



**BEC INCORPORATED**

**CERTIFICATION APPLICATION TEST REPORT**

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

**Woodstream Corporation Model V440 Lora Radio Bait Box Rodent Trap**

**FCC ID: SNA-V440  
ISED ID: 9458A-V440**

**REPORT BEC-2224-01**


**TEST DATES: 09/27/2022 – 10/17/2022**

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

**PREPARED BY:** \_\_\_\_\_

  
JR Fanella, Test Engineer

**REVIEWED and APPROVED BY:** \_\_\_\_\_

  
Steve Fanella, Quality Manager

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## Revision History

| Revision # | Description of Changes      | Date of Changes | Date Released |
|------------|-----------------------------|-----------------|---------------|
| 0          | Test Report Initial Release | N/A             | 11/10/2022    |



## 1.0 Administrative Information

### 1.1 Project Details

|  |   |  |
|--|---|--|
| <b>Project Number</b>                      | BEC-2224  |  |
| <b>Manufacturer</b>                        | Woodstream Corporation  |  |
| <b>Model Number</b>                        | V440  |  |
| <b>EUT Description</b>                     | VLINK Bait Box Rodent Trap with LoRa Radio  |  |
| <b>Serial Numbers</b>                      | None  |  |
| <b>Sample Types</b>                        | Unmodified Sample (Radiated Emissions Test Samples)   | Modified with SMA connector on transmitter output port (Antenna Conducted Test Sample) |
| <b>Sample Numbers</b>                      | 2224-01 and 2224-03   | 2224-02  |
| <b>FCC ID</b>                              | SNA-V440  |  |
| <b>ISED ID</b>                             | 9458A-V440  |  |
| <b>Radio Chip Manufacturer</b>             | Semtech Corporation   |  |
| <b>Radio Chip Model Number</b>             | SX1272  |  |
| <b>Frequency of Operation</b>              | 902 – 915 MHz   |  |
| <b>Frequencies Tested</b>                  | Low (903.0 MHz), Middle (909.4 MHz), High (914.2 MHz)   |  |
| <b>Antenna Gain</b>                        | + 5.06 dBi  |  |
| <b>Antenna Type</b>                        | Inverted-F PCB Trace Antenna  |  |
| <b>Modulation</b>                          | LoRa  |  |
| <b>FCC Classification</b>                  | Digital Transmission System (DTS)   |  |
| <b>Date Samples Received</b>               | 09/23/2022  |  |
| <b>EUT Firmware Version</b>                | FW Version 1.2.10 MCU: AVR32DA32  |  |
| <b>Sample Types and Condition Received</b> | Production Units Suitable for Test  |  |
| <b>Applicable FCC Rules</b>                | FCC Rules Part 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz Direct Sequence System   |  |
| <b>Applicable ISED Rules</b>               | 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

|  |  |
|--|--|
| <b>Test Laboratory Location</b>                    | BEC Incorporated<br>970 East High Street<br>Pottstown, PA 19464      |
| <b>BEC Test Personnel</b>                          | JR Fanella / Tom Koester / Steve Fanella                             |
| <b>BEC Laboratory Number<br/>FCC Registration</b>  | US1118   |
| <b>BEC Laboratory Number<br/>ISED Registration</b> | 7342A-1  |
| <b>Test Performed For</b>                          | Woodstream Corporation<br>69 North Locust Street<br>Lititz, PA 17543 |
| <b>Customer Technical<br/>Contacts</b>             | Dwayne Arrighy/Matt Kauffman   |
| <b>Customer Reference<br/>Number</b>               | PO # 197937  |



## 1.4 Measurement Uncertainty

| Measurement                    | Measurement Distance | Frequency Range  | Measurement Limit | Expanded Uncertainty |
|--------------------------------|----------------------|------------------|-------------------|----------------------|
| Radiated Disturbance           | 3 Meter              | 30 MHz – 1 GHz   | Class B           | 4.27                 |
| 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   | $\pm 0.5$ ppm           | $\pm 0.027$ ppm |
| RF Power, Conducted   | $\pm 1.5$ dB            | $\pm 1.45$ dB   |
| Conducted Spurious Emission of Transmitter, Valid up to 6 GHz | $\pm 3$ dB              | $\pm 0.9$ dB    |
| Radiated Emission of Transmitter, Valid up to 6 GHz           | $\pm 6$ dB              | $\pm 4.87$ dB   |
| Radiated Emission of Receiver, Valid up to 6 GHz              | $\pm 6$ dB              | $\pm 4.87$ dB   |
| Occupied Bandwidth  | $\pm 5$ %               | $\pm 2$ %       |
| Temperature   | $\pm 2.5$ °C            | $\pm 0.5$ °C    |
| Humidity  | $\pm 10$ %              | $\pm 2.5$ %     |

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 V440 LoRa Radio Bait Box Rodent Trap was tested and found to be compliant to the sections of the FCC Part 15 Subpart C and ISSED standards listed below:

| Report Section       | FCC Part 15, Subpart C     | RSS-Gen           | RSS-247 | Test Description   | Result   |
|----------------------|----------------------------|-------------------|---------|--|----------|
| N/A                  | 15.207                     | 7.2               |         | Conducted Limits (AC Power)                                      | N/A      |
| <a href="#">4.1</a>  | 15.203                     | Annex A 10(g)     |         | Antenna Requirement  | PASS     |
| <a href="#">4.2</a>  | 15.204                     | 8.3               |         | External RF power amplifiers and antenna modifications           | PASS     |
| <a href="#">4.3</a>  | ANSI C63.10, Section 11.6  |                   |         | Duty Cycle   | Measured |
| <a href="#">4.4</a>  | 15.247(d)                  |                   | 5.5     | DTS Emissions in non-restricted frequency Bands 30 MHz to 10 GHz | PASS     |
| <a href="#">4.5</a>  | 15.205, 15.209<br>15.35(b) | 8.1, 8.9,<br>8.10 | 3.3     | DTS Emissions in restricted frequency Bands 30 MHz to 10GHz      | PASS     |
| <a href="#">4.6</a>  | 15.247(a)(2)               |                   | 5.2 (a) | 6 dB Occupied Bandwidth  | PASS     |
| <a href="#">4.7</a>  | 2.1049(h)                  | 6.7               |         | 99% Occupied Bandwidth   | PASS     |
| <a href="#">4.8</a>  | 15.247(b)(3)               |                   | 5.4 (d) | Maximum Conducted Output Power and EIRP                          | PASS     |
| <a href="#">4.9</a>  | 15.247(e)                  |                   | 5.2 (b) | Antenna Port, Power Spectral Density                             | PASS     |
| <a href="#">4.10</a> | 15.247(d)                  |                   | 5.5     | Band Edge Measurement  | 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 V440 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 four (4) 1.5 VDC AA alkaline batteries.

### **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, DTS Operation within the band of 902 - 928 MHz.

### **2.4 Test Configuration**

The Woodstream Model V440 LoRa Radio Bait Box Rodent Trap Sample # 2224-02 was tested without the enclosure for all antenna conducted measurements. The Woodstream Model V440 LoRa Radio Bait Box Rodent Trap Sample # 2224-01 and Sample # 2224-03 were tested within the trap enclosure during all radiated emissions tests.

### **2.5 Test Configuration Rationale**

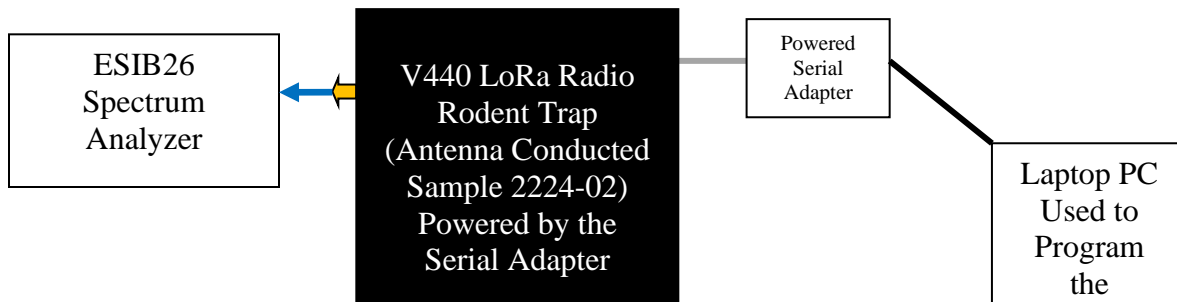
The modified radio of the Woodstream Model V440 LoRa Radio Bait Box Rodent Trap allows direct access to the output of the radio, without a transmission antenna. The unmodified unit is factory produced with modified software for EMI test purposes.



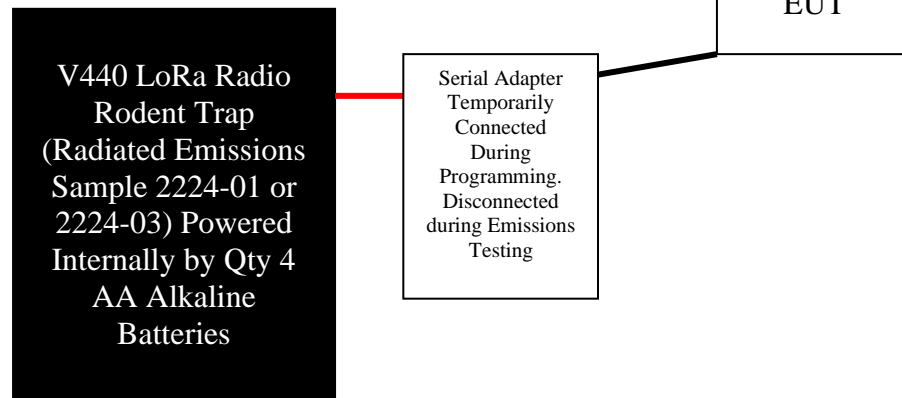
## 2.6 Test Configuration Diagrams

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<br>(Unmodified Emissions Samples)                  | Woodstream<br>Corporation | V440  | None          | 2224-01 and<br>2224-03 |
| Lora Radio VLINK Rodent Trap<br>(Modified with SMA Antenna<br>Conducted Sample) |                           |       |               | 2224-02                |

### Interconnection Cable List (Conducted Test Setup)

| Manufacturer        | Model                    | Type  | Shielding       | Length    | Description  |
|---------------------|--------------------------|---|-----------------|-----------|--|
| Flexco<br>Microwave | FC19560<br>600236A<br>2B | Antenna<br>Conducted RF<br>Measurement<br>Cable | Double<br>Braid | 0.6 Meter | Measurement Cable<br>from the Antenna SMA<br>Connector of the EUT to<br>the input of the Rohde<br>and Schwarz ESIB26<br>Receiver. BEC Asset #<br>BEC-811 |

### Support Equipment

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



## 2.8 Test Signals and Test Modulation

By design this product does not have an external Modulation input connector, therefore, normal operating modulation was used for all testing reported herein. The only test where modulation was not active was during testing of the Maximum Peak Power Output FCC Section 15.247(b) (3) (Section 4.6 of this report) to ensure that the un-modulated carrier was not higher than the modulated carrier.

The control unit in this product is a digital frequency transmitter. The EUT transmits to a discrete frequency on a specific channel. The Woodstream Model V440 LoRa Radio Bait Box Rodent Trap has 8 Channels available. The 8 Channels and frequencies that can be transmitted by the EUT are as follows:

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|
| 0       | 903.0           | 4       | 909.4           |
| 1       | 904.6           | 5       | 911.0           |
| 2       | 906.2           | 6       | 912.6           |
| 3       | 907.8           | 7       | 914.2           |

For the required testing, the EUT was configured to transmit at low Channel 0 (903.0 MHz), middle Channel 4 (909.4 MHz) and high Channel 7 (914.2 MHz). The EUT operates with a 500 kHz bandwidth and a Spread Factor of 8. The maximum output power setting of 20 was used for all tests. The Duty Cycle of the LoRa Modulation signal is 100%.

## 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 3m. Antenna gain value was calculated to be + 5.06 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 V440 LoRa Radio Bait Box Rodent Trap Radiated Emissions Test Samples 2224-01 and 2224-03 were 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 V440 LoRa Radio Bait Box Rodent Trap Antenna Conducted Test Sample 2224-02.

## **2.12 EUT Pictures Woodstream Model V440 LoRa Radio Bait Box Rodent Trap**

See Appendix B Woodstream V440 LoRa Radio Mouse Snap Trap External Photos



## **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 March 2019 Amendment 1: General Requirements for Compliance of Radio Apparatus

RSS-247 Issue 2 February 2017: 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

#### **3.1.4 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 V440 LoRa Radio Bait Box Rodent Trap 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 V440 LoRa Radio Bait Box Rodent Trap. There are no detachable parts of the antenna. The antenna is not replaceable, nor changeable, and therefore complies with the requirements of this section.

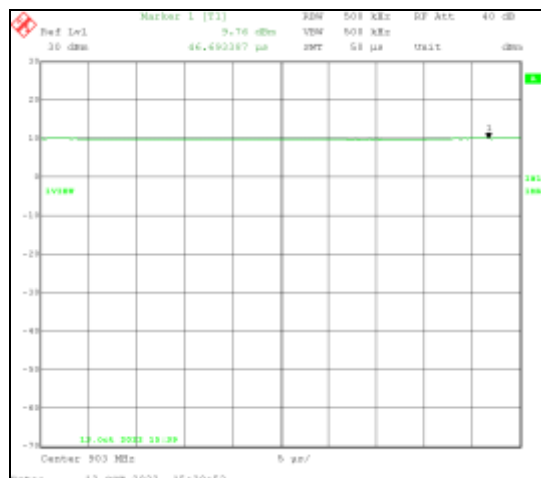
### 4.3 Duty Cycle of the DTS Fundamental Transmission

The duty cycle of the DTS transmission shall 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 (10/13/2022)

The fundamental transmission signal, tuned to 903.0 MHz, was displayed on the spectrum analyzer with zero frequency span, 500 kHz RBW and 500 kHz 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%.

