

# FCC PART 15.247

## TEST REPORT

For

### Jiangsu SEUIC Technology Co.,Ltd

No23.Wenzhu Road. Yuhuatai District. Nanjing. Jiangsu China

**FCC ID: 2AC68-AUTOID6**

<b>Report Type:</b> Original Report	<b>Product Type:</b> AUTOID6
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<b>Report Number:</b> RSH140814050-00C	
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## TABLE OF CONTENTS

<b>GENERAL INFORMATION.....</b>	<b>4</b>
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....	4
OBJECTIVE.....	4
RELATED SUBMITTAL(S)/GRANT(S).....	4
TEST METHODOLOGY.....	4
TEST FACILITY.....	5
<b>SYSTEM TEST CONFIGURATION.....</b>	<b>6</b>
DESCRIPTION OF TEST CONFIGURATION.....	6
EQUIPMENT MODIFICATIONS.....	6
BLOCK DIAGRAM OF TEST SETUP.....	6
<b>SUMMARY OF TEST RESULTS.....</b>	<b>7</b>
<b>FCC §15.247 (i) &amp; §1.1310 &amp; §2.1093- RF EXPOSURE.....</b>	<b>8</b>
APPLICABLE STANDARD.....	8
<b>FCC §15.203 - ANTENNA REQUIREMENT.....</b>	<b>9</b>
APPLICABLE STANDARD.....	9
ANTENNA CONNECTOR CONSTRUCTION.....	9
<b>FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS.....</b>	<b>10</b>
APPLICABLE STANDARD.....	10
MEASUREMENT UNCERTAINTY.....	10
EUT SETUP.....	10
EMI TEST RECEIVER SETUP.....	11
TEST PROCEDURE.....	11
CORRECTED AMPLITUDE & MARGIN CALCULATION.....	11
TEST EQUIPMENT LIST AND DETAILS.....	12
TEST RESULTS SUMMARY.....	12
TEST DATA.....	12
<b>FCC §15.209, §15.205 &amp; §15.247(d) - SPURIOUS EMISSIONS.....</b>	<b>15</b>
APPLICABLE STANDARD.....	15
MEASUREMENT UNCERTAINTY.....	15
EUT SETUP.....	15
EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP.....	16
TEST PROCEDURE.....	16
TEST EQUIPMENT LIST AND DETAILS.....	17
CORRECTED AMPLITUDE & MARGIN CALCULATION.....	17
TEST RESULTS SUMMARY.....	17
TEST DATA.....	17
<b>FCC §15.247(a) (1) - CHANNEL SEPARATION TEST.....</b>	<b>22</b>
APPLICABLE STANDARD.....	22
TEST EQUIPMENT LIST AND DETAILS.....	22
TEST PROCEDURE.....	22
TEST DATA.....	22
<b>FCC §15.247(a) (1) – 20 dB BANDWIDTH TESTING.....</b>	<b>25</b>
APPLICABLE STANDARD.....	25
TEST PROCEDURE.....	25
TEST EQUIPMENT LIST AND DETAILS.....	25

TEST DATA .....26

**FCC §15.247(a) (1) (iii) - QUANTITY OF HOPPING CHANNEL TEST .....28**

    APPLICABLE STANDARD .....28

    TEST PROCEDURE .....28

    TEST EQUIPMENT LIST AND DETAILS.....28

    TEST DATA .....28

**FCC §15.247(a) (1) - TIME OF OCCUPANCY (DWELL TIME).....30**

    APPLICABLE STANDARD .....30

    TEST PROCEDURE .....30

    TEST EQUIPMENT LIST AND DETAILS.....30

    TEST DATA .....30

**FCC §15.247(b) (2) - PEAK OUTPUT POWER MEASUREMENT .....34**

    APPLICABLE STANDARD .....34

    TEST PROCEDURE .....34

    TEST EQUIPMENT LIST AND DETAILS.....34

    TEST DATA .....34

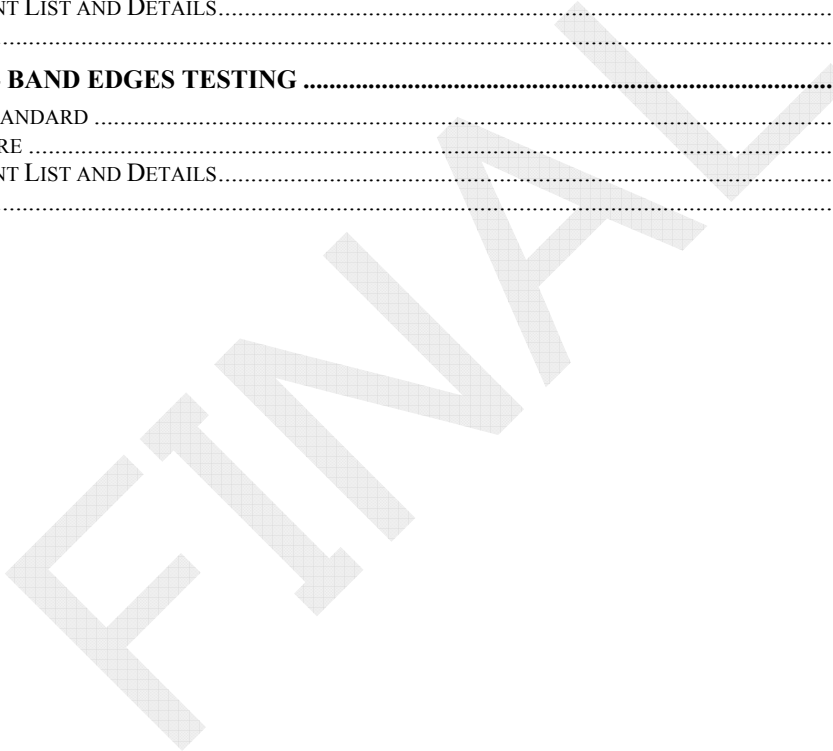
**FCC §15.247(d) - BAND EDGES TESTING .....37**

    APPLICABLE STANDARD .....37

    TEST PROCEDURE .....37

    TEST EQUIPMENT LIST AND DETAILS.....37

    TEST DATA .....37



## GENERAL INFORMATION

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

The *Jiangsu SEUIC Technology Co.,Ltd*'s product, model number: *AUTOID6* (FCC ID: 2AC68-*AUTOID6*) or ("EUT") in this report is a *AUTOID6*, rated input voltage: DC 5V from adapter or DC 3.7V from lithium battery.

The measurement please refer below:

Description	Serial Number	Length (cm)	Width (cm)	High (cm)
RFID antenna on the back side	140814050-1	15.6	8.1	5.6
RFID antenna on the top side	140814050-2	19.7	8.4	5.6

Adapter information:

Model: FJ-SW0503000U

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

Output: DC 5V, 3000mA

*\*Two type of RFID antenna employed for this product, please refer to the EUT photos, the antenna type don't effected the test results except the radiation test, All measurement and test data in this report was gathered from production sample serial number: 140814050-1, except radiation test for two type of sample .The EUT was received on 2014-08-21*

### Objective

This report is prepared on behalf of *Jiangsu SEUIC Technology Co.,Ltd* in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communications Commission's rules.

The tests were performed in order to determine the 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)

FCC Part15C DTS submissions with FCC ID: 2AC68-AUTOID6.

FCC Part15C DSS submissions with FCC ID: 2AC68-AUTOID6.

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, 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.

## 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 C63.4-2003.

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.

FEMVA

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The system was configured for testing in an engineering mode.

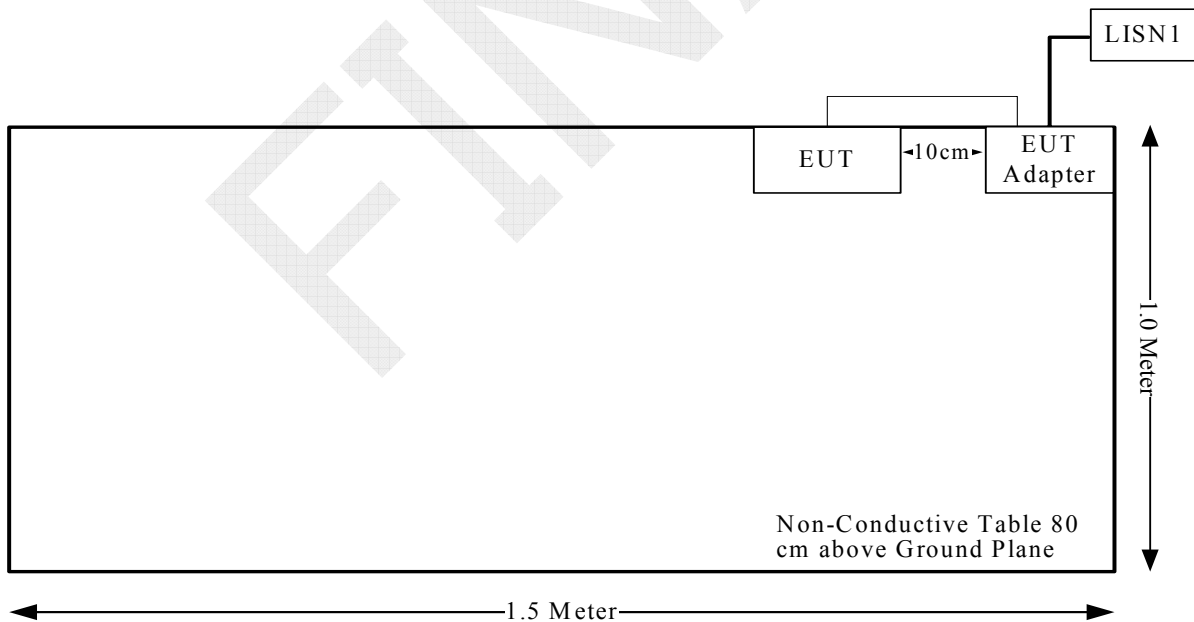
99 hopping channels are provided by manufacturer, and EUT was tested with low channel: 902.75 MHz, middle channel: 915.25MHz, and high channel: 927.25MHz.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	902.75	26	915.25
2	903.25	27	915.75
...	...	...	...
...	...	...	...
...	...	...	...
24	914.25	49	926.75
25	914.75	50	927.25

### Equipment Modifications

No modification was made to the EUT.

### Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

<b>FCC Rules</b>	<b>Description of Test</b>	<b>Result</b>
§15.247 (i), §1.1310,§2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	Conducted Emissions	Compliance
§15.205, §15.209, §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)	Time of Occupancy (Dwell Time)	Compliance
§15.247(a)(1)	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) & §1.1310 & §2.1093- RF EXPOSURE**

### **Applicable Standard**

According to §15.247(i) and §1.1310, 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.

According to KDB447498 D01 General RF Exposure Guidance v05r02:

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances  $\leq 50$  mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$  for 1-g SAR and  $\leq 7.5$  for 10-g extremity SAR, where

- $f(\text{GHz})$  is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum test separation distance is  $\leq 50$  mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is  $< 5$  mm, a distance of 5 mm according to 5) in section 4.1 is applied to determine SAR test exclusion.

### **Measurement Result**

The maximum peak conducted output power = 20.61 dBm = 115.08mW at 902.75MHz

The time-averaged maximum power = peak power\*duty cycle = 115.08mW \*(pulse width\* hopping numbers per 20s/20s) = 115.08mW\*[31.9ms\*(4 pulse in 20s per channel\*50 channels)/20s = 36.71mW

$[(\text{max. power of channel, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}]$   
 $= 36.71/5 * (\sqrt{0.90275}) = 6.98 < 7.5$

**So the SAR evaluation is not necessary for extremity (hands) use.**



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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 employed two types of integral antenna for RFID. The antenna gain is 2 dBi for the antenna on the back side, and 3dBi for the antenna on the top side, that fulfills the requirement of this section. Please refer to the EUT photos.

**Result:** Compliance.

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

**Applicable Standard**

FCC§15.207

**Measurement Uncertainty**

Compliance or non-compliance with a disturbance limit shall be determined in the following manner:

If  $U_{lab}$  is less than or equal to  $U_{cispr}$  of Table 1, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If  $U_{lab}$  is greater than  $U_{cispr}$  of Table 1, then:

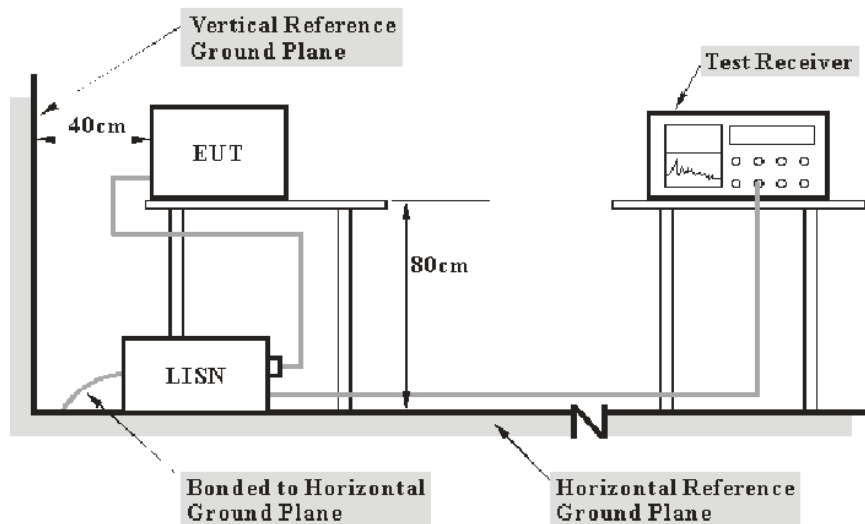
- compliance is deemed to occur if no measured disturbance level, increased by  $(U_{lab} - U_{cispr})$ , exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by  $(U_{lab} - U_{cispr})$ , exceeds the disturbance limit.

Based on CISPR 16-4-2: 2011, measurement uncertainty of conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Dongguan) is 3.46 dB (150 kHz to 30 MHz).

Table 1 – Values of  $U_{cispr}$

Measurement	$U_{cispr}$
Conducted disturbance at mains port using AMN (150 kHz to 30 MHz)	3.4 dB

**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 C63.4-2003 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:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

### Test Procedure

During the conducted emission test, the adapter or adapter was connected to the outlet of the 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.

### Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$$V_C = V_R + A_C + VDF$$

$$C_f = A_C + VDF$$

Herein,

$V_C$  (cord. Reading): corrected voltage amplitude

$V_R$ : reading voltage amplitude

$A_C$ : attenuation caused by cable loss

VDF: voltage division factor of AMN

$C_f$ : Correction Factor

The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the maximum 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
R&S	EMI Test Receiver	ESCS 30	830245/006	2013-11-20	2014-11-20
R&S	L.I.S.N	ESH3-Z5	843331/015	N/A	N/A
R&S	Two-line V-network	ENV 216	3560.6550.12	2014-01-22	2015-01-22
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, 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, with the worst margin reading of:

**19.0 at 0.670921 MHz** in the **Neutral** conducted mode

### Test Data

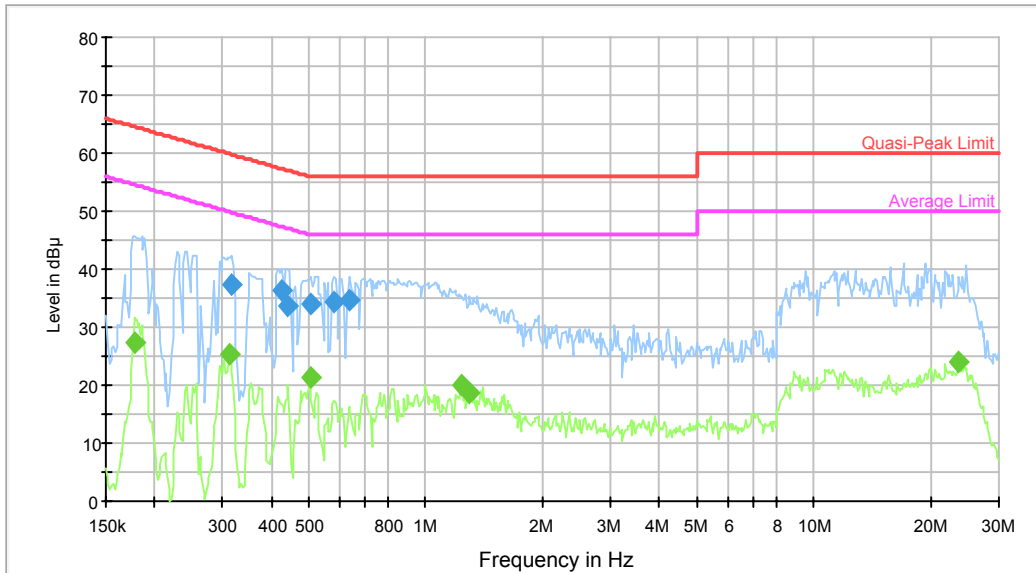
#### Environmental Conditions

<b>Temperature:</b>	28.1 °C
<b>Relative Humidity:</b>	49 %
<b>ATM Pressure:</b>	100.4 kPa

