

FCC PART 15.247 TEST REPORT

For

Hobbico, Inc.

2904 Research Road, Champaign, Illinois, United States

FCC ID: IYFFLITT

Report Type: Original Report	Product Name: Flitt Drone RTF
Report Number: RDG170821001-00A	
Report Date: 2017-08-30	
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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Dongguan).

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The **Hobbico, Inc.**'s product, model number: **HCAE11 (FCC ID: IYFFLITT)** (the "EUT") in this report was a **Flitt Drone RTF**, which was measured approximately: 14.5 cm (L) x 3.8 cm (W) x 3.25 cm (H), rated input voltage: DC3.7V from battery and the battery can be removed and charged by charger.

**All measurement and test data in this report was gathered from final production sample, serial number: 170821001 (assigned by the BACL, Dongguan). The EUT was received on 2017-08-21.*

Objective

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

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

Related Submittal(s)/Grant(s)

No related submittal/grant.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Dongguan).

Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.61dB
Power Spectral Density, conducted	±0.61 dB
Unwanted Emissions, radiated	30M~200MHz: 4.58 dB for Horizontal, 4.59 dB for Vertical 200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical 1G~6GHz: 4.45 dB, 6G~26.5GHz: 5.23 dB
Unwanted Emissions, conducted	±1.5 dB
Temperature	±1℃
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
AC Power Lines Conducted Emission	3.12 dB (150 kHz to 30 MHz)

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 Industry Area, Tangxia, Dongguan, Guangdong, China

Bay Area Compliance Laboratories Corp. (Dongguan) has been accredited to ISO 17025 by CNAS(Lab code: L5662). And accredited to ISO 17025 by NVLAP(Test Laboratory Accreditation Certificate Number 500069-0), the FCC Designation No. CN5002 under the KDB 974614 D01.

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.

Bay Area Compliance Laboratories Corp. (Dongguan) was registered with ISED Canada under ISED Canada Registration Number 3062D.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in Engineering Mode, which was provided by the manufacturer.

The device only support 802.11b and 802.11g mode, total 11 channels are provided:

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	/	/

Test was performed with channel 1,6,11.

EUT Exercise Software

The software “IPOP” was used for testing, which was provided by manufacturer. 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.

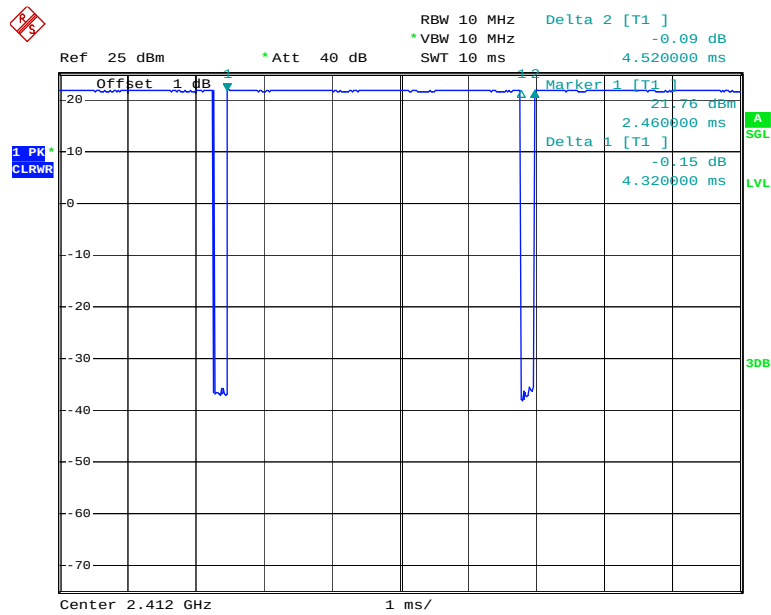
The maximum power was configured as below table, that provided by the manufacturer:

Test Mode	Test Software Version	IPOP		
802.11b	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	1Mbps	1Mbps	1Mbps
	Power Level Setting	11	11	14
802.11g	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	6Mbps	6Mbps	6Mbps
	Power Level Setting	16	18	16

The duty cycle as below:

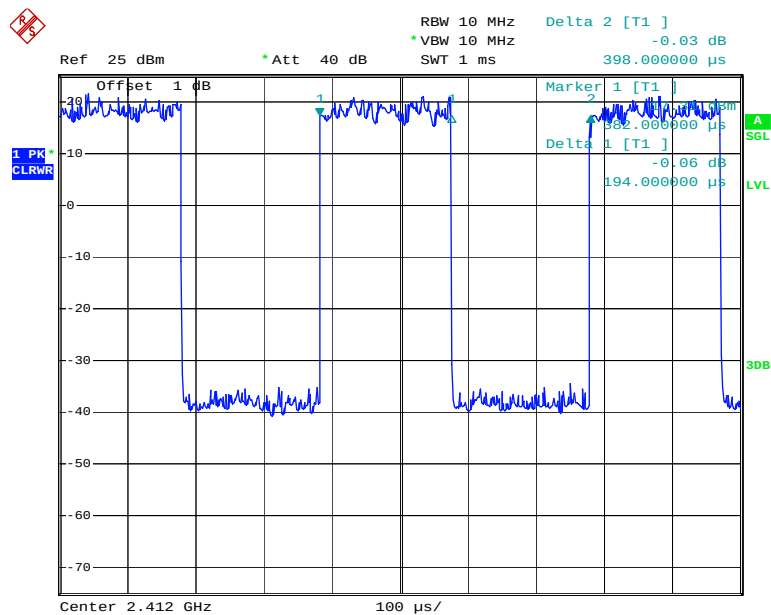
Mode	T _{on} (ms)	T _{on+off} (ms)	Duty Cycle (%)
802.11b	4.32	4.52	95.58
802.11g	0.194	0.398	48.74

802.11b



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802.11g

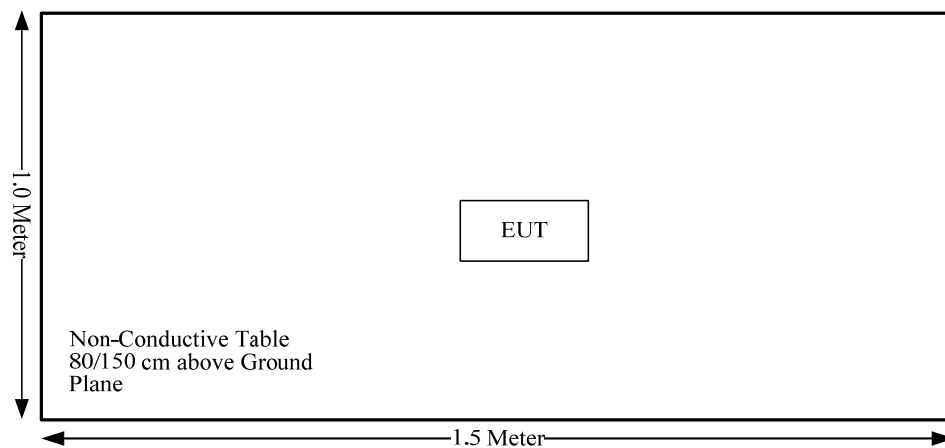


Date: 24.AUG.2017 10:31:06

Equipment Modifications

No modification was made to the EUT.

