# FCC Radio Test Report

## *FCC ID: 2ASGR-EC003N*

| | | |
|---|---|---|
| **Report No.** | : | TBR-C-202202-0086-5 |
| **Applicant** | : | Zhongshan Yihu Electronics Co.,ltd |
| **Equipment Under Test (EUT)** | | |
| **EUT Name** | : | Car alarm with Push start button kit |
| **Model No.** | : | EC003N |
| **Series Model No.** | : | EC003 series, EC003N series, EC009 series, EC010 series, EC211 series |
| **Brand Name** | : | EASYGUARD |
| **Sample ID** | : | 202202-0086_3-01 |
| **Receipt Date** | : | 2022-02-21 |
| **Test Date** | : | 2022-02-21 to 2022-03-07 |
| **Issue Date** | : | 2022-03-07 |
| **Standards** | : | FCC Part 15, Subpart C (15.231(a)) |
| **Test Method** | : | ANSI C63.10:2013 |
| **Conclusions** | : | **PASS** |

In the configuration tested, the EUT complied with the standards specified above,

The EUT technically complies with the FCC requirements

| | | | |
|---|---|---|---|
| **Test/Witness Engineer** | : | Camille Li | Camille Li |
| **Engineer Supervisor** | : | IVAN SU | IVAN SU |
| **Engineer Manager** | : | Ray Lai | Ray Lai |

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

TB-RF-074-1.0

# Contents

**CONTENTS** ..... 2
**1. GENERAL INFORMATION ABOUT EUT** ..... 5
1.1 Client Information ..... 5
1.2 General Description of EUT (Equipment Under Test) ..... 5
1.3 Block Diagram Showing the Configuration of System Tested ..... 6
1.4 Description of Support Units ..... 6
1.5 Description of Test Mode ..... 6
1.6 Description of Test Software Setting ..... 7
1.7 Measurement Uncertainty ..... 7
1.8 Test Facility ..... 8
**2. TEST SUMMARY** ..... 8
**3. TEST SOFTWARE** ..... 8
**4. TEST EQUIPMENT** ..... 9
**5. CONDUCTED EMISSION TEST** ..... 10
5.1 Test Standard and Limit ..... 10
5.2 Test Setup ..... 10
5.3 Test Procedure ..... 11
5.4 Deviation From Test Standard ..... 11
5.5 Test Data ..... 11
**6. RADIATED EMISSION TEST** ..... 12
6.1 Test Standard and Limit ..... 12
6.2 Test Setup ..... 13
6.3 Test Procedure ..... 15
6.4 Deviation From Test Standard ..... 15
6.5 EUT Operating Condition ..... 15
6.6 Test Data ..... 15
**7. BANDWIDTH** ..... 16
7.1 Test Standard and Limit ..... 16
7.2 Test Setup ..... 16
7.3 Test Procedure ..... 16
7.4 Deviation From Test Standard ..... 16
7.5 EUT Operating Condition ..... 16
7.6 Test Data ..... 16
**8. RELEASE TIME MEASUREMENT** ..... 17
8.1 Test Standard and Limit ..... 17
8.2 Test Setup ..... 17
8.3 Test Procedure ..... 17
8.4 Deviation From Test Standard ..... 17

8.5 EUT Operating Condition ..... 17
8.6 Test Data ..... 17
**9. DUTY CYCLE ..... 18**
9.1 Test Standard and Limit ..... 18
9.2 Test Setup ..... 18
9.3 Test Procedure ..... 18
9.4 Deviation From Test Standard ..... 18
9.5 EUT Operating Condition ..... 18
9.6 Test Data ..... 18
**10. ANTENNA REQUIREMENT ..... 19**
10.1 Standard Requirement ..... 19
10.1 Deviation From Test Standard ..... 19
10.2 Antenna Connected Construction ..... 19
**ATTACHMENT A-- RADIATED EMISSION TEST DATA ..... 20**
**ATTACHMENT C--BANDWIDTH DATA ..... 26**
**ATTACHMENT D-- RELEASE TIME MEASUREMENT DATA ..... 27**
**ATTACHMENT E--DUTY CYCLE DATA ..... 28**

# Revision History

| Report No. | Version | Description | Issued Date |
|---|---|---|---|
| TBR-C-202202-0086-5 | Rev.01 | Initial issue of report | 2022-03-07 |
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# 1. General Information about EUT

## 1.1 Client Information

| | | |
|---|---|---|
| **Applicant** | : | Zhongshan Yihu Electronics Co.,ltd |
| **Address** | : | Rm2008, 2nd floor, building 3, NO.77 Caihong Road, west district, Zhongshan City, Guangdong, China |
| **Manufacturer** | : | Zhongshan Yihu Electronics Co.,ltd |
| **Address** | : | Rm2008, 2nd floor, building 3, NO.77 Caihong Road, west district, Zhongshan City, Guangdong, China |

## 1.2 General Description of EUT (Equipment Under Test)

| | | | |
|---|---|---|---|
| **EUT Name** | : | Car alarm with Push start button kit | |
| **Model(s)** | : | EC003N, EC003 series, EC003N series, EC009 series, EC010 series, EC211 series | |
| **Model Difference** | : | All PCB boards and circuit diagrams are the same, the only difference is that appearance color. | |
| **Product Description** | : | Operation Frequency: | 433.92 MHz |
| | | Output Power: | 61.07 dBuV/m (PK Max.)<br>68.35 dBuV/m (AV Max.) |
| | | Antenna Type: | PCB Antenna |
| | | Antenna Gain: | 0dBi |
| | | Modulation Type: | OOK |
| **Power Rating** | : | TX: DC 3.0V by button cell | |
| **Software Version** | : | V1.0 | |
| **Hardware Version** | : | V1.0 | |
| **Remark** | : | The antenna gain provided by the applicant, the verified for the RF conduction test provided by TOBY test lab. | |

**Note:**

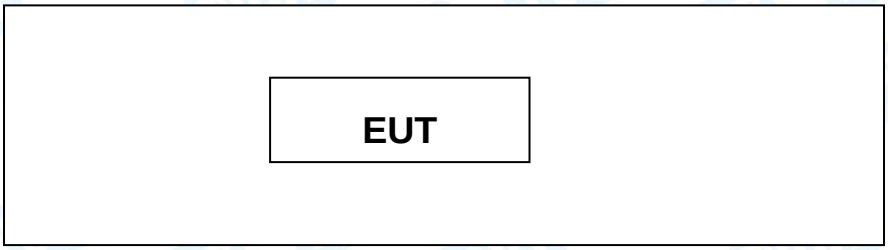
(1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

(2) Antenna description

| Brand | Model Name | Type | Antenna Gain(dBi) |
|---|---|---|---|
| N/A | N/A | PCB Ant. | 0 |

## 1.3 Block Diagram Showing the Configuration of System Tested

**TX Mode**




## 1.4 Description of Support Units

The EUT has been test as an independent unit.

## 1.5 Description of Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned follow was evaluated respectively.

| Test Items | Note |
|---|---|
| Conducted Emission | Continuously transmitting |
| Radiated Emission | Continuously transmitting |
| Bandwidth | Continuously transmitting |
| Duty Cycle | Continuously transmitting |
| Release Time | Normal Mode |

**Note:**

(1) During the testing procedure, the continuously transmitting mode was programmed by the customer.

