FCC PART 15.407

TEST REPORT

For

Alinket Electronic Technology (Shanghai) Co., Ltd.

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

FCC ID: 2AELJ-ALXCOMBA

Report Type:	Product Type:
Original Report	Alinket Wi-Fi & BT Combo Controller

Test Engineer:	Chris Wang
Report Number:	RKS161031009-00C
Report Date:	2016-11-09
Reviewed By:	Jesse Huang EMC Engineer
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Kunshan) No.248 Chenghu Road,Kunshan,Jiangsu province,China Tel: +86-0512-86175000 Fax: +86-0512-88934268 www.baclcorp.com.cn

TABLE OF CONTENTS

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The Alinket Electronic Technology (Shanghai) Co., Ltd.'s product, model number: ALXC2X (FCC ID: 2AELJ-ALXCOMBA) or the "EUT" in this report was a Alinket Wi-Fi & BT Combo Controller, which was measured approximately:28mm (L) x14.3 mm (W) x2.2mm(H). Rated input voltage: 3.3VDC.

** Note: The product's series model number: ALXC1X, ALX85X. The difference between them was explained in the declaration letter.*

**All measurement and test data in this report was gathered from production sample serial number: 20160527001 (Assigned by the BACL. The EUT supplied by the applicant was received on 2016-05-27)*

Objective

This type approval 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 E of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart E, section 15.203, 15.205, 15.207, 15.209 and 15.407 rules.

Related Submittal(s)/Grant(s)

FCC part 15.247 DTS and FCC part 15.247 DSS submission with FCC ID: 2AELJ-ALXCOMBA.

Test Methodology

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

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

Test Facility

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

The EUT was configured for testing in an engineering mode which was provided by the manufacturer.

For 5150~5250 MHz band, 802.11a/n20 mode Channel 5180MHz, 5200MHz, 5240MHz were tested.

For 5725~5850 MHz band, 802.11a/n20 mode Channel 5745MHz, 5785MHz, 5825MHz were tested.

EUT Exercise Software

The software "WL43341B0" was used for testing, which was provided by manufacturer. The worst condition (maximum power) was setting by the software as following table:

For 5150~5250 MHz band
802.11a, Power level: 16
802.11n20, Power level: 15

For 5745~5825 MHz band
802.11a, Power level: 15
802.11n20, Power level: 14

Equipment Modifications

N/A.

Support Equipment List and Details

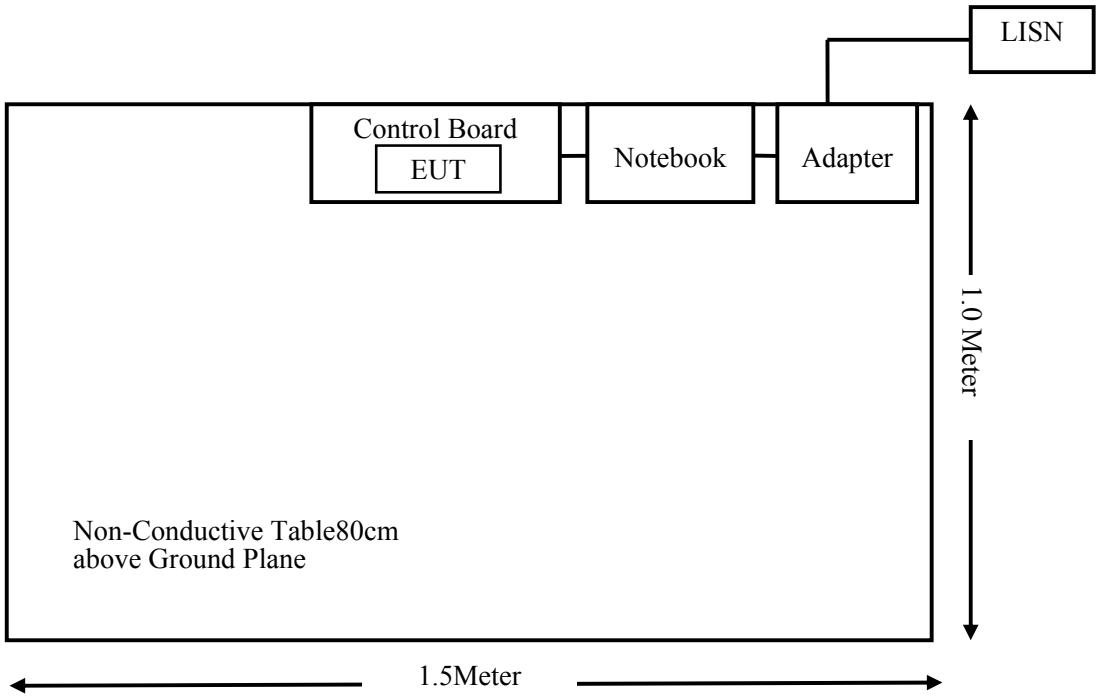
Manufacturer	Description	Model	Serial Number
DELL	Notebook	GX620	D65874152
Alinket	Control Board	N/A	N/A

External Cable

Cable Description	Shielding Type	Length (m)	From Port	To
USB Cable	Unshielding	0.3	Control Board	Notebook

Block Diagram of Test Setup

For Conducted Emissions：



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.407(f) & §2.1091	MAXIMUM PERMISSIBLE EXPOSURE (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
FCC §15.207&§15.407(b) (6)	AC Power Line Conducted Emissions	Compliance
§ 15.205 & §15.209 & §15.407(b) (1),(6),(7)	undesirable emission & restricted bands	Compliance
§15.407(b) (1) ,(4)	BANDEDGE	Compliance
§15.407(a), (1)(5),(e)	Emission Bandwidth	Compliance
§15.407(a)(1)&§15.407(a)(3)	Conducted Transmitter Output Power	Compliance
§15.407 (a)(1),(5)	Power Spectral Density	Compliance

FCC §15.407(f) & §1.1310 & §2.1091- MAXIMUM PERMISSIBLEXPOSURE (MPE)

Applicable Standard

According to §15.247(i) and §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

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 Range	Antenna Gain		Output Power		Evaluation Distance	Power Density	MPE Limit
	(MHz)	(dBi)	(numeric)	(dBm)	(mW)	(cm)	(mW/cm^2)	(mW/cm^2)
802.11b	2412-2462	1.0	1.26	18.00	63.10	20	0.0158	1
802.11g	2412-2462	1.0	1.26	18.00	63.10	20	0.0158	1
802.11n HT20	2412-2462	1.0	1.26	18.00	63.10	20	0.0158	1
BLE	2402-2480	1.0	1.26	4.00	2.51	20	0.0006	1
BT	2402-2480	1.0	1.26	7.00	5.01	20	0.0013	1
802.11a	5150-5250	1.0	1.26	14.00	25.12	20	0.0063	1
802.11n-HT20		1.0	1.26	14.00	25.12	20	0.0063	1
802.11a	5725-5850	1.0	1.26	14.00	25.12	20	0.0063	1
802.11n-HT20		1.0	1.26	14.00	25.12	20	0.0063	1

Note: (1) The target output power:
802.11b： 17±1dBm, which declared by the Manufacturer.
802.11g： 17±1dBm, which declared by the Manufacturer.
802.11n HT20： 17±1dBm, which declared by the Manufacturer.
BLE： 3±1dBm, which declared by the Manufacturer.
BT： 5±2dBm,which declared by the Manufacturer.
802.11a： 12±2 dBm, which declared by the Manufacturer.
802.11n-HT20： 12±2 dBm, which declared by the Manufacturer.

(2) The EUT has the BT, 2.4GHz WIFI, 5GHz WIFI functions, they can transmitting simultaneously. According to KDB 447498 D01 General RF Exposure Guidance v06 and test data, the BT, 2.4G WIFI (802.11n HT20), 5GHz WIFI (802.11a 5150-5250) model is the worst case, their sum of MPE ratio is 0.0234 which is less than 1.0,so the collocation exposure exclusion applies.

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 use of a standard antenna jack or electrical connector is prohibited.

Antenna Connector Construction

The EUT has a ceramic antenna arrangement for WIFI, which the antenna gain is 1dBi, fulfill the requirement of this section. Please refer to the EUT photos.

Result: Compliance.

FCC §15.407 (b) (6) §15.207 (a) –AC Power Line Conducted Emissions

Applicable Standard

FCC §15.207, §15.407(b) (6)

Measurement Uncertainty

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

If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

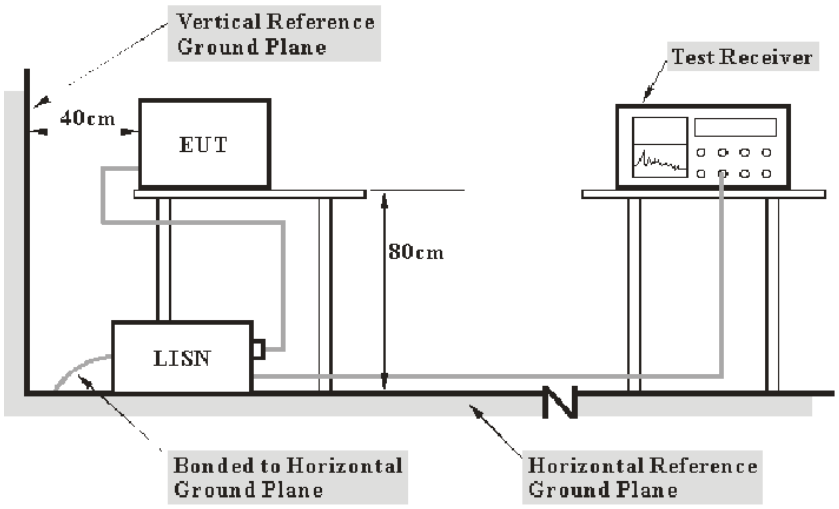
If U_{lab} is greater than U_{cispr} of Table 1, then:
- compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
- non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit.

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

Table 1 – Values of U_{cispr}

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

EUT Setup



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

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

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120VAC/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

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$V_C = V_R + A_C + VDF$
$C_f = A_C + VDF$

Herein,
V_C (cord. Reading): corrected voltage amplitude
V_R: reading voltage amplitude
A_c: attenuation caused by cable loss
VDF: voltage division factor of AMN
C_f: Correction Factor

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

Margin = Limit – Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	834115/007	2015-11-12	2016-11-11
Rohde & Schwarz	LISN	ESH3-Z5	862770/011	2016-10-10	2017-10-10
Rohde & Schwarz	LISN	ESH3-Z5	892239/018	2016-07-04	2017-07-03
Rohde & Schwarz	Pulse limiter	ESH3-Z2	879940/0058	2016-06-19	2017-06-18
HP	Current probe	11967A	636	2016-07-04	2017-07-03
FCC	ISN	FCC-TLISN-T8-02	20376	2016-07-04	2017-07-03
Rohde & Schwarz	CE Test software	EMC 32	V 09.10.0	/	/
MICRO-COAX	Coaxial line	UFB-293B-1-0480-50X50	97F0173	2016-09-08	2017-09-08

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

Test Procedure

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

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

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

Test Results Summary

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

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

Test Data

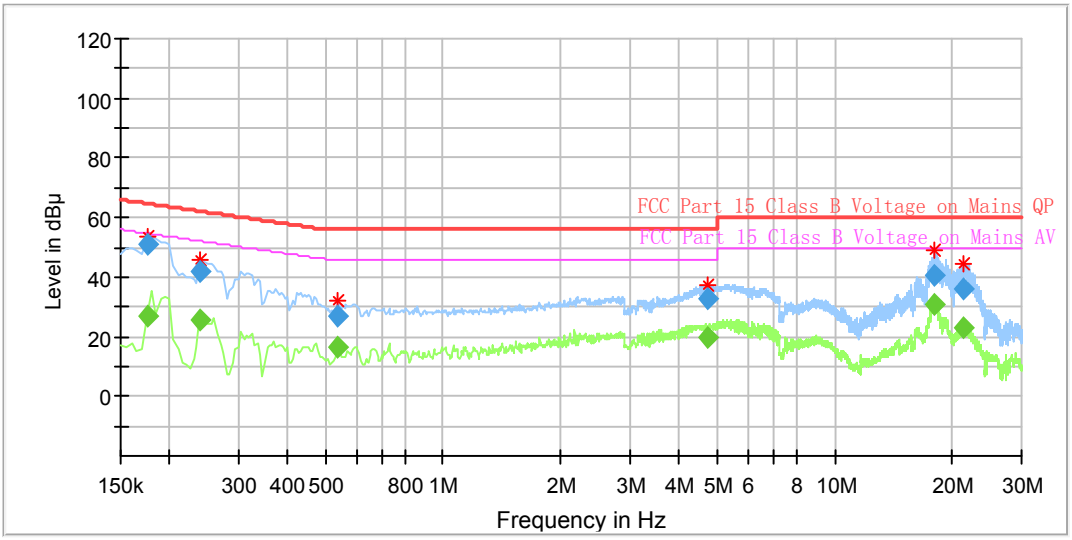
Environmental Conditions

Temperature:	27.3 °C
Relative Humidity:	55 %
ATM Pressure:	100.5 kPa

The testing was performed by Chris Wang on 2016-10-29.

