

 Testing and Engineering Services Lab	Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
	Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
	Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093 IC RSS-102 Issue 2

## RF EXPOSURE EVALUATION

### SPECIFIC ABSORPTION RATE

#### **SAR TEST REPORT**

FOR

**MEDICAL INTELLIGENCE TECHNOLOGIES INC.**

**WRIST-WORN PERSONAL LOCATION DEVICE**

**MODEL: COLUMBA**

**FCC ID: TV9-MICLM-C001**

**IC ID: 6387A-CLMBRA01**

**Test Report Serial No.**

**033106TV9-T735-S24G**

**Test Report Revision No.**

**Revision 1.2 - 3rd Release**

(Recalculated ERP for 300 kHz RBW)

**Test Lab and Location**

**Celltech Compliance Testing & Engineering Lab**

**(Celltech Labs Inc.)**

**1955 Moss Court**

**Kelowna, BC**

**Canada**

**V1Y 9L3**

**Test Report Prepared By:**

*Cheri Frangiadakis*

**Cheri Frangiadakis**  
Test Report Writer  
Celltech Labs Inc.

**Test Report Approved By:**



**Jonathan Hughes**  
General Manager  
Celltech Labs Inc.

Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device	IC ID:	6387A-CLMBRA01			
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.					
	Page 1 of 36					



Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093

## DECLARATION OF COMPLIANCE SAR RF EXPOSURE EVALUATION

### Test Lab and Location

**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

### Company Information

**MEDICAL INTELLIGENCE TECHNOLOGIES INC.**

1170 Grande-Allée Ouest  
Québec (Quebec) G1S 1E5  
Canada

**FCC IDENTIFIER:**

TV9-MICLM-C001

**IC IDENTIFIER:**

6387A-CLMBRA01

**Model(s):**

Columba

**SAR Test Requirement(s):**

FCC 47 CFR §2.1093; Health Canada Safety Code 6

**SAR Test Procedure(s):**

FCC OET Bulletin 65, Supplement C (Edition 01-01)

Industry Canada RSS-102 Issue 2

**FCC Device Classification:**

PCS Licensed Transmitter worn on body (PCT)

**IC Device Classification:**

2 GHz Personal Communication Services (RSS-133 Issue 3)

Cellular Telephones Employing New Technologies (RSS-132 Issue 2)

**Device Description:**

Dual-Band PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device

**Transmit Frequency Range(s):**

1850.2 - 1909.8 MHz (PCS GSM)

824.2 - 848.8 MHz (Cellular GSM)

**Max. RF Output Power Tested:**

30.66 dBm (1.16 W) EIRP (PCS GSM)

22.57 dBm (180.79 mW) ERP (Cellular GSM)

**Max. Duty Cycle Tested:**

24 % (Source-Based Time-Averaged)

**Max. SBTA RF Output Power:**

24.45 dBm (278.4 mW) EIRP (PCS GSM)

16.37 dBm (43.39 mW) ERP (Cellular GSM)

**Data Transmission Type:**

GPRS Class B, Multislot Class 10

**Antenna Type(s) Tested:**

Internal PCB Antenna

**Power Source(s) Tested:**

External Power Supply (4.1 VDC)

**Internal Battery Type(s):**

Lithium-Polymer (3.7 V, 570 mAh)

**Max. SAR Level(s) Evaluated:**

Wrist: 0.033 W/kg (PCS); 0.00208 W/kg (Cellular) - 10g average

Body: 0.054 W/kg (PCS); 0.00321 W/kg (Cellular) - 1g average

Celltech Labs Inc. declares under its sole responsibility that this wireless device was compliant 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) and Industry Canada RSS-102 Issue 2 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.

**Test Report Approved By:**

Sean Johnston  
SAR Lab Manager  
Celltech Labs Inc.



Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device	IC ID:	6387A-CLMBRA01			
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.					
						Page 2 of 36

Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093

## TABLE OF CONTENTS

1.0 INTRODUCTION	4
2.0 DESCRIPTION of DEVICE UNDER TEST (DUT)	4
3.0 SAR MEASUREMENT SYSTEM	5
4.0 MEASUREMENT SUMMARY	6
5.0 DETAILS OF SAR EVALUATION	8
6.0 EVALUATION PROCEDURES	8
7.0 SYSTEM PERFORMANCE CHECK	9
8.0 SIMULATED EQUIVALENT TISSUES	10
9.0 SAR SAFETY LIMITS	10
10.0 ROBOT SYSTEM SPECIFICATIONS	11
11.0 PROBE SPECIFICATION (ET3DV6)	12
12.0 SAM PHANTOM V4.0C	12
13.0 DEVICE HOLDER	12
14.0 TEST EQUIPMENT LIST	13
15.0 MEASUREMENT UNCERTAINTIES	14
MEASUREMENT UNCERTAINTIES (Cont.)	15
16.0 REFERENCES	16
APPENDIX A - SAR MEASUREMENT DATA	17
APPENDIX B - SYSTEM PERFORMANCE CHECK DATA	21
APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS	26
APPENDIX D - SAR TEST SETUP PHOTOGRAPHS	30
APPENDIX E - SYSTEM VALIDATION	34
APPENDIX F - PROBE CALIBRATION	35
APPENDIX G - SAM PHANTOM CERTIFICATE OF CONFORMITY	36



Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093

## 1.0 INTRODUCTION

This measurement report demonstrates that the Medical Intelligence Technologies Inc. Model: Columba PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device FCC ID: TV9-MICLM-C001 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]) and IC RSS-102 Issue 2 (see reference [4]) were employed. A description of the product and operating configuration, detailed summary of the test results, methodology and procedures used in the evaluation, equipment used, and the various provisions of the rules are included within this test report.

## 2.0 DESCRIPTION of DEVICE UNDER TEST (DUT)

<b>SAR Test Requirement(s)</b>	FCC Rule Part 47 CFR §2.1093							
	Health Canada Safety Code 6							
<b>SAR Test Procedure(s)</b>	FCC OET Bulletin 65, Supplement C (01-01)							
	Industry Canada RSS-102 Issue 2							
<b>FCC Device Classification</b>	PCS Licensed Transmitter worn on body (PCT)				Rule Part 24E			
<b>IC Device Classification</b>	2 GHz Personal Communication Services				RSS 133 Issue 3			
	Cellular Telephone Employing New Technologies				RSS-132 Issue 2			
<b>Device Description</b>	Dual-Band PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device							
<b>RF Exposure Category</b>	General Population / Uncontrolled Environment							
<b>FCC IDENTIFIER</b>	TV9-MICLM-C001							
<b>IC IDENTIFIER</b>	6387A-CLMBRA01							
<b>Model(s)</b>	Columba							
<b>Test Sample Serial No.(s)</b>	None			Identical Prototype				
<b>Transmit Frequency Range(s)</b>	1850.2 - 1909.8 MHz			PCS GSM Band				
	824.2 - 848.8 MHz			Cellular GSM Band				
<b>Mode(s) of Operation</b>	GSM/GPRS							
<b>Data Transmission Type</b>	GPRS Class B		Multislot Class 10			Two Uplink Slots		
<b>Max. RF Output Power Measured</b>	<b>EIRP</b>	30.94 dBm	1.24 W	Ch. 512	1850.2 MHz	<b>SBTA</b>	24.74 dBm	298.0 mW
		30.66 dBm	1.16 W	Ch. 661	1880.0 MHz	<b>SBTA</b>	24.45 dBm	278.4 mW
		26.05 dBm	0.403 W	Ch. 810	1909.8 MHz	<b>SBTA</b>	19.86 dBm	96.72 mW
	<b>ERP</b>	19.99 dBm	99.69 mW	Ch. 128	824.2 MHz	<b>SBTA</b>	13.79 dBm	23.93 mW
		22.57 dBm	180.79 mW	Ch. 190	836.6 MHz	<b>SBTA</b>	16.37 dBm	43.39 mW
		19.80 dBm	95.55 mW	Ch. 251	848.8 MHz	<b>SBTA</b>	13.60 dBm	22.93 mW
<b>Max. Duty Cycle Tested</b>	24 %		Source-Based Time-Averaged			Crest Factor 1:4.16		
<b>Antenna Type(s) Tested</b>	Internal PCB Antenna							
<b>Power Source(s) Tested</b>	External Power Supply			4.1 VDC				
<b>Internal Battery Type(s)</b>	Lithium-Polymer			3.7 V, 570 mAh				
<b>Configuration(s) Tested</b>	Wrist-Worn			Bottom Side of DUT				

<b>Company:</b>	Medical Intelligence Technologies Inc.	<b>Model:</b>	Columba	<b>FCC ID:</b>	TV9-MICLM-C001	
<b>DUT Type:</b>	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device			<b>IC ID:</b>	6387A-CLMBRA01	
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.					
						Page 4 of 36

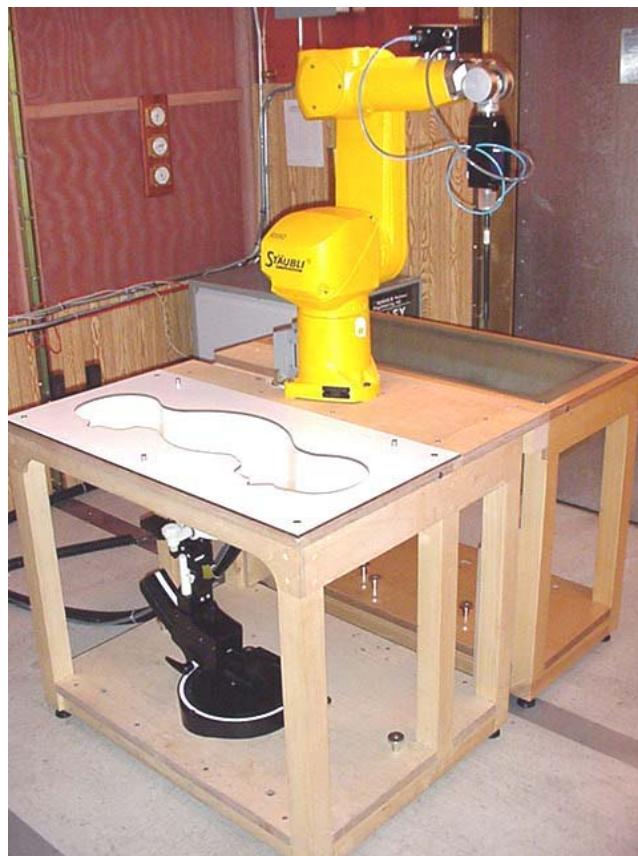
Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093

### 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 and validation dipole



DASY4 SAR Measurement System with SAM phantom and device holder

Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	 <b>Medical</b> <b>Intelligence</b> <a href="http://www.medicalintelligence.com">www.medicalintelligence.com</a>	
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device	IC ID:	6387A-CLMBRA01				
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.						
	Page 5 of 36						



Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
Type of Evaluation:	RF Exposure SAR	FCC 47 CFR §2.1093	IC RSS-102 Issue 2

## 4.0 MEASUREMENT SUMMARY

### WRIST-WORN SAR EVALUATION RESULTS - PCS/Cellular GPRS

Freq. (MHz)	Chan.	Test Mode		Power Supply	Antenna Position	DUT Position to Planar Phantom	Separation Distance to Planar Phantom (cm)	Start Power EIRP/ERP (dBm)		SAR Drift During Test (dB)	Body SAR 1g (W/kg)		Wrist SAR 10g (W/kg)					
								Meas.	SBTA		Measured	Scaled	Measured	Scaled				
1880.0	661	PCS GPRS	2 Slots	4.1 VDC	Internal	Bottom Side	0.0	30.66 EIRP	24.45 EIRP	-0.969 <sup>4</sup>	0.051	0.054 <sup>3</sup>	0.031	0.033 <sup>3</sup>				
836.6	190	Cellular GPRS	2 slots	4.1 VDC	Internal	Bottom Side	0.0	22.57 ERP	16.37 ERP	0.861 <sup>4</sup>	0.00321	--	0.00208	--				
ANSI / IEEE C95.1 1999 SAFETY LIMIT				WRIST: 4.0 W/kg (averaged over 10 grams)				BODY: 1.6 W/kg (averaged over 1 gram)				Spatial Peak Uncontrolled Exposure / General Population						
Test Date(s)		April 05, 2006			April 06, 2006			Measured Fluid Type			1880 MHz	835 MHz	Unit					
Dielectric Constant $\epsilon_r$	1880 MHz Body				835 MHz Body				Relative Humidity		30	30	%					
	IEEE Target	Meas.	Dev.	IEEE Target	Meas.	Dev.	Atmospheric Pressure	101.1	101.3		101.3	kPa						
	53.3	$\pm 5\%$	50.9	-4.5%	55.2	$\pm 5\%$	54.3	-1.6%	Ambient Temperature		25.1	24.8	°C					
Conductivity $\sigma$ (mho/m)	1880 MHz Body				835 MHz Body				Fluid Temperature		23.8	22.5	°C					
	IEEE Target	Meas.	Dev.	IEEE Target	Meas.	Dev.	Fluid Depth	1000	$\rho$ (Kg/m <sup>3</sup> )		$\geq 15$	$\geq 15$	cm					
	1.52	$\pm 5\%$	1.51	-0.7%	0.97	$\pm 5\%$	0.98	+1.0%										
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 measured SAR levels evaluated at the mid channel were $\geq 3$ 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 SAR level measured at the mid channel for PCS band was scaled up by 0.28 dB to report an estimated increase in the SAR level based on the difference in output power (EIRP) that was measured for the low channel (see page 7 for EIRP measurement results).																
	4.	The power drifts reported were measured at the reference point of the planar phantom with low SAR. The drift values reported are inaccurate due to the SAR value at the reference point is close to the measurement noise floor.																
	5.	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.																
	6.	The dielectric parameters of the simulated tissue mixtures were measured prior to the SAR evaluations using an ALS-PR-DIEL Dielectric Probe Kit and an HP 8753ET Network Analyzer (see Appendix C).																
	7.	The SAR measurements were performed within 24 hours of the system performance check.																

Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device	IC ID:	6387A-CLMBRA01			
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.					
						Page 6 of 36

	Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
	Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
	Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093

## MEASUREMENT SUMMARY (Cont.)

				Project Number:	755	Company:	Medical Intelligence	Test Start Date:	3-Apr-06					
Product: Columba				Test End Date:	3-Apr-06									
<b>ERP Measurement Results - Cellular Band</b>														
DUT#	Orientation	Power Source	Accessory	Polarity	Distance	Carrier Channel	Frequency	Corrected Field Strength	SA Signal Level (uncorrected)	Power Applied to Antenna	Antenna Gain	RBW Correction Factor	Measured ERP Carrier Level	
							MHz	dBuV/m	dBuV	dBm			dB	dBm
1	Short Edge Up	4.1 VDC P/S	none	H	3	128	824.2000	97.77	70.21	12.40	2.82	4.77	19.99	99.69
1	Short Edge Up	4.1 VDC P/S	none	V	3	128	824.2000	96.45	68.89	11.82	2.82	4.77	19.41	87.23
1	Short Edge Up	4.1 VDC P/S	none	H	3	190	836.6000	100.12	72.70	14.70	3.10	4.77	22.57	180.79
1	Short Edge Up	4.1 VDC P/S	none	V	3	190	836.6000	98.15	70.73	13.54	3.10	4.77	21.41	138.41
1	Short Edge Up	4.1 VDC P/S	none	H	3	251	848.8000	97.71	70.41	11.65	3.38	4.77	19.80	95.55
1	Short Edge Up	4.1 VDC P/S	none	V	3	251	848.8000	95.57	68.27	11.11	3.38	4.77	19.26	84.38

<b>Company:</b>	Medical Intelligence Technologies Inc.	<b>Model:</b>	Columba	<b>FCC ID:</b>	TV9-MICLM-C001	 <b>Medical</b> <b>Intelligence</b> <a href="http://www.medicalintelligence.com">www.medicalintelligence.com</a>
<b>DUT Type:</b>	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device				IC ID: 6387A-CLMBRA01	
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 7 of 36	

Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093

## 5.0 DETAILS OF SAR EVALUATION

The Medical Intelligence Technologies Inc. Model: Columba PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device FCC ID: TV9-MICLM-C001 has demonstrated compliance for localized Specific Absorption Rate (Uncontrolled Exposure) based on the test provisions and conditions described below. The detailed test setup photographs are shown in Appendix D.

### DUT Test Configuration

1. The DUT was tested for wrist-worn SAR with the bottom side placed parallel to, and touching, the outer surface of the SAM phantom (planar section).

### DUT Test Mode(s) & Power Setting(s)

2. The RF conducted output power of the DUT could not be measured by Celltech Labs due to an internal antenna. The DUT was evaluated for SAR at the maximum RF conducted output power level preset by the manufacturer.
3. The DUT was evaluated at the maximum EIRP and ERP levels measured prior to the SAR evaluations at Celltech Labs' 3-meter Open Area Test Site using the signal substitution method in accordance with ANSI/TIA-603-C-2004 measurement procedures (see reference [7]).
4. The DUT was placed in test mode using a communications test set (Wavetek 4202S). The SAR evaluation was performed with the DUT transmitting continuously in GPRS mode at maximum power in 2 time slots (Crest factor: 4.16).
5. The DUT was evaluated for SAR using an external DC power supply. The internal battery was disconnected and power leads were soldered onto the external power connector of the device. The device was unable to be tested from the internal battery power source.

### Test Conditions

6. 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.
7. The dielectric parameters of the simulated tissue mixtures were measured prior to the SAR evaluations using an ALS-PR-DIEL Dielectric Probe Kit and an HP 8753ET Network Analyzer (see Appendix C).
8. The SAR measurements were performed within 24 hours of the system performance check.

## 6.0 EVALUATION PROCEDURES

- (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.

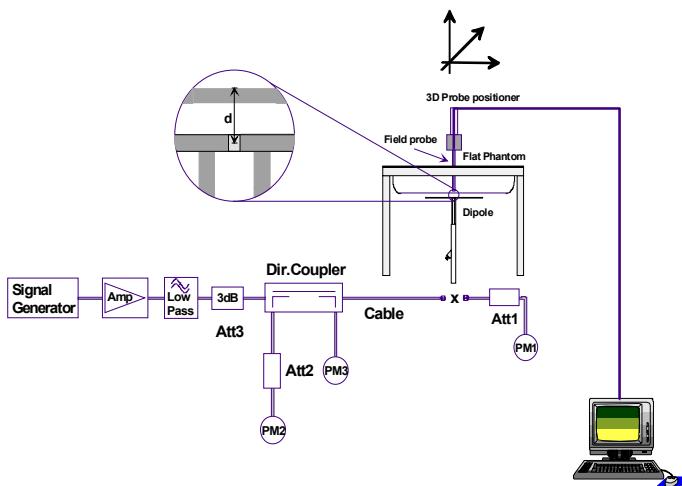
A 1g and 10g spatial peak SAR was determined as follows:

- 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 from 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 F). 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 (5 x 5 x 7 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 (7 x 7 x 7) to ensure complete capture of the peak spatial-average SAR.

Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001				
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device	IC ID:	6387A-CLMBRA01						
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.								
	Page 8 of 36								

## 7.0 SYSTEM PERFORMANCE CHECK

Prior to the SAR evaluations, system checks were performed at the planar section of the SAM phantom using a 1900MHz dipole and an 835MHz dipole (see Appendix E for system validation procedures). The dielectric parameters of the simulated tissue mixtures were measured prior to the system performance checks using an ALS-PR-DIEL Dielectric Probe Kit and an HP 8753ET Network Analyzer (see Appendix C). A forward power of 250 mW was applied to the dipole and the system was verified to a tolerance of  $\pm 10\%$  (see Appendix B for system performance check test plots). For the 835 MHz system performance check evaluated in body tissue simulant please refer to table 1 below for the SAR system manufacturer's reference body SAR values from the DASY4 Operation Manual (see reference [6]).



**Figure 1. System Performance Check Setup Diagram**



## 1900MHz Dipole Setup



## 835MHz Dipole Setup

Dipole Type	Distance [mm]	Frequency [MHz]	SAR (1g) [W/kg]	SAR (10g) [W/kg]	SAR (peak) [W/kg]
D300V2	15	300	3.02	2.06	4.36
D450V2	15	450	5.01	3.36	7.22
D835V2	15	835	9.71	6.38	14.1
D900V2	15	900	11.1	7.17	16.3
D1450V2	10	1450	29.6	16.6	49.8
D1500V2	10	1500	30.8	17.1	52.1
D1640V2	10	1640	34.4	18.7	59.4
D1800V2	10	1800	38.5	20.3	67.5
D1900V2	10	1900	39.8	20.8	69.6
D2000V2	10	2000	40.9	21.2	71.5
D2450V2	10	2450	51.2	23.7	97.6
D3000V2	10	3000	61.9	24.8	136.7

Table 32.1: Numerical reference SAR values for SPEAG dipoles and flat phantom filled with body-tissue simulating liquid. Note: All SAR values normalized to 1 W forward power.

Table 1. SAR system manufacturer's reference body SAR values

<b>Company:</b>	Medical Intelligence Technologies Inc.	<b>Model:</b>	Columba	<b>FCC ID:</b>	TV9-MICLM-C001	 <b>Medical</b> <b>Intelligence</b> <a href="http://www.medicalIntelligence.com">www.medicalIntelligence.com</a>
<b>DUT Type:</b>	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device			<b>IC ID:</b>	6387A-CLMBRA01	
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.			Page 9 of 36		

Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093

## 8.0 SIMULATED EQUIVALENT TISSUES

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

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

835MHz TISSUE MIXTURE		
INGREDIENT	835 MHz Body	835 MHz Body
	System Performance Check	DUT Evaluation
Water	53.79 %	53.79 %
Sugar	45.13 %	45.13 %
Salt	0.98 %	0.98 %
Bactericide	0.10 %	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
Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.		
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.		

Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001				
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device	IC ID:	6387A-CLMBRA01						
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.								



 Testing and Engineering Services Lab	Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
	Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
	Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093

## 11.0 PROBE SPECIFICATION (ET3DV6)

Construction:	Symmetrical design with triangular core Built-in shielding against static charges	
Calibration:	PEEK enclosure material (resistant to organic solvents, e.g. glycol)	
	In air from 10 MHz to 2.5 GHz	
	In brain simulating tissue at frequencies of 900 MHz and 1.8 GHz (accuracy $\pm$ 8%)	
Frequency:	10 MHz to >6 GHz; Linearity: $\pm$ 0.2 dB	
Directivity:	(30 MHz to 3 GHz) $\pm$ 0.2 dB in brain tissue (rotation around probe axis) $\pm$ 0.4 dB in brain tissue (rotation normal to probe axis)	
Dynamic Range:	5 $\mu$ W/g to >100 mW/g; Linearity: $\pm$ 0.2 dB	
Surface Detection:	$\pm$ 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	
Application:	Distance from probe tip to dipole centers: 2.7 mm General dosimetry up to 3 GHz Compliance tests of portable devices	

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 G 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

Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	 Medical Intelligence www.medicalintelligence.com	
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device	IC ID:	6387A-CLMBRA01				
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.						
	Page 12 of 36						



Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093

## 14.0 TEST EQUIPMENT LIST

TEST EQUIPMENT		ASSET NO.	SERIAL NO.	DATE CALIBRATED	CALIBRATION DUE DATE
USED	DESCRIPTION				
x	Schmid & Partner DASY4 System	-	-	-	-
x	-DASY4 Measurement Server	00158	1078	N/A	N/A
x	-Robot	00046	599396-01	N/A	N/A
x	-DAE4	00019	353	15Jun05	15Jun06
	-DAE3	00018	370	08Feb06	08Feb07
x	-ET3DV6 E-Field Probe	00016	1387	16Mar06	16Mar07
	-ET3DV6 E-Field Probe	00017	1590	20May05	20May06
	-EX3DV4 E-Field Probe	00125	3547	14Feb06	14Feb07
	-300MHz Validation Dipole	00023	135	25Oct05	25Oct06
	-450MHz Validation Dipole	00024	136	25Oct05	25Oct06
	-835MHz Validation Dipole	00022	411	Brain	28Mar06
x				Body	27Mar06
	-900MHz Validation Dipole	00020	054	Brain	10Jun05
				Body	10Jun05
	-1800MHz Validation Dipole	00021	247	Brain	14Jun05
				Body	14Jun05
x	-1900MHz Validation Dipole	00032	151	Brain	17Jun05
				Body	22Apr05
	-2450MHz Validation Dipole	00025	150	Brain	20Sep05
				Body	22Apr05
	-5800MHz Validation Dipole	00126	1031	Brain	15Mar06
x	-SAM Phantom V4.0C	00154	1033	N/A	N/A
	-Barski Planar Phantom	00155	03-01	N/A	N/A
	-Plexiglas Side Planar Phantom	00156	161	N/A	N/A
	-Plexiglas Validation Planar Phantom	00157	137	N/A	N/A
x	ALS-PR-DIEL Dielectric Probe Kit	00160	260-00953	N/A	N/A
	Gigatronics 8652A Power Meter	00110	1835801	16Apr05	16Apr06
	Gigatronics 8652A Power Meter	00007	1835272	03Feb06	03Feb07
x	Gigatronics 8652A Power Meter	00008	1835267	29Apr05	29Apr06
	Gigatronics 80701A Power Sensor	00011	1833542	03Feb06	03Feb07
x	Gigatronics 80701A Power Sensor	00012	1834350	12Sep05	12Sep06
	Gigatronics 80701A Power Sensor	00013	1833713	03Feb06	03Feb07
	Gigatronics 80701A Power Sensor	00014	1833699	07Sep05	07Sep06
x	Gigatronics 80701A Power Sensor	00109	1834366	16Apr05	16Apr06
x	HP 8753ET Network Analyzer	00134	US39170292	04May05	04May06
x	HP 8648D Signal Generator	00005	3847A00611	29Apr05	29Apr06
x	HP E3611A DC Power Supply	00201	KR83015294	N/A	N/A
	Rohde & Schwarz SMR40 Signal Generator	00006	100104	12Apr05	12Apr06
x	Amplifier Research 5S1G4 Power Amplifier	00106	26235	N/A	N/A

Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device	IC ID:	6387A-CLMBRA01			
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.					
	Page 13 of 36					

## 15.0 MEASUREMENT UNCERTAINTIES

UNCERTAINTY BUDGET FOR DEVICE EVALUATION						
Error Description	Uncertainty Value ±%	Probability Distribution	Divisor	ci 1g	Uncertainty Value ±% (1g)	$V_i$ or $V_{eff}$
<b>Measurement System</b>						
Probe calibration (900 MHz)	5.5	Normal	1	1	5.5	∞
Probe calibration (1925 MHz)	3.5	Normal	1	1	3.5	∞
Axial isotropy of the probe	4.7	Rectangular	1.732050808	0.7	1.9	∞
Spherical isotropy of the probe	9.6	Rectangular	1.732050808	0.7	3.9	∞
Spatial resolution	0	Rectangular	1.732050808	1	0.0	∞
Boundary effects	1	Rectangular	1.732050808	1	0.6	∞
Probe linearity	4.7	Rectangular	1.732050808	1	2.7	∞
Detection limit	1	Rectangular	1.732050808	1	0.6	∞
Readout electronics	0.3	Normal	1	1	0.3	∞
Response time	0.8	Rectangular	1.732050808	1	0.5	∞
Integration time	2.6	Rectangular	1.732050808	1	1.5	∞
RF ambient conditions	3	Rectangular	1.732050808	1	1.7	∞
Mech. constraints of robot	0.4	Rectangular	1.732050808	1	0.2	∞
Probe positioning	2.9	Rectangular	1.732050808	1	1.7	∞
Extrapolation & integration	1	Rectangular	1.732050808	1	0.6	∞
<b>Test Sample Related</b>						
Device positioning	2.9	Normal	1	1	2.9	12
Device holder uncertainty	3.6	Normal	1	1	3.6	8
Power drift	5	Rectangular	1.732050808	1	2.9	∞
<b>Phantom and Setup</b>						
Phantom uncertainty	4	Rectangular	1.732050808	1	2.3	∞
Liquid conductivity (target)	5	Rectangular	1.732050808	0.64	1.8	∞
Liquid conductivity (measured)	2.5	Normal	1	0.64	1.6	∞
Liquid permittivity (target)	5	Rectangular	1.732050808	0.6	1.7	∞
Liquid permittivity (measured)	2.5	Normal	1	0.6	1.5	∞
<b>Combined Standard Uncertainty</b>						
835 MHz					10.58	
1880 MHz					9.69	
<b>Expanded Uncertainty (k=2)</b>						
835 MHz					21.16	
1880 MHz					19.39	

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

Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093

## MEASUREMENT UNCERTAINTIES (Cont.)

UNCERTAINTY BUDGET FOR SYSTEM VALIDATION						
Error Description	Uncertainty Value $\pm\%$	Probability Distribution	Divisor	$ci_{1g}$	Uncertainty Value $\pm\% (1g)$	$V_i$ or $V_{eff}$
<b>Measurement System</b>						
Probe calibration (900 MHz)	5.5	Normal	1	1	5.5	$\infty$
Probe calibration (1925 MHz)	3.5	Normal	1	1	3.5	$\infty$
Axial isotropy of the probe	4.7	Rectangular	1.732050808	1	2.7	$\infty$
Spherical isotropy of the probe	0	Rectangular	1.732050808	1	0.0	$\infty$
Spatial resolution	0	Rectangular	1.732050808	1	0.0	$\infty$
Boundary effects	1	Rectangular	1.732050808	1	0.6	$\infty$
Probe linearity	4.7	Rectangular	1.732050808	1	2.7	$\infty$
Detection limit	1	Rectangular	1.732050808	1	0.6	$\infty$
Readout electronics	0.3	Normal	1	1	0.3	$\infty$
Response time	0	Rectangular	1.732050808	1	0.0	$\infty$
Integration time	0	Rectangular	1.732050808	1	0.0	$\infty$
RF ambient conditions	3	Rectangular	1.732050808	1	1.7	$\infty$
Mech. constraints of robot	0.4	Rectangular	1.732050808	1	0.2	$\infty$
Probe positioning	2.9	Rectangular	1.732050808	1	1.7	$\infty$
Extrapolation & integration	1	Rectangular	1.732050808	1	0.6	$\infty$
<b>Dipole</b>						
Dipole Positioning	2	Normal	1.732050808	1	1.2	$\infty$
Power & Power Drift	4.7	Normal	1.732050808	1	2.7	$\infty$
<b>Phantom and Setup</b>						
Phantom uncertainty	4	Rectangular	1.732050808	1	2.3	$\infty$
Liquid conductivity (target)	5	Rectangular	1.732050808	0.64	1.8	$\infty$
Liquid conductivity (measured)	2.5	Normal	1	0.64	1.6	$\infty$
Liquid permittivity (target)	5	Rectangular	1.732050808	0.6	1.7	$\infty$
Liquid permittivity (measured)	2.5	Normal	1	0.6	1.5	$\infty$
<b>Combined Standard Uncertainty</b>						
835 MHz						8.79
1900 MHz						7.69
<b>Expanded Uncertainty (k=2)</b>						
835 MHz						17.57
1900 MHz						15.39

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

	Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
	Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
	Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093

## 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: 1999.
- [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 - "Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)", Radio Standards Specification RSS-102 Issue 2: November 2005.
- [5] IEEE Standard 1528-2003 - "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques": December 2003.
- [6] Schmid & Partner Engineering AG - "DASY4 Manual", V4.5 March 2005.
- [7] ANSI/TIA-603-C - "Land Mobile FM or PM Communications Equipment - Measurement and Performance Standards": December 2004.

Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	 <b>Medical Intelligence</b> <a href="http://www.medicalintelligence.com">www.medicalintelligence.com</a>	
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device	IC ID:	6387A-CLMBRA01				
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.						



Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093 IC RSS-102 Issue 2

## APPENDIX A - SAR MEASUREMENT DATA

Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	 Medical Intelligence <a href="http://www.medicalintelligence.com">www.medicalintelligence.com</a>	
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device	IC ID:	6387A-CLMBRA01				
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.						

 Celltech <small>Testing and Engineering Services Lab</small>	Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
	Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
	Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093

Date Tested: 04/05/2006

### Wrist-Worn SAR - Bottom Side of DUT - PCS GPRS - 1880.0 MHz - Channel 661

**DUT: Medical Intelligence Columba; Type: Dual-Band GSM/GPRS Wrist-Worn Personal Location Device; Serial: None**

Ambient Temp: 25.1 °C; Fluid Temp: 23.8 °C; Barometric Pressure: 101.1 kPa; Humidity: 30%

Power Supply: 4.1 VDC External

RF Output Power: 30.66 dBm (EIRP)

Communication System: PCS GPRS (2 Time Slots)

Frequency: 1880.0 MHz; Channel 661; Duty Cycle: 1:4.16

Medium: M1880 ( $\sigma = 1.51 \text{ mho/m}$ ;  $\epsilon_r = 50.9$ ;  $\rho = 1000 \text{ kg/m}^3$ )

- Probe: ET3DV6 - SN1387; ConvF(4.7, 4.7, 4.7); Calibrated: 16/03/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 15/06/2005
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

#### Wrist-Worn SAR - PCS Band - Bottom Side of DUT Touching Planar Phantom - Mid Channel

**Area Scan (7x9x1):** Measurement grid: dx=15mm, dy=15mm

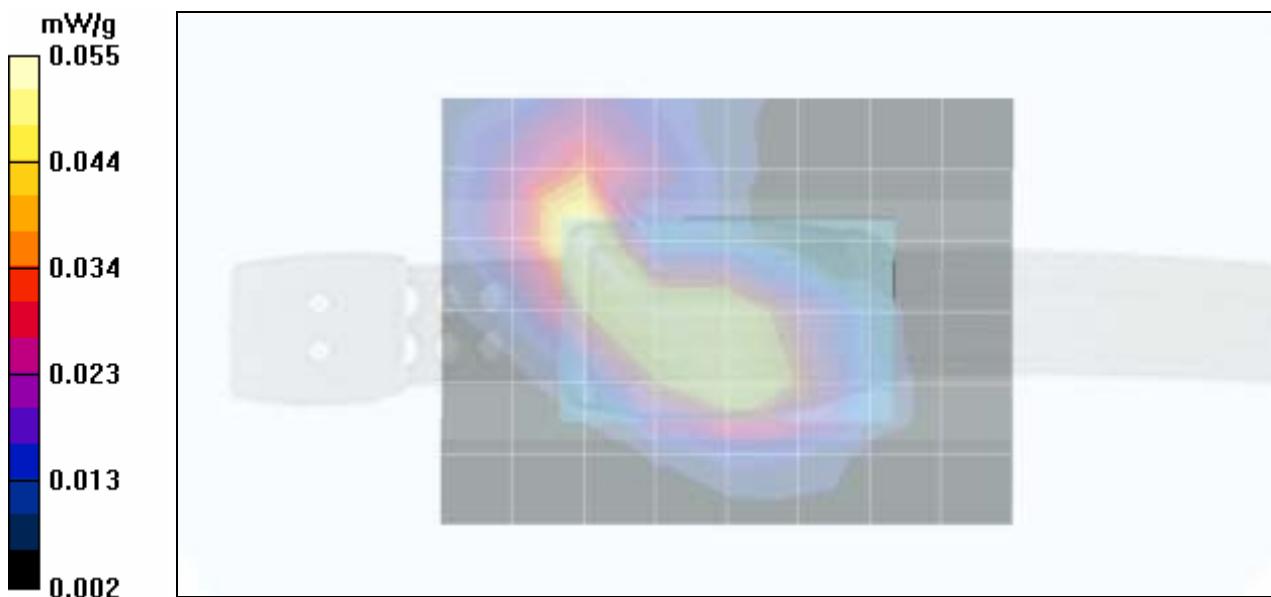
#### Wrist-Worn SAR - PCS Band - Bottom Side of DUT Touching Planar Phantom - Mid Channel

**Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.69 V/m; Power Drift = -0.969 dB

Peak SAR (extrapolated) = 0.094 W/kg

**SAR(1 g) = 0.051 mW/g; SAR(10 g) = 0.031 mW/g**



Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device	IC ID:	6387A-CLMBRA01			
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.					
	Page 18 of 36					

 Testing and Engineering Services Lab	Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
	Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
	Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093

Date Tested: 04/06/2006

### Wrist-Worn SAR - Bottom Side of DUT - Cellular GPRS - 836.6 MHz - Channel 190

**DUT: Medical Intelligence Columba; Type: Dual-Band GSM/GPRS Wrist-Worn Personal Location Device; Serial: None**

Ambient Temp: 24.8 °C; Fluid Temp: 22.5 °C; Barometric Pressure: 101.3 kPa; Humidity: 30%

Power Supply: 4.1 VDC External

RF Output Power: 22.57 dBm (ERP)

Communication System: Cellular GPRS (2 Time Slots)

Frequency: 836.6 MHz; Channel 190; Duty Cycle: 1:4.16

Medium: M835 ( $\sigma = 0.98 \text{ mho/m}$ ;  $\epsilon_r = 54.3$ ;  $\rho = 1000 \text{ kg/m}^3$ )

- Probe: ET3DV6 - SN1387; ConvF(6.04, 6.04, 6.04); Calibrated: 16/03/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 15/06/2005
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

