

# FCC PART 15.247

## TEST REPORT

For

### Qcom Technology Inc.

4F., No.301, Sec. 2, Tiding Blvd. Neihu Dist., Taipei City Taiwan (R.O.C.)

**FCC ID: RUJ-LR802URN3**

<b>Report Type:</b> Original Report	<b>Product Type:</b> 802.11 b/g/n Wireless USB Module
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<b>Report Number:</b> RTW150203051-00	
<b>Report Date:</b> 2015-02-11	
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F E M V A L

## GENERAL INFORMATION

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

The *Qcom Technology Inc.*'s product, model number: *LR802URN3 (FCC ID: RUJ-LR802URN3)* or ("EUT") in this report is a *802.11 b/g/n Wireless USB Module*, which was measured approximately: 6 cm (L) x 2.5 cm (W) x 0.3 cm (H), rated input voltage: DC 5.0V from system.

*Note: The series product, model LR802URN3, LR802URN2-01 are electrically identical, the only difference between them are the model names and main board size, we selected LR802URN3 for fully testing, the details was explained in the attached declaration letter.*

*\* All measurement and test data in this report was gathered from production sample serial number: 150203051 (Assigned by BACL.Dongguan). The EUT was received on 2015-02-04.*

### Objective

This report is prepared on behalf of *Qcom Technology Inc.* in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communications Commission's rules

The tests were performed in order to determine the compliance of the EUT with FCC Part 15-Subpart C, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

### Related Submittal(s)/Grant(s)

No related Submittal(s).

### 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. (Dongguan).

### Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) 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 February 06, 2015 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.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The system was configured for testing in testing mode, which was provided by manufacturer. For 2.4GHz band, 11 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437	/	/

For 802.11b, 802.11g, and 802.11n ht20 modes were tested with Channel 1, 6 and 11. For 802.11n ht40 mode were tested with Channel 3, 6 and 9.

The worst-case data rates are determined to be as follows for each mode based upon investigations by measuring the average power and PSD across all data rates bandwidths, and modulations.

### Antenna Configuration Details

Manufacturer	Model	Antenna Type	Antenna Connector	Antenna Gain (dBi)
Taoglas	GW26.0152	Dipole	RP-SMA(M)	1.0
ThinkYard	T500001	Dipole	RP-SMA(M)	2.0
ThinkYard	T000701	PIFA	IPX	1.5
ThinkYard	T000803	PIFA	IPX	1.5
ThinkYard	T000805	PIFA	IPX	1.5
Skylink	IWX-2411RSXX	Dipole	RP-SMA(M)	2.0
Skylink	NP-Y110	Dipole	RP-SMA(M)	2.15

The antennas with maximum antenna gain for each antenna type were chose to test radiated Spurious Emissions: PIFA antenna chose T000701, Dipole antenna chose NP-Y110.

### Equipment Modifications

No modification was made to the EUT tested.

## EUT Exercise Software

The software “MP Kit” was used for testing, which was provided by manufacturer. The worst condition (maximum power with 100% duty cycle) was setting by the software as following table:

Test Mode	Test Software Version	MP Kit		
802.11b	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	1Mbps	1Mbps	1Mbps
	Power Level Setting	38	38	38
802.11g	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	6Mbps	6Mbps	6Mbps
	Power Level Setting	32	32	32
802.11n ht20	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting	38	38	38
802.11n ht40	Test Frequency	2422MHz	2437MHz	2452MHz
	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting	31	31	31

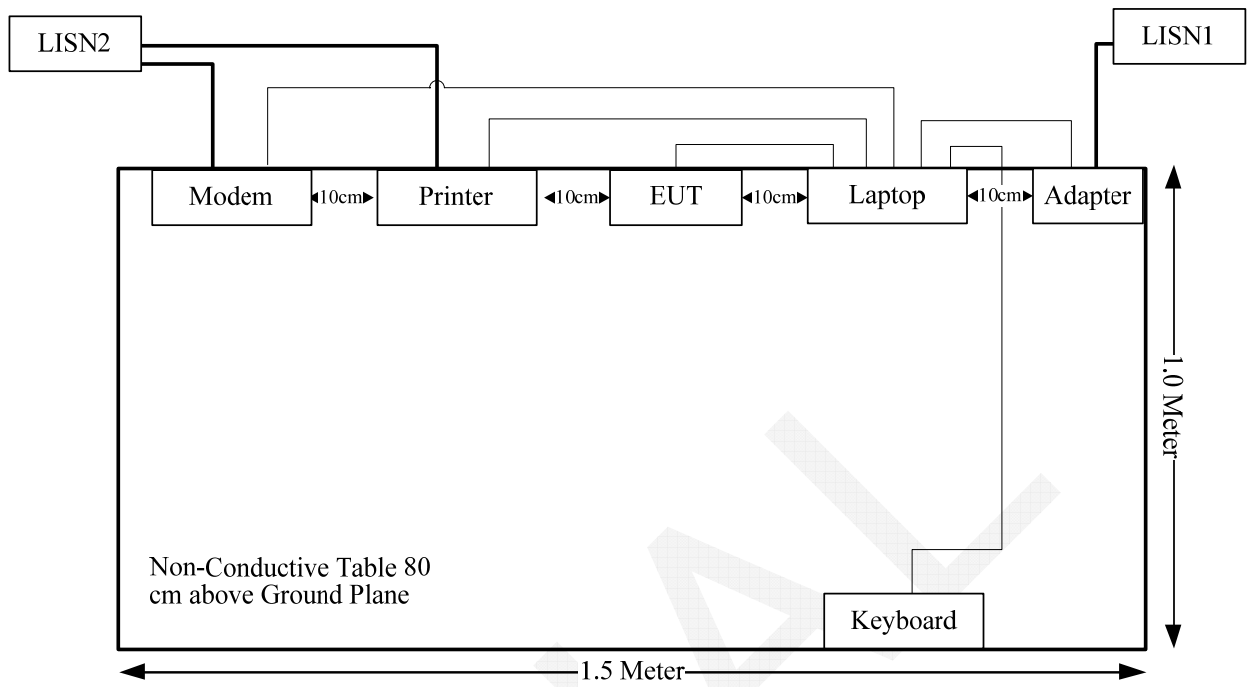
## Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Laptop	PP11L	QDS-BRCM1017
HP	Printer	C3941A	JPTVOB2337
DELL	Keyboard	L100	CNORH656658907BL05DC
SAST	Modem	AEM-2100	0293

## External Cable

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
Serial Cable	yes	No	1.2	Serial Port of Laptop	Modem
Parallel Cable	yes	No	1.2	ParallelPort of Laptop	Printer
Keyboard Cable	yes	No	1.8	USB Port of Laptop	Keyboard
USB Cable	yes	No	1.0	USB Port of Laptop	EUT

### 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 & §2.1091	Maximum Permissible Exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Compliance
§15.247(d)	Spurious Emissions at Antenna Port	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB Emission Bandwidth	Compliance
§15.247(b)(3)	Maximum conducted output power	Compliance
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(e)	Power Spectral Density	Compliance



**FCC §15.247 (i) & §1.1307 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)**

**Applicable Standard**

According to subpart 15.247(i) and subpart §1.1307, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission’s guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minutes)
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; \* = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

**Calculated Formulary:**

Predication of MPE limit at a given distance

$S = PG/4\pi R^2$  = power density (in appropriate units, e.g. mW/cm<sup>2</sup>);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

**Calculated Data:**

Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )
	(dBi)	(numeric)	(dBm)	(mW)			
2412	2.15	1.64	15.78	37.84	20.00	0.01236	1.0

**Result:** The device meet FCC MPE at 20 cm distance

## **FCC §15.203 - ANTENNA REQUIREMENT**

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### **Applicable Standard**

According to § 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 user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

### **Antenna Connector Construction**

This product used an IPX connector to connect the antenna, the maximum gain of the antennas is 2.15 dBi, which fulfill the requirement of this section, please refer to the EUT photos.

**Result:** Compliance.

## FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

### Applicable Standard

FCC§15.207

### Measurement Uncertainty

Compliance or non-compliance with a disturbance limit shall be determined in the following manner:

If  $U_{lab}$  is less than or equal to  $U_{cispr}$  of Table 1, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If  $U_{lab}$  is greater than  $U_{cispr}$  of Table 1, then:

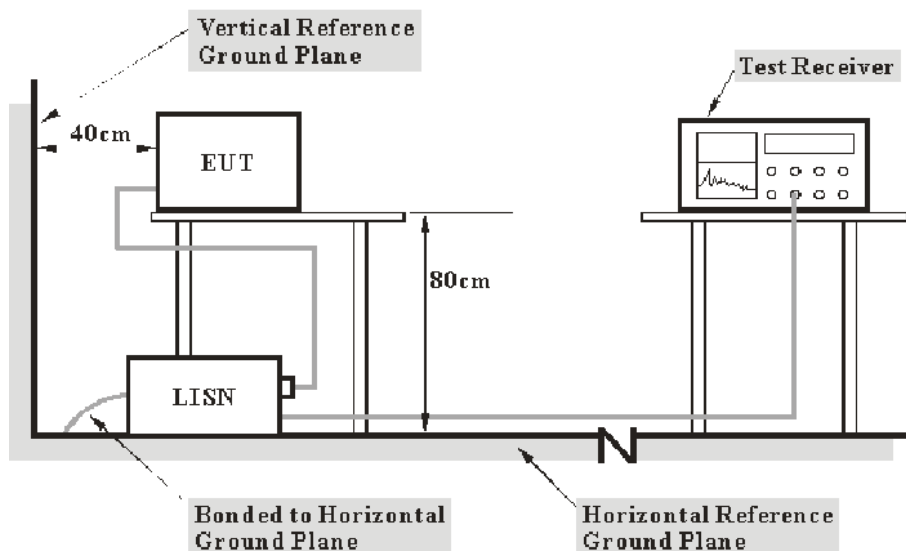
- compliance is deemed to occur if no measured disturbance level, increased by  $(U_{lab} - U_{cispr})$ , exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by  $(U_{lab} - U_{cispr})$ , exceeds the disturbance limit.

Based on CISPR 16-4-2-2011, measurement uncertainty of conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Dongguan) is 3.46 dB (150 kHz to 30 MHz).

Table 1 – Values of  $U_{cispr}$

Measurement	$U_{cispr}$
Conducted disturbance at mains port using AMN (150 kHz to 30 MHz)	3.4 dB

### 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 laptop was connected to a 120 VAC/60 Hz power source

### EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

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

### Test Procedure

During the conducted emission test, the adapter of laptop was connected to the first LISN and the other support equipments were connected to the outlet of the second 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.

### Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$$V_C = V_R + A_C + VDF$$

$$C_f = A_C + VDF$$

Herein,

$V_C$  (cord. Reading): corrected voltage amplitude

$V_R$ : reading voltage amplitude

$A_C$ : attenuation caused by cable loss

VDF: voltage division factor of AMN

$C_f$ : Correction Factor

The “**Margin**” column of the following data tables indicates the degree of compliance within 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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2014-10-16	2015-10-16
R&S	L.I.S.N	ESH3-Z5	843331/015	N/A	N/A
R&S	Two-line V-network	ENV 216	3560.6550.12	2014-12-11	2015-12-11
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A

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

### Test Results Summary

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

**7.2 dB at 0.312220 MHz in the Line conducted mode**

### Test Data

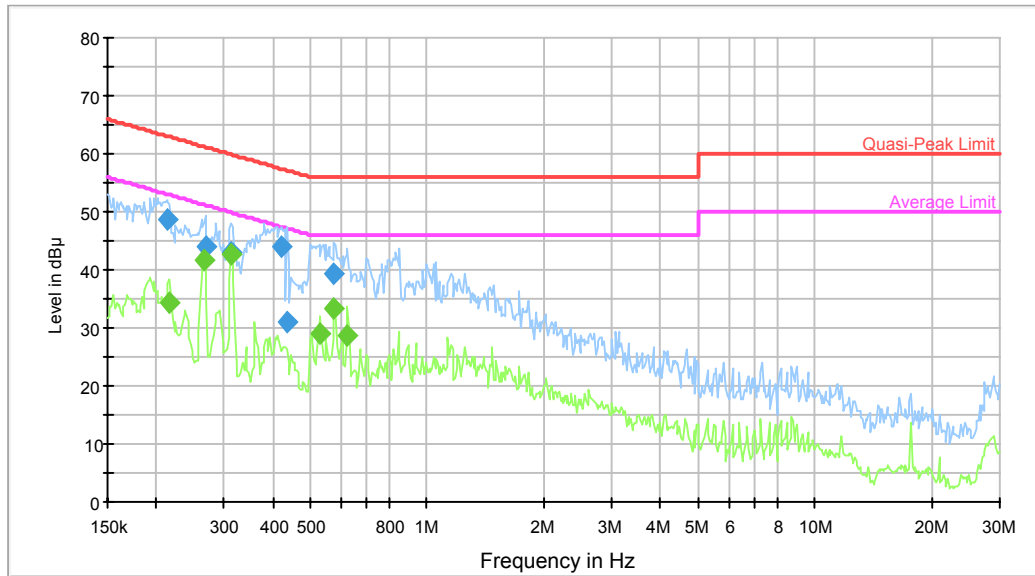
#### Environmental Conditions

<b>Temperature:</b>	20.73 °C
<b>Relative Humidity:</b>	36 %
<b>ATM Pressure:</b>	101.8 kPa

*The testing was performed by Allen Qiao on 2015-02-05.*

Test Mode: Transmitting

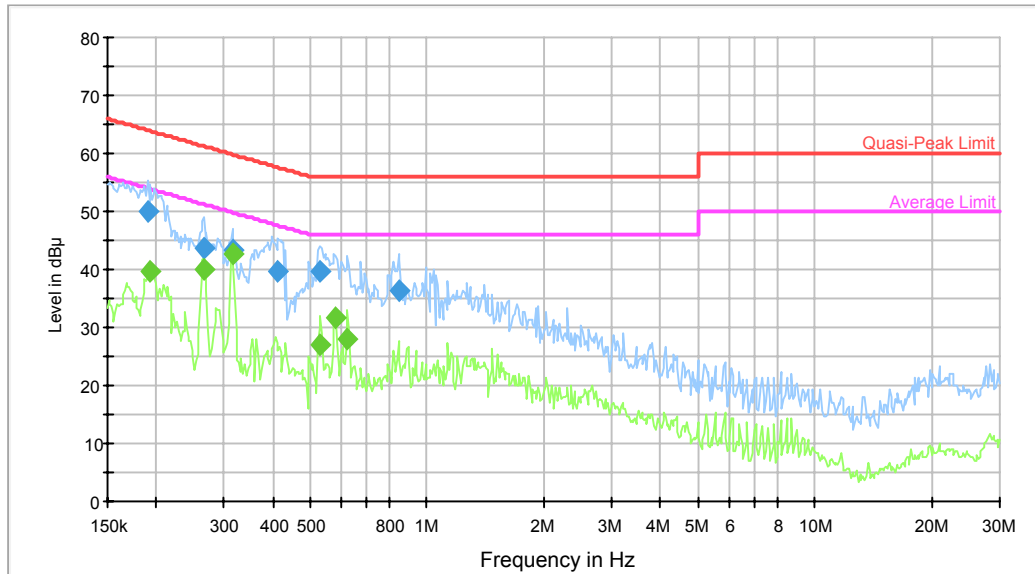
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.212988	48.5	9.000	L1	10.7	14.6	63.1	Compliance
0.268355	43.9	9.000	L1	10.7	17.3	61.2	Compliance
0.312220	42.9	9.000	L1	10.7	17.0	59.9	Compliance
0.422630	44.1	9.000	L1	10.5	13.3	57.4	Compliance
0.436318	31.0	9.000	L1	10.5	26.2	57.1	Compliance
0.576662	39.5	9.000	L1	10.4	16.5	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.216409	34.3	9.000	L1	10.7	18.6	53.0	Compliance
0.266226	41.7	9.000	L1	10.7	9.6	51.2	Compliance
0.312220	42.7	9.000	L1	10.7	7.2	49.9	Compliance
0.532496	29.2	9.000	L1	10.3	16.8	46.0	Compliance
0.576662	33.3	9.000	L1	10.4	12.7	46.0	Compliance
0.624492	28.8	9.000	L1	10.5	17.2	46.0	Compliance

**AC120 V, 60 Hz, Neutral:**



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.190505	50.1	9.000	N	11.1	13.9	64.0	Compliance
0.266226	43.7	9.000	N	11.2	17.5	61.2	Compliance
0.314718	43.4	9.000	N	11.1	16.5	59.8	Compliance
0.412647	39.7	9.000	N	10.7	17.9	57.6	Compliance
0.532496	39.8	9.000	N	10.3	16.2	56.0	Compliance
0.845331	36.3	9.000	N	10.5	19.8	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.193566	39.6	9.000	N	11.2	14.3	53.9	Compliance
0.266226	40.0	9.000	N	11.2	11.2	51.2	Compliance
0.314718	42.5	9.000	N	11.1	7.3	49.8	Compliance
0.532496	27.1	9.000	N	10.3	18.9	46.0	Compliance
0.581275	31.8	9.000	N	10.4	14.2	46.0	Compliance
0.624492	27.9	9.000	N	10.5	18.1	46.0	Compliance

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

### Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

### Measurement Uncertainty

Compliance or non-compliance with a disturbance limit shall be determined in the following manner:

If  $U_{lab}$  is less than or equal to  $U_{cispr}$  of Table 2, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If  $U_{lab}$  is greater than  $U_{cispr}$  of Table 2, then:

- compliance is deemed to occur if no measured disturbance level, increased by  $(U_{lab} - U_{cispr})$ , exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by  $(U_{lab} - U_{cispr})$ , exceeds the disturbance limit.

