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## FCC PART 15.109

### RADAR DETECTOR REPORT

Applicant	B&M MERCHANDISE LLC	
Address	744 STABLEWATCH DR INDEPENDENCE KY 41051 USA	
Product Model Number	RADENSO HD+	
Product Description	RADAR DETECTOR	
FCC ID:	2AEE3HDR	
Date Sample Received	8/11/2015	
Date Tested	8/28/2015	
Tested By	Tim Royer	
Approved By	Cory Leverett	
Test Results	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL

Report Number	Version Number	Description	Issue Date
1634UT15TestReport.docx	Rev.1	Initial Issue	8/28/2015

THE ATTACHED REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL  
WITHOUT THE WRITTEN APPROVAL OF TIMCO ENGINEERING, INC.

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## **GENERAL REMARKS**

The attached report shall not be reproduced except in full without the written permission of Timco Engineering Inc.

The test results relate only to the items tested.

### **Summary**

The device under test does:

- Fulfill the general approval requirements as identified in this test report
- Not fulfill the general approval requirements as identified in this test report

### **Attestations**

This equipment has been tested in accordance with the standards identified in this test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report.

All instrumentation and accessories used to test products for compliance to the indicated standards are calibrated regularly in accordance with ISO 17025 requirements.

I attest that the necessary measurements were made, under my supervision, at:

**Timco Engineering Inc.**  
**849 NW State Road 45**  
**Newberry, FL 32669**

**Authorized Signatory Name:**

  


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Tim Royer  
**Engineering Project Manager**

**Date: 8/28/2015**

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**GENERAL INFORMATION**

EUT Specification

<b>EUT Description</b>	RADAR DETECTOR
<b>FCC ID</b>	2AEE3HDR
<b>Model Number</b>	RADENSO HD+
<b>Operating Frequency</b>	10.525GHz(X-Band), 24.150 GHz (K-Band), 33.4-36.0GHz (Ka Band)
<b>EUT Power Source</b>	<input type="checkbox"/> 110–120Vac/50– 60Hz <input checked="" type="checkbox"/> DC Power 12V <input type="checkbox"/> Battery Operated Exclusively
<b>Test Item</b>	<input type="checkbox"/> Prototype <input type="checkbox"/> Pre-Production <input checked="" type="checkbox"/> Production
<b>Type of Equipment</b>	<input type="checkbox"/> Fixed <input checked="" type="checkbox"/> Mobile <input type="checkbox"/> Portable
<b>Test Conditions</b>	Temperature: 24-26°C Relative humidity: 50-65% Barometric Pressure:
<b>Modification to the EUT</b>	None
<b>Test Exercise</b>	The EUT was operated in a normal mode.
<b>Applicable Standards</b>	FCC Pt 15.109
<b>Test Procedure</b>	ANSI C63.4: 2009
<b>Test Facility</b>	Timco Engineering Inc. at 849 NW State Road 45 Newberry, FL 32669 USA.

**TEST RESULTS SUMMARY**

The test results relate only to the items tested.	
<b>FCC Rules Part No.</b>	<b>RESULTS</b> Pass/Fail/NA
15.109 Radiated Emissions	Pass

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## RADIATED SPURIOUS EMISSIONS

Rules Part No.: 15.109

### Requirements:

Frequency	Limits
30 – 88	40.0 dB $\mu$ V/m measured @ 3 meters
80 – 216	43.5 dB $\mu$ V/m measured @ 3 meters
216 – 960	46.0 dB $\mu$ V/m measured @ 3 meters
Above 960	54.0 dB $\mu$ V/m measured @ 3 meters
11.7 to 12.2GHz	54.0 dB $\mu$ V/m measured @ 3 meters

**Test Procedure:** A search was made of the spectrum from 30 to 1000MHz and from 11.7 to 12.2GHz. Measurements in the 11.7 to 12.2GHz band were made with a Standard Gain Horn. The measurements in the 11.7 to 12.2GHz band represent the ambient noise levels. The attached plots were made with peak detector with the analyzer in a maximum hold for 2 minutes.

Testing was done in accordance with ANSI C63.4 & 15.35(b) specifies the use of an average detector in this band. In addition, the peak level of an emission shall not exceed the average limit by more than 20 dB using a minimum Resolution Bandwidth (RBW) of 1 MHz and minimum Video Bandwidth (VBW) OF 1 MHz. The following procedure is designed to determine if there are any spurious emissions from the local oscillator within the band of interest along with any additional spurious emissions caused by other circuitry within the device.

- 1) Determine the frequency of the peak emission:

Start Frequency 11.7 GHz

Stop Frequency 12.2 GHz

RBW equal to or greater than 1 MHz

VBW equal to or greater than 1 MHz

Detector Function Peak

Maximize the emissions with regards to device orientation, antenna polarization, and antenna height. Sweep the band using Max Hold for a minimum of 2 minutes. Record this frequency for measuring the peak emission. In addition record the frequency of other spurious emissions noted.

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## RADIATED SPURIOUS EMISSIONS

### Test Procedure (Cont.):

2) Determine the peak level of the emission:

Center Frequency Set to the frequency determined in Step 1 RBW Equal to or greater than 1 MHz VBW Equal to or greater than 1 MHz Detector Function Peak Measure the value of the peak emission using Max Hold for a minimum of 2 minutes. This can be done at zero spans or a frequency span where the analyzer does not show a "Measurement Uncalibrated" message. Record the peak value. If the peak measurement is compliant with the average limit an average measurement is not necessary. If the peak value exceeds the average limit by less than 20 dB proceed to Step 3.

