



BEC INCORPORATED

CERTIFICATION APPLICATION TEST REPORT

**TEST STANDARDS:
FCC Part 15 Subpart C, ISED RSS-Gen, ISED RSS-247
DSS Intentional Radiator**

**Woodstream Corporation Model V430B
VLINK Rodent Snap Trap with LoRa Radio**

**FCC ID: SNA-V430B
ISED ID: 9458A-V430B**

REPORT BEC-2287-02

TEST DATES: 12/22/2023 – 01/11/2024

**CUSTOMER:
Woodstream Corporation
69 North Locust Street
Lititz, PA 17543**

PREPARED BY: _____

JR Fanella, Test Engineer

REVIEWED and APPROVED BY: _____

Steve Fanella, Quality Manager

The results described in this report relate only to the item(s) tested. This document shall not be reproduced except in full without prior written permission of BEC Incorporated





TABLE OF CONTENTS

Notice to Customer	4
Revision History	4
1.0 Administrative Information	5
1.1 Project Details	5
1.2 Preface	6
1.3 Laboratory and Customer Information	6
1.4 Measurement Uncertainty	7
1.5 Test Result Summary Table	8
1.6 Condition of Received Sample	9
1.7 Climatic Environment	9
1.8 Test Equipment	9
2.0 Equipment Under Test	10
2.1 EUT Description	10
2.2 Product Category	10
2.3 Product Classification	10
2.4 Test Configuration	10
2.5 Test Configuration Rationale	10
2.6 Test Configuration Diagrams	11
2.7 EUT Information, Interconnection Cabling and Support Equipment	12
2.8 Test Signals and Test Modulation	13
2.9 Antenna Gain	14
2.10 Grounding	14
2.11 EUT Modifications	14
2.12 EUT Pictures Woodstream Model V430B Rodent Snap Trap with LoRa Radio	14
3.0 Applicable Requirements, Methods, and Procedures	15
3.1 Applicable Requirements	15
3.1.1 FCC Requirements	15
3.1.2 Innovation, Science and Economic Development Canada (ISED)	15
3.1.3 Basic Test Methods and Test Procedures	15
3.2 Deviations or Exclusions from the Requirements	15
4.0 Test Results	16
4.1 Antenna Requirement (47 CFR 15.203)(RSS-GEN ANNEX A (10)(g))	16
4.2 External RF power amps/antenna modifications (47 CFR 15.204)(RSS-GEN 8.3)	16
4.3 Duty Cycle of the DSS Fundamental Transmission	16
4.3.1 Duty Cycle Measurement Results (01/10/2024)	17
4.4 DSS Emissions in Non-restricted Frequency Bands (FCC Section 15.247(d), RSS-247 Sec. 5.5)	18
4.4.1 DSS Emissions in Non-restricted Frequency Bands Test Procedure	18
4.4.2 DSS Emissions in Non-restricted Frequency Bands Reference Measurement Channel 0 at 902.3 MHz (01/09/2024)	18
4.4.3 DSS Emissions in Non-restricted Frequency Bands Channel 0 Test Results (01/09/2024)	19
4.4.4 DSS Emissions in Non-restricted Frequency Bands Reference Measurement Channel 32 at 908.7 MHz (01/09/2024)	23



4.4.5	DSS Emissions in Non-restricted Frequency Bands Channel 32 Test Results (01/09/2024).....	24
4.4.6	DSS Emissions in Non-restricted Frequency Bands Reference Measurement Channel 63 at 914.9 MHz (01/09/2024).....	28
4.4.7	DSS Emissions in Non-restricted Frequency Bands Channel 63 Test Results (01/09/2024).....	29
4.5	DSS Radiated Emissions in Non-restricted and Restricted Frequency Bands, 30 MHz - 10 GHz (47 CFR 15.205 & 15.209)(RSS-GEN 8.9 & 8.10)	33
4.5.1	Non-restricted and Restricted Bands Test Facility	33
4.5.2	Non-restricted and Restricted Bands Radiated Emissions Test Procedure	34
4.5.3	DSS Emissions in Non-restricted and Restricted Bands of Operation, 30 MHz – 1000 MHz Test Results (12/27/2023).....	35
4.5.4	DSS Emissions in Non-restricted and Restricted Bands of Operation, 1 – 10 GHz Test Results (12/29/2023 & 01/08/2024).....	37
4.6	DSS 20 dB Occupied Bandwidth (FCC Section 15.247(a)(1) RSS-247 5.1(c)).....	39
4.6.1	20 dB Occupied Bandwidth – Test Procedure.....	39
4.6.2	DSS (20 dB) Occupied Bandwidth Test Results (01/08/2024)	39
4.7	DSS 99% Occupied Bandwidth RSS-Gen 6.7	42
4.7.1	DSS 99% Occupied Bandwidth – Test Procedure.....	42
4.7.2	DSS 99% Occupied Bandwidth Test Results (01/08/2024)	42
4.8	Maximum Output Power Conducted and EIRP (FCC Part 15.247(b)(3), RSS-247 Section 5.4(d)).....	45
4.8.1	Maximum Output Power Peak Conducted Test Procedure-DSS Mode.....	45
4.8.1.1	Maximum Output Power Peak Conducted Test Results (01/08/2024).....	45
4.8.2	Maximum Output Power Average Conducted Test Procedure-Hybrid Mode	49
4.8.2.1	Maximum Output Power Average Conducted Test Results (01/08/2024)	49
4.8.3	EIRP Calculation RSS-247 (01/08/2024).....	52
4.9	Carrier Frequency Separation 47 CFR 15.247(a)(1) RSS-247 (5.1)(b)	53
4.9.1	Carrier Frequency Separation Test Procedure.....	53
4.9.2	Carrier Frequency Separation Test Results (01/10/2024)	54
4.10	Number of Hopping Frequencies 47 CFR 15.247(a)(1)(i), RSS-247 (5.1)(c)	55
4.10.1	Number of Hopping Frequencies Test Procedure	55
4.10.2	Number of Hopping Frequencies Test Results (01/11/2024).....	55
4.11	Time of Occupancy (Dwell Time) 47 CFR 15.247(a)(1)(i), RSS-247 (5.1)(c).....	60
4.11.1	Time of Occupancy (Dwell Time) Test Procedure	60
4.11.2	Time of Occupancy (Dwell Time) Test Results (01/11/2024)	60
4.12	Band Edge Measurement 47 CFR 15.247(d) and RSS-247 (5.5).....	65
4.12.1	Band Edge Measurement Test Procedure.....	65
4.12.2	Band Edge Measurement Test Results (01/10/2024)	65
4.13	Average Power Spectral Density, Hybrid Mode (FCC Section 15.247(e) and (f), RSS-247 Section 5.2(b) and 5.3).....	68
4.13.1	Average Power Spectral Density Test Procedure	68
4.13.1.1	Average Power Spectral Density Test Results (01/08/2024).....	68
5.0	Test Setup Photos.....	71
Appendix A	– Test Equipment.....	72



Notice to Customer

This report and any recommendations it contain represent the result of BEC's testing and assessment on behalf of your company. Testing has been conducted according to accepted engineering standards and practices. This report reflects testing and assessment of product samples provided by your company and may not reflect the characteristics of other samples, especially those produced at different times. This report and its findings and recommendations, if implemented, should not be construed as an assurance or implied warranty for the continuing electromagnetic compatibility (EMC) of the product. **BEC shall not be liable for incidental or consequential damages, even if advised of the possibility thereof.**

BEC will not disseminate this report to other parties without your express permission. You may reproduce this report in its entirety including this notice and the entireties of any supplemental test reports on the same product (e.g. reports on additional testing following modification). However, 'you may not reproduce portions of the report (except for the entirety of the summary section) or quote from it for any purpose without specific prior written permission from BEC'.

The BEC Decision Rule: Measurement Uncertainty is not applied to any testing measurements or test results provided to the customer by BEC Incorporated at this time.

Revision History

Revision #	Description of Changes	Date of Changes	Date Released
0	Test Report Initial Release	N/A	01/23/2024
1	Removed DRAFT watermark on Pages 42 to 73. Changed Titles in Radiated emissions tables to clarify that the measurements are corrected (using Correction Factors)	04/04/2024	04/04/2024



1.0 Administrative Information

1.1 Project Details

Project Number	BEC-2287	
Manufacturer	Woodstream Corporation	
Model Number	V430B	
EUT Description	VLINK Rodent Snap Trap with LoRa Radio	
Serial Numbers	SR231218WS00067	3
Sample Types	Radiated Emissions Test Sample	Antenna Conducted Test Sample with SMA Adapter
Sample Numbers	2287-02	2287-01
FCC ID	SNA-V430B	
ISED ID	9458A-V430B	
Radio Chip Manufacturer	Semtech Corporation	
Radio Chip Model Number	SX1261	
Frequency of Operation	902 – 915 MHz	
Frequencies Tested	Low (902.3 MHz), Middle (908.7 MHz), High (914.9 MHz)	
Antenna Gain	+ 2.11 dBi	
Antenna Type	Inverted F PCB Trace	
Modulation	LoRa	
Signal Classification	DSS Spread Spectrum Transmitter	
EUT Firmware Version	2.3.4	
Date Samples Received	12/20/2023	
Sample Types and Condition Received	Production Units Suitable for Test	
Applicable FCC Rules	FCC Rules Part 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz Part 15 Spread Spectrum Transmitter	
Applicable ISED Rules	RSS-Gen: General Requirements for Compliance of Radio Apparatus & RSS-247: Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices	



1.2 Preface

This report documents product testing conducted to verify compliance of the specified EUT with applicable standards and requirements as identified herein. EUT, test instrument configurations, test procedures, and recorded data are generally described in this report. The reader is referred to the applicable test standards for detailed procedures. The following table summarizes the test results obtained during this evaluation.

1.3 Laboratory and Customer Information

Test Laboratory Location	BEC Incorporated 970 East High Street Pottstown, PA 19464
BEC Test Personnel	JR Fanella / Steve Fanella
BEC Laboratory Number FCC Registration	US1118
BEC Laboratory Number ISED Registration	7342A-1
Test Performed For	Woodstream Corporation 69 North Locust Street Lititz, PA 17543
Customer Technical Contacts	Dave George/Matt Kauffman
Customer Reference Number	PO # 204485



1.4 Measurement Uncertainty

Measurement	Measurement Distance	Frequency Range	Measurement Limit	Expanded Uncertainty
Radiated Disturbance	3 Meter	30 MHz – 1 GHz	Class B	4.65
Conducted Disturbance AC Mains	N/A	150 kHz – 30 MHz	Class A or B	2.69

No adjustments to measured data presented in this report are required because all values of uncertainty are less than the CISPR 16-4-2:2018 recommendations. These uncertainties have a coverage factor of $k = 2$, which yields approximately a 95% level of confidence for the near-normal distribution typical of most measurement results.

FCC Registered Test Site Number: US1118
 ISED Registered Test Site Number: 7342A-1

Test Measurement	ETSI EN 300 220-1 Limit	BEC Value
Radio Frequency	± 0.5 ppm	± 0.027 ppm
RF Power, Conducted	± 1.5 dB	± 1.45 dB
Conducted Spurious Emission of Transmitter, Valid up to 6 GHz	± 3 dB	± 0.9 dB
Radiated Emission of Transmitter, Valid up to 6 GHz	± 6 dB	± 4.87 dB
Radiated Emission of Receiver, Valid up to 6 GHz	± 6 dB	± 4.87 dB
Occupied Bandwidth	± 5 %	± 2 %
Temperature	± 2.5 °C	± 0.5 °C
Humidity	± 10 %	± 2.5 %

These uncertainties have a coverage factor of $k = 1.96$ or $k = 2$, (which provide confidence levels of respectively 95 % and 95.45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)). Principles for the calculation of measurement uncertainty are contained in ETSI TR 100 028 [i.3], in particular in annex D of ETSI TR 100 028-2 [i.3].



1.5 Test Result Summary Table

The Woodstream Model V430B Rodent Snap Trap with LoRa Radio was tested and found to be compliant to the sections of the FCC Part 15 Subpart C and ISED standards listed below:

Report Section	FCC Part 15, Subpart C	ISED RSS-Gen	ISED RSS-247	Test Description	Result
N/A	15.207(b)	7.2		Conducted Emissions AC Mains 150 kHz to 30 MHz	N/A
4.1	15.203	Annex A 10(g)		Antenna Requirement	PASS
4.2	15.204	8.3		External RF power amps/antenna modifications	PASS
4.3	ANSI C63.10, Section 11.6			Duty Cycle	Measured
4.4	15.247(d)		5.5	DSS Emissions in Non-Restricted Frequency Bands 30 MHz to 10 GHz	PASS
4.5	15.205, 15.209 15.35(b)	8.1, 8.9, 8.10	3.3	DSS Emissions in Restricted & Non-restricted Frequency Bands 30 MHz to 10GHz	PASS
4.6	15.247(a)(1)		5.1 c)	20 dB Occupied Bandwidth	PASS
4.7	2.1049(h)	6.7		DSS 99% Occupied Bandwidth	PASS
4.8	15.247(b)(3)		5.4 d)	Maximum Conducted Output Power, Peak and Average, EIRP	PASS
4.9	15.247(a)(1)		5.1 b)	Carrier Frequency Separation	PASS
4.10	15.247(a)(1)(i)		5.1 c)	Number of Hopping Frequencies	PASS
4.11	15.247(a)(1)(i)		5.1 c)	Time of Occupancy	PASS
4.12	15.247(d)		5.5	Band Edge Measurement	PASS
4.13	15.247(e) and (f)		5.2 b) and 5.3	Average Power Spectral Density	PASS



1.6 Condition of Received Sample

An evaluation of the EUT was conducted in order to verify test subject identity and condition and to ensure suitability for testing. No evidence of physical damage was noted. The test item condition was deemed acceptable for the performance of the requested test services.

1.7 Climatic Environment

The following were the general environmental conditions inside the laboratory during testing:

Temperature: $22^{\circ}\text{C} \pm 5^{\circ}\text{C}$

Humidity: $50\% \pm 20\%$

Barometric Pressure: $1010 - 1050\text{ mb} \pm 20\%$

1.8 Test Equipment

All test equipment is checked to manufacturer's specifications and, when applicable, have current N.I.S.T. traceable, ISO 9002 conforming certificates of calibration. Test equipment used for the tests described herein is listed in Appendix A.



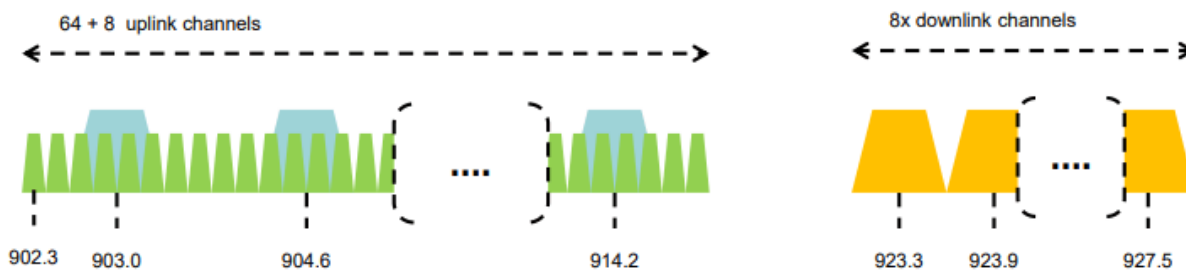
2.0 Equipment Under Test

Unless otherwise noted in the individual test results sections, testing was performed on the EUT as follows.

2.1 EUT Description

The Woodstream Model V430B VLINK is a Rodent Trap which incorporates a LoRa Radio to communicate trap status to a smart phone or network application. The device is powered by an internal 3.0 VDC coin cell lithium battery.

The Model V430B operates in FHSS mode while in the joining phase and then switches to Hybrid mode for data phase. FHSS mode uses 64 channels and Hybrid mode uses a subset of 8 channels.



2.2 Product Category

FCC Part 15, Subpart C (Section 15.247), ISED RSS-Gen, ISED RSS-247

2.3 Product Classification

Intentional Radiator Testing Requirements, DSS Operation within the band of 902 - 928 MHz.

2.4 Test Configuration

The Woodstream Model V430B Rodent Snap Trap with LoRa Radio Sample # 2287-01 was tested without the enclosure for all antenna conducted measurements. The Woodstream Model V430B Rodent Snap Trap with LoRa Radio Sample # 2287-02 was tested within the trap enclosure during all radiated emissions tests.

2.5 Test Configuration Rationale

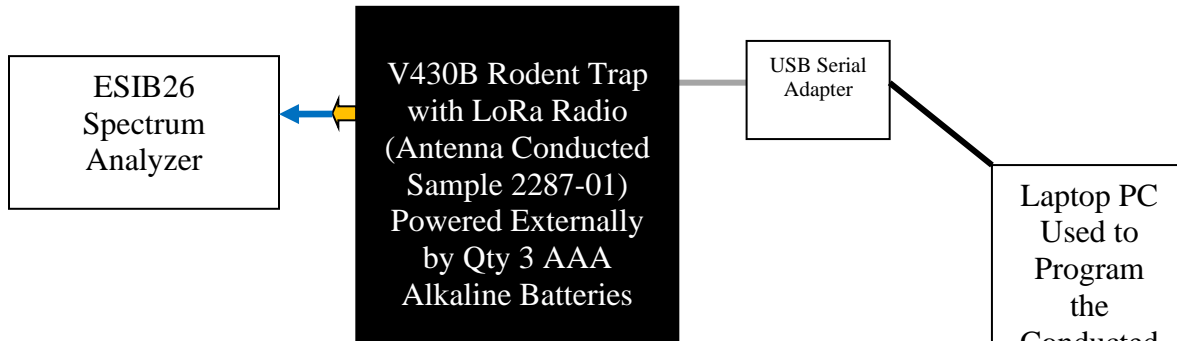
The modified radio of the Woodstream Model V430B Rodent Snap Trap with LoRa Radio allows direct access to the output of the radio, without a transmission antenna. The unmodified unit is factory produced with modified software for EMI test purposes.



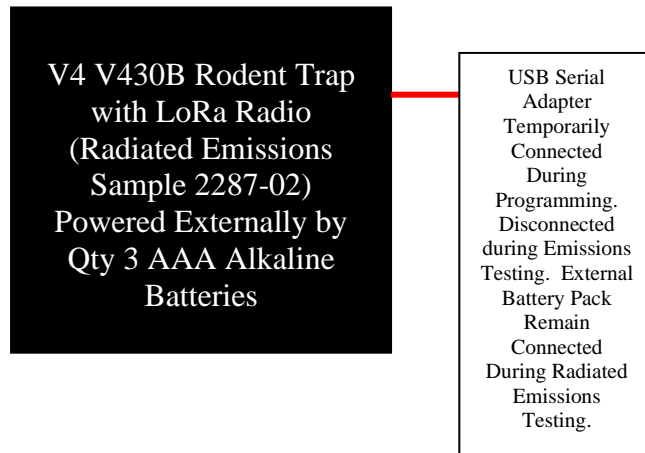
2.6 Test Configuration Diagrams

Block diagrams of the EUT configuration showing interconnection cables are illustrated below. The drawing shows the physical hardware layout used for the tests along with I/O cables and AC power distribution.

