

# TEST REPORT

Reference No..... : WTX22X0803457W-1  
FCC ID ..... : 2A8VJB-2  
Applicant ..... : CM-GLO LLC  
Address..... : 1201 N 4th Street, Watertown, WI 53098, USA  
Product Name ..... : Remote Control  
Test Model. .... : Remote B -2  
Standards ..... : FCC Part 15.231  
Date of Receipt sample .... : September 23, 2022  
Date of Test..... : September 23, 2022 to October 8, 2022  
Date of Issue ..... : October 8, 2022  
Test Result..... : **Pass**

Remarks:

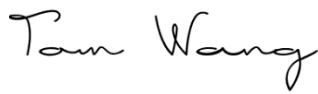
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**Prepared By:**

**Waltek Testing Group (Shenzhen) Co., Ltd.**

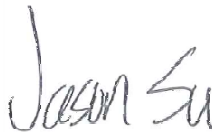
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## 1. GENERAL INFORMATION

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### 1.1 Product Description for Equipment Under Test (EUT)

#### Client Information

Applicant: CM-GLO LLC  
Address of applicant: 1201 N 4th Street, Watertown, WI 53098, USA

Manufacturer: CM-GLO LLC  
Address of manufacturer: 1201 N 4th Street, Watertown, WI 53098, USA

| General Description of EUT                                                                                                                                                                                                                                                                     |                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Product Name:                                                                                                                                                                                                                                                                                  | Remote Control    |
| Trade Name:                                                                                                                                                                                                                                                                                    | /                 |
| Model No.:                                                                                                                                                                                                                                                                                     | Remote B-2        |
| Adding Model(s):                                                                                                                                                                                                                                                                               | Remote B-3        |
| Rated Voltage:                                                                                                                                                                                                                                                                                 | Input: DC 18V, 3A |
| Serial Number:                                                                                                                                                                                                                                                                                 | S059S1            |
| <i>Note: The test data is gathered from a production sample, provided by the manufacturer. The appearance of others models listed in the report is different from main-test model Remote B-2, but the circuit and the electronic construction do not change, declared by the manufacturer.</i> |                   |

| Technical Characteristics of EUT |          |
|----------------------------------|----------|
| Frequency Range:                 | 315MHz   |
| Modulation:                      | FSK      |
| Antenna Type:                    | Integral |
| Antenna Gain:                    | 0dBi     |

## 1.2 Test Standards

**FCC Part 15.231:** Periodic operation in the band 40.66-40.70 MHz and above 70 MHz.

**ANSI C63.10-2013:** American National Standard for Testing Unlicensed Wireless Devices.

*Maintenance of compliance* is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission/immunity, should be checked to ensure compliance has been maintained.

## 1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard for Testing Unlicensed Wireless Devices.

## 1.4 Test Facility

### **Address of the test laboratory**

Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China

### **FCC – Registration No.: 125990**

Waltek Testing Group (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. The Designation Number is CN5010, and Test Firm Registration Number is 125990.

## 1.5 EUT Setup and Test Mode

The EUT was operated at continuous transmitting mode that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

| Test Mode List |              |                 |
|----------------|--------------|-----------------|
| Test Mode      | Description  | Remark          |
| TM1            | Transmitting | With modulation |
| TM2            |              |                 |
| TM3            |              |                 |

| Special Cable List and Details |            |                     |                        |
|--------------------------------|------------|---------------------|------------------------|
| Cable Description              | Length (m) | Shielded/Unshielded | With / Without Ferrite |
| /                              | /          | /                   | /                      |

| Auxiliary Equipment List and Details |              |       |               |
|--------------------------------------|--------------|-------|---------------|
| Description                          | Manufacturer | Model | Serial Number |
| /                                    | /            | /     | /             |

## 1.6 Measurement Uncertainty

| Measurement uncertainty        |            |                     |
|--------------------------------|------------|---------------------|
| Parameter                      | Conditions | Uncertainty         |
| Occupied Bandwidth             | Conducted  | $\pm 1.5\%$         |
| Conducted Spurious Emission    | Conducted  | $\pm 2.17\text{dB}$ |
| Transmission Time              | Conducted  | $\pm 5\%$           |
| Conducted Emissions            | Conducted  | $\pm 2.88\text{dB}$ |
| Transmitter Spurious Emissions | Radiated   | $\pm 5.1\text{dB}$  |

