



FCC PART 15.247

TEST REPORT

For

Mobi Technologies, Inc.

5913 Blackwelder St, Culver City, CA 90232, United States

FCC ID: Y4N70294R

Report Type: Original Report	Product Type: MobiCam Clear & Secure Digital Audio/Video Monitor
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Report Number: <u>RSZ111214002-00</u>	
Report Date: <u>2012-04-13</u>	
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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)

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Mobi Technologies, Inc.*'s product, model number: 70294R (FCC ID: Y4N70294R) (the "EUT") in this report is a parent unit of *MobiCam Clear & Secure Digital Audio/Video Monitor*, which was measured approximately: 10.2 cm (L) x 6.5 cm (W) x 2.4 cm (H), rated input voltage: DC 4.5 V battery or DC 6V from adapter.

Adapter 1 Information:

AC-DC Adapter

Model: CTR04-060-0400U;

Input: 100-240V~50/60Hz 150mA;

Output: 6V DC 400mA

Adapter 2 Information:

POWER SUPPLY

Model: LFS060400D-A8S;

Input: 100-240V AC 50/60Hz 0.15A (MAX);

Output: 6V DC 0.4A

** All measurement and test data in this report was gathered from production sample serial number: 1112026 (Assigned by BACL, Shenzhen). The EUT was received on 2011-12-14.*

Objective

This Type approval report is prepared on behalf of *Mobi Technologies, 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: Y4N70295T.

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.

Equipment Modifications

No modification was made to EUT.

Support Equipment List and Details

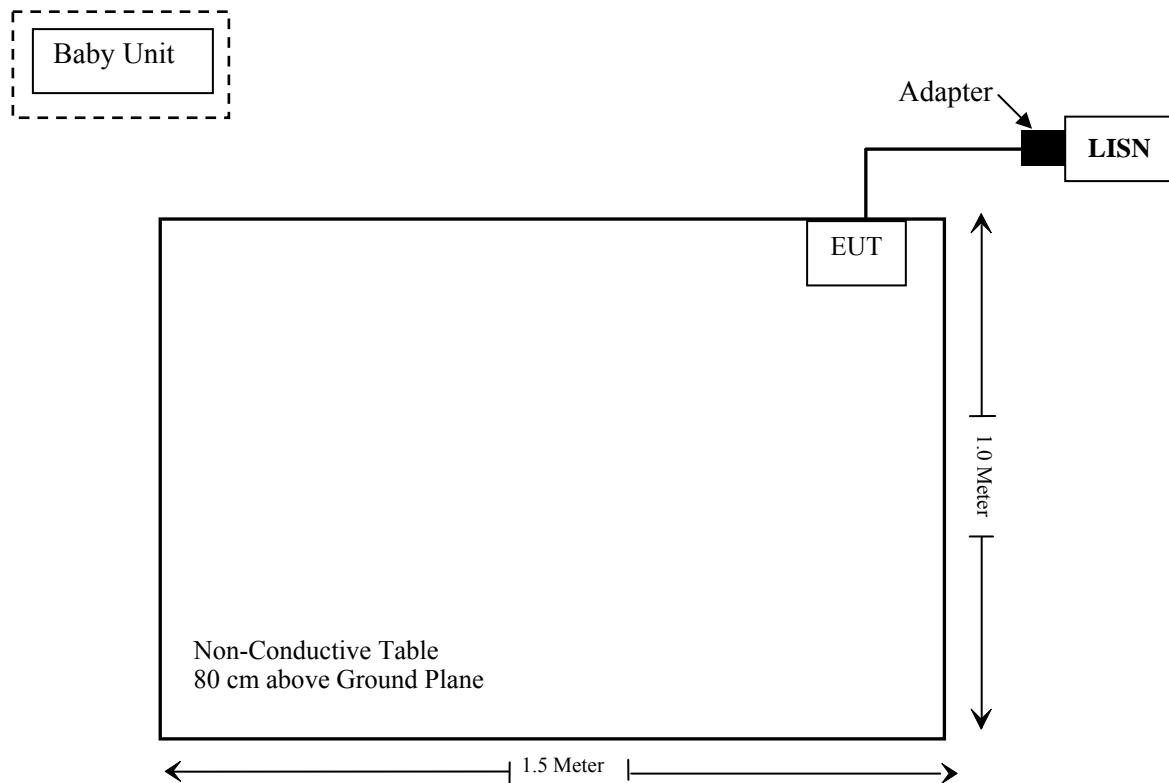
Manufacturer	Description	Model	Serial Number
Mobi	MobiCam Clear & Secure Digital Audio/Video Monitor	70295T (Baby Unit)	N/A

External I/O Cable

Cable Description	Length (m)	From/Port	To
Unshielded Detachable DC Power Cable	1.8	EUT	Adapter

Block Diagram of Test Setup

Conducted Emission:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§ 15.319 (i); §2.1093	RF Radiation Exposure (SAR)	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. 319 (i) & §2.1093 - RF EXPOSURE

Applicable Standard

According to FCC §15.319 (i) Unlicensed PCS devices are subject to the radiofrequency radiation exposure requirements specified in §1.1307(b), 2.1091 and 2.1093 of this chapter, as appropriate. All equipment shall be considered to operate in a general population/uncontrolled environment. Applications for equipment authorization of devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

According to KDB 447498 D01 Mobile Portable RF Exposure v04 1) c): Unless excluded by specific FCC test procedures, portable devices with output power $> 60/f$ (GHz) mW shall include SAR data for equipment approval.

RF Exposure Evaluation

Max Peak output power: 2437.875 MHz: 18.69 dBm = 73.96 mW

Duty Cycle=Ton/Tp=4.94 %

The source-based average power = $73.96 \text{ mW} \times 4.94\% = 3.65 \text{ mW}$

SAR exclusion threshold = $60/f = 60/2.437875 = 24.61 \text{ mW}$

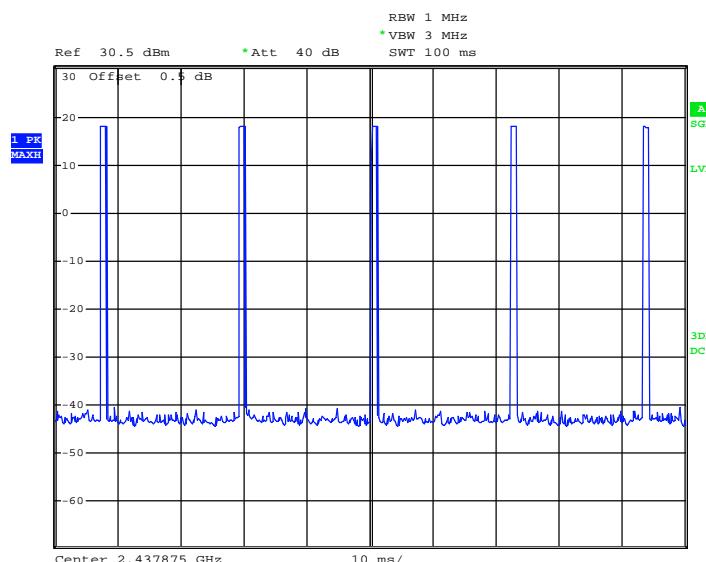
SAR evaluation is not necessary.

