




	<u>Date(s) of Evaluation</u> June 30, 2009	<u>Test Report Serial No.</u> 062909TS5-T971-S24C	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> July 06, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

<b>SAR TEST REPORT (FCC/IC)</b>			
<b>RF EXPOSURE EVALUATION</b>		<b>SPECIFIC ABSORPTION RATE</b>	
<b>MANUFACTURER / APPLICANT</b>		SENDUM WIRELESS CORPORATION	
<b>DEVICE UNDER TEST (DUT)</b>		ANKLE-WORN TRACKING BRACELET	
<b>DEVICE TRANSMITTER(S)</b>		DUAL-BAND CDMA 2000 (1xRTT)	
<b>DEVICE MODEL(S)</b>		ET300	
<b>DEVICE IDENTIFIER(S)</b>	<b>FCC ID:</b>	TS5-6055M-ET300	
	<b>IC:</b>	6234A-6055MET300	
<b>APPLICATION TYPE</b>	<b>FCC/IC</b>	Certification	
<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 65, Supp. C (01-01)	KDB 447498 D01 v03r03
		KDB 941225 D01 v02	KDB 450824 D01 v01r01
	<b>IC</b>	RSS-102 Issue 2	
	<b>IEEE</b>	1528-2003	
	<b>IEC</b>	62209-1:2005	
<b>FCC DEVICE CLASSIFICATION(S)</b>	PCS Licensed Transmitter worn on body (PCT)		47 CFR §24(E)
<b>IC DEVICE CLASSIFICATION(S)</b>	2 GHz Personal Communication Services		RSS-133 Issue 5
	800 MHz Cell. Phones Employing New Tech.		RSS-132 Issue 2
<b>RF EXPOSURE CATEGORY</b>	General Population / Uncontrolled		
<b>RF EXPOSURE EVALUATION(S)</b>	Ankle-worn (Extremity)		
<b>TEST REPORT SERIAL NO.</b>	062909TS5-T971-S24C		
<b>TEST REPORT REVISION NO.</b>	Revision 1.0	Initial Release	July 06, 2009
<b>TEST REPORT SIGNATORIES</b>	<b>Testing Performed By</b>		<b>Test Report Prepared By</b>
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<b>TEST LAB ACCREDITATION(S)</b>	 Test Lab Certificate No. 2470.01		

<b>Company:</b>	Sendum Wireless Corporation	<b>FCC ID:</b>	TS5-6055M-ET300	<b>IC:</b>	6234A-6055MET300	<b>Sendum</b>
<b>Model(s):</b>	ET300	<b>DUT Type:</b>	Dual-Band Cellular/PCS CDMA 1xRTT Ankle-worn Tracking Bracelet			
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## DECLARATION OF COMPLIANCE SAR RF EXPOSURE EVALUATION


<b>Test Lab Information</b>	<b>Name</b>	CELLTECH LABS INC.		<b>Address</b>	21-364 Lougheed Road, Kelowna, B.C. V1X 7R8 Canada		
<b>Applicant Information</b>	<b>Name</b>	SENDUM WIRELESS CORP.		<b>Address</b>	4500 Beedie Street, Burnaby, B.C. V5J 5L2 Canada		
<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)		KDB 447498 D01 v03r03			
		KDB 941225 D01 v02		KDB 450824 D01 v01r01			
	<b>IC</b>	RSS-102 Issue 2	<b>IEEE</b>	1528-2003	<b>IEC</b>	62209-1:2005	
	<b>Note</b>	Currently there are no standardized SAR test procedures for evaluating the extremities; therefore the test procedures for a body-worn device were implemented (including FCC KDB Inquiry Tracking Number 580205).					
<b>Device Classification(s)</b>	<b>FCC</b>	PCS Licensed Transmitter worn on body (PCT)		47 CFR §24(E)			
	<b>IC</b>	2 GHz Personal Communication Services		RSS-133 Issue 5			
800 MHz Cellular Telephones Employing New Technologies		RSS-132 Issue 2					
<b>RF Exposure Category</b>	<b>FCC/IC</b>	General Population / Uncontrolled Environment					
<b>Device Identifier(s)</b>	<b>FCC ID:</b>	TS5-6055M-ET300					
	<b>IC</b>	6234A-6055MET300					
<b>Device Description</b>	Ankle-worn Tracking Bracelet with Dual-Band CDMA						
<b>Device Model(s)</b>	ET300		<b>Test Sample Serial No.</b>	Unit 2 (Identical Prototype)			
<b>Transmit Frequency Range(s)</b>	824.70 - 848.31 MHz (Cellular CDMA)			1851.25 - 1908.75 MHz (PCS CDMA)			
<b>Transmission Protocol</b>	CDMA 2000 1xRTT		<b>Mode(s) of Operation Tested</b>	"Bits Hold" (alternative Up/Down Bits)			
<b>Manufacturer's Duty Cycle Spec.</b>	<b>Normal</b>	< 5 secs every 30 minutes		<b>Maximum</b>	< 5 secs every 1 minute		
<b>Manufacturer's Rated Power</b>	<b>Cellular</b>	24 dBm (+/- 0.5 dB) Conducted		<b>PCS</b>	23.5 dBm (+/- 0.5 dB) Conducted		
<b>Max. RF Output Power Tested</b>	<b>Band</b>	<b>Frequency</b>	<b>Channel</b>	<b>dBm</b>	<b>Watts</b>	<b>Measurement Method</b>	
	Cellular	836.52 MHz	384	24.3	0.269	Average Conducted	
	PCS	1880.00 MHz	600	23.9	0.245	Average Conducted	
<b>Antenna Type(s) Tested</b>	Internal Tri-Band (CDMA / GPS Rx)		<b>Co-located Tx</b>	None	<b>Co-located Antenna(s)</b>	Beacon (Receive only)	
<b>Power Source(s) Tested</b>	Lithium-ion Battery		3.7V	2150mAh		Panasonic CGR18650CG	
<b>Body-worn Accessories Tested</b>	None (The ankle strap was cut off at the outside edges of the DUT in order for the inner facing surface to touch the planar phantom section. The ankle strap sections removed from the DUT do not contain any metal components. The ankle strap attachment section is attached to the DUT with 4 metal screws which were attached to the DUT for the SAR evaluations.)						
<b>Audio Accessories Tested</b>	None (not applicable - the DUT does not support voice operations)						
<b>Max. SAR Level(s) Evaluated</b>	<b>ANKLE (Extremity)</b>	<b>0.851 W/kg</b>	10g average	PCS Band	<b>FCC/IC Spatial Peak SAR Limit</b>	4.0 W/kg (averaged over 10g)	
		<b>0.971 W/kg</b>	10g average	Cellular Band		General Population Exposure	
<p>Celltech Labs Inc. declares under its sole responsibility that this wireless portable 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 standards and procedures specified in FCC OET Bulletin 65, Supplement C (Edition 01-01), Industry Canada RSS-102 Issue 2, IEEE Standard 1528-2003 and IEC International Standard 62209-1:2005. 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>The results and statements contained in this report pertain only to the device(s) evaluated.</p> <p>This test report shall not be reproduced partially, or in full, without the prior written approval of Celltech Labs Inc.</p>							
<b>Test Report Approved By</b>			<b>Sean Johnston</b>	<b>Celltech Labs Inc.</b>			





<b>Company:</b>	Sendum Wireless Corporation	<b>FCC ID:</b>	TS5-6055M-ET300	<b>IC:</b>	6234A-6055MET300	<b>Sendum</b>
<b>Model(s):</b>	ET300	<b>DUT Type:</b>	Dual-Band Cellular/PCS CDMA 1xRTT Ankle-worn Tracking Bracelet			
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<b>Model(s):</b>	<b>ET300</b>	<b>DUT Type:</b>	<b>Dual-Band Cellular/PCS CDMA 1xRTT Ankle-worn Tracking Bracelet</b>			
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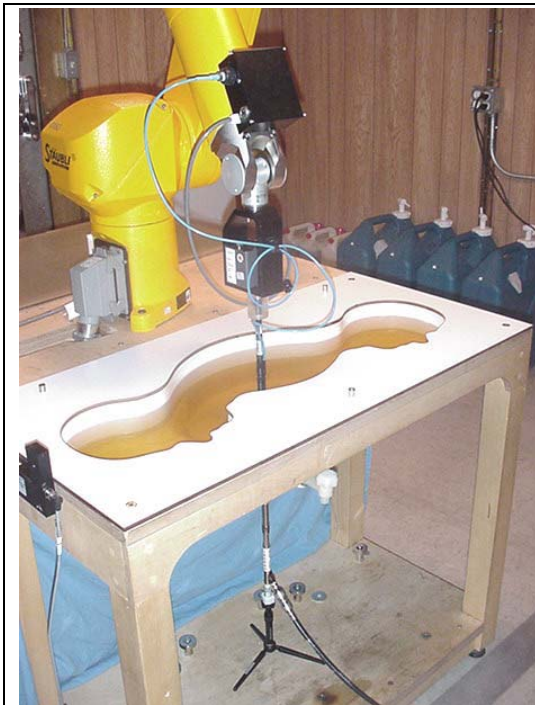
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## 1.0 INTRODUCTION

This measurement report demonstrates that the Sendum Wireless Corporation Model: ET300 Dual-Band CDMA 1xRTT Ankle-worn Tracking Bracelet complies with the Extremity SAR (Specific Absorption Rate) RF exposure requirements specified in FCC 47 CFR §2.1093 (see reference [1]) and Health Canada's Safety Code 6 (see reference [2]) for the General Population / Uncontrolled Exposure environment. The test procedures described in FCC OET Bulletin 65, Supplement C, Edition 01-01 (see reference [3]), IC RSS-102 Issue 2 (see reference [4]), IEEE Standard 1528-2003 (see reference [5]) and International Standard IEC 62209-1:2005 (see reference [6]) 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 utilizes a controller with a built in VME-bus computer.





DASY4 System with SAM Twin Phantom V4.0C



DASY4 Measurement Server

<b>Company:</b>	Sendum Wireless Corporation	<b>FCC ID:</b>	TS5-6055M-ET300	<b>IC:</b>	6234A-6055MET300	Sendum
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### 3.0 OUTPUT POWER MEASUREMENTS



#### Power Measurement Procedures

This procedure assumes the Anritsu MT8820A Radio Communication Analyzer contains the following applications installed and with valid license. The RF conducted output power measurements were performed in accordance with the procedures described in FCC KDB 941225 D01 v02 (SAR Measurement Procedures for 3G Devices - see reference [9]).

