

**FCC PART 15B**  
**MEASUREMENT AND TEST REPORT**

For

**Ningbo Baihuang Electric Appliances Co., Ltd.**

No.180,Yanshan Rd,Huximen,Heng He Town,Cixi,Ningbo,China.

**FCC ID: Q92-BH9907U**

|                                                                                                                                                                                                                            |                                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| <b>Report Type:</b><br>Original Report                                                                                                                                                                                     | <b>Product Type:</b><br>Remote Control Switch Receiver |
| <b>Test Engineer:</b> Allen Tian                                                                                                                                                                                           | <i>Allen - tian</i>                                    |
| <b>Report Number:</b> RKS150918001-00C                                                                                                                                                                                     |                                                        |
| <b>Report Date:</b> 2015-12-18                                                                                                                                                                                             |                                                        |
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## GENERAL INFORMATION

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

The Ningbo Baihuang Electric Appliances Co., Ltd.'s product, model number: BH9907U (FCC ID: Q92-BH9907U) or the "EUT" in this report is a Remote Control Switch Receiver, the input power is AC 120V/60Hz. The highest operating frequency is 433.92MHz.

*\*The product's series model number: 9907-Receiver, ZAP-S. These models have the same Circuits and components. The difference of these models are have different model name.*

*\*All measurement and test data in this report was gathered from production sample serial number: 151206006 (Assigned by BACL, Kunshan). The EUT supplied by the applicant was received on 2015-12-06*

### Objective

This report is prepared on behalf of Ningbo Baihuang Electric Appliances Co., Ltd. in accordance with Part 2-Subpart J, and Part 15-Subparts A and B of the Federal Communication Commissions rules.

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

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

No related submittal(s).

### 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 radiated and conducted 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.

### Test Facility

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

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 (FCC §15.27)****Justification**

The system was configured for testing in a typical fashion (as normally used by a typical user).

**EUT Exercise Software**

No exercise software was used.

**Special Accessories**

No special accessory was used.

**Equipment Modifications**

No modification was made to the EUT tested.

