




# FCC PART 15.247 TEST REPORT

For

## Chengdu XGimi Technology Co., Ltd.

5F, Building A7, Tianfu Software Park, Tianfu Avenue, Hi-tech Zone, Chengdu, China

**FCC ID: 2AFENB914C**

|  |  |
|--|--|
| <b>Report Type:</b><br>Original Report | <b>Product Name:</b><br>Remote Controller  |
| <b>Report Number:</b>                  | RSC170927001   |
| <b>Report Date:</b>                    | 2017-10-18   |
| <b>Reviewed By:</b>                    | Sula Huang<br>  |
| <b>Test Laboratory:</b>                | EMC Director<br>Bay Area Compliance Laboratories Corp. (Chengdu)<br>No.5040, Huilongwan Plaza, No. 1, Shawan Road,<br>Jinniu District, Chengdu, Sichuan, China<br>Tel: +86-28-65525123<br>Fax: +86-28-65525125<br>www.baclcorp.com |

**Note:** This test report was prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Chengdu). Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. This report was valid only with a valid digital signature.

## **TABLE OF CONTENTS**

|  |           |
|--|-----------|
| <b>GENERAL INFORMATION .....</b>                                       | <b>3</b>  |
| PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) .....               | 3         |
| MECHANICAL DESCRIPTION OF EUT .....                                    | 3         |
| OBJECTIVE .....  | 3         |
| RELATED SUBMITTAL(S)/GRANT(S).....                                     | 3         |
| MEASUREMENT UNCERTAINTY .....  | 4         |
| TEST METHODOLOGY .....   | 4         |
| TEST FACILITY.....   | 4         |
| <b>SYSTEM TEST CONFIGURATION.....</b>                                  | <b>5</b>  |
| DESCRIPTION OF TEST CONFIGURATION .....                                | 5         |
| EQUIPMENT MODIFICATIONS .....  | 5         |
| EUT EXERCISE SOFTWARE.....   | 5         |
| SUPPORT EQUIPMENT LIST AND DETAILS .....                               | 7         |
| EXTERNAL I/O CABLE .....   | 7         |
| BLOCK DIAGRAM OF TEST SETUP .....                                      | 7         |
| TEST EQUIPMENTS LIST.....  | 9         |
| <b>SUMMARY OF TEST RESULTS .....</b>                                   | <b>10</b> |
| <b>FCC §15.247 (i) &amp; §1.1310 &amp; §2.1093 - RF EXPOSURE.....</b>  | <b>11</b> |
| APPLICABLE STANDARD.....   | 11        |
| <b>FCC §15.203 - ANTENNA REQUIREMENT .....</b>                         | <b>12</b> |
| APPLICABLE STANDARD.....   | 12        |
| ANTENNA CONNECTOR CONSTRUCTION .....                                   | 12        |
| <b>FCC §15.209, §15.205 &amp; §15.247(d) - SPURIOUS EMISSIONS.....</b> | <b>13</b> |
| APPLICABLE STANDARD.....   | 13        |
| EUT SETUP.....   | 13        |
| EMI TEST RECEIVER SETUP .....  | 14        |
| TEST PROCEDURE .....   | 14        |
| CORRECTED AMPLITUDE & MARGIN CALCULATION .....                         | 14        |
| TEST DATA .....  | 15        |
| <b>FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH .....</b>              | <b>19</b> |
| APPLICABLE STANDARD.....   | 19        |
| TEST PROCEDURE .....   | 19        |
| TEST DATA .....  | 19        |
| <b>FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER .....</b>       | <b>22</b> |
| APPLICABLE STANDARD.....   | 22        |
| TEST PROCEDURE .....   | 22        |
| TEST DATA .....  | 22        |
| <b>FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE .....</b> | <b>25</b> |
| APPLICABLE STANDARD.....   | 25        |
| TEST PROCEDURE .....   | 25        |
| TEST DATA .....  | 25        |
| <b>FCC §15.247(e) - POWER SPECTRAL DENSITY .....</b>                   | <b>27</b> |
| APPLICABLE STANDARD.....   | 27        |
| TEST PROCEDURE .....   | 27        |
| TEST DATA .....  | 27        |

## **GENERAL INFORMATION**

---

### **Product Description for Equipment under Test (EUT)**

The **Chengdu XGimi Technology Co., Ltd.**, model number: **B914C (FCC ID: 2AFENB914C)** or the "EUT" as referred to in this report was one **Remote Controller**.

### **Mechanical Description of EUT**

The EUT was measured approximately: 150 mm (L) x 17.67 mm (W) x 35 mm (H).  
Rated input voltage: DC3V from 2\*AAA batteries.

*Note 1: The products, test model: B914C, multiple models: B910C, B911C, B912C, B913C, B915C, B916C. Their differences were presented in Product Difference Statement provided by the applicant of this report. So, we selected model B914C to fully test.*

*\*All measurement and test data in this report was gathered from final production sample, serial number: 170927001/01 (assigned by the BACL, Chengdu). It may have deviation from any other sample. The EUT supplied by the applicant was received on 2017-09-26, and EUT conformed to test requirement.*

### **Objective**

This report is prepared on behalf of **Chengdu XGimi Technology Co., Ltd.** in accordance with Part 2, Subpart J, Part 15, Subparts A and C of the Federal Communications Commission's rules.

The tests were performed in order to determine the compliance of the EUT with FCC Part 15 Subpart C, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

### **Related Submittal(s)/Grant(s)**

FCC Part 15.247 DTS submissions with FCC ID: 2AFENG03V.  
FCC Part 15.407 NII submissions with FCC ID: 2AFENG03V.  
FCC Part 15.247 DSS submissions with FCC ID: 2AFENG03V.

## Measurement Uncertainty

| Item                              |              | Uncertainty |         |
|-----------------------------------|--------------|-------------|---------|
| AC power line conducted emission  |              | 2.71 dB     |         |
| Radiated Emission(Field Strength) | 30MHz-200MHz | H           | 4.57 dB |
|                                   |              | V           | 4.81 dB |
|                                   | 200MHz-1GHz  | H           | 5.69 dB |
|                                   |              | V           | 6.07 dB |
|                                   | 1GHz-6GHz    |             | 5.49 dB |
|                                   | 6GHz-18GHz   |             | 5.57 dB |
|                                   | 18GHz-25GHz  |             | 5.48 dB |
| Conducted RF Power                |              | ±0.61dB     |         |
| Power Spectrum Density            |              | ±0.61dB     |         |
| Occupied Bandwidth                |              | ±5%         |         |
| Humidity                          |              | ±5%         |         |
| Temperature                       |              | ±1°C        |         |

## Test Methodology

All measurements contained in this report were conducted with:

1. ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.
2. KDB558074 D01 DTS Meas Guidance v04.

## Test Facility

The test site used by BACL to collect test data is located No. 5040, Huilongwan Plaza, No. 1, Shawan Road, Jinniu District, Chengdu, Sichuan, China.

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The system was configured in testing mode, which was provided by manufacturer.

For Bluetooth LE mode, 40 channels are provided for testing:

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|
| 0       | 2402            | 20      | 2442            |
| 1       | 2404            | ...     | ...             |
| ...     | ...             | ...     | ...             |
| ...     | ...             | ...     | ...             |
| ..      | ...             | 38      | 2478            |
| 19      | 2440            | 39      | 2480            |

EUT was tested with channel 0, 19 and 39.

### Equipment Modifications

No modification was made to the EUT tested.

