

	Date(s) of Evaluation 12/17/ 2012, 5/6/2013	Test Report Serial No. 121112BBO-T1210-S80V	Test Report Revision No. Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	Test Report Issue Date May 6, 2013	Description of Test(s) Specific Absorption Rate	RF Exposure Category 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, B.C. V1X 7R8 Canada			
Test Lab Accreditation(s)	ISO 17025	A2LA Test Lab Certificate No. 2470.01			
Applicant Information	Name	COBRA ELECTRONICS CORPORATION			
	Address	6500 West Cortlan Street, Chicago, IL 60707 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 65, Supplement C	FCC	KDB 447498 D01v05	
	IC	RSS-102 Issue 4	IEEE	Standard 1528-2003	
Device Classification(s)	FCC	Licensed Non-Broadcast Transmitter Held to Face (TNF)			
	IC	Maritime Radio Transmitter and Receiver (RSS-182)			
Device RF Exposure Category	FCC/IC	General Population / Uncontrolled Environment			
Device Identifier(s)	FCC ID:	BBOMRHH500			
	IC:	906A-MRHH500			
Device Model(s)	Model(s)	MR HH500	MR HH350 (not tested)		
	Note: Only model difference is that the MR HH350 does not have Bluetooth or voice recording. Models are mechanically and electrically identical.				
Co-located Transmitters	Bluetooth (7mW) - not able to transmit simultaneously with radio.				
Test Sample Serial No.	#8 (Identical Prototype)				
Date of Sample Receipt	Dec. 11, 2012	Date(s) of Evaluations		Dec. 17, 2012, May 6, 2013	
Test Sample Hardware Rev. No.	n/a	Test Sample Firmware Rev. No.		B6CD	
Device-Under-Test Description (DUT)	Portable FM VHF Push-To-Talk (PTT) Marine Radio Transceiver with Bluetooth				
VHF Transmit Frequency Range(s)	156.025 - 157.425 MHz (VHF Marine Band)				
Manuf. Rated Output Power	5.0 W +/- 0.8 W (average conducted) (Hi power setting)				
Measured RF Output Power	5.2 W	37.2 dBm	Conducted	156.7 MHz (Ch. 14)	
Battery Type Tested	Lithium-Ion	7.4 V	1000 mAh	P/N: 110-350	
Antenna Type Tested	Removable Stubby			P/N: N/A	
Body-worn Accessory Tested	Belt-Clip (contains metal)			P/N: 240-003	
Audio Accessory Tested	Speaker-Microphone			P/N: CM330-001	
Max. SAR Level(s) Evaluated	Face-held	0.299 W/kg	1g	50% PTT duty factor	General Population / Uncontrolled
	Body-worn	0.603 W/kg	1g	50% PTT duty factor	
FCC/IC Spatial Peak SAR Limit	Head/Body	1.6 W/kg	1g	50% PTT duty factor	
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 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 IEC International Standard 62209-2:2010. 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.					
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Test Report Approved By		Mike Meaker	Engineering Technologist	Celltech Labs Inc.	

Applicant:	Cobra Electronics Corporation	FCC ID:	BBOMRHH500	IC:	906A-MRHH500	
Model(s):	MR HH500	DUT Type:	Portable VHF PTT Marine Radio Transceiver	156.025-157.425 MHz		
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Applicant:	Cobra Electronics Corporation	FCC ID:	BBOMRHH500	IC:	906A-MRHH500	
Model(s):	MR HH500	DUT Type:	Portable VHF PTT Marine Radio Transceiver	156.025-157.425 MHz		
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REVISION HISTORY			
REVISION NO.	DESCRIPTION	IMPLEMENTED BY	RELEASE DATE
1.0	1st Release	Mike Meaker	Dec. 19, 2012
1.1	Body-worn configuration was re-tested utilizing the system verification procedures of FCC KDB 865664 D01v01 - Refer to section 8.0 and 13.0	Mike Meaker	May 6, 2013

TEST REPORT SIGN-OFF			
DEVICE TESTED BY	REPORT PREPARED BY	QA REVIEW BY	REPORT APPROVED BY
Mike Meaker	Mike Meaker	Glen Westwell	Mike Meaker

Applicant:	Cobra Electronics Corporation	FCC ID:	BBOMRHH500	IC:	906A-MRHH500	
Model(s):	MR HH500	DUT Type:	Portable VHF PTT Marine Radio Transceiver	156.025-157.425 MHz		
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1.0 INTRODUCTION

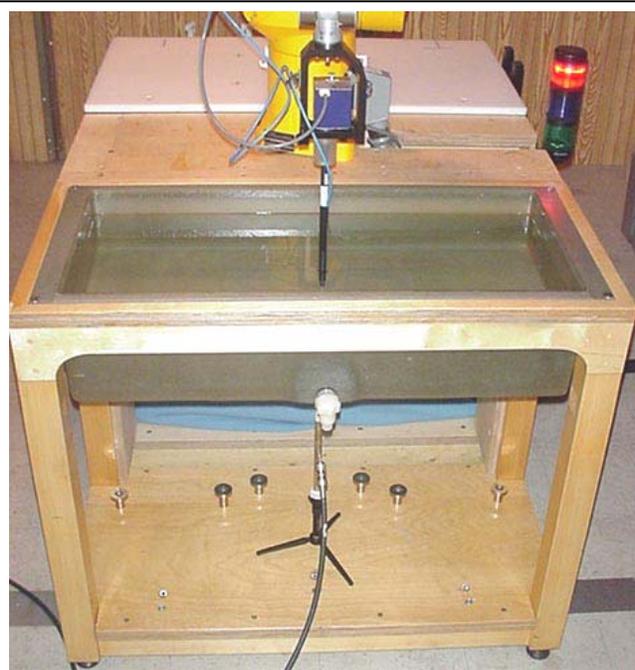
This measurement report demonstrates that the Cobra Electronics Corporation Models: MR HH500 and MR HH350 Portable VHF PTT Marine Radio Transceivers comply with the SAR (Specific Absorption Rate) RF exposure requirements specified in FCC 47 CFR §2.1093 (see reference [1]) and Health Canada's Safety Code 6 (see reference [2]) for the General Population / Uncontrolled Exposure environment. The measurement procedures described in FCC OET Bulletin 65, Supplement C 01-01 (see reference [3]), IC RSS-102 Issue 4 (see reference [4]), IEEE Standard 1528-2003 (see reference [5]) and IEC Standard 62209-2:2010 (see reference [6]) were employed. A description of the device, 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 Head 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 predecoder 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.



DASY4 SAR System with Plexiglas side planar phantom



DASY4 SAR System with Barski Fiberglass Planar Phantom

Applicant:	Cobra Electronics Corporation	FCC ID:	BBOMRHH500	IC:	906A-MRHH500	
Model(s):	MR HH500	DUT Type:	Portable VHF PTT Marine Radio Transceiver	156.025-157.425 MHz		
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3.0 RF CONDUCTED OUTPUT POWER MEASUREMENT

Band	Frequency	Channel	Mode	Power Setting	Measured Power Level		Method
					dBm	Watts	
VHF	156.7 MHz	14	CW	Hi	37.2	5.2	Average Conducted
Notes							
1. The test channel was selected in accordance with the procedures specified in FCC KDB 447498 (see reference [7]).							
2. The RF conducted output power level of the DUT was measured by Celltech prior to the SAR evaluations using a Gigatronics 8652A Universal Power Meter at the antenna of the DUT in accordance with FCC 47 CFR §2.1046 (see reference [13]) and IC RSS-Gen (see reference [14]).							

4.0 NO. OF TEST CHANNELS (N_c)

Device Frequency Range	Band	N_c	Test Frequencies (MHz)
156.025 - 157.425 MHz	VHF Marine	1	156.7 MHz
Note: The number of test channels (N_c) was calculated in accordance with the procedures specified in FCC KDB 447498 (see reference [7]).			

5.0 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 [9]).

Probe Calibration Freq.	Device Measurement Freq.	Frequency Interval	± 25 MHz \leq 300 MHz
150 MHz	156.7 MHz	6.7 MHz	$<$ 25 MHz
Note: The probe calibration and measurement frequency interval is $<$ 25 MHz; therefore additional steps were not required.			

