

FCC PART 15.247

TEST REPORT

For

SVAT Electronics

4080 Montrose Rd., Niagara Falls, Ontario, L2H 1J9, Canada

FCC ID: SMH-32111P

Report Type: Original Report	Product Type: Digital FHSS Device (Parent Unit)
Test Engineer: Simon Wang	<i>Simon Wang</i>
Report Number: RSZ130521004-00B	
Report Date: 2013-09-27	
Reviewed By: Sula Huang RF Engineer	<i>Sula Huang</i>
Prepared By:	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.

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.....	5
SYSTEM TEST CONFIGURATION	6
DESCRIPTION OF TEST CONFIGURATION.....	6
EUT EXERCISE SOFTWARE.....	6
EQUIPMENT MODIFICATIONS.....	6
EXTERNAL I/O CABLE.....	6
BLOCK DIAGRAM OF TEST SETUP.....	6
SUMMARY OF TEST RESULTS	7
§15.247 (i), §1.1307 (b) (1), §2.1093 – RF EXPOSURE	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	16
APPLICABLE STANDARD.....	16
MEASUREMENT UNCERTAINTY.....	16
EUT SETUP.....	16
EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP.....	17
TEST PROCEDURE.....	17
TEST EQUIPMENT LIST AND DETAILS.....	17
CORRECTED AMPLITUDE & MARGIN CALCULATION.....	18
TEST RESULTS SUMMARY.....	18
TEST DATA.....	18
FCC §15.247(a) (1)-CHANNEL SEPARATION	23
APPLICABLE STANDARD.....	23
TEST PROCEDURE.....	23
TEST EQUIPMENT LIST AND DETAILS.....	23
TEST DATA.....	23
FCC §15.247(a) (1) – 20 dB EMISSION BANDWIDTH	26
APPLICABLE STANDARD.....	26

TEST PROCEDURE26
 TEST EQUIPMENT LIST AND DETAILS.....26
 TEST DATA26

FCC §15.247(a) (1) (iii)-QUANTITY OF HOPPING CHANNEL29
 APPLICABLE STANDARD29
 TEST PROCEDURE29
 TEST EQUIPMENT LIST AND DETAILS.....29
 TEST DATA29

FCC §15.247(a) (1) (iii) -TIME OF OCCUPANCY (DWELL TIME).....31
 APPLICABLE STANDARD31
 TEST PROCEDURE31
 TEST EQUIPMENT LIST AND DETAILS.....31
 TEST DATA31

FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT34
 APPLICABLE STANDARD34
 TEST PROCEDURE34
 TEST EQUIPMENT LIST AND DETAILS.....34
 TEST DATA34

FCC §15.247(d) - BAND EDGES37
 APPLICABLE STANDARD37
 TEST PROCEDURE37
 TEST EQUIPMENT LIST AND DETAILS.....37
 TEST DATA38

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *SVAT Electronics*'s product, model number: 32111 (FCC ID: SMH-32111P) (the "EUT") in this report was a parent unit of Digital FHSS Device, named as 2.4GHz Digital Video Baby Monitor by the applicant, which was measured approximately: 6.6 cm (L) x 2.8 cm (W) x 14.5 cm (H), rated input voltage: DC 3.7V rechargeable Li-ion battery or DC 6V charging from Charger.

Charger Adapter 1 Information: AC Adapter
Model: 5E-AD060080-U
Input: 100-240V~50/60 Hz 0.15A
Output: DC 6V 0.8A

Charger Adapter 2 Information: SWITCHING MODE POWER SUPPLY
Model: GPE053A-060080-1
Input: 100-240V~50/60 Hz 0.2A
Output: DC 6.0V 800mA, 4.8W

**All measurement and test data in this report was gathered from production sample serial number: 1305108 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2013-05-21.*

Objective

This report is prepared on behalf of *SVAT Electronics* 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 baby unit of a system with FCC ID: SMH-32111B.

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.

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

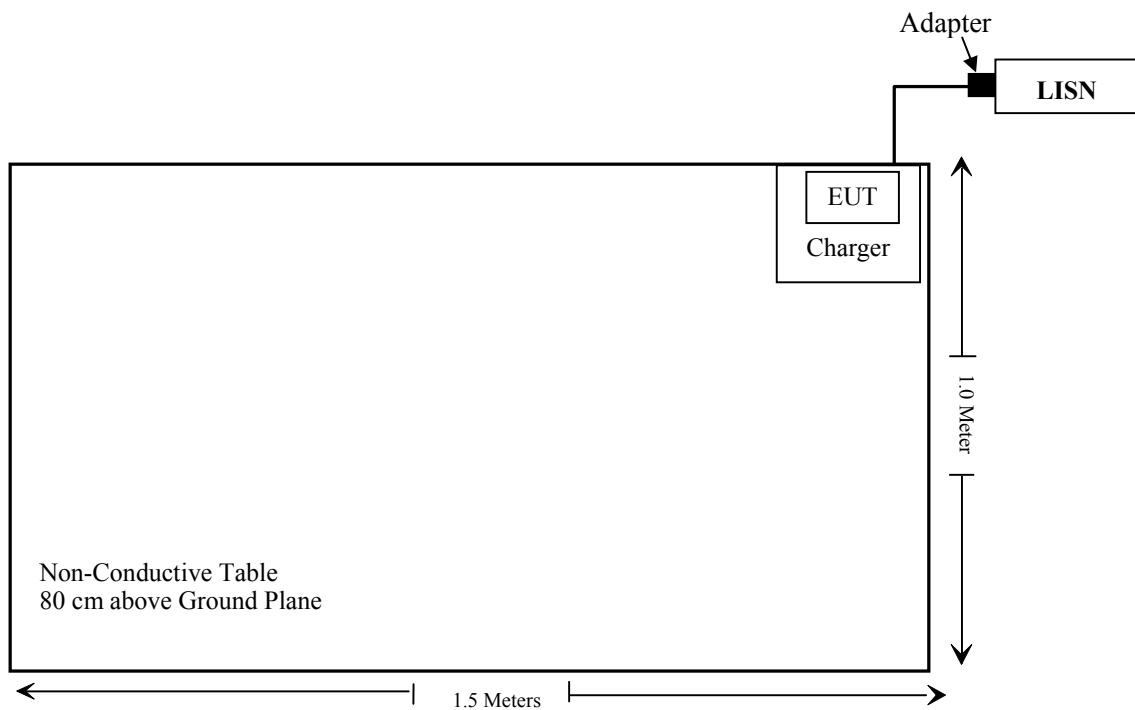
No modification was made to the EUT tested.

External I/O Cable

Cable Description	Length (m)	From/Port	To
Un-shielding DC Power Cable	1.78	Charger	Adapter

Block Diagram of Test Setup

For Conducted Emission



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307 (b)(1), §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 Emission Bandwidth	Compliance
§15.247(a)(1)	Channel Separation	Compliance
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance
§15.247(a)(1)(iii)	Quantity of hopping channel	Compliance
§15.247(b)(1)	Peak Output Power Measurement	Compliance
§15.247(d)	Band Edges	Compliance

§15.247 (i), §1.1307 (b) (1), §2.1093 – RF EXPOSURE

Standard Applicable

According to FCC §15.247 (i) & §2.1093

Result: Compliant

Please refer to the SAR report, report No.: RSZ130522004-20A.