(2) The EUT is considered a Mobile unit, and it was pre-tested on the positioned of each 3 axis: X axis, Y axis and Z axis. The worst case was found positioned on Z-plane. There for only the test data of this Z-plane were used for radiated emission measurement test.

## 1.6 Description of Test Software Setting

During testing channel& Power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of transmitting mode.

| | |
|---|---|
| **RF Power Setting in Test SW:** | DEF |

## 1.7 Measurement Uncertainty

The reported uncertainty of measurement y ± U，where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2，providing a level of confidence of approximately 95 %.

| **Test Item** | **Parameters** | **Expanded Uncertainty ($U_{Lab}$)** |
|---|---|---|
| Conducted Emission | Level Accuracy:<br>9kHz~150kHz<br>150kHz to 30MHz | ±3.50 dB<br>±3.10 dB |
| Radiated Emission | Level Accuracy:<br>9kHz to 30 MHz | ±4.60 dB |
| Radiated Emission | Level Accuracy:<br>30MHz to 1000 MHz | ±4.20 dB |
| Radiated Emission | Level Accuracy:<br>Above 1000MHz | ±4.20 dB |

## 1.8 Test Facility

The testing was performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at: 1/F.,Building 6, Rundongsheng Industrial Zone, Longzhu, Xixiang, Bao'an District, Shenzhen, Guangdong, China. At the time of testing, the following bodies accredited the Laboratory:

**CNAS (L5813)**

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

**A2LA Certificate No.: 4750.01**

The laboratory has been accredited by American Association for Laboratory Accreditation(A2LA) to ISO/IEC 17025：2017 General Requirements for the Competence of Testing and Calibration Laboratories for the technical competence in the field of Electrical Testing. And the A2LA Certificate No.: 4750.01.FCC Accredited Test Site Number: 854351 Designation Number: CN1223.

**IC Registration No.: (11950A)**

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A.

# 2. Test Summary

| FCC Part 15 Subpart (15.231(a)) | | | |
|---|---|---|---|
| **Standard Section** | **Test Item** | **Judgment** | **Remark** |
| **FCC** | | | |
| 15.203 | Antenna Requirement | PASS | **N/A** |
| 15.207 | Conducted Emission | **N/A** | **N/A** |
| 15.231 | Release Time | PASS | **N/A** |
| | Radiation Emission | PASS | **N/A** |
| | 20 dB Bandwidth | PASS | **N/A** |
| | Duty Cycle | PASS | **N/A** |
| **Note:** N/A is an abbreviation for Not Applicable. | | | |

# 3. Test Software

| Test Item | Test Software | Manufacturer | Version No. |
|---|---|---|---|
| Conducted Emission | EZ-EMC | EZ | CDI-03A2 |
| Radiation Emission | EZ-EMC | EZ | FA-03A2RE |

# 4. Test Equipment

| Conducted Emission Test | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model No.** | **Serial No.** | **Last Cal.** | **Cal. Due Date** |
| EMI Test Receiver | Rohde & Schwarz | ESCI | 100321 | Jul. 02, 2021 | Jul. 01, 2022 |
| RF Switching Unit | Compliance Direction Systems Inc | RSU-A4 | 34403 | Jul. 02, 2021 | Jul. 01, 2022 |
| AMN | SCHWARZBECK | NNBL 8226-2 | 8226-2/164 | Jul. 02, 2021 | Jul. 01, 2022 |
| LISN | Rohde & Schwarz | ENV216 | 101131 | Jul. 02, 2021 | Jul. 01, 2022 |
| **Radiation Emission Test** | | | | | |
| **Equipment** | **Manufacturer** | **Model No.** | **Serial No.** | **Last Cal.** | **Cal. Due Date** |
| Spectrum Analyzer | Agilent | E4407B | MY45106456 | Jul. 02, 2021 | Jul. 01, 2022 |
| EMI Test Receiver | Rohde & Schwarz | ESPI | 100010/007 | Jul. 02, 2021 | Jul. 01, 2022 |
| Bilog Antenna | ETS-LINDGREN | 3142E | 00117537 | Feb. 28, 2022 | Feb. 27, 2024 |
| Horn Antenna | ETS-LINDGREN | 3117 | 00143207 | Feb. 28, 2022 | Feb. 27, 2024 |
| Loop Antenna | SCHWARZBECK | FMZB 1519 B | 1519B-059 | Jul. 06, 2021 | Jul. 05, 2022 |
| Pre-amplifier | Sonoma | 310N | 185903 | Feb. 24, 2022 | Feb. 23, 2023 |
| Pre-amplifier | HP | 8449B | 3008A00849 | Feb. 24, 2022 | Feb. 23, 2023 |
| Cable | HUBER+SUHNER | 100 | SUCOFLEX | Feb. 24, 2022 | Feb. 23, 2023 |
| Positioning Controller | ETS-LINDGREN | 2090 | N/A | N/A | N/A |
| **Antenna Conducted Emission** | | | | | |
| **Equipment** | **Manufacturer** | **Model No.** | **Serial No.** | **Last Cal.** | **Cal. Due Date** |
| Spectrum Analyzer | Agilent | E4407B | MY45106456 | Jul. 02, 2021 | Jul. 01, 2022 |
| Spectrum Analyzer | Rohde & Schwarz | ESPI | 100010/007 | Jul. 02, 2021 | Jul. 01, 2022 |
| MXA Signal Analyzer | Agilent | N9020A | MY49100060 | Sep. 10, 2021 | Sep. 09, 2022 |
| Vector Signal Generator | Agilent | N5182A | MY50141294 | Sep. 10, 2021 | Sep. 09, 2022 |
| Analog Signal Generator | Agilent | N5181A | MY50141953 | Sep. 10, 2021 | Sep. 09, 2022 |
| RF Power Sensor | DARE!! Instruments | RadiPowerRPR3006W | 17I00015SNO26 | Sep. 10, 2021 | Sep. 09, 2022 |
| | DARE!! Instruments | RadiPowerRPR3006W | 17I00015SNO29 | Sep. 10, 2021 | Sep. 09, 2022 |
| | DARE!! Instruments | RadiPowerRPR3006W | 17I00015SNO31 | Sep. 10, 2021 | Sep. 09, 2022 |
| | DARE!! Instruments | RadiPowerRPR3006W | 17I00015SNO33 | Sep. 10, 2021 | Sep. 09, 2022 |

