



FCC ID: M82-AIM-P707  
Report No.: T180307D10-RP

Page: 1 / 25  
Rev.: 02

## FCC 47 CFR PART 15 SUBPART C

### TEST REPORT

For

**AIM-P707B0 10-in-1 WPC charging station**

**Model: AIM-P707, AIM-P707B0; AIM-P707XXXXXXXXXXXXXXXXXXXXX**  
(where "X" may be any alphanumeric character, "-" or blank)

**Trade Name: ADVANTECH**

*Issued to*

**Advantech Co.Ltd.  
No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District,  
Taipei 114, Taiwan, R.O.C.**

*Issued by*

**Compliance Certification Services Inc.  
No.11, Wugong 6th Rd., Wugu Dist.,  
New Taipei City 24891, Taiwan. (R.O.C.)  
Issued Date: April 18, 2019**

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.  
除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部分複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at [www.sgs.com/terms\\_and\\_conditions.htm](http://www.sgs.com/terms_and_conditions.htm) and for electronic format documents, subject to Terms and Conditions for Electronic Documents at [www.sgs.com/terms\\_e-document.htm](http://www.sgs.com/terms_e-document.htm). Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



Report No.: T180307D10-RP

Page: 2 / 25

Rev.: 02

### Revision History

| Rev. | Issue Date        | Revisions                                                                                                 | Effect Page     | Revised By   |
|------|-------------------|-----------------------------------------------------------------------------------------------------------|-----------------|--------------|
| 00   | April 16, 2018    | Initial Issue                                                                                             | ALL             | Allison Chen |
| 01   | February 25, 2019 | 1. Revised unit "20Db" to "20dB".<br>2. Added description on remark.<br>3. Removed test procedure item 4. | P.14, 20,<br>22 | Allison Chen |
| 02   | April 18, 2019    | 1. Revised description of test modes in sec.4.5.<br>2. Revised title "20DB" to "20dB".                    | P.3, 9,<br>14   | Allison Chen |



Report No.: T180307D10-RP

Page: 3 / 25

Rev.: 02

## TABLE OF CONTENTS

|                                                         |             |
|---------------------------------------------------------|-------------|
| <b>1. TEST RESULT CERTIFICATION.....</b>                | <b>4</b>    |
| <b>2. EUT DESCRIPTION .....</b>                         | <b>5</b>    |
| <b>3. TEST SUMMERY .....</b>                            | <b>6</b>    |
| <b>4. TEST METHODOLOGY .....</b>                        | <b>7</b>    |
| 4.1 EUT CONFIGURATION .....                             | 7           |
| 4.2 EUT EXERCISE .....                                  | 7           |
| 4.3 GENERAL TEST PROCEDURES .....                       | 7           |
| 4.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS..... | 8           |
| 4.5 DESCRIPTION OF TEST MODES .....                     | 9           |
| <b>5. INSTRUMENT CALIBRATION.....</b>                   | <b>10</b>   |
| 5.1 MEASURING INSTRUMENT CALIBRATION.....               | 10          |
| 5.2 MEASUREMENT EQUIPMENT USED.....                     | 10          |
| 5.3 MEASUREMENT UNCERTAINTY .....                       | 11          |
| <b>6. FACILITIES AND ACCREDITATIONS.....</b>            | <b>12</b>   |
| 6.1 FACILITIES.....                                     | 12          |
| 6.2 EQUIPMENT .....                                     | 12          |
| <b>7. SETUP OF EQUIPMENT UNDER TEST .....</b>           | <b>13</b>   |
| 7.1 SETUP CONFIGURATION OF EUT.....                     | 13          |
| 7.2 SUPPORT EQUIPMENT .....                             | 13          |
| <b>8. TEST REQUIREMENTS.....</b>                        | <b>14</b>   |
| 8.1 20dB BANDWIDTH .....                                | 14          |
| 8.2 TRANSMITTER RADIATED EMISSION.....                  | 16          |
| 8.3 AC CONDUCTED EMISSION.....                          | 22          |
| 8.4 ANTENNA REQUIREMENT .....                           | 25          |
| <b>APPENDIX A PHOTOGRAPHS OF TEST SETUP .....</b>       | <b>A- 1</b> |
| <b>APPENDIX 1 - PHOTOGRAPHS OF EUT</b>                  |             |



Report No.: T180307D10-RP

Page: 4 / 25

Rev.: 02

## 1. TEST RESULT CERTIFICATION

**Applicant:** Advantech Co.Ltd.  
No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District,  
Taipei 114, Taiwan, R.O.C.

**Equipment Under Test:** AIM-P707B0 10-in-1 WPC charging station

**Trade Name:** ADVANTECH

**Model:** AIM-P707, AIM-P707B0, AIM-P707xxxxxxxxxxxxxxxx (where  
"X" may be any alphanumeric character, "-" or blank)

**Date of Test:** March 27 ~ 28, 2018

| APPLICABLE STANDARDS   |                         |
|------------------------|-------------------------|
| STANDARD               | TEST RESULT             |
| FCC 47 CFR Part 15.209 | No non-compliance noted |

### We hereby certify that:

All test results conform to above mentioned standards.

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10: 2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part15.203, Part15.207, Part15.209. Part15.215.

The test results of this report relate only to the tested sample EUT identified in this report.

Approved by:

Sam Chuang  
Manager  
Compliance Certification Services Inc.

Tested by:

Ryan Du  
Engineer  
Compliance Certification Services Inc.



