# TEST REPORT

| | |
|---|---|
| Product Name: | Mini Badger(Running Badger) |
| FCC ID: | 2A49Z-MINIBADGER |
| Trademark: | Arrowy Racing |
| Model Number: | Mini Badger |
| Prepared For: | Nanjing Arrowy Racing Technology Co., Ltd. |
| Address: | Room 3322, floor 3, Cuiping scientific innovation park, No. 37, Jiangjun Avenue, Jiangning District, Nanjing, China |
| Manufacturer: | Jiaxing Suyu Technology Co., LTD |
| Address: | Room 402, 4 / F, Building 5, No.988, Xinxing 2nd Road, Pinghu Economic and Technological Development Zone, Jiaxing City, Zhejiang Province, China |
| Prepared By: | Shenzhen CTB Testing Technology Co., Ltd. |
| Address: | 1&2/F., Building A, No.26, Xinhe Road, Xinqiao, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, China |
| Sample Received Date: | Mar. 04, 2024 |
| Sample tested Date: | Mar. 04, 2024 to Mar. 15, 2024 |
| Issue Date: | Mar. 15, 2024 |
| Report No.: | CTB240314013RFX |
| Test Standards | FCC Part15.231<br>ANSI C63.10:2013 |
| Test Results | PASS |
| Remark: | This is 433MHz radio test report. |

| Compiled by: | Reviewed by: | Approved by: |
|---|---|---|
| Zhou Kui | Arron Liu | Bin Mei / Director |

The test report is effective only with both signature and specialized stamp. This result(s) shown in this report r
Note: If there is any objection to the inspection results in this report, please submit a written report to the company within 15 days from the date of receiving the report. The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen CTB Testing Technology Co., Ltd. this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client. "*" indicates the testing items were fulfilled by subcontracted lab. "#" indicates the items are not in CNAS accreditation scope.

**TABLE OF CONTENT**



*(Note: N/A means not applicable)*

## 1. VERSION

| Report No. | Issue Date | Description | Approved |
|---|---|---|---|
| CTB240314013RFX | Mar. 15, 2024 | Original | Valid |

## 2. TEST SUMMARY

The Product has been tested according to the following specifications:

| Test Item | Test Requirement | Test method | Result |
|---|---|---|---|
| **AC Power Line Conducted Emission** | 47 CFR Part 15 Subpart C Section 15.207 | ANSI C63.10-2013 | N/A |
| **Radiated Emission** | 47 CFR Part 15 Subpart C Section 15.209; 15.231(b) | ANSI C63.10-2013 | PASS |
| **Dwell Time** | 47 CFR Part 15 Subpart C Section 15.231 (a) | ANSI C63.10-2013 | PASS |
| **Occupied Bandwidth** | 47 CFR Part 15 Subpart C Section 15.231(c) | ANSI C63.10-2013 | PASS |
| **Antenna requirement** | 47 CFR Part 15 Subpart C Section 15.203 | ANSI C63.10-2013 | PASS |

## 3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

| Item | Uncertainty |
|---|---|
| Occupancy bandwidth | U=±54.3Hz |
| Conducted output power Above 1G | U=±1.0dB |
| Conducted output power below 1G | U=±0.9dB |
| Power Spectral Density , Conduction | U=±1.0dB |
| Conduction spurious emissions | U=±2.8dB |
| Out of band emission | U=±54Hz |
| 3m camber Radiated spurious emission(30MHz-1GHz) | U=±4.3dB |
| 3m chamber Radiated spurious emission(1GHz-18GHz) | U=±4.5dB |
| humidity uncertainty | U=±5.3% |
| Temperature uncertainty | U=±0.59℃ |
| Supply voltages | U=±3% |
| Time | U=±5% |

## 4. PRODUCT INFORMATION AND TEST SETUP

### 4.1 Product Information

| | |
|---|---|
| Model(s): | Mini Badger |
| Model Description: | N/A |
| Hardware Version: | V1.0 |
| Software Version: | V1.0 |
| Operation Frequency: | 433.834MHz |
| Type of Modulation: | FSK |
| Antenna installation: | Internal antenna |
| Antenna Gain: | 1.0dBi |
| Ratings: | DC 6V Battery |

### 4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

### 4.3 Support Equipment

| No. | Device Type | Brand | Model | Series No. | Data Cable | Power Cord |
|---|---|---|---|---|---|---|
| 1. | --- | --- | --- | --- | --- | -- |

***Notes:***

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

## 4.4 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

| Test mode |
| --- |
| Keep the EUT in transmitting mode with modulation. |

## 4.5 Test Environment

| | |
| --- | --- |
| Humidity(%): | 54 |
| Atmospheric Pressure(kPa): | 101 |
| Normal Voltage(DC): | 48V |
| Normal Temperature(℃) | 23 |

## 5. TEST FACILITY AND TEST INSTRUMENT USED

### 5.1 Test Facility

All measurement facilities used to collect the measurement data are located at 1&2F., Building A, No. 26, Xinhe Road, Xinqiao, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

