

September 23, 2020

Murray Hunting LLC
1070 County Road 279
Liberty Hill, TX 78642

Dear Mr. Murray Choate,

Enclosed is the EMC Wireless test report for compliance testing of the Murray Hunting LLC, Remote Control SG-1 as tested to the requirements of Title 47 of the CFR, Ch. 1 (10-1-06 ed.), FCC Part 15 Subpart C for Intentional Radiators.

Thank you for using the services of Eurofins E&E North America. If you have any questions regarding these results or if we can be of further service to you, please feel free to contact me.

Sincerely yours,
EUROFINS E&E NORTH AMERICA



Michelle Tawmging
Documentation Department

Reference: (\\Murray Hunting LLC\WIRA102180-FCC231 Rev. 1)

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Electromagnetic Compatibility Criteria Test Report

for the

**Murray Hunting LLC
Remote Control**

Tested under
the FCC Certification Rules
contained in
Title 47 of the CFR, Part 15.231 Subpart C
for Intentional Radiators

Report: WIRA102180-FCC231 Rev. 1

September 23, 2020

Prepared For:

**Murray Hunting LLC
1070 County Road 279
Liberty Hill, TX 78642**

Prepared By:
Eurofins E&E North America
13501 McCallen Pass,
Austin, TX 78753

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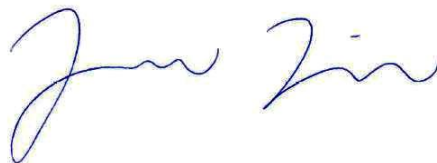


Adan Arab, Project Engineer
Electromagnetic Compatibility Lab



Michelle Tawmging
Documentation Department

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of FCC Rules Part 15.231 under normal use and maintenance.



Jonathan Tavira
Manager, Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	August 24, 2020	Initial Issue.
1	September 23, 2020	TCB Comments.

Table of Contents

I.	Executive Summary	1
	A. Purpose of Test.....	2
	B. Executive Summary	2
II.	Equipment Configuration.....	3
	A. Overview.....	4
	B. References.....	4
	C. Test Site.....	5
	D. Measurement Uncertainty	5
	E. Description of Test Sample	5
	F. Equipment Configuration.....	6
	G. Support Equipment.....	6
	H. Ports and Cabling Information	6
	I. Mode of Operation	6
	J. Monitoring Method	6
	K. Modifications	6
	a) Modifications to EUT	6
	b) Modifications to Test Standard.....	6
	L. Disposition of EUT	6
III.	Electromagnetic Compatibility Criteria for Intentional Radiators	7
	§ 15.203 Antenna Requirement	8
	§ 15.231(a) Periodic Operation Requirements.....	9
	§ 15.231(c) Field Strength of Fundamental and Harmonics	13
	§ 15.231(c) 20dB Bandwidth.....	27
IV.	Test Equipment	29
V.	Certification & User’s Manual Information	31
	A. Certification Information.....	32
	B. Label and User’s Manual Information	36

List of Figures

Figure 1: Executive Summary of EMC Part 15.231 Compliance Testing	2
Figure 2: EUT Summary Table	4
Figure 3: References	4
Figure 4: Uncertainty Calculations Summary	5
Figure 5: Block Diagram of Test Configuration	5
Figure 6: Equipment Configuration	6
Figure 7: Support Equipment	6
Figure 8: Ports and Cabling Information	6
Figure 9: Deactivation time	9
Figure 10: Silent time	10
Figure 11: Transmission time	10
Figure 12: Total Pulse Transmission Time	11
Figure 13: Two non-periodic Pulse duration Time	12
Figure 14: Radiated Emissions Test Setup	14
Figure 15: Field Strength of Fundamental - 433.92 MHz - Average - Horizontal	15
Figure 16: Field Strength of Fundamental - 433.92 MHz - Average - Vertical	15
Figure 17: Field Strength of Fundamental - 433.92 MHz - Peak - Horizontal	16
Figure 18: Field Strength of Fundamental - 433.92 MHz - Peak - Vertical	16
Figure 19: Field Strength of Fundamental Test Result	17
Figure 20: Lower Bandedge - 433.92 MHz - Average - Horizontal	17
Figure 21: Lower Bandedge - 433.92 MHz - Average - Vertical	18
Figure 22: Lower Bandedge - 433.92 MHz - Peak - Horizontal	18
Figure 23: Lower Bandedge - 433.92 MHz - Peak - Vertical	19
Figure 24: Upper Bandedge - 433.92 MHz - Average - Horizontal	19
Figure 25: Upper Bandedge - 433.92 MHz - Average - Vertical	20
Figure 26: Upper Bandedge - 433.92 MHz - Peak - Horizontal	20
Figure 27: Upper Bandedge - 433.92 MHz - Peak - Vertical	21
Figure 28: Radiated Bandedge Test Result	21
Figure 29: RSE - 433.92 MHz - 1-5 GHz - Average - Horizontal	22
Figure 30: RSE - 433.92 MHz - 1-5 GHz - Average - Vertical	22
Figure 31: RSE - 433.92 MHz - 1-5 GHz - Peak - Horizontal	23
Figure 32: RSE - 433.92 MHz - 1-5 GHz - Peak - Vertical	23
Figure 33: RSE - 433.92 MHz - 30-1000 MHz - Average - Horizontal	24
Figure 34: RSE - 433.92 MHz - 30-1000 MHz - Average - Vertical	24
Figure 35: RSE - 433.92 MHz - 30-1000 MHz - Peak - Horizontal	25
Figure 36: RSE - 433.92 MHz - 30-1000 MHz - Peak - Vertical	25
Figure 37: Radiated Spurious Emissions Test Result	26
Figure 44: 20 dB Bandwidth Test Setup	27
Figure 45: 20dB Bandwidth Test Result	27
Figure 46: 20dB OBW - 60.426 KHz	28
Figure 47: Test Equipment List	30

List of Terms and Abbreviations

AC	Alternating Current
ACF	Antenna Correction Factor
Cal	Calibration
<i>d</i>	Measurement Distance
dB	Decibels
dB μ A	Decibels above one microamp
dB μ V	Decibels above one microvolt
dB μ A/m	Decibels above one microamp per meter
dB μ V/m	Decibels above one microvolt per meter
DC	Direct Current
E	Electric Field
EUT	Equipment Under Test
<i>f</i>	Frequency
FCC	Federal Communications Commission
GRP	Ground Reference Plane
H	Magnetic Field
HCP	Horizontal Coupling Plane
Hz	Hertz
kHz	kilohertz
kPa	kilopascal
kV	kilovolt
LISN	Line Impedance Stabilization Network
MHz	Megahertz
μ H	microhenry
μ	microfarad
μ s	microseconds
PRF	Pulse Repetition Frequency
RF	Radio Frequency
RMS	Root-Mean-Square
TWT	Traveling Wave Tube
V/m	Volts per meter
VCP	Vertical Coupling Plane

Executive Summary

A. Purpose of Test

An EMC evaluation was performed to determine compliance of the Murray Hunting LLC Remote Control SG-1, with the requirements of Part 15, §15.231. All references are to the most current version of Title 47 of the Code of Federal Regulations in effect. In accordance with §2.1033, the following data is presented in support of the Certification of the Remote Control SG-1. Murray Hunting LLC should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the Remote Control SG-1, has been **permanently** discontinued.

B. Executive Summary

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, §15.231, in accordance with Murray Hunting LLC, purchase order number SG123018. All tests were conducted using measurement procedure ANSI C63.10-2013.

FCC Reference	Description	Results
§15.203	Antenna Requirement	Compliant
§15.207(a)	Conducted Emission Limits	Not Applicable
§15.231(a)	Periodic Operation Requirements	Compliant
§15.231(b)	Field Strength of Fundamentals and Harmonics	Compliant
§15.231(c)	20dB Bandwidth	Compliant
§15.231(b)	Radiated Emissions	Compliant

Figure 1: Executive Summary of EMC Part 15.231 Compliance Testing

Equipment Configuration

A. Overview

Eurofins MET Laboratories, Inc. was contracted by Murray Hunting LLC to perform testing on the Remote Control SG-1, under Murray Hunting LLC’s purchase order number SG123018.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Murray Hunting LLC, Remote Control.

The results obtained relate only to the item(s) tested.

Model(s) Tested:	SG-1	
Model(s) Covered:	SG-1	
EUT Specifications:	Primary Power: 9 VDC	
	FCC ID: 2AVXA-SG	
	Max Field Strength:	70.17 (dB μ V/m) @ 3m
	EUT Frequency Ranges:	433.92 MHz
	Antenna Type:	Integral Telescopic Antenna
	Antenna Gain:	2 dBi
Analysis:	The results obtained relate only to the item(s) tested.	
Environmental Test Conditions:	Temperature: 15-35° C	
	Relative Humidity: 30-60%	
	Barometric Pressure: 860-1060 mbar	
Evaluated by:	Adan Arab	
Report Date(s):	September 23, 2020	

Figure 2: EUT Summary Table

B. References

CFR 47, Part 15, Subpart C	Federal Communication Commission, Code of Federal Regulations, Title 47, Part 15: General Rules and Regulations, Allocation, Assignment, and Use of Radio Frequencies
ANSI C63.4:2014	Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ISO/IEC 17025:2017	General Requirements for the Competence of Testing and Calibration Laboratories
ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

Figure 3: References

C. Test Site

All testing was performed at Eurofins MET Laboratories, Inc., Inc., 13501 McCallen Pass, Austin, TX 78753. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

Radiated Emissions measurements were performed in a 10 meter semi-anechoic chamber (equivalent to an Open Area Test Site). In accordance with §2.948(a)(3), a complete site description is contained at Eurofins MET Laboratories, Inc.

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D. Measurement Uncertainty

Test Method	Typical Expanded Uncertainty	K	Confidence Level
RF Frequencies	±4.52 Hz	2	95%
RF Power Conducted Emissions	±2.32 dB	2	95%
RF Power Conducted Spurious Emissions	±2.25 dB	2	95%
RF Power Radiated Emissions	±3.01 dB	2	95%

Figure 4: Uncertainty Calculations Summary

E. Description of Test Sample

The Slow Glow Remote control is used for to increase the intensity of LED unit that utilizes battery power to provide shooting light for the hunting/harvesting of wild hogs and other legal exotic game while hunting in poor lighting conditions or darkness. The remote when pressed FULL it illuminates the light slowly (no flashing in order to not alarm game animals with sudden intensity changes. When this 433 MHz remote control is used, the intensity of the LED light will not be limited to 60% but will instead, slowly illuminate to 100% intensity over a 3-minute period.



Figure 5: Block Diagram of Test Configuration

F. Equipment Configuration

Ref. ID	Slot #	Name / Description	Model Number	Part Number	Serial Number	Rev. #
1	N/A	Remote Control	SG-1	010119	18450	N/A

Figure 6: Equipment Configuration

G. Support Equipment

Support equipment necessary for the operation and testing of the EUT is included in the following list.

