EMC TEST REPORT

(FULL COMPLIANCE)

Report Number: 102499904ATL-001
Project Number: G102499904

Report Issue Date: April 11, 2016

Model(s) Tested: K5579

Standards: 47 CFR Part 15, Subpart C (15.231 - Periodic operation in the band 40.66-40.70 MHz and above 70 MHz)
RSS-210, Issue 8, 2010

Tested by:
Intertek Testing Services NA, Inc.
1950 Evergreen Blvd, Suite 100
Duluth, GA 30096 USA

Client:
Hunter Fan Company
7130 Goodlett Farms Parkway, Ste 400
Cordova, TN 38016-4991 USA

Report prepared by

Mary Sampson/Senior Project Engineer

Report reviewed by

Krishna Vemuri/Engineering Team Lead

Table of Contents

1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 4.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested **complies** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

2 Test Summary

Section	Test full name	Result
3	Client Information	
4	Description of Equipment Under Test and Variant Models	
5	System Setup and Method	
6	Restrictions (47 CFR Part 15 Subpart C:2016 Section 15.231(a)(2) RSS-210 Issue 8, 2010, Section A1.1.1(b))	Pass
-	AC Mains Conducted Emissions (Battery operated device	N/A
7	Fundamental Radiated Emissions (47 CFR Part 15 Subpart C:2016 Section 15.231(b) RSS-210 Issue 8, 2010, Section A1.1.2)	Pass
8	Radiated Spurious Emissions below 1GHz (47 CFR Part 15 Subpart C:2016 Section 15.231(b) RSS-210 Issue 8, 2010, Section A1.1.2)	Pass
9	Radiated Spurious Emissions Above 1 GHz (47 CFR Part 15 Subpart C:2016 Section 15.231(b) RSS-210 Issue 8, 2010, Section A1.1.2)	Pass
10	Bandwidth (47 CFR Part 15 Subpart C:2014 Section 15.231(c) RSS-210 Issue 8, 2010, Section A1.1.3)	Pass
11	RF Exposure Compliance (47 CFR Part 2 Subpart J: 2014 Section 2.1091)	Pass
12	Revision History	

3 Client Information

This EUT was tested at the request of:

Client: Hunter Fan Company
7130 Goodlett Farms Parkway, Ste 400
Cordova, TN 38016-4991
USA

Contact: Julian Martin
Telephone: +1 (901) 248-2810
Fax: +1 (901) 248-2382
Email: jmartin@hunterfan.com

4 Description of Equipment Under Test and Variant Models

Manufacturer: Shenzhen H and T Intelligent Control, Ltd.
H&T Industrial Park
TianLiao Road, TianLiao Community,
GongMing Stree, GuangMing District
China

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Hunter SIMPLEconnect 4-Button Handheld Remote	Shenzhen H and T Intelligent Control, Ltd.	K5579	Intertek Assigned Number: ATL1603041430-001 – Normal Transmission Sample
Hunter SIMPLEconnect 4-Button Handheld Remote	Shenzhen H and T Intelligent Control, Ltd.	K5579	Intertek Assigned Number: ATL1603041430-002 – Continuous Transmission Sample

Receive Date:	03/04/2016
Received Condition:	Good
Type:	Production

Description of Equipment Under Test (provided by client)
A hand held wireless transmitter used for remote control of a ceiling fan and light assembly.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
3Vdc	20mA (Max)/ 0.2 uA (Standby)	N/A	N/A

Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	Continuous transmission
2	Normal transmission

Software used by the EUT:

No.	Descriptions of EUT Exercising
1	None

Radio/Receiver Characteristics	
Frequency Band(s)	433 MHz
Modulation Type(s)	ASK
Maximum Output Power	N/A
Test Channels	One (433 MHz)
Occupied Bandwidth	682.69 kHz
Frequency Hopper: Number of Hopping Channels	N/A
Frequency Hopper: Channel Dwell Time	N/A
Frequency Hopper: Max interval between two instances of use of the same channel	N/A
MIMO Information (# of Transmit and Receive antenna ports)	N/A
Equipment Type	Standalone
ETSI LBT/Adaptivity	N/A
ETSI Adaptivity Type	N/A
ETSI Temperature Category (I, II, III)	N/A
ETSI Receiver Category (1, 2, 3)	N/A
Antenna Type and Gain	Integral, 0.0 dBi

Variant Models:

The following variant models were not tested as part of this evaluation, but have been identified by the manufacturer as being electrically identical models, depopulated models, or with reasonable similarity to the model(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

N/A

5 System Setup and Method

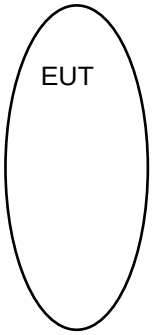
Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination
None					

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
None			

5.1 Method:

Configuration as required by ANSI C63.10:2013.

