

# FCC RADIO TEST REPORT

Applicant..... : Vornado Air LLC  
Address..... : 415 East 13th Street, Andover KS, USA  
Manufacturer..... : NINGBO HOMSTAR ELECTRICAL CO., LTD.  
Address..... : Dawan Village, Shengshan Town, Cixi, Zhejiang, P. R. China  
Factory..... : NINGBO HOMSTAR ELECTRICAL CO., LTD.  
Address..... : Dawan Village, Shengshan Town, Cixi, Zhejiang, P. R. China  
Product Name..... : Remote Control  
Brand Name..... : VORNADO  
Model No. .... : AXL  
FCC ID..... : WOT-AXL  
Measurement Standard..... : 47 CFR FCC Part 15, Subpart C (Section 15.231)  
Receipt Date of Samples..... : November 03, 2023  
Date of Tested..... : November 03, 2023 to November 20, 2023  
Date of Report..... : November 23, 2023

This report shows that above equipment is technically compliant with the requirements of the standards above. All test results in this report apply only to the tested sample(s). Without prior written approval of Dongguan Nore Testing Center Co., Ltd, this report shall not be reproduced except in full.



Prepared by

Rose Hu / Project Engineer



Iori Fan / Project Signatory

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**Revision History**

| Report Number  | Description   | Issued Date |
|----------------|---------------|-------------|
| NTC2311051FV00 | Initial Issue | 2023-11-23  |
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## 1. Summary of Test Result

| FCC Rules           | Description of Test              | Result                        | Remarks |
|---------------------|----------------------------------|-------------------------------|---------|
| §15.207 (a)         | AC Power Line Conducted Emission | N/A <small>see note 2</small> | ---     |
| §15.231(b) & 15.209 | Radiated Spurious Emission       | PASS                          | ---     |
| §15.231(c)          | 20 dB Occupied bandwidth         | PASS                          | ---     |
| §15.231(a)          | Transmission time                | PASS                          | ---     |
| §15.203             | Antenna Requirement              | PASS                          | ---     |

Note: 1. The EUT has been tested as an independent unit. And continual transmitting in maximum power (New batteries were used during test)

2. AC Power Conducted Emission is not applicable due to the EUT only can be powered by battery.

## 2. General Description of EUT

| Product Information     |  |
|-------------------------|--|
| Product Name:           | Remote Control   |
| Main Model Name:        | AXL  |
| Additional Model Name:  | N/A  |
| Model Difference:       | N/A  |
| S/N:                    | JZY-RF04J  |
| Brand Name:             | VORNADO  |
| Hardware Version:       | JZY-RF04J  |
| Software Version:       | JZY-RF04J-WL116FC-001_V2.0-4EE0BC  |
| Rating:                 | DC 3V from CR2032 battery  |
| Classification:         | Class B  |
| Typical arrangement:    | Table-top  |
| I/O Port:               | Refer to the user manual   |
| Accessories Information |  |
| Adapter:                | N/A  |
| Cable:                  | N/A  |
| Other:                  | N/A  |
| Additional Information  |  |
| Note:                   | N/A  |
| Remark:                 | All the information above are provided by the manufacturer. More detailed feature of the EUT please refers to the user manual. |

| Technical Specification  |                                  |
|--------------------------|----------------------------------|
| Declaring the Frequency: | 433.913MHz                       |
| Modulation Type:         | ASK                              |
| Antenna Type:            | PCB antenna                      |
| Antenna Gain:            | 0 dBi (Declared by manufacturer) |
| Number of Channels:      | 1                                |

### 3. Test Channels and Modes Detail

| Mode |    | Test Frequency (MHz) | Modulation | Data Rate (Mbps) |
|------|----|----------------------|------------|------------------|
| 1    | TX | 433.913MHz           | ASK        | ---              |

Note: TX mode means that the EUT was programmed to be in continuously transmitting mode.

### 4. Configuration of EUT

**TX Mode**

EUT

### 5. Modification of EUT

No modifications are made to the EUT during all test items.

### 6. Description of Support Device

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| No. | Equipment | Brand | M/N | S/N | Cable Specification | Remarks |
|-----|-----------|-------|-----|-----|---------------------|---------|
| --- | ---       | ---   | --- | --- | ---                 | ---     |

## 7. Test Facility and Location

|                                   |   |  |
|-----------------------------------|---|--|
| Test Site                         | : | Dongguan Nore Testing Center Co., Ltd. (Dongguan NTC Co., Ltd.)  |
| Accreditations and Authorizations | : | <p>The Laboratory has been assessed and proved to be in compliance with CNAS/CL01<br/>Listed by CNAS, August 13, 2018<br/>The Certificate Registration Number is L5795.<br/>The Certificate is valid until August 13, 2024</p> <p>The Laboratory has been assessed and proved to be in compliance with ISO17025<br/>Listed by A2LA, November 01, 2017<br/>The Certificate Registration Number is 4429.01</p> <p>Listed by FCC, November 06, 2017<br/>Test Firm Registration Number: 907417</p> <p>Listed by Industry Canada, June 08, 2017<br/>The Certificate Registration Number. Is 46405-9743A</p> |
| Test Site Location                | : | Building D, Gaosheng Science and Technology Park, Hongtu Road, Nancheng District, Dongguan City, Guangdong Province, China   |



## 8. Applicable Standards and References

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

### Test Standards:

47 CFR Part 15, Subpart C, 15.231

ANSI C63.10-2013

### References Test Guidance:

N/A

## 9. Deviations and Abnormalities from Standard Conditions

No additions, deviations and exclusions from the standard.

