

FCC PART 15.247
TEST REPORT

For

Summer Infant, Inc.

1275 Park East Drive, Woonsocket, Rhode Island, United States

FCC ID: PZK-845T

Report Type: Original Report	Product Type: FHSS Device (Camera Unit)
Test Engineer: <u>Ken Zhang</u>	<i>Ken Zhang</i>
Report Number: <u>RSZ120319001-00</u>	
Report Date: <u>2012-03-30</u>	
Reviewed By: <u>EMC Engineer</u>	<i>Alvin Huang</i>
Test Laboratory:	
Bay Area Compliance Laboratories Corp. (Shenzhen) 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 www.baclcorp.com.cn	

Note: This test report is prepared for the customer shown above and for the equipment 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* 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
BLOCK DIAGRAM OF TEST SETUP	6
SUMMARY OF TEST RESULTS	7
FCC §15.247 (i) & §1.1307 (b) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE).....	8
STANDARD APPLICABLE	8
FCC §15.203 – ANTENNA REQUIREMENT.....	9
APPLICABLE STANDARD	9
ANTENNA CONNECTOR CONSTRUCTION	9
FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS	10
APPLICABLE STANDARD	10
MEASUREMENT UNCERTAINTY	10
EUT SETUP	10
EMI TEST RECEIVER SETUP.....	11
TEST PROCEDURE	11
TEST EQUIPMENT LIST AND DETAILS.....	11
TEST RESULTS SUMMARY.....	11
TEST DATA	11
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS.....	14
APPLICABLE STANDARD	14
MEASUREMENT UNCERTAINTY	14
EUT SETUP	14
EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP	15
TEST PROCEDURE	15
TEST EQUIPMENT LIST AND DETAILS.....	15
CORRECTED AMPLITUDE & MARGIN CALCULATION	15
TEST RESULTS SUMMARY.....	16
TEST DATA	16
FCC §15.247(a) (1)-CHANNEL SEPARATION TEST	18
APPLICABLE STANDARD	18
TEST PROCEDURE	18
TEST EQUIPMENT LIST AND DETAILS.....	18
TEST DATA	18
FCC §15.247(a) (1) – 20 dB BANDWIDTH TESTING.....	21
APPLICABLE STANDARD	21
TEST PROCEDURE	21
TEST EQUIPMENT LIST AND DETAILS.....	21

TEST DATA21

FCC §15.247(a) (1) (iii)-QUANTITY OF HOPPING CHANNEL TEST24

 APPLICABLE STANDARD24

 TEST PROCEDURE24

 TEST EQUIPMENT LIST AND DETAILS.....24

 TEST DATA24

FCC §15.247(a) (1) (iii) -TIME OF OCCUPANCY (DWELL TIME).....26

 APPLICABLE STANDARD26

 TEST PROCEDURE26

 TEST EQUIPMENT LIST AND DETAILS.....26

 TEST DATA26

FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT29

 APPLICABLE STANDARD29

 TEST PROCEDURE29

 TEST EQUIPMENT LIST AND DETAILS.....29

 TEST DATA29

FCC §15.247(d) - BAND EDGES TESTING32

 APPLICABLE STANDARD32

 TEST PROCEDURE32

 TEST EQUIPMENT LIST AND DETAILS.....32

 TEST DATA33

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Summer Infant, Inc.*'s product, model number: 28450 (FCC ID: PZK-845T) (the "EUT") in this report was a camera unit of *FHSS Device*, named as *Slim & Secure plus digital Color Video Monitor* by applicant, which was measured approximately: 9.0 cm (L) x 9.0 cm (W) x 17 cm (H), rated input voltage: DC 7.5V adapter.

Adapter information:

Model: ADN050750500

Input: AC 120V, 250mA, 60 Hz

Output: DC 7.5V, 500mA

** All measurement and test data in this report was gathered from production sample serial number: 1203038 (Assigned by BACL, Shenzhen). The EUT was received on 2012-03-19.*

Objective

This 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, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

Submitted with the part of a system with FCC ID: PZK-845R

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 on 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 an ISO/IEC 17025 accredited laboratory, and is accredited by 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.

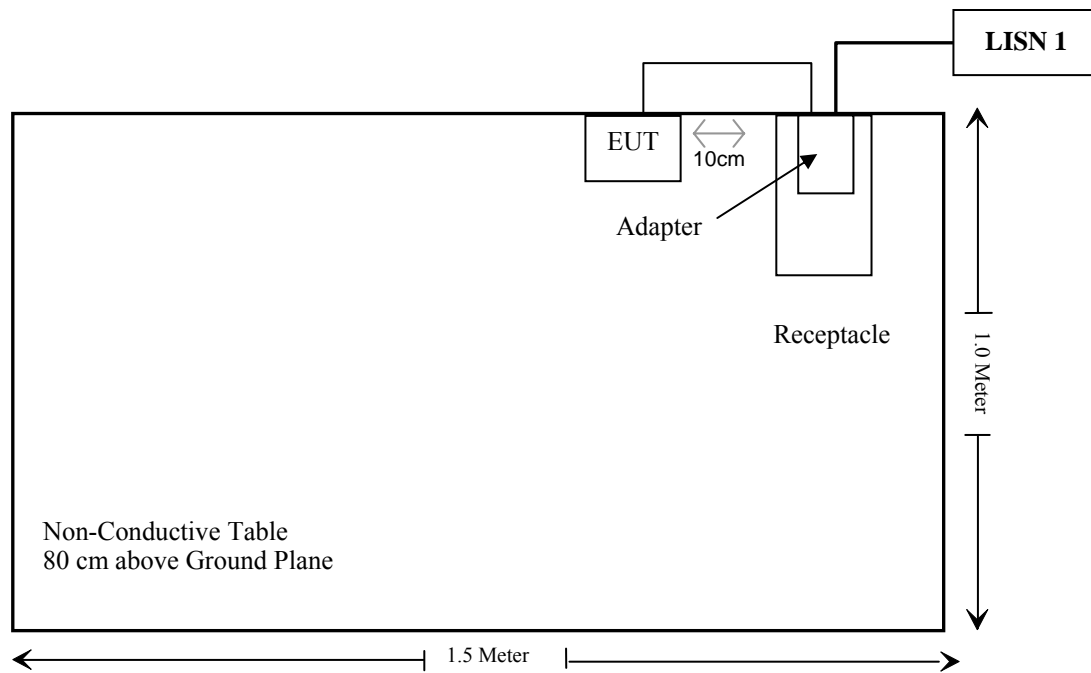
EUT Exercise Software

No exercise software was used.

