



DATE: 25 July 2017

I.T.L. (PRODUCT TESTING) LTD.
FCC/IC Radio Test Report
For

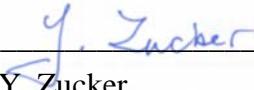
AeroScout

Equipment under test:

**WanderGuard BLUE EX5700
Controller**

**EX-5700-NA
(125kHz transmitter)**

Tested by: 
M. Zohar

Approved by: 
Y. Zucker

This report must not be reproduced, except in full, without the written permission of I.T.L. (Product Testing) Ltd.

This report relates only to items tested.



Measurement/Technical Report for AeroScout

WanderGuard BLUE EX5700 Controller

EX-5700-NA

**FCC ID: Q3HEX5700
IC: 5115A-EX5700**

This report concerns: Original Grant: X
 Class I Change:
 Class II Change:

Equipment type: DCD - Part 15 Low Power Transmitter Below 1705 kHz
 Low Power Transmitter General Field Limits
 (9kHz-30MHz)

Limits used: 47CFR15 Section 15.209
 RSS-Gen, Issue 4, November 2014

Measurement procedure used ANSI C.63.10 2013

Application for Certification prepared by: R. Pinchuck ITL (Product Testing) Ltd. 1 Bat Sheva Street Lod, 7116002 Israel e-mail Rpinchuck@itlglobal.org	Applicant for this device: (different from "prepared by") Reuven Amsalem AeroScout 2 Ilan Ramon St., Science Park Ness-Ziona, 7403635, Israel Tel: +972-8-936-9393 Fax: +972-8-936-5977 e-mail: reuven.amsalem@aeroscout.com
--	--



TABLE OF CONTENTS

1. GENERAL INFORMATION	4
1.1 Administrative Information.....	4
1.2 List of Accreditations	5
1.3 Product Description	6
1.4 Test Methodology	6
1.5 Test Facility	6
1.6 Measurement Uncertainty	6
2. SYSTEM TEST CONFIGURATION	7
2.1 Justification.....	7
2.2 EUT Exercise Software	7
2.3 Special Accessories	7
2.4 Equipment Modifications	7
2.5 Configuration of Tested System.....	8
3. CONDUCTED & RADIATED MEASUREMENT TEST SETUP PHOTOS	9
4. CONDUCTED EMISSION FROM AC MAINS	11
4.1 Test Specification	11
4.2 Test Procedure	11
4.3 Test Limit.....	11
4.4 Test Results.....	12
4.5 Test Equipment Used; Conducted Emission.....	21
5. FIELD STRENGTH OF FUNDAMENTAL	22
5.1 Test Specification	22
5.2 Test Procedure	22
5.3 Test Limit.....	22
5.4 Test Results.....	23
5.5 Test Instrumentation Used; Field Strength of Fundamental	25
6. RADIATED EMISSION, 9 KHZ – 30 MHZ	26
6.1 Test Specification	26
6.2 Test Procedure	26
6.3 Test Limit.....	26
6.4 Test Results.....	26
6.5 Test Instrumentation Used; Radiated Measurements.....	28
6.6 Field Strength Calculation	28
7. BANDWIDTH FOR 125 KHZ TRANSMITTER	29
7.1 Test Specification	29
7.2 Test Procedure	29
7.3 Test Limit.....	29
7.4 Test Results.....	29
7.5 Test Equipment Used; Bandwidth.....	29
8. ANTENNA INFORMATION/GAIN	30
9. APPENDIX A - CORRECTION FACTORS	31
9.1 Correction factors for RF CABLE for Semi Anechoic Chamber.....	31
9.2 Correction factors for ACTIVE LOOP ANTENNA	32



1. General Information

1.1 Administrative Information

Manufacturer: AeroScout

Manufacturer's Address: 2 Ilan Ramon St., Science Park
Ness-Ziona, 7403635, Israel
Tel: +972-8-936-9393
Fax: +972-8-936-5977

Manufacturer's Representative: Leonid Shikelman

Equipment Under Test (E.U.T): WanderGuard BLUE EX5700 Controller

Equipment Model No.: EX-5700-NA

Equipment Part No.: Not designated

HVIN: EX5700-NA

PMN: EX5700

Date of Receipt of E.U.T: June 4, 2017

Start of Test: June 4, 2017; July 25, 2017*

End of Test: July 11, 2017; July 25, 2017*

Test Laboratory Location: I.T.L (Product Testing) Ltd.
1 Bat Sheva St.,
LOD 7120101
ISRAEL

Test Specifications: FCC Part 15, Subpart C, Section 15.209
RSS-Gen, Issue 4, November 2014

*Bandwidth testing was re-tested on July 25, 2017.



1.2 *List of Accreditations*

The EMC laboratory of I.T.L. is accredited by the following bodies:

1. The American Association for Laboratory Accreditation (A2LA) (U.S.A.), Certificate No. 1152.01.
2. The Federal Communications Commission (FCC) (U.S.A.), FCC Designation No. IL1005.
3. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
4. Industry Canada (Canada), IC File No.: 46405-4025; Sites No. IC 4025A-1, 4025A-2.

I.T.L. Product Testing Ltd. is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with I.T.L.'s terms of accreditation unless stated otherwise in the report.



1.3 **Product Description**

The EX5700 Door Controller is a main component of STANLEY Healthcare's WanderGuard BLUE Wander Management Solution for monitoring and securing facility doors against resident wandering.

The WanderGuard BLUE Door Controller controls the WanderGuard BLUE system by storing all system configuration parameters and receiving messages from Tags, Keypads, and WanderGuard BLUE Manager, and locking the door as necessary. The Controller is typically installed above or in proximity to the monitored door.

