



NVLAP LAB CODE 200707-0



# FCC PART 15.247

## MEASUREMENT AND TEST REPORT

For

### ESI Cases and Accessories Inc

240 Madison Ave., 11<sup>th</sup> Floor, New York, NY 10016, USA

**FCC ID: UTO010220105PR531**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Bluegoose (Bluetooth handsfree car kit)
<b>Test Engineer:</b> Cookies Bu	<i>Cookies Bu</i>
<b>Report Number:</b> RSZ10020801	
<b>Report Date:</b> 2010-03-17	
<b>Reviewed By:</b> Merry Zhao	<i>Merry Zhao</i>
<b>Prepared By:</b> EMC Engineer	
Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008	

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 \* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "\*" (Rev.2)

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## GENERAL INFORMATION

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### Product Description for Equipment under Test (EUT)

The *ESI Cases and Accessories Inc's* product, model number: *5PR531 (FCC ID: UTO010220105PR531)* or the "EUT" as referred to in this report is a *Bluegoose (Bluetooth handsfree car kit)*, the main unit measures approximately: 9.2 cm L x 6.2 cm W x 1.6 cm H, rated input voltage: DC 3.7V battery. the in-car charger measures approximately: 37.2 cm L x 7.5 cm W x 2.5 cm H, rated input voltage: DC 12-24V storage battery charging for the main unit.

*All measurement and test data in this report was gathered from production sample serial number: 1002018 (Assigned by BACL, Shenzhen). The EUT was received on 2010-02-08.*

### Objective

This Type approval report is prepared on behalf of *ESI Cases and Accessories 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, 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 C63.4-2003, 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 3<sup>rd</sup> 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 November 21, 2007. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

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 a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



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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 a typical fashion (as normally used by a typical user).

### Equipment Modifications

No modification was made to the unit tested.

### EUT Exercise Software

CSR bluetest 3 provided by the manufacturer.

### Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
DELL	Motherboard	OWC297	CN-OWC297-70821-566-02BR	DoC
DELL	Power	NPS-250KB D	CN-0H2678-17972-56E8NBM	DoC
Seagate	Hard Disk	ST340014A	5JXK3NAD	DoC
DELL	3.5' Floppy	N/A	CN-0N8893-69802-54Q-02OZ	DoC
Lite-ON	CD-Rom	LTN-489S	N/A	DoC
Intel	CPU	Celeron D-2533	N/A	N/A
ProMOS	Memory	V826632K24SATG-C0	0525-K1933700	N/A
Intel	Ethernet	PRO 10/100 VE	N/A	DoC

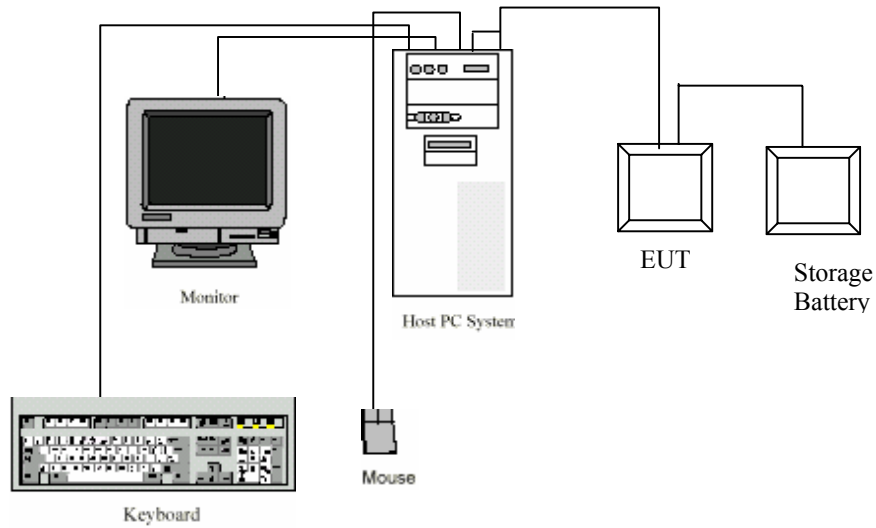
### Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
DELL	PC	1#	N/A	DOC
DELL	Keyboard 1#	L100	CNORH65668907BL04TY	DOC
DELL	Mouse 1#	MOC5UO	G1B0096D	DOC
DELL	LCD 2#	1505FP	CN-OY4287-71618-574-GBSH	DOC

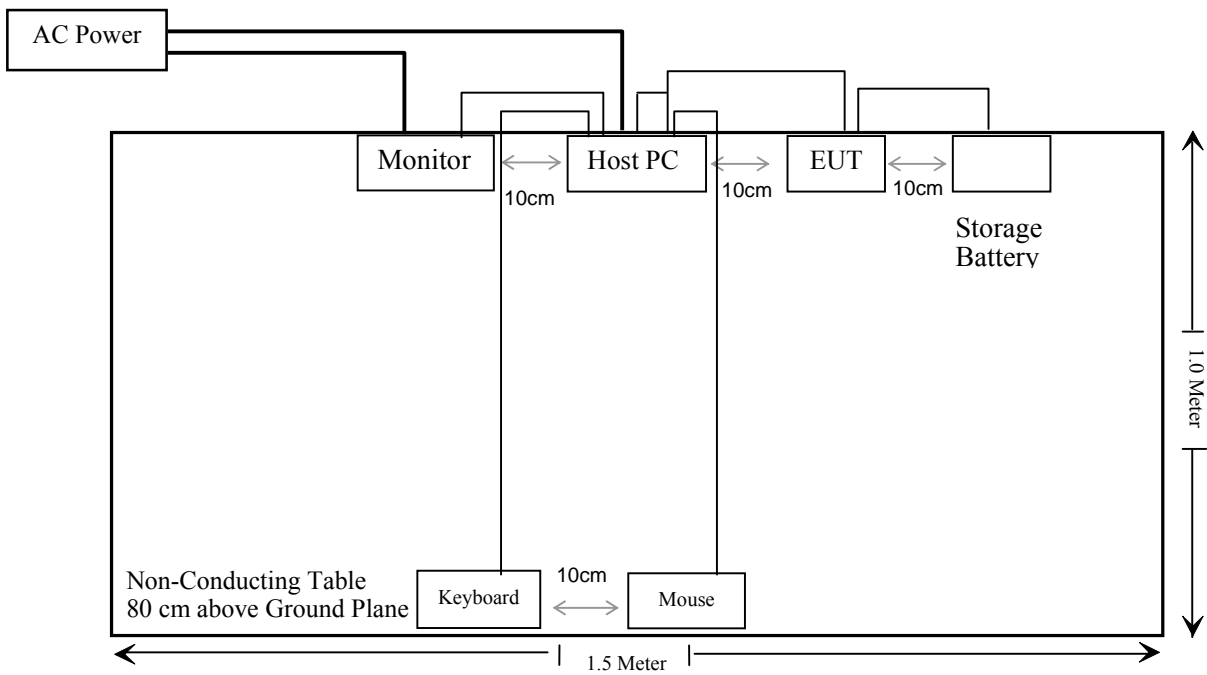
### External I/O Cable

Cable Description	Length (m)	From/Port	To
Unshielded Detachable Control Cable	1.12	SPI Port of Main Unit	Parallel Port of PC
Unshielded Undetachable USB Cable	0.6	Parallel Port of Control Line	USB Port of PC

### Configuration of Test Setup



### Block Diagram of Test Setup



## **SUMMARY OF TEST RESULTS**

<b>FCC Rules</b>	<b>Description of Test</b>	<b>Result</b>
15.247 (i), §1.1307 (b) (1) & §2.1093	RF Exposure	Compliant
§15.203	Antenna Requirement	Compliant
§15.207 (a)	Conducted Emissions	N/A
§15.205, §15.209, §15.247(d)	Radiated Emissions	Compliant *
§15.247 (a)(1)	20 dB Bandwidth	Compliant
§15.247(a)(1)	Channel Separation Test	Compliant
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliant
§15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliant
§15.247(b)(1)	Peak Output Power Measurement	Compliant
§15.247(d)	Band edges	Compliant

Note: \*With measurement uncertainty.



**FCC §15.247 (i), §1.1307 (b)(1) & §2.1093 - RF EXPOSURE****Standard Applicable**

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:

$$P_{\text{BDR}} = 2.57 \text{ dBm} = 1.807 \text{ mW}$$

$$P_{\text{EDR}} = 1.41 \text{ dBm} = 1.386 \text{ mW}$$

$$60/f_{\text{GHz}} = 60/2402 = 24.98 \text{ mW}$$

$$P_{\text{BDR}} < 60/f_{\text{GHz}}$$

This is a portable device and the Max peak output power of EUT is less than 24.98 mW, SAR evaluation is not necessary.

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## **FCC §15.203 – ANTENNA REQUIREMENT**

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### **Standard Applicable**

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 printed antenna on the PCB, which in accordance to section 15.203, the maximum gain is -0.833 dBi; please refer to the internal photos.

**Result:** Compliant.

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

### Applicable Standard

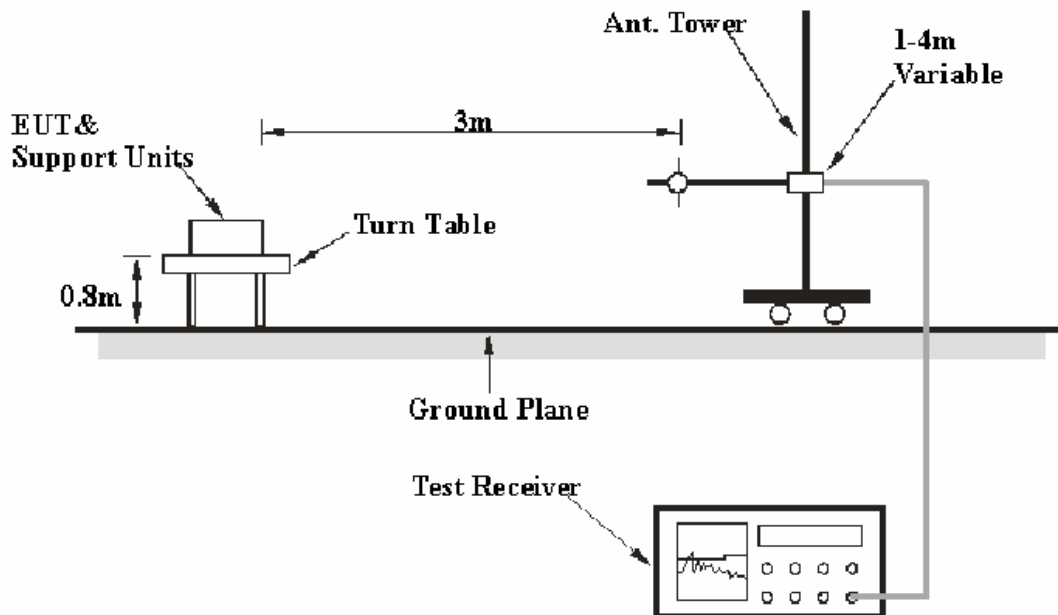
FCC §15.205; §15.209; §15.247(d)

### 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  $\pm 4.0$  dB.

### EUT Setup



The radiated emission tests were performed in the 3 meters chamber B test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15.209 and FCC 15.247 limits.

