



# MEASUREMENT REPORT

## FCC PART 15.247/ IC RSS-247

**FCC ID:** BRWTIARLGTNNG  
**IC:** 6157A-TIARLGTNNG  
**Applicant:** Horizon Hobby, LLC  
**Application Type:** Certification  
**Product:** Receiver  
**Model No.:** SPMAR6610T  
**Brand Name:** Spektrum  
**FCC Classification:** Digital Transmission System (DTS)  
**FCC Rule Part(s):** Part 15 Subpart C (Section 15.247)  
**IC Rule(s):** RSS-247 Issue 2, RSS-GEN Issue 5  
**Test Procedure(s):** ANSI C63.10-2013, KDB 558074 D01v05r02  
**Test Date:** April 11 ~ April 26, 2019

Reviewed By:

*Sunny Sun*

( Sunny Sun )

Approved By:

*Robin Wu*

( Robin Wu )



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

## Revision History

| Report No.    | Version | Description    | Issue Date | Note  |
|---------------|---------|----------------|------------|-------|
| 1904RSU007-U1 | Rev. 01 | Initial Report | 05-17-2019 | Valid |
|               |         |                |            |       |

# CONTENTS

| Description                                       | Page      |
|---|-----------|
| <b>1. INTRODUCTION .....</b>                      | <b>6</b>  |
| 1.1. Scope .....                                  | 6         |
| 1.2. MRT Test Location .....                      | 6         |
| <b>2. PRODUCT INFORMATION .....</b>               | <b>7</b>  |
| 2.1. Feature of Equipment under Test .....        | 7         |
| 2.2. Working Frequencies.....                     | 7         |
| 2.3. Test Mode .....                              | 7         |
| 2.4. Device Capabilities .....                    | 8         |
| 2.5. Test Configuration .....                     | 8         |
| 2.6. EMI Suppression Device(s)/Modifications..... | 8         |
| 2.7. Labeling Requirements.....                   | 9         |
| <b>3. DESCRIPTION of TEST.....</b>                | <b>10</b> |
| 3.1. Evaluation Procedure .....                   | 10        |
| 3.2. AC Line Conducted Emissions .....            | 10        |
| 3.3. Radiated Emissions.....                      | 11        |
| <b>4. ANTENNA REQUIREMENTS.....</b>               | <b>12</b> |
| <b>5. TEST EQUIPMENT CALIBRATION DATE.....</b>    | <b>13</b> |
| <b>6. MEASUREMENT UNCERTAINTY .....</b>           | <b>15</b> |
| <b>7. TEST RESULT .....</b>                       | <b>16</b> |
| 7.1. Summary.....                                 | 16        |
| 7.2. 6dB Bandwidth Measurement.....               | 17        |
| 7.2.1. Test Limit .....                           | 17        |
| 7.2.2. Test Procedure used.....                   | 17        |
| 7.2.3. Test Setting.....                          | 17        |
| 7.2.4. Test Setup .....                           | 17        |
| 7.2.5. Test Result.....                           | 18        |
| 7.3. Output Power Measurement.....                | 19        |
| 7.3.1. Test Limit .....                           | 19        |
| 7.3.2. Test Procedure Used .....                  | 19        |
| 7.3.3. Test Setting.....                          | 19        |
| 7.3.4. Test Setup .....                           | 19        |
| 7.3.5. Test Result.....                           | 20        |
| 7.4. Power Spectral Density Measurement.....      | 21        |

|           |   |           |
|-----------|---|-----------|
| 7.4.1.    | Test Limit .....                                    | 21        |
| 7.4.2.    | Test Procedure Used .....                           | 21        |
| 7.4.3.    | Test Setting.....                                   | 21        |
| 7.4.4.    | Test Setup .....                                    | 22        |
| 7.4.5.    | Test Result.....                                    | 23        |
| 7.5.      | Conducted Band Edge and Out-of-Band Emissions ..... | 26        |
| 7.5.1.    | Test Limit .....                                    | 26        |
| 7.5.2.    | Test Procedure Used .....                           | 26        |
| 7.5.3.    | Test Settintg.....                                  | 26        |
| 7.5.4.    | Test Setup .....                                    | 27        |
| 7.5.5.    | Test Result.....                                    | 28        |
| 7.6.      | Radiated Spurious Emission Measurement .....        | 30        |
| 7.6.1.    | Test Limit .....                                    | 30        |
| 7.6.2.    | Test Procedure Used .....                           | 30        |
| 7.6.3.    | Test Setting.....                                   | 30        |
| 7.6.4.    | Test Setup .....                                    | 32        |
| 7.6.5.    | Test Result.....                                    | 33        |
| 7.7.      | Radiated Restricted Band Edge Measurement.....      | 41        |
| 7.7.1.    | Test Limit .....                                    | 41        |
| 7.7.2.    | Test Procedure Used .....                           | 44        |
| 7.7.3.    | Test Setting.....                                   | 44        |
| 7.7.4.    | Test Setup .....                                    | 45        |
| 7.7.5.    | Test Result.....                                    | 46        |
| 7.8.      | AC Conducted Emissions Measurement .....            | 54        |
| 7.8.1.    | Test Limit .....                                    | 54        |
| 7.8.2.    | Test Setup .....                                    | 54        |
| 7.8.3.    | Test Result.....                                    | 54        |
| <b>8.</b> | <b>CONCLUSION .....</b>                             | <b>55</b> |
|           | <b>Appendix A - Test Setup Photograph .....</b>     | <b>56</b> |
|           | <b>Appendix B - EUT Photograph.....</b>             | <b>57</b> |

## §2.1033 General Information

|                                   |   |
|-----------------------------------|---|
| <b>Applicant:</b>                 | Horizon Hobby, LLC  |
| <b>Applicant FCC Address:</b>     | 2904 Research Rd. Champaign, IL 61822   |
| <b>Applicant ISED Address:</b>    | 4105 Fieldstone Rd. Champaign IL 61822 United States Of America   |
| <b>Manufacturer:</b>              | Horizon Hobby, LLC  |
| <b>Manufacturer FCC Address:</b>  | 2904 Research Rd. Champaign, IL 61822   |
| <b>Manufacturer ISED Address:</b> | 4105 Fieldstone Rd. Champaign IL 61822 United States Of America   |
| <b>Test Site:</b>                 | MRT Technology (Suzhou) Co., Ltd  |
| <b>Test Site Address:</b>         | D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China  |
| <b>Test Device Serial No.:</b>    | N/A <input type="checkbox"/> Production <input checked="" type="checkbox"/> Pre-Production <input type="checkbox"/> Engineering |

### Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- MRT facility is a FCC registered (MRT Reg. No. 893164) test facility with the site description report on file and has met all the requirements specified in ANSI C63.4-2014.
- MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.
- MRT facility is a VCCI registered (R-20025, G-20034, C-20020, T-20020) test laboratory with the site description on file at VCCI Council.
- MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications, Radio and SAR testing.



## 1. INTRODUCTION

### 1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

### 1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The measurement facility compliant with the test site requirements specified in ANSI C63.4-2014.



## 2. PRODUCT INFORMATION

### 2.1. Feature of Equipment under Test

|                      |  |
|----------------------|--|
| Product Name:        | Receiver   |
| Model No.:           | SPMAR6610T   |
| Brand Name:          | Spektrum   |
| Frequency Range:     | 2402 ~ 2478 MHz  |
| Type of Modulation:  | GFSK   |
| Channel Number:      | 23   |
| Antenna Information: | 2T <sub>x</sub> & 2R <sub>x</sub> , SISO Mode Only<br>Monopole Antenna, 2dBi |

### 2.2. Working Frequencies

| Channel | Frequency | Channel | Frequency |
|---------|-----------|---------|-----------|
| 01      | 2402 MHz  | 02      | 2405 MHz  |
| 03      | 2408 MHz  | 04      | 2412 MHz  |
| 05      | 2415 MHz  | 06      | 2418 MHz  |
| 07      | 2422 MHz  | 08      | 2425 MHz  |
| 09      | 2428 MHz  | 10      | 2431 MHz  |
| 11      | 2435 MHz  | 12      | 2438 MHz  |
| 13      | 2440 MHz  | 14      | 2444 MHz  |
| 15      | 2448 MHz  | 16      | 2451 MHz  |
| 17      | 2454 MHz  | 18      | 2457 MHz  |
| 19      | 2461 MHz  | 20      | 2464 MHz  |
| 21      | 2467 MHz  | 22      | 2471 MHz  |
| 23      | 2478 MHz  | ---     | ---       |

Note: The engineer test sample was provided by the manufacturer, it was configured into fixed frequency T<sub>x</sub> status after power on.

### 2.3. Test Mode

|           |                                     |
|-----------|-------------------------------------|
| Test Mode | Mode 1: Transmit by GFSK Modulation |
|-----------|-------------------------------------|



## 2.4. Device Capabilities

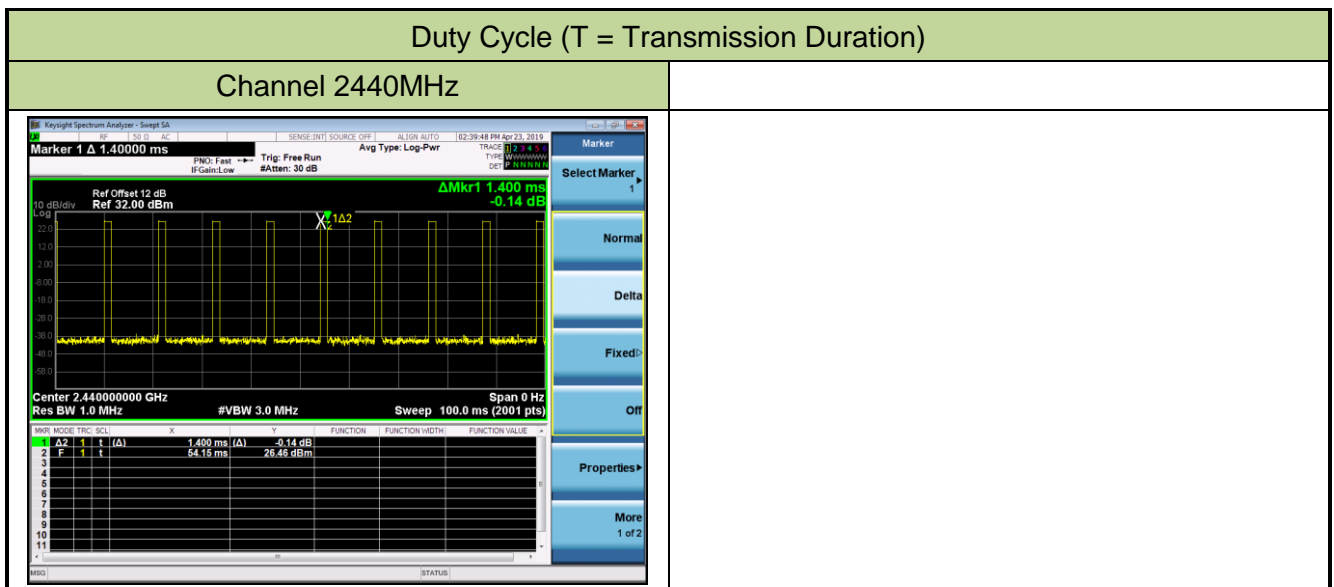
This device contains the following capabilities:

### 2.4G Transmitter.

The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 1MHz, VBW = 3MHz, and detector = peak. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

| Time On<br>(ms) | One Period<br>(ms) | Duty Cycle<br>(%) | Duty Cycle Factor<br>(dB) |
|-----------------|--------------------|-------------------|---------------------------|
| 12.60           | 100                | 12.60             | -17.99                    |

Note: Duty Cycle Factor =  $20 \cdot \log(\text{Duty Cycle})$



## 2.5. Test Configuration

The device was tested per the guidance of ANSI C63.10-2013. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

## 2.6. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.



## **2.7. Labeling Requirements**

### Per 2.1074 & 15.19; Docket 95-19

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase.

However, when the device is so small wherein placement of the label with specified statement is not practical, only the FCC ID must be displayed on the device per Section 15.19(a)(5). Please see attachment for FCC ID label and label location.

### RSP-100 Issue 11 Section 3

The manufacturer, importer or distributor shall meet the labelling requirements set out in this section for every unit:

(i) prior to marketing in Canada, for products manufactured in Canada

(ii) prior to importation into Canada, for imported products

For information regarding the e-labelling option, see Notice 2014-DRS1003. The label for the certified product represents the manufacturer's or importer's compliance with Innovation, Science and Economic Development Canada's (ISED) regulatory requirements.

Please see attachment for IC label and label location.

### 3. DESCRIPTION of TEST

#### 3.1. Evaluation Procedure

The measurement procedures described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2013), and the guidance was used in the measurement of the device.

**Deviation from measurement procedure.....None**

#### 3.2. AC Line Conducted Emissions

The line-conducted facility is located inside an 8'x4'x4' shielded enclosure. A 1m x 2m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50 $\Omega$ /50uH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference ground-plane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the receiver and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The receiver was scanned from 150kHz to 30MHz. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 9kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was also maximized by varying: power lines, the mode of operation or data exchange speed, or support equipment whichever determined the worst-case emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions are used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

An extension cord was used to connect to a single LISN which powered by EUT. The extension cord was calibrated with LISN, the impedance and insertion loss are compliance with the requirements as stated in ANSI C63.10-2013.

### 3.3. Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. A MF Model 210SS turntable is used for radiated measurement. It is a continuously rotatable, remote controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm high PVC support structure is placed on top of the turntable.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up for frequencies below 1GHz was placed on top of the 0.8 meter high, 1 x 1.5 meter table; and test set-up for frequencies 1-40GHz was placed on top of the 1.5 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions. According to 3dB Beam-Width of horn antenna, the horn antenna should be always directed to the EUT when rising height.

## 4. ANTENNA REQUIREMENTS

### **Excerpt from §15.203 of the FCC Rules/Regulations:**

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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.”

### **Conclusion:**

The device unit complies with the requirement of §15.203.