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 one integrated antenna arrangement, which was permanently attached and the gain was 2.0 dBi, fulfill the requirement of this section. Please refer to the internal photos.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207

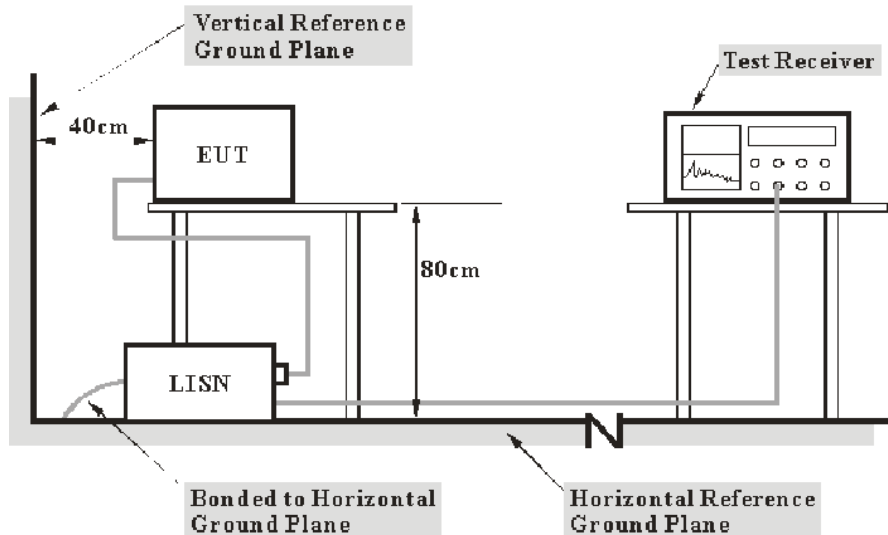
Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements may be receiver reading, attenuation of the connection between AMN/ISN and receiver, AMN/ISN voltage division factor, AMN/ISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report

Port	Measurement uncertainty
AC Mains	3.26 dB (k=2, 95% level of confidence)
CAT 3	3.70 dB (k=2, 95% level of confidence)
CAT 5	3.86 dB (k=2, 95% level of confidence)
CAT 6	4.64 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:

Frequency Range	IF B/W
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	ESCI	101122	2013-05-09	2014-05-09
Rohde & Schwarz	1st LISN	ESH2-Z5	892107/021	2012-08-22	2013-08-22
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2013-06-17	2014-06-17
Rohde & Schwarz	1st LISN	ENV216	3560.6650.12-101613-Yb	2013-05-07	2014-05-07
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2012-08-09	2013-08-09
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2013-10-15	2014-10-15
BACL	CE Test software	BACL-CE	V1.0	-	-

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

Test Results Summary

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

10.4 dB at 0.353382 MHz in the **Line** conducted mode (Charger Adapter 1)

Test Data

Environmental Conditions

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

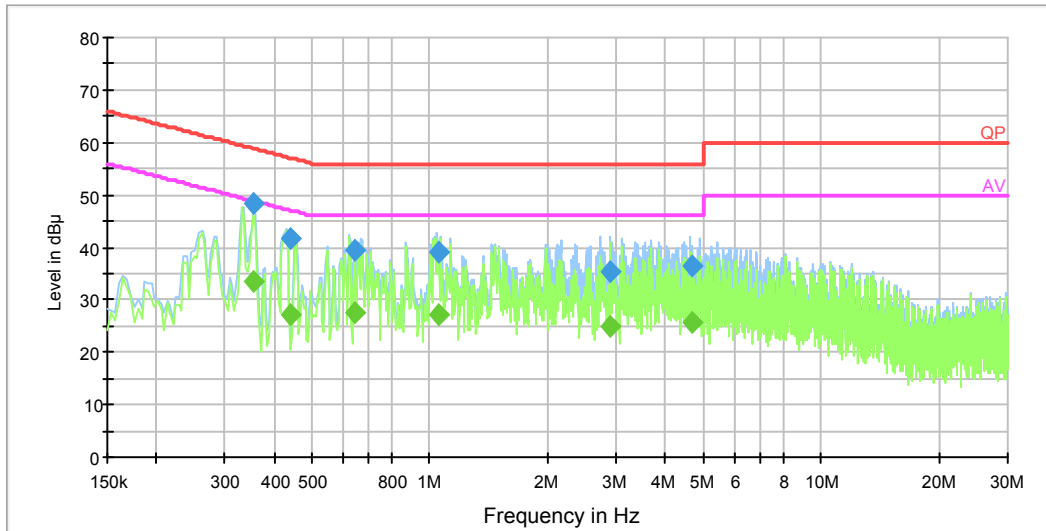
The testing was performed by Simon Wang on 2013-05-28 and 2013-09-27.

Test Mode: Charging & Transmitting

Charger Adapter1:

AC 120 V, 60 Hz, Line:

EMI Auto Test L



Quasi-peak detection mode

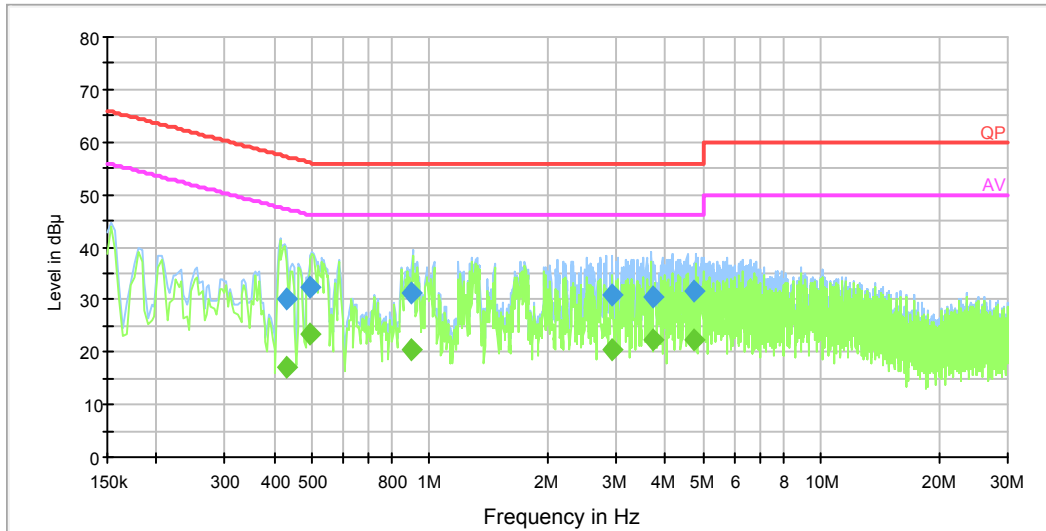
Frequency (MHz)	Corrected Amplitude (dBµV)	Corrected Factor (dB)	Limit (dBµV)	Margin (dB)	Remark (PK/QP/Ave)
0.353382	48.4	0.4	58.9	10.4	QP
0.442843	41.7	0.4	57.0	15.3	QP
0.644620	39.6	0.4	56.0	16.4	QP
1.049994	39.2	0.4	56.0	16.8	QP
4.659098	36.3	0.4	56.0	19.7	QP
2.880373	35.3	0.4	56.0	20.7	QP

Average detection mode

Frequency (MHz)	Corrected Amplitude (dBµV)	Corrected Factor (dB)	Limit (dBµV)	Margin (dB)	Remark (PK/QP/Ave)
0.353382	33.4	0.4	48.9	15.5	Ave.
0.644620	27.5	0.4	46.0	18.5	Ave.
1.049994	27.2	0.4	46.0	18.8	Ave.
0.442843	27.0	0.4	47.0	20.0	Ave.
4.659098	25.8	0.4	46.0	20.2	Ave.
2.880373	24.9	0.4	46.0	21.1	Ave.

AC 120V, 60 Hz, Neutral:

EMI Auto Test N



Quasi-peak detection mode

Frequency (MHz)	Corrected Amplitude (dBµV)	Corrected Factor (dB)	Limit (dBµV)	Margin (dB)	Remark (PK/QP/Ave)
0.492081	32.3	0.4	56.1	23.8	QP
4.755428	31.6	0.4	56.0	24.4	QP
0.893899	31.1	0.4	56.0	24.9	QP
2.927473	30.7	0.4	56.0	25.3	QP
3.706339	30.4	0.4	56.0	25.6	QP
0.429460	30.3	0.3	57.3	27.0	QP

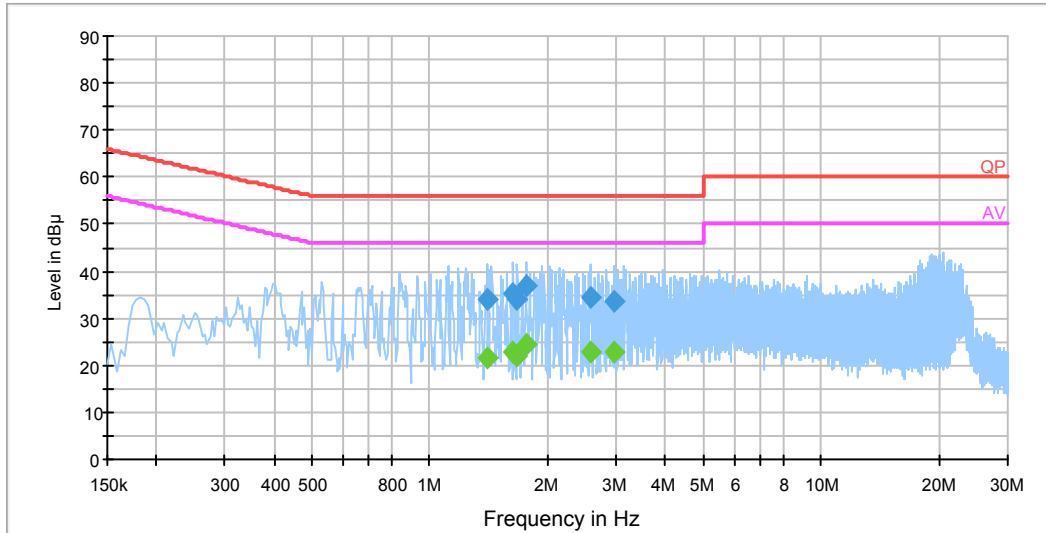
Average detection mode

Frequency (MHz)	Corrected Amplitude (dBµV)	Corrected Factor (dB)	Limit (dBµV)	Margin (dB)	Remark (PK/QP/Ave)
0.492081	23.6	0.4	46.1	22.6	Ave.
3.706339	22.3	0.4	46.0	23.7	Ave.
4.755428	22.2	0.4	46.0	23.8	Ave.
2.927473	20.5	0.4	46.0	25.5	Ave.
0.893899	20.4	0.4	46.0	25.6	Ave.
0.429460	17.2	0.3	47.3	30.0	Ave.