5.2 EUT Block Diagram:



6 Restrictions

6.1 Method

Tests are performed in accordance with 47 CFR Part 15 Subpart C: 2016 Section 15.231(a)(2) and RSS-210 Issue 8, 2010, Section A1.1.1(b).

TEST SITE: 10m Semi-Anechoic Chamber Control Room

10 Meter Semi-Anechoic Chamber The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096. It is a 10 meter semi-anechoic chamber manufactured by Panashield. Embedded in the floor is a 3 meter diameter turntable.

6.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
200127;	Barometric Pressure, Temperature and Humidity Monitor	Omega	IBTHX-W	8190327	10/30/2015	10/30/2016
13389;	EMI Receiver	Agilent Tech.	MXE/N9038A	MY50010160	11/13/2015	11/13/2016

Software Utilized:

Name	Manufacturer	Version
None (Receiver software)		

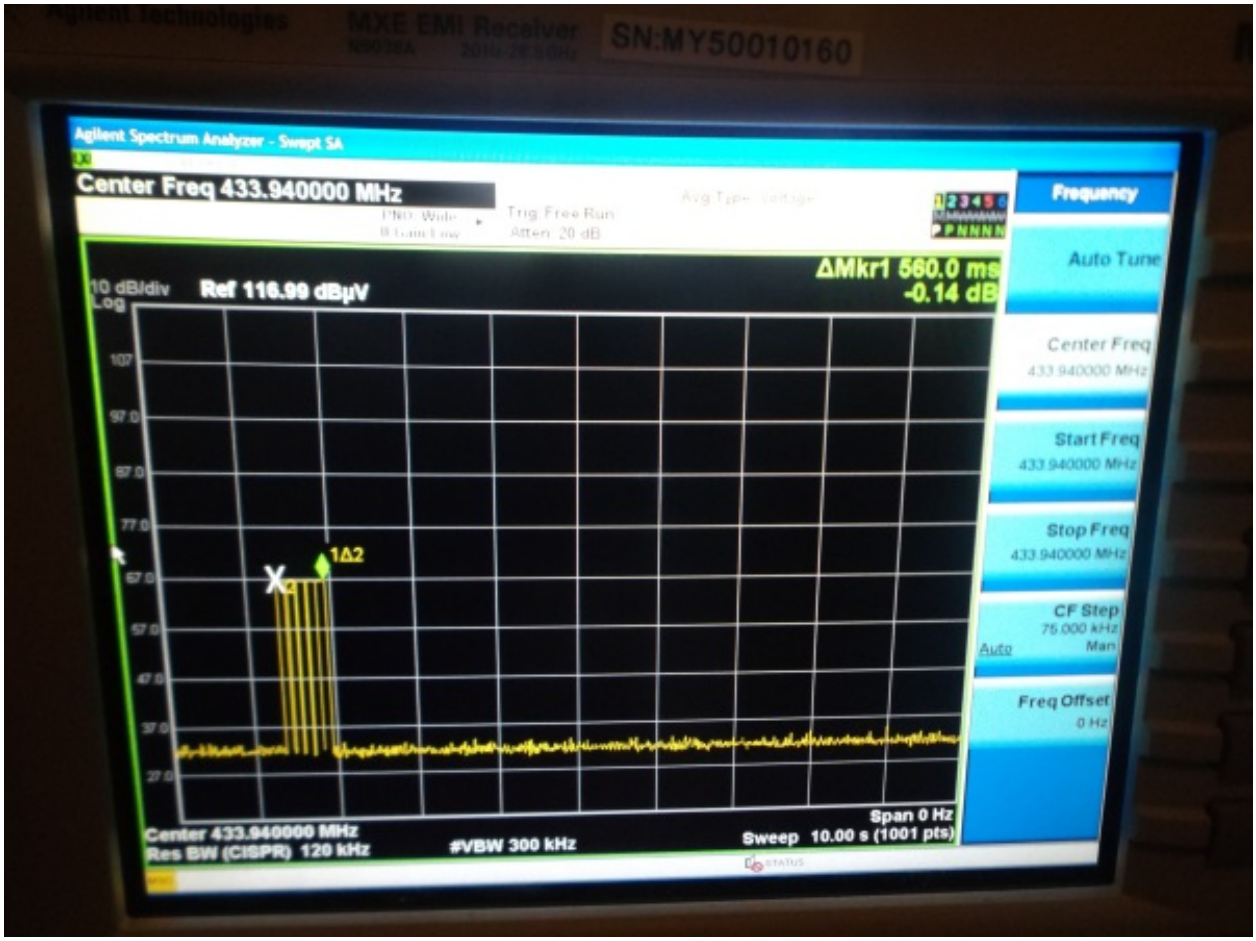
6.3 Results:

§ 15.231 Periodic operation in the band 40.66–40.70 MHz and above 70 MHz. (a) The provisions of this section are restricted to periodic operation within the band 40.66–40.70 MHz and above 70 MHz. Except as shown in paragraph (e) of this section, the intentional radiator is restricted to the transmission of a control signal such as those used with alarm systems, door openers, remote switches, etc. Continuous transmissions, voice, video and the radio control of toys are not permitted. Data is permitted to be sent with a control signal. The following conditions shall be met to comply with the provisions for this periodic operation: A transmitter activated automatically shall cease transmission within 5 seconds after activation.