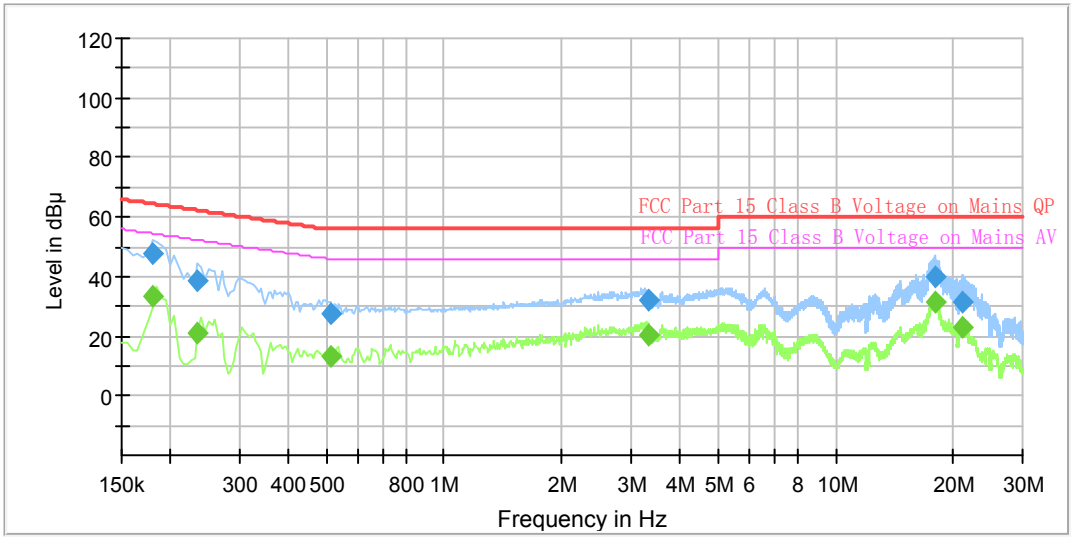
Test Mode: Transmitting

AC 120V/60 Hz, Line



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.175000	---	27.13	9.000	L1	10.3	27.59	54.72	Compliance
0.175000	51.07	---	9.000	L1	10.3	13.65	64.72	Compliance
0.240000	---	25.33	9.000	L1	10.3	26.77	52.10	Compliance
0.240000	41.87	---	9.000	L1	10.3	20.23	62.10	Compliance
0.540000	---	16.31	9.000	L1	10.3	29.69	46.00	Compliance
0.540000	27.19	---	9.000	L1	10.3	28.81	56.00	Compliance
4.740000	---	19.88	9.000	L1	10.5	26.12	46.00	Compliance
4.740000	32.70	---	9.000	L1	10.5	23.30	56.00	Compliance
18.050000	---	30.58	9.000	L1	10.5	19.42	50.00	Compliance
18.050000	40.66	---	9.000	L1	10.5	19.34	60.00	Compliance
21.435000	---	22.74	9.000	L1	10.5	27.26	50.00	Compliance
21.435000	36.31	---	9.000	L1	10.5	23.69	60.00	Compliance

AC 120V/60 Hz, Neutral



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.180000	---	33.28	9.000	N	10.3	21.21	54.49	Compliance
0.180000	47.95	---	9.000	N	10.3	16.54	64.49	Compliance
0.235000	---	21.22	9.000	N	10.3	31.05	52.27	Compliance
0.235000	38.31	---	9.000	N	10.3	23.96	62.27	Compliance
0.515000	---	13.35	9.000	N	10.3	32.65	46.00	Compliance
0.515000	27.27	---	9.000	N	10.3	28.73	56.00	Compliance
3.325000	---	20.09	9.000	N	10.5	25.91	46.00	Compliance
3.325000	31.98	---	9.000	N	10.5	24.02	56.00	Compliance
17.865000	---	31.43	9.000	N	10.5	18.57	50.00	Compliance
17.865000	40.11	---	9.000	N	10.5	19.89	60.00	Compliance
21.040000	---	22.86	9.000	N	10.5	27.14	50.00	Compliance
21.040000	31.70	---	9.000	N	10.5	28.30	60.00	Compliance

Note:

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

§15.205 & §15.209 & §15.407(B) (1),(6),(7) – UNDESIRABLE EMISSION & RESTRICTED BANDS

Applicable Standard

FCC §15.407 (b) (1), (6), (7); §15.209; §15.205;

For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27dBm/MHz

For transmitters operating in the 5.25–5.35 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz. Devices operating in the 5.25–5.35 GHz band that generate emissions in the 5.15–5.25 GHz band must meet all applicable technical requirements for operation in the 5.15–5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of –27 dBm/MHz in the 5.15–5.25 GHz band.

For transmitters operating in the 5.47–5.725 GHz band: all emissions outside of the 5.47–5.725 GHz band shall not exceed an EIRP of −27 dBm/MHz.

For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

As per FCC §15.35(d):Unless otherwise specified, on any frenquency or frequencies above 1000MHz,the radiated emission limits are based on the use of measurement instrunmentation employing an average detector function. Unless otherwise specified, measurements above 1000MHz shall be performed using a minimum resolution bandwidth of 1MHz.

According to KDB 789033 D02 General UNII Test Procedures New Rules v01, emission shall be computed as: E [dBμV/m] = EIRP[dBm] + 95.2, for d = 3 meters.

Measurement Uncertainty

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

If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If U_{lab} is greater than U_{cispr} of Table 1, then:
- compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
- non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit.

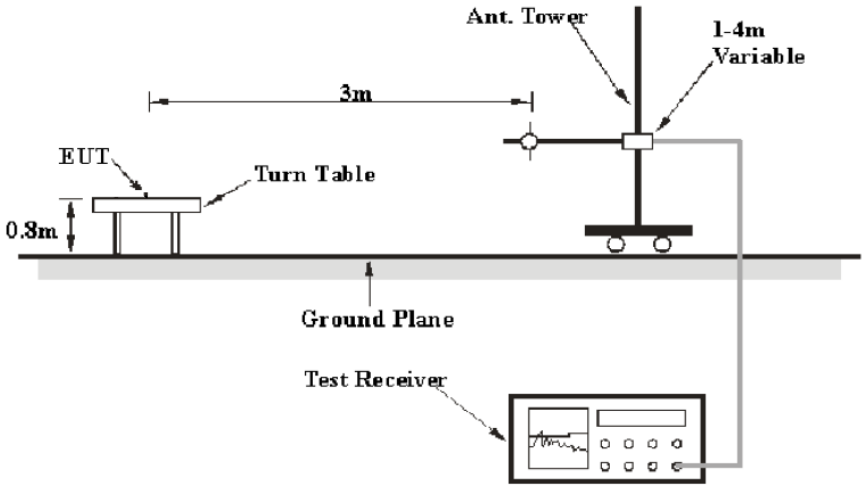
Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:
30M~1GHz: 5.91 dB
1G~6GHz: 4.92 dB
6G~18GHz: 5.23 dB

Table 1 – Values of U_{cispr}

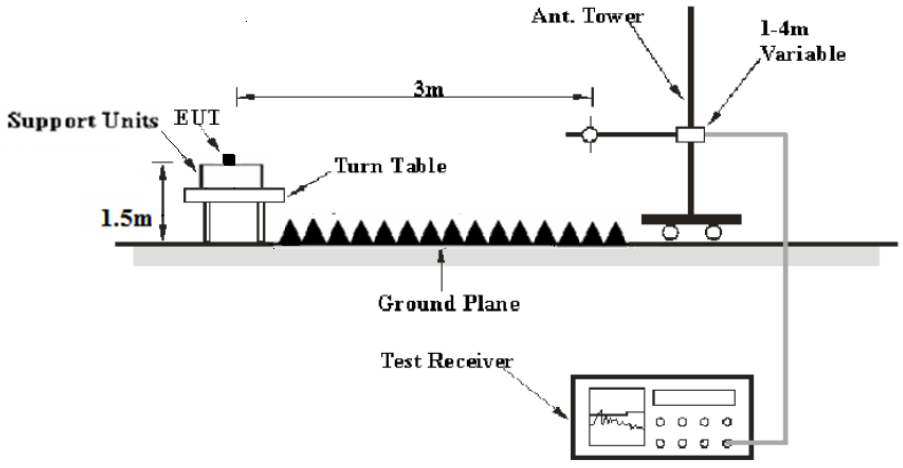
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

EUT Setup

Below 1 G:



Above 1 G:



The radiated emission tests were performed in the 3 meters chamber, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.407 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

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

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 40 GHz.

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

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

Test Procedure

During the radiated emission test, the adapter was connected to the first AC floor outlet and the other support equipments were connected to the second AC floor outlet.

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

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

The Radiated measurements was performed, The EIRP converted to field strength as follows:

According to C63.4, the above 1G test result shall be extrapolated to the specified distance using an extrapolation factor of 20dB/decade from 3m to 1.5m
Distance extrapolation factor =20 log (specific distance [3m]/test distance [1.5m]) dB
Extrapolation result = Corrected Amplitude (dBμV/m) - distance extrapolation factor (6dB)
or Limit line = Specific limits(dBμV) + distance extrapolation factor (6dB)

Corrected Amplitude & Margin Calculation

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

Corrected Amplitude = Meter Reading + Antenna Loss + 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 –Extrapolation result

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sonoma Instrunent	Amplifier	330	171377	2016-10-21	2017-10-21
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2016-11-12	2017-11-11
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2016-01-09	2019-01-08
ETS	Horn Antenna	3115	6229	2016-11-07	2017-11-06
EMCO	Horn Antenna	3116	2516	2016-11-07	2019-11-06
Rohde & Schwarz	Signal Analyzer	FSIQ26	836131/009	2016-09-21	2017-09-21
Mini	Pre-amplifier	ZVA-183-S+	857001418	2016-09-16	2017-09-16
DUCOMMUN	Pre-amplifier	ALN-22093530-01	990147	2016-09-16	2017-09-16
champrotek	Chamber	Chamber A	1#	/	/
R&S	Auto test Software	EMC32	V 09.10.0	/	/
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-12-16	2016-12-15
BACL	RF cable	KS-LAB-010	KS-LAB-010	2016-09-16	2017-09-15

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

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, Section 15.205, 15.209 and 15.407, with the worst margin reading of:

1.93 dB at **5850 M**Hz in the Vertical polarization for 802.11n-ht20 5725-5850 MHz Band.

Test Data

Environmental Conditions

Temperature:	26.5 °C
Relative Humidity:	61 %
ATM Pressure:	100.1 kPa

The testing was performed by Chris Wang on 2016-11-05.

Mode: Transmitting

30MHz~40GHz(5150-5250 MHz & 5725-5850 MHz)

802.11a Mode:

Frequency	Receiver		Turntable Degree	Rx Antenna		Corrected Factor	Corrected Amplitude	Extrapolation result	Limit	Margin
	Reading	Detector		Height	Polar					
(MHz)	(dBμV)	(PK/QP/AV)		(cm)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dB)
5150-5250 MHz band-Low Channel:5180 MHz										
5180.0	102.90	PK	35	150	V	8.6	111.50	105.50	/	/
5180.0	87.22	AV	35	150	V	8.6	95.82	89.82	/	/
5180.0	102.52	PK	66	200	H	8.6	111.12	105.12	/	/
5180.0	87.04	AV	66	200	H	8.6	95.64	89.64	/	/
5150.0	52.84	PK	32	150	V	8.5	61.34	55.34	74	18.66
5150.0	36.01	AV	32	150	V	8.5	44.51	38.51	54	15.49
10360.0	53.02	PK	24	150	V	19.8	72.82	66.82	74	7.18
10360.0	34.74	AV	24	150	V	19.8	54.54	48.54	54	5.46
15540.0	36.55	PK	208	200	H	27.5	64.05	58.05	74	15.96
15540.0	22.39	AV	208	200	H	27.5	49.89	43.89	54	10.11
6654.0	44.25	PK	358	150	V	13.4	57.65	51.65	74	22.35
6654.0	29.47	AV	358	150	V	13.4	42.87	36.87	54	17.13
283.5	40.47	QP	258	100	H	-10.8	29.67	/	46	16.33
5150-5250 MHz band-Middle Channel:5200MHz										
5200.0	103.01	PK	53	150	V	8.6	111.61	105.61	/	/
5200.0	87.53	AV	53	150	V	8.6	96.13	90.13	/	/
5200.0	102.70	PK	65	200	H	8.6	111.30	105.30	/	/
5200.0	86.92	AV	65	200	H	8.6	95.52	89.52	/	/
10400.0	51.74	PK	23	150	V	20.3	72.04	66.04	74	7.96
10400.0	33.70	AV	23	150	V	20.3	54.00	48.00	54	6.00
15600.0	36.14	PK	208	200	H	27.6	63.74	57.74	74	16.26
15600.0	22.13	AV	208	200	H	27.6	49.73	43.73	54	10.27
6654.0	44.24	PK	0	150	V	13.4	57.64	51.64	74	22.36
6654.0	29.33	AV	0	150	V	13.4	42.73	36.73	54	17.27
7450.0	42.65	PK	341	150	H	17.2	59.85	53.85	74	20.15
7450.0	26.97	AV	341	150	H	17.2	44.17	38.17	54	15.84
283.5	40.39	QP	240	100	H	-10.8	29.59	/	46	16.41
5150-5250 MHz band-High Channel:5240MHz										
5240.0	104.60	PK	41	150	V	8.7	113.30	107.30	/	/
5240.0	99.95	AV	41	150	V	8.7	108.65	102.65	/	/
5240.0	100.65	PK	69	200	H	8.7	109.35	103.35	/	/
5240.0	96.82	AV	69	200	H	8.7	105.52	99.52	/	/
5350.0	39.21	PK	33	150	V	9.0	48.21	42.21	74	17.69
5350.0	36.01	AV	33	150	V	9.0	45.01	39.01	54	14.99
10480.0	30.62	PK	76	150	V	20.4	51.02	45.02	74	8.03
10480.0	25.58	AV	76	150	V	20.4	45.98	39.98	54	6.73
15720.0	31.88	PK	205	200	H	27.7	59.58	53.58	74	16.87
15720.0	25.66	AV	205	200	H	27.7	53.36	47.36	54	11.05
6654.0	31.00	PK	354	150	V	13.4	44.40	38.40	74	22.45
6654.0	23.09	AV	354	150	V	13.4	36.49	30.49	54	17.02
283.5	40.34	QP	258	100	H	-10.8	29.54	/	46	16.46