## 10. Test Conditions

| No. | Test Item                   | Test Mode | Test Voltage | Tested by | Remarks    |
|-----|-----------------------------|-----------|--------------|-----------|------------|
| 1.  | AC Power Conducted Emission | ---       | ---          | ---       | ---        |
| 2.  | Radiated Emission           | 1         | DC 3V        | Sean      | See note 1 |
| 3.  | 20 dB Occupied bandwidth    | 1         | DC 3V        | Sean      | See note 1 |
| 4.  | Transmission time           | 1         | DC 3V        | Sean      | See note 1 |
| 5.  | Antenna Requirement         | ---       | ---          | ---       | ---        |

### Note:

- The testing climatic conditions for temperature, humidity, and atmospheric pressure are within: 15~35°C, 30~70%, 86~106kPa
- As the EUT can be operated multiple positions, all X,Y,Z axis were considered during the test and only the worst case X was recorded.

## 11. Measurement Uncertainty

| No. | Test Item              | Frequency      | Uncertainty | Remarks |
|-----|------------------------|----------------|-------------|---------|
| 1.  | Conducted Emission     | 150KHz ~ 30MHz | ±2.52 dB    | ---     |
| 2.  | Radiated Emission Test | 9kHz ~ 30MHz   | ±5.66 dB    | ---     |
|     |                        | 30MHz ~ 1GHz   | ±5.66 dB    | ---     |
|     |                        | 1GHz ~ 18GHz   | ±5.19 dB    | ---     |
|     |                        | 18GHz ~ 40GHz  | ±5.19 dB    | ---     |

**Note:**

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The measurement uncertainty levels above are estimated and calculated according to CISPR 16-4-2.
3. The conformity assessment statement in this report is based solely on the test results, measurement uncertainty is excluded.

## 12. Sample Calculations

| Conducted Emission |                      |                     |                    |              |           |          |
|--------------------|----------------------|---------------------|--------------------|--------------|-----------|----------|
| Freq. (MHz)        | Reading Level (dBuV) | Correct Factor (dB) | Measurement (dBuV) | Limit (dBuV) | Over (dB) | Detector |
| 0.1900             | 30.10                | 10.60               | 40.70              | 79.00        | -38.30    | QP       |

Where,

Freq. = Emission frequency in MHz

Reading Level = Spectrum Analyzer/Receiver Reading

Corrector Factor = Insertion loss of LISN + Cable Loss + RF Switching Unit attenuation

Measurement = Reading + Corrector Factor

Limit = Limit stated in standard

Margin = Measurement - Limit

Detector = Reading for Quasi-Peak / Average / Peak

| Radiated Spurious Emissions |                      |                       |                      |                |           |          |
|-----------------------------|----------------------|-----------------------|----------------------|----------------|-----------|----------|
| Freq. (MHz)                 | Reading Level (dBuV) | Correct Factor (dB/m) | Measurement (dBuV/m) | Limit (dBuV/m) | Over (dB) | Detector |
| 633.3400                    | 6.82                 | 27.73                 | 34.55                | 46.00          | -11.45    | QP       |

Where,

Freq. = Emission frequency in MHz

Reading Level = Spectrum Analyzer/Receiver Reading

Corrector Factor = Antenna Factor + Cable Loss - Pre-amplifier

Measurement = Reading + Corrector Factor

Limit = Limit stated in standard

Over = Margin, which calculated by Measurement - Limit

Detector = Reading for Quasi-Peak / Average / Peak

Note: For all conducted test items, the spectrum analyzer offset or transducer is derived from RF cable loss and attenuator factor. The offset or transducer is equal to the RF cable loss plus attenuator factor.

### 13. Duty Cycle

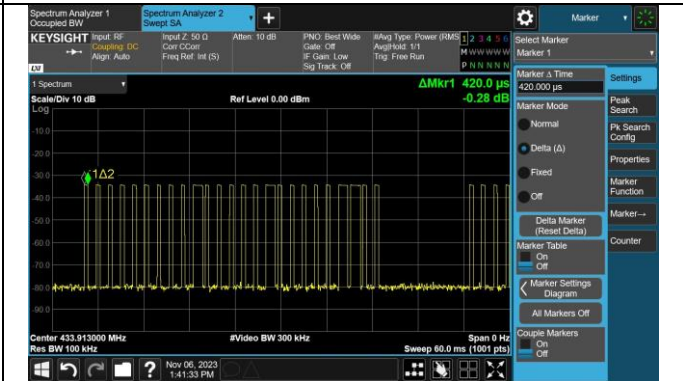
| Frequency MHz | TP time (ms) | Ton time (Total) (ms) | Duty cycle | AV Factor |
|---------------|--------------|-----------------------|------------|-----------|
| 433.913       | 50.52        | 13.62                 | 26.95%     | -11.38    |

Test Photo

TP time



Ton 1 time



Ton 2 time



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Note: Duty Cycle = (Total Ton time / TP time ) x 100%

Total Ton time = Ton 1 x n1 + Ton 2 x n2 + ...+ Ton n x n = 0.42\*21 + 1.2\*4=13.62ms

AV Factor = 20log(Duty Cycle).