Duty Cycle of DTS Transmission







#### 4.4 DTS Emissions in Non-restricted Frequency Bands (FCC Section 15.247(d), RSS-247 Sec.5)

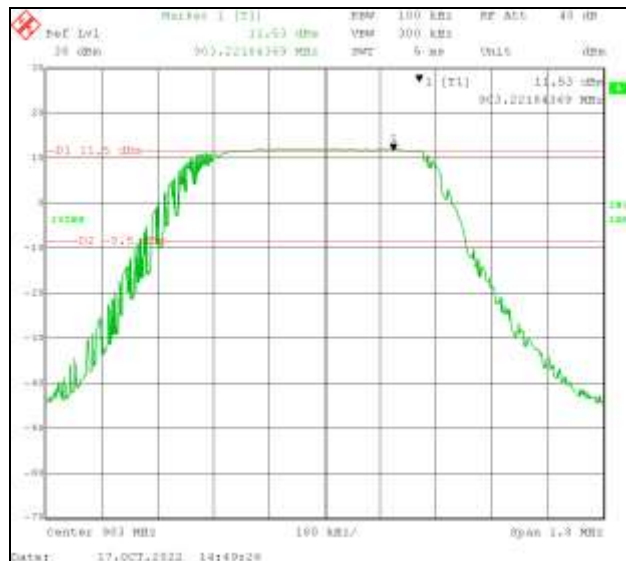
##### 4.4.1 DTS Emissions in Non-restricted Frequency Bands Test Procedure

A measurement of the emissions in non-restricted frequency bands was made at the low Frequency 903.0 MHz (Channel 0), middle Frequency 909.4 MHz (Channel 4) and high Frequency 914.2 MHz (Channel 7). The signal output was maximized with LoRa modulation with 500 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 five bands: 9 kHz – 100 MHz, 100-500 MHz, 500 M – 1 GHz, 1 – 5 GHz and 5 – 10 GHz. Each of the three fundamental test frequencies was measured for the reference value to determine the -20 dBc value.

##### Spectrum Analyzer Settings

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

##### 4.4.2 DTS Emissions in Non-restricted Frequency Bands Reference Measurement Channel 0 (10/17/2022)

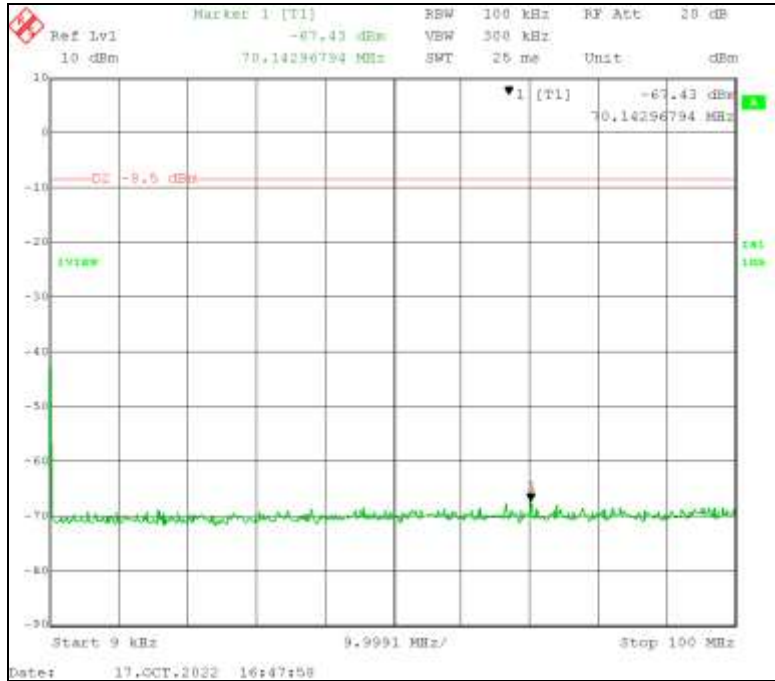


The peak level of 11.5 dBm is the maximum peak output of the Woodstream Model V440 LoRa Radio Bait Box Rodent Trap. The conducted spurious emissions from the antenna port must be 20 dB down from this peak. The resultant limit is therefore -8.5 dBm and is displayed on the plots below.

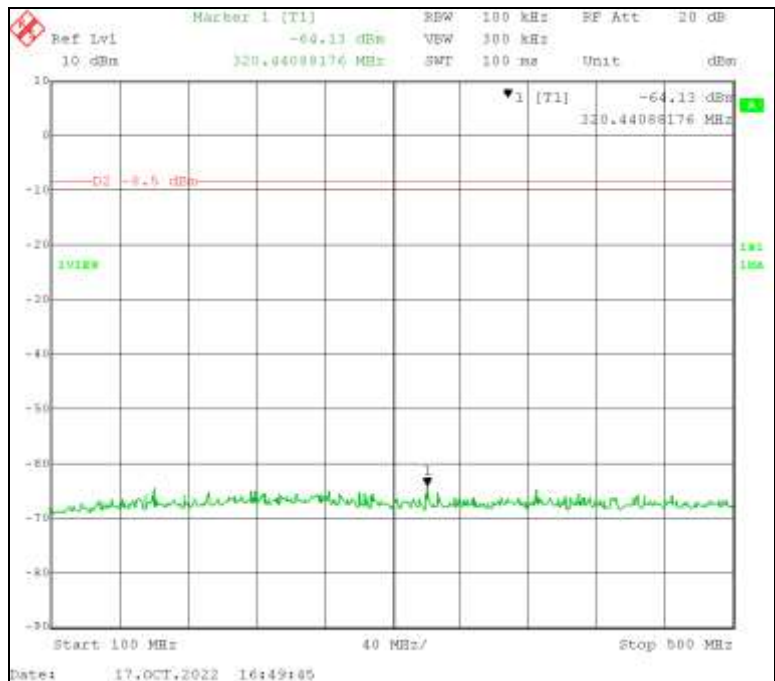


### 4.4.3 DTS Emissions in Non-restricted Frequency Bands Channel 0 Test Results (10/17/2022)

9 kHz – 100 MHz

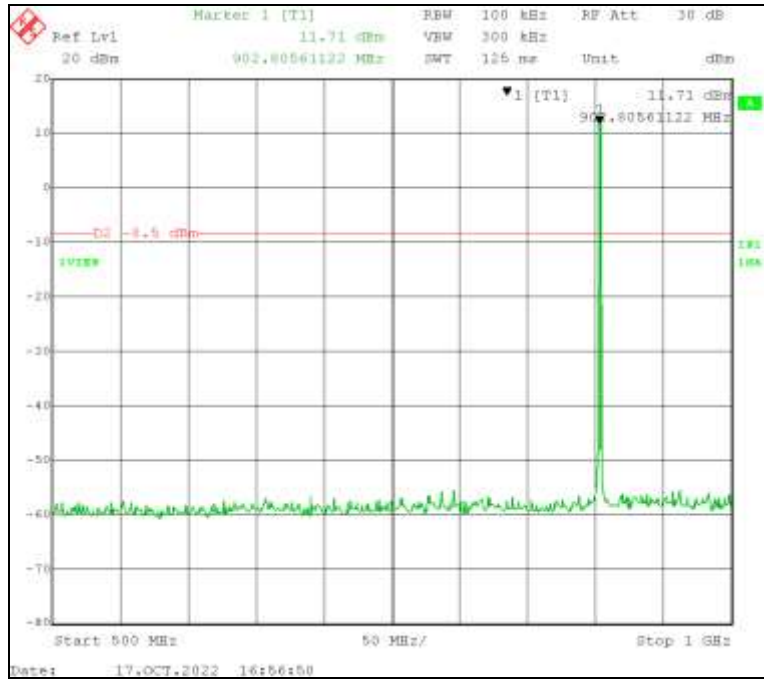


100 MHz – 500 MHz

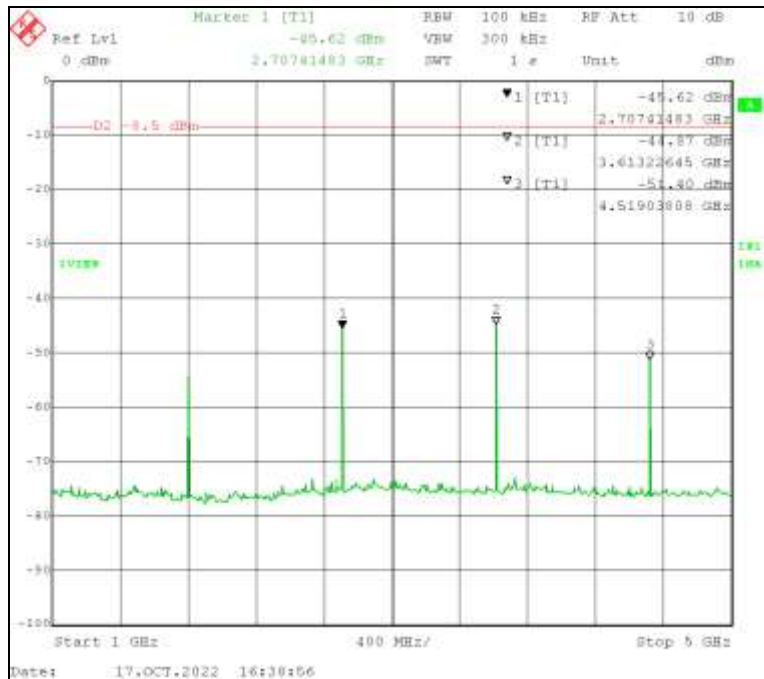




### 500 MHz – 1000 MHz

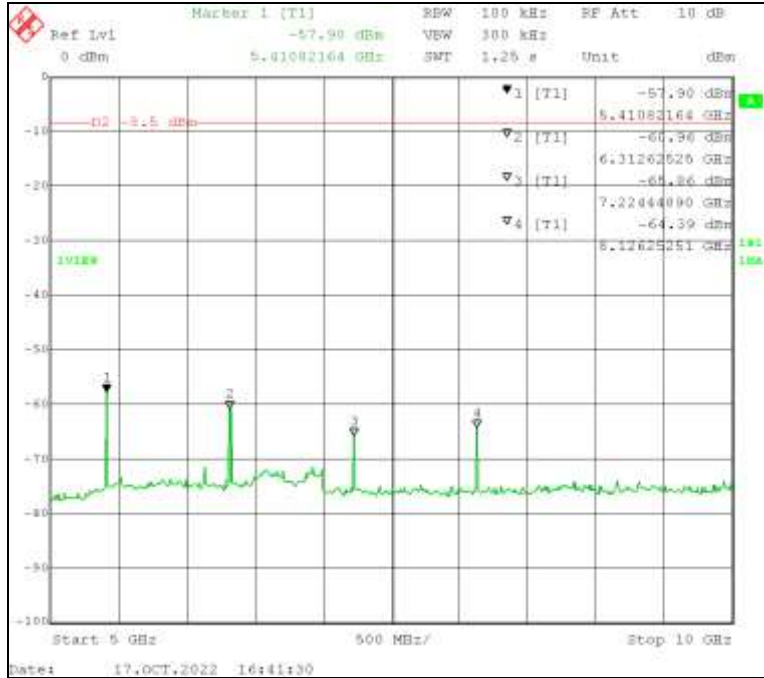


### 1 GHz – 5 GHz





### 5 GHz – 10 GHz

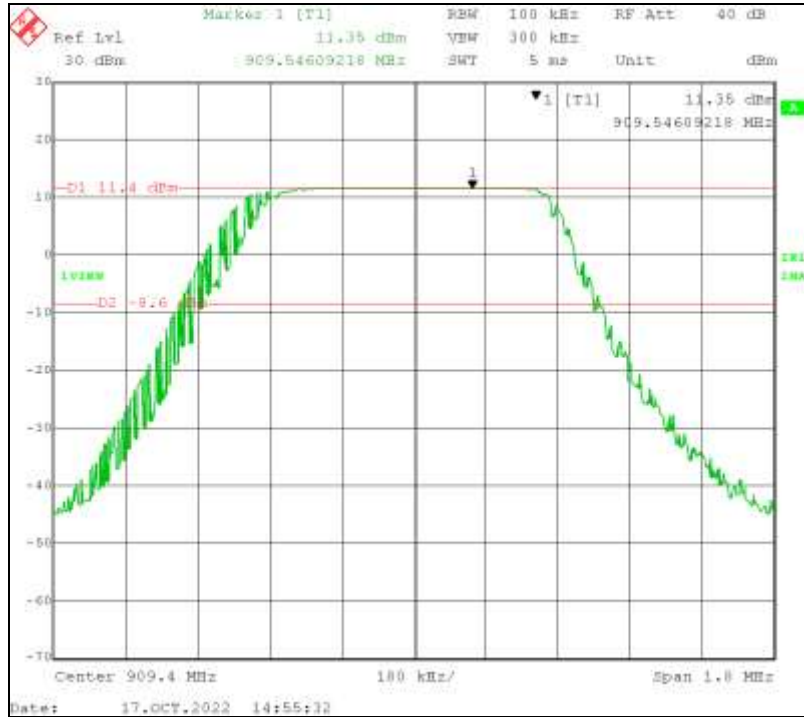


### Test Results of Highest Emissions: Channel 0 (Frequency 903.0 MHz)

| Channel Frequency | Frequency | Measured Peak Level | 20 dBc Limit | Margin | Result |
|-------------------|-----------|---------------------|--------------|--------|--------|
| MHz               | GHz       | dBm                 | dBm          | dB     |        |
| 903.0             | 2.7074    | -45.62              | -8.50        | -37.12 | Pass   |
| 903.0             | 3.6132    | -44.87              | -8.50        | -36.37 | Pass   |
| 903.0             | 4.519     | -51.40              | -8.50        | -42.9  | Pass   |
| 903.0             | 5.4108    | -57.90              | -8.50        | -49.40 | Pass   |
| 903.0             | 6.3126    | -60.96              | -8.50        | -52.46 | Pass   |
| 903.0             | 7.2244    | -65.86              | -8.50        | -57.36 | Pass   |
| 903.0             | 8.1262    | -64.39              | -8.50        | -55.89 | Pass   |



