



Lab Code: 200707-0



FCC PART 15.247

MEASUREMENT AND TEST REPORT

For

Summer Infant, Inc.

582 Great Road, North Smithfield, Rhode Island 02896, USA

FCC ID: PZK-2827R

Report Type: Original Report	Product Type: Baby Monitor
Test Engineer: <u>Kvass. Yang</u>	
Report Number: <u>RSZ11012707</u>	
Report Date: <u>2011-03-08</u>	
Reviewed By: <u>Merry Zhao</u>	
Prepared By: <u>Bay Area Compliance Laboratories Corp. (Shenzhen)</u> 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008	

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. This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP*, NIST, or any agency of the Federal Government.

* This report contains data that are not covered by the NVLAP accreditation and are marked with an asterisk “★” (Rev.2)

TABLE OF CONTENTS

GENERAL INFORMATION.....	4
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....	4
OBJECTIVE.....	4
RELATED SUBMITTAL(S)/GRANT(S).....	4
TEST METHODOLOGY.....	4
TEST FACILITY.....	4
SYSTEM TEST CONFIGURATION.....	6
DESCRIPTION OF TEST CONFIGURATION	6
EUT EXERCISE SOFTWARE	6
EQUIPMENT MODIFICATIONS	6
EXTERNAL I/O CABLE.....	6
CONFIGURATION OF TEST SETUP	6
BLOCK DIAGRAM OF TEST SETUP.....	7
SUMMARY OF TEST RESULTS	8
FCC §15.247 (i) & §2.1093 - RF EXPOSURE INFORMATION	9
APPLICABLE STANDARD	9
FCC §15.203 – ANTENNA REQUIREMENT	10
APPLICABLE STANDARD	10
ANTENNA CONNECTOR CONSTRUCTION	10
FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS	11
APPLICABLE STANDARD	11
MEASUREMENT UNCERTAINTY	11
EUT SETUP	11
EMI TEST RECEIVER SETUP.....	12
TEST EQUIPMENT LIST AND DETAILS.....	12
TEST PROCEDURE	12
TEST RESULTS SUMMARY.....	12
TEST DATA	12
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS.....	15
APPLICABLE STANDARD	15
MEASUREMENT UNCERTAINTY	15
EUT SETUP	15
EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP	16
TEST EQUIPMENT LIST AND DETAILS.....	16
TEST PROCEDURE	16
CORRECTED AMPLITUDE & MARGIN CALCULATION	16
TEST RESULTS SUMMARY	17
TEST DATA	17
FCC §15.247(a) (1) - CHANNEL SEPARATION TEST	21
APPLICABLE STANDARD	21
TEST EQUIPMENT LIST AND DETAILS.....	21
TEST PROCEDURE	21
TEST DATA	21

FCC §15.247(a) (1) – 20 dB BANDWIDTH TESTING	25
APPLICABLE STANDARD	25
TEST EQUIPMENT LIST AND DETAILS.....	25
TEST PROCEDURE	25
TEST DATA	25
FCC §15.247(a) (1) (iii) - QUANTITY OF HOPPING CHANNEL TEST	28
APPLICABLE STANDARD	28
TEST EQUIPMENT LIST AND DETAILS.....	28
TEST PROCEDURE	28
TEST DATA	28
FCC §15.247(a) (1) (iii) -TIME OF OCCUPANCY (DWELL TIME).....	30
APPLICABLE STANDARD	30
TEST EQUIPMENT LIST AND DETAILS.....	30
TEST PROCEDURE	30
TEST DATA	30
FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT	33
APPLICABLE STANDARD	33
TEST EQUIPMENT LIST AND DETAILS.....	33
TEST PROCEDURE	33
TEST DATA	33
FCC §15.247(d) - BAND EDGES TESTING	36
APPLICABLE STANDARD	36
TEST EQUIPMENT LIST AND DETAILS.....	36
TEST PROCEDURE	36
TEST DATA	37

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Summer Infant, Inc.*'s product, model number: *PZK-2827R (FCC ID: PZK-2827R)* or the "EUT" as referred to in this report is a *Baby Monitor*, which measures approximately: 12.0 cm (L) x 5.0 cm (W) x 2.5 cm (H), rated input voltage: DC 6.0 V battery or DC 6.0 V from the adapter.

Adapter Information:

Model: AD050600550;
Input: AC 120V/60Hz, 250 mA;
Output: DC 6.0 V 500 mA;

** All measurement and test data in this report was gathered from production sample serial number: 11010094 (Assigned by BACL, Shenzhen). The EUT was received on 2011-02-27.*

Objective

This Type approval report is prepared on behalf of *Summer Infant, 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 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)

2.4 GHz wireless camera with FCC ID: PZK-2827T.

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. (Shenzhen). 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. (Shenzhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2010. 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.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



The current scope of accreditations can be found at <http://ts.nist.gov/Standards/scopes/2007070.htm>

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in an engineering mode which was selected by manufacturer.

EUT Exercise Software

N/A.