Antenna Conducted Test Configuration (modified with SMA connector in place of antenna)



Radiated Emission Test Configuration (un-modified EUT)





2.7 EUT Information, Interconnection Cabling and Support Equipment

EUT Hardware

Description	Manufacturer	Model	Serial Number	Sample Number
Lora Radio VLINK Rodent Trap (Unmodified Emissions Samples)	Woodstream Corporation	V430B	SR231218WS00067	2287-02
Lora Radio VLINK Rodent Trap (Modified with SMA Antenna Conducted Sample)			3	2287-01

Interconnection Cable List (Conducted Test Setup)

Manufacturer	Model	Type	Shielding	Length	Description
Suhner	S 04272B	Antenna Conducted RF Measurement Cable	Braided with Foil	0.7 Meter	Measurement Cable from the Antenna SMA Connector of the EUT to the input of the Rohde and Schwarz ESIB26 Receiver. BEC Asset # BEC-962

Support Equipment

Description	Manufacturer	Model	Serial Number
Powered Serial Adapter	Woodstream	2457159A_Y40	none
Lap Top Computer	Dell	Inspiron 15-3567	E4B4B16C-F475-4A3F-9795-A06C5CB4AB43



2.9 Antenna Gain

The antenna gain was derived using the formulae outlined in Appendix G of ANSI C63.10. The maximum peak output of the transmitter was measured at the SMA connector. The maximum radiated emission from the EUT with the internal antenna attached was measured at a distance of 3 meters from the EUT. The resultant antenna gain was the difference between EIRP at the transmitter terminals and the EIRP calculated from the field strength measured at 3 Meters. Antenna gain value was calculated to be + 2.11 dBi.

2.10 Grounding

There was no ground connection used; the EUT is battery powered and self-contained.

2.11 EUT Modifications

The Woodstream Model V430B Rodent Snap Trap with LoRa Radio Radiated Emissions Test Samples 2287-02 was modified to add a Serial Port for programming the EUTs radio. Also, an SMA connector was added directly to the antenna output on the main board of the Woodstream Model V430B Rodent Snap Trap with LoRa Radio Antenna Conducted Test Sample 2287-01.

2.12 EUT Pictures Woodstream Model V430B Rodent Snap Trap with LoRa Radio

See External Photos Exhibit(s) submitted under this grant.



3.0 Applicable Requirements, Methods, and Procedures

3.1 Applicable Requirements

The results of the measurement of the radio disturbance characteristics of the EUT described herein may be applied and where appropriate, provide a presumption of compliance to one or more of the following requirements or to other requirements at the discretion of the customer, regulatory agencies, or other entities.

3.1.1 FCC Requirements

Code of Federal Regulations: Title 47 – Telecommunication
Chapter I - Federal Communications Commission
Sub-chapter A – General
Part 15 – Radio Frequency Devices
Subpart C - Intentional Radiators
15.247 Operation within the bands 902-928 MHz,
2400-2483.5 MHz, and 5725-5850 MHz.

3.1.2 Innovation, Science and Economic Development Canada (ISED)

RSS-Gen Issue 5, February 2021 Amendment 2: General Requirements for Compliance of Radio Apparatus

RSS-247 Issue 3, August 2023: Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

3.1.3 Basic Test Methods and Test Procedures

KDB Document 558074 D01 15.247 Meas Guidance v05r02, Guidance for Performing Compliance Measurements on Digital Transmission Systems, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating under Section 15.247 of the FCC Rules.

ANSI C63.10-2020, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

3.2 Deviations or Exclusions from the Requirements

No deviations or exclusions were made.



4.0 Test Results

4.1 Antenna Requirement (47 CFR 15.203)(RSS-GEN ANNEX A (10)(g))

The antenna used by the Woodstream Model V430B Rodent Snap Trap with LoRa Radio is an Inverted-F PCB Trace Antenna. There are no detachable parts of the antenna. The antenna is not replaceable, nor changeable, and therefore complies with the requirements of this section.

4.2 External RF power amps/antenna modifications (47 CFR 15.204)(RSS-GEN 8.3)

There are no RF power amplifier kits available to be used with the Woodstream Model V430B Rodent Snap Trap with LoRa Radio. There are no detachable parts of the antenna. The antenna is not replaceable, nor changeable, and therefore complies with the requirements of this section.

4.3 Duty Cycle of the DSS Fundamental Transmission

The duty cycle of the DSS transmission should be greater than or equal to 98%. This ensures that the various emissions measured for this certification test will be made with the transmitter fully active. Duty cycles less than 98% can be used and a duty cycle correction factor can be calculated to reduce the peak level of the emission for radiated emission tests. The procedure of ANSI C63.10, Section 11.6 was used to evaluate the duty cycle of this device.



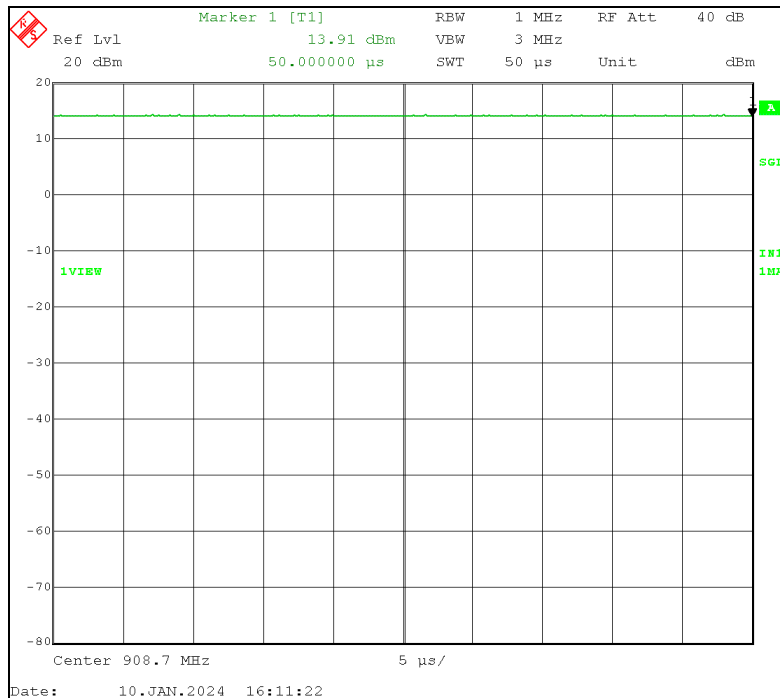
4.3.1 Duty Cycle Measurement Results (01/10/2024)

The fundamental transmission signal, tuned to 908.7 MHz, was displayed on the spectrum analyzer with zero frequency span and 1 MHz RBW and 3 MHz VBW to determine the duty cycle. The depiction below shows a continuous transmission. There is no off time while the transmitter is active with LoRa modulation. Therefore, the duty cycle is 100%.

Spectrum Analyzer Settings

RBW	1	MHz
VBW	3	MHz
Span	Zero	
Sweep (Auto)	50	us

Duty Cycle of DSS Transmission





4.4 DSS Emissions in Non-restricted Frequency Bands (FCC Section 15.247(d), RSS-247 Sec. 5.5)

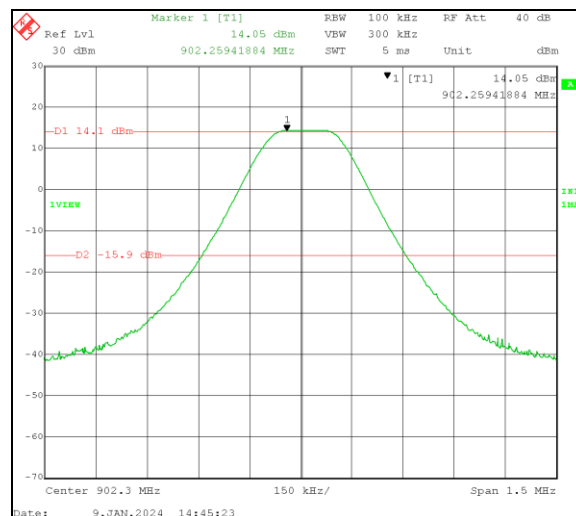
4.4.1 DSS Emissions in Non-restricted Frequency Bands Test Procedure

A measurement of the emissions in non-restricted frequency bands was made at the low Frequency 902.3 MHz (Channel 0), middle Frequency 908.7 MHz (Channel 32) and high Frequency 914.9 MHz (Channel 63). The signal output was maximized with LoRa modulation with 125 kHz bandwidth and Spread Factor of 8. The procedure for the test is ANSI C63.10, Section 11.11. The frequency spectrum from 9 kHz to 10 GHz was divided into six bands: 9 kHz – 30 MHz, 30 MHz - 100 MHz, 100 MHz - 500 MHz, 500 MHz – 1 GHz, 1 GHz – 5 GHz and 5 GHz – 10 GHz. The limit is 30 dBc based upon the measurement of Maximum Average Output Power. Each of the three fundamental test frequencies was measured for the reference value to determine the -30 dBc value.

Spectrum Analyzer Settings

RBW	100	kHz
VBW	300	kHz
Span	Varies	MHz
Sweep (Auto)	Varies	ms

4.4.2 DSS Emissions in Non-restricted Frequency Bands Reference Measurement Channel 0 at 902.3 MHz (01/09/2024)

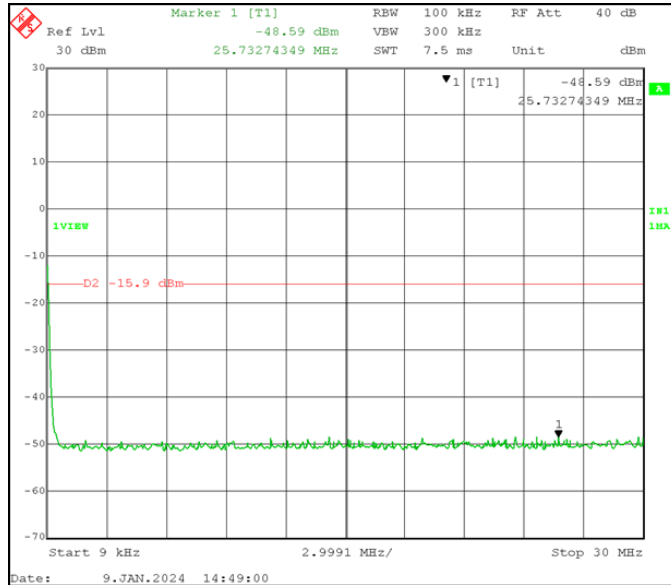


The peak level of 14.1 dBm is the maximum peak output of the Woodstream Model V430B Rodent Snap Trap with LoRa Radio. The conducted spurious emissions from the antenna port must be 30 dB down from this peak. The resultant limit is therefore -15.9 dBm and is displayed on the plots below.

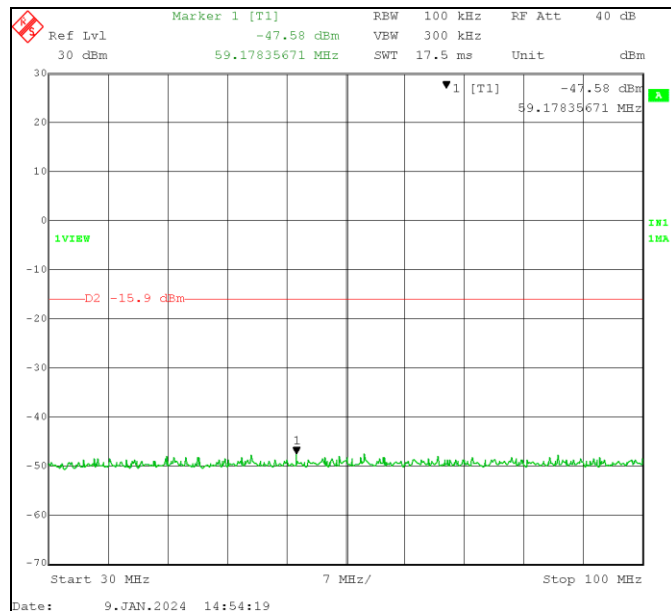


4.4.3 DSS Emissions in Non-restricted Frequency Bands Channel 0 Test Results (01/09/2024)

9 kHz – 30 MHz

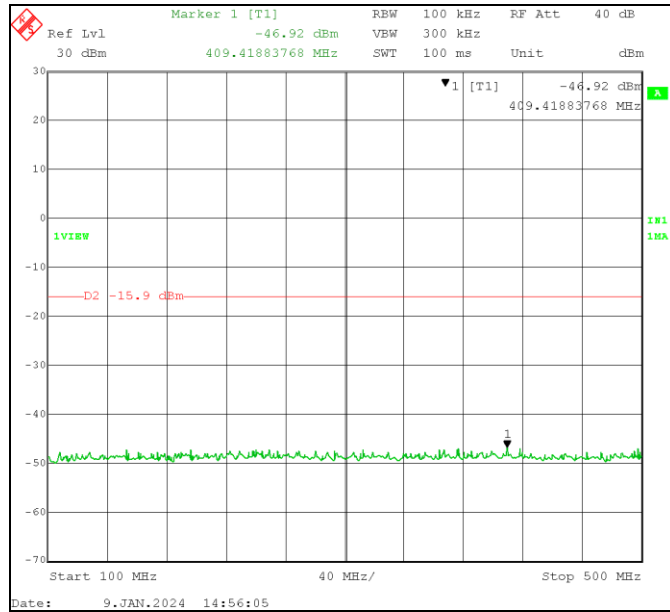


30 MHz – 100 MHz

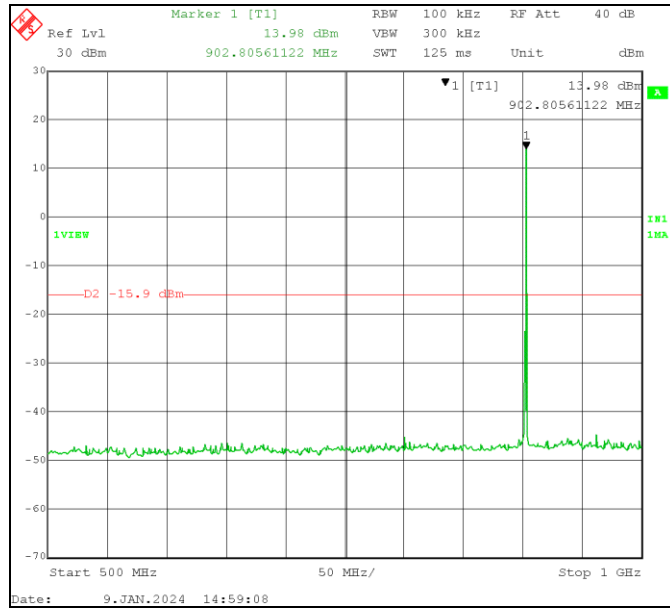




100 MHz – 500 MHz

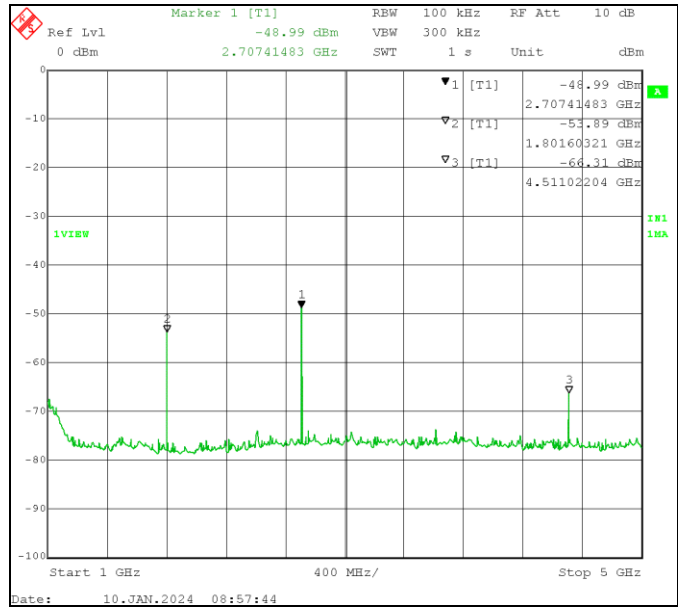


500 MHz – 1000 MHz

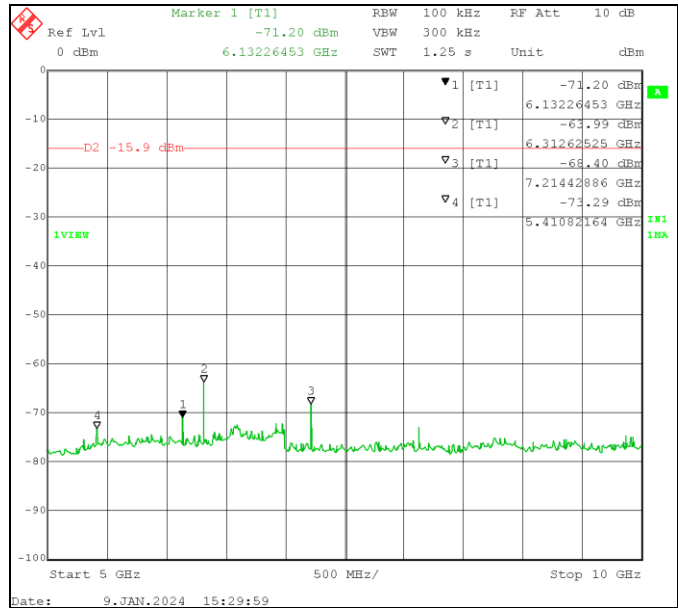




1 GHz – 5 GHz



5 GHz – 10 GHz



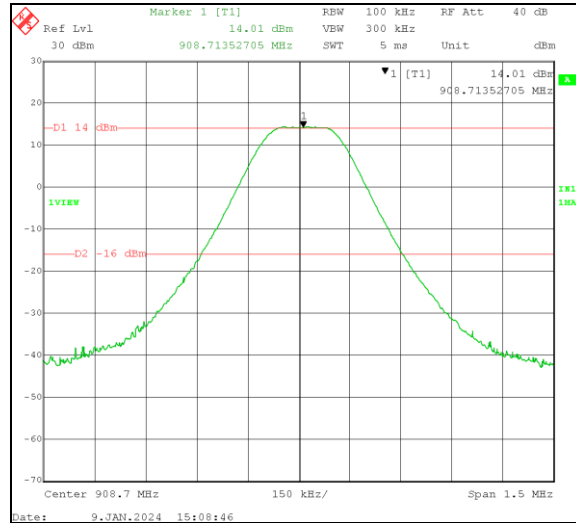


Test Results of Highest Emissions: Channel 0 (Frequency 902.3 MHz)

Channel	Tx Ch Frequency	Frequency	Level	Limit	Margin	Result
#	MHz	GHz	dBc	dBc	dB	
0	902.3	1.8016	-53.89	-30.00	-23.89	Pass
0	902.3	2.7074	-48.99	-30.00	-18.99	Pass
0	902.3	6.3126	-63.99	-30.00	-33.99	Pass



4.4.4 DSS Emissions in Non-restricted Frequency Bands Reference Measurement Channel 32 at 908.7 MHz (01/09/2024)

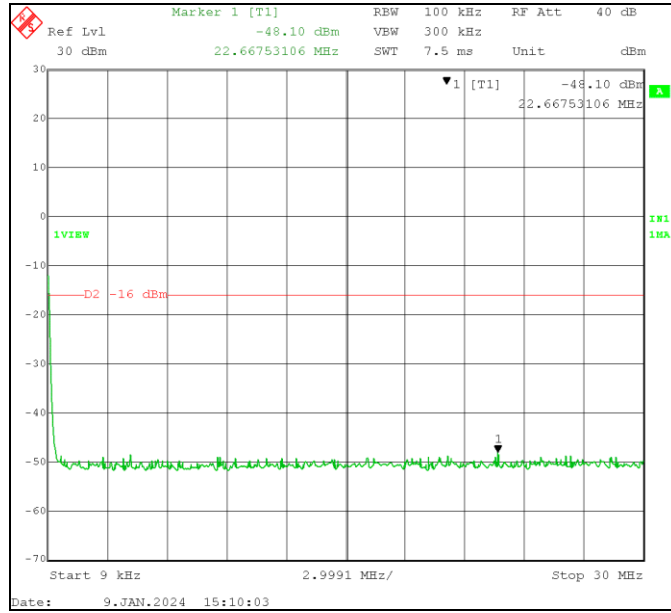


The peak level of 14.0 dBm is the maximum peak output of the Woodstream Model V430B Rodent Snap Trap with LoRa Radio. The conducted spurious emissions from the antenna port must be 30 dB down from this peak. The resultant limit is therefore -16.0 dBm and is displayed on the plots below.