#### 4.4.4 DTS Emissions in Non-restricted Frequency Bands Reference Measurement Channel 4 (10/17/2022)

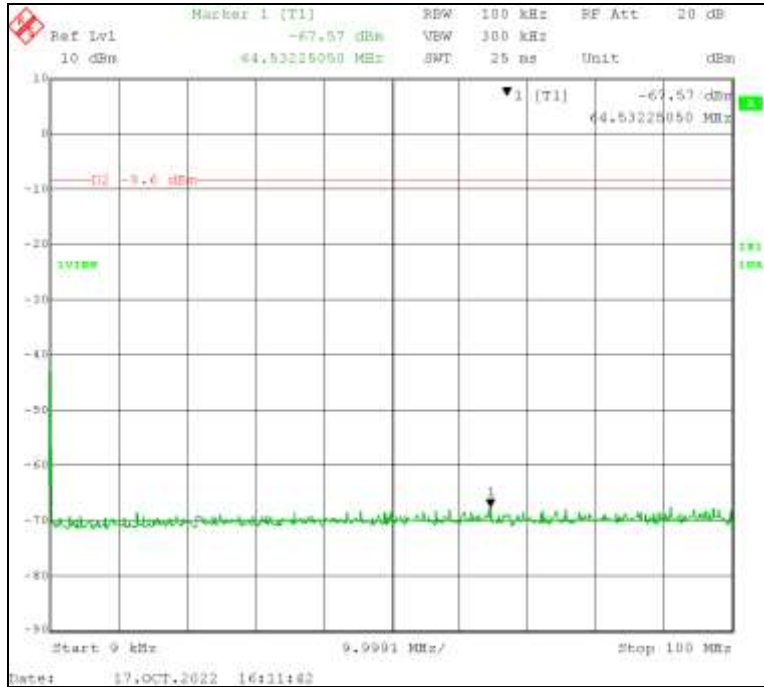


The peak level of 11.4 dBm is the maximum peak output of the Woodstream Model V440 LoRa Radio Bait Box Rodent Trap. The conducted spurious emissions from the antenna port must be 20 dB down from this peak. The resultant limit is therefore -8.6 dBm and is displayed on the plots below.

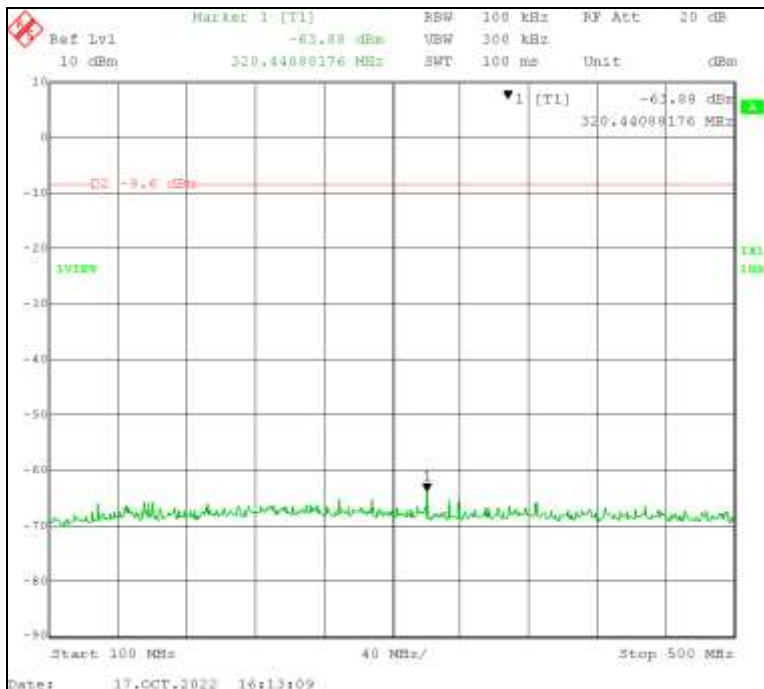


### 4.4.5 DTS Emissions in Non-restricted Frequency Bands Channel 4 Test Results (10/17/2022)

9 kHz – 100 MHz

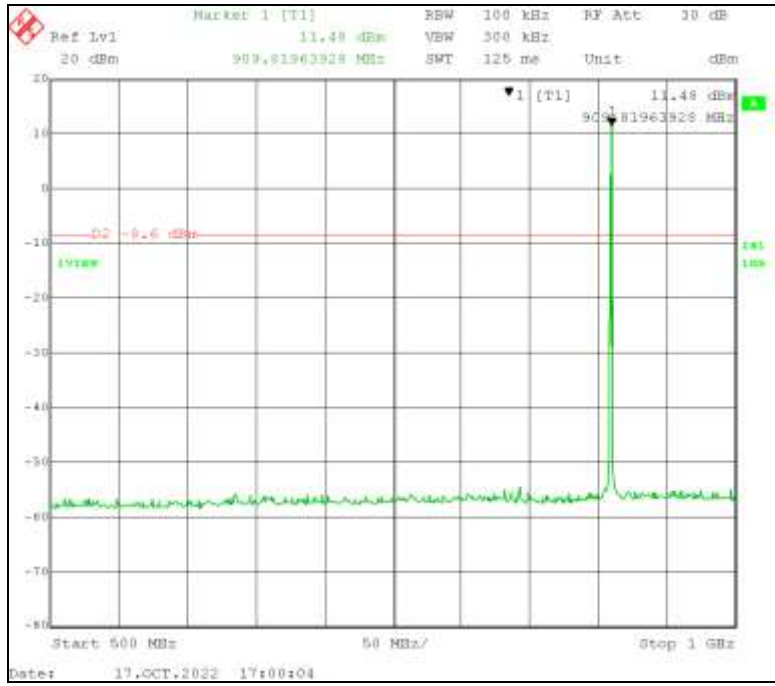


100 MHz – 500 MHz

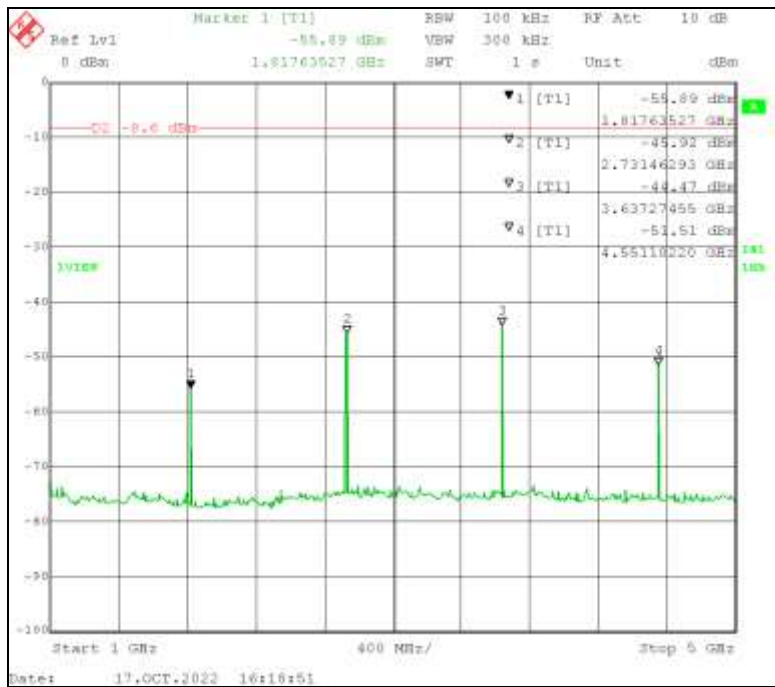




### 500 MHz – 1000 MHz

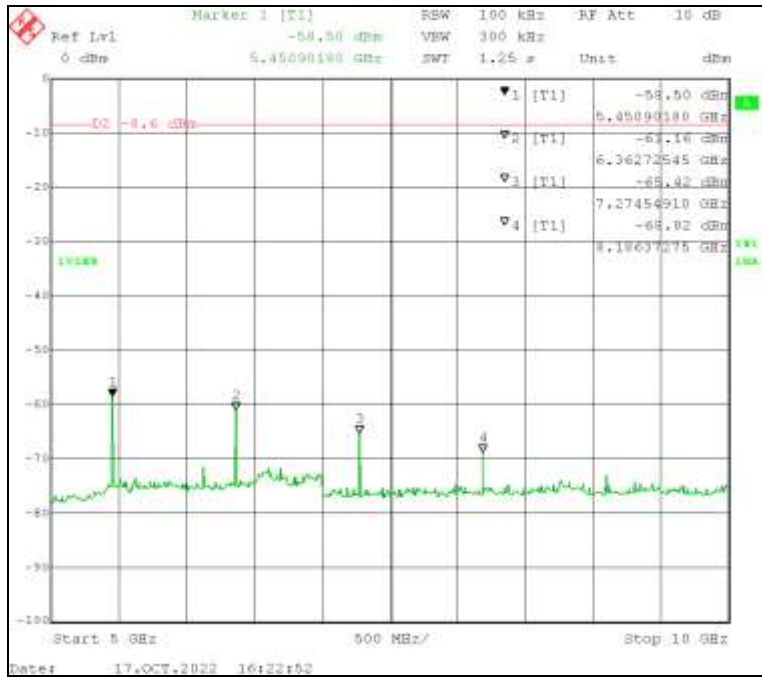


### 1 GHz – 5 GHz





5 GHz – 10 GHz



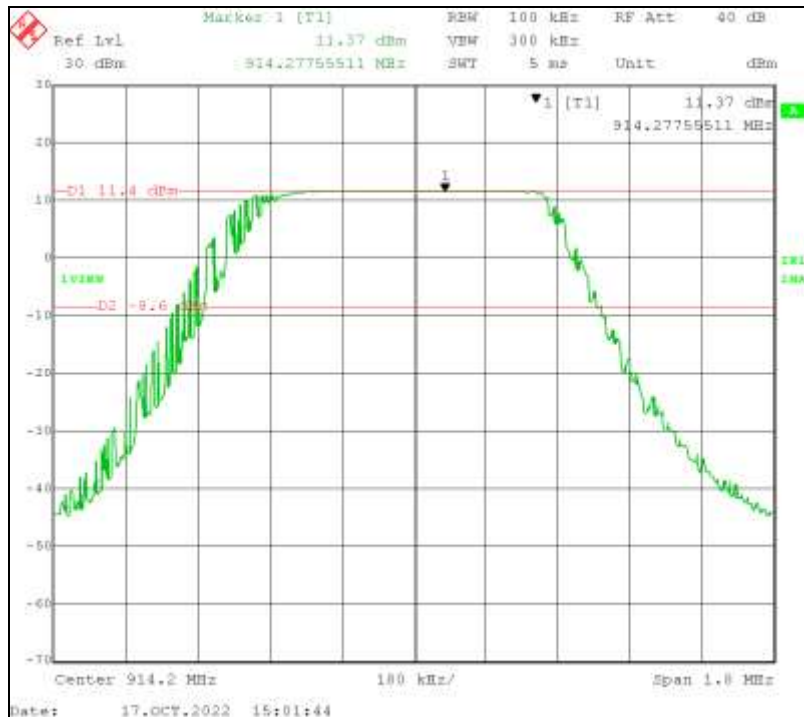
Test Results Table Highest Emissions: Channel 4 (909.4 MHz)

| Channel Frequency<br>MHz | Frequency<br>GHz | Measured Peak Level<br>dBm | 20 dBc Limit<br>dBm | Margin<br>dB | Result |
|--------------------------|------------------|----------------------------|---------------------|--------------|--------|
| 909.4                    | 1.8176           | -55.89                     | -8.60               | -47.29       | Pass   |
| 909.4                    | 2.7314           | -45.92                     | -8.60               | -37.32       | Pass   |
| 909.4                    | 3.6372           | -44.47                     | -8.60               | -35.87       | Pass   |
| 909.4                    | 4.5511           | -51.51                     | -8.60               | -42.91       | Pass   |
| 909.4                    | 5.4509           | -58.5                      | -8.60               | -49.9        | Pass   |
| 909.4                    | 6.3627           | -61.16                     | -8.60               | -52.56       | Pass   |
| 909.4                    | 7.2745           | -65.42                     | -8.60               | -56.82       | Pass   |
| 909.4                    | 8.1864           | -68.82                     | -8.60               | -60.22       | Pass   |





#### 4.4.6 DTS Emissions in Non-restricted Frequency Bands Reference Measurement Channel 7 (10/17/2022)

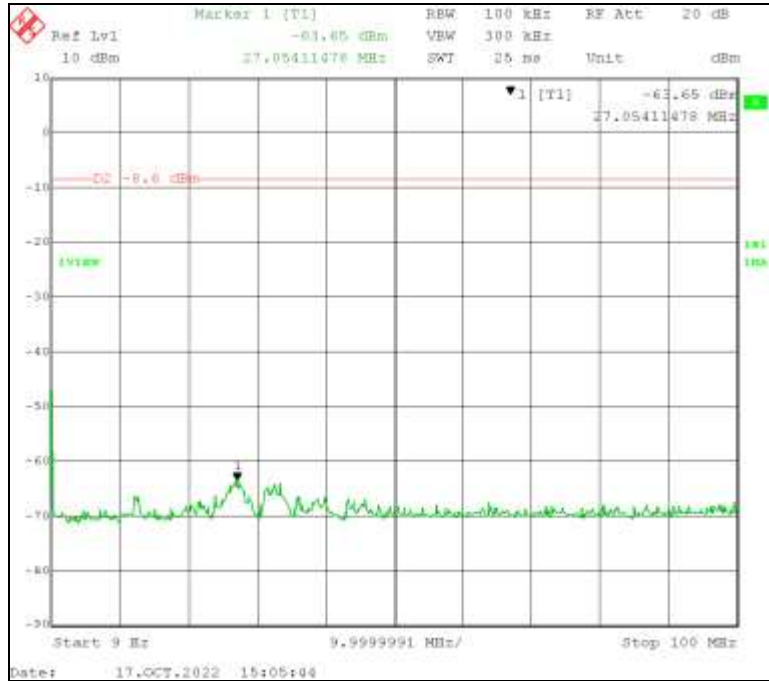


The peak level of 11.4 dBm is the maximum peak output of the Woodstream Model V440 LoRa Radio Bait Box Rodent Trap. The conducted spurious emissions from the antenna port must be 20 dB down from this peak. The resultant limit is therefore -8.6 dBm and is displayed on the plots below.