Charger Adapter 2:

AC 120 V, 60 Hz, Line:

EMI Auto Test L



Quasi-peak detection mode

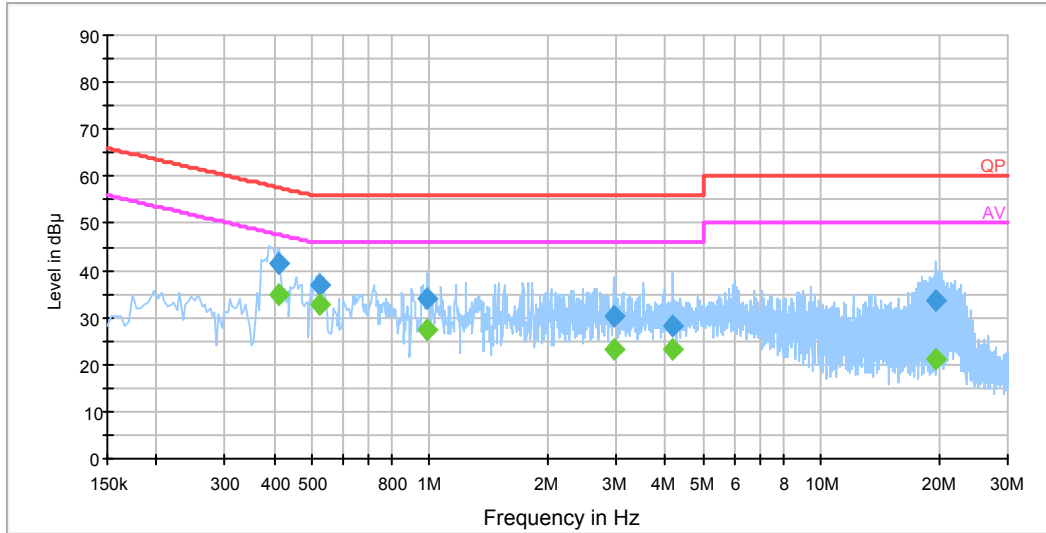
Frequency (MHz)	Corrected Amplitude (dBµV)	Corrected Factor (dB)	Limit (dBµV)	Margin (dB)	Remark (PK/QP/Ave)
1.406000	34.1	19.5	56.0	21.9	QP
1.638000	35.4	19.5	56.0	20.6	QP
1.674000	33.8	19.5	56.0	22.2	QP
1.770000	36.9	19.5	56.0	19.1	QP
2.566000	34.5	19.5	56.0	21.5	QP
2.954000	33.6	19.5	56.0	22.4	QP

Average detection mode

Frequency (MHz)	Corrected Amplitude (dBµV)	Corrected Factor (dB)	Limit (dBµV)	Margin (dB)	Remark (PK/QP/Ave)
1.406000	21.5	19.5	46.0	24.5	Ave.
1.638000	22.7	19.5	46.0	23.3	Ave.
1.674000	22.1	19.5	46.0	23.9	Ave.
1.770000	24.5	19.5	46.0	21.5	Ave.
2.566000	22.7	19.5	46.0	23.3	Ave.
2.954000	22.6	19.5	46.0	23.4	Ave.

AC 120V, 60 Hz, Neutral:

EMI Auto Test N



Quasi-peak detection mode

Frequency (MHz)	Corrected Amplitude (dBµV)	Corrected Factor (dB)	Limit (dBµV)	Margin (dB)	Remark (PK/QP/Ave)
0.410000	41.6	19.5	57.6	16.0	QP
0.526000	37.0	19.5	56.0	19.0	QP
0.986000	34.1	19.5	56.0	21.9	QP
2.942000	30.1	19.6	56.0	25.9	QP
4.190000	28.3	19.7	56.0	27.7	QP
19.602000	33.5	20.1	60.0	26.5	QP

Average detection mode

Frequency (MHz)	Corrected Amplitude (dBµV)	Corrected Factor (dB)	Limit (dBµV)	Margin (dB)	Remark (PK/QP/Ave)
0.410000	34.9	19.5	47.6	12.7	Ave.
0.526000	33.0	19.5	46.0	13.0	Ave.
0.986000	27.5	19.5	46.0	18.5	Ave.
2.942000	23.1	19.6	46.0	22.9	Ave.
4.190000	23.1	19.7	46.0	22.9	Ave.
19.602000	21.1	20.1	50.0	28.9	Ave.

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

Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

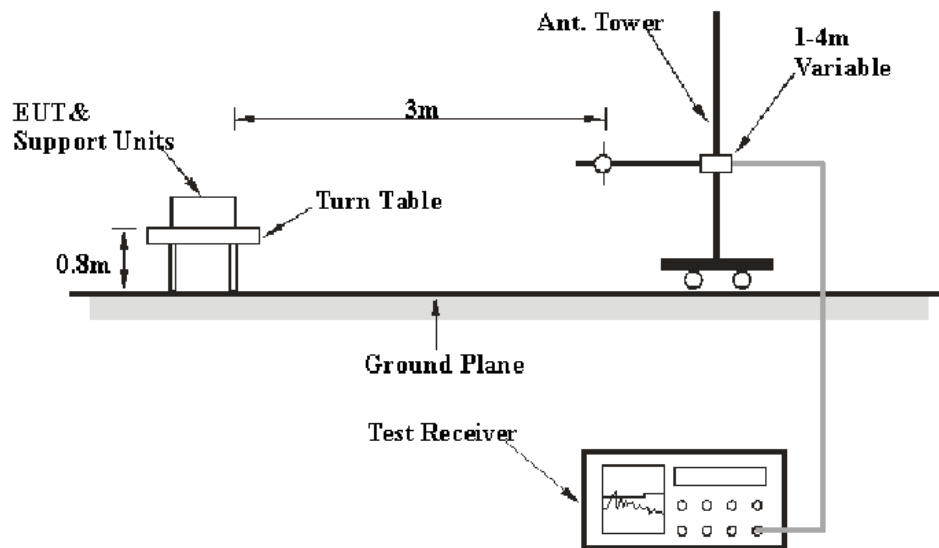
Measurement Uncertainty

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 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown in below table. And the uncertainty will not be taken into consideration for the test data recorded in the report

Frequency	Polarity	Measurement uncertainty
30MHz~200MHz	Horizontal	4.62 dB (k=2, 95% level of confidence)
	Vertical	4.54 dB (k=2, 95% level of confidence)
200MHz~1GHz	Horizontal	4.84 dB (k=2, 95% level of confidence)
	Vertical	5.91 dB (k=2, 95% level of confidence)
1 GHz~6 GHz	/	4.68 dB (k=2, 95% level of confidence)
Above 6 GHz	/	4.92 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:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	100 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 was connected to the outlet of the LISN.