## 5. TEST EQUIPMENT CALIBRATION DATE

### Conducted Emissions - SR2

| Instrument                 | Manufacturer | Type No.    | Asset No.   | Cali. Interval | Cali. Due Date |
|----------------------------|--------------|-------------|-------------|----------------|----------------|
| EMI Test Receiver          | R&S          | ESR3        | MRTSUE06185 | 1 year         | 2020/04/15     |
| Two-Line V-Network         | R&S          | ENV 216     | MRTSUE06002 | 1 year         | 2019/06/14     |
| Two-Line V-Network         | R&S          | ENV 216     | MRTSUE06003 | 1 year         | 2019/06/14     |
| Thermohygrometer           | Testo        | 608-H1      | MRTSUE06404 | 1 year         | 2019/08/14     |
| Shielding Anechoic Chamber | MIX-BEP      | Chamber-SR2 | MRTSUE06214 | N/A            | N/A            |

### Radiated Emissions - AC1

| Instrument                 | Manufacturer | Type No.    | Asset No.   | Cali. Interval | Cali. Due Date |
|----------------------------|--------------|-------------|-------------|----------------|----------------|
| EMI Test Receiver          | R&S          | ESR7        | MRTSUE06001 | 1 year         | 2019/08/13     |
| PXA Signal Analyzer        | Keysight     | 9030B       | MRTSUE06395 | 1 year         | 2019/09/25     |
| Loop Antenna               | Schwarzbeck  | FMZB 1519   | MRTSUE06025 | 1 year         | 2019/11/09     |
| Bilog Period Antenna       | Schwarzbeck  | VULB 9168   | MRTSUE06172 | 1 year         | 2020/03/31     |
| Broad Band Horn Antenna    | Schwarzbeck  | BBHA 9120D  | MRTSUE06023 | 1 year         | 2019/10/19     |
| Broad Band Horn Antenna    | Schwarzbeck  | BBHA 9170   | MRTSUE06024 | 1 year         | 2019/12/17     |
| Microwave System Amplifier | Agilent      | 83017A      | MRTSUE06076 | 1 year         | 2019/11/16     |
| Preamplifier               | Schwarzbeck  | BBV 9721    | MRTSUE06121 | 1 year         | 2019/06/12     |
| Thermohygrometer           | Testo        | 608-H1      | MRTSUE06403 | 1 year         | 2019/08/14     |
| Anechoic Chamber           | TDK          | Chamber-AC1 | MRTSUE06213 | 1 year         | 2020/05/01     |

### Radiated Emission - AC2

| Instrument                     | Manufacturer | Type No.    | Asset No.   | Cali. Interval | Cali. Due Date |
|--------------------------------|--------------|-------------|-------------|----------------|----------------|
| Spectrum Analyzer              | Keysight     | N9038A      | MRTSUE06125 | 1 year         | 2019/08/13     |
| Loop Antenna                   | Schwarzbeck  | FMZB 1519   | MRTSUE06025 | 1 year         | 2019/11/09     |
| Bilog Period Antenna           | Schwarzbeck  | VULB 9162   | MRTSUE06022 | 1 year         | 2019/10/19     |
| Horn Antenna                   | Schwarzbeck  | BBHA9120D   | MRTSUE06171 | 1 year         | 2019/11/09     |
| Broad Band Horn Antenna        | Schwarzbeck  | BBHA 9170   | MRTSUE06024 | 1 year         | 2019/12/17     |
| Broadband Coaxial Preamplifier | Schwarzbeck  | BBV 9718    | MRTSUE06176 | 1 year         | 2019/11/16     |
| Preamplifier                   | Schwarzbeck  | BBV 9721    | MRTSUE06121 | 1 year         | 2019/06/12     |
| Temperature/Humidity Meter     | Minggao      | ETH529      | MRTSUE06170 | 1 year         | 2019/12/13     |
| Anechoic Chamber               | RIKEN        | Chamber-AC2 | MRTSUE06213 | 1 year         | 2020/05/01     |

## Conducted Test Equipment - TR3

| Instrument                             | Manufacturer | Type No.    | Asset No.   | Cali. Interval | Cali. Due Date |
|--|--------------|-------------|-------------|----------------|----------------|
| EXA Signal Analyzer                    | Agilent      | N9020A      | MRTSUE06106 | 1 year         | 2020/04/15     |
| EXA Signal Analyzer                    | Keysight     | N9010B      | MRTSUE06452 | 1 year         | 2019/07/19     |
| Signal Analyzer                        | R&S          | FSV40       | MRTSUE06218 | 1 year         | 2020/04/15     |
| Power Meter                            | Agilent      | U2021XA     | MRTSUE06030 | 1 year         | 2019/11/16     |
| USB wideband power sensor              | Keysight     | U2021XA     | MRTSUE06446 | 1 year         | 2019/07/19     |
| USB wideband power sensor              | Keysight     | U2021XA     | MRTSUE06447 | 1 year         | 2019/07/05     |
| Bluetooth Test Set                     | Anritsu      | MT8852B-042 | MRTSUE06389 | 1 year         | 2019/06/14     |
| Audio Analyzer                         | Agilent      | U8903B      | MRTSUE06143 | 1 year         | 2019/08/14     |
| Modulation Analyzer                    | HP           | 8901A       | MRTSUE06098 | 1 year         | 2019/10/18     |
| Wideband Radio<br>Communication Tester | R&S          | CMW 500     | MRTSUE06243 | 1 year         | 2019/11/16     |
| DC Power Supply                        | GWINSTEK     | DPS-3303C   | MRTSUE06064 | N/A            | N/A            |
| Temperature & Humidity<br>Chamber      | BAOYT        | BYH-150CL   | MRTSUE06051 | 1 year         | 2019/11/16     |
| Thermohygrometer                       | testo        | 608-H1      | MRTSUE06401 | 1 year         | 2019/08/14     |

| Software     | Version | Function          |
|--------------|---------|-------------------|
| EMI Software | V3      | EMI Test Software |

## 6. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT 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  $k = 2$ .

|  |
|--|
| <b>AC Conducted Emission Measurement - SR2</b>   |
| Measuring Uncertainty for a Level of Confidence of 95% ( $U=2U_c(y)$ ):<br>150kHz~30MHz: 3.46dB                        |
| <b>Radiated Emission Measurement - AC1</b>   |
| Measuring Uncertainty for a Level of Confidence of 95% ( $U=2U_c(y)$ ):<br>9kHz ~ 1GHz: 4.18dB<br>1GHz ~ 25GHz: 4.76dB |
| <b>Radiated Emission Measurement - AC2</b>   |
| Measuring Uncertainty for a Level of Confidence of 95% ( $U=2U_c(y)$ ):<br>9kHz ~ 1GHz: 3.86dB<br>1GHz ~ 25GHz: 4.33dB |



## 7. TEST RESULT

### 7.1. Summary

| FCC Section(s)   | IC Section(s)    | Test Description  | Test Limit   | Test Condition | Test Result | Reference         |
|------------------|------------------|---|--|----------------|-------------|-------------------|
| 15.247(a)(2)     | RSS-247 [5.2]    | 6dB Bandwidth   | $\geq 500\text{kHz}$   | Conducted      | Pass        | Section 7.2       |
| 15.247(b)(3)     | RSS-247 [5.4(4)] | Output Power  | $\leq 30\text{dBm}$  |                | Pass        | Section 7.3       |
| 15.247(e)        | RSS-247 [5.2]    | Power Spectral Density  | $\leq 8\text{dBm}/3\text{kHz}$   |                | Pass        | Section 7.4       |
| 15.247(d)        | RSS-247 [5.5]    | Band Edge / Out-of-Band Emissions   | $\leq 30\text{dBc(Peak)}$  |                | Pass        | Section 7.5       |
| 15.205<br>15.209 | RSS-247 [5.5]    | General Field Strength Limits (Restricted Bands and Radiated Emission Limits) | Emissions in restricted bands must meet the radiated limits detailed in 15.209 | Radiated       | Pass        | Section 7.6 & 7.7 |
| 15.207           | RSS-Gen [8.8]    | AC Conducted Emissions 150kHz - 30MHz   | < FCC 15.207 limits  | Line Conducted | Pass        | Section 7.8       |

#### Notes:

- 1) All modes of operation and data rates were investigated. For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- 3) "N/A" means that the test item is not applicable, and the details information refer to relevant section.
- 4) Test Items "6dB Bandwidth" & "Band Edge / Out-of-Band Emissions" have been assessed each transmission, and showed the worst test data in this report.

## 7.2. 6dB Bandwidth Measurement

### 7.2.1. Test Limit

The minimum 6dB bandwidth shall be at least 500 kHz.

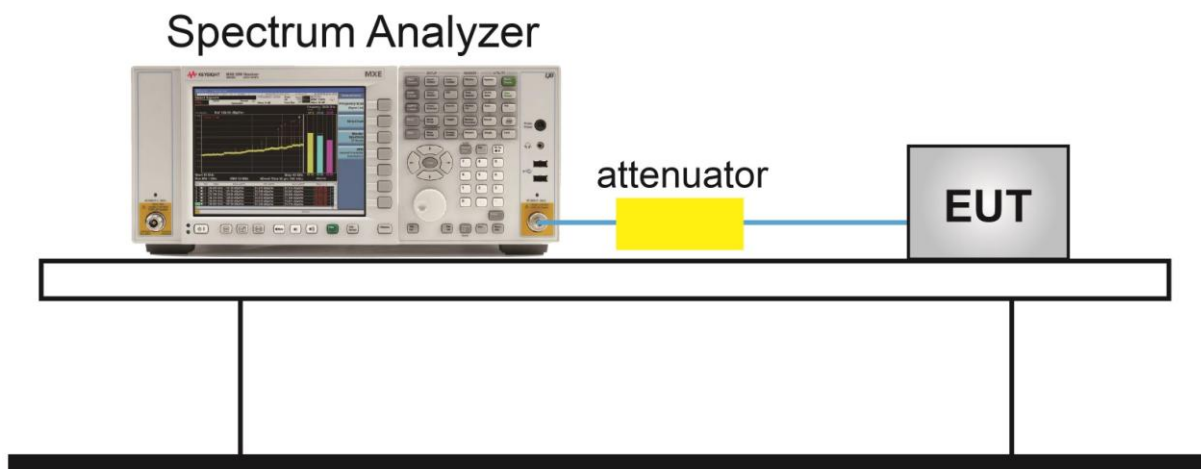
### 7.2.2. Test Procedure used

ANSI C63.10-2013 Section 11.8

### 7.2.3. Test Setting

1. The Spectrum's automatic bandwidth measurement capability was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to  $X = 6$ . The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. Set RBW = 100 kHz
3.  $VBW \geq 3 \times RBW$
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. Allow the trace was allowed to stabilize

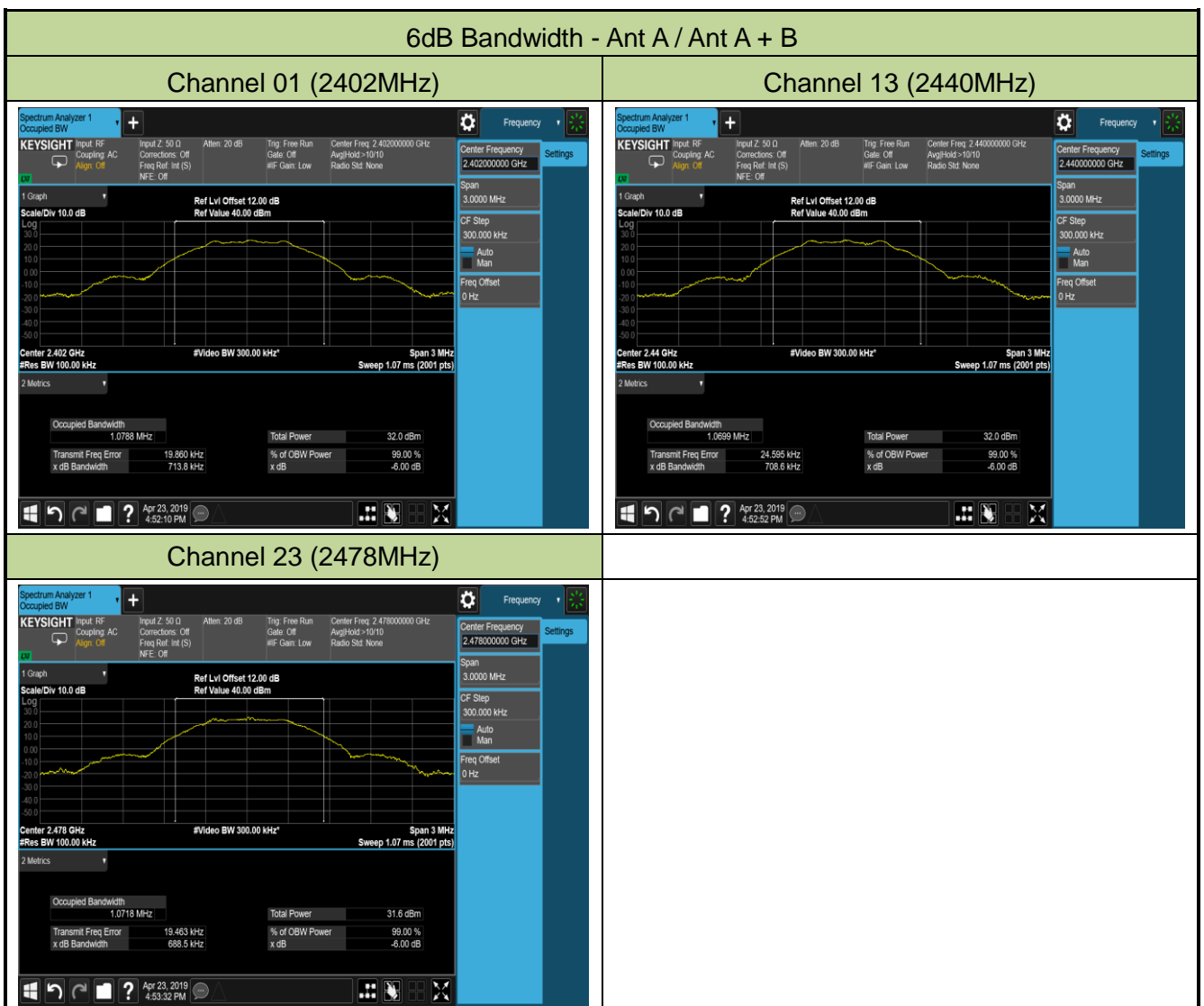
### 7.2.4. Test Setup



### 7.2.5. Test Result

|               |               |                   |            |
|---------------|---------------|-------------------|------------|
| Product       | Receiver      | Temperature       | 25°C       |
| Test Engineer | Ternence Wang | Relative Humidity | 52%        |
| Test Site     | TR3           | Test Date         | 2019/04/23 |

| Test Mode | Channel No. | Frequency (MHz) | 6dB Bandwidth (MHz) | 99% Bandwidth (MHz) | Limit (MHz) | Result |
|-----------|-------------|-----------------|---------------------|---------------------|-------------|--------|
| Ant A     |             |                 |                     |                     |             |        |
| GFSK      | 01          | 2402            | 0.71                | 1.08                | $\geq 0.5$  | Pass   |
| GFSK      | 13          | 2440            | 0.71                | 1.07                | $\geq 0.5$  | Pass   |
| GFSK      | 23          | 2478            | 0.69                | 1.07                | $\geq 0.5$  | Pass   |



### 7.3. Output Power Measurement

#### 7.3.1. Test Limit

The maximum out power shall be less 1 Watt (30dBm).