Equipment Modifications

No modification was made to the EUT tested.

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307 (b)(1), §2.1091	Maximum Permissible Exposure (MPE)	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)(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)

Standard Applicable

According to subpart 15.247 (i) and subpart 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mw/cm ²)	Averaging Time (Minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	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

MPE Calculation

Predication of MPE limit at a given distance

$$S = PG/4\pi R^2$$

Where:

S = power density (in appropriate units, e.g. mW/cm²)

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)

Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
	(dBi)	(numeric)	(dBm)	(mW)			
2469.639	0	1	12.53	17.91	20	0.0036	1

Note: To comply with FCC RF exposure compliance requirements, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons.

Result: Compliance

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 a monopole antenna connect to RF board, which in accordance to section 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

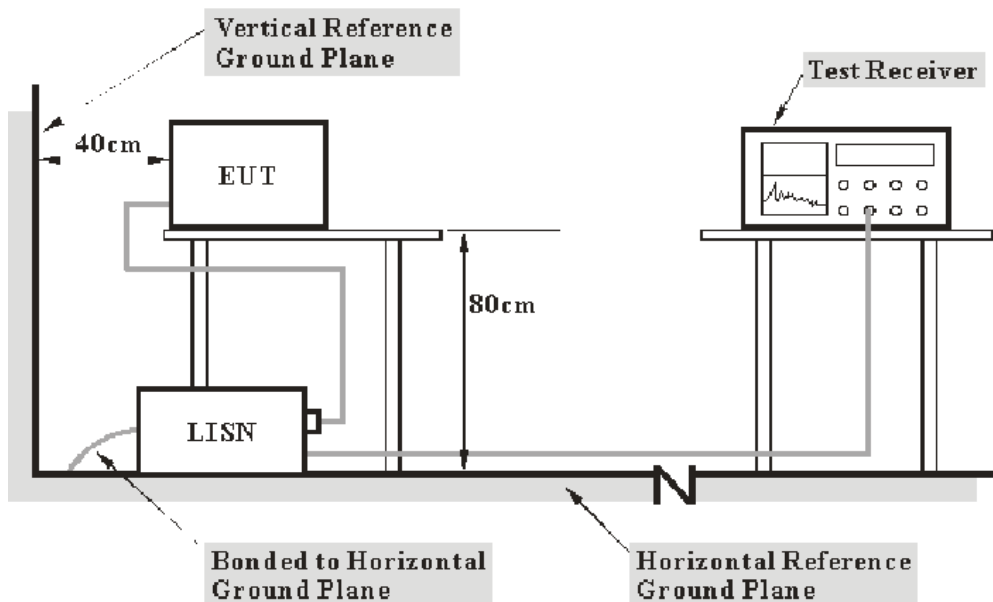
FCC §15.207

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 CISPR-16-4-4, 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 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 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
Rohde & Schwarz	EMI Test Receiver	ESCS30	830245/006	2012-03-03	2013-03-02
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2012-03-09	2013-03-08
Rohde & Schwarz	Pulse limiter	ESH3Z2	DE25985	2011-07-08	2012-07-07

* **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 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:

4.50 dB at 0.620 MHz in the **Line** conducted mode

Test Data

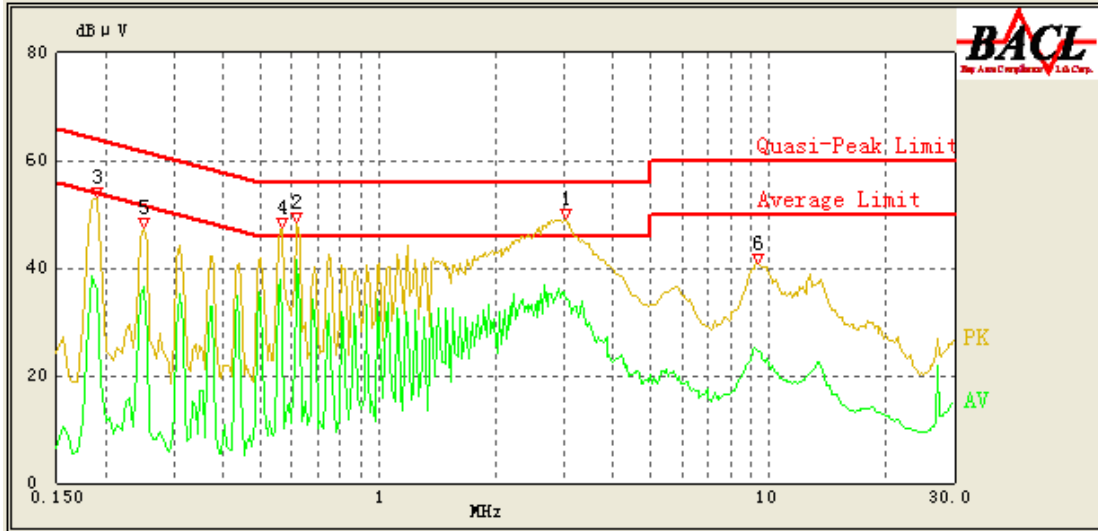
Environmental Conditions

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

The testing was performed by Ken Zhang on 2012-03-23.

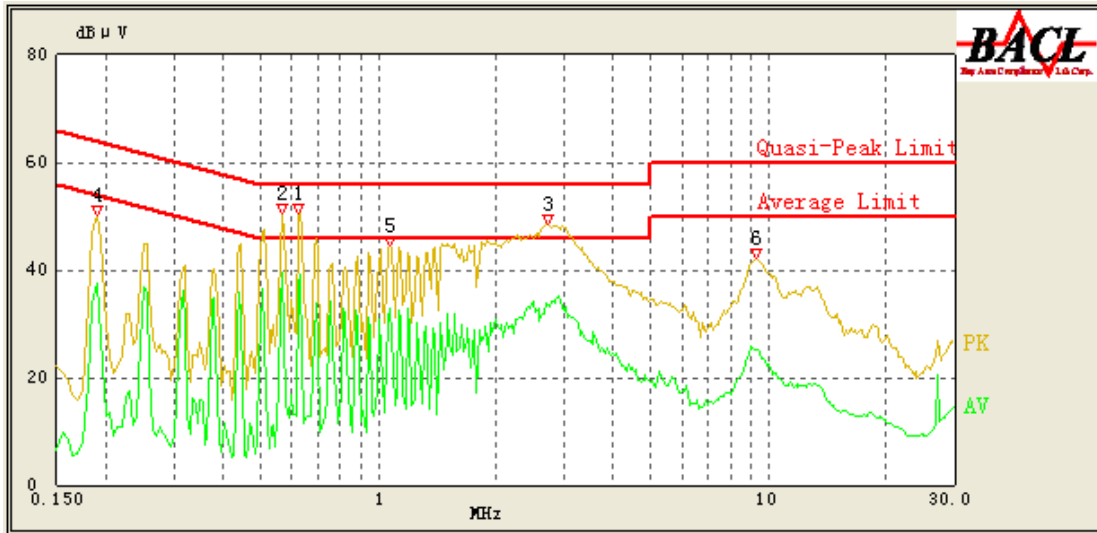
Test Mode: Transmitting

AC 120 V, 60 Hz, Line:



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/QP/Ave.)
0.620	41.50	10.23	46.00	4.50	Ave.
3.005	35.37	10.42	46.00	10.63	Ave.
3.010	43.63	10.42	56.00	12.37	QP
0.620	42.19	10.23	56.00	13.81	QP
0.190	40.75	10.23	54.86	14.11	Ave.
0.250	36.66	10.23	53.14	16.48	Ave.
0.565	29.41	10.23	46.00	16.59	Ave.
0.565	36.82	10.23	56.00	19.18	QP
0.190	44.95	10.23	64.86	19.91	QP
0.250	40.30	10.23	63.14	22.84	QP
9.415	24.36	10.92	50.00	25.64	Ave.
9.375	31.25	10.91	60.00	28.75	QP

AC 120V, 60 Hz, Neutral:



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/QP/Ave.)
0.565	39.36	10.23	46.00	6.64	Ave.
0.625	37.66	10.23	46.00	8.34	Ave.
0.570	46.38	10.23	56.00	9.62	QP
0.625	46.27	10.23	56.00	9.73	QP
1.070	35.85	10.25	46.00	10.15	Ave.
2.700	35.79	10.39	46.00	10.21	Ave.
2.720	43.95	10.39	56.00	12.05	QP
1.070	42.20	10.25	56.00	13.80	QP
0.190	37.38	10.23	54.86	17.48	Ave.
0.190	46.07	10.23	64.86	18.79	QP
9.345	28.20	10.91	50.00	21.80	Ave.
9.345	35.22	10.91	60.00	24.78	QP

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

Applicable Standard

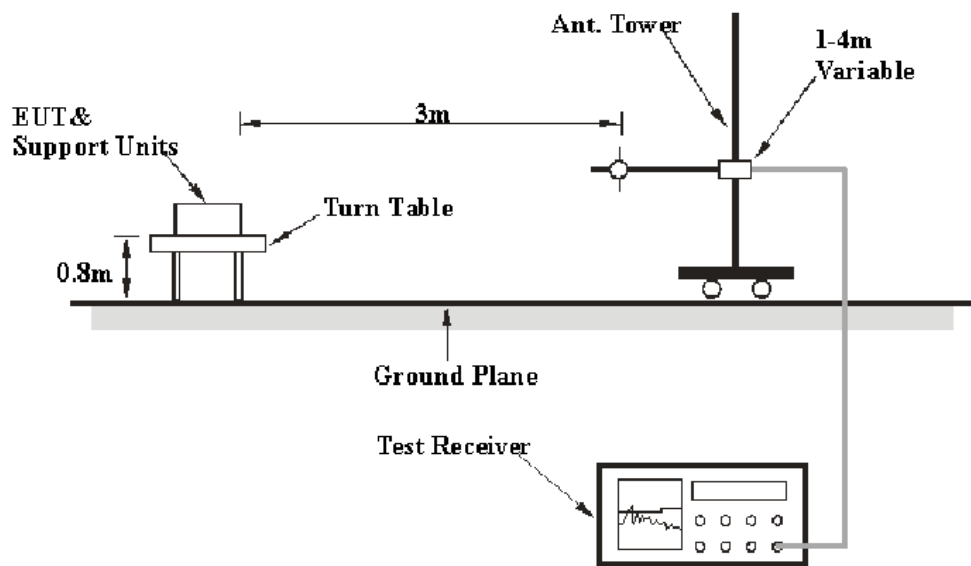
FCC §15.247 (d); §15.209; §15.205;

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 CISPR 16-4-4, 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 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:

<i>Frequency Range</i>	<i>RBW</i>	<i>Video B/W</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 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 to 1GHz and peak and Average detection modes for frequencies above 1GHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447D	2944A09795	2011-08-02	2012-08-02
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2011-11-11	2012-11-10
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2011-07-05	2012-07-04
Picosecond	Amplifier	Boulder	N/A	2012-03-08	2013-03-08
Sunol Sciences	Horn Antenna	DRH-118	A052604	2011-05-05	2012-05-04
Rohde&Schwarz	Signal Analyzer	FSIQ 26	609358	2011-07-08	2012-07-07
Electro-Mechanics	Horn Antenna	3116	9510-2270	2011-10-11	2012-10-10

* **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.

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:

1.4 dB at 312 MHz in the Horizontal polarization

Test Data

Environmental Conditions

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

The testing was performed by Ken Zhang on 2012-03-23.

1) 30 MHz- 1 GHz

Frequency (MHz)	Detector (PK/QP /Ave.)	Corrected Amplitude (dBμV/m)	Antenna Height (cm)	Ant. Polarity	Turntable Position (deg)	Correction Factor (dB)	FCC Part 15.247/15.209/15.205		
							Limit (dBμV/m)	Margin (dB)	Comment
312.00	QP	44.6	110	H	146	-12.1	46.0	1.4*	Spurious
216.01	QP	40.0	110	H	146	-14.1	46.0	6.0	Spurious
54.76	QP	33.8	120	V	138	-18.0	40.0	6.2	Spurious
148.60	QP	33.5	120	V	138	-13.9	43.5	10.0	Spurious

*Within measurement uncertainty.