#### 1xRTT

- Cell info → Cell Parameters → System ID (SID) → 331 (for Cellular) and 331 (for PCS)  
→ Network ID (NID) → 1

RF CONDUCTED OUTPUT POWER MEASUREMENT RESULTS					
Band	Radio Configuration	Service Option	Ch 1013	Ch 384	Ch 777
			824.70 MHz	836.52 MHz	848.31 MHz
			Pavg (dBm)	Pavg (dBm)	Pavg (dBm)
Cellular	RC1	SO55	24.3	24.2	24.2
	RC3	SO32	24.4	24.3	24.2
	RC3	SO55	24.2	24.2	24.2
Band	Radio Configuration	Service Option	Ch 25	Ch 600	Ch 1175
			1851.25 MHz	1880.00 MHz	1908.75 MHz
			Pavg (dBm)	Pavg (dBm)	Pavg (dBm)
PCS	RC1	SO55	23.9	23.8	24.0
	RC3	SO32	23.9	23.9	24.0
	RC3	SO55	23.9	23.8	24.0

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## 4.0 MEASUREMENT SUMMARY

### SAR EVALUATION RESULTS



Freq. Band	Freq.	Chan.	Batt. Type	Test Mode	Radio Config.	Service Option	DUT Position to Planar Phantom Section	Antenna Distance to Planar Phantom Section	Cond. Power Before Test	SAR Drift During Test	Measured SAR		
	MHz										ANKLE		
											W/kg	Aver.	
850	836.52	384	Li-ion	CDMA 1xRTT	RC3	SO32	Inner Surface Touch Position (1.5 mm curve gap)	3.0 cm	24.3	0.212	0.851	10g	
1900	1880.00	600	Li-ion	CDMA 1xRTT	RC3	SO32	Inner Surface Touch Position (1.5 mm curve gap)	3.0 cm	23.9	-0.062	0.971	10g	
<b>SAR SAFETY LIMIT(S)</b>						<b>ANKLE (EXTREMITY)</b>		<b>SPATIAL PEAK</b>	<b>RF EXPOSURE CATEGORY</b>				
FCC 47 CFR 2.1093			Health Canada Safety Code 6			4.0 W/kg		10g average	General Population / Uncontrolled				
<b>Test Date(s)</b>	June 30, 2009				June 30, 2009				<b>Fluid Type</b>	<b>835 Body</b>	<b>1900 Body</b>	<b>Unit</b>	
<b>Dielectric Constant <math>\epsilon_r</math></b>	<b>835 MHz Body</b>				<b>1880 MHz Body</b>				<b>Relative Humidity</b>		35	35	%
	<b>IEEE Target</b>		<b>Meas.</b>	<b>Dev.</b>	<b>IEEE Target</b>		<b>Meas.</b>	<b>Dev.</b>	<b>Atmospheric Pressure</b>		101.1	101.1	kPa
	55.2	± 5%	54.2	-1.8%	53.3	± 5%	52.7	-1.1%	<b>Ambient Temperature</b>		23.0	23.2	°C
<b>Conductivity <math>\sigma</math> (mho/m)</b>	<b>835 MHz Body</b>				<b>1880 MHz Body</b>				<b>Fluid Temperature</b>		23.5	23.8	°C
	<b>IEEE Target</b>		<b>Meas.</b>	<b>Dev.</b>	<b>IEEE Target</b>		<b>Meas.</b>	<b>Dev.</b>	<b>Fluid Depth</b>		≥ 15	≥ 15	cm
	0.97	± 5%	0.96	-1.0%	1.52	± 5%	1.54	+1.3%	<b><math>\rho</math> (Kg/m<sup>3</sup>)</b>		1000		

## 5.0 DETAILS OF SAR EVALUATION

The Sendum Wireless Corporation Model: ET300 Dual-Band CDMA 1xRTT Ankle-worn Tracking Bracelet 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.

- Detailed measurement data and plots showing the maximum SAR location of the DUT are reported in Appendix A.
- The DUT was tested for ankle-worn SAR with the inner facing surface placed parallel to, and touching, the outer surface of the SAM phantom (planar section). The ankle strap was cut off at the side edges of the DUT prior to the SAR evaluations in order to place the DUT in a parallel touch position against the outer surface of the planar phantom section (per FCC KDB Inquiry Tracking Number 580205). The ankle strap does not contact any metal components. The curvature of the DUT provides a 1.5 mm spacing from inner surface to planar phantom section.
- SAR evaluation for the outward facing surface of the DUT was not required (per FCC KDB Inquiry Tracking Number 580205).
- Currently there are no standardized SAR test procedures for evaluating the extremities; therefore the test procedures for a body-worn device were implemented (including FCC KDB Inquiry Tracking Number 580205).
- The DUT battery was fully charged prior to the SAR evaluations.
- The SAR drift of the DUT measured by the DASY4 system during the SAR evaluations was within 5% from the start power.
- The SAR evaluations were performed with an air-link communication established between the DUT and Anritsu MT8820A Radio Communication Analyzer in accordance with the procedures described in FCC KDB 941225 D01 v02 (SAR Measurement Procedures for 3G Devices - see reference [9]).
- 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.
- The dielectric parameters of the simulated tissue mixtures were measured prior to the SAR evaluations using an HP 85070C Dielectric Probe Kit and an HP 8753ET Network Analyzer (see Appendix C).

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## 6.0 EVALUATION PROCEDURES

- a. (i) The evaluation was performed in the applicable area of the phantom depending on the type of device being tested. For devices held to the ear during normal operation, both the left and right ear positions were evaluated using the SAM phantom.  
(ii) For body-worn and face-held devices a planar phantom was used.
- b. The SAR was determined by a pre-defined procedure within the DASY4 software. Upon completion of a reference and optical surface check, the exposed region of the phantom was scanned near the inner surface with a grid spacing of 15mm x 15mm.  
An area scan was determined as follows:
- c. Based on the defined area scan grid, a more detailed grid is created to increase the points by a factor of 10. The interpolation function then evaluates all field values between corresponding measurement points.
- d. A linear search is applied to find all the candidate maxima. Subsequently, all maxima are removed that are >2 dB from the global maximum. The remaining maxima are then used to position the cube scans.  
A 1g and 10g spatial peak SAR was determined as follows:
- e. Extrapolation is used to determine the values between the dipole center of the probe and the surface of the phantom. For E-Field Probe EX3DV4 this data cannot be measured because the center of the dipole sensors is 1.0 mm away from the probe tip and the distance between the probe and the boundary must be larger than 25% of the probe diameter. The probe diameter is 2.4 mm (see probe calibration document in Appendix F). In the DASY4 software, the distance between the sensor center and phantom surface is set to 2.0 mm. This provides a distance of 1.0 mm between the probe tip and the surface. For E-Field Probe ET3DV6 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 of the values between the dipole center and the surface of the phantom was based on trivariate quadratics computed from the previously calculated 3D interpolated points nearest the phantom surface.
- f. Interpolated data is used to calculate the average SAR over 1g and 10g cubes by spatially discretizing the entire measured cube. The volume used to determine the averaged SAR is a 1mm grid (42875 interpolated points).
- g. A zoom scan volume of 32 mm x 32 mm x 30 mm (5 x 5 x 7 points) centered at the peak SAR location determined from the area scan is used for all zoom scans for devices with a transmit frequency < 800 MHz. Zoom scans for frequencies ≥ 800 MHz are determined with a scan volume of 30 mm x 30 mm x 30 mm (7 x 7 x 7) to ensure complete capture of the peak spatial-average SAR.

## 7.0 SAR PROBE CALIBRATION & MEASUREMENT FREQUENCIES



The following procedures are recommended for measurements at 150 MHz - 3 GHz to minimize probe calibration and tissue dielectric parameter discrepancies. In general, SAR measurements below 300 MHz should be within ±50 MHz of the probe calibration frequency. At 300 MHz to 3 GHz, measurements should be within ±100 MHz of the probe calibration frequency. Measurements exceeding 50% of these intervals, ±25 MHz < 300 MHz and ±50 MHz ≥300 MHz, require additional steps (per FCC KDB 450824 D01 v01r01, SAR Probe Calibration and System Verification Considerations for Measurements at 150 MHz - 3 GHz - see reference [8]).

Probe Calibration Freq.	Device Measurement Freq.	Frequency Interval	+50 MHz ≥ 300 MHz
835 MHz	836.52 MHz	1.52 MHz	< 50 MHz
1810 MHz	1880.00 MHz	70 MHz	> 50 MHz

The probe calibration and measurement frequency interval is > 50 MHz; therefore the following additional steps were implemented (per FCC KDB 450824 D01 v01r01): *The measured 1-g SAR may be compensated with respect to +5% tolerances in  $\epsilon_r$  and -5% tolerances in  $\sigma$ , computed according to valid SAR sensitivity data, to reduce SAR underestimation and maintain conservativeness.* SAR sensitivity data is reported below (per SPEAG DASY4 Manual - see reference [10]).

Probe Calibration Frequency = 1810 MHz				Nominal Probe Target Dielectric Parameters (BODY):				53.3 $\epsilon_r$	1.52 $\sigma$
Frequency	Tissue	$\sigma$ (+/-)	Sensitivity	$\epsilon_r$ (+/-)	Sensitivity	% Change	Measured SAR	Compensated SAR	
1880 MHz	Body	+1.3%	n/a	-4.8%	n/a	n/a	0.971 10g	n/a 10g	

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## 8.0 SYSTEM PERFORMANCE CHECK

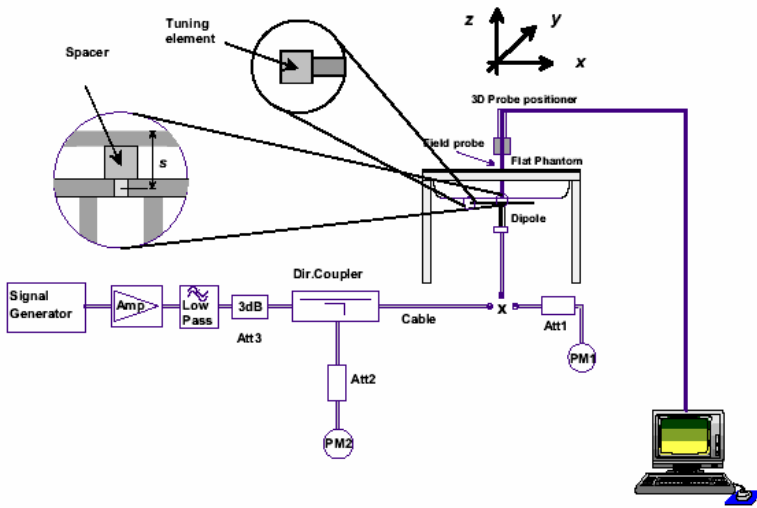
Prior to the SAR evaluations daily system checks were performed at the planar section of the SAM phantom with 835 MHz and 1900 MHz SPEAG dipoles (see Appendix B for system performance check test plots) in accordance with the procedures described in IEEE Standard 1528-2003 (see reference [5]) and International Standard IEC 62209-1:2005 (see reference [6]). A forward power of 250 mW was applied to the dipole and the system was verified to a tolerance of  $\pm 10\%$  from the system manufacturer's dipole calibration target SAR value (see Appendix E for system manufacturer's dipole calibration procedures).

