

FCC PART 15.247

TEST REPORT

For

Shenzhen Fuyeda Industry Development Corp., Ltd.

No.1, Newmen Road, Tongsheng Village, Dalang Street, Bao'An, Shenzhen, China

FCC ID: V4P-245IR-1

Report Type: Original Report	Product Type: 2.4G RF dongle
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Report Number: RSZ120717005-00	
Report Date: 2012-08-16	
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* If this report contains data that are not covered by the NVLAP accreditation, they will be marked with an asterisk "★"
(Rev.2)

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Shenzhen Fuyeda Industry Development Corp., Ltd.*'s product, model number: *MS-245IR (FCC ID: V4P-245IR-1)* (or the "EUT") in this report was a *2.4G RF dongle*, which was measured approximately: 2.0 cm (L) x 1.5 cm (W) x 0.7 cm (H), rated input voltage: 5V from host PC USB port.

** All measurement and test data in this report was gathered from production sample serial number: 1207089 (Assigned by BACL, Shenzhen). The EUT was received on 2012-07-17.*

Objective

This report is prepared on behalf of *Shenzhen Fuyeda Industry Development Corp., Ltd.* 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)

Part of mouse with FCC ID: V4P-245IR.

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

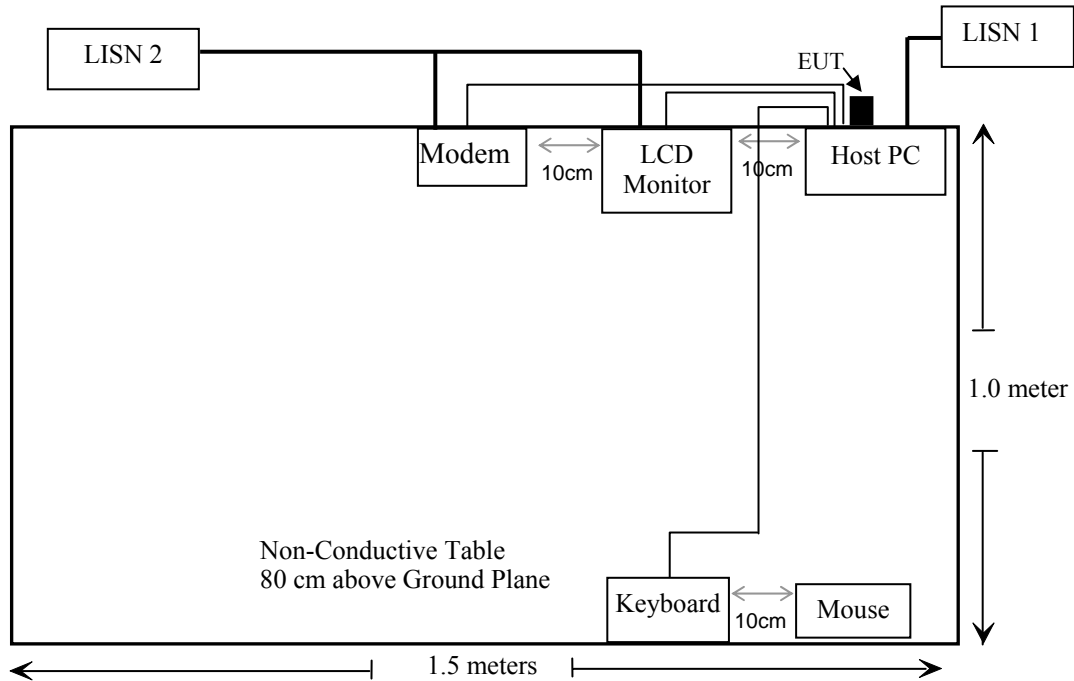
No equipment modification was made to the EUT.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	PC	VOSTRO 220S	127BP2X
DELL	Keyboard	L100	CNORH656658907BL05DC
Fuyeda	Mouse	MS-245IR	N/A
DELL	LCD Monitor	E178WFPC	CN-OWY564-64180-7C4-2SQH
SAST	Modem	AEM-2100	0293

External I/O Cable

Cable Description	Length (m)	From/Port	To
Shielded Detachable Serial Cable	1.5	Host PC	Modem
Shielded Detachable K/B Cable	1.5	Host PC	Keyboard
Shielded Detachable VGA Cable	1.8	Host PC	LCD Monitor

Block Diagram of Test Setup

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 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) & §2.1093- RF EXPOSURE

Applicable Standard

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

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

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

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

Measurement Result:

Max Peak output power:

2402 MHz: $-4.39 \text{ dBm} + 0 \text{ dBi} = -4.39 \text{ dBm} = 0.36 \text{ mW}$

$60/f\text{GHz} = 60/2.402 = 24.98 \text{ mW}$

Max Peak output power $< 60/f\text{GHz}$

So the SAR measurement is not necessary.

FCC §15.203 – ANTENNA REQUIREMENT

Applicable Standard

According to FCC § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Antenna Connector Construction

The EUT has a PCB antenna connected 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

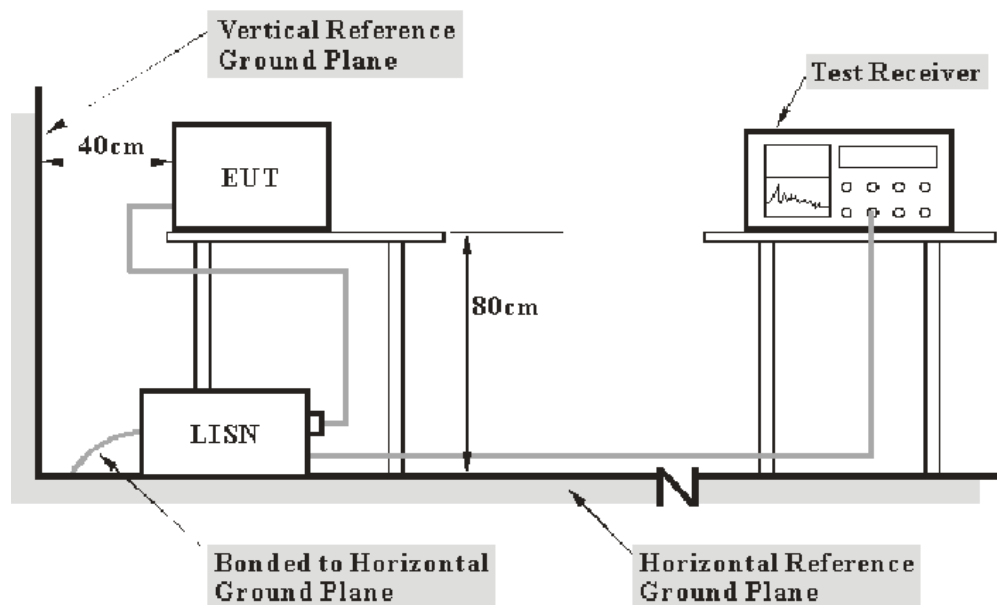
FCC §15.207

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 30 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 PC 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 PC 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	100176	2011-11-24	2012-11-23
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2011-11-17	2012-11-16
Rohde & Schwarz	Pulse limiter	ESH3Z2	DE25985	2011-07-08	2012-07-07
BACL	CE Test software	BACL-CE	V1.0	N/A	N/A

* **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.