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	8447E	1937A01046	2012-11-24	2013-11-23
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2013-05-09	2014-05-09
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2014-11-27
SUPER ULTRA	Amplifier	ZVA-213+	N/A	2012-11-24	2013-11-23
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2014-11-30
BIZI	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2010-10-14	2013-10-13

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

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:

4.04 dB at 7232.63 MHz in the Vertical polarization

Test Data

Environmental Conditions

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

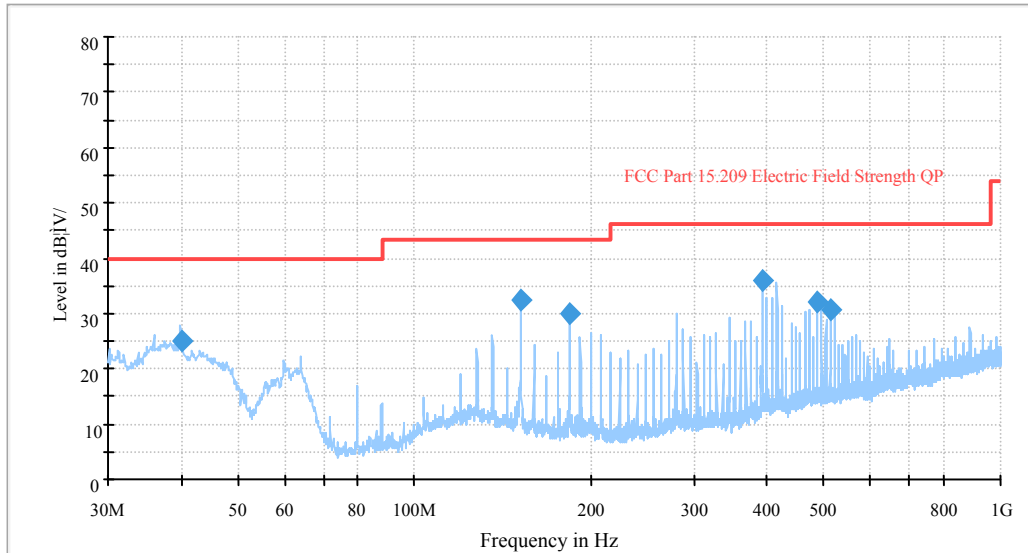
The testing was performed by Simon Wang on 2013-05-28 and 2013-09-27.

Test mode: Transmitting

30 MHz-1GHz:

Charger Adapter 1:

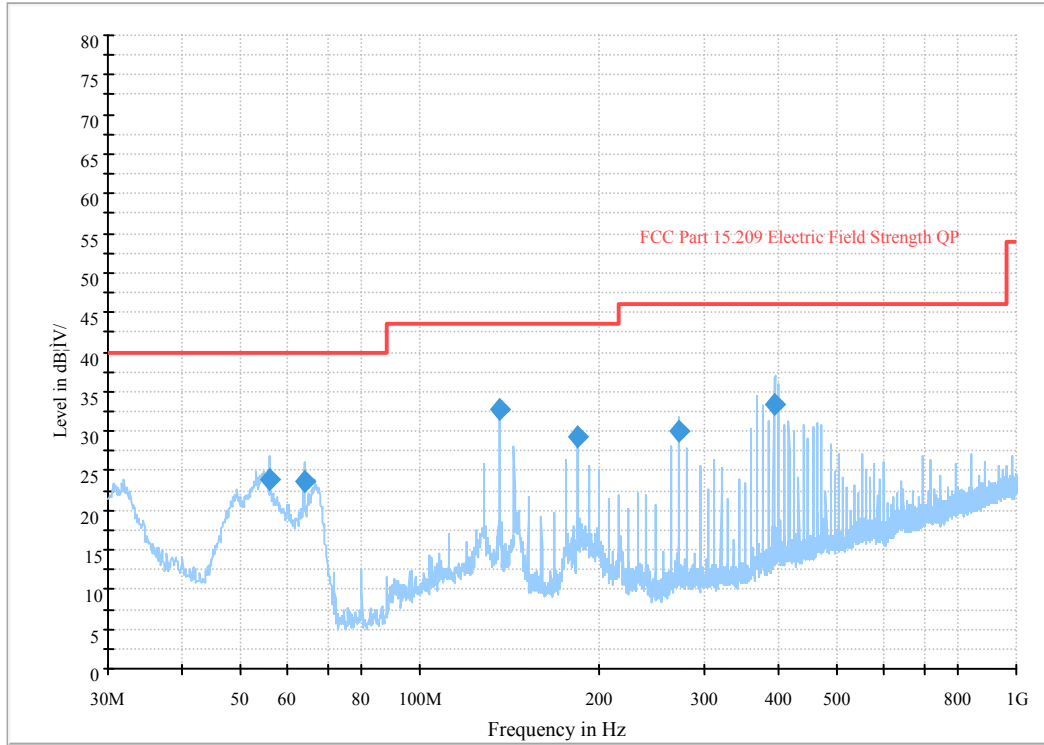
Auto Test (FCC part 15.209)



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
39.990950	25.1	123	V	0	-14.3	40.0	14.9
152.006000	32.3	328	H	165	-15.0	43.5	11.2
184.007300	30.1	100	V	210	-16.3	43.5	13.4
392.040950	35.9	100	H	5	-12.2	46.0	10.1
488.011850	31.9	123	V	0	-10.1	46.0	14.1
512.009600	30.7	121	V	2	-10.1	46.0	15.3

Charger Adapter 2:

Auto Test (FCC part 15.209)



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
55.983200	24.0	100	V	0.0	-20.9	40.0	16.0
64.013600	23.6	102	V	186.0	-20.8	40.0	16.4
136.017950	32.8	104	V	91.0	-14.0	43.5	10.7
183.989600	29.3	103	V	0.0	-16.3	43.5	14.2
272.001350	30.5	159	H	55.0	-14.4	46.0	15.5
392.029550	34.0	102	H	11.0	-12.2	46.0	12.0

1GHz-25GHz:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBµV/m)	FCC Part 15.247/205/209	
	Reading (dBµV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)
Low Channel (2410.875 MHz)									
2410.875	98.64	PK	123	1.1	H	6.13	104.77	/	/
2410.875	95.94	Ave.	123	1.1	H	6.13	102.07	/	/
2410.875	101.23	PK	215	1.2	V	6.13	107.36	/	/
2410.875	100.56	Ave.	215	1.2	V	6.13	106.69	/	/
7232.63	33.34	Ave.	145	1.2	V	16.62	49.96	54	4.04
4821.75	35.29	Ave.	23	1.1	H	12.4	47.69	54	6.31
7232.63	46.08	PK	145	1.2	V	16.62	62.70	74	11.30
2491.5	32.52	Ave.	85	1.3	H	7.21	39.73	54	14.27
4821.75	46.18	PK	23	1.1	H	12.4	58.58	74	15.42
2322.2	31.69	Ave.	24	1.2	V	5.48	37.17	54	16.83
2215.3	31.76	Ave.	102	1.0	V	4.4	36.16	54	17.84
2491.5	43.71	PK	85	1.3	H	7.21	50.92	74	23.08
2215.3	42.87	PK	102	1.0	V	4.4	47.27	74	26.73
2322.2	41.58	PK	24	1.2	V	5.48	47.06	74	26.94
Middle Channel (2441.250 MHz)									
2441.25	100.6	PK	61	1.2	H	7.21	107.81	/	/
2441.25	97.77	Ave.	61	1.2	H	7.21	104.98	/	/
2441.25	103.35	PK	15	1.0	V	7.21	110.56	/	/
2441.25	100.52	Ave.	15	1.0	V	7.21	107.73	/	/
7323.75	32.43	Ave.	187	1.1	V	15.91	48.34	54	5.66
4882.5	33.17	Ave.	42	1.0	V	12.46	45.63	54	8.37
7323.75	45.86	PK	187	1.1	V	15.91	61.77	74	12.23
4882.5	48.21	PK	42	1.0	V	12.46	60.67	74	13.33
2489.1	30.54	Ave.	163	1.2	H	7.21	37.75	54	16.25
2239.6	31.72	Ave.	80	1.2	V	4.99	36.71	54	17.29
2351.7	31.01	Ave.	71	1.1	V	5.48	36.49	54	17.51
2489.1	43.76	PK	163	1.2	H	7.21	50.97	74	23.03
2351.7	43.09	PK	71	1.1	V	5.48	48.57	74	25.43
2239.6	42.98	PK	80	1.2	V	4.99	47.97	74	26.03

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dB μ V/m)	FCC Part 15.247/205/209	
	Reading (dB μ V)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dB μ V/m)	Margin (dB)
High Channel (2471.625 MHz)									
2471.625	96.83	PK	107	1.1	H	7.21	104.04	/	/
2471.625	94.37	Ave.	107	1.1	H	7.21	101.58	/	/
2471.625	99.98	PK	112	1.0	V	7.21	107.19	/	/
2471.625	97.48	Ave.	112	1.0	V	7.21	104.69	/	/
7414.875	32.66	Ave.	87	1.0	V	15.9	48.56	54	5.44
4943.25	33.37	Ave.	152	1.1	V	12.5	45.87	54	8.13
7414.875	46.95	PK	87	1.0	V	15.9	62.85	74	11.15
4943.25	45.21	PK	152	1.1	V	12.5	57.71	74	16.29
2493.6	30.45	Ave.	179	1.2	V	7.21	37.66	54	16.34
2282.4	30.76	Ave.	73	1.2	H	4.99	35.75	54	18.25
2345.8	29.84	Ave.	96	1.1	H	5.48	35.32	54	18.68
2493.6	41.78	PK	179	1.2	V	7.21	48.99	74	25.01
2345.8	43.01	PK	96	1.1	H	5.48	48.49	74	25.51
2282.4	42.35	PK	73	1.2	H	4.99	47.34	74	26.66

FCC §15.247(a) (1)-CHANNEL SEPARATION

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, RBW was set at 100 kHz, VBW \geq 3RBW 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
BIZI	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

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

Test Data

Environmental Conditions

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

* The testing was performed by Simon Wang on 2013-05-28.