**1.7 Test Equipment List and Details**

| No.       | Description             | Manufacturer           | Model                 | Serial No.  | Cal Date   | Due. Date  |
|-----------|-------------------------|------------------------|-----------------------|-------------|------------|------------|
| SEMT-1075 | Communication Tester    | Rohde & Schwarz        | CMW500                | 148650      | 2022-03-27 | 2023-03-26 |
| SEMT-1063 | GSM Tester              | Rohde & Schwarz        | CMU200                | 114403      | 2022-03-27 | 2023-03-26 |
| SEMT-1072 | Spectrum Analyzer       | Agilent                | E4407B                | MY41440400  | 2022-03-27 | 2023-03-26 |
| SEMT-1079 | Spectrum Analyzer       | Agilent                | N9020A                | US47140102  | 2022-03-27 | 2023-03-26 |
| SEMT-1080 | Signal Generator        | Agilent                | 83752A                | 3610A01453  | 2022-03-27 | 2023-03-26 |
| SEMT-1081 | Vector Signal Generator | Agilent                | N5182A                | MY47070202  | 2022-03-27 | 2023-03-26 |
| SEMT-1028 | Power Divider           | Weinschel              | 1506A                 | PM204       | 2022-03-27 | 2023-03-26 |
| SEMT-1082 | Power Divider           | RF-Lambda              | RFLT4W5M18G           | 14110400027 | 2022-03-27 | 2023-03-26 |
| SEMT-1031 | Spectrum Analyzer       | Rohde & Schwarz        | FSP30                 | 836079/035  | 2022-03-27 | 2023-03-26 |
| SEMT-1007 | EMI Test Receiver       | Rohde & Schwarz        | ESVB                  | 825471/005  | 2022-03-27 | 2023-03-26 |
| SEMT-1008 | Amplifier               | Agilent                | 8447F                 | 3113A06717  | 2022-04-12 | 2023-04-11 |
| SEMT-1043 | Amplifier               | C&D                    | PAP-1G18              | 2002        | 2022-04-12 | 2023-04-11 |
| SEMT-1069 | Loop Antenna            | Schwarz beck           | FMZB 1516             | 9773        | 2021-03-19 | 2023-03-18 |
| SEMT-1068 | Broadband Antenna       | Schwarz beck           | VULB9163              | 9163-333    | 2021-03-19 | 2023-03-18 |
| SEMT-1042 | Horn Antenna            | ETS                    | 3117                  | 00086197    | 2021-03-19 | 2023-03-18 |
| SEMT-1121 | Horn Antenna            | Schwarzbeck            | BBHA 9170             | BBHA9170582 | 2021-04-27 | 2023-04-26 |
| SEMT-1169 | Pre-amplifier           | Direction Systems Inc. | PAP-2640              | 14145-14153 | 2022-04-27 | 2023-04-26 |
| SEMT-1163 | Spectrum Analyzer       | Rohde & Schwarz        | FSP40                 | 100612      | 2022-03-27 | 2023-03-26 |
| SEMT-1166 | Power Limiter           | Agilent                | N9356B                | MY45450376  | 2022-03-27 | 2023-03-26 |
| SEMT-1076 | RF Switcher             | Top Precision          | RCS03-A2              | /           | 2021-03-19 | 2023-03-18 |
| SEMT-1096 | Power Sensor            | Agilent                | U2021XA               | MY54250019  | 2022-03-27 | 2023-03-26 |
| SEMT-C001 | Cable                   | Zheng DI               | LL142-07-07-10M(A)    | /           | /          | /          |
| SEMT-C002 | Cable                   | Zheng DI               | ZT40-2.92J-2.92J-6M   | /           | /          | /          |
| SEMT-C003 | Cable                   | Zheng DI               | ZT40-2.92J-2.92J-2.5M | /           | /          | /          |
| SEMT-C004 | Cable                   | Zheng DI               | 2M0RFC                | /           | /          | /          |
| SEMT-C005 | Cable                   | Zheng DI               | 1M0RFC                | /           | /          | /          |
| SEMT-C006 | Cable                   | Zheng DI               | 1M0RFC                | /           | /          | /          |

**Software List**

| Description | Manufacturer | Model | Version |
|-------------|--------------|-------|---------|
|-------------|--------------|-------|---------|

Waltek Testing Group (Shenzhen) Co., Ltd.

[Http://www.waltek.com.cn](http://www.waltek.com.cn)

|                                            |       |        |         |
|--------------------------------------------|-------|--------|---------|
| EMI Test Software<br>(Radiated Emission)*  | Farad | EZ-EMC | RA-03A1 |
| EMI Test Software<br>(Conducted Emission)* | Farad | EZ-EMC | RA-03A1 |

\*Remark: indicates software version used in the compliance certification testing.

2. SUMMARY OF TEST RESULTS

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| FCC Rules   | Description of Test Item     | Result    |
|-------------|------------------------------|-----------|
| § 15.203    | Antenna Requirement          | Compliant |
| §15.205     | Restricted Band of Operation | Compliant |
| § 15.207(a) | Conducted Emission           | N/A       |
| § 15.209    | Radiated Spurious Emissions  | Compliant |
| §15.231(a)  | Deactivation Testing         | Compliant |
| §15.231(b)  | Radiated Emissions           | Compliant |
| §15.231(c)  | 20dB Bandwidth Testing       | Compliant |

N/A: Not applicable.

### **3. Antenna Requirement**

---

#### **3.1 Standard Applicable**

According to FCC Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

#### **3.2 Test Result**

This product has a permanent antenna, fulfill the requirement of this section.