### EUT Exercise Software

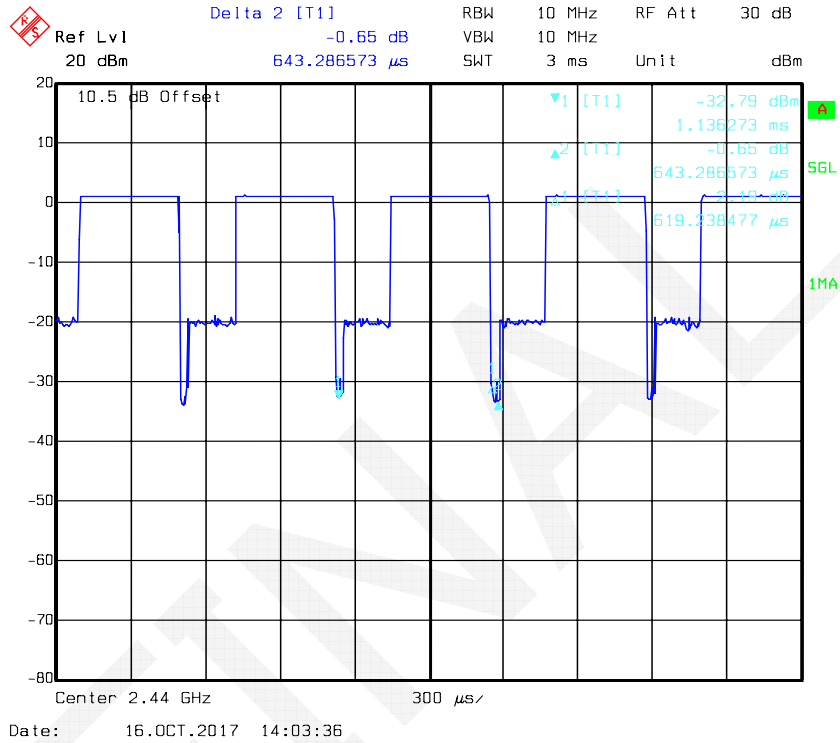
The worst condition was setting by the software as following table:

| Test Software Version | BeeMPTool |         |         |
|-----------------------|-----------|---------|---------|
| Test Frequency        | 2402MHz   | 2440MHz | 2480MHz |
| Power Level Setting   | Default   | Default | Default |

Duty Cycle information is below:

| $T_{on}$<br>(ms) | $T_{on+off}$<br>(ms) | Duty Cycle<br>(%) |
|------------------|----------------------|-------------------|
| 0.62             | 0.64                 | 96.87             |

### Duty Cycle



### Support Equipment List and Details

| Manufacturer | Description | Model | Serial Number |
|--------------|-------------|-------|---------------|
| -            | -           | -     | -             |

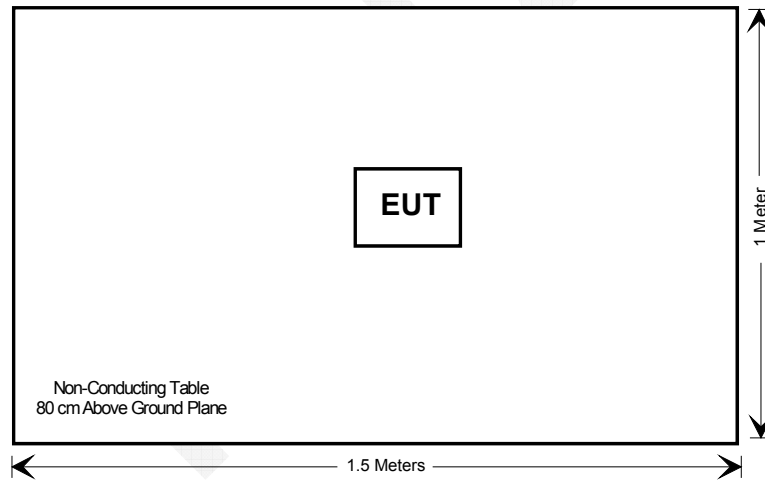
### External I/O Cable

| Cable Description | Length (m) | From | To |
|-------------------|------------|------|----|
| -                 | -          | -    | -  |

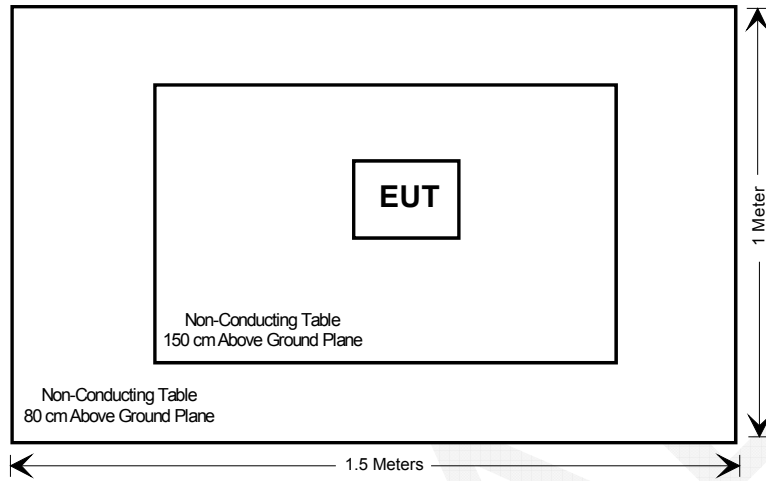
### Block Diagram of Test Setup

Radiated Emissions

Below 1GHz:



Above 1GHz:





### Test Equipments List

| Manufacturer            | Description           | Model      | Serial Number | Calibration Date | Calibration Due Date |
|-------------------------|-----------------------|------------|---------------|------------------|----------------------|
| Radiated Emissions Test |                       |            |               |                  |                      |
| Sonoma                  | Pre-Amplifier         | 310N       | 186684        | 2017-08-18       | 2018-08-17           |
| Sunol Sciences          | Broadband Antenna     | JB3        | A121808       | 2017-05-18       | 2020-05-17           |
| Rohde & Schwarz         | EMI Test Receiver     | ESIB 40    | 100215        | 2017-09-12       | 2018-09-11           |
| ETS                     | Horn Antenna          | 3115       | 003-6076      | 2017-05-19       | 2020-05-18           |
| A.H.Systems,inc         | Horn Antenna          | SAS-574    | 505           | 2016-12-02       | 2017-12-01           |
| Mini-circuits           | Pre-Amplifier         | ZVA-183-S+ | 771001215     | 2017-05-20       | 2018-05-19           |
| HP                      | Pre-Amplifier         | 8449B      | 3008A00277    | 2016-12-02       | 2017-12-01           |
| INMET                   | Attenuator            | N-6dB      | /             | 2016-11-10       | 2017-11-09           |
| EMCT                    | Semi-Anechoic Chamber | 966        | N/A           | 2015-04-24       | 2018-04-23           |
| N/A                     | RF Cable (below 1GHz) | NO.1       | N/A           | 2016-11-10       | 2017-11-09           |
| N/A                     | RF Cable (below 1GHz) | NO.4       | N/A           | 2016-11-10       | 2017-11-09           |
| N/A                     | RF Cable (above 1GHz) | NO.2       | N/A           | 2016-11-10       | 2017-11-09           |
| Rohde & Schwarz         | EMC32                 | N/A        | V 8.52.0      | N/A              | N/A                  |
| RF Conducted Test       |                       |            |               |                  |                      |
| Rohde & Schwarz         | Spectrum Analyzer     | FSEM30     | 100018        | 2017-05-18       | 2018-05-17           |
| WEINSCHEL ENGINEERING   | Attenuator            | 1A10dB     | AA4135        | 2016-11-10       | 2017-11-09           |
| N/A                     | RF Cable              | N/A        | N/A           | Each Time        | /                    |

\* **Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

## SUMMARY OF TEST RESULTS

---

| FCC Rules                           | Description of Test                      | Result         |
|-------------------------------------|--|----------------|
| FCC §15.247 (i) & §1.1310 & §2.1093 | RF Exposure                              | Compliant      |
| §15.203                             | Antenna Requirement                      | Compliant      |
| §15.207 (a)                         | AC Line Conducted Emissions              | Not Applicable |
| §15.205, §15.209, §15.247(d)        | Spurious Emissions                       | Compliant      |
| §15.247 (a)(2)                      | 6 dB Emission Bandwidth                  | Compliant      |
| §15.247(b)(3)                       | Maximum conducted output power           | Compliant      |
| §15.247(d)                          | 100 kHz Bandwidth of Frequency Band Edge | Compliant      |
| §15.247(e)                          | Power Spectral Density                   | Compliant      |

Note:

Not Applicable: The device is one battery operated equipment.

