TIMCO ENGINEERING, Inc.

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FCC PART 15.209

LOW POWER TRANSMITTER

TEST REPORT

Applicant	KASTLE SYSTEMS INTERNATONAL
Address	6402 ARLINGTON BLVD. FALLS CHURCH, VA 22042
FCC ID	2ALZS-AIO-M
Models	1299, 1299-P, 1299-W, 1299-PW
Product Description	BLE MULLION READER
Date Sample Received	5/2/2017
Date Tested	5/2/2017
Tested By	Tim Royer
Approved By	Sid Sanders
Test Results	☒ PASS ☐ FAIL

Report Number	Version Number	Description	Issue Date
788UT17TestReport1	Rev1	Initial Issue	5/5/2017
	Rev2	Corrected Report	5/17/2017
	Rev3	Added powerline conducted emissions	5/25/2017

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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: 5/ 5/ 2017

Reviewed and approved by: _____
Name: Sid Sanders
Title: Engineer

Date: 5/ 16/ 17

REPORT SUMMARY

Disclaimer	The test results only relate to the item tested.
Applicable Rule(s)	Pt 15.209, ANSI C63.10: 2013
Related Report	None

TEST ENVIRONMENT

Test Facility	**Timco Engineering, Inc. 849 NW State Road 45 Newberry, FL 32669 USA.**
Test Condition in the laboratory	Temperature: 26ºC Relative humidity: 50%

TEST SETUP SUMMARY

Test Setup Diagram/ Description	The DUT was placed on the turntable per setup per ANSI C63.4: 2014. A test set up photo is provided for clarification.
Deviation from the standard/procedure	No deviation
Modification of DUT	No modification

DUT SPECIFICATION

DUT Description	BLE MULLION READER
FCC ID	2ALZS-AIO-M
Models	1299, 1299-P, 1299-W, 1299-PW
DUT Power Source	☐ 110–120Vac/50– 60Hz
	☒ DC Power , 12V
	☐ Battery Operated Exclusively
Test Item	☐ Prototype
	☒ Pre-Production
	☐ Production
Type of Equipment	☒ Fixed
	☐ Mobile
	☐ Portable
Laboratory Test Conditions	Temperature: 26ºC Humidity: 55%
Modifications to DUT:	☒ No ☐ Yes (explanation below)

TEST SUPPORTING EQUIPMENT

Device	Manufacturer	Model	S/N	Supplied By	Used For
12V supply	Security and Fire Electronics	V6T	N/A	Security and Fire Electronics	Powerline

TEST PROCEDURES

Power line conducted Emission: The test procedure used was ANSI C63.4-2009.The spectrum was scanned from 0.15 to 30 MHz.

Radiation Interference: The test procedure used was ANSI C63.4 using a spectrum analyzer with a preselector. The bandwidth of the spectrum analyzer was 100 kHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The video bandwidth was always greater than or equal to the RBW.

The frequency was scanned from 30 MHz to 1.0 GHz. When an emission was found, the table was rotated to produce the maximum signal strength. The DUT was measured in three (3) orthogonal planes when necessary.

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 dBµV) to the antenna correction factor supplied by the antenna manufacturer plus the coax loss. 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 dBµV	+ 10.36 dB/m	+ 0.40 dB	= 30.76 dBµV/m @ 3m

ANSI C63.4 Measurement Procedures: The EUT was placed on a non-conducting table 80 cm above the ground plane with the EUT located in the center of the table. With the antenna vertical a preliminary scan was done at 1 meters distance, the EUT was moved to a 3.0-meter distance and the antenna height varied and also placed in a horizontal position. The frequency was scanned from 9.0 kHz to 1.0 GHz. When an emission was found, the table was rotated to produce the maximum signal strength. The EUT was measured in three (3) orthogonal planes (as necessary).

POWER LINE CONDUCTED INTERFERENCE

Rules Part No.: Part 15.207

Requirements:

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

Test Data: The following plots represent the emissions read for power line conducted. Both lines were observed.

POWER LINE CONDUCTED INTERFERENCE

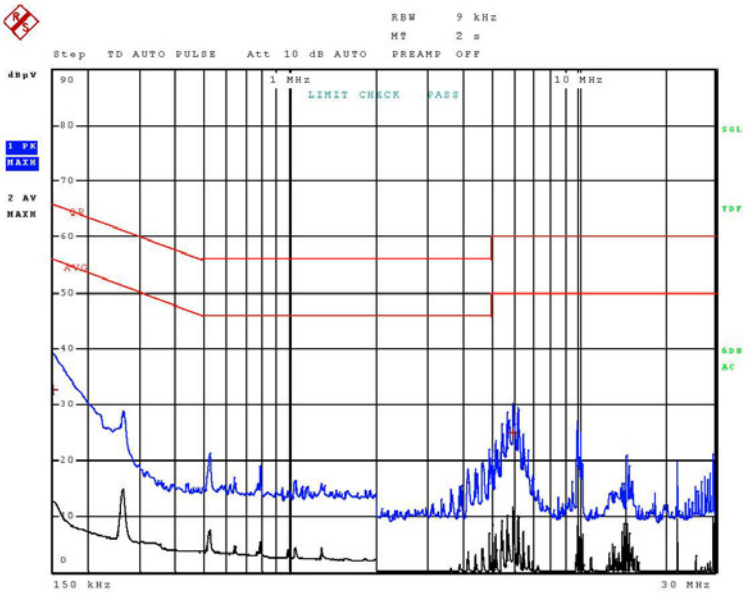
Test Data: Line 1

25.May 17 10:01

Time Domain Scan (1 Range)