RSS-210, A1.1.1 Types of Momentary Signals
The following conditions shall be met to comply with the provisions for momentary operation:
(a) A manually operated transmitter shall be equipped with a push-to-operate switch and be under manual control at all transmission times. When released, the transmitter shall cease transmission (holdover time of up to 5 seconds is permitted).

The sample tested was found to Comply.

6.4 Plots/Data:



Test Personnel:	Mary T Sampson MTS	Test Date:	03/24/2016
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	47 CFR Part 15 Subpart C:2016 Section 15.231(a)(2) and RSS-210 Issue 8, 2010, Section A1.1.1(b)	Limit Applied:	See Section 6.3
Input Voltage:	One 3Vdc CR2032 battery		
Pretest Verification w/ Ambient Signals or BB Source:	**N/A**	Ambient Temperature:	24.2 ºC
		Relative Humidity:	31.7 %
		Atmospheric Pressure:	984.4 mbars

Deviations, Additions, or Exclusions: None

7 Fundamental Radiated Emissions

7.1 Method

Tests are performed in accordance with 47 CFR Part 15 Subpart C: 2016 Section 15.231(b) and RSS-210 Issue 8, 2010, Section A1.1.2.

TEST SITE: 10m Semi-Anechoic Chamber

10 Meter Semi-Anechoic Chamber The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096. It is a 10 meter semi-anechoic chamber manufactured by Panashield. Embedded in the floor is a 3 meter diameter turntable.

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
Radiated Emissions, 10m	30-1000 MHz	3.6 dB	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	3.9 dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.2 dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	4.2 dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	4.2 dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	4.2 dB	5.5 dB

As shown in the table above our radiated emissions U_{lab} is less than the corresponding U_{CISPR} reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG
Where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dBμV/m

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0
$UF = 10^{(32\ dB\mu V / 20)}$ = 39.8 μV/m

7.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
200127;	Barometric Pressure, Temperature and Humidty Monitor	Omega	IBTHX-W	8190327	10/30/2015	10/30/2016
MP3;	Cable MP3, 18 GHz, N, 10m	Megaphase	G919-NKNK-394	MP3	05/07/2015	05/07/2016
ST-6;	RF Coax Cable - Rated 9 kHz to 18 GHz.	Megaphase	A81-0303-275	16-01-801	02/10/2016	02/10/2017
E207;	RF Coax Cable	Megaphase	TM18-N1N1-120	14065201-001	05/07/2015	05/07/2016
E212;	RF Coax Cable	Megaphase	TM18-N1N1-120	15055601002	06/10/2015	06/10/2016
13389;	EMI Receiver	Agilent Tech.	MXE/N9038A	MY50010160	11/13/2015	11/13/2016
10060;	Antenna Bilog 30-2000MHz	Chase	CBL6112B	2520	02/02/2016	02/05/2018

Software Utilized:

Name	Manufacturer	Version
None (Receiver Firmware)		

7.3 Results:

47CFR Part 15 §15.231(b)
In addition to the provisions of §15.205, the field strength of emissions from intentional radiators operated under §15.231 shall not exceed the following:

Fundamental Frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/com)
40.66 - 40.7	2,250	225
70 - 130	1,250	125
130- 174	[1] 1,250 to 3,750	[1] 125 to 375
174 - 260	3,750	375
260 - 470	[1] 3,750 to 12,500	[1] 375 to 1,250
Above 470	12,500	1,250
[1] Linear Interpolations		

RSS-210, Annex A1.1 Momentarily Operated Devices
The frequency bands and field strength limits in tables A and B of this annex are only for the transmission of a control signal, such as that used with alarm systems, door openers, remote switches, etc. Radio control of toys or model aircraft, and continuous transmissions, such as voice or video, are not permitted except as provided in Section A1.1.5 below. Data may be sent with a control signal.

Fundamental Frequency (MHz), excluding restricted band frequencies of RSS-GEN	Field Strength of the Fundamental (Note 1) (microvolts/m at 3 metres)	Field Strength of Unwanted Emissions (Note 1) (microvolts/m at 3 meters)
40.66 - 40.70	See Section A2.7	
70 - 130	1,250	125
130- 174	1,250 to 3,750*	125 to 375
174 - 260 (Note 2)	3,750	375
260 - 470 (Note 2)	3,750 to 12,500*	[1] 375 to 1,250
Above 470	12,500	1,250

Note 1: Limits on the field strength of emissions, as shown in this table, are based on the average value of the measured emissions. As an alternative, compliance with the limits in this table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector.