### 5.2 Test Instrument Used

| Item | Equipment | Manufacturer | Type No. | Serial No. | Calibrated until |
|---|---|---|---|---|---|
| 1 | Spectrum Analyzer | Agilent | N9020A | MY52090073 | 2024.07.05 |
| 2 | Power Sensor | Agilent | U2021XA | MY56120032 | 2024.07.05 |
| 3 | Power Sensor | Agilent | U2021XA | MY56120034 | 2024.07.05 |
| 4 | Communication test set | R&S | CMW500 | 108058 | 2024.07.05 |
| 5 | Spectrum Analyzer | KEYSIGHT | N9020A | MY51289897 | 2024.07.05 |
| 6 | Signal Generator | Agilent | N5181A | MY50140365 | 2024.07.05 |
| 7 | Vector signal generator | Agilent | N5182A | MY47420195 | 2024.07.05 |
| 8 | Communication test set | Agilent | E5515C | MY50102567 | 2024.07.06 |
| 9 | 2.4 GHz Filter | Shenxiang | MSF2400-2483.5MS-1154 | 20181015001 | 2024.07.05 |
| 10 | 5 GHz Filter | Shenxiang | MSF5150-5850 MS-1155 | 20181015001 | 2024.07.06 |
| 11 | Filter | Xingbo | XBLBQ-DZA120 | 190821-1-1 | 2024.07.06 |
| 12 | BT&WI-FI Automatic test software | Micowave | MTS8000 | Ver. 2.0.0.0 | / |
| 13 | Rohde & Schwarz SFU Broadcast Test System | R&S | SFU | 101017 | 2024.10.30 |
| 14 | Temperature humidity chamber | Hongjing | TH-80CH | DG-15174 | 2024.07.05 |
| 15 | 234G Automatic test software | Micowave | MTS8200 | Ver. 2.0.0.0 | / |
| 16 | 966 chamber | C.R.T. | 966 | / | 2024.08.11 |
| 17 | Receiver | R&S | ESPI | 100362 | 2024.07.05 |
| 18 | Amplifier | HP | 8447E | 2945A02747 | 2024.07.05 |
| 19 | Amplifier | Agilent | 8449B | 3008A01838 | 2024.07.05 |
| 20 | TRILOG Broadband Antenna | Schwarzbeck | VULB 9168 | 00869 | 2024.07.08 |

| | | | | | |
|---|---|---|---|---|---|
| 21 | Double Ridged Broadband Horn Antenna | Schwarzbeck | BBHA9120D | 01911 | 2024.07.08 |
| 22 | EMI test software | Fala | EZ-EMC | FA-03A2 RE | / |
| 23 | Loop Antenna | Schwarzbeck | FMZB 1519B | 1519B-224 | 2024.07.08 |
| 24 | loop antenna | ZHINAN | ZN30900A | GTS534 | / |
| 25 | 40G Horn antenna | A/H/System | SAS-574 | 588 | 2024.10.30 |
| 26 | Amplifier | AEROFLEX | Aeroflex | 097 | 2024.07.05 |

**Continuous disturbance**

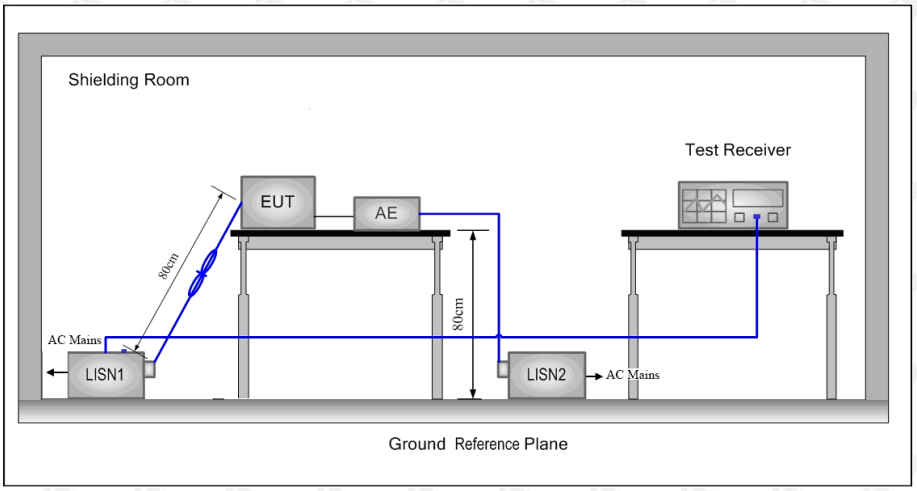
| No. | Equipment | Manufacturer | Model No. | Serial No. | Calibrated until |
|---|---|---|---|---|---|
| 1 | LISN | ROHDE&SCHWARZ | ESH3-Z5 | 100318 | 2024.07.05 |
| 2 | Pulse limiter | ROHDE&SCHWARZ | ESH3Z2 | 357881052 | 2024.07.05 |
| 3 | EMI TEST RECEIVER | ROHDE&SCHWARZ | ESCI | 100428/003 | 2024.07.05 |
| 4 | Coaxial cable | ZDECL | Z302S-NJ-SMA J-12M | 18091905 | 2024.07.05 |
| 5 | ISN | Schwarzbeck | NTFM8158 | 183 | 2024.07.05 |
| 6 | Communication test set | Agilent | E5515C | MY50102567 | 2024.07.05 |
| 7 | Communication test set | R&S | CMW500 | 108058 | 2024.07.05 |
| 8 | EZ-EMC | Frad | EMC-con3A1.1 | / | / |