### SYSTEM PERFORMANCE CHECK EVALUATION RESULTS

Test Date	Fluid Freq. (MHz)	SAR 10g (W/kg)			Dielectric Constant $\epsilon_r$			Conductivity $\sigma$ (mho/m)			$\rho$ (Kg/m <sup>3</sup> )	Amb. Temp. (°C)	Fluid Temp. (°C)	Fluid Depth (cm)	Humid. (%)	Barom. Press. (kPa)
		SPEAG Target	Meas.	Dev.	SPEAG Target	Meas.	Dev.	SPEAG Target	Meas.	Dev.						
Jun 30	835	1.64 $\pm 10\%$	1.57	-4.3%	53.9 $\pm 5\%$	54.2	+0.6%	1.01 $\pm 5\%$	0.96	-5.0%	1000	23.0	23.5	$\geq 15$	35	101.1
Jun 30	1900	5.62 $\pm 10\%$	5.28	-6.0%	54.9 $\pm 5\%$	52.6	-4.2%	1.56 $\pm 5\%$	1.56	0.0%	1000	23.2	23.8	$\geq 15$	35	101.1

**Notes**

1. The target SAR values are the nominal values from the dipole calibration performed by SPEAG (see Appendix E).
2. The target dielectric parameters are the nominal values from the dipole calibration performed by SPEAG (see Appendix E).
3. The fluid temperature was measured prior to and after the system performance check to ensure the temperature remained within  $\pm 2^\circ\text{C}$  of the fluid temperature reported during the dielectric parameter measurements.
4. The dielectric parameters of the simulated tissue mixture were measured prior to the system performance check using a Dielectric Probe Kit and a Network Analyzer (see Appendix C).




**System Performance Check Measurement Setup (IEEE Standard 1528-2003)**





**835 MHz Validation Dipole Setup**



**1900 MHz Validation Dipole Setup**

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## 9.0 SIMULATED EQUIVALENT TISSUES

The simulated equivalent Body tissue recipe in the table below is derived from the SAR system manufacturer's suggested recipe in the DASY4 manual (see reference [11]) in accordance with the procedures and requirements specified in IEEE Standard 1528-2003 (see reference [5]) and IEC Standard 62209-1:2005 (see reference [6]). The ingredient percentage may have been adjusted minimally in order to achieve the appropriate target dielectric parameters within the specified tolerance.



PCS BAND TISSUE MIXTURE		
INGREDIENT	1900 MHz Body	1880 MHz Body
	System Performance Check	DUT Evaluation
Water	69.85 %	69.85 %
Glycol Monobutyl	29.89 %	29.89 %
Salt	0.26 %	0.26 %

CELL BAND TISSUE MIXTURE		
INGREDIENT	835 MHz Body	835 MHz Body
	System Performance Check	DUT Evaluation
Water	53.79 %	53.79 %
Sugar	45.13 %	45.13 %
Salt	0.98 %	0.98 %
Bactericide	0.10 %	0.10 %

## 10.0 SAR LIMITS

SAR RF EXPOSURE LIMITS			
FCC 47 CFR 2.1093	Health Canada Safety Code 6	(General Population / Uncontrolled Exposure)	(Occupational / Controlled Exposure)
Spatial Average (averaged over the whole body)		0.08 W/kg	0.4 W/kg
Spatial Peak (averaged over any 1 g of tissue)		1.6 W/kg	8.0 W/kg
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)		<b>4.0 W/kg</b>	20.0 W/kg
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.			



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## 11.0 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>	
<u>Probe (Cell Band)</u>	
<b>Model</b>	ET3DV6
<b>Serial No.</b>	1590
<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>Probe (PCS Band)</u>	
<b>Model</b>	EX3DV4
<b>Serial No.</b>	3600
<b>Construction</b>	Symmetrical design with triangular core
<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 Twin Phantom V4.0C
<b>Shell Material</b>	Fiberglass
<b>Thickness</b>	2.0 ±0.1 mm
<b>Volume</b>	Approx. 25 liters

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## 12.0 PROBE SPECIFICATIONS

### ET3DV6 E-Field Probe

**Construction:** Symmetrical design with triangular core  
 Built-in shielding against static charges  
 PEEK enclosure material (resistant to organic solvents, glycol)

**Calibration:** In air from 10 MHz to 2.5 GHz  
 In brain simulating tissue at frequencies of 900 MHz and 1.8 GHz (accuracy  $\pm 8\%$ )

**Frequency:** 10 MHz to > 6 GHz; Linearity:  $\pm 0.2$  dB (30 MHz to 3 GHz)

**Directivity:**  $\pm 0.2$  dB in brain tissue (rotation around probe axis)  
 $\pm 0.4$  dB in brain tissue (rotation normal to probe axis)

**Dynamic Range:**  $5 \mu\text{W/g}$  to > 100 mW/g; Linearity:  $\pm 0.2$  dB

**Surface Detect:**  $\pm 0.2$  mm repeatability in air and clear liquids over diffuse reflecting surfaces

**Dimensions:** Overall length: 330 mm; Tip length: 16 mm  
 Body diameter: 12 mm; Tip diameter: 6.8 mm  
 Distance from probe tip to dipole centers: 2.7 mm

**Application:** General dosimetry up to 3 GHz  
 Compliance tests of mobile phone



ET3DV6 E-Field Probe

### EX3DV4 E-Field Probe

**Construction:** Symmetrical design with triangular core  
 Built-in shielding against static charges  
 PEEK enclosure material (resistant to organic solvents, e.g. DGBE)

**Calibration:** Basic Broadband Calibration in air: 10-3000 MHz  
 Conversion Factors (CF) for HSL 900 and HSL 1750

**Frequency:** 10 MHz to >6 GHz; Linearity:  $\pm 0.2$  dB (30 MHz to 3 GHz)

**Directivity:**  $\pm 0.3$  dB in HSL (rotation around probe axis)  
 $\pm 0.5$  dB in tissue material (rotation normal to probe axis)

**Dynamic Range:**  $10 \mu\text{W/g}$  to >100 mW/g; Linearity:  $\pm 0.2$  dB  
 (noise: typically <  $1 \mu\text{W/g}$ )

**Dimensions:** Overall length: 330 mm (Tip: 20 mm)  
 Tip diameter: 2.5 mm (Body: 12 mm)  
 Typical distance from probe tip to dipole centers: 1.0 mm

**Application:** High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better than 30%.



EX3DV4 E-Field Probe

## 13.0 SAM TWIN PHANTOM V4.0C

The SAM Twin 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 Twin Phantom V4.0C).



SAM Twin Phantom V4.0C



## 14.0 DEVICE HOLDER

The DASY4 device holder has two scales for device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The plane between the ear openings and the mouth tip has a rotation angle of 65°. The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections.




Device Holder



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## 15.0 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	CNR	CNR
x	-Robot	00046	599396-01	CNR	CNR
x	-DAE4	00019	353	28Apr09	28Apr10
x	-ET3DV6 E-Field Probe	00017	1590	21Jul08	21Jul09
x	-EX3DV4 E-Field Probe	00213	3600	28Apr09	28Apr10
x	-D835V2 Validation Dipole	00217	4d075	20Apr09	20Apr10
x	-D1900V2 Validation Dipole	00218	5d107	21Apr09	21Apr10
x	-SAM Twin Phantom V4.0C	00154	1033	CNR	CNR
x	HP 85070C Dielectric Probe Kit	00033	none	CNR	CNR
x	HP E4408B Spectrum Analyzer	00015	US39240170	23Apr08	21Jul09
x	Gigatronics 8652A Power Meter	00007	1835272	23Apr08	21Jul09
x	Gigatronics 80701A Power Sensor	00014	1833699	23Apr08	21Jul09
x	HP 8753ET Network Analyzer	00134	US39170292	28Apr08	28Apr10
x	Anritsu MT8820A Radio Communication Analyzer	00208	6200241241	CNR	CNR
x	Rohde & Schwarz SMR20 Signal Generator	00006	100104	CNR	CNR
x	Amplifier Research 5S1G4 Power Amplifier	00106	26235	CNR	CNR
Abbr.	CNR = Calibration Not Required				



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## 16.0 MEASUREMENT UNCERTAINTIES


UNCERTAINTY BUDGET FOR DEVICE EVALUATION									
Uncertainty Component	IEEE 1528 Section	Uncertainty Value ±%	Probability Distribution	Divisor	ci 1g	ci 10g	Uncertainty Value ±% (1g)	Uncertainty Value ±% (10g)	V <sub>i</sub> or V <sub>eff</sub>
<b>Measurement System</b>									
Probe Calibration (835 MHz)	E.2.1	5.5	Normal	1	1	1	5.5	5.5	∞
Axial Isotropy	E.2.2	4.7	Rectangular	1.732050808	0.7	0.7	1.9	1.9	∞
Hemispherical Isotropy	E.2.2	9.6	Rectangular	1.732050808	0.7	0.7	3.9	3.9	∞
Boundary Effect	E.2.3	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	Rectangular	1.732050808	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	0.3	Normal	1	1	1	0.3	0.3	∞
Response Time	E.2.7	0.8	Rectangular	1.732050808	1	1	0.5	0.5	∞
Integration Time	E.2.8	2.6	Rectangular	1.732050808	1	1	1.5	1.5	∞
RF Ambient Conditions	E.6.1	3	Rectangular	1.732050808	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	Rectangular	1.732050808	1	1	0.2	0.2	∞
Probe Positioning wrt Phantom Shell	E.6.3	2.9	Rectangular	1.732050808	1	1	1.7	1.7	∞
Extrapolation, interpolation & integration algorithms for max. SAR evaluation	E.5	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
<b>Test Sample Related</b>									
Test Sample Positioning	E.4.2	2.9	Normal	1	1	1	2.9	2.9	12
Device Holder Uncertainty	E.4.1	3.6	Normal	1	1	1	3.6	3.6	8
SAR Drift Measurement	6.6.2	5	Rectangular	1.732050808	1	1	2.9	2.9	∞
<b>Phantom and Tissue Parameters</b>									
Phantom Uncertainty	E.3.1	4	Rectangular	1.732050808	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2	5	Rectangular	1.732050808	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measured)	E.3.3	1	Normal	1	0.64	0.43	0.6	0.4	∞
Liquid Permittivity (target)	E.3.2	5	Rectangular	1.732050808	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measured)	E.3.3	1.8	Normal	1	0.6	0.49	1.1	0.9	∞
<b>Combined Standard Uncertainty</b>			<b>RSS</b>				<b>10.43</b>	<b>10.26</b>	
<b>Expanded Uncertainty (95% Confidence Interval)</b>			<b>k=2</b>				<b>20.85</b>	<b>20.52</b>	
<b>Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 and IEC International Standard 62209-1:2005</b>									



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## MEASUREMENT UNCERTAINTIES (Cont.)

