



TESTING LABORATORY
CERTIFICATE #4820.01



FCC PART 15.247

TEST REPORT

For

AKUVOX (XIAMEN) NETWORKS CO., LTD.

10/F, No.56, Software Park II, Xiamen, China

FCC ID: 2AHCR-VPR48G433

Report Type: Original Report	Product Name: Video Phone
Report Number: <u>RXM180614051-00A</u>	
Report Date: <u>2018-09-05</u>	
Reviewed By:	Dean Lau <i>Dean Lau</i>
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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). This report must not be used by the customer to claim product certification, approval, or endorsement by A2LA* or any agency of the Federal Government. * This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk “*”.

TABLE OF CONTENTS

GENERAL INFORMATION.....	4
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	4
OBJECTIVE	4
RELATED SUBMITTAL(S)/GRANT(S).....	4
TEST METHODOLOGY	4
MEASUREMENT UNCERTAINTY	5
TEST FACILITY	5
SYSTEM TEST CONFIGURATION.....	6
DESCRIPTION OF TEST CONFIGURATION	6
EUT EXERCISE SOFTWARE	7
EQUIPMENT MODIFICATIONS	10
SUPPORT EQUIPMENT LIST AND DETAILS	10
SUPPORT CABLE LIST AND DETAILS	10
BLOCK DIAGRAM OF TEST SETUP	11
SUMMARY OF TEST RESULTS	12
FCC §15.247 (i) & §1.1310 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE(MPE).....	13
APPLICABLE STANDARD	13
FCC §15.203 - ANTENNA REQUIREMENT.....	14
APPLICABLE STANDARD	14
ANTENNA CONNECTOR CONSTRUCTION	14
FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS	15
APPLICABLE STANDARD	15
EUT SETUP	15
EMI TEST RECEIVER SETUP.....	15
TEST PROCEDURE	16
CORRECTED AMPLITUDE & MARGIN CALCULATION	16
TEST EQUIPMENT LIST AND DETAILS.....	16
TEST DATA	17
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS.....	21
APPLICABLE STANDARD	21
EUT SETUP	21
EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP	22
TEST PROCEDURE	22
CORRECTED AMPLITUDE & MARGIN CALCULATION	22
TEST EQUIPMENT LIST AND DETAILS.....	23
TEST DATA	23
FCC §15.247(a) (2)–6 dB EMISSION BANDWIDTH.....	34
APPLICABLE STANDARD	34
TEST PROCEDURE	34
TEST EQUIPMENT LIST AND DETAILS.....	34
TEST DATA	34
FCC §15.247(b) (3) - MAXIMUM PEAK CONDUCTED OUTPUT POWER.....	42
APPLICABLE STANDARD	42
TEST PROCEDURE	42
TEST EQUIPMENT LIST AND DETAILS.....	42

TEST DATA	43
FCC §15.247(d)– 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE.....	44
APPLICABLE STANDARD	44
TEST PROCEDURE	44
TEST EQUIPMENT LIST AND DETAILS.....	44
TEST DATA	45
FCC §15.247(e) - POWER SPECTRAL DENSITY	50
APPLICABLE STANDARD	50
TEST PROCEDURE	50
TEST EQUIPMENT LIST AND DETAILS.....	50
TEST DATA	50

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:		Video Phone
EUT Model:		VP-R48G(433)
Multiple Model:		R48G(433)
FCC ID:		2AHCR-VPR48G433
Rated Input Voltage:		DC12V from adapter or DC48V from POE
Adapter Information	Model:	RD1201000-C55-26MG
	Input:	AC 100-240V, 50/60Hz, 0.6A MAX
	Output:	DC 12V, 1A
External Dimension:		241mm(L)*198mm(W)*95mm(H)
Serial Number:		180614051
EUT Received Date:		2018.06.15

Note: The series product, models VP-R48G(433), R48G(433) are electrically identical, we selected VP-R48G(433) for testing, the details of the differences between them were explained in the declaration letter.

Objective

This report is prepared on behalf of AKUVOX (XIAMEN) NETWORKS CO., LTD. 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, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 15C DSR submissions with FCC ID: 2AHCR-VPR48G433.
FCC Part 15C DSS submissions with FCC ID: 2AHCR-VPR48G433.
Submitted with the part of a system with FCC ID: 2AHCR-EP10-433.

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 KDB 558074 D01 DTS Meas Guidance v04.

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: 4.55 dB, 200M~1GHz: 5.92 dB, 1G~6GHz: 4.98 dB, 6G~18GHz: 5.89 dB, 18G~26.5G: 5.47 dB, 26.5G~40G: 5.63 dB
Unwanted Emissions, conducted	±1.5 dB
Temperature	±1 °C
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.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 897218, the FCC Designation No. : CN1220.

The test site has been 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.

For 2.4GHz band, 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	/	/

For 802.11b, 802.11g, and 802.11n ht20 modes were test with channel 1,6,11.

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.

For Bluetooth LE mode, 40 channels are provided for testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2442
1	2404	...	...
...	...	...	...
...	...	...	...
..	...	38	2478
19	2440	39	2480

EUT was tested with channel 0, 19 and 39.

EUT Exercise Software

The software “Engineering Mode” was used for testing, which was provided by manufacturer. The maximum power was configured as below table, that provided by the manufacturer:

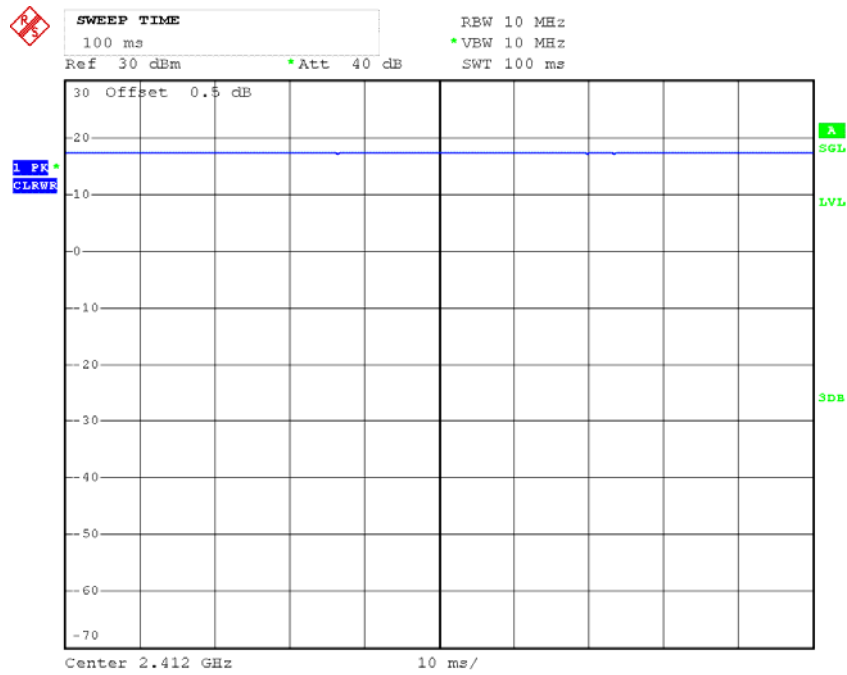
Mode	Channel	Frequency (MHz)	Data Rate	Power level
802.11b	Low	2412	1 Mbps	21
	Middle	2437	1 Mbps	21
	High	2462	1 Mbps	22
802.11g	Low	2412	6 Mbps	17
	Middle	2437	6 Mbps	18
	High	2462	6 Mbps	15
802.11n ht20	Low	2412	MCS0	15
	Middle	2437	MCS0	16
	High	2462	MCS0	14

Bluetooth LE mode was configured by the system default setting

The maximum duty cycle as following table:

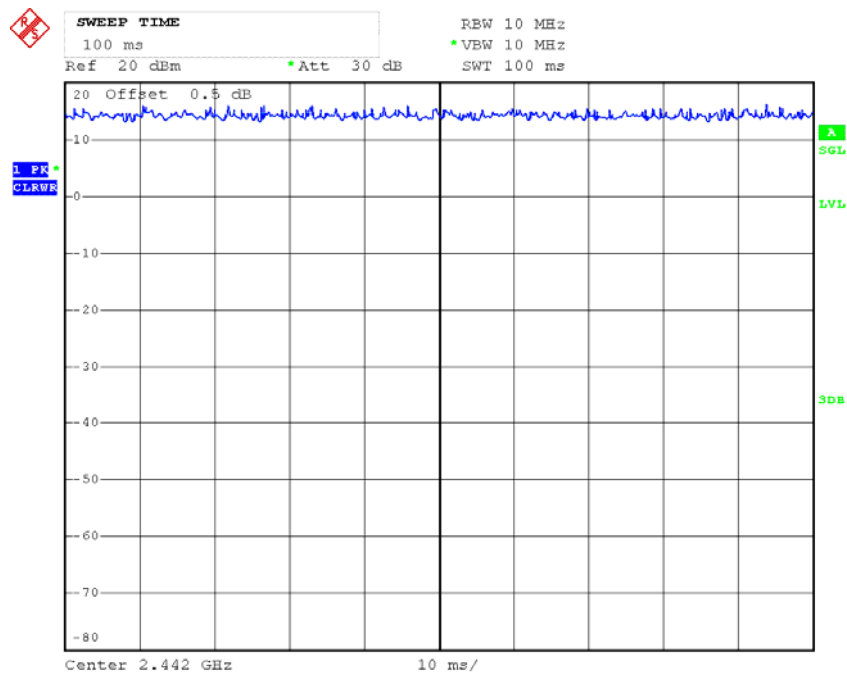
Test mode	T _{on} (ms)	Duty Cycle (%)	VBW Setting
802.11b	100	100	10Hz
802.11g	100	100	10Hz
802.11n ht20	100	100	10Hz
BLE	0.425	67.5	3kHz

802.11b



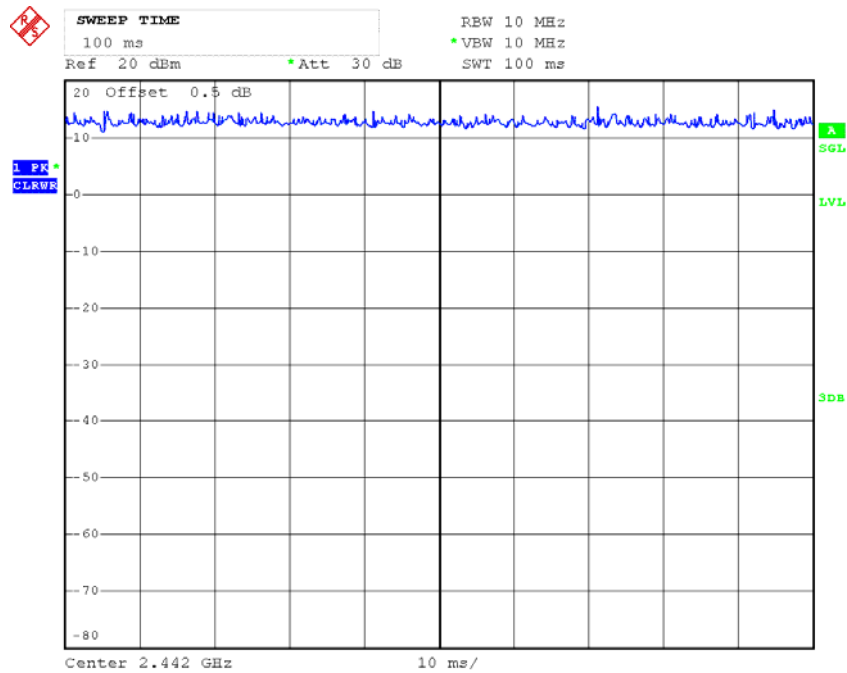
Date: 5.JUL.2018 23:44:01

802.11g



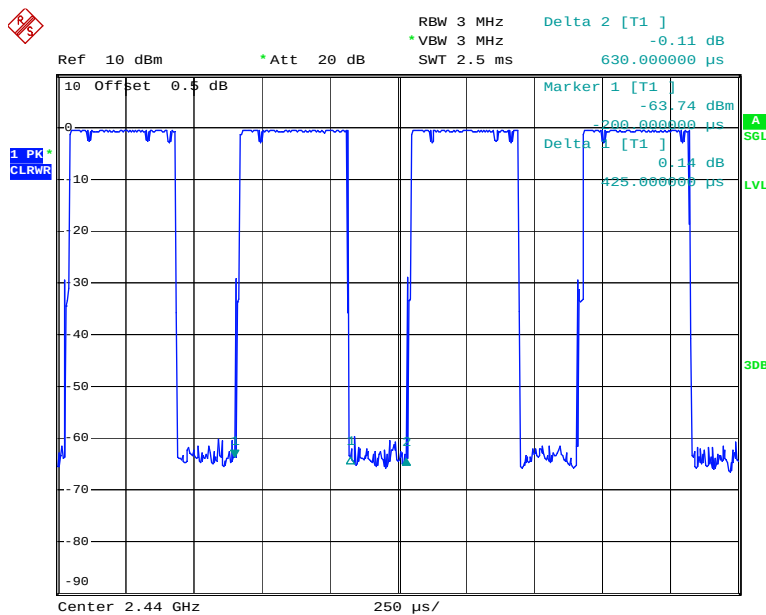
Date: 4.SEP.2018 17:33:59

802.11n ht20



Date: 4.SEP.2018 17:34:58

BLE



Date: 29.JUN.2018 00:17:02

Equipment Modifications

No modification was made to the EUT.

