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CERTIFICATION TEST REPORT

Manufacturer: Woodstream Corporation
P.O. Box 327
69 North Locust Street
Lititz, Pennsylvania 17542-0327 USA

Applicant: Same as Above

Product Name: Victor Connected Snap Trap - Rat

Product Description: Snap style rat trap that uses a LoRa radio to communicate status (set, catch, miss) to a gateway associated with a LoRaWAN provider.

Operating Voltage/Frequency: Battery-Operated

Model: V430

FCC ID: SNA-V430

Testing Commenced: Sept. 24, 2019

Testing Ended: Sept. 25, 2019

Summary of Test Results: **In Compliance, with Modifications**

The EUT complies with the EMC requirements when manufactured identically as the unit tested in this report, including any required modifications and/or manufacturer's statement. Any changes to the design or build of this unit subsequent to this testing may deem it non-compliant.

Standards:

- ❖ **FCC Part 15 Subpart C, Section 15.249**
- ❖ **FCC Part 15 Subpart C, Section 15.215(c) – Additional provisions to the general radiated emission limitations**
- ❖ **FCC15.207 - Conducted Limits**
- ❖ **FCC Part 15 Subpart A, Section 15.31(e) – Measurement Standards**



Order Number: F2P22113

Applicant: Woodstream Corporation

Model: SNA-V430

Evaluation Conducted by:

Julius Chiller, EMC/Wireless Engineer

Report Reviewed by:

Ken Littell, Director of EMC & Wireless Operations

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1 ADMINISTRATIVE INFORMATION

1.1 Measurement Location:

F2 Labs in Middlefield, Ohio. Site description and attenuation data are on file with the FCC's Sampling and Measurement Branch at the FCC Laboratory in Columbia, MD.

1.2 Measurement Procedure:

All measurements were performed according to the 2013 version of ANSI C63.10 and recommended FCC procedure of measurement of equipment operating under Section 15.249. A list of the measurement equipment can be found in Section 6.

1.3 Uncertainty Budget:

The uncertainty in EMC measurements arises from several factors which affect the results, some associated with environmental conditions in the measurement room, the test equipment being used, and the measurement techniques adopted.

The measurement uncertainty budgets detailed below are calculated from the test and calibration data and are expressed with a 95% confidence factor using a coverage factor of $k=2$. The Uncertainty for a laboratory are referred to as U_{lab} . For Radiated and Conducted Emissions, the Expanded Uncertainty is compared to the U_{cispr} values to determine if a specific margin is required to deem compliance.

U_{lab}

Measurement Range	Combined Uncertainty	Expanded Uncertainty
Radiated Emissions <1 GHz @ 3m	2.54	5.07dB
Radiated Emissions <1 GHz @ 10m	2.55	5.09dB
Radiated Emissions 1 GHz to 2.7 GHz	1.81	3.62dB
Radiated Emissions 2.7 GHz to 18 GHz	1.55	3.10dB
AC Power Line Conducted Emissions, 150kHz to 30 MHz	1.38	2.76dB
AC Power Line Conducted Emissions, 9kHz to 150kHz	1.66	3.32dB

U_{cispr}

Measurement Range	Expanded Uncertainty
Radiated Emissions <1 GHz @ 3m	5.2dB
Radiated Emissions <1 GHz @ 10m	5.2dB
Radiated Emissions 1 GHz to 2.7 GHz	Under Consideration
Radiated Emissions 2.7 GHz to 18 GHz	Under Consideration
AC Power Line Conducted Emissions, 150kHz to 30 MHz	3.6dB
AC Power Line Conducted Emissions, 9kHz to 150kHz	4.0dB

If U_{lab} is less than or equal to U_{cispr} , then:

- compliance is deemed to occur if no measured disturbance exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance exceeds the disturbance limit.

If U_{lab} is greater than U_{cispr} in table 1, then:

- compliance is deemed to occur if no measured disturbance, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit.

Note: Only measurements listed in the tables above that relate to tests included in this Test Report are applicable.



Order Number: F2P22113

Applicant: Woodstream Corporation

Model: SNA-V430

1.4 Document History:

Document Number	Description	Issue Date	Approved By
F2P22113-01E	First Issue	Nov. 8, 2019	K. Littell



2 SUMMARY OF TEST RESULTS

Test Name	Standard(s)	Results
-20dB Occupied Bandwidth	CFR 47 Part 15.215(c)	Complies
Field Strength of Emissions	CFR 47 Part 15.249(a)(d)	Complies
Variation of the Input Power	CFR 47 Part 15.231(e)	Complies*

Note: Requirements met by using new battery.

Modifications Made to the Equipment
Power output was reduced to a setting of "5" to meet the 94 dB μ V/m field strength limit.



3 TABLE OF MEASURED RESULTS

Test		Low Channel	Mid Channel	High Channel
	125kHz:	(902.5)	(908.5)	(914.8)
	500kHz:	(903)	(909.4)	(914.2)
Average Field Strength of Fundamental	125kHz	93.3 dB μ V/m	93.8 dB μ V/m	93.6 dB μ V/m
	500kHz	92.66 dB μ V/m	92.98 dB μ V/m	93.31 dB μ V/m
Average Limit for Fundamental		50 millivolts/meter (93.97 dB μ V/m)	50 millivolts/meter (93.97 dB μ V/m)	50 millivolts/meter (93.97 dB μ V/m)
-20dB Occupied Bandwidth (MHz)	125kHz	0.145	0.145	0.139
	500kHz	0.766	0.739	0.773

The -20dB bandwidth of the emission shall be contained within the frequency band designated in the rule section under which the equipment is operated.



4 ENGINEERING STATEMENT

This report has been prepared on behalf of Woodstream Corporation to provide documentation for the testing described herein. This equipment has been tested and found to comply with part 15.249 of the FCC Rules using ANSI C63.10 2013 standard. The test results found in this test report relate only to the items tested.



5 EUT INFORMATION AND DATA

5.1 Equipment Under Test:

Product: **Victor Connected Snap Trap - Rat**

Model: V430

Serial No.: None Specified

FCC ID: SNA-V430

5.2 Trade Name:

Woodstream Corporation

5.3 Power Supply:

Battery-Operated

5.4 Applicable Rules:

CFR 47, Part 15.249

5.5 Equipment Category:

DTX

5.6 Antenna:

0dBi Gain Integral Antenna

5.7 Accessories:

Laptop: Dell, model not specified.

Interface Board: USB Retro, model not specified.

5.8 Test Item Condition:

The equipment to be tested was received in good condition.

5.9 Testing Algorithm:

EUT was set to continuously transmit on low, mid and high channels in the 902-928 MHz LoRa Band. EUT was tested at bandwidth settings of 125kHz and 500KHz. Spread factors from 8-12 were examined for worst case emissions. Factor 12 was determined to be worst case.

125kHz: low, 902.3 MHz; mid, 908.5 MHz; high, 914.9 MHz.

500kHz: low, 903 MHz; mid, 909.4 MHz; high, 914.2 MHz.

**6 LIST OF MEASUREMENT INSTRUMENTATION**

Equipment Type	Asset Number	Manufacturer	Model	Serial Number	Calibration Due Date
Shielded Chamber	CL166-E	Albatross Projects	B83117-DF435-T261	US140023	Oct. 31, 2019
Shield Room	0175-3V	Ray Proof	N/A	11645	Apr. 23, 2020
Temp/Hum. Recorder	CL261	Extech	445814	04	Mar. 6, 2020
Spectrum Analyzer	CL147	Agilent	E7402A	MY45101241	Jan. 25, 2020
Receiver	CL151	Rohde & Schwarz	ESU40	100319	Oct. 25, 2019
Antenna, JB3 Combination	CL175	Sunol Sciences, Inc.	JB3	A030315	Oct. 11, 2019
Horn Antenna	CL098	Emco	3115	9809-5580	Jan. 31, 2021
Pre-Amplifier	CL153	Keysight Tech.	83006A	MY39500791	Aug. 5, 2020
Active 18" Loop Antenna	CL163-Loop	A.H. Systems, Inc.	EHA-52B	100	July 24, 2020
Pre-amplifier	CL250	Com-Power	PAM-118A	18040011	Oct. 26, 2019
Software:	Tile Version 3.4.B.3		Software Verified: Sept. 24-25, 2019		
Software:	EMC 32, Version 5.20.2		Software Verified: Sept. 24-25, 2019		