2) 1 GHz -25 GHz

Indicated		Detector (PK/QP /Ave.)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247/15.209/15.205			
Frequency (MHz)	Receiver Reading (dBµV)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Comment
Low Channel (2408.851 MHz)												
2408.851	83.54	PK	168	1.1	V	27.4	3.03	10.29	103.68	/	/	Fund.
2408.851	49.76	Ave.	168	1.1	V	27.4	3.03	10.29	69.90	/	/	Fund.
4817.702	43.96	PK	186	1.3	H	31.3	4.30	9.96	69.60	74.00	4.40	harmonic
4817.702	23.23	Ave.	186	1.3	H	31.3	4.30	9.96	48.87	54.00	5.13	harmonic
9635.404	15.13	Ave.	68	1.0	V	36.8	5.99	9.36	48.56	54.00	5.44	harmonic
7226.553	16.33	Ave.	8	1.1	V	35.4	5.22	9.21	47.74	54.00	6.26	harmonic
2386	44.93	PK	6	1.0	V	27.4	3.03	10.29	65.07	74.00	8.93	spurious
2386	23.96	Ave.	6	1.0	V	27.4	3.03	10.29	44.10	54.00	9.90	spurious
9635.404	30.34	PK	68	1.0	V	36.8	5.99	9.36	63.77	74.00	10.23	harmonic
7226.553	31.14	PK	8	1.1	V	35.4	5.22	9.21	62.55	74.00	11.45	harmonic
Middle Channel (2437.074MHz)												
2437.074	84.88	PK	48	1.3	H	27.5	3.11	10.32	105.17	/	/	Fund.
2437.074	49.6	Ave.	48	1.3	H	27.5	3.11	10.32	69.89	/	/	Fund.
4874.148	23.77	Ave.	158	1.0	H	31.5	4.36	10.01	49.62	54.00	4.38	harmonic
4874.148	43.22	PK	158	1.0	H	31.5	4.36	10.01	69.07	74.00	4.93	harmonic
9748.296	15.11	Ave.	112	1.1	V	37.0	6.10	9.35	48.86	54.00	5.14	harmonic
7311.222	14.95	Ave.	43	1.3	V	35.4	5.09	9.14	46.30	54.00	7.70	harmonic
9748.296	29.43	PK	112	1.1	V	37.0	6.10	9.35	63.18	74.00	10.82	harmonic
7311.222	31.45	PK	43	1.3	V	35.4	5.09	9.14	62.80	74.00	11.20	harmonic
High Channel (2469.639 MHz)												
2469.639	85.08	PK	128	1.1	V	27.5	3.11	10.32	105.37	/	/	Fund.
2469.639	53.26	Ave.	128	1.1	V	27.5	3.11	10.32	73.55	/	/	Fund.
4939.278	43.78	PK	88	1.3	H	31.5	4.40	9.82	69.86	74.00	4.14	harmonic
9878.556	15.37	Ave.	73	1.2	V	37.3	6.09	9.16	49.60	54.00	4.40	harmonic
4939.278	22.83	Ave.	88	1.3	H	31.5	4.40	9.82	48.91	54.00	5.09	harmonic
7408.917	15.37	Ave.	48	1.2	V	35.6	5.20	9.25	46.92	54.00	7.08	harmonic
9878.556	30.57	PK	73	1.2	V	37.3	6.09	9.16	64.80	74.00	9.20	harmonic
2498	22.61	Ave.	13	1.2	H	27.5	3.11	10.32	42.90	54.00	11.10	spurious
7408.917	31.21	PK	48	1.2	V	35.6	5.20	9.25	62.76	74.00	11.24	harmonic
2498	42.28	PK	13	1.2	H	27.5	3.11	10.32	62.57	74.00	11.43	spurious
2484	42.20	PK	26	1.0	V	27.5	3.11	10.32	62.49	74.00	11.51	spurious
2484	22.03	Ave.	26	1.0	V	27.5	3.11	10.32	42.32	54.00	11.68	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 Procedure

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2011-11-11	2012-11-10

* **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 Data

Environmental Conditions

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

* *The testing was performed by Ken Zhang on 2012-03-23.*

Test Result: Compliance.

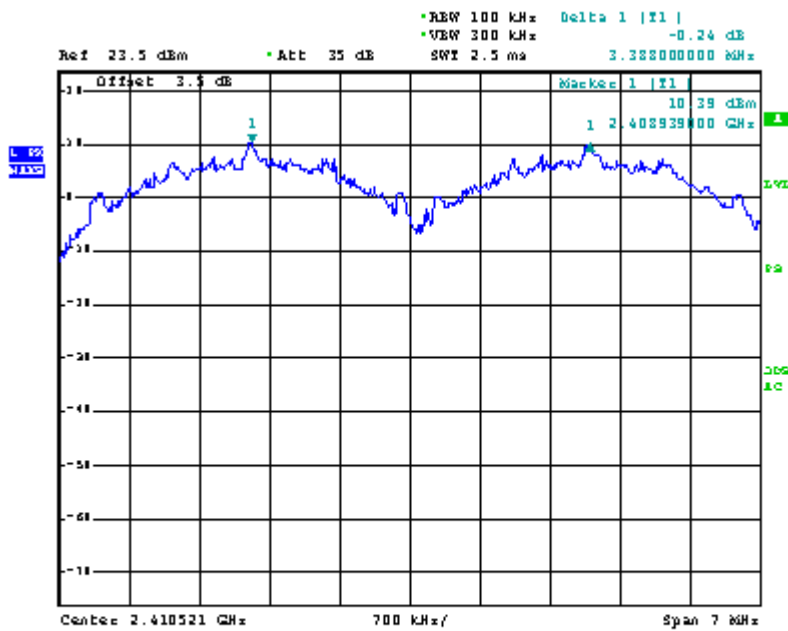
Please refer to following tables and plots

Test Mode: Transmitting

Channel	Channel Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
Channel 1	2408.851	3.388	2.485	Pass
Channel 2	2412.191			
Channel 8	2433.567	3.388	2.431	
Channel 9	2437.074			
Channel 17	2466.299	3.388	2.485	
Channel 18	2469.639			

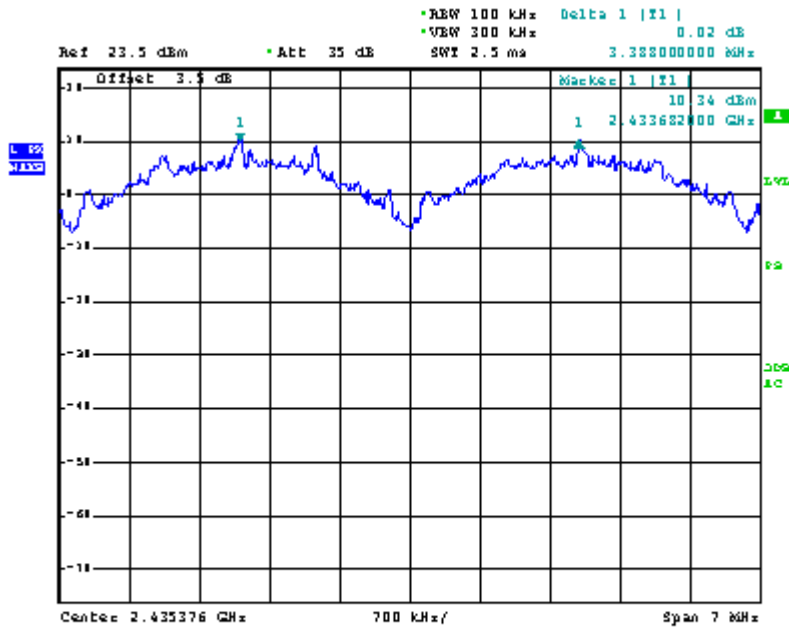
Please refer to the following plots.