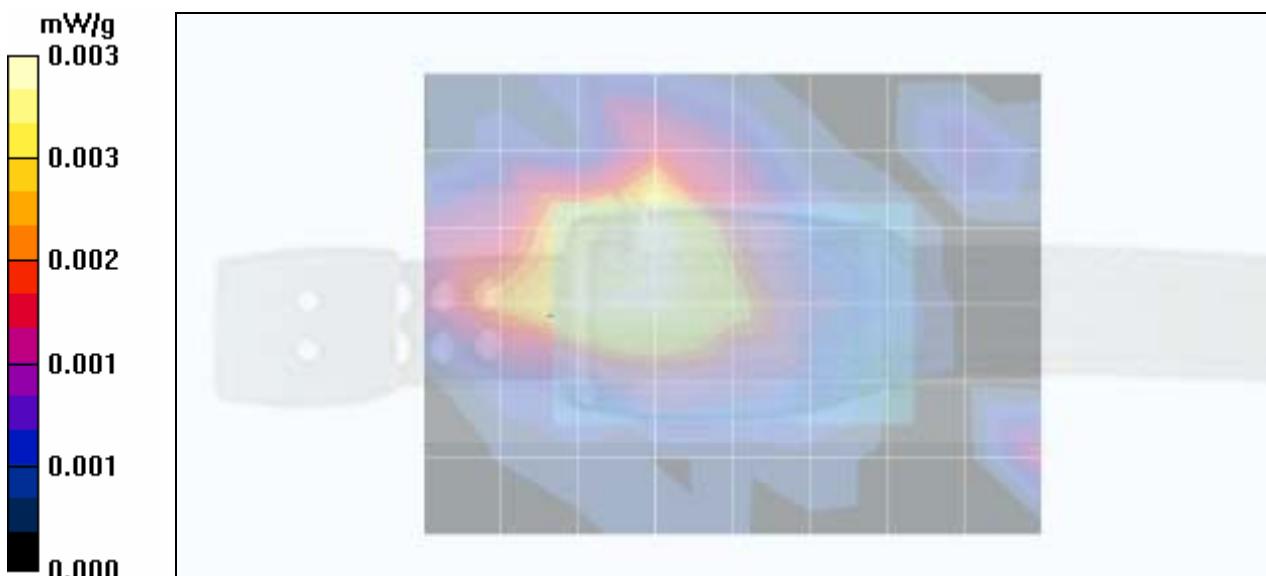
**Wrist-Worn SAR - Cellular Band - Bottom Side of DUT Touching Planar Phantom - Mid Channel Area Scan (7x9x1):** Measurement grid: dx=15mm, dy=15mm

**Wrist-Worn SAR - Cellular Band - Bottom Side of DUT Touching Planar Phantom - Mid Channel Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 1.36 V/m; Power Drift = 0.861 dB

Peak SAR (extrapolated) = 0.007 W/kg

**SAR(1 g) = 0.00321 mW/g; SAR(10 g) = 0.00208 mW/g**



Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device	IC ID:	6387A-CLMBRA01			
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.					
	Page 19 of 36					

 <b>Celltech</b> <small>Testing and Engineering Services Lab</small>	Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
	Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
	Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093 IC RSS-102 Issue 2

## Fluid Depth (>15cm)



**Planar Section**

Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	 <b>Medical</b> <small>Intelligence</small> <small>www.medicalintelligence.com</small>	
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device	IC ID:	6387A-CLMBRA01				
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.						
	Page 20 of 36						



Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093 IC RSS-102 Issue 2

## APPENDIX B - SYSTEM PERFORMANCE CHECK DATA

Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	 Medical Intelligence <a href="http://www.medicalintelligence.com">www.medicalintelligence.com</a>	
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device	IC ID:	6387A-CLMBRA01				
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.						

 Testing and Engineering Services Lab	Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
	Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
	Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093

Date Tested: 04/05/2006

## System Performance Check (Brain) - 1900 MHz Dipole

**DUT: Dipole 1900 MHz; Model: D1900V2; Type: System Performance Check; Serial: 151; Calibrated: 06/17/2005**

Ambient Temp: 25.1 °C; Fluid Temp: 23.8 °C; Barometric Pressure: 101.1 kPa; Humidity: 30%

Communication System: CW

Forward Conducted Power: 250 mW

Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: HSL1900 ( $\sigma = 1.33 \text{ mho/m}$ ;  $\epsilon_r = 39.0$ ;  $\rho = 1000 \text{ kg/m}^3$ )

- Probe: ET3DV6 - SN1387; ConvF(5, 5, 5); Calibrated: 16/03/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 15/06/2005
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

### 1900 MHz Dipole - System Performance Check/Area Scan (5x8x1):

Measurement grid: dx=15mm, dy=15mm

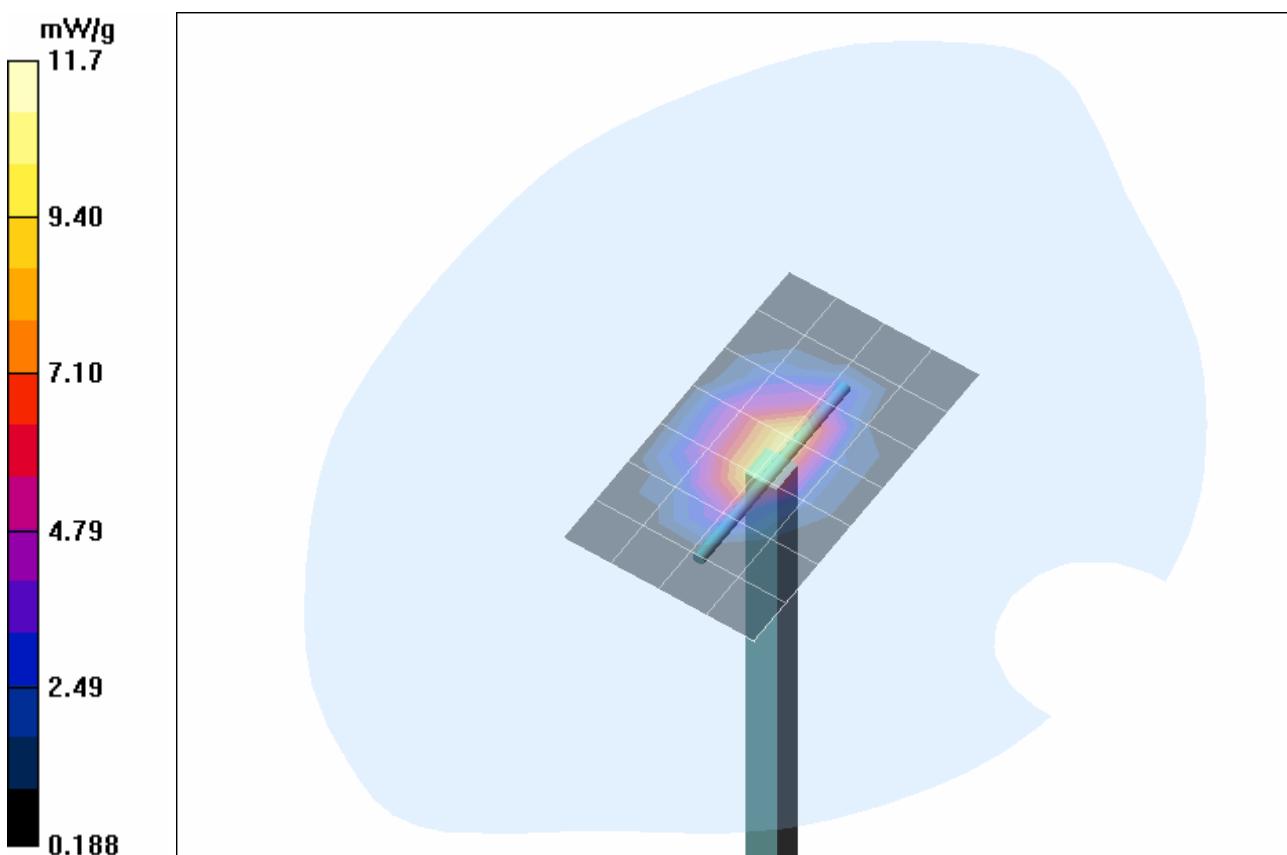
### 1900 MHz Dipole - System Performance Check/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 90.3 V/m; Power Drift = -0.023 dB

Peak SAR (extrapolated) = 23.2 W/kg

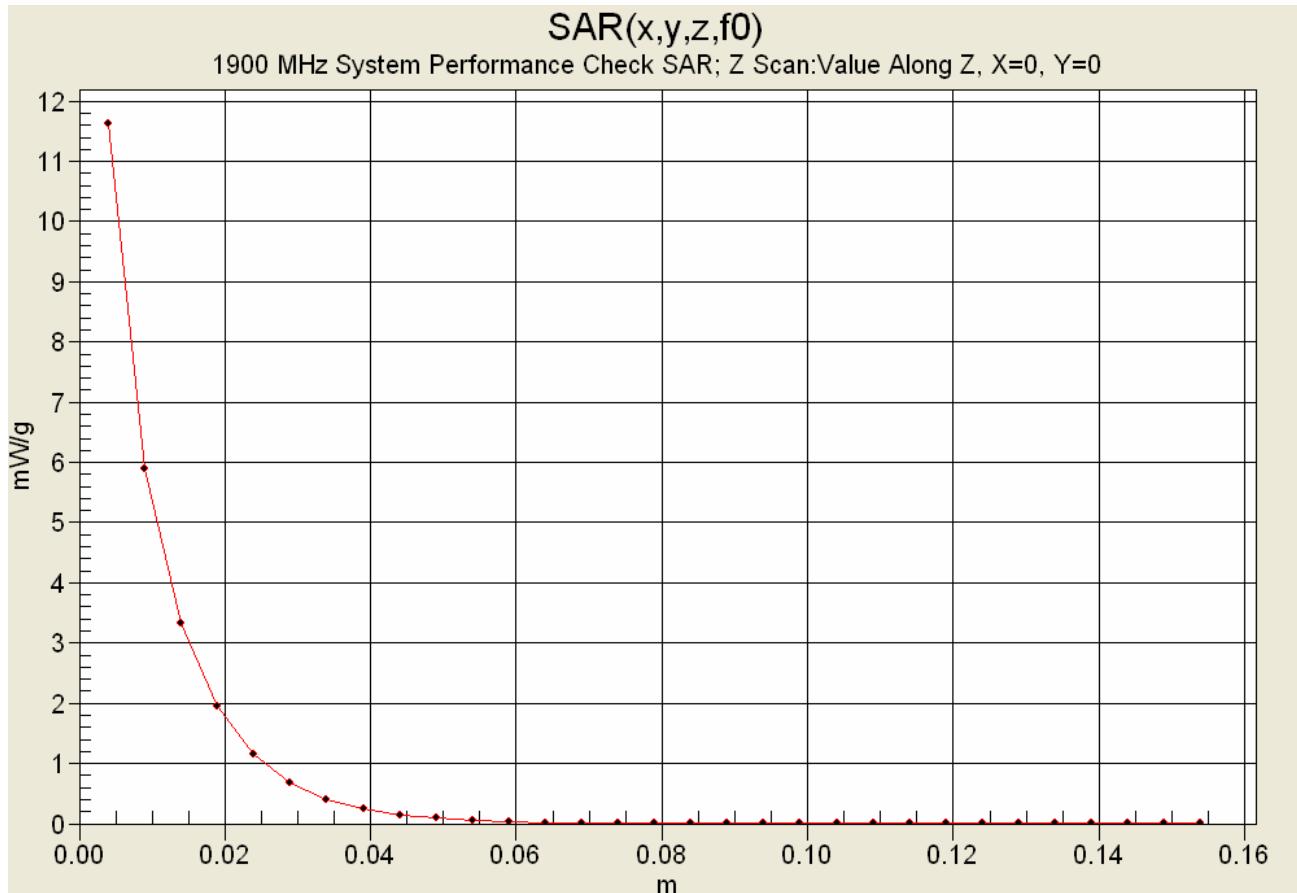
**SAR(1 g) = 10.5 mW/g; SAR(10 g) = 5.28 mW/g**



Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device	IC ID:	6387A-CLMBRA01			
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.					
	Page 22 of 36					

 Testing and Engineering Services Lab	Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
	Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
	Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093

## Z-Axis Scan



Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	 Medical Intelligence www.medicalintelligence.com	
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device	IC ID:	6387A-CLMBRA01				
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.						
	Page 23 of 36						

 Testing and Engineering Services Lab	Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
	Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
	Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093

Date Tested: 04/06/2006

## System Performance Check (Body) - 835 MHz Dipole

**DUT: Dipole 835 MHz; Model: D835V2; Type: System Performance Check; Serial: 411; Calibrated: 03/27/2006**

Ambient Temp: 23.5 °C; Fluid Temp: 22.5 °C; Barometric Pressure: 101.2 kPa; Humidity: 30%

Communication System: CW

Forward Conducted Power: 250 mW

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: M835 ( $\sigma = 0.98 \text{ mho/m}$ ;  $\epsilon_r = 54.3$ ;  $\rho = 1000 \text{ kg/m}^3$ )

- Probe: ET3DV6 - SN1387; ConvF(6.04, 6.04, 6.04); Calibrated: 16/03/2006
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 15/06/2005
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

### 835 MHz Dipole - System Performance Check/Area Scan (6x10x1):

Measurement grid: dx=10mm, dy=10mm

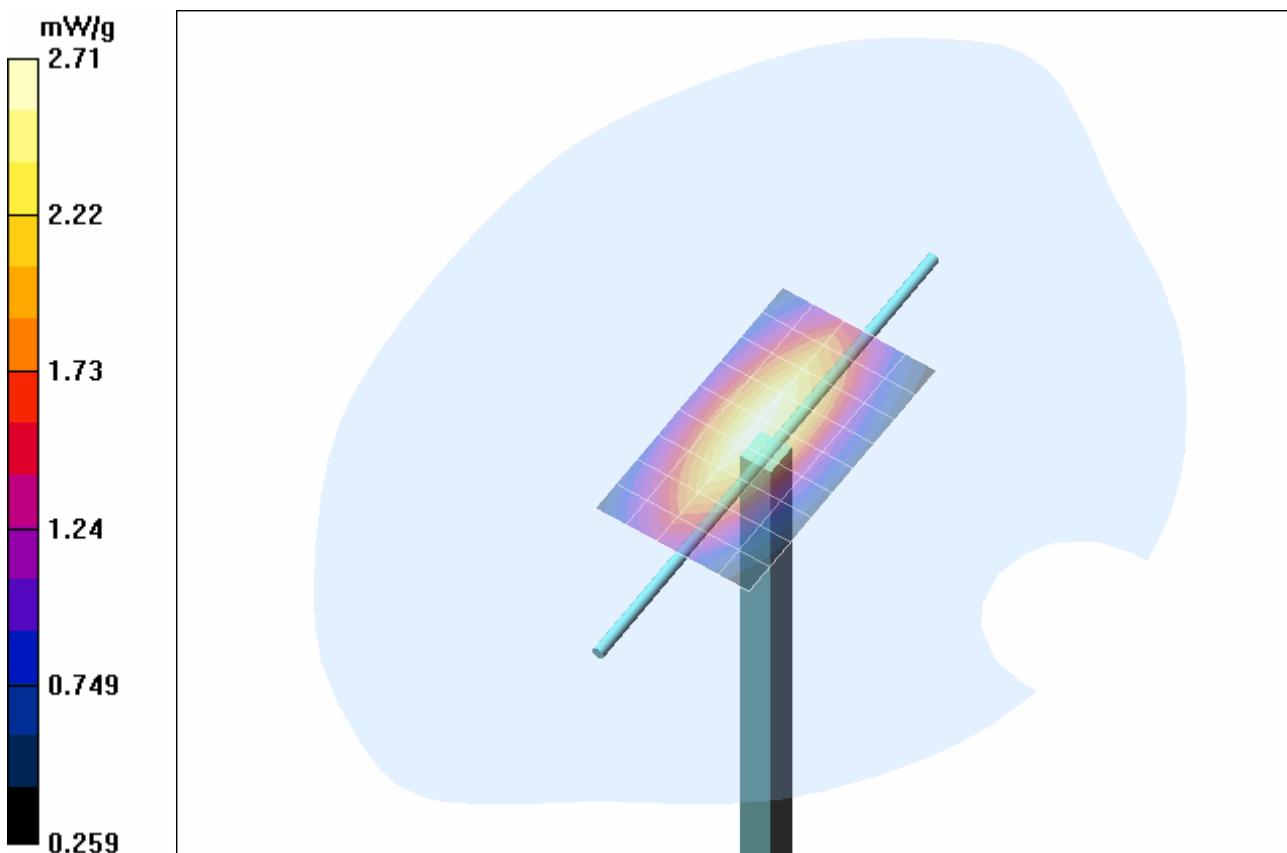
### 835 MHz Dipole - System Performance Check/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.8 V/m; Power Drift = -0.024 dB

Peak SAR (extrapolated) = 3.64 W/kg

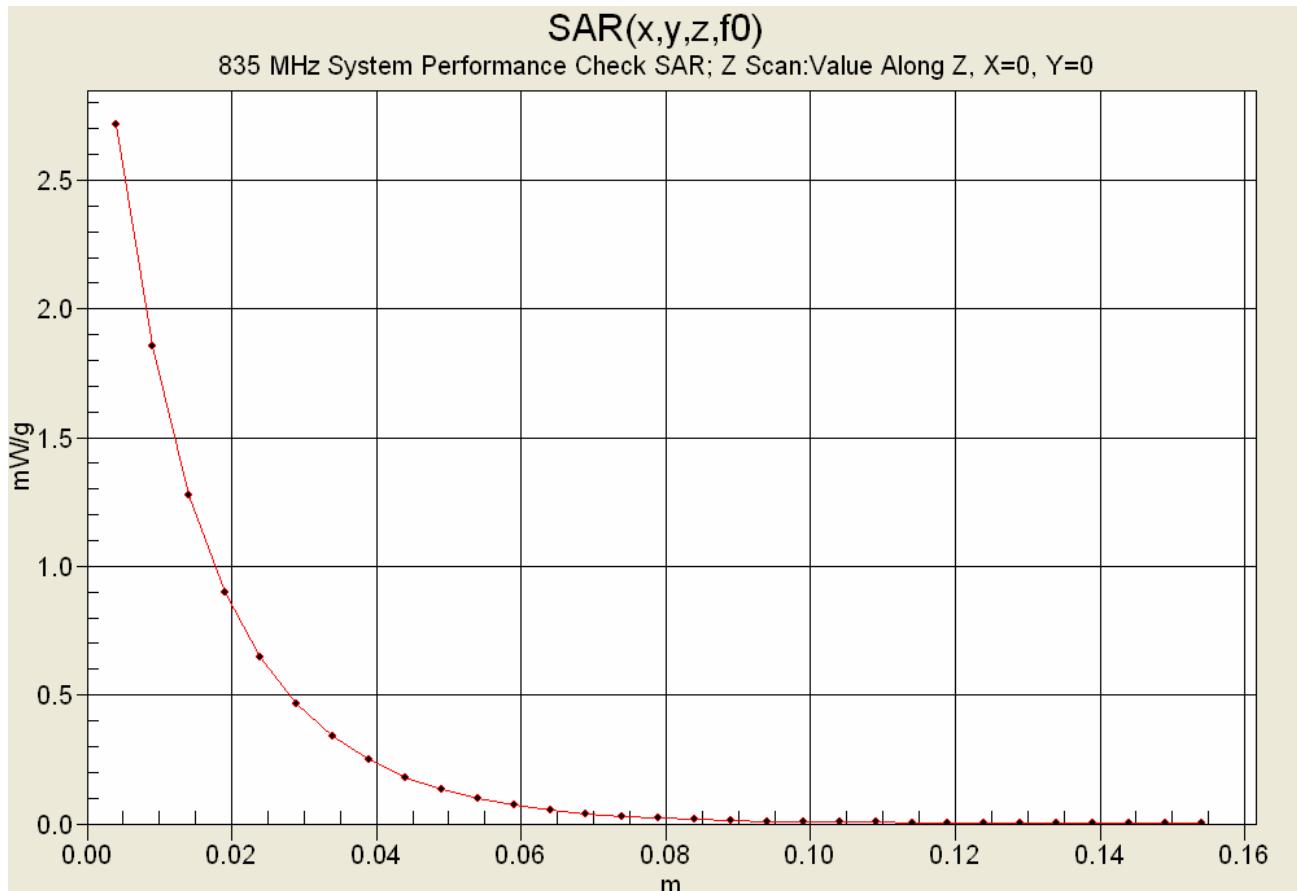
**SAR(1 g) = 2.51 mW/g; SAR(10 g) = 1.65 mW/g**



Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	 Medical Intelligence <a href="http://www.medicalintelligence.com">www.medicalintelligence.com</a>	
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device	IC ID:	6387A-CLMBRA01				
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.						
	Page 24 of 36						

 Celltech <small>Testing and Engineering Services Lab</small>	Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
	Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
	Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093

## Z-Axis Scan



Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device	IC ID:	6387A-CLMBRA01			
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.					
	Page 25 of 36					



Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093 IC RSS-102 Issue 2

## APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS

Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device			IC ID:	6387A-CLMBRA01	
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.					