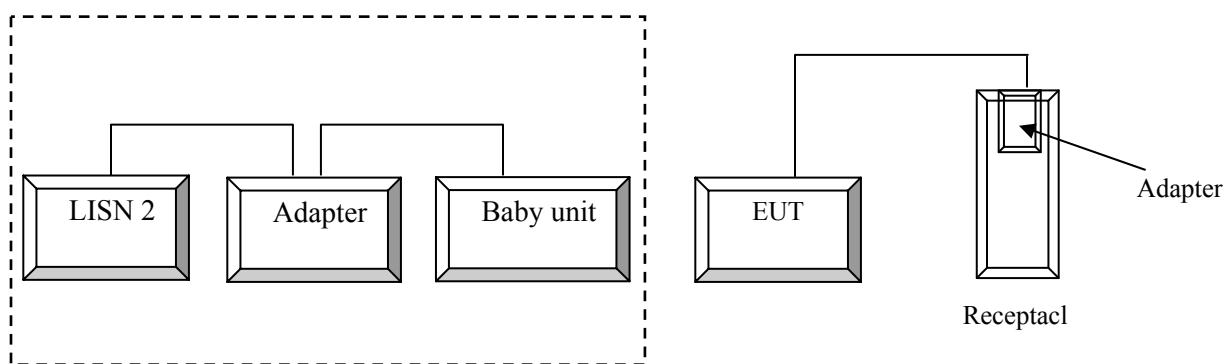
Equipment Modifications

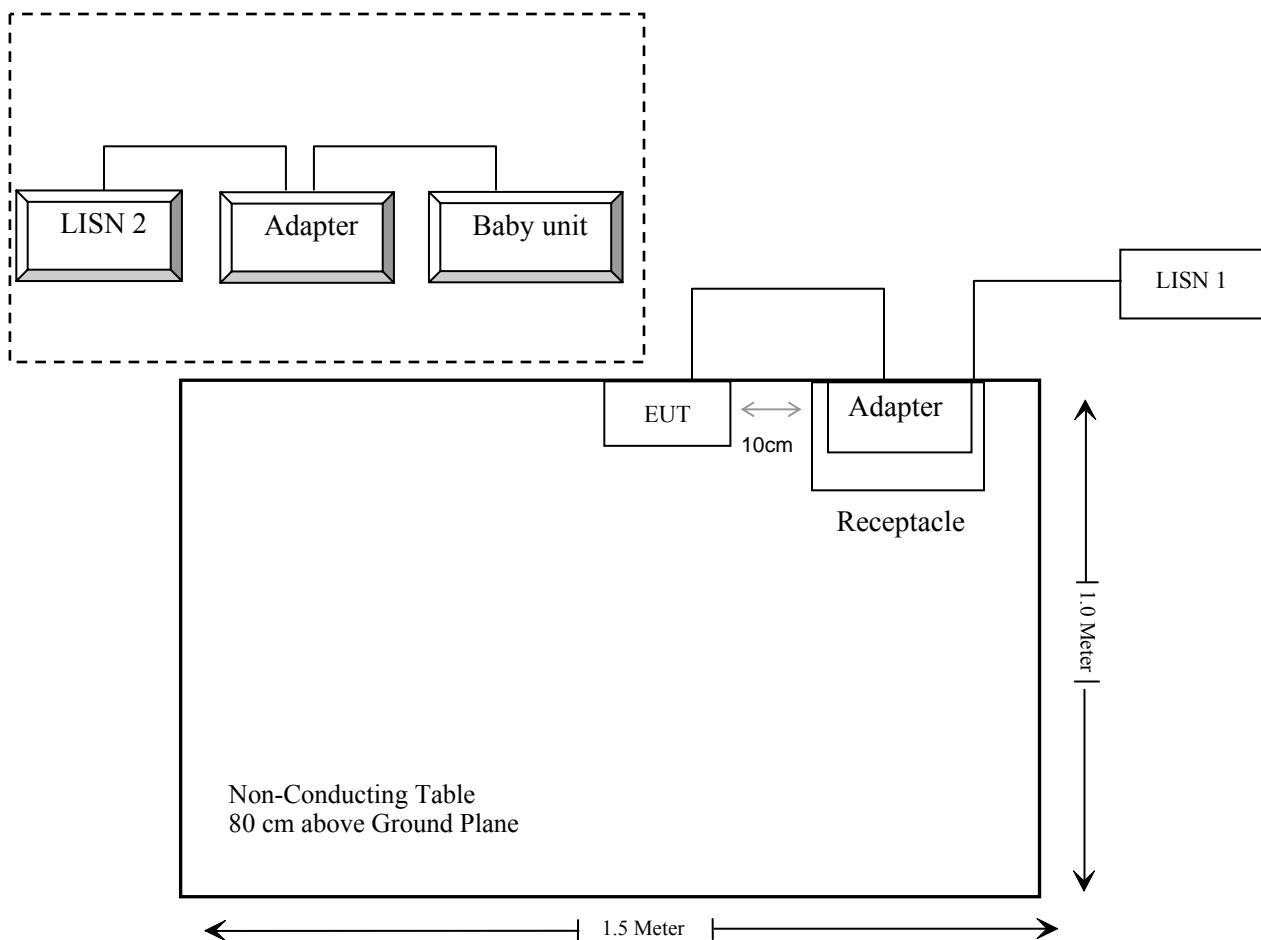
No modification was made to the unit tested.

External I/O Cable

Cable Description	Length (m)	From/Port	To
Unshielded Detachable Power Cabel	1.98	Adapter	EUT

Configuration of Test Setup



Block Diagram of Test Setup

SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §2.1093	RF Exposure Information	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line 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)(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) & §2.1093 - RF EXPOSURE INFORMATION

Applicable Standard

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

According to KDB 447498 D01 Mobile Portable RF Exposure v03r03, no SAR required if power is lower than the flowing threshold:

When routine evaluation is required for SAR and the output power is $\leq 60/f(\text{GHz})$ mW, the test reduction and test exclusion procedures given herein, or in KDB 616217 or KDB 648474, are applicable.

A device may be used in portable exposure conditions with no restrictions on host platforms when either the source-based time-averaged output power is $\leq 60/f(\text{GHz})$ mW or all measured 1-g SAR are < 0.4 W/kg.10 When SAR evaluation is required, the most conservative exposure conditions for all expected operating configurations must be tested.

Result

Max Peak output power:
2408.825 MHz: $4.18 \text{ dBm} + 0 \text{ dBi} = 4.18 \text{ dBm} = 2.618 \text{ mW}$
 $60/f_{\text{GHz}} = 60/2.408825 = 24.9 \text{ mW}$
Max Peak output power $< 60/f_{\text{GHz}}$

So the SAR measurement is not necessary.

FCC §15.203 – ANTENNA REQUIREMENT

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; the maximum gain is 0 dBi; which in accordance to §15.203, please refer to the internal photos.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

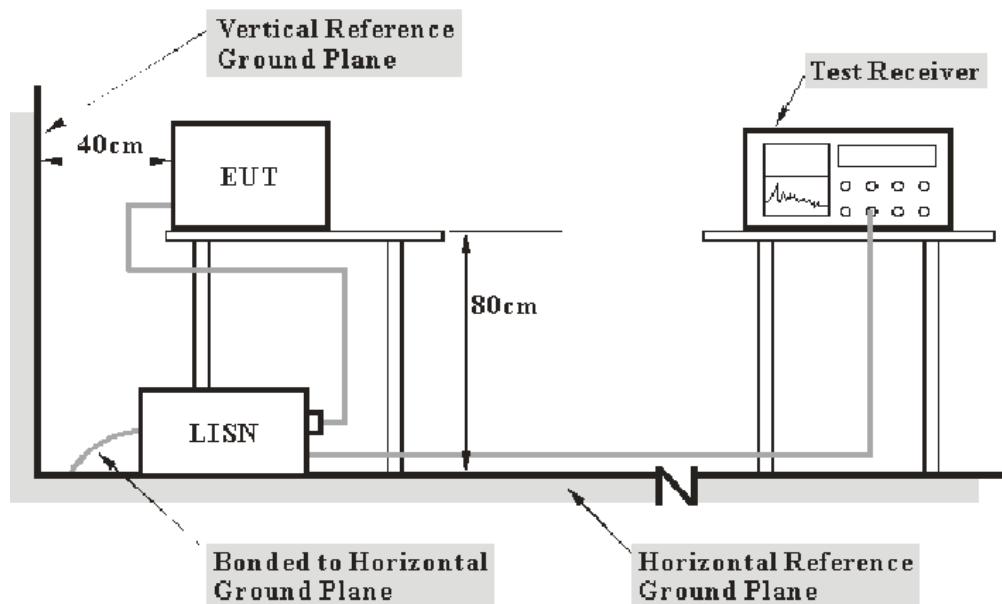
FCC §15.207

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. (Shenzhen) is ± 2.4 dB (k=2, 95% level of confidence).

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2009 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:

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	830245/006	2010-03-03	2011-03-02
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2010-03-09	2011-03-08

* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

During the conducted emission test, the adapter was connected to the LISN. Maximizing procedure was performed on the six (6) highest emissions of the EUT. All data was recorded in the Quasi-peak and average detection mode.

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:

5.93 dB at 0.165 MHz in the **Line** conductor mode, Ave

Test Data

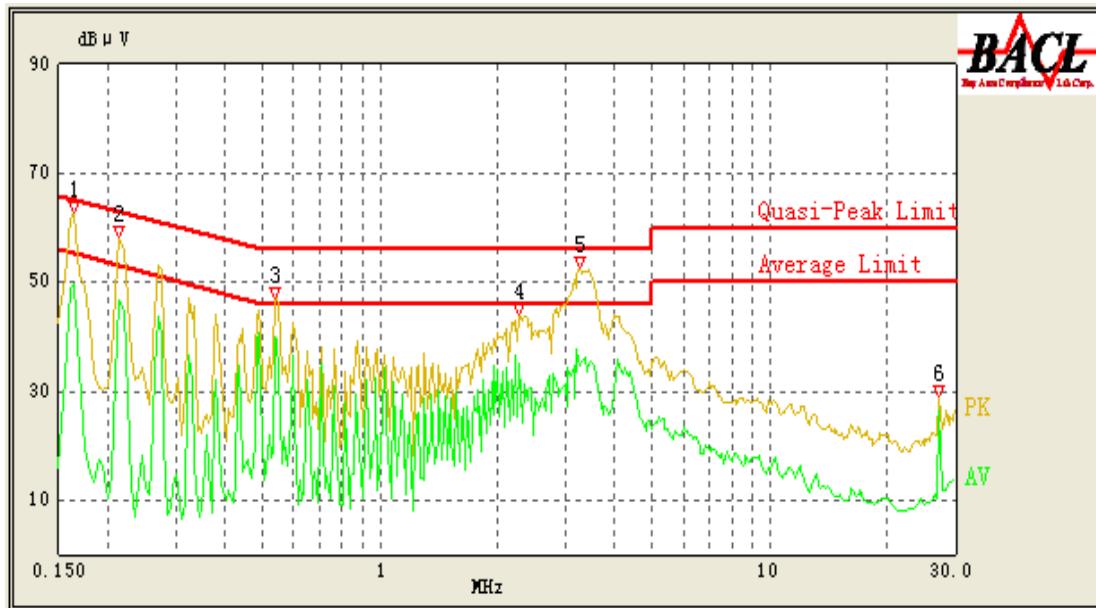
Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

