DECLARATION OF COMPLIANCE
SAR RF EXPOSURE EVALUATION

Test Lab	Applicant Information
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	**palmOne, Wireless Business Unit** 400 N. McCarthy Blvd. Milpitas, CA 95035 United States

FCC IDENTIFER:	**O8FMADECA**
IC IDENTIFIER:	**3959A-MADECA**
Model(s):	**Treo 650**
FCC 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**
FCC Classification:	**PCS Licensed Transmitter held to ear (PCE)**
Device Type:	**Portable Dual-Band PCS/Cellular CDMA2000 Phone with co-located Bluetooth**
Mode(s) of Operation:	**PCS CDMA / Cellular CDMA**
Tx Frequency Range(s):	**1851.25 - 1908.75 MHz (PCS CDMA)** **824.70 - 848.31 MHz (Cellular CDMA)**
Max. RF Output Power Tested:	**24.41 dBm Conducted (PCS CDMA)** **24.46 dBm Conducted (Cellular CDMA)** **-5.1 dBm Peak Conducted (Bluetooth)**
Antenna Type(s) Tested:	**External Fixed Stubby (Dual-Band CDMA)** **Internal (Broadcom BCM-2035 Bluetooth)**
Battery Type(s) Tested:	**Lithium-ion 3.7 V, 1900 mAh (P/N: 167-10165-00)**
Body-Worn Accessories Tested:	**Leather Side Case with Belt-Clip (SKU#3180WW)** **Leather Pouch and Swivel Belt-Clip (SKU#3179WW)** **Aluminum Case and Swivel Belt-Clip (SKU#3202WW)** **Generic Ear-Microphone**
Max. SAR Levels Evaluated:	**PCS Band: 1.33 W/kg (Head) / 0.667 W/kg (Body)** **Cellular Band: 1.50 W/kg (Head) / 0.999 W/kg (Body)**

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.

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

Russell W. Pipe
Senior Compliance Technologist
Celltech Labs Inc.

TABLE OF CONTENTS

© 2004 Celltech Labs Inc.

1.0 INTRODUCTION

This measurement report demonstrates that the palmOne Model: Treo 650 Dual-Band PCS/Cellular CDMA2000 Phone (with internal co-located Broadcom BCM-2035 Bluetooth Transmitter) FCC ID: O8FMADECA 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, 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)			
FCC Device Classification	PCS Licensed Transmitter held to ear (PCE)			
Test Procedure(s)	FCC OET Bulletin 65, Supplement C (01-01)			
	IC RSS-102 Issue 1 (Provisional)			
	IEEE Standard 1528-2003			
Device Type	Dual-Band PCS/Cellular CDMA2000 Phone (with internal co-located Bluetooth Transmitter)			
FCC IDENTIFIER	O8FMADECA			
IC IDENTIFIER	3959A-MADECA			
Model(s)	Treo 650			
Serial No.	HT427D900027		Identical Prototype	
Mode(s) of Operation	PCS CDMA			
	Cellular CDMA			
Tx Frequency Range(s)	1851.25 - 1908.75 MHz		PCS Band	
	824.70 - 848.31 MHz		Cellular Band	
Max. RF Output Power Tested	24.41 dBm	Conducted	1851.25 MHz	PCS Band
	24.27 dBm	Conducted	1880.00 MHz	
	24.06 dBm	Conducted	1908.75 MHz	
	24.37 dBm	Conducted	824.70 MHz	Cellular Band
	24.46 dBm	Conducted	836.52 MHz	
	24.41 dBm	Conducted	848.31 MHz	
	-5.1 dBm	Peak Conducted	2441 MHz	Bluetooth
Battery Type(s) Tested	Lithium-ion	3.7 V, 1900 mAh		P/N: 167-10165-00
Antenna Type(s) Tested	External Fixed Stubby		Dual-Band CDMA	
	Internal		Broadcom BCM-2035 Bluetooth	
Body-Worn Accessories Tested	Leather Side Case with Belt-Clip (No metal)			SKU#3180WW
	Leather Pouch and Swivel Belt-Clip (Plastic w/ Metal Spring)			SKU#3179WW
	Aluminum Case and Swivel Belt-Clip (Plastic w/ Metal Spring)			SKU#3202WW
	Generic Ear-Microphone			n/a
Additional Accessories Testing Not Required	Leather Latch Case (No metal, > 1.5 cm separation distance)			SKU#3196WW

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

HEAD SAR EVALUATION RESULTS - CELLULAR CDMA Mode

Test Mode	Freq. (MHz)	Chan.	Antenna Type	Battery Type	Phantom Section	Test Position	Cond. Power Before Test (dBm)	SAR Drift During Test (dB)	Measured SAR 1g (W/kg)	Scaled SAR 1g (W/kg) by drift
Cellular CDMA	836.52	384	Stubby	Li-ion	Right Ear	Cheek/Touch	24.46	0.0201	1.50	1.50
Cellular CDMA	824.70	1013	Stubby	Li-ion	Right Ear	Cheek/Touch	24.37	-0.00454	1.20	1.20
Cellular CDMA	848.31	777	Stubby	Li-ion	Right Ear	Cheek/Touch	24.41	-0.0221	1.39	1.40
Cellular CDMA	836.52	384	Stubby	Li-ion	Right Ear	Ear/Tilt (15°)	24.46	0.0316	1.26	1.26
Cellular CDMA	824.70	1013	Stubby	Li-ion	Right Ear	Ear/Tilt (15°)	24.37	-0.0431	1.09	1.10
Cellular CDMA	848.31	777	Stubby	Li-ion	Right Ear	Ear/Tilt (15°)	24.41	0.014	1.18	1.18
Cellular CDMA	836.52	384	Stubby	Li-ion	Left Ear	Cheek/Touch	24.46	-0.08	1.34	1.36
Cellular CDMA	824.70	1013	Stubby	Li-ion	Left Ear	Cheek/Touch	24.37	-0.0791	1.08	1.10
Cellular CDMA	848.31	777	Stubby	Li-ion	Left Ear	Cheek/Touch	24.41	-0.114	1.26	1.29
Cellular CDMA	836.52	384	Stubby	Li-ion	Left Ear	Ear/Tilt (15°)	24.46	-0.00272	P 0.912	P 0.913
									S 0.895	S 0.896
Cellular CDMA	824.70	1013	Stubby	Li-ion	Left Ear	Ear/Tilt (15°)	24.37	-0.109	P 0.756	P 0.775
									S 0.740	S 0.759
Cellular CDMA	848.31	777	Stubby	Li-ion	Left Ear	Ear/Tilt (15°)	24.41	-0.0498	P 0.876	P 0.886
									S 0.849	S 0.859

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

Test Date(s)	July 27, 2004			**Relative Humidity**	34	**%**
Measured Fluid Type	**835 MHz Brain**			**Atmospheric Pressure**	102.6	**kPa**
Dielectric Constant ε_r	**IEEE Target**		**Measured**	**Ambient Temperature**	23.5	**°C**
	41.5	**± 5%**	40.4	**Fluid Temperature**	22.2	**°C**
Conductivity σ **(mho/m)**	**IEEE Target**		**Measured**	**Fluid Depth**	≥ 15	**cm**
	0.90	**± 5%**	0.90	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 SAR levels measured 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. Secondary peak SAR levels within 2 dB of the primary were reported (P = Primary, S = Secondary).
4. The power drifts measured by the DASY4 system were within 5% of the start power and were subsequently added to the measured SAR levels to report scaled SAR results as shown in the above table.
5. The DUT was tested with a fully charged Lithium-ion battery.
6. The SAR measurements were performed within 24 hours of the system performance check.

MEASUREMENT SUMMARY (Cont.)

HEAD SAR EVALUATION RESULTS - CELLULAR CDMA Mode (Cont.)												
Test Date	Test Mode	Freq. (MHz)	Chan	Antenna Type	Battery Type	Accessory Type	Phantom Section	Test Position	Cond. Power Before Test (dBm)	SAR Drift During Test (dB)	Meas. SAR 1g (W/kg)	Scaled SAR 1g (W/kg) by drift
07/29/04	Cellular CDMA	836.52	384	Stubby	Li-ion	Aluminum Case	Right Ear	Cheek/Touch	24.46	-0.0306	0.643	0.648
07/29/04	Cellular CDMA	836.52	384	Stubby	Li-ion	Aluminum Case	Right Ear	Ear/Tilt (15°)	24.46	-0.203	0.565	0.592
08/18/04	Cellular CDMA	836.52	384	Stubby	Li-ion	--	Right Ear	Cheek/Touch	24.44	-0.0006	1.45	1.45
	Modulated Fixed Frequency (Bluetooth)	2441	Mid	Internal					-5.1			

ANSI / IEEE C95.1 1999 - SAFETY LIMIT BRAIN: 1.6 W/kg (averaged over 1 gram) Spatial Peak - Uncontrolled Exposure / General Population									
Test Date(s)	July 29, 2004			August 18, 2004			Test Date(s)	Jul-29	Aug-18	Unit
Dielectric Constant ε_r	835 MHz Brain			835 MHz Brain			Relative Humidity	38	36	%
	IEEE Target		Measured	IEEE Target		Measured	Atmospheric Pressure	102.1	102.7	kPa
	41.5	± 5%	40.4	41.5	± 5%	40.6	Ambient Temperature	23.8	23.1	°C
Conductivity σ (mho/m)	835 MHz Brain			835 MHz Brain			Fluid Temperature	22.5	23.6	°C
	IEEE Target		Measured	IEEE Target		Measured	Fluid Depth	≥ 15	≥ 15	cm
	0.90	± 5%	0.90	0.90	± 5%	0.91	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 SAR levels measured 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 were within 5% of the start power and were subsequently added to the measured SAR levels to report scaled SAR results as shown in the above table.
4. The DUT was evaluated inside the Aluminum Case accessory for the worst-case Touch and Tilt positions evaluated without the accessory as shown in the above table.
5. A co-located transmit test was performed with CDMA and Bluetooth transmitting simultaneously in the worst-case Cellular CDMA single-transmit configuration as shown in the above table. The Bluetooth transmitter was tested at maximum power setting with a modulated signal on a fixed frequency and the frequency hopping disabled.
6. The DUT was tested with a fully charged Lithium-ion battery.
7. The SAR measurements were performed within 24 hours of the system performance check.

MEASUREMENT SUMMARY (Cont.)

HEAD SAR EVALUATION RESULTS - PCS CDMA Mode

Test Date	Test Mode	Freq. (MHz)	Chan.	Antenna Type	Battery Type	Phantom Section	Test Position	Cond. Power Before Test (dBm)	SAR Drift During Test (dB)	Measured SAR 1g (W/kg)		Scaled SAR 1g (W/kg) by drift	
07/27/04	PCS CDMA	1880.00	600	Stubby	Li-ion	Right Ear	Ear/Tilt (15°)	24.24	-0.0262	1.29		1.30	
07/27/04	PCS CDMA	1851.25	25	Stubby	Li-ion	Right Ear	Ear/Tilt (15°)	24.41	-0.0419	1.21		1.22	
07/27/04	PCS CDMA	1908.75	1175	Stubby	Li-ion	Right Ear	Ear/Tilt (15°)	24.06	-0.203	1.18		1.24	
07/27/04	PCS CDMA	1880.00	600	Stubby	Li-ion	Right Ear	Cheek/Touch	24.24	0.0617	P	1.09	P	1.09
										S	0.996	S	0.996
07/27/04	PCS CDMA	1851.25	25	Stubby	Li-ion	Right Ear	Cheek/Touch	24.41	-0.0545	P	0.959	P	0.971
										S	0.885	S	0.896
										S	0.772	S	0.731
07/28/04	PCS CDMA	1908.75	1175	Stubby	Li-ion	Right Ear	Cheek/Touch	24.06	-0.0446	P	1.06	P	1.07
										S	0.953	S	0.963
										S	0.834	S	0.843
07/28/04	PCS CDMA	1880.00	600	Stubby	Li-ion	Left Ear	Cheek/Touch	24.24	0.0257	P	1.17	P	1.17
										S	0.812	S	0.812
07/28/04	PCS CDMA	1851.25	25	Stubby	Li-ion	Left Ear	Cheek/Touch	24.41	-0.0360	P	1.05	P	1.06
										S	0.765	S	0.771
07/28/04	PCS CDMA	1908.75	1175	Stubby	Li-ion	Left Ear	Cheek/Touch	24.06	-0.190	P	1.15	P	1.20
										S	0.794	S	0.830
07/28/04	PCS CDMA	1880.00	600	Stubby	Li-ion	Left Ear	Ear/Tilt (15°)	24.24	-0.0244	1.32		1.33	
07/28/04	PCS CDMA	1851.25	25	Stubby	Li-ion	Left Ear	Ear/Tilt (15°)	24.41	-0.0604	1.18		1.20	
07/28/04	PCS CDMA	1908.75	1175	Stubby	Li-ion	Left Ear	Ear/Tilt (15°)	24.06	-0.123	1.17		1.20	

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

Test Date(s)	July 27, 2004			July 28, 2004		
Dielectric Constant ε_r	1880 MHz Brain			1880 MHz Brain		
	IEEE Target		Measured	IEEE Target		Measured
	40.0	± 5%	38.4	40.0	± 5%	38.1
Conductivity σ (mho/m)	1880 MHz Brain			1880 MHz Brain		
	IEEE Target		Measured	IEEE Target		Measured
	1.40	± 5%	1.41	1.40	± 5%	1.40

Test Date(s)	Jul-27	Jul-28	Units
Relative Humidity	37	35	%
Atmospheric Pressure	102.3	102.5	kPa
Ambient Temperature	24.1	23.9	°C
Fluid Temperature	22.6	22.6	°C
Fluid Depth	≥ 15	≥ 15	cm
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 SAR levels measured 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. Secondary peak SAR levels within 2 dB of the primary were reported (P = Primary, S = Secondary).
4. The power drifts measured by the DASY4 system were within 5% of the start power and were subsequently added to the measured SAR levels to report scaled SAR results as shown in the above table.
5. The DUT was tested with a fully charged Lithium-ion battery.
6. The SAR measurements were performed within 24 hours of the system performance check.

MEASUREMENT SUMMARY (Cont.)

HEAD SAR EVALUATION RESULTS - PCS CDMA Mode (Cont.)

Test Date	Test Mode	Freq. (MHz)	Chan	Antenna Type	Battery Type	Accessory Type	Phantom Section	Test Position	Cond. Power Before Test (dBm)	SAR Drift During Test (dB)	Measured SAR 1g (W/kg)	Scaled SAR 1g (W/kg) by drift
07/30/04	PCS CDMA	1880.00	600	Stubby	Li-ion	Aluminum Case	Left Ear	Ear/Tilt (15°)	24.24	0.0110	0.490	0.490
07/30/04	PCS CDMA	1908.75	1175	Stubby	Li-ion	Aluminum Case	Left Ear	Cheek/Touch	24.06	-0.132	P 0.347 S 0.308	P 0.358 S 0.309
08/18/04	PCS CDMA	1880.00	600	Stubby	Li-ion	--	Left Ear	Ear/Tilt (15°)	24.27	-0.0790	1.25	1.27
	Modulated Fixed Freq. (Bluetooth)	2441	Mid	Internal					-5.1			

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

Test Date(s)	July 30, 2004			August 18, 2004			Test Date(s)	Jul-30	Aug-18	Unit
Dielectric Constant ε_r	1880 MHz Brain			1880 MHz Brain			Relative Humidity	39	43	%
	IEEE Target		Measured	IEEE Target		Measured	Atmospheric Pressure	101.9	102.3	kPa
	40.0	± 5%	38.1	40.0	± 5%	38.3	Ambient Temperature	24.8	24.4	°C
Conductivity σ (mho/m)	1880 MHz Brain			1880 MHz Brain			Fluid Temperature	23.0	22.4	°C
	IEEE Target		Measured	IEEE Target		Measured	Fluid Depth	≥ 15	≥ 15	cm
	1.40	± 5%	1.40	1.40	± 5%	1.40	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 SAR levels measured 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. Secondary peak SAR levels within 2 dB of the primary were reported (P = Primary, S = Secondary).
4. The power drifts measured by the DASY4 system were within 5% of the start power and were subsequently added to the measured SAR levels to report scaled SAR results as shown in the above table.
5. The DUT was evaluated inside the Aluminum Case accessory for the worst-case Touch and Tilt positions evaluated without the accessory as shown in the above table.
6. A co-located transmit test was performed with CDMA and Bluetooth transmitting simultaneously in the worst-case PCS CDMA single-transmit configuration as shown in the above table. The Bluetooth transmitter was tested at maximum power setting with a modulated signal on a fixed frequency and the frequency hopping disabled.
7. The DUT was tested with a fully charged Lithium-ion battery.
8. The SAR measurements were performed within 24 hours of the system performance check.

MEASUREMENT SUMMARY (Cont.)

BODY-WORN EVALUATION RESULTS - CELLULAR CDMA Mode

Test Date	Test Mode	Freq. (MHz)	Chan.	Antenna Type	Battery Type	Body-worn Accessories	DUT Position to Planar Phantom	Separation Distance to Planar Phantom (cm)	Cond. Power Before Test (dBm)	SAR Drift During Test (dB)	Meas. SAR 1g (W/kg)	Scaled SAR 1g (W/kg) by drift
07/31/04	Cellular CDMA	836.52	384	Stubby	Li-ion	Side Case with Belt-Clip and Ear-Mic	Front Side	1.4	24.46	-0.00742	0.938	0.940
07/31/04	Cellular CDMA	824.70	1013	Stubby	Li-ion	Side Case with Belt-Clip and Ear-Mic	Front Side	1.4	24.37	-0.0697	0.675	0.686
07/31/04	Cellular CDMA	848.31	777	Stubby	Li-ion	Side Case with Belt-Clip and Ear-Mic	Front Side	1.4	24.41	-0.133	0.820	0.846
07/31/04	Cellular CDMA	836.52	384	Stubby	Li-ion	Air-Gap Spacing with Ear-Mic	Front Side	1.5	24.46	-0.0832	0.603	0.615
07/31/04	Cellular CDMA	836.52	384	Stubby	Li-ion	Air-Gap Spacing with Ear-Mic	Back Side	1.5	24.46	0.0503	0.603	0.603
07/31/04	Cellular CDMA	836.52	384	Stubby	Li-ion	Fitted Pouch with Belt-Clip and Ear-Mic	Back Side	2.5	24.46	-0.00600	0.393	0.394
07/31/04	Cellular CDMA	836.52	384	Stubby	Li-ion	Aluminum Case with Belt-Clip and Ear-Mic	Back Side	2.5	24.46	-0.0206	0.245	0.246
08/18/04	Cellular CDMA	836.52	384	Stubby	Li-ion	Side Case with Belt-Clip and Ear-Mic	Front Side	1.4	24.44	0.00661	0.999	0.999
	Modulated Fixed Freq. (Bluetooth)	2441	Mid	Internal					-5.1			

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

Test Date(s)	July 31, 2004			August 18, 2004			Test Date(s)	Jul-31	Aug-18	Unit
Dielectric Constant ε_r	835 MHz Body			835 MHz Body			Relative Humidity	40	53	%
	IEEE Target		Measured	IEEE Target		Measured	Atmospheric Pressure	101.7	102.7	kPa
	55.2	± 5%	54.1	55.2	± 5%	53.6	Ambient Temperature	24.2	23.9	°C
Conductivity σ (mho/m)	835 MHz Body			835 MHz Body			Fluid Temperature	23.3	23.6	°C
	IEEE Target		Measured	IEEE Target		Measured	Fluid Depth	≥ 15	≥ 15	cm
	0.97	± 5%	1.00	55.2	± 5%	1.00	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 SAR levels measured 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 were within 5% of the start power and were subsequently added to the measured SAR levels to report scaled SAR results as shown in the above table.
4. A co-located transmit test was performed with CDMA and Bluetooth transmitting simultaneously in the worst-case Cellular CDMA single-transmit configuration as shown in the above table. The Bluetooth transmitter was tested at maximum power setting with a modulated signal on a fixed frequency and the frequency hopping disabled.
5. The DUT was tested with a fully charged Lithium-ion battery.
6. The SAR measurements were performed within 24 hours of the system performance check.

MEASUREMENT SUMMARY (Cont.)

BODY-WORN SAR EVALUATION RESULTS - PCS CDMA Mode

Test Date	Test Mode	Freq. (MHz)	Chan.	Antenna Type	Battery Type	Body-worn Accessories	DUT Position to Planar Phantom	Separation Distance to Planar Phantom (cm)	Cond. Power Before Test dBm	SAR Drift During Test (dB)	Meas. SAR 1g (W/kg)	Scaled SAR 1g (W/kg) by drift
07/30/04	PCS CDMA	1880.00	600	Stubby	Li-ion	Side Case with Belt-Clip and Ear-Mic	Front Side	1.4	24.24	-0.0932	0.458	0.468
07/30/04	PCS CDMA	1880.00	600	Stubby	Li-ion	Fitted Pouch with Belt-Clip and Ear-Mic	Back Side	2.5	24.24	-0.0340	0.354	0.357
07/30/04	PCS CDMA	1880.00	600	Stubby	Li-ion	Aluminum Case with Belt-Clip and Ear-Mic	Back Side	2.5	24.24	-0.0743	0.125	0.127
07/30/04	PCS CDMA	1880.00	600	Stubby	Li-ion	Air-Gap Spacing with Ear-Mic	Front Side	1.5	24.24	-0.0417	0.475	0.480
07/30/04	PCS CDMA	1880.00	600	Stubby	Li-ion	Air-Gap Spacing with Ear-Mic	Back Side	1.5	24.24	-0.0500	0.659	0.667
08/18/04	PCS CDMA	1880.00	600	Stubby	Li-ion	Air-Gap Spacing with Ear-Mic	Back Side	1.5	24.27	-0.0245	0.652	0.656
	Modulated Fixed Freq. (Bluetooth)	2441	Mid	Internal					-5.1			

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

Test Date(s)	July 30, 2004			August 18, 2004			Test Date(s)	Jul-30	Aug-18	Unit
Measured Fluid Type	1880 MHz Body			1880 MHz Body			Relative Humidity	40	42	%
Dielectric Constant ε_r	IEEE Target		Measured	IEEE Target		Measured	Atmospheric Pressure	101.8	102.2	kPa
	53.3	± 5%	51.1	53.3	± 5%	50.7	Ambient Temperature	25.0	24.3	°C
Conductivity σ (mho/m)	1880 MHz Body			1880 MHz Body			Fluid Temperature	22.5	23.7	°C
	IEEE Target		Measured	IEEE Target		Measured	Fluid Depth	≥ 15	≥ 15	cm
	1.52	± 5%	1.54	1.52	± 5%	1.51	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 SAR levels measured 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 were within 5% of the start power and were subsequently added to the measured SAR levels to report scaled SAR results as shown in the above table.
4. A co-located transmit test was performed with CDMA and Bluetooth transmitting simultaneously in the worst-case PCS CDMA single-transmit configuration as shown in the above table. The Bluetooth transmitter was tested at maximum power setting with a modulated signal on a fixed frequency and the frequency hopping disabled.
5. The DUT was tested with a fully charged Lithium-ion battery.
6. The SAR measurements were performed within 24 hours of the system performance check.