The conducted output power limit specified in paragraph FCC Part 15.247(b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs FCC Part 15.247(b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### 7.3.2. Test Procedure Used

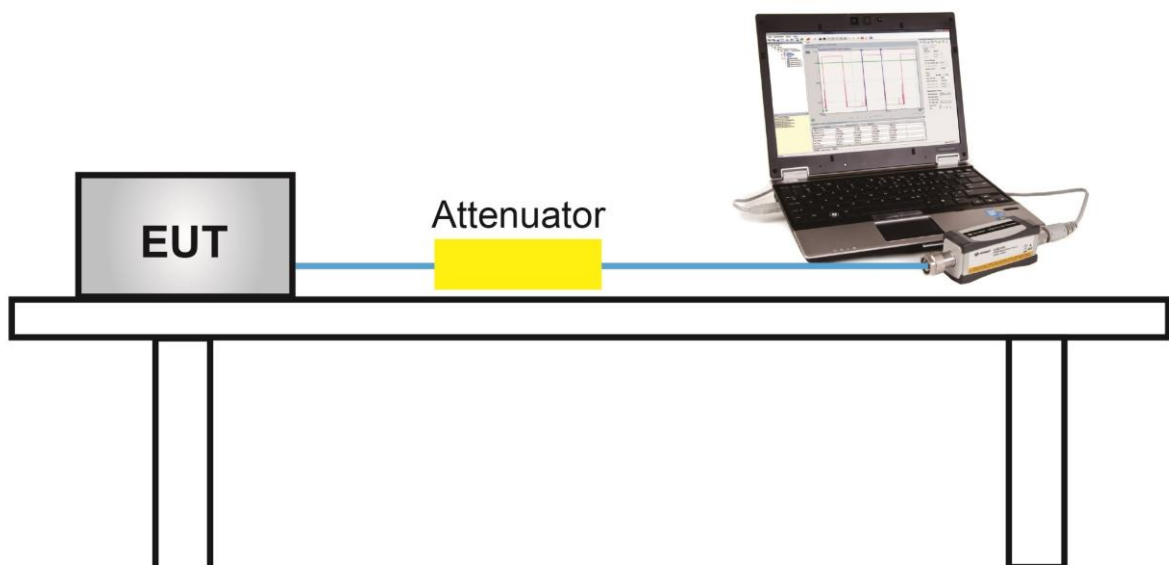
ANSI C63.10 Section 11.9.2.3.2

#### 7.3.3. Test Setting

##### Average Power Measurement

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.

#### 7.3.4. Test Setup



### 7.3.5.Test Result

|               |               |                   |            |
|---------------|---------------|-------------------|------------|
| Product       | Receiver      | Temperature       | 23°C       |
| Test Engineer | Ternence Wang | Relative Humidity | 51%        |
| Test Site     | TR3           | Test Date         | 2019/04/23 |

| Test Mode | Channel No. | Freq. (MHz) | Average Power (dBm) |       | Limit (dBm) | Result |
|-----------|-------------|-------------|---------------------|-------|-------------|--------|
|           |             |             | Ant A               | Ant B |             |        |
| GFSK      | 01          | 2402        | 25.62               | 25.40 | ≤ 30.00     | Pass   |
| GFSK      | 13          | 2440        | 25.82               | 25.58 | ≤ 30.00     | Pass   |
| GFSK      | 23          | 2478        | 25.79               | 25.51 | ≤ 30.00     | Pass   |

Note: The max EIRP = 25.82dBm + 2dBi = 27.82dBm.

## **7.4. Power Spectral Density Measurement**

### **7.4.1. Test Limit**

The maximum permissible power spectral density is 8dBm in any 3 kHz band.

The same method of determining the conducted output power shall be used to determine the power spectral density.

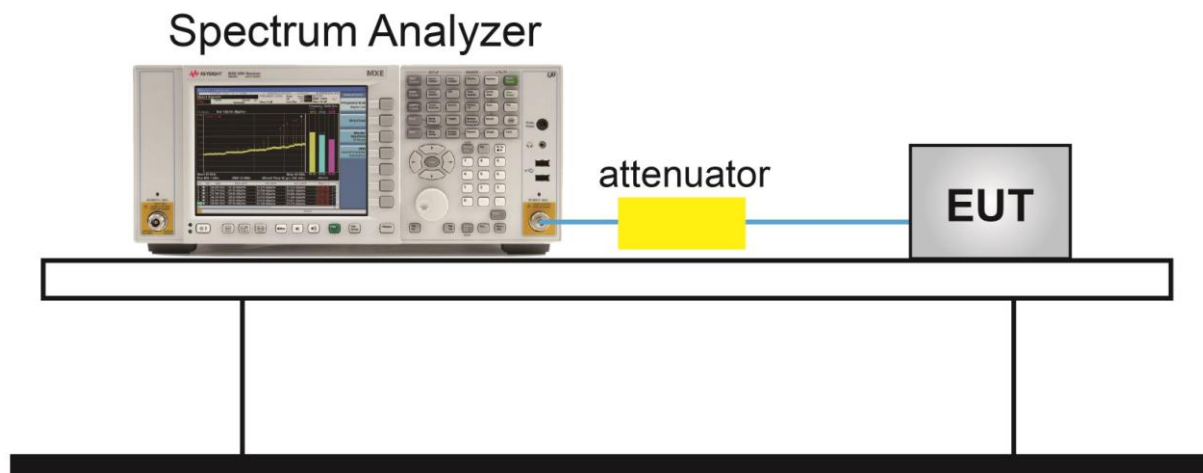
### **7.4.2. Test Procedure Used**

ANSI C63.10 Section 11.10.5

### **7.4.3. Test Setting**

1. Measure the duty cycle (x) of the transmitter output signal.
2. Set instrument center frequency to DTS channel center frequency.
3. Set span to at least 1.5 times the OBW.
4. RBW = 10 kHz.
5. VBW = 30 kHz.
6. Detector = RMS.
7. Ensure that the number of measurement points in the sweep  $\geq 2 \times \text{span/RBW}$ .
8. Sweep time = auto couple.
9. Don't use sweep triggering. Allow sweep to "free run".
10. Employ trace averaging (RMS) mode over a minimum of 100 traces.
11. Use the peak marker function to determine the maximum amplitude level.
12. Add  $10 \log (1/x)$ , where x is the duty cycle measured in step (a), to the measured PSD to compute the average PSD during the actual transmission time.

#### 7.4.4. Test Setup





#### 7.4.5. Test Result

|               |               |                   |            |
|---------------|---------------|-------------------|------------|
| Product       | Receiver      | Temperature       | 23°C       |
| Test Engineer | Ternence Wang | Relative Humidity | 52%        |
| Test Site     | TR3           | Test Date         | 2019/04/24 |

| Test Mode | Channel No. | Freq. (MHz) | AVG PSD (dBm / 10kHz) | Duty Cycle (%) | Final AVG PSD (dBm / 3kHz) | Limit (dBm / 3kHz) | Result |
|-----------|-------------|-------------|-----------------------|----------------|----------------------------|--------------------|--------|
| Ant A     |             |             |                       |                |                            |                    |        |
| GFSK      | 01          | 2402        | 3.58                  | 12.60          | 7.35                       | ≤ 8.00             | Pass   |
| GFSK      | 13          | 2440        | 3.88                  | 12.60          | 7.65                       | ≤ 8.00             | Pass   |
| GFSK      | 23          | 2478        | 4.00                  | 12.60          | 7.77                       | ≤ 8.00             | Pass   |
| Ant B     |             |             |                       |                |                            |                    |        |
| GFSK      | 01          | 2402        | 4.02                  | 12.60          | 7.79                       | ≤ 8.00             | Pass   |
| GFSK      | 13          | 2440        | 4.18                  | 12.60          | 7.95                       | ≤ 8.00             | Pass   |
| GFSK      | 23          | 2478        | 3.60                  | 12.60          | 7.37                       | ≤ 8.00             | Pass   |

Note: Final AVG PSD (dBm / 3kHz) = AVG PSD (dBm / 10kHz) + 10\*Log(3/10)+ 10\*log (1/Duty Cycle).

## Power Spectral Density - Ant A

### Channel 01 (2402MHz)



### Channel 13 (2440MHz)

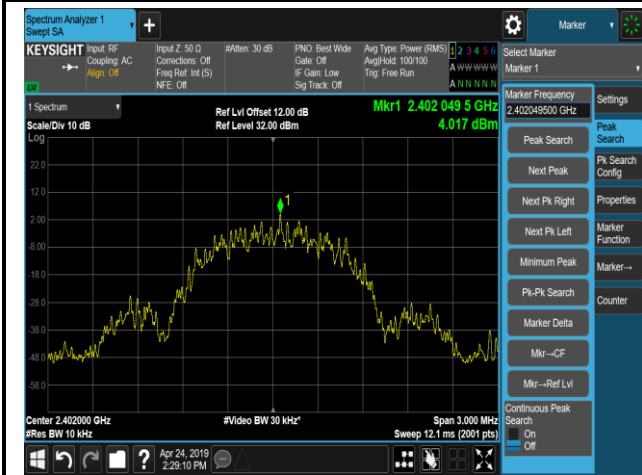


### Channel 23 (2478MHz)



## Power Spectral Density - Ant B

### Channel 01 (2402MHz)



### Channel 13 (2440MHz)



### Channel 23 (2478MHz)



## **7.5. Conducted Band Edge and Out-of-Band Emissions**

### **7.5.1. Test Limit**

The limit for out-of-band spurious emissions at the band edge is 30dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100 kHz bandwidth per the PSD procedure.

### **7.5.2. Test Procedure Used**

ANSI C63.10 Section 11.11

### **7.5.3. Test Setting**

#### **Reference level measurement**

1. Set instrument center frequency to DTS channel center frequency
2. Set the span to  $\geq 1.5$  times the DTS bandwidth
3. Set the RBW = 100 kHz
4. Set the VBW  $\geq 3 \times$  RBW
5. Detector = peak
6. Sweep time = auto couple
7. Trace mode = max hold
8. Allow trace to fully stabilize

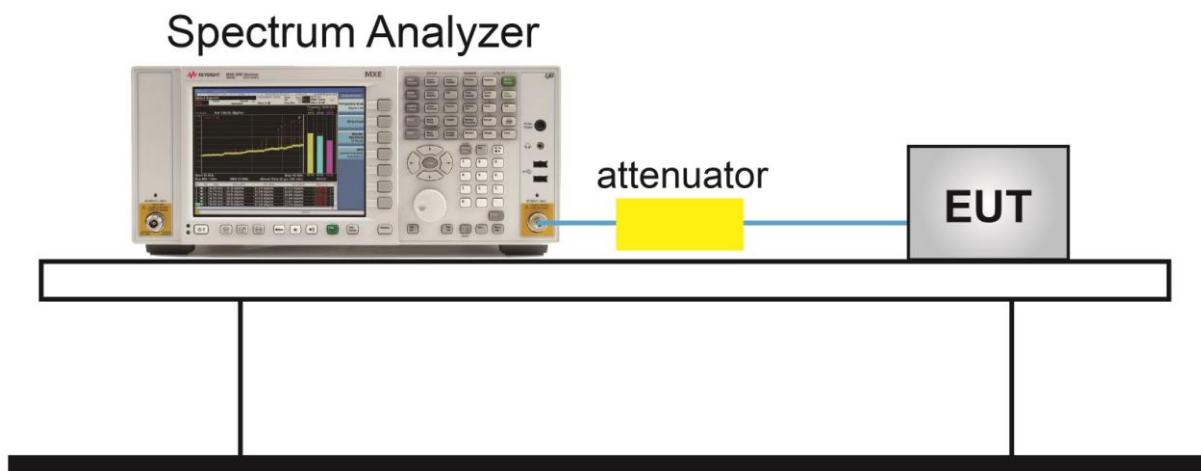
#### **Emission level measurement**

1. Set the center frequency and span to encompass frequency range to be measured
2. RBW = 100kHz
3. VBW = 300kHz
4. Detector = Peak
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

### Test Notes

1. RBW was set to 1.3MHz rather than 100 kHz in order to increase the measurement speed.
2. The display line shown in the following plots denotes the limit at 30Db below the fundamental emission level measured in a 100 kHz bandwidth. However, since the traces in the following plots are measured with a 1.3MHz RBW, the display line may not necessarily appear to be 30Db below the level of the fundamental in a 1.3MHz bandwidth.
3. For plots showing conducted spurious emissions near the limit, the frequencies were investigated with a reduced RBW to ensure that no emissions were present

### 7.5.4. Test Setup



### 7.5.5. Test Result

|               |               |                   |            |
|---------------|---------------|-------------------|------------|
| Product       | Receiver      | Temperature       | 23°C       |
| Test Engineer | Ternence Wang | Relative Humidity | 52%        |
| Test Site     | TR3           | Test Date         | 2019/04/24 |

| Test Mode | Channel No. | Frequency (MHz) | Limit | Result |
|-----------|-------------|-----------------|-------|--------|
| Ant A     |             |                 |       |        |
| GFSK      | 01          | 2402            | 30dBc | Pass   |
| GFSK      | 13          | 2440            | 30dBc | Pass   |
| GFSK      | 23          | 2478            | 30dBc | Pass   |

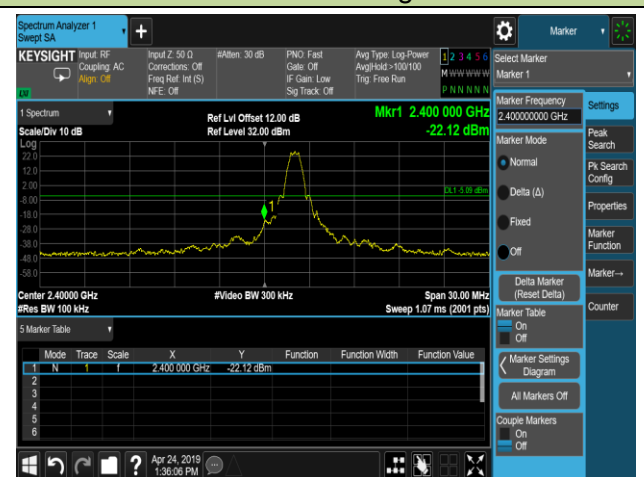
### Out-of-Band Emissions

#### Channel 01 (2402MHz) - Ant A

##### 100kHz PSD reference Level



##### Low Band Edge



### Spurious Emission



### Channel 13 (2440MHz) - Ant A

#### 100kHz PSD reference Level



#### Spurious Emission

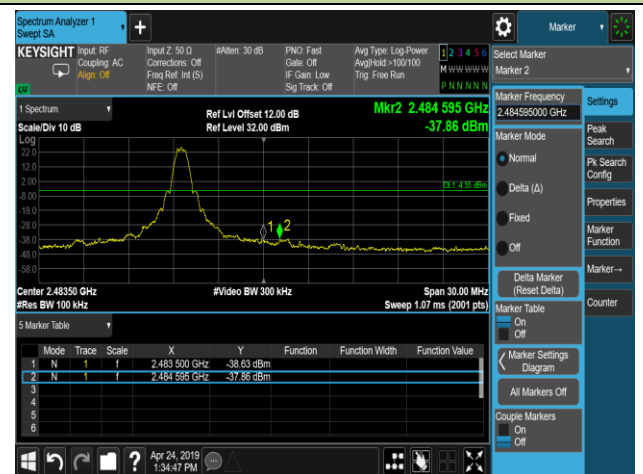


### Channel 23 (2478MHz) - Ant A

#### 100kHz PSD reference Level



#### High Band Edge



#### Spurious Emission



--

--



## 7.6. Radiated Spurious Emission Measurement

### 7.6.1. Test Limit

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.

