



## 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**

<b>Report Type:</b> Original Report	<b>Product Type:</b> WIRELESS TRANSMISSION MODULE--RECEIVER
<b>Report Number:</b> <u>RSZ170327006-00</u>	
<b>Report Date:</b> <u>2017-04-12</u>	
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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.

## **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.....</b>	<b>5</b>
DESCRIPTION OF TEST CONFIGURATION .....	5
EUT EXERCISE SOFTWARE .....	5
SPECIAL ACCESSORIES.....	5
EQUIPMENT MODIFICATIONS .....	5
SUPPORT EQUIPMENT LIST AND DETAILS .....	5
EXTERNAL I/O CABLE.....	5
BLOCK DIAGRAM OF TEST SETUP .....	6
<b>SUMMARY OF TEST RESULTS.....</b>	<b>7</b>
<b>TEST EQUIPMENT LIST .....</b>	<b>8</b>
<b>FCC §15.107 – AC LINE CONDUCTED EMISSIONS .....</b>	<b>9</b>
APPLICABLE STANDARD .....	9
EUT SETUP .....	9
EMI TEST RECEIVER SETUP.....	9
TEST PROCEDURE .....	9
CORRECTED FACTOR & MARGIN CALCULATION .....	10
TEST RESULTS SUMMARY .....	10
TEST DATA .....	10
<b>FCC §15.109 - RADIATED SPURIOUS EMISSIONS .....</b>	<b>13</b>
APPLICABLE STANDARD .....	13
EUT SETUP .....	13
EMI TEST RECEIVER SETUP.....	14
TEST PROCEDURE .....	14
CORRECTED AMPLITUDE & MARGIN CALCULATION .....	14
TEST RESULTS SUMMARY .....	14
TEST DATA .....	15

## 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)  $\times$  3.1 cm (W)  $\times$  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	$\pm 3.26$ dB
Radiated emission	30MHz~1GHz
	Above 1G
	$\pm 5.91$ dB
	$\pm 4.92$ dB

## 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

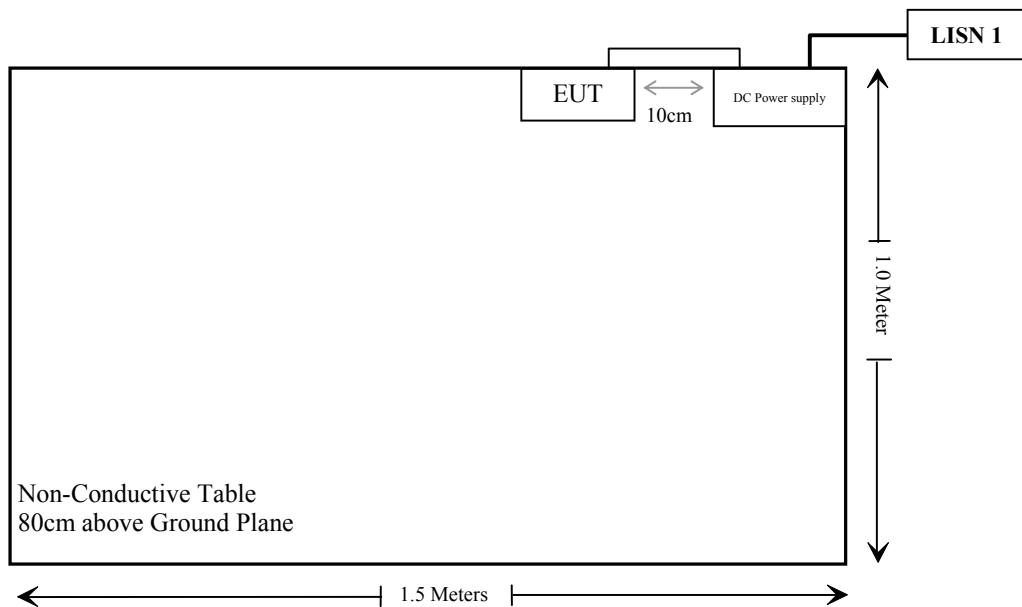
No modification was made to the EUT tested.

