



FCC PART 15B, CLASS B
TEST REPORT

For

AIN TECHNICAL (SHENZHEN) CO.,LTD

C6 Building 301A Heng Feng Industrial City, He Zhou, Xi Xiang Street, Bao An Qu, Shenzhen,
China

FCC ID: 2ALPWAS-100RX

| | |
|--|--|
| Report Type: Original Report | Product Type: WIRELESS TRANSMISSION MODULE--RECEIVER |
| Report Number: RSZ170327006-00 | |
| Report Date: 2017-04-12 | |
| Reviewed By: Engineer | Oscar Ye <i>Oscar.Ye</i> |
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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *AIN TECHNICAL (SHENZHEN) CO.,LTD*'s product, model number: *AS-100RX (FCC ID: 2ALPWAS-100RX)* or the "EUT" in this report was a *WIRELESS TRANSMISSION MODULE--RECEIVER*, which was measured approximately: 6.5 cm (L) × 3.1 cm (W) × 1.85 cm (H), rated with input voltage: DC 12~24 V. The highest operational frequency is 433.92 MHz.

**All measurement and test data in this report was gathered from production sample serial number: 1700500 (Assigned by BACL, Kunshan). The EUT supplied by the applicant was received on 2017-03-27.*

Objective

This test report is prepared on behalf of *AIN TECHNICAL (SHENZHEN) CO.,LTD* in accordance with Part 2-Subpart J, Part 15-Subparts A, 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 15.231 DSC submissions with FCC ID: 2ALPWAS-100TX.

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. (Kunshan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

| Item | | Uncertainty |
|------------------------------------|------------|-------------|
| AC Power Lines Conducted Emissions | | ±3.26 dB |
| Radiated emission | 30MHz~1GHz | ±5.91dB |
| | Above 1G | ±4.92dB |

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Test site at Bay Area Compliance Laboratories Corp. (Kunshan) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 06, 2014. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 815570. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a manufacturer testing fashion.

EUT operation mode: Receiving

EUT Exercise Software

No exercise software was used.

Special Accessories

No special accessory.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

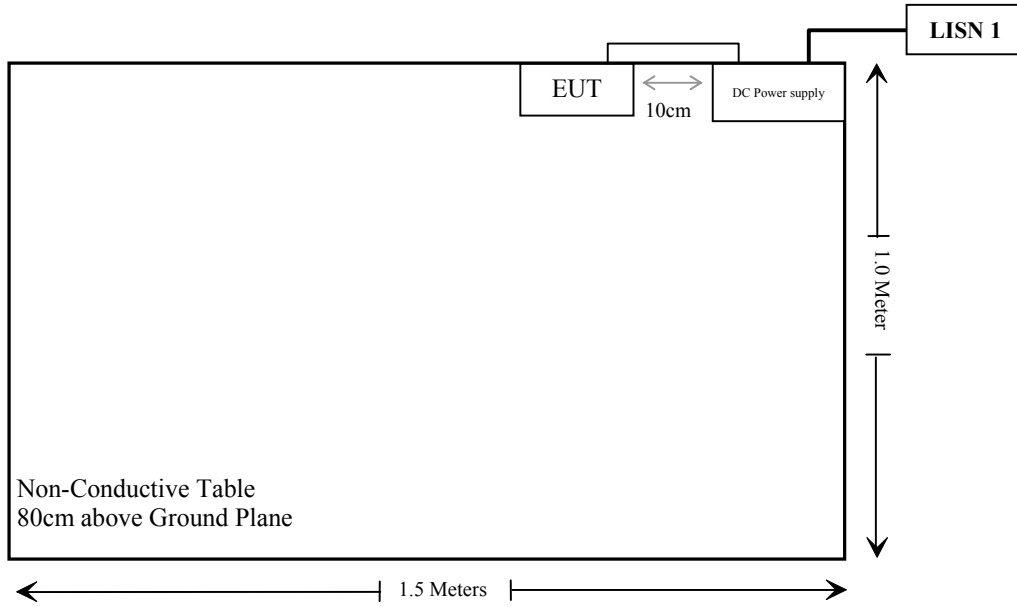
| Manufacturer | Description | Model | Serial Number |
|--------------|-----------------|-------------|---------------|
| EST | DC Power supply | MCH-303D-II | 14070562 |

External I/O Cable

| Cable Description | Length (m) | From/Port | To |
|----------------------------------|------------|-----------------|--------|
| Un-shielding Detachable DC Cable | 1.0 | DC Power supply | EUT |
| Un-shielding Detachable AC Cable | 1.0 | DC Power supply | LISN 1 |

