





FCC PART 15.247  
TEST REPORT

For

**Baby's Journey, Inc.**

999 Main Street, Unit 703, Pawtucket, RI 02860, United States

**FCC ID: PJF-3927006TX**

|   |   |
|---|---|
| <b>Report Type:</b><br>Original Report  | <b>Product Type:</b><br>BRU Perfect View 5'' Video Monitor(Baby Unit)                 |
| <b>Test Engineer:</b> Ares Liu  |   |
| <b>Report Number:</b> R1DG121101001-00  |   |
| <b>Report Date:</b> 2012-12-07  |   |
| <b>Reviewed By:</b> Ivan Cao<br>EMC Engineer  |  |
| <b>Test Laboratory:</b> Bay Area Compliance Laboratories Corp. (Dongguan)<br>No.69 Pulongcun, Puxinhu Industrial Zone,<br>Tangxia, Dongguan, Guangdong, China<br>Tel: +86-769-86858888<br>Fax: +86-769-86858891<br><a href="http://www.baclcorp.com.cn">www.baclcorp.com.cn</a> |   |

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. (Dongguan).

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## GENERAL INFORMATION

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

The *Baby's Journey, Inc.*'s product, model number: 3927006TX (FCC ID: PJF-3927006TX) or ("EUT") in this report is a BRU Perfect View 5" Video Monitor(Baby Unit), which was measured approximately: 7.5 cm (L) x7.5 cm (W) x 15.0 cm (H), rated input voltage: DC 5.0V from adapter.

Adapter information:HON-KWANG  
Model:HK-U-050A100-US  
Input: AC 100-240V, 50/60Hz, 0.2A  
Output: DC 5.0V, 1.0A

*\* All measurement and test data in this report was gathered from production sample serial number: 121101001 (Assigned by BACL, Dongguan). The EUT was received on 2012-11-01.*

### Objective

This report is prepared on behalf of *Baby's Journey, Inc.* in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine the Bluetooth of EUT compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

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

No related submittal(s).

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

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

The uncertainty of any RF tests which use conducted method measurement is  $\pm 0.96$  dB, the uncertainty of any radiation on emissions measurement is  $\pm 4.0$  dB

## **Test Facility**

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) 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 February 02, 2012. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. 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.

19 hopping channels are provided by manufacturer, and EUT was tested with low channel : 2411.375MHz, middle channel :2441.75MHz, and high channel: 2472.125MHz.

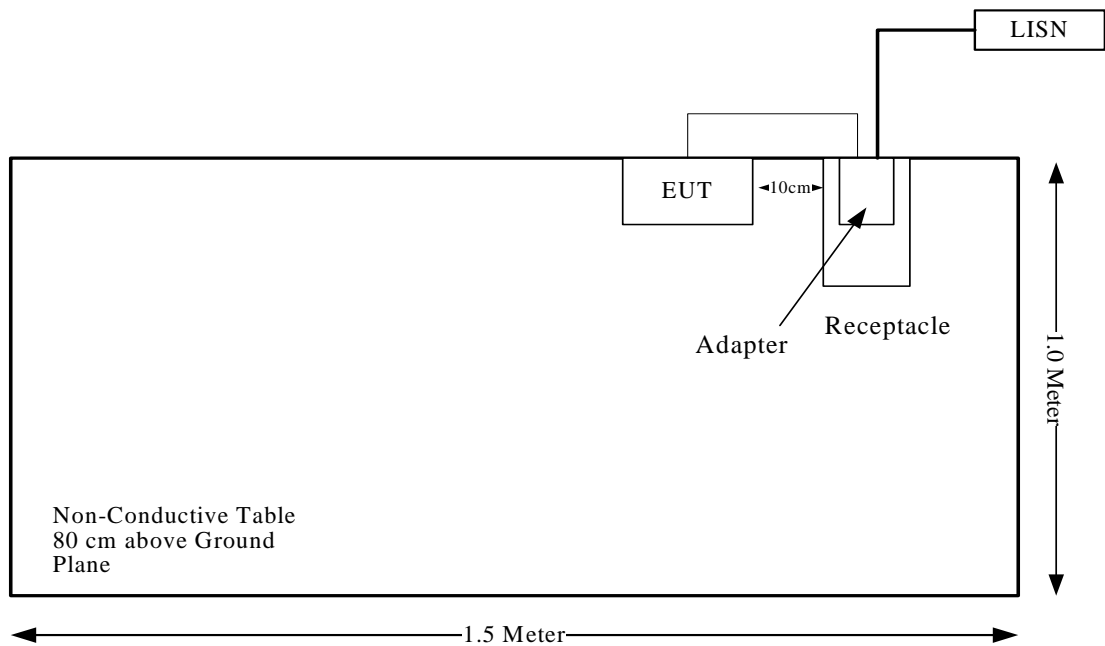
### EUT Exercise Software

No EUT exercise software was used.

### Equipment Modifications

No modification was made to the EUT tested.

### Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

| <b>FCC Rules</b>                | <b>Description of Test</b>       | <b>Result</b> |
|---------------------------------|----------------------------------|---------------|
| §15.247 (i), §2.1091            | Maximum Permissible exposure     | Compliance    |
| §15.203                         | Antenna Requirement              | Compliance    |
| §15.207 (a)                     | Conducted Emissions              | Compliance    |
| §15.205, §15.209,<br>§15.247(d) | Radiated Emissions               | Compliance    |
| §15.247 (a)(1)                  | 20 dB Bandwidth                  | Compliance    |
| §15.247(a)(1)                   | Channel Separation Test          | Compliance    |
| §15.247(a)(1)(iii)              | Time of Occupancy (Dwell Time)   | Compliance    |
| §15.247(a)(1)(iii)              | Quantity of hopping channel Test | Compliance    |
| §15.247(b)(1)                   | Peak Output Power Measurement    | Compliance    |
| §15.247(d)                      | Band Edges                       | Compliance    |

**FCC §15.247 (i) & §1.1307 (b) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)**

**Applicable Standard**

According to subpart 15.247(i) and subpart §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission’s guidelines.

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

| <b>(B) Limits for General Population/Uncontrolled Exposure</b> |                               |                               |                                     |                          |
|--|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| Frequency Range (MHz)  | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm <sup>2</sup> ) | Averaging Time (minutes) |
| 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:**

| Frequency (MHz) | Antenna Gain |           | Conducted Power |       | Evaluation Distance (cm) | Power Density (mW/cm <sup>2</sup> ) | MPE Limit (mW/cm <sup>2</sup> ) |
|-----------------|--------------|-----------|-----------------|-------|--------------------------|-------------------------------------|---------------------------------|
|                 | (dBi)        | (numeric) | (dBm)           | (mW)  |                          |                                     |                                 |
| 2411.375        | 0            | 1.00      | 14.32           | 27.04 | 20.00                    | 0.005                               | 1.0                             |

**Result:** The device meet FCC MPE at 20cm distance



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## **FCC §15.203 - ANTENNA REQUIREMENT**

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### **Applicable Standard**

According to FCC § 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 use of a standard antenna jack or electrical connector is prohibited.

### **Antenna Connector Construction**

The EUT has an internal antenna permanently soldering on the printed circuit boards, which complied with 15.203, the maximum gain is 0 dBi, please refer to the internal photos.