Support Equipment List and Details

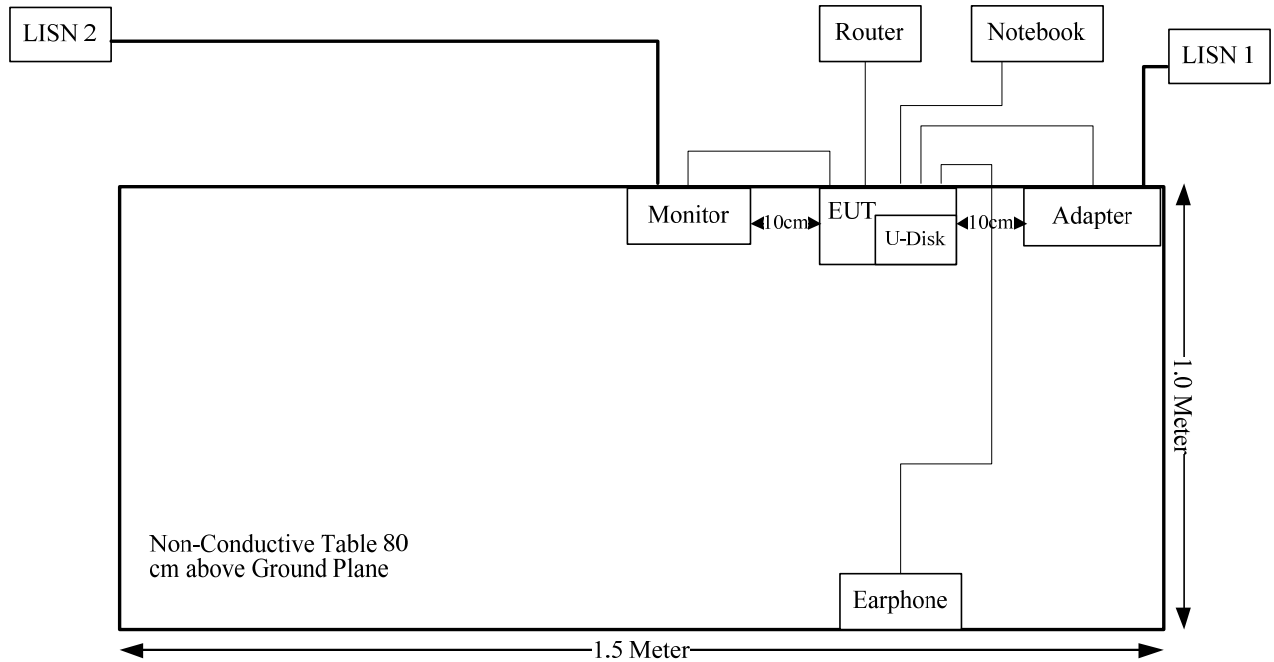
Manufacturer	Description	Model	Serial Number
L.T.E.	SWITCHING MODE POWER SUPPLY	G0548B-480-050	N/A
Tenda	Router	D301	E3941017710003629
Huawei	Headset	N/A	
DELL	Notebook	PP11L	HLKYGB1
Sandisk	U-DISK	N/A	N/A
Dell	Monitor	U3011t	CN-OPH5NY-74445-17M-114L

Support Cable List and Details

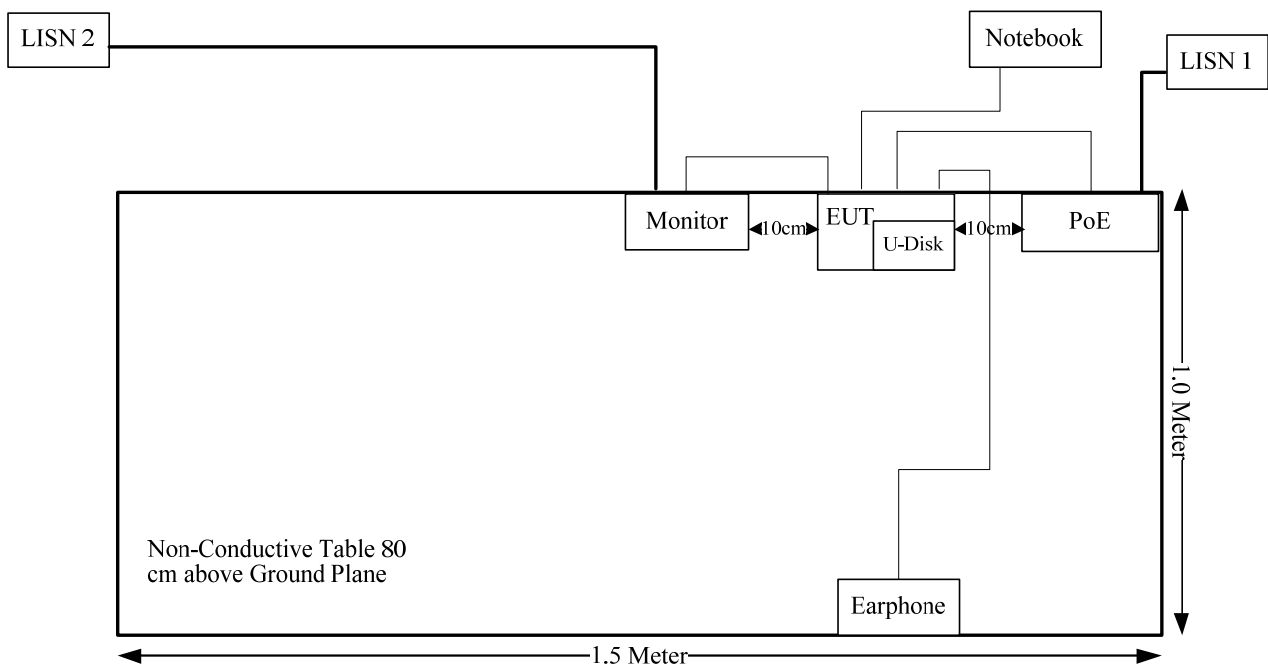
Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
Adapter Cable	No	No	1.52	Adapter	EUT
RJ45 Cable	No	No	5.00	PC Port of EUT	Notebook
RJ45 Cable	No	No	5.00	INTERNET Port of EUT	Router
RJ45 Cable	No	No	1.00	INTERNET Port of EUT	POE
HDMI Cable	Yes	Yes	3.05	HDMI Port of EUT	Monitor

Block Diagram of Test Setup

M1



M2



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i) & §1.1310 & §2.1091	Maximum Permissible Exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Compliance
§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

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/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		Tune-up Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
	(dBi)	(numeric)	(dBm)	(mW)			
2412-2462	2	1.58	20	100.00	20.00	0.0315	1.0
2402-2480	2	1.58	4.5	2.82	20.00	0.0009	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 has one internal antenna arrangement for BT and WIFI, and the antenna gain is 2 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

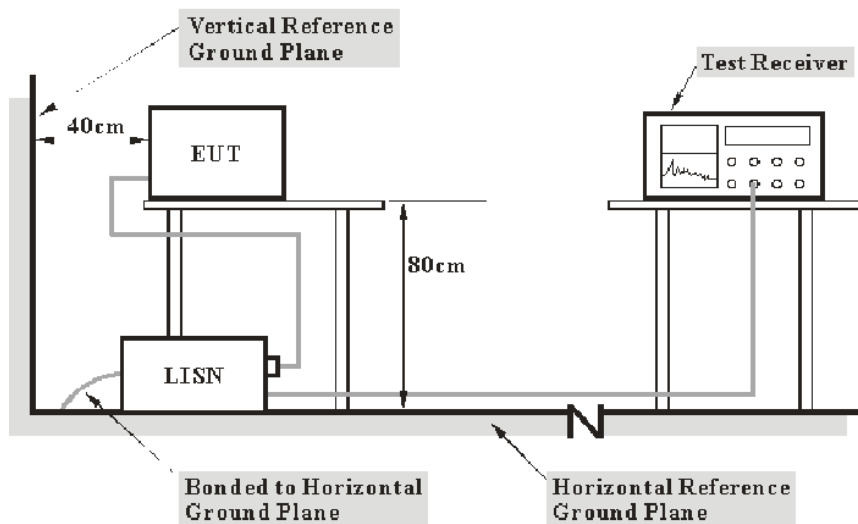
Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207(a)

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.

The spacing between the peripherals was 10 cm.

The adapter was connected to the main lisn with a 120 V/60 Hz AC 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 first 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 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	2017-12-11	2018-12-11
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-01	2017-09-05	2018-09-05
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A
R&S	Two-line V-network	ENV 216	101614	2017-12-08	2018-12-08
R&S	EMI Test Receiver	ESCS 30	830245/006	2017-12-11	2018-12-11

* **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**

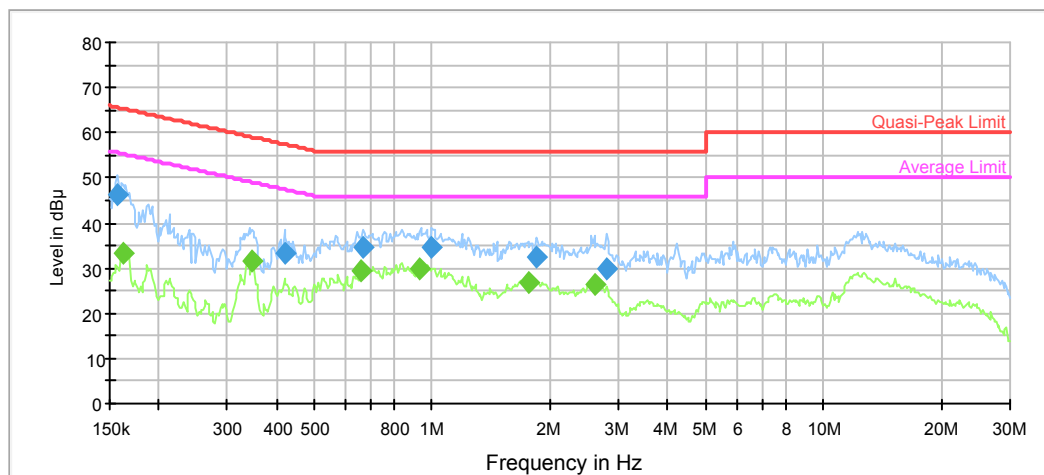
Temperature:	29.2°C
Relative Humidity:	55 %
ATM Pressure:	101.3 kPa

The testing was performed by Sider Huang on 2018-07-03.

Test Mode: Transmitting (Wi-Fi mode 802.11b middle channel was the worst)

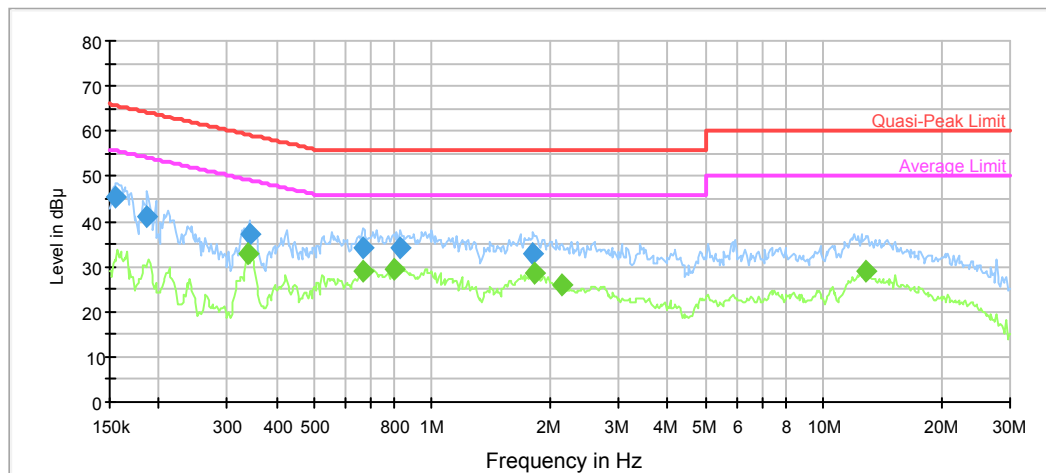
Adapter:

AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.157346	46.2	9.000	L1	11.1	19.4	65.6	Compliance
0.419276	33.1	9.000	L1	10.0	24.4	57.5	Compliance
0.665597	34.5	9.000	L1	9.8	21.5	56.0	Compliance
0.999305	34.6	9.000	L1	9.8	21.4	56.0	Compliance
1.845692	32.5	9.000	L1	9.7	23.5	56.0	Compliance
2.793231	29.8	9.000	L1	9.8	26.2	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.162441	33.2	9.000	L1	11.0	22.1	55.3	Compliance
0.346296	31.7	9.000	L1	10.0	17.4	49.1	Compliance
0.660314	29.6	9.000	L1	9.8	16.4	46.0	Compliance
0.930151	29.9	9.000	L1	9.8	16.1	46.0	Compliance
1.759527	26.7	9.000	L1	9.7	19.3	46.0	Compliance
2.599932	26.3	9.000	L1	9.8	19.7	46.0	Compliance

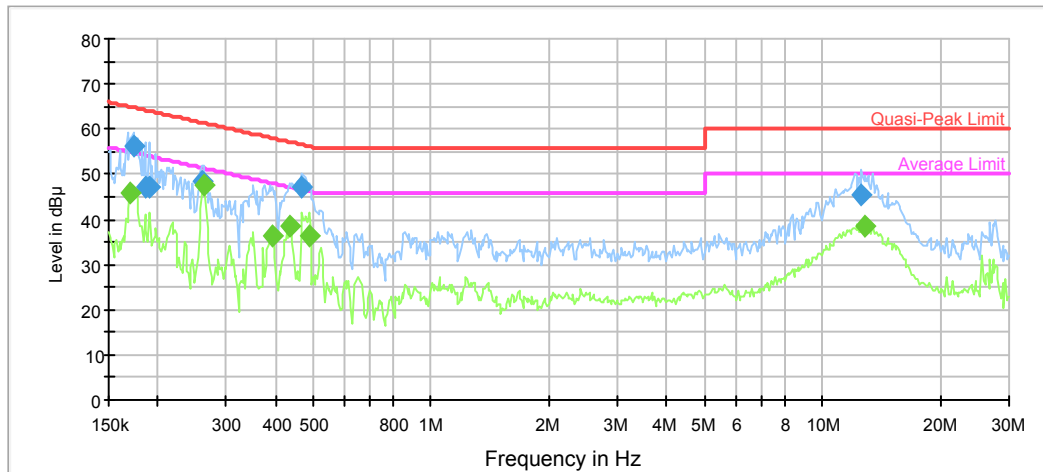
AC120 V, 60 Hz, Neutral:

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.156097	45.4	9.000	N	11.1	20.3	65.7	Compliance
0.187494	41.0	9.000	N	10.7	23.1	64.1	Compliance
0.340821	37.1	9.000	N	10.1	22.1	59.2	Compliance
0.665597	34.1	9.000	N	9.8	21.9	56.0	Compliance
0.831967	34.3	9.000	N	9.8	21.7	56.0	Compliance
1.816511	32.9	9.000	N	9.7	23.1	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.338116	32.9	9.000	N	10.1	16.3	49.2	Compliance
0.665597	29.1	9.000	N	9.8	16.9	46.0	Compliance
0.799472	29.4	9.000	N	9.8	16.6	46.0	Compliance
1.831043	28.5	9.000	N	9.7	17.5	46.0	Compliance
2.147382	26.1	9.000	N	9.8	19.9	46.0	Compliance
12.795830	28.8	9.000	N	9.9	21.2	50.0	Compliance

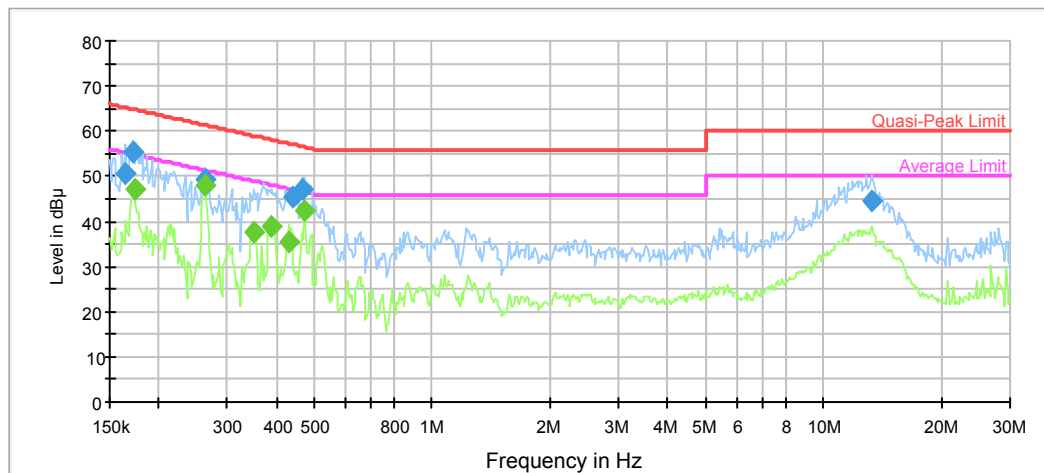
PoE:

AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.173134	56.1	9.000	L1	10.9	8.7	64.8	Compliance
0.186006	46.9	9.000	L1	10.8	17.3	64.2	Compliance
0.190505	47.1	9.000	L1	10.7	16.9	64.0	Compliance
0.259937	48.5	9.000	L1	10.3	12.9	61.4	Compliance
0.468757	47.2	9.000	L1	9.9	9.3	56.5	Compliance
12.593528	45.2	9.000	L1	9.9	14.8	60.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.170396	45.8	9.000	L1	10.9	9.1	54.9	Compliance
0.262017	47.8	9.000	L1	10.3	3.6	51.4	Compliance
0.393383	36.4	9.000	L1	10.0	11.6	48.0	Compliance
0.436318	38.4	9.000	L1	9.9	8.7	47.1	Compliance
0.487810	36.3	9.000	L1	9.9	9.9	46.2	Compliance
12.898197	38.3	9.000	L1	9.9	11.7	50.0	Compliance