UNCERTAINTY BUDGET FOR DEVICE EVALUATION									
Uncertainty Component	IEEE 1528 Section	Uncertainty Value ±%	Probability Distribution	Divisor	ci 1g	ci 10g	Uncertainty Value ±% (1g)	Uncertainty Value ±% (10g)	V <sub>i</sub> or V <sub>eff</sub>
<b>Measurement System</b>									
Probe Calibration (1810 MHz)	E.2.1	5.5	Normal	1	1	1	5.5	5.5	∞
Axial Isotropy	E.2.2	4.7	Rectangular	1.732050808	0.7	0.7	1.9	1.9	∞
Hemispherical Isotropy	E.2.2	9.6	Rectangular	1.732050808	0.7	0.7	3.9	3.9	∞
Boundary Effect	E.2.3	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	Rectangular	1.732050808	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	0.3	Normal	1	1	1	0.3	0.3	∞
Response Time	E.2.7	0.8	Rectangular	1.732050808	1	1	0.5	0.5	∞
Integration Time	E.2.8	2.6	Rectangular	1.732050808	1	1	1.5	1.5	∞
RF Ambient Conditions	E.6.1	3	Rectangular	1.732050808	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	Rectangular	1.732050808	1	1	0.2	0.2	∞
Probe Positioning wrt Phantom Shell	E.6.3	2.9	Rectangular	1.732050808	1	1	1.7	1.7	∞
Extrapolation, interpolation & integration algorithms for max. SAR evaluation	E.5	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
<b>Test Sample Related</b>									
Test Sample Positioning	E.4.2	2.9	Normal	1	1	1	2.9	2.9	12
Device Holder Uncertainty	E.4.1	3.6	Normal	1	1	1	3.6	3.6	8
SAR Drift Measurement	6.6.2	5	Rectangular	1.732050808	1	1	2.9	2.9	∞
<b>Phantom and Tissue Parameters</b>									
Phantom Uncertainty	E.3.1	4	Rectangular	1.732050808	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2	5	Rectangular	1.732050808	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measured)	E.3.3	1.3	Normal	1	0.64	0.43	0.8	0.6	∞
Liquid Permittivity (target)	E.3.2	5	Rectangular	1.732050808	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measured)	E.3.3	1.1	Normal	1	0.6	0.49	0.7	0.5	∞
<b>Combined Standard Uncertainty</b>			<b>RSS</b>				<b>10.41</b>	<b>10.24</b>	
<b>Expanded Uncertainty (95% Confidence Interval)</b>			<b>k=2</b>				<b>20.81</b>	<b>20.48</b>	
Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 and IEC International Standard 62209-1:2005									



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## 17.0 REFERENCES

- [1] Federal Communications Commission - "Radiofrequency radiation exposure evaluation: portable devices", Rule Part 47 CFR §2.1093.
- [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] International Standard IEC 62209-1:2005 - "Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures."
- [7] Federal Communications Commission, Office of Engineering and Technology - "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies"; KDB 447498 D01 v03r03: January 2009.
- [8] Federal Communications Commission, Office of Engineering and Technology - "Application Note: SAR Probe Calibration and System Verification Considerations for Measurements at 150 MHz - 3 GHz"; KDB 450824 D01 v01r01: January 2007.
- [9] Federal Communications Commission, Office of Engineering and Technology - "SAR Measurement Procedures for 3G Devices"; KDB 941225 D01 v02: October 2007.
- [10] Schmid & Partner Engineering AG - DASY4 Manual V4.6, Chapter 21 Application Note, SAR Sensitivities: Sept. 2005.
- [11] Schmid & Partner Engineering AG - DASY4 Manual V4.6, Chapter 18 Application Note, Body Tissue Recipe: Sept. 2005.



<b>Company:</b>	<b>Sendum Wireless Corporation</b>	<b>FCC ID:</b>	<b>TS5-6055M-ET300</b>	<b>IC:</b>	<b>6234A-6055MET300</b>	<b>Sendum</b>
<b>Model(s):</b>	<b>ET300</b>	<b>DUT Type:</b>	<b>Dual-Band Cellular/PCS CDMA 1xRTT Ankle-worn Tracking Bracelet</b>			
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	<u>Date(s) of Evaluation</u> June 30, 2009	<u>Test Report Serial No.</u> 062909TS5-T971-S24C	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> July 06, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

## APPENDIX A - SAR MEASUREMENT DATA

<b>Company:</b>	<b>Sendum Wireless Corporation</b>	<b>FCC ID:</b>	<b>TS5-6055M-ET300</b>	<b>IC:</b>	<b>6234A-6055MET300</b>	<b>Sendum</b>
<b>Model(s):</b>	<b>ET300</b>	<b>DUT Type:</b>	<b>Dual-Band Cellular/PCS CDMA 1xRTT Ankle-worn Tracking Bracelet</b>			
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	<u>Date(s) of Evaluation</u> June 30, 2009	<u>Test Report Serial No.</u> 062909TS5-T971-S24C	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> July 06, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

Date Tested: 06/30/2009

### Ankle-worn SAR - Cellular Band - CDMA 1xRTT - Inner Facing Surface of DUT - 836.52 MHz

**DUT: Sendum Wireless; Model: ET300; Type: Dual-Band CDMA 1xRTT Ankle-worn Tracking Bracelet; Serial: Unit 2**

Ambient Temp: 23.0°C; Fluid Temp: 23.5°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CDMA 1xRTT

Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: M835 Medium parameters used:  $f = 836.62 \text{ MHz}$ ;  $\sigma = 0.96 \text{ mho/m}$ ;  $\epsilon_r = 54.2$ ;  $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(6.39, 6.39, 6.39); Calibrated: 21/07/2008

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

- Electronics: DAE4 Sn353; Calibrated: 28/04/2009

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

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

### Ankle-worn SAR - Inner Facing Surface of DUT Touching Planar Phantom Section (1.5 mm curvature air-gap)

**Area Scan (7x10x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (measured) = 1.11 mW/g

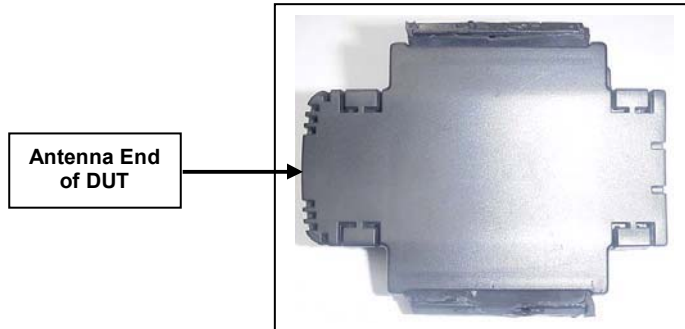
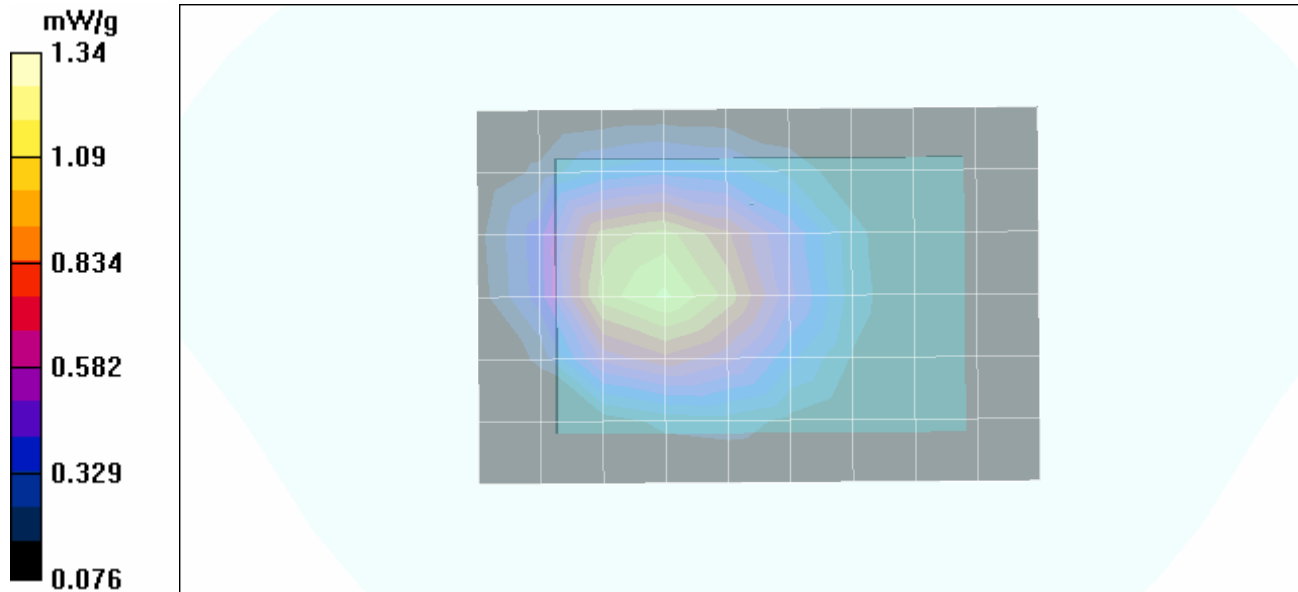
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 30.0 V/m; Power Drift = 0.212 dB



Peak SAR (extrapolated) = 1.60 W/kg

**SAR(10 g) = 0.851 mW/g**

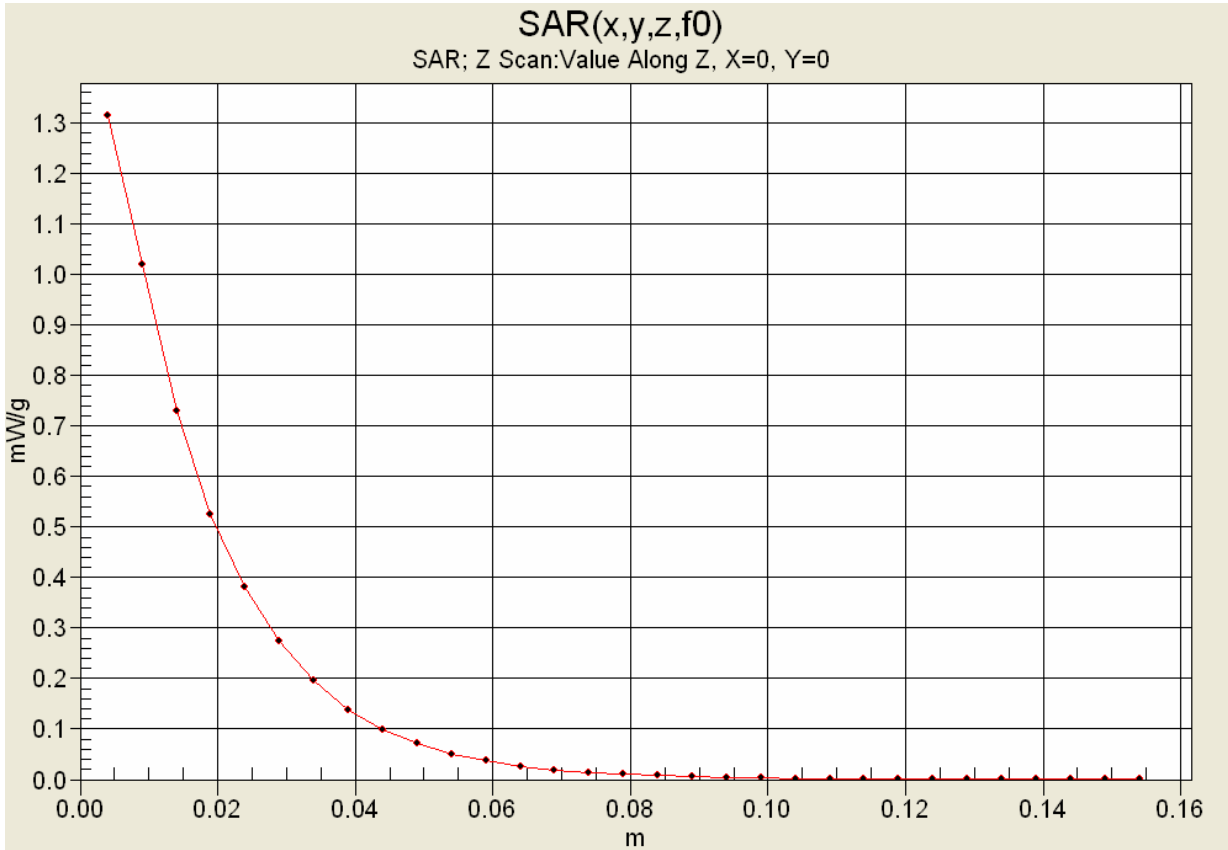
Maximum value of SAR (measured) = 1.34 mW/g