Model name	WanderGuard BLUE EX5700 Door Controller
Working voltage	24-48VDC via 2 optionally types of AC/DC adapters
Mode of operation	Transceiver
Modulation	OOK
Operation Frequency Range	125kHz
Transmit power	8.8dBm
Antenna gain	N/A (Magnetic antenna)
Modulation BW	2.7Kbps

1.4 **Test Methodology**

Radiated testing was performed according to the procedures in ANSI C63.10: 2013. Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 **Test Facility**

Emissions tests were performed at I.T.L.'s testing facility in Lod, Israel. I.T.L.'s EMC Laboratory is accredited by A2LA, certificate No. 1152.01 and its FCC Designation No. IL1005.

1.6 **Measurement Uncertainty**

Conducted Emission

Conducted Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4)

0.15 – 30 MHz:

Expanded Uncertainty (95% Confidence, K=2):
± 3.44 dB

Radiated Emission

Radiated Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4) for open site 30-1000MHz:

Expanded Uncertainty (95% Confidence, K=2):
± 4.98 dB



2. System Test Configuration

2.1 Justification

The E.U.T contains a LF 125 kHz transmitter with 2 antennas at different polarity via one RF chain.

The E.U.T has 2 installation positions: wall or ceiling mounted.

Exploratory testing was performed in 2 orthogonal polarities to determine the radiated emission “worst case”.

The results are shown in the below screening results table with the “worst case” identified as ceiling installation position.

Frequency	Wall Mounted			Ceiling Mounted		
	Field Strength (dBuV/m)	2 nd Harmonic (dBuV/m)	3 th Harmonic (dBuV/m)	Field Strength (dBuV/m)	2 nd Harmonic (dBuV/m)	3 th Harmonic (dBuV/m)
125kHz	86.5	47.5	51.5	87.1	53.8	56.7

Figure 1. Screening Results

Testing was performed while the E.U.T was transmitting continuously at 125 kHz with modulation.

For AC line conducted emission testing, 2 types of AC/DC adapters were tested.

2.2 EUT Exercise Software

No special exercise software was used.

2.3 Special Accessories

2 types of AC/DC adapters was used:

Type 1: Manufacturer: MG electronics; Model No: ST242A.

Type 2: Manufacturer: ALTRONIX CORP; Model No: AL175UL.

2.4 Equipment Modifications

No equipment modifications were required to achieve compliance.



2.5 Configuration of Tested System

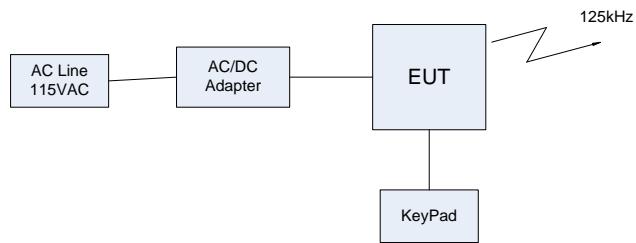


Figure 2. Test Set-Up



3. Conducted & Radiated Measurement Test Setup Photos

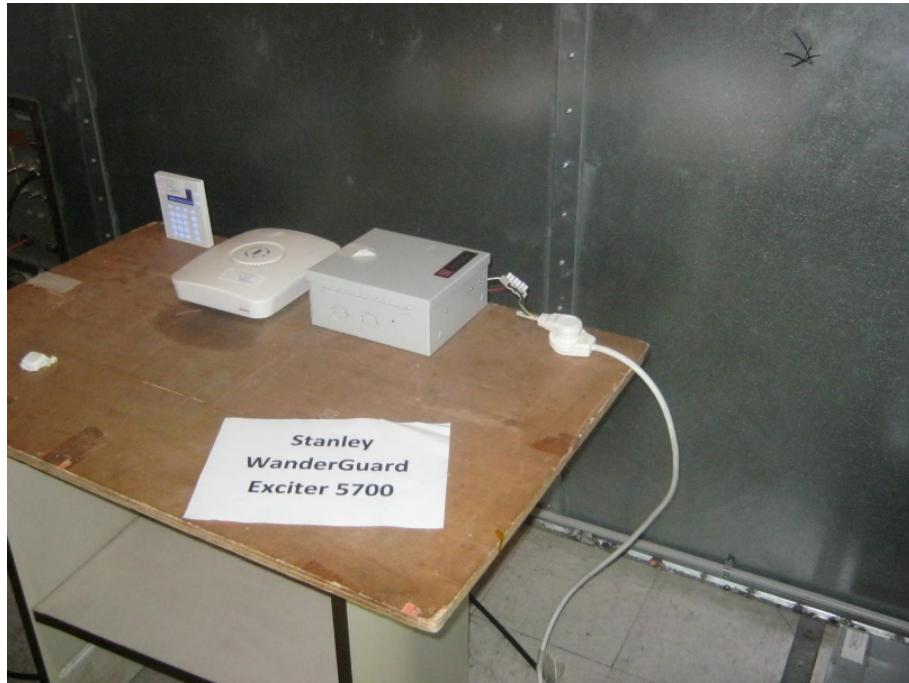


Figure 3. Conducted Emission from AC Mains (AC/DC adapter type 1) Test Setup



Figure 4. Conducted Emission from AC Mains (AC/DC adapter type 2) Test Setup



Figure 5. Radiated Emission Test Setup



4. Conducted Emission From AC Mains

4.1 Test Specification

FCC Part 15, Subpart C, Section 15.207

RSS-Gen, Issue 4: 2014, Section 8.8

4.2 Test Procedure

(Temperature (22°C)/ Humidity (57%RH))

The E.U.T operation mode and test setup are as described in Section 2 of this report. In order to minimize background noise interference, the conducted emission testing was performed inside a shielded room, with the E.U.T placed on a 0.8 meter high wooden table, 0.4 meter from the room's vertical wall. In the case of a floor-standing E.U.T., it was placed on the horizontal ground plane.