Ref. ID	Name / Description	Manufacturer	Model Number	*Customer Supplied Calibration Data
2	Battery	Peak Power	1604E 6F22 9V	N/A
*The 'Customer Supplied Calibration Data' column will be marked as either not applicable, not available or will contain the calibration date supplied by the Customer.				

Figure 7: Support Equipment

H. Ports and Cabling Information

Ref. ID	Port name on EUT	Cable Description or reason for no cable	Qty	Length as tested (m)	Max Length (m)	Shielded? (Y/N)	Termination Box ID & Port Name
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Figure 8: Ports and Cabling Information

I. Mode of Operation

When the Remote Control Auto/Full bottom is pressed the transmitter is triggered and the small red LED light on the top front of the remote blinks indicating transmission is happening and is the LED light stop blinking indicating the no Transmission and the Transmitter is in Silent Period.

J. Monitoring Method

Once triggered 433 MHz transmitter, the red LED light blinks during the transmission period and stays OFF when transmitter is in silent period.

K. Modifications

- a) **Modifications to EUT**
No modifications were made to the EUT.
- b) **Modifications to Test Standard**
No modifications were made to the test standard.

L. Disposition of EUT

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to Murray Hunting LLC upon completion of testing.

Electromagnetic Compatibility Criteria for Intentional Radiators

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.203 Antenna Requirement

Test Requirement: § 15.203: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

The structure and application of the EUT were analyzed to determine compliance with Section 15.203 of the Rules. Section 15.203 states that the subject device must meet at least one of the following criteria:

- a.) Antenna must be permanently attached to the unit.
- b.) Antenna must use a unique type of connector to attach to the EUT.
- c.) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.

Results: EUT utilizes an integral antenna. The EUT as tested is **compliant** the criteria of §15.203.

Test Engineer(s): Giuliano Messina

Test Date(s): January 7, 2019

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.231 (a) Periodic Operation Requirements

Test Requirement(s): § 15.231 (a): (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.

Test Procedure: The EUT transmitter deactivates automatically with in less than 5 seconds and the transmitter ceases transmission within 5 seconds after activation. Delta Marker plots below shows the duration of transmission.

Test Results: The EUT was **compliant** with the requirements of this sections 15.231(a)(1) and (a)(2).

Test Engineer(s): Adan Arab

Test Date(s): 08-12-2020

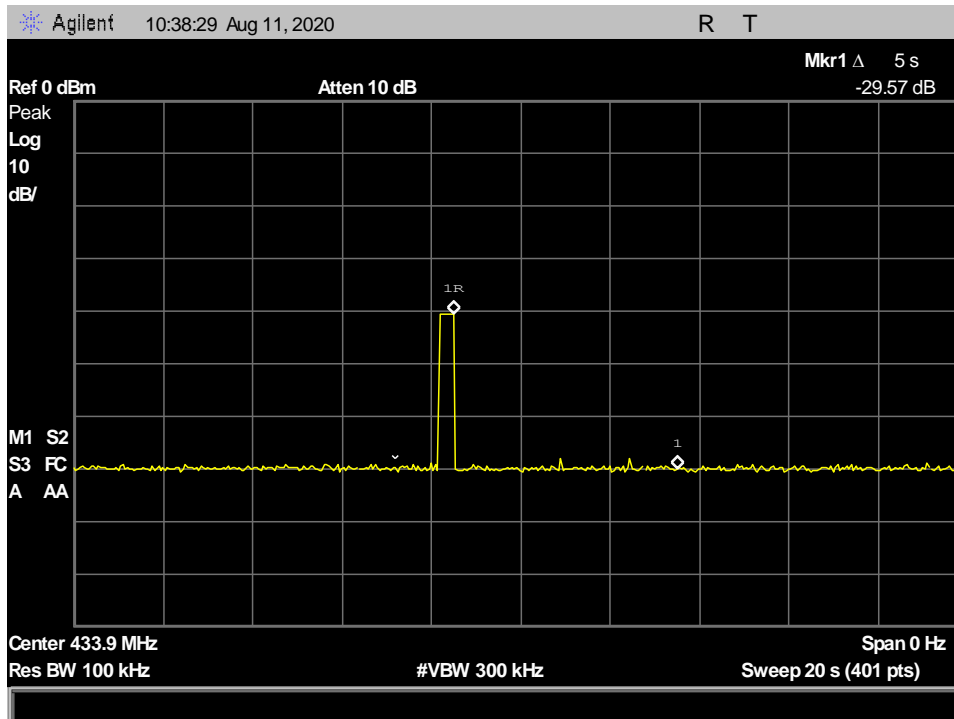


Figure 9: Deactivation time

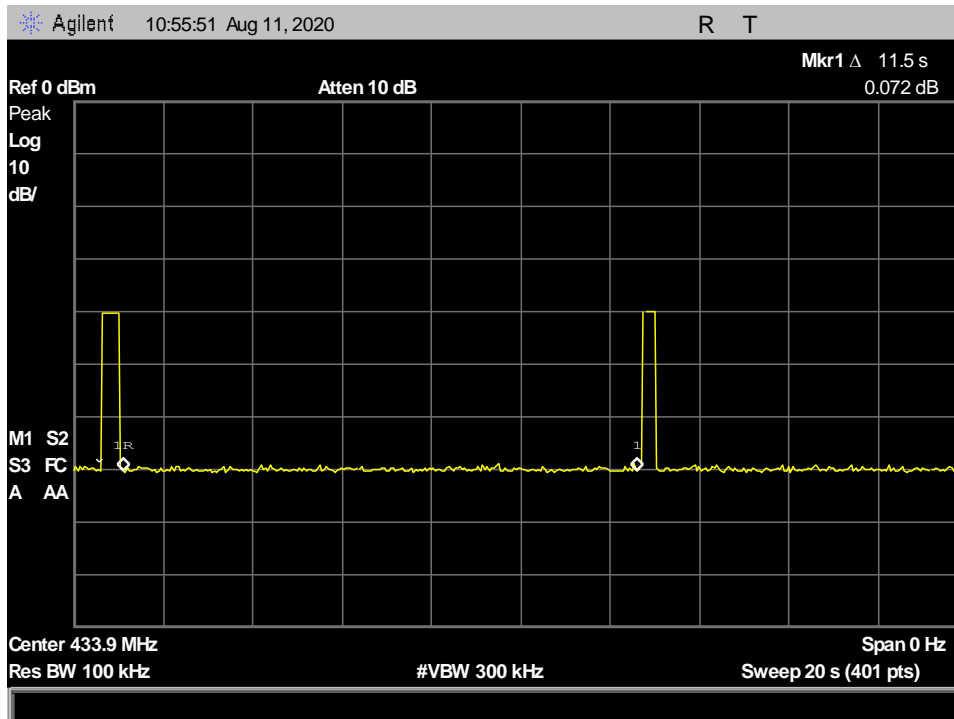


Figure 10: Silent time

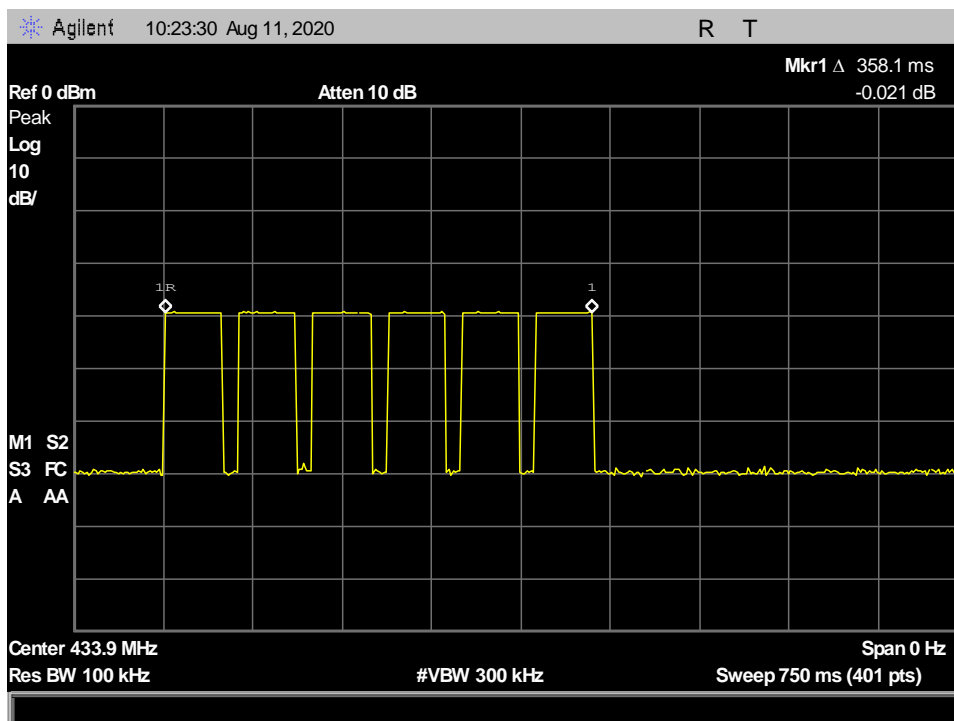


Figure 11: Transmission time

§ 15.231 (b) Duty Cycle

Test Requirement(s): § 15.231 (b): According to FCC 15.231 (b) and 15.35 (c), For pulse operation transmitter, the averaging pulsed emissions are calculated by peak value of measured emissions plus a duty cycle factor.

Test Procedure: With the EUT’s antenna attached, the EUT’s output signal is received by the test antenna, which is connected to the spectrum analyzer. Set the center frequency to 433.92, then set the spectrum analyzer to Zero Span for the release time reading. During the testing, the switch is pressed and released. Delta Marker plots shows the total duration of transmission and non-periodic pulse durations.

