


	<u>Date(s) of Evaluation</u> March 10-11, 2008	<u>Test Report Serial No.</u> 031008NC3-T888-S24G	<u>Test Report Revision No.</u> Rev. 1.2 (3rd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> May 16, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

## APPENDIX E - SYSTEM VALIDATION

Company:	Pro Tech Monitoring, Inc.		FCC ID:	NC3WMTD3000	824.2-848.8 / 1850.2-1909.8 MHz	
Model(s):	WMTD3000	DUT Type:	Dual-Band PCS/Cellular GSM/GPRS Ankle-worn Tracking Device			
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	Date of Evaluation:	June 07, 2007	Document Serial No.:	SV835M-060707-R1.3		
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz	Fluid Type:	Body

## 835 MHz SYSTEM VALIDATION

Type:

**835 MHz Validation Dipole**

Asset Number:

**00022**

Serial Number:

**411**

Place of Validation:

**Celltech Labs Inc.**

Date of Validation:

**June 07, 2007**

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


Performed by:

**Cheri Frangiadakis**

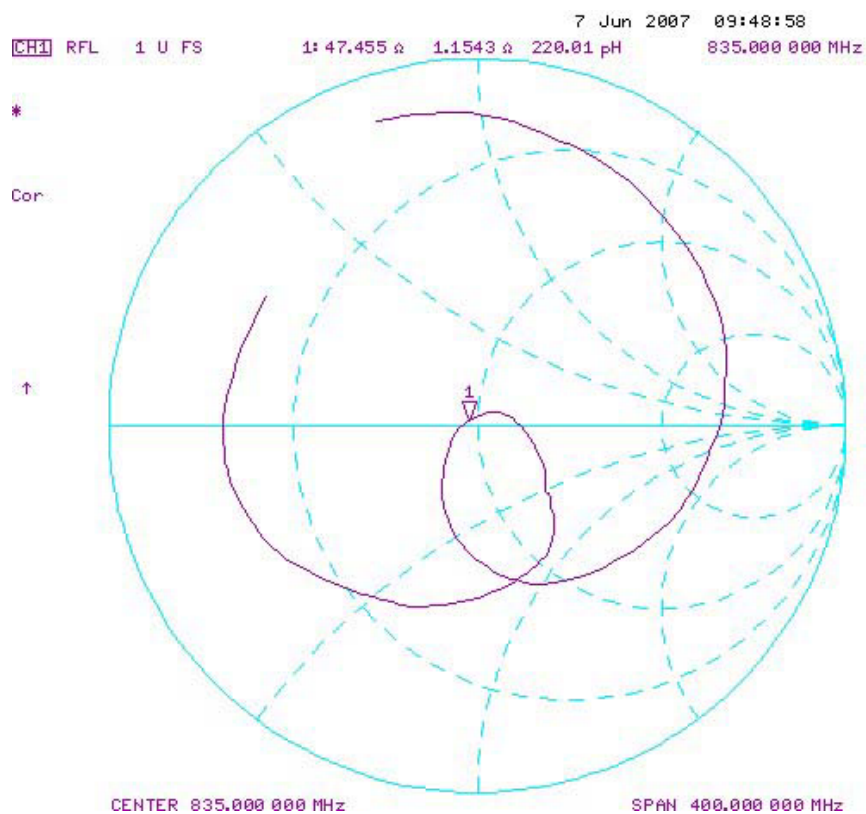
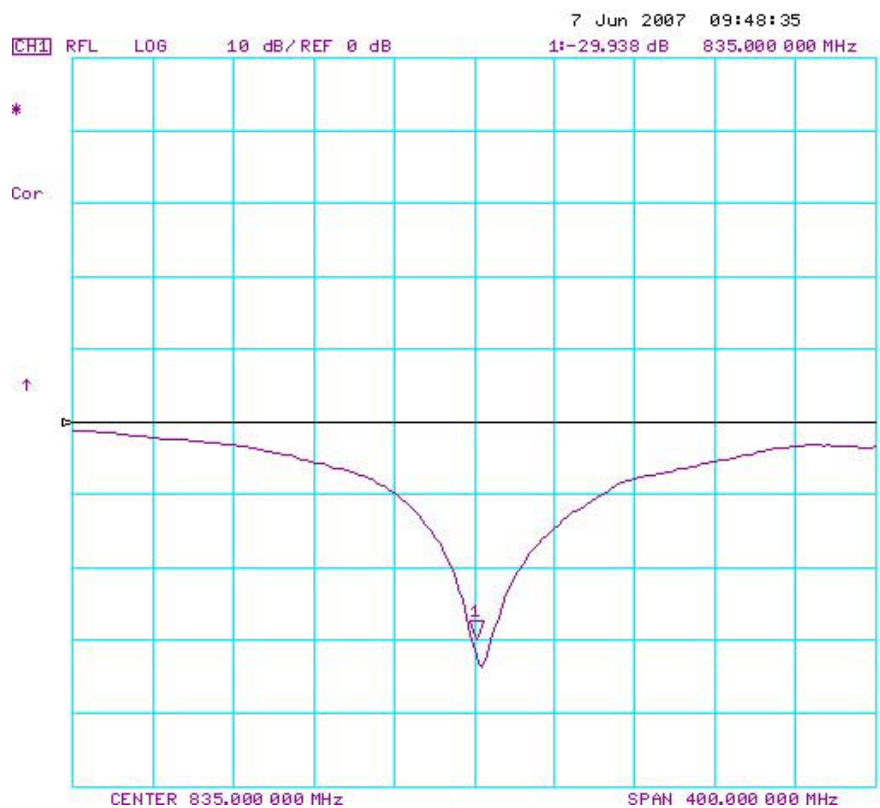
Approved by:


**Sean Johnston**



	Date of Evaluation:	June 07, 2007	Document Serial No.:	SV835M-060707-R1.3		
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz	Fluid Type:	Body

## 2. Validation Dipole VSWR Data



	Date of Evaluation:	June 07, 2007	Document Serial No.:	SV835M-060707-R1.3		
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz	Fluid Type:	Body

### 3. Validation Dipole Dimensions

Frequency (MHz)	L (mm)	h (mm)	d (mm)
300	396.0	250.0	6.0
450	270.0	167.0	6.0
<b>835</b>	<b>161.0</b>	<b>89.8</b>	<b>3.6</b>
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	51.5	30.4	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. Test Equipment List