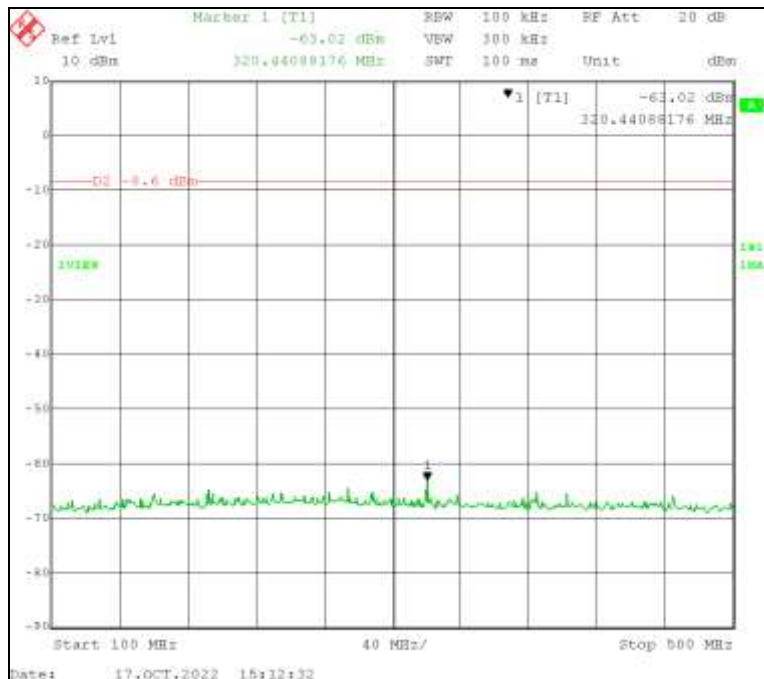


### 4.4.7 DTS Emissions in Non-restricted Frequency Bands Channel 7 Test Results (10/17/2022)

9 kHz – 100 MHz

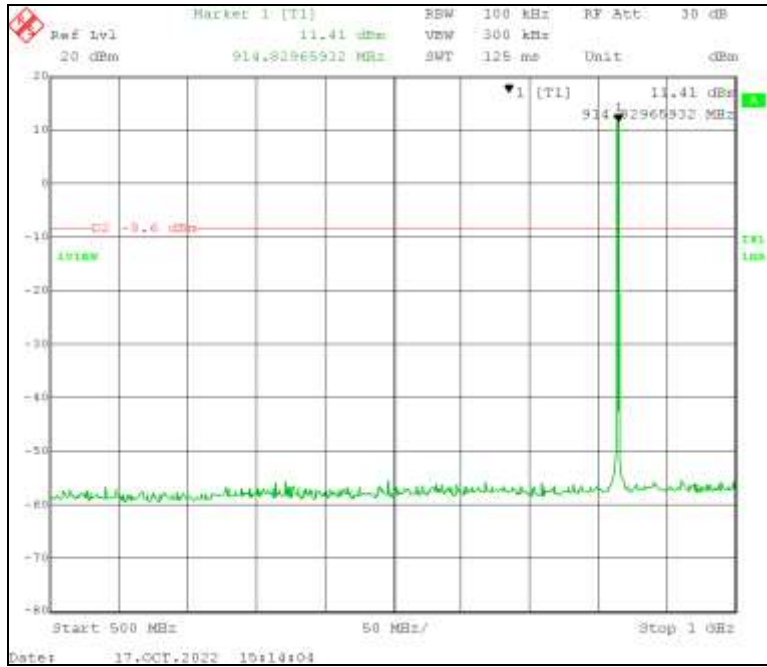


100 MHz – 500 MHz

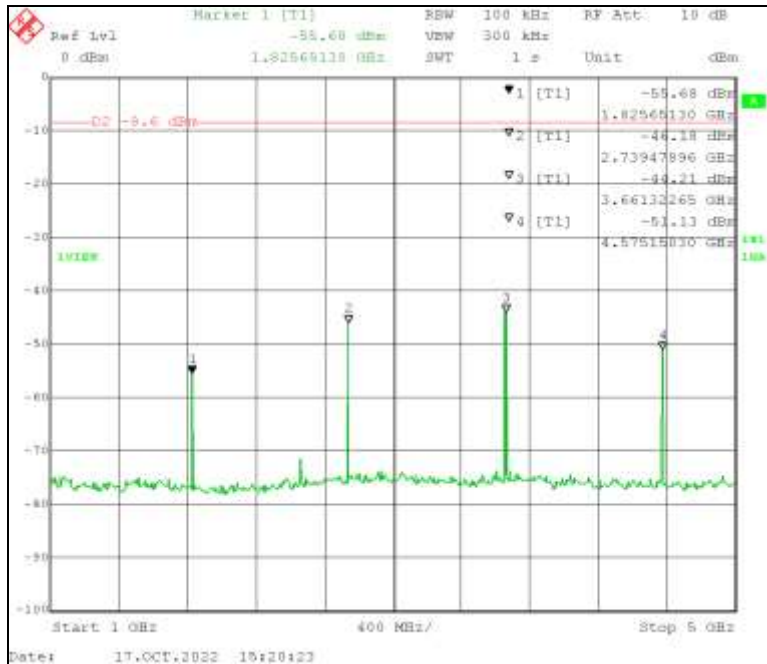




### 500 MHz – 1000 MHz

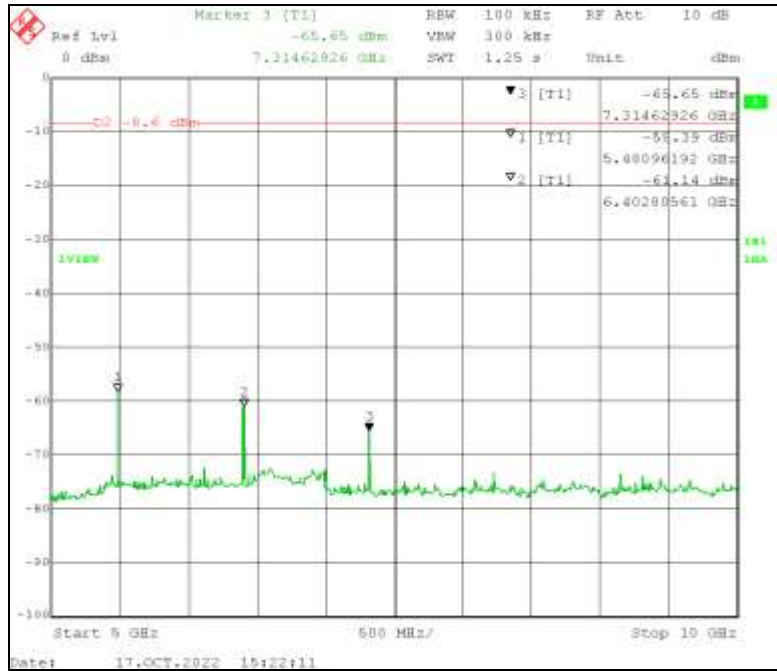


### 1 GHz – 5 GHz





### 5 GHz – 10 GHz



### Test Results of Highest Emissions: Channel 7 (Frequency 914.2 MHz)

| Channel Frequency | Frequency | Measured Peak Level | 20 dBc Limit | Margin | Result |
|-------------------|-----------|---------------------|--------------|--------|--------|
| MHz               | GHz       | dBm                 | dBm          | dB     |        |
| 914.2             | 1.8256    | -55.68              | -8.60        | -47.08 | Pass   |
| 914.2             | 2.7394    | -46.18              | -8.60        | -37.58 | Pass   |
| 914.2             | 3.6613    | -44.21              | -8.60        | -35.61 | Pass   |
| 914.2             | 4.5751    | -51.13              | -8.60        | -42.53 | Pass   |
| 914.2             | 5.4891    | -58.39              | -8.60        | -49.79 | Pass   |
| 914.2             | 6.4028    | -61.14              | -8.60        | -52.54 | Pass   |
| 914.2             | 7.3146    | -65.65              | -8.60        | -57.05 | Pass   |

**Test Results:** The Antenna Conducted Spurious Emissions of the Woodstream Model V440 LoRa Radio Bait Box Rodent Trap, at Low, Middle and High Frequencies, are below the carrier 20 dBc limit and therefore compliant with the limits specified in FCC Section 15.247(d).



#### **4.5 DTS 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 V440 LoRa Radio Bait Box Rodent Trap, 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 V440 LoRa Radio Bait Box Rodent Trap was tested at three frequencies: low (Channel 0, 903.0 MHz), middle (Channel 4, 909.4 MHz) and high (Channel 7, 914.2 MHz). The transmitter was operated at maximum output power (20), 500 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 $\mu$ V/m) = Meter Reading (dB $\mu$ V) + Antenna Factor (dB/m) + Cable Loss (dB) – Amplifier Gain (dB)

Measurements were made with the Woodstream Model V440 LoRa Radio Bait Box Rodent Trap transmitting at low (Channel 0), middle (Channel 4) and high (Channel 7). LoRa modulation with 500 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 DTS Emissions in Non-restricted and Restricted Bands of Operation, 30 MHz – 1000 MHz Test Results (09/29/2022)

#### Low Channel 0 (903.0 MHz)

| Frequency | Peak Corrected | Quasi-Peak Corrected | Antenna Polarity | Turntable Angle | Antenna Height | Correction Factors | Peak Limit    | Peak Margin | QP Limit      | QP Margin | Result |
|-----------|----------------|----------------------|------------------|-----------------|----------------|--------------------|---------------|-------------|---------------|-----------|--------|
| MHz       | <u>dBuV/m</u>  | <u>dBuV/m</u>        | H or V           | degrees         | cm             | dB                 | <u>dBuV/m</u> | dB          | <u>dBuV/m</u> | dB        |        |
| *133.765  | 15.31          | 16.20                | H                | 274             | 103            | -6.76              | 63.52         | -48.21      | 43.52         | -27.32    | Pass   |
| *117.121  | 15.61          | 14.61                | V                | 360             | 172            | -6.74              | 63.52         | -47.91      | 43.52         | -28.91    | Pass   |
| 239.995   | 23.17          | 22.52                | H                | 346             | 255            | -7.40              | 66.02         | -42.85      | 46.02         | -23.50    | Pass   |
| *240.02   | 22.30          | 22.12                | V                | 325             | 233            | -7.40              | 66.02         | -43.72      | 46.02         | -23.90    | Pass   |
| 377.548   | 26.80          | 25.56                | H                | 001             | 114            | -4.09              | 66.02         | -39.22      | 46.02         | -20.46    | Pass   |
| 377.626   | 26.42          | 22.43                | V                | 342             | 119            | -4.08              | 66.02         | -39.60      | 46.02         | -23.59    | Pass   |
| 487.003   | 26.08          | 22.80                | H                | 257             | 204            | -1.90              | 66.02         | -39.94      | 46.02         | -23.22    | Pass   |
| 487.116   | 24.25          | 22.48                | V                | 039             | 250            | -1.89              | 66.02         | -41.77      | 46.02         | -23.54    | Pass   |
| 624.382   | 26.47          | 24.52                | V                | 067             | 187            | -0.21              | 66.02         | -39.55      | 46.02         | -21.50    | Pass   |
| 624.430   | 26.04          | 26.38                | H                | 207             | 239            | -0.21              | 66.02         | -39.98      | 46.02         | -19.64    | Pass   |
| 638.352   | 23.69          | 22.45                | H                | 018             | 108            | 0.30               | 66.02         | -42.33      | 46.02         | -23.57    | Pass   |
| 638.783   | 23.17          | 22.28                | V                | 022             | 187            | 0.34               | 66.02         | -42.85      | 46.02         | -23.74    | Pass   |
| 737.087   | 32.52          | 30.11                | V                | 185             | 249            | 1.61               | 66.02         | -33.50      | 46.02         | -15.91    | Pass   |
| 737.371   | 29.35          | 28.11                | H                | 337             | 166            | 1.61               | 66.02         | -36.67      | 46.02         | -17.91    | Pass   |
| 738.414   | 32.56          | 29.95                | H                | 335             | 134            | 1.62               | 66.02         | -33.46      | 46.02         | -16.07    | Pass   |
| 864.563   | 26.68          | 24.76                | V                | 360             | 128            | 3.45               | 66.02         | -39.34      | 46.02         | -21.26    | Pass   |
| *966.671  | 28.35          | 25.82                | H                | 248             | 115            | 4.80               | 73.98         | -45.63      | 53.98         | -28.16    | Pass   |
| *972.362  | 27.24          | 25.73                | V                | 136             | 139            | 4.81               | 73.98         | -46.74      | 53.98         | -28.25    | Pass   |