## 14. Test Items and Results

### 14.1 Conducted Emissions Measurement

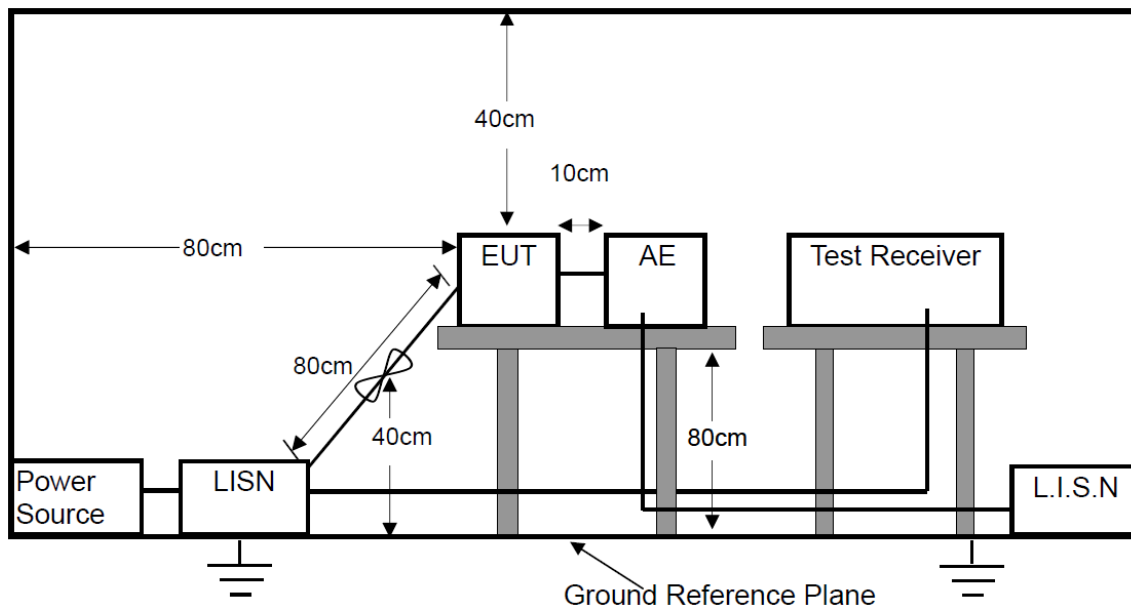
#### LIMIT

According to the requirements of FCC PART 15.207, the limits are as follows:

| Frequency (MHz) | Quasi-peak | Average  |
|-----------------|------------|----------|
| 0.15 to 0.5     | 66 to 56   | 56 to 46 |
| 0.5 to 5        | 56         | 46       |
| 5 to 30         | 60         | 50       |

- Note:
1. If the limits for the average detector are met when using the quasi-peak detector, then the limits for the measurements with the average detector are considered to be met.
  2. The lower limit shall apply at the transition frequencies.
  3. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5MHz.

#### BLOCK DIAGRAM OF TEST SETUP



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## TEST PROCEDURES

- a. The EUT was placed on a wooden table 0.8m height from the metal ground plan and 0.4m from the conducting wall of the shielding room and it was kept at 0.8m from any other grounded conducting surface.
- b. All I/O cables and support devices were positioned as per ANSI C63.10.
- c. Connect mains power port of the EUT to a line impedance stabilization network (LISN).
- d. Connect all support devices to the other LISN and AAN, if needed.
- e. Scan the frequency range from 150KHz to 30MHz at both sides of AC line for maximum conducted interference checking and record the test data.

## TEST RESULTS

Not Applicable.

## 14.2 Radiated Spurious Emissions Measurement

### LIMIT

| Frequency range<br>MHz | Distance Meters | Field Strengths Limit (15.209) |
|------------------------|-----------------|--------------------------------|
|                        |                 | $\mu\text{V/m}$                |
| 0.009 ~ 0.490          | 300             | 2400/F(kHz)                    |
| 0.490 ~ 1.705          | 30              | 24000/F(kHz)                   |
| 1.705 ~ 30             | 30              | 30                             |
| 30 ~ 88                | 3               | 100                            |
| 88 ~ 216               | 3               | 150                            |
| 216 ~ 960              | 3               | 200                            |
| Above 960              | 3               | 500                            |

- Remark: (1) Emission level  $(\text{dB})\mu\text{V} = 20 \log \text{Emission level } \mu\text{V/m}$
- (2) The smaller limit shall apply at the cross point between two frequency bands.
- (3) As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
- (4) The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.
- (5) §15.247(d) specifies that emissions which fall in the restricted bands, as defined in §15.205 comply with radiated emission limits specified in §15.209.

According to 15.231(b), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

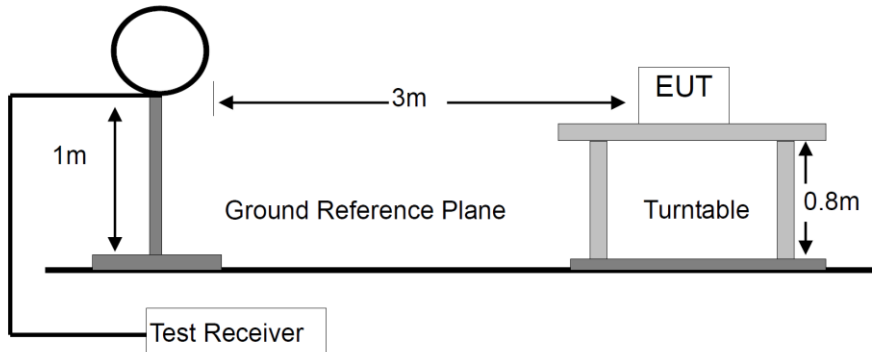
| Fundamental frequency (MHz) | Field strength of fundamental (microvolts/ meter) | spurious emissions (microvolts/meter) |
|-----------------------------|---|---------------------------------------|
| 40.66 - 40.70               | 2250  | 225                                   |
| 70 - 130                    | 1250  | 125                                   |
| 130 - 174                   | 1250 to 3750*                                     | 125 to 375*                           |
| 174 - 260                   | 3750  | 375                                   |
| 260 - 470                   | 3750 to 12500*                                    | 375 to 1250*                          |
| Above 470                   | 12500   | 1250                                  |

Remark: (1) \* Linear interpolations  
 (2) Emission level (dB) $\mu$ V = 20 log Emission level  $\mu$ V/m.  
 (3) The smaller limit shall apply at the cross point between two frequency bands.