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN/ISN VDF (Voltage Division Factor), Cable Loss and Pulse Limiter Attenuation. The basic equation is as follows:

$$\text{Correction Factor} = \text{LISN VDF} + \text{Cable Loss} + \text{Pulse Limiter Attenuation}$$

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 7 dB 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 Part 15.207, with the worst margin reading of:

9.74 dB at 1.105 MHz in the Line conducted mode

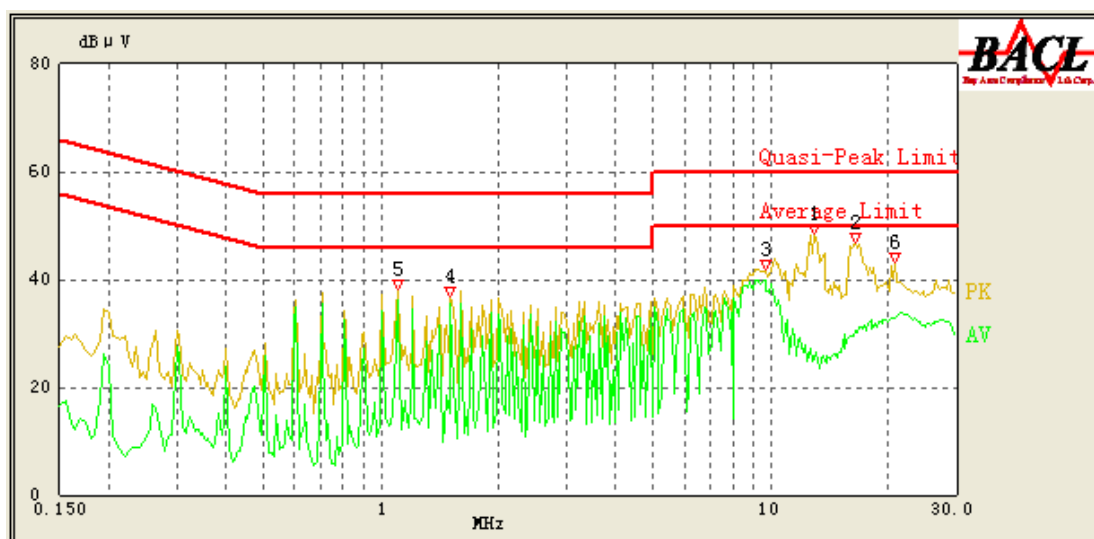
Test Data**Environmental Conditions**

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

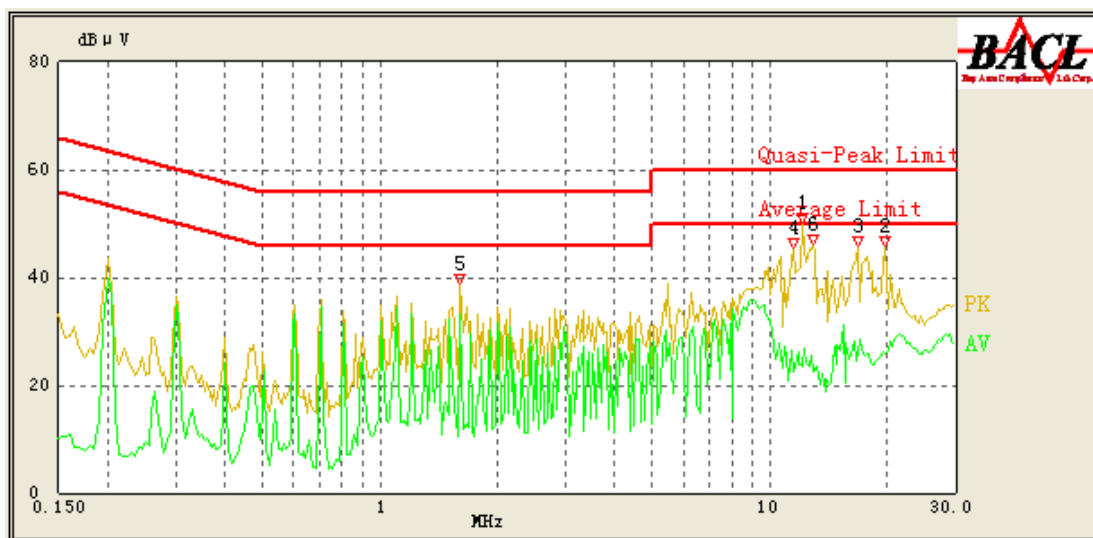
The testing was performed by Tiger Ye on 2012-07-23.

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.)
1.105	36.26	10.17	46.00	9.74	Ave.
9.655	40.00	10.48	50.00	10.00	Ave.
1.510	35.49	10.19	46.00	10.51	Ave.
20.715	32.83	12.68	50.00	17.17	Ave.
1.105	36.61	10.17	56.00	19.39	QP
9.655	40.48	10.48	60.00	19.52	QP
16.490	30.43	11.76	50.00	19.57	Ave.
1.510	36.24	10.19	56.00	19.76	QP
16.400	36.89	11.73	60.00	23.11	QP
12.885	35.69	10.97	60.00	24.31	QP
12.970	25.25	10.98	50.00	24.75	Ave.
20.815	35.04	12.66	60.00	24.96	QP

AC 120V, 60 Hz, Neutral:

Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/QP/Ave.)
1.610	33.28	10.19	46.00	12.72	Ave.
11.520	45.04	10.72	60.00	14.96	QP
12.885	44.91	10.92	60.00	15.09	QP
1.610	34.32	10.19	56.00	21.68	QP
16.765	38.27	11.71	60.00	21.73	QP
19.670	37.54	12.48	60.00	22.46	QP
16.765	26.02	11.71	50.00	23.98	Ave.
19.710	25.71	12.49	50.00	24.29	Ave.
12.150	34.72	10.81	60.00	25.28	QP
12.170	23.48	10.82	50.00	26.52	Ave.
11.460	22.45	10.71	50.00	27.55	Ave.
12.975	22.42	10.94	50.00	27.58	Ave.

