

# FCC PART 15.407 TEST REPORT

For

## Shenzhen Lenkeng Technology Co., Ltd

West 4F, Jinguangxia Culture&Tech Park, 3 Guangxia Road, Shenzhen, 518049 China

**FCC ID: 2ADXC16WA88**

|                                                                                                                                                                                                                                                                                                                 |                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <b>Report Type:</b><br>Original Report                                                                                                                                                                                                                                                                          | <b>Product Type:</b><br>Wireless Extender |
| <b>Test Engineer:</b> Hill He <i>HYM He</i>                                                                                                                                                                                                                                                                     |                                           |
| <b>Report Number:</b> RSZ151120554-00A                                                                                                                                                                                                                                                                          |                                           |
| <b>Report Date:</b> 2016-01-25                                                                                                                                                                                                                                                                                  |                                           |
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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

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

The Shenzhen Lenkeng Technology Co., Ltd's product, model number: LKV388A (FCC ID: 2ADXC16WA88) or the "EUT" in this report was a *Wireless Extender*, which was measured approximately: 19.5 cm (L) x 13.8 cm (W) x 3.1 cm(H), rated with input voltage: DC 5.0V from adapter.

Adapter information:

Model: NBS24J050300HU

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

Output: DC 5.0V, 3.0A

*Note: The series product, model LKV388A, LKV388, LKV688-200M, LKV388SDI, LKV388VGA and LKV388DVI have the same or similar appearance, structure, PCB, Material and function. Model LKV388A was selected for fully testing. The detailed information can be referred to the attached declaration letter which was stated and guaranteed by the applicant.*

*\* All measurement and test data in this report was gathered from production sample serial number: 1511017 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2015-11-20.*

### Objective

This type approval report is prepared on behalf of *Shenzhen Lenkeng Technology Co., Ltd* in accordance with Part 2-Subpart J, Part 15-Subparts A, B and E of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart E, section 15.203, 15.205, 15.207, 15.209 and 15.407 rules.

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

No related submittal(s).

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

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

Measurement uncertainty with RF radiated emission is 5.81 dB for 30MHz-1GHz.and 4.88 dB for above 1GHz, 1.95dB for conducted measurement.

## **Test Facility**

The test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F, the 3<sup>rd</sup> 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 C63.10-2013.

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 an engineering mode, which was provided by manufacturer.

### EUT Exercise Software

N/A

### Equipment Modifications

No modification was made to the EUT tested.

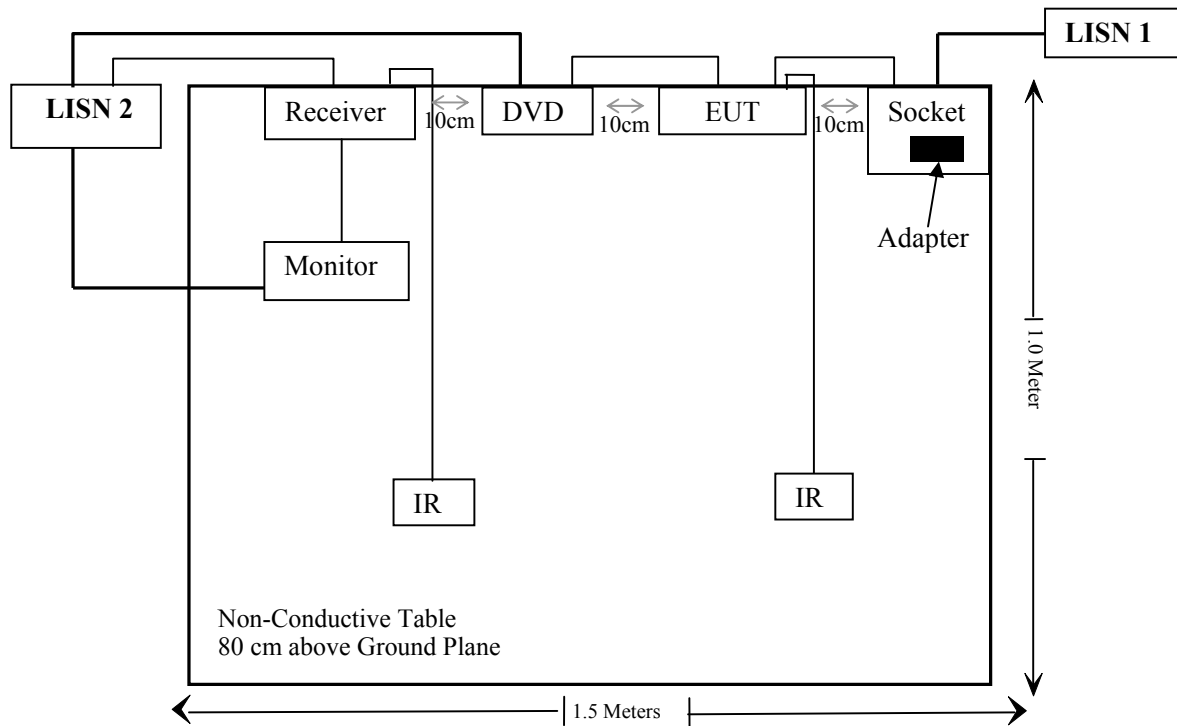
### Support Equipment List and Details

| Manufacturer | Description | Model       | Serial Number   |
|--------------|-------------|-------------|-----------------|
| Bull         | Socket      | N/A         | N/A             |
| PHILIPS      | DVD         | DVP5986K/93 | KX1A0712545698  |
| SANSUNG      | Monitor     | 225MS       | CR22HV2P401073M |
| Lenkeng      | Receiver    | LKV388A     | N/A             |

### External I/O Cable

| Cable Description                       | Length (m) | From/Port | To       |
|-----------------------------------------|------------|-----------|----------|
| Un-shielding Un-detachable AC Cable     | 1.0        | Socket    | LISN 1   |
| Un-shielding Un-detachable DC Cable     | 1.5        | EUT       | Adapter  |
| Shielding Detachable HDMI Cable         | 1.0        | EUT       | DVD      |
| Un-shielding Un-detachable Singal Cable | 1.0        | Receiver  | IR       |
| Un-shielding Un-detachable Singal Cable | 1.0        | EUT       | IR       |
| Un-shielding Detachable AC Cable        | 1.2        | DVD       | LISN 2   |
| Un-shielding Un-detachable DC Cable     | 1.5        | Receiver  | LISN 2   |
| Un-shielding Detachable AC Cable        | 1.5        | Monitor   | LISN 2   |
| Shielding Detachable HDMI Cable         | 1.0        | Monitor   | Receiver |

# Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

| FCC Rules                                   | Description of Test                    | Result     |
|---------------------------------------------|----------------------------------------|------------|
| §15.407 (f), §2.1091                        | Maximum Permissible Exposure (MPE)     | Compliance |
| §15.203                                     | Antenna Requirement                    | Compliance |
| §15.407(b)(6)& §15.207(a)                   | Conducted Emissions                    | Compliance |
| §15.205& §15.209<br>&§15.407(b) (1),(6),(7) | Undesirable Emission& Restricted Bands | Compliance |
| §15.407(a) (1)                              | 26 dB Emission Bandwidth               | Compliance |
| §15.407(a)(1)                               | Conducted Transmitter Output Power     | Compliance |
| §15.407 (a)(1)                              | Power Spectral Density                 | Compliance |