Summary of the Test Result:

$T_P = 62.25 \text{ ms} < 100 \text{ ms}$

$T_{ON} = T_{ON1} * \text{Number} + T_{ON2} * \text{Number} = 44.850 \text{ ms}$

From ANSI C63.10 section 7.5 (g)(3)

$\text{Duty Cycle} = (T_{ON}/100\text{ms}) * 100 = (44.850/100)*100 = 44.85\%$

$\text{Factor} = 20 * \log (T_{ON}/T_P) = -6.96$

Test Engineer(s): Adan Arab

Test Date(s): 08-12-2020

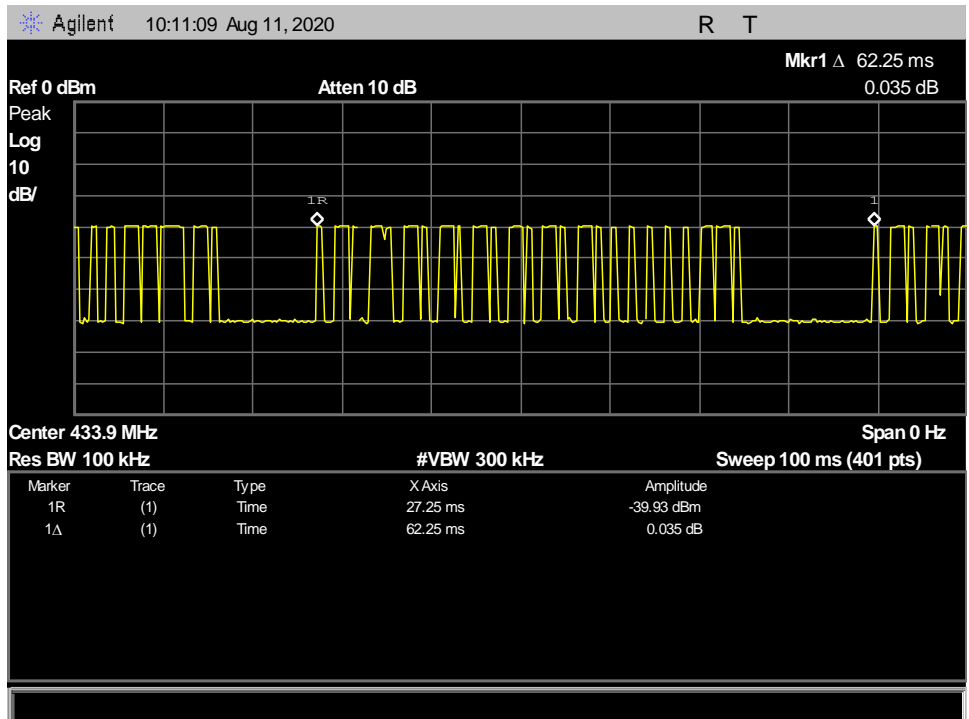


Figure 12: Total Pulse Transmission Time

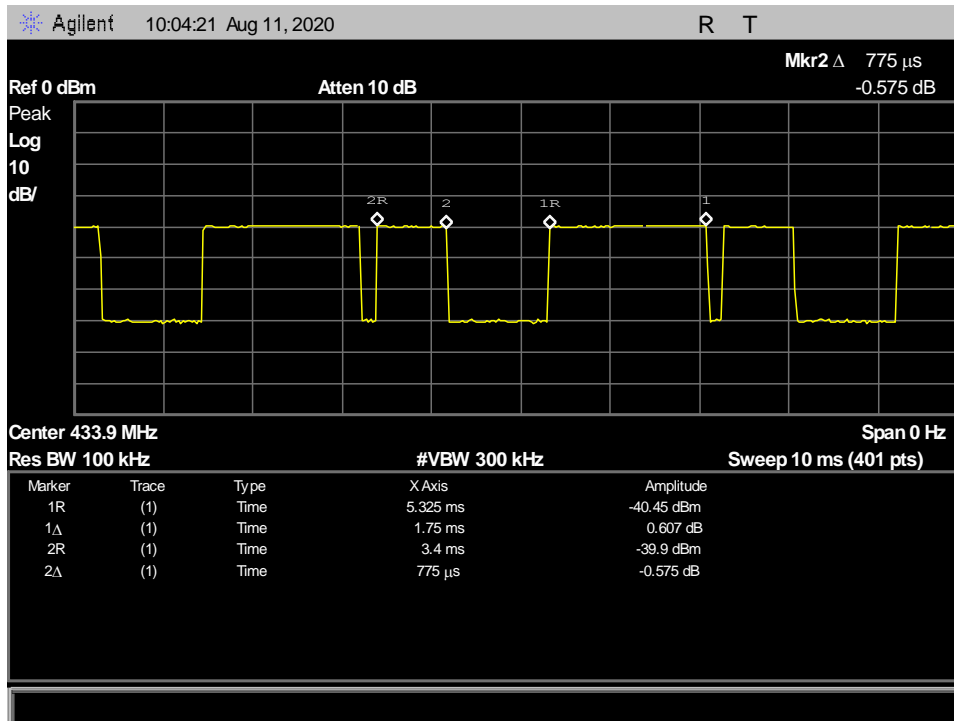


Figure 13: Two non-periodic Pulse duration Time

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.231(b) Field Strength of Fundamental and Harmonics

Test Requirements: §15.231(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 following:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66– 40.70	2,250	225
70–130	1,250	125
130–174	1,250* to 3,750	125* to 375
174–260	3,750	375
260–470	3,750* to 12,500	375* to 1,250
Above 470	12,500	1,250

Note: * Linear Interpolations

(1) The above field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges. (2) 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. (3) 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.

Test Procedure: The EUT was placed in a 10m semi anechoic chamber. A log periodic antenna was placed 10m from the EUT and used to measure the field strength of the fundamental. The EUT was rotated about all three orthogonal axis. A distance correction factor is used to correct the measurement distance from 10m to 3m as standard dictates. The peak field strength was measured and then the average was calculated from the peak value by correcting for duty cycle.

For harmonics measurements above 1 GHz, a horn antenna was used 3m from the EUT.

The Fundamental and Harmonics emission limit is calculated based on the fundamental frequency of 433.92 MHz per ANSI C63.10 Section 7.6.2 eq (12)

$$\text{Limit}[\mu\text{V}/\text{m}] = \text{Lim}_{\text{lower}} + (\text{Fc}-\text{F}_{\text{lower}})[(\text{Lim}_{\text{upper}}-\text{Lim}_{\text{lower}})/(\text{F}_{\text{upper}}-\text{F}_{\text{lower}})]$$

Lim_{lower} is the limit at the lower frequency of the intended band of operation

Lim_{upper} is the limit at the upper frequency of the intended band of operation

f_{lower} is the lower frequency of the intended band of operation

f_{upper} is the upper frequency of the intended band of operation

$f_c - f_{lower}$

f_c is the center frequency of the emission signal

The effective limit in $dB\mu V/m$ is found using $[20 \log (\text{Limit } [\mu V/m])]$.

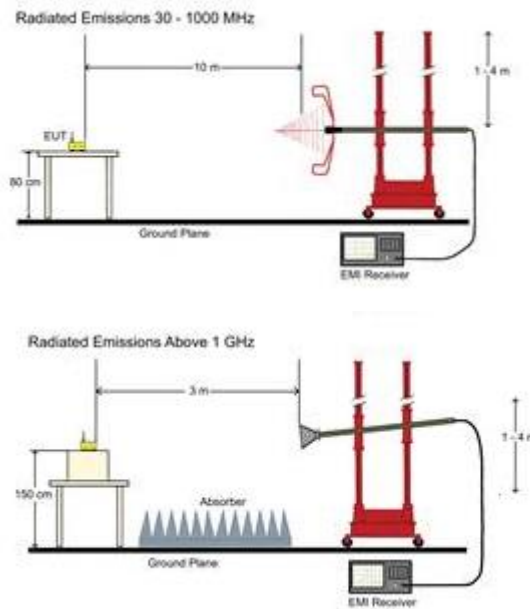


Figure 14: Radiated Emissions Test Setup

Test Results: Equipment was **compliant** with § 15.231 (b).

Test Engineer(s): Adan Arab

Test Date(s): 08-12-2020

Field Strength of Fundamental Emissions:

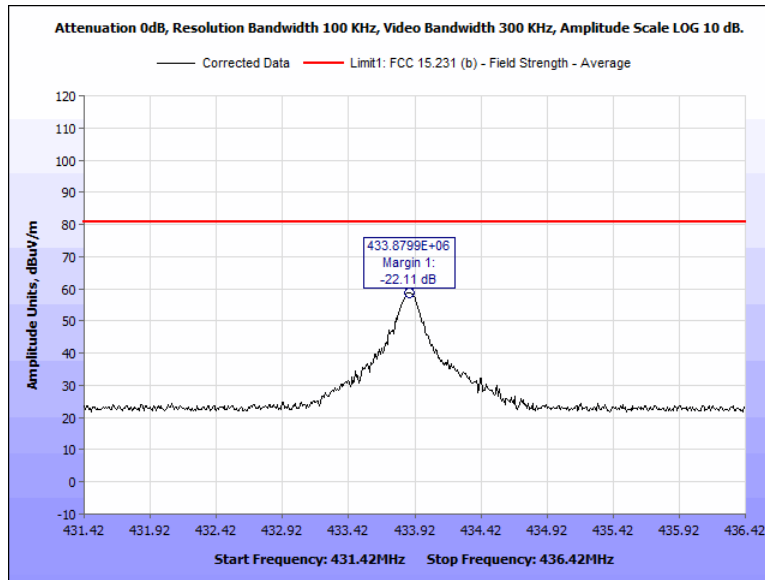


Figure 15: Field Strength of Fundamental - 433.92 MHz - Average - Horizontal.

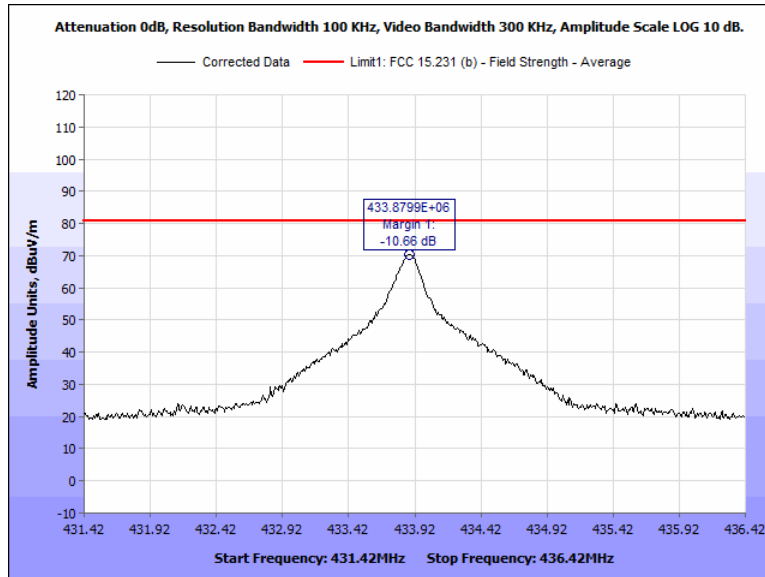


Figure 16: Field Strength of Fundamental - 433.92 MHz - Average - Vertical.

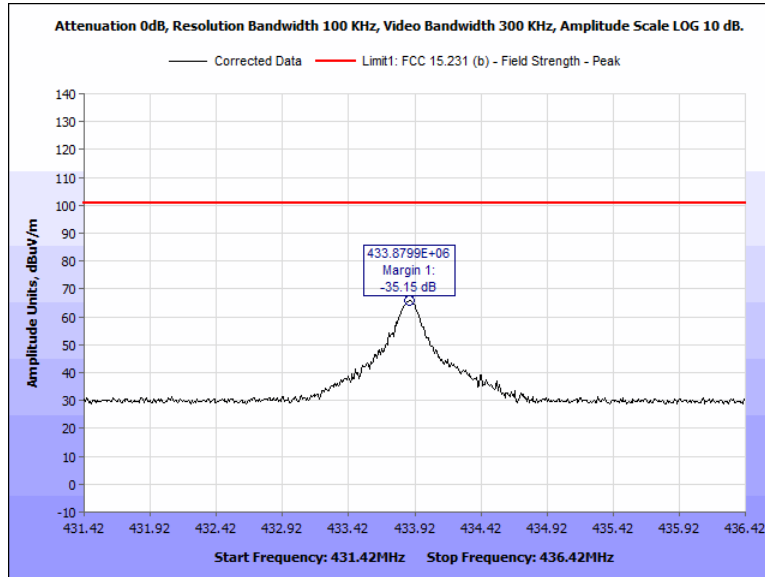


Figure 17: Field Strength of Fundamental - 433.92 MHz - Peak- Horizontal.