Frequency	Receiver		Turntable Degree	Rx Antenna		Corrected Factor	Corrected Amplitude	Extrapolation result	Limit	Margin
	Reading	Detector		Height	Polar					
(MHz)	(dBμV)	(PK/QP/AV)		(cm)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dB)
5725-5850 MHz band-Low Channel:5745 MHz										
5745.0	90.50	PK	164	150	V	10.1	100.60	94.60	/	/
5745.0	74.74	AV	164	150	V	10.1	84.84	78.84	/	/
5745.0	90.31	PK	56	200	H	10.1	100.41	94.41	/	/
5745.0	74.46	AV	56	200	H	10.1	84.56	78.56	/	/
5725.0	66.00	PK	97	150	V	10.0	76.00	70.00	74	4.00
5725.0	38.54	AV	97	150	V	10.0	48.54	42.54	54	11.46
11490.0	51.94	PK	52	150	V	22.1	74.04	68.04	74	5.96
11490.0	32.11	AV	52	150	V	22.1	54.21	48.21	54	5.79
17235.0	36.97	PK	351	200	H	34.4	71.37	65.37	74	8.63
17235.0	22.36	AV	351	200	H	34.4	56.76	50.76	54	3.24
6587.0	44.85	PK	15	150	V	13.2	58.05	52.05	74	21.95
6587.0	27.80	AV	15	150	V	13.2	41.00	35.00	54	19.00
283.5	40.65	QP	258	100	H	-10.8	29.85	/	46	16.15
5725-5850 MHz band-Middle Channel:5785MHz										
5785.0	92.52	PK	151	150	V	10.2	102.72	96.72	/	/
5785.0	76.69	AV	151	150	V	10.2	86.89	80.89	/	/
5785.0	91.93	PK	48	200	H	10.2	102.13	96.13	/	/
5785.0	76.21	AV	48	200	H	10.2	86.41	80.41	/	/
11570.0	52.08	PK	145	150	V	22.3	74.38	68.38	74	5.62
11570.0	33.13	AV	145	150	V	22.3	55.43	49.43	54	4.57
17355.0	36.92	PK	12	200	H	34.5	71.42	65.42	74	8.58
17355.0	23.34	AV	12	200	H	34.5	57.84	51.84	54	2.16
6587.0	44.77	PK	345	150	V	13.2	57.97	51.97	74	22.03
6587.0	29.06	AV	345	150	V	13.2	42.26	36.26	54	17.74
7551.0	42.65	PK	341	150	H	17.2	59.85	53.85	74	20.15
7551.0	27.25	AV	341	150	H	17.2	44.45	38.45	54	15.55
283.5	39.97	QP	240	100	H	-10.8	29.17	/	46	16.83
5725-5850 MHz band-High Channel:5825MHz										
5825.0	93.02	PK	153	150	V	10.3	103.32	97.32	/	/
5825.0	77.10	AV	153	150	V	10.3	87.40	81.40	/	/
5825.0	92.55	PK	66	200	H	10.3	102.85	96.85	/	/
5825.0	76.67	AV	66	200	H	10.3	86.97	80.97	/	/
5850.0	67.61	PK	256	150	V	10.4	78.01	72.01	74	1.99
5850.0	38.70	AV	256	150	V	10.4	49.10	43.10	54	10.90
11650.0	52.48	PK	157	150	V	22.5	74.98	68.98	74	5.02
11650.0	33.65	AV	157	150	V	22.5	56.15	50.15	54	3.85
17475.0	37.15	PK	21	200	H	34.6	71.75	65.75	74	8.25
17475.0	22.48	AV	21	200	H	34.6	57.08	51.08	54	2.92
6587.0	45.11	PK	350	150	V	13.2	58.31	52.31	74	21.69
6587.0	29.74	AV	350	150	V	13.2	42.94	36.94	54	17.06
283.5	40.44	QP	258	100	H	-10.8	29.64	/	46	16.36

802.11n ht20 Mode:

Frequency	Receiver		Turntable Degree	Rx Antenna		Corrected Factor	Corrected Amplitude	Extrapolation result	Limit	Margin
	Reading	Detector		Height	Polar					
(MHz)	(dBμV)	(PK/QP/AV)		(cm)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dB)
5150-5250 MHz band-Low Channel:5180 MHz										
5180.0	99.43	PK	153	150	V	8.6	108.03	102.03	/	/
5180.0	83.51	AV	153	150	V	8.6	92.11	86.11	/	/
5180.0	99.35	PK	54	200	H	8.6	107.95	101.95	/	/
5180.0	82.85	AV	54	200	H	8.6	91.45	85.45	/	/
5150.0	69.18	PK	32	150	V	8.5	77.68	71.68	74	2.32
5150.0	40.04	AV	32	150	V	8.5	48.54	42.54	54	11.46
10360.0	52.70	PK	354	150	V	20.2	72.90	66.90	74	7.10
10360.0	33.25	AV	354	150	V	20.2	53.45	47.45	54	6.55
15540.0	37.93	PK	138	200	H	27.5	65.43	59.43	74	14.57
15540.0	22.55	AV	138	200	H	27.5	50.05	44.05	54	9.95
6654.0	44.67	PK	119	150	V	13.4	58.07	52.07	74	21.94
6654.0	29.24	AV	119	150	V	13.4	42.64	36.64	54	17.36
283.5	40.34	QP	258	100	H	-10.8	29.54	/	46	16.46
5150-5250 MHz band-Middle Channel:5200MHz										
5200.0	99.28	PK	151	150	V	8.6	107.88	101.88	/	/
5200.0	83.30	AV	151	150	V	8.6	91.90	85.90	/	/
5200.0	99.25	PK	48	200	H	8.6	107.85	101.85	/	/
5200.0	83.16	AV	48	200	H	8.6	91.76	85.76	/	/
10400.0	52.03	PK	0	150	V	20.3	72.33	66.33	74	7.67
10400.0	32.27	AV	0	150	V	20.3	52.57	46.57	54	7.43
15600.0	36.61	PK	147	200	H	27.6	64.21	58.21	74	15.79
15600.0	22.11	AV	147	200	H	27.6	49.71	43.71	54	10.29
6654.0	44.51	PK	118	150	V	13.4	57.91	51.91	74	22.09
6654.0	28.85	AV	118	150	V	13.4	42.25	36.25	54	17.75
7450.0	42.44	PK	341	150	H	17.2	59.64	53.64	74	20.36
7450.0	27.24	AV	341	150	H	17.2	44.44	38.44	54	15.56
283.5	40.58	QP	240	100	H	-10.8	29.78	/	46	16.22
5150-5250 MHz band-High Channel:5240MHz										
5240.0	103.70	PK	42	150	V	8.7	106.90	100.90	/	/
5240.0	98.64	AV	42	150	V	8.7	92.74	86.74	/	/
5240.0	100.90	PK	66	200	H	8.7	106.54	100.54	/	/
5240.0	95.96	AV	66	200	H	8.7	91.89	85.89	/	/
5350.0	36.90	PK	35	150	V	9.0	62.63	56.63	74	17.37
5350.0	33.41	AV	35	150	V	9.0	45.30	39.30	54	14.70
10480.0	29.46	PK	6	150	V	20.4	45.30	39.30	74	34.70
10480.0	24.31	AV	6	150	V	20.4	45.30	39.30	54	14.70
15720.0	31.41	PK	9	200	H	27.7	45.30	39.30	74	34.70
15720.0	24.46	AV	9	200	H	27.7	45.30	39.30	54	14.70
6654.0	30.92	PK	127	150	V	13.4	45.30	39.30	74	34.70
6654.0	23.06	AV	127	150	V	13.4	45.30	39.30	54	14.70
283.5	41.05	QP	258	100	H	-10.8	29.85	/	46	16.15

Frequency	Receiver		Turntable Degree	Rx Antenna		Corrected Factor	Corrected Amplitude	Extrapolation result	Limit	Margin
	Reading	Detector		Height	Polar					
(MHz)	(dBμV)	(PK/QP/AV)		(cm)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dB)
5725-5850 MHz band-Low Channel:5745 MHz										
5745.0	89.33	PK	305	150	V	10.1	99.43	93.43	/	/
5745.0	74.40	AV	305	150	V	10.1	84.50	78.50	/	/
5745.0	89.06	PK	37	200	H	10.1	99.16	93.16	/	/
5745.0	73.98	AV	37	200	H	10.1	84.08	78.08	/	/
5725.0	65.26	PK	298	150	V	10.0	75.26	69.26	74	4.74
5725.0	33.92	AV	298	150	V	10.0	43.92	37.92	54	16.08
11490.0	52.77	PK	76	150	V	22.1	74.87	68.87	74	5.13
11490.0	33.14	AV	76	150	V	22.1	55.24	49.24	54	4.76
17235.0	36.66	PK	321	200	H	34.4	71.06	65.06	74	8.94
17235.0	22.48	AV	321	200	H	34.4	56.88	50.88	54	3.12
6587.0	44.84	PK	310	150	V	13.2	58.04	52.04	74	21.96
6587.0	29.26	AV	310	150	V	13.2	42.46	36.46	54	17.54
283.5	40.45	QP	258	100	H	-10.8	29.65	/	46	16.35
5725-5850 MHz band-Middle Channel:5785MHz										
5785.0	101.09	PK	320	150	V	10.3	100.59	94.59	/	/
5785.0	95.39	AV	320	150	V	10.3	86.41	80.41	/	/
5785.0	97.29	PK	48	200	H	10.3	100.09	94.09	/	/
5785.0	93.03	AV	48	200	H	10.3	85.66	79.66	/	/
11570.0	37.17	PK	0	150	V	22.3	75.54	69.54	74	4.46
11570.0	32.65	AV	0	150	V	22.3	55.43	49.43	54	4.57
17355.0	28.32	PK	359	200	H	34.5	71.18	65.18	74	8.82
17355.0	22.16	AV	359	200	H	34.5	57.15	51.15	54	2.85
6587.0	30.58	PK	100	150	V	13.2	58.32	52.32	74	21.68
6587.0	25.39	AV	100	150	V	13.2	42.58	36.58	54	17.42
7551.0	34.25	PK	341	150	H	17.2	60.34	54.34	74	19.66
7551.0	29.09	AV	341	150	H	17.2	44.15	38.15	54	15.85
283.5	41.54	QP	240	100	H	-10.8	29.99	/	46	16.01
5725-5850 MHz band-High Channel:5825MHz										
5825.0	91.39	PK	0	150	V	10.3	101.69	95.69	/	/
5825.0	76.34	AV	0	150	V	10.3	86.64	80.64	/	/
5825.0	91.07	PK	255	200	H	10.3	101.37	95.37	/	/
5825.0	75.77	AV	255	200	H	10.3	86.07	80.07	/	/
5850.0	67.67	PK	253	150	V	10.4	78.07	72.07	74	1.93
5850.0	35.39	AV	253	150	V	10.4	45.79	39.79	54	14.21
11650.0	53.53	PK	3	150	V	22.5	76.03	70.03	74	3.97
11650.0	33.62	AV	3	150	V	22.5	56.12	50.12	54	3.88
17475.0	36.75	PK	350	200	H	34.6	71.35	65.35	74	8.65
17475.0	23.04	AV	350	200	H	34.6	57.64	51.64	54	2.36
6587.0	45.65	PK	105	150	V	13.2	58.85	52.85	74	21.15
6587.0	29.34	AV	105	150	V	13.2	42.54	36.54	54	17.46
283.5	40.82	QP	258	100	H	-10.8	30.02	/	46	15.98

FCC §15.407(b) (1) (2) (3) (4) –BAND EDGE

Applicable Standard

FCC §15.407 (b) (1), (2), (3), (4);

For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of -27dBm/MHz

For transmitters operating in the 5.25–5.35 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz. Devices operating in the 5.25–5.35 GHz band that generate emissions in the 5.15–5.25 GHz band must meet all applicable technical requirements for operation in the 5.15–5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of –27 dBm/MHz in the 5.15–5.25 GHz band.

For transmitters operating in the 5.47–5.725 GHz band: all emissions outside of the 5.47–5.725 GHz band shall not exceed an EIRP of −27 dBm/MHz.
For transmitters operating in the 5.725–5.850 GHz band: all emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibration 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 measuremen 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 1 MHz and VBW to 3MHz of spectrum analyzer. Offset the antenna gain and cable loss.
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	FSV40	101116	2016-07-04	2017-07-03
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-12-16	2016-12-15

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) 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:	60 %
ATM Pressure:	99.8 kPa

The testing was performed by Chris Wang on 2016-11-04.

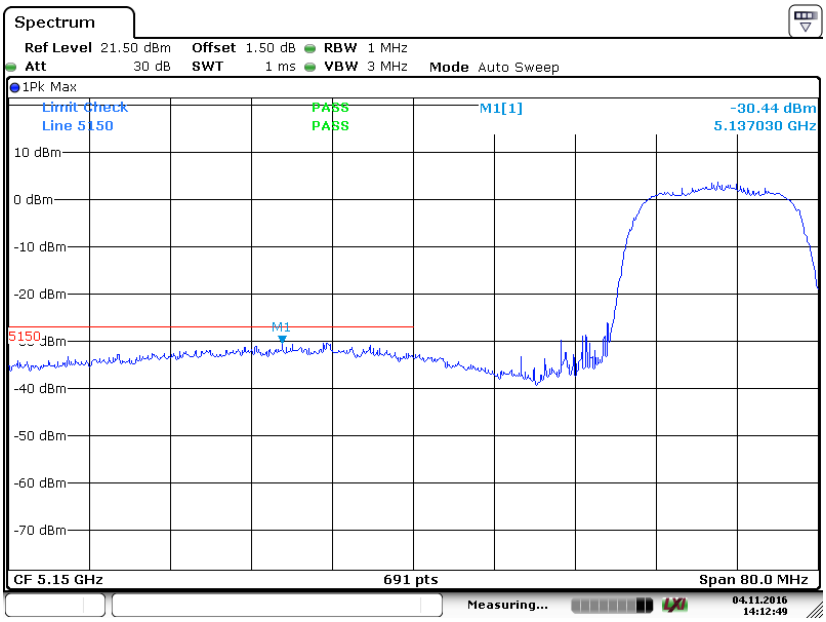
Please refer to the following table and plots.