## **FCC §15.407 (f) & §2.1091 –MAXIMUM PERMISSIBLE EXPOSURE (MPE)**

### **Applicable Standard**

According to FCC §2.1091 and §1.1307(b) (1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

| <b>(B) Limits for General Population/Uncontrolled Exposure</b> |                                      |                                      |                                          |                                 |
|----------------------------------------------------------------|--------------------------------------|--------------------------------------|------------------------------------------|---------------------------------|
| <b>Frequency Range (MHz)</b>                                   | <b>Electric Field Strength (V/m)</b> | <b>Magnetic Field Strength (A/m)</b> | <b>Power Density (mW/cm<sup>2</sup>)</b> | <b>Averaging Time (minutes)</b> |
| 0.3–1.34                                                       | 614                                  | 1.63                                 | *(100)                                   | 30                              |
| 1.34–30                                                        | 824/f                                | 2.19/f                               | *(180/f <sup>2</sup> )                   | 30                              |
| 30–300                                                         | 27.5                                 | 0.073                                | 0.2                                      | 30                              |
| 300–1500                                                       | /                                    | /                                    | f/1500                                   | 30                              |
| 1500–100,000                                                   | /                                    | /                                    | 1.0                                      | 30                              |

f = frequency in MHz; \* = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

### **Calculated Formulary:**

Predication of MPE limit at a given distance

$S = PG/4\pi R^2$  = power density (in appropriate units, e.g. mW/cm<sup>2</sup>);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

### **Calculated Data:**

| <b>Frequency (MHz)</b> | <b>Antenna Gain</b> |                  | <b>Turn-up Conducted Power</b> |             | <b>Evaluation Distance (m)</b> | <b>Power Density (mW/cm<sup>2</sup>)</b> | <b>MPE Limit (mW/cm<sup>2</sup>)</b> |
|------------------------|---------------------|------------------|--------------------------------|-------------|--------------------------------|------------------------------------------|--------------------------------------|
|                        | <b>(dBi)</b>        | <b>(numeric)</b> | <b>(dBm)</b>                   | <b>(mW)</b> |                                |                                          |                                      |
| 5200                   | 5.0                 | 3.16             | 16.50                          | 44.67       | 0.2                            | 0.028                                    | 1.0                                  |

Note: To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

### **Result: Compliance**

## **FCC §15.203 – ANTENNA REQUIREMENT**

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### **Applicable Standard**

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.407 (a), if the transmitting antennas of directional gain greater than 6dBi are used, the transmit power and power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### **Antenna Connector Construction**

The EUT has a RP-SMA antenna connector which the maximum gain is 5dBi, fulfill the requirement of this section, and please refer to the EUT photo.

**Result:** Compliance.

## FCC §15.407 (b) (6) §15.207 (a) – CONDUCTED EMISSIONS

### Applicable Standard

FCC §15.207, §15.407(b) (6)

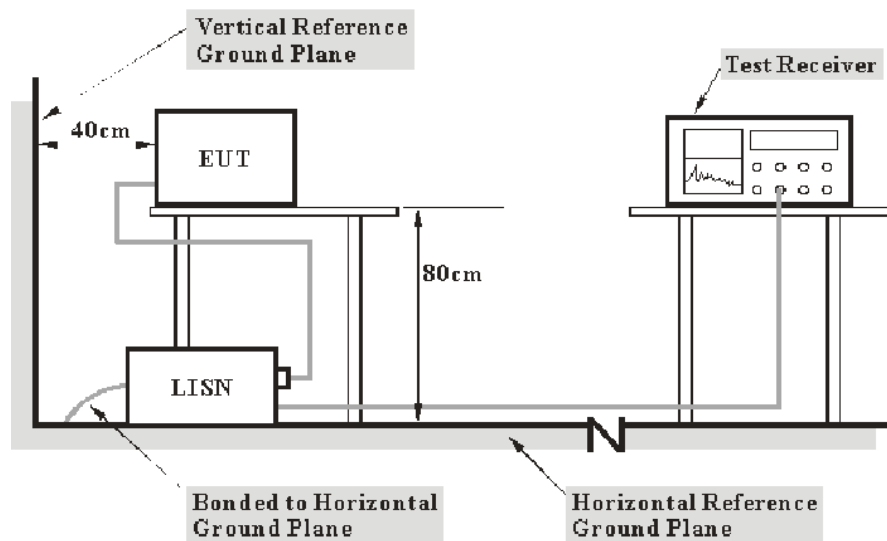
### Measurement Uncertainty

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. (Shenzhen) 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 | 3.54 dB (k=2, 95% level of confidence) |
| CAT 3    | 3.72 dB (k=2, 95% level of confidence) |
| CAT 5    | 3.74 dB (k=2, 95% level of confidence) |
| CAT 6    | 4.54 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 setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

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

During the conducted emission test, the adapter was connected to 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  | 100176                 | 2015-06-03       | 2016-06-03           |
| Rohde & Schwarz | LISN              | ESH2-Z5 | 892107/021             | 2015-06-09       | 2016-06-09           |
| Rohde & Schwarz | LISN              | ENV216  | 3560.6650.12-101613-Yb | 2015-06-09       | 2016-06-09           |
| Rohde & Schwarz | Transient Limitor | 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).

## Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207, the worst margin reading as below:

**10.0 dB at 1.877470 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

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

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:       | 24 °C     |
| Relative Humidity: | 50 %      |
| ATM Pressure:      | 101.0 kPa |

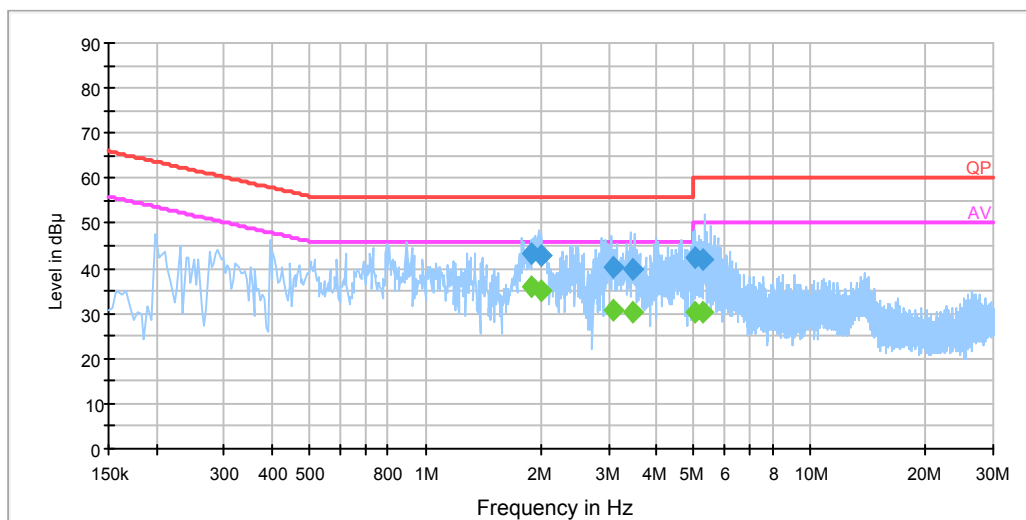
*The testing was performed by Hill He on 2015-12-29.*

EUT operation mode: Transmitting (worst case)

Pre-scan with all the six models, the worst case is from the model: LKV388A.

