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FCC PART 15.249
UNLICENSED LOW POWER RADIO
TEST REPORT

Applicant	ENERGY AND LIFE-SAVING DEVICES, INC.
Address	1310 N. PIERCE ROAD SPOKANE VALLEY WA 99206 USA
Proposed FCC ID	VEQMA-T1
Model Number	MA-T1
Product Description	Emergency Vehicle Detector
Date Sample Received	6/14/2007
Date Tested	6/27/2007
Tested By	Richard Block
Approved By	Mario de Aranzeta
Report Number	2318AUT7TestReport.pdf
Test Results	☒ PASS ☐ FAIL

ACCREDITED
Certificate # 0955-01

TABLE OF CONTENT

ATTESTATION STATEMENT

This equipment has been tested in accordance with the standards identified in the referenced 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 by me or under my supervision, at TIMCO ENGINEERING, INC. located at 849 N.W. State Road 45, Newberry, Florida 32669.

Authorized by: Mario de Aranzeta

Signature: on file

Function: Lab Supervisor

Date: June 28, 2007

REPORT SUMMARY

Disclaimer	The test results relate only to the items tested.
Purpose of Test	To show the DUT in compliance with FCC CFR 47, Part 15.249 requirements for a low power transmitter
Test Standards	ANSI/TIA 603-C: 2004, FCC CFR 47 Part 15.249, ANSI C63.4: 2003
Related Report(s)/Approval(s)	N/A

TEST ENVIRONMENT AND TEST SETUP

Test Facility	All tests were conducted by Timco Engineering Inc. located at 849 NW State Road 45, Newberry, FL 32669 USA
Laboratory Test Condition	Temperature: 26°C Relative humidity: 50%
Deviation from the standards	No deviation
Modification to the DUT	No modification was made.
Test Exercise (software etc.)	The DUT was placed in continuous transmitting mode of operation.
System Setup	Stand alone device.

DUT SPECIFICATION

DUT Description	Emergency Vehicle Detector
FCC ID	VEQMA-T1
Model Number	MA-T1
Serial Number	N/A
Operating Frequency	915MHz
No. of Channels	One (1)
Modulations	ON-OFF Keying FSK
DUT Power Source	DC Power
Test Item	Pre-Production
Type of Equipment	Portable
Antenna	¼ wave dipole
Antenna Connector	Reverse-polarity SMA

EMC EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3/10-Meter OATS	TEI	N/A	N/A	Listed 3/20/07	3/19/10
3-Meter OATS	TEI	N/A	N/A	Listed 1/11/06	1/10/09
Antenna: Biconnical	Eaton	94455-1	1057	CAL 12/12/05	12/12/07
Antenna: Biconnical	Eaton	94455-1	1096	CAL 10/11/06	10/11/08
Antenna: Biconnical	Electro-Metrics	BIA-25	1171	CAL 4/29/07	4/29/09
Analyzer Blue Tower Quasi-Peak Adapter	HP	85650A	2811A01279	CAL 5/17/07	5/17/09
Analyzer Blue Tower RF Preselector	HP	85685A	2926A00983	CAL 5/17/07	5/17/09
Analyzer Blue Tower Spectrum Analyzer	HP	8568B	2928A04729 2848A18049	CAL 5/17/07	5/17/09
LISN	Electro-Metrics	ANS-25/2	2604	CAL 10/5/06	10/5/08
LISN	Electro-Metrics	EM-7820	2682	CAL 4/28/07	4/28/09
Antenna: Log-Periodic	Eaton	96005	1243	CAL 12/14/05	12/14/07

TEST PROCEDURE

Radiation Interference: ANSI Standard C63.4-2003 using an Agilent Model 8566B spectrum analyzer, a Hewlett Packard Model 85685A Pre-selector, a Hewlett Packard Model 85650A Quasi-Peak adapter, and an appropriate antenna. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100KHz with an appropriate sweep speed and the video bandwidth was 300KHz up to 1.0GHz and 1.0MHz with a video BW of 3.0MHz above 1.0GHz. When an emission was found, the table was rotated to produce the maximum signal strength. The antenna was placed in both the horizontal and vertical planes and the worse case emissions were reported. The spectrum was searched to at least the tenth (10) harmonic of the fundamental.

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	+ 0.5	= 30.86 dBuV/m @ 3m

Power Line Conducted Interference: The procedure used was ANSI C63.4-2003 using a 50uH LISN. Both lines were observed. The bandwidth of the spectrum analyzer was 10kHz with an appropriate sweep speed. The spectrum was scanned from 0.15 to 30 MHz.

Occupied Bandwidth: A small sample of the transmitter output was fed into the spectrum analyzer and the attached plot was printed. The vertical scale is set to -10 dBm per division.

ANSI C63.4-2003 Measurement Procedures: The DUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The DUT was placed in the center of the table (1.5m side) and tested in the vertical and horizontal mode of operation. 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.