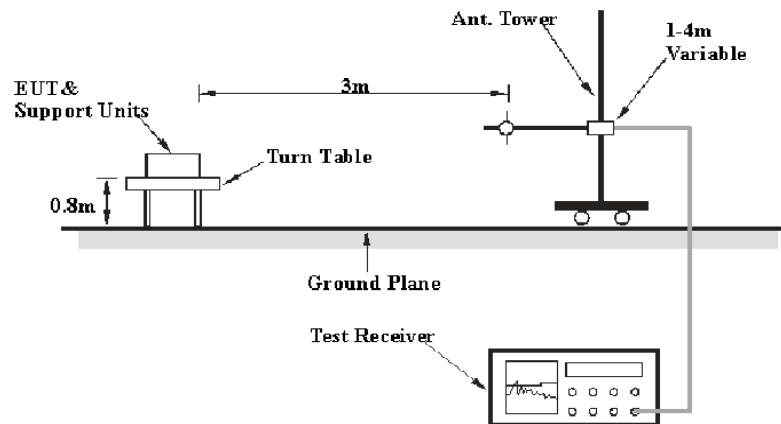
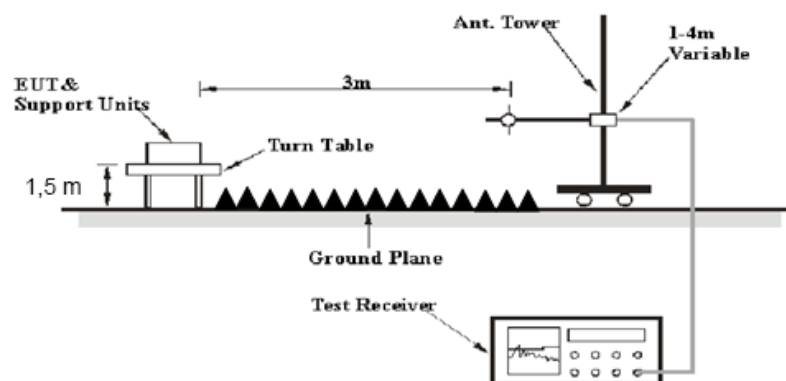
AC120 V, 60 Hz, Neutral:

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.165051	50.7	9.000	N	11.0	14.5	65.2	Compliance
0.171759	55.3	9.000	N	10.9	9.6	64.9	Compliance
0.262017	49.5	9.000	N	10.3	11.9	61.4	Compliance
0.439808	45.3	9.000	N	9.9	11.8	57.1	Compliance
0.468757	47.2	9.000	N	9.9	9.3	56.5	Compliance
13.315918	44.4	9.000	N	9.9	15.6	60.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.173134	47.1	9.000	N	10.9	7.7	54.8	Compliance
0.262017	47.8	9.000	N	10.3	3.6	51.4	Compliance
0.351859	37.5	9.000	N	10.0	11.4	48.9	Compliance
0.390261	38.9	9.000	N	10.0	9.2	48.1	Compliance
0.429420	35.4	9.000	N	9.9	11.9	47.3	Compliance
0.472507	42.4	9.000	N	9.9	4.1	46.5	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 Below 1GHz tests were performed in the 3 meters chamber test site A, above 1GHz tests were performed in the 3 meters chamber test site B, 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:

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

1GHz- 25GHz:

Measurement	Duty cycle	RBW	Video B/W
PK	Any	1MHz	3 MHz
AV	>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	2017-12-11	2018-12-11
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2017-09-05	2018-09-05
HP	Amplifier	8447D	2727A05902	2017-09-05	2018-09-05
R&S	Spectrum Analyzer	FSU 26	200256	2018-01-04	2019-01-04
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
TDK RF	Horn Antenna	HRN-0118	130 084	2016-01-05	2019-01-04
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-01 1304	2016-11-18	2019-11-18
MICRO-COAX	Coaxial Cable	UFA147-1-2362-100100	64639 231029-001	2018-02-24	2019-02-28
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2017-9-5	2018-9-5
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2018-06-27	2019-06-27
E-Microwave	Band-stop Filters	OBSF-2400-2483.5-S	OE01601525	2018-06-16	2019-06-16
Micro-tronics	High Pass Filter	HPM50111	S/N-G217	2018-06-16	2019-06-16

* **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:	25.6~29.3 °C
Relative Humidity:	35~45 %
ATM Pressure:	99.6~101.6 kPa

* The testing was performed by Tyler Pan & Sunny Cen from 2018-06-29 to 2018-07-12.

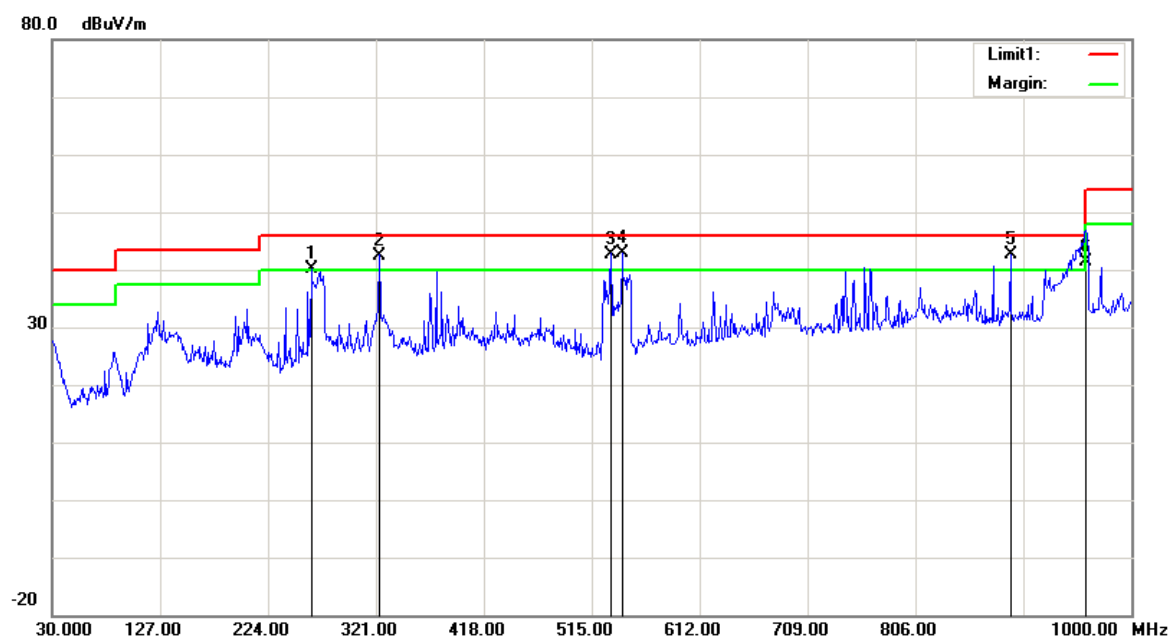
Test Result: Compliance, please Refer to the following data

Test Mode: Transmitting

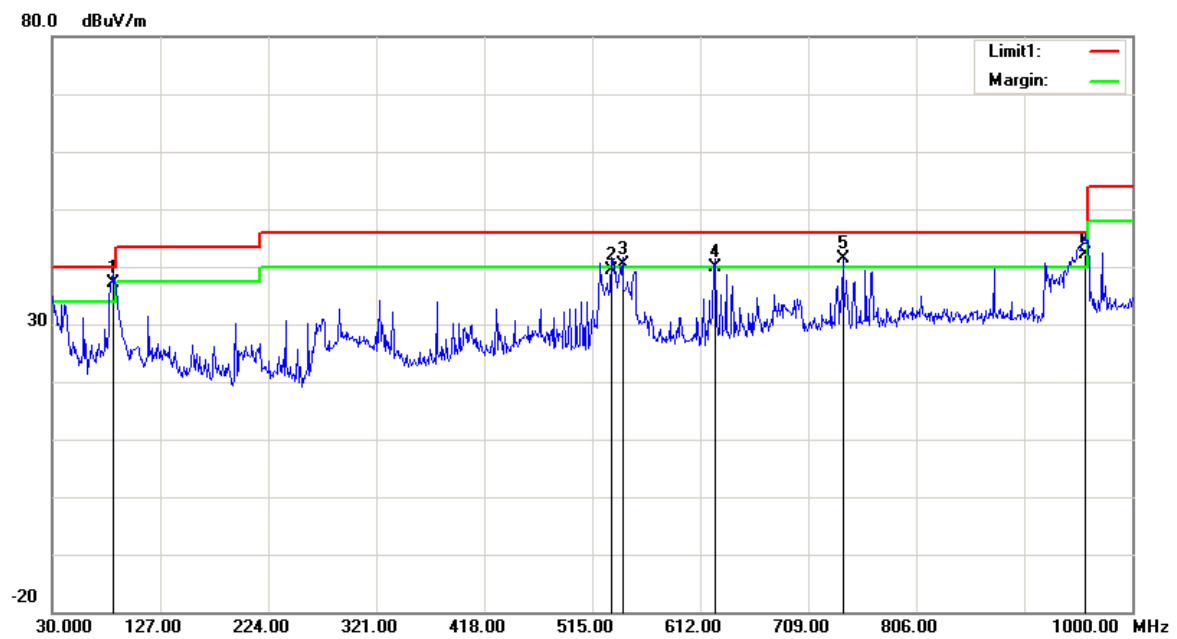
1) 30MHz-1GHz(802.11n ht20 middle channel was the worst)

Adpater

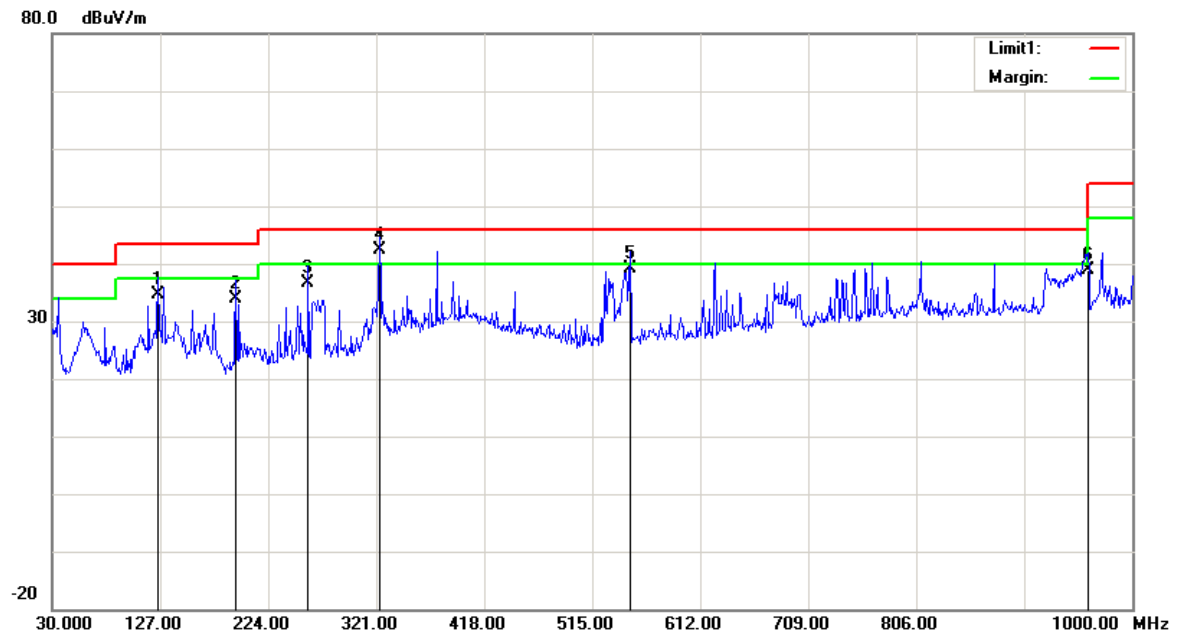
Horizontal:



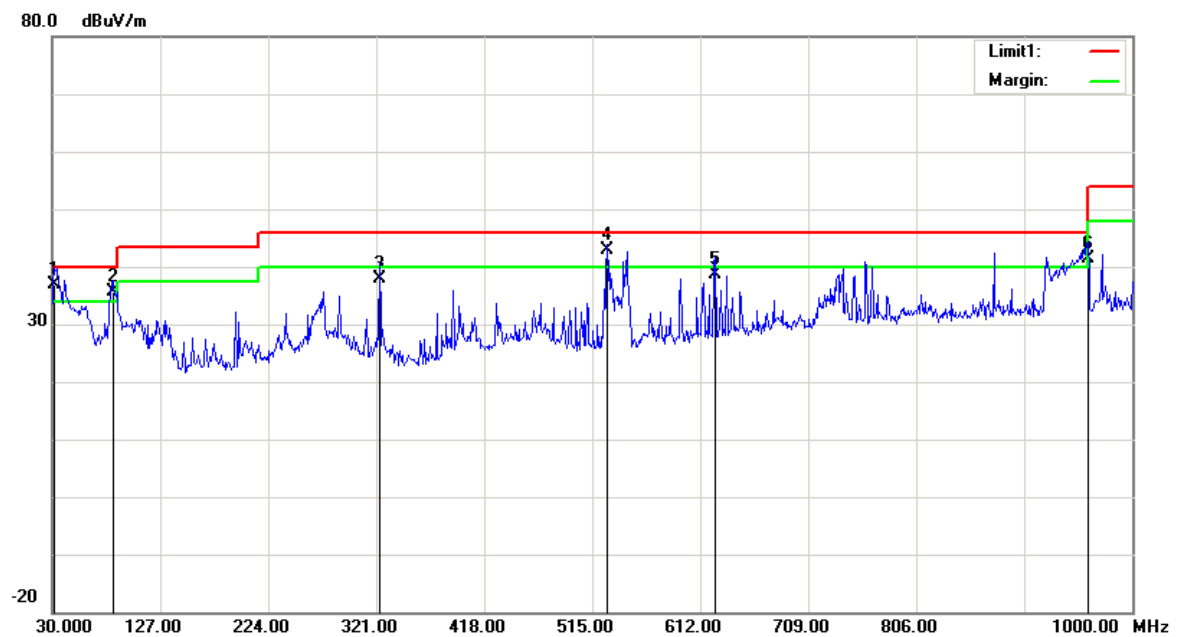
Frequency (MHz)	Receiver Reading (dBuV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
262.8000	44.87	QP	-4.77	40.10	46.00	5.90
323.9100	46.01	QP	-3.51	42.50	46.00	3.50
532.4600	42.38	QP	0.32	42.70	46.00	3.30
542.1600	42.53	QP	0.27	42.80	46.00	3.20
891.3600	36.70	QP	5.90	42.60	46.00	3.40
959.2600	12.38	QP	29.12	41.50	46.00	4.50

Vertical:

Frequency (MHz)	Receiver Reading (dBuV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
84.3200	48.66	QP	-11.46	37.20	40.00	2.80
532.4600	39.18	QP	0.32	39.50	46.00	6.50
542.1600	40.23	QP	0.27	40.50	46.00	5.50
625.5800	38.10	QP	1.70	39.80	46.00	6.20
740.0400	38.13	QP	3.37	41.50	46.00	4.50
958.2900	13.10	QP	29.10	42.20	46.00	3.80

