



DATE: 25 June 2018

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

AeroScout

Equipment under test:

**WanderGuard BLUE EX5700
Outdoor Controller**

**original: EX5700-NA
new: EX5700-OUT-NA
(125kHz transmitter)**

Tested by:

M. Zohar

Approved by:

D. Shidlow

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This report relates only to items tested.



Measurement/Technical Report for AeroScout

WanderGuard BLUE EX5700 Outdoor Controller

original: EX5700-NA
new: EX5700-OUT-NA

FCC ID: Q3HEX5700
IC: 5115A-EX5700

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

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 5, April 2018

Measurement procedure used ANSI C.63.10 2013

Application for Certification prepared by:	Applicant for this device: (different from "prepared by")
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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	9
3.	CONDUCTED & RADIATED MEASUREMENT TEST SETUP PHOTOS	10
4.	FIELD STRENGTH OF FUNDAMENTAL	11
4.1	Test Specification	11
4.2	Test Procedure	11
4.3	Test Limit	11
4.4	Test Results	12
4.5	Test Instrumentation Used; Field Strength of Fundamental	12
5.	RADIATED EMISSION, 9 KHZ – 30 MHZ	13
5.1	Test Specification	13
5.2	Test Procedure	13
5.3	Test Limit	13
5.4	Test Results	13
5.5	Test Instrumentation Used; Radiated Measurements	15
5.6	Field Strength Calculation	15
6.	BANDWIDTH FOR 125 KHZ TRANSMITTER	16
6.1	Test Specification	16
6.2	Test Procedure	16
6.3	Test Limit	16
6.4	Test Results	16
6.5	Test Equipment Used; Bandwidth	17
7.	APPENDIX A - CORRECTION FACTORS	18
7.1	Correction factors for RF CABLE for Semi Anechoic Chamber	18
7.2	Correction factors for ACTIVE LOOP ANTENNA	19



1. General Information

1.1 Administrative Information

Manufacturer: AeroScout Ltd.

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: Eli Aharon

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

Equipment Model No.: original: EX5700-NA
new: EX5700-OUT-NA

Equipment Part No.: Not designated

HVIN: EX5700-OUT-NA

PMN: EX5700-OUT

Date of Receipt of E.U.T: April 17, 2018

Start of Test: April 17, 2018

End of Test: April 18, 2018

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 5, April 2018



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.

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

1. The E.U.T. was originally FCC and ISED certified on 08/01/2017 under FCC ID: Q3HEX5700 and IC: 5115A-EX5700.
2. The following C2PC changes were made to the EUT:
 - a. minor enclosure changes to make the EUT an outdoor unit. See customer's declaration on following page.
3. A C2PC is requested based on the above changes. The following tests were performed conducted: Field Strength of Fundamental, Radiated Emission and Bandwidth.
4. The E.U.T. met the requirements of a C2PC.
5. The E.U.T contains a LF 125 kHz transmitter with 2 antennas at different polarity via one RF chain.
6. The E.U.T has 2 installation positions: wall or ceiling mounted.
7. Exploratory testing was performed with each the original and the new models 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.

Model	Frequency	Wall Mounted			Ceiling Mounted		
		Field Strength (dBuV/m)	2 rd Harmonic (dBuV/m)	3 th Harmonic (dBuV/m)	Field Strength (dBuV/m)	2 rd Harmonic (dBuV/m)	3 th Harmonic (dBuV/m)
EX-5700-NA	125kHz	96.8	57.0	54.0	98.4	58.2	56.0
EX-5700-OUT-NA	125kHz	95.8	55.6	53.8	97.9	58.2	55.4

Figure 1. Screening Results

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

2.2 EUT Exercise Software

No special exercise software was used.

2.3 Special Accessories

No special accessories were used.

2.4 Equipment Modifications

No equipment modifications were required to achieve compliance.



AeroScout®

Date: June 4, 2018

DECLARATION

I HEREBY DECLARE THE FOLLOWING:

1. The E.U.T. was originally FCC and ISED certified on 08/01/2017 under FCC ID: Q3HEX5700 and IC: 5115A-EX5700.
2. The following C2PC changes were made to the EUT:
 - a. minor enclosure changes to make the EUT an outdoor unit.
3. No other changes have been made.