**Result:** Compliance.

## FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

### Applicable Standard

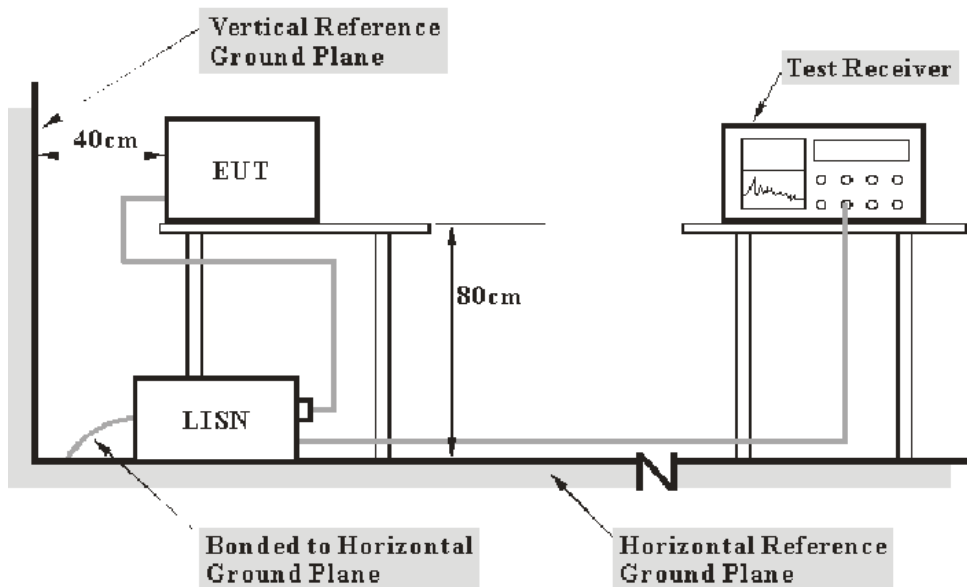
FCC§15.207

### Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratory Corp. (Dongguan) is  $\pm 2.4$  dB ( $k=2$ , 95% level of confidence), and the uncertainty will not be taken into consideration for all the test data recorded in the report.

### 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 C63.4-2009 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter was 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:

| <i>Frequency Range</i> | <i>IF B/W</i> |
|------------------------|---------------|
| 150 kHz – 30 MHz       | 9 kHz         |

## Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the first 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 |
|--------------|-------------------|---------|---------------|------------------|----------------------|
| R&S          | EMI Test Receiver | ESCS 30 | 830245/006    | 2012-10-08       | 2013-10-07           |
| R&S          | LISN1             | ESH3-Z5 | 843331/015    | 2012-09-17       | 2013-09-16           |
| R&S          | LISN2             | ESH3-Z5 | 100113        | 2012-10-08       | 2013-10-07           |

## Test Results Summary

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

**19.80 dB at 0.430 MHz** in the **Line** conducted mode.

## Test Data

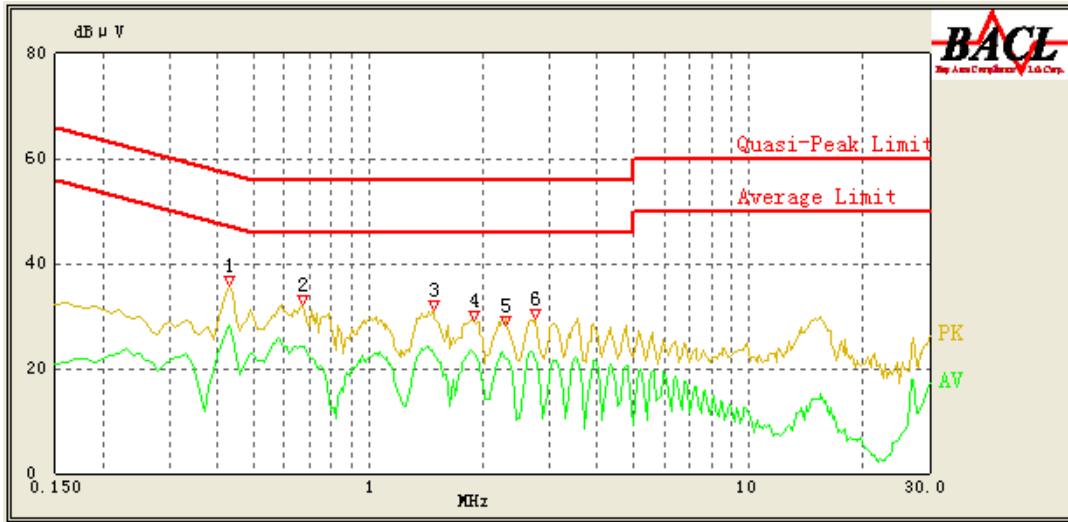
### Environmental Conditions

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 25.9° C   |
| <b>Relative Humidity:</b> | 54 %      |
| <b>ATM Pressure:</b>      | 100.7 kPa |

*The testing was performed by Ares Liu on 2012-11-24.*

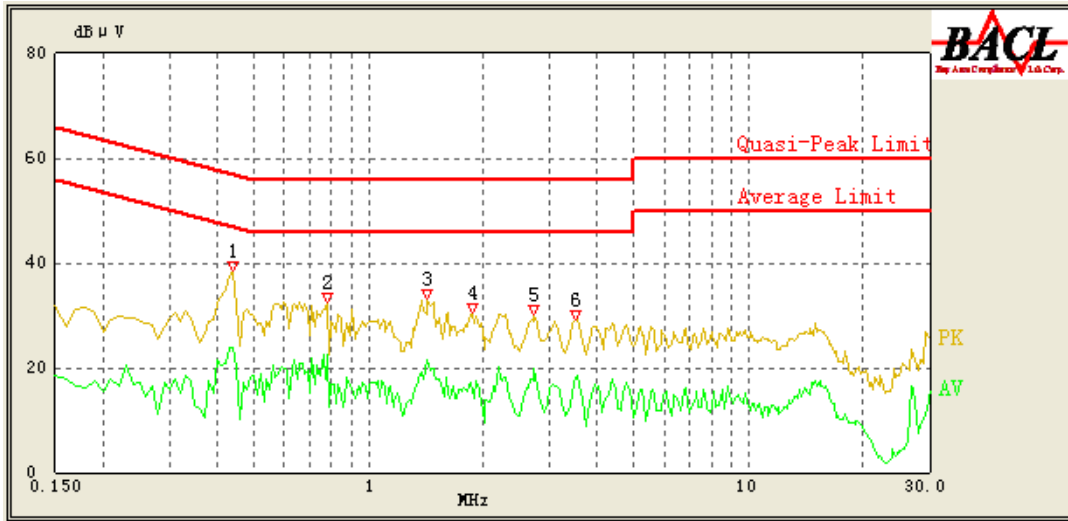
*Test Mode: Transmitting*

AC 120V/60 Hz, Line



| Frequency (MHz) | Cord. Reading (dBμV) | Correction Factor (dB) | Limit (dBμV) | Margin (dB) | Detector (PK/AV/QP) |
|-----------------|----------------------|------------------------|--------------|-------------|---------------------|
| 0.430           | 28.20                | 0.22                   | 48.00        | 19.80       | AV                  |
| 0.670           | 24.20                | 0.21                   | 46.00        | 21.80       | AV                  |
| 1.470           | 23.37                | 0.25                   | 46.00        | 22.63       | AV                  |
| 1.890           | 22.70                | 0.26                   | 46.00        | 23.30       | AV                  |
| 2.730           | 22.61                | 0.28                   | 46.00        | 23.39       | AV                  |
| 0.430           | 34.15                | 0.22                   | 58.00        | 23.85       | QP                  |
| 2.300           | 21.95                | 0.27                   | 46.00        | 24.05       | AV                  |
| 0.670           | 28.33                | 0.21                   | 56.00        | 27.67       | QP                  |
| 1.480           | 27.45                | 0.25                   | 56.00        | 28.55       | QP                  |
| 1.900           | 26.43                | 0.26                   | 56.00        | 29.57       | QP                  |
| 2.300           | 25.85                | 0.27                   | 56.00        | 30.15       | QP                  |
| 2.750           | 25.62                | 0.28                   | 56.00        | 30.38       | QP                  |