7 FCC PART 15.215(e), OCCUPIED BANDWIDTH

7.1 Requirements:

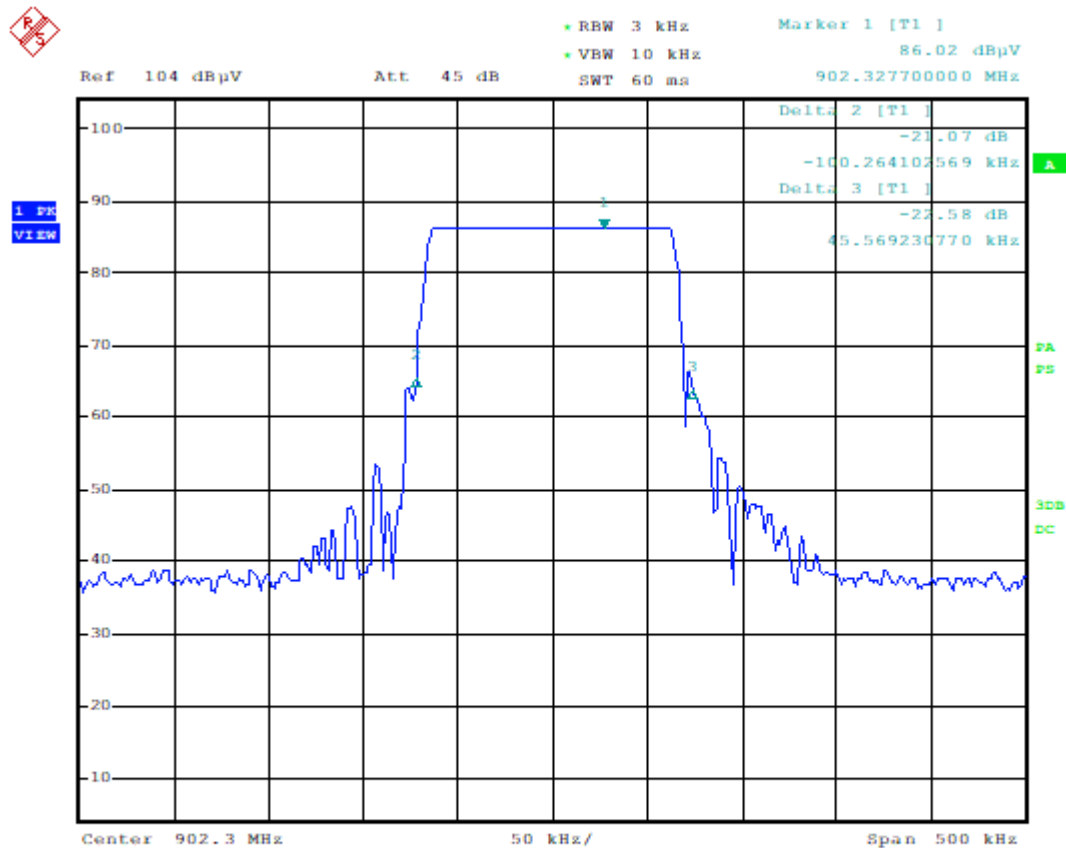
Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the -20dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage.

Bandwidth measurements were made at the low, mid and upper frequencies. The bandwidth was measured using the analyzer's marker function.



7.2 Occupied Bandwidth Test Data

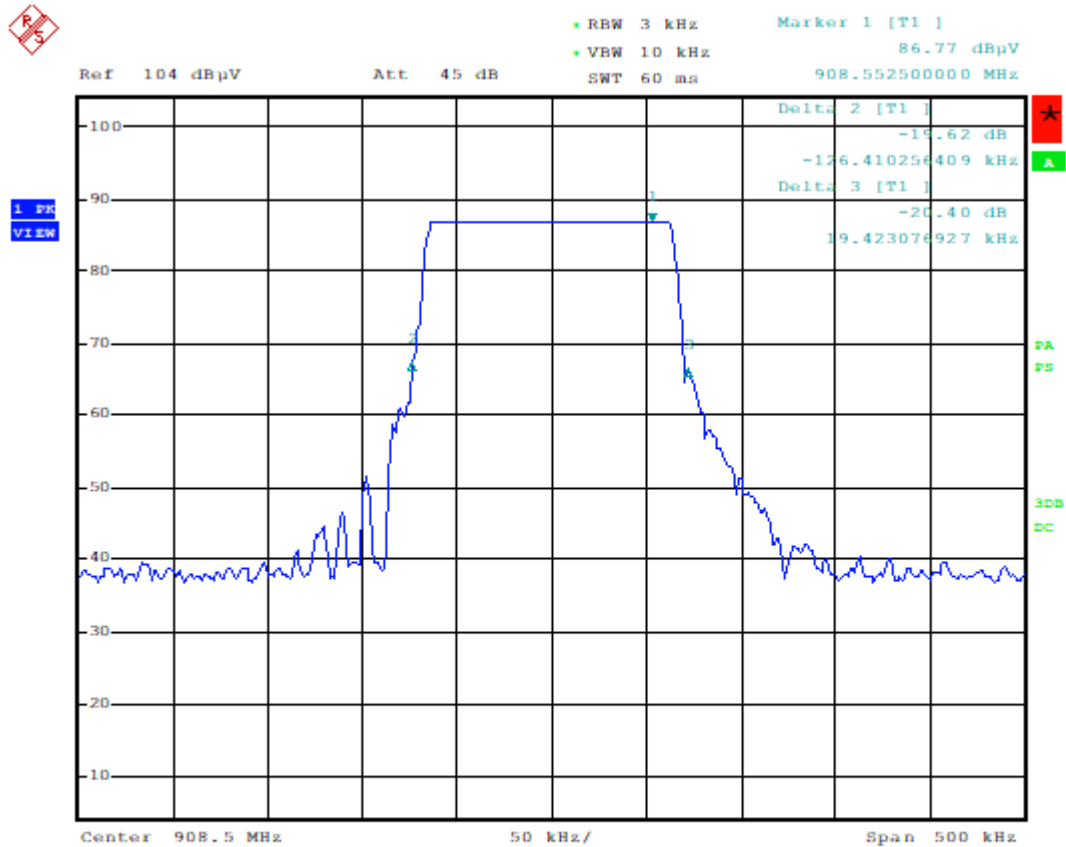
Test Date(s):	Sept. 25, 2019	Test Engineer(s):	J. Chiller
Standards:	CFR 47 Part 15.215(c)	Air Temperature:	19.0°C
		Relative Humidity:	61%