PoE**Horizontal:**

Frequency (MHz)	Receiver Reading (dBuV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
125.0600	39.36	QP	-4.76	34.60	43.50	8.90
194.9000	40.82	QP	-6.82	34.00	43.50	9.50
259.8900	41.96	QP	-5.36	36.60	46.00	9.40
323.9100	45.81	QP	-3.51	42.30	46.00	3.70
548.9500	38.99	QP	0.21	39.20	46.00	6.80
960.2300	9.77	QP	29.13	38.90	54.00	15.10

Vertical:

Frequency (MHz)	Receiver Reading (dBuV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
31.9400	36.69	QP	0.11	36.80	40.00	3.20
84.3200	47.16	QP	-11.46	35.70	40.00	4.30
323.9100	41.41	QP	-3.51	37.90	46.00	8.10
528.5800	42.62	QP	0.28	42.90	46.00	3.10
625.5800	36.90	QP	1.70	38.60	46.00	7.40
960.2300	12.27	QP	29.13	41.40	54.00	12.60

**2) 1-25GHz:
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)	Remark	Polar (H/V)	Factor (dB/m)					
Low Channel: 2412 MHz									
2412.00	78.45	PK	H	24.84	3.35	0.00	106.64	N/A	N/A
2412.00	74.34	AV	H	24.84	3.35	0.00	102.53	N/A	N/A
2412.00	74.52	PK	V	24.84	3.35	0.00	102.71	N/A	N/A
2412.00	70.43	AV	V	24.84	3.35	0.00	98.62	N/A	N/A
2390.00	29.82	PK	H	24.80	3.33	0.00	57.95	74.00	16.05
2390.00	18.03	AV	H	24.80	3.33	0.00	46.16	54.00	7.84
4824.00	48.03	PK	H	29.75	4.58	27.41	54.95	74.00	19.05
4824.00	34.39	AV	H	29.75	4.58	27.41	41.31	54.00	12.69
7236.00	45.74	PK	H	33.98	5.62	27.22	58.12	74.00	15.88
7236.00	31.96	AV	H	33.98	5.62	27.22	44.34	54.00	9.66
Middle Channel: 2437 MHz									
2437.00	80.06	PK	H	24.89	3.36	0.00	108.31	N/A	N/A
2437.00	76.21	AV	H	24.89	3.36	0.00	104.46	N/A	N/A
2437.00	76.34	PK	V	24.89	3.36	0.00	104.59	N/A	N/A
2437.00	72.18	AV	V	24.89	3.36	0.00	100.43	N/A	N/A
4874.00	47.19	PK	H	29.85	4.57	27.54	54.07	74.00	19.93
4874.00	34.16	AV	H	29.85	4.57	27.54	41.04	54.00	12.96
7311.00	46.11	PK	H	34.10	5.68	27.28	58.61	74.00	15.39
7311.00	32.63	AV	H	34.10	5.68	27.28	45.13	54.00	8.87
High Channel: 2462 MHz									
2462.00	81.55	PK	H	24.93	3.37	0.00	109.85	N/A	N/A
2462.00	75.66	AV	H	24.93	3.37	0.00	103.96	N/A	N/A
2462.00	77.35	PK	V	24.93	3.37	0.00	105.65	N/A	N/A
2462.00	73.21	AV	V	24.93	3.37	0.00	101.51	N/A	N/A
2483.50	29.29	PK	H	24.97	3.38	0.00	57.64	74.00	16.36
2483.50	17.01	AV	H	24.97	3.38	0.00	45.36	54.00	8.64
4924.00	47.54	PK	H	29.95	4.57	27.51	54.55	74.00	19.45
4924.00	33.20	AV	H	29.95	4.57	27.51	40.21	54.00	13.79
7386.00	45.31	PK	H	34.22	5.74	27.18	58.09	74.00	15.91
7386.00	32.98	AV	H	34.22	5.74	27.18	45.76	54.00	8.24

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)	Remark	Polar (H/V)	Factor (dB/m)					
Low Channel: 2412 MHz									
2412.00	79.51	PK	H	24.84	3.35	0.00	107.70	N/A	N/A
2412.00	67.36	AV	H	24.84	3.35	0.00	95.55	N/A	N/A
2412.00	76.55	PK	V	24.84	3.35	0.00	104.74	N/A	N/A
2412.00	64.82	AV	V	24.84	3.35	0.00	93.01	N/A	N/A
2390.00	41.13	PK	H	24.80	3.33	0.00	69.26	74.00	4.74
2390.00	22.43	AV	H	24.80	3.33	0.00	50.56	54.00	3.44
4824.00	46.41	PK	H	29.75	4.58	27.41	53.33	74.00	20.67
4824.00	34.51	AV	H	29.75	4.58	27.41	41.43	54.00	12.57
7236.00	45.88	PK	H	33.98	5.62	27.22	58.26	74.00	15.74
7236.00	33.05	AV	H	33.98	5.62	27.22	45.43	54.00	8.57
Middle Channel: 2437 MHz									
2437.00	81.97	PK	H	24.89	3.36	0.00	110.22	N/A	N/A
2437.00	70.42	AV	H	24.89	3.36	0.00	98.67	N/A	N/A
2437.00	78.82	PK	V	24.89	3.36	0.00	107.07	N/A	N/A
2437.00	67.35	AV	V	24.89	3.36	0.00	95.60	N/A	N/A
4874.00	47.41	PK	H	29.85	4.57	27.54	54.29	74.00	19.71
4874.00	34.35	AV	H	29.85	4.57	27.54	41.23	54.00	12.77
7311.00	45.46	PK	H	34.10	5.68	27.28	57.96	74.00	16.04
7311.00	32.63	AV	H	34.10	5.68	27.28	45.13	54.00	8.87
High Channel: 2462 MHz									
2462.00	79.67	PK	H	24.93	3.37	0.00	107.97	N/A	N/A
2462.00	67.56	AV	H	24.93	3.37	0.00	95.86	N/A	N/A
2462.00	76.54	PK	V	24.93	3.37	0.00	104.84	N/A	N/A
2462.00	65.31	AV	V	24.93	3.37	0.00	93.61	N/A	N/A
2483.50	41.92	PK	H	24.97	3.38	0.00	70.27	74.00	3.73
2483.50	21.50	AV	H	24.97	3.38	0.00	49.85	54.00	4.15
4924.00	47.37	PK	H	29.95	4.57	27.51	54.38	74.00	19.62
4924.00	34.69	AV	H	29.95	4.57	27.51	41.70	54.00	12.30
7386.00	45.91	PK	H	34.22	5.74	27.18	58.69	74.00	15.31
7386.00	32.47	AV	H	34.22	5.74	27.18	45.25	54.00	8.75

802.11n ht20 Mode:

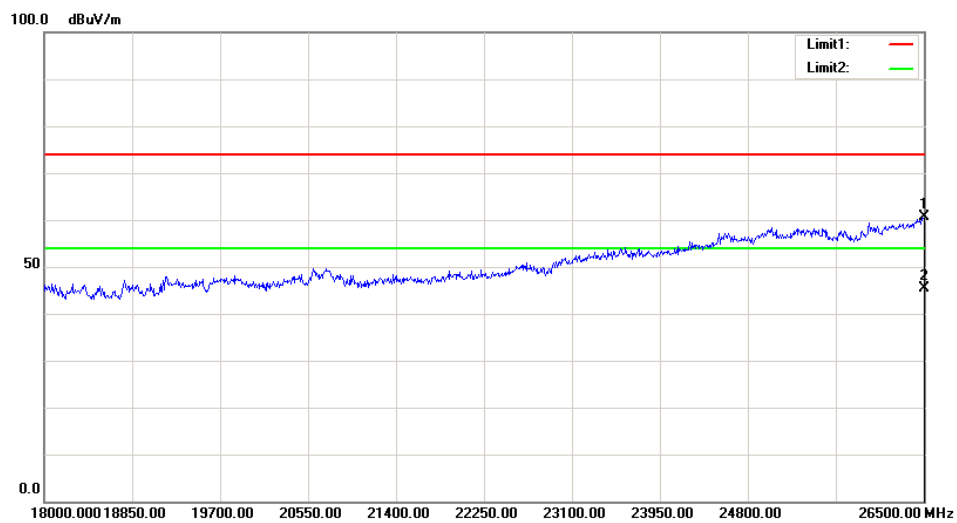
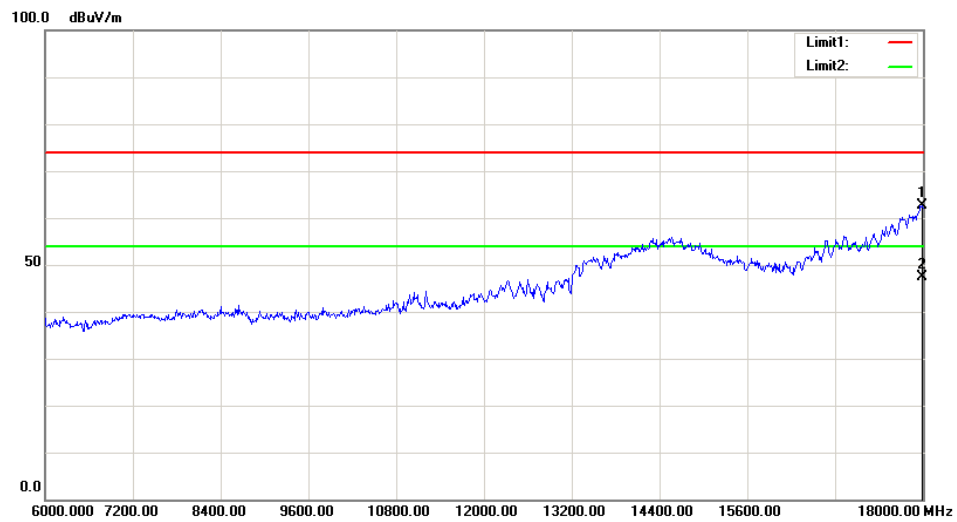
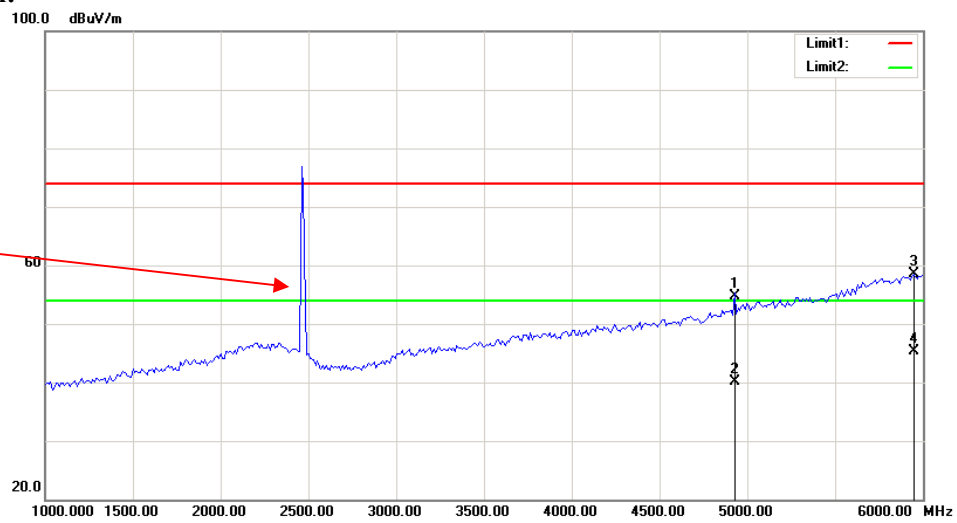
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Remark	Polar (H/V)	Factor (dB/m)					
Low Channel: 2412 MHz									
2412.00	76.99	PK	H	24.84	3.35	0.00	105.18	N/A	N/A
2412.00	65.41	AV	H	24.84	3.35	0.00	93.60	N/A	N/A
2412.00	73.97	PK	V	24.84	3.35	0.00	102.16	N/A	N/A
2412.00	62.64	AV	V	24.84	3.35	0.00	90.83	N/A	N/A
2390.00	40.36	PK	H	24.80	3.33	0.00	68.49	74.00	5.51
2390.00	22.57	AV	H	24.80	3.33	0.00	50.70	54.00	3.30
4824.00	46.25	PK	H	29.75	4.58	27.41	53.17	74.00	20.83
4824.00	34.42	AV	H	29.75	4.58	27.41	41.34	54.00	12.66
7236.00	45.42	PK	H	33.98	5.62	27.22	57.80	74.00	16.20
7236.00	32.80	AV	H	33.98	5.62	27.22	45.18	54.00	8.82
Middle Channel: 2437 MHz									
2437.00	80.72	PK	H	24.89	3.36	0.00	108.97	N/A	N/A
2437.00	70.04	AV	H	24.89	3.36	0.00	98.29	N/A	N/A
2437.00	77.62	PK	V	24.89	3.36	0.00	105.87	N/A	N/A
2437.00	66.54	AV	V	24.89	3.36	0.00	94.79	N/A	N/A
4874.00	47.88	PK	H	29.85	4.57	27.54	54.76	74.00	19.24
4874.00	34.20	AV	H	29.85	4.57	27.54	41.08	54.00	12.92
7311.00	45.71	PK	H	34.10	5.68	27.28	58.21	74.00	15.79
7311.00	32.41	AV	H	34.10	5.68	27.28	44.91	54.00	9.09
High Channel: 2462 MHz									
2462.00	77.26	PK	H	24.93	3.37	0.00	105.56	N/A	N/A
2462.00	66.45	AV	H	24.93	3.37	0.00	94.75	N/A	N/A
2462.00	74.18	PK	V	24.93	3.37	0.00	102.48	N/A	N/A
2462.00	63.24	AV	V	24.93	3.37	0.00	91.54	N/A	N/A
2483.50	40.56	PK	H	24.97	3.38	0.00	68.91	74.00	5.09
2483.50	22.43	AV	H	24.97	3.38	0.00	50.78	54.00	3.22
4924.00	47.62	PK	H	29.95	4.57	27.51	54.63	74.00	19.37
4924.00	34.57	AV	H	29.95	4.57	27.51	41.58	54.00	12.42
7386.00	45.62	PK	H	34.22	5.74	27.18	58.40	74.00	15.60
7386.00	33.26	AV	H	34.22	5.74	27.18	46.04	54.00	7.96

BLE Mode:

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)					
Low Channel: 2402 MHz									
2402.00	72.36	PK	H	28.10	1.80	0.00	102.26	N/A	N/A
2402.00	67.67	AV	H	28.10	1.80	0.00	97.57	N/A	N/A
2402.00	74.63	PK	V	28.10	1.80	0.00	104.53	N/A	N/A
2402.00	69.98	AV	V	28.10	1.80	0.00	99.88	N/A	N/A
2390.00	24.15	PK	V	28.08	1.80	0.00	54.03	74.00	19.97
2390.00	13.37	AV	V	28.08	1.80	0.00	43.25	54.00	10.75
4804.00	48.02	PK	V	32.91	3.17	37.20	46.90	74.00	27.10
4804.00	35.87	AV	V	32.91	3.17	37.20	34.75	54.00	19.25
7206.00	47.12	PK	V	35.74	4.82	37.23	50.45	74.00	23.55
7206.00	34.69	AV	V	35.74	4.82	37.23	38.02	54.00	15.98
Middle Channel: 2440 MHz									
2440.00	72.29	PK	H	28.18	1.82	0.00	102.29	N/A	N/A
2440.00	67.66	AV	H	28.18	1.82	0.00	97.66	N/A	N/A
2440.00	73.79	PK	V	28.18	1.82	0.00	103.79	N/A	N/A
2440.00	69.22	AV	V	28.18	1.82	0.00	99.22	N/A	N/A
4880.00	47.52	PK	V	33.06	3.27	37.21	46.64	74.00	27.36
4880.00	35.14	AV	V	33.06	3.27	37.21	34.26	54.00	19.74
7320.00	46.83	PK	V	36.03	4.62	37.37	50.11	74.00	23.89
7320.00	34.46	AV	V	36.03	4.62	37.37	37.74	54.00	16.26
High Channel: 2480 MHz									
2480.00	70.18	PK	H	28.26	1.84	0.00	100.28	N/A	N/A
2480.00	65.69	AV	H	28.26	1.84	0.00	95.79	N/A	N/A
2480.00	72.05	PK	V	28.26	1.84	0.00	102.15	N/A	N/A
2480.00	67.44	AV	V	28.26	1.84	0.00	97.54	N/A	N/A
2483.50	27.15	PK	V	28.27	1.84	0.00	57.26	74.00	16.74
2483.50	14.06	AV	V	28.27	1.84	0.00	44.17	54.00	9.83
4960.00	47.97	PK	V	33.22	3.23	37.25	47.17	74.00	26.83
4960.00	35.54	AV	V	33.22	3.23	37.25	34.74	54.00	19.26
7440.00	46.78	PK	V	36.34	4.41	37.52	50.01	74.00	23.99
7440.00	35.19	AV	V	36.34	4.41	37.52	38.42	54.00	15.58

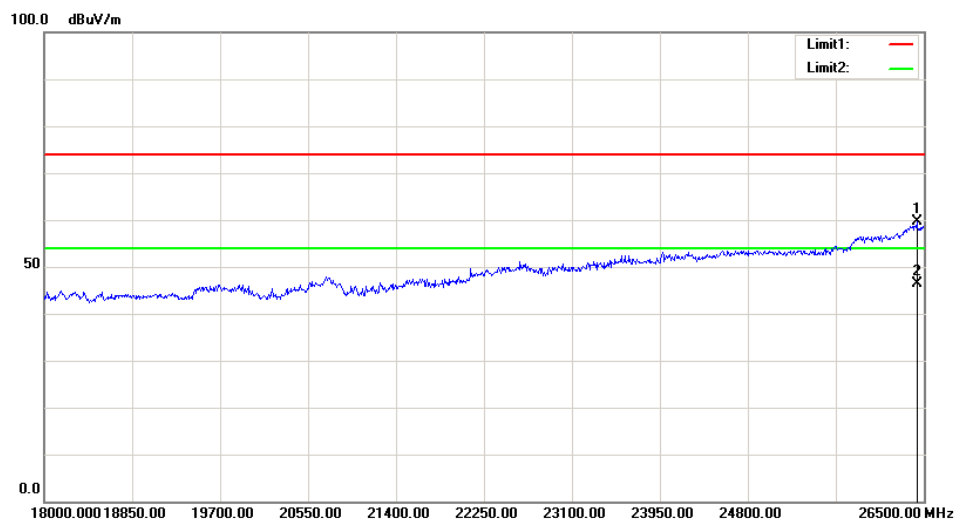
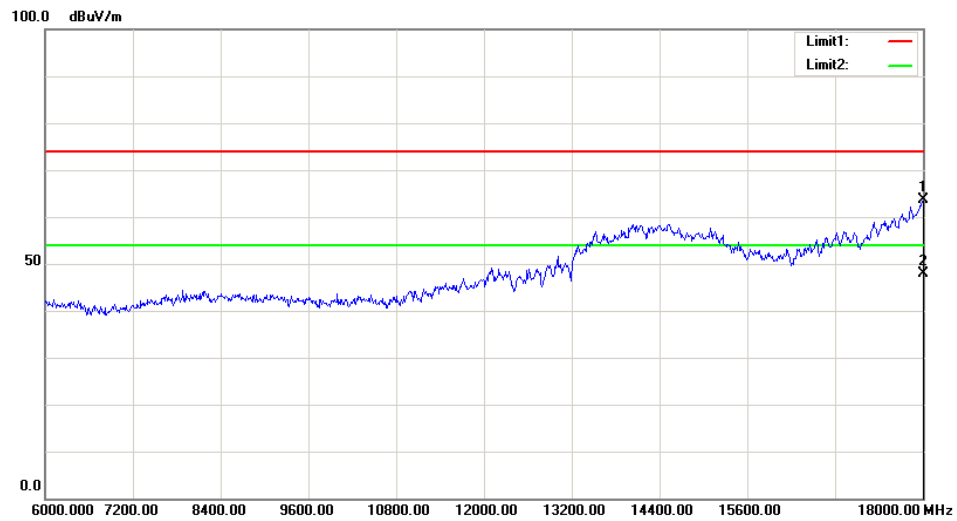
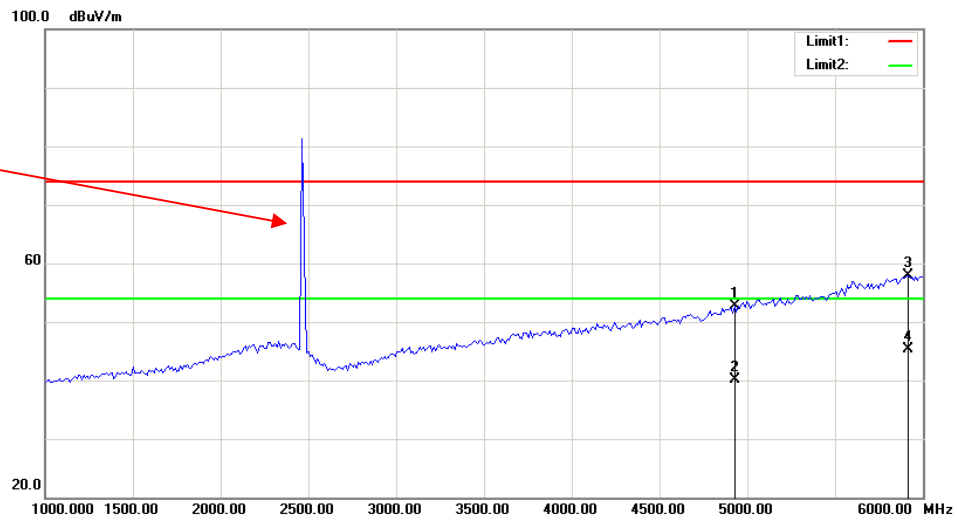
Test plots(802.11 n ht20 mode high channel was the worst)
Horizontal:

Fundamental
Test with Band
Rejection Filter



Vertical:

Fundamental
Test with Band
Rejection Filter



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

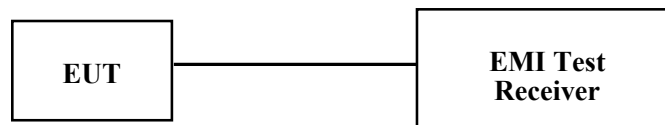
Applicable Standard

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) $\geq 3 \times \text{RBW}$.
- 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	2017-12-08	2018-12-08
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	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:	27.5 °C
Relative Humidity:	61 %
ATM Pressure:	100 kPa

* The testing was performed by Tiago Huang on 2018-07-25.

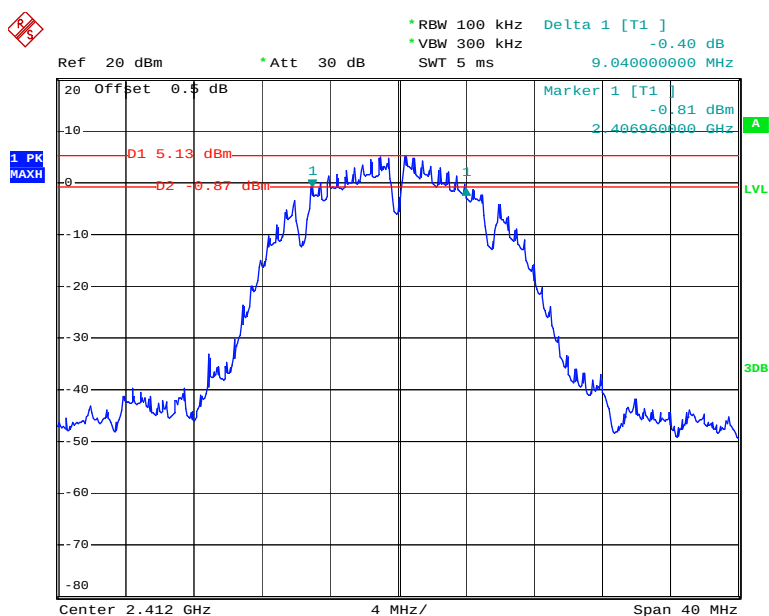
Test Mode: Transmitting

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

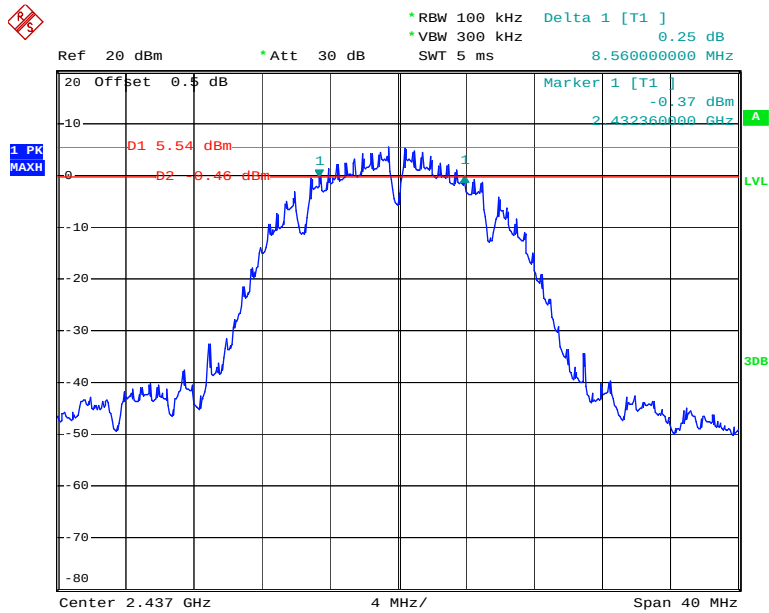
Test mode	Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)
802.11b	Low	2412	9.04	≥ 0.5
	Middle	2437	8.56	≥ 0.5
	High	2462	9.04	≥ 0.5
802.11g	Low	2412	15.52	≥ 0.5
	Middle	2437	15.76	≥ 0.5
	High	2462	15.76	≥ 0.5
802.11n ht20	Low	2412	16.48	≥ 0.5
	Middle	2437	16.48	≥ 0.5
	High	2462	16.48	≥ 0.5
BLE	Low	2402	0.716	≥ 0.5
	Middle	2440	0.704	≥ 0.5
	High	2480	0.684	≥ 0.5

6dB bandwidth:

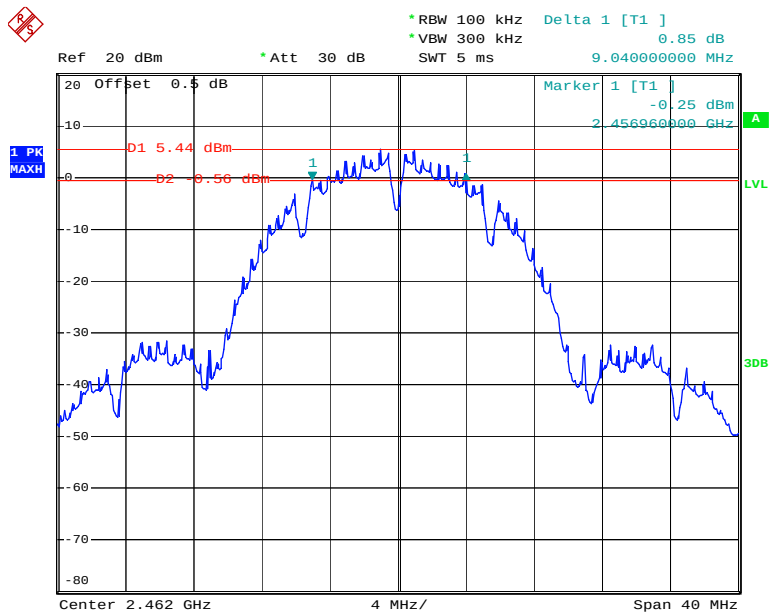
802.11b Low Channel



Date: 25.JUL.2018 20:51:36

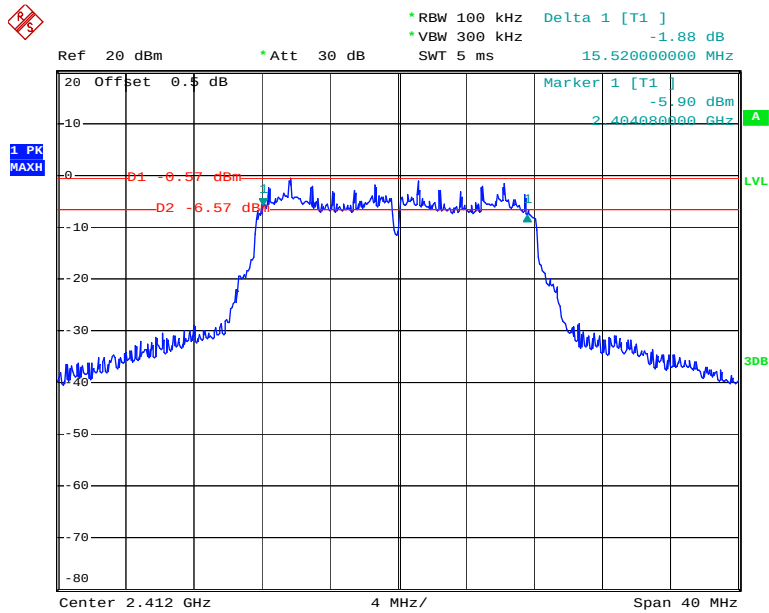
802.11b Middle Channel

Date: 25.JUL.2018 20:56:47

802.11b High Channel

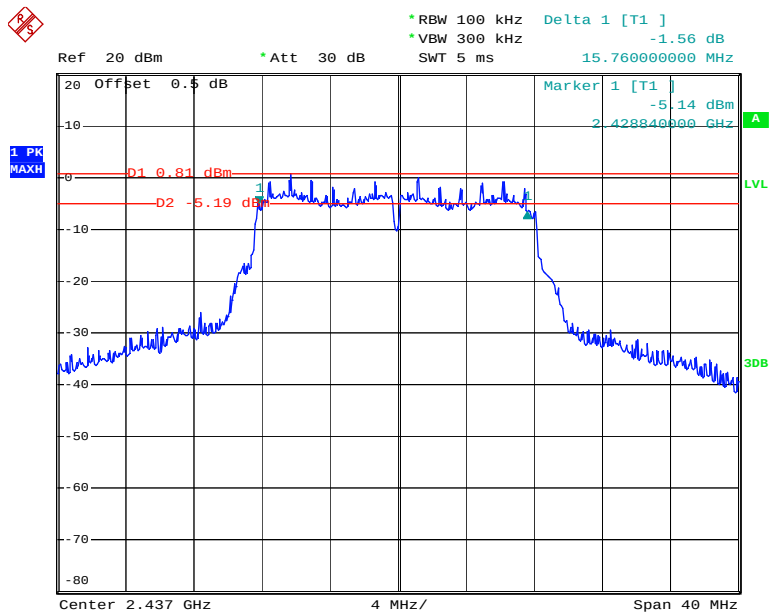
Date: 25.JUL.2018 20:59:14

802.11g Low Channel

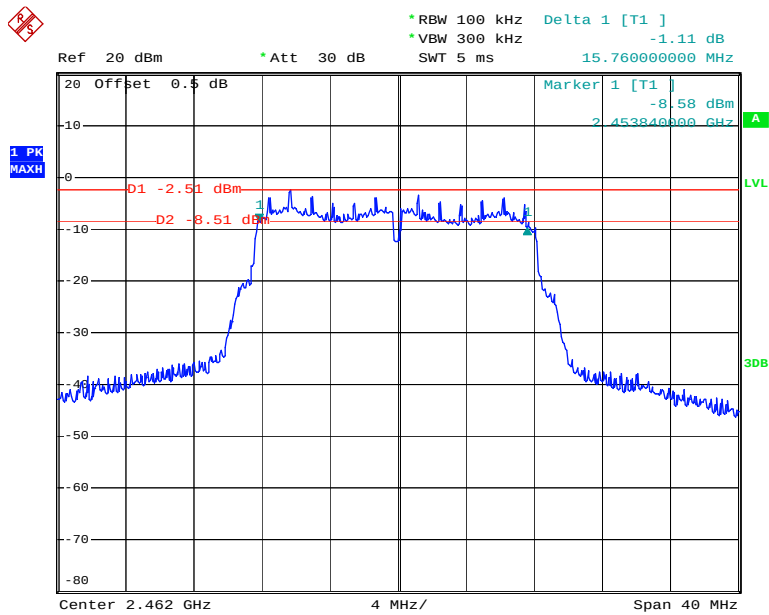


Date: 25.JUL.2018 21:01:58

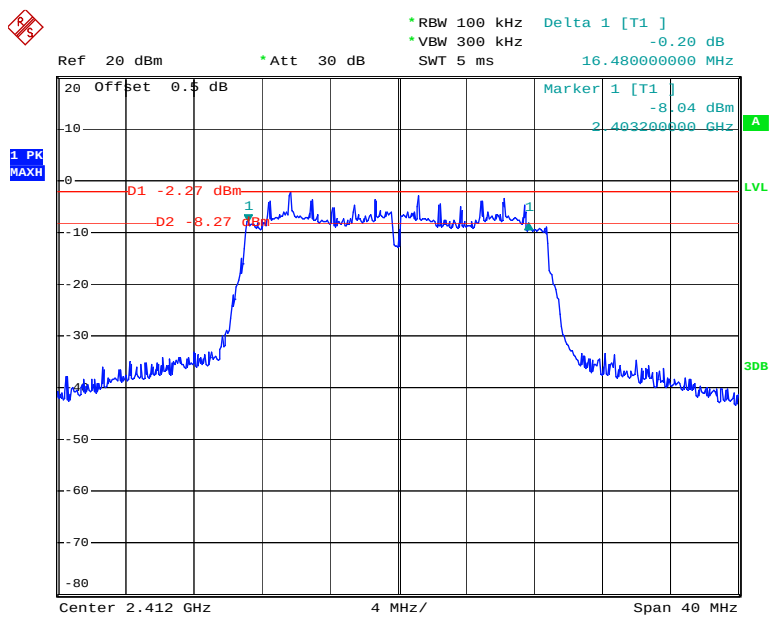
802.11g Middle Channel



Date: 25.JUL.2018 21:05:57

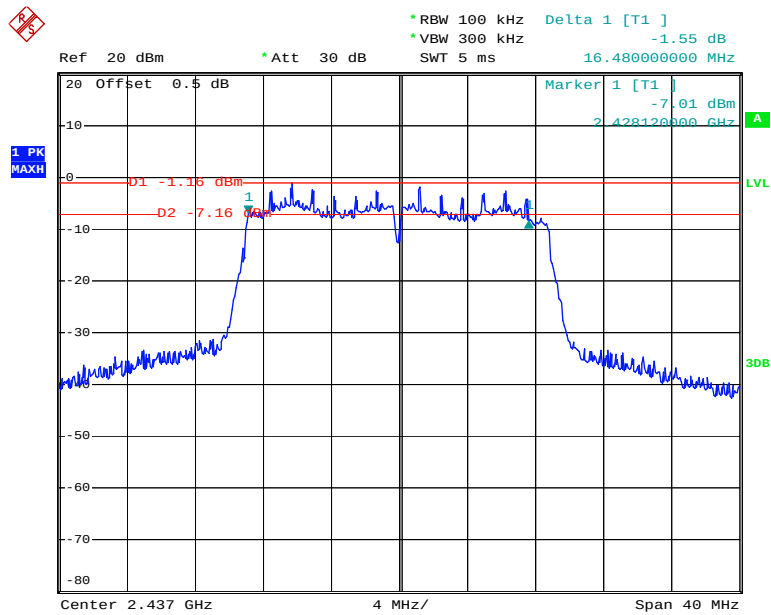
802.11g High Channel

Date: 25.JUL.2018 21:10:07

802.11n ht20 Low Channel

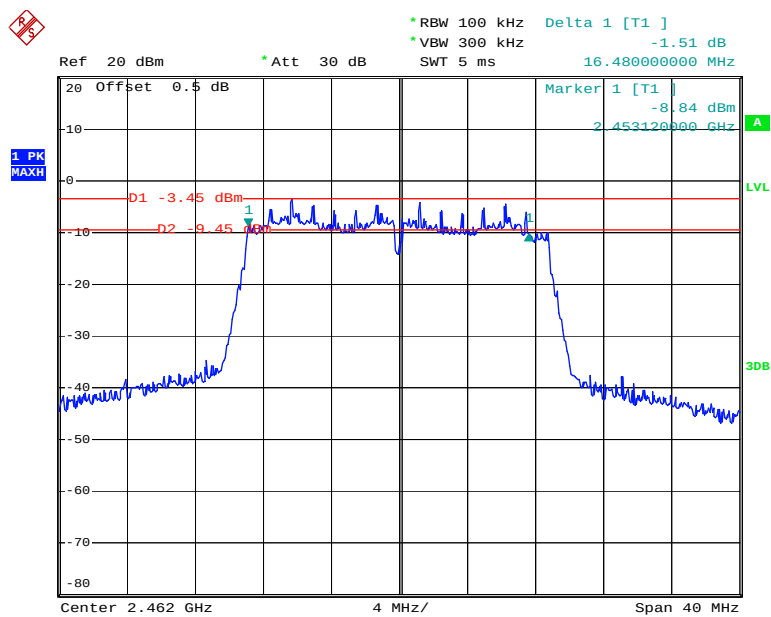
Date: 25.JUL.2018 21:13:44

802.11n ht20 Middle Channel



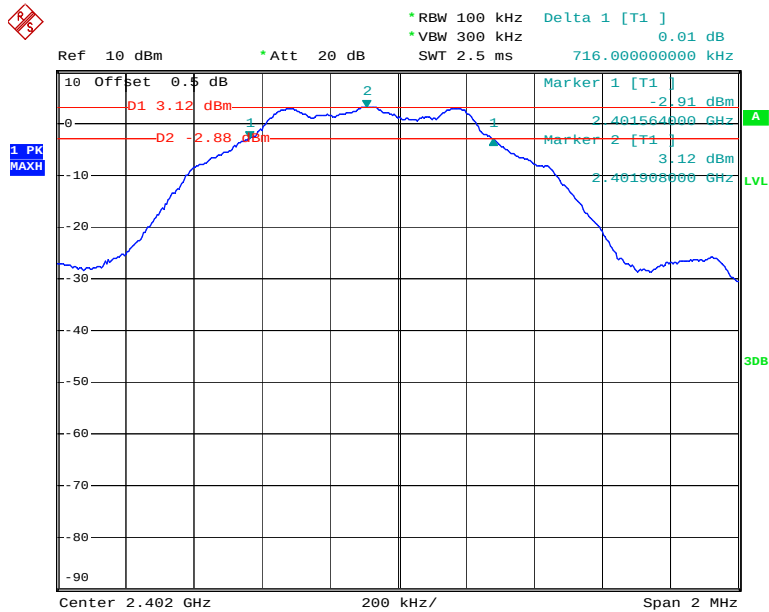
Date: 25.JUL.2018 21:16:44

802.11n ht20 High Channel



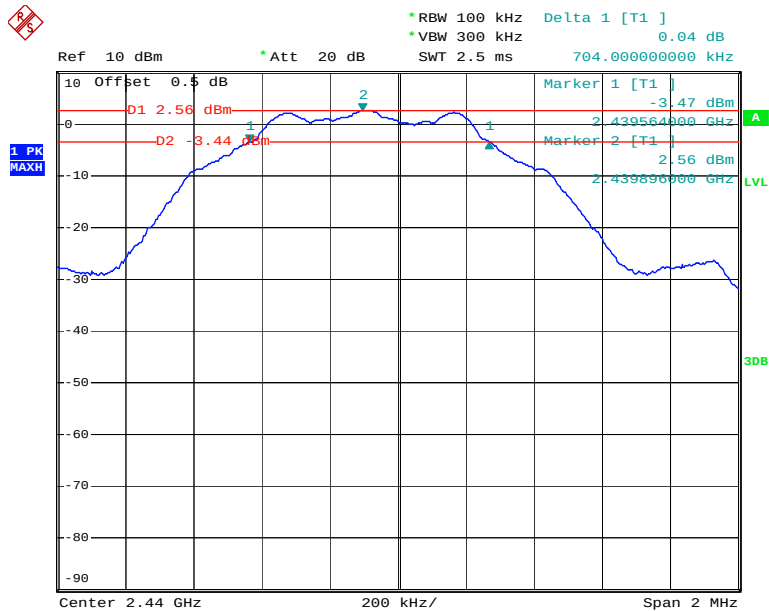
Date: 25.JUL.2018 21:20:34

BLE Low Channel



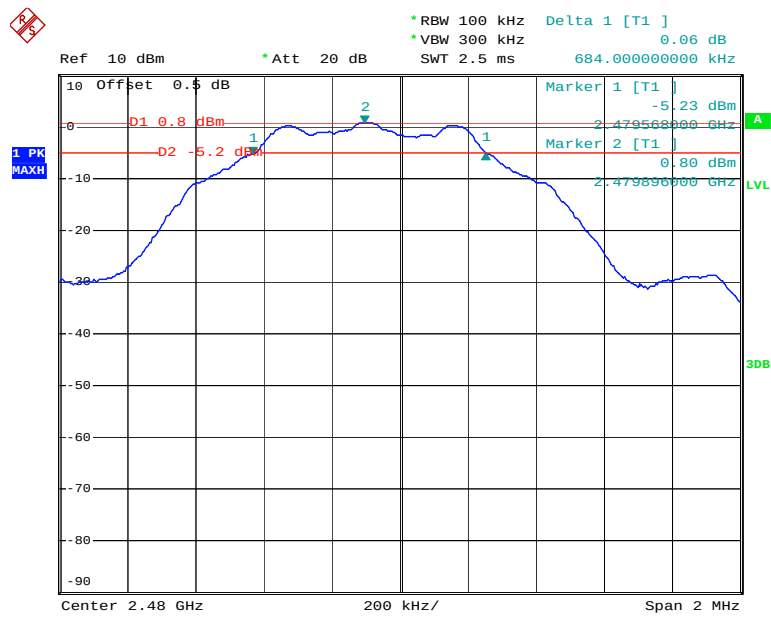
Date: 27.JUN.2018 19:32:07

BLE Middle Channel



Date: 27.JUN.2018 19:40:51

BLE High Channel



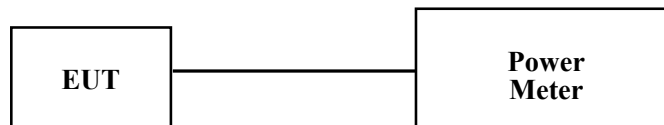
Date: 27.JUN.2018 19:50:12

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	USB Wideband Power Sensor	U2022XA	MY5417006	2017-12-11	2018-12-11
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	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:	27.5 °C
Relative Humidity:	61 %
ATM Pressure:	100 kPa

* The testing was performed by Tiago Huang on 2018-07-25.

Test Mode: Transmitting

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

Test mode	Channel	Frequency (MHz)	Max Peak Conducted Output Power (dBm)	Max Conducted Average Output Power (dBm)	Limit (dBm)
802.11b	Low	2412	17.81	13.88	30
	Middle	2437	15.90	13.58	30
	High	2462	16.75	14.59	30
802.11g	Low	2412	18.47	9.45	30
	Middle	2437	19.09	10.61	30
	High	2462	17.35	7.87	30
802.11n ht20	Low	2412	17.16	7.75	30
	Middle	2437	18.93	8.84	30
	High	2462	19.24	6.89	30
BLE	Low	2402	4.05	/	30
	Middle	2440	3.53	/	30
	High	2480	1.85	/	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	2017-12-08	2018-12-08
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	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

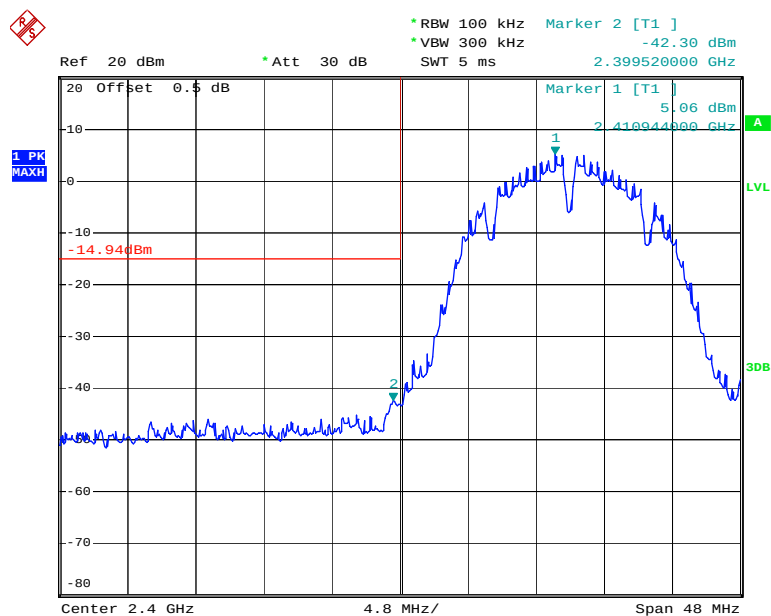
Temperature:	27.1 ~ 29.9 °C
Relative Humidity:	47 ~ 70 %
ATM Pressure:	99.5 ~ 101.7 kPa

* The testing was performed by Tiago Huang from 2018-06-27 to 2018-07-25.

Test mode: Transmitting

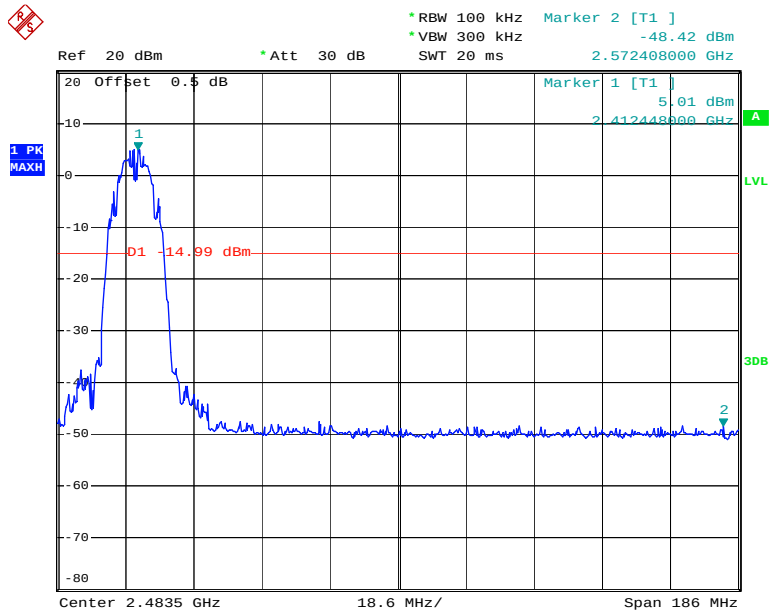
Test Result: Compliant. Please refer to following plots.