Report No.: T180307D10-RP

Page: 5 / 25

Rev.: 02

## 2. EUT DESCRIPTION

|                            |                                                                                                                                                                                                               |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Product</b>             | AIM-P707B0 10-in-1 WPC charging station                                                                                                                                                                       |
| <b>Trade Name</b>          | ADVANTECH                                                                                                                                                                                                     |
| <b>Model Number</b>        | AIM-P707, AIM-P707B0, AIM-P707xxxxxxxxxxxxxxxxxx<br>(where "X" may be any alphanumeric character, "-" or blank)                                                                                               |
| <b>Model Discrepancy</b>   | All the above models are identical except for the designation of model numbers. The suffix of (where "X" may be any alphanumeric character, "-" or blank) on model number is just for marketing purpose only. |
| <b>Received Date</b>       | March 7, 2018                                                                                                                                                                                                 |
| <b>Power Supply</b>        | Power from AC adapter. (I/P: 120V/60Hz)                                                                                                                                                                       |
| <b>Frequency Band</b>      | 110 KHz ~ 205 KHz                                                                                                                                                                                             |
| <b>Antenna Designation</b> | Coli Antenna                                                                                                                                                                                                  |

### **Remark:**

1. The sample selected for test was production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: **M82-AIM-P707** filing to comply with Section 15.203, 15.207, 15.209 and 15.215 of the FCC Part 15, Subpart C Rules.



Report No.: T180307D10-RP

Page: 6 / 25

Rev.: 02

### 3. TEST SUMMERY

| Standard Sec. | Chapter | Test Item                        | Result |
|---------------|---------|----------------------------------|--------|
| 15.215        | 8.1     | 20dB Bandwidth                   | Pass   |
| 15.209        | 8.2     | Transmitter Radiated Emission    | Pass   |
| 15.207        | 8.3     | AC Power-line Conducted Emission | Pass   |
| 15.203        | 8.4     | Antenna Requirement              | Pass   |



Report No.: T180307D10-RP

Page: 7 / 25

Rev.: 02

## **4. TEST METHODOLOGY**

The tests documented in this report were performed in accordance with ANSI C63.10: 2013, ANSI 63.4 2014 and FCC CFR 47 Part 15.203, 15.207, 15.209, 15.215.

### **4.1 EUT CONFIGURATION**

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

### **4.2 EUT EXERCISE**

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.203, 15.207, 15.209, 15.215 under the FCC Rules Part 15 Subpart C and ANSI C63.10: 2013.

### **4.3 GENERAL TEST PROCEDURES**

#### **Conducted Emissions**

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in ANSI C63.10: 2013, Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz was using CISPR Quasi-peak and average detector modes.

#### **Radiated Emissions**

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. The EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in ANSI C63.10: 2013.

#### 4.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

- (a) Except as shown in other rules, only spurious emissions are permitted in any of the frequency bands listed below:

| MHz                        | MHz                 | MHz             | GHz              |
|----------------------------|---------------------|-----------------|------------------|
| 0.090 - 0.110              | 16.42 - 16.423      | 399.9 - 410     | 4.5 - 5.15       |
| <sup>1</sup> 0.495 - 0.505 | 16.69475 - 16.69525 | 608 - 614       | 5.35 - 5.46      |
| 2.1735 - 2.1905            | 16.80425 - 16.80475 | 960 - 1240      | 7.25 - 7.75      |
| 4.125 - 4.128              | 25.5 - 25.67        | 1300 - 1427     | 8.025 - 8.5      |
| 4.17725 - 4.17775          | 37.5 - 38.25        | 1435 - 1626.5   | 9.0 - 9.2        |
| 4.20725 - 4.20775          | 73 - 74.6           | 1645.5 - 1646.5 | 9.3 - 9.5        |
| 6.215 - 6.218              | 74.8 - 75.2         | 1660 - 1710     | 10.6 - 12.7      |
| 6.26775 - 6.26825          | 108 - 121.94        | 1718.8 - 1722.2 | 13.25 - 13.4     |
| 6.31175 - 6.31225          | 123 - 138           | 2200 - 2300     | 14.47 - 14.5     |
| 8.291 - 8.294              | 149.9 - 150.05      | 2310 - 2390     | 15.35 - 16.2     |
| 8.362 - 8.366              | 156.52475 -         | 2483.5 - 2500   | 17.7 - 21.4      |
| 8.37625 - 8.38675          | 156.52525           | 2655 - 2900     | 22.01 - 23.12    |
| 8.41425 - 8.41475          | 156.7 - 156.9       | 3260 - 3267     | 23.6 - 24.0      |
| 12.29 - 12.293             | 162.0125 - 167.17   | 3332 - 3339     | 31.2 - 31.8      |
| 12.51975 - 12.52025        | 167.72 - 173.2      | 3345.8 - 3358   | 36.43 - 36.5     |
| 12.57675 - 12.57725        | 240 - 285           | 3600 - 4400     | ( <sup>2</sup> ) |
| 13.36 - 13.41              | 322 - 335.4         |                 |                  |

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> Above 38.6

- (b) Except as provided by other rules, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.



#### 4.5 DESCRIPTION OF TEST MODES

The EUT (model: AIM-P707) had been tested under operating condition.

Dummy load is used to make the EUT for staying in continuous transmitting mode was programmed. The EUT is including 10 charging traies, each charging tray is the independent charging module and same coil.

Choose one of the charging traies to testing for all test items.