-20dB OBW: 125kHz, SF12 - Low Channel

Date: 24.SEP.2019 18:48:32



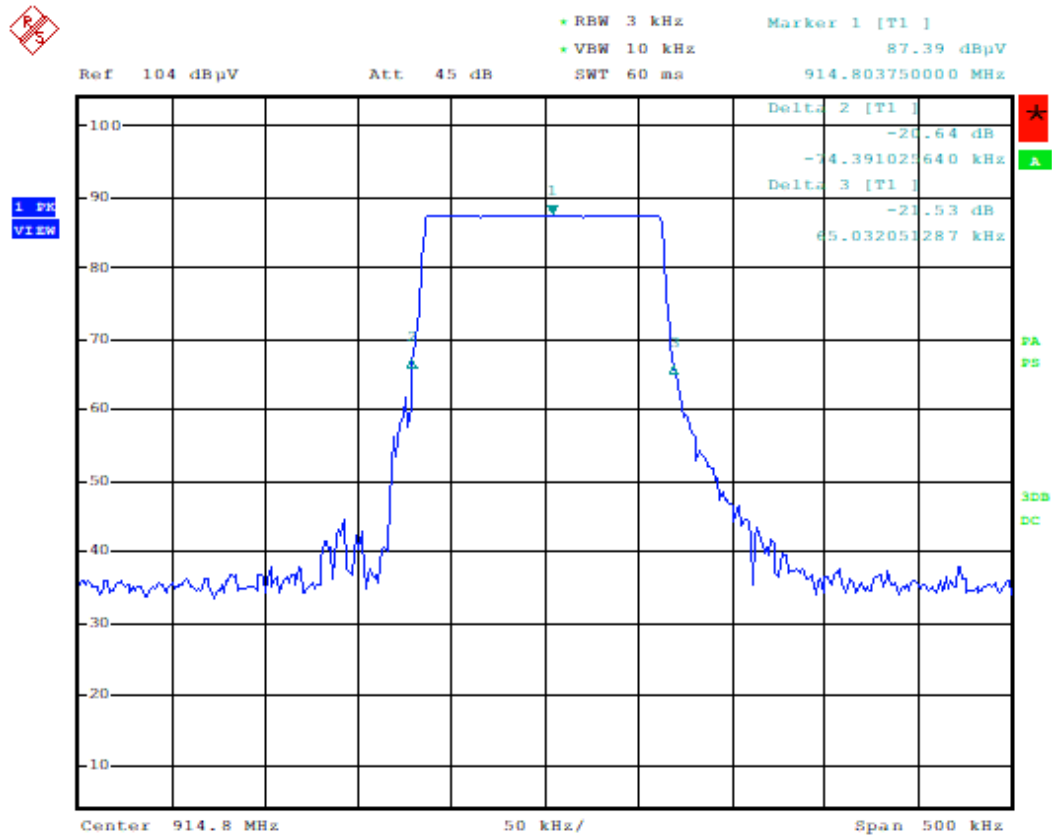
-20dB OBW: 125kHz, SF12 - Mid Channel



Date: 24.SEP.2019 18:52:21



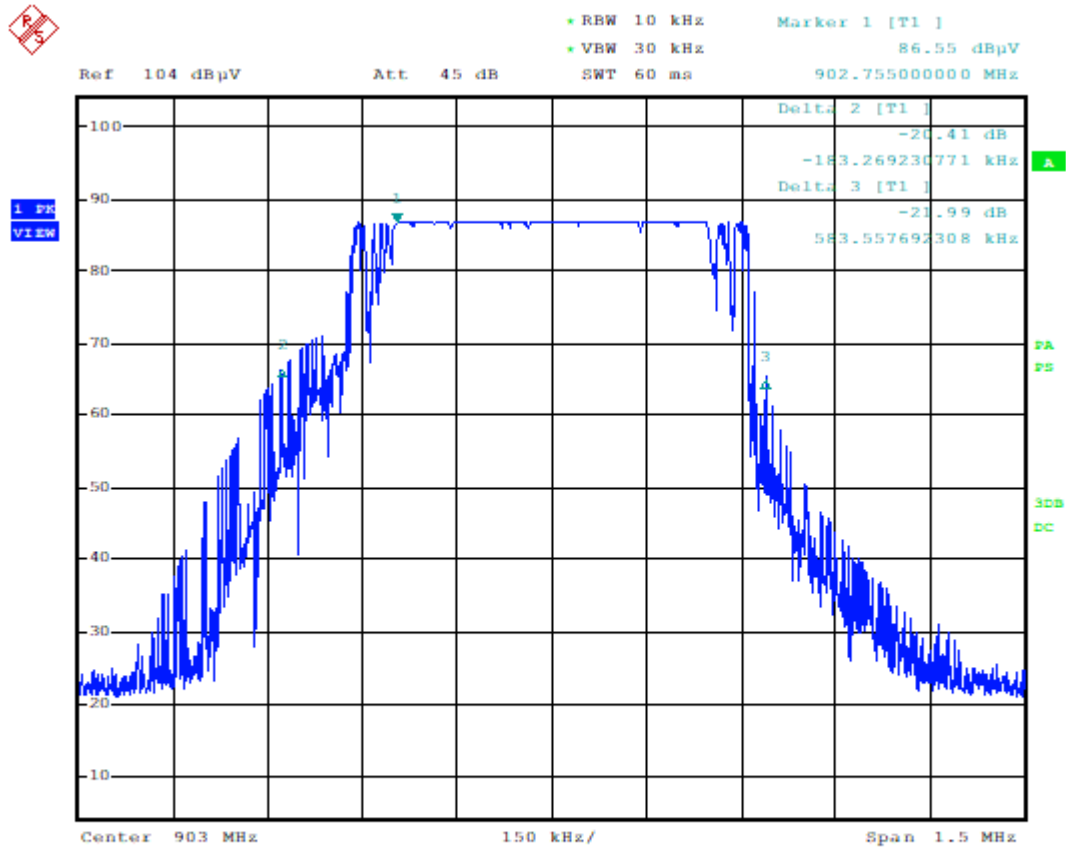
-20dB OBW: 125kHz, SF12 - High Channel



Date: 25.SEP.2019 11:01:06



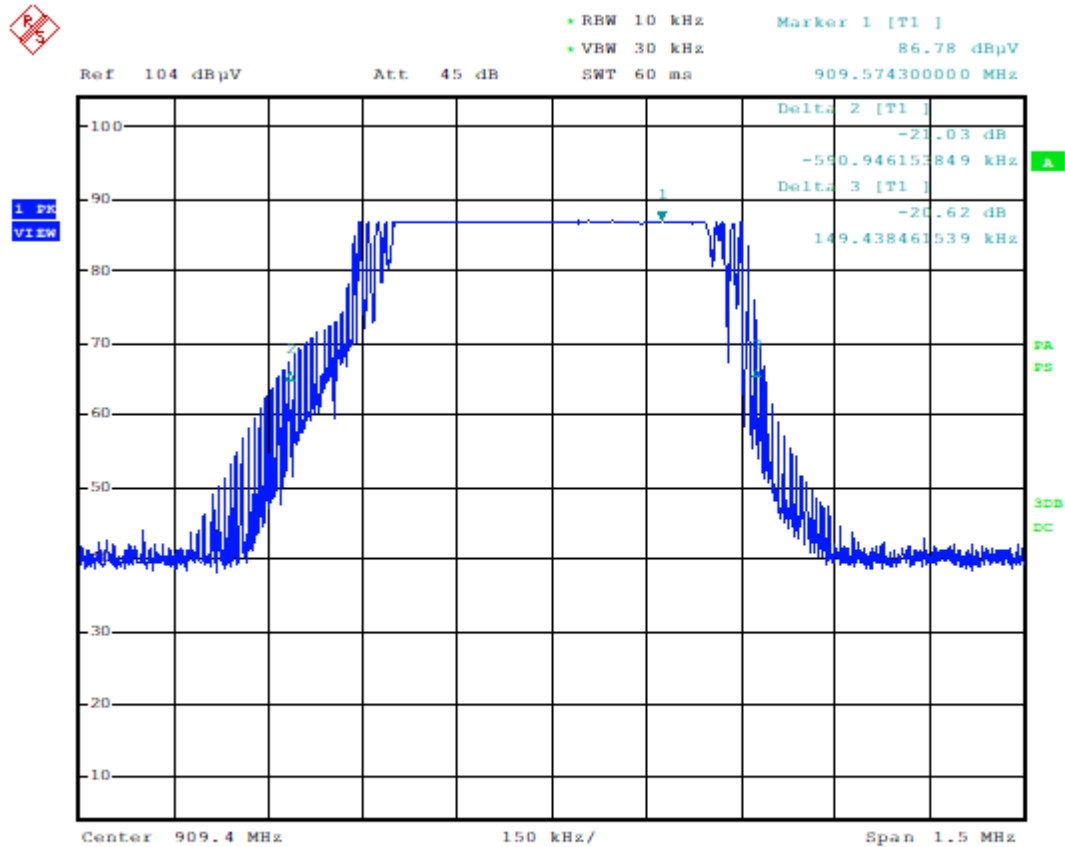
-20dB OBW: 500kHz, SF12 - Low Channel



Date: 25.SEP.2019 11:11:12



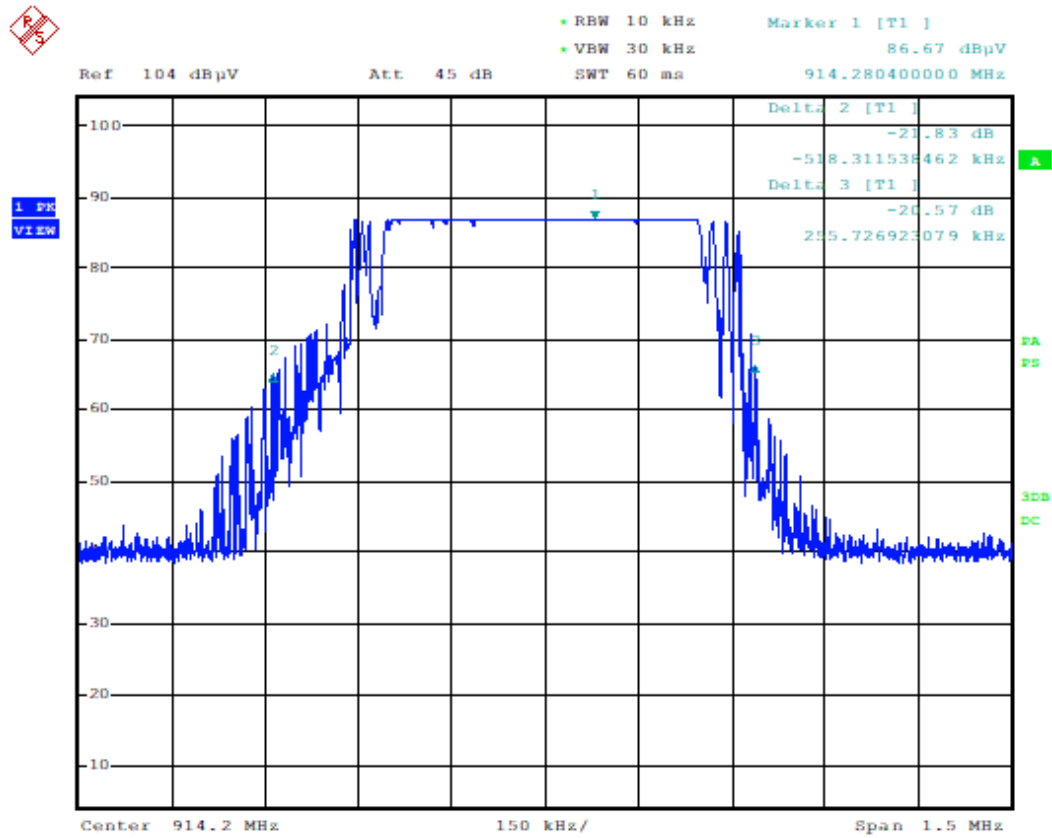
-20dB OBW: 500kHz, SF12 - Mid Channel



Date: 25.SEP.2019 11:18:11



-20dB OBW: 500kHz, SF12 - High Channel



Date: 25.SEP.2019 11:24:02

**8 FCC PART 15.249(a)(d) – FIELD STRENGTH OF EMISSIONS FROM INTENTIONAL RADIATORS**

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

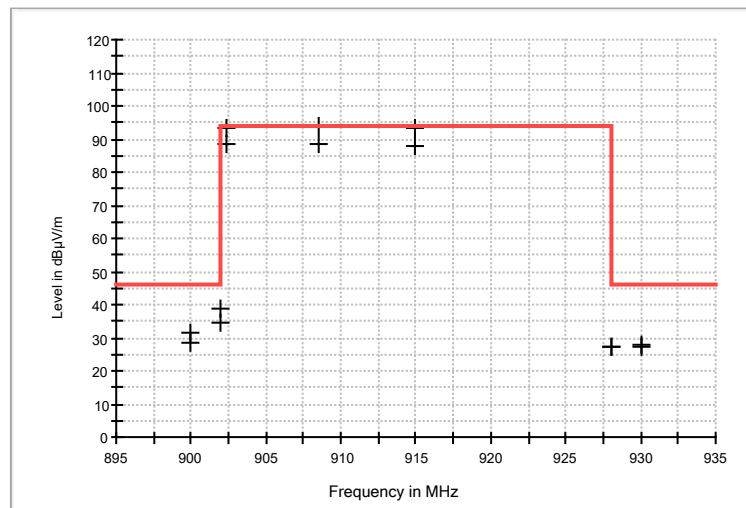
NOTE: During the pre-scan evaluation, the EUT was rotated in all possible directions to find the maximum emissions. The orthogonal position that showed the highest emissions was used. The antenna was raised between 1 and 4 meters and the EUT turntable was rotated 360 degrees to maximize the emissions.