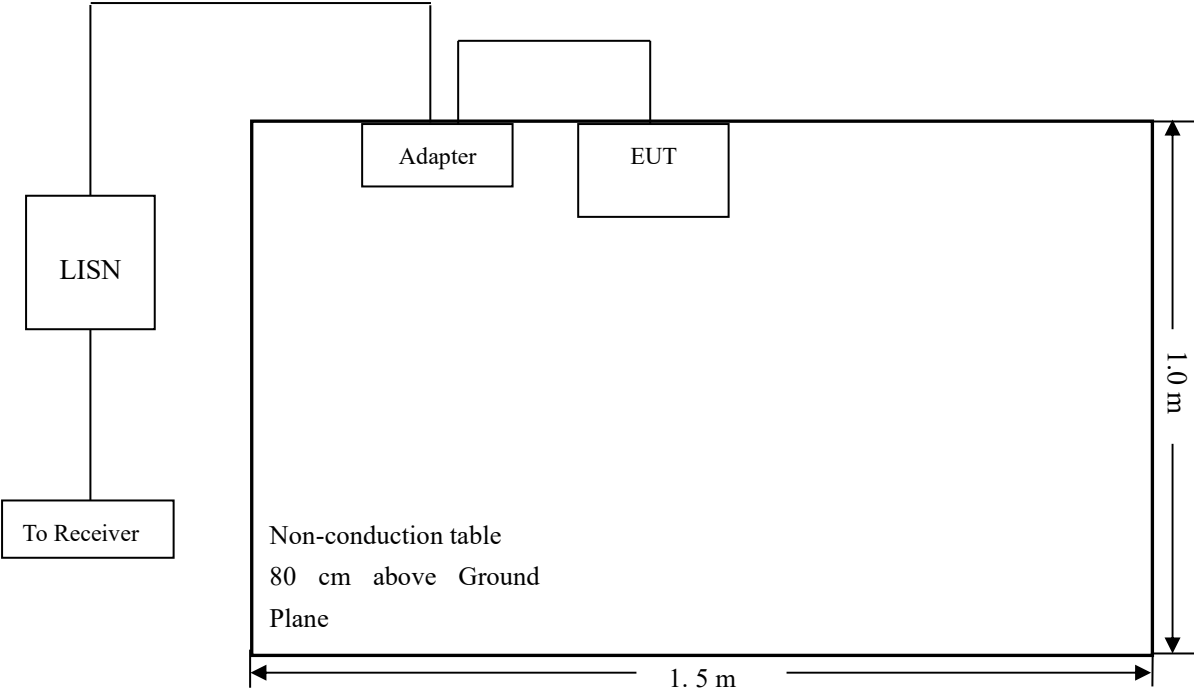
4. Conducted Emissions

4.1 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15.207 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle. The spacing between the peripherals was 10 cm.

4.2 Basic Test Setup Block Diagram



4.3 Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 25 °C     |
| Relative Humidity: | 52%       |
| ATM Pressure:      | 1012 mbar |

4.4 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

- Start Frequency ..... 150 kHz
- Stop Frequency ..... 30 MHz
- Sweep Speed ..... Auto
- IF Bandwidth..... 10 kHz

Quasi-Peak Adapter Bandwidth ..... 9 kHz  
Quasi-Peak Adapter Mode ..... Normal

#### 4.5 Summary of Test Results/Plots

According to the data in section 4.7, the EUT complied with the FCC Part 15.207 Conducted margin for a Class B device, with the *worst* margin reading of:

**-15.90 dB at 18.078 MHz** in the **Neutral** mode, **Average** detector, 0.15-30MHz

#### 4.6 Conducted Emissions Test Data

Note: The EUT is DC supply, So this item is not applicable.

## 5. Radiated Emissions

---

### 5.1 Standard Applicable

According to §15.231(b), the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

| Fundamental Frequency (MHz) | Field Strength of Fundamental (microvolts/meter) | Field Strength of Spurious Emissions (microvolts/meter) |
|-----------------------------|--------------------------------------------------|---------------------------------------------------------|
| 40.66 - 40.70               | 2,250                                            | 225                                                     |
| 70 - 130                    | 1,250                                            | 125                                                     |
| 130 - 174                   | 1,250 to 3,750 **                                | 125 to 375 **                                           |
| 174 - 260                   | 3,750                                            | 375                                                     |
| 260 - 470                   | 3,750 to 12,500 **                               | 375 to 1,250 **                                         |
| Above 470                   | 12,500                                           | 1,250                                                   |

---

\*\* linear interpolations

The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength.

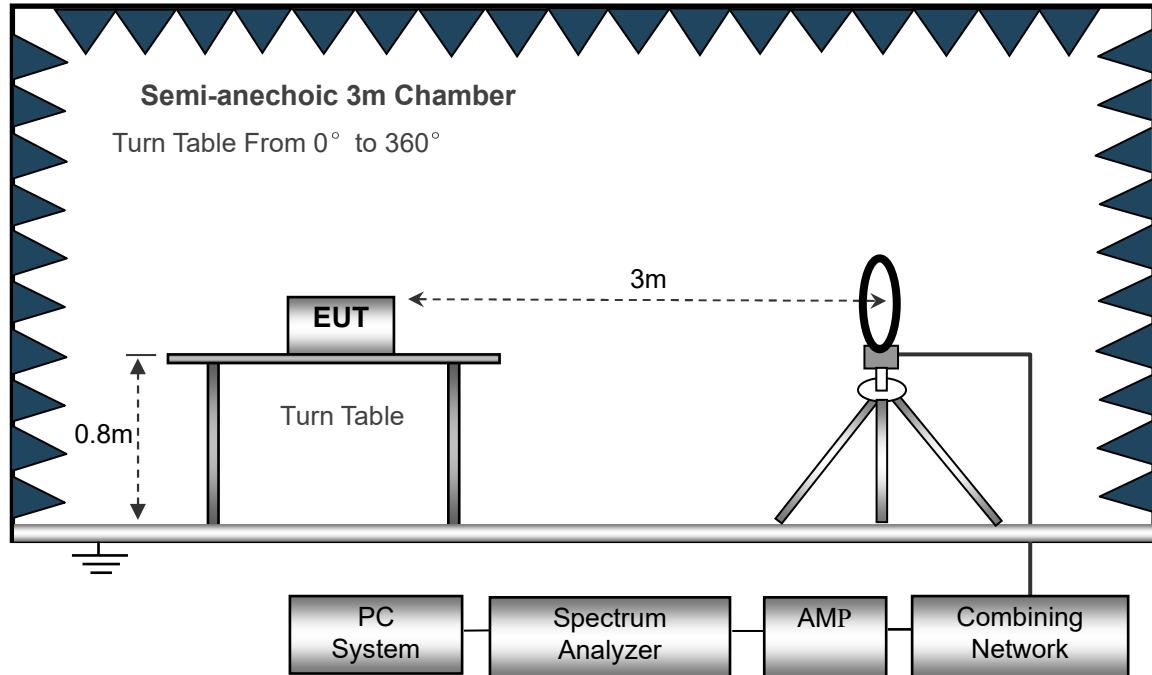
The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

Compliance with the provisions of §15.205 shall be demonstrated using the measurement instrumentation specified in that section.