\* Restricted Band Frequency

#### Middle Channel 4 (909.4 MHz)

| Frequency | Peak Corrected | Quasi-Peak Corrected | Antenna Polarity | Turntable Angle | Antenna Height | Correction Factors | Peak Limit    | Peak Margin | QP Limit      | QP Margin | Result |
|-----------|----------------|----------------------|------------------|-----------------|----------------|--------------------|---------------|-------------|---------------|-----------|--------|
| MHz       | <u>dBuV/m</u>  | <u>dBuV/m</u>        | H or V           | degrees         | cm             | dB                 | <u>dBuV/m</u> | dB          | <u>dBuV/m</u> | dB        |        |
| *133.685  | 14.52          | 16.23                | H                | 005             | 140            | -6.75              | 63.52         | -49.00      | 43.52         | -27.29    | Pass   |
| 239.990   | 23.57          | 23.06                | H                | 053             | 247            | -7.40              | 66.02         | -42.45      | 46.02         | -22.96    | Pass   |
| *240.005  | 22.85          | 22.63                | V                | 349             | 182            | -7.40              | 66.02         | -43.17      | 46.02         | -23.39    | Pass   |
| 377.566   | 24.59          | 23.69                | H                | 155             | 199            | -4.08              | 66.02         | -41.43      | 46.02         | -22.33    | Pass   |
| 377.603   | 26.66          | 25.34                | V                | 293             | 218            | -4.08              | 66.02         | -39.36      | 46.02         | -20.68    | Pass   |
| 485.908   | 24.27          | 21.42                | V                | 325             | 180            | -1.90              | 66.02         | -41.75      | 46.02         | -24.60    | Pass   |
| 487.079   | 23.56          | 22.34                | H                | 191             | 160            | -1.89              | 66.02         | -42.46      | 46.02         | -23.68    | Pass   |
| 624.421   | 24.43          | 24.91                | V                | 005             | 131            | -0.21              | 66.02         | -41.59      | 46.02         | -21.11    | Pass   |
| 624.553   | 24.77          | 24.07                | H                | 249             | 239            | -0.21              | 66.02         | -41.25      | 46.02         | -21.95    | Pass   |
| 640.024   | 23.61          | 22.12                | V                | 130             | 240            | 0.37               | 66.02         | -42.41      | 46.02         | -23.90    | Pass   |
| 737.081   | 31.55          | 32.70                | V                | 153             | 230            | 1.61               | 66.02         | -34.47      | 46.02         | -13.32    | Pass   |
| 737.576   | 34.71          | 31.19                | H                | 154             | 160            | 1.61               | 66.02         | -31.31      | 46.02         | -14.83    | Pass   |
| 741.456   | 28.06          | 28.71                | H                | 001             | 244            | 1.73               | 66.02         | -37.96      | 46.02         | -17.31    | Pass   |
| 741.500   | 29.01          | 30.42                | V                | 299             | 146            | 1.73               | 66.02         | -37.01      | 46.02         | -15.60    | Pass   |
| 804.549   | 23.92          | 24.35                | H                | 110             | 130            | 3.00               | 66.02         | -42.10      | 46.02         | -21.67    | Pass   |
| 909.587   | 23.96          | 25.37                | H                | 227             | 228            | 4.20               | 66.02         | -42.06      | 46.02         | -20.65    | Pass   |
| *976.822  | 27.60          | 25.75                | V                | 256             | 188            | 4.84               | 73.98         | -46.38      | 53.98         | -28.23    | Pass   |

\* Restricted Band Frequency



## High Channel 7 (914.2 MHz)

| Frequency | Peak Corrected | Quasi-Peak Corrected | Antenna Polarity | Turntable Angle | Antenna Height | Correction Factors | 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        |        |
| *133.91   | 19.91          | 16.13                | H                | 142             | 115            | -6.77              | 63.52      | -43.61      | 43.52    | -27.39    | Pass   |
| 239.992   | 24.77          | 21.74                | V                | 357             | 116            | -7.40              | 66.02      | -41.25      | 46.02    | -24.28    | Pass   |
| *240.012  | 23.58          | 22.88                | H                | 286             | 141            | -7.40              | 66.02      | -42.44      | 46.02    | -23.14    | Pass   |
| 377.553   | 27.69          | 26.49                | H                | 218             | 254            | -4.09              | 66.02      | -38.33      | 46.02    | -19.53    | Pass   |
| 377.603   | 27.65          | 25.41                | V                | 169             | 120            | -4.08              | 66.02      | -38.37      | 46.02    | -20.61    | Pass   |
| 487.146   | 20.22          | 22.00                | V                | 299             | 129            | -1.88              | 66.02      | -45.80      | 46.02    | -24.02    | Pass   |
| 487.301   | 21.97          | 22.23                | H                | 098             | 118            | -1.87              | 66.02      | -44.05      | 46.02    | -23.79    | Pass   |
| 579.033   | 27.13          | 24.76                | H                | 219             | 150            | -0.73              | 66.02      | -38.89      | 46.02    | -21.26    | Pass   |
| 624.615   | 24.00          | 26.34                | V                | 032             | 249            | -0.21              | 66.02      | -42.02      | 46.02    | -19.68    | Pass   |
| 637.778   | 22.01          | 22.21                | V                | 339             | 099            | 0.26               | 66.02      | -44.01      | 46.02    | -23.81    | Pass   |
| 640.930   | 25.55          | 22.32                | H                | 223             | 254            | 0.37               | 66.02      | -40.47      | 46.02    | -23.70    | Pass   |
| 736.392   | 34.05          | 31.99                | V                | 360             | 225            | 1.61               | 66.02      | -31.97      | 46.02    | -14.03    | Pass   |
| 737.044   | 31.66          | 30.13                | H                | 036             | 123            | 1.61               | 66.02      | -34.36      | 46.02    | -15.89    | Pass   |
| 741.290   | 28.19          | 28.78                | H                | 233             | 197            | 1.73               | 66.02      | -37.83      | 46.02    | -17.24    | Pass   |
| 741.585   | 31.73          | 29.68                | V                | 024             | 171            | 1.73               | 66.02      | -34.29      | 46.02    | -16.34    | Pass   |
| 814.522   | 27.69          | 24.26                | H                | 316             | 199            | 3.12               | 66.02      | -38.33      | 46.02    | -21.76    | Pass   |
| 869.155   | 26.05          | 24.90                | V                | 067             | 099            | 3.49               | 66.02      | -39.97      | 46.02    | -21.12    | Pass   |

\* Restricted Band Frequency

## Receive Mode

| Frequency | Peak Corrected | Quasi-Peak Corrected | Antenna Polarity | Turntable Angle | Antenna Height | Correction Factors | 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        |        |
| *134.286  | 16.54          | 14.03                | H                | 343             | 165            | -6.78              | 63.52      | -46.98      | 43.52    | -29.49    | Pass   |
| *114.382  | 17.05          | 14.69                | V                | 188             | 192            | -6.93              | 63.52      | -46.47      | 43.52    | -28.83    | Pass   |
| 239.992   | 21.63          | 22.30                | H                | 116             | 171            | -7.40              | 66.02      | -44.39      | 46.02    | -23.72    | Pass   |
| *240.001  | 24.37          | 22.56                | V                | 277             | 120            | -7.40              | 66.02      | -41.65      | 46.02    | -23.46    | Pass   |
| 377.658   | 27.46          | 22.35                | H                | 049             | 142            | -4.08              | 66.02      | -38.56      | 46.02    | -23.67    | Pass   |
| 377.661   | 24.04          | 25.44                | V                | 061             | 196            | -4.08              | 66.02      | -41.98      | 46.02    | -20.58    | Pass   |
| 485.757   | 22.87          | 22.17                | V                | 168             | 156            | -1.90              | 66.02      | -43.15      | 46.02    | -23.85    | Pass   |
| 486.359   | 21.08          | 21.80                | H                | 102             | 166            | -1.90              | 66.02      | -44.94      | 46.02    | -24.22    | Pass   |
| 578.943   | 26.54          | 25.12                | V                | 001             | 207            | -0.73              | 66.02      | -39.48      | 46.02    | -20.90    | Pass   |
| 579.185   | 25.01          | 23.54                | H                | 017             | 134            | -0.72              | 66.02      | -41.01      | 46.02    | -22.48    | Pass   |
| 623.843   | 28.48          | 23.72                | H                | 315             | 119            | -0.23              | 66.02      | -37.54      | 46.02    | -22.30    | Pass   |
| 626.060   | 22.92          | 22.90                | V                | 120             | 233            | -0.10              | 66.02      | -43.10      | 46.02    | -23.12    | Pass   |
| 637.425   | 22.65          | 24.52                | V                | 229             | 212            | 0.25               | 66.02      | -43.37      | 46.02    | -21.50    | Pass   |
| 639.164   | 24.53          | 22.43                | H                | 151             | 170            | 0.36               | 66.02      | -41.49      | 46.02    | -23.59    | Pass   |
| 736.472   | 30.81          | 29.69                | H                | 073             | 151            | 1.61               | 66.02      | -35.21      | 46.02    | -16.33    | Pass   |
| 738.225   | 30.73          | 29.17                | V                | 058             | 119            | 1.61               | 66.02      | -35.29      | 46.02    | -16.85    | Pass   |
| 741.304   | 30.46          | 28.94                | V                | 027             | 135            | 1.73               | 66.02      | -35.56      | 46.02    | -17.08    | Pass   |
| 742.291   | 26.30          | 28.15                | H                | 187             | 219            | 1.73               | 66.02      | -39.72      | 46.02    | -17.87    | Pass   |

\* Restricted Band Frequency

**Test Results:** The Woodstream Model V440 LoRa Radio Bait Box Rodent Trap, operating in DTS 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 13.32 dB.





#### 4.5.4 DTS Emissions in Non-Restricted and Restricted Bands of Operation, 1 – 10 GHz Test Results (10/11/2022)

##### Low Channel 0 (903.0 MHz)

| Frequency | Peak Level | Average Level | 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             |        |
| *3.61224  | 38.45      | 31.89         | V                | 050             | 102            | -1.21              | 73.98               | -35.53      | 53.98                | -22.09         | Pass   |
| *4.51489  | 41.85      | 31.76         | V                | 233             | 103            | 0.66               | 73.98               | -32.13      | 53.98                | -22.22         | Pass   |
| *4.51524  | 43.53      | 37.13         | H                | 329             | 212            | 0.66               | 73.98               | -30.45      | 53.98                | -16.85         | Pass   |
| *5.41699  | 49.28      | 39.07         | H                | 030             | 171            | 3.30               | 73.98               | -24.70      | 53.98                | -14.91         | Pass   |
| 6.32002   | 48.93      | 38.48         | H                | 319             | 188            | 3.09               | 73.98               | -25.05      | 53.98                | -15.50         | Pass   |
| 6.32029   | 48.94      | 38.56         | V                | 360             | 203            | 3.09               | 73.98               | -25.04      | 53.98                | -15.42         | Pass   |
| 7.22220   | 47.01      | 37.30         | V                | 012             | 211            | 4.19               | 73.98               | -26.97      | 53.98                | -16.68         | Pass   |
| 7.22231   | 45.61      | 41.90         | H                | 317             | 150            | 4.19               | 73.98               | -28.37      | 53.98                | -12.08         | Pass   |
| *8.12620  | 50.18      | 38.81         | V                | 040             | 197            | 5.46               | 73.98               | -23.80      | 53.98                | -15.17         | Pass   |
| *8.12800  | 55.07      | 43.18         | H                | 335             | 115            | 5.46               | 73.98               | -18.91      | 53.98                | -10.80         | Pass   |
| *9.02833  | 50.10      | 38.60         | H                | 336             | 152            | 6.84               | 73.98               | -23.88      | 53.98                | -15.38         | Pass   |

\* Restricted Band Frequency

##### Middle Channel 4 (909.4 MHz)

| Frequency | Peak Level | Average Level | 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             |        |
| *2.72759  | 39.87      | 32.85         | H                | 312             | 103            | -4.50              | 73.98               | -34.11      | 53.98                | -21.13         | Pass   |
| *3.63790  | 40.17      | 32.02         | V                | 360             | 101            | -1.05              | 73.98               | -33.81      | 53.98                | -21.96         | Pass   |
| *4.54756  | 43.03      | 34.21         | V                | 311             | 102            | 0.70               | 73.98               | -30.95      | 53.98                | -19.77         | Pass   |
| *4.54761  | 46.03      | 36.97         | H                | 30              | 103            | 0.70               | 73.98               | -27.95      | 53.98                | -17.01         | Pass   |
| *5.45513  | 38.66      | 30.46         | V                | 348             | 118            | 3.28               | 73.98               | -35.32      | 53.98                | -23.52         | Pass   |
| *5.45622  | 46.67      | 37.39         | H                | 314             | 175            | 3.28               | 73.98               | -27.31      | 53.98                | -16.59         | Pass   |
| *7.27407  | 49.71      | 38.71         | V                | 359             | 120            | 4.45               | 73.98               | -24.27      | 53.98                | -15.27         | Pass   |
| *7.27673  | 42.62      | 39.74         | H                | 55              | 171            | 4.47               | 73.98               | -31.36      | 53.98                | -14.24         | Pass   |
| *8.18279  | 52.95      | 39.80         | H                | 42              | 113            | 5.52               | 73.98               | -21.03      | 53.98                | -14.18         | Pass   |
| *8.18299  | 46.77      | 38.41         | V                | 337             | 100            | 5.52               | 73.98               | -27.21      | 53.98                | -15.57         | Pass   |