TEST EQUIPMENT	ASSET NO.	SERIAL NO.	DATE OF CAL.	CAL. DUE DATE
SPEAG DASY4 Measurement Server	00158	1078	N/A	N/A
SPEAG Robot	00046	599396-01	N/A	N/A
SPEAG DAE4	00019	353	21Jun06	21Jun07
SPEAG ET3DV6 E-Field Probe	00016	1387	16Mar07	16Mar08
835 MHz Validation Dipole	00022	411	07Jun07	07Jun08
SPEAG SAM Phantom V4.0C	00154	1033	N/A	N/A
ALS-PR-DIEL Dielectric Probe Kit	00160	260-00953	N/A	N/A
Gigatronics 8652A Power Meter	00007	1835272	26Mar07	26Mar08
Gigatronics 80701A Power Sensor	00014	1833699	22Jan07	22Jan08
Gigatronics 80701A Power Sensor	00109	1834366	26Mar07	26Mar08
HP 8753ET Network Analyzer	00134	US39170292	20Apr07	20Apr08
HP 8648D Signal Generator	00005	3847A00611	NCR	NCR
Amplifier Research 5S1G4 Power Amplifier	00106	26235	NCR	NCR

	Date of Evaluation:	June 07, 2007	Document Serial No.:	SV835M-060707-R1.3		
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz	Fluid Type:	Body

## 6. 835 MHz System Validation Setup



	Date of Evaluation:	June 07, 2007	Document Serial No.:	SV835M-060707-R1.3		
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz	Fluid Type:	Body

## 7. 835 MHz Validation Dipole Setup



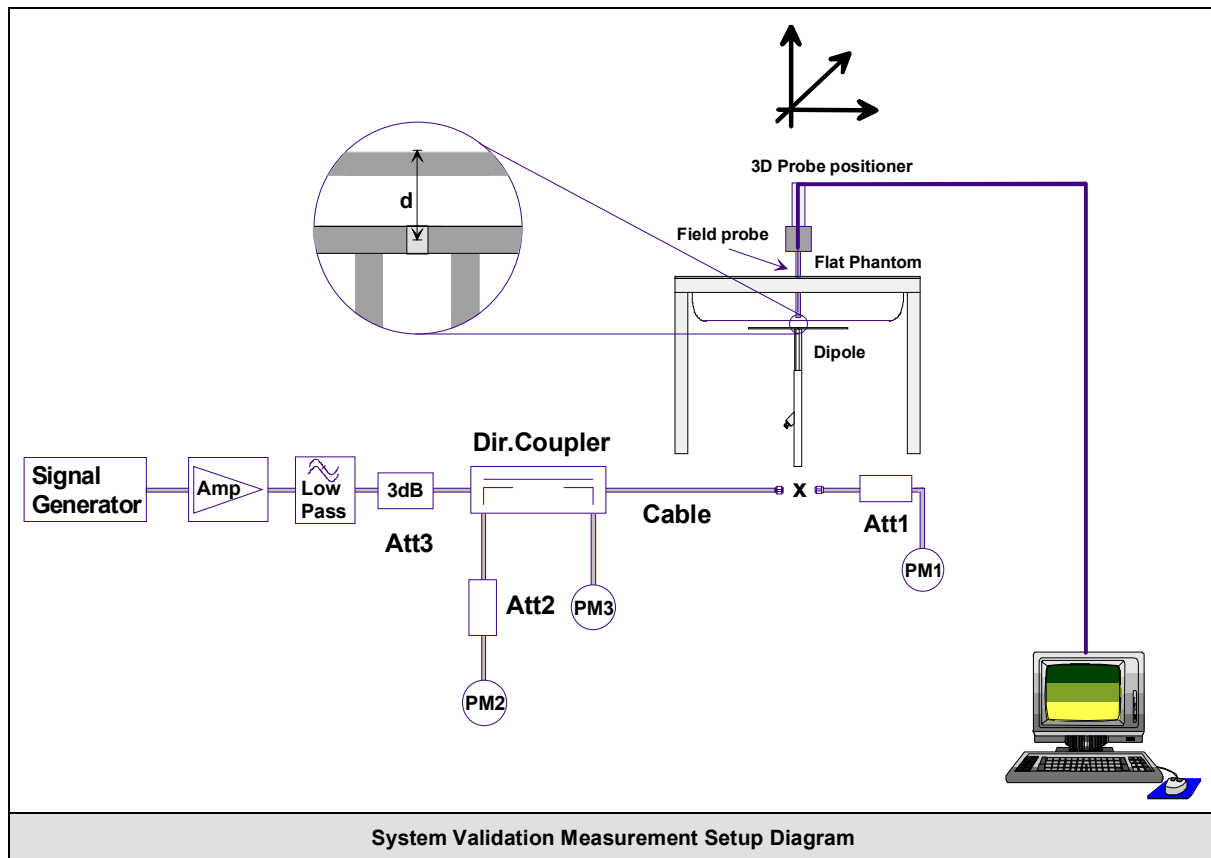


	Date of Evaluation:	June 07, 2007	Document Serial No.:	SV835M-060707-R1.3		
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz	Fluid Type:	Body

## 8. SAR Measurement

Measurements were made using a dosimetric E-field probe ET3DV6 (S/N: 1387, Conversion Factor 6.18). The SAR measurement was performed with the E-field probe in mechanical and optical surface detection mode. 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.





## 9. Measurement Conditions

The SAM phantom was filled with 835 MHz Body tissue simulant.

Relative Permittivity: 55.1 (-0.1% deviation from target)  
 Conductivity: 0.94 mho/m (-3.0% deviation from target)  
 Fluid Temperature: 21.6 °C (Start of Test) / 21.9 °C (End of Test)  
 Fluid Depth: ≥ 15.0 cm

Environmental Conditions:

Ambient Temperature: 24.2°C  
 Barometric Pressure: 96.9 kPa  
 Humidity: 31%

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%
IEEE Target Dielectric Parameters:	$\epsilon_r = 55.2 (+/- 5\%)$ $\sigma = 0.97 \text{ S/m } (+/- 5\%)$

## 10. System Validation SAR Results

SAR @ 0.25W Input averaged over 1g (W/kg)				SAR @ 1W Input averaged over 1g (W/kg)			
SPEAG Target		Measured	Deviation	SPEAG Target		Measured	Deviation
2.43	+/- 10%	2.21	-9.0%	9.71	+/- 10%	8.84	-9.0%
SAR @ 0.25W Input averaged over 10g (W/kg)				SAR @ 1W Input averaged over 10g (W/kg)			
SPEAG Target		Measured	Deviation	SPEAG Target		Measured	Deviation
1.60	+/- 10%	1.45	-9.4%	6.38	+/- 10%	5.80	-9.1%

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.