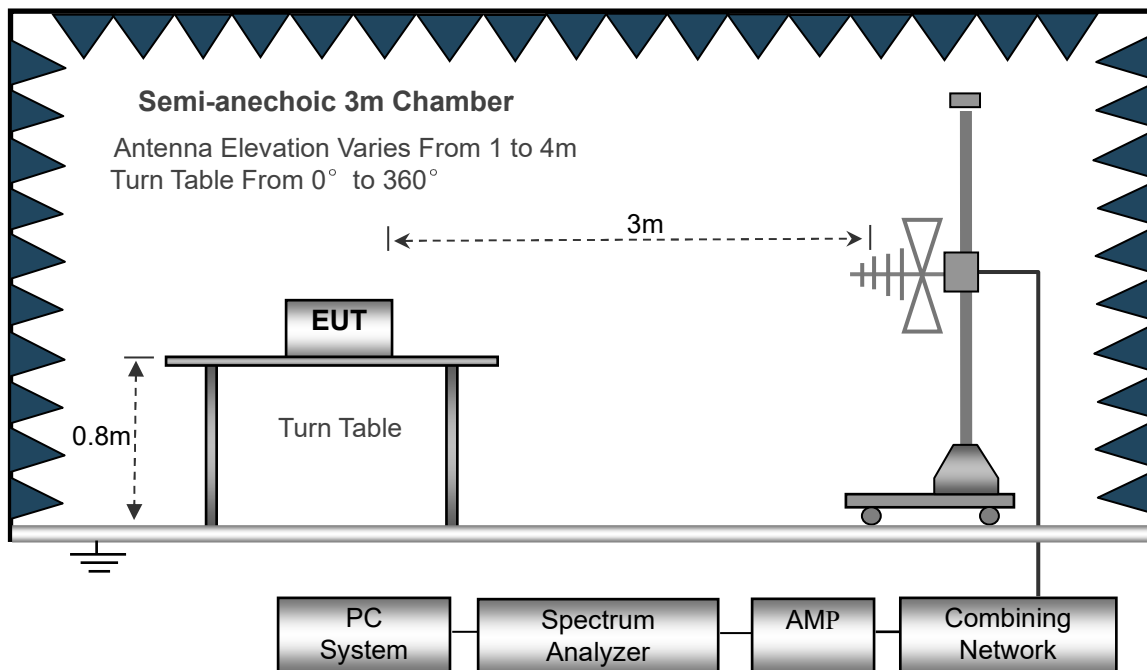
## 5.2 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.205 15.231(b) and FCC Part 15.209 Limit.

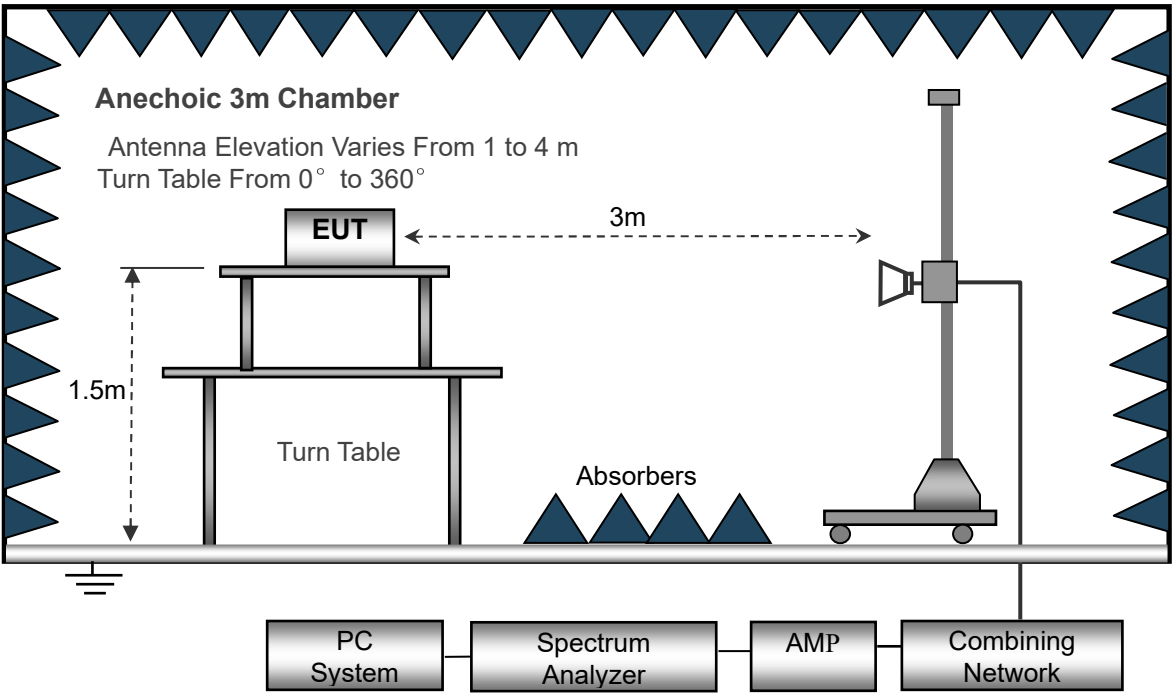
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30MHz to 1GHz.



The test setup for emission measurement above 1GHz.