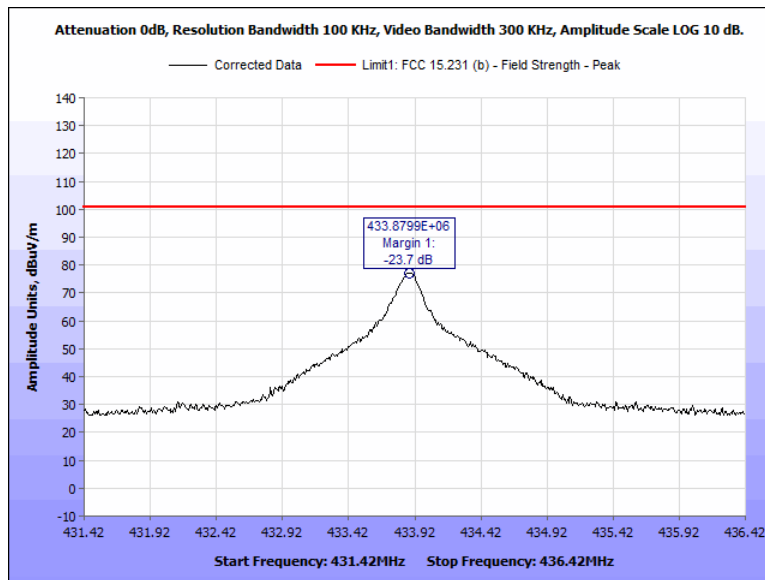


Figure 18: Field Strength of Fundamental - 433.92 MHz - Peak- Vertical.

Frequency (MHz)	Antenna Polarity	Uncorrected Amplitude (dBuV)	RBW (KHz)	Duty Cycle Factor (dB)	Distance Correction Factor (dB)	ACF (dB/m)	Preamp Factor (dB)	Corrected Amplitude (dBuV/m)	Limit 1, Average (dBuV/m)	Limit 2, Peak (dBuV/m)	Margin 1, (dB)	Margin 2, (dB)
433.8799	H	56.58	100	-6.96	10.46	20.5	-21.86	58.72	80.83	--	-22.11	--
433.8799	V	72.28	100	-6.96	10.46	16.26	-21.86	70.17	80.83	--	-10.66	--
433.8799	H	56.58	100	--	10.46	20.5	-21.86	65.68	--	100.83	--	-35.15
433.8799	V	72.28	100	--	10.46	16.26	-21.86	77.13	--	100.83	--	-23.7

Figure 19: Field Strength of Fundamental Test Result

Field Strength of Radiated Spurious Emissions:

Note: 15.231 limits are used for measuring the spurious emission since 15.205 requirements need to be met.

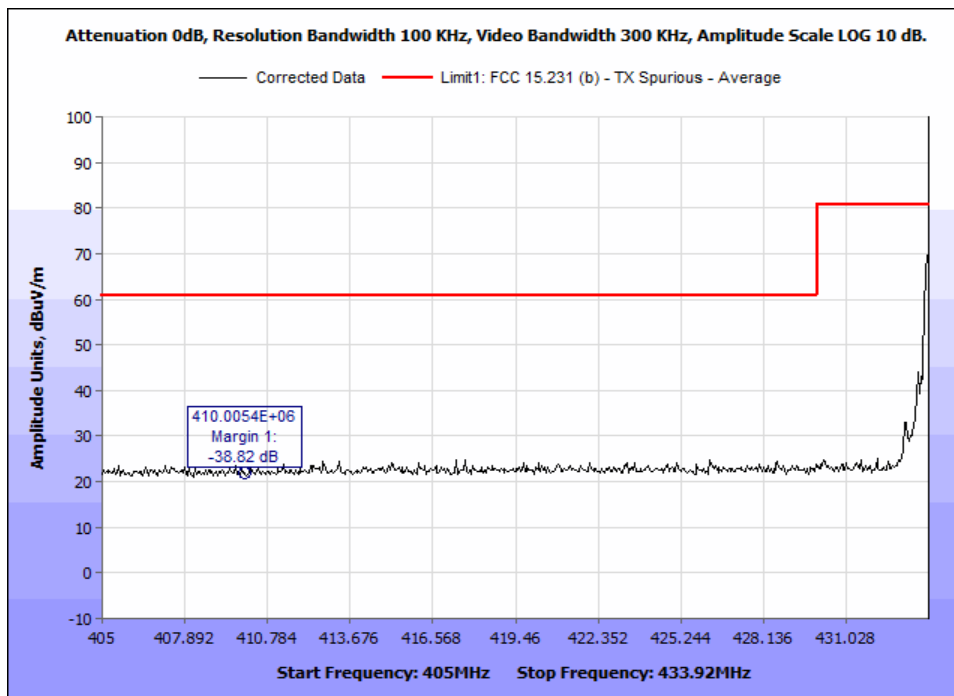


Figure 20: Lower Bandedge - 433.92 MHz - Average - Horizontal.

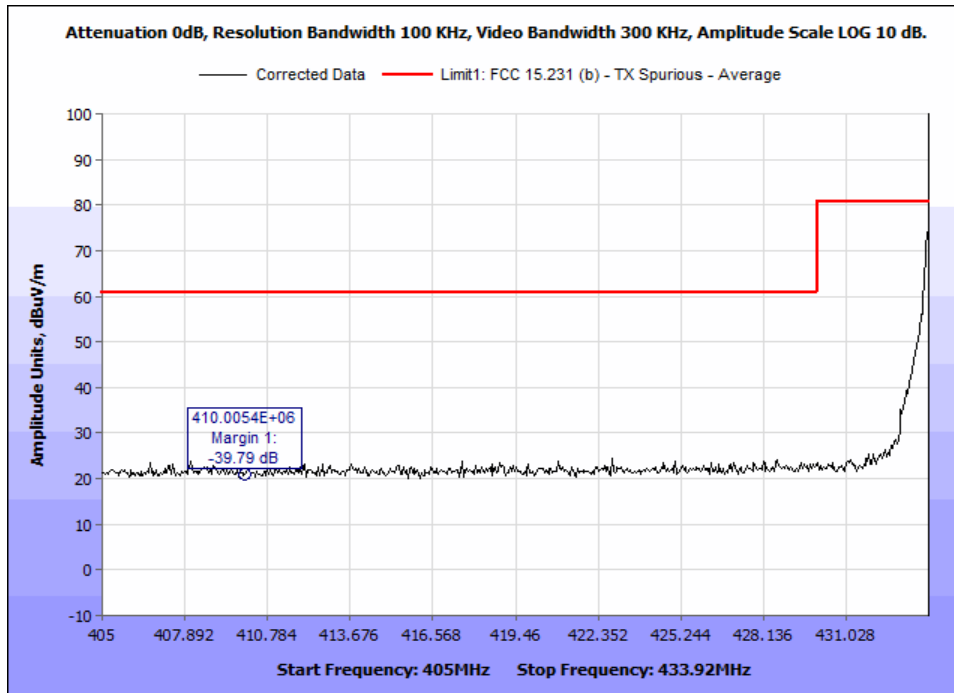


Figure 21: Lower Bandedge - 433.92 MHz - Average - Vertical.

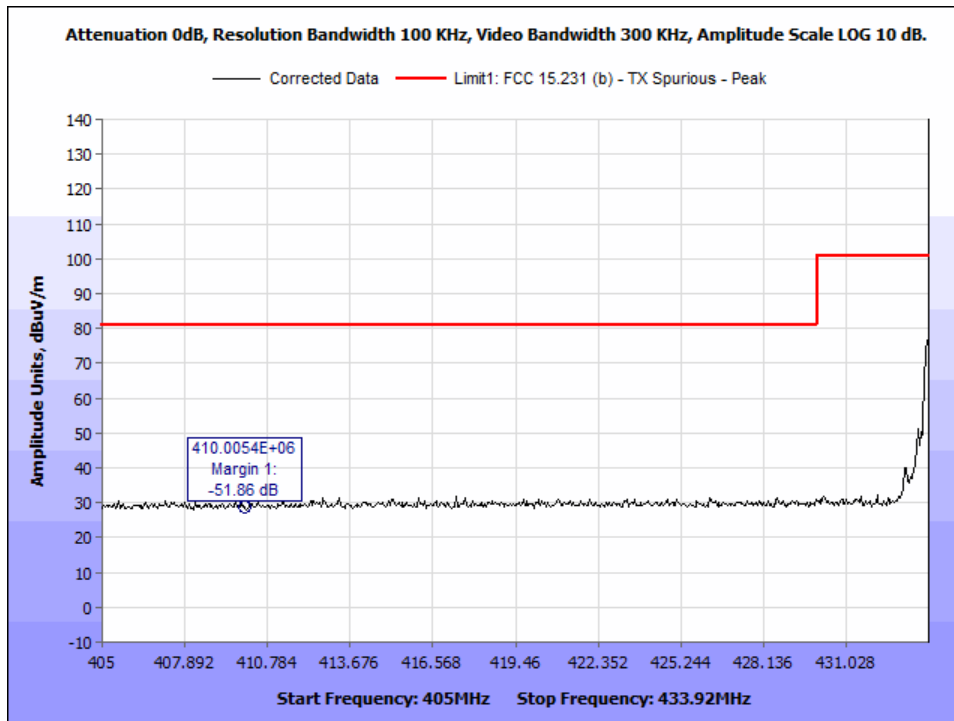


Figure 22: Lower Bandedge - 433.92 MHz - Peak - Horizontal.

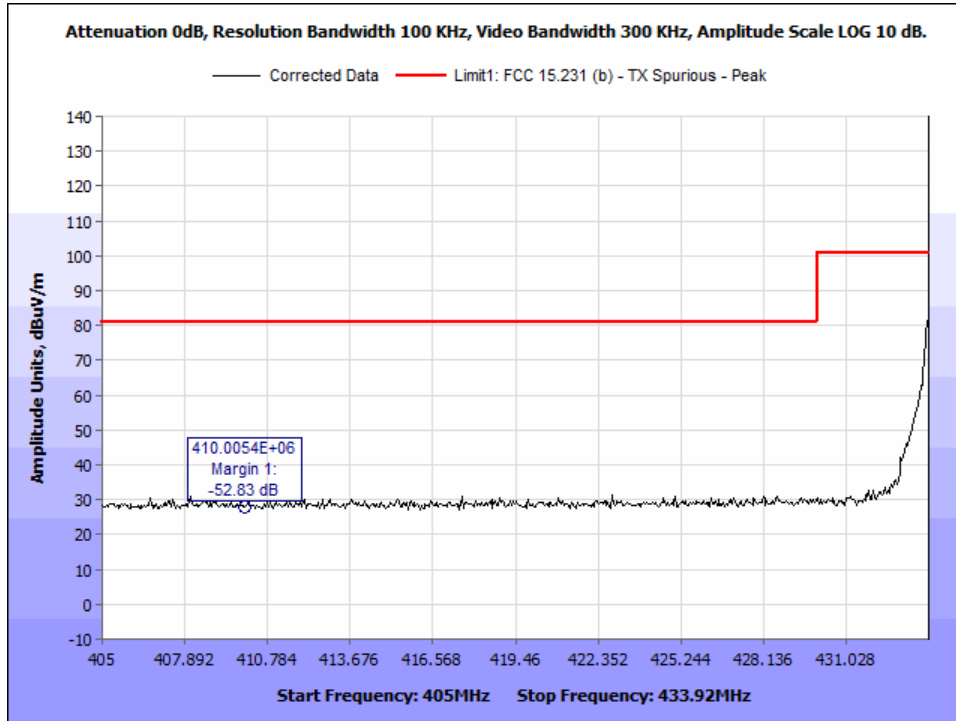


Figure 23: Lower Bandedge - 433.92 MHz - Peak - Vertical.

