

# FCC PART 15B, CLASS B TEST REPORT

For

**Foream Network Technology Co, Ltd.**

RM1101, Block A, building 5, Shenzhen Software Industry Base, Shenzhen, China

**FCC ID: 2AFHKFD9965**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Foream X1 wearable sport camera
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<b>Report Number:</b> RSZ150727005-00	
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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 FACILITY .....	3
<b>SYSTEM TEST CONFIGURATION.....</b>	<b>4</b>
DESCRIPTION OF TEST CONFIGURATION .....	4
EUT EXERCISE SOFTWARE .....	4
SPECIAL ACCESSORIES.....	4
EQUIPMENT MODIFICATIONS .....	4
SUPPORT EQUIPMENT LIST AND DETAILS .....	4
EXTERNAL I/O CABLE.....	5
BLOCK DIAGRAM OF TEST SETUP .....	5
<b>SUMMARY OF TEST RESULTS .....</b>	<b>6</b>
<b>FCC §15.107 – AC LINE CONDUCTED EMISSIONS.....</b>	<b>7</b>
APPLICABLE STANDARD .....	7
MEASUREMENT UNCERTAINTY.....	7
EUT SETUP .....	7
EMI TEST RECEIVER SETUP.....	8
TEST PROCEDURE .....	8
TEST EQUIPMENT LIST AND DETAILS.....	8
CORRECTED FACTOR & MARGIN CALCULATION .....	8
TEST RESULTS SUMMARY .....	9
TEST DATA .....	9
<b>FCC §15.109 - RADIATED SPURIOUS EMISSIONS .....</b>	<b>12</b>
APPLICABLE STANDARD .....	12
MEASUREMENT UNCERTAINTY.....	12
EUT SETUP .....	12
EMI TEST RECEIVER SETUP.....	13
TEST PROCEDURE .....	14
TEST EQUIPMENT LIST AND DETAILS.....	14
CORRECTED AMPLITUDE & MARGIN CALCULATION .....	14
TEST RESULTS SUMMARY .....	15
TEST DATA .....	15

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## GENERAL INFORMATION

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

The *Foream Network Technology Co, Ltd.* 's product, model number: *FD9965 (FCC ID: 2AFHKFD9965)* or the "EUT" in this report was a *Foream X1 wearable sport camera*, which was measured approximately: 177mm (L) × 177 mm (W) × 27 mm (H), rated with input voltage: DC 3.7 V rechargeable Li-ion battery. The highest operating frequency is 430MHz.

*\*All measurement and test data in this report was gathered from production sample serial number: 1505874 (Assigned by Shenzhen BACL). The EUT supplied by the applicant was received on 2015-07-27.*

### Objective

This test report is prepared on behalf of *Foream Network Technology Co, Ltd.* 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 submissions with FCC ID: 2AFHKFD9965

### Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) 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 October 31, 2013. 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.: 382179. 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: Downloading (data transfer with computer)

### EUT Exercise Software

“BurnIn test v5.3” 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
N/A	earphone	N/A	2365284
Kingston	Micro SD card	4 GB	N/A
TCL	Monitor	TFT1560PS	ALA560S05C180409
DELL	PC	DCSCSF	127BP2X
ECOM	Modem	56000bps	21654684
LISTED	Modem adapter	TYP60-1207000Z	326703
Microsoft	Keyboard	1406	0200706128743
Microsoft	Mouse	1405	0204608630856