After verification, all tests were carried out with the worst case test modes as shown below.

| AC Power Line Conducted Emission |                                                                                                                                            |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Test Condition                   | AC Power line conducted emission for line and neutral                                                                                      |
| Voltage/Hz                       | 120V/60Hz                                                                                                                                  |
| Test Mode                        | Mode 1:EUT power by AC adapter via power cable.                                                                                            |
| Worst Mode                       | <input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4 |

| Radiated Emission Measurement Above 1G |                                                                                                                                                                                                                                                                                               |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Condition                         | Band edge, Emission for Unwanted and Fundamental                                                                                                                                                                                                                                              |
| Voltage/Hz                             | 120V/60Hz                                                                                                                                                                                                                                                                                     |
| Test Mode                              | Mode 1:EUT power by AC adapter via power cable.                                                                                                                                                                                                                                               |
| Worst Mode                             | <input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4                                                                                                                                                    |
| Worst Position                         | <input type="checkbox"/> Placed in fixed position.<br><input type="checkbox"/> Placed in fixed position at X-Plane (E2-Plane)<br><input type="checkbox"/> Placed in fixed position at Y-Plane (E1-Plane)<br><input checked="" type="checkbox"/> Placed in fixed position at Z-Plane (H-Plane) |
| Worst Polarity                         | <input checked="" type="checkbox"/> Horizontal <input type="checkbox"/> Vertical                                                                                                                                                                                                              |

| Radiated Emission Measurement Below 1G |                                                                                                                                            |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Test Condition                         | Radiated Emission Below 1G                                                                                                                 |
| Voltage/Hz                             | 120V/60Hz                                                                                                                                  |
| Test Mode                              | Mode 1:EUT power by AC adapter via power cable.                                                                                            |
| Worst Mode                             | <input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4 |

Remark:

1. The worst mode was record in this test report.
2. EUT pre-scanned in three axis ,X,Y, Z and two polarity, Horizontal and Vertical for radiated measurement. The worst case(Z-Plane and Horizontal) were recorded in this report
3. For below 1G, AC power line conducted emission and radiation emission were performed the EUT transmit at the highest output power channel as worse case.

## 5. INSTRUMENT CALIBRATION

### 5.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

### 5.2 MEASUREMENT EQUIPMENT USED

#### Equipment Used for Emissions Measurement

**Remark:** Each piece of equipment is scheduled for calibration once a year and Loop Antenna is scheduled for calibration once three years.

| RF Conducted Test Site          |                    |                 |            |            |            |
|---------------------------------|--------------------|-----------------|------------|------------|------------|
| Equipment                       | Manufacturer       | Model           | S/N        | Cal Date   | Cal Due    |
| Spectrum Analyzer               | R&S                | FSV 40          | 101073     | 10/02/2017 | 10/01/2018 |
| Thermostatic/Hrgrosatic Chamber | GWINSTEK           | GTC-288MH-CC    | TH160402   | 05/23/2017 | 05/22/2018 |
| Directional Coupler             | Agilent            | 87301D          | MY44350252 | 07/25/2017 | 07/24/2018 |
| SUCOFLEX Cable                  | HUBER SUHNER       | SUCOFLEX 104PEA | 25157      | 07/31/2017 | 07/30/2018 |
| Divider                         | Solvang Technology | 2-18GHz 4Way    | STI08-0015 | 07/26/2017 | 07/25/2018 |

| 3M 966 Chamber Test Site |              |                 |            |            |            |
|--------------------------|--------------|-----------------|------------|------------|------------|
| Equipment                | Manufacturer | Model           | S/N        | Cal Date   | Cal Due    |
| Spectrum Analyzer        | Agilent      | E4446A          | US42510252 | 11/27/2017 | 11/26/2018 |
| Loop Ant                 | COM-POWER    | AL-130          | 121051     | 03/21/2018 | 03/20/2019 |
| Antenna Tower            | CCS          | CC-A-1F         | N/A        | N.C.R      | N.C.R      |
| Controller               | CCS          | CC-C-1F         | N/A        | N.C.R      | N.C.R      |
| Turn Table               | CCS          | CC-T-1F         | N/A        | N.C.R      | N.C.R      |
| Cable                    | HUBER SUHNER | SUCOFLEX 104PEA | 20995      | 07/31/2017 | 07/30/2018 |

| AC-line Conduction Test Site |              |           |          |            |            |
|------------------------------|--------------|-----------|----------|------------|------------|
| Equipment                    | Manufacturer | Model     | S/N      | Cal Date   | Cal Due    |
| LISN                         | R&S          | ENV216    | 101054   | 05/18/2017 | 05/17/2018 |
| LISN                         | SCHWARZBECK  | NSLK 8127 | 8127-541 | 02/14/2018 | 02/13/2019 |
| EMI Test Receiver            | R&S          | ESCI      | 100064   | 05/17/2017 | 05/16/2018 |



Report No.: T180307D10-RP

Page: 11 / 25

Rev.: 02

### 5.3 MEASUREMENT UNCERTAINTY

| PARAMETER                             | UNCERTAINTY |
|---------------------------------------|-------------|
| AC Powerline Conducted Emission       | +/- 1.2575  |
| Emission bandwidth, 6dB bandwidth     | +/- 1.4003  |
| RF output power, conducted            | +/- 1.1372  |
| Power density, conducted              | +/- 1.4003  |
| 3M Semi Anechoic Chamber / 30M~200M   | +/- 4.0138  |
| 3M Semi Anechoic Chamber / 200M~1000M | +/- 3.9483  |
| 3M Semi Anechoic Chamber / 1G~8G      | +/- 2.5975  |
| 3M Semi Anechoic Chamber / 8G~18G     | +/- 2.6112  |
| 3M Semi Anechoic Chamber / 18G~26G    | +/- 2.7389  |
| 3M Semi Anechoic Chamber / 26G~40G    | +/- 2.9683  |

**Remark:** This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .



Report No.: T180307D10-RP

Page: 12 / 25

Rev.: 02

## 6. FACILITIES AND ACCREDITATIONS

### 6.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

☐ No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.

Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

☒ No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.)

Tel: 886-2-2299-9720 / Fax: 886-2-2299-9721

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

### 6.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."



Report No.: T180307D10-RP

Page: 13 / 25

Rev.: 02

## 7. SETUP OF EQUIPMENT UNDER TEST

### 7.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

### 7.2 SUPPORT EQUIPMENT

| No. | Device Type | Brand | Model | Series No. | FCC ID | Cable length & Type Describe |
|-----|-------------|-------|-------|------------|--------|------------------------------|
|     | N/A         |       |       |            |        |                              |

**Remark:**

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

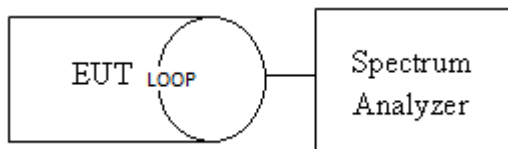
## 8. TEST REQUIREMENTS

### 8.1 20dB BANDWIDTH

#### Definition

According to FCC Part 15.215 (c) ,Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

#### Test Configuration



#### TEST PROCEDURE

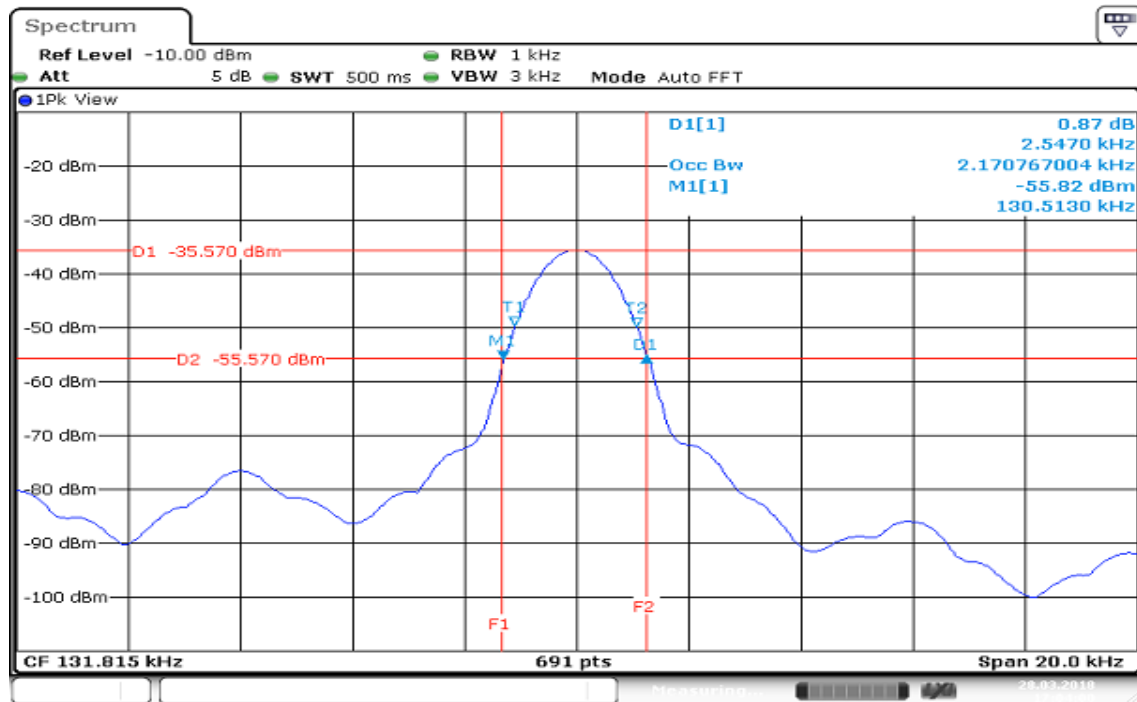
The Loop antenna connected to the spectrum analyzer, was touching to the transmitter antenna. Set the RBW=1KHz, VBW  $\geq 3 \times$  RBW, Detector = Peak, Trace mode = Max hold, Sweep = 500ms. Measure the maximum width of the emission that is constrained by the frequencies associated with the Occupied Bandwidth.

#### TEST RESULTS

*No non-compliance noted*

| Test Condition | Frequency(kHz) | 99% Bandwidth (kHz) | F <sub>L</sub> at 20dB BW (kHz) | F <sub>H</sub> at 20dB BW (kHz) | 20dB Bandwidth (kHz) | Limit |
|----------------|----------------|---------------------|---------------------------------|---------------------------------|----------------------|-------|
| Charging mode  | 131.815        | 2.17076             | 130.5130                        | 133.0600                        | 2.5470               | N/A   |

## Test Data



Date: 28.MAR.2018 17:04:01

## 8.2 TRANSMITTER RADIATED EMISSION

### LIMIT

1. According to FCC PART 15.209(a), except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency<br>(MHz) | Field Strength<br>( $\mu\text{V/m}$ ) | Measurement Distance<br>(m) |
|--------------------|---------------------------------------|-----------------------------|
| 0.009 - 0.490      | 2400/F(kHz)                           | 300                         |
| 0.490 - 1.705      | 24000/F(kHz)                          | 30                          |
| 1.705 – 30.0       | 30                                    | 30                          |
| 30-88              | 100                                   | 3                           |
| 88-216             | 150                                   | 3                           |
| 216-960            | 200                                   | 3                           |
| Above 960          | 500                                   | 3                           |

