FCC PART 15.247

TEST REPORT

For

Alinket Electronic Technology (Shanghai) Co., Ltd.

Room 403, No. 10, Lane 198, Zhangheng Road, Pudong, Shanghai, China

FCC ID: 2AELJ-ALXC1X

Report Type:	**Product Type:**
Original Report	Alinket wireless controller

Test Engineer:	Matt Yao
Report Number:	RKS150925001-00A
Report Date:	2015-10-28
Reviewed By:	Jesse Huang EMC Manager
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The Alinket Electronic Technology (Shanghai) Co., Ltd.'s product, model number: ALXC11B (FCC ID: 2AELJ-ALXC1X) or the "EUT" in this report was a Alinket wireless controller, which was measured approximately: 32 mm (L) x16 mm (W) x 3 mm (H), rated input voltage: DC 3.3 V.

** Note: The product's series model number: ALXC1X. ALXC1X and ALXC11B are the same products, and just have the different model name.*

**All measurement and test data in this report was gathered from production sample serial number: 150925001 (Assigned by the BACL. The EUT supplied by the applicant was received on 2015-09-25)*

Objective

This report is prepared on behalf of Alinket Electronic Technology (Shanghai) Co., Ltd.in accordance with Part 2-Subpart J, Part 15-Subparts A, B and C of the Federal Communication Commissions rules.

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

Related Submittal(s)/Grant(s)

N/A

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices and FCC KDB558074 D01 DTS Meas Guidance v03r03.

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

Measurement uncertainty with RF radiated emission is 5.91 dB for 30MHz-1GHz.and 4.92 dB for above 1GHz, 1.95dB for conducted measurement.

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the Chenghu Lake Road, Kunshan Development Zone No.248,Kunshan, Jiangsu, China

Test site at Bay Area Compliance Laboratories Corp. (Kunshan) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 06, 2014. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 815570. 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

For 802.11b, 802.11g and 802.11n-HT20 mode, 11 channels are provided to testing:

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

For 802.11b, 802.11g, 802.11n-HT20 mode, EUT was tested with Channel 1, 6 and 11.

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

RF test tool built-in the EUT.

The worst case was performed under:
802.11b: Data rate:1 Mbps, Power level: 15
802.11g: Data rate: 6 Mbps, Power level: 12
802.11n-HT20: Data rate: MCS0, Power level: 12

Support Equipment List and Details

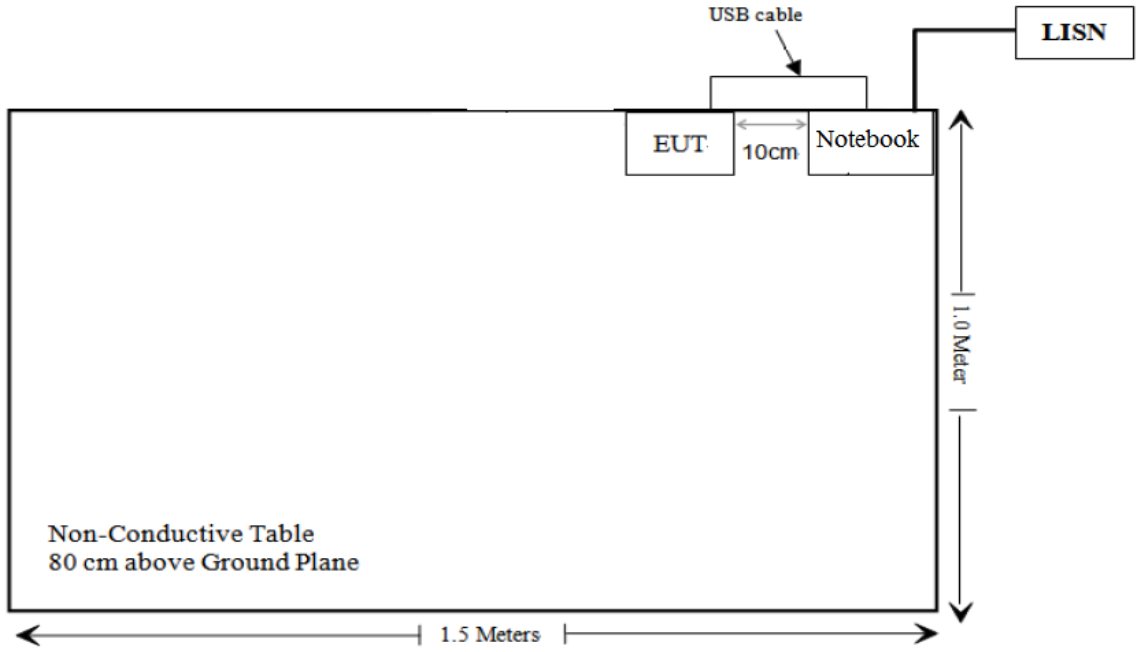
Manufacturer	Description	Model	Serial Number
Lenovo	Notebook	T400	N/A

External I/O Cable

Cable Description	Length (m)	From Port	To
USB Cable	0.9	EUT	PC

Block Diagram of Test Setup

For conducted emission



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307 (b) (1)& §2.1091	RF Exposure	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), §1.1310& §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.

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^2);
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:

Mode	Frequency (MHz)	Antenna Gain		Target Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
802.11b	2412	2	1.585	16.50	44.67	20	0.014	1.0
802.11g	2412	2	1.585	15.50	35.48	20	0.011	1.0
802.11n HT20	2412	2	1.585	14.50	28.18	20	0.009	1.0

Note: The target output power: 802.11b:16 ±0.5dBm,
802.11g:15±0.5dBm,
802.11n:14±0.5dBm
Please refer to the Technical Specification, which declared by the Manufacturer.

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.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.
And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has a Dipole antenna and a PCB antenna arrangement for wifi, which the antenna gain are 2 dBi and 0 dBi, 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

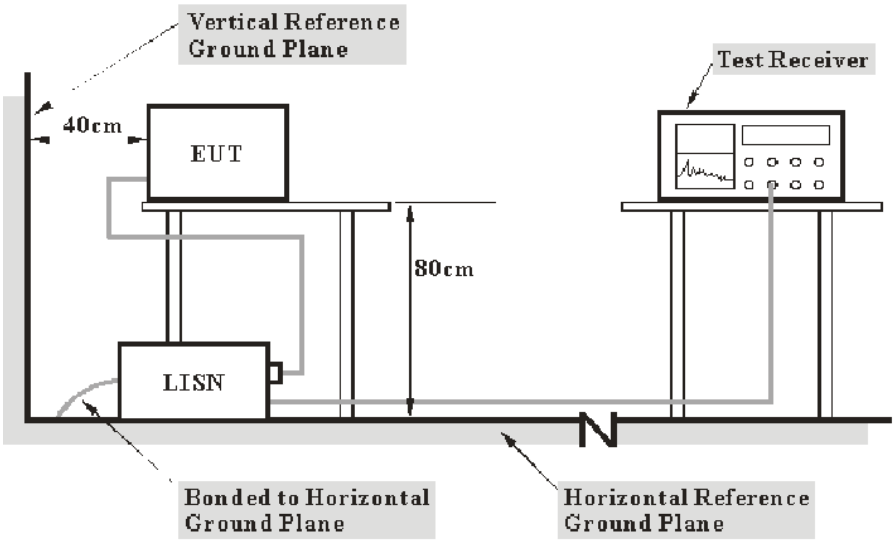
Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between LISN and receiver, LISN voltage division factor, LISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Kunshan) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report.

Port	Expanded Measurement uncertainty
AC Mains	3.26 dB (k=2, 95% level of confidence)
CAT 3	3.70 dB (k=2, 95% level of confidence)
CAT 5	3.86 dB (k=2, 95% level of confidence)
CAT 6	4.64 dB (k=2, 95% level of confidence)

EUT Setup



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

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The adapter 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 was connected to the outlet of the LISN.

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

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	934115/007	2014-11-4	2015-11-3
Rohde & Schwarz	LISN	ESH3-Z5	862770/011	2014-11-4	2015-11-3
Rohde & Schwarz	LISN	ESH3-Z5	892239/018	2015-6-23	2016-6-22
Rohde & Schwarz	Pulse limiter	ESH3-Z2	879940/0058	2015-6-19	2016-6-18
HP	Current probe	8710-1744	636	2015-6-19	2016-6-18
FCC	ISN	FCC-TLISN-T8-02	20376	2015-6-23	2016-6-22
Rohde & Schwarz	CE Test software	EMC 32	V 09.10.0	--	--

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

Corrected Factor & Margin Calculation

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

Correction Factor = LISN VDF + Cable Loss

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Results Summary

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

11.34 dB at **0.175000MHz** in the **Line** conducted mode

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

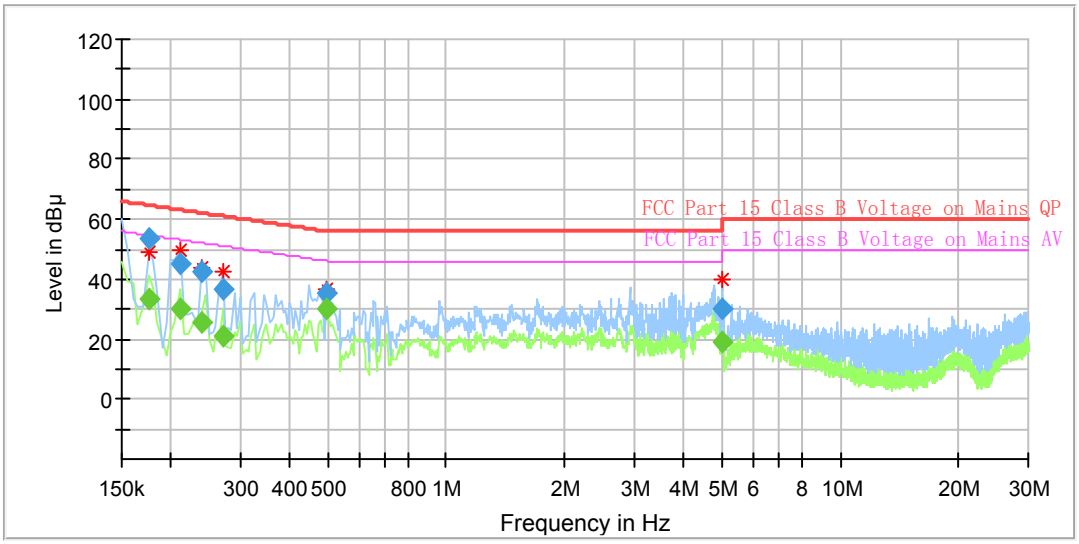
Environmental Conditions

Temperature:	23 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Matt Yao on 2015-10-21.