	Date of Evaluation:	June 07, 2007	Document Serial No.:	SV835M-060707-R1.3		
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz	Fluid Type:	Body

## System Validation - 835 MHz Dipole - June 7, 2007

**DUT: Dipole 835 MHz; Asset: 00022; Serial: 411**

Ambient Temp: 24.2°C; Fluid Temp: 21.6°C; Barometric Pressure: 96.9 kPa; Humidity: 31%

Communication System: CW

Forward Conducted Power: 250 mW

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: M835 Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.94 \text{ mho/m}$ ;  $\epsilon_r = 55.1$ ;  $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1387; ConvF(6.18, 6.18, 6.18); Calibrated: 16/03/2007
- Sensor-Surface: 4 mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 21/06/2006
- Phantom: SAM 4.0; Type: Fiberglass; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

### 835 MHz System Validation/Area Scan (6x10x1):

Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (measured) = 2.28 mW/g

### 835 MHz System Validation/Zoom Scan (7x7x7)/Cube 0:

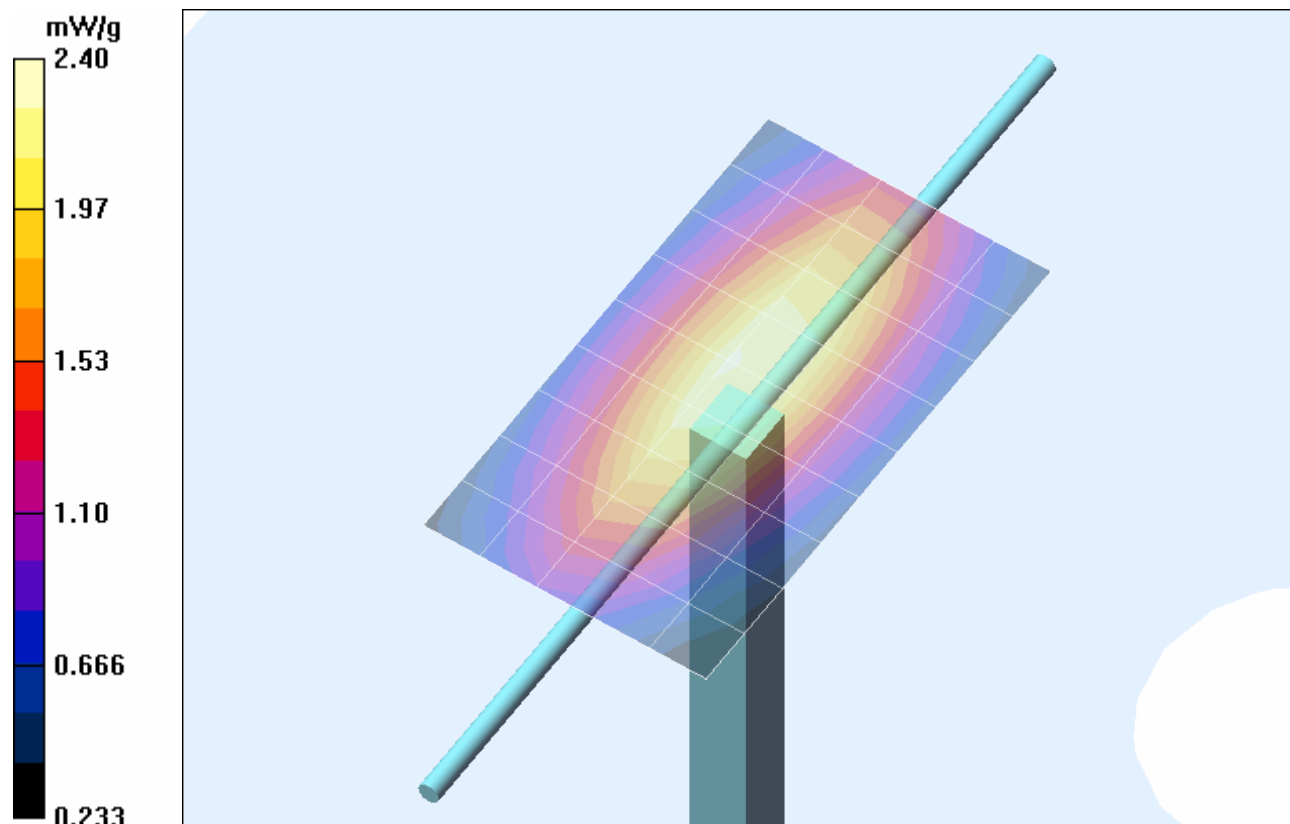
Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

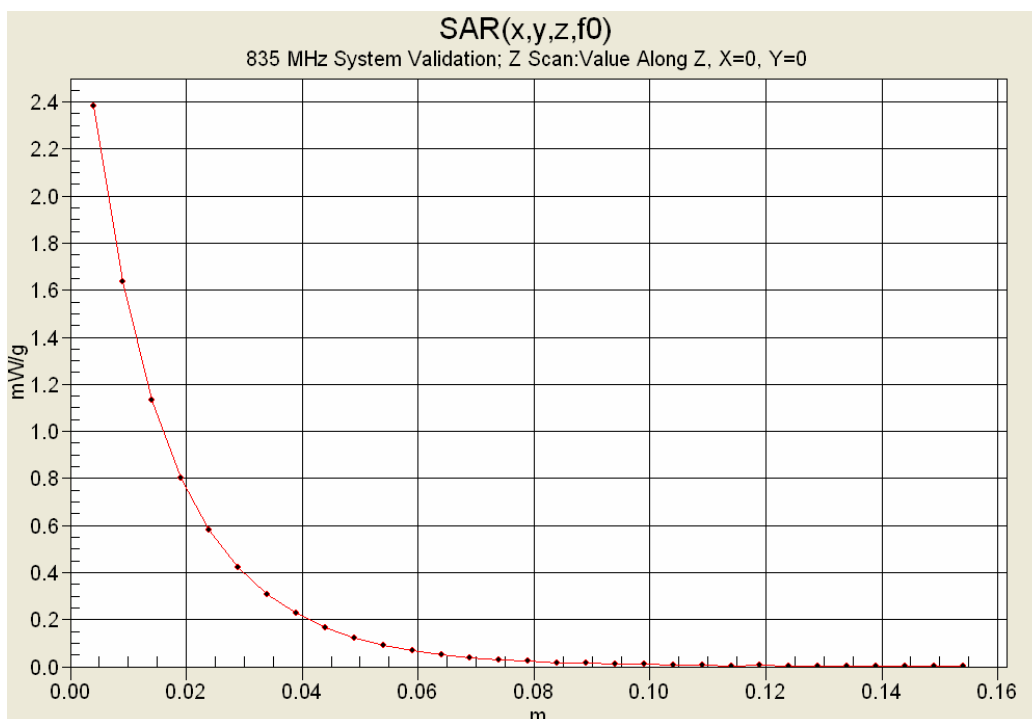
Reference Value = 51.7 V/m; Power Drift = -0.028 dB