## **FCC §15.247 (i) & §1.1310 & §2.1093 - RF EXPOSURE**

---

### **Applicable Standard**

According to §15.247(i) and §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB447498 D01 General RF Exposure Guidance v06:

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances  $\leq 50$  mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$  for 1-g SAR and  $\leq 7.5$  for 10-g extremity SAR, where

- $f(\text{GHz})$  is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum test separation distance is  $\leq 50$  mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is  $< 5$  mm, a distance of 5 mm according to 5) in section 4.1 is applied to determine SAR test exclusion.

### **Measurement Result**

The max tune-up conducted power is 1.0 dBm (1.26 mW).

$[(\text{max. power of channel, mW}) / (\text{min. test separation distance, mm})] [\sqrt{f(\text{GHz})}]$   
 $= 1.26/5 \cdot (\sqrt{2.48}) = 0.40 < 7.5$

**So the stand-alone SAR evaluation is not necessary.**

## **FCC §15.203 - ANTENNA REQUIREMENT**

---

### **Applicable Standard**

According to FCC §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

### **Antenna Connector Construction**

The EUT has one PCB antenna arrangement, which was permanently attached and the antenna gain is 2.7 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

**Result:** Compliance.

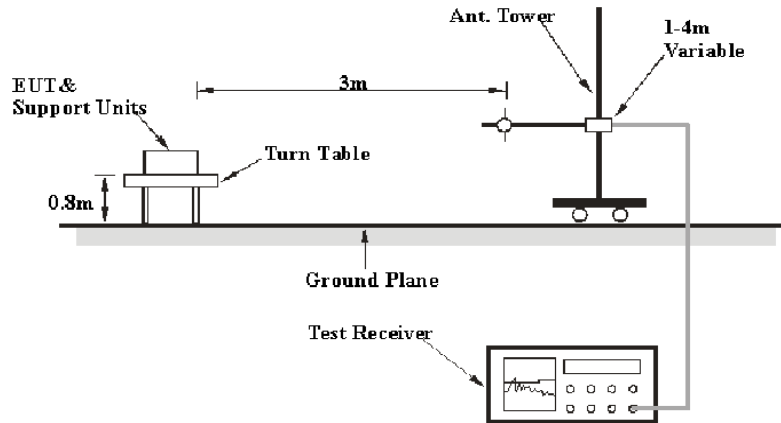
## FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

### Applicable Standard

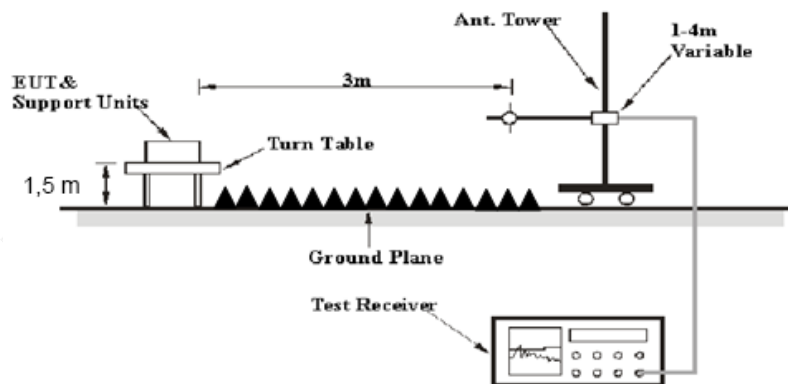
FCC §15.247 (d); §15.209; §15.205;

### EUT Setup

#### Below 1GHz:



#### Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.247 limits.

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

The spacing between the peripherals was 10 cm.

## EMI Test Receiver Setup

The system was investigated from 30 MHz to 25 GHz.

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

| Frequency Range   | RBW     | Video B/W | IF B/W  | Detector |
|-------------------|---------|-----------|---------|----------|
| 30 MHz – 1000 MHz | 120 kHz | 300 kHz   | 120 kHz | QP       |
| Above 1 GHz       | 1MHz    | 3 MHz     | 1MHz    | PK       |
|                   | 1MHz    | 3 MHz     | 1MHz    | AV       |

## Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz, peak and Average detection modes for frequencies above 1 GHz.

Scan with X-Axis, Y-Axis and Z-Axis position to explore the highest emission level and the worst case was recorded.

## Corrected Amplitude & Margin Calculation

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

$$\text{Corrected Amplitude} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

## Test Data

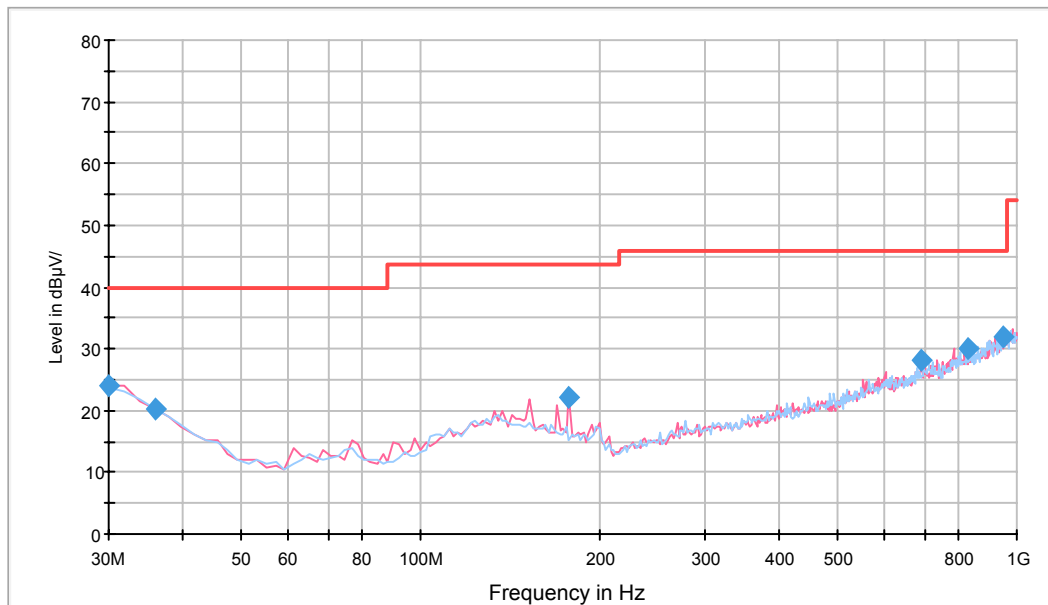
### Environmental Conditions

|                    |          |
|--------------------|----------|
| Temperature:       | 22 °C    |
| Relative Humidity: | 64 %     |
| ATM Pressure:      | 96.2 kPa |

\* The testing was performed by Tom Tang on 2017-10-17.