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.247 (i) & §1.1310 & §2.1091	Maximum Permissible Exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Not Applicable
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB 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

Note:

Not Applicable: the EUT was powered by battery.

FCC §15.247 (i) & §1.1310 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247(i) and subpart §1.1310, 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) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	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.

Calculation formula:

Prediction of power density at the distance of the applicable MPE limit

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm²);

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 output power including Tune-up Tolerance		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
	(dBi)	(numeric)	(dBm)	(mW)			
2412-2462	1	1.26	28	630.96	20.00	0.1581	1.0

Result: The device meet FCC MPE at 20 cm distance

FCC §15.203 - ANTENNA REQUIREMENT

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

Antenna Connector Construction

The EUT have an IPEX port connect to the internal FPC antenna. The Maximum gain is 1.0 dBi, compliance the requirements, Please refer to the EUT photos.

Result: Compliance.

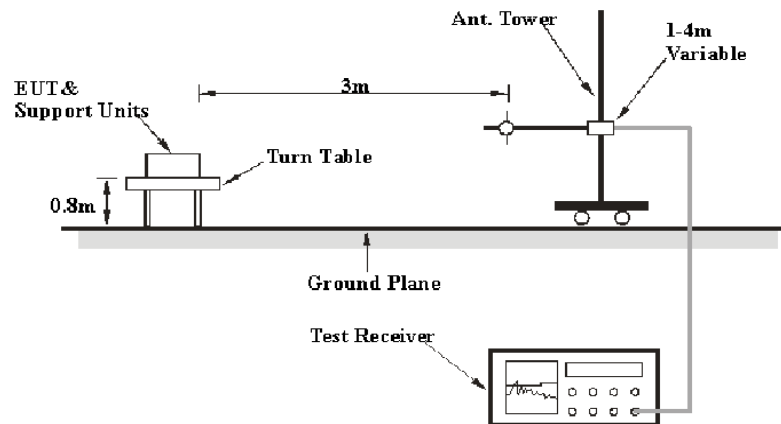
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

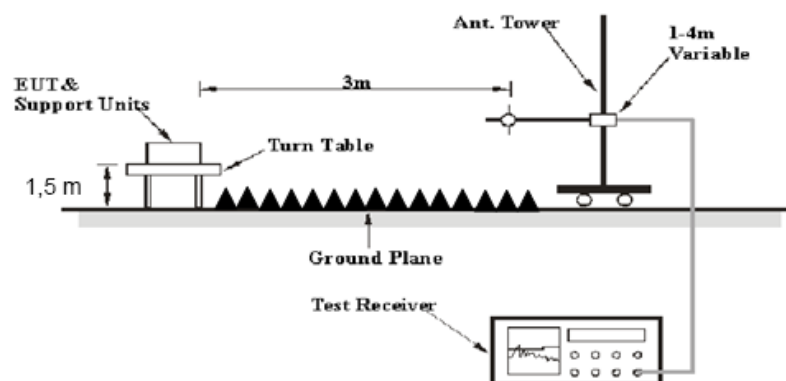
FCC §15.247 (d); §15.209; §15.205;

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 C63.10-2013. The specification used was the FCC 15.209, and FCC 15.247 limits.

The spacing between the peripherals was 10 cm.

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:

30MHz-1000MHz:

Detector	RBW	Video B/W	IF B/W
QP	120 kHz	300 kHz	120kHz

1GHz- 25GHz:

Detector	Duty cycle	RBW	Video B/W
PK	Any	1MHz	3 MHz
Ave.	>98%	1MHz	10 Hz
	<98%	1MHz	1/T

Note: T is minimum transmission duration

Test Procedure

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

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz, peak and Average detection modes for frequencies above 1 GHz.

Corrected Amplitude & Margin Calculation

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

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

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 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	2016-09-01	2017-08-31
Sunol Sciences	Antenna	JB3	A060611-1	2014-11-06	2017-11-05
HP	Amplifier	8447E	2434A02181	2016-09-01	2017-09-01
R&S	Spectrum Analyzer	FSU 26	200256	2016-12-08	2017-12-08
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-04
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-02 1304	2017-06-16	2020-06-15
MITEQ	Amplifier	AFS42-00101800- 25-S-42	2001271	2016-09-05	2017-09-05
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2016-09-06	2017-09-06
Unknown	Coaxial Cable	Chamber A-1	4m	2016-09-01	2017-09-01
Unknown	Coaxial Cable	Chamber B-1	0.75m	2016-09-01	2017-09-01
Unknown	Coaxial Cable	Chamber A-2	10m	2016-09-01	2017-09-01
Unknown	Coaxial Cable	Chamber B-2	8m	2016-09-01	2017-09-01
Farad	Test Software	EZ-EMC	V1.1.4.2	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).