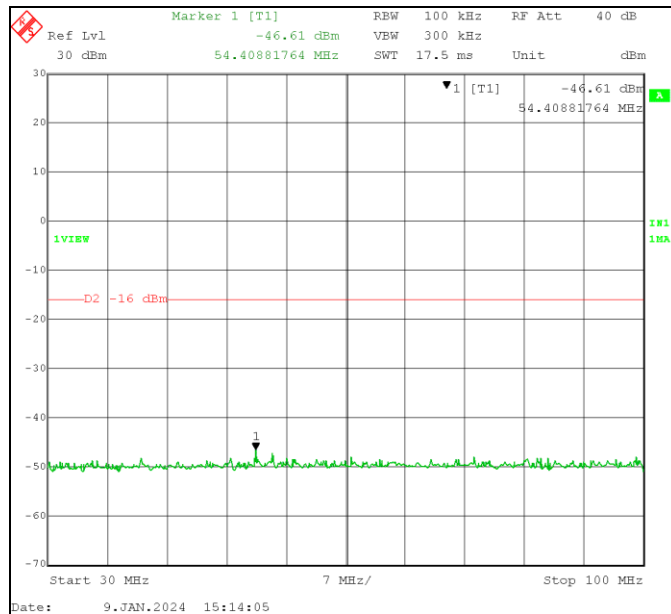


4.4.5 DSS Emissions in Non-restricted Frequency Bands Channel 32 Test Results (01/09/2024)

9 kHz – 30 MHz

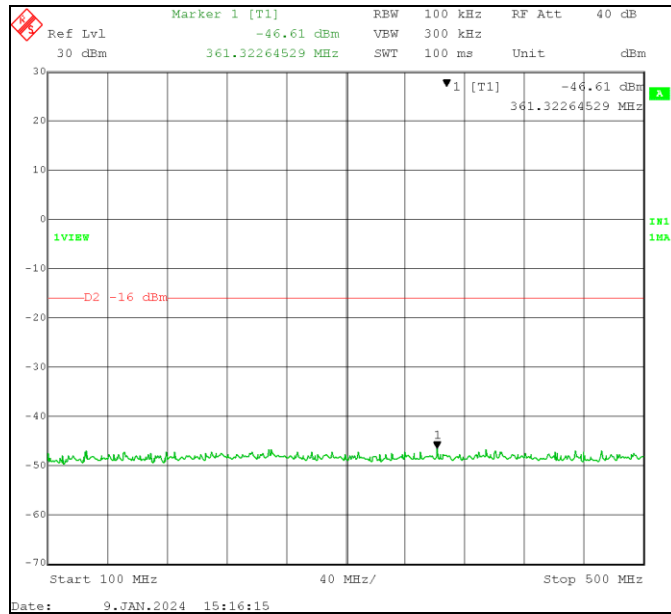


30 MHz – 100 MHz

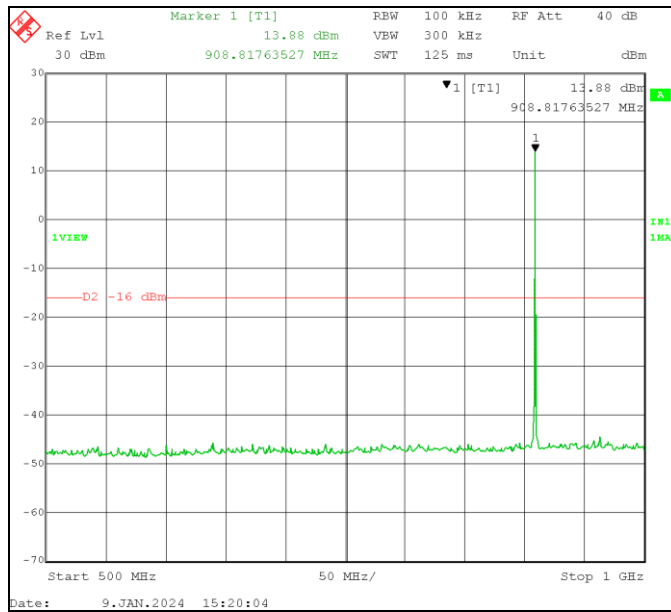




100 MHz – 500 MHz

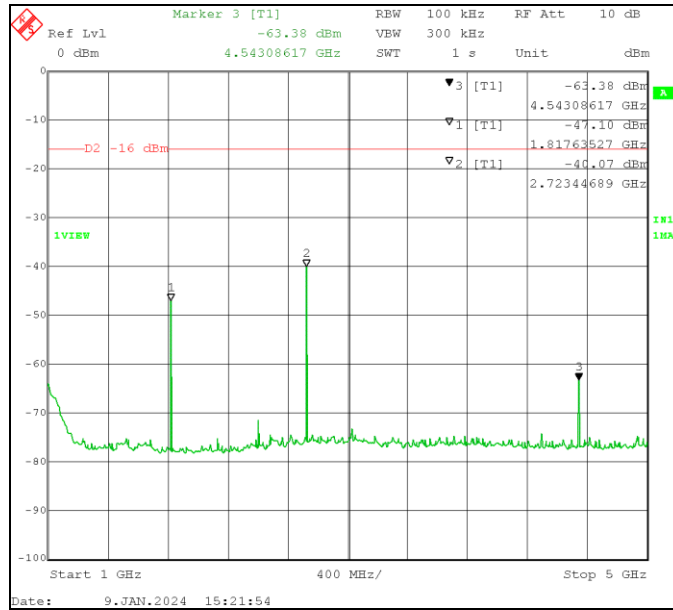


500 MHz – 1000 MHz

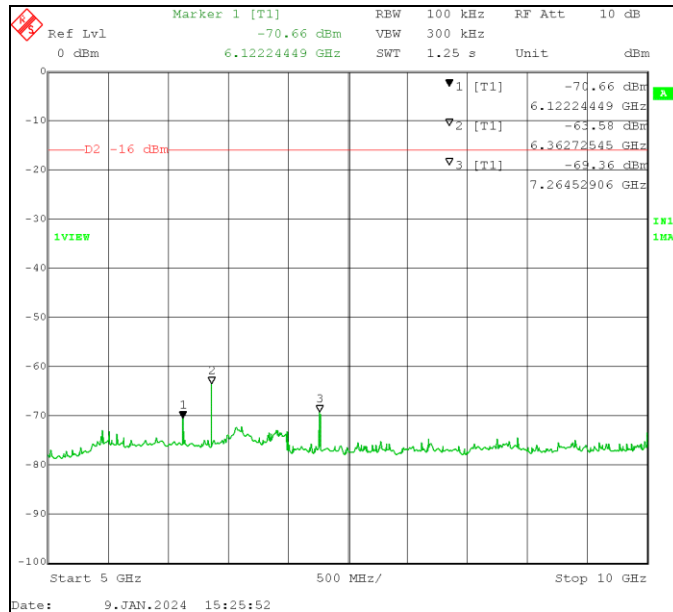




1 GHz – 5 GHz



5 GHz – 10 GHz



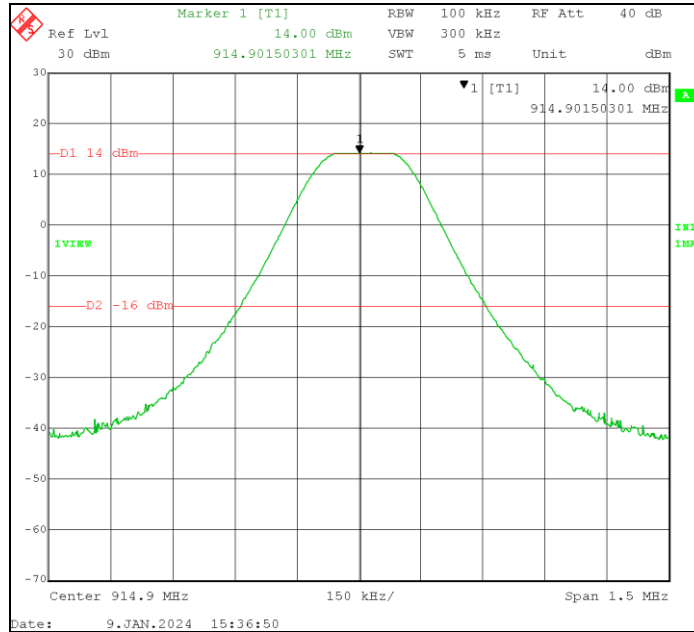


Test Results Table Highest Emissions: Channel 32 (908.7 MHz)

Channel	Tx Ch Frequency	Frequency	Level	Limit	Margin	Result
#	MHz	GHz	dBc	dBc	dB	
32	908.7	1.8176	-47.10	-30.00	-17.1	Pass
32	908.7	2.7234	-40.07	-30.00	-10.07	Pass
32	908.7	4.5431	-63.38	-30.00	-33.38	Pass



4.4.6 DSS Emissions in Non-restricted Frequency Bands Reference Measurement Channel 63 at 914.9 MHz (01/09/2024)

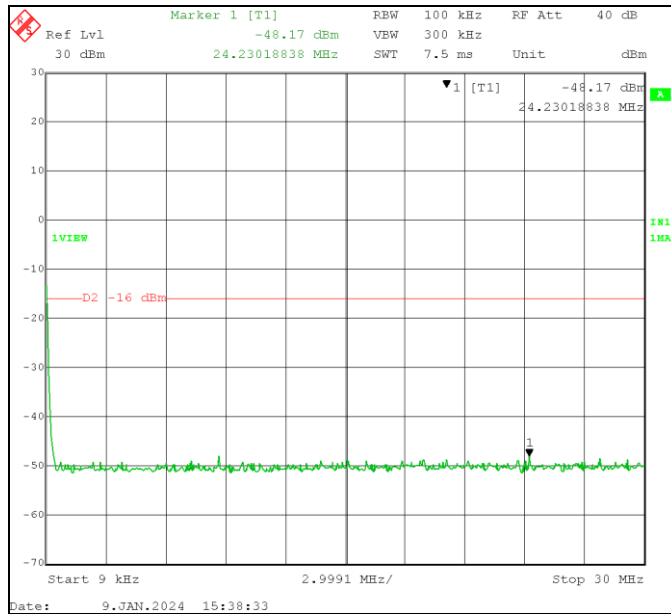


The peak level of 14.0 dBm is the maximum peak output of the Woodstream Model V430B Rodent Snap Trap with LoRa Radio. The conducted spurious emissions from the antenna port must be 30 dB down from this peak. The resultant limit is therefore -16.0 dBm and is displayed on the plots below.

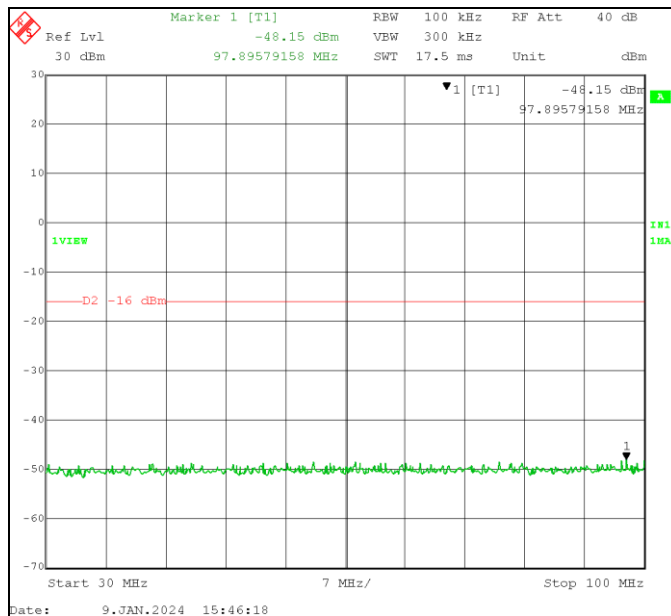


4.4.7 DSS Emissions in Non-restricted Frequency Bands Channel 63 Test Results (01/09/2024)

9 kHz – 30 MHz

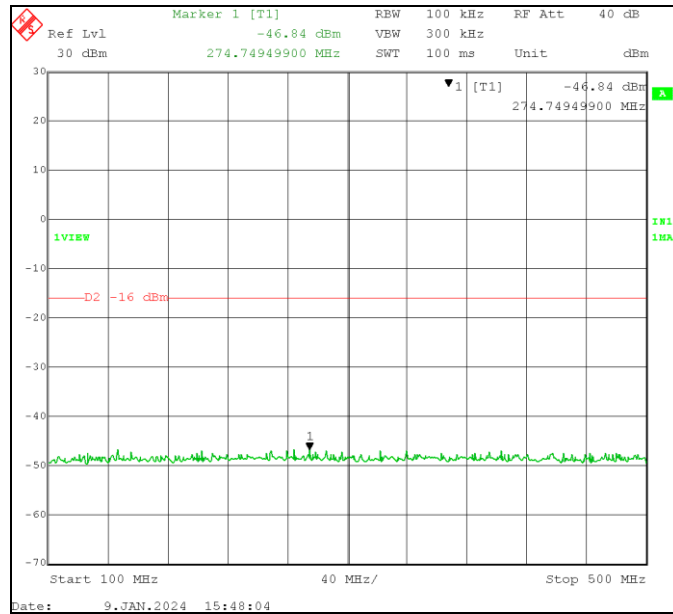


30 MHz – 100 MHz

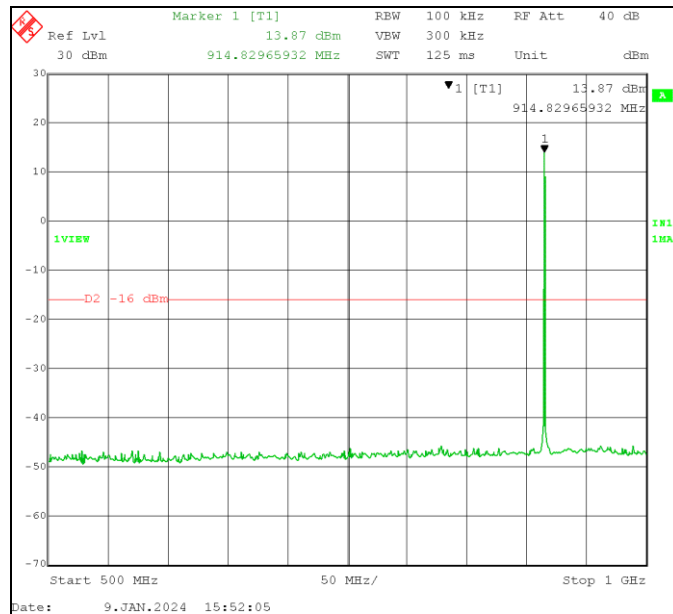




100 MHz – 500 MHz

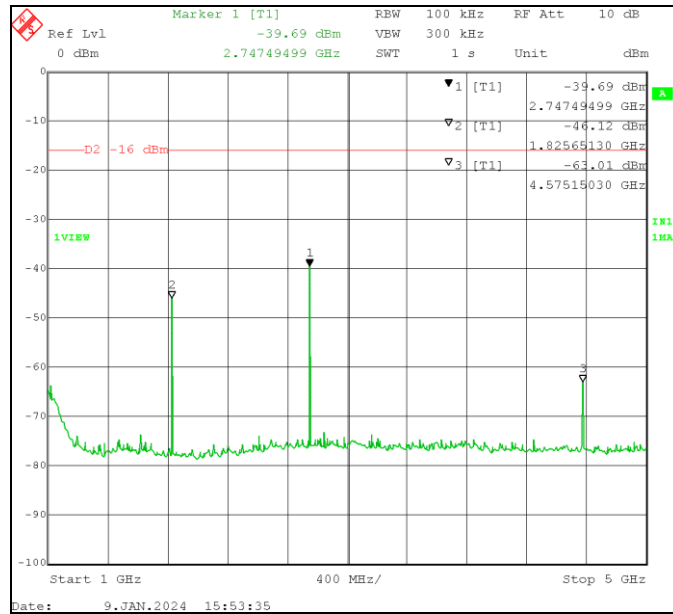


500 MHz – 1000 MHz

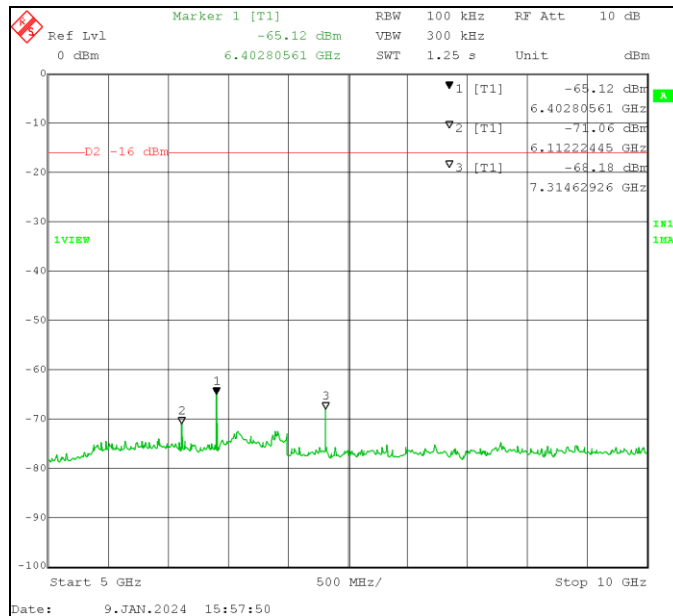




1 GHz – 5 GHz



5 GHz – 10 GHz





Test Results Table Highest Emissions: Channel 63 (914.9 MHz)

Channel #	Tx Ch MHz	Frequency GHz	Level dBc	Limit dBc	Margin dB	Result
63	914.9	5.4810	-55.70	-30.00	-25.70	Pass
63	914.9	7.3146	-62.80	-30.00	-32.80	Pass
63	914.9	8.2365	-62.18	-30.00	-32.18	Pass

Test Results: The Antenna Conducted Spurious Emissions of the Woodstream Model V430B Rodent Snap Trap with LoRa Radio, at Low, Middle and High Frequencies, are below the 30 dBc limit and therefore compliant with the limits specified in FCC Section 15.247(d).



