



Simplifying · Security

**Door/Window Sensor  
FCC ID: U5X- DWSLL**

## **Certification Test Report**

**July 23, 2021**

**Contents**

1. Introduction..... 3

2. Statement of Compliance..... 3

    2.1. FCC Part 2 §2.907..... 3

    2.2. FCC Part 2 §2.909..... 3

    2.3. FCC Part 2 §2.911..... 3

    2.4. FCC Part 2 §2.913..... 3

    2.5. FCC Part 2 §2.915..... 3

    2.6. FCC Part 2 §2.925..... 3

    2.7. FCC Part 2 §2.943, 2.945..... 3

    2.8. FCC Part 2 §2.947..... 3

    2.9. FCC Part 2 §2.948..... 4

    2.10. FCC Part 2 §2.1033..... 4

3. Discussion of Laboratory Measurements and Rules Compliance ..... 5

    3.1. FCC Part 15 §15.231(a)(1)..... 5

    3.2. FCC Part 15 §15.231(a)(2)..... 5

    3.3. FCC Part 15 §15.231(a)(3)..... 5

    3.4. FCC Part 15 §15.231(a)(4)..... 5

    3.5. FCC Part 15 §15.231(a)(5)..... 5

    3.6. FCC Part 15 §15.231(b)..... 5

        3.6.1. Field Strength Limits ..... 5

        3.6.2. Duty Cycle Correction Factor and Average Emission Calculation..... 5

        3.6.3. Measured Radiated Field Strength Data ..... 5

    3.7. FCC Part 15 §15.231(c) ..... 6

        3.7.1. Bandwidth Requirements - Limits and Measured Data ..... 6

# 1. Introduction

The DWS-LL is a door/window sensor designed for use in a wireless home security system. The device is powered by a single CR2032 lithium battery. It measures 2.90" x 1.00" x 0.40" and weighs approximately 0.75 ounces. The device transmits packets to a security system which indicate the state of a tamper switch and the detection of an open door/window. Additional operational detail and descriptions can be found in Exhibit F.

Certification is requested under FCC Rules, Part 15, Subpart C, Paragraph 15.231.

# 2. Statement of Compliance

Specific sections of FCC Rules Part 2 that require information or listing are given below.

## 2.1. **FCC Part 2 §2.907**

This is an application for certification of original equipment.

## 2.2. **FCC Part 2 §2.909**

We have been informed of the grantee responsibilities with regard to certified equipment.

## 2.3. **FCC Part 2 §2.911**

- a) This application has been filed electronically using form 731.
- b) All required information has been supplied in this application and its attachments.
- c) All required information has been supplied in this application and its attachments.
- d) All information provided for this application is true and correct to the best of our knowledge and belief. We certify compliance with the requirements of §1.2002 concerning the Anti-Drug Abuse Act of 1988. Signatures are supplied electronically, and statements agreed to, in the appropriate block of form 731 and in all attachments were required. The technical test data has been signed by the agency performing the testing.
- e) The technical test data has been signed by the agency performing the testing.
- f) Signatures have been supplied electronically by an officer of Alula.

## 2.4. **FCC Part 2 §2.913**

- a) This application has been filed electronically.
- b) Appropriate fees have been filed electronically.
- c) Equipment samples shall be supplied as requested.

## 2.5. **FCC Part 2 §2.915**

We are requesting a grant of certification. This application shows compliance with the technical standards.

## 2.6. **FCC Part 2 §2.925**

A label shall be affixed to each piece of equipment, showing the FCC identifier. The label shall read "FCC ID: U5X-DWSLL". See Exhibit B for a photograph showing the label and location on the device.

## 2.7. **FCC Part 2 §2.943, 2.945**

Sample production equipment shall be submitted to the FCC upon request.

## 2.8. **FCC Part 2 §2.947**

- a) Measurement procedure follows ANSI C63.4: 2009.
- b) A description of utilized test equipment is contained in the report.

## **2.9. FCC Part 2 §2.948**

Measurements were taken at the following FCC-approved facility:

**Rhein Tech Laboratories, Inc.**  
**360 Herndon Parkway, Suite 1400**  
**Herndon, VA 20170 USA**  
**Contact: Rick McMurray**  
**703-689-0368**

Photographs of the test site and setup are shown in Exhibit J.