## 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>
30MHz – 1000 MHz	100 kHz	300 kHz	QP
1000 MHz – 25 GHz	1 MHz	3 MHz	PK
1000 MHz – 25 GHz	1 MHz	10 Hz	AV

## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447D	2944A09795	2009-08-02	2010-08-02
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2009-11-07	2010-11-06
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2009-03-11	2010-03-11
HP	Amplifier	8449B	3008A00277	2009-09-12	2010-09-11
Sunol Sciences	Horn Antenna	DRH-118	A052604	2009-09-25	2010-09-25
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2009-08-28	2010-08-27

\* **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 host PC and monitor were connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-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 maximum 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:

### Below 1 GHz:

**3.4 dB** at **31.699500 MHz** in the **Vertical** polarization for **BDR**  
**2.7 dB** at **96.002250 MHz** in the **Vertical** polarization for **EDR**

### Above 1 GHz:

#### BDR

**7.63 dB** at **4804.00 MHz** in the **Horizontal** polarization (Low Channel)  
**6.91 dB** at **4882.00 MHz** in the **Horizontal** polarization (Middle Channel)  
**8.03 dB** at **4960.00 MHz** in the **Vertical** polarization (High Channel)

#### EDR

**6.42 dB** at **4804.00 MHz** in the **Vertical** polarization (Low Channel)  
**7.96 dB** at **4882.00 MHz** in the **Horizontal** polarization (Middle Channel)  
**7.50 dB** at **4960.00 MHz** in the **Horizontal** polarization (High Channel)

## Test Data

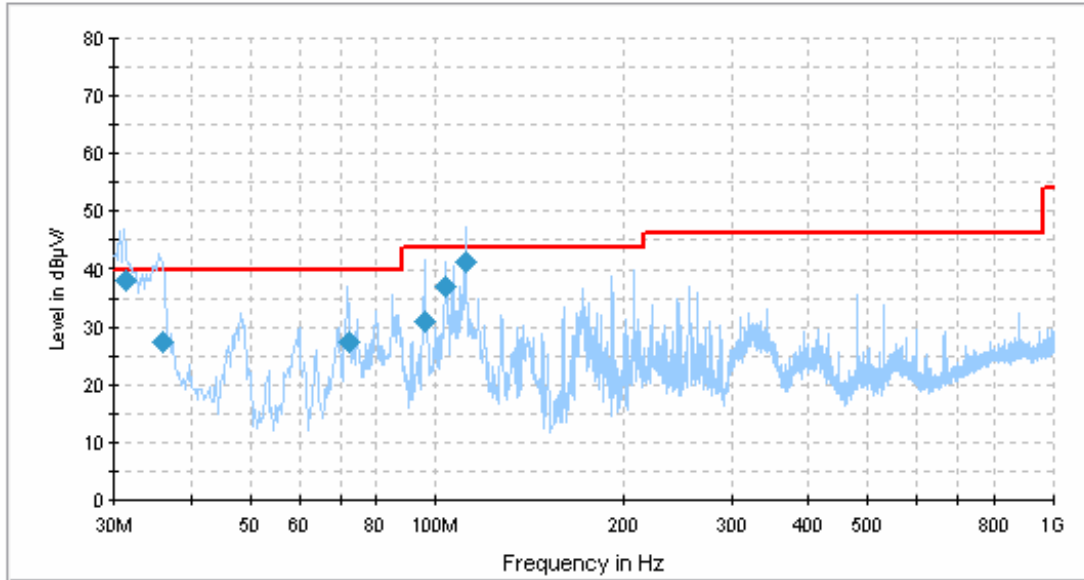
### Environmental Conditions

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	48 %
<b>ATM Pressure:</b>	100.9 kPa

\* The testing was performed by Cookies Bu on 2010-03-07.

**Below 1 GHz**

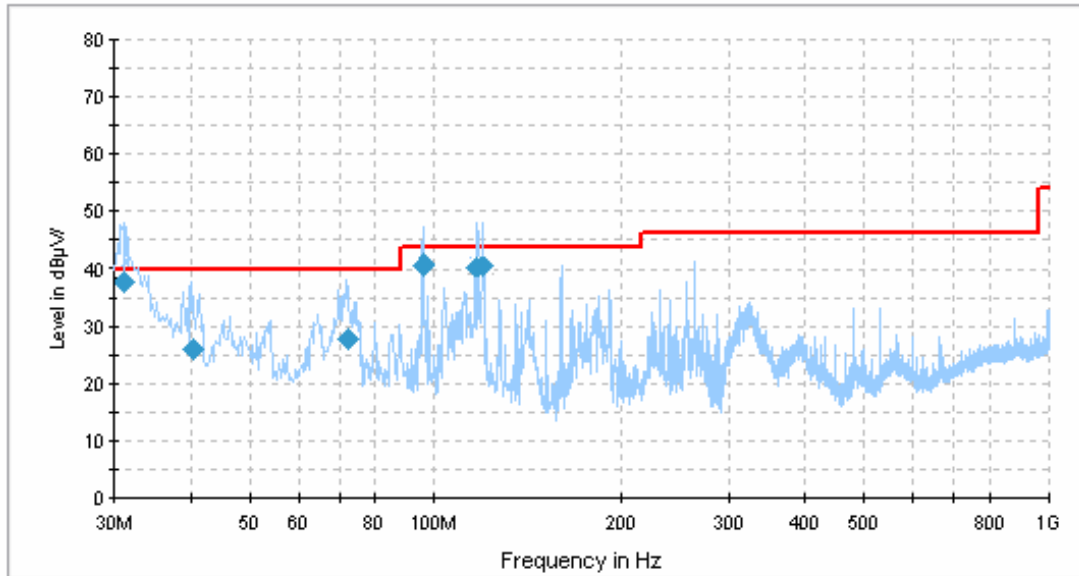
BDR



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Position (degree)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
31.699500	36.6	123.0	V	131.0	-7.3	40.0	3.4*
111.538250	40.1	102.0	V	53.0	-14.6	43.5	3.4*
103.979750	37.3	104.0	V	95.0	-16.2	43.5	6.2
96.294000	31.0	105.0	V	97.0	-18.3	43.5	12.5
36.010000	27.4	101.0	V	293.0	-10.6	40.0	12.6
72.299000	27.4	99.0	V	136.0	-19.6	40.0	12.6

*\*With measurement uncertainty.*

EDR:



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Position (degree)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
96.002250	40.8	103.0	V	227.0	-18.4	43.5	2.7*
119.594250	40.4	105.0	V	301.0	-13.7	43.5	3.1*
117.345000	40.3	101.0	V	9.0	-14.0	43.5	3.2*
31.290500	36.5	104.0	V	172.0	-6.9	40.0	3.5*
72.202000	27.7	147.0	V	356.0	-19.6	40.0	12.3
40.590750	26.0	102.0	V	149.0	-13.7	40.0	14.0

\*With measurement uncertainty.

**Above 1 GHz**

BDR:

Frequency (MHz)	S.A. Reading (dBµV/m)	Detector (PK/QP/AV)	Direction (Degree)	Test Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBµV/m)	FCC Part 15.247/209		
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	Remarks
<b>Low Channel (2402 MHz)</b>												
4804.00	35.57	AV	240	1.5	H	36.6	7.60	33.4	46.37	54	7.63	harmonic
4804.00	34.19	AV	180	1.0	V	35.4	7.60	33.4	43.79	54	10.21	harmonic
4804.00	52.88	PK	240	1.5	H	36.6	7.60	33.4	63.68	74	10.32	harmonic
4804.00	50.84	PK	180	1.0	V	35.4	7.60	33.4	60.44	74	13.56	harmonic
2330.19	31.42	AV	320	1.5	V	30.9	7.91	34.0	36.23	54	17.77	spurious
2311.92	31.25	AV	146	1.3	H	30.9	7.91	34.0	36.06	54	17.94	spurious
3580.16	30.31	AV	59	1.3	V	32.2	5.77	33.7	34.58	54	19.42	spurious
2330.19	47.83	PK	320	1.5	V	30.9	7.91	34.0	52.64	74	21.36	spurious
2311.92	47.65	PK	146	1.3	H	30.9	7.91	34.0	52.46	74	21.54	spurious
1601.68	32.56	AV	156	1.5	H	27.5	5.62	34.4	31.28	54	22.72	spurious
3580.16	46.77	PK	59	1.3	V	32.2	5.77	33.7	51.04	74	22.96	spurious
1601.68	49.32	PK	156	1.5	H	27.5	5.62	34.4	48.04	74	25.96	spurious
<b>Middle Channel (2441 MHz)</b>												
4882.00	36.28	AV	250	1.6	H	36.6	7.61	33.4	47.09	54	6.91	harmonic
4882.00	37.09	AV	178	1.7	V	35.4	7.61	33.4	46.7	54	7.3	harmonic
4882.00	53.59	PK	250	1.6	H	36.6	7.61	33.4	64.4	74	9.6	harmonic
4882.00	53.70	PK	178	1.7	V	35.4	7.61	33.4	63.31	74	10.69	harmonic
1629.53	32.23	AV	175	1.3	H	27.5	5.62	34.4	30.95	54	23.05	spurious
1627.85	31.28	AV	154	1.5	V	27.8	5.62	34.4	30.3	54	23.7	spurious
1629.53	48.93	PK	175	1.3	H	27.5	5.62	34.4	47.65	74	26.35	spurious
1627.85	47.98	PK	155	1.5	V	27.8	5.62	34.4	47.0	74	27.0	spurious
<b>High Channel (2480 MHz)</b>												
4960.00	36.34	AV	355	1.6	V	35.4	7.63	33.4	45.97	54	8.03	harmonic
4960.00	34.87	AV	35	1.6	H	36.6	7.63	33.4	45.70	54	8.30	harmonic
4960.00	53.04	PK	355	1.6	V	35.4	7.63	33.4	62.67	74	11.33	harmonic
4960.00	51.57	PK	35	1.6	H	36.6	7.63	33.4	62.40	74	11.6	harmonic
2483.79	34.99	AV	89	1.3	H	30.9	7.93	34.0	39.82	54	14.18	spurious
2484.51	34.93	AV	210	1.5	V	30.9	7.93	34.0	39.76	54	14.24	spurious
2484.51	52.03	PK	210	1.5	V	30.9	7.93	34.0	56.86	74	17.14	spurious
2483.79	51.69	PK	89	1.3	H	30.9	7.93	34.0	56.52	74	17.48	spurious
1654.61	31.26	AV	150	1.1	H	27.5	5.62	34.4	29.98	54	24.02	spurious
1654.61	30.87	AV	280	1.2	V	27.8	5.62	34.4	29.89	54	24.11	spurious
1654.61	47.96	PK	150	1.1	H	27.5	5.62	34.4	46.68	74	27.32	spurious
1654.61	47.57	PK	280	1.2	V	27.8	5.62	34.4	46.59	74	27.41	spurious



EDR:

Frequency (MHz)	S.A. Reading (dBµV/m)	Detector (PK/QP/AV)	Direction (Degree)	Test Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBµV/m)	FCC Part 15.247/209		
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	Remarks
<b>Low Channel (2402 MHz)</b>												
4804.00	37.98	AV	180	1.0	V	35.40	7.60	33.4	47.58	54	6.42	harmonic
4804.00	34.17	AV	240	1.0	H	36.6	7.60	33.4	44.97	54	9.03	harmonic
4804.00	54.70	PK	180	1.0	V	35.40	7.60	33.4	64.30	74	9.70	harmonic
4804.00	50.89	PK	240	1.0	H	36.6	7.60	33.4	61.69	74	12.31	harmonic
2331.80	30.55	AV	146	1.3	H	30.9	7.91	34.0	35.36	54	18.64	spurious
2376.21	30.41	AV	320	1.5	V	30.9	7.91	34.0	35.22	54	18.78	spurious
2331.80	47.27	PK	146	1.3	H	30.9	7.91	34.0	52.08	74	21.92	spurious
2376.21	47.13	PK	320	1.5	V	30.9	7.91	34.0	51.94	74	22.06	spurious
1601.68	32.94	AV	157	1.2	H	27.5	5.62	34.4	31.66	54	22.34	spurious
1601.68	32.09	AV	226	1.3	V	27.8	5.62	34.4	31.11	54	22.89	spurious
1601.68	49.66	PK	157	1.2	H	27.5	5.62	34.4	48.38	74	25.62	spurious
1601.68	48.81	PK	226	1.3	V	27.8	5.62	34.4	47.83	74	26.17	spurious
<b>Middle Channel (2441 MHz)</b>												
4882.00	35.23	AV	250	1.0	H	36.6	7.61	33.4	46.04	54	7.96	harmonic
4882.00	35.25	AV	178	1.1	V	35.4	7.61	33.4	44.86	54	9.14	harmonic
4882.00	52.04	PK	250	1.0	H	36.6	7.61	33.4	62.85	74	11.15	harmonic
4882.00	52.06	PK	178	1.1	V	35.4	7.61	33.4	61.67	74	12.33	harmonic
1629.54	32.91	AV	154	1.5	V	27.8	5.62	34.4	31.93	54	22.07	spurious
1629.54	32.24	AV	175	1.3	H	27.5	5.62	34.4	30.96	54	23.04	spurious
1629.54	49.71	PK	155	1.5	V	27.8	5.62	34.4	48.73	74	25.27	spurious
1629.54	49.05	PK	175	1.3	H	27.5	5.62	34.4	47.77	74	26.23	spurious
<b>High Channel (2480 MHz)</b>												
4960.00	35.67	AV	35	1.1	H	36.6	7.63	33.4	46.50	54	7.50	harmonic
4960.00	36.55	AV	355	1.1	V	35.4	7.63	33.4	46.18	54	7.82	harmonic
4960.00	52.77	PK	35	1.1	H	36.6	7.63	33.4	63.60	74	10.40	harmonic
2483.95	38.62	AV	89	1.3	H	30.9	7.93	34.0	43.45	54	10.55	spurious
4960.00	53.65	PK	355	1.1	V	35.4	7.63	33.4	63.28	74	10.72	harmonic
2483.50	37.48	AV	210	1.5	V	30.9	7.93	34.0	42.31	54	11.69	spurious
2483.95	55.72	PK	89	1.3	H	30.9	7.93	34.0	60.55	74	13.45	spurious
2483.50	54.58	PK	210	1.5	V	30.9	7.93	34.0	59.41	74	14.59	spurious
1654.60	30.72	AV	280	1.2	V	27.8	5.62	34.4	29.74	54	24.26	spurious
1654.60	30.81	AV	150	1.1	H	27.5	5.62	34.4	29.53	54	24.47	spurious
1654.60	47.82	PK	280	1.2	V	27.8	5.62	34.4	46.84	74	27.16	spurious
1654.60	47.91	PK	150	1.1	H	27.5	5.62	34.4	46.63	74	27.37	spurious

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

### Applicable Standard

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater provided the systems operate with an output power no greater than 125 mW.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2009-11-07	2010-11-06

\* **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 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 Data

#### Environmental Conditions

<b>Temperature:</b>	26 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100.9 kPa

\* The testing was performed by Cookies Bu on 2010-03-07.

**Test Result:** Compliant.

Please refer to following tables and plots

*Test Mode: Transmitting (BDR)*

Channel	Channel Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
Low Channel	2402	1.002	0.56000	Pass
Adjacent Channel	2403			
Mid Channel	2441	1.002	0.56267	Pass
Adjacent Channel	2442			
High Channel	2480	1.002	0.55467	Pass
Adjacent Channel	2479			

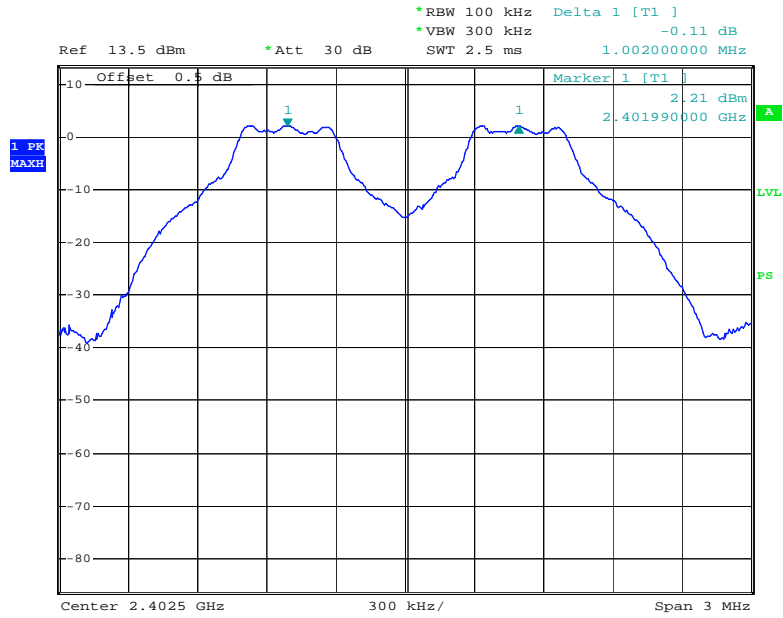
*Test Mode: Transmitting (EDR)*

Channel	Channel Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
Low Channel	2402	1.002	0.812	Pass
Adjacent Channel	2403			
Mid Channel	2441	1.002	0.812	Pass
Adjacent Channel	2442			
High Channel	2480	1.002	0.812	Pass
Adjacent Channel	2479			

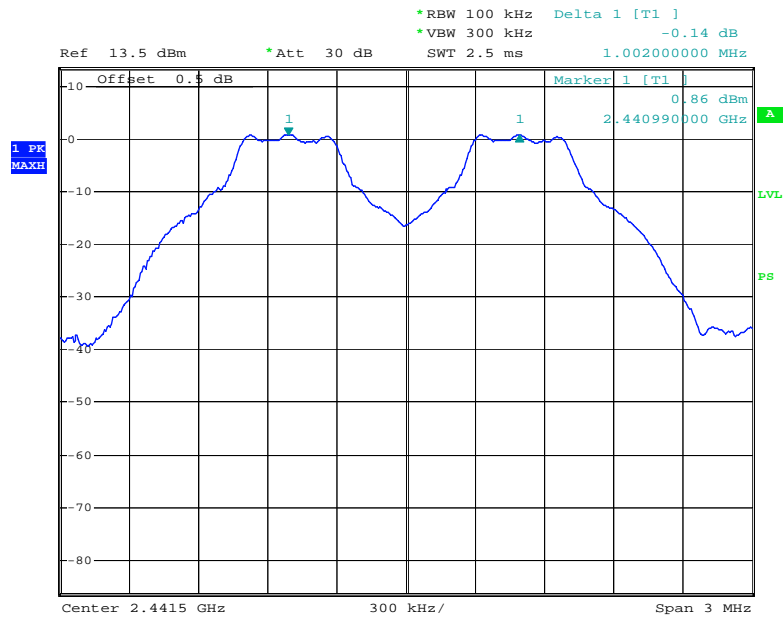
Please refer to the following plots.

**BDR:**

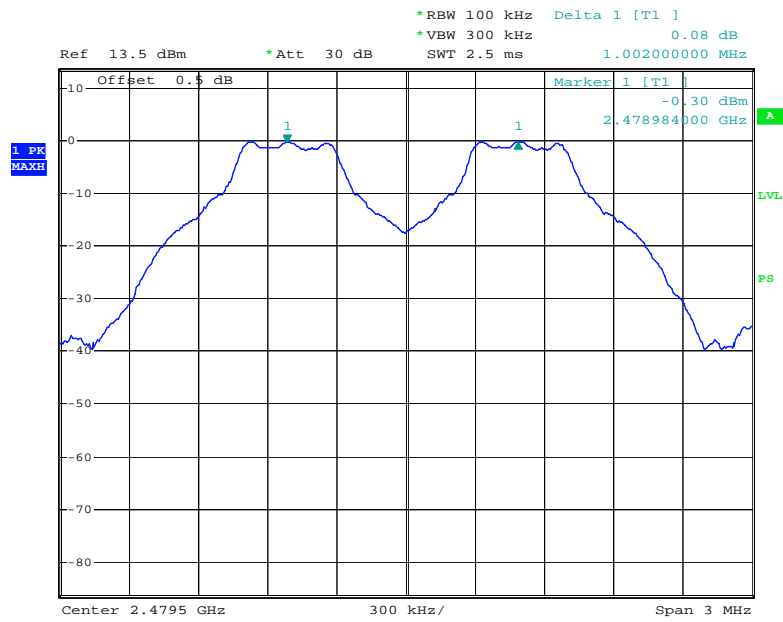
**Low Channel**



**Middle Channel**

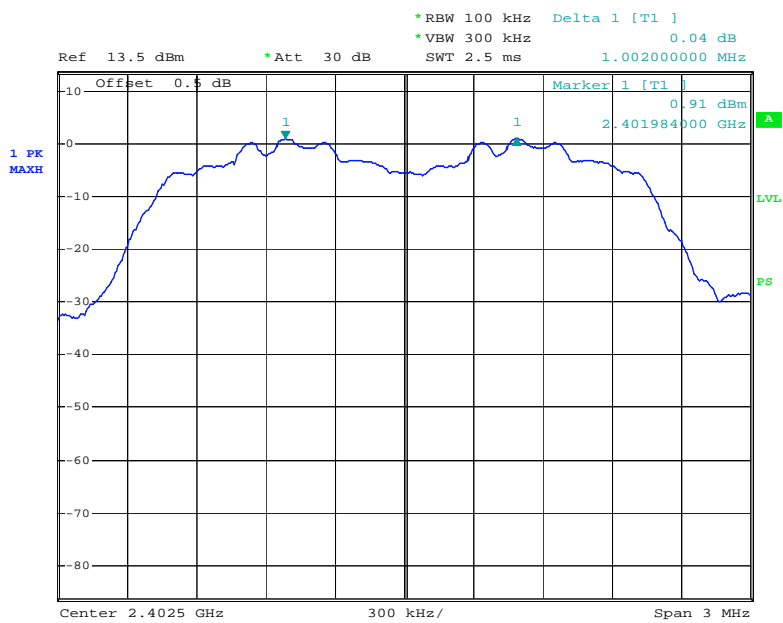


### High Channel

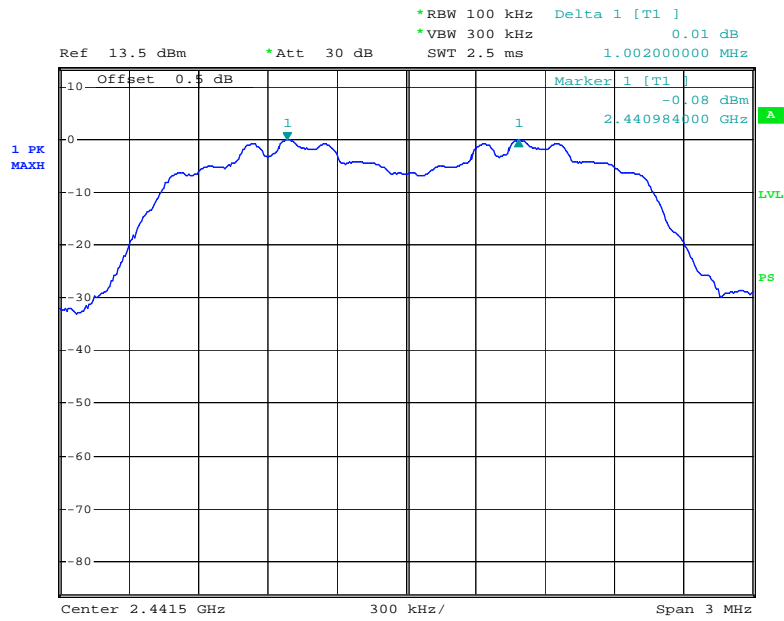


EDR:

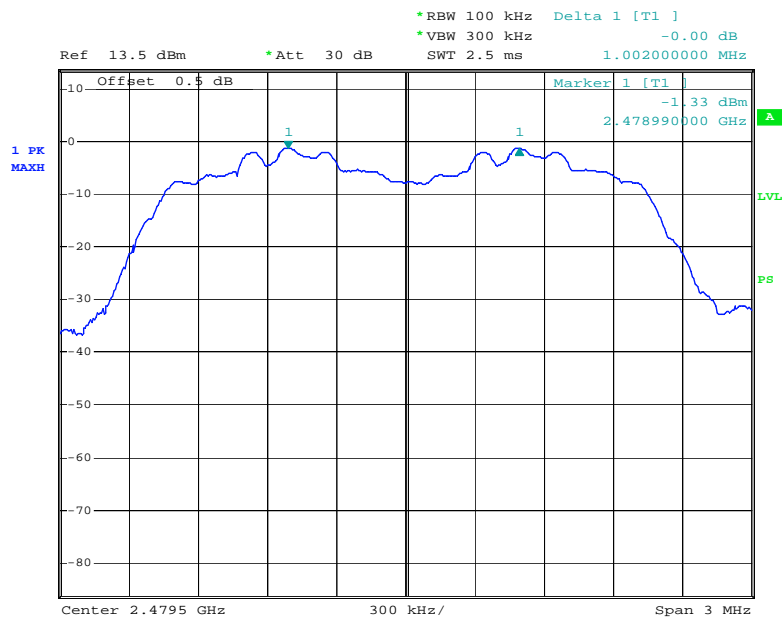
### Low Channel



### Middle Channel



### High Channel



## 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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2009-11-07	2010-11-06

\* **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. 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 Data

#### Environmental Conditions

<b>Temperature:</b>	26 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100.9 kPa

\* The testing was performed by Cookies Bu on 2010-03-07.