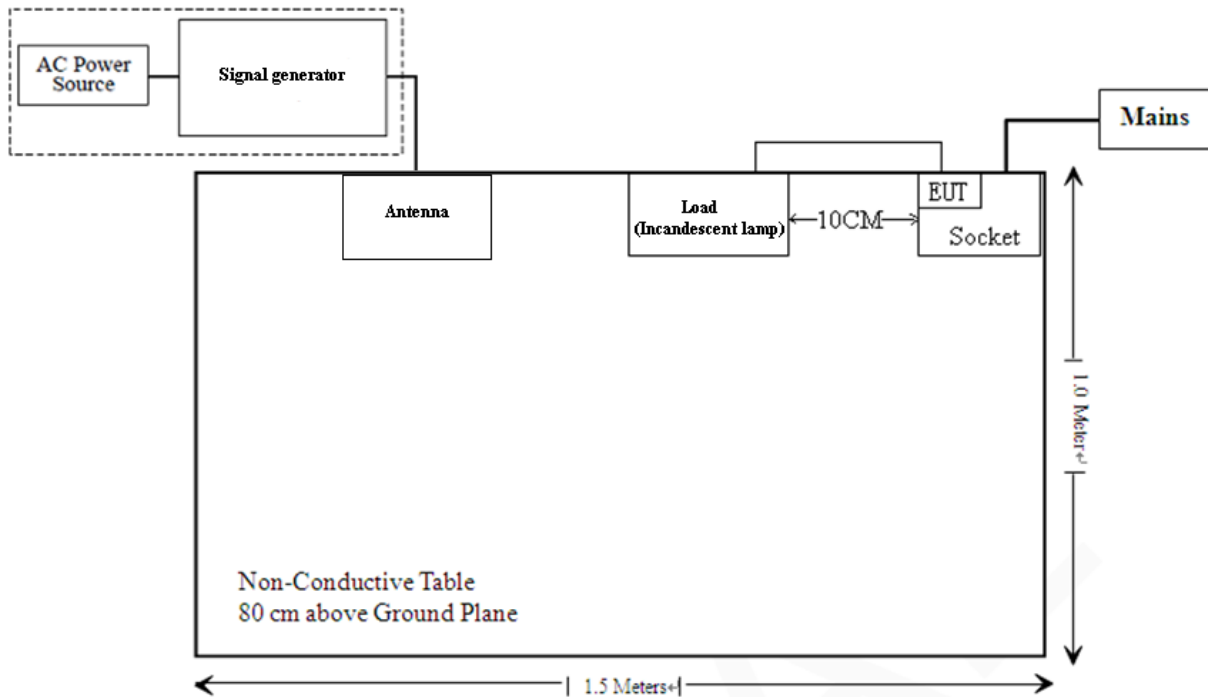
**Support Equipment List and Details**

| Manufacturer | Description             | Model | Serial Number |
|--------------|-------------------------|-------|---------------|
| /            | Load(Incandescent lamp) | 100W  | /             |

**External I/O Cable**

| Cable Description | Length (m) | From/Port | To |
|-------------------|------------|-----------|----|
| /                 | /          | /         | /  |

## Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

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

## FCC §15.107 – AC LINE CONDUCTED EMISSIONS

### Applicable Standard

According to FCC§15.107

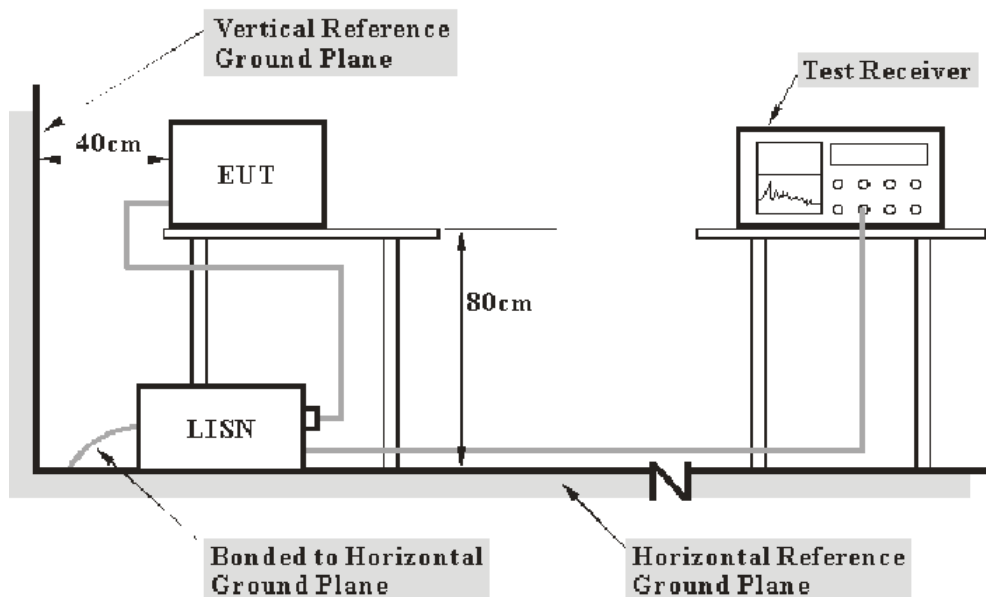
### Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between LISN and receiver, LISN voltage division factor, LISN 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. (Kunshan) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report.

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

The EUT was connected to an AC 120V/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 EUT was connected to the outlet of the LISN.

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.

### Test Equipment List and Details

| Manufacturer    | Description       | Model   | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-------------------|---------|---------------|------------------|----------------------|
| Rohde & Schwarz | EMI Test Receiver | ESCS30  | 934115/007    | 2015-11-4        | 2016-11-3            |
| Rohde & Schwarz | LISN              | ESH3-Z5 | 862770/011    | 2015-11-4        | 2016-11-3            |
| Rohde & Schwarz | LISN              | ESH3-Z5 | 12008         | 2015-06-23       | 2016-06-22           |
| Rohde & Schwarz | Transient Limiter | ESH3Z2  | DE25985       | 2015-09-16       | 2016-09-15           |
| Rohde & Schwarz | CE Test software  | EMC 32  | V 09.10.0     | --               | --                   |

**\* 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).

### 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:

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

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:

$$\text{Margin} = \text{Limit} - (\text{QuasiPeak} \& \text{Average})$$

## Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.107 Class B, the worst margin reading as below:

**14.87 dB at 6.745000 MHz** in the **Line** conducted mode

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

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

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

## Test Data

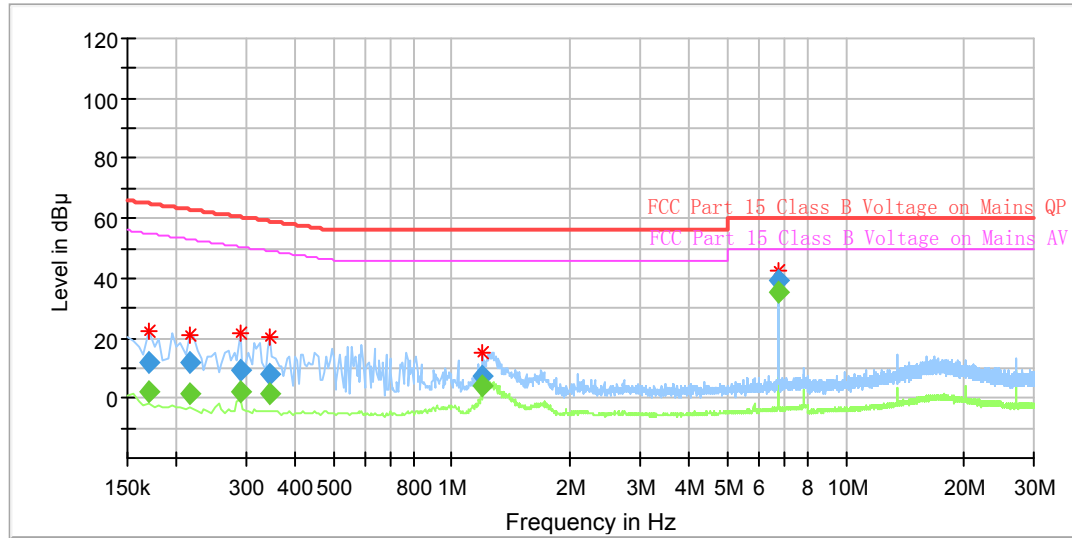
### Environmental Conditions

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 25 °C     |
| <b>Relative Humidity:</b> | 51 %      |
| <b>ATM Pressure:</b>      | 101.0 kPa |

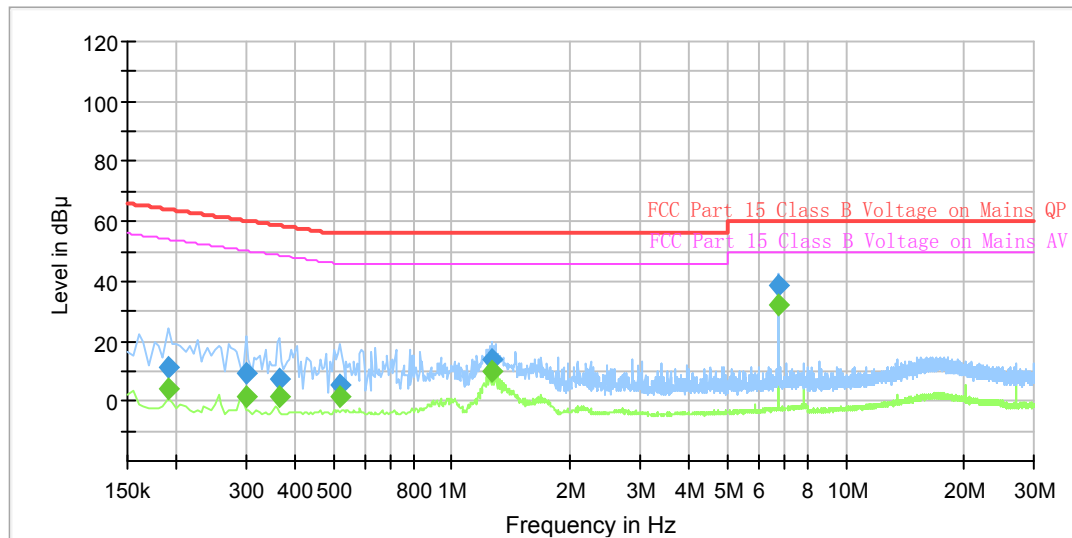
*The testing was performed by Allen.tian on 2015-12-14*