Note: Duty Cycle=Ton/Tp*100%

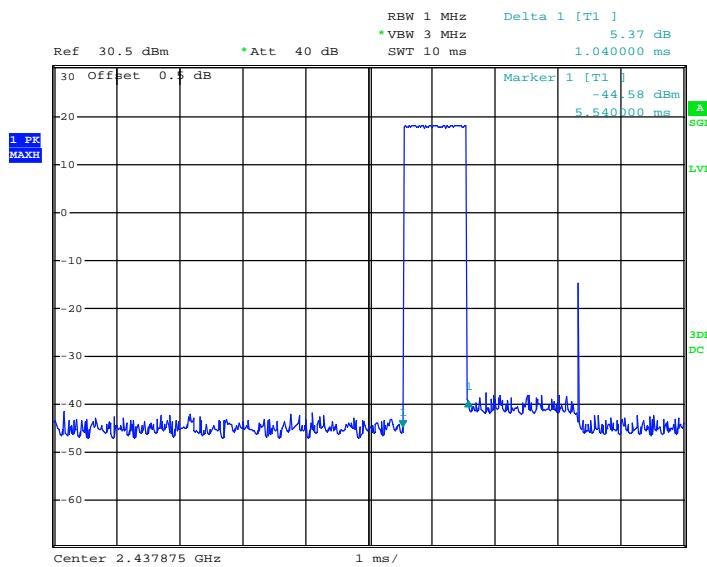
Ton=1.04ms

Tp=21.06ms

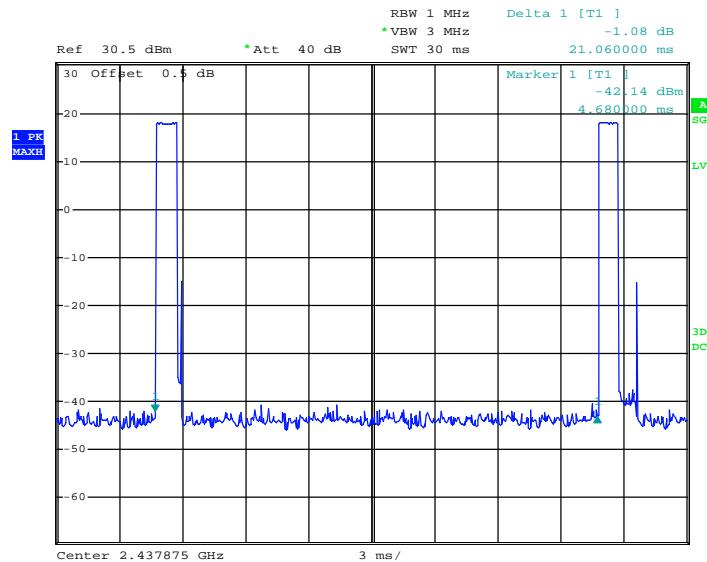
Duty Cycle= Ton/Tp = 4.94%



Date: 10.JAN.2012 22:47:02



Date: 10.JAN.2012 22:48:15



Date: 10.JAN.2012 22:47:42

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

This product has an integrated antenna arrangement and the gain is 0 dBi, which was soldered on PCB, fulfill the requirement of this section. Please refer to the internal photos.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

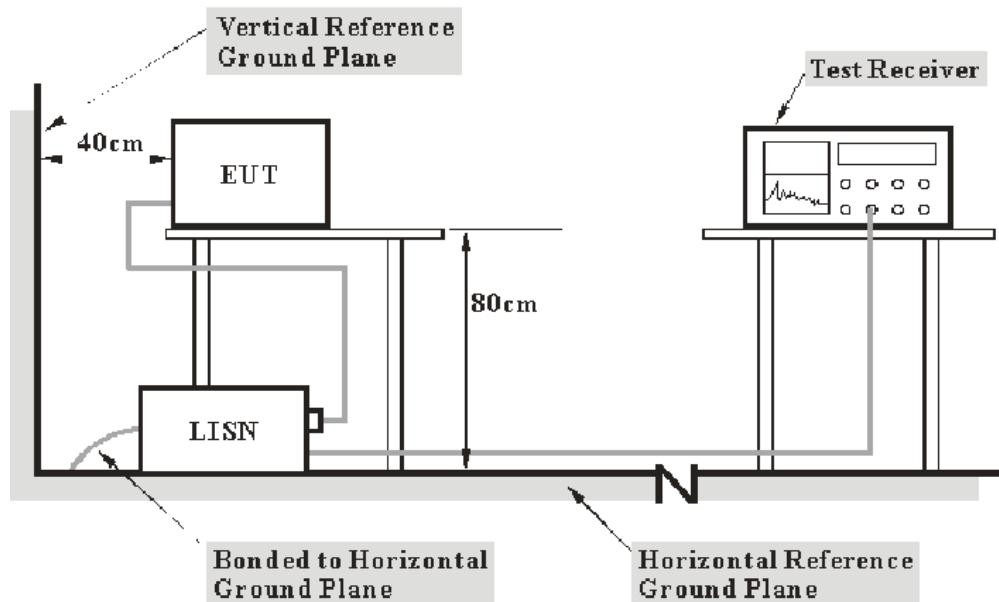
CFR47 §15.207

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 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	2011-03-03	2012-03-02
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2011-03-09	2012-03-08
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 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 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:

Powered by adapter 1:

13.26 dB at 0.375 MHz in the **Neutral** conducted mode

Powered by adapter 2:

12.97 dB at 0.470 MHz in the **Neutral** conducted mode

Test Data

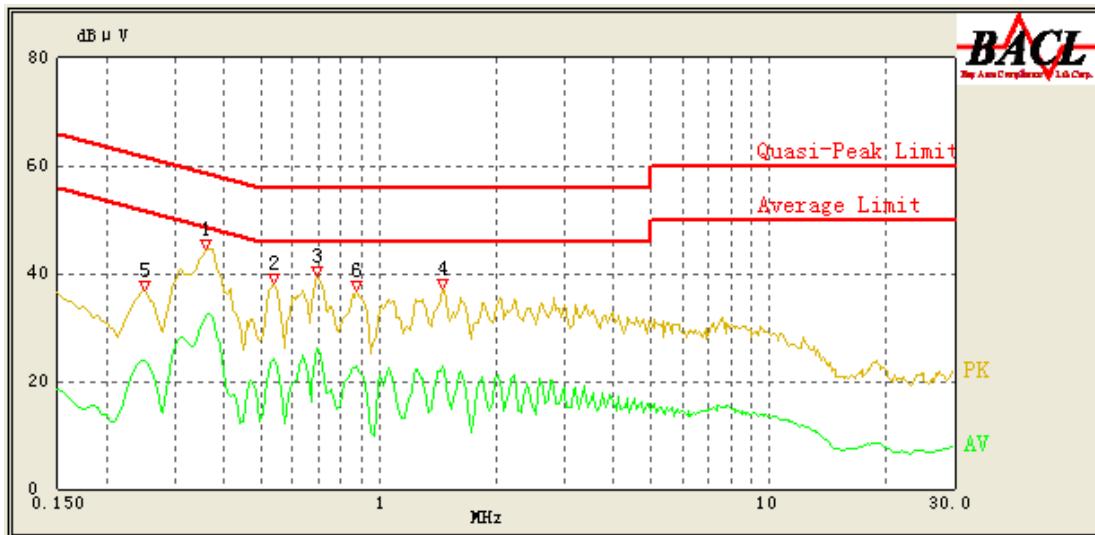
Environmental Conditions

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

The testing was performed by Brown Lu on 2011-12-26.

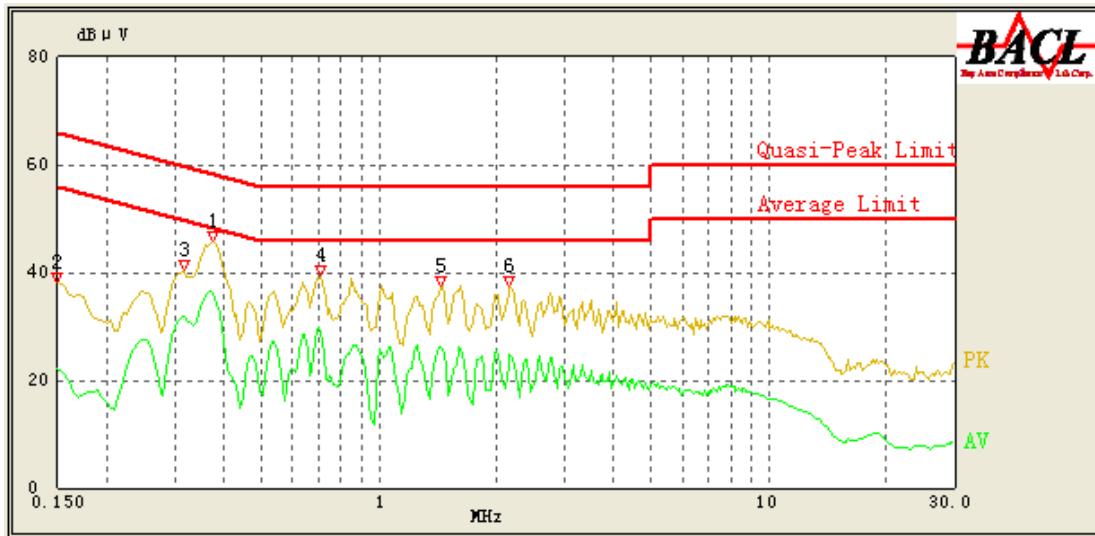
Test Mode: Operating (Powered by adapter 1)

AC 120 V, 60 Hz, Line:



Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	Corrected Amplitude (dB μ V)	Correction Factor (dB)	Limit (dB μ V)	Margin (dB)	Detector (PK/QP/Ave.)
0.360	31.72	10.10	50.00	18.28	Ave.
0.695	26.09	10.10	46.00	19.91	Ave.
0.360	38.77	10.10	60.00	21.23	QP
0.535	24.11	10.10	46.00	21.89	Ave.
0.695	33.53	10.10	56.00	22.47	QP
1.455	22.85	10.10	46.00	23.15	Ave.
0.875	22.82	10.10	46.00	23.18	Ave.
0.535	32.19	10.10	56.00	23.81	QP
0.880	30.25	10.10	56.00	25.75	QP
1.450	30.06	10.10	56.00	25.94	QP
0.250	23.87	10.10	53.14	29.27	Ave.
0.250	32.36	10.10	63.14	30.78	QP

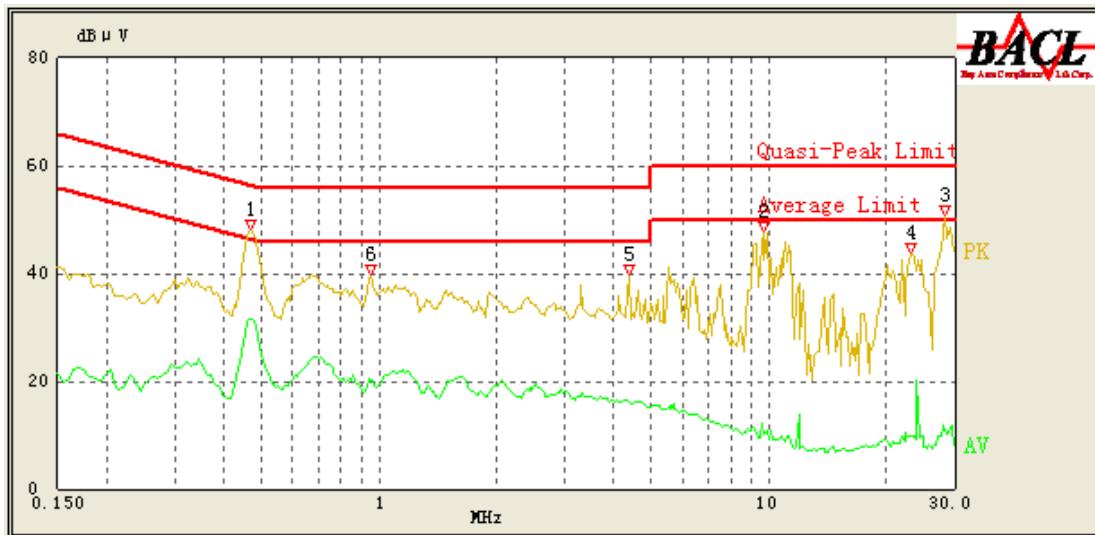
AC 120V, 60 Hz, Neutral:



Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	Corrected Amplitude (dB μ V)	Correction Factor (dB)	Limit (dB μ V)	Margin (dB)	Detector (PK/QP/Ave.)
0.375	36.31	10.10	49.57	13.26	Ave.
0.710	28.80	10.10	46.00	17.20	Ave.
0.375	41.33	10.10	59.57	18.24	QP
0.315	31.70	10.10	51.29	19.59	Ave.
1.430	26.08	10.10	46.00	19.92	Ave.
2.165	24.95	10.10	46.00	21.05	Ave.
0.710	34.72	10.10	56.00	21.28	QP
0.315	37.25	10.10	61.29	24.04	QP
1.440	31.86	10.10	56.00	24.14	QP
2.165	31.65	10.10	56.00	24.35	QP
0.150	22.18	10.10	56.00	33.82	Ave.
0.150	32.16	10.10	66.00	33.84	QP

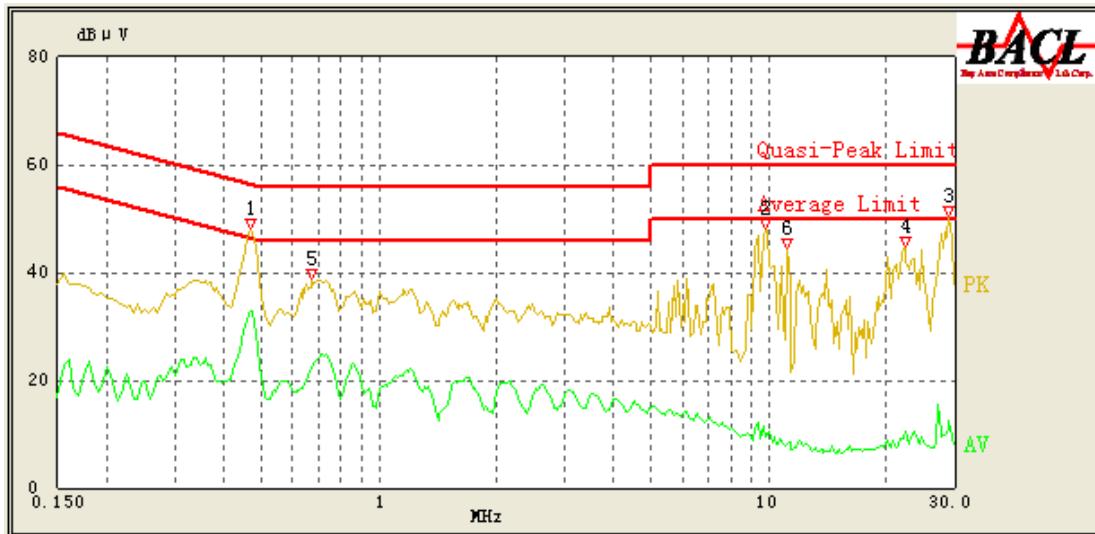
Test Mode: Operating (Powered by adapter 2)

AC 120 V, 60 Hz, Line:



Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	Corrected Amplitude (dB μ V)	Correction Factor (dB)	Limit (dB μ V)	Margin (dB)	Detector (PK/QP/Ave.)
0.470	42.90	10.10	56.86	13.96	QP
0.470	31.56	10.10	46.86	15.30	Ave.
0.955	33.62	10.10	56.00	22.38	QP
0.955	20.30	10.10	46.00	25.70	Ave.
4.365	16.12	10.10	46.00	29.88	Ave.
4.365	25.65	10.10	56.00	30.35	QP
9.610	12.02	10.10	50.00	37.98	Ave.
28.145	11.95	10.10	50.00	38.05	Ave.
23.045	9.80	10.10	50.00	40.20	Ave.
9.690	17.22	10.10	60.00	42.78	QP
28.350	15.25	10.10	60.00	44.75	QP
23.045	14.64	10.10	60.00	45.36	QP

AC 120V, 60 Hz, Neutral:



Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	Corrected Amplitude (dB μ V)	Correction Factor (dB)	Limit (dB μ V)	Margin (dB)	Detector (QP/Ave.)
0.470	43.89	10.10	56.86	12.97	QP
0.470	32.72	10.10	46.86	14.14	Ave.
0.675	33.79	10.10	56.00	22.21	QP
0.675	22.36	10.10	46.00	23.64	Ave.
28.970	12.53	10.10	50.00	37.47	Ave.
22.350	10.59	10.10	50.00	39.41	Ave.
9.775	9.47	10.10	50.00	40.53	Ave.
11.150	8.33	10.10	50.00	41.67	Ave.
11.150	17.85	10.10	60.00	42.15	QP
28.970	17.19	10.10	60.00	42.81	QP
9.775	15.86	10.10	60.00	44.14	QP
22.350	12.68	10.10	60.00	47.32	QP

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

Applicable Standard

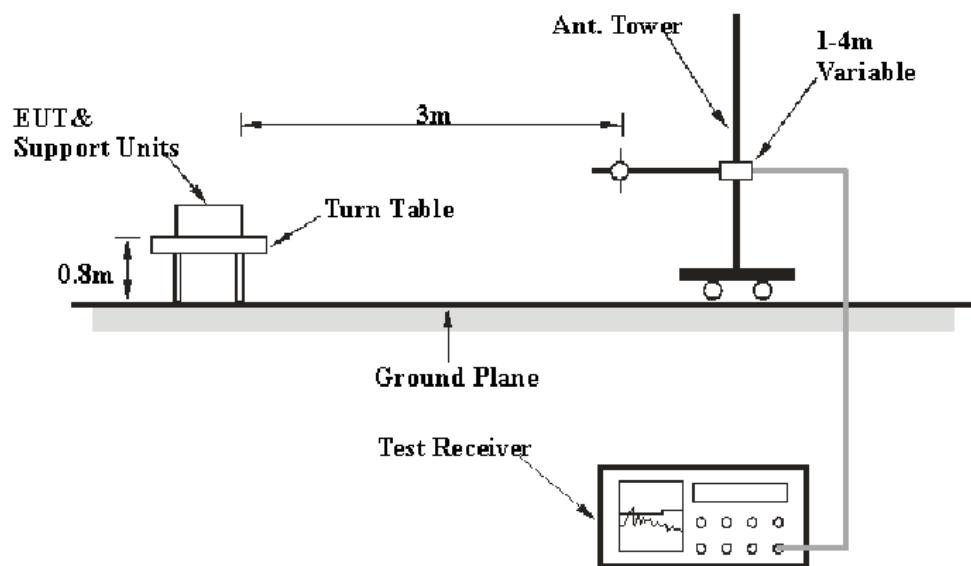
FCC §15.247 (d); §15.209; §15.205;

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 spacing between the peripherals was 10 cm.

