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Report No.: 1711TW0401-U1  
Report Version: 1.0  
Issue Date: 2017-12-20

## MEASUREMENT REPORT

### FCC PART 15.231

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**FCC ID:** 2AOQRTCRF-PTI4

**APPLICANT:** ENERGY MANAGEMENT SYSTEM CO., LTD

**Application Type:** Certification

**Product:** TAINET Transceiver Module

**Model No.:** TCRF-PTI4

**Brand Name:** 

**FCC Classification:** Part 15 Remote Control/Security Device Transmitter (DSR)

**FCC Rule Part(s):** Part 15.231

**Test Procedure(s):** ANSI C63.10-2013

**Test Date:** December 8 ~ 13, 2017

Tested By : *Peter Syu*  
( Peter Syu )

Reviewed By : *Paddy Chen*  
( Paddy Chen )

Approved By : *Chenz Ker*  
( Chenz Ker )



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 (Taiwan) Co., Ltd.

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## Revision History

| Report No.    | Version | Description     | Issue Date | Note |
|---------------|---------|-----------------|------------|------|
| 1711TW0401-U1 | 1.0     | Original Report | 2017-12-20 |      |

# 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. Equipment Description.....                 | 7         |
| 2.2. Test Standards .....                       | 8         |
| 2.3. Test Methodology .....                     | 8         |
| 2.4. EUT Setup and Test Mode .....              | 9         |
| <b>3. ANTENNA REQUIREMENTS.....</b>             | <b>10</b> |
| <b>4. TEST EQUIPMENT CALIBRATION DATA .....</b> | <b>11</b> |
| <b>5. MEASUREMENT UNCERTAINTY .....</b>         | <b>12</b> |
| <b>6. TEST RESULT .....</b>                     | <b>13</b> |
| 6.1. Summary .....                              | 13        |
| 6.2. Radiated Emissions .....                   | 14        |
| 6.2.1. Standard Applicable .....                | 14        |
| 6.2.2. Test Procedure.....                      | 14        |
| 6.2.3. Test Setup.....                          | 15        |
| 6.2.4. Test Results .....                       | 16        |
| 6.3. 20dB Bandwidth / 99% Bandwidth .....       | 52        |
| 6.3.1. Standard Applicable .....                | 52        |
| 6.3.2. Test Procedure.....                      | 52        |
| 6.3.3. Test Setup.....                          | 52        |
| 6.3.4. Test Result.....                         | 53        |
| 6.4. Transmission Time.....                     | 54        |
| 6.4.1. Standard Applicable .....                | 54        |
| 6.4.2. Test Procedure.....                      | 54        |
| 6.4.3. Test Setup.....                          | 54        |
| 6.4.4. Test Result.....                         | 55        |
| 6.5. Duty Cycle .....                           | 56        |
| 6.5.1. Standard Applicable .....                | 56        |
| 6.5.2. Test Procedure.....                      | 56        |
| 6.5.3. Test Setup.....                          | 56        |
| 6.5.4. Test Result.....                         | 57        |
| 6.6. AC Conducted Emissions Measurement.....    | 58        |

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|           |                                               |           |
|-----------|-----------------------------------------------|-----------|
| 6.6.1.    | Test Limit .....                              | 58        |
| 6.6.2.    | Test Setup.....                               | 58        |
| 6.6.3.    | Test Result.....                              | 59        |
| <b>7.</b> | <b>CONCLUSION.....</b>                        | <b>61</b> |
|           | <b>Appendix A - Test Photograph .....</b>     | <b>62</b> |
|           | <b>Appendix B - External Photograph .....</b> | <b>66</b> |
|           | <b>Appendix C - Internal Photograph .....</b> | <b>72</b> |

## §2.1033 General Information

|                                |                                                                                                                                 |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <b>Applicant</b>               | ENERGY MANAGEMENT SYSTEM CO., LTD                                                                                               |
| <b>Applicant Address</b>       | No.8,Dali 3rd Rd.,Shanhua District, Southern Taiwan Science Park (STSP),Tainan City 741, Taiwan(R.O.C)                          |
| <b>Manufacturer</b>            | ENERGY MANAGEMENT SYSTEM CO., LTD                                                                                               |
| <b>Manufacturer Address</b>    | No.8,Dali 3rd Rd.,Shanhua District, Southern Taiwan Science Park (STSP),Tainan City 741, Taiwan(R.O.C)                          |
| <b>Test Site</b>               | MRT Technology (Taiwan) Co., Ltd                                                                                                |
| <b>Test Site Address</b>       | No. 38, Fuxing Second Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C)                                                      |
| <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

1. MRT facility is a FCC registered (Reg. No. 291082) test facility with the site description report on file and is designated by the FCC as an Accredited Test Film.
2. MRT facility is an IC registered (MRT Reg. No. 21723-1) test laboratory with the site description on file at Industry Canada.
3. MRT Lab is accredited to ISO 17025 by the Taiwan Accreditation Foundation (TAF Cert. No. 3261) in EMC, Telecommunications and Radio testing for FCC (Designation Number: TW3261), Industry Taiwan, EU and TELEC Rules.

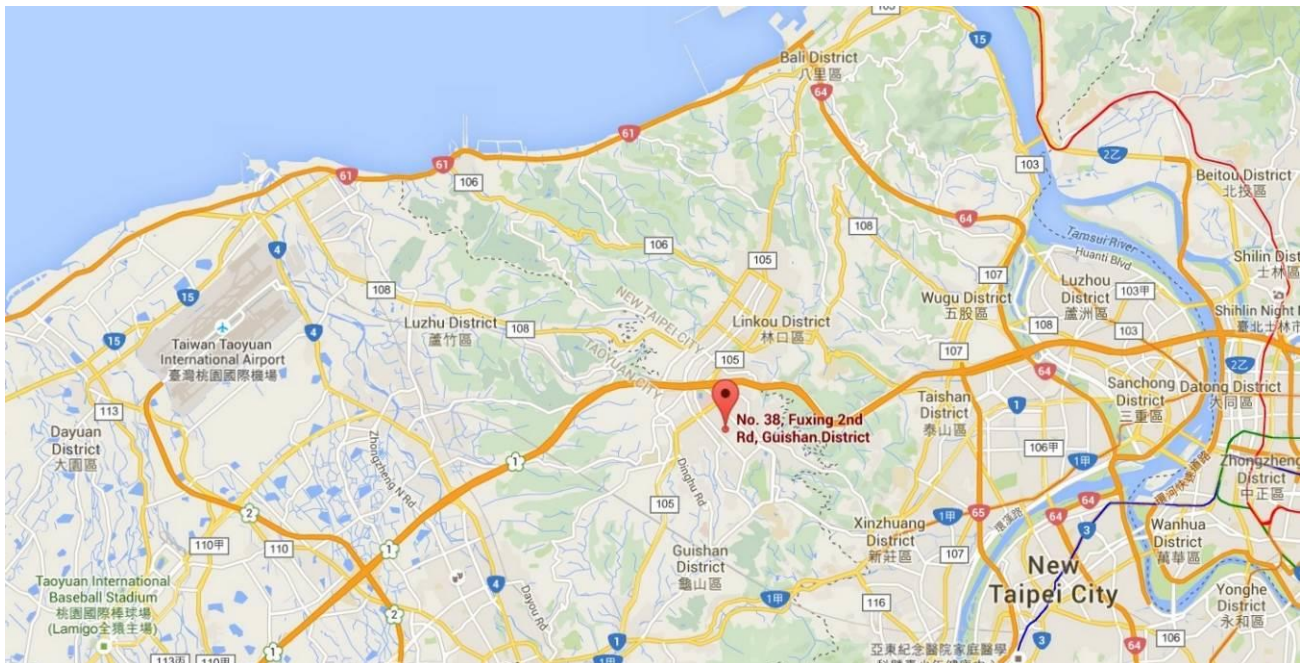
## 1. INTRODUCTION

### 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 Taoyuan City. These measurement tests were conducted at the MRT Technology (Taiwan) Co., Ltd. Facility located at No.38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 33377, Taiwan (R.O.C).



## 2. PRODUCT INFORMATION

### 2.1. Equipment Description

|                    |                                                  |
|--------------------|--------------------------------------------------|
| Product Name       | TAINET Transceiver Module                        |
| Model No.          | TCRF-PTI4                                        |
| Frequency Range    | 432.3 ~ 435.5MHz                                 |
| Type of modulation | FSK                                              |
| Antenna Type       | Helical                                          |
| Test Voltage       | DC 3.6V by Battery (RFI/RFR), DC 5V by USB (RFD) |
| Max Power          | 79.23 dBuV/m                                     |

Note:

Since KDB 996369 D01, If the module is limited because it is not shielded, only the module grantee can make the test evaluation that the module is compliant in the host as below.

| No. | Product Name             | Model No. |
|-----|--------------------------|-----------|
| 1   | RF USB Dongle            | RFD       |
| 2   | RF Transceiver Interface | RFI       |
| 3   | RF Network Repeater      | RFR       |

## 2.2. Test Standards

The following report is prepared on behalf of the **ENERGY MANAGEMENT SYSTEM CO., LTD** in accordance with FCC Part 15, Subpart C, and section 15.231, 15.203, 15.205 and 15.209 of the Federal Communication Commission rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.231, 15.203, 15.205 and 15.209 of the Federal Communication Commission rules.

**Maintenance of compliance** is the responsibility of the manufacturer. Any modification of the product, which results in lowering the emission/immunity, should be checked to ensure compliance has been maintained.

## 2.3. Test Methodology

The measurement procedures described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2013).

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



## 2.4. EUT Setup and Test Mode

The EUT was operated at continuous transmitting mode that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

| Test Mode |                                      |
|-----------|--------------------------------------|
| Mode 1    | RFR Transmitting with FSK Modulation |
| Mode 2    | RFI Transmitting with FSK Modulation |
| Mode 3    | RFD Transmitting with FSK Modulation |

| Channel List                |              |
|-----------------------------|--------------|
| Channel                     | Freq (MHz)   |
| CH00                        | 433.7        |
| CH01                        | 434.1        |
| CH02                        | 433.5        |
| CH03                        | 434.3        |
| CH04                        | 433.3        |
| CH05                        | 434.5        |
| CH06                        | 433.1        |
| CH07                        | 434.7        |
| CH08                        | 342.9        |
| CH09                        | 434.9        |
| CH10                        | 432.7        |
| CH11                        | 435.1        |
| CH12                        | 432.5        |
| CH13                        | 435.3        |
| <b>CH14 (Low Channel)</b>   | <b>432.3</b> |
| <b>CH15 (Hight Channel)</b> | <b>435.5</b> |
| CH16                        | 433.9        |

### 3. 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.”

- The antenna of the **TAINET Transceiver Module** is permanently attached.
- There are no provisions for connection to an external antenna.

**Conclusion:**

The TAINET Transceiver Module unit complies with the requirement of §15.203.

## 4. TEST EQUIPMENT CALIBRATION DATA

### Conducted Emissions – SR2

| Instrument         | Manufacturer | Type No.                    | Asset No.   | Cali. Interval | Cali. Due Date |
|--------------------|--------------|-----------------------------|-------------|----------------|----------------|
| Two-Line V-Network | R&S          | ENV216                      | MRTTWA00019 | 1 year         | 2018.03.15     |
| Cable              | Rosnol       | N1C50-RG400-B<br>1C50-500CM | MRTTWE00013 | 1 year         | 2018.05.19     |
| EMI Test Receiver  | R&S          | ESR3                        | MRTTWA00009 | 1 year         | 2018.03.16     |

### Radiated Emissions – AC1

| Instrument               | Manufacturer | Type No.                  | Asset No.   | Cali. Interval | Cali. Due Date |
|--------------------------|--------------|---------------------------|-------------|----------------|----------------|
| Broadband TRILOG Antenna | SCHWARZBECK  | VULB 9162                 | MRTTWA00001 | 1 year         | 2018.05.14     |
| EMI Test Receiver        | R&S          | ESR3                      | MRTTWA00009 | 1 year         | 2018.03.16     |
| Active Loop Antenna      | Schwarzbeck  | FMZB 1519B                | MRTTWA00002 | 1 year         | 2018.04.13     |
| Broadband Horn antenna   | SCHWARZBECK  | BBHA 9120D                | MRTTWA00003 | 1 year         | 2018.04.17     |
| Breitband Hornantenna    | Schwarzbeck  | BBHA 9170                 | MRTTWA00004 | 1 year         | 2018.04.24     |
| Broadband Amplifier      | Schwarzbeck  | BBV 9721                  | MRTTWA00006 | 1 year         | 2018.04.24     |
| Broadband Preamplifier   | SCHWARZBECK  | BBV 9718                  | MRTTWA00005 | 1 year         | 2018.04.19     |
| Cable                    | HUBERSUHNER  | SF106                     | MRTTWA00010 | 1 year         | 2018.05.19     |
| Cable                    | Rosnol       | K1K50-UP0264-<br>K1K50-4M | MRTTWA00012 | 1 year         | 2018.05.19     |

### Conducted Test Equipment – SR2

| Instrument                | Manufacturer | Type No. | Asset No.   | Cali. Interval | Cali. Due Date |
|---------------------------|--------------|----------|-------------|----------------|----------------|
| Spectrum Analyzer         | KEYSIGHT     | N9010A   | MRTTWA00012 | 1 year         | 2018.07.24     |
| USB Wideband Power Sensor | KEYSIGHT     | U2021XA  | MRTTWA00015 | 1 year         | 2018.03.19     |

### Test Software

| Software | Version   | Function          |
|----------|-----------|-------------------|
| e3       | 9.160520a | EMI Test Software |
| EMI      | V3        | EMI Test Software |

## 5. 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  $k = 2$ .

|                                                                                                 |
|-------------------------------------------------------------------------------------------------|
| AC Conducted Emission Measurement – SR2                                                         |
| Measuring Uncertainty for a Level of Confidence of 95% ( $U=2U_c(y)$ ):<br>150kHz~30MHz: 2.42dB |
| Conducted Measurement– SR1                                                                      |
| Measuring Uncertainty for a Level of Confidence of 95% ( $U=2U_c(y)$ ): 1.3dB                   |
| Radiated Emission Measurement – AC1                                                             |
| Measuring Uncertainty for a Level of Confidence of 95% ( $U=2U_c(y)$ ): 4.22dB                  |

## 6. TEST RESULT

### 6.1. Summary

**Product Name:** TAINET Transceiver Module

**Applicant:** TCRF-PTI4

| FCC Part Section(s) | Test Description                         | Test Condition | Test Result |
|---------------------|------------------------------------------|----------------|-------------|
| 15.205<br>15.231(b) | Radiated Spurious Emissions              | Radiated       | Pass        |
| 15.231(c)           | 20dB Bandwidth                           |                | Pass        |
| 15.231(e)           | Transmission Time                        |                | Pass        |
| 15.231(e)           | Duty Cycle                               |                | Pass        |
| 15.207              | AC Conducted Emissions<br>150kHz - 30MHz | Line Conducted | Pass        |

**Notes:**

- 1) All modes of operation and data rates were investigated. 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) The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

## 6.2. Radiated Emissions

### 6.2.1. Standard Applicable

According to §15.231(b), the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

| Fundamental frequency (MHz) | Field strength of fundamental (microvolts/meter) | Field strength of spurious emissions (microvolts/meter) |
|-----------------------------|--------------------------------------------------|---------------------------------------------------------|
| 40.66-40.70                 | 2,250                                            | 225                                                     |
| 70-130                      | 1,250                                            | 125                                                     |
| 130-174                     | 1,250 to 3,750                                   | 125 to 375                                              |
| 174-260                     | 3,750                                            | 375                                                     |
| 260-470                     | 3,750 to 12,500                                  | 375 to 1,250                                            |
| Above 470                   | 12,500                                           | 1,250                                                   |

The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength.

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements start below or at the lowest crystal frequency.

Compliance with the provisions of §15.205 shall be demonstrated using the measurement instrumentation specified in that section.

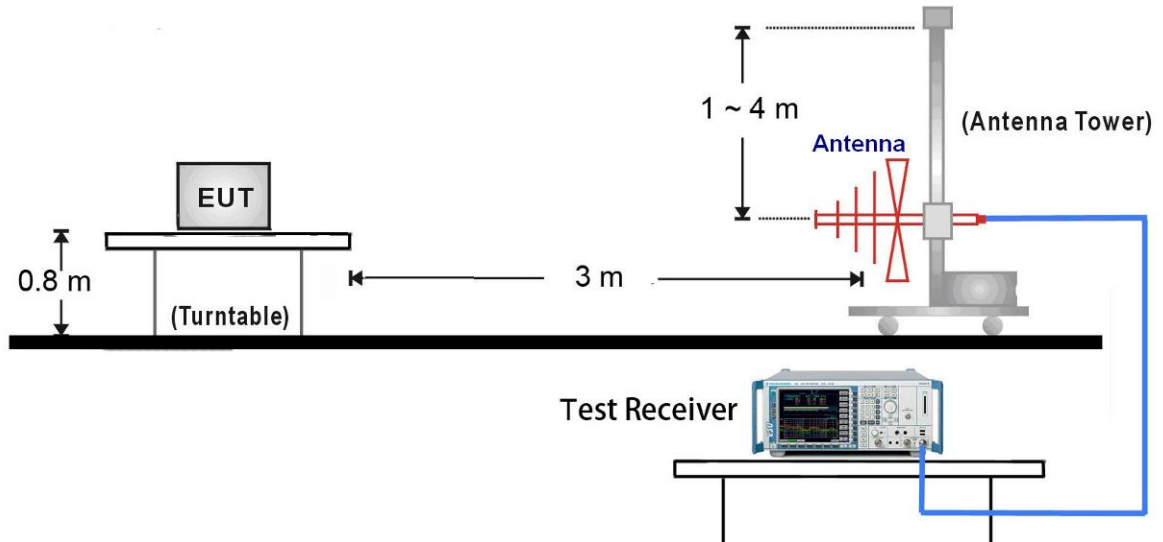
### 6.2.2. Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.231(b) and FCC Part 15.209 Limit.

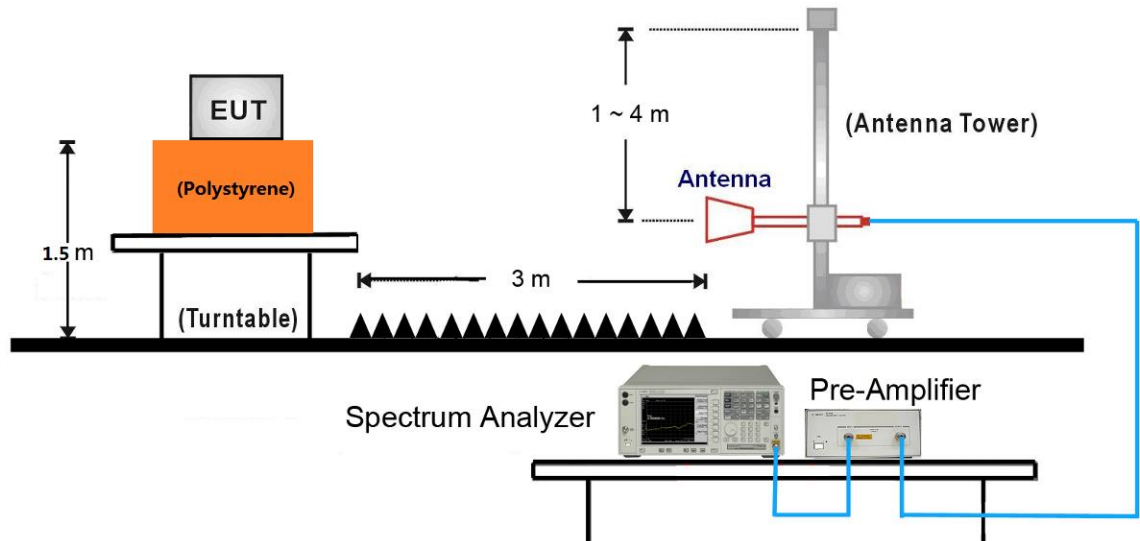
### 6.2.3. Test Setup

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.231(b) and FCC Part 15.209 Limit.

#### 30MHz ~ 1GHz Test Setup:

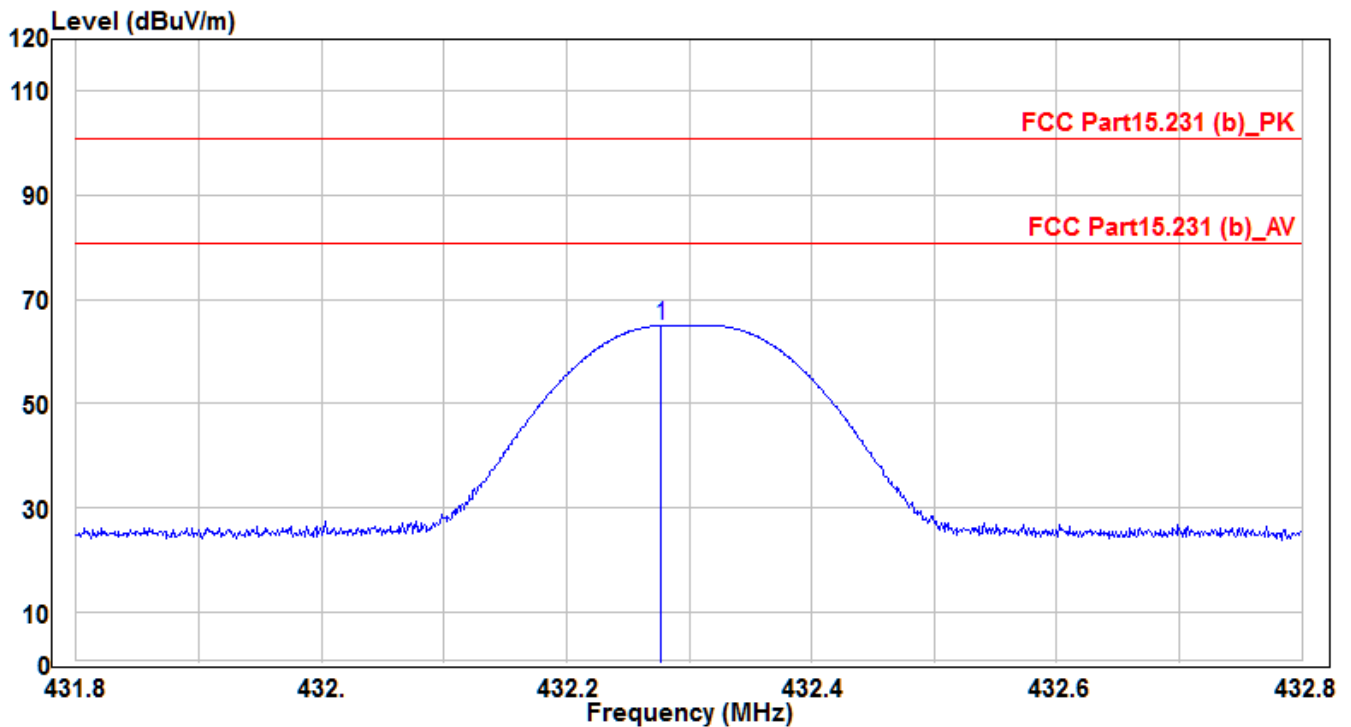


#### 1GHz ~ 5GHz Test Setup:



#### 6.2.4. Test Results

|           |                        |                  |             |
|-----------|------------------------|------------------|-------------|
| EUT       | RF Network Repeater    | Test Date        | 2017/12/14  |
| Factor    | VULB 9162 (30MHz~8GHz) | Temp. / Humidity | 25°C / 60%  |
| Polarity  | Horizontal             | Site / Engineer  | AC1 / Peter |
| Test Mode | MODE1-CH14             | Test Voltage     | By Battery  |



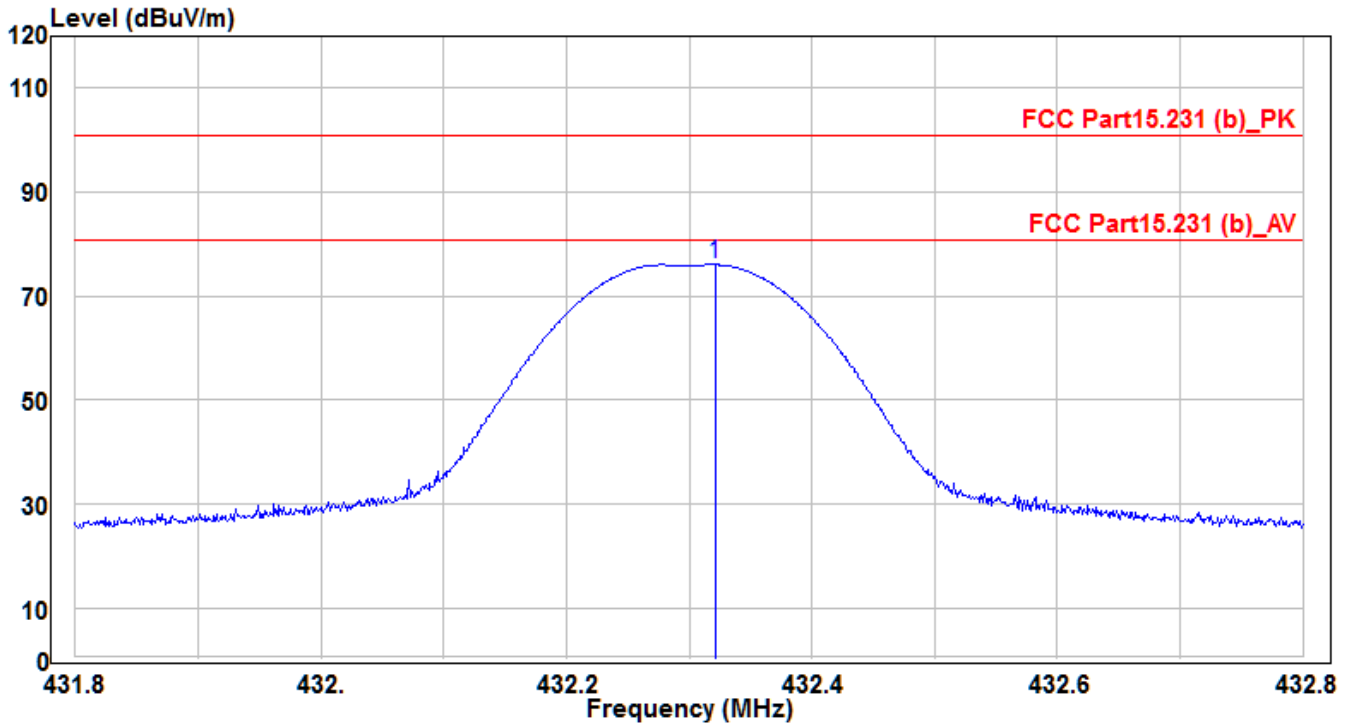
| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  | * | 432.277         | 40.2           | 24.76    | 64.96                | -35.83      | 100.79         | 100         | 95          | Peak              |

Note :

1. " \* " means the worst value in this measurement data °
2. Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
4. The emission levels of other frequencies are very lower than the limit and not show in test report °
5. Other channel/mode was also verified. The test results shown represent the worst case emissions °
6. No emission found between lowest internal used/generated frequency to 30MHz °



|           |                        |                  |             |
|-----------|------------------------|------------------|-------------|
| EUT       | RF Network Repeater    | Test Date        | 2017/12/14  |
| Factor    | VULB 9162 (30MHz~8GHz) | Temp. / Humidity | 25°C / 60%  |
| Polarity  | Vertical               | Site / Engineer  | AC1 / Peter |
| Test Mode | MODE1-CH14             | Test Voltage     | By Battery  |

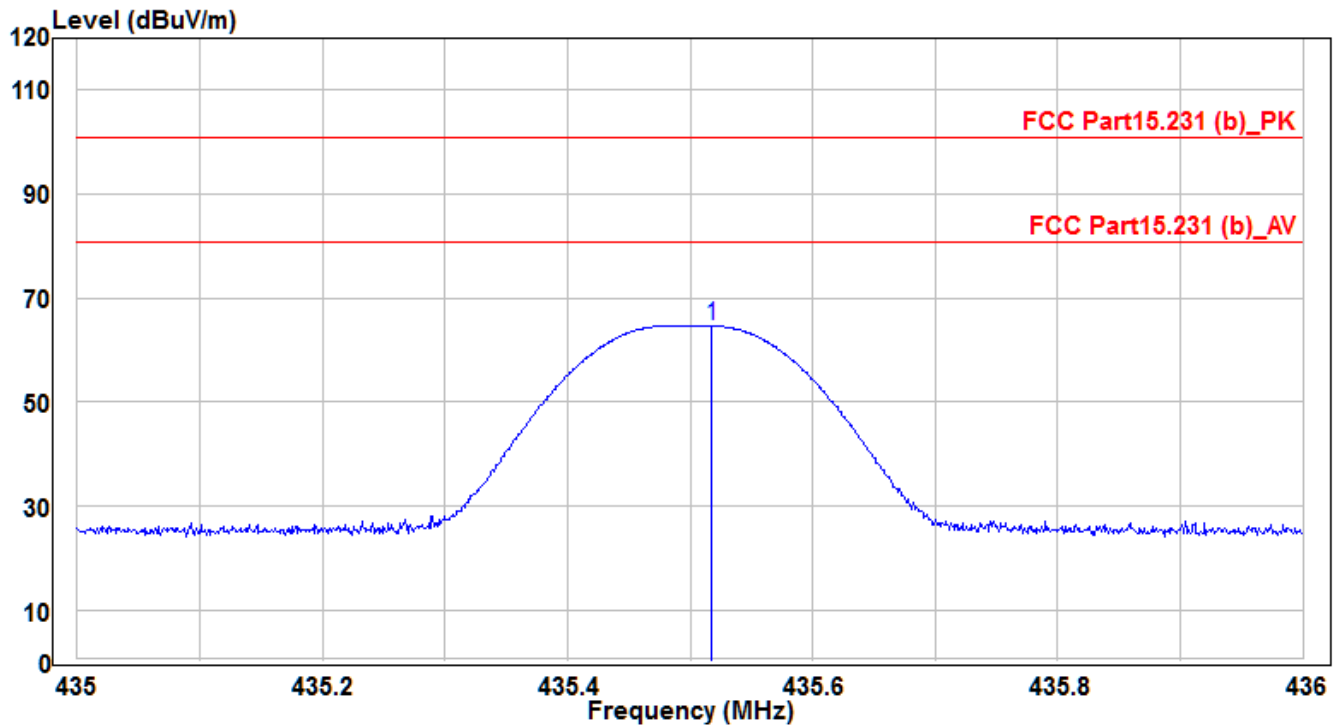


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  | * | 432.321         | 51.29          | 24.76    | 76.05                | -24.74      | 100.79         | 100         | 400         | Peak              |

Note :

1. " \* " means the worst value in this measurement data °
2. Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
4. The emission levels of other frequencies are very lower than the limit and not show in test report °
5. Other channel/mode was also verified. The test results shown represent the worst case emissions °
6. No emission found between lowest internal used/generated frequency to 30MHz °

|           |                        |                  |             |
|-----------|------------------------|------------------|-------------|
| EUT       | RF Network Repeater    | Test Date        | 2017/12/14  |
| Factor    | VULB 9162 (30MHz~8GHz) | Temp. / Humidity | 25°C / 60%  |
| Polarity  | Horizontal             | Site / Engineer  | AC1 / Peter |
| Test Mode | MODE1-CH15             | Test Voltage     | By Battery  |