5.0 DETAILS OF SAR EVALUATION

The palmOne Model: Treo 650 Dual-Band PCS/Cellular CDMA2000 Phone (with internal co-located Broadcom BCM-2035 Bluetooth Transmitter) FCC ID: O8FMADECA was compliant for localized Specific Absorption Rate (SAR) based on the test provisions and conditions described below. The detailed test setup photographs are shown in Appendix G.

Ear-held Configuration

1) The DUT was tested in an ear-held configuration on both the left and right sections of the SAM phantom at the mid channel of the operating band. If the SAR level at the mid channel of the frequency band for each test configuration (left ear, right ear, cheek/touch, ear/tilt) was ≥ 3dB below the SAR limit, measurements at the low and high channels were optional (per FCC OET Bulletin 65, Supplement C, Edition 01-01 - see reference [3]).

a) The handset was placed in the device holder in a normal operating position with the test device reference point located along the vertical centerline on the front of the device aligned to the ear reference point, with the center of the earpiece touching the center of the ear spacer of the SAM phantom.

b) With the handset positioned parallel to the cheek, the test device reference point was aligned to the ear reference point on the head phantom, and the vertical centerline was aligned to the phantom reference plane (initial ear position).

c) While maintaining the three alignments, the body of the handset was gradually adjusted to each of the following test positions:

- Cheek/Touch Position: the handset was brought toward the mouth of the head phantom by pivoting against the ear reference point until any point of the mouthpiece or keypad touched the phantom.

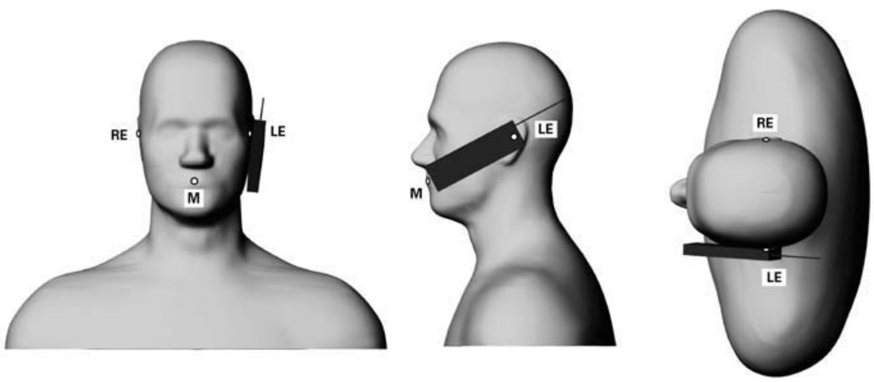


Figure 1. Phone position 1, "cheek" or "touch" position. The reference points for the right ear (RE), left ear (LE) and mouth (M), which define the reference plane for phone positioning, are indicated (Shoulders are shown for illustration only).

- Ear/Tilt Position: With the phone aligned in the Cheek/Touch position, the handset was tilted away from the mouth with respect to the test device reference point by 15 degrees.

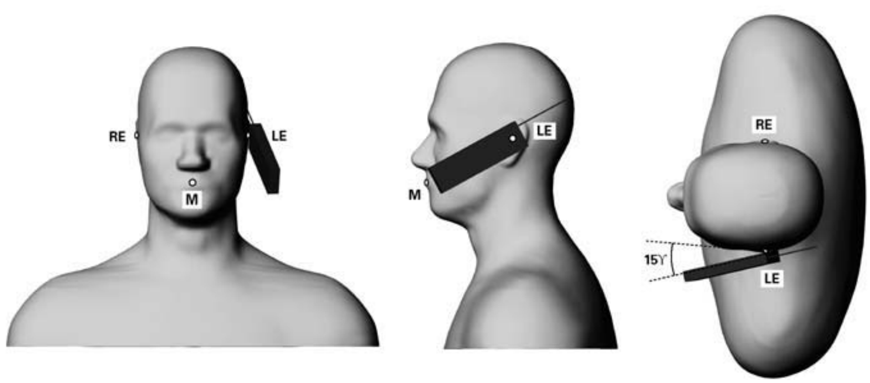


Figure 2. Phone position 2, "tilted position." The reference points for the right ear (RE), left ear (LE) and mouth (M), which define the reference plane for phone positioning, are indicated (Shoulders are shown for illustration only).

DETAILS OF SAR EVALUATION (Cont.)

2) The DUT was tested in an ear-held configuration with the Aluminum Case accessory in the worst-case Cheek/Touch and Ear/Tilt positions for both the PCS and Cellular bands.
3) Co-located transmit tests were performed with the CDMA and Bluetooth transmitting simultaneously in the worst-case single-transmit configuration for both the PCS and Cellular bands.

Body-worn Configuration

4) The DUT was tested in a body-worn configuration placed inside the Leather Side Case with Belt-Clip accessory (SKU#3180WW). The front side of the DUT (keypad side) was placed facing parallel to the outer surface of the SAM phantom (planar section) with the attached belt-clip accessory touching the phantom surface (the leather side case accessory is designed so that the DUT is positioned with the keypad side facing the user's body). The leather side case with belt-clip accessory provided a 1.4 cm separation distance between the front side of the DUT (keypad side) and the outer surface of the SAM phantom (planar section). A generic ear-microphone accessory was connected to the DUT for the duration of the tests.
5) The DUT was tested in a body-worn configuration placed inside the Fitted Leather Pouch with Swivel Belt-Clip accessory (SKU#3179WW). The back side of the DUT was placed facing parallel to the outer surface of the SAM phantom (planar section) with the attached belt-clip accessory touching the phantom surface (the fitted leather pouch accessory is designed so that the DUT is positioned with the back side facing the user's body). The fitted leather pouch with swivel belt-clip accessory provided a 2.5 cm separation distance between the back side of the DUT and the outer surface of the SAM phantom (planar section). A generic ear-microphone accessory was connected to the DUT for the duration of the tests.
6) The DUT was tested in a body-worn configuration placed inside the Aluminum Case with Swivel Belt-Clip accessory (SKU#3202WW). The back side of the DUT was placed facing parallel to the outer surface of the SAM phantom (planar section) with the attached belt-clip accessory touching the phantom surface (the aluminum case accessory is designed so that the DUT is positioned with the back side facing the user's body). The aluminum case with swivel belt-clip accessory provided a 2.5 cm separation distance between the back side of the DUT and the outer surface of the SAM phantom (planar section). A generic ear-microphone accessory was connected to the DUT for the duration of the tests.
7) The DUT was tested in a body-worn configuration with an "air gap" spacing of 1.5 cm between the front side (keypad side) and the outer surface of the SAM phantom (planar section). The DUT was also tested with an "air gap" spacing of 1.5 cm between the back side and the outer surface of the SAM phantom (planar section). No body-worn accessories were used with the DUT in the "air gap" spacing configurations (except generic ear-microphone accessory connected) for the purpose that the option of generic body-worn holster/case accessories that do not contain any metallic components and provide a minimum separation distance of 1.5 cm between the phone and the user's body could be used.
8) Co-located transmit tests were performed with the CDMA and Bluetooth transmitting simultaneously in the worst-case single-transmit configuration for both the PCS and Cellular bands.
9) The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter checks and the SAR evaluations. The temperatures reported were consistent for all measurement periods.
10) The dielectric properties of the simulated tissue mixtures were measured prior to the SAR evaluation using an HP 85070C Dielectric Probe Kit and an HP 8753E Network Analyzer (see Appendix E for printout of measured fluid dielectric parameters).
11) The SAR measurements were performed within 24 hours of the system performance check.

Test Modes & Power Settings

12) The DUT was tested with a modulated CDMA signal generated via internal software at a full data rate in the "always up" power control mode. The Bluetooth transmitter was tested at maximum power setting with a modulated signal on a fixed frequency and the frequency hopping disabled.
13) The conducted power levels were measured before each test according to the procedures described in FCC 47 CFR §2.1046 using a Gigatronics 8652A Universal Power Meter.
14) The power drifts measured by the DASY4 system were within 5% of the start power and were subsequently added to the measured SAR levels to report scaled SAR results as shown in the test data tables.
15) The DUT was tested with a fully charged Lithium-ion battery.

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.

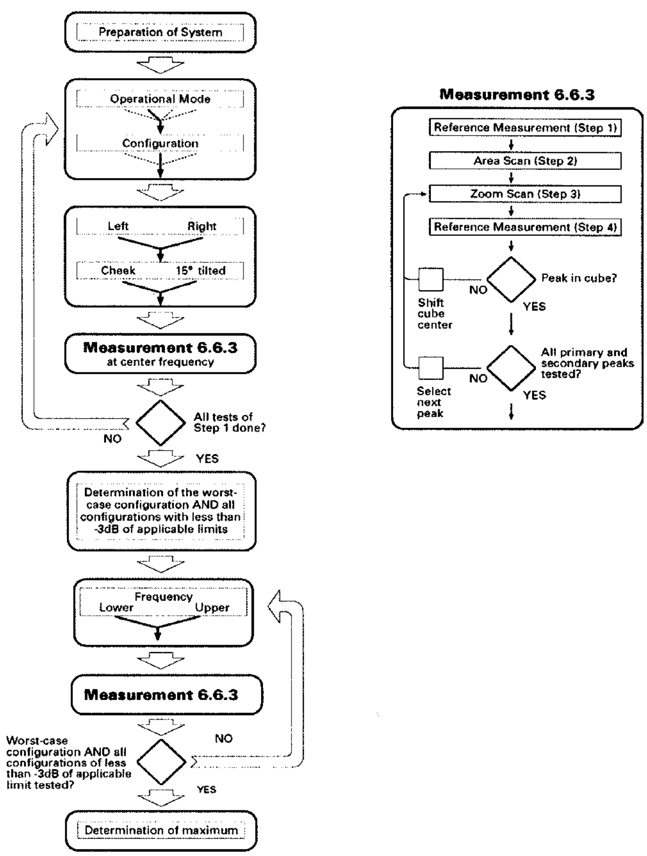


Figure 3. Flow Chart for determining the largest peak spatial-average SAR from all device configurations per IEEE Standard 1528-2003 (see reference [5]).

7.0 SYSTEM PERFORMANCE CHECK

Prior to the SAR evaluations a system check was performed at the planar section of the SAM phantom with an 835MHz dipole and a 1900MHz dipole (see Appendix C 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 E for printout of measured fluid dielectric parameters). A forward power of 250mW was applied to the dipole and the system was verified to a tolerance of ±10% (see Appendix B for system performance check test plots).

SYSTEM PERFORMANCE CHECK

Test Date	Brain Mixture	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)
	Freq. (MHz)	IEEE Target	Measured	IEEE Target	Measured	IEEE Target	Measured						
07/27/04	835	2.38 ±10%	2.38 (+0.0%)	41.5 ±5%	40.4	0.90 ±5%	0.90	1000	23.4	22.2	≥ 15	33	102.6
07/27/04	1900	9.93 ±10%	10.4 (+4.7%)	40.0 ±5%	38.4	1.40 ±5%	1.43	1000	24.1	22.6	≥ 15	37	102.3
07/29/04	835	2.38 ±10%	2.51 (+5.5%)	41.5 ±5%	40.5	0.90 ±5%	0.90	1000	23.8	23.6	≥ 15	43	102.2
07/29/04	1900	9.93 ±10%	10.3 (+3.7%)	40.0 ±5%	38.1	1.40 ±5%	1.41	1000	24.6	23.5	≥ 15	42	101.8
07/31/04	835	2.38 ±10%	2.50 (+5.0%)	41.5 ±5%	41.0	0.90 ±5%	0.92	1000	24.0	23.5	≥ 15	39	101.9
08/18/04	835	2.38 ±10%	2.49 (+4.6%)	41.5 ±5%	40.6	0.90 ±5%	0.91	1000	23.4	23.6	≥ 15	51	102.7
08/18/04	1900	9.93 ±10%	10.8 (+8.8%)	40.0 ±5%	38.3	1.40 ±5%	1.42	1000	24.2	22.4	≥ 15	45	102.4

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 reported in the above table were consistent for all measurement periods.

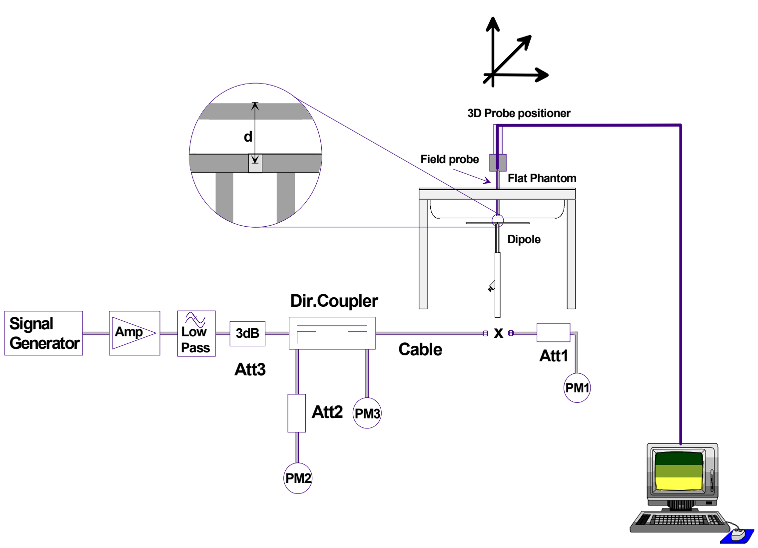


Figure 4. System Performance Check Setup Diagram

835MHz Dipole Setup

1900MHz Dipole Setup

© 2004 Celltech Labs Inc.

8.0 SIMULATED EQUIVALENT TISSUES

The 1880/1900MHz simulated equivalent tissue mixtures consist of Glycol-monobutyl, water, and salt. The 835MHz simulated tissue mixtures consist of a viscous gel using hydroxethylcellulose (HEC) gelling agent and saline solution. Preservation with a bactericide was added and visual inspection was made to ensure air bubbles were not trapped during the mixing process. The fluids were prepared according to standardized procedures and measured for dielectric parameters (permittivity and conductivity).

1880/1900MHz TISSUE MIXTURES			
INGREDIENT	1900MHz Brain	1880MHz Brain	1880MHz 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 %

835MHz TISSUE MIXTURES		
INGREDIENT	835MHz Brain	835MHz Body
	System Check & DUT Evaluation	DUT Evaluation
Water	40.71 %	53.79 %
Sugar	56.63 %	45.13 %
Salt	1.48 %	0.98 %
HEC	0.99 %	--
Bactericide	0.19 %	0.10 %

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.:	1590
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. 20 liters

© 2004 Celltech Labs Inc.

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

© 2004 Celltech Labs Inc.

14.0 TEST EQUIPMENT LIST

TEST EQUIPMENT	SERIAL NO.	CALIBRATION DATE
Schmid & Partner DASY4 System	-	-
-DASY4 Measurement Server	1078	N/A
-Robot	599396-01	N/A
-DAE3	353	Dec 2003
-DAE3	370	May 2004
-ET3DV6 E-Field Probe	1387	Mar 2004
-ET3DV6 E-Field Probe	1590	May 2004
-300MHz Validation Dipole	135	Oct 2003
-450MHz Validation Dipole	136	Nov 2003
-835MHz Validation Dipole	411	Mar 2004
-900MHz Validation Dipole	054	June 2004
-1800MHz Validation Dipole	247	June 2004
-1900MHz Validation Dipole	151	June 2004
-2450MHz Validation Dipole	150	Sept 2003
-SAM Phantom V4.0C	1033	N/A
-Barski Planar Phantom	03-01	N/A
-Plexiglas Planar Phantom	161	N/A
-Validation Planar Phantom	137	N/A
HP 85070C Dielectric Probe Kit	N/A	N/A
Gigatronics 8651A Power Meter	8650137	April 2004
Gigatronics 8652A Power Meter	1835267	April 2004
Gigatronics 80701A Power Sensor	1833535	April 2004
Gigatronics 80701A Power Sensor	1833542	April 2004
Gigatronics 80701A Power Sensor	1834350	April 2004
HP E4408B Spectrum Analyzer	US39240170	Dec 2003
HP 8594E Spectrum Analyzer	3543A02721	April 2004
HP 8753E Network Analyzer	US38433013	April 2004
HP 8648D Signal Generator	3847A00611	April 2004
Amplifier Research 5S1G4 Power Amplifier	26235	N/A
Will'Tek Wavetek 4303 CDMA2000 Test Set	1141417	June 2004

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 (835 MHz)	± 5.95	Normal	1	1	± 5.95	∞
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						
835 MHz					**± 13.76**	
1900 MHz					**± 13.32**	
Expanded Uncertainty (k=2)						
835 MHz					**± 27.51**	
1900 MHz					**± 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 (835 MHz)	± 5.95	Normal	1	1	± 5.95	∞
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						
835 MHz					**± 10.54**	
1900 MHz					**± 9.97**	
Expanded Uncertainty (k=2)						
835 MHz					**± 21.09**	
1900 MHz					**± 19.93**	

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

© 2004 Celltech Labs Inc.

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".

APPENDIX B - SYSTEM PERFORMANCE CHECK DATA

Date Tested: 07/27/04

System Performance Check - 835 MHz Dipole

DUT: Dipole 835 MHz; Model: D835V2; Type: System Performance Check; Serial: 411; Calibrated: 03/16/2004

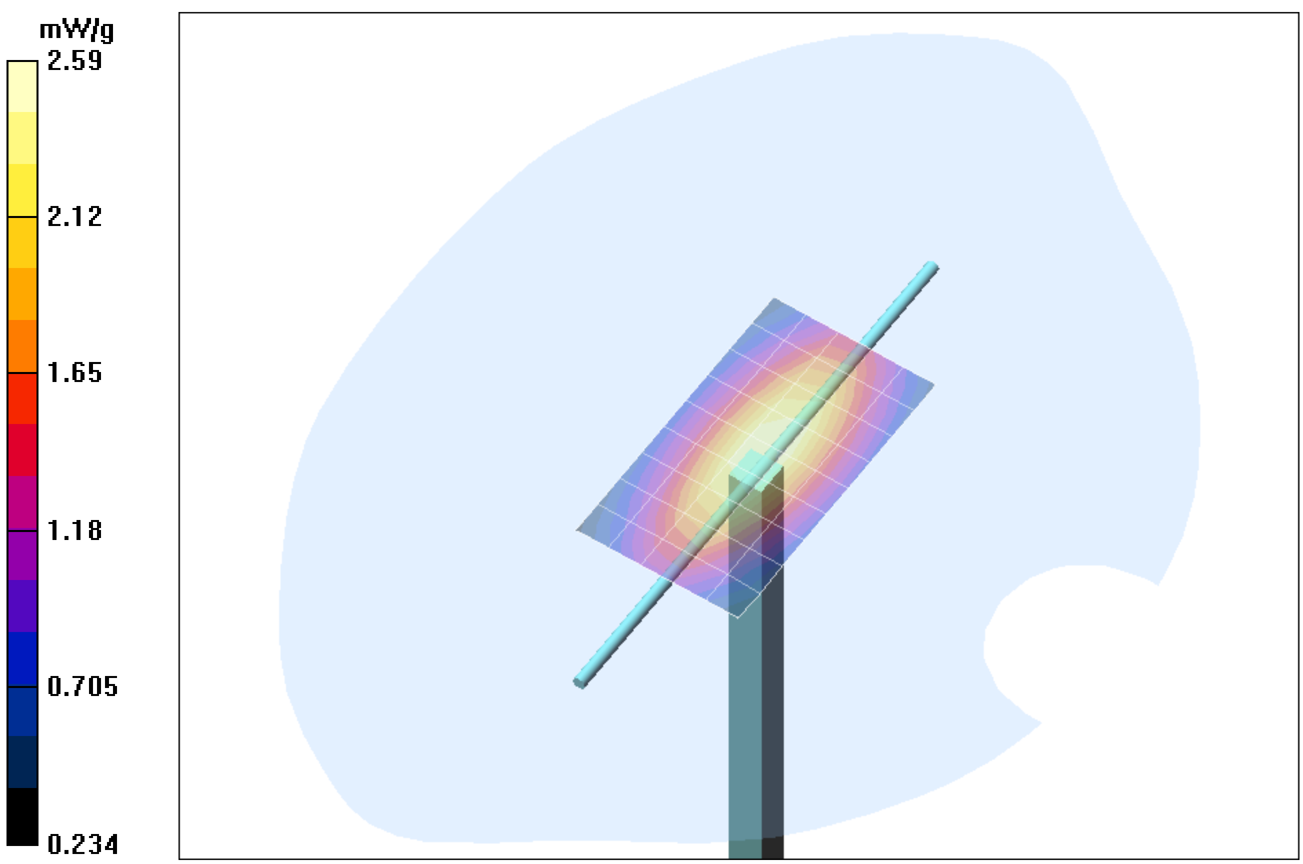
Ambient Temp: 23.4 °C; Fluid Temp: 22.2 °C; Barometric Pressure: 102.6 kPa; Humidity: 33%

Communication System: CW
Forward Conducted Power: 250mW
Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL835 (σ = 0.90 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1590; ConvF(6.71, 6.71, 6.71); Calibrated: 24/05/2004
- 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

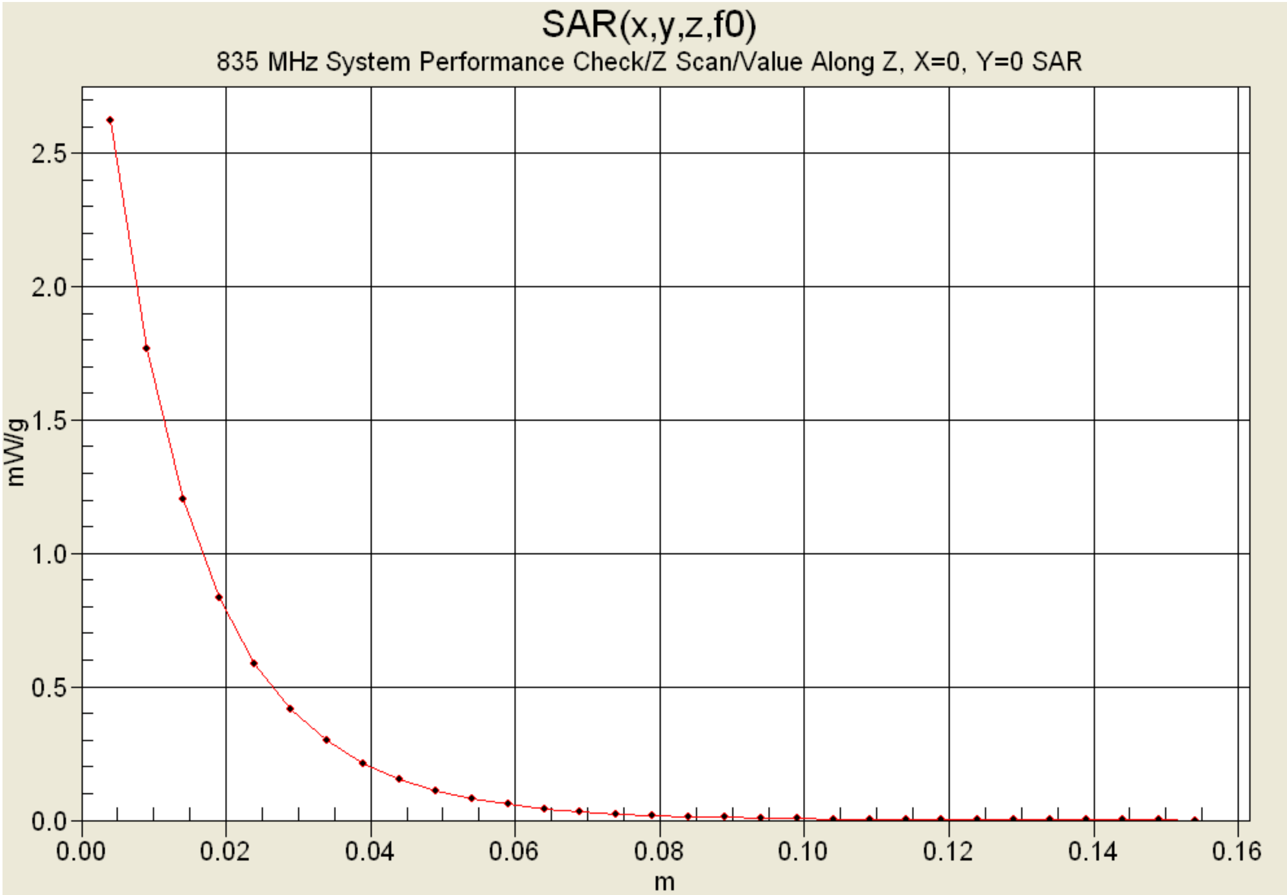
835 MHz System Performance Check/Area Scan (6x10x1):
Measurement grid: dx=10mm, dy=10mm

835 MHz System Performance Check/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.2 V/m; Power Drift = 0.1 dB
Peak SAR (extrapolated) = 3.5 W/kg
SAR(1 g) = 2.38 mW/g; SAR(10 g) = 1.56 mW/g



© 2004 Celltech Labs Inc.

