

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

DECLARATION OF COMPLIANCE - SAR RF EXPOSURE EVALUATION (FCC/IC)

Test Lab Information	Name	CELLTECH LABS INC.			
	Address	21-364 Lougheed Road, Kelowna, British Columbia V1X 7R8 Canada			
Test Lab Accreditation(s)	A2LA	ISO/IEC 17025:2005 (A2LA Test Lab Certificate No. 2470.01)			
Applicant Information	Name	UNIDEN AMERICA CORPORATION			
	Address	4700 Amon Carter Boulevard, Fort Worth, Texas 76155 United States			
Application Type(s)	FCC	TCB Certification	IC	CB Certification	
Standard(s) Applied	FCC	47 CFR §2.1093			
	IC	Health Canada Safety Code 6			
Procedure(s) Applied	FCC	OET Bulletin 65, Supplement C (Edition 01-01)			
		KDB 447498 D01v04			
	IC	RSS-102 Issue 4			
	IEEE	1528-2003			
	IEC	62209-1:2005			
Device Identifier(s)	FCC ID:	AMWUT051			
	IC:	513C-UT051			
Date of Sample Receipt	November 03, 2010				
Date(s) of Evaluation	November 03, 2010				
Device Model(s)	GMR2838				
Test Sample Serial No.	None (Identical Prototype)				
Hardware / Firmware Revision No.s	Hardware	EPP Stage	Firmware	EPP Stage	
Device Description	Portable FM UHF GMRS/FRS Push-To-Talk (PTT) Radio Transceiver				
Transmit Frequency Range(s)	462.5500 - 462.7250 MHz (GMRS Channels 15-22)				
	462.5625 - 462.7125 MHz (GMRS/FRS Channels 1-7)				
	467.5625 - 467.7125 MHz (FRS Channels 8-14)				
RF Output Power Measured	0.75 W	28.75 dBm	ERP	462.5625 MHz	GMRS Ch. 1
	0.27 W	24.31 dBm	ERP	467.5625 MHz	FRS Ch. 8
Battery Type(s) Tested	Ni-MH Battery Pack		4.8 V	550 mAh	Model: BP40
Antenna Type(s) Tested	External Non-detachable (-0.5 dBi Gain)				
Body-worn Accessories Tested	Plastic Belt-Clip (supplied with DUT)				
Audio Accessories Tested	Headset-Microphone (P/N: ZA-133)				
Max. SAR Level(s) Evaluated	Face-held	0.655 W/kg	1g	50% PTT duty cycle	General Population / Uncontrolled RF Exposure Environment
	Body-worn	0.500 W/kg	1g	50% PTT duty cycle	
FCC/IC Spatial Peak SAR Limit	Head/Body	1.6 W/kg	1g	50% PTT duty cycle	
Celltech Labs Inc. declares under its sole responsibility that this wireless portable device has demonstrated compliance with the Specific Absorption Rate (SAR) RF exposure requirements specified in FCC 47 CFR §2.1093 and Health Canada's Safety Code 6 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 (Edition 01-01), Industry Canada RSS-102 Issue 4, IEEE Standard 1528-2003 and International Standard IEC 62209-1:2005. All measurements were performed in accordance with the SAR system manufacturer recommendations.					
I attest to the accuracy of data. All measurements were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.					
The results and statements contained in this report pertain only to the device(s) evaluated.					
This test report shall not be reproduced partially, or in full, without the prior written approval of Celltech Labs Inc.					
Test Report Approved By			Sean Johnston	Lab Manager	Celltech Labs Inc

Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.					Page 1 of 32

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

TABLE OF CONTENTS

1.0 INTRODUCTION	4
2.0 SAR MEASUREMENT SYSTEM	4
3.0 REFERENCE OUTPUT POWER MEASUREMENT	4
4.0 SAR MEASUREMENT SUMMARY	5
5.0 DETAILS OF SAR EVALUATION	6
6.0 SAR EVALUATION PROCEDURES	6
7.0 SYSTEM PERFORMANCE CHECK	7
8.0 SAR PROBE CALIBRATION & MEASUREMENT FREQUENCIES	8
9.0 SIMULATED EQUIVALENT TISSUES	8
10.0 SAR LIMITS	8
11.0 ROBOT SYSTEM SPECIFICATIONS	9
12.0 PROBE SPECIFICATION (ET3DV6)	10
13.0 BARKSI PLANAR PHANTOM	10
14.0 DEVICE HOLDER	10
15.0 TEST EQUIPMENT LIST	11
16.0 MEASUREMENT UNCERTAINTIES	12
17.0 REFERENCES	13
APPENDIX A - SAR MEASUREMENT DATA	14
APPENDIX B - SYSTEM PERFORMANCE CHECK DATA	19
APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS	22
APPENDIX D - SAR TEST SETUP PHOTOGRAPHS	25
APPENDIX E - DIPOLE CALIBRATION	30
APPENDIX F - PROBE CALIBRATION	31
APPENDIX G - BARKSI PLANAR PHANTOM CERTIFICATE OF CONFORMITY	32

Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.					Page 2 of 32

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

REVISION HISTORY

REVISION NO.	DESCRIPTION	IMPLEMENTED BY	RELEASE DATE
1.0	Initial Release	Jon Hughes	November 09, 2010

TEST REPORT SIGN-OFF

DEVICE TESTED BY	REPORT PREPARED BY	QA REVIEW BY	REPORT APPROVED BY
Scott Kulifaj	Scott Kulifaj	Jon Hughes	Sean Johnston

Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.					Page 3 of 32

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

1.0 INTRODUCTION

This measurement report demonstrates that the Uniden America Corporation GMR2838 Portable FM GMRS/FRS Push-To-Talk Radio Transceiver (FCC ID: AMWUT051 / IC: 513C-UT051) complies with the SAR (Specific Absorption Rate) RF exposure requirements specified in FCC 47 CFR §2.1093 (see reference [1]) and Health Canada's Safety Code 6 (see reference [2]) for the General Population / Uncontrolled Exposure environment. The test procedures described in FCC OET Bulletin 65, Supplement C Edition 01-01 (see reference [3]), IC RSS-102 Issue 4 (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 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 Body 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 built in VME-bus computer.

3.0 REFERENCE OUTPUT POWER MEASUREMENT

RF OUTPUT POWER MEASUREMENT					
Test Frequency	Band	Mode	dBm	Watts	Method
462.5625 MHz	GMRS	CW	28.75	0.75	ERP
Notes					
1. The ERP measurements were made in an anechoic chamber in accordance with the procedures described in ANSI TIA/EIA-603-C-2004 (see reference [12]).					

Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 4 of 32

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

4.0 SAR MEASUREMENT SUMMARY

SAR EVALUATION RESULTS

Test Type	Freq.	Channel		Test Mode	Batt. Type	Accessories		DUT Spacing to Planar Phantom		Start Power (ERP) Watts	Measured SAR 1g (W/kg)		SAR Drift During Test dB	Scaled SAR with droop 1g (W/kg)	
						Body	Audio	DUT	Antenna		PTT Duty Cycle			PTT Duty Cycle	
	MHz									100%	50%		100%	50%	
FACE	462.5625	1	GMRS	CW	Ni-MH	n/a	n/a	2.5 cm	3.2 cm	0.75	1.25	0.625	-0.187	1.31	0.655
BODY	462.5625	1	GMRS	CW	Ni-MH	Belt-Clip	Headset	1.5 cm	2.5 cm	0.75	0.981	0.491	-0.091	1.00	0.500
SAR LIMIT(S)						HEAD / BODY			SPATIAL PEAK			RF EXPOSURE CATEGORY			
FCC 47 CFR 2.1093		Health Canada Safety Code 6				1.6 W/kg			averaged over 1 gram			General Population / Uncontrolled			
Test Date(s)		November 03, 2010				November 03, 2010				Evaluation Type		Face	Body	Unit	
Measured Fluid		450 MHz HEAD				450 MHz BODY				Atmospheric Pressure		101.1	101.1	kPa	
										Relative Humidity		35	35	%	
Dielectric Constant ϵ_r		IEEE Target		462.5625*	Dev.	IEEE Target		462.5625*	Dev.	Ambient Temperature		22.0	22.0	°C	
		43.5	± 5%	45.6	+4.8%	56.7	± 5%	57.9	+2.1%	Fluid Temperature		21.4	21.2	°C	
Conductivity σ (mho/m)		IEEE Target		462.5625*	Dev.	IEEE Target		462.5625*	Dev.	Fluid Depth		≥ 15	≥ 15	cm	
		0.87	± 5%	0.86	-1.1%	0.94	± 5%	0.92	-2.1%	ρ (Kg/m ³)		1000			

Notes

1. Detailed measurement plots showing the maximum SAR location of the DUT are reported in Appendix A.
2. The transmission band of the DUT is less than 10 MHz; therefore single channel data only is required to be reported (per FCC OET Bulletin 65, Supplement C, Edition 01-01 - see reference [3]).
3. The power droop measured by the DASY4 system for the duration of the SAR evaluation was added to the measured SAR level to report the scaled SAR result as shown in the above test data table.
4. The DUT was tested in unmodulated continuous transmit operation (Continuous Wave mode at 100% duty cycle) with the PTT depressed.
5. 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 measured fluid remained within +/-2°C.
6. The dielectric parameters of the simulated tissue mixtures were measured prior to the SAR evaluations using a Dielectric Probe Kit and a Network Analyzer (see Appendix C).
7. * interpolated using DASY4 Software

Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 5 of 32

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

5.0 DETAILS OF SAR EVALUATION

The Uniden America Corporation GMR2838 Portable FM GMRS/FRS PTT Radio Transceiver (FCC ID: AMWUT051 / IC: 513C-UT051) was compliant for localized Specific Absorption Rate (General Population / Uncontrolled Exposure) based on the test provisions and conditions described below. The detailed test setup photographs are shown in Appendix D.

1. The DUT was evaluated in a face-held configuration with the front of the radio placed parallel to the outer surface of the planar phantom. A 2.5 cm spacing was maintained between the front of the DUT and the outer surface of the planar phantom.
2. The DUT was evaluated in a body-worn configuration with the back of the radio placed parallel and the plastic belt-clip touching the outer surface of the planar phantom. The belt-clip accessory provided a 1.5 cm spacing from the back of the DUT to the outer surface of the planar phantom. The body-worn SAR evaluation was performed with the customer-supplied headset-microphone audio accessory connected to the audio jack of the DUT.
3. The conducted output power levels of the DUT were preset by the manufacturer prior to the SAR evaluations and were not measured by Celltech Labs due to the internal antenna. The output power level reported is the ERP level measured by Celltech Labs prior to the SAR evaluations.
4. The area scan evaluation was performed with a fully charged battery pack. After the area scan was completed the battery pack was replaced with a fully charged battery pack prior to the zoom scan evaluation.
5. The face-held and body-worn SAR evaluations were performed with the DUT set to the high power setting on GMRS Channel 1 in unmodulated continuous transmit operation (Continuous Wave mode at 100% duty cycle) with the transmit key constantly depressed.
6. For a push-to-talk device the 50% duty cycle compensation reported assumes a transmit/receive cycle of equal time base.

6.0 SAR EVALUATION PROCEDURES

- a. (i) The evaluation was performed in the applicable area of the phantom depending on the type of device being tested. For devices held to the ear during normal operation, both the left and right ear positions were evaluated using the SAM phantom.
(ii) For body-worn and face-held devices a planar phantom was used.
- b. The SAR was determined by a pre-defined procedure within the DASY4 software. Upon completion of a reference and optical surface check, the exposed region of the phantom was scanned near the inner surface with a grid spacing of 15mm x 15mm.
An area scan was determined as follows:
- c. Based on the defined area scan grid, a more detailed grid is created to increase the points by a factor of 10. The interpolation function then evaluates all field values between corresponding measurement points.
- d. A linear search is applied to find all the candidate maxima. Subsequently, all maxima are removed that are >2 dB from the global maximum. The remaining maxima are then used to position the cube scans.
A 1g and 10g spatial peak SAR was determined as follows:
- e. Extrapolation is used to find the points between the dipole center of the probe and the surface of the phantom. This data cannot be measured, since the center of the dipoles is 2.7 mm away 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 E). The extrapolation was based on trivariate quadratics computed from the previously calculated 3D interpolated points nearest the phantom surface.
- f. Interpolated data is used to calculate the average SAR over 1g and 10g cubes by spatially discretizing the entire measured cube. The volume used to determine the averaged SAR is a 1mm grid (42875 interpolated points).
- g. A zoom scan volume of 32 mm x 32 mm x 30 mm (5 x 5 x 7 points) centered at the peak SAR location determined from the area scan is used for all zoom scans for devices with a transmit frequency < 800 MHz. Zoom scans for frequencies ≥ 800 MHz are determined with a scan volume of 30 mm x 30 mm x 30 mm (7 x 7 x 7) to ensure complete capture of the peak spatial-average SAR.

Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.					Page 6 of 32

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

7.0 SYSTEM PERFORMANCE CHECK

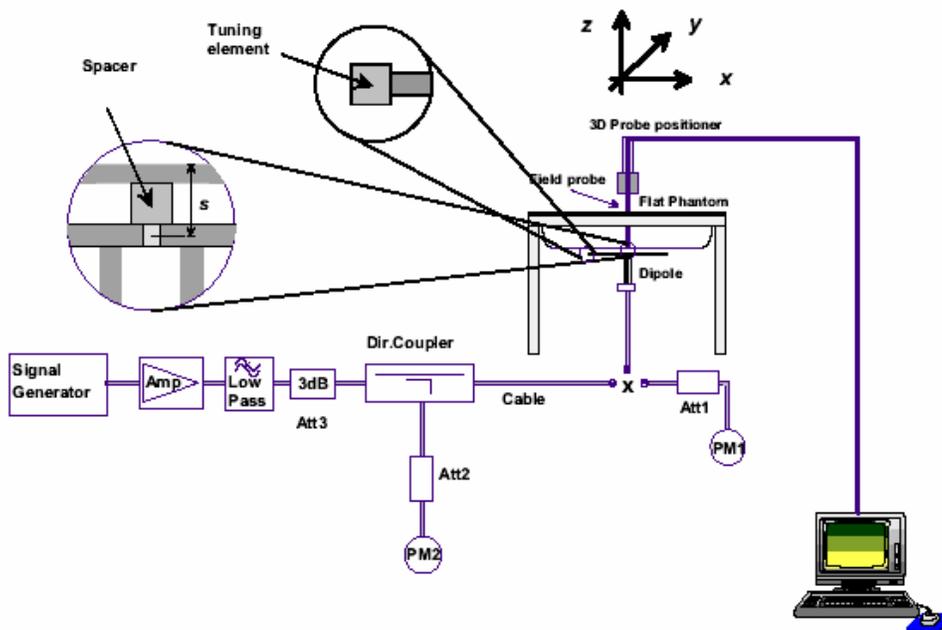
Prior to the SAR evaluation a daily system check was performed with a planar phantom and 450 MHz dipole (see Appendix B for system performance check test plot) in accordance with the procedures described in IEEE Standard 1528-2003 (see reference [5]). The dielectric parameters of the simulated tissue mixture were measured prior to the system performance check using a Dielectric Probe Kit and a Network Analyzer (see Appendix C for measured fluid dielectric parameters). A forward power of 398 mW was applied to the dipole and the system was verified to a tolerance of $\pm 10\%$ from the SAR system manufacturer's dipole calibration target SAR value (see Appendix E for system manufacturer's dipole calibration procedures).

SYSTEM PERFORMANCE CHECK EVALUATION

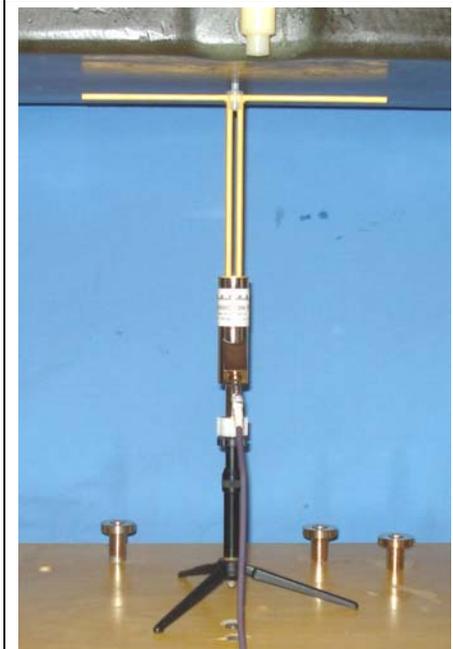
Test Date	Equiv. Tissue	SAR 1g (W/kg)			Dielectric Constant ϵ_r			Conductivity σ (mho/m)			ρ (Kg/m ³)	Amb. Temp. (°C)	Fluid Temp. (°C)	Fluid Depth (cm)	Humid. (%)	Barom. Press. (kPa)
		Freq. (MHz)	SPEAG Target	Meas.	Dev.	SPEAG Target	Meas.	Dev.	SPEAG Target	Meas.						
Nov 3	Head 450	1.87 $\pm 10\%$	1.99	+6.4%	43.5 $\pm 5\%$	45.6	+4.8%	0.87 $\pm 5\%$	0.85	-2.3%	1000	22.0	21.4	≥ 15	35	101.1

Notes

- The target SAR value is the measured values from the SAR system manufacturer's dipole calibration (see Appendix E).
- The target dielectric parameters are the nominal values from the SAR system manufacturer's dipole calibration (see Appendix E).
- 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. The measured fluid remained within $\pm 2^\circ\text{C}$.
- 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)



450 MHz Validation Dipole Setup

Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 7 of 32

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

8.0 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 \geq 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 \geq 300 MHz
450 MHz	462.5625 MHz	12.5625 MHz	< 50 MHz
The probe calibration and measurement frequency interval is < 50 MHz; therefore the additional steps are not required.			

9.0 SIMULATED EQUIVALENT TISSUES

The simulated equivalent tissue recipe in the table below is derived from the SAR system manufacturer's suggested recipe in the DASY4 manual (see references [9] and [10]) in accordance with the procedures and requirements specified in IEEE Standard 1528-2003 (see reference [5]). The ingredient percentage may have been adjusted minimally in order to achieve the appropriate target dielectric parameters within the specified tolerance.

SIMULATED TISSUE MIXTURES		
INGREDIENT	450 MHz HEAD	450 MHz BODY
Water	38.56 %	52.00 %
Sugar	56.32 %	45.65 %
Salt	3.95 %	1.75 %
HEC	0.98 %	0.50 %
Bactericide	0.19 %	0.10 %

10.0 SAR LIMITS

SAR RF EXPOSURE LIMITS			
FCC 47 CFR 2.1093	Health Canada Safety Code 6	General Population	Occupational
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)		4.0 W/kg	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.			

Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 8 of 32

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	  Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

11.0 ROBOT SYSTEM SPECIFICATIONS

<u>Specifications</u>	
Positioner	Stäubli Unimation Corp. Robot Model: RX60L
Repeatability	0.02 mm
No. of axis	6
<u>Data Acquisition Electronic (DAE) System</u>	
<u>Cell Controller</u>	
Processor	AMD Athlon XP 2400+
Clock Speed	2.0 GHz
Operating System	Windows XP Professional
<u>Data Converter</u>	
Features	Signal Amplifier, multiplexer, A/D converter, and control logic
Software	Measurement Software: DASY4, V4.7 Build 44
	Postprocessing Software: SEMCAD, V1.8 Build 171
Connecting Lines	Optical downlink for data and status info., Optical uplink for commands and clock
<u>DASY4 Measurement Server</u>	
Function	Real-time data evaluation for field measurements and surface detection
Hardware	PC/104 166MHz Pentium CPU; 32 MB chipdisk; 64 MB RAM
Connections	COM1, COM2, DAE, Robot, Ethernet, Service Interface
<u>E-Field Probe</u>	
Model	ET3DV6
Serial No.	1590
Construction	Triangular core fiber optic detection system
Frequency	10 MHz to 6 GHz
Linearity	±0.2 dB (30 MHz to 3 GHz)
<u>Evaluation Phantom</u>	
Type	Barski Planar Phantom
Shell Material	Fiberglass
Thickness	2.0 ±0.1 mm
Volume	Approx. 70 liters
<u>Validation Phantom</u>	
Type	Barski Planar Phantom
Shell Material	Fiberglass
Thickness	2.0 ±0.1 mm
Volume	Approx. 70 liters

Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 9 of 32

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

12.0 PROBE SPECIFICATION (ET3DV6)

<p>Construction: Symmetrical design with triangular core; Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, glycol)</p> <p>Calibration: In air from 10 MHz to 2.5 GHz In head simulating tissue at frequencies of 900 MHz and 1.8 GHz (accuracy $\pm 8\%$)</p> <p>Frequency: 10 MHz to > 6 GHz; Linearity: ± 0.2 dB (30 MHz to 3 GHz)</p> <p>Directivity: ± 0.2 dB in head tissue (rotation around probe axis) ± 0.4 dB in head tissue (rotation normal to probe axis)</p> <p>Dynamic Range: 5 μW/g to > 100 mW/g; Linearity: ± 0.2 dB</p> <p>Surface Detect: ± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces</p> <p>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</p> <p>Application: General dosimetry up to 3 GHz; Compliance tests of mobile phone</p>	
ET3DV6 E-Field Probe	

13.0 BARKSI PLANAR PHANTOM

<p>The Barski Planar Phantom is a fiberglass shell phantom with a 2.0 mm (+/-0.2mm) thick device measurement area at the center of the phantom for SAR evaluations of devices with a larger surface area than the planar section of the SAM phantom. The planar phantom is integrated in a wooden table. The planar phantom was used for the DUT SAR evaluations and the system performance check evaluations. See Appendix G for dimensions and specifications of the Barski planar phantom.</p>	
Barski Planar Phantom	

14.0 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>	
Device Holder	

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

15.0 TEST EQUIPMENT LIST

TEST EQUIPMENT		ASSET NO.	SERIAL NO.	DATE CALIBRATED	CALIBRATION INTERVAL
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	27Apr10	Annual
x	-ET3DV6 E-Field Probe	00017	1590	15Jul10	Annual
x	-SPEAG D450V3 Validation Dipole	000217	1068	18Jan10	Biennial
x	-Barski Planar Phantom	00155	03-01	CNR	CNR
x	HP 85070C Dielectric Probe Kit	00033	none	CNR	CNR
x	Gigatronics 8652A Power Meter	00007	1835272	04May10	Biennial
x	Gigatronics 80701A Power Sensor	00014	1833699	04May10	Biennial
x	HP 8753ET Network Analyzer	00134	US39170292	04May10	Biennial
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				

Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 11 of 32

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

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 _i or V _{eff}
Measurement System									
Probe Calibration (450 MHz)	E.2.1	6.65	Normal	1	1	1	6.65	6.65	∞
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	∞
Test Sample Related									
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	∞
Phantom and Tissue Parameters									
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	2.1	Normal	1	0.64	0.43	1.3	0.9	∞
Liquid Permittivity (target)	E.3.2	5	Rectangular	1.732050808	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measured)	E.3.3	4.8	Normal	1	0.6	0.49	2.9	2.4	∞
Combined Standard Uncertainty			RSS				11.45	11.16	
Expanded Uncertainty (95% Confidence Interval)			k=2				22.91	22.32	
Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003									

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2

Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 12 of 32

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

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 (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)", Radio Standards Specification RSS-102 Issue 4: March 2010.
- [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 D01v04: November 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] Schmid & Partner Engineering AG - DASY4 Manual V4.6, Chapter 16 Application Note, Head Tissue Recipe: Sept. 2005.
- [10] Schmid & Partner Engineering AG - DASY4 Manual V4.6, Chapter 17 Application Note, Body Tissue Recipe: Sept. 2005.
- [11] ISO/IEC 17025 - "General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:2005)."
- [12] ANSI/TIA-603-C, "Land Mobile FM or PM Communications Equipment - Measurement and Performance Standards": December 2004.

Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.					Page 13 of 32

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

APPENDIX A - SAR MEASUREMENT DATA

Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.					Page 14 of 32

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

Date Tested: 11/03/2010

Face-held SAR - GMRS - Channel 1 - 462.5625 MHz

DUT: Uniden GMR2838; Type: Portable GMRS/FRS PTT Radio Transceiver; Serial: TA No. 6 (Pre-production)

Ambient Temp: 22.0°C; Fluid Temp: 21.4°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Frequency: 462.5625 MHz; Duty Cycle: 1:1

Medium: HSL450 Medium parameters used (interpolated): $f = 462.5625 \text{ MHz}$; $\sigma = 0.86 \text{ mho/m}$; $\epsilon_r = 45.6$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(7.25, 7.25, 7.25); Calibrated: 15/07/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 27/04/2010
- Phantom: Barski Industries; Type: Fiberglass Planar; Serial: 03-01
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Face-held SAR - 2.5 cm Spacing from Front of DUT to Planar Phantom

Area Scan (8x16x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 1.38 mW/g

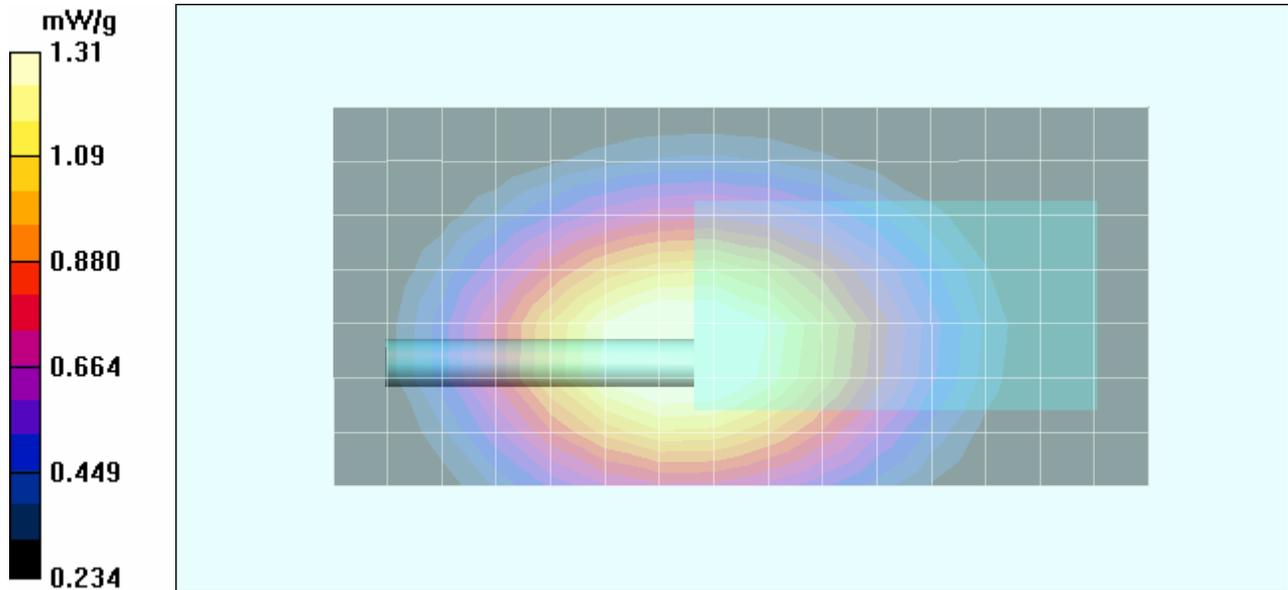
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 38.8 V/m; Power Drift = -0.187 dB

Peak SAR (extrapolated) = 1.72 W/kg

SAR(1 g) = 1.25 mW/g; SAR(10 g) = 0.927 mW/g

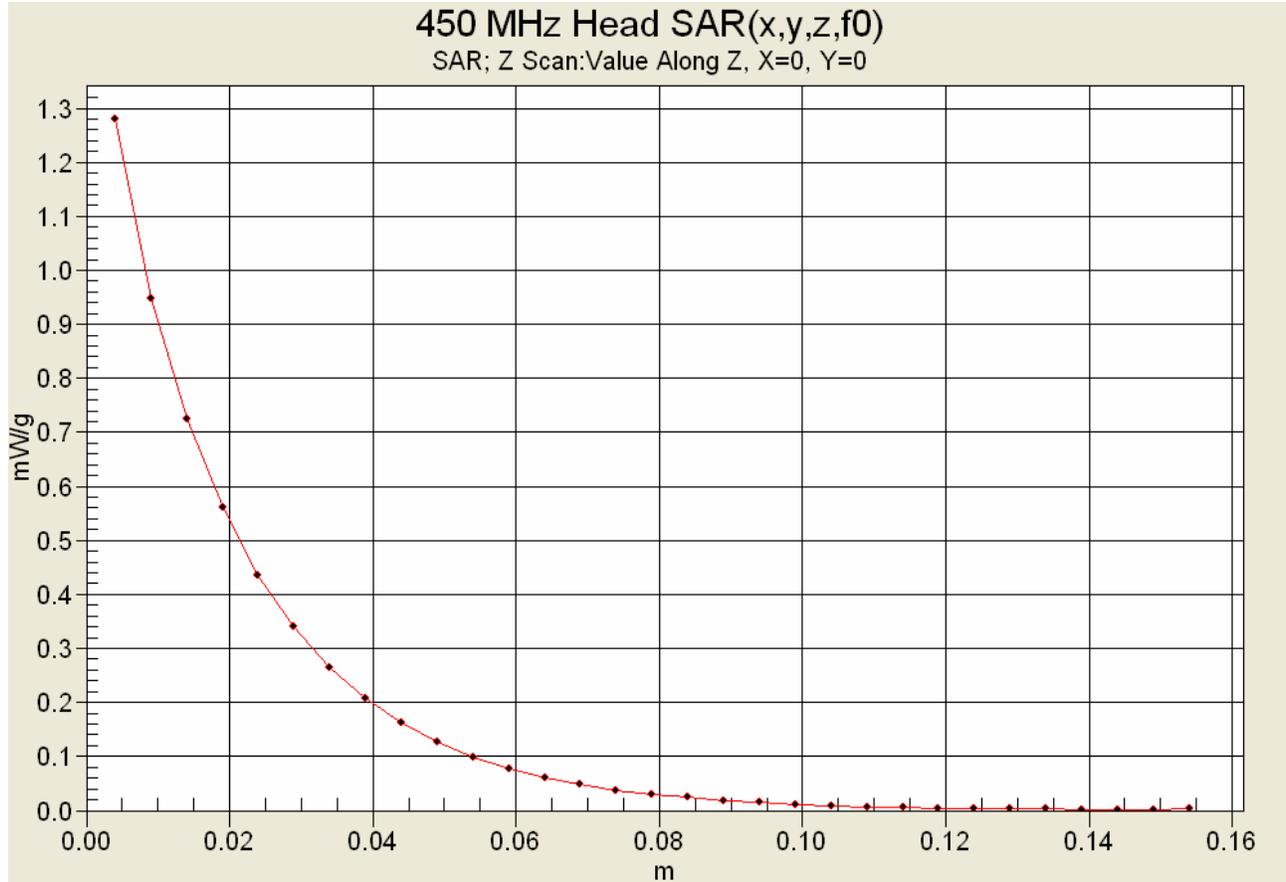
Maximum value of SAR (measured) = 1.31 mW/g



Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 15 of 32

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

Z-Axis Scan



Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 16 of 32

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

Date Tested: 11/03/2010

Body-worn SAR - GMRS - Channel 1 - 462.5625 MHz

DUT: Uniden GMR2838; Type: Portable GMRS/FRS PTT Radio Transceiver; Serial: TA No. 6 (Pre-production)

Body-worn Accessory: Plastic Belt-Clip; Audio Accessory: Headset-Microphone (P/N: ZA-133)

Ambient Temp: 22.0°C; Fluid Temp: 21.2°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Frequency: 462.5625 MHz; Duty Cycle: 1:1

Medium: M450 Medium parameters used (interpolated): $f = 462.5625 \text{ MHz}$; $\sigma = 0.92 \text{ mho/m}$; $\epsilon_r = 57.9$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(7.73, 7.73, 7.73); Calibrated: 15/07/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 27/04/2010
- Phantom: Barski Industries; Type: Fiberglass Planar; Serial: 03-01
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body-worn SAR - 1.5 cm Belt-Clip Spacing from Back of DUT to Planar Phantom

Area Scan (8x16x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 1.06 mW/g

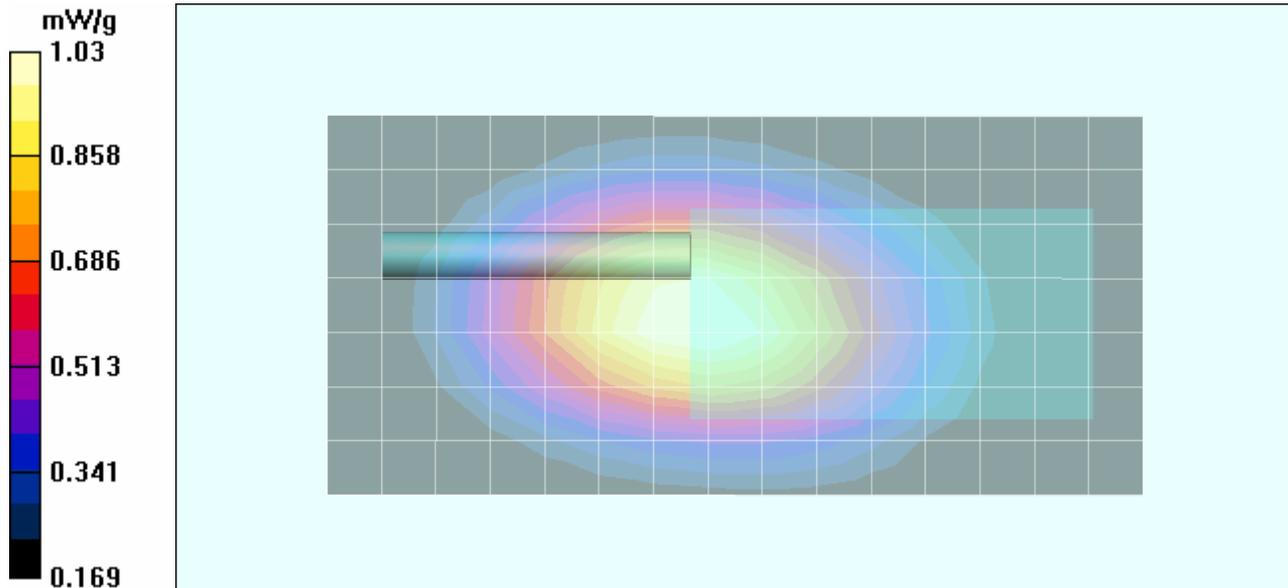
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 33.8 V/m; Power Drift = -0.091 dB