Based on CISPR 16-4-2-2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:

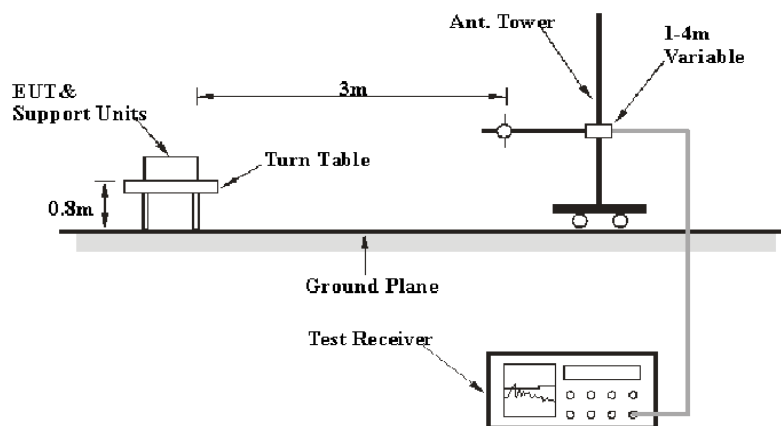
30M~200MHz: 5.0 dB  
 200M~1GHz: 6.2 dB  
 1G~6GHz: 4.45 dB  
 6G~18GHz: 5.23 dB

Table 2 – Values of  $U_{cispr}$

Measurement	$U_{cispr}$
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

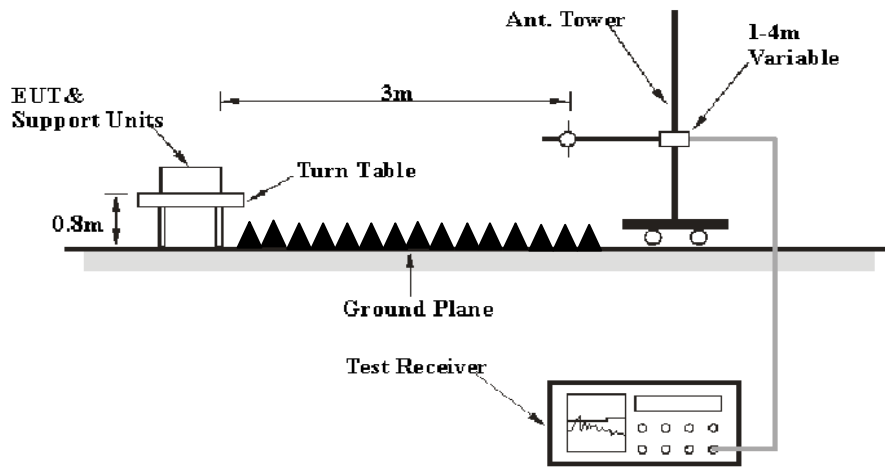
### EUT Setup

Below 1GHz:





**Above 1GHz:**



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC 15.209, and FCC 15.247 limits. The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

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

**EMI Test Receiver & Spectrum Analyzer Setup**

The system was investigated from 30 MHz to 25 GHz.

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

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

**Test Procedure**

During the radiated emission test, the adapter of laptop was connected to the first AC floor outlet and the other support equipments were connected to the second 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-1 GHz, peak and Average detection modes for frequencies above 1 GHz.

## Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2014-05-09	2015-05-09
Sunol Sciences	Antenna	JB3	A060611-3	2014-07-28	2017-07-27
HP	Amplifier	8447E	2434A02181	2014-09-01	2015-09-01
R&S	Spectrum Analyzer	FSEM	DE31388	2014-05-09	2015-05-09
ETS LINDGREN	Horn Antenna	3115	000 527 35	2012-09-06	2015-09-06
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2014-02-19	2015-02-19
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-01 1304	2014-06-16	2017-06-15
Ducommun Technologies	Horn Antenna	ARH-2823-02	1007726-01 1302	2014-06-16	2017-06-15

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

## Test Results Summary

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

**9.2 dB at 2483.5 MHz in the Vertical polarization for 802.11b Mode**

## Test Data

### Environmental Conditions

<b>Temperature:</b>	21.2°C
<b>Relative Humidity:</b>	67 %
<b>ATM Pressure:</b>	102.1 kPa

*The testing was performed by Allen Qiao on 2015-02-09.*

*Test Mode: Transmitting*

**PIFA antenna:**

802.11b Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2412 MHz									
2412	66.59	PK	H	25.67	3.68	0.00	95.94	N/A	N/A
2412	62.75	AV	H	25.67	3.68	0.00	92.10	N/A	N/A
2412	68.36	PK	V	25.67	3.68	0.00	97.71	N/A	N/A
2412	64.21	AV	V	25.67	3.68	0.00	93.56	N/A	N/A
2390	25.78	PK	V	25.61	3.63	0.00	55.02	74.00	18.98
2390	14.13	AV	V	25.61	3.63	0.00	43.37	54.00	10.63
4824	33.12	PK	V	30.64	5.03	27.41	41.38	74.00	32.62
4824	21.25	AV	V	30.64	5.03	27.41	29.51	54.00	24.49
7236	32.58	PK	V	34.17	6.65	25.90	47.50	74.00	26.50
7236	20.05	AV	V	34.17	6.65	25.90	34.97	54.00	19.03
9648	30.66	PK	V	36.06	8.55	27.46	47.81	74.00	26.19
9648	18.64	AV	V	36.06	8.55	27.46	35.79	54.00	18.21
3862	34.58	PK	V	29.60	4.55	27.32	41.41	74.00	32.59
3862	22.15	AV	V	29.60	4.55	27.32	28.98	54.00	25.02
192.7	32.27	QP	V	11.66	1.69	21.46	24.16	43.50	19.34
Middle Channel: 2437 MHz									
2437	68.25	PK	H	25.74	3.75	0.00	97.74	N/A	N/A
2437	64.17	AV	H	25.74	3.75	0.00	93.66	N/A	N/A
2437	70.32	PK	V	25.74	3.75	0.00	99.81	N/A	N/A
2437	67.03	AV	V	25.74	3.75	0.00	96.52	N/A	N/A
4874	33.11	PK	V	30.77	5.14	27.42	41.60	74.00	32.40
4874	21.13	AV	V	30.77	5.14	27.42	29.62	54.00	24.38
7311	32.44	PK	V	34.35	6.74	25.88	47.65	74.00	26.35
7311	19.97	AV	V	34.35	6.74	25.88	35.18	54.00	18.82
9748	30.52	PK	V	36.30	8.61	27.24	48.19	74.00	25.81
9748	18.59	AV	V	36.30	8.61	27.24	36.26	54.00	17.74
3862	34.59	PK	V	29.60	4.55	27.32	41.42	74.00	32.58
3862	22.01	AV	V	29.60	4.55	27.32	28.84	54.00	25.16
2417	35.12	PK	V	25.68	3.70	27.33	37.17	74.00	36.83
2417	22.43	AV	V	25.68	3.70	27.33	24.48	54.00	29.52
192.7	32.86	QP	V	11.66	1.69	21.46	24.75	43.50	18.75
High Channel: 2462 MHz									
2462	71.89	PK	H	25.80	3.75	0.00	101.44	N/A	N/A
2462	67.71	AV	H	25.80	3.75	0.00	97.26	N/A	N/A
2462	75.59	PK	V	25.80	3.75	0.00	105.14	N/A	N/A
2462	71.11	AV	V	25.80	3.75	0.00	100.66	N/A	N/A
2483.5	27.56	PK	V	25.86	3.67	0.00	57.09	74.00	16.91
2483.5	15.27	AV	V	25.86	3.67	0.00	44.80	54.00	9.20
4924	33.1	PK	V	30.90	5.34	27.43	41.91	74.00	32.09
4924	21.13	AV	V	30.90	5.34	27.43	29.94	54.00	24.06
7386	32.33	PK	V	34.53	6.83	25.86	47.83	74.00	26.17
7386	19.86	AV	V	34.53	6.83	25.86	35.36	54.00	18.64
9848	30.6	PK	V	36.54	8.66	26.94	48.86	74.00	25.14
9848	18.69	AV	V	36.54	8.66	26.94	36.95	54.00	17.05
3862	34.68	PK	V	29.60	4.55	27.32	41.51	74.00	32.49
3862	21.9	AV	V	29.60	4.55	27.32	28.73	54.00	25.27
192.7	31.62	QP	V	11.66	1.69	21.46	23.51	43.50	19.99

802.11g Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2412 MHz									
2412	59.35	PK	H	25.67	3.68	0.00	88.70	N/A	N/A
2412	50.46	AV	H	25.67	3.68	0.00	79.81	N/A	N/A
2412	60.59	PK	V	25.67	3.68	0.00	89.94	N/A	N/A
2412	51.18	AV	V	25.67	3.68	0.00	80.53	N/A	N/A
2390	25.94	PK	V	25.61	3.63	0.00	55.18	74.00	18.82
2390	14.02	AV	V	25.61	3.63	0.00	43.26	54.00	10.74
4824	33.12	PK	V	30.64	5.03	27.41	41.38	74.00	32.62
4824	21.05	AV	V	30.64	5.03	27.41	29.31	54.00	24.69
7236	32.3	PK	V	34.17	6.65	25.90	47.22	74.00	26.78
7236	19.85	AV	V	34.17	6.65	25.90	34.77	54.00	19.23
9648	30.59	PK	V	36.06	8.55	27.46	47.74	74.00	26.26
9648	18.75	AV	V	36.06	8.55	27.46	35.90	54.00	18.10
3862	34.77	PK	V	29.60	4.55	27.32	41.60	74.00	32.40
3862	21.75	AV	V	29.60	4.55	27.32	28.58	54.00	25.42
192.7	32.73	QP	V	11.66	1.69	21.46	24.62	43.50	18.88
Middle Channel: 2437 MHz									
2437	61.35	PK	H	25.74	3.75	0.00	90.84	N/A	N/A
2437	52.64	AV	H	25.74	3.75	0.00	82.13	N/A	N/A
2437	64.46	PK	V	25.74	3.75	0.00	93.95	N/A	N/A
2437	54.88	AV	V	25.74	3.75	0.00	84.37	N/A	N/A
4874	33.11	PK	V	30.77	5.14	27.42	41.60	74.00	32.40
4874	21.06	AV	V	30.77	5.14	27.42	29.55	54.00	24.45
7311	32.1	PK	V	34.35	6.74	25.88	47.31	74.00	26.69
7311	19.68	AV	V	34.35	6.74	25.88	34.89	54.00	19.11
9748	30.43	PK	V	36.30	8.61	27.24	48.10	74.00	25.90
9748	18.74	AV	V	36.30	8.61	27.24	36.41	54.00	17.59
3862	34.86	PK	V	29.60	4.55	27.32	41.69	74.00	32.31
3862	21.61	AV	V	29.60	4.55	27.32	28.44	54.00	25.56
2417	33.25	PK	V	25.68	3.70	27.33	35.30	74.00	38.70
2417	21.57	AV	V	25.68	3.70	27.33	23.62	54.00	30.38
192.7	32.53	QP	V	11.66	1.69	21.46	24.42	43.50	19.08
High Channel: 2462 MHz									
2462	65.37	PK	H	25.80	3.75	0.00	94.92	N/A	N/A
2462	56.87	AV	H	25.80	3.75	0.00	86.42	N/A	N/A
2462	67.56	PK	V	25.80	3.75	0.00	97.11	N/A	N/A
2462	58.89	AV	V	25.80	3.75	0.00	88.44	N/A	N/A
2483.5	26.54	PK	V	25.86	3.67	0.00	56.07	74.00	17.93
2483.5	14.62	AV	V	25.86	3.67	0.00	44.15	54.00	9.85
4924	32.97	PK	V	30.90	5.34	27.43	41.78	74.00	32.22
4924	21.05	AV	V	30.90	5.34	27.43	29.86	54.00	24.14
7386	32.09	PK	V	34.53	6.83	25.86	47.59	74.00	26.41
7386	19.61	AV	V	34.53	6.83	25.86	35.11	54.00	18.89
9848	30.4	PK	V	36.54	8.66	26.94	48.66	74.00	25.34
9848	18.6	AV	V	36.54	8.66	26.94	36.86	54.00	17.14
3862	34.79	PK	V	29.60	4.55	27.32	41.62	74.00	32.38
3862	21.58	AV	V	29.60	4.55	27.32	28.41	54.00	25.59
192.7	33.47	QP	V	11.66	1.69	21.46	25.36	43.50	18.14

802.11 n ht20 Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2412 MHz									
2412	62.84	PK	H	25.67	3.68	0.00	92.19	N/A	N/A
2412	55.88	AV	H	25.67	3.68	0.00	85.23	N/A	N/A
2412	64.25	PK	V	25.67	3.68	0.00	93.60	N/A	N/A
2412	54.81	AV	V	25.67	3.68	0.00	84.16	N/A	N/A
2390	26.34	PK	V	25.61	3.63	0.00	55.58	74.00	18.42
2390	14.77	AV	V	25.61	3.63	0.00	44.01	54.00	9.99
4824	33.16	PK	V	30.64	5.03	27.41	41.42	74.00	32.58
4824	21.14	AV	V	30.64	5.03	27.41	29.40	54.00	24.60
7236	32.28	PK	V	34.17	6.65	25.90	47.20	74.00	26.80
7236	19.76	AV	V	34.17	6.65	25.90	34.68	54.00	19.32
9648	30.72	PK	V	36.06	8.55	27.46	47.87	74.00	26.13
9648	18.58	AV	V	36.06	8.55	27.46	35.73	54.00	18.27
3862	34.73	PK	V	29.60	4.55	27.32	41.56	74.00	32.44
3862	21.87	AV	V	29.60	4.55	27.32	28.70	54.00	25.30
192.7	32.92	QP	V	11.66	1.69	21.46	24.81	43.50	18.69
Middle Channel: 2437 MHz									
2437	64.51	PK	H	25.74	3.75	0.00	94.00	N/A	N/A
2437	55.93	AV	H	25.74	3.75	0.00	85.42	N/A	N/A
2437	68.46	PK	V	25.74	3.75	0.00	97.95	N/A	N/A
2437	58.36	AV	V	25.74	3.75	0.00	87.85	N/A	N/A
4874	33.03	PK	V	30.77	5.14	27.42	41.52	74.00	32.48
4874	21.17	AV	V	30.77	5.14	27.42	29.66	54.00	24.34
7311	32.11	PK	V	34.35	6.74	25.88	47.32	74.00	26.68
7311	19.67	AV	V	34.35	6.74	25.88	34.88	54.00	19.12
9748	30.71	PK	V	36.30	8.61	27.24	48.38	74.00	25.62
9748	18.61	AV	V	36.30	8.61	27.24	36.28	54.00	17.72
3862	34.85	PK	V	29.60	4.55	27.32	41.68	74.00	32.32
3862	21.98	AV	V	29.60	4.55	27.32	28.81	54.00	25.19
2417	34.58	PK	V	25.68	3.70	27.33	36.63	74.00	37.37
2417	22.27	AV	V	25.68	3.70	27.33	24.32	54.00	29.68
192.7	33.69	QP	V	11.66	1.69	21.46	25.58	43.50	17.92
High Channel: 2462 MHz									
2462	68.05	PK	H	25.80	3.75	0.00	97.60	N/A	N/A
2462	58.67	AV	H	25.80	3.75	0.00	88.22	N/A	N/A
2462	70.66	PK	V	25.80	3.75	0.00	100.21	N/A	N/A
2462	60.57	AV	V	25.80	3.75	0.00	90.12	N/A	N/A
2483.5	25.83	PK	V	25.86	3.67	0.00	55.36	74.00	18.64
2483.5	14.67	AV	V	25.86	3.67	0.00	44.20	54.00	9.80
4924	32.92	PK	V	30.90	5.34	27.43	41.73	74.00	32.27
4924	21.09	AV	V	30.90	5.34	27.43	29.90	54.00	24.10
7386	31.96	PK	V	34.53	6.83	25.86	47.46	74.00	26.54
7386	19.81	AV	V	34.53	6.83	25.86	35.31	54.00	18.69
9848	30.67	PK	V	36.54	8.66	26.94	48.93	74.00	25.07
9848	18.55	AV	V	36.54	8.66	26.94	36.81	54.00	17.19
3862	34.83	PK	V	29.60	4.55	27.32	41.66	74.00	32.34
3862	21.94	AV	V	29.60	4.55	27.32	28.77	54.00	25.23
192.7	33.62	QP	V	11.66	1.69	21.46	25.51	43.50	17.99

