

FCC PART 15B, CLASS B  
MEASUREMENT AND TEST REPORT

For

**Grandstream Networks, Inc.**

126 Brookline Ave, 3rd Floor Boston, MA 02215, USA

**FCC ID: YZZGXV3240V3**

|  |   |
|--|---|
| <b>Report Type:</b><br>Original Report | <b>Product Type:</b><br>IP Multimedia Phone   |
| <b>Report Number:</b> RSZ170927001-00A |   |
| <b>Report Date:</b> 2017-11-20         |   |
| <b>Reviewed By:</b>                    | Candy Li<br>RF Engineer   |
| <b>Prepared By:</b>                    | Bay Area Compliance Laboratories Corp. (Shenzhen)<br>6/F., West Wing, Third Phase of Wanli Industrial<br>Building, Shihua Road, Futian Free Trade Zone,<br>Shenzhen, Guangdong, China<br>Tel: +86-755-33320018<br>Fax: +86-755-33320008<br><a href="http://www.baclcorp.com.cn">www.baclcorp.com.cn</a> |

**Note:** This test report is prepared for the customer shown above and for the equipment described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

## **TABLE OF CONTENTS**

|  |           |
|--|-----------|
| <b>GENERAL INFORMATION.....</b>                          | <b>3</b>  |
| PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) ..... | 3         |
| OBJECTIVE .....  | 3         |
| RELATED SUBMITTAL(S)/GRANT(S).....                       | 3         |
| TEST METHODOLOGY .....                                   | 3         |
| MEASUREMENT UNCERTAINTY.....                             | 3         |
| TEST FACILITY .....                                      | 4         |
| <b>SYSTEM TEST CONFIGURATION (FCC §15.27) .....</b>      | <b>5</b>  |
| JUSTIFICATION .....                                      | 5         |
| EUT EXERCISE SOFTWARE .....                              | 5         |
| EQUIPMENT MODIFICATIONS .....                            | 5         |
| SUPPORT EQUIPMENT LIST AND DETAILS .....                 | 5         |
| EXTERNAL I/O CABLE.....                                  | 6         |
| BLOCK DIAGRAM OF TEST SETUP .....                        | 6         |
| <b>SUMMARY OF TEST RESULTS .....</b>                     | <b>8</b>  |
| <b>TEST EQUIPMENT LIST .....</b>                         | <b>9</b>  |
| <b>FCC §15.107 – AC LINE CONDUCTED EMISSIONS.....</b>    | <b>10</b> |
| APPLICABLE STANDARD .....                                | 10        |
| EUT SETUP .....  | 10        |
| EMI TEST RECEIVER SETUP.....                             | 10        |
| TEST PROCEDURE .....                                     | 10        |
| CORRECTED FACTOR & MARGIN CALCULATION .....              | 11        |
| TEST RESULTS SUMMARY .....                               | 11        |
| TEST DATA .....  | 11        |
| <b>FCC §15.109 - RADIATED EMISSIONS .....</b>            | <b>18</b> |
| APPLICABLE STANDARD .....                                | 18        |
| TEST SYSTEM SETUP .....                                  | 18        |
| EMI TEST RECEIVER SETUP.....                             | 19        |
| TEST PROCEDURE .....                                     | 19        |
| CORRECTED AMPLITUDE & MARGIN CALCULATION .....           | 19        |
| TEST RESULTS SUMMARY .....                               | 19        |
| TEST DATA .....  | 20        |

## GENERAL INFORMATION

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

The *Grandstream Networks, Inc.*'s product, model number: *GXV3240 (FCC ID: YZZGXV3240V3)* in this report was an *IP Multimedia Phone*, which was measured approximately: 20.62 cm (L) × 19.65 cm (W) × 8.52 cm (H), rated with input voltage: DC 12V from adapter or DC 48V powered by POE supply. The highest operation frequency is 2480MHz.

#### Adapter 1 Information:

Model: F18W8-120150SPAUY

Input: AC 100-240V, 50/60Hz, 0.6A

Output: DC 12V, 1.5 A

#### Adapter 2 Information:

Model: H18US1200150A

Input: AC 100-240V, 50/60Hz, 0.8A

Output: DC 12V, 1.5 A

*\*All measurement and test data in this report was gathered from production sample serial number: 1702161 (Assigned by BACL, shenzhen). The EUT supplied by the applicant was received on 2017-09-27.*

### Objective

This test report is prepared on behalf of *Grandstream Networks, Inc.* in accordance with Part 2-Subpart J, Part 15-Subparts A and B of the Federal Communication Commissions rules.

The objective of the manufacturer is to determine the compliance of the EUT with FCC Part 15 B.

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

FCC Part 15.247 DTS&DSS submissions with FCC ID: YZZGXV3240V3.

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

### Measurement Uncertainty

| Parameter           |            | uncertainty |
|---------------------|------------|-------------|
| Conducted Emissions |            | ±1.95dB     |
| Radiated Emissions  | Below 1GHz | ±4.75dB     |
|                     | Above 1GHz | ±4.88dB     |

## Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China.

Bay Area Compliance Laboratories Corp. (Shenzhen) has been accredited to ISO/IEC 17025 by CNAS(Lab code: L2408). And accredited to ISO/IEC 17025 by NVLAP(Lab code: 200707-0), the FCC Designation No. CN5001 under the KDB 974614 D01.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Bay Area Compliance Laboratories Corp. (Shenzhen) was registered with ISED Canada under ISED Canada Registration Number 3062B.

**SYSTEM TEST CONFIGURATION (FCC §15.27)**

---

**Justification**

The system was configured for testing in normal condition.

Test Mode 1: Talking&HDMI&Playing&Connect PC (Ping with computer)

**EUT Exercise Software**

No exercise software was used.

**Equipment Modifications**

No modification was made to the EUT tested.

**Support Equipment List and Details**

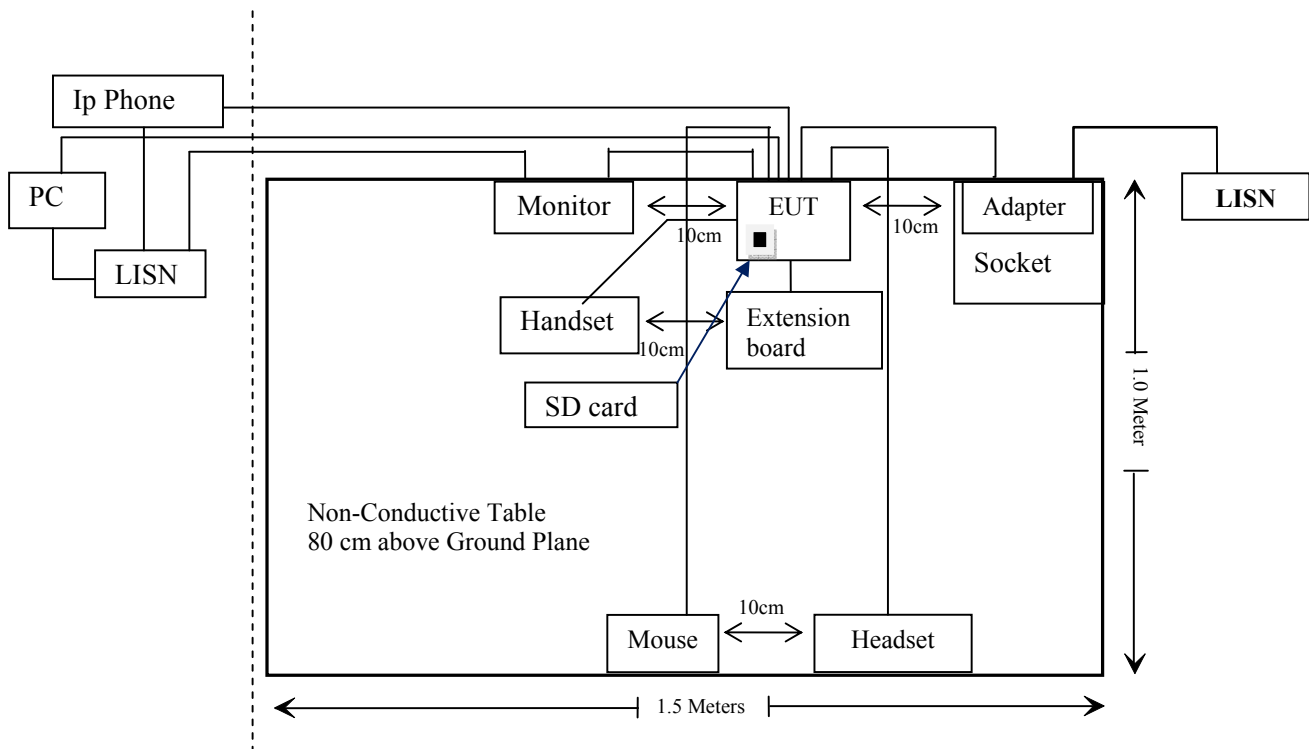
| Manufacturer | Description     | Model      | Serial Number   |
|--------------|-----------------|------------|-----------------|
| BULL         | Socket          | GN-415K    | 5503290068073   |
| DELL         | PC              | DCSCSF     | 127BP2X         |
| N/A          | Mouse           | N/A        | N/A             |
| N/A          | POE             | PSE801FM   | N/A             |
| Grandstream  | Extension board | GXP2200EXT | N/A             |
| DCOMA        | Headset         | N/A        | N/A             |
| SAMSUNG      | Monitor         | 225MS      | CR22HVZP401073M |
| Kingston     | SD card         | N/A        | N/A             |