**AC 120V/60 Hz, Line:**

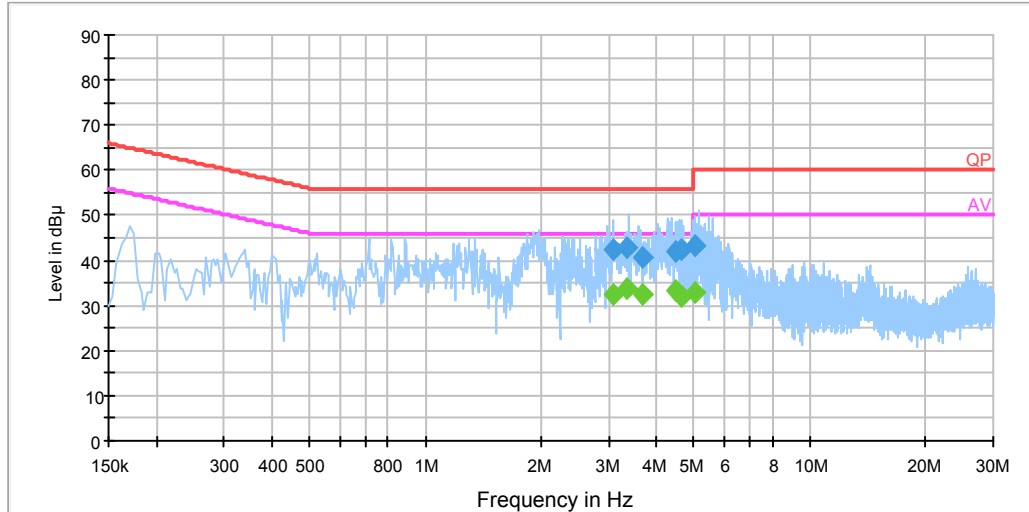
EMI Auto Test L



| Frequency (MHz) | Corrected Amplitude (dBμV) | Correction Factor (dB) | Limit (dBμV) | Margin (dB) | Detector (PK/Ave./QP) |
|-----------------|----------------------------|------------------------|--------------|-------------|-----------------------|
| 1.877470        | 43.5                       | 20.0                   | 56.0         | 12.5        | QP                    |
| 1.877470        | 36.0                       | 20.0                   | 46.0         | 10.0        | Ave.                  |
| 1.999550        | 42.7                       | 20.0                   | 56.0         | 13.3        | QP                    |
| 1.999550        | 35.2                       | 20.0                   | 46.0         | 10.8        | Ave.                  |
| 3.084130        | 40.4                       | 20.0                   | 56.0         | 15.6        | QP                    |
| 3.084130        | 30.6                       | 20.0                   | 46.0         | 15.4        | Ave.                  |
| 3.454910        | 39.6                       | 20.0                   | 56.0         | 16.4        | QP                    |
| 3.454910        | 30.5                       | 20.0                   | 46.0         | 15.5        | Ave.                  |
| 5.031570        | 42.3                       | 20.0                   | 60.0         | 17.7        | QP                    |
| 5.031570        | 30.3                       | 20.0                   | 50.0         | 19.7        | Ave.                  |
| 5.246290        | 42.0                       | 20.0                   | 60.0         | 18.0        | QP                    |
| 5.246290        | 30.2                       | 20.0                   | 50.0         | 19.8        | Ave.                  |

**AC120V, 60 Hz, Neutral:**

EMI Auto Test N



| Frequency (MHz) | Corrected Amplitude (dBμV) | Correction Factor (dB) | Limit (dBμV) | Margin (dB) | Detector (PK/Ave./QP) |
|-----------------|----------------------------|------------------------|--------------|-------------|-----------------------|
| 3.095950        | 42.4                       | 20.0                   | 56.0         | 13.6        | QP                    |
| 3.095950        | 32.7                       | 20.0                   | 46.0         | 13.3        | Ave.                  |
| 3.355090        | 42.6                       | 20.0                   | 56.0         | 13.4        | QP                    |
| 3.355090        | 33.7                       | 20.0                   | 46.0         | 12.3        | Ave.                  |
| 3.679430        | 40.5                       | 20.0                   | 56.0         | 15.5        | QP                    |
| 3.679430        | 32.3                       | 20.0                   | 46.0         | 13.7        | Ave.                  |
| 4.452090        | 41.8                       | 20.0                   | 56.0         | 14.2        | QP                    |
| 4.452090        | 33.5                       | 20.0                   | 46.0         | 12.5        | Ave.                  |
| 4.612550        | 42.3                       | 20.0                   | 56.0         | 13.7        | QP                    |
| 4.612550        | 31.8                       | 20.0                   | 46.0         | 14.2        | Ave.                  |
| 5.027330        | 43.4                       | 20.0                   | 60.0         | 16.6        | QP                    |
| 5.027330        | 33.1                       | 20.0                   | 50.0         | 16.9        | Ave.                  |

**Note:**

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

**§15.205 & §15.209 & §15.407(B) (1),(6),(7) – UNDESIRABLE EMISSION****Applicable Standard**

FCC §15.407 (b) (1),(6), (7); §15.209; §15.205;

For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz.

Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

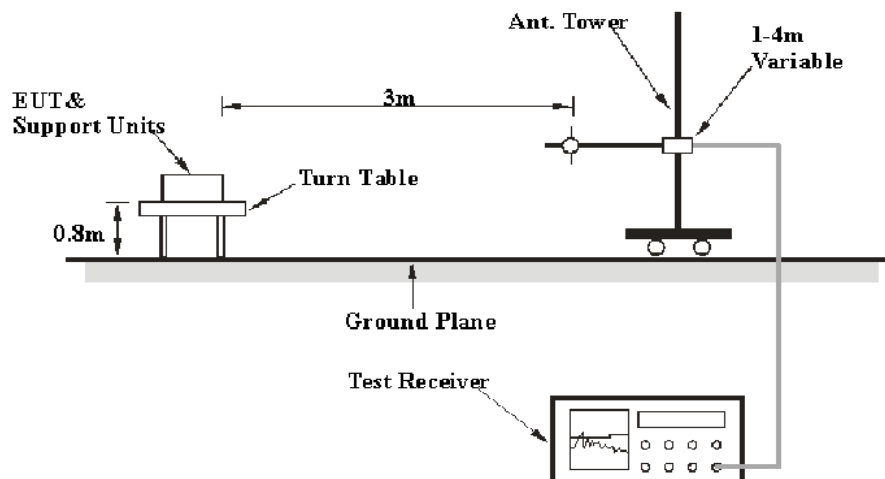
**Measurement Uncertainty**

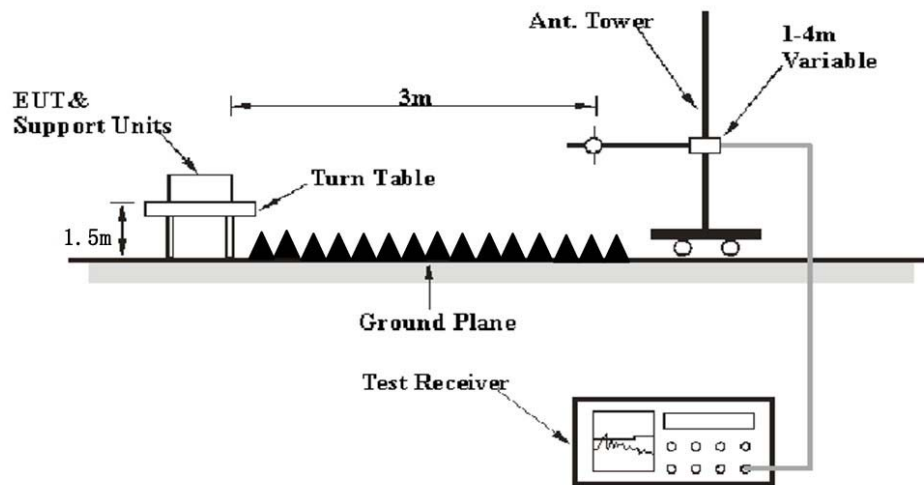
All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency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

Based on CISPR 16-4-2:2011, the expanded combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Shenzhen) is 5.81 dB for 30MHz-1GHz and 4.88 dB for above 1GHz, 1.95dB for conducted measurement at antenna port. And the uncertainty will not be taken into consideration for the test data recorded in the report.