The E.U.T was powered from 115 V AC / 60 Hz via 50 Ohm / 50 μ Hn Line Impedance Stabilization Network (LISN) on the phase and neutral lines. The LISN's were grounded to the shielded room ground plane (floor), and were kept at least 0.8 meters from the nearest boundary of the E.U.T

The center of the E.U.T.'s AC cable was folded back and forth, in order to form a bundle less than 0.40 meters and a total cable length of 1 meter.

The effect of varying the position of the cables was investigated to find the configuration that produces maximum emission.

The emission voltages at the LISN's outputs were measured using a computerized receiver, complying with CISPR 16 requirements. The specification limits are loaded to the receiver and are displayed on the receiver's spectrum display.

The E.U.T was tested while transmitting simultaneously 125 kHz.

A frequency scan between 0.15 and 30 MHz was performed at 9 kHz I.F. band width, using peak detection.

The spectral components having the highest level on each line were measured using a quasi-peak and average detector.

4.3 Test Limit

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66.0 to 56.0*	56.0 to 46.0*
0.5-5.0	56.0	46.0
5.0-30.0	60.0	50.0

* Decreases with the logarithm of the frequency.



4.4 **Test Results**

JUDGEMENT: Passed by 2.19 dB

The margin between the emission levels and the specification limit is, in the worst case, 5.82dB for the phase line at 0.298 MHz and 2.19dB at 0.99 MHz for the neutral line.

The EUT met the F.C.C. Part 15, Subpart C and RSS-Gen, Issue 4: 2014, Section 8.8 specification requirements.

The details of the highest emissions are given in *Figure 6* to *Figure 13*.



Conducted Emission

E.U.T Description WanderGuard BLUE EX5700
Controller
Type EX-5700-NA
Serial Number: Not designated

Specification: FCC Part 15, Subpart C, Section 15.207
 RSS-Gen, Issue 4: 2014, Section 8.8
Lead: Phase
Detectors: Quasi-peak, Average
Voltage supply type: Type 1

EDIT PEAK LIST (Final Measurement Results)				
Trace1:	CE22BQP			
Trace2:	CE22BAP			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dB μ V	DELTA	LIMIT dB
2 Average	250 kHz	36.63	-15.12	
1 Quasi Peak	254 kHz	54.57	-7.05	
1 Quasi Peak	298 kHz	54.47	-5.82	
2 Average	366 kHz	19.68	-28.90	
1 Quasi Peak	434 kHz	46.74	-10.42	
2 Average	498 kHz	38.35	-7.68	
1 Quasi Peak	994 kHz	43.93	-12.06	
2 Average	998 kHz	35.53	-10.46	
1 Quasi Peak	1.738 MHz	38.94	-17.05	
2 Average	1.738 MHz	38.43	-7.56	
2 Average	2.482 MHz	38.45	-7.54	
1 Quasi Peak	2.974 MHz	37.40	-18.59	
1 Quasi Peak	4.462 MHz	37.09	-18.90	
2 Average	4.466 MHz	35.49	-10.50	
2 Average	6.702 MHz	35.85	-14.14	
1 Quasi Peak	9.914 MHz	39.25	-20.74	
1 Quasi Peak	17.626 MHz	44.71	-15.29	
2 Average	17.626 MHz	38.01	-11.98	
1 Quasi Peak	18.094 MHz	49.66	-10.33	
2 Average	18.094 MHz	36.60	-13.39	

Date: 11.JUL.2017 16:26:10

Figure 6. Detectors: Peak, Quasi-peak, Average

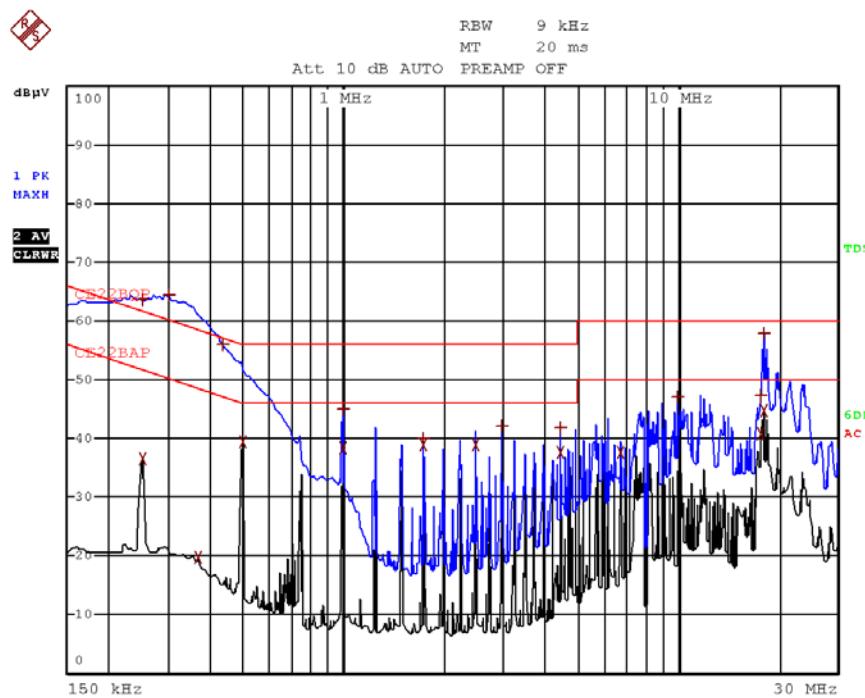
Note: *QP Delta/Av Delta refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.*