RADIATION INTERFERENCE

Rules Part No.: 15.249, 15.209

Requirements:

Frequency	Limits
Part 15.209	
9 to 490 kHz	2400/F (kHz) µV/m @ 300 meters
490 to 1705 kHz	24000/F (kHz) µV/m @ 30 meters
1705 kHz to 30 MHz	29.54 dBµV/m @ 30 meters
30 – 88	40.0 dBµV/m @ 3 meters
80 – 216	43.5 dBµV/m @ 3 meters
216 – 960	46.0 dBµV/m @ 3 meters
Above 960	54.0 dBµV/m @ 3 meters
Part 15.249	
Fundamental 902 – 928 MHz	94.0 dBµV/m @ 3 meters
Fundamental 2.4 – 2.4835 MHz	94.0 dBµV/m @ 3 meters
Harmonics	54.0 dBµV/m @ 3 meters

Test Data:

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Duty Cycle dB	Field Strength dBuV/m	Margin dB
915.0	915.00	75.1	V	1.97	22.60	20.26	79.41	14.59
915.0	915.00	77.1	H	1.97	23.35	20.26	82.16	11.84
915.0	1,830.00	13.0	V	2.76	30.18	20.26	25.68	28.32
915.0	1,830.00	14.6	H	2.76	30.18	20.26	27.28	26.72
915.0	2,745.00	9.5	V	3.42	32.89	20.26	25.55	28.45
915.0	2,745.00	15.8	H	3.42	32.89	20.26	31.85	22.15
915.0	3,660.00	6.0	H	4.19	33.43	20.26	23.36	30.64
915.0	3,660.00	6.8	V	4.19	33.43	20.26	24.16	29.84
915.0	4,575.00	5.1	V	4.79	34.16	20.26	23.79	30.21
915.0	4,575.00	6.1	H	4.79	34.16	20.26	24.79	29.21

[Continued]

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Duty Cycle dB	Field Strength dBuV/m	Margin dB
915.0	5,490.00	5.2	H	5.15	35.09	20.26	25.18	28.82
915.0	5,490.00	5.3	V	5.15	35.09	20.26	25.28	28.72
915.0	6,405.00	6.9	V	5.42	36.02	20.26	28.08	25.92
915.0	6,405.00	7.6	H	5.42	36.02	20.26	28.78	25.22
915.0	7,320.00	7.3	H	5.79	36.28	20.26	29.11	24.89
915.0	7,320.00	7.8	V	5.79	36.28	20.26	29.61	24.39
915.0	8,235.00	7.0	H	6.29	36.30	20.26	29.33	24.67
915.0	8,235.00	8.3	V	6.29	36.30	20.26	30.63	23.37
915.0	9,150.00	7.6	H	6.65	36.98	20.26	30.97	23.03
915.0	9,150.00	7.9	V	6.65	36.98	20.26	31.27	22.73

30 – 1000 MHz Emissions

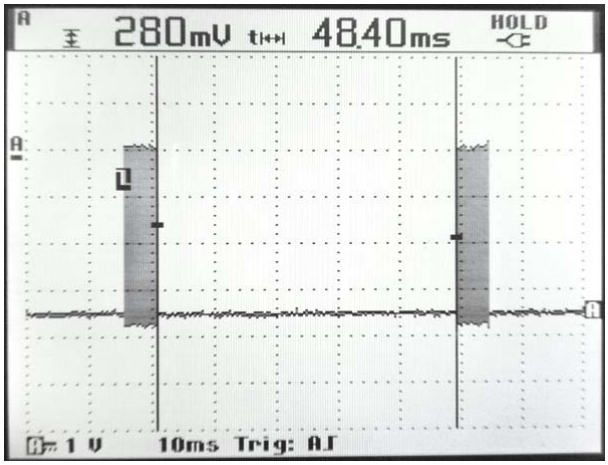
Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Field Strength dBuV/m	Margin dB
35.53	5.6	V	0.43	10.42	16.45	23.55
47.67	3.9	V	0.49	10.63	15.02	24.98
61.88	7.8	V	0.54	10.71	19.05	20.95
66.73	7.4	V	0.56	8.74	16.70	23.30
85.77	5.8	V	0.61	8.06	14.47	25.53
894.69	7.2	V	1.95	22.65	31.80	14.20
904.50	16.1	V	1.96	22.66	40.72	13.28
925.82	18.4	V	1.99	22.66	43.05	10.95

