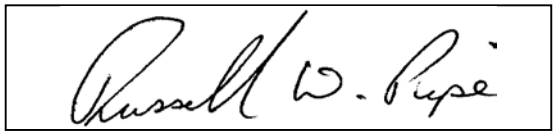
Celltech
Testing and Engineering Services Lab

1900 MHz SYSTEM VALIDATION DIPOLE

Type:	**1900 MHz Validation Dipole**
Serial Number:	**151**
Place of Calibration:	**Celltech Labs Inc.**
Date of Calibration:	**June 18, 2004**

Celltech Labs Inc. hereby certifies that this device has been calibrated on the date indicated above.

Calibrated by: 

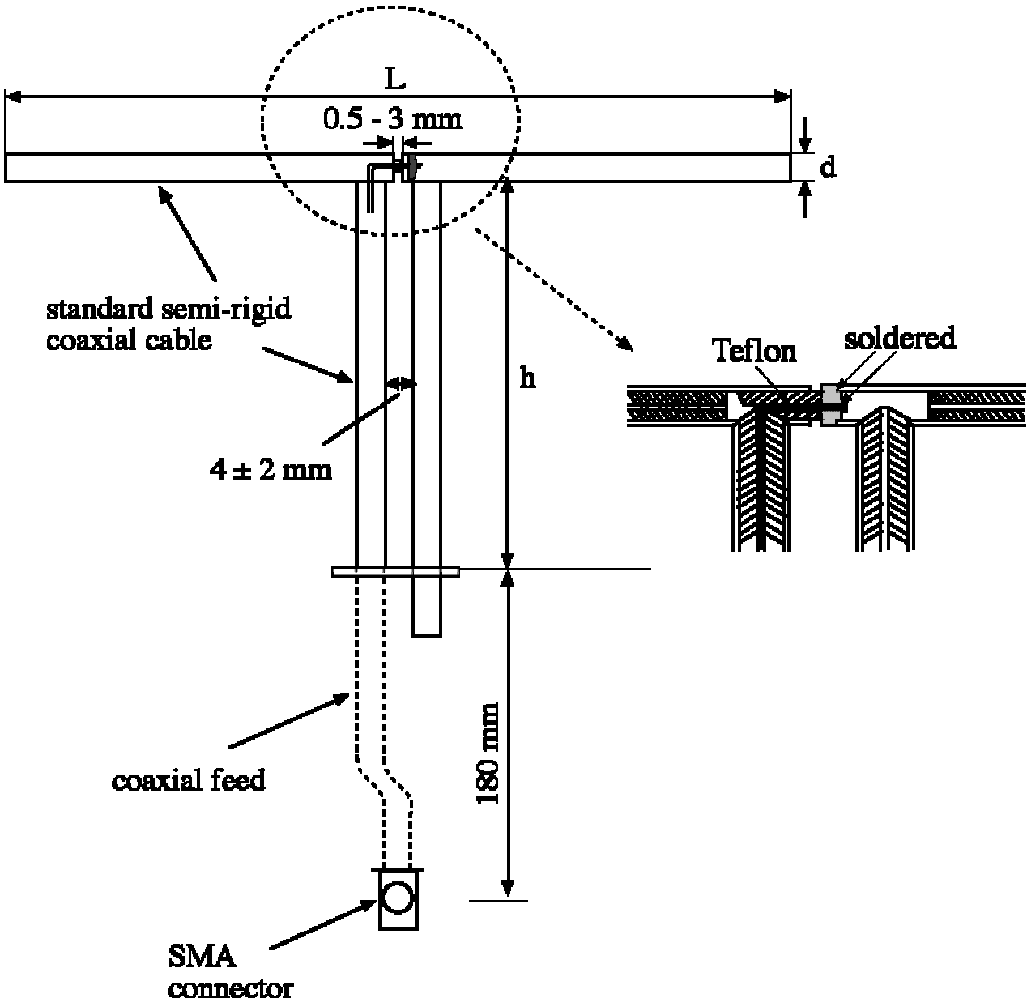
Approved by: 

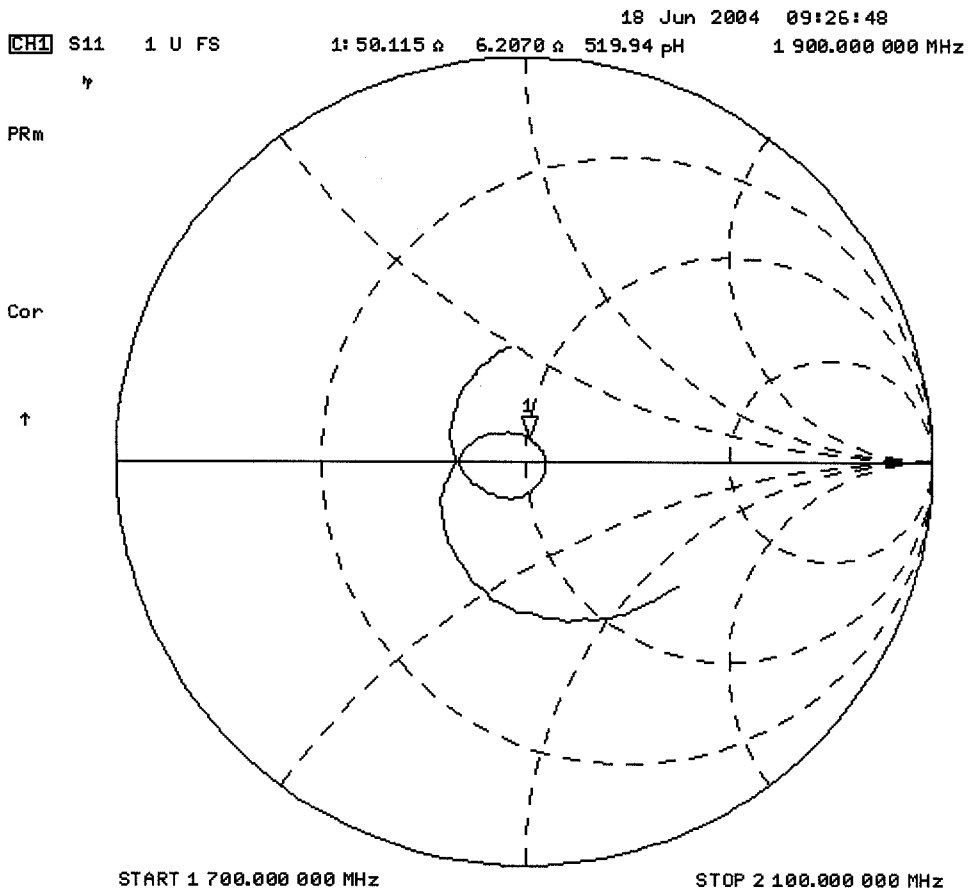
Celltech Labs Inc. 1955 Moss Court, Kelowna, B.C. Canada V1Y 9L3
Tel. 250-448-7047 • Fax. 250-448-7046 • e-mail: info@celltechlabs.com
www.celltechlabs.com

