






	<u>Date(s) of Evaluation</u> October 10, 2007	<u>Test Report Serial No.</u> 092707L2V-T855-S25S	<u>Test Report Revision No.</u> Revision 1.1	  Certificate No. 2470.01
	<u>Test Report Issue Date</u> October 26, 2007	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

## SAR TEST REPORT


RF EXPOSURE EVALUATION	SPECIFIC ABSORPTION RATE		
APPLICANT	AXONN, LLC		
PRODUCT	BODY-WORN PERSONAL TRACKING DEVICE		
MODEL NAME	SATELLITE PERSONAL TRACKER		
MODELNUMBER	SPT		
IDENTIFIER(S)	FCC ID:	L2V-PT1	IC: 3989A-PT1
APPLICATION TYPE	Certification		
STANDARD(S) APPLIED	FCC 47 CFR §2.1093		
	Health Canada Safety Code 6		
PROCEDURE(S) APPLIED	FCC OET Bulletin 65, Supplement C (01-01)		
	FCC OET Application Note - SAR Probe Calibration and System Verification Considerations for Measurements at 150MHz-3GHz (01-07)		
	Industry Canada RSS-102 Issue 2		
FCC DEVICE CLASSIFICATION	Licensed Non-Broadcast Transmitter Worn on Body (TNT)		47 CFR §25
IC DEVICE CLASSIFICATION	Hand-Held Satellite Mobile Earth Station (MES)		RSS-170
RF EXPOSURE CATEGORY	General Population / Uncontrolled		
RF EXPOSURE EVALUATION(S)	Body-Worn		
TEST REPORT SERIAL NO.	092707L2V-T855-S25S		
TEST REPORT REVISION NO.S	Revision 1.1	1. Corrected Data on Page 7 2. Corrected Data on Page 21	October 26, 2007
	Revision 1.0	Initial Release	October 23, 2007
TEST REPORT ISSUE DATE	October 23, 2007		
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TEST LAB ACCREDITATION(S)	  Certificate No. 2470.01		



Company:	AxonN, LLC	FCC ID:	L2V-PT1	IC ID:	3989A-PT1	Freq.:	1611.25 - 1618.75 MHz	
Model(s):	Satellite Personal Tracker (SPT)		DUT:	Body-worn Portable Personal Tracking Device				
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## DECLARATION OF COMPLIANCE SAR RF EXPOSURE EVALUATION



<b>Test Lab Information</b>	<b>Name</b>	<b>CELLTECH LABS INC.</b>			
	<b>Address</b>	21-364 Lougheed Road, Kelowna, B.C. V1X 7R8 Canada			
<b>Applicant Information</b>	<b>Name</b>	<b>AXONN, LLC</b>			
	<b>Address</b>	19349 North 12 <sup>th</sup> Street, Covington, LA 70433 United States			
<b>Standard(s) Applied</b>	<b>FCC</b>	47 CFR §2.1093			
	<b>IC</b>	Health Canada Safety Code 6			
<b>Procedure(s) Applied</b>	<b>FCC</b>	OET Bulletin 65, Supplement C (01-01) OET Application Note - SAR Probe Calibration and System Verification Considerations for Measurements at 150 MHz - 3 GHz (01-07)			
	<b>IC</b>	RSS-102 Issue 2			
<b>Device Classification(s)</b>	<b>FCC</b>	Licensed Non-Broadcast Transmitter Worn on Body (TNT)	47 CFR §25		
	<b>IC</b>	Satellite Mobile Earth Stations (MES)	RSS-170 Issue 1		
<b>Device RF Exposure Category</b>	<b>Portable</b>	General Population / Uncontrolled Environment			
<b>Device Identifier(s)</b>	<b>FCC ID:</b>	L2V-PT1			
	<b>IC:</b>	3989A-PT1			
	<b>Model Name</b>	Satellite Personal Tracker			
	<b>Model No.</b>	SPT			
<b>Device Description</b>	<b>Serial No.</b>	007340046 (Production Unit)			
<b>Device Description</b>	Body-worn Personal Tracking Device				
<b>Modulation Type(s)</b>	CDMA (DSSS)				
<b>Transmit Frequency Range(s)</b>	1611.25 - 1618.75 MHz (Globalstar Satellite Band)				
<b>Max. RF Output Power Tested</b>	12.2 dBm	16.6 mW	EIRP	Channel B	1613.75 MHz
<b>Antenna Type(s) Tested</b>	Integral				
<b>Battery Type(s) Tested</b>	Energizer Lithium-ion	1.5V, 3000mAh		AA (x2)	
<b>Body-Worn Accessories Tested</b>	Belt-Clip	Plastic with Metal Screw		P/N: None	
<b>Audio Accessories Tested</b>	None		Device does not support audio operations		
<b>Max. SAR Level(s) Evaluated</b>	Body-worn	<b>0.016 W/kg</b>	1g average	Front Side of DUT with Lanyard Accessory	
<b>ANSI/IEEE Safety Limit (C95.1)</b>	Body-worn	1.6 W/kg	1g average	General Population / Uncontrolled Exposure	
<p>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 for the General Population / Uncontrolled Exposure environment. The device was tested in accordance with the measurement procedures specified in FCC OET Bulletin 65, Supplement C (01-01), FCC OET Application Note - SAR Probe Calibration and System Verification Considerations for Measurements at 150 MHz - 3 GHz (01-07) and Industry Canada RSS-102 Issue 2. All measurements were performed in accordance with the SAR system manufacturer recommendations.</p>					
<p>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.</p>					
<p>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.</p>					
<b>Test Report Approved By</b>					
	<b>Sean Johnston</b>		<b>Celltech Labs Inc.</b>		

<b>Company:</b>	<b>AxonN, LLC</b>	<b>FCC ID:</b>	<b>L2V-PT1</b>	<b>IC ID:</b>	<b>3989A-PT1</b>	<b>Freq.:</b>	<b>1611.25 - 1618.75 MHz</b>	
<b>Model(s):</b>	<b>Satellite Personal Tracker (SPT)</b>		<b>DUT:</b>	<b>Body-worn Portable Personal Tracking Device</b>				
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	<u>Test Report Issue Date</u> October 26, 2007	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

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<b>Company:</b>	<b>Axon, LLC</b>	<b>FCC ID:</b>	<b>L2V-PT1</b>	<b>IC ID:</b>	<b>3989A-PT1</b>	<b>Freq.:</b>	<b>1611.25 - 1618.75 MHz</b>	
<b>Model(s):</b>	<b>Satellite Personal Tracker (SPT)</b>		<b>DUT:</b>	<b>Body-worn Portable Personal Tracking Device</b>				
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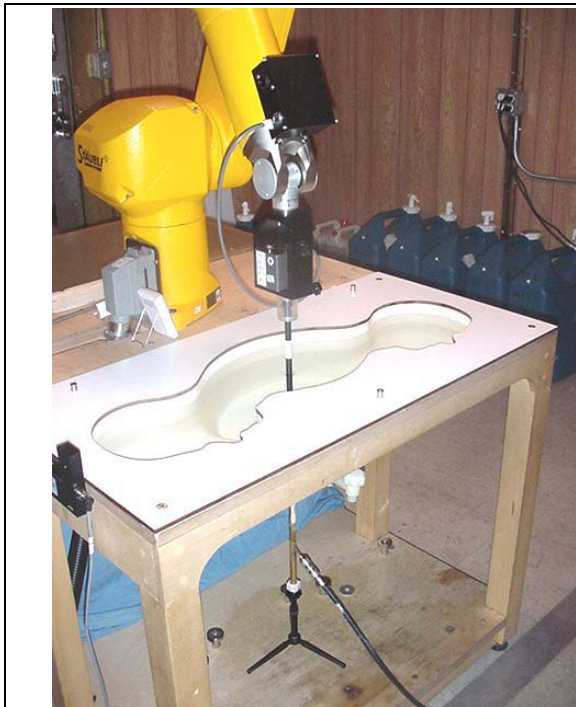
	<u>Date(s) of Evaluation</u> October 10, 2007	<u>Test Report Serial No.</u> 092707L2V-T855-S25S	<u>Test Report Revision No.</u> Revision 1.1	
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## 1.0 INTRODUCTION

This measurement report demonstrates that the AXONN, LLC Body-worn Satellite Personal Tracker 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 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 System with SAM Phantom and validation dipole



DASY4 System with SAM Phantom and device holder


<b>Company:</b>	AxonN, LLC	<b>FCC ID:</b>	L2V-PT1	<b>IC ID:</b>	3989A-PT1	<b>Freq.:</b>	1611.25 - 1618.75 MHz	
<b>Model(s):</b>	Satellite Personal Tracker (SPT)	<b>DUT:</b>	Body-worn Portable Personal Tracking Device					
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### 3.0 MEASUREMENT SUMMARY

#### BODY-WORN SAR EVALUATION RESULTS

Freq. MHz	Chan.	Test Mode	Antenna Position	Battery Type	Accessories		DUT Position to Planar Phantom	Reference Output Power (EIRP)		SAR Drift During Test dB	Measured SAR	
					Body-Worn	Spacing		dBm	mW		W/kg	Peak <sup>3</sup>
1613.75	Mid (B)	DSSS	Internal	Energizer Lithium	Lanyard	0.0 cm	Front Side	12.2	16.6	-0.018 <sup>4</sup>	0.016	1g
1613.75	Mid (B)	DSSS	Internal	Energizer Lithium	Lanyard	0.0 cm	Back Side	12.2	16.6	-- <sup>5</sup>	0.005	Peak <sup>3</sup>
1613.75	Mid (B)	DSSS	Internal	Energizer Lithium	Belt-Clip	0.5 cm	Back Side	12.2	16.6	-- <sup>5</sup>	0.004	Peak <sup>3</sup>
<b>ANSI / IEEE C95.1: 2005 - SAFETY LIMIT</b>				<b>BODY: 1.6 W/kg (averaged over 1 gram)</b>				<b>Spatial Peak Uncontrolled Exposure / General Population</b>				
<b>Test Date(s)</b>		October 10, 2007				<b>Relative Humidity</b>		41		%		
<b>Dielectric Constant <math>\epsilon_r</math></b>		<b>1610 MHz Body</b>				<b>Atmospheric Pressure</b>		102.5		kPa		
		<b>Interpolated Target<sup>9</sup></b>		<b>Measured</b>	<b>Deviation</b>	<b>Ambient Temperature</b>		24.5		°C		
		53.8	± 5%	51.8	-3.7%	<b>Fluid Temperature</b>		22.9		°C		
<b>Conductivity <math>\sigma</math> (mho/m)</b>		<b>Interpolated Target<sup>9</sup></b>		<b>Measured</b>	<b>Deviation</b>	<b>Fluid Depth</b>		≥ 15		cm		
		1.40	± 5%	1.34	-4.3%	<b><math>\rho</math> (Kg/m<sup>3</sup>)</b>		1000				
<b>Note(s)</b>		1.	The measurement results were obtained with the DUT tested in the conditions described in this report. Detailed measurement data and plots showing the maximum SAR location of the DUT are reported in Appendix A.									
		2.	If the SAR levels measured at the mid channel were ≥ 3 dB below the SAR limit, SAR evaluation for the low and high channels was optional (per FCC OET Bulletin 65, Supplement C, Edition 01-01 - see reference [3]).									
		3.	The SAR levels measured and reported for the back side of the DUT is the Peak SAR level measured from the area scan. The 1g-averaged SAR is not measured when the peak SAR value from the area scan evaluation is less than 1% of the 1g average limit. The mathematical formula used to extrapolate the SAR value at the surface from the zoom scan SAR values measured at 5 mm steps leading away from the surface assumes a curving slope (i.e. the SAR values gradually decrease as the probe moves away from the surface). When the peak SAR of a device is so low that the RF noise level is competing with the SAR level, the zoom scan measurements leading away from the surface are no longer a curving slope and the extrapolation formula cannot accurately estimate the 1g average SAR. Therefore the peak value from the area scan is reported in place of the 1g averaged SAR value whenever the peak values are less than 1% of the average limit. This avoids gross uncertainties in the 1g average SAR calculation while maintaining a conservative estimation of the SAR level.									
		4.	The power drift of the DUT measured by the DASY4 system during the SAR evaluation was <5% from the start power.									
		5.	The power drift of the DUT during the SAR evaluations was measured at the reference point of the phantom with low SAR. The resulting drift values were inaccurate due to the SAR value at the reference point is close to the measurement noise floor and therefore are not reported.									
		6.	The DUT battery was fully charged prior to the SAR evaluations.									
		7.	The fluid temperature was measured prior to and after the SAR evaluations to ensure the temperature remained within +/-2°C of the fluid temperature reported during the dielectric parameter measurements.									
		8.	The dielectric parameters of the simulated tissue mixture were measured prior to the SAR evaluations using a Dielectric Probe Kit and a Network Analyzer (see Appendix C).									
		9.	The dielectric properties listed in FCC OET Bulletin 65, Supplement C are specified within the frequency range of 150 MHz and 5800 MHz at certain frequencies. In the dielectric property measurement software program (Aprel) the dielectric properties specified were derived by interpolation method using linear model.									
		10.	The SAR evaluations were performed within 24 hours of the system performance check.									