* Linear interpolation with frequency F in MHz:
For 130-174 MHz: FS (microvolts/m) = (56.82 x F)-6136
For 260-470 MHz: FS (microvolts/m) = (41.67 x F)-7083

Note 2: The frequency band 225-399.9 MHz is allocated for Government of Canada usage. There are different types of operations in different parts of this band of frequencies, including communications with aircraft and operations using high-power transmitters. Besides avoiding the restricted frequency bands listed in RSS-Gen, it is recommended that the entire 225-399.9 MHz band be avoided.

The sample tested was found to Comply.

7.4 Setup Photographs:

7.5 Plots/Data:

Client: Hunter Fan Company
Model Number: K5579
Project Number: G102499904
Tested By: MTS
Date: 03/24/2016
Frequency Range (MHz): Fundamental
Input power: 3Vdc Battery (CR2032)

Receiver: Agilent MXE
Antenna: Chase Liberty_2520
Cables: ST-6+MP3+E-207+E-212
Preamp: ZKL-2 200069
Test Distance (m): 3
Limit: FCC15 Class B-3m
Modifications for compliance (y/n): n

A	B	C	D	E	F	G	H	I	J
Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Net dB(uV/m)	3m Limit dB(uV/m)	Margin dB	Detectors / Bandwidths Det/RBW
X-Axis									
V	433.922	65.5	16.5	3.9	40.2	45.7	80.8	-35.1	QP/120kHz
H	433.940	82.1	16.9	3.9	40.2	62.7	80.8	-18.1	QP/120kHz
Y-Axis									
V	433.921	74.0	16.5	3.9	40.2	54.2	80.8	-26.6	QP/120kHz
H	433.935	81.4	16.9	3.9	40.2	62.0	80.8	-18.8	QP/120kHz
Z-Axis									
V	433.936	77.2	16.5	3.9	40.2	57.4	80.8	-23.4	QP/120kHz
H	433.936	70.3	16.9	3.9	40.2	50.9	80.8	-29.9	QP/120kHz
Calculations		G=C+D+E-F		I=G-H					

Test Personnel: Mary T Sampson MTS
Supervising/Reviewing Engineer: (Where Applicable) N/A
Product Standard: 47 CFR Part 15 Subpart C:2016 Section 15.231(b) RSS-210 Issue 8, 2010, Section A1.1.2
Input Voltage: One 3Vdc CR2032 battery
Pretest Verification w/ Ambient Signals or BB Source: **BB Source**

Test Date: 03/24/2016
Limit Applied: See Section 7.3
Ambient Temperature: 24.2 ºC
Relative Humidity: 31.7 %
Atmospheric Pressure: 984.4 mbars

Deviations, Additions, or Exclusions: None

8 Radiated Spurious Emissions below 1GHz

8.1 Method

Tests are performed in accordance with 47 CFR Part 15 Subpart C: 2016 Section 15.231(b) and RSS-210 Issue 8, 2010, Section A1.1.2.

TEST SITE: 10 m Semi-Anechoic Chamber

10 Meter Semi-Anechoic Chamber The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096. It is a 10 meter semi-anechoic chamber manufactured by Panashield. Embedded in the floor is a 3 meter diameter turntable.

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
Radiated Emissions, 10m	30-1000 MHz	3.6 dB	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	3.9 dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.2 dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	4.2 dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	4.2 dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	4.2 dB	5.5 dB

As shown in the table above our radiated emissions U_{lab} is less than the corresponding U_{CISPR} reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG
Where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dBμV/m

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0
$UF = 10^{(32\ dB\mu V / 20)}$ = 39.8 μV/m

8.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
200127;	Barometric Pressure, Temperature and Humidity Monitor	Omega	IBTHX-W	8190327	10/30/2015	10/30/2016
MP3;	Cable MP3, 18 GHz, N, 10m	Megaphase	G919-NKNK-394	MP3	05/07/2015	05/07/2016
ST-6;	RF Coax Cable - Rated 9 kHz to 18 GHz.	Megaphase	A81-0303-275	16-01-801	02/10/2016	02/10/2017
E207;	RF Coax Cable	Megaphase	TM18-N1N1-120	14065201-001	05/07/2015	05/07/2016
E212;	RF Coax Cable	Megaphase	TM18-N1N1-120	15055601002	06/10/2015	06/10/2016
13389;	EMI Receiver	Agilent Tech.	MXE/N9038A	MY50010160	11/13/2015	11/13/2016
10060;	Antenna Bilog 30-2000MHz	Chase	CBL6112B	2520	02/02/2016	02/05/2018

Software Utilized:

Name	Manufacturer	Version
None		

8.3 Results:

47CFR Part 15 §15.231(b)
In addition to the provisions of §15.205, the field strength of emissions from intentional radiators operated under §15.231 shall not exceed the following:

Fundamental Frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/com)
40.66 - 40.7	2,250	225
70 - 130	1,250	125
130- 174	[1] 1,250 to 3,750	[1] 125 to 375
174 - 260	3,750	375
260 - 470	[1] 3,750 to 12,500	[1] 375 to 1,250
Above 470	12,500	1,250
[1] Linear Interpolations		

RSS-210, Annex A1.1 Momentarily Operated Devices
The frequency bands and field strength limits in tables A and B of this annex are only for the transmission of a control signal, such as that used with alarm systems, door openers, remote switches, etc. Radio control of toys or model aircraft, and continuous transmissions, such as voice or video, are not permitted except as provided in Section A1.1.5 below. Data may be sent with a control signal.