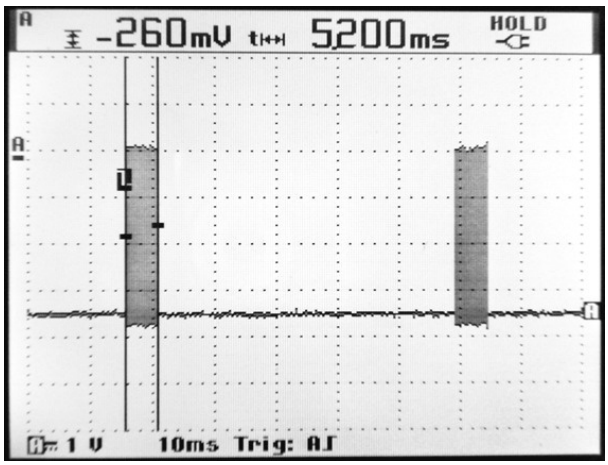
DUTY CYCLE DECLARATION

The period of the pulse train is determined by observing it on an oscilloscope or a spectrum analyzer with zero (0) frequency span. A plot is then made of the pulse train with a sweep time of 100 milliseconds. This sweep determines the duration of the pulse train, which in this case is millisecond. This sweep allows the determination of the number of and type of pulses, i.e. long & short. Plots are then made showing the duration of each type of pulse and its duration. From the 100 millisecond Plot, the number of a given type of pulse is then multiplied by the duration of that type pulse. This allows the calculation of the amount of time the DUT is on within 100 ms. If the pulse train is longer than 100 ms then this number is multiplied by 100 to determine the percentage ON TIME. If the pulse train is less than 100 ms the total on time is divided by the length of the pulse train and then multiplied by 100 to determine the percentage ON TIME.

dB = 20*log(ON TIME)/PERIOD
dB = 20*log(5.2/53.6)
dB = 20*log(0.097)
dB = -20.26

Duty Cycle plots present below.



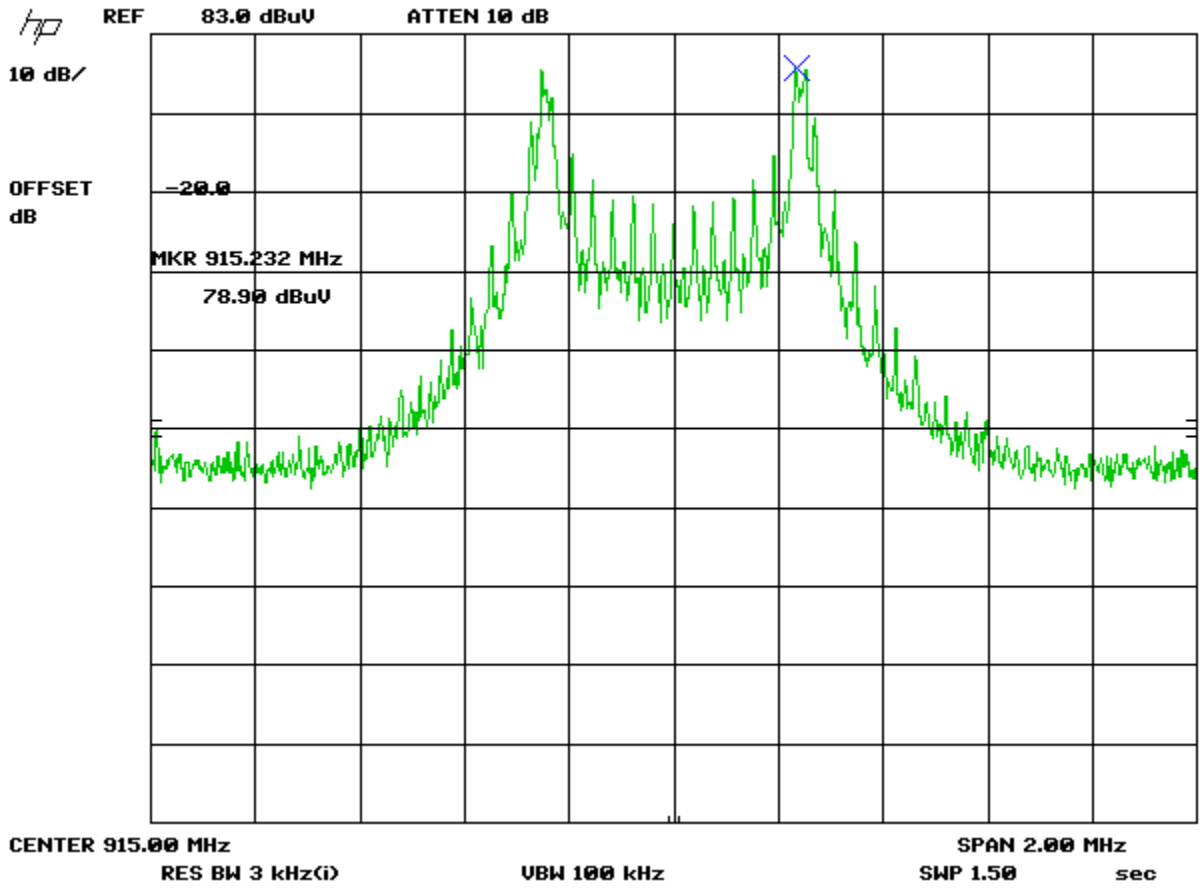


OCCUPIED BANDWIDTH

Rules Part No.: 15.249 (d)

Requirements: The field strength of any emissions appearing outside the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 50 dB below the level of the carrier or to the general limits of 15.209.

Test Data:



POWER LINE CONDUCTED INTERFERENCE

Rules Part No.: 15.207

Requirements:

Frequency (MHz)	Quasi Peak Limits (dBuv)	Average Limits (dBuV)
0.15 – 0.5	66 – 56 *	56 – 46 *
0.5 – 5.0	56	46
5.0 – 30	60	50
* Decreases with logarithm of frequency		

Test Data: Not applicable because the DUT is battery operated exclusively.