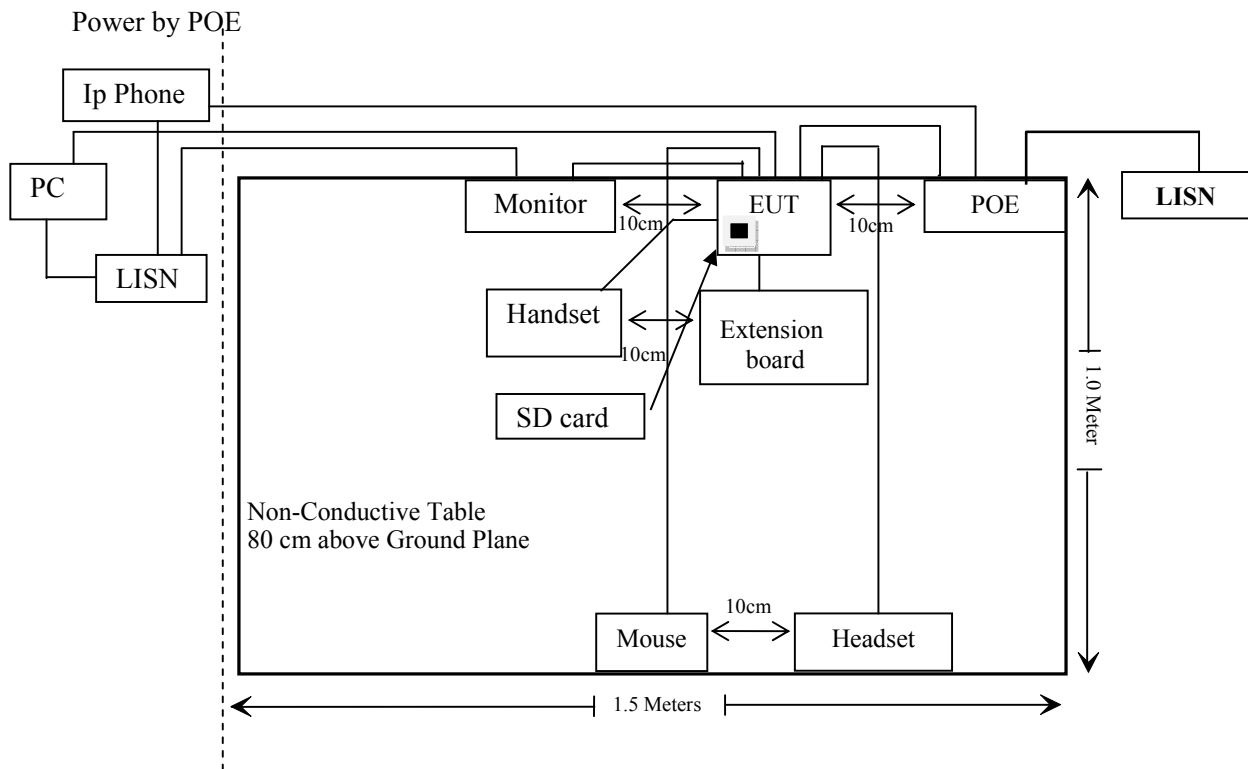
**External I/O Cable**

| Cable Description                                    | Length (m) | From/Port | To              |
|--|------------|-----------|-----------------|
| Un-shielded detachable AC cable                      | 1.0        | POE       | LISN            |
| Un-shielded detachable RJ45 cable                    | 1.2        | POE       | EUT             |
| Un-shielded Un-detachable AC cable                   | 1.0        | Socket    | LISN            |
| Un-shielded Un-detachable DC Cable                   | 2.5        | EUT       | Adapter         |
| Shielded Un-detachable USB cable                     | 1.4        | EUT       | Mouse           |
| Un-shielded Un-detachable extension board RJ11 cable | 0.2        | EUT       | Extension board |
| Un-shielded detachable RJ45 cable                    | 12.0       | EUT       | PC              |
| Shielded detachable HDMI cable                       | 0.75       | EUT       | Monitor         |
| Un-shielded Un-detachable Headset cable              | 1.4        | EUT       | Headset         |
| Un-shielded detachable AC cable                      | 1.2        | Monitor   | Mains           |

**Block Diagram of Test Setup**

Power by adapter





**SUMMARY OF TEST RESULTS**

| FCC Rules | Description of Test         | Results    |
|-----------|-----------------------------|------------|
| §15.107   | AC Line Conducted Emissions | Compliance |
| §15.109   | Radiated Emissions          | Compliance |



**TEST EQUIPMENT LIST**

| Manufacturer                           | Description              | Model                 | Serial Number          | Calibration Date | Calibration Due Date |
|--|--------------------------|-----------------------|------------------------|------------------|----------------------|
| <b>AC Line Conducted Emission Test</b> |                          |                       |                        |                  |                      |
| Rohde & Schwarz                        | EMI Test Receiver        | ESCS30                | 100176                 | 2017-08-04       | 2018-08-04           |
| Rohde & Schwarz                        | LISN                     | ENV216                | 3560.6650.12-101613-Yb | 2016-12-07       | 2017-12-07           |
| Rohde & Schwarz                        | Transient Limiter        | ESH3Z2                | DE25985                | 2017-05-21       | 2017-11-19           |
| Rohde & Schwarz                        | CE Test software         | EMC 32                | V8.53.0                | NCR              | NCR                  |
| N/A                                    | Conducted Emission Cable | N/A                   | UF A210B-1-0720-504504 | 2017-05-12       | 2017-11-12           |
| <b>Radiated Emission Test</b>          |                          |                       |                        |                  |                      |
| Sunol Sciences                         | Horn Antenna             | DRH-118               | A052604                | 2014-12-29       | 2017-12-28           |
| Rohde & Schwarz                        | Signal Analyzer          | FSIQ26                | 8386001028             | 2017-04-24       | 2018-04-24           |
| Sunol Sciences                         | Bi-log Antenna           | JB1                   | A040904-2              | 2014-12-17       | 2017-12-16           |
| Mini                                   | Pre-amplifier            | ZVA-183-S+            | 5969001149             | 2017-05-21       | 2018-05-21           |
| HP                                     | Amplifier                | HP8447E               | 1937A01046             | 2017-05-21       | 2017-11-19           |
| Rohde & Schwarz                        | EMI Test Receiver        | ESCI                  | 101120                 | 2016-12-07       | 2017-12-07           |
| Ducommun technologies                  | RF Cable                 | UFA210A-1-4724-30050U | MFR64369 223410-001    | 2017-05-21       | 2017-11-19           |
| Ducommun technologies                  | RF Cable                 | 104PEA                | 218124002              | 2017-05-21       | 2017-11-19           |
| Ducommun technologies                  | RF Cable                 | RG-214                | 1                      | 2017-05-21       | 2017-11-19           |
| Ducommun technologies                  | RF Cable                 | RG-214                | 2                      | 2017-05-22       | 2017-11-22           |

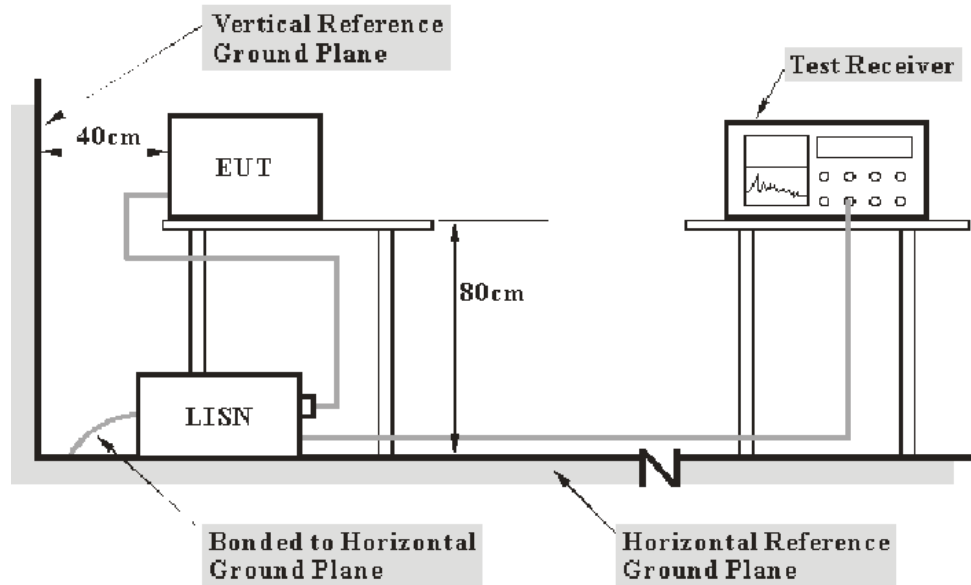
**\* Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

## FCC §15.107 – AC LINE CONDUCTED EMISSIONS

### Applicable Standard

According to FCC§15.107

### EUT Setup



- Note: 1. Support units were connected to second LISN.  
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The measurement procedure of EUT setup is according with ANSI C63.4-2014. The related limit was specified in FCC Part 15.107 Class B.

### EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

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

| Frequency Range  | IF B/W |
|------------------|--------|
| 150 kHz – 30 MHz | 9 kHz  |

### Test Procedure

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

## Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

$$\text{Correction Factor} = \text{LISN VDF} + \text{Cable Loss} + \text{Transient Limiter Attenuation}$$

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

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

## Test Results Summary

According to the recorded data in following table,

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(Lm)} \leq L_{\text{lim}} + U_{\text{cispr}}$$

In BACL,  $U_{(Lm)}$  is less than  $U_{\text{cispr}}$ , if  $L_m$  is less than  $L_{\text{lim}}$ , it implies that the EUT complies with the limit.