8.1 Test Data - Field Strength of Emissions from Intentional Radiators

Test Date(s):	Sept. 24, 2019	Test Engineer(s):	J. Chiller
Standards:	CFR 47 Part 15.249(a)	Air Temperature:	22.6°C
		Relative Humidity:	50%

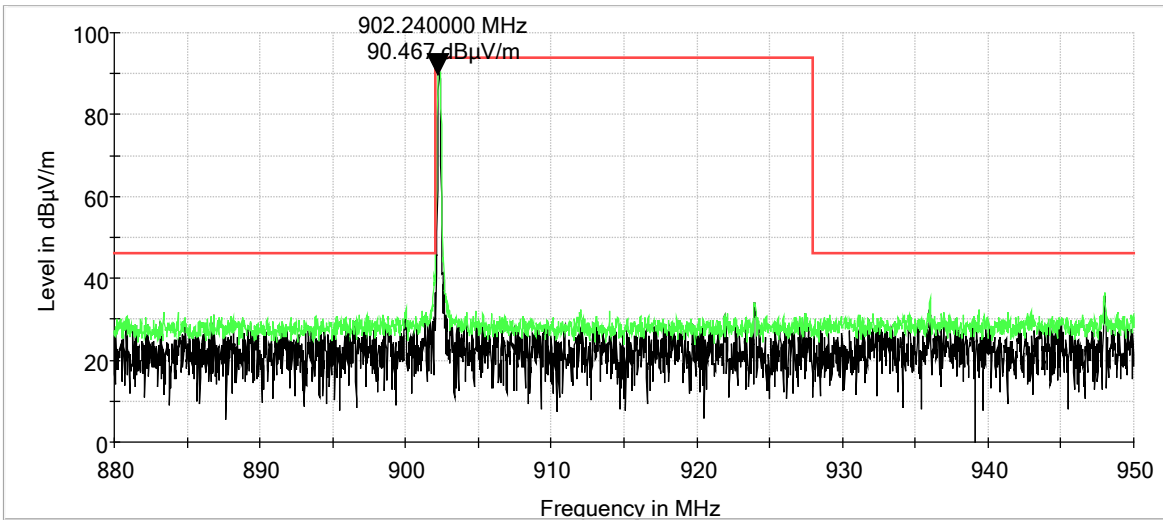
125kHz, SF12: Band Edge



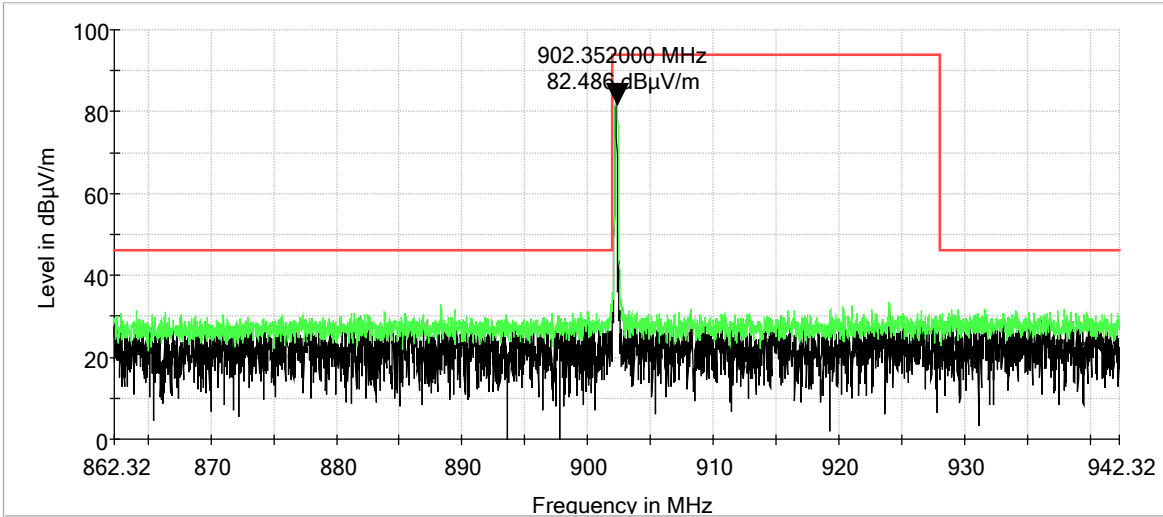
Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Azimuth (deg)	Reading (dBµV)	Correction Factors (dB)	Emission (dBµV/m)	Limit (dBµV/m)	Margin (dB)
900.000000	H	100.00	109.00	21.3	7.2	28.5	46.0	-17.5
900.000000	V	165.00	123.00	24.1	7.2	31.3	46.0	-14.7
902.000000	V	165.00	123.00	27.1	7.2	34.3	46.0	-11.7
902.000000	H	100.00	109.00	31.6	7.2	38.8	46.0	-7.2
902.320000	H	100.00	109.00	86.1	7.2	93.3	94.0	-0.7
902.320000	V	165.00	123.00	81.4	7.2	88.6	94.0	-5.4
908.520000	H	100.00	117.00	86.7	7.1	93.8	94.0	-0.2
908.520000	V	165.00	120.00	81.4	7.1	88.5	94.0	-5.5
914.920000	V	175.00	125.00	80.7	7.2	87.9	94.0	-6.1
914.920000	H	100.00	101.00	86.4	7.2	93.6	94.0	-0.4
928.000000	H	100.00	101.00	20.0	7.4	27.4	46.0	-18.6
928.000000	V	175.00	125.00	19.8	7.4	27.2	46.0	-18.8
930.000000	H	100.00	101.00	20.0	7.5	27.5	46.0	-18.5
930.000000	V	175.00	125.00	20.5	7.5	28.0	46.0	-18.0