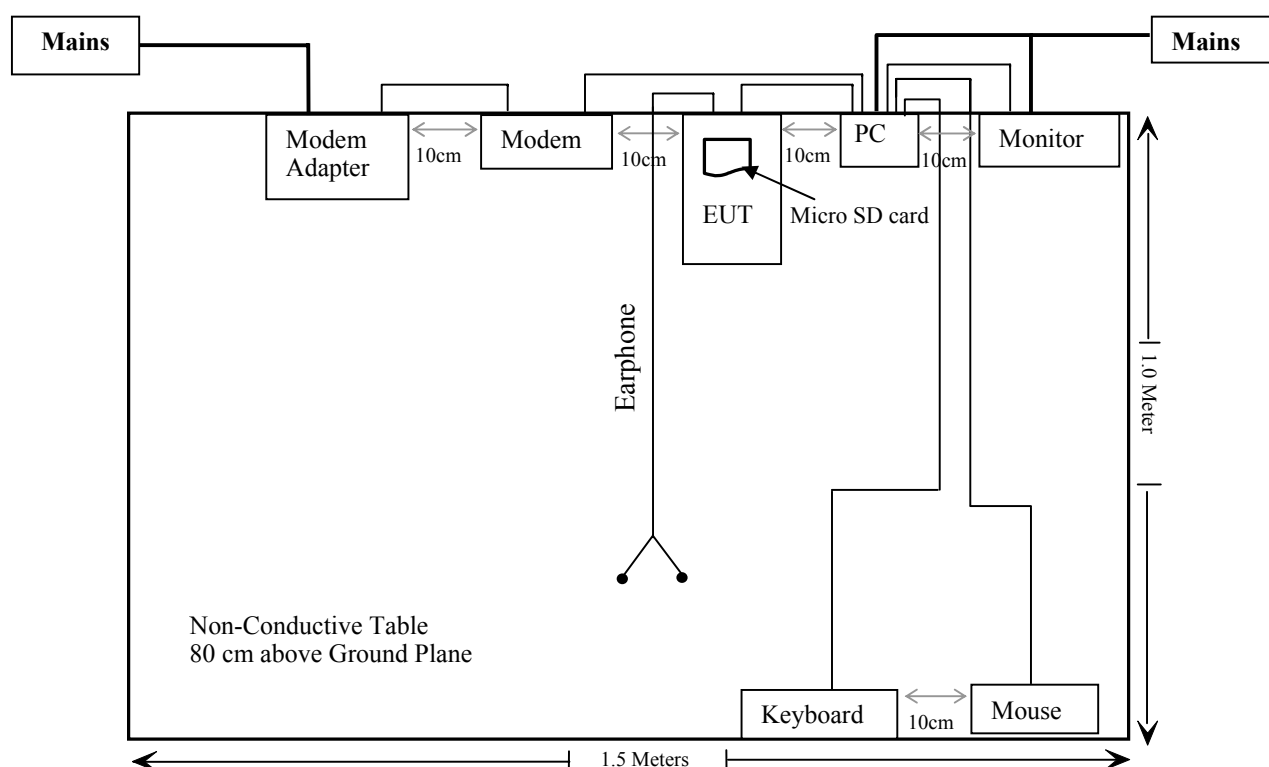
**External I/O Cable**

Cable Description	Length (m)	From / Port	To
Un-Shielded detachable AC cable	1.5	Monitor	Mains
Shielded detachable VGA cable	1.5	PC	Monitor
Un-Shielded detachable AC cable	1.2	PC	Mains
Un-Shielded Un-detachable earphone cable	1.5	Earphone	EUT
Shielded detachable USB cable	0.93	PC	EUT
Un-Shielded detachable RS232 cable	1.8	PC	Modem
Un-Shielded Un-detachable DC cable	1.7	Modem	Modem adapter
Un-Shielded detachable AC cable	1.6	Modem adapter	mains
Shielded Un-detachable USB cable	1.5	Keyboard	PC
Shielded Un-detachable USB cable	1.5	Mouse	PC

**Block Diagram of Test Setup**

For Radiated emission:

Test Mode: Downloading



**SUMMARY OF TEST RESULTS**

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

## FCC §15.107 – AC LINE CONDUCTED EMISSIONS

### Applicable Standard

According to FCC §15.107

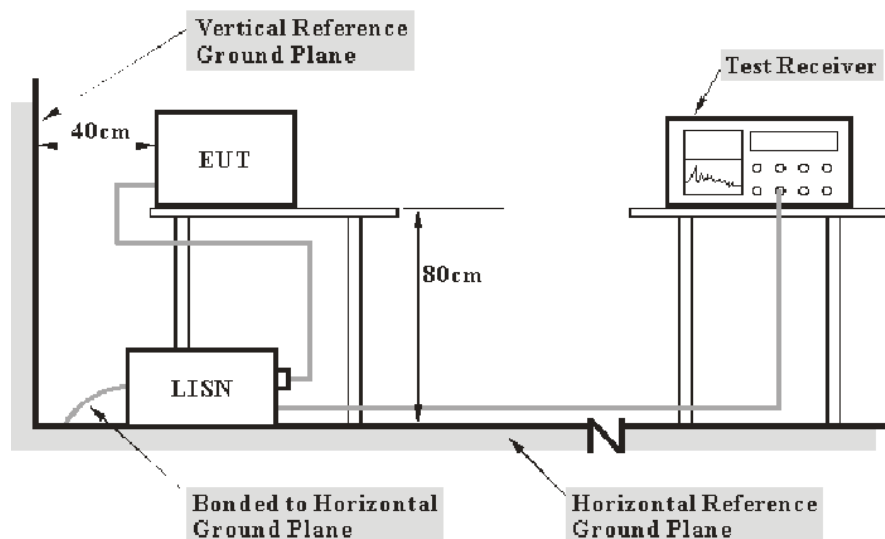
### Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between LISN/ISN and receiver, LISN/ISN voltage division factor, LISN/ISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report