<b>Company:</b>	Sendum Wireless Corporation	<b>FCC ID:</b>	TS5-6055M-ET300	<b>IC:</b>	6234A-6055MET300	Sendum
<b>Model(s):</b>	ET300	<b>DUT Type:</b>	Dual-Band Cellular/PCS CDMA 1xRTT Ankle-worn Tracking Bracelet			
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	<u>Date(s) of Evaluation</u> June 30, 2009	<u>Test Report Serial No.</u> 062909TS5-T971-S24C	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> July 06, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

### Z-Axis Scan



<b>Company:</b>	Sendum Wireless Corporation	<b>FCC ID:</b>	TS5-6055M-ET300	<b>IC:</b>	6234A-6055MET300	<b>Sendum</b>
<b>Model(s):</b>	ET300	<b>DUT Type:</b>	Dual-Band Cellular/PCS CDMA 1xRTT Ankle-worn Tracking Bracelet			
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	<u>Date(s) of Evaluation</u> June 30, 2009	<u>Test Report Serial No.</u> 062909TS5-T971-S24C	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> July 06, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

Date Tested: 06/30/2009

**Ankle-worn SAR - PCS Band - CDMA 1xRTT - Inner Facing Surface of DUT - 1880.00 MHz**

**DUT: Sendum Wireless; Model: ET300; Type: Dual-Band CDMA 1xRTT Ankle-worn Tracking Bracelet; Serial: Unit 2**

Ambient Temp: 23.2°C; Fluid Temp: 23.8°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CDMA 1xRTT

Frequency: 1880.00 MHz; Duty Cycle: 1:1

Medium: M1880 Medium parameters used:  $f = 1880 \text{ MHz}$ ;  $\sigma = 1.54 \text{ mho/m}$ ;  $\epsilon_r = 52.7$ ;  $\rho = 1000 \text{ kg/m}^3$

- Probe: EX3DV4 - SN3600; ConvF(6.68, 6.68, 6.68); Calibrated: 28/04/2009

- Sensor-Surface: 3mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn353; Calibrated: 28/04/2009

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

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

**Ankle-worn SAR - Inner Facing Surface of DUT Touching Planar Phantom Section (1.5 mm curvature air-gap)**

**Area Scan (7x10x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (measured) = 2.14 mW/g

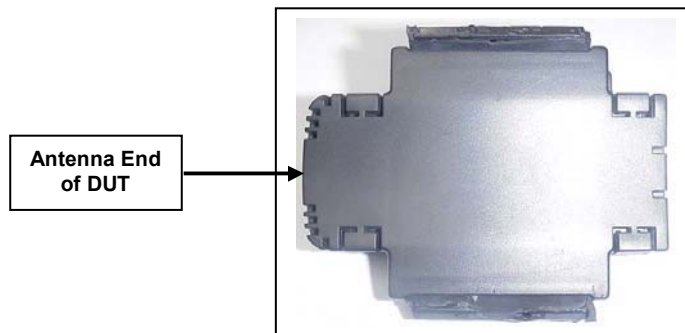
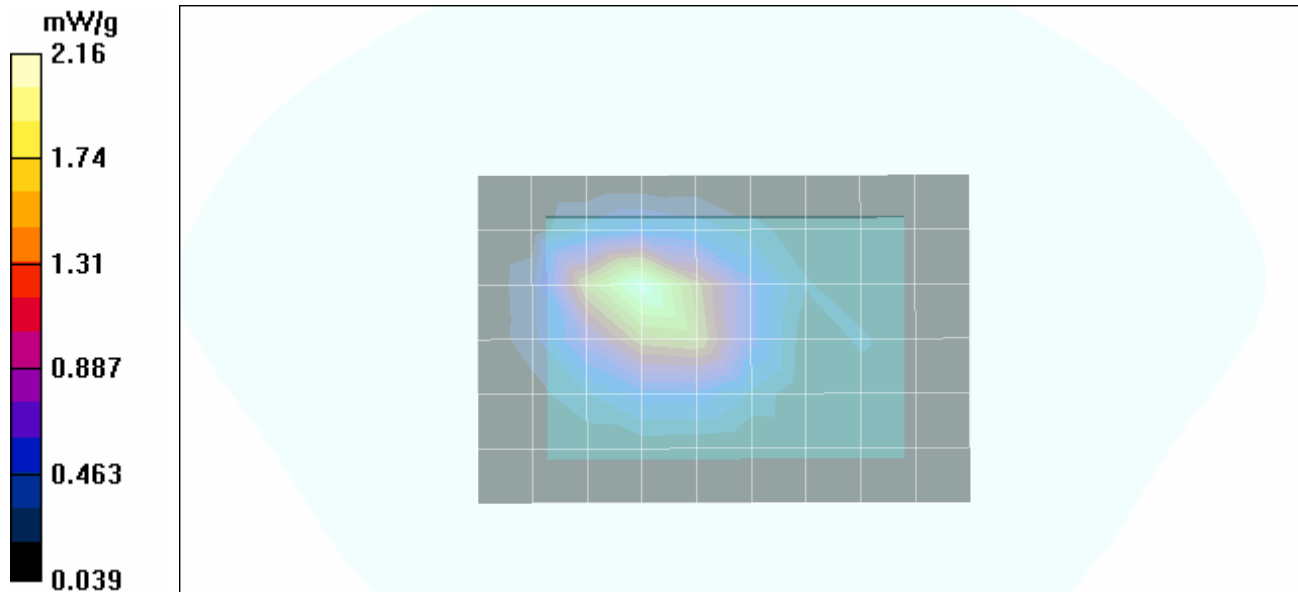
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 28.5 V/m; Power Drift = -0.062 dB



Peak SAR (extrapolated) = 3.38 W/kg

**SAR(10 g) = 0.971 mW/g**

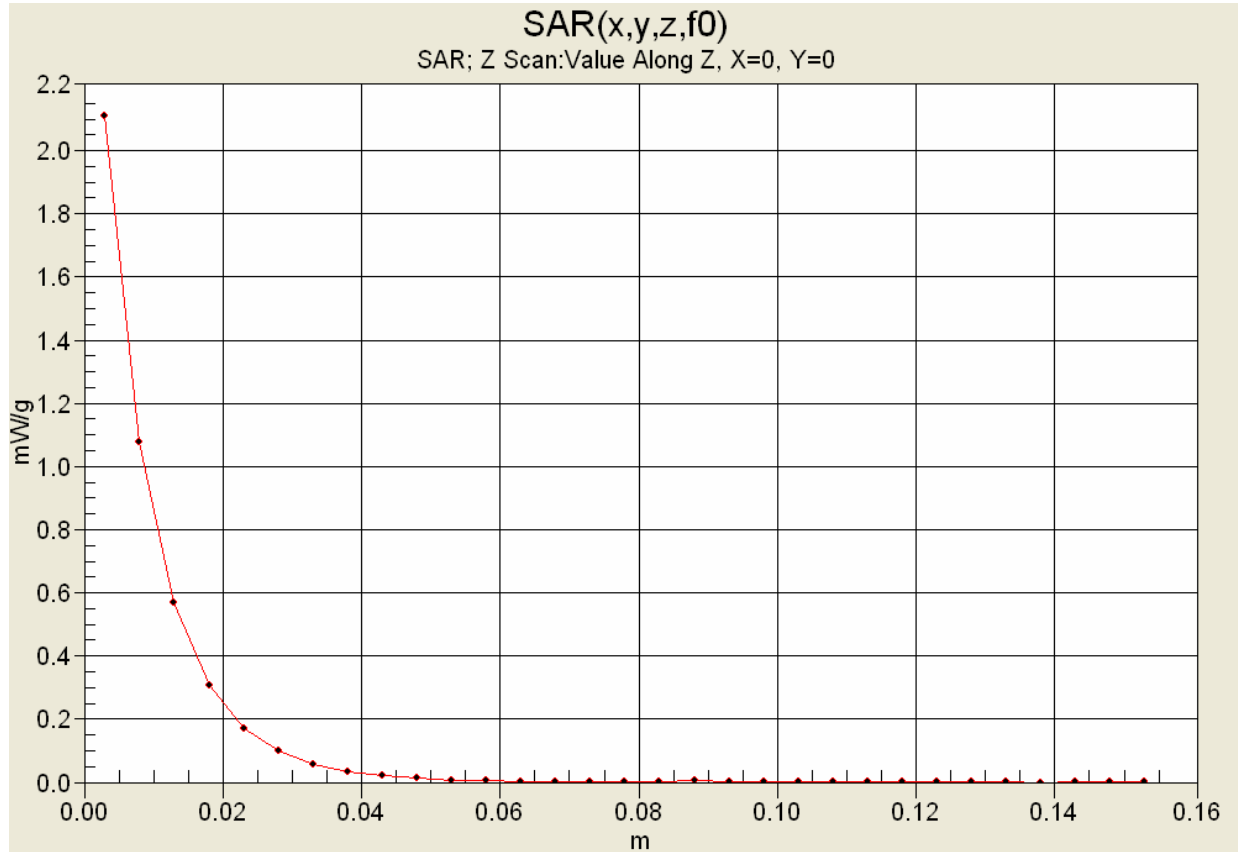
Maximum value of SAR (measured) = 2.16 mW/g





<b>Company:</b>	Sendum Wireless Corporation	<b>FCC ID:</b>	TS5-6055M-ET300	<b>IC:</b>	6234A-6055MET300	Sendum
<b>Model(s):</b>	ET300	<b>DUT Type:</b>	Dual-Band Cellular/PCS CDMA 1xRTT Ankle-worn Tracking Bracelet			
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	<u>Test Report Issue Date</u> July 06, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

## Z-Axis Scan





<b>Company:</b>	Sendum Wireless Corporation	<b>FCC ID:</b>	TS5-6055M-ET300	<b>IC:</b>	6234A-6055MET300	<b>Sendum</b>
<b>Model(s):</b>	ET300	<b>DUT Type:</b>	Dual-Band Cellular/PCS CDMA 1xRTT Ankle-worn Tracking Bracelet			
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	<u>Date(s) of Evaluation</u> June 30, 2009	<u>Test Report Serial No.</u> 062909TS5-T971-S24C	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> July 06, 2009	<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>Sendum Wireless Corporation</b>	<b>FCC ID:</b>	<b>TS5-6055M-ET300</b>	<b>IC:</b>	<b>6234A-6055MET300</b>	<b>Sendum</b>
<b>Model(s):</b>	<b>ET300</b>	<b>DUT Type:</b>	<b>Dual-Band Cellular/PCS CDMA 1xRTT Ankle-worn Tracking Bracelet</b>			
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	<u>Date(s) of Evaluation</u> June 30, 2009	<u>Test Report Serial No.</u> 062909TS5-T971-S24C	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> July 06, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