Z-Axis Scan



© 2004 Celltech Labs Inc.

Date Tested: 07/27/04

System Performance Check - 1900 MHz Dipole

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

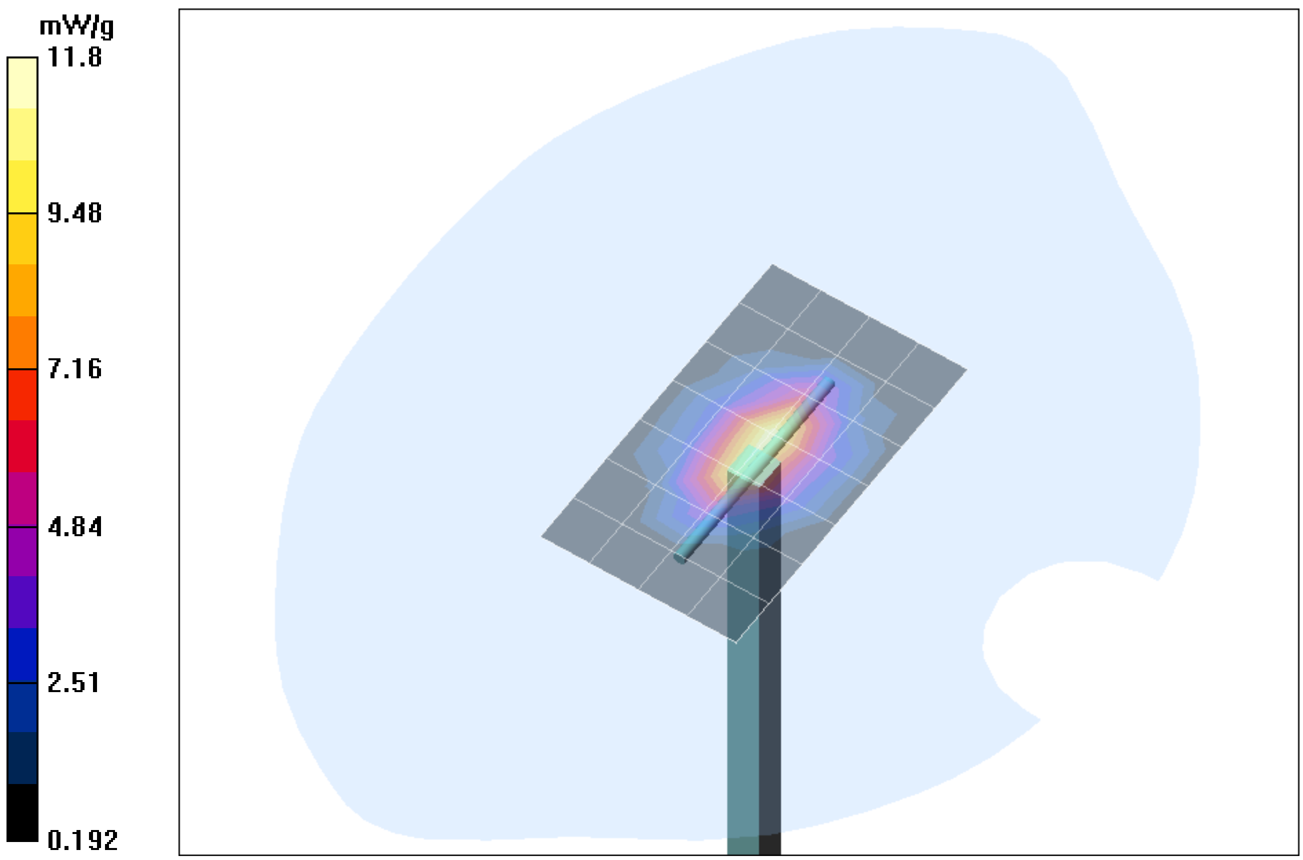
Ambient Temp: 24.1 °C; Fluid Temp: 22.6 °C; Barometric Pressure: 102.3 kPa; Humidity: 37%

Communication System: CW
Forward Conducted Power: 250mW
Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL1900 (σ = 1.43 mho/m; ε_r = 38.4; ρ = 1000 kg/m^3)

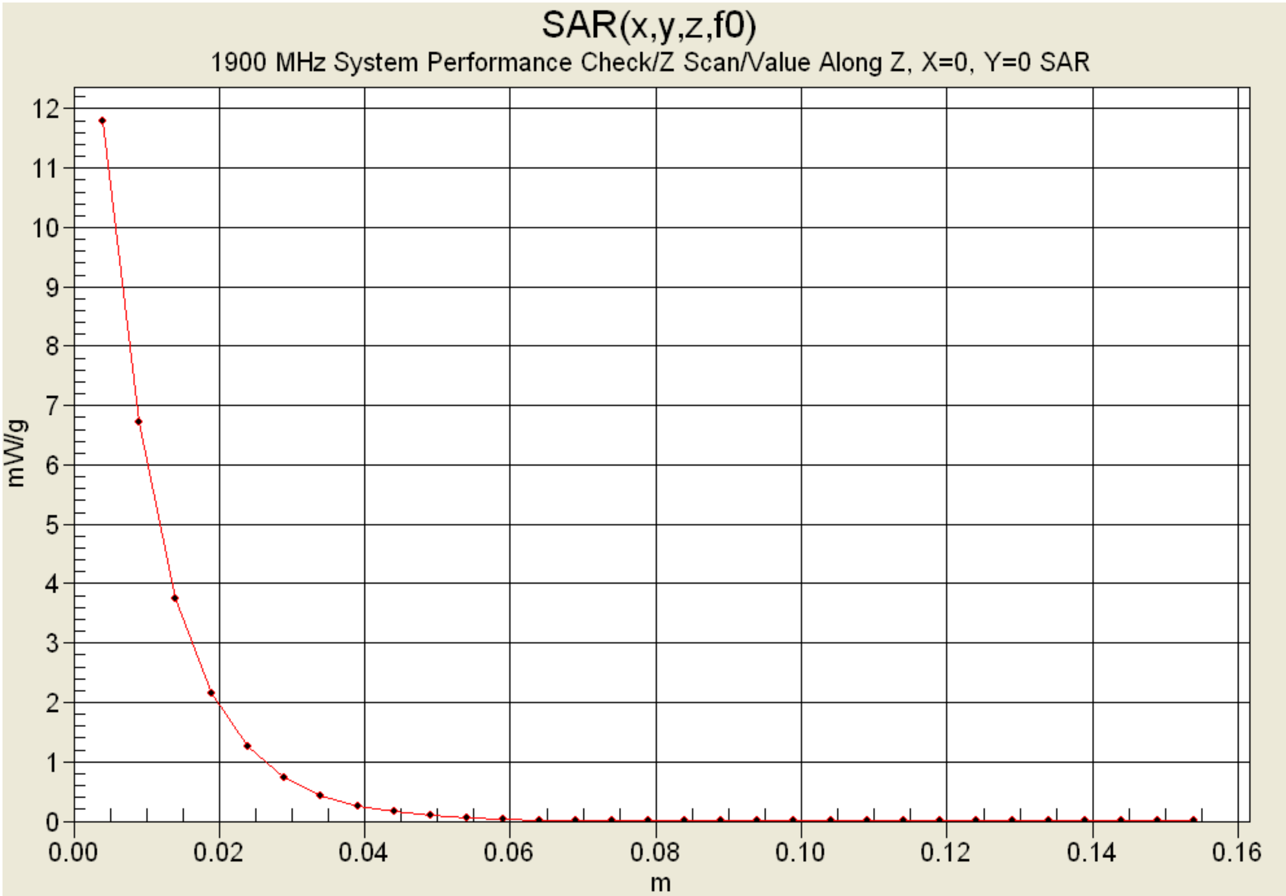
- Probe: ET3DV6 - SN1590; ConvF(5.03, 5.03, 5.03); Calibrated: 24/05/2004
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn370; Calibrated: 14/05/2004
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

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

1900 MHz System Performance Check/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.9 V/m; Power Drift = 0.0 dB
Peak SAR (extrapolated) = 17.9 W/kg
SAR(1 g) = 10.4 mW/g; SAR(10 g) = 5.48 mW/g



Z-Axis Scan


SAR(x,y,z,f0)
1900 MHz System Performance Check/Z Scan/Value Along Z, X=0, Y=0 SAR
mW/g
0
1
2
3
4
5
6
7
8
9
10
11
12
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
m

Date Tested: 07/29/04

System Performance Check - 835 MHz Dipole

DUT: Dipole 835 MHz; Model: D835V2; Type: System Performance Check; Serial: 411; Calibrated: 03/16/2004

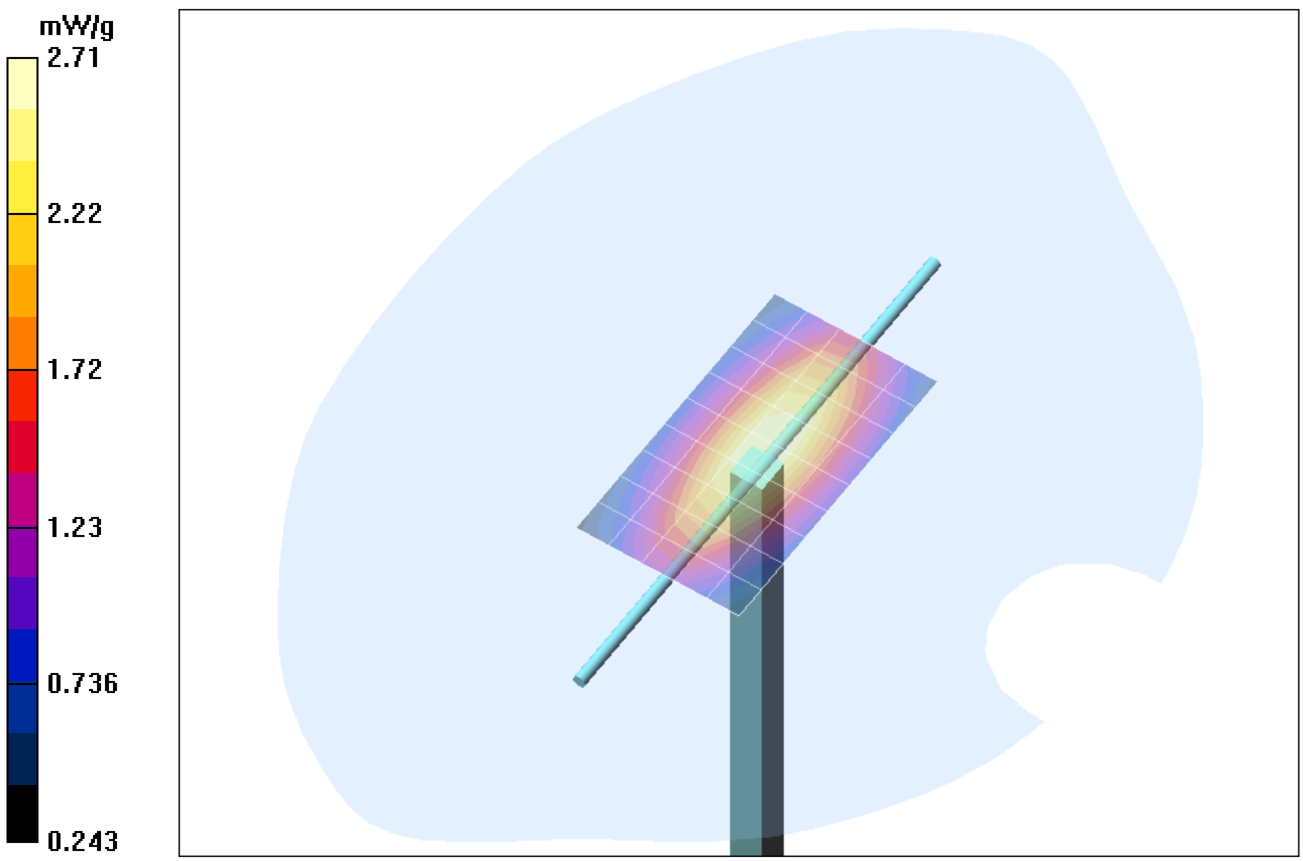
Ambient Temp: 23.8 °C; Fluid Temp: 23.6 °C; Barometric Pressure: 102.2 kPa; Humidity: 43%

Communication System: CW
Forward Conducted Power: 250mW
Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL835 (σ = 0.90 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1590; ConvF(6.71, 6.71, 6.71); Calibrated: 24/05/2004
- 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

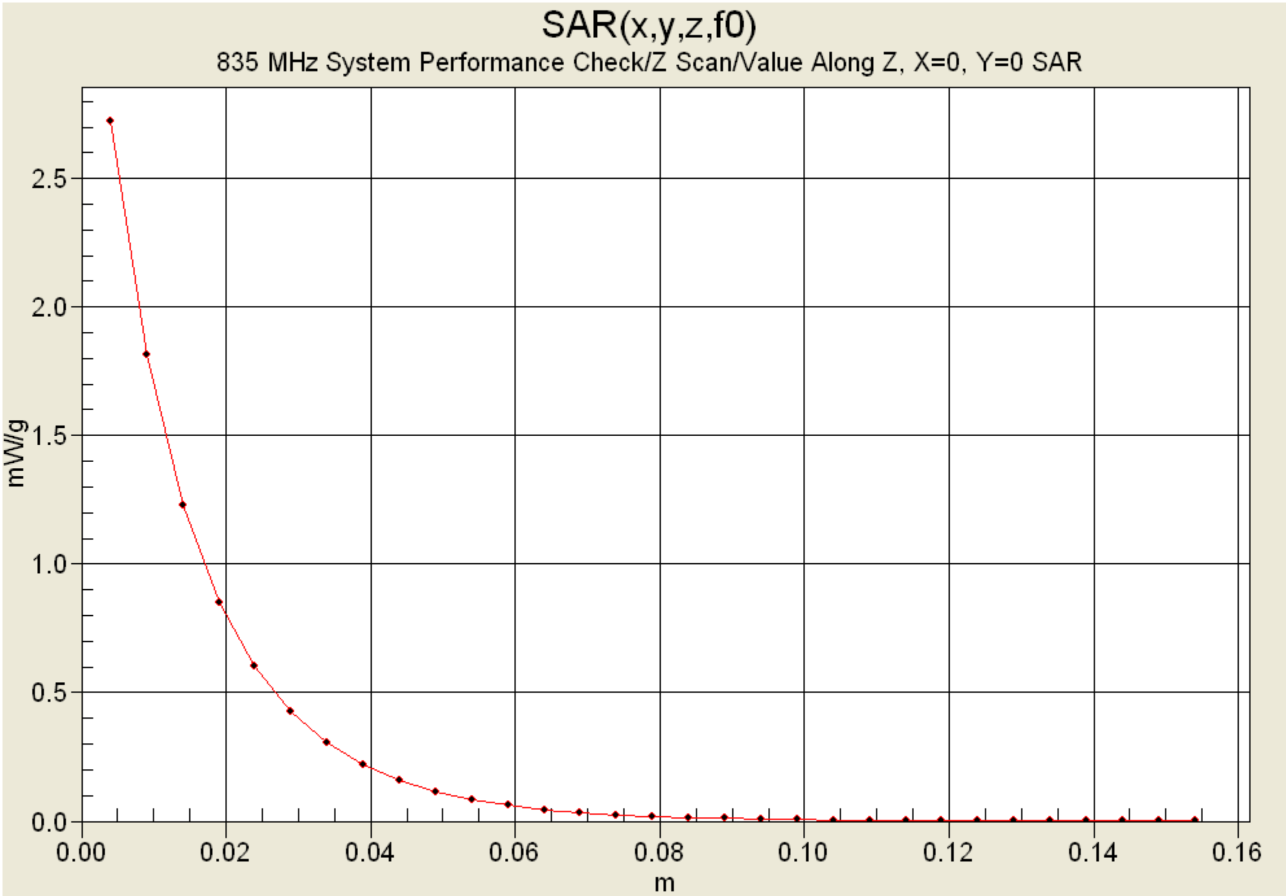
835 MHz System Performance Check/Area Scan (6x10x1):
Measurement grid: dx=10mm, dy=10mm

835 MHz System Performance Check/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.8 V/m; Power Drift = 0.009 dB
Peak SAR (extrapolated) = 3.77 W/kg
SAR(1 g) = 2.51 mW/g; SAR(10 g) = 1.64 mW/g



© 2004 Celltech Labs Inc.