5.3 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\begin{aligned} \text{Result} &= \text{Indicated Reading} + \text{Correct} \\ \text{Correct} &= \text{Ant. Factor} + \text{Cable Loss} - \text{Ampl. Gain} \end{aligned}$$

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15C Limit}$$

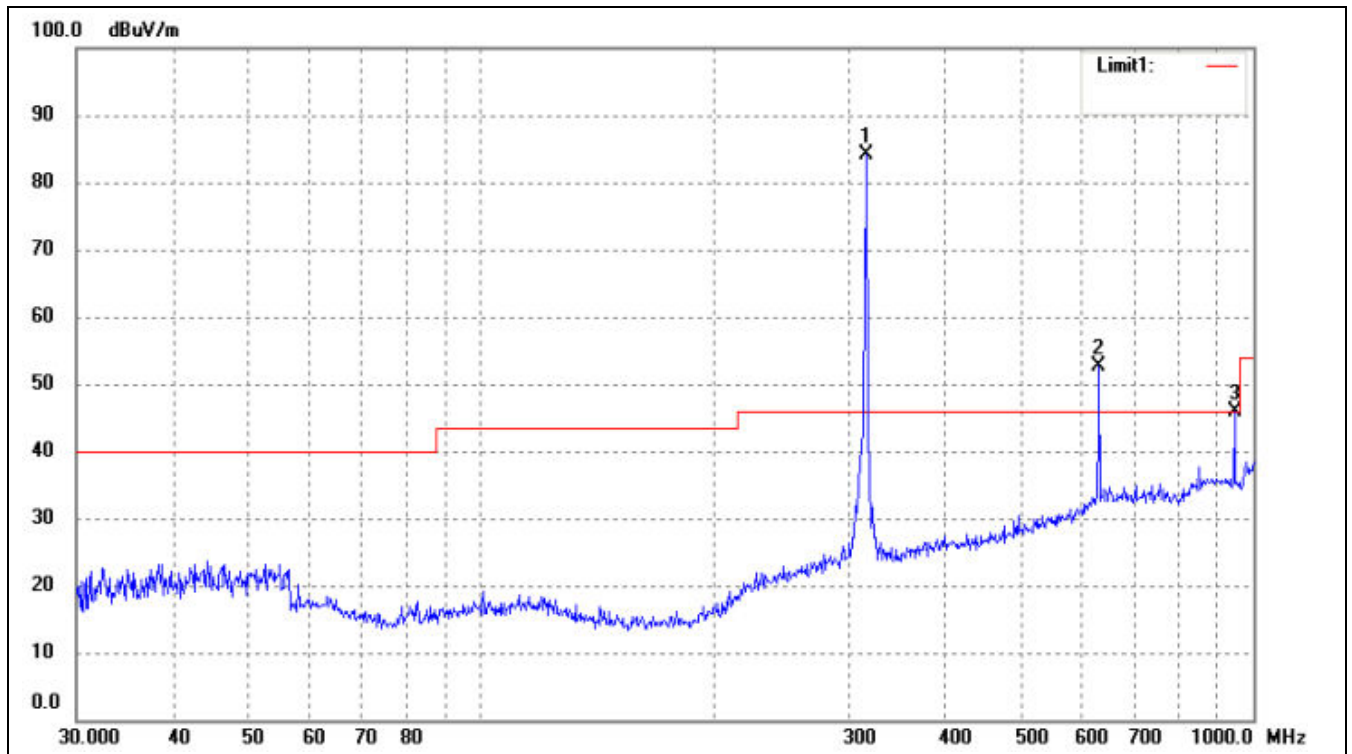
5.4 Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 21° C     |
| Relative Humidity: | 50%       |
| ATM Pressure:      | 1011 mbar |

5.5 Summary of Test Results/Plots

- Note: 1. this EUT was tested in 3 orthogonal positions and the worst case position data was reported.*
- 2. Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 5<sup>th</sup> Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
- 3. The measurements greater than 20dB below the limit from 9kHz to 30MHz..*
- 4. The fundamental frequency is 315MHz, so the fundamental and spurious emissions radiated limit base on the the operating frequency 315MHz.*

|                |        |           |            |
|----------------|--------|-----------|------------|
| Test Frequency | 315MHz | Polarity: | Horizontal |
|----------------|--------|-----------|------------|