**Test Result:** Compliant.

Please refer to following tables and plots

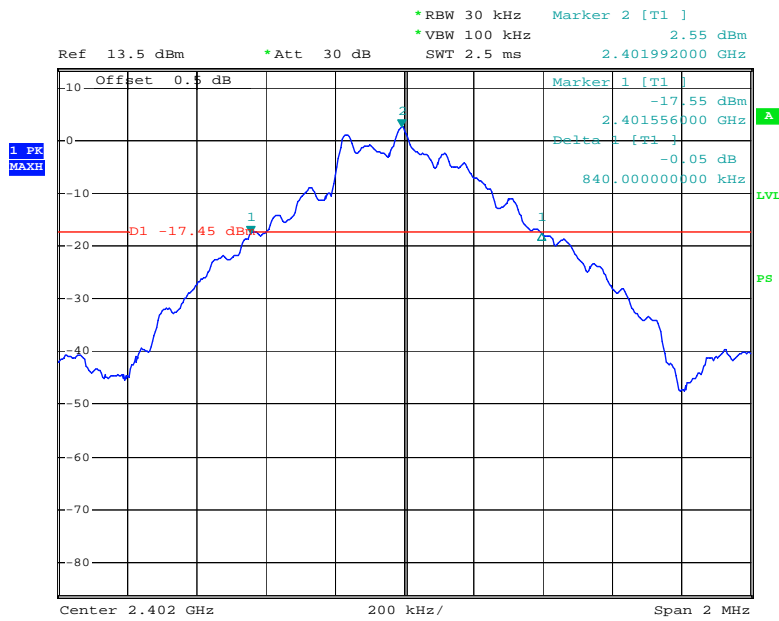
Test Mode: Transmitting (BDR)

Mode	Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
BDR	Low	2402	0.840
	Middle	2441	0.844
	High	2480	0.832
EDR	Low	2402	1.218
	Middle	2441	1.218
	High	2480	1.218

Please refer to the following plots.

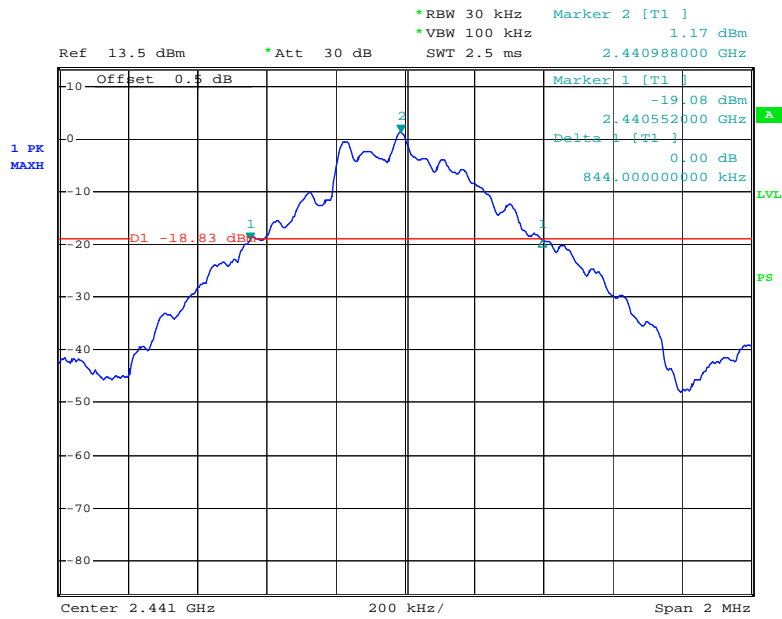
**BDR**

**Low Channel**

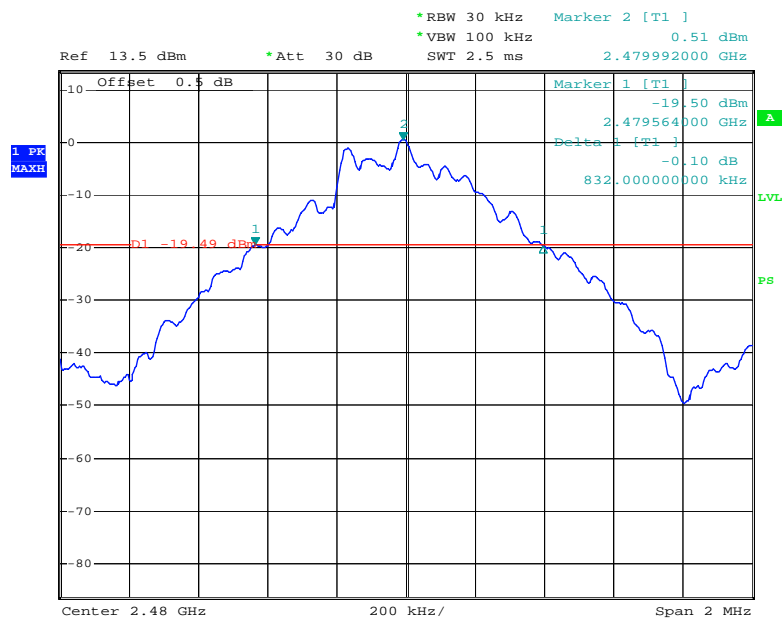




### Middle Channel

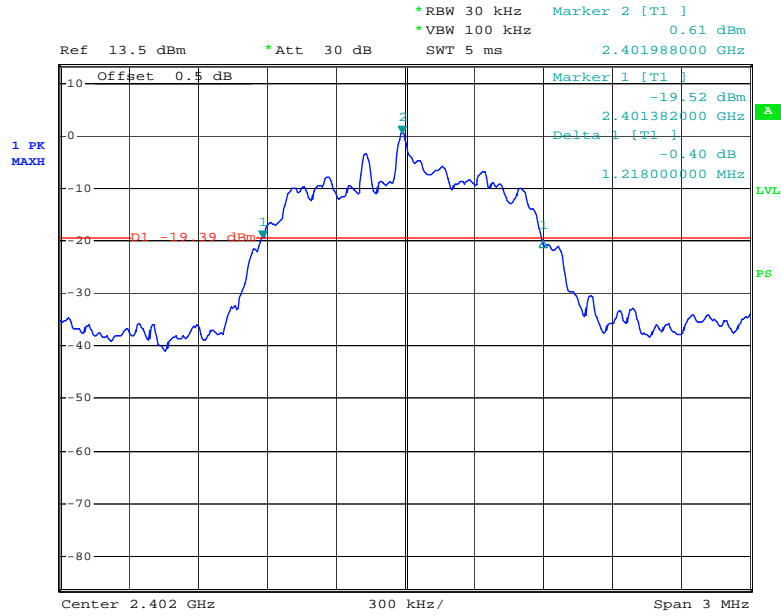


### High Channel

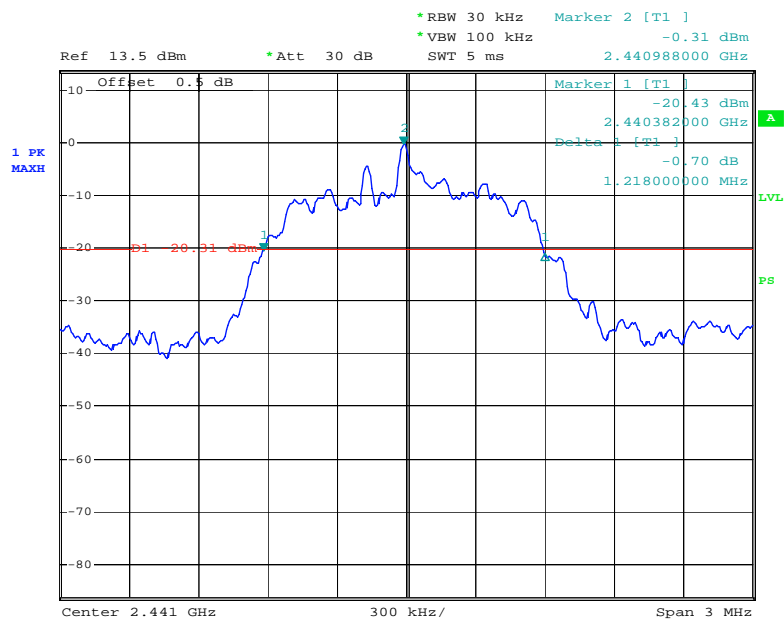


**EDR**

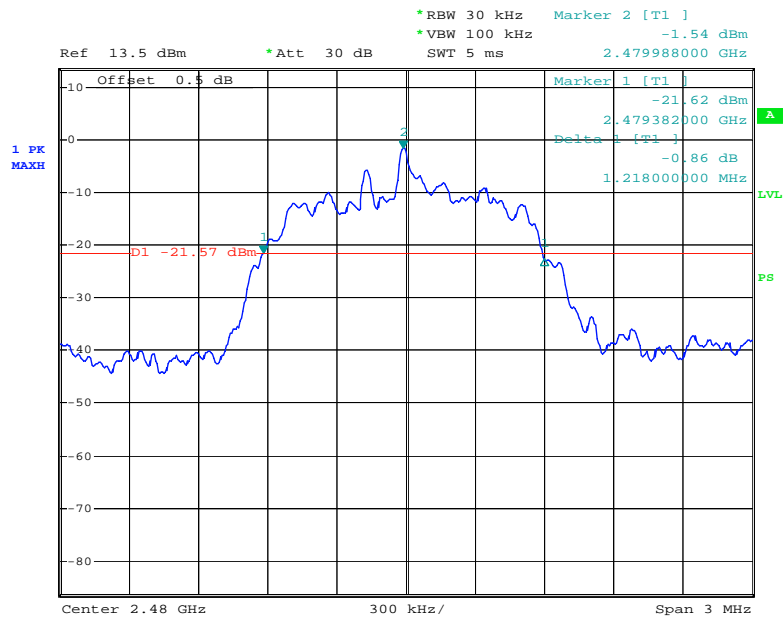
**Low Channel**



**Middle Channel**



### High Channel



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

### **Applicable Standard**

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

### **Test Equipment List and Details**

<b>Manufacturer</b>	<b>Description</b>	<b>Model</b>	<b>Serial Number</b>	<b>Calibration Date</b>	<b>Calibration Due Date</b>
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2009-11-07	2010-11-06