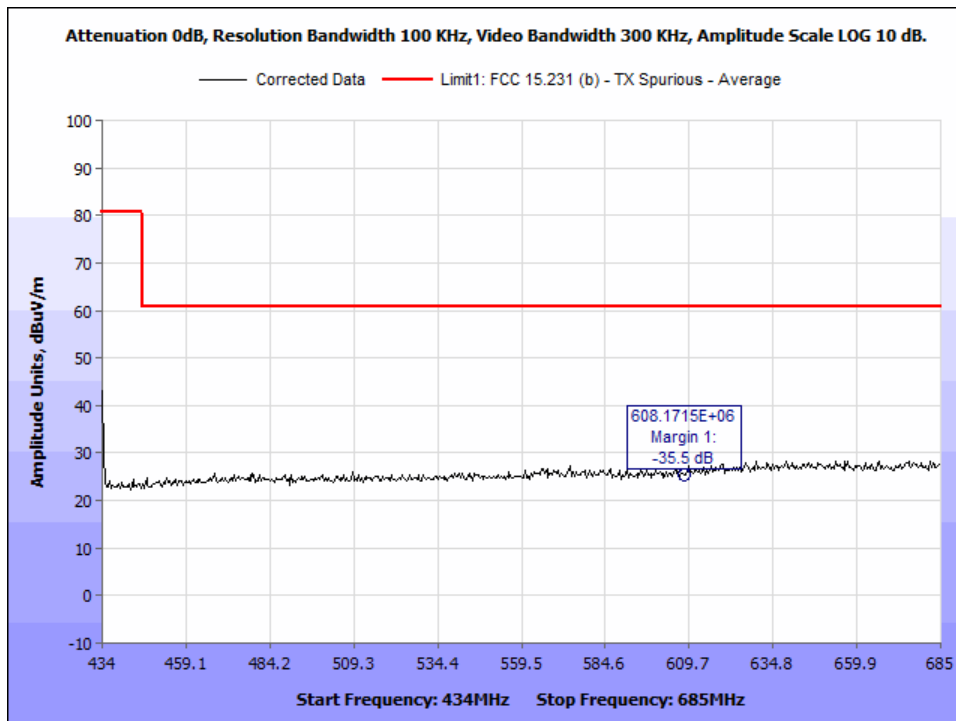


Figure 24: Upper Bandedge - 433.92 MHz - Average - Horizontal.

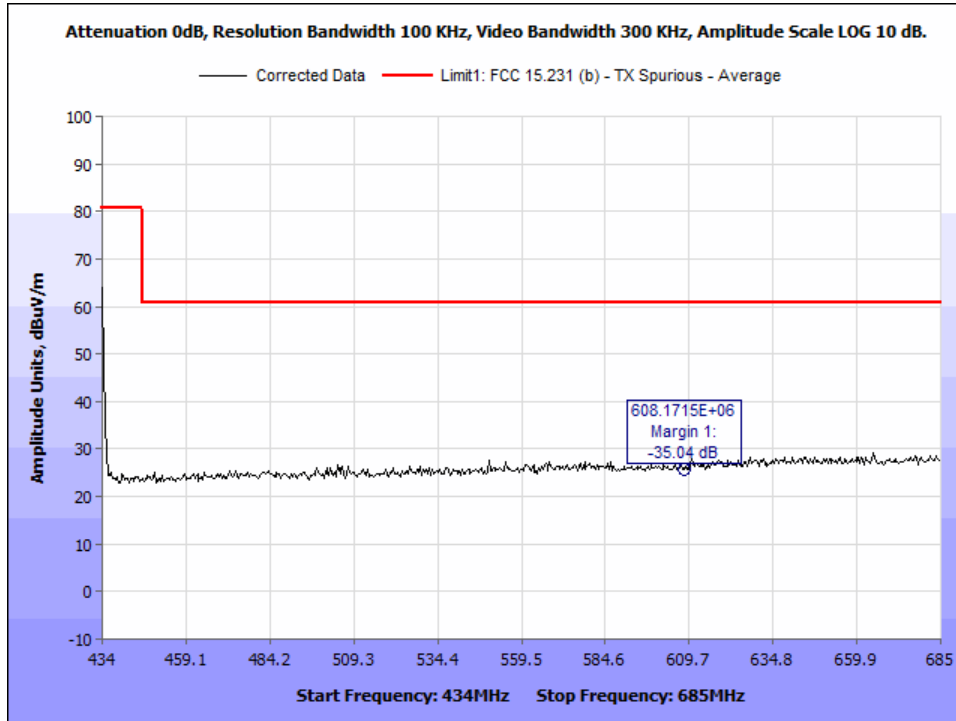


Figure 25: Upper Bandedge - 433.92 MHz - Average - Vertical.

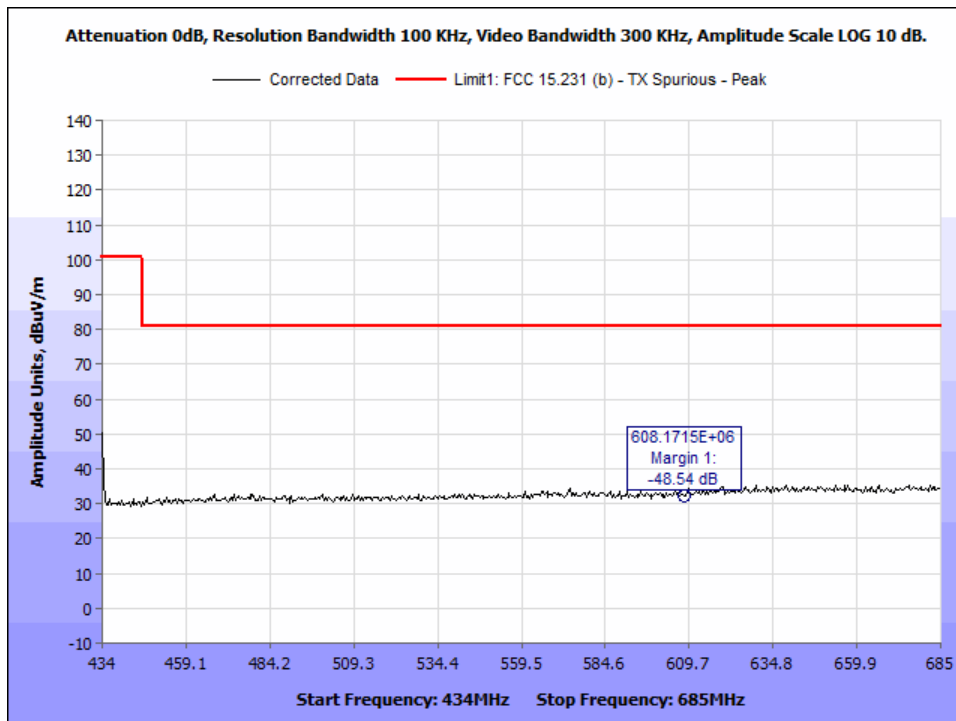


Figure 26: Upper Bandedge - 433.92 MHz - Peak - Horizontal.

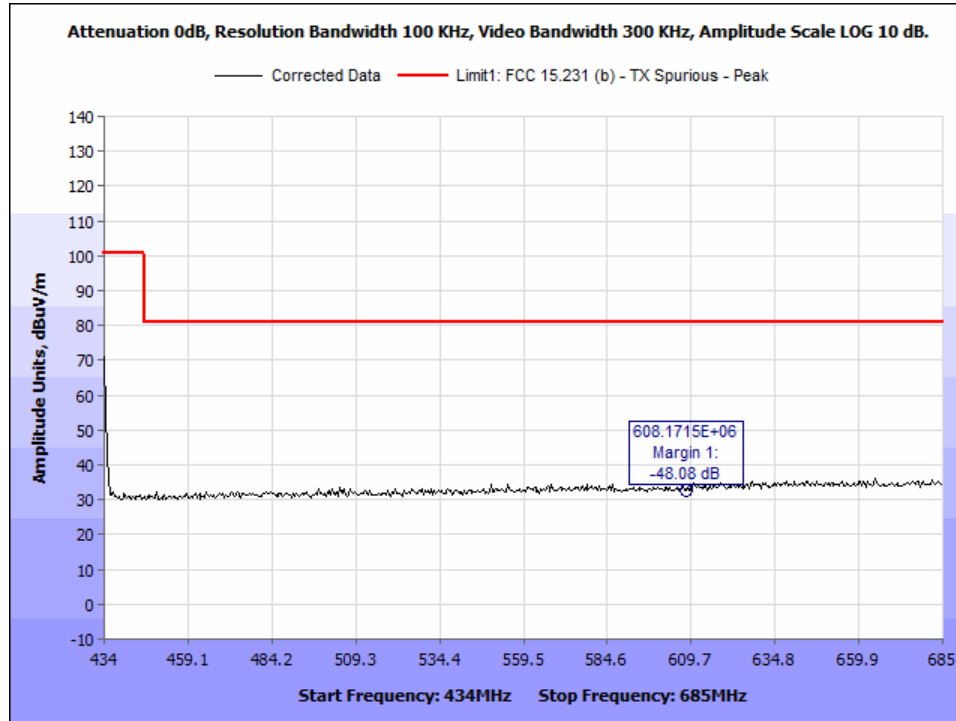


Figure 27: Upper Bandedge - 433.92 MHz - Peak - Vertical.