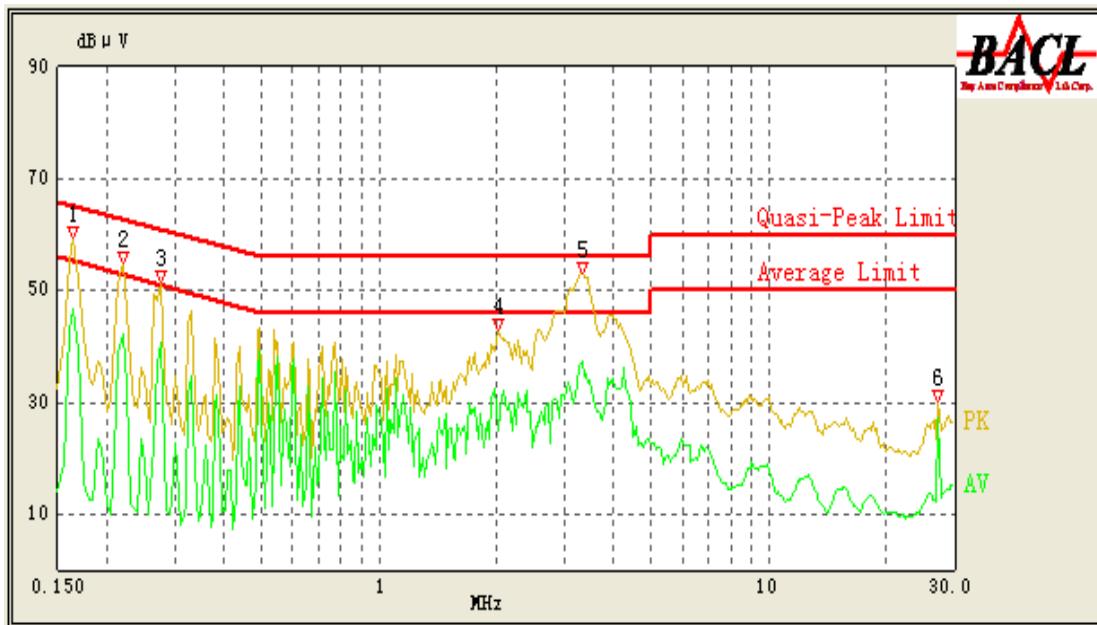
The testing was performed by Kvass Yang on 2011-02-22.

Test Mode: Charging and Transmitting

120 V, 60 Hz, Line:



Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	Cord. Result (dB μ V)	Correction Factor (dB)	Limit (dB μ V)	Margin (dB)	Remark (PK/QP/Ave)
0.165	49.64	10.09	55.57	5.93	Ave
0.540	39.81	10.19	46.00	6.19	Ave
3.265	49.24	10.14	56.00	6.76	QP
0.215	46.52	10.06	54.14	7.62	Ave
0.165	57.65	10.09	65.57	7.92	QP
2.280	35.21	10.19	46.00	10.79	Ave
3.255	34.71	10.14	46.00	11.29	Ave
0.215	50.89	10.06	64.14	13.25	QP
0.540	41.77	10.19	56.00	14.23	QP
2.280	39.53	10.19	56.00	16.47	QP
27.120	26.48	10.13	50.00	23.52	Ave
27.120	27.13	10.13	60.00	32.87	QP

120V, 60 Hz, Neutral:

Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	Cord. Result (dB μ V)	Correction Factor (dB)	Limit (dB μ V)	Margin (dB)	Remark (PK/QP/Ave)
3.320	37.35	10.13	46.00	8.65	Ave
0.165	46.84	10.09	55.57	8.73	Ave
0.165	54.41	10.09	65.57	11.16	QP
0.275	40.67	10.02	52.43	11.76	Ave
0.220	42.05	10.05	54.00	11.95	Ave
3.320	43.53	10.13	56.00	12.47	QP
0.220	50.25	10.05	64.00	13.75	QP
0.275	46.21	10.02	62.43	16.22	QP
2.015	25.12	10.20	46.00	20.88	Ave
27.120	27.06	10.13	50.00	22.94	Ave
2.015	32.60	10.20	56.00	23.4	QP
27.120	29.03	10.13	60.00	30.97	QP

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

Applicable Standard

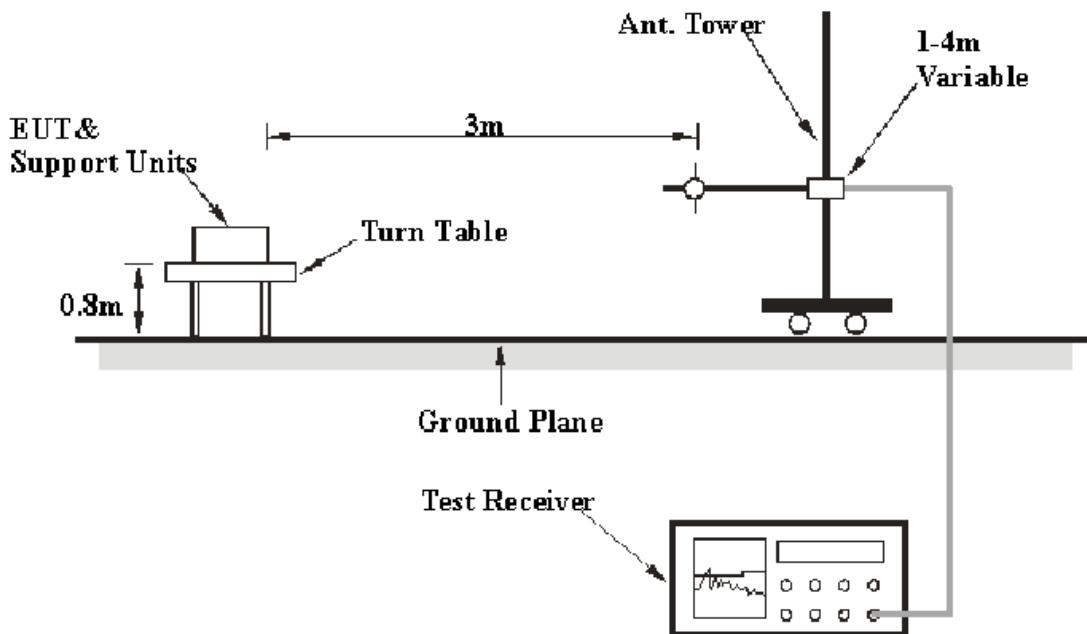
FCC §15.247 (d); §15.209; §15.205;

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. (Shenzhen) is ± 4.0 dB (k=2, 95% level of confidence).

EUT Setup



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.

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:

<u>Frequency Range</u>	<u>RBW</u>	<u>Video B/W</u>
30MHz – 1000 MHz	100 kHz	300 kHz
1000 MHz – 25 GHz	1 MHz	3 MHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447D	2944A09795	2010-08-02	2011-08-02
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-24	2011-11-23
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2010-03-11	2011-03-11
HP	Amplifier	8449B	3008A00277	2010-09-12	2011-09-11
Sunol Sciences	Horn Antenna	DRH-118	A052604	2010-05-05	2011-05-04
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2010-07-08	2011-07-08

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

For the radiated emissions test, 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-1GHz and peak and Average detection modes for frequencies above 1GHz.