Channel 1 & Channel 2



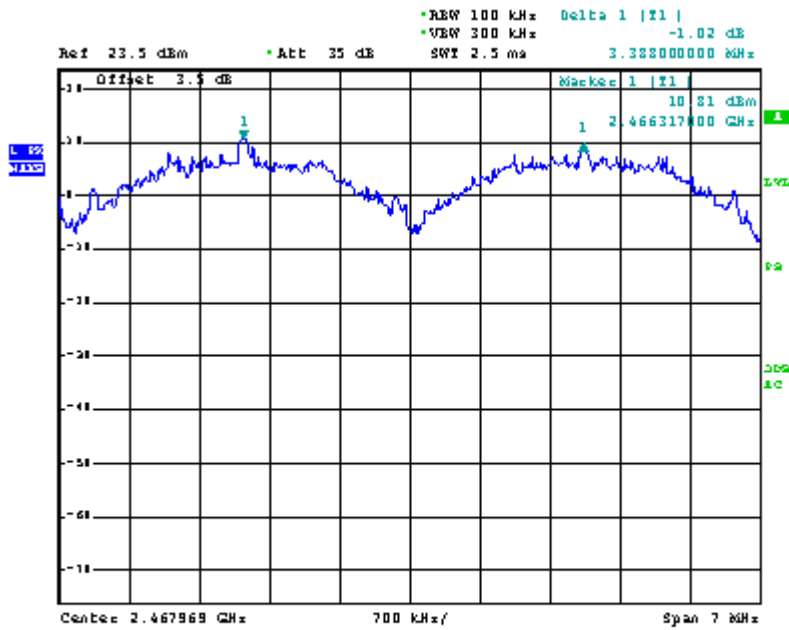
Date: 23.MAR.2012 11:07:14

Channel 8 & Channel 9



Date: 23.MAR.2012 13:18:56

Channel 17 & Channel 18



Date: 23.MAR.2012 11:11:21

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 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	Signal Analyzer	FSIQ 26	609358	2011-07-08	2012-07-07

* **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 Data

Environmental Conditions

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

* The testing was performed by Ken Zhang on 2012-03-24.

Test Result: Compliance.

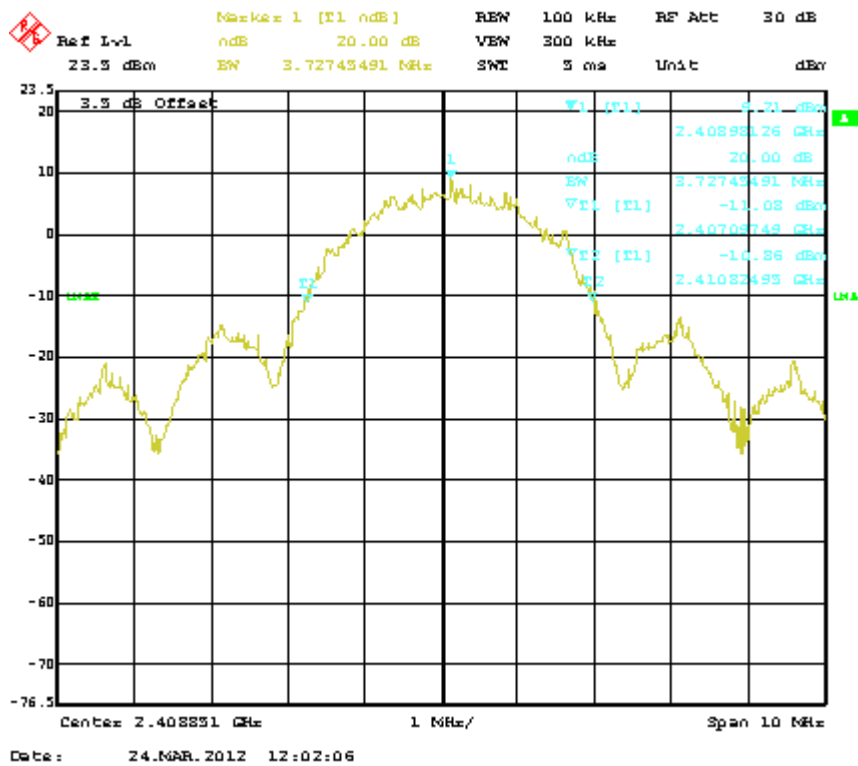
Please refer to following tables and plots

Test Mode: Transmitting

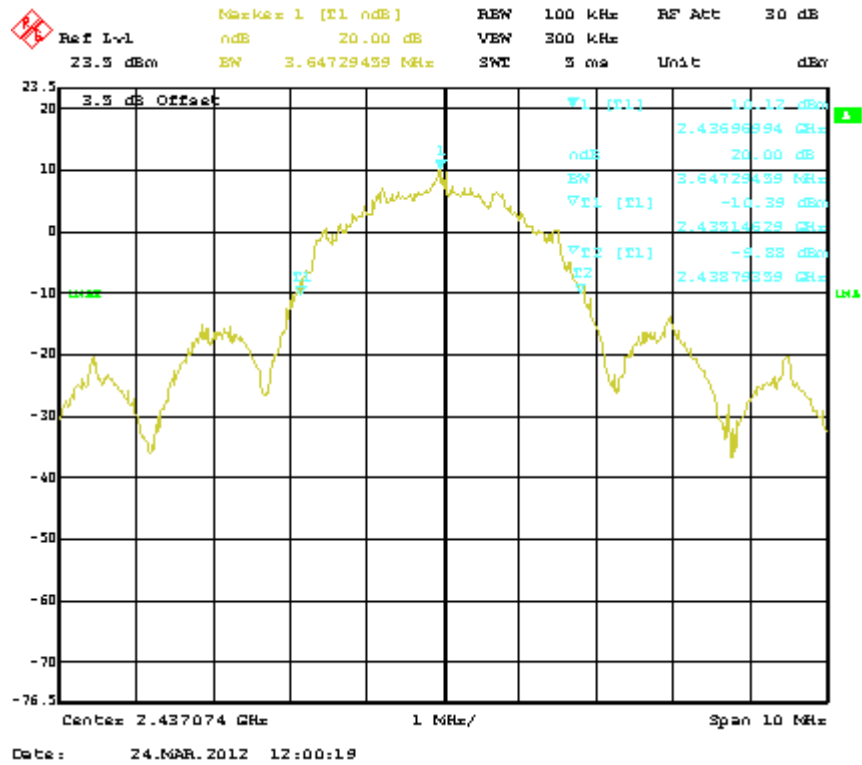
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	2408.851	3.727
Middle	2437.074	3.647
High	2469.639	3.727

Please refer to the following plots.