*The testing was performed by Sevin Li on 2014-08-25.*

Test Mode: Operating

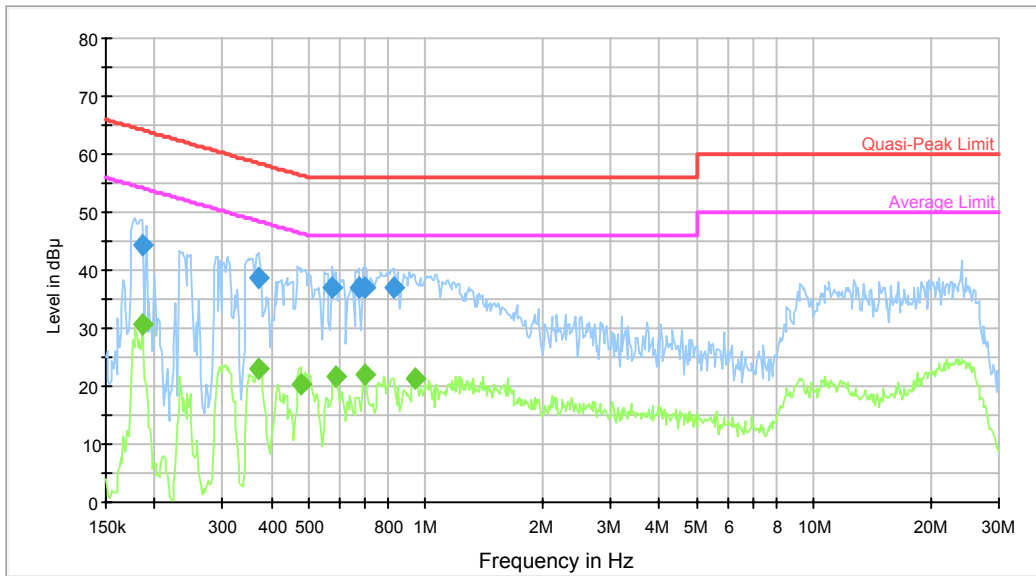
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.317235	37.4	9.000	L1	10.7	22.3	59.8	Compliance
0.426011	36.5	9.000	L1	10.5	20.9	57.3	Compliance
0.443327	33.8	9.000	L1	10.5	23.2	57.0	Compliance
0.507637	33.9	9.000	L1	10.3	22.1	56.0	Compliance
0.581275	34.3	9.000	L1	10.4	21.7	56.0	Compliance
0.639600	34.7	9.000	L1	10.5	21.3	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.177322	27.5	9.000	L1	10.4	27.1	54.6	Compliance
0.312220	25.4	9.000	L1	10.7	24.6	49.9	Compliance
0.503608	21.3	9.000	L1	10.3	24.7	46.0	Compliance
1.239175	20.0	9.000	L1	10.4	26.0	46.0	Compliance
1.289541	18.8	9.000	L1	10.4	27.2	46.0	Compliance
23.633576	24.0	9.000	L1	10.9	26.0	50.0	Compliance

**AC120 V, 60 Hz, Neutral:**



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.187494	44.3	9.000	N	11.1	19.8	64.1	Compliance
0.372042	38.5	9.000	N	10.9	19.9	58.5	Compliance
0.576662	36.9	9.000	N	10.4	19.1	56.0	Compliance
0.670921	37.0	9.000	N	10.6	19.0	56.0	Compliance
0.698191	36.9	9.000	N	10.6	19.1	56.0	Compliance
0.825364	37.1	9.000	N	10.5	19.0	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.187494	30.7	9.000	N	11.1	23.5	54.1	Compliance
0.372042	22.9	9.000	N	10.9	25.6	48.5	Compliance
0.476287	20.5	9.000	N	10.4	25.9	46.4	Compliance
0.585926	21.6	9.000	N	10.4	24.4	46.0	Compliance
0.698191	21.9	9.000	N	10.6	24.1	46.0	Compliance
0.937592	21.2	9.000	N	10.5	24.8	46.0	Compliance

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

**Applicable Standard**

FCC §15.247 (d); §15.209; §15.205;

**Measurement Uncertainty**

Compliance or non-compliance with a disturbance limit shall be determined in the following manner:

If  $U_{lab}$  is less than or equal to  $U_{cispr}$  of Table 2, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If  $U_{lab}$  is greater than  $U_{cispr}$  of Table 1, then:

- compliance is deemed to occur if no measured disturbance level, increased by  $(U_{lab} - U_{cispr})$ , exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by  $(U_{lab} - U_{cispr})$ , exceeds the disturbance limit.

Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:

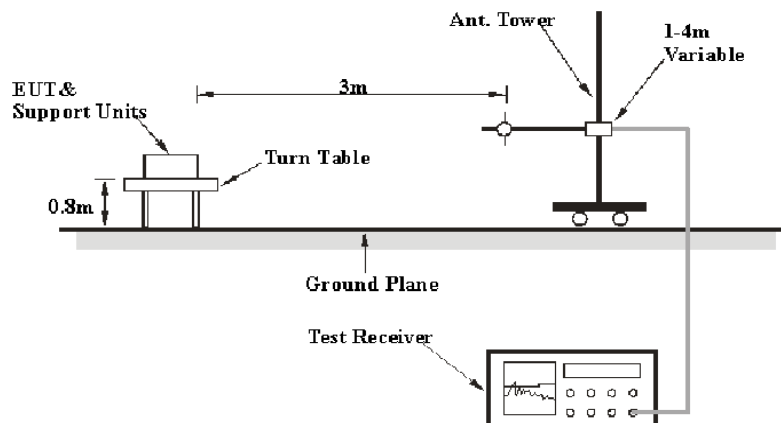
- 30M~200MHz: 5.0 dB
- 200M~1GHz: 6.2 dB
- 1G~6GHz: 4.45 dB
- 6G~18GHz: 5.23 dB

Table 2 – Values of  $U_{cispr}$

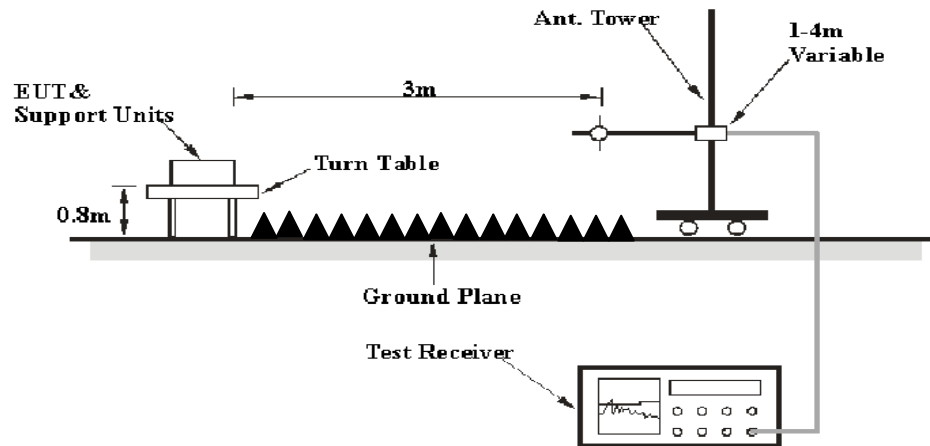
Measurement	$U_{cispr}$
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

**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 C63.4-2003. 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.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 VAC/60 Hz power source

**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:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

**Test Procedure**

For the radiated emissions test, the adapter or adapter was connected to the 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
R&S	EMI Test Receiver	ESCI	100224	2014-05-09	2015-05-09
Sunol Sciences	Antenna	JB3	A060611-3	2014-07-28	2017-07-27
HP	Amplifier	8447E	2434A02181	2014-09-01	2015-09-01
R&S	Spectrum Analyzer	FSEM	DE31388	2014-05-09	2015-05-09
ETS LINDGREN	Horn Antenna	3115	000 527 35	2012-09-06	2015-09-06
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2014-02-19	2015-02-19
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-01 1304	2014-06-16	2017-06-15
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2014-09-06	2015-09-06

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

**Corrected Amplitude & Margin Calculation**

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 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:

**1.92 dB at 1830.5 MHz in the Horizontal polarization**

**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	28.3 °C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	100.3kPa

*The testing was performed by Sevin Li on 2014-10-22.  
Test Mode: Transmitting*

Antenna 1:

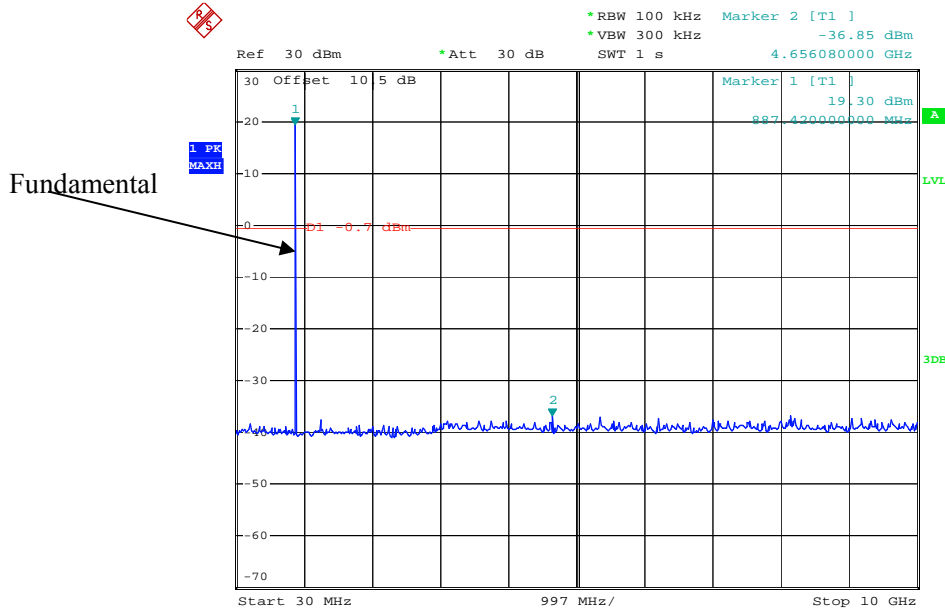
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	FCC 15.247	
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)
Frequency: 902.75MHz									
902.75	87.9	PK	H	22.95	3.70	0.00	114.55	N/A	N/A
902.75	85.21	PK	V	22.95	3.70	0.00	111.86	N/A	N/A
902.75	76.29	AV	H	22.95	3.70	0.00	102.94	N/A	N/A
902.75	74.68	AV	V	22.95	3.70	0.00	101.33	N/A	N/A
1805.5	62.31	PK	H	27.52	3.45	27.53	65.74	74.00	8.26
1805.5	48.25	AV	H	27.52	3.45	27.53	51.68	54.00	2.32
2708.25	43.75	PK	H	31.31	4.02	27.83	51.25	74.00	22.75
2708.25	34.85	AV	V	31.31	4.02	27.83	42.35	54.00	11.65
3611	43.49	PK	H	31.90	5.06	27.81	52.64	74.00	21.36
3611	33.95	AV	V	31.90	5.06	27.81	43.10	54.00	10.90
902	36.21	QP	H	22.94	3.71	22.17	40.69	46.00	5.31
902	25.45	QP	V	22.94	3.71	22.17	29.93	46.00	16.07
3012	32.02	PK	H	30.92	7.16	27.55	42.56	74.00	31.44
3012	22.48	AV	V	30.92	7.16	27.55	33.02	54.00	20.98
45.5	35.63	QP	H	10.74	0.89	21.42	25.84	40.00	14.16
40.6	34.75	QP	H	14.00	0.83	21.42	28.16	40.00	11.84
Frequency: 915.25MHz									
915.25	87.85	PK	H	22.91	3.68	0.00	114.44	N/A	N/A
915.25	85.29	PK	V	22.91	3.68	0.00	111.88	N/A	N/A
915.25	76.41	AV	H	22.91	3.68	0.00	103.00	N/A	N/A
915.25	74.26	AV	V	22.91	3.68	0.00	100.85	N/A	N/A
1830.5	63.47	PK	H	27.68	3.57	27.43	67.28	74.00	6.72
1830.5	48.27	AV	H	27.68	3.57	27.43	52.08	54.00	1.92
2745.75	45.62	PK	H	31.26	3.96	27.95	52.89	74.00	21.11
2745.75	35.24	AV	H	31.26	3.96	27.95	42.51	54.00	11.49
3661	43.47	PK	H	31.99	4.83	27.64	52.65	74.00	21.35
3661	33.74	AV	H	31.99	4.83	27.64	42.92	54.00	11.08
2907	33.15	PK	H	31.03	5.85	27.49	42.54	74.00	31.46
2907	25.14	AV	H	31.03	5.85	27.49	34.53	54.00	19.47
45.5	35.83	QP	H	10.74	0.89	21.42	26.04	40.00	13.96
40.6	35.27	QP	H	14.00	0.83	21.42	28.68	40.00	11.32
Frequency: 927.25MHz									
927.25	88.76	PK	H	22.98	3.70	0.00	115.44	N/A	N/A
927.25	87.21	PK	V	22.98	3.70	0.00	113.89	N/A	N/A
927.25	77.95	AV	H	22.98	3.70	0.00	104.63	N/A	N/A
927.25	76.85	AV	V	22.98	3.70	0.00	103.53	N/A	N/A
1854.5	62.52	PK	H	27.84	3.63	27.39	66.60	74.00	7.40
1854.5	47.15	AV	H	27.84	3.63	27.39	51.23	54.00	2.77
2781.75	44.66	PK	H	31.21	4.18	27.73	52.31	74.00	21.69
2781.75	32.68	AV	H	31.21	4.18	27.73	40.33	74.00	33.67
3709	43.09	PK	H	32.08	5.02	27.37	52.81	74.00	21.19
3709	32.15	AV	H	32.08	5.02	27.37	41.87	54.00	12.13
928	36.22	QP	H	23.00	3.70	22.13	40.80	46.00	5.20
928	35.03	QP	V	23.00	3.70	22.13	39.61	46.00	6.39
2950	33.52	PK	H	30.97	6.46	27.65	43.30	74.00	30.70
2950	24.59	AV	H	30.97	6.46	27.65	34.37	54.00	19.63
45.5	35.26	QP	H	10.74	0.89	21.42	25.47	40.00	14.53
40.6	34.82	QP	H	14.00	0.83	21.42	28.23	40.00	11.77

Antenna 2:

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	FCC 15.247	
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)
Frequency: 902.75MHz									
902.75	89.36	PK	H	22.95	3.70	0.00	116.01	N/A	N/A
902.75	86.21	PK	V	22.95	3.70	0.00	112.86	N/A	N/A
902.75	78.48	AV	H	22.95	3.70	0.00	105.13	N/A	N/A
902.75	76.54	AV	V	22.95	3.70	0.00	103.19	N/A	N/A
1805.5	57.19	PK	H	27.52	3.45	27.53	60.62	74.00	13.38
1805.5	47.24	AV	H	27.52	3.45	27.53	50.67	54.00	3.33
2708.25	46.25	PK	H	31.31	4.02	27.83	53.75	74.00	20.25
2708.25	37.24	AV	H	31.31	4.02	27.83	44.74	54.00	9.26
3611	38.21	PK	H	31.90	5.06	27.81	47.36	74.00	26.64
3611	28.47	AV	H	31.90	5.06	27.81	37.62	54.00	16.38
902	35.02	QP	H	22.94	3.71	22.17	39.50	46.00	6.50
902	34.36	QP	V	22.94	3.71	22.17	38.84	46.00	7.16
3010	39.02	PK	H	30.92	7.22	27.55	49.60	74.00	24.40
3010	29.54	AV	H	30.92	7.22	27.55	40.12	54.00	13.88
45.2	36.85	QP	H	10.91	0.89	21.42	26.61	40.00	13.39
40.3	35.41	QP	H	14.22	0.83	21.42	28.84	40.00	11.16
Frequency: 915.25MHz									
915.25	89.02	PK	H	22.91	3.68	0.00	115.61	N/A	N/A
915.25	86.11	PK	V	22.91	3.68	0.00	112.70	N/A	N/A
915.25	78.29	AV	H	22.91	3.68	0.00	104.88	N/A	N/A
915.25	76.25	AV	V	22.91	3.68	0.00	102.84	N/A	N/A
1830.5	58.76	PK	H	27.68	3.57	27.43	62.57	74.00	11.43
1830.5	45.14	AV	H	27.68	3.57	27.43	48.95	54.00	5.05
2745.75	46.13	PK	H	31.26	3.96	27.95	53.40	74.00	20.60
2745.75	34.98	AV	H	31.26	3.96	27.95	42.25	54.00	11.75
3661	43.95	PK	H	31.99	4.83	27.64	53.13	74.00	20.87
3661	32.58	AV	H	31.99	4.83	27.64	41.76	54.00	12.24
2907	38.2	PK	H	31.03	5.85	27.49	47.59	74.00	26.41
2907	30.17	AV	H	31.03	5.85	27.49	39.56	54.00	14.44
45.2	35.99	QP	H	10.91	0.89	21.42	26.42	40.00	13.58
40.3	35.74	QP	H	14.22	0.83	21.42	28.92	40.00	11.08
Frequency: 927.25MHz									
927.25	89.42	PK	H	22.98	3.70	0.00	116.10	N/A	N/A
927.25	87.14	PK	V	22.98	3.70	0.00	113.82	N/A	N/A
927.25	78.29	AV	H	22.98	3.70	0.00	104.97	N/A	N/A
927.25	77.18	AV	V	22.98	3.70	0.00	103.86	N/A	N/A
1854.5	57.98	PK	H	27.84	3.63	27.39	62.06	74.00	11.94
1854.5	47.94	AV	H	27.84	3.63	27.39	52.02	54.00	1.98
2781.75	49.24	PK	H	31.21	4.18	27.73	56.89	74.00	17.11
2781.75	39.47	AV	H	31.21	4.18	27.73	47.12	54.00	6.88
3709	45.21	PK	H	32.08	5.02	27.37	54.93	74.00	19.07
3709	35.77	AV	H	32.08	5.02	27.37	45.49	54.00	8.51
928	37.1	QP	H	23.00	3.70	22.13	41.68	46.00	4.32
928	35.82	QP	V	23.00	3.70	22.13	40.40	46.00	5.60
2950	38.25	PK	H	30.97	6.46	27.65	48.03	74.00	25.97
2950	27.97	AV	H	30.97	6.46	27.65	37.75	54.00	16.25
45.2	36.02	QP	H	10.91	0.89	21.42	26.40	40.00	13.60
40.3	35.64	QP	H	14.22	0.83	21.42	29.27	40.00	10.73