**Radiated emission**

| No. | Equipment | Manufacturer | Model No. | Serial No. | Calibrated until |
|---|---|---|---|---|---|
| 1 | Double Ridged Broadband Horn Antenna | Schwarzbeck | BBHA 9120 D | 01911 | 2024.07.08 |
| 2 | TRILOG Broadband Antenna | Schwarzbeck | VULB 9168 | 00869 | 2024.07.08 |
| 3 | Amplifier | Agilent | 8449B | 3008A01838 | 2024.07.05 |
| 4 | Amplifier | HP | 8447E | 2945A02747 | 2024.07.05 |
| 5 | EMI TEST RECEIVER | ROHDE&SCHWARZ | ESCI | 100428/003 | 2024.07.05 |
| 6 | Coaxial cable | ETS | RFC-SNS-100-NMS-80 NI | / | 2024.07.05 |
| 7 | Coaxial cable | ETS | RFC-SNS-100-NMS-20 NI | / | 2024.07.05 |
| 8 | Coaxial cable | ETS | RFC-SNS-100-SMS-20 NI | / | 2024.07.05 |
| 9 | Coaxial cable | ETS | RFC-NNS-100 -NMS-300 NI | / | 2024.07.05 |
| 10 | Communication test set | Agilent | E5515C | MY50102567 | 2024.07.05 |
| 11 | Communication test set | R&S | CMW500 | 108058 | 2024.07.05 |
| 12 | EZ-EMC | Frad | EMC-con3A1.1 | / | / |

## 6. AC POWER LINE CONDUCTED EMISSION

### 6.1 Block Diagram Of Test Setup




### 6.2 Limit

| Frequency (MHz) | Maximum RF Line Voltage (dBμV) | | | |
|---|---|---|---|---|
| | CLASS A | | CLASS B | |
| | Q.P. | Ave. | Q.P. | Ave. |
| 0.15 - 0.50 | 79 | 66 | 66-56* | 56-46* |
| 0.50 - 5.00 | 73 | 60 | 56 | 46 |
| 5.00 - 30.0 | 73 | 60 | 60 | 50 |

* Decreasing linearly with the logarithm of the frequency

### 6.3 Test procedure

1) The mains terminal disturbance voltage test was conducted in a shielded room.

2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,

4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0,4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0,8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0,8 m from the LISN 2.

5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

6.4 Test Result

N/A

NOTE: This EUT is powered by DC power only, this test item is not applicable.

## 7. RADIATED EMISSION

### 7.1 Block Diagram Of Test Setup

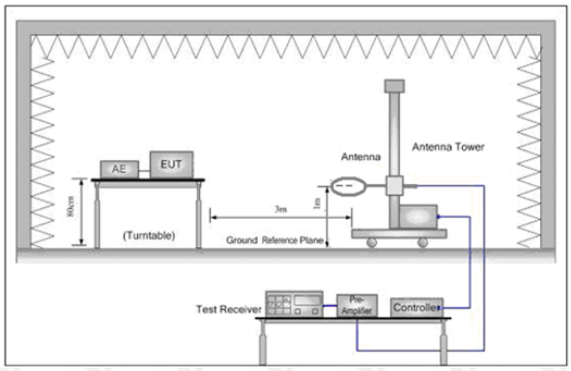



Figure 1. Below 30MHz

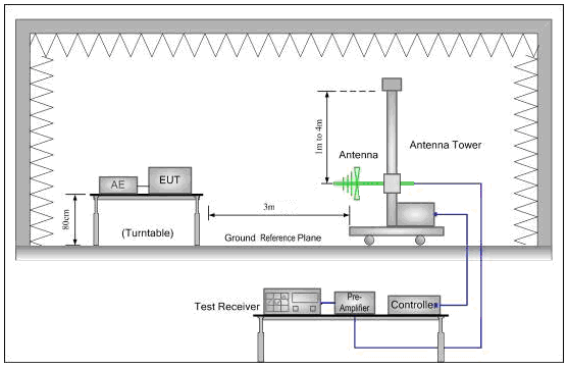



Figure 2. 30MHz to 1GHz

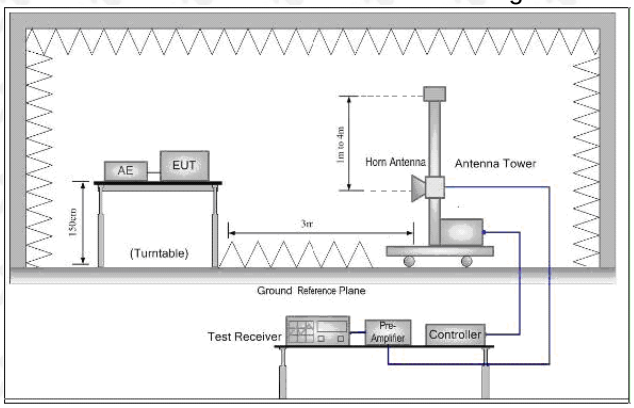



Figure 3. Above 1GHz

### 7.2 Limit

Spurious Emissions:

| Frequency | Field strength (dBμV/m) | Remark | Measurement distance (m) |
|---|---|---|---|
| 0.009MHz-0.490MHz | 20log 2400/F (kHz) + 80 | - | 3 |
| 0.490MHz-1.705MHz | 20log 24000/F (kHz) + 40 | - | 3 |
| 1.705MHz-30MHz | 20log 30 + 40 | - | 3 |
| 30MHz-88MHz | 40.0 | Quasi-peak | 3 |
| 88MHz-216MHz | 43.5 | Quasi-peak | 3 |
| 216MHz-960MHz | 46.0 | Quasi-peak | 3 |
| 960MHz-1GHz | 54.0 | Quasi-peak | 3 |
| Above 1GHz | 54.0 | Average | 3 |