## **2.10. FCC Part 2 §2.1033**

- a) Form 731 has been filed electronically.
- b) The technical report, along with its exhibits, contains the information as follows:
  - (1) The full name and mailing address of the manufacturer of the device and the applicant for certification:

**Alula**  
**2340 Energy Park Drive, Suite 100**  
**St. Paul, MN 55108**
  - (2) FCC Identifier: U5X-DWSLL
  - (3) A copy of the installation/user instructions is furnished as Exhibit E.
  - (4) A brief description of the device and operation is furnished in Exhibit F. Schematic is furnished in Exhibit G.
  - (5) Block diagram furnished in Exhibit H.
  - (6) This document constitutes a technical test report.
  - (7) Internal and external photographs have been furnished in Exhibits A and C.
  - (8) Not applicable. There are no peripheral or accessory devices used with this device. It is a standalone device.
  - (9) This application not pursuant to the transition rules of section 15.37
  - (10) Not applicable. This device does not include a scanning receiver.
  - (11) Not applicable.
  - (12) Not applicable.
  - (13) Not applicable.
  - (14) Test setup photos are furnished in Exhibit J.
- c) Not applicable. This device shall operate under Part 15 of the rules.
- d) Not applicable.
- e) Not applicable. This is not a composite system.

### 3. Discussion of Laboratory Measurements and Rules Compliance

#### 3.1. **FCC Part 15 §15.231(a)(1)**

Precautions are taken in the firmware to ensure that all manually activated transmissions cease within 5 seconds after being released as shown in Exhibit I.

#### 3.2. **FCC Part 15 §15.231(a)(2)**

Precautions are taken in the firmware to ensure that all automatically activated transmissions cease within 5 seconds after activation as shown in Exhibit I.

#### 3.3. **FCC Part 15 §15.231(a)(3)**

Precautions are taken in the firmware to ensure the total duration of supervision transmissions does not exceed 2 seconds per hour. Additional information can be found in Exhibit F.

#### 3.4. **FCC Part 15 §15.231(a)(4)**

Device does not continue transmitting beyond the packets resulting from each activation.

#### 3.5. **FCC Part 15 §15.231(a)(5)**

There is no setup information transmitted with this device.

#### 3.6. **FCC Part 15 §15.231(b)**

##### 3.6.1. **Field Strength Limits**

The table that follows shows the emission limits as determined by interpolation of the data in §15.231(b), the requirements of §15.35(b) regarding peak emission limits, and the requirements of §15.205/§15.209 regarding restricted bands and their limits.

	Average Limit (dBuV/m)	Peak Limit (dBuV/m)
Fundamental (433.92 MHz)	80.825	100.825
Spurious	60.825	80.825
Restricted Band	54.00	74.00

##### 3.6.2. **Duty Cycle Correction Factor and Average Emission Calculation**

Precautions are taken in the firmware to ensure there is at least 100 mS between packets. The transmitter duty cycle over a 100 mS time period is 10.0%. Additional packet transmission characteristics and details can be found in Exhibit F.

The average emission level, as given in §15.35(c), is calculated as follows:

$$\text{Average Emission Level} = \text{Peak Measurement} + 20\log(0.10)$$

##### 3.6.3. **Measured Radiated Field Strength Data**

Radiated fundamental and spurious emissions were tested at three meters. The EUT was tested in the three orthogonal planes with the receive antenna in both polarities. The emissions were maximized per ANSI C63.4:2003 8.3.1.2; that is, the measurement antenna height was varied between 1 and 4m, and the EUT was rotated through 360 degrees on a rotating turntable until the maximum emissions were found. Both horizontal and vertical measurement antenna polarizations were used. A resolution bandwidth of 120kHz was used for frequencies less than 1000MHz, and a resolution bandwidth of 1MHz was used for frequencies greater than or equal to 1000MHz. The video bandwidth was set to a value at least three times greater than the resolution bandwidth. All spurious emissions in the applicable frequency range were investigated. The EUT was adapted to continuously transmit for testing purposes. Further measured radiated data is shown in Exhibit I.

The table that follows shows both peak and average emissions, limits, resulting margins, and pass/fail results.

