BEC INCORPORATED

SAR EXEMPTION REPORT

TEST STANDARDS:
FCC Part 15 Subpart C Intentional Radiator

Woodstream Corporation Model V440
VLINK Bait Box Rodent Trap with LoRa Radio (DSS and DTS)

FCC ID: SNA-V440

REPORT BEC-2224-06

CUSTOMER:
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Revision History

Revision #	Description of Changes	Date of Changes	Date Released
0	Test Report Initial Release	N/A	11/02/2022

1.0 Administrative Information

1.1 General Information Table

Project Number	BEC-2224	
Manufacturer	Woodstream Corporation	
Model Number	V440	
EUT Description	VLINK Bait Box Rodent Trap with LoRa Radio	
Serial Number	None	
Sample Type	Modified with SMA connector on transmitter output port (Antenna Conducted Sample)	
Sample Number	2224-02	
FCC ID	SNA-V440	
Radio Chip Manufacturer	Semtech Corporation	
Radio Chip Model Number	SX1272	
Frequency of Operation	902 – 915 MHz	
Frequencies Tested	Low (902.3 MHz) Middle (908.7 MHz) High (914.9 MHz)	Low (903.0 MHz) Middle (909.4 MHz) High (914.2 MHz)
Antenna Gain	+ 5.06 dBi	
Tune Up Tolerance	+/- 2.0 dBm	
Antenna Type	Inverted-F PCB Trace Antenna	
Modulation	LoRa	
FCC Classification	Digital Spread Spectrum (DSS)	Digital Transmission System (DTS)
Date Samples Received	09/23/2022	
EUT Firmware Version	FW Version 1.2.10 MCU: AVR32DA32	
Condition Sample Received	Production Unit Suitable for Test	
Device Type	Portable Device	
Applicable FCC Rules	47 CFR Part 2.1093	
KDB Guidance Document	447498 D04 Interim General RF Exposure Guidance v01	

1.2 Separation Distance Rationale

The V-Link LoRa Bait Box is a rodent trap designed to perform periodic measurements of the bait within the bait area of the bait box using a capacitive sensor. The trap will report this bait level in 25% increments to the Vlink app via LoRaWAN on a daily basis or whenever the bait level changes. A separation distance of 20 cm was selected due to the limited interaction with the device. This device is typically used in an outdoor setting and setup away from people.

1.3 Maximum Permissible Exposure Calculation

§15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

(i) Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. *See* §1.1307(b)(1) of this chapter.

§1.1307 Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared.

(b)(1) The appropriate exposure limits in §§1.1310 and 2.1093 of this chapter are generally applicable to all facilities, operations and transmitters regulated by the Commission.

§1.1310 Radiofrequency radiation exposure limits.

(2) At operating frequencies less than or equal to 6 GHz, the limits for maximum permissible exposure (MPE), derived from whole-body Specific Absorption Rate (SAR) limits and listed in Table 1 of paragraph (e) of this section, may be used instead of whole-body SAR limits as set forth in paragraph (a) through (c) of this section to evaluate the environmental impact of human exposure to RF radiation as specified in §1.1307(b), except for portable devices as defined in §2.1093 as these evaluations shall be performed according to the SAR provisions in §2.1093 of this chapter.

(4) Both the MPE limits listed in Table 1 of paragraph (e) of this section and the SAR limits as set forth in paragraph (a) through (c) of this section and in §2.1093 of this chapter are for continuous exposure, that is, for indefinite time periods. Exposure levels higher than the limits are permitted for shorter exposure times, as long as the average exposure over the specified averaging time in Table 1 is less than the limits. Detailed information on our policies regarding procedures for evaluating compliance with all of these exposure limits can be found in the FCC's *OET Bulletin 65,* "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields," and in supplements to *Bulletin 65,* all available at the FCC's Internet Web site: *http://www.fcc.gov/oet/rfsafety*

§2.1093 Radiofrequency radiation exposure evaluation: portable devices.

(b) For purposes of this section, a portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user.

From: OET Bulletin 65 Edition 97-02, page 19.

$$S = \frac{PG}{4\pi R^2} \quad (3)$$

where: S = Power Density (in appropriate units, e.g., mW/cm^2)
P = Power input to the antenna (in appropriate units, e.g., mW)
G = Power Gain of the antenna (numeric) in the direction of interest to an isotropic radiator
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

or:
$$S = \frac{EIRP}{4\pi R^2} \quad (4)$$

where: EIRP = equivalent (or effective) isotropically radiated power

1.4 Maximum Permissible Exposure Calculation Results

Calculation

1. P(dBm) = Maximum conducted output power (dBm) + Tune-up Tolerance (dB)

2. P(dBm) is converted to P(mW)

3. P(mW) = 1mW * $10^{(P(dBm)/10)}$

4. G (numeric) = $10^{(Antenna\ Gain/10)}$

5. Calculate S (Power Density) using Equation (3)

Model V440 Transmission Signal Type	Frequency	Max Power Input P(dBm)	Converted Power Input P(mW)	G = Power Gain (numeric)	S = Power Density @ 20 cm	1.1310 Radio Frequency Radiation Exposure Limits	Margin
	MHz	dBm	mW		mW/cm^2	mW/cm^2	
DSS	914.9	13.33	21.5278	3.206	0.0137	0.6099	-0.5962
DTS	903.0	13.51	22.4388	3.206	0.0143	0.6020	-0.5877

Antenna power shown in the above table reflect the highest measured levels among the low, middle and high frequencies for the DSS transmitter and DTS transmitter.

Results: The maximum calculated Power Density of the measurements for the DSS and DTS LoRa Radio contained in the Woodstream V440 is 0.0143 mW/cm^2. This complies with the limit of 0.6020 mW/cm^2 from Table 1(B) of 47 CFR Part 1.1310. Therefore, exposure evaluation is not required.