Port	Measurement uncertainty
AC Mains	3.26 dB (k=2, 95% level of confidence)
CAT 3	3.70 dB (k=2, 95% level of confidence)
CAT 5	3.86 dB (k=2, 95% level of confidence)
CAT 6	4.64 dB (k=2, 95% level of confidence)

### 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.

The host PC, LCD Monitor and Modem Adapter were connected to a 120 VAC/60 Hz power source.

## 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

During the conducted emission test, the host PC was connected to the first LISN and the other relevant equipments were connected to the second LISN.

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.

## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2015-06-03	2016-06-03
Rohde & Schwarz	LISN	ENV216	3560.6650.12-101613-Yb	2014-12-01	2015-12-01
Rohde & Schwarz	LISN	ESH2-Z5	892107/021	2015-06-09	2016-06-09
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2015-05-14	2016-05-14
Rohde & Schwarz	CE Test software	EMC 32	V8.53	NCR	NCR

\* **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).

## 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, the worst margin as below:

**5.2 dB at 8.849190 MHz in the Line conducted mode**

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

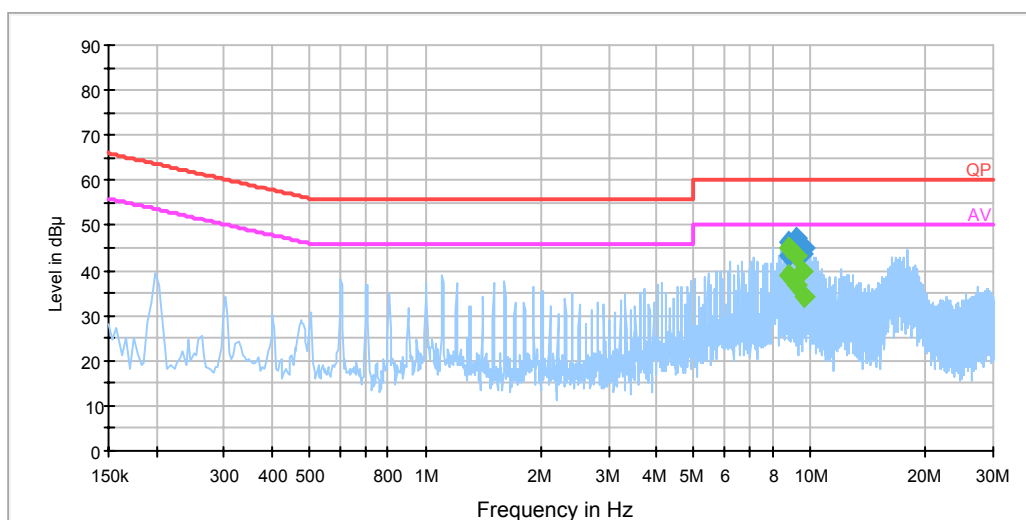
<b>Temperature:</b>	26 °C
<b>Relative Humidity:</b>	52 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Joson Xiao on 2015-08-22.*