\* **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**

<b>Temperature:</b>	26 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100.9 kPa

*The testing was performed by Cookies Bu on 2010-03-07.*

**Test Result:** Compliant.

Please refer to following tables and plots

Test Mode: Transmitting (BDR)

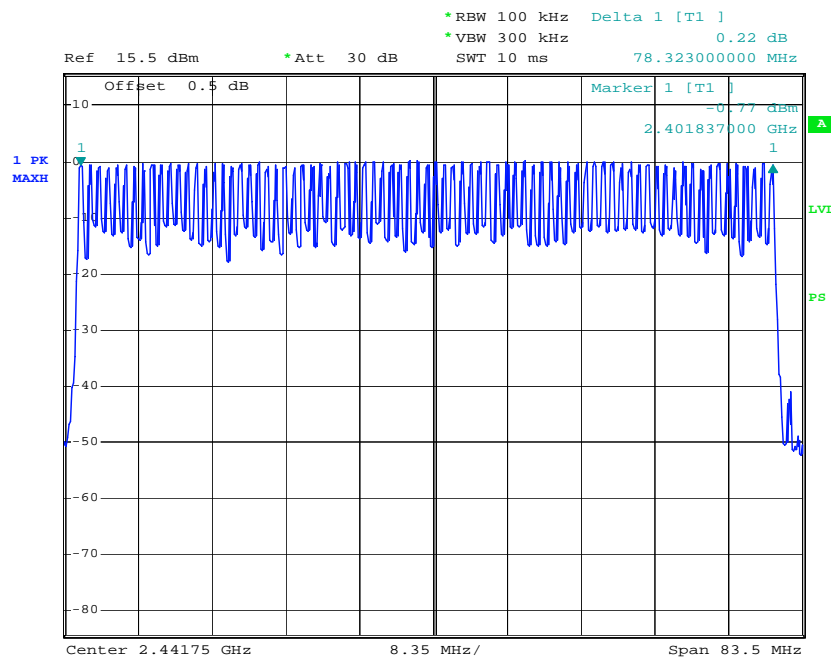
Frequency Range (MHz)	Number of Hopping Channel	Limit
2400~2483.5	79	≥ 15

Test Mode: Transmitting (EDR)

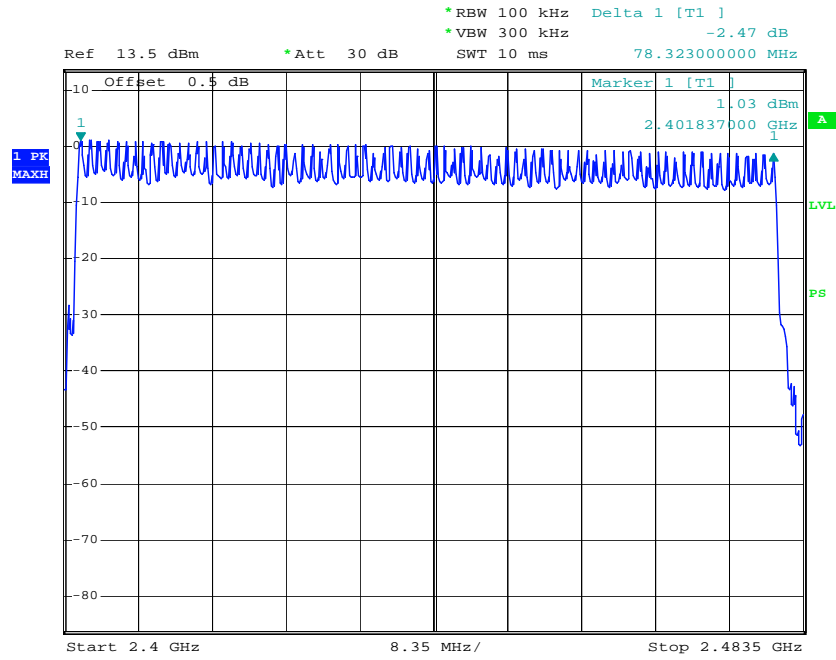
Frequency Range (MHz)	Number of Hopping Channel	Limit
2400~2483.5	79	≥ 15

**Number of Hopping Channels**

**BDR**



EDR



**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 Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2009-11-07	2010-11-06

\* **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 \* 31.6s

Hop rate=1600/s

**Test Data****Environmental Conditions**

<b>Temperature:</b>	26 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100.9 kPa

\* The testing was performed by Cookies Bu on 2010-03-07.

**Test Result:** Compliant.

Please refer to following tables and plots

*Test Mode: Transmitting (BDR)*

Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
<b>DH 1</b>	Low	0.540	0.1728	0.4	Pass
	Middle	0.555	0.1776	0.4	Pass
	High	0.565	0.1808	0.4	Pass
	<i>Note: Dwell time=Pulse width (ms) × (1600 ÷ 2 ÷ 79) × 31.6 Second</i>				
<b>DH 3</b>	Low	1.824	0.29184	0.4	Pass
	Middle	1.848	0.29568	0.4	Pass
	High	1.840	0.29440	0.4	Pass
	<i>Note: Dwell time=Pulse width (ms) × (1600 ÷ 4 ÷ 79) × 31.6 Second</i>				
<b>DH 5</b>	Low	3.096	0.33056	0.4	Pass
	Middle	3.096	0.33056	0.4	Pass
	High	3.060	0.32672	0.4	Pass
	<i>Note: Dwell time=Pulse width (ms) × (1600 ÷ 6 ÷ 79) × 31.6 Second</i>				

*Test Mode: Transmitting (EDR)*

Mode	Channel	Pulse Width (ms)	Dwell Time (Sec)	Limit (Sec)	Result
<b>DH 1</b>	Low	0.572	0.18304	0.4	Pass
	Middle	0.560	0.17920	0.4	Pass
	High	0.568	0.18176	0.4	Pass
	<i>Note: Dwell time=Pulse width (ms) × (1600 ÷ 2 ÷ 79) × 31.6 Second</i>				
<b>DH 3</b>	Low	1.830	0.29280	0.4	Pass
	Middle	1.842	0.29472	0.4	Pass
	High	1.866	0.29856	0.4	Pass
	<i>Note: Dwell time=Pulse width (ms) × (1600 ÷ 4 ÷ 79) × 31.6 Second</i>				
<b>DH 5</b>	Low	3.072	0.32800	0.4	Pass
	Middle	3.192	0.34081	0.4	Pass
	High	3.120	0.33312	0.4	Pass
	<i>Note: Dwell time=Pulse width (ms) × (1600 ÷ 6 ÷ 79) × 31.6 Second</i>				

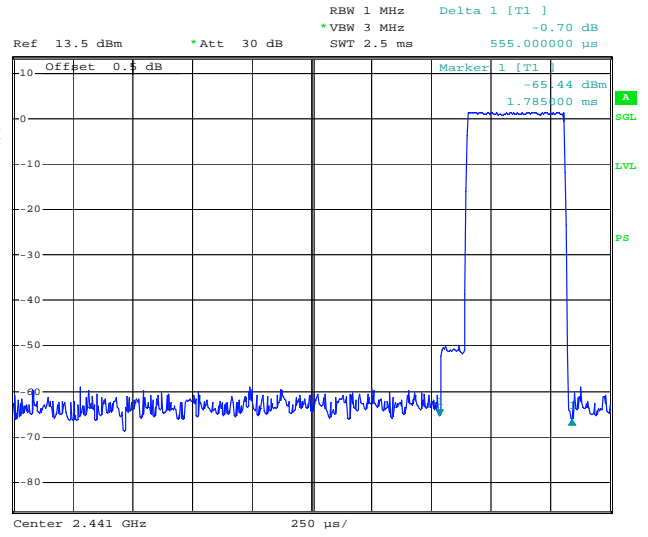
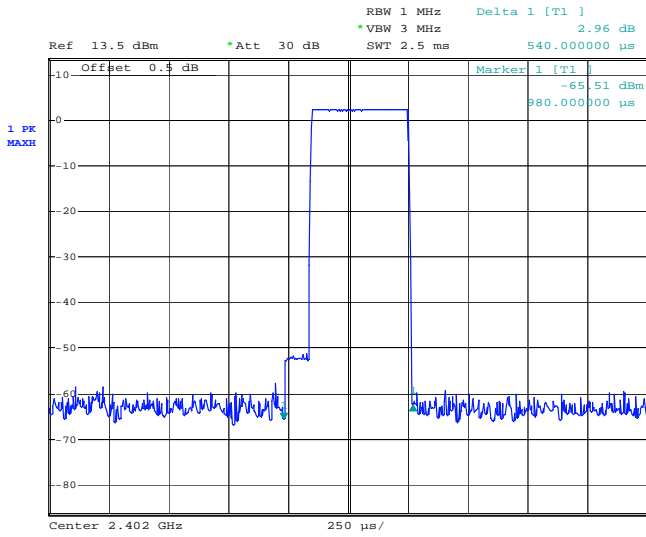
Please refer to the following plots.



**BDR**

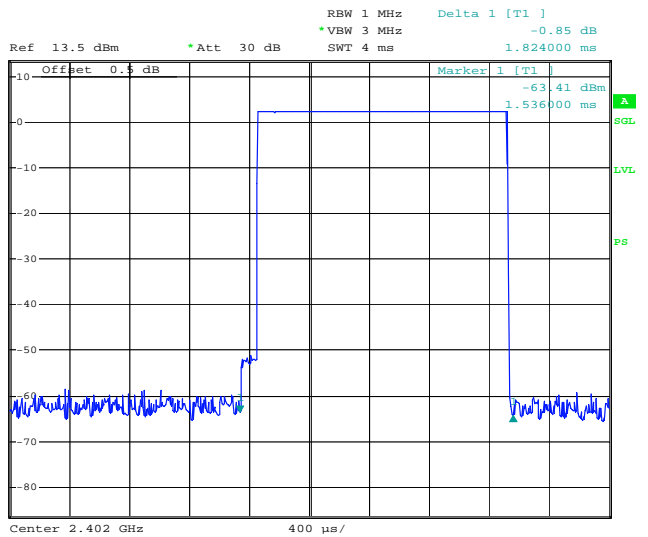
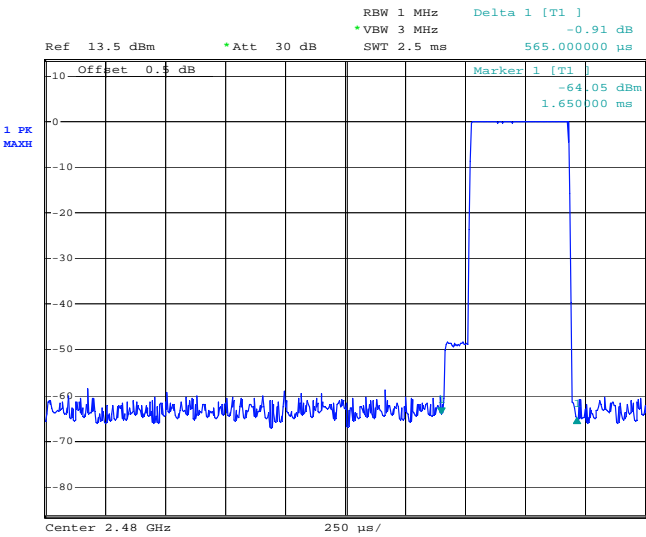
**Low Channel for DH1**