<b>Company:</b>	Axonon, LLC	<b>FCC ID:</b>	L2V-PT1	<b>IC ID:</b>	3989A-PT1	<b>Freq.:</b>	1611.25 - 1618.75 MHz	
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## 4.0 DETAILS OF SAR EVALUATION

The AXONN, LLC Body-worn Satellite Personal Tracker (SPT) was compliant 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.

### Test Configuration(s)

- The DUT was tested for body-worn SAR with the front side of the device placed parallel to, and touching, the outer surface of the SAM phantom (planar section) utilizing the lanyard accessory attached to the DUT.
- The DUT was tested for body-worn SAR with the back side of the device placed parallel to, and touching, the outer surface of the SAM phantom (planar section) utilizing the lanyard accessory attached to the DUT (belt-clip removed).
- The DUT was tested for body-worn SAR with the back side of the device placed parallel to, and touching, the outer surface of the SAM phantom (planar section). The attached belt-clip accessory provided a 0.5 cm spacing from the back of the DUT to the SAM phantom (planar section).

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


- The conducted power level(s) of the DUT could not be measured for the SAR evaluation due to integral antenna. The DUT was evaluated for SAR at the maximum conducted output power level preset by the manufacturer.
- The output power levels (EIRP) referenced in this report were measured by US Technologies prior to the SAR evaluations.
- The DUT was tested with a modulated DSSS signal in continuous transmit operation at 100% duty cycle.
- The DUT was set to the channel tested by adjusting the DIP switch settings on the internal transmitter module.
- The power drift of the DUT during the SAR evaluations was measured by the DASY4 system.



### Test Conditions

- The fluid temperature was measured prior to and after the SAR evaluations to ensure the temperature remained within  $\pm 2^{\circ}\text{C}$  of the fluid temperature reported during the dielectric parameter measurements.
- The dielectric parameters of the simulated tissue mixture were measured prior to the SAR evaluations using a Dielectric Probe Kit and a Network Analyzer (see Appendix C).

## 5.0 EVALUATION PROCEDURES

- 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.
  - For body-worn and face-held devices a planar phantom was used.
- 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:
- 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.
- 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:
- 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.
- 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).
- 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  $\geq 800$  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.

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<b>Model(s):</b>	<b>Satellite Personal Tracker (SPT)</b>		<b>DUT:</b>	<b>Body-worn Portable Personal Tracking Device</b>				
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## 6.0 SYSTEM PERFORMANCE CHECK

Prior to the SAR evaluations of the test device, five measurements were made using the SAM phantom (planar section) with an 1800 MHz dipole using 1640 MHz calibrated probe conversion factor in order to establish a mean SAR value as reported in the table below (see Appendix B for evaluation results and test plots). The dielectric parameters of the simulated tissue mixture were measured prior to the five measurements using a Dielectric Probe Kit and a 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  $\pm 15\%$  from the system validation target SAR value (see Appendix E for system validation procedures).

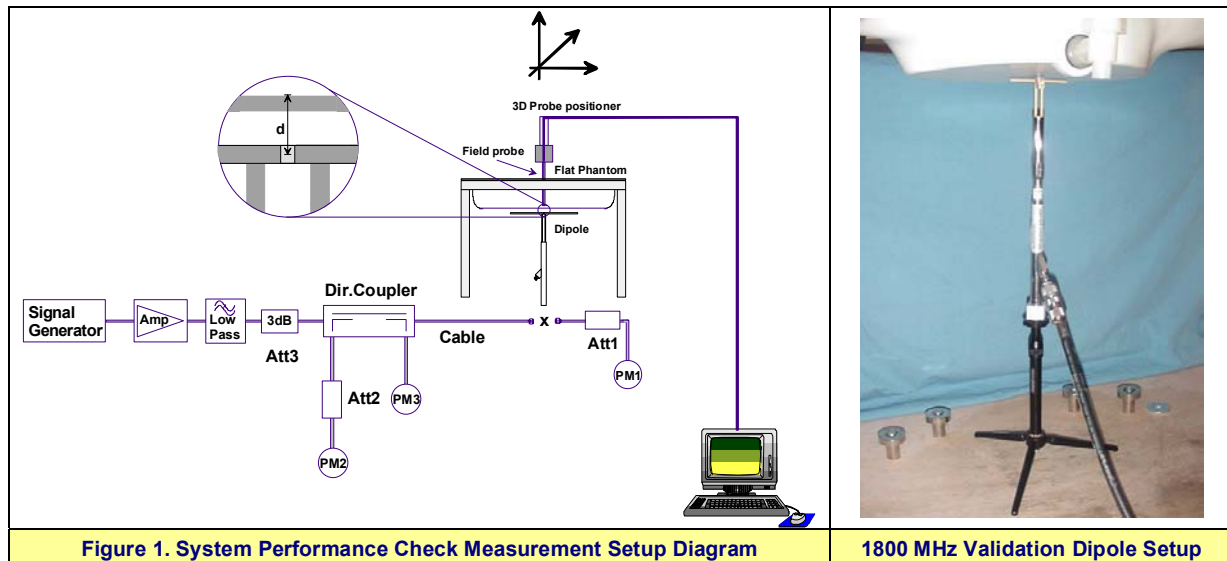
### SYSTEM PERFORMANCE CHECK EVALUATIONS


Test Date	Tissue Freq.	Dipole Freq.	System Validation Target SAR	SAR 1g (W/kg)		Probe Calibration Frequency	Probe Conversion Factor	Dielectric Constant $\epsilon_r$			Conductivity $\sigma$ (mho/m)		
				Mean Value Measured	Dev.			1610 MHz Body			1610 MHz Body		
	MHz	MHz	W/kg (1g)			MHz	Body	Target	Meas.	Dev.	Target	Meas.	Dev.
Oct-10	1610 1800	1800	10.5 $\pm 15\%$	9.47	-9.8%	1640 $\pm 50$ MHz	4.7	53.8 $\pm 10\%$	51.8	-3.7%	1.40 $\pm 10\%$	1.34	-4.3%
	Body							Interpolated <sup>3</sup>			Interpolated <sup>3</sup>		



- Note(s)**
- The system performance check evaluations were performed according to the procedure referred to as alternative system verification method B of FCC OET Application Note - SAR Probe Calibration and System Verification Considerations for Measurements at 150 MHz - 3 GHz (see reference [7]). The measured mean SAR value reported is the mean SAR value of the five measurements performed (see Appendix B).
  - The target SAR value reported is established from the System Validation procedure performed by Celltech Labs Inc. (see Appendix E).
  - The target dielectric parameters reported are the tissue dielectric parameters required at the frequency of the test device (1610 MHz). The dielectric properties listed in FCC OET Bulletin 65, Supplement C are specified within the frequency range of 150 MHz and 5800 MHz at specific frequencies. In the dielectric property measurement software program (Aprel) used by Celltech Labs the dielectric properties specified were derived by interpolation method using linear model.
  - The tissue dielectric parameters measured at the dipole frequency (1800 MHz) were within  $\pm 10\%$  required at that frequency (see Appendix C).
  - The fluid temperature was measured prior to and after the SAR evaluations to ensure the temperature remained within  $\pm 2^\circ\text{C}$  of the fluid temperature reported during the dielectric parameter measurements.
  - The SAR evaluations of the test device were performed within 24 hours of the system performance check.

### Measurement Conditions

Ambient Temperature	Fluid Temperature	Barometric Pressure	Humidity	$\rho$ (Kg/m <sup>3</sup> )	Fluid Depth
24.5°C	22.9°C	102.5 kPa	41%	1000	$\geq 15$ cm



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<b>Model(s):</b>	Satellite Personal Tracker (SPT)	<b>DUT:</b>	Body-worn Portable Personal Tracking Device					
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## 7.0 SIMULATED EQUIVALENT TISSUES

The simulated equivalent tissue mixture consisted of Glycol-monobutyl, water, and salt. The fluid was prepared according to standardized procedures and measured for dielectric parameters (permittivity and conductivity).



SIMULATED TISSUE MIXTURE	
INGREDIENT	1610/1800 MHz Body
Water	70.17 %
Glycol Monobutyl	29.43 %
Salt	0.40 %

## 8.0 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
The Spatial Average value of the SAR averaged over the whole body.		
The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.		
The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.		
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.		


<b>Company:</b>	<b>Axonm, LLC</b>	<b>FCC ID:</b>	<b>L2V-PT1</b>	<b>IC ID:</b>	<b>3989A-PT1</b>	<b>Freq.:</b>	<b>1611.25 - 1618.75 MHz</b>	
<b>Model(s):</b>	<b>Satellite Personal Tracker (SPT)</b>		<b>DUT:</b>	<b>Body-worn Portable Personal Tracking Device</b>				
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## 9.0 ROBOT SYSTEM SPECIFICATIONS

<u>Specifications</u>	
<b>Positioner</b>	Stäubli Unimation Corp. Robot Model: RX60L
<b>Repeatability</b>	0.02 mm
<b>No. of axis</b>	6
<u>Data Acquisition Electronic (DAE) System</u>	
<u>Cell Controller</u>	
<b>Processor</b>	AMD Athlon XP 2400+
<b>Clock Speed</b>	2.0 GHz
<b>Operating System</b>	Windows XP Professional
<u>Data Converter</u>	
<b>Features</b>	Signal Amplifier, multiplexer, A/D converter, and control logic
<b>Software</b>	Measurement Software: DASY4, V4.7 Build 44
	Postprocessing Software: SEMCAD, V1.8 Build 171
<b>Connecting Lines</b>	Optical downlink for data and status info.; Optical uplink for commands and clock
<u>DASY4 Measurement Server</u>	
<b>Function</b>	Real-time data evaluation for field measurements and surface detection
<b>Hardware</b>	PC/104 166MHz Pentium CPU; 32 MB chipdisk; 64 MB RAM
<b>Connections</b>	COM1, COM2, DAE, Robot, Ethernet, Service Interface
<u>E-Field Probe</u>	
<b>Model</b>	ET3DV6
<b>Serial No.</b>	1387
<b>Construction</b>	Triangular core fiber optic detection system
<b>Frequency</b>	10 MHz to 6 GHz
<b>Linearity</b>	±0.2 dB (30 MHz to 3 GHz)
<u>Phantom(s)</u>	
<b>Type</b>	SAM V4.0C
<b>Shell Material</b>	Fiberglass
<b>Thickness</b>	2.0 ±0.1 mm
<b>Volume</b>	Approx. 25 liters

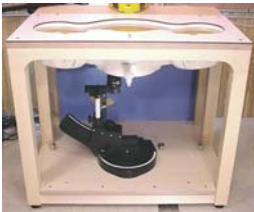
<b>Company:</b>	Axon, LLC	<b>FCC ID:</b>	L2V-PT1	<b>IC ID:</b>	3989A-PT1	<b>Freq.:</b>	1611.25 - 1618.75 MHz	
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## 10.0 PROBE SPECIFICATIONS


