

TEST REPORT

For

Zhongshan K-mate General Electronics Co., Ltd.

Fuwan Industrial Zone, Fuwan South Road, Sunwen East Road,
East District, Zhongshan, Guangdong, China

FCC PART 15.247

FCC ID: WAD-BTS010

Report Type: Original Report	Product Type: Bluetooth Speaker
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* 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 *Zhongshan K-mate General Electronics Co., Ltd's* product, model number: *BTS010* (FCC ID: *WAD-BTS010*) or the "EUT" as referred to in this report is a *Bluetooth Speaker*, which measures approximately: 10.8 cm (L) x 5.4 cm (W) x 2.5 cm (H), rated input voltage: DC 3.7 V built-in rechargeable battery

All measurement and test data in this report was gathered from production sample serial number: 1105020 (Assigned by BACL, Shenzhen). The EUT was received on 2011-05-16.

Objective

This Type approval report is prepared on behalf of *Zhongshan K-mate General Electronics Co., 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, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

N/A

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is 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 typical fashion (as normally used by a typical user).

Equipment Modifications

No modification was made to the unit tested.

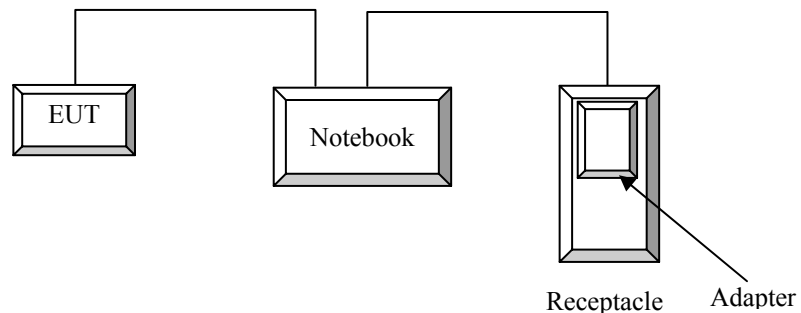
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Notebook	D600	00045-438-852-864

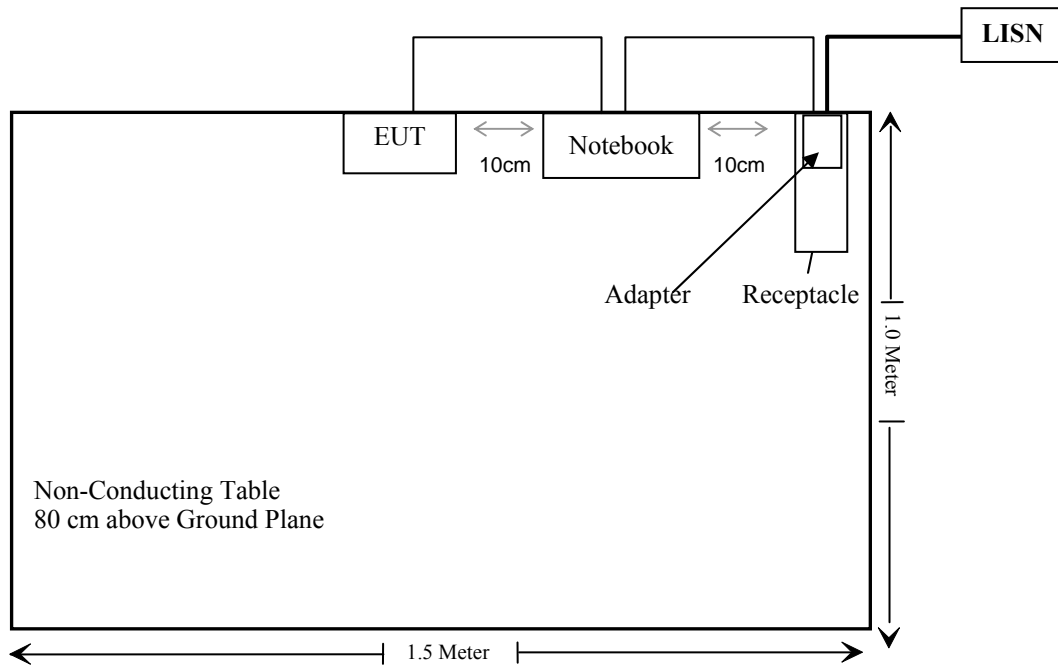
External I/O Cable

Cable Description	Length (m)	From Port	To
Unshielded Detachable USB Cable	1.2	EUT	Notebook

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1310 §2.1093	RF Exposure Information	Compliance
§15.203	Antenna Requirement	Compliance
§15.207(a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209 & §15.247(d)	Radiated Emissions	Compliance
§15.247(a)(1)	20 dB Emission 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 §1.1310 & §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 1) c), portable device with output power $>60/f_{\text{GHz}}$ mW shall include SAR data for equipment approval.

Result:

Maximum peak output power of device:

BDR: 3.60 dBm=2.291mW

EDR: 2.59 dBm=1.816mW

$60/f_{\text{GHz}} = 60/2.441 = 24.58 \text{ mW}$

This is a portable device and the Max peak output power of EUT is less than 24.58 mW, 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 layout antenna, the gain is 0 dBi, which in accordance to section 15.203, please refer to the internal photos.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

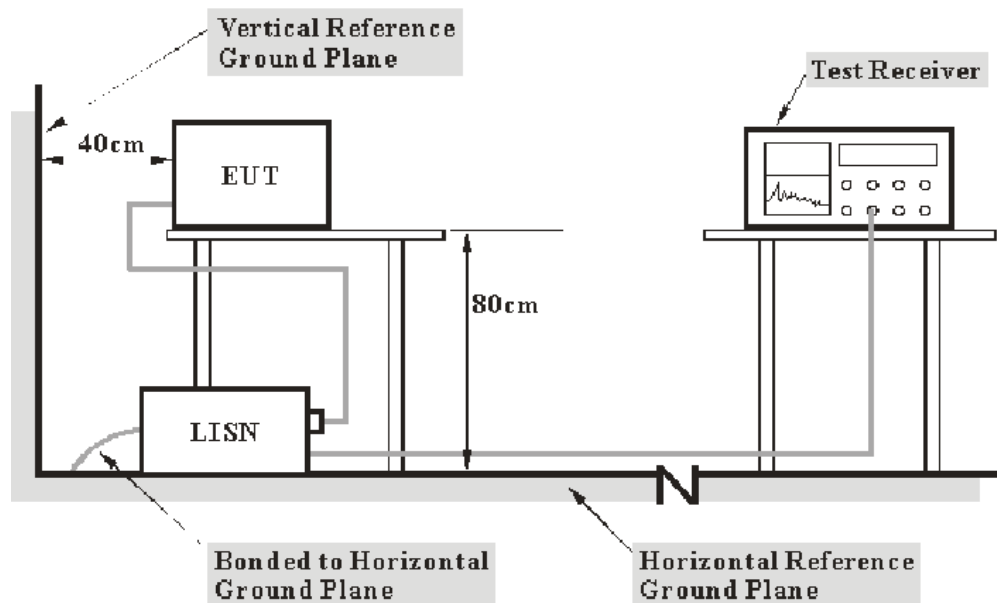
FCC §15.207

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratory Corp. (Shenzhen) is ± 2.4 dB (k=2, 95% level of confidence).

EUT Setup



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

The setup of EUT is according with per ANSI C63.4-2009 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter of notebook 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:

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

Test Procedure

During the conducted emission test, the adapter of notebook was connected to the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Test 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

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

Test Results Summary

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

21.74 dB at 4.905 MHz in the Neutral conducted mode

Test Data

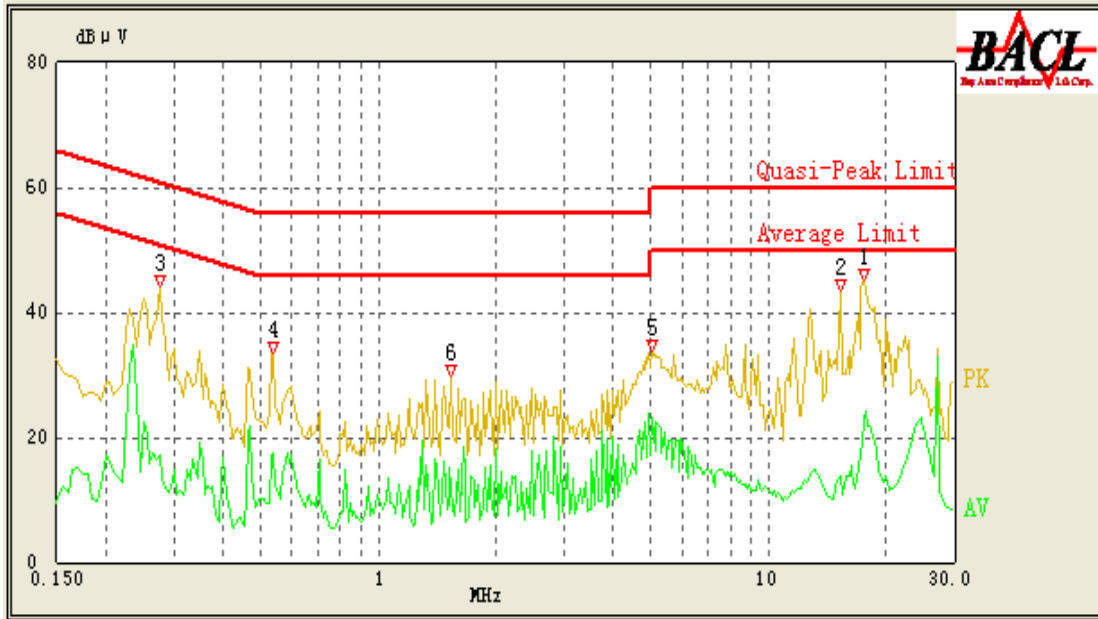
Environmental Conditions

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

The testing was performed by Felix Li on 2011-06-18.

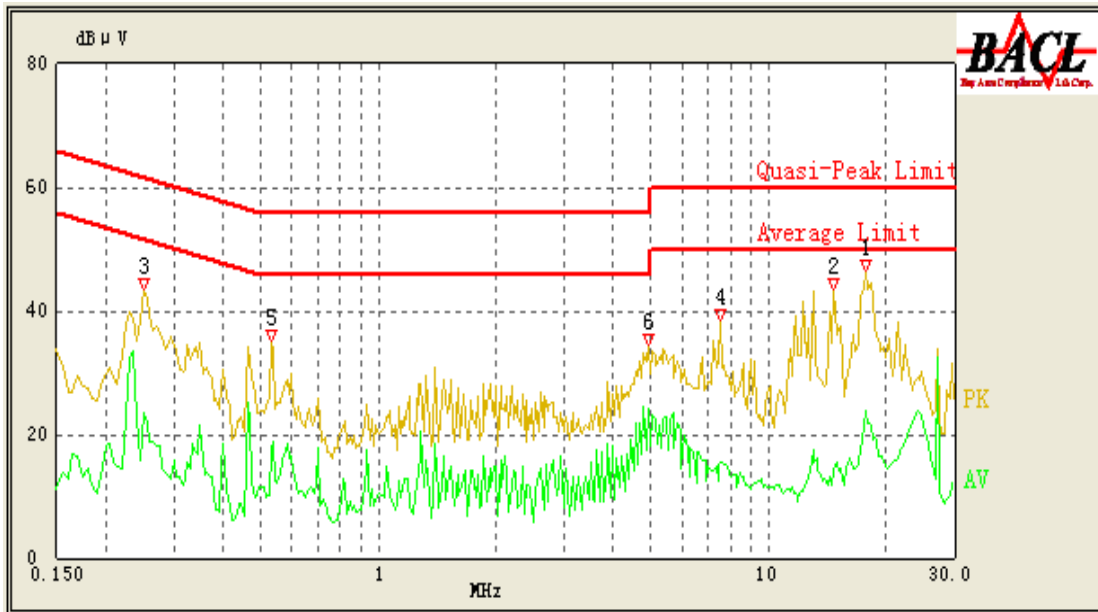
Test Mode: Charging & Communicating

AC 120 V, 60 Hz, Line:



Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	Corrected Result (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Remark (PK/QP/Ave.)
5.045	23.14	10.20	50.00	26.86	Ave.
17.615	22.77	10.20	50.00	27.23	Ave.
0.535	17.60	10.10	46.00	28.40	Ave.
0.535	27.22	10.10	56.00	28.78	QP
17.495	29.60	10.20	60.00	30.40	QP
1.525	15.19	10.12	46.00	30.81	Ave.
1.530	24.87	10.12	56.00	31.13	QP
0.275	28.54	10.10	62.43	33.89	QP
5.045	24.83	10.20	60.00	35.17	QP
0.275	17.15	10.10	52.43	35.28	Ave.
15.300	13.74	10.20	50.00	36.26	Ave.
15.360	22.15	10.20	60.00	37.85	QP

AC 120V, 60 Hz, Neutral:



Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	Corrected Result (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Remark (PK/QP/Ave.)
4.905	24.26	10.20	46.00	21.74	Ave.
0.250	37.61	10.10	63.14	25.53	QP
17.695	23.95	10.20	50.00	26.05	Ave.
0.530	28.95	10.10	56.00	27.05	QP
0.530	17.41	10.10	46.00	28.59	Ave.
17.705	31.25	10.20	60.00	28.75	QP
0.250	23.39	10.10	53.14	29.75	Ave.
4.905	24.18	10.20	56.00	31.82	QP
7.480	15.26	10.20	50.00	34.74	Ave.
14.715	14.26	10.20	50.00	35.74	Ave.
14.715	22.06	10.20	60.00	37.94	QP
7.540	19.97	10.20	60.00	40.03	QP

FCC §15.205, §15.209 & §15.247(d) – RADIATED EMISSIONS

Applicable Standard

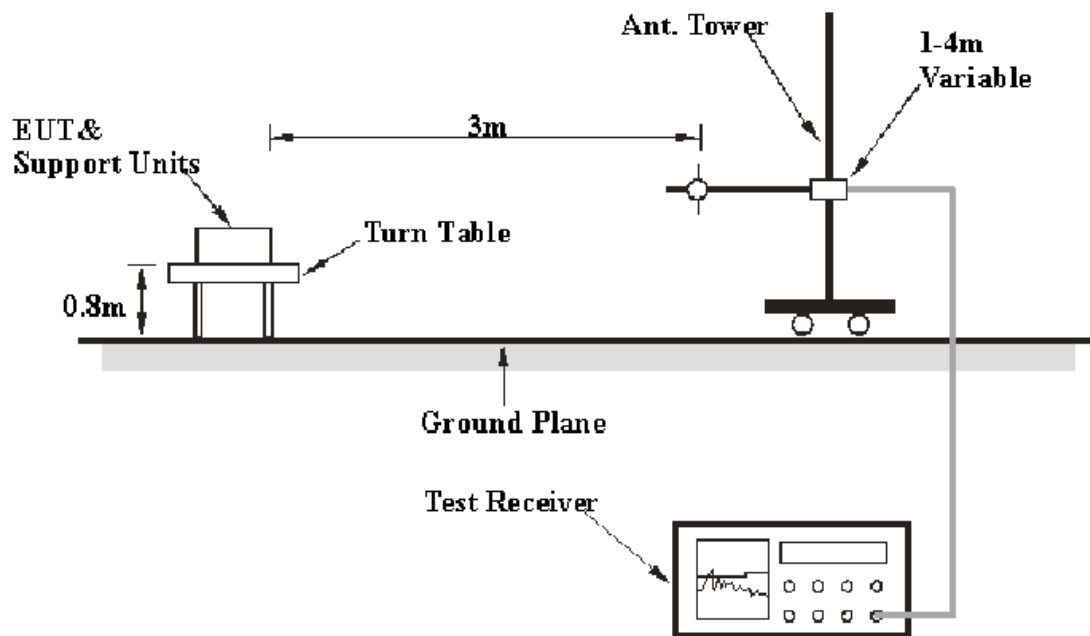
FCC §15.205; §15.209; §15.247(d)

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is ± 4.0 dB. ($k=2$, 95% level of confidence).

EUT Setup



The radiated emission tests were performed in the 3 meters, 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 -1 GHz and peak and Average detection modes for frequencies above 1 GHz.

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 7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447D	2944A09795	2010-08-02	2011-08-02
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2010-07-05	2011-07-04
Mini-Circuits	Amplifier	ZVA-213+	T-E27H	2011-03-08	2012-03-08
Sunol Sciences	Horn Antenna	DRH-118	A052604	2010-05-05	2011-05-04
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2010-07-08	2011-07-08

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

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, and section 15.205, 15.209 and 15.247, with the worst margin reading of:

Worst case:

1.9 dB at 90.637000 MHz in the **Vertical** polarization below 1 GHz (EDR)

Test Data

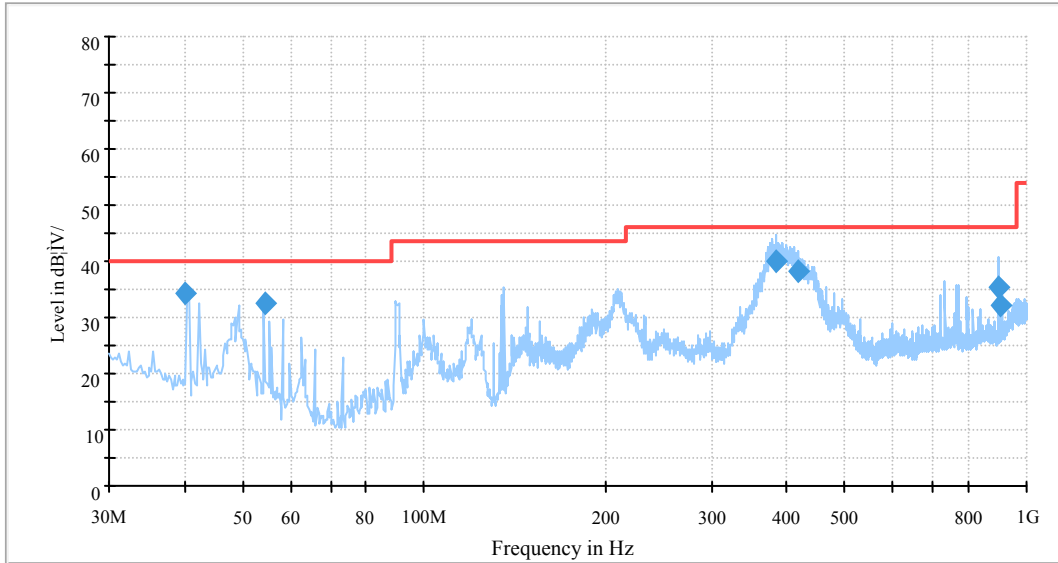
Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	56 %
ATM Pressure:	101 kPa

** The testing was performed by Felix Li on 2011-06-16.*

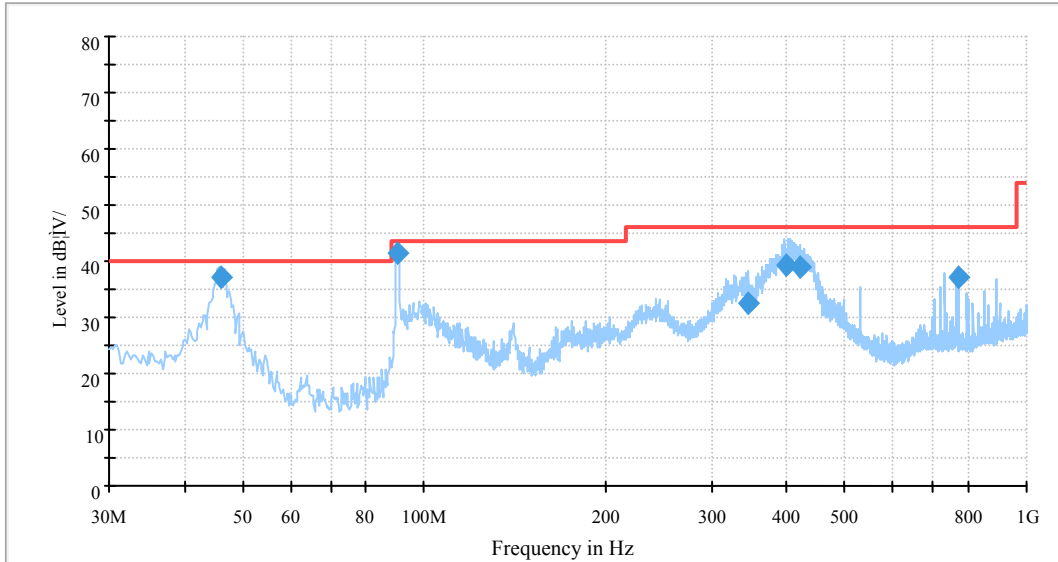
1) Below 1 GHz:

Test mode: Charging & Communicating (BDR)



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Test Antenna		Turntable Position (degree)	Limit (dBµV/m)	Margin (dB)
		Height (cm)	Polarity (H/V)			
40.250250	34.2	167.0	V	90.0	40.0	5.8
383.145250	39.9	100.0	H	278.0	46.0	6.1
54.391000	32.6	121.0	V	257.0	40.0	7.4
417.669500	38.3	101.0	H	164.0	46.0	7.7
897.474500	35.3	100.0	V	7.0	46.0	10.7
905.286500	32.3	120.0	V	36.0	46.0	22.7

Test mode: Charging & Communicating (EDR)



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Test Antenna		Turntable Position (degree)	Limit (dBµV/m)	Margin (dB)
		Height (cm)	Polarity (H/V)			
90.637000	41.6	100.0	V	59.0	43.5	1.9*
46.167000	37.1	100.0	V	261.0	40.0	2.9*
397.577000	39.4	101.0	H	350.0	46.0	6.6
421.340750	39.1	102.0	H	0.0	46.0	6.9
768.062000	37.0	100.0	V	103.0	46.0	9.0
344.955500	32.6	137.0	H	264.0	46.0	13.4

* Within measurement uncertainty!