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, section 15.205, 15.209 and 15.247, with the worst margin reading of:

30 -1000 MHz:

1.6 dB at **142.907500 MHz** in the **Vertical** polarization, by battery
0.1 dB at **186.025500 MHz** in the **Horizontal** polarization, by adapter

Above 1 GHz:

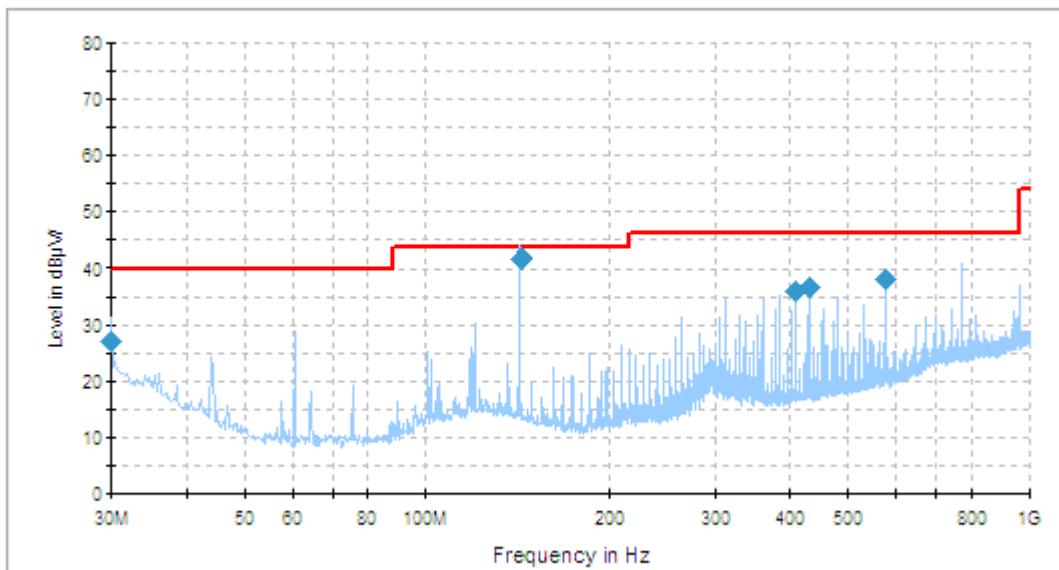
4.71dB at **7226.475 MHz** in the **Horizontal** polarization at low channel

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

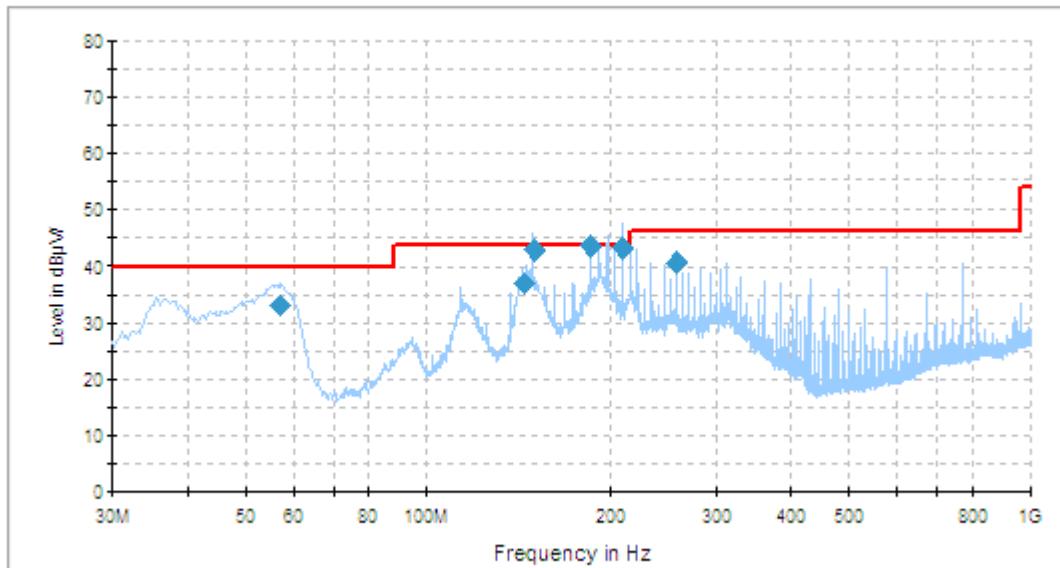
The testing was performed by Kvass Yang on 2011-03-06.

30-1000 MHz:*Test Mode: Transmitting by battey*

Frequency (MHz)	Corrected Amplitude (dB μ V/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dB μ V/m)	Margin (dB)
142.907500	41.9	169.0	V	117.0	-13.4	43.5	1.6*
576.035500	38.3	98.0	V	329.0	-7.0	46.0	7.7
432.024750	36.7	98.0	H	87.0	-9.4	46.0	9.3
408.035250	36.2	98.0	H	87.0	-9.8	46.0	9.8
30.027750	27.0	124.0	V	208.0	-5.4	40.0	13

*Note: *within measurement uncertainty.*

Test Mode: Transmitting by adapter



Frequency (MHz)	Corrected Amplitude (dB μ V/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dB μ V/m)	Margin (dB)
186.025500	43.4	195.0	H	93.0	-15.0	43.5	0.1*
210.007000	43.3	178.0	H	97.0	-14.2	43.5	0.2*
150.001000	42.9	209.0	H	97.0	-14.0	43.5	0.6*
258.006750	40.8	135.0	H	95.0	-13.3	46.0	5.2
144.391750	37.3	205.0	H	94.0	-13.5	43.5	6.2
57.097000	33.4	98.0	V	326.0	-18.3	40.0	6.6

*Note: *within measurement uncertainty.*

Above 1 GHz:*Test mode: Depend on free scan; the adapter mode is the worse case.*

Indicated		Detector (PK/Ave)	Table Angle Degree	Test Antenna		Correction Factor			FCC Part 15.247/15.209			
Frequency (MHz)	S.A. Reading (dB μ V)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre- Amp. (dB)	Cord. Amp. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Comment
Low Channel (2408.825 MHz)												
7226.475	31.65	Ave.	125	2.0	H	39.1	5.16	26.62	49.29	54	4.71	harmonic
4817.65	35.24	Ave.	134	1.8	H	35.8	4.32	26.80	48.56	54	5.44	harmonic
7226.475	31.54	Ave.	126	1.4	V	37.8	5.16	26.62	47.88	54	6.12	harmonic
4817.65	34.12	Ave.	145	1.5	V	34.1	4.32	26.80	45.74	54	8.26	harmonic
7226.475	42.02	PK	125	2.0	H	39.1	5.16	26.62	59.66	74	14.34	harmonic
4817.65	45.57	PK	134	1.8	H	35.8	4.32	26.80	58.89	74	15.11	harmonic
7226.475	41.32	PK	126	1.4	V	37.8	5.16	26.62	57.66	74	16.34	harmonic
4817.65	45.21	PK	145	1.5	V	34.1	4.32	26.80	56.83	74	17.17	harmonic
Middle Channel (2439.20 MHz)												
7317.6	30.54	Ave.	125	1.4	H	39.1	5.09	26.60	48.13	54	5.87	harmonic
4878.4	33.65	Ave.	76	1.6	H	36.4	4.36	26.80	47.61	54	6.39	harmonic
7317.6	30.44	Ave.	98	2.0	V	37.8	5.09	26.60	46.73	54	7.27	harmonic
4878.4	33.12	Ave.	25	1.5	V	35.2	4.36	26.80	45.88	54	8.12	harmonic
4878.4	45.01	PK	76	1.6	H	36.4	4.36	26.80	58.97	74	15.03	harmonic
7317.6	39.98	PK	125	1.4	H	39.1	5.09	26.60	57.57	74	16.43	harmonic
4878.4	44.78	PK	25	1.5	V	35.2	4.36	26.80	57.54	74	16.46	harmonic
7317.6	39.52	PK	98	2.0	V	37.8	5.09	26.60	55.81	74	18.19	harmonic
High Channel (2467.40 MHz)												
4934.8	34.98	Ave.	264	1.5	H	36.6	4.40	26.75	49.23	54	4.77	harmonic
7404.2	31.02	Ave.	124	1.8	H	39.0	5.30	26.58	48.74	54	5.26	harmonic
4934.8	34.21	Ave.	278	1.6	V	35.4	4.40	26.75	47.26	54	6.74	harmonic
7404.2	30.65	Ave.	167	1.4	V	37.8	5.30	26.58	47.17	54	6.83	harmonic
4934.8	46.78	PK	264	1.5	H	36.6	4.40	26.75	61.03	74	12.97	harmonic
7404.2	42.01	PK	124	1.8	H	39.0	5.30	26.58	59.73	74	14.27	harmonic
4934.8	46.12	PK	278	1.6	V	35.4	4.40	26.75	59.17	74	14.83	harmonic
7404.2	41.45	PK	167	1.4	V	37.8	5.30	26.58	57.97	74	16.03	harmonic