Date Tested: 06/30/2009

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

**DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d075; Calibration: 04/20/2009**

Ambient Temp: 23.0°C; Fluid Temp: 23.5°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Forward Conducted Power: 250 mW

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: M835 Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.96 \text{ mho/m}$ ;  $\epsilon_r = 54.2$ ;  $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(6.39, 6.39, 6.39); Calibrated: 21/07/2008
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 28/04/2009
- Phantom: SAM 4.0; Type: Fiberglass; Serial: 1033
- Measurement SW: DASy4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

### System Performance Check - 835 MHz Dipole

**Area Scan (6x10x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (measured) = 2.42 mW/g

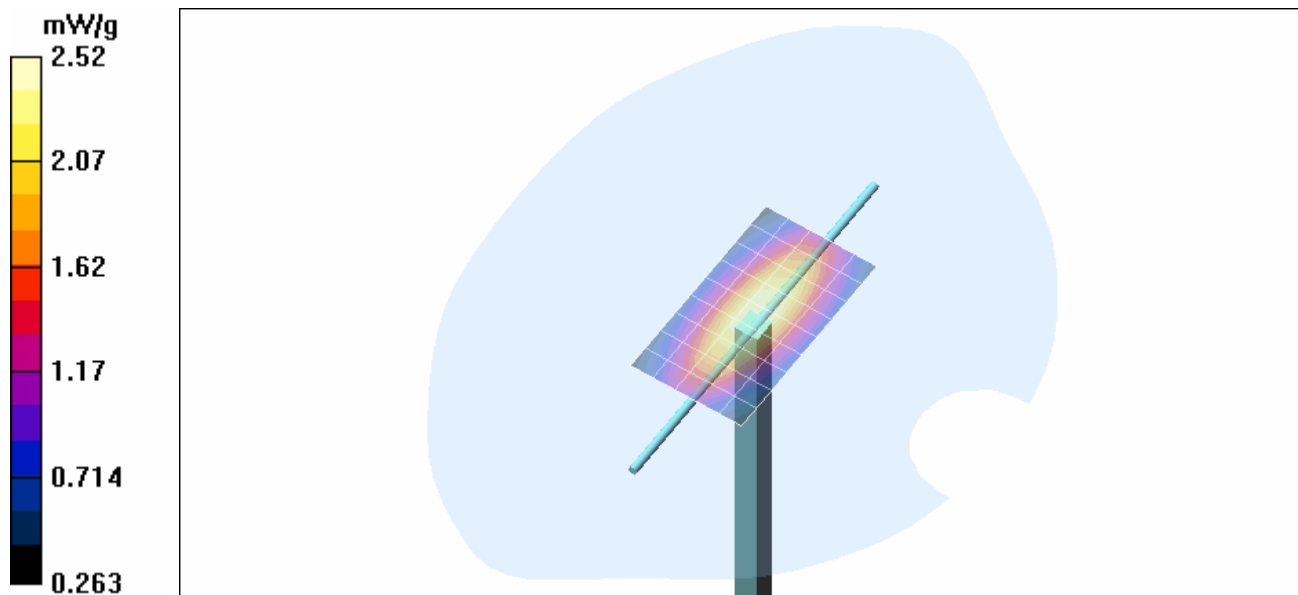
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 54.6 V/m; Power Drift = -0.019 dB



Peak SAR (extrapolated) = 3.03 W/kg

**SAR(1 g) = 2.32 mW/g; SAR(10 g) = 1.57 mW/g**

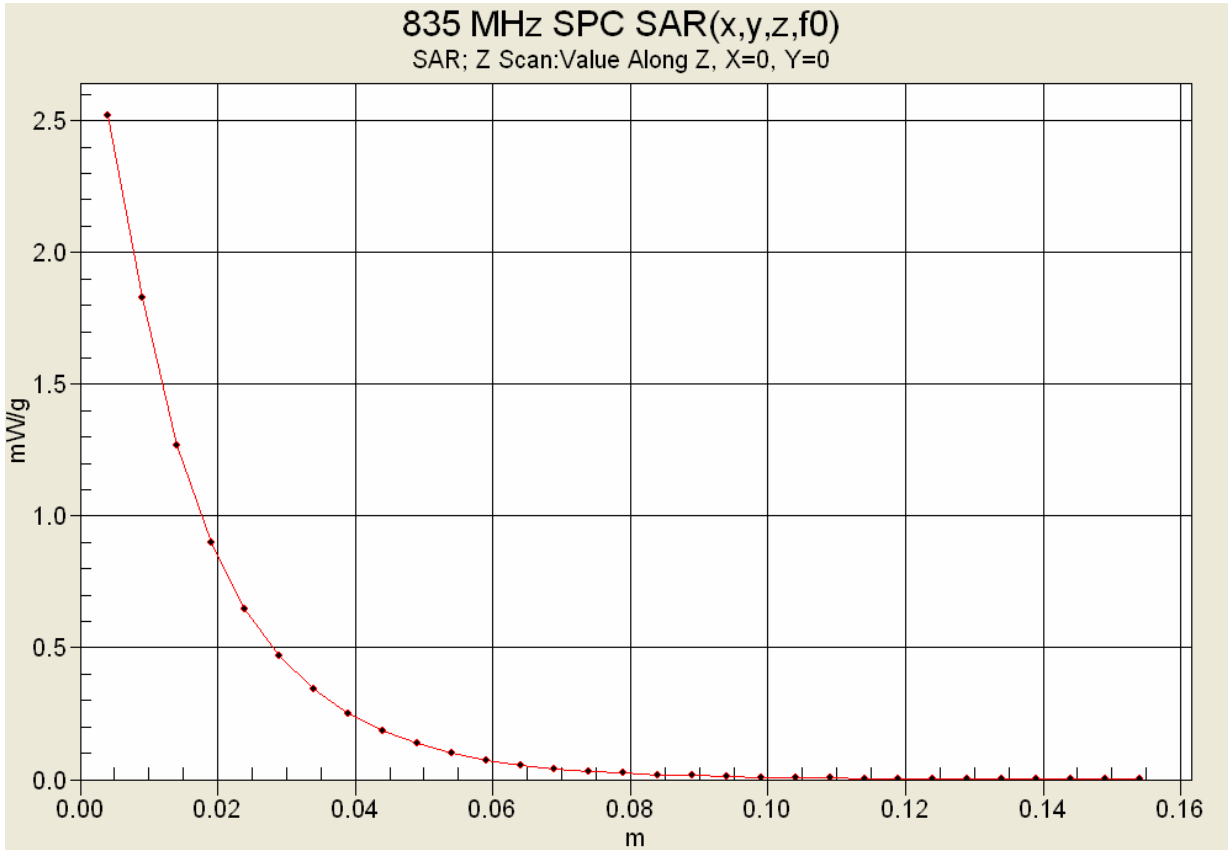
Maximum value of SAR (measured) = 2.52 mW/g





<b>Company:</b>	Sendum Wireless Corporation	<b>FCC ID:</b>	TS5-6055M-ET300	<b>IC:</b>	6234A-6055MET300	Sendum
<b>Model(s):</b>	ET300	<b>DUT Type:</b>	Dual-Band Cellular/PCS CDMA 1xRTT Ankle-worn Tracking Bracelet			
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	<u>Date(s) of Evaluation</u> June 30, 2009	<u>Test Report Serial No.</u> 062909TS5-T971-S24C	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> July 06, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

### Z-Axis Scan



<b>Company:</b>	Sendum Wireless Corporation	<b>FCC ID:</b>	TS5-6055M-ET300	<b>IC:</b>	6234A-6055MET300	<b>Sendum</b>
<b>Model(s):</b>	ET300	<b>DUT Type:</b>	Dual-Band Cellular/PCS CDMA 1xRTT Ankle-worn Tracking Bracelet			
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	<u>Date(s) of Evaluation</u> June 30, 2009	<u>Test Report Serial No.</u> 062909TS5-T971-S24C	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> July 06, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

Date Tested: 06/30/2009

## System Performance Check - 1900 MHz Dipole - Body

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d107; Calibrated: 21/04/2009**

Ambient Temp: 23.2°C; Fluid Temp: 23.8°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Forward Conducted Power: 250 mW

Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: M1900 Medium parameters used:  $f = 1900 \text{ MHz}$ ;  $\sigma = 1.56 \text{ mho/m}$ ;  $\epsilon_r = 52.6$ ;  $\rho = 1000 \text{ kg/m}^3$

- Probe: EX3DV4 - SN3600; ConvF(6.68, 6.68, 6.68); Calibrated: 28/04/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 28/04/2009
- Phantom: SAM 4.0; Type: Fiberglass; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

### System Performance Check - 1900 MHz Dipole

**Area Scan (5x8x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (measured) = 12.5 mW/g

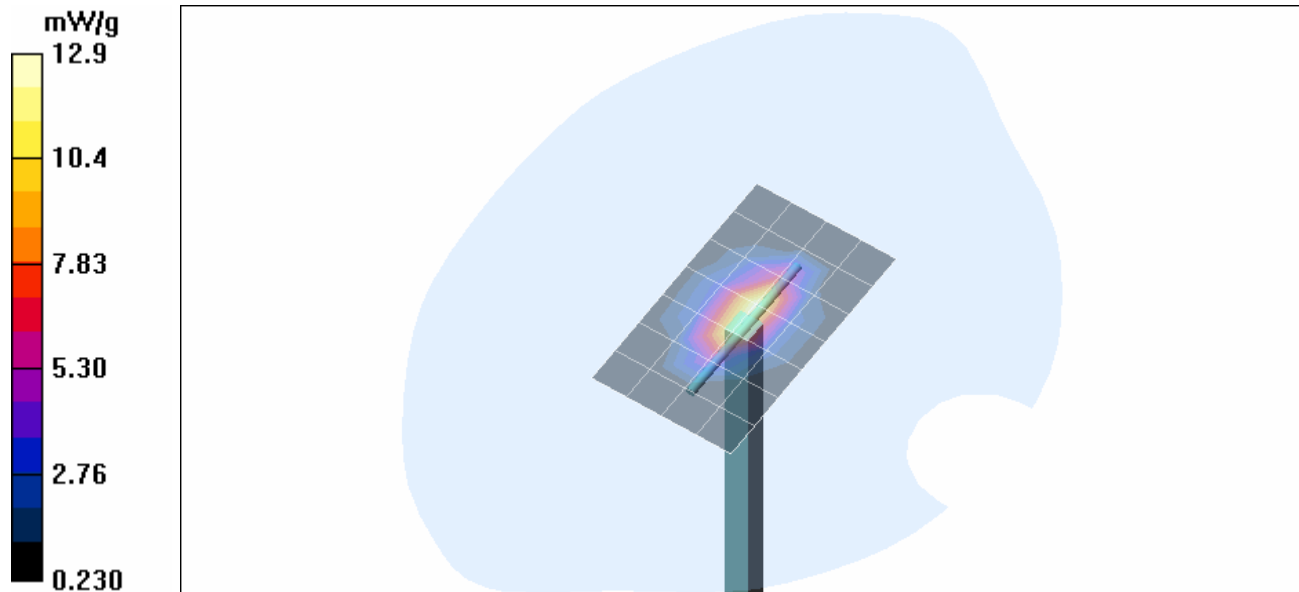
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 91.4 V/m; Power Drift = -0.033 dB