# 5. Conducted Emission Test

## 5.1 Test Standard and Limit

### 5.1.1Test Standard

FCC 15.207

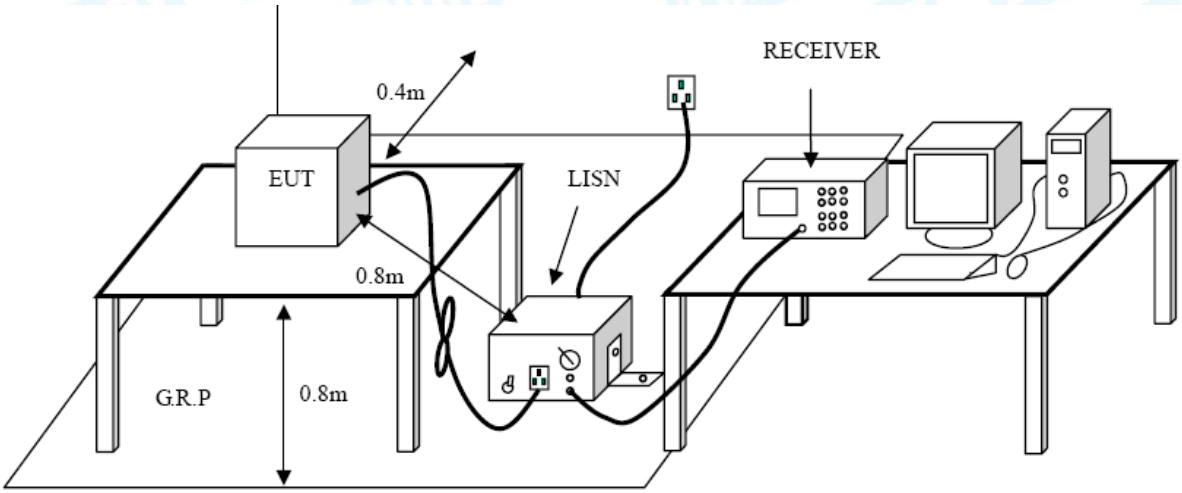
### 5.1.2 Test Limit

**Conducted Emission Test Limit**

| Frequency | Maximum RF Line Voltage (dBμV) | |
|---|---|---|
| | Quasi-peak Level | Average Level |
| 150kHz~500kHz | 66 ~ 56 * | 56 ~ 46 * |
| 500kHz~5MHz | 56 | 46 |
| 5MHz~30MHz | 60 | 50 |

Notes:
(1) *Decreasing linearly with logarithm of the frequency.
(2) The lower limit shall apply at the transition frequencies.
(3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

## 5.2 Test Setup



## 5.3 Test Procedure

The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

The EUT must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation.

Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

LISN at least 80 cm from nearest part of EUT chassis.

The bandwidth of EMI test receiver is set at 9kHz, and the test frequency band is from 0.15MHz to 30MHz.

## 5.4 Deviation From Test Standard

No deviation

## 5.5 Test Data

N/A, no USB or AC charging port was provided, therefore, it’s not applicable

# 6. Radiated Emission Test

## 6.1 Test Standard and Limit

6.1.1 Test Standard

FCC 15.231

6.1.2 Test Limit

According to FCC 15.231(a) requirement:

In addition to the provisions of Section 15.205, the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:

| Fundamental Frequency (MHz) | Field Strength of Fundamental (microvolt/meter) at 3m | Field Strength of Spurious Emissions (microvolt/meter) at 3m |
|---|---|---|
| 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 |

** Linear interpolations, the formulas for calculating the maximum permitted fundamental field strengths are as follows:

(1) for the band 130~174 MHz, uV/m at 3 meters= 56.81818(F)-6136.3636;

(2) for the band 260~470 MHz, uV/m at 3 meter= 41.6667(F)-7083.3333.

(3) The maximum permitted unwanted emissions level is 20 dB below the maximum permitted fundamental level. In addition field strength of any emissions which appear inside of the restriction band shall not exceed the general radiated emissions limits in FCC Part15.209.

| Frequency (MHz) | Field Strength (microvolt/meter) | Measurement Distance (meters) |
|---|---|---|
| 0.009~0.490 | 2400/F(KHz) | 300 |
| 0.490~1.705 | 24000/F(KHz) | 30 |
| 1.705~30.0 | 30 | 30 |
| 30~88 | 100 | 3 |
| 88~216 | 150 | 3 |
| 216~960 | 200 | 3 |

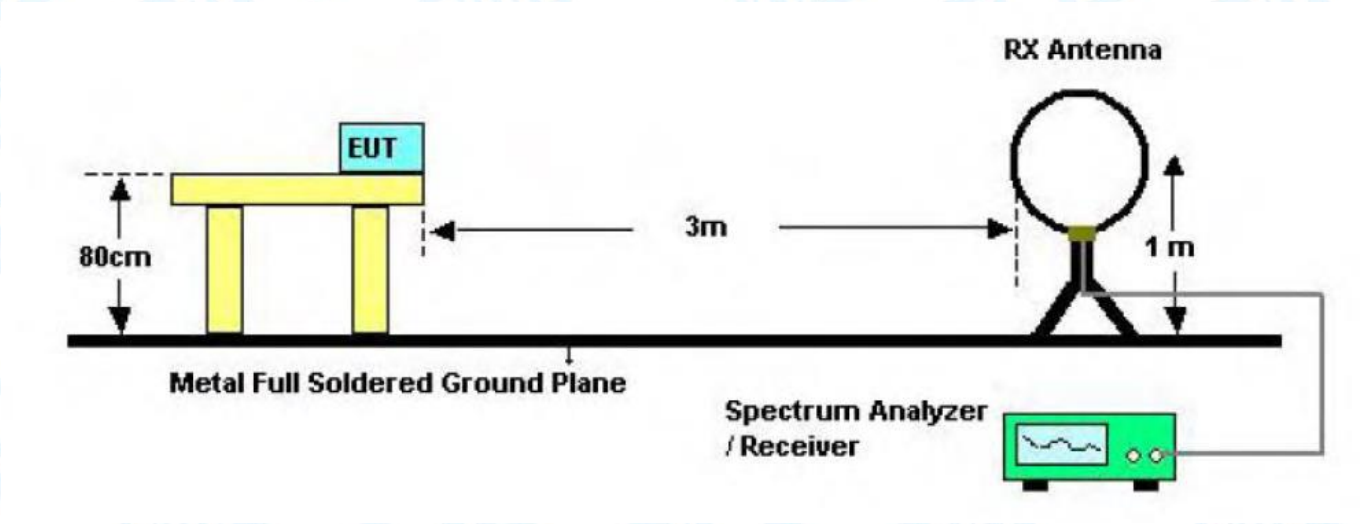
| | | |
|---|---|---|
| Above 960 | 500 | 3 |

Note:
(1) The tighter limit applies at the band edges.
(2) For above 30MHz:
Emission Level(dBuV/m)=20log Emission Level(uV/m)
For 0.009~0.490MHz:
Emission Level(dBuV/m)=20log Emission Level(uV/m) +40log(300/3)
For 0.049~30MHz:
Emission Level(dBuV/m)=20log Emission Level(uV/m) +40log(30/3)