2) Above 1 GHz*Test mode: Transmitting (BDR)*

Frequency (MHz)	Receiver Reading (dB μ V)	Detector (PK/QP/Ave)	Direction (Degree)	Test Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dB μ V/m)	FCC Part 15.247/205/209		
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dB μ V/m)	Margin (dB)	Note
Low Channel (2402 MHz)												
4804	34.10	Ave.	114	1.8	H	36.6	4.30	26.75	48.25	54	5.75	harmonic
4804	31.26	Ave.	65	1.8	V	35.4	4.30	26.75	44.21	54	9.79	harmonic
4804	44.94	PK	114	1.8	H	36.6	4.30	26.75	59.09	74	14.91	harmonic
4804	45.18	PK	65	1.8	V	35.4	4.30	26.75	58.13	74	15.87	harmonic
2385.67	21.43	Ave.	18	1.3	H	30.6	2.98	26.83	28.18	54	25.82	spurious
2378.13	20.52	Ave.	227	1.3	V	30.6	2.98	26.83	27.27	54	26.73	spurious
2385.67	35.78	PK	18	1.3	H	30.6	2.98	26.83	42.53	74	31.47	spurious
2378.13	34.79	PK	227	1.3	V	30.6	2.98	26.83	41.54	74	32.46	spurious
Middle Channel (2441 MHz)												
4882	36.12	Ave.	164	1.3	V	35.4	4.36	26.75	49.13	54	4.87	harmonic
4882	34.86	Ave.	235	1.3	H	36.6	4.36	26.75	49.07	54	4.93	harmonic
4882	45.23	PK	235	1.3	H	36.6	4.36	26.75	59.44	74	14.56	harmonic
4882	45.93	PK	164	1.3	V	35.4	4.36	26.75	58.94	74	15.06	harmonic
High Channel (2480 MHz)												
4960	33.95	Ave.	332	1.2	H	36.6	4.40	26.75	48.2	54	5.80	harmonic
4960	34.12	Ave.	154	1.2	V	35.4	4.40	26.75	47.17	54	6.83	harmonic
4960	43.86	PK	332	1.2	H	36.6	4.40	26.75	58.11	74	15.89	harmonic
4960	44.02	PK	154	1.2	V	35.4	4.40	26.75	57.07	74	16.93	harmonic
2483.56	26.24	Ave.	254	1.4	H	30.6	3.03	26.88	32.99	54	21.01	spurious
2483.58	26.01	Ave.	152	1.3	V	29.8	3.03	26.88	31.96	54	22.04	spurious
2483.56	41.36	PK	254	1.4	H	30.6	3.03	26.88	48.11	74	25.89	spurious
2483.58	40.98	PK	153	1.3	V	29.8	3.03	26.88	46.93	74	27.07	spurious

Test mode: Transmitting (EDR)

Frequency (MHz)	Receiver Reading (dBµV)	Detector (PK/QP/Ave)	Direction (Degree)	Test Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBµV/m)	FCC Part 15.247/205/205		
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	Note
Low Channel (2402 MHz)												
4804	26.54	Ave.	122	1.2	H	36.6	4.30	26.75	40.69	54	13.31	harmonic
4804	26.53	Ave.	145	1.4	V	35.4	4.30	26.75	39.48	54	14.52	harmonic
4804	42.60	PK	122	1.2	H	36.6	4.30	26.75	56.75	74	17.25	harmonic
4804	39.47	PK	145	1.4	V	35.4	4.30	26.75	52.42	74	21.58	harmonic
2314.8	23.63	Ave.	226	1.3	H	30.6	2.98	26.83	30.38	54	23.62	spurious
2327.6	22.19	Ave.	325	1.2	V	30.6	2.98	26.83	28.94	54	25.06	spurious
2314.8	35.18	PK	226	1.3	H	30.6	2.98	26.83	41.93	74	32.07	spurious
2327.6	34.95	PK	325	1.2	V	30.6	2.98	26.83	41.7	74	32.30	spurious
Middle Channel (2441 MHz)												
4882	26.94	Ave.	125	1.5	H	36.6	4.36	26.75	41.15	54	12.85	harmonic
4882	26.75	Ave.	345	1.4	V	35.4	4.36	26.75	39.76	54	14.24	harmonic
4882	42.86	PK	125	1.5	H	36.6	4.36	26.75	57.07	74	16.93	harmonic
4882	42.86	PK	125	1.5	H	36.6	4.36	26.75	57.07	74	16.93	harmonic
4882	40.15	PK	345	1.4	V	35.4	4.36	26.75	53.16	74	20.84	harmonic
High Channel (2480 MHz)												
4960	25.76	Ave.	127	1.2	H	36.6	4.40	26.75	40.01	54	13.99	harmonic
4960	25.08	Ave.	78	1.3	V	35.4	4.40	26.75	38.13	54	15.87	harmonic
4960	41.25	PK	127	1.2	H	36.6	4.40	26.75	55.5	74	18.50	harmonic
2483.56	26.33	Ave.	330	1.2	H	30.6	3.03	26.88	33.08	54	20.92	spurious
4960	38.48	PK	78	1.3	V	35.4	4.40	26.75	51.53	74	22.47	harmonic
2483.53	25.36	Ave.	165	1.4	V	29.8	3.03	26.88	31.31	54	22.69	spurious
2483.56	41.99	PK	330	1.5	H	30.6	3.03	26.88	48.74	74	25.26	spurious
2483.53	40.86	PK	165	1.4	V	29.8	3.03	26.88	46.81	74	27.19	spurious

FCC §15.247(a) (1) - CHANNEL SEPARATION TEST

Applicable Standard

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB 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 20 dB 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 transmitting mode, spectrum Bandwidth was set at 100 kHz, maxhold the channel.
2. Set the adjacent channel of the EUT maxhold another truce
3. Measure the channel separation.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10

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

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	56 %
ATM Pressure:	101 kPa

* *The testing was performed by Felix Li on 2011-06-15.*

Test Result: Compliance.

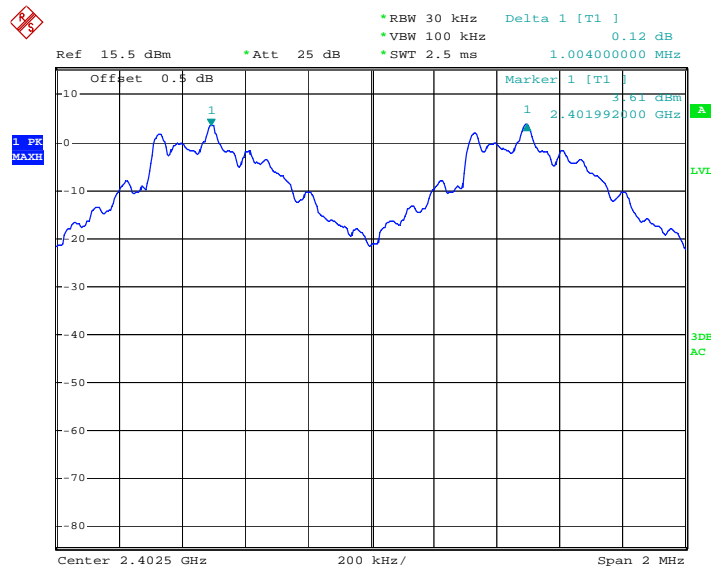
Please refer to following tables and plots

Test Mode: Transmitting

Mode	Channel	Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
BDR	Low	2402	1.004	0.824	Pass
	Adjacent	2403			
	Middle	2441	1.004	0.824	Pass
	Adjacent	2442			
	High	2480	1.004	0.824	Pass
	Adjacent	2479			
EDR	Low	2402	1.008	1.208	Pass
	Adjacent	2403			
	Middle	2441	1.008	1.216	Pass
	Adjacent	2442			
	High	2480	1.008	1.216	Pass
	Adjacent	2479			

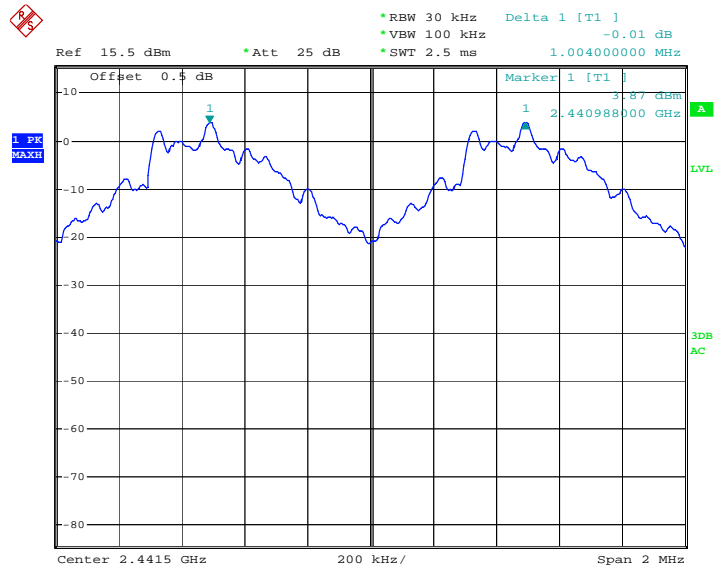
BDR:

Low Channel



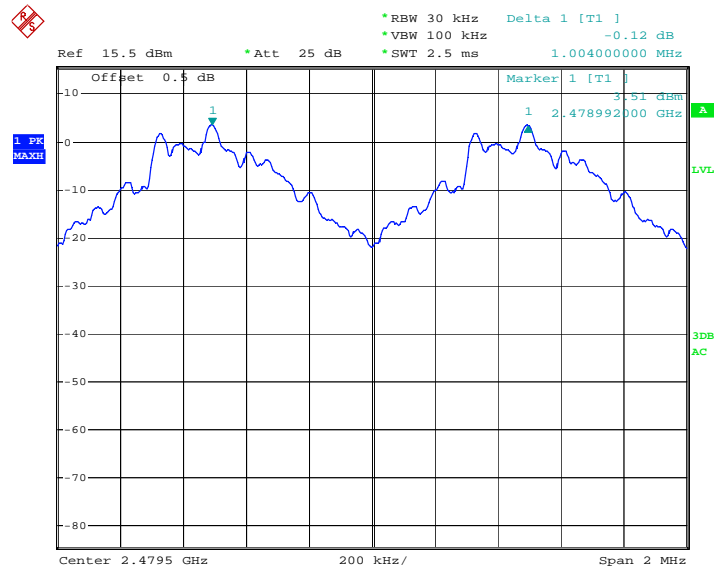
Date: 15.JUN.2011 12:33:13

Middle Channel



Date: 15.JUN.2011 12:34:02

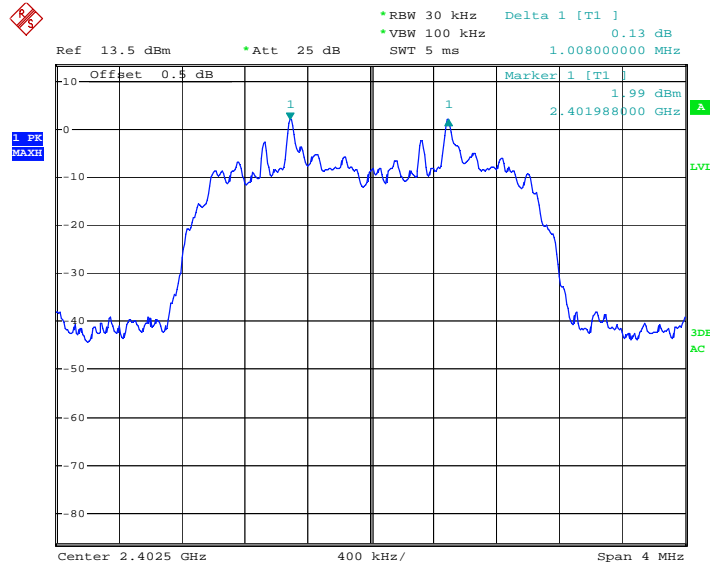
High Channel



Date: 15.JUN.2011 12:34:45

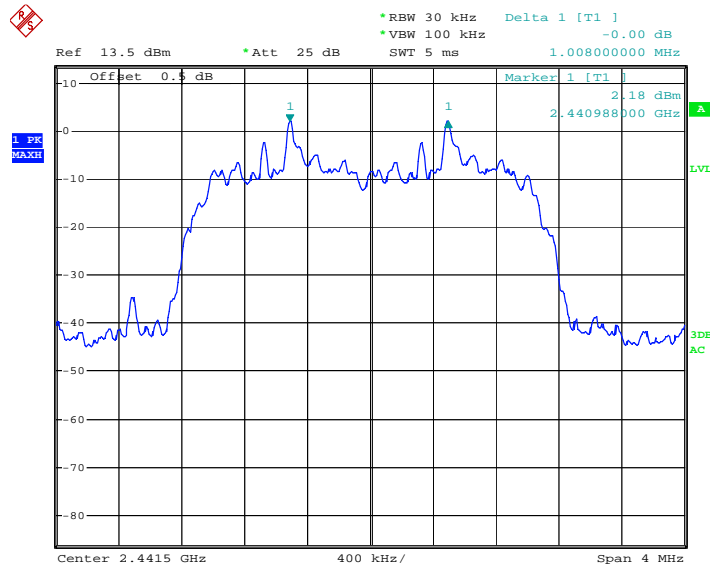
EDR:

Low Channel



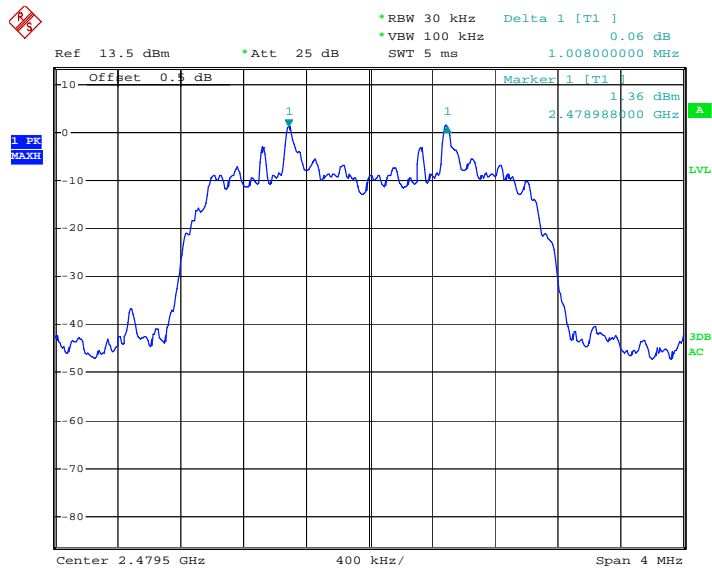
Date: 15.JUN.2011 18:36:00

Middle Channel



Date: 15.JUN.2011 18:36:42

High Channel



Date: 15.JUN.2011 18:37:24

FCC §15.247(a) (1) – 20 dB EMISSION 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 125 mW.

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. Turn on the EUT and connect it to measurement instrument. 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	100035	2010-11-11	2011-11-10

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

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	101 kPa

* The testing was performed by Felix Li on 2011-06-15.

Test Result: Compliance.

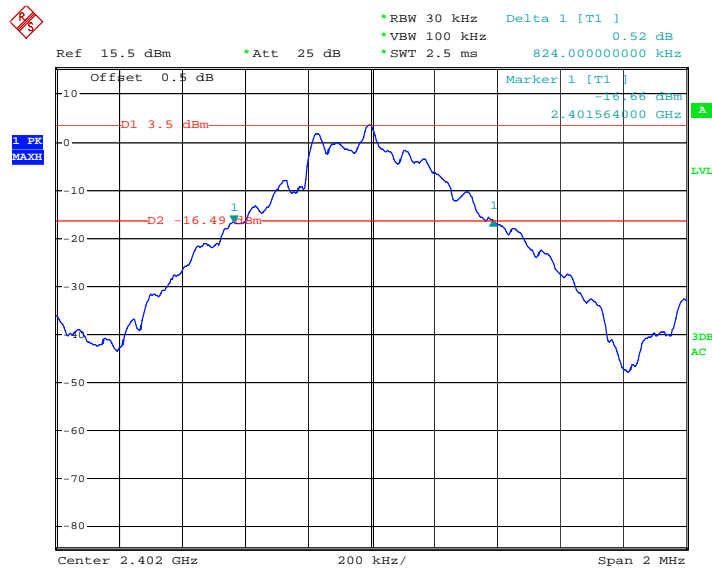
Please refer to following tables and plots

Test Mode: Transmitting

Mode	Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
BDR	Low	2402	0.824
	Middle	2441	0.824
	High	2480	0.824
EDR	Low	2402	1.208
	Middle	2441	1.216
	High	2480	1.216

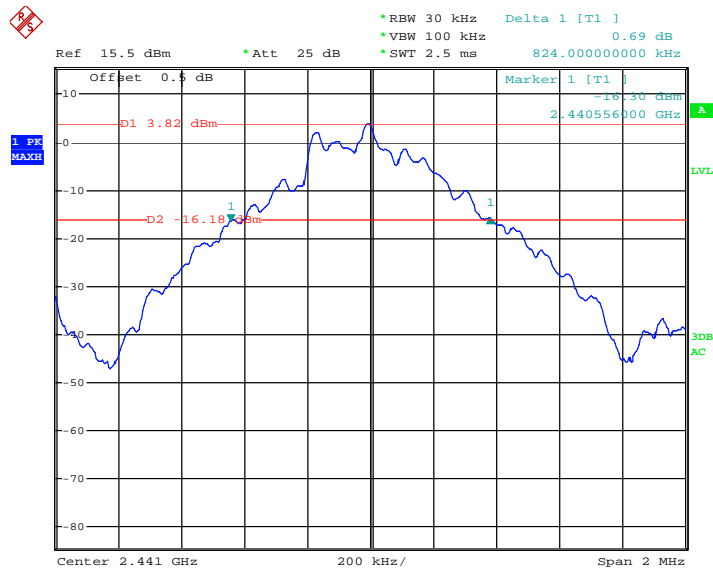
BDR:

Low Channel



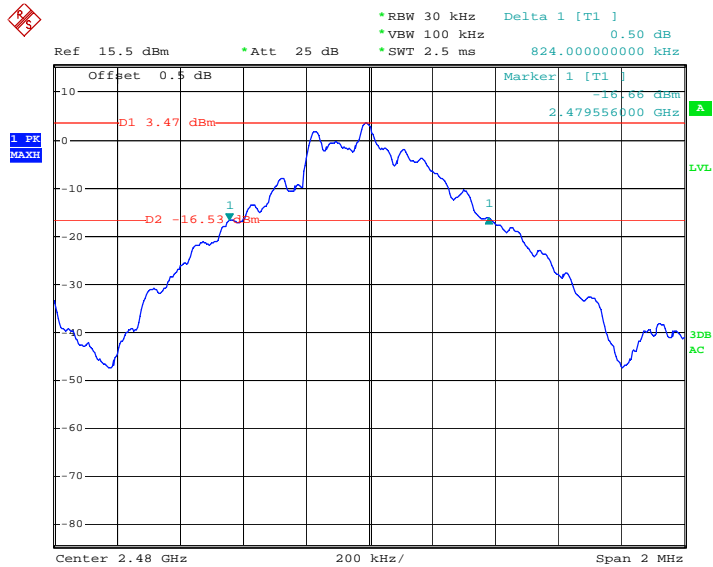
Date: 15.JUN.2011 12:29:10

Middle Channel



Date: 15.JUN.2011 12:30:41

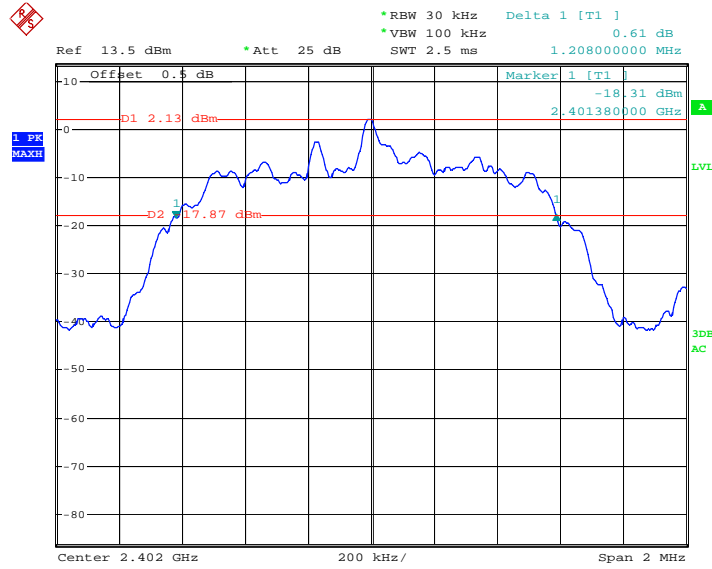
High Channel



Date: 15.JUN.2011 12:31:46

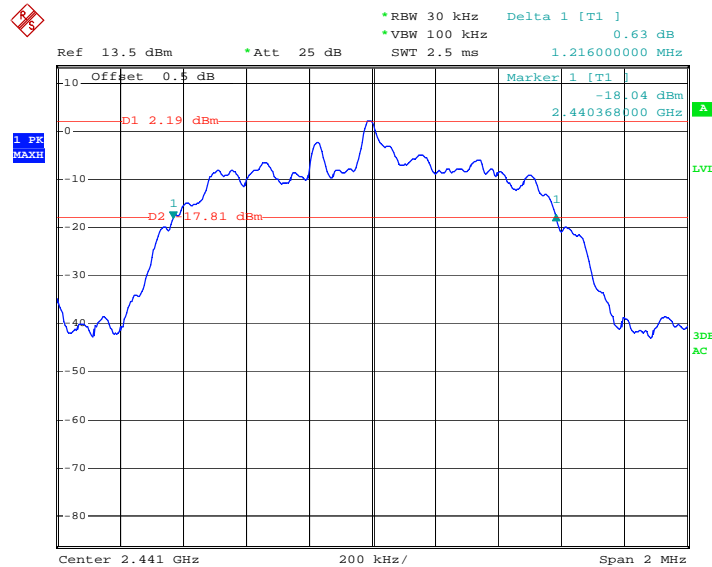
EDR:

Low Channel



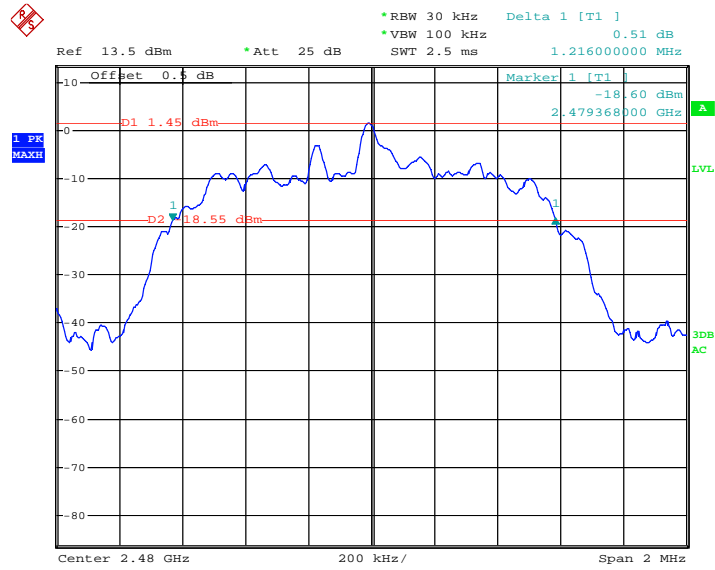
Date: 15.JUN.2011 18:26:14

Middle Channel



Date: 15.JUN.2011 18:24:59

High Channel



Date: 15.JUN.2011 18:27:30

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

Applicable Standard

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

Test Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Set the EUT in hopping mode from first channel to last.
3. By using the Max-Hold function record the Quantity of the channel.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10

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

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	56 %
ATM Pressure:	101 kPa

The testing was performed by Felix Li on 2011-06-15.

Test Result: Compliance.