Test mode	Band	Frequency (MHz)	E.I.R.P BAND EDGE (dBm/MHz)	Limits (dBm/MHz)	Result
802.11a	5150-5250 MHz	5137.0	-30.44	-27	PASS
		5352.4	-37.18	-27	PASS
	5725-5850 MHz	5649.8	-40.24	-27	PASS
		5927.9	-38.08	-27	PASS
802.11n ht20	5150-5250 MHz	5141.2	-30.79	-27	PASS
		5351.0	-38.42	-27	PASS
	5725-5850 MHz	5647.7	-38.58	-27	PASS
		5926.4	-37.85	-27	PASS

NOTE: E.I.R.P BAND EDGE= Reading Level+antenna gain

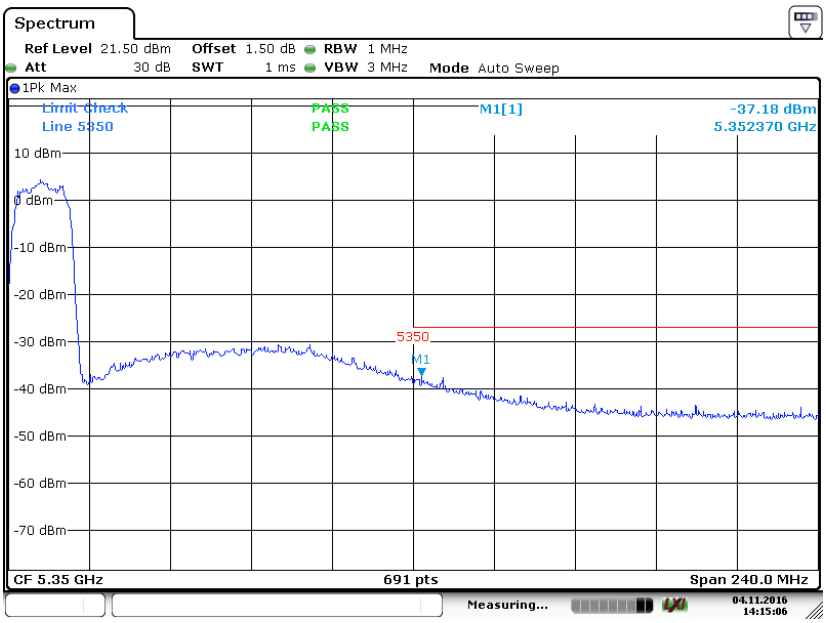
5150-5250 MHz Band:

802.11a Band Edge, Left Side



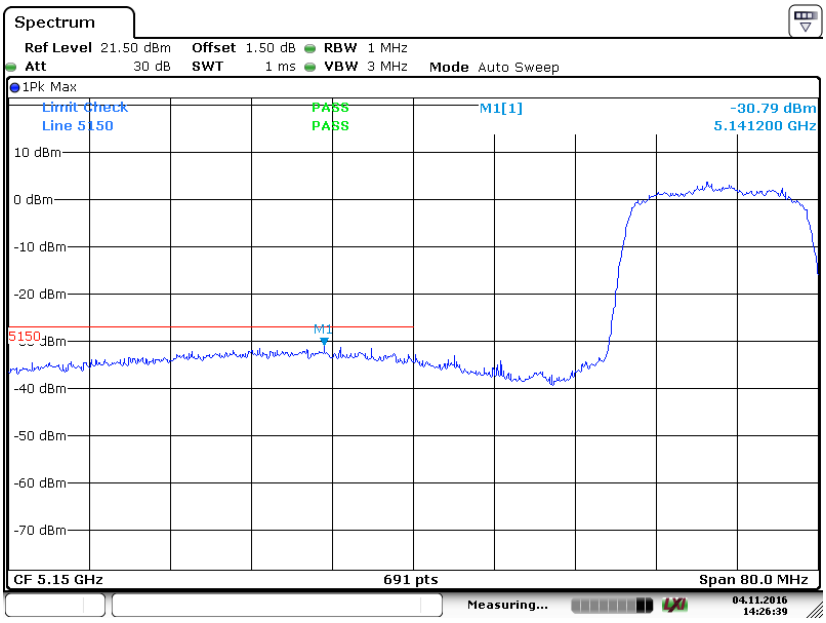
Date: 4.NOV.2016 14:12:49

802.11a Band Edge, Right Side



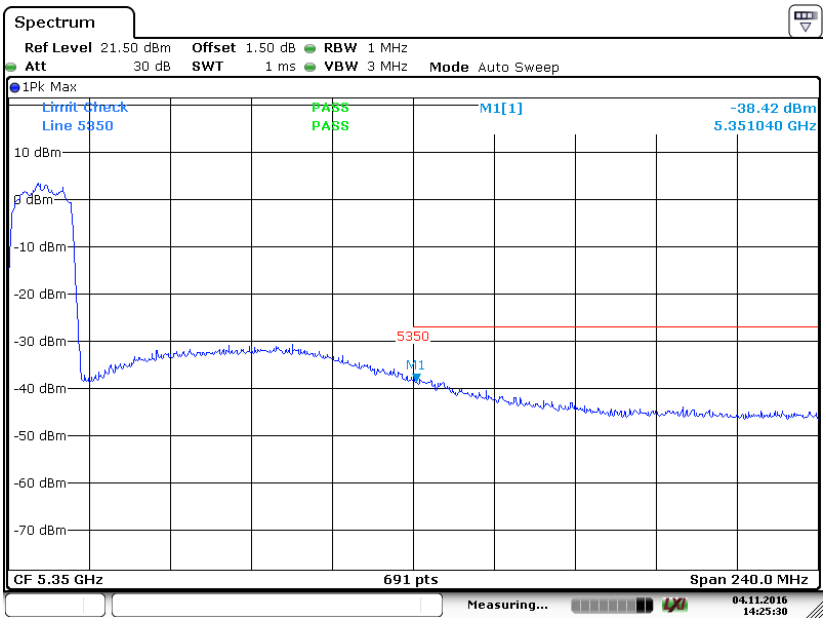
Date: 4.NOV.2016 14:15:06

802.11n ht20 Band Edge, Left Side



Date: 4.NOV.2016 14:26:39

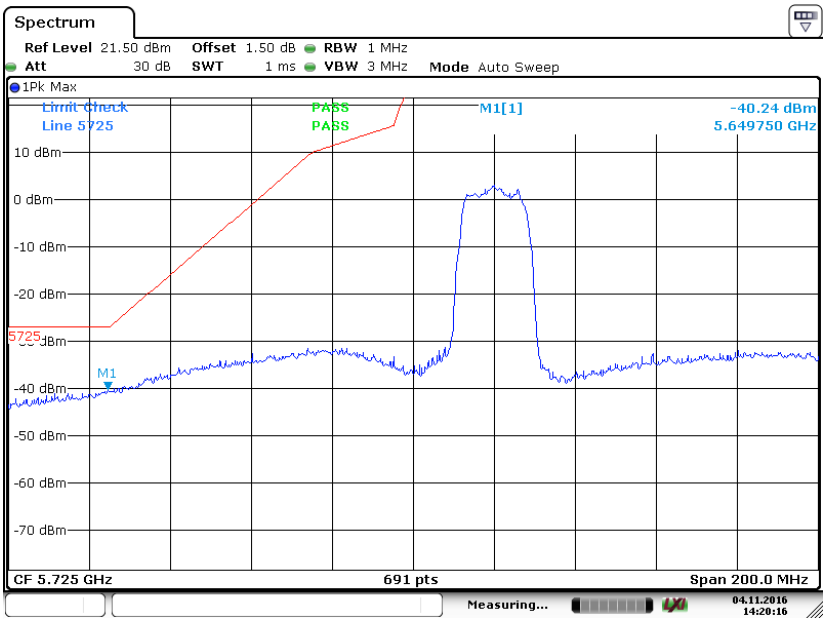
802.11n ht20 Band Edge, Right Side



Date: 4.NOV.2016 14:25:30

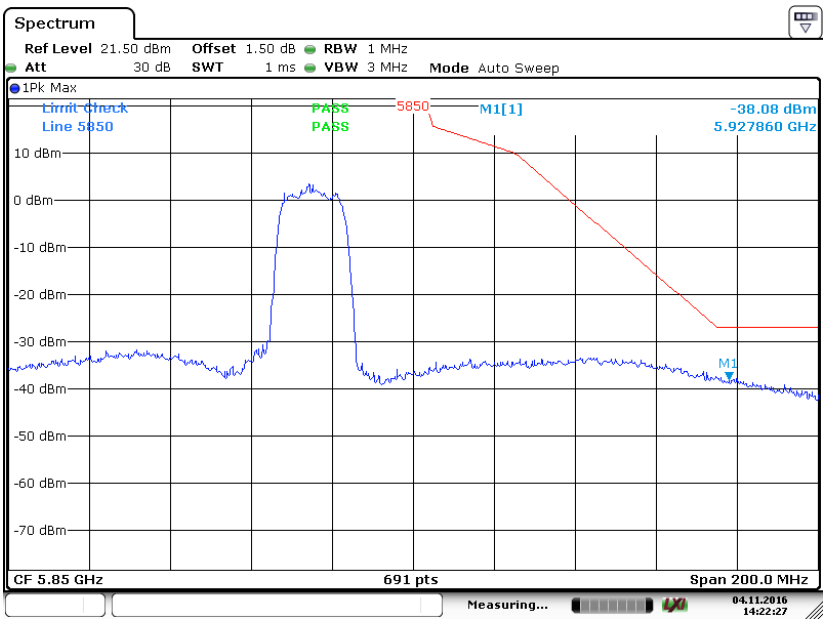
5725-5850 MHz Band:

802.11a Band Edge, Left Side



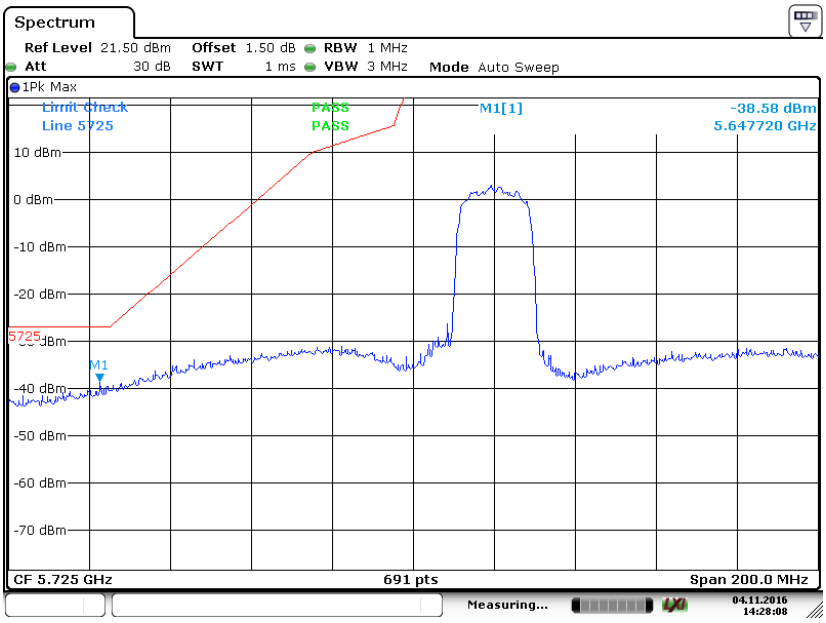
Date: 4.NOV.2016 14:20:16

802.11a Band Edge, Right Side



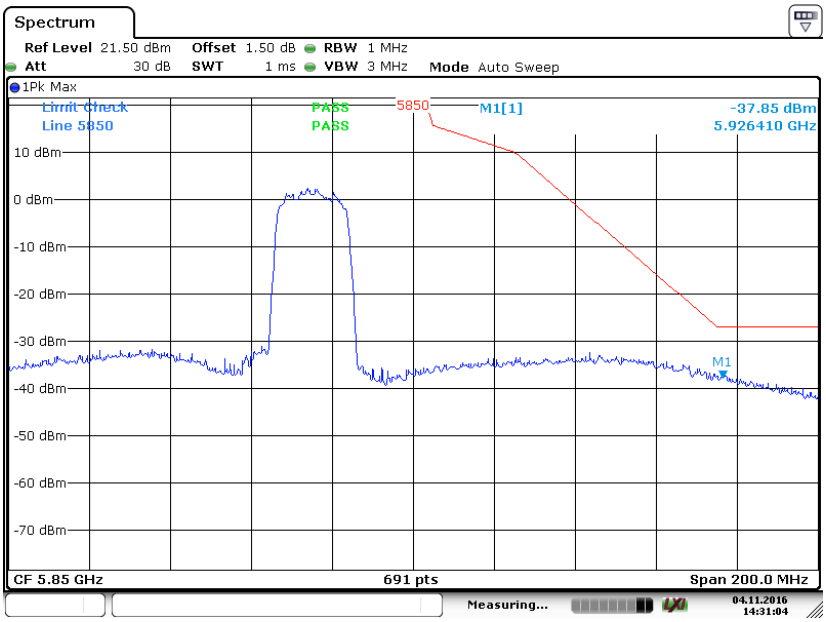
Date: 4.NOV.2016 14:22:27

802.11n ht20 Band Edge, Left Side



Date: 4.NOV.2016 14:28:08

802.11n ht20 Band Edge, Right Side



Date: 4.NOV.2016 14:31:05

FCC §15.407(a) &§15.407(e)–EMISSION BANDWIDTH

Applicable Standard

.
The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Equipment List and Details

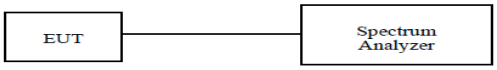
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSV40	101116	2016-07-04	2017-07-03
Rohde & Schwarz	Signal Analyzer	FSIQ26	836131/009	2016-09-21	2017-09-21
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-12-16	2016-12-15

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

Test Procedure

6. **1. Emission Bandwidth (EBW)**
a) Set RBW = approximately 1% of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

2. **Minimum Emission Bandwidth for the band 5.725-5.85 GHz**
Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.725-5.85 GHz. The following procedure shall be used for measuring this bandwidth:
a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 × RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) 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 Data

Environmental Conditions

Temperature:	27.3 °C
Relative Humidity:	60 %
ATM Pressure:	100.2 kPa

The testing was performed by Chris Wang on 2016-11-04.