Note:

- 1) Corrected Amplitude = Reading + Correction Factor
- 2) Correction Factor = LISN/ISN VDF (Voltage Division Factor) + Cable Loss + Pulse Limiter Attenuation
The corrected factor has been input into the transducer of the test software.
- 3) Margin = Limit – Corrected Amplitude

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

Applicable Standard

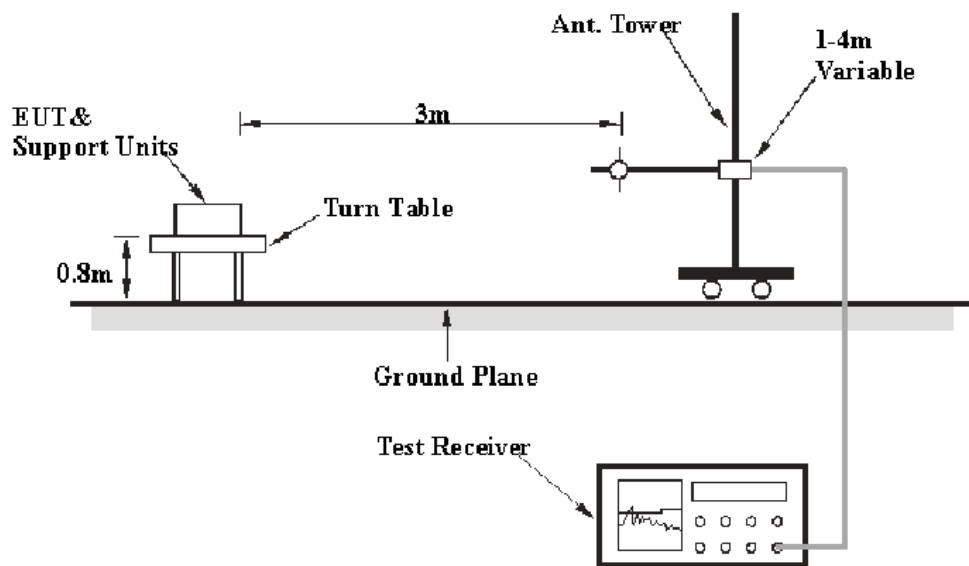
FCC §15.247 (d); §15.209; §15.205;

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.

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

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	2011-11-24	2012-11-23
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2011-11-17	2012-11-16
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2012-11-27
SUPER ULTRA	Amplifier	ZVA-213+	N/A	2011-11-24	2012-11-23
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2012-11-30
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2011-11-24	2012-11-23
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2011-10-14	2012-10-13
R&S	Auto test Software	EMC32	V6.30	N/A	N/A

* **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:

17.13 dB at 9904.0 MHz in the Vertical polarization

Test Data

Environmental Conditions

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

The testing was performed by Tiger Ye on 2012-07-19.

30 MHz-25 GHz:

Frequency (MHz)	Reveiver Reading (dBμV/m)	Detector (PK/QP/Ave.)	Direction (Degree)	Height (m)	Polar (H/V)	Antenna Loss (dB)	Cable loss (dB)	Amplifier Gain (dB)	Corr. Amplitude (dBμV/m)	FCC Part 15.247/15.205/15.209	
										Limit (dBμV/m)	Margin (dB)
Low Channel (2402 MHz)											
2402.0	75.63	PK	68	1.2	V	29.60	3.03	26.50	81.76	/	/
2402.0	55.37	Ave.	68	1.2	V	29.60	3.03	26.50	61.50	/	/
2402.0	74.12	PK	14	1.1	H	29.60	3.03	26.50	80.25	/	/
2402.0	53.24	Ave.	14	1.1	H	29.60	3.03	26.50	59.37	/	/
2368.3	50.95	PK	82	1.2	H	29.00	2.98	26.50	56.43	74.00	17.57
9608.0	17.05	Ave.	5	1.2	V	39.80	5.98	26.50	36.33	54.00	17.67
2368.3	30.72	Ave.	82	1.2	H	29.00	2.98	26.50	36.20	54.00	17.80
4804.0	23.65	Ave.	62	1.2	V	34.60	4.30	26.50	36.05	54.00	17.95
30.5	26.1	QP	180	1.2	V	21.50	0.20	26.00	21.80	40.00	18.20
7206.0	17.58	Ave.	132	1.3	H	37.90	5.22	26.50	34.20	54.00	19.80
4804.0	40.91	PK	62	1.2	V	34.60	4.30	26.50	53.31	74.00	20.69
9608.0	33.67	PK	5	1.2	V	39.80	5.98	26.50	52.95	74.00	21.05
2338.6	46.68	PK	43	1.1	V	29.00	2.98	26.50	52.16	74.00	21.84
2485.2	45.99	PK	64	1.2	V	29.60	3.03	26.50	52.12	74.00	21.88
2338.6	26.37	Ave.	43	1.1	V	29.00	2.98	26.50	31.85	54.00	22.15
2485.2	25.64	Ave.	64	1.2	V	29.60	3.03	26.50	31.77	54.00	22.23
7206.0	33.25	PK	132	1.3	H	37.90	5.22	26.50	49.87	74.00	24.13
480.0	29.6	QP	267	1.6	V	17.50	0.20	26.00	21.30	46.00	24.70
Middle Channel (2441 MHz)											
2441.0	75.29	PK	32	1.3	V	30.20	3.11	26.50	82.10	/	/
2441.0	56.01	Ave.	32	1.3	V	30.20	3.11	26.50	62.82	/	/
2441.0	73.85	PK	0	1.2	H	30.20	3.11	26.50	80.66	/	/
2441.0	53.12	Ave.	0	1.2	H	30.20	3.11	26.50	59.93	/	/
9764.0	17.44	Ave.	42	1.2	V	39.80	6.10	26.50	36.84	54.00	17.16
4882.0	43.25	PK	73	1.1	V	34.60	4.36	26.50	55.71	74.00	18.29
7323.0	17.49	Ave.	55	1.2	H	37.90	5.09	26.50	33.98	54.00	20.02
4882.0	21.09	Ave.	73	1.1	V	34.60	4.36	26.50	33.55	54.00	20.45
9764.0	33.67	PK	42	1.2	V	39.80	6.10	26.50	53.07	74.00	20.93
2485.1	23.91	Ave.	25	1.2	V	30.20	3.11	26.50	30.72	54.00	23.28
2365.2	44.57	PK	143	1.2	H	29.60	3.03	26.50	50.70	74.00	23.30
2365.2	24.51	Ave.	143	1.2	H	29.60	3.03	26.50	30.64	54.00	23.36
2485.1	43.22	PK	25	1.2	V	30.20	3.11	26.50	50.03	74.00	23.97
696.5	26.84	QP	307	4.0	V	20.0	0.62	26.00	21.46	46.00	24.54
2337.1	43.66	PK	69	1.3	V	29.00	2.98	26.50	49.14	74.00	24.86
2337.1	23.58	Ave.	69	1.3	V	29.00	2.98	26.50	29.06	54.00	24.94
7323.0	32.25	PK	55	1.2	H	37.90	5.09	26.50	48.74	74.00	25.26
527.9	27.42	QP	296	1.1	V	17.80	0.57	26.00	19.79	46.00	26.21