Applicant:	Cobra Electronics Corporation	FCC ID:	BBOMRHH500	IC:	906A-MRHH500	
Model(s):	MR HH500	DUT Type:	Portable VHF PTT Marine Radio Transceiver	156.025-157.425 MHz		
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6.0 ACCESSORY LISTING

Accessory ID # for Test Report	ACCESSORY CATEGORY: ANTENNA		
	Part Number	Description	SAR Evaluation
1	N/A	Detachable Stubby Antenna	Yes
Accessory ID # for Test Report	ACCESSORY CATEGORY: BATTERY		
	Part Number	Description	SAR Evaluation
a	110-350	Li-ion Battery 7.4V, 1000mAh	Yes
b	110-012	Alkaline Battery case	No ¹
Accessory ID # for Test Report	ACCESSORY CATEGORY: BODY-WORN		
	Part Number	Description	SAR Evaluation
1	240-003	Belt-clip (contains metal)	Yes
Accessory ID # for Test Report	ACCESSORY CATEGORY: AUDIO		
	Part Number	Description	SAR Evaluation
A	CM330-001	Speaker-Microphone	Yes

Manufacturer's disclosed accessory listing provided by Cobra Electronics Corporation.

Notes:

1. Alkaline battery was not tested based on lower output power capability and inability to sustain hi power mode transmissions.

Applicant:	Cobra Electronics Corporation	FCC ID:	BBOMRHH500	IC:	906A-MRHH500	
Model(s):	MR HH500	DUT Type:	Portable VHF PTT Marine Radio Transceiver	156.025-157.425 MHz		
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7.0 FLUID DIELECTRIC PARAMETERS

FLUID DIELECTRIC PARAMETERS						
Date: 12/17/2012		Frequency: 150 MHz			Tissue: Head	
Freq	Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
0.050	81.71	0.64	52.3	0.76	56.23%	-15.79%
0.060	68.65	0.71	52.3	0.76	31.26%	-6.58%
0.070	66.37	0.7	52.3	0.76	26.90%	-7.89%
0.080	59.8	0.69	52.3	0.76	14.34%	-9.21%
0.090	61.65	0.69	52.3	0.76	17.88%	-9.21%
0.100	62.01	0.71	52.3	0.76	18.57%	-6.58%
0.110	56.21	0.71	52.3	0.76	7.48%	-6.58%
0.120	54.35	0.71	52.3	0.76	3.92%	-6.58%
0.130	55.16	0.74	52.3	0.76	5.47%	-2.63%
0.140	52.76	0.73	52.3	0.76	0.88%	-3.95%
0.150	54.12	0.73	52.3	0.76	3.48%	-3.95%
0.1567*	52.4	0.75	52.3	0.76	0.19%	-1.32%
0.160	51.61	0.76	52.3	0.76	-1.32%	0.00%
0.170	52.39	0.76	52.3	0.76	0.17%	0.00%
0.180	50.76	0.79	52.3	0.76	-2.94%	3.95%
0.190	51.29	0.81	52.3	0.76	-1.93%	6.58%
0.200	50.21	0.79	52.3	0.76	-4.00%	3.95%
0.210	48.62	0.81	52.3	0.76	-7.04%	6.58%
0.220	48.52	0.8	52.3	0.76	-7.23%	5.26%
0.230	46.86	0.81	52.3	0.76	-10.40%	6.58%
0.240	47.09	0.83	52.3	0.76	-9.96%	9.21%
0.250	46.51	0.84	52.3	0.76	-11.07%	10.53%

**interpolated using DASY4 software*

Test Date	Fluid Type	Ambient Temperature	Fluid Temperature	Fluid Depth	Atmospheric Pressure	Relative Humidity	ρ (Kg/m ³)
Dec 17	150 Head	22.0 °C	21.5 °C	≥ 15 cm	98.8 kPa	30%	1000

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FLUID DIELECTRIC PARAMETERS						
Date: 02/27/2013		Frequency: 2450 MHz			Tissue: Body	
Freq	Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
0.050	98.71	0.75	61.9	0.8	59.47%	-6.25%
0.060	95.2	0.74	61.9	0.8	53.80%	-7.50%
0.070	82.83	0.74	61.9	0.8	33.81%	-7.50%
0.080	75.55	0.77	61.9	0.8	22.05%	-3.75%
0.090	74.96	0.78	61.9	0.8	21.10%	-2.50%
0.100	76.6	0.75	61.9	0.8	23.75%	-6.25%
0.110	64.88	0.77	61.9	0.8	4.81%	-3.75%
0.120	61.65	0.79	61.9	0.8	-0.40%	-1.25%
0.130	65.08	0.77	61.9	0.8	5.14%	-3.75%
0.140	63	0.81	61.9	0.8	1.78%	1.25%
0.150	64.56	0.82	61.9	0.8	4.30%	2.50%
0.1567*	62.3	0.82	61.9	0.8	0.65%	2.50%
0.160	61.26	0.82	61.9	0.8	-1.03%	2.50%
0.170	60.34	0.83	61.9	0.8	-2.52%	3.75%
0.180	59.48	0.84	61.9	0.8	-3.91%	5.00%
0.190	61.79	0.83	61.9	0.8	-0.18%	3.75%
0.200	60.12	0.83	61.9	0.8	-2.88%	3.75%
0.210	58.92	0.83	61.9	0.8	-4.81%	3.75%
0.220	60.29	0.85	61.9	0.8	-2.60%	6.25%
0.230	58.26	0.86	61.9	0.8	-5.88%	7.50%
0.240	58.12	0.88	61.9	0.8	-6.11%	10.00%
0.250	58.88	0.87	61.9	0.8	-4.88%	8.75%

*interpolated using DASY4 software

Test Date	Fluid Type	Ambient Temperature	Fluid Temperature	Fluid Depth	Atmospheric Pressure	Relative Humidity	ρ (Kg/m ³)
May 6	150 Body	23.0 °C	23.3 °C	≥ 15 cm	101.4 kPa	30%	1000

Applicant:	Cobra Electronics Corporation	FCC ID:	BBOMRHH500	IC:	906A-MRHH500	
Model(s):	MR HH500	DUT Type:	Portable VHF PTT Marine Radio Transceiver	156.025-157.425 MHz		
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8.0 SAR MEASUREMENT SUMMARY

SAR EVALUATION RESULTS														
Test Config.	Test Date	Freq.	Ch.	Battery Type	Cond. Power Before Test	Accessories		Device Distance to Planar Phantom		Measured SAR (before droop) 1g (W/kg)		SAR Drift During Test dB	Scaled SAR (with droop) 1g (W/kg)	
		MHz			Watts	Body-worn	Audio	DUT	Antenna	PTT Duty Factor			PTT Duty Factor	
					100%	50%	100%	50%						
FACE	Dec 17	156.7	14	Li-ion	5.2	-	-	2.5 cm	3.9 cm	0.537	0.269	-0.248	0.569	0.284
BODY	May 6	156.7	14	Li-ion	5.2	Belt-clip	Spkr-mic	1.5 cm	3.0 cm	1.10	0.550	-0.602	1.26	0.632
SAR LIMIT(S)					HEAD			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				
Notes														
1.	Detailed measurement data and plots showing the maximum SAR location of the DUT are reported in Appendix A.													
2.	The SAR 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.													
3.	The highest measured SAR test was < 0.8 W/kg. Therefore repeatability measurements were not required according to the procedures of FCC KDB 865664 (see reference [8]).													

9.0 SAR SCALING (MANUFACTURER TOLERANCE)

SAR SCALING TO MANUFACTURER'S MAX. UPPER TOLERANCE SPEC.					
Test Config.	Test Freq. (MHz)	Measured Conducted Power (Watts)	Measured SAR Level 1g (W/kg)*	Scaling to Max. Conducted Power Level (5.8 Watts)	Scaled SAR Level 1g (W/kg)*
Face	156.7	5.2	0.269	+ 0.47 dB	0.299
Body	156.7	5.2	0.550	+ 0.47 dB	0.603

*50% PTT duty-cycle

10.0 CO-LOCATED TRANSMITTERS

The MR HH500 model is equipped with Bluetooth. However, the DUT does not allow simultaneous transmission of the Bluetooth and VHF Transmitters. The Bluetooth (7mW) is also below the threshold for SAR testing, so no testing is required to show compliance, according to KDB 447498 D01v05 (see reference{7}).

Applicant:	Cobra Electronics Corporation	FCC ID:	BBOMRHH500	IC:	906A-MRHH500	
Model(s):	MR HH500	DUT Type:	Portable VHF PTT Marine Radio Transceiver	156.025-157.425 MHz		
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11.0 DETAILS OF SAR EVALUATION

The DUT 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.