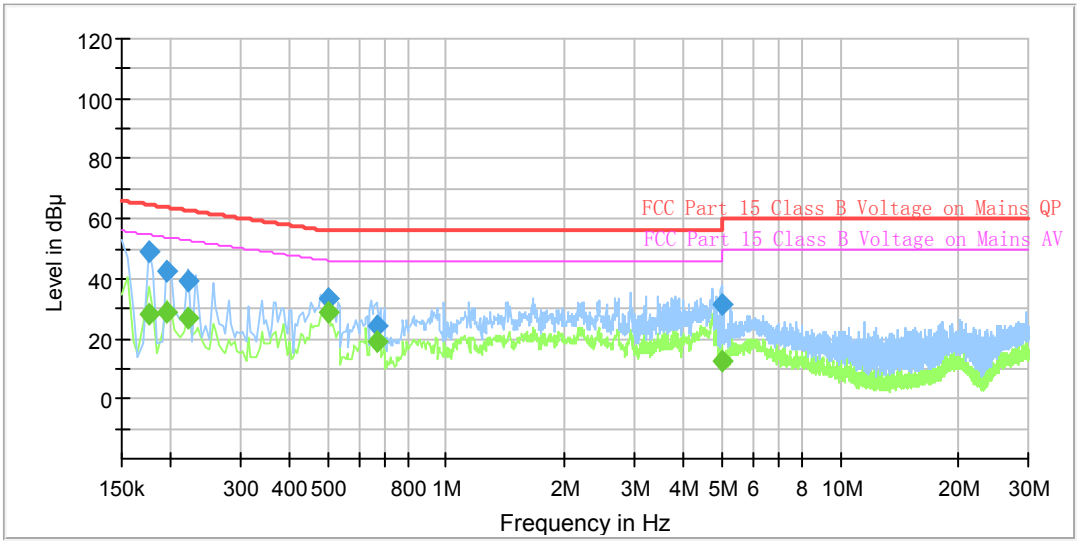
EUT operation mode: Transmitting

AC 120V/60 Hz, Line



Frequency (MHz)	QuasiPeak (dBµV)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.175000	---	33.08	9.000	L1	11.0	21.64	54.72	Compliance
0.175000	53.38	---	9.000	L1	11.0	11.34	64.72	Compliance
0.210000	---	30.08	9.000	L1	11.0	23.13	53.21	Compliance
0.210000	45.22	---	9.000	L1	11.0	17.99	63.21	Compliance
0.240000	---	25.65	9.000	L1	11.0	26.45	52.10	Compliance
0.240000	42.43	---	9.000	L1	11.0	19.67	62.10	Compliance
0.270000	---	21.23	9.000	L1	11.0	29.89	51.12	Compliance
0.270000	36.65	---	9.000	L1	11.0	24.47	61.12	Compliance
0.495000	---	30.26	9.000	L1	11.0	15.82	46.08	Compliance
0.495000	35.12	---	9.000	L1	11.0	20.96	56.08	Compliance
5.010000	---	19.25	9.000	L1	11.3	30.75	50.00	Compliance
5.010000	30.26	---	9.000	L1	11.3	29.74	60.00	Compliance

AC 120V/60 Hz, Neutral



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.175000	---	28.30	9.000	N	11.0	26.42	54.72	Compliance
0.175000	48.79	---	9.000	N	11.0	15.93	64.72	Compliance
0.195000	---	28.53	9.000	N	11.0	25.29	53.82	Compliance
0.195000	42.45	---	9.000	N	11.0	21.37	63.82	Compliance
0.220000	---	26.69	9.000	N	11.0	26.13	52.82	Compliance
0.220000	38.94	---	9.000	N	11.0	23.88	62.82	Compliance
0.500000	---	28.96	9.000	N	11.0	17.04	46.00	Compliance
0.500000	33.72	---	9.000	N	11.0	22.28	56.00	Compliance
0.665000	---	18.77	9.000	N	11.1	27.23	46.00	Compliance
0.665000	24.41	---	9.000	N	11.1	31.59	56.00	Compliance
4.990000	---	12.70	9.000	N	11.4	33.30	46.00	Compliance
4.990000	31.38	---	9.000	N	11.4	24.62	56.00	Compliance

Note:
1) Corr.=LISN VDF (Voltage Division Factor) + Cable Loss
2) Corrected Amplitude = Reading + Corr.
3) Margin = Limit –Corrected Amplitude

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

Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

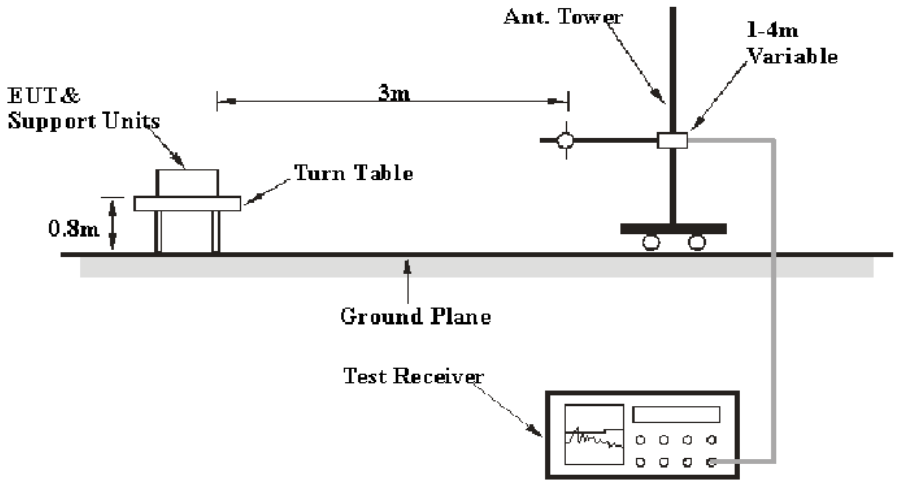
Measurement Uncertainty

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

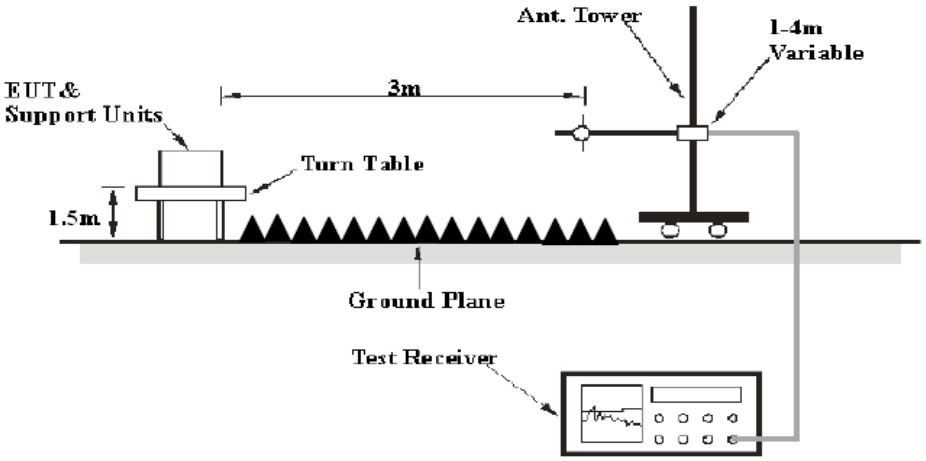
Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Kunshan) is 5.91 dB for 30MHz-1GHz and 4.92 dB for above 1GHz, 1.95dB for conducted measurement at antenna port. And the uncertainty will not be taken into consideration for the test data recorded in the report

EUT Setup

Below 1 GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters 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 adapter 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	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

Test Procedure

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

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sonoma Instrunent	Amplifier	330	171377	2015-9-16	2016-9-16
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2015-5-20	2016-5-19
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2014-11-7	2015-11-6
ETS	Horn Antenna	3115	6229	2014-11-7	2015-11-6
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2014-11-4	2015-11-3
Mini	Pre-amplifier	ZVA-183-S+	857001418	2015-9-16	2016-9-16
R&S	Auto test Software	EMC32	V 09.10.0	-	-
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-06-16	2015-12-15

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

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:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - 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:

Margin = Limit – Corrected Amplitude

Test Results Summary

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

1.83 dB at **240 MHz** in the **Horizontal** polarization
for 802.11b mode

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

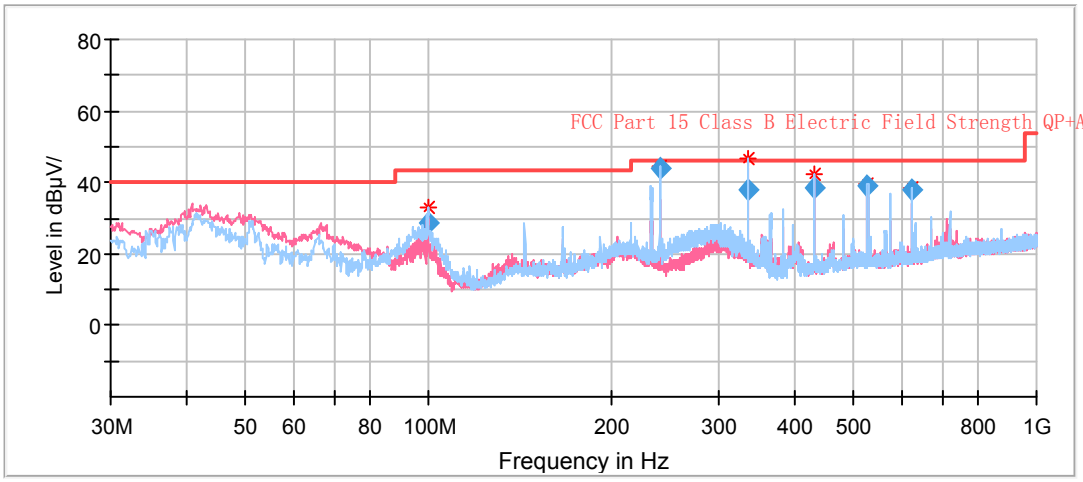
Temperature:	25 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Matt Yao on 2015-10-22.

EUT operation mode: Transmitting

30 MHz-1 GHz:

The worst case was performed under 802.11b mode



Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBµV/m)	FCC Part 15.247/205/209	
	Reading (dBµV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dB µ V/m)	Margin (dB)
99.840000	45.36	QP	9.0	199.0	H	-16.8	28.56	43.50	14.94
240.005000	56.07	QP	27.0	100.0	H	-11.9	44.17	46.00	1.83
335.913750	47.46	QP	60.0	199.0	H	-9.5	37.96	46.00	8.04
431.943750	46.06	QP	27.0	199.0	H	-7.4	38.66	46.00	7.34
527.973750	44.37	QP	359.0	100.0	H	-5.3	39.07	46.00	6.93
624.003750	42.49	QP	128.0	100.0	H	-4.3	38.19	46.00	7.81

1GHz-25GHz

For Dipole antenna

802.11b Mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dB μ V/m)	Margin (dB)
Low Channel (2412 MHz)									
2412	95.32	PK	233.00	150.00	V	2.90	98.22	/	/
2412	83.88	Ave	233.00	150.00	V	2.90	86.78	/	/
2412	94.43	PK	152.00	150.00	H	2.90	97.33	/	/
2412	82.60	Ave	152.00	150.00	H	2.90	85.50	/	/
2359	37.27	PK	157.00	150.00	V	1.10	38.37	74	35.63
2359	22.03	Ave	157.00	150.00	V	1.10	23.13	54	30.87
2364	41.13	PK	156.00	200.00	V	1.80	42.93	74	31.07
2364	22.39	Ave	156.00	200.00	V	1.80	24.19	54	29.81
4824	36.56	PK	6.00	150.00	H	13.80	50.36	74	23.64
4824	24.78	Ave	6.00	150.00	H	13.80	38.58	54	15.42
6671	35.39	PK	67.00	200.00	V	17.20	52.59	74	21.41
6671	22.09	Ave	67.00	200.00	V	17.20	39.29	54	14.71
7236	35.79	PK	63.00	200.00	H	18.80	54.59	74	19.41
7236	23.79	Ave	63.00	200.00	H	18.80	42.59	54	11.41

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Middle Channel (2437 MHz)									
2437	95.05	PK	150.00	150.00	V	3.10	98.15	/	/
2437	83.22	Ave	150.00	150.00	V	3.10	86.32	/	/
2437	94.02	PK	90.00	200.00	H	3.10	97.12	/	/
2437	82.00	Ave	90.00	200.00	H	3.10	85.10	/	/
1489	41.90	PK	220.00	150.00	V	0.00	41.90	74	32.1
1489	24.01	Ave	220.00	150.00	V	0.00	24.01	54	29.99
1597	43.15	PK	110.00	200.00	H	0.70	43.85	74	30.15
1597	29.25	Ave	110.00	200.00	H	0.70	29.95	54	24.05
4874	43.78	PK	30.00	150.00	V	13.90	57.68	74	16.32
4874	32.58	Ave	30.00	150.00	V	13.90	46.48	54	7.52
6647	34.34	PK	340.00	200.00	H	18.80	53.14	74	20.86
6647	20.84	Ave	340.00	200.00	H	18.80	39.64	54	14.36
7311	33.55	PK	224.00	150.00	H	18.90	52.45	74	21.55
7311	20.44	Ave	224.00	150.00	H	18.90	39.34	54	13.81

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2462 MHz)									
2462	94.82	PK	112.00	200.00	V	3.10	97.92	/	/
2462	82.34	Ave	112.00	200.00	V	3.10	85.44	/	/
2462	94.06	PK	80.00	100.00	H	3.10	97.16	/	/
2462	81.77	Ave	80.00	100.00	H	3.10	84.87	/	/
2495	54.02	PK	140.00	200.00	V	4.20	58.22	74	15.78
2495	43.25	Ave	140.00	200.00	V	4.20	47.45	54	6.55
2599	41.66	PK	356.00	200.00	V	4.20	45.86	74	28.14
2599	26.66	Ave	356.00	200.00	V	4.20	30.86	54	23.14
4924	47.09	PK	55.00	200.00	H	14.00	61.09	74	12.91
4924	34.81	Ave	55.00	200.00	H	14.00	48.81	54	5.19
6622	34.15	PK	11.00	100.00	H	18.70	52.85	74	21.15
6622	20.87	Ave	11.00	100.00	H	18.70	39.57	54	14.43
7386	33.07	PK	294.00	200.00	H	19.80	52.87	74	21.13
7386	19.99	Ave	294.00	200.00	H	19.80	39.79	54	14.21