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

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

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

Frequency Range	RBW	Video B/W	Detector
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	PK

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
HP	Amplifier	2VA-213+	T-E27H	2011-03-08	2012-03-08
Sunol Sciences	Horn Antenna	DRH-118	A052604	2011-05-05	2012-05-04
Electro-Mechanics	Horn Antenna	3116	9510-2270	2011-10-11	2012-10-10
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 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-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:

5.1 dB at 167.978500 MHz in the **Horizontal** polarization at Middle channel

Test Data

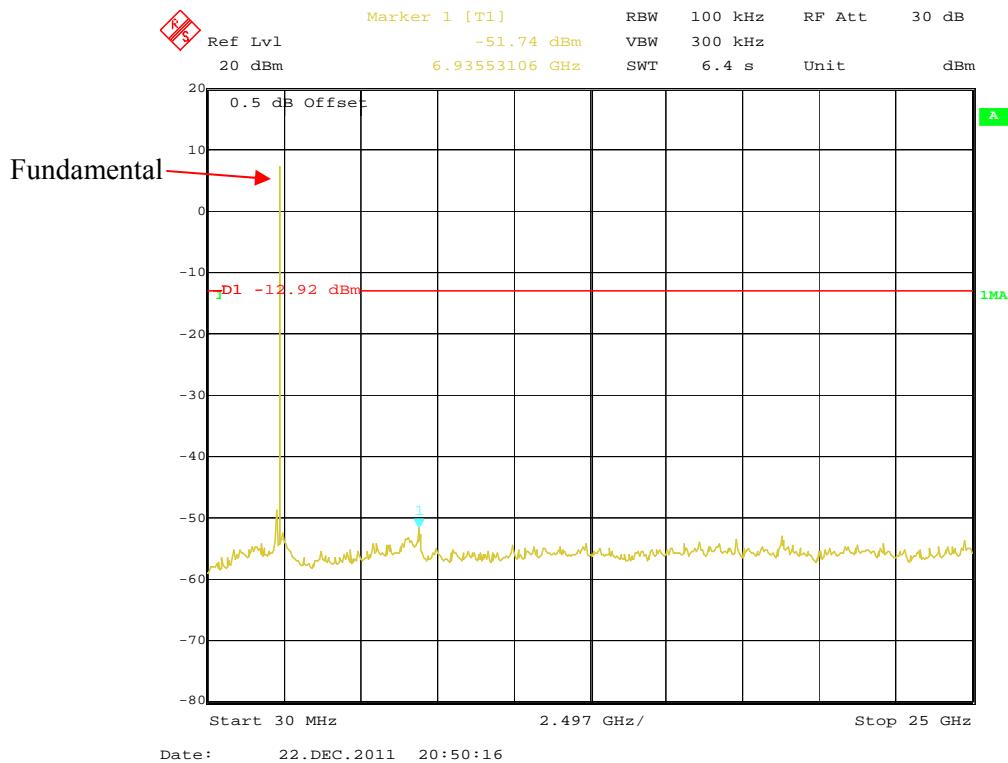
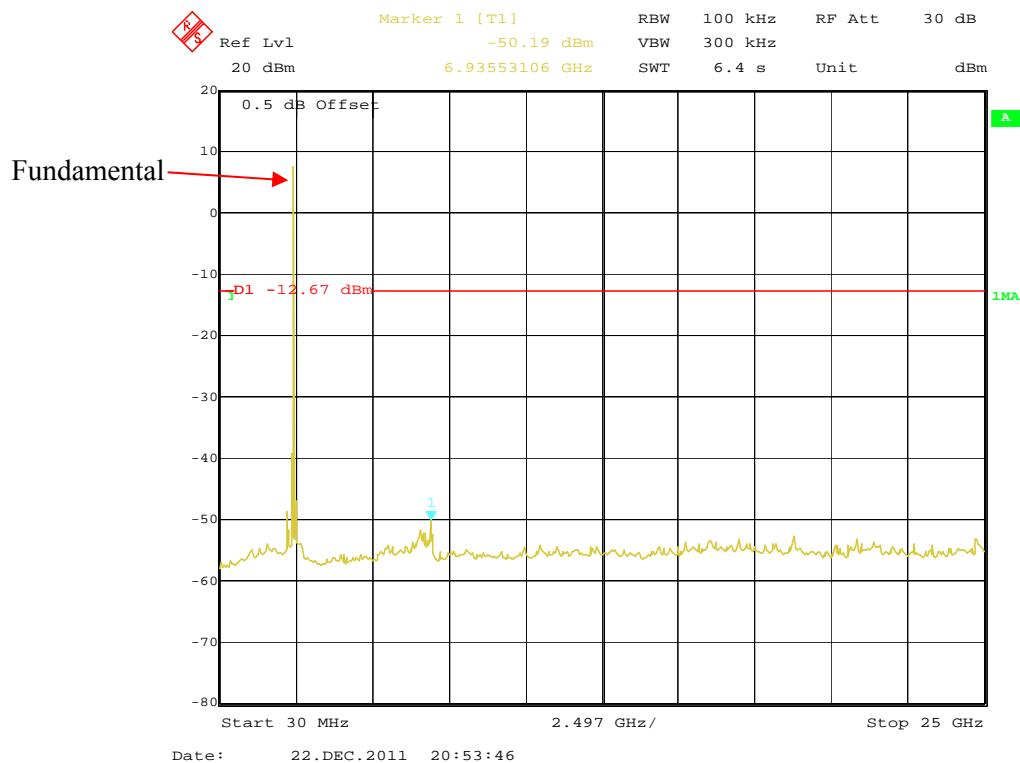
Environmental Conditions

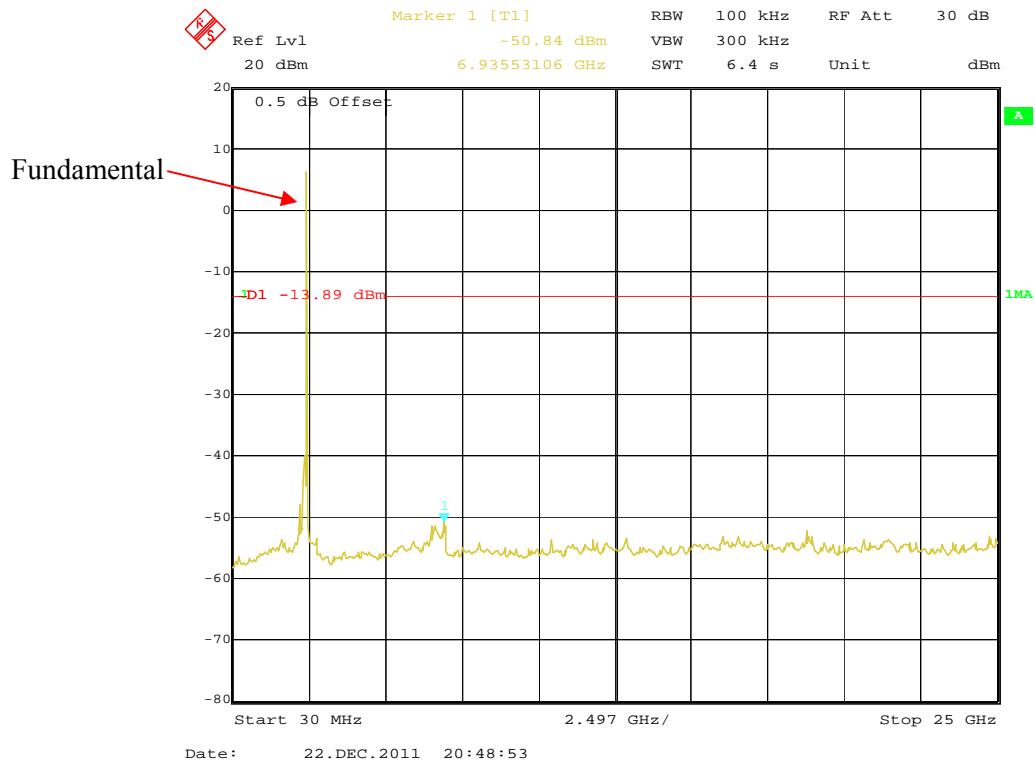
Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Brown Lu on 2011-12-22.