Z-Axis Scan



SAR(x,y,z,f0)
835 MHz System Performance Check/Z Scan/Value Along Z, X=0, Y=0 SAR
mW/g
2.5
2.0
1.5
1.0
0.5
0.0
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
m

Date Tested: 07/29/04

System Performance Check - 1900 MHz Dipole

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

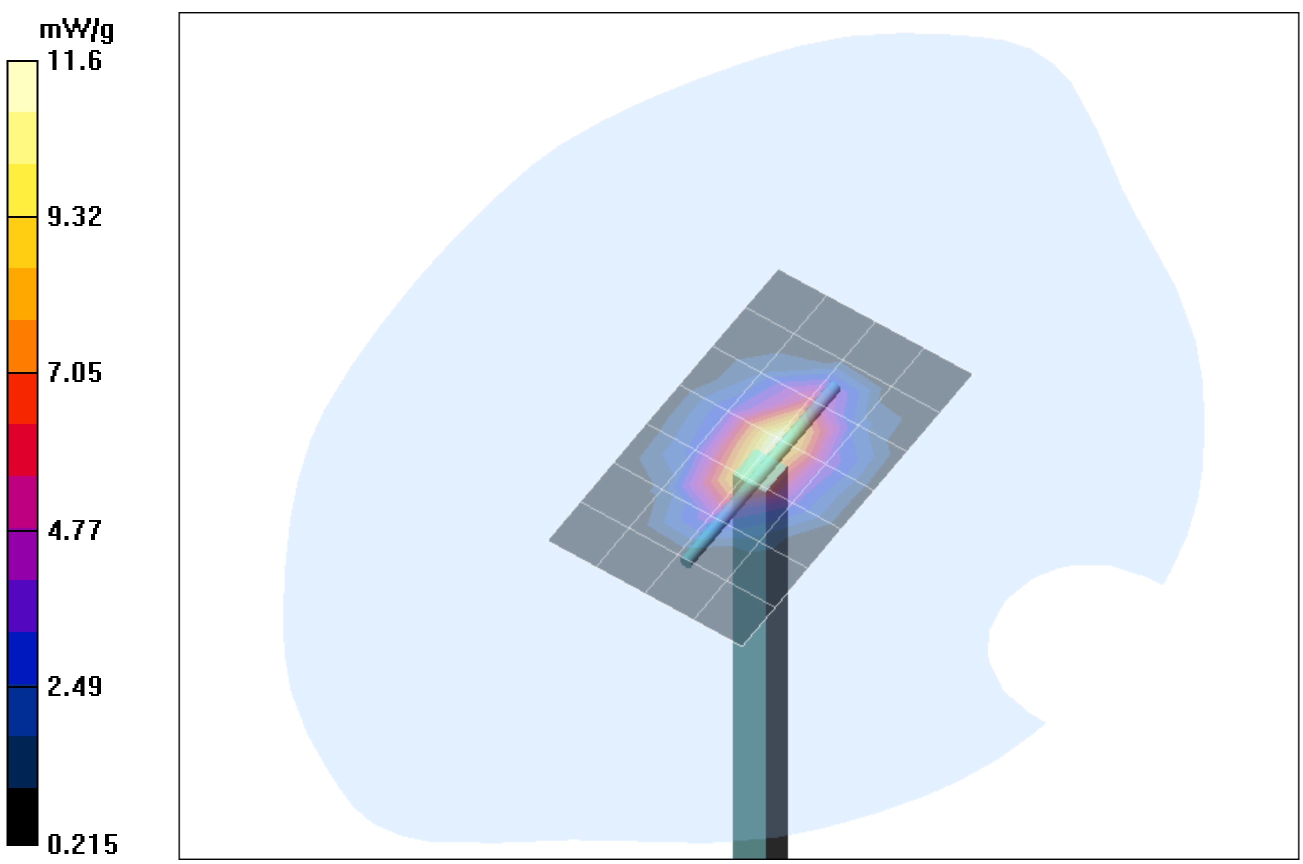
Ambient Temp: 24.6 °C; Fluid Temp: 23.5 °C; Barometric Pressure: 101.8 kPa; Humidity: 42%

Communication System: CW
Forward Conducted Power: 250mW
Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL1900 (σ = 1.41 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3)

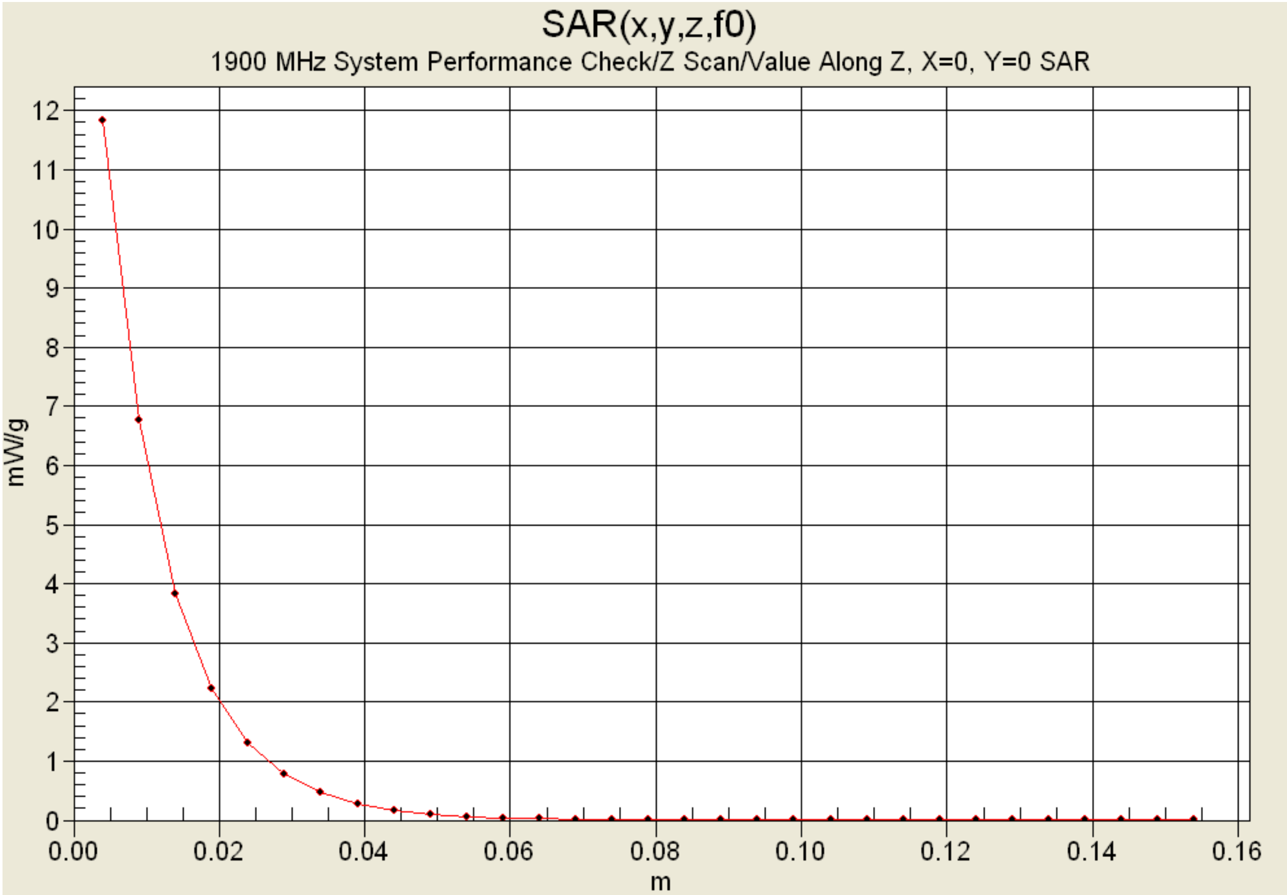
- Probe: ET3DV6 - SN1590; ConvF(5.03, 5.03, 5.03); Calibrated: 24/05/2004
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn370; Calibrated: 14/05/2004
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

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

1900 MHz System Performance Check/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.5 V/m; Power Drift = 0.0 dB
Peak SAR (extrapolated) = 17.7 W/kg
SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.45 mW/g



Z-Axis Scan


SAR(x,y,z,f0)
1900 MHz System Performance Check/Z Scan/Value Along Z, X=0, Y=0 SAR
mW/g
12
11
10
9
8
7
6
5
4
3
2
1
0
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
m

Date Tested: 07/31/04

System Performance Check - 835 MHz Dipole

DUT: Dipole 835 MHz; Model: D835V2; Type: System Performance Check; Serial: 411; Calibrated: 03/16/2004

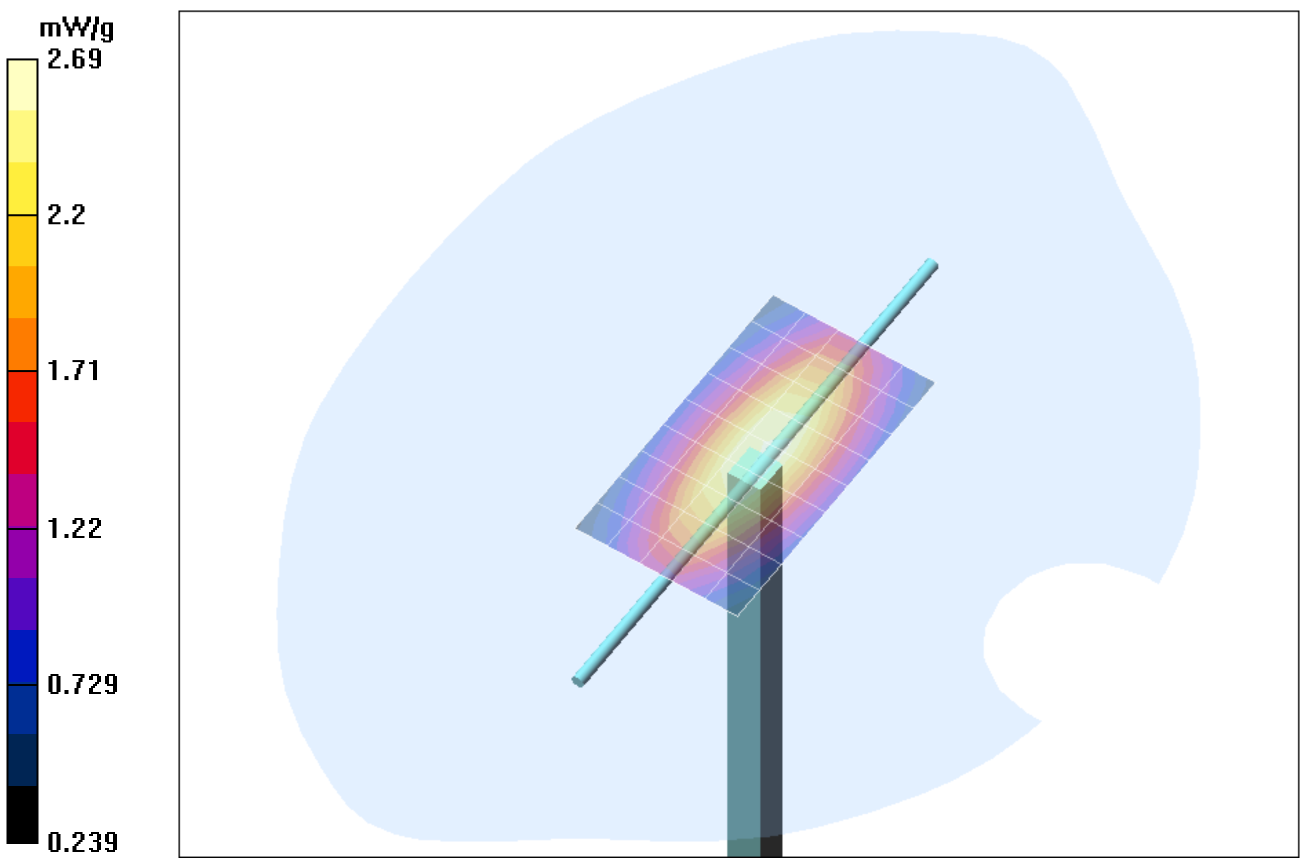
Ambient Temp: 24.0 °C; Fluid Temp: 23.5 °C; Barometric Pressure: 101.9 kPa; Humidity: 39%

Communication System: CW
Forward Conducted Power: 250mW
Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL835 (σ = 0.92 mho/m; ε_r = 41.0; ρ = 1000 kg/m^3)

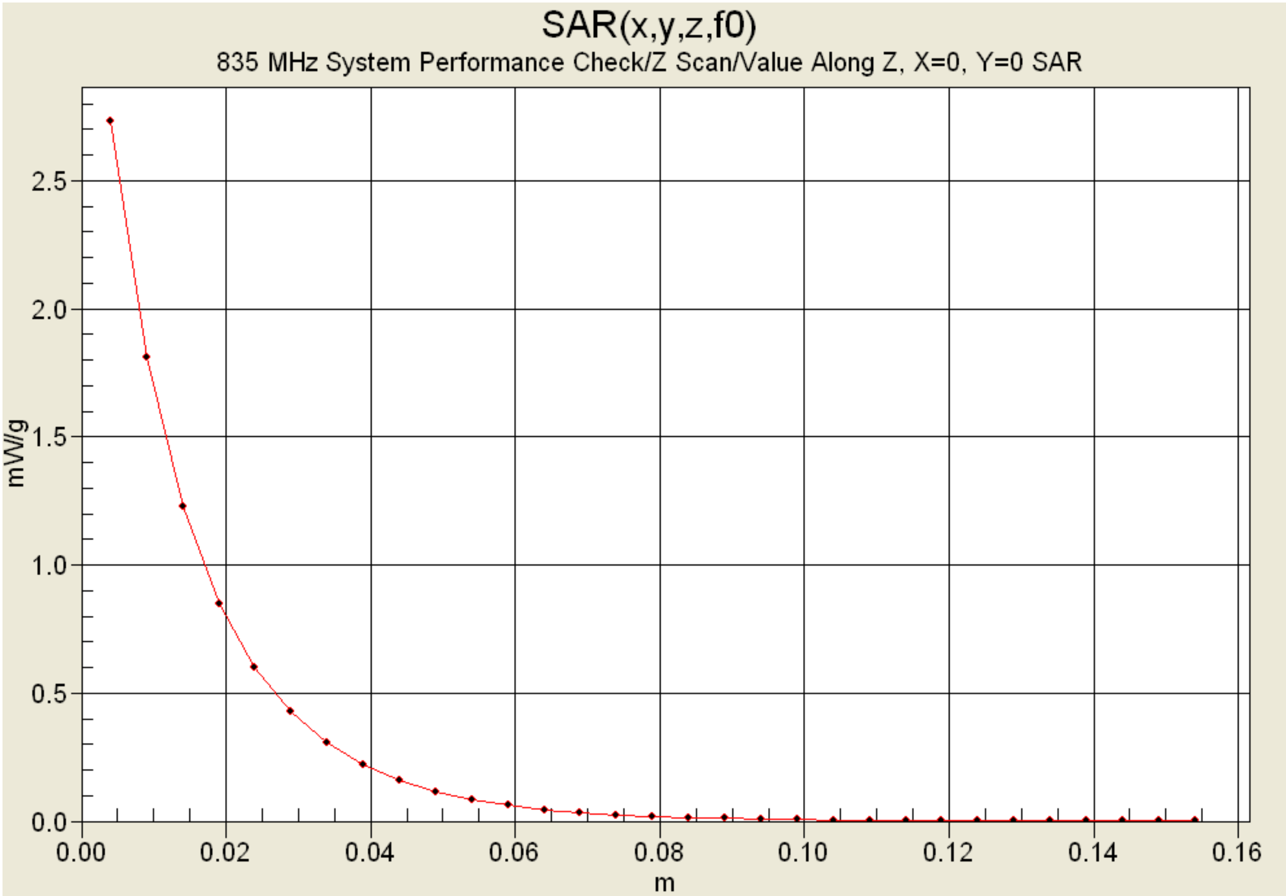
- Probe: ET3DV6 - SN1590; ConvF(6.71, 6.71, 6.71); Calibrated: 24/05/2004
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn370; Calibrated: 14/05/2004
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

835 MHz System Performance Check/Area Scan (6x10x1):
Measurement grid: dx=10mm, dy=10mm

835 MHz System Performance Check/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56 V/m; Power Drift = -0.0 dB
Peak SAR (extrapolated) = 3.75 W/kg
SAR(1 g) = 2.50 mW/g; SAR(10 g) = 1.62 mW/g



Z-Axis Scan


SAR(x,y,z,f0)
835 MHz System Performance Check/Z Scan/Value Along Z, X=0, Y=0 SAR
mW/g
2.5
2.0
1.5
1.0
0.5
0.0
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
m

Date Tested: 08/18/04

System Performance Check - 835 MHz Dipole

DUT: Dipole 835 MHz; Model: D835V2; Type: System Performance Check; Serial: 411; Calibrated: 03/16/2004

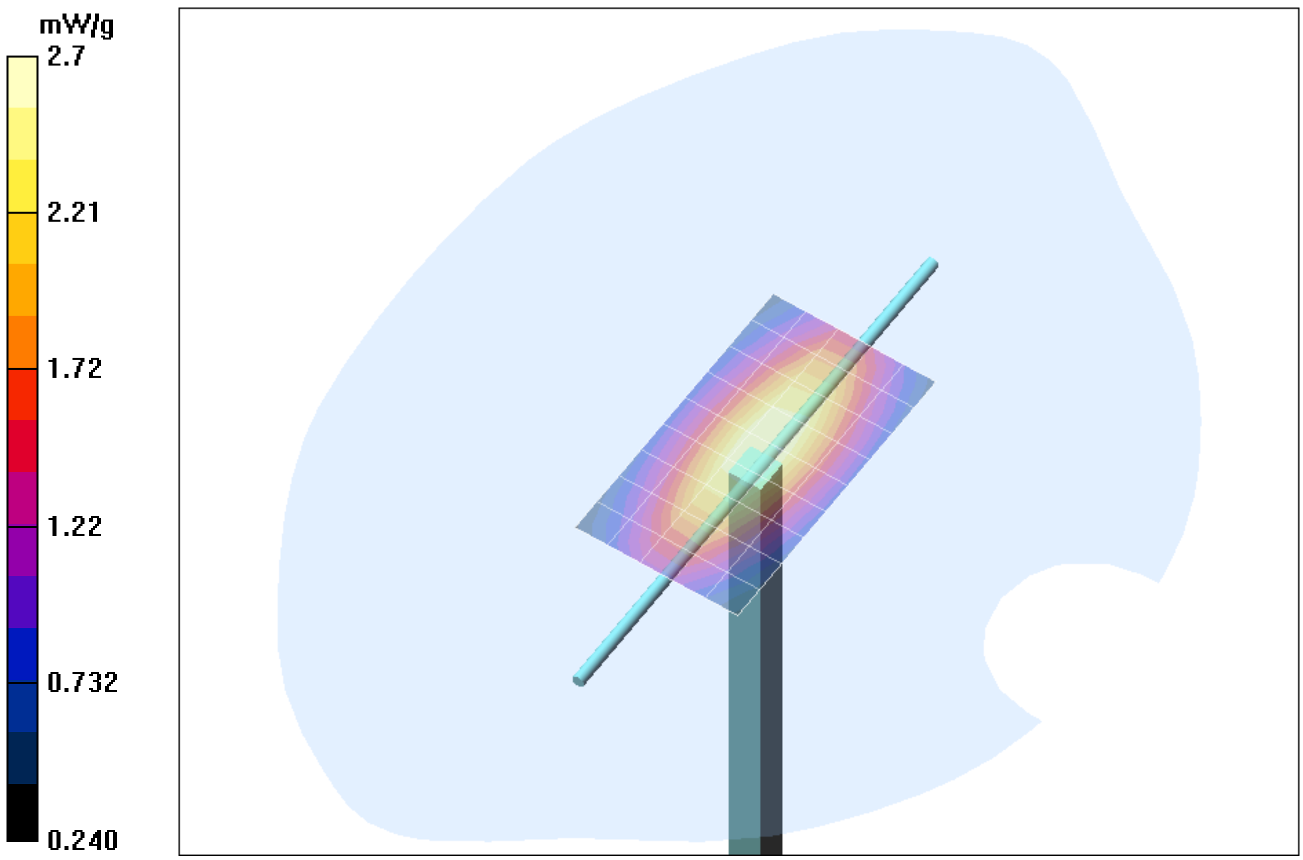
Ambient Temp: 23.4 °C; Fluid Temp: 23.6 °C; Barometric Pressure: 102.7 kPa; Humidity: 51%

Communication System: CW
Forward conducted Power: 250mW
Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL835 (σ = 0.91 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3)

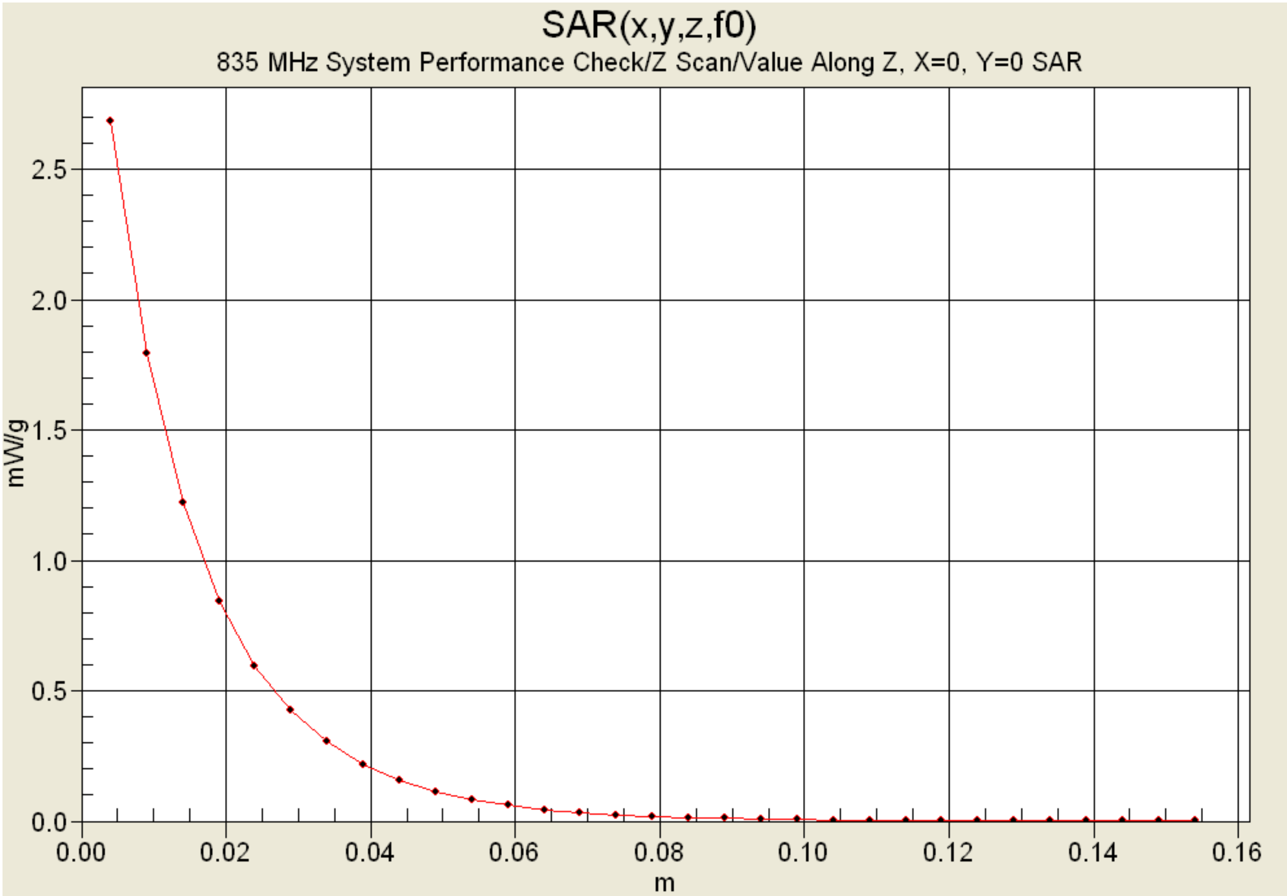
- Probe: ET3DV6 - SN1590; ConvF(6.71, 6.71, 6.71); Calibrated: 24/05/2004
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn370; Calibrated: 14/05/2004
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

835 MHz System Performance Check/Area Scan (6x10x1):
Measurement grid: dx=10mm, dy=10mm

835 MHz System Performance Check/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.8 V/m; Power Drift = 0.1 dB
Peak SAR (extrapolated) = 3.74 W/kg
SAR(1 g) = 2.49 mW/g; SAR(10 g) = 1.62 mW/g



Z-Axis Scan



© 2004 Celltech Labs Inc.