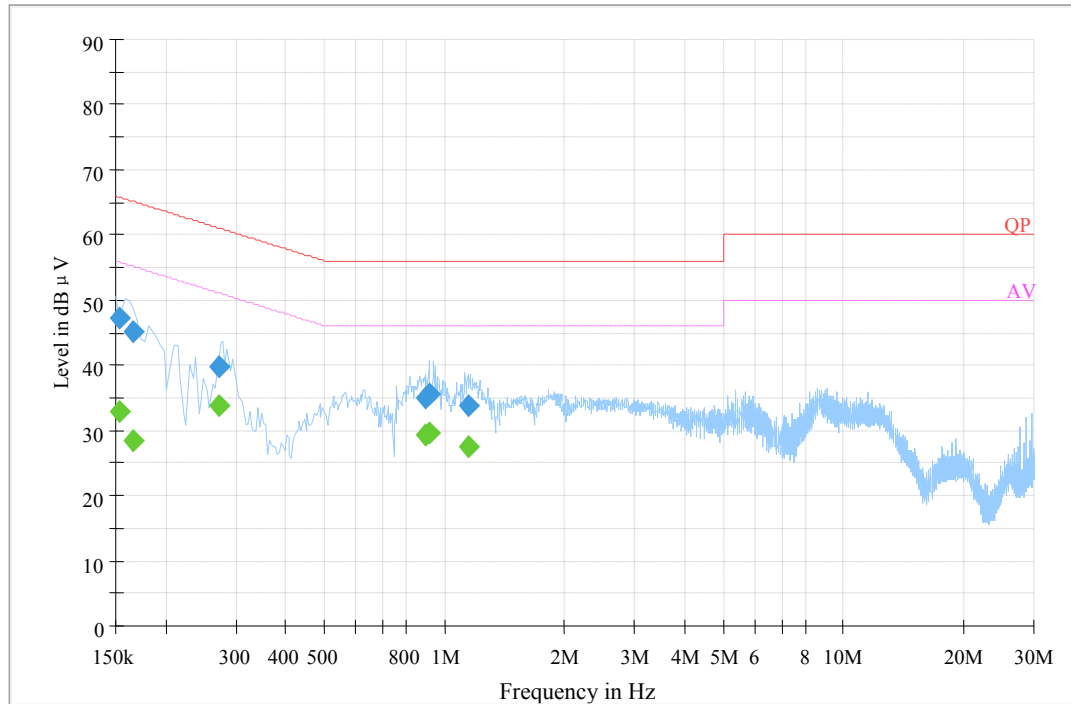
## Test Data

### Environmental Conditions

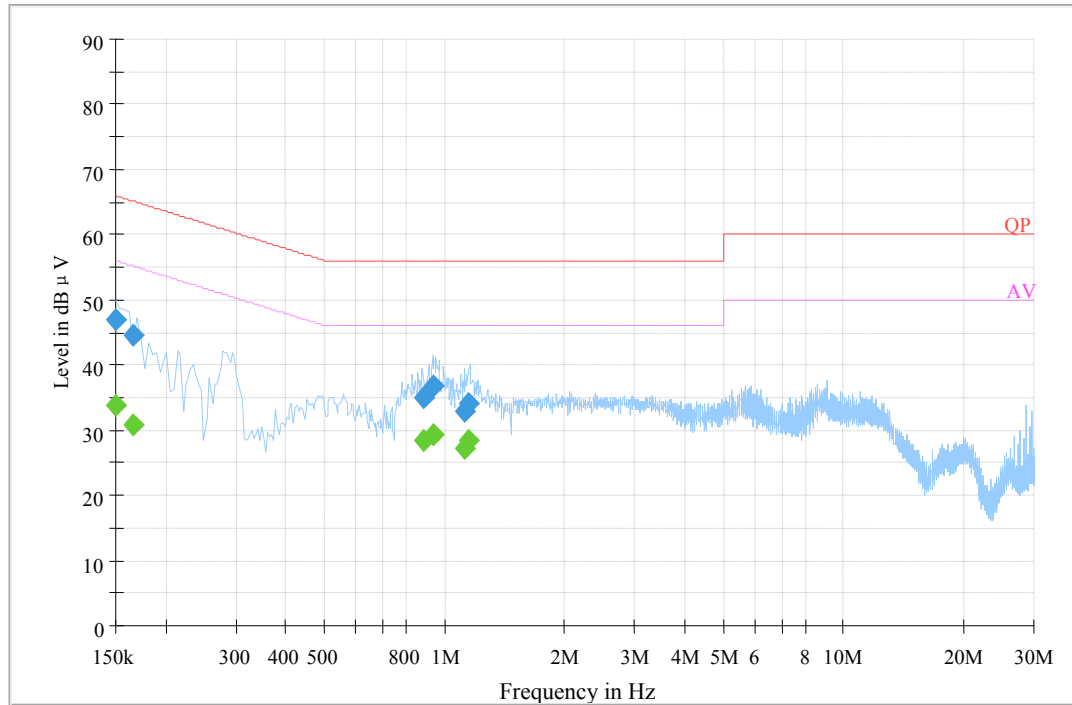
|                    |           |
|--------------------|-----------|
| Temperature:       | 26 °C     |
| Relative Humidity: | 56 %      |
| ATM Pressure:      | 101.0 kPa |

*The testing was performed by Dylan Li on 2017-10-09.*

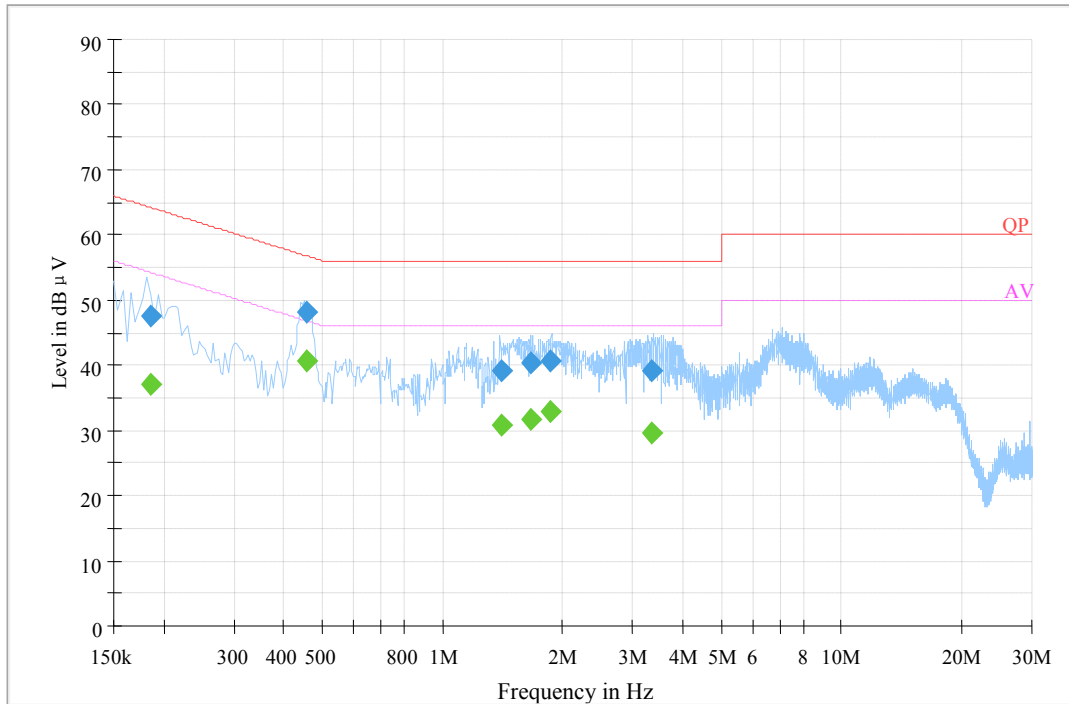
*Tested mode 1:*

**Powered by Adapter 1****AC 120V/60 Hz, Line**

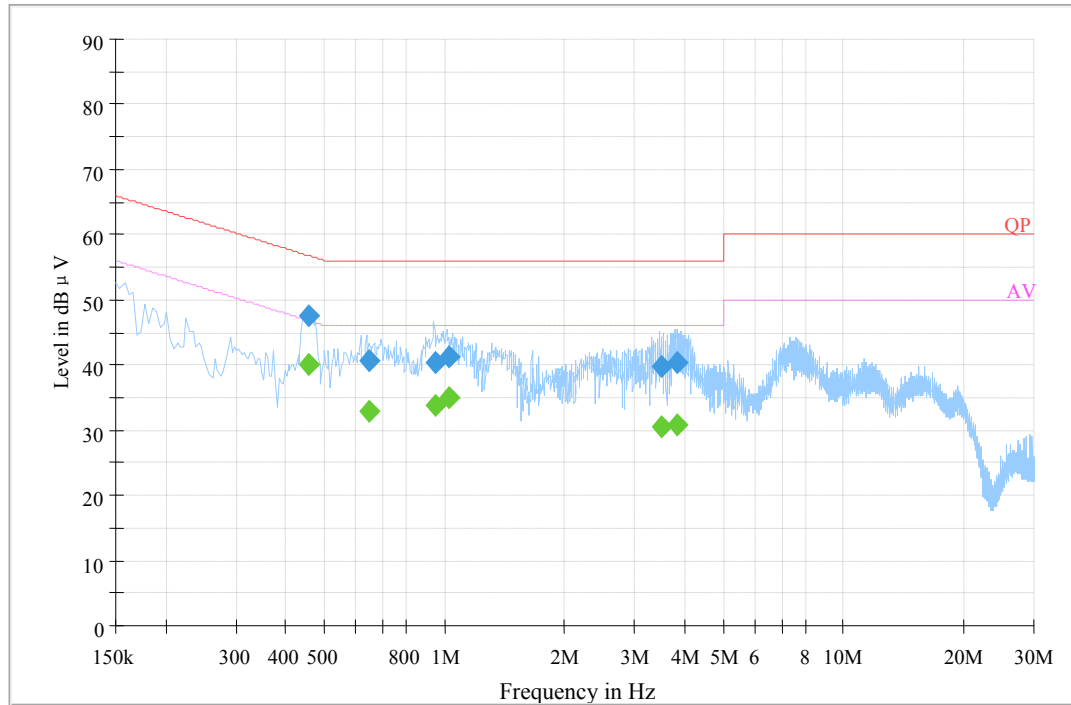
| Frequency (MHz) | Corrected Amplitude (dBμV) | Correction Factor (dB) | Limit (dBμV) | Margin (dB) | Detector (PK/Ave./QP) |
|-----------------|----------------------------|------------------------|--------------|-------------|-----------------------|
| 0.153500        | 47.2                       | 20.2                   | 65.8         | 18.6        | QP                    |
| 0.165500        | 45.2                       | 20.2                   | 65.2         | 20.0        | QP                    |
| 0.273500        | 39.9                       | 20.2                   | 61.0         | 21.1        | QP                    |
| 0.892590        | 34.9                       | 20.1                   | 56.0         | 21.1        | QP                    |
| 0.920230        | 35.7                       | 20.1                   | 56.0         | 20.3        | QP                    |
| 1.142890        | 33.9                       | 20.1                   | 56.0         | 22.1        | QP                    |
| 0.153500        | 32.9                       | 20.2                   | 55.8         | 22.9        | Ave.                  |
| 0.165500        | 28.3                       | 20.2                   | 55.2         | 26.9        | Ave.                  |
| 0.273500        | 33.7                       | 20.2                   | 51.0         | 17.3        | Ave.                  |
| 0.892590        | 29.4                       | 20.1                   | 46.0         | 16.6        | Ave.                  |
| 0.920230        | 29.6                       | 20.1                   | 46.0         | 16.4        | Ave.                  |
| 1.142890        | 27.5                       | 20.1                   | 46.0         | 18.5        | Ave.                  |