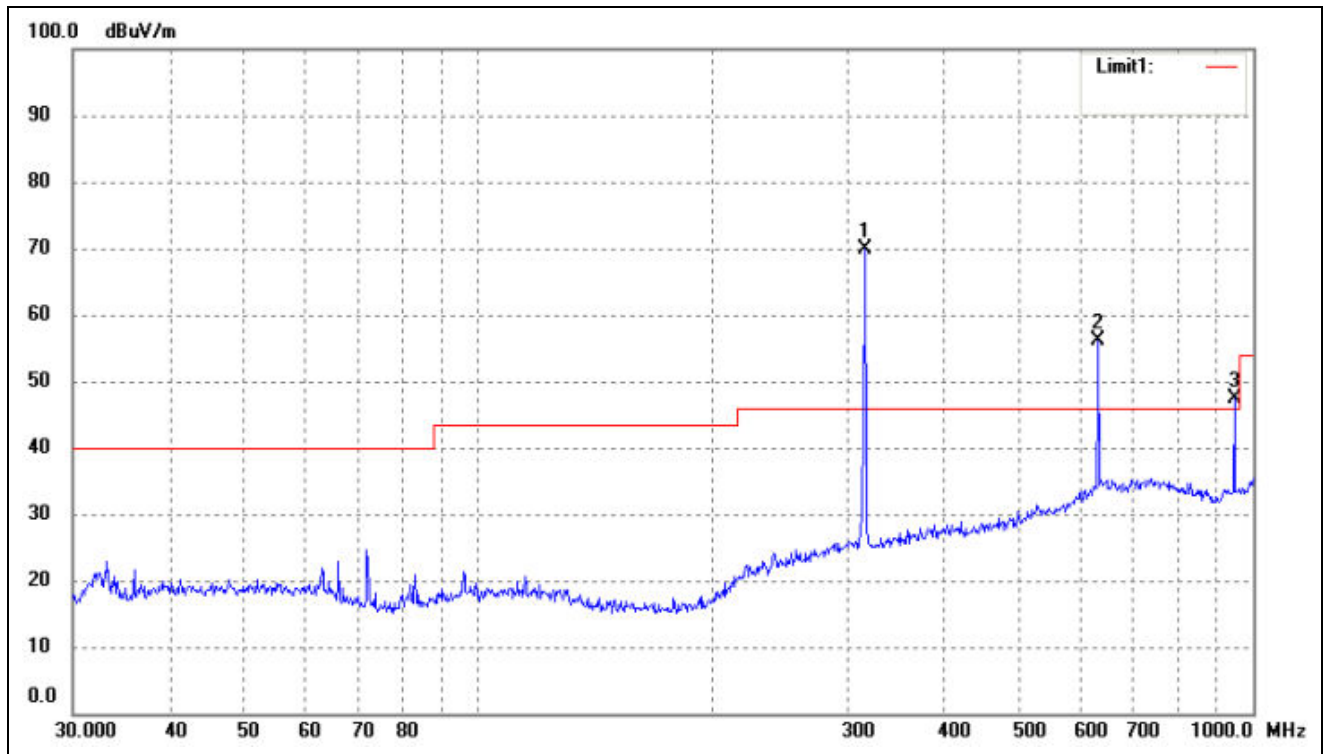


| No. | Frequency<br>MHz | Reading<br>dBuV/m | Corr.<br>Factor(<br>dB) | Dutycycle<br>Factor<br>(dB) | Result<br>dBuV/m | Limit<br>dBuV/m | Margin<br>(dB) | Deg.<br>( ° ) | Height<br>(cm) | Remark |
|-----|------------------|-------------------|-------------------------|-----------------------------|------------------|-----------------|----------------|---------------|----------------|--------|
| 1   | 315.0000         | 93.53             | -9.4                    | /                           | 84.13            | 95.62           | -11.49         | 360           | 100            | peak   |
|     | 315.0000         | /                 | /                       | -9.21                       | 74.92            | 75.62           | -0.7           | /             | /              | Ave    |
| 2   | 630.0000         | 53.81             | -1.29                   | /                           | 52.52            | 75.62           | -23.10         | 183           | 100            | peak   |
|     | 630.0000         | /                 | /                       | -9.21                       | 43.31            | 75.62           | -32.31         | /             | /              | Ave    |
| 3   | 945.0000         | 49.57             | -3.72                   | /                           | 45.85            | 75.62           | -29.77         | 231           | 100            | peak   |
|     | 945.0000         | /                 | /                       | -9.21                       | 36.64            | 75.62           | -38.98         | /             | /              | Ave    |

#### Above 1GHz

| No. | Frequency<br>MHz | Reading<br>dBuV/m | Corr.<br>Factor<br>(dB) | Dutycycle<br>Factor<br>(dB) | Result<br>dBuV/m | Limit<br>dBuV/m | Margin<br>dB | Deg.<br>( ° ) | Height<br>(cm) | Remark |
|-----|------------------|-------------------|-------------------------|-----------------------------|------------------|-----------------|--------------|---------------|----------------|--------|
| 1   | 1260.00          | 27.31             | 26.95                   | /                           | 54.26            | 74.00           | -19.74       | 45            | 100            | Peak   |
|     | 1260.00          | /                 | /                       | -9.21                       | 45.05            | 75.62           | -30.57       | /             | /              | Ave    |
| 2   | 1575.00          | 27.64             | 27.77                   | /                           | 55.41            | 74.00           | -18.59       | 310           | 100            | Peak   |
|     | 1575.00          | /                 | /                       | -9.21                       | 46.2             | 75.62           | -29.42       | /             | /              | Ave    |

|                |        |           |          |
|----------------|--------|-----------|----------|
| Test Frequency | 315MHz | Polarity: | Vertical |
|----------------|--------|-----------|----------|



| No. | Frequency<br>MHz | Reading<br>dBuV/m | Corr.<br>Factor(<br>dB) | Dutycycle<br>Factor<br>(dB) | Result<br>dBuV/m | Limit<br>dBuV/m | Margin<br>(dB) | Deg.<br>( ° ) | Height<br>(cm) | Remark |
|-----|------------------|-------------------|-------------------------|-----------------------------|------------------|-----------------|----------------|---------------|----------------|--------|
| 1   | 315              | 79.37             | -9.4                    | /                           | 69.87            | 95.62           | -25.72         | 261           | 100            | peak   |
|     | 315              | /                 | /                       | -9.21                       | 60.66            | 75.62           | -14.96         | /             | /              | Ave    |
| 2   | 630              | 57.44             | -1.29                   | /                           | 56.15            | 75.62           | -19.47         | 183           | 100            | peak   |
|     | 630              | /                 | /                       | -9.21                       | 46.94            | 55.62           | -8.68          | /             | /              | Ave    |
| 3   | 945              | 51.02             | -3.72                   | /                           | 47.3             | 75.62           | -28.32         | 225           | 100            | peak   |
|     | 945              | /                 | /                       | -9.21                       | 38.09            | 55.62           | -17.53         | /             | /              | Ave    |

#### Above 1GHz

| No. | Frequency<br>MHz | Reading<br>dBuV/m | Corr.<br>Factor<br>(dB) | Dutycycle<br>Factor<br>(dB) | Result<br>dBuV/m | Limit<br>dBuV/m | Margin<br>dB | Deg.<br>( ° ) | Height<br>(cm) | Remark |
|-----|------------------|-------------------|-------------------------|-----------------------------|------------------|-----------------|--------------|---------------|----------------|--------|
| 1   | 1260.00          | 27.54             | 26.95                   | /                           | 54.49            | 74              | -19.51       | 45            | 100            | Peak   |
|     | 1260.00          | /                 | /                       | -9.21                       | 45.28            | 75.62           | -30.34       | /             | /              | Ave    |
| 2   | 1575.00          | 27.3              | 27.77                   | /                           | 55.07            | 74              | -18.93       | 273           | 100            | Peak   |
|     | 1575.00          | /                 | /                       | -9.21                       | 45.86            | 55.62           | -9.76        | /             | /              | Ave    |

## 6. 20dB Bandwidth

---

### 6.1 Standard Applicable

According to FCC Part 15.231(c), The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier.

