TIMCO ENGINEERING, Inc.

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

CLASS II PERMISSIVE CHANGE

RADAR DETECTOR REPORT

Applicant	**COBRA ELECTRONICS CORPORATION**
Address	**6500 WEST CORTLAND STREET CHICAGO IL 60707**
Product Model Number	RAD250
Product Description	RADAR DETECTOR
FCC ID:	BBO2016A
Date Sample Received	10/14/2016
Date Tested	10/27/2016
Tested By	Tim Royer
Approved By	Cory Leverett

Report Number	Version Number	Description	Issue Date
2075UT16TestReport	Rev1	Initial Issue	10/28/16
2075UT16TestReport	Rev2	Corrected model number	11/10/16

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GENERAL REMARKS

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

Summary

The device under test does:

☒ Fulfill the general approval requirements as identified in this test report and was selected by the customer.

☐ 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 at:

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

Tested by:
Name and Title: Tim Royer Project Manager/Testing Engineer

Date: 10/27/2016

Reviewed and approved by:
Name and Title: Cory Leverett, Engineering Tech.

Date: 10/31/2016

GENERAL INFORMATION

EUT Specification

EUT Description	RADAR DETECTOR
FCC ID	BBO2016A
Model Number	RAD250
Operating Frequency	10.425 – 10.575 (X-Band), 24.0 – 24.25 (K-Band), & 33.4-36.0 (Ka Band) GHz
EUT Power Source	☐ 110–120Vac/50– 60Hz
	☒ DC Power 12V
	☐ Battery Operated Exclusively
Test Item	☐ Prototype
	☐ Pre-Production
	☒ Production
Type of Equipment	☐ Fixed
	☒ Mobile
	☐ Portable
Test Conditions	Temperature: 24-26ºC Relative humidity: 50-65% Barometric Pressure: 30.01”
Modification to the EUT	None
Test Exercise	The EUT was powered with 13.5VDC and switched on.
Applicable Standards	FCC Pt 15.109 (h)
Test Procedure	ANSI C63.4: 2014, FCC Pt 15A
Test Facility	**Timco Engineering Inc. at 849 NW State Road 45 Newberry, FL 32669 USA.**

TEST RESULTS SUMMARY

FCC Rules Part No.	RESULTS Pass/ Fail/ NA
15.109 (h) Radiated Emissions	Pass

RADIATED SPURIOUS EMISSIONS

Rules Part No.: 15.109 (h)

Requirements:

Frequency	Average Limit	Peak Limit
11.7 to 12.2GHz	54.0 dBµV/m measured @ 3 meters	74.0 dBµV/m measured @ 3 meters

Test Procedure: A search was made of the spectrum 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 the standard list above & 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.