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

**Field Strength of Fundamental Limit:**

| Fundamental and harmonics emission limits Frequency(MHz) | Field strength of Fundamental((microvolts/meter) | Field strength of spurious emissions(microvolts/meter) |
|---|---|---|
| 40.66-40.70 | 2280 | 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 |

** linear interpolations

[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, μV/m at 3 meters = 56.81818(F) - 6136.3636; for the band 260-470 MHz, μV/m at 3 meters = 41.6667(F) - 7083.3333. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

| Frequency | Limit (dBμV/m @3m) | Remark |
|---|---|---|
| 433.834MHz | 80.8 | Average Value |
| | 100.8 | Peak Value |

7.3 Test procedure

**Below 1GHz test procedure as below:**

a.The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.

b.The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c.The antenna height 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.

d.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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rota table table was turned from 0 degrees to 360 degrees to find the maximum reading.

e.The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f.If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

**Above 1GHz test procedure as below:**

g.Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter( Above 18GHz the distance is 1 meter and table is 1.5 meter).

h.Test the EUT in the lowest channel ,the middle channel ,the Highest channel

j.Repeat above procedures until all frequencies measured was complete.

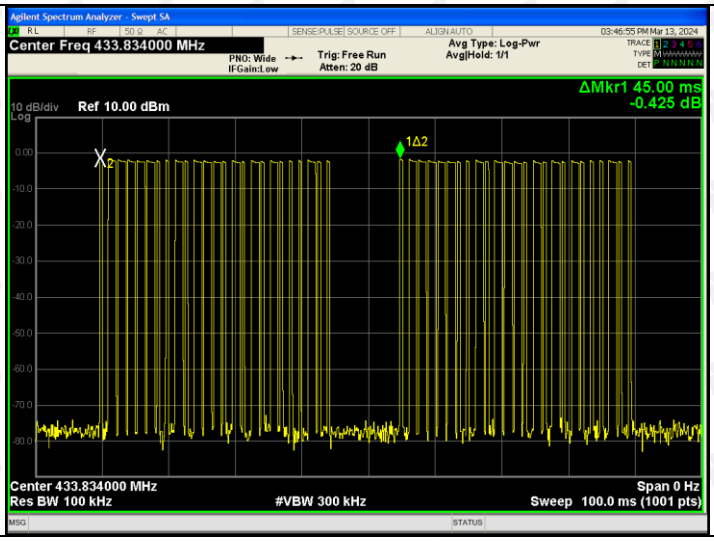
Receiver set:

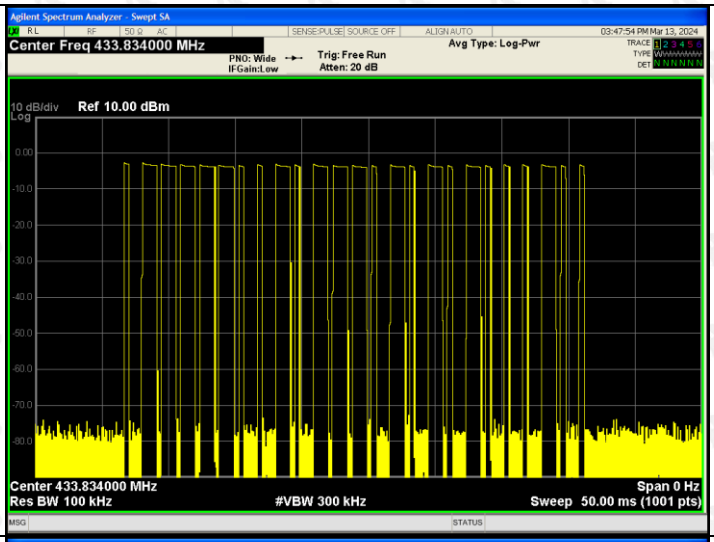
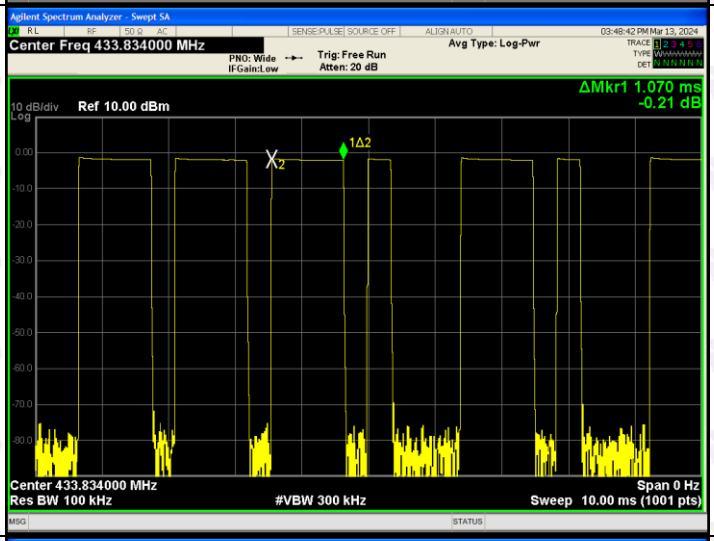
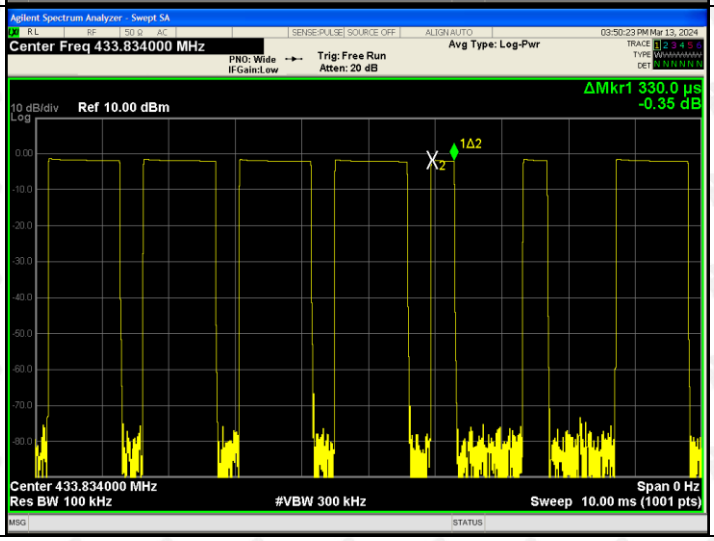
| Frequency | Detector | RBW | VBW | Remark |
|---|---|---|---|---|
| 0.009MHz-0.090MHz | Peak | 10kHz | 30KHz | Peak |
| 0.009MHz-0.090MHz | Average | 10kHz | 30KHz | Average |
| 0.090MHz-0.110MHz | Quasi-peak | 10kHz | 30KHz | Quasi-peak |
| 0.110MHz-0.490MHz | Peak | 10kHz | 30KHz | Peak |
| 0.110MHz-0.490MHz | Average | 10kHz | 30KHz | Average |
| 0.490MHz -30MHz | Quasi-peak | 10kHz | 30kHz | Quasi-peak |
| 30MHz-1GHz | Quasi-peak | 100 kHz | 300KHz | Quasi-peak |
| Above 1GHz | Peak | 1MHz | 3MHz | Peak |
| | Peak | 1MHz | 10Hz | Average |