Test Result: Compliance.

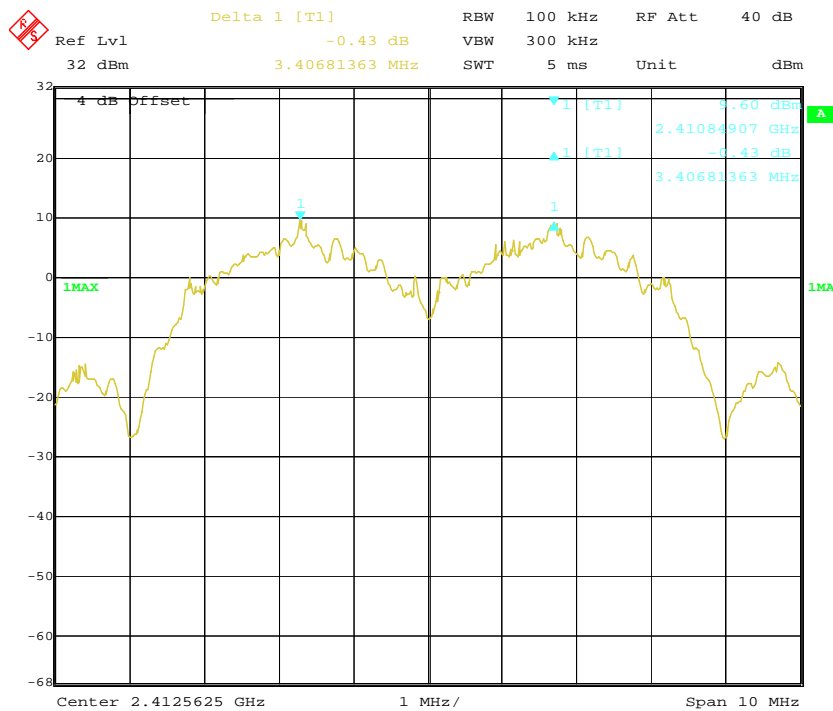
Please refer to following tables and plots

Test Mode: Transmitting

Channel	Channel Frequency (MHz)	Channel Separation (MHz)	>Limit (MHz)	Result
Low	2410.875	3.407	2.431	Pass
Adjacent	2414.250			
Middle	2441.250	3.367	2.431	
Adjacent	2437.875			
High	2471.625	3.387	2.431	
Adjacent	2468.250			

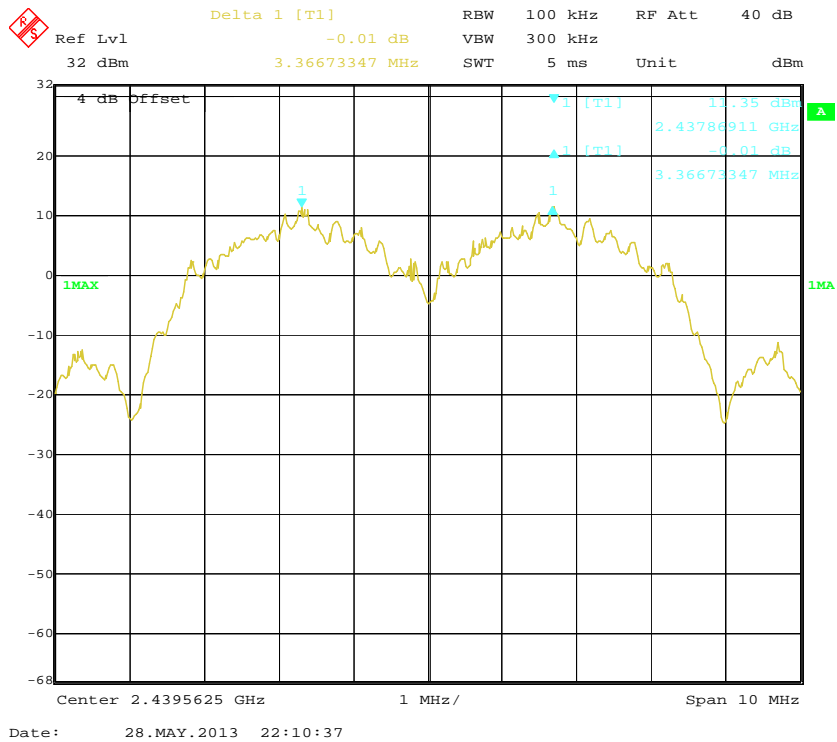
Note: limit = 2/3 of 20 dB bandwidth

Low Channel

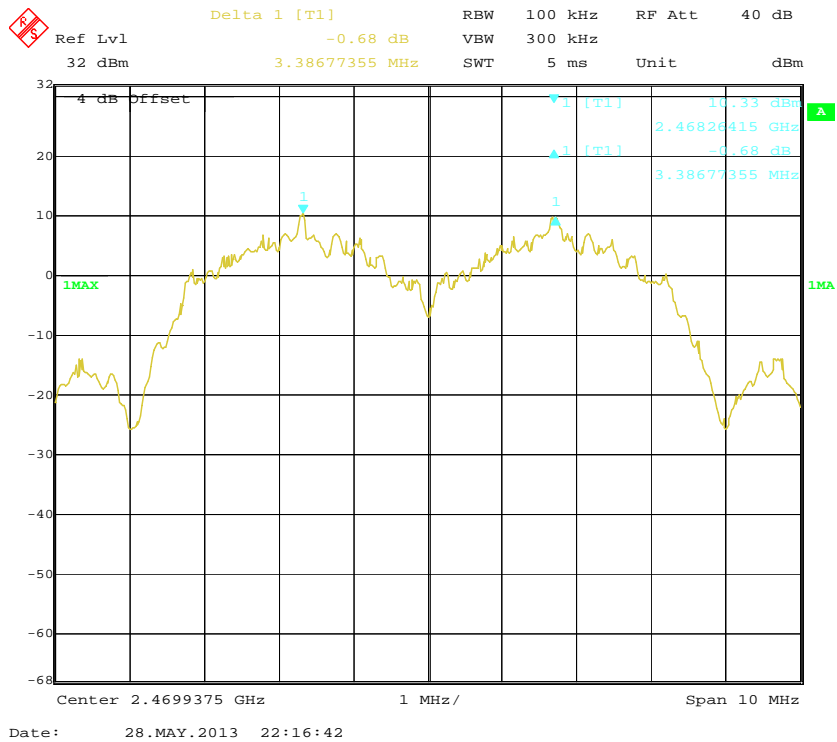


Date: 28.MAY.2013 22:05:52

Middle Channel



High Channel



FCC §15.247(a) (1) – 20 dB EMISSION BANDWIDTH

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
BIZI	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

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

Test Data

Environmental Conditions

Temperature:	24°C
Relative Humidity:	50 %
ATM Pressure:	100.0 kPa

* *The testing was performed by Simon Wang on 2013-05-28.*

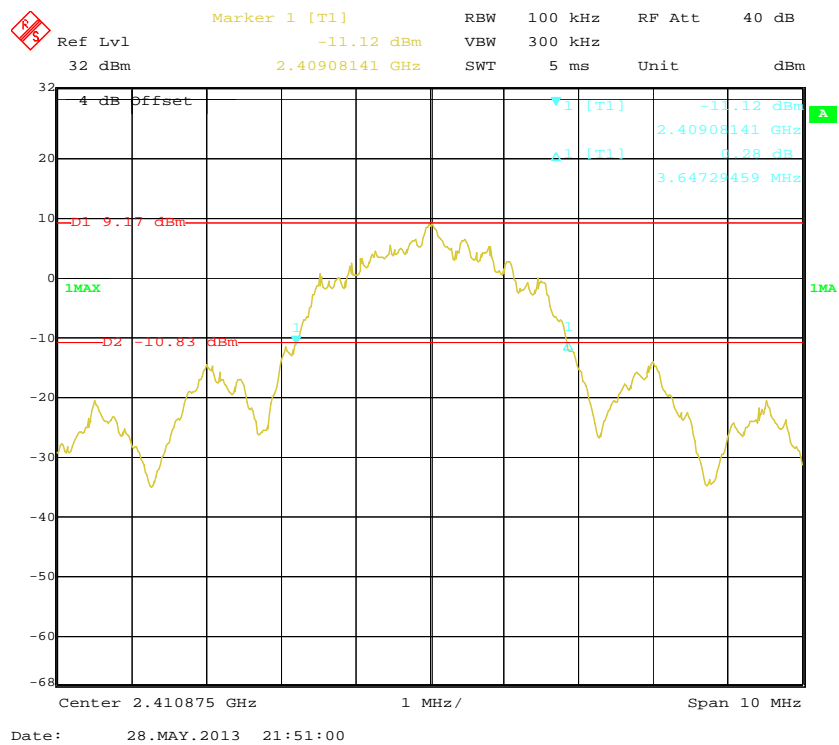
Test Result: Compliance.