| FCC Part 15 Subpart C Paragraph 15.209 |                         |                               |
|--|-------------------------|-------------------------------|
| Frequency<br>[MHz]                     | Field Strength<br>[V/m] | Measured Distance<br>[Meters] |
| 0.009 - 0.490                          | 2400/F (kHz)            | 300                           |
| 0.490 - 1.705                          | 24000/F (kHz)           | 30                            |
| 1.705 - 30                             | 30                      | 30                            |
| 30 - 88                                | 100                     | 3                             |
| 88 - 216                               | 150                     | 3                             |
| 216 - 960                              | 200                     | 3                             |
| Above 960                              | 500                     | 3                             |

### 7.6.2. Test Procedure Used

ANSI C63.10 Section 6.3 (General Requirements)

ANSI C63.10 Section 6.4 (Standard test method below 30MHz)

ANSI C63.10 Section 6.5 (Standard test method above 30MHz to 1GHz)

ANSI C63.10 Section 6.6 (Standard test method above 1GHz)

### 7.6.3. Test Setting

#### Quasi-Peak Measurements below 1GHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = as specified in Table 1
4. Detector = CISPR quasi-peak or average
5. Sweep time = auto couple
6. Trace was allowed to stabilize

**Table 1 - RBW as a function of frequency**

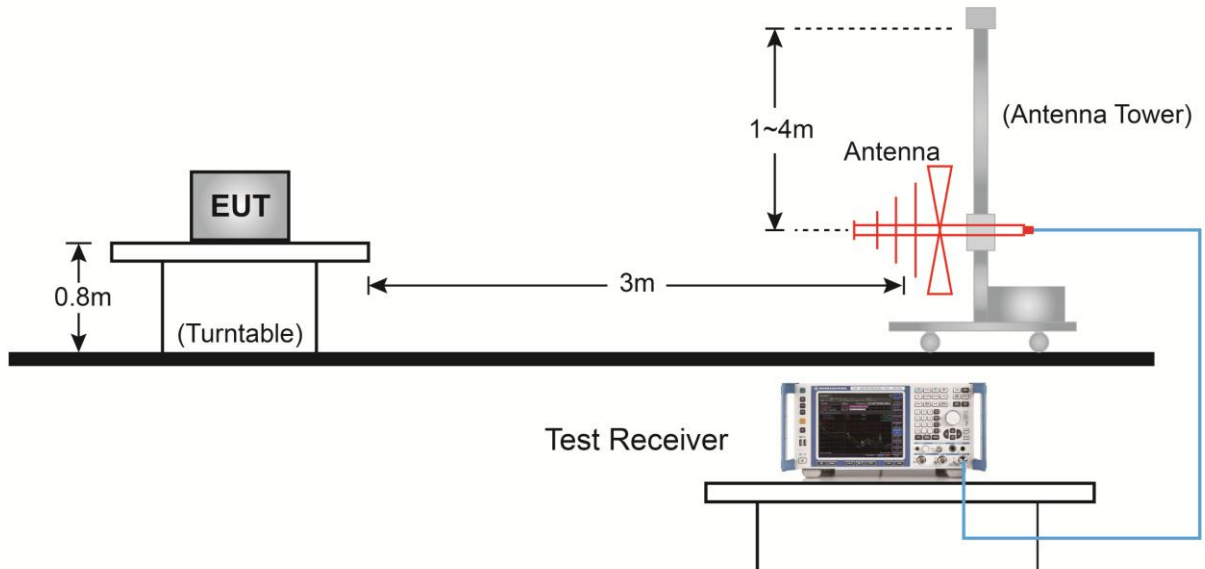
| Frequency     | RBW           |
|---------------|---------------|
| 9 ~ 150 kHz   | 200 ~ 300 Hz  |
| 0.15 ~ 30 MHz | 9 ~ 10 kHz    |
| 30 ~ 1000 MHz | 100 ~ 120 kHz |

**Peak Measurements above 1GHz**

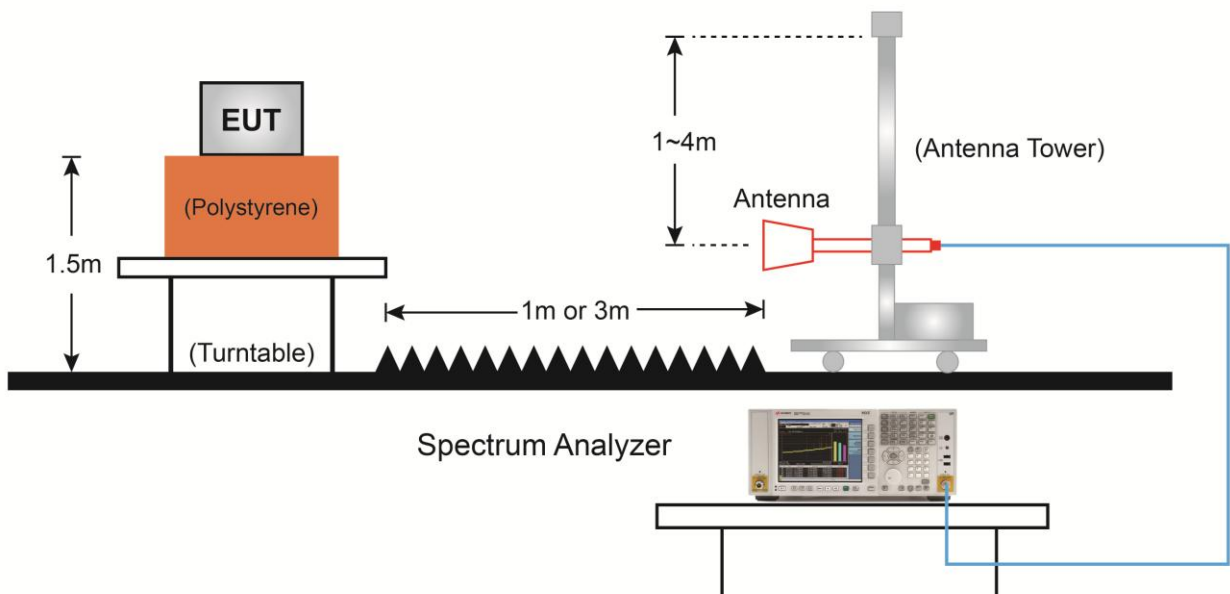
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

#### 7.6.4. Test Setup

##### Below 1GHz Test Setup:



##### Above 1GHz Test Setup:



### 7.6.5. Test Result

|               |  |                   |            |
|---------------|--|-------------------|------------|
| Product       | Receiver   | Temperature       | 26°C       |
| Test Engineer | Ternence Wang  | Relative Humidity | 56%        |
| Test Site     | AC1  | Test Date         | 2019/04/24 |
| Test Mode:    | Ant A  | Test Channel:     | 01         |
| Remark:       | 1. Average measurement was not performed if peak level lower than average limit (54dBμV/m).<br>2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report. |                   |            |

| Mark | Frequency (MHz) | Reading Level (dBμV) | Factor (dB) | Duty Cycle Factor (dB) | Measure Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Detector | Polarization |
|------|-----------------|----------------------|-------------|------------------------|------------------------|----------------|-------------|----------|--------------|
|      | 4799.5          | 63.4                 | 4.6         | N/A                    | 68.0                   | 74.0           | -6.0        | Peak     | Horizontal   |
|      | 4799.5          | 63.4                 | 4.6         | -18.0                  | 50.0                   | 54.0           | -4.0        | Average  | Horizontal   |
| *    | 7205.0          | 55.8                 | 10.5        | N/A                    | 66.3                   | 89.4           | -23.1       | Peak     | Horizontal   |
| *    | 9610.5          | 52.6                 | 14.0        | N/A                    | 66.6                   | 89.4           | -22.8       | Peak     | Horizontal   |
|      | 12007.5         | 40.6                 | 15.3        | N/A                    | 55.9                   | 74.0           | -18.1       | Peak     | Horizontal   |
|      | 12007.5         | 40.6                 | 15.3        | -18.0                  | 37.9                   | 54.0           | -16.1       | Average  | Horizontal   |
|      | 4808.0          | 60.0                 | 4.7         | N/A                    | 64.7                   | 74.0           | -9.3        | Peak     | Vertical     |
|      | 4808.0          | 60.0                 | 4.7         | -18.0                  | 46.7                   | 54.0           | -7.3        | Average  | Vertical     |
| *    | 7205.0          | 59.4                 | 10.5        | N/A                    | 69.9                   | 89.4           | -19.5       | Peak     | Vertical     |
| *    | 9610.5          | 57.7                 | 14.0        | N/A                    | 71.7                   | 89.4           | -17.7       | Peak     | Vertical     |
|      | 12007.5         | 43.1                 | 15.3        | N/A                    | 58.4                   | 74.0           | -15.6       | Peak     | Vertical     |
|      | 12007.5         | 43.1                 | 15.3        | -18.0                  | 40.4                   | 54.0           | -13.6       | Average  | Vertical     |

Note 1: "\*" is not in restricted band, its limit is 30dBc of the fundamental emission level (119.4dBμV/m) or 15.209 which is higher.

Note 2: Peak Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Average Measure Level = Peak Measure Level + Duty Cycle Factor

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre Amplifier Gain (dB)

Note 3: Average measurement was not performed when the peak level lower than average limit.

|               |  |                   |            |
|---------------|--|-------------------|------------|
| Product       | Receiver   | Temperature       | 26°C       |
| Test Engineer | Ternence Wang  | Relative Humidity | 56%        |
| Test Site     | AC1  | Test Date         | 2019/04/24 |
| Test Mode:    | Ant A  | Test Channel:     | 13         |
| Remark:       | 1. Average measurement was not performed if peak level lower than average limit (54dBμV/m).<br>2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report. |                   |            |

| Mark | Frequency (MHz) | Reading Level (dBμV) | Factor (dB) | Duty Cycle Factor (dB) | Measure Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Detector | Polarization |
|------|-----------------|----------------------|-------------|------------------------|------------------------|----------------|-------------|----------|--------------|
|      | 4876.0          | 63.3                 | 4.8         | N/A                    | 68.1                   | 74.0           | -5.9        | Peak     | Horizontal   |
|      | 4876.0          | 63.3                 | 4.8         | -18.0                  | 50.1                   | 54.0           | -3.9        | Average  | Horizontal   |
|      | 7315.5          | 54.5                 | 10.5        | N/A                    | 65.0                   | 74.0           | -9.0        | Peak     | Horizontal   |
|      | 7315.5          | 54.5                 | 10.5        | -18.0                  | 47.0                   | 54.0           | -7.0        | Average  | Horizontal   |
| *    | 9763.5          | 48.9                 | 14.5        | N/A                    | 63.4                   | 92.8           | -29.4       | Peak     | Horizontal   |
| *    | 14642.5         | 43.1                 | 19.6        | N/A                    | 62.7                   | 92.8           | -30.1       | Peak     | Horizontal   |
|      | 4876.0          | 61.0                 | 4.8         | N/A                    | 65.8                   | 74.0           | -8.2        | Peak     | Vertical     |
|      | 4876.0          | 61.0                 | 4.8         | -18.0                  | 47.8                   | 54.0           | -6.2        | Average  | Vertical     |
|      | 7315.5          | 57.4                 | 10.5        | N/A                    | 67.9                   | 74.0           | -6.1        | Peak     | Vertical     |
|      | 7315.5          | 57.4                 | 10.5        | -18.0                  | 49.9                   | 54.0           | -4.1        | Average  | Vertical     |
| *    | 9755.0          | 50.2                 | 14.5        | N/A                    | 64.7                   | 92.8           | -28.1       | Peak     | Vertical     |
| *    | 14642.5         | 41.0                 | 19.6        | N/A                    | 60.6                   | 92.8           | -32.2       | Peak     | Vertical     |

Note 1: “\*” is not in restricted band, its limit is 30dBc of the fundamental emission level (122.8dBμV/m) or 15.209 which is higher.

Note 2: Peak Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Average Measure Level = Peak Measure Level + Duty Cycle Factor

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre Amplifier Gain (dB)

Note 3: Average measurement was not performed when the peak level lower than average limit.

|               |  |                   |            |
|---------------|--|-------------------|------------|
| Product       | Receiver   | Temperature       | 26°C       |
| Test Engineer | Ternence Wang  | Relative Humidity | 56%        |
| Test Site     | AC1  | Test Date         | 2019/04/24 |
| Test Mode:    | Ant A  | Test Channel:     | 23         |
| Remark:       | 1. Average measurement was not performed if peak level lower than average limit (54dBμV/m).<br>2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report. |                   |            |

| Mark | Frequency (MHz) | Reading Level (dBμV) | Factor (dB) | Duty Cycle Factor (dB) | Measure Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Detector | Polarization |
|------|-----------------|----------------------|-------------|------------------------|------------------------|----------------|-------------|----------|--------------|
|      | 4952.5          | 65.3                 | 4.9         | N/A                    | 70.2                   | 74.0           | -3.8        | Peak     | Horizontal   |
|      | 4952.5          | 65.3                 | 4.9         | -18.0                  | 52.2                   | 54.0           | -1.8        | Average  | Horizontal   |
|      | 7434.5          | 55.3                 | 10.7        | N/A                    | 66.0                   | 74.0           | -8.0        | Peak     | Horizontal   |
|      | 7434.5          | 55.3                 | 10.7        | -18.0                  | 48.0                   | 54.0           | -6.0        | Average  | Horizontal   |
| *    | 9916.5          | 49.4                 | 14.6        | N/A                    | 64.0                   | 91.5           | -27.5       | Peak     | Horizontal   |
| *    | 14872.0         | 42.9                 | 19.1        | N/A                    | 62.0                   | 91.5           | -29.5       | Peak     | Horizontal   |
|      | 4952.5          | 58.7                 | 4.9         | N/A                    | 63.6                   | 74.0           | -10.4       | Peak     | Vertical     |
|      | 4952.5          | 58.7                 | 4.9         | -18.0                  | 45.6                   | 54.0           | -8.4        | Average  | Vertical     |
|      | 7434.5          | 56.4                 | 10.7        | N/A                    | 67.1                   | 74.0           | -6.9        | Peak     | Vertical     |
|      | 7434.5          | 56.4                 | 10.7        | -18.0                  | 49.1                   | 54.0           | -4.9        | Average  | Vertical     |
| *    | 9908.0          | 50.8                 | 14.7        | N/A                    | 65.5                   | 91.5           | -26.0       | Peak     | Vertical     |
| *    | 14863.5         | 41.7                 | 19.0        | N/A                    | 60.7                   | 91.5           | -30.8       | Peak     | Vertical     |

Note 1: “\*” is not in restricted band, its limit is 30dBc of the fundamental emission level (121.5dBμV/m) or 15.209 which is higher.