3) Determine the average level of the emission:

Center Frequency Set to the frequency determined in Step 1  
Span Zero

RBW Equal to or greater than 1 MHz  
VBW Equal to or greater than 10 Hz  
Detector Function Peak

This measurement uses video averaging and must be done in Linear mode. The analyzer Reference Level is adjusted so that a signal is clearly visible on the screen. Measure the value of the emission using Max Hold for a minimum of 2 minutes. Record this as the average value. Step 2 and Step 3 should be repeated for other spurious emissions.

**Formula of Conversion Factors:** The field strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB. The gain of the preselector was accounted for in the spectrum analyzer meter reading.

**Example:**

Freq. (MHz)	Meter Reading	+ ACF	+ CL	= FS
33	20 dBuV	+ 10.36 dB/m	+0.40 dB	=30.36
dBuV/m @ 3m				

**ANSI STANDARD C63.4-2009 10.1.7 MEASUREMENT PROCEDURES:** The unit under test was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The table used for radiated measurements is capable of continuous rotation. When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

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**RADIATED SPURIOUS EMISSIONS**
**Test Data: Field Strength Below 1 GHz**

Detector	Emission Frequency MHz	Meter Reading dBu V	Antenna Polarity	Coax Loss Db	Correction Factor dB/M	Field Strength dBu V/M
Peak	79.85	21.82	V	0.49	8.26	30.57
Peak	127.80	11.94	V	0.66	12.32	24.92
Peak	64.05	10.51	V	0.40	6.33	17.24
Peak	31.90	9.87	V	0.19	12.65	22.71
Peak	79.95	12.60	H	0.49	8.29	21.38
Peak	95.92	5.63	H	0.56	10.72	16.91
Peak	127.80	5.51	H	0.66	12.32	18.49
Peak	205.12	11.81	V	0.87	10.90	23.58
Peak	255.12	5.55	V	0.93	11.96	18.44
Peak	271.79	5.91	V	0.95	12.93	19.79
Peak	450.00	4.74	V	1.45	16.00	22.18
Peak	207.69	6.40	H	0.87	10.79	18.06
Peak	366.66	5.49	H	1.28	14.33	21.10
Peak	357.69	4.47	H	1.24	14.51	20.22
Peak	11815.38	11.73	V	7.73	38.57	58.03
Peak	12002.88	12.30	V	7.80	38.80	58.90
Peak	12116.66	12.17	V	7.88	38.88	58.93
Peak	11752.88	11.01	H	7.70	38.49	57.20
Peak	11925.16	10.61	H	7.77	38.71	57.09
Peak	11970.03	10.72	H	7.79	38.76	57.27

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## RADIATED SPURIOUS EMISSIONS

### TEST DATA: 11.7 – 12.2 GHZ 3 METER FIELD STRENGTH

Emissions in this band were measured at a distance of 1 Meter using a 20 dB standard gain horn, the results were extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear distance for field strength measurements).

#### 3 Meter Extrapolation Table:

Detector	Ant Polarity	Emission Frequency (MHz)	Measured Level (dBuV)	measured distance (m)	extrapolation distance (m)	extrapolated level (dBuV/m)
Peak	V	11815.38	11.73	1	3	2.19
Peak	V	12002.8799	12.3	1	3	2.76
Peak	V	12116.6602	12.17	1	3	2.63
Peak	H	11752.8799	11.01	1	3	1.47
Peak	H	11925.1602	10.61	1	3	1.07
Peak	H	11970.0303	10.72	1	3	1.18

#### 3 Meter Field Strength Table:

Detector	Emission Frequency (MHz)	Meter Reading (dBuV/m)	Ant Polarity	Coax Loss (dB)	Correction Factor (dB)	Field Strength (dBuV/m)	Margin (dB)
Peak	11815.3799	2.19	V	7.73	31.67	41.58	12.42
Peak	12002.8799	2.76	V	7.80	31.81	42.37	11.63
Peak	12116.6602	2.63	V	7.88	31.89	42.40	11.60
Peak	11752.8799	1.47	H	7.70	31.62	40.79	13.21
Peak	11925.1602	1.07	H	7.77	31.75	40.59	13.41
Peak	11970.0303	1.18	H	7.79	31.78	40.75	13.25

#### Results - Meets Requirements

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**TEST EQUIPMENT LIST**

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
Antenna: Biconical Chamber	Eaton Chamber	94455-1	1057	06/14/13	12/14/15
Antenna: Log-Periodic Chamber	Eaton	96005	1243	05/31/13	11/30/15
Antenna: Standard Gain Horn 8.2-12.5 GHz	Systron Donner	DBG-520-20	Not Serialized	NA	NA
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	12/31/13	12/31/15
Antenna: Double-Ridged Horn/ETS Horn 2	ETS-Lindgren	3117	00041534	02/25/15	02/25/17
Software: Field Strength Program	Timco	N/A	Version 4.0	NA	NA
Antenna: Active Loop	ETS-Lindgren	6502	00062529	10/09/13	10/09/15
EMI Test Receiver R & S ESU 40 Chamber	Rohde & Schwarz	ESU 40	100320	03/11/14	03/11/16

**\*EMI RECEIVER SOFTWARE VERSION**

The receiver firmware used was version 4.43 Service Pack 3

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