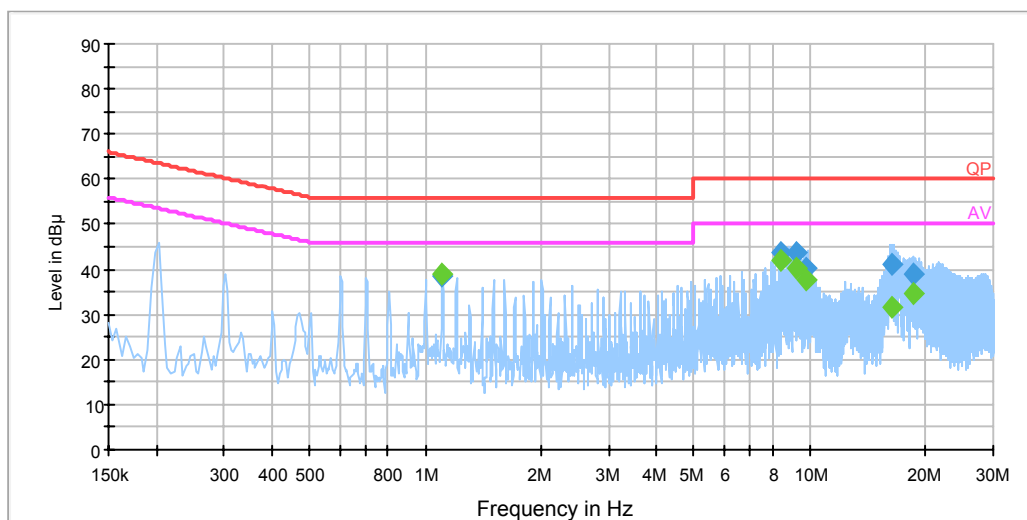
EUT operation mode: Downloading

AC 120V/60 Hz, Line

EMI Auto Test L



Frequency (MHz)	Corrected Amplitude (dBμV)	Corrected Factor (dB)	Limit (dBμV)	Margin (dB)	Remark (PK/QP/Ave.)
8.849190	46.1	20.1	60.0	13.9	QP
8.849190	44.8	20.1	50.0	5.2	Ave.
8.854810	43.3	20.1	60.0	16.7	QP
8.854810	38.8	20.1	50.0	11.2	Ave.
9.247190	47.2	20.1	60.0	12.8	QP
9.247190	36.8	20.1	50.0	13.2	Ave.
9.253630	44.7	20.1	60.0	15.3	QP
9.253630	43.1	20.1	50.0	6.9	Ave.
9.549190	43.5	20.1	60.0	16.5	QP
9.549190	39.8	20.1	50.0	10.2	Ave.
9.647690	44.9	20.1	60.0	15.1	QP
9.647690	34.4	20.1	50.0	15.6	Ave.

**AC 120V/60 Hz, Neutral****EMI Auto Test N**

Frequency (MHz)	Corrected Amplitude (dBμV)	Corrected Factor (dB)	Limit (dBμV)	Margin (dB)	Remark (PK/QP/Ave.)
1.105410	38.4	20.0	56.0	17.6	QP
1.105410	38.8	20.0	46.0	7.2	Ave.
8.440870	43.5	20.1	60.0	16.5	QP
8.440870	41.9	20.1	50.0	8.1	Ave.
9.243310	43.9	20.1	60.0	16.1	QP
9.243310	40.4	20.1	50.0	9.6	Ave.
9.754250	40.4	20.1	60.0	19.6	QP
9.754250	37.7	20.1	50.0	12.3	Ave.
16.394470	41.0	20.1	60.0	19.0	QP
16.394470	31.5	20.1	50.0	18.5	Ave.
18.592710	39.1	20.1	60.0	20.9	QP
18.592710	34.7	20.1	50.0	15.3	Ave.

**Note:**

- 1) Correction Factor = LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter Attenuation  
The corrected factor has been input into the transducer of the test software.
- 2) Corrected Amplitude = Reading + Correction Factor
- 3) Margin = Limit – Corrected Amplitude

## FCC §15.109 - RADIATED SPURIOUS EMISSIONS

### Applicable Standard

FCC §15.109

### Measurement Uncertainty

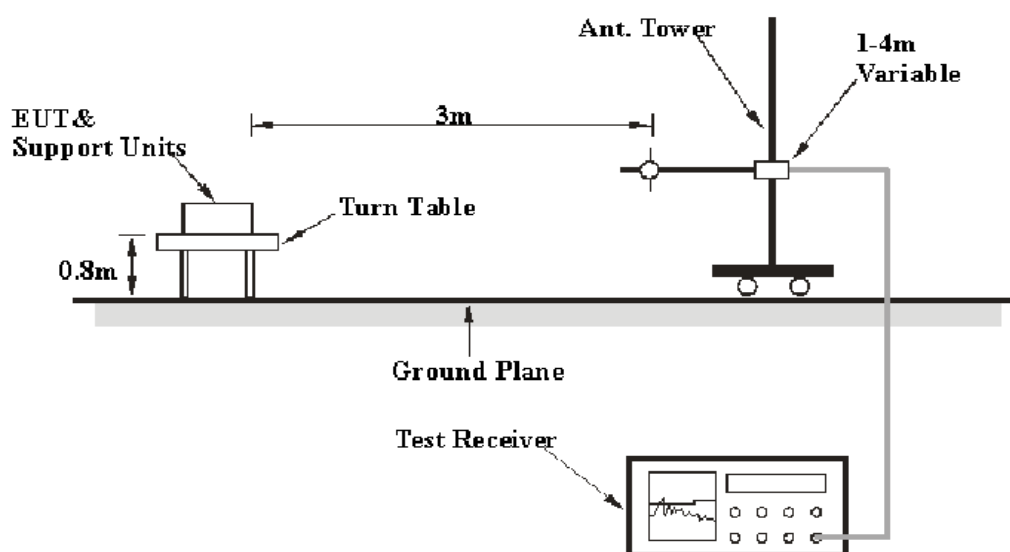
All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown in below table. And the uncertainty will not be taken into consideration for the test data recorded in the report