**Middle Channel for DH1**

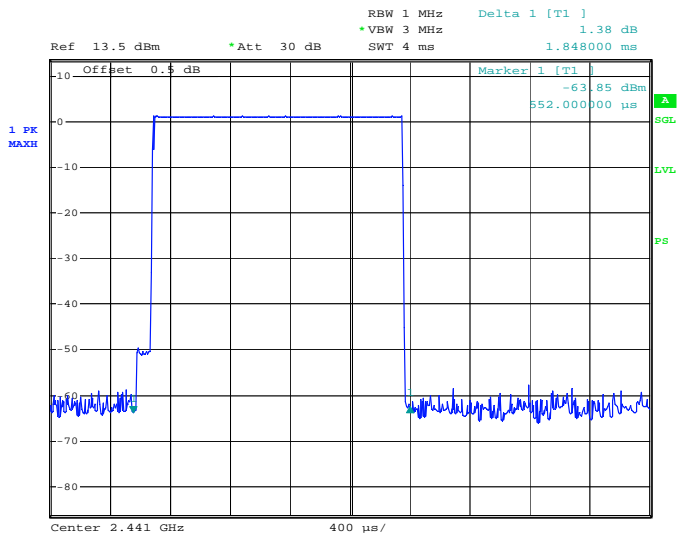


**High Channel for DH1**

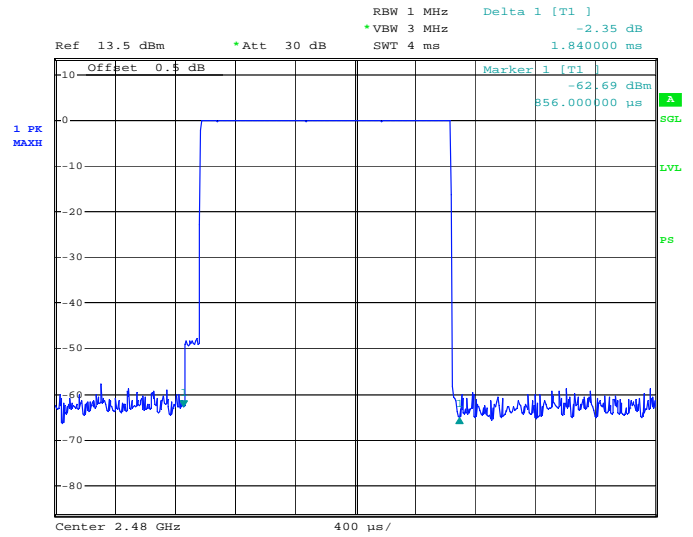
**Low Channel for DH3**



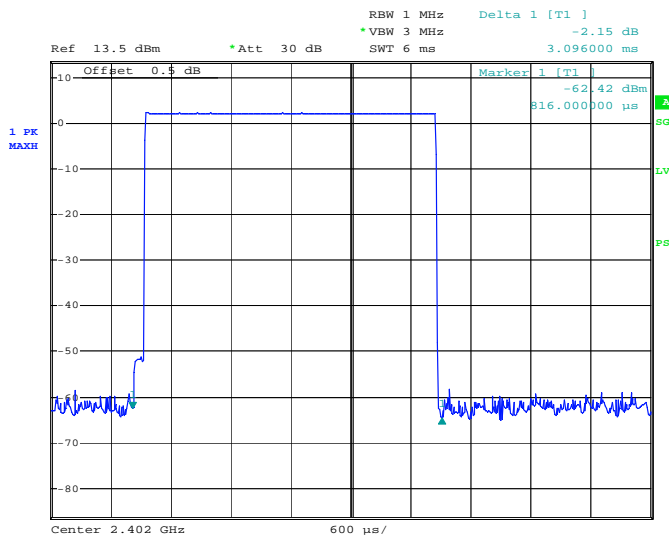
**Middle Channel for DH3**



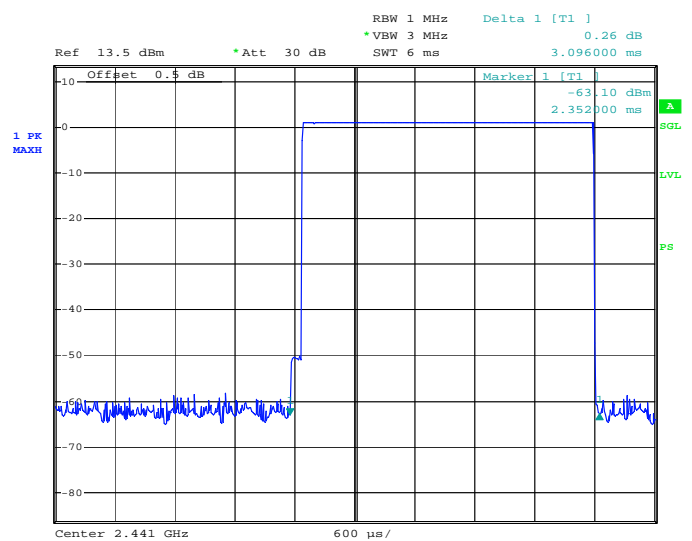
**High Channel for DH3**



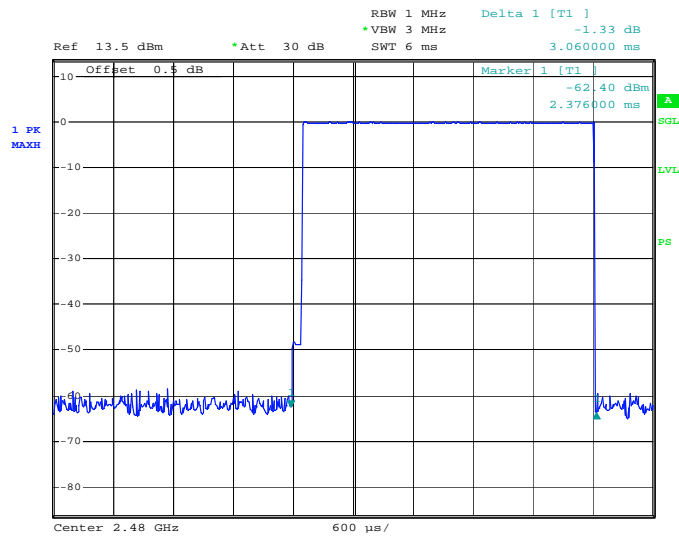
**Low Channel for DH5**



**Middle Channel for DH5**

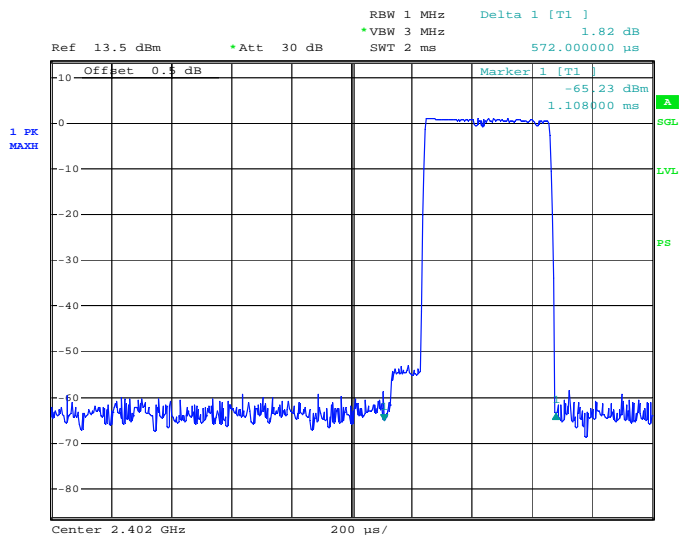


### High Channel for DH5

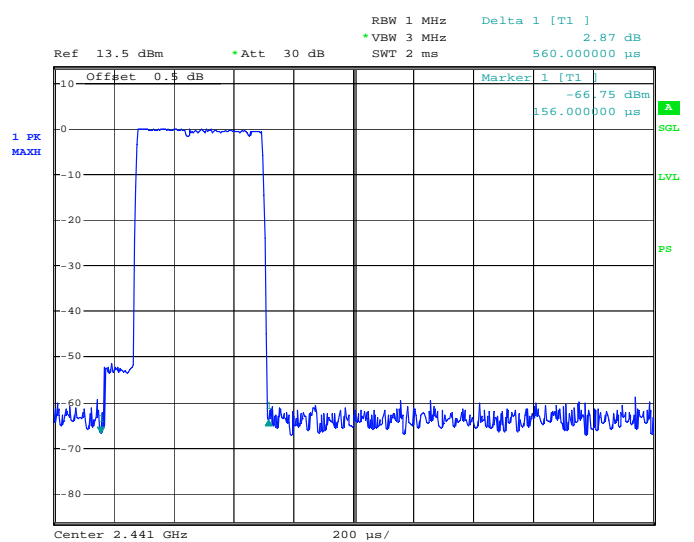


### EDR

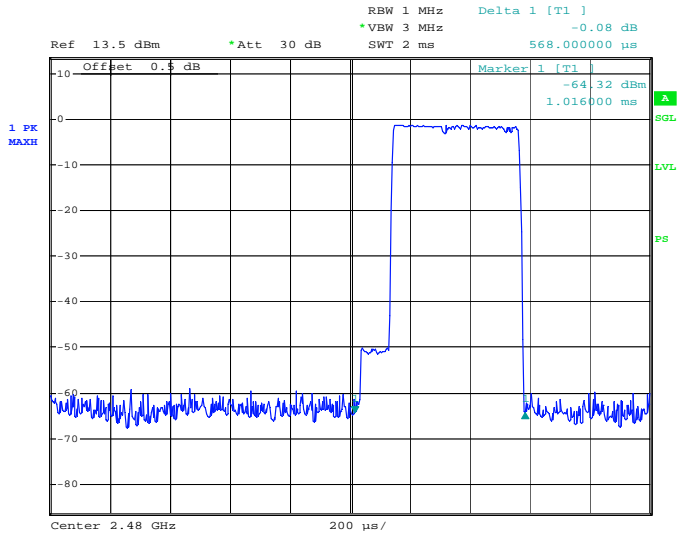
#### Low Channel for DH1



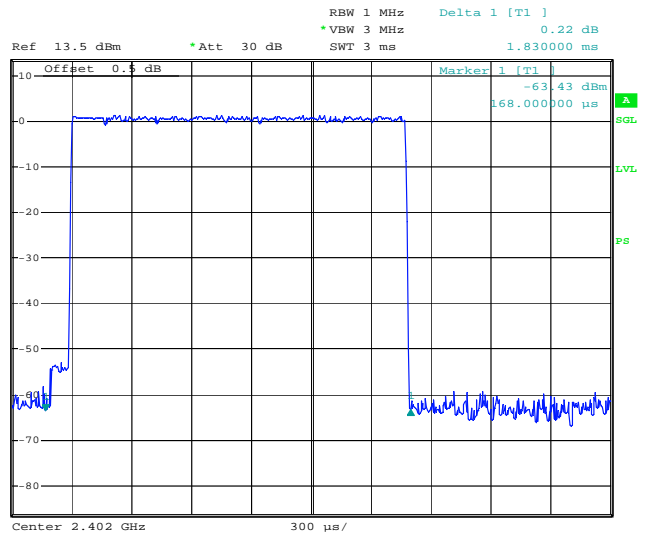
#### Middle Channel for DH1



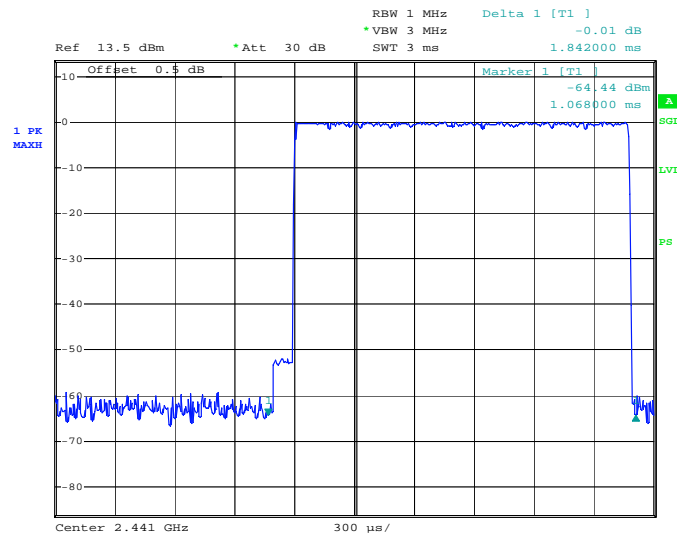
**High Channel for DH1**



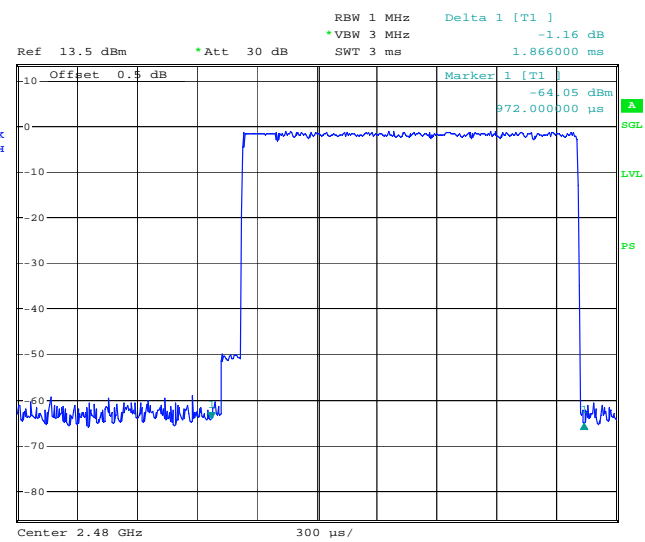
**Low Channel for DH3**



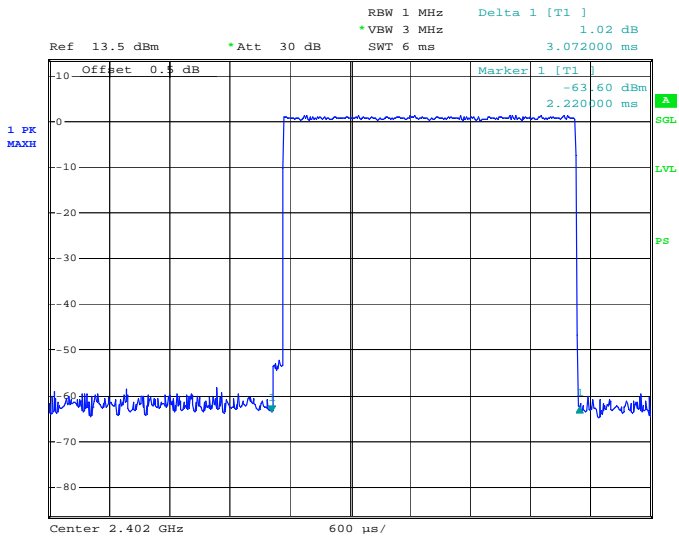
**Middle Channel for DH3**



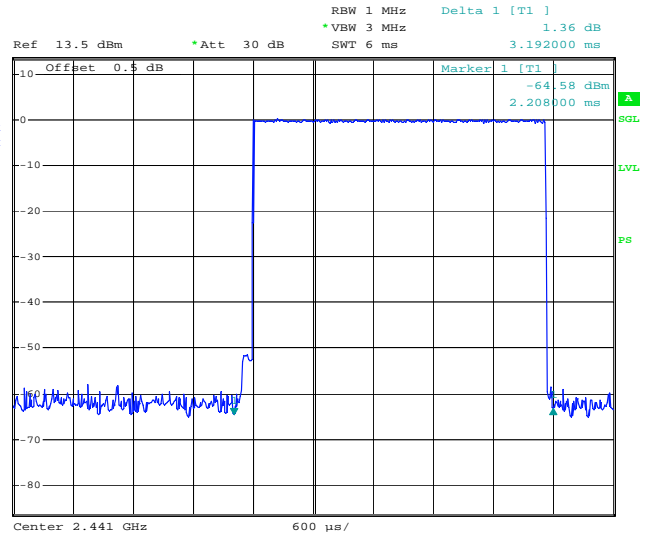
**High Channel for DH3**



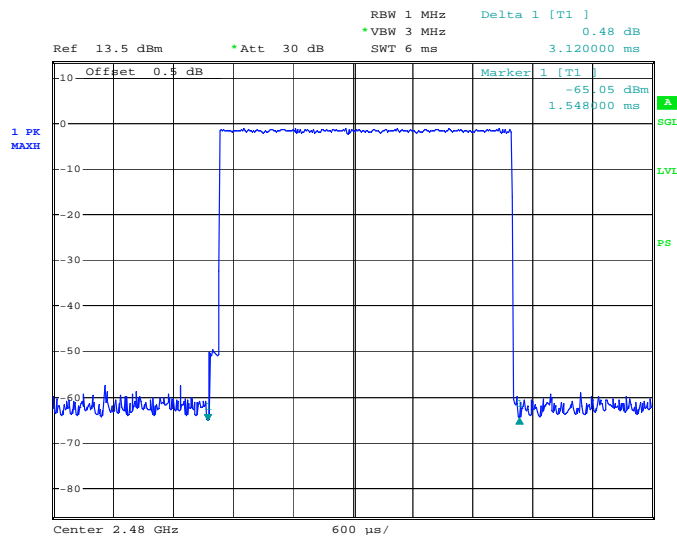