Emission Frequency (MHz)	Peak Emissions				Average Emissions			
	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Test Result	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Test Result
433.92	92.3	100.825	-8.5	PASS	72.3	80.825	-8.5	PASS
867.84	51.2	80.825	-29.6	PASS	31.2	60.8	-29.6	PASS
1301.76	57.1	74.000	-16.9	PASS	37.1	54.0	-16.9	PASS
1735.68	61.7	80.825	-19.1	PASS	41.7	60.8	-19.1	PASS
2169.60	45.6	80.825	-35.2	PASS	25.6	60.8	-35.2	PASS
2603.52	62.4	80.825	-18.4	PASS	42.4	60.8	-18.4	PASS
3037.44	50.0	80.825	-30.8	PASS	30.0	60.8	-30.8	PASS
3471.36	47.7	80.825	-33.1	PASS	27.7	60.8	-33.1	PASS
3905.28	39.0	74.000	-35.0	PASS	19.0	54.0	-35.0	PASS
4339.20	34.1	74.000	-39.9	PASS	14.1	54.0	-39.9	PASS

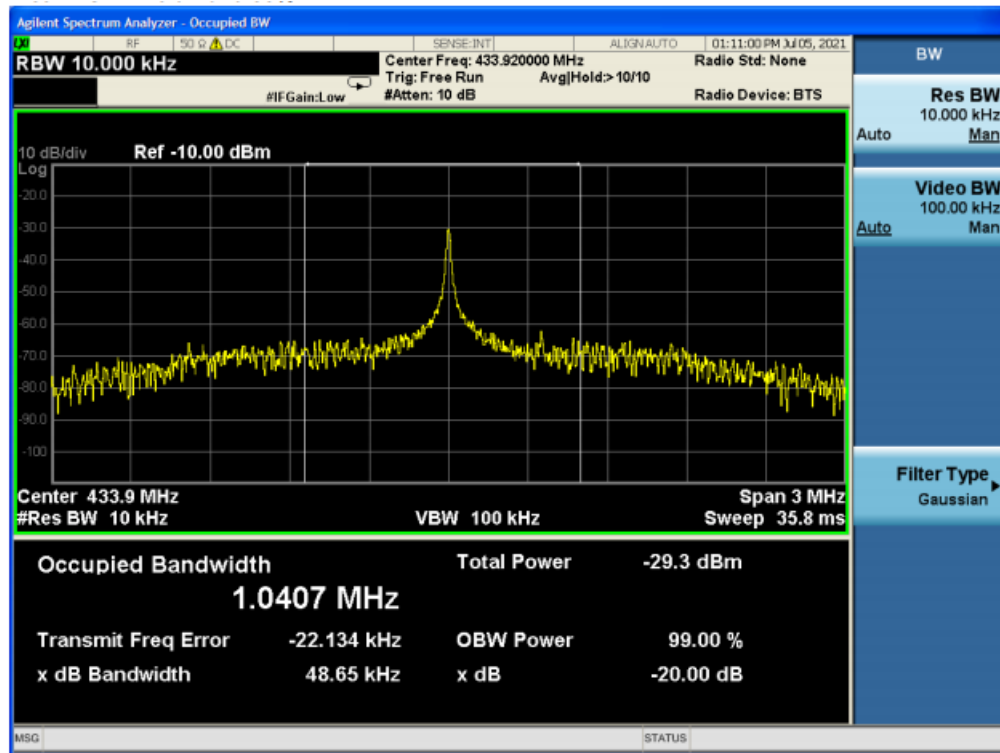
### 3.7. FCC Part 15 §15.231(c)

#### 3.7.1. Bandwidth Requirements - Limits and Measured Data

The allowed 20dB bandwidth of the transmitted signal is 0.25% of the carrier frequency.

$$\text{BW Limit} = 0.0025 * 433.92 \text{ MHz} = 1.0848 \text{ MHz}$$

The plot that follows shows the 20dB bandwidth of the modulated signal is 48.65 kHz or 0.04865 MHz. These measurements show compliance with the bandwidth requirements by a margin of 1036.15 kHz or 1.03615 MHz. Further bandwidth data is shown in Exhibit I.



*Paul Hill*