Peak SAR (extrapolated) = 18.8 W/kg

**SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.28 mW/g**

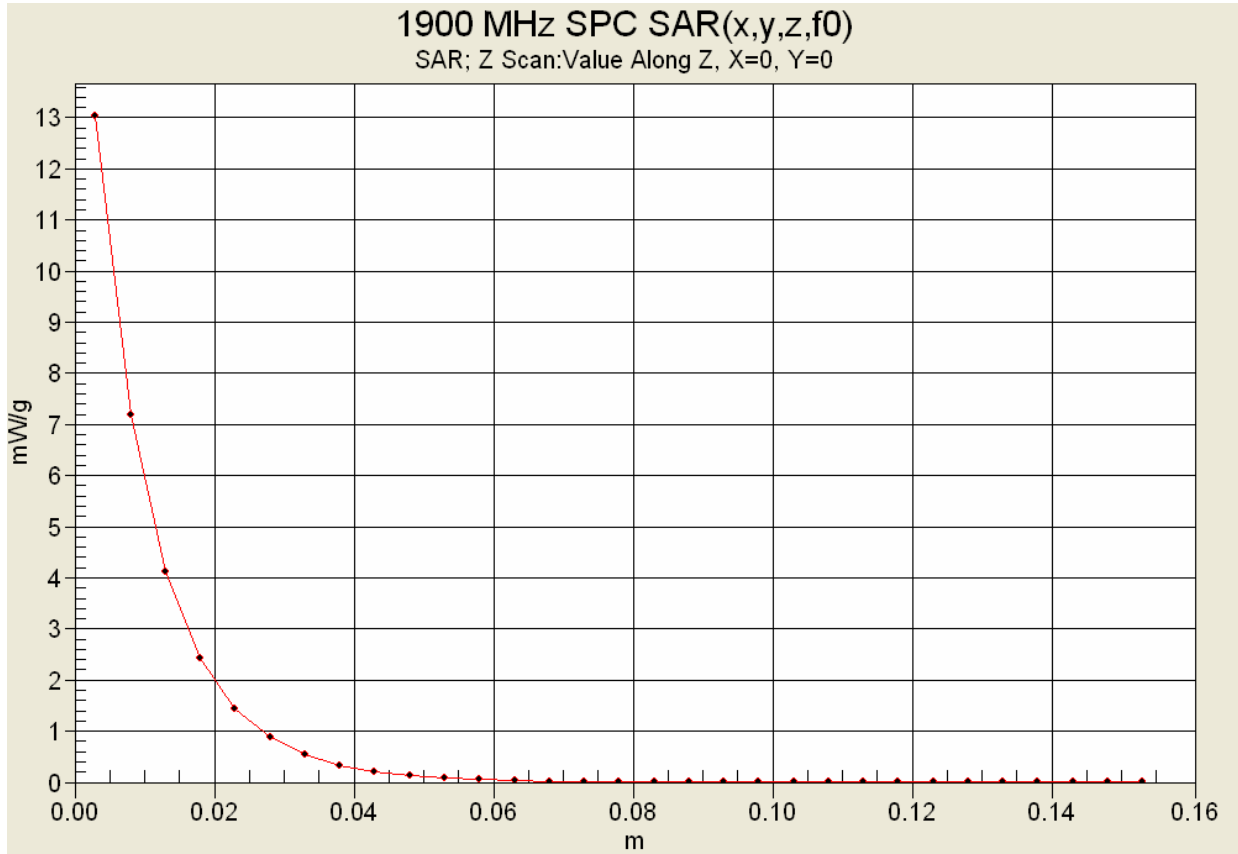
Maximum value of SAR (measured) = 12.9 mW/g





<b>Company:</b>	Sendum Wireless Corporation	<b>FCC ID:</b>	TS5-6055M-ET300	<b>IC:</b>	6234A-6055MET300	Sendum
<b>Model(s):</b>	ET300	<b>DUT Type:</b>	Dual-Band Cellular/PCS CDMA 1xRTT Ankle-worn Tracking Bracelet			
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### Z-Axis Scan



	<u>Date(s) of Evaluation</u> June 30, 2009	<u>Test Report Serial No.</u> 062909TS5-T971-S24C	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> July 06, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

**APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS**

<b>Company:</b>	<b>Sendum Wireless Corporation</b>	<b>FCC ID:</b>	<b>TS5-6055M-ET300</b>	<b>IC:</b>	<b>6234A-6055MET300</b>	<b>Sendum</b>
<b>Model(s):</b>	<b>ET300</b>	<b>DUT Type:</b>	<b>Dual-Band Cellular/PCS CDMA 1xRTT Ankle-worn Tracking Bracelet</b>			
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	<u>Date(s) of Evaluation</u> June 30, 2009	<u>Test Report Serial No.</u> 062909TS5-T971-S24C	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> July 06, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	



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

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#### Measured Fluid Dielectric Parameters (Body) June 30, 2009

Frequency	e'	e''
735000000.	55.0932	21.1580
739000000.	55.0585	21.1498
743000000.	55.0246	21.1415
747000000.	54.9662	21.1293
751000000.	54.9302	21.0741
755000000.	54.8522	21.0691
759000000.	54.8531	21.0495
763000000.	54.8472	20.9909
767000000.	54.7790	21.0242
771000000.	54.7533	20.9903
775000000.	54.6884	20.9933
779000000.	54.6618	20.9195
783000000.	54.6470	20.9286
787000000.	54.5788	20.8816
791000000.	54.5626	20.8339
795000000.	54.5254	20.8224
799000000.	54.5263	20.8203
803000000.	54.5075	20.8250
807000000.	54.4752	20.8061
811000000.	54.4151	20.7861
815000000.	54.4044	20.7766
819000000.	54.3659	20.7659
823000000.	54.3085	20.7623
827000000.	54.2634	20.7597
831000000.	54.2659	20.7343
<b>835000000.</b>	<b>54.1979</b>	<b>20.7404</b>
839000000.	54.1507	20.7115
843000000.	54.1455	20.7055
847000000.	54.0643	20.7278
851000000.	54.0555	20.6797
855000000.	54.0210	20.7063
859000000.	53.9505	20.6924
863000000.	53.9279	20.6607
867000000.	53.9444	20.6464
871000000.	53.8724	20.6231
875000000.	53.8233	20.6020
879000000.	53.7728	20.6029
883000000.	53.7870	20.6053
887000000.	53.7179	20.5819
891000000.	53.6731	20.5651
895000000.	53.6794	20.5703
899000000.	53.6283	20.5875
903000000.	53.5764	20.5478
907000000.	53.5750	20.5558
911000000.	53.5020	20.5250
915000000.	53.4847	20.5032
919000000.	53.4413	20.4407
923000000.	53.4215	20.5124
927000000.	53.3633	20.4869
931000000.	53.3838	20.4655
935000000.	53.3329	20.4425

<b>Company:</b>	<b>Sendum Wireless Corporation</b>	<b>FCC ID:</b>	<b>TS5-6055M-ET300</b>	<b>IC:</b>	<b>6234A-6055MET300</b>	<b>Sendum</b>
<b>Model(s):</b>	<b>ET300</b>	<b>DUT Type:</b>	<b>Dual-Band Cellular/PCS CDMA 1xRTT Ankle-worn Tracking Bracelet</b>			
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	<u>Date(s) of Evaluation</u> June 30, 2009	<u>Test Report Serial No.</u> 062909TS5-T971-S24C	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> July 06, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	



## 1900 MHz System Performance Check & 1880 MHz DUT Evaluation (Body)

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### Measured Fluid Dielectric Parameters (Body) June 30, 2009



Frequency	e'	e''
1800000000.	53.0167	14.5223
1804000000.	53.0193	14.5279
1808000000.	52.9913	14.5304
1812000000.	52.9773	14.5497
1816000000.	52.9440	14.5708
1820000000.	52.9340	14.5940
1824000000.	52.9180	14.5797
1828000000.	52.9046	14.6023
1832000000.	52.8830	14.6105
1836000000.	52.8588	14.6279
1840000000.	52.8481	14.6272
1844000000.	52.8517	14.6391
1848000000.	52.8268	14.6504
1852000000.	52.7910	14.6567
1856000000.	52.8014	14.6630
1860000000.	52.7779	14.6874
1864000000.	52.7555	14.7002
1868000000.	52.7550	14.7052
1872000000.	52.7269	14.7230
1876000000.	52.7006	14.7218
1880000000.	52.6991	14.7453
1884000000.	52.6867	14.7640
1888000000.	52.6566	14.7452
1892000000.	52.6461	14.7694
1896000000.	52.6369	14.7539
1900000000.	52.6363	14.7767
1904000000.	52.5956	14.8097
1908000000.	52.5939	14.8264
1912000000.	52.5737	14.8417
1916000000.	52.5717	14.8412
1920000000.	52.5686	14.8593
1924000000.	52.5412	14.8775
1928000000.	52.5295	14.8891
1932000000.	52.5189	14.8857
1936000000.	52.5036	14.9005
1940000000.	52.4863	14.9207
1944000000.	52.4718	14.9279
1948000000.	52.4407	14.9675
1952000000.	52.4444	14.9551
1956000000.	52.4284	14.9675
1960000000.	52.4325	14.9864
1964000000.	52.4090	14.9703
1968000000.	52.3749	14.9850
1972000000.	52.3697	15.0123
1976000000.	52.3454	15.0218
1980000000.	52.3190	15.0402
1984000000.	52.3152	15.0524
1988000000.	52.3159	15.0537
1992000000.	52.2745	15.0895
1996000000.	52.2749	15.1015
2000000000.	52.2227	15.1054

<b>Company:</b>	Sendum Wireless Corporation	<b>FCC ID:</b>	TS5-6055M-ET300	<b>IC:</b>	6234A-6055MET300	<b>Sendum</b>
<b>Model(s):</b>	ET300	<b>DUT Type:</b>	Dual-Band Cellular/PCS CDMA 1xRTT Ankle-worn Tracking Bracelet			
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	<u>Date(s) of Evaluation</u> June 30, 2009	<u>Test Report Serial No.</u> 062909TS5-T971-S24C	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> July 06, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

**APPENDIX D - SAR TEST SETUP & DUT PHOTOGRAPHS**



<b>Company:</b>	<b>Sendum Wireless Corporation</b>	<b>FCC ID:</b>	<b>TS5-6055M-ET300</b>	<b>IC:</b>	<b>6234A-6055MET300</b>	<b>Sendum</b>
<b>Model(s):</b>	<b>ET300</b>	<b>DUT Type:</b>	<b>Dual-Band Cellular/PCS CDMA 1xRTT Ankle-worn Tracking Bracelet</b>			
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	<u>Date(s) of Evaluation</u> June 30, 2009	<u>Test Report Serial No.</u> 062909TS5-T971-S24C	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> July 06, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