AC 120V/60 Hz, Neutral



| Frequency (MHz) | Cord. Reading (dBμV) | Correction Factor (dB) | Limit (dBμV) | Margin (dB) | Detector (PK/AV/QP) |
|-----------------|----------------------|------------------------|--------------|-------------|---------------------|
| 0.440           | 34.97                | 0.22                   | 57.71        | 22.74       | QP                  |
| 0.780           | 22.48                | 0.22                   | 46.00        | 23.52       | AV                  |
| 0.440           | 23.93                | 0.22                   | 47.71        | 23.78       | AV                  |
| 1.430           | 21.37                | 0.25                   | 46.00        | 24.63       | AV                  |
| 1.430           | 30.33                | 0.25                   | 56.00        | 25.67       | QP                  |
| 2.730           | 19.78                | 0.28                   | 46.00        | 26.22       | AV                  |
| 0.780           | 28.46                | 0.22                   | 56.00        | 27.54       | QP                  |
| 3.490           | 17.20                | 0.31                   | 46.00        | 28.80       | AV                  |
| 1.860           | 17.13                | 0.26                   | 46.00        | 28.87       | AV                  |
| 2.730           | 26.76                | 0.28                   | 56.00        | 29.24       | QP                  |
| 3.500           | 26.53                | 0.31                   | 56.00        | 29.47       | QP                  |
| 1.870           | 25.80                | 0.26                   | 56.00        | 30.20       | QP                  |

## FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

### Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

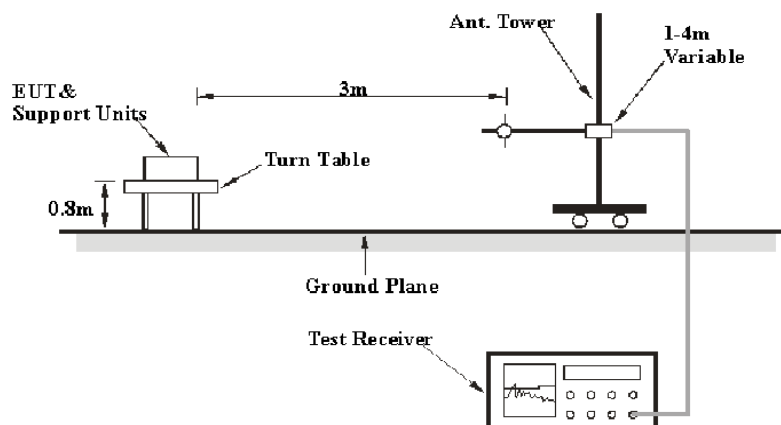
### Measurement Uncertainty

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.

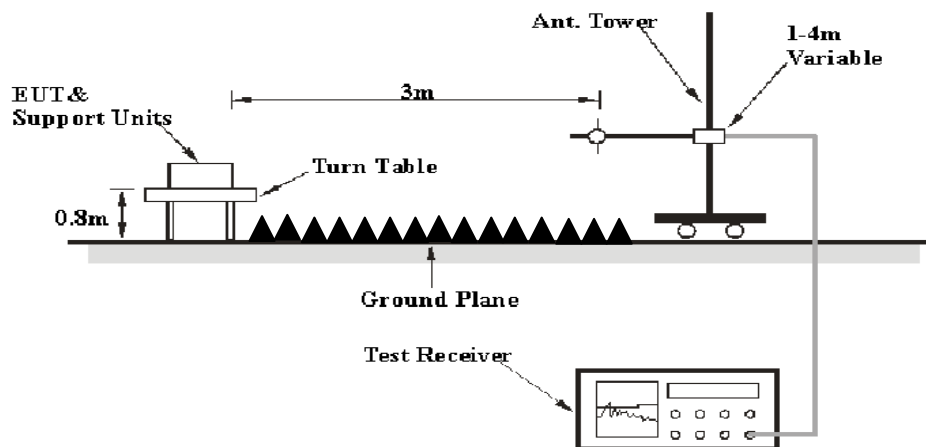
Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Dongguan) is 4.0 dB(k=2, 95% level of confidence), and the uncertainty will not be taken into consideration for all the test data recorded in the report.

### EUT Setup

#### Below 1GHz:



#### Above 1GHz:



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC 15.209, and FCC 15.247 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 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

| <i>Frequency Range</i> | <i>RBW</i> | <i>Video BW</i> | <i>Detector</i> |
|------------------------|------------|-----------------|-----------------|
| 30 MHz – 1000 MHz      | 100 kHz    | 300 kHz         | QP              |
| 1000 MHz – 25 GHz      | 1 MHz      | 3 MHz           | PK              |
| 1000 MHz – 25 GHz      | 1 MHz      | 10 Hz           | Ave.            |

### Test Procedure

For the radiated emissions test, the adapter was connected to the first AC floor outlet. Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

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

### Test Equipment List and Details

| Manufacturer    | Description        | Model      | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|--------------------|------------|---------------|------------------|----------------------|
| Rohde & Schwarz | EMI Test Receiver  | ESCI       | 100035        | 2012-05-14       | 2013-05-13           |
| Sunol Sciences  | Hybrid Antennas    | JB3        | A060611-1     | 2011-09-06       | 2013-09-05           |
| HP              | Pre-amplifier      | 8447E      | 2434A02181    | 2012-10-08       | 2013-10-07           |
| R&S             | Spectrum Analyzer  | FSEM 30    | DE31388       | 2012-03-15       | 2013-03-14           |
| ETS-LINDGREN    | Horn Antenna       | 3115       | 000 527 35    | 2012-09-06       | 2014-09-05           |
| Mini-Circuits   | Wideband Amplifier | ZVA-183-S+ | 96901149      | N/A              | N/A                  |

## 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 Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, and section 15.205, 15.209 and 15.247, with the worst margin reading of:

**2.07 dB at 551.86 MHz in the Vertical polarization**

## Test Data

### Environmental Conditions

|                           |          |
|---------------------------|----------|
| <b>Temperature:</b>       | 25.9°C   |
| <b>Relative Humidity:</b> | 54%      |
| <b>ATM Pressure:</b>      | 100.7kPa |