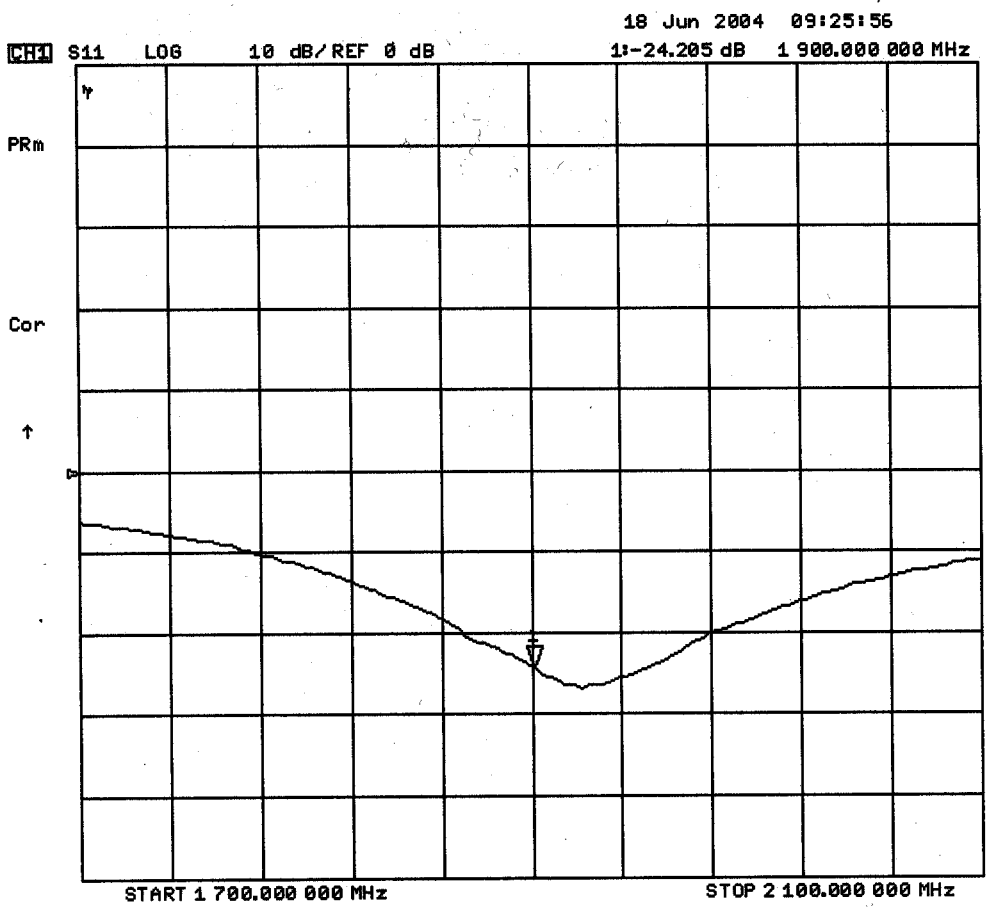
1. Dipole Construction & Electrical Characteristics

The validation dipole was constructed in accordance with the IEEE Standard "Annex G (informative) Reference dipoles for use in system validation". The electrical properties were measured using an HP 8753E Network Analyzer. The network analyzer was calibrated to the validation dipole N-type connector feed point using an HP85032E Type N calibration kit. The dipole was placed parallel to a planar phantom at a separation distance of 10.0mm from the simulating fluid using a loss-less dielectric spacer. The measured input impedance is:

Feed point impedance at 1900MHz	Re{Z} = 50.115Ω
	Im{Z} = 6.2070Ω
Return Loss at 1900MHz	-24.205dB




18 Jun 2004 09:26:48
CH1 S11 1 U FS
1: 50.115 Ω 6.2070 Ω 519.94 pH
1 900.000 000 MHz
PRm
Cor
1
START 1 700.000 000 MHz
STOP 2 100.000 000 MHz


18 Jun 2004 09:25:56
CH1 S11 LOG 10 dB/ REF 0 dB
1:-24.205 dB 1 900.000 000 MHz
PRm
Cor
START 1 700.000 000 MHz
STOP 2 100.000 000 MHz

Validation Dipole Dimensions

Frequency (MHz)	L (mm)	h (mm)	d (mm)
300	420.0	250.0	6.2
450	288.0	167.0	6.2
835	161.0	89.8	3.6
900	149.0	83.3	3.6
1450	89.1	51.7	3.6
1800	72.0	41.7	3.6
1900	68.0	39.5	3.6
2000	64.5	37.5	3.6
2450	51.8	30.6	3.6
3000	41.5	25.0	3.6

2. Validation Phantom

The validation phantom is the SAM (Specific Anthropomorphic Mannequin) phantom manufactured by Schmid & Partner Engineering AG. The SAM phantom is a Fiberglass shell integrated in a wooden table. The shape of the shell corresponds to the phantom defined by SCC34-SC2. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot.

Shell Thickness: 2.0 ± 0.1 mm
Filling Volume: Approx. 20 liters
Dimensions: 50 cm (W) x 100 cm (L)

1900 MHz System Validation Setup

1900 MHz System Validation Setup

3. Measurement Conditions

The SAM phantom was filled with 1900 MHz brain simulating tissue.