**EUT Setup**

**Below 1 GHz:**



**Above 1 GHz:**

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC 15.209 and FCC 15.407 limits.

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

**EMI Test Receiver & Spectrum Analyzer Setup**

The system was investigated from 30 MHz to 40 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were 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     | /       | PK       |
|                   | 1 MHz   | 10 Hz     | /       | Ave.     |

**Test Procedure****Radiated Spurious Emission**

During the radiated emission test, the adapter was connected to the AC floor outlet.

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

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1GHz, peak and Average detection modes for frequencies above 1GHz.

The EUT is set 1.5 meter away from the testing antenna, which is varied from 1-4 mete, and the EUT is placed on a turntable, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

### 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 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            | 101122        | 2015-11-03       | 2016-11-03           |
| Sunol Sciences            | Bi-log Antenna    | JB1             | A040904-2     | 2014-12-07       | 2017-12-06           |
| Mini                      | Amplifier         | ZVA-183-S+      | 5969001149    | 2015-04-23       | 2016-04-23           |
| A.H. System               | Horn Antenna      | SAS-200/571     | 135           | 2013-02-11       | 2016-02-10           |
| Rohde & Schwarz           | Signal Analyzer   | FSIQ26          | 8386001028    | 2015-12-11       | 2016-12-11           |
| DUCOMMUN                  | Pre-amplifier     | ALN-22093530-01 | 991373-01     | 2015-12-02       | 2016-12-01           |
| Agilent                   | Spectrum Analyzer | 8564E           | 3943A01781    | 2013-05-09       | 2016-05-08           |
| the electro-Mechanics Co. | Horn Antenna      | 3116            | 9510-2270     | 2013-10-14       | 2016-10-13           |

\* **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).

### Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, Section 15.205, 15.209 and 15.407, the worst margin reading as below:

**0.33 dB at 5397.940 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

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

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>       | 23 °C     |
| <b>Relative Humidity:</b> | 49 %      |
| <b>ATM Pressure:</b>      | 101.0 kPa |

The testing was performed by Hill He on 2015-12-24.

EUT operation mode: Transmitting (worst case)

Pre-scan with all the six models, the worst case is from the model: LKV388A.

30 MHz ~ 40 GHz:

| Frequency<br>(MHz) | Receiver          |                          | Turntable<br>Degree | Rx Antenna    |                | Corrected<br>Factor<br>(dB) | Corrected<br>Amplitude<br>(dBμV/m) | FCC Part<br>15.407/205/209 |                |
|--------------------|-------------------|--------------------------|---------------------|---------------|----------------|-----------------------------|------------------------------------|----------------------------|----------------|
|                    | Reading<br>(dBμV) | Detector<br>(PK/QP/Ave.) |                     | Height<br>(m) | Polar<br>(H/V) |                             |                                    | Limit<br>(dBμV/m)          | Margin<br>(dB) |
| 5180 MHz           |                   |                          |                     |               |                |                             |                                    |                            |                |
| 265.7              | 44.29             | QP                       | 115                 | 1.2           | H              | -13.7                       | 30.59                              | 46                         | 15.41          |
| 5180.00            | 100.31            | PK                       | 132                 | 2.4           | H              | 2.29                        | 102.60                             | /                          | /              |
| 5180.00            | 89.04             | Ave.                     | 132                 | 2.4           | H              | 2.29                        | 91.33                              | /                          | /              |
| 5180.00            | 107.51            | PK                       | 36                  | 1.5           | V              | 2.29                        | 109.80                             | /                          | /              |
| 5180.00            | 96.42             | Ave.                     | 36                  | 1.5           | V              | 2.29                        | 98.71                              | /                          | /              |
| 5397.94            | 63.62             | PK                       | 16                  | 1.8           | V              | 1.74                        | 65.36                              | 74                         | 8.64           |
| 5397.94            | 51.93             | Ave.                     | 16                  | 1.8           | V              | 1.74                        | 53.67                              | 54                         | 0.33           |
| 7006.42            | 46.41             | PK                       | 353                 | 1.8           | V              | 8.14                        | 54.55                              | 74                         | 19.45          |
| 7006.42            | 28.41             | Ave.                     | 353                 | 1.8           | V              | 8.14                        | 36.55                              | 54                         | 17.45          |
| 7513.56            | 45.41             | PK                       | 305                 | 1.5           | V              | 9.87                        | 55.28                              | 74                         | 18.72          |
| 7513.56            | 27.26             | Ave.                     | 305                 | 1.5           | V              | 9.87                        | 37.13                              | 54                         | 16.87          |
| 10360.00           | 45.17             | PK                       | 338                 | 2.0           | V              | 13.75                       | 58.92                              | 74                         | 15.08          |
| 10360.00           | 27.15             | Ave.                     | 338                 | 2.0           | V              | 13.75                       | 40.90                              | 54                         | 13.10          |
| 15540.00           | 46.39             | PK                       | 113                 | 1.2           | V              | 17.86                       | 64.25                              | 74                         | 9.75           |
| 15540.00           | 31.29             | Ave.                     | 113                 | 1.2           | V              | 17.86                       | 49.15                              | 54                         | 4.85           |

| Frequency<br>(MHz) | Receiver          |                          | Turntable<br>Degree | Rx Antenna    |                | Corrected<br>Factor<br>(dB) | Corrected<br>Amplitude<br>(dBμV/m) | FCC Part<br>15.407/205/209 |                |
|--------------------|-------------------|--------------------------|---------------------|---------------|----------------|-----------------------------|------------------------------------|----------------------------|----------------|
|                    | Reading<br>(dBμV) | Detector<br>(PK/QP/Ave.) |                     | Height<br>(m) | Polar<br>(H/V) |                             |                                    | Limit<br>(dBμV/m)          | Margin<br>(dB) |
| 5200 MHz           |                   |                          |                     |               |                |                             |                                    |                            |                |
| 265.7              | 44.22             | QP                       | 115                 | 1.2           | H              | -13.7                       | 30.52                              | 46                         | 15.48          |
| 5200.00            | 99.89             | PK                       | 53                  | 2.4           | H              | 2.29                        | 102.18                             | /                          | /              |
| 5200.00            | 88.65             | Ave.                     | 53                  | 2.4           | H              | 2.29                        | 90.94                              | /                          | /              |
| 5200.00            | 107.51            | PK                       | 108                 | 1.5           | V              | 2.29                        | 109.80                             | /                          | /              |
| 5200.00            | 96.87             | Ave.                     | 108                 | 1.5           | V              | 2.29                        | 99.16                              | /                          | /              |
| 5148.51            | 61.75             | PK                       | 286                 | 1.4           | V              | 1.75                        | 63.50                              | 74                         | 10.50          |
| 5148.51            | 48.28             | Ave.                     | 286                 | 1.4           | V              | 1.75                        | 50.03                              | 54                         | 3.97           |
| 5399.89            | 62.13             | PK                       | 301                 | 2.0           | V              | 1.74                        | 63.87                              | 74                         | 10.13          |
| 5399.89            | 51.26             | Ave.                     | 301                 | 2.0           | V              | 1.74                        | 53.00                              | 54                         | 1.00           |
| 7531.35            | 42.77             | PK                       | 137                 | 1.5           | V              | 9.87                        | 52.64                              | 74                         | 21.36          |
| 7531.35            | 25.10             | Ave.                     | 137                 | 1.5           | V              | 9.87                        | 34.97                              | 54                         | 19.03          |
| 7536.91            | 44.89             | PK                       | 207                 | 1.9           | V              | 9.87                        | 54.76                              | 74                         | 19.24          |
| 7536.91            | 24.75             | Ave.                     | 207                 | 1.9           | V              | 9.87                        | 34.62                              | 54                         | 19.38          |
| 10400.00           | 40.61             | PK                       | 114                 | 1.2           | V              | 13.75                       | 54.36                              | 74                         | 19.64          |
| 10400.00           | 26.40             | Ave.                     | 114                 | 1.2           | V              | 13.75                       | 40.15                              | 54                         | 13.85          |