802.11 n ht40 Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2422 MHz									
2422	57.56	PK	H	25.70	3.71	0.00	86.97	N/A	N/A
2422	48.66	AV	H	25.70	3.71	0.00	78.07	N/A	N/A
2422	58.39	PK	V	25.70	3.71	0.00	87.80	N/A	N/A
2422	49.24	AV	V	25.70	3.71	0.00	78.65	N/A	N/A
2390	25.31	PK	V	25.61	3.63	0.00	54.55	74.00	19.45
2390	13.86	AV	V	25.61	3.63	0.00	43.10	54.00	10.90
4844	33.36	PK	V	30.69	4.99	27.42	41.62	74.00	32.38
4844	20.98	AV	V	30.69	4.99	27.42	40.43	54.00	13.57
7266	32.17	PK	V	34.24	6.68	25.89	34.73	74.00	39.27
7266	19.7	AV	V	34.24	6.68	25.89	34.73	54.00	19.27
9688	30.57	PK	V	36.15	8.58	27.37	47.93	74.00	26.07
9688	18.75	AV	V	36.15	8.58	27.37	36.11	54.00	17.89
3862	34.63	PK	V	29.60	4.55	27.32	41.46	74.00	32.54
3862	22	AV	V	29.60	4.55	27.32	28.83	54.00	25.17
192.7	33.64	QP	V	11.66	1.69	21.46	25.53	43.50	17.97
Middle Channel: 2437 MHz									
2437	58.54	PK	H	25.74	3.75	0.00	88.03	N/A	N/A
2437	48.32	AV	H	25.74	3.75	0.00	77.81	N/A	N/A
2437	60.54	PK	V	25.74	3.75	0.00	90.03	N/A	N/A
2437	50.37	AV	V	25.74	3.75	0.00	79.86	N/A	N/A
4874	33.48	PK	V	30.77	5.14	27.42	41.97	74.00	32.03
4874	21.07	AV	V	30.77	5.14	27.42	29.56	54.00	24.44
7311	32.36	PK	V	34.35	6.74	25.88	47.57	74.00	26.43
7311	19.66	AV	V	34.35	6.74	25.88	34.87	54.00	19.13
9748	30.42	PK	V	36.30	8.61	27.24	48.09	74.00	25.91
9748	18.61	AV	V	36.30	8.61	27.24	36.28	54.00	17.72
3862	34.66	PK	V	29.60	4.55	27.32	41.49	74.00	32.51
3862	22.2	AV	V	29.60	4.55	27.32	29.03	54.00	24.97
2417	36.35	PK	V	25.68	3.70	27.33	38.40	74.00	35.60
2417	22.54	AV	V	25.68	3.70	27.33	24.59	54.00	29.41
192.7	35.29	QP	V	11.66	1.69	21.46	27.18	43.50	16.32
High Channel: 2452 MHz									
2452	60.77	PK	H	25.78	3.78	0.00	90.33	N/A	N/A
2452	52.53	AV	H	25.78	3.78	0.00	82.09	N/A	N/A
2452	62.54	PK	V	25.78	3.78	0.00	92.10	N/A	N/A
2452	54.36	AV	V	25.78	3.78	0.00	83.92	N/A	N/A
2483.5	26.55	PK	V	25.86	3.67	0.00	56.08	74.00	17.92
2483.5	14.57	AV	V	25.86	3.67	0.00	44.10	54.00	9.90
4904	33.44	PK	V	30.85	5.31	27.43	42.17	74.00	31.83
4904	20.88	AV	V	30.85	5.31	27.43	29.61	54.00	24.39
7356	32.55	PK	V	34.45	6.79	25.87	47.92	74.00	26.08
7356	19.65	AV	V	34.45	6.79	25.87	35.02	54.00	18.98
9808	30.34	PK	V	36.44	8.64	27.09	48.33	74.00	25.67
9808	18.66	AV	V	36.44	8.64	27.09	36.65	54.00	17.35
3862	34.63	PK	V	29.60	4.55	27.32	41.46	74.00	32.54
3862	22.09	AV	V	29.60	4.55	27.32	28.92	54.00	25.08
192.7	34.02	QP	V	11.66	1.69	21.46	25.91	43.50	17.59

**Dipole Antenna:**

802.11b Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2412 MHz									
2412	70.29	PK	H	25.67	3.68	0.00	99.64	N/A	N/A
2412	65.85	AV	H	25.67	3.68	0.00	95.20	N/A	N/A
2412	77.04	PK	V	25.67	3.68	0.00	106.39	N/A	N/A
2412	73.55	AV	V	25.67	3.68	0.00	102.90	N/A	N/A
2390	27.24	PK	V	25.61	3.63	0.00	56.48	74.00	17.52
2390	15.63	AV	V	25.61	3.63	0.00	44.87	54.00	9.13
4824	35.38	PK	V	30.64	5.03	27.41	43.64	74.00	30.36
4824	23.03	AV	V	30.64	5.03	27.41	31.29	54.00	22.71
7236	33.1	PK	V	34.17	6.65	25.90	48.02	74.00	25.98
7236	21.06	AV	V	34.17	6.65	25.90	35.98	54.00	18.02
9648	30.31	PK	V	36.06	8.55	27.46	47.46	74.00	26.54
9648	18.32	AV	V	36.06	8.55	27.46	35.47	54.00	18.53
3920	36.87	PK	V	29.72	4.54	27.27	43.86	74.00	30.14
3920	23.3	AV	V	29.72	4.54	27.27	30.29	54.00	23.71
185.3	32.51	QP	V	11.37	1.63	21.45	24.06	43.50	19.44
Middle Channel: 2437 MHz									
2437	70.45	PK	H	25.74	3.75	0.00	99.94	N/A	N/A
2437	66.67	AV	H	25.74	3.75	0.00	96.16	N/A	N/A
2437	77.01	PK	V	25.74	3.75	0.00	106.50	N/A	N/A
2437	73.32	AV	V	25.74	3.75	0.00	102.81	N/A	N/A
4874	35.4	PK	V	30.77	5.14	27.42	43.89	74.00	30.11
4874	23.06	AV	V	30.77	5.14	27.42	31.55	54.00	22.45
7311	33.25	PK	V	34.35	6.74	25.88	48.46	74.00	25.54
7311	21.08	AV	V	34.35	6.74	25.88	36.29	54.00	17.71
9748	30.31	PK	V	36.30	8.61	27.24	47.98	74.00	26.02
9748	18.31	AV	V	36.30	8.61	27.24	35.98	54.00	18.02
3920	37.02	PK	V	29.72	4.54	27.27	44.01	74.00	29.99
3920	23.45	AV	V	29.72	4.54	27.27	30.44	54.00	23.56
1563	34.58	PK	V	23.73	2.63	27.66	33.28	74.00	40.72
1563	22.25	AV	V	23.73	2.63	27.66	20.95	54.00	33.05
185.3	32.19	QP	V	11.37	1.63	21.45	23.74	43.50	19.76
High Channel: 2462 MHz									
2462	68.84	PK	H	25.80	3.75	0.00	98.39	N/A	N/A
2462	64.97	AV	H	25.80	3.75	0.00	94.52	N/A	N/A
2462	76.28	PK	V	25.80	3.75	0.00	105.83	N/A	N/A
2462	72.03	AV	V	25.80	3.75	0.00	101.58	N/A	N/A
2483.5	27.65	PK	V	25.86	3.67	0.00	57.18	74.00	16.82
2483.5	15.24	AV	V	25.86	3.67	0.00	44.77	54.00	9.23
4924	35.46	PK	V	30.90	5.34	27.43	44.27	74.00	29.73
4924	23.25	AV	V	30.90	5.34	27.43	32.06	54.00	21.94
7386	33.25	PK	V	34.53	6.83	25.86	48.75	74.00	25.25
7386	21.15	AV	V	34.53	6.83	25.86	36.65	54.00	17.35
9848	30.28	PK	V	36.54	8.66	26.94	48.54	74.00	25.46
9848	18.43	AV	V	36.54	8.66	26.94	36.69	54.00	17.31
3920	37.05	PK	V	29.72	4.54	27.27	44.04	74.00	29.96
3920	23.36	AV	V	29.72	4.54	27.27	30.35	54.00	23.65
185.3	32.68	QP	V	11.37	1.63	21.45	24.23	43.50	19.27

802.11g Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2412 MHz									
2412	63.17	PK	H	25.67	3.68	0.00	92.52	N/A	N/A
2412	54.86	AV	H	25.67	3.68	0.00	84.21	N/A	N/A
2412	70.65	PK	V	25.67	3.68	0.00	100.00	N/A	N/A
2412	62.25	AV	V	25.67	3.68	0.00	91.60	N/A	N/A
2390	25.36	PK	V	25.61	3.63	0.00	54.60	74.00	19.40
2390	14.03	AV	V	25.61	3.63	0.00	43.27	54.00	10.73
4824	35.29	PK	V	30.64	5.03	27.41	43.55	74.00	30.45
4824	22.71	AV	V	30.64	5.03	27.41	30.97	54.00	23.03
7236	33.17	PK	V	34.17	6.65	25.90	48.09	74.00	25.91
7236	20.87	AV	V	34.17	6.65	25.90	35.79	54.00	18.21
9648	30.1	PK	V	36.06	8.55	27.46	47.25	74.00	26.75
9648	17.98	AV	V	36.06	8.55	27.46	35.13	54.00	18.87
3920	36.73	PK	V	29.72	4.54	27.27	43.72	74.00	30.28
3920	22.94	AV	V	29.72	4.54	27.27	29.93	54.00	24.07
185.3	33.13	QP	V	11.37	1.63	21.45	24.68	43.50	18.82
Middle Channel: 2437 MHz									
2437	63.72	PK	H	25.74	3.75	0.00	93.21	N/A	N/A
2437	55.31	AV	H	25.74	3.75	0.00	84.80	N/A	N/A
2437	70.52	PK	V	25.74	3.75	0.00	100.01	N/A	N/A
2437	61.88	AV	V	25.74	3.75	0.00	91.37	N/A	N/A
4874	35.22	PK	V	30.77	5.14	27.42	43.71	74.00	30.29
4874	22.76	AV	V	30.77	5.14	27.42	31.25	54.00	22.75
7311	33.27	PK	V	34.35	6.74	25.88	48.48	74.00	25.52
7311	20.85	AV	V	34.35	6.74	25.88	36.06	54.00	17.94
9748	30.22	PK	V	36.30	8.61	27.24	47.89	74.00	26.11
9748	17.89	AV	V	36.30	8.61	27.24	35.56	54.00	18.44
3920	36.86	PK	V	29.72	4.54	27.27	43.85	74.00	30.15
3920	23.13	AV	V	29.72	4.54	27.27	30.12	54.00	23.88
1563	34.67	PK	V	23.73	2.63	27.66	33.37	74.00	40.63
1563	22.36	AV	V	23.73	2.63	27.66	21.06	54.00	32.94
185.3	31.57	QP	V	11.37	1.63	21.45	23.12	43.50	20.38
High Channel: 2462 MHz									
2462	61.98	PK	H	25.80	3.75	0.00	91.53	N/A	N/A
2462	53.33	AV	H	25.80	3.75	0.00	82.88	N/A	N/A
2462	69.25	PK	V	25.80	3.75	0.00	98.80	N/A	N/A
2462	60.45	AV	V	25.80	3.75	0.00	90.00	N/A	N/A
2483.5	26.63	PK	V	25.86	3.67	0.00	56.16	74.00	17.84
2483.5	16.16	AV	V	25.86	3.67	0.00	45.69	54.00	8.31
4924	35.3	PK	V	30.90	5.34	27.43	44.11	74.00	29.89
4924	22.76	AV	V	30.90	5.34	27.43	31.57	54.00	22.43
7386	33.19	PK	V	34.53	6.83	25.86	48.69	74.00	25.31
7386	20.9	AV	V	34.53	6.83	25.86	36.40	54.00	17.60
9848	30.35	PK	V	36.54	8.66	26.94	48.61	74.00	25.39
9848	18.11	AV	V	36.54	8.66	26.94	36.37	54.00	17.63
3920	36.83	PK	V	29.72	4.54	27.27	43.82	74.00	30.18
3920	23.31	AV	V	29.72	4.54	27.27	30.30	54.00	23.70
185.3	34.38	QP	V	11.37	1.63	21.45	25.93	43.50	17.57



802.11 n ht20 Mode

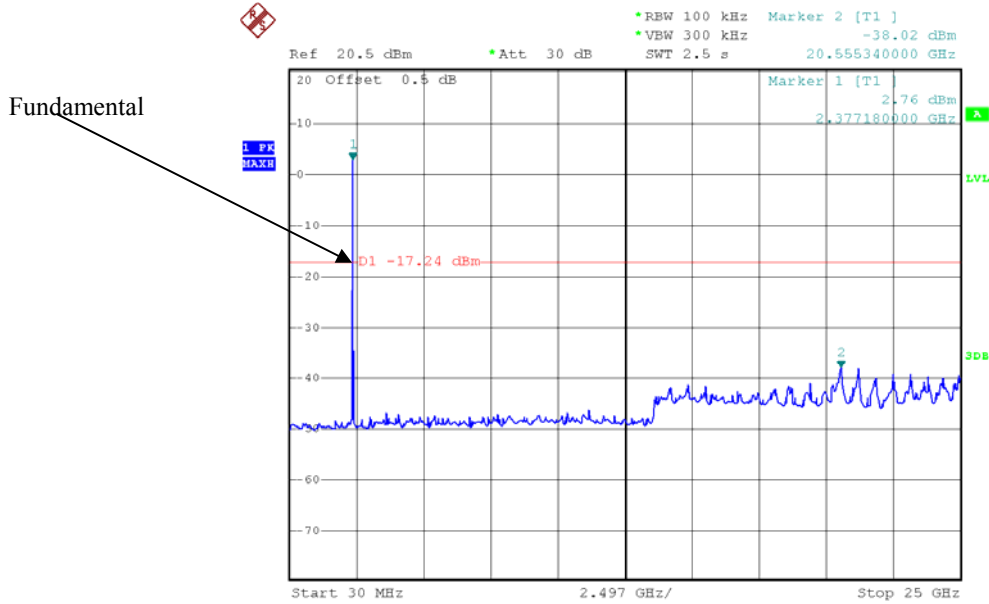
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2412 MHz									
2412	66.34	PK	H	25.67	3.68	0.00	95.69	N/A	N/A
2412	57.35	AV	H	25.67	3.68	0.00	86.70	N/A	N/A
2412	74.12	PK	V	25.67	3.68	0.00	103.47	N/A	N/A
2412	64.56	AV	V	25.67	3.68	0.00	93.91	N/A	N/A
2390	27.1	PK	V	25.61	3.63	0.00	56.34	74.00	17.66
2390	15.14	AV	V	25.61	3.63	0.00	44.38	54.00	9.62
4824	35.1	PK	V	30.64	5.03	27.41	43.36	74.00	30.64
4824	22.45	AV	V	30.64	5.03	27.41	30.71	54.00	23.29
7236	33.11	PK	V	34.17	6.65	25.90	48.03	74.00	25.97
7236	20.8	AV	V	34.17	6.65	25.90	35.72	54.00	18.28
9648	29.81	PK	V	36.06	8.55	27.46	46.96	74.00	27.04
9648	17.82	AV	V	36.06	8.55	27.46	34.97	54.00	19.03
3920	36.75	PK	V	29.72	4.54	27.27	43.74	74.00	30.26
3920	22.87	AV	V	29.72	4.54	27.27	29.86	54.00	24.14
185.3	33.26	QP	V	11.37	1.63	21.45	24.81	43.50	18.69
Middle Channel: 2437 MHz									
2437	65.16	PK	H	25.74	3.75	0.00	94.65	N/A	N/A
2437	56.92	AV	H	25.74	3.75	0.00	86.41	N/A	N/A
2437	72.22	PK	V	25.74	3.75	0.00	101.71	N/A	N/A
2437	63.96	AV	V	25.74	3.75	0.00	93.45	N/A	N/A
4874	35.29	PK	V	30.77	5.14	27.42	43.78	74.00	30.22
4874	22.81	AV	V	30.77	5.14	27.42	31.30	54.00	22.70
7311	33.1	PK	V	34.35	6.74	25.88	48.31	74.00	25.69
7311	20.64	AV	V	34.35	6.74	25.88	35.85	54.00	18.15
9748	29.99	PK	V	36.30	8.61	27.24	47.66	74.00	26.34
9748	17.6	AV	V	36.30	8.61	27.24	35.27	54.00	18.73
3920	36.81	PK	V	29.72	4.54	27.27	43.80	74.00	30.20
3920	22.85	AV	V	29.72	4.54	27.27	29.84	54.00	24.16
1563	35.64	PK	V	23.73	2.63	27.66	34.34	74.00	39.66
1563	32.15	AV	V	23.73	2.63	27.66	30.85	54.00	23.15
185.3	31.54	QP	V	11.37	1.63	21.45	23.09	43.50	20.41
High Channel: 2462 MHz									
2462	64.42	PK	H	25.80	3.75	0.00	93.97	N/A	N/A
2462	55.86	AV	H	25.80	3.75	0.00	85.41	N/A	N/A
2462	72.06	PK	V	25.80	3.75	0.00	101.61	N/A	N/A
2462	62.82	AV	V	25.80	3.75	0.00	92.37	N/A	N/A
2483.5	17.99	PK	V	25.86	3.67	0.00	47.52	74.00	26.48
2483.5	15.53	AV	V	25.86	3.67	0.00	45.06	54.00	8.94
4924	35.09	PK	V	30.90	5.34	27.43	43.90	74.00	30.10
4924	22.82	AV	V	30.90	5.34	27.43	31.63	54.00	22.37
7386	33.09	PK	V	34.53	6.83	25.86	48.59	74.00	25.41
7386	20.77	AV	V	34.53	6.83	25.86	36.27	54.00	17.73
9848	30.32	PK	V	36.54	8.66	26.94	48.58	74.00	25.42
9848	17.81	AV	V	36.54	8.66	26.94	36.07	54.00	17.93
3920	36.88	PK	V	29.72	4.54	27.27	43.87	74.00	30.13
3920	23.36	AV	V	29.72	4.54	27.27	30.35	54.00	23.65
185.3	33.42	QP	V	11.37	1.63	21.45	24.97	43.50	18.53