Peak SAR (extrapolated) = 1.39 W/kg

SAR(1 g) = 0.981 mW/g; SAR(10 g) = 0.715 mW/g

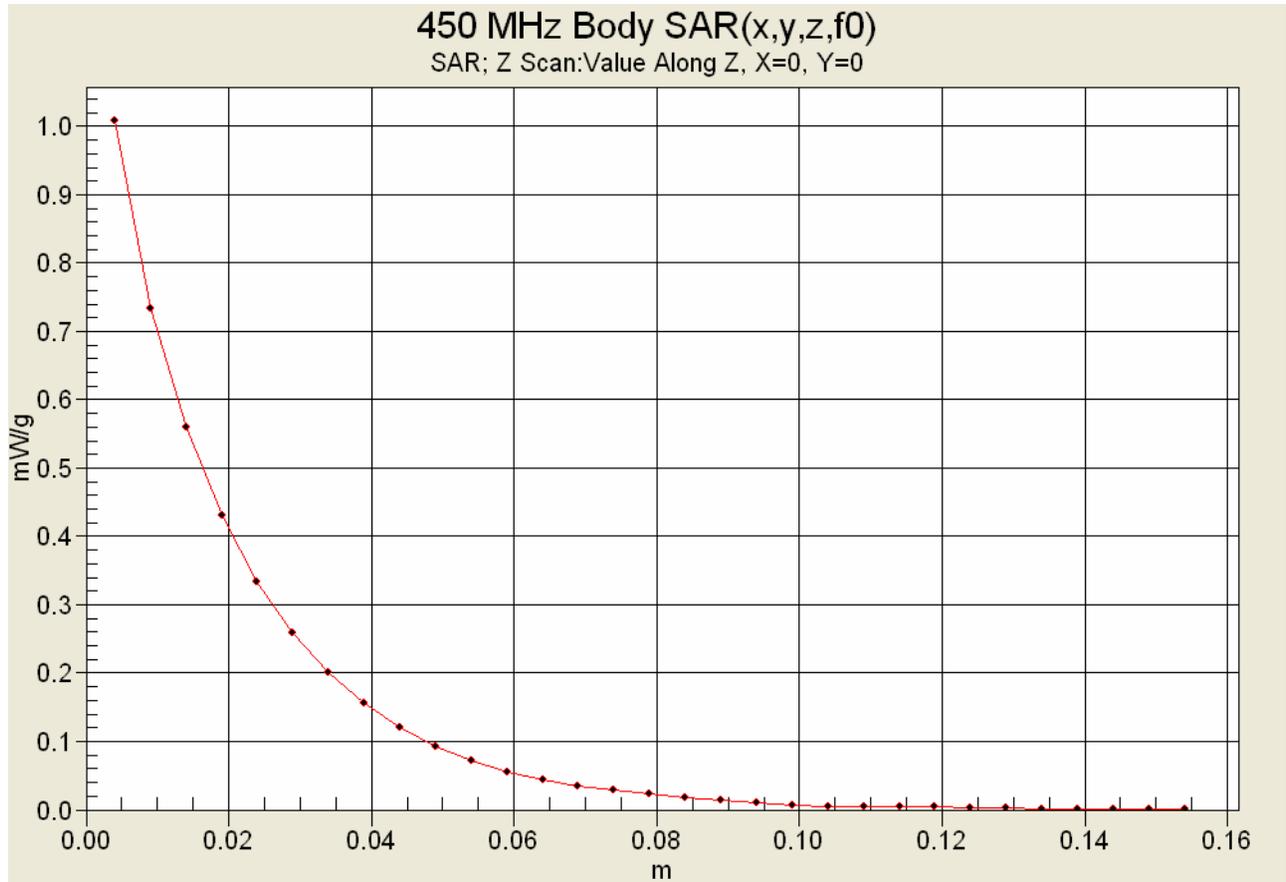
Maximum value of SAR (measured) = 1.03 mW/g



Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 17 of 32

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

Z-Axis Scan



Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 18 of 32

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

APPENDIX B - SYSTEM PERFORMANCE CHECK DATA

Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.					Page 19 of 32

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

Date Tested: 11/03/2010

System Performance Check - 450 MHz Dipole - HSL

DUT: Dipole D450V3; Asset: 000217; Serial: 1068; Calibration: 01/18/2010

Ambient Temp: 22.0°C; Fluid Temp: 21.4°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Forward Conducted Power: 398 mW

Frequency: 450 MHz; Duty Cycle: 1:1

Medium: HSL450 Medium parameters used: $f = 450 \text{ MHz}$; $\sigma = 0.85 \text{ mho/m}$; $\epsilon_r = 45.6$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(7.25, 7.25, 7.25); Calibrated: 15/07/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 27/04/2010
- Phantom: Barski Industries; Type: Fiberglass Planar; Serial: 03-01
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

System Performance Check - 450 MHz Dipole

Area Scan (6x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 2.09 mW/g

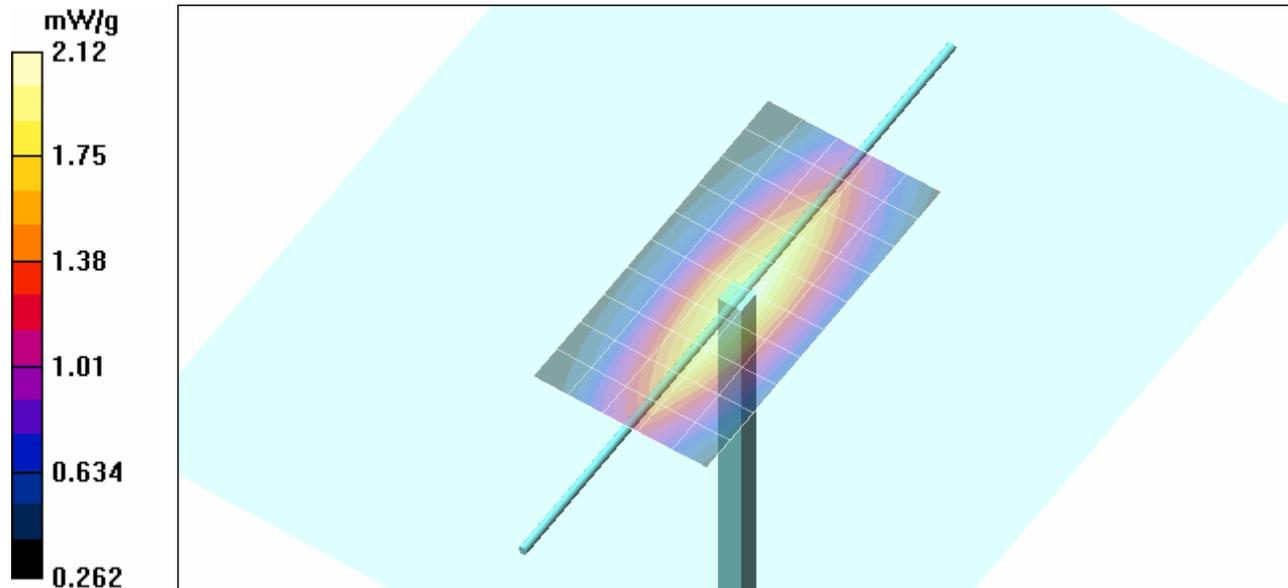
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 49.0 V/m; Power Drift = -0.007 dB

Peak SAR (extrapolated) = 3.07 W/kg

SAR(1 g) = 1.99 mW/g; SAR(10 g) = 1.35 mW/g

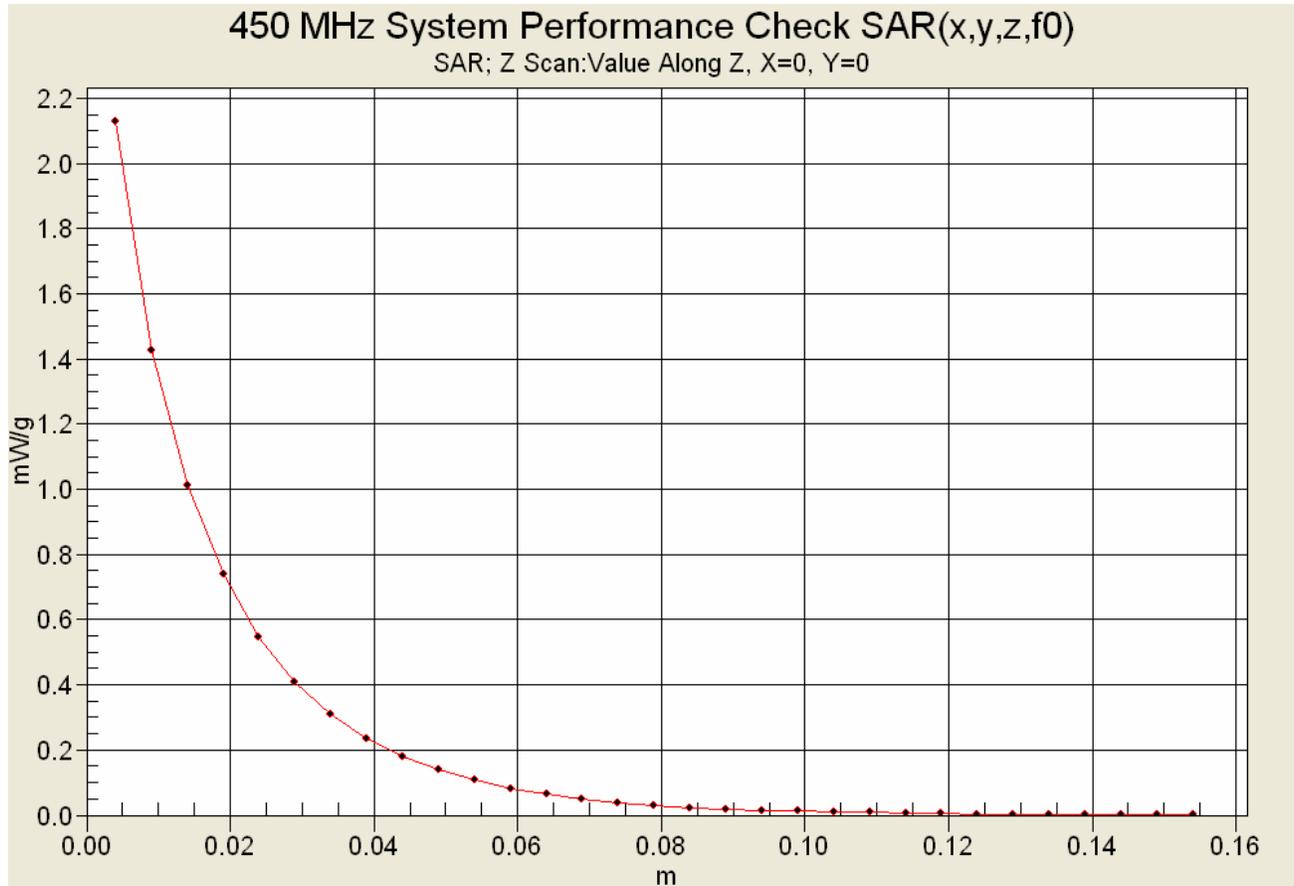
Maximum value of SAR (measured) = 2.12 mW/g



Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 20 of 32

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

Z-Axis Scan



	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS

Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.					Page 22 of 32

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

450 MHz Head

Celltech Labs Inc.
Test Result for UIM Dielectric Parameter
03/Nov/2010
Frequency (GHz)
FCC_eHFCC OET 65 Supplement C (June 2001) Limits for Body Epsilon
FCC_sHFCC OET 65 Supplement C (June 2001) Limits for Body Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

Freq	FCC_eHFCC_sH	Test_e	Test_s
0.3500	44.70 0.87	48.00	0.76
0.3600	44.58 0.87	47.44	0.76
0.3700	44.46 0.87	47.52	0.78
0.3800	44.34 0.87	47.51	0.78
0.3900	44.22 0.87	47.13	0.80
0.4000	44.10 0.87	46.85	0.82
0.4100	43.98 0.87	46.82	0.82
0.4200	43.86 0.87	46.80	0.83
0.4300	43.74 0.87	46.51	0.83
0.4400	43.62 0.87	46.17	0.84
0.4500	43.50 0.87	45.62	0.85
0.4600	43.45 0.87	45.60	0.85
0.4700	43.40 0.87	45.62	0.87
0.4800	43.34 0.87	45.14	0.88
0.4900	43.29 0.87	44.88	0.88
0.5000	43.24 0.87	45.22	0.89
0.5100	43.19 0.87	45.12	0.92
0.5200	43.14 0.88	44.07	0.91
0.5300	43.08 0.88	43.94	0.92
0.5400	43.03 0.88	44.53	0.94
0.5500	42.98 0.88	43.99	0.95

Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 23 of 32

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

450 MHz Body

Celltech Labs Inc.
Test Result for UIM Dielectric Parameter
03/Nov/2010
Frequency (GHz)
FCC_eHFCC Bulletin 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sHFCC Bulletin 65 Supplement C (June 2001) Limits for Head Sigma
FCC_eB FCC Limits for Body Epsilon
FCC_sB FCC Limits for Body Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