Date Tested: 08/18/04

System Performance Check - 1900 MHz Dipole

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

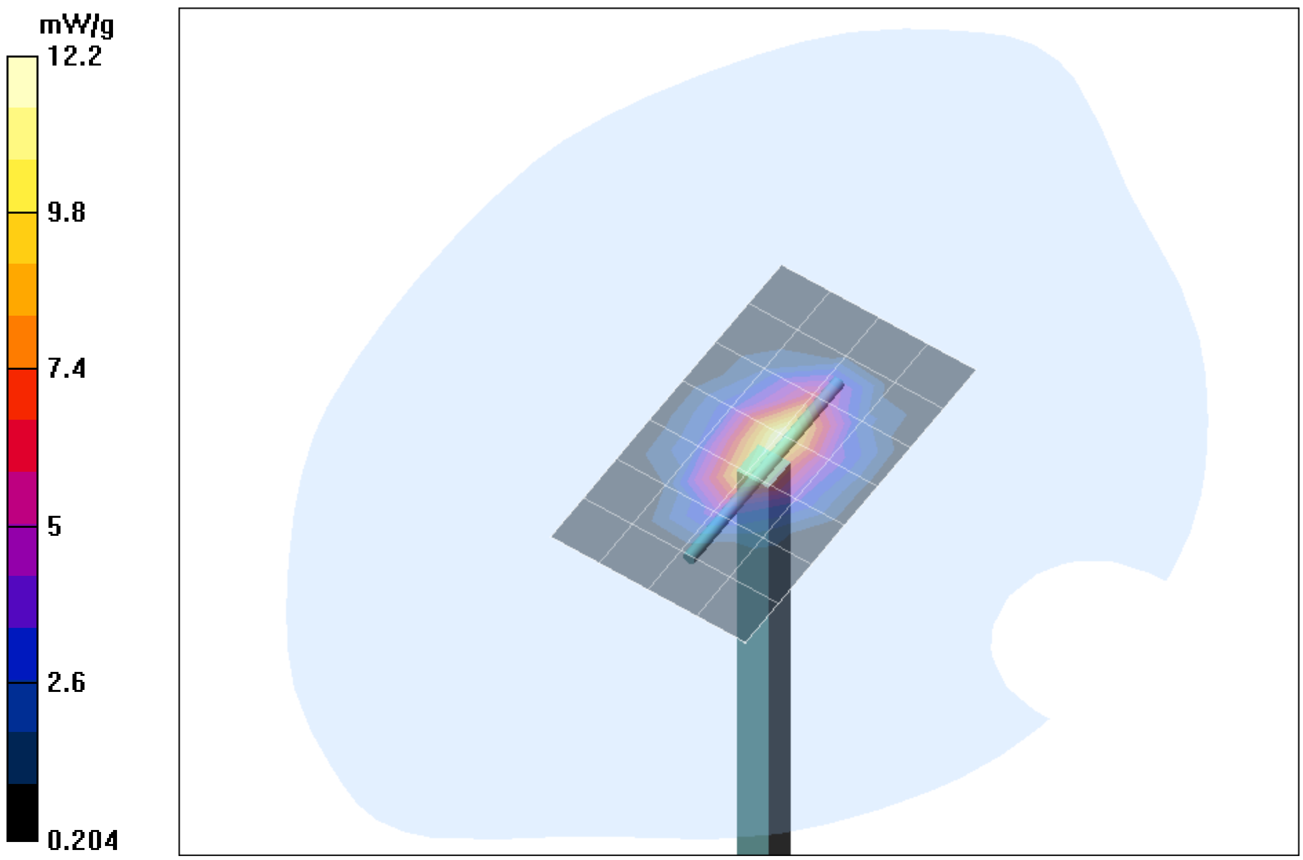
Ambient Temp: 24.2 °C; Fluid Temp: 22.4 °C; Barometric Pressure: 102.4 kPa; Humidity: 45%

Communication System: CW
Forward Conducted Power: 250mW
Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL1900 (σ = 1.42 mho/m; ε_r = 38.3; ρ = 1000 kg/m^3)

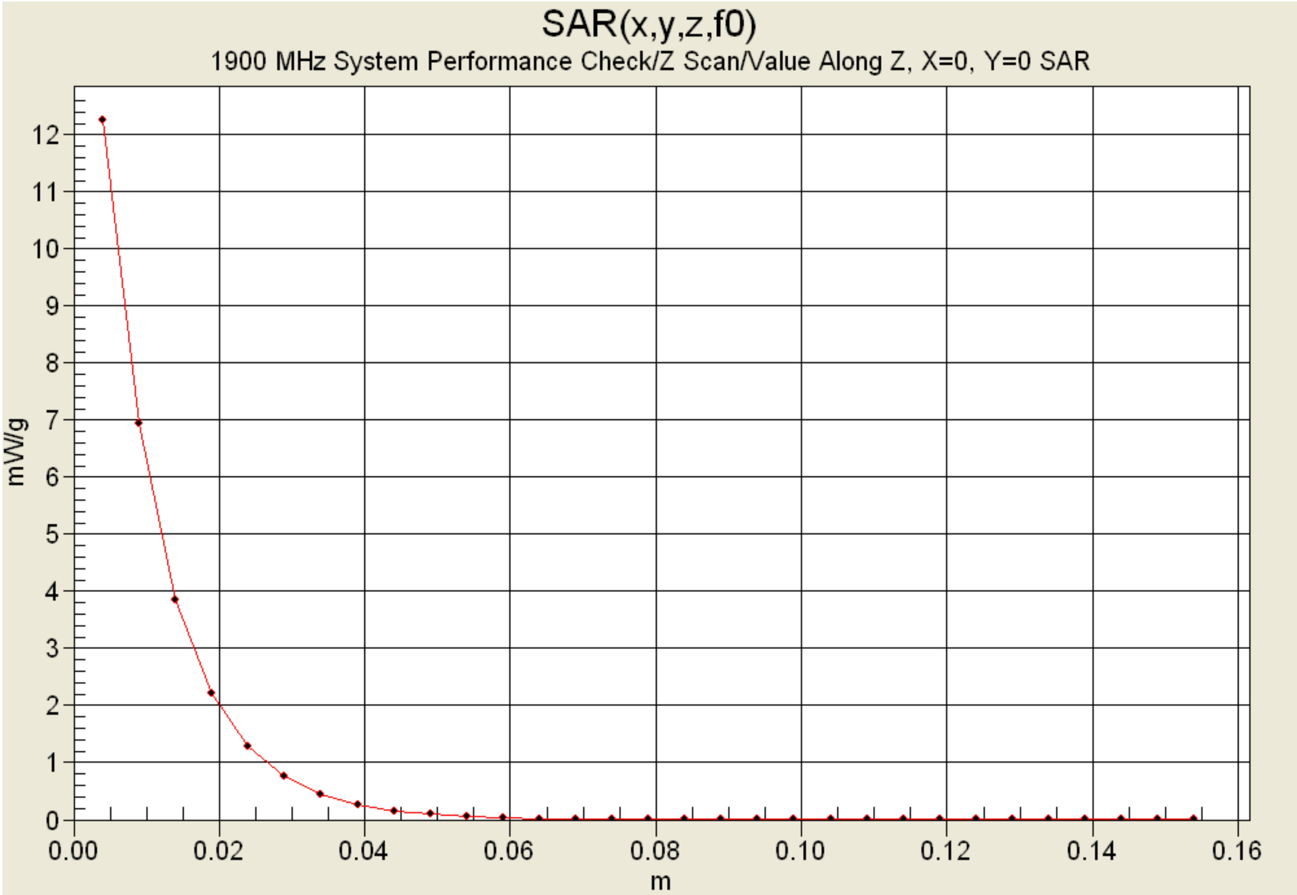
- Probe: ET3DV6 - SN1590; ConvF(5.03, 5.03, 5.03); Calibrated: 24/05/2004
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn370; Calibrated: 14/05/2004
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

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

1900 MHz System Performance Check/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.5 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 18.6 W/kg
SAR(1 g) = 10.8 mW/g; SAR(10 g) = 5.65 mW/g



Z-Axis Scan



© 2004 Celltech Labs Inc.

APPENDIX C - SYSTEM VALIDATION

Celltech
Testing and Engineering Services Lab

835 MHz SYSTEM VALIDATION DIPOLE

Type: **835 MHz Validation Dipole**

Serial Number: **411**

Place of Calibration: **Celltech Labs Inc.**

Date of Calibration: **March 16, 2004**

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

Calibrated by:

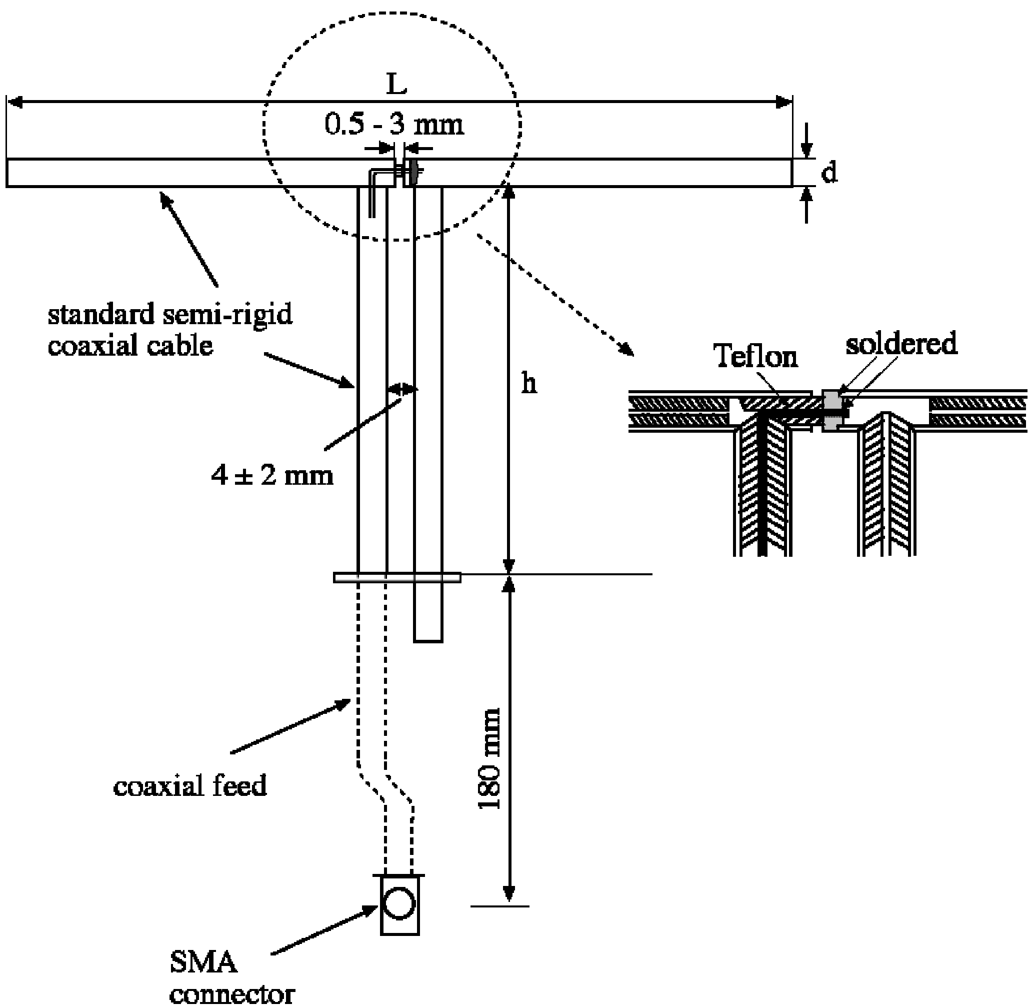
Approved by:

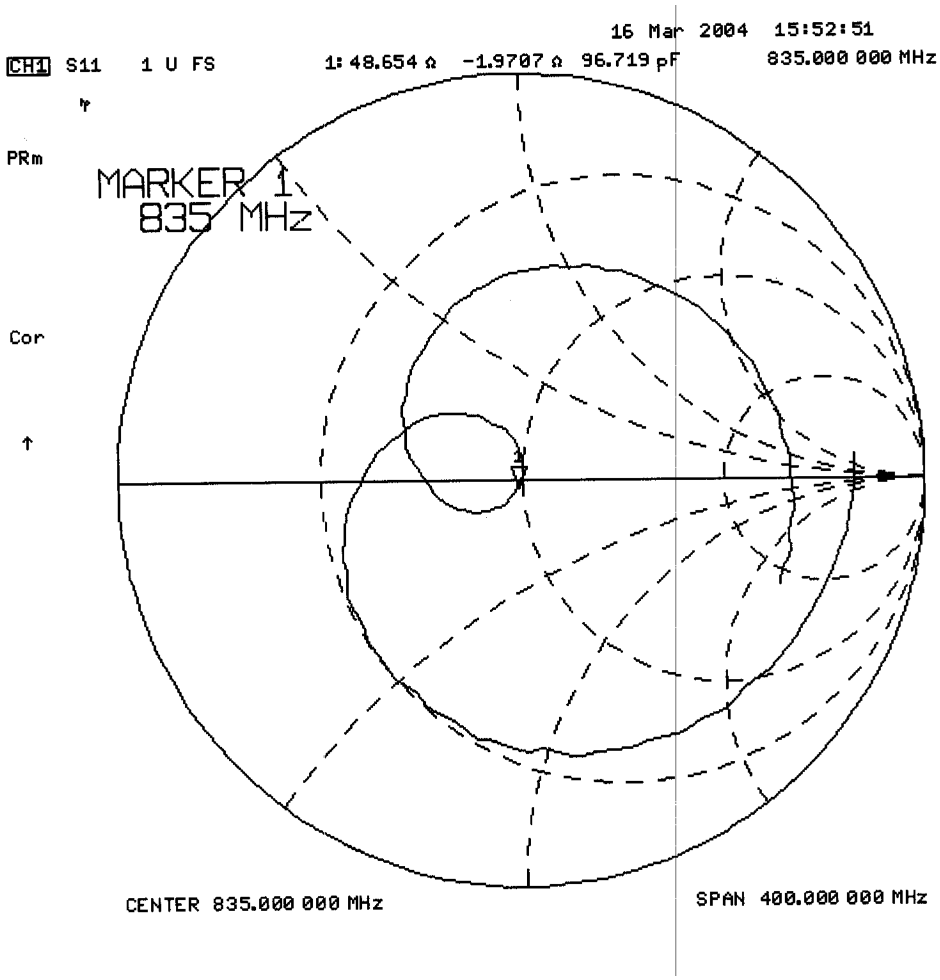
Celltech Labs Inc. 1955 Moss Court, Kelowna, B.C. Canada V1Y 9L3
Tel. 250-448-7047 • Fax. 250-448-7046 • e-mail: info@celltechlabs.com
www.celltechlabs.com

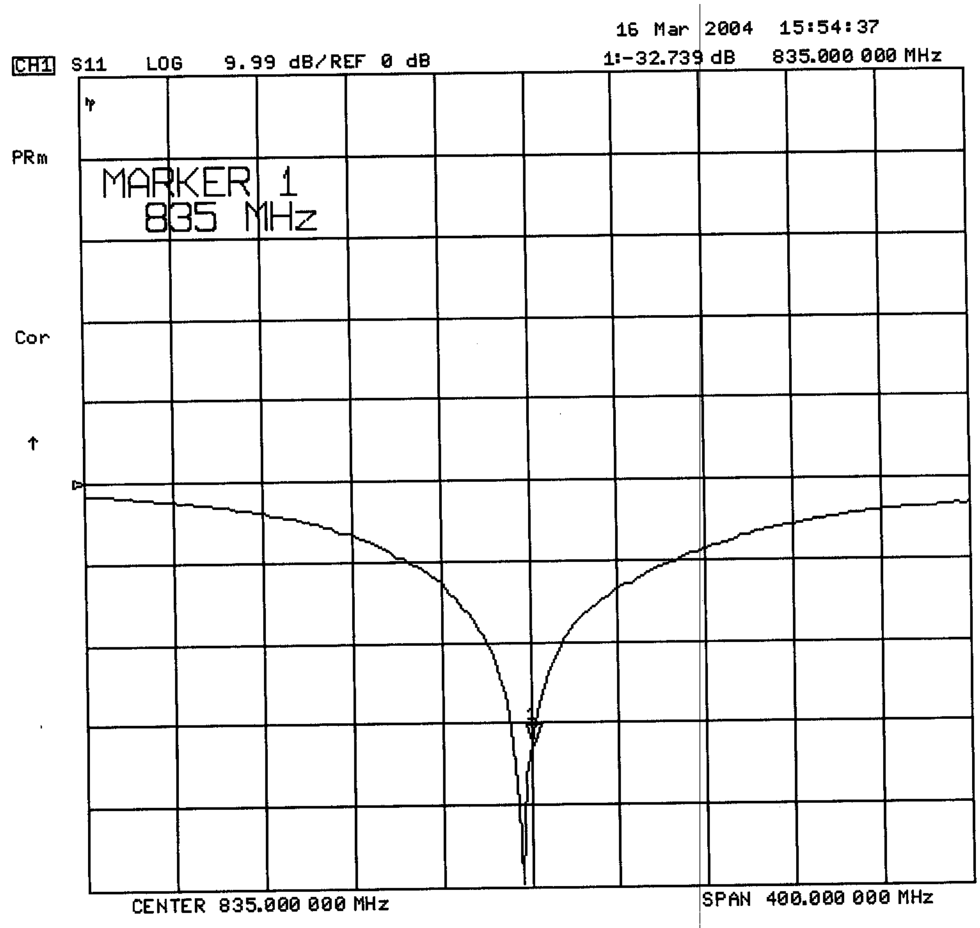
1. Dipole Construction & Electrical Characteristics

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 15.0mm from the simulating fluid using a loss-less dielectric spacer. The measured input impedance is:

Feed point impedance at 835MHz	Re{Z} = 48.654Ω Im{Z} = -1.9707Ω
Return Loss at 835MHz	-32.739dB




16 Mar 2004 15:52:51
CH1 S11 1 U FS
1: 48.654 Ω -1.9707 Ω 96.719 pF
835.000 000 MHz
PRm
MARKER 1
835 MHz
Cor
CENTER 835.000 000 MHz
SPAN 400.000 000 MHz


16 Mar 2004 15:54:37
CH1 S11 LOG 9.99 dB/REF 0 dB
1:-32.739 dB 835.000 000 MHz
PRm
MARKER 1
835 MHz
Cor
CENTER 835.000 000 MHz
SPAN 400.000 000 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)

835 MHz System Validation Setup

835 MHz System Validation Setup

3. Measurement Conditions

The SAM phantom was filled with 835 MHz brain simulating tissue.

Relative Permittivity:	42.6
Conductivity:	0.94 mho/m
Ambient Temperature:	24.6 °C
Fluid Temperature:	21.9 °C
Fluid Depth:	≥ 15.0 cm
Barometric Pressure:	101.6 kPa
Humidity:	31%

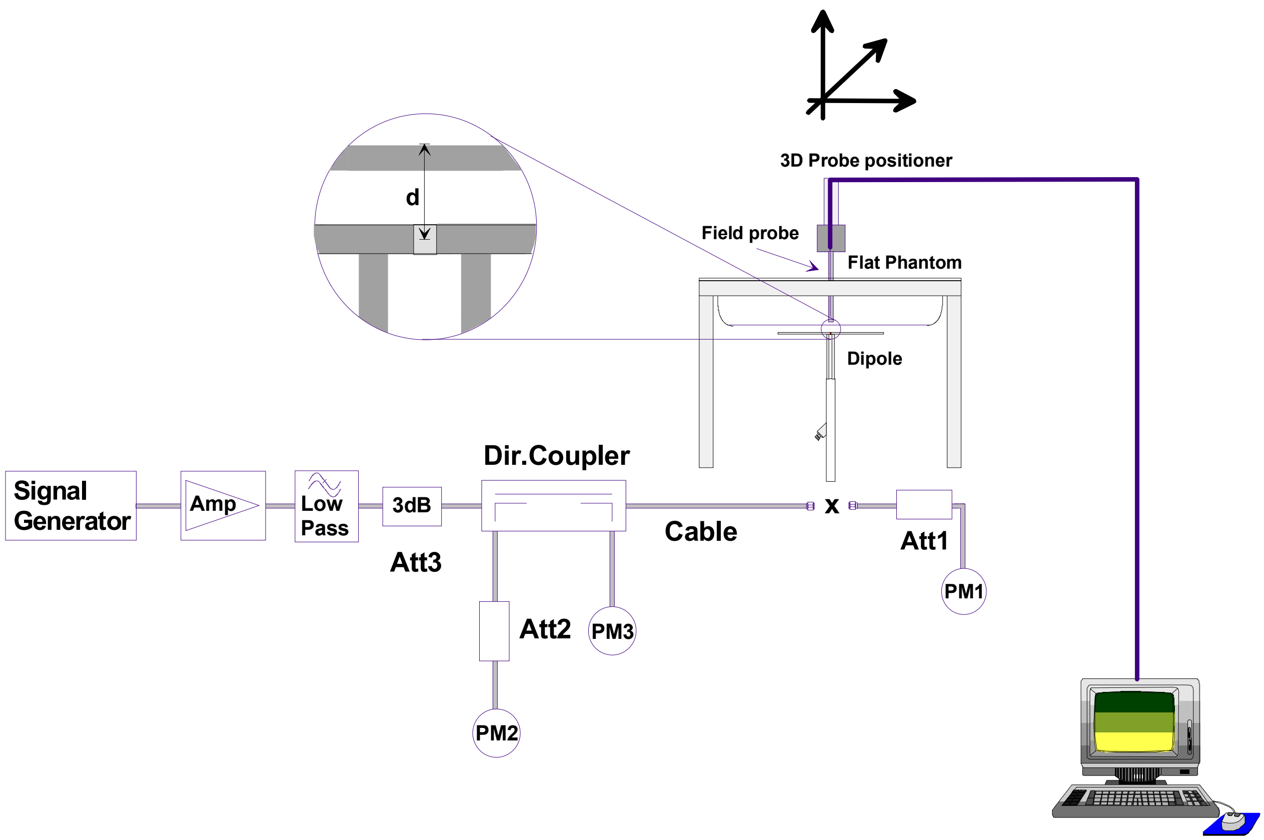
The 835 MHz simulating tissue consists of the following ingredients:

Ingredient	Percentage by weight
Water	40.71%
Sugar	56.63%
Salt	1.48%
HEC	0.99%
Dowicil 75	0.19%
Target Dielectric Parameters at 22 °C	ε_r = 41.5 σ = 0.90 S/m

Measurements were taken in the flat section of the SAM phantom using a dosimetric E-field probe ET3DV6 (s/n: 1590, conversion factor 7.0).