### Low Channel for DH5



### Middle Channel for DH5



### High Channel for DH5



**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.

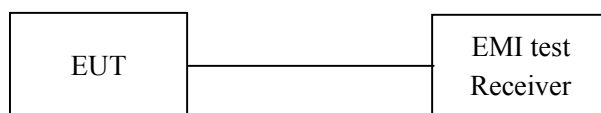
**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2009-11-07	2010-11-06

\* **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 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**

<b>Temperature:</b>	26 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100.9 kPa

\* *The testing was performed by Cookies Bu on 2010-03-07.*

**Test Result:** Compliant.

Test Mode: Transmitting (BDR)

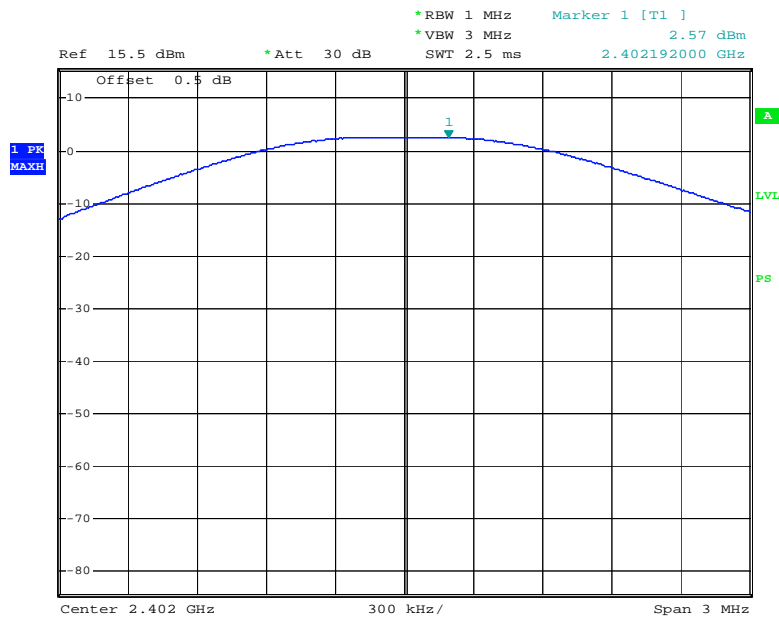
Channel	Channel Frequency (MHz)	Conducted Output Power		Limit (mW)
		(dBm)	(mW)	
Low	2402	2.57	1.807	1000
Middle	2441	1.29	1.346	1000
High	2480	0.15	1.035	1000

Test Mode: Transmitting (EDR)

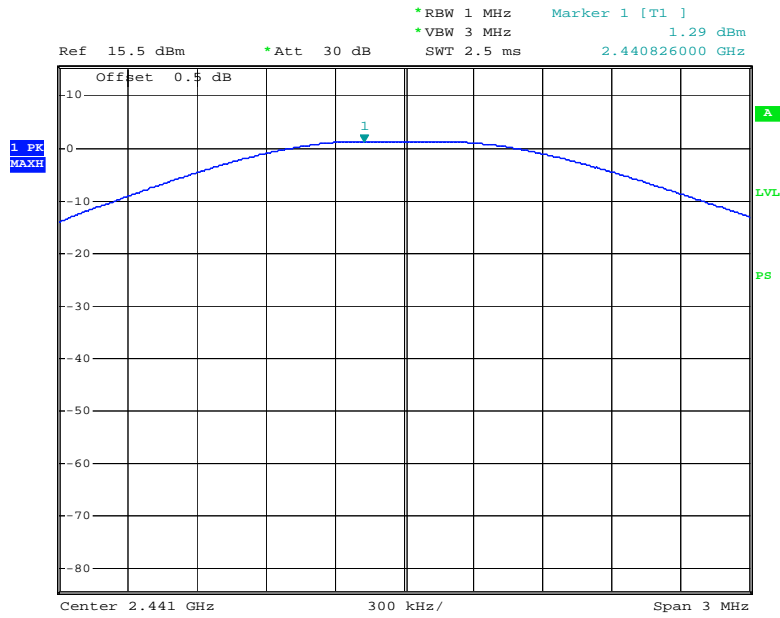
Channel	Channel Frequency (MHz)	Conducted Output Power		Limit (mW)
		(dBm)	(mW)	
Low	2402	1.41	1.384	1000
Middle	2441	0.19	1.045	1000
High	2480	-0.84	0.824	1000