<p><b>Construction:</b> Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, glycol)</p> <p><b>Calibration:</b> In air from 10 MHz to 2.5 GHz In brain simulating tissue at frequencies of 900 MHz and 1.8 GHz (accuracy <math>\pm 8\%</math>)</p> <p><b>Frequency:</b> 10 MHz to &gt; 6 GHz; Linearity: <math>\pm 0.2</math> dB (30 MHz to 3 GHz)</p> <p><b>Directivity:</b> <math>\pm 0.2</math> dB in brain tissue (rotation around probe axis) <math>\pm 0.4</math> dB in brain tissue (rotation normal to probe axis)</p> <p><b>Dynamic Range:</b> 5 <math>\mu</math>W/g to &gt; 100 mW/g; Linearity: <math>\pm 0.2</math> dB</p> <p><b>Surface Detect:</b> <math>\pm 0.2</math> mm repeatability in air and clear liquids over diffuse reflecting surfaces</p> <p><b>Dimensions:</b> Overall length: 330 mm Tip length: 16 mm Body diameter: 12 mm Tip diameter: 6.8 mm Distance from probe tip to dipole centers: 2.7 mm</p> <p><b>Application:</b> General dosimetry up to 3 GHz Compliance tests of mobile phone</p>	
<b>ET3DV6 E-Field Probe</b>	



## 11.0 SAM PHANTOM V4.0C

<p>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).</p>	
<b>SAM Phantom V4.0C</b>	

## 12.0 DEVICE HOLDER


<p>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.</p>	
<b>Device Holder</b>	



<b>Company:</b> Axonn, LLC	<b>FCC ID:</b> L2V-PT1	<b>IC ID:</b> 3989A-PT1	<b>Freq.:</b> 1611.25 - 1618.75 MHz	
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### 13.0 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	10Jul07	10Jul08		
	-DAE3	00018	370	13Mar07	13Mar08		
x	-ET3DV6 E-Field Probe	00016	1387	16Mar07	16Mar08		
	-EX3DV4 E-Field Probe	00213	3600	24Jan07	24Jan08		
	-300 MHz Validation Dipole	00023	135	08Jun07	08Jun08		
	-450 MHz Validation Dipole	00024	136	30Jul07	30Jul08		
	-835 MHz Validation Dipole	00022	411	Brain	07Jun07	07Jun08	
				Body	07Jun07	07Jun08	
	-900 MHz Validation Dipole	00020	054	Brain	07Jun07	07Jun08	
				Body	07Jun07	07Jun08	
	-1800 MHz Validation Dipole	00021	247	Brain	06Jun07	06Jun08	
x				Body	10Oct07	-	
	-1900 MHz Validation Dipole	00032	151	Brain	06Jun07	06Jun08	
				Body	06Jun07	06Jun08	
	-2450 MHz Validation Dipole	00025	150	Brain	16Jul07	16Jul08	
				Body	08Jun07	08Jun08	
	5GHz Validation Dipole	00126	1031	Body	18May07	18May08	
				-5200 MHz	Body	22May07	22May08
				-5500 MHz	Brain	09May07	09May08
				-5800 MHz	Body	10May07	10May08
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		
	ALS-PR-DIEL Dielectric Probe Kit	00160	260-00953	N/A	N/A		
x	HP 85070C Dielectric Probe Kit	00033	US39240170	N/A	N/A		
x	Gigatronics 8652A Power Meter	00007	1835272	26Mar07	26Mar08		
	Gigatronics 8652A Power Meter	00008	1835267	22Jan07	22Jan08		
x	Gigatronics 80701A Power Sensor	00012	1834350	22Jan07	22Jan08		
x	Gigatronics 80701A Power Sensor	00014	1833699	22Jan07	22Jan08		
	Gigatronics 80701A Power Sensor	00109	1834366	26Mar07	26Mar08		
x	HP 8753ET Network Analyzer	00134	US39170292	20Apr07	20Apr08		
	HP 8648D Signal Generator	00005	3847A00611	NCR	NCR		
x	Rohde & Schwarz SMR20 Signal Generator	00006	100104	NCR	NCR		
x	Amplifier Research 5S1G4 Power Amplifier	00106	26235	NCR	NCR		
	Amplifier Research 10W1000C Power Amplifier	00041	27887	NCR	NCR		
	Nextec NB00383 Microwave Amplifier	00151	0535	NCR	NCR		
	HP E4408B Spectrum Analyzer	00015	US39240170	05Feb07	05Feb08		



<b>Company:</b>	<b>Axon, LLC</b>	<b>FCC ID:</b>	<b>L2V-PT1</b>	<b>IC ID:</b>	<b>3989A-PT1</b>	<b>Freq.:</b>	<b>1611.25 - 1618.75 MHz</b>	
<b>Model(s):</b>	<b>Satellite Personal Tracker (SPT)</b>		<b>DUT:</b>	<b>Body-worn Portable Personal Tracking Device</b>				
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## 14.0 MEASUREMENT UNCERTAINTIES


UNCERTAINTY BUDGET FOR DEVICE EVALUATION						
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 (1640 MHz)	7.0	Normal	1	1	7.0	∞
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	8.2	Rectangular	1.732050808	1	4.7	∞
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)	4.3	Normal	1	0.64	2.8	∞
Liquid permittivity (target)	5	Rectangular	1.732050808	0.6	1.7	∞
Liquid permittivity (measured)	3.7	Normal	1	0.6	2.2	∞
<b>Combined Standard Uncertainty</b>					<b>12.67</b>	
<b>Expanded Uncertainty (k=2)</b>					<b>25.34</b>	
<b>Notes</b>	1. Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 (see reference [5]).					

<b>Company:</b>	Axon, LLC	<b>FCC ID:</b>	L2V-PT1	<b>IC ID:</b>	3989A-PT1	<b>Freq.:</b>	1611.25 - 1618.75 MHz	
<b>Model(s):</b>	Satellite Personal Tracker (SPT)		<b>DUT:</b>	Body-worn Portable Personal Tracking Device				
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## MEASUREMENT UNCERTAINTIES (Cont.)

UNCERTAINTY BUDGET FOR SYSTEM VALIDATION						
Error Description	Uncertainty Value $\pm\%$	Probability Distribution	Divisor	$c_i$ 1g	Uncertainty Value $\pm\%$ (1g)	$V_i$ or $V_{eff}$
<b>Measurement System</b>						
Probe calibration (1640 MHz)	7.0	Normal	1	1	7.0	$\infty$
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	8.2	Rectangular	1.732050808	1	4.7	$\infty$
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)	4.3	Normal	1	0.64	2.8	$\infty$
Liquid permittivity (target)	5	Rectangular	1.732050808	0.6	1.7	$\infty$
Liquid permittivity (measured)	3.7	Normal	1	0.6	2.2	$\infty$
<b>Combined Standard Uncertainty</b>					<b>11.21</b>	
<b>Expanded Uncertainty (k=2)</b>					<b>22.42</b>	
<b>Notes</b>	1. Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 (see reference [5]).					


<b>Company:</b>	<b>Axonn, LLC</b>	<b>FCC ID:</b>	<b>L2V-PT1</b>	<b>IC ID:</b>	<b>3989A-PT1</b>	<b>Freq.:</b>	<b>1611.25 - 1618.75 MHz</b>	
<b>Model(s):</b>	<b>Satellite Personal Tracker (SPT)</b>			<b>DUT:</b>	<b>Body-worn Portable Personal Tracking Device</b>			
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## 15.0 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] ANSI/IEEE C95.1-2005 - "American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 3 kHz to 300 GHz", New York: IEEE, April 2006.
- [7] Federal Communications Commission, OET - "Application Note: SAR Probe Calibration and System Verification Considerations for Measurements at 150 MHz - 3 GHz": January 2007 (Rev. 1.1).

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## APPENDIX A - SAR MEASUREMENT DATA

<b>Company:</b>	<b>Axon, LLC</b>	<b>FCC ID:</b>	<b>L2V-PT1</b>	<b>IC ID:</b>	<b>3989A-PT1</b>	<b>Freq.:</b>	<b>1611.25 - 1618.75 MHz</b>	
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Date Tested: 10/10/2007

### Body-Worn SAR - Front Side of DUT - 1613.75 MHz - Channel B

DUT: Axonn Model: Satellite Personal Tracker (SPT); Type: Personal Tracking Device; Serial: 007340046

Body-Worn Accessory: Lanyard; Audio Accessory: n/a

Ambient Temp: 24.5°C; Fluid Temp: 22.9°C; Barometric Pressure: 102.5 kPa; Humidity: 41%

Communication System: DSSS

RF Output Power: 12.2 dBm (EIRP)

Frequency: 1613.75 MHz; Duty Cycle: 1:1

1.5V 3000mAh Energizer Lithium AA Battery (x2)

Medium: M1610 Medium parameters used:  $f = 1613.75 \text{ MHz}$ ;  $\sigma = 1.34 \text{ mho/m}$ ;  $\epsilon_r = 51.8$ ;  $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1387; ConvF(4.7, 4.7, 4.7); Calibrated: 16/03/2007
- Sensor-Surface: 4 mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 10/07/2007
- Phantom: SAM 4.0; Type: Fiberglass; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

### Body-Worn SAR - Front Side of DUT Touching SAM Phantom (Planar Section) - Channel B

Area Scan (8x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.016 mW/g

### Body-Worn SAR - Front Side of DUT Touching SAM Phantom (Planar Section) - Channel B

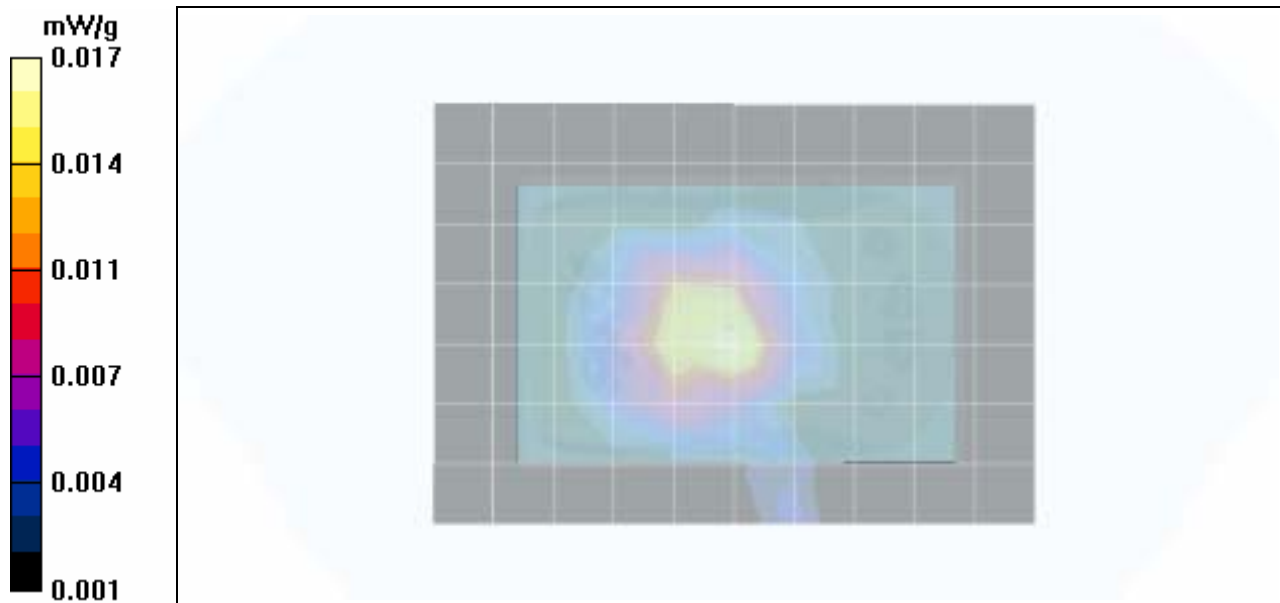
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm


Reference Value = 3.60 V/m; Power Drift = -0.018 dB



Peak SAR (extrapolated) = 0.026 W/kg

**SAR(1 g) = 0.016 mW/g; SAR(10 g) = 0.010 mW/g**

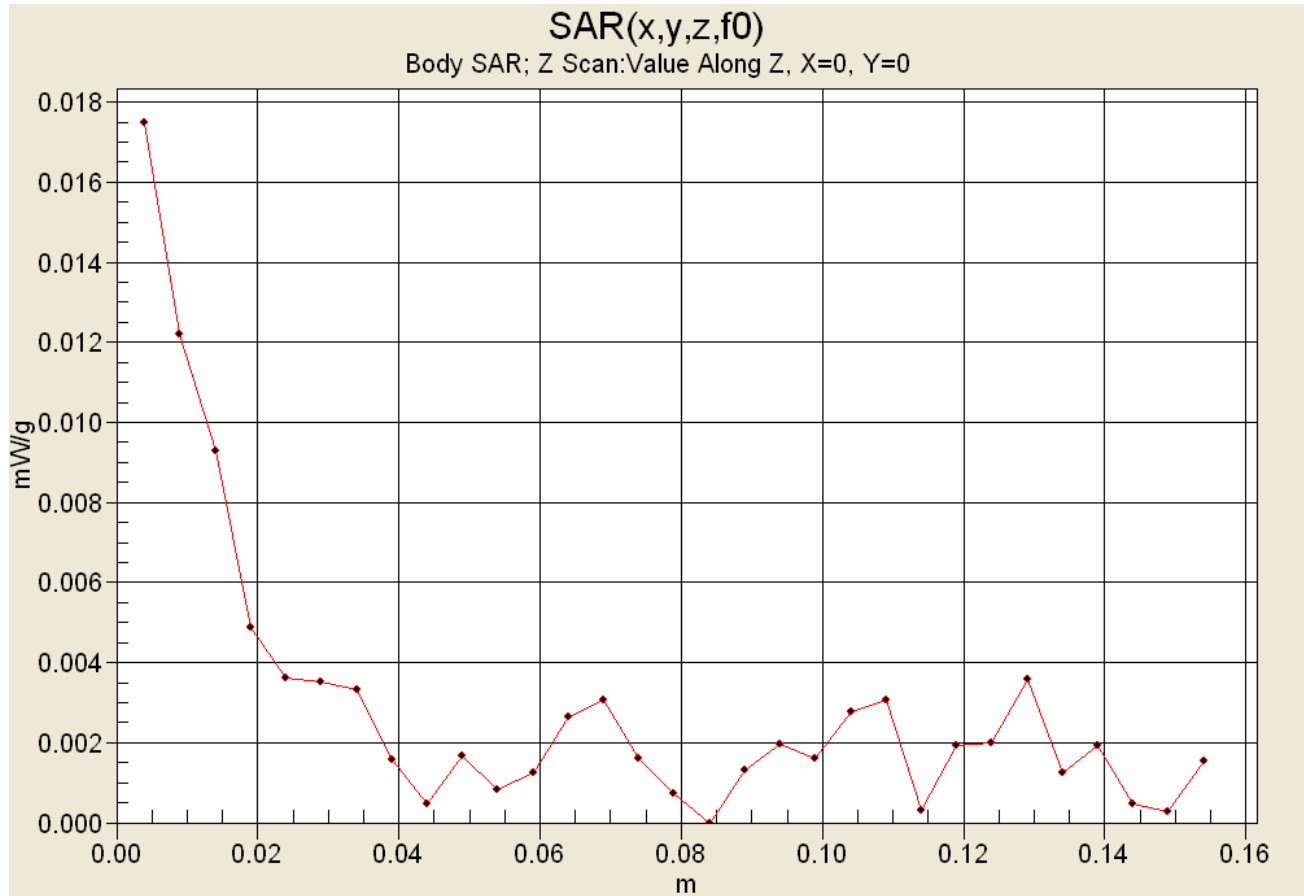
Maximum value of SAR (measured) = 0.017 mW/g




Company:	Axonn, LLC	FCC ID:	L2V-PT1	IC ID:	3989A-PT1	Freq.:	1611.25 - 1618.75 MHz	
Model(s):	Satellite Personal Tracker (SPT)		DUT:	Body-worn Portable Personal Tracking Device				
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### Z-Axis Scan



Due to the very low SAR level measured in this configuration the Z-axis scan is only reporting noise. The DASY4 software adjusts the scale according to the measured SAR level, which for this evaluation is close to the measurement noise floor.

<b>Company:</b> Axonn, LLC	<b>FCC ID:</b> L2V-PT1	<b>IC ID:</b> 3989A-PT1	<b>Freq.:</b> 1611.25 - 1618.75 MHz	
<b>Model(s):</b> Satellite Personal Tracker (SPT)	<b>DUT:</b> Body-worn Portable Personal Tracking Device			
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	<u>Test Report Issue Date</u> October 26, 2007	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

Date Tested: 10/10/2007

### Body-Worn SAR - Back Side of DUT - 1613.75 MHz - Channel B

**DUT: Axonn Model: Satellite Personal Tracker (SPT); Type: Personal Tracking Device; Serial: 007340046**

**Body-Worn Accessory: Lanyard; Audio Accessory: n/a**

Ambient Temp: 24.5°C; Fluid Temp: 22.9°C; Barometric Pressure: 102.5 kPa; Humidity: 41%

Communication System: DSSS

RF Output Power: 12.2 dBm (EIRP)

Frequency: 1613.75 MHz; Duty Cycle: 1:1

1.5V 3000mAh Energizer Lithium AA Battery (x2)

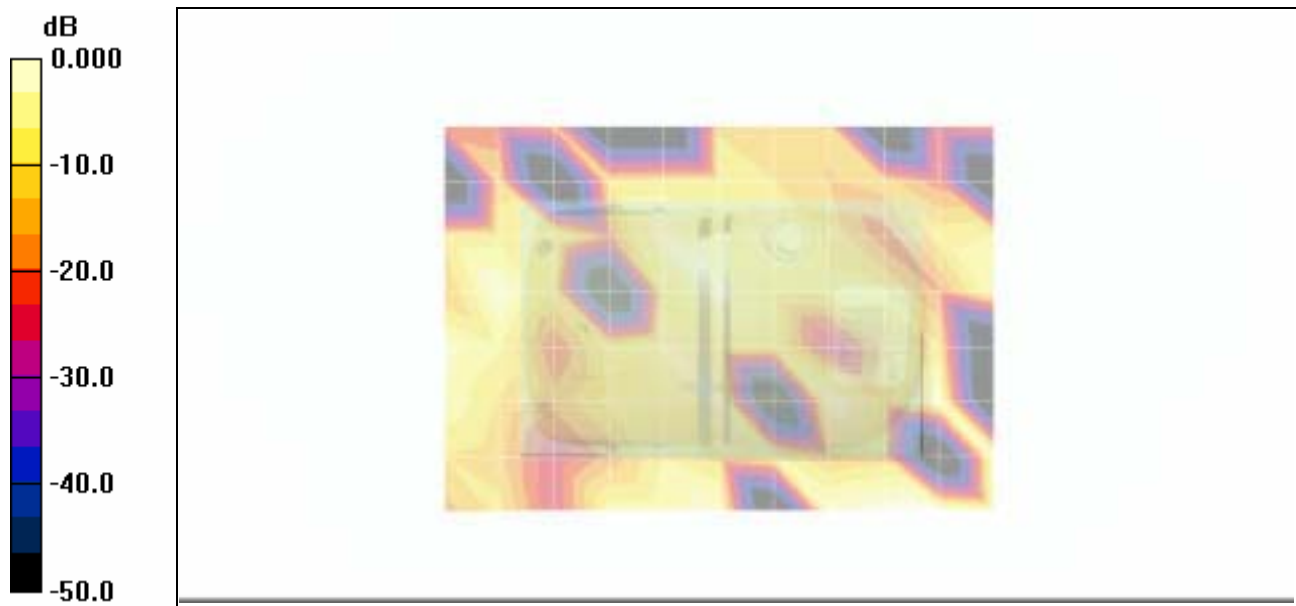
Medium: M1610 Medium parameters used:  $f = 1613.75 \text{ MHz}$ ;  $\sigma = 1.34 \text{ mho/m}$ ;  $\epsilon_r = 51.8$ ;  $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1387; ConvF(4.7, 4.7, 4.7); Calibrated: 16/03/2007
- Sensor-Surface: 4 mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 10/07/2007
- Phantom: SAM 4.0; Type: Fiberglass; Serial: 1033
- Measurement SW: DASy4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171


### Body-Worn SAR - Back Side of DUT Touching SAM Phantom (Planar Section) - Channel B

**Area Scan (8x11x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$



**Maximum Peak Value of SAR (measured) = 0.005 mW/g**



0 dB = 0.005 mW/g

<b>Company:</b>	Axonn, LLC	<b>FCC ID:</b>	L2V-PT1	<b>IC ID:</b>	3989A-PT1	<b>Freq.:</b>	1611.25 - 1618.75 MHz	
<b>Model(s):</b>	Satellite Personal Tracker (SPT)		<b>DUT:</b>	Body-worn Portable Personal Tracking Device				
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Date Tested: 10/10/2007

### Body-Worn SAR - Back Side of DUT - 1613.75 MHz - Channel B

**DUT: Axonn Model: Satellite Personal Tracker (SPT); Type: Personal Tracking Device; Serial: 007340046**

**Body-Worn Accessory: Belt-Clip; Audio Accessory: n/a**

Ambient Temp: 24.5°C; Fluid Temp: 22.9°C; Barometric Pressure: 102.5 kPa; Humidity: 41%

Communication System: DSSS

RF Output Power: 12.2 dBm (EIRP)

Frequency: 1613.75 MHz; Duty Cycle: 1:1

1.5V 3000mAh Energizer Lithium AA Battery (x2)

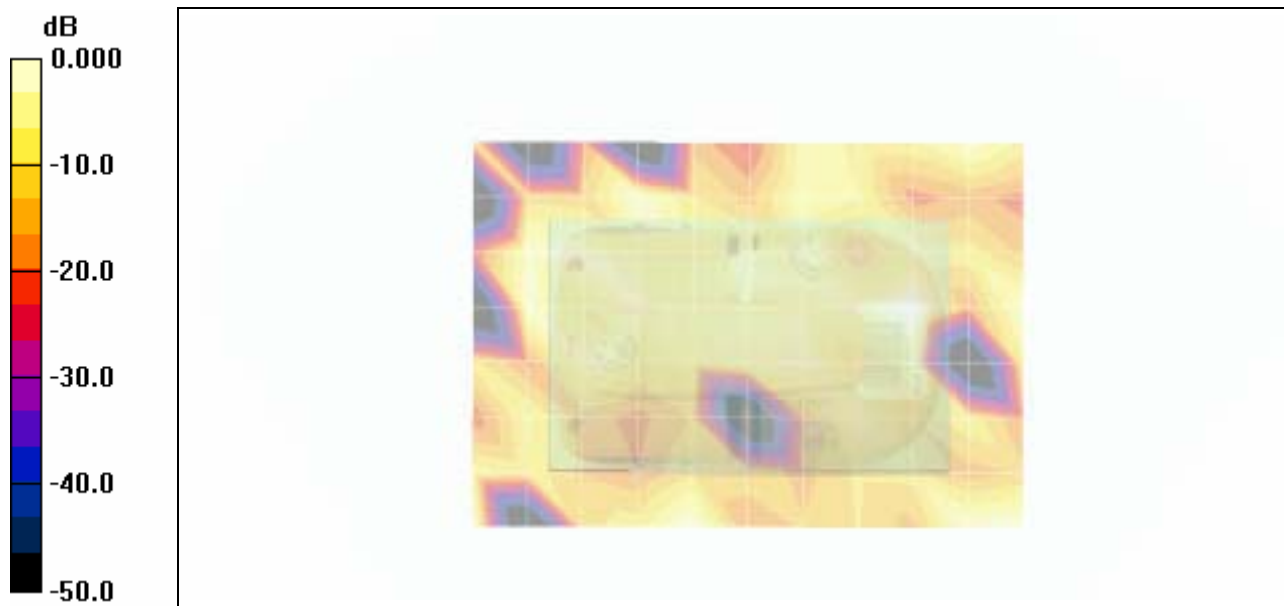
Medium: M1610 Medium parameters used:  $f = 1613.75 \text{ MHz}$ ;  $\sigma = 1.34 \text{ mho/m}$ ;  $\epsilon_r = 51.8$ ;  $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1387; ConvF(4.7, 4.7, 4.7); Calibrated: 16/03/2007
- Sensor-Surface: 4 mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 10/07/2007
- Phantom: SAM 4.0; Type: Fiberglass; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171