802.11g Mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2412 MHz)									
2412	93.35	PK	90.0	150.00	V	2.90	96.25	/	/
2412	81.92	Ave	90.0	150.00	V	2.90	84.82	/	/
2412	92.47	PK	36.0	200.00	H	2.90	95.37	/	/
2412	80.66	Ave	36.0	200.00	H	2.90	83.56	/	/
2342	35.20	PK	182.0	200.00	V	1.10	37.00	74	37
2342	20.11	Ave	182.0	200.00	V	1.10	21.91	54	32.09
2379	38.51	PK	46.0	150.00	H	1.80	41.51	74	32.49
2379	19.96	Ave	46.0	150.00	H	1.80	22.96	54	31.04
4824	37.27	PK	30.0	200.00	H	13.80	48.87	74	25.13
4824	25.60	Ave	30.0	200.00	H	13.80	37.20	54	16.8
6652	35.97	PK	280.0	150.00	V	17.20	51.07	74	22.93
6652	22.81	Ave	280.0	150.00	V	17.20	37.91	54	16.09
7236	35.85	PK	164.0	200.00	H	18.80	53.05	74	20.95
7236	23.97	Ave	164.0	200.00	H	18.80	41.17	54	12.83

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Middle Channel (2437 MHz)									
2437	93.18	PK	120.0	200.00	V	3.10	96.18	/	/
2437	81.37	Ave	120.0	200.00	V	3.10	84.37	/	/
2437	92.16	PK	60.0	150.0	H	3.10	95.16	/	/
2437	80.16	Ave	60.0	150.0	H	3.10	83.16	/	/
1489	38.79	PK	190.0	200.0	V	0.00	40.49	74	33.51
1489	21.08	Ave	190.0	200.0	V	0.00	22.78	54	31.22
1597	39.52	PK	80.0	150.0	H	0.70	42.42	74	31.58
1597	25.76	Ave	80.0	150.0	H	0.70	28.66	54	25.34
4874	44.41	PK	0.0	200.0	V	13.90	56.11	74	17.89
4874	33.33	Ave	0.0	200.0	V	13.90	45.03	54	8.97
6647	36.12	PK	310.0	150.0	H	18.80	51.62	74	22.38
6647	22.75	Ave	310.0	150.0	H	18.80	38.25	54	15.75
7311	33.64	PK	194.0	200.00	H	18.90	50.94	74	23.06
7311	20.66	Ave	194.0	200.00	H	18.90	37.96	54	16.04

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2462 MHz)									
2462	92.85	PK	96.0	200.0	V	3.10	95.95	/	/
2462	80.40	Ave	96.0	200.0	V	3.10	83.50	/	/
2462	92.10	PK	36.0	150.0	H	3.10	95.20	/	/
2462	79.83	Ave	36.0	150.0	H	3.10	82.93	/	/
2515	54.85	PK	166.0	150.0	V	4.20	56.65	74	17.35
2515	44.19	Ave	166.0	150.0	V	4.20	45.99	54	8.01
2620	41.41	PK	60.0	150.0	H	4.20	44.41	74	29.59
2620	26.56	Ave	60.0	150.0	H	4.20	29.56	54	24.44
4924	49.49	PK	20.0	200.0	V	14.00	59.49	74	14.51
4924	37.33	Ave	20.0	200.0	V	14.00	47.33	54	6.67
6622	35.73	PK	286.0	200.00	H	18.70	51.33	74	22.67
6622	22.58	Ave	286.0	200.00	H	18.70	38.18	54	15.82
7386	33.95	PK	170.0	200.0	V	19.80	51.35	74	22.65
7386	21.00	Ave	170.0	200.0	V	19.80	38.40	54	15.6

802.11n-HT20 Mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2412 MHz)									
2412	92.85	PK	120.0	150.0	V	2.90	95.75	/	/
2412	81.43	Ave	120.0	150.0	V	2.90	84.33	/	/
2412	91.97	PK	66.0	200.00	H	2.90	94.87	/	/
2412	80.16	Ave	66.0	200.00	H	2.90	83.06	/	/
2259	35.40	PK	212.0	150.00	V	1.10	36.50	74	37.5
2259	20.31	Ave	212.0	150.00	V	1.10	21.41	54	32.59
2366	39.22	PK	76.0	150.00	V	1.80	41.02	74	32.98
2366	20.66	Ave	76.0	150.00	V	1.80	22.46	54	31.54
4824	34.57	PK	0.0	200.00	H	13.80	48.37	74	25.63
4824	22.91	Ave	0.0	200.00	H	13.80	36.71	54	17.29
5875	33.38	PK	310.0	150.0	V	17.20	50.58	74	23.42
5875	20.21	Ave	310.0	150.0	V	17.20	37.41	54	16.59
7236	33.76	PK	194.0	200.00	H	18.80	52.56	74	21.44
7236	21.88	Ave	194.0	200.00	H	18.80	40.68	54	13.32

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Middle Channel (2437 MHz)									
2437	92.58	PK	150.0	200.00	V	3.10	95.68	/	/
2437	80.77	Ave	150.0	200.00	V	3.10	83.87	/	/
2437	91.56	PK	90.0	150.0	H	3.10	94.66	/	/
2437	79.56	Ave	90.0	150.0	H	3.10	82.66	/	/
1527	40.00	PK	220.0	200.0	V	0.00	40.00	74	34
1527	22.28	Ave	220.0	200.0	V	0.00	22.28	54	31.72
2210	41.23	PK	110.0	200.00	H	0.70	41.93	74	32.07
2210	27.47	Ave	110.0	200.00	H	0.70	28.17	54	25.83
4874	41.72	PK	30.0	200.0	V	13.90	55.62	74	18.38
4874	30.63	Ave	30.0	200.0	V	13.90	44.53	54	9.47
6010	32.32	PK	340.0	150.0	H	18.80	51.12	74	22.88
6010	18.96	Ave	340.0	150.0	H	18.80	37.76	54	16.24
7311	31.54	PK	224.0	150.0	H	18.90	50.44	74	23.56
7311	18.56	Ave	224.0	150.0	H	18.90	37.46	54	16.54

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2462 MHz)									
2462	92.12	PK	220	150	V	3.1	95.22	/	/
2462	80.02	Ave	220	150	V	3.1	83.12	/	/
2462	90.92	PK	102	150	H	3.1	94.02	/	/
2462	79.04	Ave	102	150	H	3.1	82.14	/	/
2485	41.12	PK	147	150	V	4.2	45.32	74	28.68
2485	17.16	Ave	147	150	H	4.2	21.36	54	32.64
2490	36.35	PK	54	150	V	4.2	40.55	74	33.45
2490	15.97	Ave	54	150	H	4.2	20.17	54	33.83
4924	31.66	PK	360	150	V	18.7	50.36	74	23.64
4924	16.44	Ave	360	150	H	18.7	35.14	54	18.86
6650	42.74	PK	242	200	V	14	56.74	74	17.26
6650	26.55	Ave	242	200	H	14	40.55	54	13.45
7386	36.18	PK	85	200	V	19.8	55.98	74	18.02
7386	18.34	Ave	85	200	H	19.8	38.14	54	15.86

1GHz-25GHz

For PCB antenna

802.11b Mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dB μ V/m)	Margin (dB)
Low Channel (2412 MHz)									
2412	94.22	PK	158	150	V	2.9	97.12	/	/
2412	82.21	Ave	158	150	V	2.9	85.11	/	/
2412	92.35	PK	126	150	H	2.9	95.25	/	/
2412	82.12	Ave	126	150	H	2.9	85.02	/	/
2363	35.48	PK	200	150	V	1.1	36.58	74	37.42
2363	21.04	Ave	200	150	V	1.1	22.14	54	31.86
2374	39.89	PK	123	150	V	1.8	41.69	74	32.31
2374	20.59	Ave	123	150	V	1.8	22.39	54	31.61
4824	34.86	PK	74	150	V	13.8	48.66	74	25.34
4824	23.41	Ave	74	150	V	13.8	37.21	54	16.79
6656	33.25	PK	115	200	V	17.2	50.45	74	23.55
6656	21.24	Ave	115	200	V	17.2	38.44	54	15.56
7236	33.23	PK	80	150	H	18.8	52.03	74	21.97
7236	23.16	Ave	80	150	H	18.8	41.96	54	12.04

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Middle Channel (2437 MHz)									
2437	94.15	PK	143	150	V	3.1	97.25	/	/
2437	82.56	Ave	143	150	V	3.1	85.66	/	/
2437	93.37	PK	47	200	H	3.1	96.47	/	/
2437	82.02	Ave	47	200	H	3.1	85.12	/	/
1490	38.55	PK	250	150	V	0	38.55	74	35.45
1490	23.36	Ave	250	150	V	0	23.36	54	30.64
1600	43.51	PK	90	200	V	0.7	44.21	74	29.79
1600	27.77	Ave	90	200	V	0.7	28.47	54	25.53
4874	42.43	PK	35	150	H	13.9	56.33	74	17.67
4874	31.97	Ave	35	150	H	13.9	45.87	54	8.13
6650	34.45	PK	312	200	V	18.8	53.25	74	20.75
6650	19.64	Ave	312	200	V	18.8	38.44	54	15.56
7311	33.12	PK	141	150	H	18.9	52.02	74	21.98
7311	19.57	Ave	141	150	H	18.9	38.47	54	15.53

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2462 MHz)									
2462	94.15	PK	130	150	V	3.1	97.25	/	/
2462	80.55	Ave	130	150	V	3.1	83.65	/	/
2462	92.15	PK	65	150	H	3.1	95.25	/	/
2462	80.31	Ave	65	150	H	3.1	83.41	/	/
2485	52.02	PK	141	150	V	4.2	56.22	74	17.78
2485	41.19	Ave	141	150	V	4.2	45.39	54	8.61
2587	39.81	PK	330	200	V	4.2	44.01	74	29.99
2587	25.91	Ave	330	200	V	4.2	30.11	54	23.89
4924	46.17	PK	14	200	H	14.0	60.17	74	13.83
4924	33.54	Ave	14	200	H	14.0	47.54	54	6.46
6630	31.53	PK	301	150	H	18.7	50.23	74	23.77
6630	19.75	Ave	301	150	H	18.7	38.45	54	15.55
7386	31.85	PK	284	200	H	19.8	51.65	74	22.35
7386	18.37	Ave	284	200	H	19.8	38.17	54	15.83

802.11g Mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2412 MHz)									
2412	92.34	PK	180	150	V	2.9	95.24	/	/
2412	81.31	Ave	180	150	V	2.9	84.21	/	/
2412	91.43	PK	50	200	H	2.9	94.33	/	/
2412	80.11	Ave	50	200	H	2.9	83.01	/	/
2350	34.11	PK	160	200	V	1.1	35.21	74	38.79
2350	19.59	Ave	160	200	V	1.1	20.69	54	33.31
2390	40.51	PK	70	150	H	1.8	42.31	74	31.69
2390	20.34	Ave	70	150	H	1.8	22.14	54	31.86
4824	34.41	PK	339	200	H	13.8	48.21	74	25.79
4824	21.89	Ave	339	200	H	13.8	35.69	54	18.31
6652	33.25	PK	254	150	V	17.2	50.45	74	23.55
6652	19.25	Ave	254	150	V	17.2	36.45	54	17.55
7236	33.34	PK	152	200	H	18.8	52.14	74	21.86
7236	21.56	Ave	152	200	H	18.8	40.36	54	13.64