### 6.1 Test Procedure

With the EUT's antenna attached, the EUT's 20dB Bandwidth power was received by the test antenna, which was connected to the spectrum analyzer with the START, and STOP frequencies set to the EUT's operation band.

### 6.2 Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 21° C     |
| Relative Humidity: | 52%       |
| ATM Pressure:      | 1011 mbar |

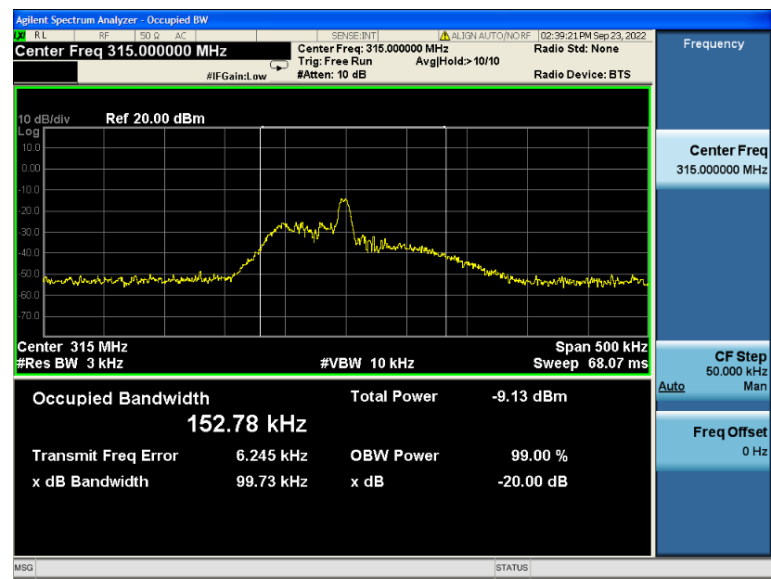
### 6.3 Summary of Test Results/Plots

| Test Frequency<br>MHz | 20dB Bandwidth<br>kHz | Limit<br>kHz | Result |
|-----------------------|-----------------------|--------------|--------|
| 315                   | 99.73                 | 787.50       | Pass   |

Limit = Fundamental Frequency X 0.25% = 315 MHz X 0.25% = 787.5 kHz

*Please refer to the attached plots.*

20dB Bandwidth Test Plot



## 7. Transmission Time

---

### 7.1 Standard Applicable

According to FCC Part 15.231 (a), the transmitter shall be complied the following requirements:

- 1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.
- (2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.
- (3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

### 7.2 Test Procedure

With the EUT's antenna attached, the EUT's output signal was received by the test antenna, which was connected to the spectrum analyzer. Set the center frequency to 433.92MHz, than set the spectrum analyzer to Zero Span for the release time reading. During the testing, the switch was released then the EUT automatically deactivated.

### 7.3 Environmental Conditions

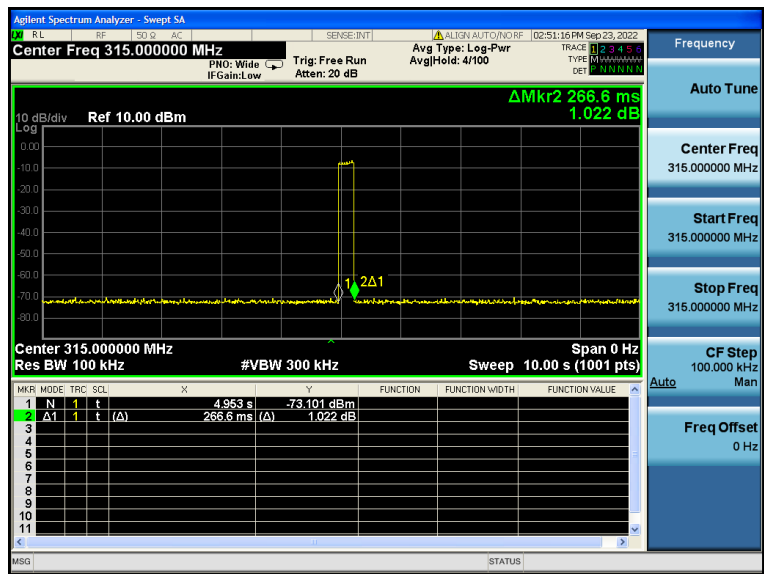
|                    |           |
|--------------------|-----------|
| Temperature:       | 20° C     |
| Relative Humidity: | 52%       |
| ATM Pressure:      | 1011 mbar |

### 7.4 Summary of Test Results/Plots

| Transmission Type | Test Frequency<br>MHz | Transmission Time<br>seconds | Limit<br>s | Result |
|-------------------|-----------------------|------------------------------|------------|--------|
| Manually          | 315                   | 0.2666                       | 5          | Pass   |

*Please refer to the attached plots.*

Transmission Time



## 8. Duty Cycle

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### 8.1 Standard Applicable

According to FCC Part 15.231 (b)(2) and 15.35 (c), For pulse operation transmitter, the averaging pulsed emissions are calculated by peak value of measured emission plus duty cycle factor.