4.5 DSS Radiated Emissions in Non-restricted and Restricted Frequency Bands, 30 MHz - 10 GHz (47 CFR 15.205 & 15.209)(RSS-GEN 8.9 & 8.10)

The emissions from the Woodstream Model V430B Rodent Snap Trap with LoRa Radio, which fall in the restricted bands of operation and unrestricted bands of operation, detailed in this section, comply with the limits of 15.209. The Woodstream Model V430B Rodent Snap Trap with LoRa Radio was tested at three frequencies: low (Channel 0, 902.3 MHz), middle (Channel 32, 908.7 MHz) and high (Channel 63, 914.9 MHz). The transmitter was operated at maximum output power (15), 125 kHz bandwidth and Spread Factor of 8.

Measurement of the signals was performed with the EUT on a turntable and a variable height antenna mast at 3 meters distance. The signals residing in restricted bands of operation are indicated in the tables below.

4.5.1 Non-restricted and Restricted Bands Test Facility

OATS

The Open Area Test Site (OATS) is an all-weather facility with a wooden enclosure that contains a ground level 4-foot diameter turntable capable of rotating equipment 360 degrees. The enclosure is free of reflective metallic objects and extraneous electromagnetic signals. This non-metallic enclosure and the 3 and 10 meter test range existing outside the enclosure rest upon a protective insulating material, which in turn covers a flat, metal, continuous ground plane.

Instrumentation for remote control of the antenna mast, turntable, and other equipment are controlled by personnel indoors. The EUT and support peripherals required for EUT operation were placed on a table 80 cm high for tabletop equipment or directly on the turntable surface for floor standing equipment. The test site complies with the requirements of ANSI C63.4 and ANSI C63.10.

SR#1

The Semi-Anechoic Shielded Room (SR#1) is a ferrite and absorber lined chamber which houses a 5-foot diameter turntable capable of rotating equipment 360 degrees and antenna mast for Horizontal and Vertical polarity measurements. The enclosure is free of reflective metallic objects and extraneous electromagnetic signals. This 3 meter shielded enclosure has a raised computer floor with metal tile bottoms providing a continuous ground plane.

Instrumentation for remote control of the antenna mast, turntable, and other equipment are controlled by personnel outside the chamber. The EUT and support peripherals required for EUT operation were placed on a table 80 cm high for tabletop equipment or directly on the turntable surface for floor standing equipment.

The chamber complies with the requirements of ANSI C63.4 and ANSI C63.10.



4.5.2 Non-restricted and Restricted Bands Radiated Emissions Test Procedure

Radiated Emissions 30 MHz – 40 GHz

The EMI receiver was set to quasi-peak mode for frequencies from 30MHz to 1GHz and the appropriate CISPR bandwidths were employed. The receiver was set to average mode for frequencies above 1GHz with the appropriate CISPR bandwidths were employed.

Three orthogonal positions of the EUT were evaluated for maximum emissions. The position of the EUT, with the base of the trap placed on the horizontal surface of the 80-cm table, was determined to be the axis that produced the highest emissions.

Significant emissions found during the preliminary scans were maximized by rotating the turntable and varying the antenna height. Both horizontal and vertical antenna polarities were also investigated for suspect emissions. The signals are maximized and measured using the in house generated RADE or off the shelf TILE software. The support equipment and test item(s) were powered off in turn to determine the source of the emissions where appropriate.

Field strengths were calculated as follows:

Field Strength (dB μ V/m) = Meter Reading (dB μ V) + Antenna Factor (dB/m) + Cable Loss (dB) – Amplifier Gain (dB)

Measurements were made with the Woodstream Model V430B Rodent Snap Trap with LoRa Radio transmitting at low (Channel 0), middle (Channel 32) and high (Channel 63). LoRa modulation with 125 kHz bandwidth was applied with the spread factor = 8. The following tables are the highest emissions recorded and summarized. Restricted band signals are marked with an asterisk. Other spurious emissions are shown to demonstrate compliance of the EUT to 15.209 limits.



4.5.3 DSS Emissions in Non-restricted and Restricted Bands of Operation, 30 MHz – 1000 MHz Test Results (12/27/2023)

Low Channel 0 (902.3 MHz)

Frequency	Peak Corrected	Quasi-Peak Corrected	Antenna Polarity	Turntable Angle	Antenna Height	Correction Factor	Peak Limit	Peak Margin	QP Limit	QP Margin	Result
MHz	dBuV/m	dBuV/m	H or V	degrees	cm	dB	dBuV/m	dB	dBuV/m	dB	
100.556	16.72	15.16	V	035	140	-9.72	63.52	-46.80	43.52	-28.36	Pass
134.410*	12.23	12.90	H	275	109	-6.78	63.52	-51.29	43.52	-30.62	Pass
412.231	19.90	17.41	H	359	254	-3.44	66.02	-46.12	46.02	-28.61	Pass
433.599	25.96	25.02	H	021	171	-2.83	66.02	-40.06	46.02	-21.00	Pass
434.212	26.88	26.82	V	286	229	-2.83	66.02	-39.14	46.02	-19.20	Pass
451.139	30.50	28.89	H	065	244	-2.50	66.02	-35.52	46.02	-17.13	Pass
635.149	20.98	20.58	V	006	139	0.24	66.02	-45.04	46.02	-25.44	Pass
742.432	26.11	25.25	V	158	202	1.73	66.02	-39.91	46.02	-20.77	Pass
814.433	31.25	30.57	H	014	100	3.13	66.02	-34.77	46.02	-15.45	Pass
825.625	26.16	24.75	V	275	192	3.16	66.02	-39.86	46.02	-21.27	Pass
870.245	32.58	32.37	H	348	099	3.50	66.02	-33.44	46.02	-13.65	Pass
878.206	27.74	24.46	V	258	196	3.64	66.02	-38.28	46.02	-21.56	Pass
* Restricted Band Signal											

Middle Channel 32 (908.7 MHz)

Frequency	Peak Corrected	Quasi-Peak Corrected	Antenna Polarity	Turntable Angle	Antenna Height	Correction Factor	Peak Limit	Peak Margin	QP Limit	QP Margin	Result
MHz	dBuV/m	dBuV/m	H or V	degrees	cm	dB	dBuV/m	dB	dBuV/m	dB	
100.524	16.36	16.04	V	077	146	-9.73	63.52	-47.16	43.52	-27.48	Pass
117.614*	15.24	12.27	H	344	156	-6.74	63.52	-48.28	43.52	-31.25	Pass
222.947	14.77	10.44	H	359	172	-8.26	66.02	-51.25	46.02	-35.58	Pass
224.954	14.21	13.67	V	019	100	-8.24	66.02	-51.81	46.02	-32.35	Pass
325.709*	16.59	13.94	V	014	156	-4.76	66.02	-49.43	46.02	-32.08	Pass
434.256	22.30	20.97	H	042	255	-2.83	66.02	-43.72	46.02	-25.05	Pass
454.362	30.54	28.08	H	215	228	-2.52	66.02	-35.48	46.02	-17.94	Pass
689.646	21.59	20.80	V	317	229	0.89	66.02	-44.43	46.02	-25.22	Pass
741.703	26.14	25.05	V	031	197	1.73	66.02	-39.88	46.02	-20.97	Pass
743.672	26.91	27.18	H	049	108	1.74	66.02	-39.11	46.02	-18.84	Pass
806.753	30.53	29.37	H	001	100	3.05	66.02	-35.49	46.02	-16.65	Pass
811.600	25.57	23.38	V	000	144	3.11	66.02	-40.45	46.02	-22.64	Pass
* Restricted Band Signal											



High Channel 63 (914.9 MHz)

Frequency MHz	Peak Corrected dBuV/m	Quasi-Peak Corrected dBuV/m	Antenna Polarity H or V	Turntable Angle degrees	Antenna Height cm	Correction Factor dB	Peak Limit dBuV/m	Peak Margin dB	QP Limit dBuV/m	QP Margin dB	Result
54.853	12.65	10.53	V	124	121	-13.37	60.00	-47.35	40.00	-29.47	Pass
100.352	16.08	17.23	V	312	114	-9.78	63.52	-47.44	43.52	-26.29	Pass
134.049*	13.40	13.07	H	288	140	-6.78	63.52	-50.12	43.52	-30.45	Pass
199.995	16.03	11.93	H	137	118	-6.89	63.52	-47.49	43.52	-31.59	Pass
327.285*	17.61	16.64	V	303	171	-4.77	66.02	-48.41	46.02	-29.38	Pass
457.503	29.03	24.18	H	211	192	-2.44	66.02	-36.99	46.02	-21.84	Pass
496.115	21.15	18.17	V	081	212	-1.88	66.02	-44.87	46.02	-27.85	Pass
634.964	22.87	20.71	H	325	219	0.24	66.02	-43.15	46.02	-25.31	Pass
738.783	26.21	25.97	H	007	108	1.62	66.02	-39.81	46.02	-20.05	Pass
738.878	25.17	25.75	V	337	234	1.62	66.02	-40.85	46.02	-20.27	Pass
800.491	33.72	32.55	H	349	100	2.94	66.02	-32.30	46.02	-13.47	Pass
875.112	24.38	25.59	V	194	103	3.67	66.02	-41.64	46.02	-20.43	Pass
* Restricted Band Signal											

Receive Mode

Frequency MHz	Peak Corrected dBuV/m	Quasi-Peak Corrected dBuV/m	Antenna Polarity H or V	Turntable Angle degrees	Antenna Height cm	Correction Factor dB	Peak Limit dBuV/m	Peak Margin dB	QP Limit dBuV/m	QP Margin dB	Result
128.186*	10.64	10.39	H	230	220	-6.54	63.52	-52.88	43.52	-33.13	Pass
132.282*	14.47	10.27	V	324	151	-6.63	63.52	-49.05	43.52	-33.25	Pass
282.515*	11.80	11.22	V	173	155	-5.33	66.02	-54.22	46.02	-34.80	Pass
283.441*	12.39	11.25	H	176	244	-5.28	66.02	-53.63	46.02	-34.77	Pass
370.268	14.97	13.06	V	313	245	-4.26	66.02	-51.05	46.02	-32.96	Pass
487.206	19.84	16.13	H	214	140	-1.88	66.02	-46.18	46.02	-29.89	Pass
529.194	18.80	16.75	V	171	099	-1.41	66.02	-47.22	46.02	-29.27	Pass
628.703	19.46	17.97	H	284	233	-0.02	66.02	-46.56	46.02	-28.05	Pass
673.959	18.59	18.09	V	049	209	0.69	66.02	-47.43	46.02	-27.93	Pass
741.911	21.26	20.35	H	325	134	1.73	66.02	-44.76	46.02	-25.67	Pass
800.536	24.07	20.86	V	209	145	2.94	66.02	-41.95	46.02	-25.16	Pass
876.447	23.80	21.53	H	252	202	3.64	66.02	-42.22	46.02	-24.49	Pass
* Restricted Band Signal											

Test Results: The Woodstream Model V430B Rodent Snap Trap with LoRa Radio, operating in DSS mode and receive mode, comply with the requirements of 47 CFR Part 15.205 and RSS-Gen Section 8.10 for restricted bands of operation with a margin of 13.47 dB.



4.5.4 DSS Emissions in Non-restricted and Restricted Bands of Operation, 1 – 10 GHz Test Results (12/29/2023 & 01/08/2024)

Low Channel 0 (902.3 MHz)

Frequency	Peak Corrected	Average Corrected	Antenna Polarity	Turntable Angle	Antenna Height	Correction Factors	15.35(b) Peak Limit	Peak Margin	15.209 Average Limit	Average Margin	Result
GHz	dBuV/m	dBuV/m	H or V	degrees	cm	dB	dBuV/m	dB	dBuV/m	dB	
1.853	30.51	22.03	H	114	102	-7.61	73.98	-43.47	53.98	-31.95	Pass
1.871	31.54	22.78	V	27	258	-7.44	73.98	-42.44	53.98	-31.20	Pass
2.528	33.64	23.56	H	138	102	-5.25	73.98	-40.34	53.98	-30.42	Pass
2.707*	38.28	30.32	V	337	101	-4.46	73.98	-35.70	53.98	-23.66	Pass
5.414*	52.51	48.91	V	221	100	3.31	73.98	-21.47	53.98	-5.07	Pass
5.414*	43.40	38.24	H	270	129	3.31	73.98	-30.58	53.98	-15.74	Pass
6.274	36.65	26.75	V	322	213	3.40	73.98	-37.33	53.98	-27.23	Pass
7.193	41.44	32.19	H	214	101	4.08	73.98	-32.54	53.98	-21.79	Pass
8.031*	44.39	34.70	V	032	114	5.22	73.98	-29.59	53.98	-19.28	Pass
8.176*	45.12	35.57	H	209	171	5.39	73.98	-28.86	53.98	-18.41	Pass
* Restricted Band Signal											

Middle Channel 32 (908.7 MHz)

Frequency	Peak Corrected	Average Corrected	Antenna Polarity	Turntable Angle	Antenna Height	Correction Factors	15.35(b) Peak Limit	Peak Margin	15.209 Average Limit	Average Margin	Result
GHz	dBuV/m	dBuV/m	H or V	degrees	cm	dB	dBuV/m	dB	dBuV/m	dB	
1.852	32.79	22.52	H	225	246	-7.61	73.98	-41.19	53.98	-31.46	Pass
1.857	31.29	21.73	V	014	101	-7.58	73.98	-42.69	53.98	-32.25	Pass
2.716*	34.24	24.43	H	178	254	-4.43	73.98	-39.74	53.98	-29.55	Pass
2.726*	37.64	32.89	V	320	100	-4.44	73.98	-36.34	53.98	-21.09	Pass
3.635*	34.17	24.14	V	147	173	-1.01	73.98	-39.81	53.98	-29.84	Pass
3.643*	35.02	23.25	H	198	125	-0.96	73.98	-38.96	53.98	-30.73	Pass
5.452*	42.06	37.12	H	159	182	3.27	73.98	-31.92	53.98	-16.86	Pass
5.452*	51.97	46.37	V	213	100	3.27	73.98	-22.01	53.98	-7.61	Pass
7.289*	42.38	32.77	H	047	203	4.63	73.98	-31.60	53.98	-21.21	Pass
7.310*	41.09	32.58	V	163	144	4.72	73.98	-32.89	53.98	-21.40	Pass
* Restricted Band Signal											



High Channel 63 (914.9 MHz)

Frequency	Peak Corrected	Average Corrected	Antenna Polarity	Turntable Angle	Antenna Height	Correction Factors	15.35(b) Peak Limit	Peak Margin	15.209 Average Limit	Average Margin	Result
GHz	dBuV/m	dBuV/m	H or V	degrees	cm	dB	dBuV/m	dB	dBuV/m	dB	
1.830	38.54	33.72	H	112	101	-7.70	73.98	-35.44	53.98	-20.26	Pass
1.830	37.62	33.28	V	295	109	-7.70	73.98	-36.36	53.98	-20.70	Pass
2.711*	32.87	23.29	H	131	101	-4.44	73.98	-41.11	53.98	-30.69	Pass
2.745*	36.69	31.71	V	150	176	-4.44	73.98	-37.29	53.98	-22.27	Pass
3.630*	34.21	22.62	V	013	102	-1.03	73.98	-39.77	53.98	-31.36	Pass
3.641*	32.05	23.12	H	108	110	-0.97	73.98	-41.93	53.98	-30.86	Pass
5.489	50.85	45.55	V	217	100	3.25	73.98	-23.13	53.98	-8.43	Pass
5.490	41.07	33.25	H	004	186	3.25	73.98	-32.91	53.98	-20.73	Pass
7.317*	43.26	32.60	H	177	104	4.73	73.98	-30.72	53.98	-21.38	Pass
7.325*	41.94	32.44	V	350	159	4.75	73.98	-32.04	53.98	-21.54	Pass
* Restricted Band Signal											

Receive Mode

Frequency	Peak Corrected	Average Corrected	Antenna Polarity	Turntable Angle	Antenna Height	Correction Factors	15.35(b) Peak Limit	Peak Margin	15.209 Average Limit	Average Margin	Result
GHz	dBuV/m	dBuV/m	H or V	degrees	cm	dB	dBuV/m	dB	dBuV/m	dB	
1.846	30.68	20.85	H	072	102	-7.63	73.98	-43.30	53.98	-33.13	Pass
1.863	29.98	20.84	V	050	169	-7.52	73.98	-44.00	53.98	-33.14	Pass
2.411	31.51	21.95	H	068	187	-5.35	73.98	-42.47	53.98	-32.03	Pass
2.528	32.31	22.13	H	114	176	-5.25	73.98	-41.67	53.98	-31.85	Pass
2.692*	30.78	22.50	V	327	141	-4.54	73.98	-43.20	53.98	-31.48	Pass
3.627*	32.33	22.84	V	090	255	-1.05	73.98	-41.65	53.98	-31.14	Pass
5.348	35.15	26.40	H	161	203	3.10	73.98	-38.83	53.98	-27.58	Pass
6.744	39.39	31.64	H	000	102	3.62	73.98	-34.59	53.98	-22.34	Pass
6.827	41.90	31.66	V	346	102	3.60	73.98	-32.08	53.98	-22.32	Pass
8.204*	45.42	34.94	V	234	201	5.46	73.98	-28.56	53.98	-19.04	Pass
* Restricted Band Signal											

Test Results: The Woodstream Model V430B Rodent Snap Trap with LoRa Radio, operating in DSS and receive modes, comply with the requirements of 47 CFR Part 15.205 and RSS-Gen Section 8.10 with a margin of 5.07 dB.



4.6 DSS 20 dB Occupied Bandwidth (FCC Section 15.247(a)(1) RSS-247 5.1(c))

4.6.1 20 dB Occupied Bandwidth – Test Procedure

The maximum DSS (20 dB) bandwidth, specified in FCC Section 15.247(a)(1)(i) was measured using a Spectrum Analyzer with 3 kHz resolution bandwidth and 10 kHz video bandwidth. Transmission frequencies at low (Channel 0, Frequency 902.3 MHz), middle (Channel 32, Frequency 908.7 MHz) and high (Channel 63, Frequency 914.9 MHz) were measured with LoRa modulation with a bandwidth of 125 kHz and spread factor of 8. ANSI C63.10 Section 6.9.2 Occupied bandwidth-relative measurement procedure was used.