Test Mode: Transmitting

#### 1) 30 MHz to 1 GHz\_Low channel-worst case



| Frequency (MHz) | QuasicPeak (dB µ V/m) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dB µ V/m) |
|-----------------|-----------------------|-------------|--------------|---------------|------------|-------------|------------------|
| 30.000000       | 24.1                  | 100.0       | V            | 267.0         | -4.8       | 15.9        | 40.0             |
| 35.831663       | 20.3                  | 100.0       | H            | 0.0           | -8.7       | 19.7        | 40.0             |
| 177.735471      | 22.0                  | 100.0       | V            | 118.0         | -12.9      | 21.5        | 43.5             |
| 692.865731      | 28.1                  | 100.0       | V            | 236.0         | -3.5       | 17.9        | 46.0             |
| 826.993988      | 29.9                  | 100.0       | H            | 81.0          | -2.0       | 16.1        | 46.0             |
| 945.571142      | 32.0                  | 100.0       | V            | 32.0          | 0.3        | 14.0        | 46.0             |

2) Above 1 GHz

| Frequency                 | Receiver |          | Rx Antenna |         | Cable loss | Amplifier Gain | Corrected Amplitude | Limit  | Margin |
|---------------------------|----------|----------|------------|---------|------------|----------------|---------------------|--------|--------|
|                           | Reading  | Detector | Polar      | Factor  |            |                |                     |        |        |
| MHz                       | dBµV     | PK/QP/AV | H/V        | dB(1/m) | dB         | dB             | dBµV/m              | dBµV/m | dB     |
| <b>Frequency: 2402MHz</b> |          |          |            |         |            |                |                     |        |        |
| 2402                      | 60.23    | PK       | H          | 28.71   | 3.00       | 0.00           | 91.94               | N/A    | N/A    |
| 2402                      | 54.59    | AV       | H          | 28.71   | 3.00       | 0.00           | 86.30               | N/A    | N/A    |
| 2402                      | 65.53    | PK       | V          | 28.71   | 3.00       | 0.00           | 97.24               | N/A    | N/A    |
| 2402                      | 61.07    | AV       | V          | 28.71   | 3.00       | 0.00           | 92.78               | N/A    | N/A    |
| 2390                      | 29.31    | PK       | V          | 28.67   | 3.00       | 0.00           | 60.98               | 74.00  | 13.02  |
| 2390                      | 16.56    | AV       | V          | 28.67   | 3.00       | 0.00           | 47.23               | 54.00  | 5.77   |
| 4804                      | 34.09    | PK       | V          | 33.85   | 5.12       | 26.87          | 46.19               | 74.00  | 27.81  |
| 4804                      | 18.28    | AV       | V          | 33.85   | 5.12       | 26.87          | 30.38               | 54.00  | 23.62  |
| 7206                      | 32.19    | PK       | V          | 36.39   | 6.16       | 26.35          | 48.39               | 74.00  | 25.61  |
| 7206                      | 17.67    | AV       | V          | 36.39   | 6.16       | 26.35          | 33.87               | 54.00  | 20.13  |
| <b>Frequency: 2440MHz</b> |          |          |            |         |            |                |                     |        |        |
| 2440                      | 59.29    | PK       | H          | 28.82   | 3.00       | 0.00           | 91.11               | N/A    | N/A    |
| 2440                      | 53.96    | AV       | H          | 28.82   | 3.00       | 0.00           | 85.78               | N/A    | N/A    |
| 2440                      | 64.62    | PK       | V          | 28.82   | 3.00       | 0.00           | 96.44               | N/A    | N/A    |
| 2440                      | 59.76    | AV       | V          | 28.82   | 3.00       | 0.00           | 91.58               | N/A    | N/A    |
| 4880                      | 34.01    | PK       | V          | 34.06   | 5.09       | 26.87          | 46.29               | 74.00  | 27.71  |
| 4880                      | 18.14    | AV       | V          | 34.06   | 5.09       | 26.87          | 30.42               | 54.00  | 23.58  |
| 7320                      | 32.16    | PK       | V          | 36.55   | 6.22       | 26.40          | 48.53               | 74.00  | 25.47  |
| 7320                      | 17.18    | AV       | V          | 36.55   | 6.22       | 26.40          | 33.55               | 54.00  | 20.45  |
| <b>Frequency: 2480MHz</b> |          |          |            |         |            |                |                     |        |        |
| 2480                      | 58.91    | PK       | H          | 28.94   | 2.99       | 0.00           | 90.84               | N/A    | N/A    |
| 2480                      | 53.43    | AV       | H          | 28.94   | 2.99       | 0.00           | 85.36               | N/A    | N/A    |
| 2480                      | 64.89    | PK       | V          | 28.94   | 2.99       | 0.00           | 96.82               | N/A    | N/A    |
| 2480                      | 59.34    | AV       | V          | 28.94   | 2.99       | 0.00           | 91.27               | N/A    | N/A    |
| 2483.5                    | 29.87    | PK       | V          | 28.95   | 2.99       | 0.00           | 61.81               | 74.00  | 12.19  |
| 2483.5                    | 16.02    | AV       | V          | 28.95   | 2.99       | 0.00           | 47.96               | 54.00  | 6.04   |
| 4960                      | 34.21    | PK       | V          | 34.29   | 5.05       | 26.88          | 46.67               | 74.00  | 27.33  |
| 4960                      | 18.19    | AV       | V          | 34.29   | 5.05       | 26.88          | 30.65               | 54.00  | 23.35  |
| 7440                      | 32.69    | PK       | V          | 36.72   | 6.27       | 26.45          | 49.23               | 74.00  | 24.77  |
| 7440                      | 17.23    | AV       | V          | 36.72   | 6.27       | 26.45          | 33.77               | 54.00  | 20.23  |

Note:

Corrected Amplitude = Corrected Factor + Reading

Corrected Factor=Antenna factor (RX) + Cable Loss – Amplifier Factor

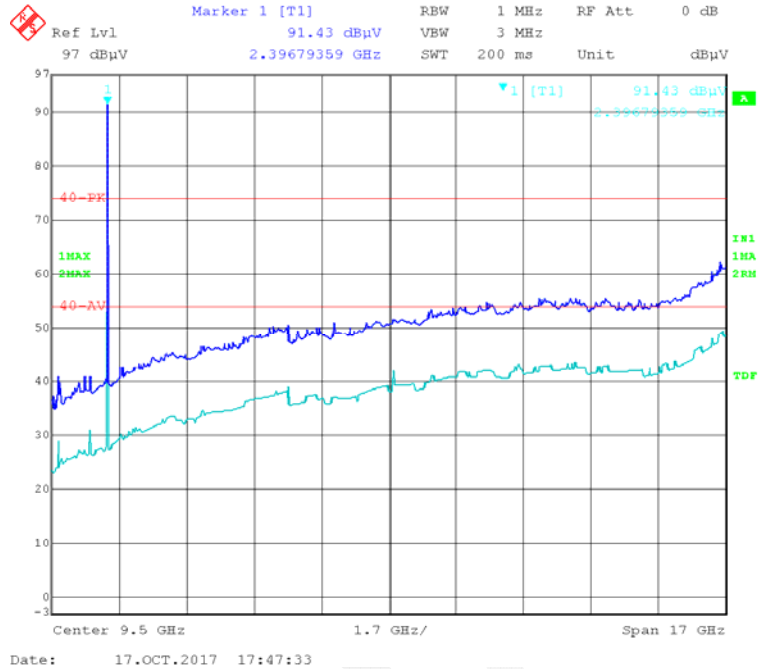
Margin = Limit- Corr. Amplitude

Spurious emissions more than 20 dB below the limit were not reported.