**Remark:** Except as provided in other rules, fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

2. In the above emission table, the tighter limit applies at the band edges.



### **Below 30MHz**

| Frequency<br>(MHz) | Field Strength      |                       |                                 |                       |                                 |
|--------------------|---------------------|-----------------------|---------------------------------|-----------------------|---------------------------------|
|                    | ( $\mu\text{V/m}$ ) | (dB $\mu\text{V/m}$ ) | Measurement Distance<br>(meter) | (dB $\mu\text{V/m}$ ) | Measurement Distance<br>(meter) |
| 0.009 - 0.490      | 2400/F(kHz)         | 48.52 – 13.80         | 300                             | 128.52–93.80          | 3                               |
| 0.490 - 1.705      | 24000/F(kHz)        | 33.80 – 22.97         | 30                              | 73.80– 62.97          | 3                               |
| 1.705 – 30.0       | 30                  | 29.54                 | 30                              | 69.54                 | 3                               |

**Remark:** According to Part 15.31(f)(2), the transfer formula as below:

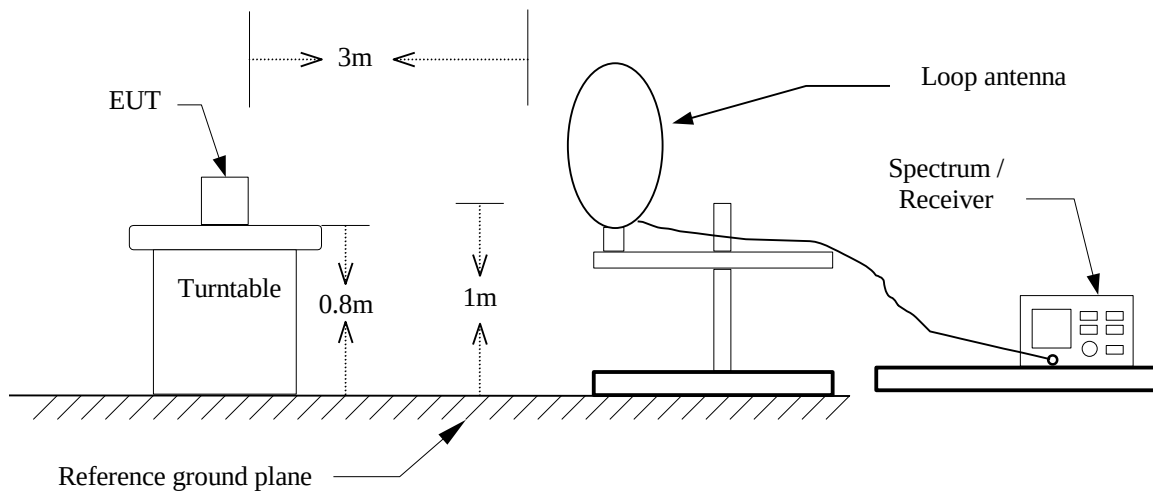
$\text{Limit@3m} = 20\log(\text{Limit@300m}) + 40\log(\text{Limit define distance}(300\text{m}) / (\text{Measurement distance}(3\text{m})))$

### **Above 30MHz**

| Frequency<br>(MHz) | Field Strength      |                       | Measurement Distance<br>(meter) |
|--------------------|---------------------|-----------------------|---------------------------------|
|                    | ( $\mu\text{V/m}$ ) | (dB $\mu\text{V/m}$ ) |                                 |
| 30-88              | 100                 | 40.0                  | 3                               |
| 88-216             | 150                 | 43.5                  | 3                               |
| 216-960            | 200                 | 46.0                  | 3                               |
| Above 960          | 500                 | 54.0                  | 3                               |