SIGNATURE  _____

Reuven Amsalem,

2.5 Configuration of Tested System

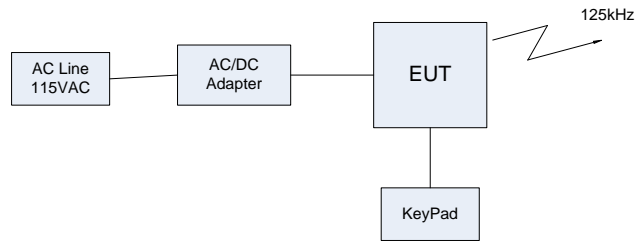


Figure 2. Test Set-Up

3. Conducted & Radiated Measurement Test Setup Photos

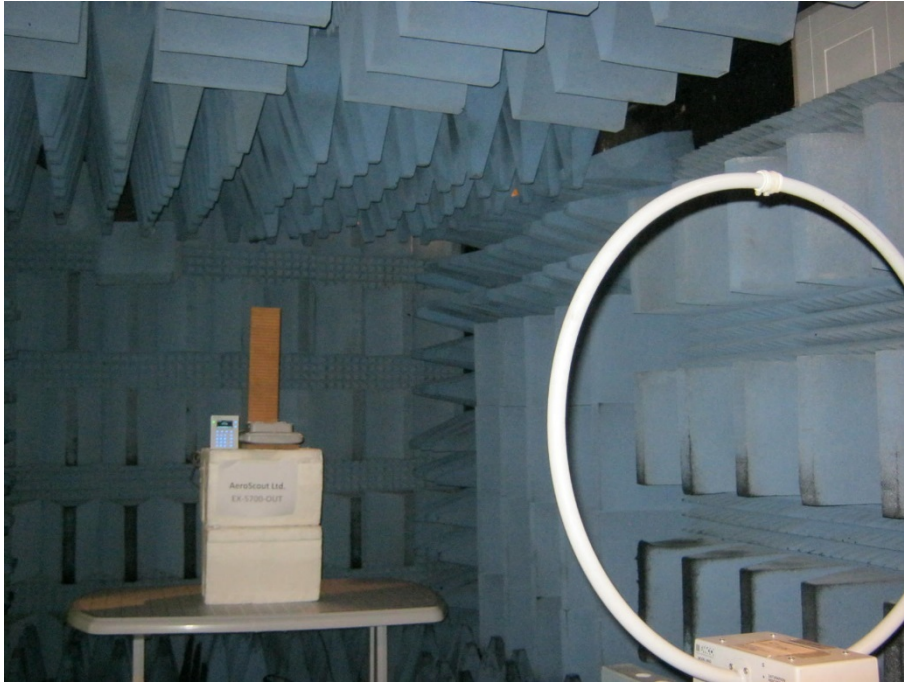


Figure 3. Radiated Emission Test Setup

4. Field Strength of Fundamental

4.1 Test Specification

Part 15, Subpart C, Section 15.209(a)
RSS-Gen, Issue 5: 2018, Section 8.9

4.2 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.

4.3 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.



4.4 Test Results

Model	Frequency	Pol	Peak Reading	Avg Limit	Margin
	(kHz)	(V/H)	(dB μ V/m)	(dB μ V/m)	(dB)
EX-5700-NA	125.0	V	98.4	105.6	-7.2
	125.0	H	95.3	105.6	-10.3
EX-5700-OUT-NA	125.0	V	97.9	105.6	-7.7
	125.0	H	95.0	105.6	-10.6

Figure 4. Field Strength of Fundamental Test Results

JUDGEMENT: Passed

The EUT met the FCC Part 15, Subpart C, Section 15.209 and RSS-Gen, Issue 5: 2018, Section 8.9 requirements.