**ANKLE-WORN SAR TEST SETUP PHOTOGRAPHS**  
 Inner Facing Surface of DUT Touching Planar Phantom Section  
 (1.5 mm DUT Curvature Air-Gap Spacing)



<b>Company:</b>	Sendum Wireless Corporation	<b>FCC ID:</b>	TS5-6055M-ET300	<b>IC:</b>	6234A-6055MET300	<b>Sendum</b>
<b>Model(s):</b>	ET300	<b>DUT Type:</b>	Dual-Band Cellular/PCS CDMA 1xRTT Ankle-worn Tracking Bracelet			
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	<u>Date(s) of Evaluation</u> June 30, 2009	<u>Test Report Serial No.</u> 062909TS5-T971-S24C	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> July 06, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

**DUT PHOTOGRAPHS**



Outer Facing Surface of DUT and Antenna Location





Bottom View of DUT with Ankle Strap

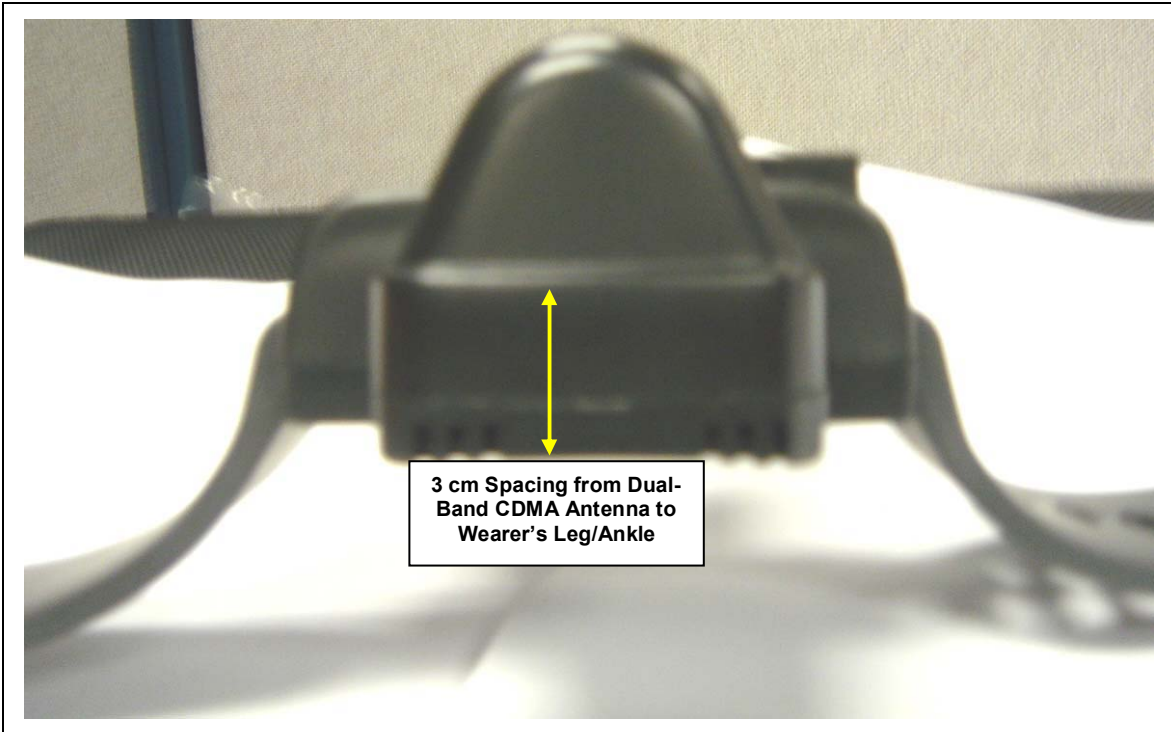


DUT with Back Plate Removed showing Metal Mounting Screws for Ankle Strap Attachment

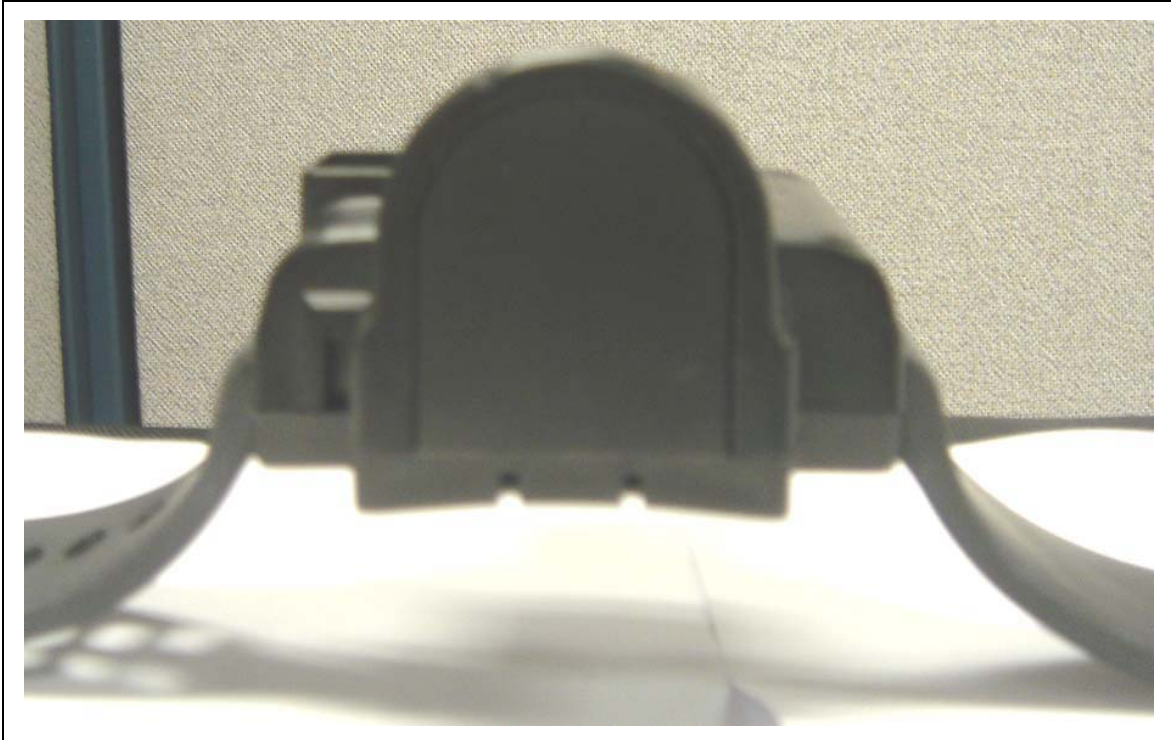
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<b>Model(s):</b>	ET300	<b>DUT Type:</b>	Dual-Band Cellular/PCS CDMA 1xRTT Ankle-worn Tracking Bracelet			
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	<u>Date(s) of Evaluation</u> June 30, 2009	<u>Test Report Serial No.</u> 062909TS5-T971-S24C	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> July 06, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

**DUT PHOTOGRAPHS**





**Antenna end of DUT**



**Battery end of DUT**

<b>Company:</b>	Sendum Wireless Corporation	<b>FCC ID:</b>	TS5-6055M-ET300	<b>IC:</b>	6234A-6055MET300	<b>Sendum</b>
<b>Model(s):</b>	ET300	<b>DUT Type:</b>	Dual-Band Cellular/PCS CDMA 1xRTT Ankle-worn Tracking Bracelet			
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	<u>Date(s) of Evaluation</u> June 30, 2009	<u>Test Report Serial No.</u> 062909TS5-T971-S24C	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> July 06, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

**DUT PHOTOGRAPHS**



Outer Facing Surface of DUT with Ankle Strap Cut Off



Inner Facing Surface of DUT with Ankle Strap Cut Off





Left and Right Sides of DUT with Ankle Strap Cut Off



Inner Facing Surface of DUT with Back Plate Removed



<b>Company:</b>	Sendum Wireless Corporation	<b>FCC ID:</b>	TS5-6055M-ET300	<b>IC:</b>	6234A-6055MET300	<b>Sendum</b>
<b>Model(s):</b>	ET300	<b>DUT Type:</b>	Dual-Band Cellular/PCS CDMA 1xRTT Ankle-worn Tracking Bracelet			
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	<u>Date(s) of Evaluation</u> June 30, 2009	<u>Test Report Serial No.</u> 062909TS5-T971-S24C	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> July 06, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

**DUT PHOTOGRAPHS**



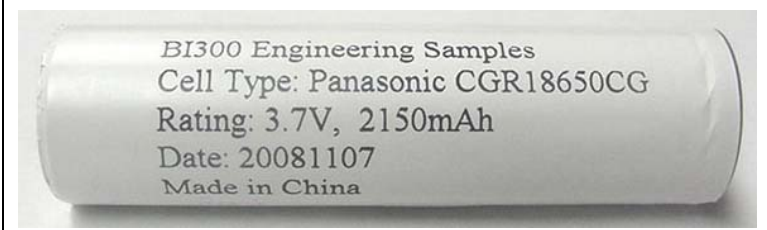
<b>Company:</b>	<b>Sendum Wireless Corporation</b>	<b>FCC ID:</b>	<b>TS5-6055M-ET300</b>	<b>IC:</b>	<b>6234A-6055MET300</b>	<b>Sendum</b>
<b>Model(s):</b>	<b>ET300</b>	<b>DUT Type:</b>	<b>Dual-Band Cellular/PCS CDMA 1xRTT Ankle-worn Tracking Bracelet</b>			
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	<u>Test Report Issue Date</u> July 06, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

**DUT PHOTOGRAPHS**



**DUT Battery Housing**



**Plastic Back Plate - Outer Facing Surface**





**DUT Lithium-ion Battery**



**Plastic Back Plate - Inner Facing Surface**

<b>Company:</b>	Sendum Wireless Corporation	<b>FCC ID:</b>	TS5-6055M-ET300	<b>IC:</b>	6234A-6055MET300	<b>Sendum</b>
<b>Model(s):</b>	ET300	<b>DUT Type:</b>	Dual-Band Cellular/PCS CDMA 1xRTT Ankle-worn Tracking Bracelet			
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	<u>Date(s) of Evaluation</u> June 30, 2009	<u>Test Report Serial No.</u> 062909TS5-T971-S24C	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> July 06, 2009	<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>Sendum Wireless Corporation</b>	<b>FCC ID:</b>	<b>TS5-6055M-ET300</b>	<b>IC:</b>	<b>6234A-6055MET300</b>	<b>Sendum</b>
<b>Model(s):</b>	<b>ET300</b>	<b>DUT Type:</b>	<b>Dual-Band Cellular/PCS CDMA 1xRTT Ankle-worn Tracking Bracelet</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

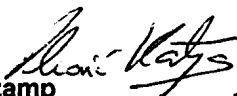
(\*) The IT'IS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of [1] and [3].

### 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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