Block Diagram of Test Setup

For conducted emissions



SUMMARY OF TEST RESULTS

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

TEST EQUIPMENT LIST

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|--|--------------------|-----------------------|---------------|------------------|----------------------|
| AC Line Conducted Emission Test | | | | | |
| Rohde & Schwarz | EMI Test Receiver | ESCS30 | 834115/007 | 2016-11-25 | 2017-11-25 |
| Rohde & Schwarz | LISN | ESH3-Z5 | 862770/011 | 2016-10-10 | 2017-10-10 |
| Rohde & Schwarz | Pulse limiter | ESH3-Z2 | 879940/0058 | 2016-06-19 | 2017-06-18 |
| MICRO-COAX | Coaxial line | UFB-293B-1-0480-50X50 | 97F0173 | 2016-09-08 | 2017-09-08 |
| Rohde & Schwarz | CE Test software | EMC 32 | V 09.10.0 | NCR | NCR |
| Radiated Emission Test | | | | | |
| Sonoma Instrument | Amplifier | 330 | 171377 | 2016-10-21 | 2017-10-21 |
| Rohde & Schwarz | EMI Test Receiver | ESCI | 100195 | 2016-11-25 | 2017-11-25 |
| Sunol Sciences | Broadband Antenna | JB3 | A090314-2 | 2016-01-09 | 2019-01-08 |
| Narda | Pre-amplifier | AFS42-00101800 | 2001270 | 2016-09-08 | 2017-09-08 |
| EMCO | Horn Antenna | 3116 | 00084159 | 2016-10-18 | 2019-10-17 |
| Rohde & Schwarz | Signal Analyzer | FSIQ26 | 100048 | 2016-11-25 | 2017-11-25 |
| ETS | Horn Antenna | 3115 | 6229 | 2016-12-12 | 2019-12-12 |
| R&S | Auto test Software | EMC32 | V 09.10.0 | NCR | NCR |
| haojintech | Coaxial Cable | Cable-1 | 001 | 2016-12-12 | 2017-12-12 |
| haojintech | Coaxial Cable | Cable-2 | 002 | 2016-12-12 | 2017-12-12 |
| haojintech | Coaxial Cable | Cable-3 | 003 | 2016-12-12 | 2017-12-12 |
| MICRO-COAX | Coaxial Cable | Cable-4 | 004 | 2016-12-12 | 2017-12-12 |
| MICRO-COAX | Coaxial Cable | Cable-5 | 005 | 2016-12-12 | 2017-12-12 |

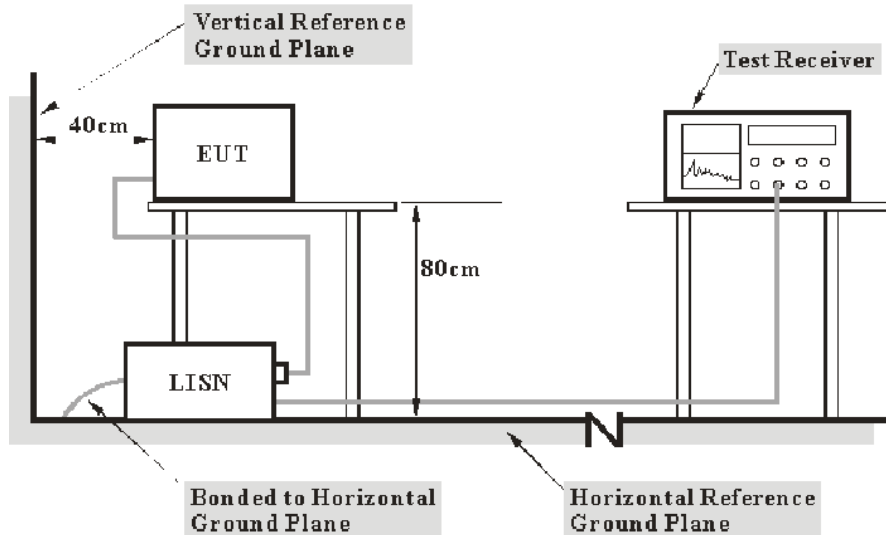
* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI)

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 per ANSI C63.4-2014. The related limit was specified in FCC Part 15.107 Class B.

The spacing between the peripherals was 10 cm.

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

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN/ISN 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 7 dB 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, the EUT complied with the FCC Part 15.107.