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Middle Channel (2437 MHz)									
2437	92.34	PK	111	200	H	3.1	95.44	/	/
2437	80.55	Ave	111	200	H	3.1	83.65	/	/
2437	91.48	PK	312	150	H	3.1	94.58	/	/
2437	80.01	Ave	312	150	H	3.1	83.11	/	/
1490	39.45	PK	154	200	V	0	39.45	74	34.55
1490	22.12	Ave	154	200	V	0	22.12	54	31.88
1595	40.32	PK	88	150	H	0.7	41.02	74	32.98
1595	26.18	Ave	88	150	H	0.7	26.88	54	27.12
4874	41.42	PK	25	200	V	13.9	55.32	74	18.68
4874	31.42	Ave	25	200	V	13.9	45.32	54	8.68
6650	32.41	PK	214	150	H	18.8	51.21	74	22.79
6650	19.31	Ave	214	150	H	18.8	38.11	54	15.89
7311	32.46	PK	120	200	H	18.9	51.36	74	22.64
7311	17.65	Ave	120	200	H	18.9	36.55	54	17.45

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2462 MHz)									
2462	91.15	PK	120	200	V	3.1	94.25	/	/
2462	79.91	Ave	120	200	V	3.1	83.01	/	/
2462	91.11	PK	39	150	H	3.1	94.21	/	/
2462	78.26	Ave	39	150	H	3.1	81.36	/	/
2486	51.11	PK	156	150	V	4.2	55.31	74	18.69
2486	40.22	Ave	156	150	V	4.2	44.42	54	9.58
2600	39.15	PK	147	150	V	4.2	43.35	74	30.65
2600	34.25	Ave	147	150	V	4.2	38.45	54	15.55
4924	44.44	PK	35	200	V	14	58.44	74	15.56
4924	31.37	Ave	35	200	V	14	45.37	54	8.63
6630	31.41	PK	245	200	H	18.7	50.11	74	23.89
6630	17.57	Ave	245	200	H	18.7	36.27	54	17.73
7386	30.54	PK	248	200	V	19.8	50.34	74	23.66
7386	17.75	Ave	248	200	V	19.8	37.55	54	16.45

802.11n-HT20 Mode:

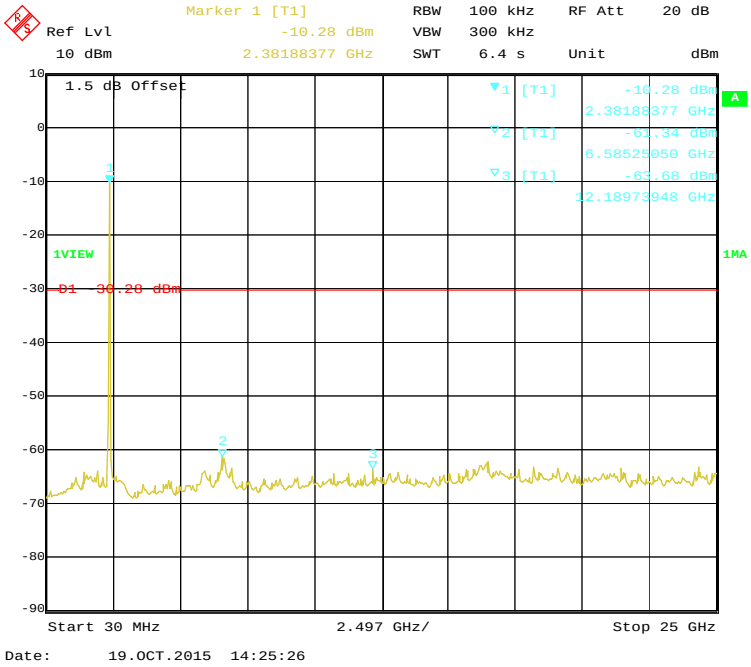
Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2412 MHz)									
2412	91.98	PK	110	150	V	2.9	94.88	/	/
2412	81.31	Ave	110	150	V	2.9	84.21	/	/
2412	90.51	PK	79	150	H	2.9	93.41	/	/
2412	79.79	Ave	79	150	H	2.9	82.69	/	/
2360	36.48	PK	250	150	V	1.1	37.58	74	36.42
2360	19.59	Ave	250	150	V	1.1	20.69	54	33.31
2389	38.53	PK	100	150	V	1.8	40.33	74	33.67
2389	20.16	Ave	100	150	V	1.8	21.96	54	32.04
4824	33.54	PK	69	200	H	13.8	47.34	74	26.66
4824	21.42	Ave	69	200	H	13.8	35.22	54	18.78
5875	32.65	PK	300	150	V	17.2	49.85	74	24.15
5875	19.05	Ave	300	150	V	17.2	36.25	54	17.75
7236	32.56	PK	214	200	H	18.8	51.36	74	22.64
7236	23.07	Ave	214	200	H	18.8	41.87	54	12.13

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Middle Channel (2437 MHz)									
2437	92.37	PK	114	150	V	3.1	95.47	/	/
2437	80.14	Ave	114	150	V	3.1	83.24	/	/
2437	90.04	PK	125	150	H	3.1	93.14	/	/
2437	79.22	Ave	125	150	H	3.1	82.32	/	/
1530	40.25	PK	200	200	V	0	40.25	74	33.75
1530	21.54	Ave	200	200	V	0	21.54	54	32.46
2215	39.66	PK	45	200	H	0.7	40.36	74	33.64
2215	28.41	Ave	45	200	H	0.7	29.11	54	24.89
4874	40.42	PK	58	200	V	13.9	54.32	74	19.68
4874	31.12	Ave	58	200	V	13.9	45.02	54	8.98
6010	31.34	PK	354	150	H	18.8	50.14	74	23.86
6010	18.31	Ave	354	150	H	18.8	37.11	54	16.89
7311	29.75	PK	212	150	H	18.9	48.65	74	25.35
7311	17.34	Ave	212	150	H	18.9	36.24	54	17.76

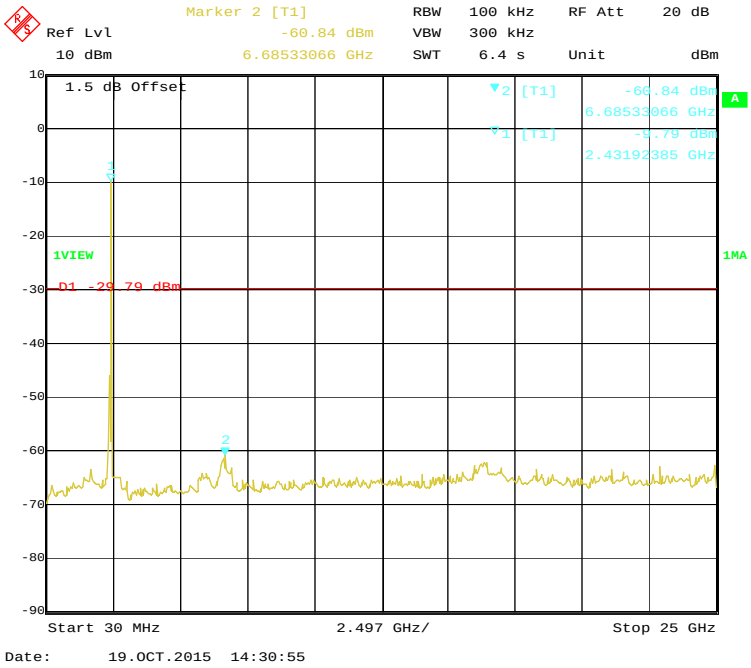
Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2462 MHz)									
2462	92.36	PK	126.0	200.0	V	3.10	95.46	/	/
2462	79.90	Ave	126.0	200.0	V	3.10	83.00	/	/
2462	91.60	PK	66.0	150.0	H	3.10	94.70	/	/
2462	79.34	Ave	66.0	150.0	H	3.10	82.44	/	/
2485	51.95	PK	196.0	150.0	V	4.20	56.15	74	17.85
2485	41.29	Ave	196.0	150.0	V	4.20	45.49	54	8.51
2492	39.72	PK	90.0	150.0	H	4.20	43.92	74	30.08
2492	24.87	Ave	90.0	150.0	H	4.20	29.07	54	24.93
4924	32.14	PK	316.0	150.0	H	18.70	50.84	74	23.16
4924	18.99	Ave	316.0	150.0	H	18.70	37.69	54	16.31
6230	44.99	PK	10.0	200.0	V	14.00	58.99	74	15.01
6230	32.84	Ave	10.0	200.0	V	14.00	46.84	54	7.16
7386	31.06	PK	200.0	200.0	V	19.80	50.86	74	23.14
7386	18.11	Ave	200.0	200.0	V	19.80	37.91	54	16.09