Fundamental Frequency (MHz), excluding restricted band frequencies of RSS-GEN	Field Strength of the Fundamental (Note 1) (microvolts/m at 3 metres)	Field Strength of Unwanted Emissions (Note 1) (microvolts/m at 3 meters)
40.66 - 40.70	See Section A2.7	
70 - 130	1,250	125
130- 174	1,250 to 3,750*	125 to 375
174 - 260 (Note 2)	3,750	375
260 - 470 (Note 2)	3,750 to 12,500*	[1] 375 to 1,250
Above 470	12,500	1,250

Note 1: Limits on the field strength of emissions, as shown in this table, are based on the average value of the measured emissions. As an alternative, compliance with the limits in this table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector.

* Linear interpolation with frequency F in MHz:
For 130-174 MHz: FS (microvolts/m) = (56.82 x F)-6136
For 260-470 MHz: FS (microvolts/m) = (41.67 x F)-7083

Note 2: The frequency band 225-399.9 MHz is allocated for Government of Canada usage. There are different types of operations in different parts of this band of frequencies, including communications with aircraft and operations using high-power transmitters. Besides avoiding the restricted frequency bands listed in RSS-Gen, it is recommended that the entire 225-399.9 MHz band be avoided.

The sample tested was found to Comply.

8.4 Setup Photographs:

8.5 Plots/Data:

Client: Hunter Fan Company
Model Number: K5579
Project Number: G102499904
Tested By: MTS
Date: 03/24/2016
Frequency Range (MHz): 30 to 1000
Input power: 3Vdc Battery (CR2032)

Receiver: Agilent MXE
Antenna: Chase Liberty_2520
Cables: ST-6+MP3+E-207+E-212
Preamp: ZKL-2 200069
Test Distance (m): 3
Limit: FCC15 Class B-3m
Modifications for compliance (y/n): n

A	B	C	D	E	F	G	H	I	J
Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Net dB(uV/m)	3m Limit dB(uV/m)	Margin dB	Detectors / Bandwidths Det/RBW
X-Axis									
H	403.935	46.9	16.2	3.7	40.2	26.7	46.0	-19.3	QP/120kHz
Y-Axis									
H	403.926	45.0	16.2	3.7	40.2	24.7	46.0	-21.3	QP/120kHz
H	867.851	44.7	20.7	5.7	40.6	30.6	46.0	-15.4	QP/120kHz
Z-Axis									
V	403.954	43.2	16.0	3.7	40.2	22.8	46.0	-23.2	QP/120kHz
Calculations		G=C+D+E-F		I=G-H					

Test Personnel: Mary T Sampson MTS
Supervising/Reviewing Engineer: (Where Applicable) N/A
Product Standard: 47 CFR Part 15 Subpart C:2016 Section 15.231(b) RSS-210 Issue 8, 2010, Section A1.1.2
Input Voltage: One 3Vdc CR2032 battery
Pretest Verification w/ Ambient Signals or BB Source: **BB Source**

Test Date: 03/24/2016
Limit Applied: See Section 8.3
Ambient Temperature: 24.2 ºC
Relative Humidity: 31.7 %
Atmospheric Pressure: 984.4 mbars

Deviations, Additions, or Exclusions: None

9 Radiated Spurious Emissions Above 1 GHz

9.1 Method

Tests are performed in accordance with 47 CFR Part 15 Subpart C: 2016 Section 15.231(b) RSS-210 Issue 8, 2010, Section A1.1.2.

TEST SITE: 10m Semi-Anechoic Chamber

10 Meter Semi-Anechoic Chamber The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096. It is a 10 meter semi-anechoic chamber manufactured by Panashield. Embedded in the floor is a 3 meter diameter turntable.