**AC 120V/60 Hz, Neutral**

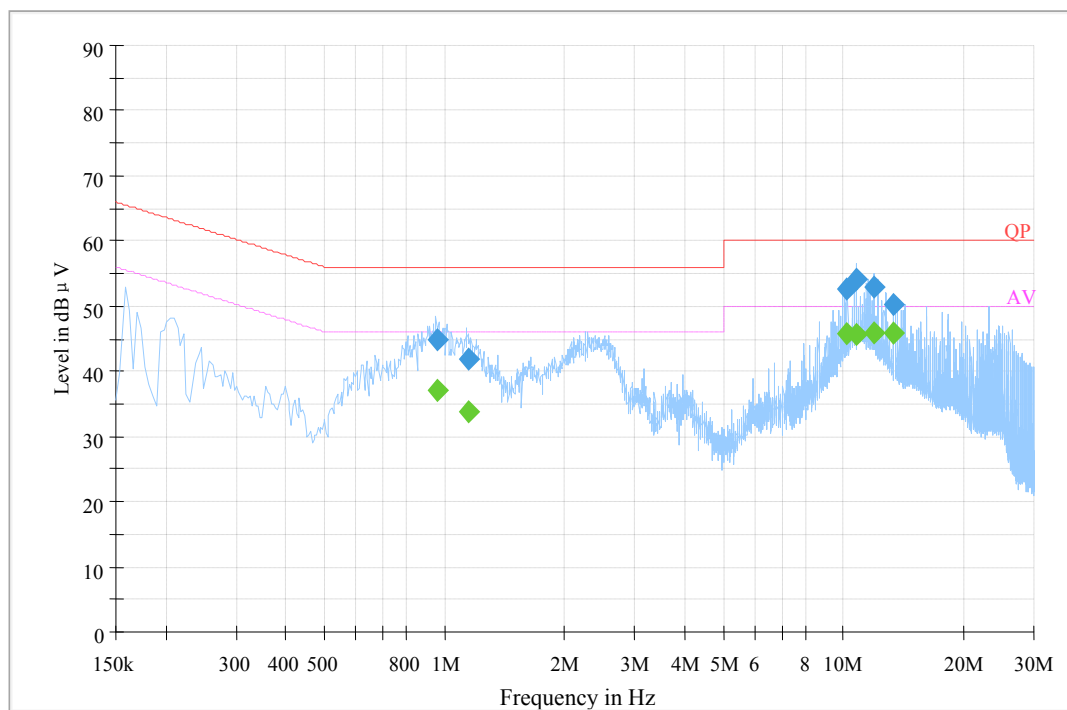
| Frequency (MHz) | Corrected Amplitude (dBμV) | Correction Factor (dB) | Limit (dBμV) | Margin (dB) | Detector (PK/Ave./QP) |
|-----------------|----------------------------|------------------------|--------------|-------------|-----------------------|
| 0.150000        | 46.9                       | 20.2                   | 66.0         | 19.1        | QP                    |
| 0.165500        | 44.6                       | 20.2                   | 65.2         | 20.6        | QP                    |
| 0.884770        | 34.9                       | 20.1                   | 56.0         | 21.1        | QP                    |
| 0.939990        | 36.7                       | 20.1                   | 56.0         | 19.3        | QP                    |
| 1.129170        | 33.0                       | 20.1                   | 56.0         | 23.0        | QP                    |
| 1.152630        | 34.2                       | 20.1                   | 56.0         | 21.8        | QP                    |
| 0.150000        | 33.9                       | 20.2                   | 56.0         | 22.1        | Ave.                  |
| 0.165500        | 30.8                       | 20.2                   | 55.2         | 24.4        | Ave.                  |
| 0.884770        | 28.4                       | 20.1                   | 46.0         | 17.6        | Ave.                  |
| 0.939990        | 29.4                       | 20.1                   | 46.0         | 16.6        | Ave.                  |
| 1.129170        | 27.2                       | 20.1                   | 46.0         | 18.8        | Ave.                  |
| 1.152630        | 28.3                       | 20.1                   | 46.0         | 17.7        | Ave.                  |

**Powered by Adapter 2****AC 120V/60 Hz, Line**

| Frequency (MHz) | Corrected Amplitude (dBμV) | Correction Factor (dB) | Limit (dBμV) | Margin (dB) | Detector (PK/Ave./QP) |
|-----------------|----------------------------|------------------------|--------------|-------------|-----------------------|
| 0.185500        | 47.4                       | 20.2                   | 64.2         | 16.8        | QP                    |
| 0.456750        | 48.2                       | 20.2                   | 56.8         | 8.6         | QP                    |
| 1.409030        | 39.3                       | 20.1                   | 56.0         | 16.7        | QP                    |
| 1.660950        | 40.3                       | 20.1                   | 56.0         | 15.7        | QP                    |
| 1.857830        | 40.7                       | 20.1                   | 56.0         | 15.3        | QP                    |
| 3.359390        | 39.3                       | 20.1                   | 56.0         | 16.7        | QP                    |
| 0.185500        | 37.0                       | 20.2                   | 54.2         | 17.2        | Ave.                  |
| 0.456750        | 40.7                       | 20.2                   | 46.8         | 6.1         | Ave.                  |
| 1.409030        | 30.9                       | 20.1                   | 46.0         | 15.1        | Ave.                  |
| 1.660950        | 31.7                       | 20.1                   | 46.0         | 14.3        | Ave.                  |
| 1.857830        | 33.0                       | 20.1                   | 46.0         | 13.0        | Ave.                  |
| 3.359390        | 29.5                       | 20.1                   | 46.0         | 16.5        | Ave.                  |

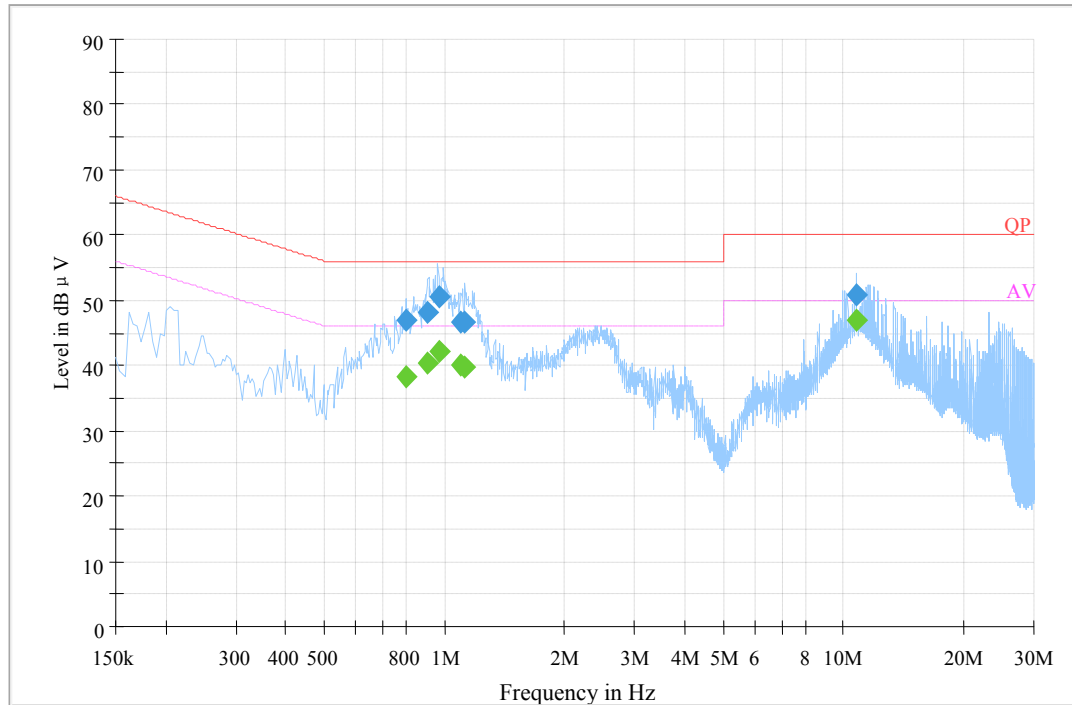
**AC 120V/60 Hz, Neutral**

| Frequency (MHz) | Corrected Amplitude (dBμV) | Correction Factor (dB) | Limit (dBμV) | Margin (dB) | Detector (PK/Ave./QP) |
|-----------------|----------------------------|------------------------|--------------|-------------|-----------------------|
| 0.455070        | 47.7                       | 20.2                   | 56.8         | 9.1         | QP                    |
| 0.644430        | 40.5                       | 20.1                   | 56.0         | 15.5        | QP                    |
| 0.951870        | 40.4                       | 20.1                   | 56.0         | 15.6        | QP                    |
| 1.022790        | 41.3                       | 20.1                   | 56.0         | 14.7        | QP                    |
| 3.497950        | 39.8                       | 20.1                   | 56.0         | 16.2        | QP                    |
| 3.824430        | 40.5                       | 20.1                   | 56.0         | 15.5        | QP                    |
| 0.455070        | 40.1                       | 20.2                   | 46.8         | 6.7         | Ave.                  |
| 0.644430        | 32.9                       | 20.1                   | 46.0         | 13.1        | Ave.                  |
| 0.951870        | 33.9                       | 20.1                   | 46.0         | 12.1        | Ave.                  |
| 1.022790        | 35.0                       | 20.1                   | 46.0         | 11.0        | Ave.                  |
| 3.497950        | 30.4                       | 20.1                   | 46.0         | 15.6        | Ave.                  |
| 3.824430        | 30.8                       | 20.1                   | 46.0         | 15.2        | Ave.                  |

