



849 NW State Road 45
Newberry, FL 32669 USA
Phone: 888.472.2424 or
352.472.5500
Fax: 352.472.2030
Email: info@timcoengr.com
Website: www.timcoengr.com

FCC PART 15.109 RADAR DETECTOR REPORT

Applicant	B&M MERCHANDISE LLC
Address	744 STABLEWATCH DR INDEPENDENCE KY 41051
Product Model Number	SPSE
Product Description	RADAR DETECTOR
FCC ID:	2AEE3SPSE
Date Sample Received	11/6/2015
Date Tested	2/4/2016
Tested By	Cory Leverett
Approved By	Tim Royer

Report Number	Version Number	Description	Issue Date
2333UT15TestReport.docx	Rev1	Initial Issue	2/4/2016

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

Table of Contents

GENERAL REMARKS	3
GENERAL INFORMATION	4
TEST RESULTS SUMMARY	4
RADIATED SPURIOUS EMISSIONS	5
Test Data: Field Strength Below 1 GHz	7
Test Data: 11.7 – 12.2 GHz 3 Meter Field Strength	8
TEST EQUIPMENT LIST	9

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

A handwritten signature in blue ink, appearing to read "Cory Leverett", is written over a circular red stamp.

Authorized Signatory Name:

Cory Leverett

Engineering Project Manager

Date: 2/4/2016

[Table of Contents](#)

Applicant: B&M MERCHANDISE LLC
FCC ID: 2AEE3SPSE
Report: 2333UT15TestReport.docx

GENERAL INFORMATION

EUT Specification

EUT Description	RADAR DETECTOR
FCC ID	2AEE3SPSE
Model Number	SPSE
Operating Frequency	10.525GHz(X-Band), 24.150 GHz (K-Band), 33.4-36.0G Hz (Ka Band)
EUT Power Source	<input type="checkbox"/> 110–120Vac/50– 60Hz
	<input checked="" type="checkbox"/> DC Power 12V
	<input type="checkbox"/> Battery Operated Exclusively
Test Item	<input type="checkbox"/> Prototype
	<input checked="" type="checkbox"/> Pre-Production
	<input type="checkbox"/> Production
Type of Equipment	<input type="checkbox"/> Fixed
	<input checked="" type="checkbox"/> Mobile
	<input type="checkbox"/> Portable
Test Conditions	Temperature: 24-26°C Relative humidity: 50-65% Barometric Pressure: 29.97 in.
Modification to the EUT	None
Test Exercise	The EUT was operated in a normal mode.
Applicable Standards	FCC Pt 15.109, Pt 15.107,
Test Procedure	ANSI C63.4: 2014
Test Facility	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.	
FCC Rules Part No.	RESULTS Pass/Fail/NA
15.109 Radiated Emissions	Pass

[Table of Contents](#)

RADIATED SPURIOUS EMISSIONS

Rules Part No.: 15.109

Requirements:

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

Test Procedure 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.

[Table of Contents](#)

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FCC ID: 2AEE3SPSE
Report: 2333UT15TestReport.docx

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.

[Table of Contents](#)

Applicant: B&M MERCHANDISE LLC
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RADIATED SPURIOUS EMISSIONS

TEST DATA: FIELD STRENGTH BELOW 1 GHZ

Detector	Emission Frequency (GHz)	Meter Reading (dBuV/m)	Ant Polarity	Coax Loss (dB)	Correction Factor (dB)	Field Strength (dBuV/m)	Margin (dB)
Peak	38.720	10.910	V	0.70	13.23	24.84	15.16
Peak	80.130	13.450	V	1.07	8.34	22.86	17.14
Peak	95.380	11.430	V	1.15	10.74	23.32	20.18
Peak	160.500	11.310	H	1.45	16.60	29.36	14.14
Peak	207.690	15.160	H	1.64	10.75	27.55	15.95
Peak	400.000	22.440	H	2.28	14.70	39.42	6.58
Peak	433.330	23.160	H	2.38	15.80	41.34	4.66
Peak	703.850	9.440	H	3.07	20.37	32.88	13.12

[TABLE OF CONTENTS](#)

RADIATED SPURIOUS EMISSIONS

TEST DATA: 11.7 – 12.2 GHZ 3 METER FIELD STRENGTH

3 Meter Field Strength Table:

Detector	Emission Frequency (GHz)	Meter Reading (dBuV/m)	Ant Polarity	Coax Loss (dB)	Correction Factor (dB)	Field Strength (dBuV/m)	Margin (dB)
Peak	11.72	11.96	V	12.84	31.6	56.40	17.60
Peak	12.10	12.23	V	13.09	31.9	57.22	16.78
Average	11.78	2.53	V	12.88	31.6	47.01	6.99
Average	12.11	2.87	V	13.1	31.9	47.87	6.13

Results - Meets Requirements

[Table of Contents](#)

TEST EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
Antenna: Active Loop	ETS	6502	00062529	11/18/15	11/18/17
Antenna: Biconnical	Eaton	94455-1	1057 YES	11/18/15	11/18/17
Antenna: Log-periodic	Electro-Metrics	LPA-25	1122	7/14/15	7/14/17
CHAMBER	Panashield	N/A	N/A	01/05/16	03/01/16
Antenna: 20 dB STD Gain Horn	Systron Donner	DBG-520-20	SDH 8.2-12.7 GHz	NA	NA
Software: Field Strength Program	Timco	N/A	Version 4.0	NA	NA
Hygro-Thermometer	Extech	445703	0602	06/30/15	06/30/17
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

[Table of Contents](#)