 Testing and Engineering Services Lab	Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
	Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
	Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093

## 1900 MHz System Performance Check (Brain)

---

Celltech Labs Inc.

Test Result for UIM Dielectric Parameter

Wed 05/Apr/2006

Frequency(GHz)

FCC\_eH FCC OET 65 Supplement C (June 2001) Limits for Head Epsilon

FCC\_sH FCC OET 65 Supplement C (June 2001) Limits for Head Sigma

Test\_e Epsilon of UIM

Test\_s Sigma of UIM

---

Freq	FCC_eH	FCC_sH	Test_e	Test_s
1.8000	40.00	1.40	39.31	1.24
1.8100	40.00	1.40	39.33	1.25
1.8200	40.00	1.40	39.31	1.26
1.8300	40.00	1.40	39.28	1.27
1.8400	40.00	1.40	39.18	1.28
1.8500	40.00	1.40	39.09	1.29
1.8600	40.00	1.40	39.11	1.31
1.8700	40.00	1.40	39.04	1.32
1.8800	40.00	1.40	38.99	1.32
1.8900	40.00	1.40	38.95	1.34
1.9000	40.00	1.40	39.01	1.33
1.9100	40.00	1.40	38.92	1.34
1.9200	40.00	1.40	38.85	1.35
1.9300	40.00	1.40	38.85	1.36
1.9400	40.00	1.40	38.67	1.37
1.9500	40.00	1.40	38.76	1.38
1.9600	40.00	1.40	38.60	1.38
1.9700	40.00	1.40	38.59	1.40
1.9800	40.00	1.40	38.61	1.41
1.9900	40.00	1.40	38.65	1.41
2.0000	40.00	1.40	38.59	1.43

Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	 Medical Intelligence	
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device			IC ID:	6387A-CLMBRA01		
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.						

 Testing and Engineering Services Lab	Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
	Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
	Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093

## 1880 MHz DUT Evaluation (Body)

Celltech Labs Inc.

Test Result for UIM Dielectric Parameter

Wed 05/Apr/2006

Frequency(GHz)

FCC\_eH FCC Bulletin 65 Supplement C (June 2001) Limits for Head Epsilon

FCC\_sH FCC Bulletin 65 Supplement C (June 2001) Limits for Head Sigma

FCC\_eB FCC Limits for Body Epsilon

FCC\_sB FCC Limits for Body Sigma

Test\_e Epsilon of UIM

Test\_s Sigma of UIM

Freq	FCC_eB	FCC_sB	Test_e	Test_s
1.8000	53.30	1.52	51.17	1.43
1.8100	53.30	1.52	51.09	1.43
1.8200	53.30	1.52	51.06	1.45
1.8300	53.30	1.52	51.03	1.46
1.8400	53.30	1.52	51.01	1.46
1.8500	53.30	1.52	50.94	1.47
1.8600	53.30	1.52	50.93	1.49
1.8700	53.30	1.52	50.86	1.50
1.8800	53.30	1.52	50.90	1.51
1.8900	53.30	1.52	50.90	1.52
1.9000	53.30	1.52	50.79	1.53
1.9100	53.30	1.52	50.81	1.54
1.9200	53.30	1.52	50.81	1.54
1.9300	53.30	1.52	50.74	1.57
1.9400	53.30	1.52	50.83	1.57
1.9500	53.30	1.52	50.67	1.57
1.9600	53.30	1.52	50.73	1.59
1.9700	53.30	1.52	50.71	1.60
1.9800	53.30	1.52	50.62	1.61
1.9900	53.30	1.52	50.63	1.64
2.0000	53.30	1.52	50.49	1.64

Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	 Medical Intelligence <a href="http://www.medicalintelligence.com">www.medicalintelligence.com</a>	
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device			IC ID:	6387A-CLMBRA01		
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.						

 Celltech <small>Testing and Engineering Services Lab</small>	Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
	Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
	Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093

## 835 MHz System Performance Check & DUT Evaluation (Body)

---

Celltech Labs Inc.

Test Result for UIM Dielectric Parameter

Thu 06/Apr/2006

Frequency(GHz)

FCC\_eH FCC Bulletin 65 Supplement C (June 2001) Limits for Head Epsilon  
 FCC\_sH FCC Bulletin 65 Supplement C (June 2001) Limits for Head Sigma

FCC\_eB FCC Limits for Body Epsilon

FCC\_sB FCC Limits for Body Sigma

Test\_e Epsilon of UIM

Test\_s Sigma of UIM

---

Freq	FCC_eB	FCC_sB	Test_e	Test_s
0.7350	55.59	0.96	55.09	0.88
0.7450	55.55	0.96	55.00	0.89
0.7550	55.51	0.96	54.97	0.90
0.7650	55.47	0.96	54.87	0.91
0.7750	55.43	0.97	54.76	0.92
0.7850	55.39	0.97	54.65	0.92
0.7950	55.36	0.97	54.48	0.93
0.8050	55.32	0.97	54.56	0.94
0.8150	55.28	0.97	54.47	0.95
0.8250	55.24	0.97	54.41	0.96
<b>0.8350</b>	<b>55.20</b>	<b>0.97</b>	<b>54.30</b>	<b>0.98</b>
0.8450	55.17	0.98	54.17	0.97
0.8550	55.14	0.99	53.98	0.99
0.8650	55.11	1.01	54.00	1.00
0.8750	55.08	1.02	53.91	1.01
0.8850	55.05	1.03	53.65	1.02
0.8950	55.02	1.04	53.65	1.03
0.9050	55.00	1.05	53.58	1.04
0.9150	55.00	1.06	53.59	1.05
0.9250	54.98	1.06	53.56	1.05
0.9350	54.96	1.07	53.46	1.06

Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device			IC ID:	6387A-CLMBRA01	
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.					



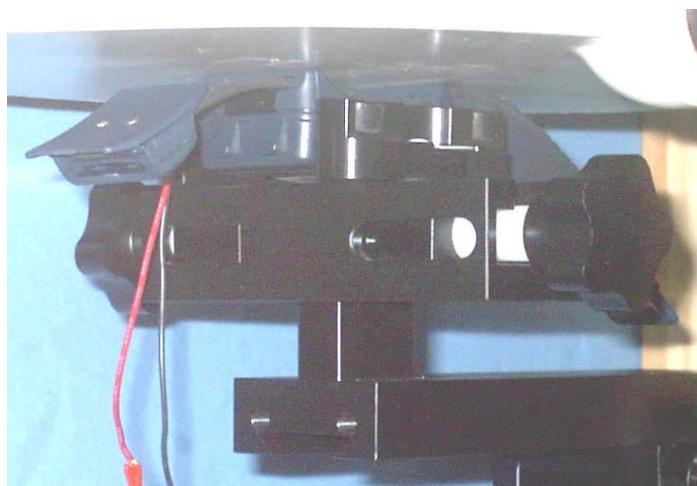
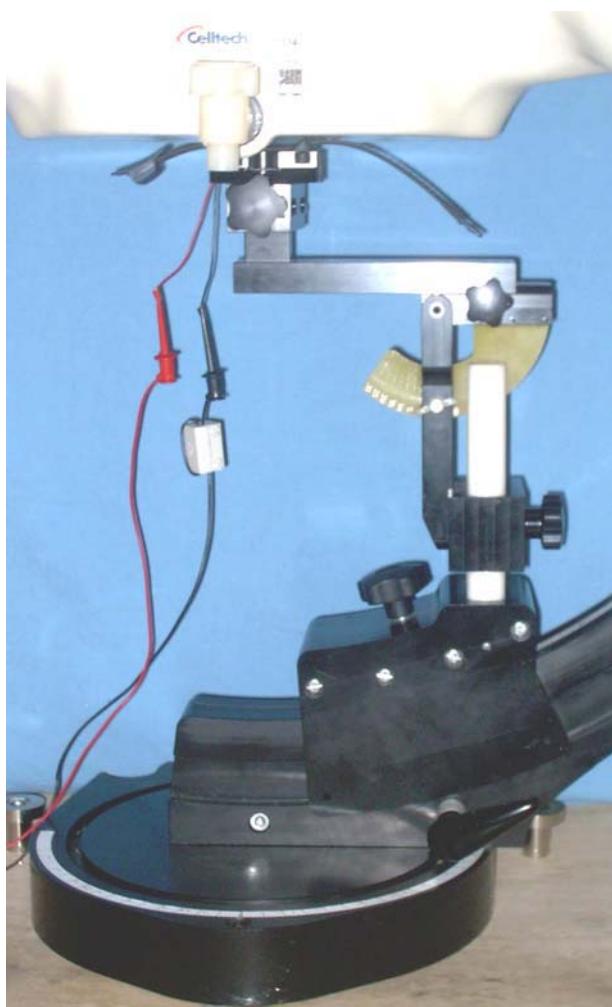
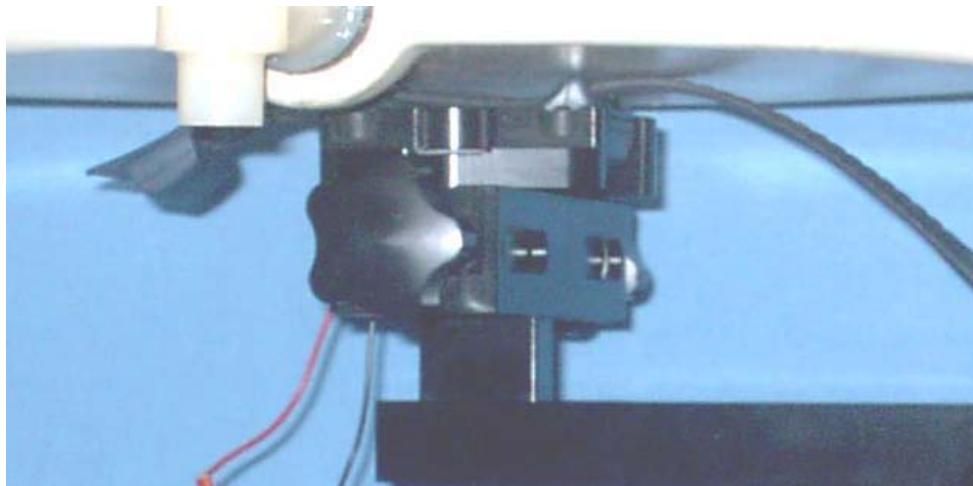
Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093 IC RSS-102 Issue 2

## APPENDIX D - SAR TEST SETUP PHOTOGRAPHS

Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	 Medical Intelligence <a href="http://www.medicalintelligence.com">www.medicalintelligence.com</a>	
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device	IC ID:	6387A-CLMBRA01				
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.						
	Page 30 of 36						

Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093

**WRIST-WORN SAR TEST SETUP PHOTOGRAPHS**  
**Bottom Side of DUT Touching Planar Phantom**



Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	 <b>Medical</b> <b>Intelligence</b> <a href="http://www.medicalintelligence.com">www.medicalintelligence.com</a>
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device	IC ID:	6387A-CLMBRA01			
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.					

Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
Type of Evaluation:	RF Exposure SAR	FCC 47 CFR §2.1093	IC RSS-102 Issue 2

## DUT PHOTOGRAPHS



Top Side of DUT



Bottom Side of DUT



Top Side of DUT



Bottom Side of DUT

Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	 <b>Medical</b> <b>Intelligence</b> <a href="http://www.medicalintelligence.com">www.medicalintelligence.com</a>	
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device	IC ID:	6387A-CLMBRA01				
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.						
	Page 32 of 36						

Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
Type of Evaluation:	RF Exposure SAR	FCC 47 CFR §2.1093	IC RSS-102 Issue 2

## DUT PHOTOGRAPHS



Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	 <b>Medical Intelligence</b> <a href="http://www.medicalintelligence.com">www.medicalintelligence.com</a>
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device	IC ID:	6387A-CLMBRA01			
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.					



Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093 IC RSS-102 Issue 2

## APPENDIX E - SYSTEM VALIDATION

Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	 Medical Intelligence <a href="http://www.medicalintelligence.com">www.medicalintelligence.com</a>	
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device	IC ID:	6387A-CLMBRA01				
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.						
	Page 34 of 36						

	Date of Evaluation:	March 27, 2006	Document Serial No.:	SV835B-032706-R1
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz Body

## 835 MHz SYSTEM VALIDATION DIPOLE

Type:

**835 MHz Validation Dipole**

Asset Number:

**00022**

Serial Number:

**411**

Place of Validation:

**Celltech Labs Inc.**

Date of Validation:

**March 27, 2006**

**Celltech Labs Inc. hereby certifies that the 835 MHz System Validation (Body) was performed on the date indicated above.**

Performed by:

**Sean Johnston**

Approved by:

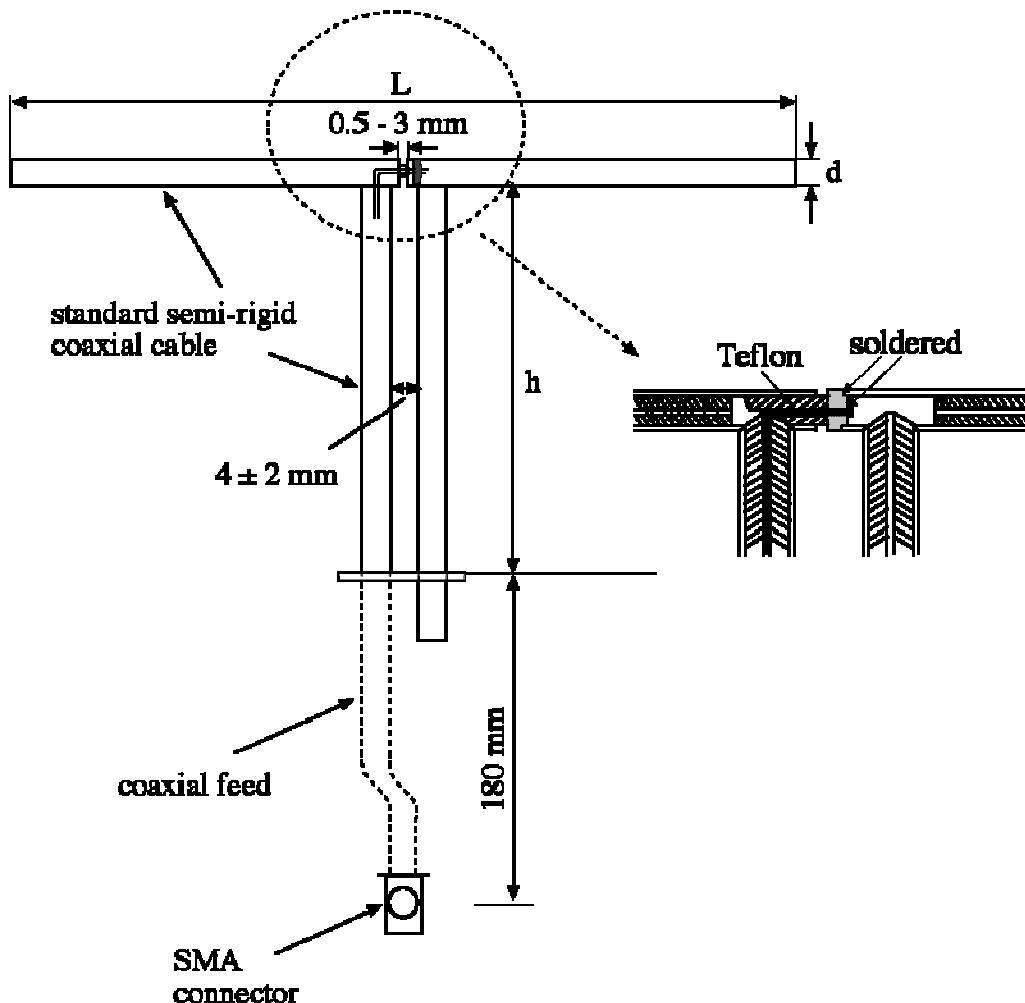
**Spencer Watson**

## 1. Validation 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 8753ET 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:

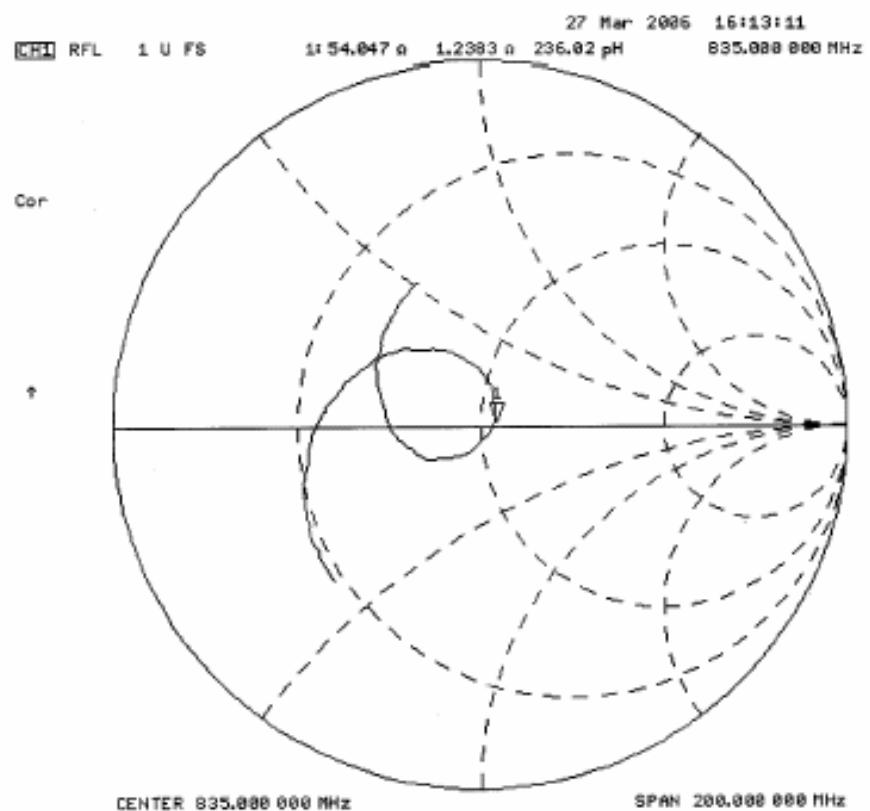
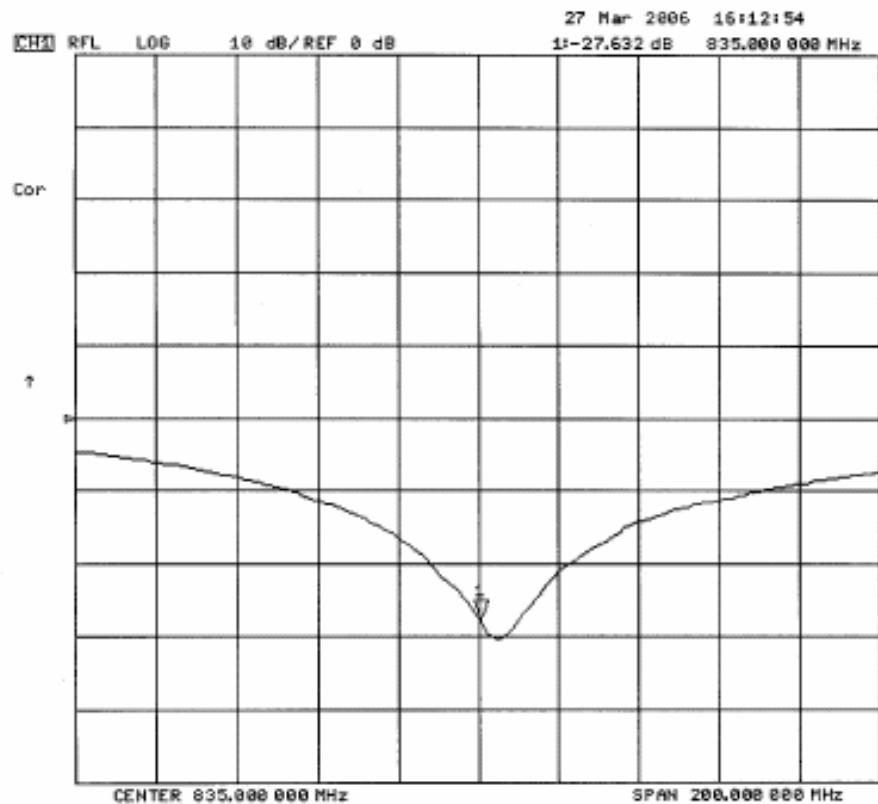
Feed point impedance at 835MHz       $\text{Re}\{Z\} = 47.627\Omega$   
 $\text{Im}\{Z\} = -0.67188\Omega$

Return Loss at 835MHz      -31.954dB



 Testing and Engineering Services Ltd.	Date of Evaluation:	March 27, 2006	Document Serial No.:	SV835B-032706-R1
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz Body

## 2. Validation Dipole VSWR Data



 Celltech <small>Testing and Engineering Services Ltd.</small>	Date of Evaluation:	March 27, 2006	Document Serial No.:	SV835B-032706-R1	
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz	Body

### 3. 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

### 4. 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. 25 liters  
**Dimensions:** 50 cm (W) x 100 cm (L)

 Celltech Testing and Engineering Services Lab.	Date of Evaluation:	March 27, 2006	Document Serial No.:	SV835B-032706-R1
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz Body

## 5. 835 MHz System Validation Setup



<b>Celltech</b> Testing and Engineering Services Lab	Date of Evaluation:	March 27, 2006	Document Serial No.:	SV835B-032706-R1	
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz	Body

## 6. 835 MHz Validation Dipole Setup



 Celltech <small>Testing and Engineering Services Ltd.</small>	Date of Evaluation:	March 27, 2006	Document Serial No.:	SV835B-032706-R1
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz Body

## 7. Measurement Conditions

The SAM phantom was filled with 835 MHz body tissue simulant with the following parameters:

Relative Permittivity: 53.7 (-2.7% from target)  
 Conductivity: 0.94 mho/m (-3% from target)  
 Fluid Temperature: 20.8 °C  
 Fluid Depth: ≥ 15.0 cm

Environmental Conditions:

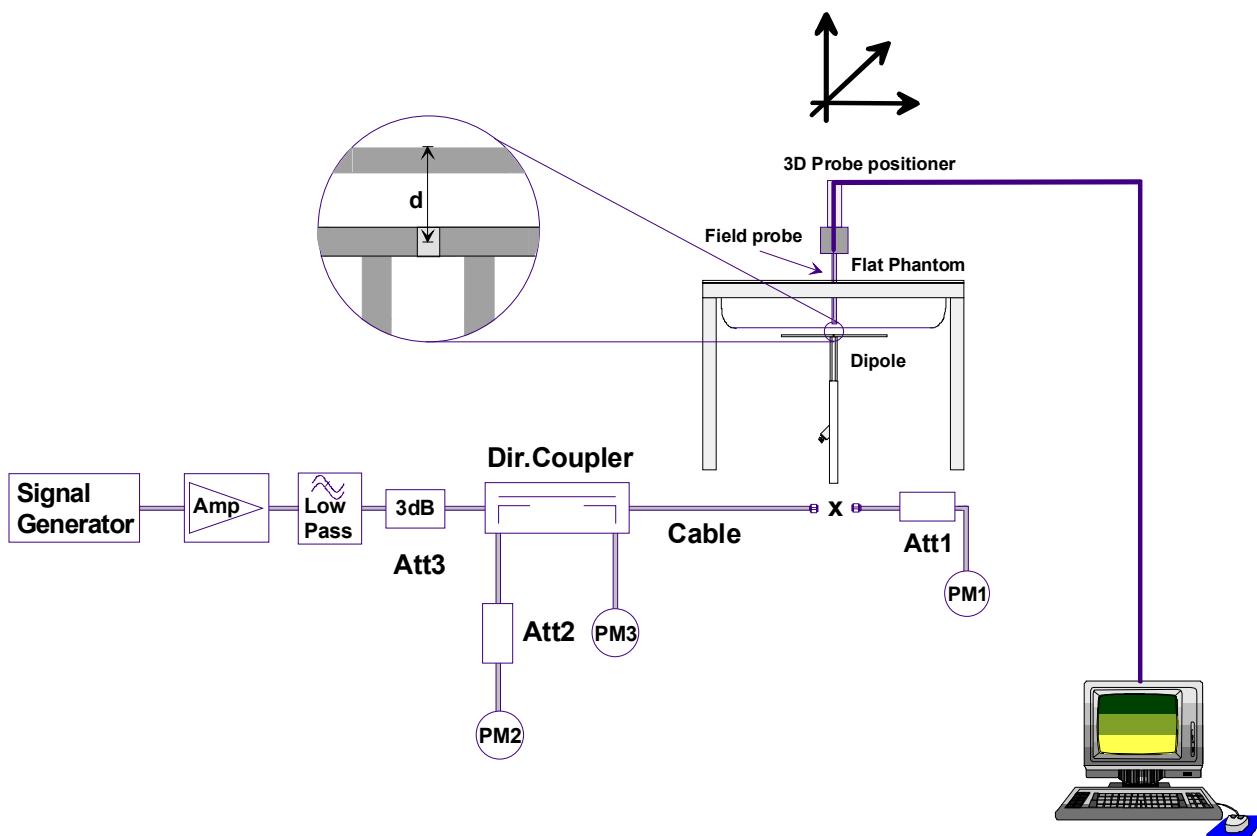
Ambient Temperature: 22.6 °C  
 Barometric Pressure: 101.8 kPa  
 Humidity: 30 %

The 835 MHz body tissue simulant consisted of the following ingredients:

Ingredient	Percentage by weight
Water	53.79%
Sugar	45.13%
Salt	0.98%
Dowicil 75	0.10%
Target Dielectric Parameters at 22 °C	$\epsilon_r = 55.2 (+/- 5\%)$ $\sigma = 0.97 \text{ S/m} (+/- 5\%)$

## 8. SAR Measurement

Measurements were made at the planar section of the SAM phantom using a dosimetric E-field probe ET3DV5 (S/N: 1590, conversion factor 6.47). 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.

 Testing and Engineering Services Ltd.	Date of Evaluation:	March 27, 2006	Document Serial No.:	SV835B-032706-R1	
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz	Body

## 9. Validation Dipole SAR Test Results

Ten SAR measurements were performed in order to achieve repeatability and to establish an average target value (W/kg).

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	Max SAR @ 0.25W Input
Test 1	2.46	9.84	1.62	6.48	2.65
Test 2	2.46	9.84	1.62	6.48	2.66
Test 3	2.46	9.84	1.62	6.48	2.67
Test 4	2.47	9.88	1.62	6.48	2.68
Test 5	2.43	9.72	1.60	6.40	2.64
Test 6	2.43	9.72	1.59	6.36	2.63
Test 7	2.42	9.68	1.59	6.36	2.59
Test 8	2.46	9.84	1.62	6.48	2.64
Test 9	2.47	9.88	1.62	6.48	2.65
Test10	2.45	9.80	1.62	6.48	2.61
Average SAR	2.451	9.804	1.612	6.448	2.642

IEEE Target SAR @ 1 Watt Input averaged over 1 gram (W/kg)	Measured SAR @ 1 Watt Input averaged over 1 gram (W/kg)	Deviation from Target (%)	IEEE Target SAR @ 1 Watt Input averaged over 10 grams (W/kg)	Measured SAR @ 1 Watt Input averaged over 10 grams (W/kg)	Deviation from Target (%)
9.71	+/- 10%	9.804	+1.0%	6.38	+/- 10%

Dipole Type	Distance [mm]	Frequency [MHz]	SAR (1g) [W/kg]	SAR (10g) [W/kg]	SAR (peak) [W/kg]
D300V2	15	300	3.02	2.06	4.36
D450V2	15	450	5.01	3.36	7.22
D835V2	15	835	9.71	6.38	14.1
D900V2	15	900	11.1	7.17	16.3
D1450V2	10	1450	29.6	16.6	49.8
D1500V2	10	1500	30.8	17.1	52.1
D1640V2	10	1640	34.4	18.7	59.4
D1800V2	10	1800	38.5	20.3	67.5
D1900V2	10	1900	39.8	20.8	69.6
D2000V2	10	2000	40.9	21.2	71.5
D2450V2	10	2450	51.2	23.7	97.6
D3000V2	10	3000	61.9	24.8	136.7

Table 32.1: Numerical reference SAR values for SPEAG dipoles and flat phantom filled with body-tissue simulating liquid. Note: All SAR values normalized to 1 W forward power.

 Testing and Engineering Services Ltd.	Date of Evaluation:	March 27, 2006	Document Serial No.:	SV835B-032706-R1
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz Body

## 835 MHz Dipole System Validation (Body) - March 27, 2006

DUT: Dipole 835 MHz; Model: D835V2; Serial: 411; Calibrated: 03/27/2006

Ambient Temp: 22.6 °C; Fluid Temp: 20.8 °C; Barometric Pressure: 101.8 kPa; Humidity: 30%

Communication System: CW

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: M835 ( $\sigma = 0.94 \text{ mho/m}$ ;  $\epsilon_r = 53.7$ ;  $\rho = 1000 \text{ kg/m}^3$ )

- Probe: ET3DV6 - SN1590; ConvF(6.47, 6.47, 6.47); Calibrated: 20/05/2005

- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)

- Electronics: DAE4 Sn353; Calibrated: 15/06/2005

- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033

- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

**835 MHz Dipole System Validation/Area Scan (6x10x1):** Measurement grid: dx=10mm, dy=10mm

**835 MHz Dipole System Validation/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.0 V/m; Power Drift = 0.027 dB

**SAR(1 g) = 2.46 mW/g; SAR(10 g) = 1.62 mW/g**

Maximum value of SAR (measured) = 2.65 mW/g

**835 MHz Dipole System Validation/Zoom Scan 3 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.8 V/m; Power Drift = 0.029 dB

**SAR(1 g) = 2.46 mW/g; SAR(10 g) = 1.62 mW/g**

Maximum value of SAR (measured) = 2.66 mW/g

**835 MHz Dipole System Validation/Zoom Scan 4 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.5 V/m; Power Drift = 0.029 dB

**SAR(1 g) = 2.46 mW/g; SAR(10 g) = 1.62 mW/g**

Maximum value of SAR (measured) = 2.67 mW/g

**835 MHz Dipole System Validation/Zoom Scan 5 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.9 V/m; Power Drift = 0.010 dB

**SAR(1 g) = 2.47 mW/g; SAR(10 g) = 1.62 mW/g**

Maximum value of SAR (measured) = 2.68 mW/g

**835 MHz Dipole System Validation/Zoom Scan 6 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.0 V/m; Power Drift = -0.087 dB

**SAR(1 g) = 2.43 mW/g; SAR(10 g) = 1.62 mW/g**

Maximum value of SAR (measured) = 2.64 mW/g

**835 MHz Dipole System Validation/Zoom Scan 7 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.6 V/m; Power Drift = -0.017 dB

**SAR(1 g) = 2.43 mW/g; SAR(10 g) = 1.59 mW/g**

Maximum value of SAR (measured) = 2.63 mW/g

**835 MHz Dipole System Validation/Zoom Scan 8 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.1 V/m; Power Drift = -0.023 dB

**SAR(1 g) = 2.42 mW/g; SAR(10 g) = 1.59 mW/g**

Maximum value of SAR (measured) = 2.59 mW/g

**835 MHz Dipole System Validation/Zoom Scan 9 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.6 V/m; Power Drift = -0.004 dB

**SAR(1 g) = 2.46 mW/g; SAR(10 g) = 1.62 mW/g**

Maximum value of SAR (measured) = 2.64 mW/g

**835 MHz Dipole System Validation/Zoom Scan 10 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.5 V/m; Power Drift = 0.012 dB

**SAR(1 g) = 2.47 mW/g; SAR(10 g) = 1.62 mW/g**

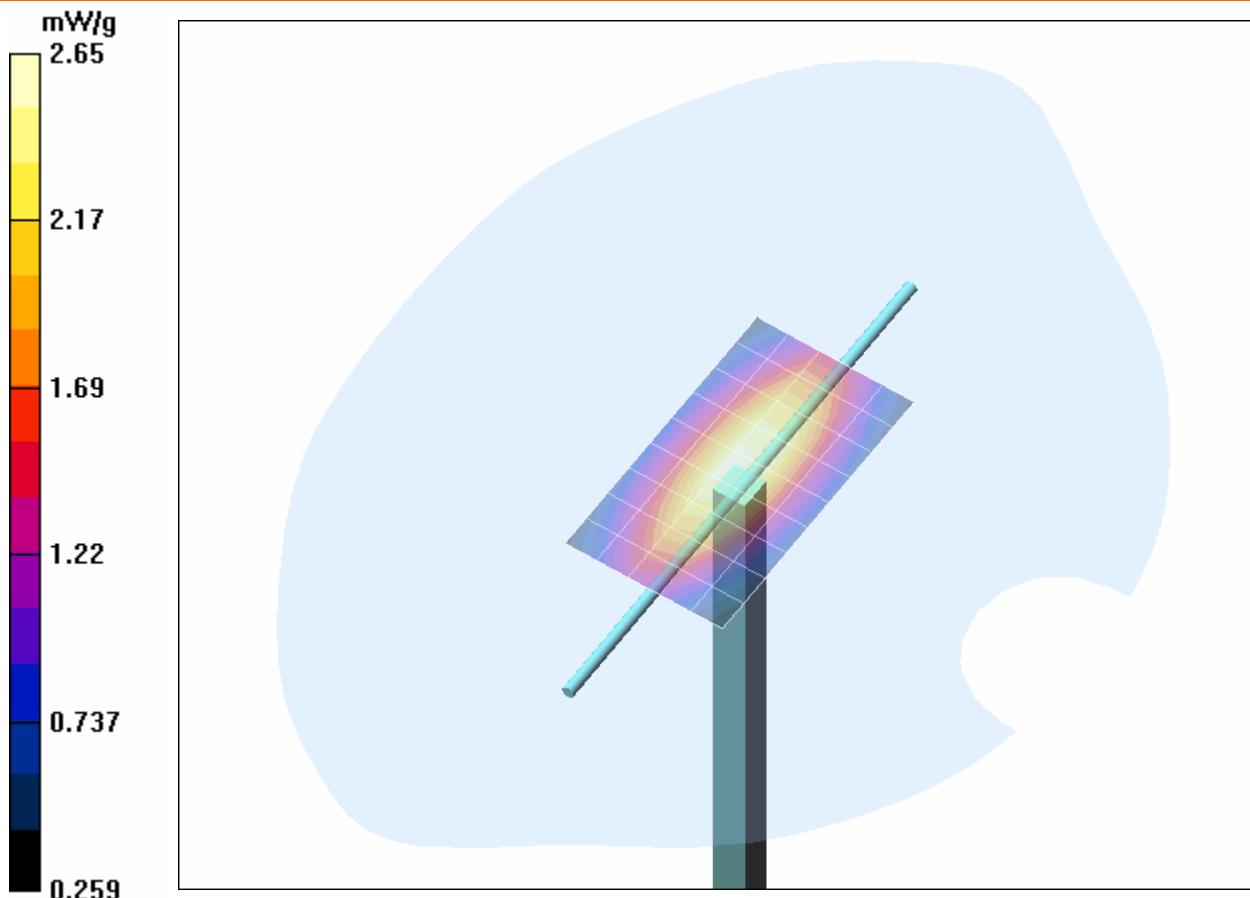
Maximum value of SAR (measured) = 2.65 mW/g