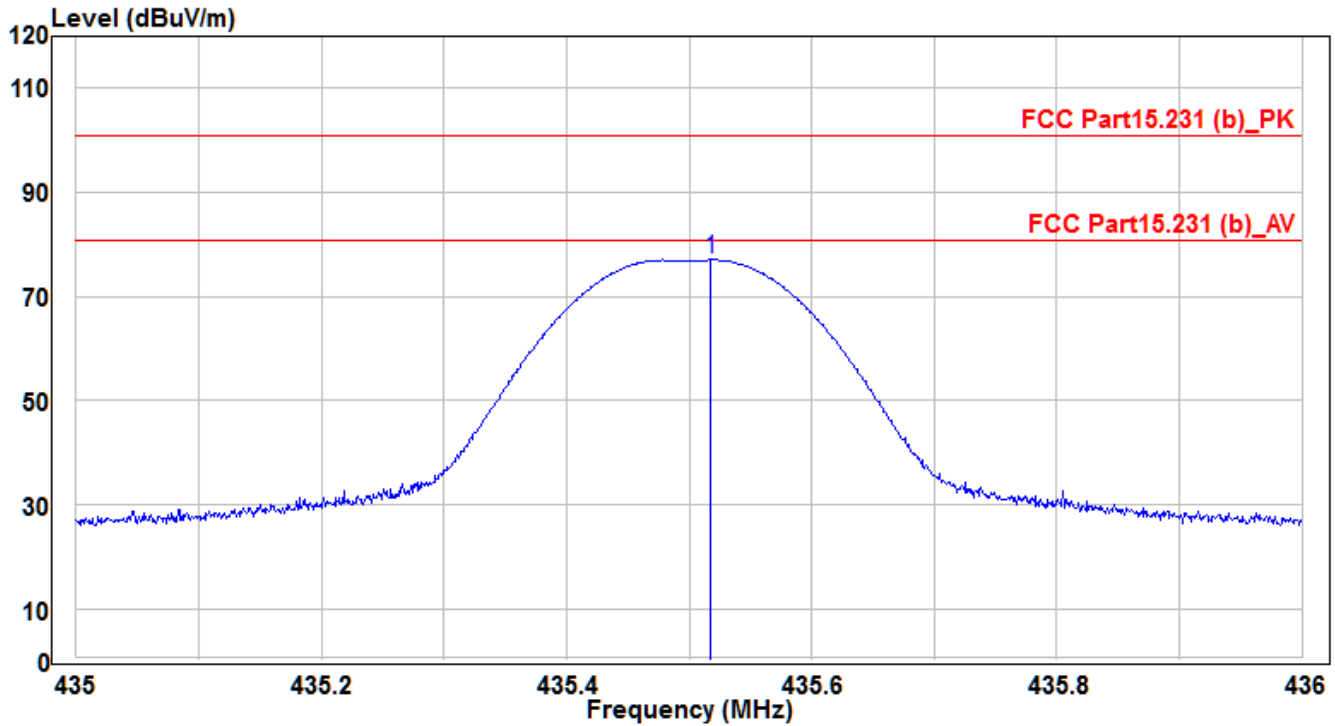


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  | * | 435.518         | 39.79          | 24.82    | 64.61                | -36.18      | 100.79         | 100         | 80          | Peak              |

Note :

1. " \* " means the worst value in this measurement data °
2. Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
4. The emission levels of other frequencies are very lower than the limit and not show in test report °
5. Other channel/mode was also verified. The test results shown represent the worst case emissions °
6. No emission found between lowest internal used/generated frequency to 30MHz °

|           |                        |                  |             |
|-----------|------------------------|------------------|-------------|
| EUT       | RF Network Repeater    | Test Date        | 2017/12/14  |
| Factor    | VULB 9162 (30MHz~8GHz) | Temp. / Humidity | 25°C / 60%  |
| Polarity  | Vertical               | Site / Engineer  | AC1 / Peter |
| Test Mode | MODE1-CH15             | Test Voltage     | By Battery  |

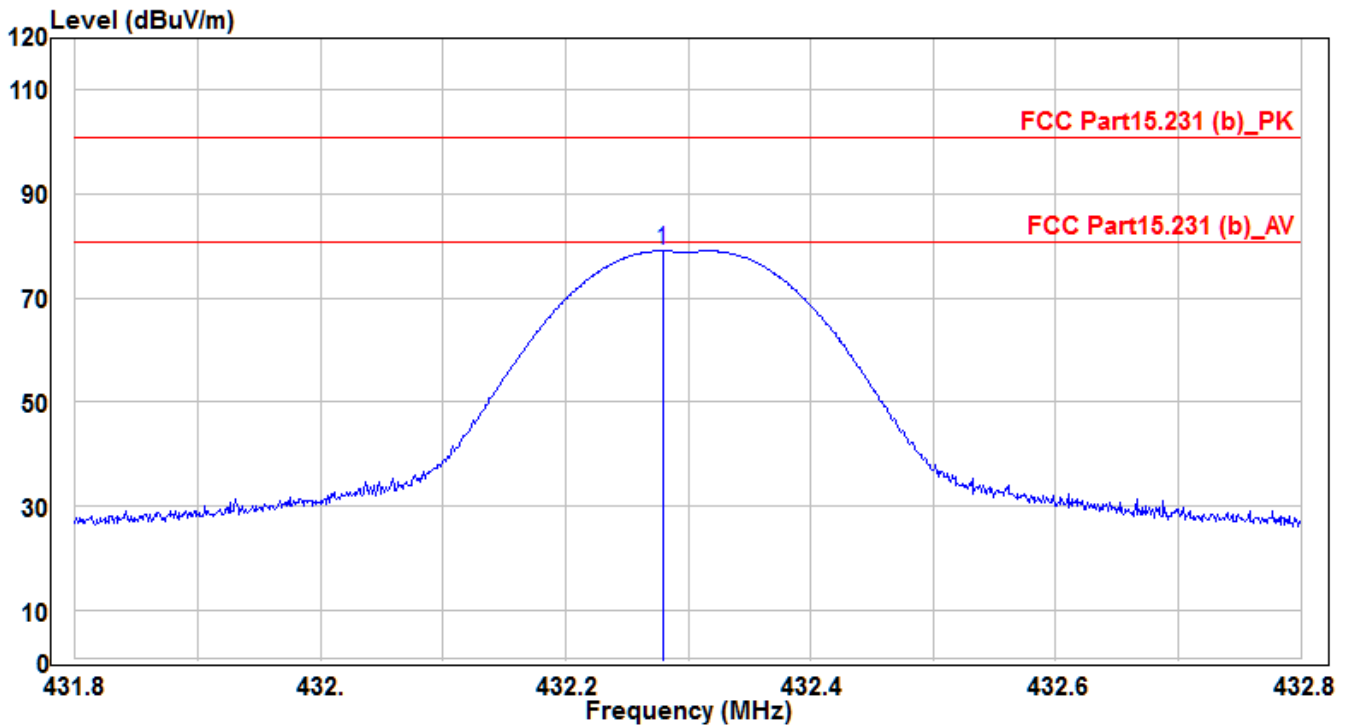


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  | * | 435.518         | 52.19          | 24.82    | 77.01                | -23.78      | 100.79         | 100         | 400         | Peak              |

Note :

- "\*" means the worst value in this measurement data °
- Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
- Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
- The emission levels of other frequencies are very lower than the limit and not show in test report °
- Other channel/mode was also verified. The test results shown represent the worst case emissions °
- No emission found between lowest internal used/generated frequency to 30MHz °

|           |                          |                  |             |
|-----------|--------------------------|------------------|-------------|
| EUT       | RF Transceiver Interface | Test Date        | 2017/12/14  |
| Factor    | VULB 9162 (30MHz~8GHz)   | Temp. / Humidity | 25°C / 60%  |
| Polarity  | Horizontal               | Site / Engineer  | AC1 / Peter |
| Test Mode | MODE2-CH14               | Test Voltage     | By Battery  |

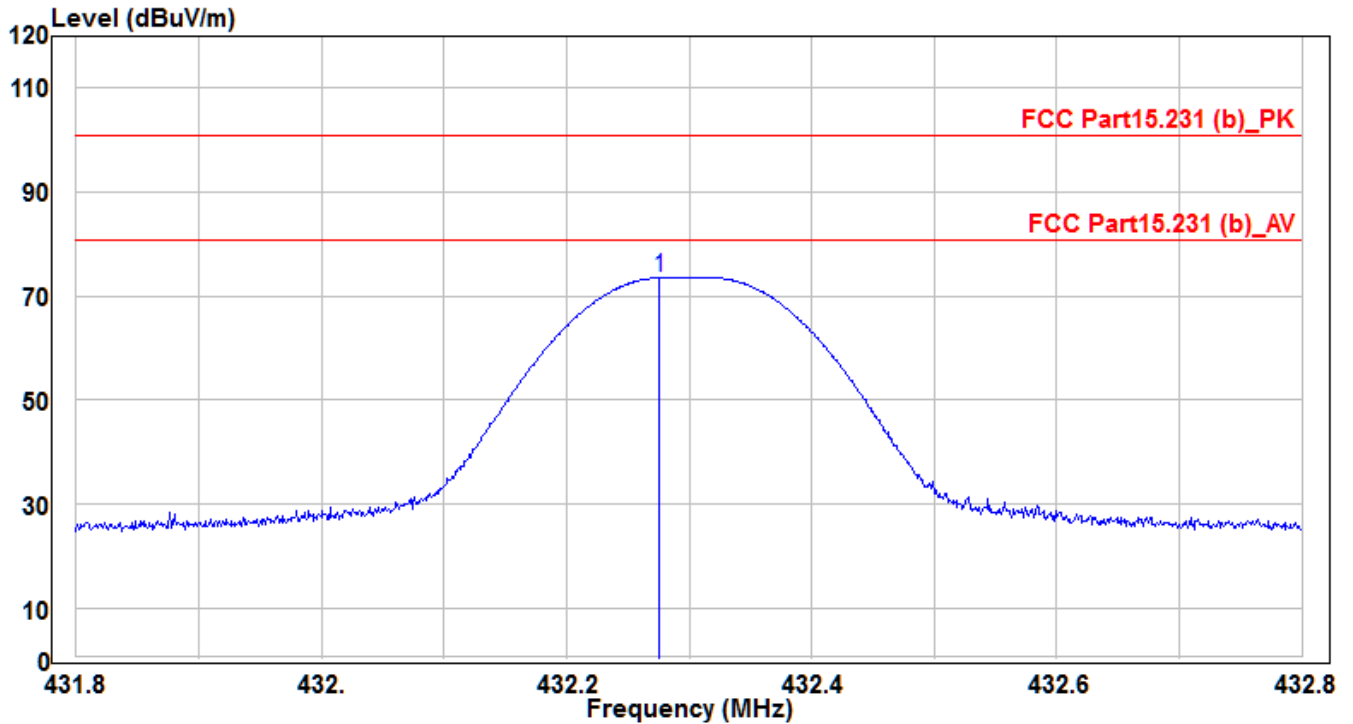


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  | * | 432.279         | 54.28          | 24.76    | 79.04                | -21.75      | 100.79         | 100         | 330         | Peak              |

Note :

1. " \* " means the worst value in this measurement data °
2. Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
4. The emission levels of other frequencies are very lower than the limit and not show in test report °
5. Other channel/mode was also verified. The test results shown represent the worst case emissions °
6. No emission found between lowest internal used/generated frequency to 30MHz °

|           |                          |                  |             |
|-----------|--------------------------|------------------|-------------|
| EUT       | RF Transceiver Interface | Test Date        | 2017/12/14  |
| Factor    | VULB 9162 (30MHz~8GHz)   | Temp. / Humidity | 25°C / 60%  |
| Polarity  | Vertical                 | Site / Engineer  | AC1 / Peter |
| Test Mode | MODE2-CH14               | Test Voltage     | By Battery  |

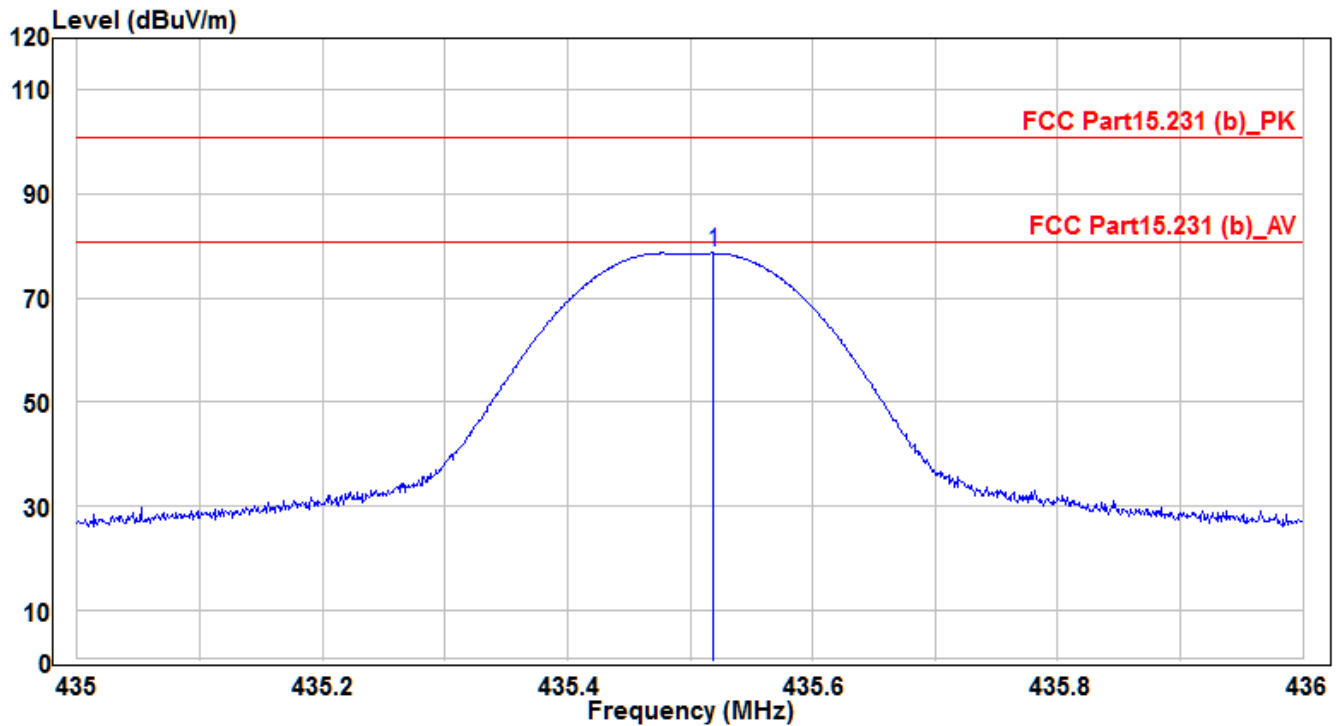


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  | * | 432.276         | 48.73          | 24.76    | 73.49                | -27.3       | 100.79         | 120         | 275         | Peak              |

Note :

1. " \* " means the worst value in this measurement data °
2. Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
4. The emission levels of other frequencies are very lower than the limit and not show in test report °
5. Other channel/mode was also verified. The test results shown represent the worst case emissions °
6. No emission found between lowest internal used/generated frequency to 30MHz °

|           |                          |                  |             |
|-----------|--------------------------|------------------|-------------|
| EUT       | RF Transceiver Interface | Test Date        | 2017/12/14  |
| Factor    | VULB 9162 (30MHz~8GHz)   | Temp. / Humidity | 25°C / 60%  |
| Polarity  | Horizontal               | Site / Engineer  | AC1 / Peter |
| Test Mode | MODE2-CH15               | Test Voltage     | By Battery  |

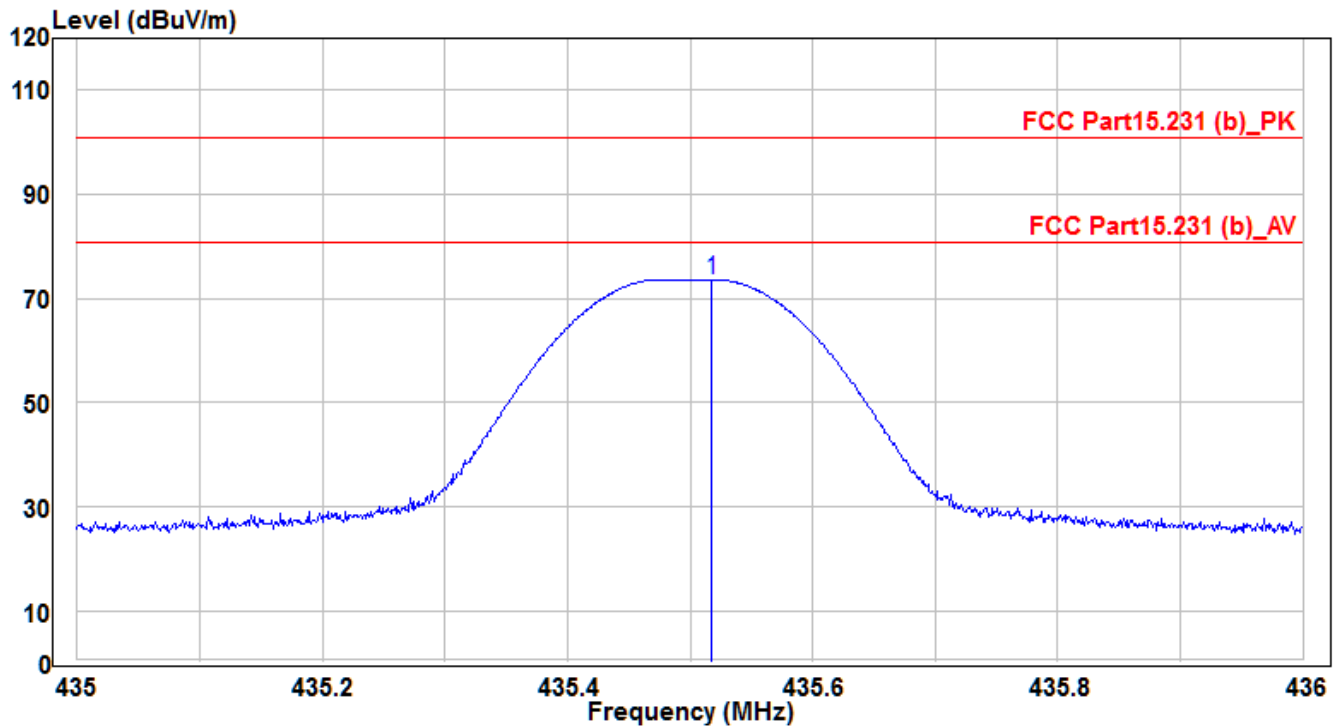


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  | * | 435.519         | 53.83          | 24.82    | 78.65                | -22.14      | 100.79         | 100         | 5           | Peak              |

Note :

1. " \* " means the worst value in this measurement data °
2. Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
4. The emission levels of other frequencies are very lower than the limit and not show in test report °
5. Other channel/mode was also verified. The test results shown represent the worst case emissions °
6. No emission found between lowest internal used/generated frequency to 30MHz °

|           |                          |                  |             |
|-----------|--------------------------|------------------|-------------|
| EUT       | RF Transceiver Interface | Test Date        | 2017/12/14  |
| Factor    | VULB 9162 (30MHz~8GHz)   | Temp. / Humidity | 25°C / 60%  |
| Polarity  | Vertical                 | Site / Engineer  | AC1 / Peter |
| Test Mode | MODE2-CH15               | Test Voltage     | By Battery  |

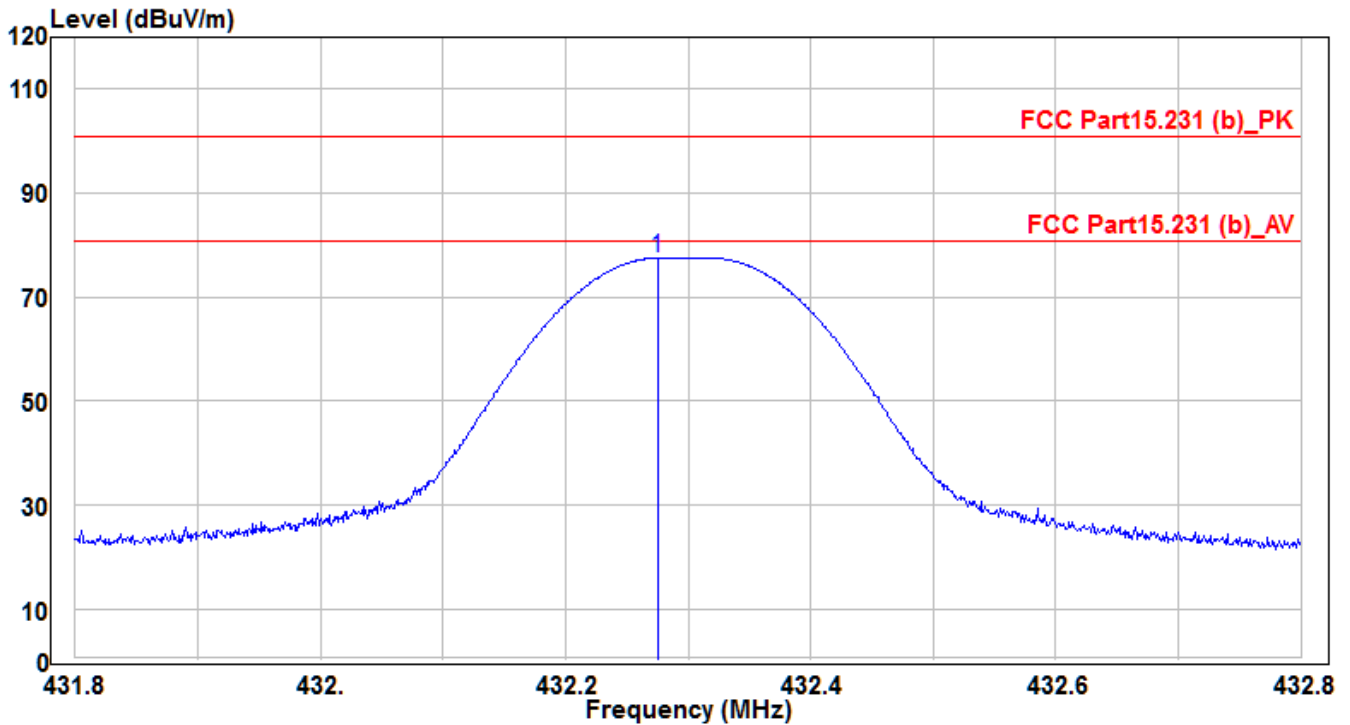


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  | * | 435.518         | 48.86          | 24.82    | 73.68                | -27.11      | 100.79         | 120         | 295         | Peak              |

Note :

1. " \* " means the worst value in this measurement data °
2. Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
4. The emission levels of other frequencies are very lower than the limit and not show in test report °
5. Other channel/mode was also verified. The test results shown represent the worst case emissions °
6. No emission found between lowest internal used/generated frequency to 30MHz °

|           |                        |                  |                |
|-----------|------------------------|------------------|----------------|
| EUT       | RF USB Dongle          | Test Date        | 2017/12/14     |
| Factor    | VULB 9162 (30MHz~8GHz) | Temp. / Humidity | 25°C / 60%     |
| Polarity  | Horizontal             | Site / Engineer  | AC1 / Peter    |
| Test Mode | MODE3-CH14             | Test Voltage     | By Notebook PC |



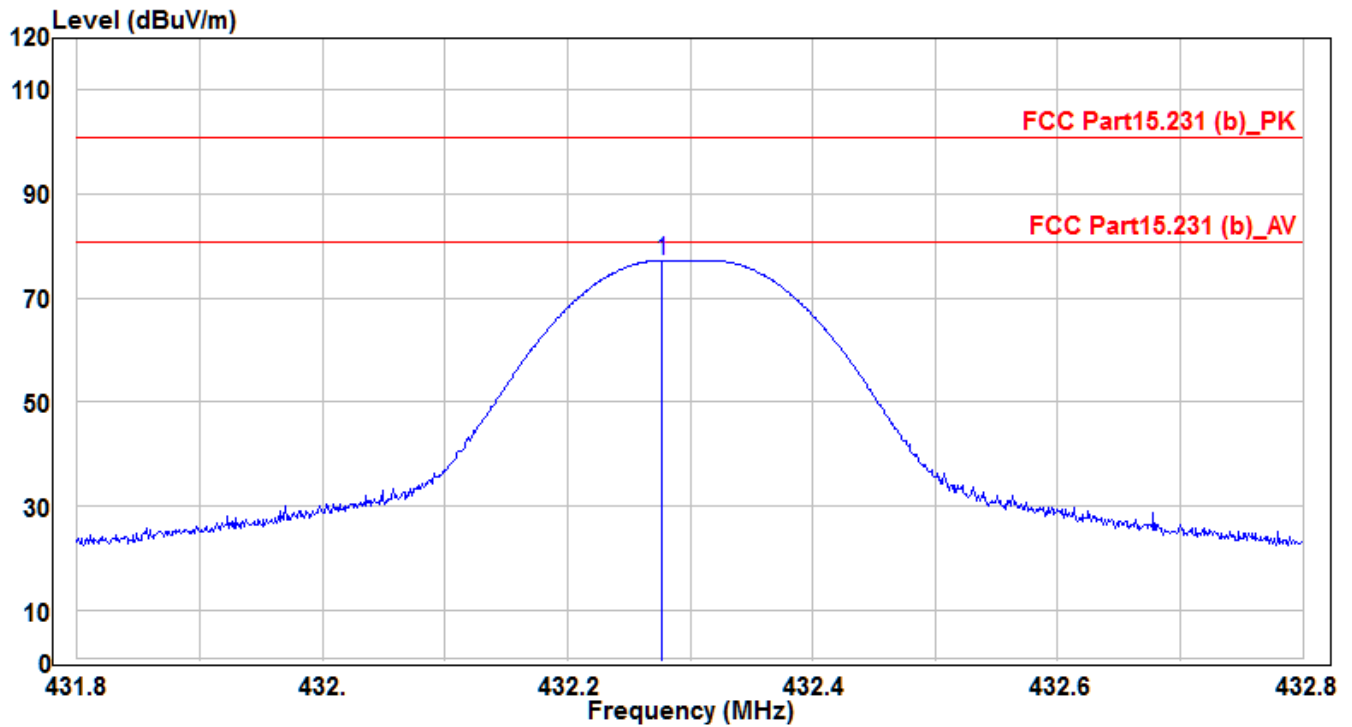
| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  | * | 432.275         | 52.73          | 24.76    | 77.49                | -23.3       | 100.79         | 100         | -40         | Peak              |

Note :

1. " \* " means the worst value in this measurement data °
2. Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
4. The emission levels of other frequencies are very lower than the limit and not show in test report °
5. Other channel/mode was also verified. The test results shown represent the worst case emissions °
6. No emission found between lowest internal used/generated frequency to 30MHz °



|           |                        |                  |                |
|-----------|------------------------|------------------|----------------|
| EUT       | RF USB Dongle          | Test Date        | 2017/12/14     |
| Factor    | VULB 9162 (30MHz~8GHz) | Temp. / Humidity | 25°C / 60%     |
| Polarity  | Vertical               | Site / Engineer  | AC1 / Peter    |
| Test Mode | MODE3-CH14             | Test Voltage     | By Notebook PC |

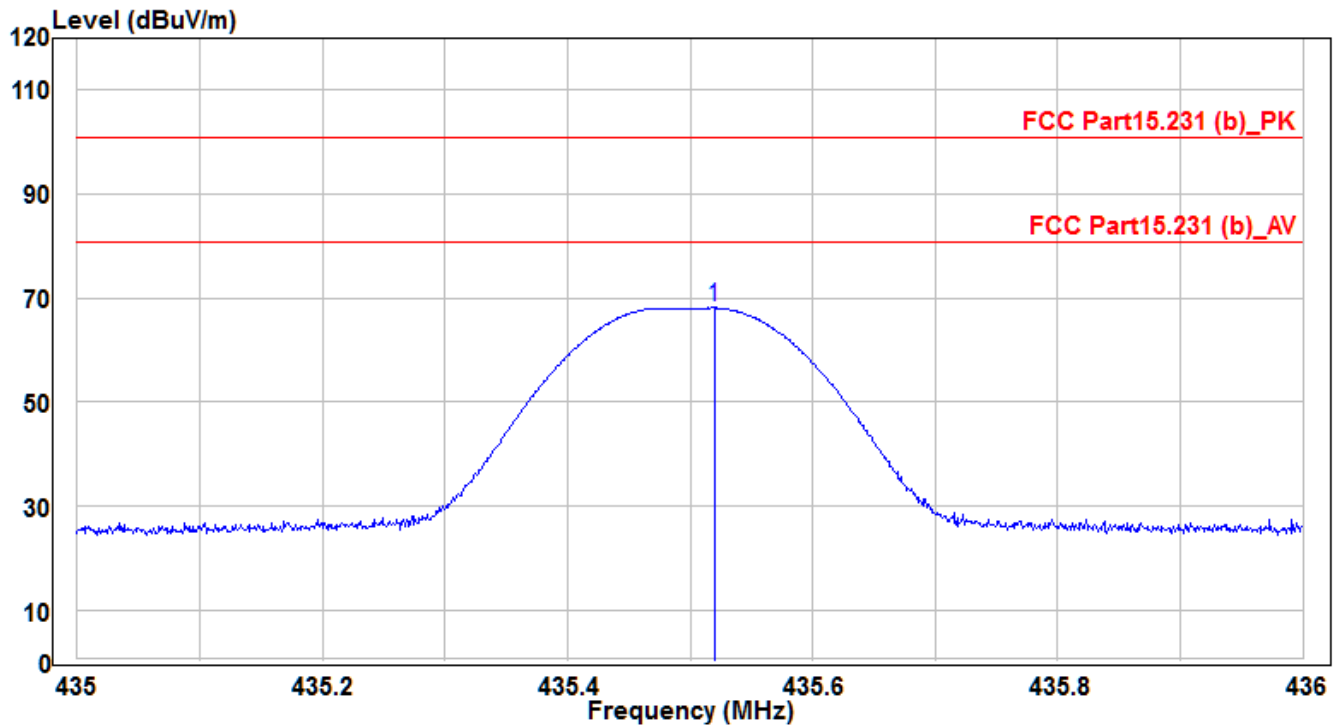


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  | * | 432.277         | 52.45          | 24.76    | 77.21                | -23.58      | 100.79         | 130         | 65          | Peak              |

Note :

1. " \* " means the worst value in this measurement data °
2. Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
4. The emission levels of other frequencies are very lower than the limit and not show in test report °
5. Other channel/mode was also verified. The test results shown represent the worst case emissions °
6. No emission found between lowest internal used/generated frequency to 30MHz °

|           |                        |                  |                |
|-----------|------------------------|------------------|----------------|
| EUT       | RF USB Dongle          | Test Date        | 2017/12/14     |
| Factor    | VULB 9162 (30MHz~8GHz) | Temp. / Humidity | 25°C / 60%     |
| Polarity  | Horizontal             | Site / Engineer  | AC1 / Peter    |
| Test Mode | MODE3-CH15             | Test Voltage     | By Notebook PC |

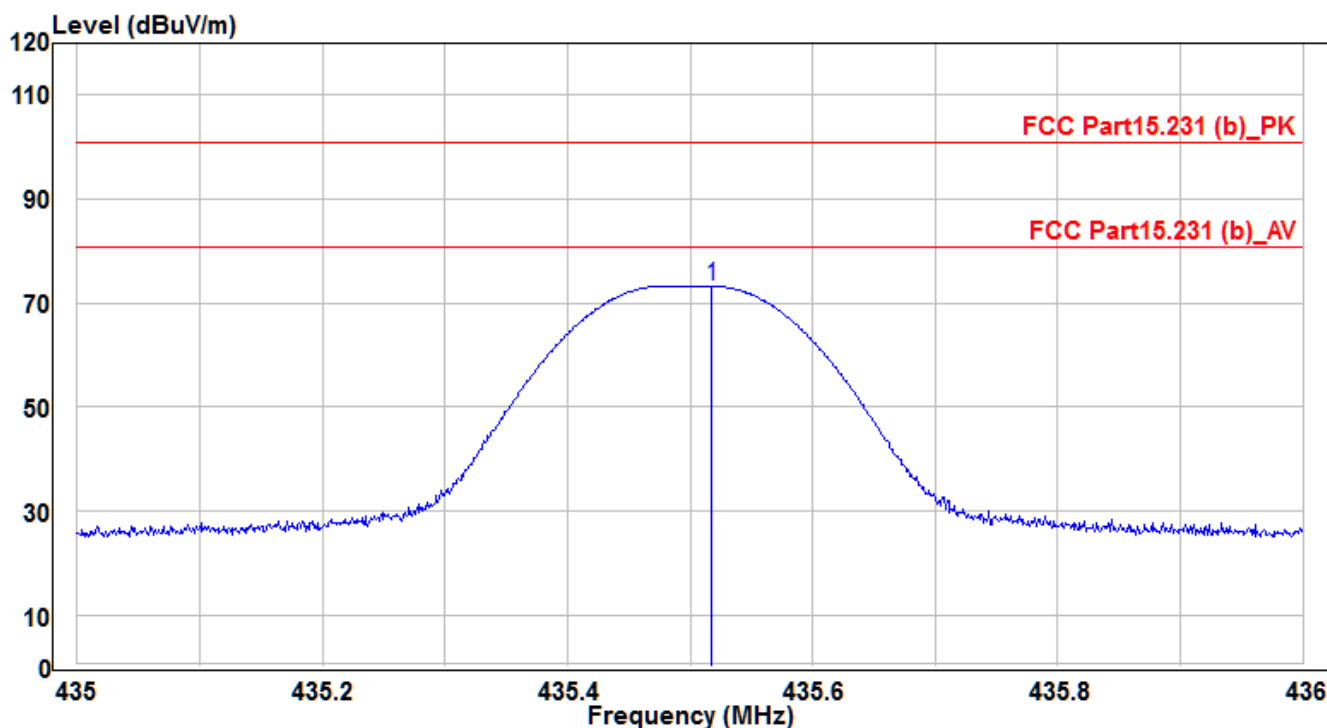


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  | * | 435.52          | 43.28          | 24.82    | 68.1                 | -32.69      | 100.79         | 100         | 210         | Peak              |