Scan Start: 150 kHz
Scan Stop: 30 MHz
Detector: Trace 1: MAX PEAK Trace 2: Average
Transducer: tdf_21

Start Frequency	Stop Frequency	Step Size	Res BW	Meas Time	RF Atten	Preamp	Input
150.000000 kHz	30.000000 MHz	2.25 kHz	9.00 kHz	500 ms	Auto	0 dB	INPUT2



Final Measurement

Meas Time: 2 s
Margin: 30 dB
Subranges: 2

Trace	Frequency	Level (dBµV)	Detector	Delta Limit/dB
1	150.000000000 kHz	32.71	Quasi Peak	-33.29
1	5.948250000 MHz	24.94	Quasi Peak	-35.06

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POWER LINE CONDUCTED INTERFERENCE

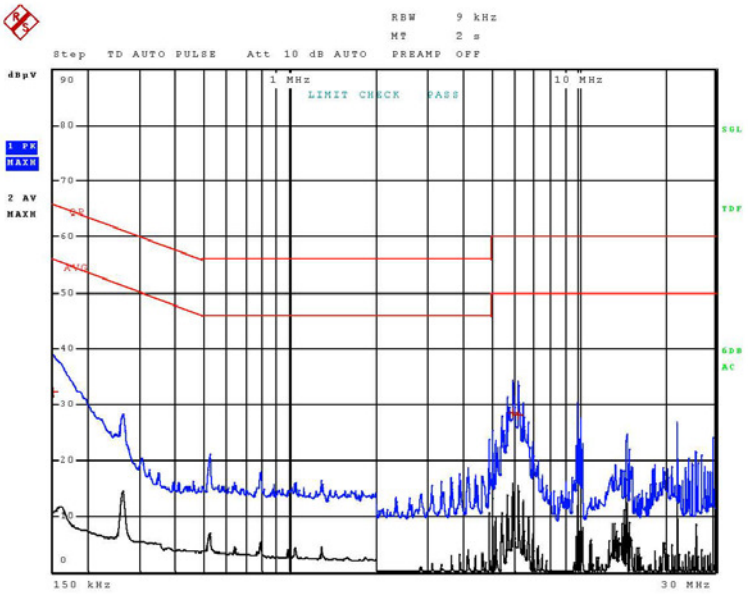
Test Data: Line 2

25.May 17 10:03

Time Domain Scan (1 Range)

Scan Start: 150 kHz
Scan Stop: 30 MHz
Detector: Trace 1: MAX PEAK Trace 2: Average
Transducer: tdf_21

Start Frequency	Stop Frequency	Step Size	Res BW	Meas Time	RF Atten	Preamp	Input
150.000000 kHz	30.000000 MHz	2.25 kHz	9.00 kHz	500 ms	Auto	0 dB	INPUT2



Final Measurement

Meas Time: 2 s
Margin: 30 dB
Subranges: 3

Trace	Frequency	Level (dBµV)	Detector	Delta Limit/dB
1	150.000000000 kHz	32.28	Quasi Peak	-33.72
1	5.941500000 MHz	28.36	Quasi Peak	-31.64
1	6.204750000 MHz	28.08	Quasi Peak	-31.92

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RADIATED SPURIOUS EMISSIONS

Rules Part No.: 15.109(a) and 15.209

Requirements: CARRIER FREQUENCY WILL NOT EXCEED 2400/F (kHz)uV/m AT 300 METERS

OUT-OF-BAND EMISSIONS SHALL NOT EXCEED THE LEVEL OF THE FUNDAMENTAL.

Frequency MHz	Limits
9 – 490 kHz	2400/F (kHz) µV/m @ 300 meters
490 – 1705 kHz	24000/F (kHz) µV/m @ 30 meters
1705 – 30 MHz	29.54 dBµV/m measured @ 30 meters
30 – 88	40.0 dBµV/m measured @ 3 meters
88 – 216	43.5 dBµV/m measured @ 3 meters
216 – 960	46.0 dBµV/m measured @ 3 meters
Above 960	54.0 dBµV/m measured @ 3 meters

The spectrum was scanned from 10 kHz to 1000 MHz.