Frequency (MHz)	Reveiver Reading (dBμV/m)	Detector (PK/QP/Ave.)	Direction (Degree)	Height (m)	Polar (H/V)	Antenna Loss (dB)	Cable loss (dB)	Amplifier Gain (dB)	Corr. Amplitude (dBμV/m)	FCC Part 15.247/15.205/15.209	
										Limit (dBμV/m)	Margin (dB)
High Channel (2476 MHz)											
2476.0	74.28	PK	23	1.3	V	30.20	3.11	26.50	81.09	/	/
2476.0	55.23	Ave.	23	1.3	V	30.20	3.11	26.50	62.04	/	/
2476.0	74.11	PK	254	1.2	H	30.20	3.11	26.50	80.92	/	/
2476.0	53.25	Ave.	254	1.2	H	30.20	3.11	26.50	60.06	/	/
9904.0	17.49	Ave.	226	1.1	V	39.80	6.08	26.50	36.87	54.00	17.13
2485.6	30.08	Ave.	39	1.2	V	29.60	3.03	26.50	36.21	54.00	17.79
2485.6	49.97	PK	39	1.2	V	29.60	3.03	26.50	56.10	74.00	17.90
4952.0	43.29	PK	7	1.2	V	34.60	4.40	26.50	55.79	74.00	18.21
4952.0	22.84	Ave.	7	1.2	V	34.60	4.40	26.50	35.34	54.00	18.66
7428.0	18.75	Ave.	11	1.2	H	37.20	5.20	26.50	34.65	54.00	19.35
2337.9	27.48	Ave.	64	1.2	V	29.00	2.98	26.50	32.96	54.00	21.04
799.6	28.7	QP	125	1.0	H	21.2	0.66	26.00	24.56	46.00	21.44
9904.0	32.66	PK	226	1.1	V	39.80	6.08	26.50	52.04	74.00	21.96
916.2	27.3	QP	236	1.6	H	22.0	0.72	26.00	24.02	46.00	21.98
2337.9	46.39	PK	64	1.2	V	29.00	2.98	26.50	51.87	74.00	22.13
2366.7	45.95	PK	57	1.2	H	29.00	2.98	26.50	51.43	74.00	22.57
2366.7	25.57	Ave.	57	1.2	H	29.00	2.98	26.50	31.05	54.00	22.95
7428.0	33.29	PK	11	1.2	H	37.20	5.20	26.50	49.19	74.00	24.81

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 30 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	101122	2011-11-17	2012-11-16

* **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
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

* The testing was performed by Tiger Ye on 2012-07-23.

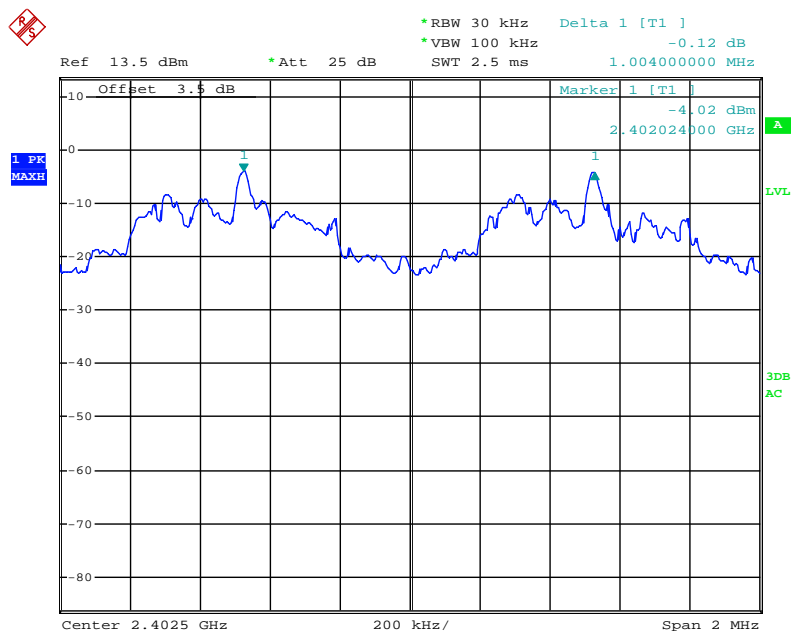
Test Result: Compliance.