Test Mode: on

## AC 120V/60 Hz, Line



| Frequency (MHz) | Corrected Amplitude    |                      | Limit (dB $\mu$ V) | Margin (dB) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------------|----------------------|--------------------|-------------|-----------------|------|------------|
|                 | QuasiPeak (dB $\mu$ V) | Average (dB $\mu$ V) |                    |             |                 |      |            |
| 0.170000        | ---                    | 1.98                 | 54.96              | 52.98       | 9.000           | L1   | 11.0       |
| 0.170000        | 11.80                  | ---                  | 64.96              | 53.16       | 9.000           | L1   | 11.0       |
| 0.215000        | ---                    | 1.57                 | 53.01              | 51.44       | 9.000           | L1   | 11.0       |
| 0.215000        | 11.80                  | ---                  | 63.01              | 51.21       | 9.000           | L1   | 11.0       |
| 0.290000        | ---                    | 2.35                 | 50.52              | 48.17       | 9.000           | L1   | 11.0       |
| 0.290000        | 9.24                   | ---                  | 60.52              | 51.28       | 9.000           | L1   | 11.0       |
| 0.345000        | ---                    | 1.29                 | 49.08              | 47.79       | 9.000           | L1   | 11.0       |
| 0.345000        | 8.17                   | ---                  | 59.08              | 50.91       | 9.000           | L1   | 11.0       |
| 1.200000        | ---                    | 4.07                 | 46.00              | 41.93       | 9.000           | L1   | 11.1       |
| 1.200000        | 7.22                   | ---                  | 56.00              | 48.78       | 9.000           | L1   | 11.1       |
| 6.745000        | ---                    | 35.13                | 50.00              | 14.87       | 9.000           | L1   | 11.4       |
| 6.745000        | 39.32                  | ---                  | 60.00              | 20.68       | 9.000           | L1   | 11.4       |

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

| Frequency (MHz) | Corrected Amplitude |                  | Limit (dB μ V) | Margin (dB) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|---------------------|------------------|----------------|-------------|-----------------|------|------------|
|                 | QuasiPeak (dB μ V)  | Average (dB μ V) |                |             |                 |      |            |
| 0.190000        | ---                 | 4.11             | 54.04          | 49.93       | 9.000           | N    | 11.0       |
| 0.190000        | 11.49               | ---              | 64.04          | 52.55       | 9.000           | N    | 11.0       |
| 0.300000        | ---                 | 1.58             | 50.24          | 48.66       | 9.000           | N    | 11.0       |
| 0.300000        | 9.40                | ---              | 60.24          | 50.84       | 9.000           | N    | 11.0       |
| 0.365000        | ---                 | 1.35             | 48.61          | 47.26       | 9.000           | N    | 11.0       |
| 0.365000        | 7.28                | ---              | 58.61          | 51.33       | 9.000           | N    | 11.0       |
| 0.520000        | ---                 | 1.45             | 46.00          | 44.55       | 9.000           | N    | 11.0       |
| 0.520000        | 5.11                | ---              | 56.00          | 50.89       | 9.000           | N    | 11.0       |
| 1.265000        | ---                 | 9.96             | 46.00          | 36.04       | 9.000           | N    | 11.1       |
| 1.265000        | 14.18               | ---              | 56.00          | 41.82       | 9.000           | N    | 11.1       |
| 6.745000        | ---                 | 32.36            | 50.00          | 17.64       | 9.000           | N    | 11.4       |
| 6.745000        | 38.59               | ---              | 60.00          | 21.41       | 9.000           | N    | 11.4       |

Note:

- 1) Corrected Amplitude = Reading + Correction Factor
- 2) Margin = Limit – Corrected Amplitude