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 20dB 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	2.46	9.84	1.61	6.44	3.56
Test 2	2.45	9.80	1.60	6.40	3.56
Test 3	2.45	9.80	1.61	6.44	3.56
Test 4	2.44	9.76	1.60	6.40	3.55
Test 5	2.43	9.72	1.60	6.40	3.53
Test 6	2.44	9.76	1.60	6.40	3.53
Test 7	2.44	9.76	1.60	6.40	3.55
Test 8	2.44	9.76	1.60	6.40	3.54
Test 9	2.47	9.88	1.62	6.48	3.58
Test10	2.47	9.88	1.62	6.48	3.62
Average Value	2.45	9.80	1.61	6.42	3.56

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

Averaged over 1cm (1g) of tissue: 9.80 mW/g

Averaged over 10cm (10g) of tissue: 6.42 mW/g

835 MHz System Validation - March 16, 2004

DUT: Dipole 835 MHz; Type: D835V2; Serial: 411
Ambient Temp: 24.6°C; Fluid Temp: 21.9°C; Barometric Pressure: 101.6 kPa; Humidity: 31%

Communication System: CW
Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL835 (σ = 0.94 mho/m; ε_r = 42.6; ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1590; ConvF(7, 7, 7); Calibrated: 15/05/2003
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 19/12/2003
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.2 Build 37; Postprocessing SW: SEMCAD, V1.8 Build 109

835 MHz System Validation/Area Scan (6x10x1): Measurement grid: dx=10mm, dy=10mm
Reference Value = 56.2 V/m; Power Drift = -0.1 dB

835 MHz System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.2 V/m; Power Drift = -0.1 dB
Peak SAR (extrapolated) = 3.56 W/kg
SAR(1 g) = 2.46 mW/g; SAR(10 g) = 1.61 mW/g

835 MHz System Validation/Zoom Scan 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.2 V/m; Power Drift = -0.1 dB
Peak SAR (extrapolated) = 3.56 W/kg
SAR(1 g) = 2.45 mW/g; SAR(10 g) = 1.6 mW/g

835 MHz System Validation/Zoom Scan 3 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.2 V/m; Power Drift = -0.1 dB
Peak SAR (extrapolated) = 3.56 W/kg
SAR(1 g) = 2.45 mW/g; SAR(10 g) = 1.61 mW/g

835 MHz System Validation/Zoom Scan 5 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.2 V/m; Power Drift = -0.1 dB
Peak SAR (extrapolated) = 3.55 W/kg
SAR(1 g) = 2.44 mW/g; SAR(10 g) = 1.6 mW/g

835 MHz System Validation/Zoom Scan 6 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.2 V/m; Power Drift = -0.1 dB
Peak SAR (extrapolated) = 3.53 W/kg
SAR(1 g) = 2.43 mW/g; SAR(10 g) = 1.6 mW/g

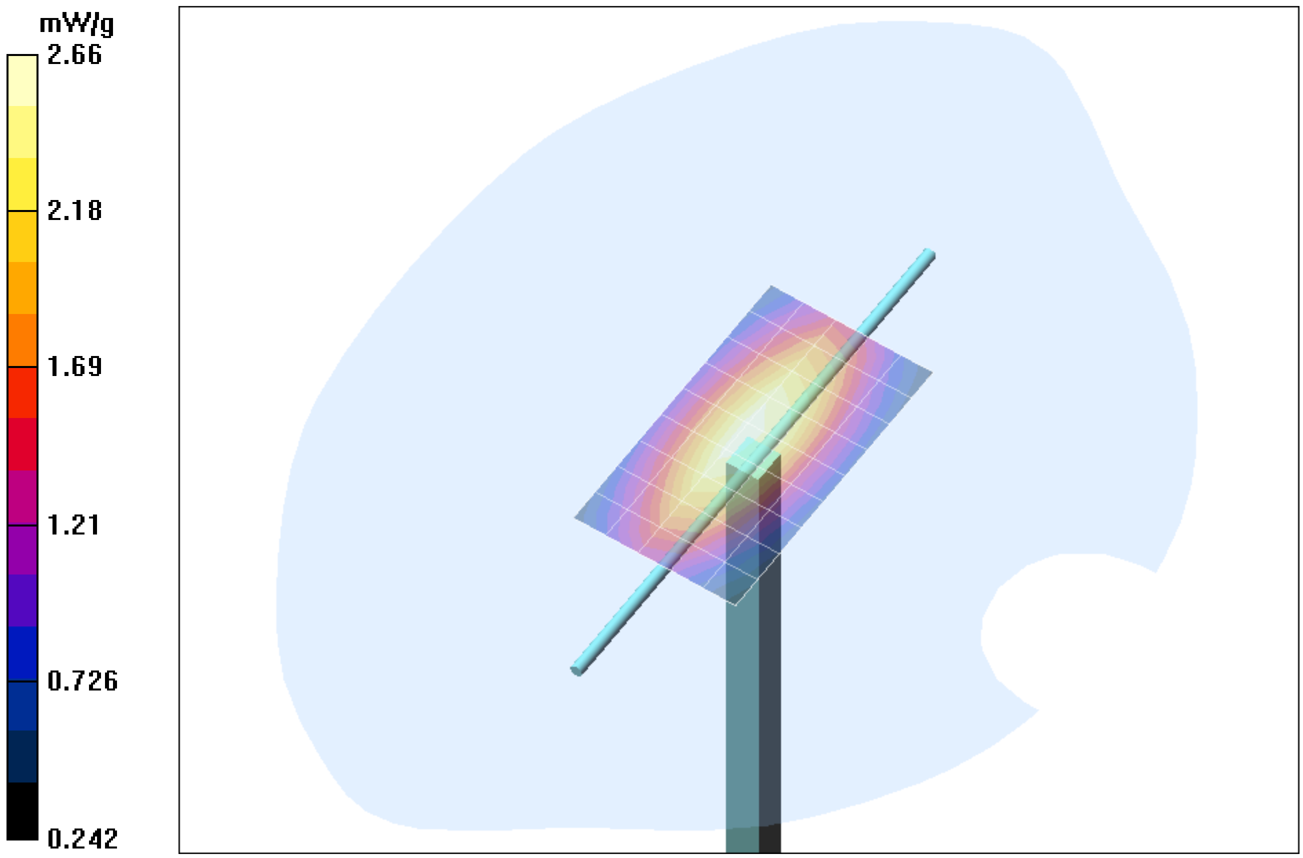
835 MHz System Validation/Zoom Scan 7 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.2 V/m; Power Drift = -0.1 dB
Peak SAR (extrapolated) = 3.53 W/kg
SAR(1 g) = 2.44 mW/g; SAR(10 g) = 1.6 mW/g

835 MHz System Validation/Zoom Scan 8 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.2 V/m; Power Drift = -0.1 dB
Peak SAR (extrapolated) = 3.55 W/kg
SAR(1 g) = 2.44 mW/g; SAR(10 g) = 1.6 mW/g

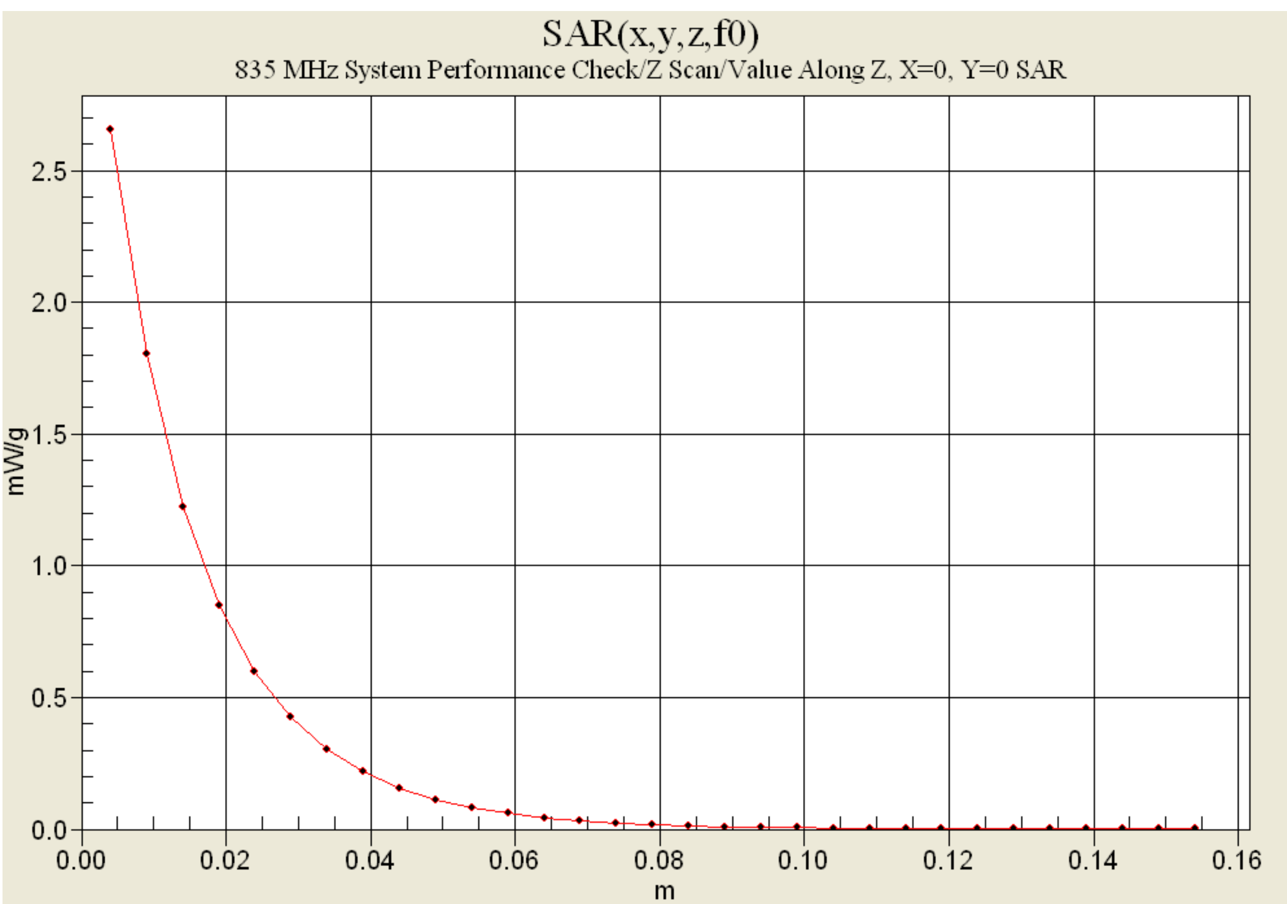
835 MHz System Validation/Zoom Scan 9 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.2 V/m; Power Drift = -0.1 dB
Peak SAR (extrapolated) = 3.54 W/kg
SAR(1 g) = 2.44 mW/g; SAR(10 g) = 1.6 mW/g

835 MHz System Validation/Zoom Scan 11 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.2 V/m; Power Drift = -0.1 dB
Peak SAR (extrapolated) = 3.58 W/kg
SAR(1 g) = 2.47 mW/g; SAR(10 g) = 1.62 mW/g

835 MHz System Validation/Zoom Scan 12 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.2 V/m; Power Drift = -0.1 dB
Peak SAR (extrapolated) = 3.62 W/kg
SAR(1 g) = 2.47 mW/g; SAR(10 g) = 1.62 mW/g



1 g average of 10 measurements: 2.449 mW/g
10 g average of 10 measurements: 1.606 mW/g



835 MHz System Performance Check

Measured Fluid Dielectric Parameters (Brain)

March 16, 2004

Frequency	e'	e"
735.000000 MHz	43.8577	20.6938
745.000000 MHz	43.6899	20.6481
755.000000 MHz	43.5341	20.5840
765.000000 MHz	43.4161	20.5576
775.000000 MHz	43.3026	20.5312
785.000000 MHz	43.2065	20.5122
795.000000 MHz	43.1067	20.5061
805.000000 MHz	43.0154	20.4762
815.000000 MHz	42.8927	20.4182
825.000000 MHz	42.7420	20.3806
835.000000 MHz	42.6206	20.2993
845.000000 MHz	42.4357	20.2595
855.000000 MHz	42.2984	20.1872
865.000000 MHz	42.1422	20.1432
875.000000 MHz	42.0082	20.1253
885.000000 MHz	41.8996	20.1110
895.000000 MHz	41.8514	20.0192
905.000000 MHz	41.7550	20.0083
915.000000 MHz	41.6535	19.9701
925.000000 MHz	41.5521	19.9380
935.000000 MHz	41.4477	19.9175

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: Spencer Watson

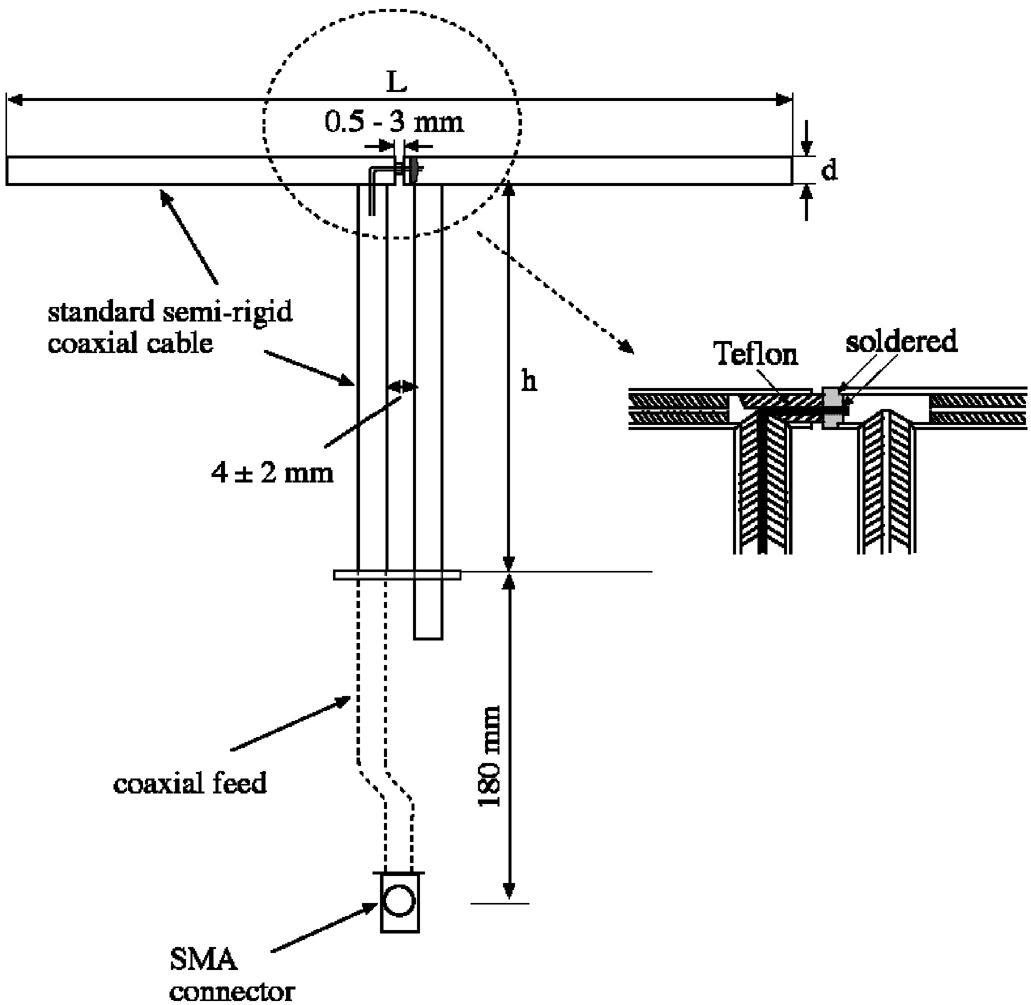
Approved by: Russell W. Pipe

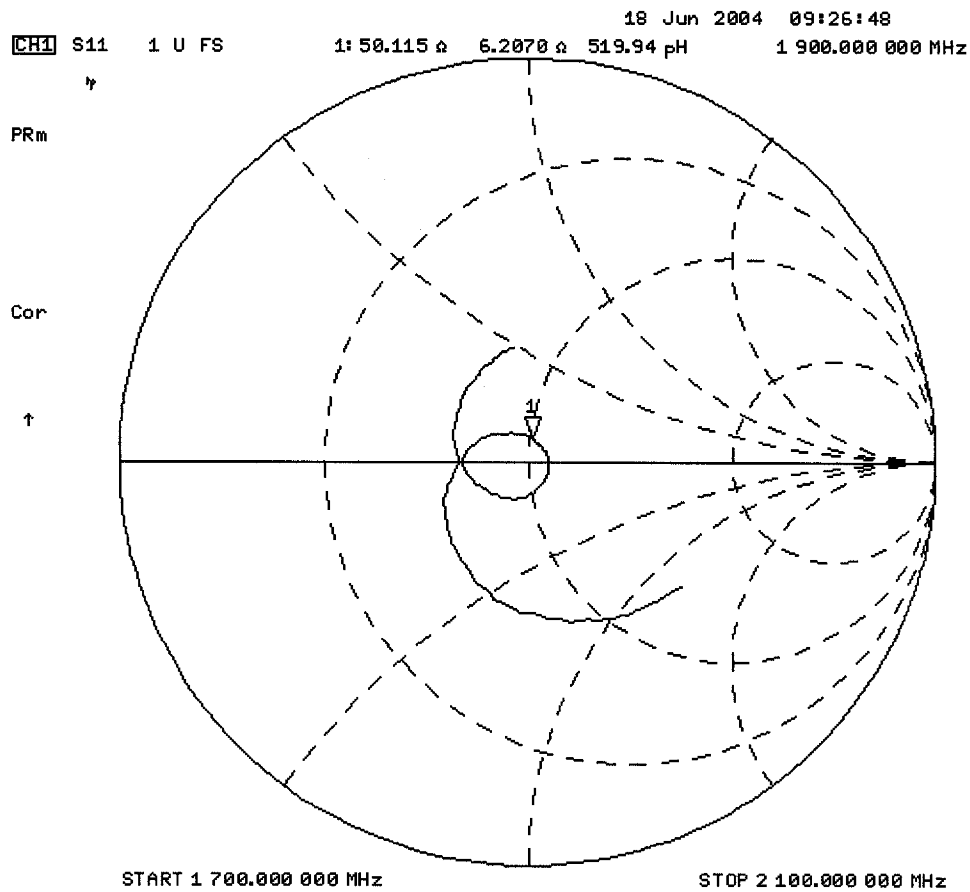
Celltech Labs Inc. 1955 Moss Court, Kelowna, B.C. Canada V1Y 9L3
Tel. 250-448-7047 • Fax. 250-448-7046 • e-mail: info@celltechlabs.com
www.celltechlabs.com

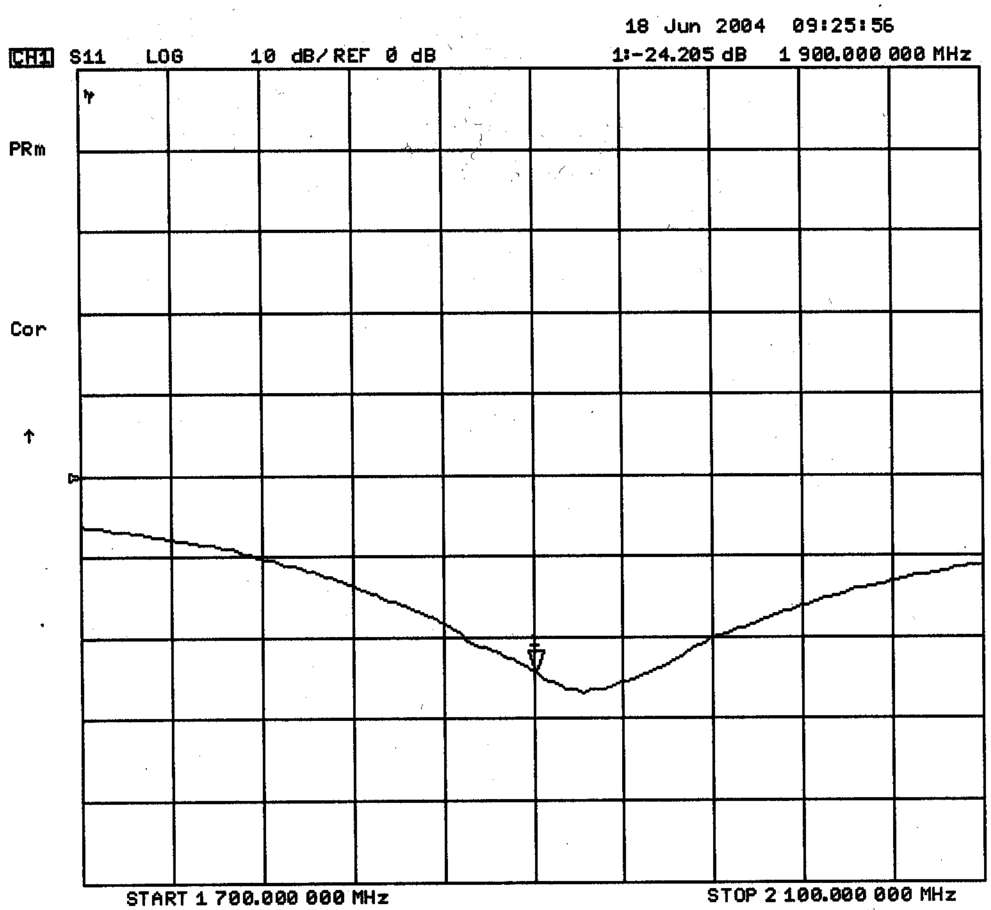
1. Dipole Construction & Electrical Characteristics

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
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.