*The testing was performed by Ares Liu on 2012-11-24.*

*Test Mode: Transmitting*



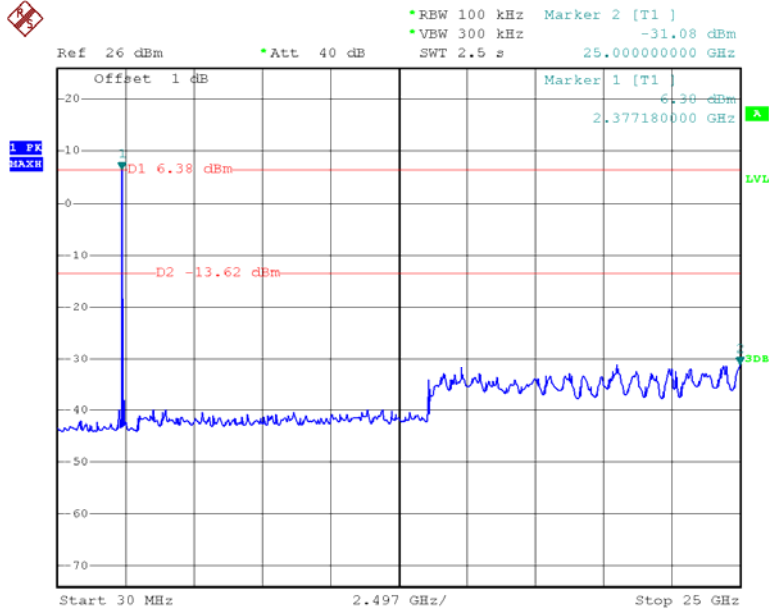
| Frequency<br>(MHz)           | Receiver          |                        | Rx Antenna     |                | Cable<br>loss<br>(dB) | Amplifier<br>Gain<br>(dB) | Corrected<br>Amplitude<br>(dBµV/m) | FCC 15.247        |                |
|------------------------------|-------------------|------------------------|----------------|----------------|-----------------------|---------------------------|------------------------------------|-------------------|----------------|
|                              | Reading<br>(dBµV) | Detector<br>(PK/QP/AV) | Polar<br>(H/V) | Factor<br>(dB) |                       |                           |                                    | Limit<br>(dBµV/m) | Margin<br>(dB) |
| Low Channel: 2411.375(MHz)   |                   |                        |                |                |                       |                           |                                    |                   |                |
| 551.86                       | 44.64             | QP                     | V              | 18.59          | 2.85                  | 22.15                     | 43.93                              | 46.00             | 2.07 *         |
| 2390                         | 40.23             | PK                     | V              | 25.61          | 3.84                  | 0.00                      | 69.68                              | 74.00             | 4.32           |
| 4822.75                      | 56.87             | PK                     | V              | 30.64          | 4.72                  | 27.21                     | 65.02                              | 74.00             | 8.98           |
| 2390                         | 14.23             | AV                     | V              | 25.61          | 3.84                  | 0.00                      | 43.68                              | 54.00             | 10.32          |
| 7234.125                     | 48.78             | PK                     | V              | 34.16          | 6.55                  | 26.57                     | 62.92                              | 74.00             | 11.08          |
| 9645.5                       | 18.17             | AV                     | H              | 36.05          | 8.71                  | 26.42                     | 36.51                              | 54.00             | 17.49          |
| 7234.125                     | 19.97             | AV                     | V              | 34.16          | 6.55                  | 26.57                     | 34.11                              | 54.00             | 19.89          |
| 9645.5                       | 34.69             | PK                     | H              | 36.05          | 8.71                  | 26.42                     | 53.03                              | 74.00             | 20.97          |
| 4822.75                      | 21.09             | AV                     | V              | 30.64          | 4.72                  | 27.21                     | 29.24                              | 54.00             | 24.76          |
| 1314.2                       | 26.48             | AV                     | H              | 23.12          | 2.65                  | 27.30                     | 24.95                              | 54.00             | 29.05          |
| 1314.2                       | 38.12             | PK                     | H              | 23.12          | 2.65                  | 27.30                     | 36.59                              | 74.00             | 37.41          |
| 2411.375                     | 40.37             | AV                     | H              | 25.67          | 3.92                  | 0.00                      | 69.96                              | N/A               | N/A            |
| 2411.375                     | 68.02             | PK                     | H              | 25.67          | 3.92                  | 0.00                      | 97.61                              | N/A               | N/A            |
| 2411.375                     | 49.11             | AV                     | V              | 25.67          | 3.92                  | 0.00                      | 78.70                              | N/A               | N/A            |
| 2411.375                     | 76.48             | PK                     | V              | 25.67          | 3.92                  | 0.00                      | 106.07                             | N/A               | N/A            |
| Middle Channel: 2441.75(MHz) |                   |                        |                |                |                       |                           |                                    |                   |                |
| 551.43                       | 44.38             | QP                     | V              | 18.59          | 2.85                  | 22.15                     | 43.67                              | 46.00             | 2.33 *         |
| 7325.25                      | 51.68             | PK                     | V              | 34.38          | 6.73                  | 26.67                     | 66.12                              | 74.00             | 7.88           |
| 4883.5                       | 55.96             | PK                     | V              | 30.80          | 4.75                  | 27.04                     | 64.47                              | 74.00             | 9.53           |
| 9085.3                       | 18.06             | AV                     | H              | 35.62          | 9.32                  | 26.50                     | 36.50                              | 54.00             | 17.50          |
| 9767                         | 17.97             | AV                     | H              | 36.34          | 8.58                  | 26.55                     | 36.34                              | 54.00             | 17.66          |
| 7325.25                      | 20.07             | AV                     | V              | 34.38          | 6.73                  | 26.67                     | 34.51                              | 54.00             | 19.49          |
| 9085.3                       | 32.44             | PK                     | H              | 35.62          | 9.32                  | 26.50                     | 50.88                              | 74.00             | 23.12          |
| 9767                         | 32.31             | PK                     | H              | 36.34          | 8.58                  | 26.55                     | 50.68                              | 74.00             | 23.32          |
| 4883.5                       | 21.25             | AV                     | V              | 30.80          | 4.75                  | 27.04                     | 29.76                              | 54.00             | 24.24          |
| 1301.7                       | 23.73             | AV                     | H              | 23.08          | 2.55                  | 27.26                     | 22.10                              | 54.00             | 31.90          |
| 1301.7                       | 36.52             | PK                     | H              | 23.08          | 2.55                  | 27.26                     | 34.89                              | 74.00             | 39.11          |
| 2441.75                      | 40.64             | AV                     | H              | 25.75          | 3.99                  | 0.00                      | 70.38                              | N/A               | N/A            |
| 2441.75                      | 68.64             | PK                     | H              | 25.75          | 3.99                  | 0.00                      | 98.38                              | N/A               | N/A            |
| 2441.75                      | 50.16             | AV                     | V              | 25.75          | 3.99                  | 0.00                      | 79.90                              | N/A               | N/A            |
| 2441.75                      | 76.91             | PK                     | V              | 25.75          | 3.99                  | 0.00                      | 106.65                             | N/A               | N/A            |

| High Channel: 2472.125(MHz) |       |    |   |       |      |       |        |       |        |
|-----------------------------|-------|----|---|-------|------|-------|--------|-------|--------|
| 551.82                      | 44.26 | QP | V | 18.59 | 2.85 | 22.15 | 43.55  | 46.00 | 2.45 * |
| 2483.5                      | 13.91 | AV | V | 25.86 | 3.80 | 0.00  | 43.57  | 54.00 | 10.43  |
| 7416.375                    | 48.26 | PK | V | 34.60 | 6.90 | 26.76 | 63.00  | 74.00 | 11.00  |
| 4944.25                     | 53.48 | PK | V | 30.95 | 4.68 | 27.25 | 61.86  | 74.00 | 12.14  |
| 2483.5                      | 30.85 | PK | V | 25.86 | 3.80 | 0.00  | 60.51  | 74.00 | 13.49  |
| 9888.5                      | 18.18 | AV | H | 36.63 | 8.45 | 26.67 | 36.59  | 54.00 | 17.41  |
| 7416.375                    | 19.42 | AV | V | 34.60 | 6.90 | 26.76 | 34.16  | 54.00 | 19.84  |
| 9888.5                      | 33.23 | PK | H | 36.63 | 8.45 | 26.67 | 51.64  | 74.00 | 22.36  |
| 4944.25                     | 20.62 | AV | V | 30.95 | 4.68 | 27.25 | 29.00  | 54.00 | 25.00  |
| 1631.5                      | 21.55 | AV | H | 23.86 | 3.17 | 27.28 | 21.30  | 54.00 | 32.70  |
| 1631.5                      | 35.24 | PK | H | 23.86 | 3.17 | 27.28 | 34.99  | 74.00 | 39.01  |
| 2472.125                    | 40.38 | AV | H | 25.83 | 3.87 | 0.00  | 70.08  | N/A   | N/A    |
| 2472.125                    | 68.56 | PK | H | 25.83 | 3.87 | 0.00  | 98.26  | N/A   | N/A    |
| 2472.125                    | 50.51 | AV | V | 25.83 | 3.87 | 0.00  | 80.21  | N/A   | N/A    |
| 2472.125                    | 78.29 | PK | V | 25.83 | 3.87 | 0.00  | 107.99 | N/A   | N/A    |

\*Within measurement uncertainty!