Spectrum Analyzer Settings:

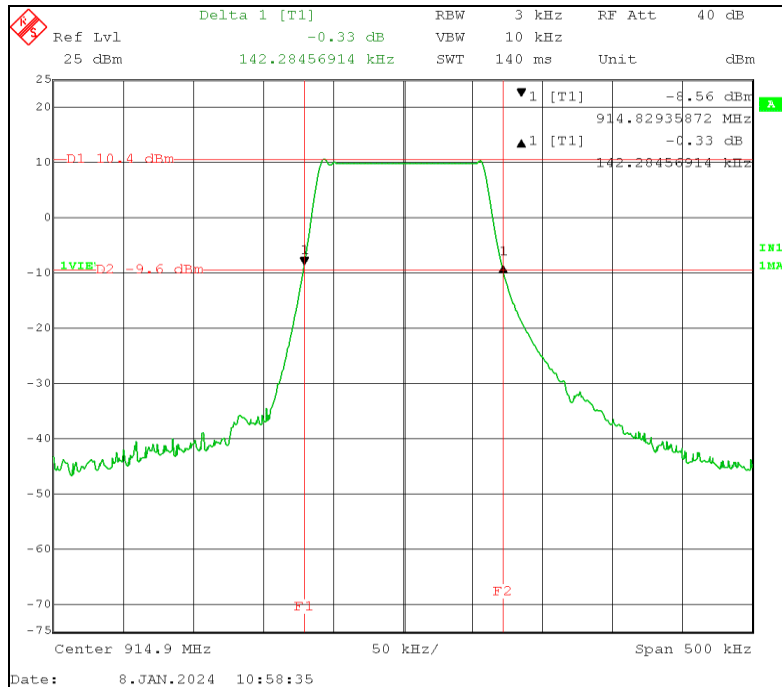
Span	500 kHz
RBW	3 kHz
VBW	10 kHz
Sweep Time	140 ms (Auto)

4.6.2 DSS (20 dB) Occupied Bandwidth Test Results (01/08/2024)

Channel	Transmitter Settings	Frequency	Measured 20 dB Bandwidth	RSS-247 5.1.3, FCC 15.247 (1)(a)(i) 20 dB BW Limit	Margin	Result
#		MHz	kHz	kHz	kHz	
0	LoRa Modulation with Settings of Power=15, BW=125 kHz, SF=8	902.3	143.29	500	-356.71	Pass
32		908.7	143.29		-356.71	Pass
63		914.9	142.28		-357.72	Pass



Channel 63: 914.90 MHz



Test Results: The DSS, 20 dB, Occupied Bandwidth measurements for the Woodstream Model V430B Rodent Snap Trap with LoRa Radio were measured and are compliant to FCC and ISED requirements.



4.7 DSS 99% Occupied Bandwidth RSS-Gen 6.7

4.7.1 DSS 99% Occupied Bandwidth – Test Procedure

The 99% Occupied Bandwidth measurement per RSS-Gen Section 6.7 was measured using a Spectrum Analyzer with 3 kHz resolution bandwidth and 10 kHz video bandwidth. Transmission frequencies at low (Channel 0), middle (Channel 32) and high (Channel 63) were measured with LoRa modulation, 125 kHz bandwidth and spread factor of 8. The test procedure of ANSI C63.10, Section 6.9.3 was used.

Spectrum Analyzer Settings:

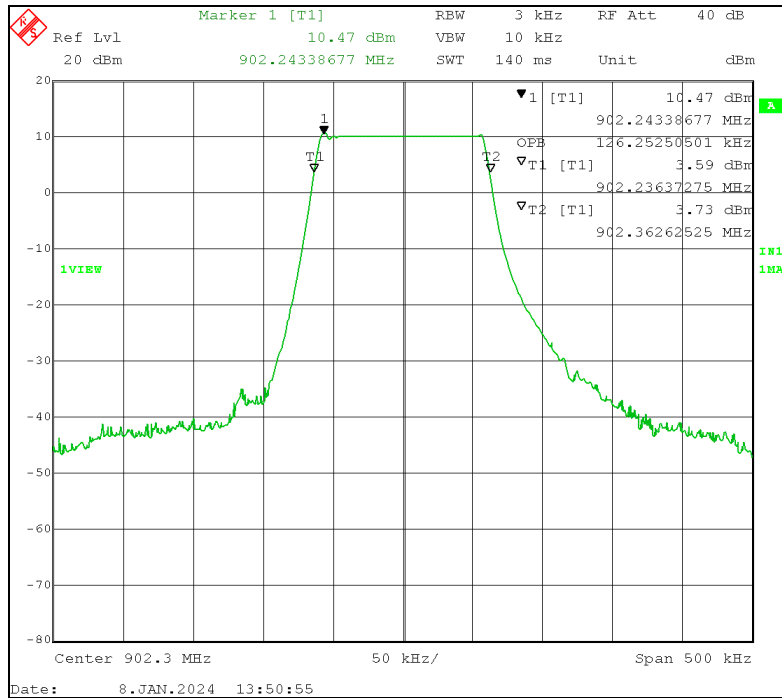
Span	500 kHz
RBW	3 kHz
VBW	10 kHz
Sweep Time	140 ms (Auto)

4.7.2 DSS 99% Occupied Bandwidth Test Results (01/08/2024)

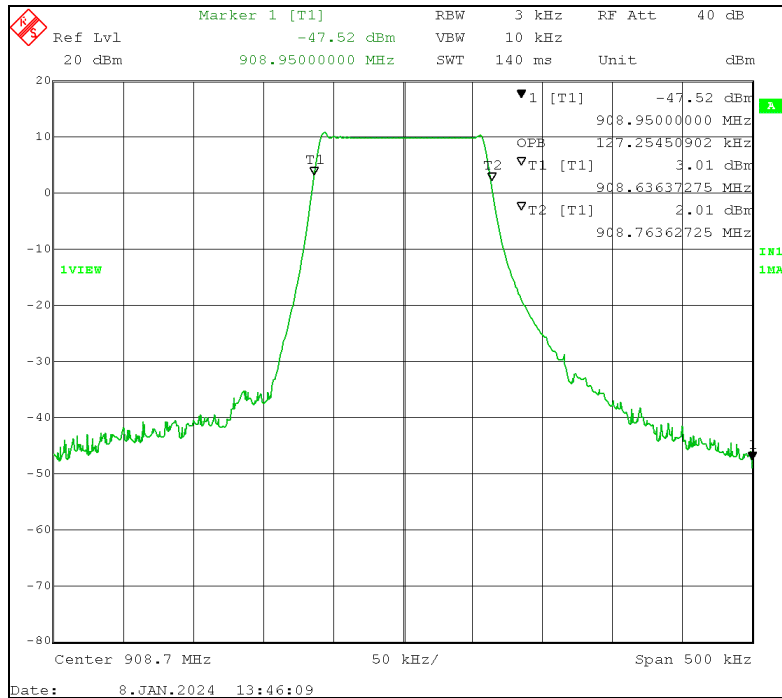
Channel	Frequency (MHz)	LoRa Modulation Settings	99% OBW (kHz)
0	902.3	Power of 15, LoRa 125 kHz BW SF=8	126.25
32	908.7		127.25
63	914.9		126.25



Channel 0: 902.30 MHz

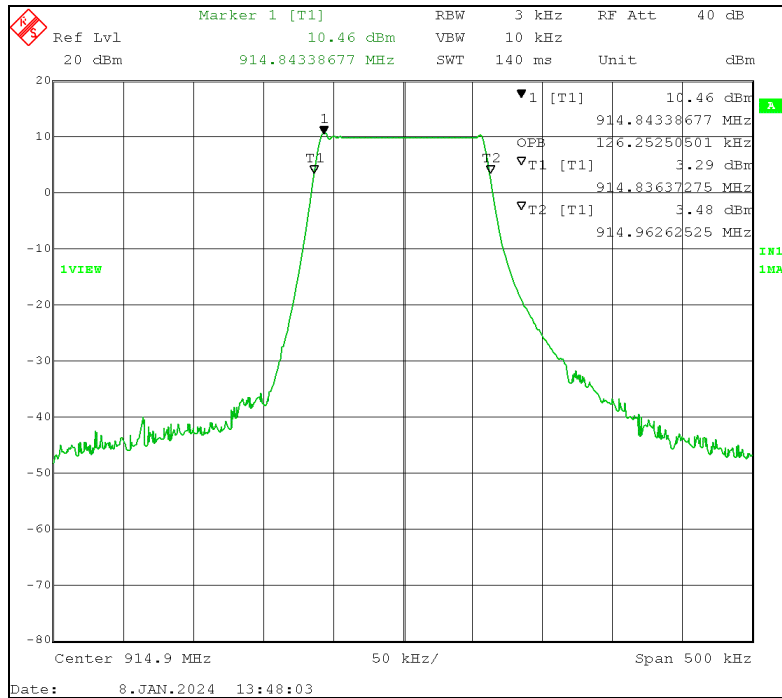


Channel 32: 908.70 MHz





Channel 63: 914.90 MHz



Test Results: The DSS 99% Occupied Bandwidth measurements for the Woodstream Model V430B Rodent Snap Trap with LoRa Radio were measured for RSS-Gen Section 6.7 requirement.



4.8 Maximum Output Power Conducted and EIRP (FCC Part 15.247(b)(3), RSS-247 Section 5.4(d))

4.8.1 Maximum Output Power Peak Conducted Test Procedure-DSS Mode

A conducted power measurement of the output frequency was measured according to ANSI C63.10, Section 11.9.1.1. Spectrum Analyzer Resolution Bandwidth and Frequency Span were based upon the Operating Bandwidth (OBW) measured in the previous section. Transmission frequencies at low (Channel 0, Frequency 902.3 MHz), middle (Channel 32, Frequency 908.7 MHz) and high (Channel 63, Frequency 914.9 MHz) were measured without modulation and with LoRa modulation, bandwidth of 125 kHz and spread factor of 8. Measurements were made with a peak detector.

Spectrum Analyzer Settings using Peak Detection:

Span	1 MHz
RBW	200 kHz
VBW	500 kHz
Sweep Time	5 ms

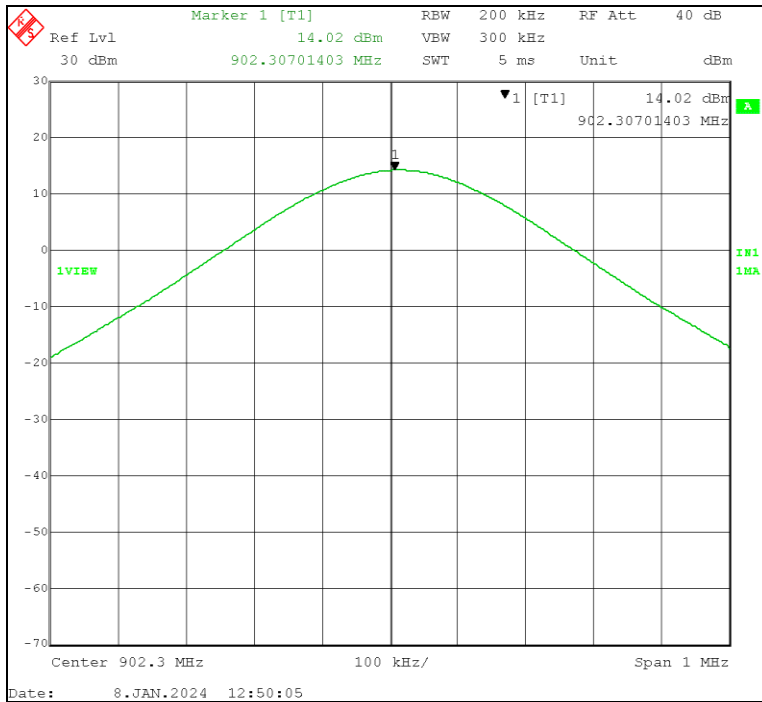
4.8.1.1 Maximum Output Power Peak Conducted Test Results (01/08/2024)

Channel	Modulation	Frequency (MHz)	Measured Level (dBm)	Cable # 962 Loss (dB)	Total		Limit		Margin	
					dBm	Watts	dBm	Watts	dBm	Watts
0	Unmodulated	902.3	14.02	0.26	14.28	0.027	30.00	1.000	-15.72	-0.973
32		908.7	13.98	0.26	14.24	0.027	30.00	1.000	-15.76	-0.973
63		914.9	13.95	0.26	14.21	0.026	30.00	1.000	-15.79	-0.974
0	LoRa Modulated Tx with Power=15, BW=125 kHz, SF=8	902.3	14.02	0.26	14.28	0.027	30.00	1.000	-15.72	-0.973
32		908.7	13.97	0.26	14.23	0.026	30.00	1.000	-15.77	-0.974
63		914.9	13.95	0.26	14.21	0.026	30.00	1.000	-15.79	-0.974

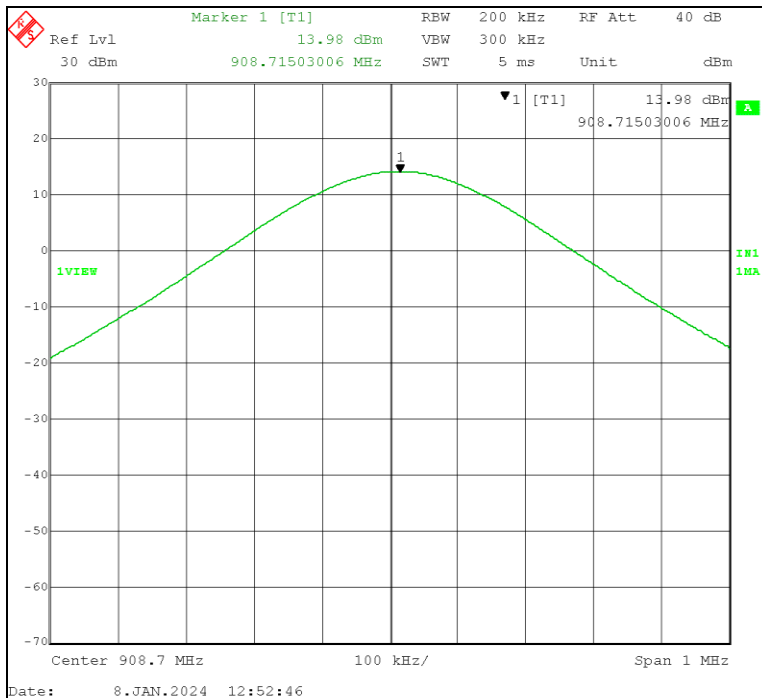
The following pages display the spectrum analyzer screens of the peak output power measurements.



Channel 0: 902.30 MHz No Modulation

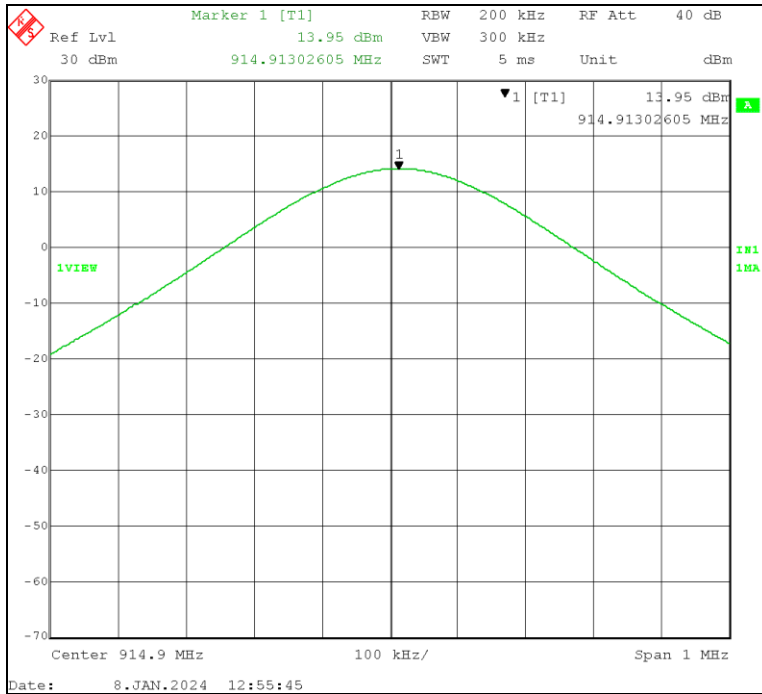


Channel 32: 908.70 MHz No Modulation

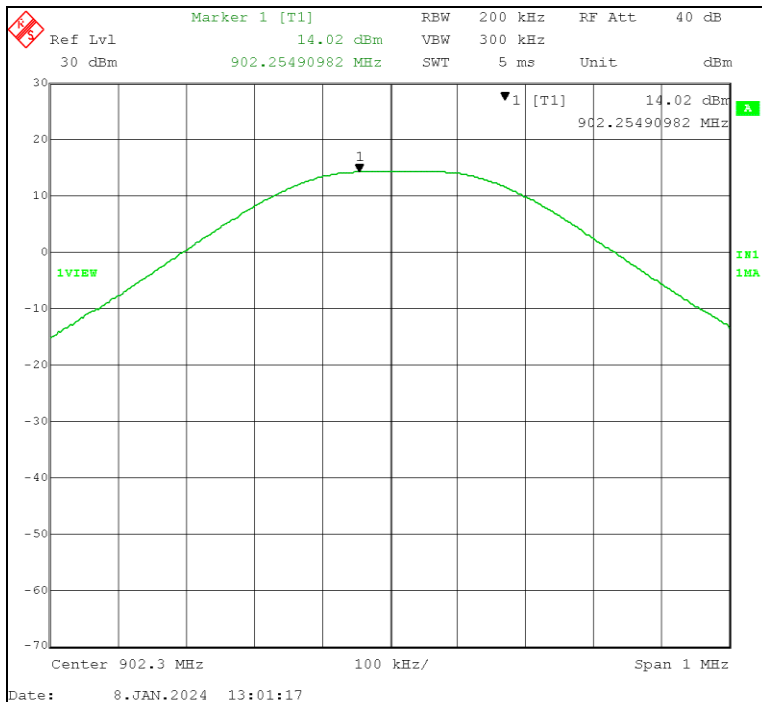




Channel 63: 914.9 MHz No Modulation

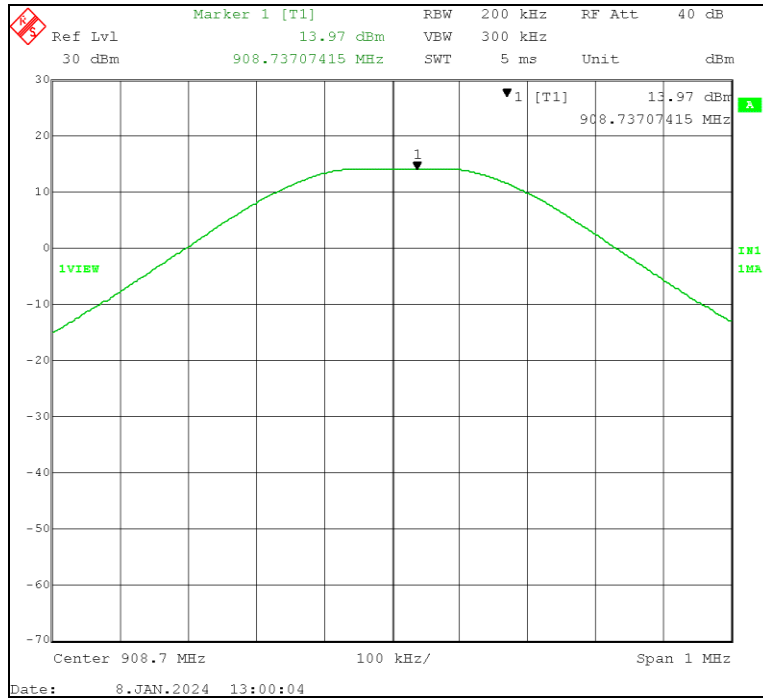


Channel 0: 902.30 MHz LoRa Modulation

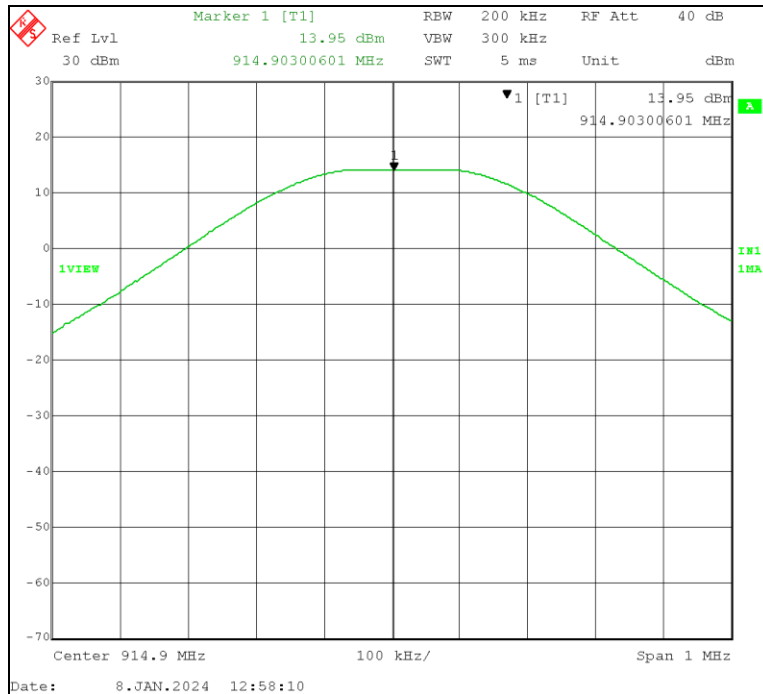




Channel 32: 908.70 MHz LoRa Modulation



Channel 63: 914.9 MHz LoRa Modulation



Test Results: The Maximum Peak Conducted Output Power peak measurements for the Woodstream Model V430B Rodent Snap Trap with LoRa Radio, with and without modulation, are compliant with the limits specified in FCC Section 15.247(b)(3).



