TEST REPORT

Report Number: 101036110ATL-013

February 26, 2013

Product Designation: 99119

Standard: 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

Client:
Hunter Fan
7130 Goodlett Farms Parkway, Ste 400
Memphis, TN 38016
Contact: Robert Davis
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Tests performed by:

Troy Ihle
EMC Project Engineer

Report reviewed by:

Jeremy O. Pickens
Senior Staff Engineer

1.0 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 3.0. The remaining test sections are the verbatum 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.

2.0 Test Summary

Section	Test Full Name	Test Date	Result
4.0	System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)		
5.0	Overview of EUT (Low Power Transmitters) (FCC 15C - EUT Overview)		
6.0	Restrictions (FCC 15C-15.231 / RSS-210 A1.1)	01/28/2013	PASS
7.0	Duty Cycle Determination (FCC 15A-15.35(c) / RSS-GEN 4.5)	01/28/2013	PASS
8.0	Radiated Emissions (FCC 15.231(b) / RSS-210 A1.1.2)	01/18/2013	PASS
9.0	Bandwidth Requirements (FCC 15.231(c) / RSS-210 A1.1.3)	01/28/2013	PASS
10.0	Revision History (Revision History)		
NA	Conducted Emissions for Intentional Radiators (FCC 15C - 15.207) was waived due to the device was battery-powered.		

3.0 Description of Equipment Under Test

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Ceiling Fan Remote	Hunter Fan	99119	N/A

EUT receive date:	January 16, 2013
EUT receive condition:	Good

Description of EUT provided by Client:
The EUT was a hand held wireless transmitter used for remote control of a ceiling fan and light assembly.

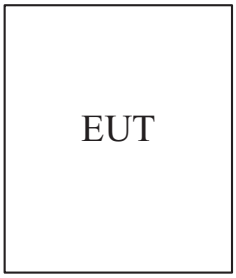
Description of EUT exercising:
During testing, the device was powered from a new internal CR2032 battery and configured to transmit continuously.

4.0 System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)

Method:

Record the details of EUTcabling, document the support equipment, and show the interconnections in a block diagram.

Drawing:



Setup Diagram

4.0 System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)

Data:

EUT Cabling						
					Connection	
ID	Description	Length	Shielding	Ferrites	From	To
None						

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
None			

5.0 Overview of EUT (Low Power Transmitters) (FCC 15C - EUT Overview)

Method:

Complete the overview spreadsheet.

Related Submittal(s) Grants: This report is for use with an application for certification of a low power transmitter. One transmitter is included in the application.

Data:

Applicant	Hunter Fan Company
	7130 Goodlett Parkway, Suite 400
	Memphis, TN 38016
Trade Name & Model No.	99119
FCC Identifier	IN2TX43
IC Identifier	3558A-TX43
Frequency Range (MHz)	434
Antenna Type (15.203)	Integral
Manufacturer name & address	Shenzhen H and T Intelligent Control Co.,Ltd Shenzhen , Guangdong, CHINA

Related Submittals and Grants:	This report is for use with an application for certification of a low power transmitter. One transmitter is included in the application.
Additions, deviations and exclusions from standards	None

6.0 Restrictions (FCC 15C-15.231 / RSS-210 A1.1)

Method:

15.231(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:

(1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

(2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

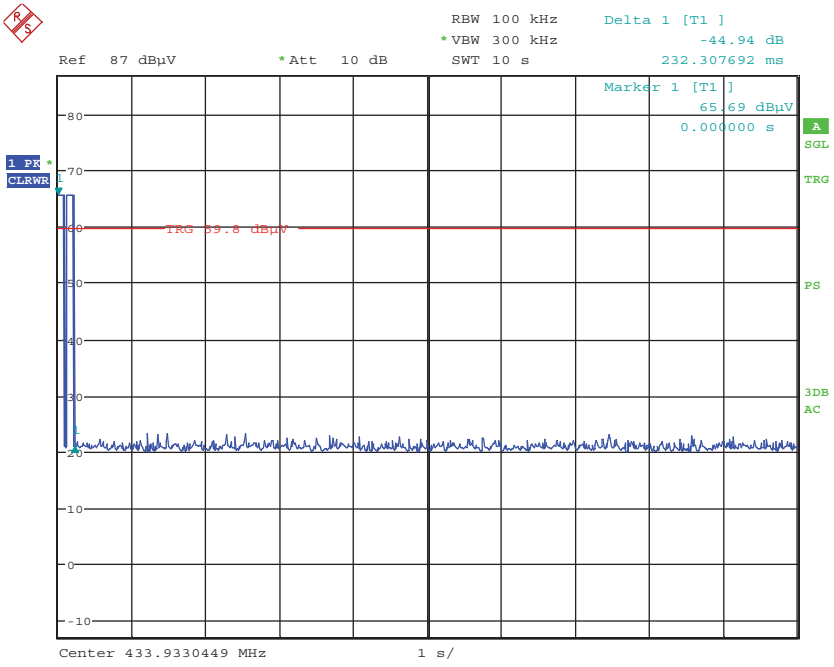
(3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

(4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition

(5) Transmission of set-up information for security systems may exceed the transmission duration limits in paragraphs (a)(1) and (a)(2) of this section, provided such transmissions are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data.

Results: The sample tested was found to Comply.

Plot:



Date: 28.JAN.2013 13:17:30

10 second deactivation sweep

6.0 Restrictions (FCC 15C-15.231 / RSS-210 A1.1)

Data:

15.231(a), RSS-210 A1.1	Response	Requirement
Frequency Range (Mhz, max)	433.9	40.66-40.70 MHz and > 70MHz
Frequency Range (MHz, min)	433.9	40.66-40.70 MHz and > 70MHz
Transmit only control signal?	Yes	Only control signal allowed
Continuous transmission?	No	No
Voice transmission?	No	No
Video transmission?	No	No
Radio control of toy?	No	No

15.231(a)(1), RSS-210 A1.1.1(a)

Manually operated?	Yes	
Deactivates within 5 seconds?	Yes	Yes
Show plot (10 second sweep)	Present	

15.231(a)(2), RSS-210 A1.1.1(b)

Automatically operated?	No	
Deactivates within 5 seconds?	N/A	
Show plot (10 second sweep)	N/A	

15.231(a)(3), RSS-210 A1.1.1(c)

Periodically transmits at predetermined intervals?	No	Allowed, with restrictions

7.0 Duty Cycle Determination (FCC 15A-15.35(c) / RSS-GEN 4.5)

Method:

(c) Unless otherwise specified, e.g. §15.255(b), when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

Determine the period of the pulse train, T, in mSec and record the results. T is defined as the time from the beginning of one pulse train to the beginning of the next pulse train.

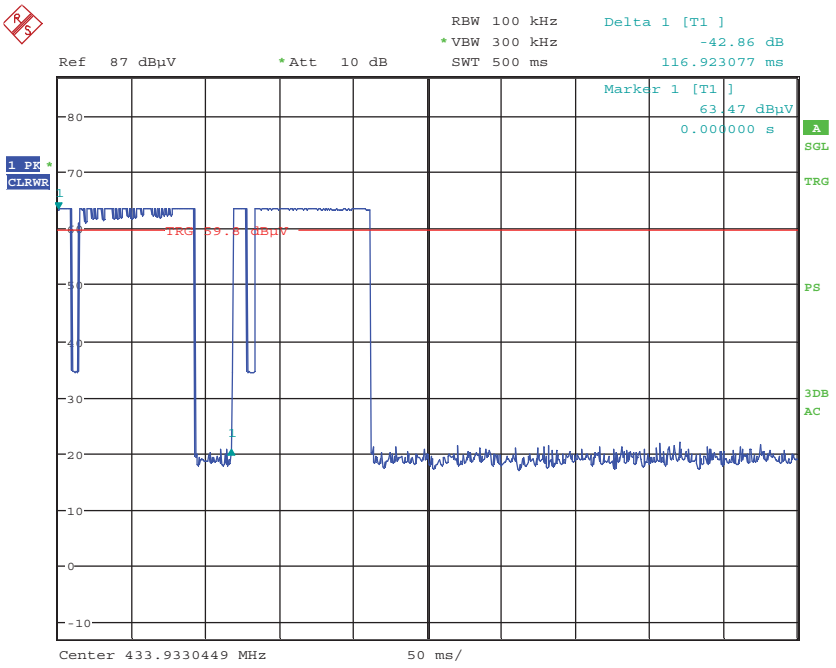
Count the number of different types of pulses, N and record the results.

For each of the different types of pulses, count the number of occurrences within one pulse train.

Use the Duty Cycle Correction Factor, DCCF, from the results table and use it to adjust the field strength measurements recorded for radiated emissions.