Test Data:

Tuned Freq MHz	Emission Frequency MHz	Meter Reading dBu V		Antenna Polarity	Coax Loss Db	Correction Factor dB/M	Field Strength dBu V/M	Margin
0.125	0.125	78.14		V	0.43	11.38	89.94	15.72
0.125	6.87	21.11	*	V	0.40	10.81	32.32	37.16
0.125	20.48	26.46		V	0.72	10.04	37.22	32.26
0.125	29.82	35.72		V	0.66	8.44	44.82	24.66
0.125	52.82	25.37	*	V	0.86	10.01	36.24	3.76
0.125	123.00	24.92	*	H	1.28	11.30	37.50	6.00
0.125	511.02	12.95	*	V	2.62	17.60	33.17	12.83
0.125	637.67	13.69	*	H	2.91	19.36	35.96	10.04

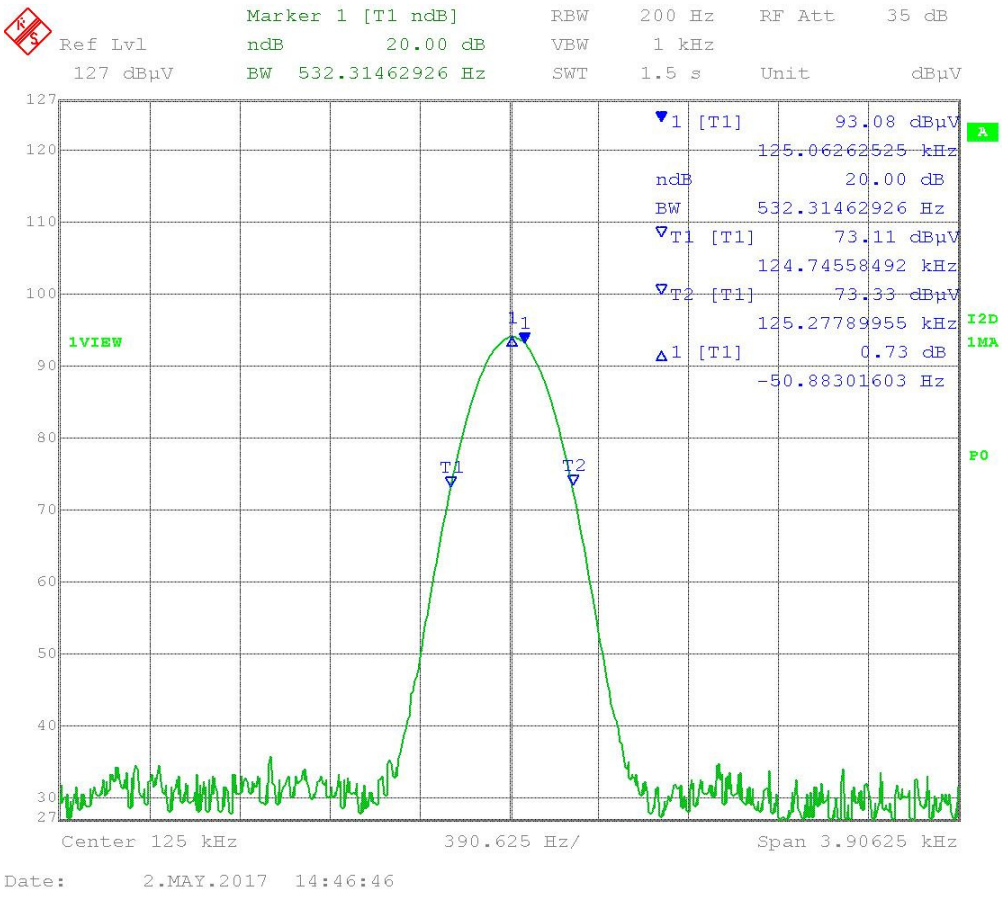
***denotes ambient measurement**

OCCUPIED BANDWIDTH

RULES PART NO.:15.215 (c)

REQUIREMENTS: Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. In the case of intentional radiators operating under the provisions of subpart E, the emission bandwidth may span across multiple contiguous frequency bands identified in that subpart. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage

Test Data: 20dB Occupied Bandwidth Plot



TEST EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
Antenna: Biconical 1096 Chamber	Eaton	94455-1	1096	07/14/15	07/14/17
Antenna: Log-Periodic 1122	Electro-Metrics	LPA-25	1122	07/14/15	07/14/17
CHAMBER	Panashield	3M	N/A	04/25/16	12/31/17
Software: Field Strength Program	Timco	N/A	Version 4.10.7.0	12/12/99	N/A
EMI Test Receiver R & S ESU 40 Chamber	Rohde & Schwarz	ESU 40	100320	04/01/16	04/01/18
Coaxial Cable - Chamber 3 cable set (Primary)	Micro-Coax	Chamber 3 cable set (Primary)	KMKM-0244-01; KMKM-0670-00; KFKF-0198-01	08/09/16	08/09/18
Bore-sight Antenna Positioning Tower	Sunol Sciences	TLT2	N/A	12/12/99	N/A
Pre-amp	RF-LAMBDA	RLNA00M45GA	NA	01/04/16	01/04/18
Coaxial Cable - BMBM-1000-00 Silver	Semflex	LISN Cable	BMBM-1000-00	01/05/17	01/05/18
LISN (Primary)	Electro-Metrics	ANS-25/2	2604	07/13/15	07/13/17
LISN (Secondary)	Electro-Metrics	EM-7820	2682	N/A	N/A

* EMI RECEIVER SOFTWARE VERSION

The receiver firmware used was version 4.43 Service Pack 3

END OF TEST REPORT