Note 2: Peak Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Average Measure Level = Peak Measure Level + Duty Cycle Factor

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre Amplifier Gain (dB)

Note 3: Average measurement was not performed when the peak level lower than average limit.

|               |  |                   |            |
|---------------|--|-------------------|------------|
| Product       | Receiver   | Temperature       | 26°C       |
| Test Engineer | Ternence Wang  | Relative Humidity | 56%        |
| Test Site     | AC1  | Test Date         | 2019/04/24 |
| Test Mode:    | Ant B  | Test Channel:     | 01         |
| Remark:       | 1. Average measurement was not performed if peak level lower than average limit (54dBμV/m).<br>2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report. |                   |            |

| Mark | Frequency (MHz) | Reading Level (dBμV) | Factor (dB) | Duty Cycle Factor (dB) | Measure Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Detector | Polarization |
|------|-----------------|----------------------|-------------|------------------------|------------------------|----------------|-------------|----------|--------------|
|      | 4799.5          | 67.2                 | 4.6         | N/A                    | 71.8                   | 74.0           | -2.2        | Peak     | Horizontal   |
|      | 4799.5          | 67.2                 | 4.6         | -18.0                  | 53.8                   | 54.0           | -0.2        | Average  | Horizontal   |
| *    | 7205.0          | 50.8                 | 10.5        | N/A                    | 61.3                   | 89.8           | -28.5       | Peak     | Horizontal   |
|      | 11123.5         | 35.9                 | 16.0        | N/A                    | 51.9                   | 74.0           | -22.1       | Peak     | Horizontal   |
| *    | 14413.0         | 39.5                 | 19.8        | N/A                    | 59.3                   | 89.8           | -30.5       | Peak     | Horizontal   |
|      | 4799.5          | 65.6                 | 4.6         | N/A                    | 70.2                   | 74.0           | -3.8        | Peak     | Vertical     |
|      | 4799.5          | 65.6                 | 4.6         | -18.0                  | 52.2                   | 54.0           | -1.8        | Average  | Vertical     |
| *    | 7205.0          | 50.5                 | 10.5        | N/A                    | 61.0                   | 89.8           | -28.8       | Peak     | Vertical     |
| *    | 9610.5          | 51.0                 | 14.0        | N/A                    | 65.0                   | 89.8           | -24.8       | Peak     | Vertical     |
|      | 12007.5         | 38.9                 | 15.3        | N/A                    | 54.2                   | 74.0           | -19.8       | Peak     | Vertical     |
|      | 12007.5         | 38.9                 | 15.3        | -18.0                  | 36.2                   | 54.0           | -17.8       | Average  | Vertical     |

Note 1: "\*" is not in restricted band, its limit is 30dBc of the fundamental emission level (119.8dBμV/m) or 15.209 which is higher.

Note 2: Peak Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Average Measure Level = Peak Measure Level + Duty Cycle Factor

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre Amplifier Gain (dB)

Note 3: Average measurement was not performed when the peak level lower than average limit.



|               |  |                   |            |
|---------------|--|-------------------|------------|
| Product       | Receiver   | Temperature       | 26°C       |
| Test Engineer | Ternence Wang  | Relative Humidity | 56%        |
| Test Site     | AC1  | Test Date         | 2019/04/24 |
| Test Mode:    | Ant B  | Test Channel:     | 13         |
| Remark:       | 1. Average measurement was not performed if peak level lower than average limit (54dBμV/m).<br>2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report. |                   |            |

| Mark | Frequency (MHz) | Reading Level (dBμV) | Factor (dB) | Duty Cycle Factor (dB) | Measure Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Detector | Polarization |
|------|-----------------|----------------------|-------------|------------------------|------------------------|----------------|-------------|----------|--------------|
|      | 4876.0          | 65.0                 | 4.8         | N/A                    | 69.8                   | 74.0           | -4.2        | Peak     | Horizontal   |
|      | 4876.0          | 65.0                 | 4.8         | -18.0                  | 51.8                   | 54.0           | -2.2        | Average  | Horizontal   |
|      | 7324.0          | 51.2                 | 10.5        | N/A                    | 61.7                   | 74.0           | -12.3       | Peak     | Horizontal   |
|      | 7324.0          | 51.2                 | 10.5        | -18.0                  | 43.7                   | 54.0           | -10.3       | Average  | Horizontal   |
| *    | 9755.0          | 47.5                 | 14.5        | N/A                    | 62.0                   | 90.2           | -28.2       | Peak     | Horizontal   |
| *    | 14642.5         | 38.0                 | 19.6        | N/A                    | 57.6                   | 90.2           | -32.6       | Peak     | Horizontal   |
|      | 4876.0          | 62.7                 | 4.8         | N/A                    | 67.5                   | 74.0           | -6.5        | Peak     | Vertical     |
|      | 4876.0          | 62.7                 | 4.8         | -18.0                  | 49.5                   | 54.0           | -4.5        | Average  | Vertical     |
|      | 7315.5          | 53.6                 | 10.5        | N/A                    | 64.1                   | 74.0           | -9.9        | Peak     | Vertical     |
|      | 7315.5          | 53.6                 | 10.5        | -18.0                  | 46.1                   | 54.0           | -7.9        | Average  | Vertical     |
| *    | 9755.0          | 49.9                 | 14.5        | N/A                    | 64.4                   | 90.2           | -25.8       | Peak     | Vertical     |
| *    | 14795.5         | 38.5                 | 19.3        | N/A                    | 57.8                   | 90.2           | -32.4       | Peak     | Vertical     |

Note 1: “\*” is not in restricted band, its limit is 30dBc of the fundamental emission level (120.2dBμV/m) or 15.209 which is higher.

Note 2: Peak Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Average Measure Level = Peak Measure Level + Duty Cycle Factor

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre Amplifier Gain (dB)

Note 3: Average measurement was not performed when the peak level lower than average limit.

|               |  |                   |            |
|---------------|--|-------------------|------------|
| Product       | Receiver   | Temperature       | 26°C       |
| Test Engineer | Ternence Wang  | Relative Humidity | 56%        |
| Test Site     | AC1  | Test Date         | 2019/04/24 |
| Test Mode:    | Ant B  | Test Channel:     | 23         |
| Remark:       | 1. Average measurement was not performed if peak level lower than average limit (54dBμV/m).<br>2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report. |                   |            |

| Mark | Frequency (MHz) | Reading Level (dBμV) | Factor (dB) | Duty Cycle Factor (dB) | Measure Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Detector | Polarization |
|------|-----------------|----------------------|-------------|------------------------|------------------------|----------------|-------------|----------|--------------|
|      | 4952.5          | 60.3                 | 4.9         | N/A                    | 65.2                   | 74.0           | -8.8        | Peak     | Horizontal   |
|      | 4952.5          | 60.3                 | 4.9         | -18.0                  | 47.2                   | 54.0           | -6.8        | Average  | Horizontal   |
|      | 7434.5          | 54.6                 | 10.7        | N/A                    | 65.3                   | 74.0           | -8.7        | Peak     | Horizontal   |
|      | 7434.5          | 54.6                 | 10.7        | -18.0                  | 47.3                   | 54.0           | -6.7        | Average  | Horizontal   |
| *    | 9916.5          | 50.7                 | 14.6        | N/A                    | 65.3                   | 86.6           | -21.3       | Peak     | Horizontal   |
| *    | 14872.0         | 40.5                 | 19.1        | N/A                    | 59.6                   | 86.6           | -27.0       | Peak     | Horizontal   |
|      | 4952.5          | 56.4                 | 4.9         | N/A                    | 61.3                   | 74.0           | -12.7       | Peak     | Vertical     |
|      | 4952.5          | 56.4                 | 4.9         | -18.0                  | 43.3                   | 54.0           | -10.7       | Average  | Vertical     |
|      | 7434.5          | 55.3                 | 10.7        | N/A                    | 66.0                   | 74.0           | -8.0        | Peak     | Vertical     |
|      | 7434.5          | 55.3                 | 10.7        | -18.0                  | 48.0                   | 54.0           | -6.0        | Average  | Vertical     |
| *    | 9916.5          | 53.7                 | 14.6        | N/A                    | 68.3                   | 86.6           | -18.3       | Peak     | Vertical     |
| *    | 14685.0         | 37.5                 | 19.4        | N/A                    | 56.9                   | 86.6           | -29.7       | Peak     | Vertical     |

Note 1: "\*" is not in restricted band, its limit is 30dBc of the fundamental emission level (116.6dBμV/m) or 15.209 which is higher.

Note 2: Peak Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

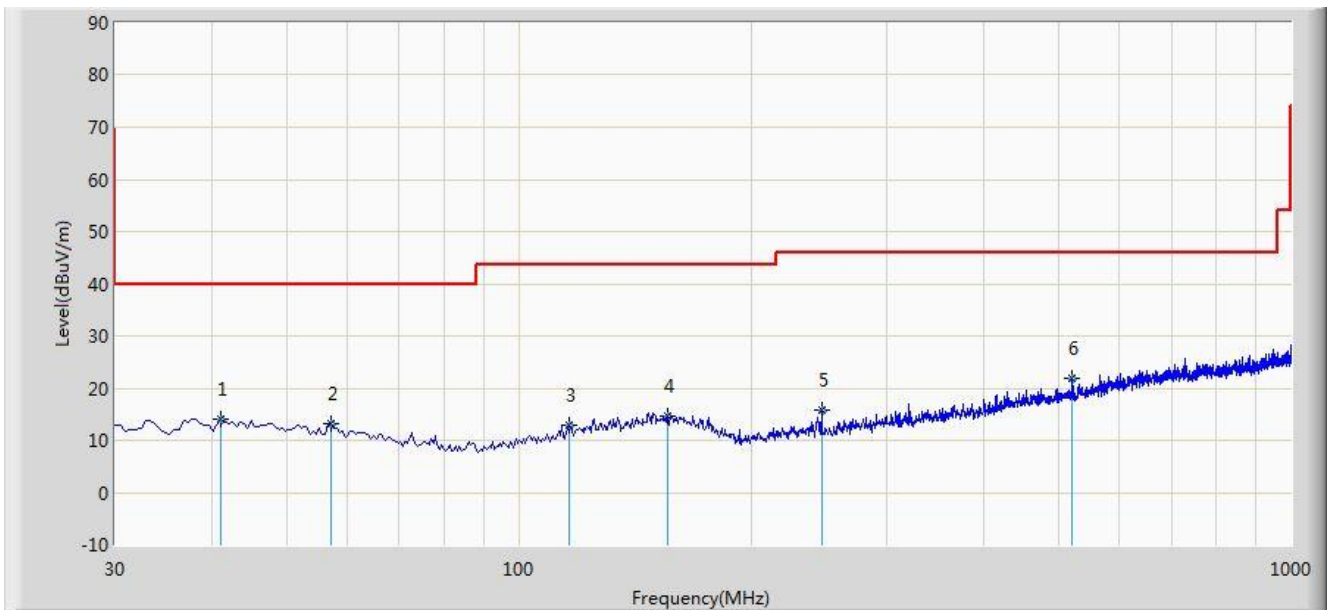
Average Measure Level = Peak Measure Level + Duty Cycle Factor

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre Amplifier Gain (dB)

Note 3: Average measurement was not performed when the peak level lower than average limit.

### The worst case of Radiated Emission below 1GHz:

|  |                          |
|--|--------------------------|
| Site: AC1  | Time: 2019/04/25 - 22:46 |
| Limit: FCC_Part15.209_RSE(3m)  | Engineer: David Lv       |
| Probe: VULB 9168 _20-2000MHz   | Polarity: Horizontal     |
| EUT: Receiver  | Power: By Battery        |
| <b>Test Mode: There is the worst case within frequency range 30MHz~1GHz.</b> |                          |



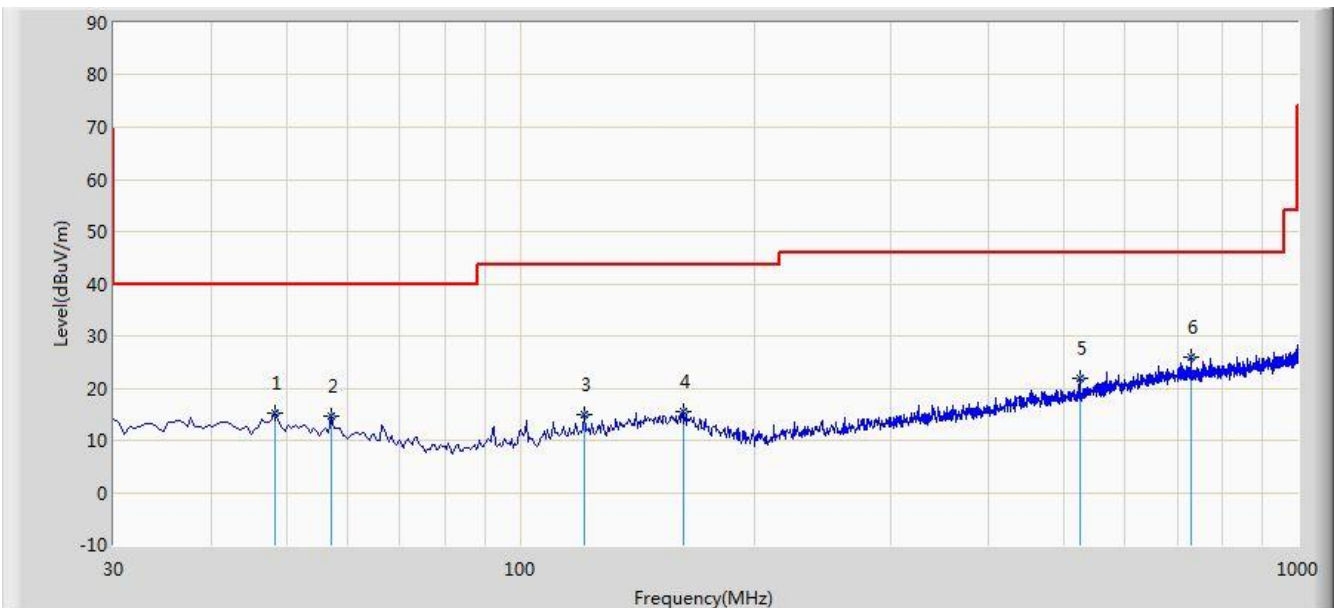
| No | Flag | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Margin (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|----|------|------|-----------------|------------------------|----------------------|-------------|----------------|-------------|------|
| 1  |      | *    | 41.155          | 14.027                 | -0.574               | -25.973     | 40.000         | 14.601      | QP   |
| 2  |      |      | 57.160          | 13.118                 | -0.620               | -26.882     | 40.000         | 13.738      | QP   |
| 3  |      |      | 116.330         | 12.902                 | -0.020               | -30.598     | 43.500         | 12.922      | QP   |
| 4  |      |      | 155.615         | 14.622                 | -0.786               | -28.878     | 43.500         | 15.408      | QP   |
| 5  |      |      | 246.795         | 15.717                 | 2.615                | -30.283     | 46.000         | 13.102      | QP   |
| 6  |      |      | 519.850         | 21.905                 | 2.609                | -24.095     | 46.000         | 19.295      | QP   |