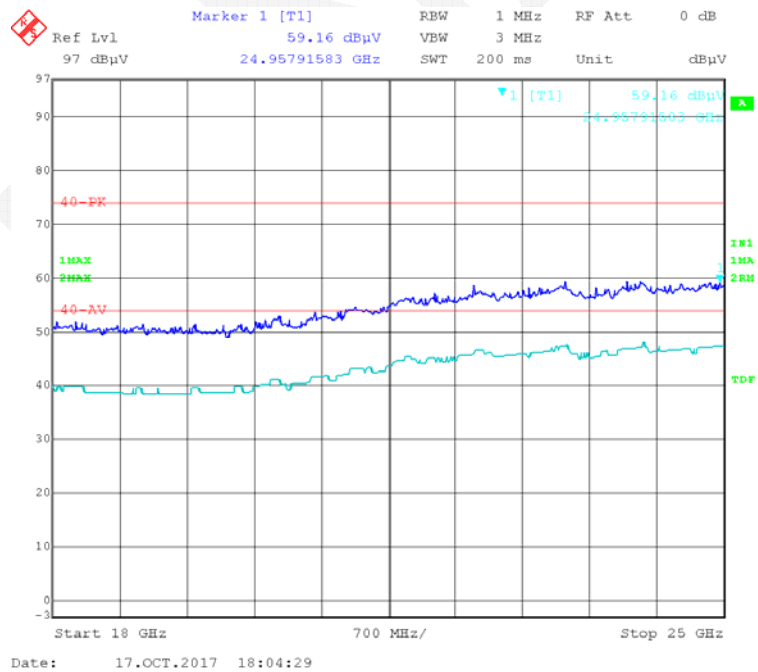


Please refer to the below pre-scan plot of worst case:

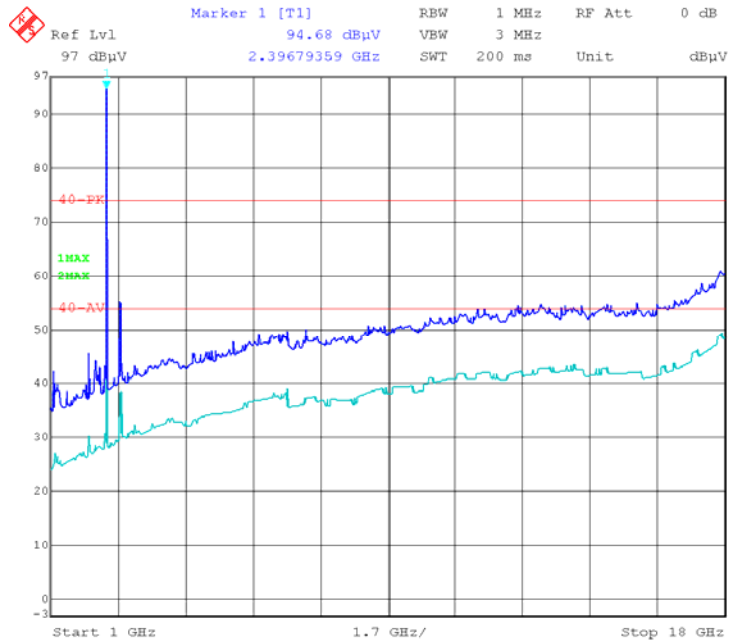
### Low Channel\_Horizontal\_1GHz-18GHz



### Low Channel\_Horizontal\_18GHz-25GHz

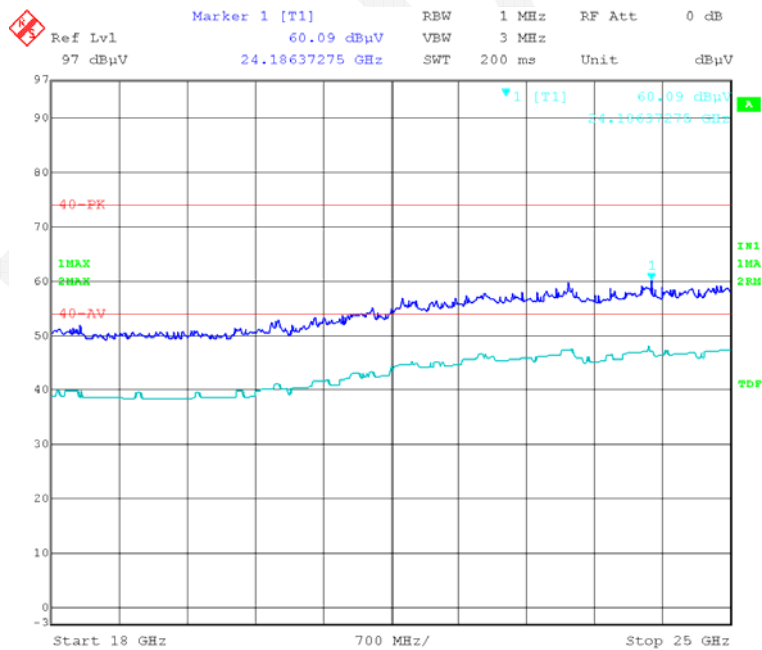


### Low Channel\_Vertical\_1GHz-18GHz



Date: 17.OCT.2017 16:56:38

### Low Channel\_Vertical\_18GHz-25GHz



Date: 17.OCT.2017 18:10:53

## FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

### Applicable Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

### Test Procedure

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW)  $\geq 3 \times$  RBW
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.



### Test Data

#### Environmental Conditions

|                    |          |
|--------------------|----------|
| Temperature:       | 20 °C    |
| Relative Humidity: | 58 %     |
| ATM Pressure:      | 96.3 kPa |

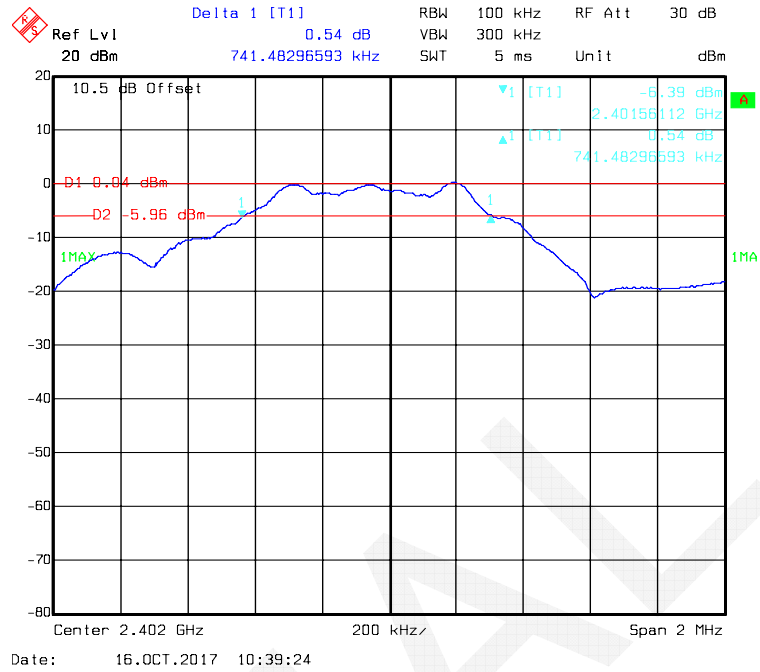
\* The testing was performed by Tom Tang on 2017-10-16.