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

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

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

Test Data

Environmental Conditions

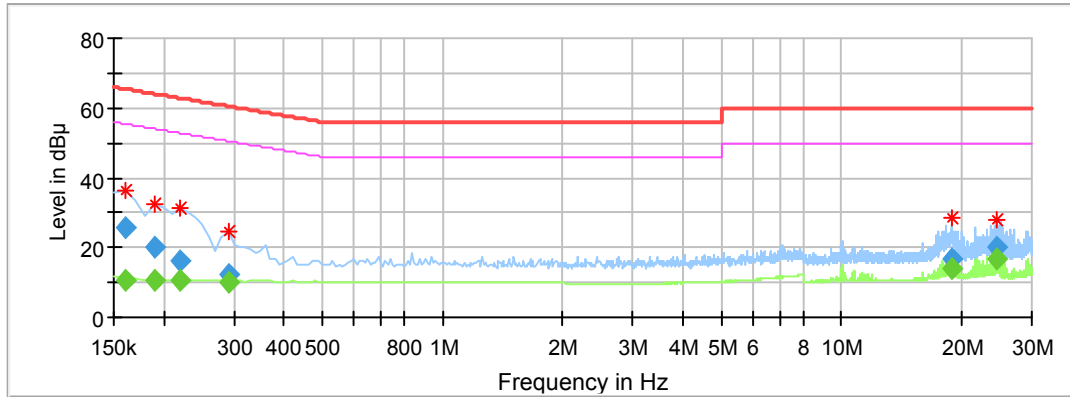
| | |
|---------------------------|-----------|
| Temperature: | 25 °C |
| Relative Humidity: | 55 % |
| ATM Pressure: | 101.0 kPa |

The testing was performed by Layne Li on 2017-04-09

EUT Operation Mode: Receiving

AC 120V/60 Hz, Line

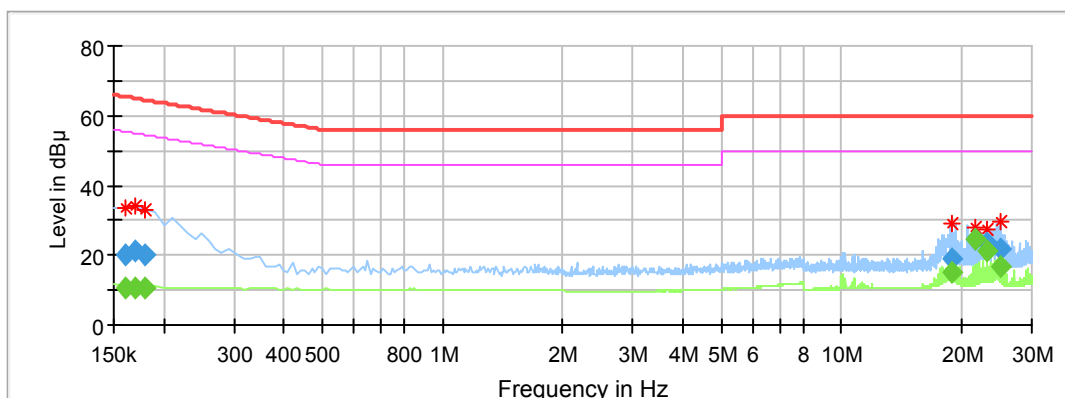
Full Spectrum



| Frequency (MHz) | QuasiPeak (dBµV) | Average (dB µ V) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) | Comment |
|-----------------|------------------|------------------|-----------------|------|------------|-------------|--------------|------------|
| 0.160000 | --- | 10.90 | 9.000 | L1 | 10.0 | 44.56 | 55.46 | Compliance |
| 0.160000 | 25.71 | --- | 9.000 | L1 | 10.0 | 39.75 | 65.46 | Compliance |
| 0.190000 | --- | 10.74 | 9.000 | L1 | 10.0 | 43.30 | 54.04 | Compliance |
| 0.190000 | 19.97 | --- | 9.000 | L1 | 10.0 | 44.07 | 64.04 | Compliance |
| 0.220000 | --- | 10.60 | 9.000 | L1 | 10.0 | 42.22 | 52.82 | Compliance |
| 0.220000 | 15.99 | --- | 9.000 | L1 | 10.0 | 46.83 | 62.82 | Compliance |
| 0.290000 | --- | 10.24 | 9.000 | L1 | 10.0 | 40.28 | 50.52 | Compliance |
| 0.290000 | 12.06 | --- | 9.000 | L1 | 10.0 | 48.46 | 60.52 | Compliance |
| 18.970000 | --- | 13.91 | 9.000 | L1 | 10.4 | 36.09 | 50.00 | Compliance |
| 18.970000 | 16.95 | --- | 9.000 | L1 | 10.4 | 43.05 | 60.00 | Compliance |
| 24.570000 | --- | 16.70 | 9.000 | L1 | 10.5 | 33.30 | 50.00 | Compliance |
| 24.570000 | 20.09 | --- | 9.000 | L1 | 10.5 | 39.91 | 60.00 | Compliance |