802.11b: Band Edge, Left Side



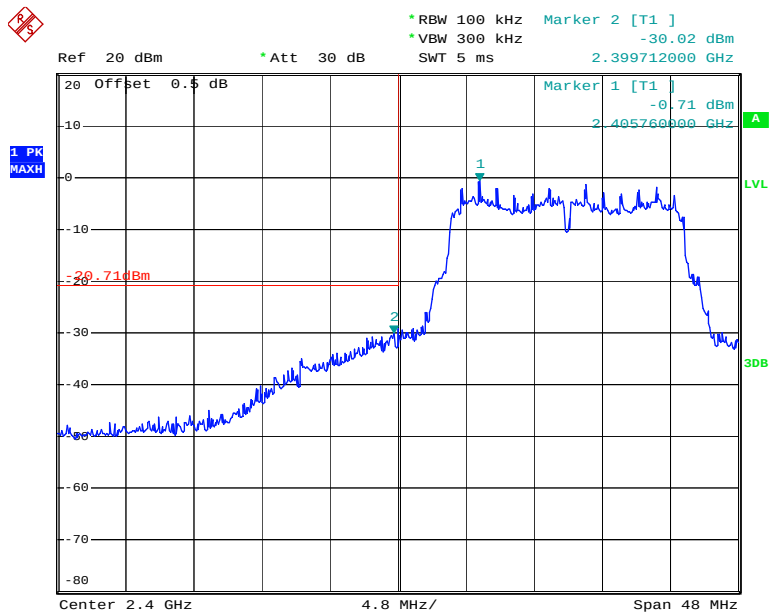
Date: 25.JUL.2018 21:25:41

802.11b: Band Edge, Right Side

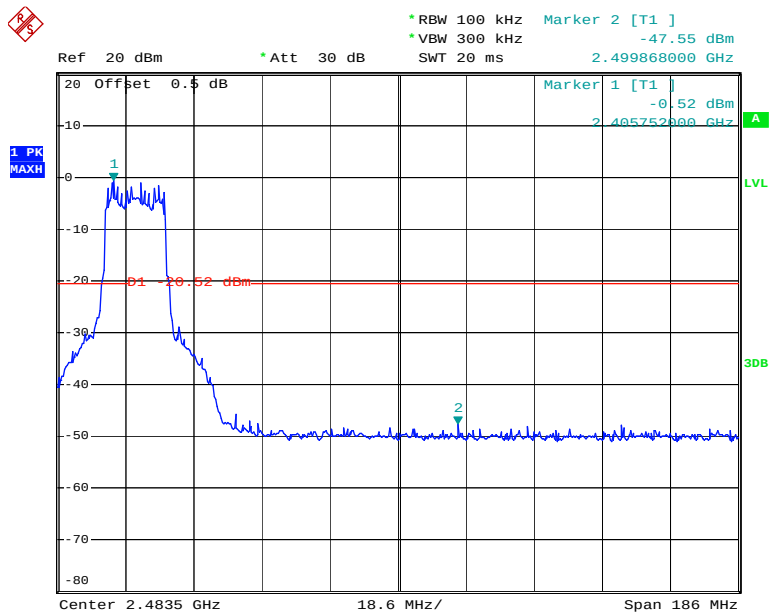


Date: 25.JUL.2018 21:34:36

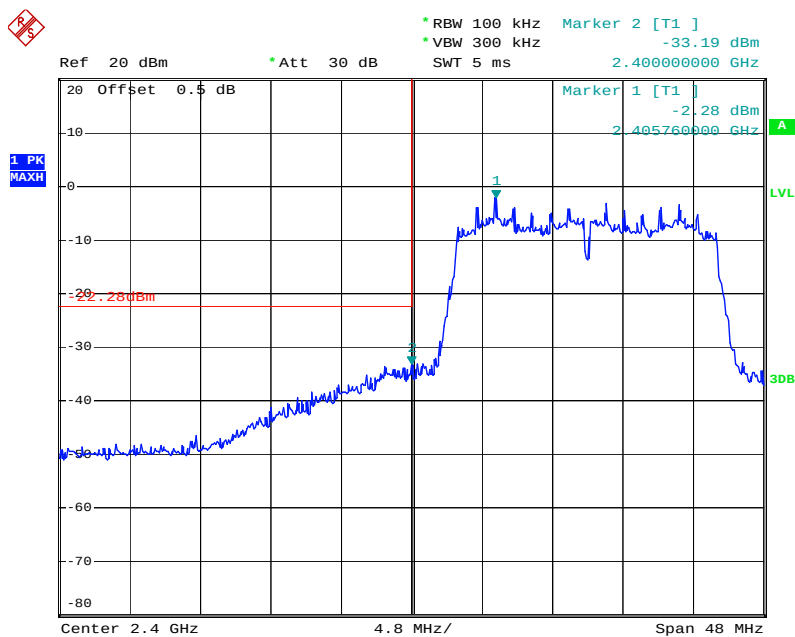
802.11g: Band Edge, Left Side



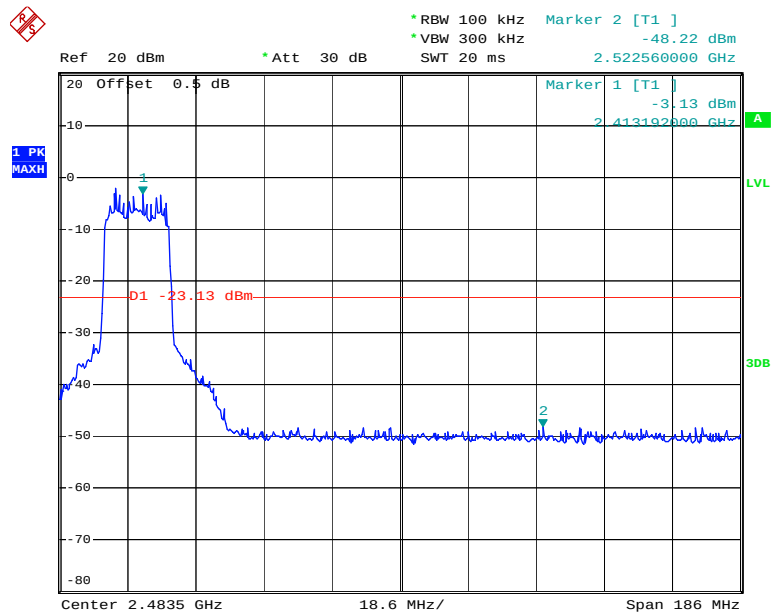
Date: 25.JUL.2018 21:05:00

802.11g: Band Edge, Right Side

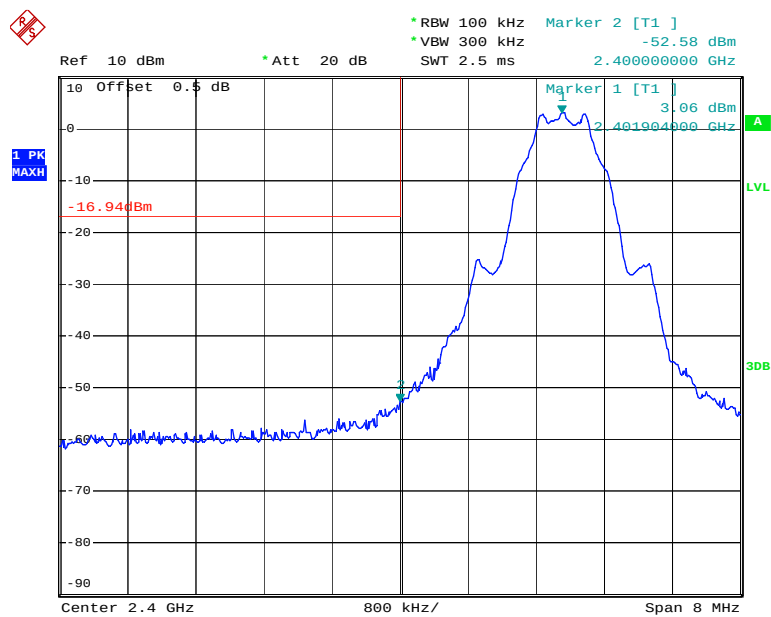
Date: 25.JUL.2018 21:28:52

802.11n ht20 Band Edge, Left Side

Date: 25.JUL.2018 21:15:58

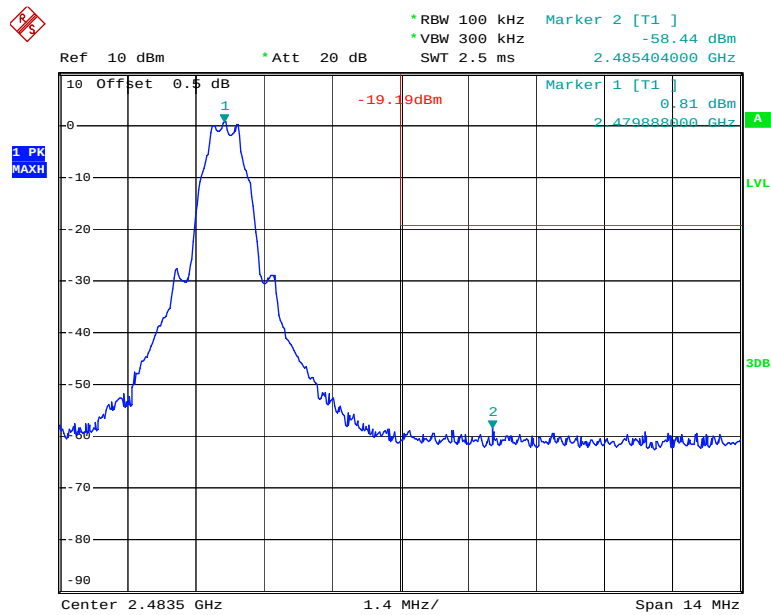
802.11n ht20 Band Edge, Right Side

Date: 25.JUL.2018 21:29:43

BLE Band Edge, Left Side

Date: 27.JUN.2018 19:33:22

BLE Band Edge, Right Side



Date: 27.JUN.2018 19:51:14

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	2017-12-08	2018-12-08
E-Microwave	Blocking Control	EMDCB-00036	0E01201047	2018-05-06	2019-05-06
Unknown	Coaxial Cable	C-SJ00-0010	C0010/02	Each time	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

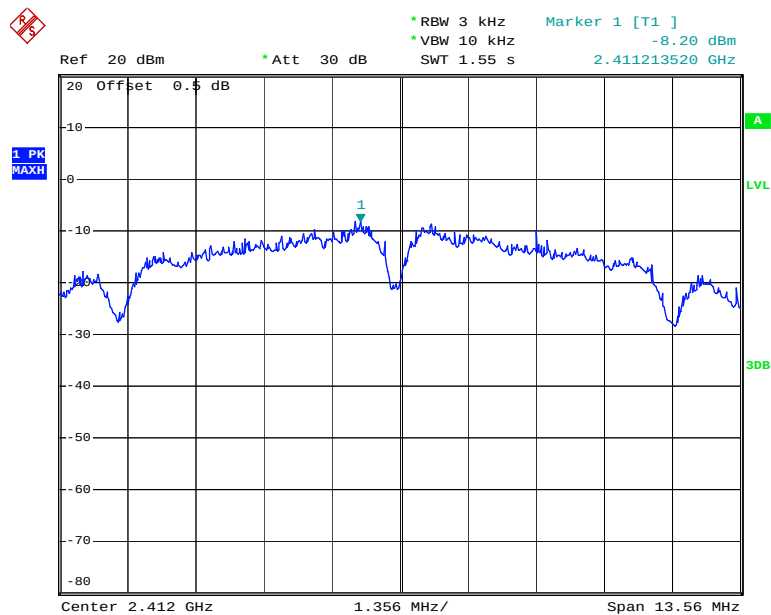
Environmental Conditions

Temperature:	27.1 ~ 29.9 °C
Relative Humidity:	47 ~ 70 %
ATM Pressure:	99.5~101.7 kPa

* The testing was performed by Tiago Huang from 2018-06-27 to 2018-07-25.

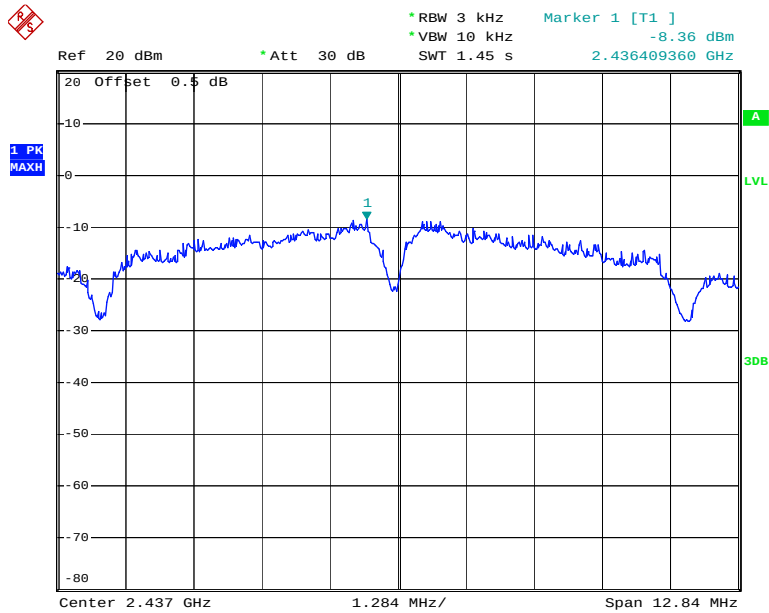
Test Result: Compliance*Test Mode: Transmitting**Test Result: Compliant. Please refer to the following table and plots*

Test mode	Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
802.11b	Low	2412	-8.20	≤ 8
	Middle	2437	-8.36	≤ 8
	High	2462	-8.12	≤ 8
802.11g	Low	2412	-14.60	≤ 8
	Middle	2437	-13.44	≤ 8
	High	2462	-16.85	≤ 8
802.11n ht20	Low	2412	-15.62	≤ 8
	Middle	2437	-15.90	≤ 8
	High	2462	-18.36	≤ 8
BLE	Low	2402	-10.49	≤ 8
	Middle	2440	-11.10	≤ 8
	High	2480	-12.99	≤ 8