Test Result: Pass.

Please refer to the following tables and plots.

5150-5250 MHz:

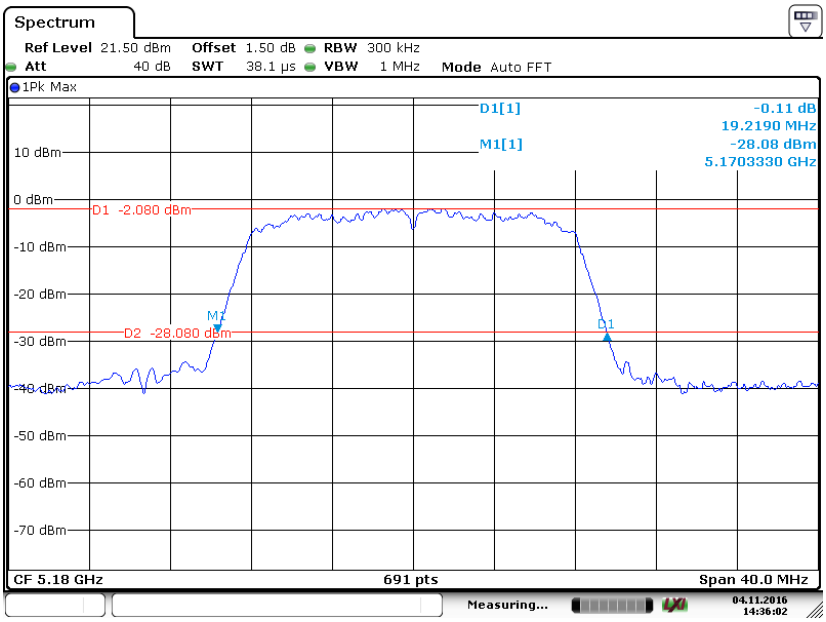
Test mode	Band	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
802.11a	5150-5250 MHz	Low	5180	19.22
		Middle	5200	19.05
		High	5240	18.87
802.11n ht20	5150-5250 MHz	Low	5180	19.22
		Middle	5200	19.28
		High	5240	19.33

5725-5850MHz:

Test mode	Band	Channel	Frequency (MHz)	6dB Bandwidth (MHz)
802.11a	5725-5850 MHz	Low	5745	16.43
		Middle	5785	16.43
		High	5825	16.43
802.11n ht20	5725-5850 MHz	Low	5745	17.66
		Middle	5785	17.66
		High	5825	17.60

5150-5250 MHz Band:

802.11a mode, 26 Bandwidth-5180MHz



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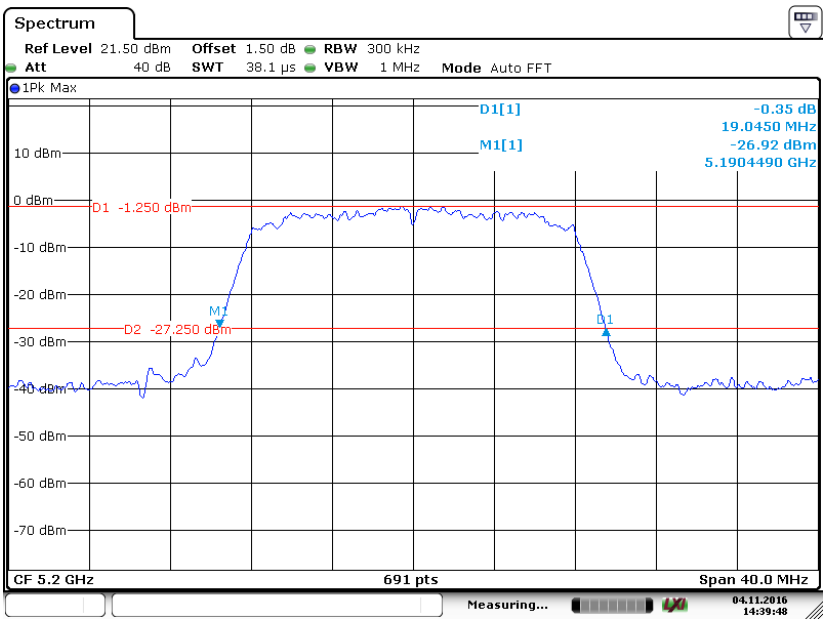
802.11a mode, 26 Bandwidth-5200MHz



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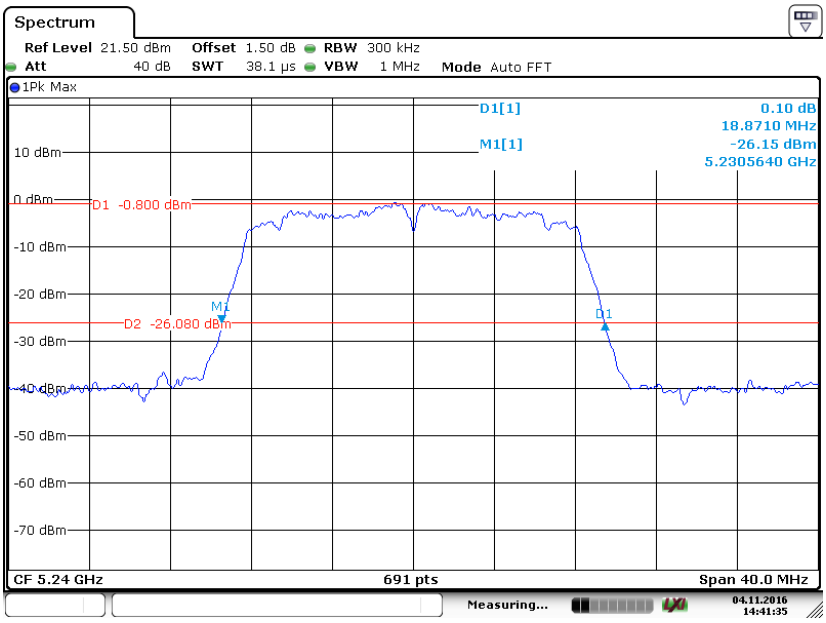
802.11a mode, 26 Bandwidth-5240MHz



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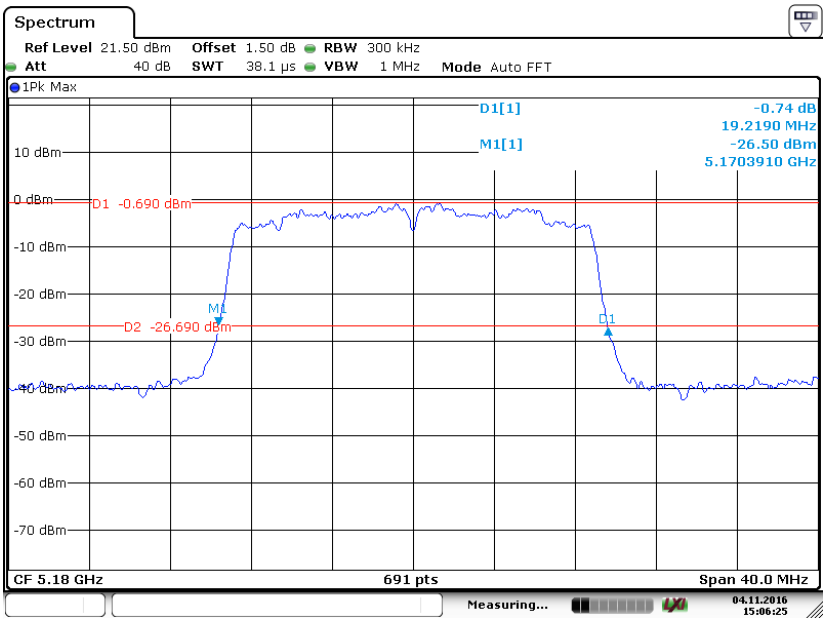
802.11n ht20 mode, 26 Bandwidth-5180MHz



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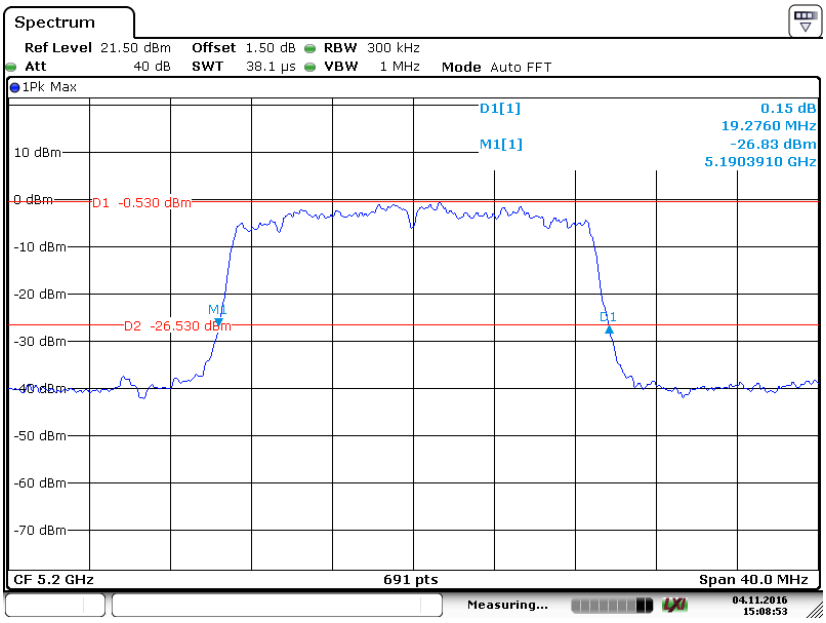
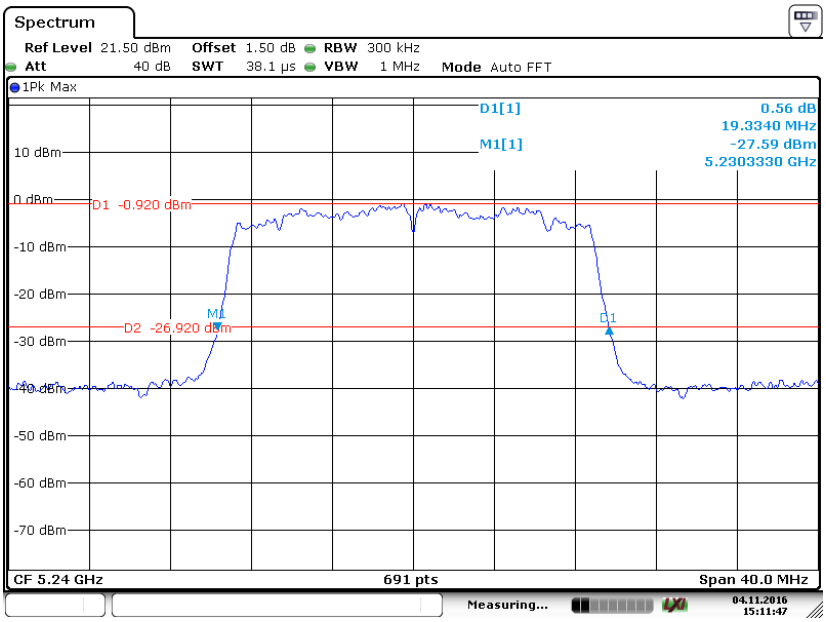
802.11n ht20 mode, 26 Bandwidth-5200MHz