\* Restricted Band Frequency



## High Channel 7 (914.2 MHz)

| Frequency | Peak Level | Average Level | 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             |        |
| *2.74205  | 38.41      | 27.03         | V                | 112             | 102            | -4.48              | 73.98               | -35.57      | 53.98                | -26.95         | Pass   |
| *3.65766  | 43.88      | 33.40         | V                | 34              | 129            | -0.90              | 73.98               | -30.10      | 53.98                | -20.58         | Pass   |
| *4.57079  | 46.56      | 38.48         | H                | 331             | 159            | 0.79               | 73.98               | -27.42      | 53.98                | -15.50         | Pass   |
| *4.57172  | 44.18      | 35.67         | V                | 12              | 179            | 0.79               | 73.98               | -29.80      | 53.98                | -18.31         | Pass   |
| 5.48565   | 39.32      | 29.86         | V                | 235             | 162            | 3.28               | 73.98               | -34.66      | 53.98                | -24.12         | Pass   |
| 5.48797   | 39.47      | 29.02         | H                | 109             | 126            | 3.28               | 73.98               | -34.51      | 53.98                | -24.96         | Pass   |
| 6.40014   | 39.20      | 29.81         | V                | 116             | 104            | 2.90               | 73.98               | -34.78      | 53.98                | -24.17         | Pass   |
| 6.40355   | 38.19      | 29.08         | H                | 1               | 171            | 2.89               | 73.98               | -35.79      | 53.98                | -24.90         | Pass   |
| *7.31186  | 47.26      | 38.14         | H                | 332             | 162            | 4.63               | 73.98               | -26.72      | 53.98                | -15.84         | Pass   |
| *8.22753  | 51.11      | 41.38         | H                | 338             | 121            | 5.60               | 73.98               | -22.87      | 53.98                | -12.60         | Pass   |

\* Restricted Band Frequency

## Receive Mode

| Frequency | Peak Level | Average Level | 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             |        |
| 1.25178   | 29.16      | 20.61         | H                | 101             | 103            | -11.82             | 73.98               | -44.82      | 53.98                | -33.37         | Pass   |
| 1.23433   | 29.42      | 20.10         | V                | 18              | 156            | -12.12             | 73.98               | -44.56      | 53.98                | -33.88         | Pass   |
| 1.89341   | 31.19      | 22.51         | H                | 29              | 131            | -7.48              | 73.98               | -42.79      | 53.98                | -31.47         | Pass   |
| 6.57740   | 41.22      | 31.72         | V                | 103             | 157            | 2.92               | 73.98               | -32.76      | 53.98                | -22.26         | Pass   |
| *8.14503  | 46.10      | 36.09         | H                | 47              | 173            | 5.45               | 73.98               | -27.88      | 53.98                | -17.89         | Pass   |
| *8.16949  | 44.91      | 36.38         | V                | 154             | 172            | 5.50               | 73.98               | -29.07      | 53.98                | -17.60         | Pass   |

\* Restricted Band Frequency

**Test Results:** The Woodstream Model V440 LoRa Radio Bait Box Rodent Trap, operating in DTS and receive modes, comply with the requirements of 47 CFR Part 15.205 and RSS-Gen Section 8.10 with a margin of 10.80 dB.



#### 4.6 DTS 6 dB Occupied Bandwidth (FCC Section 15.247(a)(2) RSS-247 5.2(a))

##### 4.6.1 6 dB Occupied Bandwidth – Test Procedure

The minimum DTS (6 dB) bandwidth, specified in FCC Section 15.247(a) (2) was measured using a Spectrum Analyzer with 100 kHz resolution bandwidth and 300 kHz video bandwidth. Transmission frequencies at low (Channel 0, Frequency 903.0 MHz), middle (Channel 4, Frequency 909.4 MHz) and high (Channel 7, Frequency 914.4 MHz) were measured with LoRa modulation with a bandwidth of 500 kHz and spread factor of 8. The test procedure of ANSI C63.10, Section 11.8, Option 1, was used.

##### Spectrum Analyzer Settings:

|            |     |     |
|------------|-----|-----|
| RBW        | 100 | kHz |
| VBW        | 300 | kHz |
| Span       | 2   | MHz |
| Sweep Time | 5   | ms  |

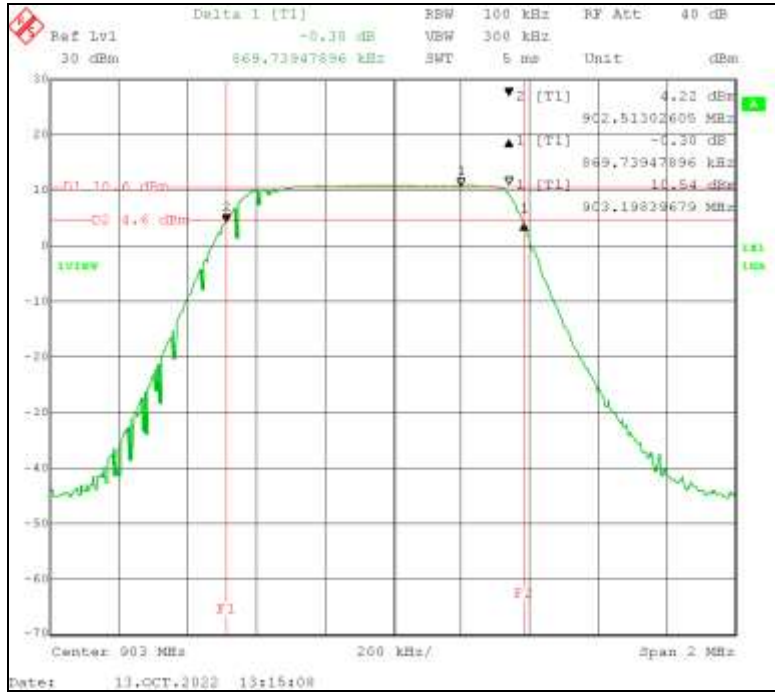
##### 4.6.2 DTS (6 dB) Occupied Bandwidth Test Results (10/13/2022)

| Channel | Frequency | Spread Factor | Measured 6 dB Bandwidth | 15.247 (a)(2) BW (Minimum) | Margin | Result |
|---------|-----------|---------------|-------------------------|----------------------------|--------|--------|
| #       | MHz       | #             | kHz                     | kHz                        | kHz    |        |
| 0       | 903.0     | 8             | 869.74                  | 500.00                     | 369.74 | Pass   |
| 4       | 909.4     |               | 845.69                  |                            | 345.69 | Pass   |
| 7       | 914.2     |               | 869.74                  |                            | 369.74 | Pass   |

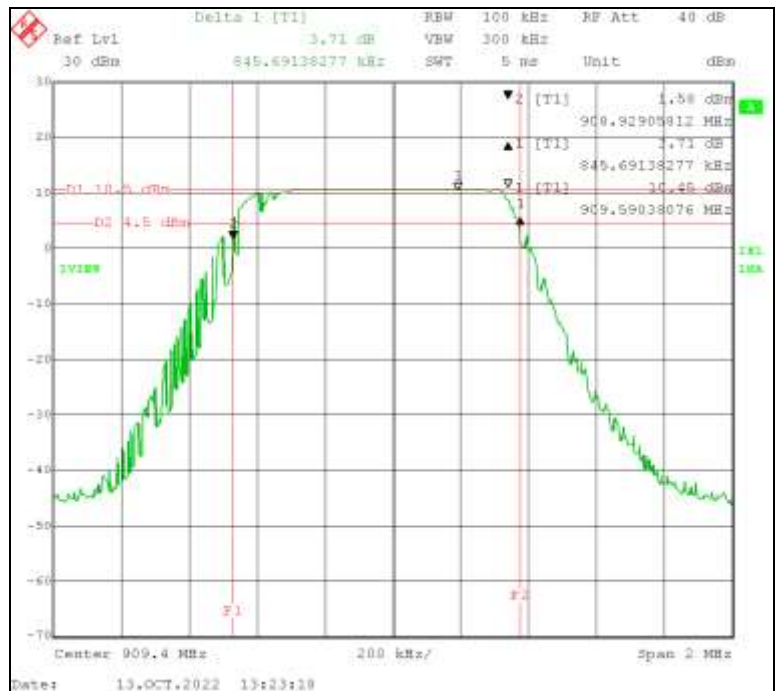


### 4.6.3 DTS (6 dB) Occupied Bandwidth Analyzer Screen Captures

#### Channel 0: 903.00 MHz

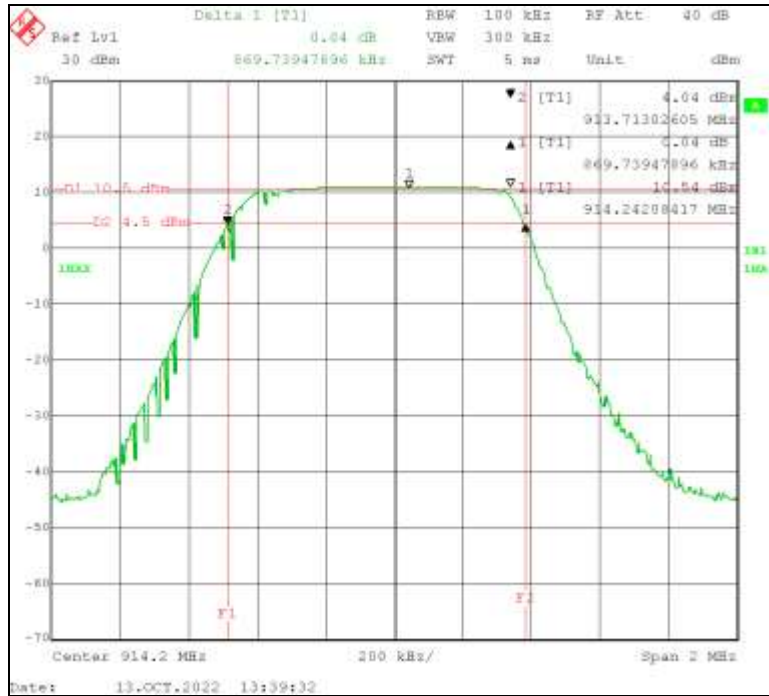


#### Channel 4: 909.40 MHz





### Channel 7: 914.20 MHz



**Test Results:** The DTS, 6 dB Occupied Bandwidth measurements for the Woodstream Model V440 LoRa Radio Bait Box Rodent Trap were measured and are compliant to FCC and ISED requirements.



#### 4.7 DTS 99% Occupied Bandwidth RSS-Gen 6.7

##### 4.7.1 DTS 99% Occupied Bandwidth – Test Procedure

The 99% Occupied Bandwidth measurement per RSS-Gen Section 6.7 was measured using a Spectrum Analyzer with 30 kHz resolution bandwidth and 100 kHz video bandwidth. Transmission frequencies at low (Channel 0, Frequency 903.0 MHz), middle (Channel 4, Frequency 909.4 MHz) and high (Channel 7, Frequency 914.2 MHz) were measured with LoRa modulation, 500 kHz bandwidth and spread factor of 8. The test procedure of ANSI C63.10, Section 6.9.3 was used.

##### Spectrum Analyzer Settings:

|                 |     |     |
|-----------------|-----|-----|
| RBW             | 10  | kHz |
| VBW             | 30  | kHz |
| Span            | 1.5 | MHz |
| Sweep Time      | 38  | ms  |
| Attenuation     | 40  | dB  |
| Reference Level | 30  | dBm |

##### 4.7.2 DTS 99% Occupied Bandwidth Test Results (10/13/2022)

| DTS TX Channel | TX Frequency | Tx Frequency Operational Bandwidth | Spread Factor | Measured 99% Occupied Bandwidth |
|----------------|--------------|------------------------------------|---------------|---------------------------------|
| #              | MHz          | kHz                                | #             | kHz                             |
| 0              | 903.00       | 500                                | 8             | 670.34                          |
| 4              | 909.40       |                                    |               | 670.34                          |
| 7              | 914.20       |                                    |               | 664.33                          |

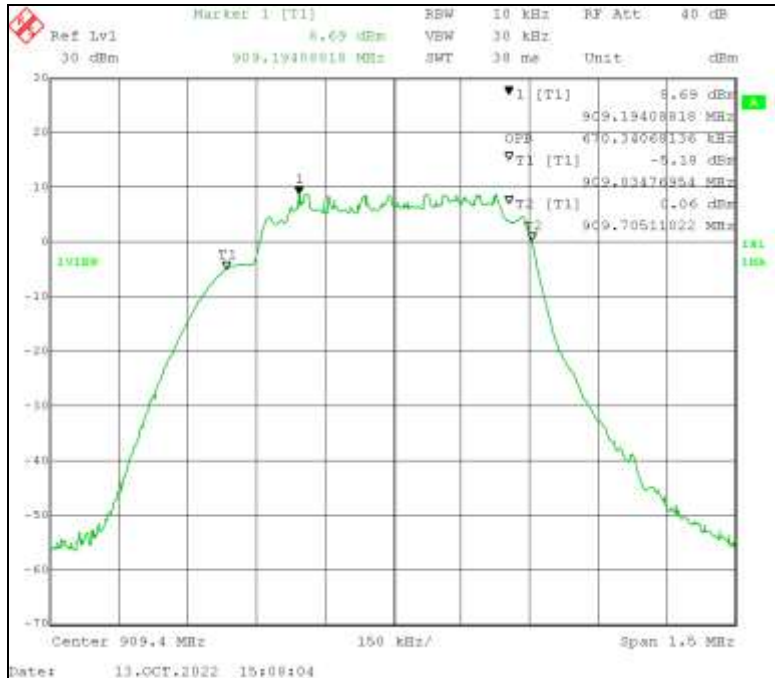


### 4.7.3 DTS 99% Occupied Bandwidth Analyzer Screen Captures

#### Channel 0: 903.00 MHz



#### Channel 4: 909.40 MHz





### Channel 7: 914.20 MHz



**Test Results:** The DTS 99% Occupied Bandwidth measurements for the Woodstream Model V440 LoRa Radio Bait Box Rodent Trap were measured for RSS-Gen Section 6.7 requirement.