Please refer to following tables and plots

Channel	Channel Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
Low Channel	2402	1.004	0.901	Pass
Adjacency Channel	2403			
Mid Channel	2441	1.004	0.901	
Adjacency Channel	2440			
High Channel	2476	1.004	0.891	
Adjacency Channel	2475			

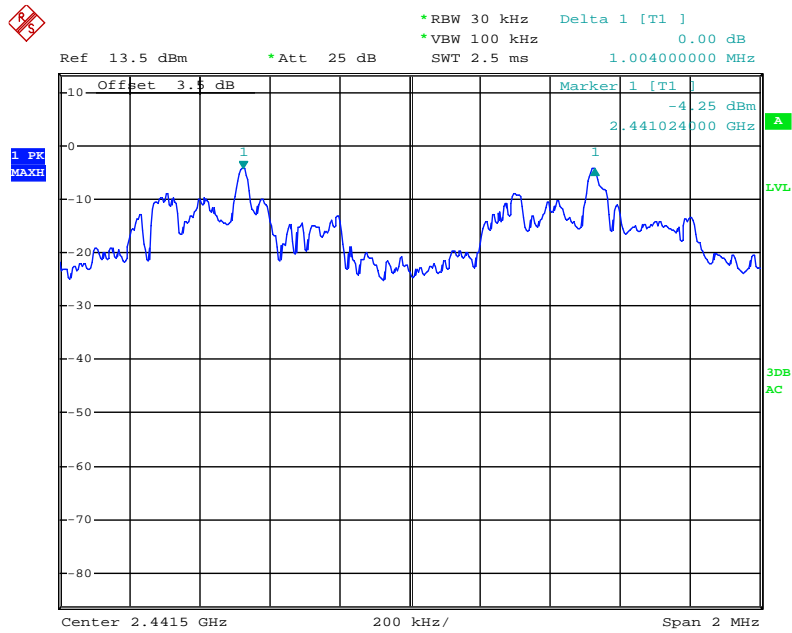
Note: Limit = 20 dB bandwidth *2/3

Low Channel



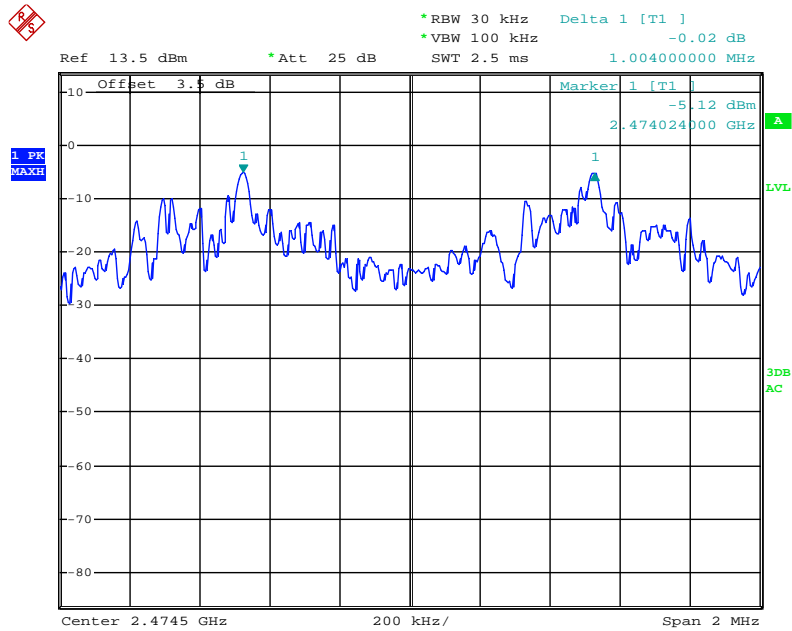
Date: 23.JUL.2012 08:40:23

Middle Channel



Date: 23.JUL.2012 08:43:52

High Channel



Date: 23.JUL.2012 08:45:57

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	EMI Test Receiver	ESCI	101122	2011-11-17	2012-11-16

* **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
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

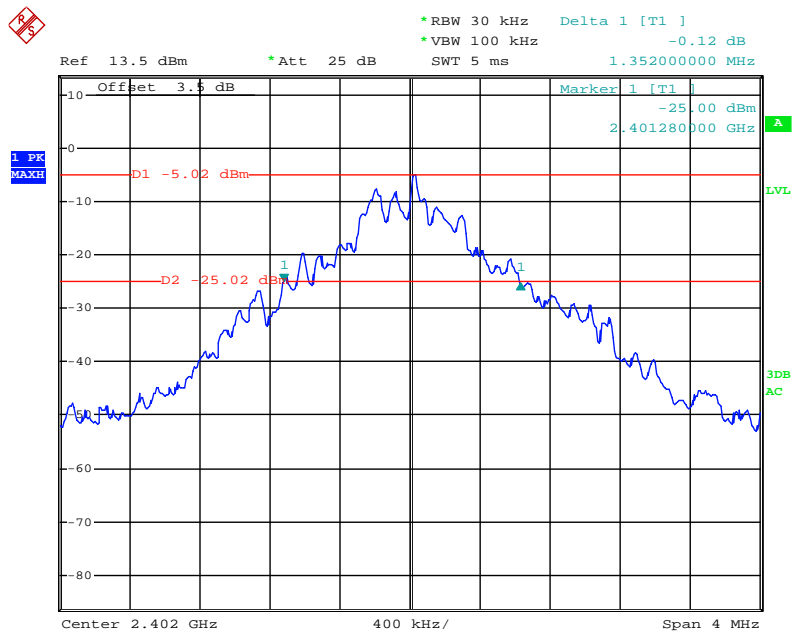
* The testing was performed by Tiger Ye on 2012-07-23.

Test Result: Compliance.

Please refer to following tables and plots

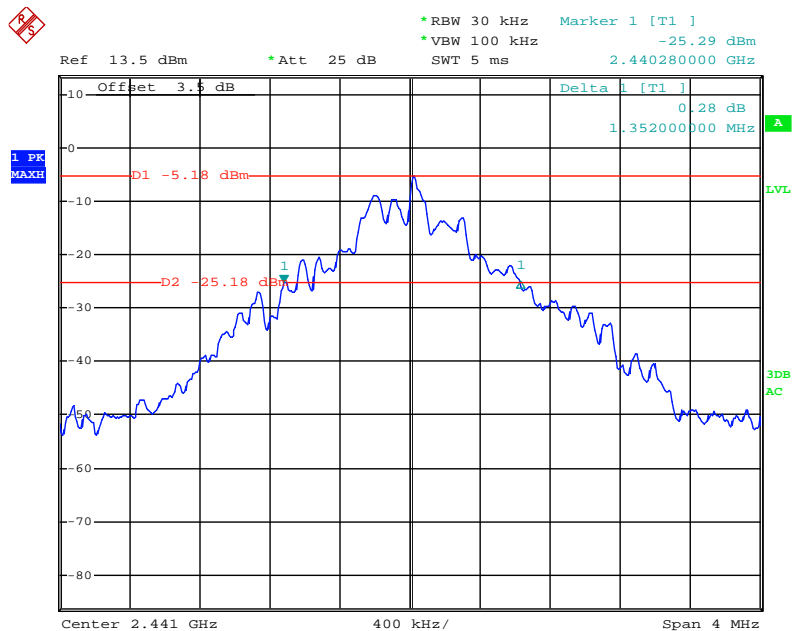
Test Mode: Transmitting

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	2402	1.352
Middle	2441	1.352
High	2476	1.336