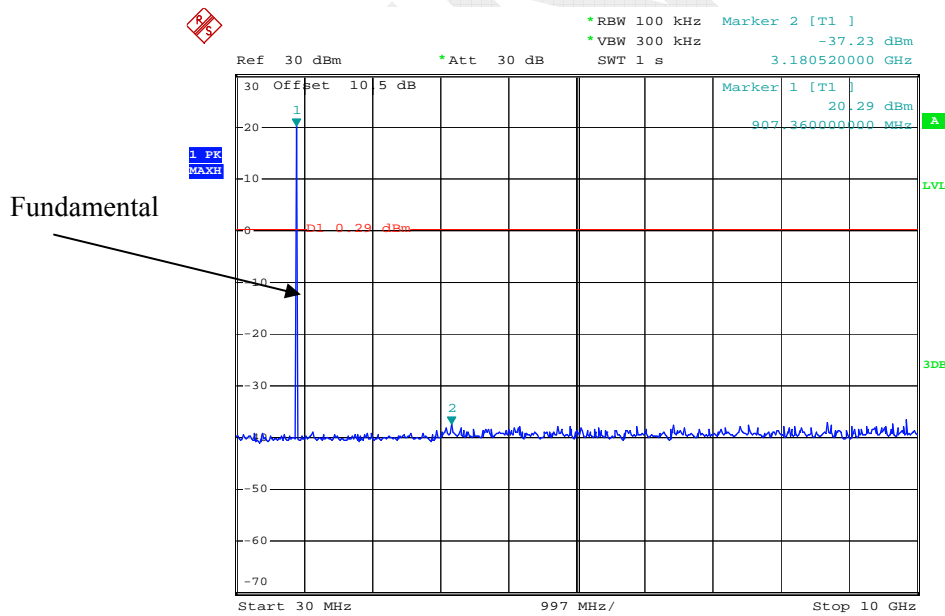
### Conducted Spurious Emissions at Antenna Port

#### Low Channel



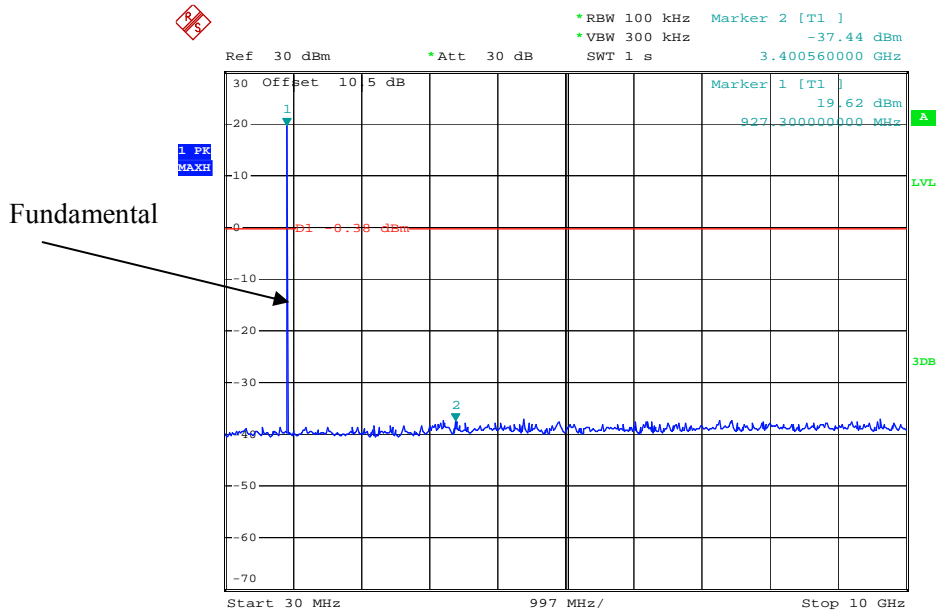
Date: 22.OCT.2014 17:06:45

#### Middle Channel



Date: 22.OCT.2014 16:56:38

### High Channel



Date: 22.OCT.2014 16:54:04

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

### Applicable Standard

(1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. 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. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

(i) For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

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

### Test Procedure

Set the EUT in transmitting mode, maxhold the trace, Allow it to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

### Test Data

#### Environmental Conditions

Temperature:	28 °C
Relative Humidity:	58 %
ATM Pressure:	100.3 kpa

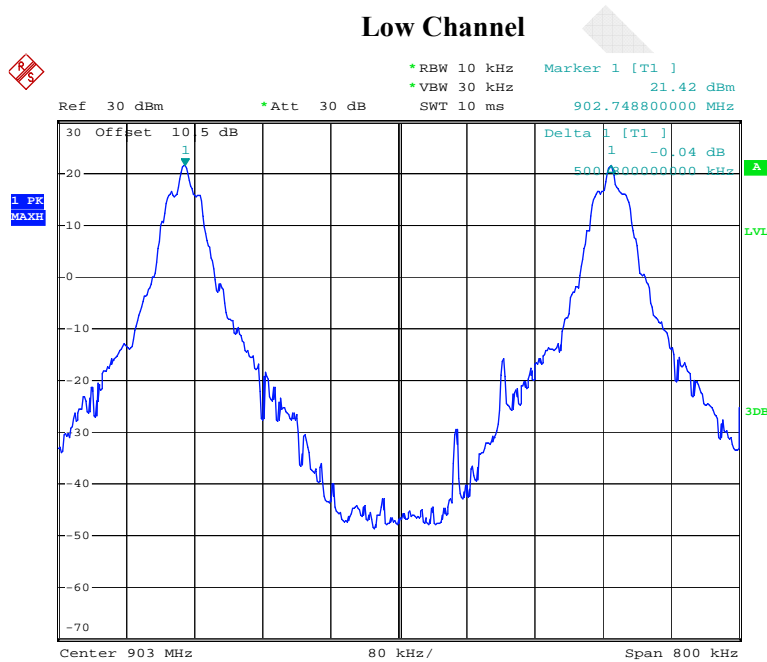
*The testing was performed by Sevin Li on 2014-10-22*

**Test Result:** Compliance.

Please refer to following tables and plots

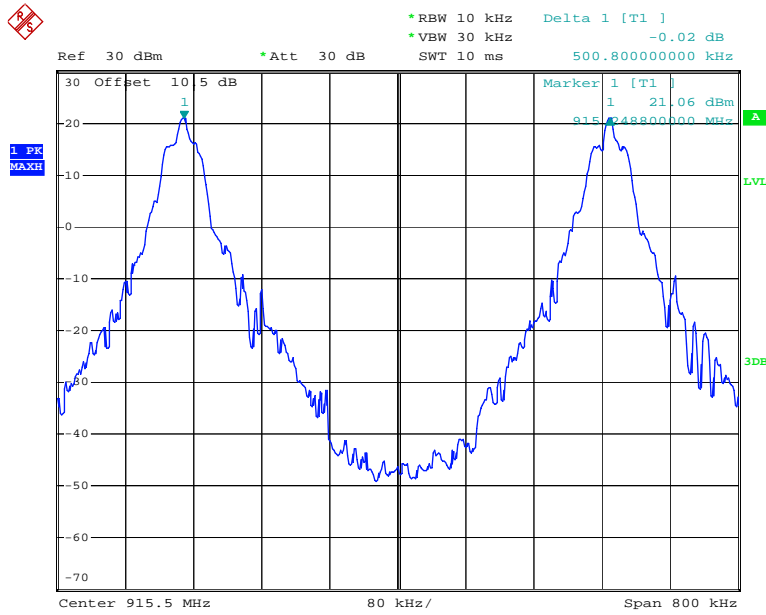
Test Mode: Transmitting

Channel	Frequency (MHz)	Channel Separation (kHz)	Limit (kHz)	Result
Low	902.75	500.800	>85.2	Pass
Adjacent	903.25			
Middle	915.25	500.800	>87.6	Pass
Adjacent	915.75			
High	927.25	500.800	>85.2	Pass
Adjacent	926.75			



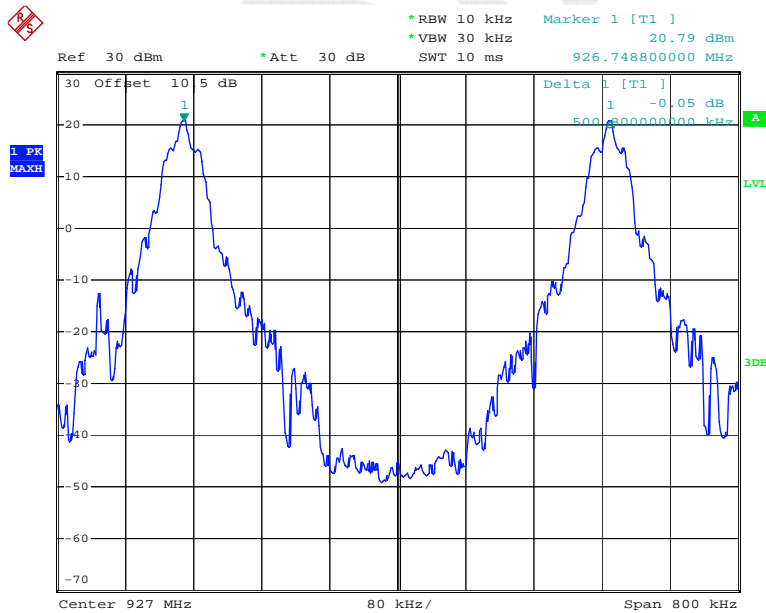
Date: 22.OCT.2014 17:38:15

### Middle Channel



Date: 22.OCT.2014 17:41:27

### High Channel



Date: 22.OCT.2014 17:43:10



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

### Applicable Standard

(1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. 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. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