Frequency (MHz)	Antenna Polarity	Uncorrected Amplitude (dBuV)	RBW (KHz)	Duty Cycle Factor (dB)	Distance Correction Factor (dB)	ACF (dB/m)	Preamp Factor (dB)	Corrected Amplitude (dBuV/m)	Limit 1, Average (dBuV/m)	Limit 2, Peak (dBuV/m)	Margin 1, (dB)	Margin 2, (dB)
410.0054	H	20.39	100	-6.96	10.46	20	-21.88	22.01	60.83	--	-38.82	--
410.0054	V	19.52	100	-6.96	10.46	19.9	-21.88	21.04	60.83	--	-39.79	--
410.0054	H	20.39	100	--	10.46	20	-21.88	28.97	--	80.83	--	-51.86
410.0054	V	19.52	100	--	10.46	19.9	-21.88	28	--	80.83	--	-52.83
608.1715	H	20.35	100	-6.96	10.46	22.6	-21.12	25.33	60.83	--	-35.5	--
608.1715	V	20.61	100	-6.96	10.46	22.8	-21.12	25.79	60.83	--	-35.04	--
608.1715	H	20.35	100	--	10.46	22.6	-21.12	32.29	--	80.83	--	-48.54
608.1715	V	20.61	100	--	10.46	22.8	-21.12	32.75	--	80.83	--	-48.08

Figure 28: Radiated Bandedge Test Result

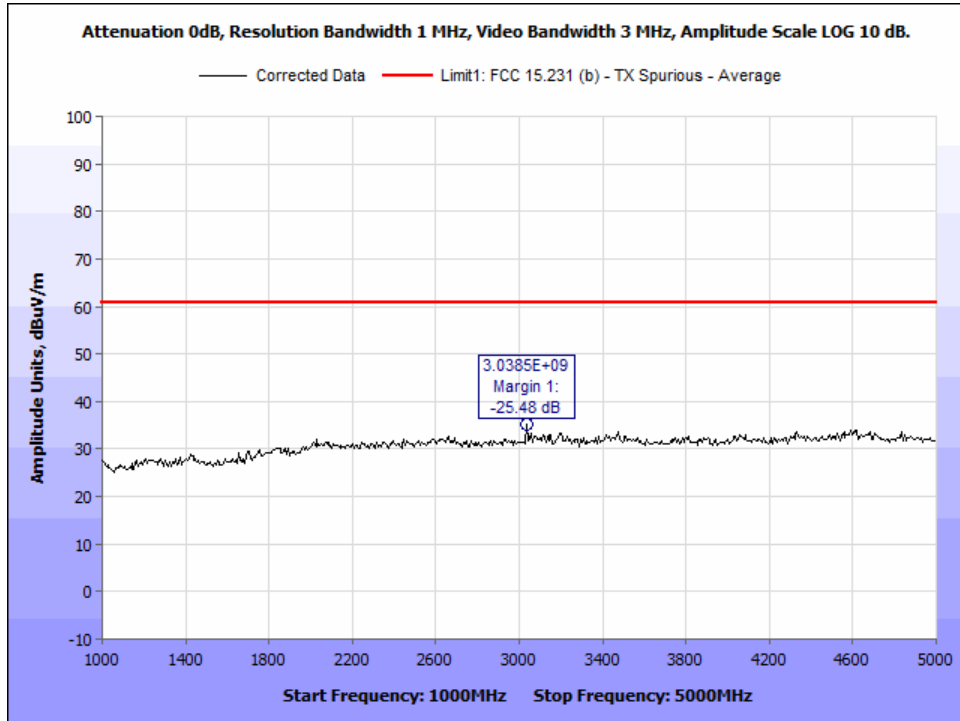


Figure 29: RSE - 433.92 MHz - 1-5 GHz - Average - Horizontal.

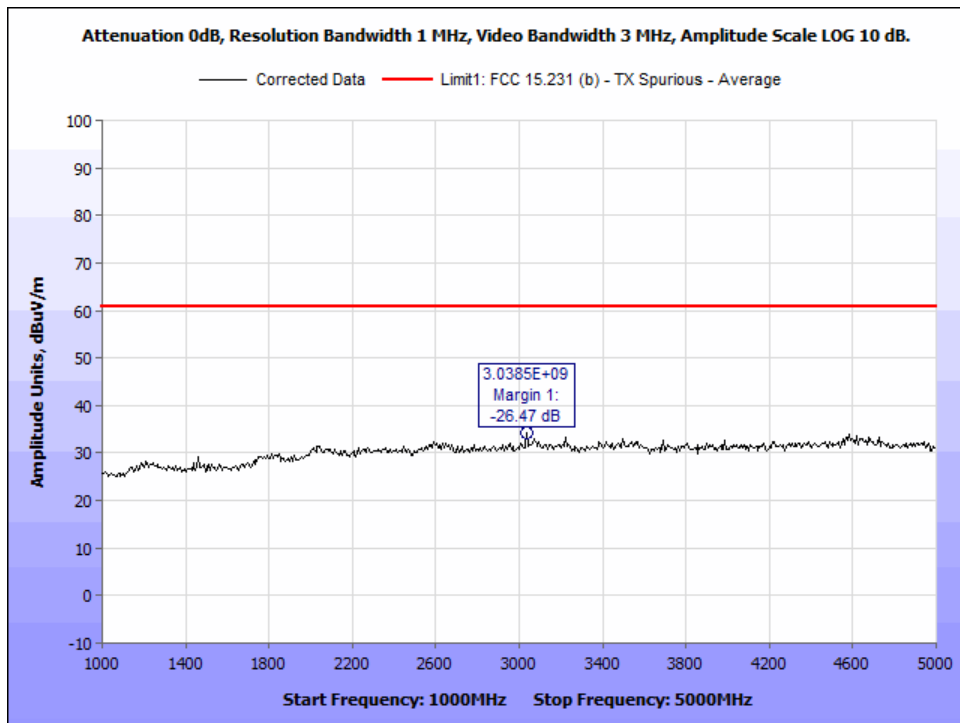


Figure 30: RSE - 433.92 MHz - 1-5 GHz - Average - Vertical.

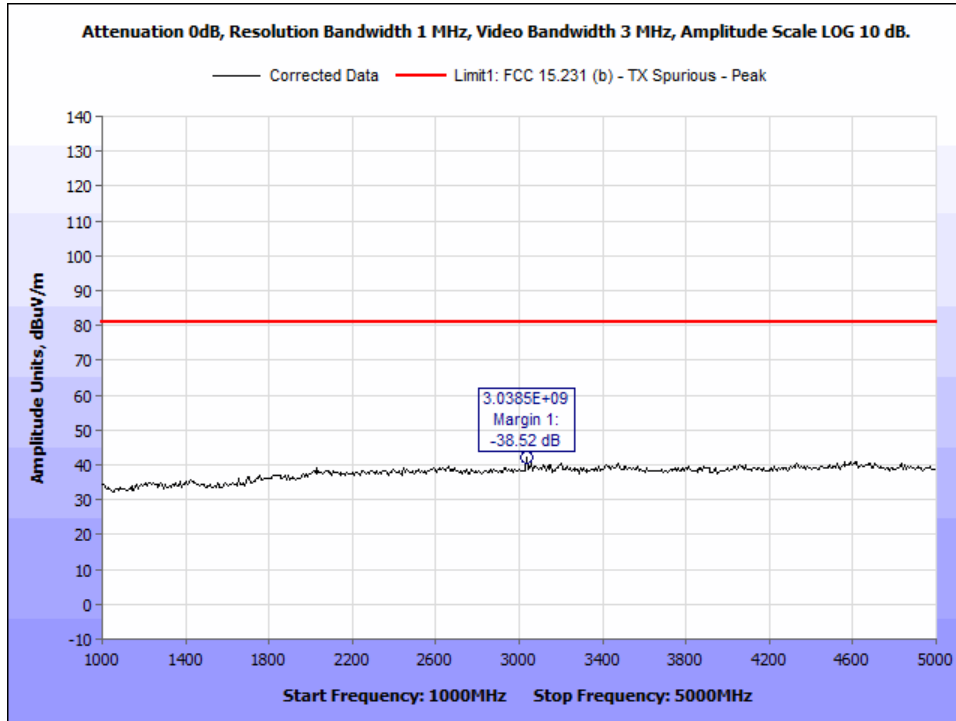


Figure 31: RSE - 433.92 MHz - 1-5 GHz - Peak - Horizontal.

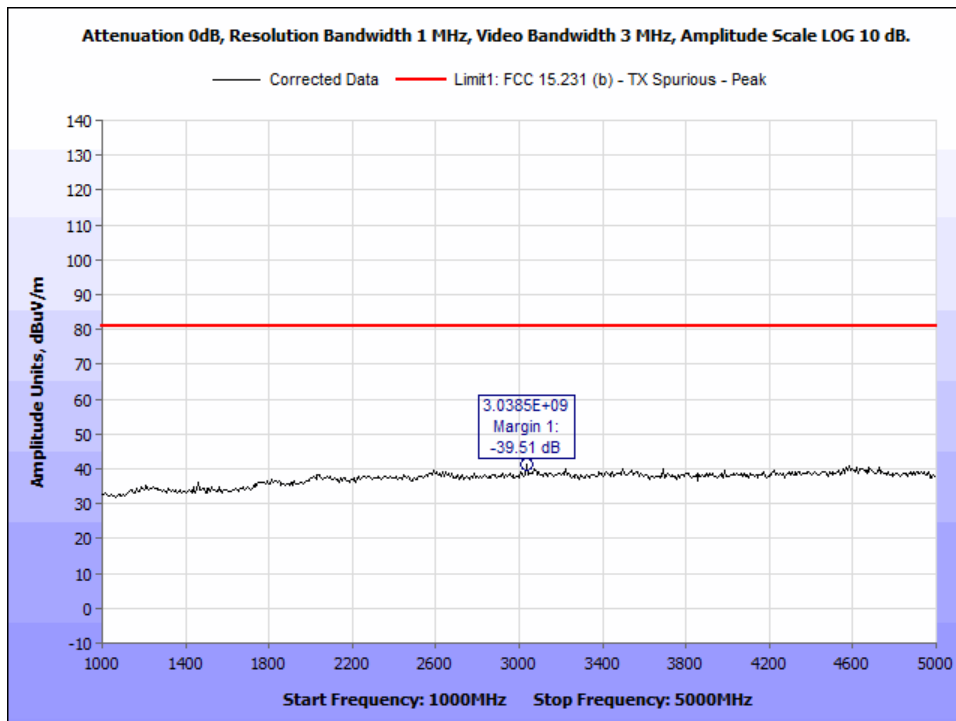


Figure 32: RSE - 433.92 MHz - 1-5 GHz - Peak - Vertical.