Note :

1. " \* " means the worst value in this measurement data °
2. Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
4. The emission levels of other frequencies are very lower than the limit and not show in test report °
5. Other channel/mode was also verified. The test results shown represent the worst case emissions °
6. No emission found between lowest internal used/generated frequency to 30MHz °

|           |                        |                  |                |
|-----------|------------------------|------------------|----------------|
| EUT       | RF USB Dongle          | Test Date        | 2017/12/14     |
| Factor    | VULB 9162 (30MHz~8GHz) | Temp. / Humidity | 25°C / 60%     |
| Polarity  | Vertical               | Site / Engineer  | AC1 / Peter    |
| Test Mode | MODE3-CH15             | Test Voltage     | By Notebook PC |

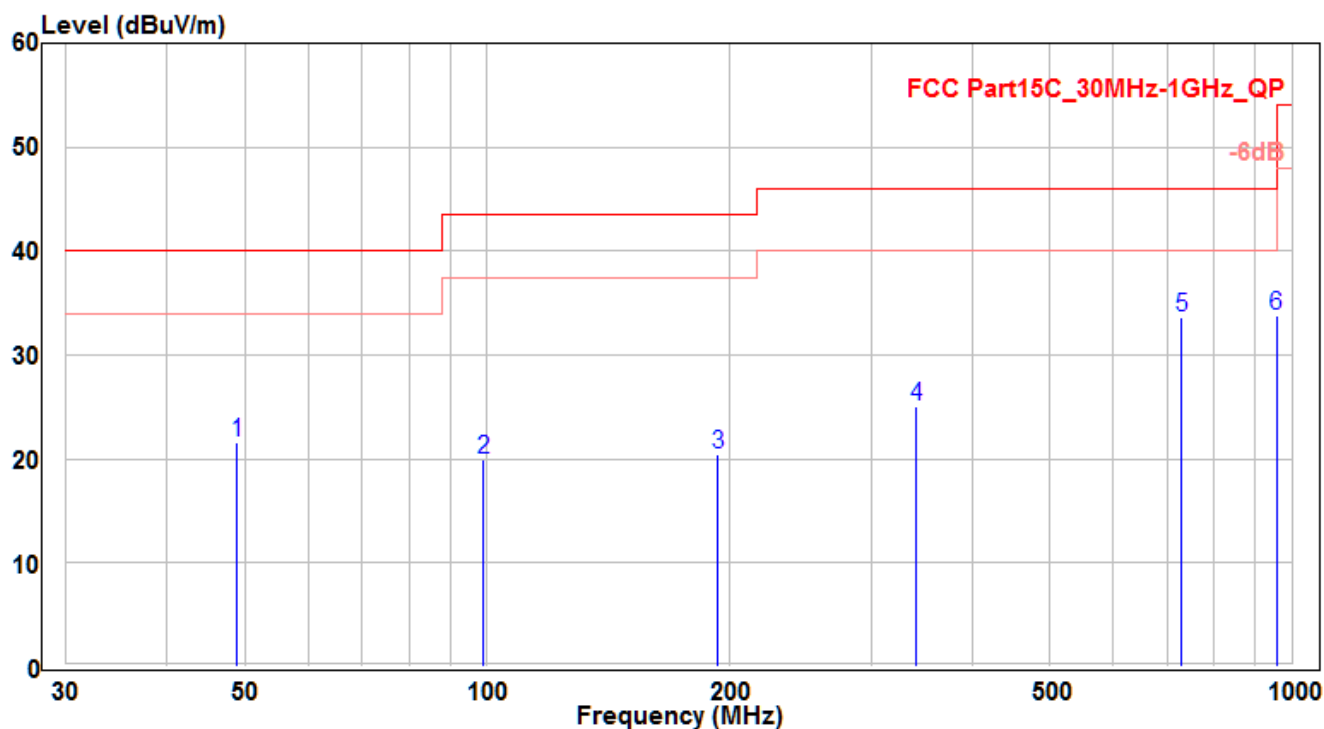


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  | * | 435.518         | 48.43          | 24.82    | 73.25                | -27.54      | 100.79         | 120         | 150         | Peak              |

Note :

- " \* " means the worst value in this measurement data °
- Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) °
- Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
- The emission levels of other frequencies are very lower than the limit and not show in test report °
- Other channel/mode was also verified. The test results shown represent the worst case emissions °
- No emission found between lowest internal used/generated frequency to 30MHz °

|           |                        |                  |             |
|-----------|------------------------|------------------|-------------|
| EUT       | RF Network Repeater    | Test Date        | 2017/12/14  |
| Factor    | VULB 9162 (30MHz~8GHz) | Temp. / Humidity | 25°C / 60%  |
| Polarity  | Horizontal             | Site / Engineer  | AC1 / Peter |
| Test Mode | MODE1-CH14             | Test Voltage     | By Battery  |

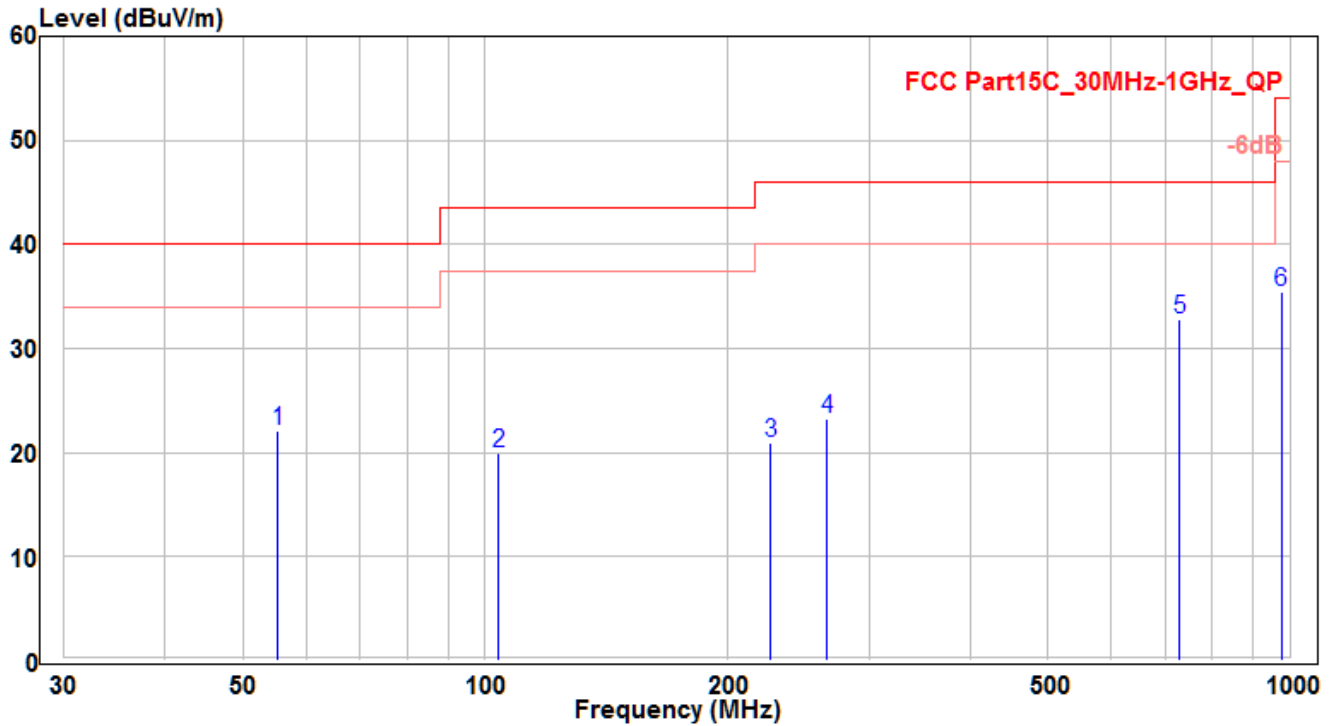


| No | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  | 48.976          | 0.09           | 21.52    | 21.61                | -18.39      | 40             | 100         | 400         | QP                |
| 2  | 98.931          | 0.74           | 19.15    | 19.89                | -23.61      | 43.5           | 100         | 400         | QP                |
| 3  | 193.627         | 1.59           | 18.94    | 20.53                | -22.97      | 43.5           | 100         | 400         | QP                |
| 4  | 341.552         | 1.94           | 23.17    | 25.11                | -20.89      | 46             | 100         | 400         | QP                |
| 5  | 729.764         | 3.69           | 29.95    | 33.64                | -12.36      | 46             | 100         | 400         | QP                |
| 6  | * 957.532       | 1.62           | 32.26    | 33.88                | -12.12      | 46             | 100         | 400         | QP                |

Note :

- " \* " means the worst value in this measurement data °
- Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
- Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
- The emission levels of other frequencies are very lower than the limit and not show in test report °
- Other channel/mode was also verified. The test results shown represent the worst case emissions °
- No emission found between lowest internal used/generated frequency to 30MHz °

|           |                        |                  |             |
|-----------|------------------------|------------------|-------------|
| EUT       | RF Network Repeater    | Test Date        | 2017/12/14  |
| Factor    | VULB 9162 (30MHz~8GHz) | Temp. / Humidity | 25°C / 60%  |
| Polarity  | Vertical               | Site / Engineer  | AC1 / Peter |
| Test Mode | MODE1-CH14             | Test Voltage     | By Battery  |

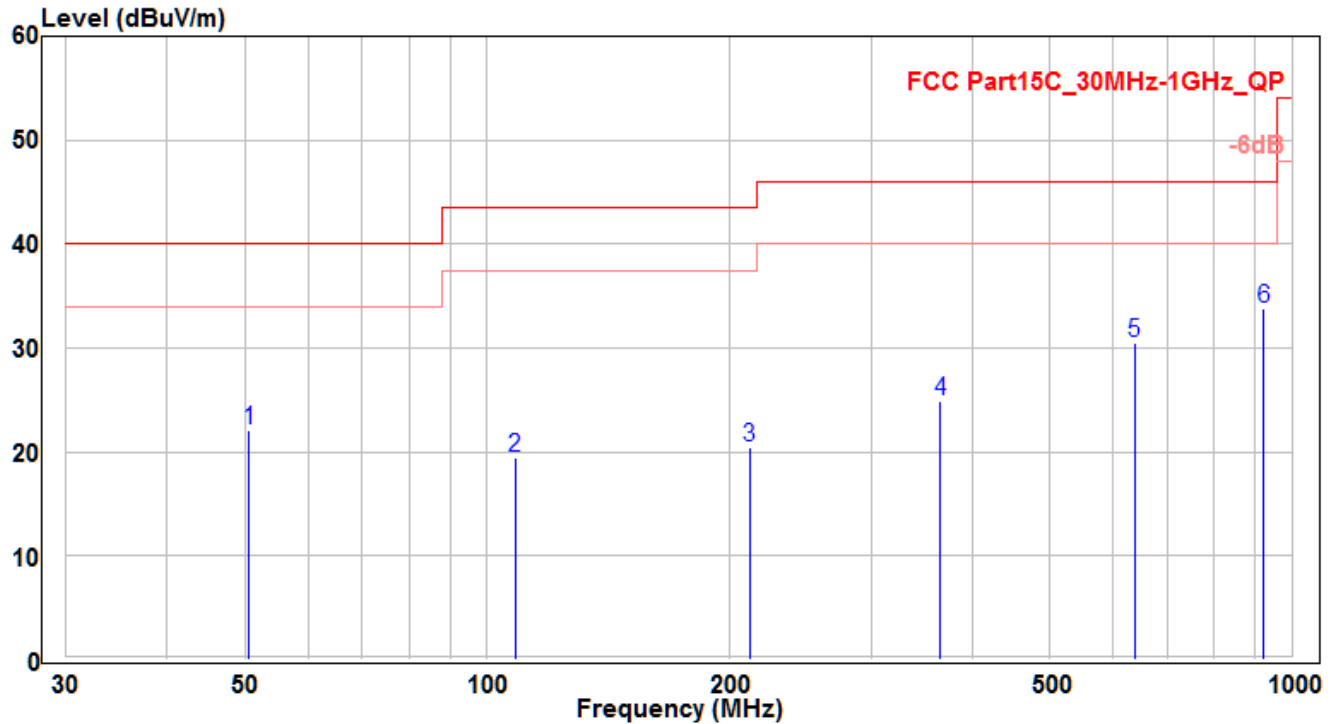


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  |   | 55.311          | 1.45           | 20.62    | 22.07                | -17.93      | 40             | 100         | 400         | QP                |
| 2  |   | 103.932         | 0.84           | 19.15    | 19.99                | -23.51      | 43.5           | 100         | 400         | QP                |
| 3  |   | 226.455         | 1.48           | 19.47    | 20.95                | -25.05      | 46             | 100         | 400         | QP                |
| 4  |   | 266.286         | 2.57           | 20.65    | 23.22                | -22.78      | 46             | 100         | 400         | QP                |
| 5  | * | 729.794         | 2.87           | 29.95    | 32.82                | -13.18      | 46             | 100         | 400         | QP                |
| 6  |   | 976.174         | 2.91           | 32.52    | 35.43                | -18.57      | 54             | 100         | 400         | QP                |

Note :

- " \* " means the worst value in this measurement data °
- Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
- Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
- The emission levels of other frequencies are very lower than the limit and not show in test report °
- Other channel/mode was also verified. The test results shown represent the worst case emissions °
- No emission found between lowest internal used/generated frequency to 30MHz °

|           |                        |                  |             |
|-----------|------------------------|------------------|-------------|
| EUT       | RF Network Repeater    | Test Date        | 2017/12/14  |
| Factor    | VULB 9162 (30MHz~8GHz) | Temp. / Humidity | 25°C / 60%  |
| Polarity  | Horizontal             | Site / Engineer  | AC1 / Peter |
| Test Mode | MODE1-CH15             | Test Voltage     | By Battery  |

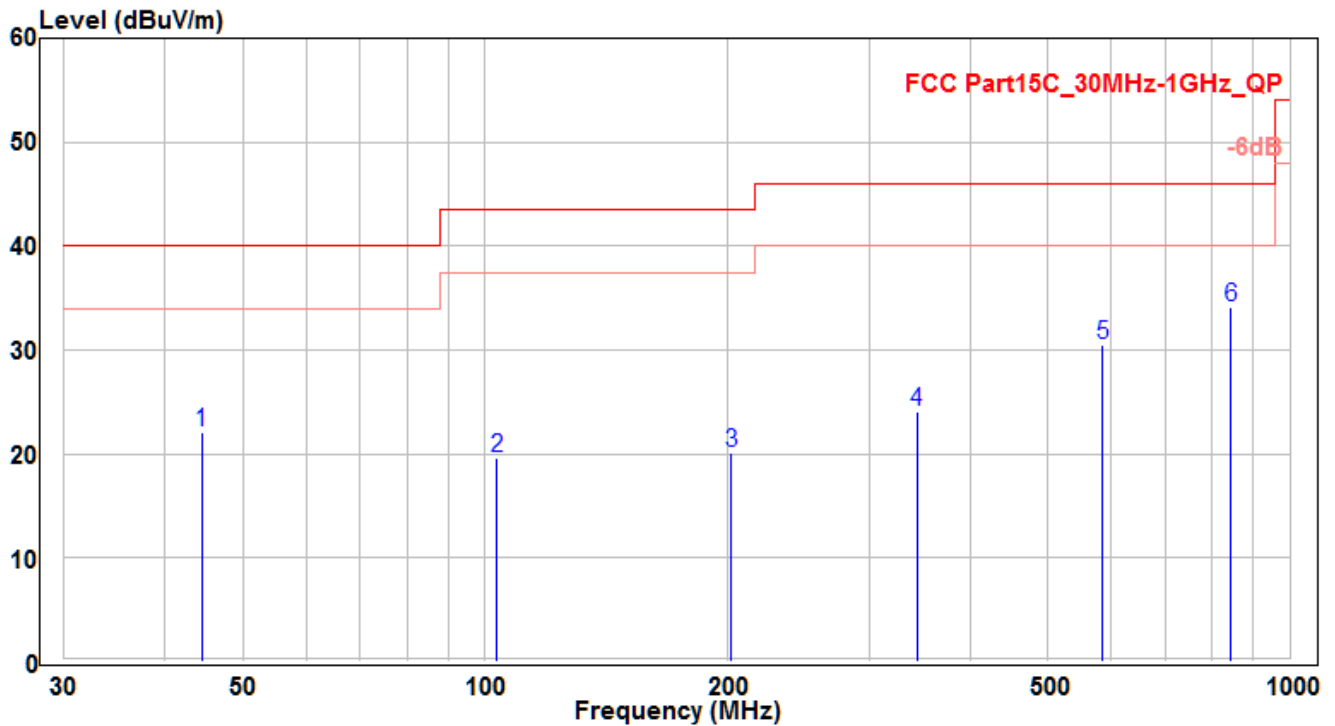


| No | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  | 50.582          | 0.59           | 21.45    | 22.04                | -17.96      | 40             | 100         | 400         | QP                |
| 2  | 108.328         | 0.59           | 18.9     | 19.49                | -24.01      | 43.5           | 100         | 400         | QP                |
| 3  | 212.087         | 1.63           | 18.78    | 20.41                | -23.09      | 43.5           | 100         | 400         | QP                |
| 4  | 365.62          | 1.13           | 23.73    | 24.86                | -21.14      | 46             | 100         | 400         | QP                |
| 5  | 637.644         | 2.02           | 28.46    | 30.48                | -15.52      | 46             | 100         | 400         | QP                |
| 6  | * 923.067       | 1.66           | 32.06    | 33.72                | -12.28      | 46             | 100         | 400         | QP                |

Note :

1. " \* " means the worst value in this measurement data °
2. Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
4. The emission levels of other frequencies are very lower than the limit and not show in test report °
5. Other channel/mode was also verified. The test results shown represent the worst case emissions °
6. No emission found between lowest internal used/generated frequency to 30MHz °

|           |                        |                  |             |
|-----------|------------------------|------------------|-------------|
| EUT       | RF Network Repeater    | Test Date        | 2017/12/14  |
| Factor    | VULB 9162 (30MHz~8GHz) | Temp. / Humidity | 25°C / 60%  |
| Polarity  | Vertical               | Site / Engineer  | AC1 / Peter |
| Test Mode | MODE1-CH15             | Test Voltage     | By Battery  |

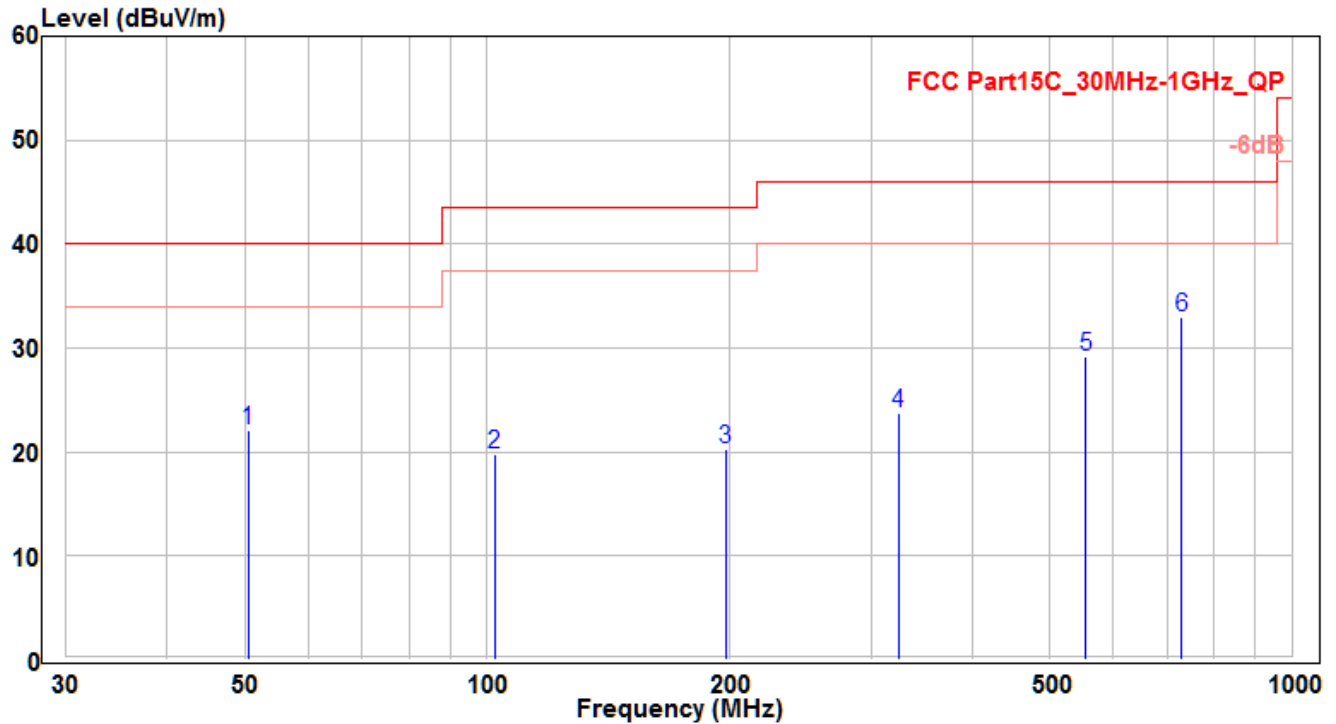


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  |   | 44.459          | 0.79           | 21.31    | 22.1                 | -17.9       | 40             | 100         | 400         | QP                |
| 2  |   | 103.326         | 0.45           | 19.19    | 19.64                | -23.86      | 43.5           | 100         | 400         | QP                |
| 3  |   | 202.357         | 1.05           | 19.04    | 20.09                | -23.41      | 43.5           | 100         | 400         | QP                |
| 4  |   | 344.189         | 0.74           | 23.28    | 24.02                | -21.98      | 46             | 100         | 400         | QP                |
| 5  |   | 584.658         | 3.01           | 27.46    | 30.47                | -15.53      | 46             | 100         | 400         | QP                |
| 6  | * | 843.891         | 2.6            | 31.55    | 34.15                | -11.85      | 46             | 100         | 400         | QP                |

Note :

- " \* " means the worst value in this measurement data °
  - Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
  - Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
  - The emission levels of other frequencies are very lower than the limit and not show in test report °
  - Other channel/mode was also verified. The test results shown represent the worst case emissions °
- No emission found between lowest internal used/generated frequency to 30MHz °

|           |                          |                  |             |
|-----------|--------------------------|------------------|-------------|
| EUT       | RF Transceiver Interface | Test Date        | 2017/12/14  |
| Factor    | VULB 9162 (30MHz~8GHz)   | Temp. / Humidity | 25°C / 60%  |
| Polarity  | Horizontal               | Site / Engineer  | AC1 / Peter |
| Test Mode | MODE2-CH14               | Test Voltage     | By Battery  |



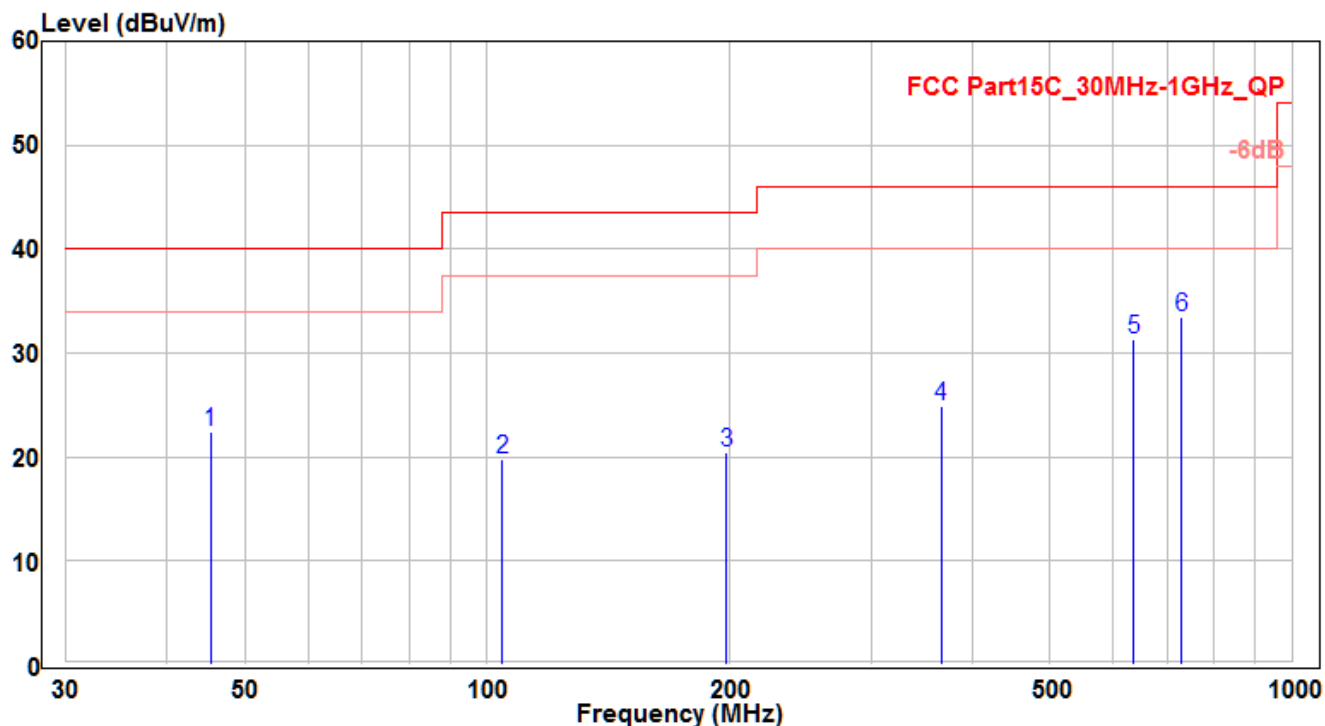
| No | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  | 50.522          | 0.64           | 21.46    | 22.1                 | -17.9       | 40             | 100         | 400         | QP                |
| 2  | 102.174         | 0.47           | 19.26    | 19.73                | -23.77      | 43.5           | 100         | 400         | QP                |
| 3  | 197.84          | 1.24           | 19.08    | 20.32                | -23.18      | 43.5           | 100         | 400         | QP                |
| 4  | 324.183         | 1.33           | 22.43    | 23.76                | -22.24      | 46             | 100         | 400         | QP                |
| 5  | 554.073         | 2.22           | 26.98    | 29.2                 | -16.8       | 46             | 100         | 400         | QP                |
| 6  | * 728.946       | 3.07           | 29.93    | 33                   | -13         | 46             | 100         | 400         | QP                |

Note :

- " \* " means the worst value in this measurement data °
- Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
- Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
- The emission levels of other frequencies are very lower than the limit and not show in test report °
- Other channel/mode was also verified. The test results shown represent the worst case emissions °
- No emission found between lowest internal used/generated frequency to 30MHz °



|           |                          |                  |             |
|-----------|--------------------------|------------------|-------------|
| EUT       | RF Transceiver Interface | Test Date        | 2017/12/14  |
| Factor    | VULB 9162 (30MHz~8GHz)   | Temp. / Humidity | 25°C / 60%  |
| Polarity  | Vertical                 | Site / Engineer  | AC1 / Peter |
| Test Mode | MODE2-CH14               | Test Voltage     | By Battery  |

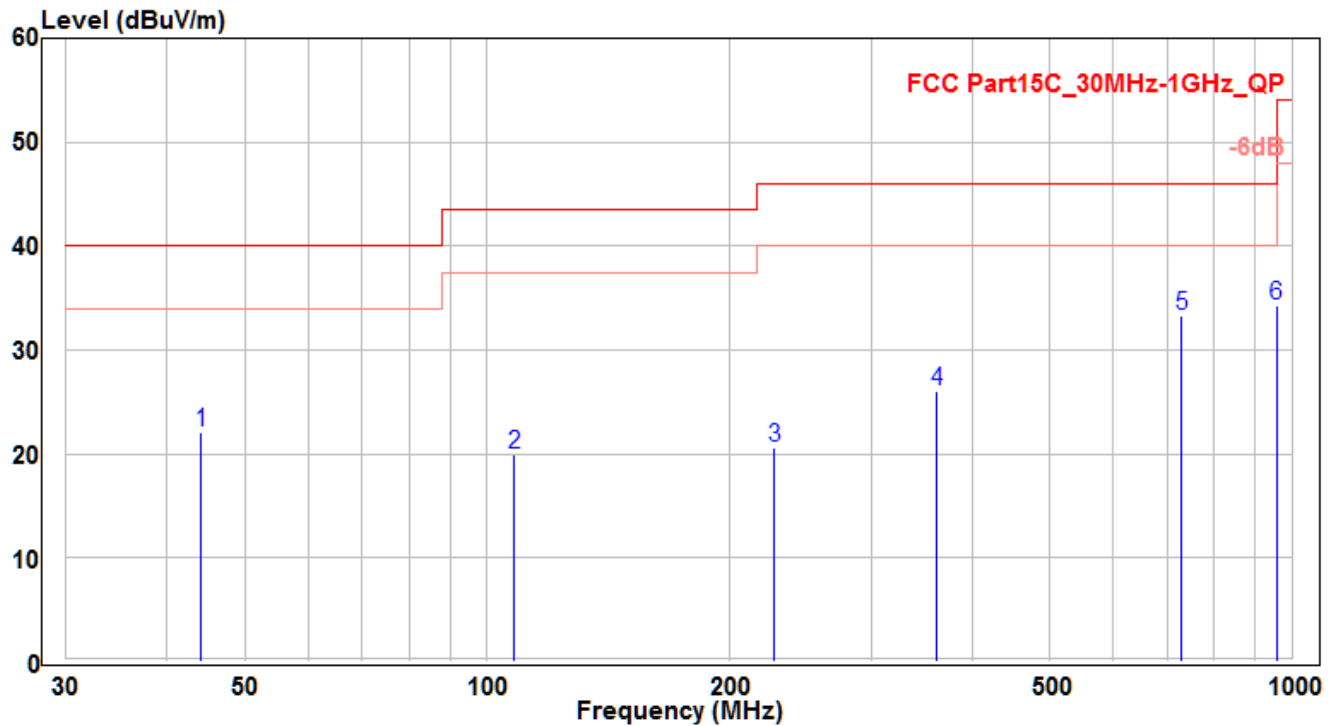


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  |   | 45.308          | 1.02           | 21.42    | 22.44                | -17.56      | 40             | 100         | 400         | QP                |
| 2  |   | 104.508         | 0.66           | 19.12    | 19.78                | -23.72      | 43.5           | 100         | 400         | QP                |
| 3  |   | 198.447         | 1.37           | 19.09    | 20.46                | -23.04      | 43.5           | 100         | 400         | QP                |
| 4  |   | 366.711         | 1.21           | 23.74    | 24.95                | -21.05      | 46             | 100         | 400         | QP                |
| 5  |   | 635.401         | 2.86           | 28.42    | 31.28                | -14.72      | 46             | 100         | 400         | QP                |
| 6  | * | 728.824         | 3.6            | 29.93    | 33.53                | -12.47      | 46             | 100         | 400         | QP                |

Note :

- "\*" means the worst value in this measurement data °
- Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
- Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
- The emission levels of other frequencies are very lower than the limit and not show in test report °
- Other channel/mode was also verified. The test results shown represent the worst case emissions °
- No emission found between lowest internal used/generated frequency to 30MHz °

|           |                          |                  |             |
|-----------|--------------------------|------------------|-------------|
| EUT       | RF Transceiver Interface | Test Date        | 2017/12/14  |
| Factor    | VULB 9162 (30MHz~8GHz)   | Temp. / Humidity | 25°C / 60%  |
| Polarity  | Horizontal               | Site / Engineer  | AC1 / Peter |
| Test Mode | MODE2-CH15               | Test Voltage     | By Battery  |