(i) For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

### Test Procedure

Set the EUT in transmitting mode, maxhold the trace, Allow it to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

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

**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	28 °C
<b>Relative Humidity:</b>	58 %
<b>ATM Pressure:</b>	100.3 kpa

The testing was performed by Sevin Li on 2014-10-22

**Test Result:** Compliance.

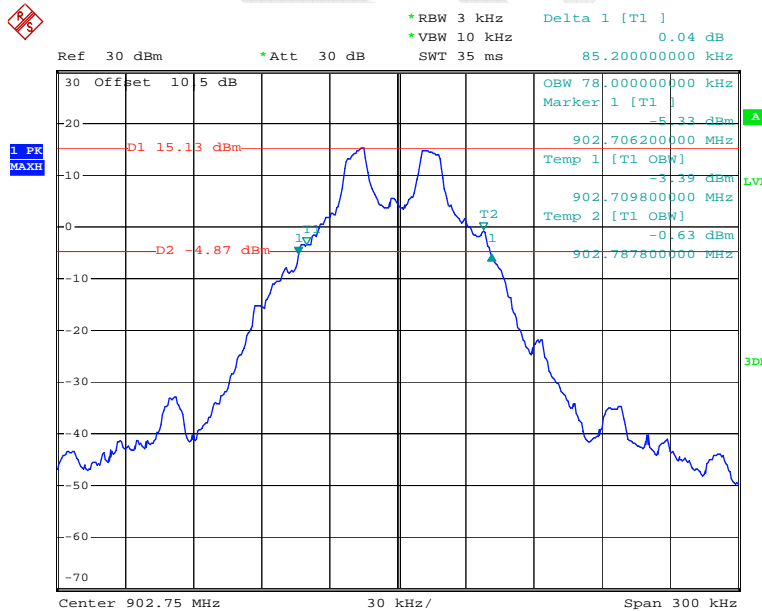
Please refer to following tables and plots

Test Mode: Transmitting

Channel	Frequency (MHz)	20 dB Bandwidth (kHz)
Low	902.75	85.20
Middle	915.25	87.60
High	927.25	85.20

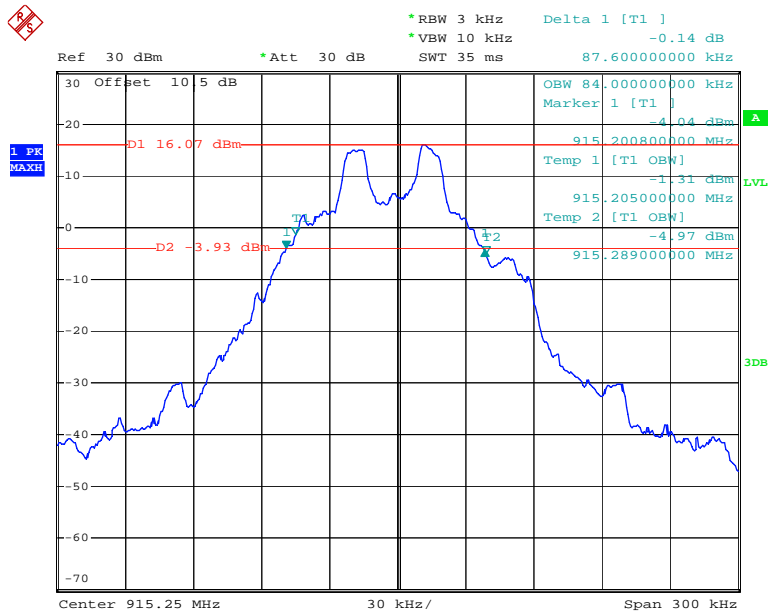
Please refer to the following plots.

**Low Channel**



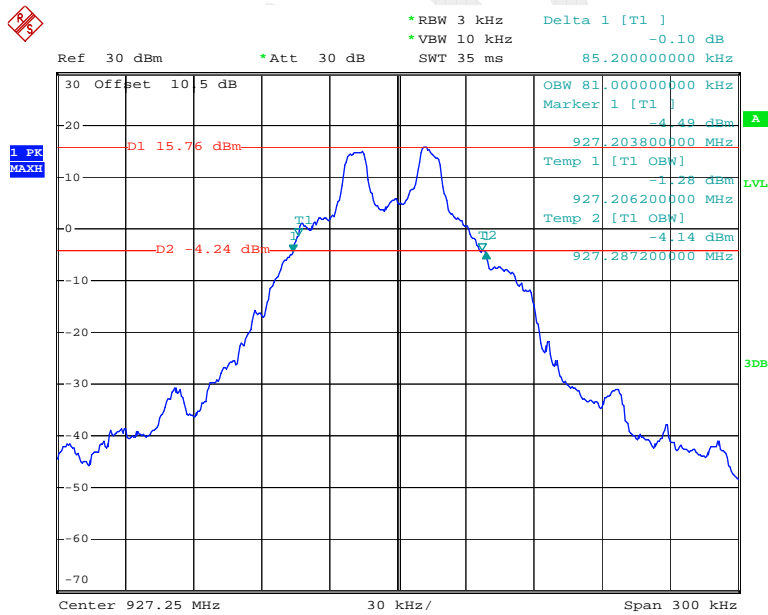
Date: 22.OCT.2014 17:02:52

### Middle Channel



Date: 22.OCT.2014 17:00:56

### High Channel



Date: 22.OCT.2014 16:48:52

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

**Applicable Standard**

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

**Test Procedure**

Set the EUT in hopping mode, maxhold the trace, allow it to stabilize.

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

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

**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	28 °C
<b>Relative Humidity:</b>	58 %
<b>ATM Pressure:</b>	100.3 kpa

*The testing was performed by Sevin Li on 2014-10-22*

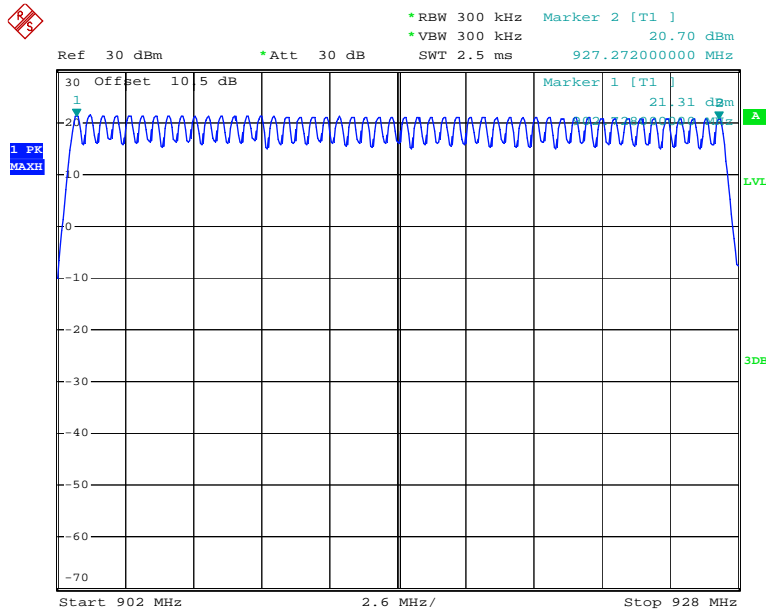
**Test Result:** Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.5	50	≥50

Number of Hopping Channels



Date: 22.OCT.2014 17:10:15

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

### Applicable Standard

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

### Test Procedure

The EUT was worked in hopping mode; Spectrum SPAN was set as zero. Sweep time was set as necessary to capture the entire dwell time per hopping channel, the quantity of pulse was get from single sweep. In addition, the time of single pulse was tested.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

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

### Test Data

#### Environmental Conditions

Temperature:	28 °C
Relative Humidity:	58 %
ATM Pressure:	100.3 kpa

The testing was performed by Sevin Li on 2014-10-22

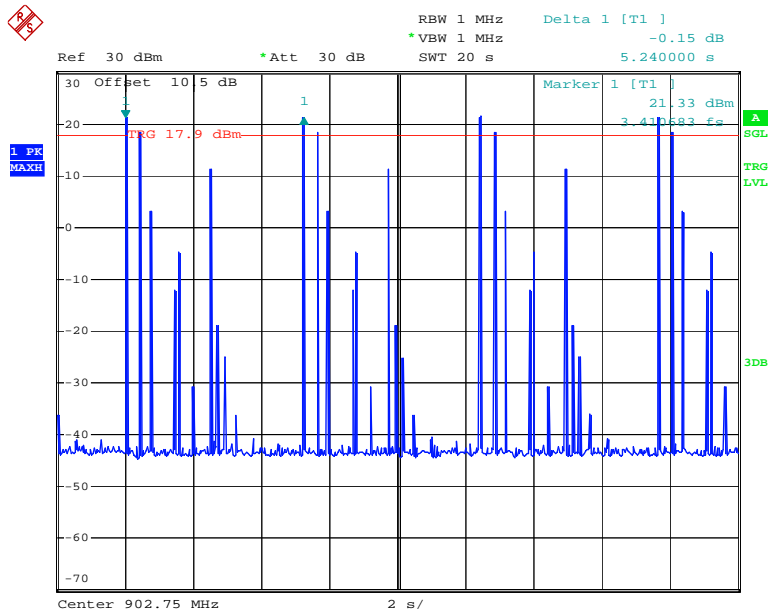
**Test Result:** Compliance.