7.4 Test Result

**7.4.1 Calculation of average factor**

The output field strengths of specification in accordance with the FCC rules specify measurements with an average detector. During the test, a spectrum analyzer incorporating a peak detector was used. Therefore, a reduction factor can be applied to the resultant peak signal level and compared to the limit for measurement instrumentation incorporating an average detector.
The duty cycle is measured in 100 ms or the repetition cycle period, whichever is a shorter time frame. The duty cycle is measured by placing the spectrum analyzer to set zero span at 100kHz resolution bandwidth.

| | | | |
|---|---|---|---|
| **Cycle** | |  | |

| | | | |
|---|---|---|---|
| **Pulse** | |  | |
| **On-time1** | |  | |
| **On-time2** | |  | |

| **Average factor:** | |
|---|---|
| Calculate Formula: | Average value=Peak value + PDCF |
| | PDCF=20 log(Duty cycle) |
| | Duty cycle = T on time / T period |
| Calculated average factor: | Ton time = 1.07×13+0.33×12=17.87(ms); T period =45(ms) |
| | PDCF = 20 log(17.87/45)= -8.02dB |

### 7.4.2 Radiated Spurious Emission

**Frequency Range (9 kHz-30MHz)**

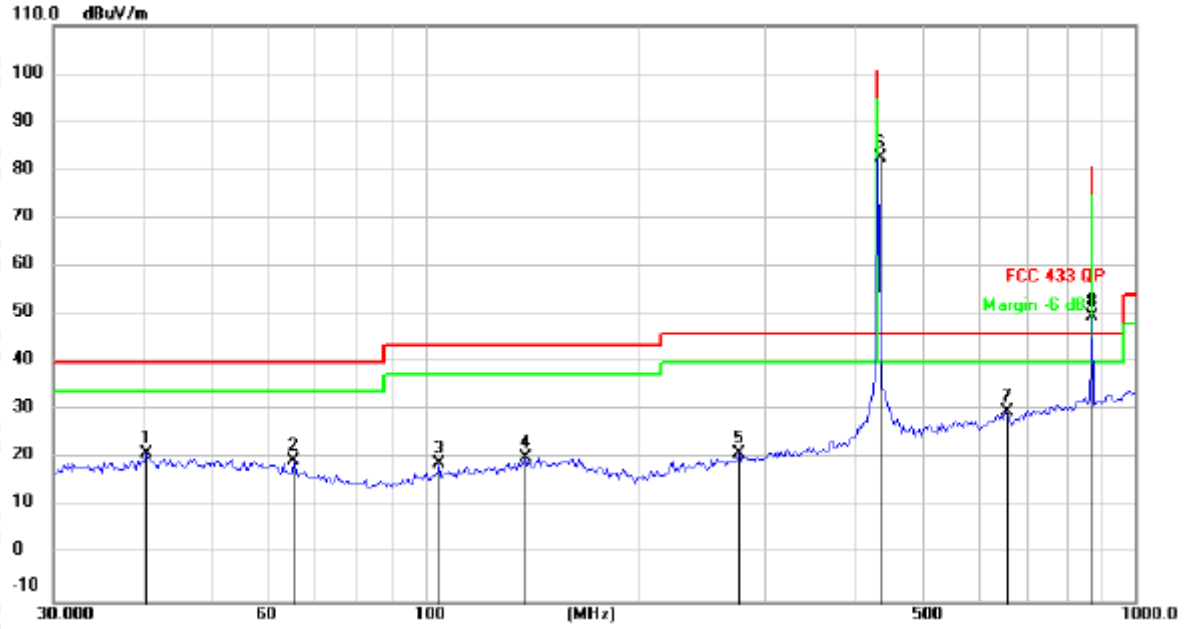
| Frequency (MHz) | Level@3m (dBμV/m) | Limit@3m (dBμV/m) |
|---|---|---|
| -- | -- | -- |
| -- | -- | -- |
| -- | -- | -- |
| -- | -- | -- |