### 8.2 Test Procedure

With the EUT's antenna attached, the EUT's output signal was received by the test antenna, which was connected to the spectrum analyzer. Set the center frequency to 433.92MHz, than set the spectrum analyzer to Zero Span for the release time reading. During the testing, the switch was released then the EUT automatically deactivated.

### 8.3 Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 20° C     |
| Relative Humidity: | 52%       |
| ATM Pressure:      | 1011 mbar |

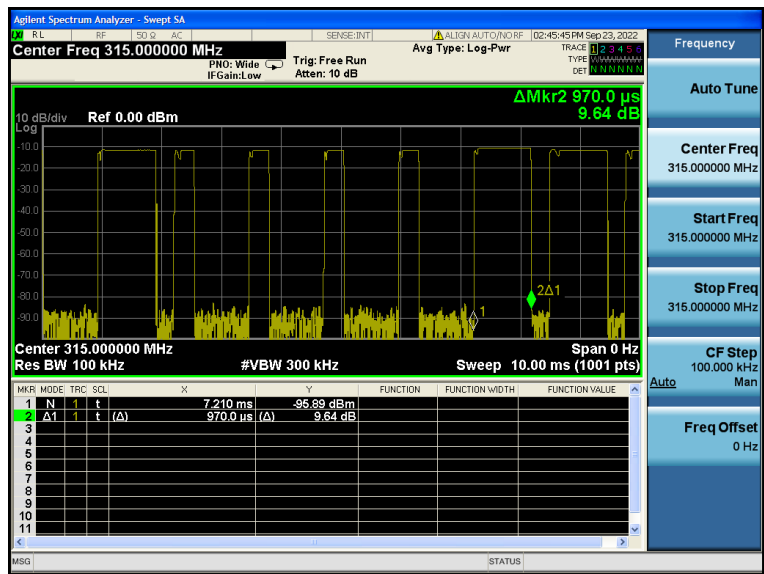
### 8.4 Summary of Test Results/Plots

| Type of Pulse    | Width of Pulse<br>ms | Quantity of Pulse | Transmission Time<br>ms | Total Time (T <sub>on</sub> )<br>ms |
|------------------|----------------------|-------------------|-------------------------|-------------------------------------|
| Pulse 1 (Wide)   | 0.97                 | 8                 | 7.76                    | 13.88                               |
| Pulse 2 (Narrow) | 0.36                 | 17                | 6.12                    |                                     |

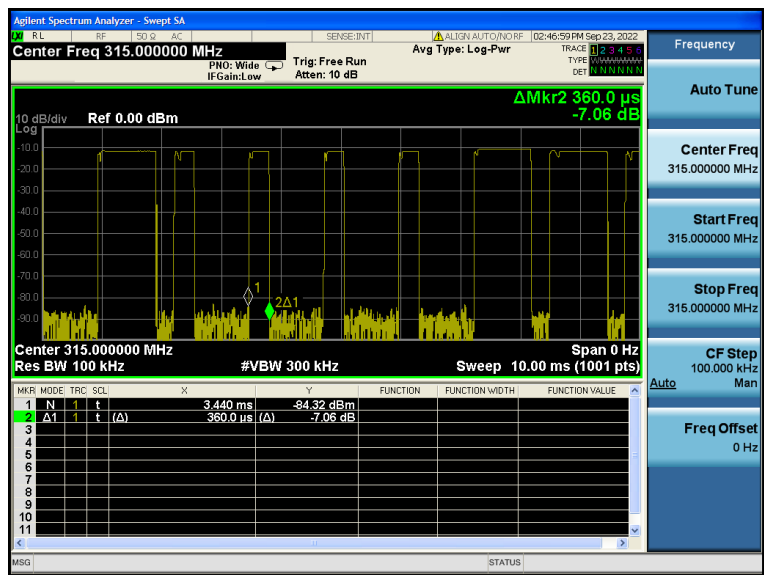
| Test Period (T <sub>p</sub> )<br>ms | Total Time (T <sub>on</sub> )<br>ms | Duty Cycle<br>% | Duty Cycle Factor<br>dB |
|-------------------------------------|-------------------------------------|-----------------|-------------------------|
| 40.08                               | 13.88                               | 34.63           | -9.21                   |

*Please refer to the attached test plots*

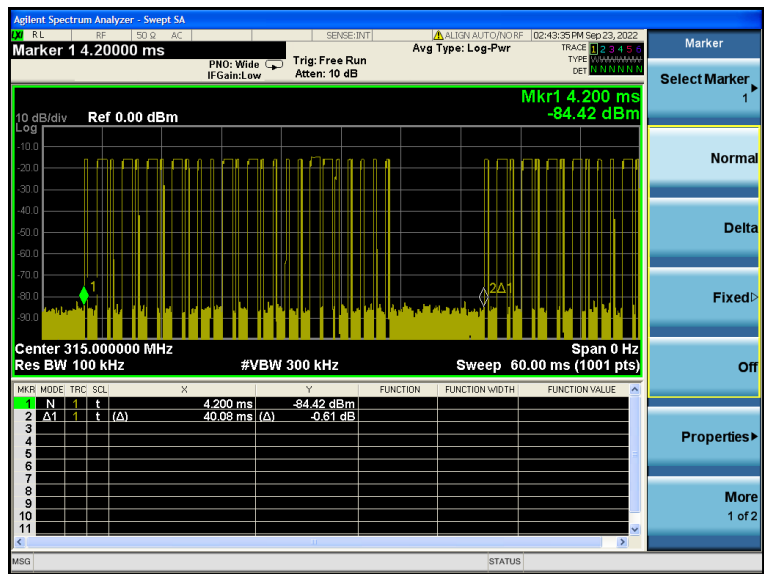
Width of Pulse 1



Width of Pulse 2



Test Period time and Quantity of Pulse



\*\*\*\*\* END OF REPORT \*\*\*\*\*