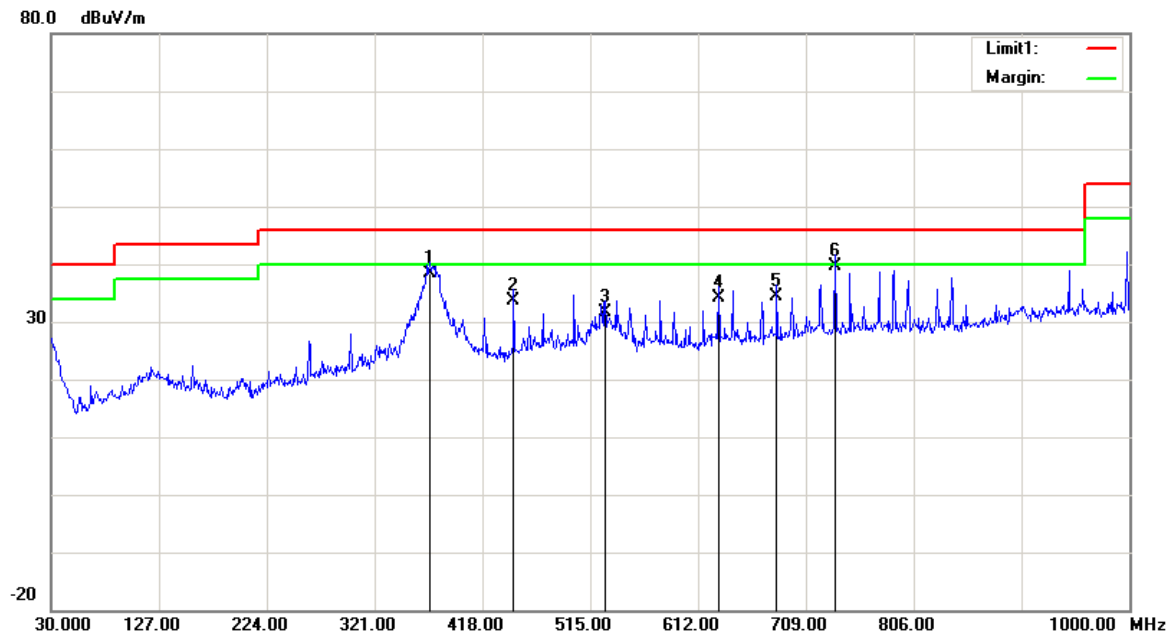
Test Data**Environmental Conditions**

Temperature:	29.2 °C
Relative Humidity:	40 %
ATM Pressure:	98.9 kPa

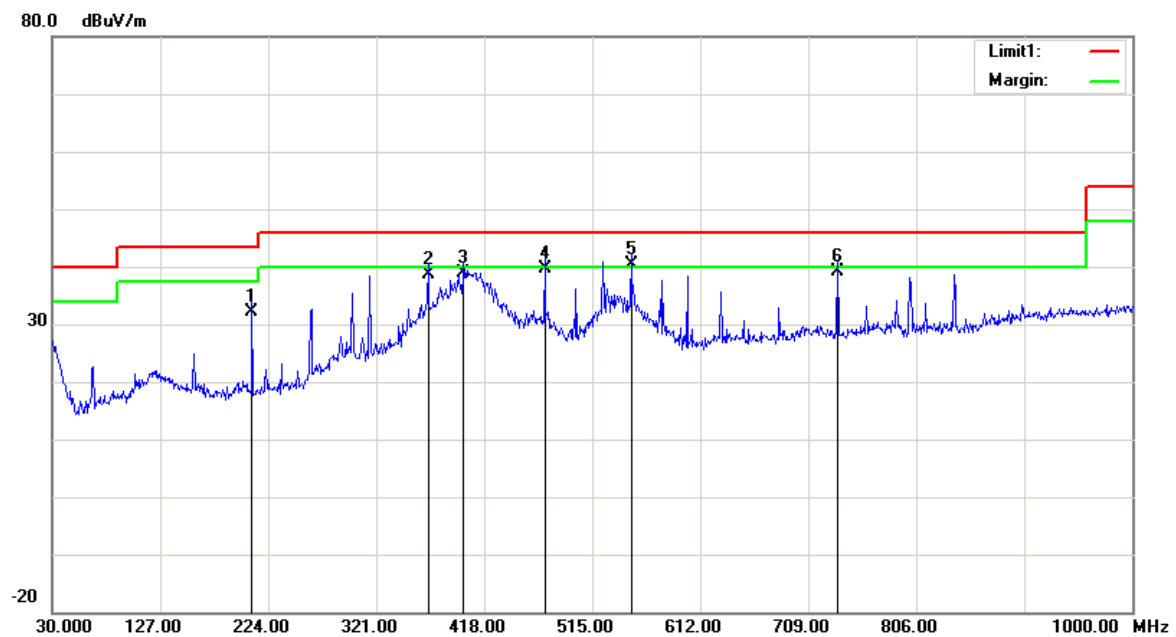
The testing was performed by Steven Zuo on 2017-08-23.

Test Result: Compliance, please Refer to the following data

Test Mode: Transmitting

1) 30MHz-1GHz(802.11g mode Middle channel was the worst):**Horizontal:**

Frequency (MHz)	Receiver Reading (dBuV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
370.4700	41.44	QP	-3.04	38.40	46.00	7.60
446.1300	35.28	QP	-1.68	33.60	46.00	12.40
528.5800	32.09	QP	-0.39	31.70	46.00	14.30
630.4300	32.78	QP	1.32	34.10	46.00	11.90
682.8100	32.77	QP	1.73	34.50	46.00	11.50
735.1900	37.22	QP	2.48	39.70	46.00	6.30

Vertical:

Frequency (MHz)	Receiver Reading (dBuV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
209.4500	39.79	QP	-7.59	32.20	43.50	11.30
367.5600	41.75	QP	-3.05	38.70	46.00	7.30
399.5700	41.35	QP	-2.45	38.90	46.00	7.10
472.3200	40.68	QP	-0.98	39.70	46.00	6.30
549.9200	40.85	QP	-0.45	40.40	46.00	5.60
735.1900	36.72	QP	2.48	39.20	46.00	6.80

2) 1-25GHz:

802.11b:

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	71.72	PK	H	28.12	3.11	0.00	102.95	N/A	N/A
2412	67.58	AV	H	28.12	3.11	0.00	98.81	N/A	N/A
2412	70.34	PK	V	28.12	3.11	0.00	101.57	N/A	N/A
2412	66.83	AV	V	28.12	3.11	0.00	98.06	N/A	N/A
2390	26.48	PK	H	28.08	3.10	0.00	57.66	74.00	16.34
2390	13.57	AV	H	28.08	3.10	0.00	44.75	54.00	9.25
4824	47.93	PK	H	32.95	4.33	35.49	49.72	74.00	24.28
4824	32.85	AV	H	32.95	4.33	35.49	34.64	54.00	19.36
7236	46.52	PK	H	35.81	5.47	35.97	51.83	74.00	22.17
7236	32.27	AV	H	35.81	5.47	35.97	37.58	54.00	16.42
5895	45.73	PK	H	34.26	4.62	35.85	48.76	74.00	25.24
5895	31.46	AV	H	34.26	4.62	35.85	34.49	54.00	19.51
Middle Channel: 2437 MHz									
2437	71.13	PK	H	28.17	3.11	0.00	102.41	N/A	N/A
2437	67.09	AV	H	28.17	3.11	0.00	98.37	N/A	N/A
2437	68.75	PK	V	28.17	3.11	0.00	100.03	N/A	N/A
2437	63.82	AV	V	28.17	3.11	0.00	95.10	N/A	N/A
4874	48.13	PK	H	33.05	4.39	35.53	50.04	74.00	23.96
4874	32.79	AV	H	33.05	4.39	35.53	34.70	54.00	19.30
7311	46.58	PK	H	36.01	5.52	35.97	52.14	74.00	21.86
7311	32.16	AV	H	36.01	5.52	35.97	37.72	54.00	16.28
5898	45.87	PK	H	34.26	4.61	35.85	48.89	74.00	25.11
5898	31.92	AV	H	34.26	4.61	35.85	34.94	54.00	19.06
6425	45.26	PK	H	34.22	5.18	35.76	48.90	74.00	25.10
6425	31.34	AV	H	34.22	5.18	35.76	34.98	54.00	19.02
High Channel: 2462 MHz									
2462	73.32	PK	H	28.22	3.10	0.00	104.64	N/A	N/A
2462	68.35	AV	H	28.22	3.10	0.00	99.67	N/A	N/A
2462	69.53	PK	V	28.22	3.10	0.00	100.85	N/A	N/A
2462	64.79	AV	V	28.22	3.10	0.00	96.11	N/A	N/A
2483.5	27.36	PK	H	28.27	3.10	0.00	58.73	74.00	15.27
2483.5	14.59	AV	H	28.27	3.10	0.00	45.96	54.00	8.04
4924	51.86	PK	H	33.15	4.42	35.57	53.86	74.00	20.14
4924	44.69	AV	H	33.15	4.42	35.57	46.69	54.00	7.31
7386	46.52	PK	H	36.20	5.57	35.98	52.31	74.00	21.69
7386	32.28	AV	H	36.20	5.57	35.98	38.07	54.00	15.93
6315	45.43	PK	H	34.24	5.05	35.78	48.94	74.00	25.06
6315	31.62	AV	H	34.24	5.05	35.78	35.13	54.00	18.87