Please refer to following tables and plots

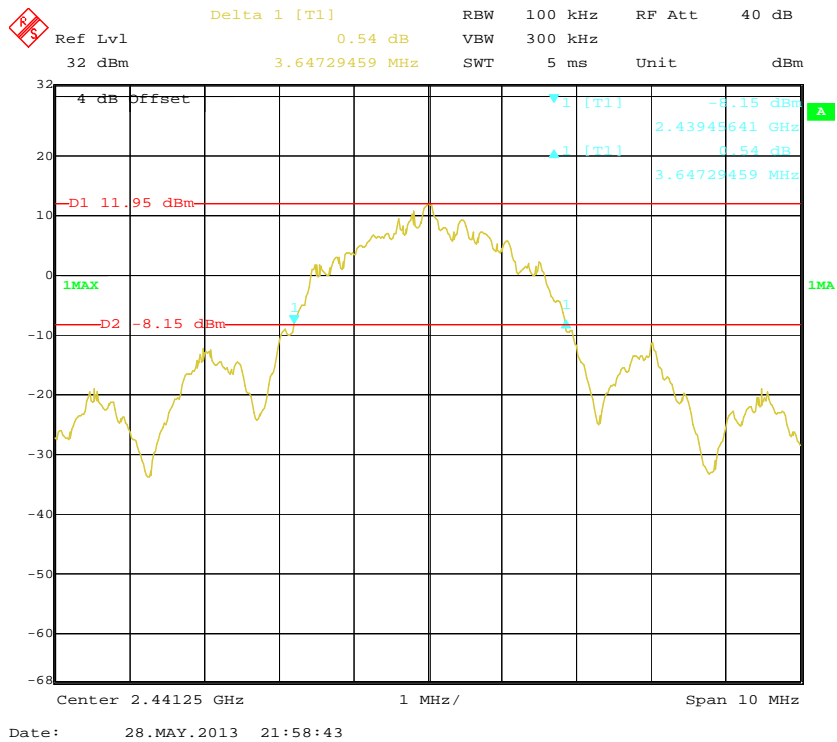
Test Mode: Transmitting

Channel	Frequency (MHz)	20 dB Emission Bandwidth (MHz)
Low	2410.875	3.647
Middle	2441.250	3.647
High	2471.625	3.647

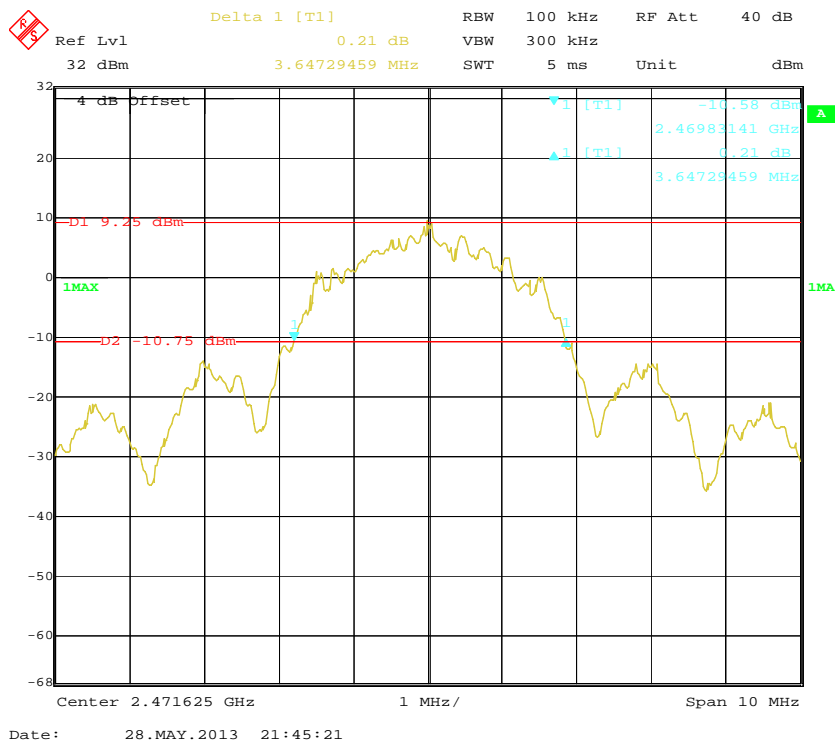
Low Channel



Middle Channel



High Channel



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

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
BIZI	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

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

Test Data

Environmental Conditions

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

The testing was performed by Simon Wang on 2013-05-28.

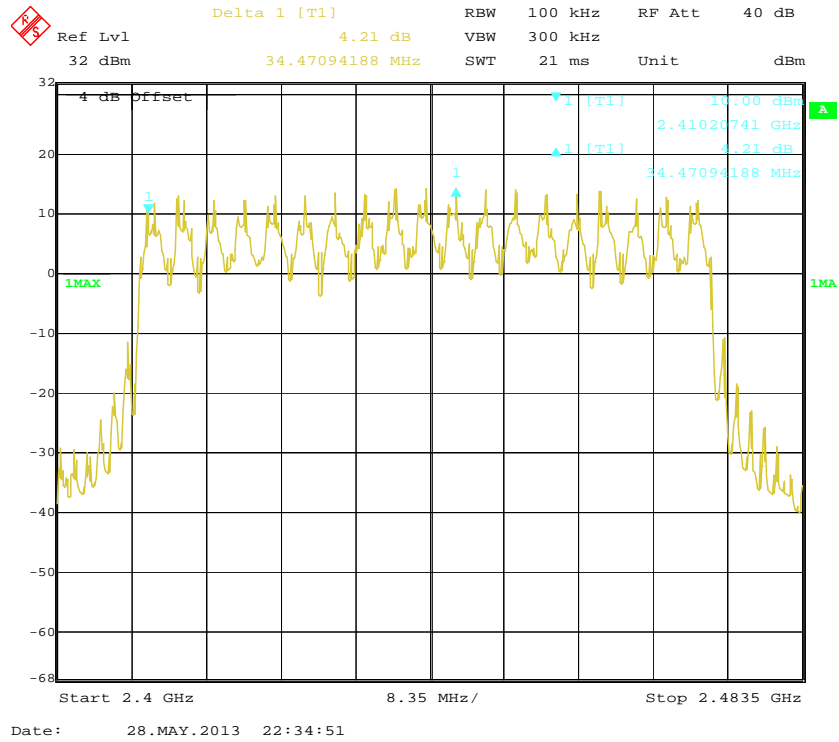
Test Result: Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.50	19	≥ 15

Number of Hopping Channels



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

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

Test Procedure

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

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
BIZI	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

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

Test Data**Environmental Conditions**

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

The testing was performed by Simon Wang on 2013-05-28.

Test Result: Compliance.