Spurious Emissions in the Restrict Bands:

Indicated		Detector (PK/Ave)	Table Angle Degree	Test Antenna		Correction Factor			FCC Part 15.247/15.209/15.205			
Frequency (MHz)	S.A. Reading (dB μ V)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre- Amp. (dB)	Cord. Amp. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Comment
2486.94	32.23	Ave.	174	1.2	H	27.5	3.2	26.8	36.13	54	17.87	spurious
2486.94	30.04	Ave.	212	1.4	V	27.5	3.2	26.8	33.94	54	20.06	spurious
2486.94	41.64	PK	174	1.2	H	27.5	3.2	26.8	45.54	74	28.46	spurious
2486.94	40.25	PK	212	1.4	V	27.5	3.2	26.8	44.15	74	29.85	spurious

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 2400-2483.5 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	EMI Test Receiver	ESCI	100035	2010-11-24	2011-11-23

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

1. Set the EUT in Operating 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 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

* The testing was performed by Kvass Yang on 2011-02-18.

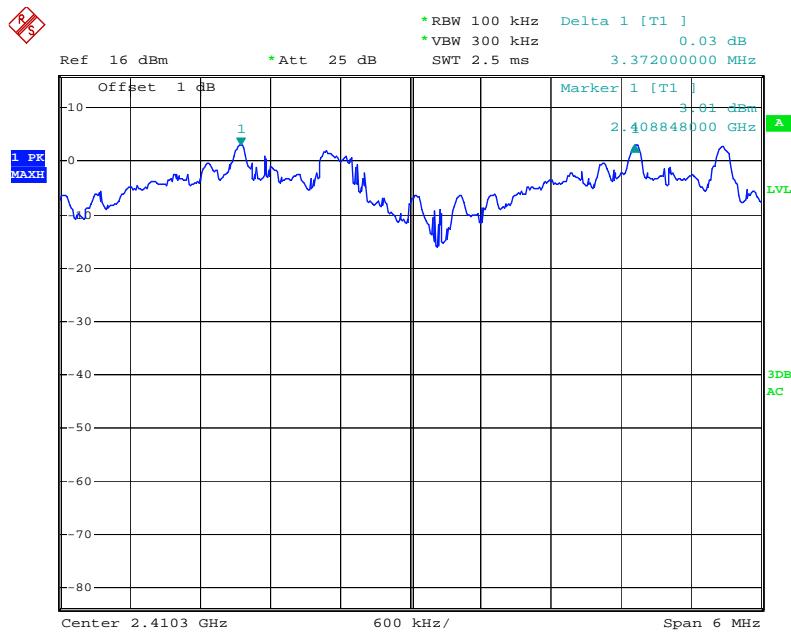
Test Result: Compliant.

Please refer to following tables and plots

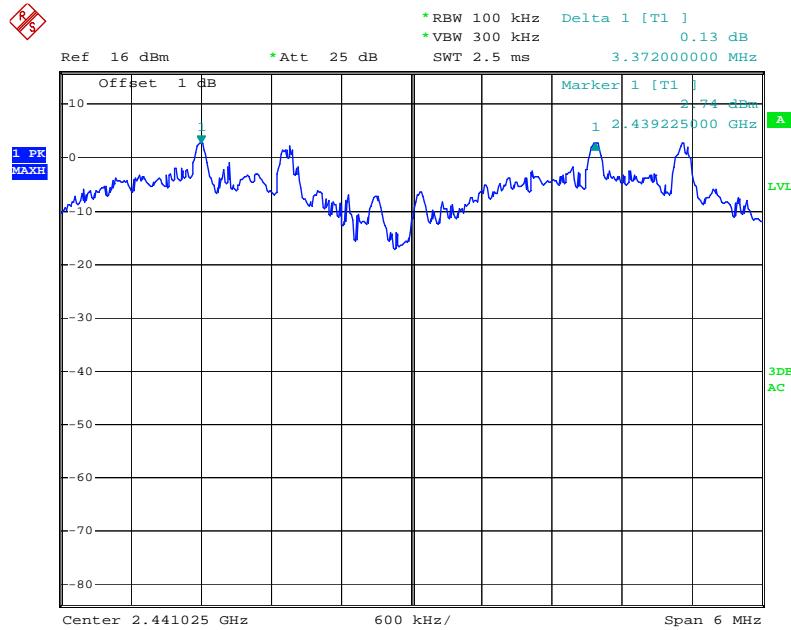
Test Mode: Transmitting

Channel	Channel Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
Channel 1	2408.825	3.372	2.293	Pass
Channel 2	2412.200			
Channel 10	2439.200	3.372	2.320	Pass
Channel 11	2442.575			
Channel 16	2460.650	4.512	2.320	Pass
Channel 15	2456.075			
Channel 18	2467.400	3.732	2.293	Pass
Channel 17	2464.025			

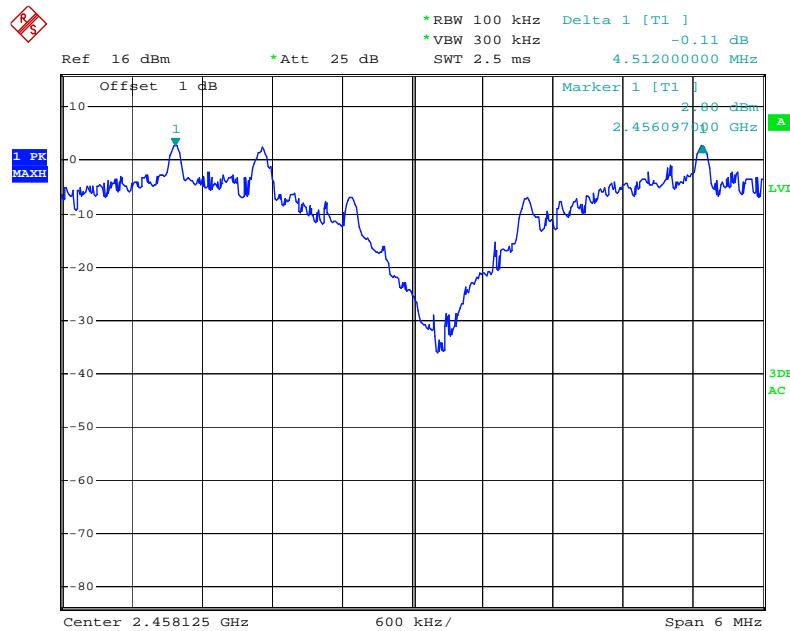
Please refer to the following plots.