125kHz, SF12: Band Edge, Low Channel, Vertical

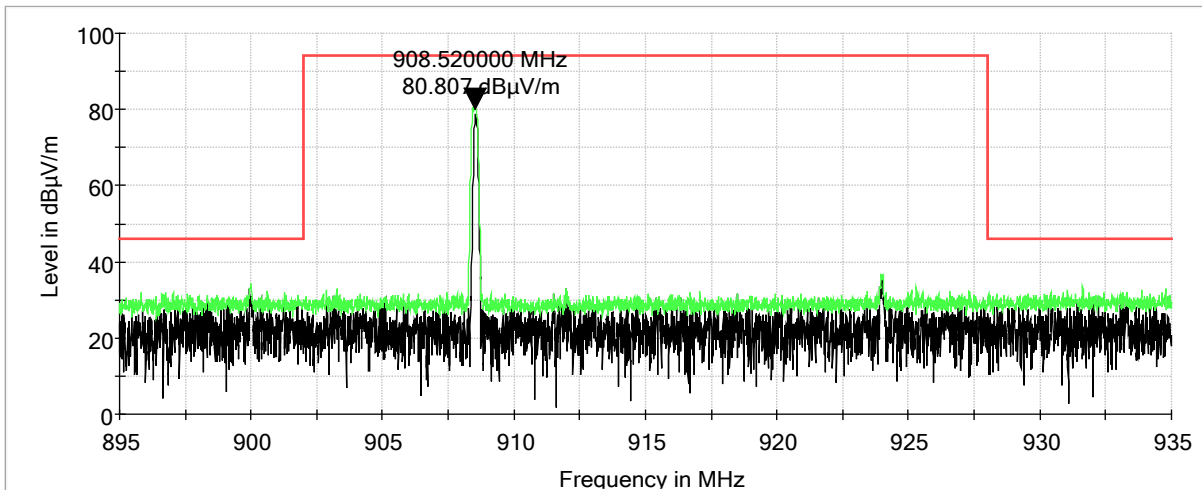


125kHz, SF12: Band Edge, Low Channel, Horizontal

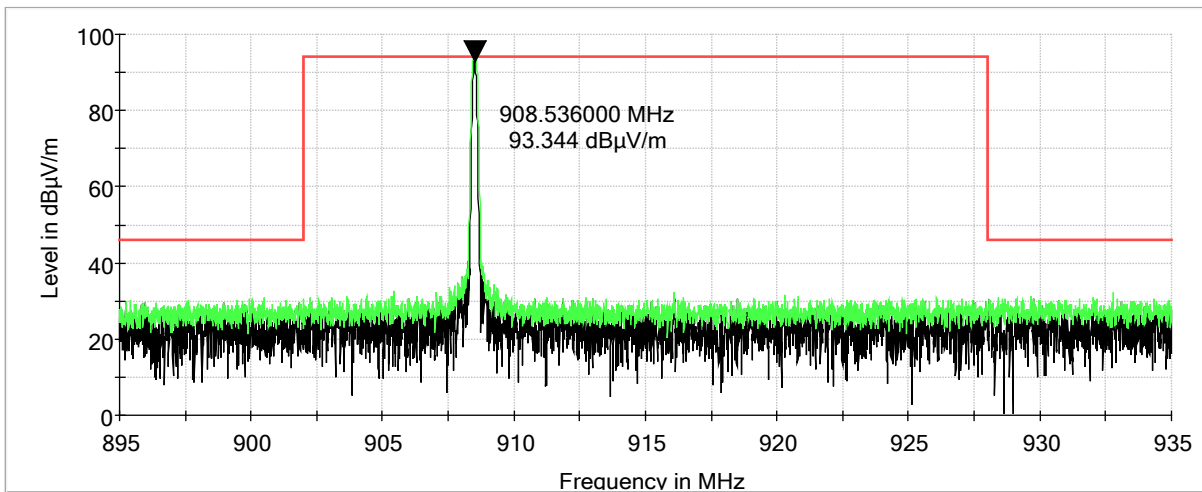




125kHz, SF12: Band Edge, Mid Channel, Vertical

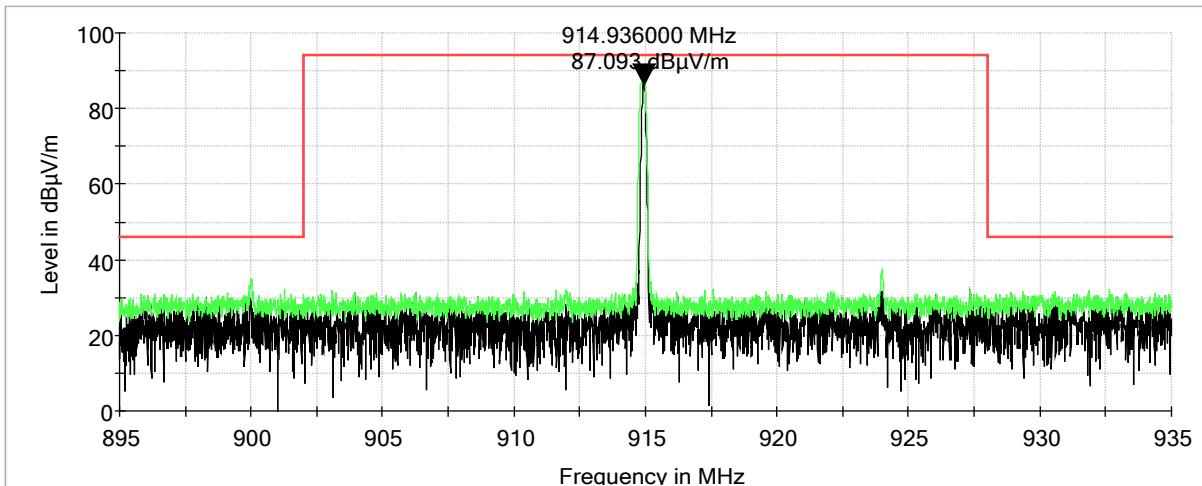


125kHz, SF12: Band Edge, Mid Channel, Horizontal

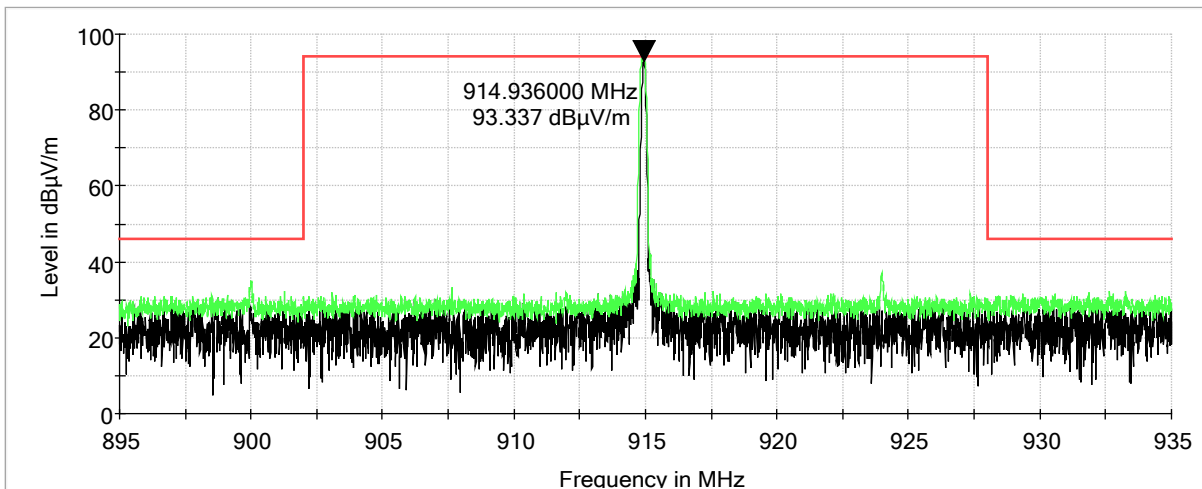




125kHz, SF12: Band Edge, High Channel, Vertical

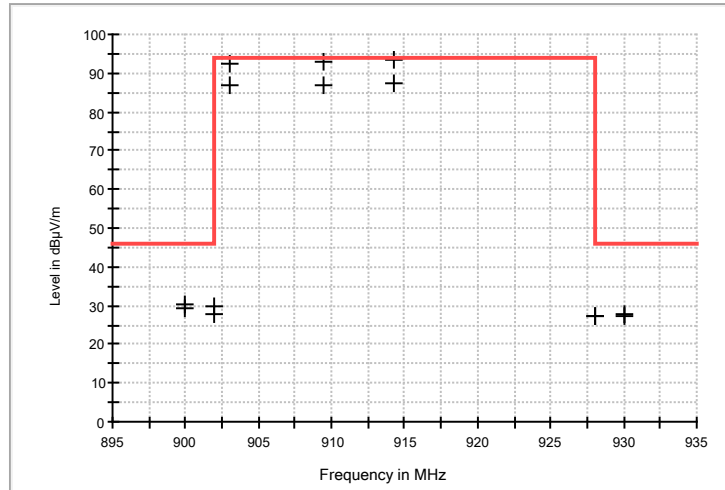


125kHz, SF12: Band Edge, High Channel, Horizontal





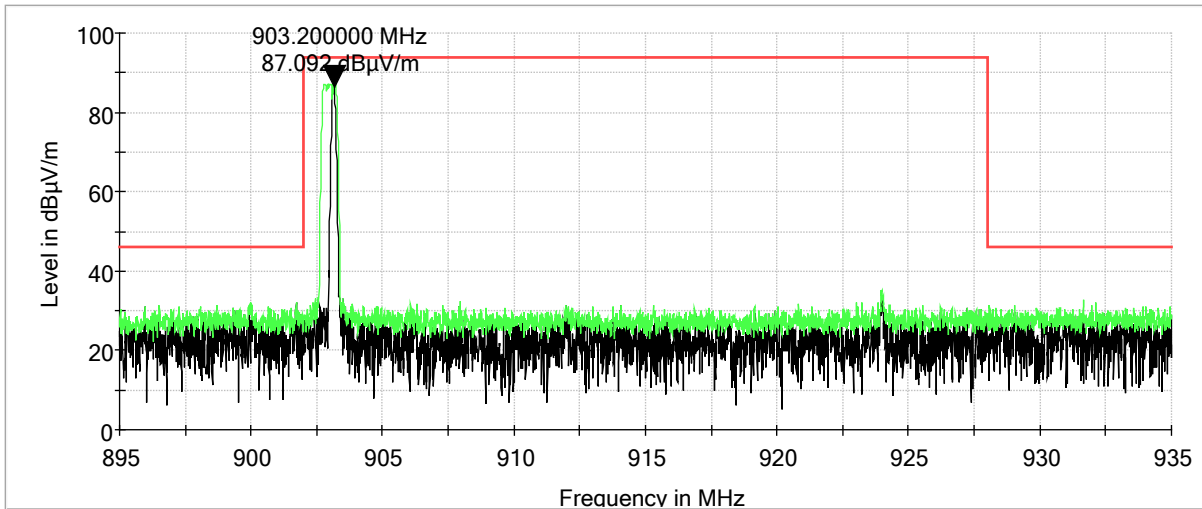
500kHz, SF12: Band Edge



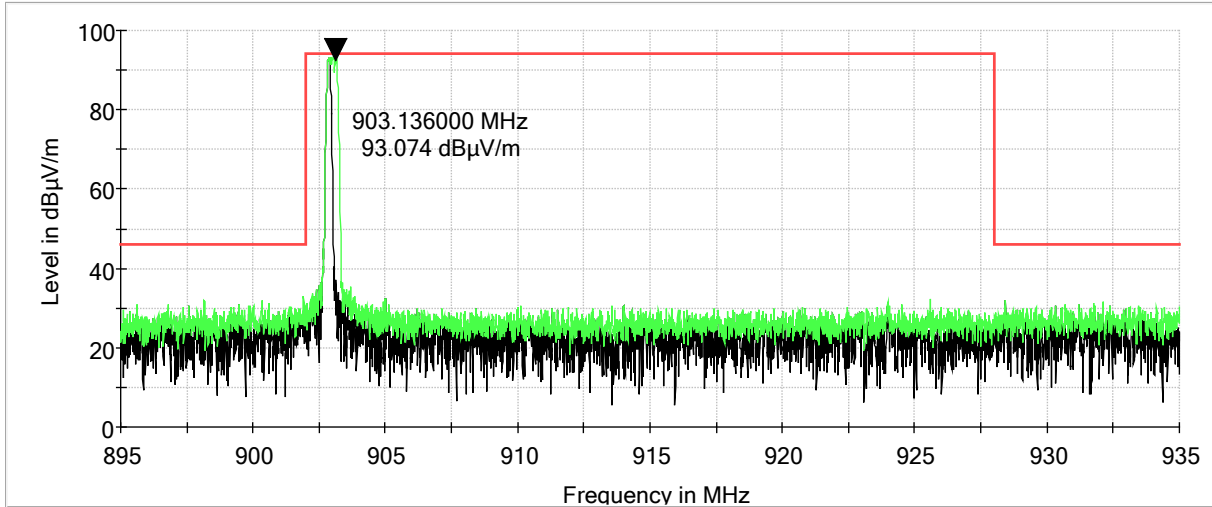
Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Azimuth (deg)	Reading (dBμV)	Correction Factors (dB)	Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
900.000000	V	155.00	152.00	23.3	7.2	30.5	46.0	-15.5
900.000000	H	100.00	283.00	22.1	7.2	29.3	46.0	-16.7
902.000000	V	155.00	152.00	20.8	7.2	28.0	46.0	-18.0
902.000000	H	100.00	283.00	22.4	7.2	29.6	46.0	-16.4
903.000000	H	100.00	283.00	85.5	7.2	92.7	94.0	-1.3
903.000000	V	155.00	152.00	79.6	7.2	86.8	94.0	-7.2
909.400000	V	155.00	152.00	79.7	7.1	86.8	94.0	-7.2
909.400000	H	100.00	275.00	85.9	7.1	93.0	94.0	-1.0
914.200000	V	155.00	152.00	80.0	7.2	87.2	94.0	-6.8
914.200000	H	100.00	283.00	86.1	7.2	93.3	94.0	-0.7
928.000000	H	155.00	152.00	19.8	7.4	27.2	46.0	-18.8
928.000000	H	100.00	109.00	19.9	7.4	27.3	46.0	-18.7
930.000000	H	155.00	152.00	20.1	7.5	27.6	46.0	-18.4
930.000000	H	100.00	109.00	19.9	7.5	27.4	46.0	-18.6