Date: 4.NOV.2016 15:08:53

802.11n ht20 mode, 26 Bandwidth-5240MHz



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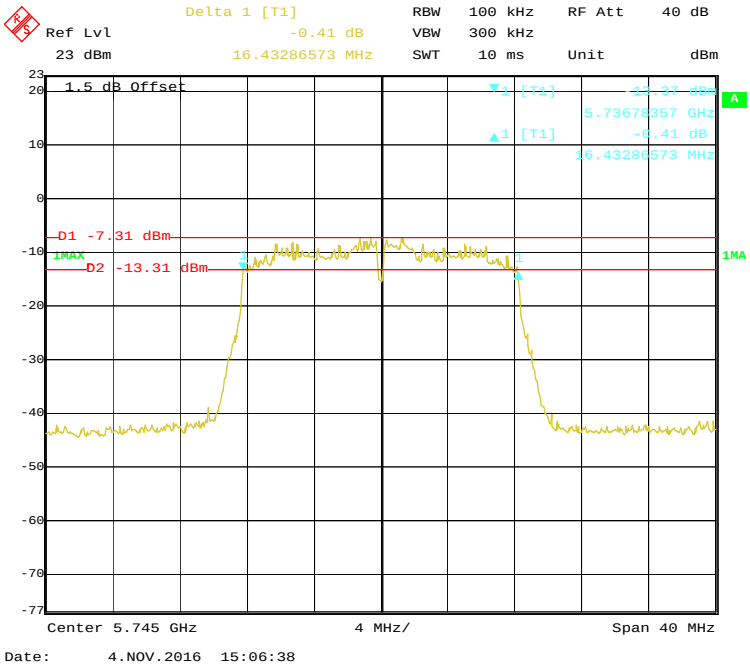
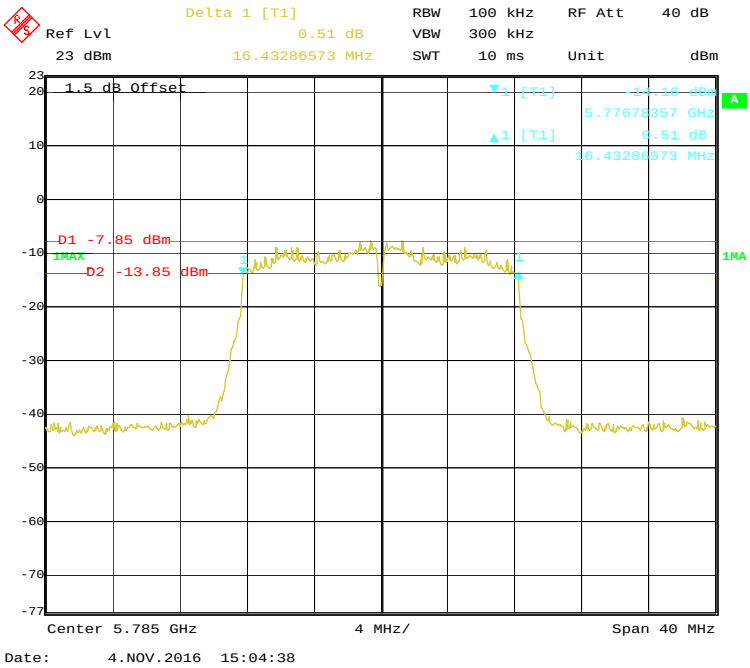
5725-5850 MHz Band:

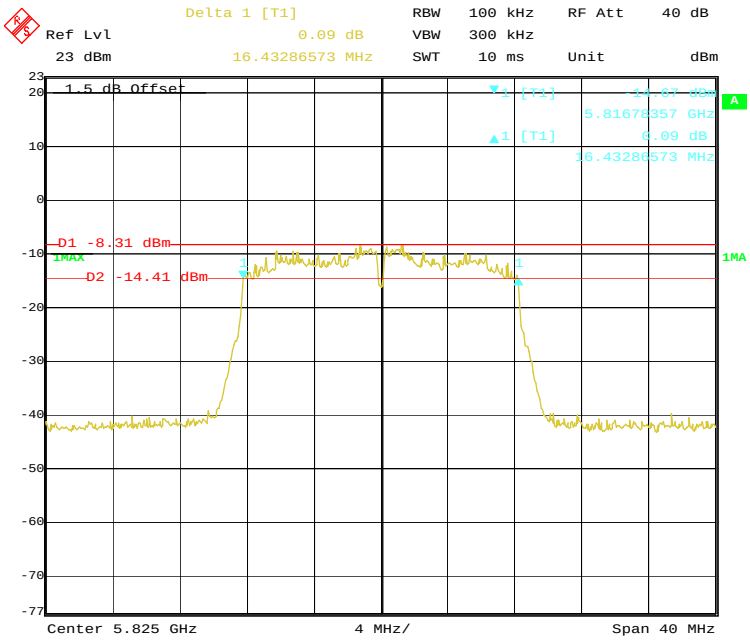
802.11a mode, 6 Bandwidth-5745MHz



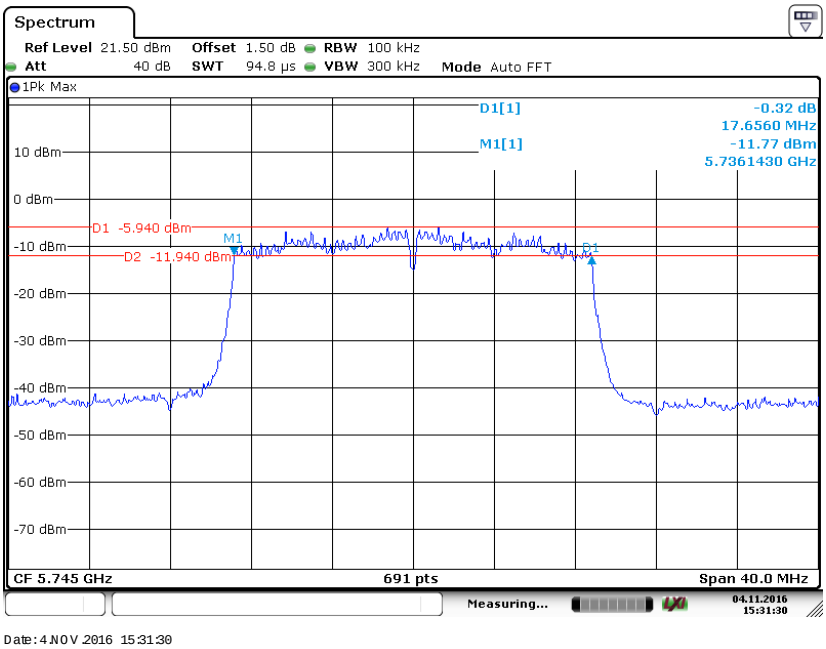
802.11a mode, 6 Bandwidth-5785MHz



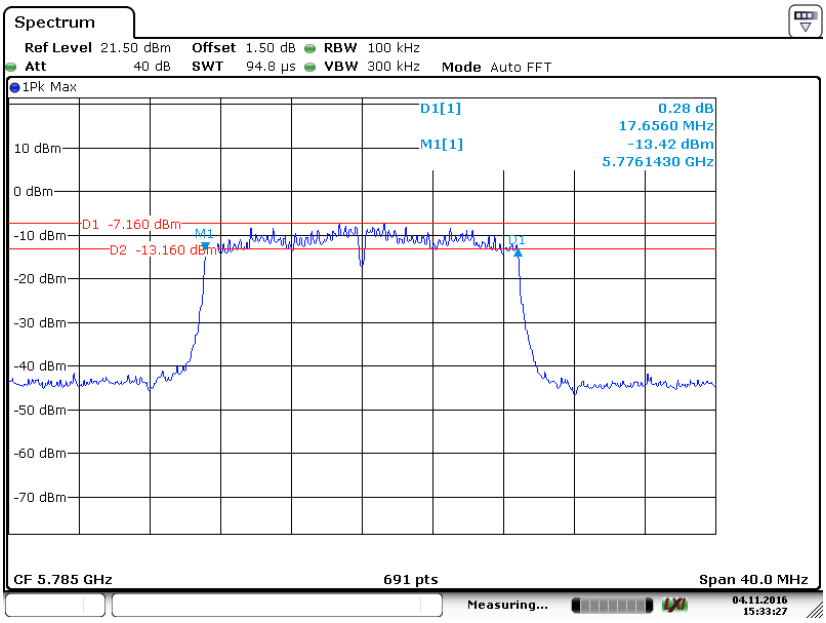
802.11a mode, 6 Bandwidth-5825MHz



802.11n ht20 mode, 6 Bandwidth-5745MHz



802.11n ht20 mode, 6 Bandwidth-5785MHz



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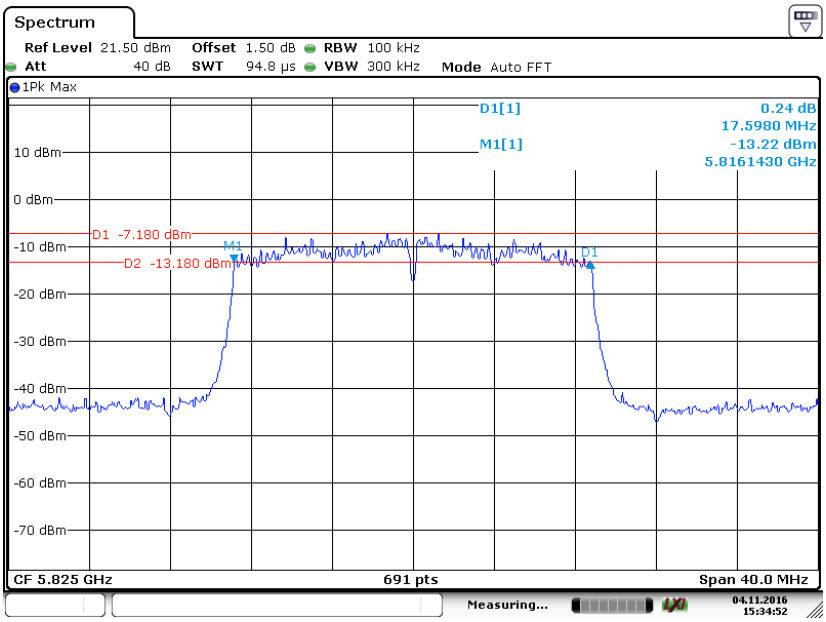
802.11n ht20 mode, 6 Bandwidth-5825MHz



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FCC §15.407(a) (1) – CONDUCTED TRANSMITTER OUTPUT POWER

Applicable Standard

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

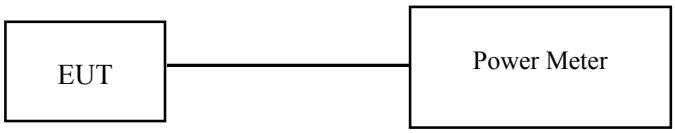
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Power Meter	N1912A	MY5000492	2016-11-18	2017-11-17
Agilent	Power Sensor	N1921A	MY54210024	2016-11-18	2017-11-17
Rohde & Schwarz	Signal Analyzer	FSV40	101116	2016-07-04	2017-07-03
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-12-16	2016-12-15

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

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 Data

Environmental Conditions

Temperature:	27.6 °C
Relative Humidity:	60 %
ATM Pressure:	99.8 kPa

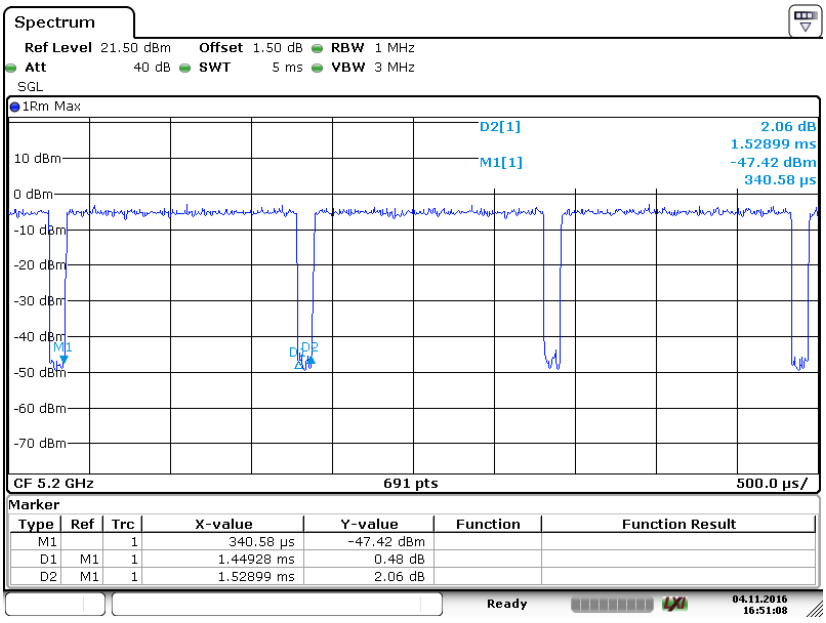
The testing was performed by Chris Wang on 2016-11-04.

Test Mode: Transmitting

Test mode	Band	Channel	Frequency (MHz)	Conducted Average Output Power Reading (dBm)	Corrected Factor 10log(1/x) (dB)	Conducted Average Output Power (dBm)	Limit (dBm)	Result
802.11a	5150-5250 MHz	Low	5180	10.38	0.23	10.61	30	PASS
		Middle	5200	10.90	0.23	11.13	30	PASS
		High	5240	11.06	0.23	11.29	30	PASS
	5725-5850 MHz	Low	5745	10.03	1.78	11.81	30	PASS
		Middle	5785	8.98	1.78	10.76	30	PASS
		High	5825	9.23	1.78	11.01	30	PASS
802.11n ht20	5150-5250 MHz	Low	5180	10.45	1.88	12.33	30	PASS
		Middle	5200	10.90	1.88	12.78	30	PASS
		High	5240	10.36	1.88	12.24	30	PASS
	5725-5850 MHz	Low	5745	9.46	1.86	11.32	30	PASS
		Middle	5785	8.46	1.86	10.32	30	PASS
		High	5825	8.40	1.86	10.26	30	PASS

Note: x is the duty cycle. For 802.11a (5150-5250 MHz): x=0.948, 802.11a (5725-5850 MHz): x=0.664, 802.11n ht20 (5150-5250 MHz): x=0.648, 802.11n ht20 (5725-5850 MHz): x=0.652.
Conducted Average Output Power= Reading+ Corrected Factor
The reading value is reading from the test software.