Results: The sample tested was found to Comply.

Plot:

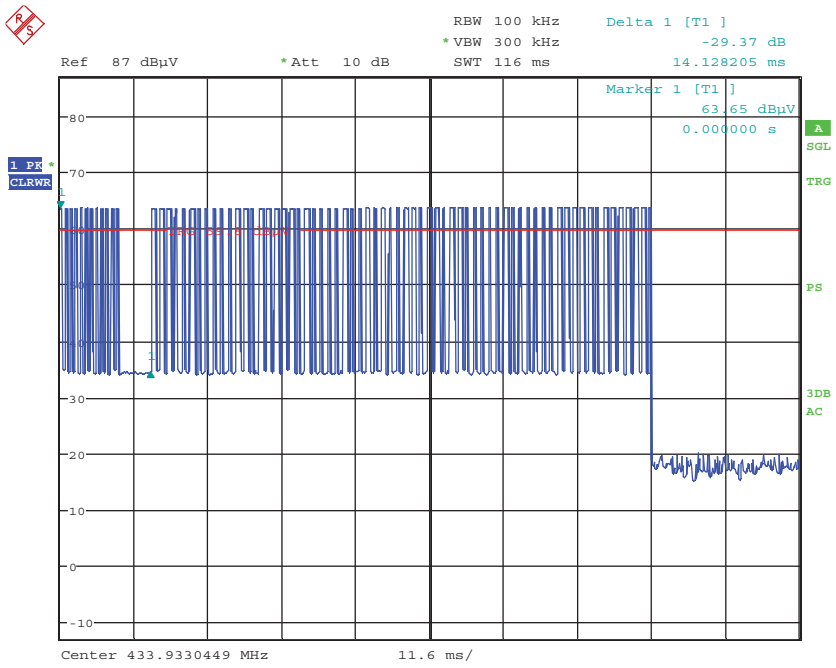


Date: 28.JAN.2013 13:18:09

0.5 Second Sweep - Pulse Train Repetition

7.0 Duty Cycle Determination (FCC 15A-15.35(c) / RSS-GEN 4.5)

Plot:

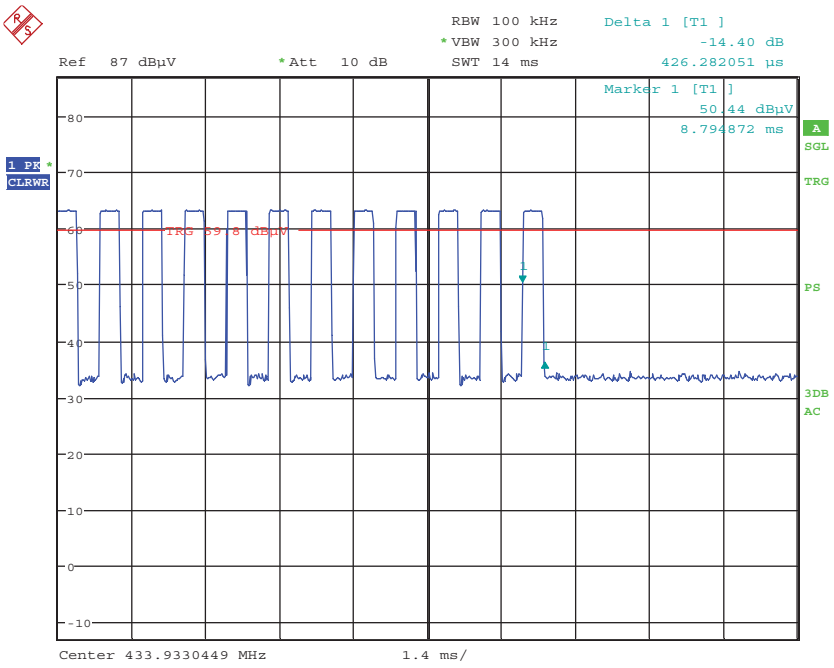


Date: 28.JAN.2013 13:18:55

116ms Plot - Full Pulse Train

7.0 Duty Cycle Determination (FCC 15A-15.35(c) / RSS-GEN 4.5)

Plot:

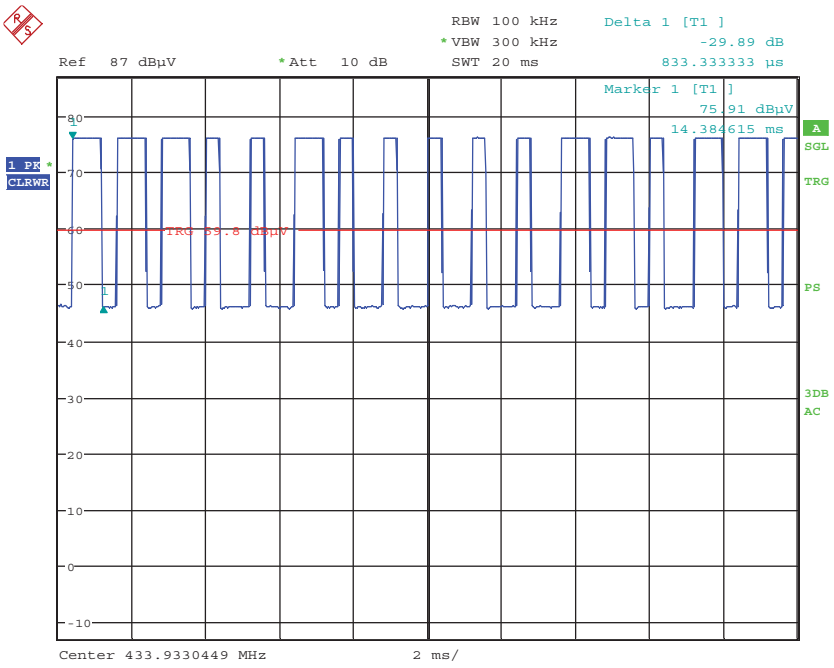


Date: 28.JAN.2013 13:20:08

Pulse Train - 0-14ms (Pulse Width 1)

7.0 Duty Cycle Determination (FCC 15A-15.35(c) / RSS-GEN 4.5)

Plot:

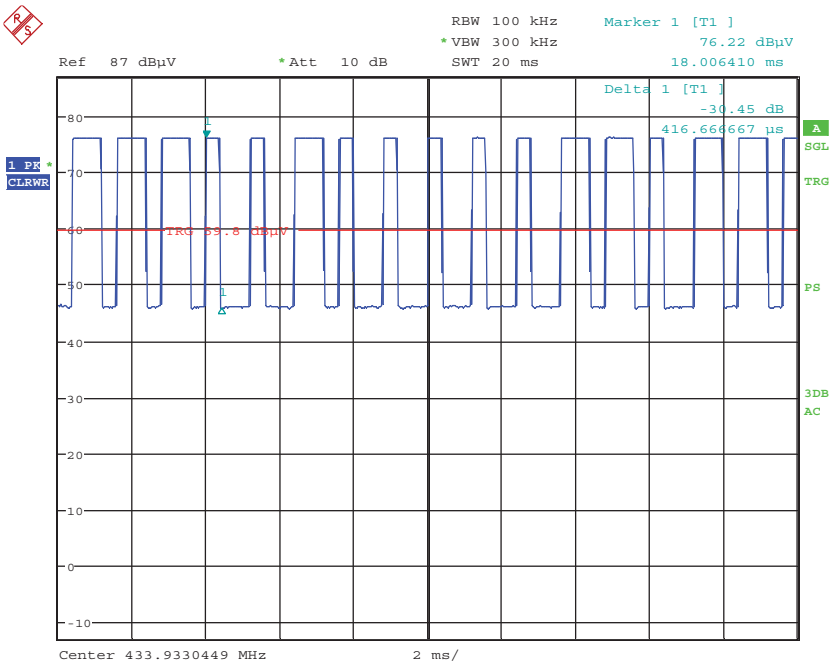


Date: 28.JAN.2013 13:21:07

Pulse Train - 14-34ms (Pulse Width 2)

7.0 Duty Cycle Determination (FCC 15A-15.35(c) / RSS-GEN 4.5)

Plot:

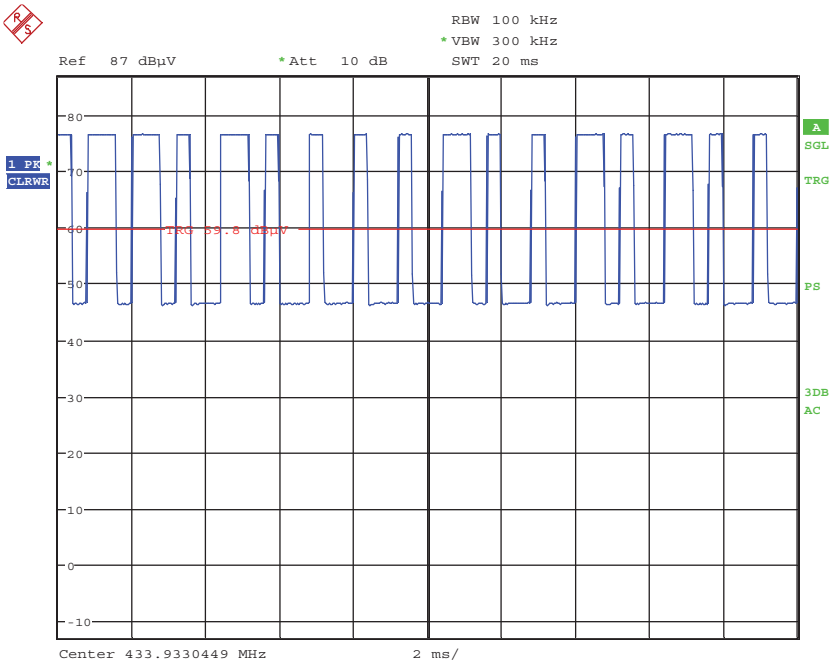


Date: 28.JAN.2013 13:22:02

Pulse Train - 14-34ms (Pulse Width 3)

7.0 Duty Cycle Determination (FCC 15A-15.35(c) / RSS-GEN 4.5)

Plot:

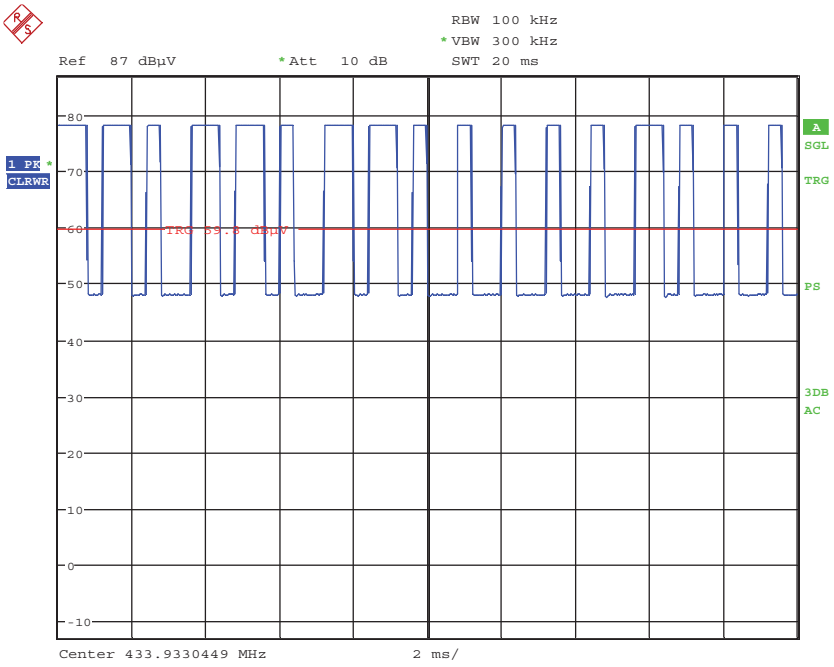


Date: 28.JAN.2013 13:22:38

Pulse Train - 34-54ms

7.0 Duty Cycle Determination (FCC 15A-15.35(c) / RSS-GEN 4.5)

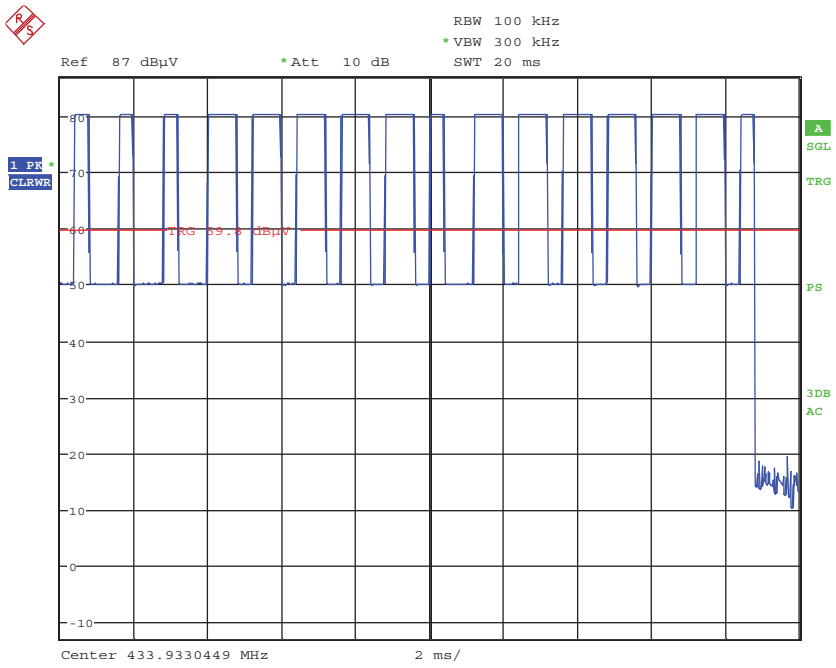
Plot:



Pulse Train - 54-74ms

7.0 Duty Cycle Determination (FCC 15A-15.35(c) / RSS-GEN 4.5)

Plot:



Pulse Train - 74-94ms

7.0 Duty Cycle Determination (FCC 15A-15.35(c) / RSS-GEN 4.5)

Data:

Duration of Pulse Train, T (mSec):	100
Averaging Interval, A_I (mSec):	100
Number of different Pulses, N:	9

	Number ($\#P_x$)	Pulse Width, mSec (PW_x)	Product ($\#P_x$)*(PW_x)
Pulse Width 1	12	0.426	5.112
Pulse Width 2	8	0.833	6.664
Pulse Width 3	8	0.417	3.336
Pulse Width 4	7	0.833	5.831
Pulse Width 5	10	0.417	4.17
Pulse Width 6	7	0.833	5.831
Pulse Width 7	10	0.417	4.17
Pulse Width 8	11	0.833	9.163
Pulse Width 9	5	0.417	2.085
Pulse Width 10			

Duty Cycle:	0.46362
Duty Cycle Correction Factor, dB:	-6.7

$$T_{on} = (PW_1 * \#P)_1 + (PW_{2*} * \#P_2) + \cdots + (PW_n * \#P_n)$$

$$DutyCycle = T_{on} \div A_I$$

$$DCCF = 20 * Log_{10}(DutyCycle)$$

8.0 Radiated Emissions (FCC 15.231(b) / RSS-210 A1.1.2)

Method:

(b) In addition to the provisions of §15.205, the field strength of emissions from intentional radiators operated under this section shall not exceed the limits specified in FCC Part 15.231(b).

Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed, the provisions in §15.35 for averaging pulsed emissions and for limiting peak emissions apply. Further, compliance with the provisions of §15.205 shall be demonstrated using the measurement instrumentation specified in that section.

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.

For radiated emission measurements, the EUT is attached to a styro-foam block and placed on a non-conductive table whose top is 80cm above the ground plane. If the EUT is handheld, the signal shall be aximized through rotation and placement in the three orthogonal axes.

During the test the EUT is rotated and the antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters.

Radiated emissions are taken at 3 meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. All readings are extrapolated back to the equivalent 3-meter reading using inverse scaling with distance.

Radiated emission measurements were performed from 30 MHz to 10 times the highest frequency generated in the EUT. When provided, emissions plots are taken with a peak detector unless otherwise indicated.

Analyzer resolution is:
□100 kHz or greater for frequencies 1000 MHz and below,
□1 MHz for frequencies above 1000 MHz.

Equipment setup for radiated disturbance tests shall follow the guidelines of ANSI C63.4:2003.

The Peak value of the Field Strength was measured. The Average value was obtained from the Peak by subtracting the Duty Cycle Correction Factor or by using an average detector.