500kHz, SF12: Band Edge, Low Channel, Vertical

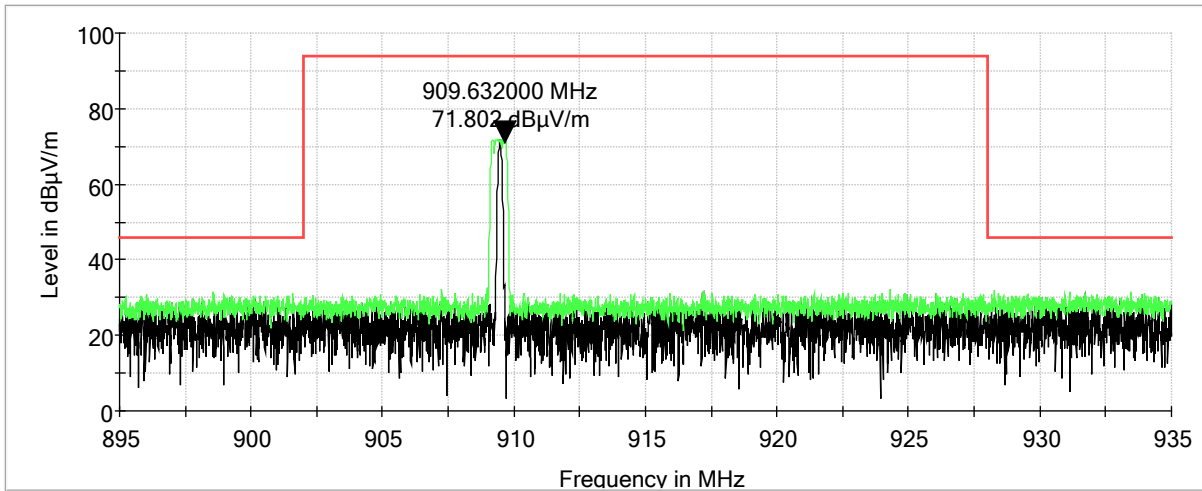


500kHz, SF12: Band Edge, Low Channel, Horizontal

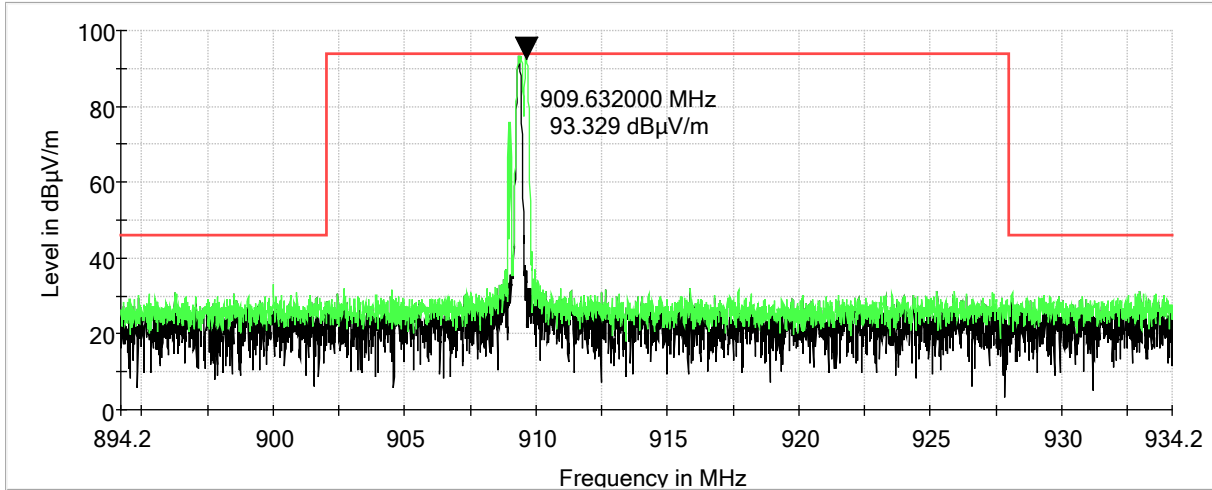




500kHz, SF12: Band Edge, Mid Channel, Vertical

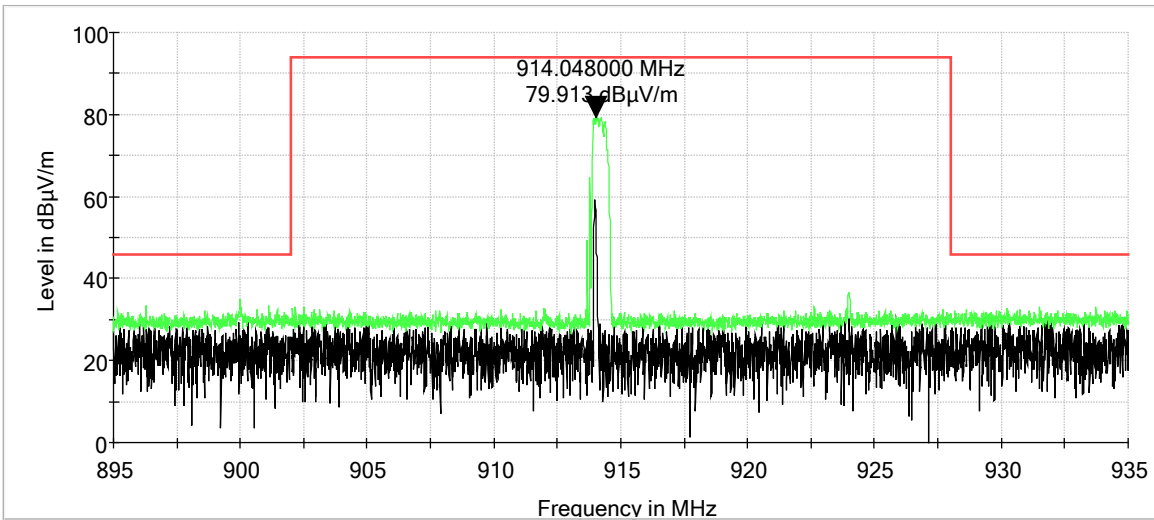


500kHz, SF12: Band Edge, Mid Channel, Horizontal

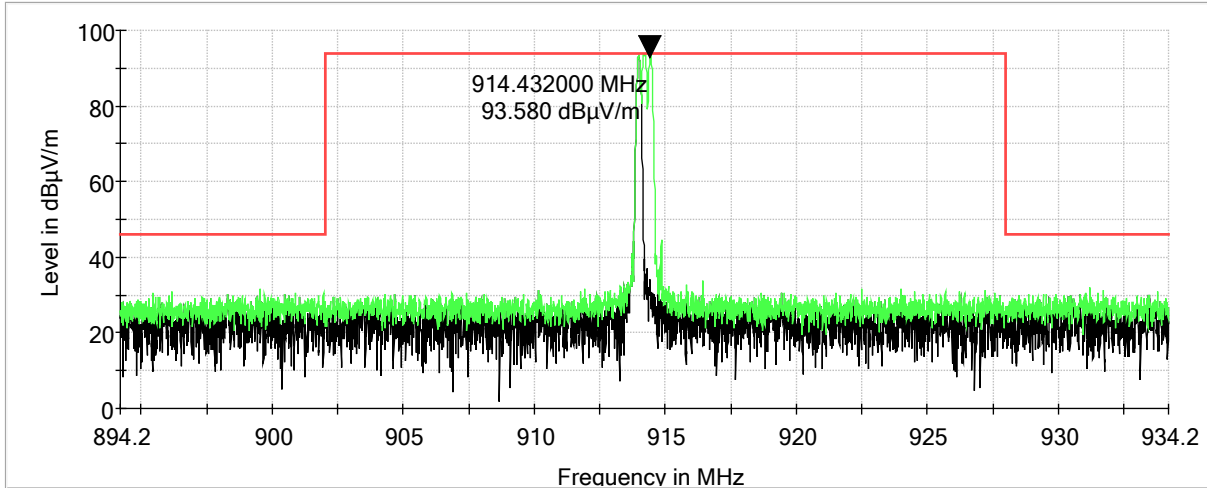




500kHz, SF12: Band Edge, High Channel, Vertical



500kHz, SF12: Band Edge, High Channel, Horizontal





8.2 Test Data – Spurious Emissions

Notes: Plots are peak, max hold pre-scan data included only to determine what frequencies to investigate and measure. During the pre-scan evaluation, the EUT was rotated in all possible directions to find the maximum emissions. The orthogonal position that showed the highest emissions was used. At some frequencies, no emissions from the EUT were measurable over the ambient noise floor. The readings did not change with EUT on and EUT off.