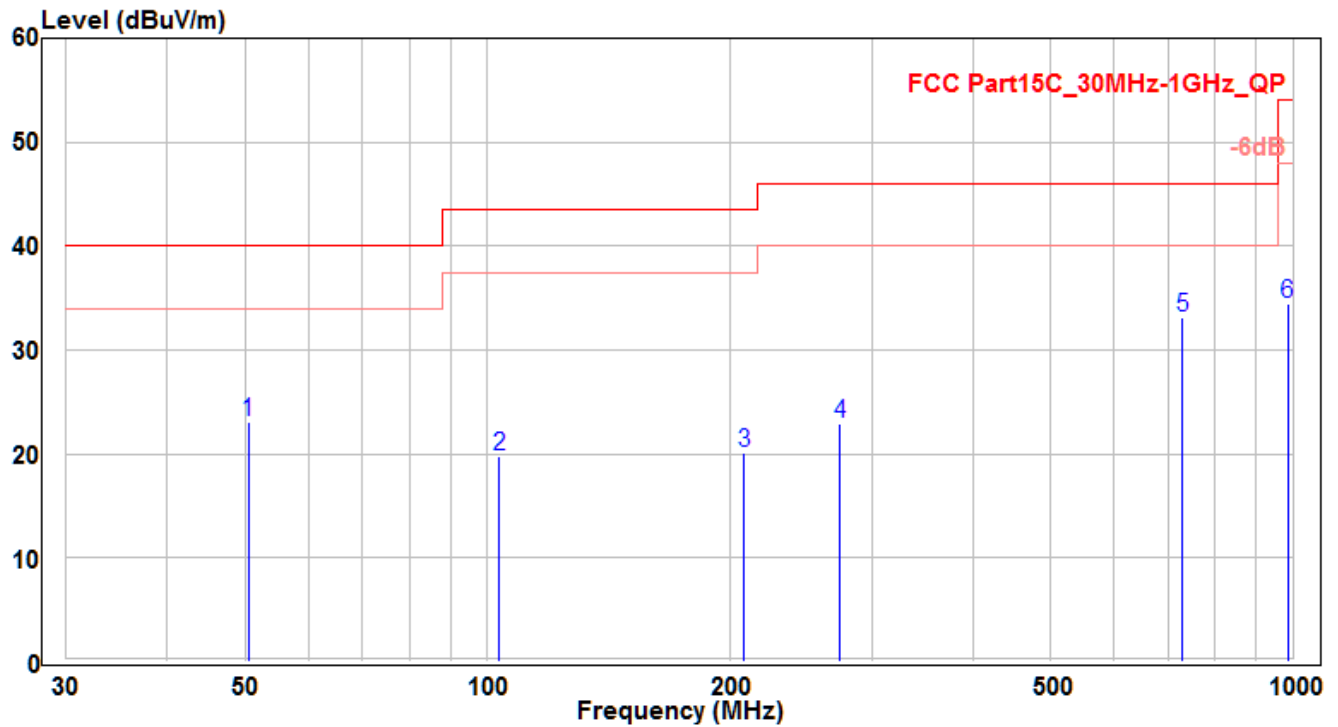


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  |   | 44.156          | 0.78           | 21.26    | 22.04                | -17.96      | 40             | 100         | 400         | QP                |
| 2  |   | 108.146         | 0.96           | 18.91    | 19.87                | -23.63      | 43.5           | 100         | 400         | QP                |
| 3  |   | 227.425         | 1.1            | 19.52    | 20.62                | -25.38      | 46             | 100         | 400         | QP                |
| 4  |   | 362.073         | 2.3            | 23.68    | 25.98                | -20.02      | 46             | 100         | 400         | QP                |
| 5  |   | 730.007         | 3.37           | 29.95    | 33.32                | -12.68      | 46             | 100         | 400         | QP                |
| 6  | * | 957.805         | 2.11           | 32.26    | 34.37                | -11.63      | 46             | 100         | 400         | QP                |

Note :

1. " \* " means the worst value in this measurement data °
2. Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
4. The emission levels of other frequencies are very lower than the limit and not show in test report °
5. Other channel/mode was also verified. The test results shown represent the worst case emissions °
6. No emission found between lowest internal used/generated frequency to 30MHz °

|           |                          |                  |             |
|-----------|--------------------------|------------------|-------------|
| EUT       | RF Transceiver Interface | Test Date        | 2017/12/14  |
| Factor    | VULB 9162 (30MHz~8GHz)   | Temp. / Humidity | 25°C / 60%  |
| Polarity  | Vertical                 | Site / Engineer  | AC1 / Peter |
| Test Mode | MODE2-CH15               | Test Voltage     | By Battery  |

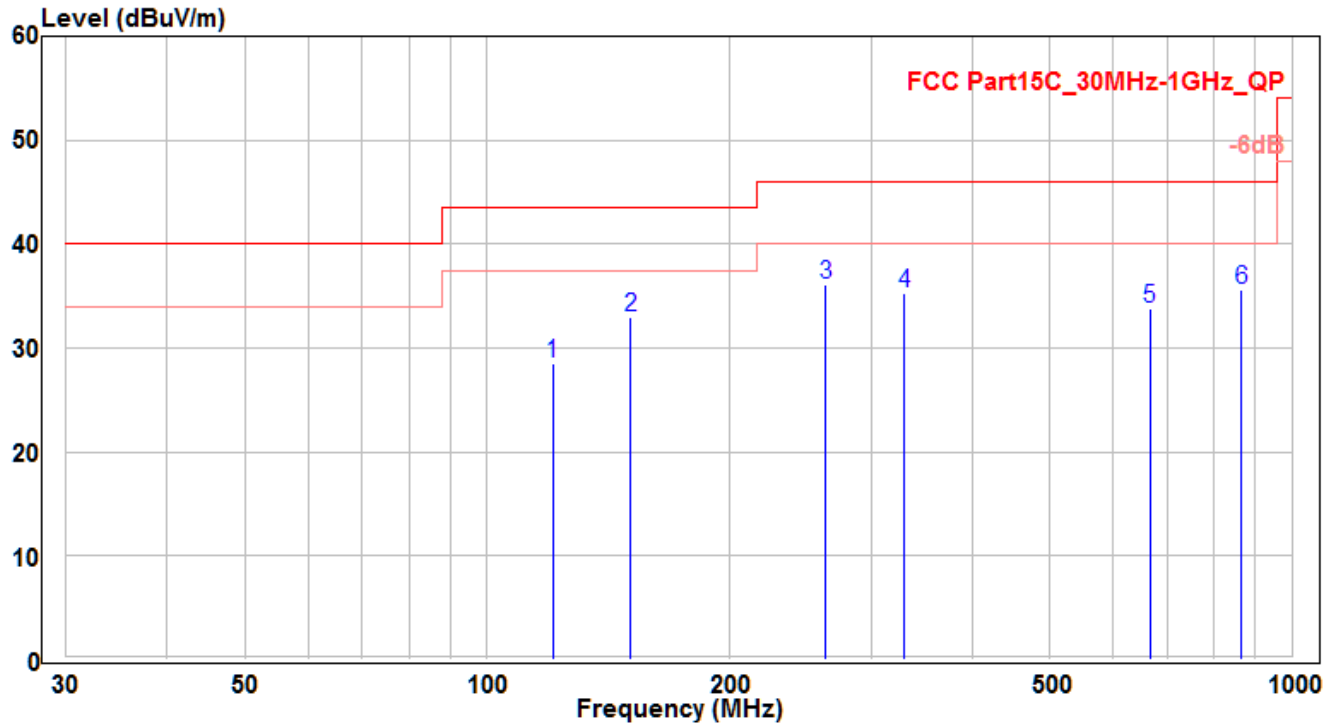


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  |   | 50.461          | 1.62           | 21.47    | 23.09                | -16.91      | 40             | 100         | 400         | QP                |
| 2  |   | 103.326         | 0.66           | 19.19    | 19.85                | -23.65      | 43.5           | 100         | 400         | QP                |
| 3  |   | 208.328         | 1.33           | 18.76    | 20.09                | -23.41      | 43.5           | 100         | 400         | QP                |
| 4  |   | 274.289         | 2.05           | 20.85    | 22.9                 | -23.1       | 46             | 100         | 400         | QP                |
| 5  | * | 729.825         | 3.15           | 29.95    | 33.1                 | -12.9       | 46             | 100         | 400         | QP                |
| 6  |   | 985.42          | 1.74           | 32.65    | 34.39                | -19.61      | 54             | 100         | 400         | QP                |

Note :

- " \* " means the worst value in this measurement data °
- Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
- Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
- The emission levels of other frequencies are very lower than the limit and not show in test report °
- Other channel/mode was also verified. The test results shown represent the worst case emissions °
- No emission found between lowest internal used/generated frequency to 30MHz °

|           |                        |                  |                |
|-----------|------------------------|------------------|----------------|
| EUT       | RF USB Dongle          | Test Date        | 2017/12/14     |
| Factor    | VULB 9162 (30MHz~8GHz) | Temp. / Humidity | 25°C / 60%     |
| Polarity  | Horizontal             | Site / Engineer  | AC1 / Peter    |
| Test Mode | MODE3-CH14             | Test Voltage     | By Notebook PC |

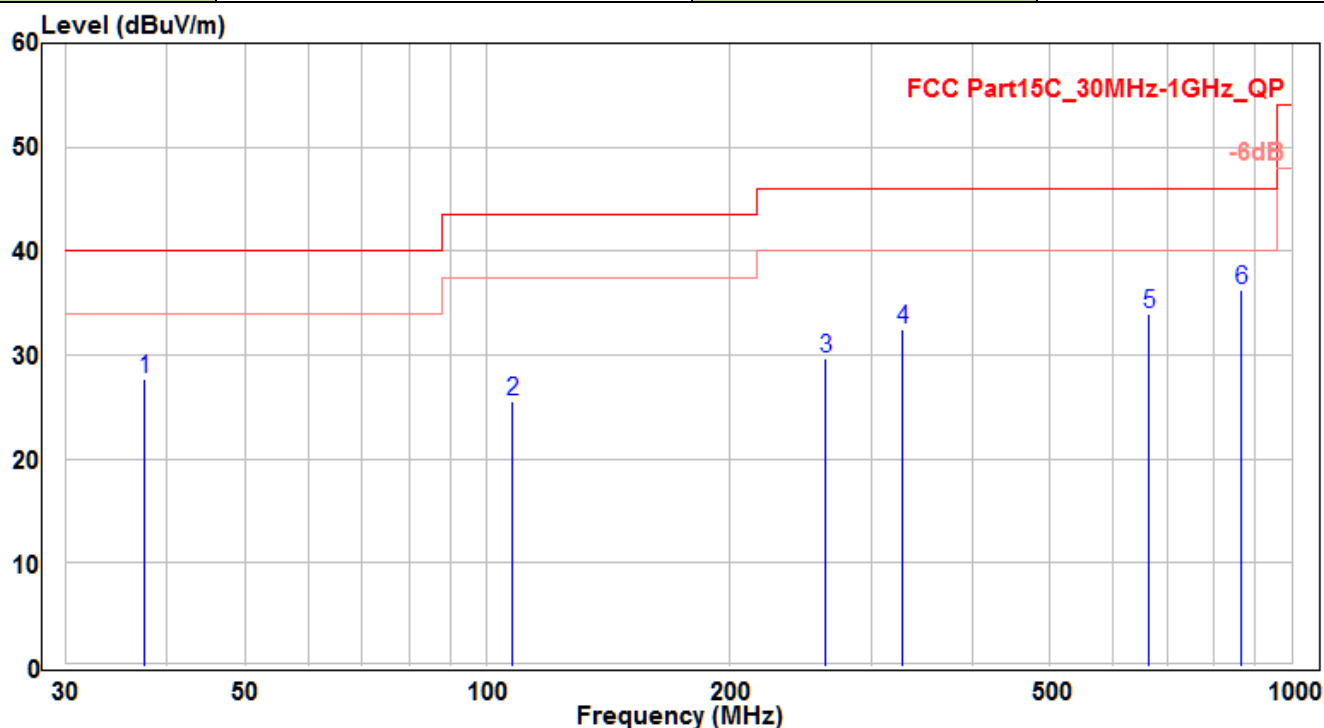


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  |   | 120.725         | 11.43          | 17.07    | 28.5                 | -15         | 43.5           | 100         | 250         | QP                |
| 2  |   | 150.735         | 17.07          | 15.9     | 32.97                | -10.53      | 43.5           | 100         | 330         | QP                |
| 3  |   | 263.8           | 15.53          | 20.62    | 36.15                | -9.85       | 46             | 100         | 400         | QP                |
| 4  |   | 329.669         | 12.65          | 22.67    | 35.32                | -10.68      | 46             | 100         | 110         | QP                |
| 5  |   | 666.169         | 4.93           | 28.94    | 33.87                | -12.13      | 46             | 100         | 250         | QP                |
| 6  | * | 864.624         | 3.76           | 31.77    | 35.53                | -10.47      | 46             | 100         | -30         | QP                |

Note :

- " \* " means the worst value in this measurement data °
- Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
- Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
- The emission levels of other frequencies are very lower than the limit and not show in test report °
- Other channel/mode was also verified. The test results shown represent the worst case emissions °
- No emission found between lowest internal used/generated frequency to 30MHz °

|           |                        |                  |                |
|-----------|------------------------|------------------|----------------|
| EUT       | RF USB Dongle          | Test Date        | 2017/12/14     |
| Factor    | VULB 9162 (30MHz~8GHz) | Temp. / Humidity | 25°C / 60%     |
| Polarity  | Vertical               | Site / Engineer  | AC1 / Peter    |
| Test Mode | MODE3-CH14             | Test Voltage     | By Notebook PC |

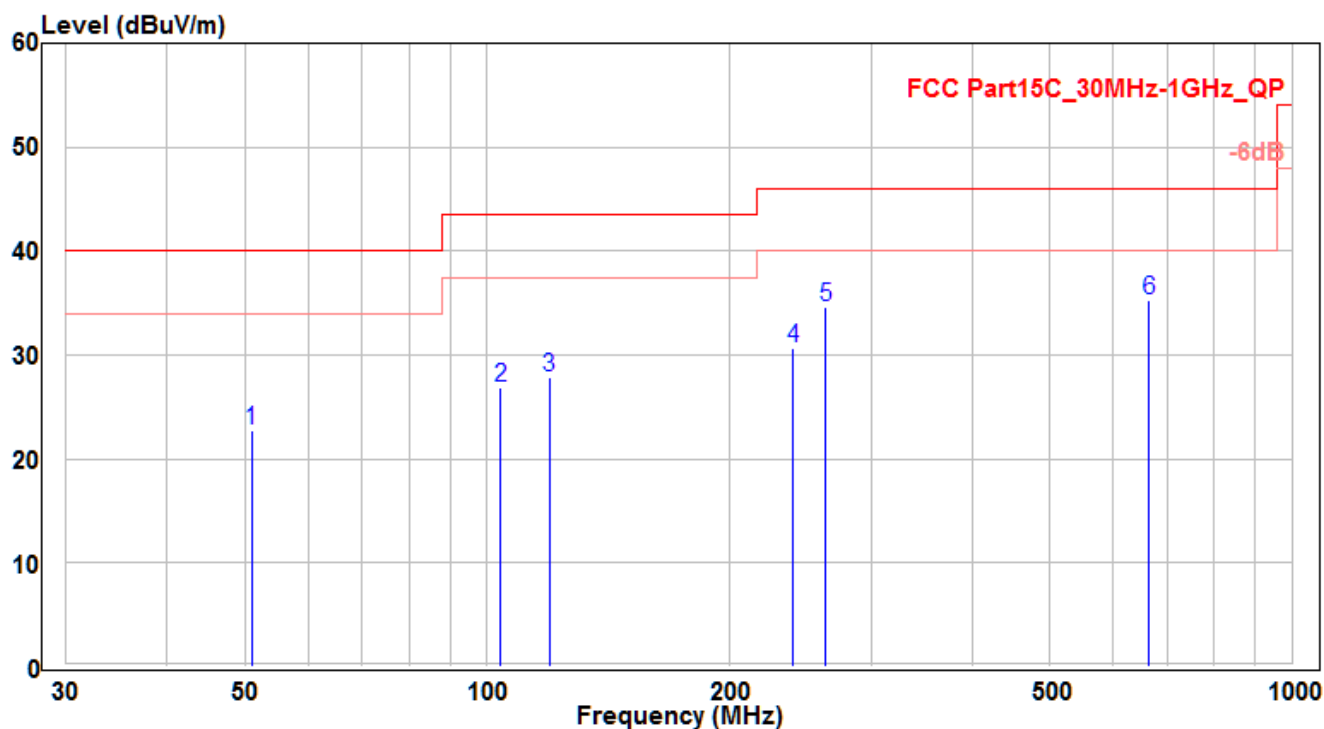


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  |   | 37.548          | 7.91           | 19.76    | 27.67                | -12.33      | 40             | 100         | 400         | QP                |
| 2  |   | 107.63          | 6.54           | 18.94    | 25.48                | -18.02      | 43.5           | 100         | 210         | QP                |
| 3  |   | 263.8           | 9.09           | 20.62    | 29.71                | -16.29      | 46             | 100         | 30          | QP                |
| 4  |   | 328.336         | 9.82           | 22.6     | 32.42                | -13.58      | 46             | 100         | -40         | QP                |
| 5  |   | 663.895         | 5.07           | 28.91    | 33.98                | -12.02      | 46             | 100         | 150         | QP                |
| 6  | * | 864.655         | 4.58           | 31.77    | 36.35                | -9.65       | 46             | 100         | 240         | QP                |

Note :

- " \* " means the worst value in this measurement data °
- Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
- Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
- The emission levels of other frequencies are very lower than the limit and not show in test report °
- Other channel/mode was also verified. The test results shown represent the worst case emissions °
- No emission found between lowest internal used/generated frequency to 30MHz °

|           |                        |                  |                |
|-----------|------------------------|------------------|----------------|
| EUT       | RF USB Dongle          | Test Date        | 2017/12/14     |
| Factor    | VULB 9162 (30MHz~8GHz) | Temp. / Humidity | 25°C / 60%     |
| Polarity  | Horizontal             | Site / Engineer  | AC1 / Peter    |
| Test Mode | MODE3-CH15             | Test Voltage     | By Notebook PC |

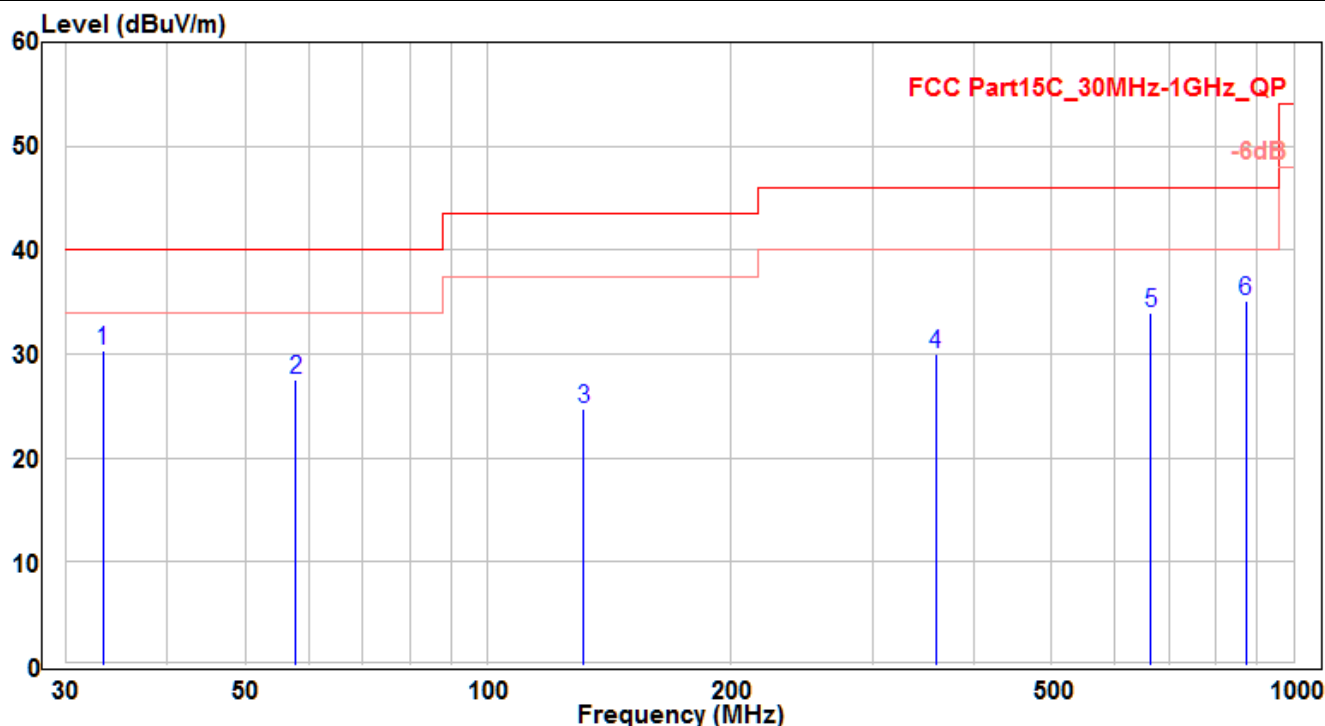


| No | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  | 50.976          | 1.43           | 21.38    | 22.81                | -17.19      | 40             | 100         | 400         | QP                |
| 2  | 104.023         | 7.8            | 19.15    | 26.95                | -16.55      | 43.5           | 100         | 400         | QP                |
| 3  | 119.634         | 10.63          | 17.2     | 27.83                | -15.67      | 43.5           | 100         | 230         | QP                |
| 4  | 239.823         | 10.55          | 20.19    | 30.74                | -15.26      | 46             | 100         | 220         | QP                |
| 5  | 263.8           | 14.08          | 20.62    | 34.7                 | -11.3       | 46             | 100         | 150         | QP                |
| 6  | * 663.925       | 6.36           | 28.91    | 35.27                | -10.73      | 46             | 100         | 310         | QP                |

Note :

1. " \* " means the worst value in this measurement data °
2. Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
4. The emission levels of other frequencies are very lower than the limit and not show in test report °
5. Other channel/mode was also verified. The test results shown represent the worst case emissions °
6. No emission found between lowest internal used/generated frequency to 30MHz °

|           |                        |                  |                |
|-----------|------------------------|------------------|----------------|
| EUT       | RF USB Dongle          | Test Date        | 2017/12/14     |
| Factor    | VULB 9162 (30MHz~8GHz) | Temp. / Humidity | 25°C / 60%     |
| Polarity  | Vertical               | Site / Engineer  | AC1 / Peter    |
| Test Mode | MODE3-CH15             | Test Voltage     | By Notebook PC |

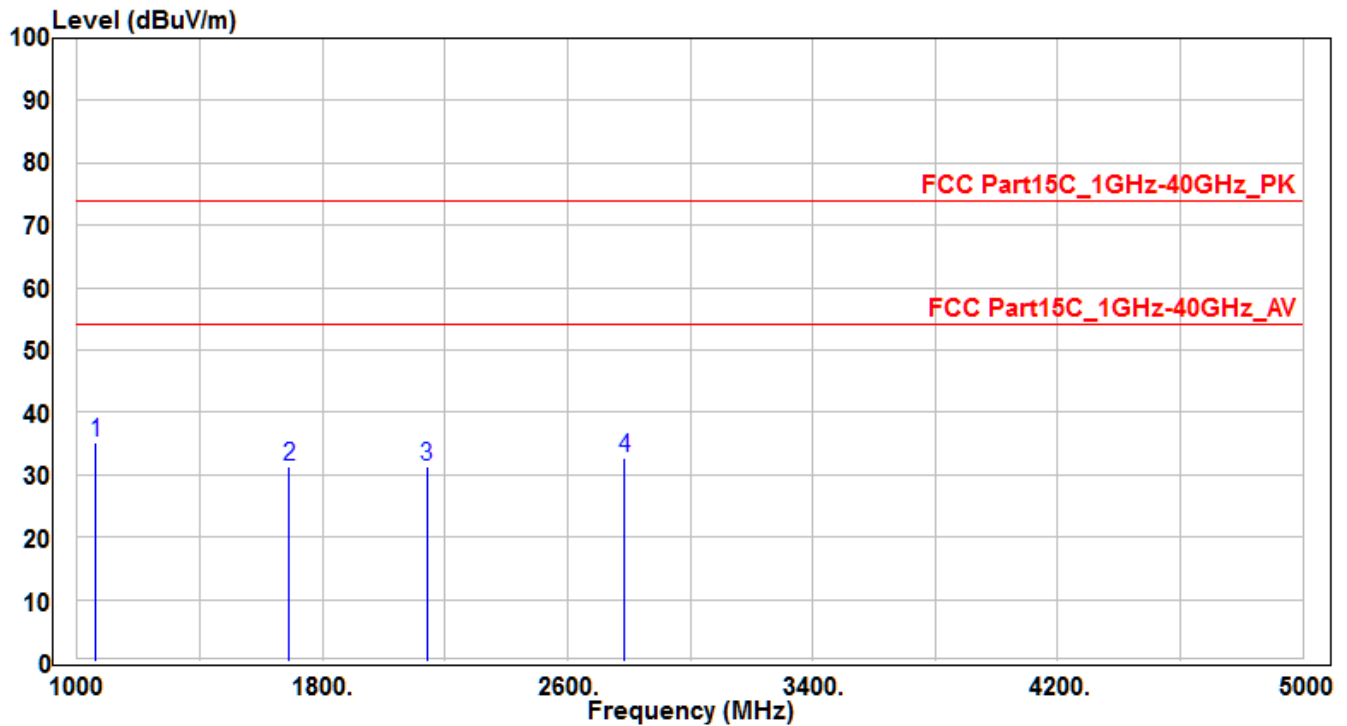


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  | * | 33.304          | 11.81          | 18.57    | 30.38                | -9.62       | 40             | 100         | 230         | QP                |
| 2  |   | 57.736          | 7.3            | 20.21    | 27.51                | -12.49      | 40             | 100         | 105         | QP                |
| 3  |   | 131.638         | 8.45           | 16.24    | 24.69                | -18.81      | 43.5           | 100         | 400         | QP                |
| 4  |   | 359.77          | 6.28           | 23.66    | 29.94                | -16.06      | 46             | 100         | 220         | QP                |
| 5  |   | 663.895         | 4.98           | 28.91    | 33.89                | -12.11      | 46             | 100         | 260         | QP                |
| 6  |   | 871.051         | 3.37           | 31.8     | 35.17                | -10.83      | 46             | 100         | 350         | QP                |

Note :

1. " \* " means the worst value in this measurement data °
2. Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
4. The emission levels of other frequencies are very lower than the limit and not show in test report °
5. Other channel/mode was also verified. The test results shown represent the worst case emissions °
6. No emission found between lowest internal used/generated frequency to 30MHz °

|           |                         |                  |             |
|-----------|-------------------------|------------------|-------------|
| EUT       | RF Network Repeater     | Test Date        | 2017/12/12  |
| Factor    | BBHA 9120D (1GHz~18GHz) | Temp. / Humidity | 25°C / 60%  |
| Polarity  | Horizontal              | Site / Engineer  | AC1 / Peter |
| Test Mode | MODE1-CH14              | Test Voltage     | By Battery  |



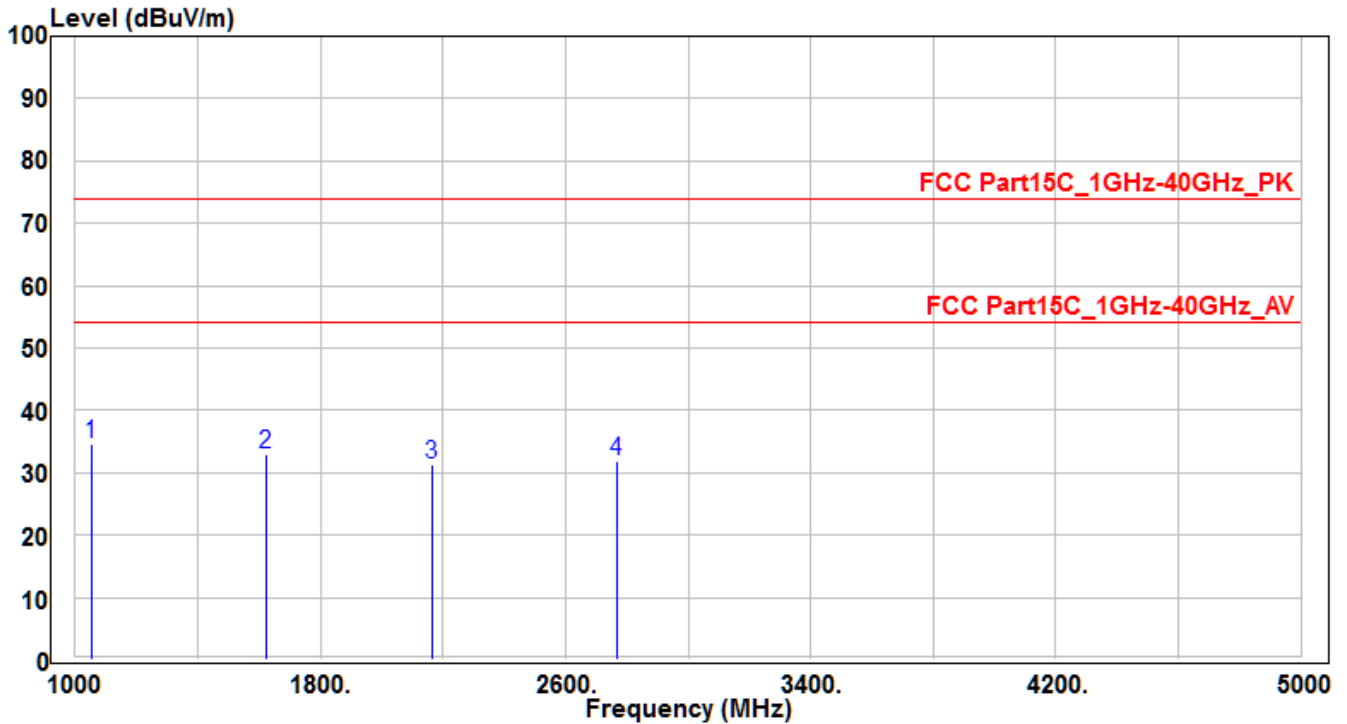
| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  | * | 1061.19         | 42.7           | -7.4     | 35.3                 | -38.7       | 74             | 150         | 400         | Peak              |
| 2  |   | 1690.92         | 37.07          | -5.68    | 31.39                | -42.61      | 74             | 150         | 400         | Peak              |
| 3  |   | 2140.15         | 35.12          | -3.89    | 31.23                | -42.77      | 74             | 150         | 400         | Peak              |
| 4  |   | 2787.01         | 35.19          | -2.54    | 32.65                | -41.35      | 74             | 150         | 400         | Peak              |

Note :

- " \* " means the worst value in this measurement data °
- Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
- Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
- The emission levels of other frequencies are very lower than the limit and not show in test report °



|           |                         |                  |             |
|-----------|-------------------------|------------------|-------------|
| EUT       | RF Network Repeater     | Test Date        | 2017/12/12  |
| Factor    | BBHA 9120D (1GHz~18GHz) | Temp. / Humidity | 25°C / 60%  |
| Polarity  | Vertical                | Site / Engineer  | AC1 / Peter |
| Test Mode | MODE1-CH14              | Test Voltage     | By Battery  |