30 - 25GHz:

Indicated		Detector (PK/Ave.)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247/15.209/15.205			
Frequency (MHz)	Receiver Reading (dB μ V)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Comment
Low Channel (2410.875 MHz)												
2410.875	104.77	PK	210	1.3	H	30.5	3.03	26.83	111.47	/	/	Fund.
2410.875	90.54	Ave.	210	1.3	H	30.5	3.03	26.83	97.24	/	/	Fund.
2410.875	98.72	PK	260	1.5	V	30.2	3.03	26.83	105.12	/	/	Fund.
2410.875	84.92	Ave.	260	1.5	V	30.2	3.03	26.83	91.32	/	/	Fund.
167.98	52.54	QP	196	2.5	H	10.20	0.70	25.24	38.20	43.5	5.3	spurious
4822	30.72	Ave.	0	1.4	H	36.3	4.30	26.75	44.57	54	9.43	harmonic
4822	32.28	Ave.	0	2.3	V	35.0	4.30	26.75	44.83	54	9.17	harmonic
4822	44.56	PK	0	1.4	H	36.3	4.30	26.75	58.41	74	15.59	harmonic
4822	45.34	PK	0	2.3	V	35.0	4.30	26.75	57.89	74	16.11	harmonic
2388.57	24.53	Ave.	20	1.0	V	30.8	3.03	26.83	30.82	54	23.18	spurious
2388.57	23.42	Ave.	20	1.0	H	30.8	3.03	26.83	29.71	54	24.29	spurious
2388.57	37.61	PK	20	1.0	V	30.8	3.03	26.83	43.90	74	30.10	spurious
2388.57	36.53	PK	20	1.0	H	30.8	3.03	26.83	42.82	74	31.18	spurious
Middle Channel (2437.875 MHz)												
2437.875	105.54	PK	110	1.5	H	30.6	3.08	26.83	112.39	/	/	Fund.
2437.875	91.00	Ave.	110	1.5	H	30.6	3.08	26.83	97.85	/	/	Fund.
2437.875	98.88	PK	150	1.6	V	30.5	3.08	26.83	105.63	/	/	Fund.
2437.875	85.93	Ave.	150	1.6	V	30.5	3.08	26.83	92.68	/	/	Fund.
167.98	52.74	QP	196	2.5	H	10.20	0.70	25.24	38.4	43.5	5.1	spurious
4876	32.74	Ave.	0	2.0	H	36.6	4.37	26.75	46.96	54	7.04	harmonic
4876	32.21	Ave.	0	2.3	V	35.4	4.37	26.75	45.23	54	8.77	harmonic
4876	50.26	PK	0	2.0	H	36.6	4.37	26.75	64.48	74	9.52	harmonic
4876	47.62	PK	0	2.3	V	35.4	4.37	26.75	60.64	74	13.36	harmonic
High Channel (2471.625 MHz)												
2471.625	104.86	PK	260	2.1	H	30.8	3.11	26.83	111.94	/	/	Fund.
2471.625	90.73	Ave.	260	2.1	H	30.8	3.11	26.83	97.81	/	/	Fund.
2471.625	98.94	PK	180	1.6	V	30.6	3.11	26.83	105.82	/	/	Fund.
2471.625	86.16	Ave.	180	1.6	V	30.6	3.11	26.83	93.04	/	/	Fund.
167.98	52.64	QP	196	2.5	H	10.20	0.70	25.24	38.3	43.5	5.2	spurious
4943	33.20	Ave.	360	2.2	H	36.6	4.37	26.75	47.42	54	6.58	harmonic
4943	32.44	Ave.	0	2.4	V	35.4	4.37	26.75	45.46	54	8.54	harmonic
4943	53.35	PK	360	2.2	H	36.6	4.37	26.75	67.57	74	6.43	harmonic
4943	53.43	PK	0	2.4	V	35.4	4.37	26.75	66.45	74	7.55	harmonic
2484.24	24.32	Ave.	360	1.5	V	31.0	3.04	26.83	31.53	54	22.47	spurious
2484.24	21.40	Ave.	360	1.5	H	31.0	3.04	26.83	28.61	54	25.39	spurious
2484.24	37.52	PK	360	1.5	V	31.0	3.04	26.83	44.73	74	29.27	spurious
2484.24	35.35	PK	360	1.5	H	31.0	3.04	26.83	42.56	74	31.44	spurious

Spurious Emissions at Antenna Terminal:**Please refer to the following plots:****Low Channel****Middle Channel**

High Channel

CFR47 §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	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 Procedure

1. Set the EUT in Operating mode, RBW of spectrum Bandwidth 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 Data

Environmental Conditions

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

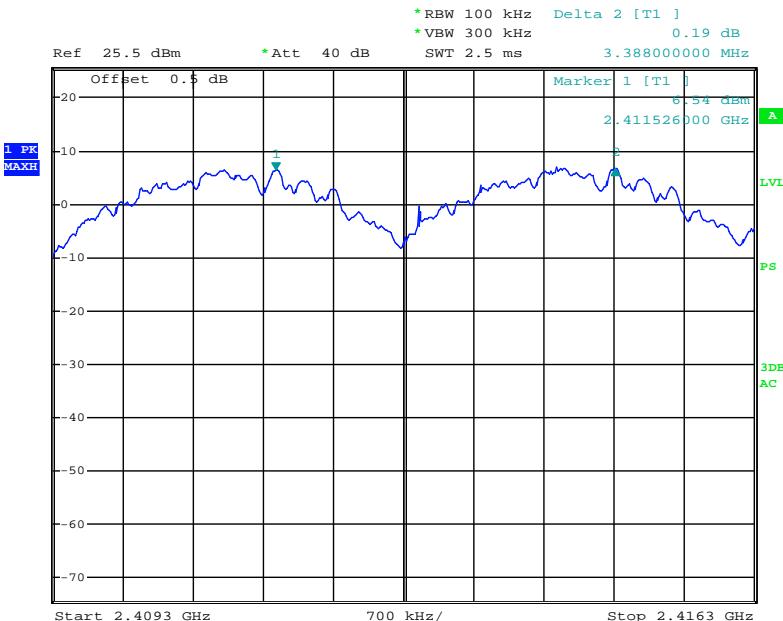
* The testing was performed by Brown Lu on 2011-12-19.