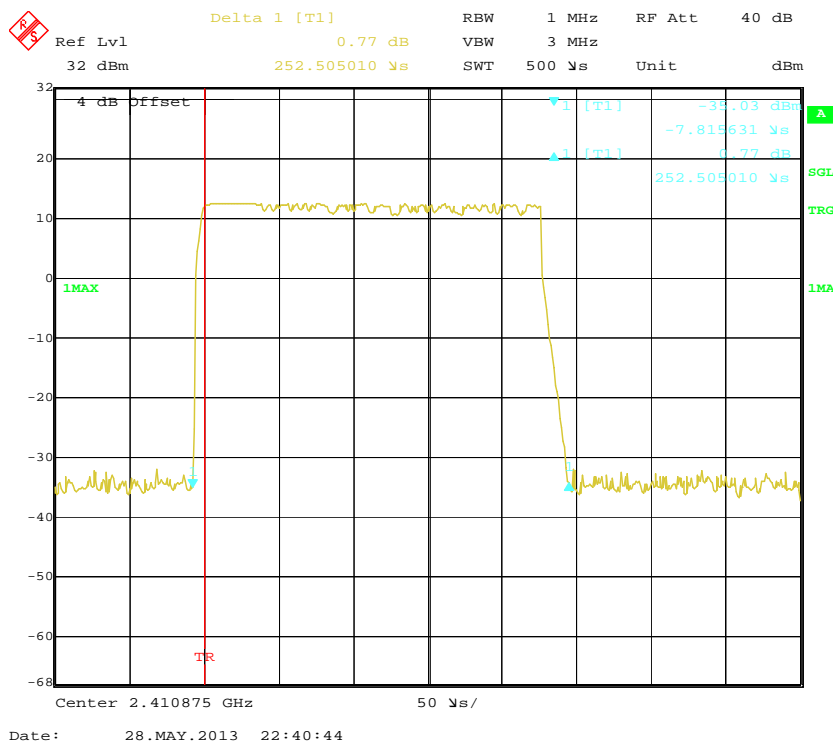
Please refer to following tables and plots

Test Mode: Transmitting

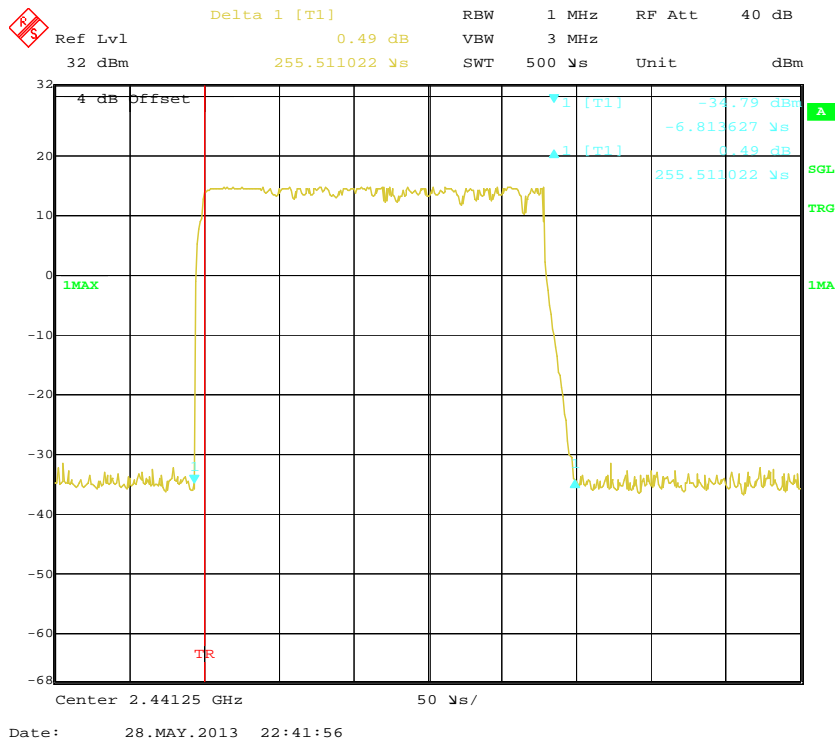
Channel	Pulse Width (ms)	Dwell Time (S)	Limit (S)	Result
Low	0.253	0.036	0.4	Pass
Middle	0.256	0.037	0.4	Pass
High	0.257	0.037	0.4	Pass

Note: Dwell time= Pulse time*(714/2/19)*19*0.4

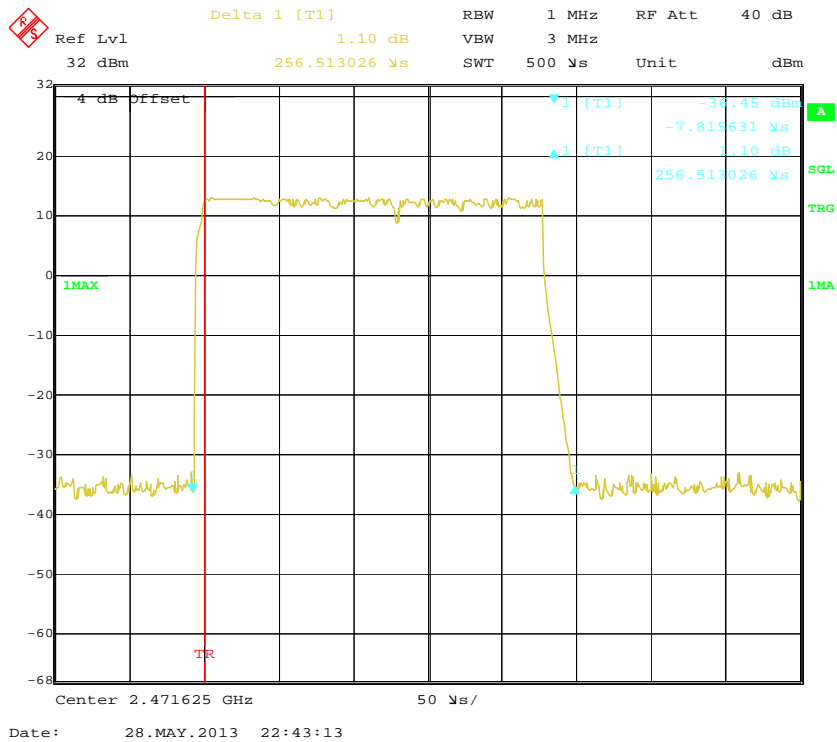
Low Channel



Middle Channel



High Channel



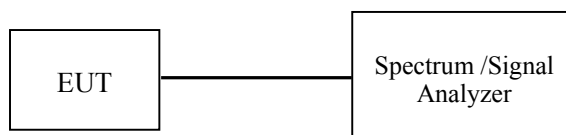
FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT

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
BIZI	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

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

Test Data

Environmental Conditions

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

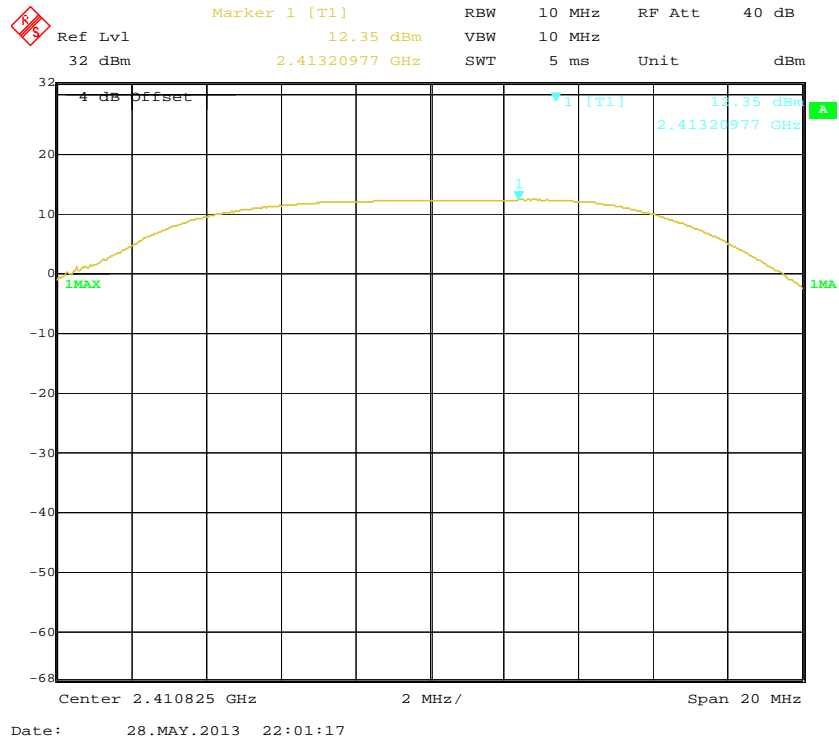
* *The testing was performed by Simon Wang on 2013-05-28.*

Test Result: Compliance.