Conducted Spurious Emissions at Antenna Port

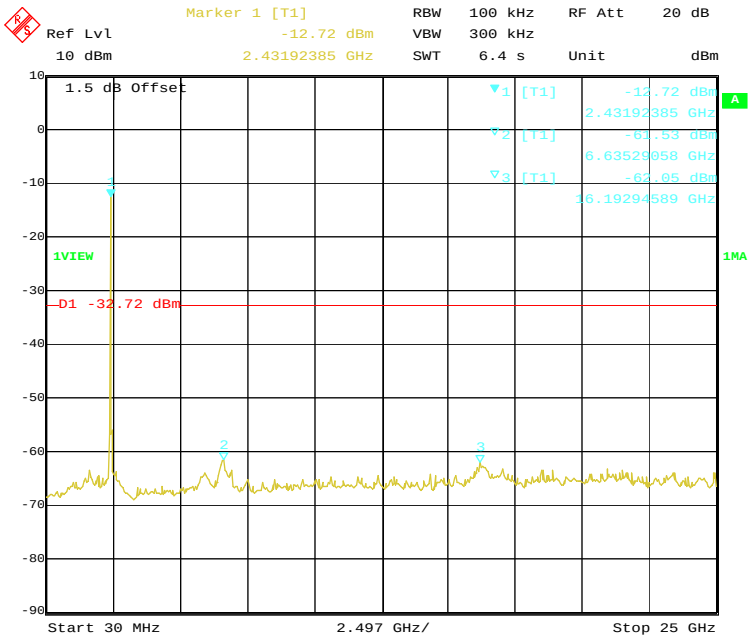
802.11b Low Channel



802.11b Middle Channel

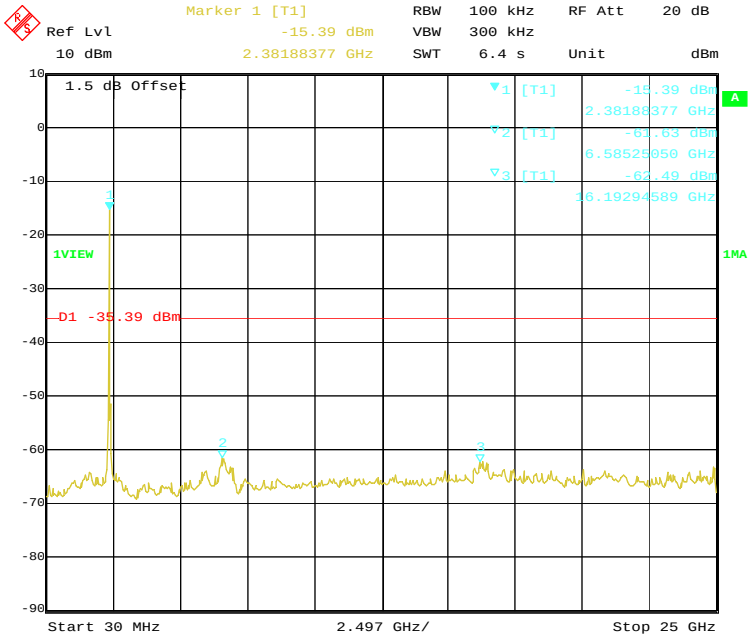


802.11b High Channel



Date: 19.OCT.2015 14:19:39

802.11g Low Channel



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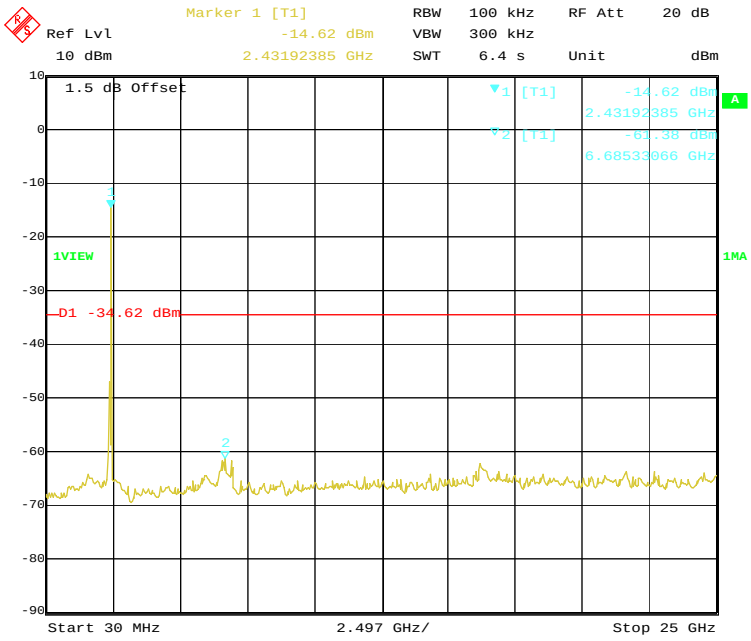
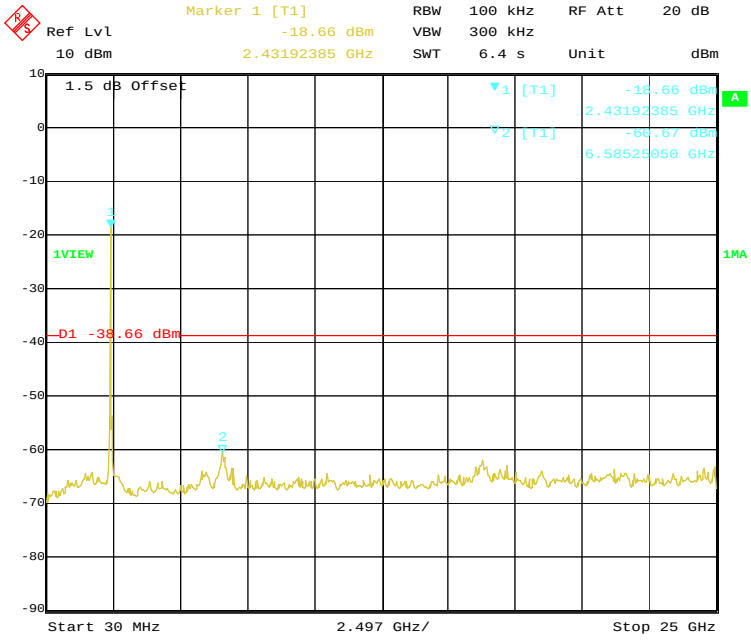
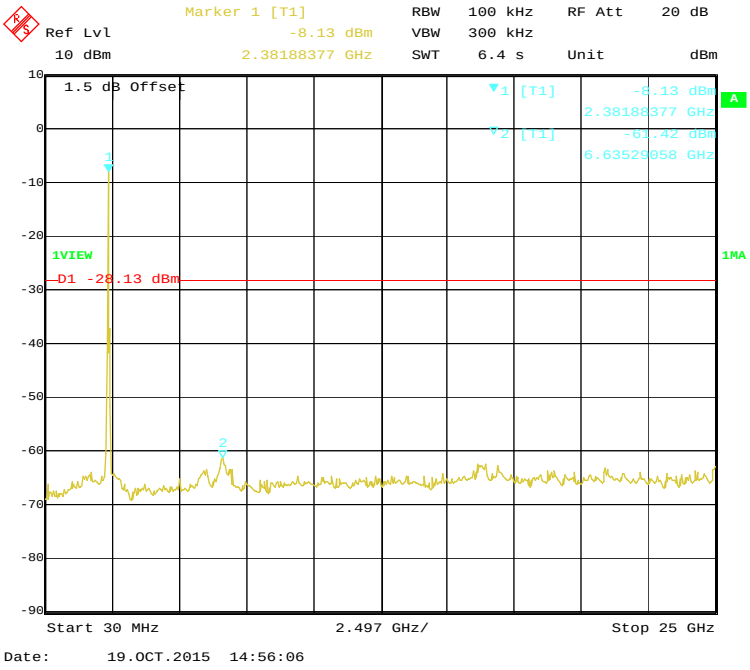
802.11g Middle Channel



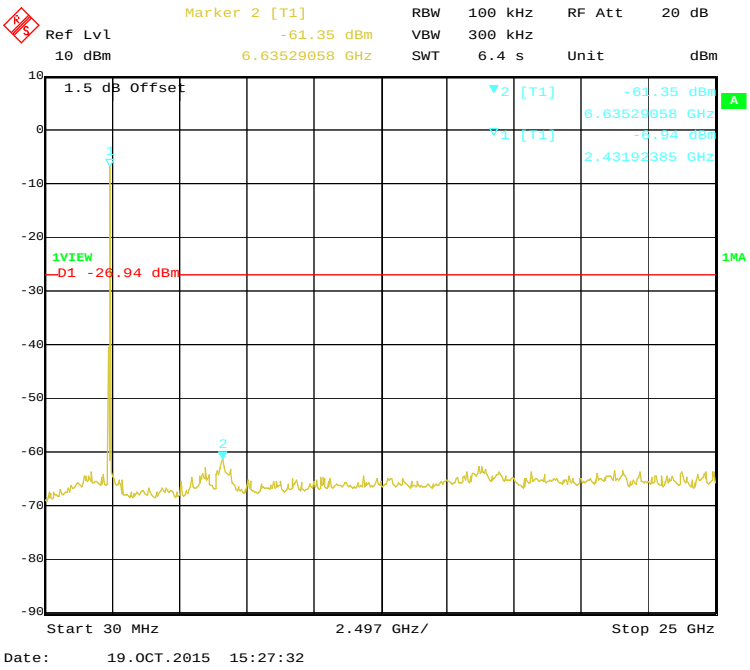
802.11g High Channel



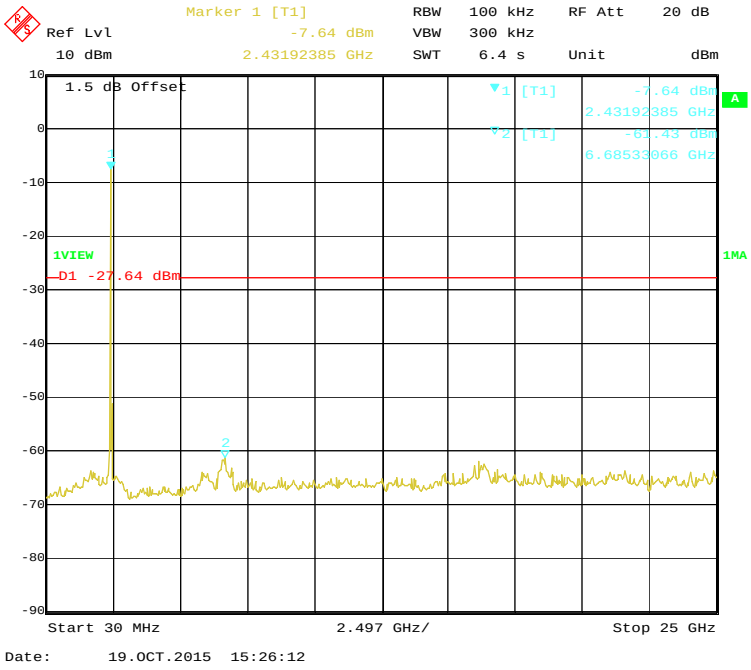
802.11n-HT20 Low Channel



802.11n-HT20 Middle Channel



802.11n-HT20 High Channel



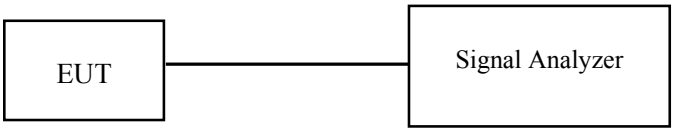
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

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

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2014-11-4	2015-11-3
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-06-16	2015-12-15

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

Test Data

Environmental Conditions

Temperature:	27 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Matt Yao on 2015-10-19.

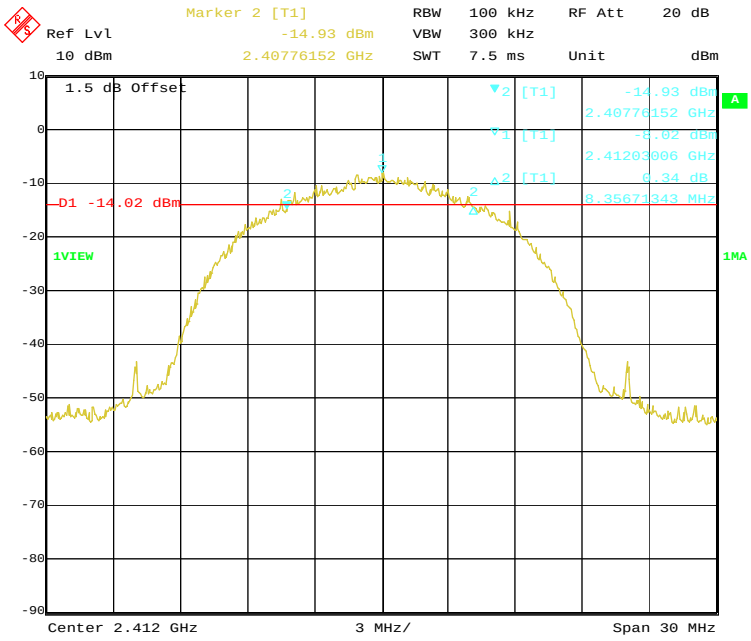
Test Result: Pass.

Please refer to the following tables and plots.

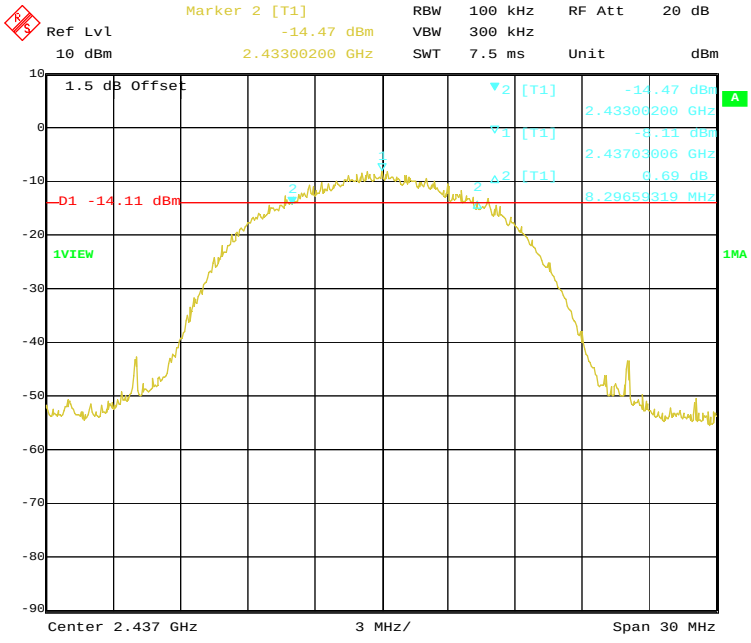
EUT operation mode: Transmitting

Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (kHz)
802.11b mode			
Low	2412	8.36	≥500
Middle	2437	8.30	≥500
High	2462	8.48	≥500
802.11g mode			
Low	2412	16.47	≥500
Middle	2437	16.47	≥500
High	2462	16.47	≥500
802.11n-HT20 mode			
Low	2412	17.74	≥500
Middle	2437	16.47	≥500
High	2462	17.37	≥500