9.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
200127;	Barometric Pressure, Temperature and Humidty Monitor	Omega	IBTHX-W	8190327	10/30/2015	10/30/2016
213061;	Antenna, Horn, <18 GHz	EMCO	3115	9208-3919	07/22/2014	07/22/2015
200162;	EMI Receiver (20Hz-40GHz)	Rohde & Schwarz	ESU 40	100314	11/21/2013	11/21/2014
MP10;	RF Coax Cable - DC to 18 GHz, Type N connectors.	Megaphase	G919-N1N1-310	15163901001	11/17/2015	11/17/2016
MP3;	Cable MP3, 18 GHz, N, 10m	Megaphase	G919-NKNK-394	MP3	05/07/2015	05/07/2016
E207;	RF Coax Cable	Megaphase	TM18-N1N1-120	14065201-001	05/07/2015	05/07/2016
E212;	RF Coax Cable	Megaphase	TM18-N1N1-120	15055601002	06/10/2015	06/10/2016
1172984;	Pre-Amp 20MHz-18GHz	A.H. System	PAM-0118P	393	01/27/2016	01/27/2017

Software Utilized:

Name	Manufacturer	Version
None (Receiver firmware)		

9.3 Results:

47CFR Part 15 §15.231(b)

Fundamental Frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/com)
40.66 - 40.7	2,250	225
70 - 130	1,250	125
130- 174	[1] 1,250 to 3,750	[1] 125 to 375
174 - 260	3,750	375
260 - 470	[1] 3,750 to 12,500	[1] 375 to 1,250
Above 470	12,500	1,250
[1] Linear Interpolations		

The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in § 15.209, whichever limit permits a higher field strength.

Fundamental Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30
30–88	100**	3
88–216	150**	3
216–960	200**	3
Above 960	500	3
**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54–72 MHz, 76–88 MHz, 174–216 MHz or 470–806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.		

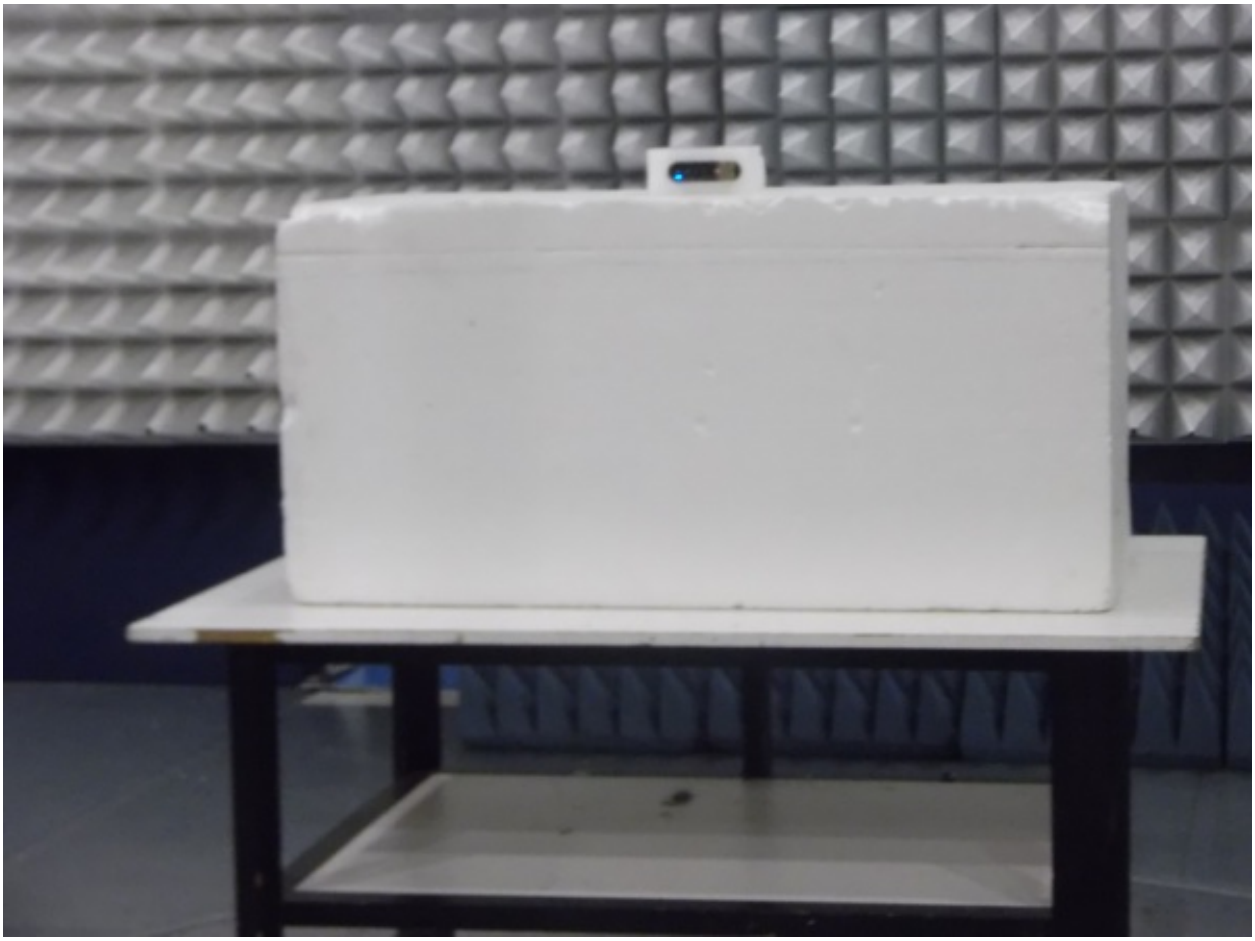
RSS-210 A1.1.2 Field Strengths and Frequency Bands
(1) The field strength of emissions from momentarily operated intentional radiators shall not exceed the limits in Table A of RSS-210.
(2) Intentional radiators shall demonstrate compliance with the field strength limits shown in Table A of RSS-210, based on the average value of the measured emissions.