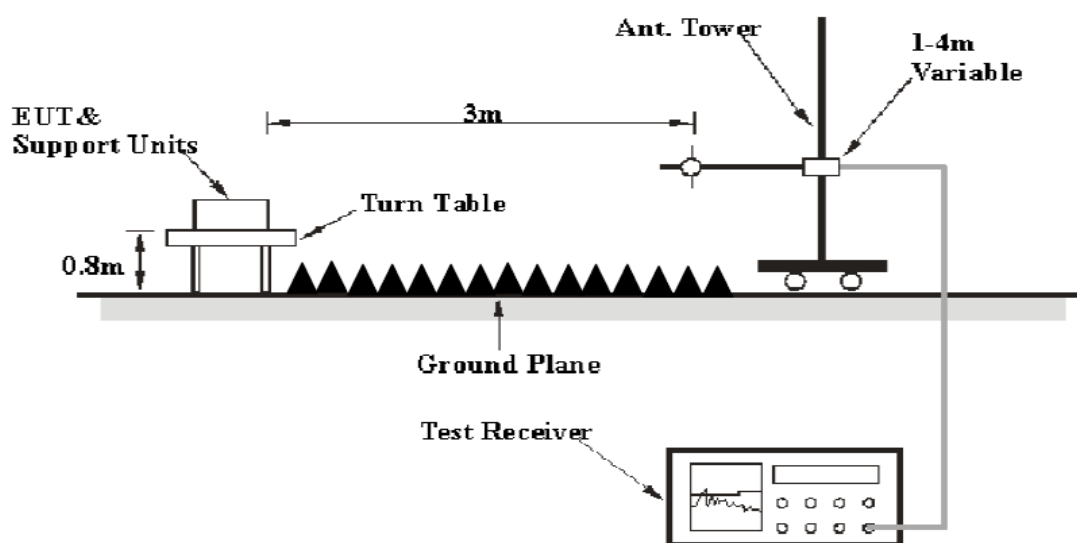
Frequency	Polarity	Measurement uncertainty
30 MHz~200 MHz	Horizontal	4.62 dB (k=2, 95% level of confidence)
	Vertical	4.54 dB (k=2, 95% level of confidence)
200 MHz~1 GHz	Horizontal	4.84 dB (k=2, 95% level of confidence)
	Vertical	5.91 dB (k=2, 95% level of confidence)
1 GHz~6 GHz	Horizontal/Vertical	4.68 dB (k=2, 95% level of confidence)
Above 6 GHz	Horizontal/Vertical	4.92 dB (k=2, 95% level of confidence)

### 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.

The host PC, LCD Monitor and Modem Adapter were connected to a 120 VAC/60 Hz power source.

### 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.

## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447E	1937A01046	2015-05-06	2016-05-06
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2014-11-03	2015-11-03
Sunol Sciences	Bi-log Antenna	JB1	A040904-2	2014-12-07	2017-12-06
A.H. System	Horn Antenna	SAS-200/571	135	2015-02-10	2018-02-10
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2014-12-11	2015-12-11
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2015-04-23	2016-04-23
TDK	Chamber	Chamber A	2#	2015-10-15	2018-10-15
TDK	Chamber	Chamber B	1#	2015-07-22	2018-07-22
R&S	Auto test Software	EMC32	V9.10	NCR	NCR

\* **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).