| Frequency<br>(MHz) | Receiver          |                          | Turntable<br>Degree | Rx Antenna    |                | Corrected<br>Factor<br>(dB) | Corrected<br>Amplitude<br>(dBμV/m) | FCC Part<br>15.407/205/209 |                |
|--------------------|-------------------|--------------------------|---------------------|---------------|----------------|-----------------------------|------------------------------------|----------------------------|----------------|
|                    | Reading<br>(dBμV) | Detector<br>(PK/QP/Ave.) |                     | Height<br>(m) | Polar<br>(H/V) |                             |                                    | Limit<br>(dBμV/m)          | Margin<br>(dB) |
| 5240 MHz           |                   |                          |                     |               |                |                             |                                    |                            |                |
| 265.7              | 44.19             | QP                       | 115                 | 1.2           | H              | -13.7                       | 30.49                              | 46                         | 15.51          |
| 5240.00            | 100.52            | PK                       | 158                 | 2.5           | H              | 2.29                        | 102.81                             | /                          | /              |
| 5240.00            | 89.35             | Ave.                     | 158                 | 2.5           | H              | 2.29                        | 91.64                              | /                          | /              |
| 5240.00            | 105.96            | PK                       | 261                 | 1.5           | V              | 2.29                        | 108.25                             | /                          | /              |
| 5240.00            | 95.15             | Ave.                     | 261                 | 1.5           | V              | 2.29                        | 97.44                              | /                          | /              |
| 5143.36            | 58.01             | PK                       | 72                  | 1.1           | V              | 1.75                        | 59.76                              | 74                         | 14.24          |
| 5143.36            | 46.36             | Ave.                     | 72                  | 1.1           | V              | 1.75                        | 48.11                              | 54                         | 5.89           |
| 7510.37            | 45.16             | PK                       | 283                 | 2.0           | V              | 9.87                        | 55.03                              | 74                         | 18.97          |
| 7510.37            | 26.52             | Ave.                     | 283                 | 2.0           | V              | 9.87                        | 36.39                              | 54                         | 17.61          |
| 7513.33            | 45.26             | PK                       | 351                 | 1.5           | V              | 9.87                        | 55.13                              | 74                         | 18.87          |
| 7513.33            | 27.44             | Ave.                     | 351                 | 1.5           | V              | 9.87                        | 37.31                              | 54                         | 16.69          |
| 10480.00           | 40.45             | PK                       | 16                  | 1.2           | V              | 13.75                       | 54.20                              | 74                         | 19.80          |
| 10480.00           | 25.02             | Ave.                     | 16                  | 1.2           | V              | 13.75                       | 38.77                              | 54                         | 15.23          |
| 15720.00           | 49.39             | PK                       | 24                  | 1.2           | V              | 17.86                       | 67.25                              | 74                         | 6.75           |
| 15720.00           | 31.85             | Ave.                     | 24                  | 1.2           | V              | 17.86                       | 49.71                              | 54                         | 4.29           |

## Band Edge

| Frequency<br>(MHz) | Receiver          |                          | Turntable<br>Degree | Rx Antenna    |                | Corrected<br>Factor<br>(dB) | Corrected<br>Amplitude<br>(dBμV/m) | FCC Part<br>15.407/205/209 |                |
|--------------------|-------------------|--------------------------|---------------------|---------------|----------------|-----------------------------|------------------------------------|----------------------------|----------------|
|                    | Reading<br>(dBμV) | Detector<br>(PK/QP/Ave.) |                     | Height<br>(m) | Polar<br>(H/V) |                             |                                    | Limit<br>(dBμV/m)          | Margin<br>(dB) |
| Low channel        |                   |                          |                     |               |                |                             |                                    |                            |                |
| 5149.50            | 65.84             | PK                       | 216                 | 1.7           | V              | 2.29                        | 68.13                              | 74                         | 5.87           |
| 5149.50            | 49.04             | Ave.                     | 216                 | 1.7           | V              | 2.29                        | 51.33                              | 54                         | 2.67           |
| High channel       |                   |                          |                     |               |                |                             |                                    |                            |                |
| 5360.12            | 60.17             | PK                       | 267                 | 2.4           | V              | 1.74                        | 61.91                              | 74                         | 12.09          |
| 5360.12            | 49.39             | Ave.                     | 267                 | 2.4           | V              | 1.74                        | 51.13                              | 54                         | 2.87           |

## Note:

Corrected Amplitude = Corrected Factor + Reading

Corrected Factor=Antenna factor (RX) + Cable Loss – Amplifier Factor

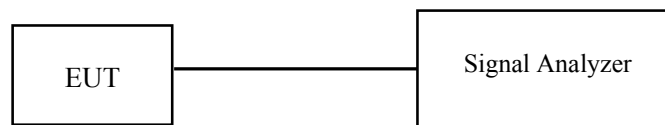
Margin = Limit- Corr. Amplitude

**FCC §15.407(a) (1) – 26 dB EMISSION BANDWIDTH****Applicable Standard**

The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

**Test Procedure****1. Emission Bandwidth (EBW)**

- a) Set RBW = approximately 1% of the emission bandwidth.
- b) Set the VBW > RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

**Test Equipment List and Details**

| Manufacturer    | Description     | Model  | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-----------------|--------|---------------|------------------|----------------------|
| Rohde & Schwarz | Signal Analyzer | FSIQ26 | 8386001028    | 2015-12-11       | 2016-12-11           |

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

## Test Data

### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 23 °C     |
| Relative Humidity: | 50 %      |
| ATM Pressure:      | 101.0 kPa |

The testing was performed by Hill He on 2015-12-11.