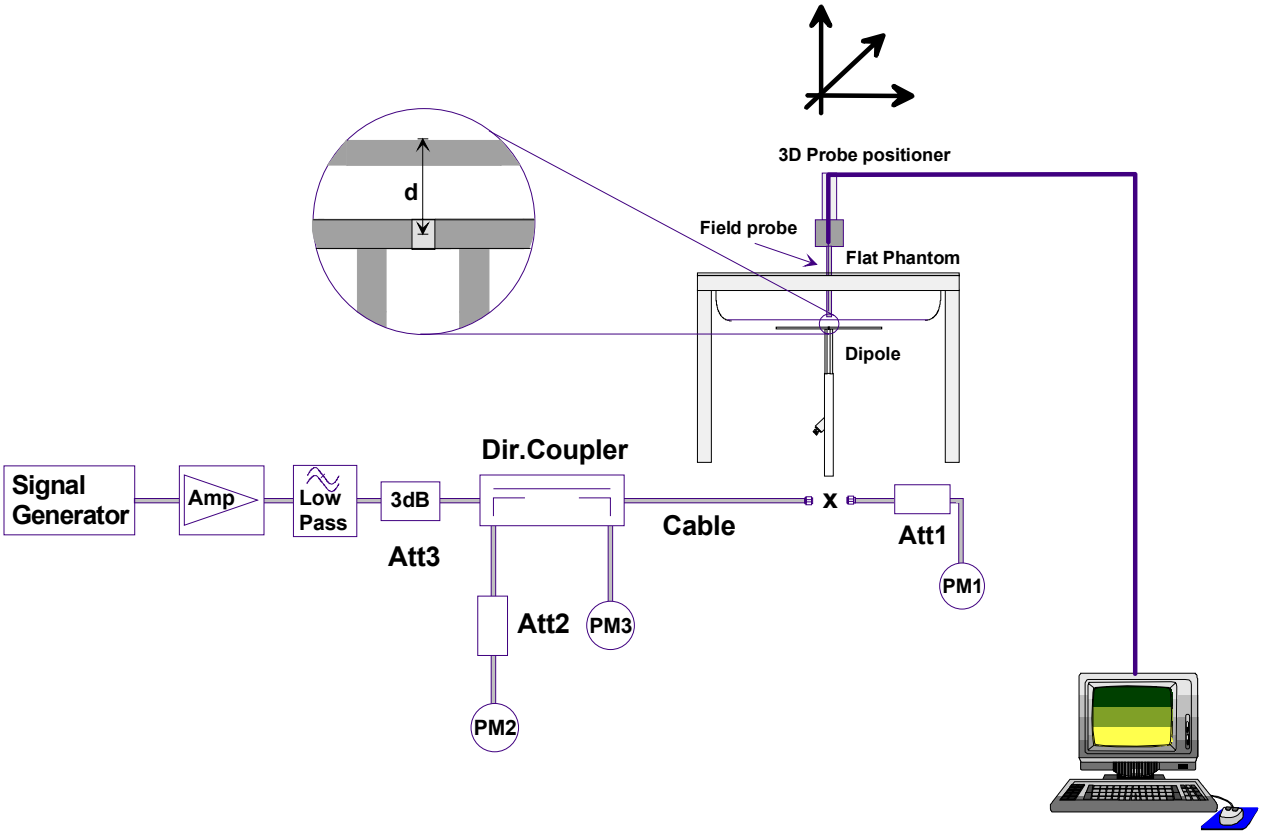
Relative Permittivity:	38.3
Conductivity:	1.43 mho/m
Ambient Temperature:	24.0 °C
Fluid Temperature:	22.6 °C
Fluid Depth:	≥ 15.0 cm
Barometric Pressure:	103.0 kPa
Humidity:	37%

The 1900 MHz tissue simulant consists of the following ingredients:

Ingredient	Percentage by weight
Water	55.85%
Glycol	44.00%
Salt	0.15%
Target Dielectric Parameters at 22 °C	ε_r = 40.0 σ = 1.40 S/m

4. SAR Measurement

The SAR measurement was performed with the E-field probe in mechanical detection mode only. The setup and determination of the forward power into the dipole was performed using the following procedures.



First the power meter PM1 (including attenuator Att1) is connected to the cable to measure the forward power at the location of the dipole connector (X). The signal generator is adjusted for the desired forward power at the dipole connector (taking into account the attenuation of Att1) as read by power meter PM2. After connecting the cable to the dipole, the signal generator is readjusted for the same reading at power meter PM2. If the signal generator does not allow adjustment in 0.01dB steps, the remaining difference at PM2 must be taken into consideration. PM3 records the reflected power from the dipole to ensure that the value is not changed from the previous value. The reflected power should be 50dB below the forward power.

Ten SAR measurements were performed in order to achieve repeatability and to establish an average target value.

Validation Dipole SAR Test Results

Validation Measurement	SAR @ 0.25W Input averaged over 1g	SAR @ 1W Input averaged over 1g	SAR @ 0.25W Input averaged over 10g	SAR @ 1W Input averaged over 10g	Peak SAR @ 0.25W Input
Test 1	10.1	40.40	5.30	21.20	17.4
Test 2	9.93	39.72	5.21	20.84	17.2
Test 3	9.98	39.92	5.23	20.92	17.3
Test 4	9.99	39.96	5.21	20.84	17.4
Test 5	9.97	39.88	5.22	20.88	17.4
Test 6	9.90	39.60	5.20	20.80	17.1
Test 7	9.93	39.72	5.21	20.84	17.2
Test 8	9.96	39.84	5.20	20.80	17.3
Test 9	9.94	39.76	5.20	20.80	17.2
Test 10	9.96	39.84	5.21	20.84	17.2
Average	9.966	39.864	5.219	20.876	17.27

The results have been normalized to 1W (forward power) into the dipole.