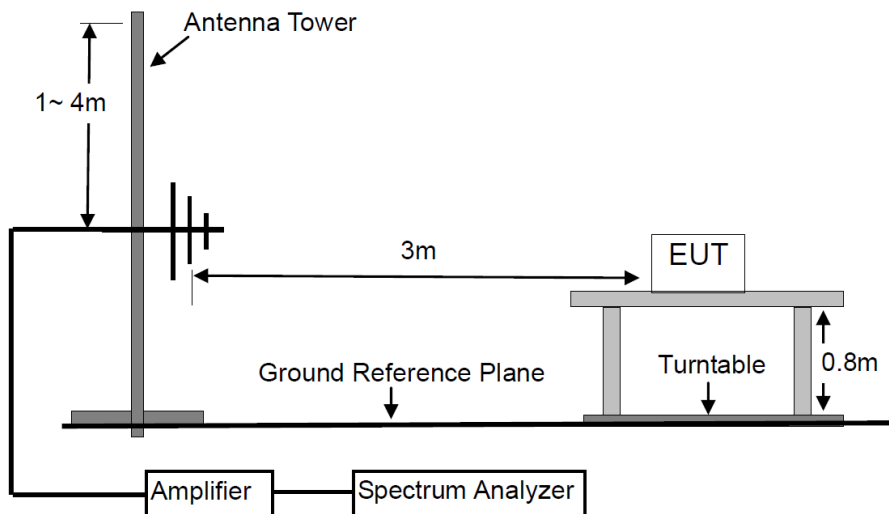


## BLOCK DIAGRAM OF TEST SETUP

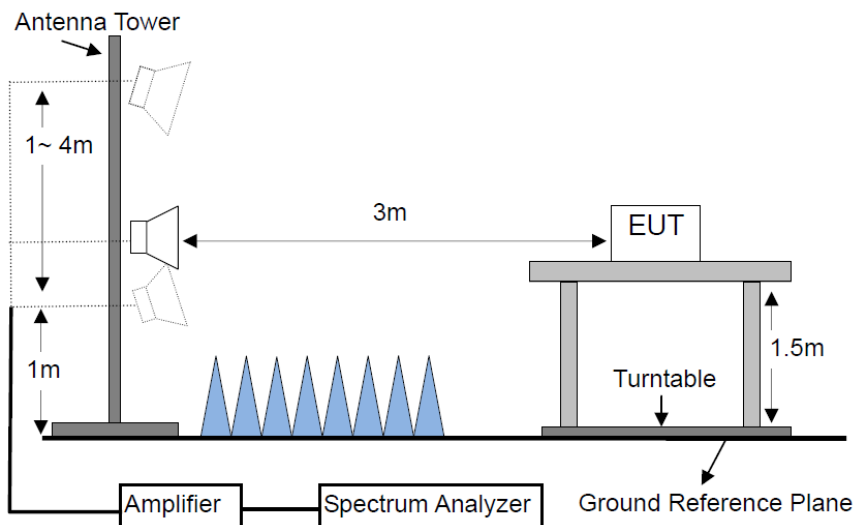
For Radiated Emission below 30MHz



For Radiated Emission 30-1000MHz



For Radiated Emission Above 1000MHz.



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## TEST PROCEDURES

- a. Below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi- anechoic chamber room.
- b. For the radiated emission test above 1GHz:

The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter full anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
- c. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to peak detect function and specified bandwidth with maximum hold mode.
- f. A Quasi-peak measurement was then made for that frequency point for below 1GHz test. PK and AV for above 1GHz emission test.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

| Frequency Band (MHz) | Detector | Resolution Bandwidth | Video Bandwidth |
|----------------------|----------|----------------------|-----------------|
| 30 to 1000           | QP       | 120 kHz              | 300 kHz         |
| Above 1000           | Peak     | 1 MHz                | 3 MHz           |
|                      | Average  | 1 MHz                | 10 Hz           |

## TEST RESULTS

PASS

Please refer to the following pages.

AVG = Peak + AV Factor,

where Peak is the measurement peak level, and AV Factor is calculated by duty cycle, details see section 13 of the report.

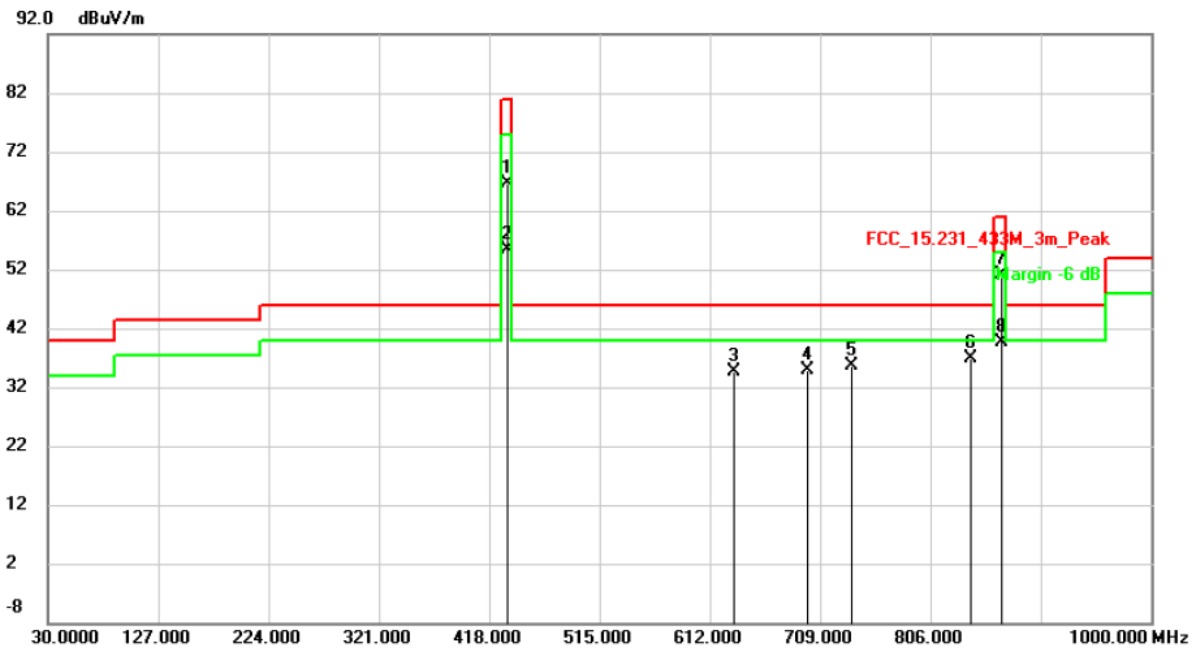
Sample calculation, Peak=66.71dBuV/m, AV Factor= -11.38dB, then AVG=66.71+(-11.38)=55.33dBuV/m.