Conducted Emission

E.U.T Description WanderGuard BLUE
EX5700 Controller
Type EX-5700-NA
Serial Number: Not designated

Specification: FCC Part 15, Subpart C, Section 15.207
 RSS-Gen, Issue 4: 2014, Section 8.8
Lead: Phase
Detectors: Peak, Average
Voltage supply type: Type 1



Date: 11.JUL.2017 16:24:50

Figure 7. Detectors: Peak, Quasi-peak, Average



Conducted Emission

E.U.T Description WanderGuard BLUE EX5700
Controller

Type EX-5700-NA

Serial Number: Not designated

Specification: FCC Part 15, Subpart C, Section 15.207
RSS-Gen, Issue 4: 2014, Section 8.8

Lead: Neutral

Detectors: Quasi-peak, Average

Voltage supply type: Type 1

EDIT PEAK LIST (Final Measurement Results)				
Trace1:	CE22BQP	Trace2:	CE22BAP	Trace3:

TRACE	FREQUENCY	LEVEL dB μ V	DELTA	LIMIT dB
1 Quasi Peak	246 kHz	53.62	-8.26	
2 Average	250 kHz	37.35	-14.40	
1 Quasi Peak	334 kHz	51.93	-7.41	
2 Average	370 kHz	21.79	-26.70	
1 Quasi Peak	434 kHz	43.94	-13.23	
2 Average	498 kHz	40.62	-5.40	
1 Quasi Peak	994 kHz	44.61	-11.38	
2 Average	994 kHz	43.80	-2.19	
2 Average	1.734 MHz	37.04	-8.95	
1 Quasi Peak	1.738 MHz	40.05	-15.94	
2 Average	2.482 MHz	39.38	-6.61	
1 Quasi Peak	3.47 MHz	38.86	-17.13	
1 Quasi Peak	3.966 MHz	39.51	-16.48	
2 Average	3.97 MHz	38.43	-7.56	
2 Average	6.702 MHz	36.89	-13.10	
1 Quasi Peak	9.418 MHz	40.68	-19.31	
1 Quasi Peak	16.854 MHz	45.35	-14.65	
2 Average	17.622 MHz	42.32	-7.67	
1 Quasi Peak	17.834 MHz	47.36	-12.63	
2 Average	17.866 MHz	43.70	-6.29	

Date: 11.JUL.2017 16:35:13

Figure 8. Detectors: Peak, Quasi-peak, Average

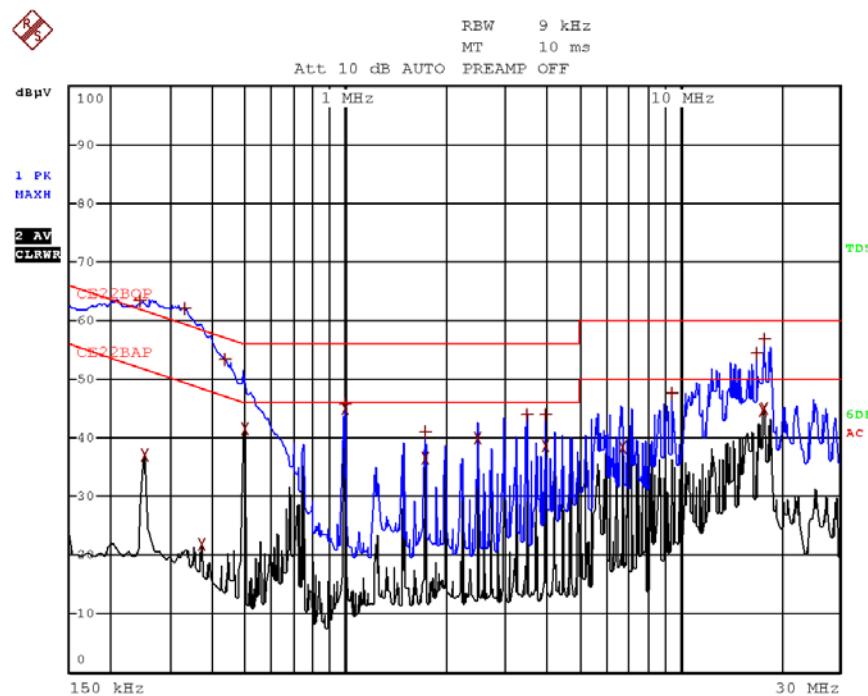
Note: QP Delta/Av Delta refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.