Test Mode: Transmitting

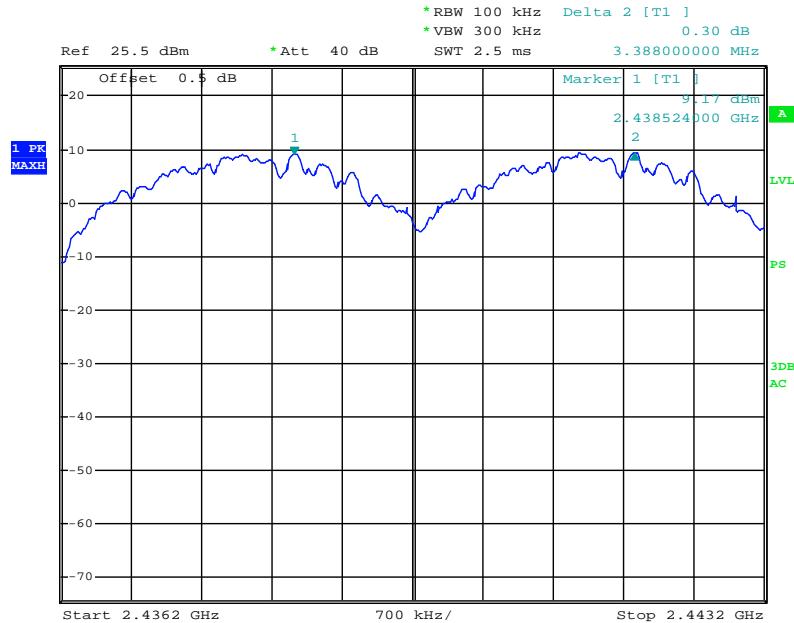
Test Result: Compliance. Please refer to following tables and plots

Channel	Channel Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result	
Low Channel	2410.875	3.388	2.467	Pass	
Adjacency Channel	2414.250				
Mid Channel	2437.875		2.613		
Adjacency Channel	2441.250				
High Channel	2471.625		2.549		
Adjacency Channel	2468.250				

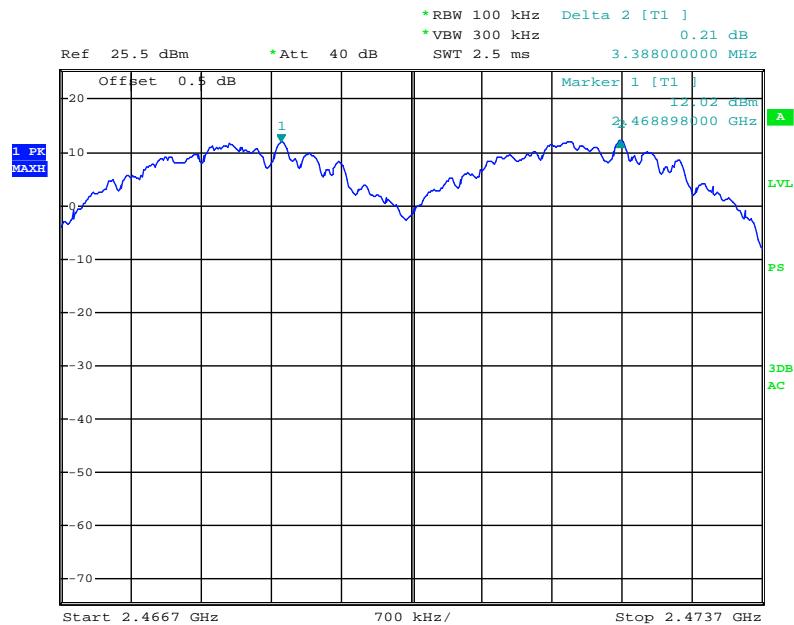
Low Channel



Date: 19.DEC.2011 22:41:10

Middle Channel

Date: 19.DEC.2011 22:42:26

High Channel

Date: 19.DEC.2011 22:44:02

CFR47 §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	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 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

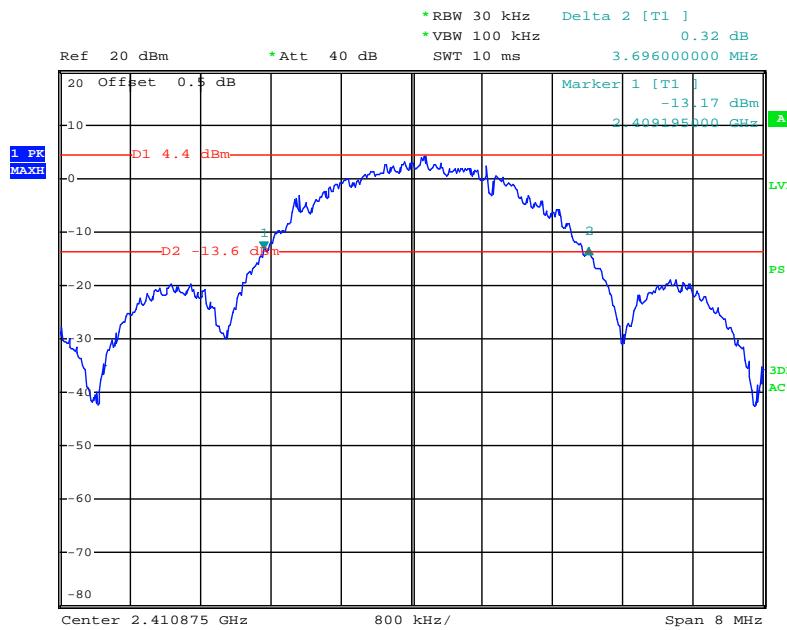
* The testing was performed by Brown Lu on 2011-12-06.

Test Mode: Transmitting

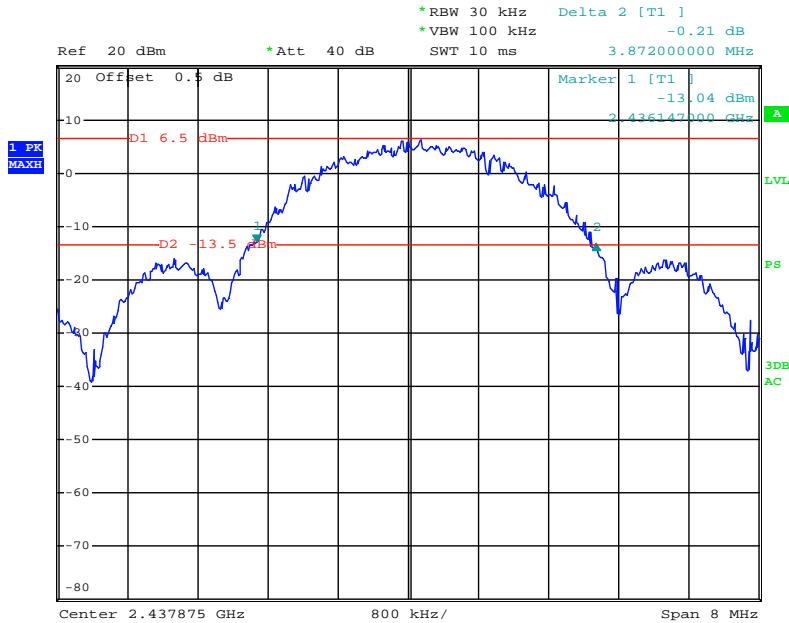
Test Result: Compliance. Please refer to following tables and plots

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	2410.875	3.696
Middle	2437.875	3.872
High	2471.625	3.888

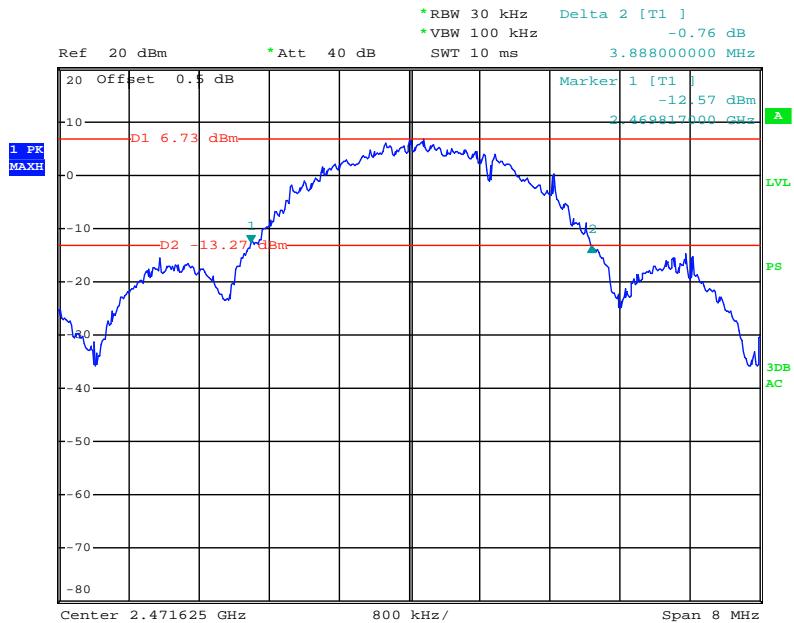
Low Channel



Date: 6.DEC.2011 17:34:37

Middle Channel

Date: 6.DEC.2011 17:31:56

High Channel

Date: 6.DEC.2011 17:33:39

CFR47 §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	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 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