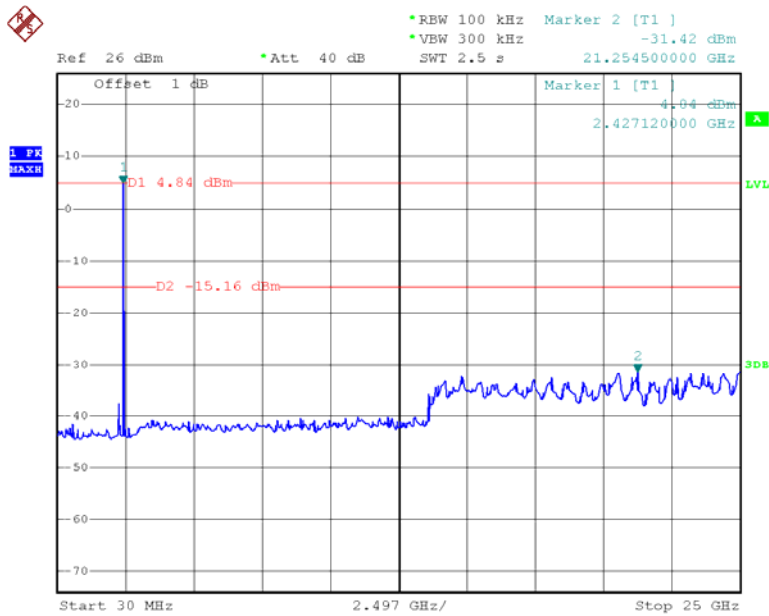
### Conducted Spurious Emissions at Antenna Port

#### Low Channel



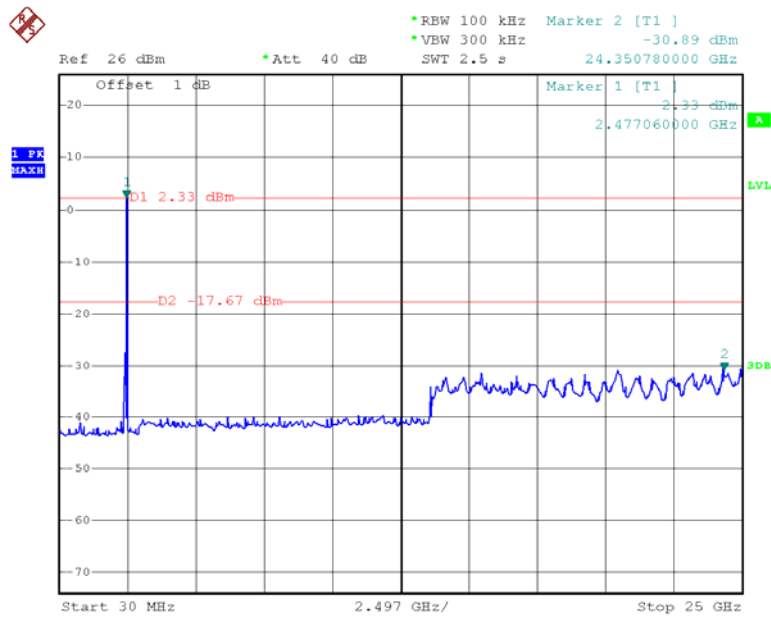
Date: 24.NOV.2012 12:00:04

#### Middle Channel



Date: 24.NOV.2012 12:01:45

### High Channel



Date: 24.NOV.2012 12:05:29

## FCC §15.247(a) (1) - CHANNEL SEPARATION TEST

### Applicable Standard

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.50 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater provided the systems operate with an output power no greater than 125 mW.

### Test Equipment List and Details

| Manufacturer    | Description       | Model | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-------------------|-------|---------------|------------------|----------------------|
| Rohde & Schwarz | Spectrum Analyzer | FSP38 | 100478        | 2012-5-14        | 2013-5-13            |

### Test Procedure

1. Set the EUT in transmitting mode, spectrum Bandwidth was set at 100 kHz, maxhold the channel.
2. Set the adjacent channel of the EUT maxhold another truce
3. Measure the channel separation.

### Test Data

#### Environmental Conditions

|                    |          |
|--------------------|----------|
| Temperature:       | 25.9 °C  |
| Relative Humidity: | 54 %     |
| ATM Pressure:      | 100.7kPa |

\* The testing was performed by Ares Liu on 2012-11-24.

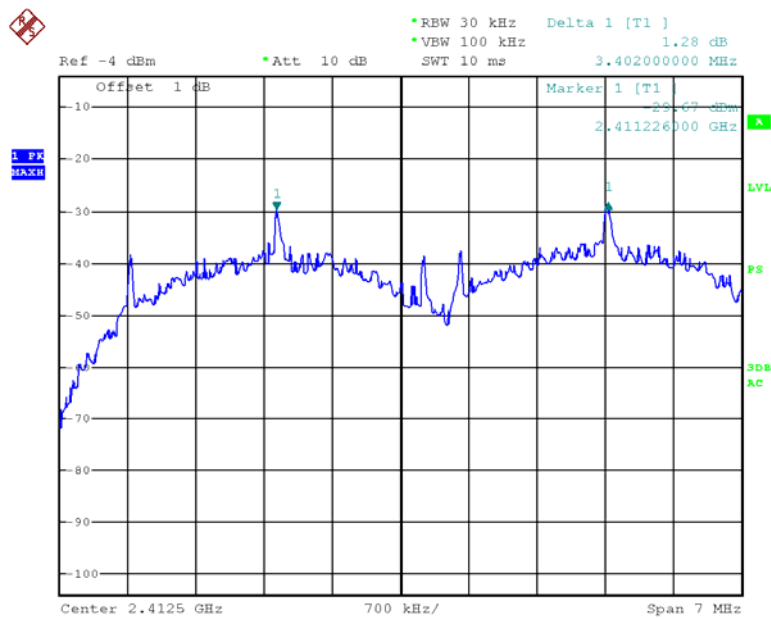
**Test Result:** Compliance.

Please refer to following tables and plots

*Test Mode: Transmitting*

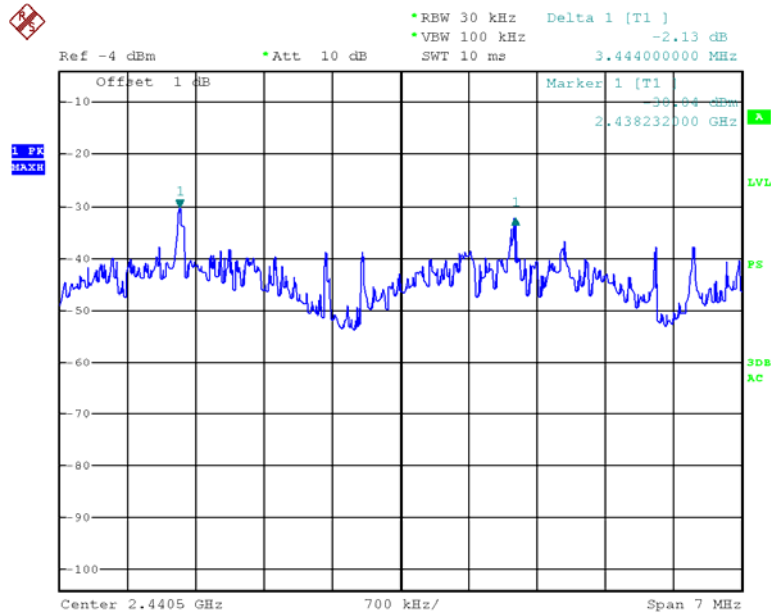
| Channel  | Frequency (MHz) | Channel Separation (MHz) | Limit (MHz) | Result |
|----------|-----------------|--------------------------|-------------|--------|
| Low      | 2411.375        | 3.402                    | 2.38        | Pass   |
| Adjacent | 2414.75         |                          |             |        |
| Middle   | 2441.75         | 3.444                    | 2.38        | Pass   |
| Adjacent | 2438.375        |                          |             |        |
| High     | 2472.125        | 3.36                     | 2.36        | Pass   |
| Adjacent | 2468.75         |                          |             |        |