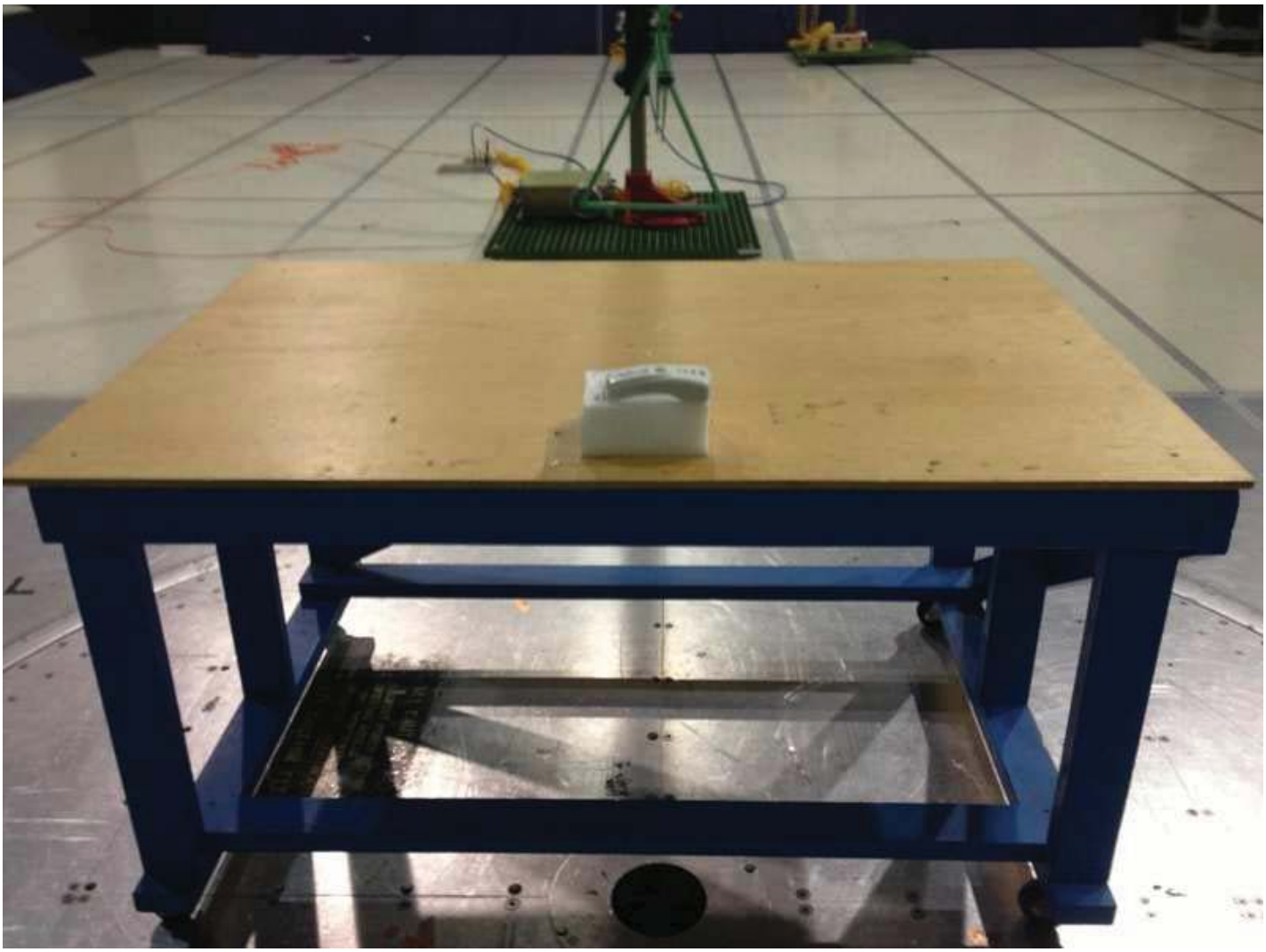
Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
7m Cable, 0.01-18GHz	Storm Products Co.	A81-0303-275.6	ST-5	07/25/2012	07/25/2013
7m Cable, 0.01-18GHz	Storm Products Co.	A81-0303-275.6	ST-4	07/25/2012	07/25/2013
Antenna, BiLog, 20-2000MHz	Chase	CBL6112A	211518	02/21/2012	02/21/2013
Antenna, Horn, <18 GHz	EMCO	3115	213061	07/19/2012	07/19/2013
Cable MP3, 18 GHz, N, 10m	Megaphase	G919-NKNK-394	MP3	05/07/2012	05/07/2013
Cable, N-N 3 meters, 18GHz	Megaphase	TM18 NKNK 118	E203	05/07/2012	05/07/2013
Cable, N-N, 3 meters, 18GHz	Megaphase	TM18-NKNK-118	E206	05/07/2012	05/07/2013
EMI Receiver	Hewlett Packard	8546A	213109	01/03/2013	01/03/2014
EMI Receiver, Preselector section	Hewlett Packard	85460A	213108	01/03/2013	01/03/2014
Filter, 1 GHz High Pass	Filtek	HP12/1000-5AB	213156a	07/06/2012	07/06/2013
Preamplifier, 20 MHz to 18 GHz, 40 dB	A.H. Systems	PAM-0118	200108	05/22/2012	05/22/2013
Preamplifier, 20MHz to 2GHz, 30 dB	A.H. Systems	PAM-0202	200082	05/01/2012	05/01/2013
Tile - software profile for radiated and conducted emissions testing.	Software	Tile - Emissions	SW006	01/14/2013	01/14/2014

Results: The sample tested was found to Comply.

8.0 Radiated Emissions (FCC 15.231(b) / RSS-210 A1.1.2)

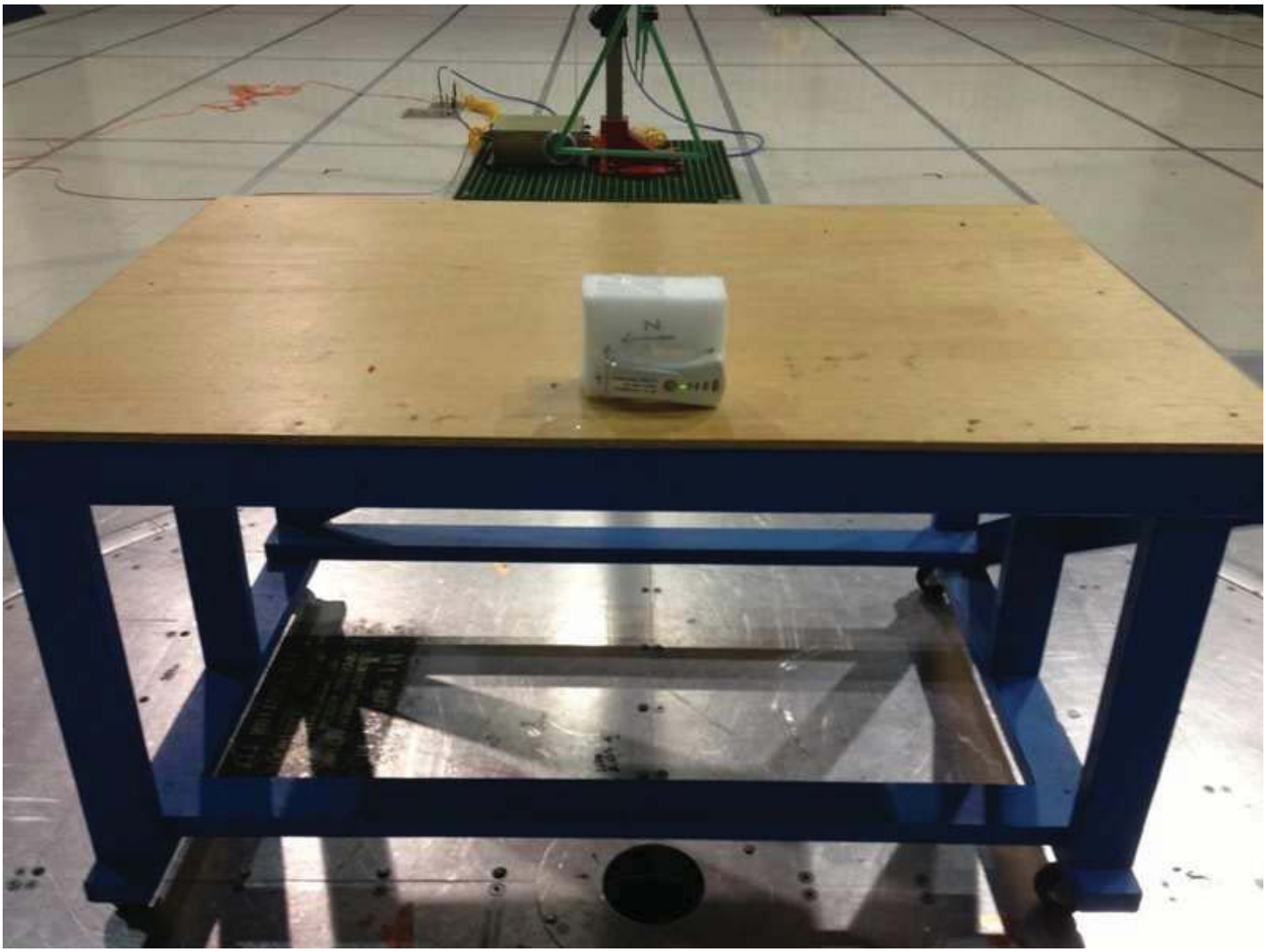
Photo:



Test setup - X-Axis

8.0 Radiated Emissions (FCC 15.231(b) / RSS-210 A1.1.2)

Photo:



Test setup - Y-Axis

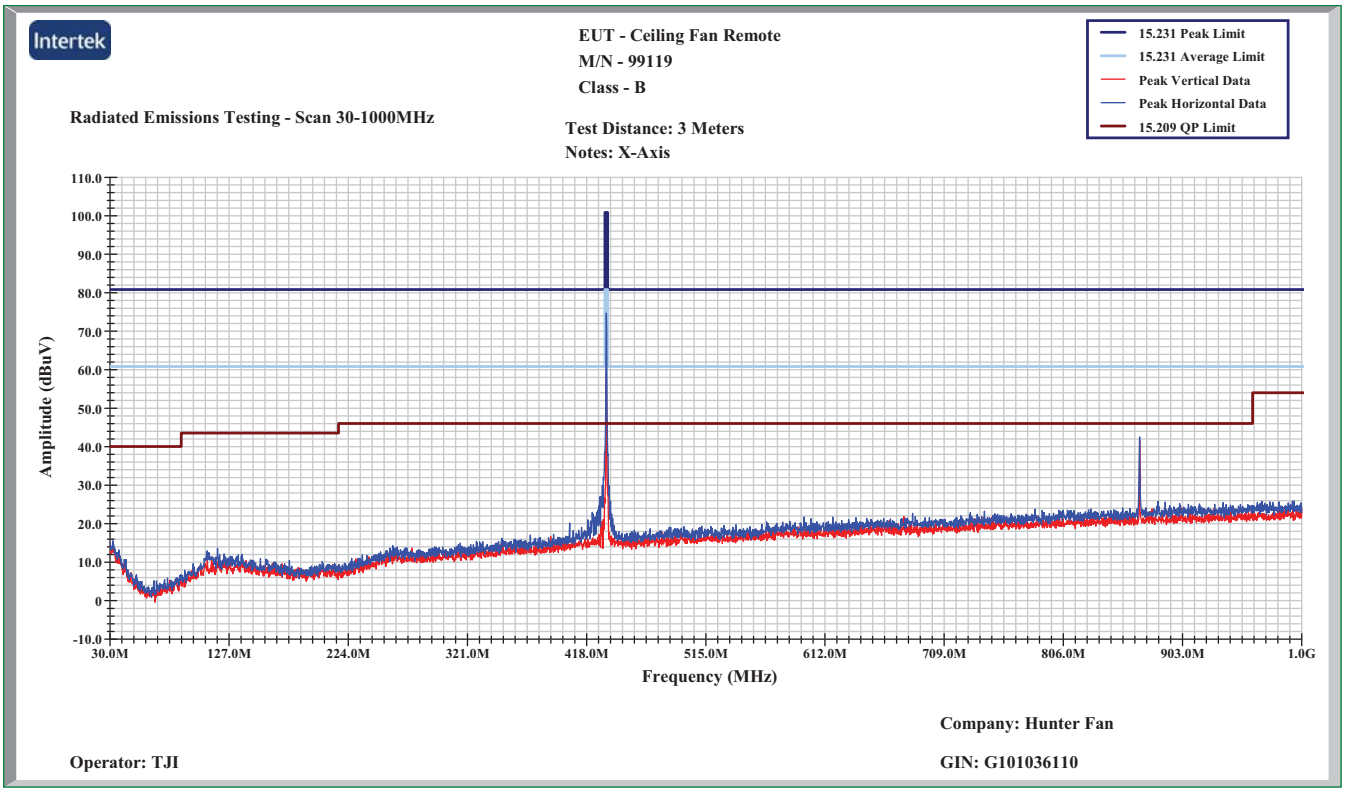
8.0 Radiated Emissions (FCC 15.231(b) / RSS-210 A1.1.2)

Photo:

Test setup - Z-Axis

8.0 Radiated Emissions (FCC 15.231(b) / RSS-210 A1.1.2)

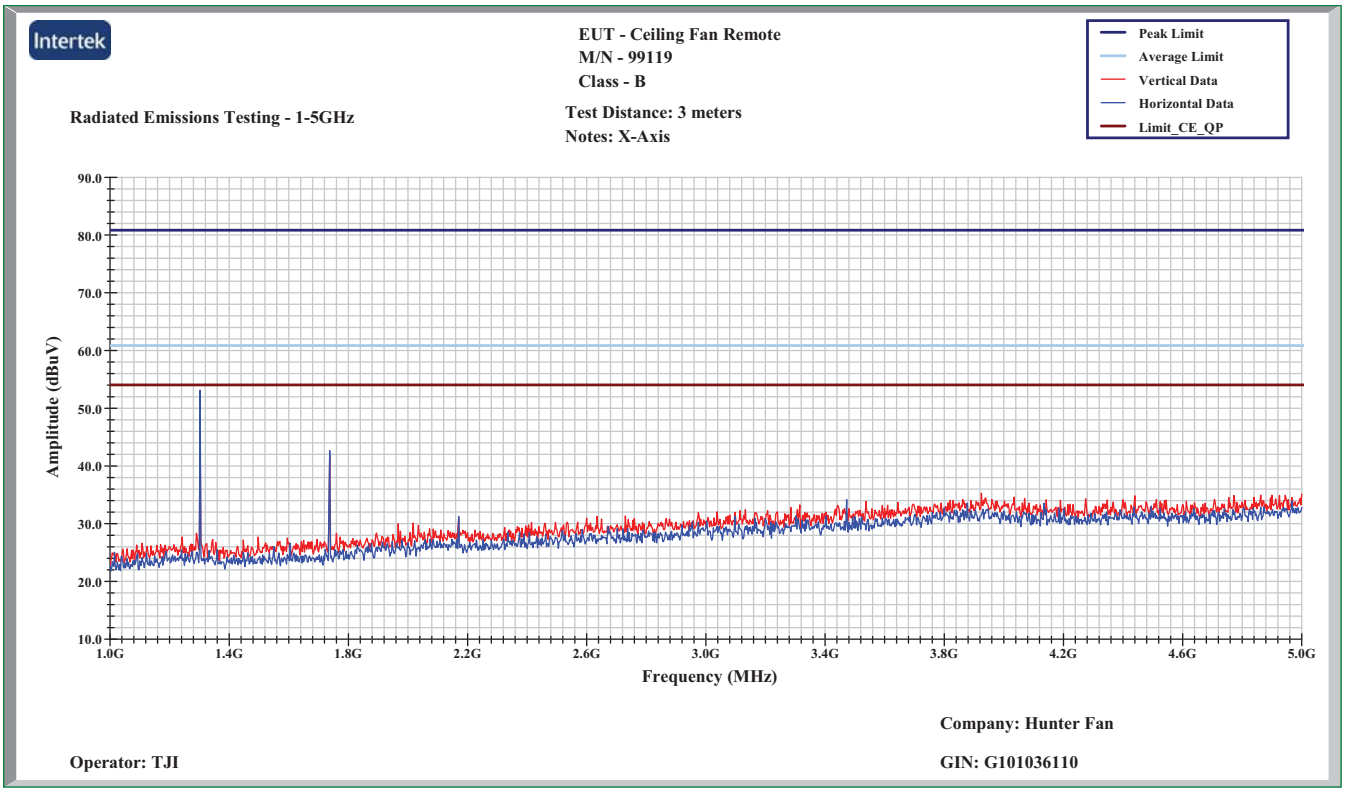
Plot:



Radiated Emissions plot - X-Axis

8.0 Radiated Emissions (FCC 15.231(b) / RSS-210 A1.1.2)

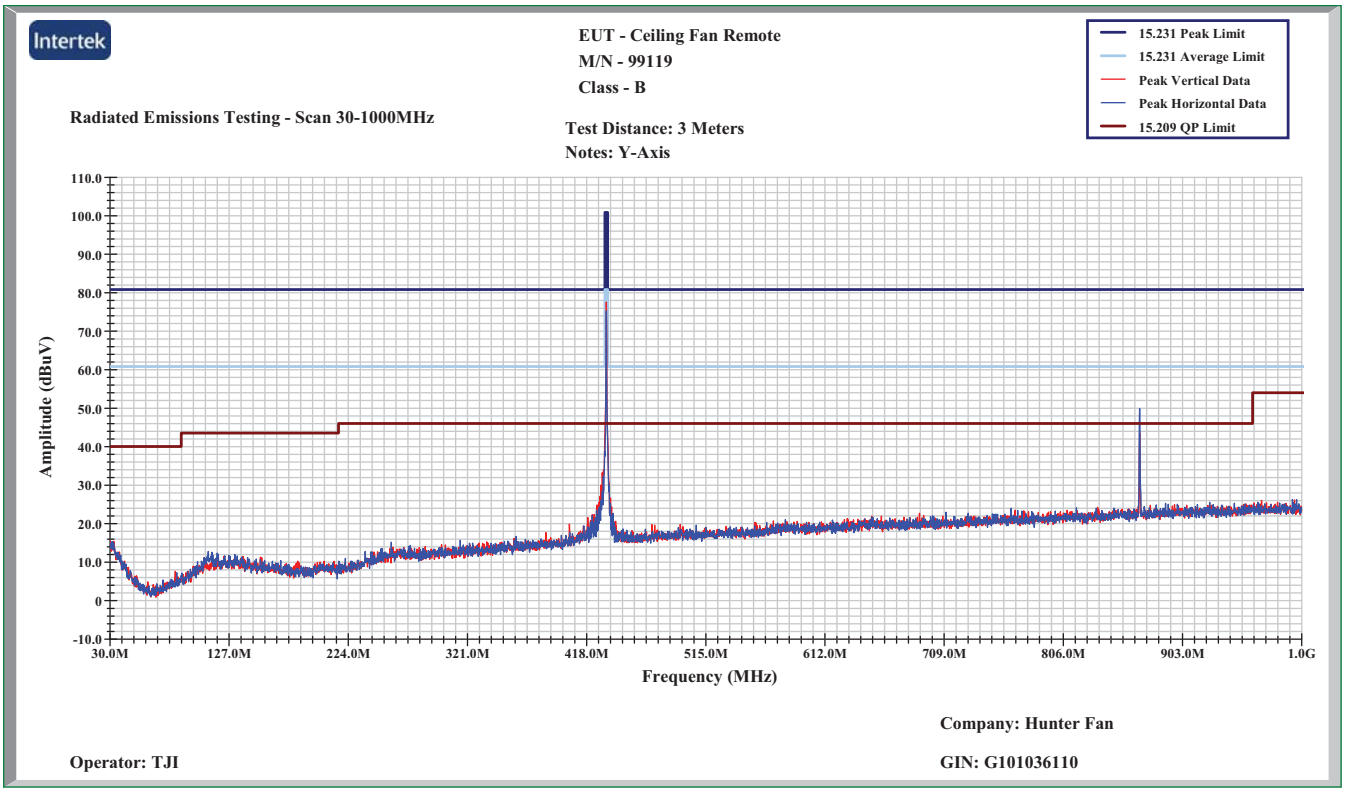
Plot:



Radiated Emissions plot - X-Axis

8.0 Radiated Emissions (FCC 15.231(b) / RSS-210 A1.1.2)

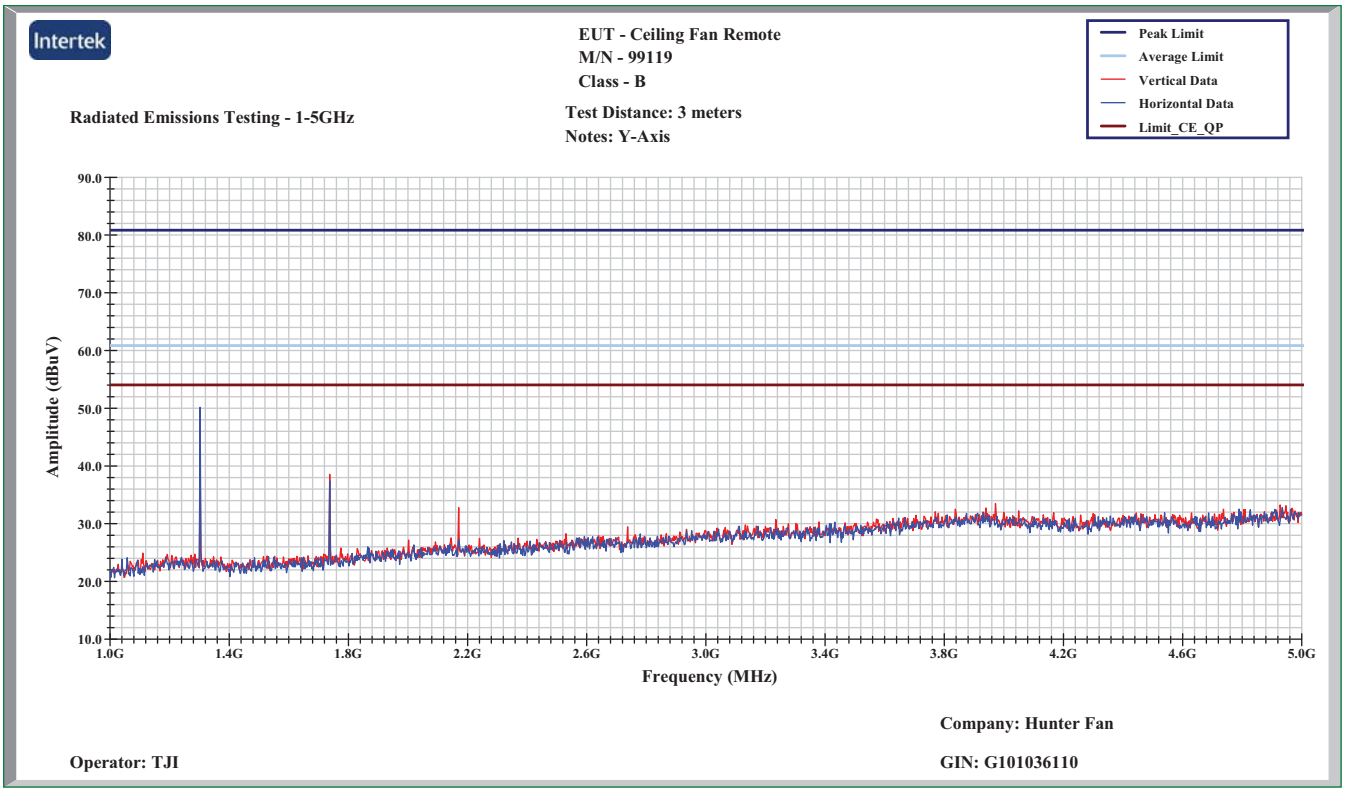
Plot:



Radiated Emissions plot - Y-Axis

8.0 Radiated Emissions (FCC 15.231(b) / RSS-210 A1.1.2)

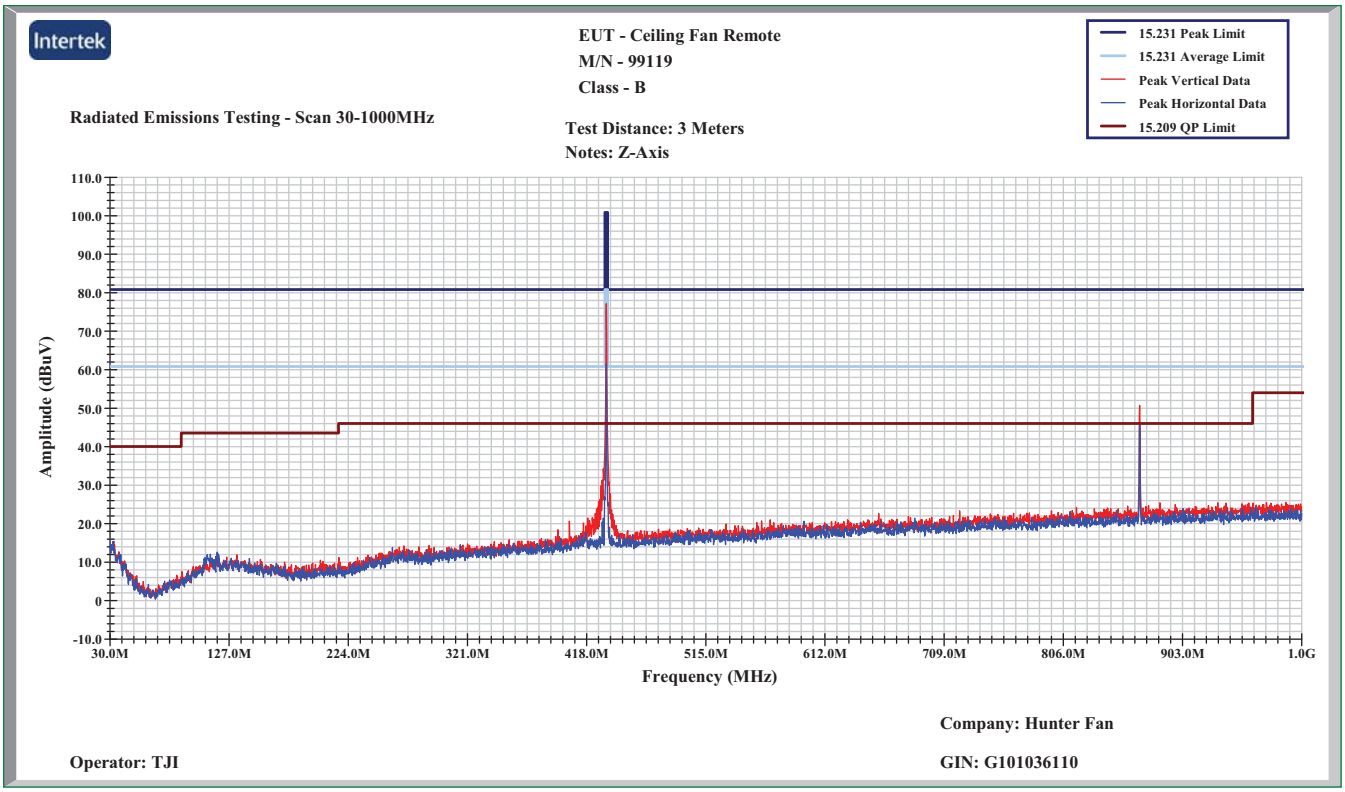
Plot:



Radiated Emissions plot - Y-Axis

8.0 Radiated Emissions (FCC 15.231(b) / RSS-210 A1.1.2)

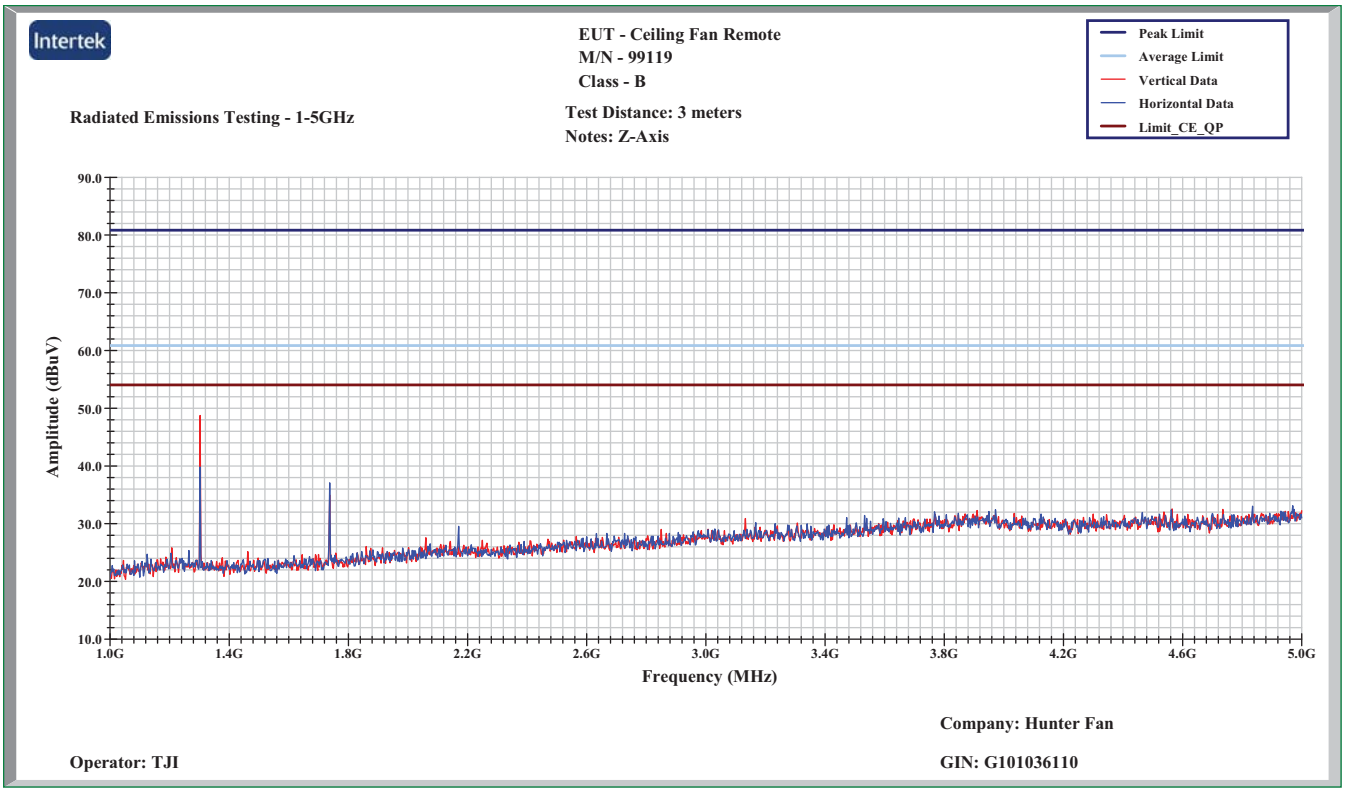
Plot:



Radiated Emissions plot - Z-Axis

8.0 Radiated Emissions (FCC 15.231(b) / RSS-210 A1.1.2)

Plot:



Radiated Emissions plot - Z-Axis

8.0 Radiated Emissions (FCC 15.231(b) / RSS-210 A1.1.2)

Data:

Frequency Range (MHz): 434 **Test Distance (m):** 3

Input power: 3VDC Battery (CR2032) **Modifications for compliance (y/n):** N

Notes:

A	B	C	D	E	F	G	H	I	J	K
Ant. Pol. (V/H)	**Frequency MHz**	**Reading dB(uV)**	**Antenna Factor dB(1/m)**	**Cable Loss dB**	**Pre-amp Factor dB**	**Duty Cycle Factor dB**	**Net dB(uV/m)**	**3m Limit dB(uV/m)**	**Margin dB**	**Axis / Detector**
V	433.933	82.1	17.1	3.9	40.1	0.0	63.0	100.8	-37.8	X / Pk
V	433.933	82.1	17.1	3.9	40.1	6.7	56.3	80.8	-24.5	X / Pk
H	433.933	96.3	17.2	3.9	40.1	0.0	77.3	100.8	-23.5	X / Pk
H	433.933	96.3	17.2	3.9	40.1	6.7	70.6	80.8	-10.2	X / Pk
V	433.933	97.2	17.1	3.9	40.1	0.0	78.1	100.8	-22.7	Y / Pk
V	433.933	97.2	17.1	3.9	40.1	6.7	71.4	80.8	-9.4	Y / Pk
H	433.933	94.9	17.2	3.9	40.1	0.0	75.9	100.8	-24.9	Y / Pk
H	433.933	94.9	17.2	3.9	40.1	6.7	69.2	80.8	-11.6	Y / Pk
V	433.933	97.1	17.1	3.9	40.1	0.0	78.0	100.8	-22.8	Z / Pk
V	433.933	97.1	17.1	3.9	40.1	6.7	71.3	80.8	-9.5	Z / Pk
H	433.933	90.9	17.2	3.9	40.1	0.0	71.9	100.8	-28.9	Z / Pk
H	433.933	90.9	17.2	3.9	40.1	6.7	65.2	80.8	-15.6	Z / Pk
Calculations		G=C+D+E-F		I=G-H						

Radiated Emissions Data - Fundamental

8.0 Radiated Emissions (FCC 15.231(b) / RSS-210 A1.1.2)

Data:

Frequency Range (MHz): 30-5000 **Test Distance (m):** 3
Input power: 3VDC Battery (CR2032) **Modifications for compliance (y/n):** N

Notes:

A	B	C	D	E	F	G	H	I	J	K
Ant. Pol. (V/H)	**Frequency MHz**	**Reading dB(uV)**	**Antenna Factor dB(1/m)**	**Cable Loss dB**	**Pre-amp Factor dB**	**Duty Cycle Factor dB**	**Net dB(uV/m)**	**3m Limit dB(uV/m)**	**Margin dB**	**Axis / Detector**
V	867.859	20.3	20.8	5.7	0.0	0.0	46.8	80.8	-34.1	X / Pk
V	867.859	20.3	20.8	5.7	0.0	6.7	40.1	60.8	-20.8	X / Pk
H	867.874	31.0	21.6	5.7	0.0	0.0	58.3	80.8	-22.6	X / Pk
H	867.874	31.0	21.6	5.7	0.0	6.7	51.6	60.8	-9.3	X / Pk
V	867.869	26.0	20.8	5.7	0.0	0.0	52.5	80.8	-28.4	Y / Pk
V	867.869	26.0	20.8	5.7	0.0	6.7	45.8	60.8	-15.1	Y / Pk
H	867.864	30.6	21.6	5.7	0.0	0.0	57.9	80.8	-23.0	Y / Pk
H	867.864	30.6	21.6	5.7	0.0	6.7	51.2	60.8	-9.7	Y / Pk
V	867.881	30.4	20.8	5.7	0.0	0.0	56.9	80.8	-24.0	Z / Pk
V	867.881	30.4	20.8	5.7	0.0	6.7	50.2	60.8	-10.7	Z / Pk
H	867.859	22.6	21.6	5.7	0.0	0.0	49.9	80.8	-31.0	Z / Pk
H	867.859	22.6	21.6	5.7	0.0	6.7	43.2	60.8	-17.7	Z / Pk
V	1301.813	55.2	25.8	4.7	37.2	6.7	41.7	74.0	-32.3	Z / Pk
V	1301.813	55.2	25.8	4.7	37.2	6.7	41.7	54.0	-12.3	Z / Pk
H	1301.813	49.8	25.6	4.7	37.2	0.0	42.8	74.0	-31.2	Z / Pk
H	1301.813	49.8	25.6	4.7	37.2	6.7	36.1	54.0	-17.9	Z / Pk
V	1735.588	45.6	25.8	3.9	37.5	0.0	37.7	80.8	-43.1	Z / Pk
V	1735.675	45.6	25.8	3.9	37.5	6.7	31.0	60.8	-29.8	Z / Pk
H	1735.588	45.7	25.9	3.9	37.5	0.0	37.9	80.8	-42.9	Z / Pk
H	1735.588	45.7	25.9	3.9	37.5	6.7	31.2	60.8	-29.6	Z / Pk
V	1301.738	49.7	25.8	4.7	37.2	0.0	42.9	74.0	-31.1	Y / Pk
V	1301.738	49.7	25.8	4.7	37.2	6.7	36.2	54.0	-17.8	Y / Pk
H	1301.738	55.8	25.6	4.7	37.2	0.0	48.8	74.0	-25.2	Y / Pk
H	1301.738	55.8	25.6	4.7	37.2	6.7	42.1	54.0	-11.9	Y / Pk
V	1735.675	44.9	25.8	3.9	37.5	0.0	37.0	80.8	-43.8	Y / Pk
V	1735.675	44.9	25.8	3.9	37.5	6.7	30.3	60.8	-30.5	Y / Pk
H	1735.675	46.3	25.9	3.9	37.5	0.0	38.5	80.8	-42.3	Y / Pk
H	1735.675	46.3	25.9	3.9	37.5	6.7	31.8	60.8	-29.0	Y / Pk
V	1301.700	52.2	25.8	4.7	37.2	0.0	45.4	74.0	-28.6	X / Pk
V	1301.700	52.2	25.8	4.7	37.2	6.7	38.7	54.0	-15.3	X / Pk
H	1301.875	58.8	25.6	4.7	37.2	0.0	51.8	74.0	-22.2	X / Pk
H	1301.875	58.8	25.6	4.7	37.2	6.7	45.1	54.0	-8.9	X / Pk
V	1735.775	46.8	25.8	3.9	37.5	0.0	38.9	80.8	-41.9	X / Pk
V	1735.775	46.8	25.8	3.9	37.5	6.7	32.2	60.8	-28.6	X / Pk
H	1735.775	49.0	25.9	3.9	37.5	0.0	41.2	80.8	-39.6	X / Pk
H	1735.775	49.0	25.9	3.9	37.5	6.7	34.5	60.8	-26.3	X / Pk
Calculations		G=C+D+E-F		I=G-H						

Radiated Emissions Data - Spurs

9.0 Bandwidth Requirements (FCC 15.231(c) / RSS-210 A1.1.3)

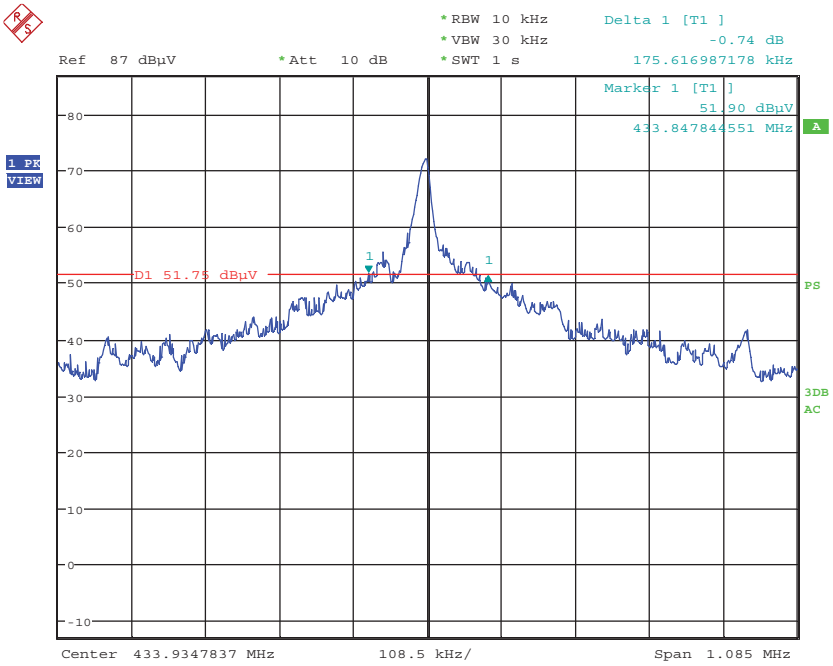
Method:

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.

- Center Frequency is set to the fundamental of transmitter.
- Resolution Bandwidth is set to approximately 1% of the emission bandwidth.
- Video Bandwidth is set greater than or equal to the Resolution Bandwidth.

Results: The sample tested was found to Comply.

Plot:

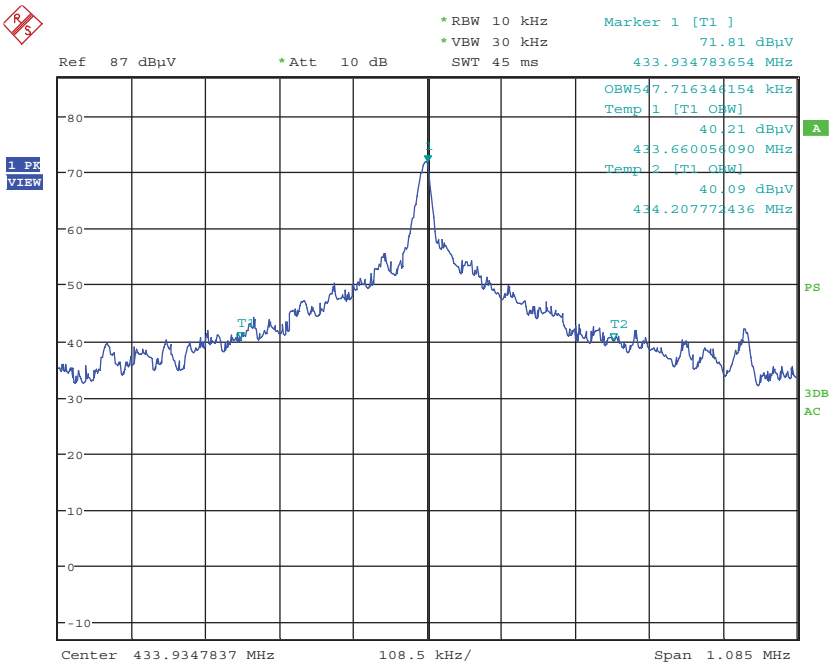


Date: 28.JAN.2013 13:03:15

20dB Bandwidth

9.0 Bandwidth Requirements (FCC 15.231(c) / RSS-210 A1.1.3)

Plot:



Date: 28.JAN.2013 12:59:02

99% Bandwidth

9.0 Bandwidth Requirements (FCC 15.231(c) / RSS-210 A1.1.3)

Data:

Fundamental Frequency MHz	Measured Bandwidth MHz	Bandwidth Limit MHz
20dB Bandwidth		
433.9	0.175	1.08475
99% Bandwidth		
433.9	0.547	1.08475

Suggested Instrument Settings	
RBW (kHz):	11
VBW (kHz):	33
Span (MHz):	1.085
Sweep time (s):	>1

10.0 Revision History (Revision History)

Method:

Document the history of the report.

Data:

Revision Level	Date	Report Number	Notes
Original issue	January 31, 2013	101036110ATL-013	--
1	February 26, 2013	101036110ATL-013	Added 2nd harmonic test data