**FCC §15.109 - RADIATED EMISSIONS****Applicable Standard**

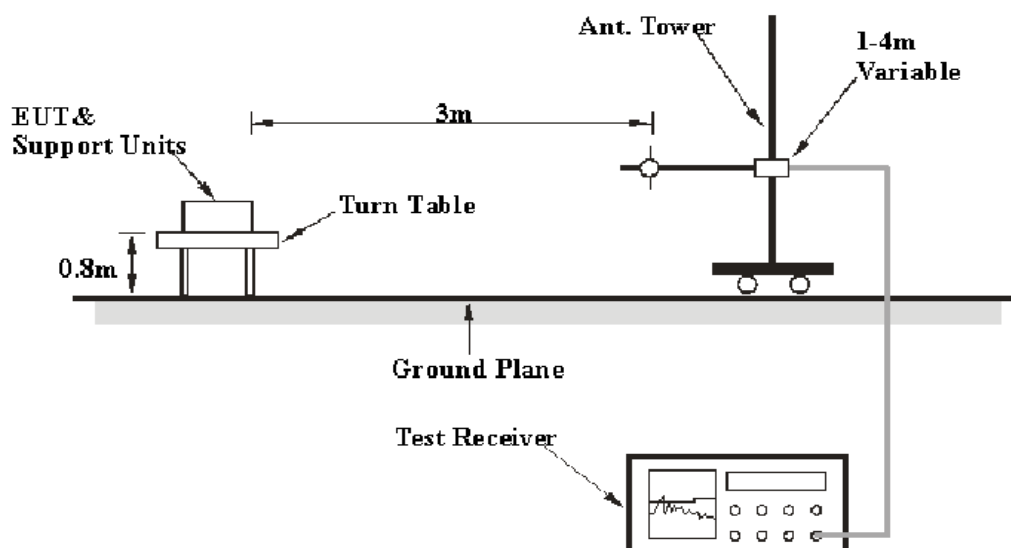
FCC §15.109

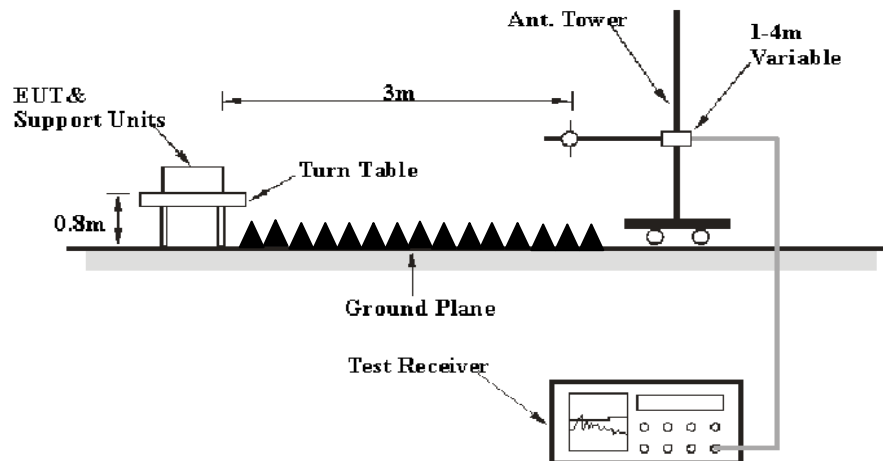
**Measurement Uncertainty**

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. (Kunshan) 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**



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 EUT was connected to an AC 120V/60 Hz power source.

### EMI Test Receiver Setup

The system was investigated from 30 MHz to 6 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 |
|-------------------|--------------------|------------|---------------|------------------|----------------------|
| Sonoma Instrument | Amplifier          | 330        | 171377        | 2015-09-16       | 2016-09-15           |
| Rohde & Schwarz   | EMI Test Receiver  | ESCI       | 100195        | 2015-05-20       | 2016-05-19           |
| Sunol Sciences    | Broadband Antenna  | JB3        | A090314-2     | 2015-11-07       | 2016-11-06           |
| ETS               | Horn Antenna       | 3115       | 6229          | 2015-11-07       | 2016-11-06           |
| Rohde & Schwarz   | Signal Analyzer    | FSIQ26     | 100048        | 2015-11-04       | 2016-11-03           |
| Mini              | Pre-amplifier      | ZVA-183-S+ | 857001418     | 2015-09-16       | 2016-09-15           |
| R&S               | Auto test Software | EMC32      | V 09.10.0     | -                | -                    |

\* **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).