***Note:*** *1. Emission Level=Reading+ Cable loss-Antenna factor-Amp factor*

*2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement*

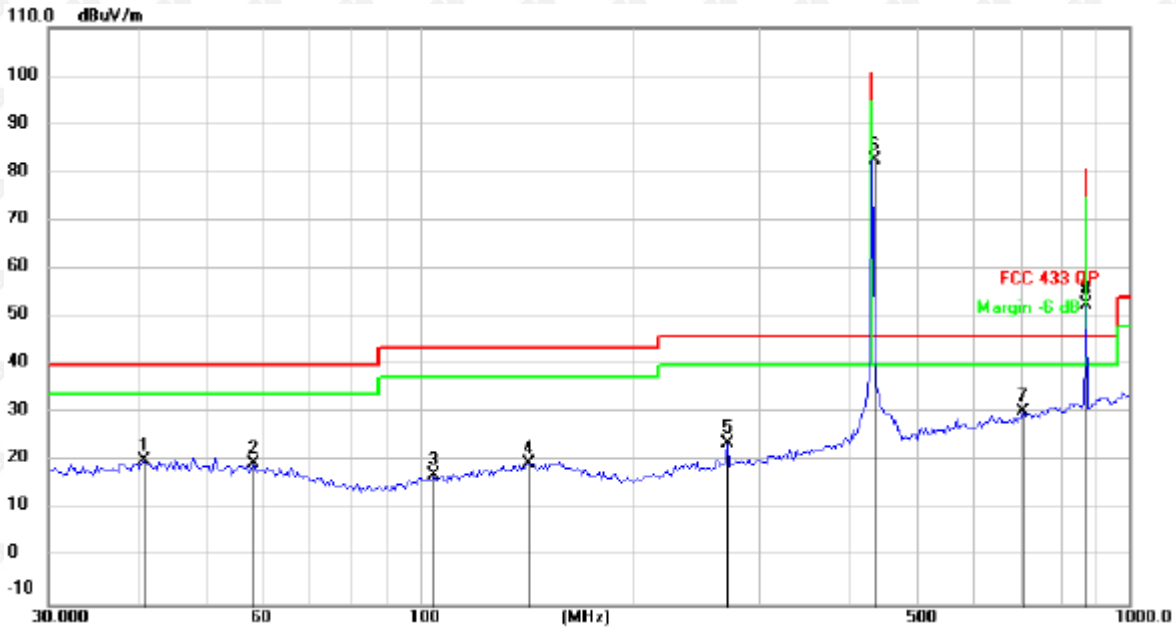
**About 30MHz-1GHz Test Results:**

Antenna polarity: H




| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|---|---|---|---|---|---|---|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 40.3988 | 25.48 | -5.6 | 19.88 | 40 | -20.12 | QP |
| 65.0035 | 24.88 | -6.18 | 18.70 | 40 | -21.30 | QP |
| 104.0779 | 27.24 | -8.88 | 18.36 | 43.5 | -25.14 | QP |
| 139.9507 | 27.13 | -7.72 | 19.41 | 43.5 | -24.09 | QP |
| 279.4927 | 26.25 | -6.7 | 19.55 | 46 | -26.45 | QP |
| 434.0687 | 86.00 | -4.73 | 81.27 | 100.8 | -19.53 | Peak |
| 656.8969 | 33.15 | -4.41 | 28.74 | 46 | -17.26 | QP |
| 869.1369 | 57.62 | -8.61 | 49.01 | 80.8 | -31.79 | Peak |

Antenna polarity: V




| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|---|---|---|---|---|---|---|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 41.7171 | 26.68 | -7.39 | 19.29 | 40 | -20.71 | QP |
| 59.5342 | 24.38 | -6.39 | 17.99 | 40 | -22.01 | QP |
| 104.5592 | 26.11 | -9.53 | 16.58 | 43.5 | -26.92 | QP |
| 143.6985 | 27.56 | -9.51 | 18.05 | 43.5 | -25.45 | QP |
| 271.0502 | 29.49 | -6.34 | 23.15 | 46 | -22.85 | QP |
| 434.0674 | 85.16 | -3.3 | 81.86 | 100.8 | -18.94 | Peak |
| 709.1832 | 31.72 | -2.34 | 29.38 | 46 | -16.62 | QP |
| 869.1315 | 57.50 | -5.52 | 51.98 | 80.8 | -28.82 | Peak |