802.11g:

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	76.56	PK	H	28.12	3.11	0.00	107.79	N/A	N/A
2412	63.79	AV	H	28.12	3.11	0.00	95.02	N/A	N/A
2412	70.48	PK	V	28.12	3.11	0.00	101.71	N/A	N/A
2412	57.46	AV	V	28.12	3.11	0.00	88.69	N/A	N/A
2390	41.12	PK	H	28.08	3.10	0.00	72.30	74.00	1.70
2390	20.53	AV	H	28.08	3.10	0.00	51.71	54.00	2.29
4824	52.67	PK	H	32.95	4.33	35.49	54.46	74.00	19.54
4824	39.25	AV	H	32.95	4.33	35.49	41.04	54.00	12.96
7236	46.82	PK	H	35.81	5.47	35.97	52.13	74.00	21.87
7236	32.27	AV	H	35.81	5.47	35.97	37.58	54.00	16.42
6216	46.34	PK	H	34.26	4.93	35.80	49.73	74.00	24.27
6216	31.57	AV	H	34.26	4.93	35.80	34.96	54.00	19.04
Middle Channel: 2437 MHz									
2437	77.37	PK	H	28.17	3.11	0.00	108.65	N/A	N/A
2437	63.82	AV	H	28.17	3.11	0.00	95.10	N/A	N/A
2437	71.79	PK	V	28.17	3.11	0.00	103.07	N/A	N/A
2437	58.89	AV	V	28.17	3.11	0.00	90.17	N/A	N/A
4874	53.09	PK	H	33.05	4.39	35.53	55.00	74.00	19.00
4874	39.56	AV	H	33.05	4.39	35.53	41.47	54.00	12.53
7311	47.57	PK	H	36.01	5.52	35.97	53.13	74.00	20.87
7311	32.84	AV	H	36.01	5.52	35.97	38.40	54.00	15.60
6249	45.76	PK	H	34.25	4.97	35.80	49.18	74.00	24.82
6249	31.57	AV	H	34.25	4.97	35.80	34.99	54.00	19.01
6325	46.52	PK	H	34.24	5.06	35.78	50.04	74.00	23.96
6325	31.65	AV	H	34.24	5.06	35.78	35.17	54.00	18.83
High Channel: 2462 MHz									
2462	76.35	PK	H	28.22	3.10	0.00	107.67	N/A	N/A
2462	63.37	AV	H	28.22	3.10	0.00	94.69	N/A	N/A
2462	69.94	PK	V	28.22	3.10	0.00	101.26	N/A	N/A
2462	56.67	AV	V	28.22	3.10	0.00	87.99	N/A	N/A
2483.5	41.11	PK	H	28.27	3.10	0.00	72.48	74.00	1.52
2483.5	21.09	AV	H	28.27	3.10	0.00	52.46	54.00	1.54
4924	52.34	PK	H	33.15	4.42	35.57	54.34	74.00	19.66
4924	39.37	AV	H	33.15	4.42	35.57	41.37	54.00	12.63
7386	46.75	PK	H	36.20	5.57	35.98	52.54	74.00	21.46
7386	32.28	AV	H	36.20	5.57	35.98	38.07	54.00	15.93
6415	46.13	PK	H	34.22	5.17	35.76	49.76	74.00	24.24
6415	31.26	AV	H	34.22	5.17	35.76	34.89	54.00	19.11

FCC §15.247(a) (2)& RSS-247 §5.2 a)–6 dB EMISSION BANDWIDTH

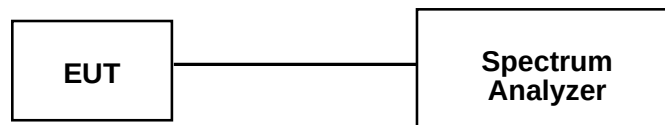
Applicable Standard

According to FCC §15.247(a) (2)

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

- 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	2016-12-08	2017-12-08
Unknown	Coaxial Cable	0.1m	C-1	Each Time	/

* **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:	24.9 °C
Relative Humidity:	54 %
ATM Pressure:	100.2 kPa

The testing was performed by Roger luo on 2017-08-25.

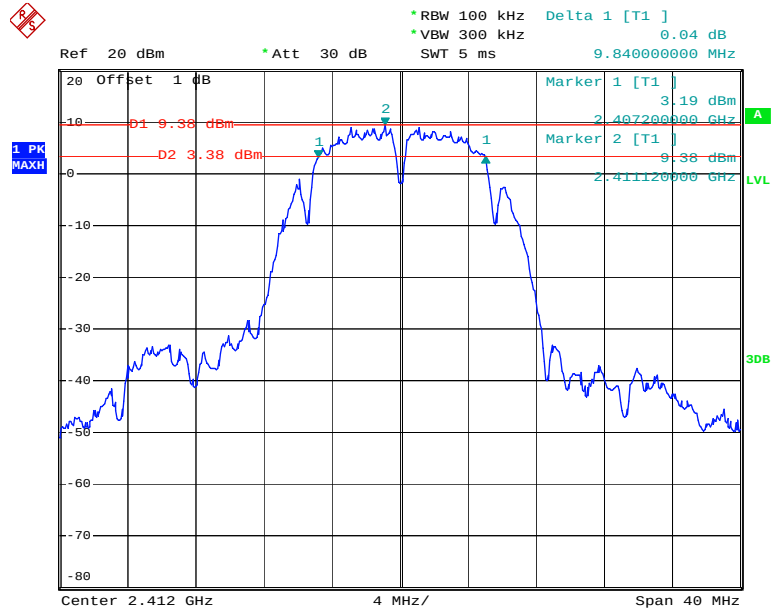
Test Mode: Transmitting

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

Test mode	Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (MHz)
802.11b	Low	2412	9.84	≥ 0.5
	Middle	2437	9.84	≥ 0.5
	High	2462	9.84	≥ 0.5
802.11g	Low	2412	16.56	≥ 0.5
	Middle	2437	16.48	≥ 0.5
	High	2462	16.56	≥ 0.5