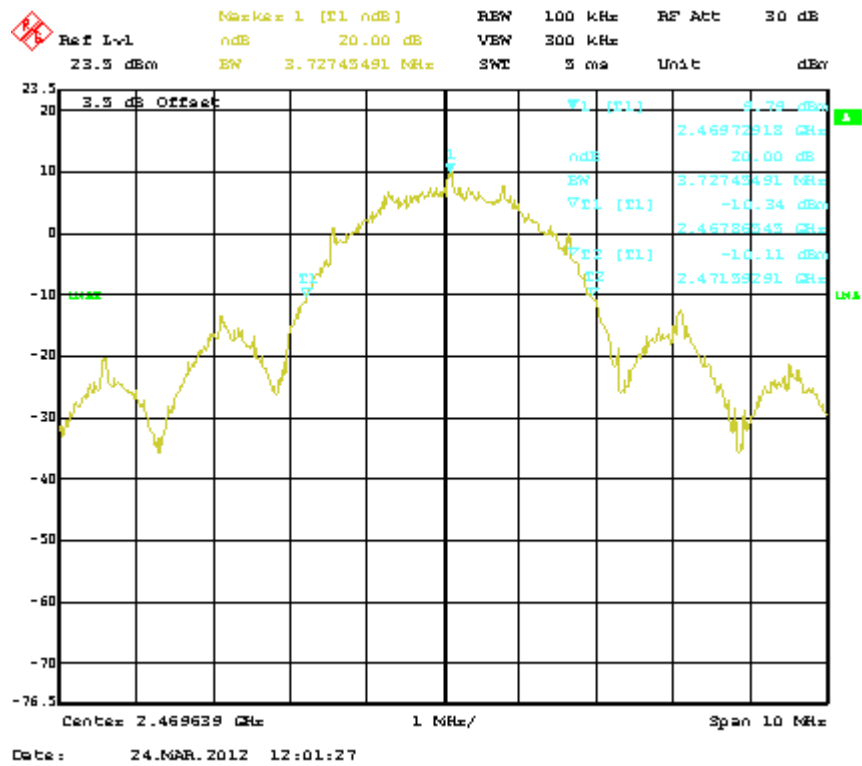
Low Channel



Middle Channel



High Channel



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

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2011-11-11	2012-11-10

* **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 Data

Environmental Conditions

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

The testing was performed by Ken Zhang on 2012-03-23.

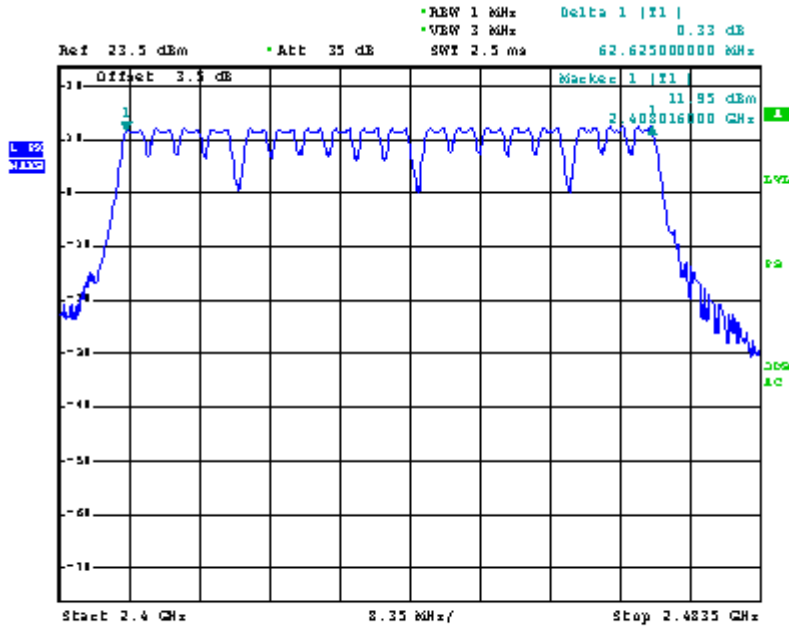
Test Result: Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.50	18	≥ 15

Number of Hopping Channels



Date: 23.MAR.2012 12:52:05

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

Dwell Time= Pulse time (ms) * hope rate/2/ number of hopping channels * hopping No.*0.4 s.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2011-11-11	2012-11-10

* **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 Data

Environmental Conditions

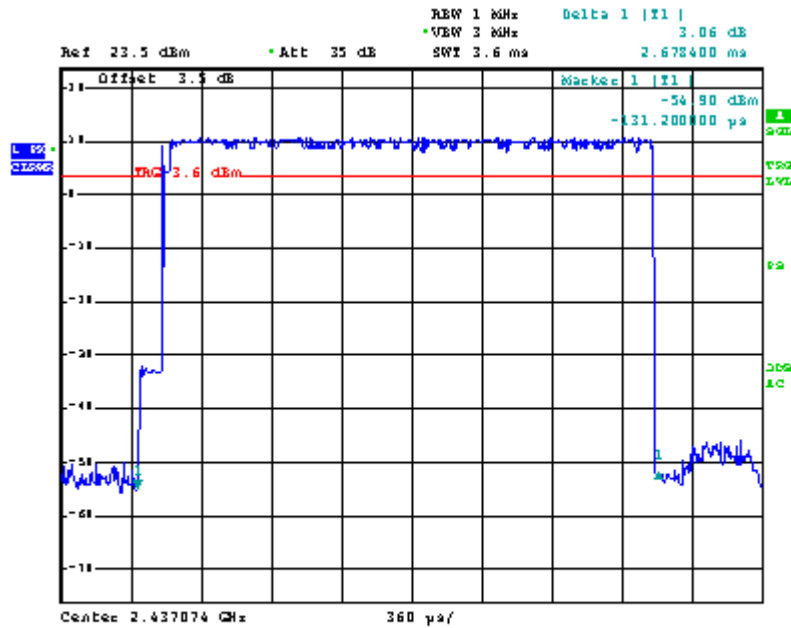
Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Ken Zhang on 2012-03-23.