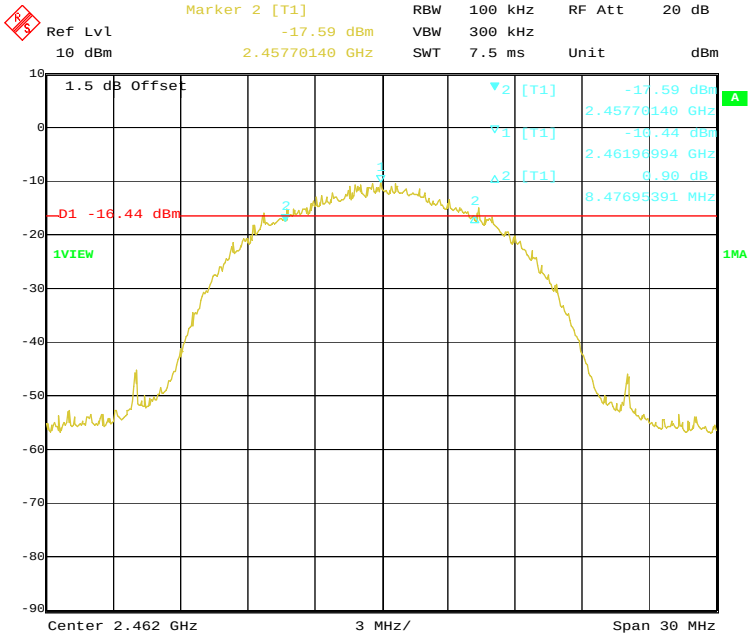
802.11b Low Channel



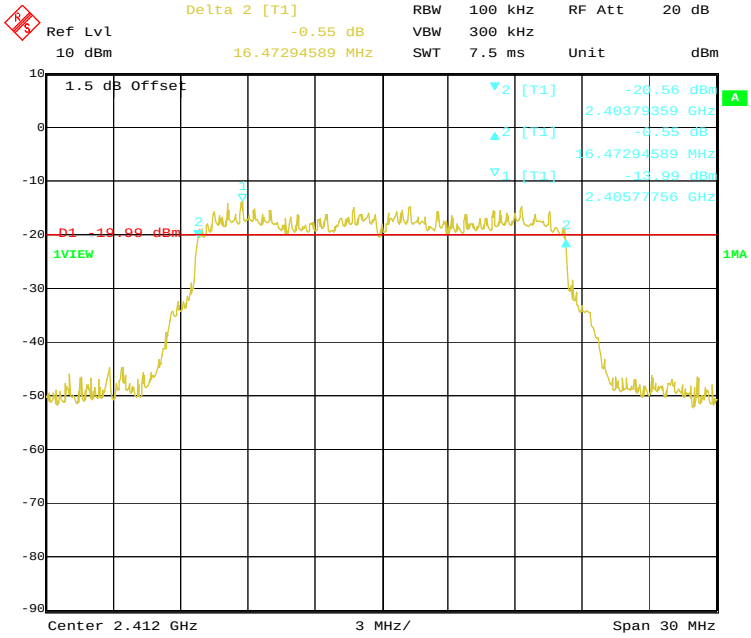
802.11b Middle Channel



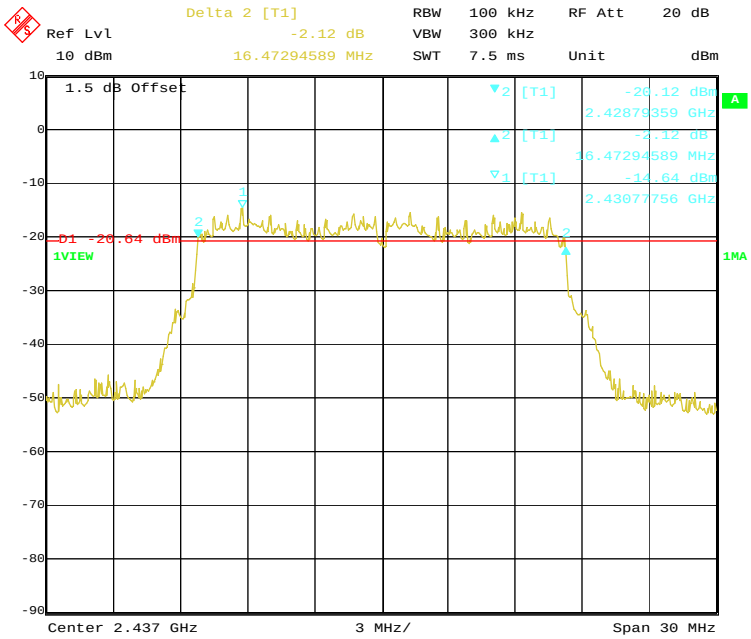
802.11b High Channel



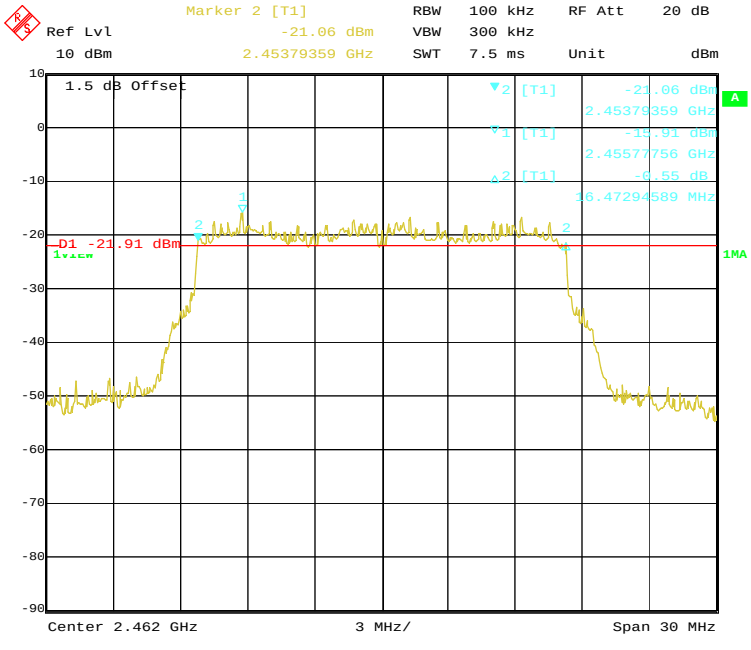
802.11g Low Channel



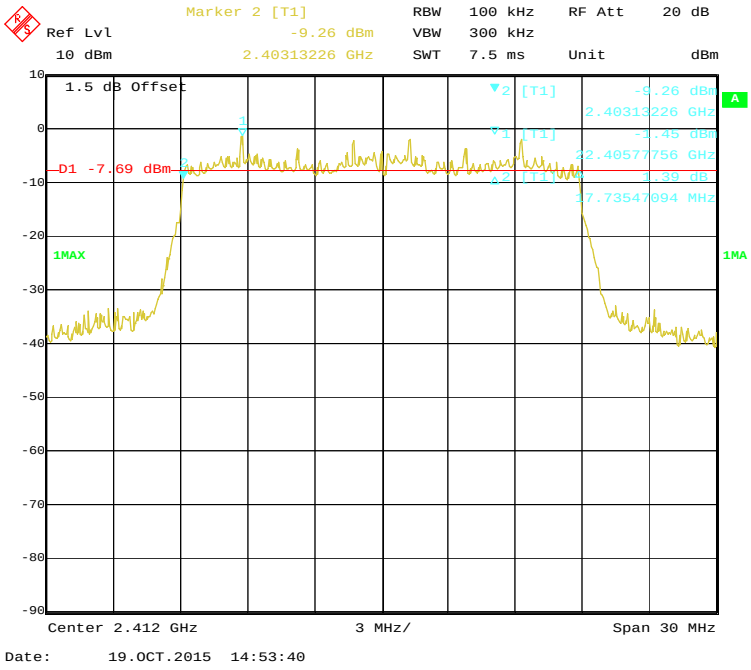
802.11g Middle Channel



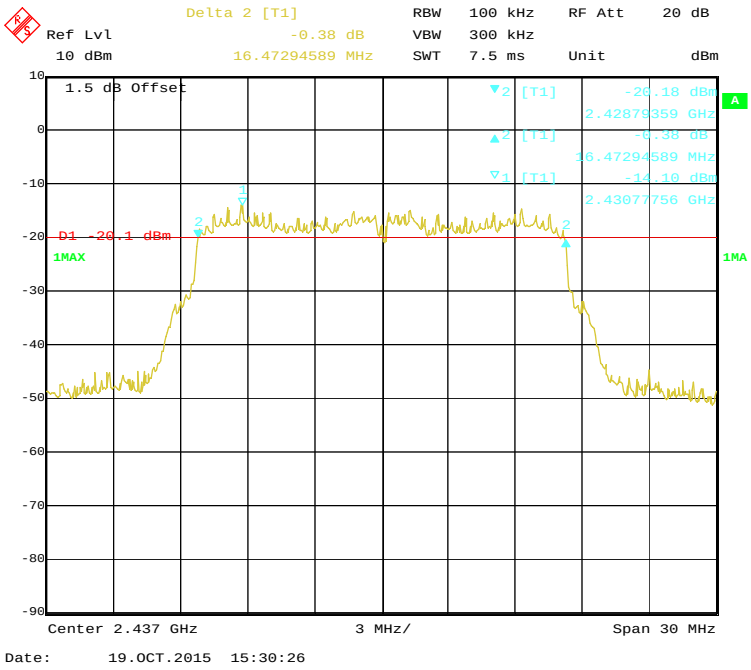
802.11g High Channel



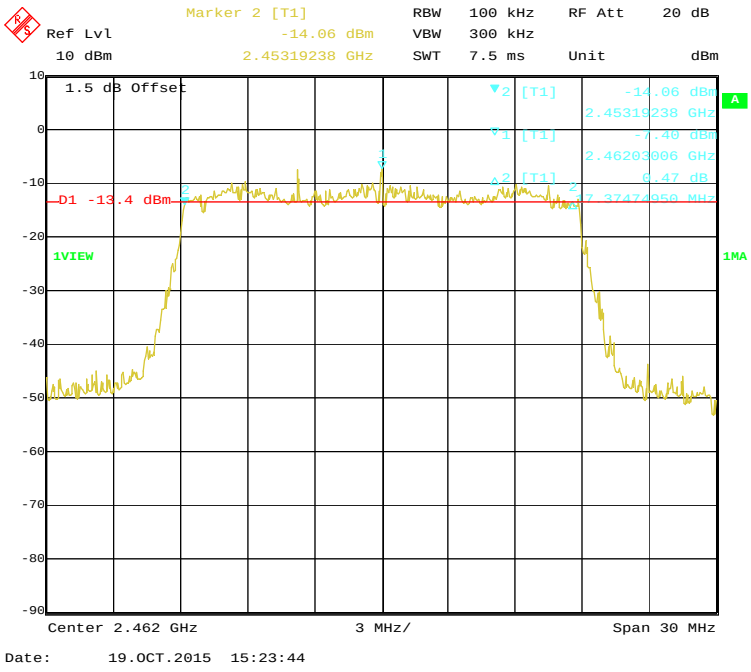
802.11n-HT20 Low Channel



802.11n-HT20 Middle Channel



802.11n-HT20 High Channel



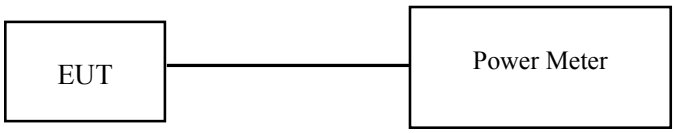
FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER

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

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 one 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	MY54210120	2014-11-03	2015-11-03
Agilent	Wideband Power Sensor	N1921A	MY54210115	2014-11-03	2015-11-03
Agilent	P-Series Power Meter	N1921A	MY5000465	2014-11-03	2015-11-03
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-06-16	2015-12-15

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

Test Data

Environmental Conditions

Temperature:	27 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Matt Yao on 2015-10-23

EUT operation mode: Transmitting

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Limit (dBm)
802.11b			
Low	2412	15.98	30
Middle	2437	15.73	30
High	2462	15.34	30
802.11g			
Low	2412	14.77	30
Middle	2437	14.61	30
High	2462	14.44	30
802.11n-HT20			
Low	2412	13.59	30
Middle	2437	13.28	30
High	2462	13.05	30

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
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2014-11-4	2015-11-3
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-06-16	2015-12-15

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

Test Data

Environmental Conditions

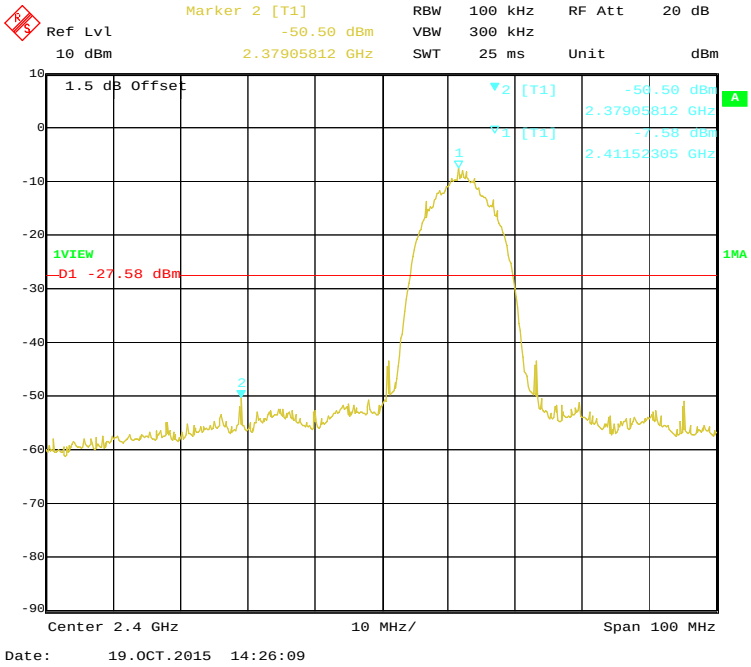
Temperature:	27 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Matt Yao on 2015-10-19.