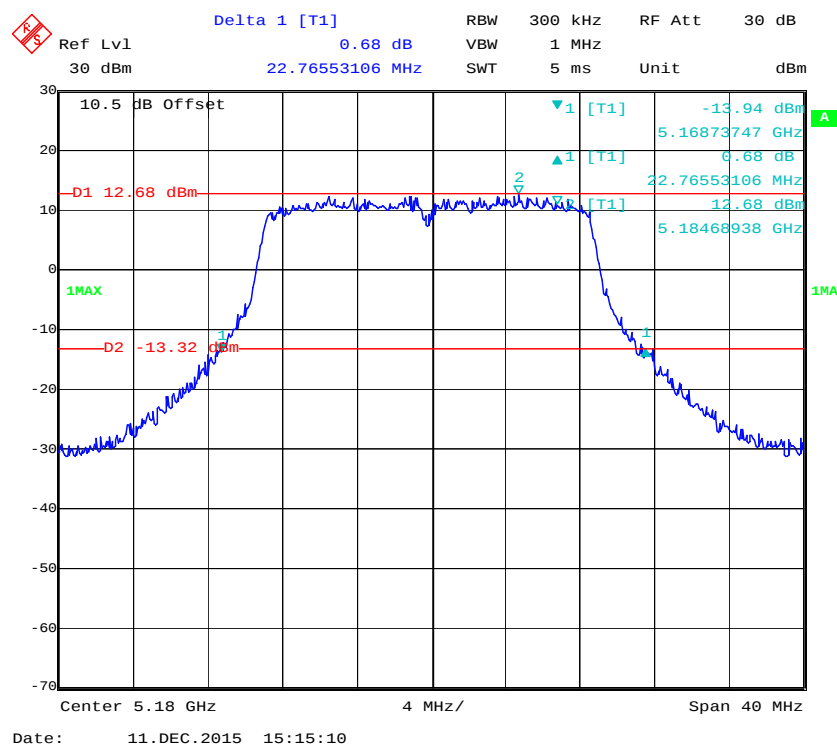
EUT operation mode: Transmitting

**Test Result:** Pass, please refer to the following tables and plots.

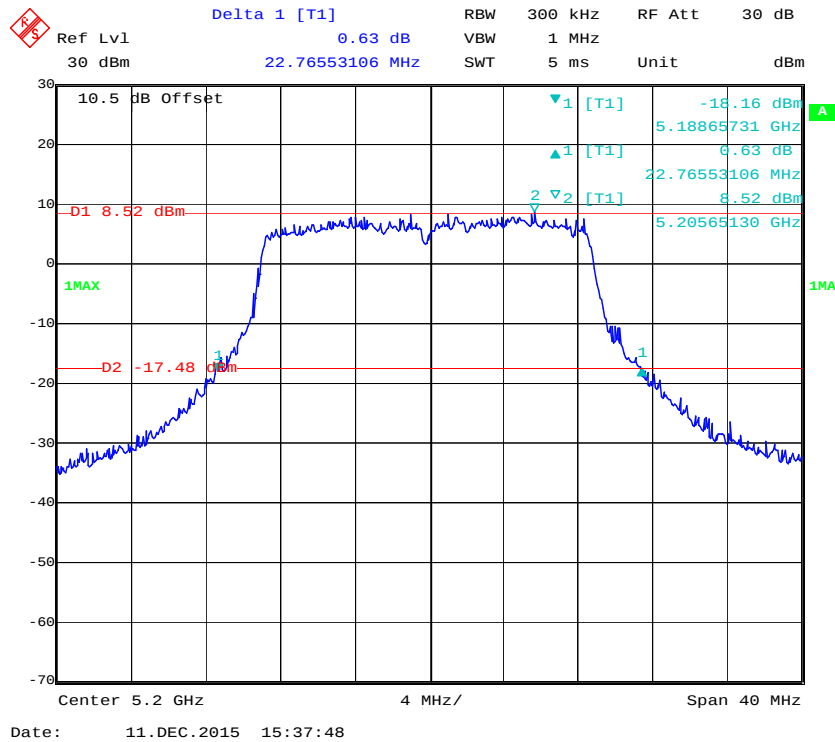
### 802.11n20 mode

| Frequency (MHz) | 26dB Emission Bandwidth (MHz) |
|-----------------|-------------------------------|
| 5180            | 22.77                         |
| 5200            | 22.77                         |
| 5240            | 22.61                         |

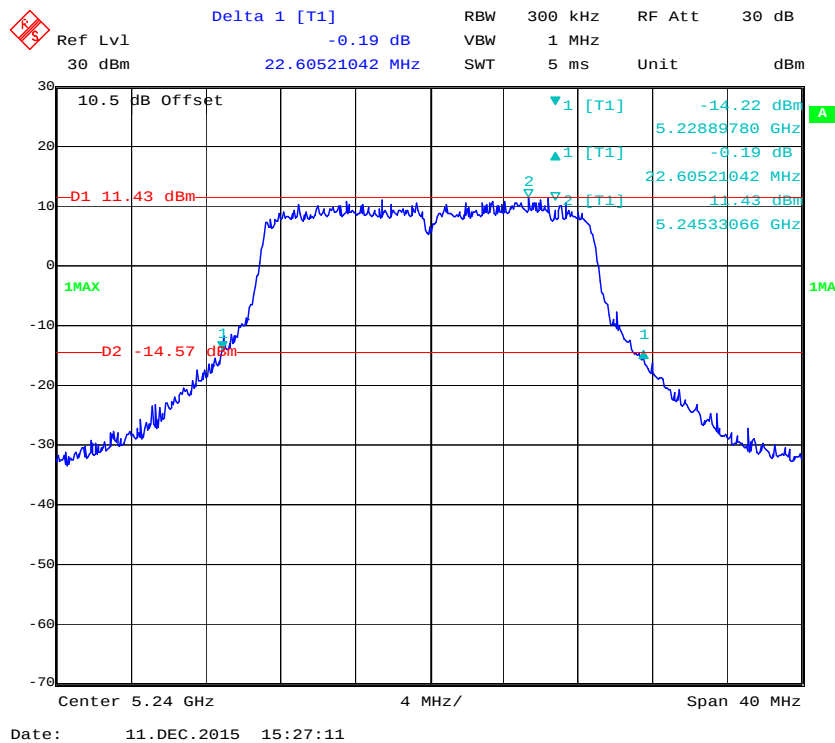
### 802.11n20 mode, 26dB Emission Bandwidth, 5180 MHz



### 802.11n20 mode, 26dB Emission Bandwidth, 5200 MHz



### 802.11n20 mode, 26dB Emission Bandwidth, 5240 MHz



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**FCC §15.407(a) (1) – CONDUCTED TRANSMITTER OUTPUT POWER**

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**Applicable Standard**

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**Test Procedure**

Set span to encompass the entire EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.

(ii) Set RBW = 1 MHz.

(iii) Set VBW  $\geq$  3 MHz.

(iv) Number of points in sweep  $\geq$  2 Span / RBW. (This ensures that bin-to-bin spacing is  $\leq$  RBW/2, so that narrowband signals are not lost between frequency bins.)

(v) Manually set sweep time  $\geq$  10 \* (number of points in sweep) \* (symbol period of the transmitted signal), but not less than the automatic default sweep time.

(vi) Set detector = RMS.

(vii) The EUT shall be operated at 100 percent duty cycle.

(viii) Perform a single sweep.

(ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

**Test Equipment List and Details**

| Manufacturer    | Description     | Model  | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-----------------|--------|---------------|------------------|----------------------|
| Rohde & Schwarz | Signal Analyzer | FSIQ26 | 8386001028    | 2015-12-11       | 2016-12-11           |

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

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

|                    |           |
|--------------------|-----------|
| Temperature:       | 23 °C     |
| Relative Humidity: | 50 %      |
| ATM Pressure:      | 101.0 kPa |

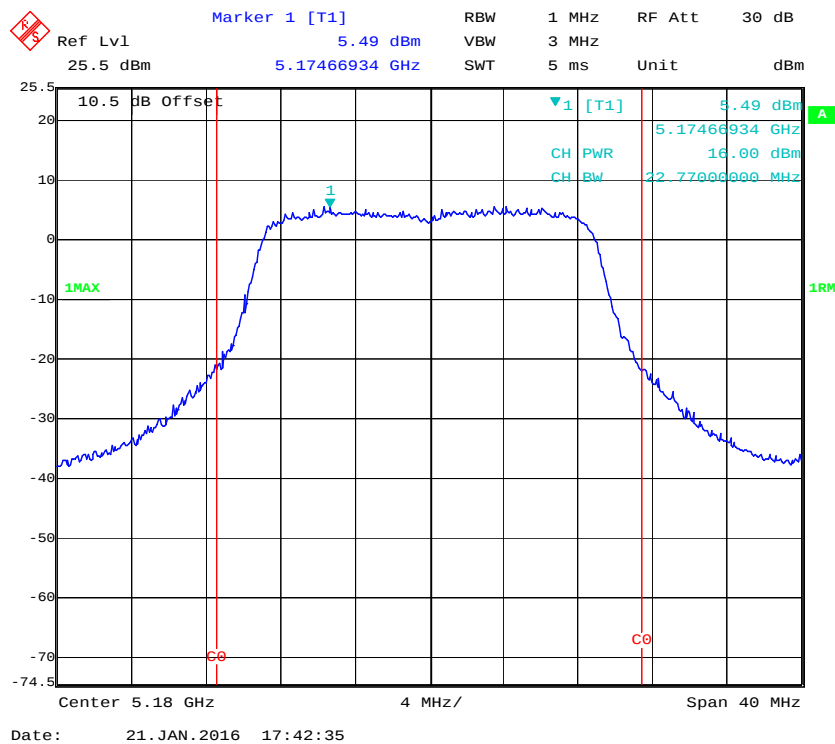
*The testing was performed by Hill He on 2016-01-21.*