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Limit – Level

For average Emission

| Frequency MHz | Peak Level dBuV/m | Duty cycle factor | AverageLevel dBuV/m | Limit AV | Margin | Polarization |
|---|---|---|---|---|---|---|
| 433.93 | 81.27 | -10.24 | 71.03 | 80.8 | -9.77 | Horizontal |
| 867.86 | 49.01 | -10.24 | 38.77 | 60.8 | -22.03 | Horizontal |
| 433.93 | 81.86 | -10.24 | 71.62 | 80.8 | -9.18 | Vertical |
| 867.86 | 51.98 | -10.24 | 41.74 | 60.8 | -19.06 | Vertical |

Notes: Average emission Level = Peak Level + Duty cycle factor

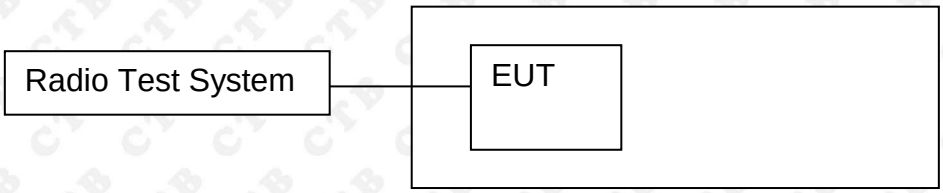
**Above 1GHz Test Results**

| Frequency MHz | Peak Level dBuV/m | Duty cycle factor | Average Level dBuV/m | Limit | | Margin dB | | Polarization |
|---|---|---|---|---|---|---|---|---|
| | | | | PK | AV | PK | AV | |
| 1301.71 | 50.73 | -10.24 | 40.49 | 80.8 | 60.8 | -30.07 | -20.31 | Vertical |
| 1735.26 | 48.75 | -10.24 | 38.51 | 80.8 | 60.8 | -32.05 | -22.29 | Vertical |
| 2603.56 | 43.23 | -10.24 | 32.99 | 80.8 | 60.8 | -37.57 | -27.81 | Vertical |
| 3037.43 | 43.25 | -10.24 | 33.01 | 80.8 | 60.8 | -37.55 | -27.79 | Vertical |
| 3471.35 | 40.06 | -10.24 | 29.82 | 80.8 | 60.8 | -40.74 | -30.98 | Vertical |
| 3905.24 | 40.44 | -10.24 | 30.20 | 80.8 | 60.8 | -40.36 | -30.60 | Vertical |
| 1301.71 | 50.52 | -10.24 | 40.28 | 80.8 | 60.8 | -30.28 | -20.52 | Horizontal |
| 1735.26 | 46.45 | -10.24 | 36.21 | 80.8 | 60.8 | -34.35 | -24.59 | Horizontal |
| 2603.56 | 42.08 | -10.24 | 31.84 | 80.8 | 60.8 | -38.72 | -28.96 | Horizontal |
| 3037.43 | 43.63 | -10.24 | 33.39 | 80.8 | 60.8 | -37.17 | -27.41 | Horizontal |
| 3471.35 | 41.44 | -10.24 | 31.20 | 80.8 | 60.8 | -39.36 | -29.60 | Horizontal |
| 3905.24 | 41.92 | -10.24 | 31.68 | 80.8 | 60.8 | -38.88 | -29.12 | Horizontal |

Notes: Average emission Level = Peak Level + Duty cycle factor

## 8. DWELL TIME

8.1 Block Diagram Of Test Setup




8.2 Limit

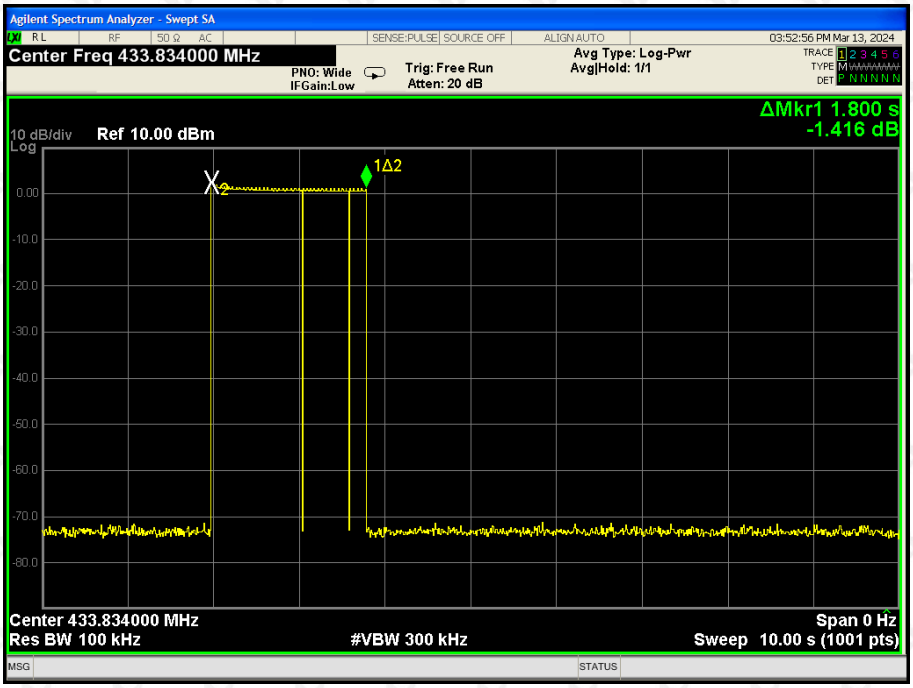
According to FCC 15.231(a) requirement:
A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

8.3 Test procedure

a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
b) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
c) Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
d) Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
e) Repeat above procedures until all measured frequencies were complete.