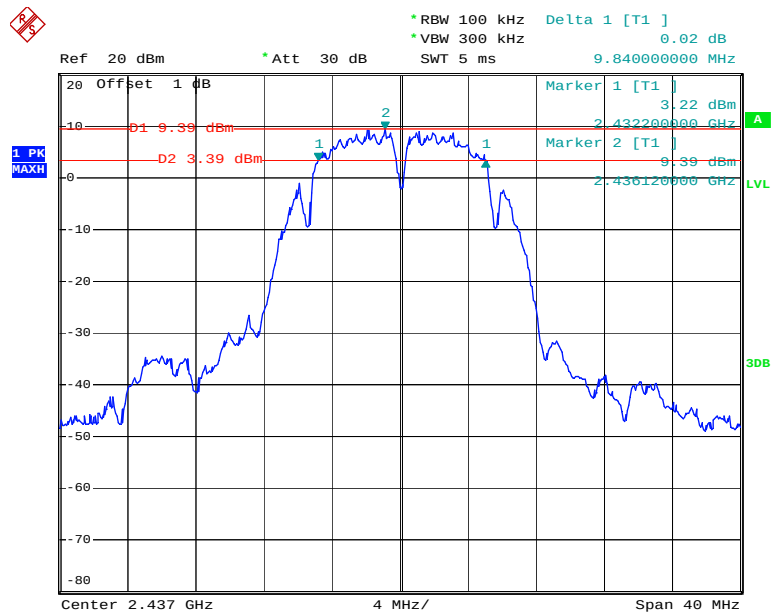
6dB Bandwidth:

802.11b Low Channel



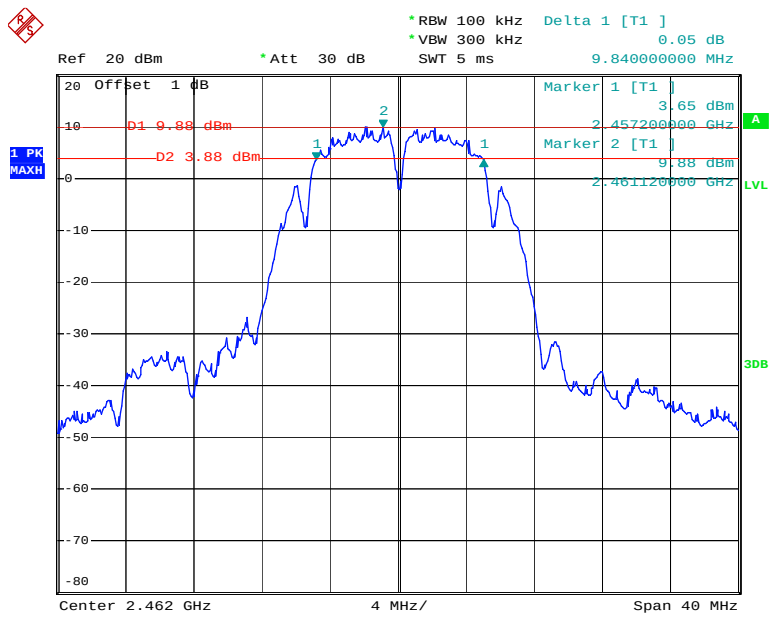
Date: 25.AUG.2017 08:58:47

802.11b Middle Channel



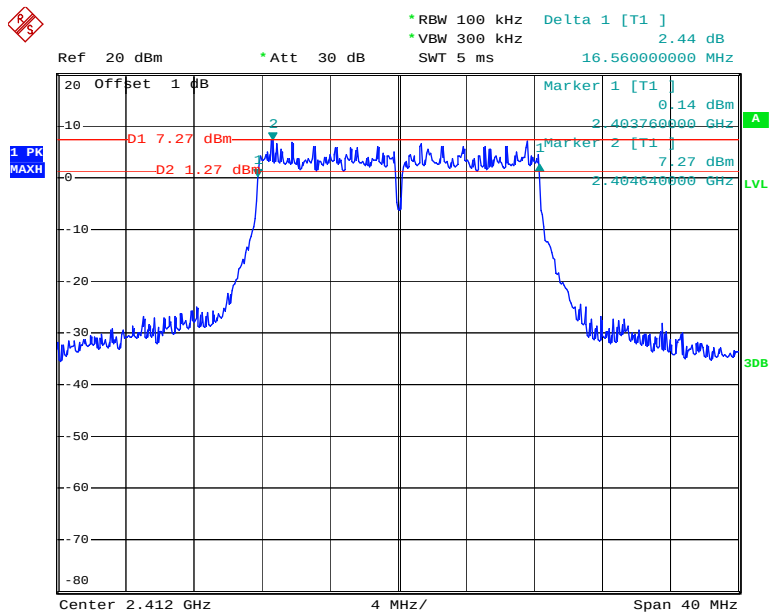
Date: 25.AUG.2017 09:02:36

802.11b High Channel

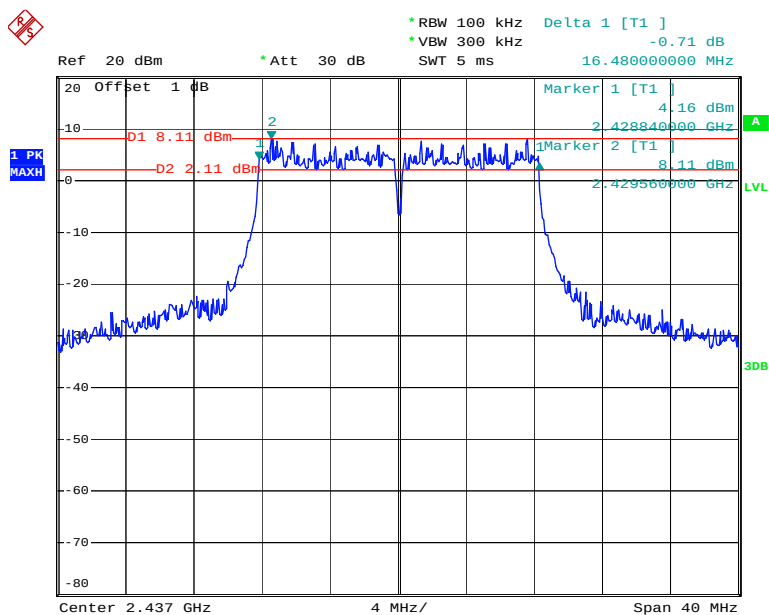


Date: 25.AUG.2017 09:10:11

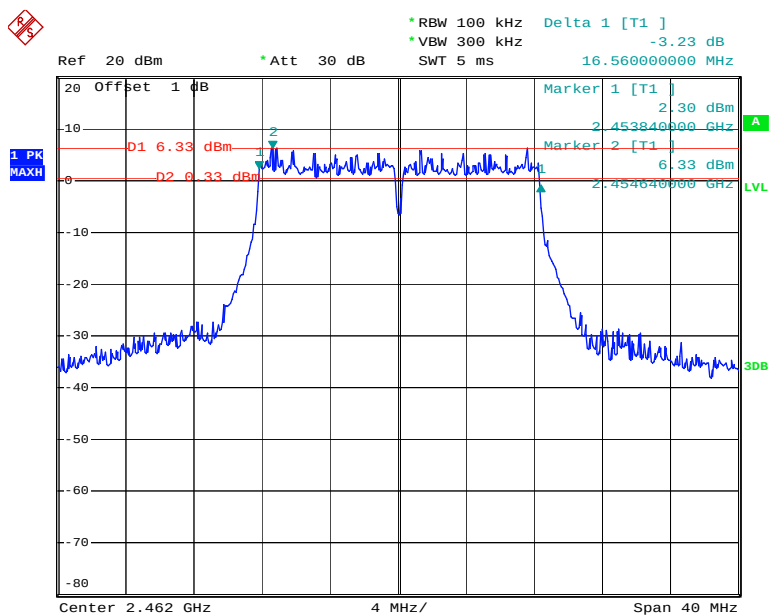
802.11g Low Channel



Date: 25.AUG.2017 09:15:35

802.11g Middle Channel

Date: 25.AUG.2017 09:18:25

802.11g High Channel

Date: 25.AUG.2017 09:13:30

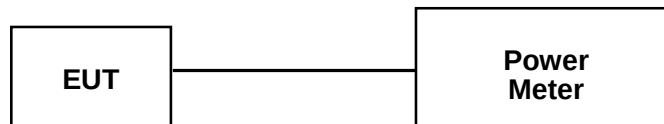
FCC §15.247(b) (3) - MAXIMUM PEAK CONDUCTED OUTPUT POWER

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

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.
4. Set the power Meter to test Peak output power, record the result as peak power.
5. Set the power meter to test average output power, record the result as average power.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Wideband Power Sensor	N1921A	MY54210016	2016-11-03	2017-11-03
Agilent	P-Series Power Meter	N1912A	MY5000448	2016-11-03	2017-11-03
Unknown	Coaxial Cable	0.1m	C-1	Each Time	/

* **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:	24.9 °C
Relative Humidity:	54 %
ATM Pressure:	100.2 kPa

The testing was performed by Roger luo on 2017-08-25.

Test Mode: Transmitting

Test mode	Channel	Frequency (MHz)	Max Peak Conducted Output Power (dBm)	Limit (dBm)
802.11b	Low	2412	22.41	30
	Middle	2437	22.37	30
	High	2462	22.81	30
802.11g	Low	2412	26.49	30
	Middle	2437	27.23	30
	High	2462	25.82	30

FCC §15.247(d)– 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE**Applicable Standard**

According to FCC§15.247(d):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	2016-12-08	2017-12-08
Unknown	Coaxial Cable	0.1m	C-1	Each Time	/

* **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**

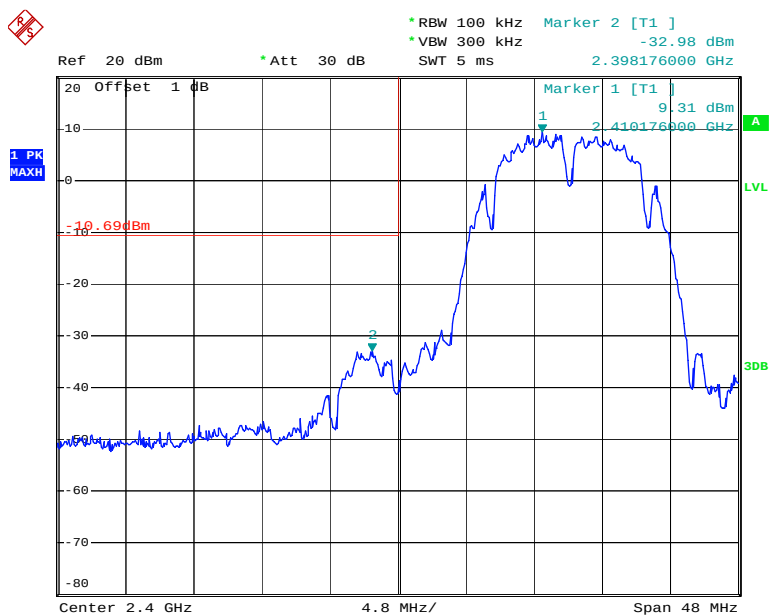
Temperature:	24.9 °C
Relative Humidity:	54 %
ATM Pressure:	100.2 kPa

The testing was performed by Roger lu on 2017-08-25.

Test mode: Transmitting

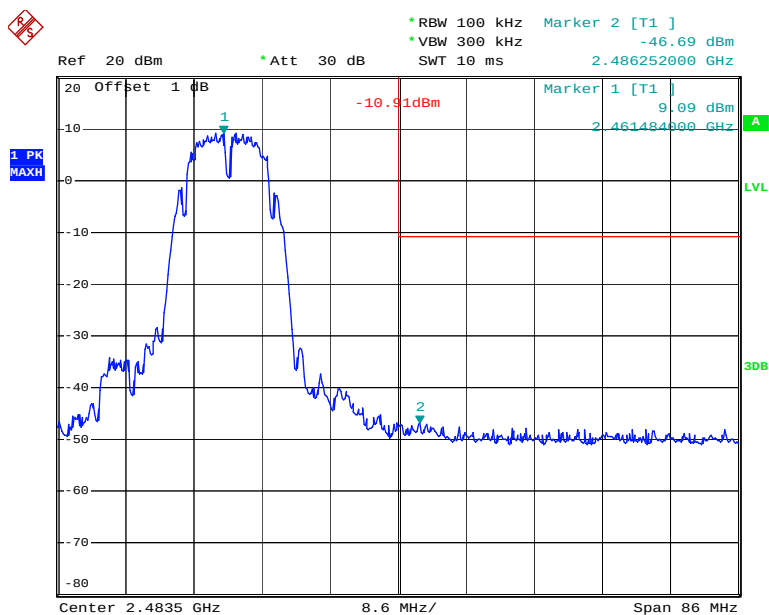
Test Result: Compliant. Please refer to following plots.