**835 MHz Dipole System Validation/Zoom Scan 11 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.5 V/m; Power Drift = -0.005 dB

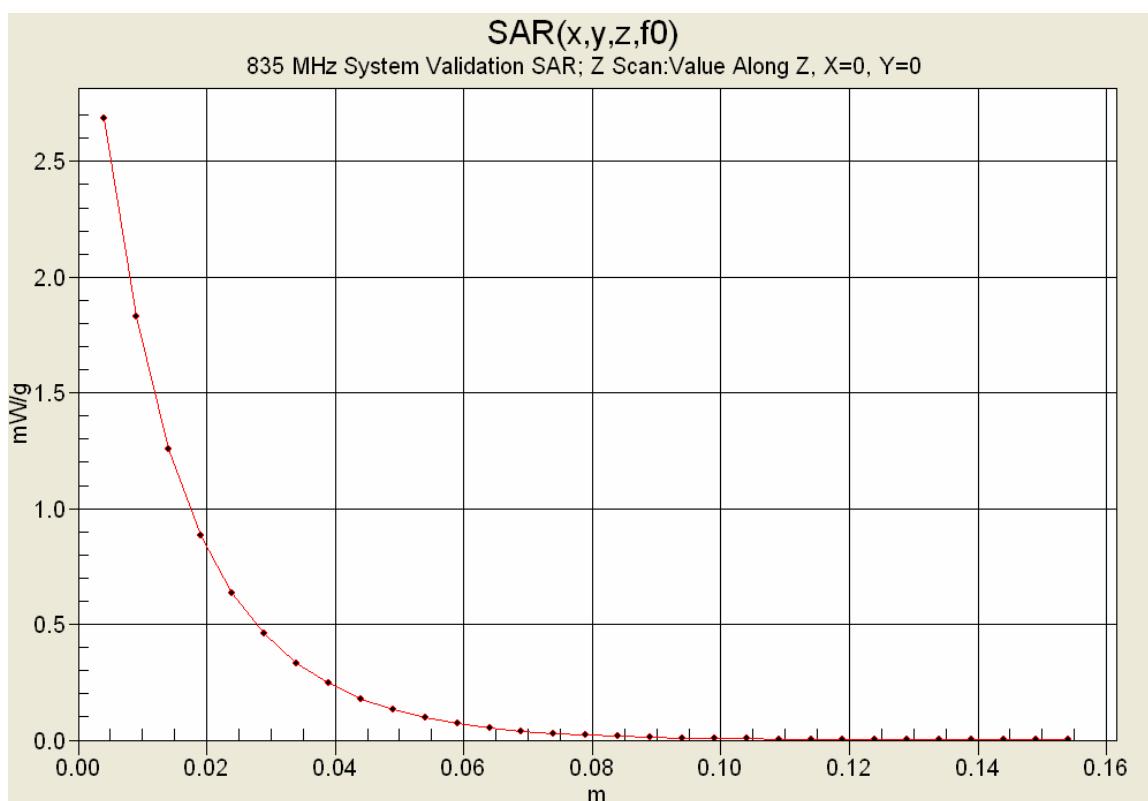
**SAR(1 g) = 2.45 mW/g; SAR(10 g) = 1.62 mW/g**

Maximum value of SAR (measured) = 2.61 mW/g



1 g average of 10 measurements: 2.451 mW/g

10 g average of 10 measurements: 1.612 mW/g



 Celltech Testing and Engineering Services Lab.	Date of Evaluation:	March 27, 2006	Document Serial No.:	SV835B-032706-R1	
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz	Body

## 10. Measured Fluid Dielectric Parameters

### **835 MHz System Validation (Body)**

\*\*\*\*\*

Celltech Labs Inc.

Test Result for UIM Dielectric Parameter

Mon 27/Mar/2006

Frequency(GHz)

FCC\_eHFCC Bulletin 65 Supplement C (June 2001) Limits for Head Epsilon

FCC\_sHFCC Bulletin 65 Supplement C (June 2001) Limits for Head Sigma

FCC\_eB FCC Limits for Body Epsilon

FCC\_sB FCC Limits for Body Sigma

Test\_e Epsilon of UIM

Test\_s Sigma of UIM

\*\*\*\*\*

Freq	FCC_eB	FCC_sB	Test_e	Test_s
0.7350	55.59	0.96	54.23	0.86
0.7450	55.55	0.96	54.00	0.87
0.7550	55.51	0.96	54.00	0.88
0.7650	55.47	0.96	54.04	0.89
0.7750	55.43	0.97	53.97	0.90
0.7850	55.39	0.97	54.01	0.90
0.7950	55.36	0.97	53.96	0.91
0.8050	55.32	0.97	53.85	0.92
0.8150	55.28	0.97	53.79	0.93
0.8250	55.24	0.97	53.69	0.94
<b>0.8350</b>	<b>55.20</b>	<b>0.97</b>	<b>53.68</b>	<b>0.94</b>
0.8450	55.17	0.98	53.35	0.95
0.8550	55.14	0.99	53.18	0.96
0.8650	55.11	1.01	53.25	0.98
0.8750	55.08	1.02	53.26	0.98
0.8850	55.05	1.03	53.11	0.99
0.8950	55.02	1.04	53.11	1.00
0.9050	55.00	1.05	52.96	1.01
0.9150	55.00	1.06	52.91	1.02
0.9250	54.98	1.06	52.93	1.03
0.9350	54.96	1.07	52.58	1.03

**1900 MHz SYSTEM VALIDATION DIPOLE**

Type:

**1900 MHz Validation Dipole**

Asset Number:

**00032**

Serial Number:

**151**

Place of Calibration:

**Celltech Labs Inc.**

Date of Calibration:

**June 17, 2005****Celltech Labs Inc. hereby certifies that this device has been calibrated on the date indicated above.**

Calibrated by:



Approved by:



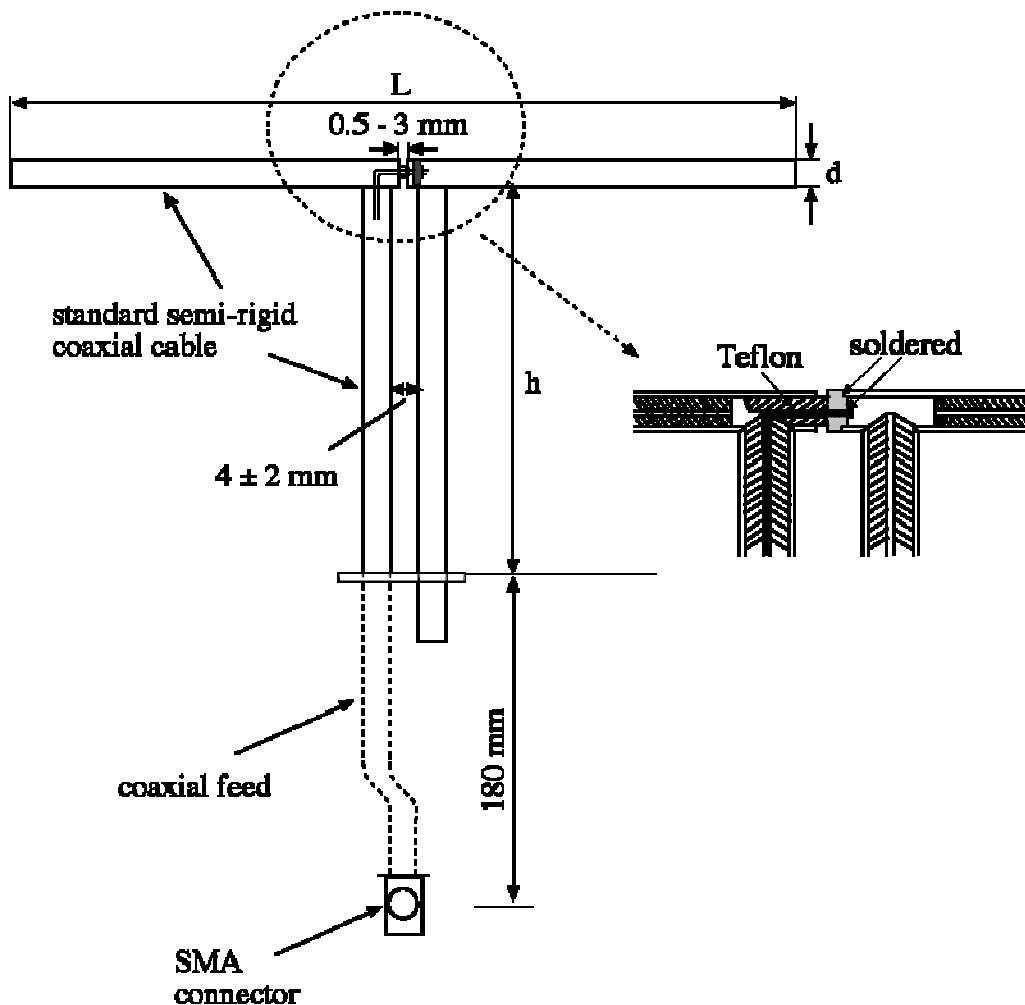
## 1. Dipole Construction & Electrical Characteristics

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 8753ET 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:

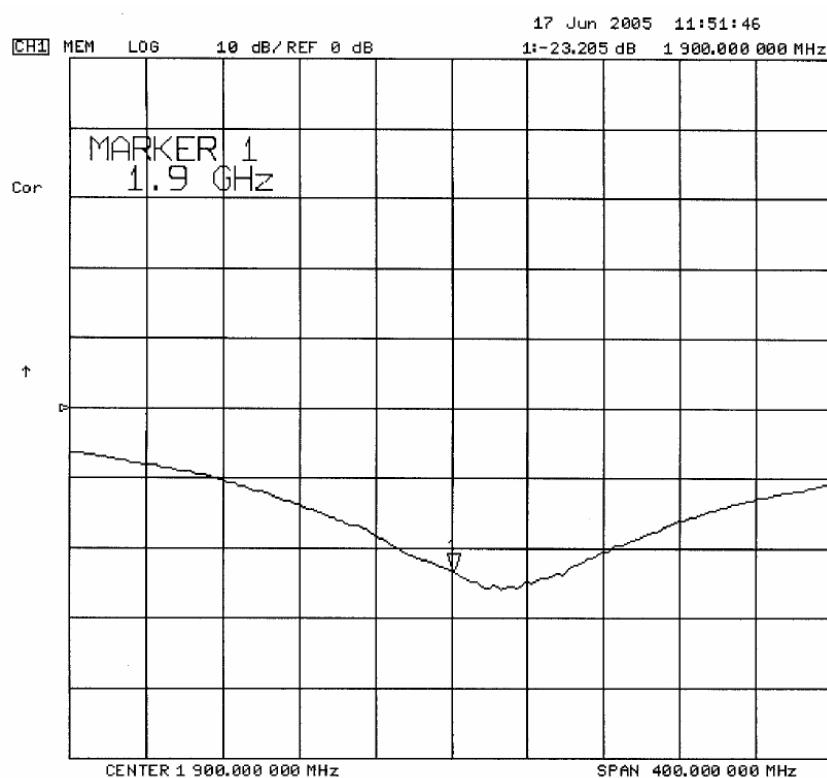
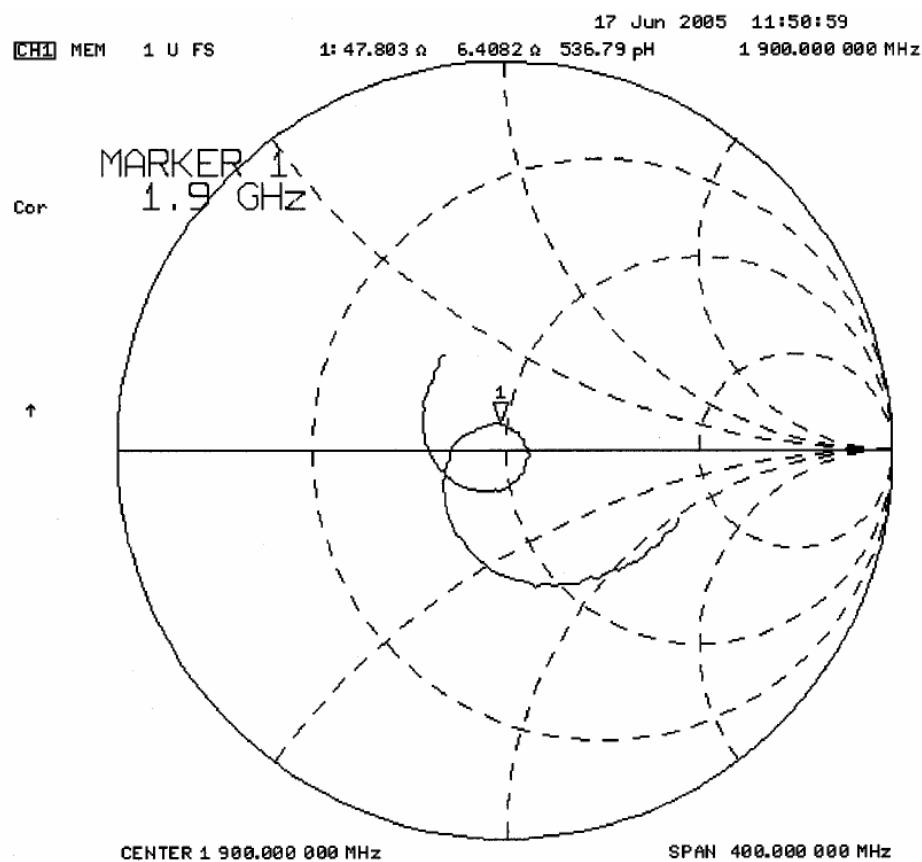
$$\text{Feed point impedance at 1900MHz} \quad \text{Re}\{Z\} = 47.803\Omega$$

$$\text{Im}\{Z\} = 6.4002\Omega$$

$$\text{Return Loss at 1900MHz} \quad -23.205\text{dB}$$



## 2. Validation Dipole VSWR Data



### 3. 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

### 4. 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. 25 liters  
**Dimensions:** 50 cm (W) x 100 cm (L)

**5. 1900 MHz System Validation Setup**



**1900 MHz System Validation Setup**



## 6. Measurement Conditions

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

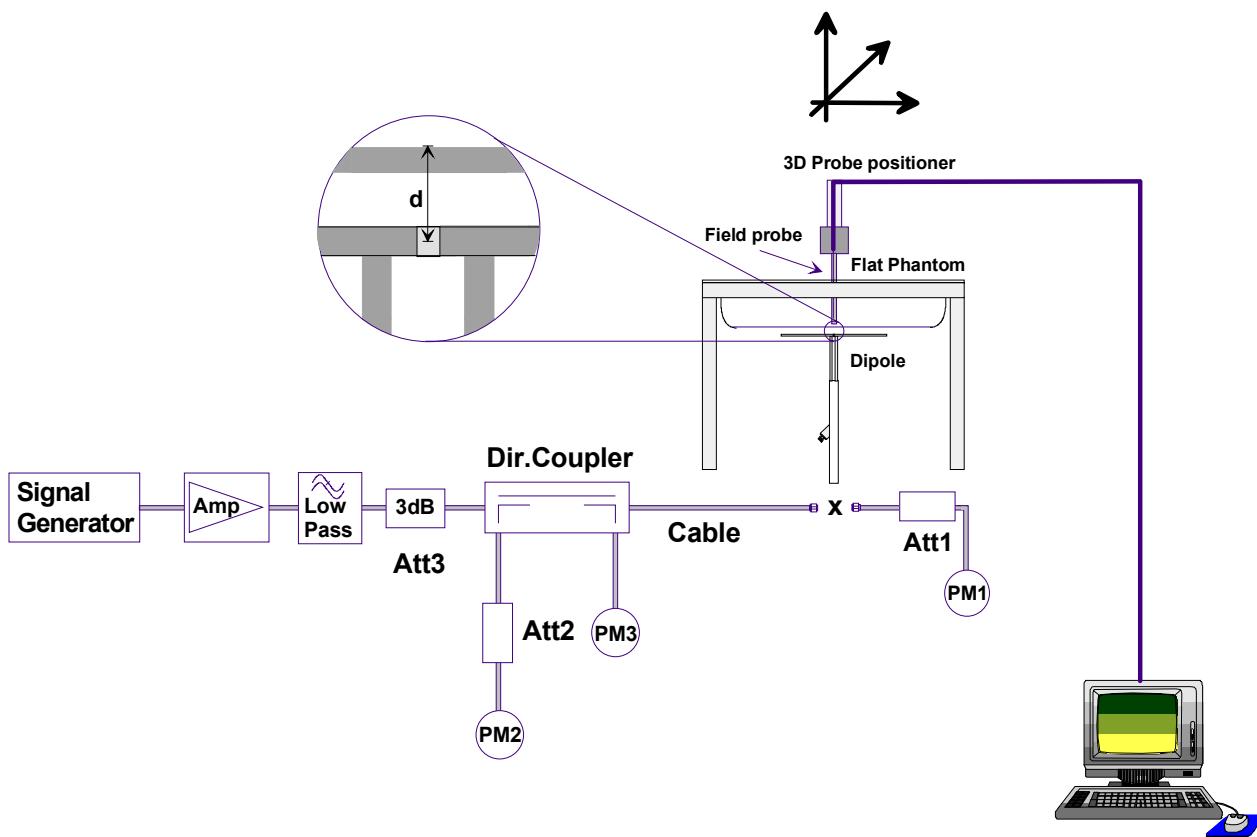
Relative Permittivity: 38.4  
Conductivity: 1.40 mho/m  
Ambient Temperature: 23.4 °C  
Fluid Temperature: 22.7 °C  
Fluid Depth: ≥ 15.0 cm  
Barometric Pressure: 100.6 kPa  
Humidity: 35%

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	$\epsilon_r = 40.0$ $\sigma = 1.40 \text{ S/m}$

## 7. 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.

## 8. Validation Dipole SAR Test Results

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

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	9.97	39.88	5.20	20.80	17.7
Test 2	10.0	40.00	5.19	20.76	17.9
Test 3	10.1	40.40	5.21	20.84	18.1
Test 4	9.98	39.92	5.20	20.80	17.8
Test 5	9.96	39.84	5.19	20.76	17.7
Test 6	9.99	39.96	5.18	20.72	17.9
Test 7	9.89	39.56	5.16	20.64	17.5
Test 8	9.95	39.80	5.19	20.76	17.6
Test 9	9.96	39.84	5.20	20.80	17.6
Test 10	9.92	39.68	5.19	20.76	17.5
Average	9.972	39.888	5.191	20.764	17.73