Freq	FCC_eB	FCC_sB	Test_e	Test_s
0.3500	57.70	0.93	59.66	0.83
0.3600	57.60	0.93	58.70	0.83
0.3700	57.50	0.93	59.21	0.84
0.3800	57.40	0.93	58.88	0.84
0.3900	57.30	0.93	58.68	0.86
0.4000	57.20	0.93	58.46	0.87
0.4100	57.10	0.93	58.81	0.88
0.4200	57.00	0.94	57.88	0.88
0.4300	56.90	0.94	58.51	0.89
0.4400	56.80	0.94	58.57	0.91
0.4500	56.70	0.94	58.02	0.91
0.4600	56.66	0.94	57.75	0.92
0.4700	56.62	0.94	58.31	0.93
0.4800	56.58	0.94	57.92	0.94
0.4900	56.54	0.94	57.87	0.95
0.5000	56.51	0.94	57.98	0.95
0.5100	56.47	0.94	57.43	0.96
0.5200	56.43	0.95	57.16	0.97
0.5300	56.39	0.95	57.86	0.98
0.5400	56.35	0.95	57.15	1.00
0.5500	56.31	0.95	56.77	1.01

Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 24 of 32

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

APPENDIX D - SAR TEST SETUP PHOTOGRAPHS

Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.					Page 25 of 32

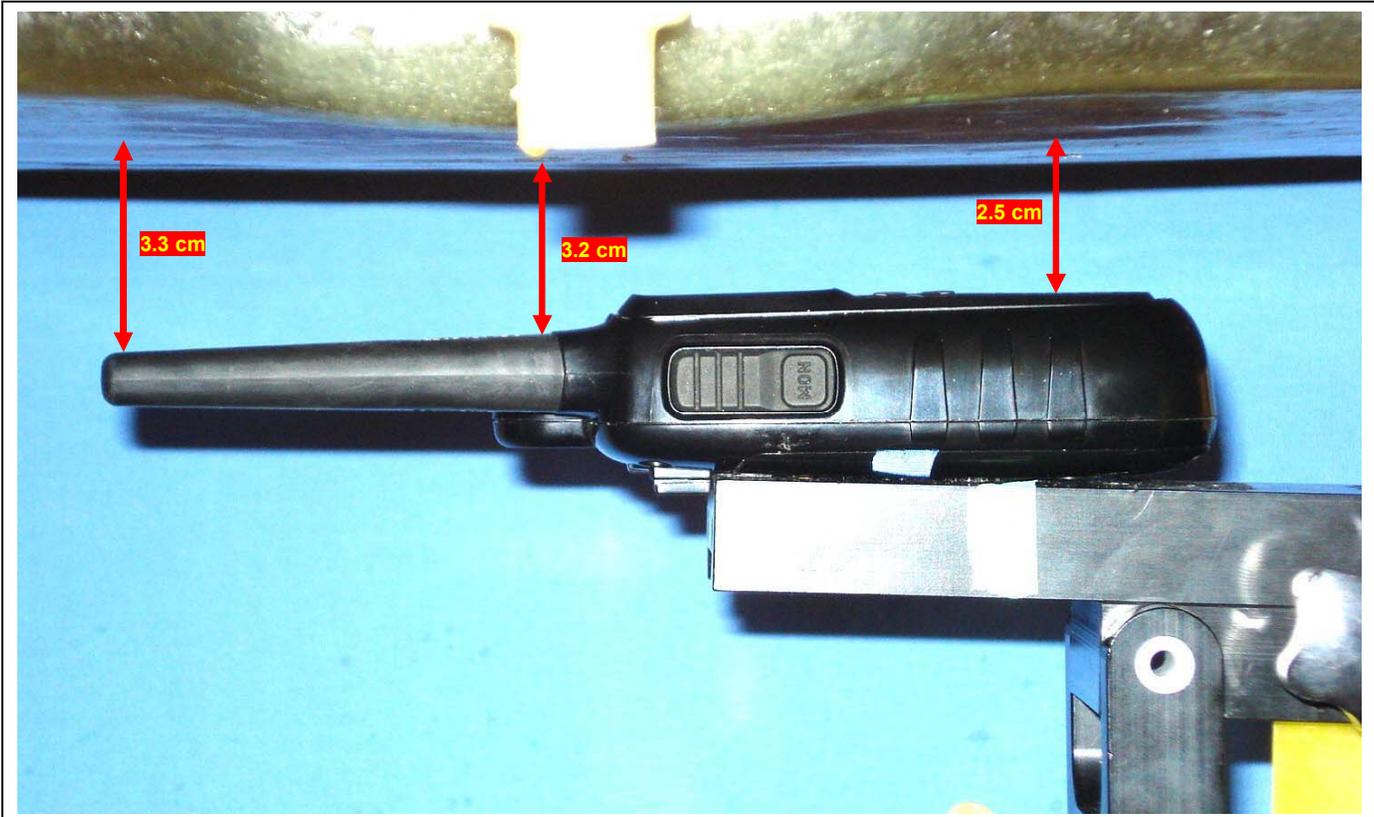
FACE-HELD SAR TEST SETUP PHOTOGRAPHS
2.5 cm Spacing from Front of DUT to Planar Phantom



Face-held Configuration - DUT with 2.5 cm spacing from front keypad side of radio to Barski phantom

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

FACE-HELD SAR TEST SETUP PHOTOGRAPHS
2.5 cm Spacing from Front of DUT to Planar Phantom

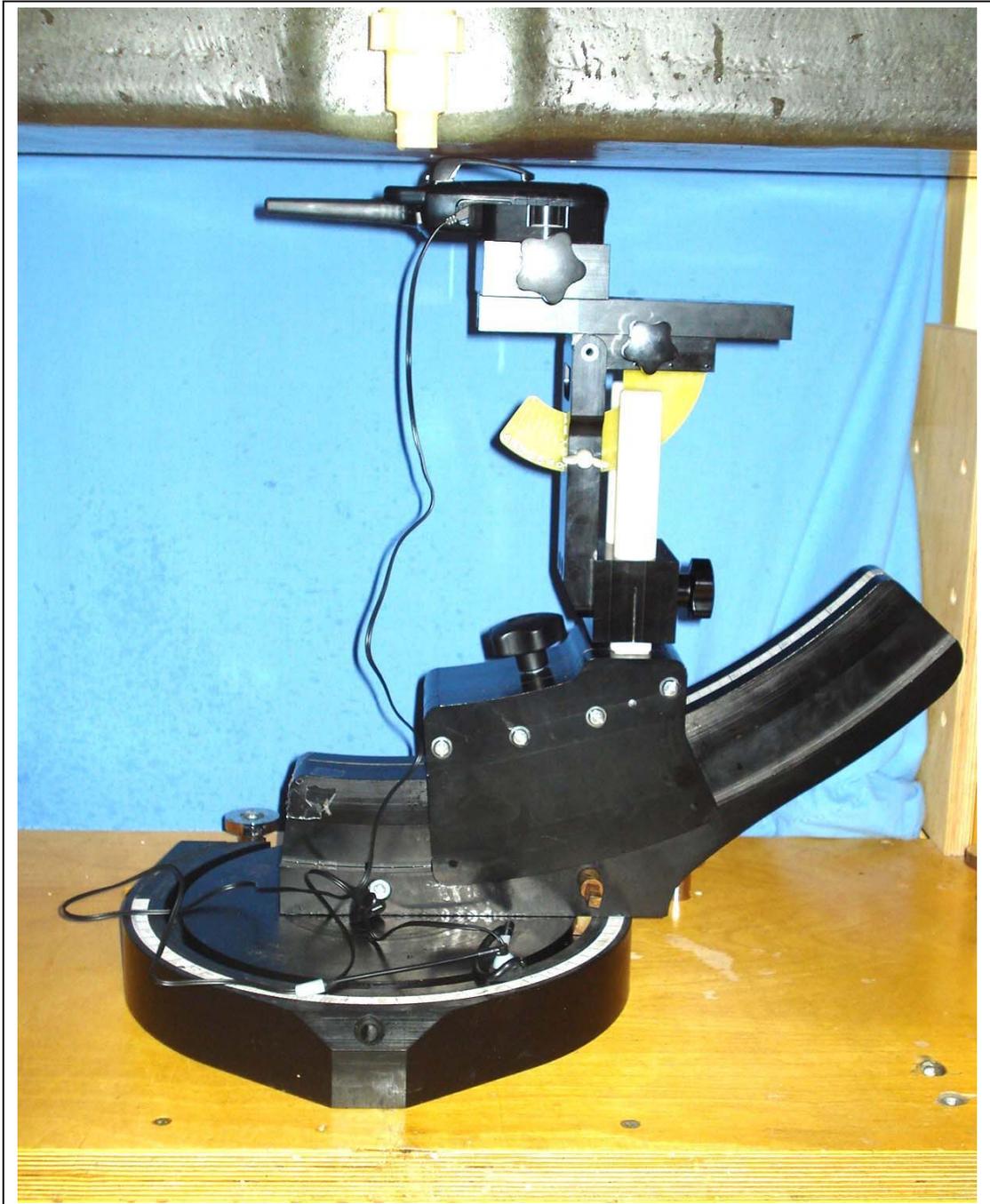


Face-Held Configuration (Keypad Side Parallel to Phantom) - 2.5 cm Spacing from Front of DUT to Planar Phantom

Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 27 of 32

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

BODY-WORN SAR TEST SETUP PHOTOGRAPHS
1.5 cm Belt-Clip Spacing from Back of DUT to Planar Phantom
DUT with Headset-Microphone Audio Accessory

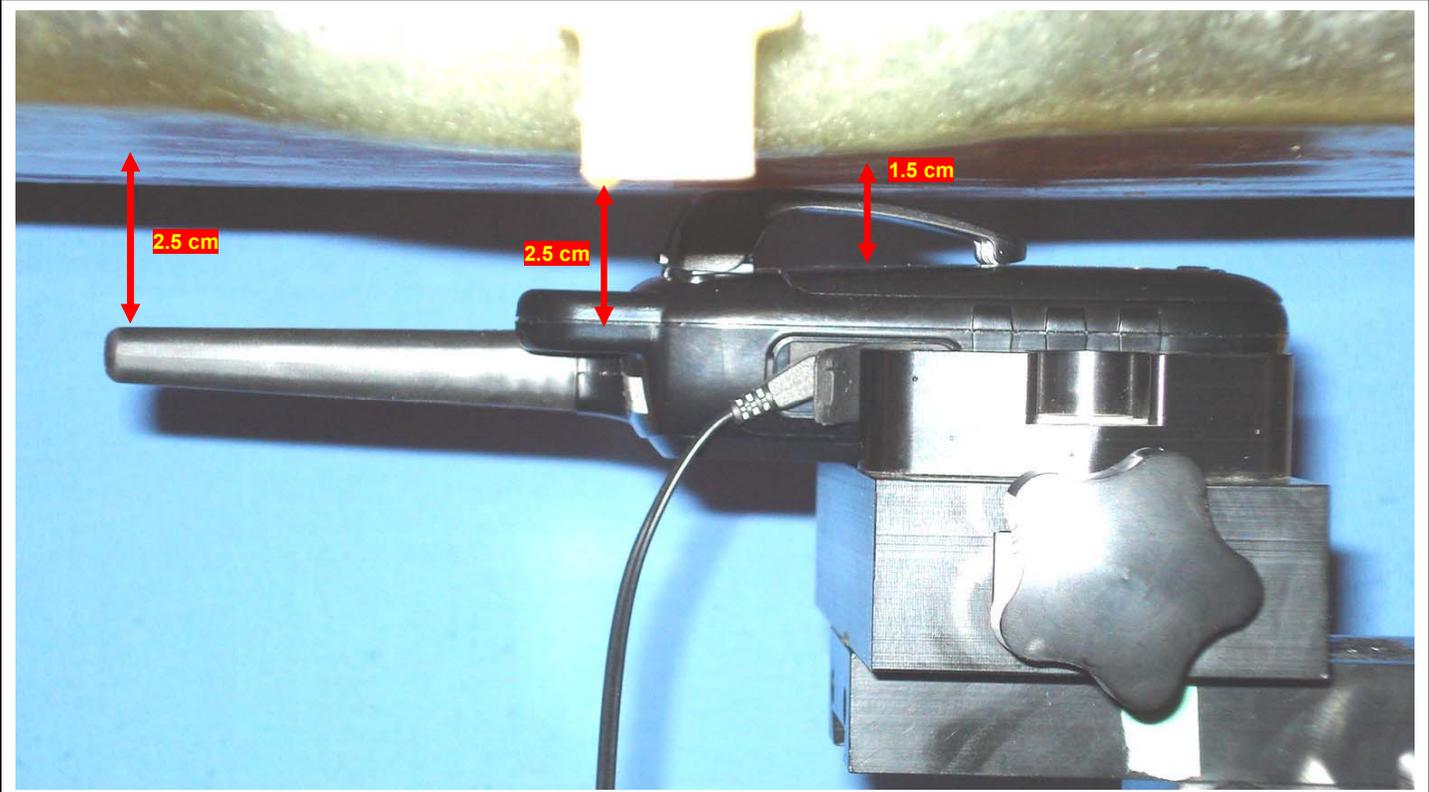


Body-worn Configuration - DUT with Belt-Clip Accessory & Headset-Microphone Audio Accessory

Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.		This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.				Page 28 of 32

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

BODY-WORN SAR TEST SETUP PHOTOGRAPHS
1.5 cm Belt-Clip Spacing from Back of DUT to Barski Phantom
DUT with Headset-Microphone Audio Accessory



Body-worn Configuration (Battery Side Parallel to Phantom) - DUT with Belt-Clip Accessory & Headset-Microphone Audio Accessory

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

APPENDIX E - DIPOLE CALIBRATION

Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.					Page 30 of 32



Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Celltech**

Certificate No.: **D450V3-1068 Jan10**

CALIBRATION CERTIFICATE

Object **D450V3 - SN: 1068**

Calibration procedure(s) **QA CAL-15.v5
Calibration Procedure for dipole validation kits below 800 MHz**

Calibration date: **January 18, 2010**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41495277	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41498087	1-Apr-09 (No. 217-01030)	Apr-10
Reference 3 dB Attenuator	SN: S5054 (3c)	31-Mar-09 (No. 217-01026)	Mar-10
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-09 (No. 217-01028)	Mar-10
Type-N mismatch combination	SN: 5047.2 / 06327	31-Mar-09 (No. 217-01029)	Mar-10
Reference Probe ET3DV6 (LF)	SN: 1507	03-Jul-09 (No. ET3-1507_Jul09)	Jul-10
DAE4	SN: 654	04-May-09 (No. DAE4-654_May09)	May-10
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	04-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-09)	In house check: Oct-10

Calibrated by: **Jeton Kastrati** Function: **Laboratory Technician** Signature: *i.v. [Signature]*

Approved by: **Katja Pokovic** Technical Manager *[Signature]*

Issued: January 20, 2010

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



Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
ConF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

- DASY4 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V5.2
Extrapolation	Advanced Extrapolation	
Phantom	ELI4 Flat Phantom	Shell thickness: 2 ± 0.2 mm
Distance Dipole Center - TSL	15 mm	with Spacer
Area Scan Resolution	dx, dy = 15 mm	
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	450 MHz \pm 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	43.5	0.87 mho/m
Measured Head TSL parameters	(22.0 \pm 0.2) °C	44.2 \pm 6 %	0.86 mho/m \pm 6 %
Head TSL temperature during test	(22.0 \pm 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	condition	
SAR measured	398 mW input power	1.87 mW / g
SAR normalized	normalized to 1W	4.70 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	4.76 mW / g \pm 18.1 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	398 mW input power	1.25 mW / g
SAR normalized	normalized to 1W	3.14 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	3.17 mW / g \pm 17.6 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	56.7	0.94 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.1 ± 6 %	0.90 mho/m ± 6 %
Body TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	condition	
SAR measured	398 mW input power	1.78 mW / g
SAR normalized	normalized to 1W	4.47 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	4.58 mW / g ± 18.1 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	398 mW input power	1.19 mW / g
SAR normalized	normalized to 1W	2.99 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	3.06 mW / g ± 17.6 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	57.5 Ω - 5.9 j Ω
Return Loss	- 21.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	54.8 Ω - 9.3 j Ω
Return Loss	- 20.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.350 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	July 16, 2009

DASY5 Validation Report for Head TSL

Date/Time: 1/18/2010 10:59:37 AM

DUT: Dipole 450 MHz; Type: D450V3; Serial: D450V3 - SN:1068

Communication System: CW; Frequency: 450 MHz; Duty Cycle: 1:1
Medium: HSL450

Medium parameters used: $f = 450$ MHz; $\sigma = 0.86$ mho/m; $\epsilon_r = 44.2$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ET3DV6 - SN1507 (LF); ConvF(6.66, 6.66, 6.66); Calibrated: 7/3/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn654; Calibrated: 5/4/2009
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1003
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

Head/d=15mm, Pin=398mW/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.99 mW/g

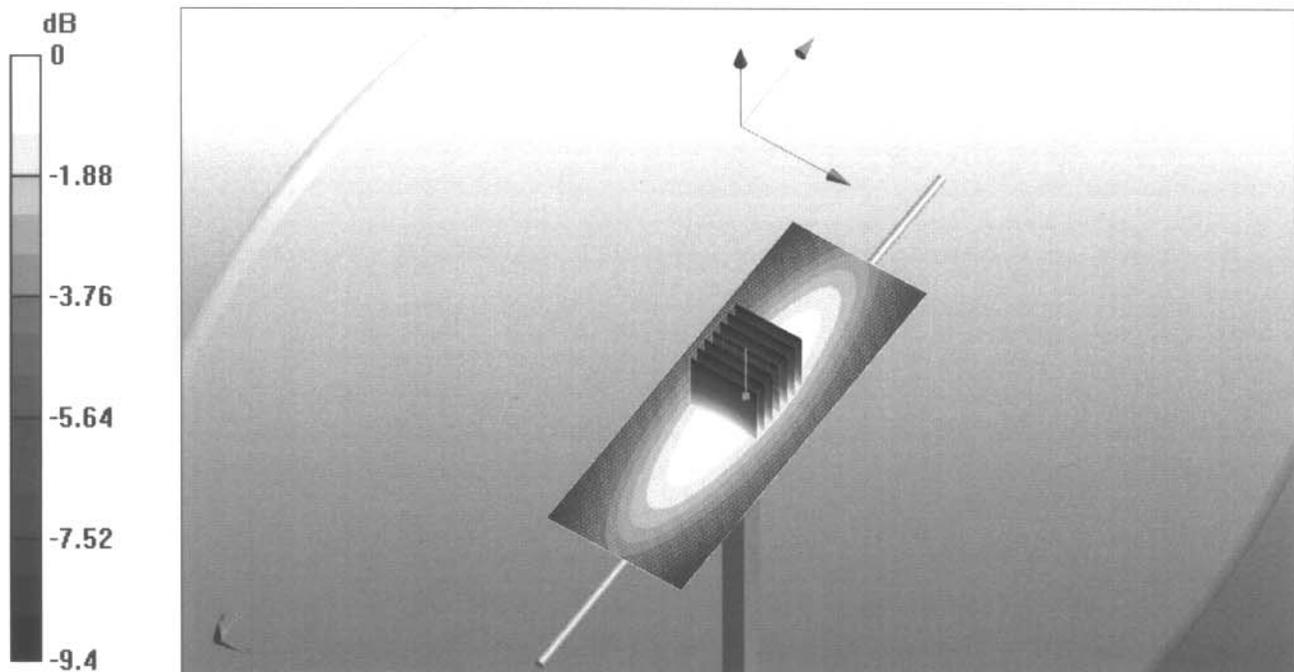
Head/d=15mm, Pin=398mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 50.2 V/m; Power Drift = -0.020 dB

Peak SAR (extrapolated) = 2.78 W/kg

SAR(1 g) = 1.87 mW/g; SAR(10 g) = 1.25 mW/g

Maximum value of SAR (measured) = 2 mW/g



0 dB = 2mW/g

Impedance Measurement Plot for Head TSL

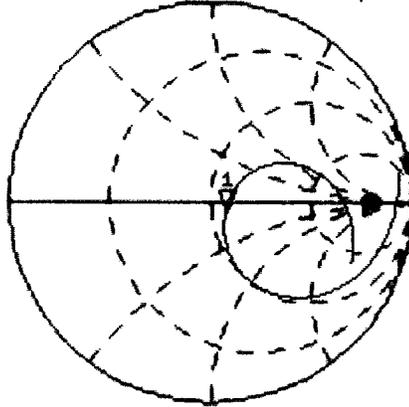
18 Jan 2010 10:25:40

CH1 S11 1 U FS

1: 57.502 Ω -5.9180 Ω 59.763 pF

450.000 000 MHz

*
Del
Cor



Avg
16

↑

CH2 S11 LOG

5 dB/REF -20 dB

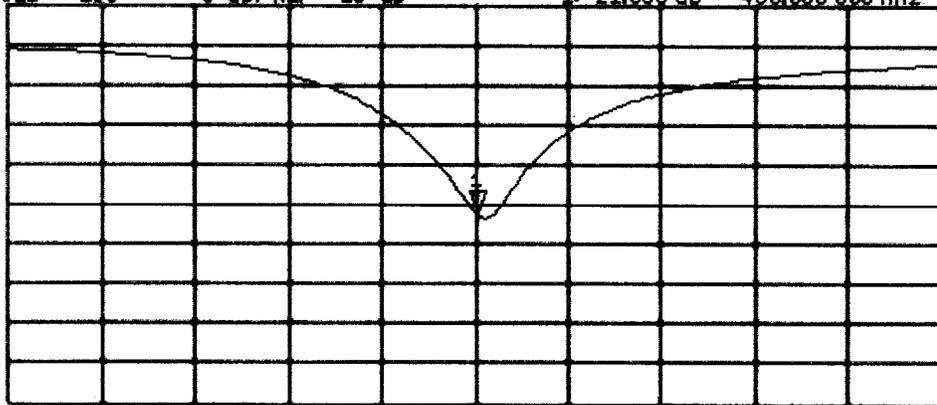
1: -21.035 dB

450.000 000 MHz

Cor

Avg
16

↑



START 250.000 000 MHz

STOP 650.000 000 MHz

DASY5 Validation Report for Body TSL

Date/Time: 1/18/2010 1:24:11 PM

DUT: Dipole 450 MHz; Type: D450V3; Serial: D450V3 - SN:1068

Communication System: CW; Frequency: 450 MHz; Duty Cycle: 1:1

Medium: MSL450

Medium parameters used: $f = 450 \text{ MHz}$; $\sigma = 0.9 \text{ mho/m}$; $\epsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ET3DV6 - SN1507 (LF); ConvF(7.11, 7.11, 7.11); Calibrated: 7/3/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn654; Calibrated: 5/4/2009
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1003
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

Body/d=15mm, Pin=398mW/Area Scan (61x201x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 1.9 mW/g

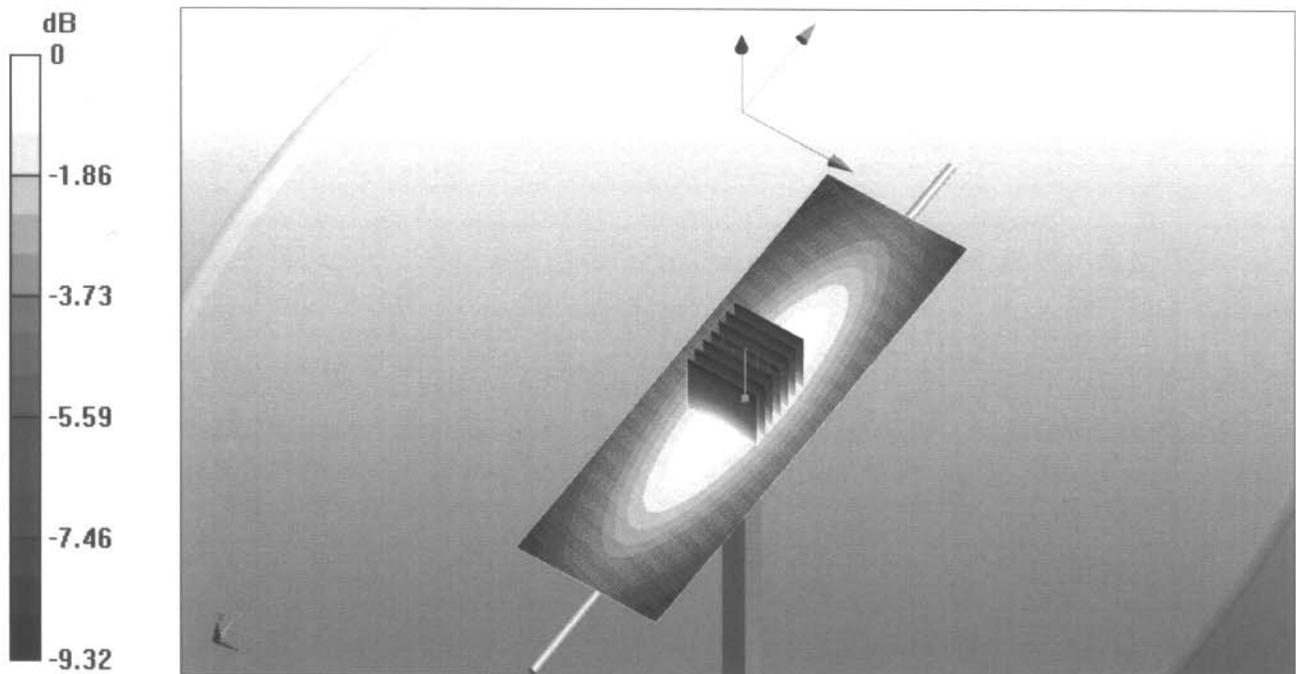
Body/d=15mm, Pin=398mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 47.4 V/m; Power Drift = -0.034 dB