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

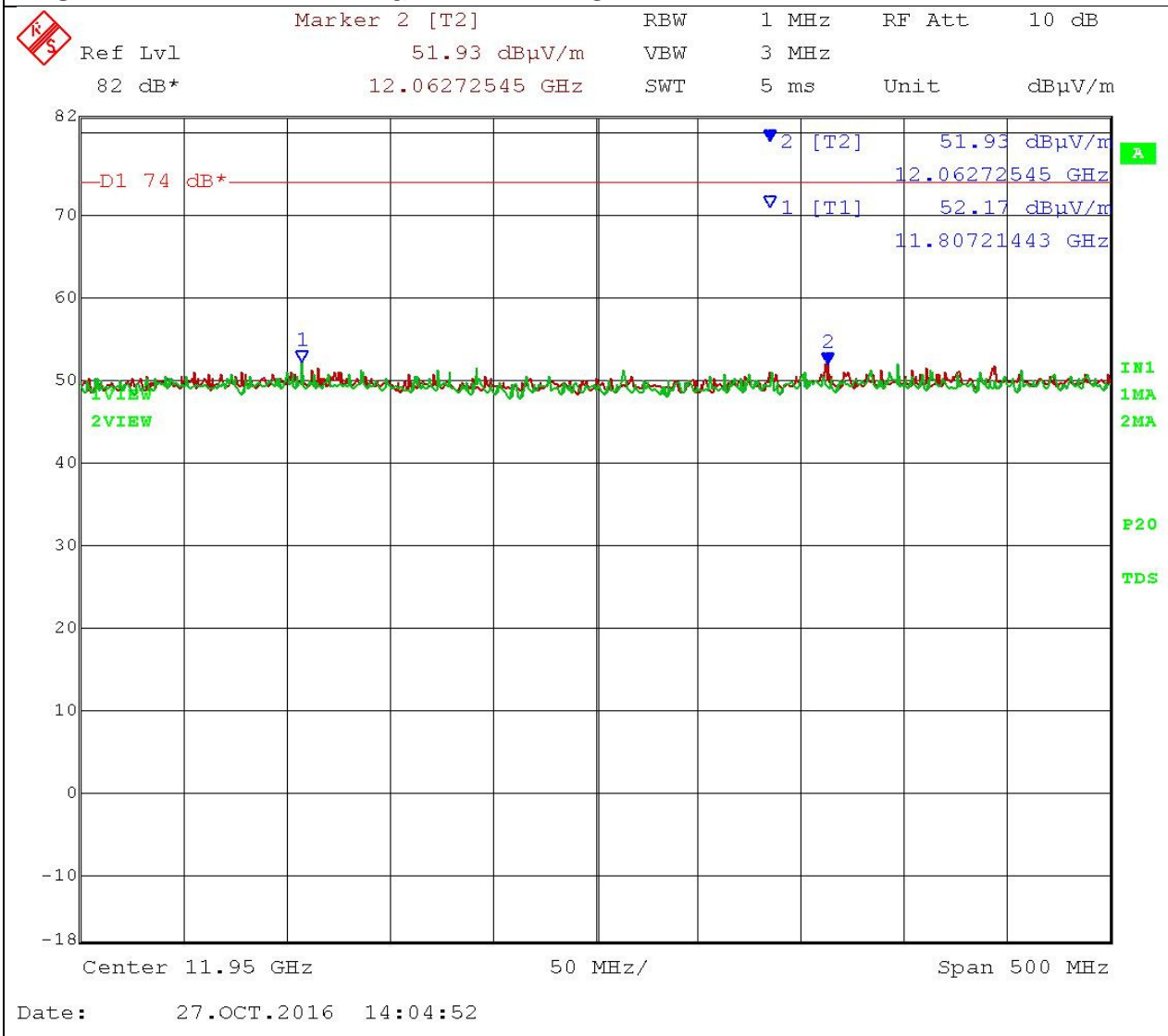
MEASUREMENT PROCEDURES: The unit under test was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The table used for radiated measurements is capable of continuous rotation. When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna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

RADIATED SPURIOUS EMISSIONS

Notes:

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).

TEST DATA: 11.7 – 12.2 GHZ PEAK PLOT



Ant Polarity: T1 (Green) = Vertical, T2 (Red) = Horizontal

Results Meets Requirements

RADIATED SPURIOUS EMISSIONS

TEST DATA: 11.7 – 12.2 GHZ AVERAGE PLOT

Ant Polarity: T1 (Green)= Vertical, T2 (Red)= Horizontal

Results Meets Requirements

TEST EQUIPMENT LIST

Device	Manufactur	Model	Serial Number	Cal/Char Date	Due Date
DC Power Supply	HP	6286A	2411A09414	N/A	N/A
Antenna: Standard Gain Horn 8.2-12.5 GHz	Systron Donner	DBG-520-20	Not Serialized	N/A	N/A
CHAMBER	Panashield	3M	N/A	04/25/16	12/31/17
EMI Test Receiver R & S ESIB 40 Screen Room	Rohde & Schwarz	ESIB 40	100274	08/16/16	08/16/18
Software: Field Strength Program	Timco	N/A	Version 4.0	N/A	N/A
Coaxial Cable - Chamber 3 cable set (Primary)	Micro-Coax	Chamber 3 cable set (Primary)	KMKM-0244-01; KMKM-0670-00; KFKF-0198-01	08/08/16	08/08/18
Bore-sight Antenna Positioning Tower	Sunol Sciences	TLT2	N/A	N/A	N/A
Pre-amp	RF-LAMBDA	RLNA00M45GA	NA	01/04/16	01/04/18

*** EMI RECEIVER SOFTWARE VERSION**

The receiver firmware used was version 4.43 Service Pack 3