**Powered by PoE****AC 120V/60 Hz, Line**

| Frequency (MHz) | Corrected Amplitude (dBμV) | Correction Factor (dB) | Limit (dBμV) | Margin (dB) | Detector (PK/Ave./QP) |
|-----------------|----------------------------|------------------------|--------------|-------------|-----------------------|
| 0.963690        | 44.9                       | 20.1                   | 56.0         | 11.1        | QP                    |
| 1.144990        | 41.8                       | 20.1                   | 56.0         | 14.2        | QP                    |
| 10.244370       | 52.6                       | 20.0                   | 60.0         | 7.4         | QP                    |
| 10.792090       | 54.0                       | 20.0                   | 60.0         | 6.0         | QP                    |
| 11.891590       | 53.1                       | 20.0                   | 60.0         | 6.9         | QP                    |
| 13.421630       | 50.1                       | 20.1                   | 60.0         | 9.9         | QP                    |
| 0.963690        | 36.9                       | 20.1                   | 46.0         | 9.1         | Ave.                  |
| 1.144990        | 33.9                       | 20.1                   | 46.0         | 12.1        | Ave.                  |
| 10.244370       | 46.3                       | 20.0                   | 50.0         | 3.7         | Ave.                  |
| 10.792090       | 45.9                       | 20.0                   | 50.0         | 4.1         | Ave.                  |
| 11.891590       | 45.8                       | 20.0                   | 50.0         | 4.2         | Ave.                  |
| 13.421630       | 45.7                       | 20.1                   | 50.0         | 4.3         | Ave.                  |



**AC 120V/60 Hz, Neutral**

| Frequency (MHz) | Corrected Amplitude (dBμV) | Correction Factor (dB) | Limit (dBμV) | Margin (dB) | Detector (PK/Ave./QP) |
|-----------------|----------------------------|------------------------|--------------|-------------|-----------------------|
| 0.805970        | 46.8                       | 20.0                   | 56.0         | 9.2         | QP                    |
| 0.912410        | 48.2                       | 20.1                   | 56.0         | 7.8         | QP                    |
| 0.967570        | 50.4                       | 20.1                   | 56.0         | 5.6         | QP                    |
| 1.097350        | 46.5                       | 20.1                   | 56.0         | 9.5         | QP                    |
| 1.121110        | 46.8                       | 20.1                   | 56.0         | 9.2         | QP                    |
| 10.792090       | 50.8                       | 20.0                   | 60.0         | 9.2         | QP                    |
| 0.805970        | 38.4                       | 20.0                   | 46.0         | 7.6         | Ave.                  |
| 0.912410        | 40.3                       | 20.1                   | 46.0         | 5.7         | Ave.                  |
| 0.967570        | 42.1                       | 20.1                   | 46.0         | 3.9         | Ave.                  |
| 1.097350        | 40.0                       | 20.1                   | 46.0         | 6.0         | Ave.                  |
| 1.121110        | 39.8                       | 20.1                   | 46.0         | 6.2         | Ave.                  |
| 10.792090       | 47.0                       | 20.0                   | 50.0         | 3.0         | Ave.                  |

**Note:**

- 1) Corrected Amplitude = Reading + Correction Factor
- 2) Correction Factor = LISN VDF + Cable Loss + Transient Limiter Attenuation
- 3) Margin = Limit – Corrected Amplitude

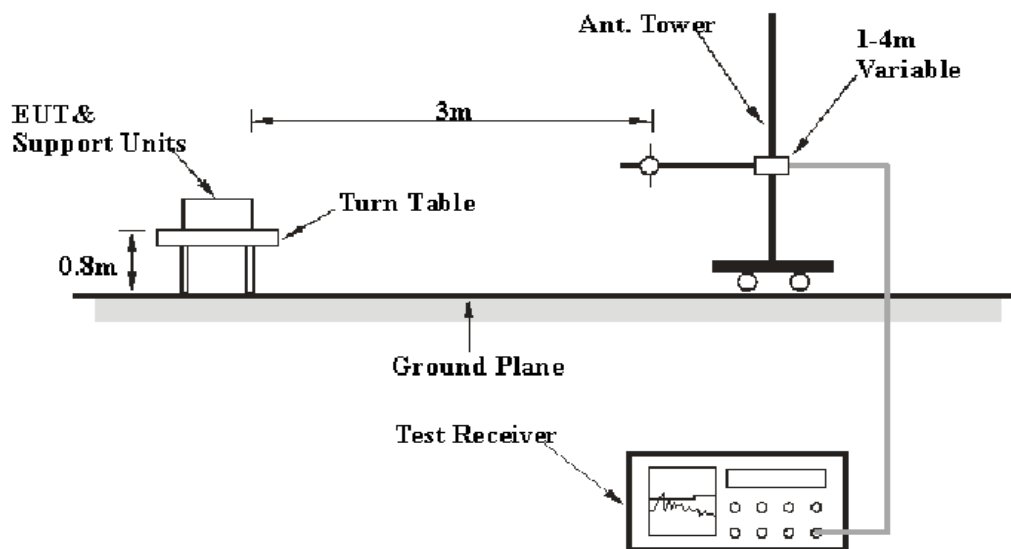
## FCC §15.109 - RADIATED EMISSIONS

### Applicable Standard

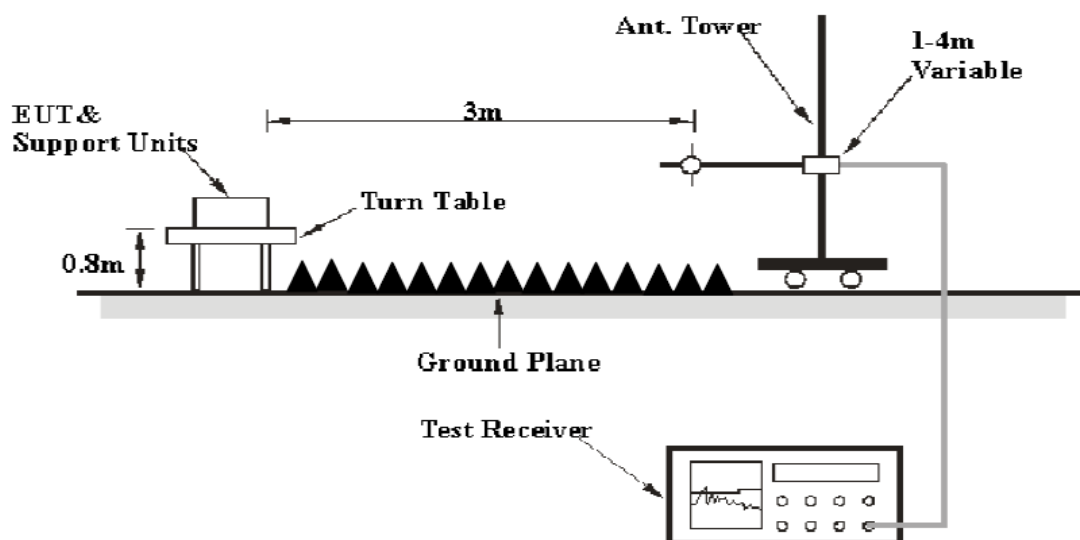
According to FCC§15.109

### Test System Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2014. The specification used was the FCC Part 15.109 Class B limits.

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

The spacing between the peripherals was 10 cm.

### EMI Test Receiver Setup

According to FCC 15.33 requirements, the EUT system was measured from 30 MHz to 12.4 GHz.

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

| Frequency Range   | RBW     | Video B/W | IF B/W  | Detector |
|-------------------|---------|-----------|---------|----------|
| 30 MHz – 1000 MHz | 100 kHz | 300 kHz   | 120 kHz | QP       |
| Above 1 GHz       | 1 MHz   | 3 MHz     | -       | Peak     |
| Above 1 GHz       | 1 MHz   | 10 Hz     | -       | Average  |

### Test Procedure

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

All final data was recorded in the Quasi-peak detection mode for below 1 GHz, and Peak and Average for above 1 GHz.