## Correction Factor & Margin Calculation

The Correction Factor is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain. The basic equation is as follows:

$$\text{Correction Factor} = \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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:

$$\text{Margin} = \text{Limit} - (\text{QuasiPeak} \& \text{Average})$$

## Test Results Summary

According to the data in the following table, the EUT complied with the FCC §15.109 Class B, with the worst margin reading of:

**25.36 dB at 32.759300 MHz in the Horizontal polarization mode**

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

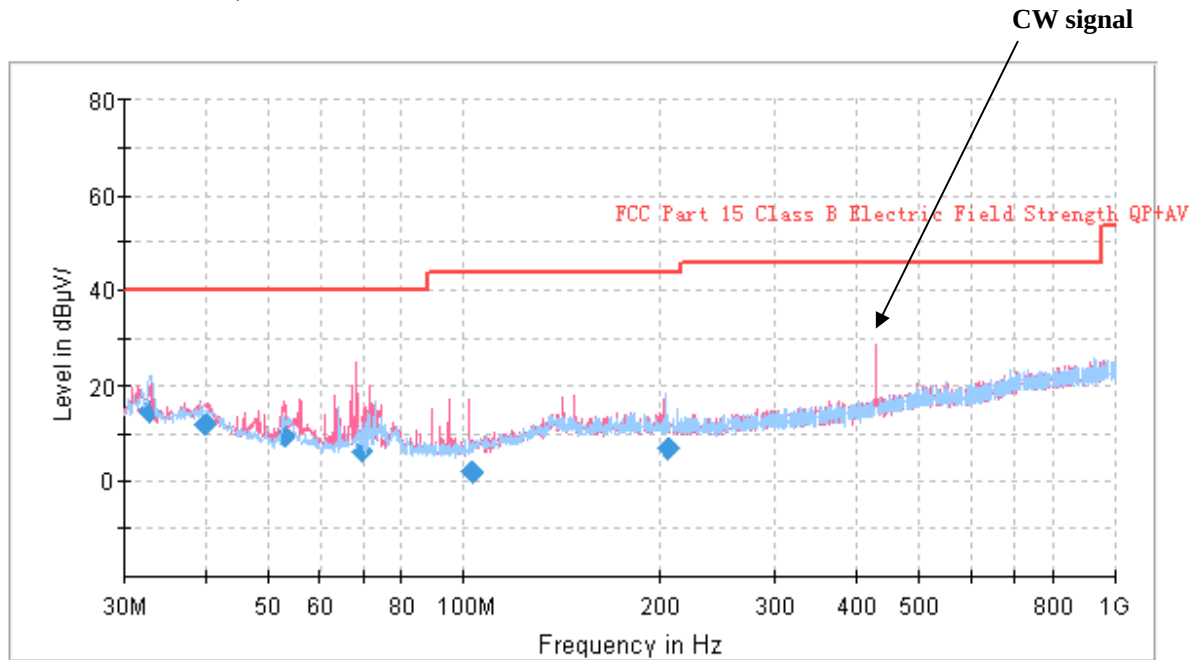
### Environmental Conditions

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 25°C      |
| <b>Relative Humidity:</b> | 51 %      |
| <b>ATM Pressure:</b>      | 101.0 kPa |