*EUT operation mode: Transmitting*

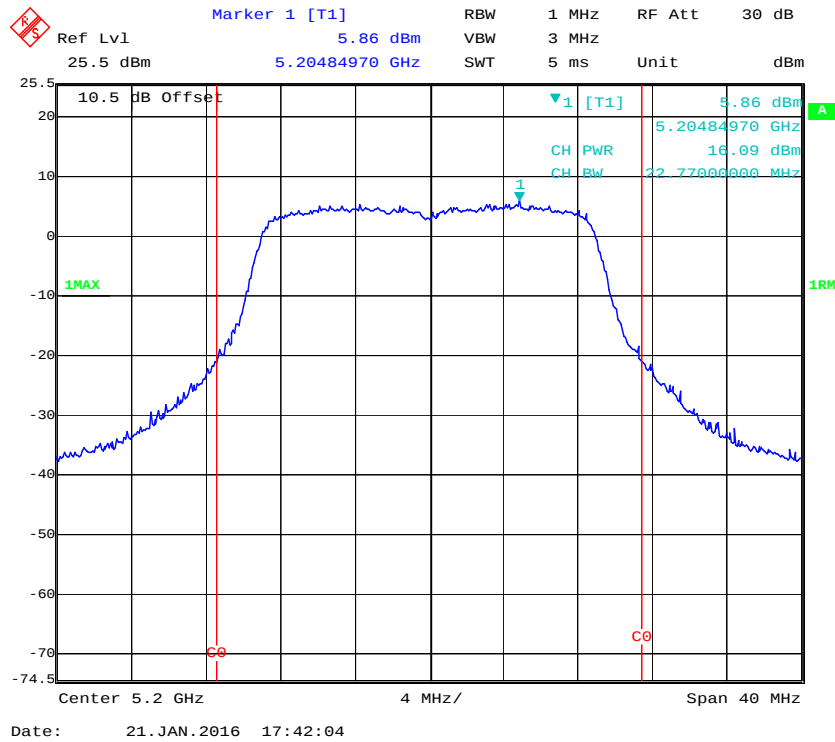
**Test Result: Pass**

**802.11n20 mode**

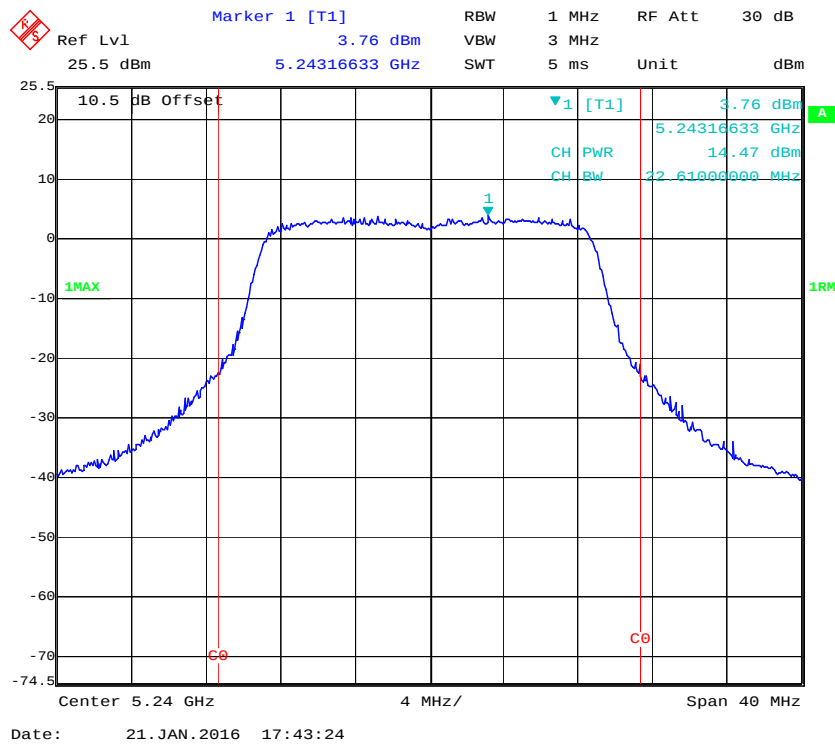
| Frequency (MHz) | Output Power (dBm) | Limit (dBm) |
|-----------------|--------------------|-------------|
| 5180            | 16.00              | 30          |
| 5200            | 16.09              |             |
| 5240            | 14.47              |             |

**802.11n20 mode, RF Conducted Output Power, 5180 MHz**

### 802.11n20 mode, RF Conducted Output Power, 5200 MHz



### 802.11n20 mode, RF Conducted Output Power, 5240 MHz



**FCC §15.407(a) (1) - POWER SPECTRAL DENSITY****Applicable Standard**

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**Test Procedure**

Set span to encompass the entire EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.

(ii) Set RBW = 1 MHz.

(iii) Set VBW  $\geq$  3 MHz.

(iv) Number of points in sweep  $\geq$  2 Span / RBW. (This ensures that bin-to-bin spacing is  $\leq$  RBW/2, so that narrowband signals are not lost between frequency bins.)

(v) Manually set sweep time  $\geq$  10 \* (number of points in sweep) \* (symbol period of the transmitted signal), but not less than the automatic default sweep time.

(vi) Set detector = RMS.

(vii) The EUT shall be operated at 100 percent duty cycle.

(viii) Perform a single sweep.

**Test Equipment List and Details**

| Manufacturer    | Description     | Model  | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-----------------|--------|---------------|------------------|----------------------|
| Rohde & Schwarz | Signal Analyzer | FSIQ26 | 8386001028    | 2015-12-11       | 2016-12-11           |

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

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

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 23 °C     |
| <b>Relative Humidity:</b> | 50 %      |
| <b>ATM Pressure:</b>      | 101.0 kPa |