Conducted Emission

E.U.T Description WanderGuard
 BLUE EX5700
 Controller
Type EX-5700-NA
Serial Number: Not designated

Specification: FCC Part 15, Subpart C, Section 15.207
 RSS-Gen, Issue 4: 2014, Section 8.8
Lead: Neutral
Detectors: Peak, Average
Voltage supply type: Type 1



Date: 11.JUL.2017 16:32:57

Figure 9 Detectors: Peak, Quasi-peak, Average



Conducted Emission

E.U.T Description WanderGuard
 BLUE EX5700
 Controller
Type EX-5700-NA
Serial Number: Not designated

Specification: FCC Part 15, Subpart C, Section 15.207
 RSS-Gen, Issue 4: 2014, Section 8.8
Lead: Phase
Detectors: : Quasi-peak, Average
Voltage supply type: Type 2

EDIT PEAK LIST (Final Measurement Results)				
Trace1:	CE22BQP			
Trace2:	CE22BAP			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dB μ V	DELTA	LIMIT dB
1	Quasi Peak 158 kHz	38.91	-26.65	
2	Average 250 kHz	34.25	-17.50	
2	Average 282 kHz	11.91	-38.84	
1	Quasi Peak 286 kHz	25.55	-35.08	
1	Quasi Peak 498 kHz	30.01	-26.01	
2	Average 498 kHz	28.36	-17.67	
1	Quasi Peak 994 kHz	29.61	-26.38	
2	Average 994 kHz	28.59	-17.40	
1	Quasi Peak 1.374 MHz	13.85	-42.14	
2	Average 1.738 MHz	23.72	-22.28	
2	Average 2.234 MHz	23.96	-22.03	
1	Quasi Peak 2.962 MHz	20.31	-35.68	
2	Average 5.622 MHz	22.33	-27.66	
1	Quasi Peak 5.626 MHz	32.79	-27.20	
1	Quasi Peak 9.178 MHz	28.29	-31.70	
2	Average 10.222 MHz	22.70	-27.29	
2	Average 12.162 MHz	22.30	-27.69	
1	Quasi Peak 13.474 MHz	27.51	-32.48	
1	Quasi Peak 27.022 MHz	32.52	-27.47	
2	Average 27.798 MHz	27.75	-22.24	

Date: 5.JUN.2017 11:01:16

Figure 10. Detectors: Peak, Quasi-peak, Average

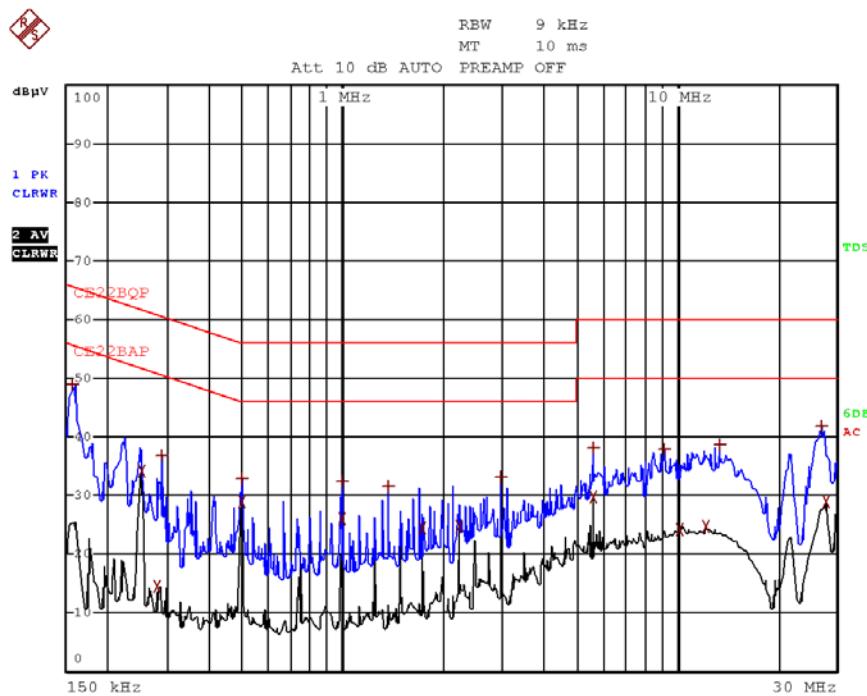
Note: *QP Delta/Av Delta refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.*



Conducted Emission

E.U.T Description WanderGuard
 BLUE EX5700
 Controller
Type EX-5700-NA
Serial Number: Not designated

Specification: FCC Part 15, Subpart C, Section 15.207
 RSS-Gen, Issue 4: 2014, Section 8.8
Lead: Phase
Detectors: Peak, Average
Voltage supply type: Type 2



Date: 5.JUN.2017 10:59:57

Figure 11. Detectors: Peak, Quasi-peak, Average



Conducted Emission

E.U.T Description WanderGuard
 BLUE EX5700
 Controller
Type EX-5700-NA
Serial Number: Not designated

Specification: FCC Part 15, Subpart C, Section 15.207
 RSS-Gen, Issue 4: 2014, Section 8.8

Lead: Neutral

Detectors: Quasi-peak, Average

Voltage supply type: Type 2

EDIT PEAK LIST (Final Measurement Results)					
Trace1:	CE22BQP				
Trace2:	CE22BAP				
Trace3:	---				
TRACE	FREQUENCY	LEVEL dB μ V	DELTA	LIMIT	dB
1	Quasi Peak 158 kHz	38.79	-26.77		
2	Average 250 kHz	34.27	-17.48		
1	Quasi Peak 350 kHz	21.07	-37.88		
2	Average 430 kHz	17.63	-29.61		
1	Quasi Peak 498 kHz	32.99	-23.03		
2	Average 498 kHz	28.85	-17.18		
2	Average 990 kHz	27.20	-18.79		
1	Quasi Peak 998 kHz	24.72	-31.27		
1	Quasi Peak 1.446 MHz	16.56	-39.43		
2	Average 1.738 MHz	23.27	-22.72		
2	Average 2.234 MHz	23.79	-22.20		
1	Quasi Peak 2.686 MHz	22.20	-33.79		
2	Average 4.218 MHz	20.61	-25.38		
1	Quasi Peak 4.654 MHz	20.76	-35.23		
2	Average 9.182 MHz	18.58	-31.42		
1	Quasi Peak 9.474 MHz	22.87	-37.12		
2	Average 10.678 MHz	18.10	-31.89		
1	Quasi Peak 10.69 MHz	23.42	-36.57		
2	Average 29.782 MHz	30.51	-19.48		
1	Quasi Peak 29.986 MHz	34.53	-25.46		