AC 120V/60 Hz, Neutral

Full Spectrum



| Frequency (MHz) | QuasiPeak (dBµV) | Average (dB µ V) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) | Comment |
|-----------------|------------------|------------------|-----------------|------|------------|-------------|--------------|------------|
| 0.160000 | --- | 10.80 | 9.000 | N | 10.1 | 44.66 | 55.46 | Compliance |
| 0.160000 | 20.27 | --- | 9.000 | N | 10.1 | 45.19 | 65.46 | Compliance |
| 0.170000 | --- | 10.68 | 9.000 | N | 10.1 | 44.28 | 54.96 | Compliance |
| 0.170000 | 21.19 | --- | 9.000 | N | 10.1 | 43.77 | 64.96 | Compliance |
| 0.180000 | --- | 10.72 | 9.000 | N | 10.1 | 43.77 | 54.49 | Compliance |
| 0.180000 | 20.11 | --- | 9.000 | N | 10.1 | 44.38 | 64.49 | Compliance |
| 18.970000 | --- | 14.87 | 9.000 | N | 10.1 | 35.13 | 50.00 | Compliance |
| 18.970000 | 18.95 | --- | 9.000 | N | 10.1 | 41.05 | 60.00 | Compliance |
| 21.660000 | --- | 24.59 | 9.000 | N | 10.2 | 25.41 | 50.00 | Compliance |
| 21.660000 | 24.67 | --- | 9.000 | N | 10.2 | 35.33 | 60.00 | Compliance |
| 23.130000 | --- | 21.11 | 9.000 | N | 10.2 | 28.89 | 50.00 | Compliance |
| 23.130000 | 23.38 | --- | 9.000 | N | 10.2 | 36.62 | 60.00 | Compliance |
| 24.950000 | --- | 16.73 | 9.000 | N | 10.2 | 33.27 | 50.00 | Compliance |
| 24.950000 | 21.67 | --- | 9.000 | N | 10.2 | 38.33 | 60.00 | Compliance |

Note:

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

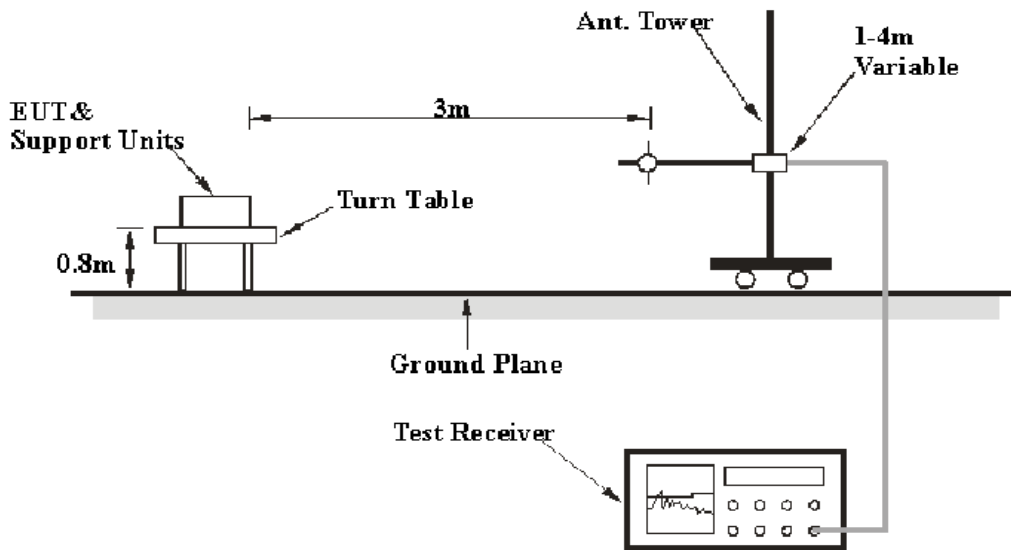
FCC §15.109 - RADIATED SPURIOUS EMISSIONS