4.8.2 Maximum Output Power Average Conducted Test Procedure-Hybrid Mode

Average Conducted power measurement of the output frequency was measured according to ANSI C63.10, Section 11.9.2.2. Spectrum Analyzer Resolution Bandwidth and Frequency Span were based upon the Operating Bandwidth (OBW) measured in the previous section. The transmission frequencies at low (Channel 0, Frequency 902.3 MHz), middle (Channel 32, Frequency 908.7 MHz) and high (Channel 63, Frequency 914.9 MHz) were measured with LoRa modulation, bandwidth of 125 kHz and spread factor of 8. Measurements were made using an RMS detector.

Spectrum Analyzer Settings using RMS Detection:

Span	500 kHz
RBW	5 kHz
VBW	20 kHz
Sweep Time	50 ms

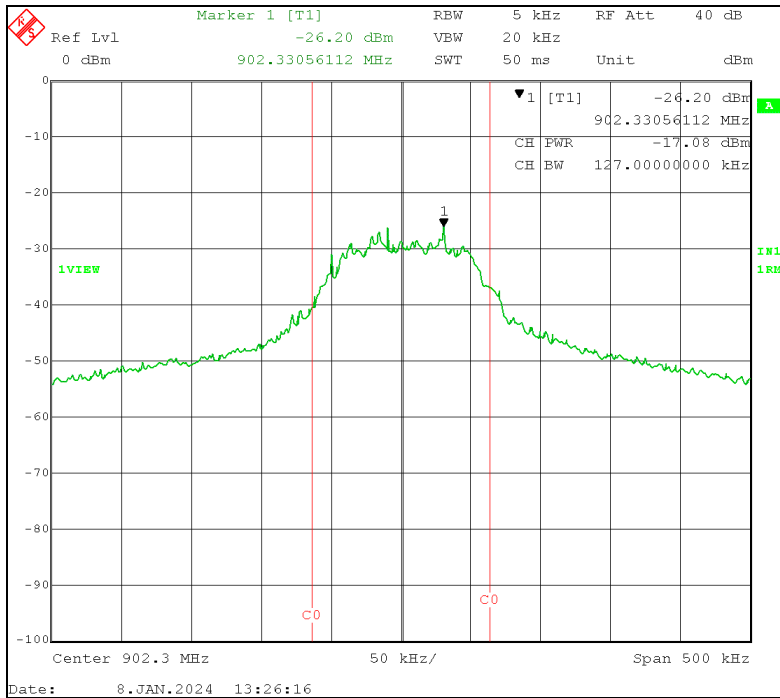
4.8.2.1 Maximum Output Power Average Conducted Test Results (01/08/2024)

Channel	Modulation	Frequency (MHz)	Average Measured Level (dBm)	Cable # 962 Loss (dB)	Total		Limit		Margin		Result
					dBm	Watts	dBm	Watts	dBm	Watts	
0	Power of 15, LoRa 125 kHz BW SF=8	902.3	-17.08	0.26	-16.82	0.000021	30.00	1.000	-46.82	-0.999979	Pass
32		908.7	-16.44	0.26	-16.18	0.000024	30.00	1.000	-46.18	-0.999976	Pass
63		914.9	-16.34	0.26	-16.08	0.000025	30.00	1.000	-46.08	-0.999975	Pass

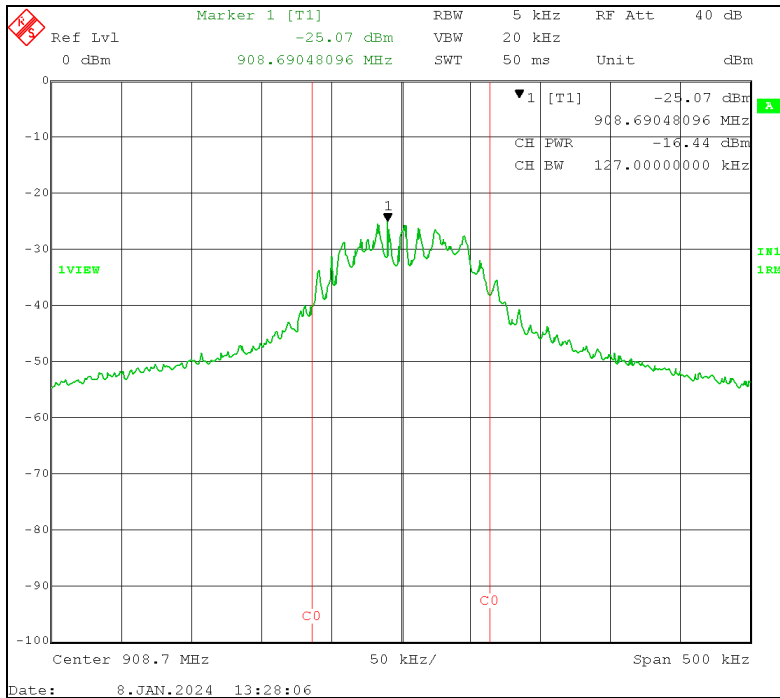
The following pages display the spectrum analyzer screens of the average output power measurements.



Channel 0: 902.30 MHz LoRa Modulation

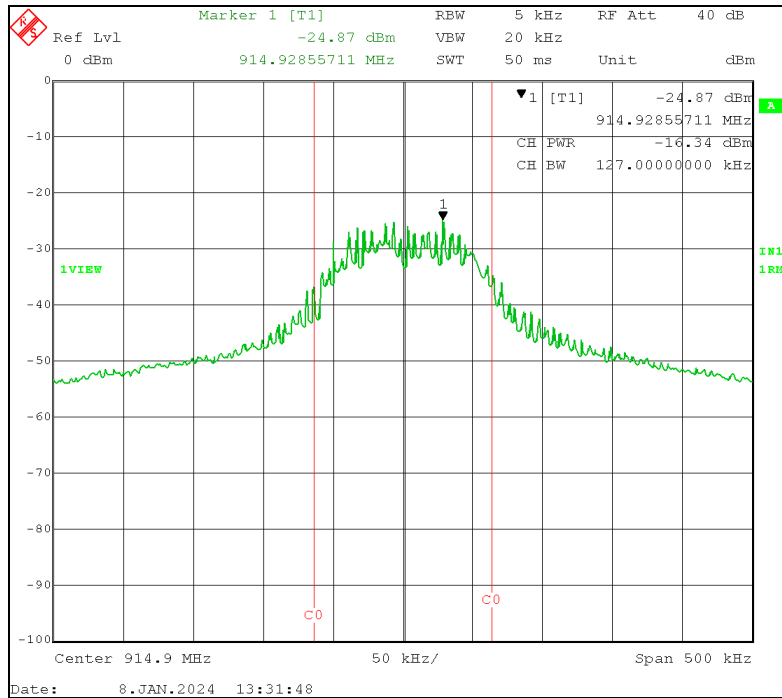


Channel 32: 908.70 MHz LoRa Modulation





Channel 63: 914.9 MHz LoRa Modulation



Test Results: The Maximum Average Conducted Output Power peak measurements for the Woodstream Model V430B Rodent Snap Trap with LoRa Radio, with no modulation and modulation, are compliant with the limits specified in FCC Section 15.247(b)(3).



4.8.3 EIRP Calculation RSS-247 (01/08/2024)

The gain of the antenna, used in the Woodstream Model V430B Rodent Snap Trap with LoRa Radio is 2.11 dBi. Applying the antenna gain to the maximum peak transmitter output produces the following values of EIRP.

Channel	Modulation and Settings	Frequency (MHz)	Transmitter Output Total		Antenna Gain		EIRP		EIRP Limit	Margin	Result
			dBm	Watts	Isotropic	Numeric	dBm	Watts	Watts	Watts	
0	Unmodulated	902.3	14.28	0.027	2.11	1.626	16.39	0.044	4.00	-3.956	Pass
32		908.7	14.24	0.027	2.11	1.626	16.35	0.043	4.00	-3.957	Pass
63		914.9	14.21	0.026	2.11	1.626	16.32	0.043	4.00	-3.957	Pass
0	LoRa 125 kHz BW SF=8	902.3	14.28	0.027	2.11	1.626	16.39	0.044	4.00	-3.956	Pass
32		908.7	14.23	0.026	2.11	1.626	16.34	0.043	4.00	-3.957	Pass
63		914.9	14.21	0.026	2.11	1.626	16.32	0.043	4.00	-3.957	Pass

The results in the above table demonstrate compliance to the ISED requirements for EIRP limits of RSS-247.



4.9 Carrier Frequency Separation 47 CFR 15.247(a)(1) RSS-247 (5.1)(b)

4.9.1 Carrier Frequency Separation Test Procedure

47 CFR Part 15.247(a)(1) and RSS-247 (5.1)(b) specify Hopping Channels must be separated by a minimum of 25 kHz or the 20 dB bandwidth whichever is greater. The 20 dB Bandwidth of this device is 144.29 kHz and this value is the required minimum separation between FHSS channels. The test procedure of ANSI C63.10, Section 7.8.2 was used.

Spectrum Analyzer Settings:

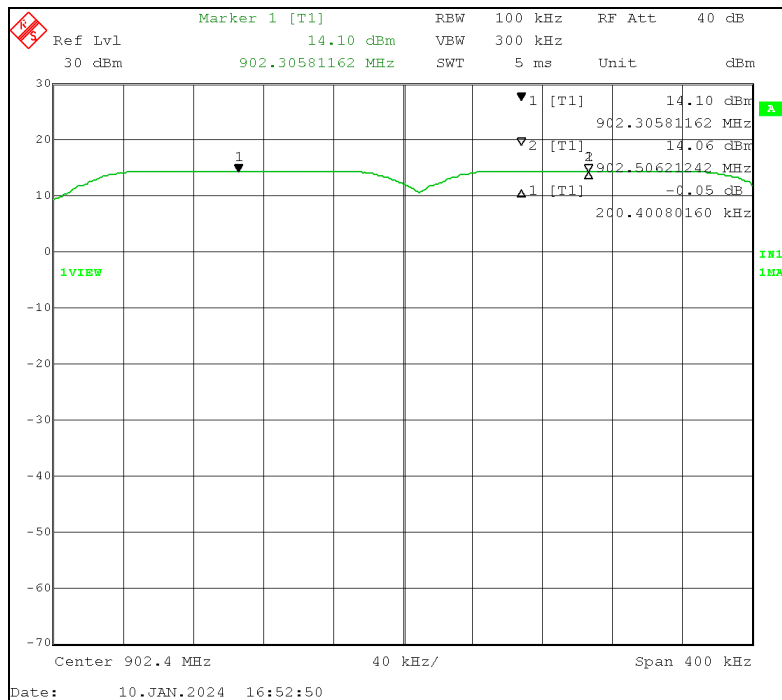
Span	400 kHz
RBW	50 kHz
VBW	200 kHz
Sweep Time	5 ms (Auto)



4.9.2 Carrier Frequency Separation Test Results (01/10/2024)

Hopping Channel	Channel Frequency	Channel Separation (Marker 1 - Delta 1)	Minimum Separation Limit (20 dB Bandwidth)	Margin	Result
#	MHz	kHz	kHz	kHz	
0	902.3	200.40	143.29	-57.11	PASS
1	902.5				

Channels 0 and 1 Carrier Frequency Separation



Test Results: The FHSS Carrier Frequency Separation of the Woodstream Model V430B Rodent Snap Trap with LoRa Radio is compliant with the limits specified in FCC Section 15.247(a)(1) and RSS-247(5.1)(b).



4.10 Number of Hopping Frequencies 47 CFR 15.247(a)(1)(i), RSS-247 (5.1)(c)

4.10.1 Number of Hopping Frequencies Test Procedure

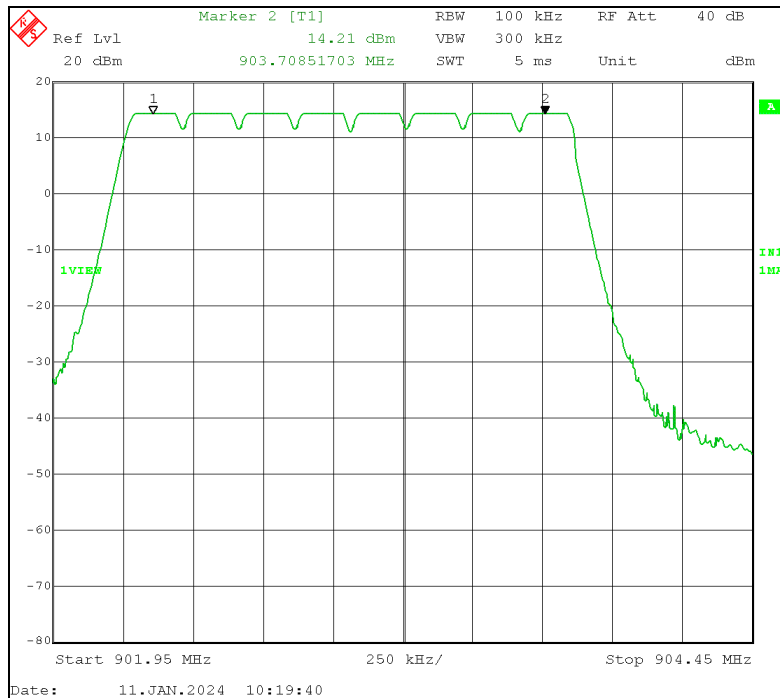
47 CFR Part 15.247(a)(1)(i) and RSS-247 (5.1)(c) specify a minimum of 50 channels for FHSS transmitters with 20-dB bandwidths less than 250 kHz. The test procedure of ANSI C63.10, Section 7.8.3 was used to demonstrate the number of hopping frequencies.

Spectrum Analyzer Settings:

Span	Varies kHz
RBW	100 kHz
VBW	300 kHz
Sweep Time	5 ms

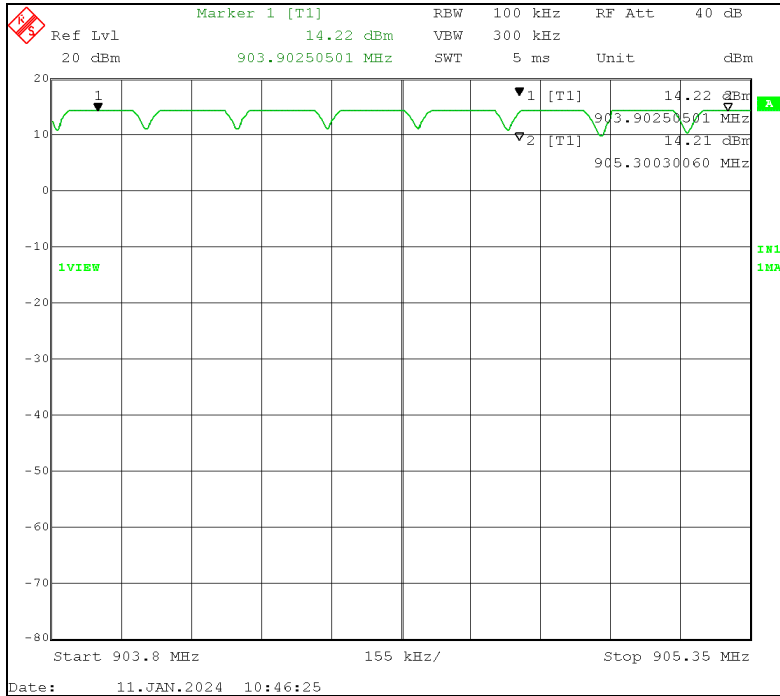
4.10.2 Number of Hopping Frequencies Test Results (01/11/2024)

Channels 0-7 (902.3 MHz to 903.7 MHz)

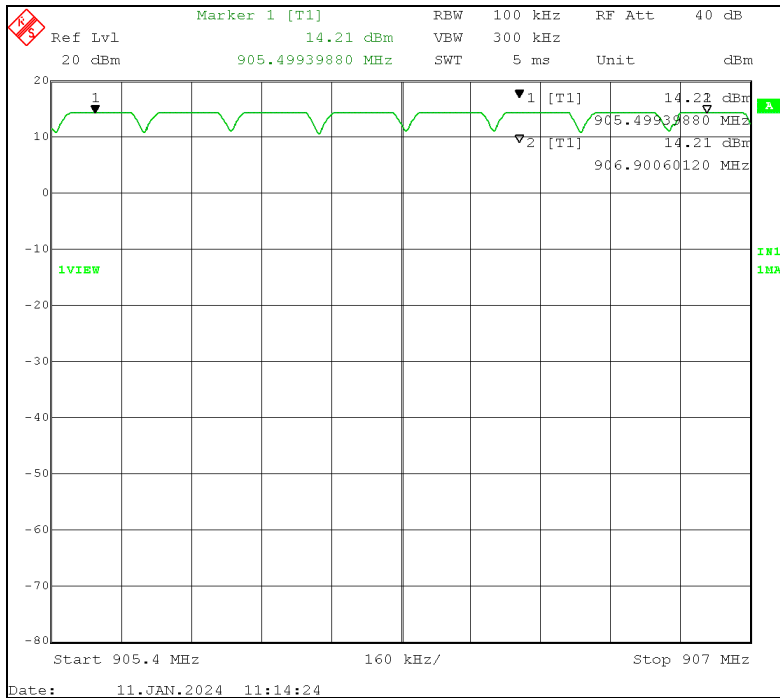




Channels 8-15 (903.9 MHz to 905.3 MHz)