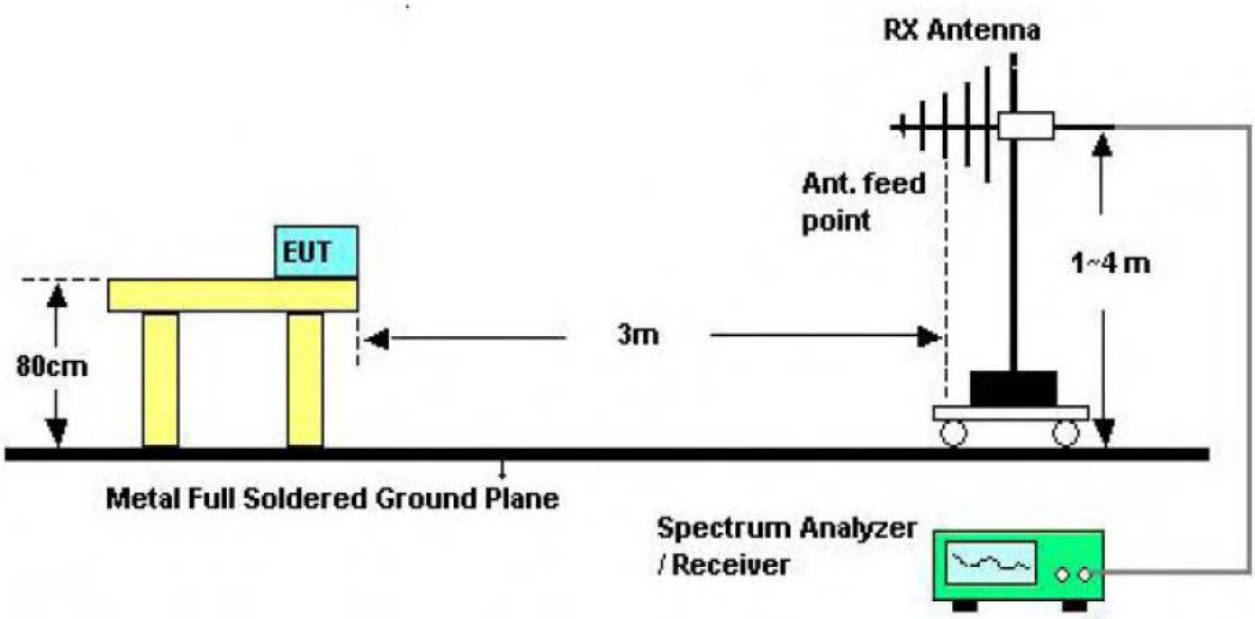
So the field strength of emission limits have been calculated in below table.

| Fundamental Frequency (MHz) | Field Strength of Fundamental (microvolt/meter) at 3m |
|---|---|
| 433.92 MHz | 80.82 (Average) |
| 433.92 MHz | 100.82 (Peak) |

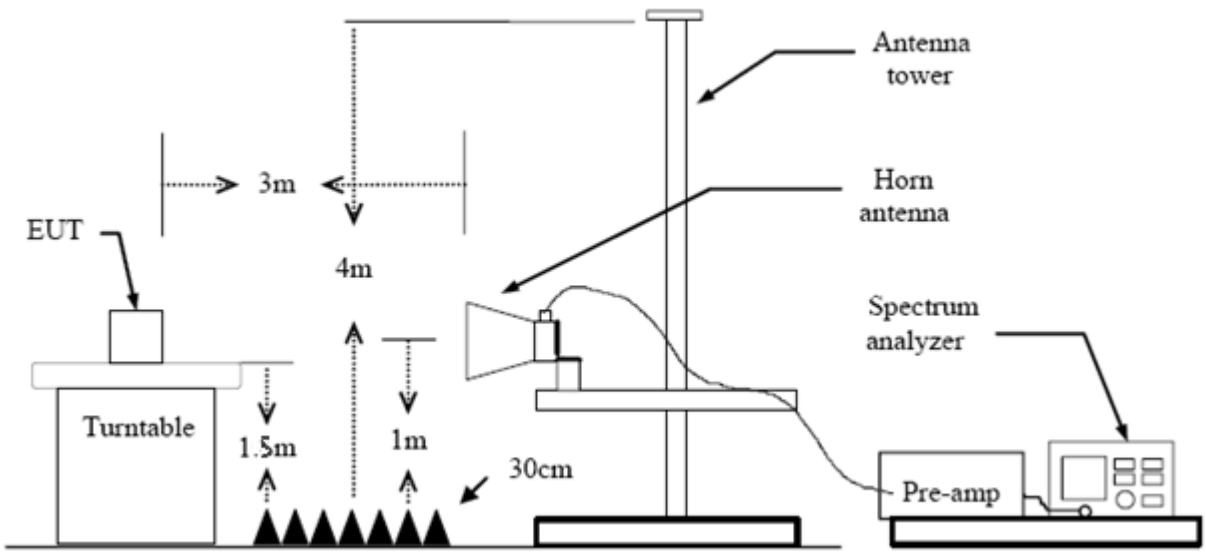
## 6.2 Test Setup




Below 30MHz Test Setup




Bellow 1000MHz Test Setup




Above 1GHz Test Setup

## 6.3 Test Procedure

(1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz. The EUT was placed on a rotating 0.8m high above the ground, the table was rotated 360 degrees to determine the position of the highest radiation.

(2) Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.

(3) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.

(4) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.

(5) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.

(6) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.

(7) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.

(8) For the actual test configuration, please see the test setup photo.

## 6.4 Deviation From Test Standard

No deviation

## 6.5 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power.

## 6.6 Test Data

Please refer to the Attachment A.

# 7. Bandwidth

## 7.1 Test Standard and Limit

### 7.1.1 Test Standard

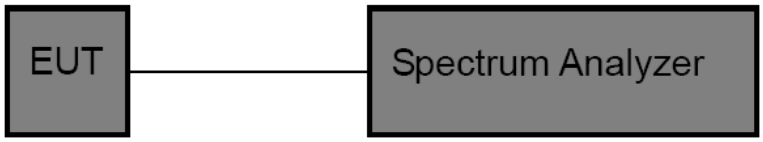
FCC 15.231

### 7.1.2 Test Limit

The 99%bandwidth of the emissions shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. So the emission bandwidth limits have been calculated in below table.

| Fundamental Frequency | 20 dB Bandwidth Limits (MHz) |
|---|---|
| 433.92MHz | 1.0848 |

## 7.2 Test Setup




## 7.3 Test Procedure

(1) Set Spectrum Analyzer Center Frequency= Fundamental Frequency, RBW=10 kHz, VBW= 30 kHz, Span= 1 MHz.
(2) Measured the spectrum width with power higher than 20 dB below carrier.

## 7.4 Deviation From Test Standard

No deviation

## 7.5 EUT Operating Condition

The Equipment Under Test was Programmed to be in continuously transmitting mode.

## 7.6 Test Data

Please refer to the Attachment C.

# 8. Release Time Measurement

## 8.1 Test Standard and Limit

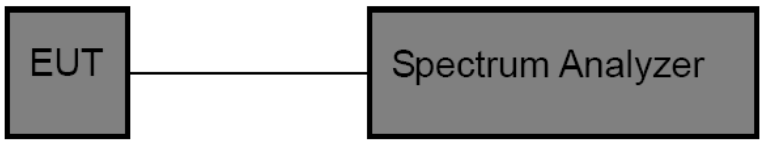
8.1.1 Test Standard

FCC 15.231

8.1.2 Test Limit

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

## 8.2 Test Setup




## 8.3 Test Procedure

(1) Setup the EUT as show in the block diagram above.
(2) Set Spectrum Analyzer Centre Frequency= Fundamental Frequency, RBW=100 kHz, VBW= 300 kHz, Span= 0 Hz. Sweep Time= 5 Seconds.
(3) Setup the EUT as normal operation and press Transmitter button.
(4) Set Spectrum Analyzer View, Delta Mark time.