•Alternatively, compliance with the limit in Table A of RSS-210 may be demonstrated using a CISPR quasi-peak detector. If average measurements are employed, the requirements of Pulsed Operation of RSS-Gen apply regarding pulsed operation for averaging pulsed emissions and for limiting peak emissions.

(3) The field strength limits shown in Table A of RSS-210 are based on the fundamental frequency of the intentional radiator. Unwanted emissions shall be attenuated to the limits listed in RSS-Gen or to the limits shown in Table A of RSS-210, whichever are less stringent.

The sample tested was found to Comply.

9.4 Setup Photographs



9.5 Plots/Data:

Client: Hunter Fan Company
Model Number: K5579
Project Number: G102499904
Tested By: MTS
Date: 03/24/2016
Frequency Range (MHz): 1000 to 5000
Input power: 3Vdc Battery (CR2032)

Receiver: Agilent MXE
Antenna: EMCO 3115
Cables: MP10+MP3+E-207+E-212
Preamp: PAM-0118-rental
Test Distance (m): 3
Limit: FCC15 Class B-3m

NOTE: Y-Axis
Modifications for compliance (y/n): n

A	B	C	D	E	F	G	H	I	J
Ant. Pol. (V/H)	**Frequency MHz**	**Reading dB(uV)**	**Antenna Factor dB(1/m)**	**Cable Loss dB**	**Pre-amp Factor dB**	**Net dB(uV/m)**	**3m Limit dB(uV/m)**	**Margin dB**	**Detectors / Bandwidths Det/RBW/VBW**
H	1301.830	57.1	25.5	8.3	43.0	47.9	74.0	-26.1	PK/1MHz/3MHz
H	1301.830	57.1	25.5	8.3	43.0	47.9	54.0	-6.1	PK/1MHz/3MHz
H	1735.820	53.1	25.8	9.7	43.0	45.6	74.0	-28.4	PK/1MHz/3MHz
H	1735.820	53.1	25.8	9.7	43.0	45.6	54.0	-8.4	PK/1MHz/3MHz
Calculations		G=C+D+E-F		I=G-H					

Test Personnel: Mary T Sampson MTS
Supervising/Reviewing Engineer: (Where Applicable) N/A
Product Standard: 47 CFR Part 15 Subpart C:2016 Section 15.231(b) RSS-210 Issue 8, 2010, Section A1.1.2
Input Voltage: One 3Vdc CR2032 battery
Pretest Verification w/ Ambient Signals or BB Source: **BB Source**

Test Date: 03/24/2016
Limit Applied: See Section 9.3
Ambient Temperature: 24.2 ºC
Relative Humidity: 31.7 %
Atmospheric Pressure: 984.4 mbars

Deviations, Additions, or Exclusions: None

10 Bandwidth

10.1 Method

Tests are performed in accordance with 47 CFR Part 15 Subpart C: 2016 Section 15.231(c) and RSS-210 Issue 8, 2010, Section A1.1.3.

TEST SITE: 10m Semi-Anechoic Chamber Control Room

The EMC Lab has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

10.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
200162;	EMI Receiver (20Hz-40GHz)	Rohde & Schwarz	ESU 40	100314	11/21/2013	11/21/2014

Software Utilized:

Name	Manufacturer	Version
None (Spectrum Analyzer Firmware)		