802.11a Mode (5150-5250 MHz) Middle Channel



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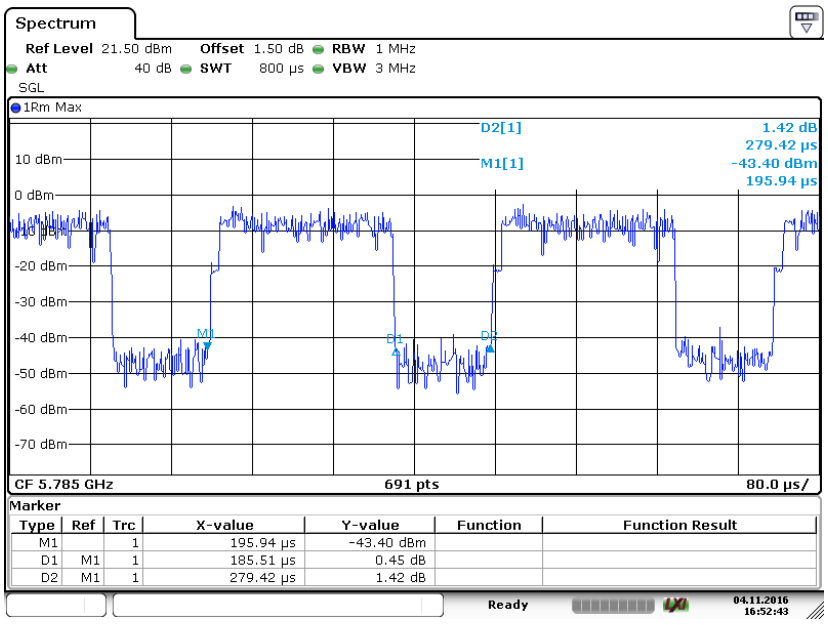
802.11a Mode (5725-5850 MHz) Middle Channel



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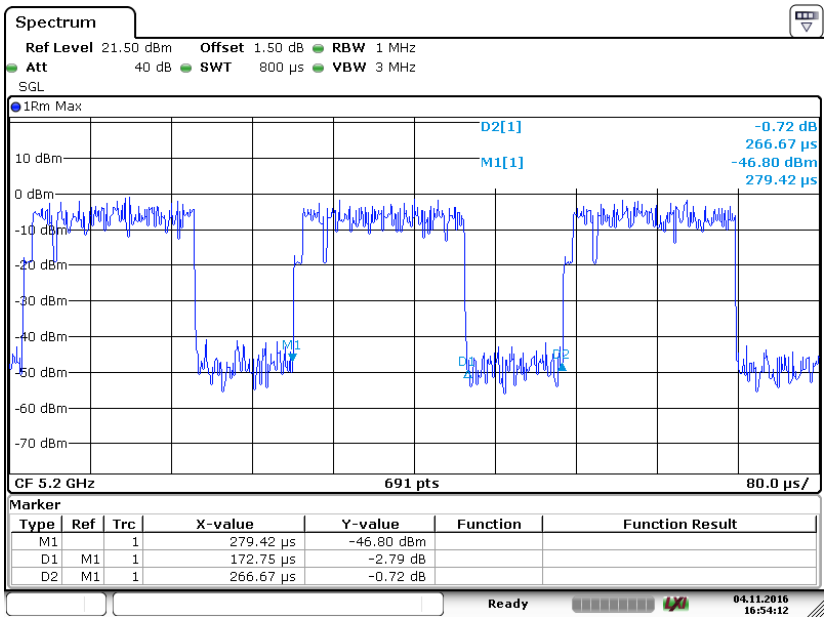
802.11n ht20 Mode (5150-5250 MHz) Middle Channel



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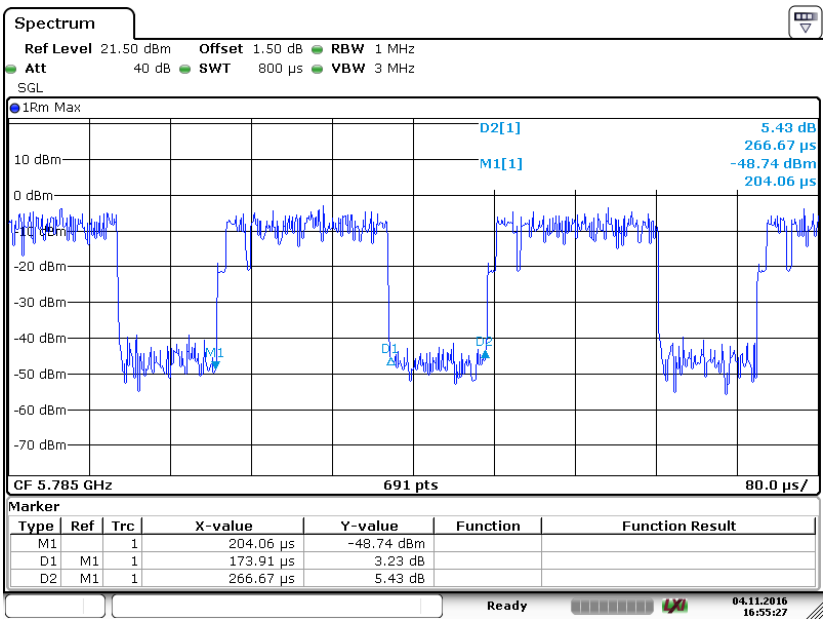
802.11n ht20 Mode (5725-5850 MHz) Middle Channel



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FCC §15.407(a) (1) (5) - POWER SPECTRAL DENSITY

Applicable Standard

According to § 15.407(a)(1)

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

According to § 15.407(a)(3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Procedure

The measurements are base on FCC KDB 789033 D02 General UNII Test Procedyres New Rules v01r03:Guidelines for Compliance Testing of Unlicensed National Information Infrastructure(U-NII)Devices section F: Maximum power spectral density(PPSD)

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSV40	101116	2016-07-04	2017-07-03
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-12-16	2016-12-15

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) 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:	60 %
ATM Pressure:	99.9 kPa

The testing was performed by Chris Wang on 2016-11-04.

Test Mode: Transmitting

5150MHz-5250MHz:

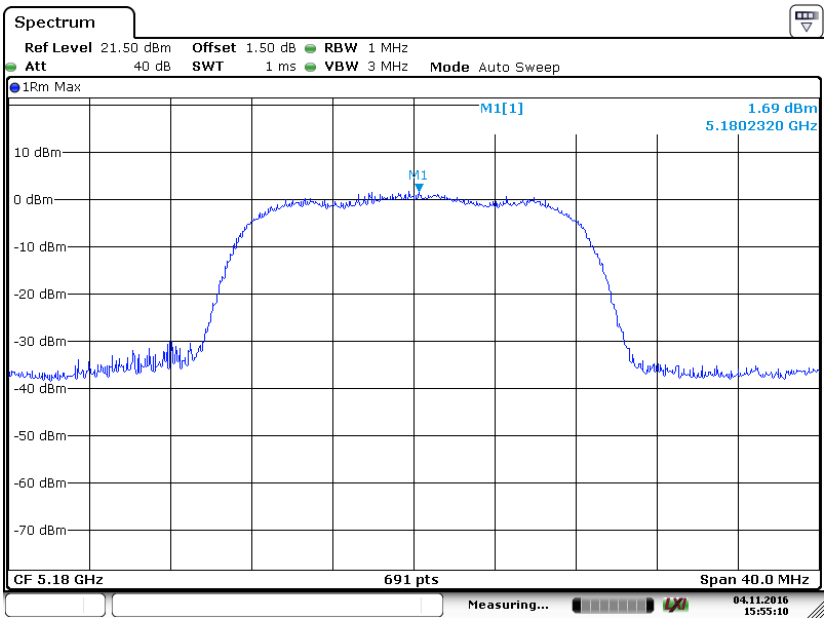
Mode	Channel	Frequency MHz	PSD (dBm/MHz)	Limit (dBm/MHz)	Result
802.11a	Low	5180	1.69	17	PASS
	Middle	5200	2.54	17	PASS
	High	5240	2.31	17	PASS
802.11n20	Low	5180	1.96	17	PASS
	Middle	5200	2.44	17	PASS
	High	5240	1.99	17	PASS

5725MHz-5850MHz:

Mode	Channel	Frequency MHz	PSD (dBm/500kHz)	Limit (dBm/500kHz)	Result
802.11a	Low	5745	0.16	30	PASS
	Middle	5785	-0.92	30	PASS
	High	5825	-0.19	30	PASS
802.11n20	Low	5745	-0.39	30	PASS
	Middle	5785	-1.61	30	PASS
	High	5825	-1.15	30	PASS

5150MHz-5250MHz Band:

802.11a mode, Power spectral density-5180MHz



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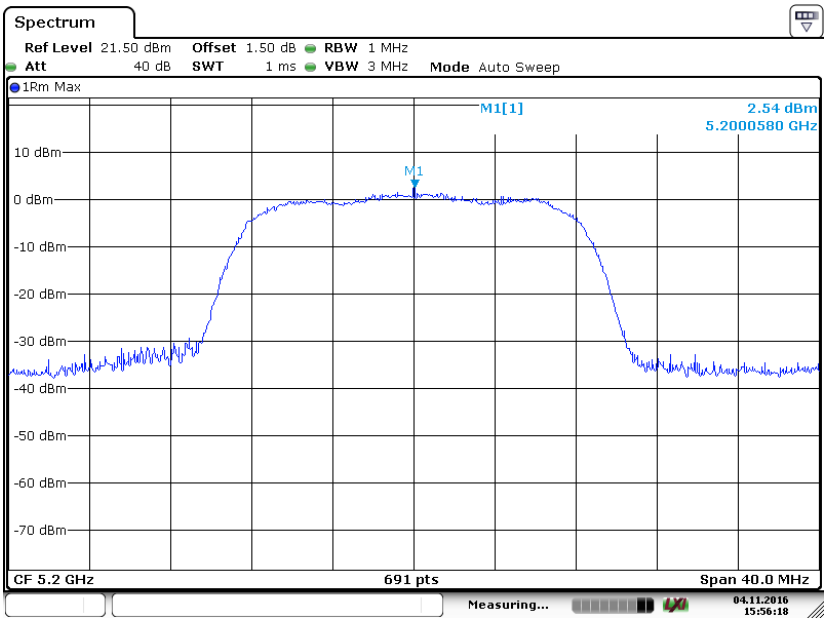
802.11a mode, Power spectral density-5200MHz



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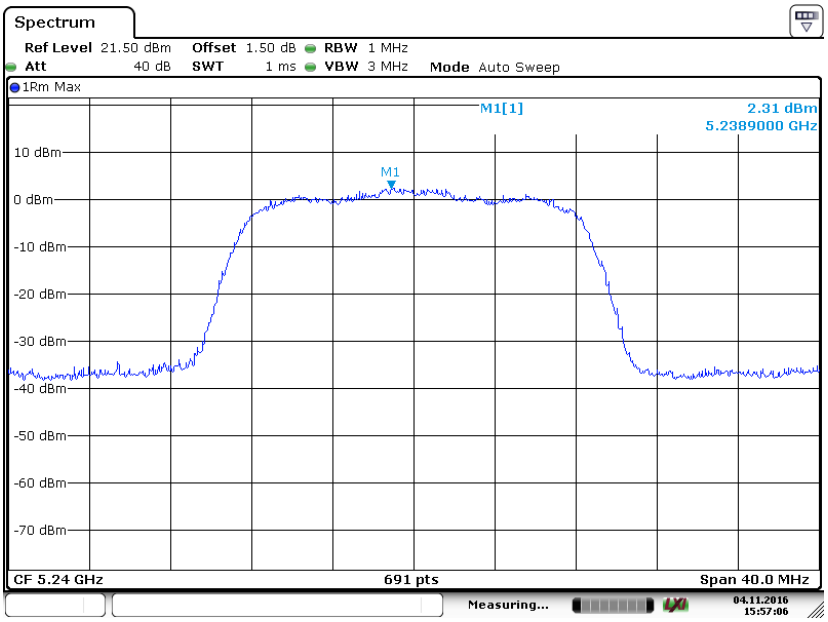
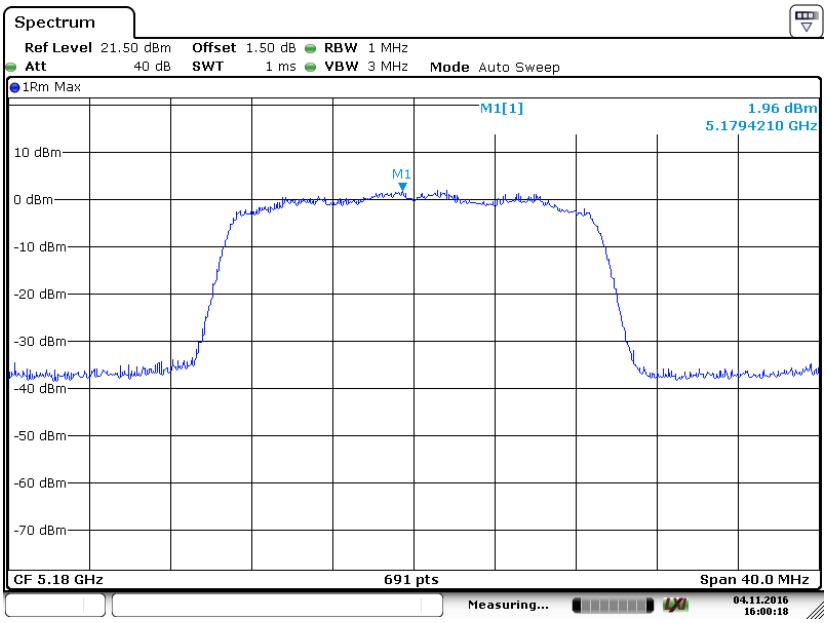
802.11a mode, Power spectral density-5240MHz