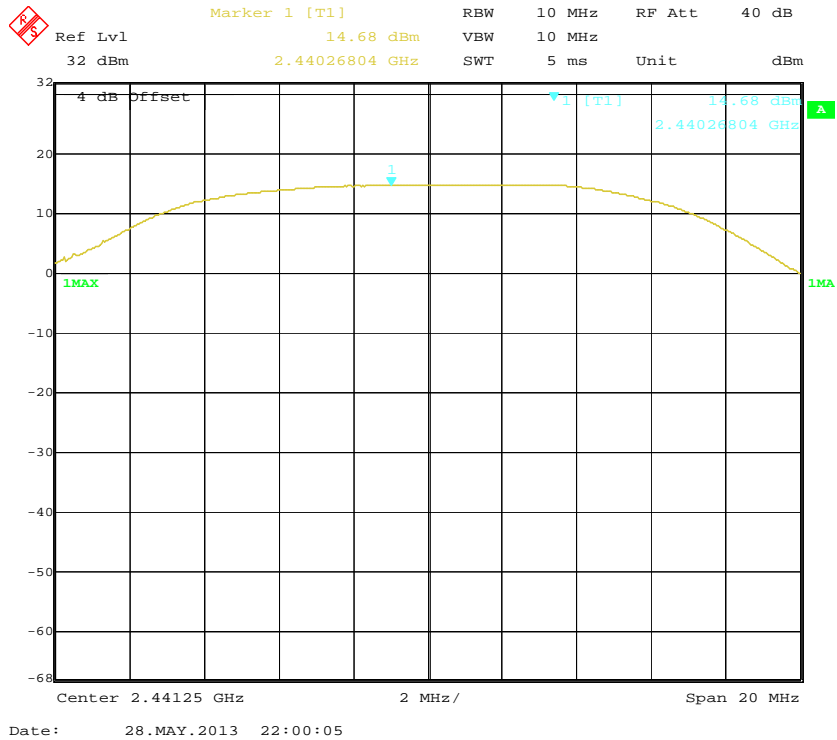
Test Mode: Transmitting

Channel	Channel frequency (MHz)	Conducted Peak output power (dBm)	Conducted Output Power (mW)	Limit (mW)
Low	2410.825	12.35	17.18	125
Middle	2441.250	14.68	29.38	125
High	2471.625	12.47	17.66	125

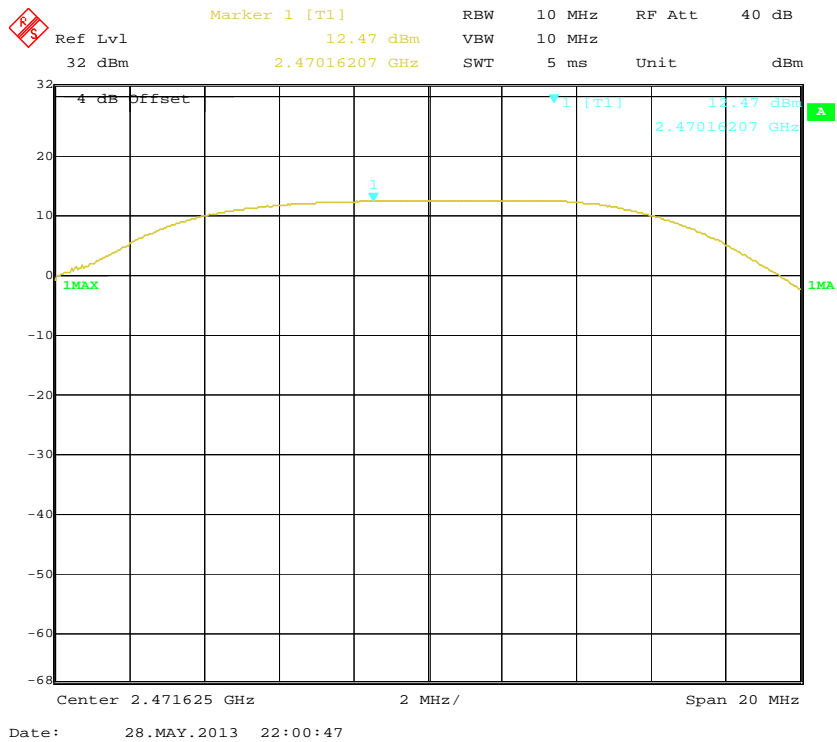
Low Channel



Middle Channel



High Channel



FCC §15.247(d) - BAND EDGES

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. 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.
4. Repeat above procedures until all measured frequencies were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
BIZI	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

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

Test Data

Environmental Conditions

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

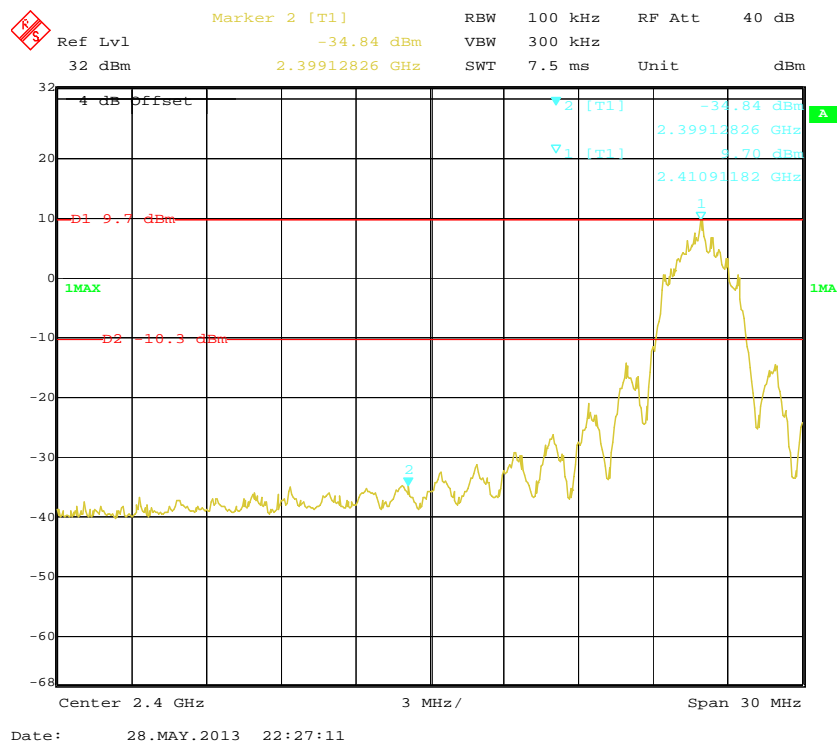
*The testing was performed by Simon Wang on 2013-05-28

Test Result: Compliance.

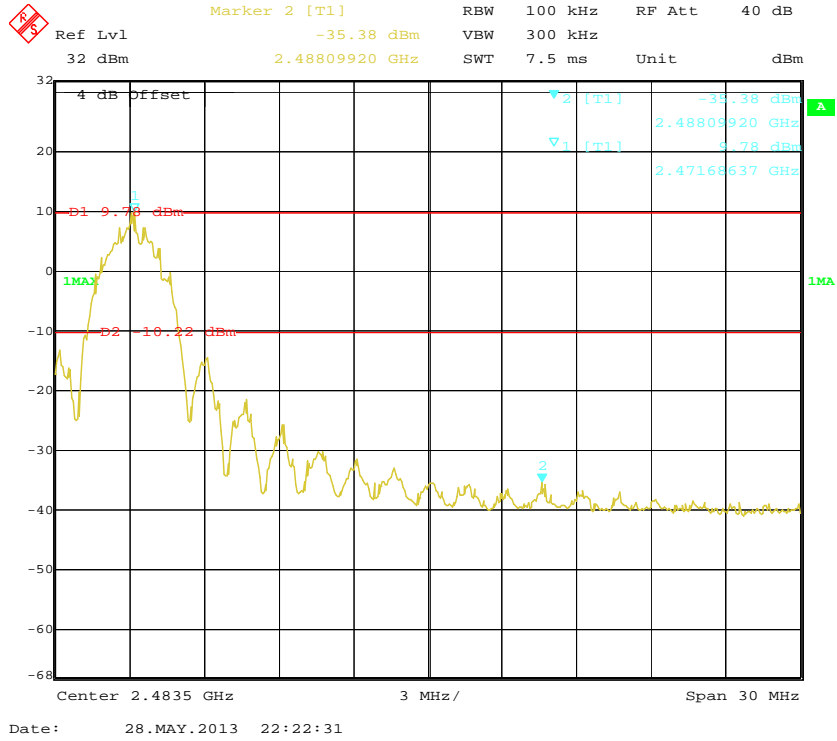
Test Mode: Transmitting

Please refer to follow plots:

Band Edge: Left Side



Band Edge: Right Side



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