Test Mode: Transmitting

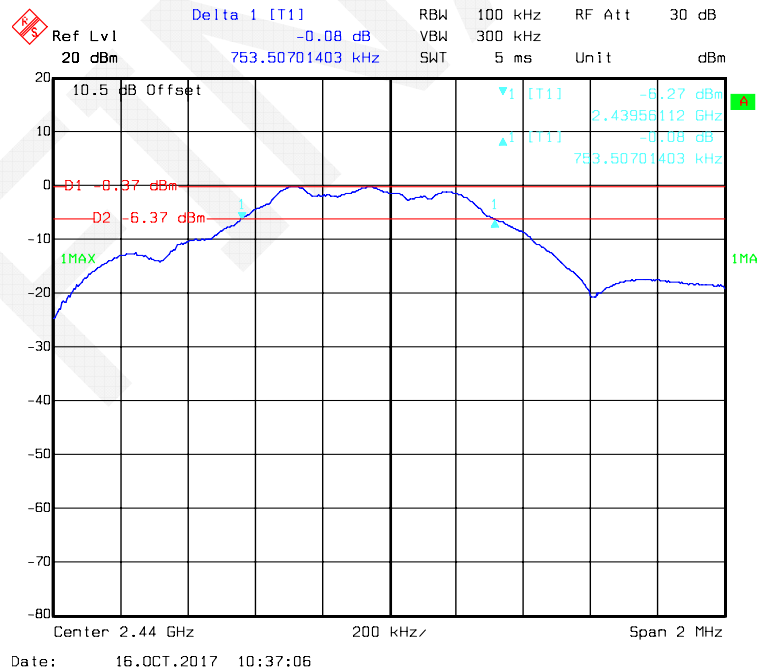
Test Result: Compliance. Please refer to the following table and plots.

| Mode | Channel | Frequency (MHz) | 6dB OBW (MHz) | Limit (MHz) |
|------|---------|-----------------|---------------|-------------|
| BLE  | Low     | 2402            | 0.74          | $\geq 0.50$ |
|      | Middle  | 2440            | 0.75          | $\geq 0.50$ |
|      | High    | 2480            | 0.77          | $\geq 0.50$ |

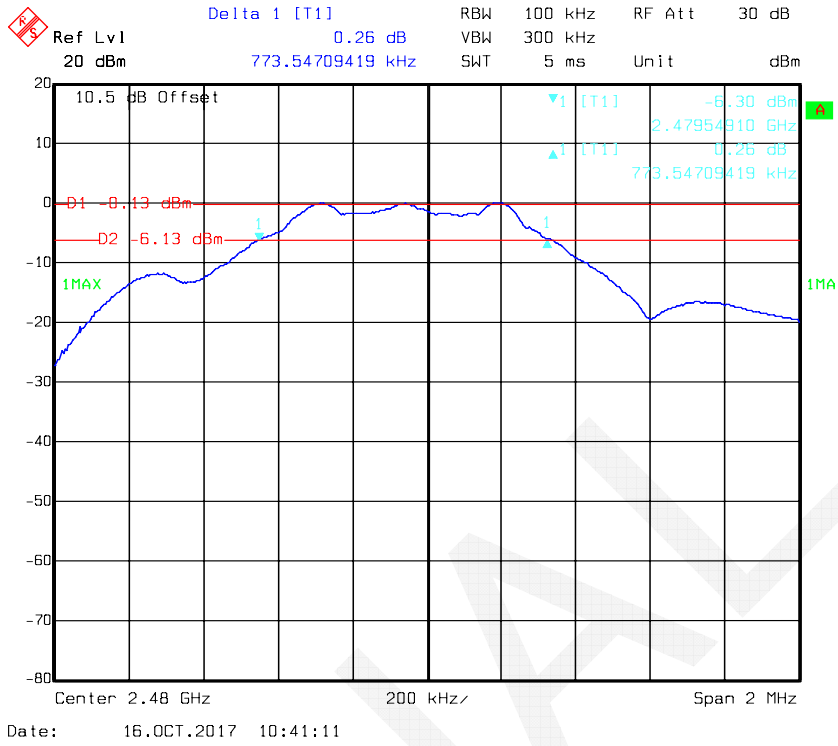
### Low Channel



### Middle Channel



### High Channel



## FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER

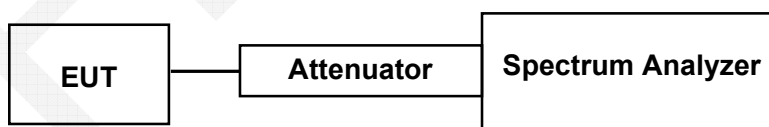
### Applicable Standard

According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

### Test Procedure

The following procedure shall be used when an instrument with a resolution bandwidth that is greater than the DTS bandwidth is available to perform the measurement:

- a) Set the RBW  $\geq$  DTS bandwidth.
- b) Set VBW  $\geq$  [3 · RBW].
- c) Set span  $\geq$  [3 · RBW].
- d) Sweep time = auto couple.
- e) Detector = peak.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use peak marker function to determine the peak amplitude level.



### Test Data

#### Environmental Conditions

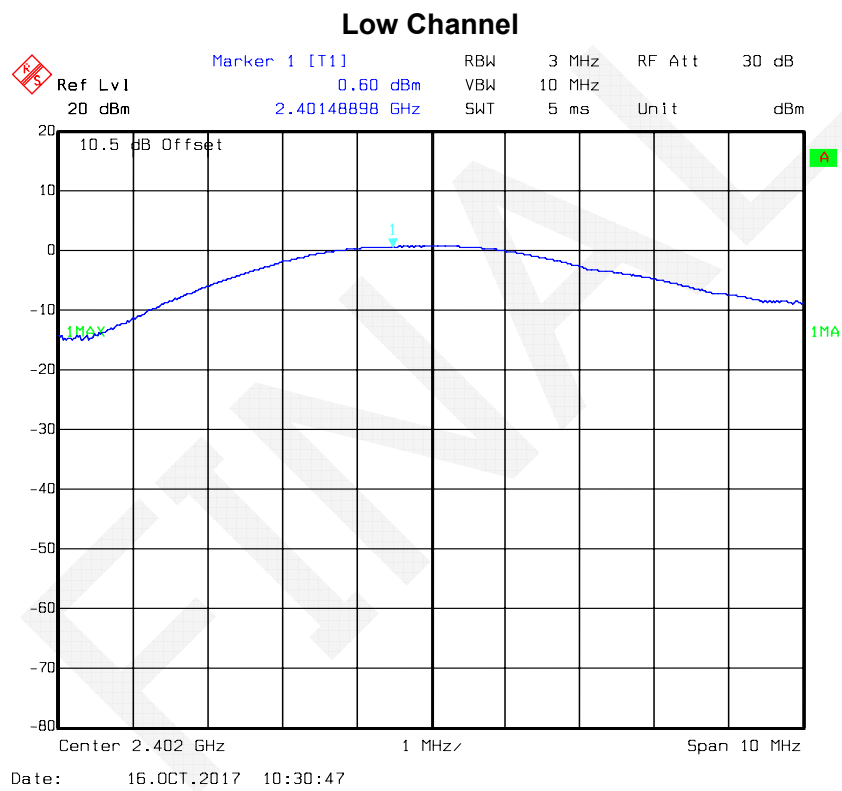
|                    |          |
|--------------------|----------|
| Temperature:       | 20 °C    |
| Relative Humidity: | 58 %     |
| ATM Pressure:      | 96.3 kPa |

\* The testing was performed by Tom Tang on 2017-10-16.