Please refer to following tables and plots

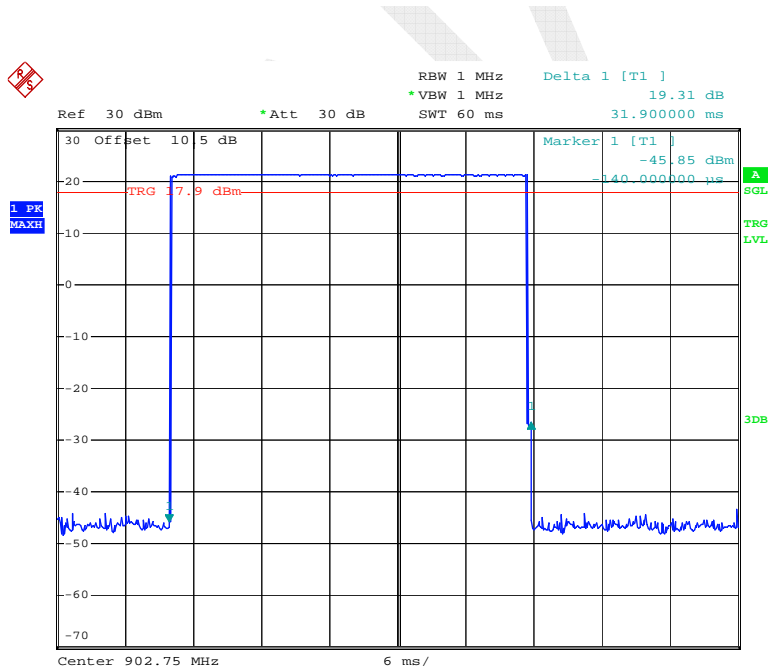
Test Mode: Transmitting

Channel	Pulse Width (ms)	Hopping Number Per 20s	Dwell Time (s)	Limit (s)	Result
Low	31.900	4	0.128	0.4	Pass
Middle	31.680	4	0.127	0.4	Pass
High	31.440	4	0.126	0.4	Pass
Dwell Time= Pulse Width* hopping number per 20s					

### Low Channel

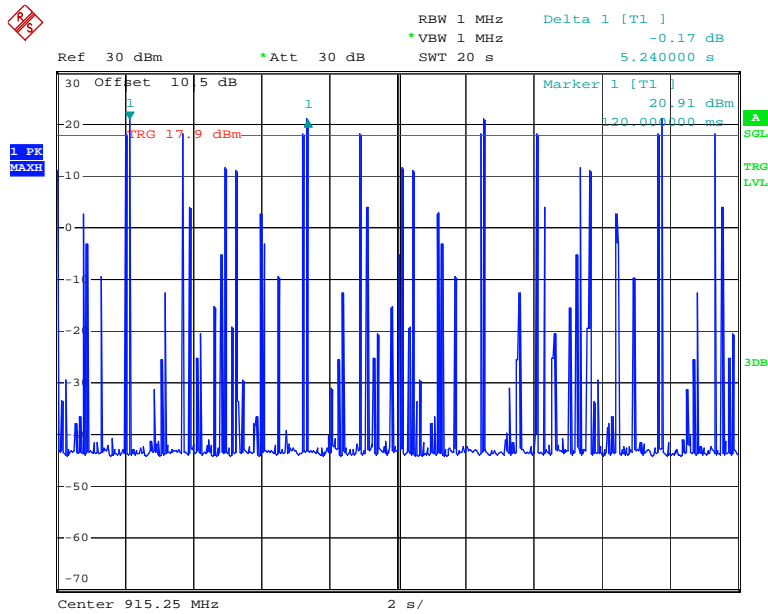


Date: 22.OCT.2014 17:20:28

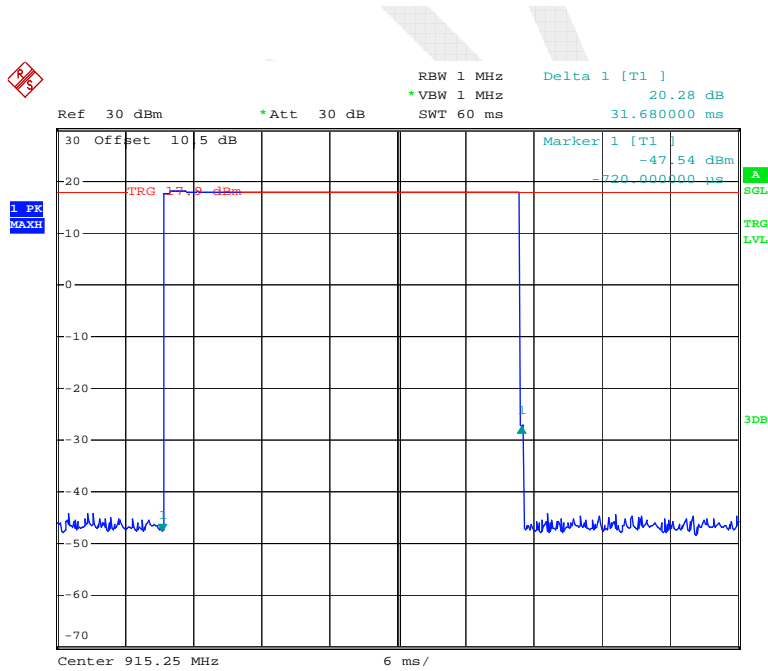


Date: 22.OCT.2014 17:12:19

### Middle Channel



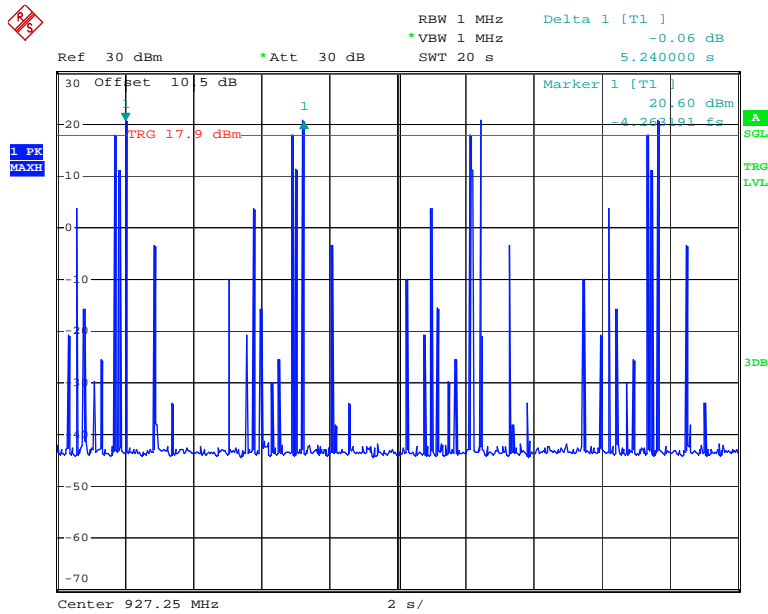
Date: 22.OCT.2014 17:23:15



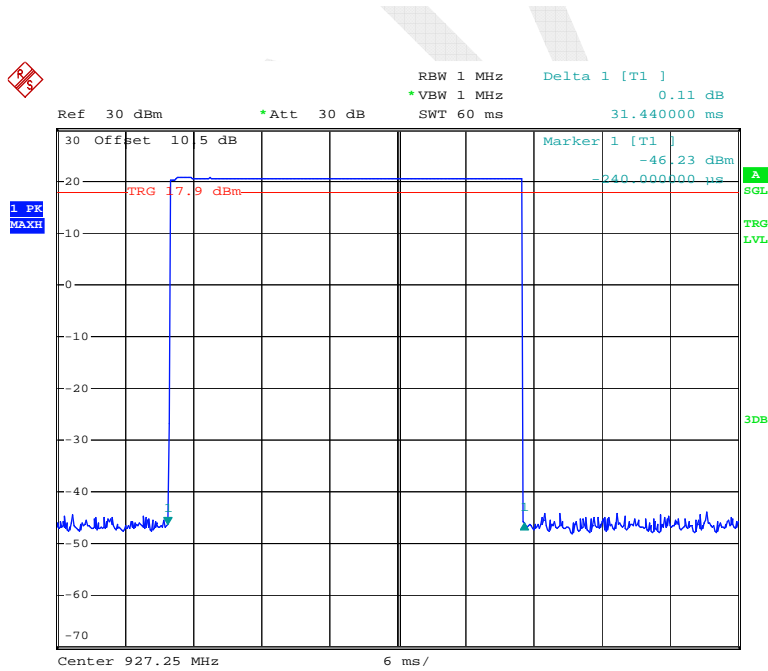
Date: 22.OCT.2014 17:26:39



### High Channel



Date: 22.OCT.2014 17:24:55



Date: 22.OCT.2014 17:26:10

**FCC §15.247(b) (2) - PEAK OUTPUT POWER MEASUREMENT**

**Applicable Standard**

According to §15.247(b) (2), For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

**Test Procedure**

Set the EUT in transmitting mode, maxhold the trace, Allow it to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission.