*The testing was performed by Allen Tian on 2015-11-13*

Operation Mode: on

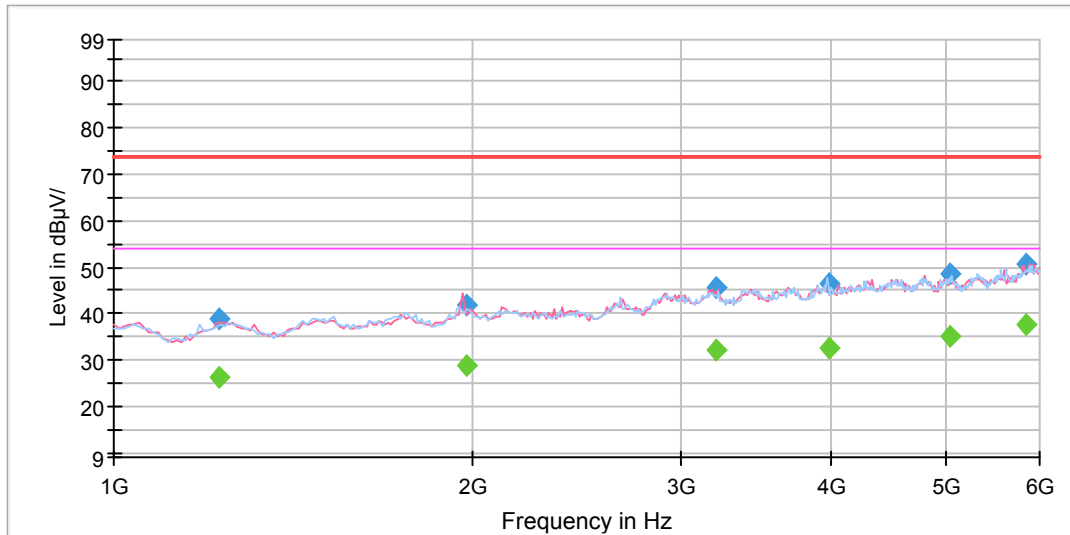
AC 120V/60 Hz, 30MHz ~ 1GHz



| Frequency (MHz) | Corrected Amplitude (dB μ V/m) | Detector  | Limit (dB μ V/m) | Margin (dB) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|--------------------------------|-----------|------------------|-------------|-----------------|-------------|-----|---------------|------------|
| 32.759300       | 14.64                          | QuasiPeak | 40.00            | 25.36       | 120.000         | 100.0       | H   | 240.0         | -10.4      |
| 39.989750       | 12.10                          | QuasiPeak | 40.00            | 27.90       | 120.000         | 200.0       | V   | 156.0         | -10.2      |
| 52.912500       | 9.55                           | QuasiPeak | 40.00            | 30.45       | 120.000         | 100.0       | V   | 82.0          | -16.5      |
| 69.782500       | 6.15                           | QuasiPeak | 40.00            | 33.85       | 120.000         | 200.0       | V   | 292.0         | -17.0      |
| 102.674550      | 2.05                           | QuasiPeak | 43.50            | 41.45       | 120.000         | 100.0       | V   | 358.0         | -16.5      |
| 205.272400      | 6.92                           | QuasiPeak | 43.50            | 36.58       | 120.000         | 100.0       | H   | 178.0         | -12.3      |

**AC 120V/60Hz, 1GHz ~ 6GHz**

Full Spectrum



| Frequency (MHz) | MaxPeak (dB $\mu$ V/m) | Average (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|------------------------|------------------------|----------------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 1226.333299     | 38.99                  | ---                    | 73.90                | 34.91       | 1000.0          | 1000.000        | 150.0       | V   | 194.0         | -1.9       |
| 1226.333299     | ---                    | 26.35                  | 53.90                | 27.55       | 1000.0          | 1000.000        | 150.0       | V   | 194.0         | -1.9       |
| 1978.078680     | ---                    | 28.83                  | 53.90                | 25.07       | 1000.0          | 1000.000        | 150.0       | V   | 48.0          | 3.8        |
| 1978.078680     | 41.73                  | ---                    | 73.90                | 32.17       | 1000.0          | 1000.000        | 150.0       | V   | 48.0          | 3.8        |
| 3203.398502     | 45.43                  | ---                    | 73.90                | 28.47       | 1000.0          | 1000.000        | 250.0       | V   | 171.0         | 9.2        |
| 3203.398502     | ---                    | 32.30                  | 53.90                | 21.60       | 1000.0          | 1000.000        | 250.0       | V   | 171.0         | 9.2        |
| 3988.446394     | 46.48                  | ---                    | 73.90                | 27.42       | 1000.0          | 1000.000        | 249.0       | H   | 13.0          | 11.7       |
| 3988.446394     | ---                    | 32.60                  | 53.90                | 21.30       | 1000.0          | 1000.000        | 249.0       | H   | 13.0          | 11.7       |
| 5038.255659     | ---                    | 35.10                  | 53.90                | 18.80       | 1000.0          | 1000.000        | 150.0       | V   | 135.0         | 14.2       |
| 5038.255659     | 48.55                  | ---                    | 73.90                | 25.35       | 1000.0          | 1000.000        | 150.0       | V   | 135.0         | 14.2       |
| 5836.457113     | ---                    | 37.46                  | 53.90                | 16.44       | 1000.0          | 1000.000        | 150.0       | V   | 191.0         | 16.6       |
| 5836.457113     | 50.72                  | ---                    | 73.90                | 23.18       | 1000.0          | 1000.000        | 150.0       | V   | 191.0         | 16.6       |

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