At least 6 of the highest frequencies were measured per ANSI 63.4 in a 3-meter anechoic chamber. Frequencies below 1GHz were measured using a quasi-peak detector. The antenna was raised between 1 and 4 meters and the EUT turntable was rotated 360 degrees to maximize the emissions. Some of the frequencies did not change with the EUT on or off. At those frequencies, the test distance was shortened to 1 meter and still no emissions from the EUT were visible or over the ambient or limit. Frequencies were scanned from 9kHz to 10 GHz in both the 125kHz and 500kHz protocols. The worst case protocol was the 500kHz, and the highest emissions from all channels are listed below.

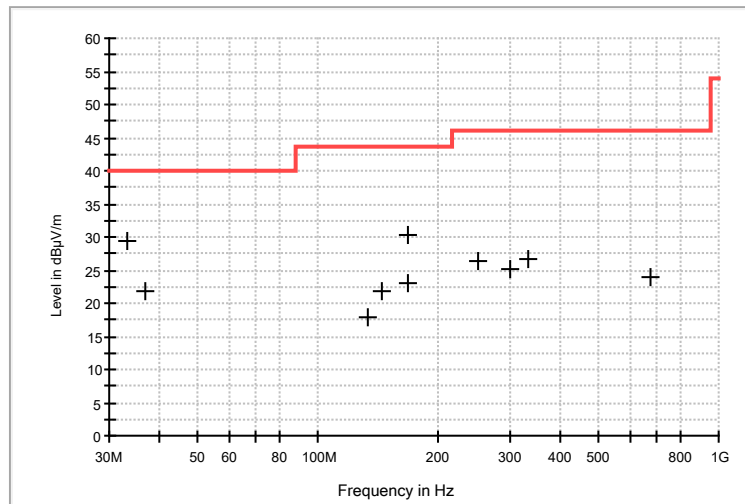
In the following plots, the black line indicates ambient noise and the red line indicates the measurement with the EUT on. Emissions to be found by the EUT from the high, mid, and low channels were measured and listed in tables below.



Test Date(s):	Sept. 25, 2019	Test Engineer(s):	J. Chiller
Standards:	CFR 47 Part 15.249(d) / Part 15.209	Air Temperature:	19.7°C
		Relative Humidity:	58%

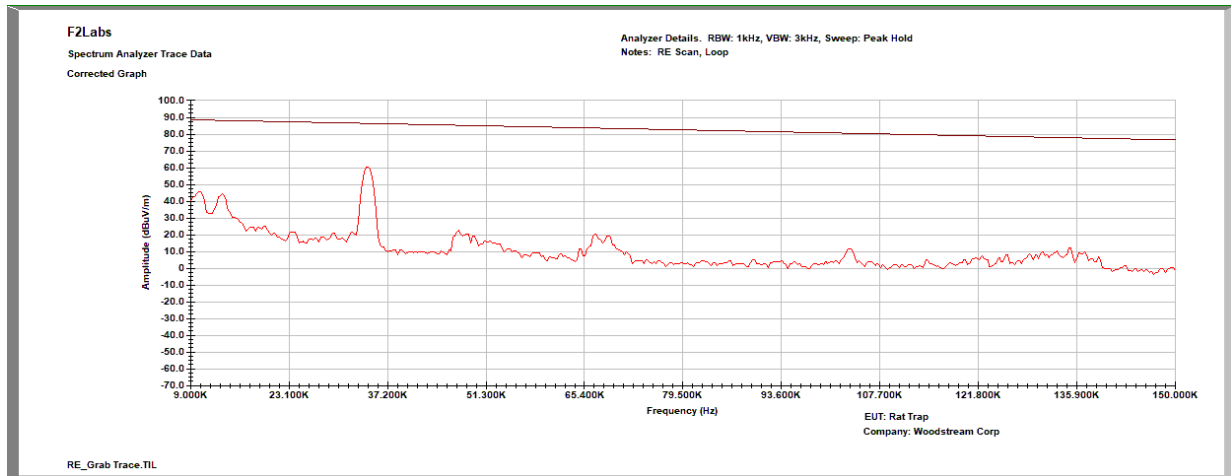
Measurements

Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Azimuth (degrees)	Reading (dBμV)	Correction Factors (dB)	Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
33.280000	V	100.00	0.00	25.0	4.4	29.40	40.0	-10.6
36.800000	H	100.00	0.00	20.1	1.6	21.70	40.0	-18.3
133.200000	H	100.00	0.00	19.8	-1.9	17.90	43.5	-25.6
144.080000	V	100.00	0.00	24.6	-2.8	21.80	43.5	-21.7
166.560000	V	100.00	0.00	33.7	-3.5	30.20	43.5	-13.3
166.560000	H	100.00	0.00	26.6	-3.5	23.10	43.5	-20.4
250.400000	V	100.00	0.00	30.0	-3.5	26.50	46.0	-19.5
299.680000	H	100.00	0.00	27.0	-1.7	25.30	46.0	-20.7
335.920000	V	100.00	0.00	27.6	-0.9	26.70	46.0	-19.3
675.440000	H	100.00	0.00	19.3	4.8	24.10	46.0	-21.9