Low Channel

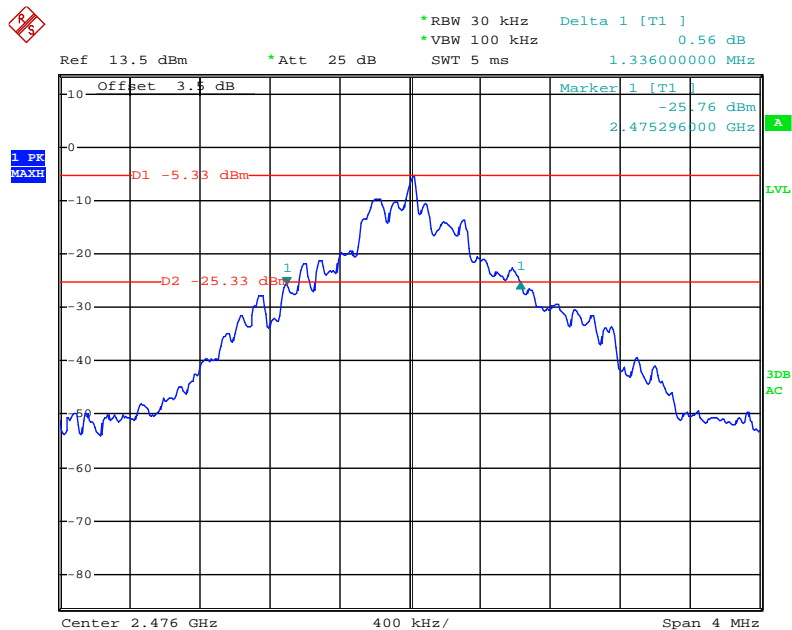
Date: 23.JUL.2012 08:11:17

Middle Channel



Date: 23.JUL.2012 08:13:04

High Channel



Date: 23.JUL.2012 08:17:10

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	101122	2011-11-17	2012-11-16

* **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 Tiger Ye on 2012-07-23.

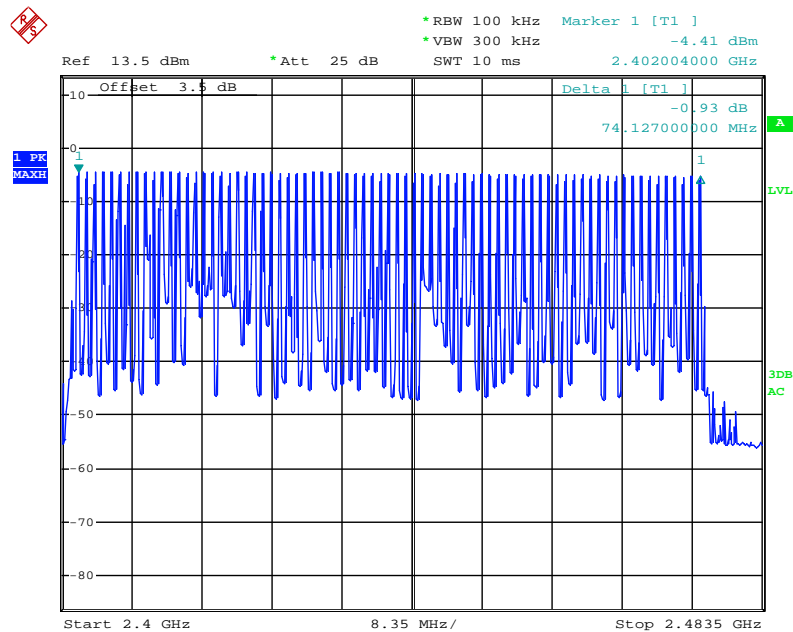
Test Result: Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.50	75	≥ 15

Number of Hopping Channels



Date: 23.JUL.2012 08:22:30

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	101122	2011-11-17	2012-11-16

* **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

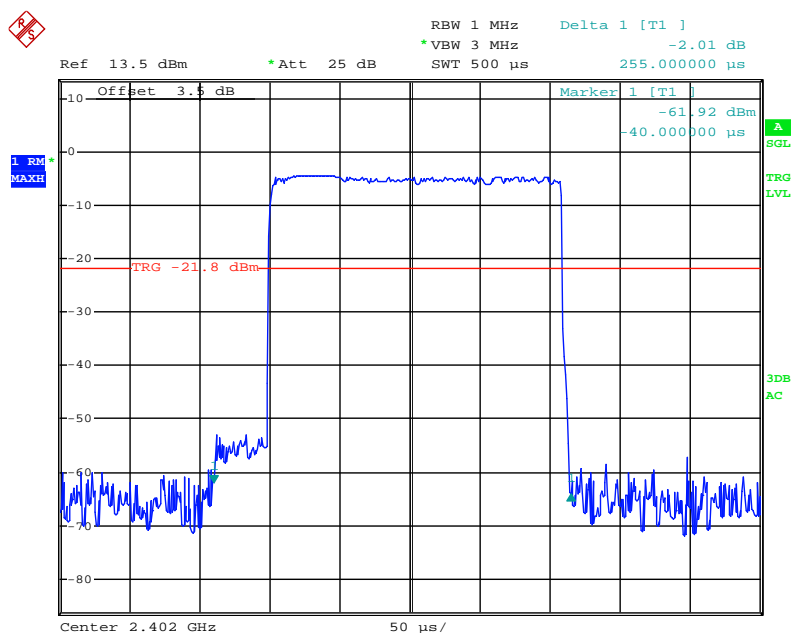
The testing was performed by Tiger Ye on 2012-07-23.

Test Result: Compliance.