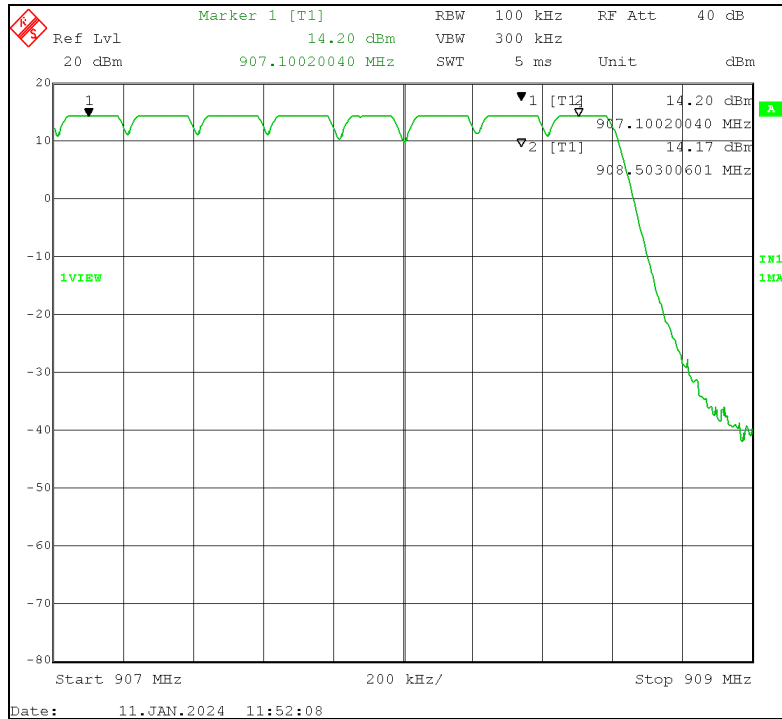


Channels 16-23 (905.5 MHz to 906.9 MHz)

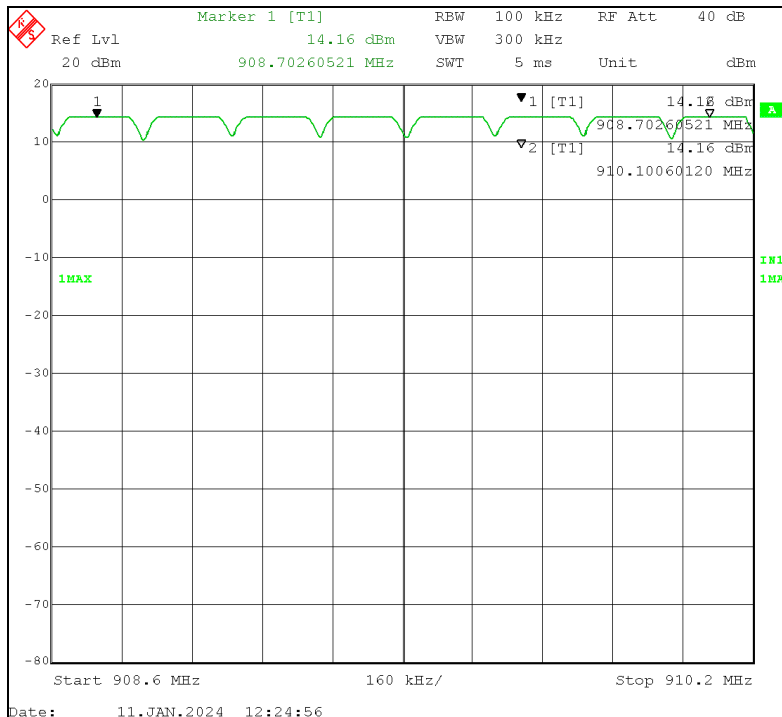




Channels 24-31 (907.1 MHz to 908.5 MHz)

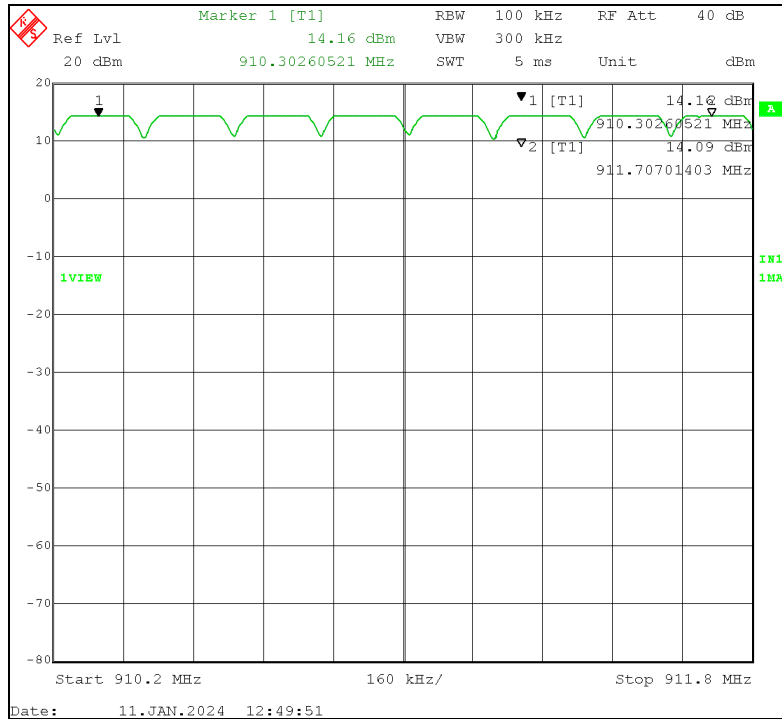


Channels 32-39 (908.7 MHz to 910.1 MHz)

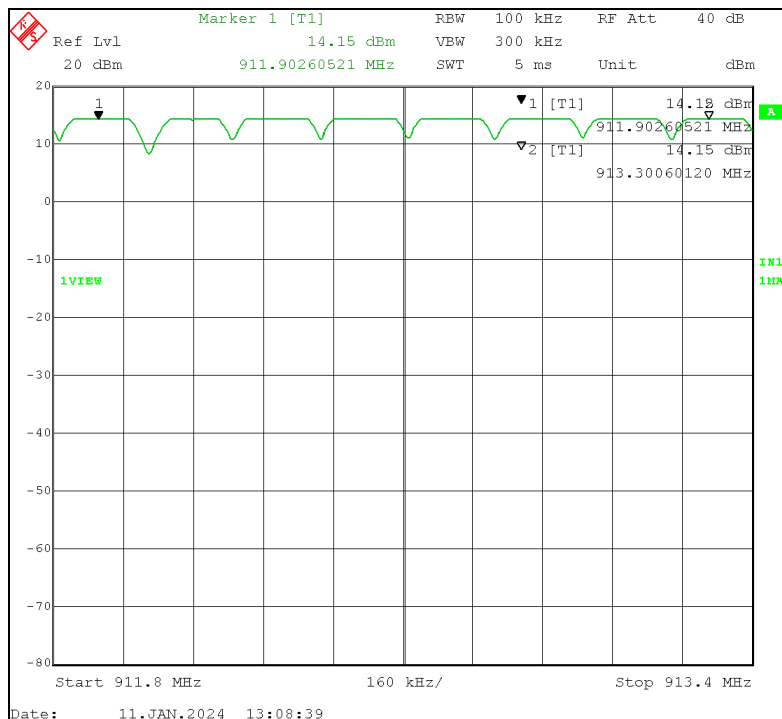




Channels 40-47 (910.3 MHz to 911.7 MHz)

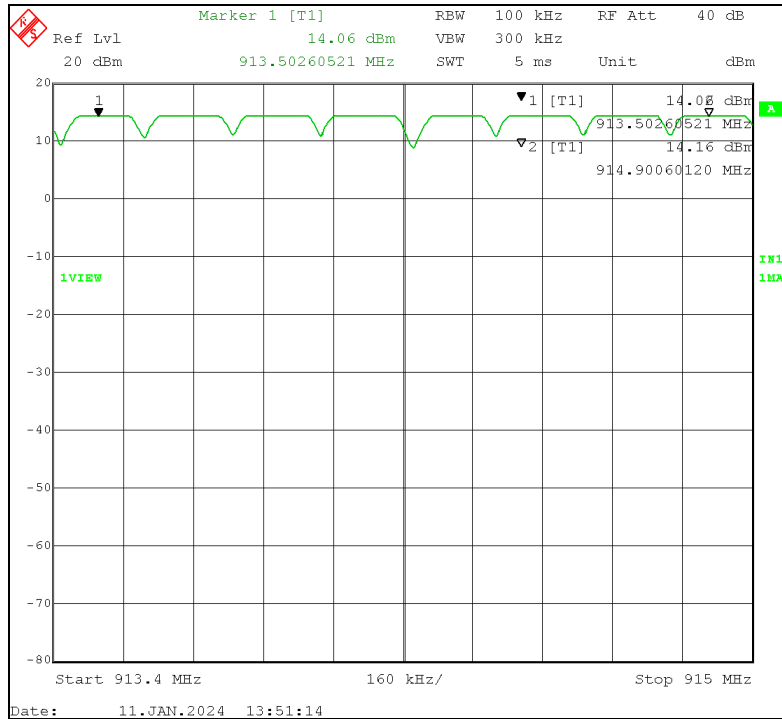


Channels 48-55 (911.9 MHz to 913.3 MHz)





Channels 56-63 (913.5 MHz to 914.9 MHz)



Test Results: The number of channels of the Woodstream Model V430B Rodent Snap Trap with LoRa Radio total 64 and are compliant to the minimum of 50 required by 47 CFR Part 15.247 (a)(1)(i) and RSS-247 (5.1)(c).



4.11 Time of Occupancy (Dwell Time) 47 CFR 15.247(a)(1)(i), RSS-247 (5.1)(c)

4.11.1 Time of Occupancy (Dwell Time) Test Procedure

47 CFR Part 15.247 (a)(1)(i) and RSS-245 (5.1)(c) require the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period. Below are spectrum analyzer screens at low, middle and high frequencies that demonstrate the dwell time and period at all possible modulation parameters. The procedure of ANSI C63.10, Section 7.8.4 was used.

Spectrum Analyzer Settings:

Span	Zero
RBW	100 kHz
VBW	300 kHz
Sweep Time	1 second

For 20 Second Time of Occupancy Test

Span	Zero
RBW	100 kHz
VBW	300 kHz
Sweep Time	20 seconds

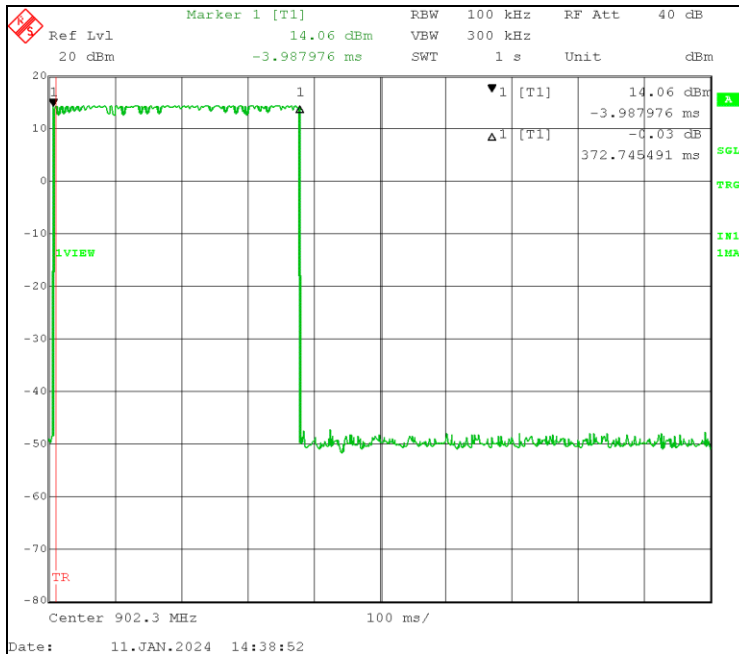
4.11.2 Time of Occupancy (Dwell Time) Test Results (01/11/2024)

Channel #	Freq (MHz)	Modulation	Data Rate	Spread Factor	Bit Rate	Dwell Time (msec)	Limit (msec)	Margin (msec)
0	902.3	LoRa	0	10	980	372.75	400	-27.25
32	908.7					370.74	400	-29.26
64	914.9					372.75	400	-27.25

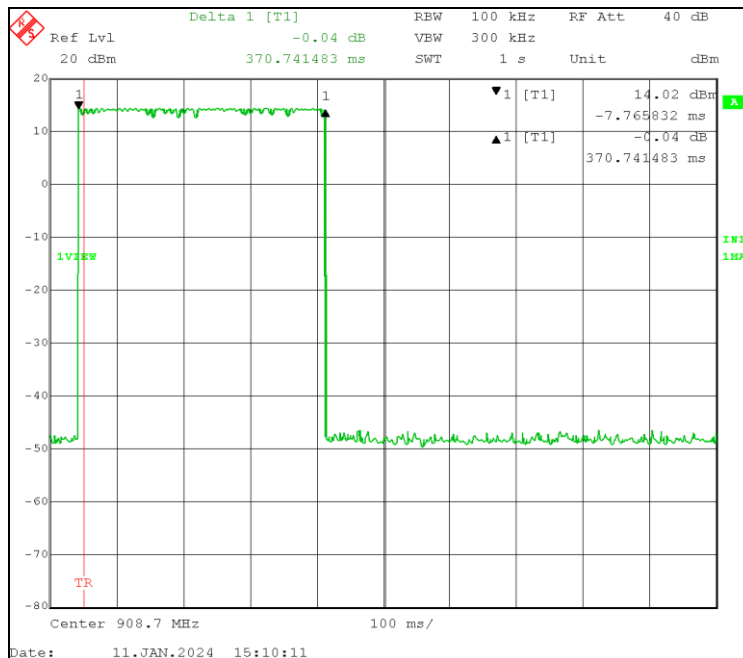


The following pages contain facsimiles of spectrum analyzer display screens demonstrating the time of occupancy.

Channel 0

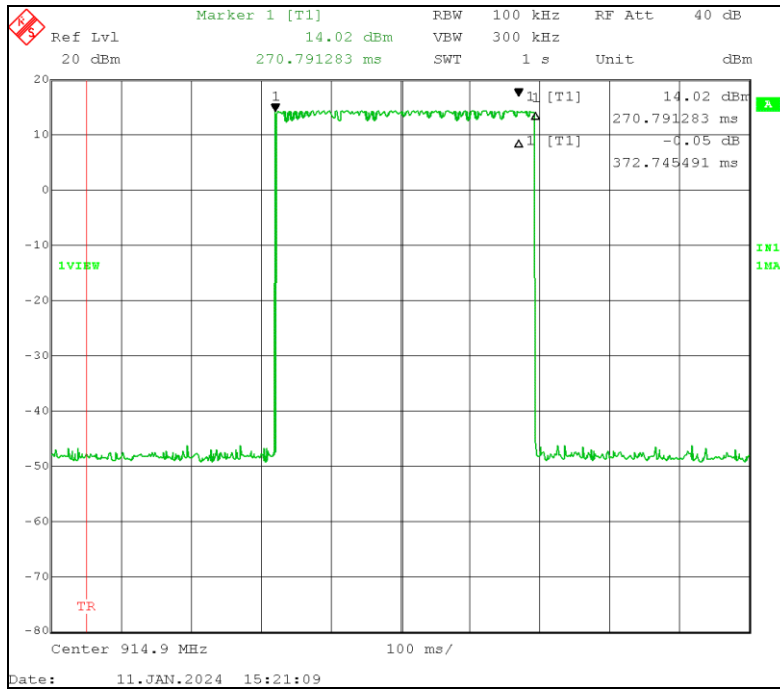


Channel 32





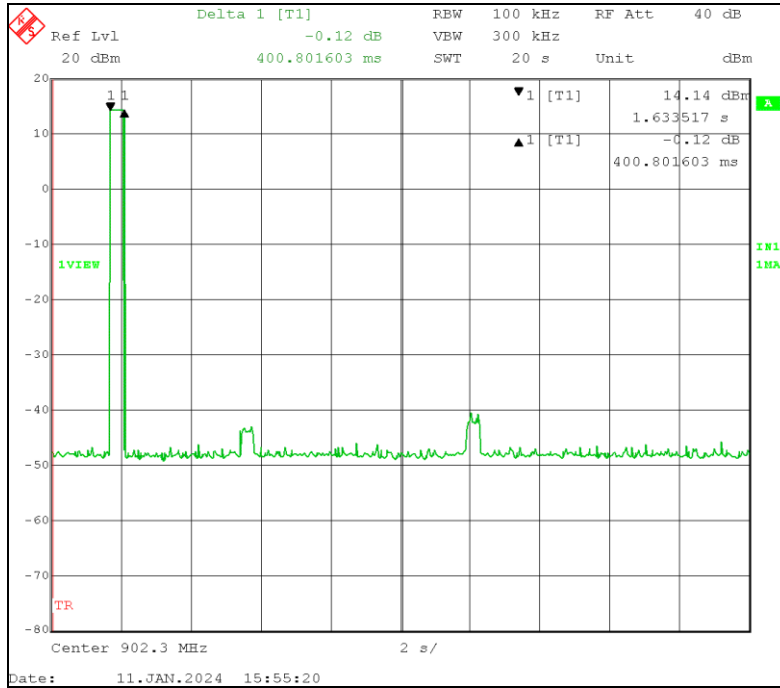
Channel 63



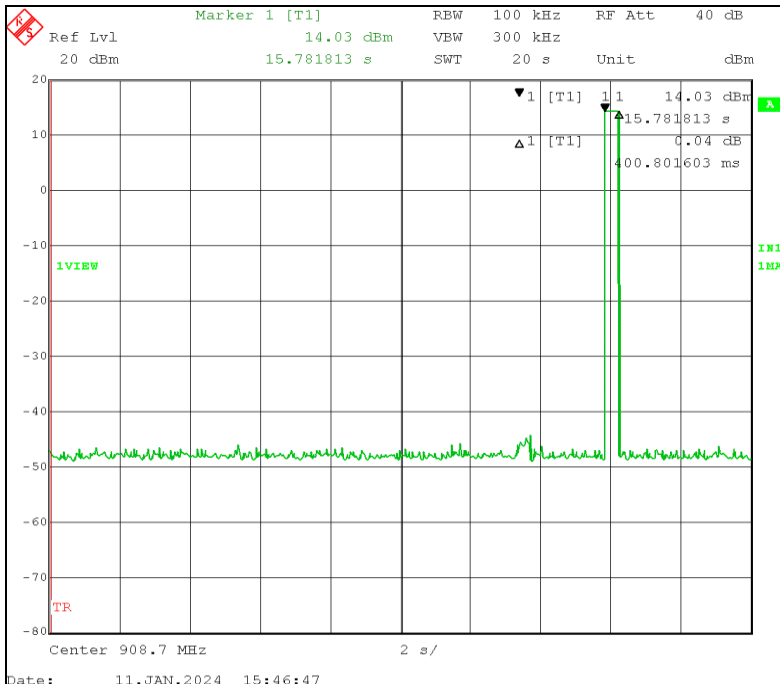


The following pages contain facsimiles of spectrum analyzer display screens demonstrating the requirement of the dwell time within a 20 second period.