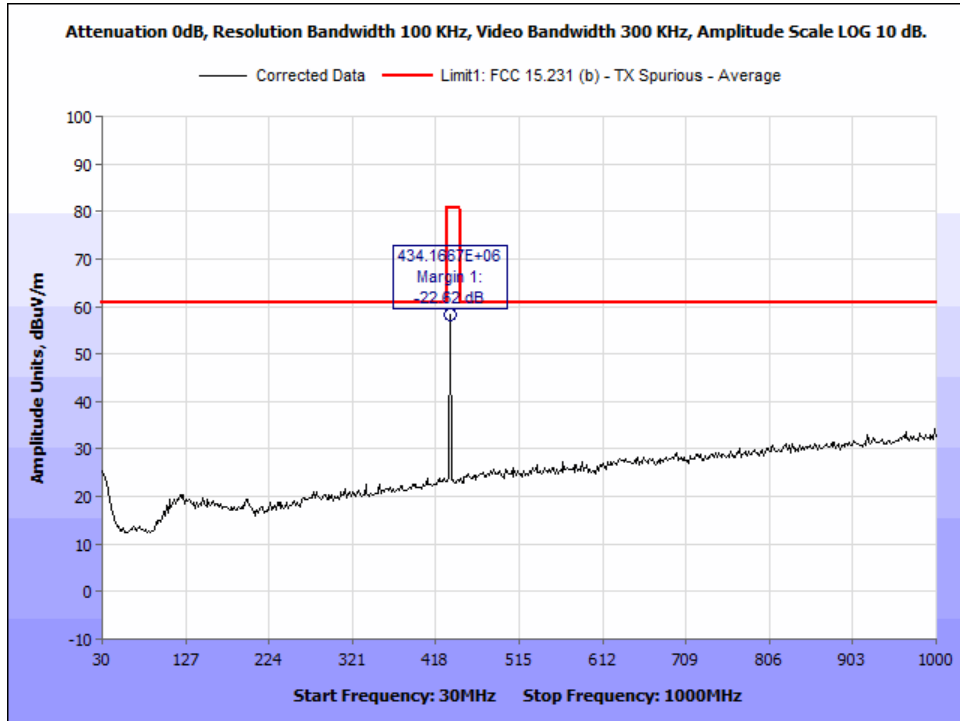


Figure 33: RSE - 433.92 MHz - 30-1000 MHz - Average - Horizontal.

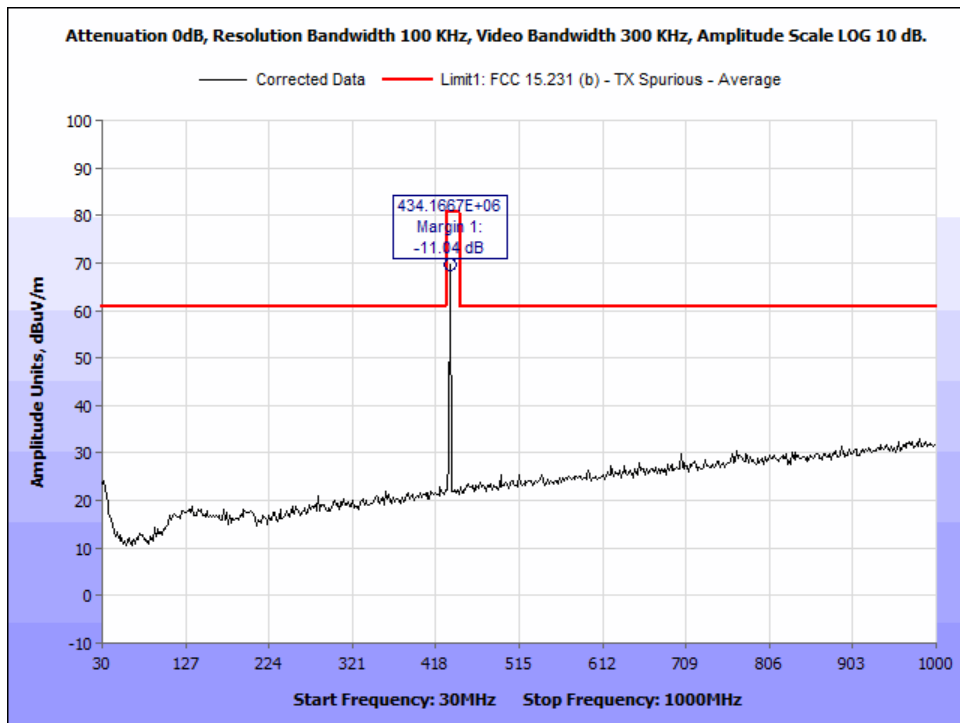


Figure 34: RSE - 433.92 MHz - 30-1000 MHz - Average - Vertical.

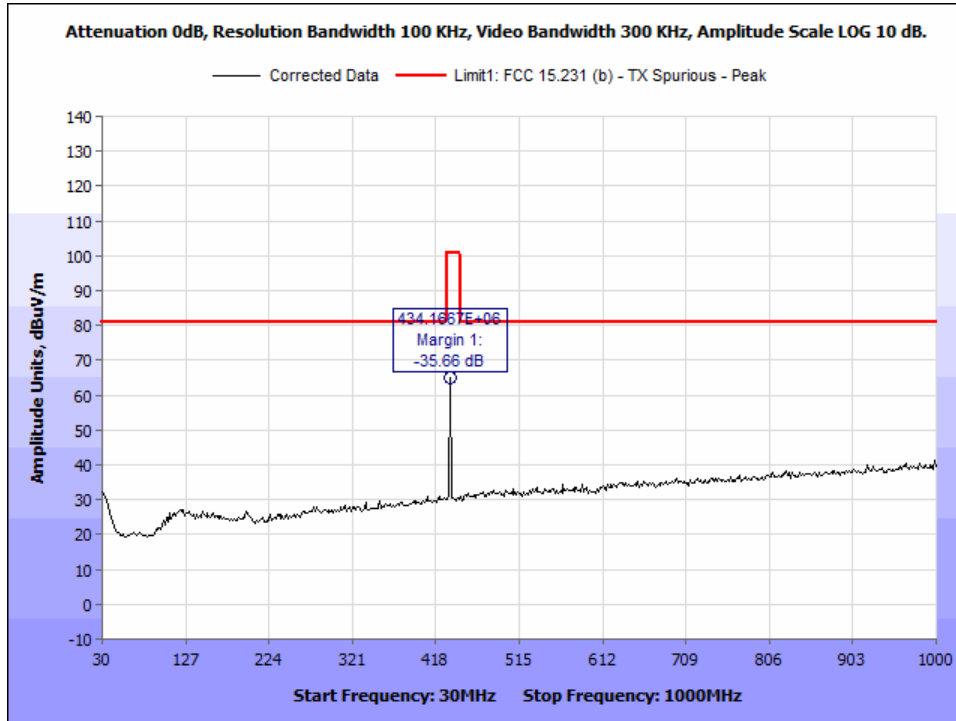


Figure 35: RSE - 433.92 MHz - 30-1000 MHz - Peak - Horizontal.

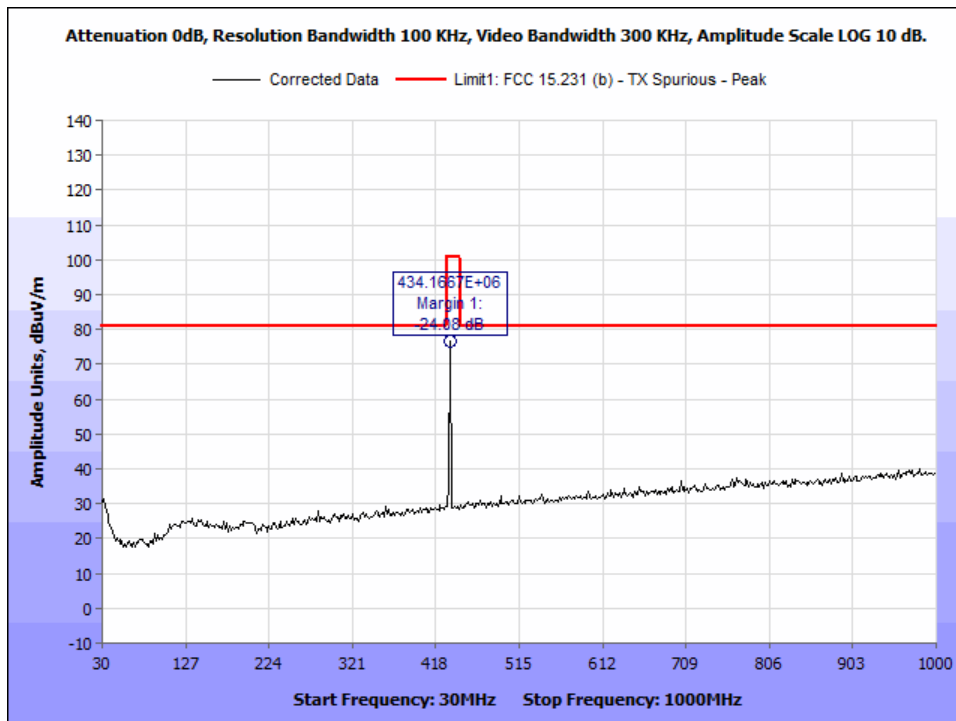


Figure 36: RSE - 433.92 MHz - 30-1000 MHz - Peak - Vertical.

Frequency (MHz)	Antenna Polarity	Uncorrected Amplitude (dBuV)	RBW (KHz)	Duty Cycle Factor (dB)	Distance Correction Factor (dB)	ACF (dB/m)	Preamp Factor (dB)	Corrected Amplitude (dBuV/m)	Limit 1, Average (dBuV/m)	Limit 2, Peak (dBuV/m)	Margin 1, (dB)	Margin 2, (dB)
434.1667	H	56.08	100	-6.96	10.46	20.5	-21.87	58.21	80.83	--	-22.62	--
434.1667	V	67.84	100	-6.96	10.46	20.32	-21.87	69.79	80.83	--	-11.04	--
434.1667	H	56.08	100	--	10.46	20.5	-21.87	65.17	--	100.83	--	-35.66
434.1667	V	67.84	100	--	10.46	20.32	-21.87	76.75	--	100.83	--	-24.08
3038.5000	H	45.87	1000	-6.96	10.46	32.63	-36.19	35.35	60.83	--	-25.48	--
3038.5000	V	44.94	1000	-6.96	10.46	32.57	-36.19	34.36	60.83	--	-26.47	--
3038.5000	H	45.87	1000	--	10.46	32.63	-36.19	42.31	--	80.83	--	-38.52
3038.5000	V	44.94	1000	--	10.46	32.57	-36.19	41.32	--	80.83	--	-39.51

Figure 37: Radiated Spurious Emissions Test Result

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.231(c) 20dB Bandwidth

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

Test Results: The EUT was **compliant** with § 15.231(c).