Channel 1 & Channel 2

Date: 18.FEB.2011 13:55:25

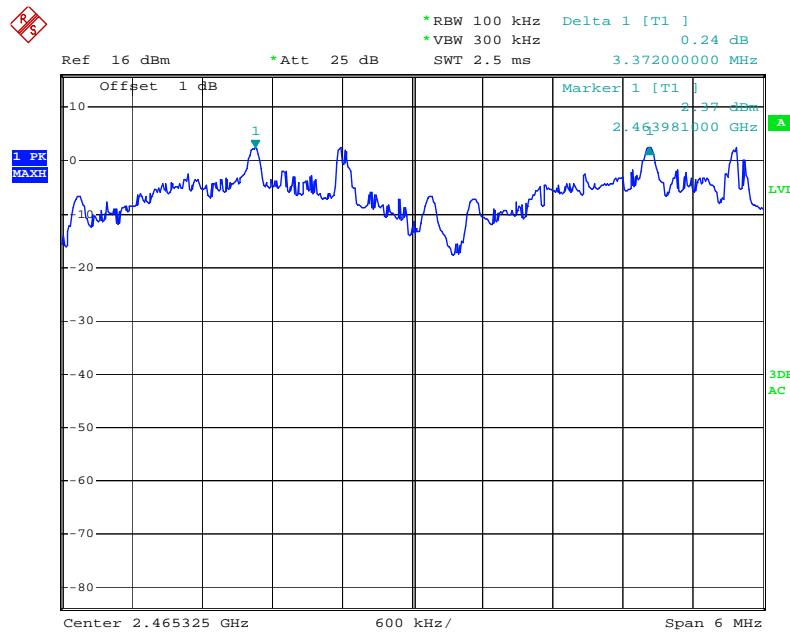
Channel 11 & Channel 12

Date: 18.FEB.2011 13:59:40

Channel 15 & Channel 16

Date: 18.FEB.2011 14:03:26

Channel 17 & Channel 18



Date: 18.FEB.2011 14:06:42

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 125mW.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-24	2011-11-23

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

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 Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.9kPa

* The testing was performed by Kvass Yang on 2011-02-18.

Test Result: Compliance.

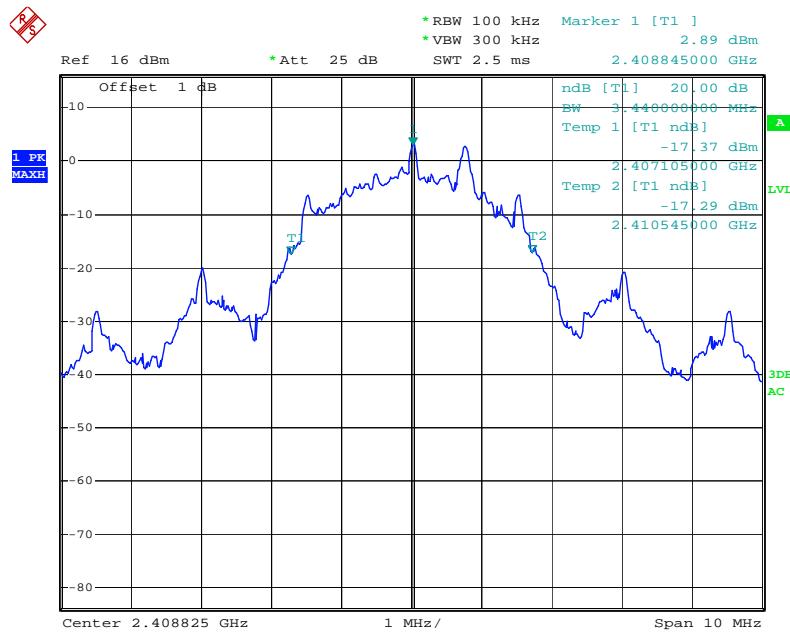
Please refer to following tables and plots

Test Mode: Transmitting

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	2408.825	3.440
Middle	2439.200	3.480
High	2467.400	3.440

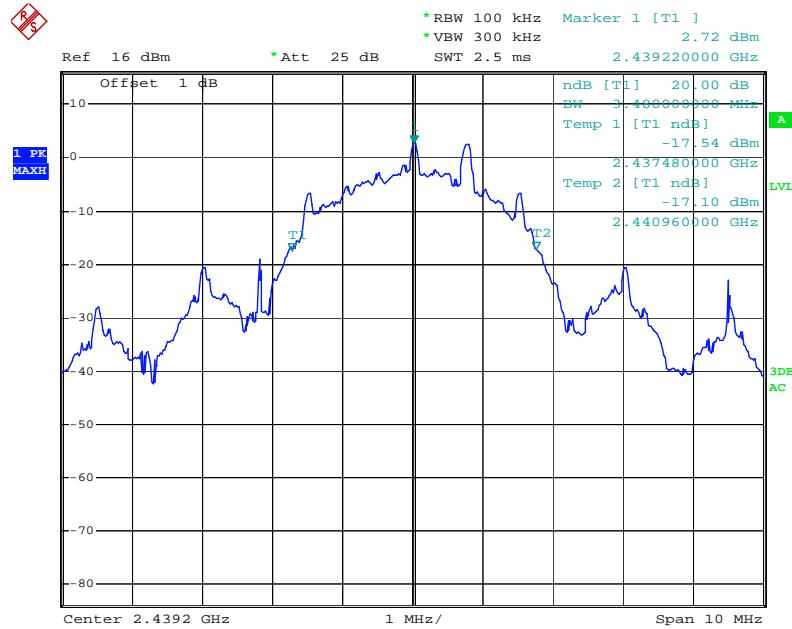
Please refer to the following plots.

Low Channel



Date: 18.FEB.2011 14:08:15

Middle Channel



Date: 18.FEB.2011 14:10:19

High Channel



Date: 18.FEB.2011 14:14:41

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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-24	2011-11-23

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

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 Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.9kPa

The testing was performed by Kvass Yang on 2011-02-18.

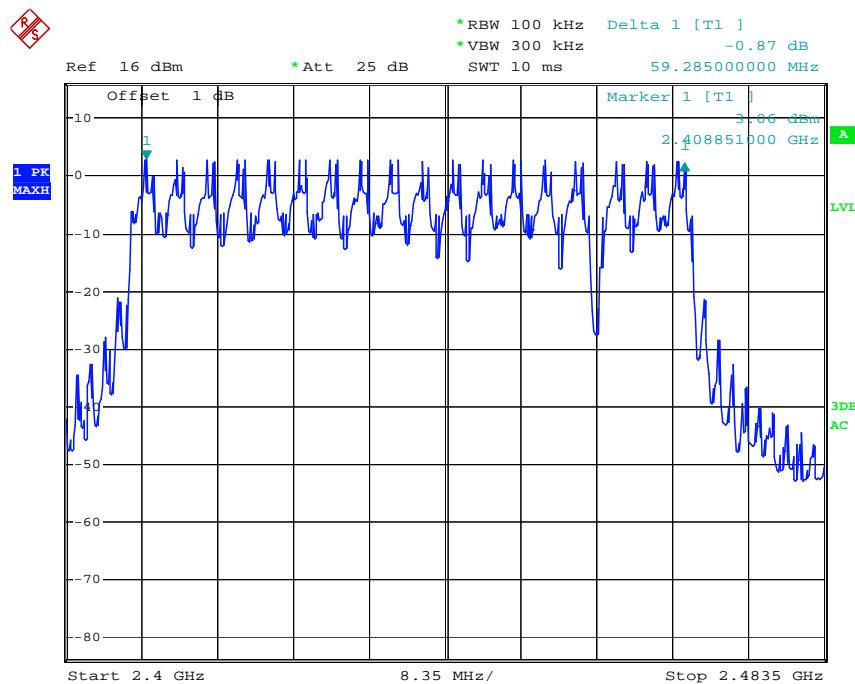
Test Result: Compliant.