## 8.4 Deviation From Test Standard

No deviation

## 8.5 EUT Operating Condition

The EUT was set to work in transmitting mode.

## 8.6 Test Data

Please refer to the Attachment D.

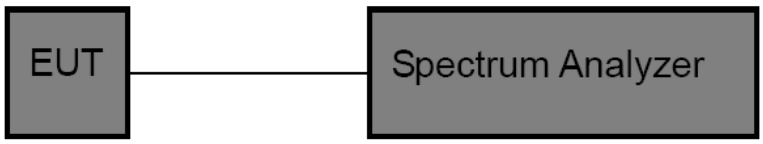
# 9. Duty Cycle

## 9.1 Test Standard and Limit

### 9.1.1 Test Standard

FCC 15.231

## 9.2 Test Setup




## 9.3 Test Procedure

(1) The EUT was placed on a turntable which is 0.8m above ground plane.
(2) Set EUT operating in continuous transmitting mode.
(3) Set the Spectrum Analyzer to the transmitter carrier frequency, and set the spectrum analyzer resolution bandwidth (RBW) to 100 kHz and video bandwidth (VBW) to 300 kHz, Span was set to 0 Hz.
(4) The Duty Cycle was measured and recorded.

## 9.4 Deviation From Test Standard

No deviation

## 9.5 EUT Operating Condition

The EUT was programmed to be in transmitting mode.

## 9.6 Test Data

Please refer to the Attachment E.

# 10. Antenna Requirement

## 10.1 Standard Requirement

10.1.1 Standard

FCC Part 15.203

10.1.2 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 shall be considered sufficient to comply with the provisions of this Section. 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.

## 10.1 Deviation From Test Standard

No deviation

## 10.2 Antenna Connected Construction

The gains of the antenna used for transmitting is 0 dBi, and the antenna connector is de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

The EUT antenna is an PCB Antenna. It complies with the standard requirement.

| Antenna Type |
|---|
| ☑ Permanent attached antenna |
| ☐ Unique connector antenna |
| ☐ Professional installation antenna |

# Attachment A-- Radiated Emission Test Data

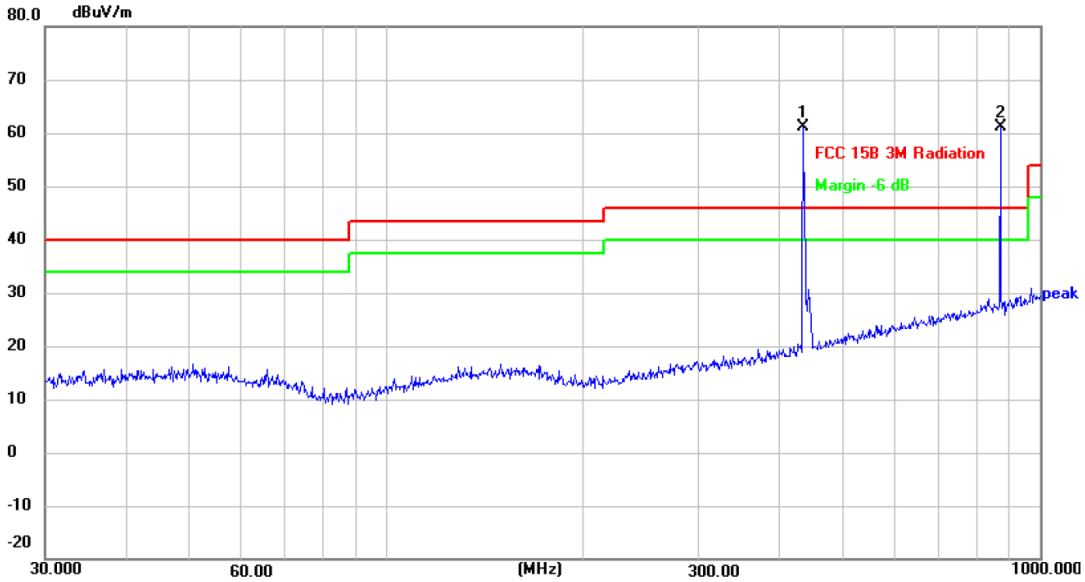
**9 KHz to 30 MHz**

From 9 KHz to 30 MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

**30MHz-1GHz**

| | | | |
|---|---|---|---|
| **Temperature:** | 23.9℃ | **Relative Humidity:** | 44% |
| **Test Voltage:** | AC 120V/60Hz | | |
| **Ant. Pol.** | Horizontal | | |
| **Test Mode:** | TX Mode | | |
| **Remark:** | No report for the emission which more than 10 dB below the prescribed limit. | | |

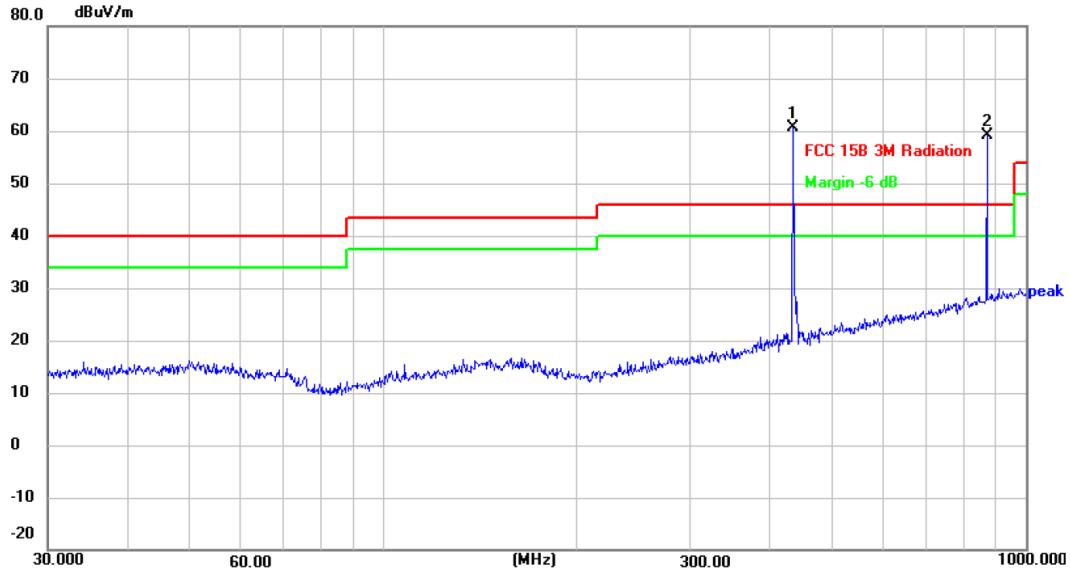



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 * | 434.0649 | 78.53 | -17.46 | 61.07 | 46.00 | 15.07 | peak |
| 2 X | 869.1301 | 69.96 | -8.92 | 61.04 | 46.00 | 15.04 | peak |