### Corrected Amplitude & Margin Calculation

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

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

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

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

### Test Results Summary

According to the recorded data in following table

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(L_m)} \leq L_{\text{lim}} + U_{\text{cisp}}r$$

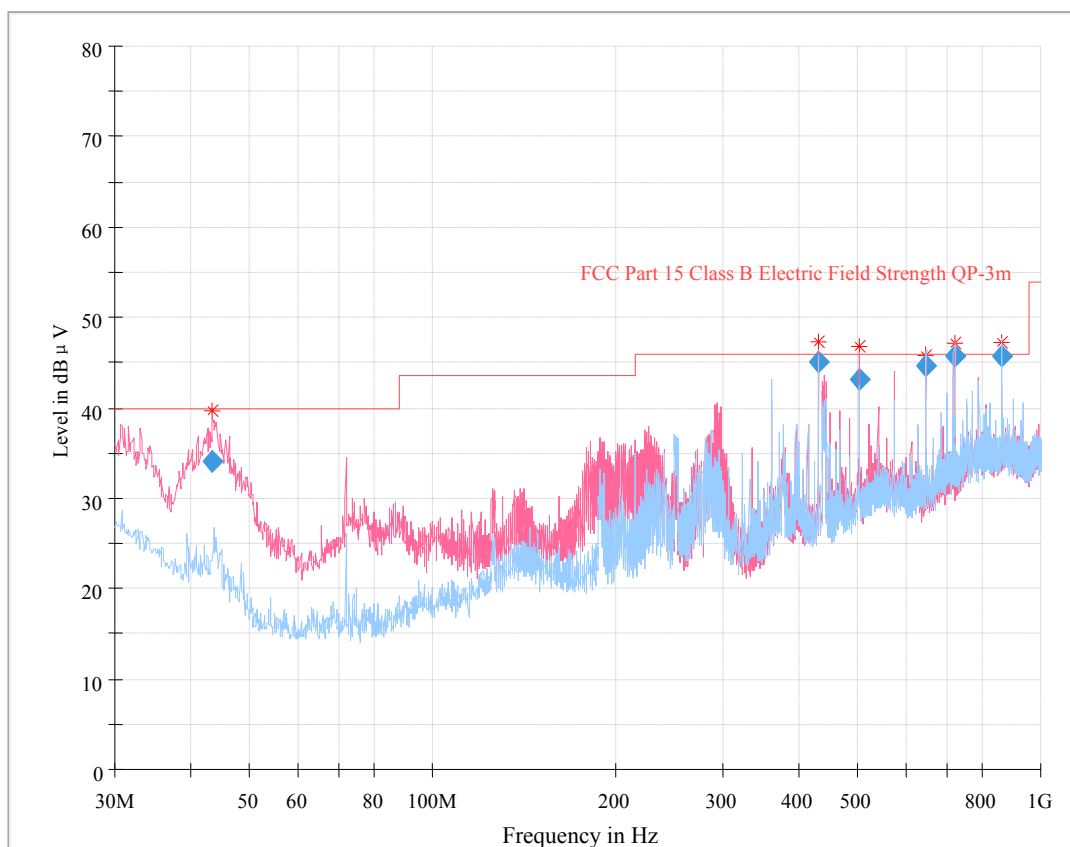
In BACL.,  $U_{(L_m)}$  is less than  $U_{\text{cisp}}r$ , if  $L_m$  is less than  $L_{\text{lim}}$ , it implies that the EUT complies with the limit.

**Test Data****Environmental Conditions**

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 26 °C     |
| <b>Relative Humidity:</b> | 56 %      |
| <b>ATM Pressure:</b>      | 101.0 kPa |

*The testing was performed by Dylan Li on 2017-10-12 and 2017-10-25.*

*Tested mode 1:*

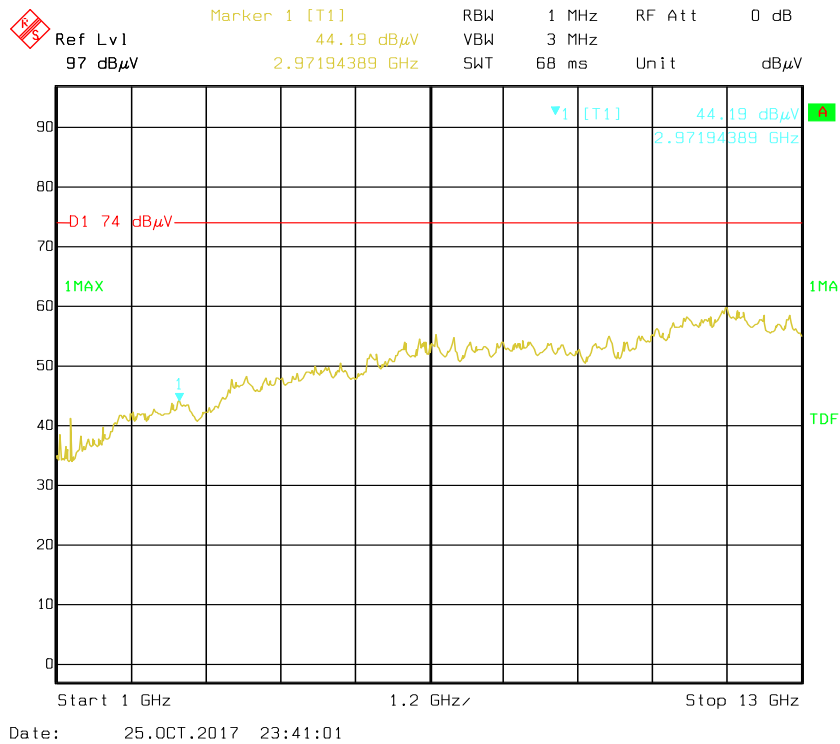
**Powered by Adapter 1****30 MHz – 1 GHz:**

| Frequency (MHz) | Corrected Amplitude (dBμV/m) | Antenna height (cm) | Antenna Polarity | Turntable position (degree) | Correction Factor (dB/m) | Limit (dBμV/m) | Margin (dB) |
|-----------------|------------------------------|---------------------|------------------|-----------------------------|--------------------------|----------------|-------------|
| 43.319875       | 34.10                        | 112.0               | V                | 337.0                       | -8.6                     | 40.00          | 5.90        |
| 432.016500      | 45.11                        | 123.0               | V                | 241.0                       | 0.2                      | 46.00          | 0.89        |
| 503.978375      | 43.21                        | 100.0               | V                | 262.0                       | 3.1                      | 46.00          | 2.79        |
| 647.990875      | 44.54                        | 118.0               | H                | 188.0                       | 4.3                      | 46.00          | 1.46        |
| 720.013125      | 45.65                        | 111.0               | H                | 136.0                       | 7.1                      | 46.00          | 0.35        |
| 864.035625      | 45.70                        | 100.0               | H                | 212.0                       | 9.2                      | 46.00          | 0.30        |