Test Result: Compliance.

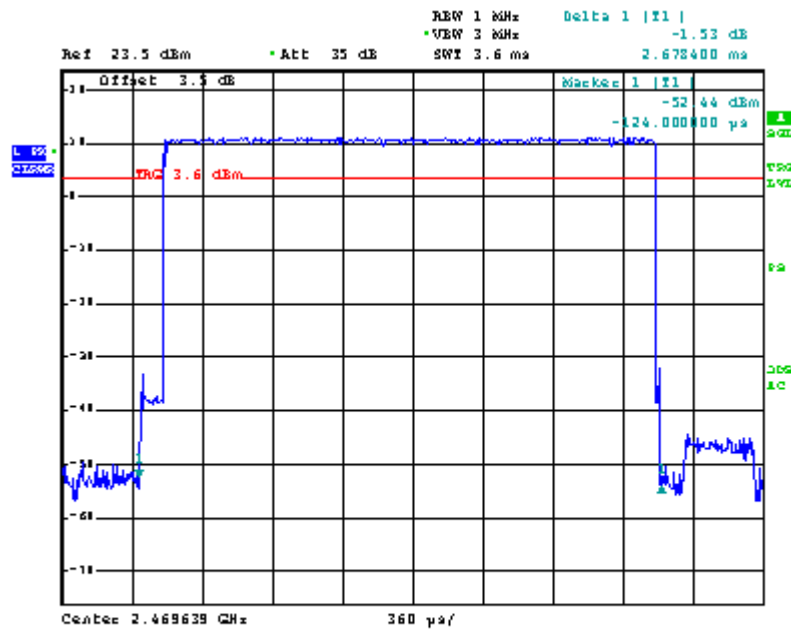
Please refer to following tables and plots

Middle Channel



Date: 23.MAR.2012 13:09:32

High Channel



Date: 23.MAR.2012 11:00:03

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 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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ 26	609358	2011-07-08	2012-07-07

* **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 Data

Environmental Conditions

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

* *The testing was performed by Ken Zhang on 2012-03-24.*

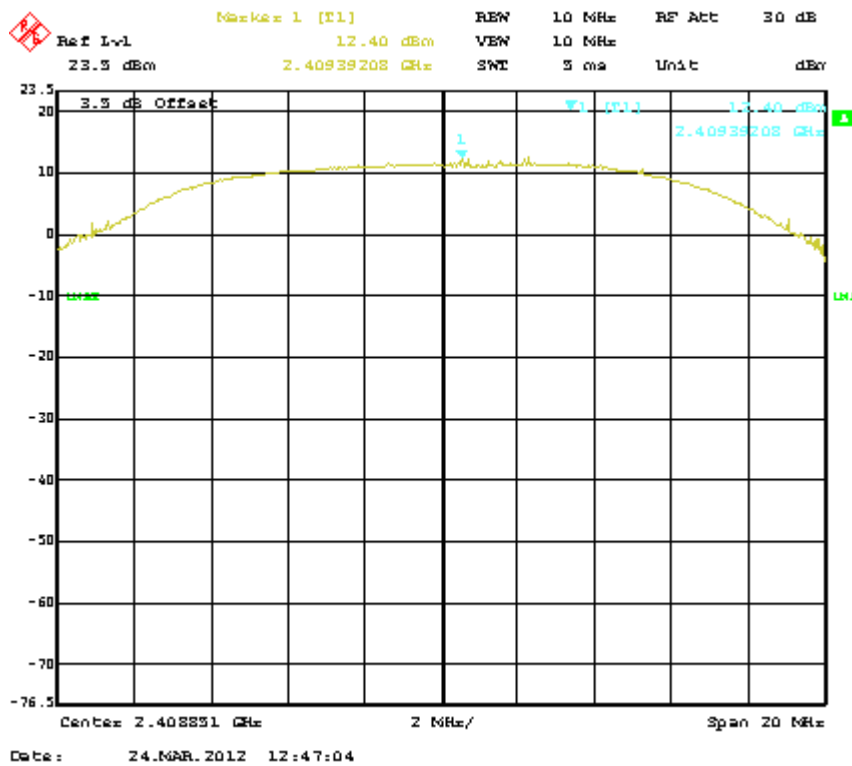
Test Result: Compliance.

Test Mode: Transmitting

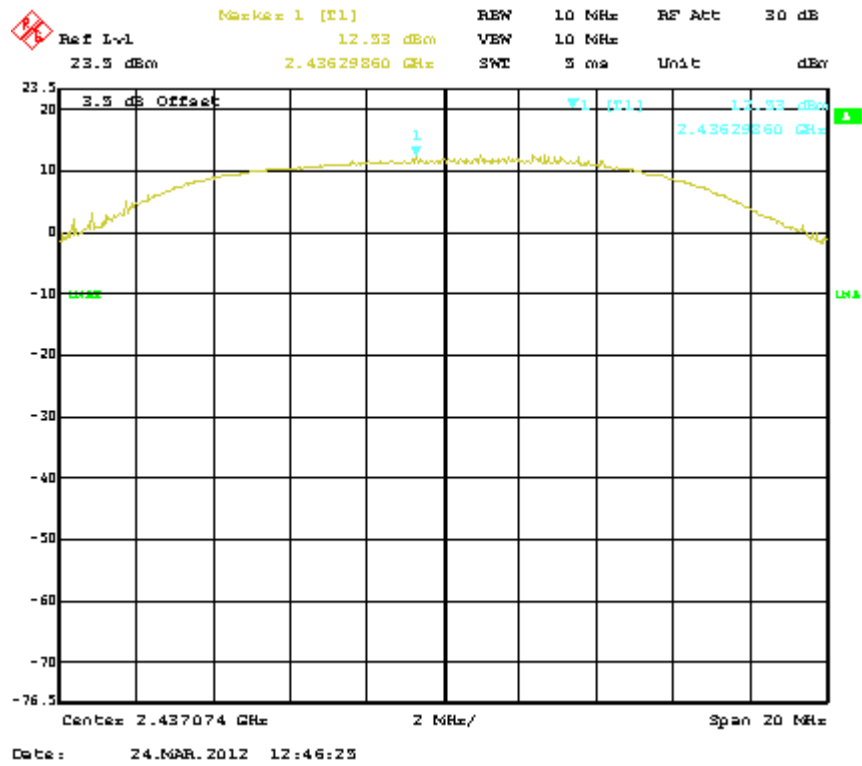
Channel	Channel frequency (MHz)	Peak output power (dBm)	Power output (mW)	Limit (mW)
Low channel	2408.851	12.40	17.38	125
Middle channel	2437.074	12.53	17.91	125
High channel	2469.639	12.53	17.91	125

Note: The data above was tested in conducted mode.