**Emission Level= Read Level+ Correct Factor**

| Fundamental and Harmonics Result | | | | | | |
|---|---|---|---|---|---|---|
| Frequency (MHz) | Peak Level (dBμV/m) | AV Factor(dBμV/m) (see Attachment D) | Average Level (dBμV/m) | Limit(dBμV/m) (average) | Limit(dBμV/m) (Peak) | Conclusion |
| 434.0649 | 61.07 | -9.68 | 51.39 | 80.80 | 100.80 | PASS |
| 869.1301 | 61.04 | -9.68 | 51.36 | 60.80 | 80.80 | PASS |

| | | | |
|---|---|---|---|
| **Temperature:** | 23.9℃ | **Relative Humidity:** | 44% |
| **Test Voltage:** | AC 120V/60Hz | | |
| **Ant. Pol.** | Vertical | | |
| **Test Mode:** | TX Mode | | |
| **Remark:** | No report for the emission which more than 10 dB below the prescribed limit. | | |



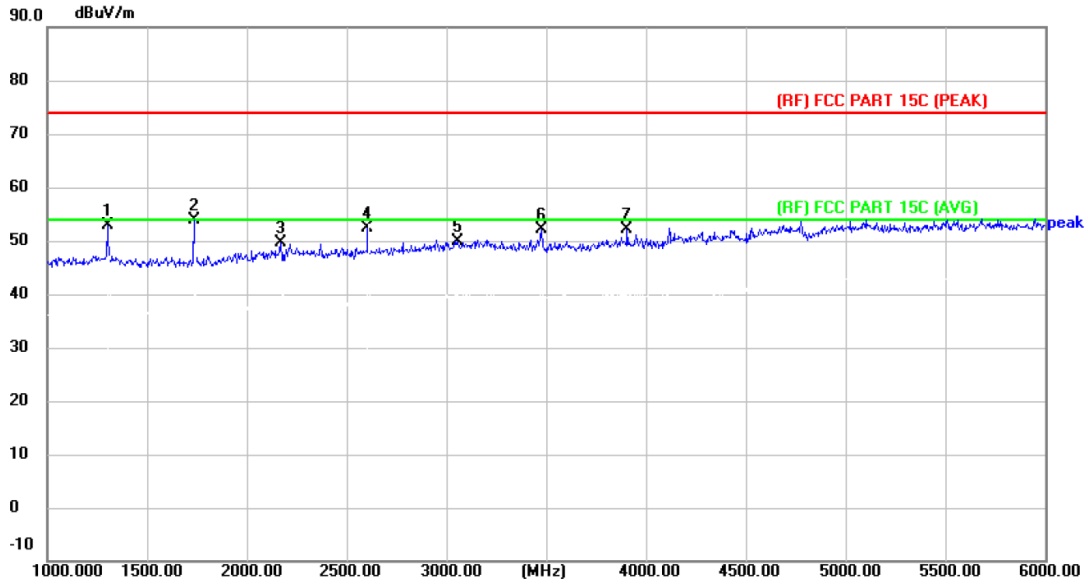

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 * | 434.0649 | 78.03 | -17.46 | 60.57 | 46.00 | 14.57 | peak |
| 2 X | 869.1301 | 68.17 | -8.92 | 59.25 | 46.00 | 13.25 | peak |

**Emission Level= Read Level+ Correct Factor**

| Fundamental and Harmonics Result | | | | | | |
|---|---|---|---|---|---|---|
| Frequency (MHz) | Peak Level (dBμV/m) | AV Factor(dBμV/m) (see Attachment D) | Average Level (dBμV/m) | Limit(dBμV/m) (average) | Limit(dBμV/m) (Peak) | Conclusion |
| 434.0649 | 60.57 | -9.68 | 50.89 | 80.80 | 100.80 | PASS |
| 869.1301 | 59.25 | -9.68 | 49.57 | 60.80 | 80.80 | PASS |

**1GHz -6GHz**

| | | | |
|---|---|---|---|
| **Temperature:** | 23.9℃ | **Relative Humidity:** | 44% |
| **Test Voltage:** | AC 120V/60Hz | | |
| **Ant. Pol.** | Horizontal | | |
| **Test Mode:** | TX Mode | | |
| **Remark:** | The peak value＜average limit, So only show the peak value. | | |

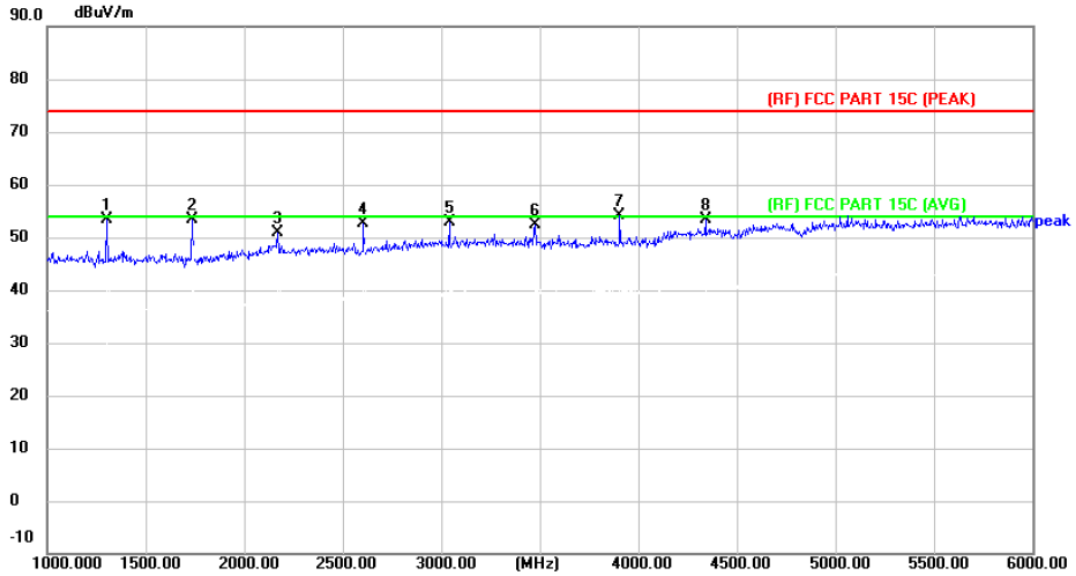



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 | 1300.000 | 60.99 | -8.13 | 52.86 | 74.00 | -21.14 | peak |
| 2 * | 1735.000 | 61.75 | -7.90 | 53.85 | 74.00 | -20.15 | peak |
| 3 | 2170.000 | 55.41 | -5.82 | 49.59 | 74.00 | -24.41 | peak |
| 4 | 2605.000 | 56.95 | -4.64 | 52.31 | 74.00 | -21.69 | peak |
| 5 | 3055.000 | 52.93 | -2.97 | 49.96 | 74.00 | -24.04 | peak |
| 6 | 3475.000 | 54.97 | -2.80 | 52.17 | 74.00 | -21.83 | peak |
| 7 | 3905.000 | 53.79 | -1.61 | 52.18 | 74.00 | -21.82 | peak |