### Body-Worn SAR - 0.5 cm Belt-Clip Spacing from Back Side of DUT to SAM Phantom (Planar Section) - Channel B



**Area Scan (8x11x1):** Measurement grid: dx=15mm, dy=15mm

**Maximum Peak Value of SAR (measured) = 0.004 mW/g**






0 dB = 0.004 mW/g

<b>Company:</b>	Axonn, LLC	<b>FCC ID:</b>	L2V-PT1	<b>IC ID:</b>	3989A-PT1	<b>Freq.:</b>	1611.25 - 1618.75 MHz	
<b>Model(s):</b>	Satellite Personal Tracker (SPT)		<b>DUT:</b>	Body-worn Portable Personal Tracking Device				
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	<u>Test Report Issue Date</u> October 26, 2007	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

**APPENDIX B - SYSTEM PERFORMANCE CHECK DATA**

<b>Company:</b>	<b>Axon, LLC</b>	<b>FCC ID:</b>	<b>L2V-PT1</b>	<b>IC ID:</b>	<b>3989A-PT1</b>	<b>Freq.:</b>	<b>1611.25 - 1618.75 MHz</b>	
<b>Model(s):</b>	<b>Satellite Personal Tracker (SPT)</b>		<b>DUT:</b>	<b>Body-worn Portable Personal Tracking Device</b>				
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	<u>Test Report Issue Date</u> October 26, 2007	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

Date Tested: 10/10/2007

**System Validation - 1610 MHz (1800 MHz Dipole) - MSL**

**DUT: Dipole 1800 MHz; Asset: 00021; Serial: 247**

Ambient Temp: 24.5°C; Fluid Temp: 22.9°C; Barometric Pressure: 102.5 kPa; Humidity: 41%

Communication System: CW

Forward Conducted Power: 250 mW

Frequency: 1610 MHz; Duty Cycle: 1:1

Medium: M1610 Medium parameters used:  $f = 1610 \text{ MHz}$ ;  $\sigma = 1.34 \text{ mho/m}$ ;  $\epsilon_r = 51.8$ ;  $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1387; ConvF(4.7, 4.7, 4.7); Calibrated: 16/03/2007

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

- Electronics: DAE4 Sn353; Calibrated: 10/07/2007

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

- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

**1610 MHz System Validation/Area Scan (5x8x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 9.74 mW/g

**1610 MHz System Validation/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 85.5 V/m; Power Drift = -0.017 dB

Peak SAR (extrapolated) = 20.8 W/kg

**SAR(1 g) = 9.41 mW/g; SAR(10 g) = 4.77 mW/g**

Maximum value of SAR (measured) = 10.2 mW/g

**1610 MHz System Validation/Zoom Scan 2 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 85.4 V/m; Power Drift = -0.012 dB

Peak SAR (extrapolated) = 20.8 W/kg

**SAR(1 g) = 9.40 mW/g; SAR(10 g) = 4.76 mW/g**

Maximum value of SAR (measured) = 10.2 mW/g

**1610 MHz System Validation/Zoom Scan 3 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 86.7 V/m; Power Drift = -0.021 dB

Peak SAR (extrapolated) = 21.1 W/kg

**SAR(1 g) = 9.53 mW/g; SAR(10 g) = 4.84 mW/g**

Maximum value of SAR (measured) = 10.4 mW/g

**1610 MHz System Validation/Zoom Scan 4 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 86.7 V/m; Power Drift = -0.010 dB

Peak SAR (extrapolated) = 21.1 W/kg

**SAR(1 g) = 9.55 mW/g; SAR(10 g) = 4.85 mW/g**

Maximum value of SAR (measured) = 10.4 mW/g

**1610 MHz System Validation/Zoom Scan 6 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 86.2 V/m; Power Drift = 0.003 dB

Peak SAR (extrapolated) = 20.9 W/kg


**SAR(1 g) = 9.46 mW/g; SAR(10 g) = 4.81 mW/g**

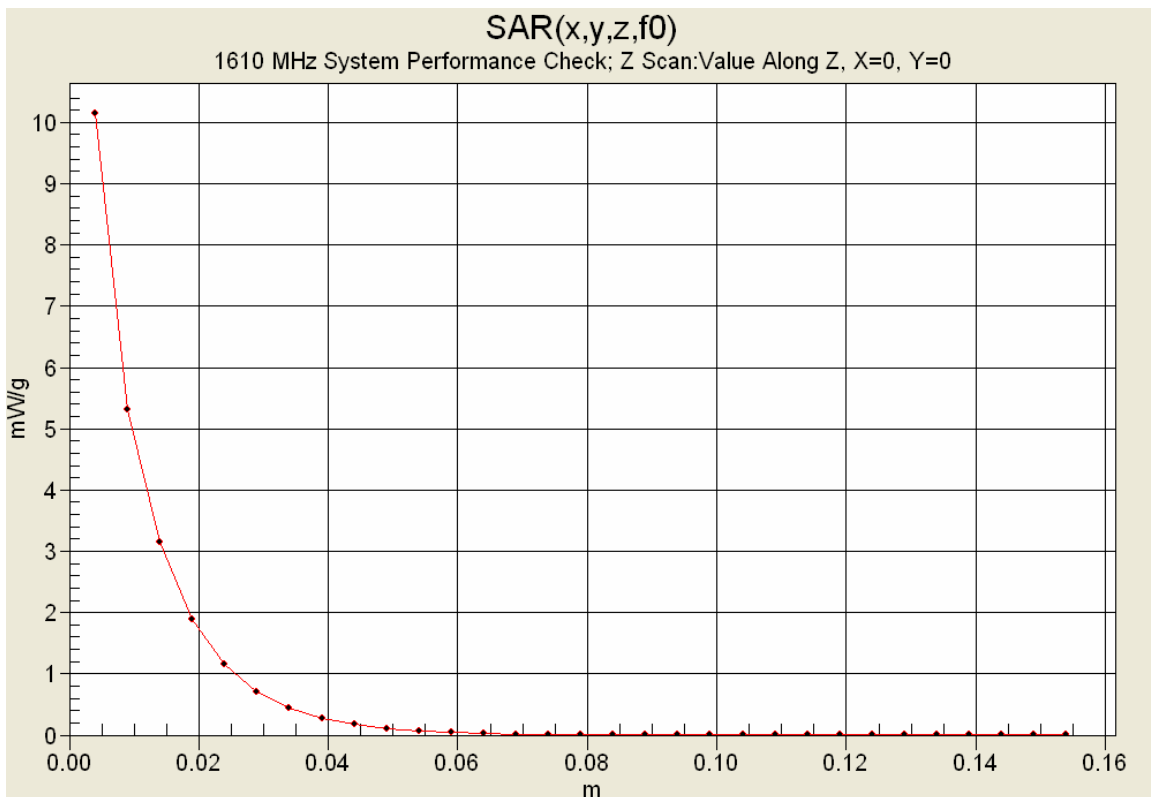
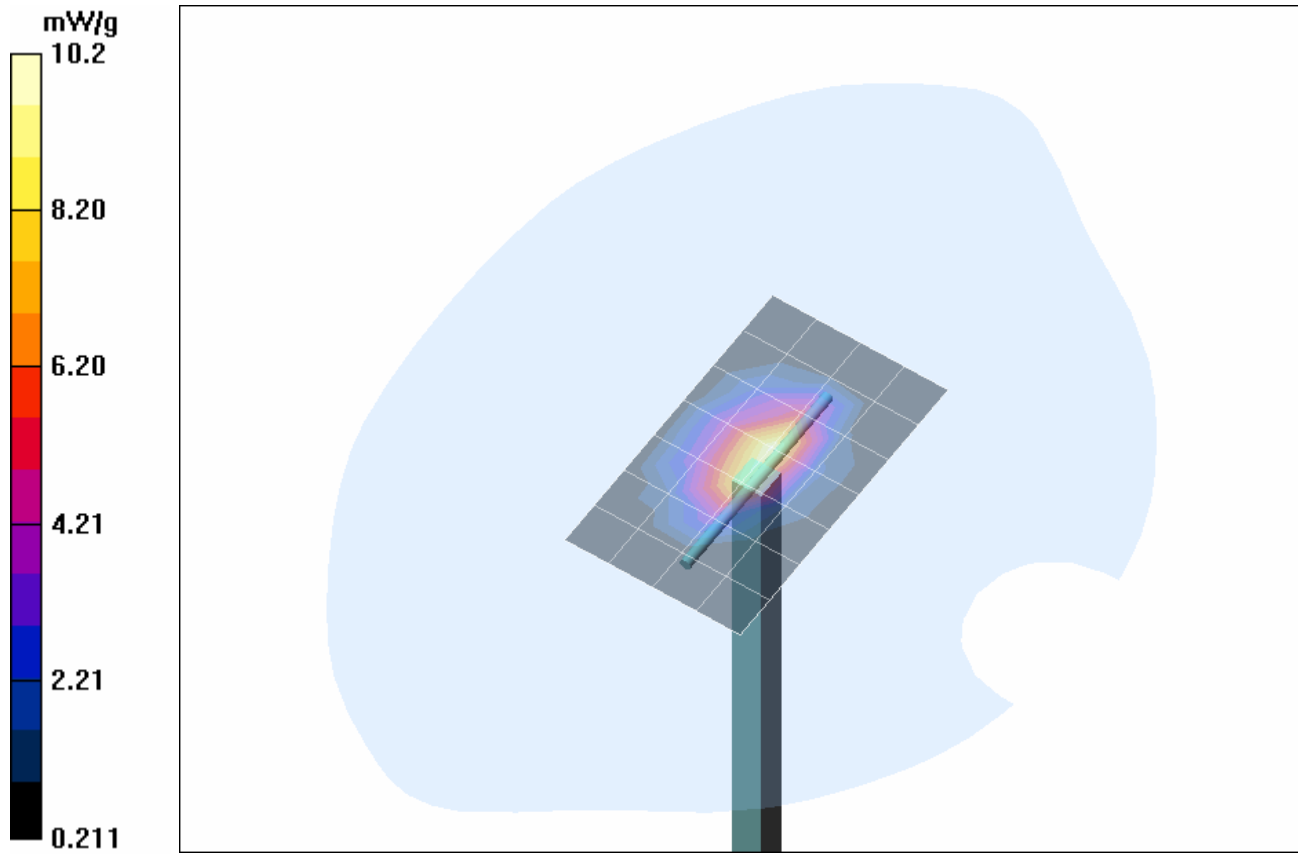
Maximum value of SAR (measured) = 10.2 mW/g

Validation Dipole Freq.	Dielectric Parameter Frequency	Probe Calibration Frequency	Probe Calibration Conversion Factor	Measured SAR (1g)		1800 MHz System Validation Target (1g)		Deviation from Target	Extrapolated Peak SAR	1800 MHz System Validation Peak Target		Deviation from Target	
				mW/g	9.41	mW/g	Dev.			%	mW/g		Dev.
MHz	MHz	MHz	Body										
1800	1610	1640 ±50MHz	4.7	Test 1	9.41	10.5	< 15%	-10.38	Test 1	20.8	23.3	< 15%	-10.6
	1610	1640 ±50MHz	4.7	Test 2	9.40	10.5	< 15%	-10.48	Test 2	20.8	23.3	< 15%	-10.6
	1610	1640 ±50MHz	4.7	Test 3	9.53	10.5	< 15%	-9.24	Test 3	21.1	23.3	< 15%	-9.4
	1610	1640 ±50MHz	4.7	Test 4	9.55	10.5	< 15%	-9.05	Test 4	21.1	23.3	< 15%	-9.4
	1610	1640 ±50MHz	4.7	Test 5	9.46	10.5	< 15%	-9.90	Test 5	20.9	23.3	< 15%	-10.2
Standard Deviation			0.068	Mean	9.47	10.5	< 15%	-9.80	Mean	20.9	23.3	< 15%	-10.2
Coefficient of Variation			0.7 %			SPEAG Target	Deviation	SPEAG Target			Deviation		
Limit = < 2 %			9.63			< 15%	-1.66%	16.88			< 15%	+23.9%	

Notes (per FCC OET Application Note: SAR Probe Calibration and System Verification Considerations for Measurements at 150MHz-3GHz; see reference 7):

- alternate system verification method A procedure does not apply to this evaluation because the return loss of the 1800 MHz dipole does not meet the -15 dB requirement at the 1610 MHz test device frequency.
- The dipole return loss meets the -15 dB spec required for alternate system verification method B.
- Analysis of probe conversion factors at dipole and device frequencies shows a SAR variation of 0.58%.
- The tissue dielectric parameters measured at the dipole frequency (1800 MHz) are within ±10% of those required at that frequency.
- The extrapolated peak SAR for 1610 MHz was 20.9 mW/g (mean). The target for extrapolated peak SAR at 1800 MHz is 16.88 (SPEAG) for a 250 mW dipole feedpoint power. Subsequently, the extrapolated peak SAR for the 1610 MHz validations is 23.9% above the target. The probe conversion factor for 1610 MHz was calculated numerically and does not have the boundary effect correction factors alpha and delta. These correction factors allow for the SAR values for measurements close to the surface of the phantom with reduced boundary effect. This lack of boundary effect compensation provides a more conservative SAR estimate and will not cause a compliance issue in this case.