4.5 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 19, 2018	February 19, 2019
Loop Antenna	EMCO	6502	2950	October 19, 2017	October 19, 2018
Semi Anechoic Chamber	ETS	S81	SL 11643	NCR	NCR

Figure 5. Test Equipment Used

5. Radiated Emission, 9 kHz – 30 MHz

5.1 Test Specification

Part 15, Subpart C, Section 209(c)
RSS-Gen, Issue 5: 2018, Section 8.9

5.2 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.

5.3 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 (dBµV/m)	Field strength* (dBµV/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

JUDGEMENT: Passed

The EUT met the requirements of the F.C.C. Part 15, Subpart C, Section 209 and RSS-Gen, Issue 5: 2018, Section 8.9 specification.

See additional information in *Figure 6*.



Radiated Emission 9 kHz – 30 MHz

E.U.T Description WanderGuard BLUE EX5700
Outdoor Controller
Model Number original: EX5700-NA
new: EX5700-OUT-NA
Part Number: Not designated

Specification: FCC, Part 15, Subpart C
RSS-Gen, Issue 5: 2018, Section 8.9

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

Model	Frequency	Polarity	Peak Reading	Limit	Margin
	(kHz)	(V/H)	(dB μ V/m)	(dB μ V/m)	(dB)
EX-5700-NA	250.0	V	68.2	99.6	-31.4
		H	70.9	99.6	-28.7
	375.0	V	54.0	96.1	-42.1
		H	57.7	96.1	-38.4
	625.0	V	52.4	71.7	-19.3
		H	55.0	71.7	-16.7
EX-5700-OUT-NA	250.0	V	60.5	99.6	-39.1
		H	64.9	99.6	-34.7
	375.0	V	49.8	96.1	-46.3
		H	52.1	96.1	-44.0
	625.0	V	48.5	71.7	-23.2
		H	46.7	71.7	-25.0

Figure 6. 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.



5.5 Test Instrumentation Used; Radiated Measurements

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
EMI Receiver	R&S	ESCI7	100724	February 19, 2018	February 19, 2019
Loop Antenna	EMCO	6502	2950	October 19, 2017	October 19, 2018
Semi Anechoic Chamber	ETS	S81	SL 11643	NCR	NCR

Figure 7. Test Equipment Used

5.6 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.

6. Bandwidth for 125 kHz Transmitter

6.1 Test Specification

Part 2, Section 2.1049

RSS-Gen, Issue 5: 2018, Section 6.7

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 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.

6.3 Test Limit

N/A

6.4 Test Results

FREQUENCY (kHz)	READING (kHz)
125.0	3.7

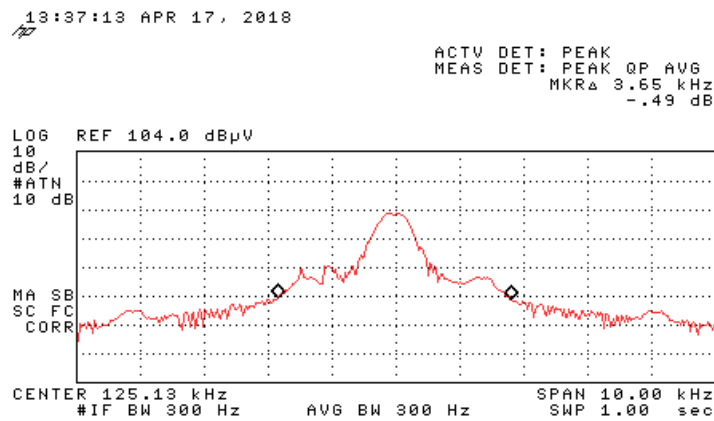


Figure 8. Occupied Bandwidth Test Results



6.5 Test Equipment Used; Bandwidth

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
EMI Receiver	R&S	ESCI7	100724	February 19, 2018	February 19, 2019
Loop Antenna	EMCO	6502	2950	October 19, 2017	October 19, 2018
Semi Anechoic Chamber	ETS	S81	SL 11643	NCR	NCR

Figure 9 Test Equipment Used



7. APPENDIX A - CORRECTION FACTORS

7.1 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



7.2 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