**Low Channel**



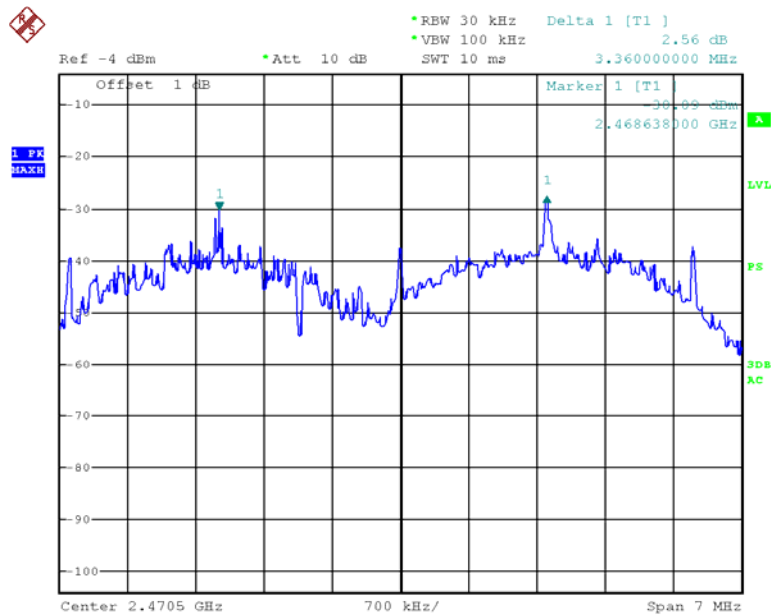
Date: 24.NOV.2012 15:36:08

### Middle Channel



Date: 24.NOV.2012 15:37:11

### High Channel



Date: 24.NOV.2012 15:40:40

## FCC §15.247(a) (1) – 20 dB BANDWIDTH TESTING

### Applicable Standard

Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

### Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT on the test table without connection to measurement instrument. Turn on the EUT. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

### Test Equipment List and Details

| Manufacturer    | Description       | Model | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-------------------|-------|---------------|------------------|----------------------|
| Rohde & Schwarz | Spectrum Analyzer | FSP38 | 100478        | 2012-5-14        | 2013-5-13            |

### Test Data

#### Environmental Conditions

|                           |          |
|---------------------------|----------|
| <b>Temperature:</b>       | 25.9 °C  |
| <b>Relative Humidity:</b> | 54 %     |
| <b>ATM Pressure:</b>      | 100.7kPa |

\* The testing was performed by Ares Liu on 2012-11-24.

**Test Result:** Compliance.

Please refer to following tables and plots

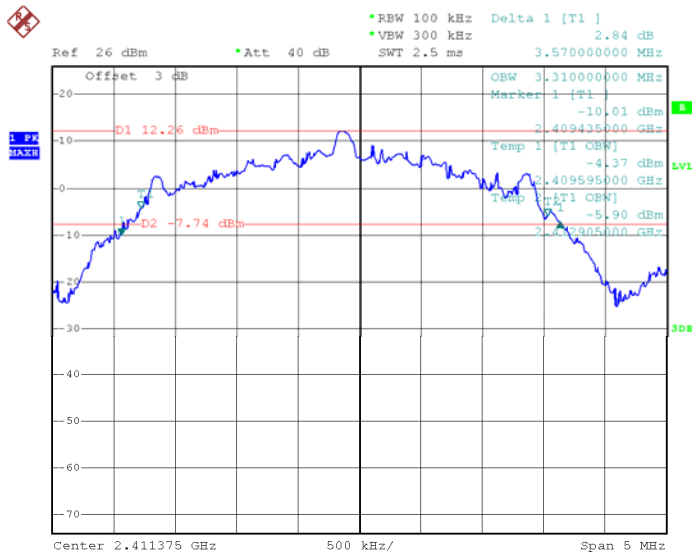
*Test Mode: Transmitting*



| Channel | Frequency (MHz) | 20 dB Bandwidth (MHz) |
|---------|-----------------|-----------------------|
| Low     | 2411.375        | 3.57                  |
| Middle  | 2441.75         | 3.57                  |
| High    | 2472.125        | 3.54                  |

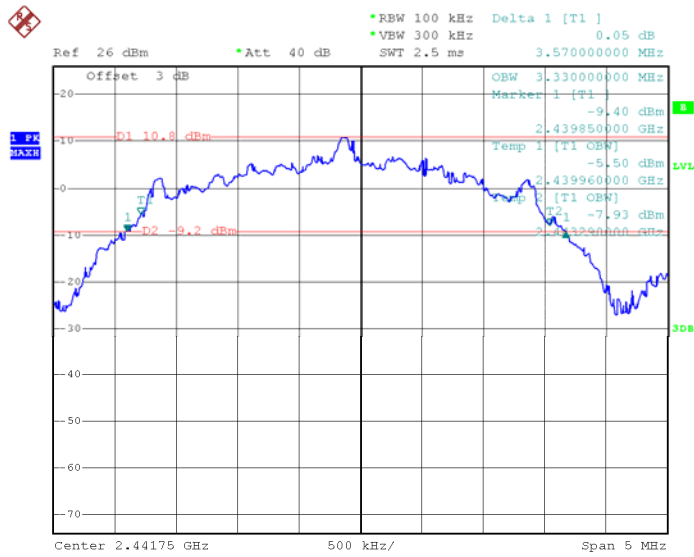
Please refer to the following plots.

**Low Channel**



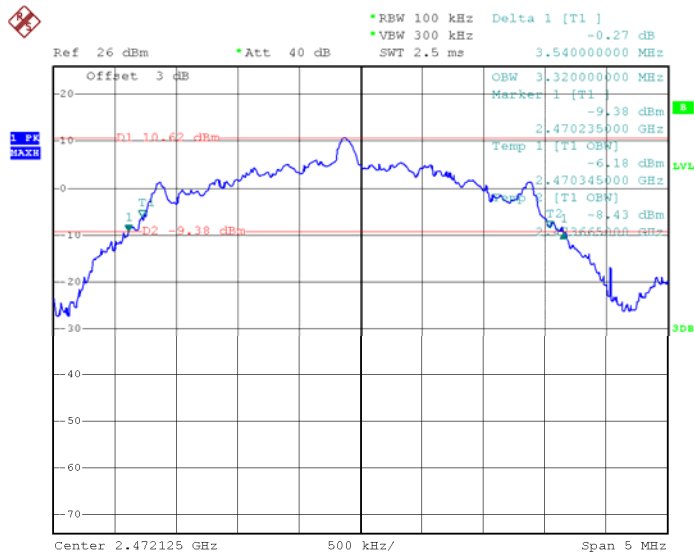
Date: 24.NOV.2012 10:07:28

### Middle Channel



Date: 24.NOV.2012 10:18:16

### High Channel



Date: 24.NOV.2012 10:13:16

## **FCC §15.247(a) (1) (iii) - QUANTITY OF HOPPING CHANNEL TEST**

### **Applicable Standard**

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

### **Test Procedure**

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Set the EUT in hopping mode from first channel to last.
3. By using the Max-Hold function record the Quantity of the channel.

### **Test Equipment List and Details**

| <b>Manufacturer</b> | <b>Description</b> | <b>Model</b> | <b>Serial Number</b> | <b>Calibration Date</b> | <b>Calibration Due Date</b> |
|---------------------|--------------------|--------------|----------------------|-------------------------|-----------------------------|
| Rohde & Schwarz     | Spectrum Analyzer  | FSP38        | 100478               | 2012-5-14               | 2013-5-13                   |

### **Test Data**

#### **Environmental Conditions**

|                           |          |
|---------------------------|----------|
| <b>Temperature:</b>       | 25.9°C   |
| <b>Relative Humidity:</b> | 54 %     |
| <b>ATM Pressure:</b>      | 100.7kPa |

*The testing was performed by Ares Liu on 2012-11-24.*

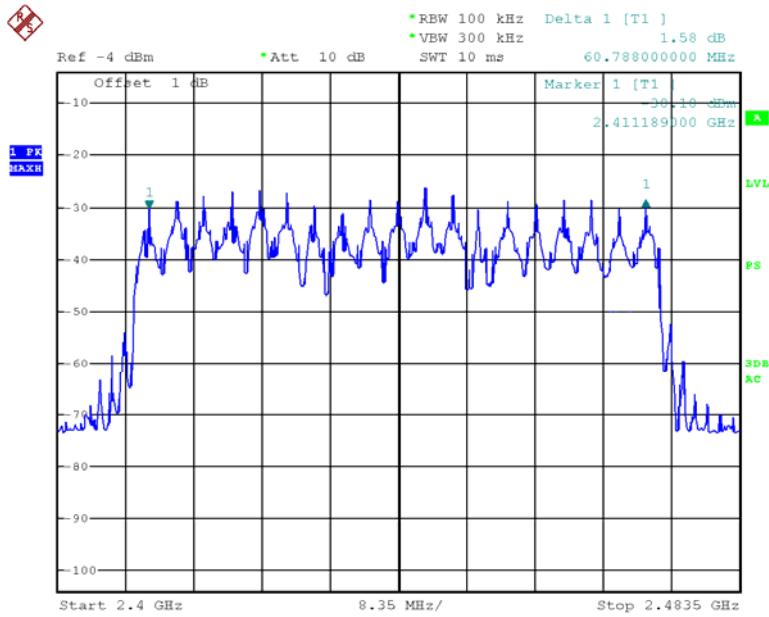
**Test Result:** Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

| Frequency Range (MHz) | Number of Hopping Channel | Limit |
|-----------------------|---------------------------|-------|
| 2400-2483.5           | 19                        | ≥15   |