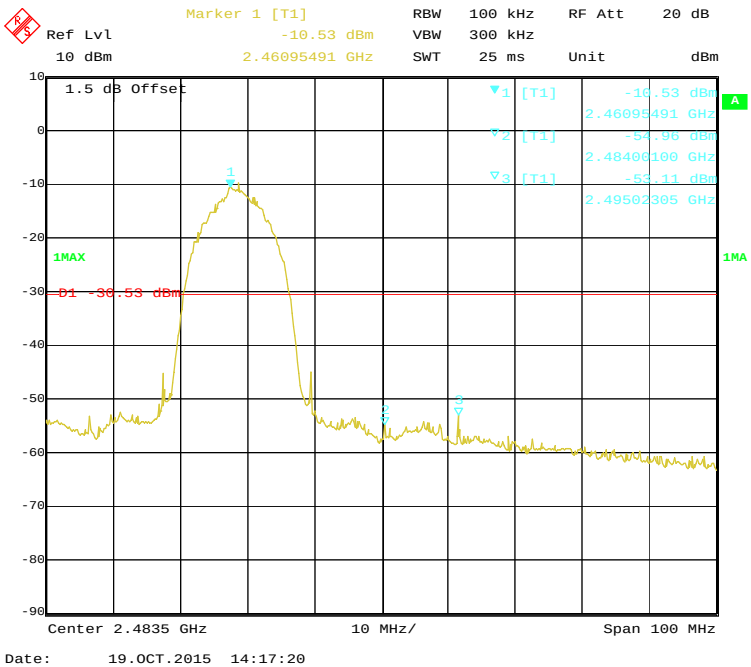
Test Result: *Compliance*

Please refer to the following table and plots.

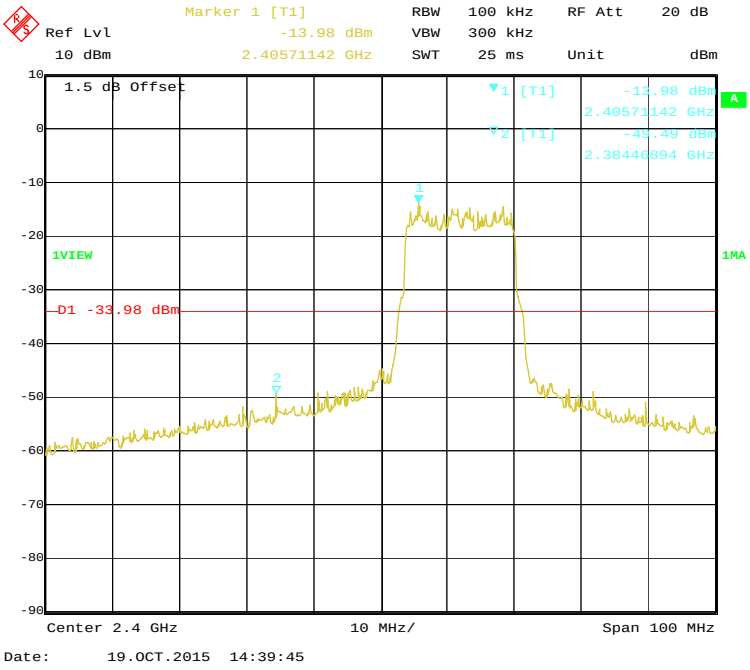
802.11b: Band Edge, Left Side



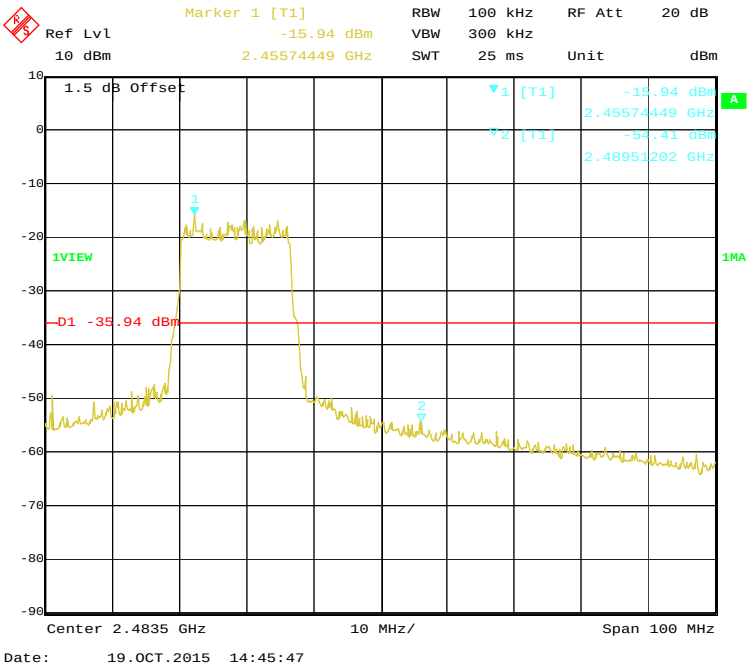
802.11b: Band Edge, Right Side



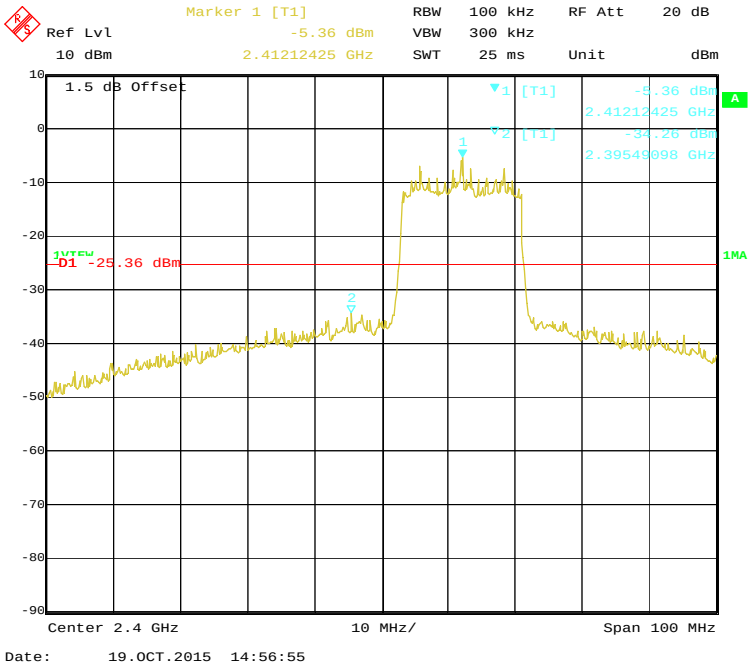
802.11g: Band Edge, Left Side



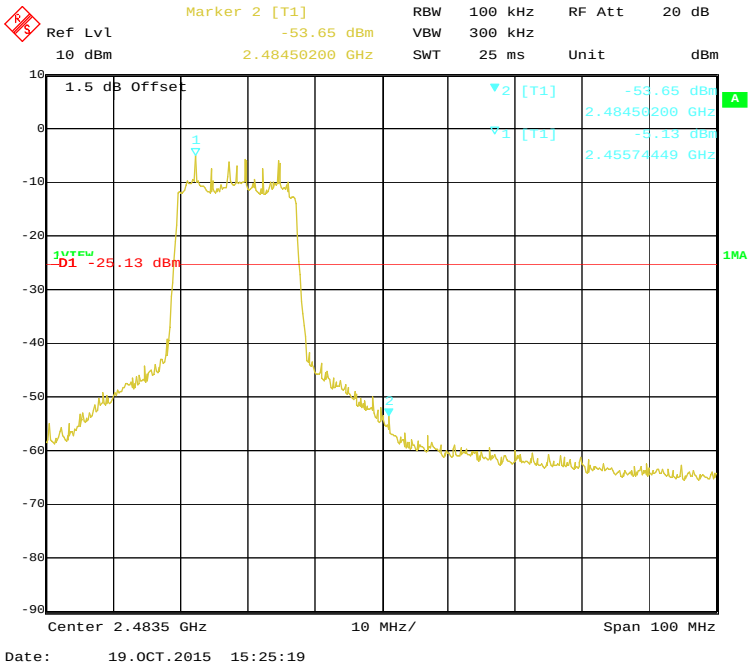
802.11g: Band Edge, Right Side



802.11n-HT20: Band Edge, Left Side



802.11n-HT20: Band Edge, Right Side



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 KDB558074 D01 DTS Meas Guidance v03r03 sub-clause 10.2

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW to: 3kHz≤ RBW≤100 kHz.
3. Set the VBW ≥ 3×RBW.
4. Set the span to 1.5 times the DTS bandwidth.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. 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
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2014-11-4	2015-11-3
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-06-16	2015-12-15

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

Test Data

Environmental Conditions

Temperature:	27 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

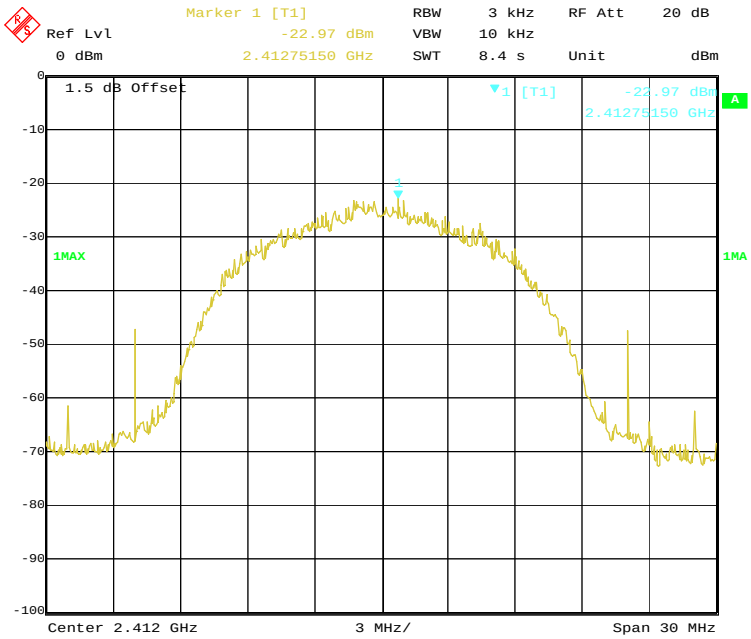
The testing was performed by Matt Yao on 2015-10-19.