Company:	Axonm, LLC	FCC ID:	L2V-PT1	IC ID:	3989A-PT1	Freq.:	1611.25 - 1618.75 MHz	
Model(s):	Satellite Personal Tracker (SPT)		DUT:	Body-worn Portable Personal Tracking Device				
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## Dipole Return Loss





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### Estimated SAR Changes Due to Probe Conversion Factors

Formulae used for calculating SAR from measured values taken from DASY4 manual.

$$V = U + U^2(cf/dcp)$$

Where:

V = compensated signal of the given channel

U = input signal of the given channel

Cf = Crest factor of exciting field

Dcp = diode compression point

In the conversion factor files for 1610 MHz and 1800 MHz the dcp is the same. Therefore the compensated signal resulting from any one measurement will be the same if calculated from any other set of conversion factors.

$$E = \text{root}(V/(\text{Norm} * \text{ConvF}))$$

Where:

V = compensated signal of the given channel

Norm = sensor sensitivity of given channel


ConvF = sensitivity enhancement in solution



In the conversion factor files for the 1387 the Norm is slightly different and has been used for the respective conversion factor. In the following tables, the calculation of E from V, Norm and ConvF are displayed. The Total is performed by  $\text{root}(E_x^2 + E_y^2 + E_z^2)$  and the percent difference is calculated and displayed on the bottom line.

	1640 MHz	1800 MHz
ConvF	4.7	4.8
Vx	18917.50	18917.50
Vy	4929.09	4929.09
Vz	5249.57	5249.57
Ex	6732.25	6784.00
Ey	1728.60	1715.46
Ez	1840.99	1827.00
Total	7190.30	7232.11
% Diff	0	0.58


Where: Normx = 1.62 Normy = 1.72 Normz = 1.72 Dcp = 92mV



Where: Normx = 1.68 Normy = 1.73 Normz = 1.73 Dcp = 92mV

<b>Company:</b>	<b>Axon, LLC</b>	<b>FCC ID:</b>	<b>L2V-PT1</b>	<b>IC ID:</b>	<b>3989A-PT1</b>	<b>Freq.:</b>	<b>1611.25 - 1618.75 MHz</b>	
<b>Model(s):</b>	<b>Satellite Personal Tracker (SPT)</b>		<b>DUT:</b>	<b>Body-worn Portable Personal Tracking Device</b>				
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## APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS

<b>Company:</b>	<b>Axonon, LLC</b>	<b>FCC ID:</b>	<b>L2V-PT1</b>	<b>IC ID:</b>	<b>3989A-PT1</b>	<b>Freq.:</b>	<b>1611.25 - 1618.75 MHz</b>	
<b>Model(s):</b>	<b>Satellite Personal Tracker (SPT)</b>		<b>DUT:</b>	<b>Body-worn Portable Personal Tracking Device</b>				
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## 1610 MHz System Validation & DUT Evaluation (Body)


\*\*\*\*\*



Celltech Labs Inc.  
Test Result for UIM Dielectric Parameter  
Wed 10/Oct/2007  
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
1.5000	53.94	1.33	52.31	1.25
1.5100	53.92	1.34	52.30	1.26
1.5200	53.91	1.34	52.22	1.27
1.5300	53.90	1.35	52.24	1.28
1.5400	53.89	1.36	52.13	1.29
1.5500	53.88	1.36	52.13	1.29
1.5600	53.86	1.37	51.97	1.30
1.5700	53.85	1.38	51.99	1.31
1.5800	53.84	1.38	51.89	1.32
1.5900	53.83	1.39	51.95	1.33
1.6000	53.81	1.39	51.94	1.34
1.6100	53.80	1.40	51.80	1.34
1.6200	53.77	1.41	51.84	1.36
1.6300	53.75	1.41	51.81	1.36
1.6400	53.72	1.42	51.83	1.38
1.6500	53.69	1.43	51.78	1.38
1.6600	53.67	1.43	51.72	1.39
1.6700	53.64	1.44	51.68	1.40
1.6800	53.62	1.44	51.62	1.40
1.6900	53.59	1.45	51.64	1.41
1.7000	53.56	1.46	51.67	1.43
1.7100	53.54	1.46	51.60	1.43
1.7200	53.51	1.47	51.61	1.44
1.7300	53.48	1.48	51.58	1.46
1.7400	53.46	1.48	51.62	1.47
1.7500	53.43	1.49	51.50	1.48
1.7600	53.41	1.49	51.52	1.48
1.7700	53.38	1.50	51.44	1.50
1.7800	53.35	1.51	51.44	1.51
1.7900	53.33	1.51	51.39	1.52
1.8000	53.30	1.52	51.25	1.53

<b>Company:</b>	Axon, LLC	<b>FCC ID:</b>	L2V-PT1	<b>IC ID:</b>	3989A-PT1	<b>Freq.:</b>	1611.25 - 1618.75 MHz	
<b>Model(s):</b>	Satellite Personal Tracker (SPT)		<b>DUT:</b>	Body-worn Portable Personal Tracking Device				
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**APPENDIX D - SAR TEST SETUP & DUT PHOTOGRAPHS**



<b>Company:</b>	<b>Axon, LLC</b>	<b>FCC ID:</b>	<b>L2V-PT1</b>	<b>IC ID:</b>	<b>3989A-PT1</b>	<b>Freq.:</b>	<b>1611.25 - 1618.75 MHz</b>	
<b>Model(s):</b>	<b>Satellite Personal Tracker (SPT)</b>		<b>DUT:</b>	<b>Body-worn Portable Personal Tracking Device</b>				
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**BODY SAR TEST SETUP PHOTOGRAPHS**  
**Front Side of DUT Touching SAM Phantom (Planar Section)**  
**DUT with Lanyard Accessory**




<b>Company:</b>	<b>Axon, LLC</b>	<b>FCC ID:</b>	<b>L2V-PT1</b>	<b>IC ID:</b>	<b>3989A-PT1</b>	<b>Freq.:</b>	<b>1611.25 - 1618.75 MHz</b>	
<b>Model(s):</b>	<b>Satellite Personal Tracker (SPT)</b>	<b>DUT:</b>	<b>Body-worn Portable Personal Tracking Device</b>					
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**BODY SAR TEST SETUP PHOTOGRAPHS**  
**Back Side of DUT Touching SAM Phantom (Planar Section)**  
**DUT with Lanyard Accessory (Belt-Clip Removed)**




<b>Company:</b>	<b>Axonn, LLC</b>	<b>FCC ID:</b>	<b>L2V-PT1</b>	<b>IC ID:</b>	<b>3989A-PT1</b>	<b>Freq.:</b>	<b>1611.25 - 1618.75 MHz</b>	
<b>Model(s):</b>	<b>Satellite Personal Tracker (SPT)</b>	<b>DUT:</b>	<b>Body-worn Portable Personal Tracking Device</b>					
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	<u>Test Report Issue Date</u> October 26, 2007	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

**BODY SAR TEST SETUP PHOTOGRAPHS**  
**0.5 cm Belt-Clip Spacing from Back of DUT to SAM Phantom (Planar Section)**  
**DUT with Belt-Clip Accessory**




<b>Company:</b>	<b>Axonm, LLC</b>	<b>FCC ID:</b>	<b>L2V-PT1</b>	<b>IC ID:</b>	<b>3989A-PT1</b>	<b>Freq.:</b>	<b>1611.25 - 1618.75 MHz</b>	
<b>Model(s):</b>	<b>Satellite Personal Tracker (SPT)</b>	<b>DUT:</b>	<b>Body-worn Portable Personal Tracking Device</b>					
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	<u>Test Report Issue Date</u> October 26, 2007	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

**DUT PHOTOGRAPHS**



<b>Company:</b> Axonn, LLC	<b>FCC ID:</b> L2V-PT1	<b>IC ID:</b> 3989A-PT1	<b>Freq.:</b> 1611.25 - 1618.75 MHz	
<b>Model(s):</b> Satellite Personal Tracker (SPT)	<b>DUT:</b> Body-worn Portable Personal Tracking Device			
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	<u>Date(s) of Evaluation</u> October 10, 2007	<u>Test Report Serial No.</u> 092707L2V-T855-S25S	<u>Test Report Revision No.</u> Revision 1.1	 Certificate No. 2470.01
	<u>Test Report Issue Date</u> October 26, 2007	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

**DUT PHOTOGRAPHS**



**Left Side of DUT with Belt-Clip**




**Right Side of DUT with Belt-Clip**





**DUT Battery Compartment**



**Energizer Lithium AA Batteries (x2)**


<b>Company:</b>	<b>Axon, LLC</b>	<b>FCC ID:</b>	<b>L2V-PT1</b>	<b>IC ID:</b>	<b>3989A-PT1</b>	<b>Freq.:</b>	<b>1611.25 - 1618.75 MHz</b>	
<b>Model(s):</b>	<b>Satellite Personal Tracker (SPT)</b>		<b>DUT:</b>	<b>Body-worn Portable Personal Tracking Device</b>				
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	<u>Date(s) of Evaluation</u> October 10, 2007	<u>Test Report Serial No.</u> 092707L2V-T855-S25S	<u>Test Report Revision No.</u> Revision 1.1	 Certificate No. 2470.01
	<u>Test Report Issue Date</u> October 26, 2007	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

**DUT PHOTOGRAPHS**





**DUT with Lanyard Accessory**

<b>Company:</b>	Axon, LLC	<b>FCC ID:</b>	L2V-PT1	<b>IC ID:</b>	3989A-PT1	<b>Freq.:</b>	1611.25 - 1618.75 MHz	
<b>Model(s):</b>	Satellite Personal Tracker (SPT)		<b>DUT:</b>	Body-worn Portable Personal Tracking Device				
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	<u>Date(s) of Evaluation</u> October 10, 2007	<u>Test Report Serial No.</u> 092707L2V-T855-S25S	<u>Test Report Revision No.</u> Revision 1.1	 Certificate No. 2470.01
	<u>Test Report Issue Date</u> October 26, 2007	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

**APPENDIX E - SYSTEM VALIDATION**

<b>Company:</b>	<b>Axon, LLC</b>	<b>FCC ID:</b>	<b>L2V-PT1</b>	<b>IC ID:</b>	<b>3989A-PT1</b>	<b>Freq.:</b>	<b>1611.25 - 1618.75 MHz</b>	
<b>Model(s):</b>	<b>Satellite Personal Tracker (SPT)</b>		<b>DUT:</b>	<b>Body-worn Portable Personal Tracking Device</b>				
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	Date of Evaluation:	October 10, 2007	Document Serial No.:	SV1800M-101007-R1.0	
	Evaluation Type:	System Validation	Validation Dipole:	1800 MHz	Fluid Type:

## 1800 MHz SYSTEM VALIDATION

Type:

**1800 MHz Validation Dipole**

Asset Number:

**00021**

Serial Number:

**247**

Place of Validation:

**Celltech Labs Inc.**

Date of Validation:

**October 10, 2007**

Celltech Labs Inc. certifies that the 1800 MHz System Validation was performed on the date indicated above.