**Emission Level= Read Level+ Correct Factor**

| Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency (MHz) | Peak Level (dBuV/m) | AV Factor(dBμV/m) (see Attachment D) | Average value (dBuV/m) | Limit Line (dBuV/m) | Over limit (dB) | Conclusion |
| 1300.000 | 52.86 | -9.68 | 43.18 | 54.00 | -10.82 | PASS |
| 1735.000 | 53.85 | -9.68 | 44.17 | 54.00 | -9.83 | PASS |
| 2170.000 | 49.59 | -9.68 | 39.91 | 54.00 | -14.09 | PASS |
| 2605.000 | 52.31 | -9.68 | 42.63 | 54.00 | -11.37 | PASS |
| 3055.000 | 49.96 | -9.68 | 40.28 | 54.00 | -13.72 | PASS |
| 3475.000 | 52.17 | -9.68 | 42.49 | 54.00 | -11.51 | PASS |
| 3905.000 | 52.18 | -9.68 | 42.5 | 54.00 | -11.5 | PASS |

| | | | |
|---|---|---|---|
| **Temperature:** | 23.9℃ | **Relative Humidity:** | 44% |
| **Test Voltage:** | AC 120V/60Hz | | |
| **Ant. Pol.** | Vertical | | |
| **Test Mode:** | TX Mode | | |
| **Remark:** | The peak value＜average limit, So only show the peak value. | | |




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 | 1300.000 | 61.63 | -8.13 | 53.50 | 74.00 | -20.50 | peak |
| 2 | 1735.000 | 61.30 | -7.90 | 53.40 | 74.00 | -20.60 | peak |
| 3 | 2170.000 | 56.73 | -5.82 | 50.91 | 74.00 | -23.09 | peak |
| 4 | 2605.000 | 57.39 | -4.64 | 52.75 | 74.00 | -21.25 | peak |
| 5 | 3040.000 | 55.77 | -2.99 | 52.78 | 74.00 | -21.22 | peak |
| 6 | 3475.000 | 55.22 | -2.80 | 52.42 | 74.00 | -21.58 | peak |
| 7 * | 3905.000 | 55.65 | -1.61 | 54.04 | 74.00 | -19.96 | peak |
| 8 | 4340.000 | 53.60 | -0.29 | 53.31 | 74.00 | -20.69 | peak |

**Emission Level= Read Level+ Correct Factor**

| Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency (MHz) | Peak Level (dBuV/m) | AV Factor(dBμV/m) (see Attachment D) | Average value (dBuV/m) | Limit Line (dBuV/m) | Over limit (dB) | Conclusion |
| 1300.000 | 53.50 | -9.68 | 43.82 | 54.00 | -10.18 | PASS |
| 1735.000 | 53.40 | -9.68 | 43.72 | 54.00 | -10.28 | PASS |
| 2170.000 | 50.91 | -9.68 | 41.23 | 54.00 | -12.77 | PASS |
| 2605.000 | 52.75 | -9.68 | 43.07 | 54.00 | -10.93 | PASS |
| 3040.000 | 52.78 | -9.68 | 43.1 | 54.00 | -10.9 | PASS |
| 3475.000 | 52.42 | -9.68 | 42.74 | 54.00 | -11.26 | PASS |
| 3905.000 | 54.04 | -9.68 | 44.36 | 54.00 | -9.64 | PASS |
| 4340.000 | 53.31 | -9.68 | 43.63 | 54.00 | -10.37 | PASS |

## Other harmonics emissions are lower than 20dB below the allowable limit.

**Note:** (1) All Readings are Peak Value and AV. And AV is calculated by the following:

Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.

Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values.

Average Values=Peak Values+20log (Duty Cycle)

(2) Emission Level= Reading Level + Probe Factor +Cable Loss

(3) Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

## Pulse Desensitization Correction Factor

Note:

1)The Smallest Pulse Width (PW)= 0.400ms

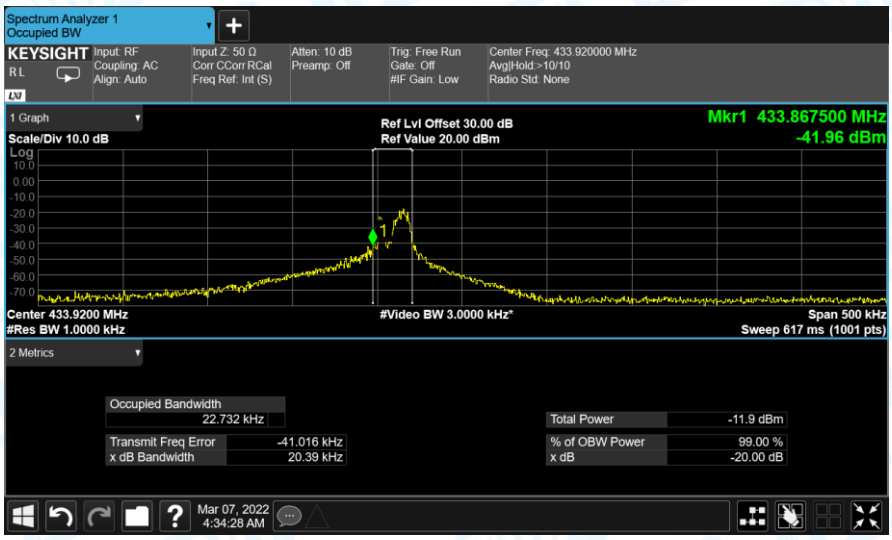
(2) 2/PW=2/0.400(ms)= 5kHz<100 kHz

Because 2/PW<RBW, so the PDCF is not needed.

# Attachment C--Bandwidth Data

| | | |
|---|---|---|
| Temperature | : | 25℃ |
| Relative Humidity | : | 65 % |
| Pressure | : | 1010 hPa |
| Test Power | : | DC 3V |

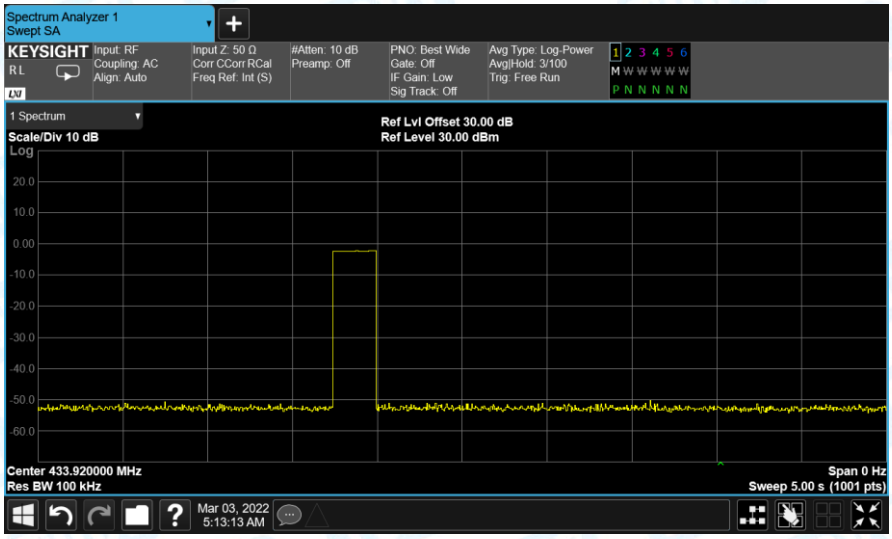
| Frequency (MHz) | 20 dBc Bandwidth (kHz) | Limit (kHz) | Result |
|---|---|---|---|
| 433.92 | 20.39 | 1084.8 | PASS |