*The testing was performed by Hill He on 2016-01-21.*

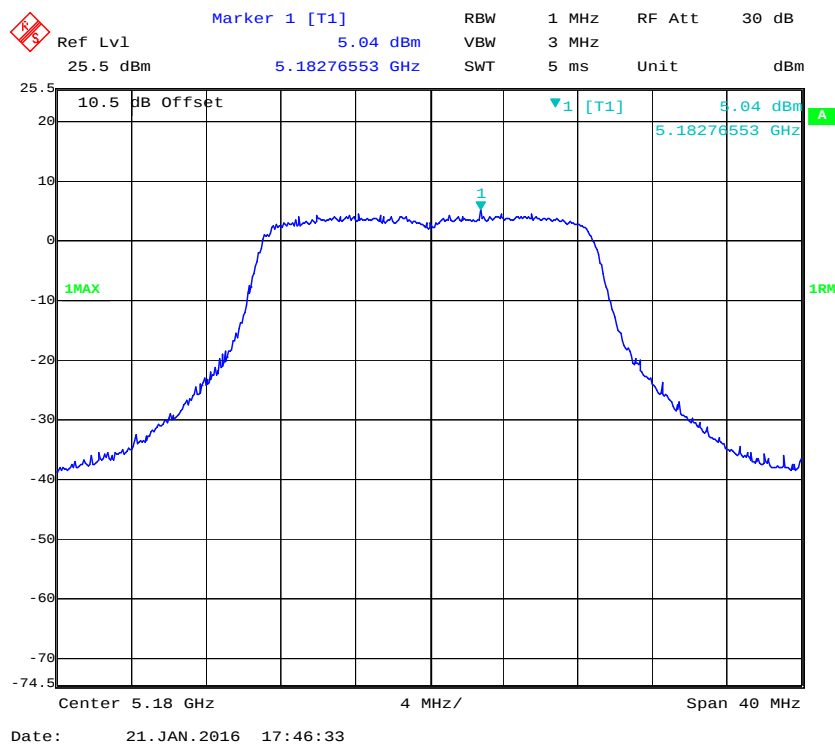
*EUT operation mode: Transmitting*

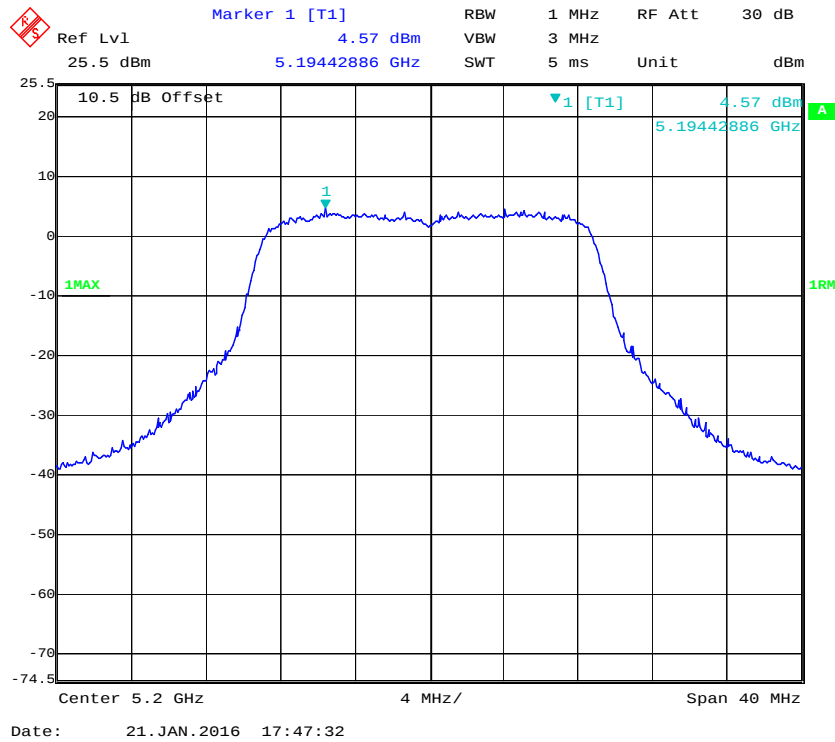
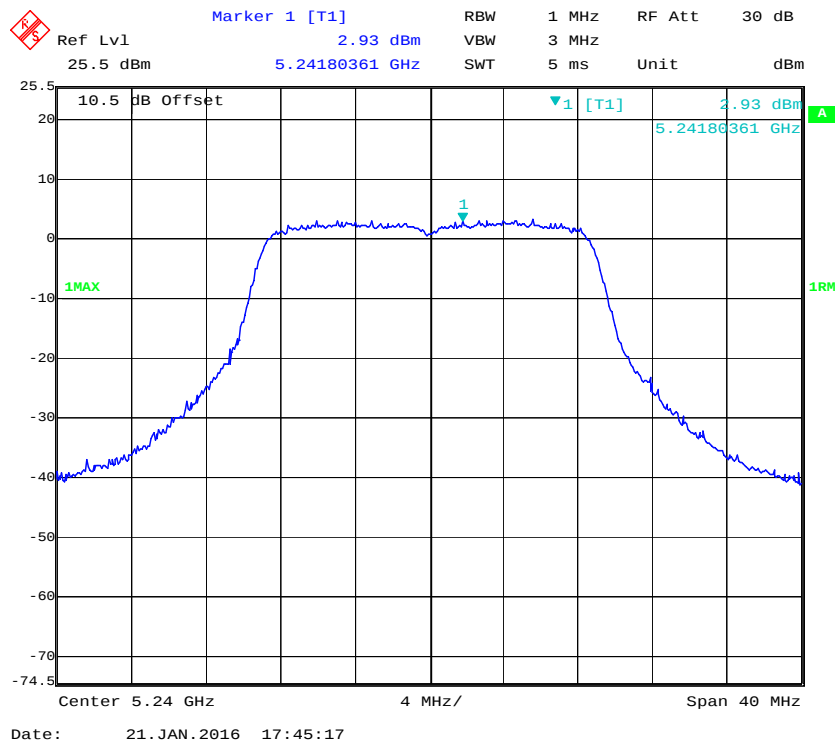
**Test Result:** Pass

Please refer to the following tables and plots.

**802.11n20 Mode**

| Frequency (MHz) | Power Spectral Density (dBm/MHz) | Limit (dBm/MHz) |
|-----------------|----------------------------------|-----------------|
| 5180            | 5.04                             | 17              |
| 5200            | 4.57                             |                 |
| 5240            | 2.93                             |                 |

**802.11n20 mode, Power Spectral Density, 5180 MHz**

**802.11n20 mode, Power Spectral Density, 5200 MHz****802.11n20 mode, Power Spectral Density, 5240 MHz**

**PRODUCT SIMILARITY DECLARATION LETTER**

Shenzhen Lenkeng Technology Co.,Ltd

**Declaration of Alteration**

To Whom It May Concern,

We, Shenzhen Lenkeng Technology Co.,Ltd\_ , hereby declare that there are some differences between our Multiple Models and testing products. Details as below:

|                         |                 |                                     |                                              |
|-------------------------|-----------------|-------------------------------------|----------------------------------------------|
| Products Description    | Name            | Wireless Extender                   |                                              |
|                         | Brand           | LENKENG                             |                                              |
|                         | Manufacturer    | Shenzhen Lenkeng Technology Co.,Ltd |                                              |
| Differences Description |                 |                                     |                                              |
| Testing Products        | Multiple Models | Differences Items                   | Details                                      |
| LKV388A                 | LKV688-200M     | Support highest resolution          | LKV388A:1080p@60Hz<br>LKV688-200M:4K×2K@30Hz |
|                         | LKV388VGA       | Interface                           | LKV388A:HDMI<br>LKV388VGA: VGA               |
|                         | LKV388SDI       | Interface                           | LKV388A:HDMI<br>LKV388SDI: SDI               |
|                         | LKV388DVI       | Interface                           | LKV388A:HDMI<br>LKV388DVI:DVI                |
|                         | LKV388          | Max. of Antenna's Gain              | LKV388A:5dBi<br>LKV388:3dBi                  |

Notes: Testing products-the products tested by BACL

Multiple Model- have the same appearance, structure, PCB, material and function to the testing products except the differences as above table.

Besides the differences in the table above, we guarantee all the information provided above is true, and notice that we'll bear all the consequences caused by any false information or concealing

Best Regards,

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Print Name: Xie Dandan

Title: Manager

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Email: jalen.chan@lenkeng.com Tel: +86-0755-83590136 Fax: +86-0755-82500201

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