- The face-held SAR evaluation was performed with the front of the DUT placed parallel to the outer surface of the planar phantom. A 2.5 cm spacing was maintained between the front side of the DUT and the outer surface of the planar phantom.
- The Body-worn SAR evaluation was performed with the belt-clip body-worn accessory attached to the back of the DUT in a parallel-touch position to the outer surface of the planar phantom.
- The body-worn SAR evaluation was performed with the customer-supplied speaker-microphone audio accessory connected to the DUT.
- Each evaluation was performed with a fully charged battery.
- The DUT was evaluated with the Li-ion battery pack only. The DUT also has a 5x AA Cell Alkaline battery case, but it cannot provide enough voltage to reach the maximum rated power of 5.8W. Additionally, the Alkaline batteries were not able to sustain a transmission at the maximum transmitter power setting for the duration of a SAR evaluation.
- The DUT was evaluated for SAR in an unmodulated continuous transmit operation (Continuous Wave mode at 100% duty cycle) with the transmit key constantly depressed. For a push-to-talk device the 50% duty cycle compensation reported assumes a transmit/receive cycle of equal time base.
- The SAR drift of the DUT was measured by the DASY4 system for the duration of the SAR evaluation and a SAR-versus-Time power droop evaluation was performed (see Appendix A).
- The fluid temperature remained within +/-2°C from the fluid dielectric parameter measurement to the completion of the SAR evaluation.
- The dielectric parameters of the simulated tissue mixture were measured prior to the SAR evaluation using a Dielectric Probe Kit and a Network Analyzer (see Appendix C).

12.0 SAR EVALUATION PROCEDURES

- The evaluation was performed in the applicable area of the phantom depending on the type of device being tested. For devices held to the ear during normal operation, both the left and right ear positions were evaluated using the SAM phantom.
 - For body-worn and face-held devices a planar phantom was used.
- The SAR was determined by a pre-defined procedure within the DASY4 software. Upon completion of a reference and optical surface check, the exposed region of the phantom was scanned near the inner surface with a grid spacing of 15mm x 15mm.
An area scan was determined as follows:
- Based on the defined area scan grid, a more detailed grid is created to increase the points by a factor of 10. The interpolation function then evaluates all field values between corresponding measurement points.
- A linear search is applied to find all the candidate maxima. Subsequently, all maxima are removed that are >2 dB from the global maximum. The remaining maxima are then used to position the cube scans.
A 1g and 10g spatial peak SAR was determined as follows:
- Extrapolation is used to find the points between the dipole center of the probe and the surface of the phantom. This data cannot be measured, since the center of the dipoles is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.4 mm (see probe calibration document in Appendix F). The extrapolation was based on trivariate quadratics computed from the previously calculated 3D interpolated points nearest the phantom surface.
- Interpolated data is used to calculate the average SAR over 1g and 10g cubes by spatially discretizing the entire measured cube. The volume used to determine the averaged SAR is a 1mm grid (42875 interpolated points).
- A zoom scan volume of 30 mm x 30 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:	Cobra Electronics Corporation	FCC ID:	BBOMRHH500	IC:	906A-MRHH500	
Model(s):	MR HH500	DUT Type:	Portable VHF PTT Marine Radio Transceiver	156.025-157.425 MHz		
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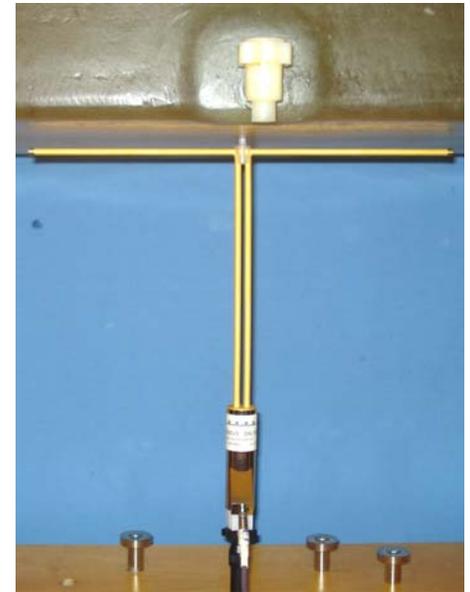
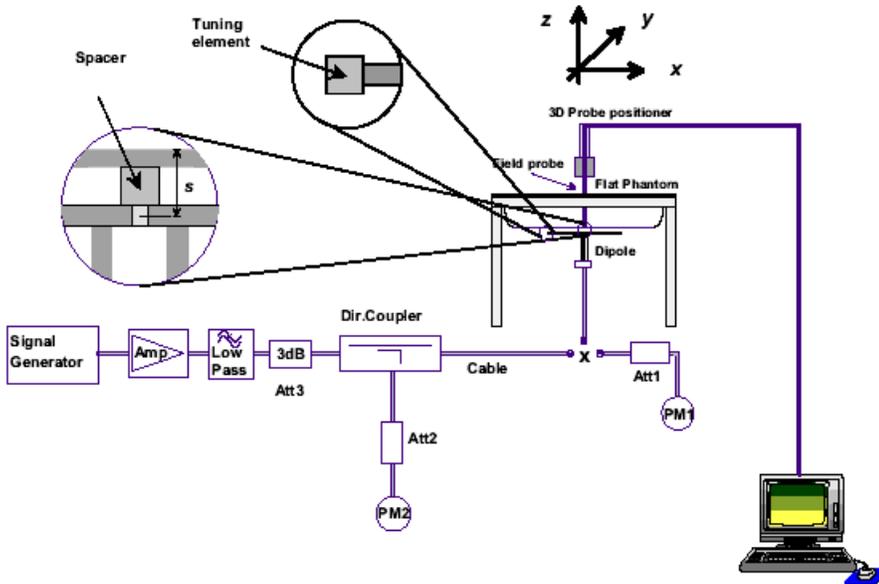
13.0 SYSTEM PERFORMANCE CHECK

Prior to the SAR evaluations, system verifications were performed with a planar phantom and SPEAG 300 MHz dipole (see Appendix B) in accordance with the procedures described in FCC KDB 865664 (see reference [8]). The system was verified to meet the internally generated SAR target using 150MHz tissue-equivalent medium with a 300 MHz validation dipole transmitting at 300 MHz (see Appendix E). 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.

SYSTEM PERFORMANCE CHECK EVALUATION

Test Date	Equiv. Tissue Freq. (MHz)	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)
		Target	Meas.	Dev.	Target	Meas.	Dev.	Target	Meas.	Dev.						
Dec 17	Head 150	0.910 ±10%	0.892	-2.0%	52.3 ±5%	54.1	+3.4%	0.76 ±5%	0.73	-3.9%	1000	22.0	21.5	≥ 15	30	98.8
May 6	Body 150	0.653 ±10%	0.656	+0.5%	61.9 ±5%	64.6	+4.4%	0.80 ±5%	0.82	+2.5%	1000	23.0	23.3	≥ 15	30	101.4

- Notes**
- The 150MHz SAR values have a coefficient of variation < 3%.
 - The target fluid dielectric parameters are the nominal values from the SAR system manufacturer's probe calibration (see Appendix F)
 - The fluid temperature remained within +/-2°C from the fluid dielectric parameter measurement to the completion of the system performance check.
 - 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)

SPEAG 300 MHz Validation Dipole Setup

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14.0 SIMULATED EQUIVALENT TISSUES

The simulated equivalent tissue recipes in the table below are derived from the SAR system manufacturer's suggested recipes in the DASY4 manual (see references [10] and [11]) 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	150 MHz HEAD	150 MHz BODY
Water	38.35 %	46.6 %
Sugar	55.5%	49.7 %
Salt	5.15%	2.6 %
HEC	0.9%	1.0 %
Bactericide	0.1%	0.1 %

15.0 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)		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:	Cobra Electronics Corporation	FCC ID:	BBOMRHH500	IC:	906A-MRHH500	
Model(s):	MR HH500	DUT Type:	Portable VHF PTT Marine Radio Transceiver	156.025-157.425 MHz		
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16.0 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 80
	Postprocessing Software: SEMCAD, V1.8 Build 186
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>Phantom</u>	
Type	Barski Planar Phantom
Shell Material	Fiberglass
Thickness	2.0 ±0.1 mm
Volume	Approx. 70 liters

Applicant:	Cobra Electronics Corporation	FCC ID:	BBOMRHH500	IC:	906A-MRHH500	
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17.0 PROBE SPECIFICATION (ET3DV6)

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 Body simulating tissue at frequencies of 900 MHz and 1.8 GHz (accuracy $\pm 8\%$)
Frequency:	10 MHz to > 6 GHz; Linearity: ± 0.2 dB (30 MHz to 3 GHz)
Directivity:	± 0.2 dB in Body tissue (rotation around probe axis) ± 0.4 dB in Body tissue (rotation normal to probe axis)
Dynamic Range:	5 μ W/g to > 100 mW/g; Linearity: ± 0.2 dB
Surface Detect:	± 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

18.0 BARSKI PLANAR PHANTOM

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.



Barski Planar Phantom

19.0 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. Face-held SAR evaluations (PTT radios) are performed with the device holder in the body axis.