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

### 4.8.1 Maximum Conducted Output Power Test Procedure

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 903.0 MHz), middle (Channel 4, Frequency 909.4 MHz) and high (Channel 7, Frequency 914.2 MHz) were measured with LoRa modulation.

#### Spectrum Analyzer Settings:

| Measurement Analyzer Settings |       |
|-------------------------------|-------|
| Span                          | 5 MHz |
| RBW                           | 1 MHz |
| VBW                           | 3 MHz |
| Sweep Time                    | 5 ms  |

### 4.8.2 Maximum Conducted Output Power Test Results (10/12/2022)

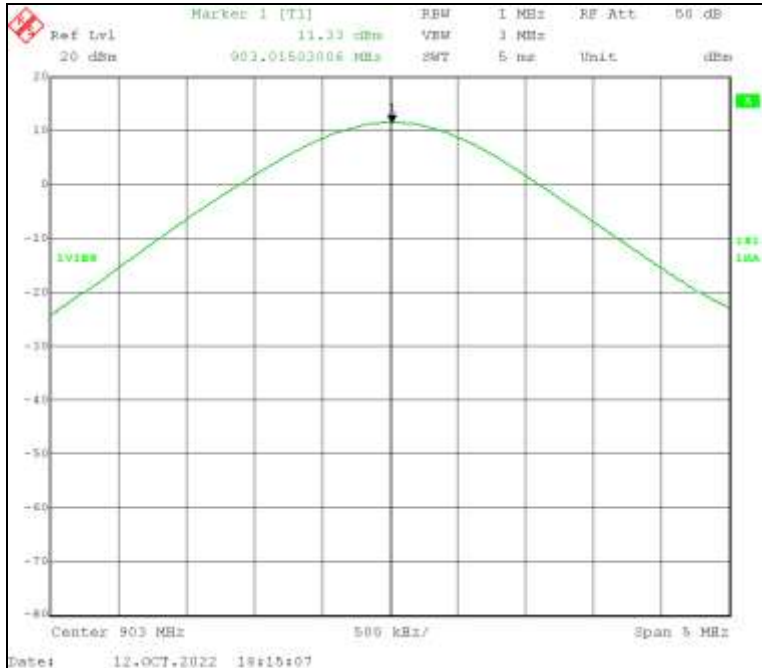
| Channel | Modulation                | Frequency (MHz) | Measured Level (dBm) | Cable # 811 Loss (dB) | Corrected Measured Level |       | Limit |       | Margin |        |
|---------|---------------------------|-----------------|----------------------|-----------------------|--------------------------|-------|-------|-------|--------|--------|
|         |                           |                 |                      |                       | dBm                      | Watts | dBm   | Watts | dBm    | Watts  |
| 0       | None                      | 903.0           | 11.33                | 0.18                  | 11.51                    | 0.014 | 30.00 | 1.000 | -18.49 | -0.986 |
| 4       |                           | 909.4           | 11.18                | 0.24                  | 11.42                    | 0.014 | 30.00 | 1.000 | -18.58 | -0.986 |
| 7       |                           | 914.2           | 11.18                | 0.20                  | 11.38                    | 0.014 | 30.00 | 1.000 | -18.62 | -0.986 |
| 0       | LoRa BW 500 kHz<br>SF = 8 | 903.0           | 11.33                | 0.18                  | 11.51                    | 0.014 | 30.00 | 1.000 | -18.49 | -0.986 |
| 4       |                           | 909.4           | 11.18                | 0.24                  | 11.42                    | 0.014 | 30.00 | 1.000 | -18.58 | -0.986 |
| 7       |                           | 914.2           | 11.18                | 0.20                  | 11.38                    | 0.014 | 30.00 | 1.000 | -18.62 | -0.986 |

Below are the spectrum analyzer screens of the peak output power measurements.

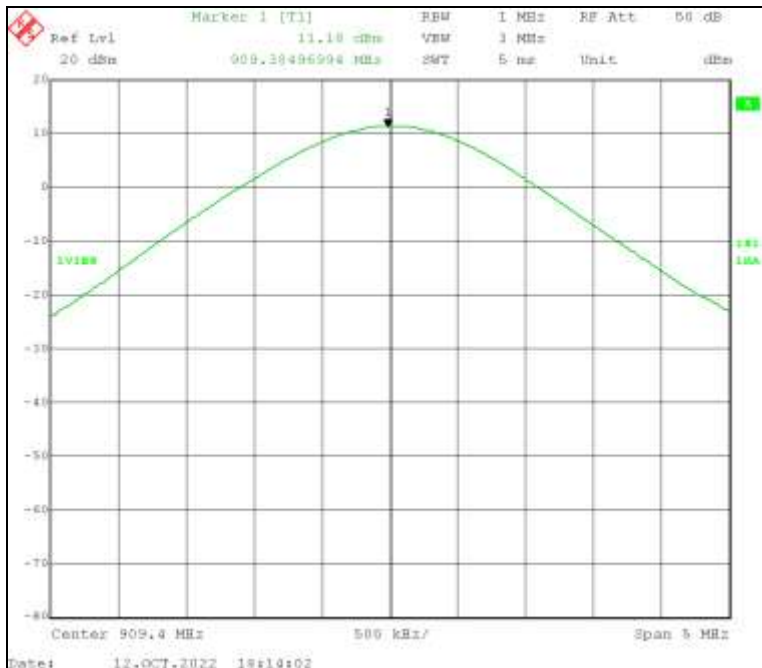


### 4.8.3 Maximum Conducted Output Power Analyzer Screen Captures

#### Channel 0: 903.0 MHz No Modulation

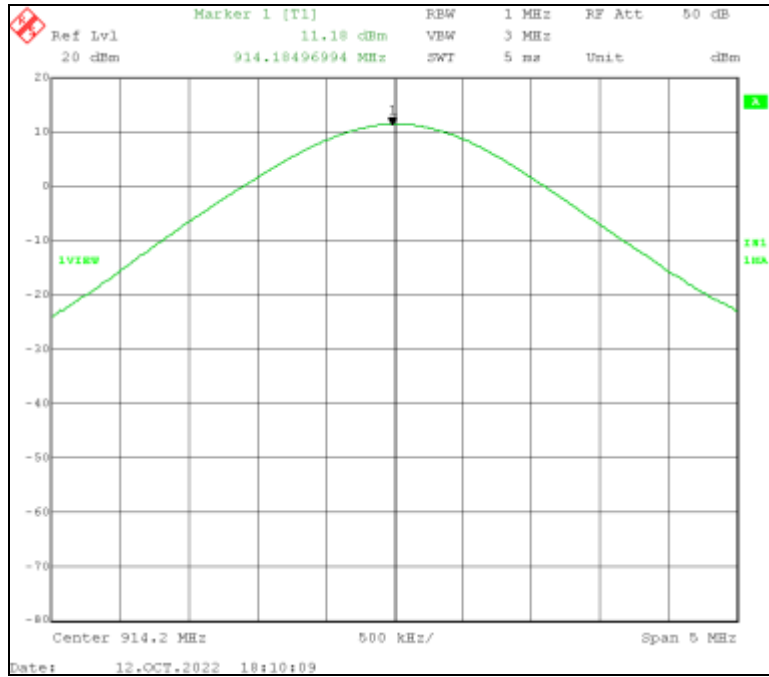


#### Channel 4: 909.4 MHz No Modulation

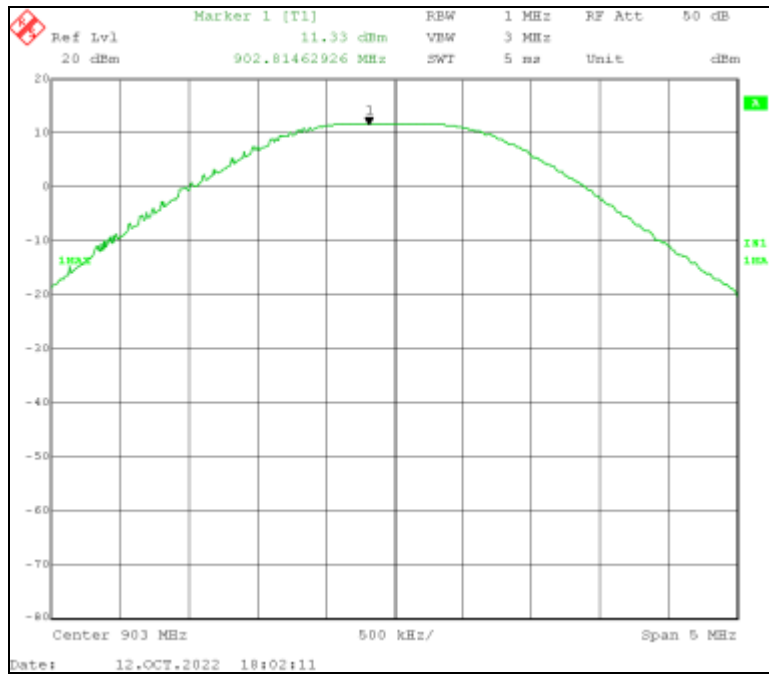




### Channel 7: 914.2 MHz No Modulation

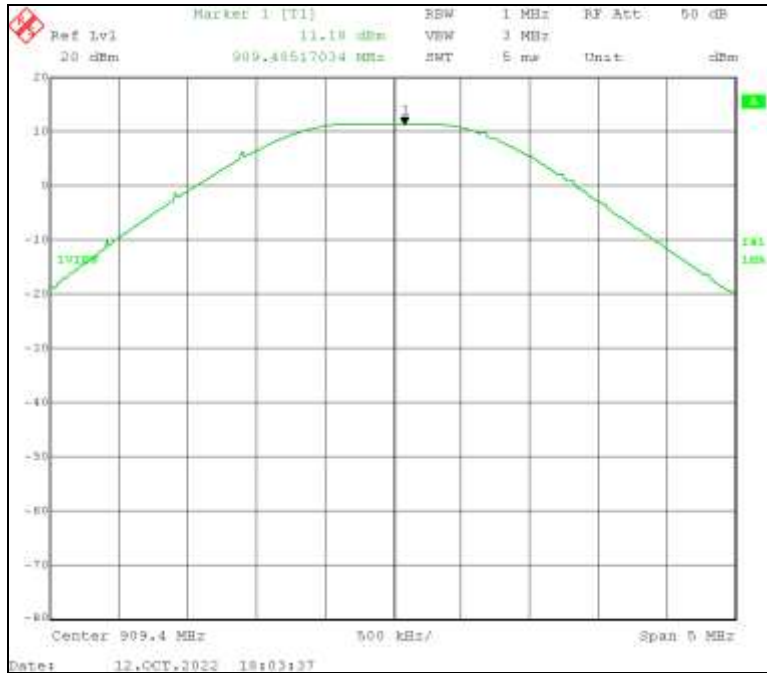


### Channel 0: 903.0 MHz LoRa Modulation





### Channel 4: 909.4 MHz LoRa Modulation



### Channel 7: 914.2 MHz LoRa Modulation



**Test Results:** The Maximum Conducted Output Power peak measurements for the Woodstream Model V440 LoRa Radio Bait Box Rodent Trap, with and without modulation, are compliant with the limits specified in FCC Section 15.247(b)(3).



#### 4.8.4 EIRP Calculation RSS-247 (10/12/2022)

The gain of the antenna used in the Woodstream Model V440 LoRa Radio Bait Box Rodent Trap is + 5.06 dBi. Applying the antenna gain to the maximum peak transmitter output produces the following values of EIRP.

| Channel | Modulation                | Frequency (MHz) | Corrected Measured Level |        | Antenna Gain |         | EIRP  |       |        |        | Result |
|---------|---------------------------|-----------------|--------------------------|--------|--------------|---------|-------|-------|--------|--------|--------|
|         |                           |                 | dBm                      | Watts  | Isotropic    | Numeric | Total | Limit | Margin |        |        |
|         |                           |                 |                          |        |              |         | dBm   | Watts | Watts  | Watts  |        |
| 0       | None                      | 903.0           | 11.51                    | 0.0142 | 5.06         | 3.206   | 16.57 | 0.045 | 4.00   | -3.955 | Pass   |
| 4       |                           | 909.4           | 11.42                    | 0.0139 |              |         | 16.48 | 0.044 |        | -3.956 | Pass   |
| 7       |                           | 914.2           | 11.38                    | 0.0137 |              |         | 16.44 | 0.044 |        | -3.956 | Pass   |
| 0       | LoRa 500 kHz BW<br>SF = 8 | 903.0           | 11.51                    | 0.0142 |              |         | 16.57 | 0.045 |        | -3.955 | Pass   |
| 4       |                           | 909.4           | 11.42                    | 0.0139 |              |         | 16.48 | 0.044 |        | -3.956 | Pass   |
| 7       |                           | 914.2           | 11.38                    | 0.0137 |              |         | 16.44 | 0.044 |        | -3.956 | Pass   |

**Test Results:** The results in the above table show compliance to the ISED requirements for EIRP limits of RSS-247.



## 4.9 Power Spectral Density (FCC Section 15.247(e), RSS-247 Section 5.2(b))

### 4.9.1 Power Spectral Density Test Procedure

A conducted power measurement of the output frequency was measured using a peak detector for the Woodstream V440 for each of the low (Channel 0, Frequency 903.0 MHz), middle (Channel 4, Frequency 909.4 MHz) and high (Channel 7, Frequency 914.2 MHz) channel frequencies. The signal output was maximized with LoRa modulation with 500 kHz bandwidth using a Spread Factor of 8. The test procedure of ANSI C63.10, Section 11.10.2 (PKPSD) was used.