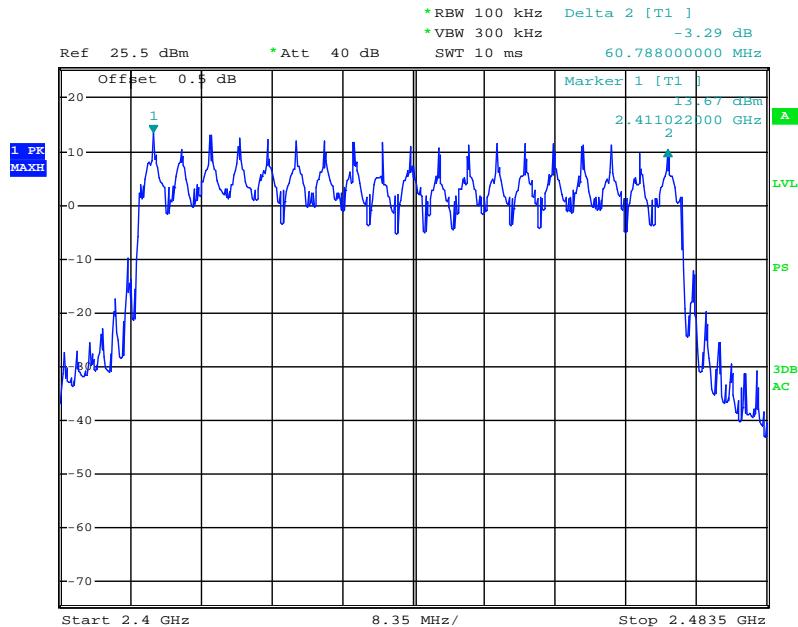
The testing was performed by Brown Lu on 2011-12-19.

Test Mode: Transmitting

Test Result: Compliance. Please refer to following tables and plots

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

Number of Hopping Channels



Date: 19.DEC.2011 22:21:03

CFR47 §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	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 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

Test Data**Environmental Conditions**

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

The testing was performed by Brown Lu on 2011-12-19.

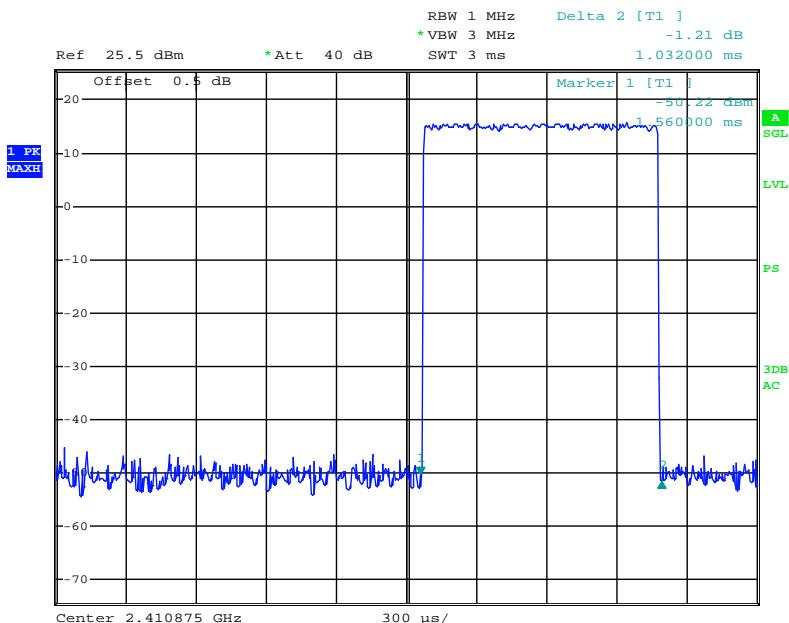
Test Mode: Transmitting

Test Result: Compliance. Please refer to following tables and plots

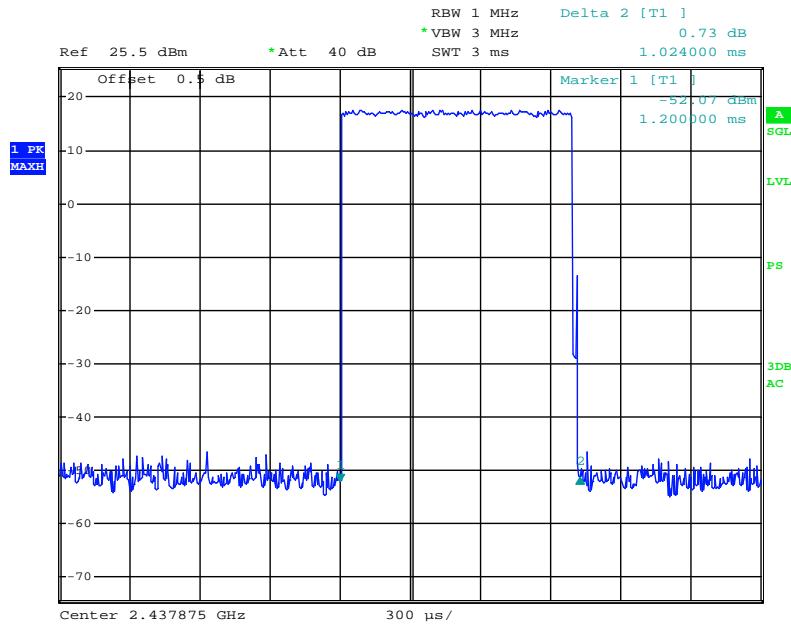
Channel	Pulse Width (ms)	Dwell Time (S)	Limit (S)	Result
Low	1.032	0.095	0.4	Pass
Middle	1.024	0.094	0.4	Pass
High	0.994	0.091	0.4	Pass

Note: Dwell time=Pulse time (ms) \times (458/2/19) \times 19 \times 0.4 S

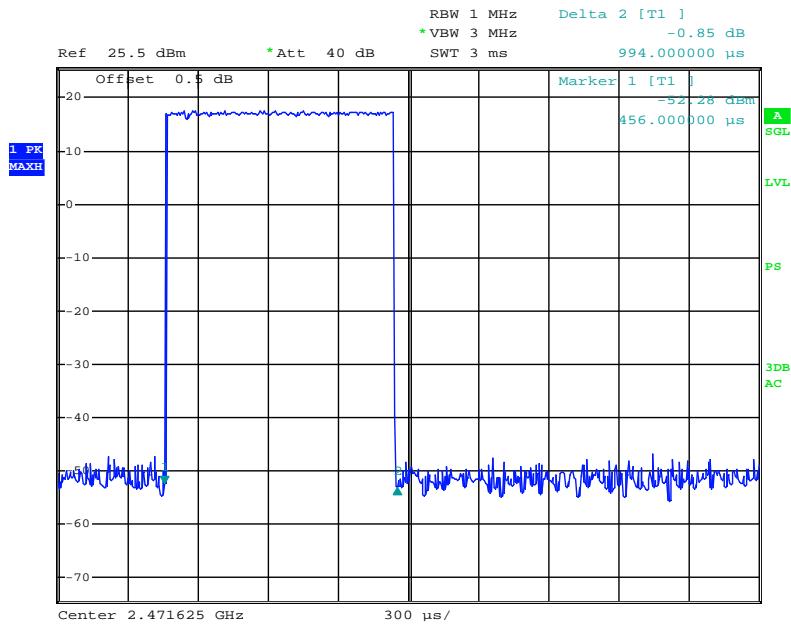
Low Channel



Date: 19.DEC.2011 21:53:03

Middle Channel

Date: 19.DEC.2011 21:59:29

High Channel

Date: 19.DEC.2011 22:00:03

CFR47 §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	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 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 Brown Lu on 2011-12-19.