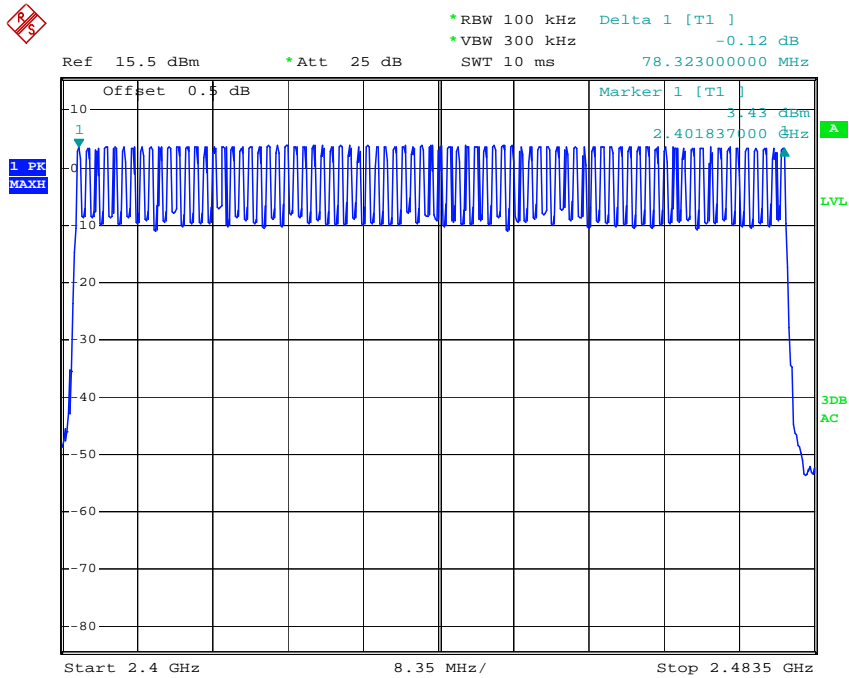
Please refer to following table and plots

Test Mode: Transmitting

Mode	Frequency Range (MHz)	Number of Hopping Channel (CH)	Limit (CH)
BDR	2400~2483.5	79	≥ 15
EDR	2400~2483.5	79	≥ 15

BDR:

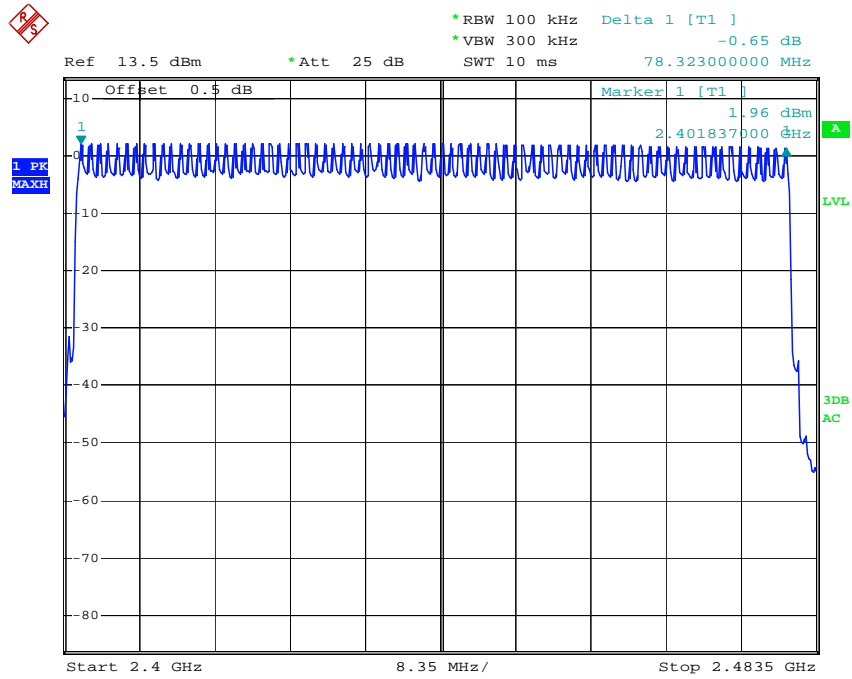
Number of Hopping Channels



Date: 15.JUN.2011 13:01:49

EDR:

Number of Hopping Channels



Date: 15.JUN.2011 18:46:53

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*hop rate/number of hopping channels*31.6S
Hop rate=1600/S

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10

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

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	56 %
ATM Pressure:	101 kPa

* The testing was performed by Felix Li on 2011-06-15.

Test Result: Compliance.

Please refer to following table and plots

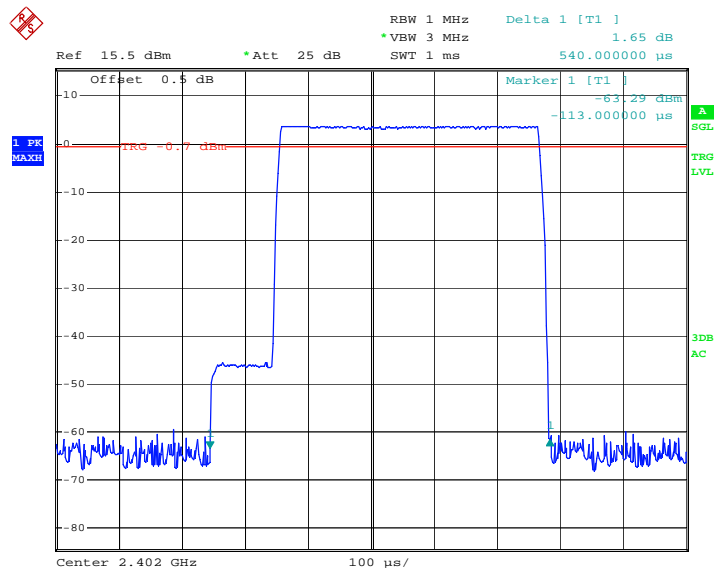
DH1:

Test Mode: Transmitting

Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
BDR	Low	0.540	0.1728	0.4	Pass
	Middle	0.540	0.1728	0.4	Pass
	High	0.540	0.1728	0.4	Pass
	Note: Dwell time = Pulse time*(1600/2/79)*31.6S				
EDR	Low	0.556	0.17792	0.4	Pass
	Middle	0.556	0.17792	0.4	Pass
	High	0.556	0.17792	0.4	Pass
	Note: Dwell time = Pulse time*(1600/2/79)*31.6S				

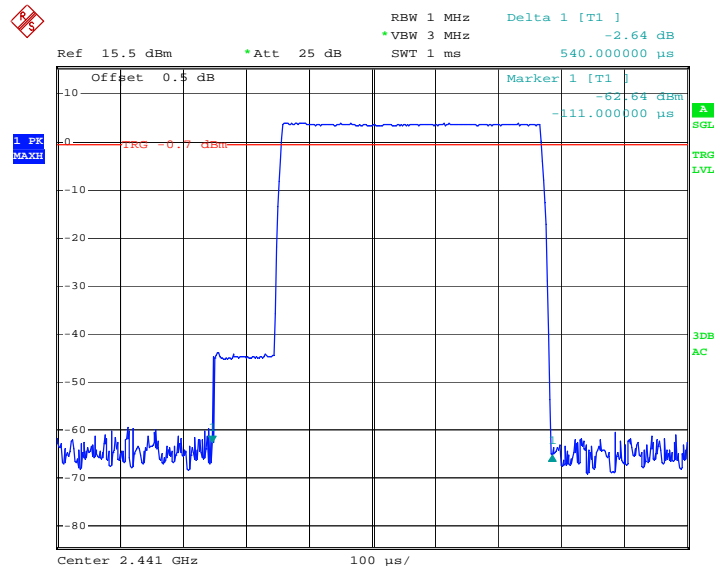
BDR:

Low Channel



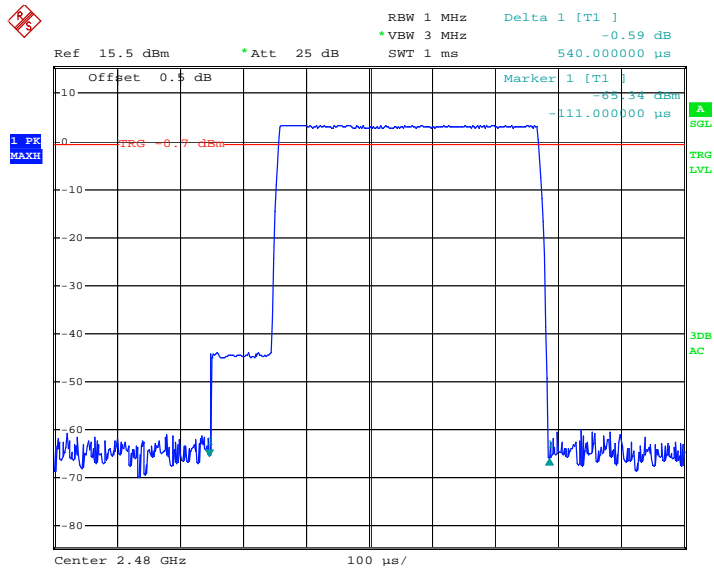
Date: 15.JUN.2011 19:27:37

Middle Channel



Date: 15.JUN.2011 19:26:55

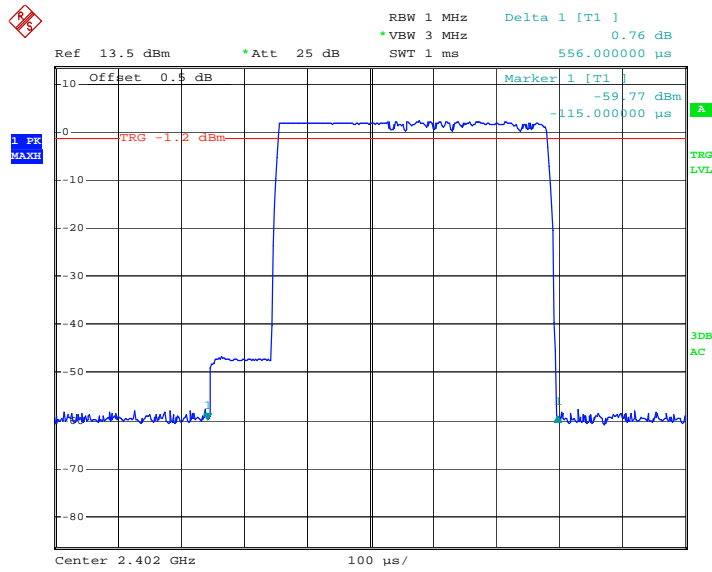
High Channel



Date: 15.JUN.2011 19:26:24

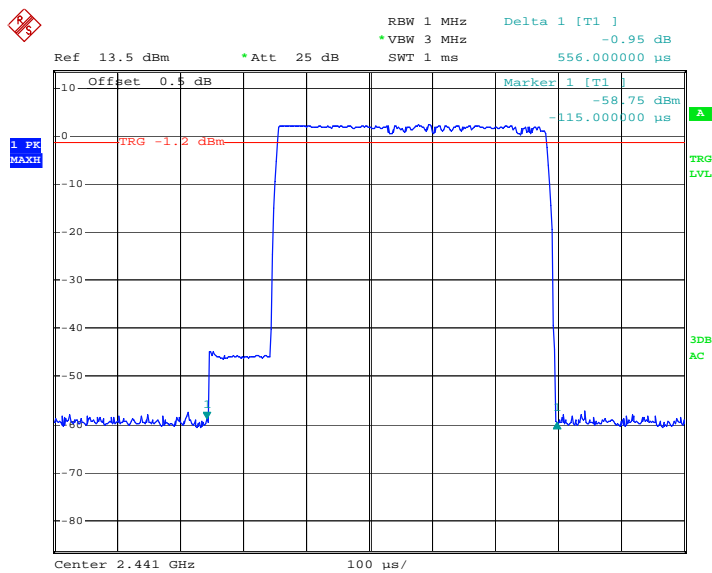
EDR:

Low Channel



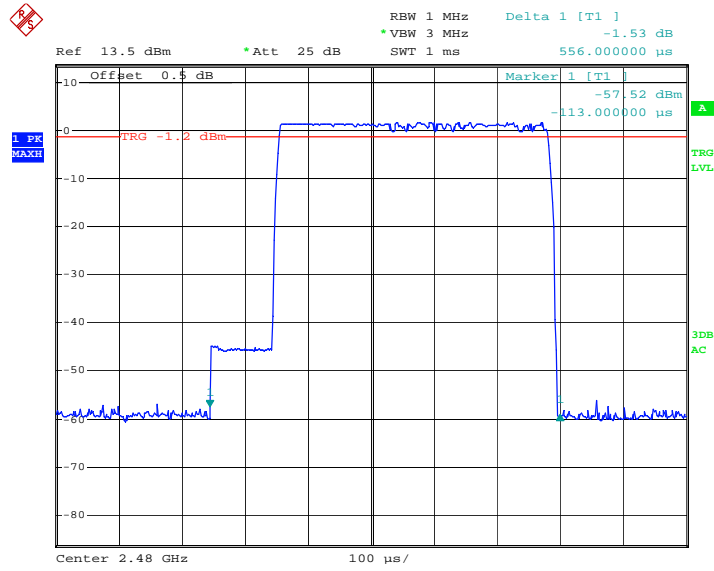
Date: 15.JUN.2011 19:23:47

Middle Channel



Date: 15.JUN.2011 19:24:19

High Channel



Date: 15.JUN.2011 19:24:59

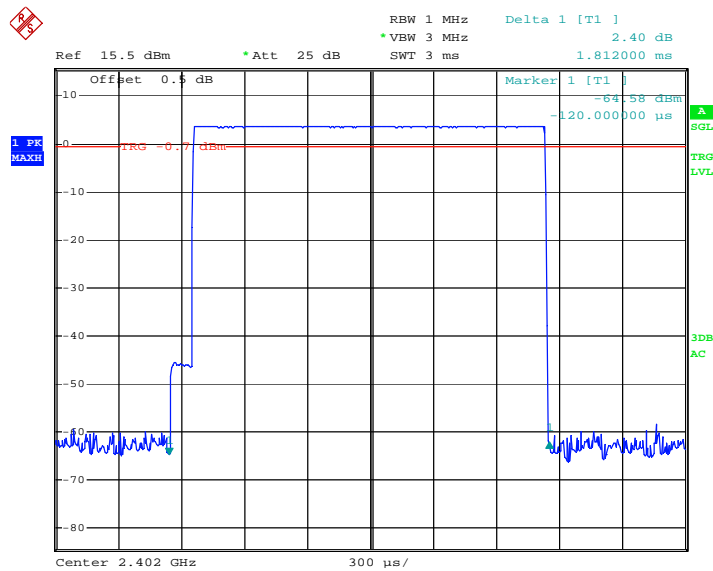
DH3:

Test Mode: Transmitting

Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
BDR	Low	1.812	0.28992	0.4	Pass
	Middle	1.812	0.28992	0.4	Pass
	High	1.812	0.28992	0.4	Pass
	<i>Note: Dwell time = Pulse time*(1600/4/79)*31.6S</i>				
EDR	Low	1.8288	0.292608	0.4	Pass
	Middle	1.8288	0.292608	0.4	Pass
	High	1.8288	0.292608	0.4	Pass
	<i>Note: Dwell time = Pulse time*(1600/4/79)*31.6S</i>				

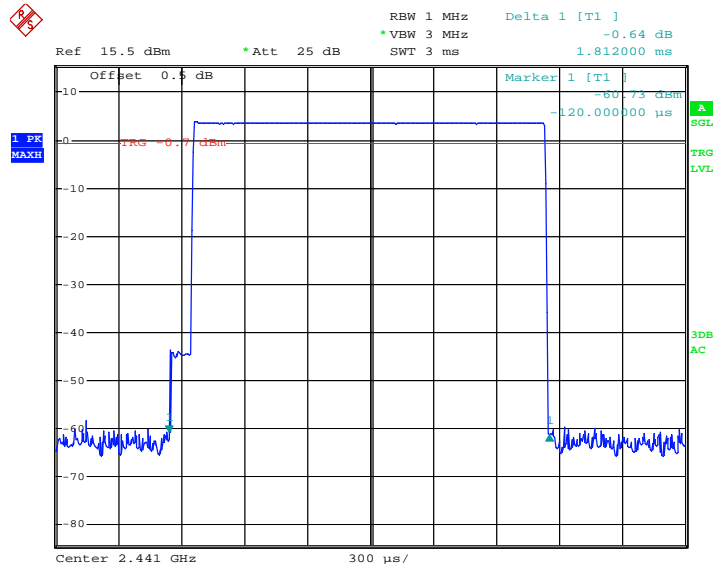
BDR:

Low Channel



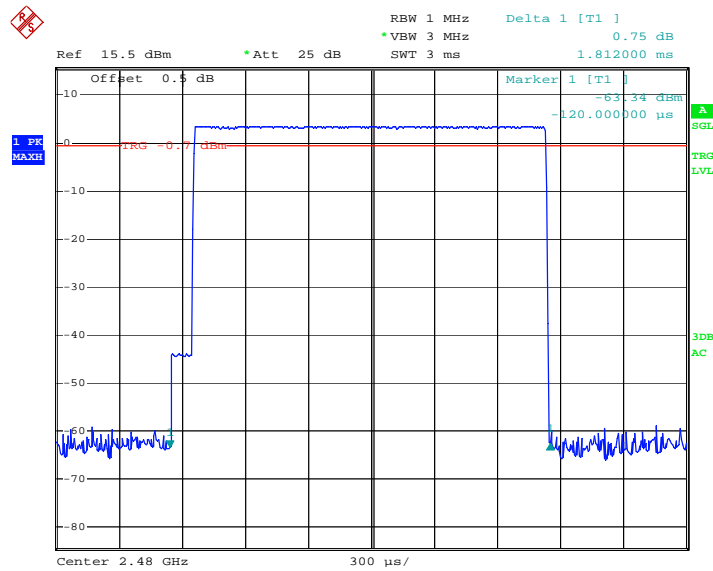
Date: 15.JUN.2011 19:28:41

Middle Channel



Date: 15.JUN.2011 19:29:15

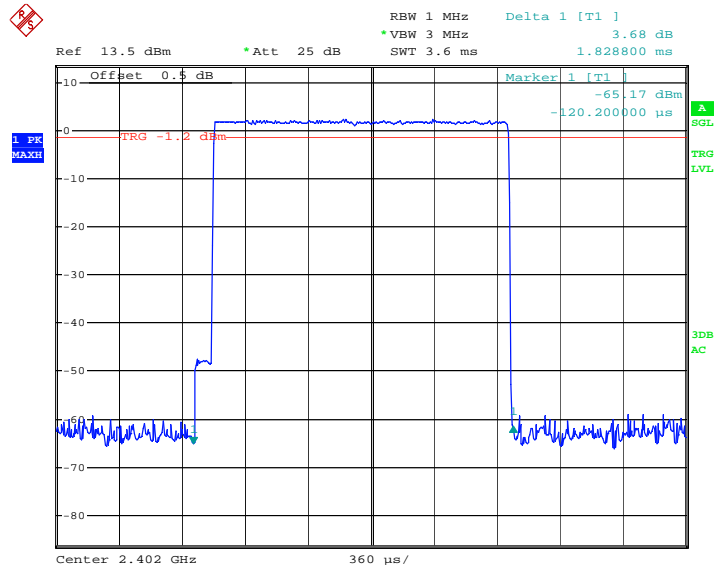
High Channel



Date: 15.JUN.2011 19:29:43

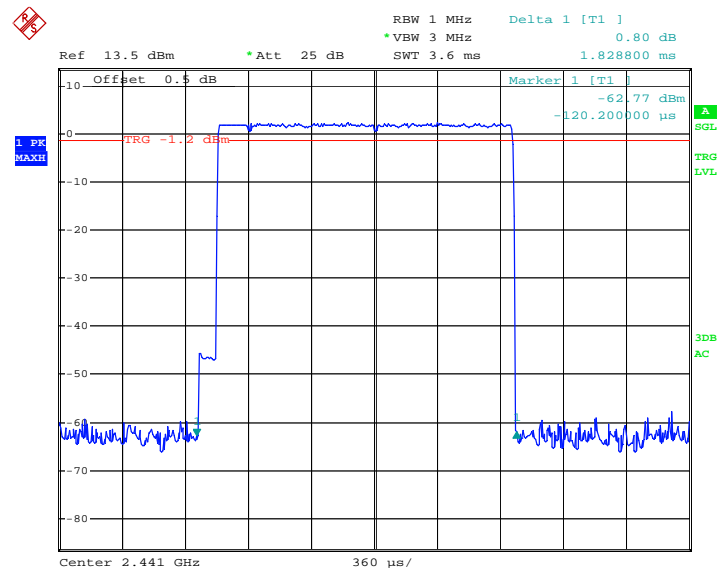
EDR:

Low Channel



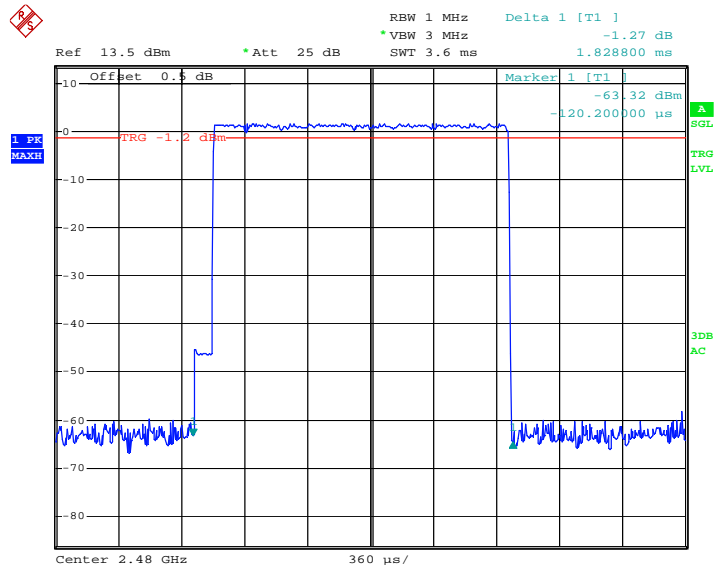
Date: 15.JUN.2011 19:22:49

Middle Channel



Date: 15.JUN.2011 19:22:20

High Channel



Date: 15.JUN.2011 19:21:36

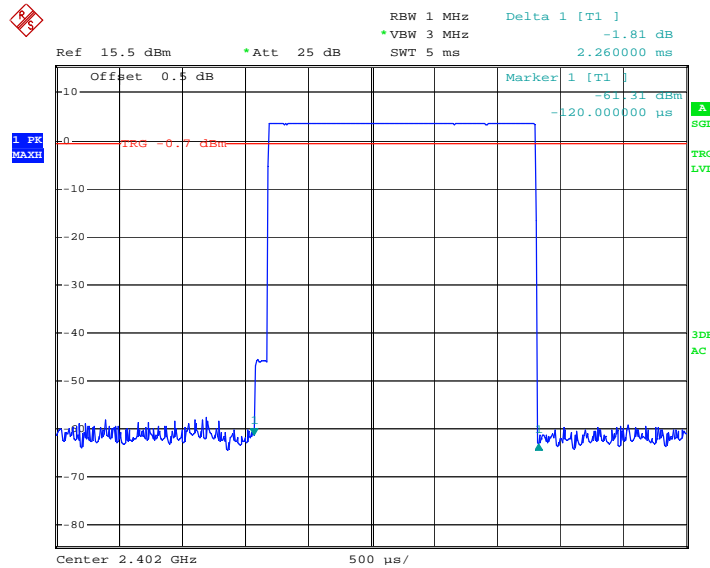
DH5:

Test Mode: Transmitting

Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
BDR	Low	2.26	0.241	0.4	Pass
	Middle	2.26	0.241	0.4	Pass
	High	2.26	0.241	0.4	Pass
	<i>Note: Dwell time = Pulse time*(1600/6/79)*31.6S</i>				
EDR	Low	3.10	0.331	0.4	Pass
	Middle	3.08	0.329	0.4	Pass
	High	3.08	0.329	0.4	Pass
	<i>Note: Dwell time = Pulse time*(1600/6/79)*31.6S</i>				

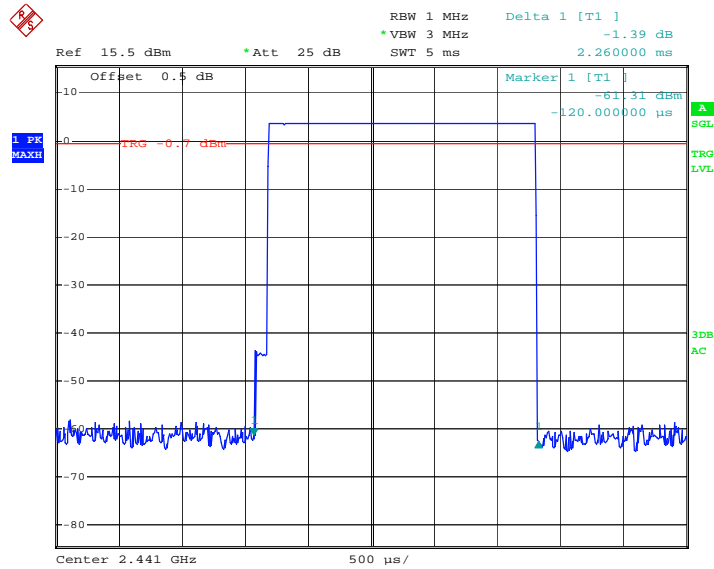
BDR:

Low Channel



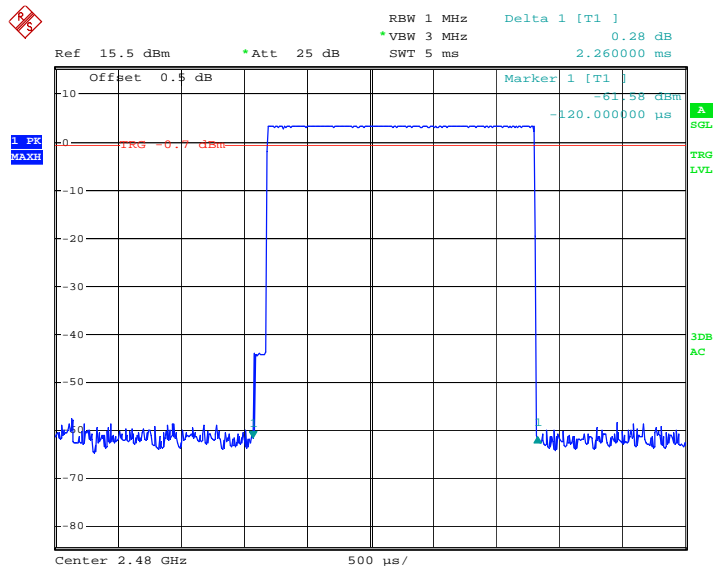
Date: 15.JUN.2011 19:31:30

Middle Channel



Date: 15.JUN.2011 19:31:05

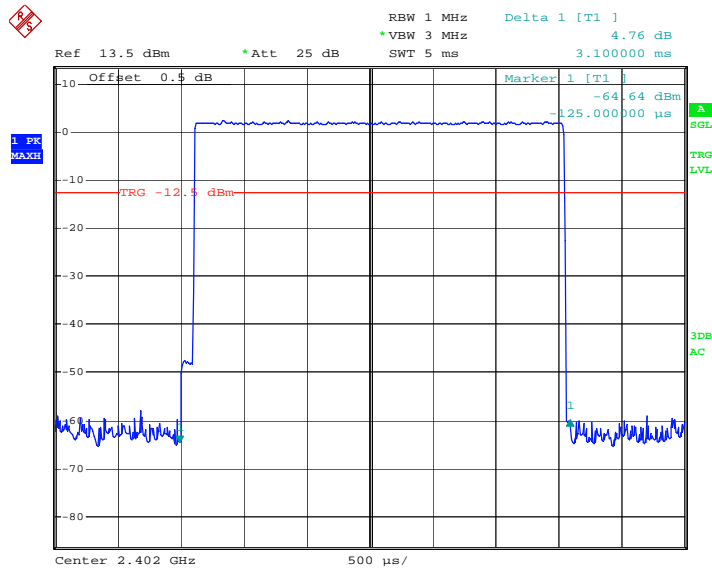
High Channel



Date: 15.JUN.2011 19:30:40

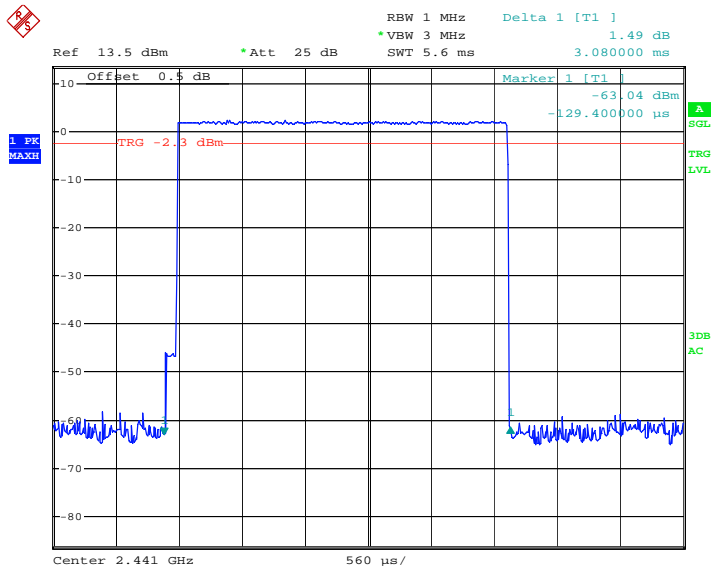
EDR:

Low Channel



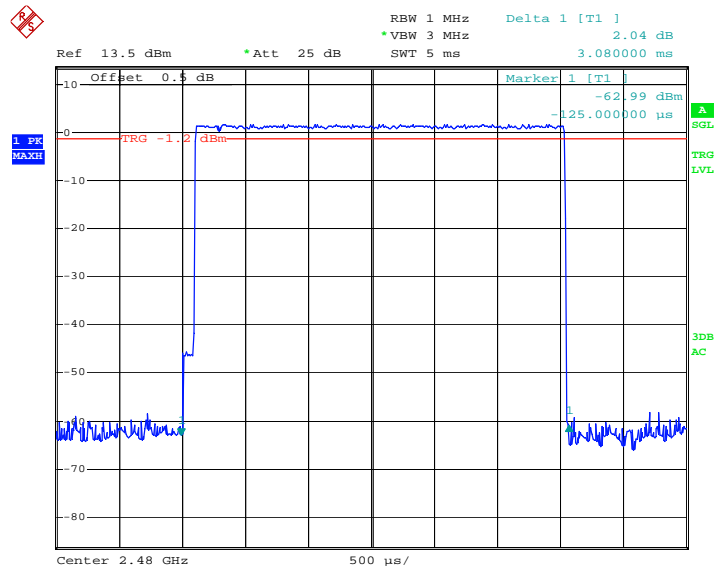
Date: 15.JUN.2011 19:15:25

Middle Channel



Date: 15.JUN.2011 19:18:39

High Channel



Date: 15.JUN.2011 19:20:06

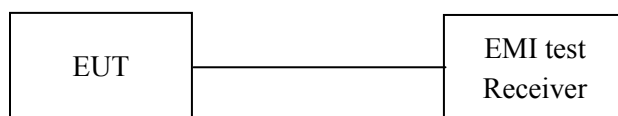
FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT

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. And 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	100035	2010-11-11	2011-11-10

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

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	56 %
ATM Pressure:	101 kPa

* *The testing was performed by Felix Li on 2011-06-15.*

Test Result: Compliance.

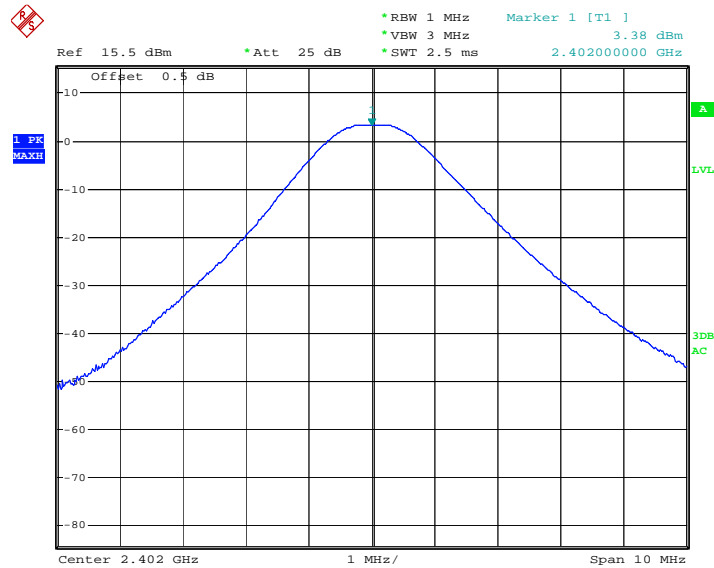
Please refer to following table and plots

Test Mode: Transmitting

Mode	Channel	Frequency (MHz)	Conducted Output Power		Limit (mW)
			(dBm)	(mW)	
BDR	Low	2402	3.38	2.18	1000
	Middle	2441	3.60	2.29	1000
	High	2480	3.18	2.08	1000
EDR	Low	2402	2.55	1.80	1000
	Middle	2441	2.59	1.82	1000
	High	2480	1.91	1.55	1000

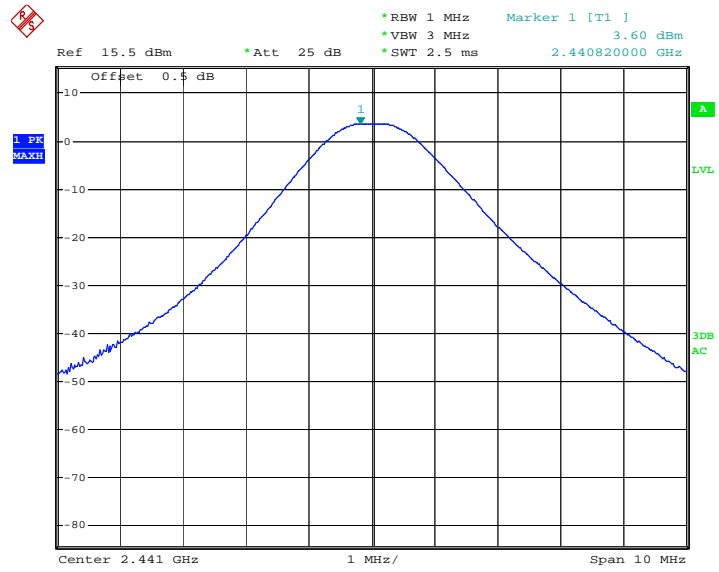
BDR:

Low Channel



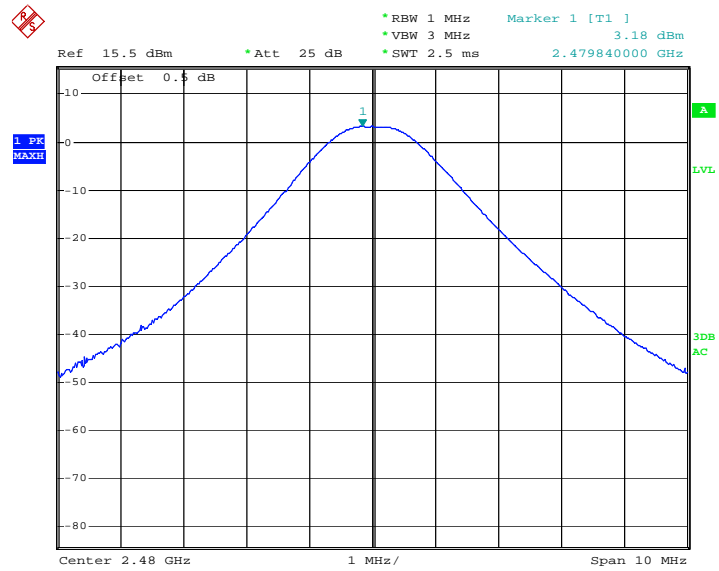
Date: 15.JUN.2011 12:35:35

Middle Channel



Date: 15.JUN.2011 12:36:24

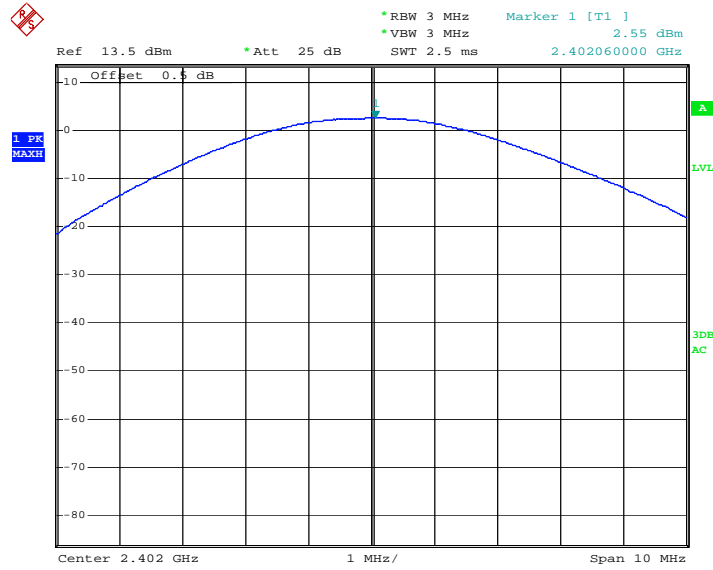
High Channel



Date: 15.JUN.2011 12:36:58

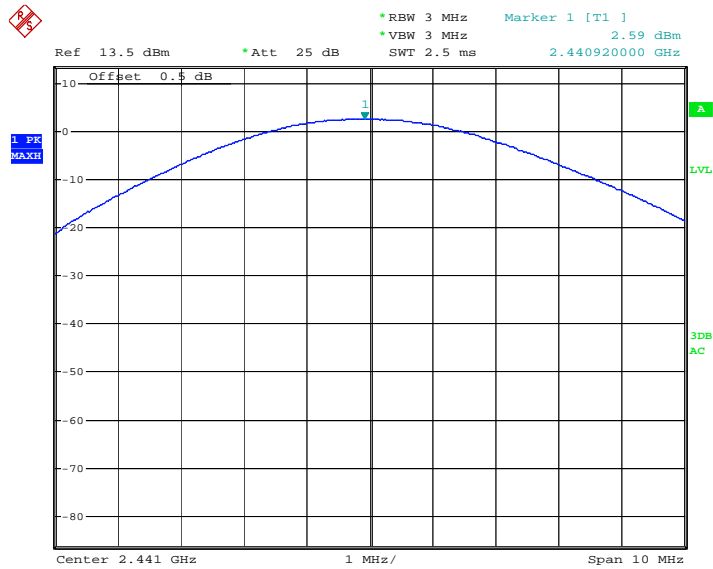
EDR:

Low Channel



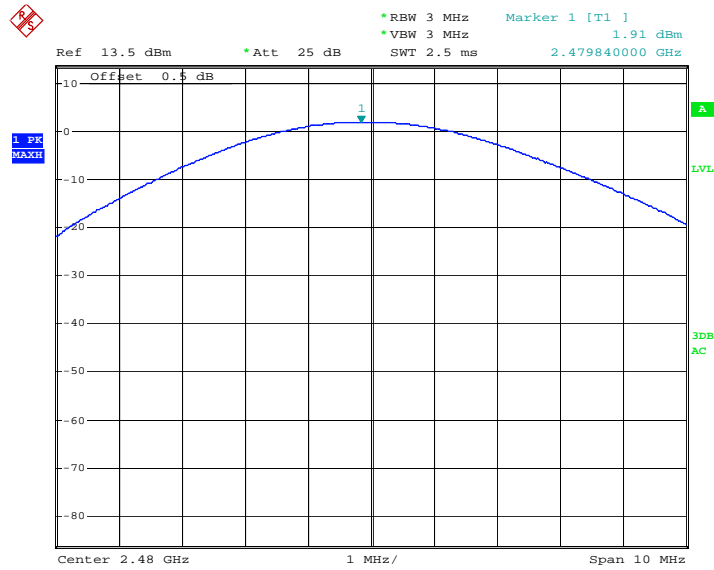
Date: 15.JUN.2011 18:38:56

Middle Channel



Date: 15.JUN.2011 18:38:31

High Chanel



Date: 15.JUN.2011 18:38:10

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. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting 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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10

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

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	56 %
ATM Pressure:	101 kPa

*The testing was performed by Felix Li on 2011-06-15.

Test Result: Compliance

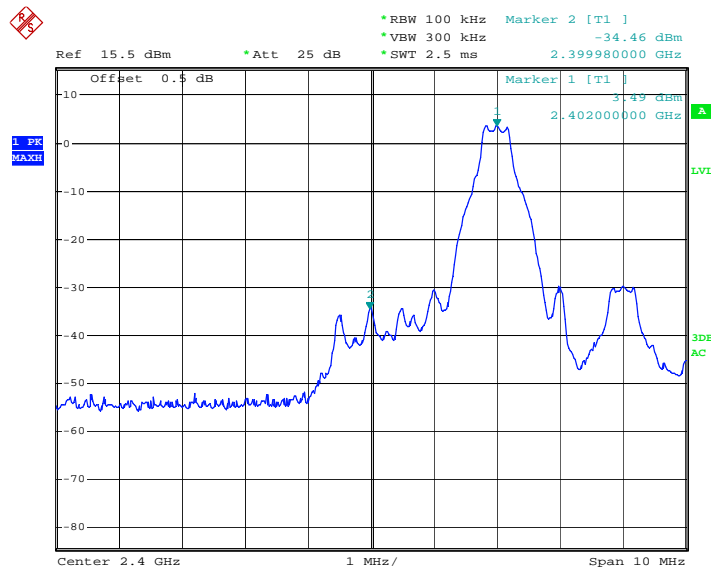
Please refer to the following table and plots.

Test Mode: Transmitting

Mode	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)
BDR	2399.98	37.95	20
	2483.98	54.95	20
EDR	2399.98	46.52	20
	2483.54	53.73	20

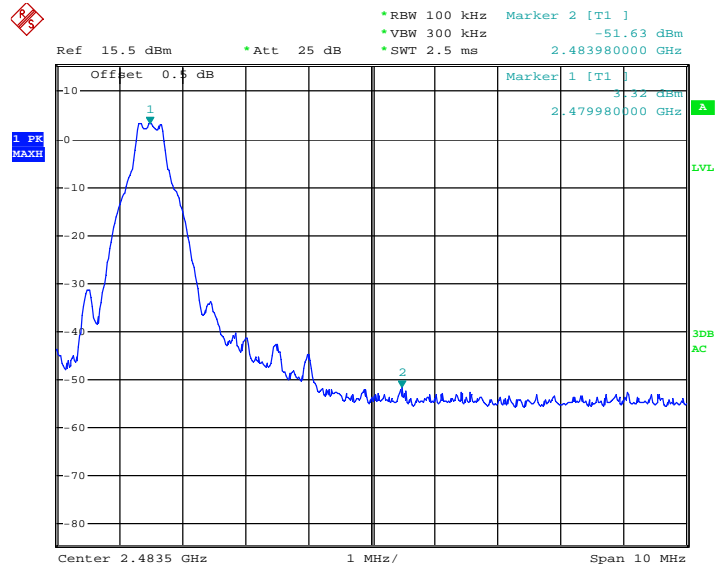
BDR:

Band Edge: Left Side



Date: 15.JUN.2011 12:39:12

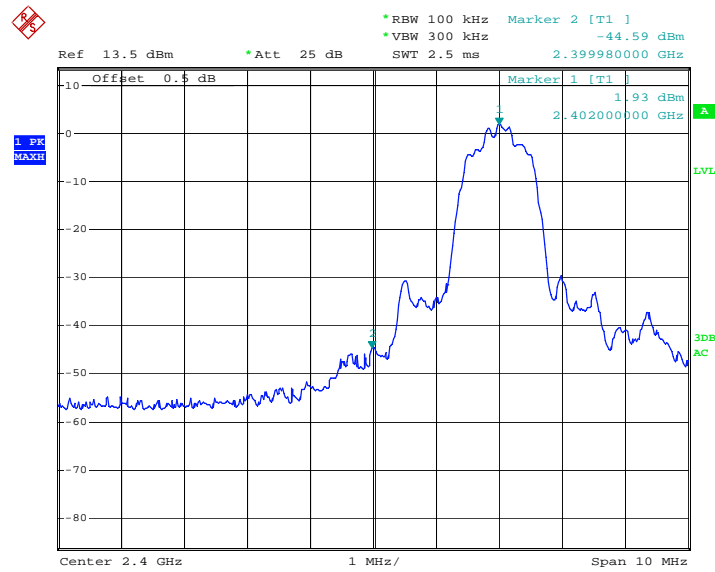
Band Edge: Right Side



Date: 15.JUN.2011 12:40:16

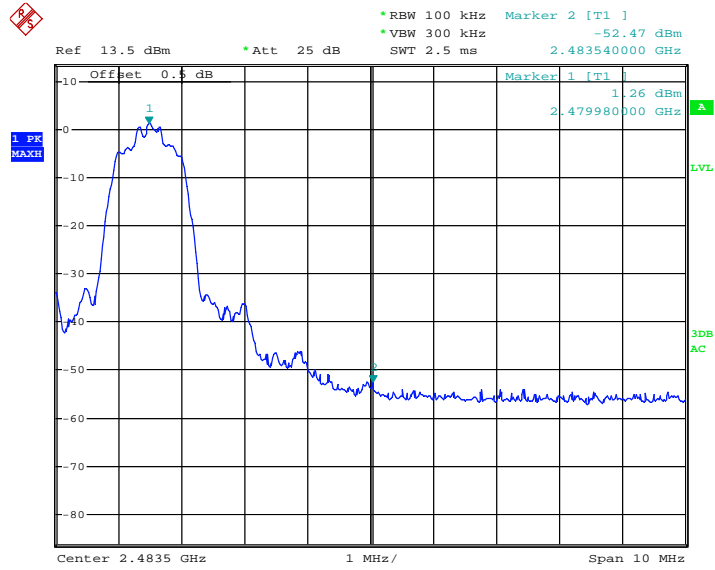
EDR:

Band Edge: Left Side



Date: 15.JUN.2011 18:33:59

Band Edge: Right Side



Date: 15.JUN.2011 18:29:36

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