Applicable Standard

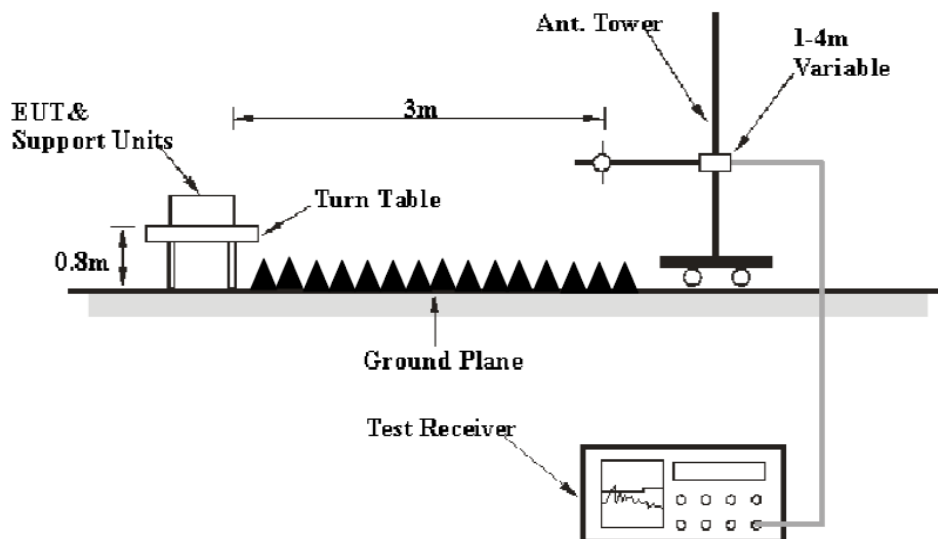
FCC §15.109

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2014. 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

The system was investigated from 30 MHz to 2 GHz.

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

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

Test Procedure

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

All data was recorded in the Quasi-peak detector mode from 30 MHz to 1 GHz and PK and average detector modes for frequencies 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 7 dB 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 data in the following table, the EUT complied with the FCC §15.109 Class B,

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

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

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

Test Data**Environmental Conditions**

| | |
|---------------------------|-----------|
| Temperature: | 25 °C |
| Relative Humidity: | 55 % |
| ATM Pressure: | 101.0 kPa |

The testing was performed by Layne Li on 2017-04-09

EUT Operation Mode: Receiving

30 MHz – 2GHz:

| Frequency (MHz) | Receiver | | Turntable Degree | Rx Antenna | | Corrected Factor (dB) | Corrected Amplitude (dBµV/m) | FCC Part 15.109 | |
|-----------------|----------------|-----------------------|------------------|------------|---------------|-----------------------|------------------------------|-----------------|-------------|
| | Reading (dBµV) | Detector (PK/QP/Ave.) | | Height (m) | Polar (H / V) | | | Limit (dBµV/m) | Margin (dB) |
| 30.06 | 25.58 | QP | 247 | 1.3 | H | -4.98 | 20.60 | 40 | 19.4 |
| 433.92 | 31.88 | QP | 158 | 1.8 | V | -8.34 | 23.54 | 46 | 22.46 |
| 564.10 | 29.65 | QP | 315 | 1.2 | H | -5.19 | 24.46 | 46 | 21.54 |
| 673.91 | 30.22 | QP | 126 | 1.2 | H | -3.74 | 26.48 | 46 | 19.52 |
| 837.82 | 33.70 | QP | 185 | 2.7 | H | -1.59 | 32.11 | 46 | 13.89 |
| 847.86 | 34.86 | QP | 242 | 3.9 | V | -1.59 | 33.27 | 46 | 12.73 |
| 1375.86 | 45.97 | PK | 329 | 1.8 | H | -10.06 | 35.91 | 74 | 38.09 |
| 1375.86 | 31.95 | Ave. | 329 | 1.8 | H | -10.06 | 21.89 | 54 | 32.11 |
| 1387.87 | 45.09 | PK | 210 | 1.2 | V | -10.06 | 35.03 | 74 | 38.97 |
| 1387.87 | 30.86 | Ave. | 210 | 1.2 | V | -10.06 | 20.80 | 54 | 33.2 |

Note:

Corrected Amplitude = Corrected Factor + Reading

Corrected Factor=Antenna factor(RX)+cable loss - amplifier factor

Margin = Limit- Corr. Amplitude

All signals exceeding 20 microvolts/meter at 3 meters have been recorded.

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