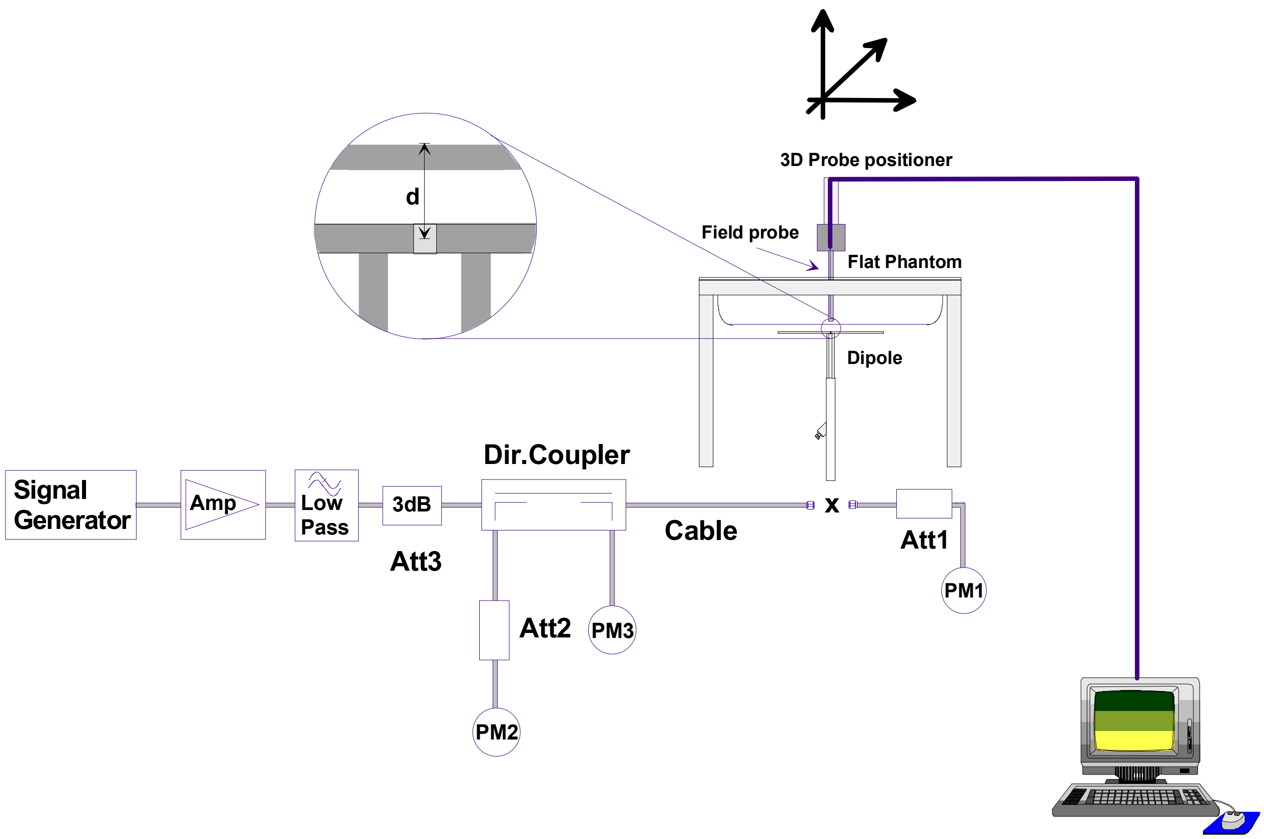
Relative Permittivity:	38.3
Conductivity:	1.43 mho/m
Ambient Temperature:	24.0 °C
Fluid Temperature:	22.6 °C
Fluid Depth:	≥ 15.0 cm
Barometric Pressure:	103.0 kPa
Humidity:	37%

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.

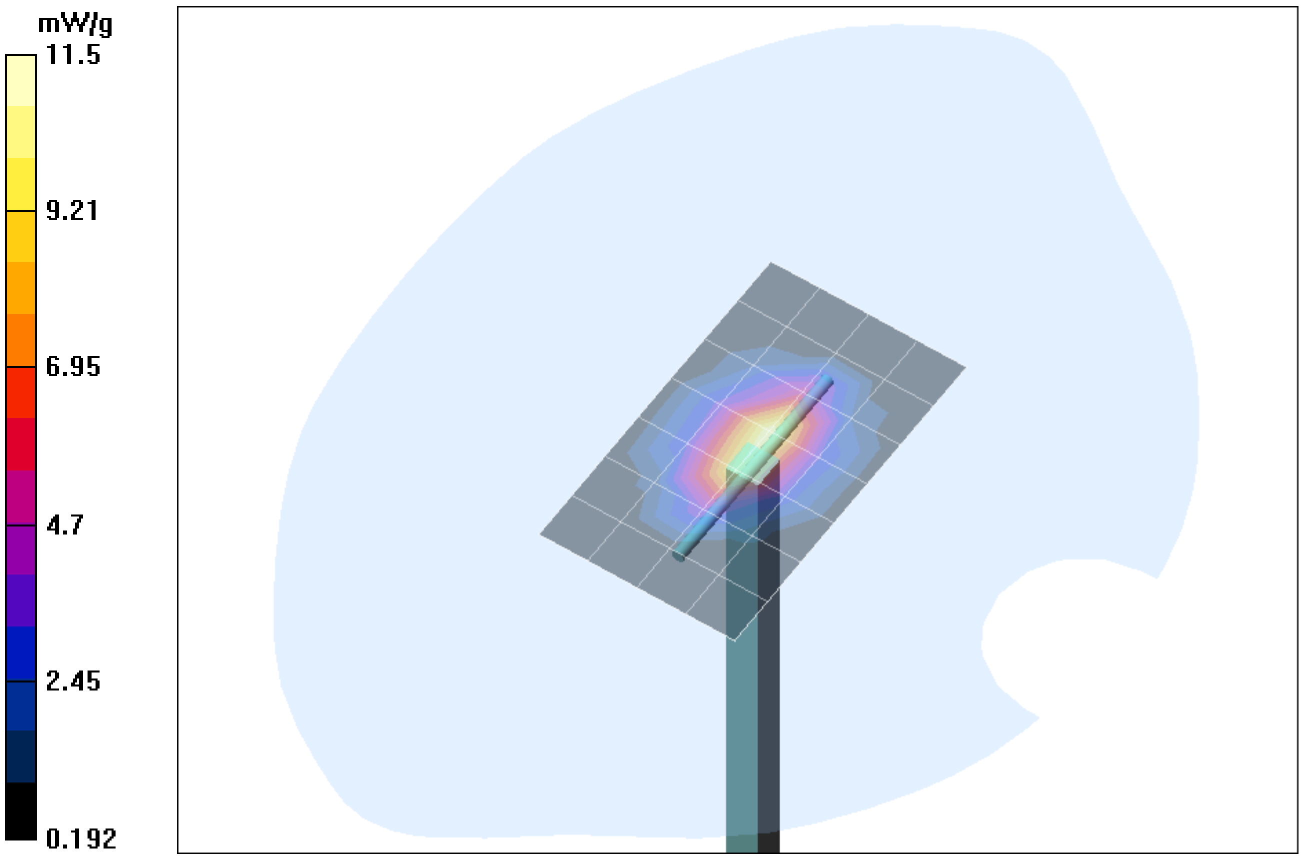
1g/10g Averaged	Average Measured SAR @ 1W Input	IEEE Target SAR @ 1W Input	Deviation (%)
1 gram	39.864	39.7	+ 0.413
10 gram	20.876	20.5	+ 1.835

1900 MHz System Validation - June 18, 2004

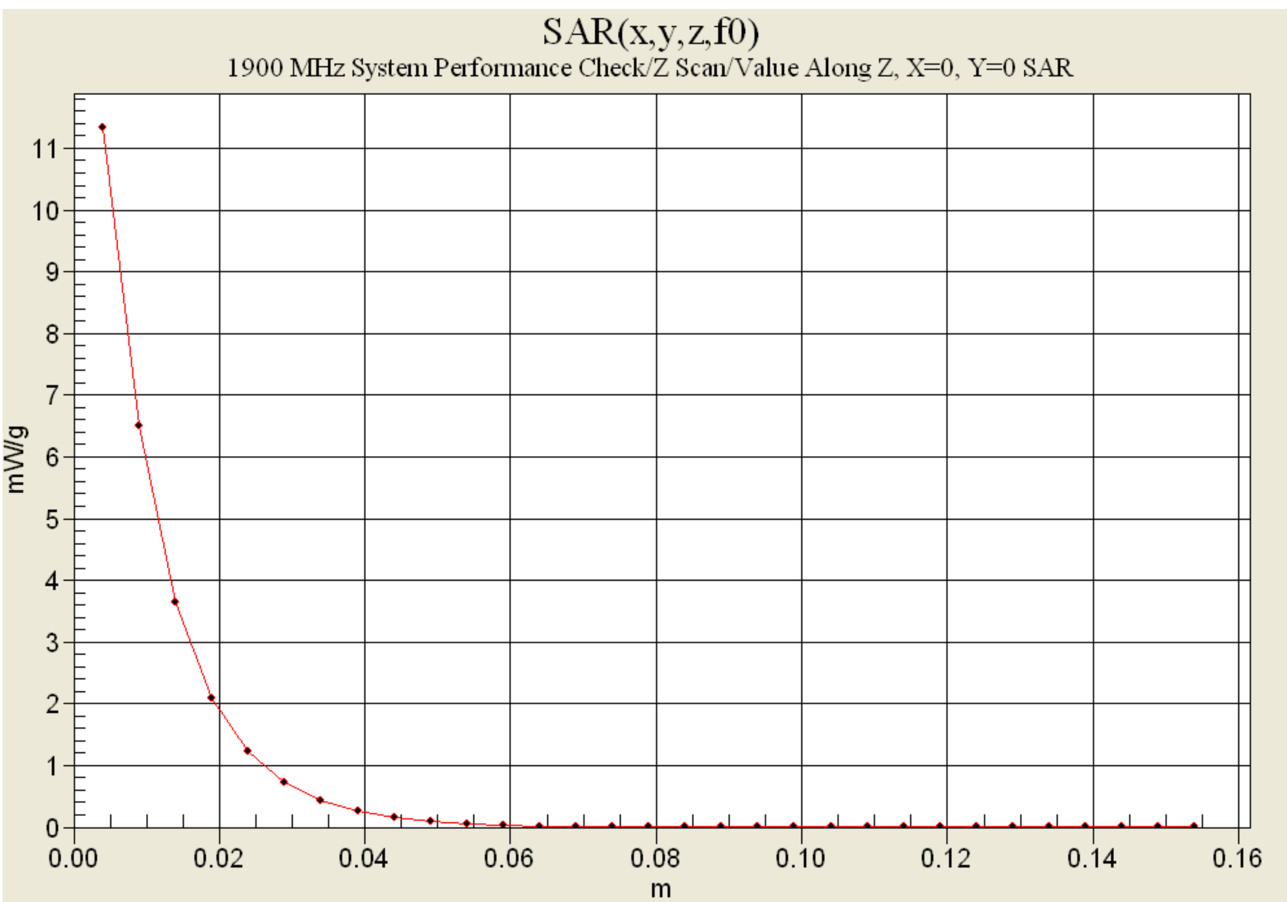
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 151
Ambient Temp: 24.0°C; Fluid Temp: 22.6°C; Barometric Pressure: 103.0 kPa; Humidity: 37%
Communication System: CW
Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL1900 (σ = 1.43 mho/m; ε_r = 38.3; ρ = 1000 kg/m^3)

- 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 D - PROBE CALIBRATION

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

Client **Celltech Labs**

CALIBRATION CERTIFICATE

Object(s)	ET3DV6 - SN:1590
Calibration procedure(s)	QA CAL-01.v2 Calibration procedure for dosimetric E-field probes
Calibration date:	May 24, 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: environ ment 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	5-May-04 (METAS, No 251-00388)	May-05
Power sensor E4412A	MY41495277	5-May-04 (METAS, No 251-00388)	May-05
Reference 20 dB Attenuator	SN: 5086 (20b)	3-May-04 (METAS, No 251-00389)	May-05
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	D. Vetter
Approved by:	Katja Pokovic	Laboratory Director	

Date issued: May 24, 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:1590

Manufactured:	March 19, 2001
Last calibrated:	May 15, 2003
Recalibrated:	May 24, 2004

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1590

Sensitivity in Free Space

NormX	**1.85** $\mu V/(V/m)^2$
NormY	**2.01** $\mu V/(V/m)^2$
NormZ	**1.73** $\mu V/(V/m)^2$

Diode Compression[A]

DCP X	**91**	mV
DCP Y	**91**	mV
DCP Z	**91**	mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Plese see Page 7.

Boundary Effect

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

Sensor Center to Phantom Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	8.0	4.4
SAR_{be} [%]	With Correction Algorithm	0.1	0.2

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

Sensor Center to Phantom Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	12.2	8.5
SAR_{be} [%]	With Correction Algorithm	0.2	0.1

Sensor Offset

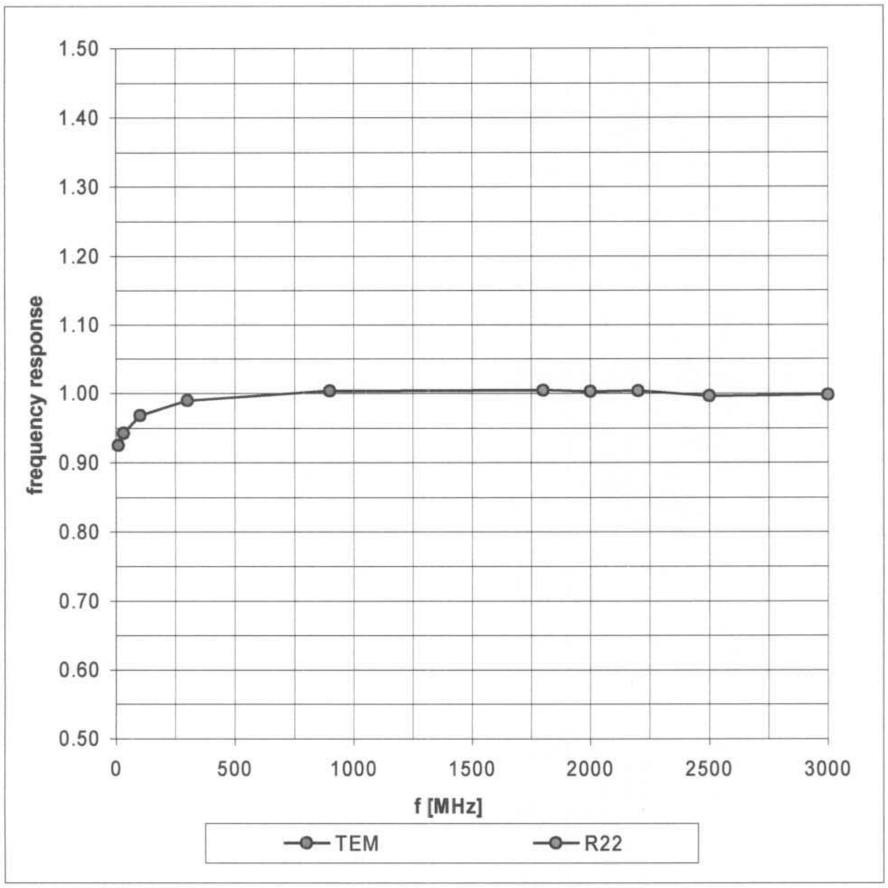
Probe Tip to Sensor Center	**2.7** mm
Optical Surface Detection	**in tolerance**

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%.

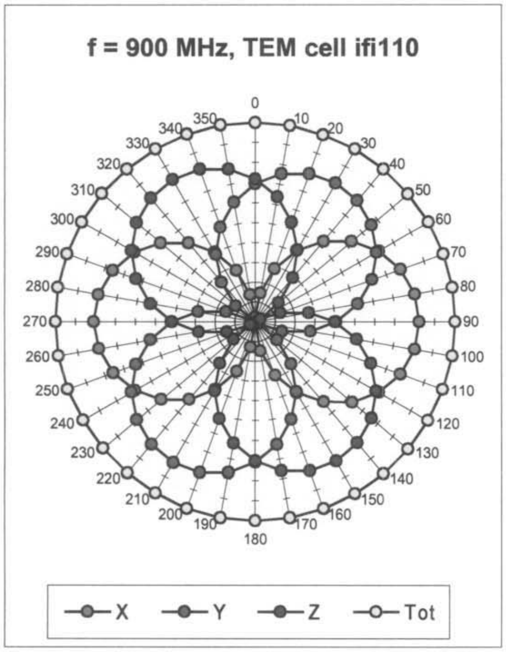
[A] numerical linearization parameter: uncertainty not required

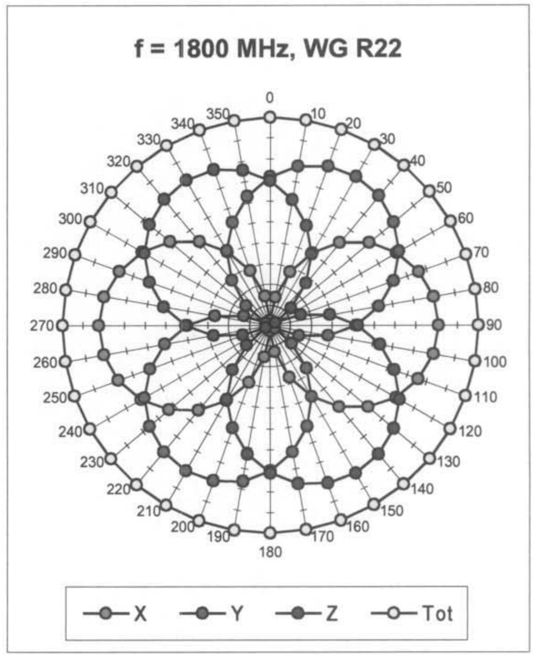
Frequency Response of E-Field

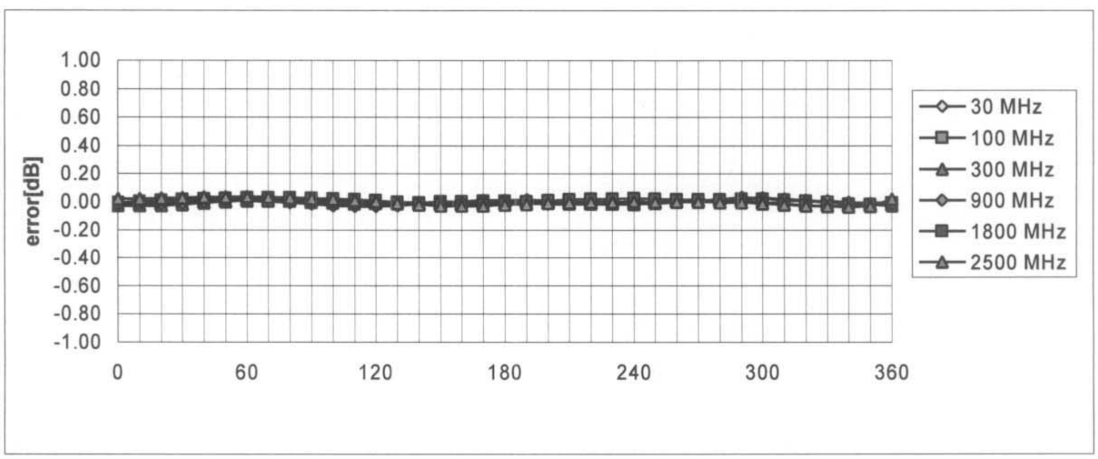
(TEM-Cell:ifi110, Waveguide R22)



Receiving Pattern (ϕ), θ = 0°



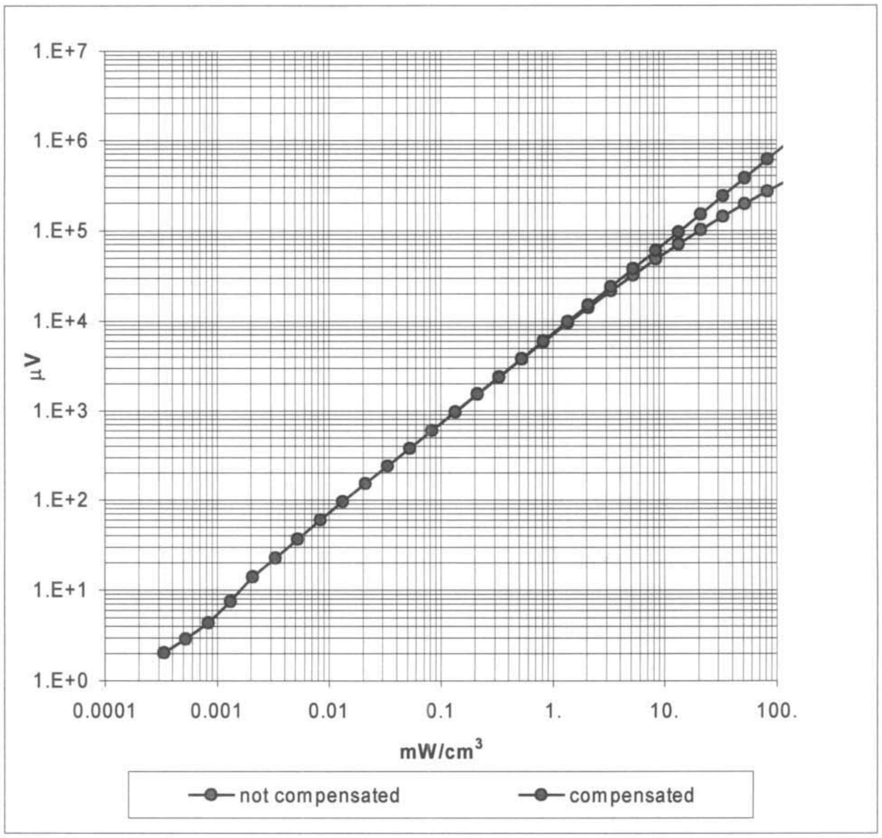


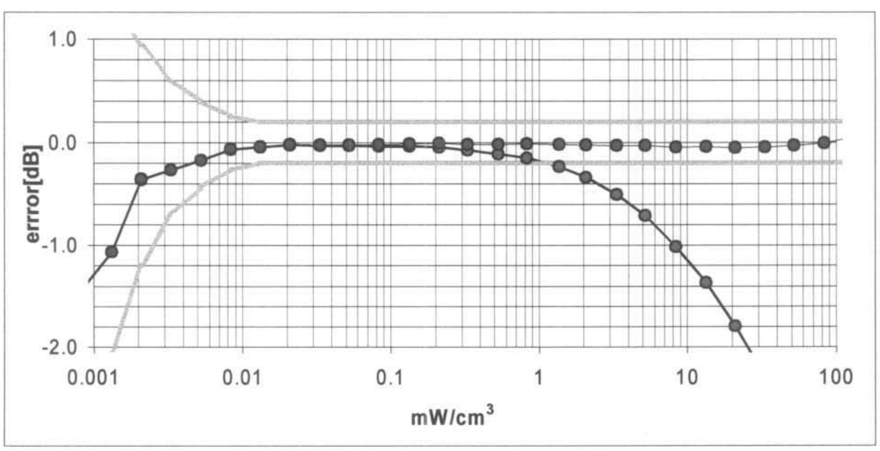


Axial Isotropy Error < ± 0.2 dB

Dynamic Range f(SAR_{head})