#### Spectrum Analyzer Settings:

| Measurement Analyzer Settings   |     |     |
|---------------------------------|-----|-----|
| RBW (Between 3 kHz and 100 kHz) | 3   | kHz |
| VBW (3 X RBW)                   | 10  | kHz |
| Span (>1.5 X the DTS Bandwidth) | 1.5 | MHz |
| Sweep (Auto)                    | 420 | ms  |
| Attenuation                     | 40  | dB  |
| Ref Level                       | 20  | dBm |

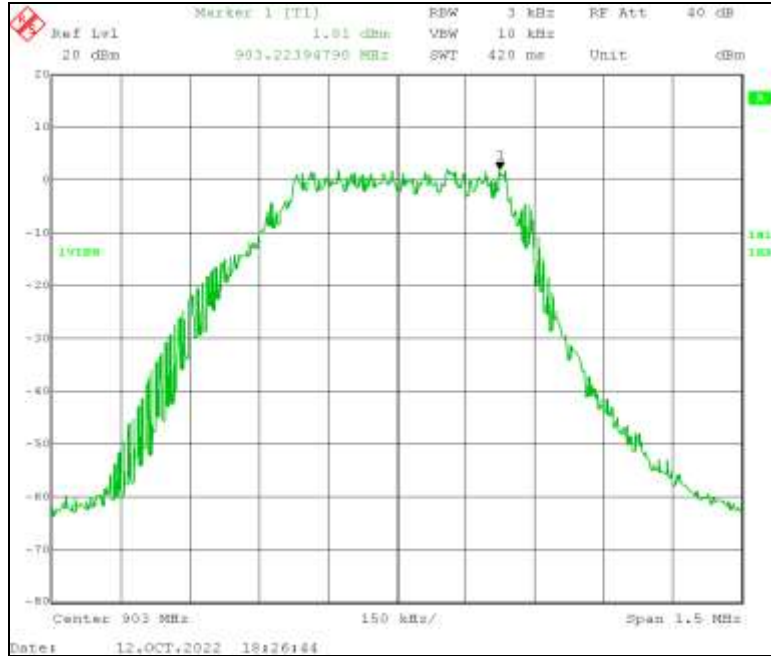
### 4.9.2 Power Spectral Density Test Results (10/12/2022)

| Channel | LoRa Modulation Information  | Frequency (MHz) | Measured Level | Cable # 811 Loss | Corrected Level | Limit | Margin |
|---------|--|-----------------|----------------|------------------|-----------------|-------|--------|
|         |  |                 | dBm            | dB               | dBm             | dBm   | dBm    |
| 0       | LoRa Modulation at Max Power Setting of 20, BW of 500 kHz and Spread factor of 8 | 903.0           | 1.81           | 0.18             | 1.99            | 8.00  | -6.01  |
| 4       |  | 909.4           | 2.12           | 0.24             | 2.36            | 8.00  | -5.64  |
| 7       |  | 914.2           | 1.88           | 0.20             | 2.08            | 8.00  | -5.92  |

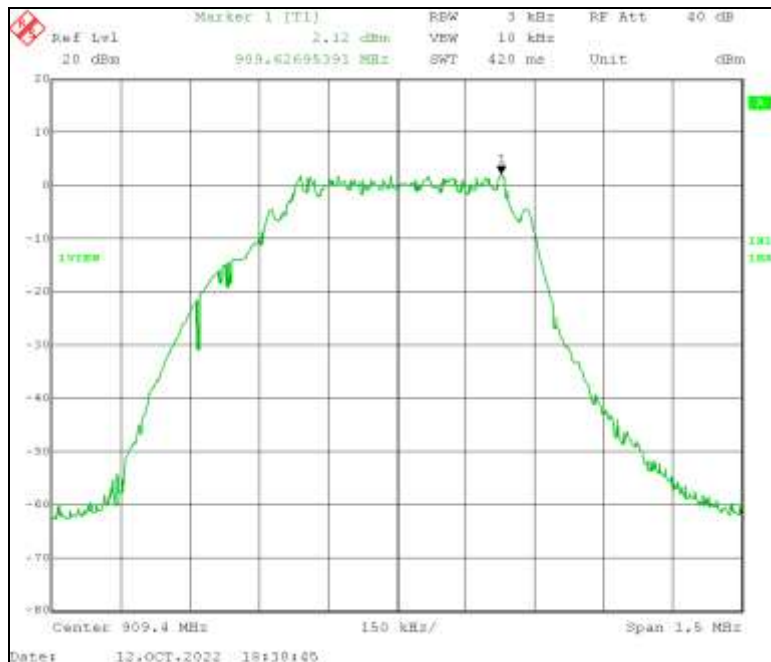


### 4.9.3 Power Spectral Density Analyzer Screen Captures

#### Channel 0, 903.0 MHz, LoRa Modulation

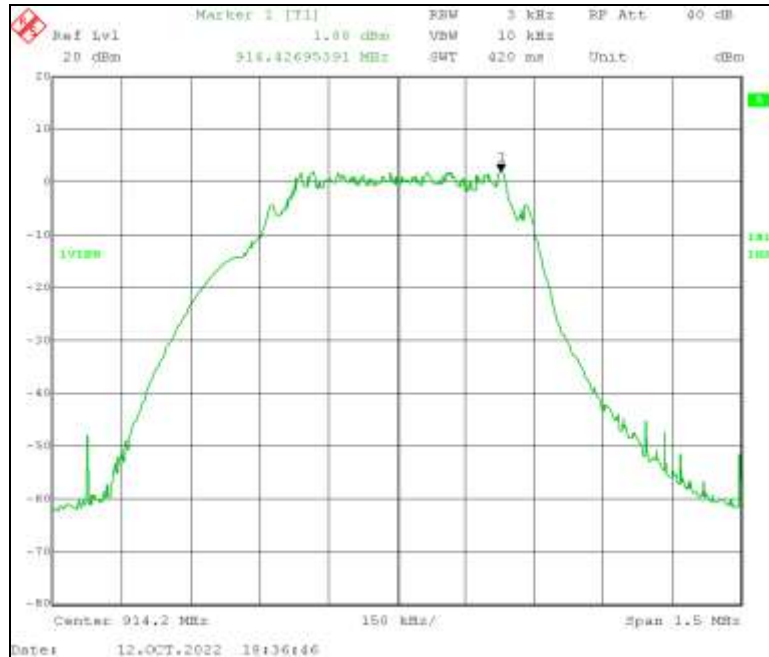


#### Channel 4, 909.4 MHz, LoRa Modulation





### Channel 7, 914.2 MHz, LoRa Modulation



**Test Results:** The Power Spectral Density measurements of the Woodstream Model V440 LoRa Radio Bait Box Rodent Trap are compliant with the limits specified in FCC Section 15.247(e) and RSS-247.





## 4.10 Band Edge Measurement (FCC Part 15.247(d), RSS-247 5.5)

### 4.10.1 Band Edge Measurement Test Procedure

Band edge measurements were recorded on the EUT while operating with a modulated carrier at 903.0 MHz (Channel 0) and 914.2 MHz (Channel 7). 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.

#### Spectrum Analyzer Settings:

| Measurement Analyzer Settings |   |
|-------------------------------|---|
| RBW                           | 100 kHz                                     |
| VBW                           | 300 kHz                                     |
| Span                          | 2 MHz for Low Band and 17 MHz for High Band |
| Sweep                         | 5 ms  |

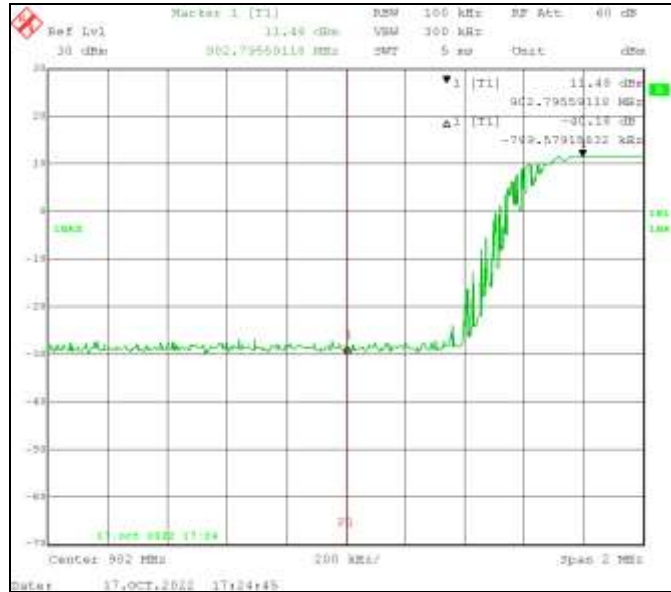
### 4.10.2 Band Edge Measurement Test Results (10/17/2022)

| Test Mode     | Frequency (MHz) | Peak Transmit | Band Edge Measurement   |            |       | Result |        |
|---------------|-----------------|---------------|---|------------|-------|--------|--------|
|               |                 |               | Peak Level @ 100 kHz Below the Lower Band or Peak Level @ 100 kHz Above the Higher Band | Limit (dB) | Delta |        | Margin |
| Tx at Maximum | 903.0           | 11.48         | -39.65  | 20.00      | 51.13 | -31.13 | Pass   |
| Tx at Maximum | 914.2           | 11.06         | -40.05  | 20.00      | 51.11 | -31.11 | Pass   |

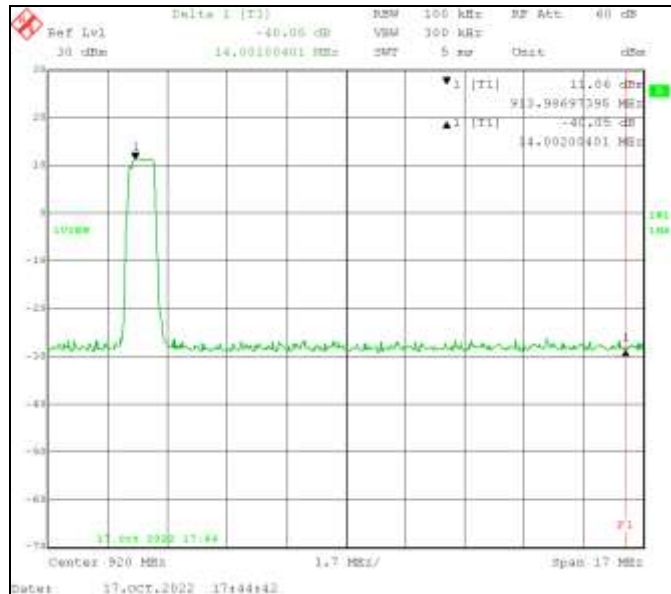


### 4.10.3 Band Edge Measurement Analyzer Screen Captures

#### Low Channel 0, 903 MHz, 500 kHz BW



#### High Channel 7, 914.2 MHz, 500 kHz BW



**Test Results:** The Band Edge measurements of the Woodstream Model V440 LoRa Radio Bait Box Rodent Trap show that emissions at the band edges of the Operating Frequency Bandwidth are below the Carrier Peak Level – 20 dBc required by 47 CFR Part 15.247(d) and ISED RSS-247, Section 5.5.



## 5.0 Test Setup Photos

See Appendix C Woodstream V440 LoRa Rodent Trap Test Setup Photos



## Appendix A – Test Equipment

| Equipment                                     | Manufacturer    | Model #                    | Serial #                      | BEC # | Calibration Date | Calibration Cycle | Calibration Due Date |
|---|-----------------|----------------------------|-------------------------------|-------|------------------|-------------------|----------------------|
| EMI Receiver<br>(20 Hz – 26.5 GHz)            | Rohde & Schwarz | ESIB 26                    | 836119/006                    | 1010  | 07/02/19         | 3.5 Years         | 01/02/23             |
| Antenna<br>(30 MHz - 6 GHz)                   | Sunol Sciences  | JB6                        | A022108                       | 712   | 06/21/21         | 3 Years           | 06/21/24             |
| 9kHz-3GHz<br>EMC Analyzer                     | Agilent         | E7402A                     | US39440162                    | 883   | 06/21/21         | 3 Years           | 06/21/24             |
| Antenna<br>(30 MHz - 6 GHz)                   | Sunol Sciences  | JB6                        | A020714                       | 882   | 05/24/21         | 3 Years           | 05/24/24             |
| Amplifier<br>(.09 – 1300 MHz)                 | Hewlett Packard | 8447F                      | 3313A06658                    | 807   | 01/13/21         | 3 Years           | 01/13/24             |
| EMC Analyzer<br>(9 kHz - 26.5 GHz)            | Hewlett Packard | 8593EM                     | 3710A00214                    | 1026  | 03/23/20         | 3 Years           | 03/23/23             |
| Amplifier System<br>(0.5 – 50 GHz)            | Hewlett Packard | 83015A<br>83017A           | 3123A00360<br>&<br>3332A00219 | 1027  | 06/16/21         | 3 Years           | 06/16/24             |
| Double Ridged<br>Horn Antenna<br>(1 - 18 GHz) | EMCO            | 3115                       | 9705-5225                     | 1028  | 11/24/21         | 3 Years           | 11/21/24             |
| OATS Site<br>(30 MHz – 1 GHz)                 | BEC             | N/A                        | N/A                           | 705   | 10/07/22         | 1 Year            | 10/07/23             |
| Temp/Humidity<br>Meter                        | Control Company | 4096                       | 151872672                     | 780   | 07/21/22         | 3 Years           | 07/21/25             |
| Notch Filter                                  | Anatech         | AE915N<br>S2095            | 10                            | 923   | 02/15/22         | 1 Year            | 02/15/23             |
| High-Pass Filter                              | Trilithic Inc.  | 6HC1500<br>/18000-<br>3-KK | 20044046                      | 741   | 02/27/20         | 3 Years           | 02/27/23             |



|   |                            |           |     |     |                  |                  |                  |
|---|----------------------------|-----------|-----|-----|------------------|------------------|------------------|
| 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 |