Please refer to following tables and plots

Test Mode: Transmitting

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400~2483.5	18	≥ 15

Number of Hopping Channels



Date: 18.FEB.2011 13:40:31

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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-24	2011-11-23

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

The EUT was worked in channel hopping; Spectrum SPAN was set as 0. Sweep was set as 0.4 X 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.*0.4 s
Hop rate=1000/160=6.25/s

Test Data**Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Kvass Yang on 2011-02-18.

Test Result: Compliance.

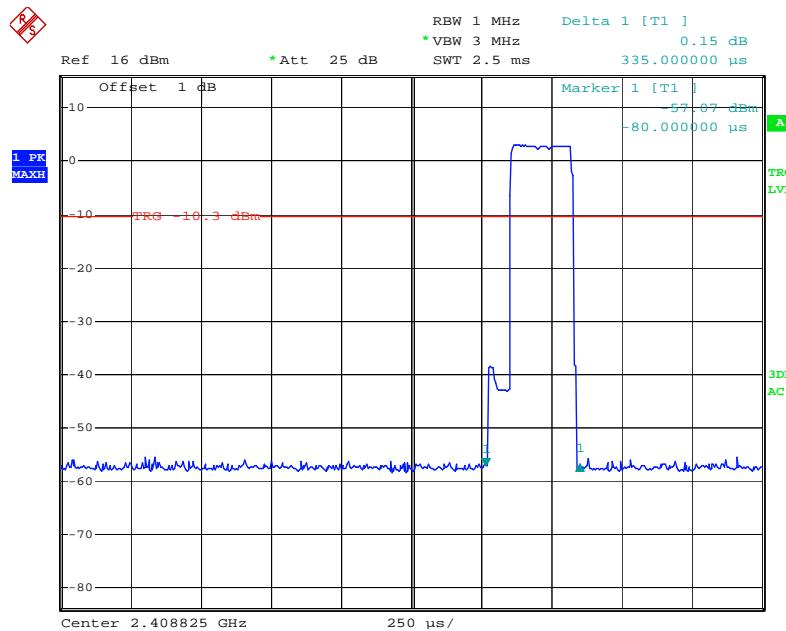
Please refer to following tables and plots

Test Mode: Transmitting

Channel	Pulse Width (ms)	Dwell Time (S)	Limit (S)	Result
Low	0.335	0.01407	0.4	Pass
Middle	0.330	0.01386	0.4	Pass
High	0.335	0.01407	0.4	Pass

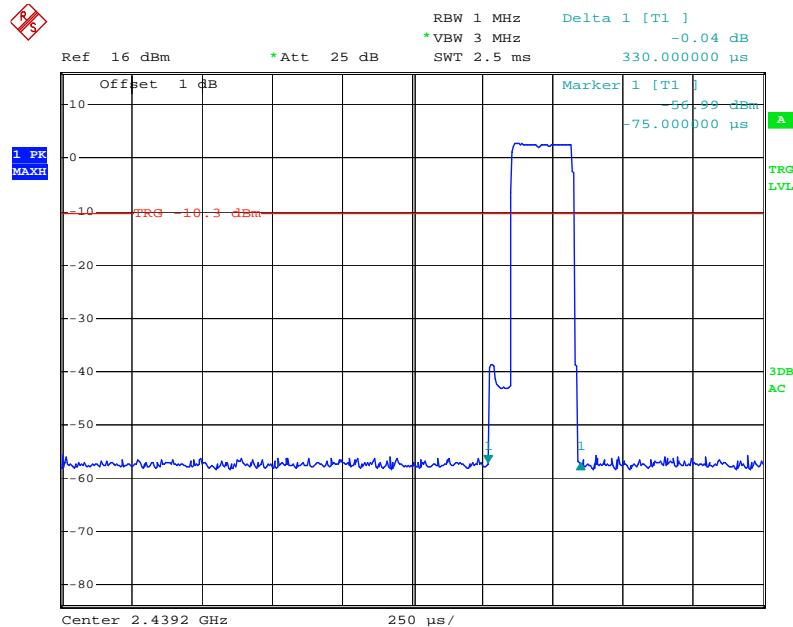
Note: Dwell time=Pulse time (ms) \times (210/2/18) \times 18 * 0.4 Second

Please refer to the following plots.

Low Channel

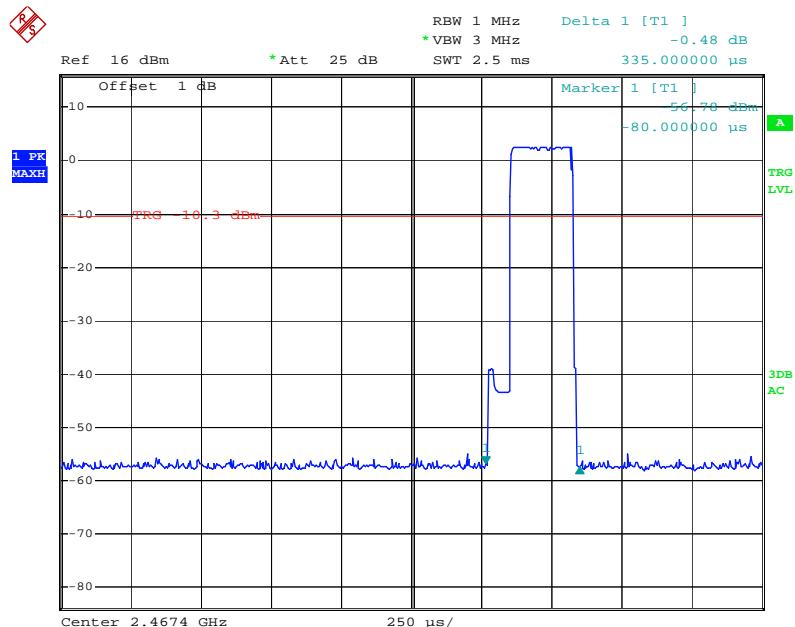
Date: 18.FEB.2011 14:29:58

Middle Channel



Date: 18.FEB.2011 14:29:21

High Channel



Date: 18.FEB.2011 14:28:50

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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2009-11-07	2010-11-06

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

1. Place the EUT on a bench and set it 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 Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.9kPa

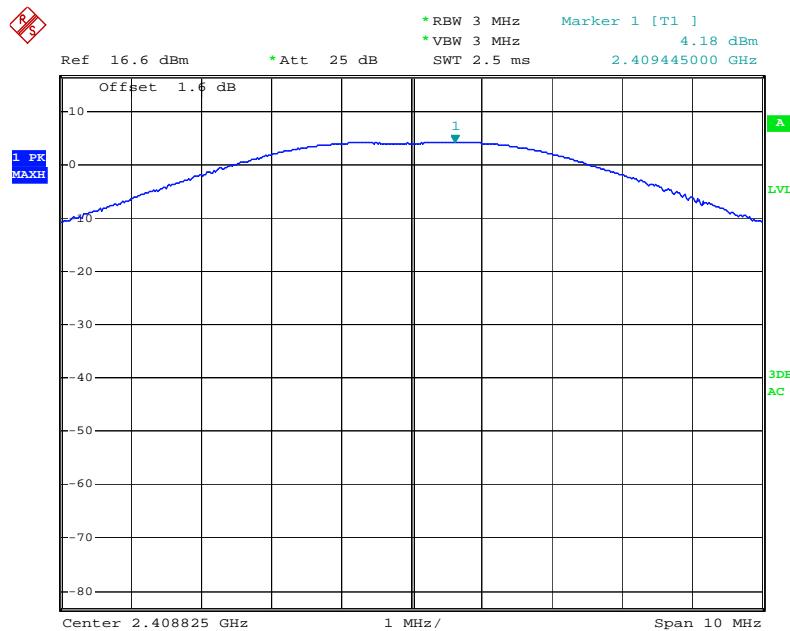
* The testing was performed by Kvass Yang on 2010-02-18.

Test Result: Compliant.