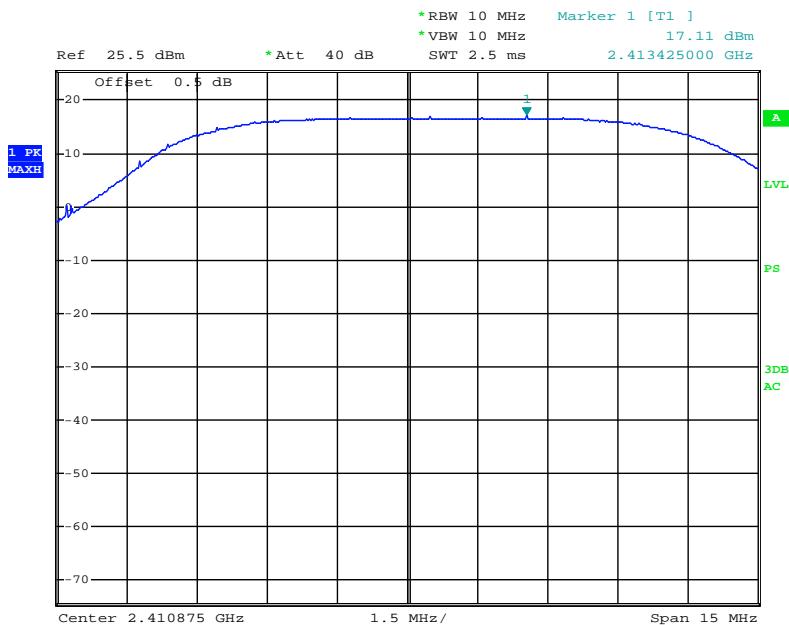
Test Mode: Transmitting

Test Result: Compliance. Please refer to following tables and plots

Channel	Channel frequency (MHz)	Peak output power (dBm)	Power output (mW)	Limit (mW)
Low channel	2410.875	17.11	51.40	125
Middle channel	2437.875	18.69	73.96	125
High channel	2471.625	18.39	69.02	125

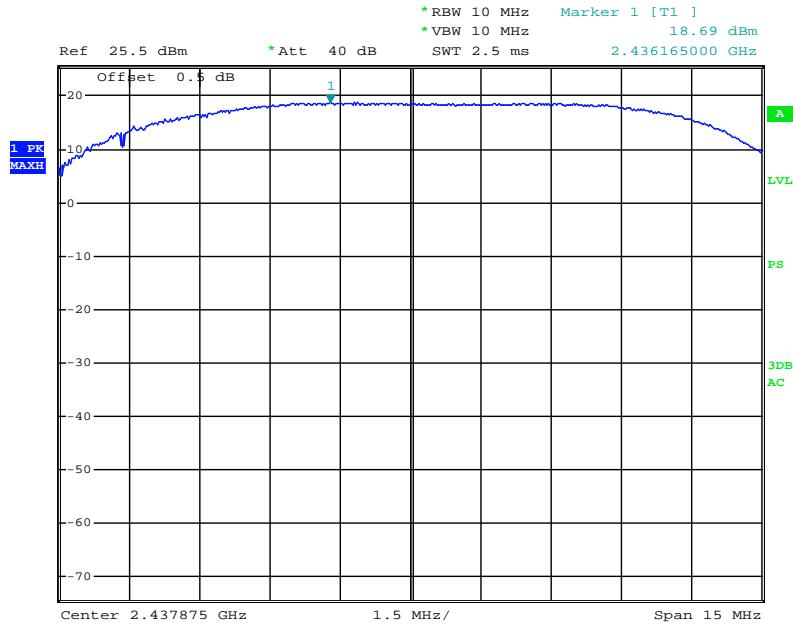
Note: The data above was tested in conducted mode.

Low Channel



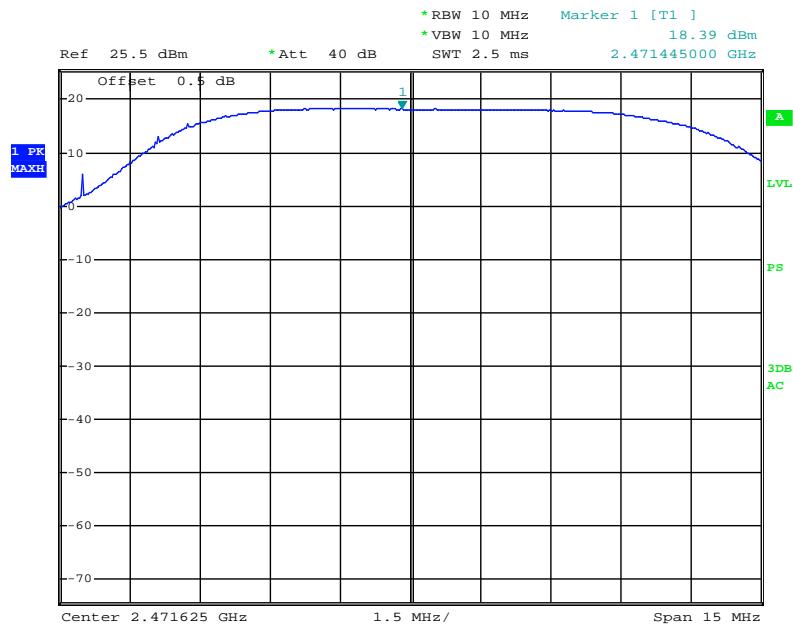
Date: 19.DEC.2011 21:51:26

Middle Channel



Date: 19.DEC.2011 21:48:56

High Channel



Date: 19.DEC.2011 21:50:00

CFR47 §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	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 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 100 kHz bandwidth from band edge, for Radiated emissions restricted band RBW=1 MHz, VBW=3 MHz.
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

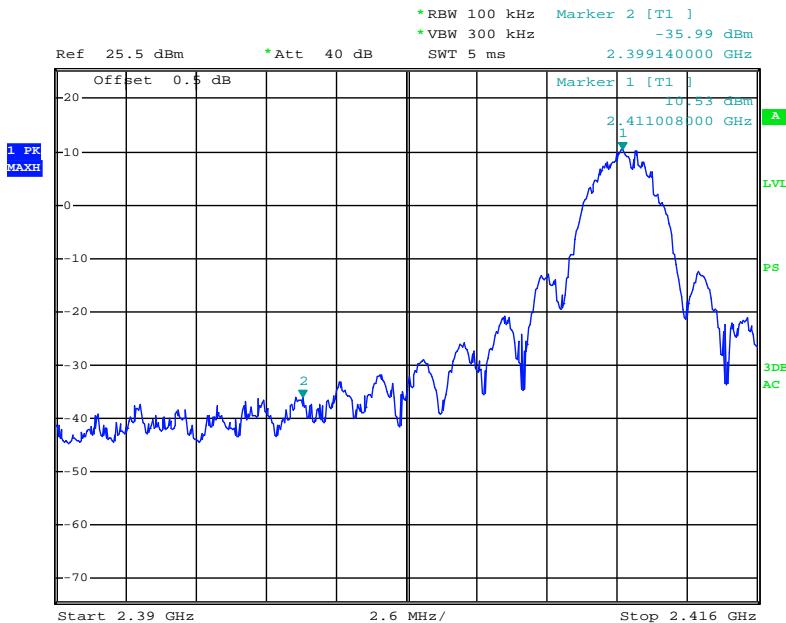
*The testing was performed by Brown Lu on 2011-12-19.

Test Mode: Transmitting

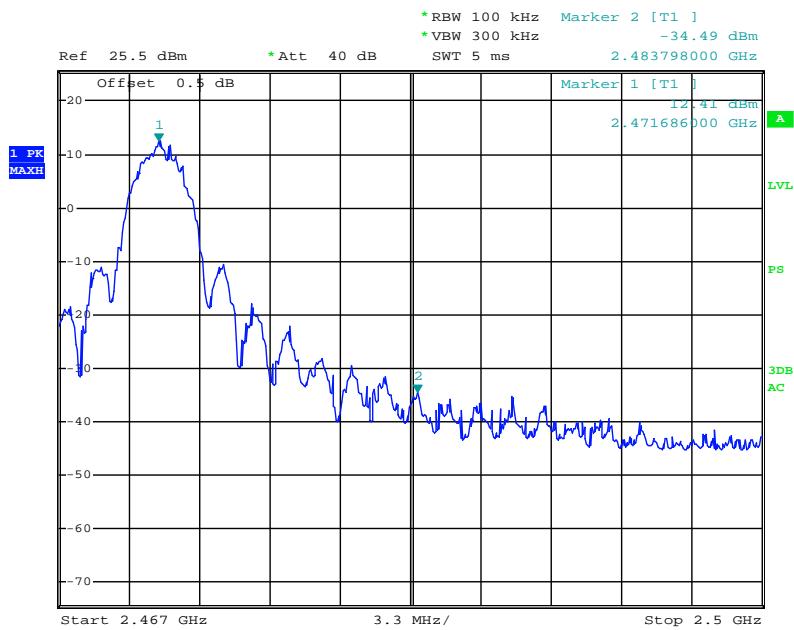
Test Result: Compliance. Please refer to following tables and plots

Frequency (MHz)	Delta Peak to Band Emission (dBc)	Delta Limit (dBc)
2399.140	46.52	20
2483.798	46.90	20

Band Edge: Left Side



Date: 19.DEC.2011 21:00:46

Band Edge: Right Side

Date: 19.DEC.2011 21:02:39

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