## Test Configuration

9kHz ~ 30MHz





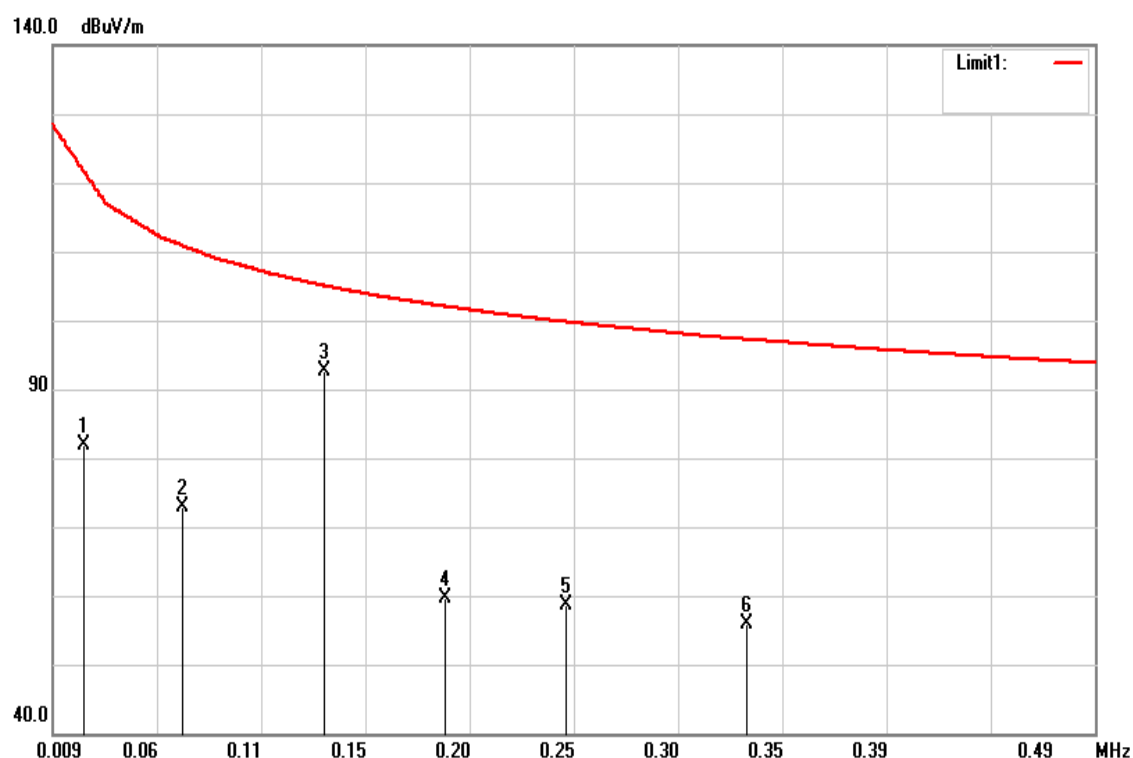
Report No.: T180307D10-RP

Page: 19 / 25

Rev.: 02

## **TEST PROCEDURE**

1. The EUT is placed on 0.1m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:  
Below 1GHz:  
RBW=100kHz / VBW=300kHz / Sweep=AUTO
7. Repeat above procedures until the measurements for all frequencies are complete.
8. Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

**9 kHz - 490 kHz****Operation Mode:** Charge mode**Test Date:** March 27, 2018**Temperature:** 22°C**Tested by:** Ryan Du**Humidity:** 34% RH

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----------------|----------------|--------------------------|-----------------|----------------|-------------|--------|
| 0.0234          | 66.99          | 14.83                    | 81.82           | 121.82         | -40.00      | peak   |
| 0.0694          | 59.01          | 13.95                    | 72.96           | 110.81         | -37.85      | peak   |
| 0.1341          | 79.24          | 13.47                    | 92.71           | 105.02         | -12.31      | peak   |
| 0.1903          | 45.97          | 13.59                    | 59.56           | 102.01         | -42.45      | peak   |
| 0.2459          | 44.85          | 13.70                    | 58.55           | 99.77          | -41.22      | peak   |
| 0.3293          | 41.97          | 13.83                    | 55.80           | 97.23          | -41.43      | peak   |

**Remark:**

1. The frequency bands 9-90 kHz, 110-490 kHz measurements employing an average detector and other below 1GHz measurements employing a CISPR quasi-peak detector.
2. The EUT peak detector value was under average limit, therefore the Average detector value compliance with the average limit.

### 490 kHz - 30 MHz

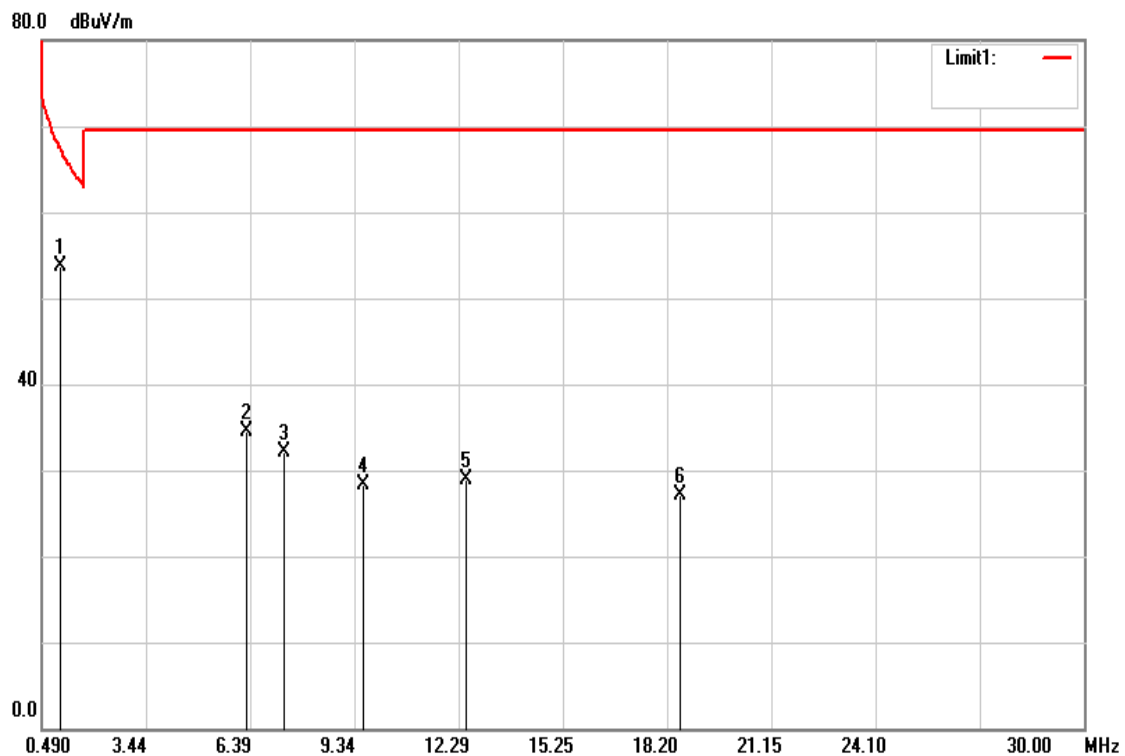
**Operation Mode:** Charge mode

**Test Date:** March 27, 2018

**Temperature:** 22°C

**Tested by:** Ryan Du

**Humidity:** 34% RH



| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----------------|----------------|--------------------------|-----------------|----------------|-------------|--------|
| 1.0212          | 40.89          | 14.21                    | 55.10           | 67.43          | -12.33      | peak   |
| 1.7442          | 28.76          | 14.23                    | 42.99           | 69.54          | -26.55      | peak   |
| 6.4215          | 22.79          | 14.74                    | 37.53           | 69.54          | -32.01      | peak   |
| 8.6053          | 17.08          | 15.10                    | 32.18           | 69.54          | -37.36      | peak   |
| 12.1169         | 13.60          | 15.23                    | 28.83           | 69.54          | -40.71      | peak   |
| 18.0337         | 11.63          | 14.94                    | 26.57           | 69.54          | -42.97      | peak   |