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

|  |                          |
|--|--------------------------|
| Site: AC1  | Time: 2019/04/25 - 22:48 |
| Limit: FCC_Part15.209_RSE(3m)  | Engineer: David Lv       |
| Probe: VULB 9168 _20-2000MHz   | Polarity: Vertical       |
| EUT: Receiver  | Power: By Battery        |
| <b>Test Mode: There is the worst case within frequency range 30MHz~1GHz.</b> |                          |



| No | Flag | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Margin (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|----|------|------|-----------------|------------------------|----------------------|-------------|----------------|-------------|------|
| 1  |      |      | 48.430          | 15.088                 | 0.808                | -24.912     | 40.000         | 14.280      | QP   |
| 2  |      |      | 57.160          | 14.522                 | 0.784                | -25.478     | 40.000         | 13.738      | QP   |
| 3  |      |      | 120.695         | 15.045                 | 1.672                | -28.455     | 43.500         | 13.372      | QP   |
| 4  |      |      | 161.920         | 15.402                 | 0.168                | -28.098     | 43.500         | 15.234      | QP   |
| 5  |      |      | 524.215         | 21.822                 | 2.418                | -24.178     | 46.000         | 19.404      | QP   |
| 6  |      | *    | 728.885         | 25.987                 | 3.137                | -20.013     | 46.000         | 22.851      | QP   |

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

## 7.7. Radiated Restricted Band Edge Measurement

### 7.7.1. Test Limit

#### For 15.205 requirement:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a).

| Frequency<br>(MHz)         | Frequency<br>(MHz)  | Frequency<br>(MHz) | Frequency<br>(GHz) |
|----------------------------|---------------------|--------------------|--------------------|
| 0.090 - 0.110              | 16.42 - 16.423      | 399.9 - 410        | 4.5 - 5.15         |
| <sup>1</sup> 0.495 - 0.505 | 16.69475 - 16.69525 | 608 - 614          | 5.35 - 5.46        |
| 2.1735 - 2.1905            | 16.80425 - 16.80475 | 960 - 1240         | 7.25 - 7.75        |
| 4.125 - 4.128              | 25.5 - 25.67        | 1300 - 1427        | 8.025 - 8.5        |
| 4.17725 - 4.17775          | 37.5 - 38.25        | 1435 - 1626.5      | 9.0 - 9.2          |
| 4.20725 - 4.20775          | 73 - 74.6           | 1645.5 - 1646.5    | 9.3 - 9.5          |
| 6.215 - 6.218              | 74.8 - 75.2         | 1660 - 1710        | 10.6 - 12.7        |
| 6.26775 - 6.26825          | 108 - 121.94        | 1718.8 - 1722.2    | 13.25 - 13.4       |
| 6.31175 - 6.31225          | 123 - 138           | 2200 - 2300        | 14.47 - 14.5       |
| 8.291 - 8.294              | 149.9 - 150.05      | 2310 - 2390        | 15.35 - 16.2       |
| 8.362 - 8.366              | 156.52475 - 156.525 | 2483.5 - 2500      | 17.7 - 21.4        |
| 8.37625 - 8.38675          | 156.7 - 156.9       | 2690 - 2900        | 22.01 - 23.12      |
| 8.41425 - 8.41475          | 162.0125 - 167.17   | 3260 - 3267        | 23.6 - 24.0        |
| 12.29 - 12.293             | 167.72 - 173.2      | 3332 - 3339        | 31.2 - 31.8        |
| 12.51975 - 12.52025        | 240 - 285           | 3345.8 - 3358      | 36.43 - 36.5       |
| 12.57675 - 12.57725        | 322 - 335.4         | 3600 - 4400        | ( <sup>2</sup> )   |
| 13.36 - 13.41              | --                  | --                 | --                 |

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47CFR must not exceed the limits shown in Table per Section 15.209.

| FCC Part 15 Subpart C Paragraph 15.209 |                          |                               |
|--|--------------------------|-------------------------------|
| Frequency<br>[MHz]                     | Field Strength<br>[uV/m] | Measured Distance<br>[Meters] |
| 0.009 - 0.490                          | 2400/F (kHz)             | 300                           |
| 0.490 - 1.705                          | 24000/F (kHz)            | 30                            |
| 1.705 - 30                             | 30                       | 30                            |
| 30 - 88                                | 100                      | 3                             |
| 88 - 216                               | 150                      | 3                             |
| 216 - 960                              | 200                      | 3                             |
| Above 960                              | 500                      | 3                             |

**For RSS-Gen Section 8.10 requirement:**

Radiated emissions which fall in the restricted bands, as defined in Section 8.10 of RSS-Gen, must also comply with the radiated emission limits specified in Section 8.9.

| Frequency<br>(MHz)  | Frequency<br>(MHz)     | Frequency<br>(GHz) |
|---------------------|------------------------|--------------------|
| 0.009 - 0.110       | 149.9 - 150.05         | 9.0 - 9.2          |
| 0.495 - 0.505       | 156.52475 - 156.525225 | 9.3 - 9.5          |
| 2.1735 - 2.1905     | 156.7 - 156.9          | 10.6 - 12.7        |
| 3.020 - 3.026       | 162.0125 - 167.17      | 13.25 - 13.4       |
| 4.125 - 4.128       | 167.72 - 173.2         | 14.47 - 14.5       |
| 4.17725 - 4.17775   | 240 - 285              | 15.35 - 16.2       |
| 4.20725 - 4.20775   | 322 - 335.4            | 17.7 - 21.4        |
| 5.677 - 5.683       | 399.9 - 410            | 22.01 - 23.12      |
| 6.215 - 6.218       | 608 - 614              | 23.6 - 24.0        |
| 6.26775 - 6.26825   | 960 - 1427             | 31.2 - 31.8        |
| 6.31175 - 6.31225   | 1435 - 1626.5          | 36.43 - 36.5       |
| 8.291 - 8.294       | 1645.5 - 1646.5        | Above 38.6         |
| 8.362 - 8.366       | 1660 - 1710            | --                 |
| 8.37625 - 8.38675   | 1718.8 - 1722.2        |                    |
| 8.41425 - 8.41475   | 2200 - 2300            |                    |
| 12.29 - 12.293      | 2310 - 2390            |                    |
| 12.51975 - 12.52025 | 2483.5 - 2500          |                    |
| 12.57675 - 12.57725 | 2655 - 2900            |                    |
| 13.36 - 13.41       | 3260 - 3267            |                    |
| 16.42 - 16.423      | 3332 - 3339            |                    |
| 16.69475 - 16.69525 | 334.5 - 3358           |                    |
| 16.80425 - 16.80475 | 3500 - 4400            |                    |
| 25.5 - 25.67        | 4500 - 5150            |                    |
| 37.5 - 38.25        | 5350 - 5460            |                    |
| 73 - 74.6           | 7250 - 7750            |                    |
| 74.8 - 75.2         | 8025 - 8500            |                    |
| 108 - 138           | --                     |                    |

All out of band emissions appearing in a restricted band as specified in Section 8.10 of the RSS-Gen must not exceed the limits shown in Table per Section 8.9.

| RSS-Gen Section 8.9 |                          |                               |
|---------------------|--------------------------|-------------------------------|
| Frequency<br>[MHz]  | Field Strength<br>[uV/m] | Measured Distance<br>[Meters] |
| 0.009 - 0.490       | 2400/F (kHz)             | 300                           |
| 0.490 - 1.705       | 24000/F (kHz)            | 30                            |
| 1.705 - 30          | 30                       | 30                            |
| 30 - 88             | 100                      | 3                             |
| 88 - 216            | 150                      | 3                             |
| 216 - 960           | 200                      | 3                             |
| Above 960           | 500                      | 3                             |

### 7.7.2.Test Procedure Used

ANSI C63.10 Section 6.3 (General Requirements)

ANSI C63.10 Section 6.6 (Standard test method above 1GHz)

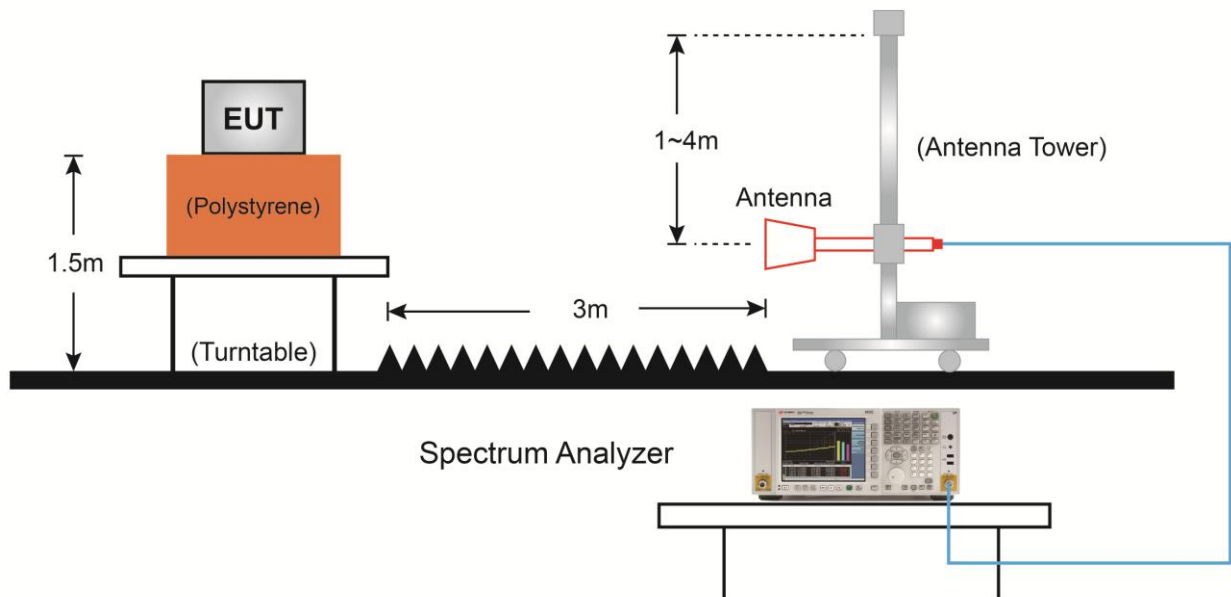
### 7.7.3.Test Setting

#### Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = as specified in Table 1
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

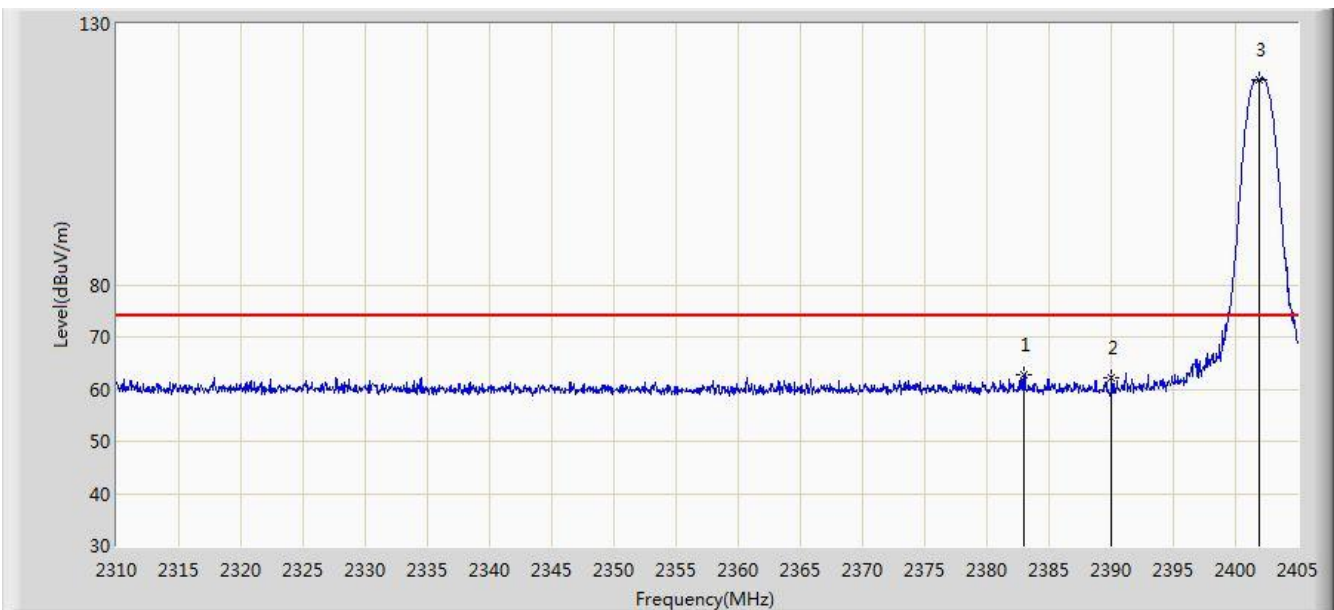


#### 7.7.4. Test Setup



### 7.7.5.Test Result

|  |                          |
|--|--------------------------|
| Site: AC1                                    | Time: 2019/04/24 - 03:38 |
| Limit: FCC_Part15_Band Edge(3m)              | Engineer: Dandy Li       |
| Probe: BBHA9120D_1-18GHz                     | Polarity: Horizontal     |
| EUT: Receiver                                | Power: By Battery        |
| Test Mode: Transmit at Channel 2402MHz Ant A |                          |



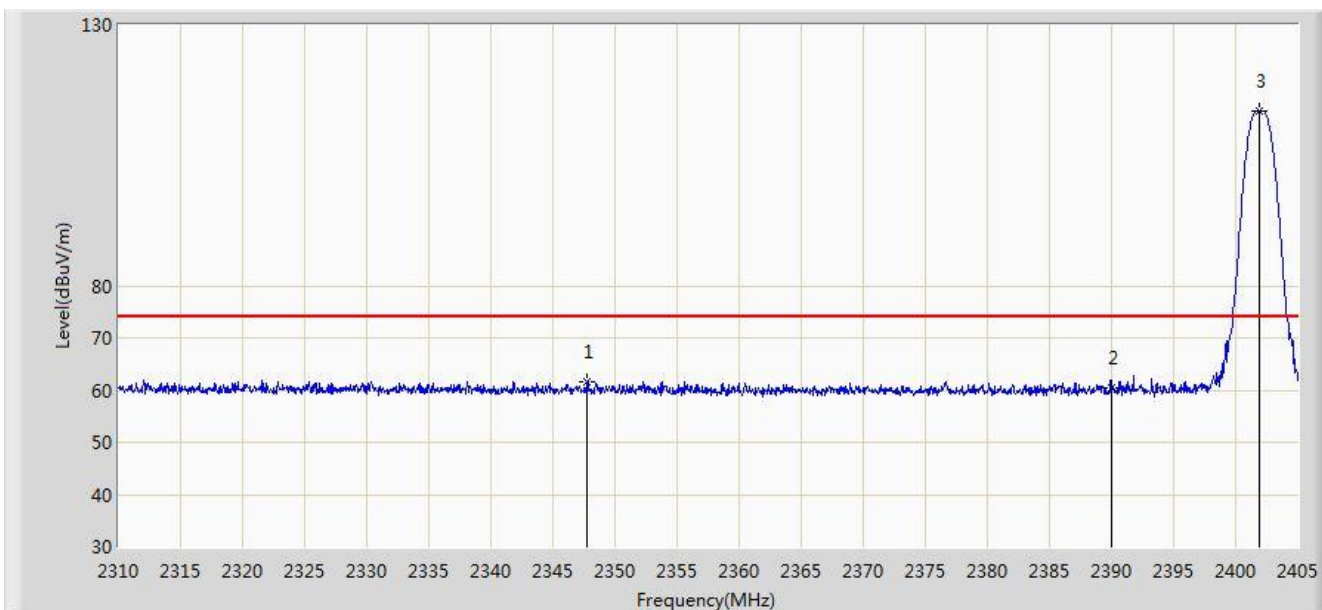
| No | Flag | Mark | Frequency (MHz) | Reading Level (dBuV) | Factor (dB) | Duty Cycle Factor (dB) | Measure Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Type |
|----|------|------|-----------------|----------------------|-------------|------------------------|------------------------|----------------|-------------|------|
| 1  |      |      | 2383.008        | 30.262               | 32.426      | N/A                    | 62.688                 | 74.000         | -11.312     | PK   |
|    |      |      | 2383.008        | 30.262               | 32.426      | -17.99                 | 44.698                 | 54.000         | -9.302      | AV   |
| 2  |      |      | 2390.000        | 29.897               | 32.413      | N/A                    | 62.310                 | 74.000         | -11.690     | PK   |
|    |      |      | 2390.000        | 29.897               | 32.413      | -17.99                 | 44.320                 | 54.000         | -9.680      | AV   |
| 3  |      | *    | 2401.865        | 86.956               | 32.396      | N/A                    | 119.352                | N/A            | N/A         | PK   |