Please refer to following tables and plots

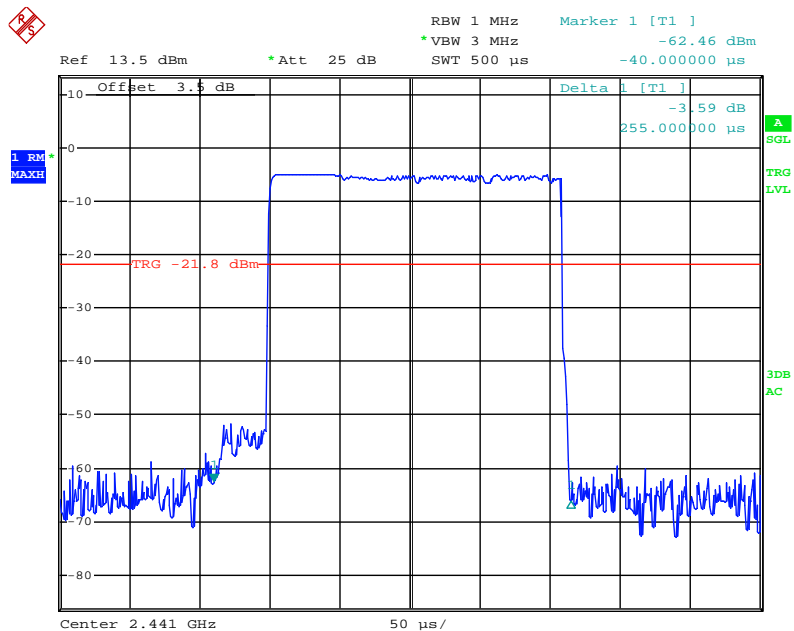
Test Mode: Transmitting

Channel	Pulse Width (ms)	Dwell Time (S)	Limit (S)	Result
Low	0.255	0.051	0.4	Pass
Middle	0.255	0.051	0.4	Pass
High	0.255	0.051	0.4	Pass
Note: Dwell time=Pulse time (ms) × (992/2/75) × 75×0.4 S				

Low Channel

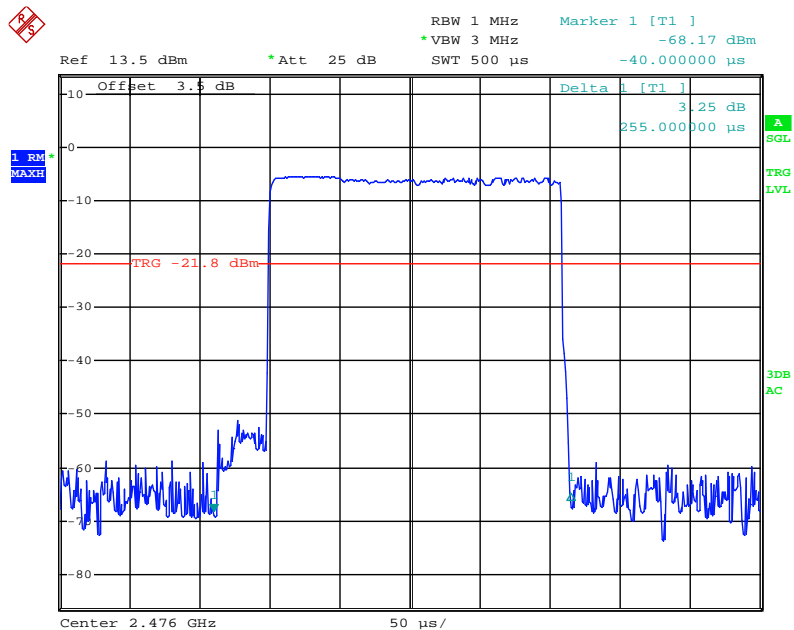
Date: 23.JUL.2012 08:56:07

Middle Channel



Date: 23.JUL.2012 08:57:11

High Channel



Date: 23.JUL.2012 08:57:40

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 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	EMI Test Receiver	ESCI	101122	2011-11-17	2012-11-16

* **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
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

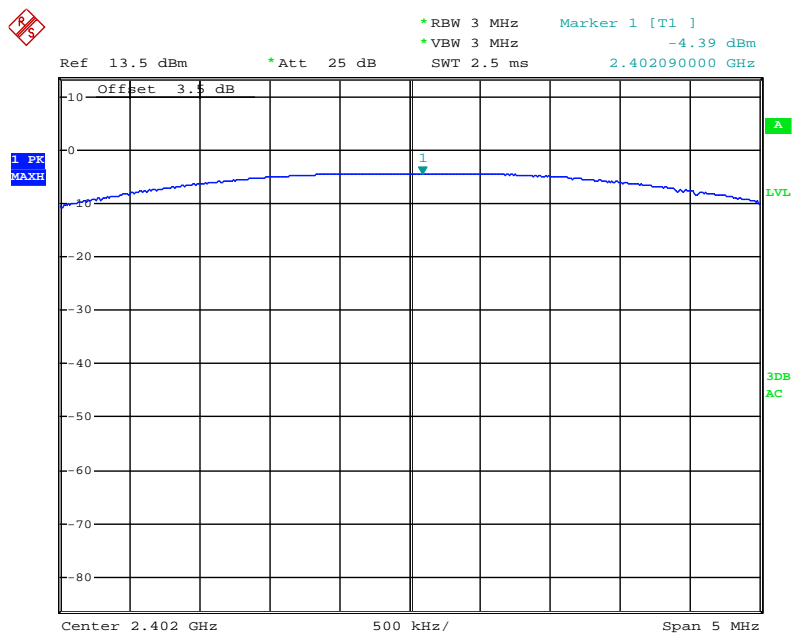
* The testing was performed by Tiger Ye on 2012-07-23.

Test Result: Compliance.

Test Mode: Transmitting

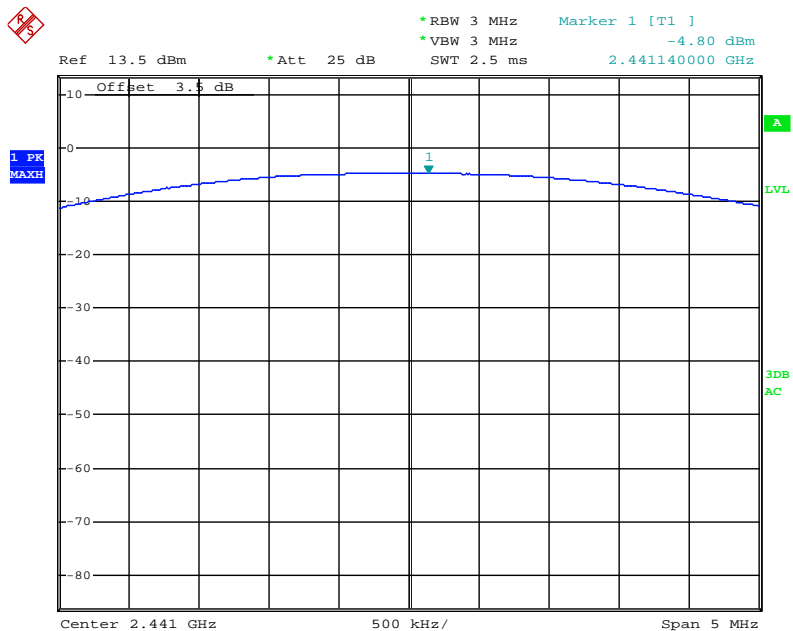
Channel	Channel frequency (MHz)	Conducted Output Power		Limit (mW)
		(dBm)	(mW)	
Low channel	2402	-4.39	0.36	1000
Middle channel	2441	-4.80	0.33	1000
High channel	2476	-5.52	0.28	1000