Channel 0

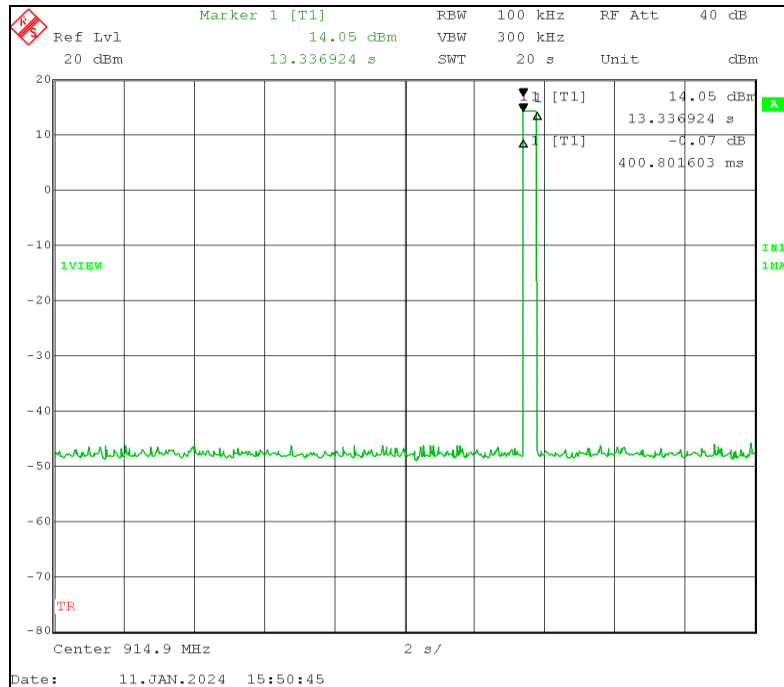


Channel 32





Channel 63



Test Results: The dwell time and period for each of the low, middle and high channels are compliant with the requirements of 47 CFR Part 15.247 and RSS-247.



4.12 Band Edge Measurement 47 CFR 15.247(d) and RSS-247 (5.5)

4.12.1 Band Edge Measurement Test Procedure

Band edge measurements were made while operating in non-hopping mode and hopping mode. Low Channel, 902.3 MHz (Channel 0) and High Channel, 914.9 MHz (Channel 63) were used as reference signals for the Low Band Edge and High Band Edge. The Authorized Band Edge measurements were made using the Relative Method of Section 6.10.4 of ANSI C63.10. The Spectrum Analyzer Screens below show emissions between the modulated carrier, at low and high frequencies and the lower and upper band edges. The limit is 30 dBc, based upon the Maximum Average Output Power Test Measurement procedure.

Spectrum Analyzer Settings:

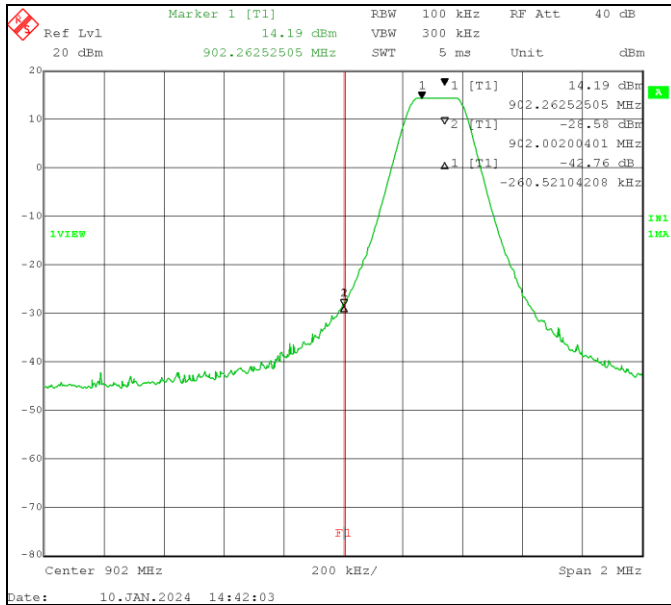
Span	Various
RBW	100 kHz
VBW	300 kHz
Sweep	5 ms

4.12.2 Band Edge Measurement Test Results (01/10/2024)

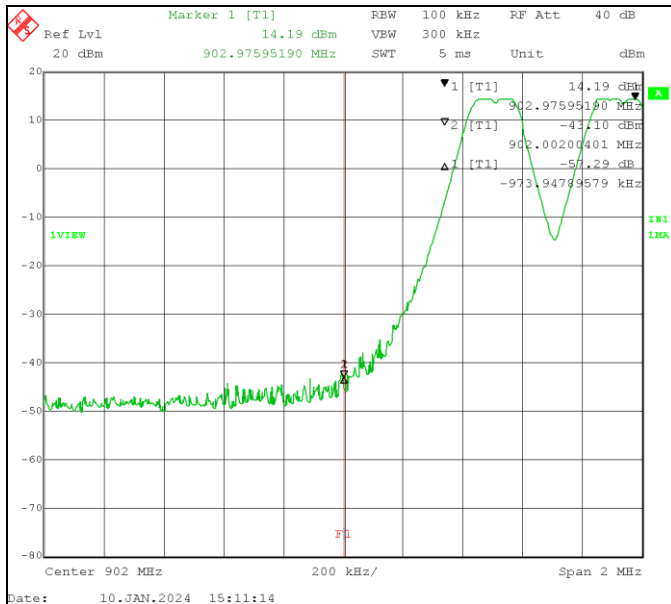
Channel	Tx Carrier Frequency (MHz)	Peak Amplitude Tx Carrier (dBm) Non-Hopping	Band Edge Measurement				Result
			Peak Amplitude at Lower Band Edge (dBm)	Difference in Tx Amplitude to Band Edge Amplitude (dBm)	Band Edge Limit (dB) *	Margin (dB)	
0	902.3	14.19	-28.58	42.77	30.00	-12.77	Pass
63	914.9	14.02	-47.25	61.27	30.00	-31.27	Pass
Channel	Hopping Tx Carrier Frequency (MHz)	Peak Amplitude Hopping Tx Carrier (dBm)	Band Edge Measurement				Result
			Peak Amplitude at Lower Band Edge (dBm)	Difference in Tx Amplitude to Band Edge Amplitude (dBm)	Band Edge Limit (dB) *	Margin (dB)	
0	902.3	14.19	-43.10	57.29	30.00	-27.29	Pass
63	914.9	14.04	-47.05	61.09	30.00	-31.09	Pass



Low Band Edge – Non-Hopping (Channel 0, 902.3 MHz, BW=125 kHz, SF=8)

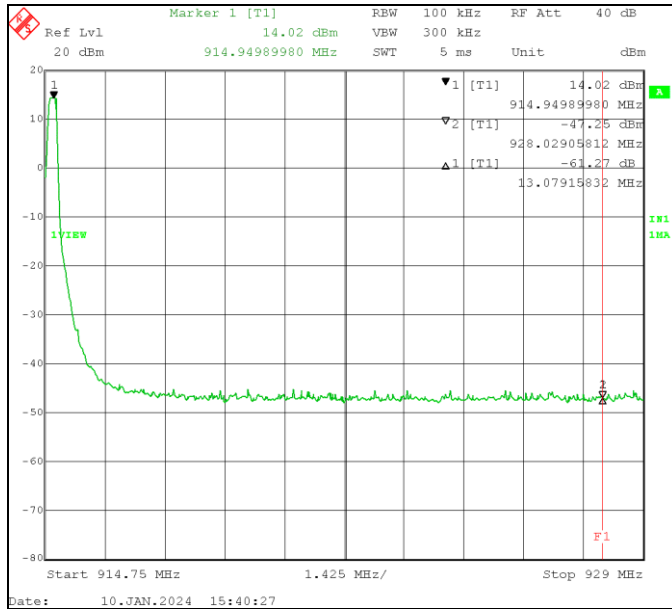


Low Band Edge – Hopping (Data Rate=980 bits/sec)

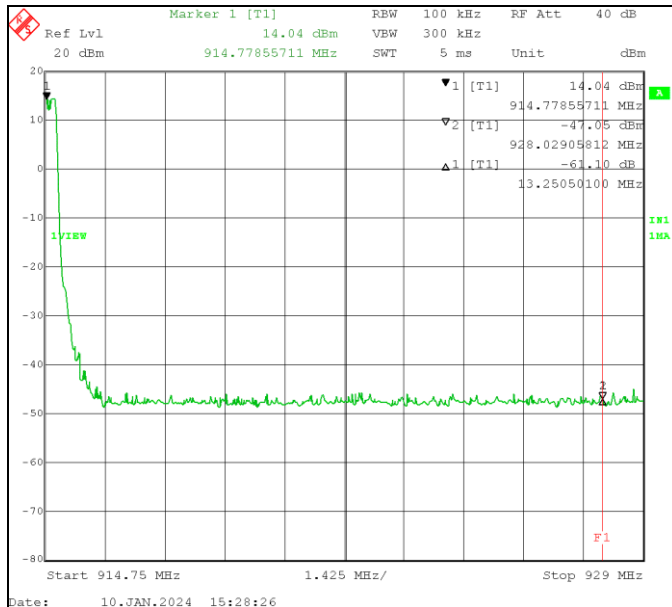




High Band Edge – Non-Hopping (Channel 63, 914.9 MHz, BW=125 kHz, SF=8)



High Band Edge – Hopping (Data Rate=980 bits/sec)



Test Results: The band edge emissions of each of the low and high channels, in non-hopping and hopping modes, are compliant with the requirements of 47 CFR Part 15.247 and RSS-247.



4.13 Average Power Spectral Density, Hybrid Mode (FCC Section 15.247(e) and (f), RSS-247 Section 5.2(b) and 5.3)

4.13.1 Average Power Spectral Density Test Procedure

A conducted power measurement of the output frequency was measured using an RMS detector for the Woodstream V440 for each of the low (Channel 0), middle (Channel 32) and high (Channel 63) channel frequencies. The signal output was maximized with LoRa modulation with 125 kHz bandwidth using a Spread Factor of 8. The test procedure of ANSI C63.10, Section 11.10.3 Method (AVGPSD-1) was used.

Spectrum Analyzer Settings using RMS Detection:

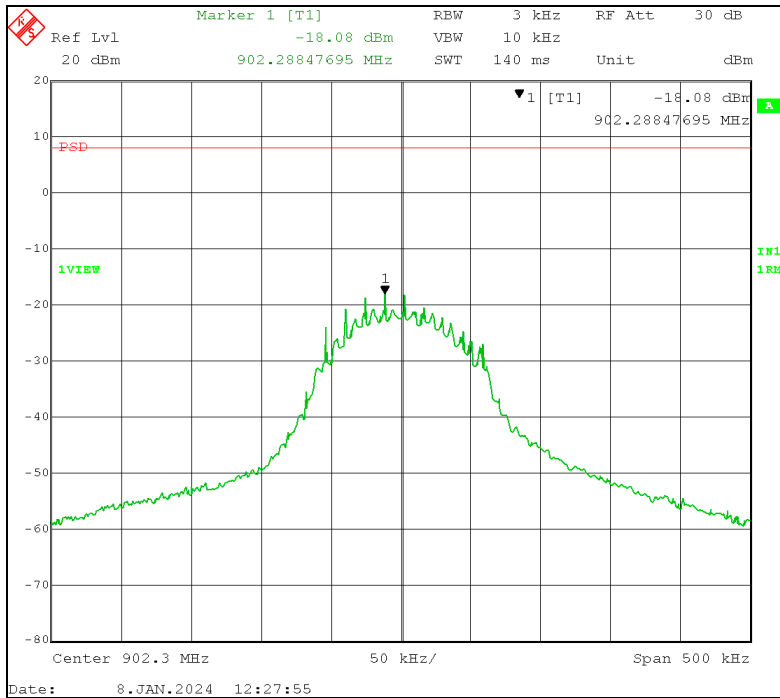
RBW (3 kHz \leq RBW \leq 100 kHz)	3	kHz
VBW (3 X RBW)	10	kHz
Span (1.5 X the DSS Bandwidth of 125 kHz)	500	kHz
Sweep Time (Auto)	140	ms
Detector	RMS	

4.13.1.1 Average Power Spectral Density Test Results (01/08/2024)

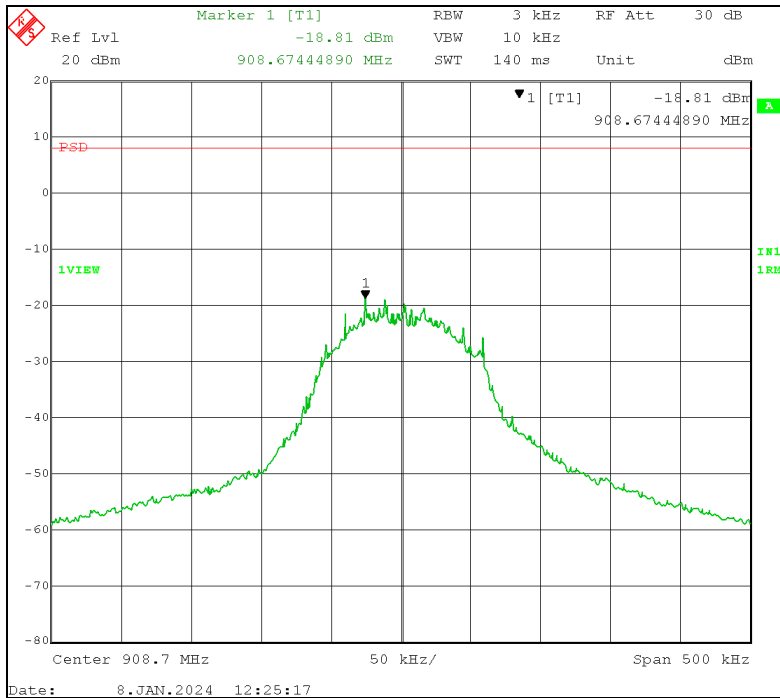
Channel	Frequency (MHz)	Tx with LoRa Modulation Settings	Measured Average Level	Cable # 962 Loss	Total	Limit	Margin	Test Result
			dBm	dB	dBm	dBm	dBm	
0	902.3	Power= +15,	-18.08	0.26	-17.82	8.00	-25.82	Pass
32	908.7	BW= 125 kHz,	-18.81	0.26	-18.55	8.00	-26.55	Pass
63	914.9	SF=8	-16.74	0.26	-16.48	8.00	-24.48	Pass



Channel 0, 902.3 MHz, LoRa Modulation

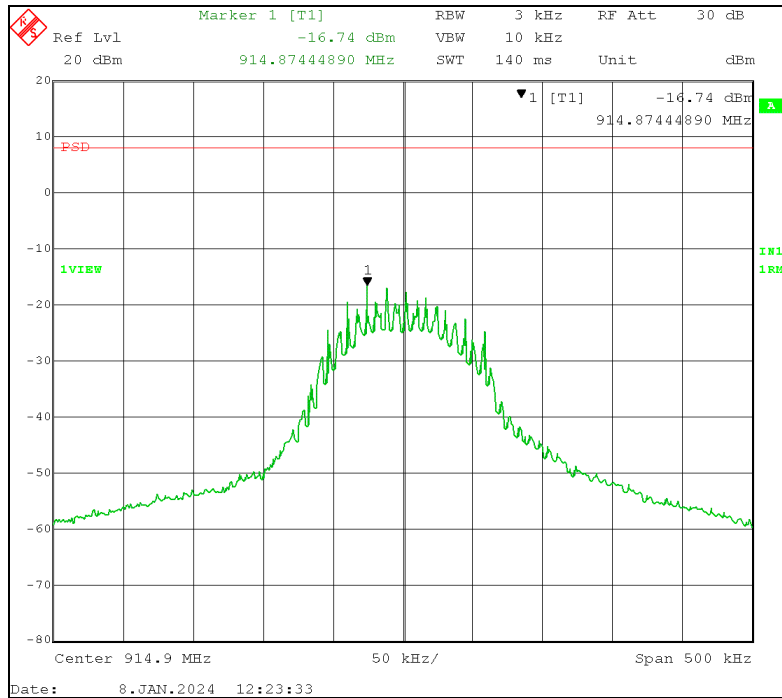


Channel 32, 908.7 MHz, LoRa Modulation





Channel 63, 914.9 MHz, LoRa Modulation



Test Results: The Average Power Spectral Density measurements of the Woodstream Model V430B Rodent Snap Trap with LoRa Radio are compliant with the limits specified in FCC Section 15.247 and RSS-247.



5.0 Test Setup Photos

See Test Setup Photos Exhibit(s) submitted under this grant for the V430B Snap Trap with LoRa Radio.



Appendix A – Test Equipment

Equipment	Manufacturer	Model #	Serial #	BEC #	Calibration Date	Calibration Cycle	Calibration Due Date
EMI Receiver (20 Hz – 26.5 GHz)	Rohde & Schwarz	ESIB 26	836119/006	1010	12/09/22	3 Years	12/09/25
Antenna (30 MHz - 6 GHz)	Sunol Sciences	JB6	A022108	712	06/21/21	3 Years	06/21/24
9kHz-3GHz EMC Analyzer	Agilent	E7402A	US39440162	883	06/21/21	5 Years	06/21/26
Antenna (30 MHz - 6 GHz)	Sunol Sciences	JB6	A020714	882	05/24/21	3 Years	05/24/24
Amplifier (.09 – 1300 MHz)	Hewlett Packard	8447F	3313A06658	807	01/13/21	5 Years	01/13/26
EMC Analyzer (9 kHz - 1.8 GHz)	Hewlett Packard	8593EM	3710A00214	1026	03/23/20	5 Years	03/23/25
Amplifier System (0.5 – 50 GHz)	Hewlett Packard	83015A 83017A	3123A00360 & 3332A00219	1027	06/16/21	3 Years	06/16/24
Double Ridged Horn Antenna (1 - 18 GHz)	EMCO	3115	9705-5225	1028	11/24/21	3 Years	11/21/24
OATS Site (30 MHz – 1 GHz)	BEC	N/A	N/A	705	10/07/23	1 Year	10/07/24
Temp/Humidity Meter	Control Company	4096	151872672	780	07/21/22	3 Years	07/21/25
Notch Filter	Anatech	AE915N S2095	10	923	No Cal. Required	No Cal. Required	No Cal. Required
High-Pass Filter	Trilithic Inc.	6HC1500 /18000- 3-KK	20044046	741	02/27/23	3 Years	02/27/26



Software (Tile Instrument Control System)	Quantum Change/EMC Systems	Version 3	N/A	N/A	No Cal. Required	No Cal. Required	No Cal. Required
Radiated Emissions Test Software	BEC	RADE	2.2	N/A	No Cal. Required	No Cal. Required	No Cal. Required