Note: Peak Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Average Measure Level = Peak Measure Level + Duty Cycle Factor

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

|  |                          |
|--|--------------------------|
| Site: AC1                                    | Time: 2019/04/24 - 03:45 |
| Limit: FCC_Part15_Band Edge(3m)              | Engineer: Dandy Li       |
| Probe: BBHA9120D_1-18GHz                     | Polarity: Vertical       |
| EUT: Receiver                                | Power: By Battery        |
| Test Mode: Transmit at Channel 2402MHz Ant A |                          |



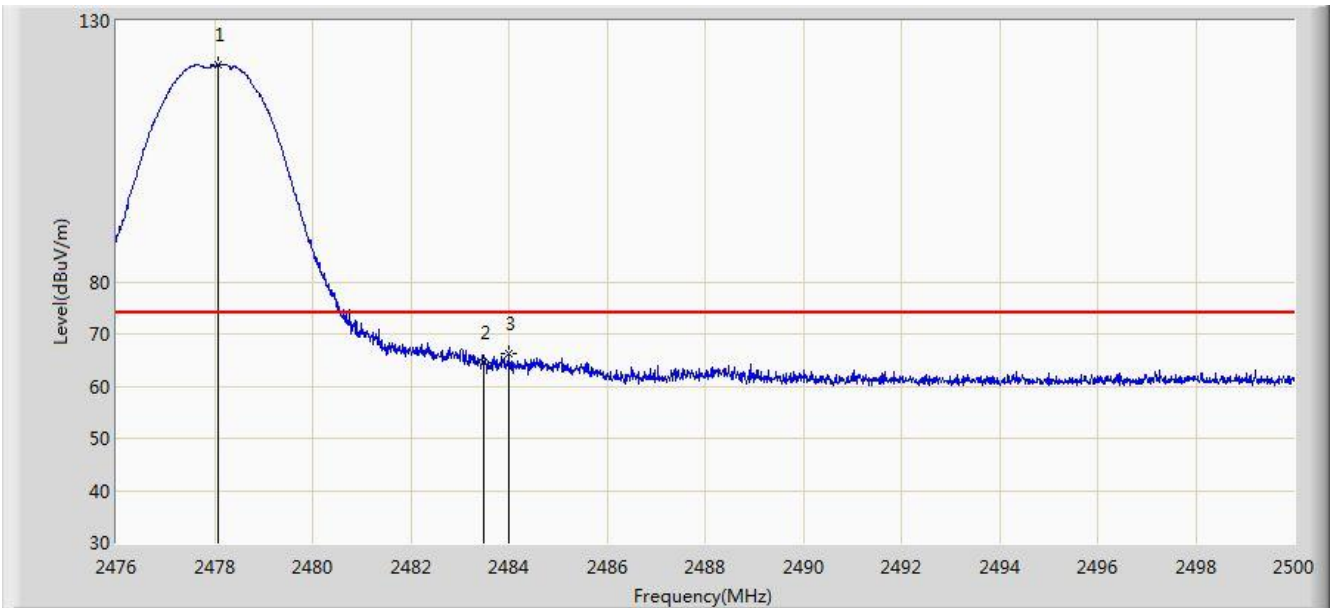
| No | Flag | Mark | Frequency (MHz) | Reading Level (dBuV) | Factor (dB) | Duty Cycle Factor (dB) | Measure Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Type |
|----|------|------|-----------------|----------------------|-------------|------------------------|------------------------|----------------|-------------|------|
| 1  |      |      | 2347.762        | 29.073               | 32.522      | N/A                    | 61.595                 | 74.000         | -12.405     | PK   |
|    |      |      | 2347.762        | 29.073               | 32.522      | -17.99                 | 43.605                 | 54.000         | -10.395     | AV   |
| 2  |      |      | 2390.000        | 28.033               | 32.413      | N/A                    | 60.446                 | 74.000         | -13.554     | PK   |
|    |      |      | 2390.000        | 28.033               | 32.413      | -17.99                 | 42.456                 | 54.000         | -11.544     | AV   |
| 4  |      | *    | 2401.865        | 80.994               | 32.396      | N/A                    | 113.39                 | N/A            | N/A         | PK   |

Note: Peak Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Average Measure Level = Peak Measure Level + Duty Cycle Factor

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

|  |                          |
|--|--------------------------|
| Site: AC1                                    | Time: 2019/04/24 - 03:47 |
| Limit: FCC_Part15_Band Edge(3m)              | Engineer: Dandy Li       |
| Probe: BBHA9120D_1-18GHz                     | Polarity: Horizontal     |
| EUT: Receiver                                | Power: By Battery        |
| Test Mode: Transmit at Channel 2478MHz Ant A |                          |



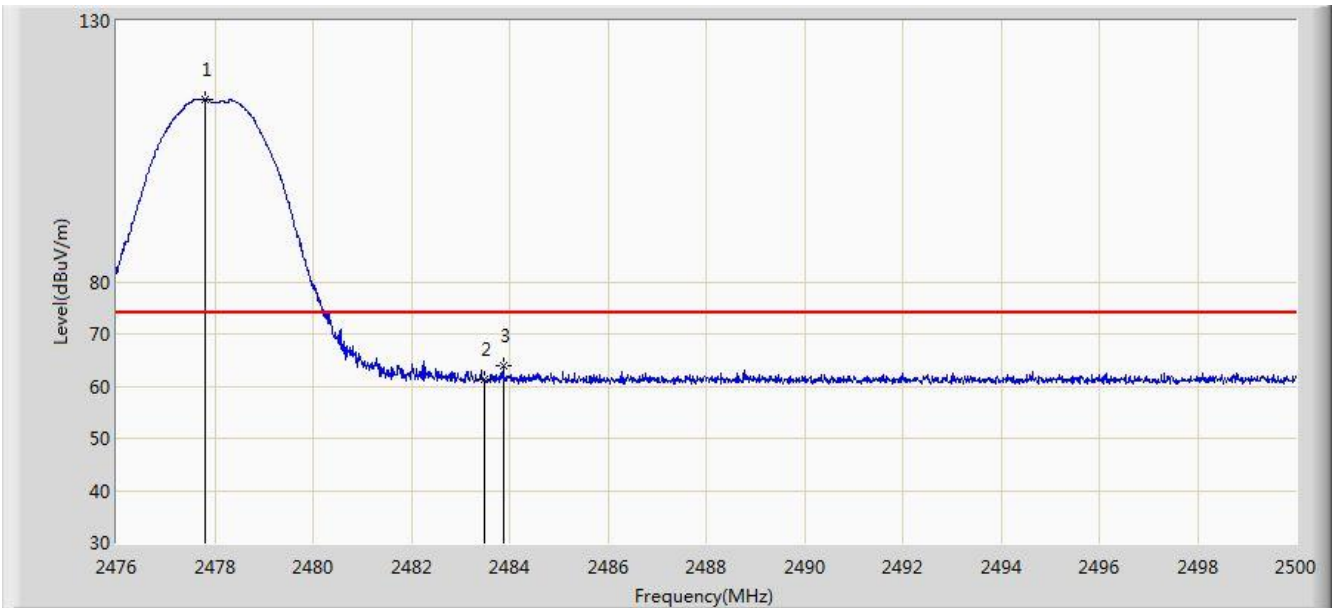
| No | Flag | Mark | Frequency (MHz) | Reading Level (dBuV) | Factor (dB) | Duty Cycle Factor (dB) | Measure Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Type |
|----|------|------|-----------------|----------------------|-------------|------------------------|------------------------|----------------|-------------|------|
| 1  |      | *    | 2478.076        | 89.061               | 32.404      | N/A                    | 121.465                | N/A            | N/A         | PK   |
| 2  |      |      | 2483.500        | 32.189               | 32.416      | N/A                    | 64.605                 | 74.000         | -9.395      | PK   |
|    |      |      | 2483.500        | 32.189               | 32.416      | -17.99                 | 46.615                 | 54.000         | -7.385      | AV   |
| 3  |      |      | 2484.004        | 33.786               | 32.417      | N/A                    | 66.203                 | 74.000         | -7.797      | PK   |
|    |      |      | 2484.004        | 33.786               | 32.417      | -17.99                 | 48.213                 | 54.000         | -5.787      | AV   |

Note: Peak Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Average Measure Level = Peak Measure Level + Duty Cycle Factor

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

|  |                          |
|--|--------------------------|
| Site: AC1                                    | Time: 2019/04/24 - 03:50 |
| Limit: FCC_Part15_Band Edge(3m)              | Engineer: Dandy Li       |
| Probe: BBHA9120D_1-18GHz                     | Polarity: Vertical       |
| EUT: Receiver                                | Power: By Battery        |
| Test Mode: Transmit at Channel 2478MHz Ant A |                          |



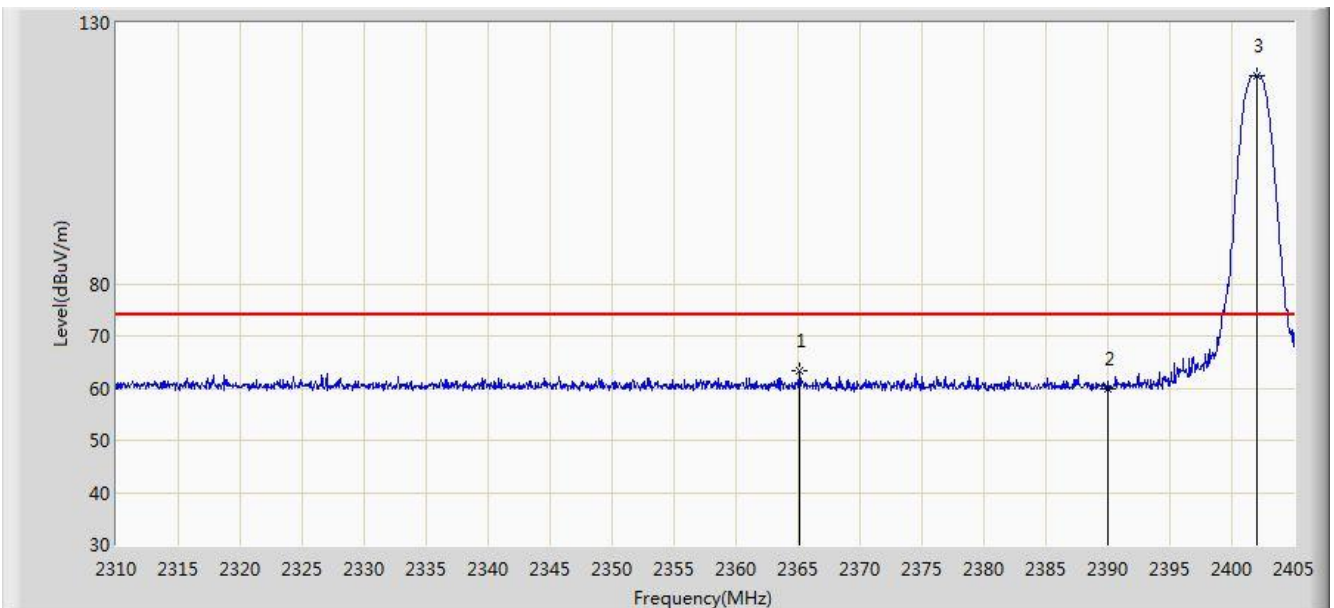
| No | Flag | Mark | Frequency (MHz) | Reading Level (dBuV) | Factor (dB) | Duty Cycle Factor (dB) | Measure Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Type |
|----|------|------|-----------------|----------------------|-------------|------------------------|------------------------|----------------|-------------|------|
| 1  |      | *    | 2477.812        | 82.56                | 32.403      | N/A                    | 114.963                | N/A            | N/A         | PK   |
| 2  |      |      | 2483.500        | 28.898               | 32.416      | N/A                    | 61.314                 | 74.000         | -12.686     | PK   |
|    |      |      | 2483.500        | 28.898               | 32.416      | -17.99                 | 43.324                 | 54.000         | -10.676     | AV   |
| 3  |      |      | 2483.872        | 31.467               | 32.416      | N/A                    | 63.883                 | 74.000         | -10.117     | PK   |
|    |      |      | 2483.872        | 31.467               | 32.416      | -17.99                 | 45.893                 | 54.000         | -8.107      | AV   |

Note: Peak Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Average Measure Level = Peak Measure Level + Duty Cycle Factor

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

|  |                          |
|--|--------------------------|
| Site: AC1                                    | Time: 2019/04/24 - 03:54 |
| Limit: FCC_Part15_Band Edge(3m)              | Engineer: Dandy Li       |
| Probe: BBHA9120D_1-18GHz                     | Polarity: Horizontal     |
| EUT: Receiver                                | Power: By Battery        |
| Test Mode: Transmit at Channel 2402MHz Ant B |                          |