Device Holder

Applicant:	Cobra Electronics Corporation	FCC ID:	BBOMRHH500	IC:	906A-MRHH500	
Model(s):	MR HH500	DUT Type:	Portable VHF PTT Marine Radio Transceiver	156.025-157.425 MHz		
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20.0 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	19-Apr-12	Biennial
x	-ET3DV6 E-Field Probe	00017	1590	24-Apr-12 / 24-Apr-13	Annual
x	-SPEAG D300V3 Validation Dipole	000216	1009	17-Apr-12 / 8-Jan-13	Triennial
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	03-May-12	Biennial
x	Gigatronics 80701A Power Sensor	00014	1833699	03-May-12	Biennial
x	Gigatronics 80334A Power Sensor	-	1837001	03-May-12	Biennial
x	HP 8753ET Network Analyzer	00134	US39170292	26-Apr-12	Biennial
x	Rohde & Schwarz SMR20 Signal Generator	00006	100104	02-May-12	Biennial
x	Amplifier Research 5S1G4 Power Amplifier	00106	26235	CNR	CNR
Abbr.	CNR = Calibration Not Required				

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21.0 MEASUREMENT UNCERTAINTIES (IC ONLY)

UNCERTAINTY BUDGET FOR DEVICE EVALUATION (IEC 62209-2:2010)									
Source of Uncertainty	IEC 62209-2 Section	Tolerance / Uncertainty ±%	Probability Distribution	Divisor	ci 1g	ci 10g	Standard Uncertainty ±% (1g)	Standard Uncertainty ±% (10g)	V _i or V _{eff}
Measurement System									
Probe Calibration (150 MHz)	7.2.2.1	10.0	Normal	1	1	1	10.0	10.0	∞
Isotropy	7.2.2.2	4.7	Rectangular	1.732050808	1	1	2.7	2.7	∞
Boundary Effect	7.2.2.6	2.5	Rectangular	1.732050808	1	1	1.4	1.4	∞
Linearity	7.2.2.3	4.7	Rectangular	1.732050808	1	1	2.7	2.7	∞
Detection Limits	7.2.2.5	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
Readout Electronics	7.2.2.7	0.3	Normal	1	1	1	0.3	0.3	∞
Response Time	7.2.2.8	0.8	Rectangular	1.732050808	1	1	0.5	0.5	∞
Integration Time	7.2.2.9	2.6	Rectangular	1.732050808	1	1	1.5	1.5	∞
RF Ambient Conditions	7.2.4.5	3	Rectangular	1.732050808	1	1	1.7	1.7	∞
Probe Positioner Mechanical Restrictions	7.2.3.1	0.4	Rectangular	1.732050808	1	1	0.2	0.2	∞
Probe Positioning wrt Phantom Shell	7.2.3.3	2.9	Rectangular	1.732050808	1	1	1.7	1.7	∞
Post-processing	7.2.5	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
Test Sample Related									
Test Sample Positioning	7.2.3.4.3	2.9	Normal	1	1	1	2.9	2.9	12
Device Holder Uncertainty	7.2.3.4.2	3.6	Normal	1	1	1	3.6	3.6	8
Drift of Output Power (meas. SAR drift)	7.2.2.10	5	Rectangular	1.732050808	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	7.2.3.2	4	Rectangular	1.732050808	1	1	2.3	2.3	∞
SAR Correction Algorithm for deviations in permittivity and conductivity	7.2.4.3	1.9	Normal	1	1	0.81	1.9	1.54	∞
Liquid Conductivity (measured)	7.2.4.3	4.13	Normal	1	0.78	0.71	3.2	2.9	∞
Liquid Permittivity (measured)	7.2.4.3	3.72	Normal	1	0.23	0.26	0.9	1.0	∞
Liquid Permittivity - temp. uncertainty	7.2.4.4	1.04	Rectangular	1.732050808	0.78	0.71	0.5	0.4	∞
Liquid Conductivity - temp. uncertainty	7.2.4.4	1.97	Rectangular	1.732050808	0.23	0.26	0.3	0.3	∞
Combined Standard Uncertainty	7.3.1		RSS				13.26	13.16	
Expanded Uncertainty (95% Confidence Interval)	7.3.2		k=2				26.53	26.31	

Measurement Uncertainty Table in accordance with International Standard IEC 62209-2:2010

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

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22.0 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 62209-2 Edition 1.0 2010-03 - "Human exposure to radio frequency fields from hand-held & body-mounted wireless communication devices - Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)".
- [7] Federal Communications Commission, Office of Engineering and Technology - "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies"; KDB 447498 D01v05: October 2012.
- [8] Federal Communications Commission, Office of Engineering and Technology - "SAR Measurement Requirements for 100 MHz to 6 GHz"; KDB 865664 D01v01: October 2012.
- [9] 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.
- [10] Schmid & Partner Engineering AG - DASY4 Manual V4.6, Chapter 16 Application Note, Head Tissue Recipe: Sept. 2005.
- [11] Schmid & Partner Engineering AG - DASY4 Manual V4.6, Chapter 17 Application Note, Body Tissue Recipe: Sept. 2005.
- [12] ISO/IEC 17025 - "General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:2005)."
- [13] Federal Communications Commission - "Measurements Required: RF Power Output"; Rule Part 47 CFR §2.1046.
- [14] Industry Canada - "General Requirements and Information for the Certification of Radiocommunication Equipment", Radio Standards Specification RSS-Gen Issue 3: December 2010.

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APPENDIX A - SAR MEASUREMENT PLOTS

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Date Tested: 12/17/2012

Face-held SAR - Channel 14 - 156.7 MHz

DUT: Cobra MR HH500; Type: VHF PTT Radio Transceiver; Serial: Not Specified

Program Notes: Ambient Temp: 22C; Fluid Temp: 21.5C; Barometric Pressure: 98.8 kPa; Humidity: 30%

Procedure Notes:

Communication System: VHF Marine

Frequency: 156.7 MHz; Duty Cycle: 1:1

Medium: HSL150 Medium parameters used (interpolated): $f = 156.7 \text{ MHz}$; $\sigma = 0.75 \text{ mho/m}$; $\epsilon_r = 52.4$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(9.3, 9.3, 9.3); Calibrated: 24/04/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 19/04/2012
- Phantom: Barski Industries; Type: Fiberglass Planar; Serial: 03-01
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Ch.14 - Face/Area Scan (7x19x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.551 mW/g

Ch.14 - Face/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

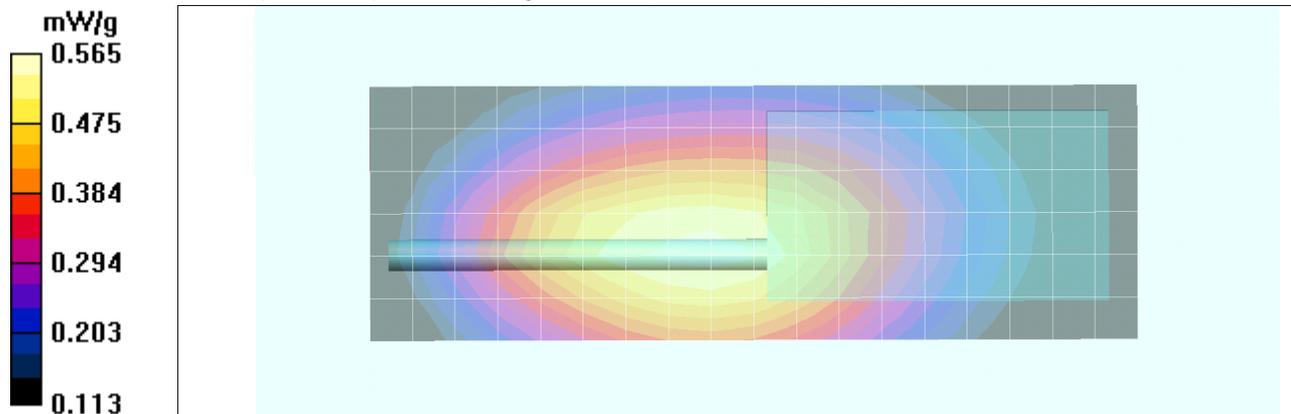
Reference Value = 26.7 V/m; Power Drift = -0.248 dB

Peak SAR (extrapolated) = 0.803 W/kg

SAR(1 g) = 0.537 mW/g; SAR(10 g) = 0.388 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