**BDR:**

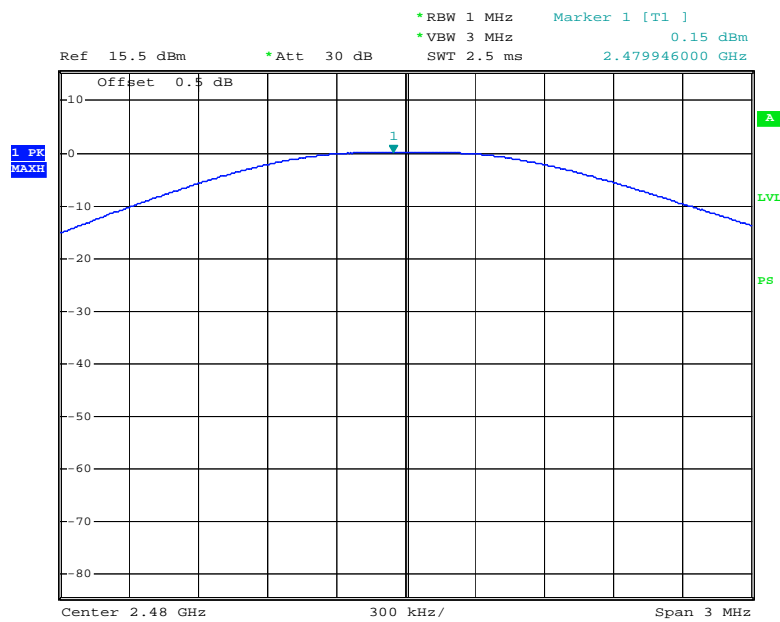
**Low Channel**



### Middle Channel



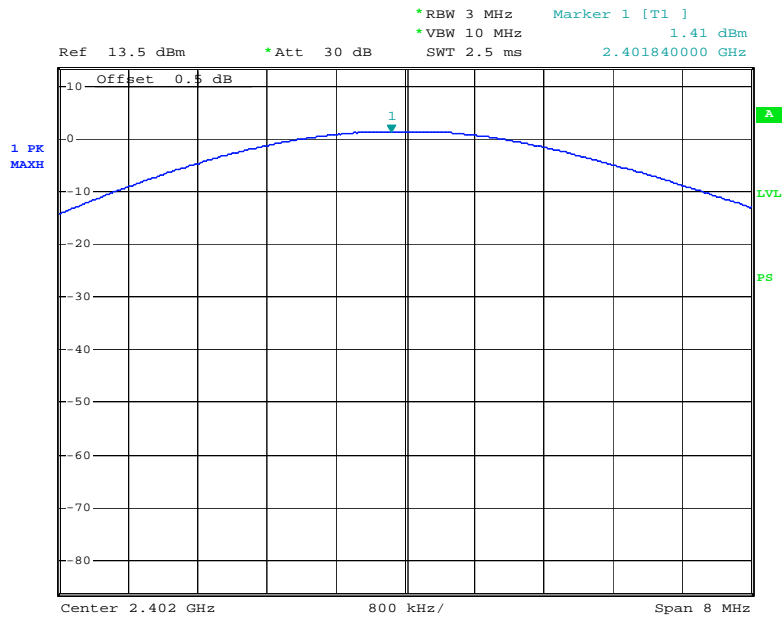
### High Chanel



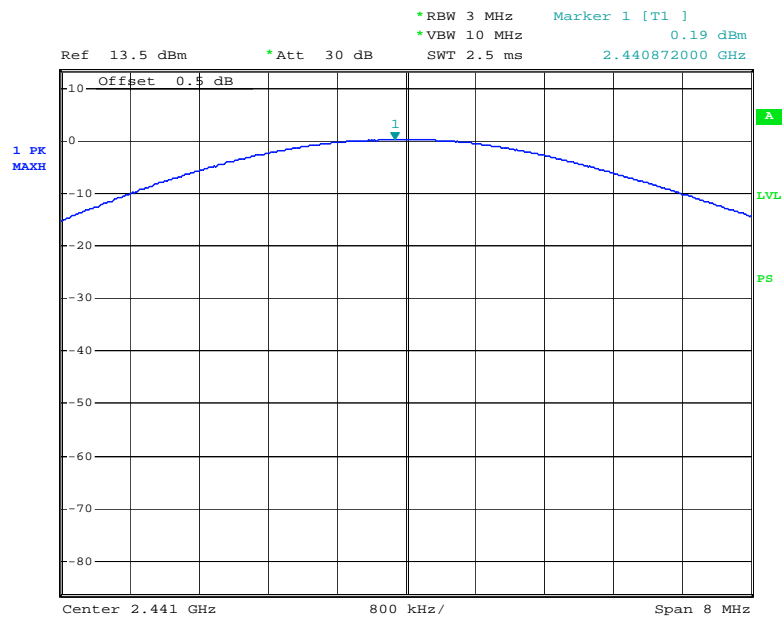


**EDR:**

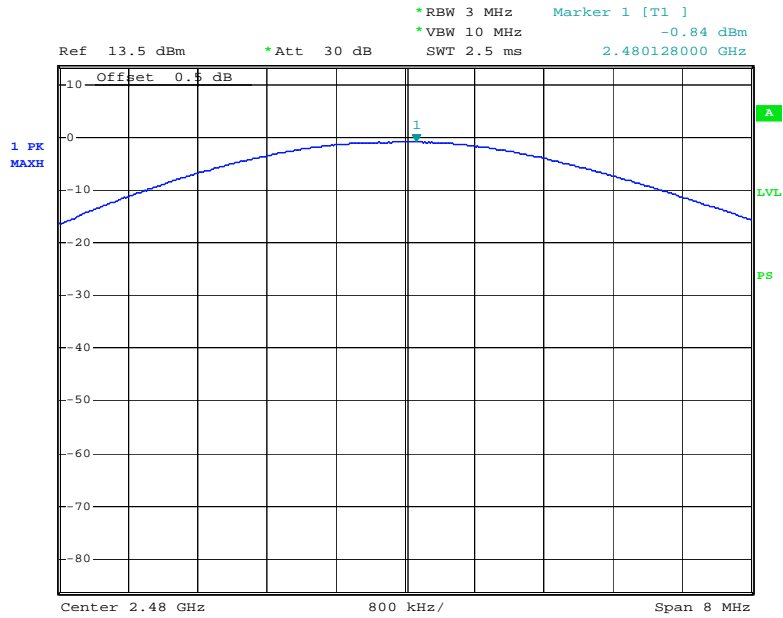
**Low Channel**



**Middle Channel**



### High Chanel



## **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 Equipment List and Details**

<b>Manufacturer</b>	<b>Description</b>	<b>Model</b>	<b>Serial Number</b>	<b>Calibration Date</b>	<b>Calibration Due Date</b>
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2009-11-07	2010-11-06

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

<b>Temperature:</b>	26 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100.9 kPa

*\*The testing was performed by Cookies Bu on 2010-03-07*

**Test Result:** Compliant

Please refer to the following table and plots.

*Test Mode: Transmitting (BDR)*

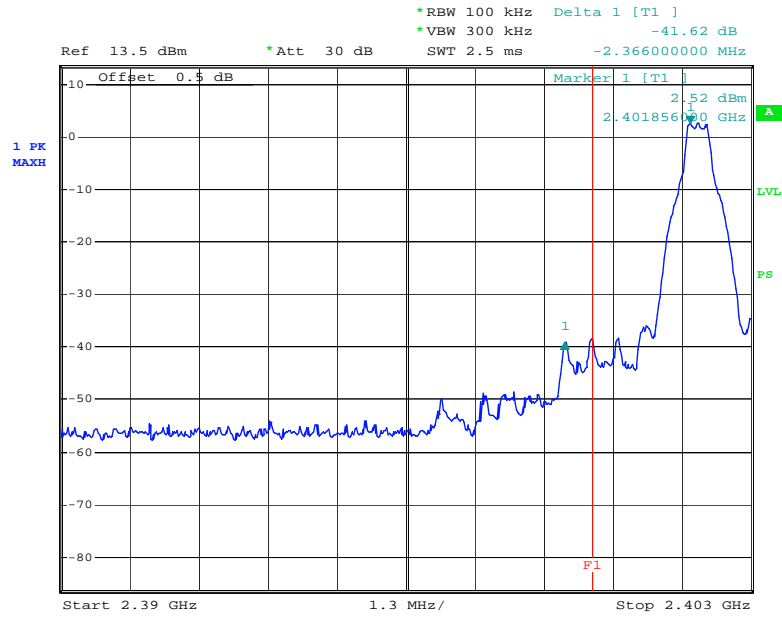
<b>Frequency (MHz)</b>	<b>Delta Peak to Band Emission (dBc)</b>	<b>Limit (dBc)</b>
2399.190	41.62	20
2484.512	45.72	20

*Test Mode: Transmitting (EDR)*

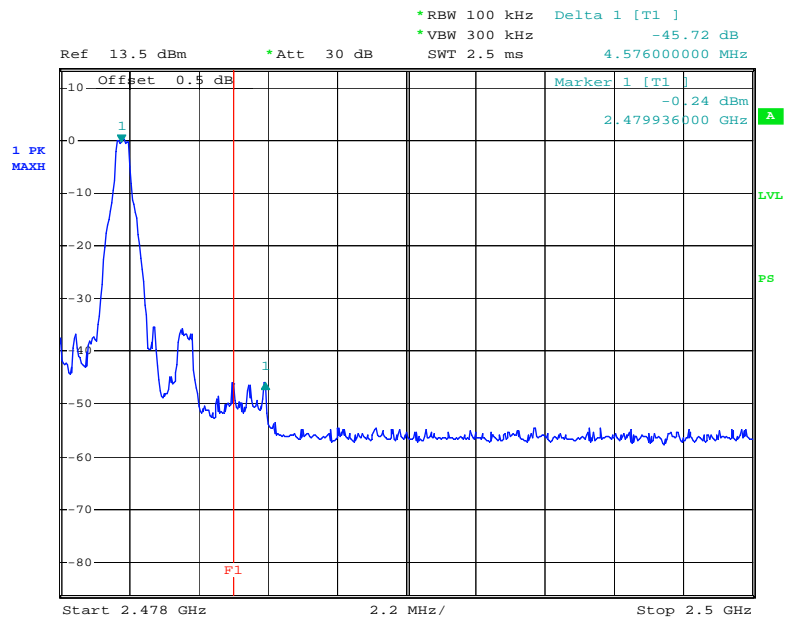
<b>Frequency (MHz)</b>	<b>Delta Peak to Band Emission (dBc)</b>	<b>Limit (dBc)</b>
2399.954	44.45	20
2483.956	47.74	20

**BDR:**

**Band Edge: Left Side**

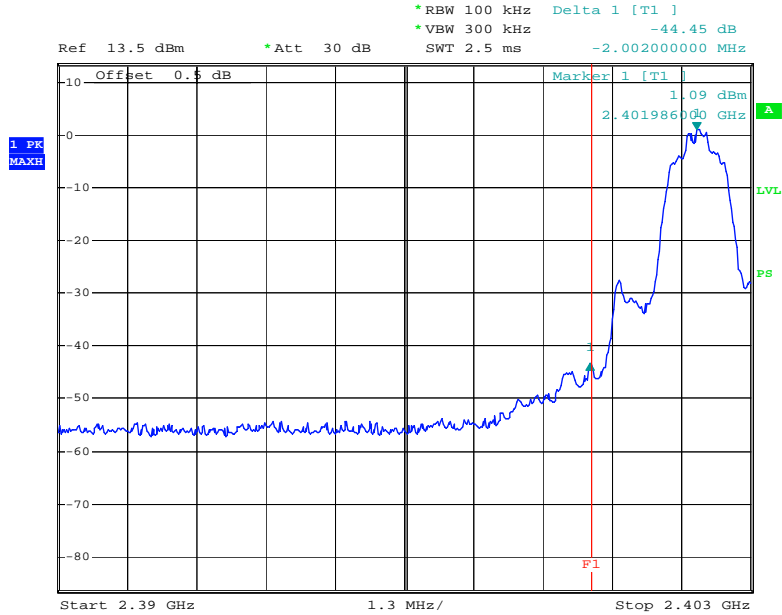


**Band Edge: Right Side**

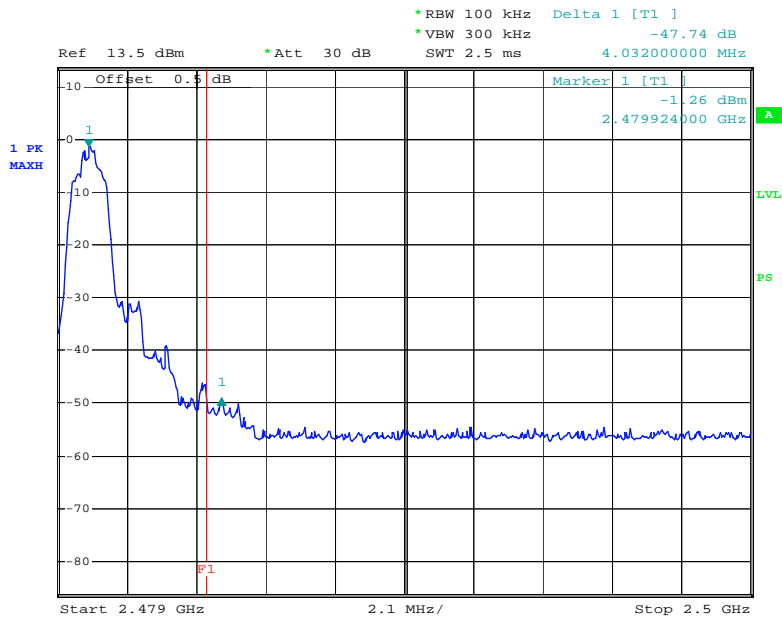


**BDR:**

**Band Edge: Left Side**



**Band Edge: Right Side**



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