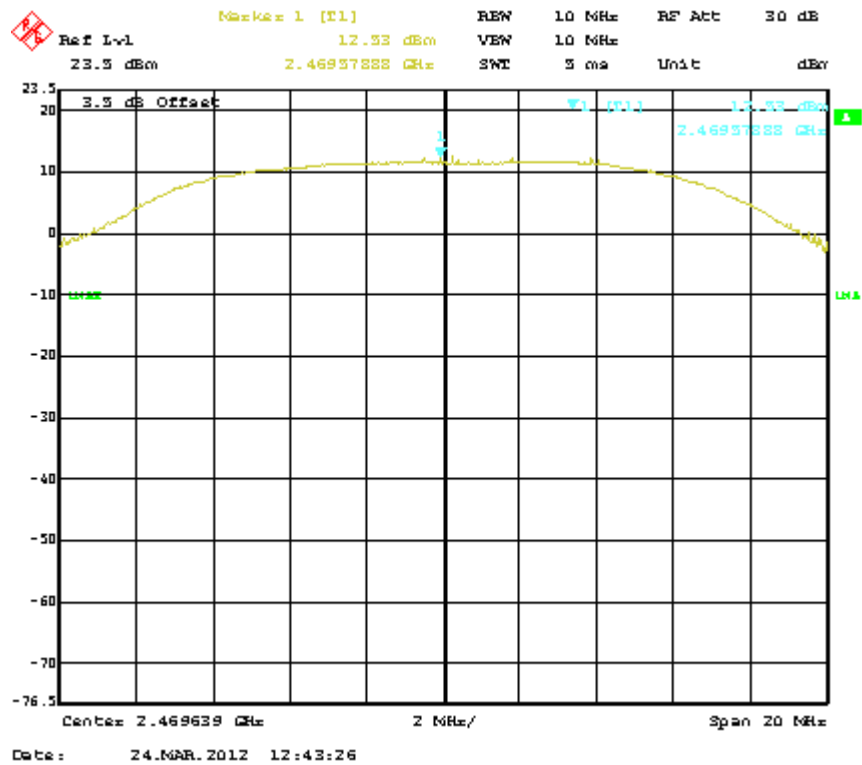
Low Channel



Middle Channel



High Channel



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. 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 RBW of spectrum analyzer to 100 kHz and VBW of spectrum analyzer to 300 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	EMI Test Receiver	ESCI	100035	2011-11-11	2012-11-10

* **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 Data

Environmental Conditions

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

*The testing was performed by Ken Zhang on 2012-03-23.

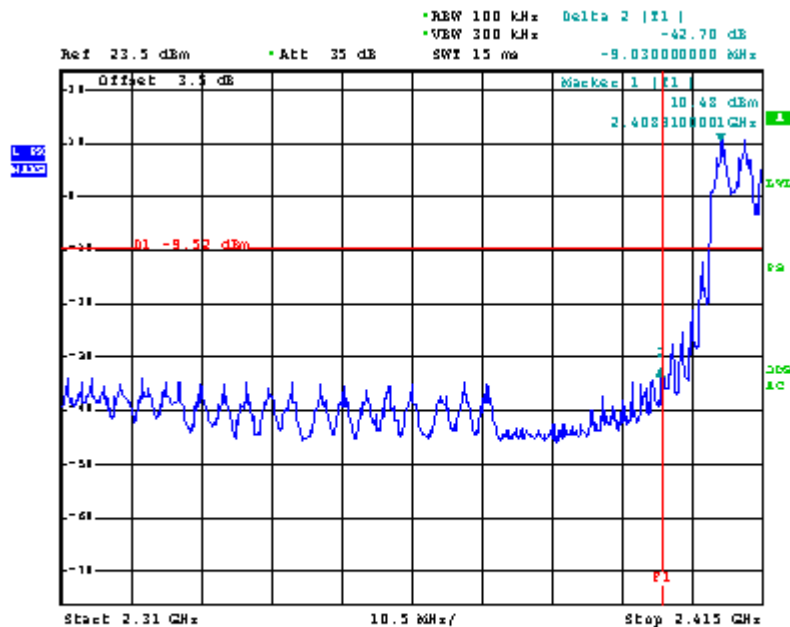
Test Result: Compliance.

Test Mode: Transmitting

Frequency (MHz)	Delta Peak to Band Emission (dBc)	≥Limit (dBc)
2399.88	42.70	20
2486.26	45.41	20

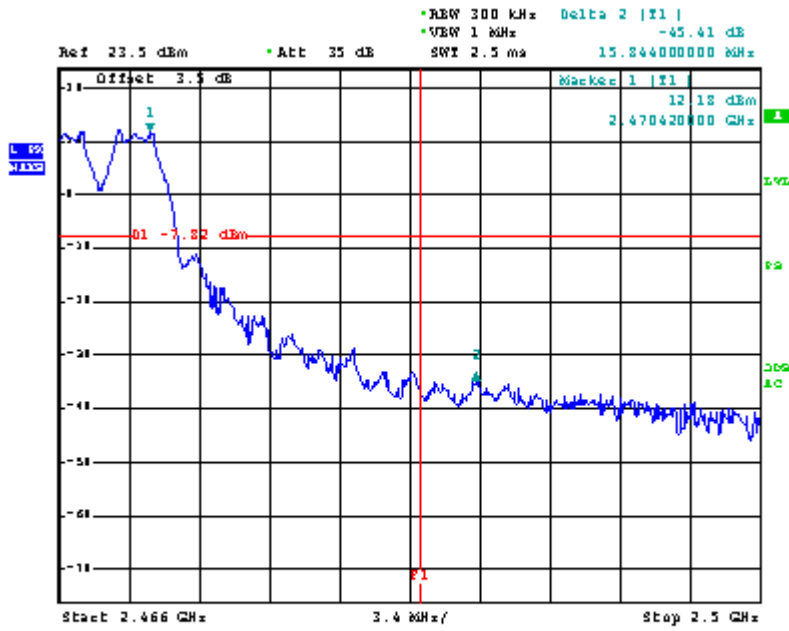
Please refer to follow plots:

Band Edge: Left Side



Date: 23.MAR.2012 11:25:25

Band Edge: Right Side



Date: 23.MAR.2012 12:56:22

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