Peak SAR (extrapolated) = 3.21 W/kg

**SAR(1 g) = 2.21 mW/g; SAR(10 g) = 1.45 mW/g**

Maximum value of SAR (measured) = 2.40 mW/g





## 11. Measured Fluid Dielectric Parameters

### System Validation - 835 MHz (Body)

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Celltech Labs Inc.

Test Result for UIM Dielectric Parameter

Tue 07/Jun/2007

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	58.23	0.86
0.7450	55.55	0.96	57.76	0.87
0.7550	55.51	0.96	57.57	0.88
0.7650	55.47	0.96	57.26	0.89
0.7750	55.43	0.97	57.05	0.90
0.7850	55.39	0.97	56.69	0.90
0.7950	55.36	0.97	56.32	0.91
0.8050	55.32	0.97	55.97	0.92
0.8150	55.28	0.97	55.74	0.93
0.8250	55.24	0.97	55.44	0.94
0.8350	55.20	0.97	55.1	0.94
0.8450	55.17	0.98	54.75	0.96
0.8550	55.14	0.99	54.47	0.96
0.8650	55.11	1.01	54.00	0.97
0.8750	55.08	1.02	53.63	0.98
0.8850	55.05	1.03	53.24	0.98
0.8950	55.02	1.04	52.84	0.99
0.9050	55.00	1.05	52.48	1.00
0.9150	55.00	1.06	52.04	1.00
0.9250	54.98	1.06	51.61	1.01
0.9350	54.96	1.07	51.18	1.02

	Date of Evaluation:	June 07, 2007	Document Serial No.:	SV835M-060707-R1.3		
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz	Fluid Type:	Body

## 12. Measurement Uncertainties

UNCERTAINTY BUDGET FOR SYSTEM VALIDATION						
Error Description	Uncertainty Value ±%	Probability Distribution	Divisor	ci 1g	Uncertainty Value ±% (1g)	V <sub>i</sub> or V <sub>eff</sub>
<b>Measurement System</b>						
Probe calibration (835 MHz)	5.5	Normal	1	1	5.5	∞
Axial isotropy of the probe	4.7	Rectangular	1.732050808	1	2.7	∞
Spherical isotropy of the probe	0	Rectangular	1.732050808	1	0.0	∞
Spatial resolution	0	Rectangular	1.732050808	1	0.0	∞
Boundary effects	0.8	Rectangular	1.732050808	1	0.5	∞
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	Rectangular	1.732050808	1	0.0	∞
Integration time	0	Rectangular	1.732050808	1	0.0	∞
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>Dipole</b>						
Dipole Positioning	2	Normal	1.732050808	1	1.2	∞
Power & Power Drift	4.7	Normal	1.732050808	1	2.7	∞
<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)	5	Normal	1	0.64	3.2	∞
Liquid permittivity (target)	5	Rectangular	1.732050808	0.6	1.7	∞
Liquid permittivity (measured)	5	Normal	1	0.6	3.0	∞
<b>Combined Standard Uncertainty</b>					<b>9.56</b>	
<b>Expanded Uncertainty (k=2)</b>					<b>19.13</b>	
Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 and IEC Standard 62209-1:2005						

	Date of Evaluation:	June 06, 2007	Document Serial No.:	SV1900M-060607-R1.3		
	Evaluation Type:	System Validation	Validation Dipole:	1900 MHz	Fluid Type:	Body

## 1900 MHz SYSTEM VALIDATION

Type:

**1900 MHz Validation Dipole**

Asset Number:

**00032**

Serial Number:

**151**

Place of Validation:

**Celltech Labs Inc.**

Date of Validation:

**June 06, 2007**


**Celltech Labs Inc. certifies that the 1900 MHz System Validation was performed on the date indicated above.**

Performed by:

**Cheri Frangiadakis**

Approved by:

**Sean Johnston**

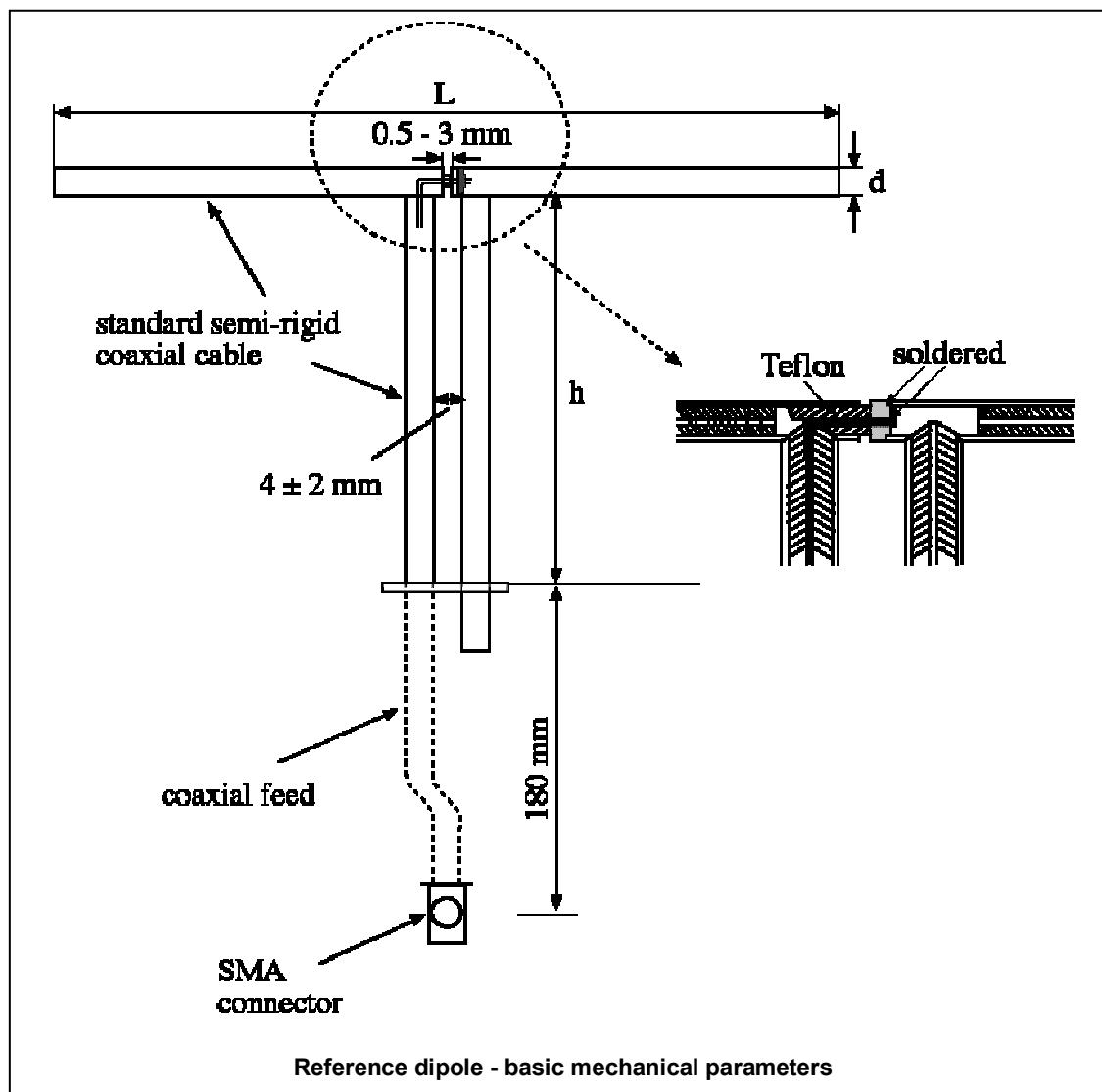
	Date of Evaluation:	June 06, 2007	Document Serial No.:	SV1900M-060607-R1.3		
	Evaluation Type:	System Validation	Validation Dipole:	1900 MHz	Fluid Type:	Body

## 1. Dipole Construction & Electrical Characteristics

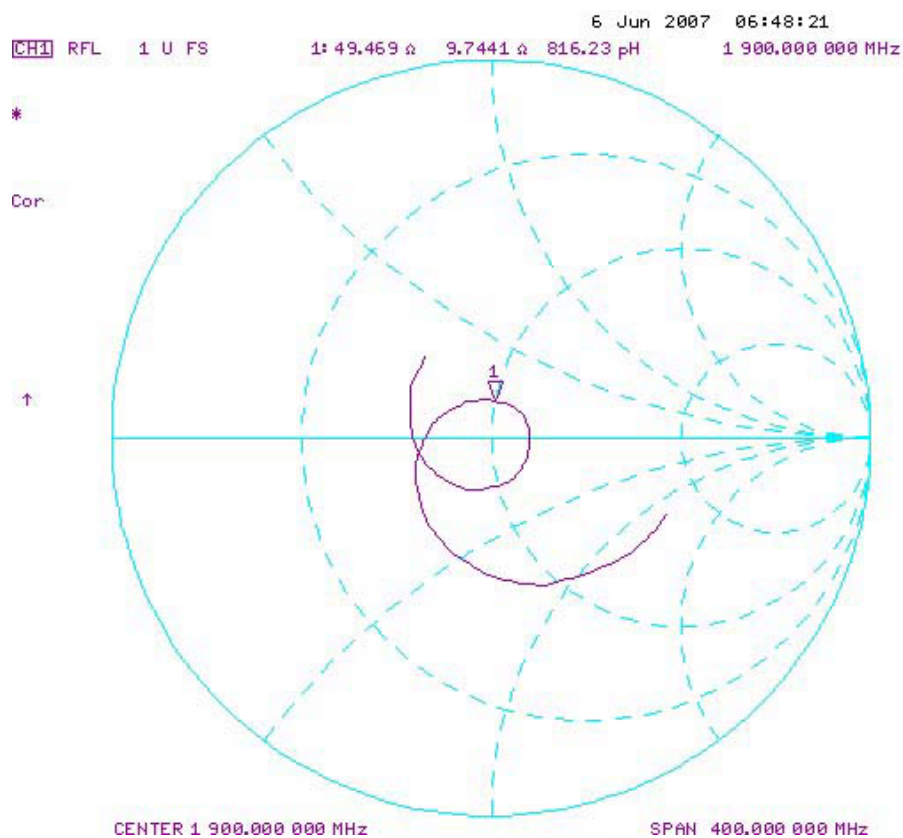
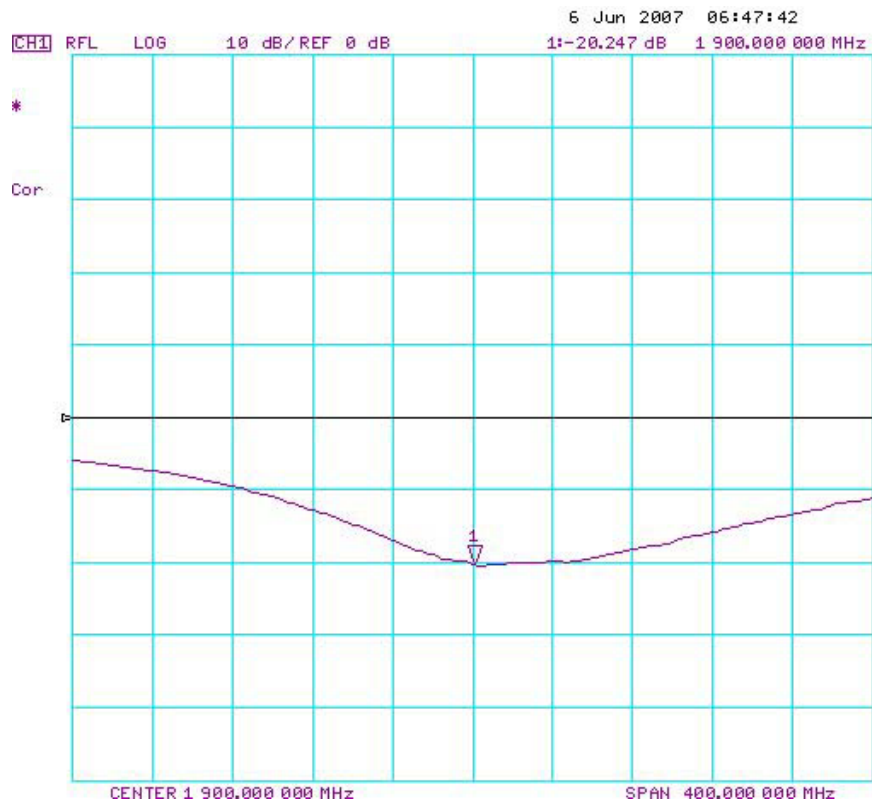
The validation dipole was constructed in accordance with the requirements specified in IEEE Standard 1528-2003 and International Standard IEC 62209-1:2005. The electrical properties were measured using an HP 8753ET Network Analyzer. The network analyzer was calibrated to the validation dipole N-type 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:

Feed point impedance at 1900 MHz       $\text{Re}\{Z\} = 49.469\Omega$   
 $\text{Im}\{Z\} = 9.7441\Omega$


Return Loss at 1900 MHz                      -20.247dB



## 2. Validation Dipole VSWR Data





	Date of Evaluation:	June 06, 2007	Document Serial No.:	SV1900M-060607-R1.3		
	Evaluation Type:	System Validation	Validation Dipole:	1900 MHz	Fluid Type:	Body

### 3. Validation Dipole Dimensions

Frequency (MHz)	L (mm)	h (mm)	d (mm)
300	396.0	250.0	6.0
450	270.0	167.0	6.0
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
<b>1900</b>	<b>68.0</b>	<b>39.5</b>	<b>3.6</b>
2000	64.5	37.5	3.6
2450	51.5	30.4	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. Test Equipment List

TEST EQUIPMENT	ASSET NO.	SERIAL NO.	DATE OF CAL.	CAL. DUE DATE
SPEAG DASY4 Measurement Server	00158	1078	N/A	N/A
SPEAG Robot	00046	599396-01	N/A	N/A
SPEAG DAE4	00019	353	21Jun06	21Jun07
SPEAG EX3DV4 E-Field Probe	00213	3600	24Jan07	24Jan08
1900 MHz Validation Dipole	00032	151	06Jun07	06Jun08
SPEAG SAM Phantom V4.0C	00154	1033	N/A	N/A
ALS-PR-DIEL Dielectric Probe Kit	00160	260-00953	N/A	N/A
Gigatronics 8652A Power Meter	00007	1835272	26Mar07	26Mar08
Gigatronics 80701A Power Sensor	00014	1833699	22Jan07	22Jan08
Gigatronics 80701A Power Sensor	00109	1834366	26Mar07	26Mar08
HP 8753ET Network Analyzer	00134	US39170292	20Apr07	20Apr08
HP 8648D Signal Generator	00005	3847A00611	NCR	NCR
Amplifier Research 5S1G4 Power Amplifier	00106	26235	NCR	NCR

	Date of Evaluation:	June 06, 2007	Document Serial No.:	SV1900M-060607-R1.3		
	Evaluation Type:	System Validation	Validation Dipole:	1900 MHz	Fluid Type:	Body


## 6. 1900 MHz System Validation Setup



	Date of Evaluation:	June 06, 2007	Document Serial No.:	SV1900M-060607-R1.3		
	Evaluation Type:	System Validation	Validation Dipole:	1900 MHz	Fluid Type:	Body

## 7. 1900 MHz Validation Dipole Setup

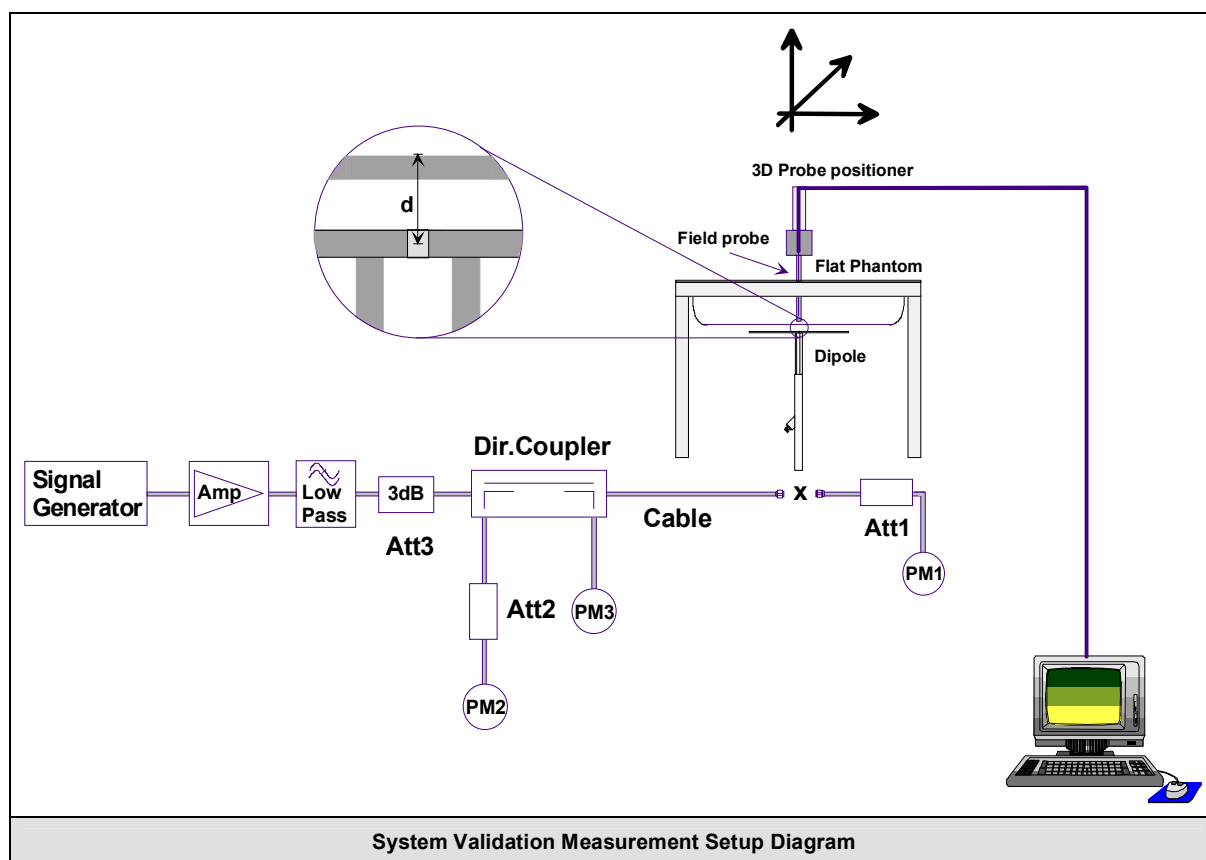



	Date of Evaluation:	June 06, 2007	Document Serial No.:	SV1900M-060607-R1.3		
	Evaluation Type:	System Validation	Validation Dipole:	1900 MHz	Fluid Type:	Body

## 8. SAR Measurement

Measurements were made using a dosimetric E-field probe EX3DV4 (S/N: 3600, Conversion Factor 6.54). 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 procedures described below.