## 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, the worst margin reading as below:

**4.23 dB at 30.013125 MHz in the Vertical polarization**

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

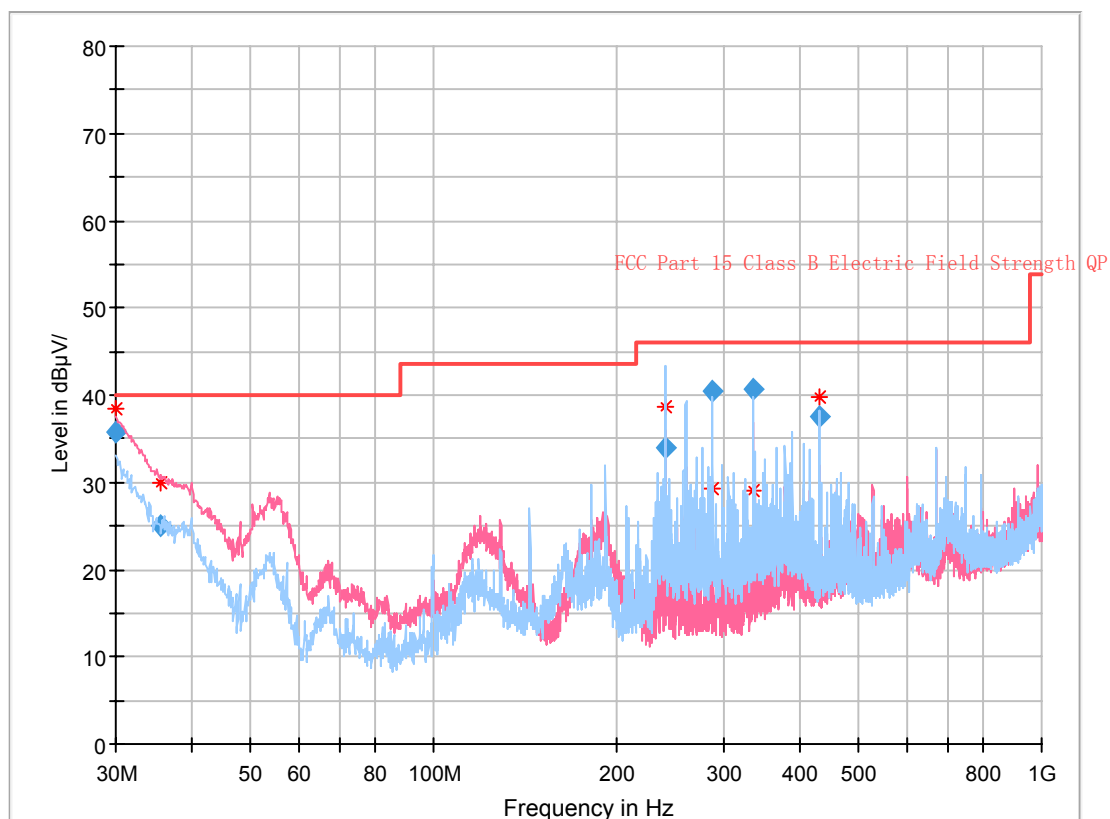
Temperature:	26 °C
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

*The testing was performed by Joson Xiao on 2015-08-22.*

EUT operation mode: Downloading

30 MHz~1 GHz

Full Spectrum



Frequency (MHz)	Corrected Amplitude (dBμV/m)	Antenna height (cm)	Antenna Polarity	Turntable position (deg)	Correction Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
30.013125	35.77	383.0	V	304.0	-5.9	40.00	4.23
35.621875	24.97	114.0	V	287.0	-10.6	40.00	15.03
240.077625	33.97	117.0	H	136.0	-14.8	46.00	12.03
287.994875	40.40	126.0	H	251.0	-12.6	46.00	5.60
336.009000	40.69	117.0	H	152.0	-12.0	46.00	5.31
432.007125	37.65	108.0	H	303.0	-10.0	46.00	8.35



**Above 1G:**

Frequency (MHz)	Reading (dBμV)	Detector (PK/QP/Ave.)	Turntable Degree	Height (m)	Polar (H/V)	Correction Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1899.79	30.09	PK	291	1.2	H	2.63	32.72	74	41.28
1899.79	19.94	Ave.	291	1.2	H	2.63	22.57	54	31.43
1601.20	30.57	PK	192	1.5	V	1.7	32.27	74	41.73
1601.20	21.25	Ave.	192	1.5	V	1.7	22.95	54	31.05

Note:

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

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