802.11 n ht40 Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2422 MHz									
2422	59.11	PK	H	25.70	3.71	0.00	88.52	N/A	N/A
2422	50.02	AV	H	25.70	3.71	0.00	79.43	N/A	N/A
2422	65.89	PK	V	25.70	3.71	0.00	95.30	N/A	N/A
2422	57.81	AV	V	25.70	3.71	0.00	87.22	N/A	N/A
2390	25.61	PK	V	25.61	3.63	0.00	54.85	74.00	19.15
2390	14.08	AV	V	25.61	3.63	0.00	43.32	54.00	10.68
4844	34.06	PK	V	30.69	4.99	27.42	42.32	74.00	31.68
4844	22.44	AV	V	30.69	4.99	27.42	41.41	54.00	12.59
7266	33.15	PK	V	34.24	6.68	25.89	35.62	74.00	38.38
7266	20.59	AV	V	34.24	6.68	25.89	35.62	54.00	18.38
9688	29.62	PK	V	36.15	8.58	27.37	46.98	74.00	27.02
9688	17.72	AV	V	36.15	8.58	27.37	35.08	54.00	18.92
3920	36.54	PK	V	29.72	4.54	27.27	43.53	74.00	30.47
3920	22.82	AV	V	29.72	4.54	27.27	29.81	54.00	24.19
185.3	33.25	QP	V	11.37	1.63	21.45	24.80	43.50	18.70
Middle Channel: 2437 MHz									
2437	59.51	PK	H	25.74	3.75	0.00	89.00	N/A	N/A
2437	50.69	AV	H	25.74	3.75	0.00	80.18	N/A	N/A
2437	65.74	PK	V	25.74	3.75	0.00	95.23	N/A	N/A
2437	56.52	AV	V	25.74	3.75	0.00	86.01	N/A	N/A
4874	33.9	PK	V	30.77	5.14	27.42	42.39	74.00	31.61
4874	22.18	AV	V	30.77	5.14	27.42	30.67	54.00	23.33
7311	33.06	PK	V	34.35	6.74	25.88	48.27	74.00	25.73
7311	20.64	AV	V	34.35	6.74	25.88	35.85	54.00	18.15
9748	29.6	PK	V	36.30	8.61	27.24	47.27	74.00	26.73
9748	17.46	AV	V	36.30	8.61	27.24	35.13	54.00	18.87
3920	36.5	PK	V	29.72	4.54	27.27	43.49	74.00	30.51
3920	22.73	AV	V	29.72	4.54	27.27	29.72	54.00	24.28
2356	33.27	PK	V	25.53	3.56	27.31	35.05	74.00	38.95
2356	21.5	AV	V	25.53	3.56	27.31	23.28	54.00	30.72
185.3	31.06	QP	V	11.37	1.63	21.45	22.61	43.50	20.89
High Channel: 2452 MHz									
2452	57.91	PK	H	25.78	3.78	0.00	87.47	N/A	N/A
2452	48.01	AV	H	25.78	3.78	0.00	77.57	N/A	N/A
2452	65.04	PK	V	25.78	3.78	0.00	94.60	N/A	N/A
2452	56.17	AV	V	25.78	3.78	0.00	85.73	N/A	N/A
2483.5	26.35	PK	V	25.86	3.67	0.00	55.88	74.00	18.12
2483.5	14.19	AV	V	25.86	3.67	0.00	43.72	54.00	10.28
4904	33.82	PK	V	30.85	5.31	27.43	42.55	74.00	31.45
4904	22.25	AV	V	30.85	5.31	27.43	30.98	54.00	23.02
7356	32.84	PK	V	34.45	6.79	25.87	48.21	74.00	25.79
7356	20.72	AV	V	34.45	6.79	25.87	36.09	54.00	17.91
9808	29.57	PK	V	36.44	8.64	27.09	47.56	74.00	26.44
9808	17.53	AV	V	36.44	8.64	27.09	35.52	54.00	18.48
3920	36.44	PK	V	29.72	4.54	27.27	43.43	74.00	30.57
3920	22.76	AV	V	29.72	4.54	27.27	29.75	54.00	24.25
185.3	33.56	QP	V	11.37	1.63	21.45	25.11	43.50	18.39

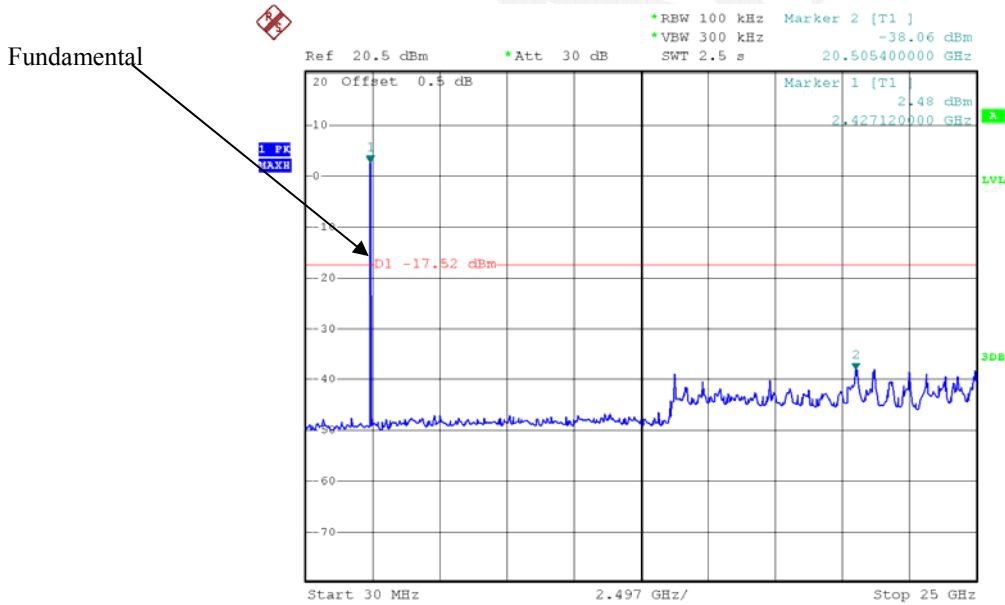
### Conducted Spurious Emissions at Antenna Port

#### 802.11b Low Channel



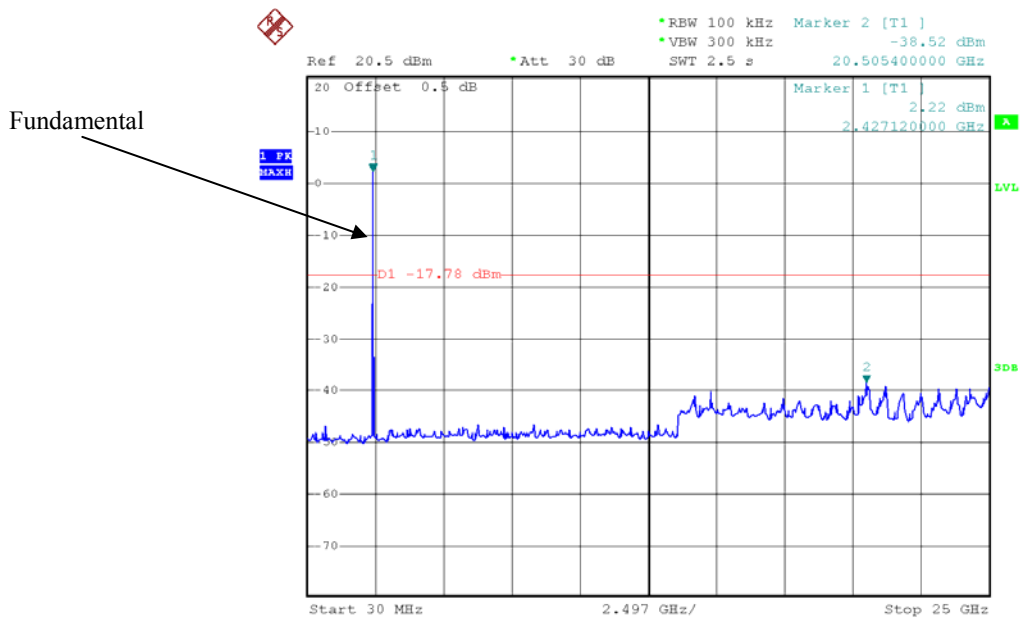
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#### 802.11b Middle Channel



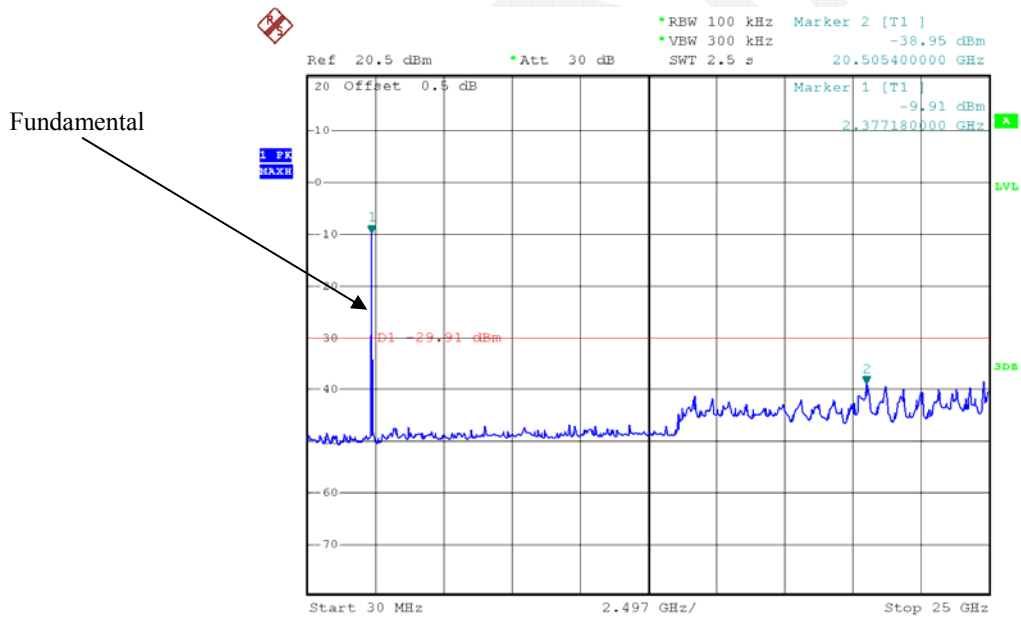
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### 802.11b High Channel