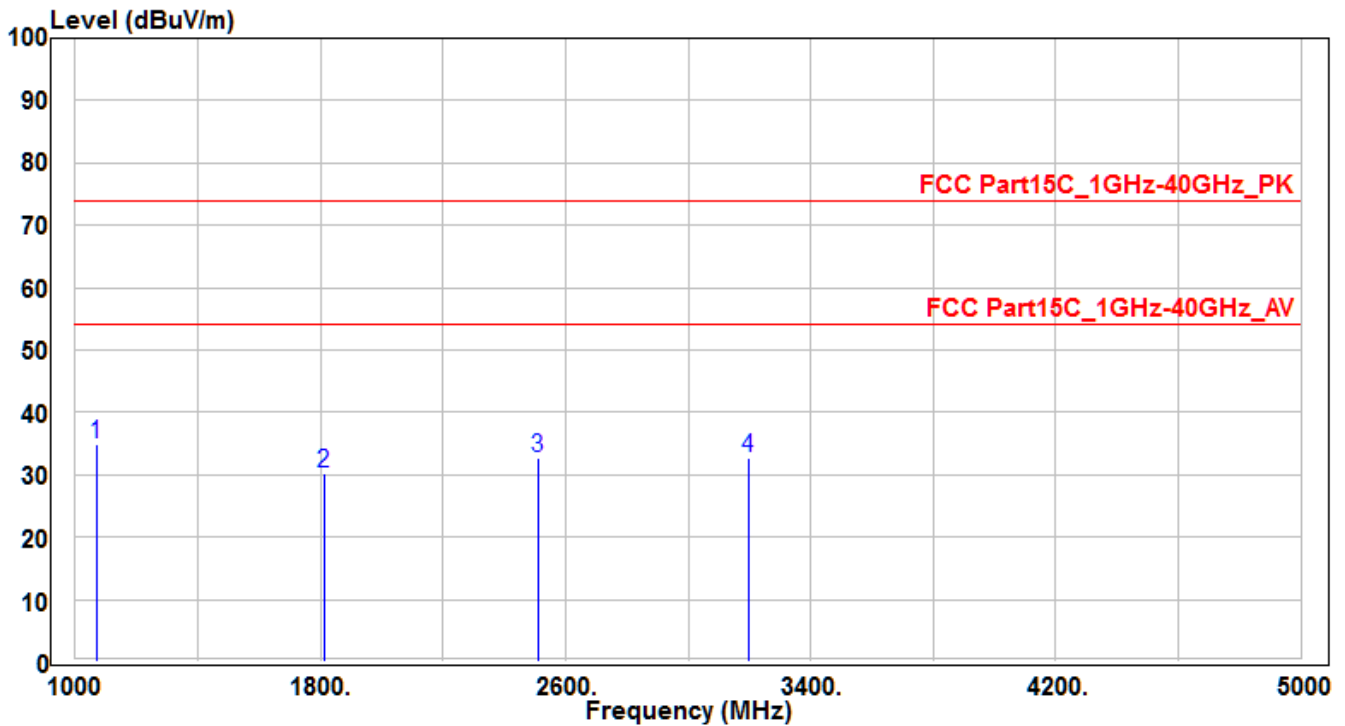


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  | * | 1051.31         | 42.1           | -7.43    | 34.67                | -39.33      | 74             | 150         | 400         | Peak              |
| 2  |   | 1622.17         | 38.85          | -5.91    | 32.94                | -41.06      | 74             | 150         | 400         | Peak              |
| 3  |   | 2164.65         | 35.11          | -3.76    | 31.35                | -42.65      | 74             | 150         | 400         | Peak              |
| 4  |   | 2765.76         | 34.38          | -2.51    | 31.87                | -42.13      | 74             | 150         | 400         | Peak              |

Note :

- " \* " means the worst value in this measurement data °
- Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
- Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
- The emission levels of other frequencies are very lower than the limit and not show in test report °

|           |                         |                  |             |
|-----------|-------------------------|------------------|-------------|
| EUT       | RF Network Repeater     | Test Date        | 2017/12/12  |
| Factor    | BBHA 9120D (1GHz~18GHz) | Temp. / Humidity | 25°C / 60%  |
| Polarity  | Horizontal              | Site / Engineer  | AC1 / Peter |
| Test Mode | MODE1-CH15              | Test Voltage     | By Battery  |

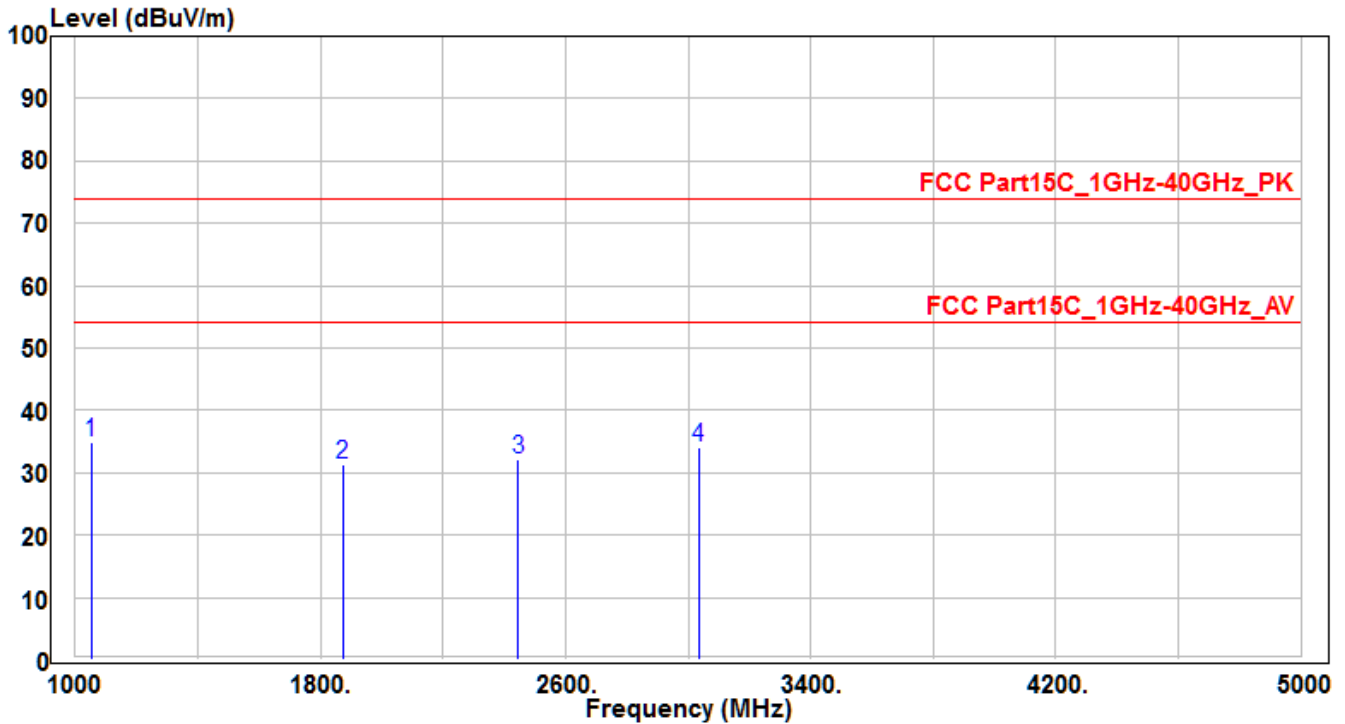


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  | * | 1068.44         | 42.28          | -7.38    | 34.9                 | -39.1       | 74             | 150         | 400         | Peak              |
| 2  |   | 1810.66         | 35.57          | -5.27    | 30.3                 | -43.7       | 74             | 150         | 400         | Peak              |
| 3  |   | 2508.77         | 34.82          | -2.04    | 32.78                | -41.22      | 74             | 150         | 400         | Peak              |
| 4  |   | 3195.62         | 35.27          | -2.47    | 32.8                 | -41.2       | 74             | 150         | 400         | Peak              |

Note :

- " \* " means the worst value in this measurement data °
- Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
- Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
- The emission levels of other frequencies are very lower than the limit and not show in test report °

|           |                         |                  |             |
|-----------|-------------------------|------------------|-------------|
| EUT       | RF Network Repeater     | Test Date        | 2017/12/12  |
| Factor    | BBHA 9120D (1GHz~18GHz) | Temp. / Humidity | 25°C / 60%  |
| Polarity  | Vertical                | Site / Engineer  | AC1 / Peter |
| Test Mode | MODE1-CH15              | Test Voltage     | By Battery  |

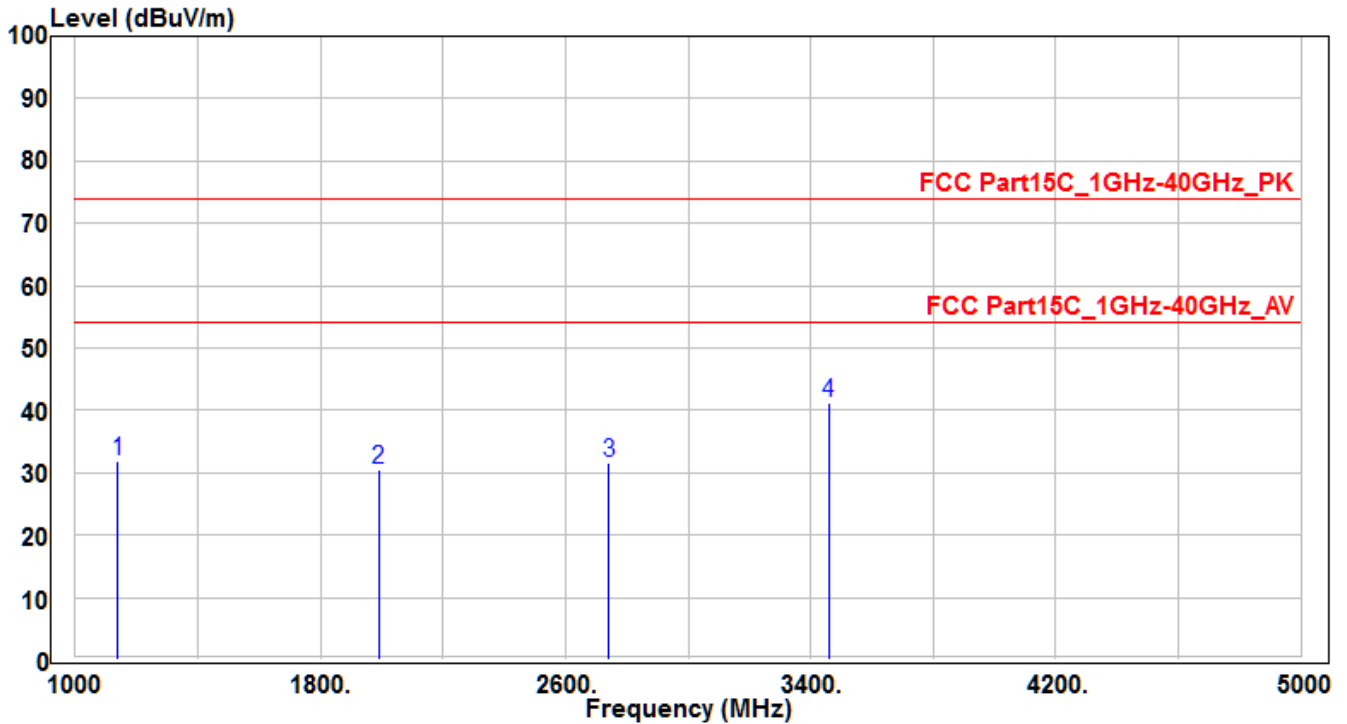


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  | * | 1051.56         | 42.36          | -7.43    | 34.93                | -39.07      | 74             | 150         | 400         | Peak              |
| 2  |   | 1872.79         | 36.32          | -5.06    | 31.26                | -42.74      | 74             | 150         | 400         | Peak              |
| 3  |   | 2445.52         | 34.41          | -2.31    | 32.1                 | -41.9       | 74             | 150         | 400         | Peak              |
| 4  |   | 3033.75         | 36.94          | -2.85    | 34.09                | -39.91      | 74             | 150         | 400         | Peak              |

Note :

- " \* " means the worst value in this measurement data °
- Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
- Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
- The emission levels of other frequencies are very lower than the limit and not show in test report °

|           |                          |                  |             |
|-----------|--------------------------|------------------|-------------|
| EUT       | RF Transceiver Interface | Test Date        | 2017/12/12  |
| Factor    | BBHA 9120D (1GHz~18GHz)  | Temp. / Humidity | 25°C / 60%  |
| Polarity  | Horizontal               | Site / Engineer  | AC1 / Peter |
| Test Mode | MODE2-CH14               | Test Voltage     | By Battery  |

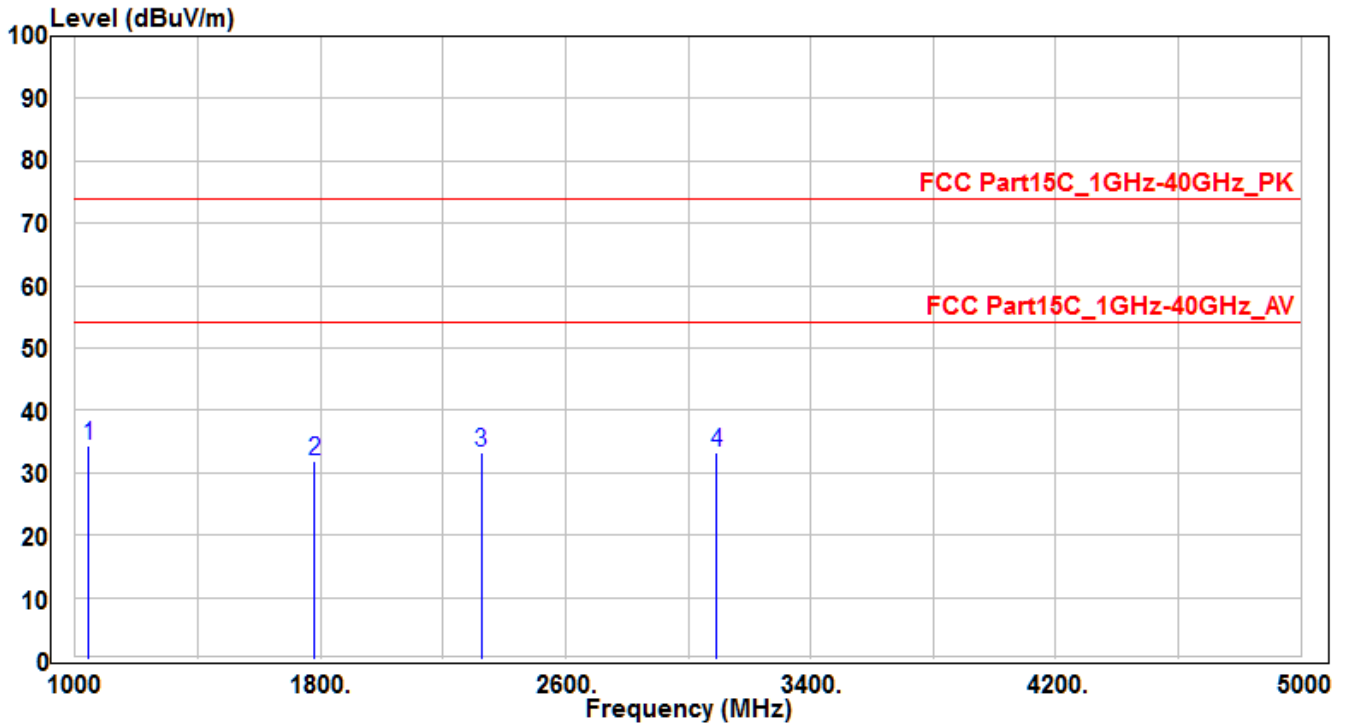


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  |   | 1140.18         | 39.19          | -7.21    | 31.98                | -42.02      | 74             | 150         | 400         | Peak              |
| 2  |   | 1989.41         | 35.13          | -4.65    | 30.48                | -43.52      | 74             | 150         | 400         | Peak              |
| 3  |   | 2741.13         | 34.14          | -2.46    | 31.68                | -42.32      | 74             | 150         | 400         | Peak              |
| 4  | * | 3458.24         | 43.1           | -1.83    | 41.27                | -32.73      | 74             | 150         | 400         | Peak              |

Note :

- " \* " means the worst value in this measurement data °
- Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
- Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
- The emission levels of other frequencies are very lower than the limit and not show in test report °

|           |                          |                  |             |
|-----------|--------------------------|------------------|-------------|
| EUT       | RF Transceiver Interface | Test Date        | 2017/12/12  |
| Factor    | BBHA 9120D (1GHz~18GHz)  | Temp. / Humidity | 25°C / 60%  |
| Polarity  | Vertical                 | Site / Engineer  | AC1 / Peter |
| Test Mode | MODE2-CH14               | Test Voltage     | By Battery  |

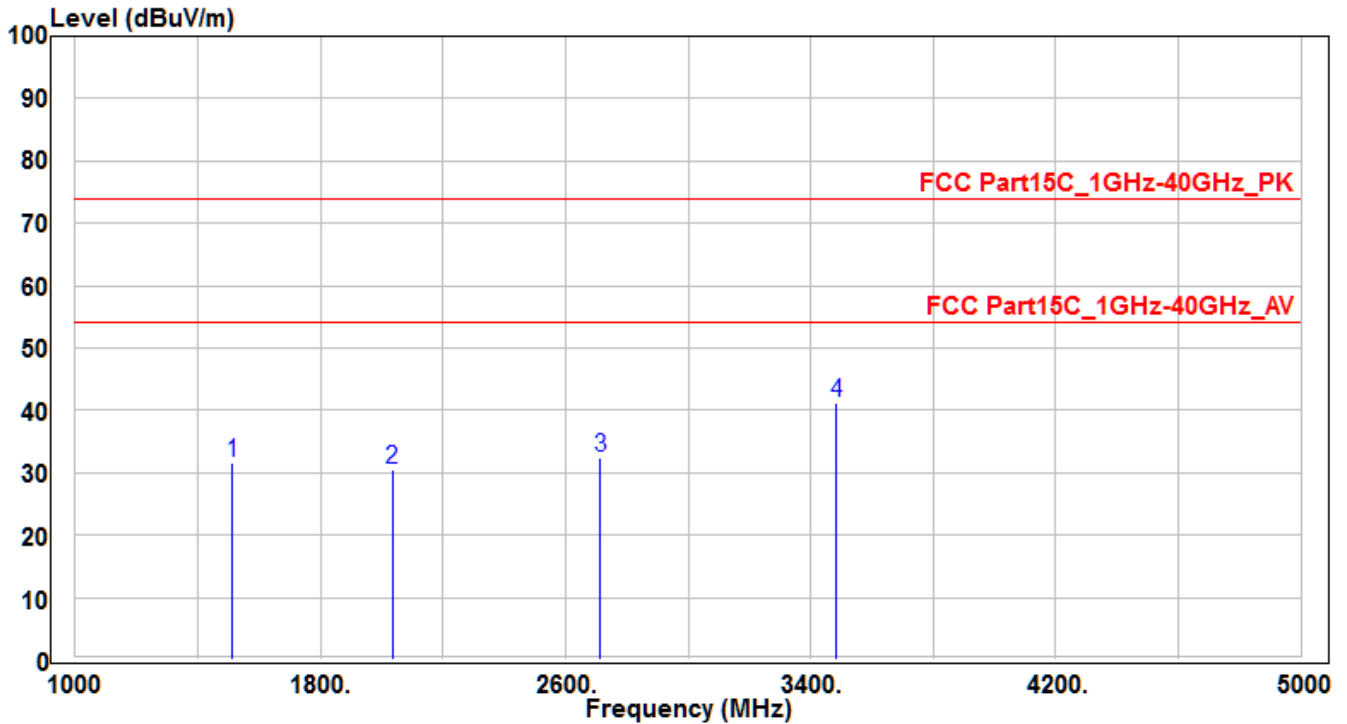


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  | * | 1045.06         | 41.74          | -7.44    | 34.3                 | -39.7       | 74             | 150         | 400         | Peak              |
| 2  |   | 1780.04         | 37.36          | -5.37    | 31.99                | -42.01      | 74             | 150         | 400         | Peak              |
| 3  |   | 2325.9          | 36.26          | -2.93    | 33.33                | -40.67      | 74             | 150         | 400         | Peak              |
| 4  |   | 3094.5          | 35.92          | -2.71    | 33.21                | -40.79      | 74             | 150         | 400         | Peak              |

Note :

- " \* " means the worst value in this measurement data °
- Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
- Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
- The emission levels of other frequencies are very lower than the limit and not show in test report °

|           |                          |                  |             |
|-----------|--------------------------|------------------|-------------|
| EUT       | RF Transceiver Interface | Test Date        | 2017/12/12  |
| Factor    | BBHA 9120D (1GHz~18GHz)  | Temp. / Humidity | 25°C / 60%  |
| Polarity  | Horizontal               | Site / Engineer  | AC1 / Peter |
| Test Mode | MODE2-CH15               | Test Voltage     | By Battery  |

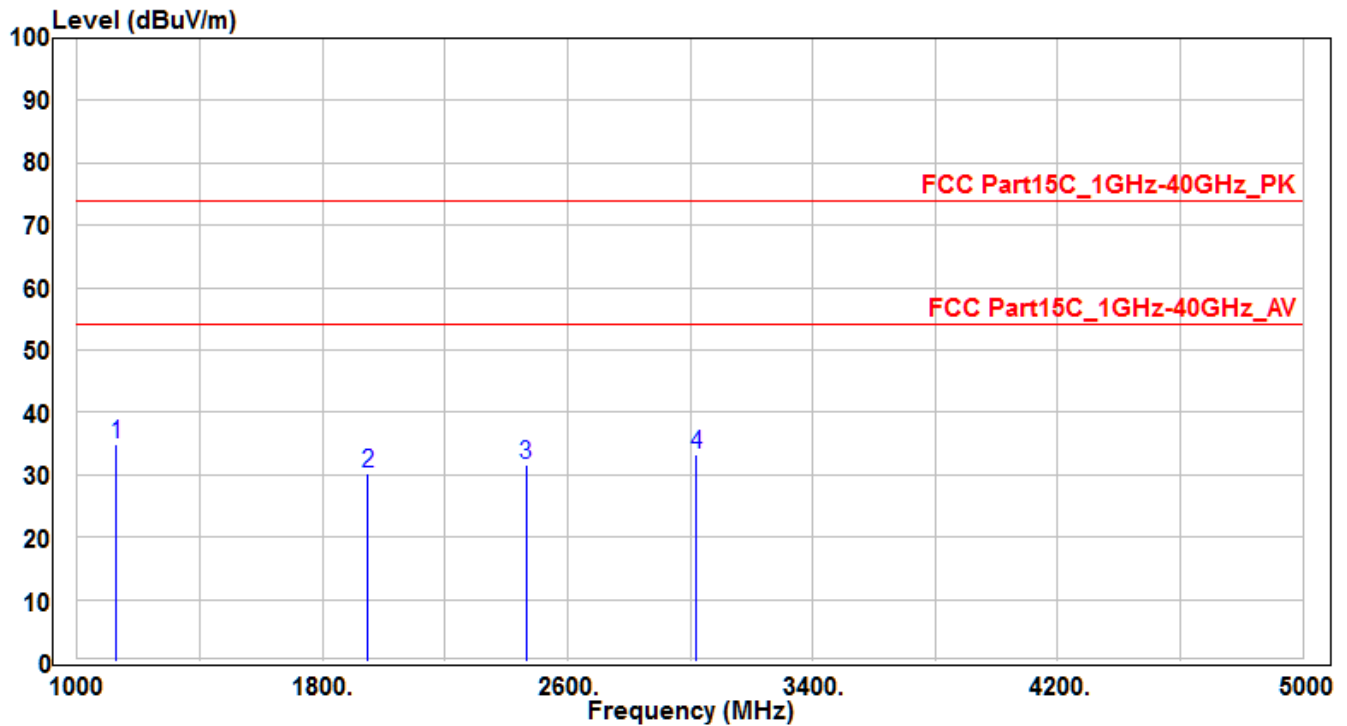


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  |   | 1513.92         | 37.95          | -6.28    | 31.67                | -42.33      | 74             | 150         | 400         | Peak              |
| 2  |   | 2035.91         | 34.9           | -4.44    | 30.46                | -43.54      | 74             | 150         | 400         | Peak              |
| 3  |   | 2712.88         | 34.96          | -2.41    | 32.55                | -41.45      | 74             | 150         | 400         | Peak              |
| 4  | * | 3483.86         | 42.88          | -1.78    | 41.1                 | -32.9       | 74             | 150         | 400         | Peak              |

Note :

- " \* " means the worst value in this measurement data °
- Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
- Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
- The emission levels of other frequencies are very lower than the limit and not show in test report °

|           |                          |                  |             |
|-----------|--------------------------|------------------|-------------|
| EUT       | RF Transceiver Interface | Test Date        | 2017/12/12  |
| Factor    | BBHA 9120D (1GHz~18GHz)  | Temp. / Humidity | 25°C / 60%  |
| Polarity  | Vertical                 | Site / Engineer  | AC1 / Peter |
| Test Mode | MODE2-CH15               | Test Voltage     | By Battery  |

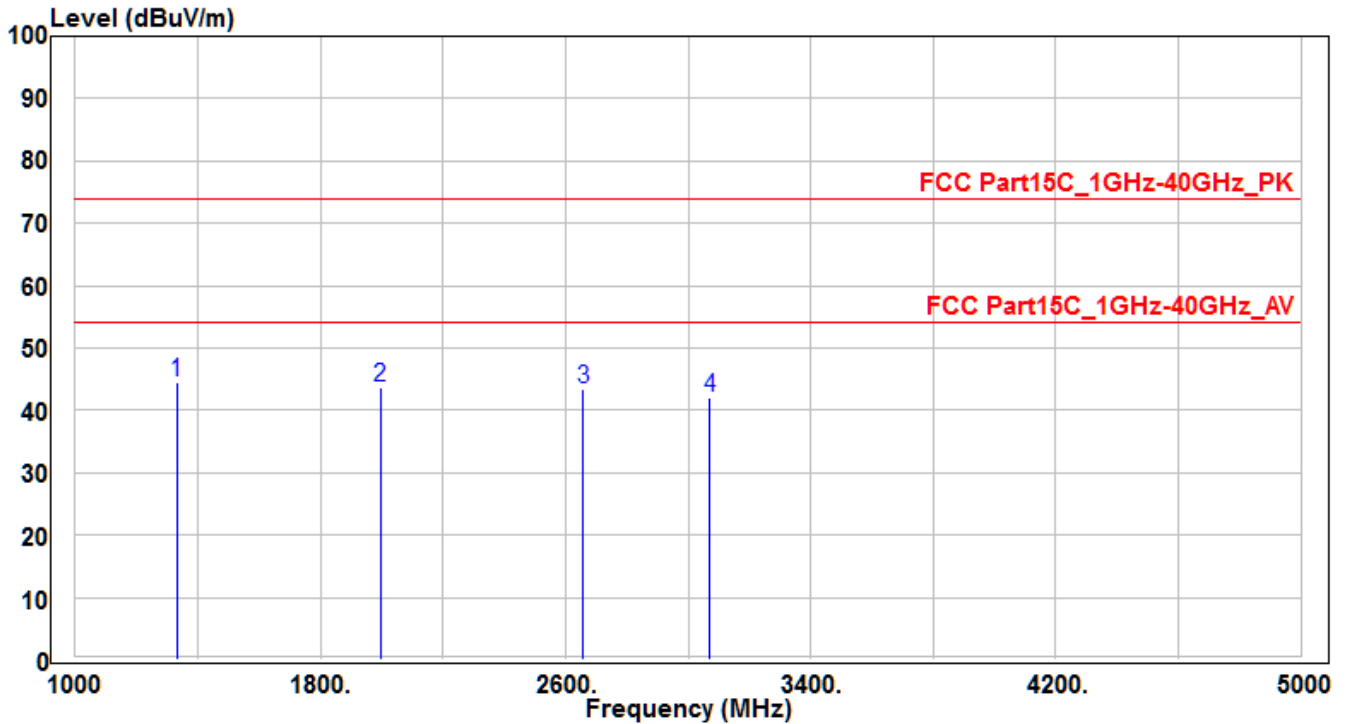


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  | * | 1128.68         | 42.11          | -7.23    | 34.88                | -39.12      | 74             | 150         | 400         | Peak              |
| 2  |   | 1948.66         | 34.95          | -4.79    | 30.16                | -43.84      | 74             | 150         | 400         | Peak              |
| 3  |   | 2466.02         | 33.75          | -2.2     | 31.55                | -42.45      | 74             | 150         | 400         | Peak              |
| 4  |   | 3019.25         | 36.17          | -2.88    | 33.29                | -40.71      | 74             | 150         | 400         | Peak              |

Note :

- " \* " means the worst value in this measurement data °
- Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
- Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
- The emission levels of other frequencies are very lower than the limit and not show in test report °

|           |                         |                  |                |
|-----------|-------------------------|------------------|----------------|
| EUT       | RF USB Dongle           | Test Date        | 2017/12/12     |
| Factor    | BBHA 9120D (1GHz~18GHz) | Temp. / Humidity | 25°C / 60%     |
| Polarity  | Horizontal              | Site / Engineer  | AC1 / Peter    |
| Test Mode | MODE3-CH14              | Test Voltage     | By Notebook PC |



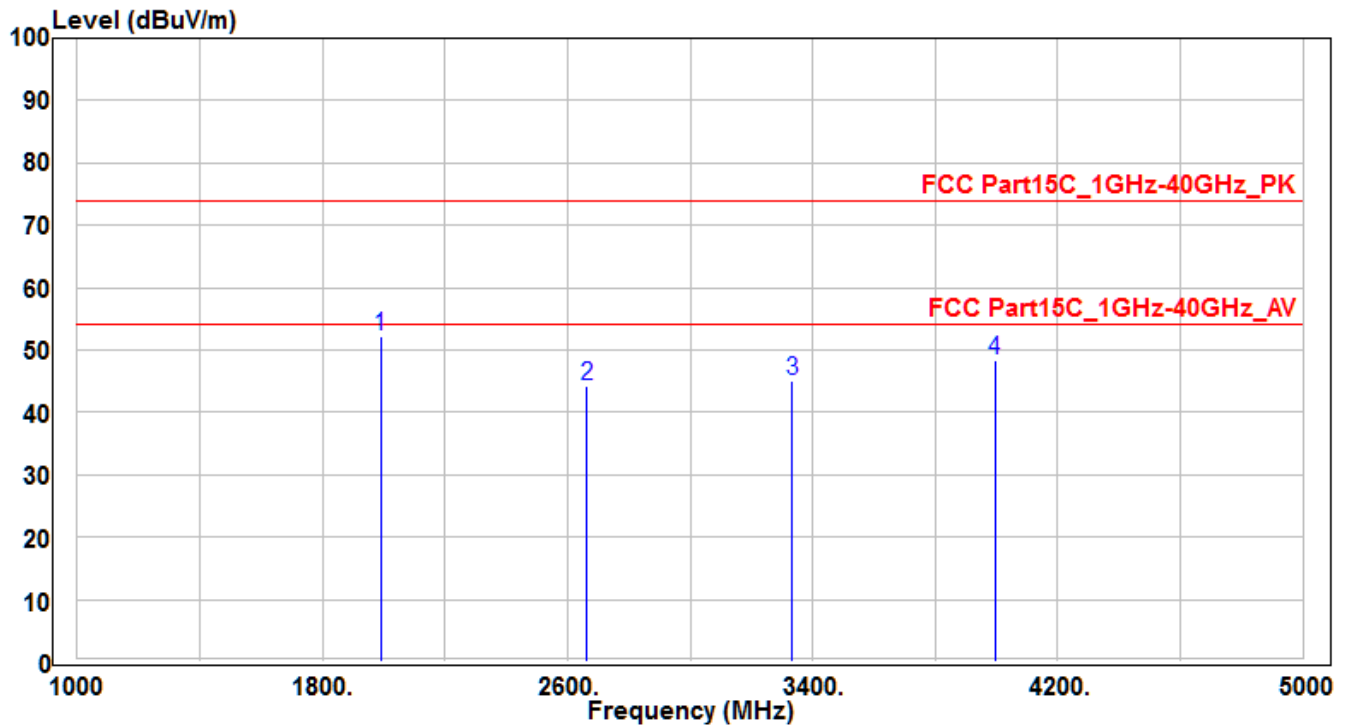
| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|--------------|-------------|-------------|-------------------|
| 1  | * | 1330.55         | 51.26          | -6.74    | 44.52                | -29.48      | 74           | 150         | 400         | Peak              |
| 2  |   | 1995.03         | 48.28          | -4.64    | 43.64                | -30.36      | 74           | 150         | 400         | Peak              |
| 3  |   | 2657.39         | 45.67          | -2.3     | 43.37                | -30.63      | 74           | 150         | 400         | Peak              |
| 4  |   | 3069.62         | 44.7           | -2.76    | 41.94                | -32.06      | 74           | 150         | 400         | Peak              |