Date: 5.JUN.2017 11:14:37

Figure 12. Detectors: Peak, Quasi-peak, Average

Note: *QP Delta/Av Delta refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.*



Conducted Emission

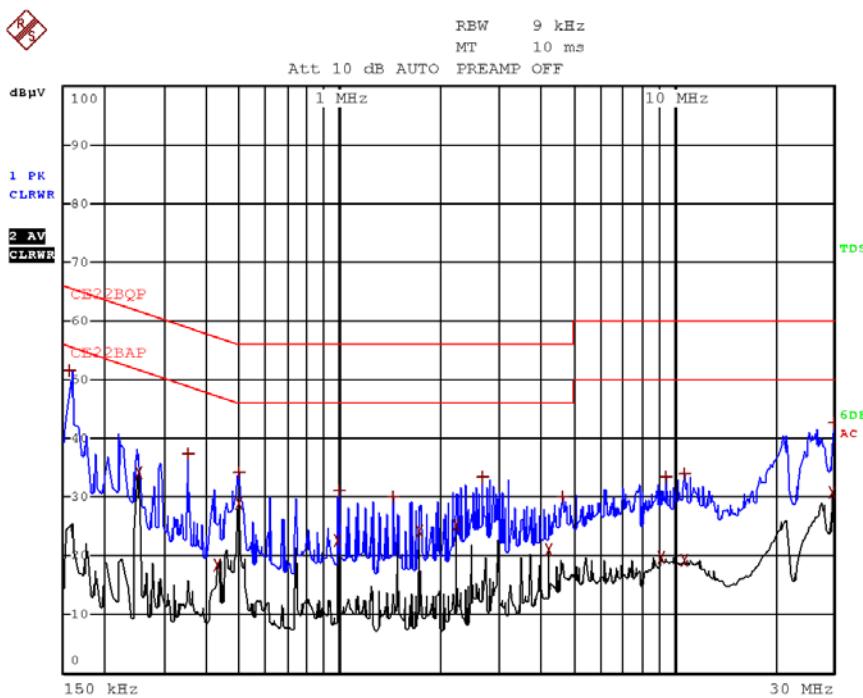
E.U.T Description	WanderGuard BLUE EX5700 Controller
Type	EX-5700-NA
Serial Number:	Not designated

Specification: FCC Part 15, Subpart C, Section 15.207
RSS-Gen, Issue 4: 2014, Section 8.8

Lead: Neutral

Detectors: Peak, Average

Voltage supply type: Type 2



Date: 5.JUN.2017 11:13:26

Figure 13 Detectors: Peak, Quasi-peak, Average



4.5 Test Equipment Used; Conducted Emission

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
LISN	Fischer	FCC-LISN-25A	127	June 23, 2016	July 31, 2017
Transient Limiter	HP	11947A	3107A03041	June 15, 2016*	June 30, 2017*
EMI Receiver	Rohde & Schwarz	ESCI7	100724	February 28, 2017	February 28, 2018

*Current calibration was performed on June 29, 2017 and next calibration due is June 29, 2018. This covers entire range of testing.

Figure 14 Test Equipment Used



5. Field Strength of Fundamental

5.1 Test Specification

Part 15, Subpart C, Section 15.209(a)

RSS-Gen, Issue 4: 2014, Section 8.9

5.2 Test Procedure

(Temperature (20°C)/ Humidity (46%RH))

The E.U.T. operation mode and test set-up are as described in Section 2 of this report. The E.U.T. was placed in the chamber on a non-conductive table, 0.8 meters above the ground.

The distance between the E.U.T. and test antenna was 3 meters.

The turntable and antenna polarity were adjusted for maximum level reading on the EMI receiver.

The EMI receiver was set to the E.U.T. Fundamental Frequency and Peak Detection.

5.3 Test Limit

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)	Field strength Limit (dB μ V/m)	Field strength* Limit (dB μ V/m)@3m
0.009-0.490	2400/F(kHz)	300	48.5-13.8	128.5-73.8
0.490-1.705	24000/F(kHz)	30	33.8-23.0	73.8-63.0
1.705-30.0	30	30	29.5	69.5
30-88	100	3	40.0	40.0
88-216	150	3	43.5	43.5
216-960	200	3	46.0	46.0
Above 960	500	3	54.0	54.0

*The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector. For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.