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	39.888	39.7	+ 0.474
10 gram	20.764	20.5	+ 1.29

## 1900 MHz System Validation - June 17, 2005

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 151  
 Ambient Temp: 23.4 °C; Fluid Temp: 22.7 °C; Barometric Pressure: 100.6 kPa; Humidity: 35%  
 Communication System: CW  
 Frequency: 1900 MHz; Duty Cycle: 1:1  
 Medium: HSL1900 ( $\sigma = 1.40$  mho/m;  $\epsilon_r = 38.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>)

- Probe: ET3DV6 - SN1590; ConvF(5.44, 5.44, 5.44); Calibrated: 20/05/2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn370; Calibrated: 25/01/2005
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

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

**1900 MHz System Validation/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 94.6 V/m; Power Drift = -0.018 dB  
 Peak SAR (extrapolated) = 17.7 W/kg  
**SAR(1 g) = 9.97 mW/g; SAR(10 g) = 5.20 mW/g**

**1900 MHz System Validation/Zoom Scan 2 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 93.6 V/m; Power Drift = -0.025 dB  
 Peak SAR (extrapolated) = 17.9 W/kg  
**SAR(1 g) = 10.0 mW/g; SAR(10 g) = 5.19 mW/g**

**1900 MHz System Validation/Zoom Scan 3 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 94.1 V/m; Power Drift = -0.011 dB  
 Peak SAR (extrapolated) = 18.1 W/kg  
**SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.21 mW/g**

**1900 MHz System Validation/Zoom Scan 4 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 94.8 V/m; Power Drift = 0.00 dB  
 Peak SAR (extrapolated) = 17.8 W/kg  
**SAR(1 g) = 9.98 mW/g; SAR(10 g) = 5.20 mW/g**

**1900 MHz System Validation/Zoom Scan 5 (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) = 17.7 W/kg  
**SAR(1 g) = 9.96 mW/g; SAR(10 g) = 5.19 mW/g**

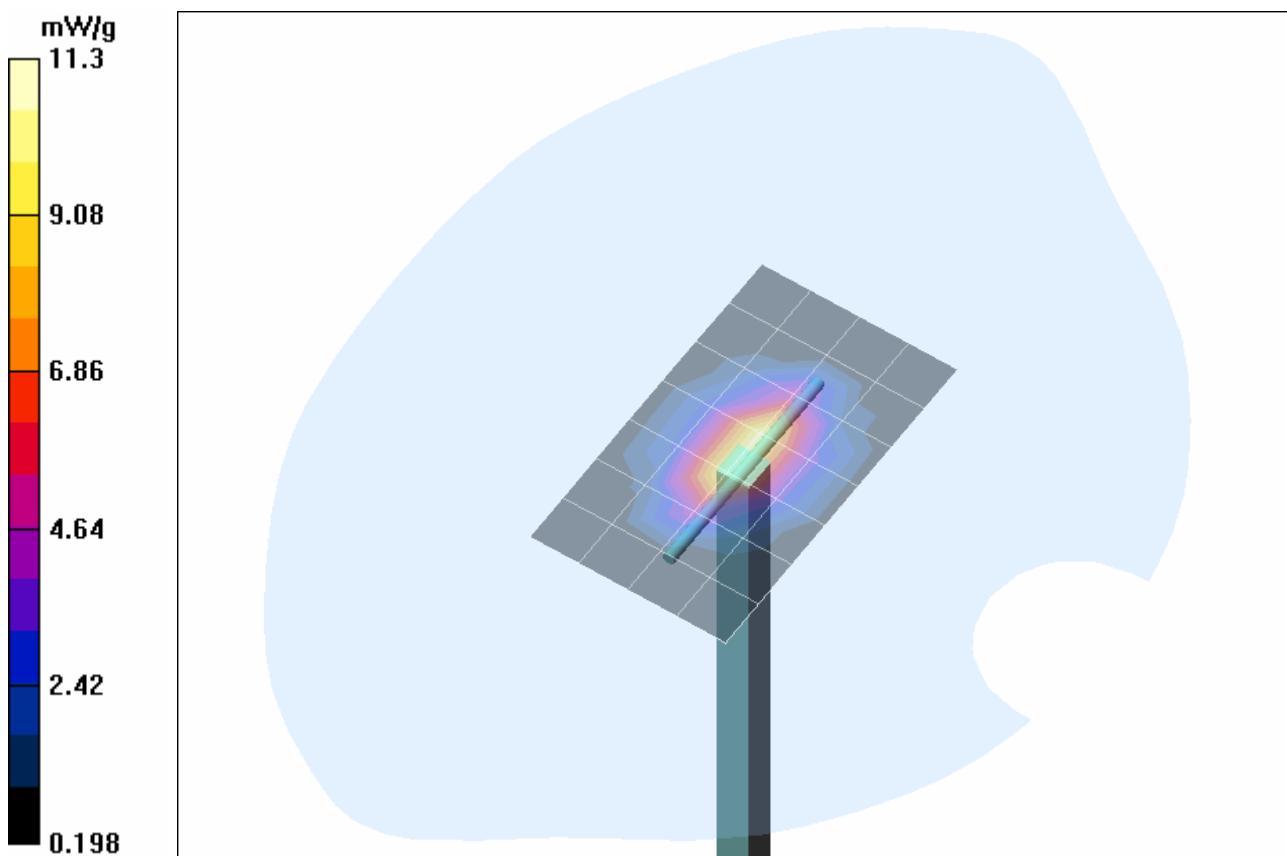
**1900 MHz System Validation/Zoom Scan 6 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 95.6 V/m; Power Drift = -0.081 dB  
 Peak SAR (extrapolated) = 17.9 W/kg  
**SAR(1 g) = 9.99 mW/g; SAR(10 g) = 5.18 mW/g**

**1900 MHz System Validation/Zoom Scan 7 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 94.6 V/m; Power Drift = -0.019 dB  
 Peak SAR (extrapolated) = 17.5 W/kg  
**SAR(1 g) = 9.89 mW/g; SAR(10 g) = 5.16 mW/g**

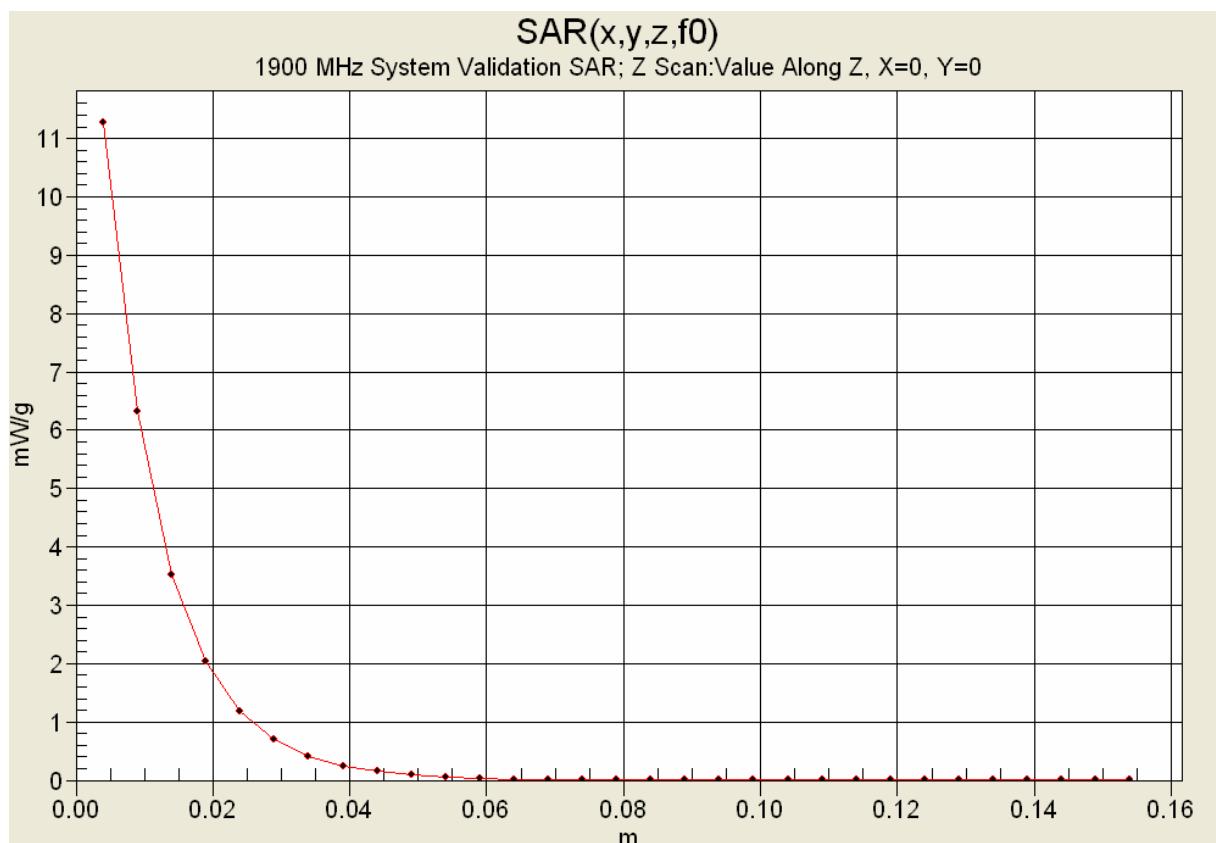
**1900 MHz System Validation/Zoom Scan 8 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 95.0 V/m; Power Drift = -0.016 dB  
 Peak SAR (extrapolated) = 17.6 W/kg  
**SAR(1 g) = 9.95 mW/g; SAR(10 g) = 5.19 mW/g**

**1900 MHz System Validation/Zoom Scan 9 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 95.0 V/m; Power Drift = 0.00 dB  
 Peak SAR (extrapolated) = 17.6 W/kg  
**SAR(1 g) = 9.96 mW/g; SAR(10 g) = 5.20 mW/g**

**1900 MHz System Validation/Zoom Scan 10 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 94.7 V/m; Power Drift = -0.00 dB  
 Peak SAR (extrapolated) = 17.5 W/kg  
**SAR(1 g) = 9.92 mW/g; SAR(10 g) = 5.19 mW/g**



1 g average of 10 measurements: 9.972 mW/g  
10 g average of 10 measurements: 5.191 mW/g



**System Validation - 1900 MHz Dipole (Brain)**

 \*\*\*\*
   
 Celltech Labs Inc.

Test Result for UIM Dielectric Parameter

Fri 17/Jun/2005

Freq Frequency (GHz)

FCC\_eH FCC OET 65 Supplement C (June 2001) Limits for Head Epsilon

FCC\_sH FCC OET 65 Supplement C (June 2001) Limits for Head Sigma

Test\_e Epsilon of UIM

Test\_s Sigma of UIM

\*\*\*\*

Freq FCC\_eH FCC\_sH Test\_e Test\_s

1.8000	40.00	1.40	38.82	1.30
1.8100	40.00	1.40	38.66	1.32
1.8200	40.00	1.40	38.64	1.33
1.8300	40.00	1.40	38.60	1.33
1.8400	40.00	1.40	38.57	1.34
1.8500	40.00	1.40	38.47	1.34
1.8600	40.00	1.40	38.40	1.36
1.8700	40.00	1.40	38.44	1.37
1.8800	40.00	1.40	38.34	1.38
1.8900	40.00	1.40	38.39	1.38
1.9000	40.00	1.40	38.37	1.40
1.9100	40.00	1.40	38.32	1.41
1.9200	40.00	1.40	38.34	1.42
1.9300	40.00	1.40	38.30	1.42
1.9400	40.00	1.40	38.31	1.44
1.9500	40.00	1.40	38.27	1.44
1.9600	40.00	1.40	38.20	1.46
1.9700	40.00	1.40	38.23	1.47
1.9800	40.00	1.40	38.11	1.49
1.9900	40.00	1.40	38.02	1.50
2.0000	40.00	1.40	38.11	1.52



Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093 IC RSS-102 Issue 2

## APPENDIX F - PROBE CALIBRATION

Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	 Medical Intelligence <a href="http://www.medicalintelligence.com">www.medicalintelligence.com</a>	
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device	IC ID:	6387A-CLMBRA01				
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.						
	Page 35 of 36						



Accredited by the Swiss Federal Office of Metrology and Accreditation  
**The Swiss Accreditation Service is one of the signatories to the EA**  
**Multilateral Agreement for the recognition of calibration certificates**

**Accreditation No.: SCS 108**

**Client** **Celltech Labs**

**Certificate No.: ET3-1387\_Mar06**

## **CALIBRATION CERTIFICATE**

**Object** **ET3DV6 - SN:1387**

**Calibration procedure(s)**  
**QA CAL-01.v5**  
**Calibration procedure for dosimetric E-field probes**

**Calibration date:** **March 16, 2006**

**Condition of the calibrated item** **In Tolerance**

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

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41495277	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41498087	3-May-05 (METAS, No. 251-00466)	May-06
Reference 3 dB Attenuator	SN: S5054 (3c)	11-Aug-05 (METAS, No. 251-00499)	Aug-06
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-05 (METAS, No. 251-00467)	May-06
Reference 30 dB Attenuator	SN: S5129 (30b)	11-Aug-05 (METAS, No. 251-00500)	Aug-06
Reference Probe ES3DV2	SN: 3013	2-Jan-06 (SPEAG, No. ES3-3013_Jan06)	Jan-07
DAE4	SN: 654	2-Feb-06 (SPEAG, No. DAE4-654_Feb06)	Feb-07
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-05)	In house check: Nov 06

Calibrated by:	Name	Function	Signature
	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

**Issued: March 16, 2006**



Accredited by the Swiss Federal Office of Metrology and Accreditation  
 The Swiss Accreditation Service is one of the signatories to the EA  
 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

### **Glossary:**

TSL	tissue simulating liquid
NORM $x,y,z$	sensitivity in free space
ConvF	sensitivity in TSL / NORM $x,y,z$
DCP	diode compression point
Polarization $\varphi$	$\varphi$ rotation around probe axis
Polarization $\vartheta$	$\vartheta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis

### **Calibration is Performed According to the Following Standards:**

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001

### **Methods Applied and Interpretation of Parameters:**

- $NORMx,y,z$ : Assessed for E-field polarization  $\vartheta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide).  $NORMx,y,z$  are only intermediate values, i.e., the uncertainties of  $NORMx,y,z$  does not effect the  $E^2$ -field uncertainty inside TSL (see below *ConvF*).
- $NORM(f)x,y,z = NORMx,y,z * frequency\_response$  (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- $DCPx,y,z$ : DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- ConvF and Boundary Effect Parameters*: Assessed in flat phantom using E-field (or Temperature Transfer Standard for  $f \leq 800$  MHz) and inside waveguide using analytical field distributions based on power measurements for  $f > 800$  MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to  $NORMx,y,z * ConvF$  whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from  $\pm 50$  MHz to  $\pm 100$  MHz.
- Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

# Probe ET3DV6

## SN:1387

Manufactured:	September 21, 1999
Last calibrated:	March 18, 2005
Recalibrated:	March 16, 2006

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

**DASY - Parameters of Probe: ET3DV6 SN:1387**

Sensitivity in Free Space <sup>A</sup>			Diode Compression <sup>B</sup>		
NormX	<b>1.62</b> $\pm$ 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP X	<b>92</b> mV	
NormY	<b>1.72</b> $\pm$ 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Y	<b>92</b> mV	
NormZ	<b>1.72</b> $\pm$ 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Z	<b>92</b> mV	

## Sensitivity in Tissue Simulating Liquid (Conversion Factors)

**Please see Page 8.**

## Boundary Effect

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

Sensor Center to Phantom Surface Distance		3.7 mm	4.7 mm
SAR <sub>be</sub> [%]	Without Correction Algorithm	9.3	5.0
SAR <sub>be</sub> [%]	With Correction Algorithm	0.1	0.2

## Sensor Offset

Probe Tip to Sensor Center **2.7 mm**

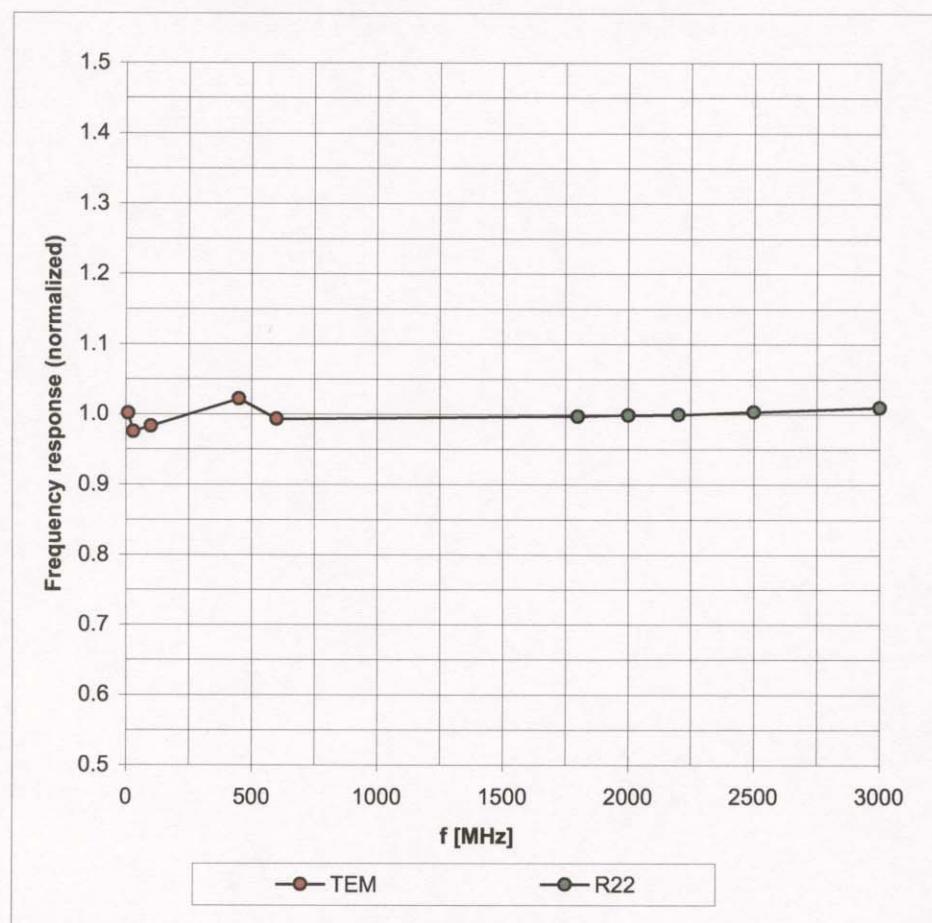
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor  $k=2$ , which for a normal distribution corresponds to a coverage probability of approximately 95%.