### 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
<b>AC Line Conducted Emission Test</b>					
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
<b>Radiated Emission Test</b>					
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

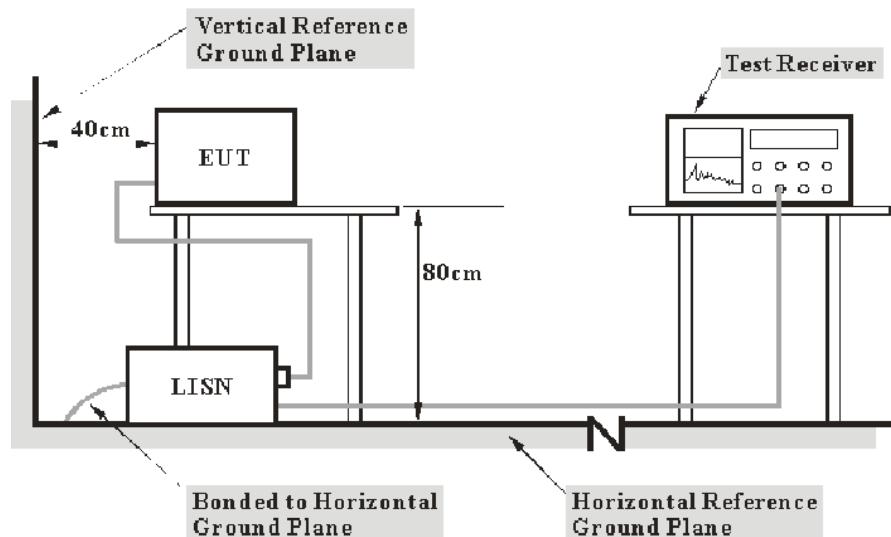
**\* Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI)

## 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

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

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

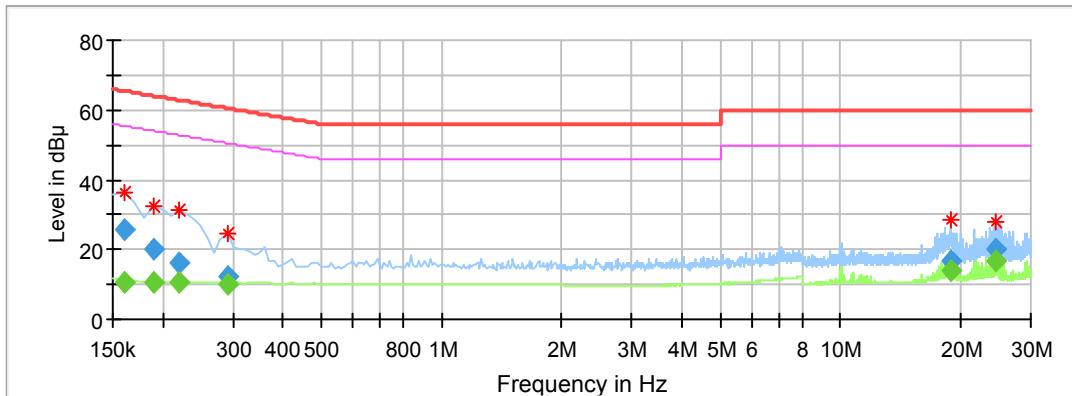
<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	55 %
<b>ATM Pressure:</b>	101.0 kPa

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

EUT Operation Mode: Receiving

AC 120V/60 Hz, Line

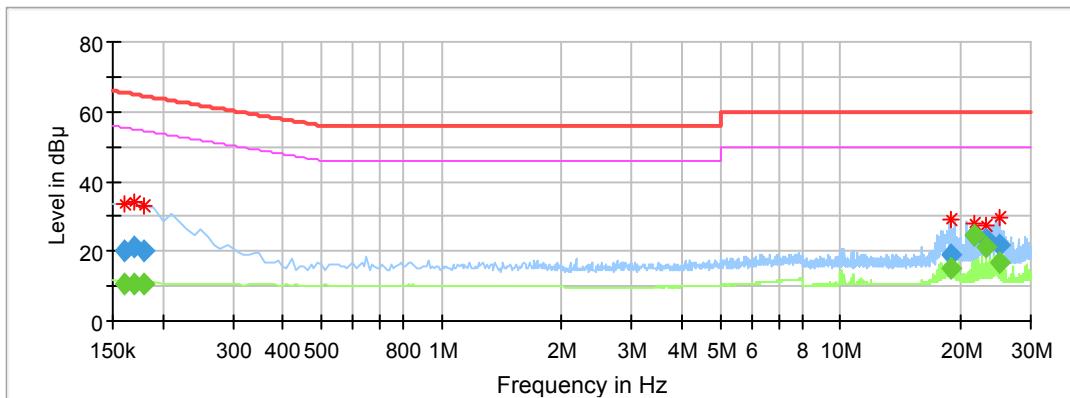
Full Spectrum



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 (dB $\mu$ V)	Average (dB $\mu$ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)	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