Power Spectral Density, 802.11b Low Channel

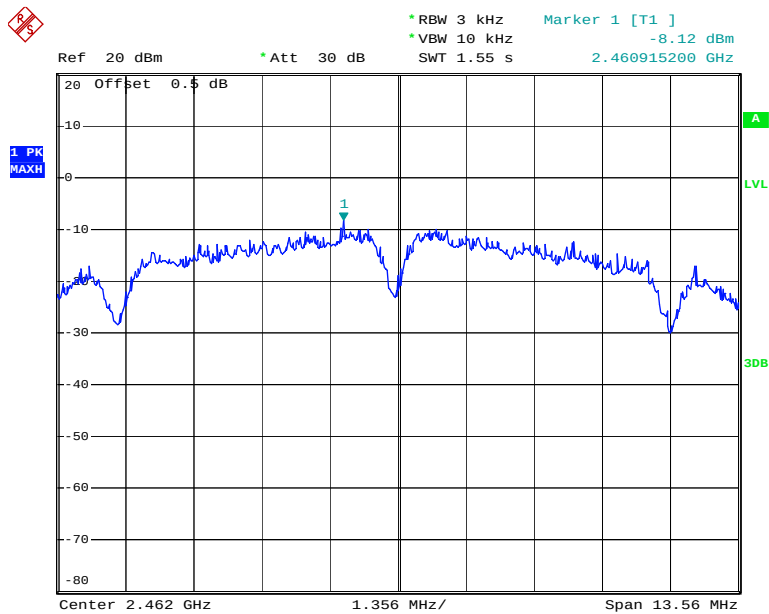
Date: 25.JUL.2018 20:52:48

Power Spectral Density, 802.11b Middle Channel



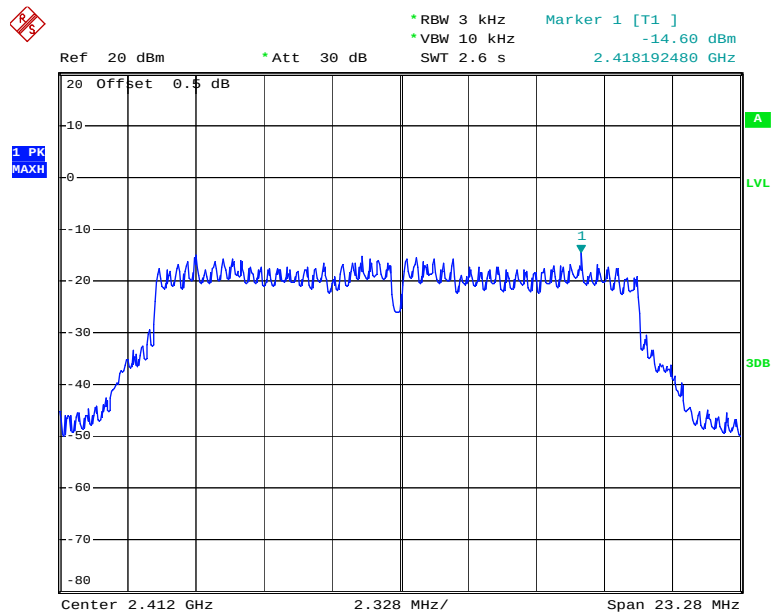
Date: 25.JUL.2018 20:58:01

Power Spectral Density, 802.11b High Channel



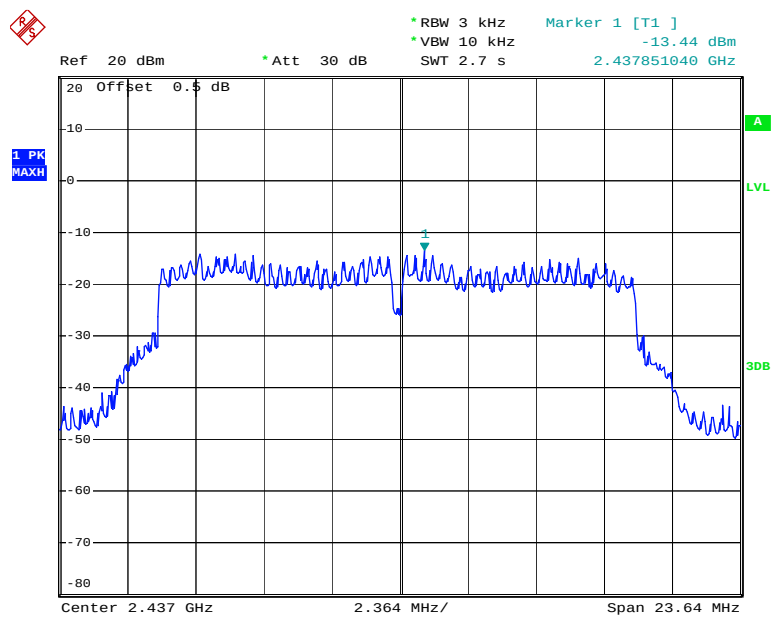
Date: 25.JUL.2018 21:00:20

Power Spectral Density, 802.11g Low Channel



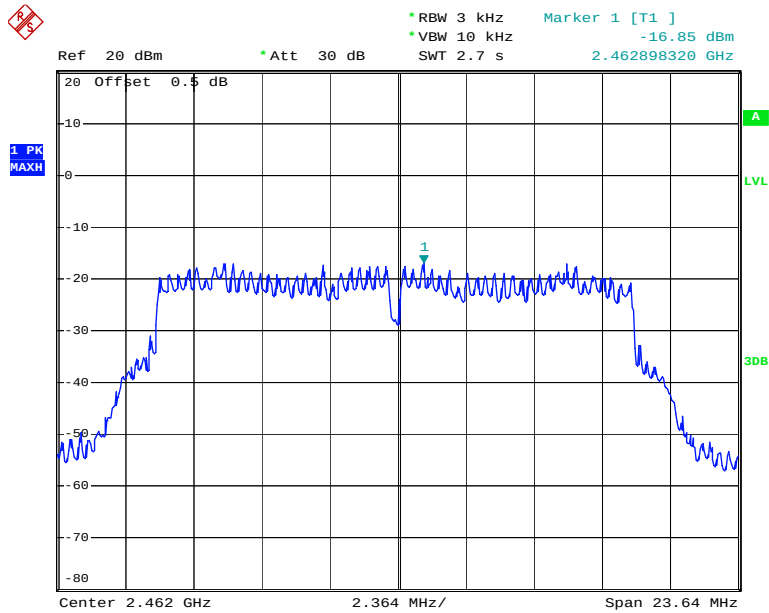
Date: 25.JUL.2018 21:04:21

Power Spectral Density, 802.11g Middle Channel



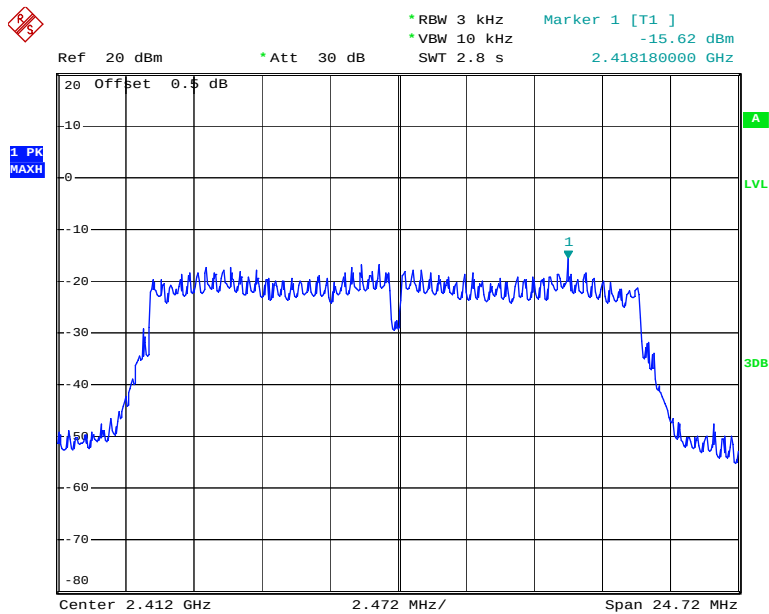
Date: 25.JUL.2018 21:08:00

Power Spectral Density, 802.11g High Channel



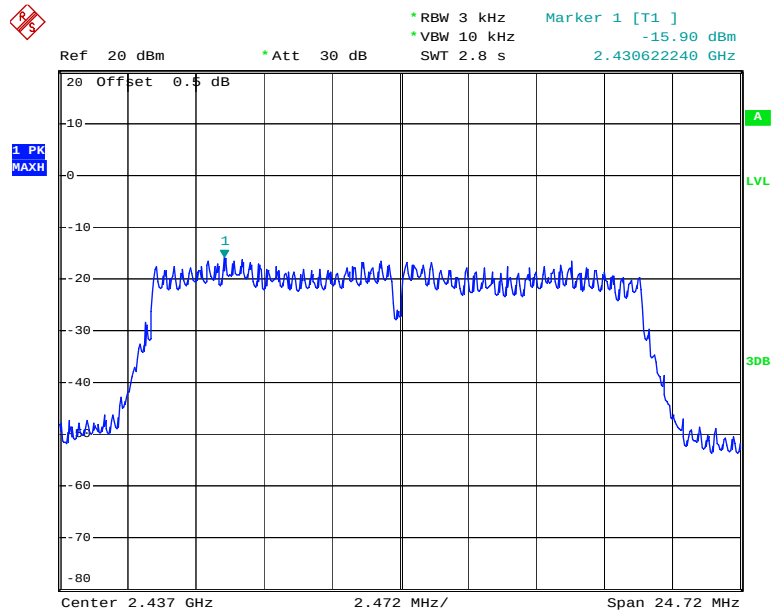
Date: 25.JUL.2018 21:12:43

Power Spectral Density, 802.11n ht20 Low Channel



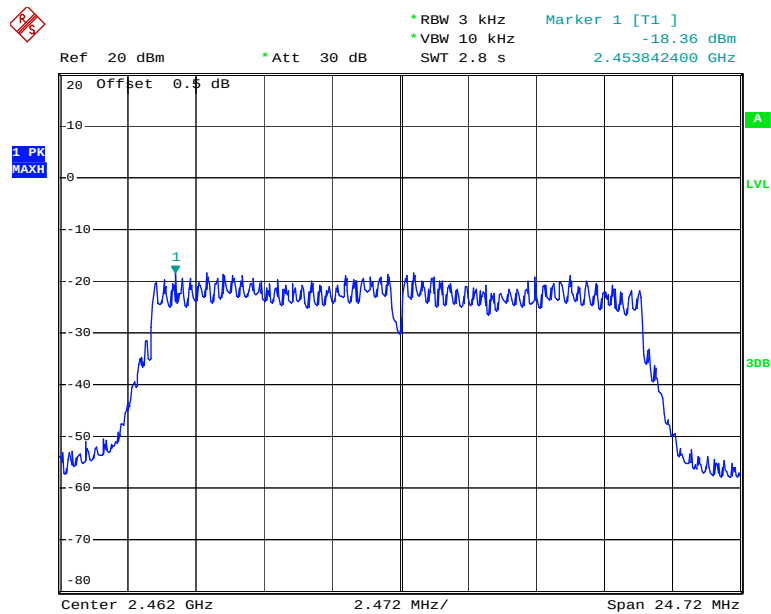
Date: 25.JUL.2018 21:15:28

Power Spectral Density, 802.11n ht20 Middle Channel



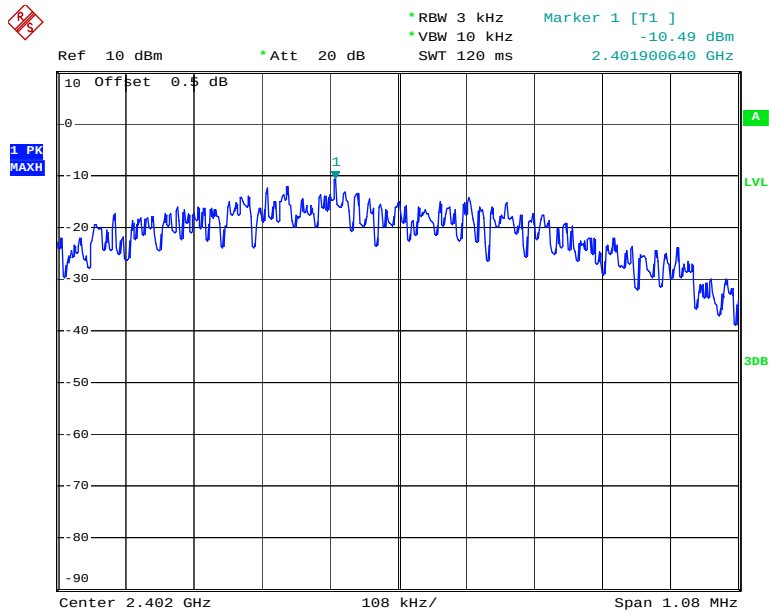
Date: 25.JUL.2018 21:19:23

Power Spectral Density, 802.11n ht20 High Channel



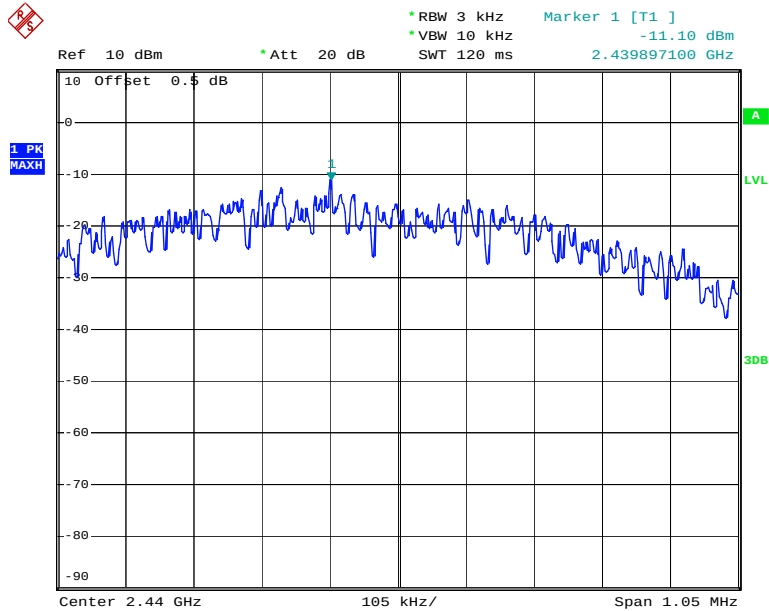
Date: 25.JUL.2018 21:22:23

Power Spectral Density, BLE Low Channel



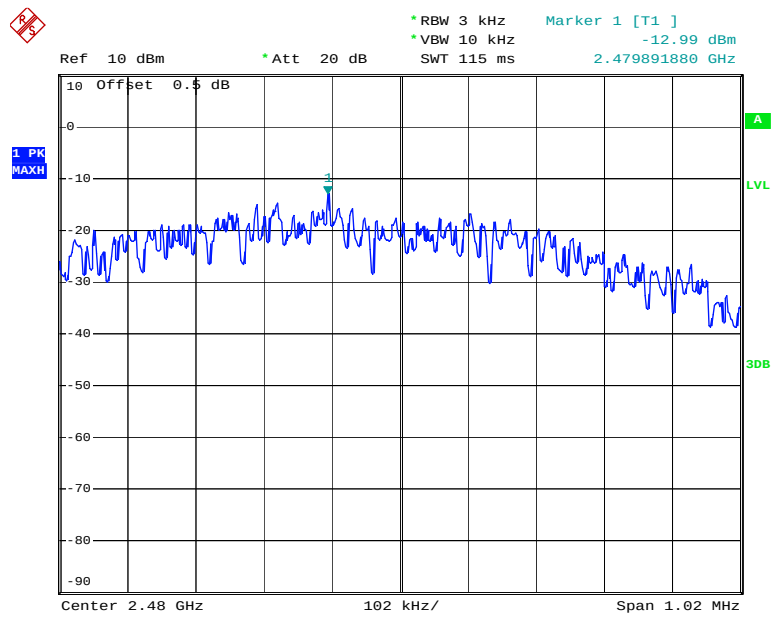
Date: 27.JUN.2018 19:32:55

Power Spectral Density, BLE Middle Channel



Date: 27.JUN.2018 19:41:38

Power Spectral Density, BLE High Channel



Date: 27.JUN.2018 19:50:54

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