Note :

- " \* " means the worst value in this measurement data °
- Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
- Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
- The emission levels of other frequencies are very lower than the limit and not show in test report °



|           |                         |                  |                |
|-----------|-------------------------|------------------|----------------|
| EUT       | RF USB Dongle           | Test Date        | 2017/12/12     |
| Factor    | BBHA 9120D (1GHz~18GHz) | Temp. / Humidity | 25°C / 60%     |
| Polarity  | Vertical                | Site / Engineer  | AC1 / Peter    |
| Test Mode | MODE3-CH14              | Test Voltage     | By Notebook PC |

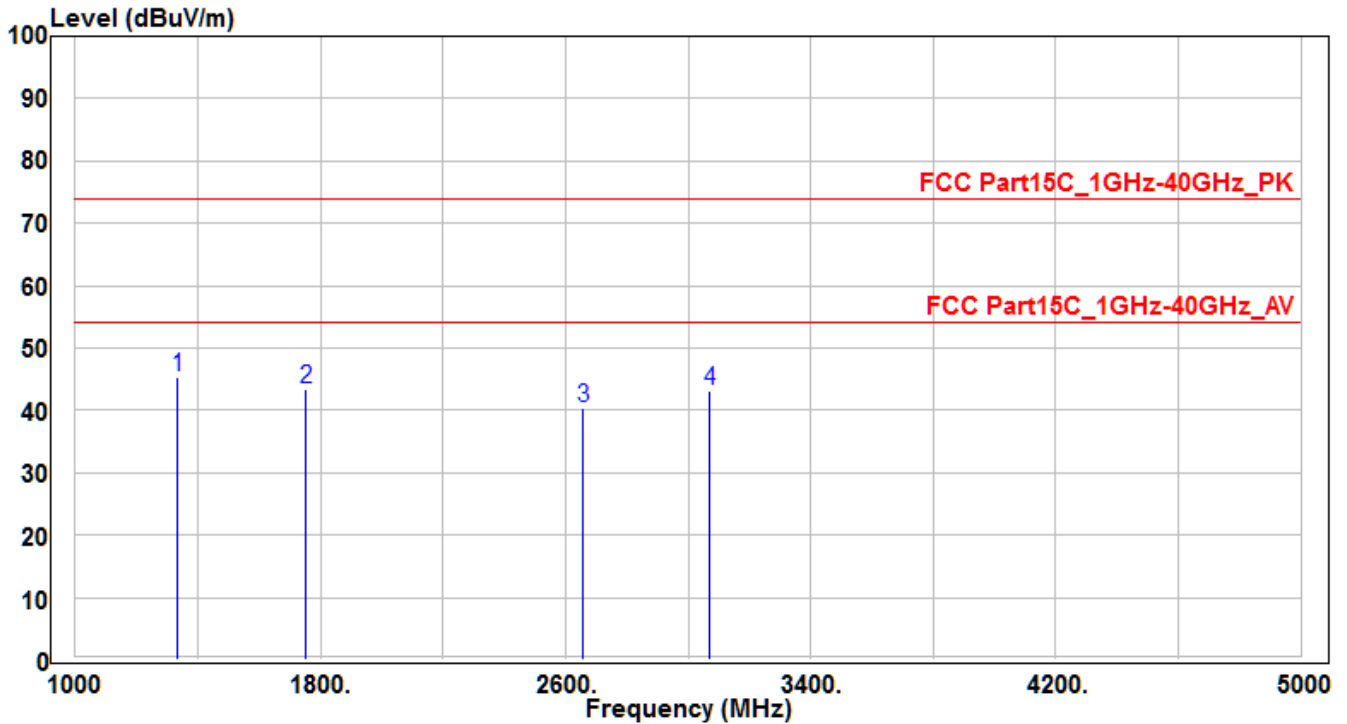


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  | * | 1991.03         | 56.9           | -4.65    | 52.25                | -21.75      | 74             | 150         | 400         | Peak              |
| 2  |   | 2664.64         | 46.7           | -2.33    | 44.37                | -29.63      | 74             | 150         | 400         | Peak              |
| 3  |   | 3333.31         | 47.08          | -2.13    | 44.95                | -29.05      | 74             | 150         | 400         | Peak              |
| 4  |   | 3996.34         | 48.31          | 0.17     | 48.48                | -25.52      | 74             | 150         | 400         | Peak              |

Note :

1. " \* " means the worst value in this measurement data °
2. Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
3. Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
4. The emission levels of other frequencies are very lower than the limit and not show in test report °

|           |                         |                  |                |
|-----------|-------------------------|------------------|----------------|
| EUT       | RF USB Dongle           | Test Date        | 2017/12/12     |
| Factor    | BBHA 9120D (1GHz~18GHz) | Temp. / Humidity | 25°C / 60%     |
| Polarity  | Horizontal              | Site / Engineer  | AC1 / Peter    |
| Test Mode | MODE3-CH15              | Test Voltage     | By Notebook PC |

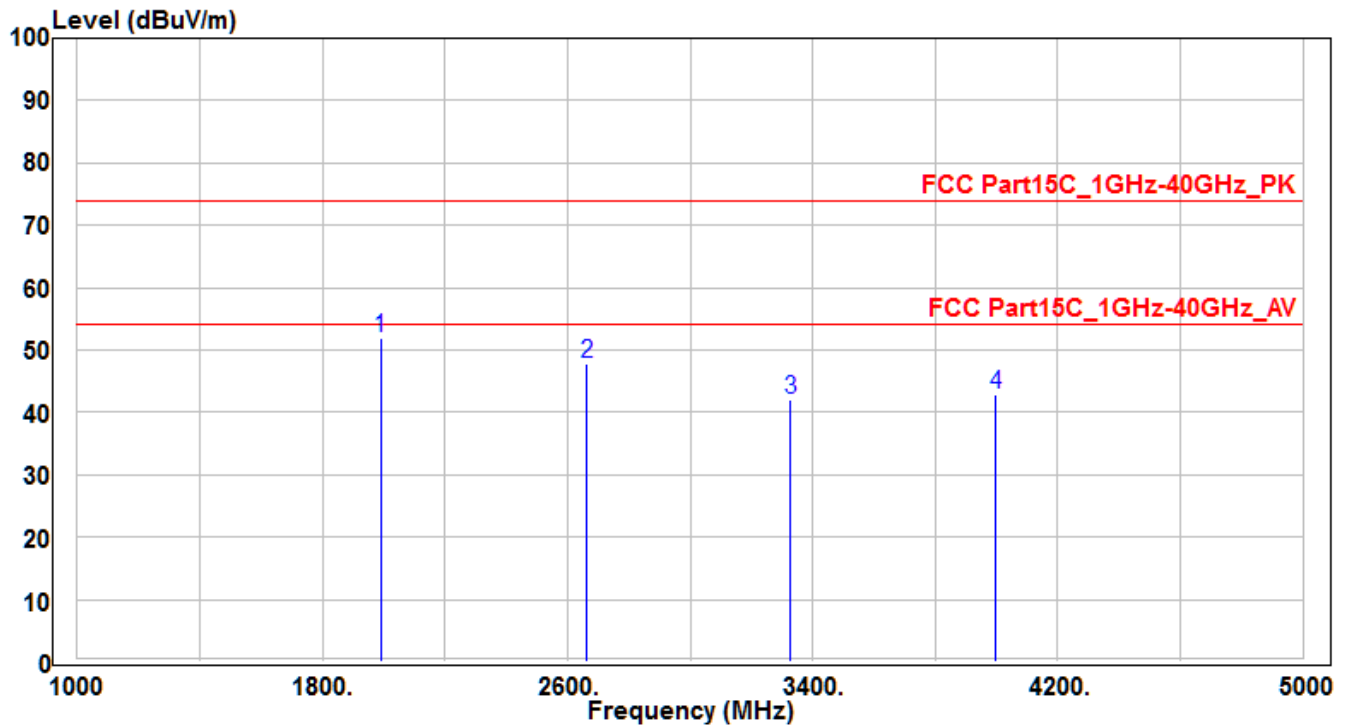


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  | * | 1332.93         | 52.08          | -6.74    | 45.34                | -28.66      | 74             | 150         | 400         | Peak              |
| 2  |   | 1753.41         | 48.94          | -5.46    | 43.48                | -30.52      | 74             | 150         | 400         | Peak              |
| 3  |   | 2657.89         | 42.76          | -2.3     | 40.46                | -33.54      | 74             | 150         | 400         | Peak              |
| 4  |   | 3070.62         | 45.92          | -2.76    | 43.16                | -30.84      | 74             | 150         | 400         | Peak              |

Note :

- " \* " means the worst value in this measurement data °
- Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
- Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
- The emission levels of other frequencies are very lower than the limit and not show in test report °

|           |                         |                  |                |
|-----------|-------------------------|------------------|----------------|
| EUT       | RF USB Dongle           | Test Date        | 2017/12/12     |
| Factor    | BBHA 9120D (1GHz~18GHz) | Temp. / Humidity | 25°C / 60%     |
| Polarity  | Vertical                | Site / Engineer  | AC1 / Peter    |
| Test Mode | MODE3-CH15              | Test Voltage     | By Notebook PC |



| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Height (cm) | Angle (deg) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|----------------------|-------------|----------------|-------------|-------------|-------------------|
| 1  | * | 1991.66         | 56.71          | -4.65    | 52.06                | -21.94      | 74             | 150         | 400         | Peak              |
| 2  |   | 2662.76         | 50.02          | -2.32    | 47.7                 | -26.3       | 74             | 150         | 400         | Peak              |
| 3  |   | 3326.49         | 44.31          | -2.16    | 42.15                | -31.85      | 74             | 150         | 400         | Peak              |
| 4  |   | 3996.59         | 42.7           | 0.17     | 42.87                | -31.13      | 74             | 150         | 400         | Peak              |

Note :

- " \* " means the worst value in this measurement data °
- Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB) °
- Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) °
- The emission levels of other frequencies are very lower than the limit and not show in test report °

### 6.3. 20dB Bandwidth

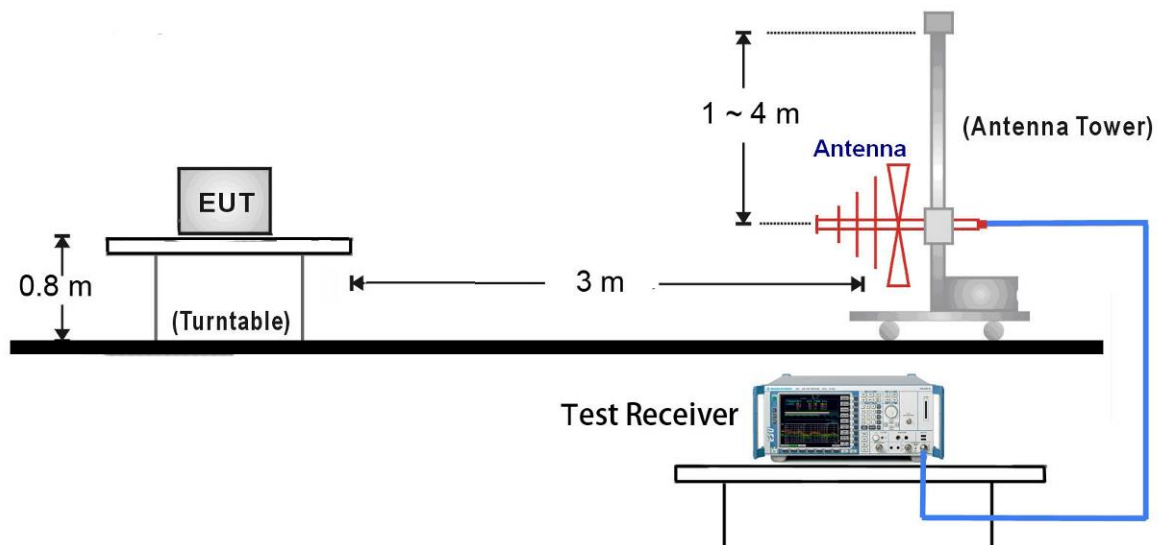
#### 6.3.1. Standard Applicable

According to FCC Part 15.231(c), the bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier.

#### 6.3.2. Test Procedure

With the EUT's antenna attached, the EUT's 20dB Bandwidth power was received by the test antenna, which was connected to the spectrum analyzer with the START, and STOP frequencies set to the EUT's operation band.

#### 6.3.3. Test Setup



### 6.3.4. Test Result

| 7. Modulation Type                                     | Frequency (MHz) | 20dB Bandwidth (MHz) | Limit (MHz)  | Result |
|--------------------------------------------------------|-----------------|----------------------|--------------|--------|
| FSK                                                    | 432.3           | 0.1088               | $\leq 1.085$ | Pass   |
| FSK                                                    | 435.5           | 0.1088               | $\leq 1.085$ | Pass   |
| Limit: $434\text{MHz} \times 0.0025 = 1.085\text{MHz}$ |                 |                      |              |        |

#### 432.3MHz



Date: 8 DEC 2017 00:31:42

#### 435.5MHz



Date: 7 DEC 2017 23:08:15

## 7.1. Transmission Time

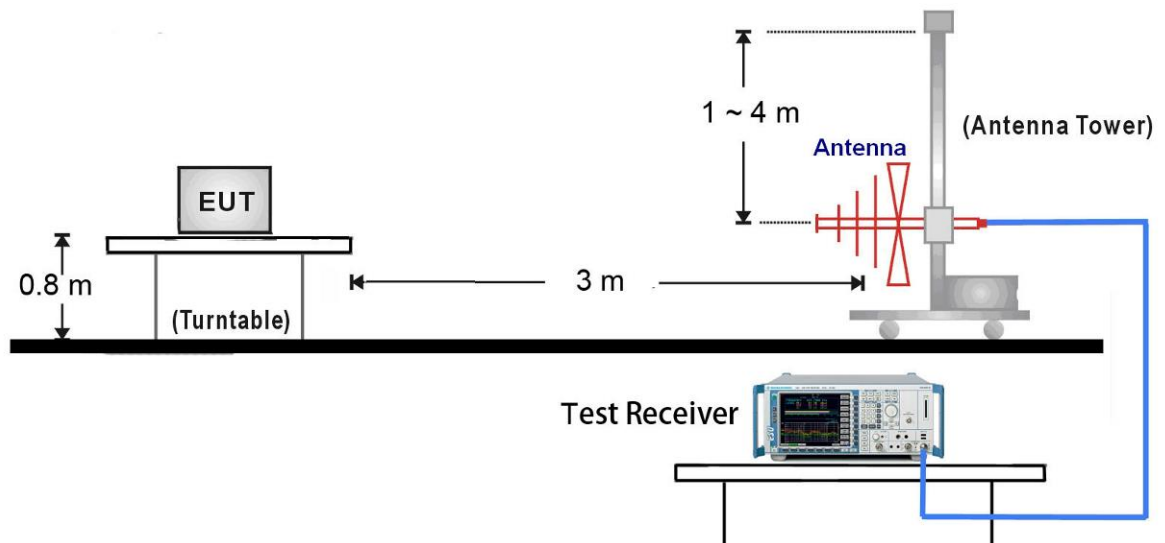
### 7.1.1. Standard Applicable

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

### 7.1.2. Test Procedure

With the EUT's antenna attached, the EUT's output signal was received by the test antenna, which was connected to the spectrum analyzer. Set the center frequency to 434MHz, then set the spectrum analyzer to Zero Span for the release time reading. During the testing, the switch was released then the EUT automatically deactivated.

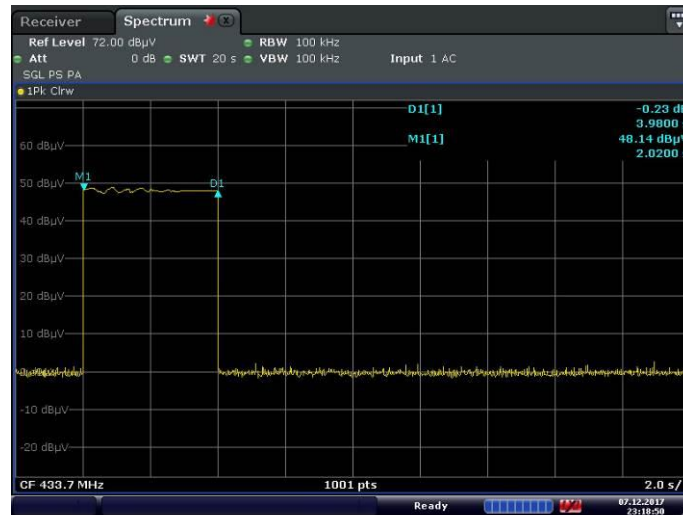
### 7.1.3. Test Setup



#### 7.1.4. Test Result

| Test Item                     | Frequency<br>(MHz) | Measurement<br>(s) | Limit<br>(s) | Result |
|-------------------------------|--------------------|--------------------|--------------|--------|
| Transmission Time( $T_{on}$ ) | 434                | 3.98               | < 5          | Pass   |

#### 434MHz-Transmission Time( $T_{on}$ )



Date: 7.DEC.2017 23:18:50

## 7.2. Duty Cycle

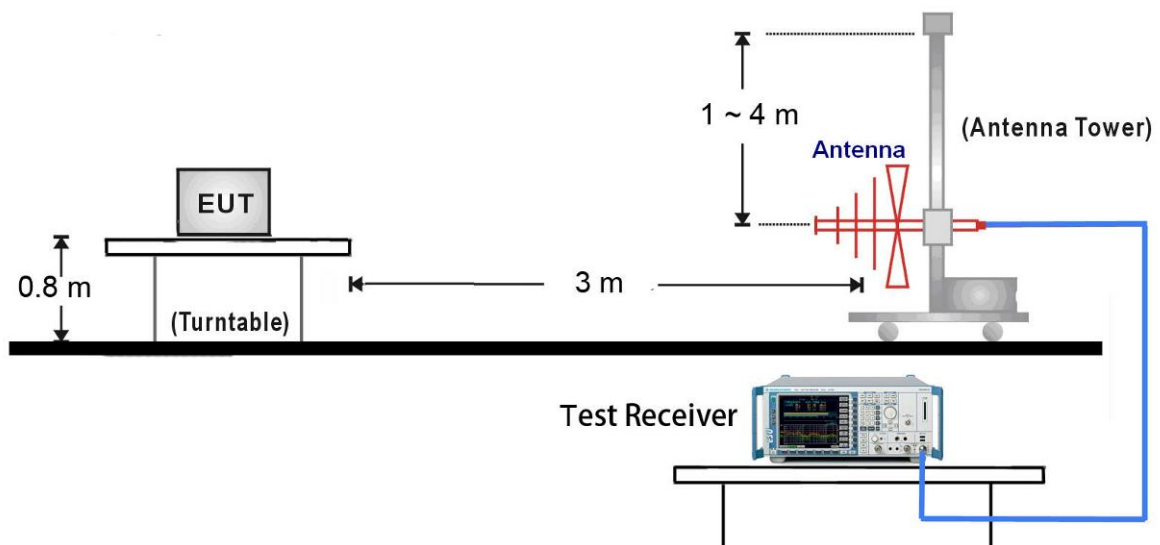
### 7.2.1. Standard Applicable

According to FCC Part 15.231(b) and 15.35(c), for pulse operation transmitter, the averaging pulsed emissions are calculated by peak value of measured emission plus duty cycle factor.

### 7.2.2. Test Procedure

With the EUT's antenna attached, the EUT's output signal was received by the test antenna, which was connected to the spectrum analyzer. Set the center frequency to 434MHz, then set the spectrum analyzer to Zero Span for the release time reading. During the testing, the switch was released then the EUT automatically deactivated.

### 7.2.3. Test Setup





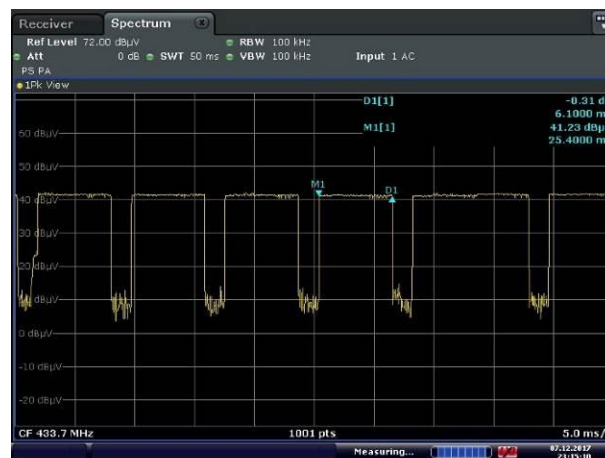
#### 7.2.4. Test Result

| Modulation Type | Total Time ( $T_{on}$ ) (ms) | The duration of one cycle (ms) | Duty Cycle (ms) | Duty Cycle Factor (dB) |
|-----------------|------------------------------|--------------------------------|-----------------|------------------------|
| FSK             | 6.1                          | 100                            | 0.06            | 24.29                  |

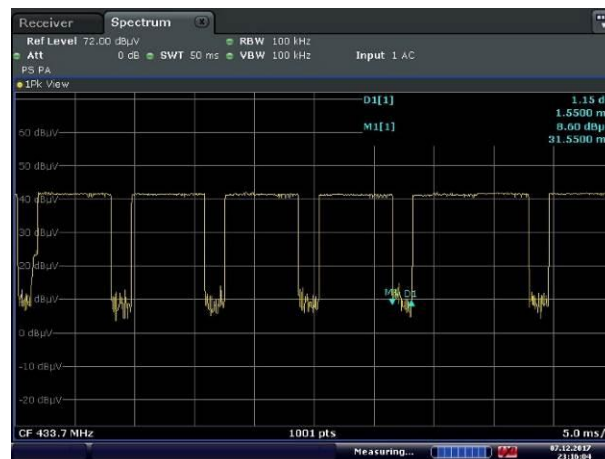
Note 1: Duty Cycle = Total Time ( $T_{on}$ ) / 100ms.

Note 2: Duty Cycle Factor =  $20 \cdot \log(1/\text{Duty Cycle})$ .

#### 434MHz ( $T_{on}$ )



#### 434MHz ( $T_{off}$ )



### 7.3. AC Conducted Emissions Measurement

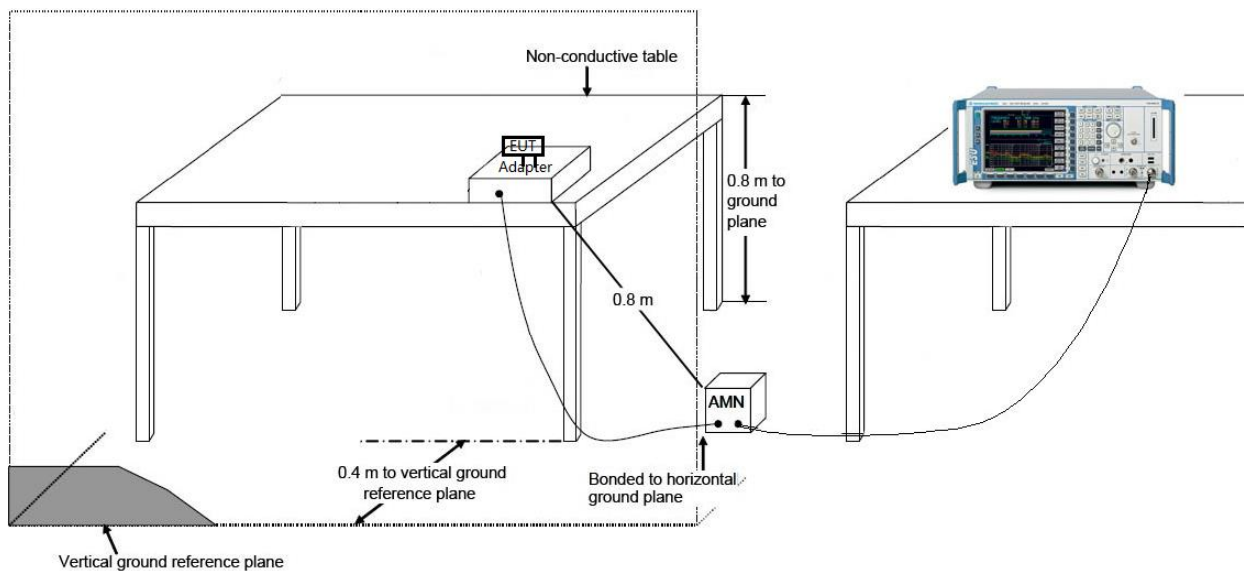
#### 7.3.1. Test Limit

| FCC Part 15 Subpart C Paragraph 15.207 / RSS-Gen Limits |                 |                      |
|---------------------------------------------------------|-----------------|----------------------|
| Frequency (MHz)                                         | QP (dB $\mu$ V) | Average (dB $\mu$ V) |
| 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.

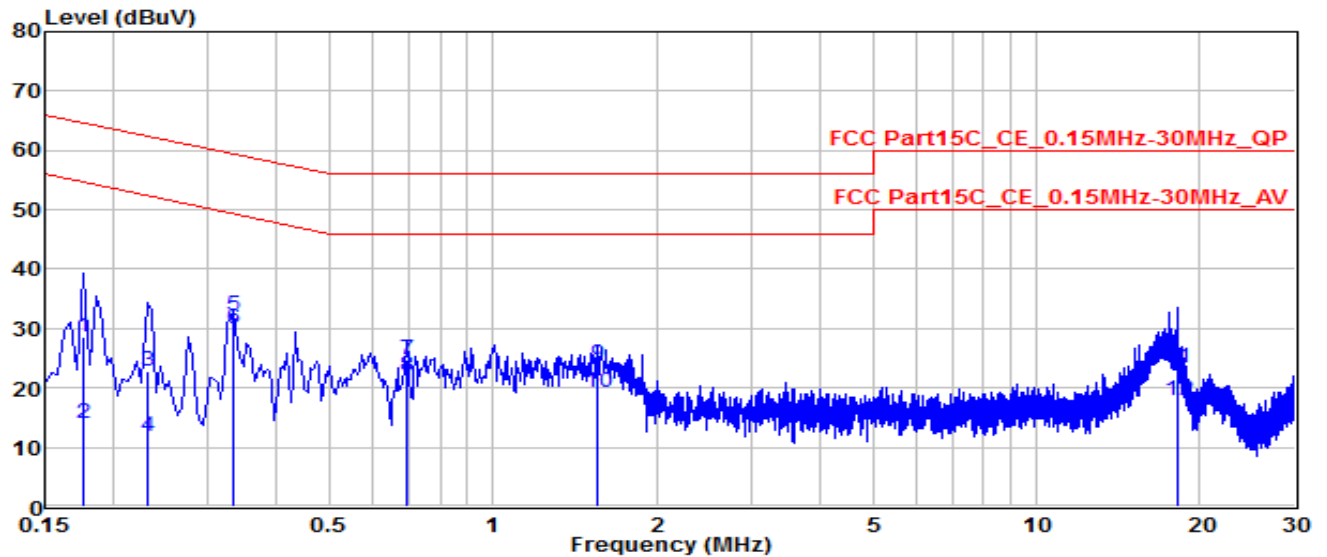
Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

#### 7.3.2. Test Setup



### 7.3.3. Test Result

|           |                           |                  |             |
|-----------|---------------------------|------------------|-------------|
| EUT       | TAINET Transceiver Module | Test Date        | 2017/12/13  |
| Factor    | CE_ENV216-L1 (Filter ON)  | Temp. / Humidity | 24°C / 55%  |
| Polarity  | Line1                     | Site / Engineer  | SR2 / Peter |
| Test Mode | MODE3-CH14                | Test Voltage     | AC120V/60Hz |

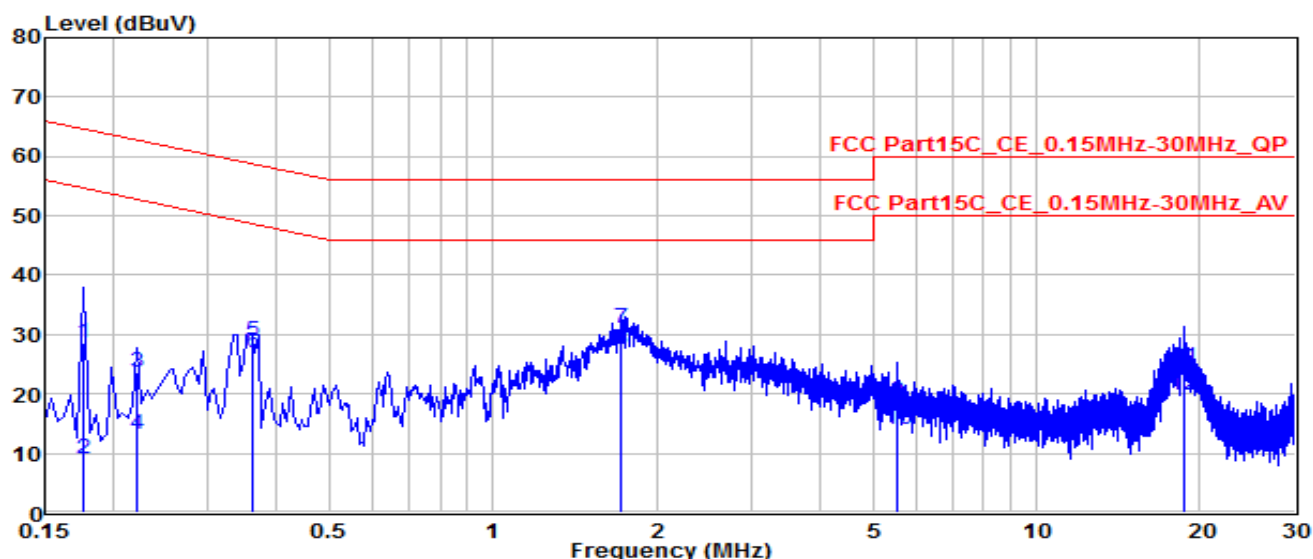


| No |   | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV) | Margin (dB) | Limit (dBuV/m) | Remark (QP/PK/AV) |
|----|---|-----------------|----------------|----------|--------------------|-------------|----------------|-------------------|
| 1  |   | 0.177           | 18.31          | 10.15    | 28.46              | -36.17      | 64.63          | QP                |
| 2  |   | 0.177           | 3.94           | 10.15    | 14.09              | -40.54      | 54.63          | Average           |
| 3  |   | 0.23099         | 12.92          | 9.95     | 22.87              | -39.54      | 62.41          | QP                |
| 4  |   | 0.23099         | 1.88           | 9.95     | 11.83              | -40.58      | 52.41          | Average           |
| 5  | * | 0.33448         | 22.11          | 10.01    | 32.12              | -27.22      | 59.34          | QP                |
| 6  | * | 0.33448         | 19.84          | 10.01    | 29.85              | -19.49      | 49.34          | Average           |
| 7  |   | 0.69445         | 14.81          | 10.01    | 24.82              | -31.18      | 56             | QP                |
| 8  |   | 0.69445         | 11.93          | 10.01    | 21.94              | -24.06      | 46             | Average           |
| 9  |   | 1.554           | 13.91          | 9.87     | 23.78              | -32.22      | 56             | QP                |
| 10 |   | 1.554           | 9.28           | 9.87     | 19.15              | -26.85      | 46             | Average           |
| 11 |   | 18.211          | 13.33          | 9.99     | 23.32              | -36.68      | 60             | QP                |
| 12 |   | 18.211          | 8.01           | 9.99     | 18                 | -32         | 50             | Average           |

Note : The EUT Power by Notebook PC

- "\*" means the worst value in this measurement data .
- C.F ( Correction Factor ) = Factor (dB)+ Cable Loss (dB) .
- Measurement (dBuV) = Reading(dBuV)+ C.F ( Correction Factor ) .
- Other mode was also verified. The test results shown represent the worst case emissions .

|           |                           |                  |             |
|-----------|---------------------------|------------------|-------------|
| EUT       | TAINET Transceiver Module | Test Date        | 2017/12/13  |
| Factor    | CE_ENV216-N (Filter ON)   | Temp. / Humidity | 24°C / 55%  |
| Polarity  | Neutral                   | Site / Engineer  | SR2 / Peter |
| Test Mode | MODE3-CH14                | Test Voltage     | AC120V/60Hz |



| No | Frequency (MHz) | Reading (dBuV) | C.F (dB) | Measurement (dBuV) | Margin (dB) | Limit (dBuV/m) | Remark (QP/PK/AV) |
|----|-----------------|----------------|----------|--------------------|-------------|----------------|-------------------|
| 1  | 0.177           | 18.53          | 10.11    | 28.64              | -35.99      | 64.63          | QP                |
| 2  | 0.177           | -0.91          | 10.11    | 9.2                | -45.43      | 54.63          | Average           |
| 3  | 0.22199         | 13.57          | 9.94     | 23.51              | -39.23      | 62.74          | QP                |
| 4  | 0.22199         | 3.25           | 9.94     | 13.19              | -39.55      | 52.74          | Average           |
| 5  | 0.36148         | 18.91          | 10.03    | 28.94              | -29.75      | 58.69          | QP                |
| 6  | 0.36148         | 17.03          | 10.03    | 27.06              | -21.63      | 48.69          | Average           |
| 7  | * 1.725         | 21.09          | 9.86     | 30.95              | -25.05      | 56             | QP                |
| 8  | * 1.725         | 17.56          | 9.86     | 27.42              | -18.58      | 46             | Average           |
| 9  | 5.554           | 8.92           | 9.78     | 18.7               | -41.3       | 60             | QP                |
| 10 | 5.554           | 4.25           | 9.78     | 14.03              | -35.97      | 50             | Average           |
| 11 | 18.643          | 14.31          | 10.06    | 24.37              | -35.63      | 60             | QP                |
| 12 | 18.643          | 9.72           | 10.06    | 19.78              | -30.22      | 50             | Average           |

Note : The EUT Power by Notebook PC

- " \* " means the worst value in this measurement data .
- C.F ( Correction Factor ) = Factor (dB)+ Cable Loss (dB) .
- Measurement (dBuV) = Reading(dBuV)+ C.F ( Correction Factor ) .
- Other channel was also verified. The test results shown represent the worst case emissions .