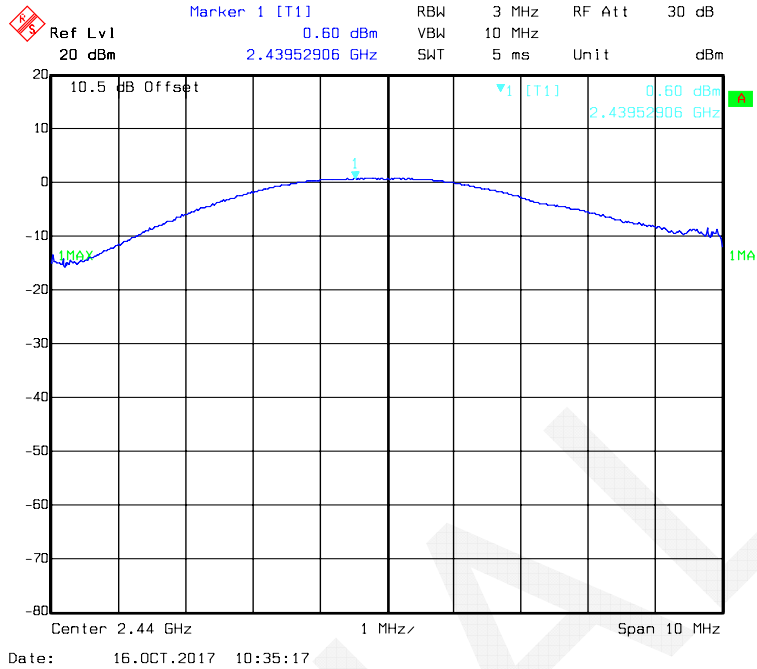
Test Mode: Transmitting

Test Result: Compliance. Please refer to the following table.

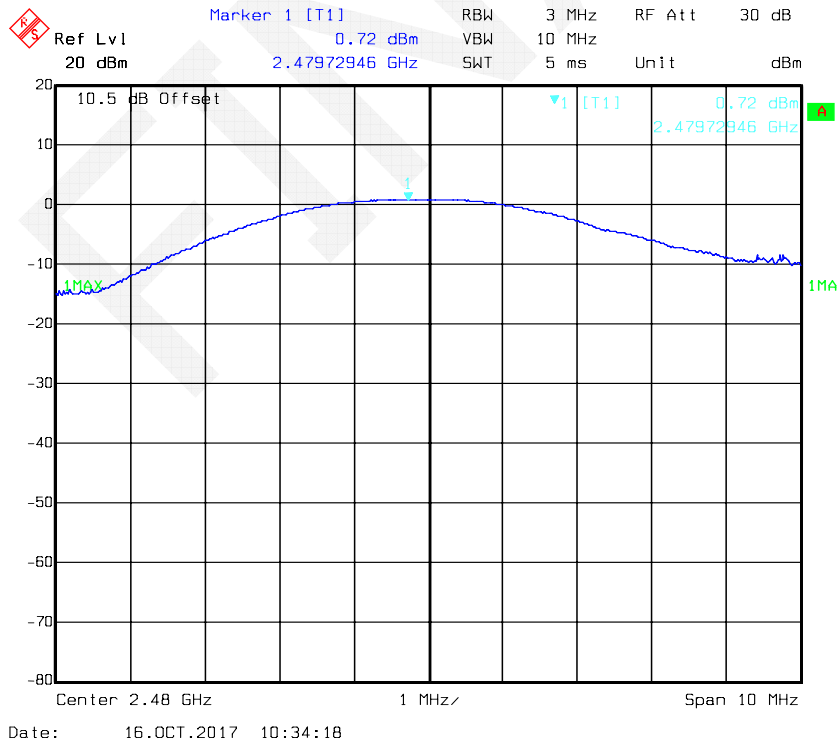
| Channel | Frequency (MHz) | Max Peak Conducted Output Power (dBm) | Limit (dBm) |
|---------|-----------------|---------------------------------------|-------------|
| Low     | 2402            | 0.60                                  | 30          |
| Middle  | 2440            | 0.60                                  | 30          |
| High    | 2480            | 0.72                                  | 30          |



### Middle Channel



### High Channel





## **FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE**

### **Applicable Standard**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

### **Test Procedure**

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

### **Test Data**

#### **Environmental Conditions**

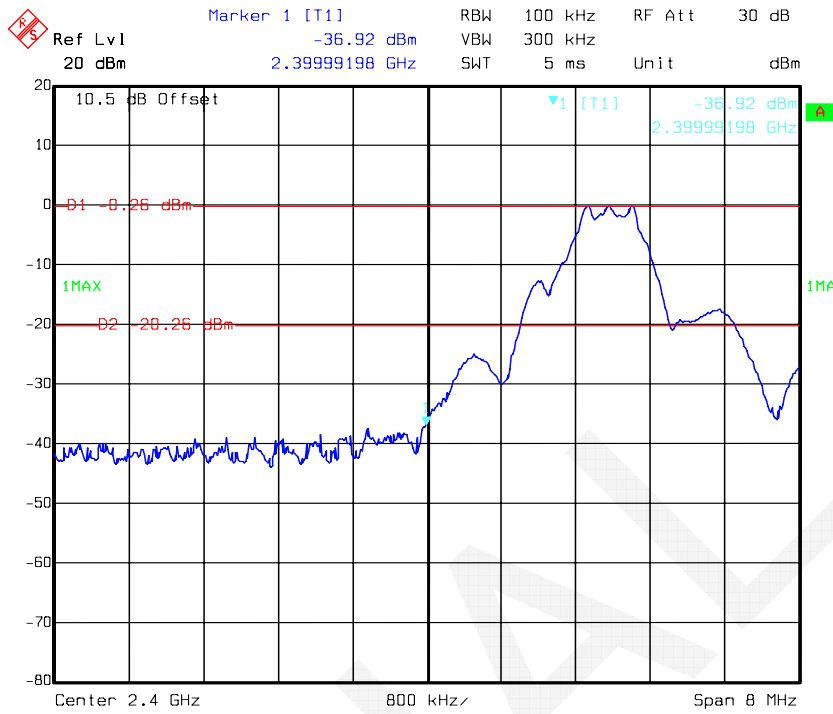
|                           |          |
|---------------------------|----------|
| <b>Temperature:</b>       | 20 °C    |
| <b>Relative Humidity:</b> | 58 %     |
| <b>ATM Pressure:</b>      | 96.3 kPa |

\* The testing was performed by Tom Tang on 2017-10-16.

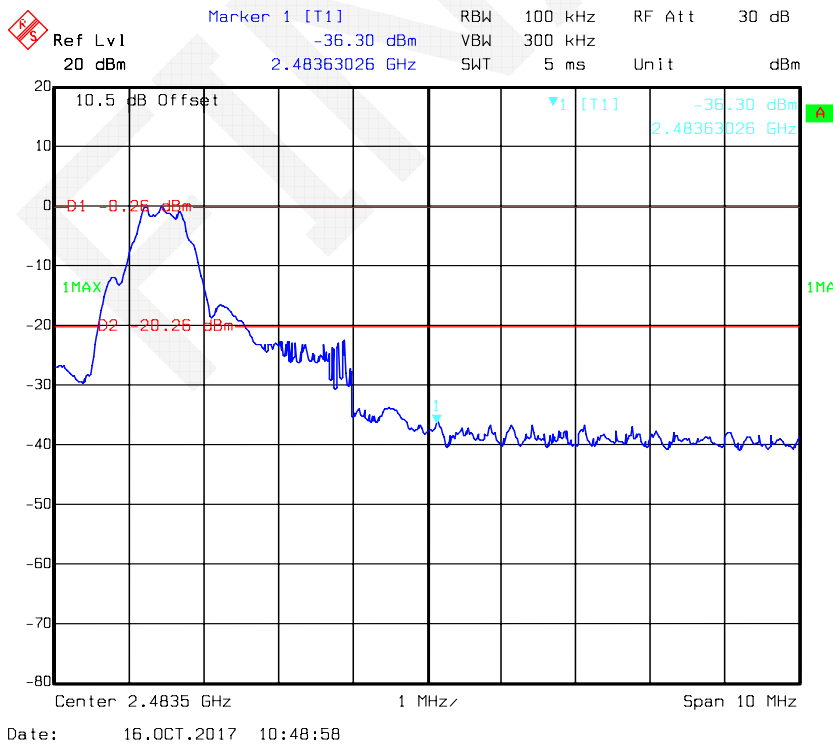
Test mode: Transmitting

Test Result: Compliance. Please refer to following plots.