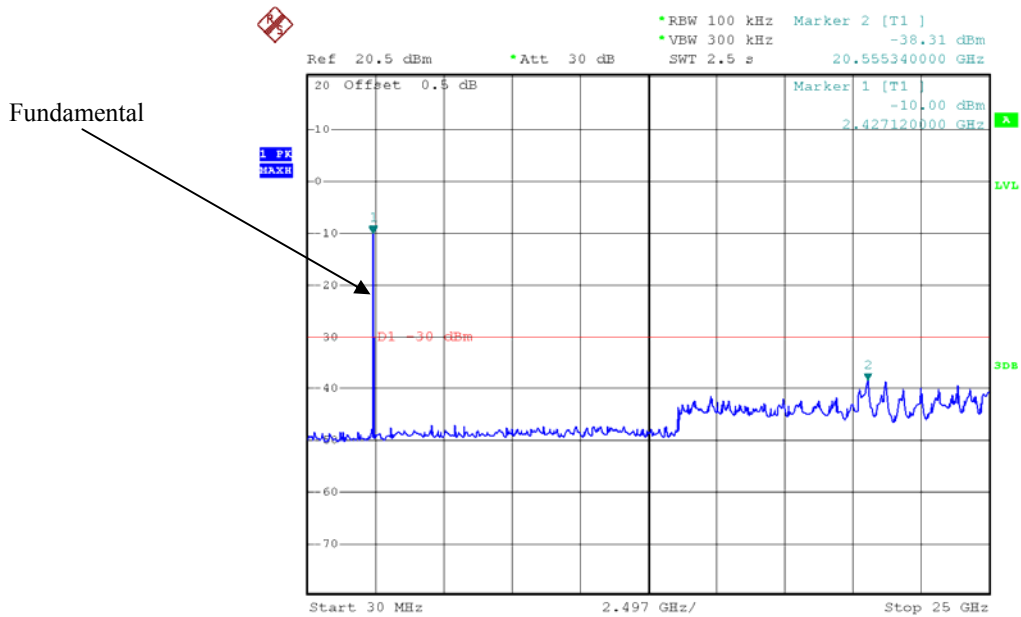
Date: 9.FEB.2015 20:45:06

### 802.11g Low Channel



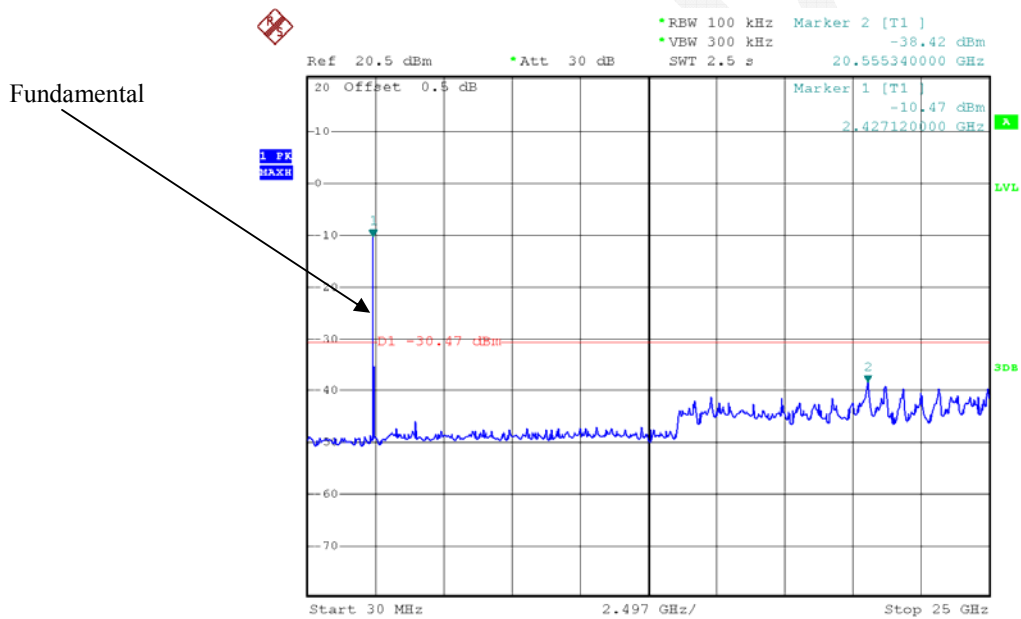
Date: 9.FEB.2015 20:41:49

### 802.11g Middle Channel



Date: 9.FEB.2015 20:41:03

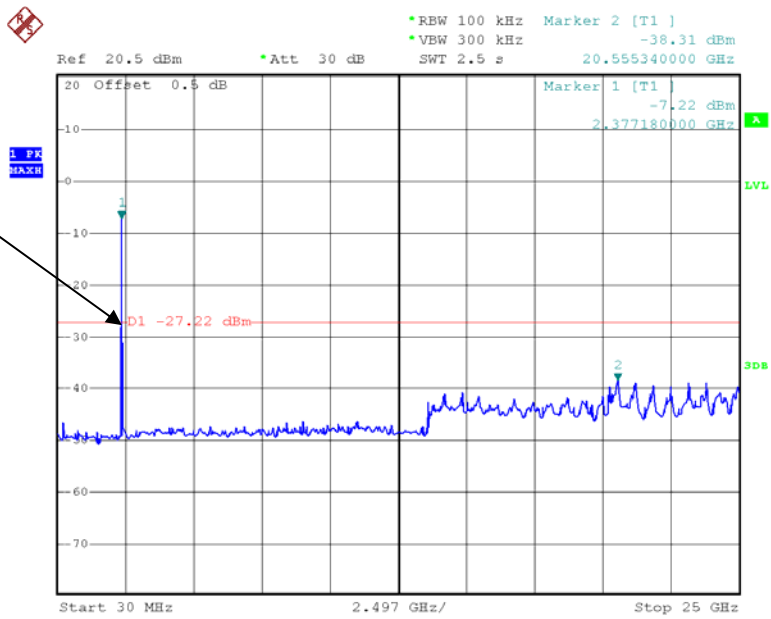
### 802.11g High Channel



Date: 9.FEB.2015 20:40:08

### 802.11n ht20 Low Channel

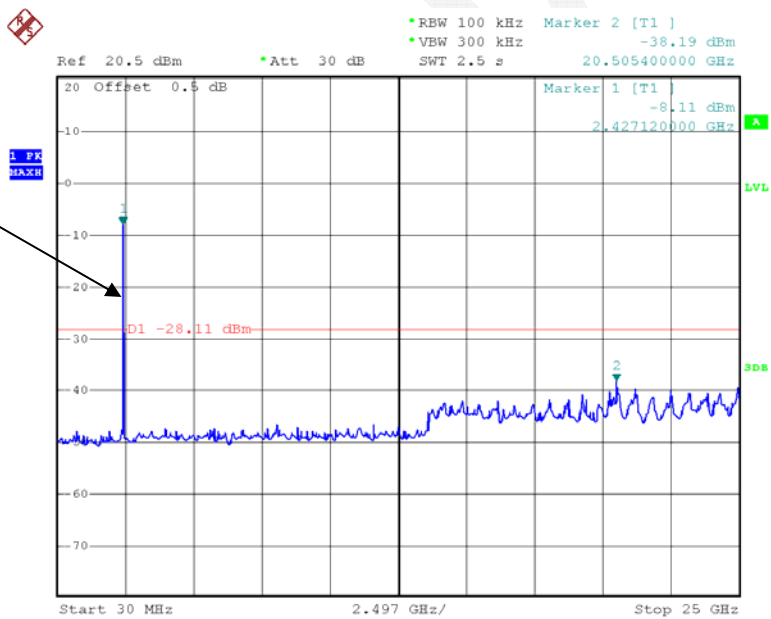
Fundamental



Date: 9.FEB.2015 20:37:54

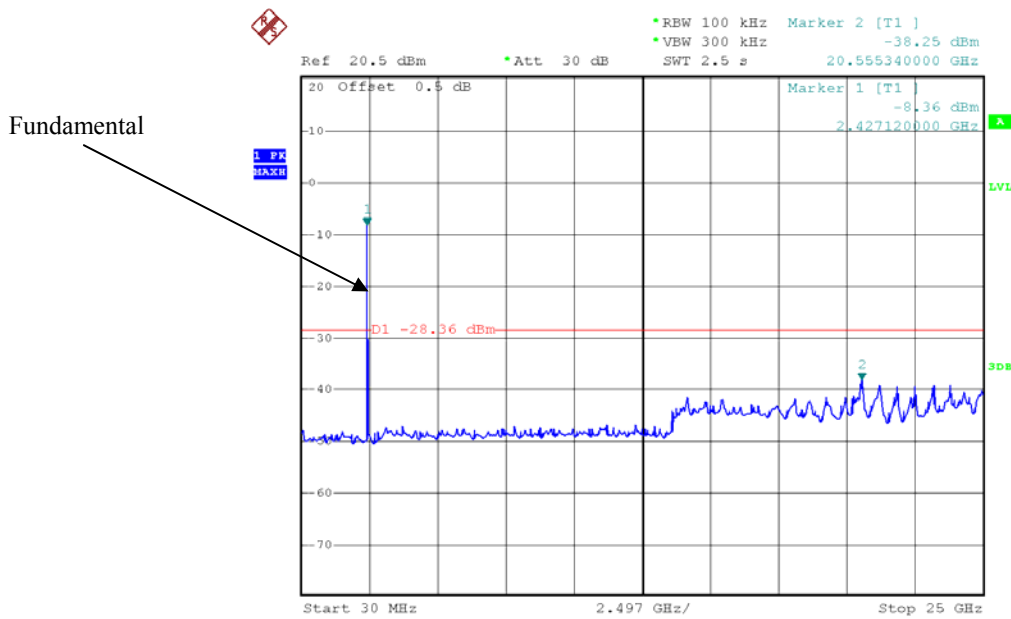
### 802.11n ht20 Middle Channel

Fundamental



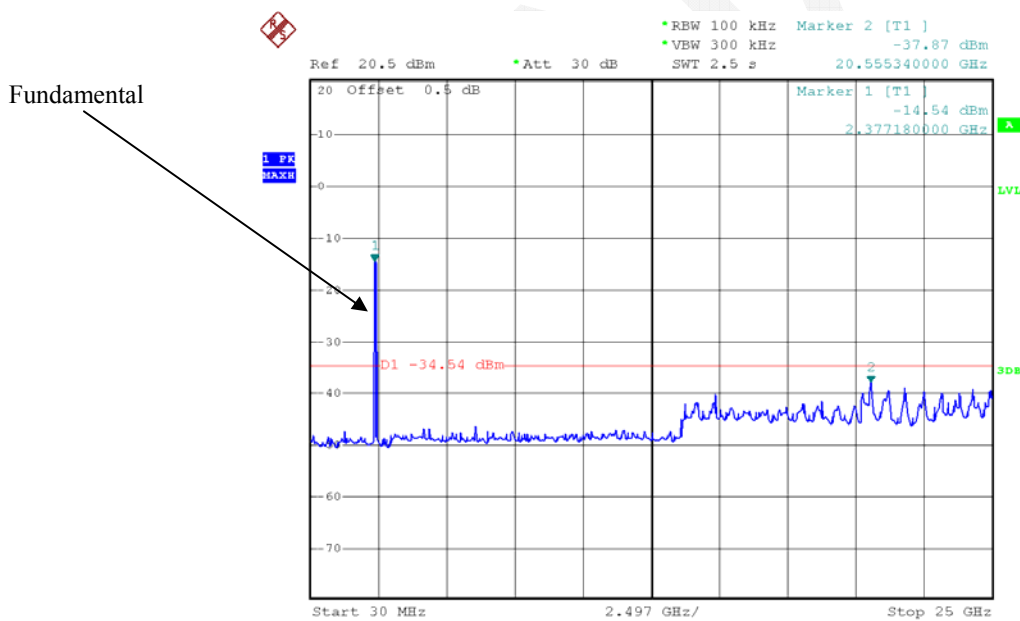
Date: 9.FEB.2015 20:38:34

### 802.11n ht20 High Channel



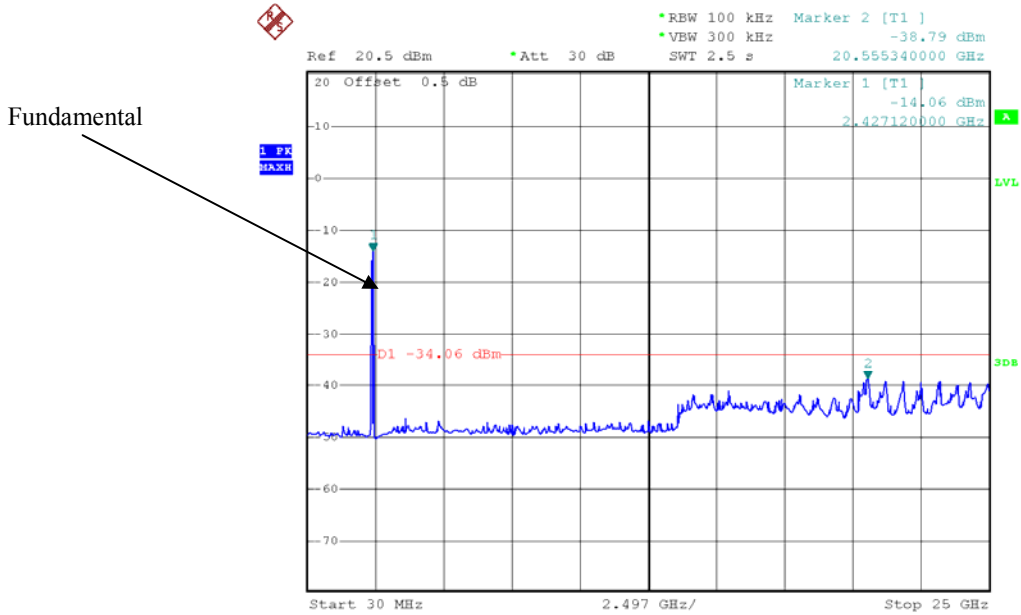
Date: 9.FEB.2015 20:39:28

### 802.11n ht40 Low Channel



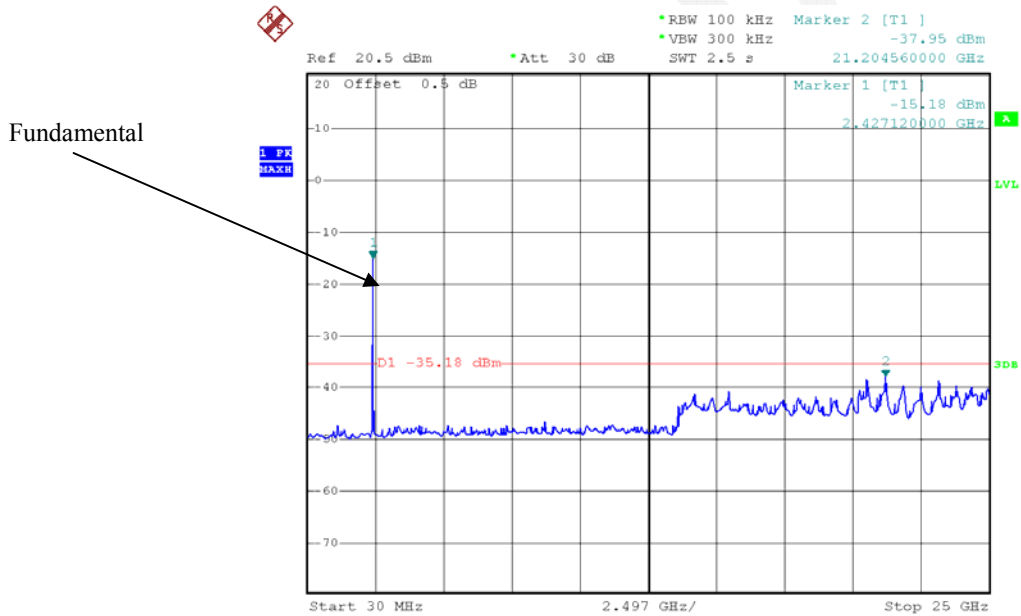
Date: 9.FEB.2015 20:36:33

### 802.11n ht40 Middle Channel



Date: 9.FEB.2015 20:35:08

### 802.11n ht40 High Channel



Date: 9.FEB.2015 20:34:09



## FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

### Applicable Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

### Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v03r02 clause8.1 Option 1:

- Set RBW = 100 kHz.
- Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to stabilize.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.



### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

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

### Test Data

#### Environmental Conditions

Temperature:	20.8 °C
Relative Humidity:	36 %
ATM Pressure:	102.1 kPa

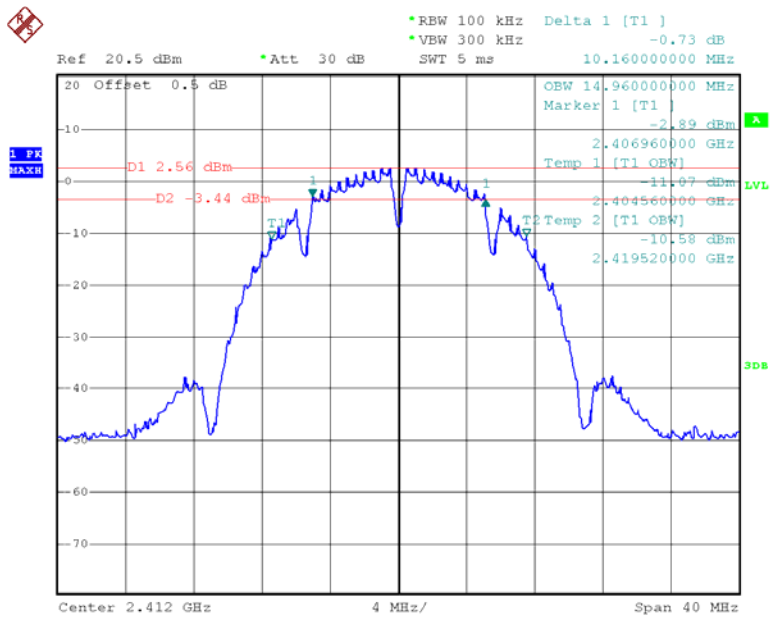
*The testing was performed by Allen Qiao on 2015-02-09.*

*Test Mode: Transmitting*

*Test Result: Compliant. Please refer to the following table and plots.*

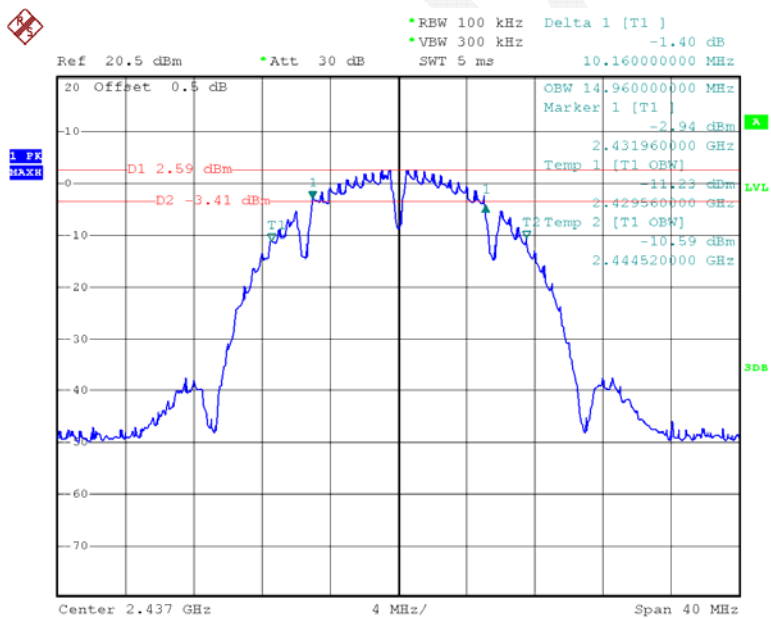
Mode	Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)
802.11b	Low	2412	10.16	$\geq 0.5$
	Middle	2437	10.16	$\geq 0.5$
	High	2462	10.16	$\geq 0.5$
802.11g	Low	2412	16.72	$\geq 0.5$
	Middle	2437	16.72	$\geq 0.5$
	High	2462	16.72	$\geq 0.5$
802.11n20	Low	2412	17.84	$\geq 0.5$
	Middle	2437	17.84	$\geq 0.5$
	High	2462	17.84	$\geq 0.5$
802.11n40	Low	2422	36.48	$\geq 0.5$
	Middle	2437	36.48	$\geq 0.5$
	High	2452	36.48	$\geq 0.5$