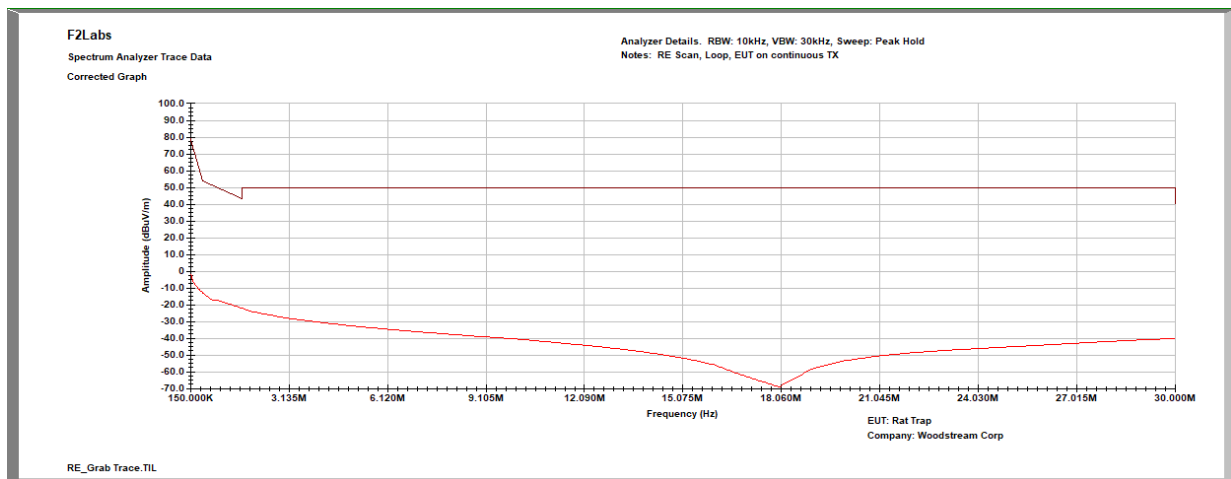




0.009 MHz to 0.15 MHz (Loop)

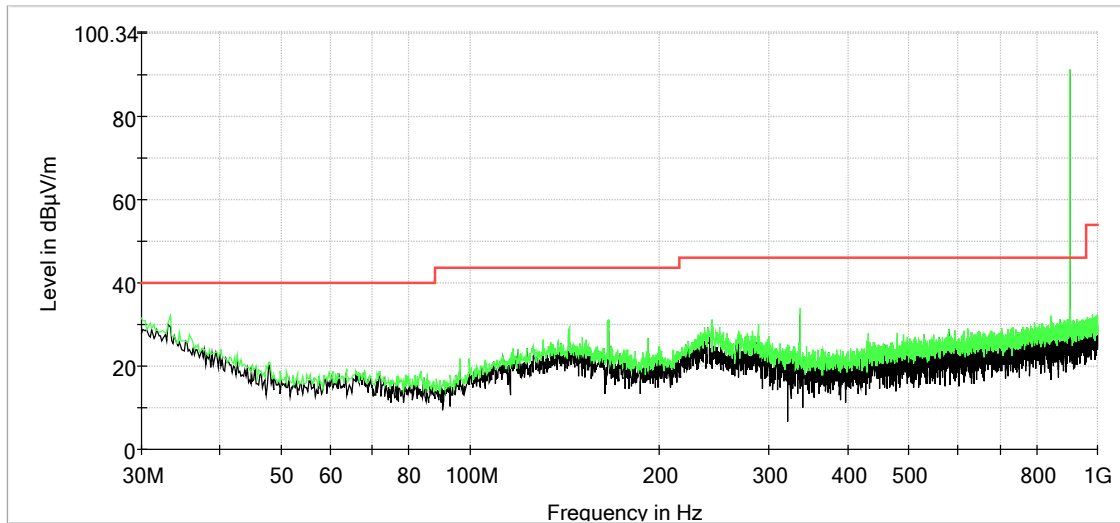


0.15 MHz to 30 MHz (Loop)

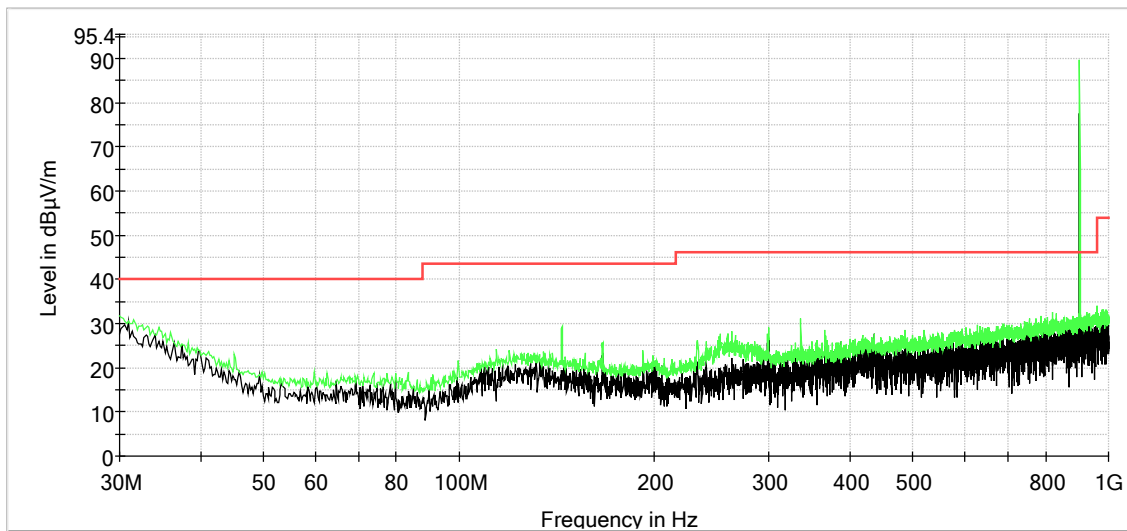




30 MHz to 1000 MHz, Vertical

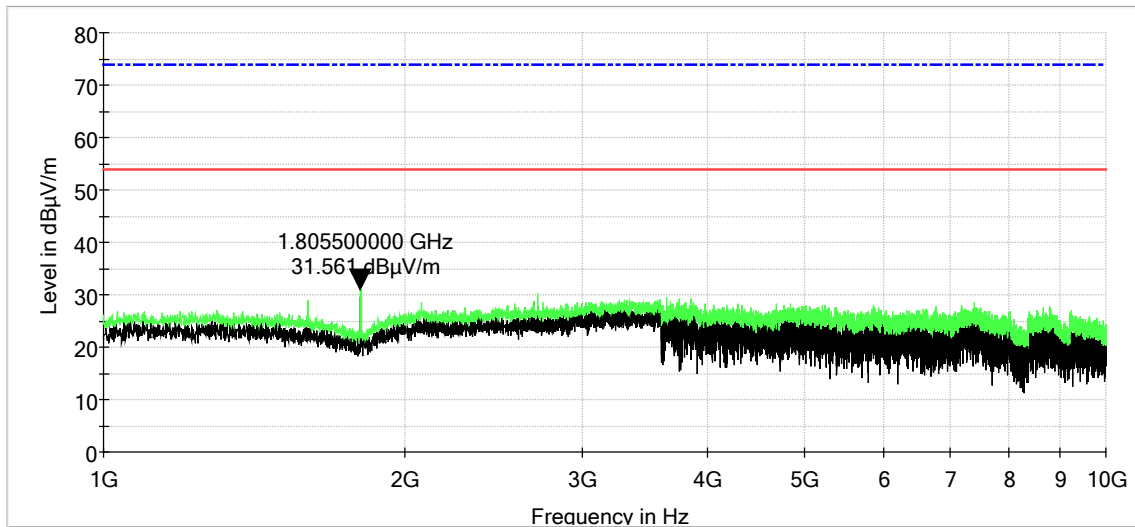


30 MHz to 1000 MHz, Horizontal

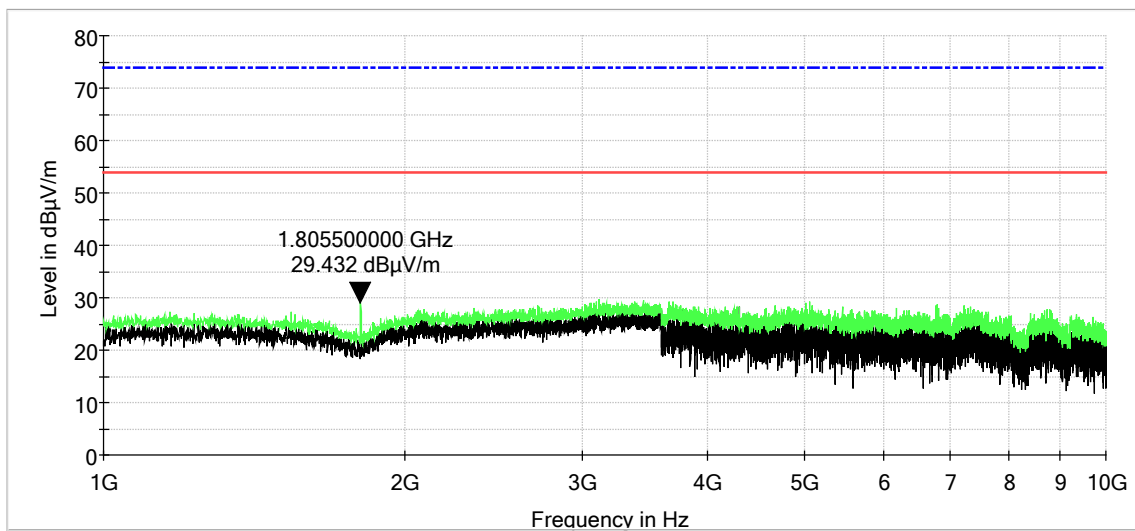




1 GHz to 10 GHz, Vertical

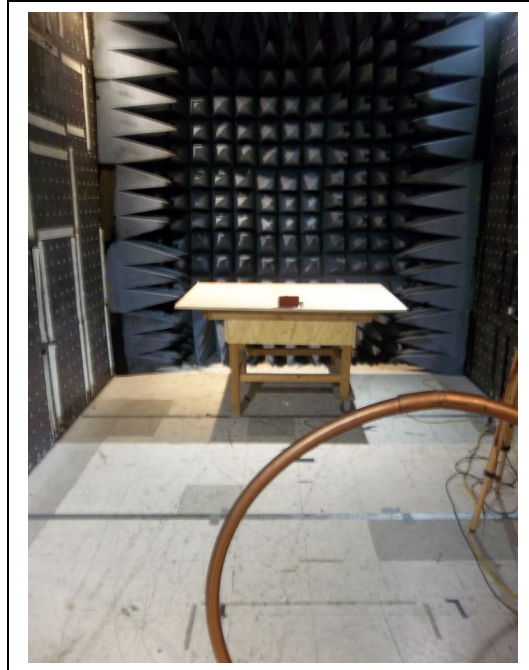


1 GHz to 10 GHz, Horizontal

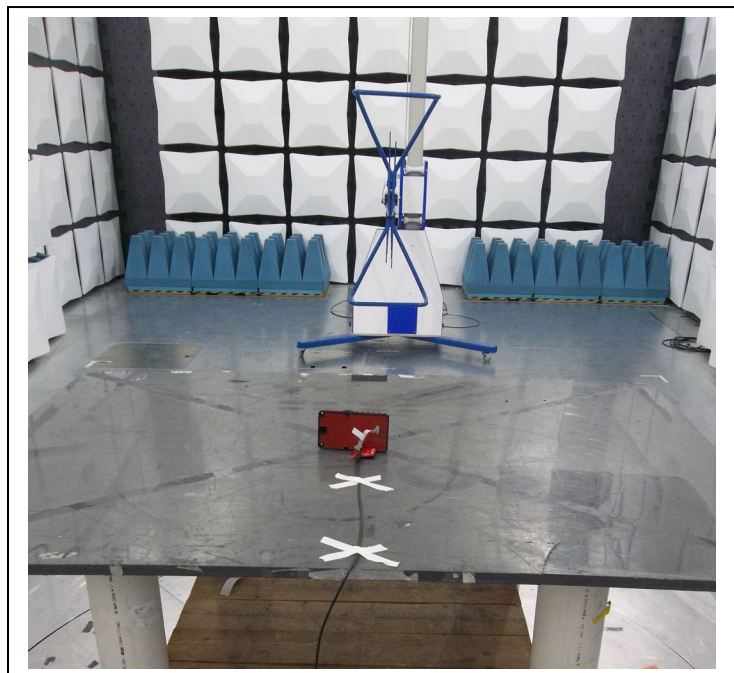


9 PHOTOGRAPHS

Radiated Spurious Emissions: Loop

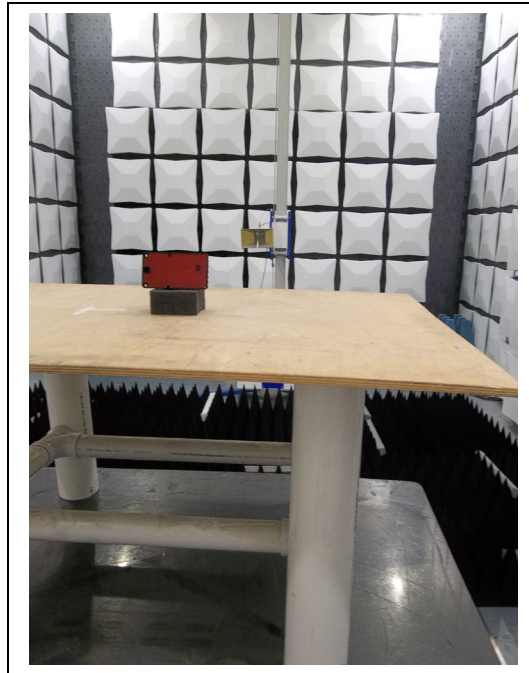


Radiated Spurious Emissions: 30 MHz to 1000 MHz





Radiated Spurious Emissions: 1 GHz to 10 GHz



Field Strength of Emissions, Occupied Bandwidth