<sup>a</sup> The uncertainties of NormX,Y,Z do not affect the  $E^2$ -field uncertainty inside TSL (see Page 8).

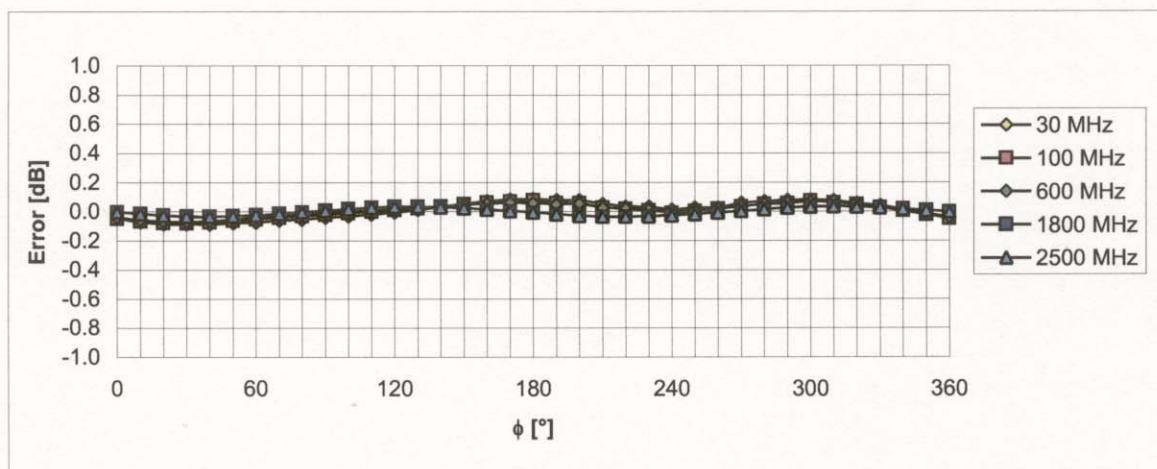
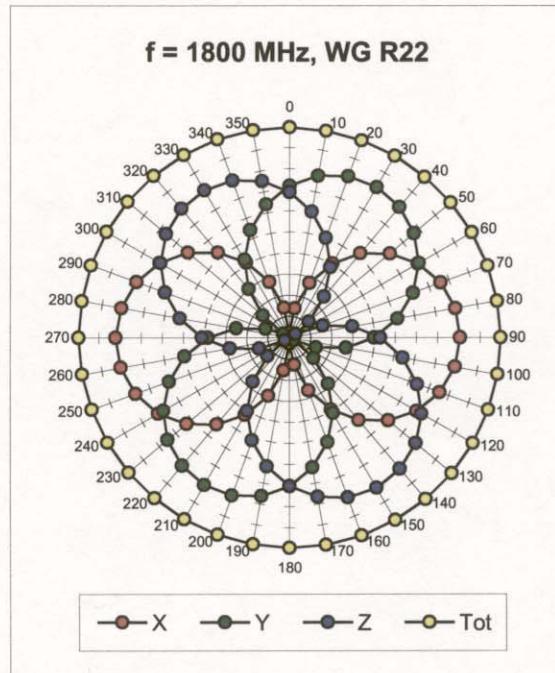
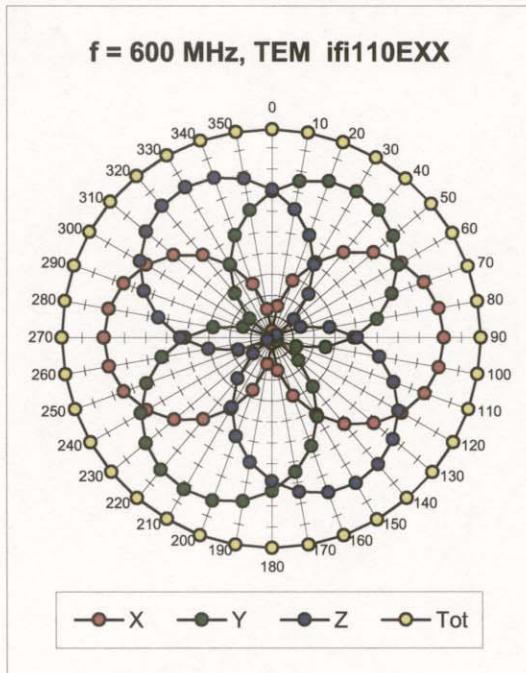
<sup>b</sup> Numerical linearization parameter: uncertainty not required.

## Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide: R22)



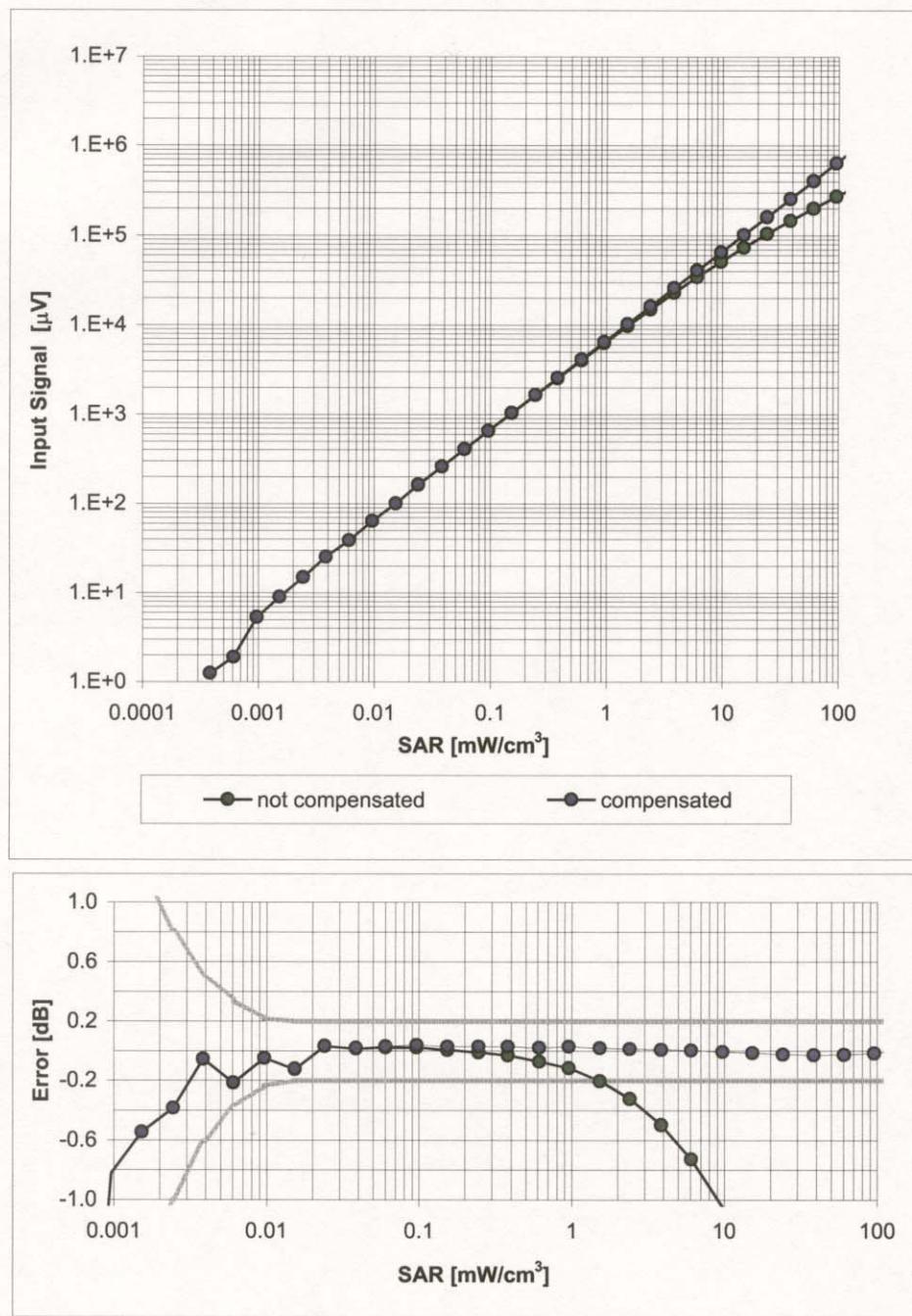
Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  ( $k=2$ )

Receiving Pattern ( $\phi$ ),  $\vartheta = 0^\circ$ 

Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  (k=2)

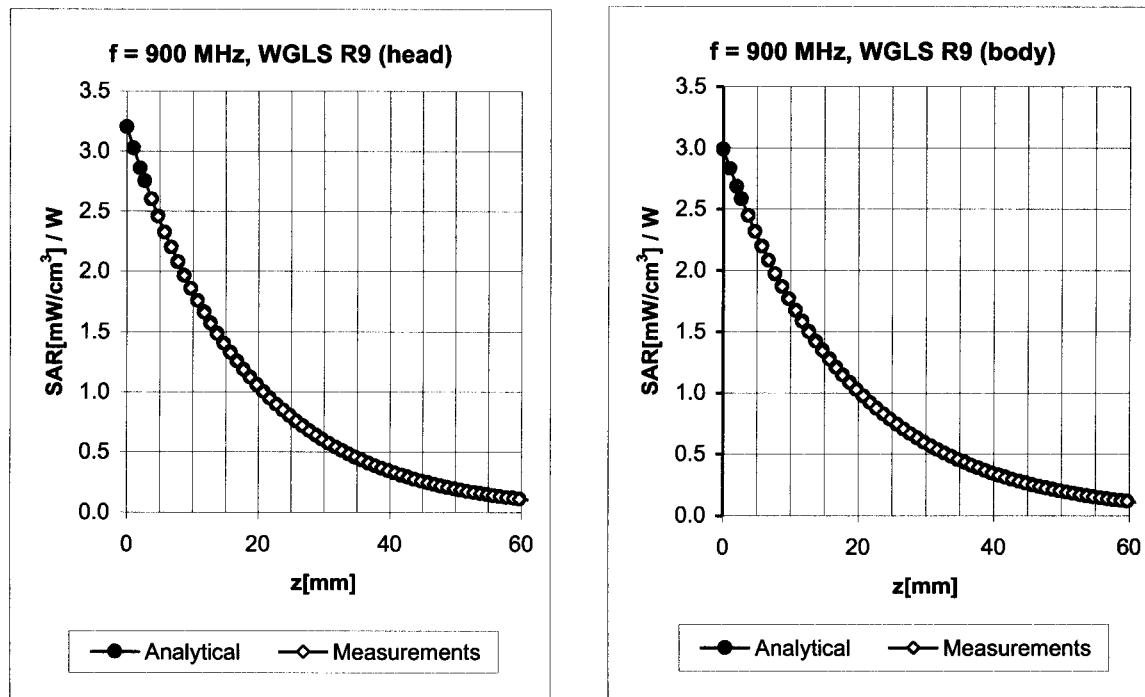
## Dynamic Range f(SAR<sub>head</sub>)

(Waveguide R22, f = 1800 MHz)



Uncertainty of Linearity Assessment:  $\pm 0.6\%$  ( $k=2$ )

## Conversion Factor Assessment

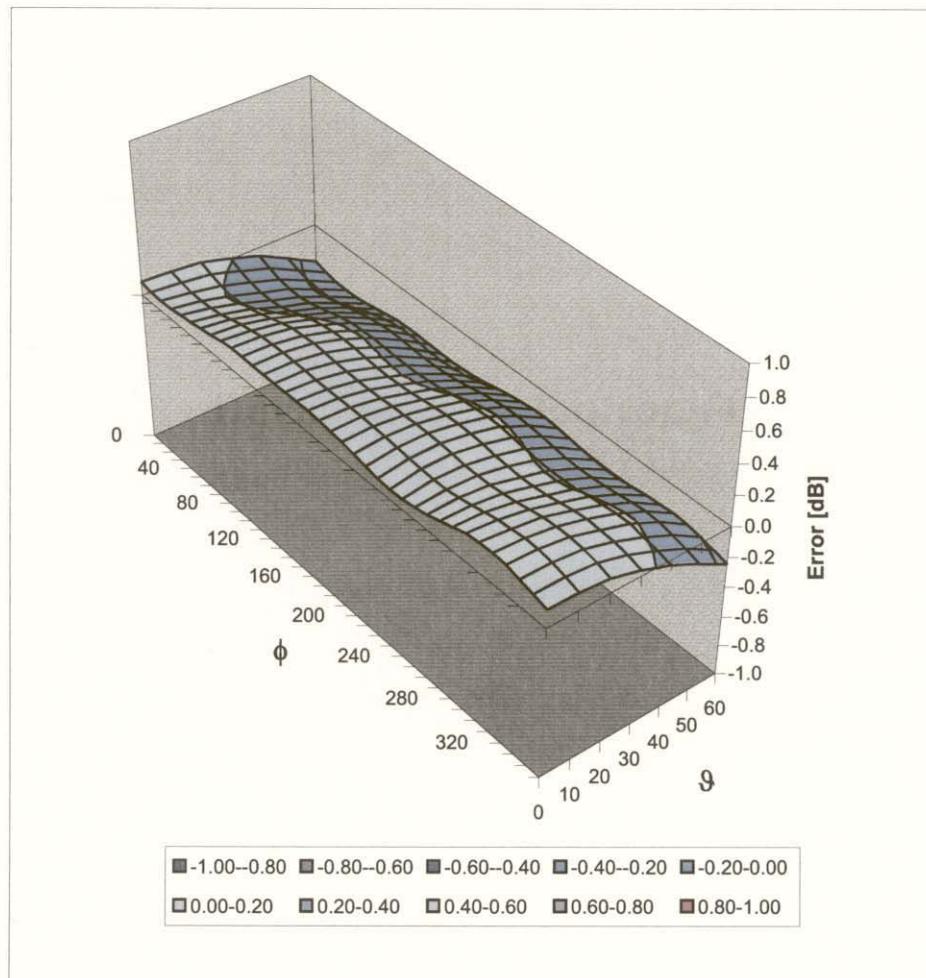


$f$ [MHz]	Validity [MHz] <sup>c</sup>	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF	Uncertainty
900	$\pm 50 / \pm 100$	Head	$41.5 \pm 5\%$	$0.97 \pm 5\%$	0.62	1.86	6.35	$\pm 11.0\% (k=2)$
900	$\pm 50 / \pm 100$	Body	$55.0 \pm 5\%$	$1.05 \pm 5\%$	0.59	1.97	6.04	$\pm 11.0\% (k=2)$

<sup>c</sup> The validity of  $\pm 100$  MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

## Deviation from Isotropy in HSL

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



Uncertainty of Spherical Isotropy Assessment:  $\pm 2.6\%$  (k=2)

## **Additional Conversion Factors for Dosimetric E-Field Probe**

Type:

**ET3DV6**

Serial Number:

**1387**

Place of Assessment:

**Zurich**

Date of Assessment:

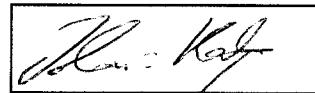
**March 18, 2006**

Probe Calibration Date:

**March 16, 2006**

Schmid & Partner Engineering AG hereby certifies that conversion factor(s) of this probe have been evaluated on the date indicated above. The assessment was performed using the FDTD numerical code SEMCAD of Schmid & Partner Engineering AG. Since the evaluation is coupled with measured conversion factors, it has to be recalculated yearly, i.e., following the re-calibration schedule of the probe. The uncertainty of the numerical assessment is based on the extrapolation from measured value at 900 MHz or at 1800 MHz.

Assessed by:



## Dosimetric E-Field Probe ET3DV6 SN:1387

Conversion factor ( $\pm$  standard deviation)

<b>150 <math>\pm</math> 50 MHz</b>	ConvF	<b>8.6 <math>\pm</math> 10 %</b>	$\epsilon_r = 52.3 \pm 5\%$ $\sigma = 0.76 \pm 5\% \text{ mho/m}$ (head tissue)
<b>150 <math>\pm</math> 50 MHz</b>	ConvF	<b>8.2 <math>\pm</math> 10 %</b>	$\epsilon_r = 61.9 \pm 5\%$ $\sigma = 0.80 \pm 5\% \text{ mho/m}$ (body tissue)
<b>300 <math>\pm</math> 50 MHz</b>	ConvF	<b>7.8 <math>\pm</math> 9 %</b>	$\epsilon_r = 45.3 \pm 5\%$ $\sigma = 0.87 \pm 5\% \text{ mho/m}$ (head tissue)
<b>450 <math>\pm</math> 50 MHz</b>	ConvF	<b>7.4 <math>\pm</math> 8 %</b>	$\epsilon_r = 43.5 \pm 5\%$ $\sigma = 0.87 \pm 5\% \text{ mho/m}$ (head tissue)
<b>450 <math>\pm</math> 50 MHz</b>	ConvF	<b>7.3 <math>\pm</math> 8 %</b>	$\epsilon_r = 56.7 \pm 5\%$ $\sigma = 0.94 \pm 5\% \text{ mho/m}$ (body tissue)
<b>750 <math>\pm</math> 50 MHz</b>	ConvF	<b>6.6 <math>\pm</math> 7 %</b>	$\epsilon_r = 41.8 \pm 5\%$ $\sigma = 0.89 \pm 5\% \text{ mho/m}$ (head tissue)
<b>750 <math>\pm</math> 50 MHz</b>	ConvF	<b>6.4 <math>\pm</math> 7 %</b>	$\epsilon_r = 55.4 \pm 5\%$ $\sigma = 0.96 \pm 5\% \text{ mho/m}$ (body tissue)
<b>1925 <math>\pm</math> 50 MHz</b>	ConvF	<b>5.0 <math>\pm</math> 7 %</b>	$\epsilon_r = 39.8 \pm 5\%$ $\sigma = 1.48 \pm 5\% \text{ mho/m}$ (head tissue)
<b>1925 <math>\pm</math> 50 MHz</b>	ConvF	<b>4.7 <math>\pm</math> 7 %</b>	$\epsilon_r = 53.2 \pm 5\%$ $\sigma = 1.60 \pm 5\% \text{ mho/m}$ (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.



Test Report Serial No.:	033106TV9-T735-S24G	Test Report Revision No.:	Revision 1.2
Dates of Evaluation:	April 05-06, 2006	Test Report Issue Date:	December 13, 2006
Type of Evaluation:	RF Exposure	SAR	FCC 47 CFR §2.1093 IC RSS-102 Issue 2

## APPENDIX G - SAM PHANTOM CERTIFICATE OF CONFORMITY

Company:	Medical Intelligence Technologies Inc.	Model:	Columba	FCC ID:	TV9-MICLM-C001	 Medical Intelligence <a href="http://www.medicalintelligence.com">www.medicalintelligence.com</a>	
DUT Type:	PCS/Cellular GSM/GPRS Wrist-Worn Personal Location Device	IC ID:	6387A-CLMBRA01				
2006 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.						

# 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