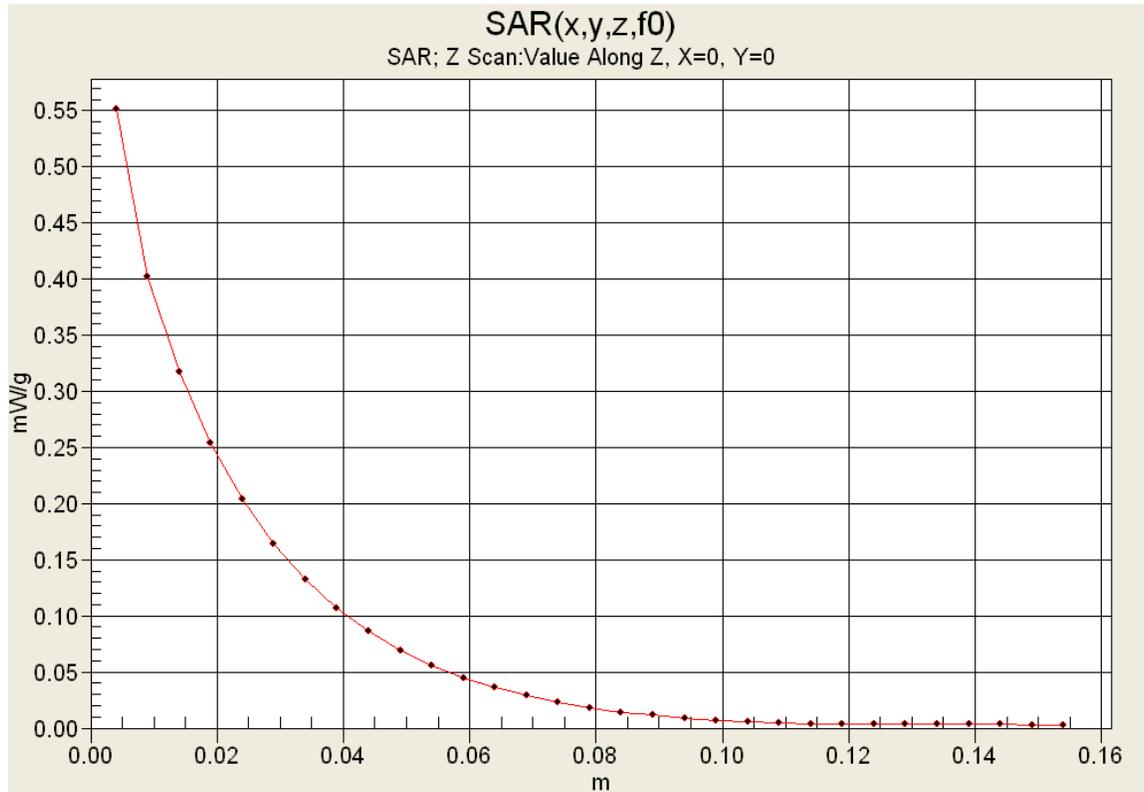
Maximum value of SAR (measured) = 0.565 mW/g



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Z-Axis Scan



Applicant:	Cobra Electronics Corporation	FCC ID:	BBOMRHH500	IC:	906A-MRHH500	
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Date Tested: 5/6/2013

Body-worn SAR - Channel 14 - 156.7 MHz

DUT: Cobra MR HH500; Type: VHF PTT Radio Transceiver; Serial: Not Specified

Program Notes: Ambient Temp: 23C; Fluid Temp: 23.3C; Barometric Pressure: 101.4 kPa; Humidity: 30%

Procedure Notes:

Communication System: VHF Marine

Frequency: 156.7 MHz; Duty Cycle: 1:1

Medium: M150 Medium parameters used (interpolated): $f = 156.7 \text{ MHz}$; $\sigma = 0.82 \text{ mho/m}$; $\epsilon_r = 62.3$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(8.65, 8.65, 8.65); Calibrated: 24/04/2013
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 19/04/2012
- Phantom: Barski Industries; Type: Fiberglass Planar; Serial: 03-01
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Ch.14 - Body/Area Scan (7x19x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 1.15 mW/g

Ch.14 - Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

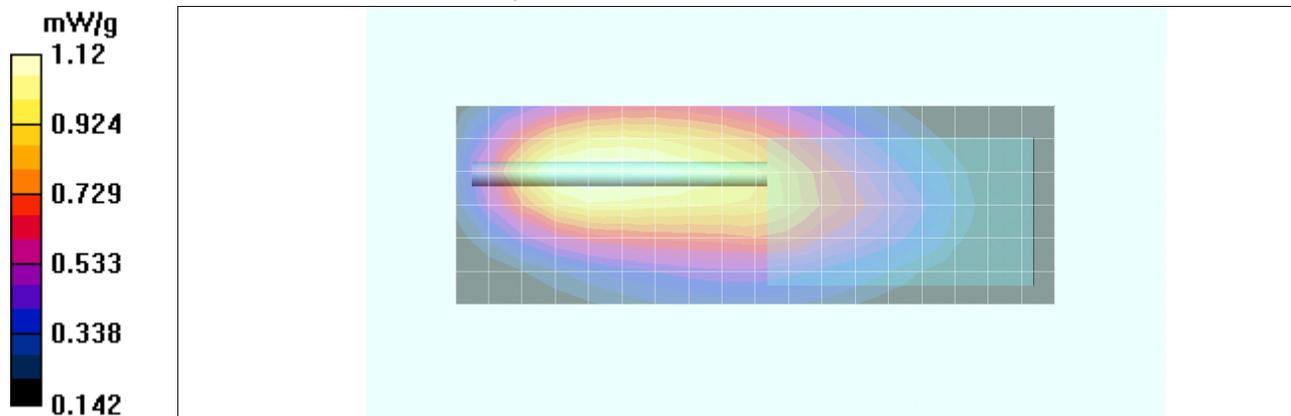
Reference Value = 33.5 V/m; Power Drift = -0.602 dB

Peak SAR (extrapolated) = 2.20 W/kg

SAR(1 g) = 1.1 mW/g; SAR(10 g) = 0.748 mW/g

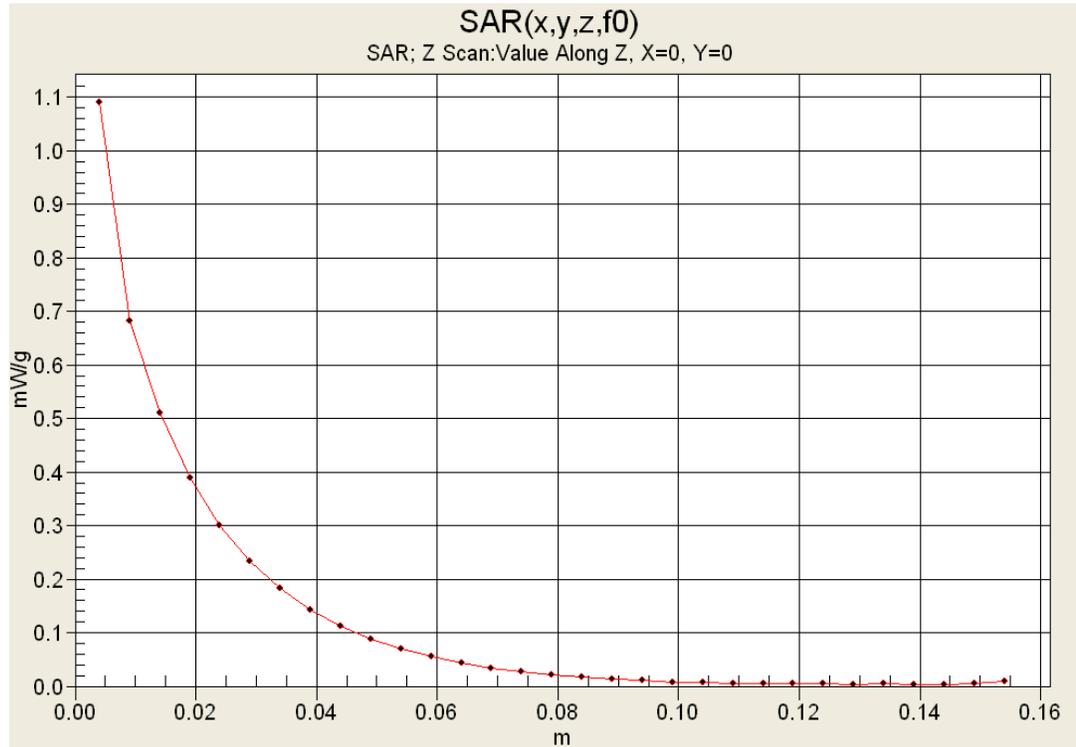
Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 1.12 mW/g



Applicant:	Cobra Electronics Corporation	FCC ID:	BBOMRHH500	IC:	906A-MRHH500	
Model(s):	MR HH500	DUT Type:	Portable VHF PTT Marine Radio Transceiver	156.025-157.425 MHz		
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Z-Axis Scan



SAR vs. Time



	<u>Date(s) of Evaluation</u> 12/17/ 2012, 5/6/2013	<u>Test Report Serial No.</u> 121112BBO-T1210-S80V	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> May 6, 2013	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

APPENDIX B - SYSTEM PERFORMANCE CHECK PLOTS

Applicant:	Cobra Electronics Corporation	FCC ID:	BBOMRHH500	IC:	906A-MRHH500	
Model(s):	MR HH500	DUT Type:	Portable VHF PTT Marine Radio Transceiver	156.025-157.425 MHz		
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	<u>Test Report Issue Date</u> May 6, 2013	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