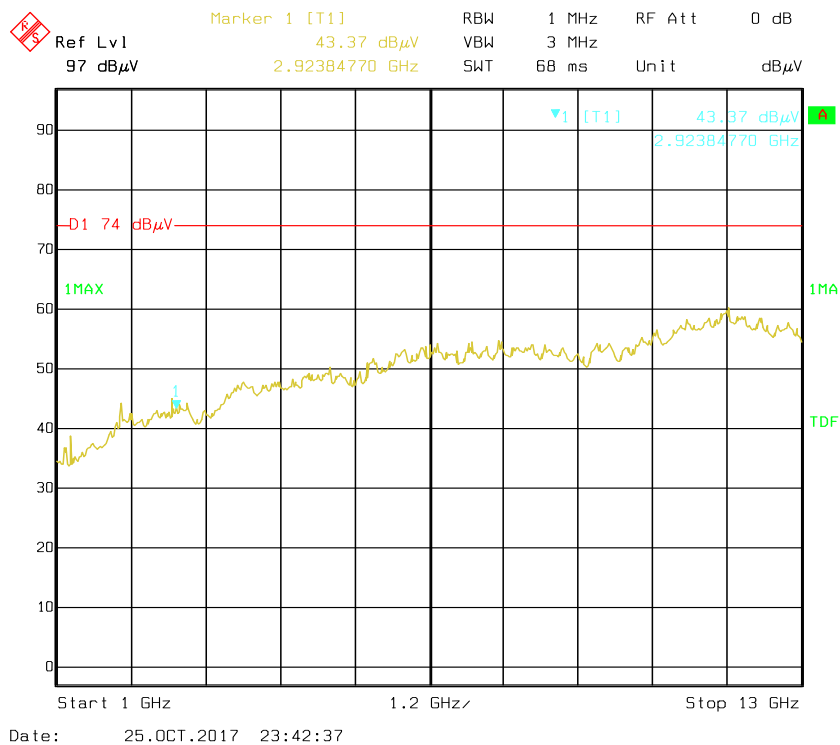
**Above 1GHz:**

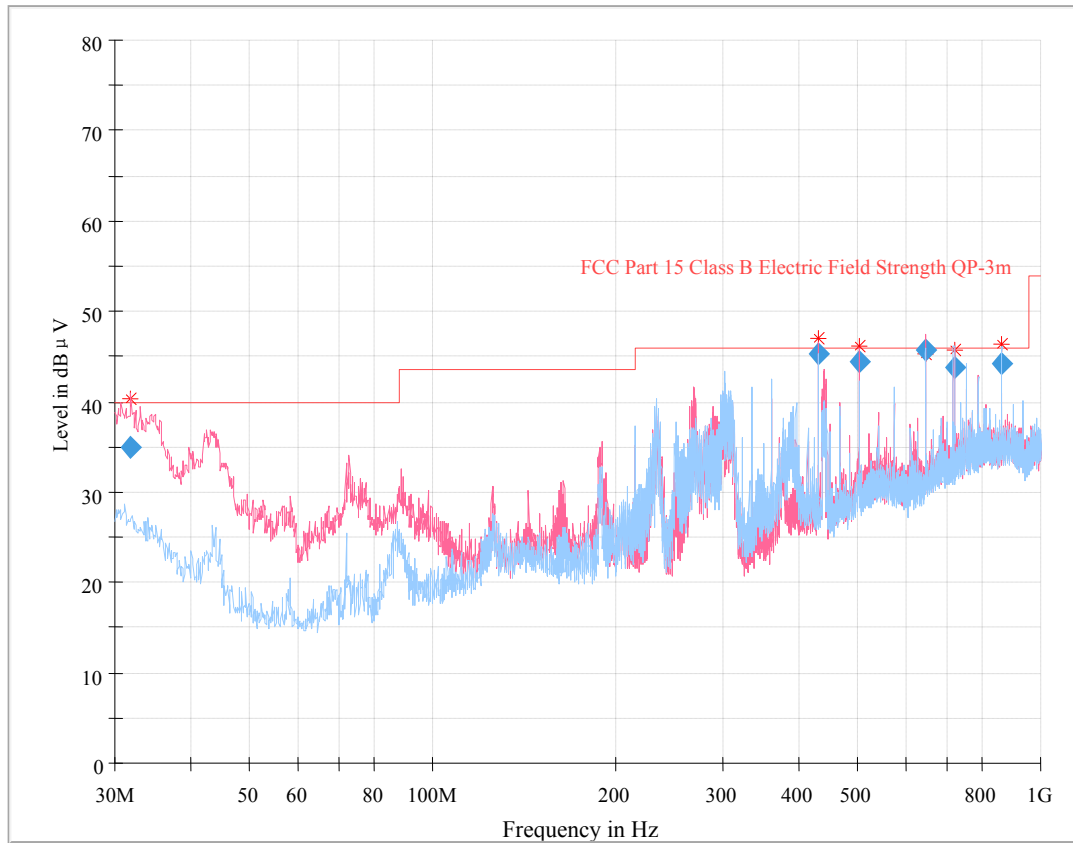
| Frequency<br>(MHz) | Measurement             |                          | Turntable<br>Degree | Rx Antenna    |                  | Corrected<br>Factor<br>(dB/m) | Corrected<br>Amplitude<br>(dB $\mu$ V/m) | FCC Part 15B            |                |
|--------------------|-------------------------|--------------------------|---------------------|---------------|------------------|-------------------------------|--|-------------------------|----------------|
|                    | Reading<br>(dB $\mu$ V) | Detector<br>(PK/QP/Ave.) |                     | Height<br>(m) | Polar<br>(H / V) |                               |  | Limit<br>(dB $\mu$ V/m) | Margin<br>(dB) |
| 1244.73            | 50.11                   | PK                       | 24                  | 1.7           | H                | -8.48                         | 41.63                                    | 74                      | 32.37          |
| 1244.73            | 33.41                   | Ave.                     | 24                  | 1.7           | H                | -8.48                         | 24.93                                    | 54                      | 29.07          |
| 2971.94            | 44.68                   | PK                       | 95                  | 2.2           | H                | 1.21                          | 45.89                                    | 74                      | 28.11          |
| 2971.94            | 30.51                   | Ave.                     | 95                  | 2.2           | H                | 1.21                          | 31.72                                    | 54                      | 22.28          |
| 1274.36            | 49.35                   | PK                       | 13                  | 1.8           | V                | -8.04                         | 41.31                                    | 74                      | 32.69          |
| 1274.36            | 32.89                   | Ave.                     | 13                  | 1.8           | V                | -8.04                         | 24.85                                    | 54                      | 29.15          |
| 2923.84            | 44.83                   | PK                       | 144                 | 1.7           | V                | -0.60                         | 44.23                                    | 74                      | 29.77          |
| 2923.84            | 30.64                   | Ave.                     | 144                 | 1.7           | V                | -0.60                         | 30.04                                    | 54                      | 23.96          |

## Pre-scan - Horizontal



## Pre-scan - Vertical



**Powered by Adapter 2****30 MHz – 1 GHz:**

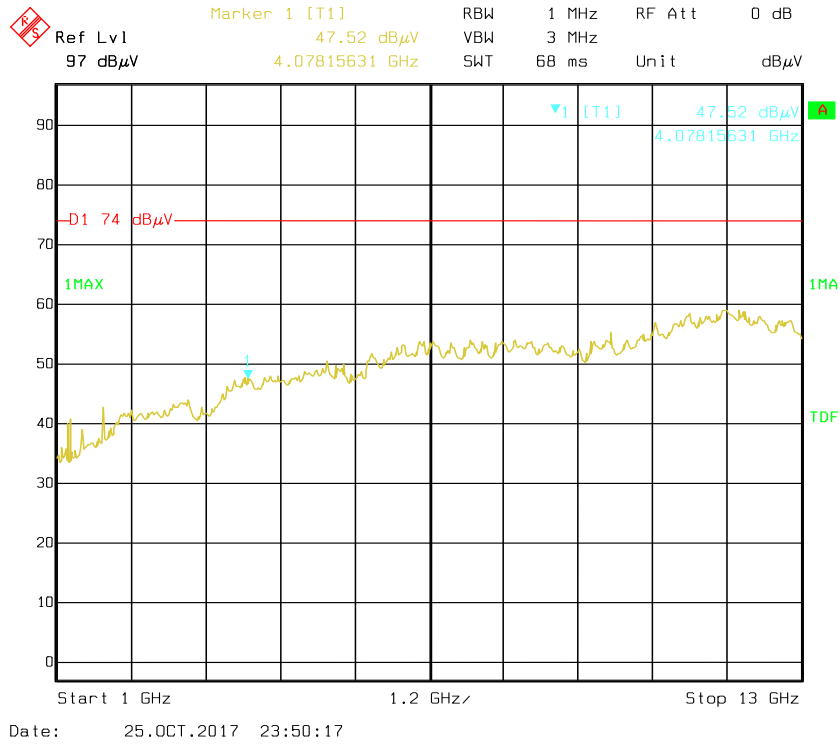
| Frequency (MHz) | Corrected Amplitude (dBμV/m) | Antenna height (cm) | Antenna Polarity | Turntable position (degree) | Correction Factor (dB/m) | Limit (dBμV/m) | Margin (dB) |
|-----------------|------------------------------|---------------------|------------------|-----------------------------|--------------------------|----------------|-------------|
| 31.712375       | 34.97                        | 100.0               | V                | 86.0                        | -0.9                     | 40.00          | 5.03        |
| 432.009875      | 45.30                        | 119.0               | V                | 252.0                       | 0.2                      | 46.00          | 0.70        |
| 503.999750      | 44.36                        | 106.0               | V                | 259.0                       | 3.1                      | 46.00          | 1.64        |
| 647.993375      | 45.71                        | 123.0               | H                | 183.0                       | 4.3                      | 46.00          | 0.29        |
| 719.999875      | 43.85                        | 107.0               | H                | 137.0                       | 7.1                      | 46.00          | 2.15        |
| 863.982500      | 44.27                        | 106.0               | H                | 211.0                       | 9.2                      | 46.00          | 1.73        |