This system validation document is valid only for the SAR evaluations performed on same date for Celltech Test Report Serial No.: 092707L2V-T855-S25S in accordance with the procedures described in FCC OET Application Note - SAR Probe Calibration and System Verification Considerations for Measurements at 150 MHz - 3 GHz (01-07 Rev. 1.1).

Performed by:

**Cheri Frangiadakis**

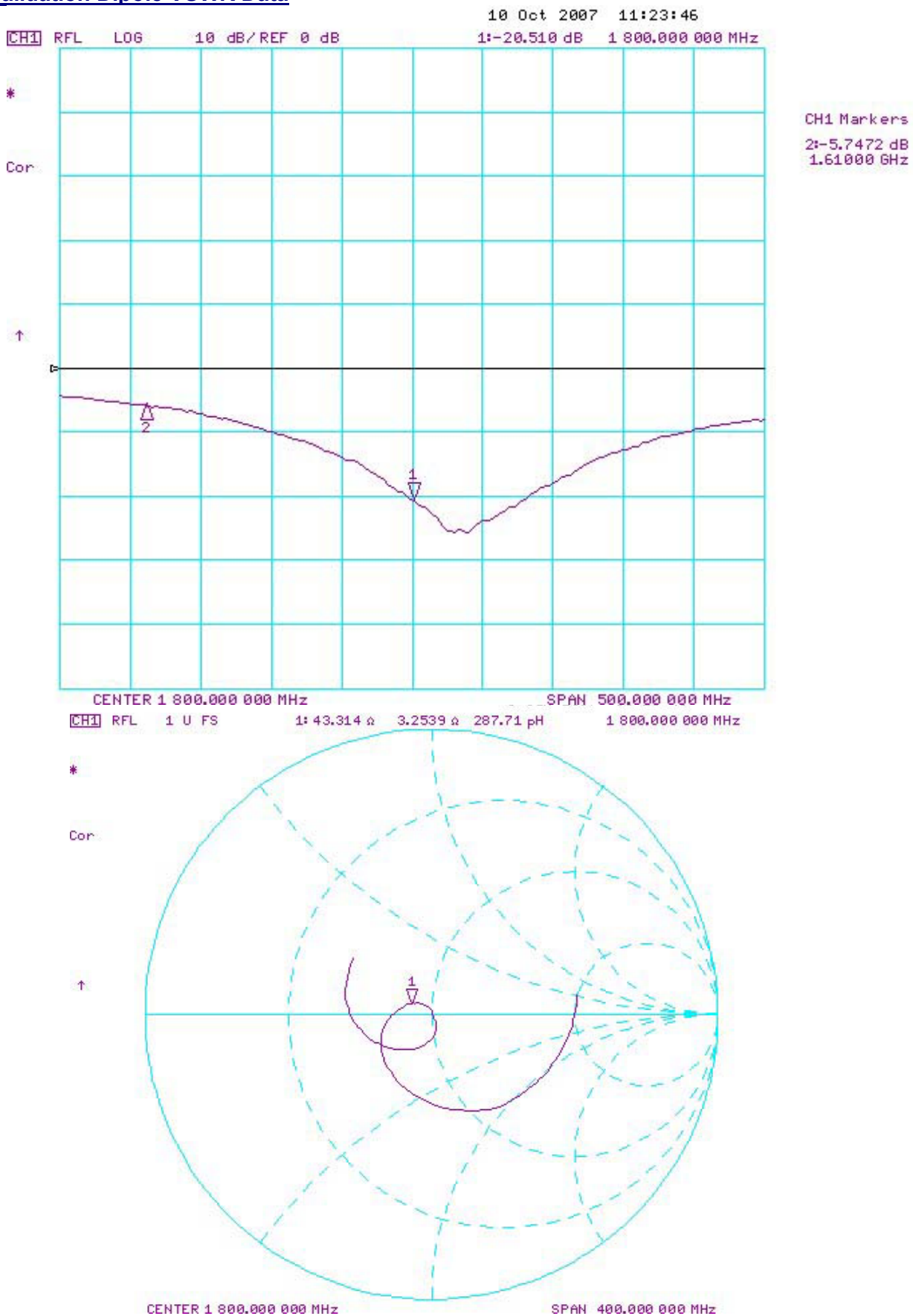
Approved by:

**Sean Johnston**





## 2. Validation Dipole VSWR Data



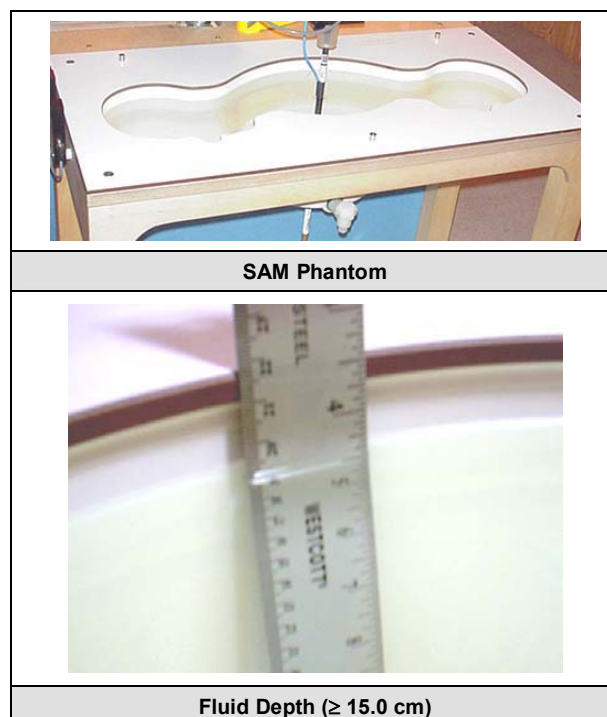
### 3. Validation Dipole Dimensions

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
<b>1800</b>	<b>72.0</b>	<b>41.7</b>	<b>3.6</b>
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. 1800 MHz System Validation Setup



	Date of Evaluation:	October 10, 2007	Document Serial No.:	SV1800M-101007-R1.0	
	Evaluation Type:	System Validation	Validation Dipole:	1800 MHz	Fluid Type:

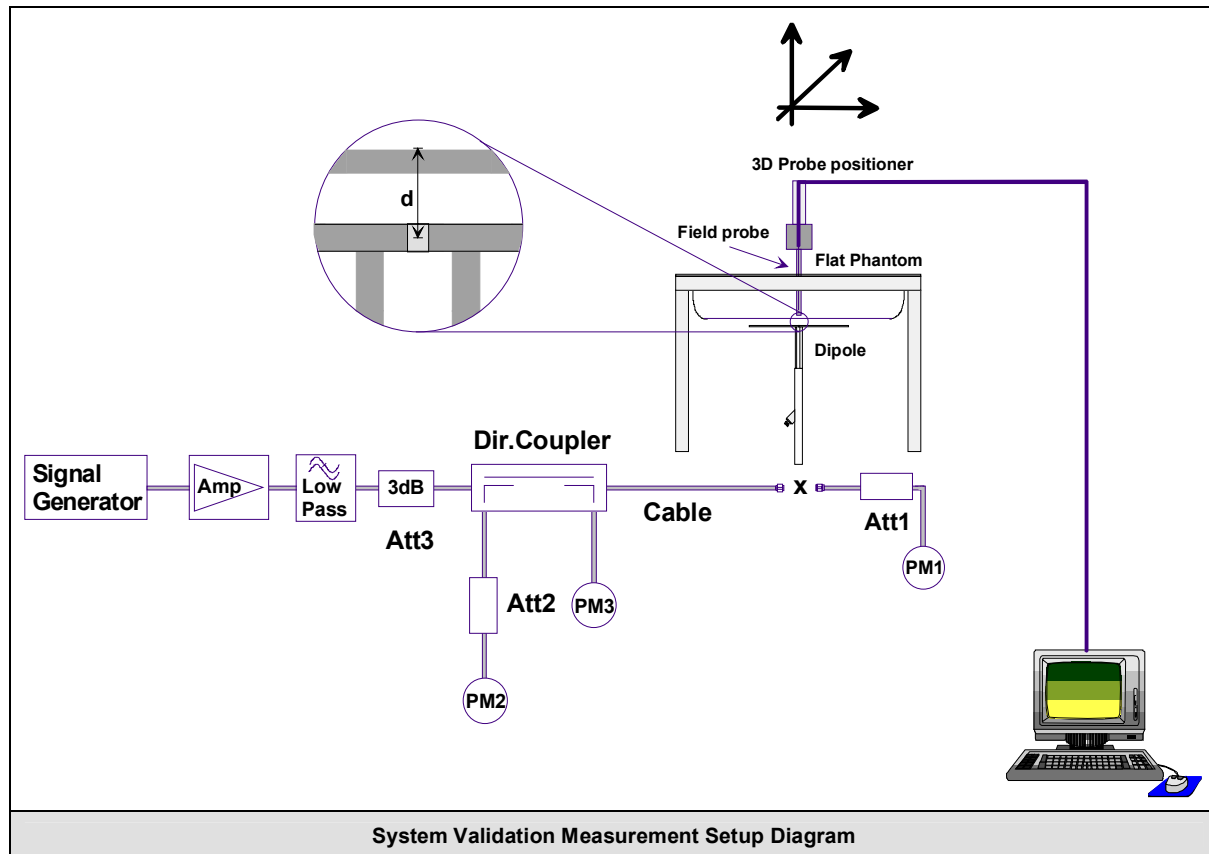
## 6. 1800 MHz Validation Dipole Setup



## 7. SAR Measurement

Measurements were made using a dosimetric E-field probe ET3DV6 (S/N: 1387, Conversion Factor 4.8). The SAR measurement was performed with the E-field probe in mechanical and optical detection mode. 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.





## 8. Measurement Conditions

The SAM phantom was filled with 1800 MHz Body tissue simulant.