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

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

**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	28 °C
<b>Relative Humidity:</b>	58 %
<b>ATM Pressure:</b>	100.3 kpa

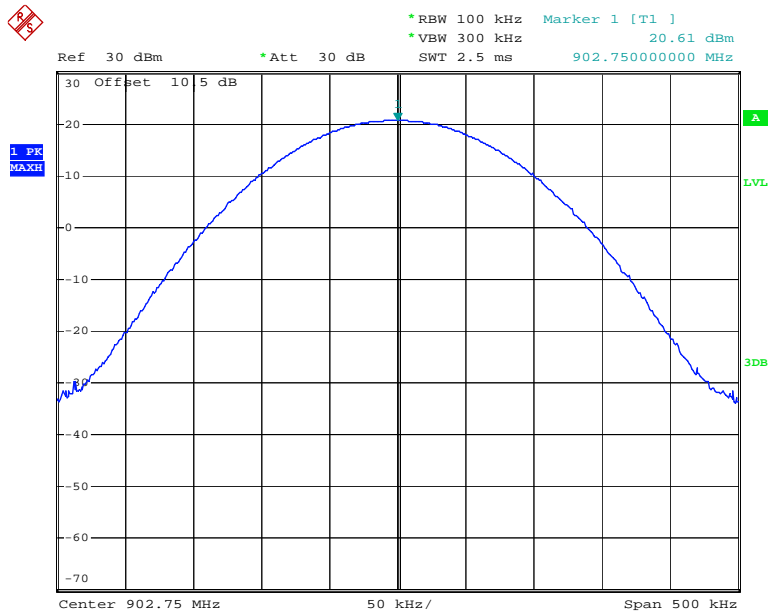
*The testing was performed by Sevin Li on 2014-10-22*

**Test Result:** Compliance.

*Test Mode: Transmitting*

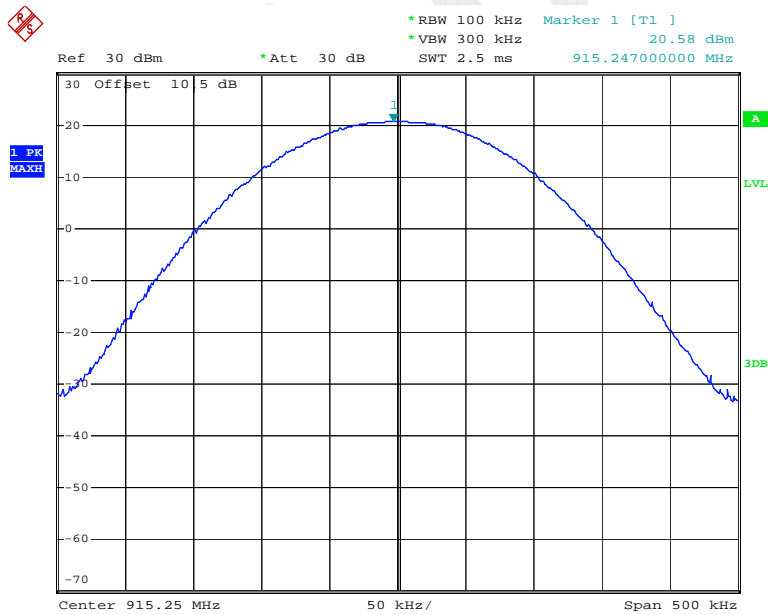
Channel	Frequency (MHz)	Peak Output Power (dBm)	Limit (dBm)
Low	902.75	20.61	30
Middle	915.25	20.58	30
High	927.25	20.53	30

### Peak Output Power, Low Channel



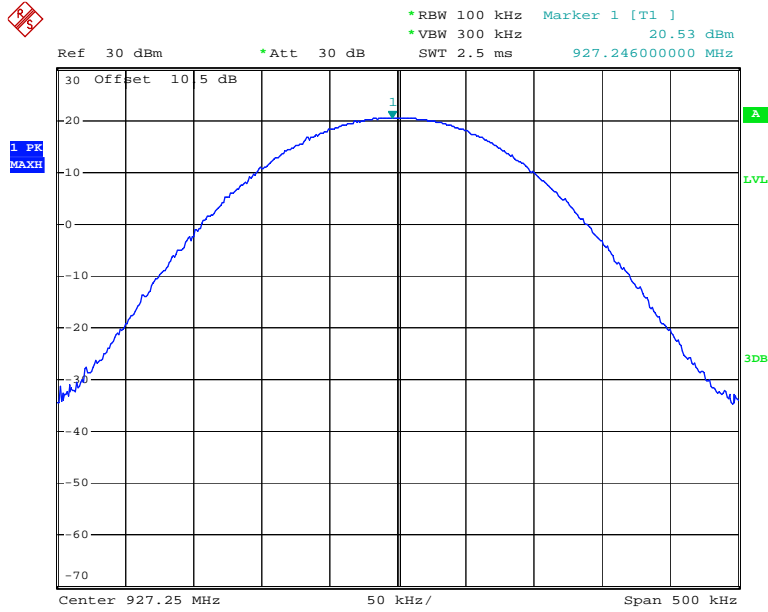
Date: 22.OCT.2014 16:45:12

### Peak Output Power, Middle Channel



Date: 22.OCT.2014 16:42:25

### Peak Output Power, High Channel



Date: 22.OCT.2014 16:45:54

FEMV

## 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. Set RBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
2. 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.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

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

### Test Data

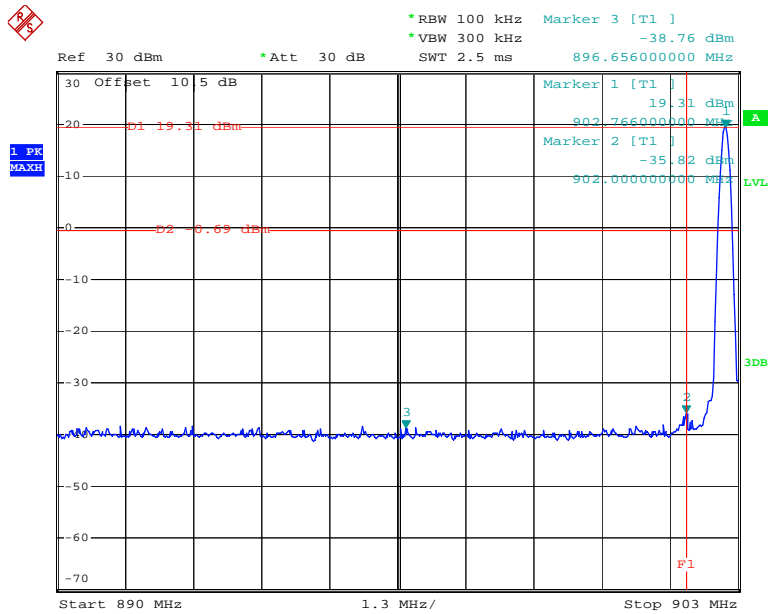
#### Environmental Conditions

Temperature:	28 °C
Relative Humidity:	58 %
ATM Pressure:	100.3 kpa

The testing was performed by Sevin Li on 2014-10-22.

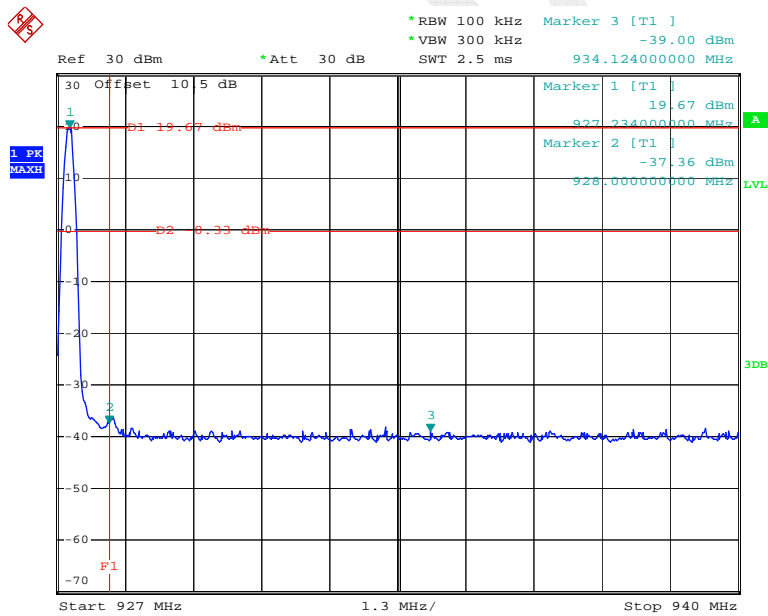
**Test Result:** Compliance

**Band Edge, Left Side**



Date: 22.OCT.2014 17:05:36

**Band Edge, Right Side**



Date: 22.OCT.2014 16:51:25

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