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.



	Date of Evaluation:	June 06, 2007	Document Serial No.:	SV1900M-060607-R1.3		
	Evaluation Type:	System Validation	Validation Dipole:	1900 MHz	Fluid Type:	Body

## 9. Measurement Conditions

The SAM phantom was filled with 1900 MHz Body tissue simulant.

Relative Permittivity: 51.0 (-4.3% deviation from target)  
 Conductivity: 1.57 mho/m (+3.3% deviation from target)  
 Fluid Temperature: 21.5 °C (Start of Test) / 21.5 °C (End of Test)  
 Fluid Depth:  $\geq 15.0$  cm  
 Environmental Conditions:  
 Ambient Temperature: 23.5 °C  
 Barometric Pressure: 96.0 kPa  
 Humidity: 33%

The 1900 MHz Body tissue simulant consisted of the following ingredients:

Ingredient	Percentage by weight
Water	69.85%
Glycol	29.89%
Salt	0.26%
IEEE Target Dielectric Parameters:	$\epsilon_r = 53.3$ (+/-5%) $\sigma = 1.52$ S/m (+/-5%)


## 10. System Validation SAR Results

SAR @ 0.25W Input averaged over 1g (W/kg)				SAR @ 1W Input averaged over 1g (W/kg)			
SPEAG Target		Measured	Deviation	SPEAG Target		Measured	Deviation
9.95	+/- 10%	10.4	+4.6%	39.8	+/- 10%	41.6	+4.6%
SAR @ 0.25W Input averaged over 10g (W/kg)				SAR @ 1W Input averaged over 10g (W/kg)			
SPEAG Target		Measured	Deviation	SPEAG Target		Measured	Deviation
5.20	+/- 10%	5.34	+2.7%	20.8	+/- 10%	21.36	+2.7%

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.

	Date of Evaluation:	June 06, 2007	Document Serial No.:	SV1900M-060607-R1.3		
	Evaluation Type:	System Validation	Validation Dipole:	1900 MHz	Fluid Type:	Body

## System Validation - 1900 MHz Dipole - June 6, 2007

**DUT: Dipole 1900 MHz; Asset: 00032; Serial: 151**

Ambient Temp: 23.5°C; Fluid Temp: 21.5°C; Barometric Pressure: 96.0 kPa; Humidity: 33%

Communication System: CW

Forward Conducted Power: 250 mW

Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: M1900 Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.57$  mho/m;  $\epsilon_r = 51.0$ ;  $\rho = 1000$  kg/m<sup>3</sup>

- Probe: EX3DV4 - SN3600; ConvF(6.54, 6.54, 6.54); Calibrated: 24/01/2007
- Sensor-Surface: 2 mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 21/06/2006
- Phantom: SAM 4.0; Type: Fiberglass; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

### 1900 MHz System Validation/Area Scan (5x8x1):

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

Maximum value of SAR (measured) = 11.2 mW/g

### 1900 MHz System Validation/Zoom Scan (7x7x7)/Cube 0:

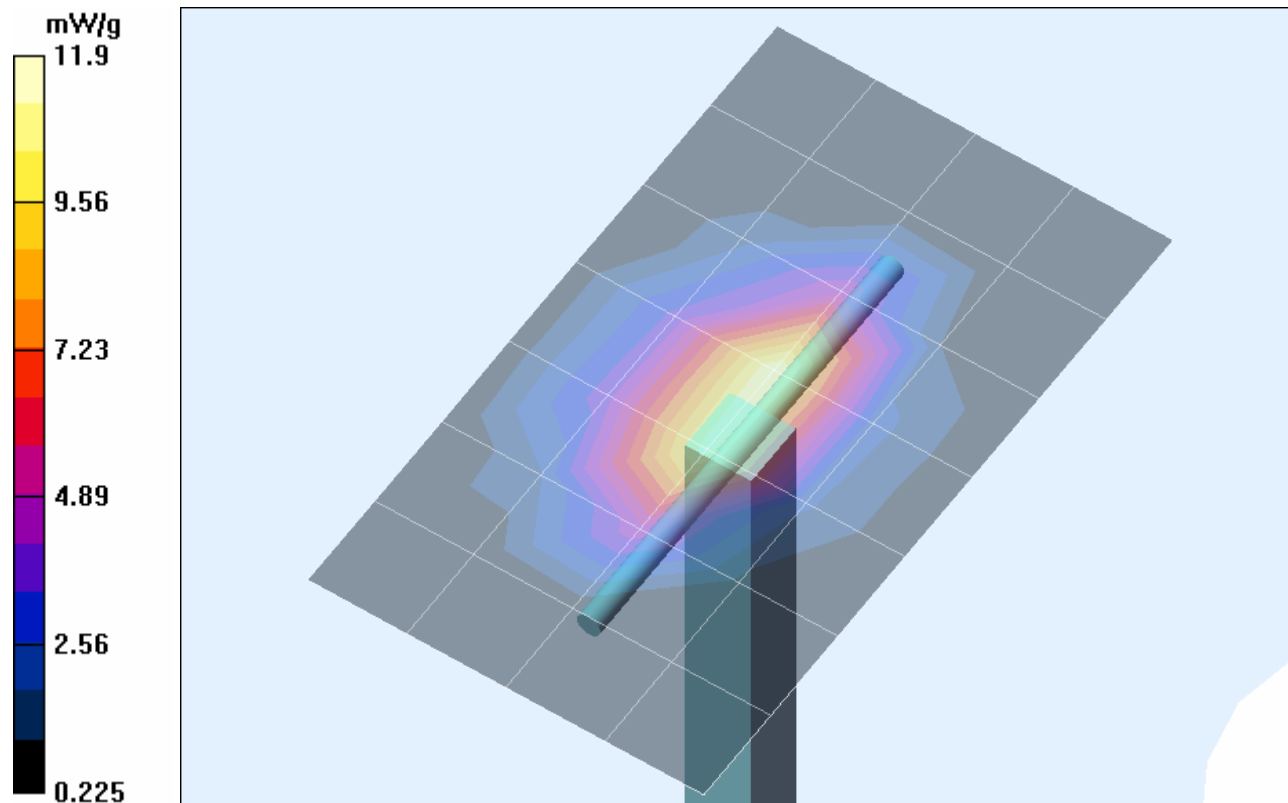
Measurement grid:  $dx=5$ mm,  $dy=5$ mm,  $dz=5$ mm