## CONCLUSION

The data collected relate only the item(s) tested and show that the **TAINET Transceiver Module** is in compliance with FCC Part 15.231(b) of the FCC Rules.

## Appendix A - Test Photograph

Test Mode: Mode 3

Description: Front View of Conducted Emission Test Setup



Test Mode: Mode 3

Description: Back View of Conducted Emission Test Setup



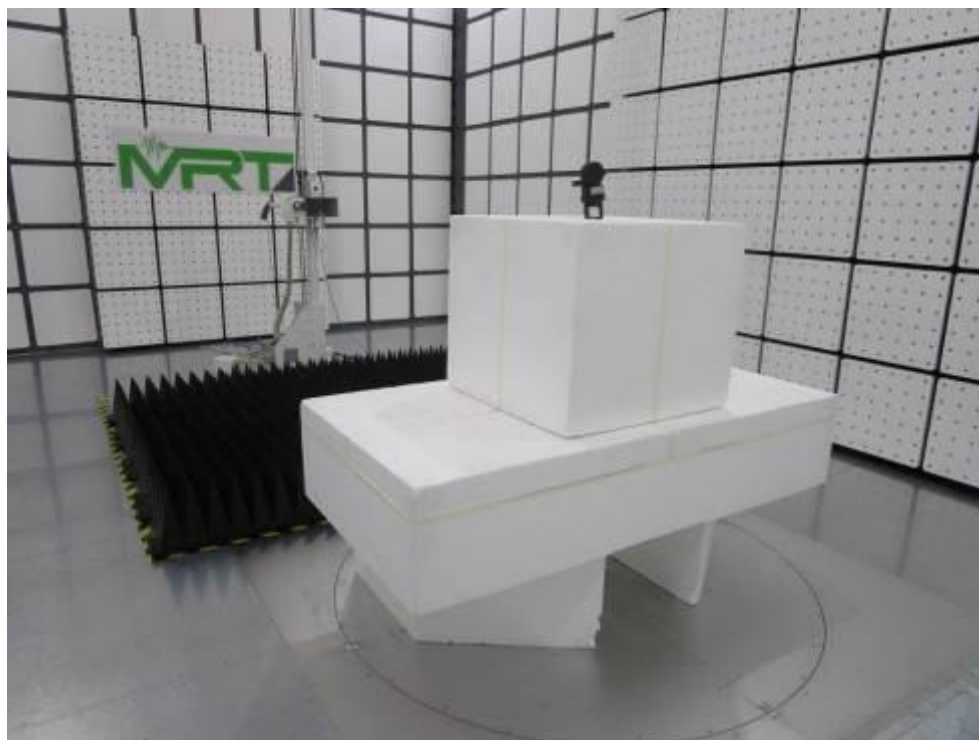
Test Mode: Mode 1

Description: Radiated Emission Test Setup for below 1GHz



Test Mode: Mode 1

Description: Radiated Emission Test Setup for above 1GHz





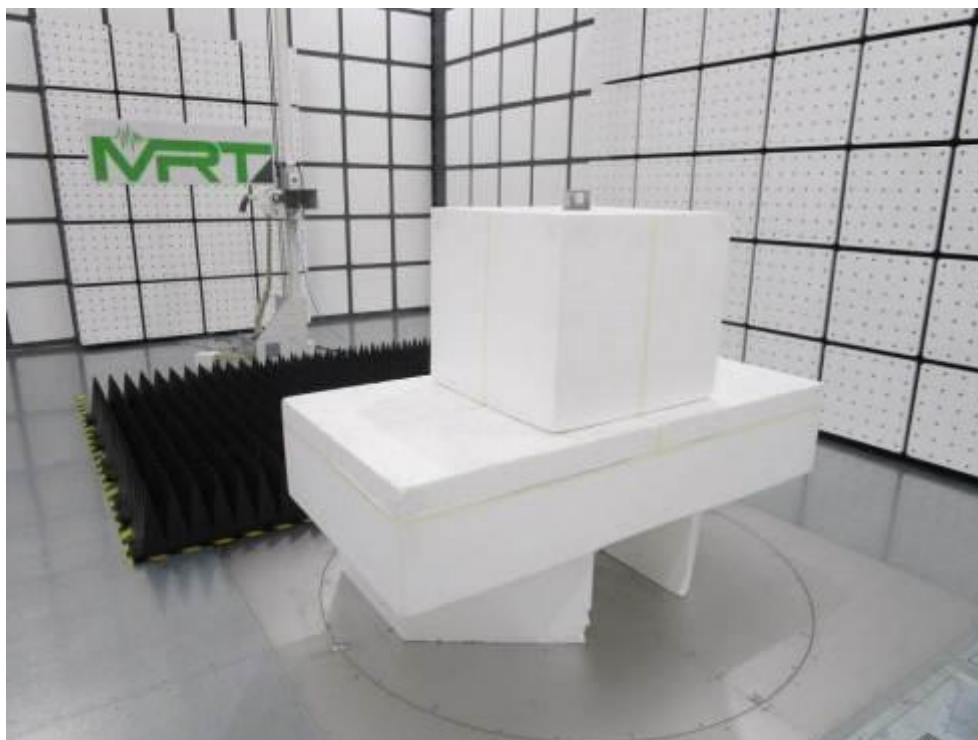
Test Mode: Mode 2

Description: Radiated Emission Test Setup for below 1GHz



Test Mode: Mode 2

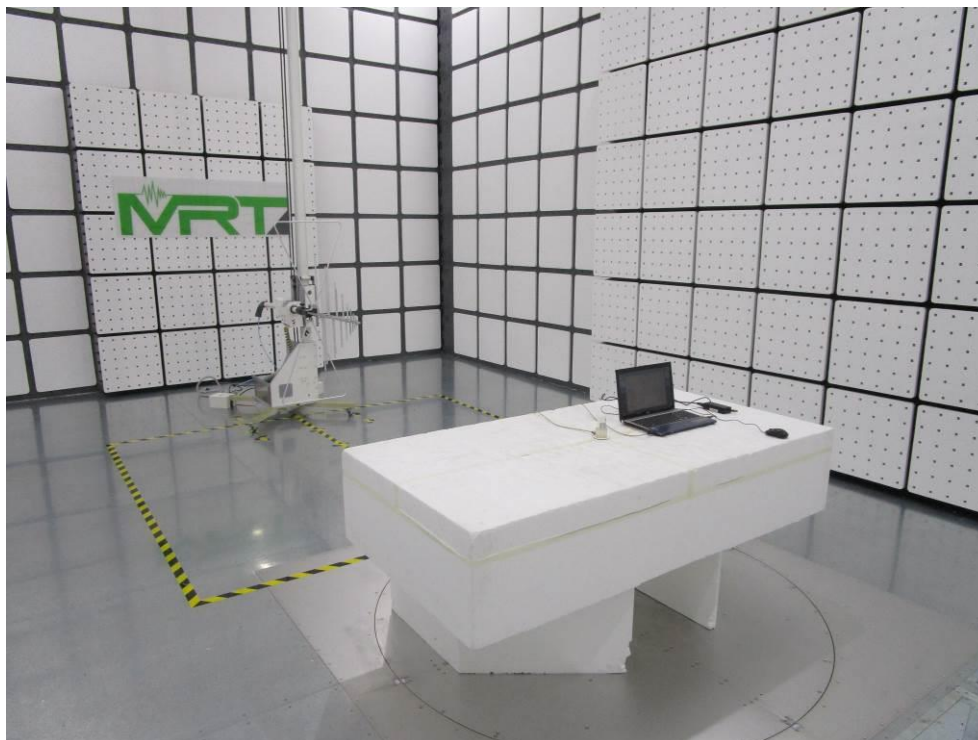
Description: Radiated Emission Test Setup for above 1GHz





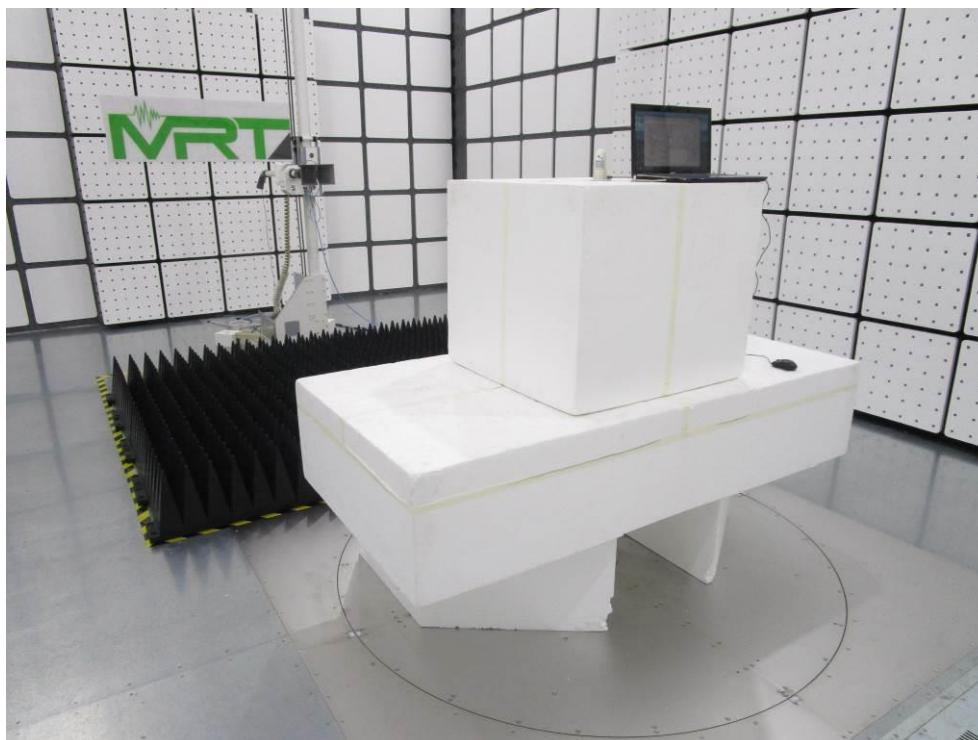
Test Mode: Mode 3

Description: Radiated Emission Test Setup for below 1GHz



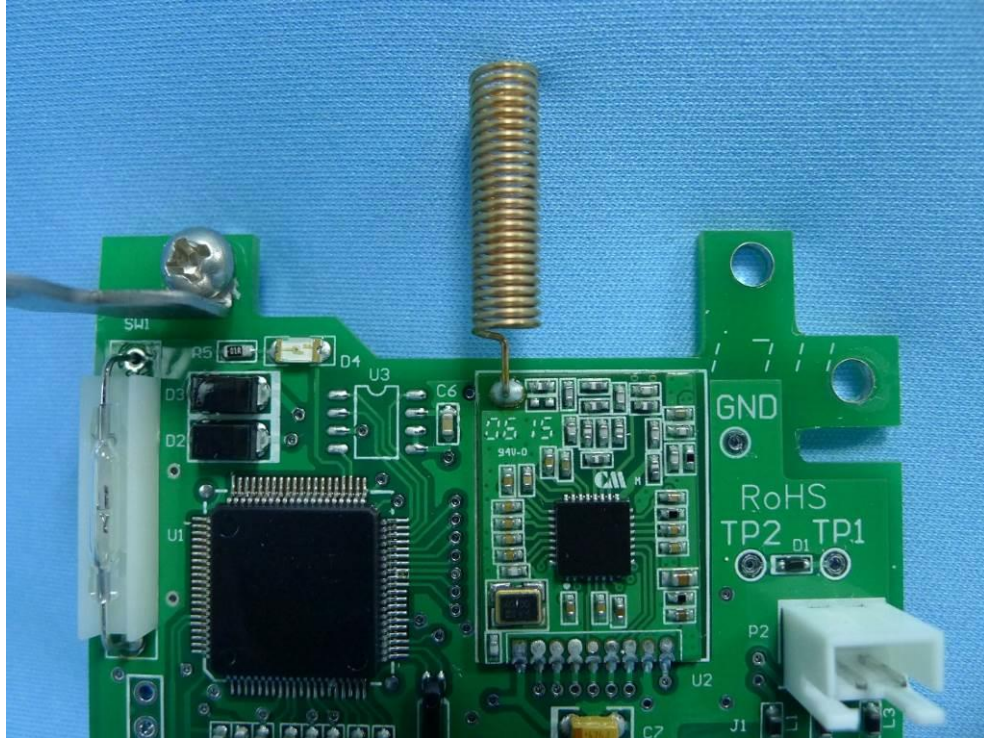
Test Mode: Mode 3

Description: Radiated Emission Test Setup for above 1GHz



## Appendix B - External Photograph

(1) EUT Photo (434MHz RF Module)



(2) Host Photo (RFR)





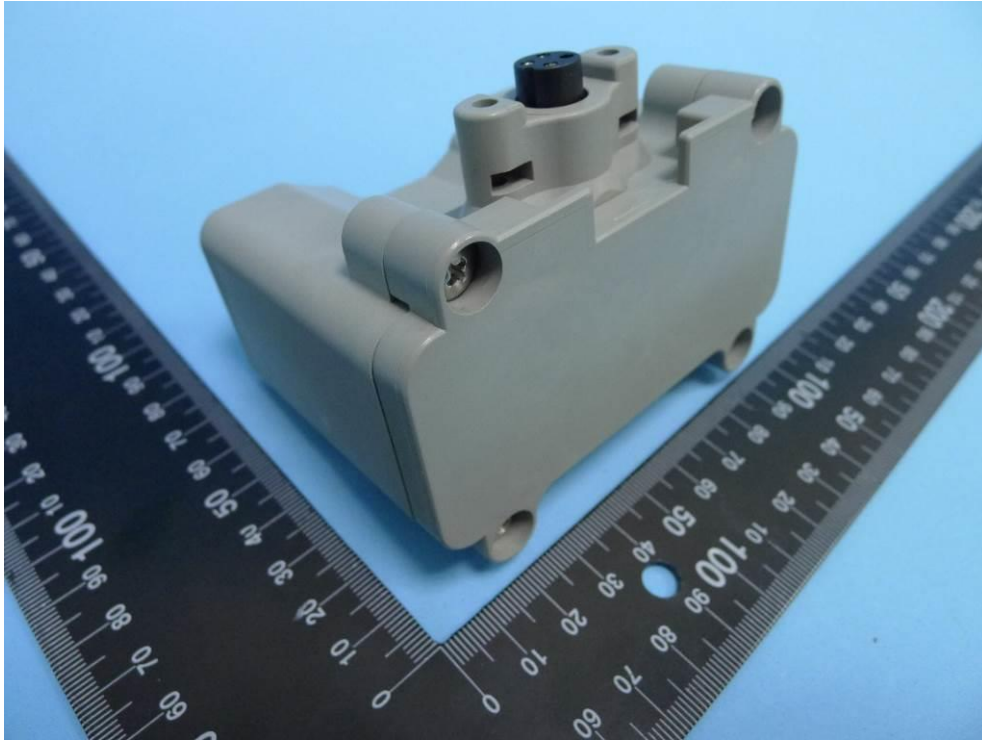
(3) Host Photo (RFR)



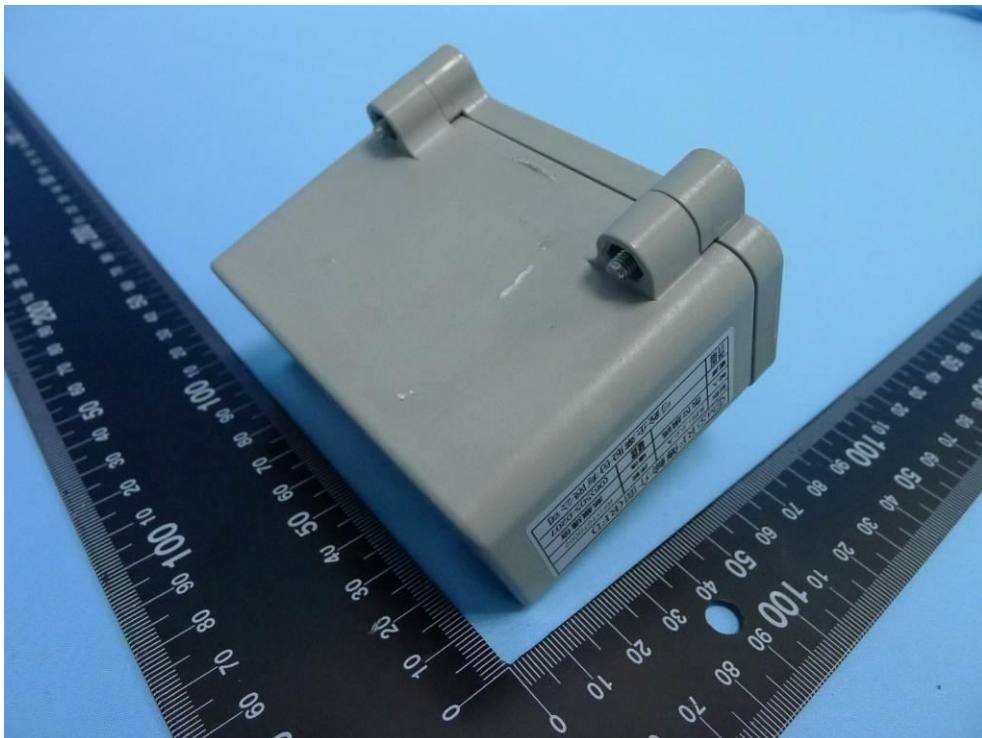
(4) Host Photo (RFR)



(5) Host Photo (RFI)



(6) Host Photo (RFI)



(7) Host Photo (RFI)



(8) Host Photo (RFD)





(9) Host Photo (RFD)



(10) Host Photo (RFD)

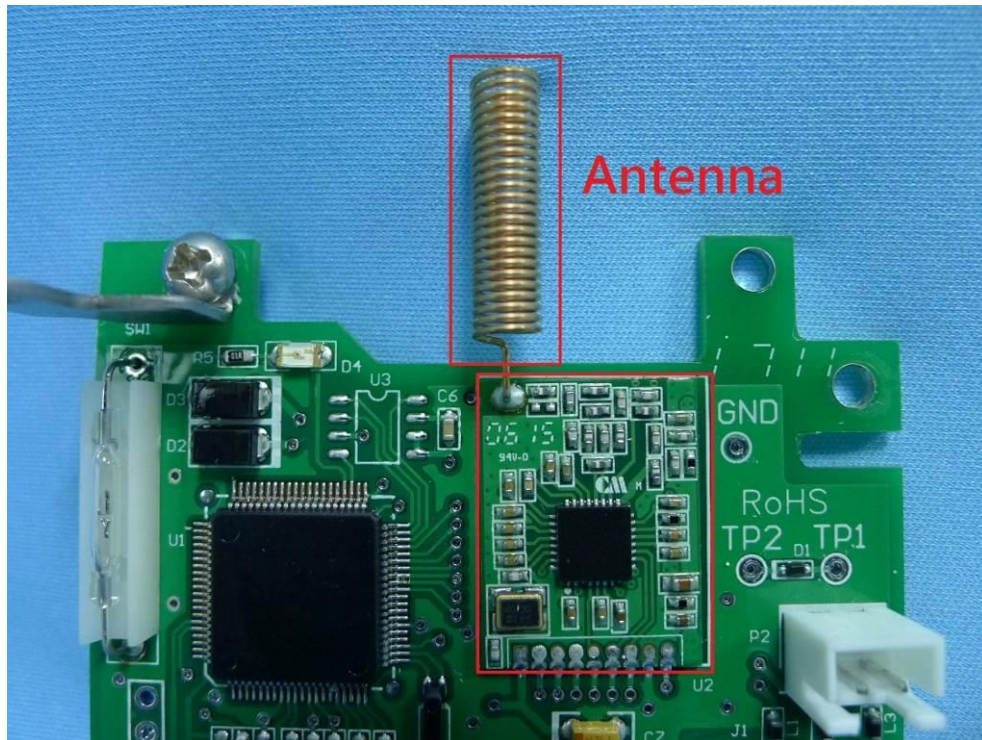


(11) Host Photo (RFD)



## Appendix C - Internal Photograph

### (1) EUT Photo (434MHz RF Module)



### (2) Host Photo (RFR)

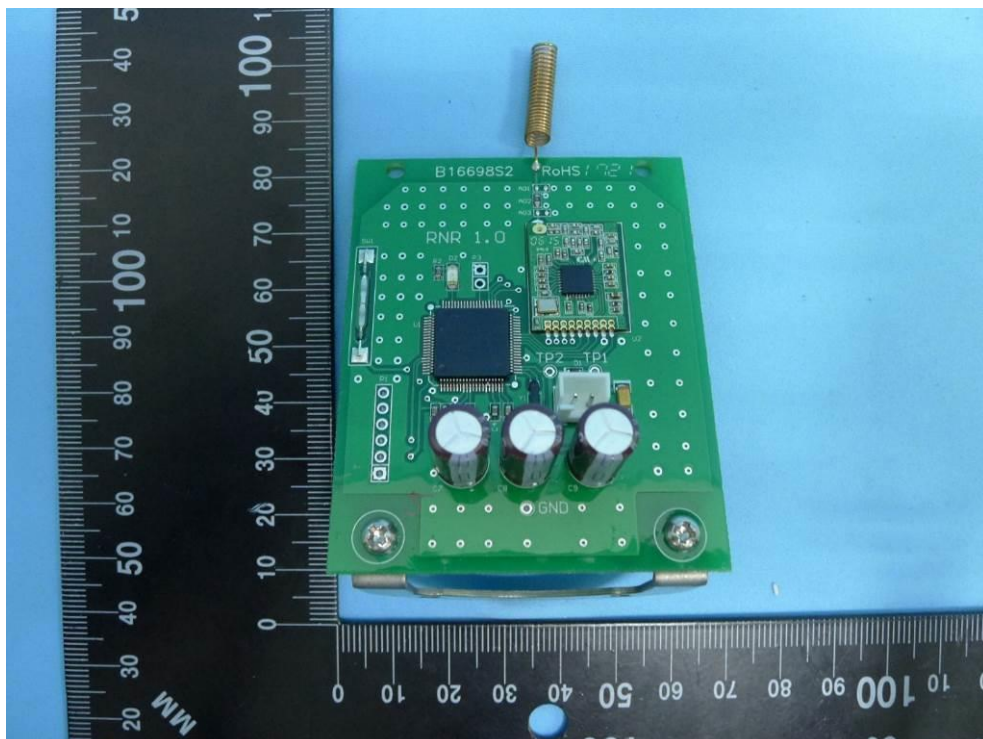




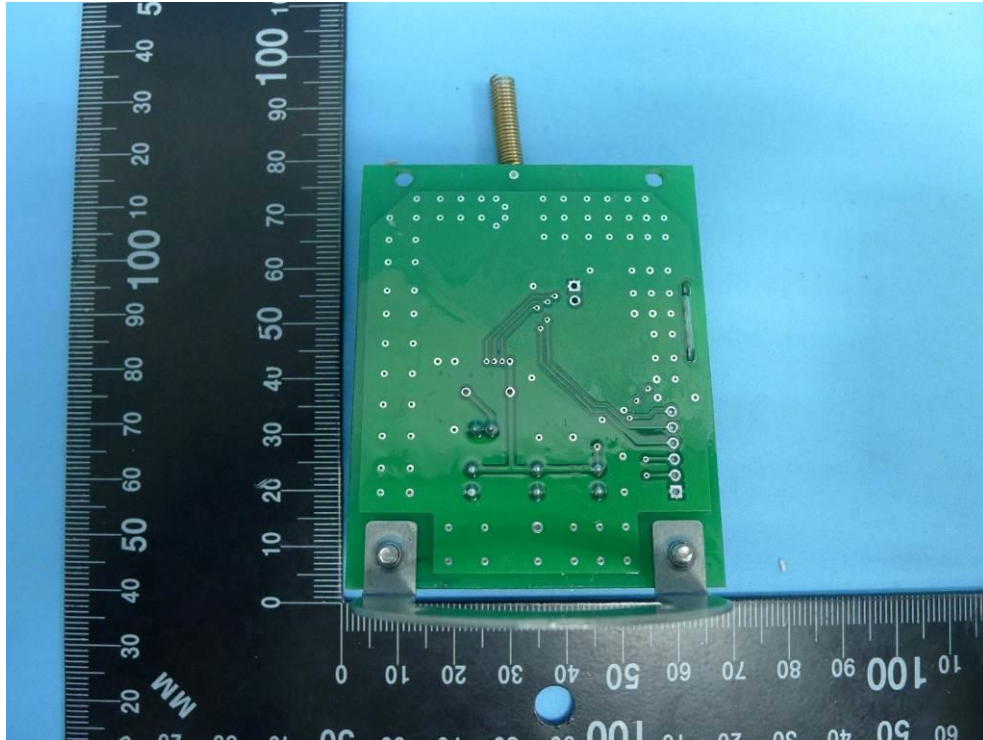
(3) Host Photo (RFR)



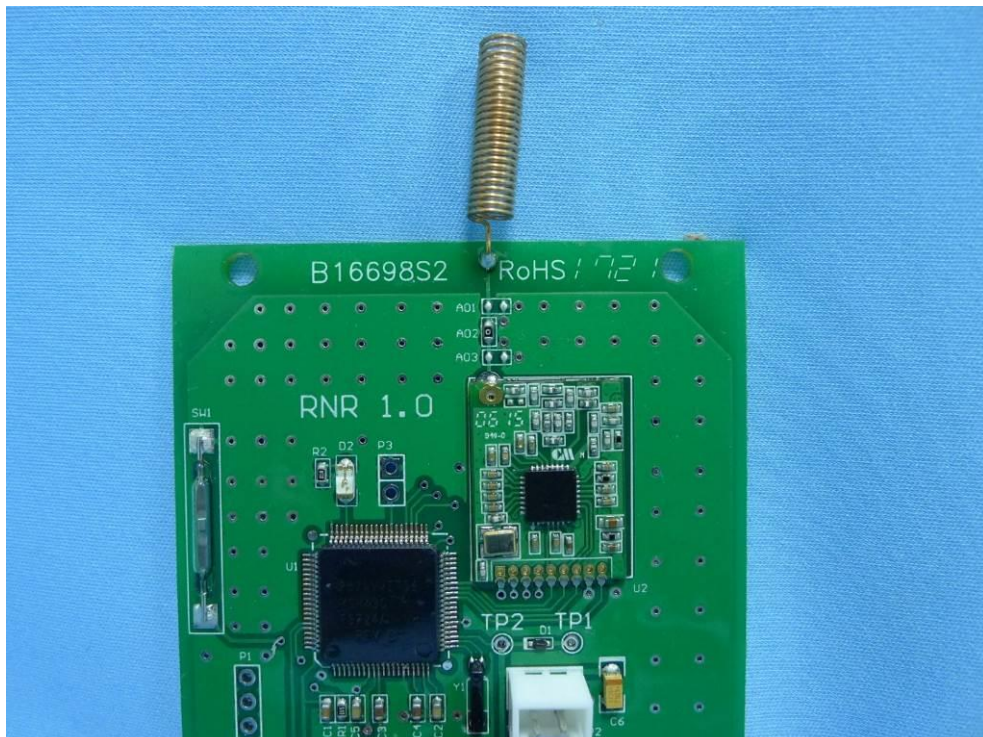
(4) Host Photo (RFR)



(5) Host Photo (RFR)

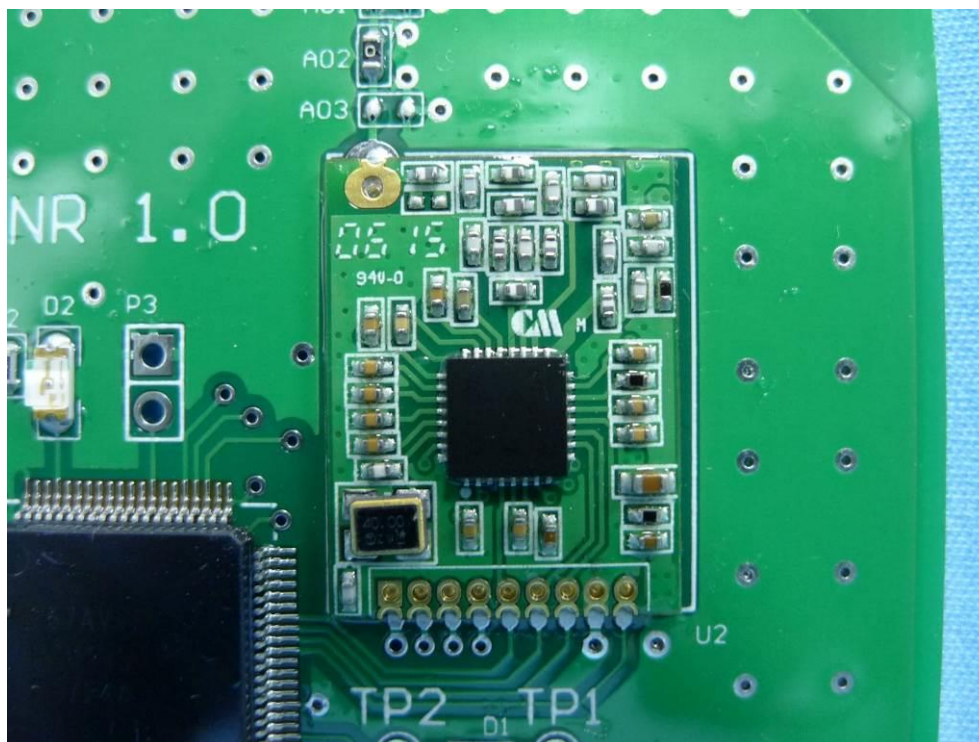


(6) Host Photo (RFR)