5.4 **Test Results**

Frequency	Pol	Peak Reading	Avg Limit	Margin
(kHz)	(V/H)	(dB μ V/m)	(dB μ V/m)	(dB)
125.0	V	101.9	105.6	-3.7
125.0	H	104.0	105.6	-1.6

Figure 15. Field Strength of Fundamental Test Results

JUDGEMENT: Passed by 1.6 dB

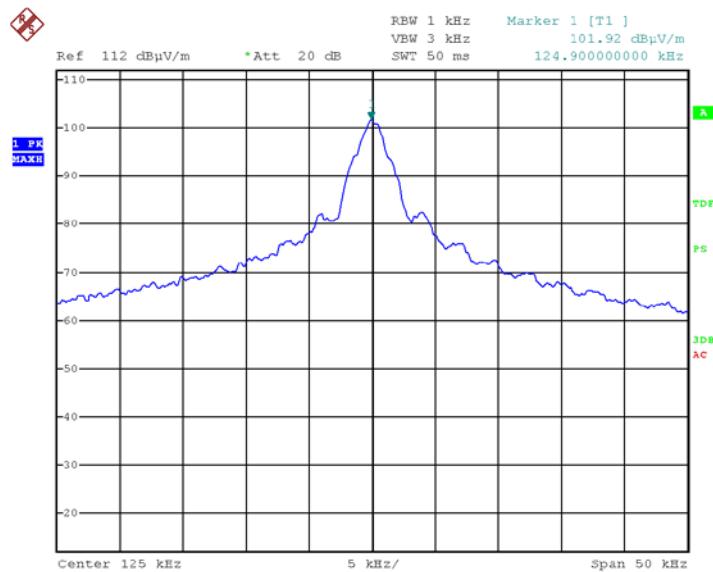
The EUT met the FCC Part 15, Subpart C, Section 15.209 and RSS-Gen, Issue 4: 2014, Section 8.9 requirements.

The details of the highest emissions are given in *Figure 16* to *Figure 17*.



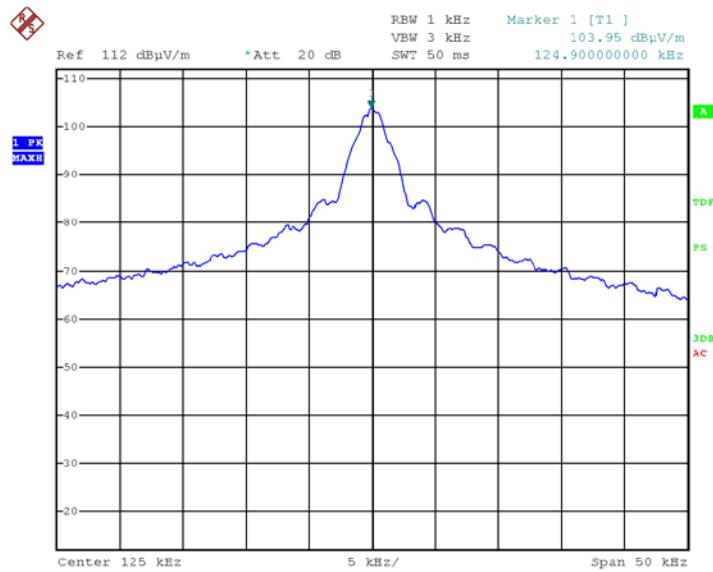
Field Strength of Fundamental

E.U.T Description WanderGuard BLUE
EX5700 Controller
Model Number EX-5700-NA
Part Number: Not designated



Date: 4.JUN.2017 14:13:05

Figure 16. Field Strength of Fundamental, Vertical



Date: 4.JUN.2017 14:27:45

Figure 17. Field Strength of Fundamental, Horizontal



5.5 **Test Instrumentation Used; Field Strength of Fundamental**

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
EMI Receiver	R&S	ESCI7	100724	February 28, 2017	February 28, 2018
Loop Antenna	EMCO	6502	2950	September 12, 2016	September 12, 2017
Semi Anechoic Chamber	ETS	S81	SL 11643	NCR	NCR

Figure 18. Test Equipment Used



6. Radiated Emission, 9 kHz – 30 MHz

6.1 Test Specification

Part 15, Subpart C, Section 209(c)
RSS-Gen, Issue 4: 2014, Section 8.9

6.2 Test Procedure

(Temperature (22°C)/ Humidity (56%RH))

The E.U.T. operation mode and test set-up are as described in Section 2 of this report. The E.U.T. was placed in the chamber on a non-conductive table, 0.8 meters above the ground.

The distance between the E.U.T. and test antenna was 3 meters.

The turntable and antenna polarity were adjusted for maximum level reading on the EMI receiver.

The EMI receiver was set to the E.U.T. Fundamental Frequency and Peak Detection.

The frequency range 9 kHz-30 MHz was scanned.

6.3 Test Limit

The level of any unwanted emissions from an intentional radiator shall not exceed the level of the fundamental emission .in addition the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)	Field strength (dB μ V/m)	Field strength* (dB μ V/m)@3m
0.009-0.490	2400/F(kHz)	300	48.5-13.8	128.5-73.8
0.490-1.705	24000/F(kHz)	30	33.8-23.0	73.8-63.0
1.705-30.0	30	30	29.5	69.5
30-88	100	3	40.0	40.0
88-216	150	3	43.5	43.5
216-960	200	3	46.0	46.0
Above 960	500	3	54.0	54.0

*The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector. For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

6.4 Test Results

JUDGEMENT: Passed by 17.3 dB

The EUT met the requirements of the F.C.C. Part 15, Subpart C, Section 209 and RSS-Gen, Issue 4: 2014, Section 8.9 specification.

See additional information in *Figure 19*.

Radiated Emission 9 kHz – 30 MHz

E.U.T Description WanderGuard BLUE EX5700
Controller
Model Number EX-5700-NA
Part Number: Not designated

Specification: FCC, Part 15, Subpart C
RSS-Gen, Issue 4: 2014, Section 8.9

Antenna Polarization: Horizontal/Vertical Frequency range: 9 kHz to 30.0 MHz
Test Distance: 3 meters Detector: Peak
Operation Frequencies: 125kHz

Frequency	Polarity	Peak Reading	Limit	Margin
(kHz)	(V/H)	(dB μ V/m)	(dB μ V/m)	(dB)
250.0	V	68.7	99.6	-30.9
	H	70.8	99.6	-28.8
375.0	V	53.7	96.1	-42.4
	H	57.2	96.1	-38.9
625.0	V	51.7	71.7	-20.0
	H	54.4	71.7	-17.3

Figure 19. Radiated Emission

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.