### 8.3 AC CONDUCTED EMISSION

#### LIMIT

According to §15.207(a), for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

| Frequency Range<br>(MHz) | Limits<br>(dB $\mu$ V) |           |
|--------------------------|------------------------|-----------|
|                          | Quasi-peak             | Average   |
| 0.15 to 0.50             | 66 to 56*              | 56 to 46* |
| 0.50 to 5                | 56                     | 46        |
| 5 to 30                  | 60                     | 50        |

#### Test Configuration

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

#### TEST PROCEDURE

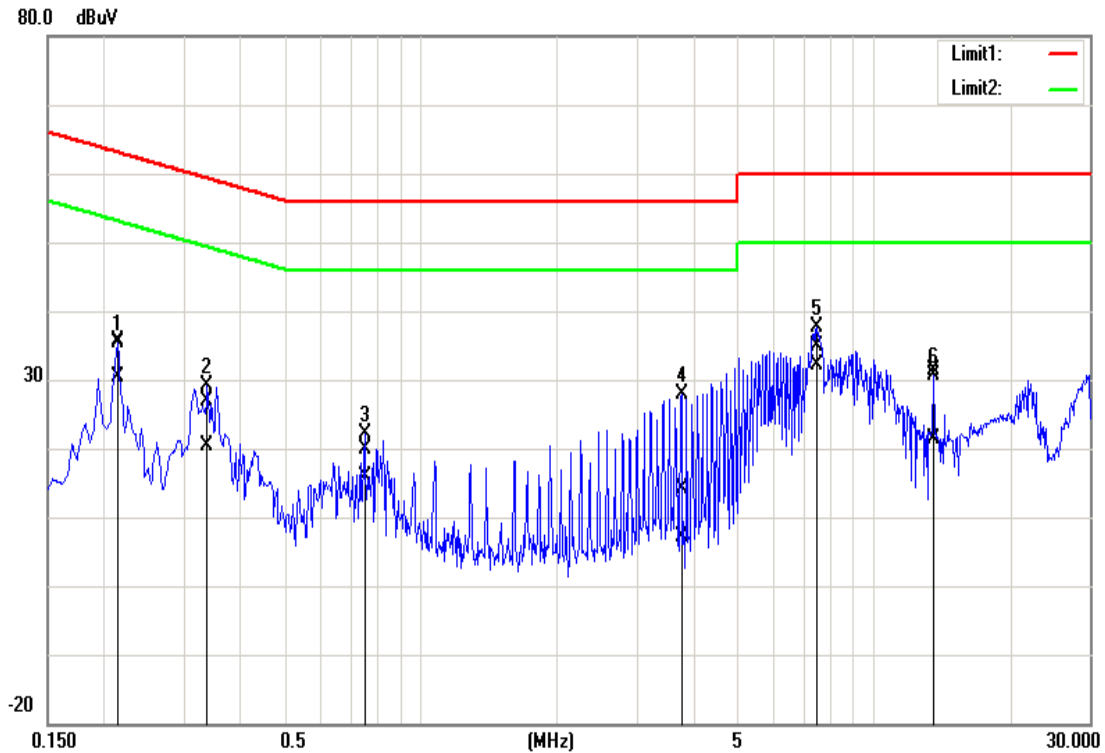
1. The EUT is placed on 0.1m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete

#### TEST RESULTS

**Pass.**

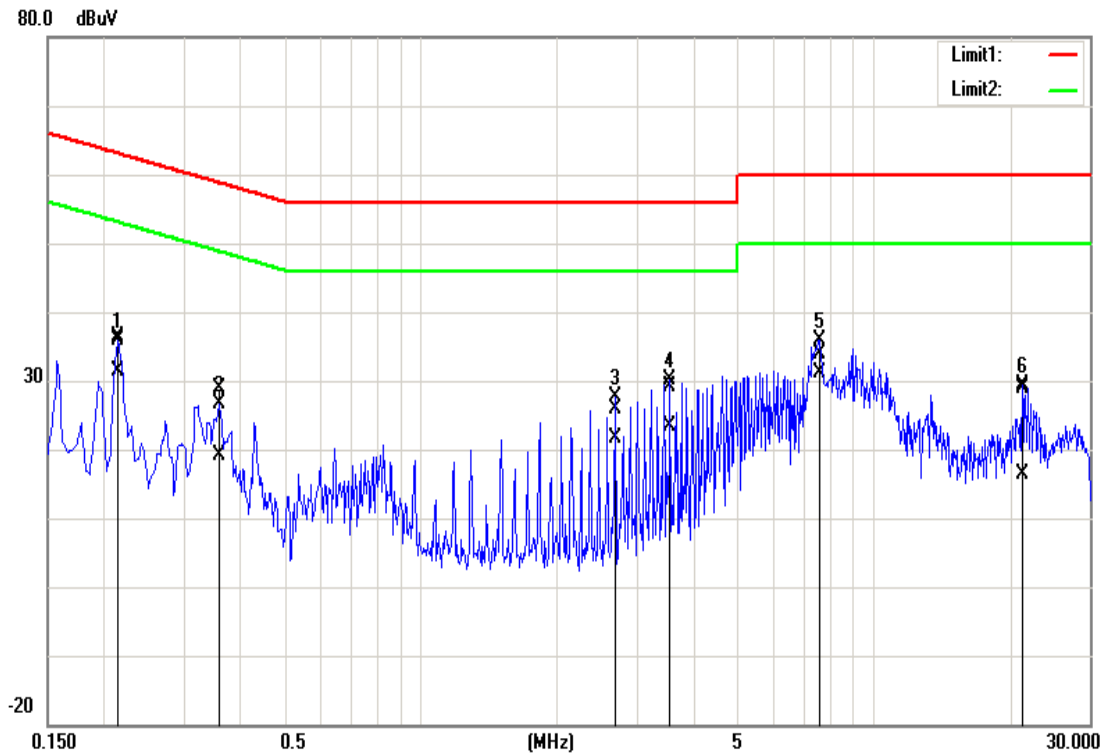
## Test Data

|               |               |               |               |
|---------------|---------------|---------------|---------------|
| Test Mode:    | Mode 1        | Temp/Hum      | 24(°C)/ 50%RH |
| Test Voltage: | 120Vac / 60Hz | Test Date     | 2018/03/28    |
| Phase:        | Line          | Test Engineer | Eric Lee      |



| No. | Frequency<br>(MHz) | QuasiPeak<br>reading<br>(dBuV) | Average<br>reading<br>(dBuV) | Correction<br>factor<br>(dB) | QuasiPeak<br>result<br>(dBuV) | Average<br>result<br>(dBuV) | QuasiPeak<br>limit<br>(dBuV) | Average<br>limit<br>(dBuV) | QuasiPeak<br>margin<br>(dB) | Average<br>margin<br>(dB) | Remark |
|-----|--------------------|--------------------------------|------------------------------|------------------------------|-------------------------------|-----------------------------|------------------------------|----------------------------|-----------------------------|---------------------------|--------|
| 1   | 0.2140             | 35.43                          | 30.36                        | 0.11                         | 35.54                         | 30.47                       | 63.05                        | 53.05                      | -27.51                      | -22.58                    | Pass   |
| 2   | 0.3380             | 26.82                          | 20.31                        | 0.12                         | 26.94                         | 20.43                       | 59.25                        | 49.25                      | -32.31                      | -28.82                    | Pass   |
| 3   | 0.7540             | 19.74                          | 15.71                        | 0.13                         | 19.87                         | 15.84                       | 56.00                        | 46.00                      | -36.13                      | -30.16                    | Pass   |
| 4   | 3.7580             | 14.01                          | 6.98                         | 0.19                         | 14.20                         | 7.17                        | 56.00                        | 46.00                      | -41.80                      | -38.83                    | Pass   |
| 5*  | 7.5140             | 34.55                          | 31.82                        | 0.25                         | 34.80                         | 32.07                       | 60.00                        | 50.00                      | -25.20                      | -17.93                    | Pass   |
| 6   | 13.5620            | 31.13                          | 21.04                        | 0.36                         | 31.49                         | 21.40                       | 60.00                        | 50.00                      | -28.51                      | -28.60                    | Pass   |

|               |               |               |               |
|---------------|---------------|---------------|---------------|
| Test Mode:    | Mode 1        | Temp/Hum      | 24(°C)/ 50%RH |
| Test Voltage: | 120Vac / 60Hz | Test Date     | 2018/03/28    |
| Phase:        | Neutral       | Test Engineer | Eric Lee      |



| No. | Frequency<br>(MHz) | QuasiPeak<br>reading<br>(dBuV) | Average<br>reading<br>(dBuV) | Correction<br>factor<br>(dB) | QuasiPeak<br>result<br>(dBuV) | Average<br>result<br>(dBuV) | QuasiPeak<br>limit<br>(dBuV) | Average<br>limit<br>(dBuV) | QuasiPeak<br>margin<br>(dB) | Average<br>margin<br>(dB) | Remark |
|-----|--------------------|--------------------------------|------------------------------|------------------------------|-------------------------------|-----------------------------|------------------------------|----------------------------|-----------------------------|---------------------------|--------|
| 1   | 0.2140             | 36.25                          | 31.32                        | 0.13                         | 36.38                         | 31.45                       | 63.05                        | 53.05                      | -26.67                      | -21.60                    | Pass   |
| 2   | 0.3580             | 28.69                          | 19.10                        | 0.13                         | 28.82                         | 19.23                       | 58.77                        | 48.77                      | -29.95                      | -29.54                    | Pass   |
| 3   | 2.6940             | 25.79                          | 21.36                        | 0.17                         | 25.96                         | 21.53                       | 56.00                        | 46.00                      | -30.04                      | -24.47                    | Pass   |
| 4   | 3.5540             | 29.00                          | 23.18                        | 0.19                         | 29.19                         | 23.37                       | 56.00                        | 46.00                      | -26.81                      | -22.63                    | Pass   |
| 5*  | 7.5740             | 33.74                          | 30.86                        | 0.26                         | 34.00                         | 31.12                       | 60.00                        | 50.00                      | -26.00                      | -18.88                    | Pass   |
| 6   | 21.3500            | 28.33                          | 15.93                        | 0.48                         | 28.81                         | 16.41                       | 60.00                        | 50.00                      | -31.19                      | -33.59                    | Pass   |





Report No.: T180307D10-RP

Page: 25 / 25

Rev.: 02

## 8.4 ANTENNA REQUIREMENT

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

-- End of Test Report --