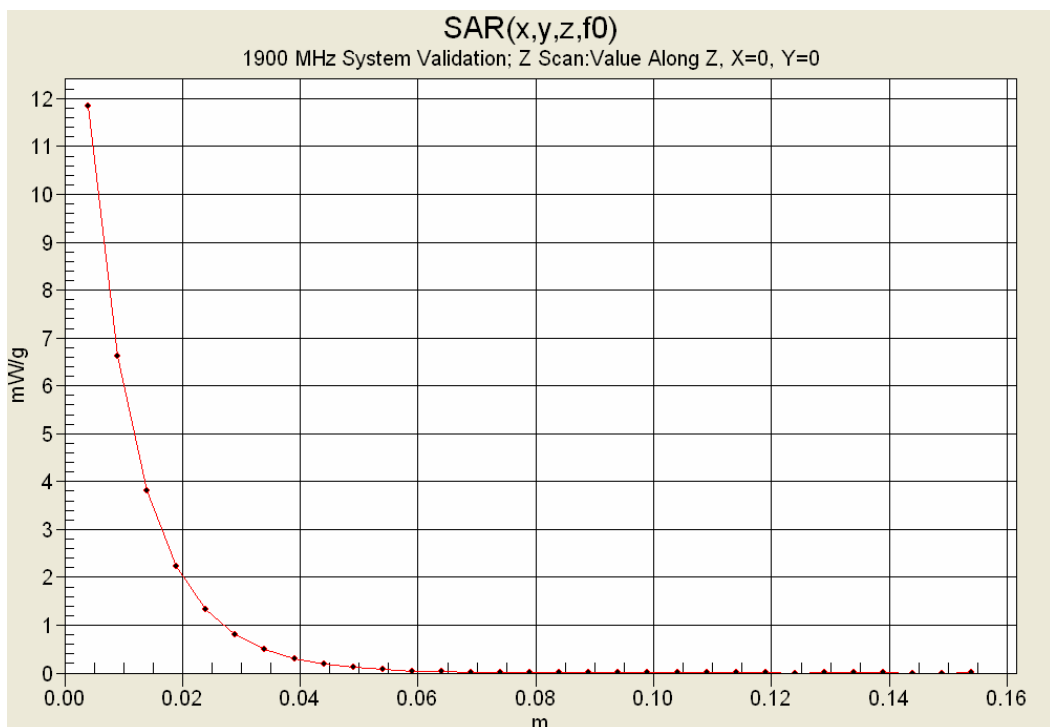
Reference Value = 88.8 V/m; Power Drift = -0.215 dB

Peak SAR (extrapolated) = 19.3 W/kg

**SAR(1 g) = 10.4 mW/g; SAR(10 g) = 5.34 mW/g**

Maximum value of SAR (measured) = 11.9 mW/g





## 11. Measured Fluid Dielectric Parameters

### System Validation - 1900 MHz (Body)

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Celltech Labs Inc.

Test Result for UIM Dielectric Parameter

Wed 06/Jun/2007

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	51.41	1.47
1.8100	53.30	1.52	51.39	1.48
1.8200	53.30	1.52	51.39	1.49
1.8300	53.30	1.52	51.29	1.49
1.8400	53.30	1.52	51.23	1.51
1.8500	53.30	1.52	51.18	1.52
1.8600	53.30	1.52	51.13	1.54
1.8700	53.30	1.52	51.13	1.54
1.8800	53.30	1.52	51.00	1.55
1.8900	53.30	1.52	50.99	1.56
1.9000	53.30	1.52	50.96	1.57
1.9100	53.30	1.52	50.92	1.58
1.9200	53.30	1.52	50.92	1.59
1.9300	53.30	1.52	50.85	1.60
1.9400	53.30	1.52	50.75	1.60
1.9500	53.30	1.52	50.71	1.63
1.9600	53.30	1.52	50.71	1.63
1.9700	53.30	1.52	50.62	1.65
1.9800	53.30	1.52	50.48	1.65
1.9900	53.30	1.52	50.57	1.66
2.0000	53.30	1.52	50.49	1.67



	Date of Evaluation:	June 06, 2007	Document Serial No.:	SV1900M-060607-R1.3		
	Evaluation Type:	System Validation	Validation Dipole:	1900 MHz	Fluid Type:	Body

## 12. Measurement Uncertainties

UNCERTAINTY BUDGET FOR SYSTEM VALIDATION						
Error Description	Uncertainty Value ±%	Probability Distribution	Divisor	ci 1g	Uncertainty Value ±% (1g)	V <sub>i</sub> or V <sub>eff</sub>
<b>Measurement System</b>						
Probe calibration (1950 MHz)	5.5	Normal	1	1	5.5	∞
Axial isotropy of the probe	4.7	Rectangular	1.732050808	1	2.7	∞
Spherical isotropy of the probe	0	Rectangular	1.732050808	1	0.0	∞
Spatial resolution	0	Rectangular	1.732050808	1	0.0	∞
Boundary effects	0.2	Rectangular	1.732050808	1	0.1	∞
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	Rectangular	1.732050808	1	0.0	∞
Integration time	0	Rectangular	1.732050808	1	0.0	∞
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>Dipole</b>						
Dipole Positioning	2	Normal	1.732050808	1	1.2	∞
Power & Power Drift	4.7	Normal	1.732050808	1	2.7	∞
<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)	5	Normal	1	0.64	3.2	∞
Liquid permittivity (target)	5	Rectangular	1.732050808	0.6	1.7	∞
Liquid permittivity (measured)	5	Normal	1	0.6	3.0	∞
<b>Combined Standard Uncertainty</b>					<b>9.55</b>	
<b>Expanded Uncertainty (k=2)</b>					<b>19.11</b>	
Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 and IEC Standard 62209-1:2005						