EUT operation mode: Transmitting

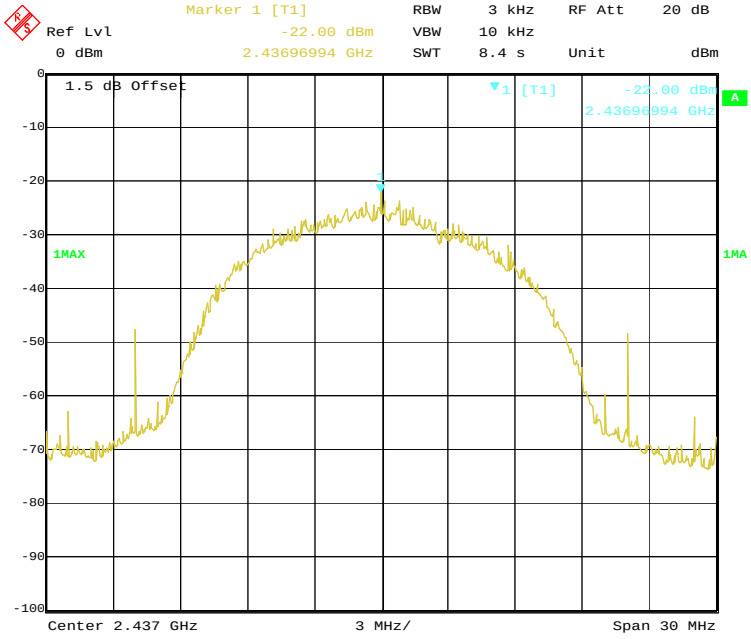
Test Result: Pass

Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
802.11b mode			
Low	2412	-22.97	≤8
Middle	2437	-22.00	≤8
High	2462	-23.66	≤8
802.11g mode			
Low	2412	-24.46	≤8
Middle	2437	-26.47	≤8
High	2462	-16.09	≤8
802.11n-HT20 mode			
Low	2412	-25.45	≤8
Middle	2437	-23.02	≤8
High	2462	-9.23	≤8

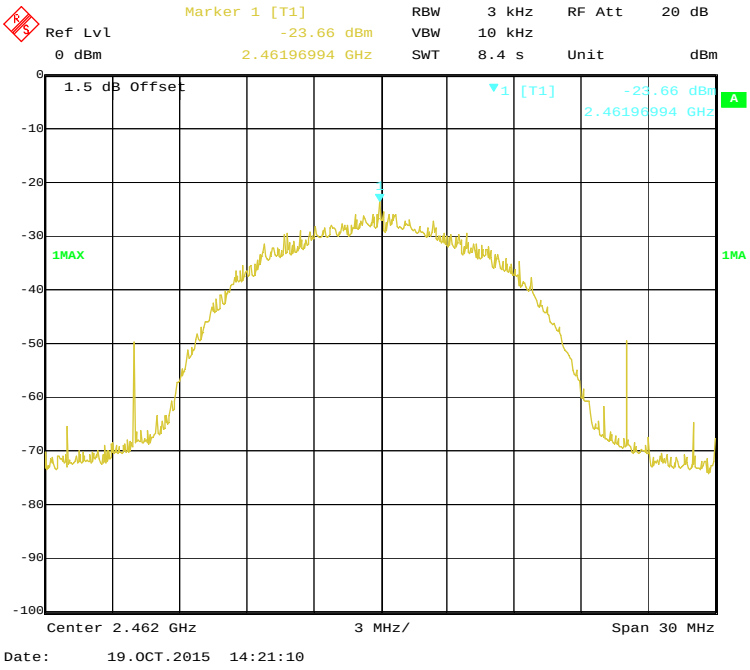
Power Spectral Density, 802.11b Low Channel



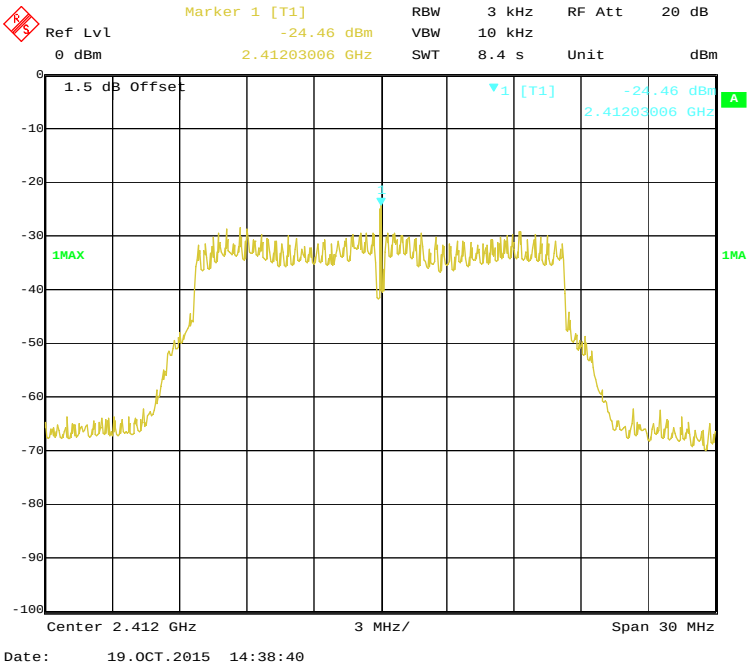
Power Spectral Density, 802.11b Middle Channel



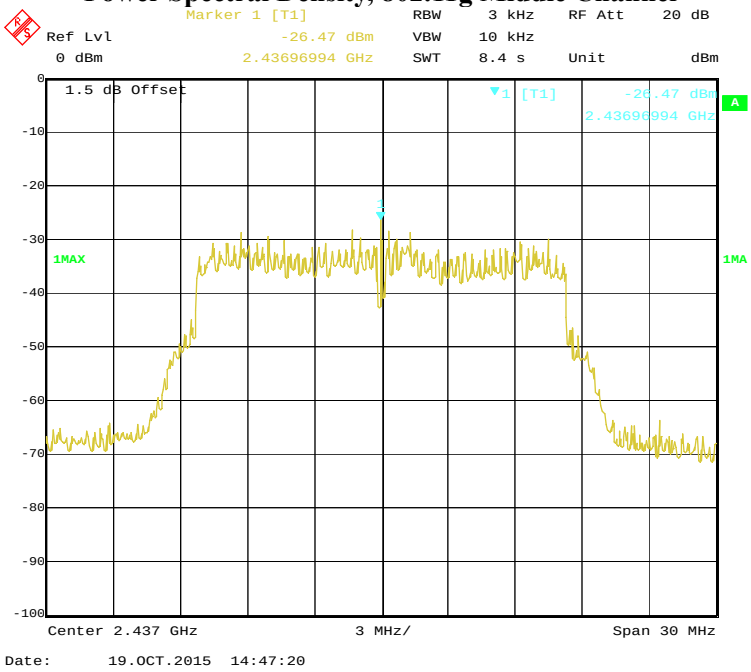
Power Spectral Density, 802.11b High Channel



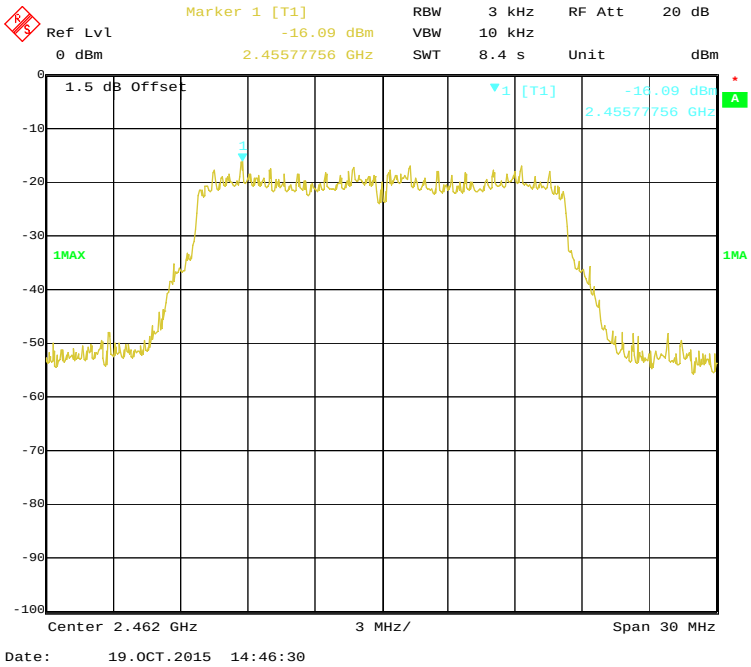
Power Spectral Density, 802.11g Low Channel



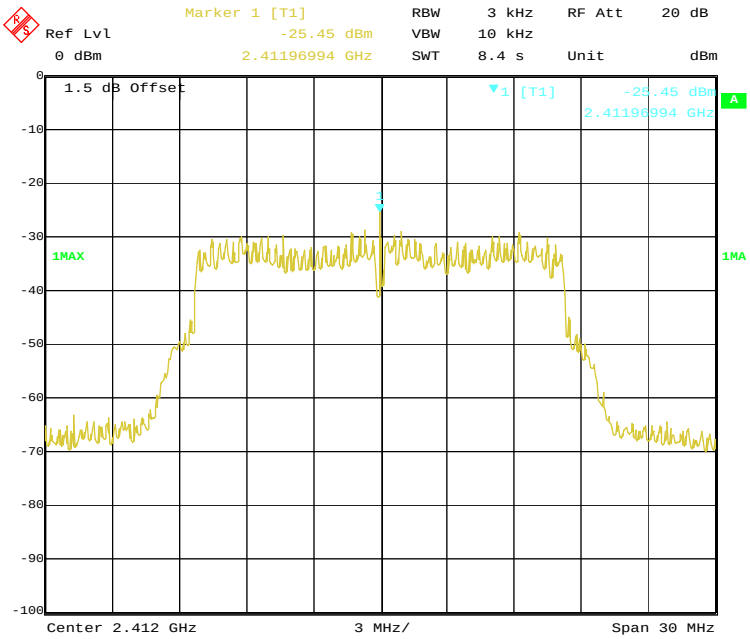
Power Spectral Density, 802.11g Middle Channel



Power Spectral Density, 802.11g High Channel

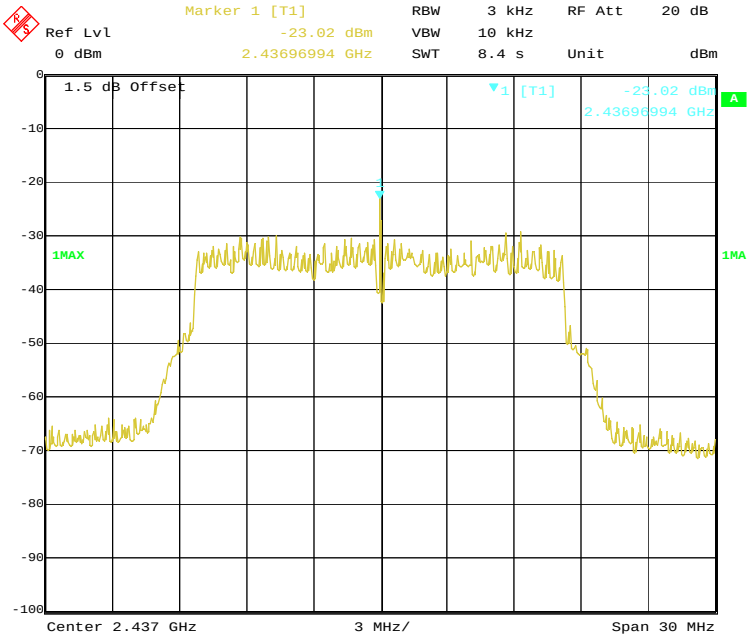


Power Spectral Density, 802.11n-HT20 Low Channel



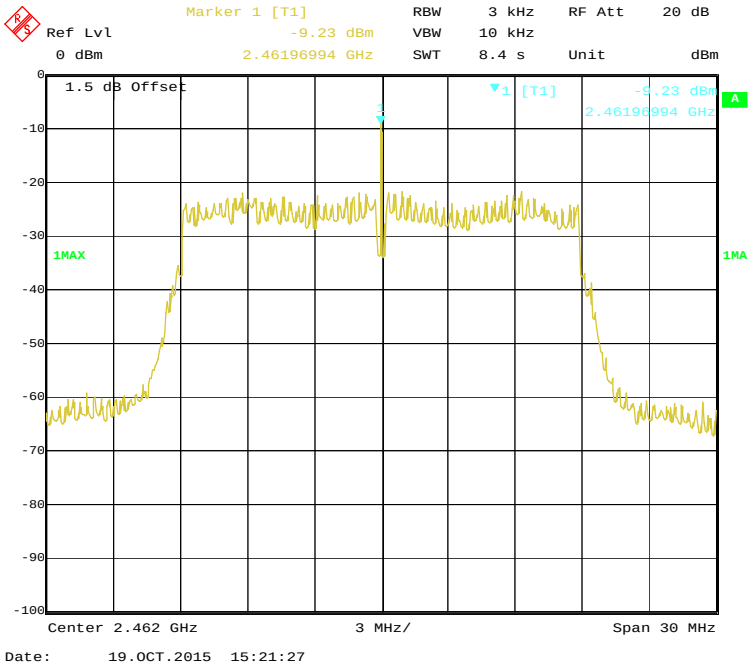
Date: 19.OCT.2015 15:32:27

Power Spectral Density, 802.11n-HT20 Middle Channel



Date: 19.OCT.2015 15:31:00

Power Spectral Density, 802.11n-HT20 High Channel



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