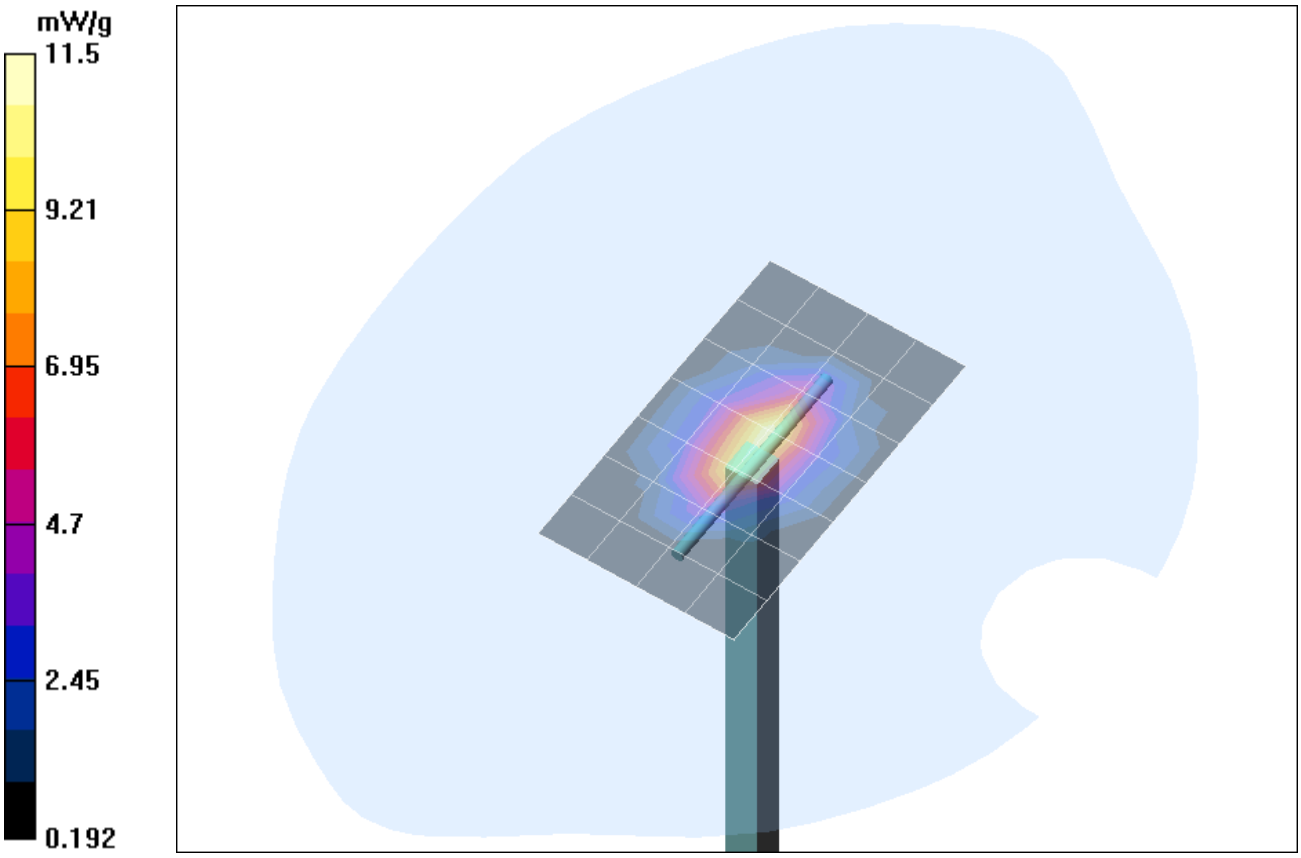
1g/10g Averaged	Average Measured SAR @ 1W Input	IEEE Target SAR @ 1W Input	Deviation (%)
1 gram	39.864	39.7	+ 0.413
10 gram	20.876	20.5	+ 1.835

1900 MHz System Validation - June 18, 2004

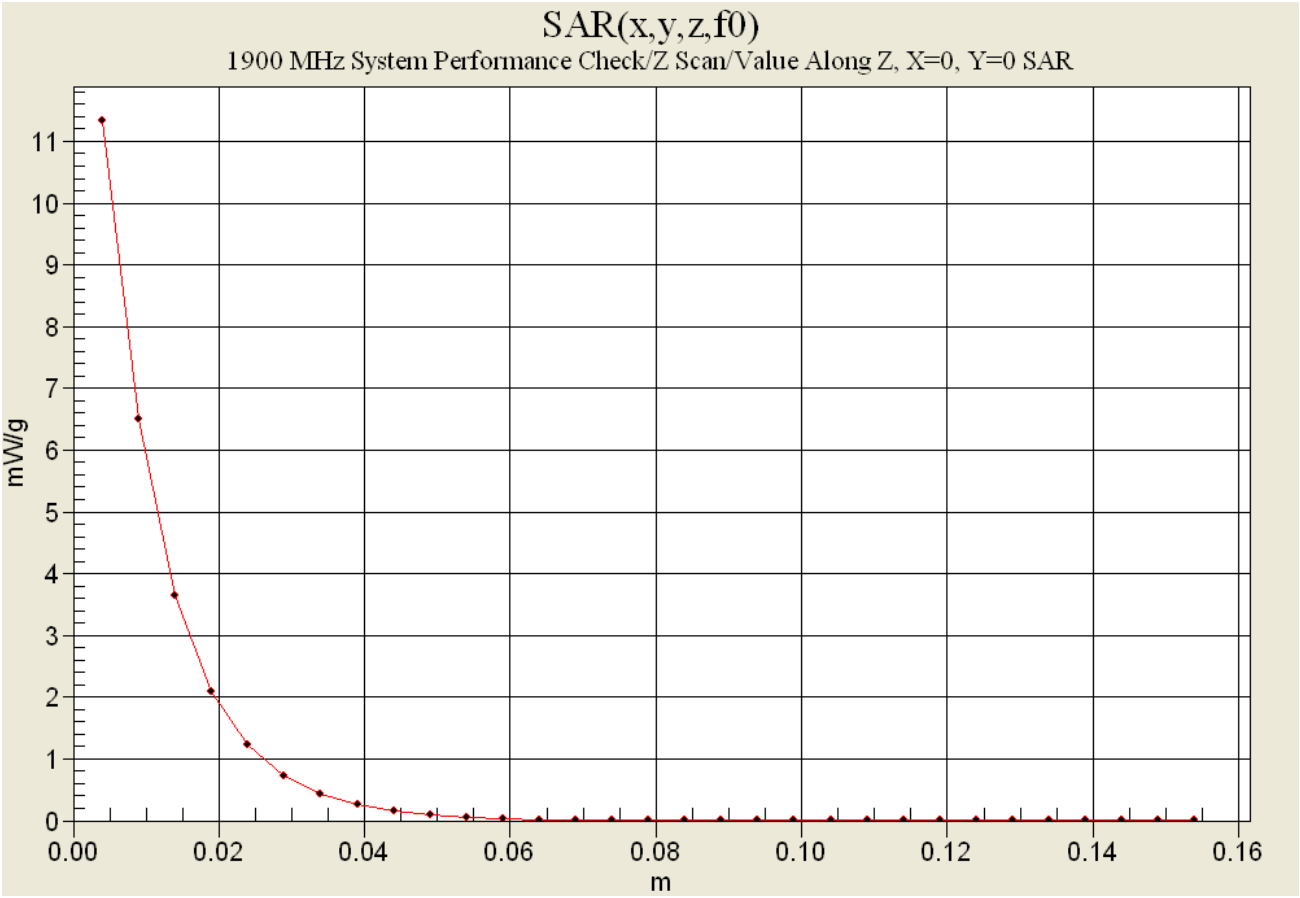
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 151
Ambient Temp: 24.0°C; Fluid Temp: 22.6°C; Barometric Pressure: 103.0 kPa; Humidity: 37%
Communication System: CW
Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL1900 (σ = 1.43 mho/m; ε_r = 38.3; ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1387; ConvF(5.25, 5.25, 5.25); Calibrated: 18/03/2004
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn370; Calibrated: 14/05/2004
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