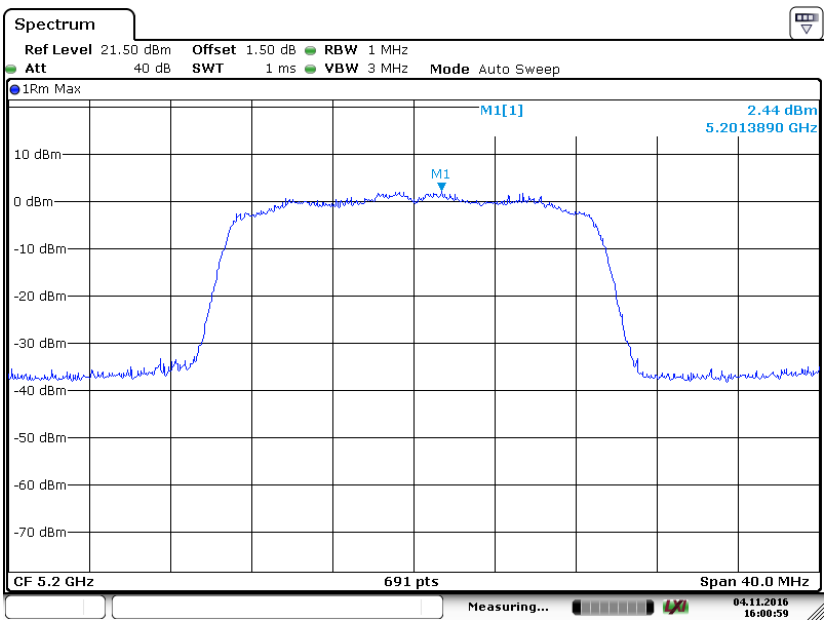
Date: 4.NOV.2016 15:57:06

802.11n ht20 mode, Power spectral density-5180MHz



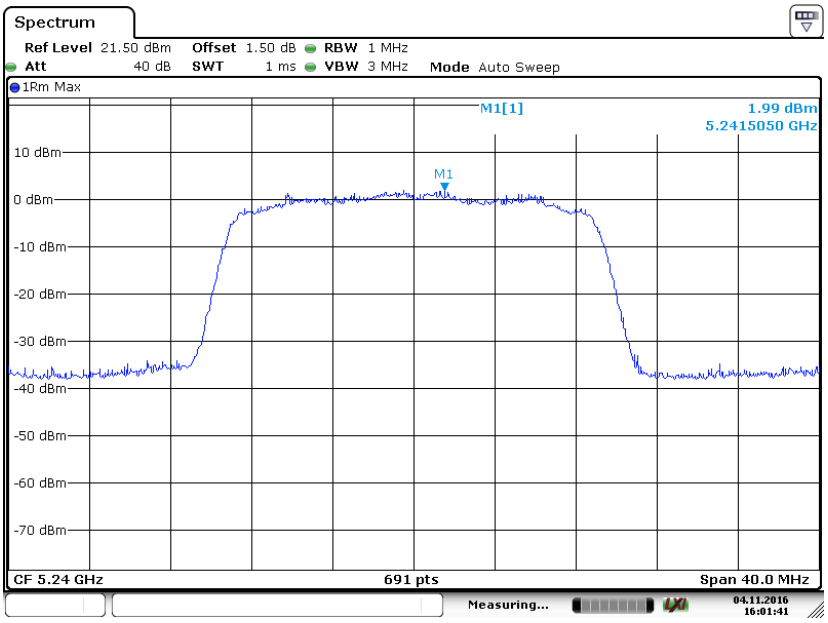
Date: 4.NOV.2016 16:00:18

802.11n ht20 mode, Power spectral density-5200MHz



Date: 4.NOV.2016 16:00:59

802.11n ht20 mode, Power spectral density-5240MHz



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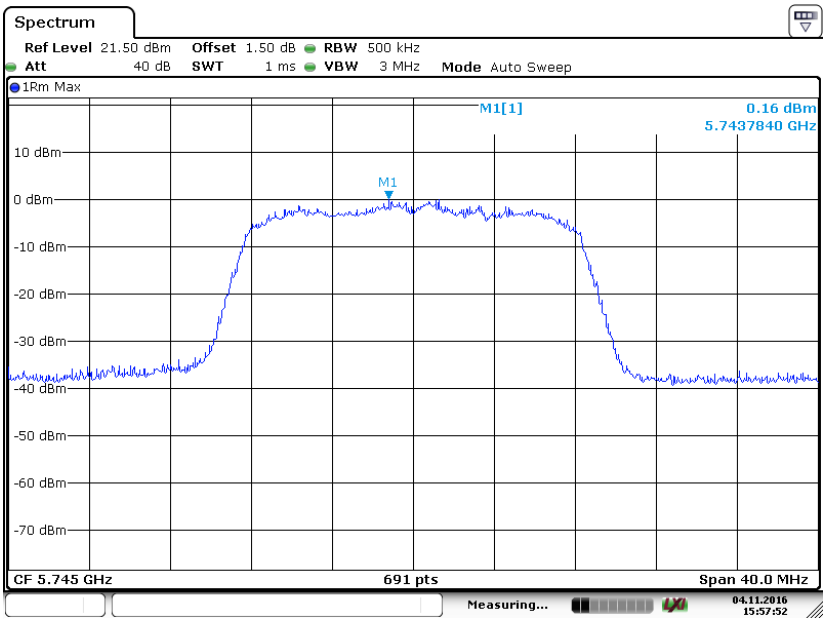
5725-5850 MHz:

802.11a mode, Power spectral density-5745MHz



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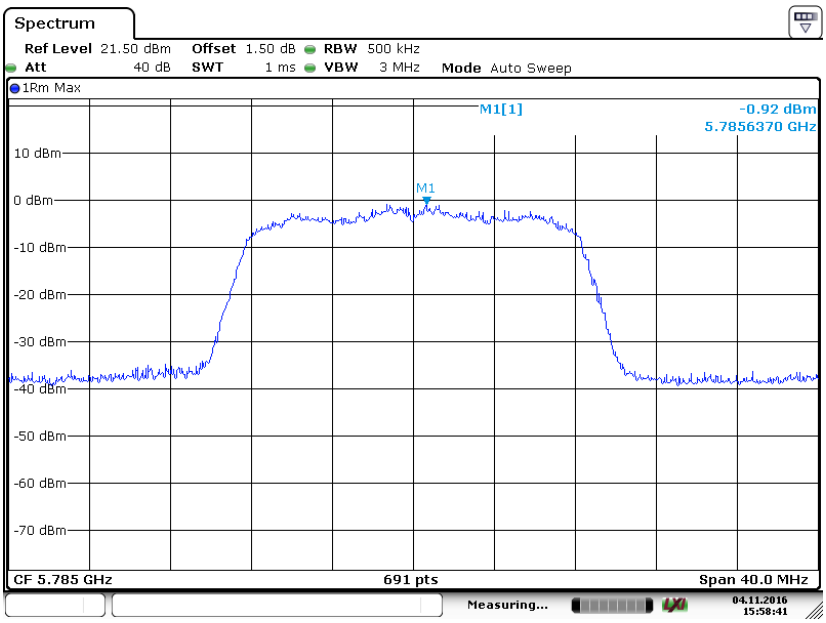
802.11a mode, Power spectral density-5785MHz



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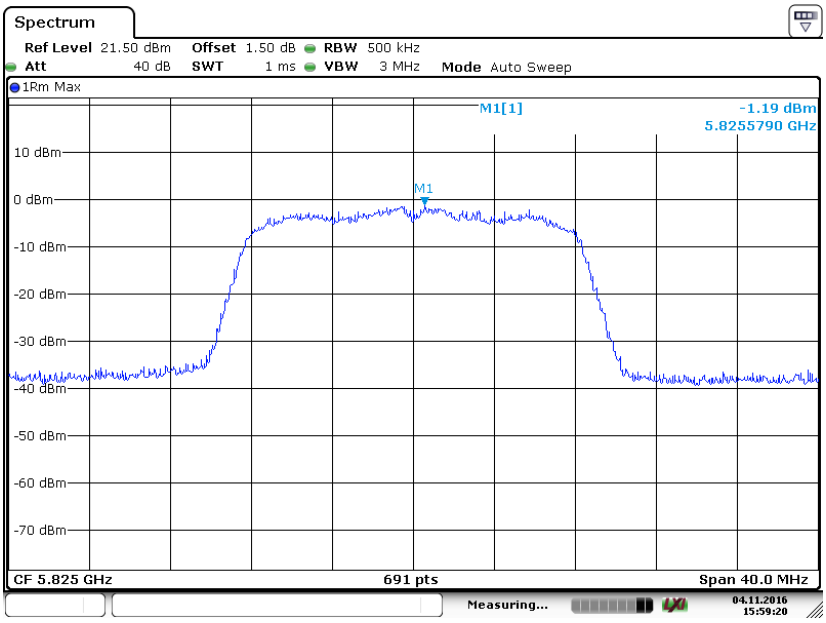
802.11a mode, Power spectral density-5825MHz



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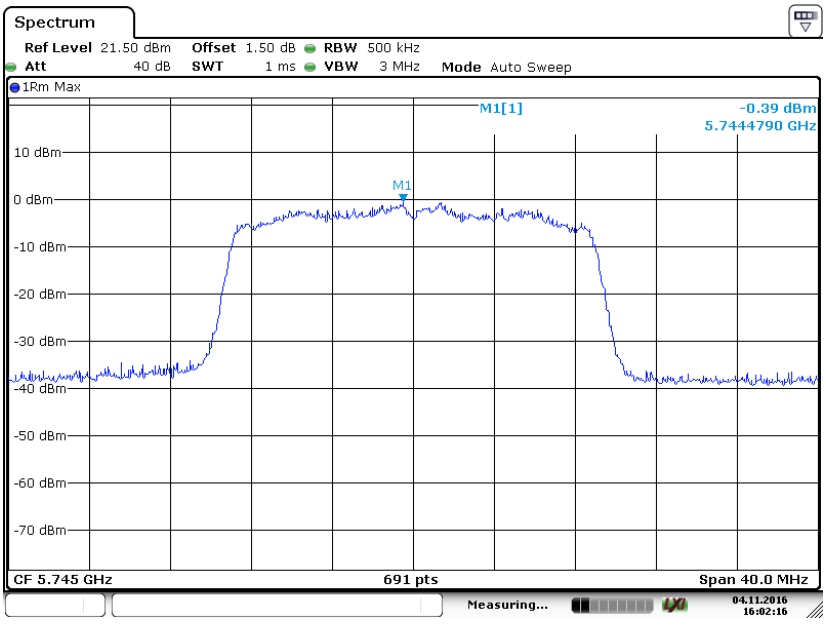
802.11n ht20 mode, Power spectral density-5745MHz



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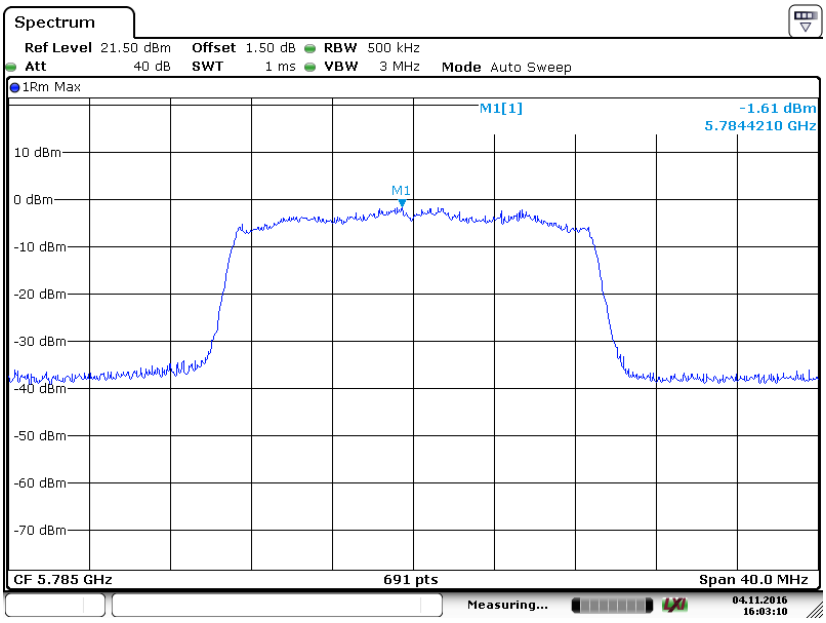
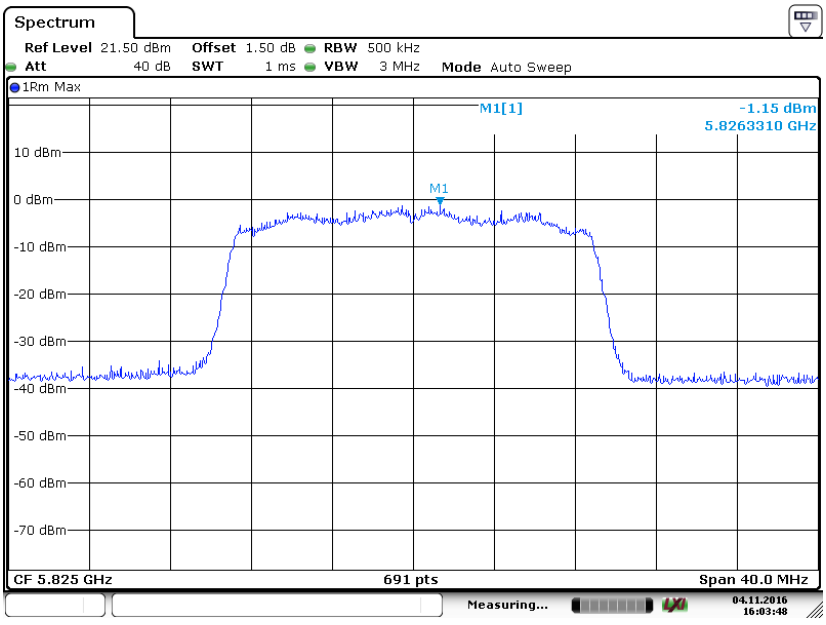
802.11n ht20 mode, Power spectral density-5785MHz



Date: 4.NOV.2016 16:03:10

802.11n ht20 mode, Power spectral density-5825MHz



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