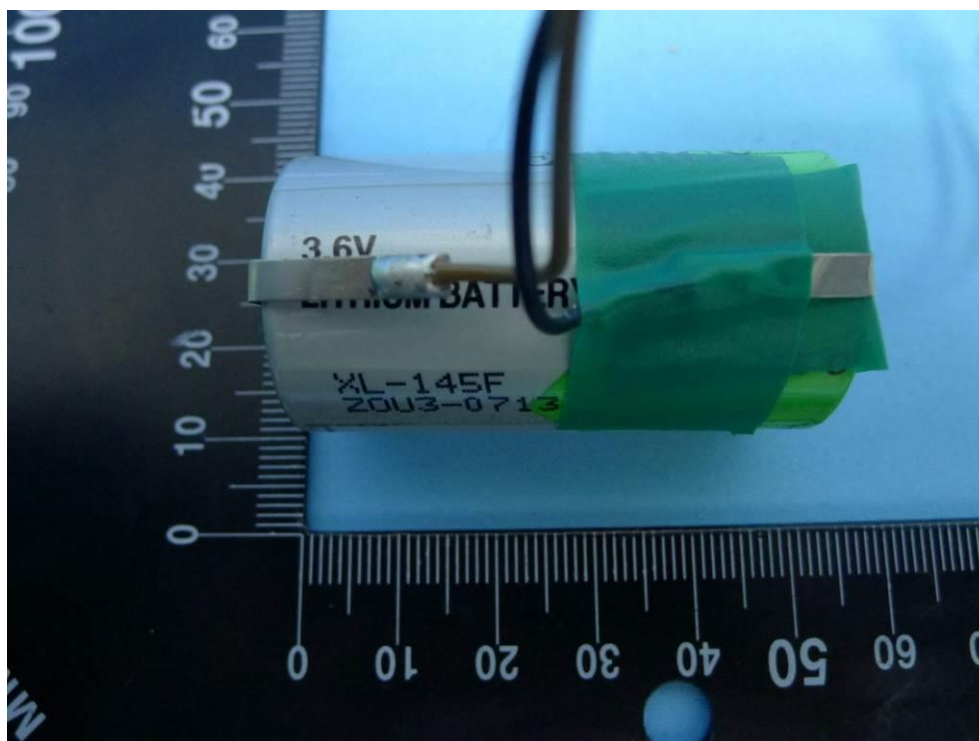




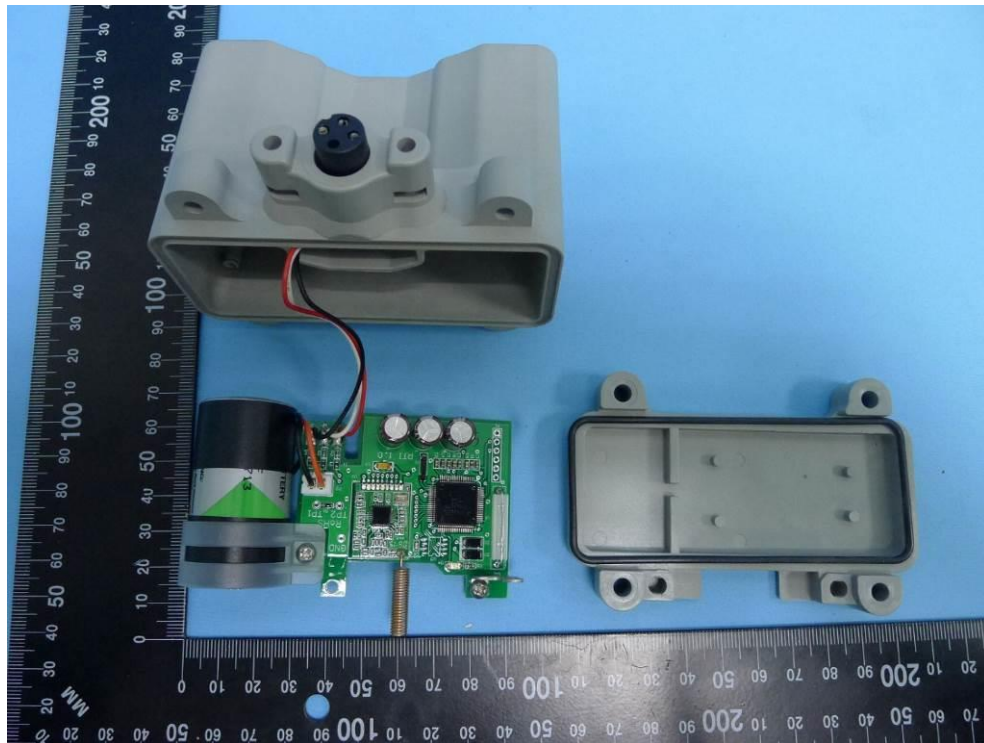
(7) Host Photo (RFR)



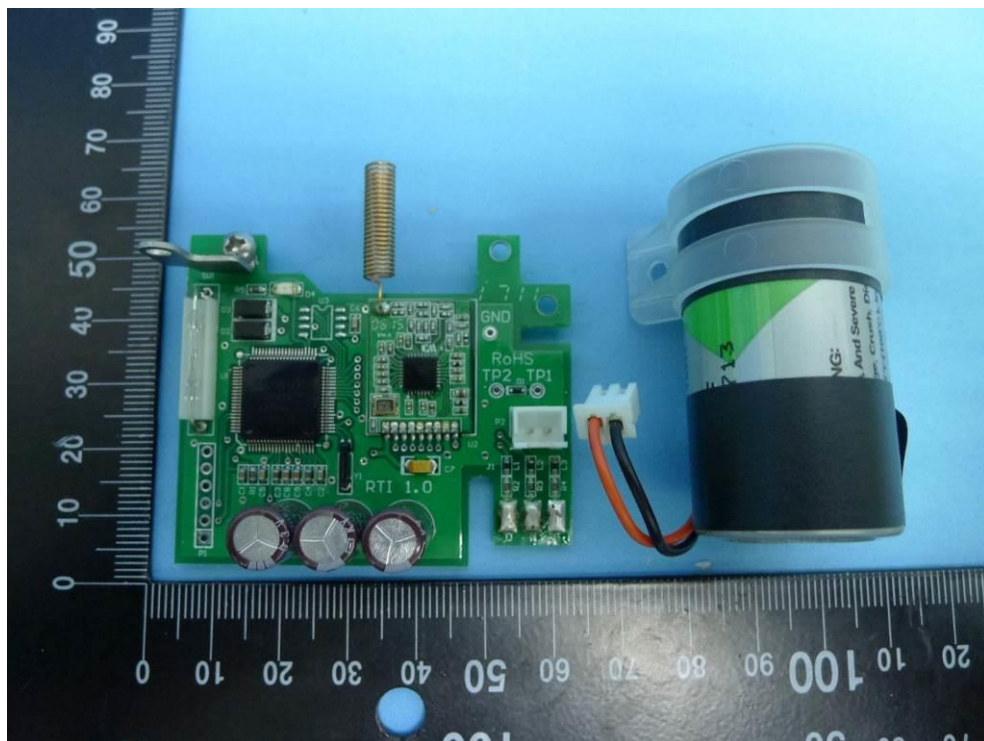
(8) Host Photo (RFR)



(9) Host Photo (RFI)

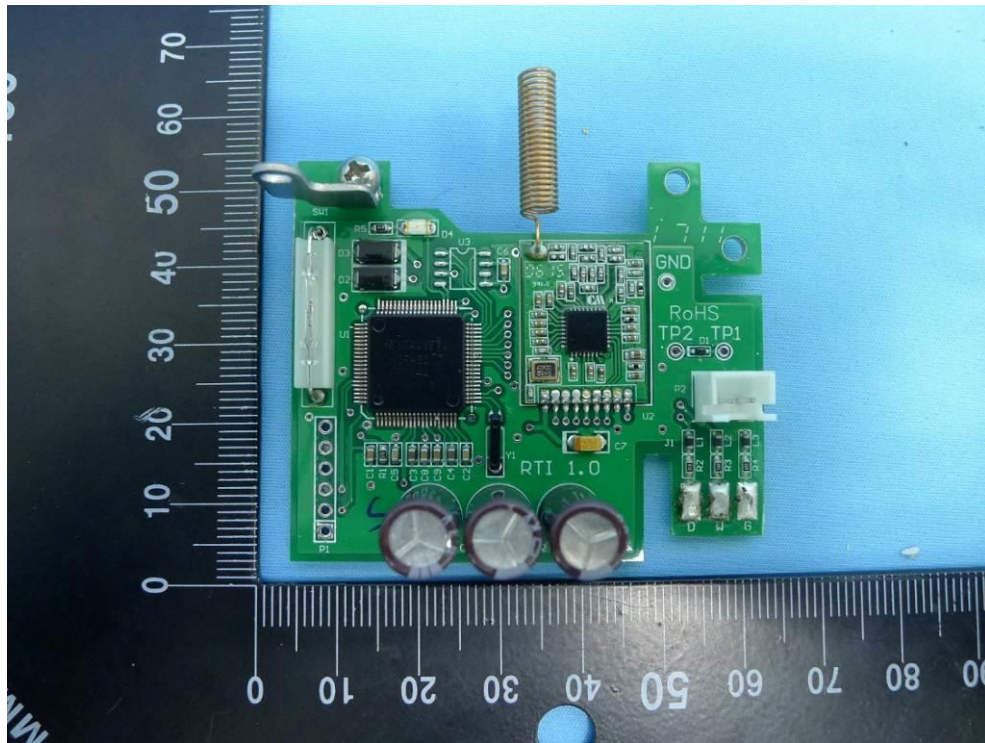


(10) Host Photo (RFI)

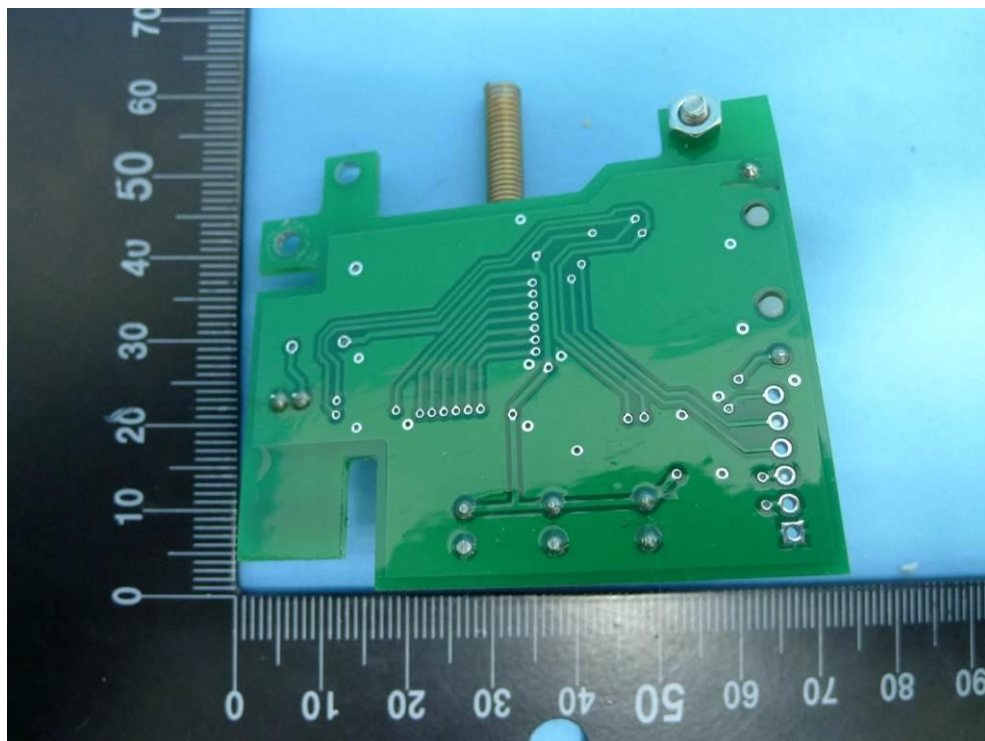




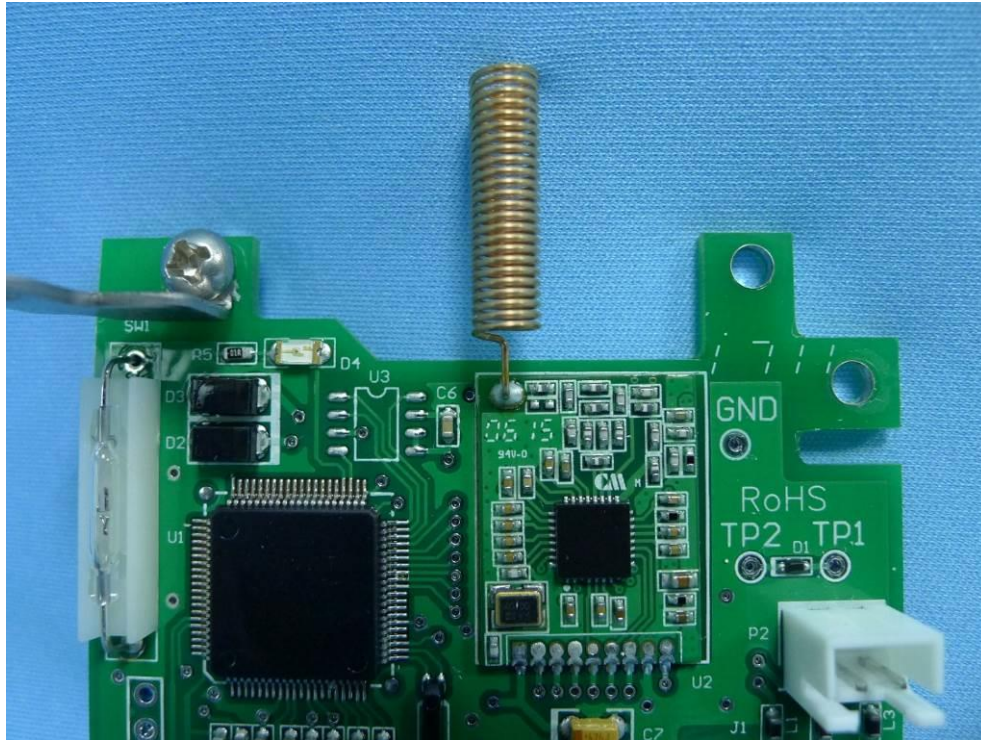
(11) Host Photo (RFI)



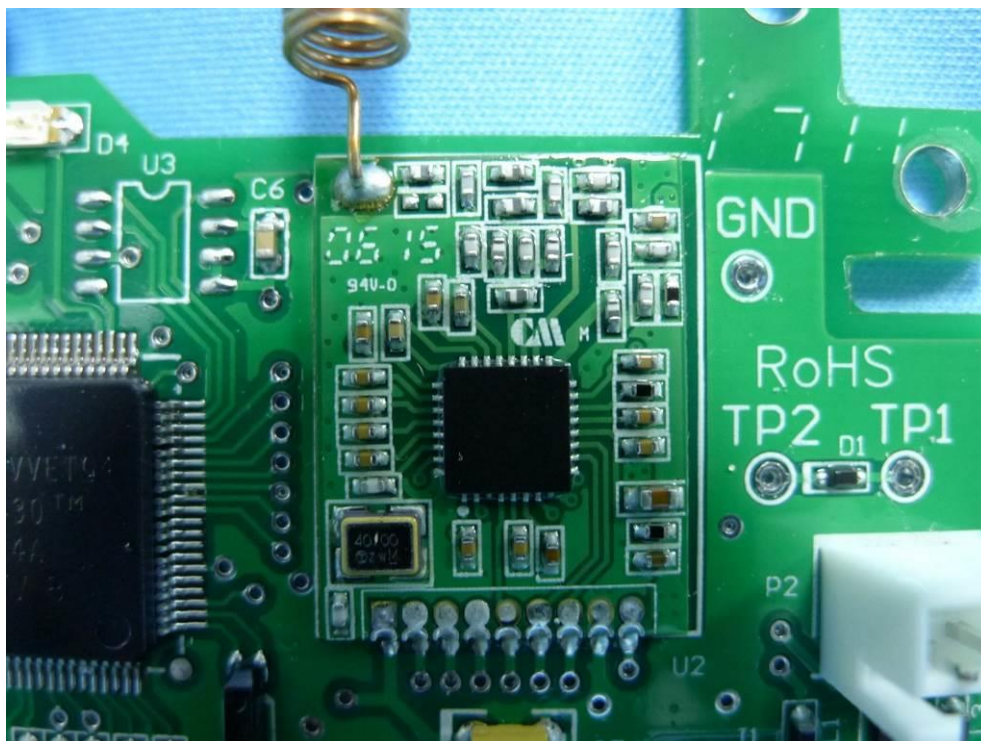
(12) Host Photo (RFI)



(13) Host Photo (RFI)

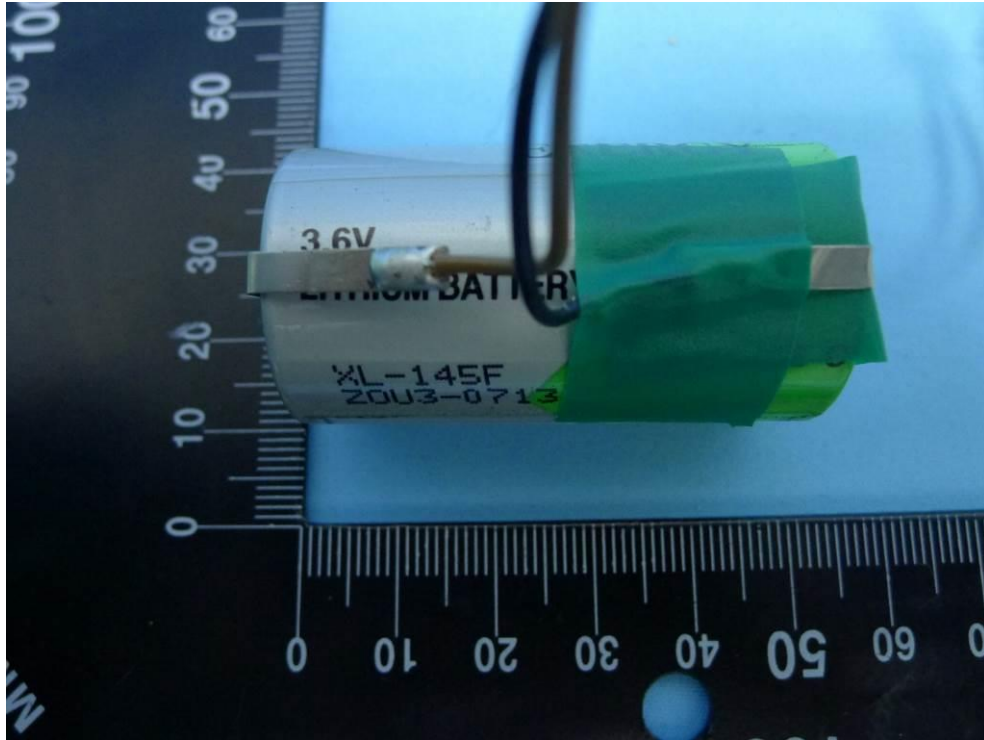


(14) Host Photo (RFI)

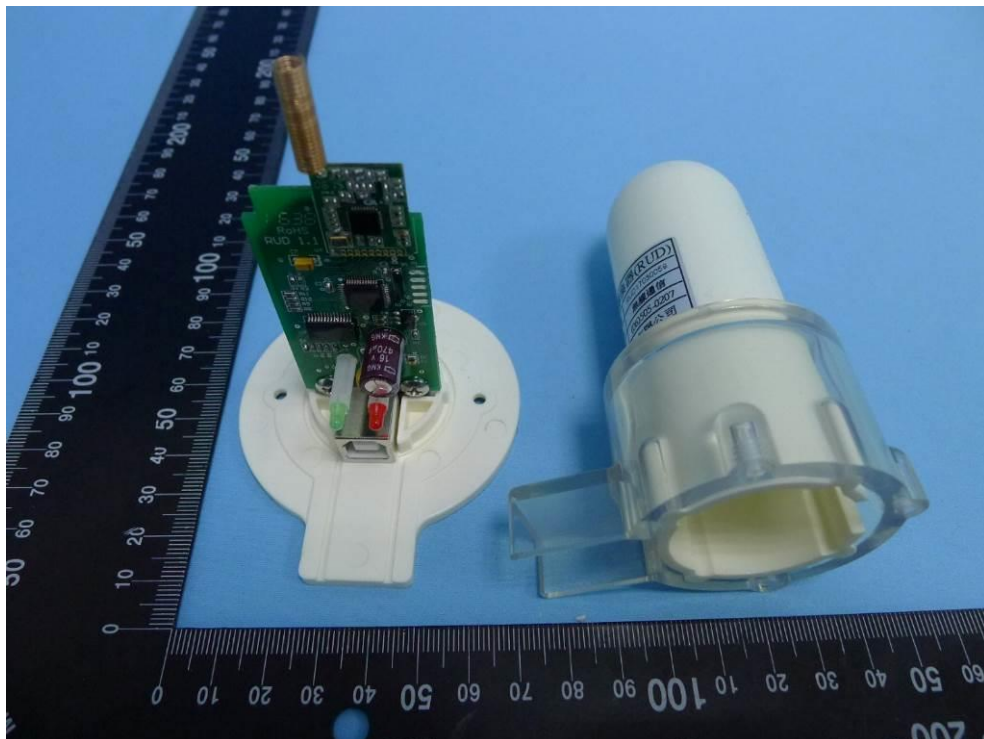




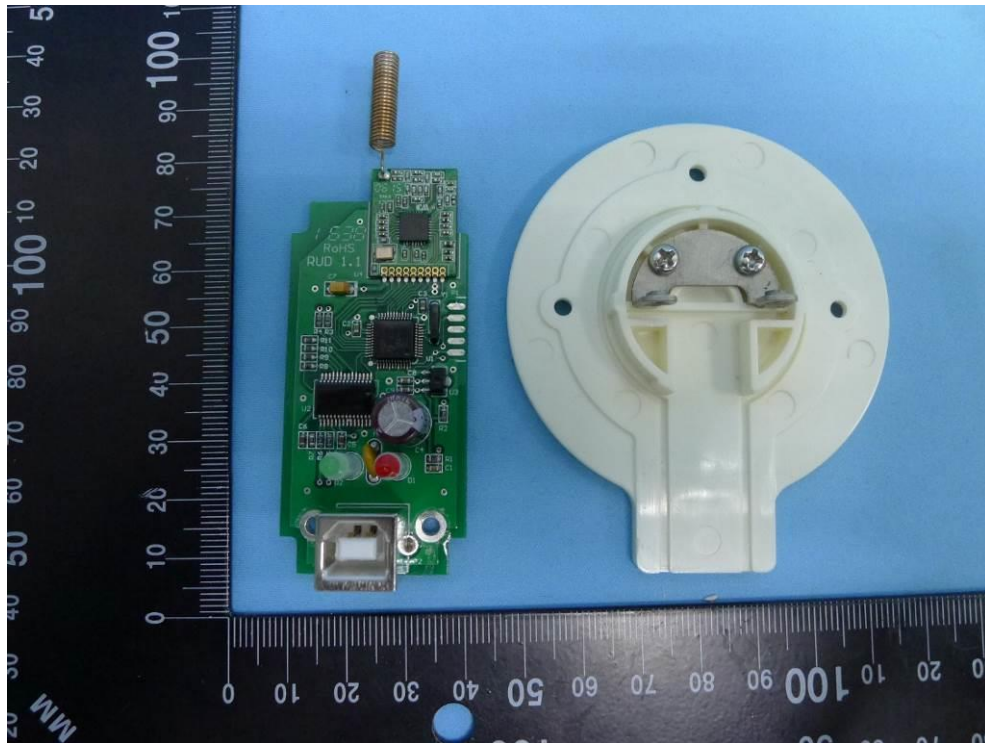
(15) Host Photo (RFI)



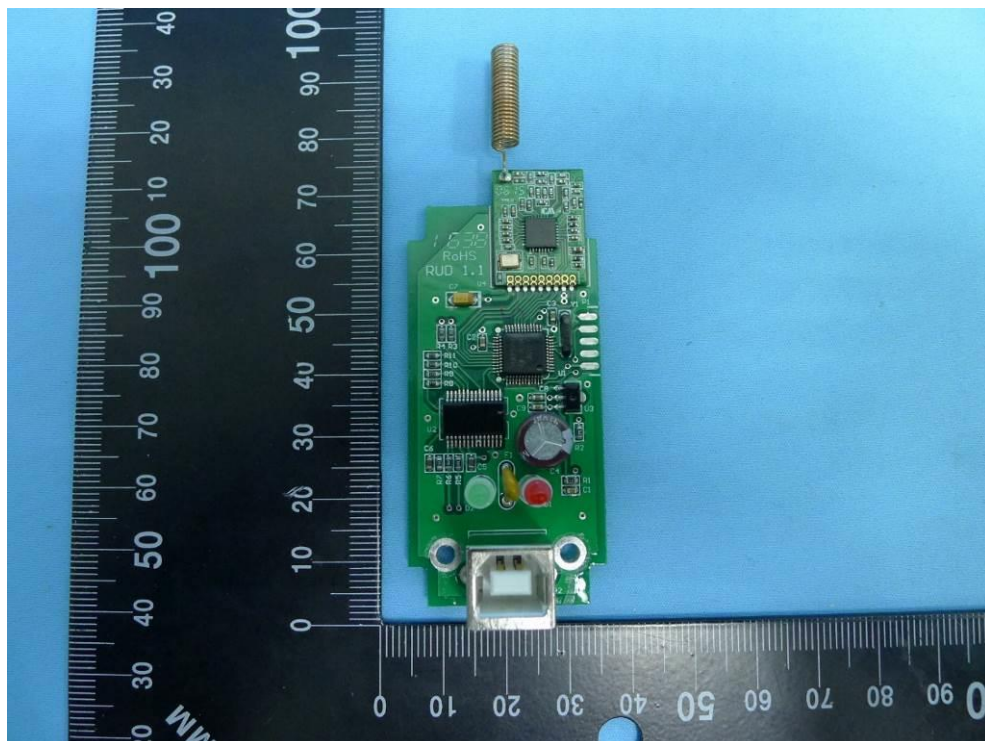
(16) Host Photo (RFD)



(17) Host Photo (RFD)

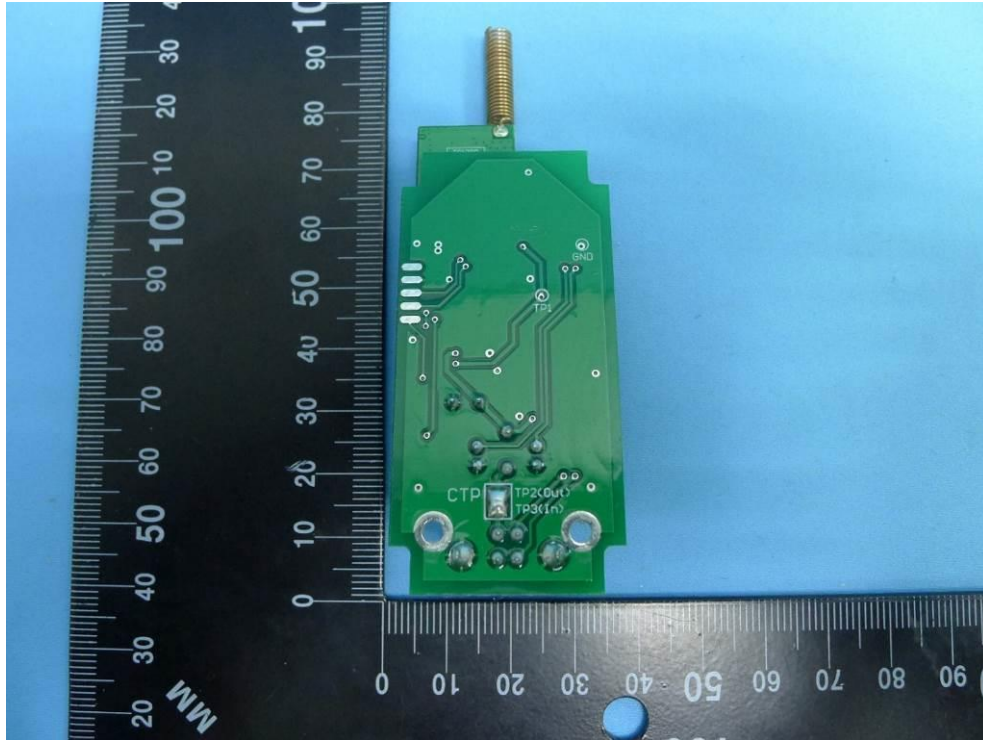


(18) Host Photo (RFD)

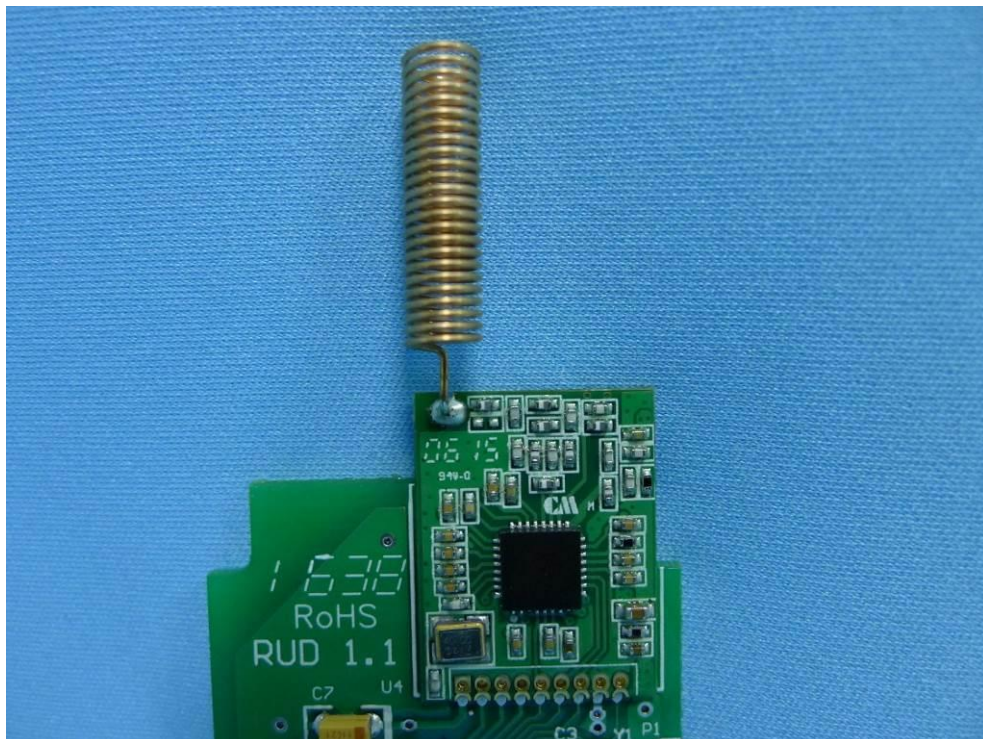




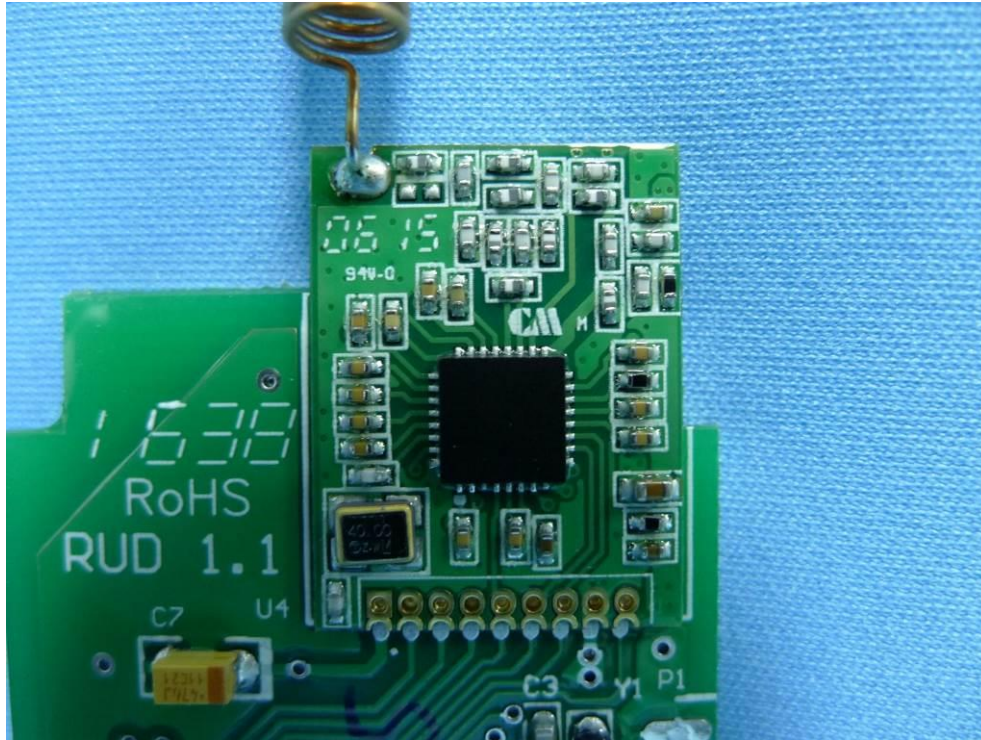
(19) Host Photo (RFD)



(20) Host Photo (RFD)



(21) Host Photo (RFD)



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The End

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