1900 MHz System Validation/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 96.9 V/m; Power Drift = 0.1 dB
1900 MHz System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.9 V/m; Power Drift = 0.1 dB
Peak SAR (extrapolated) = 17.4 W/kg
SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.3 mW/g
1900 MHz System Validation/Zoom Scan 2 (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.8 V/m; Power Drift = 0.0 dB
Peak SAR (extrapolated) = 17.2 W/kg
SAR(1 g) = 9.93 mW/g; SAR(10 g) = 5.21 mW/g
1900 MHz System Validation/Zoom Scan 3 (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.2 V/m; Power Drift = 0.009 dB
Peak SAR (extrapolated) = 17.3 W/kg
SAR(1 g) = 9.98 mW/g; SAR(10 g) = 5.23 mW/g
1900 MHz System Validation/Zoom Scan 4 (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.9 V/m; Power Drift = 0.001 dB
Peak SAR (extrapolated) = 17.4 W/kg
SAR(1 g) = 9.99 mW/g; SAR(10 g) = 5.21 mW/g
1900 MHz System Validation/Zoom Scan 5 (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.2 V/m; Power Drift = -0.003 dB
Peak SAR (extrapolated) = 17.4 W/kg
SAR(1 g) = 9.97 mW/g; SAR(10 g) = 5.22 mW/g
1900 MHz System Validation/Zoom Scan 6 (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.8 V/m; Power Drift = -0.0 dB
Peak SAR (extrapolated) = 17.1 W/kg
SAR(1 g) = 9.9 mW/g; SAR(10 g) = 5.2 mW/g
1900 MHz System Validation/Zoom Scan 7 (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.8 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 17.2 W/kg
SAR(1 g) = 9.93 mW/g; SAR(10 g) = 5.21 mW/g
1900 MHz System Validation/Zoom Scan 8 (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.1 V/m; Power Drift = -0.007 dB
Peak SAR (extrapolated) = 17.3 W/kg
SAR(1 g) = 9.96 mW/g; SAR(10 g) = 5.2 mW/g
1900 MHz System Validation/Zoom Scan 9 (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.7 V/m; Power Drift = -0.0 dB
Peak SAR (extrapolated) = 17.2 W/kg
SAR(1 g) = 9.94 mW/g; SAR(10 g) = 5.2 mW/g
1900 MHz System Validation/Zoom Scan 10 (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.1 V/m; Power Drift = -0.0 dB
Peak SAR (extrapolated) = 17.2 W/kg
SAR(1 g) = 9.96 mW/g; SAR(10 g) = 5.21 mW/g



1 g average of 10 measurements: 9.966 mW/g
10 g average of 10 measurements: 5.219 mW/g



1900 MHz System Validation

Measured Fluid Dielectric Parameters (Brain)

June 18, 2004

Frequency	e'	e"
1.800000000 GHz	38.7685	13.2945
1.810000000 GHz	38.7232	13.3253
1.820000000 GHz	38.6647	13.3519
1.830000000 GHz	38.6047	13.3737
1.840000000 GHz	38.5593	13.4078
1.850000000 GHz	38.5136	13.4244
1.860000000 GHz	38.4736	13.4289
1.870000000 GHz	38.4328	13.4399
1.880000000 GHz	38.3934	13.4856
1.890000000 GHz	38.3637	13.4872
1.900000000 GHz	38.3205	13.5178
1.910000000 GHz	38.2981	13.5327
1.920000000 GHz	38.2590	13.5755
1.930000000 GHz	38.2344	13.5976
1.940000000 GHz	38.2172	13.6297
1.950000000 GHz	38.1838	13.6574
1.960000000 GHz	38.1575	13.6807
1.970000000 GHz	38.1070	13.6962
1.980000000 GHz	38.0516	13.7296
1.990000000 GHz	38.0093	13.7634
2.000000000 GHz	37.9485	13.7978

APPENDIX F - PROBE CALIBRATION

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

Client **Celltech**

CALIBRATION CERTIFICATE

Object(s)	ET3DV6 - SN:1387
Calibration procedure(s)	QA CAL-01.v2 Calibration procedure for dosimetric E-field probes
Calibration date:	March 18, 2004
Condition of the calibrated item	In Tolerance (according to the specific calibration document)

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

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 (SPEAG, in house check Oct-03)	In house check: Oct 05
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 (SPEAG, in house check Oct-03)	In house check: Oct 05

	Name	Function	Signature
Calibrated by:	Nico Vetterli	Technician	
Approved by:	Katja Pokovic	Laboratory Director	

Date issued: March 18, 2004

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:1387

Manufactured:	September 21, 1999
Last calibrated:	February 26, 2003
Recalibrated:	March 18, 2004

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1387

Sensitivity in Free Space

Diode Compression[A]

NormX	**1.62** $\mu V/(V/m)^2$	DCP X	**92**	mV
NormY	**1.71** $\mu V/(V/m)^2$	DCP Y	**92**	mV
NormZ	**1.71** $\mu V/(V/m)^2$	DCP Z	**92**	mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Plese see Page 7.

Boundary Effect

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

Sensor Cener to Phantom Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	9.3	4.4
SAR_{be} [%]	With Correction Algorithm	0.0	0.1

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

Sensor to Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	14.8	10.0
SAR_{be} [%]	With Correction Algorithm	0.2	0.0