|                          |                        |
|--------------------------|------------------------|
| M/N: AXL                 | Testing Voltage: DC 3V |
| Polarization: Horizontal | Detector: QP           |
| Test Mode: TX            | Distance: 3m           |

## Radiated Emission Measurement

Date: 2023/11/6

Time: 19:01:12



| No. | Mk. | Freq.    | Reading Level | Correct Factor | Measurement | Limit  | Over   | Detector | Comment |
|-----|-----|----------|---------------|----------------|-------------|--------|--------|----------|---------|
|     |     | MHz      | dBuV          | dB/m           | dBuV/m      | dBuV/m | dB     |          |         |
| 1   |     | 433.9130 | 42.49         | 24.22          | 66.71       |        |        | peak     |         |
| 2   |     | 433.9130 |               |                | 55.33       | 80.80  | -25.47 | AVG      |         |
| 3   |     | 633.3400 | 6.82          | 27.73          | 34.55       | 46.00  | -11.45 | QP       |         |
| 4   |     | 697.3600 | 6.03          | 28.87          | 34.90       | 46.00  | -11.10 | QP       |         |
| 5   |     | 737.1300 | 6.27          | 29.46          | 35.73       | 46.00  | -10.27 | QP       |         |
| 6   | *   | 841.8900 | 5.75          | 31.13          | 36.88       | 46.00  | -9.12  | QP       |         |
| 7   |     | 867.8260 | 19.57         | 31.50          | 51.07       |        |        | peak     |         |
| 8   |     | 867.8260 |               |                | 39.69       | 60.80  | -21.11 | AVG      |         |

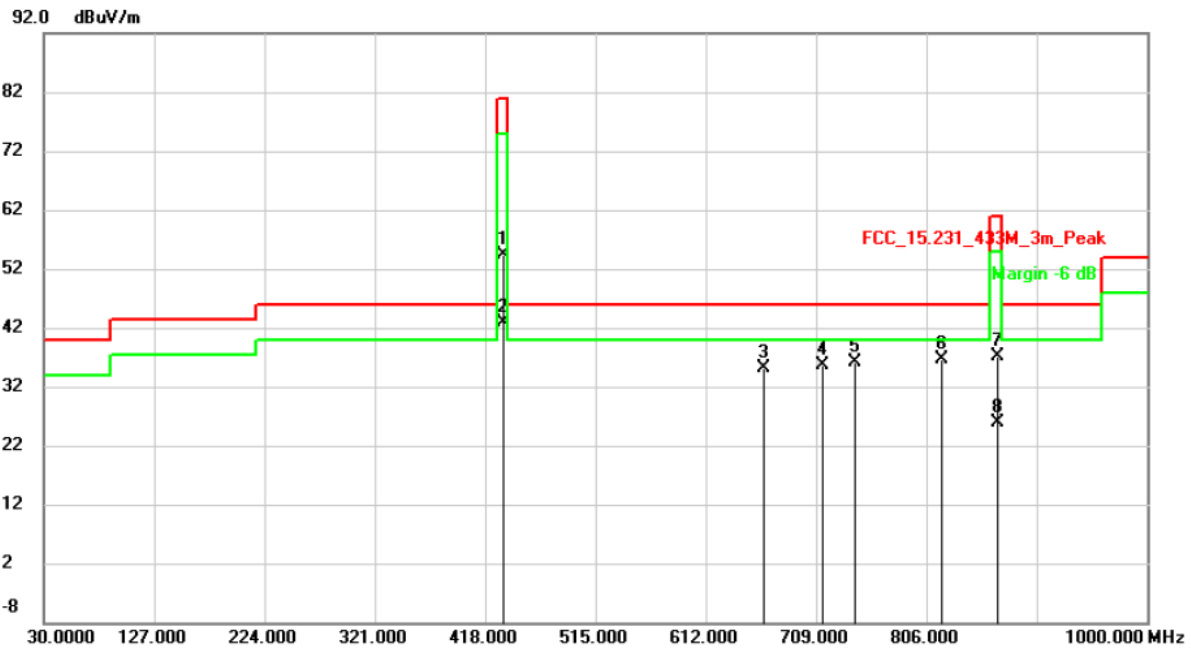
**Note: Below 30MHz, the emissions are lower than 20dB below the allowable limit.**

|                        |                        |
|------------------------|------------------------|
| M/N: AXL               | Testing Voltage: DC 3V |
| Polarization: Vertical | Detector: QP           |
| Test Mode: TX          | Distance: 3m           |

## Radiated Emission Measurement

Date: 2023/11/6

Time: 19:08:07



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB/m | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Over<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|---------------------------|----------------------------|-----------------|------------|----------|---------|
| 1   |     | 433.9130     | 31.16                    | 23.22                     | 54.38                      |                 |            | peak     |         |
| 2   |     | 433.9130     |                          |                           | 43.00                      | 80.80           | -37.80     | AVG      |         |
| 3   |     | 663.4099     | 6.79                     | 28.23                     | 35.02                      | 46.00           | -10.98     | QP       |         |
| 4   |     | 714.8200     | 6.39                     | 29.16                     | 35.55                      | 46.00           | -10.45     | QP       |         |
| 5   |     | 742.9500     | 6.48                     | 29.54                     | 36.02                      | 46.00           | -9.98      | QP       |         |
| 6   | *   | 819.5800     | 5.87                     | 30.71                     | 36.58                      | 46.00           | -9.42      | QP       |         |
| 7   |     | 867.8260     | 5.72                     | 31.50                     | 37.22                      |                 |            | peak     |         |
| 8   |     | 867.8260     |                          |                           | 25.84                      | 60.80           | -34.96     | AVG      |         |