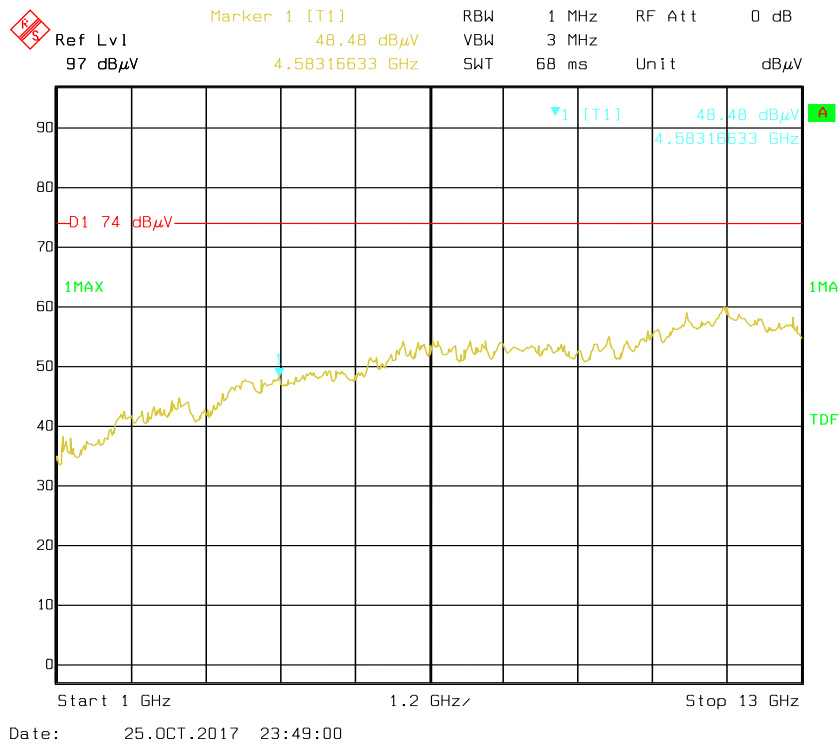
**Above 1GHz:**

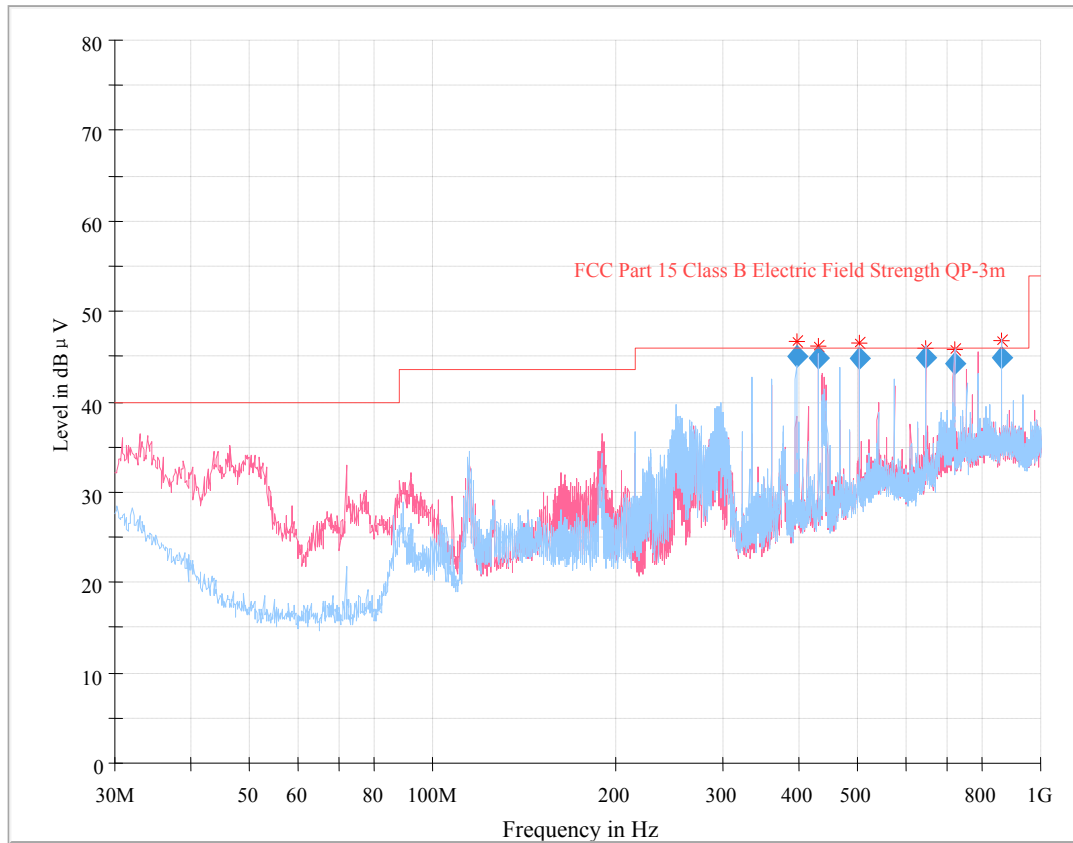
| Frequency<br>(MHz) | Measurement       |                          | Turntable<br>Degree | Rx Antenna    |                  | Corrected<br>Factor<br>(dB/m) | Corrected<br>Amplitude<br>(dBμV/m) | FCC Part 15B      |                |
|--------------------|-------------------|--------------------------|---------------------|---------------|------------------|-------------------------------|------------------------------------|-------------------|----------------|
|                    | Reading<br>(dBμV) | Detector<br>(PK/QP/Ave.) |                     | Height<br>(m) | Polar<br>(H / V) |                               |                                    | Limit<br>(dBμV/m) | Margin<br>(dB) |
| 4078.15            | 44.31             | PK                       | 194                 | 1.1           | H                | 4.04                          | 48.35                              | 74                | 25.65          |
| 4078.15            | 30.34             | Ave.                     | 194                 | 1.1           | H                | 4.04                          | 34.38                              | 54                | 19.62          |
| 4583.16            | 44.69             | PK                       | 60                  | 1.5           | V                | 5.31                          | 50.00                              | 74                | 24.00          |
| 4583.16            | 30.54             | Ave.                     | 60                  | 1.5           | V                | 5.31                          | 35.85                              | 54                | 18.15          |
| 1405.81            | 47.09             | PK                       | 141                 | 2.0           | H                | -7.89                         | 39.20                              | 74                | 34.80          |
| 1405.81            | 29.16             | Ave.                     | 141                 | 2.0           | H                | -7.89                         | 21.27                              | 54                | 32.73          |
| 1427.60            | 46.37             | PK                       | 261                 | 2.1           | V                | -7.89                         | 38.48                              | 74                | 35.52          |
| 1427.60            | 28.82             | Ave.                     | 261                 | 2.1           | V                | -7.89                         | 20.93                              | 54                | 33.07          |

Pre-scan - Horizontal



Pre-scan - Vertical



**Powered by POE****30 MHz – 1 GHz:**

| Frequency (MHz) | Corrected Amplitude (dBμV/m) | Antenna height (cm) | Antenna Polarity | Turntable position (degree) | Correction Factor (dB/m) | Limit (dBμV/m) | Margin (dB) |
|-----------------|------------------------------|---------------------|------------------|-----------------------------|--------------------------|----------------|-------------|
| 396.010750      | 45.45                        | 106.0               | H                | 258.0                       | -0.1                     | 46.00          | 0.55        |
| 431.990000      | 45.34                        | 123.0               | V                | 227.0                       | 0.2                      | 46.00          | 0.66        |
| 504.008000      | 45.13                        | 169.0               | H                | 220.0                       | 3.1                      | 46.00          | 0.87        |
| 648.006000      | 45.24                        | 165.0               | V                | 276.0                       | 4.3                      | 46.00          | 0.76        |
| 720.011625      | 43.24                        | 110.0               | H                | 137.0                       | 7.1                      | 46.00          | 2.76        |
| 864.015625      | 45.06                        | 156.0               | H                | 211.0                       | 9.2                      | 46.00          | 0.94        |

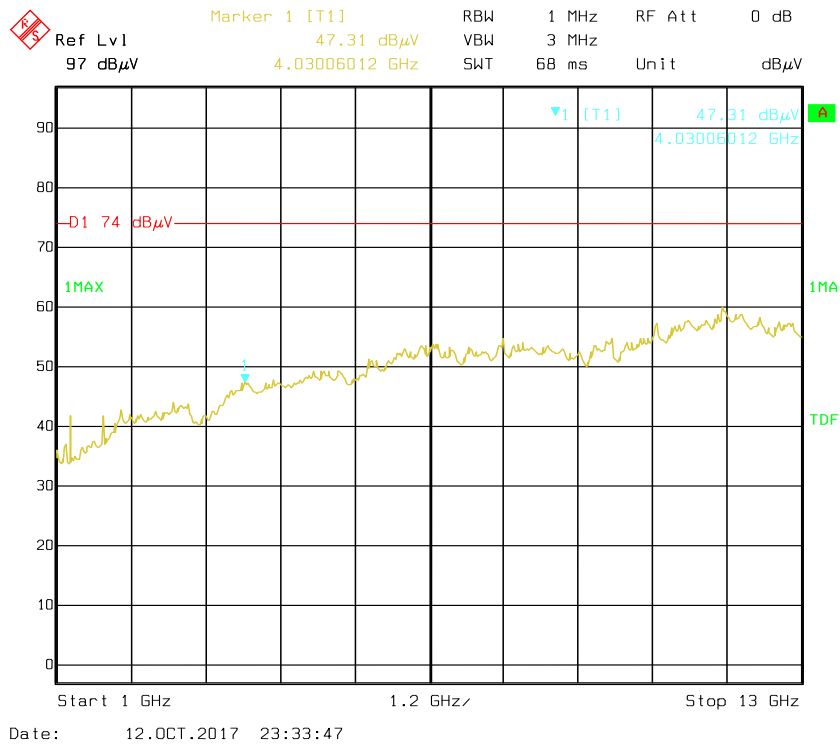
**Above 1GHz:**

| Frequency<br>(MHz) | Measurement             |                          | Turntable<br>Degree | Rx Antenna    |                  | Corrected<br>Factor<br>(dB/m) | Corrected<br>Amplitude<br>(dB $\mu$ V/m) | FCC Part 15B            |                |
|--------------------|-------------------------|--------------------------|---------------------|---------------|------------------|-------------------------------|--|-------------------------|----------------|
|                    | Reading<br>(dB $\mu$ V) | Detector<br>(PK/QP/Ave.) |                     | Height<br>(m) | Polar<br>(H / V) |                               |  | Limit<br>(dB $\mu$ V/m) | Margin<br>(dB) |
| 1546.78            | 50.26                   | PK                       | 16                  | 1.1           | H                | -5.52                         | 44.74                                    | 74                      | 29.26          |
| 1546.78            | 33.22                   | Ave.                     | 16                  | 1.1           | H                | -5.52                         | 27.70                                    | 54                      | 26.30          |
| 4030.06            | 44.28                   | PK                       | 150                 | 1.5           | H                | 3.06                          | 47.34                                    | 74                      | 26.66          |
| 4030.06            | 30.11                   | Ave.                     | 150                 | 1.5           | H                | 3.06                          | 33.17                                    | 54                      | 20.83          |
| 1605.45            | 49.67                   | PK                       | 186                 | 2.0           | V                | -5.35                         | 44.32                                    | 74                      | 29.68          |
| 1605.45            | 33.05                   | Ave.                     | 186                 | 2.0           | V                | -5.35                         | 27.70                                    | 54                      | 26.30          |
| 4006.01            | 44.36                   | PK                       | 24                  | 1.7           | V                | 3.06                          | 47.42                                    | 74                      | 26.58          |
| 4006.01            | 30.15                   | Ave.                     | 24                  | 1.7           | V                | 3.06                          | 33.21                                    | 54                      | 20.79          |

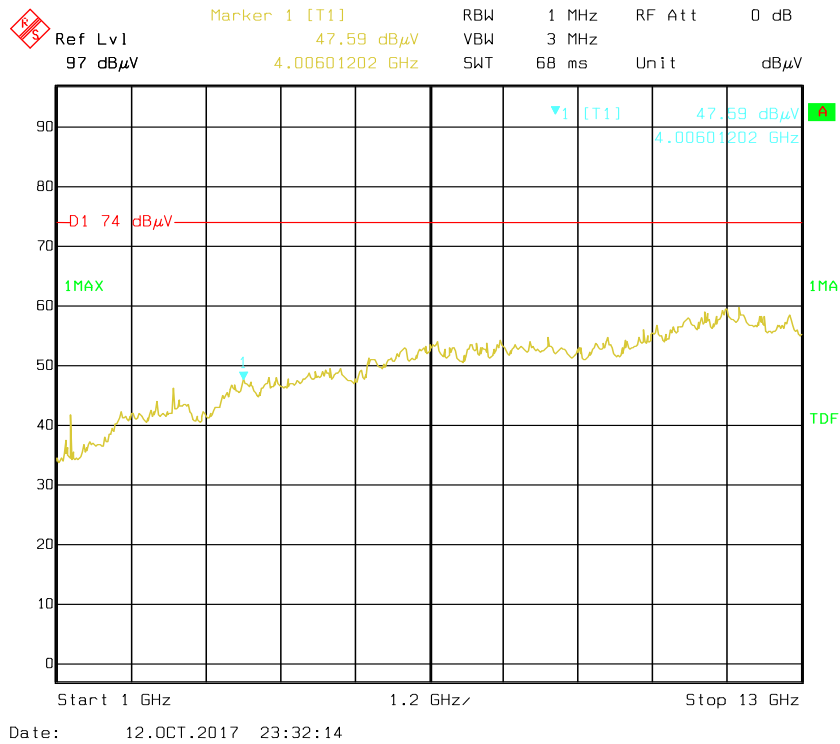
**Note:**

- 1) Correction Factor=Antenna factor (RX) + cable loss – amplifier factor
- 2) Corrected Amplitude = Correction Factor + Reading
- 3) Margin = Limit - Corrected Amplitude

### Pre-scan - Horizontal



### Pre-scan - Vertical



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