Sensor Offset

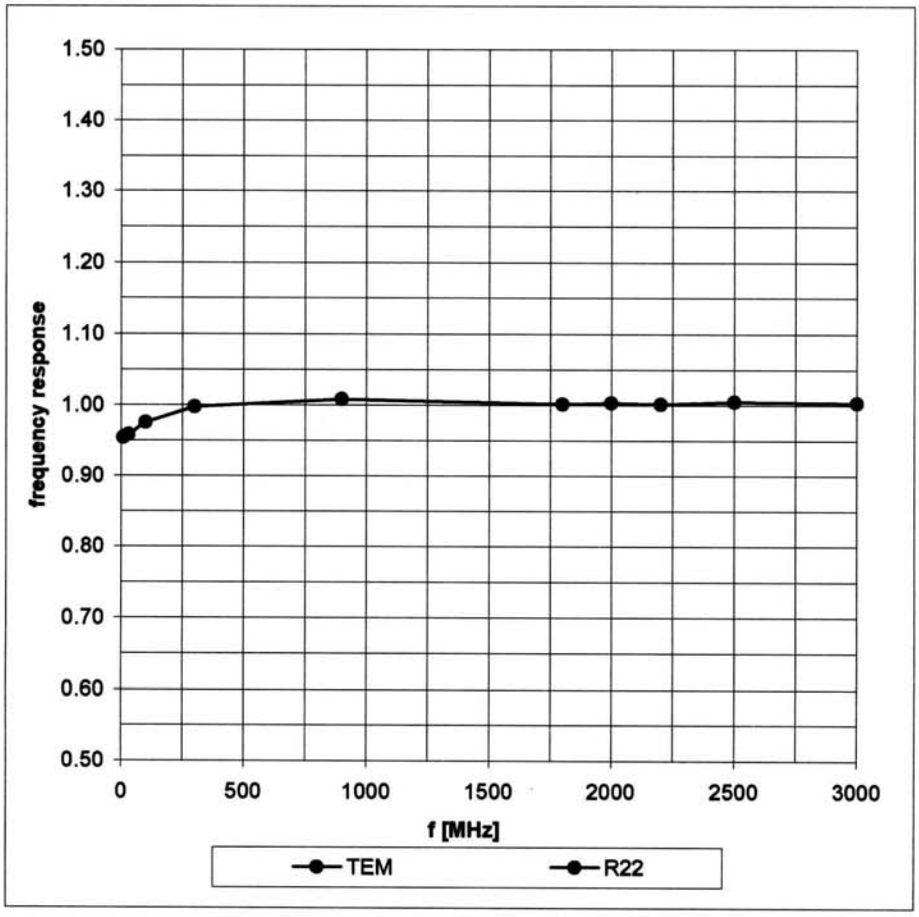
Probe Tip to Sensor Center	**2.7** mm
Optical Surface Detection	**in tolerance**

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

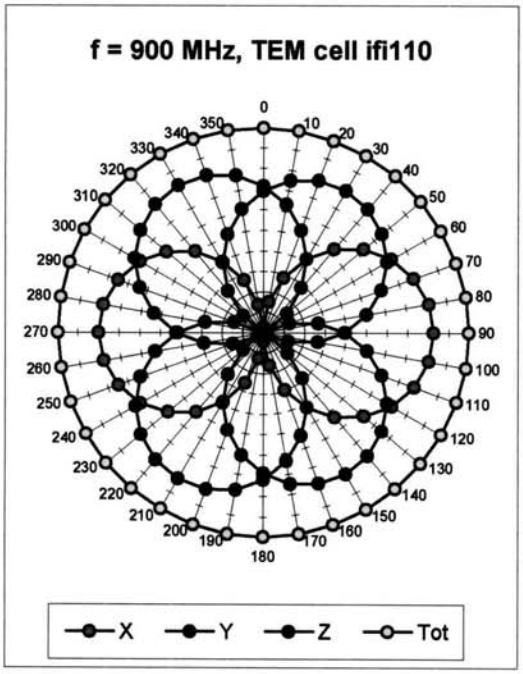
[A] numerical linearization parameter: uncertainty not required

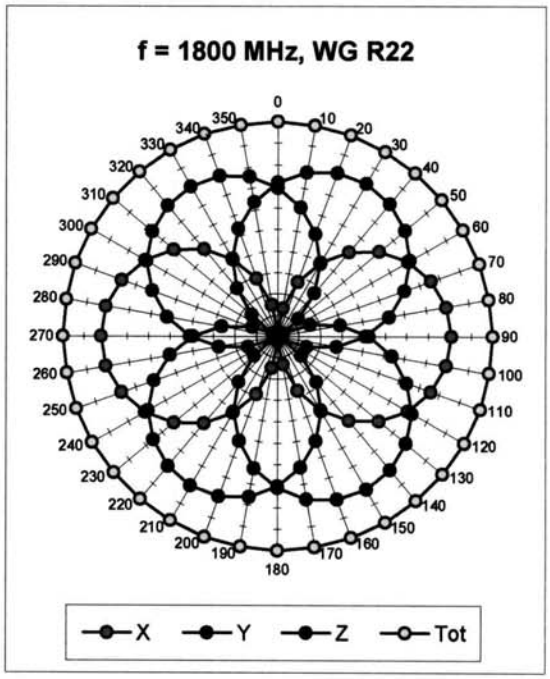
Frequency Response of E-Field

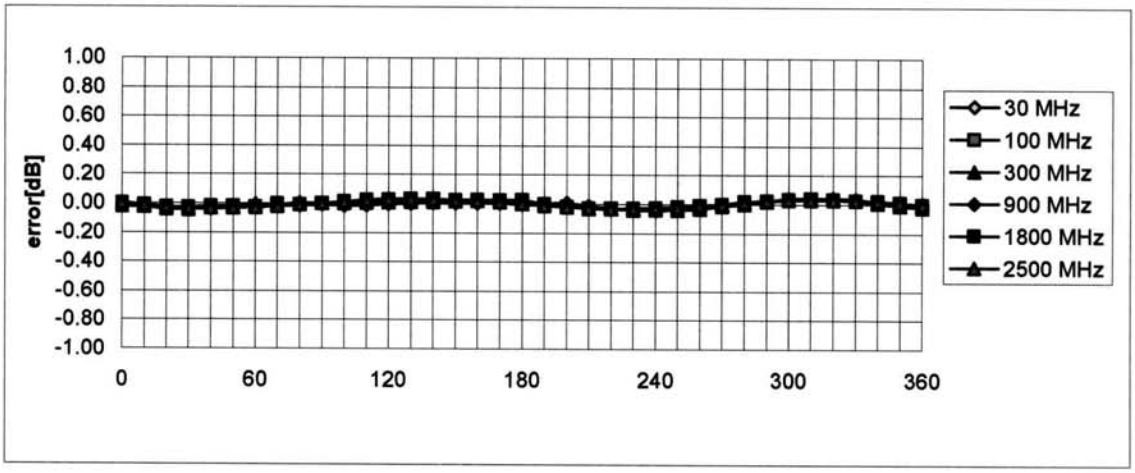
(TEM-Cell:ifi110, Waveguide R22)