Date Tested: 12/17/2012

System Performance Check - 300 MHz Dipole - 150 MHz Head Fluid

DUT: Dipole 300 MHz; Type: D300V3; Serial: 1009; Calibrated: 17/04/2012

Program Notes: Ambient Temp: 22C; Fluid Temp: 21.5C; Barometric Pressure: 98.8 kPa; Humidity: 30%

Procedure Notes: 300 MHz Dipole transmitting at 300 MHz using 150 MHz SAR probe calibration and 150 MHz tissue dielectric parameters

Communication System: CW

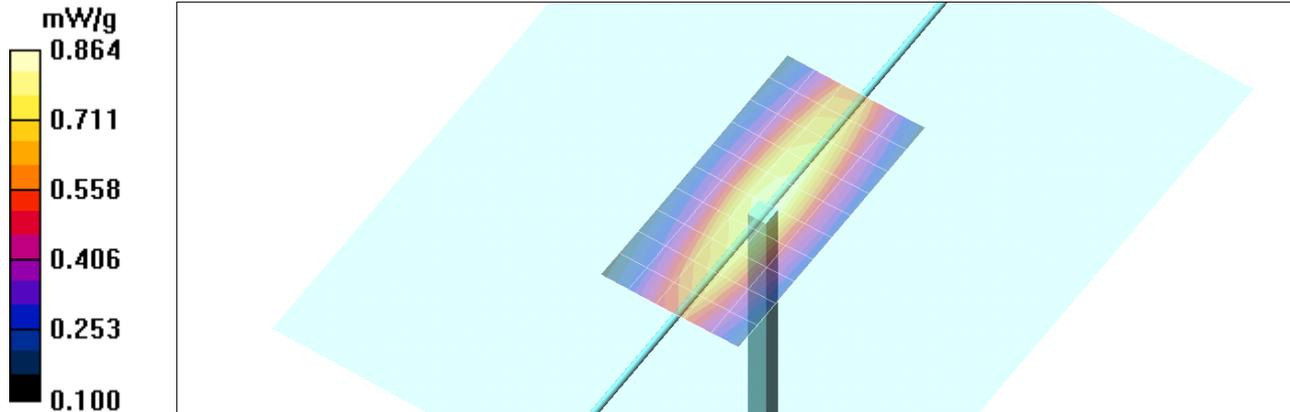
Frequency: 150 MHz; Duty Cycle: 1:1

Medium: HSL150 Medium parameters used: $f = 150 \text{ MHz}$; $\sigma = 0.73 \text{ mho/m}$; $\epsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(9.3, 9.3, 9.3); Calibrated: 24/04/2012
- Sensor-Surface: 5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 19/04/2012
- Phantom: Barski Industries; Type: Fiberglass Planar; Serial: 03-01
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

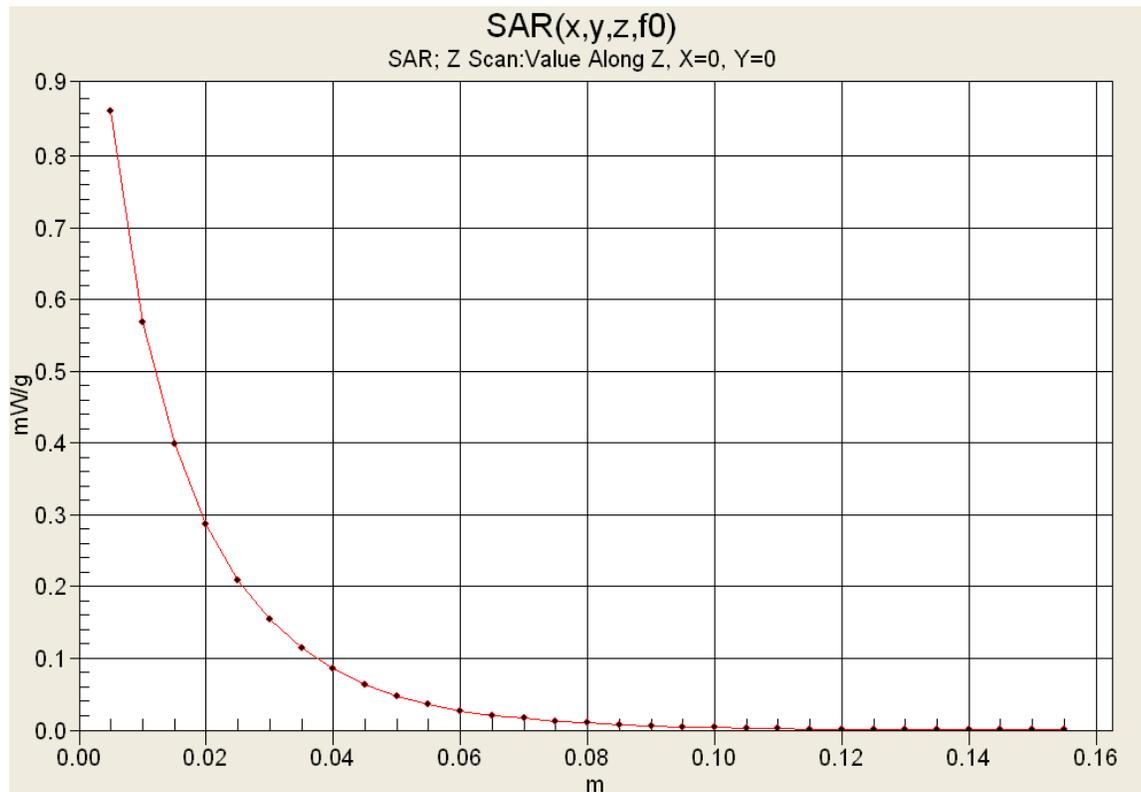
Head d=15mm, Pin = 398mW/Area Scan (6x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.831 mW/g

Head d=15mm, Pin = 398mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 34.6 V/m; Power Drift = -0.067 dB
Peak SAR (extrapolated) = 1.43 W/kg
SAR(1 g) = 0.892 mW/g; SAR(10 g) = 0.592 mW/g
Maximum value of SAR (measured) = 0.864 mW/g



Applicant:	Cobra Electronics Corporation	FCC ID:	BBOMRHH500	IC:	906A-MRHH500	
Model(s):	MR HH500	DUT Type:	Portable VHF PTT Marine Radio Transceiver	156.025-157.425 MHz		
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Z-axis Scan



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Date Tested: 5/6/2013

System Performance Check - 300 MHz Dipole - 150 MHz Body Fluid

DUT: Dipole 300 MHz Body; Type: D300V3; Serial: 1009; Calibrated: 01/08/2013

Program Notes: Ambient Temp: 23C; Fluid Temp: 23.3C; Barometric Pressure: 101.4 kPa; Humidity: 30%

Procedure Notes: 300 MHz Dipole transmitting at 300 MHz using 150 MHz SAR probe calibration and 150 MHz tissue dielectric parameters

Communication System: CW

Frequency: 150 MHz; Duty Cycle: 1:1

Medium: M150 Medium parameters used: $f = 150 \text{ MHz}$; $\sigma = 0.82 \text{ mho/m}$; $\epsilon_r = 64.6$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(8.65, 8.65, 8.65); Calibrated: 24/04/2013
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 19/04/2012
- Phantom: Barski Industries; Type: Fiberglass Planar; Serial: 03-01
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body d=15mm, Pin = 250mW/Area Scan (6x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.645 mW/g

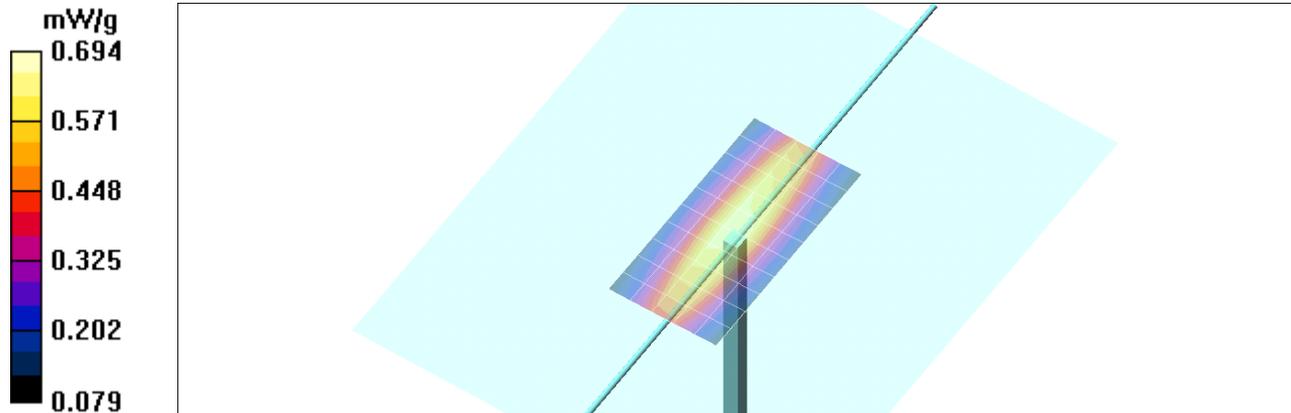
Body d=15mm, Pin = 250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 29.1 V/m; Power Drift = -0.001 dB