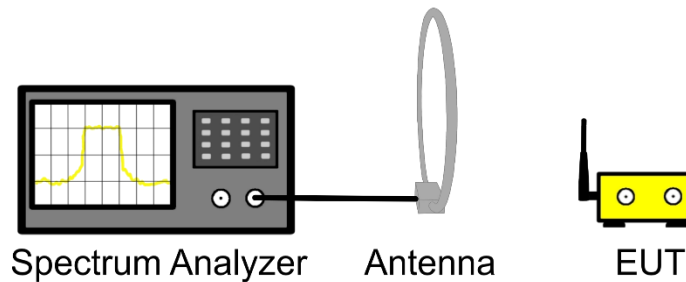


Figure 38: 20 dB Bandwidth Test Setup

Frequency MHz	20dB Bandwidth (KHz)	Limit (KHz)
433.92	60.426	1084.8

Figure 39: 20dB Bandwidth Test Result

Limit = Frequency*0.25% = 1084.8 KHz

Test Engineer(s): Adan Arab

Test Date(s): 08-11-2020

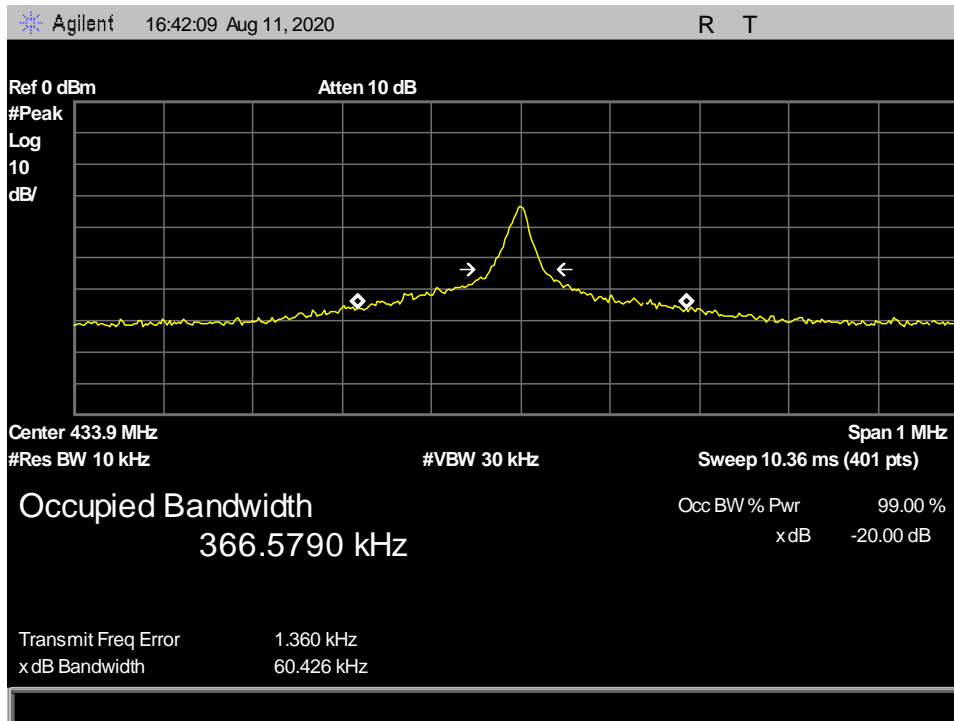


Figure 40: 20dB OBW - 60.426 KHz

Test Equipment

Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2017.

MET ASSET #	EQUIPMENT	MANUFACTURER	MODEL	CAL DATE	CAL DUE
1A1141	SPECTRUM ANALYZER	AGILENT TECHNOLOGIES	E4407B	08/05/2019	09/05/2020
1A1073	MULTI DEVICE CONTROLLER	ETS EMCO	2090	SEE NOTE	SEE NOTE
1A1147	BILOG ANTENNA	SUNOL SCIENCES CORP	JB3	06/05/2019	12/05/2020
1A1088	PREAMPLIFIER	ROHDE & SCHWARZ	TS-PR1	SEE NOTE	SEE NOTE
1A1080	MULTI DEVICE CONTROLLER	ETS EMCO	2090	SEE NOTE	SEE NOTE
1A1083	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESU40	10/10/2019	10/10/2020
1A1073	MULTI DEVICE CONTROLLER	ETS EMCO	2090	SEE NOTE	SEE NOTE
1A1183	DOUBLE RIDGED WAVEGUIDE ANTENNA	ETS LINDGREN	3117	06/01/2020	06/01/2022
1A1180	AMPLIFIER	MITEQ	AMF-7D-01001800-22-10P	SEE NOTE	SEE NOTE
1A1106	10 M SEMI-ANECHOIC CHAMBER (NSA)	ETS - LINDGREN	04X07	SEE NOTE	SEE NOTE
1A1191	TEMPERATURE HUMIDITY PRESSURE SENSOR/ RECORDER	OMEGA	PRHTEMP2000	01/31/2020	01/31/2021

Figure 41: Test Equipment List

Note: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.

Certification & User's Manual Information

Certification & User's Manual Information

M. Certification Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart I — Marketing of Radio frequency devices:

§ 2.801 Radio-frequency device defined.

As used in this part, a radio-frequency device is any device which in its operation is capable of Emitting radio-frequency energy by radiation, conduction, or other means. Radio- frequency devices include, but are not limited to:

- (a) The various types of radio communication transmitting devices described throughout this chapter.
- (b) *The incidental, unintentional and intentional radiators defined in Part 15 of this chapter.*
- (c) The industrial, scientific, and medical equipment described in Part 18 of this chapter.
- (d) Any part or component thereof which in use emits radio-frequency energy by radiation, conduction, or other means.

§ 2.803 Marketing of radio frequency devices prior to equipment authorization.

- (a) Except as provided elsewhere in this chapter, no person shall sell or lease, or offer for sale or lease (including advertising for sale or lease), or import, ship or distribute for the purpose of selling or leasing or offering for sale or lease, any radio frequency device unless:
 - (1) In the case of a device subject to certification, such device has been authorized by the Commission in accordance with the rules in this chapter and is properly identified and labeled as required by §2.925 and other relevant sections in this chapter; or
 - (2) In the case of a device that is not required to have a grant of equipment authorization issued by the Commission, but which must comply with the specified technical standards prior to use, such device also complies with all applicable administrative (including verification of the equipment or authorization under a Declaration of Conformity, where required), technical, labeling and identification requirements specified in this chapter.
- (d) Notwithstanding the provisions of paragraph (a) of this section, the offer for sale solely to business, commercial, industrial, scientific or medical users (but not an offer for sale to other parties or to end users located in a residential environment) of a radio frequency device that is in the conceptual, developmental, design or pre-production stage is permitted prior to equipment authorization or, for devices not subject to the equipment authorization requirements, prior to a determination of compliance with the applicable technical requirements *provided* that the prospective buyer is advised in writing at the time of the offer for sale that the equipment is subject to the FCC rules and that the equipment will comply with the appropriate rules before delivery to the buyer or to centers of distribution.

- (e)(1) Notwithstanding the provisions of paragraph (a) of this section, prior to equipment authorization or determination of compliance with the applicable technical requirements any radio frequency device may be operated, but not marketed, for the following purposes and under the following conditions:
- (i) *Compliance testing;*
 - (ii) Demonstrations at a trade show provided the notice contained in paragraph (c) of this section is displayed in a conspicuous location on, or immediately adjacent to, the device;
 - (iii) Demonstrations at an exhibition conducted at a business, commercial, industrial, scientific or medical location, but excluding locations in a residential environment, provided the notice contained in paragraphs (c) or (d) of this section, as appropriate, is displayed in a conspicuous location on, or immediately adjacent to, the device;
 - (iv) Evaluation of product performance and determination of customer acceptability, provided such operation takes place at the manufacturer's facilities during developmental, design or pre-production states; or
 - (v) Evaluation of product performance and determination of customer acceptability where customer acceptability of a radio frequency device cannot be determined at the manufacturer's facilities because of size or unique capability of the device, provided the device is operated at a business, commercial, industrial, scientific or medical user's site, but not at a residential site, during the development, design or pre-production stages.
- (e)(2) For the purpose of paragraphs (e)(1)(iv) and (e)(1)(v) of this section, the term *manufacturer's facilities* includes the facilities of the party responsible for compliance with the regulations and the manufacturer's premises, as well as the facilities of other entities working under the authorization of the responsible party in connection with the development and manufacture, but not the marketing, of the equipment.
- (f) For radio frequency devices subject to verification and sold solely to business, commercial, industrial, scientific and medical users (excluding products sold to other parties or for operation in a residential environment), parties responsible for verification of the devices shall have the option of ensuring compliance with the applicable technical specifications of this chapter at each end user's location after installation, provided that the purchase or lease agreement includes a proviso that such a determination of compliance be made and is the responsibility of the party responsible for verification of the equipment.

Certification & User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart J — Equipment Authorization Procedures:

§ 2.901 Basis and Purpose

- (a) In order to carry out its responsibilities under the Communications Act and the various treaties and international regulations, and in order to promote efficient use of the radio spectrum, the Commission has developed technical standards for radio frequency equipment and parts or components thereof. The technical standards applicable to individual types of equipment are found in that part of the rules governing the service wherein the equipment is to be operated.¹ *In addition to the technical standards provided, the rules governing the service may require that such equipment be verified by the manufacturer or importer, be authorized under a Declaration of Conformity, or receive an equipment authorization from the Commission by one of the following procedures: certification or registration.*
- (b) The following sections describe the verification procedure, the procedure for a Declaration of Conformity, and the procedures to be followed in obtaining certification from the Commission and the conditions attendant to such a grant.

§ 2.907 Certification.

- (a) Certification is an equipment authorization issued by the Commission, based on representation and test data submitted by the applicant.
- (b) Certification attaches to all units subsequently marketed by the grantee which are identical (see Section 2.908) to the sample tested except for permissive changes or other variations authorized by the Commission pursuant to Section 2.1043.

¹ In this case, the equipment is subject to the rules of Part 15. More specifically, the equipment falls under Subpart B (of Part 15), which deals with unintentional radiators.

Certification & User's Manual Information

§ 2.948 Description of measurement facilities.

- (a) Each party making measurements of equipment that is subject to an equipment authorization under Part 15 or Part 18 of this chapter, regardless of whether the measurements are filed with the Commission or kept on file by the party responsible for compliance of equipment marketed within the U.S. or its possessions, shall compile a description of the measurement facilities employed.
- (1) If the measured equipment is subject to the verification procedure, the description of the measurement facilities shall be retained by the party responsible for verification of the equipment.
- (i) *If the equipment is verified through measurements performed by an independent laboratory, it is acceptable for the party responsible for verification of the equipment to rely upon the description of the measurement facilities retained by or placed on file with the Commission by that laboratory. In this situation, the party responsible for the verification of the equipment is not required to retain a duplicate copy of the description of the measurement facilities.*
- (ii) If the equipment is verified based on measurements performed at the installation site of the equipment, no specific site calibration data is required. It is acceptable to retain the description of the measurement facilities at the site at which the measurements were performed.
- (2) If the equipment is to be authorized by the Commission under the certification procedure, the description of the measurement facilities shall be filed with the Commission's Laboratory in Columbia, Maryland. The data describing the measurement facilities need only be filed once but must be updated as changes are made to the measurement facilities or as otherwise described in this section. At least every three years, the organization responsible for filing the data with the Commission shall certify that the data on file is current.

Certification & User's Manual Information

1. Label and User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart A — General:

§ 15.19 Labeling requirements.

(a) *In addition to the requirements in Part 2 of this chapter, a device subject to certification or verification shall be labeled as follows:*

- (1) Receivers associated with the operation of a licensed radio service, e.g., FM broadcast under Part 73 of this chapter, land mobile operation under Part 90, etc., shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

- (2) A stand-alone cable input selector switch, shall bear the following statement in a conspicuous location on the device:

This device is verified to comply with Part 15 of the FCC Rules for use with cable television service.

- (3) All other devices shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

- (4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified under paragraph (a) of this section is required to be affixed only to the main control unit.

- (5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

§ 15.21 Information to user.

The user's manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Verification & User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart B — Unintentional Radiators:

§ 15.105 Information to the user.

- (a) For a Class A digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at own expense.

- (b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

End of Report