802.11b: Band Edge, Left Side



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802.11b: Band Edge, Right Side



Date: 25.AUG.2017 09:11:27

Ref 20 dBm Att 30 dB RBW 100 kHz VBW 300 kHz SWT 5 ms

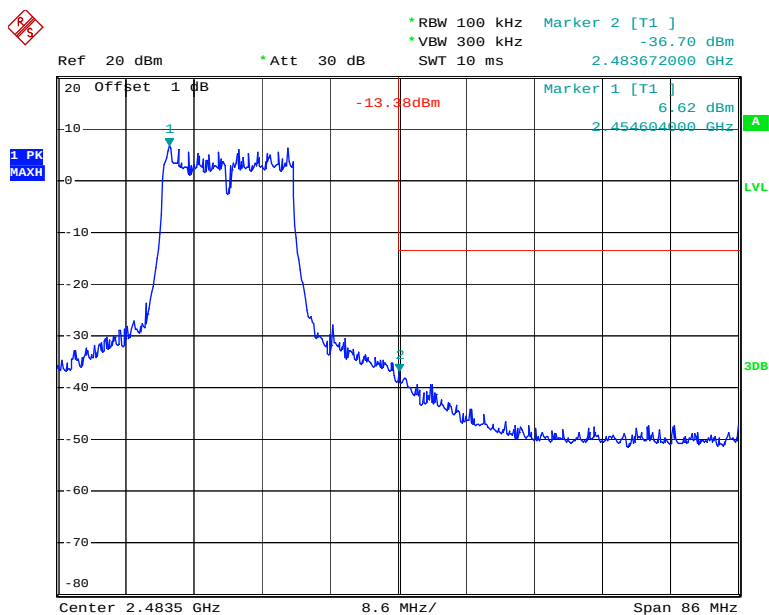
Marker 2 [T1] 2.399904000 GHz -25.97 dBm

Marker 1 [T1] 2.404608000 GHz 7.37 dBm

1 PK MAXH

Center 2.4 GHz 4.8 MHz/ Span 48 MHz

802.11g: Band Edge, Right Side



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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

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 was set 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 the RBW = 3 kHz, VBW = 10 kHz, Set the span to 1.5 times the DTS bandwidth.
4. Use the peak marker function to determine the maximum amplitude level.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2016-12-08	2017-12-08
Unknown	Coaxial Cable	0.1m	C-1	Each Time	/

* **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:	24.9 °C
Relative Humidity:	54 %
ATM Pressure:	100.2 kPa

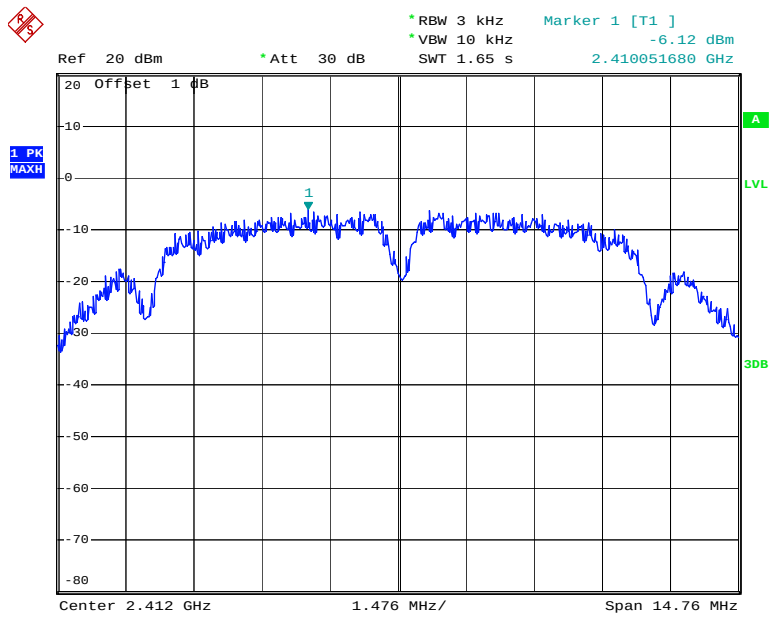
The testing was performed by Roger lu on 2017-08-25.

Test Result: Compliance*Test Mode: Transmitting*

Test mode	Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
802.11b	Low	2412	-6.12	≤ 8
	Middle	2437	-6.42	≤ 8
	High	2462	-5.88	≤ 8
802.11g	Low	2412	-9.89	≤ 8
	Middle	2437	-7.58	≤ 8
	High	2462	-9.66	≤ 8