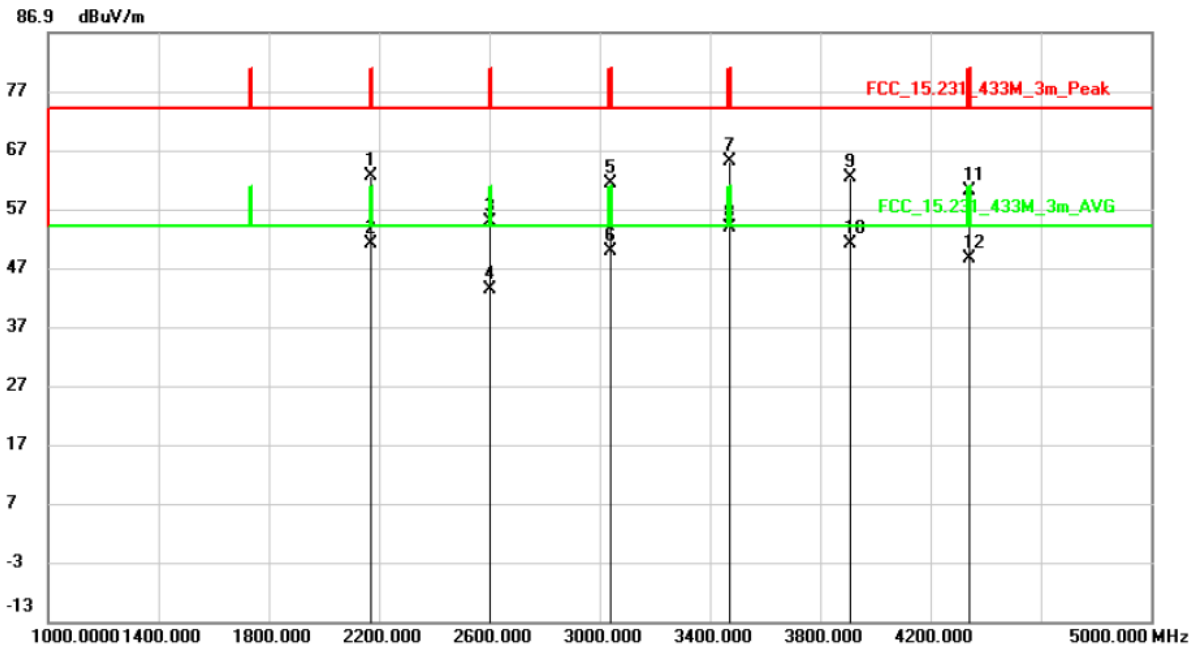
**Note: Below 30MHz, the emissions are lower than 20dB below the allowable limit.**

|                          |                        |
|--------------------------|------------------------|
| M/N: AXL                 | Testing Voltage: DC 3V |
| Polarization: Horizontal | Detector: Peak & AVG   |
| Test Mode: TX            | Distance: 3m           |

## Radiated Emission Measurement

Date: 2023/11/6

Time: 19:18:27



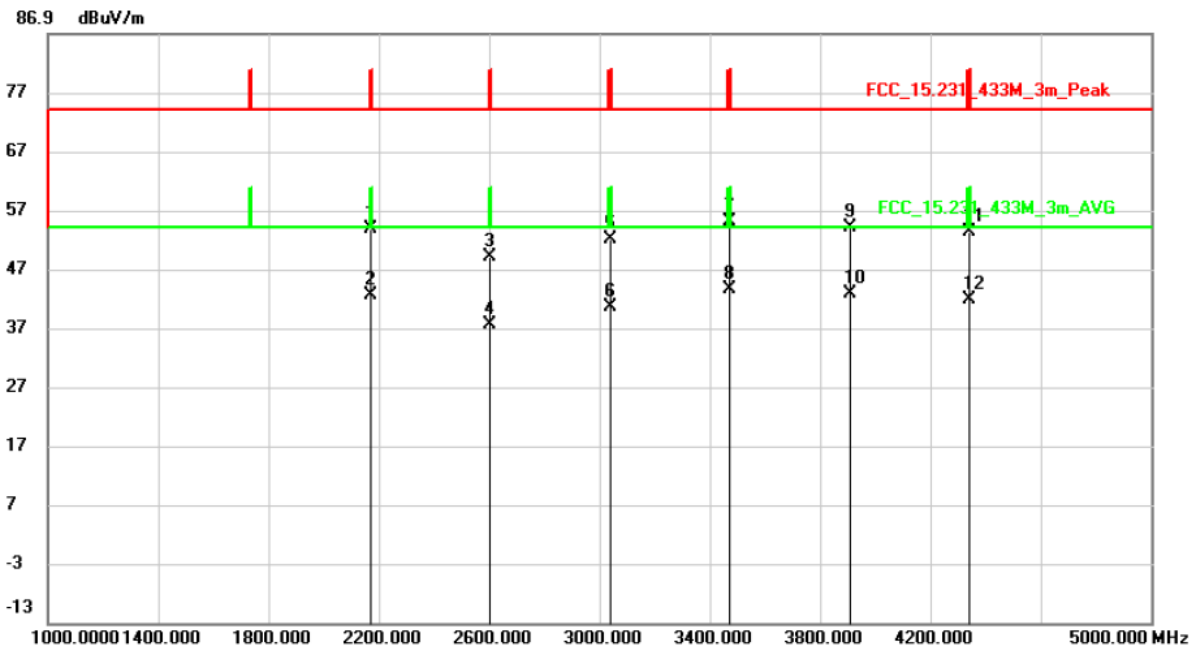
| No. | Mk. | Freq.    | Reading Level | Correct Factor | Measurement | Limit  | Over   | Detector | Comment |
|-----|-----|----------|---------------|----------------|-------------|--------|--------|----------|---------|
|     |     | MHz      | dBuV          | dB/m           | dBuV/m      | dBuV/m | dB     |          |         |
| 1   |     | 2169.565 | 62.95         | -0.47          | 62.48       |        |        | peak     |         |
| 2   |     | 2169.565 |               |                | 51.10       | 60.80  | -9.70  | AVG      |         |
| 3   |     | 2603.478 | 53.94         | 0.77           | 54.71       |        |        | peak     |         |
| 4   |     | 2603.478 |               |                | 43.33       | 60.80  | -17.47 | AVG      |         |
| 5   |     | 3037.391 | 59.39         | 1.85           | 61.24       |        |        | peak     |         |
| 6   |     | 3037.391 |               |                | 49.86       | 60.80  | -10.94 | AVG      |         |
| 7   |     | 3471.304 | 62.36         | 2.68           | 65.04       |        |        | peak     |         |
| 8   |     | 3471.304 |               |                | 53.66       | 60.80  | -7.14  | AVG      |         |
| 9   |     | 3905.217 | 58.54         | 3.75           | 62.29       |        |        | peak     |         |
| 10  | *   | 3905.217 |               |                | 50.91       | 54.00  | -3.09  | AVG      |         |
| 11  |     | 4339.130 | 55.26         | 4.75           | 60.01       |        |        | peak     |         |
| 12  |     | 4339.130 |               |                | 48.63       | 60.80  | -12.17 | AVG      |         |