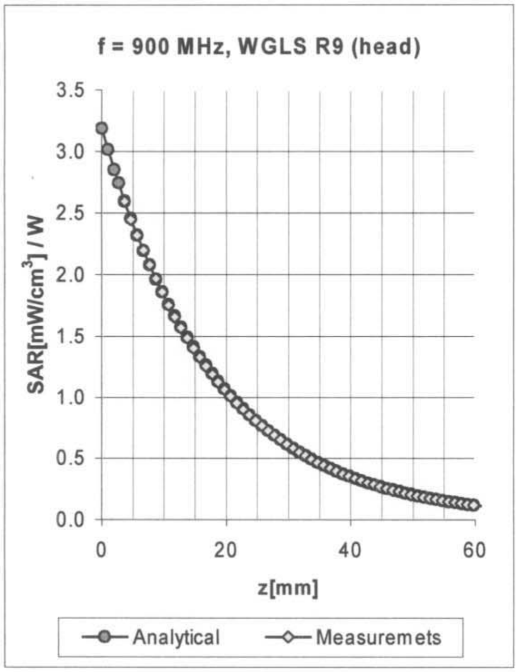
(Waveguide R22)

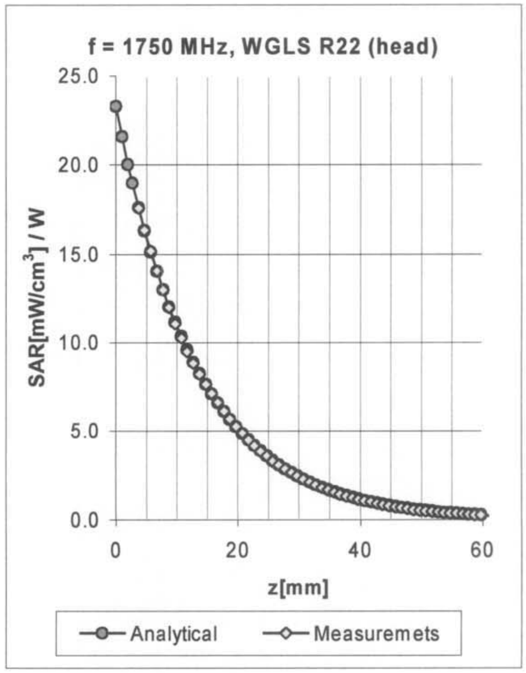




Probe Linearity Error < ± 0.2 dB

Conversion Factor Assessment



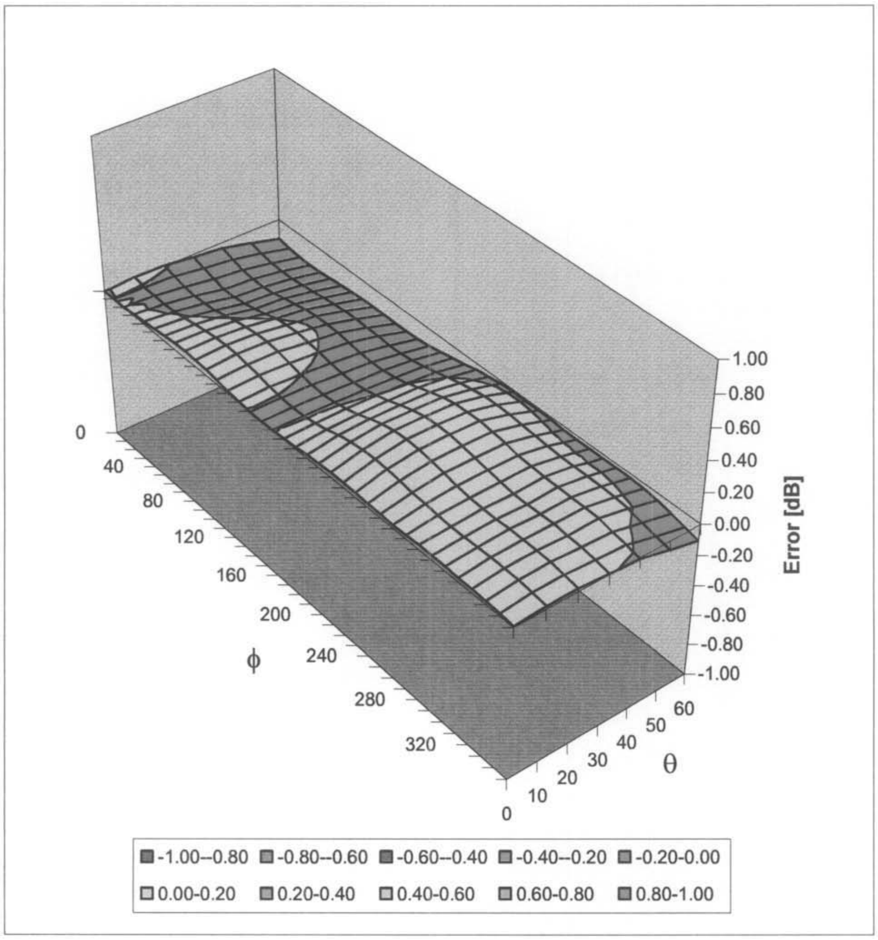


f [MHz]	Validity [MHz][B]	Tissue	Permittivity	Conductivity	Alpha	Depth	ConvF	Uncertainty
835	750-950	Head	41.5 ± 5%	0.90 ± 5%	0.68	1.64	6.71	± 11.9% (k=2)
1750	1700-1800	Head	40.0 ± 5%	1.40 ± 5%	0.43	2.67	5.28	± 9.7% (k=2)
1900	1850-1950	Head	40.0 ± 5%	1.40 ± 5%	0.46	2.81	5.03	± 9.7% (k=2)
2450	2400-2500	Head	39.2 ± 5%	1.80 ± 5%	0.81	1.95	4.44	± 9.7% (k=2)
835	750-950	Body	55.2 ± 5%	0.97 ± 5%	0.49	1.99	6.54	± 11.9% (k=2)
1750	1700-1800	Body	53.3 ± 5%	1.52 ± 5%	0.50	2.87	4.68	± 9.7% (k=2)
1900	1850-1950	Body	53.3 ± 5%	1.52 ± 5%	0.52	2.93	4.58	± 9.7% (k=2)
2450	2400-2500	Body	52.7 ± 5%	1.95 ± 5%	0.91	1.78	4.22	± 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

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:	**1590**
Place of Assessment:	**Zurich**
Date of Assessment:	**May 25, 2004**
Probe Calibration Date:	**May 24, 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:

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:1590

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	**7.9 ± 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	**8.8 ± 8%**	**ε_r = 61.9 ± 5%** **σ = 0.80 ± 5% mho/m** (body tissue)
450 MHz	ConvF	**7.7 ± 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 E - MEASURED FLUID DIELECTRIC PARAMETERS

835 MHz System Performance Check & DUT Evaluation (Head)

Measured Fluid Dielectric Parameters (Brain)

July 27, 2004

Frequency	e'	e"
735.000000 MHz	41.5763	19.7642
745.000000 MHz	41.4565	19.7116
755.000000 MHz	41.3088	19.6450
765.000000 MHz	41.1899	19.6297
775.000000 MHz	41.0332	19.5804
785.000000 MHz	40.9233	19.5651
795.000000 MHz	40.8172	19.5496
805.000000 MHz	40.7023	19.5265
815.000000 MHz	40.6186	19.4853
825.000000 MHz	40.4640	19.4643
835.000000 MHz	40.3522	19.3910
845.000000 MHz	40.1820	19.3774
855.000000 MHz	40.0635	19.3097
865.000000 MHz	39.9212	19.2913
875.000000 MHz	39.7951	19.2797
885.000000 MHz	39.6675	19.2495
895.000000 MHz	39.5882	19.1672
905.000000 MHz	39.4829	19.1236
915.000000 MHz	39.3983	19.1241
925.000000 MHz	39.3187	19.0655
935.000000 MHz	39.1808	19.0446

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

Measured Fluid Dielectric Parameters (Brain)

July 27, 2004

Frequency	e'	e"
1.800000000 GHz	38.8011	13.3295
1.810000000 GHz	38.7429	13.3587
1.820000000 GHz	38.6863	13.3630
1.830000000 GHz	38.6345	13.4037
1.840000000 GHz	38.5979	13.4324
1.850000000 GHz	38.5421	13.4519
1.860000000 GHz	38.4924	13.4649
1.870000000 GHz	38.4620	13.4784
1.880000000 GHz	38.4173	13.5006
1.890000000 GHz	38.3796	13.5275
1.900000000 GHz	38.3621	13.5568
1.910000000 GHz	38.3129	13.5851
1.920000000 GHz	38.2920	13.6193
1.930000000 GHz	38.2659	13.6480
1.940000000 GHz	38.2312	13.6705
1.950000000 GHz	38.1970	13.7014
1.960000000 GHz	38.1446	13.7062
1.970000000 GHz	38.0946	13.7359
1.980000000 GHz	38.0240	13.7587
1.990000000 GHz	37.9834	13.8174
2.000000000 GHz	37.9429	13.8474

1880 MHz DUT Evaluation (Head)

Measured Fluid Dielectric Parameters (Brain)

July 28, 2004

Frequency	e'	e"
1.780000000 GHz	38.4931	13.1621
1.790000000 GHz	38.4649	13.1844
1.800000000 GHz	38.4219	13.2153
1.810000000 GHz	38.3667	13.2385
1.820000000 GHz	38.2962	13.2739
1.830000000 GHz	38.2704	13.2920
1.840000000 GHz	38.2077	13.3261
1.850000000 GHz	38.1649	13.3368
1.860000000 GHz	38.1426	13.3354
1.870000000 GHz	38.1067	13.3540
1.880000000 GHz	38.0725	13.3833
1.890000000 GHz	38.0545	13.3941
1.900000000 GHz	38.0156	13.4264
1.910000000 GHz	37.9889	13.4718
1.920000000 GHz	37.9475	13.5057
1.930000000 GHz	37.8919	13.5427
1.940000000 GHz	37.8663	13.5699
1.950000000 GHz	37.8427	13.5988
1.960000000 GHz	37.8005	13.6191
1.970000000 GHz	37.7641	13.6332
1.980000000 GHz	37.7019	13.6550

835 MHz System Performance Check

Measured Fluid Dielectric Parameters (Brain)

July 29, 2004

Frequency	e'	e''
735.000000 MHz	41.7385	19.7591
745.000000 MHz	41.5868	19.7253
755.000000 MHz	41.4644	19.6743
765.000000 MHz	41.2880	19.6161
775.000000 MHz	41.1382	19.5981
785.000000 MHz	41.0451	19.5667
795.000000 MHz	40.9351	19.5407
805.000000 MHz	40.8337	19.4917
815.000000 MHz	40.7629	19.4842
825.000000 MHz	40.6202	19.4540
835.000000 MHz	40.5023	19.4027
845.000000 MHz	40.3226	19.3596
855.000000 MHz	40.2010	19.3231
865.000000 MHz	40.0494	19.2760
875.000000 MHz	39.9366	19.2804
885.000000 MHz	39.8421	19.2301
895.000000 MHz	39.7662	19.1659
905.000000 MHz	39.6488	19.1200
915.000000 MHz	39.5458	19.0958
925.000000 MHz	39.4483	19.0468
935.000000 MHz	39.3154	19.0145

835 MHz DUT Evaluation (Head)

Measured Fluid Dielectric Parameters (Brain)

July 29, 2004

Frequency	e'	e"
735.000000 MHz	41.5982	19.7821
745.000000 MHz	41.4755	19.7415
755.000000 MHz	41.3088	19.6450
765.000000 MHz	41.1634	19.6139
775.000000 MHz	41.0241	19.5883
785.000000 MHz	40.9286	19.5858
795.000000 MHz	40.8226	19.5701
805.000000 MHz	40.7433	19.5589
815.000000 MHz	40.6276	19.4989
825.000000 MHz	40.5039	19.4747
835.000000 MHz	40.3673	19.4079
845.000000 MHz	40.2207	19.3668
855.000000 MHz	40.0401	19.3367
865.000000 MHz	39.9281	19.2792
875.000000 MHz	39.7872	19.2516
885.000000 MHz	39.6689	19.2191
895.000000 MHz	39.6183	19.1685
905.000000 MHz	39.5063	19.1366
915.000000 MHz	39.4117	19.1202
925.000000 MHz	39.3354	19.0896
935.000000 MHz	39.2124	19.0544

1900 MHz System Performance Check

Measured Fluid Dielectric Parameters (Brain)

July 29, 2004

Frequency	e'	e"
1.800000000 GHz	38.5122	13.1237
1.810000000 GHz	38.4600	13.1480
1.820000000 GHz	38.4102	13.1740
1.830000000 GHz	38.3772	13.1813
1.840000000 GHz	38.3279	13.2192
1.850000000 GHz	38.2801	13.2326
1.860000000 GHz	38.2155	13.2357
1.870000000 GHz	38.1808	13.2622
1.880000000 GHz	38.1484	13.3051
1.890000000 GHz	38.1126	13.3354
1.900000000 GHz	38.0790	13.3819
1.910000000 GHz	38.0505	13.4107
1.920000000 GHz	38.0140	13.4531
1.930000000 GHz	37.9900	13.4761
1.940000000 GHz	37.9515	13.4880
1.950000000 GHz	37.9215	13.5120
1.960000000 GHz	37.8752	13.5175
1.970000000 GHz	37.8042	13.5187
1.980000000 GHz	37.7543	13.5472
1.990000000 GHz	37.6852	13.5795
2.000000000 GHz	37.6260	13.6030

1880 MHz DUT Evaluation (Head)

Measured Fluid Dielectric Parameters (Brain)

July 30, 2004

Frequency	e'	e"
1.780000000 GHz	38.5424	13.2058
1.790000000 GHz	38.5119	13.2292
1.800000000 GHz	38.4657	13.2647
1.810000000 GHz	38.4077	13.2982
1.820000000 GHz	38.3733	13.3239
1.830000000 GHz	38.3218	13.3389
1.840000000 GHz	38.2731	13.3763
1.850000000 GHz	38.2271	13.3914
1.860000000 GHz	38.1716	13.4035
1.870000000 GHz	38.1193	13.4288
1.880000000 GHz	38.0856	13.4488
1.890000000 GHz	38.0409	13.4874
1.900000000 GHz	38.0035	13.5215
1.910000000 GHz	37.9576	13.5493
1.920000000 GHz	37.9296	13.5807
1.930000000 GHz	37.8858	13.5987
1.940000000 GHz	37.8546	13.6351
1.950000000 GHz	37.8211	13.6615
1.960000000 GHz	37.7697	13.6529
1.970000000 GHz	37.7161	13.6806
1.980000000 GHz	37.6678	13.6966

1880 MHz DUT Evaluation (Body)

Measured Fluid Dielectric Parameters (Muscle)

July 30, 2004

Frequency	e'	e"
1.780000000 GHz	51.5077	14.4559
1.790000000 GHz	51.4613	14.4966
1.800000000 GHz	51.4353	14.5422
1.810000000 GHz	51.3775	14.5858
1.820000000 GHz	51.3402	14.6127
1.830000000 GHz	51.3135	14.6417
1.840000000 GHz	51.2497	14.6666
1.850000000 GHz	51.2129	14.6833
1.860000000 GHz	51.1579	14.7017
1.870000000 GHz	51.1127	14.7335
1.880000000 GHz	51.0798	14.7692
1.890000000 GHz	51.0574	14.8067
1.900000000 GHz	51.0342	14.8451
1.910000000 GHz	51.0029	14.8802
1.920000000 GHz	50.9818	14.9207
1.930000000 GHz	50.9549	14.9524
1.940000000 GHz	50.9371	14.9726
1.950000000 GHz	50.8956	15.0038
1.960000000 GHz	50.8489	15.0116
1.970000000 GHz	50.7932	15.0388
1.980000000 GHz	50.7390	15.0581

835 MHz System Performance Check

Measured Fluid Dielectric Parameters (Brain)

July 31, 2004

Frequency	e'	e''
735.000000 MHz	42.1920	20.1491
745.000000 MHz	42.0711	20.0891
755.000000 MHz	41.8820	20.0141
765.000000 MHz	41.7893	19.9850
775.000000 MHz	41.6265	19.9303
785.000000 MHz	41.5184	19.8967
795.000000 MHz	41.4482	19.9089
805.000000 MHz	41.3347	19.8676
815.000000 MHz	41.2354	19.8452
825.000000 MHz	41.0979	19.8448
835.000000 MHz	40.9829	19.7758
845.000000 MHz	40.8334	19.7393
855.000000 MHz	40.6556	19.6606
865.000000 MHz	40.5244	19.6227
875.000000 MHz	40.3797	19.5597
885.000000 MHz	40.2589	19.5322
895.000000 MHz	40.2190	19.4625
905.000000 MHz	40.1149	19.4374
915.000000 MHz	40.0275	19.4084
925.000000 MHz	39.9212	19.3714
935.000000 MHz	39.7871	19.3439

835 MHz DUT Evaluation (Body)

Measured Fluid Dielectric Parameters (Muscle)

July 31, 2004

Frequency	e'	e"
735.000000 MHz	55.0041	22.0205
745.000000 MHz	54.8820	21.9534
755.000000 MHz	54.7685	21.8613
765.000000 MHz	54.6596	21.7698
775.000000 MHz	54.5485	21.7279
785.000000 MHz	54.5010	21.6882
795.000000 MHz	54.4465	21.6512
805.000000 MHz	54.3883	21.5930
815.000000 MHz	54.2830	21.5355
825.000000 MHz	54.1927	21.5074
835.000000 MHz	54.0634	21.4666
845.000000 MHz	53.9579	21.4184
855.000000 MHz	53.8340	21.3675
865.000000 MHz	53.7013	21.3106
875.000000 MHz	53.5944	21.3098
885.000000 MHz	53.5215	21.2752
895.000000 MHz	53.4689	21.1756
905.000000 MHz	53.3961	21.1114
915.000000 MHz	53.3155	21.0461
925.000000 MHz	53.2283	21.0206
935.000000 MHz	53.1532	20.9909

835 MHz System Performance Check & DUT Evaluation (Head)

Measured Fluid Dielectric Parameters (Brain)

August 18, 2004

Frequency	e'	e''
735.000000 MHz	41.7987	19.8610
745.000000 MHz	41.6520	19.8475
755.000000 MHz	41.4995	19.7681
765.000000 MHz	41.3601	19.7219
775.000000 MHz	41.2307	19.6972
785.000000 MHz	41.0823	19.6675
795.000000 MHz	41.0002	19.6220
805.000000 MHz	40.9212	19.5768
815.000000 MHz	40.8506	19.5518
825.000000 MHz	40.7161	19.5342
835.000000 MHz	40.5858	19.5165
845.000000 MHz	40.4248	19.4667
855.000000 MHz	40.2737	19.4369
865.000000 MHz	40.1163	19.3695
875.000000 MHz	39.9738	19.3406
885.000000 MHz	39.8684	19.3227
895.000000 MHz	39.8055	19.2340
905.000000 MHz	39.6886	19.2068
915.000000 MHz	39.5804	19.1978
925.000000 MHz	39.4759	19.1739
935.000000 MHz	39.3658	19.1527

835 MHz DUT Evaluation (Body)

Measured Fluid Dielectric Parameters (Muscle)

August 18, 2004

Frequency	e'	e"
735.000000 MHz	54.5642	22.0542
745.000000 MHz	54.4727	21.9919
755.000000 MHz	54.3677	21.9115
765.000000 MHz	54.2211	21.7997
775.000000 MHz	54.0869	21.7450
785.000000 MHz	53.9539	21.6454
795.000000 MHz	53.8772	21.5633
805.000000 MHz	53.8641	21.5395
815.000000 MHz	53.7934	21.5189
825.000000 MHz	53.7352	21.5219
835.000000 MHz	53.5950	21.5156
845.000000 MHz	53.4787	21.4852
855.000000 MHz	53.3526	21.4160
865.000000 MHz	53.2214	21.3506
875.000000 MHz	53.1038	21.2821
885.000000 MHz	53.0007	21.2415
895.000000 MHz	52.9569	21.1268
905.000000 MHz	52.8704	21.0978
915.000000 MHz	52.7552	21.0654
925.000000 MHz	52.6605	21.0618
935.000000 MHz	52.5556	21.0476

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

Measured Fluid Dielectric Parameters (Brain)

August 18, 2004

Frequency	e'	e"
1.800000000 GHz	38.7421	13.1628
1.810000000 GHz	38.7058	13.2096
1.820000000 GHz	38.6401	13.2499
1.830000000 GHz	38.5971	13.2708
1.840000000 GHz	38.5550	13.2913
1.850000000 GHz	38.5052	13.3167
1.860000000 GHz	38.4521	13.3442
1.870000000 GHz	38.3869	13.3497
1.880000000 GHz	38.3422	13.3726
1.890000000 GHz	38.3110	13.4108
1.900000000 GHz	38.2771	13.4330
1.910000000 GHz	38.2298	13.4696
1.920000000 GHz	38.2076	13.5023
1.930000000 GHz	38.1747	13.5300
1.940000000 GHz	38.1461	13.5580
1.950000000 GHz	38.1008	13.5762
1.960000000 GHz	38.0599	13.5860
1.970000000 GHz	38.0217	13.6030
1.980000000 GHz	37.9676	13.6159
1.990000000 GHz	37.9091	13.6607
2.000000000 GHz	37.8513	13.6822

1880 MHz DUT Evaluation (Body)

Measured Fluid Dielectric Parameters (Muscle)

August 18, 2004

Frequency	e'	e"
1.780000000 GHz	51.1025	14.2288
1.790000000 GHz	51.1014	14.2563
1.800000000 GHz	51.0467	14.3028
1.810000000 GHz	51.0107	14.3307
1.820000000 GHz	50.9812	14.3427
1.830000000 GHz	50.9368	14.3604
1.840000000 GHz	50.8750	14.3718
1.850000000 GHz	50.8499	14.3705
1.860000000 GHz	50.7953	14.3908
1.870000000 GHz	50.7525	14.4228
1.880000000 GHz	50.7198	14.4604
1.890000000 GHz	50.6976	14.4998
1.900000000 GHz	50.6645	14.5487
1.910000000 GHz	50.6397	14.5767
1.920000000 GHz	50.6312	14.6011
1.930000000 GHz	50.6197	14.6282
1.940000000 GHz	50.6085	14.6340
1.950000000 GHz	50.5831	14.6456
1.960000000 GHz	50.5601	14.6308
1.970000000 GHz	50.5298	14.6298
1.980000000 GHz	50.4861	14.6588

APPENDIX F - 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