Peak SAR (extrapolated) = 2.71 W/kg

SAR(1 g) = 1.78 mW/g; SAR(10 g) = 1.19 mW/g

Maximum value of SAR (measured) = 1.9 mW/g



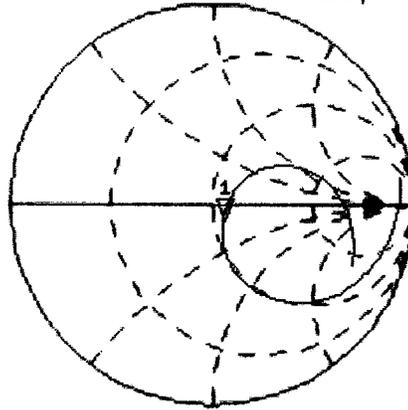
0 dB = 1.9mW/g

Impedance Measurement Plot for Body TSL

18 Jan 2010 12:18:41

CH1 S11 1 U FS 1: 54.824 Ω -9.3047 Ω 38.011 pF 450.000 000 MHz

*
Del
Cor



Avg
16

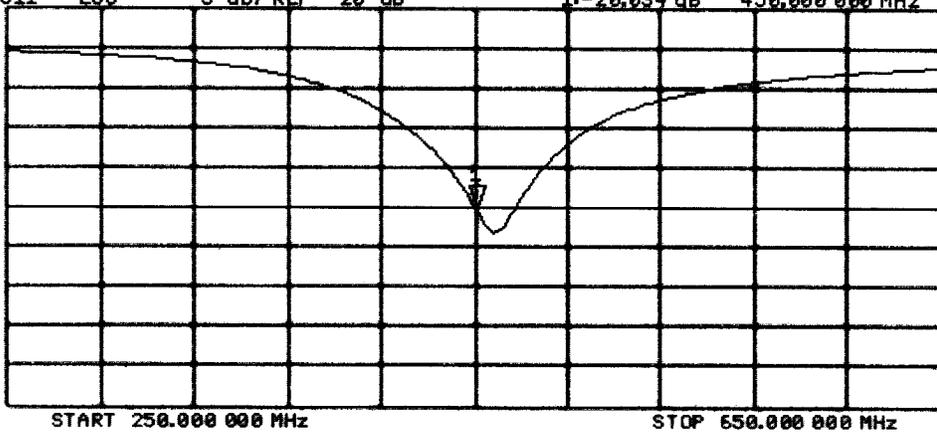
↑

CH2 S11 LOG 5 dB/REF -20 dB 1:-20.034 dB 450.000 000 MHz

Cor

Avg
16

↑



	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

APPENDIX F - PROBE CALIBRATION

Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.					Page 31 of 32



Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Celltech**

Certificate No: **ET3-1590_Jul10**

CALIBRATION CERTIFICATE

Object **ET3DV6 - SN:1590**

Calibration procedure(s) **QA CAL-01.v6, QA CAL-12.v6, QA CAL-23.v3 and QA CAL-25.v2
Calibration procedure for dosimetric E-field probes**

Calibration date: **July 15, 2010**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41495277	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41498087	1-Apr-10 (No. 217-01136)	Apr-11
Reference 3 dB Attenuator	SN: S5054 (3c)	30-Mar-10 (No. 217-01159)	Mar-11
Reference 20 dB Attenuator	SN: S5086 (20b)	30-Mar-10 (No. 217-01161)	Mar-11
Reference 30 dB Attenuator	SN: S5129 (30b)	30-Mar-10 (No. 217-01160)	Mar-11
Reference Probe ES3DV2	SN: 3013	30-Dec-09 (No. ES3-3013_Dec09)	Dec-10
DAE4	SN: 660	20-Apr-10 (No. DAE4-660_Apr10)	Apr-11
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-09)	In house check: Oct10

Calibrated by	Name Jeton Kastrati	Function Laboratory Technician	Signature 
Approved by:	Name Katja Pokovic	Technical Manager	

Issued: July 15, 2010

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



Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,y,z}
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

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

Probe ET3DV6

SN:1590

Manufactured:	March 19, 2001
Last calibrated:	July 16, 2009
Recalibrated:	July 15, 2010

Calibrated for DASYS/EASY Systems

(Note: non-compatible with DASYS2 system!)

DASY/EASY - Parameters of Probe: ET3DV6 SN:1590**Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	1.86	2.06	1.77	$\pm 10.1\%$
DCP (mV) ^B	91.4	92.4	83.5	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dBuV	C	VR mV	Unc ^E (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	300.0	$\pm 1.5\%$
			Y	0.00	0.00	1.00	300.0	
			Z	0.00	0.00	1.00	300.0	

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

^A The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Pages 5 and 6)

^B Numerical linearization parameter: uncertainty not required.

^E Uncertainty is determined using the maximum deviation from linear response applying recatangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: ET3DV6 SN:1590

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Validity [MHz] ^c	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
450	± 50 / ± 100	43.5 ± 5%	0.87 ± 5%	7.25	7.25	7.25	0.20	2.19 ± 13.3%
835	± 50 / ± 100	41.5 ± 5%	0.90 ± 5%	6.27	6.27	6.27	0.32	2.49 ± 11.0%
900	± 50 / ± 100	41.5 ± 5%	0.97 ± 5%	6.12	6.12	6.12	0.27	2.86 ± 11.0%

^c The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

DASY/EASY - Parameters of Probe: ET3DV6 SN:1590

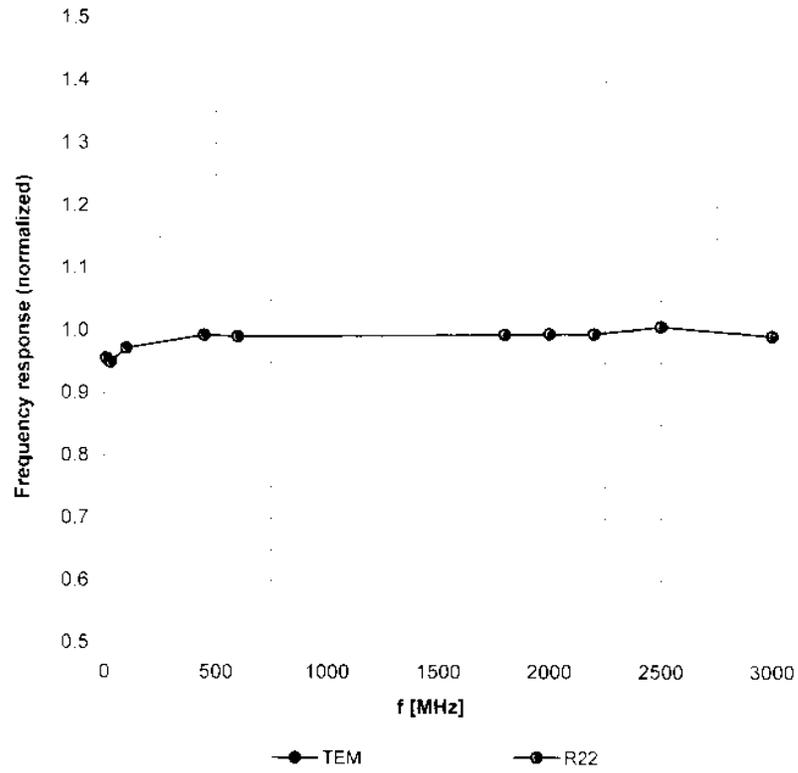
Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz]	Validity [MHz] ^c	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
450	± 50 / ± 100	56.7 ± 5%	0.94 ± 5%	7.73	7.73	7.73	0.13	2.06 ± 13.3%
835	± 50 / ± 100	55.2 ± 5%	0.97 ± 5%	6.33	6.33	6.33	0.22	3.60 ± 11.0%
900	± 50 / ± 100	55.0 ± 5%	1.05 ± 5%	6.15	6.15	6.15	0.28	2.94 ± 11.0%

^c The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

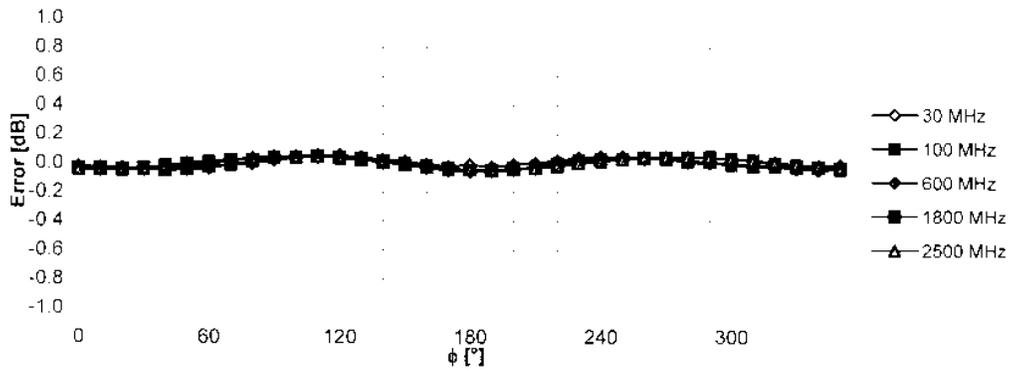
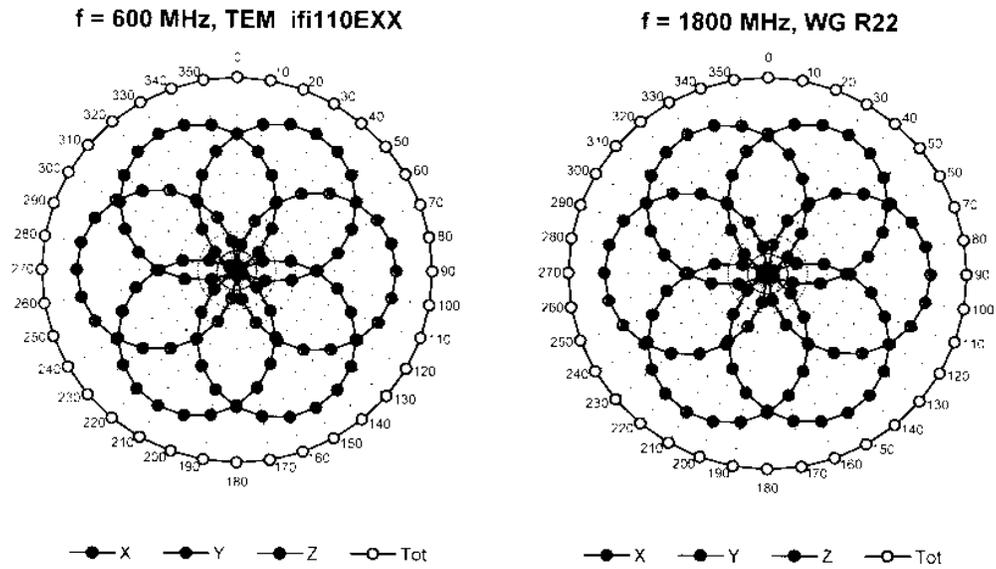
Frequency Response of E-Field