Low Channel



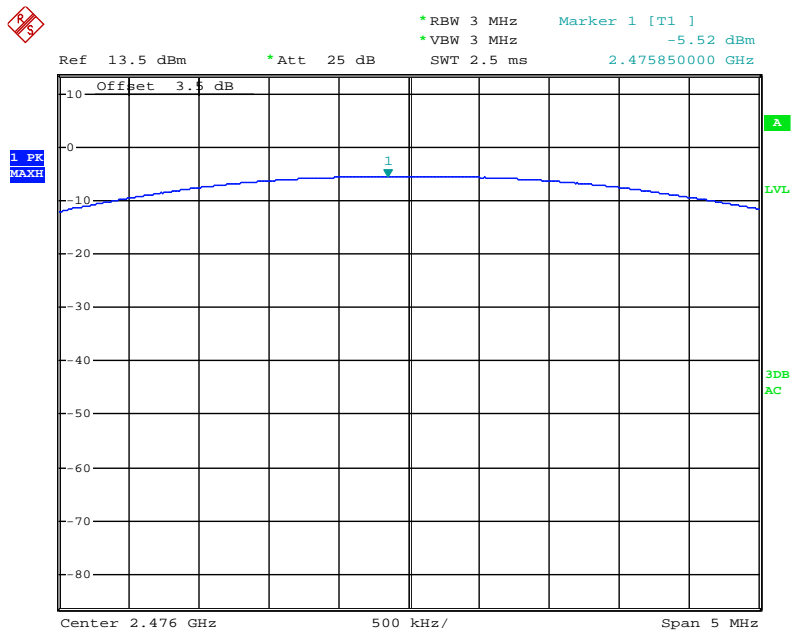
Date: 23.JUL.2012 08:48:08

Middle Channel



Date: 23.JUL.2012 08:48:50

High Chanel



Date: 23.JUL.2012 08:49:56

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 300 kHz and VBW of spectrum analyzer to 1 MHz 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	101122	2011-11-17	2012-11-16

* **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
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

*The testing was performed by Tiger Ye on 2012-07-23.

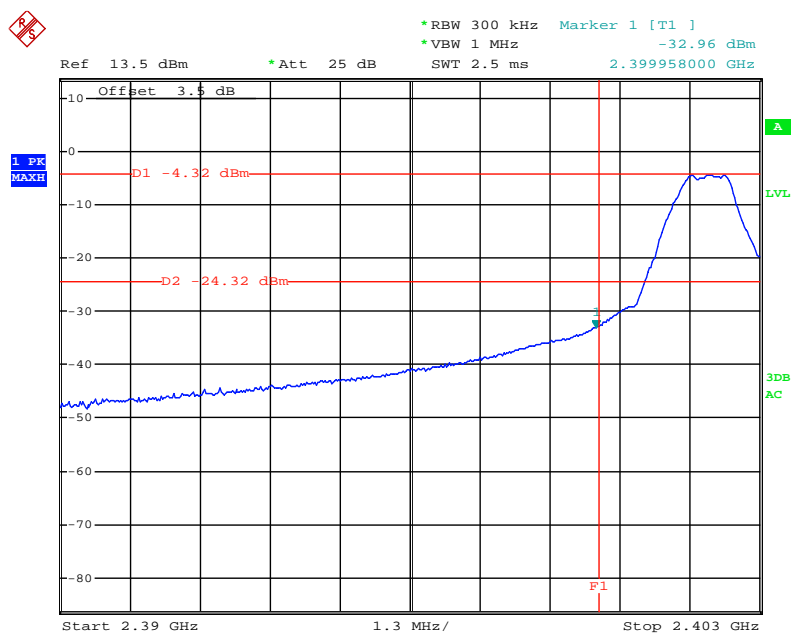
Test Result: Compliance.

Test Mode: Transmitting

Frequency (MHz)	Delta Peak to Band Emission (dBc)	Delta Limit (dBc)
2399.958	28.64	20
2483.568	39.66	20

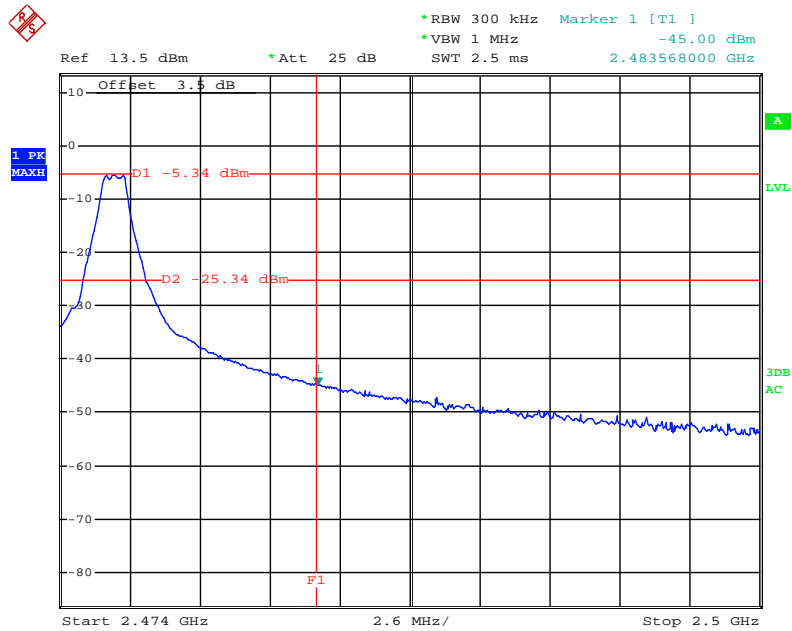
Please refer to follow plots:

Band Edge-Left Side



Date: 23.JUL.2012 09:03:58

Band Edge-Right Side



Date: 23.JUL.2012 09:07:09

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