### 802.11b Low Channel



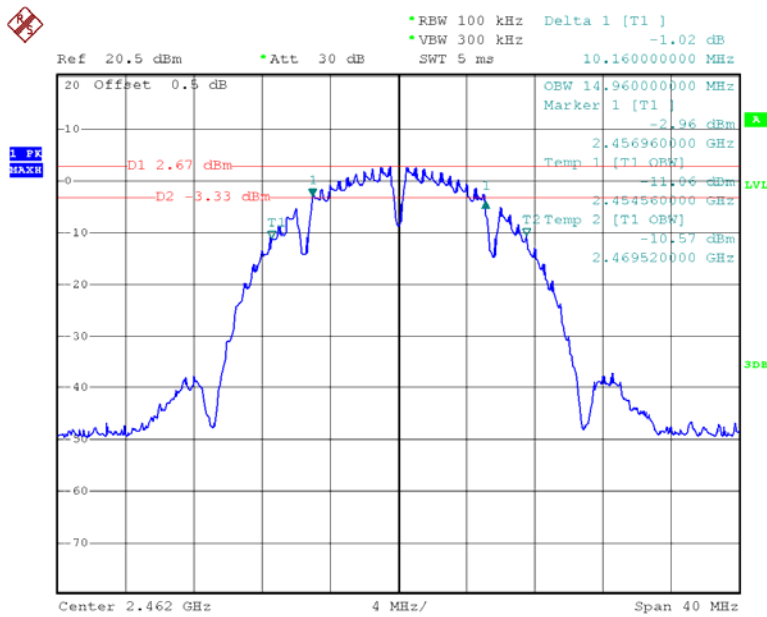
Date: 9.FEB.2015 20:02:03

### 802.11b Middle Channel



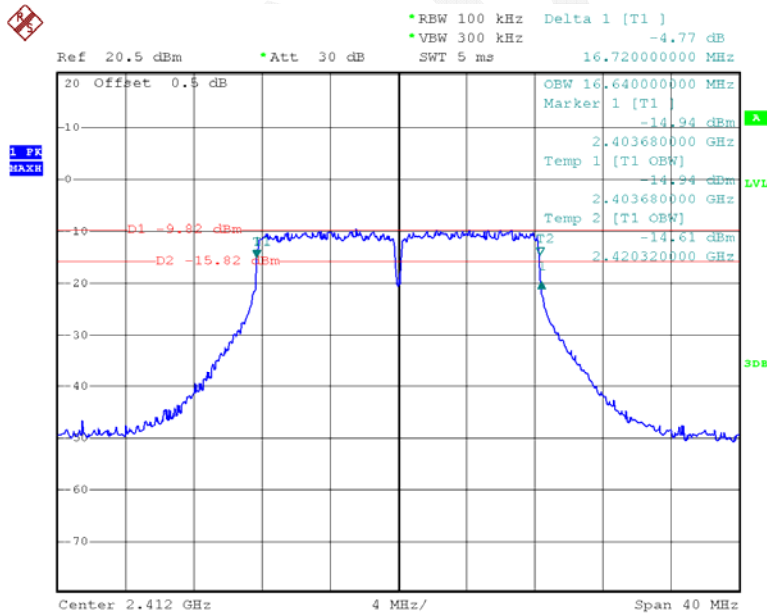
Date: 9.FEB.2015 20:01:18

### 802.11b High Channel



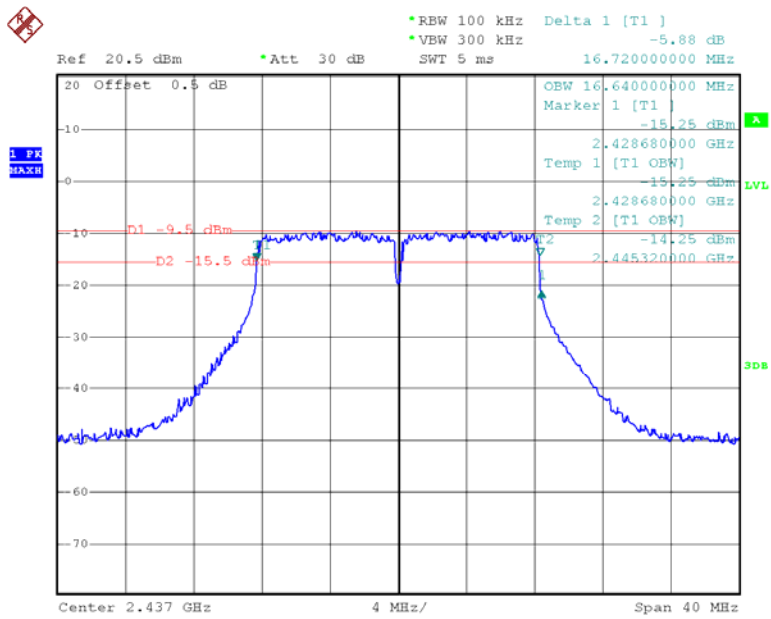
Date: 9.FEB.2015 20:00:31

### 802.11g Low Channel



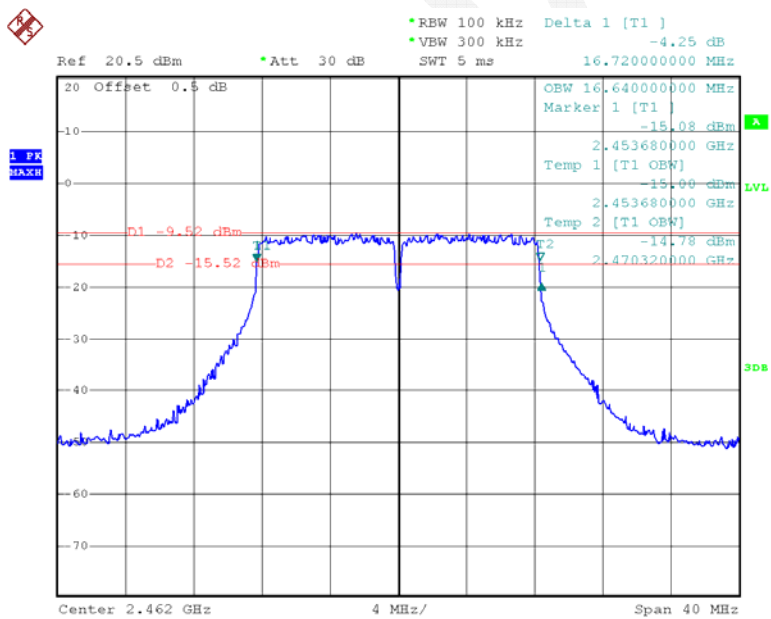
Date: 9.FEB.2015 20:03:11

### 802.11g Middle Channel



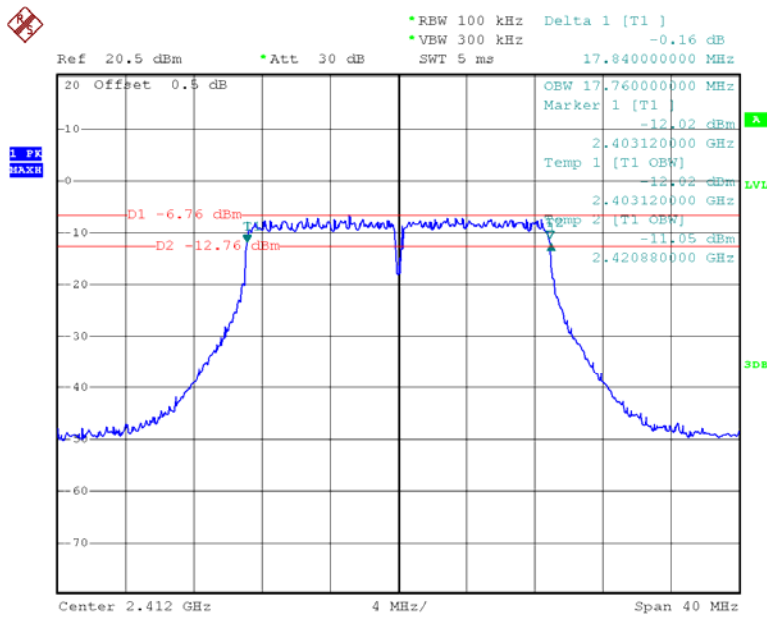
Date: 9.FEB.2015 20:03:56

### 802.11g High Channel



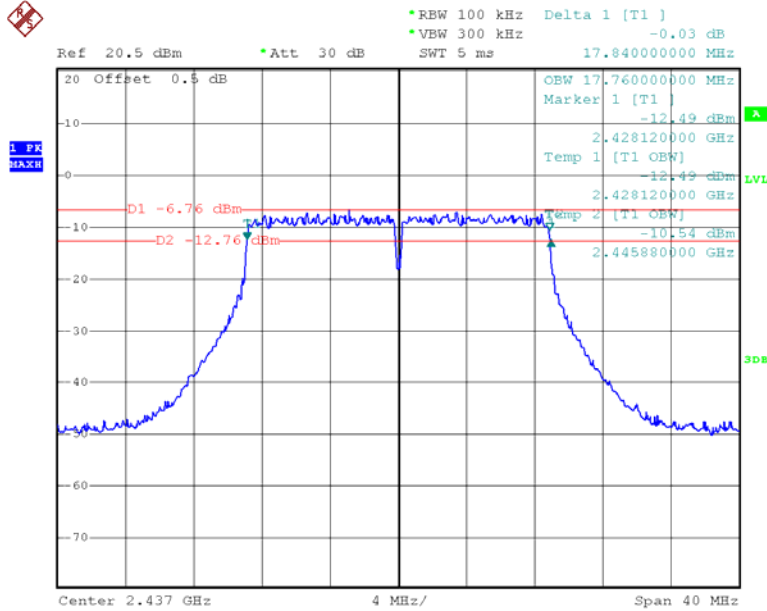
Date: 9.FEB.2015 20:04:35

### 802.11n ht20 Low Channel



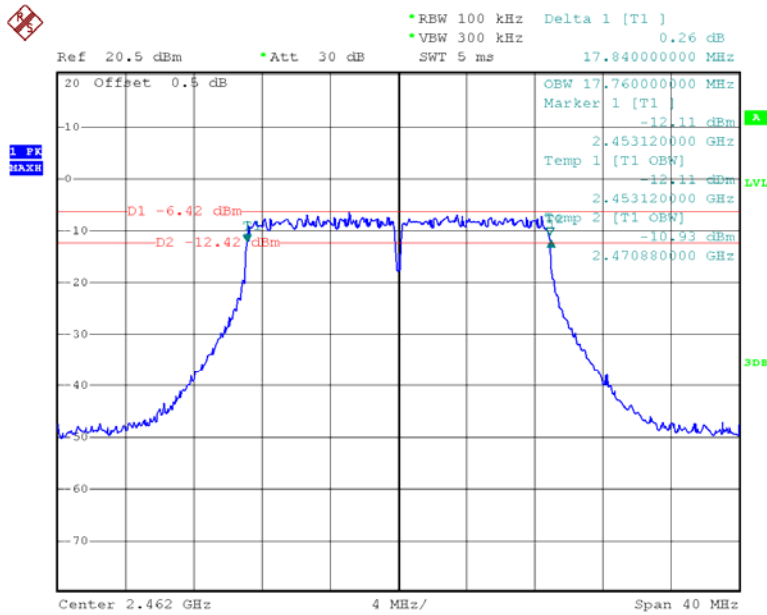
Date: 9.FEB.2015 20:07:16

### 802.11n ht20 Middle Channel



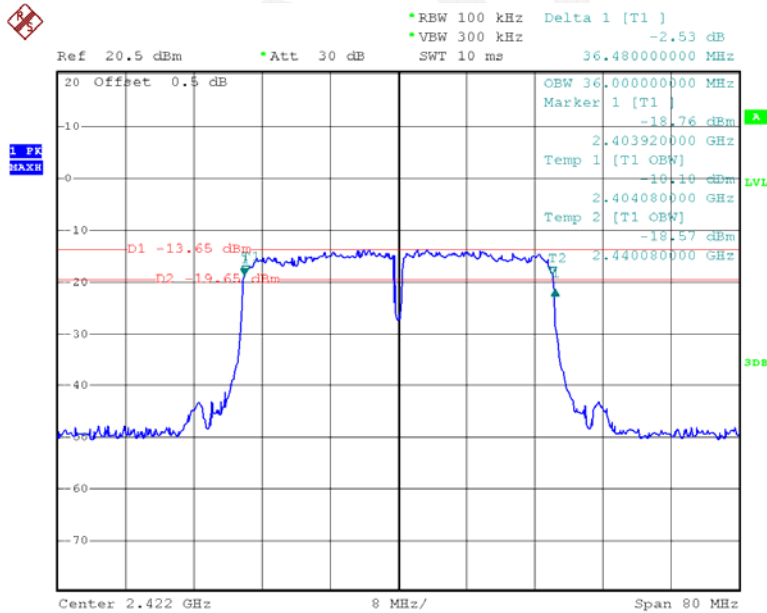
Date: 9.FEB.2015 20:06:15

### 802.11n ht20 High Channel



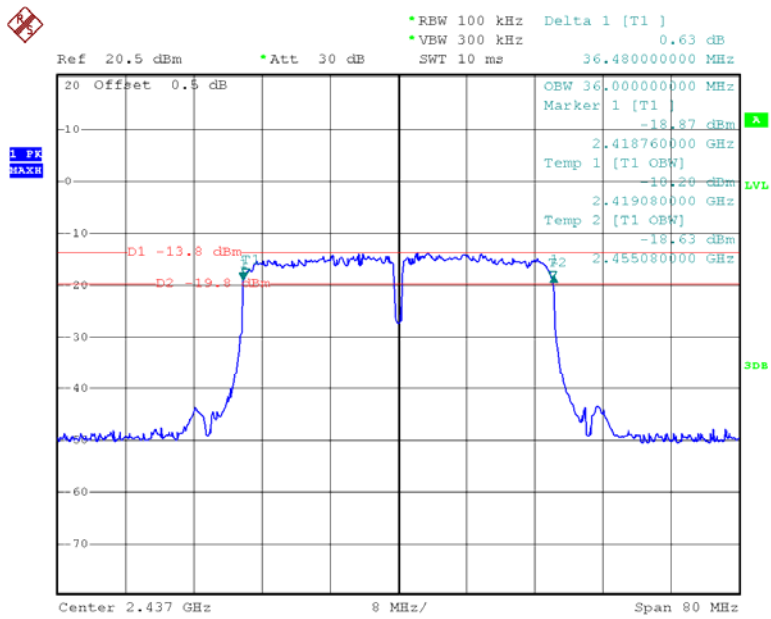
Date: 9.FEB.2015 20:05:27

### 802.11n ht40 Low Channel



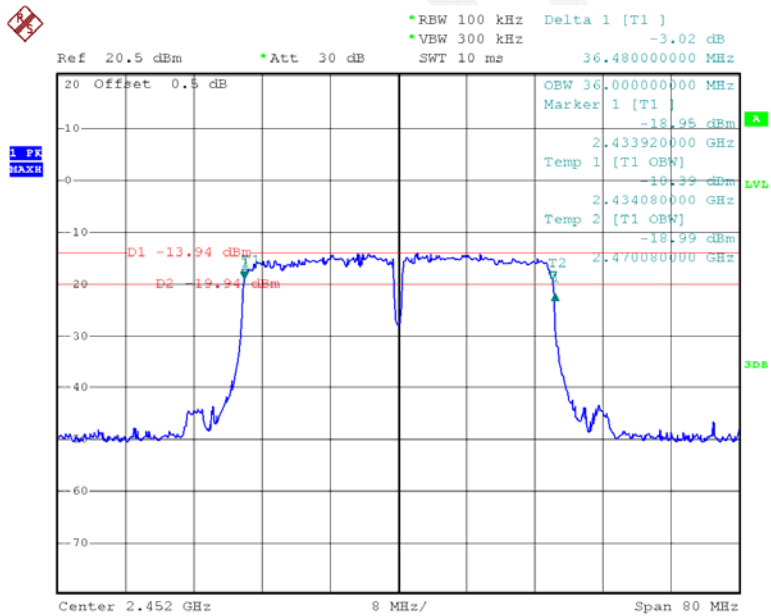
Date: 9.FEB.2015 20:08:41

### 802.11n ht40 Middle Channel



Date: 9.FEB.2015 20:09:40

### 802.11n ht40 High Channel



Date: 9.FEB.2015 20:10:35



## FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER

### Applicable Standard

According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

### Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v03r02

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to test equipment.
3. Add a correction factor to the display.



### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Wideband Power Sensor	N1921A	MY54210016	2014-11-12	2015-11-12
Agilent	Wideband Power Sensor	N1921A	MY54170013	2014-11-12	2015-11-12
Agilent	P-Series Power Meter	N1912A	MY5000448	2014-11-12	2015-11-12

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

### Test Data

#### Environmental Conditions

Temperature:	20.8 °C
Relative Humidity:	36 %
ATM Pressure:	102.1 kPa

*The testing was performed by Allen Qiao on 2015-02-09.*

*Test Mode: Transmitting*

*Test Result: Compliant. Please refer to the following table.*

Mode	Channel	Frequency (MHz)	conducted Peak output power (dBm)	Limit (dBm)	Result
802.11b	Low	2412	15.78	30	PASS
	Middle	2437	15.77	30	PASS
	High	2462	15.73	30	PASS
802.11g	Low	2412	12.71	30	PASS
	Middle	2437	12.66	30	PASS
	High	2462	12.32	30	PASS
802.11n20	Low	2412	15.39	30	PASS
	Middle	2437	15.30	30	PASS
	High	2462	15.23	30	PASS
802.11n40	Low	2422	11.42	30	PASS
	Middle	2437	11.32	30	PASS
	High	2452	11.15	30	PASS

## FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE

### 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. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz 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
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

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

### Test Data

#### Environmental Conditions

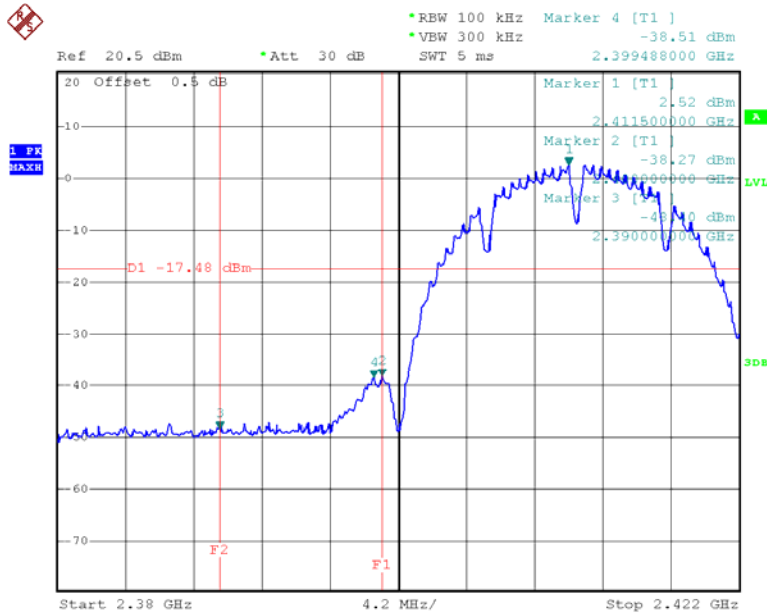
Temperature:	20.8 °C
Relative Humidity:	36 %
ATM Pressure:	102.1 kPa

*The testing was performed by Allen Qiao on 2015-02-09.*

*Test mode: Transmitting*

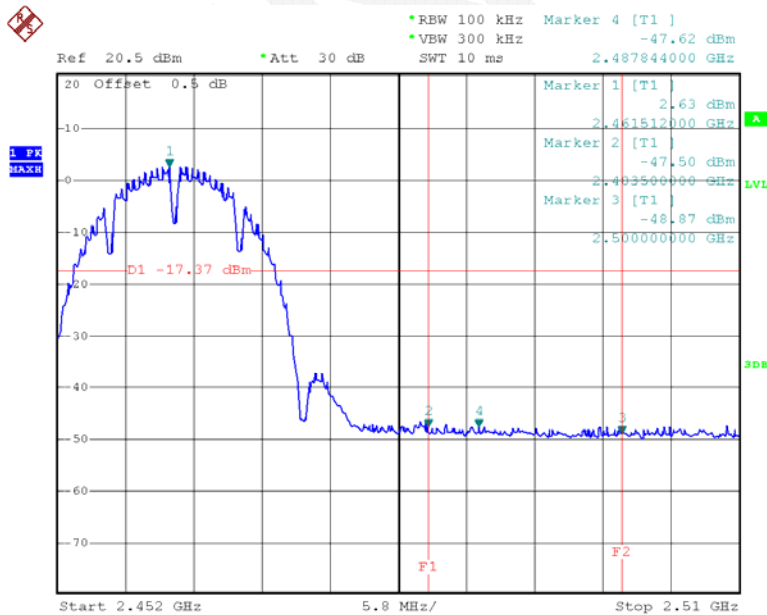
Test Result: Compliant. Please refer to following plots.

**802.11b: Band Edge, Left Side**



Date: 9.FEB.2015 20:21:17

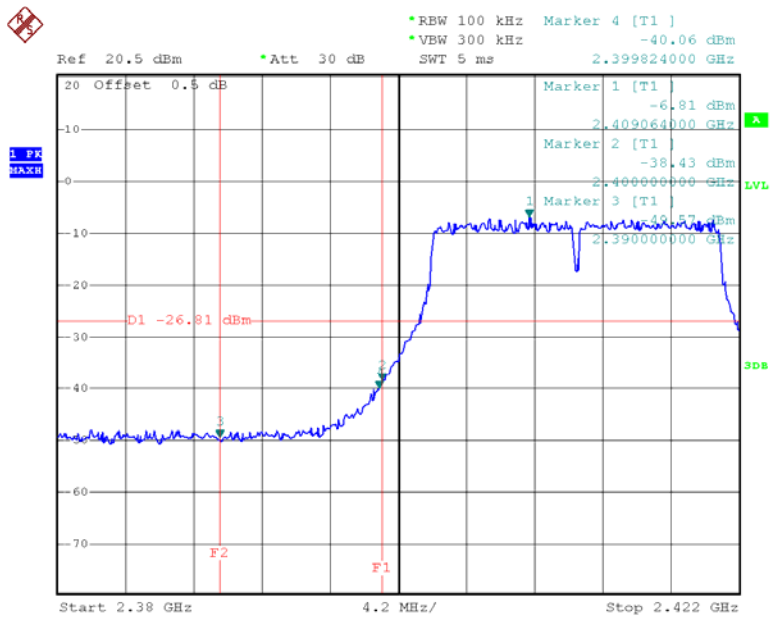
**802.11b: Band Edge, Right Side**



Date: 9.FEB.2015 20:19:49

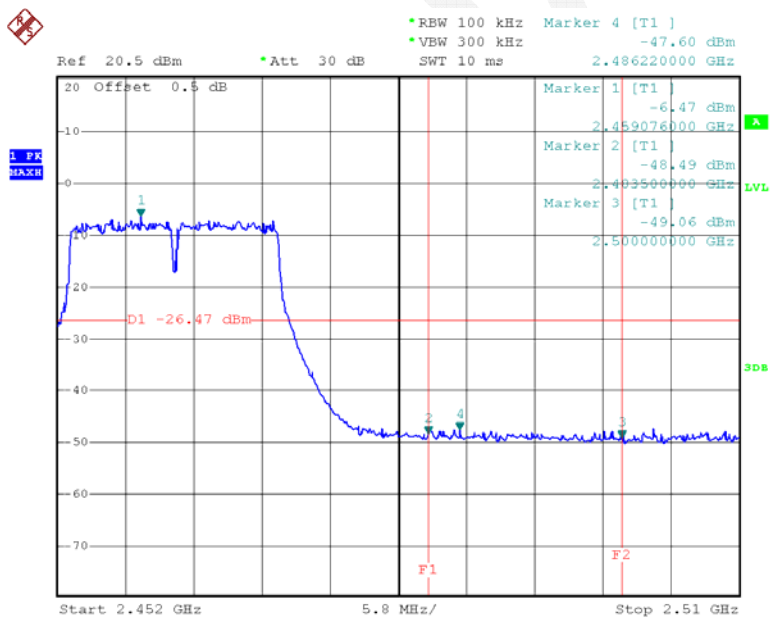


### 802.11n ht20 Band Edge, Left Side



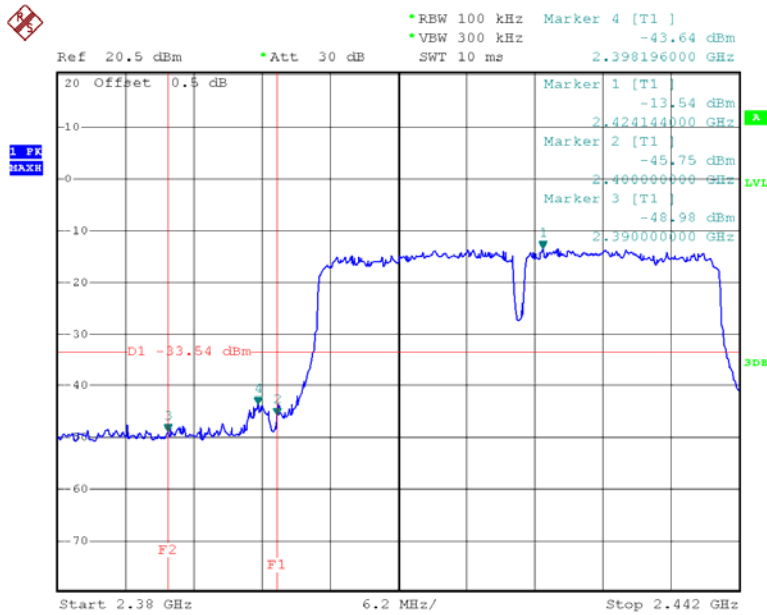
Date: 9.FEB.2015 20:26:38

### 802.11n ht20 Band Edge, Right Side



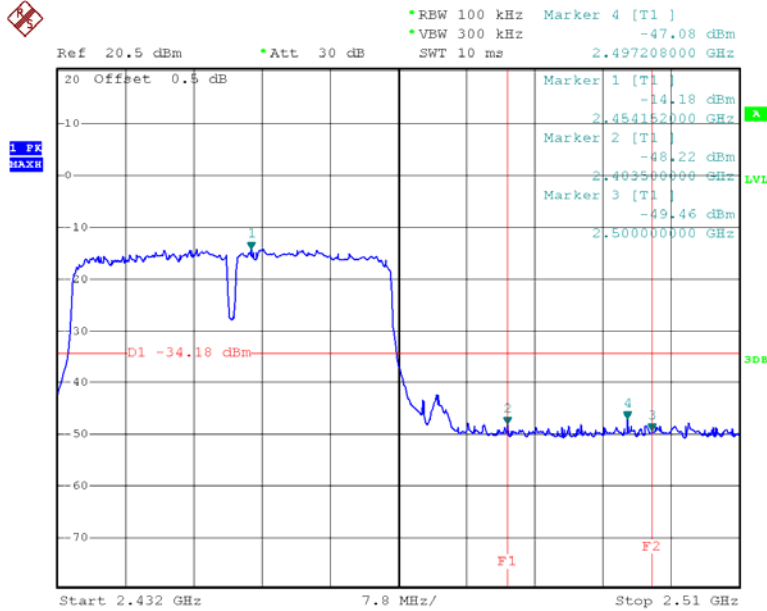
Date: 9.FEB.2015 20:25:22

### 802.11n ht40 Band Edge, Left Side



Date: 9.FEB.2015 20:30:54

### 802.11n ht40 Band Edge, Right Side



Date: 9.FEB.2015 20:32:30

## FCC §15.247(e) - POWER SPECTRAL DENSITY

### Applicable Standard

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

### Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v03r02 clause10.2:

- a) Set analyzer center frequency to DTS channel center frequency.
- b) Set the span to 1.5 times the DTS bandwidth.
- c) Set the RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
- d) Set the VBW  $\geq 3 \times \text{RBW}$ .
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum amplitude level within the RBW.
- j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

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

### Test Data

#### Environmental Conditions

<b>Temperature:</b>	20.8 °C
<b>Relative Humidity:</b>	36 %
<b>ATM Pressure:</b>	102.1 kPa

*The testing was performed by Allen Qiao on 2015-02-09.*

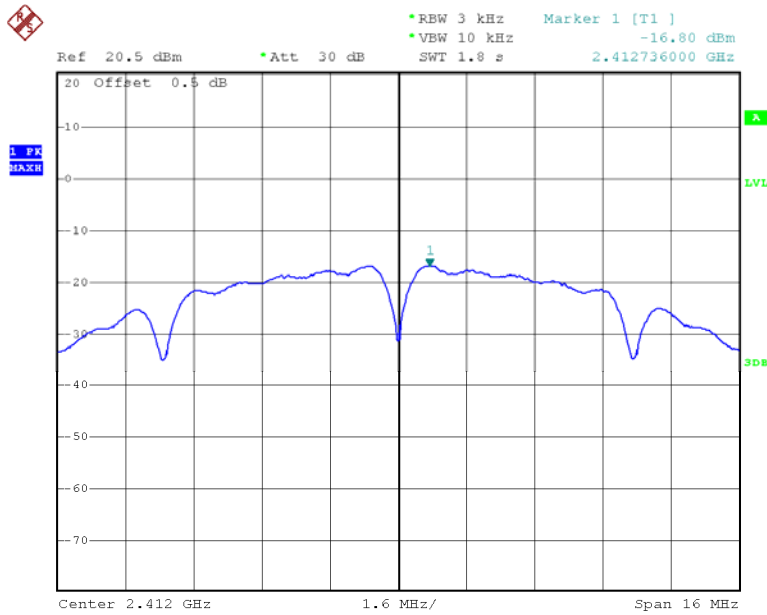


*Test Mode: Transmitting*

*Test Result: Compliant. Please refer to the following table and plots*

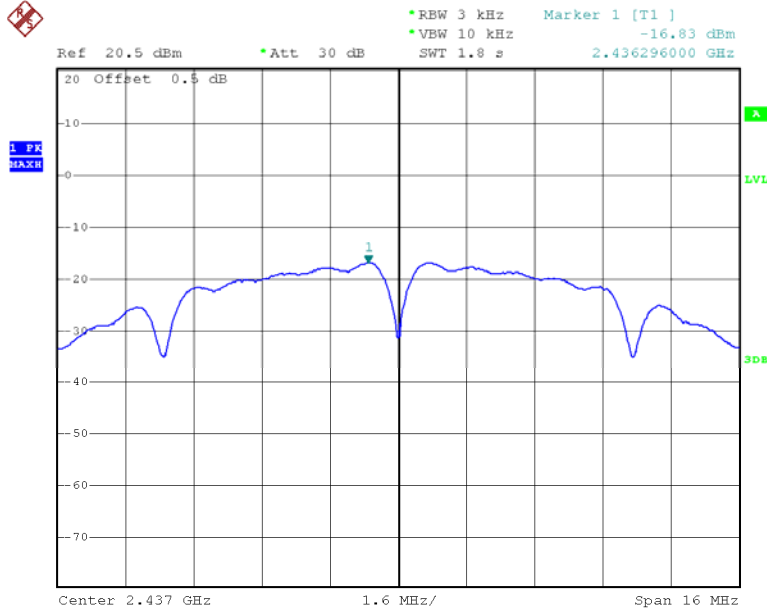
Mode	Channel Channel	Frequency MHz	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
802.11b	Low	2412	-16.80	≤8	PASS
	Middle	2437	-16.83	≤8	PASS
	High	2462	-16.89	≤8	PASS
802.11g	Low	2412	-23.49	≤8	PASS
	Middle	2437	-23.60	≤8	PASS
	High	2462	-23.91	≤8	PASS
802.11n20	Low	2412	-20.70	≤8	PASS
	Middle	2437	-20.53	≤8	PASS
	High	2462	-20.86	≤8	PASS
802.11n40	Low	2422	-26.18	≤8	PASS
	Middle	2437	-26.66	≤8	PASS
	High	2452	-26.55	≤8	PASS