|                        |                        |
|------------------------|------------------------|
| M/N: AXL               | Testing Voltage: DC 3V |
| Polarization: Vertical | Detector: Peak & AVG   |
| Test Mode: TX          | Distance: 3m           |

## Radiated Emission Measurement

Date: 2023/11/6

Time: 19:25:47



| No. | Mk. | Freq.    | Reading Level | Correct Factor | Measurement | Limit  | Over   | Detector | Comment |
|-----|-----|----------|---------------|----------------|-------------|--------|--------|----------|---------|
|     |     | MHz      | dBuV          | dB/m           | dBuV/m      | dBuV/m | dB     |          |         |
| 1   |     | 2169.565 | 54.29         | -0.47          | 53.82       |        |        | peak     |         |
| 2   |     | 2169.565 |               |                | 42.44       | 60.80  | -18.36 | AVG      |         |
| 3   |     | 2603.478 | 48.15         | 0.77           | 48.92       |        |        | peak     |         |
| 4   |     | 2603.478 |               |                | 37.54       | 60.80  | -23.26 | AVG      |         |
| 5   |     | 3037.391 | 50.18         | 1.85           | 52.03       |        |        | peak     |         |
| 6   |     | 3037.391 |               |                | 40.65       | 60.80  | -20.15 | AVG      |         |
| 7   |     | 3471.304 | 52.23         | 2.68           | 54.91       |        |        | peak     |         |
| 8   |     | 3471.304 |               |                | 43.53       | 60.80  | -17.27 | AVG      |         |
| 9   |     | 3905.217 | 50.35         | 3.75           | 54.10       |        |        | peak     |         |
| 10  | *   | 3905.217 |               |                | 42.72       | 54.00  | -11.28 | AVG      |         |
| 11  |     | 4339.130 | 48.49         | 4.75           | 53.24       |        |        | peak     |         |
| 12  |     | 4339.130 |               |                | 41.86       | 60.80  | -18.94 | AVG      |         |

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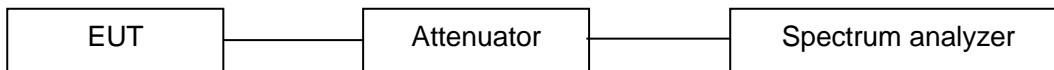
### 14.3 20dB Occupied Bandwidth

#### LIMIT

According to 15.231(C), the bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz.

Limit =  $433.913\text{MHz} \times 0.25\% = 1084.7825 \text{ KHz}$

#### BLOCK DIAGRAM OF TEST SETUP



#### TEST PROCEDURES

1. The output port (antenna) from the transmitter was connected to an attenuator and then to the input of the RF Spectrum analyzer.
2. Spectrum analyzer set the corresponding parameters for measurement and record the tested data