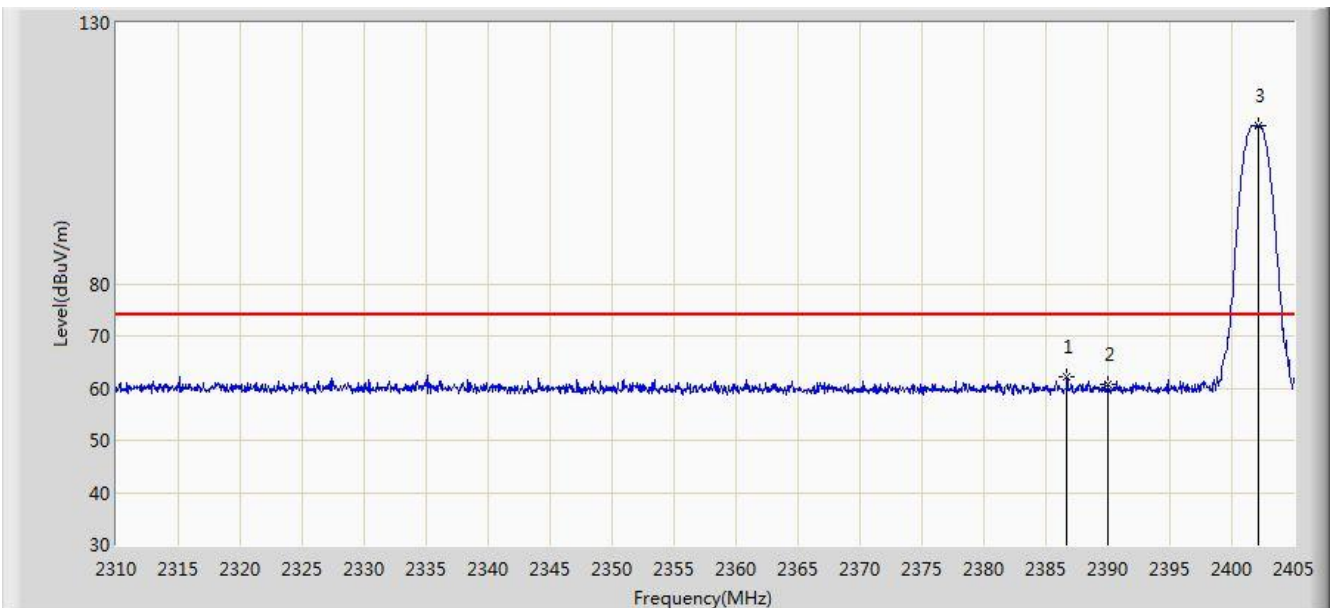
| No | Flag | Mark | Frequency (MHz) | Reading Level (dBuV) | Factor (dB) | Duty Cycle Factor (dB) | Measure Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Type |
|----|------|------|-----------------|----------------------|-------------|------------------------|------------------------|----------------|-------------|------|
| 1  |      |      | 2365.147        | 30.964               | 32.463      | N/A                    | 63.427                 | 74.000         | -10.573     | PK   |
|    |      |      | 2365.147        | 30.964               | 32.463      | -17.99                 | 45.437                 | 54.000         | -8.563      | AV   |
| 2  |      |      | 2390.000        | 27.392               | 32.413      | N/A                    | 59.805                 | 74.000         | -14.195     | PK   |
|    |      |      | 2390.000        | 27.392               | 32.413      | -17.99                 | 41.815                 | 54.000         | -12.185     | AV   |
| 3  |      | *    | 2402.008        | 87.372               | 32.396      | N/A                    | 119.768                | N/A            | N/A         | PK   |

Note: Peak Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Average Measure Level = Peak Measure Level + Duty Cycle Factor

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

|  |                          |
|--|--------------------------|
| Site: AC1                                    | Time: 2019/04/24 - 03:58 |
| Limit: FCC_Part15_Band Edge(3m)              | Engineer: Dandy Li       |
| Probe: BBHA9120D_1-18GHz                     | Polarity: Vertical       |
| EUT: Receiver                                | Power: By Battery        |
| Test Mode: Transmit at Channel 2402MHz Ant B |                          |



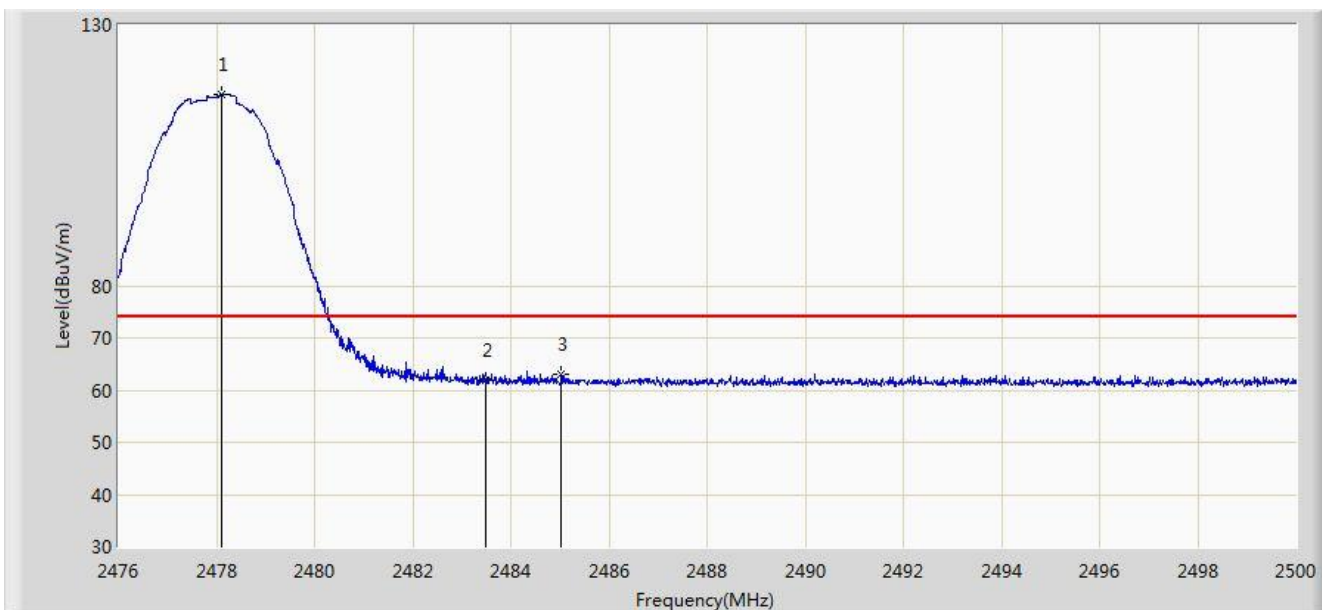
| No | Flag | Mark | Frequency (MHz) | Reading Level (dBuV) | Factor (dB) | Duty Cycle Factor (dB) | Measure Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Type |
|----|------|------|-----------------|----------------------|-------------|------------------------|------------------------|----------------|-------------|------|
| 1  |      |      | 2386.712        | 29.615               | 32.418      | N/A                    | 62.033                 | 74.000         | -11.967     | PK   |
|    |      |      | 2386.712        | 29.615               | 32.418      | -17.99                 | 44.043                 | 54.000         | -9.957      | AV   |
| 2  |      |      | 2390.000        | 28.295               | 32.413      | N/A                    | 60.708                 | 74.000         | -13.292     | PK   |
|    |      |      | 2390.000        | 28.295               | 32.413      | -17.99                 | 42.718                 | 54.000         | -11.282     | AV   |
| 4  |      | *    | 2402.150        | 77.992               | 32.396      | N/A                    | 110.388                | N/A            | N/A         | PK   |

Note: Peak Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Average Measure Level = Peak Measure Level + Duty Cycle Factor

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

|  |                          |
|--|--------------------------|
| Site: AC1                                    | Time: 2019/04/24 - 03:59 |
| Limit: FCC_Part15_Band Edge(3m)              | Engineer: Dandy Li       |
| Probe: BBHA9120D_1-18GHz                     | Polarity: Horizontal     |
| EUT: Receiver                                | Power: By Battery        |
| Test Mode: Transmit at Channel 2478MHz Ant B |                          |



| No | Flag | Mark | Frequency (MHz) | Reading Level (dBuV) | Factor (dB) | Duty Cycle Factor (dB) | Measure Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Type |
|----|------|------|-----------------|----------------------|-------------|------------------------|------------------------|----------------|-------------|------|
| 1  |      | *    | 2478.112        | 84.151               | 32.404      | N/A                    | 116.555                | N/A            | N/A         | PK   |
| 2  |      |      | 2483.500        | 29.334               | 32.416      | N/A                    | 61.750                 | 74.000         | -12.250     | PK   |
|    |      |      | 2483.500        | 29.334               | 32.416      | -17.99                 | 43.760                 | 54.000         | -10.240     | AV   |
| 3  |      |      | 2485.036        | 30.676               | 32.418      | N/A                    | 63.094                 | 74.000         | -10.906     | PK   |
|    |      |      | 2485.036        | 30.676               | 32.418      | -17.99                 | 45.104                 | 54.000         | -8.896      | AV   |

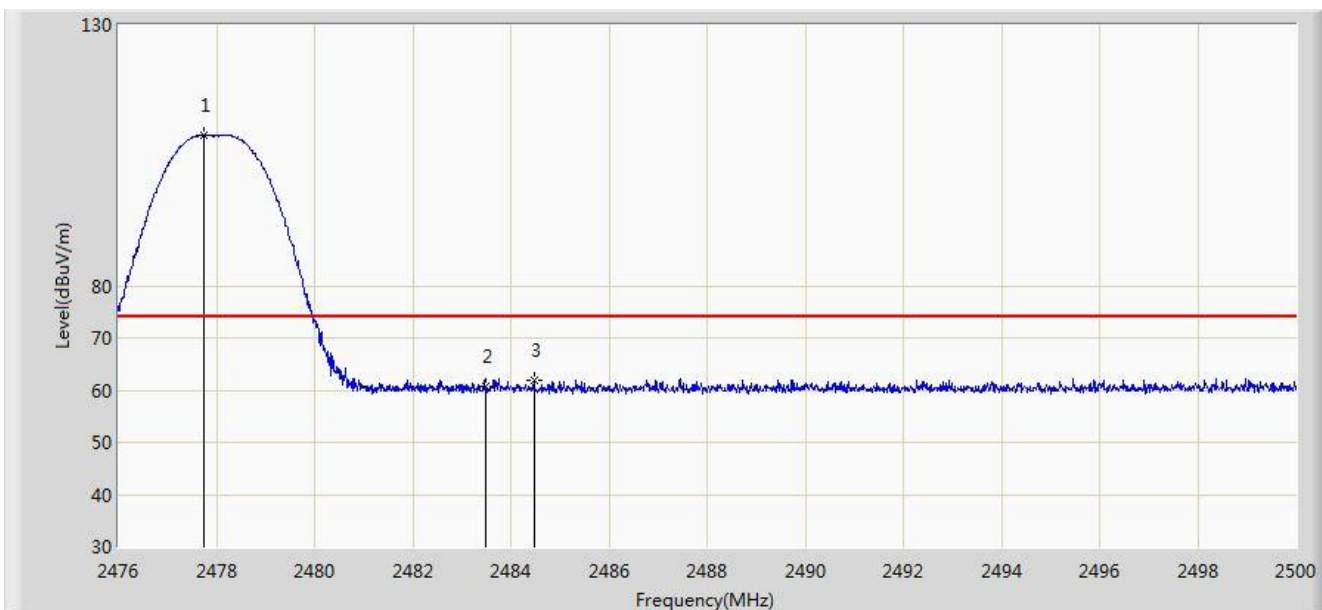
Note: Peak Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Average Measure Level = Peak Measure Level + Duty Cycle Factor

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)



|  |                          |
|--|--------------------------|
| Site: AC1                                    | Time: 2019/04/24 - 04:08 |
| Limit: FCC_Part15_Band Edge(3m)              | Engineer: Dandy Li       |
| Probe: BBHA9120D_1-18GHz                     | Polarity: Vertical       |
| EUT: Receiver                                | Power: By Battery        |
| Test Mode: Transmit at Channel 2478MHz Ant B |                          |



| No | Flag | Mark | Frequency (MHz) | Reading Level (dBuV) | Factor (dB) | Duty Cycle Factor (dB) | Measure Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Type |
|----|------|------|-----------------|----------------------|-------------|------------------------|------------------------|----------------|-------------|------|
| 1  |      | *    | 2477.740        | 76.486               | 32.403      | N/A                    | 108.889                | N/A            | N/A         | PK   |
| 2  |      |      | 2483.500        | 28.167               | 32.416      | N/A                    | 60.583                 | 74.000         | -13.417     | PK   |
|    |      |      | 2483.500        | 28.167               | 32.416      | -17.99                 | 42.593                 | 54.000         | -11.407     | AV   |
| 3  |      |      | 2484.472        | 29.434               | 32.417      | N/A                    | 61.851                 | 74.000         | -12.149     | PK   |
|    |      |      | 2484.472        | 29.434               | 32.417      | -17.99                 | 43.861                 | 54.000         | -10.139     | AV   |

Note: Peak Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Average Measure Level = Peak Measure Level + Duty Cycle Factor

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

## 7.8. AC Conducted Emissions Measurement

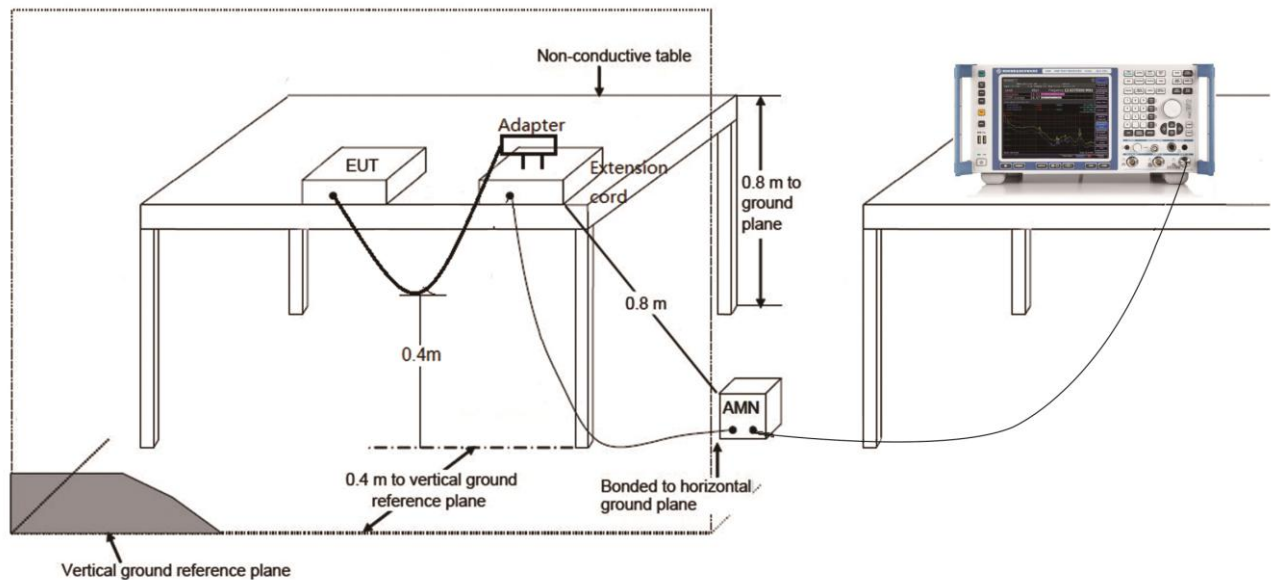
### 7.8.1. Test Limit

| FCC Part 15 Subpart C Paragraph 15.207 Limits |           |           |
|---|-----------|-----------|
| Frequency (MHz)                               | QP (dBuV) | AV (dBuV) |
| 0.15 ~ 0.50                                   | 66 ~ 56   | 56 ~ 46   |
| 0.50 ~ 5.0                                    | 56        | 46        |
| 5.0 ~ 30                                      | 60        | 50        |

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

### 7.8.2. Test Setup



### 7.8.3. Test Result

The EUT is powered by battery, so this requirement does not apply.

## 8. CONCLUSION

The data collected relate only the item(s) tested and show that the device is in compliance with Part 15C of the FCC Rules and ISED Rules.

---

The End

## **Appendix A - Test Setup Photograph**

Refer to “ 1904RSU007-UT” file.

## **Appendix B - EUT Photograph**

Refer to “ 1904RSU007-UE” file.