Number of Hopping Channels



Date: 24.NOV.2012 15:29:42

## **FCC §15.247(a) (1) (iii) - TIME OF OCCUPANCY (DWELL TIME)**

### **Applicable Standard**

Frequency hopping systems in the 2400-2483.5 MHz shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

### **Test Procedure**

The EUT was worked in channel hopping; Spectrum SPAN was set as 0. Sweep was set as 0.4 \* channel no. (s), the quantity of pulse was get from single sweep. In addition, the time of single pulses was tested.

Dwell Time= time slot length \* hope rate/ number of hopping channels \*hopping NO. \* 0.4s

### **Test Equipment List and Details**

| Manufacturer    | Description       | Model | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-------------------|-------|---------------|------------------|----------------------|
| Rohde & Schwarz | Spectrum Analyzer | FSP38 | 100478        | 2012-5-14        | 2013-5-13            |

### **Test Data**

#### **Environmental Conditions**

|                           |          |
|---------------------------|----------|
| <b>Temperature:</b>       | 25.9 °C  |
| <b>Relative Humidity:</b> | 54 %     |
| <b>ATM Pressure:</b>      | 100.7kPa |

\* The testing was performed by Ares Liu on 2012-11-24.

**Test Result:** Compliance.

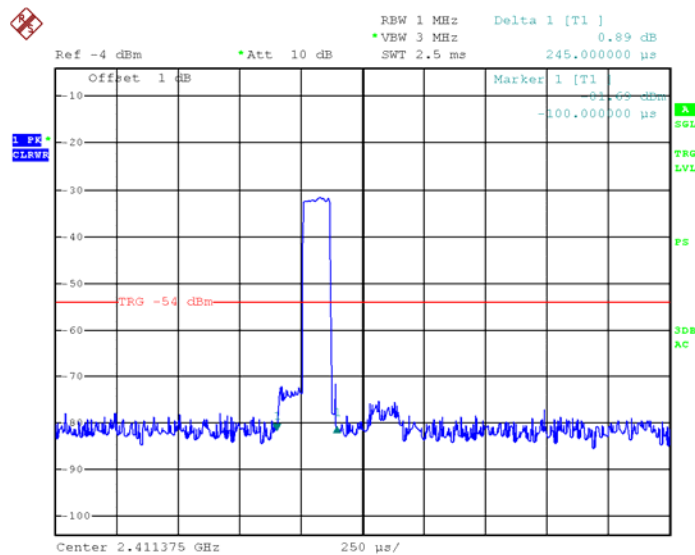
Please refer to following tables and plots

Test Mode: Transmitting

| Channel   | Pulse Width (ms) | Dwell Time (s) | Limit (s) | Result |
|---|------------------|----------------|-----------|--------|
| Low   | 0.245            | 0.03087        | 0.4       | Pass   |
| Middle  | 0.225            | 0.02835        | 0.4       | Pass   |
| High  | 0.245            | 0.03087        | 0.4       | Pass   |
| Dwell Time(s)= time slot length(s)* 315/19*19 * 0.4 |                  |                |           |        |

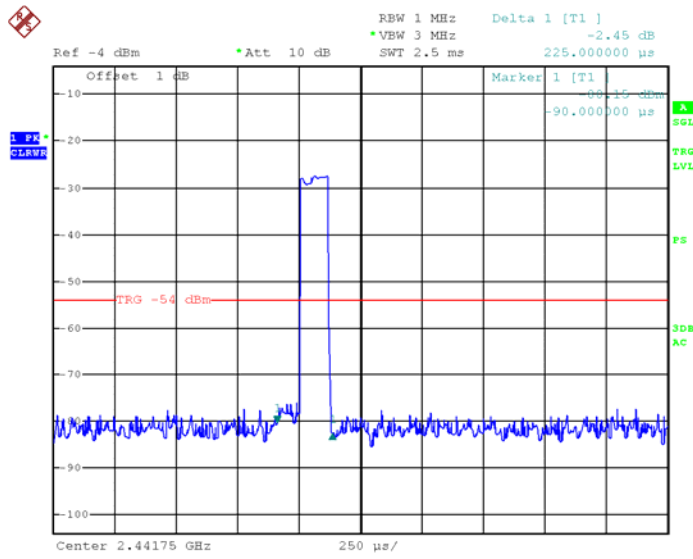
Note: The EUT hopping 315times per second

### Low Channel



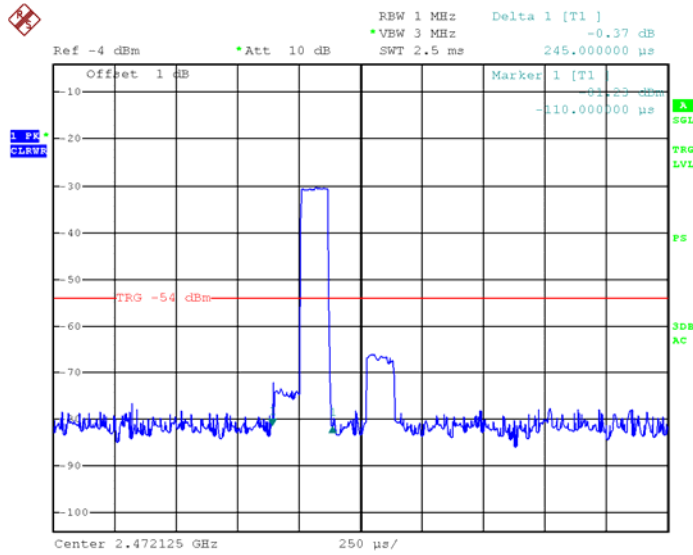
Date: 24.NOV.2012 16:18:52

### Middle Channel



Date: 24.NOV.2012 16:19:31

### High Channel



Date: 24.NOV.2012 16:19:55

**FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT**

**Applicable Standard**

According to §15.247(b) (1), for frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts

**Test Procedure**

1. Place the EUT on a bench and set in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to an EMI test receiver.
3. Add a correction factor to the display.