10.3 Results:

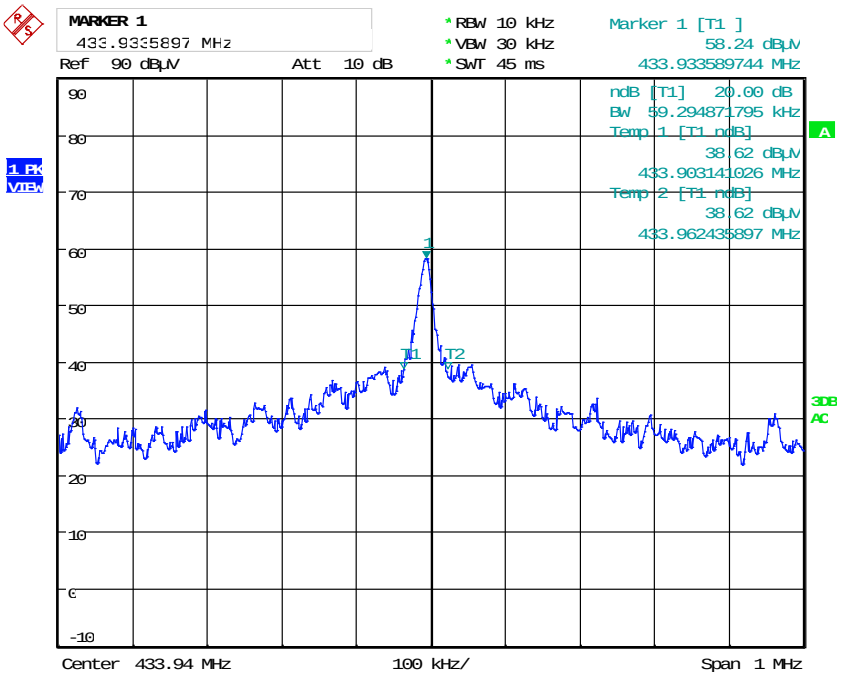
47CFR Part 15 §15.231(c)
The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

RSS-210 A1.1.3 Bandwidth of Momentary Signals
For the purpose of Section A1.1, the 99% bandwidth shall be no wider than 0.25% of the centre frequency for devices operating between 70 MHz and 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the centre frequency.

The sample tested was found to Comply.

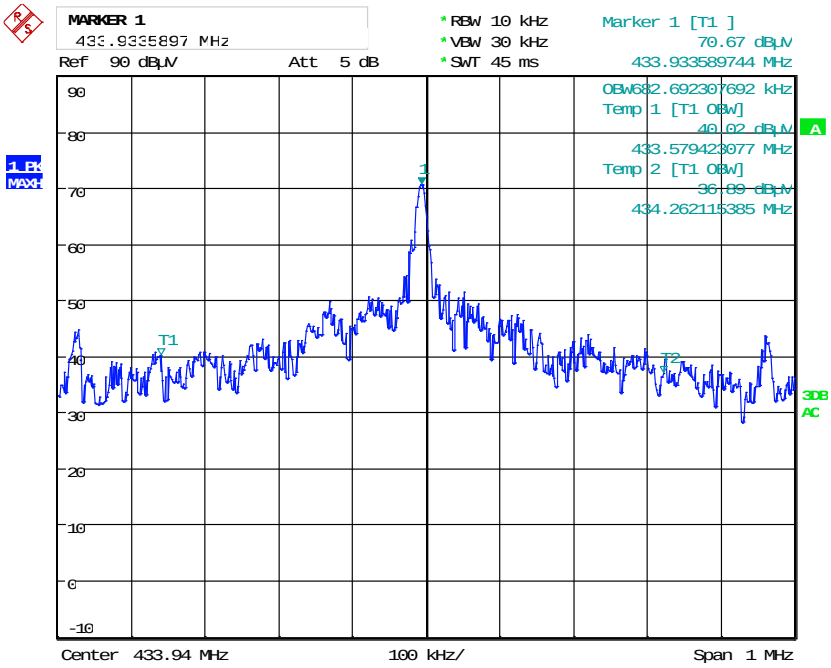
10.4 Data:

20 dB Bandwidth



Date: 24.MAR.2016 16:55:47

Occupied Bandwidth



Date: 24.MAR.2016 16:59:12

Test Personnel:	Mary T Sampson MTS	Test Date:	03/24/2016
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	47 CFR Part 15 Subpart C:2014 Section 15.231(c) and RSS-210 Issue 8, 2010, Section A1.1.3	Test Levels:	See Section 10.3
Input Voltage:	One 3Vdc CR2032 battery		
		Ambient Temperature:	24.2 ºC
		Relative Humidity:	31.7 %
		Atmospheric Pressure:	984.4 mbars

Deviations, Additions, or Exclusions: None

11 RF Exposure

SAR test exclusion threshold formula according to FCC KDB 447898 D01 v05r02 is

$P^*\sqrt{f}/d < 3$

where
P is *max. power of channel, including tune-up tolerance, mW*
f is operating frequency in GHz
d is *min. test separation distance, mm*

The maximum measured radiated power is 0.0000558 mW (-32.53 dBm). The antenna gain, G is 0.0 dBi (0.0 numerical). Therefore, the conducted power (P) is 0.00000055847019474 W.

At 5mm distance the condition for SAR exclusion threshold is

$0.00000055847019474 \times \sqrt{0.433} \div 5 = 0.00000007$ which is less than 3.

Therefore, SAR testing is not required as the SAR Test Exclusion Threshold condition is satisfied.

SAR Exemption limit according to IC RSS-102 Issue 5, at 5 mm separation distance = 68.5 mW
Routine evaluation is not required since the higher of the maximum conducted or equivalent isotropically radiated power (e.i.r.p.) source-based, time averaged output power is below the exemption limit.

12 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	04/11/2016	102499904ATL-002	MTS MTS	KV	Original Issue