Receiving Pattern (ϕ) , θ = 0°



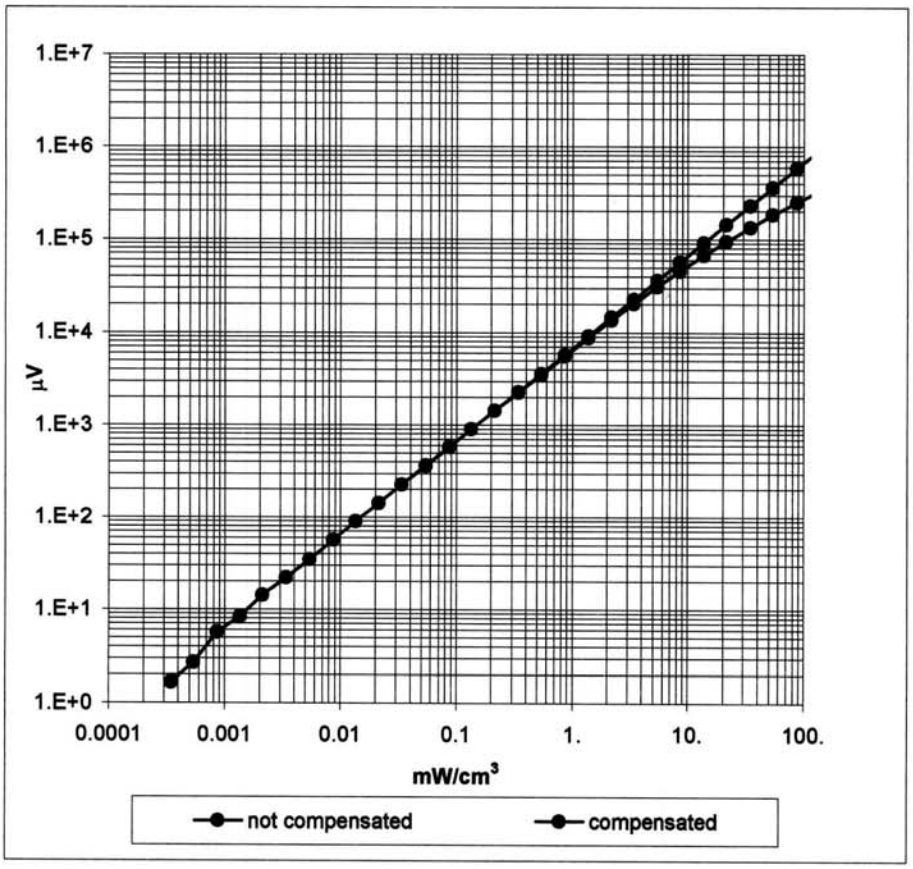


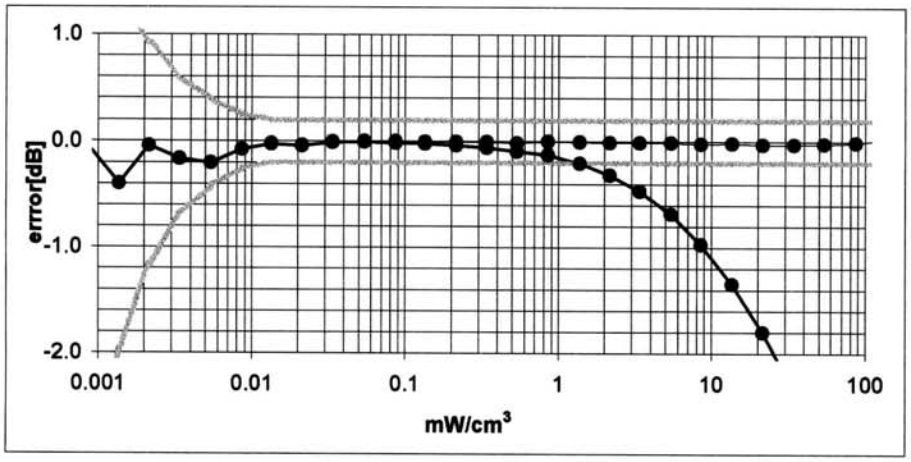


Axial Isotropy Error < ± 0.2 dB

Dynamic Range f(SAR_{head})

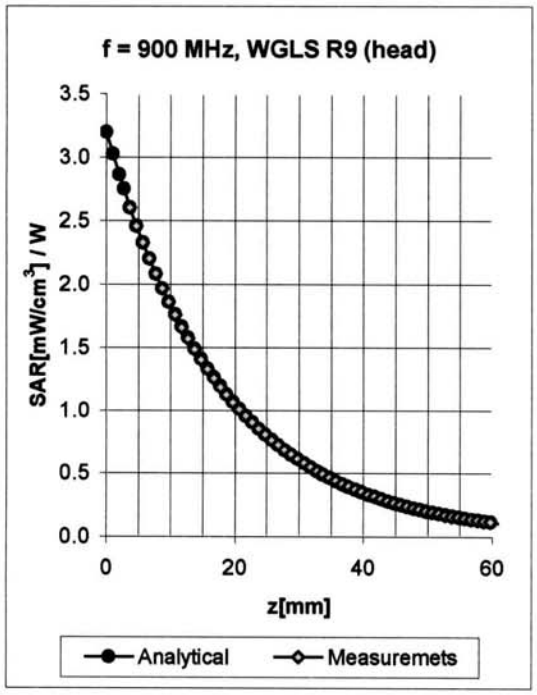
(Waveguide R22)