### Power Spectral Density, 802.11b Low Channel



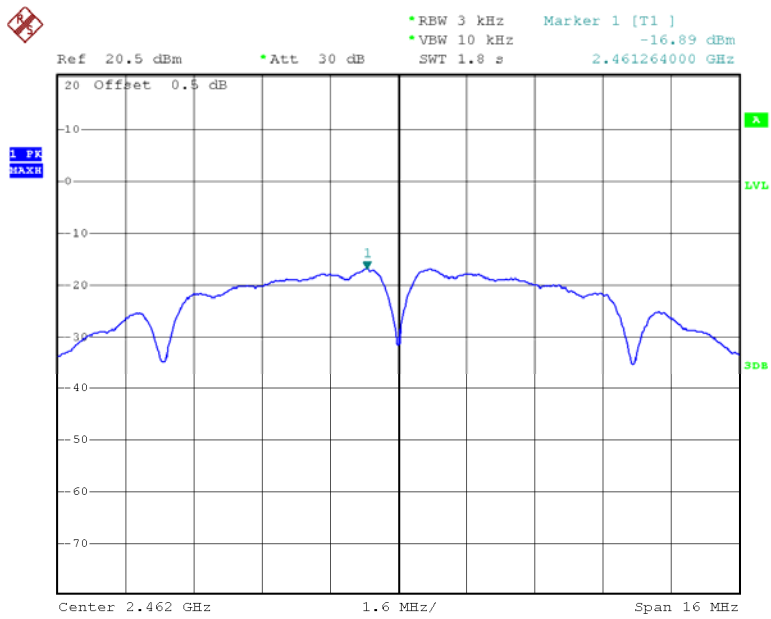
Date: 9.FEB.2015 20:17:06

### Power Spectral Density, 802.11b Middle Channel



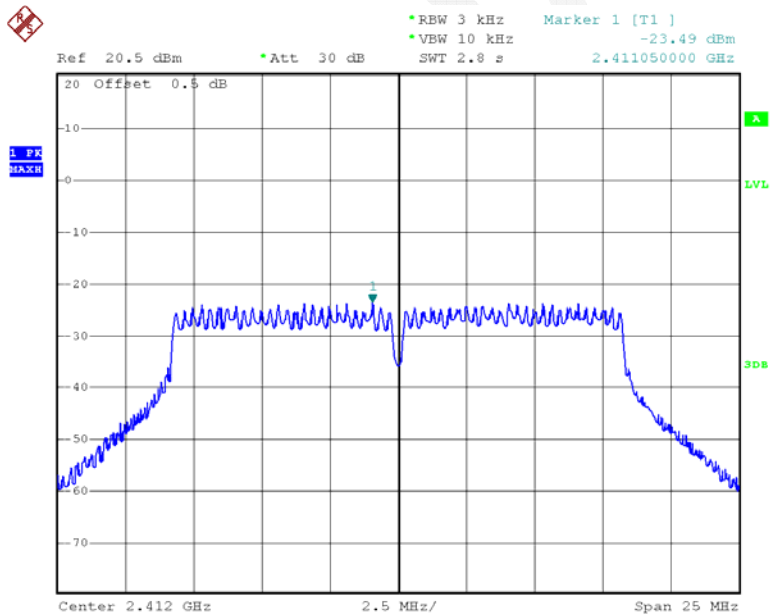
Date: 9.FEB.2015 20:17:22

### Power Spectral Density, 802.11b High Channel



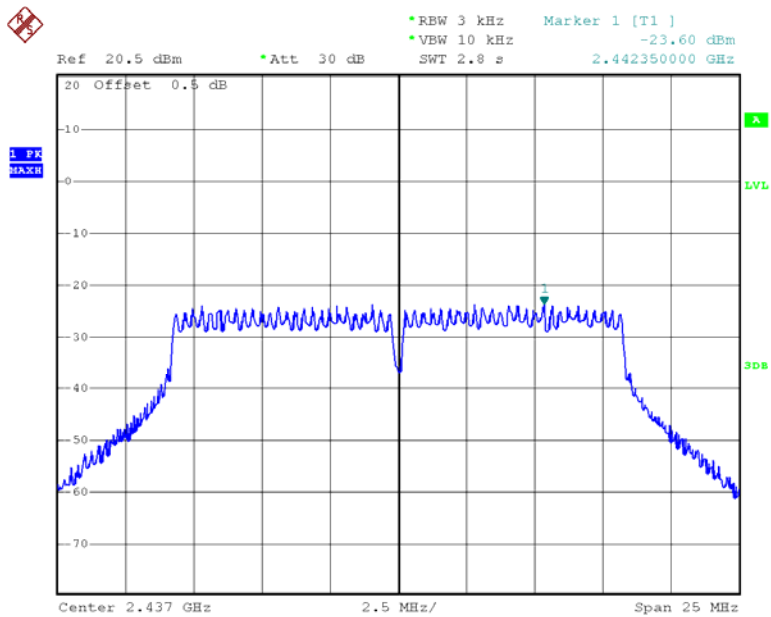
Date: 9.FEB.2015 20:17:41

### Power Spectral Density, 802.11g Low Channel



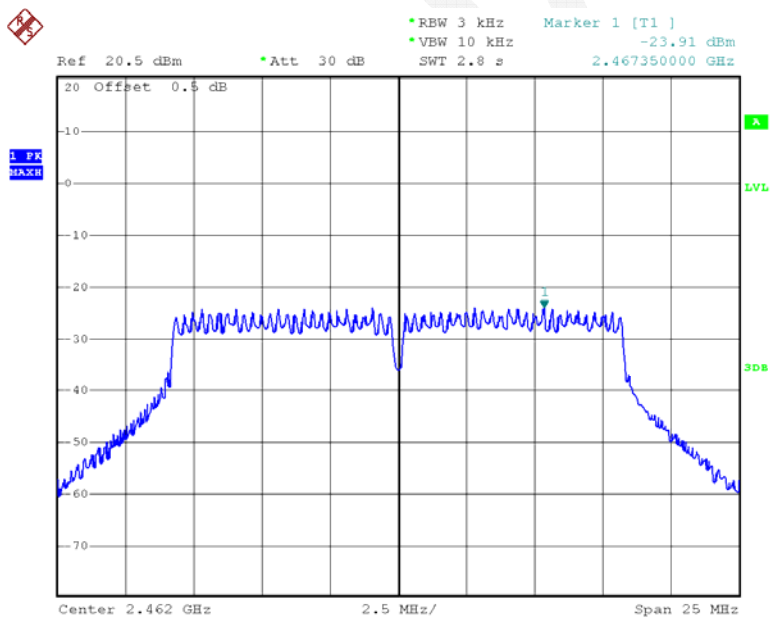
Date: 9.FEB.2015 20:16:41

### Power Spectral Density, 802.11g Middle Channel



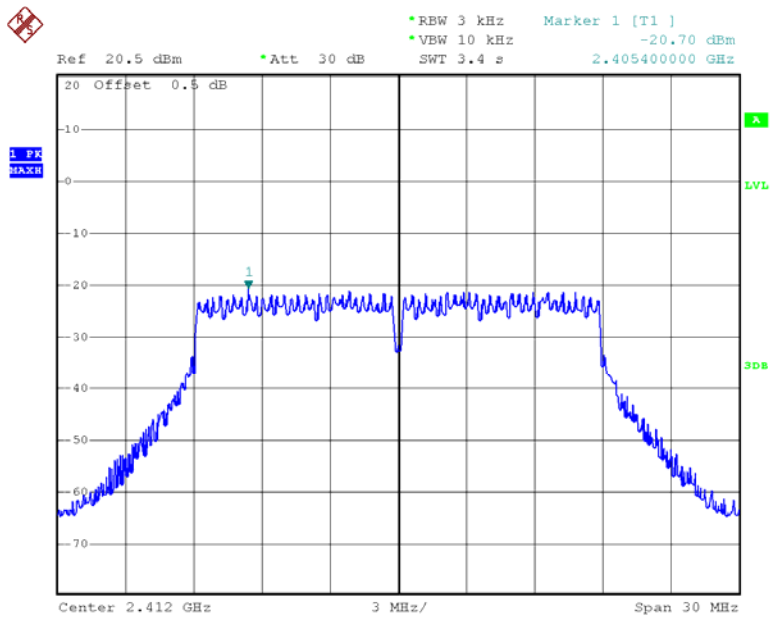
Date: 9.FEB.2015 20:16:11

### Power Spectral Density, 802.11g High Channel



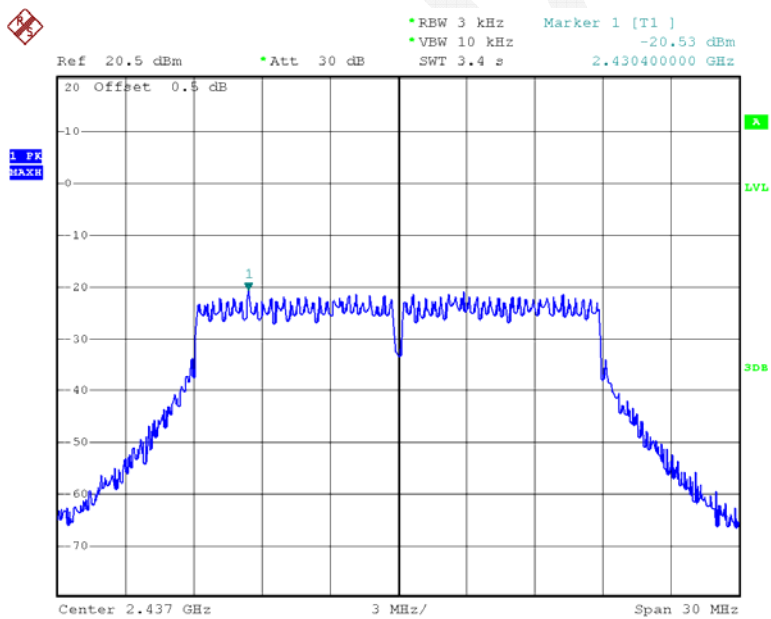
Date: 9.FEB.2015 20:15:50

### Power Spectral Density, 802.11n ht20 Low Channel



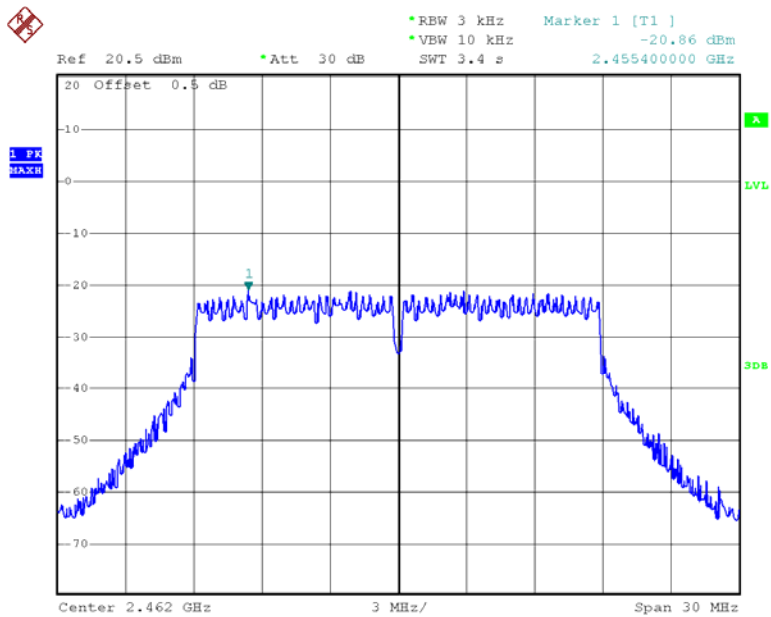
Date: 9.FEB.2015 20:14:02

### Power Spectral Density, 802.11n ht20 Middle Channel



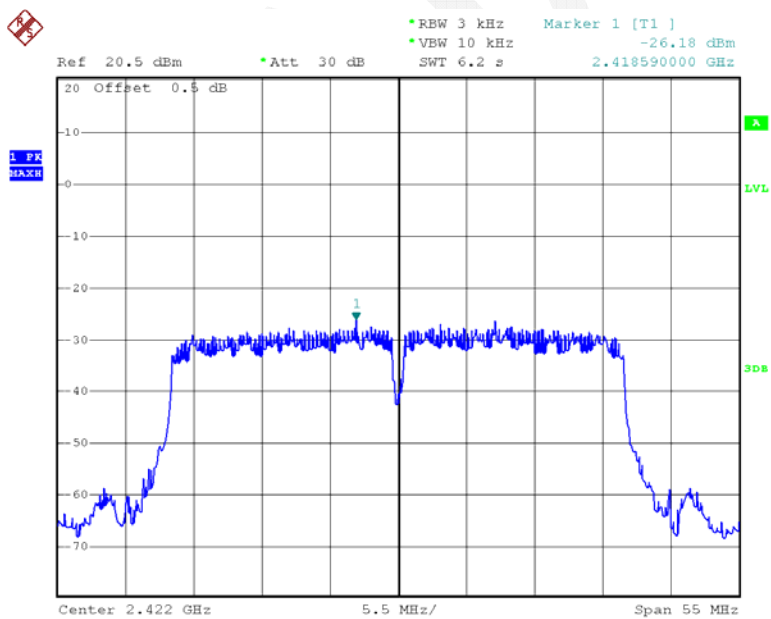
Date: 9.FEB.2015 20:14:24

### Power Spectral Density, 802.11n ht20 High Channel



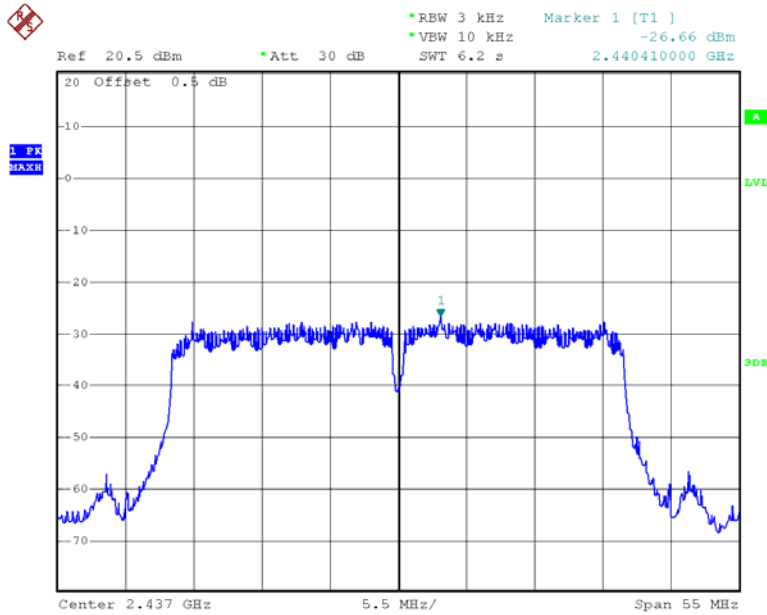
Date: 9.FEB.2015 20:14:44

### Power Spectral Density, 802.11n ht40 Low Channel



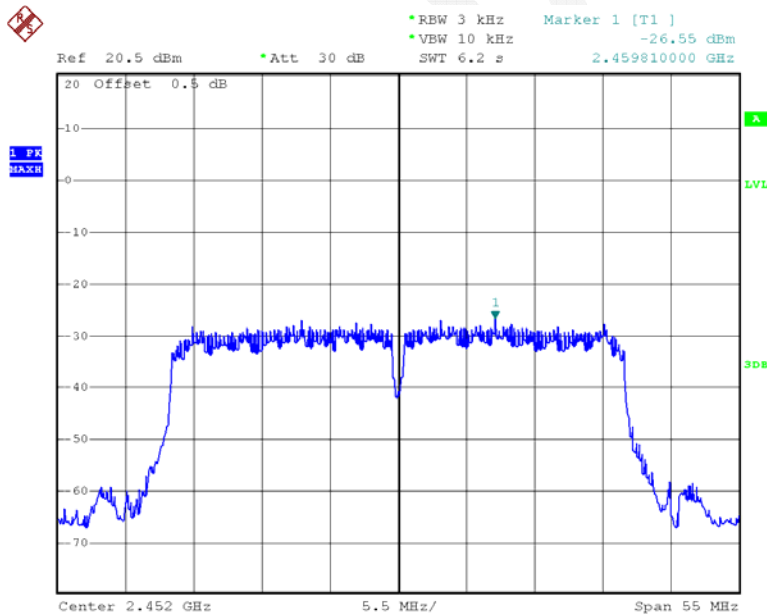
Date: 9.FEB.2015 20:13:26

### Power Spectral Density, 802.11n ht40 Middle Channel



Date: 9.FEB.2015 20:12:12

### Power Spectral Density, 802.11n ht40 High Channel



Date: 9.FEB.2015 20:12:59

**DECLARATION LETTER**



**QCOM TECHNOLOGY INC.**

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 4F., No.301, Sec. 2, Tiding Blvd. Neihu Dist., Taipei City 11493  
 TEL: 886-2-2658-9198 FAX: 886-2-2658-2068

**Declaration of Alteration**

To Whom It May Concern,

We, Qcom Technology Inc. hereby declare that there are some differences between our Multiple Models and testing model. Details as below:

Products Description	Name	802.11b/g/n Wireless USB Module		
	Project No.	RTW150203050, R2TW150203050-03, RTW150203051, RTW150203052		
Differences Description				
Testing model	Multiple Models	Differences Items	Details	
LR802URN3	LR802URN2-01	All circuit design and layout are identical. Only the model name and main board are different size	Refer to external photos.	

Notes: Testing model-the product's model tested by BACL  
 Multiple Model- have the same or similar appearance, structure, PCB, Material and function to the testing product's model, and only are different for model name and main board size.

Besides the differences in the table above, we declare the products are identical.  
 We guarantee all the information provided above is true, and notice that we'll bear all the consequences caused by any false information or concealing.

Best Regards,

Signature: Wu-Hu, Ting

Printed Name: **Wu-Hu Ting, Ding**

Title: **R&D Dept. II Manager, ding@qcom.com.tw**

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QPDG004R32 Version1.0 (20140717)

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