Test Mode: Transmitting

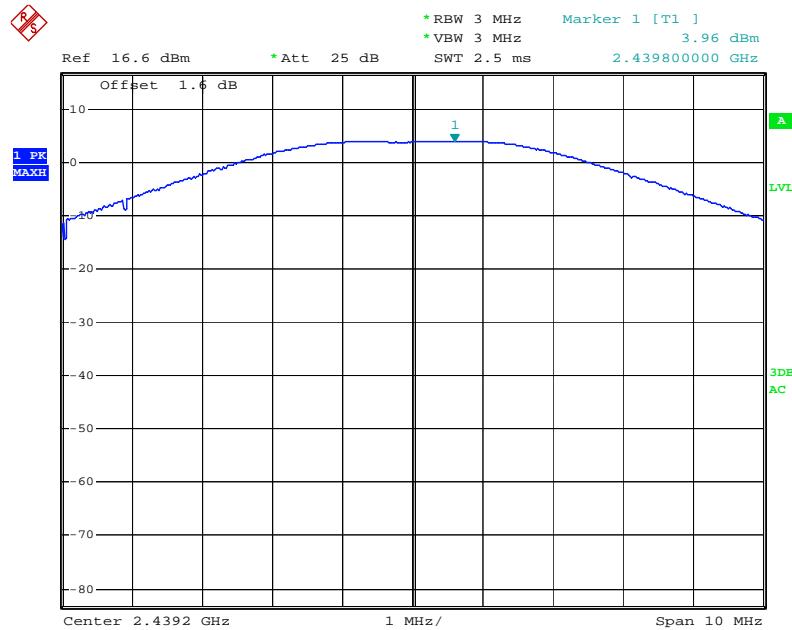
Channel	Frequency (MHz)	Conducted Output Power (dBm)	Conducted Output Power (mW)	Limit (mW)
Low	2408.825	4.18	2.618	125
Middle	2439.200	3.96	2.489	125
High	2467.400	3.83	2.415	125

Note: The data above was tested in conducted mode.

Low Channel

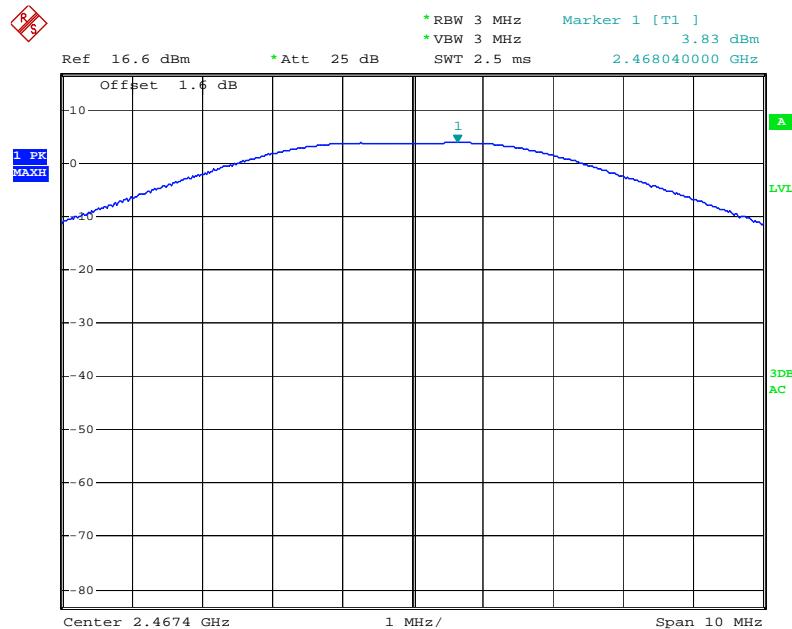
Date: 18.FEB.2011 14:21:23

Middle Channel



Date: 18.FEB.2011 14:24:30

High Channel



Date: 18.FEB.2011 14:27:40

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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-24	2011-11-23

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

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 without connection to measurement instrument. Put it on the Rotated table and turn on the EUT and make it operate in Operating 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 100kHz bandwidth from band edge, for Radiated emissions restricted band RBW=1MHz, VBW=3MHz.
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 Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.9kPa

*The testing was performed by Kvass Yang on 2011-02-18.

Test Result: Compliant

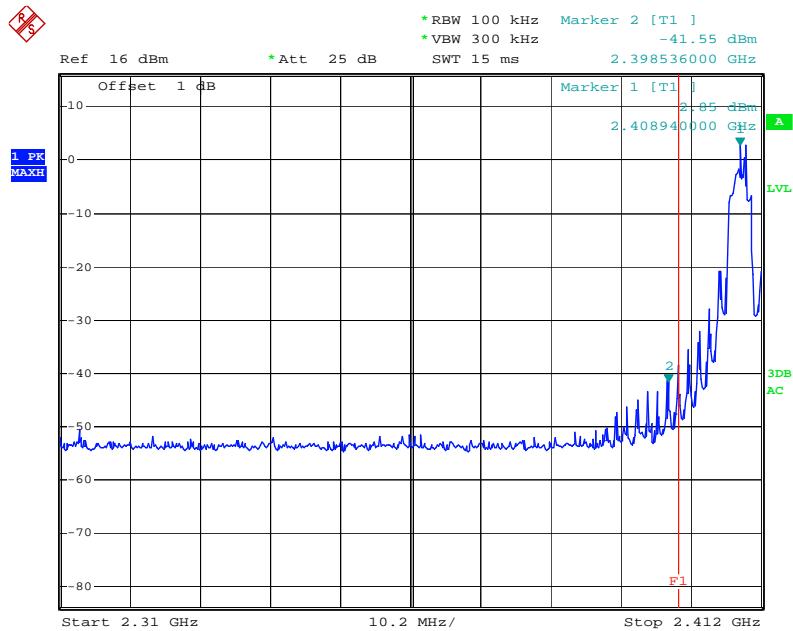
Test Mode: Transmitting

Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)
2398.536	44.40	20
2486.896	47.77	20

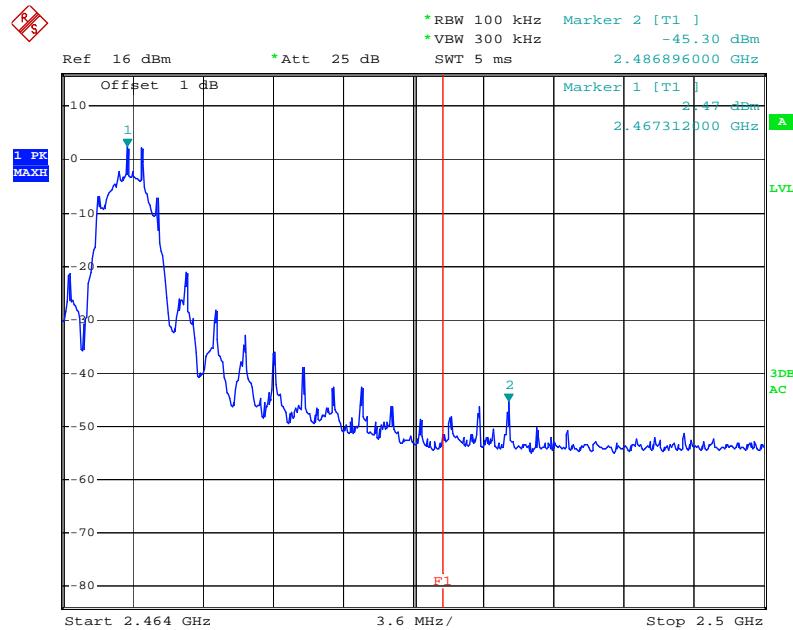
Note: The point fall into the stricted band was in FCC 15.209, please refer to the restrict band testing.

Please refer to follow plots:

Band Edge: Left Side



Date: 18.FEB.2011 14:17:48

Band Edge: Right Side

Date: 18.FEB.2011 14:16:41

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