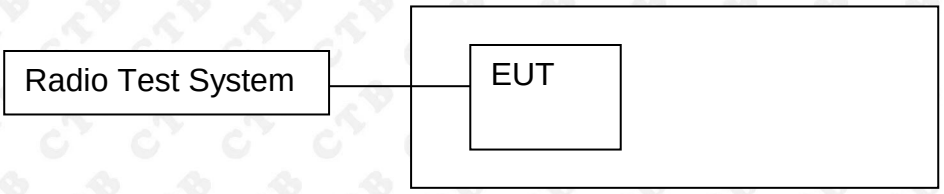
8.4 Test Result

| Transmitting time(S) | Limit (S) | Results |
|---|---|---|
| 1.8 | ≤5 | Pass |



## 9. OCCUPIED BANDWIDTH

9.1 Block Diagram Of Test Setup




9.2 Limit

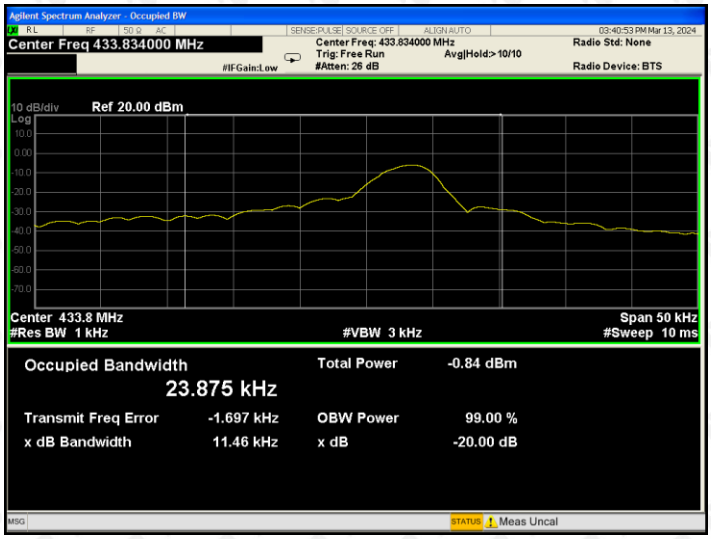
The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.
B.W (20dBc) Limit = 0.25% * f(MHz) = 0.25% * 433.92MHz = 1.0848MHz

9.3 Test procedure

1. Set RBW = 10 kHz.
2. Set the video bandwidth (VBW) ≥RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

9.4 Test Result

| 20dB bandwidth (kHz) | Limit (MHz) | Results |
|---|---|---|
| 11.46 | 1.0848 | Pass |



## 10. ANTENNA REQUIREMENT

15.203 requirement:
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.

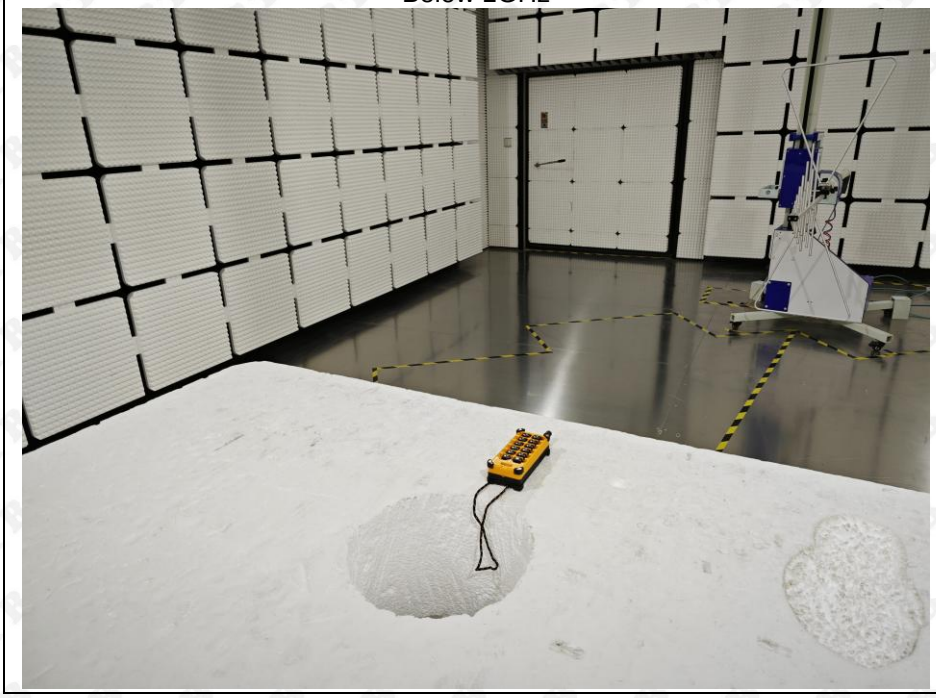
**EUT Antenna:**

The antenna is Internal Antenna and no consideration of replacement. The best case gain of the antenna is 1dBi.

## 11. EUT TEST SETUP PHOTOGRAPHS

Radiated Emission

Below 1GHz



Above 1GHz

**※※※※※ END OF REPORT ※※※※※**