Peak SAR (extrapolated) = 1.10 W/kg

SAR(1 g) = 0.656 mW/g; SAR(10 g) = 0.435 mW/g

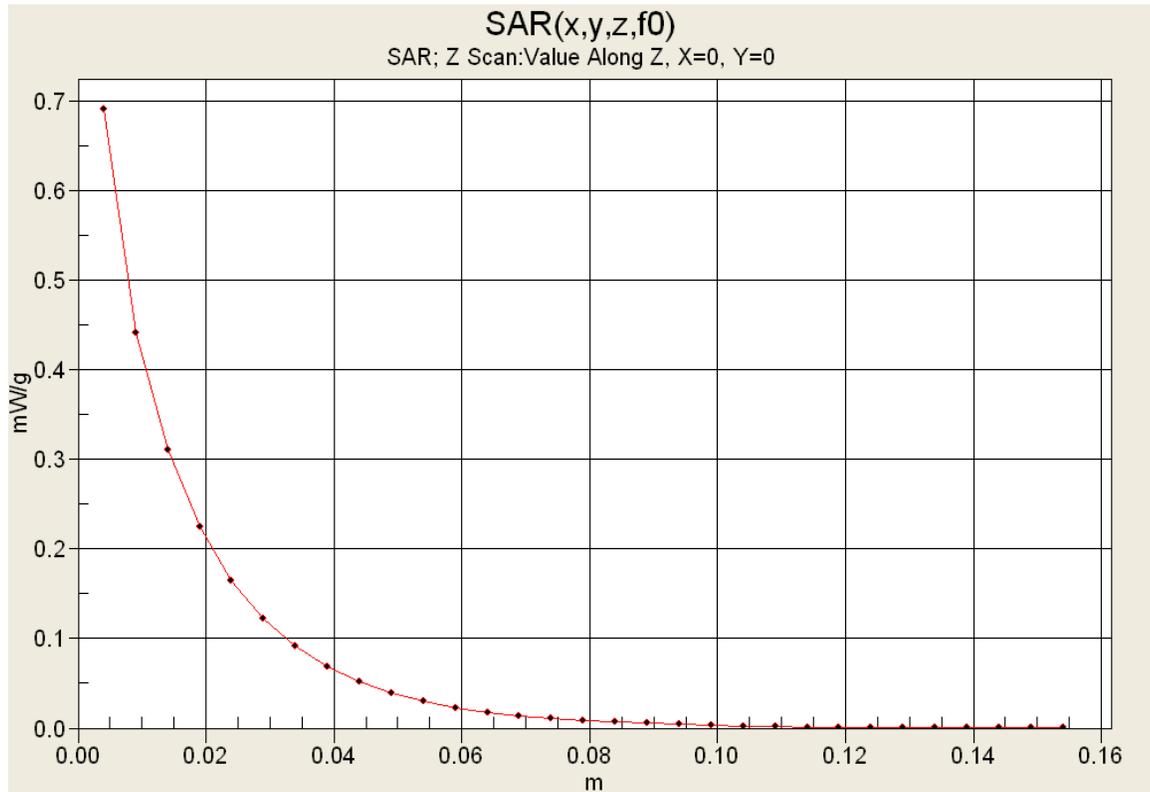
Maximum value of SAR (measured) = 0.694 mW/g



Applicant:	Cobra Electronics Corporation	FCC ID:	BBOMRHH500	IC:	906A-MRHH500	
Model(s):	MR HH500	DUT Type:	Portable VHF PTT Marine Radio Transceiver	156.025-157.425 MHz		
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	<u>Test Report Issue Date</u> May 6, 2013	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

Z-axis Scan



Applicant:	Cobra Electronics Corporation	FCC ID:	BBOMRHH500	IC:	906A-MRHH500	
Model(s):	MR HH500	DUT Type:	Portable VHF PTT Marine Radio Transceiver	156.025-157.425 MHz		
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	<u>Test Report Issue Date</u> May 6, 2013	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS

Applicant:	Cobra Electronics Corporation	FCC ID:	BBOMRHH500	IC:	906A-MRHH500	
Model(s):	MR HH500	DUT Type:	Portable VHF PTT Marine Radio Transceiver	156.025-157.425 MHz		
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	<u>Test Report Issue Date</u> May 6, 2013	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

150 MHz Head

Celltech Labs
Test Result for UIM Dielectric Parameter
17/Dec/2012
Freq Frequency(GHz)
FCC_eHFCC OET 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sHFCC OET 65 Supplement C (June 2001) Limits for Head Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

Freq	FCC_eHFCC_sH	Test_e	Test_s
0.0500	56.97 0.69	81.71	0.64
0.0600	56.50 0.69	68.65	0.71
0.0700	56.03 0.70	66.37	0.70
0.0800	55.57 0.71	59.80	0.69
0.0900	55.10 0.72	61.65	0.69
0.1000	54.63 0.72	62.01	0.71
0.1100	54.17 0.73	56.21	0.71
0.1200	53.70 0.74	54.35	0.71
0.1300	53.23 0.75	55.16	0.74
0.1400	52.77 0.75	52.76	0.73
0.1500	52.30 0.76	54.12	0.73
0.1600	51.83 0.77	51.61	0.76
0.1700	51.37 0.77	52.39	0.76
0.1800	50.90 0.78	50.76	0.79
0.1900	50.43 0.79	51.29	0.81
0.2000	49.97 0.80	50.21	0.79
0.2100	49.50 0.80	48.62	0.81
0.2200	49.03 0.81	48.52	0.80
0.2300	48.57 0.82	46.86	0.81
0.2400	48.10 0.83	47.09	0.83
0.2500	47.63 0.83	46.51	0.84

Applicant:	Cobra Electronics Corporation	FCC ID:	BBOMRHH500	IC:	906A-MRHH500	
Model(s):	MR HH500	DUT Type:	Portable VHF PTT Marine Radio Transceiver	156.025-157.425 MHz		
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	<u>Test Report Issue Date</u> May 6, 2013	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

150 MHz Body

Celltech Labs
Test Result for UIM Dielectric Parameter
06/May/2013
Freq Frequency(GHz)
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
0.0500	64.37	0.72	98.71	0.75
0.0600	64.12	0.73	95.20	0.74
0.0700	63.87	0.74	82.83	0.74
0.0800	63.63	0.74	75.55	0.77
0.0900	63.38	0.75	74.96	0.78
0.1000	63.13	0.76	76.60	0.75
0.1100	62.89	0.77	64.88	0.77
0.1200	62.64	0.78	61.65	0.79
0.1300	62.39	0.78	65.08	0.77
0.1400	62.15	0.79	63.00	0.81
0.1500	61.90	0.80	64.56	0.82
0.1600	61.65	0.81	61.26	0.82
0.1700	61.41	0.82	60.34	0.83
0.1800	61.16	0.82	59.48	0.84
0.1900	60.91	0.83	61.79	0.83
0.2000	60.67	0.84	60.12	0.83
0.2100	60.42	0.85	58.92	0.83
0.2200	60.17	0.86	60.29	0.85
0.2300	59.93	0.86	58.26	0.86
0.2400	59.68	0.87	58.12	0.88
0.2500	59.43	0.88	58.88	0.87