6.5 **Test Instrumentation Used; Radiated Measurements**

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
EMI Receiver	R&S	ESCI7	100724	February 28, 2017	February 28, 2018
Loop Antenna	EMCO	6502	2950	September 12, 2016	September 12, 2017
Semi Anechoic Chamber	ETS	S81	SL 11643	NCR	NCR

Figure 20. Test Equipment Used

6.6 **Field Strength Calculation**

The field strength is calculated directly by the EMI Receiver software, and a "Correction Factors" data disk, using the following equation:

$$FS = RA + AF + CF$$

FS: Field Strength [dB μ V/m]
RA: Receiver Amplitude [dB μ V]
AF: Receiving Antenna Correction Factor [dB/m]
CF: Cable Attenuation Factor [dB]

Example: $FS = 30.7 \text{ dB}\mu\text{V (RA)} + 14.0 \text{ dB/m (AF)} + 0.9 \text{ dB (CF)} = 45.6 \text{ dB}\mu\text{V}$

No external pre-amplifiers are used.



7. Bandwidth for 125 kHz Transmitter

7.1 Test Specification

Part 2, Section 2.1049

RSS-Gen, Issue 4: 2014, Section 6.6

7.2 Test Procedure

(Temperature (22°C)/ Humidity (56%RH))

The E.U.T. operation mode and test set-up are as described in Section 2 of this report. The E.U.T. was placed in the chamber on a non-conductive table, 0.8 meters above the ground.

The distance between the E.U.T. and test antenna was 3 meters.

The transmitter unit was operated with normal modulation. The spectrum analyzer span was set to ~ 3 times the OBW. The spectrum bandwidth of the transmitter unit was measured and recorded.

99% OBW function was set “on”.

7.3 Test Limit

N/A

7.4 Test Results

FREQUENCY (kHz)	READING (kHz)
125.0	4.4

Figure 21. 99% Bandwidth Test Results

7.5 Test Equipment Used; Bandwidth

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
EMI Receiver	R&S	ESCI7	100724	February 28, 2017	February 28, 2018
Loop Antenna	EMCO	6502	2950	September 12, 2016	September 12, 2017
Semi Anechoic Chamber	ETS	S81	SL 11643	NCR	NCR

Figure 22 Test Equipment Used

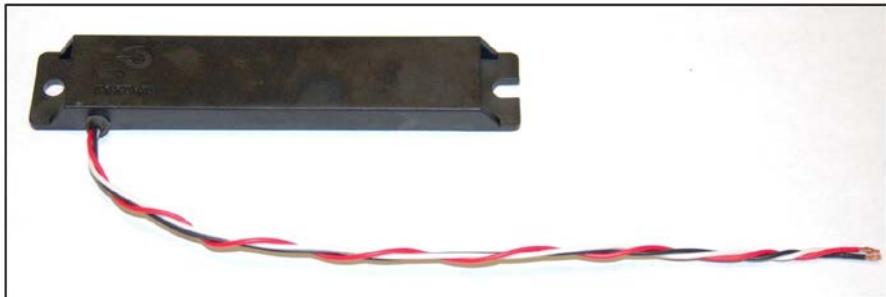


8. ANTENNA INFORMATION/GAIN

Magnetic antenna

	CUSTOMER AEROSCOUT LTD.	CUSTOMER CODE	PART DESCRIPTION Emitter Ant KGEA-BFCR type:500μH/3,3nF/125kHz 3 wires		
	INTERNAL CODE X-D0658-028	DATE 15/01/13	EDITION 4	DOCUMENT NAME E0658028_4	PAGE 1/4

C/Severo Ochoa 33 – Parque Tecnológico de Andalucía. 29590 Campanillas, Málaga (Spain) Phone +34 951 231 320 Fax +34 951 231 321
E-mail:ramon.fernandez@grupopremo.com Web <http://www.grupopremo.com>.





9. APPENDIX A - CORRECTION FACTORS

9.1 *Correction factors for RF CABLE for Semi Anechoic Chamber*

FREQ (MHz)	LOSS (dB)
1000.0	1.5
2000.0	2.1
3000.0	2.7
4000.0	3.1
5000.0	3.5
6000.0	4.1
7000.0	4.6
8000.0	4.9
9000.0	5.7
10000.0	5.7
11000.0	6.1
12000.0	6.1
13000.0	6.2
14000.0	6.7
15000.0	7.4
16000.0	7.5
17000.0	7.9
18000.0	8.1
19000.0	8.8
20000.0	9.1



9.2 Correction factors for ACTIVE LOOP ANTENNA
Model 6502
S/N 9506-2950

f(MHz)	MAF(dBs/m)	AF(dB/m)
0.01	-33.1	18.4
0.02	-37.2	14.3
0.03	-38.2	13.3
0.05	-39.8	11.7
0.1	-40.1	11.4
0.2	-40.3	11.2
0.3	-40.3	11.2
0.5	-40.3	11.2
0.7	-40.3	11.2
1	-40.1	11.4
2	-40	11.5
3	-40	11.5
4	-40.1	11.4
5	-40.2	11.3
6	-40.4	11.1
7	-40.4	11.1
8	-40.4	11.1
9	-40.5	11
10	-40.5	11
20	-41.5	10
30	-43.5	8