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



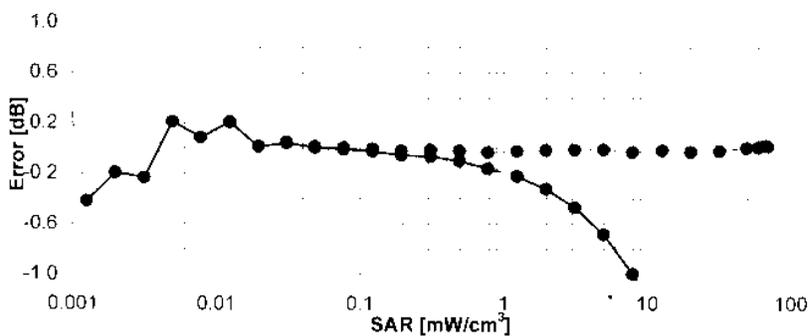
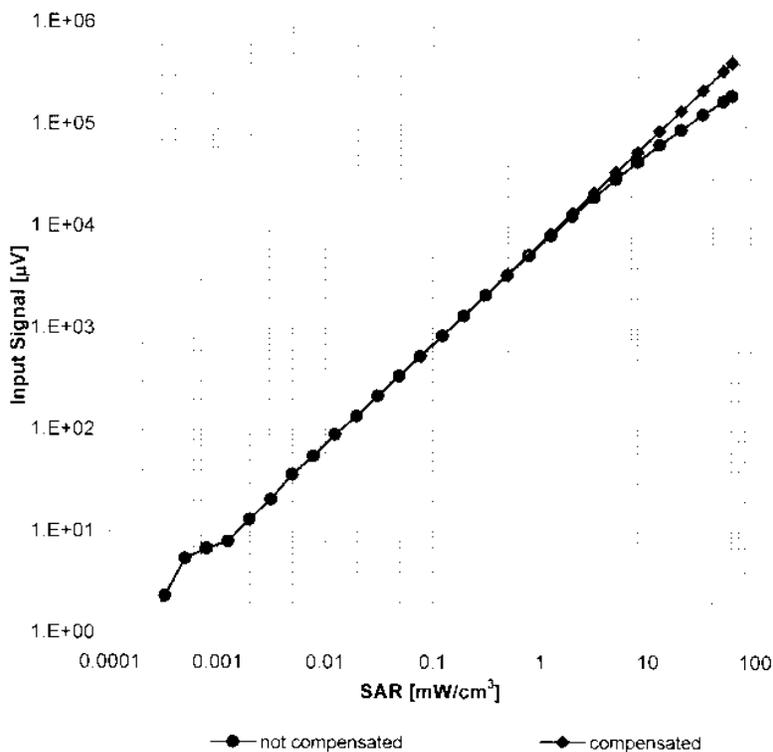
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

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



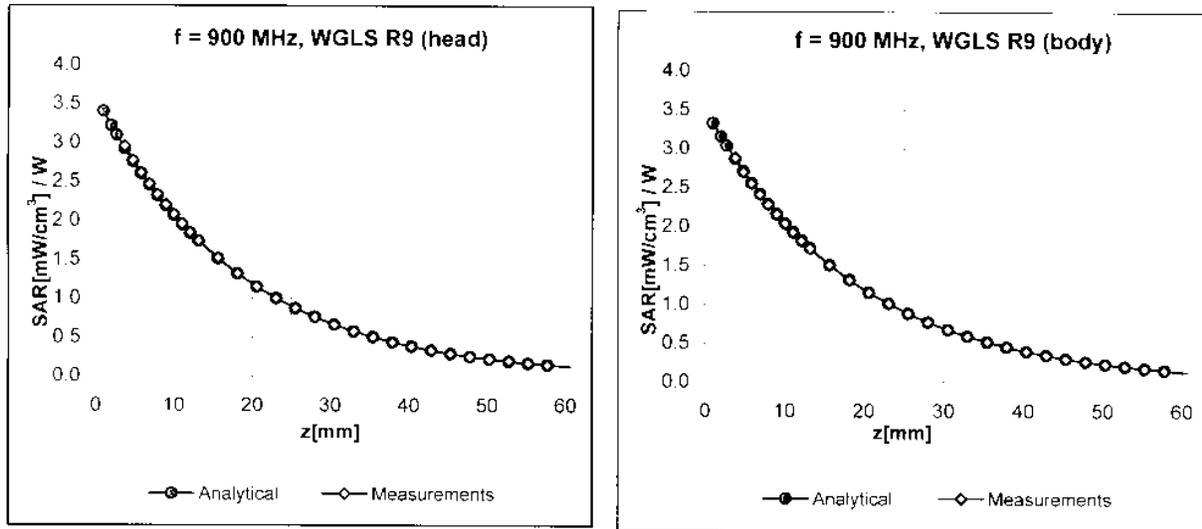
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

Dynamic Range f(SAR_{head}) (Waveguide R22, f = 1800 MHz)



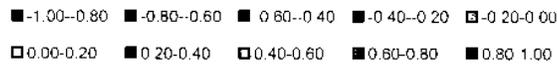
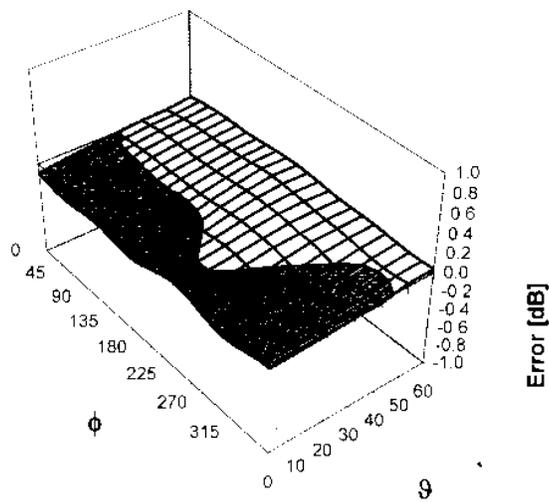
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



Deviation from Isotropy in HSL

Error (ϕ, θ), f = 900 MHz



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

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	enabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	6.8 mm
Probe Tip to Sensor X Calibration Point	2.7 mm
Probe Tip to Sensor Y Calibration Point	2.7 mm
Probe Tip to Sensor Z Calibration Point	2.7 mm
Recommended Measurement Distance from Surface	4 mm

	<u>Date(s) of Evaluation</u> November 03, 2010	<u>Test Report Serial No.</u> 110310AMW-T1060-E95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> November 09, 2010	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

APPENDIX G - BARSKI PLANAR PHANTOM CERTIFICATE OF CONFORMITY

Applicant:	Uniden America Corporation	FCC ID:	AMWUT051	IC:	513C-UT051	
DUT Type:	Portable GMRS/FRS UHF PTT Radio Transceiver	DUT Model(s):	GMR2838			
2010 Celltech Labs Inc.	This document is not to be reproduced in whole or in part without the prior written permission of Celltech Labs Inc.					Page 32 of 32

2378 Westlake Road
Kelowna, B.C. Canada
V1Z-2V2



Ph. # 250-769-6848
Fax # 250-769-6334
E-mail: barskiind@shaw.ca
Web: www.bcfiberglass.com

FIBERGLASS FABRICATORS

Certificate of Conformity

Item : Flat Planar Phantom Unit # 03-01
Date: June 16, 2003
Manufacturer: Barski Industries (1985 Ltd)

Test	Requirement	Details
Shape	Compliance to geometry according to drawing	Supplied CAD drawing
Material Thickness	Compliant with the requirements	2mm +/- 0.2mm in measurement area
Material Parameters	Dielectric parameters for required frequencies Based on Dow Chemical technical data	100 MHz-5 GHz Relative permittivity < 5 Loss Tangent < 0.05

Conformity

Based on the above information, we certify this product to be compliant to the requirements specified.

Signature: _____

A handwritten signature in black ink, appearing to read 'Daniel Chailer', is written over a horizontal line.

Daniel Chailer



Fiberglass Planar Phantom - Top View



Fiberglass Planar Phantom - Front View



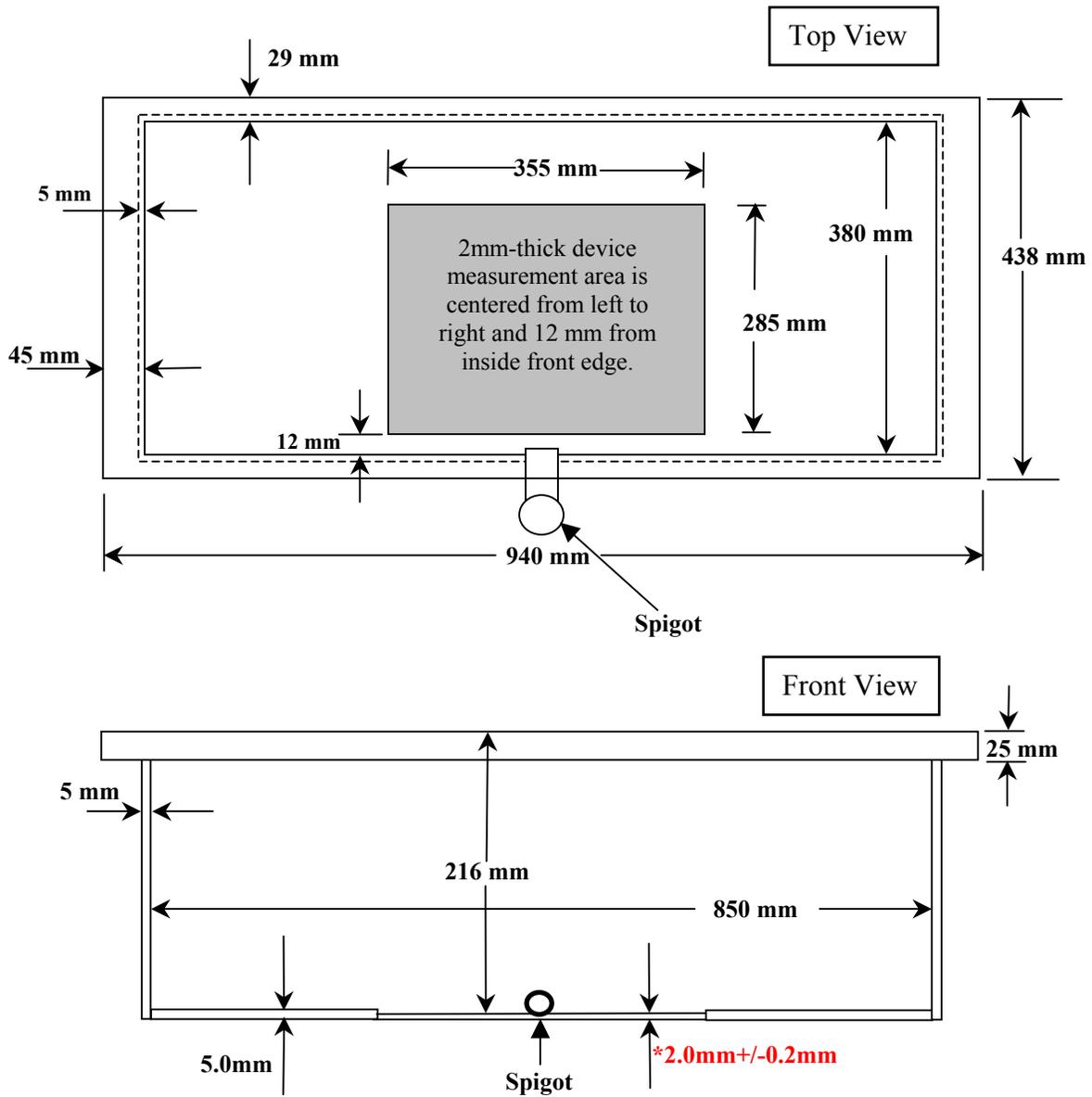
Fiberglass Planar Phantom - Back View



Fiberglass Planar Phantom - Bottom View

Dimensions of Fiberglass Planar Phantom

(Manufactured by Barski Industries Ltd. - Unit# 03-01)



**Note: Measurements that aren't repeated for the opposite sides are the same as the side measured.
This drawing is not to scale.**