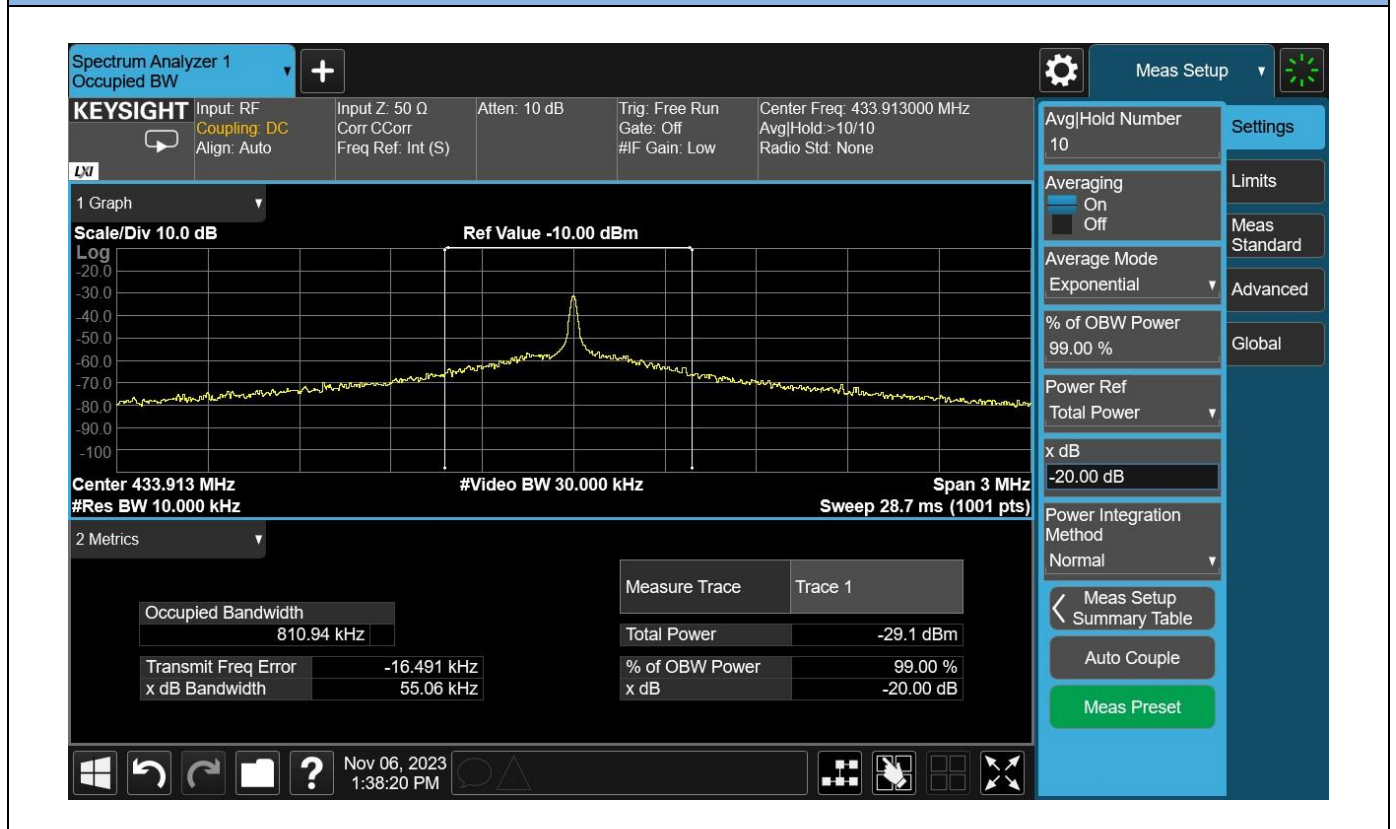
## TEST RESULTS

PASS

Please refer to the following table.

| Frequency (MHz) | 20 dB Bandwidth (KHz) | Limit (KHz) | Result |
|-----------------|-----------------------|-------------|--------|
| 433.913         | 55.06                 | 1084.7825   | PASS   |

### Test Photo



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## 14.4 Transmission time

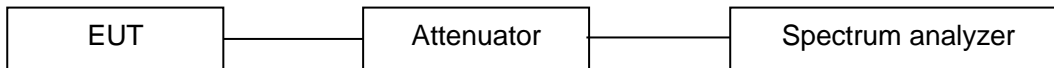
### LIMIT

15.231 (a) (1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

15.231(a) (2) A transmitter activated automatically shall cease transmission within 5seconds after activation.

15.231(e), under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of transmission but in no case less than 10 seconds.

### BLOCK DIAGRAM OF TEST SETUP



### TEST PROCEDURES

1. The output port (antenna) from the transmitter was connected to an attenuator and then to the input of the RF Spectrum analyzer.
2. Spectrum analyzer set the corresponding parameters for measurement and record the tested data.

### TEST RESULTS

PASS

Please refer to the following table.

| Frequency (MHz) | Transmission time (sec) | Limit (sec) | Result |
|-----------------|-------------------------|-------------|--------|
| 433.913         | 0.3                     | <5          | PASS   |

Test Photo



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## 14.5 Antenna Requirement

### STANDARD APPLICABLE

According to of FCC part 15C section 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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

### ANTENNA CONNECTED CONSTRUCTION

The antenna is PCB antenna that no antenna other than furnished by the responsible party shall be used with the device, and the best case gain of the antenna is 0dBi, Therefore, the antenna is consider meet the requirement.

## 15. Test Equipment List

| Item | Equipment                      | Manufacturer                            | Model No.            | Serial No.        | Last Cal.     | Cal. Interval |
|------|--------------------------------|---|----------------------|-------------------|---------------|---------------|
| 1.   | Test Receiver                  | Rohde & Schwarz                         | ESCI7                | 100837            | Mar. 13, 2023 | 1 Year        |
| 2.   | Antenna                        | Schwarzbeck                             | VULB9162             | 9162-010          | Mar. 23, 2022 | 2 Year        |
| 3.   | Spectrum Analyzer              | Rohde & Schwarz                         | FSU26                | 200409/026        | Mar. 13, 2023 | 1 Year        |
| 4.   | Spectrum Analyzer              | Keysight                                | N9020A               | MY54200831        | Mar. 13, 2023 | 1 Year        |
| 5.   | Spectrum Analyzer              | Rohde & Schwarz                         | FSV40                | 101094            | Mar. 13, 2023 | 1 Year        |
| 6.   | Horn Antenna                   | Schwarzbeck                             | BBHA9170             | 9170-172          | Mar. 23, 2022 | 2 Year        |
| 7.   | Power Sensor                   | DARE                                    | RPR3006W             | 15I00041SNO<br>64 | Mar. 13, 2023 | 1 Year        |
| 8.   | Horn Antenna                   | COM-Power                               | AH-118               | 071078            | Mar. 23, 2022 | 2 Year        |
| 9.   | Pre-Amplifier                  | HP                                      | HP 8449B             | 3008A00964        | Mar. 13, 2023 | 1 Year        |
| 10.  | Pre-Amplifier                  | HP                                      | HP 8447D             | 1145A00203        | Mar. 13, 2023 | 1 Year        |
| 11.  | Loop Antenna                   | Schwarzbeck                             | FMZB 1513            | 1513-272          | Mar. 23, 2022 | 2 Year        |
| 12.  | Test Receiver                  | Rohde & Schwarz                         | ESCI                 | 101152            | Mar. 13, 2023 | 1 Year        |
| 13.  | L.I.S.N                        | Rohde & Schwarz                         | ENV 216              | 101317            | Mar. 13, 2023 | 1 Year        |
| 14.  | RF Switching Unit              | Compliance<br>Direction Systems<br>Inc. | RSU-M2               | 38311             | Mar.13, 2023  | 1 Year        |
| 15.  | Temporary antenna<br>connector | TESCOM                                  | SS402                | N/A               | N/A           | N/A           |
| 16.  | Test Software                  | EZ                                      | EZ_EMCC<br>NTC-3A1.1 | N/A               | N/A           | N/A           |

Note: For photographs of EUT and measurement, please refer to appendix in separate documents.

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