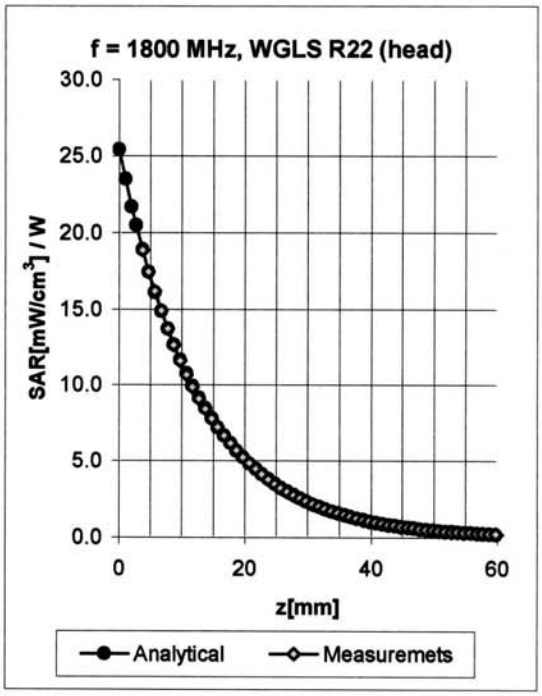




Probe Linearity < ± 0.2 dB

Conversion Factor Assessment



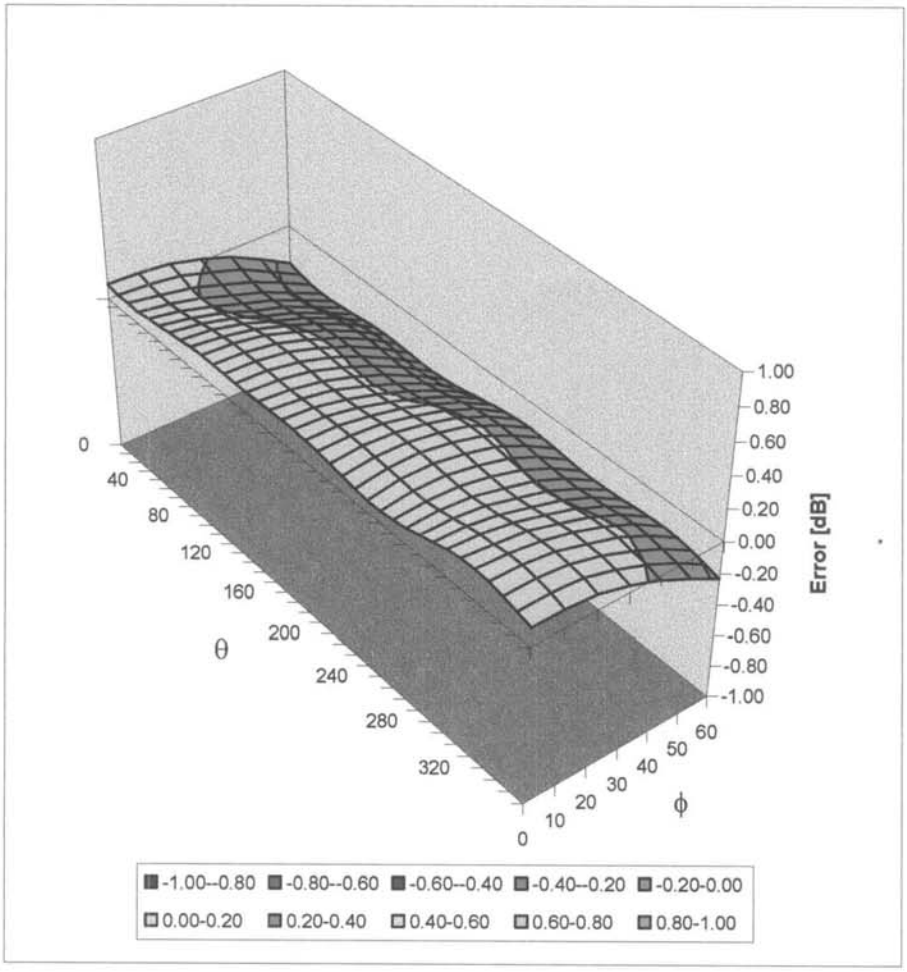


f [MHz]	Validity [MHz][B]	Tissue	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
835	750-950	Head	41.5 ± 5%	0.90 ± 5%	0.72	1.78	6.71 ± 11.9% (k=2)
1750	1700-1800	Head	40.0 ± 5%	1.40 ± 5%	0.51	2.67	5.38 ± 9.7% (k=2)
1900	1850-1950	Head	40.0 ± 5%	1.40 ± 5%	0.55	2.66	5.25 ± 9.7% (k=2)
2450	2400-2500	Head	39.2 ± 5%	1.80 ± 5%	0.99	1.89	4.77 ± 9.7% (k=2)
835	750-950	Body	55.2 ± 5%	0.97 ± 5%	0.56	2.04	6.24 ± 11.9% (k=2)
1750	1700-1800	Body	53.3 ± 5%	1.52 ± 5%	0.58	2.82	4.68 ± 9.7% (k=2)
1900	1850-1950	Body	53.3 ± 5%	1.52 ± 5%	0.62	2.77	4.57 ± 9.7% (k=2)
2450	2400-2500	Body	52.7 ± 5%	1.95 ± 5%	1.75	1.28	4.50 ± 9.7% (k=2)

[B] The total standard uncertainty is calculated as root-sum-square of standard uncertainty of the Conversion Factor at calibration frequency and the standard uncertainty for the indicated frequency band.

Deviation from Isotropy in HSL

Error (θ,ϕ), f = 900 MHz



Spherical Isotropy Error < ± 0.4 dB

Schmid & Partner Engineering AG

s p e a g

Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 1 245 9700, Fax +41 1 245 9779
info@speag.com, http://www.speag.com

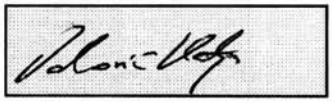
Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ET3DV6**
Serial Number:	**1387**
Place of Assessment:	**Zurich**
Date of Assessment:	**March 22, 2004**
Probe Calibration Date:	**March 18, 2004**

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:



Schmid & Partner Engineering AG

s p e a g

Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 1 245 9700, Fax +41 1 245 9779
info@speag.com, http://www.speag.com

Dosimetric E-Field Probe ET3DV6 SN:1387

Conversion factor (± standard deviation)

150 MHz	ConvF	**9.1 ± 8%**	ε_r = 52.3 ± 5% σ = 0.76 ± 5% mho/m (head tissue)
300 MHz	ConvF	**7.8 ± 8%**	ε_r = 45.3 ± 5% σ = 0.87 ± 5% mho/m (head tissue)
450 MHz	ConvF	**7.5 ± 8%**	ε_r = 43.5 ± 5% σ = 0.87 ± 5% mho/m (head tissue)
150 MHz	ConvF	**8.7 ± 8%**	ε_r = 61.9 ± 5% σ = 0.80 ± 5% mho/m (body tissue)
450 MHz	ConvF	**7.6 ± 8%**	ε_r = 56.7 ± 5% σ = 0.94 ± 5% mho/m (body tissue)

Important Note:

For numerically assessed probe conversion factors, parameters Alpha and Delta in the DASY software must have the following entries: Alpha = 0 and Delta = 1.

Please see also Section 4.7 of the DASY4 Manual.

APPENDIX G - 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