Applicant:	Cobra Electronics Corporation	FCC ID:	BBOMRHH500	IC:	906A-MRHH500	
Model(s):	MR HH500	DUT Type:	Portable VHF PTT Marine Radio Transceiver	156.025-157.425 MHz		
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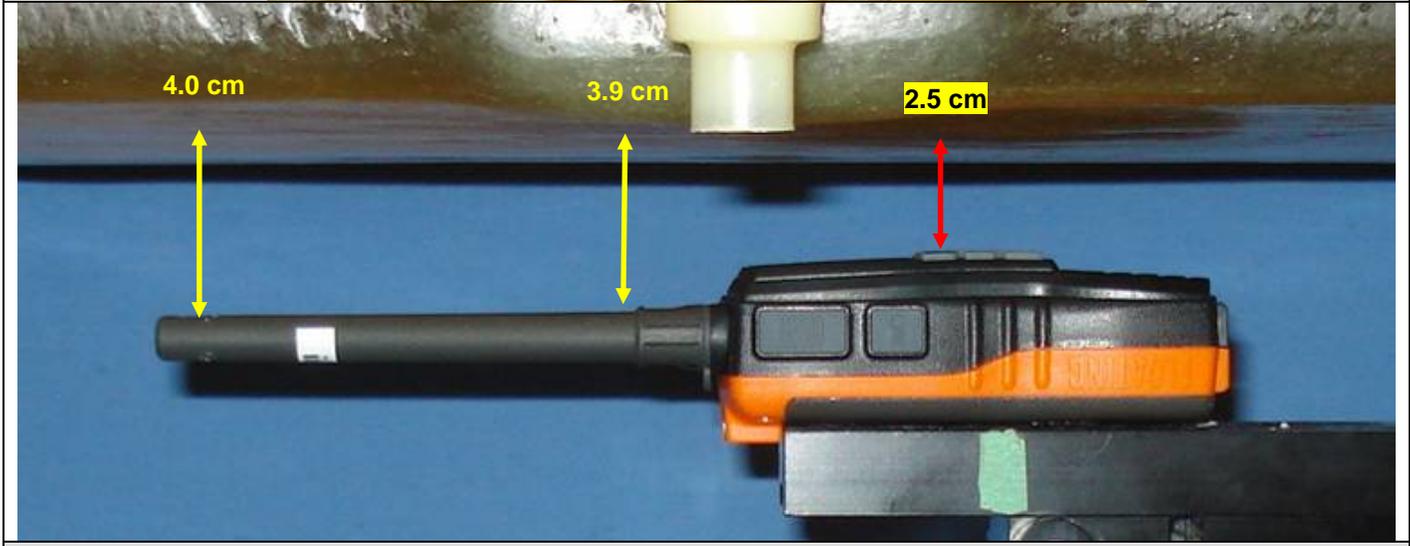
	<u>Date(s) of Evaluation</u> 12/17/ 2012, 5/6/2013	<u>Test Report Serial No.</u> 121112BBO-T1210-S80V	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	
	<u>Test Report Issue Date</u> May 6, 2013	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

APPENDIX D - SAR TEST SETUP & DUT PHOTOGRAPHS

Applicant:	Cobra Electronics Corporation	FCC ID:	BBOMRHH500	IC:	906A-MRHH500	
Model(s):	MR HH500	DUT Type:	Portable VHF PTT Marine Radio Transceiver	156.025-157.425 MHz		
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	<u>Test Report Issue Date</u> May 6, 2013	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

FACE-HELD SAR TEST SETUP PHOTOGRAPHS

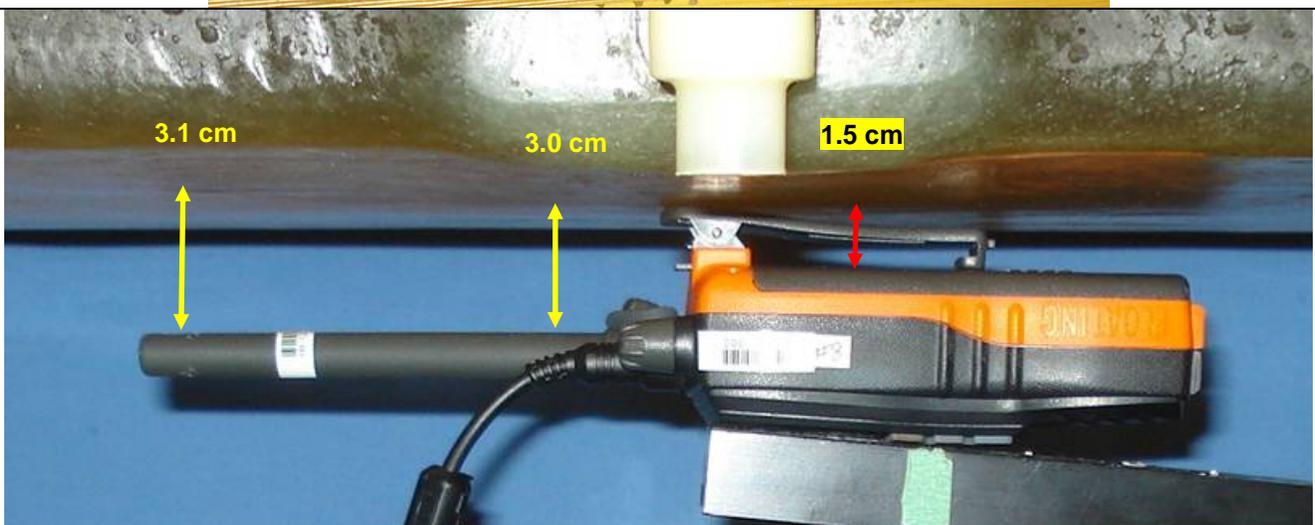


Face-held Test Setup

Applicant:	Cobra Electronics Corporation	FCC ID:	BBOMRHH500	IC:	906A-MRHH500	
Model(s):	MR HH500	DUT Type:	Portable VHF PTT Marine Radio Transceiver	156.025-157.425 MHz		
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BODY-WORN SAR TEST SETUP PHOTOGRAPHS



Body-worn Test Setup

Applicant:	Cobra Electronics Corporation	FCC ID:	BBOMRHH500	IC:	906A-MRHH500	
Model(s):	MR HH500	DUT Type:	Portable VHF PTT Marine Radio Transceiver	156.025-157.425 MHz		
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	<u>Test Report Issue Date</u> May 6, 2013	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

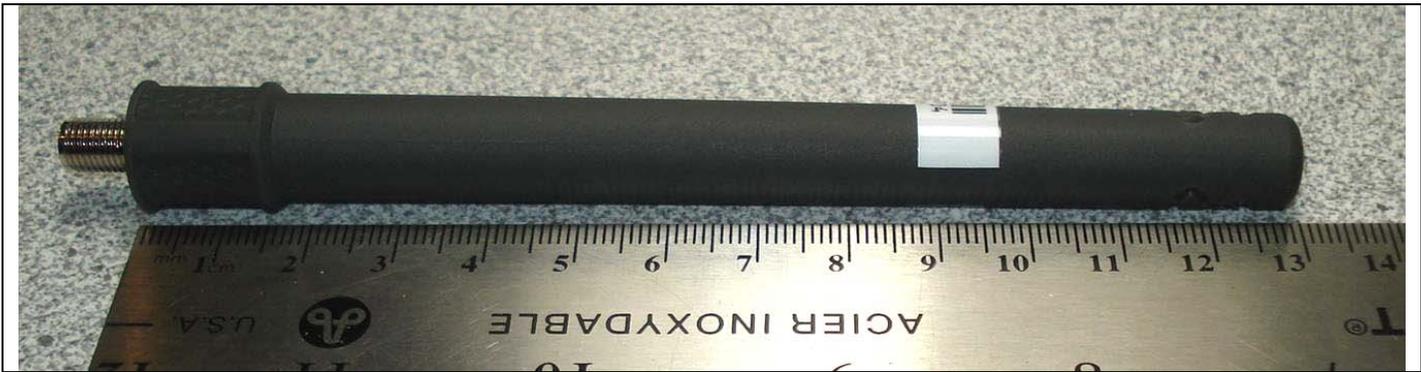
DUT PHOTOGRAPHS



Applicant: Cobra Electronics Corporation	FCC ID: BBOMRHH500	IC: 906A-MRHH500	
Model(s): MR HH500	DUT Type: Portable VHF PTT Marine Radio Transceiver	156.025-157.425 MHz	
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DUT PHOTOGRAPHS



Antenna



Belt-clip accessory

Applicant:	Cobra Electronics Corporation	FCC ID:	BBOMRHH500	IC:	906A-MRHH500	
Model(s):	MR HH500	DUT Type:	Portable VHF PTT Marine Radio Transceiver	156.025-157.425 MHz		
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DUT PHOTOGRAPHS

	
Front of Li-ion Battery	Back of Li-ion Battery
	
Front of Alkaline Battery Case	Back of Alkaline Battery Case (AA's inserted)
	
Back of DUT with Battery removed	

Applicant: Cobra Electronics Corporation	FCC ID: BBOMRHH500	IC: 906A-MRHH500	
Model(s): MR HH500	DUT Type: Portable VHF PTT Marine Radio Transceiver	156.025-157.425 MHz	
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	<u>Date(s) of Evaluation</u> 12/17/ 2012, 5/6/2013	<u>Test Report Serial No.</u> 121112BBO-T1210-S80V	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> May 6, 2013	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

DUT PHOTOGRAPHS



Speaker-mic Accessory

Applicant:	Cobra Electronics Corporation	FCC ID:	BBOMRHH500	IC:	906A-MRHH500	
Model(s):	MR HH500	DUT Type:	Portable VHF PTT Marine Radio Transceiver	156.025-157.425 MHz		
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