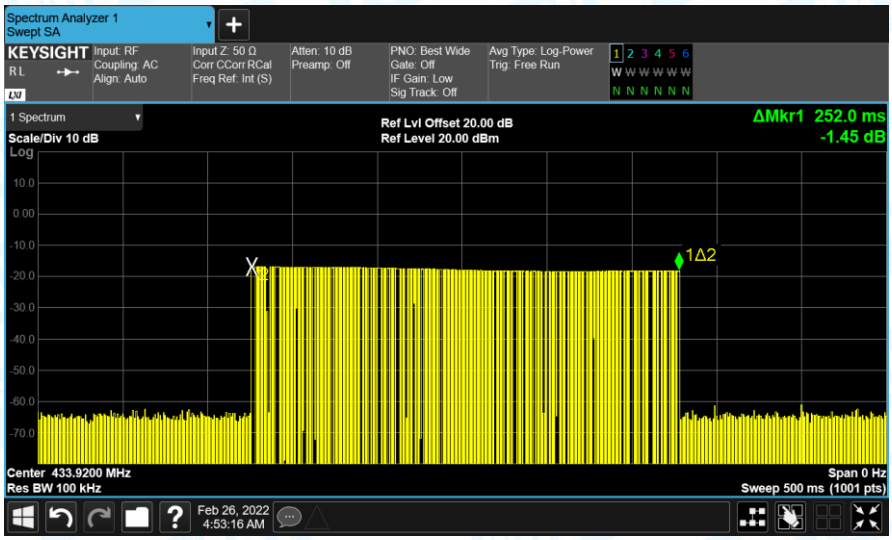


# Attachment D-- Release Time Measurement Data

| | | |
|---|---|---|
| Temperature | : | 25 ℃ |
| Relative Humidity | : | 65 % |
| Pressure | : | 1010 hPa |
| Test Power | : | DC 3V |

| Release Time(s) | Limit (s) | Result |
|---|---|---|
| 0.252 | 5 | PASS |



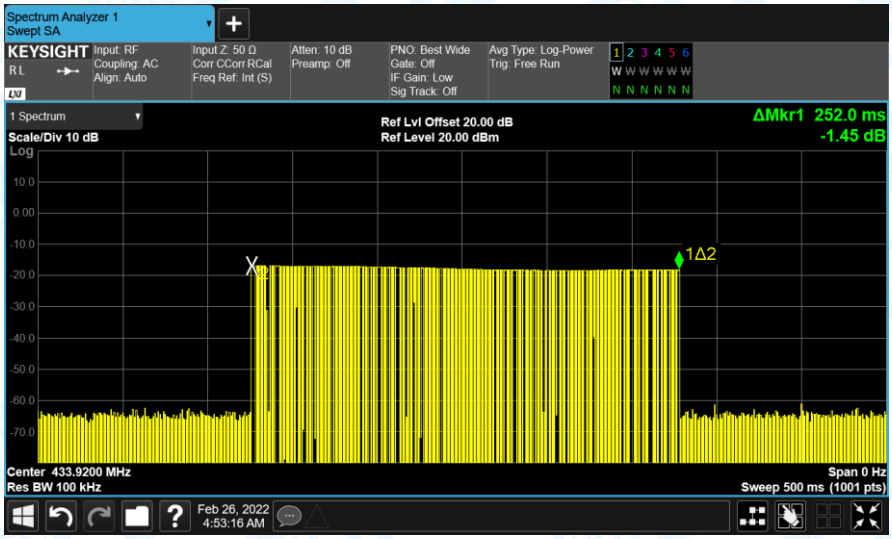
# Attachment E--Duty Cycle Data

Please refer the following pages:

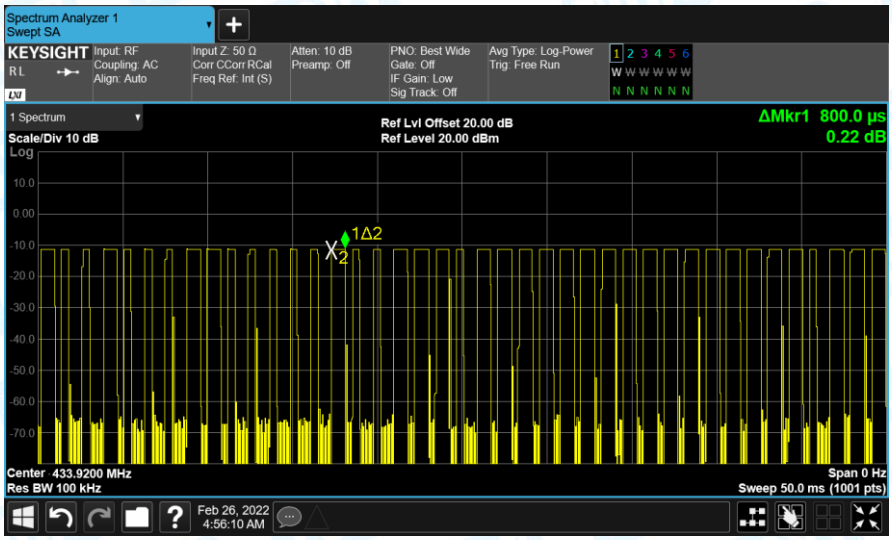
**Plot 1:** transmit once in 100ms, there are two kinds of pulse, the large pulses total 35, the small pulses total 12.
**Plot 2:** one large pulse in a time period of 0.8 ms
**Plot 3:** one small pulse in a time period of 0.4 ms

**Duty Cycle=ON/Total= (0.8*37+0.4*12)/100=40.4/100=32.8%**
**20log (Duty Cycle) =-9.68**
**Average=Peak Value+ 20log (Duty Cycle), AV=PK-9.68**

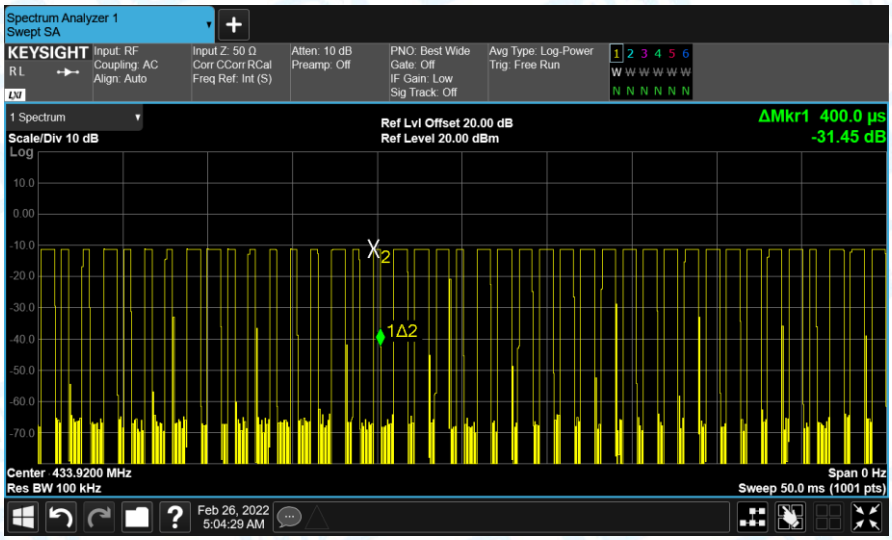
## Plot 1



## Plot 2




## Plot 3




**-----END OF REPORT-----**