**Test Equipment List and Details**

| Manufacturer    | Description       | Model | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-------------------|-------|---------------|------------------|----------------------|
| Rohde & Schwarz | Spectrum Analyzer | FSP38 | 100478        | 2012-5-14        | 2013-5-13            |

**Test Data**

**Environmental Conditions**

|                           |          |
|---------------------------|----------|
| <b>Temperature:</b>       | 25.9°C   |
| <b>Relative Humidity:</b> | 54%      |
| <b>ATM Pressure:</b>      | 100.7kPa |

*\* The testing was performed by Ares Liu on 2012-12-07.*

**Test Result:** Compliance.

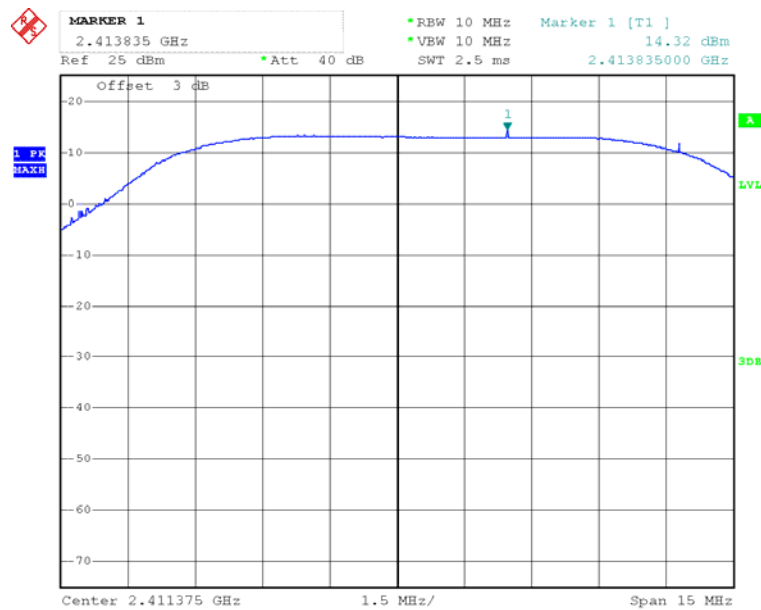


Test Mode: Transmitting

| Channel | Frequency (MHz) | Output power (dBm) | Limit (dBm) |
|---------|-----------------|--------------------|-------------|
| Low     | 2411.375        | 14.32              | 21          |
| Middle  | 2441.75         | 13.46              | 21          |
| High    | 2472.125        | 12.27              | 21          |

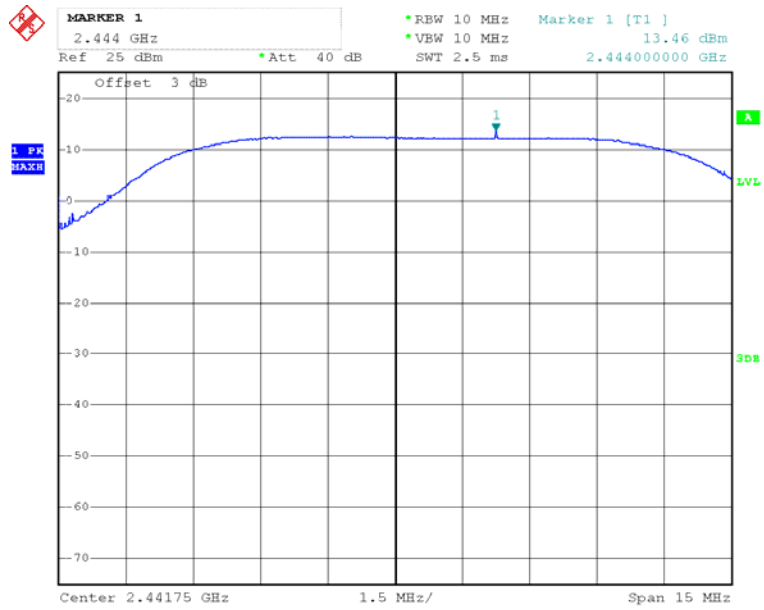
Note: The data above was tested in conducted mode.

### Output Power, Low



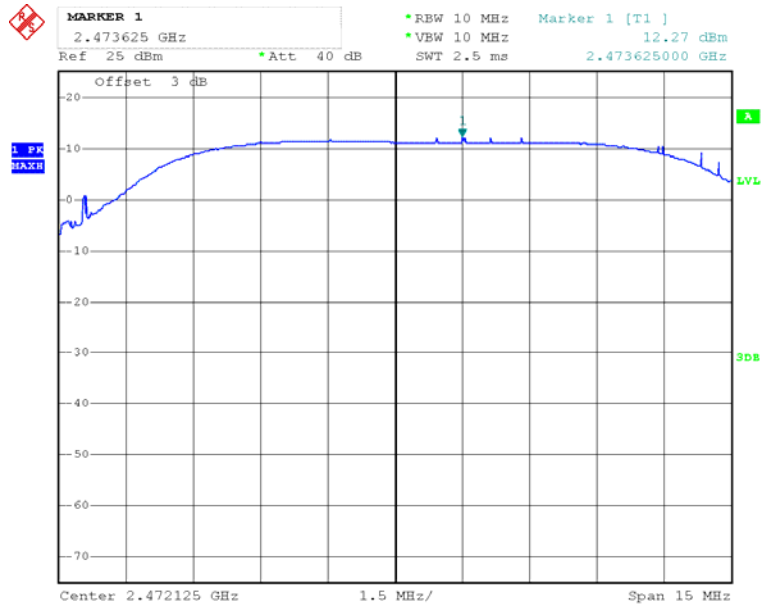
Date: 7.DEC.2012 12:30:41

### Output Power, Middle



Date: 7.DEC.2012 12:31:09

### Output Power, High



Date: 7.DEC.2012 12:32:22

## FCC §15.247(d) - BAND EDGES TESTING

### Applicable Standard

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

### Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

### Test Equipment List and Details

| Manufacturer    | Description       | Model | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-------------------|-------|---------------|------------------|----------------------|
| Rohde & Schwarz | Spectrum Analyzer | FSP38 | 100478        | 2012-5-14        | 2013-5-13            |

### Test Data

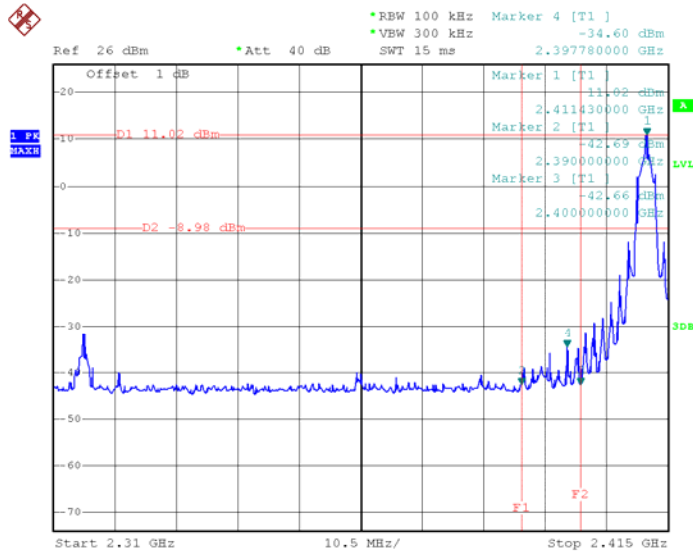
#### Environmental Conditions

|                    |        |
|--------------------|--------|
| Temperature:       | 26 °C  |
| Relative Humidity: | 48 %   |
| ATM Pressure:      | 101kPa |

*\*The testing was performed by Ares Liu on 2012-11-24.*

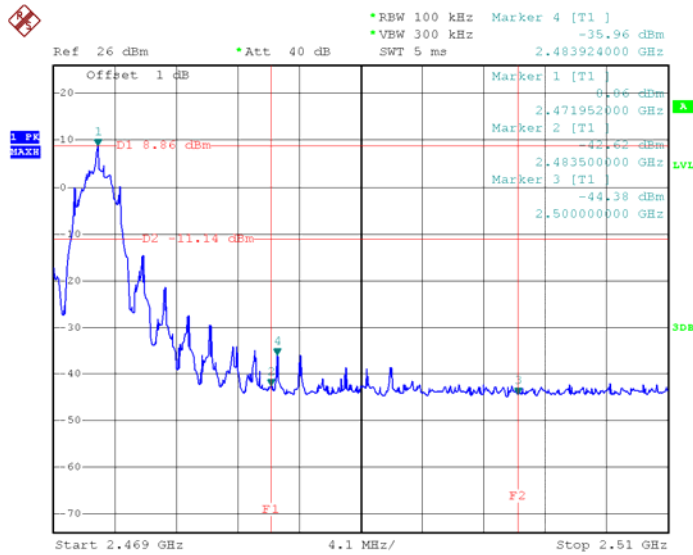
**Test Result: Compliance**

**Band Edge, Left Side**



Date: 24.NOV.2012 10:12:01

**Band Edge, Right Side**



Date: 24.NOV.2012 10:13:42

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