### Band Edge, Left Side



### Band Edge, Right Side



## FCC §15.247(e) - POWER SPECTRAL DENSITY

### Applicable Standard

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

### Test Procedure

- a) Set analyzer center frequency to DTS channel center frequency.
- b) Set the span to 1.5 times the DTS bandwidth.
- c) Set the RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
- d) Set the VBW  $\geq 3 \times \text{RBW}$ .
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum amplitude level within the RBW.
- j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

### Test Data

#### Environmental Conditions

|                    |          |
|--------------------|----------|
| Temperature:       | 20 °C    |
| Relative Humidity: | 58 %     |
| ATM Pressure:      | 96.3 kPa |

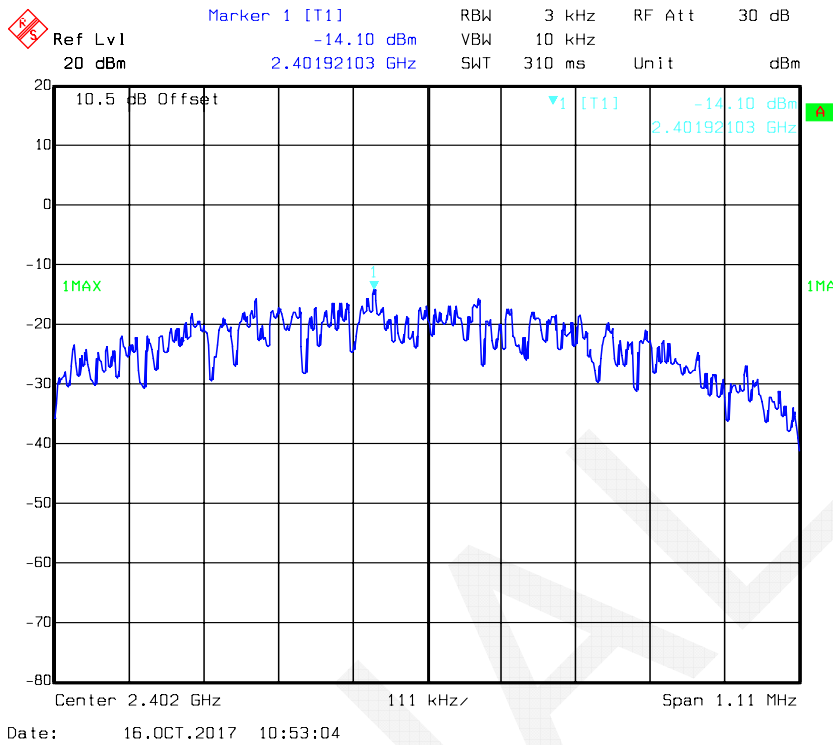
\* The testing was performed by Tom Tang on 2017-10-16.

Test Mode: Transmitting

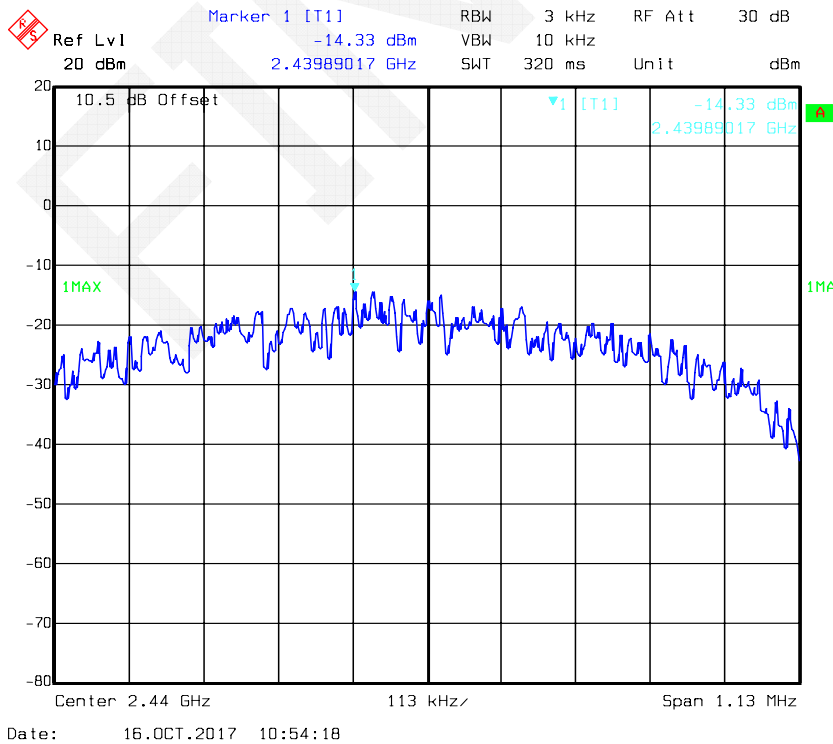
Test Result: Compliance. Please refer to the following table and plots

| Channel | Frequency (MHz) | Power Spectral Density (dBm/3kHz) | Limit (dBm/3kHz) |
|---------|-----------------|-----------------------------------|------------------|
| Low     | 2402            | -14.10                            | $\leq 8$         |
| Middle  | 2440            | -14.33                            | $\leq 8$         |
| High    | 2480            | -13.87                            | $\leq 8$         |

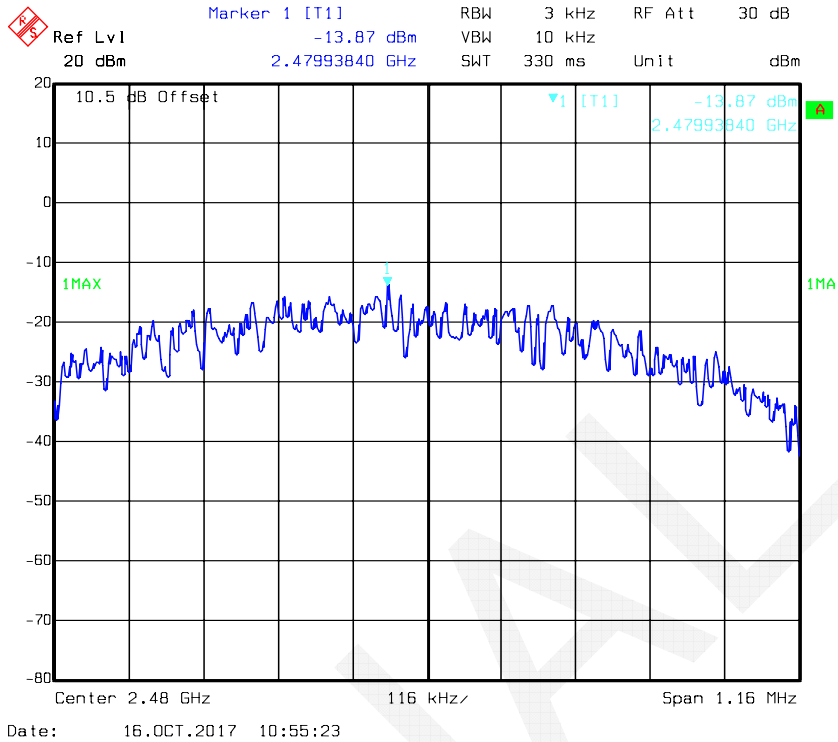
### Power Spectral Density, Low Channel



### Power Spectral Density, Middle Channel



### Power Spectral Density, High Channel



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