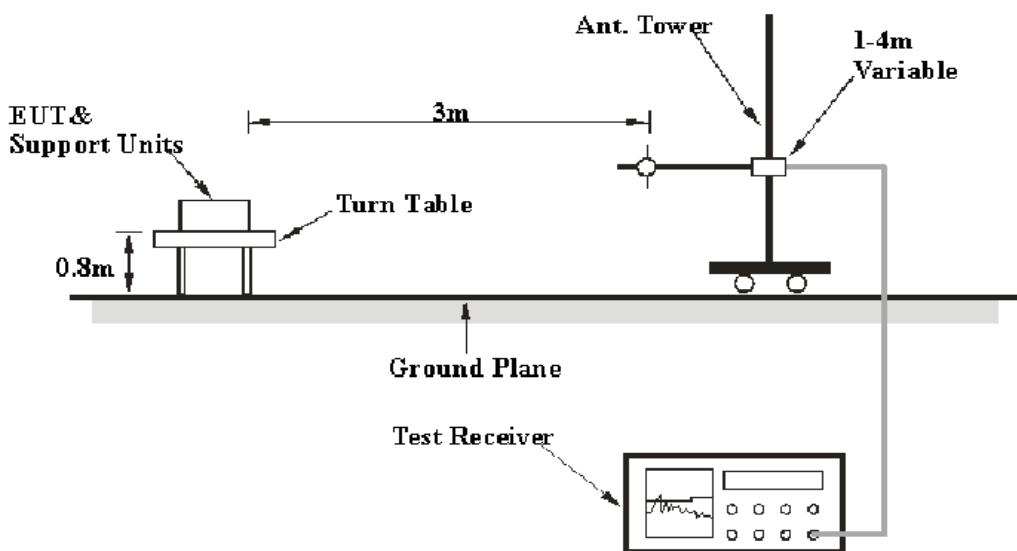
## FCC §15.109 - RADIATED SPURIOUS EMISSIONS

### Applicable Standard

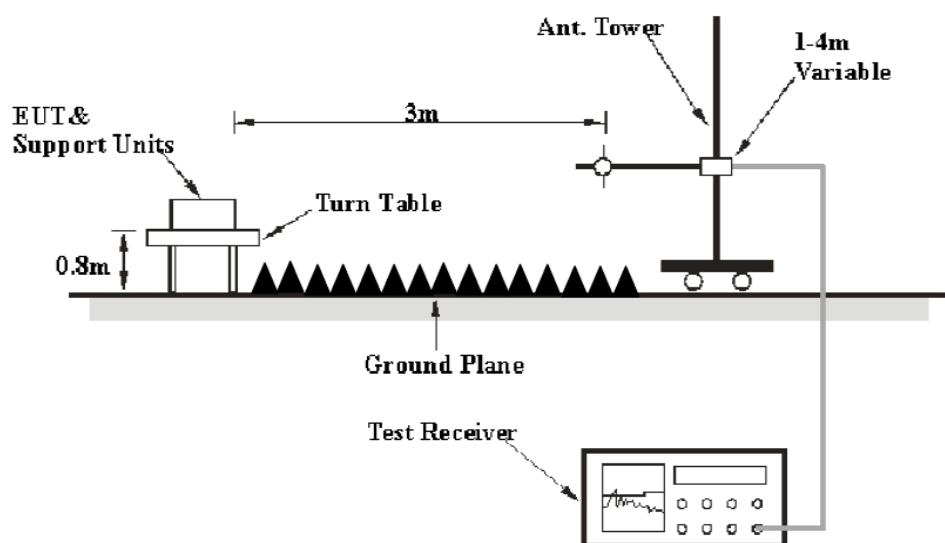
FCC §15.109

### 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

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

In BACL,  $U_{(Lm)}$  is less than  $U_{\text{cisp}}$ , 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>	25 °C
<b>Relative Humidity:</b>	55 %
<b>ATM Pressure:</b>	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 (dB $\mu$ V/m)	FCC Part 15.109	
	Reading (dB $\mu$ V)	Detector (PK/QP/Ave.)		Height (m)	Polar (H / V)			Limit (dB $\mu$ V/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 \*\*\*\*\*