Relative Permittivity: 51.0 (-4.3% deviation from target)  
 Conductivity: 1.48 mho/m (-2.5% deviation from target)  
 Fluid Temperature: 23.5 °C  
 Fluid Depth: ≥ 15.0 cm

Environmental Conditions:  
 Ambient Temperature: 24.5 °C  
 Barometric Pressure: 102.5 kPa  
 Humidity: 41%

The 1800 MHz Body tissue simulant consisted of the following ingredients:


Ingredient	Percentage by weight
Water	70.17%
Glycol	29.43%
Salt	0.40%
<b>IEEE Target Dielectric Parameters:</b>	<b><math>\epsilon_r = 53.3 (+/-5\%)</math>    <math>\sigma = 1.52 \text{ S/m} (+/-5\%)</math></b>

## 9. 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
<b>9.63</b>	<b>+/- 10%</b>	10.5	+9.1%	<b>38.5</b>	<b>+/- 10%</b>	42.0	+9.1%
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
<b>5.08</b>	<b>+/- 10%</b>	5.3	+4.5%	<b>20.3</b>	<b>+/- 10%</b>	21.2	+4.5%

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:	October 10, 2007	Document Serial No.:	SV1800M-101007-R1.0
	Evaluation Type:	System Validation	Validation Dipole:	1800 MHz
			Fluid Type:	Body

## System Validation - 1800 MHz Dipole - Oct. 10, 2007

**DUT: Dipole 1800 MHz; Asset: 00021; Serial: 247**

Ambient Temp: 24.5 °C; Fluid Temp: 23.5 °C; Barometric Pressure: 102.5 kPa; Humidity: 41%

Communication System: CW

Forward Conducted Power: 250 mW

Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: M1800 Medium parameters used:  $f = 1800 \text{ MHz}$ ;  $\sigma = 1.48 \text{ mho/m}$ ;  $\epsilon_r = 51.0$ ;  $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1387; ConvF(4.8, 4.8, 4.8); Calibrated: 18/12/2006
- Sensor-Surface: 4 mm (Mechanical and Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 10/07/2007
- Phantom: SAM 4.0; Type: Fibreglas; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

### 1800 MHz System Performance Check/Area Scan (5x8x1):

Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (measured) = 10.8 mW/g

### 1800 MHz System Performance Check/Zoom Scan (7x7x7)/Cube 0:

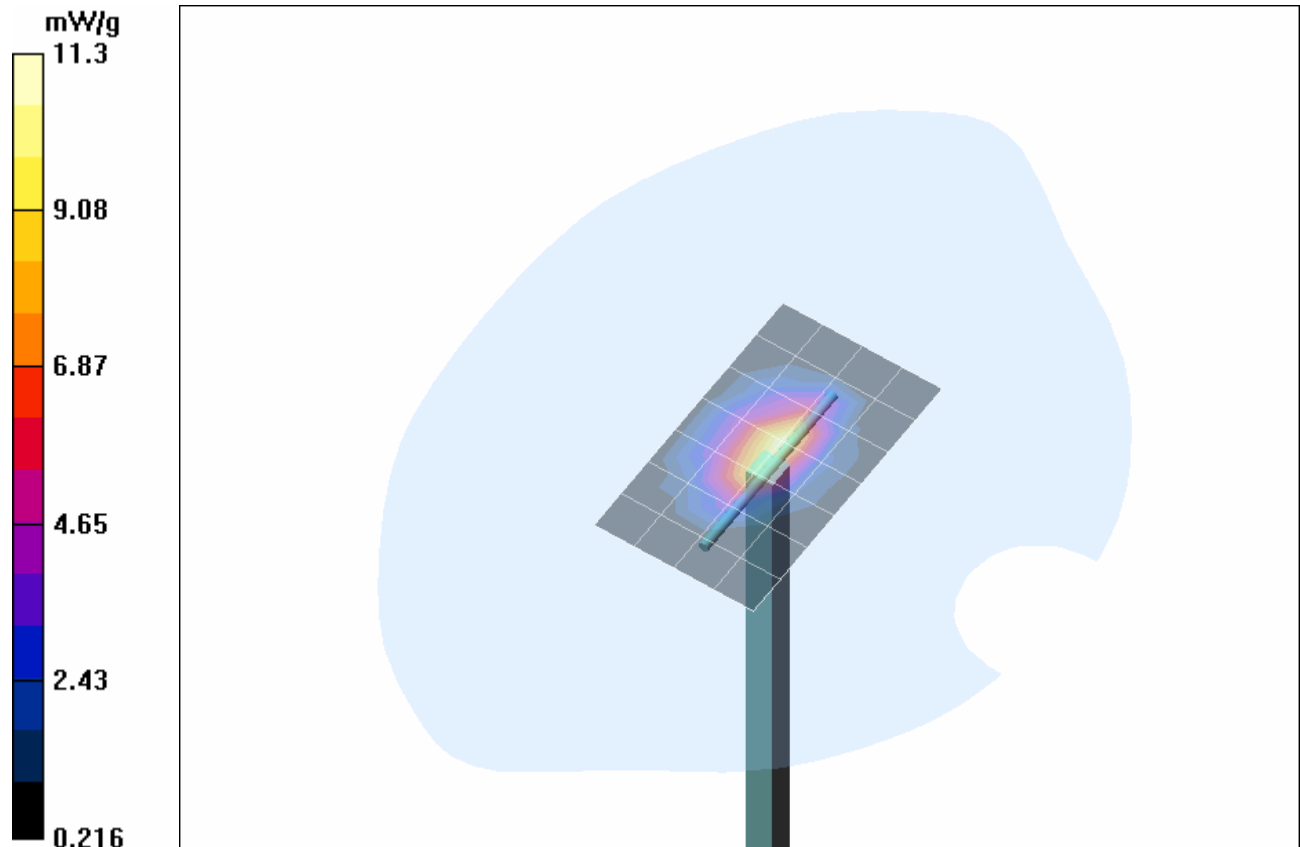
Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

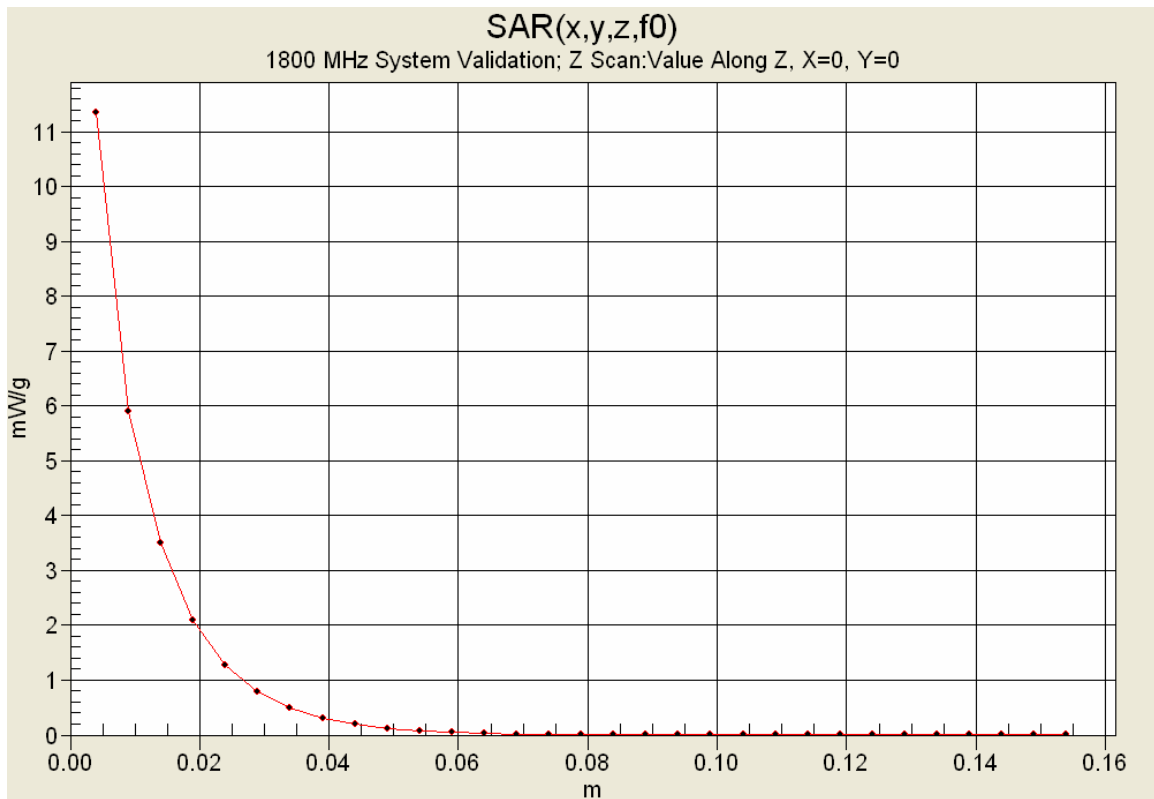
Reference Value = 86.4 V/m; Power Drift = 0.006 dB

Peak SAR (extrapolated) = 23.3 W/kg

**SAR(1 g) = 10.5 mW/g; SAR(10 g) = 5.3 mW/g**

Maximum value of SAR (measured) = 11.3 mW/g





### 10. Measured Fluid Dielectric Parameters

\*\*\*\*\*

Celltech Labs Inc.

Test Result for UIM Dielectric Parameter

Wed 10/Oct/2007

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
1.7000	53.56	1.46	51.26	1.36
1.7100	53.54	1.46	51.20	1.37
1.7200	53.51	1.47	51.13	1.38
1.7300	53.48	1.48	51.25	1.40
1.7400	53.46	1.48	51.27	1.40
1.7500	53.43	1.49	51.14	1.42
1.7600	53.41	1.49	51.04	1.43
1.7700	53.38	1.50	51.11	1.45
1.7800	53.35	1.51	51.17	1.46
1.7900	53.33	1.51	51.01	1.46
1.8000	53.30	1.52	51.02	1.48
1.8100	53.30	1.52	51.03	1.49
1.8200	53.30	1.52	50.94	1.49
1.8300	53.30	1.52	50.90	1.51
1.8400	53.30	1.52	50.84	1.52
1.8500	53.30	1.52	50.87	1.53
1.8600	53.30	1.52	50.82	1.55
1.8700	53.30	1.52	50.67	1.55
1.8800	53.30	1.52	50.73	1.56
1.8900	53.30	1.52	50.75	1.57
1.9000	53.30	1.52	50.73	1.59

	Date of Evaluation:	October 10, 2007	Document Serial No.:	SV1800M-101007-R1.0	
	Evaluation Type:	System Validation	Validation Dipole:	1800 MHz	Fluid Type:



## 11. 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 (1850 MHz) <sup>2</sup>	8	Normal	1	1	8.0	∞
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	8.2	Rectangular	1.732050808	1	4.7	∞
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)	2.5	Normal	1	0.64	1.6	∞
Liquid permittivity (target)	5	Rectangular	1.732050808	0.6	1.7	∞
Liquid permittivity (measured)	4.3	Normal	1	0.6	2.6	∞
<b>Combined Standard Uncertainty</b>					<b>11.72</b>	
<b>Expanded Uncertainty (k=2)</b>					<b>23.44</b>	
<b>Notes</b>	1. Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 and IEC 62209-1:2005.					
	2. 1850 MHz probe conversion factor was assessed numerically in December 2006. Since then, the probe (ET3DV6 SN: 1387) has been recalibrated in March 2007; however the 1850 MHz frequency was not reassessed. It is our assumption based on the conversion factor comparisons shown below that the probe conversion factor at 1850 MHz would not change by any more than 1% if numerically reassessed. Based on this assumption the probe calibration uncertainty value was increased by 1% based on changes in conversion factor observed at 835 MHz and 900 MHz for same probe (ET3DV6 SN:1387) within the period of March 2004 - March 2007 as shown below:					
	835 MHz ConvF - 03/18/04 = 6.24	835 MHz ConvF - 03/16/07 = 6.18	Conversion Factor Change = < 1%			
900 MHz ConvF - 03/18/05 = 6.10	900 MHz ConvF - 03/16/06 = 6.04	Conversion Factor Change = < 1%				


	Date of Evaluation:	October 10, 2007	Document Serial No.:	SV1800M-101007-R1.0	
	Evaluation Type:	System Validation	Validation Dipole:	1800 MHz	Fluid Type:

## 12. 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	10Jul07	10Jul08
SPEAG ET3DV6 E-Field Probe	00016	1387	16Mar07	16Mar08
SPEAG SAM Phantom V4.0C	00154	1033	N/A	N/A
HP 85070C Dielectric Probe Kit	00033	US39240170	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

	<u>Date(s) of Evaluation</u> October 10, 2007	<u>Test Report Serial No.</u> 092707L2V-T855-S25S	<u>Test Report Revision No.</u> Revision 1.1	 Certificate No. 2470.01
	<u>Test Report Issue Date</u> October 26, 2007	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

## APPENDIX G - SAM PHANTOM CERTIFICATE OF CONFORMITY

<b>Company:</b>	<b>Axonon, LLC</b>	<b>FCC ID:</b>	<b>L2V-PT1</b>	<b>IC ID:</b>	<b>3989A-PT1</b>	<b>Freq.:</b>	<b>1611.25 - 1618.75 MHz</b>	
<b>Model(s):</b>	<b>Satellite Personal Tracker (SPT)</b>		<b>DUT:</b>	<b>Body-worn Portable Personal Tracking Device</b>				
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# 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

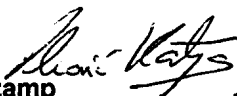
(\*) The IT'IS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of [1] and [3].

### 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**



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