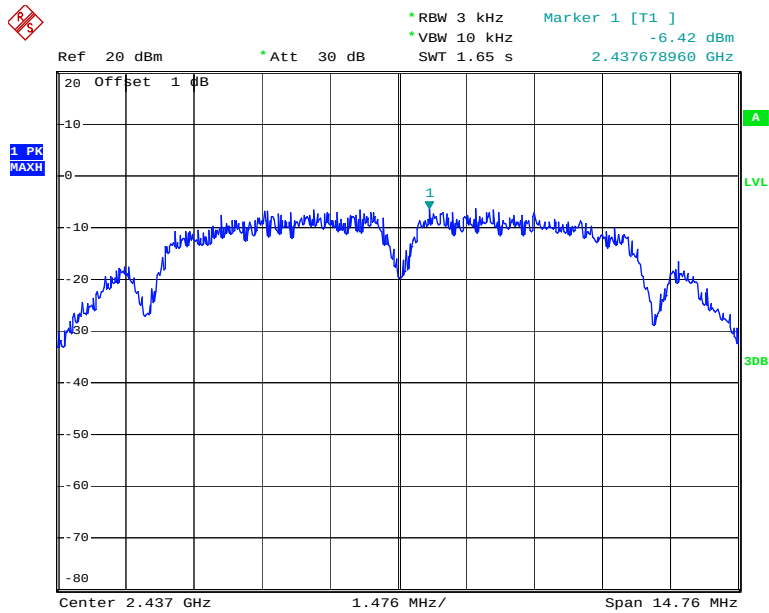
Please refer to the following plots

Power Spectral Density, 802.11b Low Channel



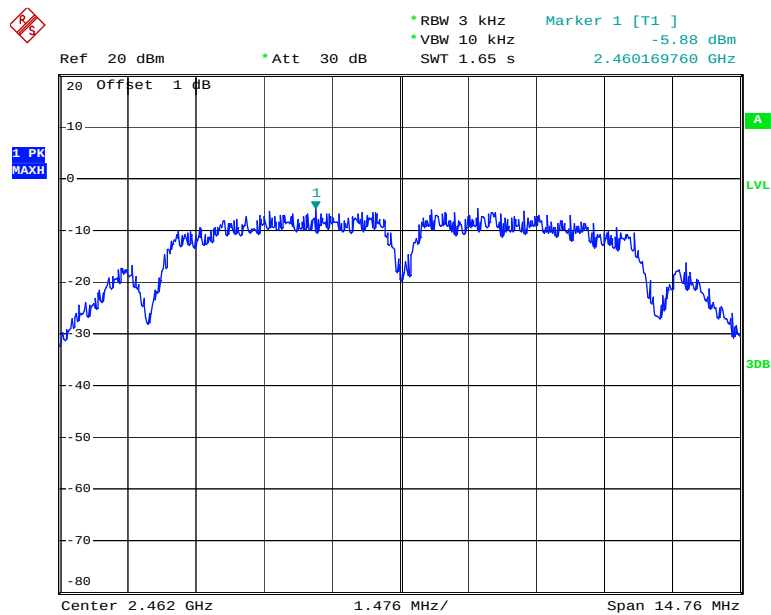
Date: 25.AUG.2017 08:59:40

Power Spectral Density, 802.11b Middle Channel



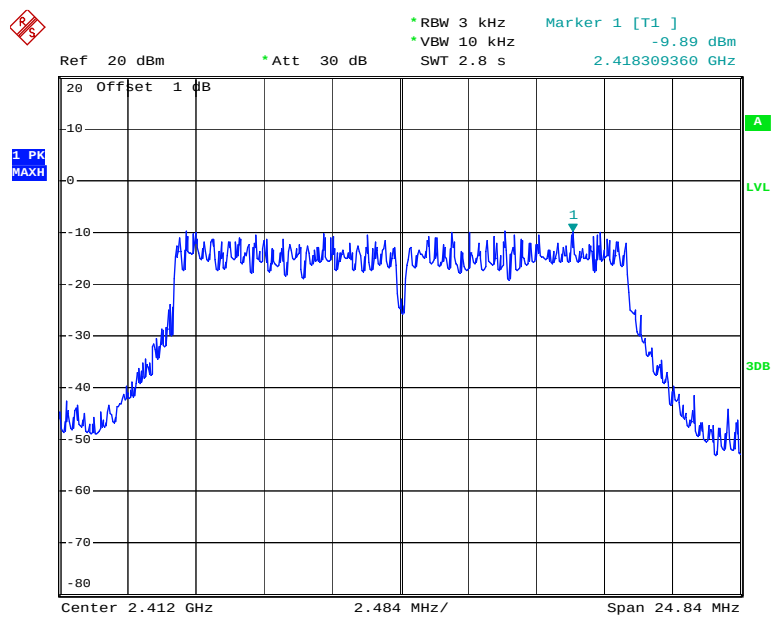
Date: 25.AUG.2017 09:03:39

Power Spectral Density, 802.11b High Channel



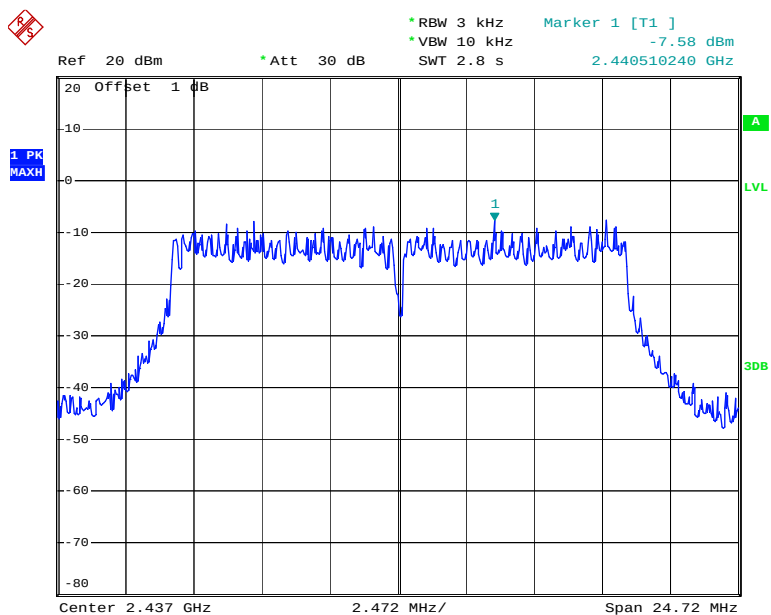
Date: 25.AUG.2017 09:11:08

Power Spectral Density, 802.11g Low Channel



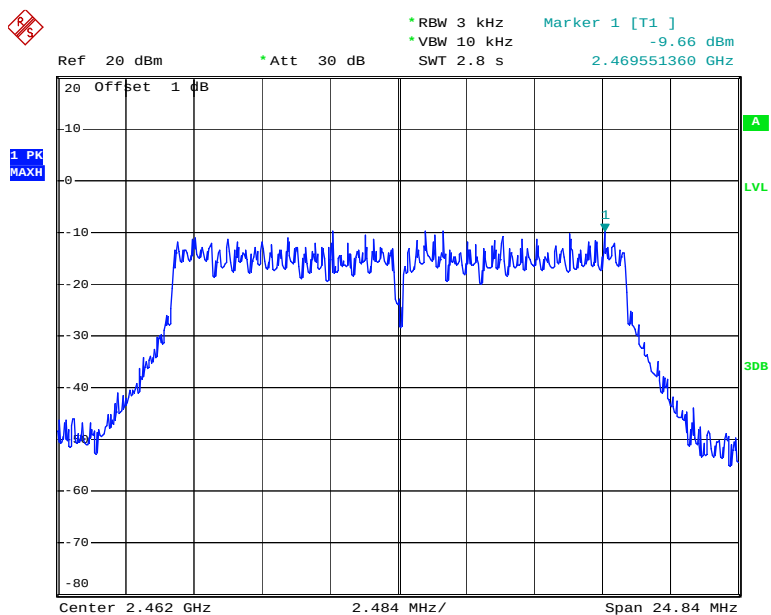
Date: 25.AUG.2017 09:16:33

Power Spectral Density, 802.11g Middle Channel



Date: 25.AUG.2017 09:19:30

Power Spectral Density, 802.11g High Channel



Date: 25.AUG.2017 09:14:27

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