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-ALXCOMBO

Report Type:	**Product Type:**
Original Report	Alinket Wireless Controller

Test Engineer:	Matt Yao
Report Number:	RKS160504002-00M
Report Date:	2016-06-12
Reviewed By:	Jesse Huang EMC Engineer
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Kunshan) Chenghu Road,Kunshan Development Zone No.248,Kunshan, Jiangsu, China Tel: +86-0512-86175000 Fax: +86-0512-88934268 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The Alinket Electronic Technology (Shanghai) Co., Ltd.'s product, model number: ALXC2X (the last "X" is from 0A to 9Z based on deferent software configurations for product marketing purpose) or the "EUT" in this report was a Alinket Wireless Controller, which was measured approximately:28mm (L) x14.3 mm (W) x2.2mm(H). Rated input voltage: 3.3VDC.

**All measurement and test data in this report was gathered from production sample serial number: 20160120012 (Assigned by the BACL. The EUT supplied by the applicant was received on 2016-01-20)*

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-ALXCOMBO.

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 Chenghu Lake Road, Kunshan Development Zone No.248, Kunshan, Jiangsu, China

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

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 815570. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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 "ALX850 MFG" 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: 14
802.11n20, Power level: 14

For 5745~5825 MHz band
802.11a, Power level: 16
802.11n20, Power level: 16

Equipment Modifications

N/A.

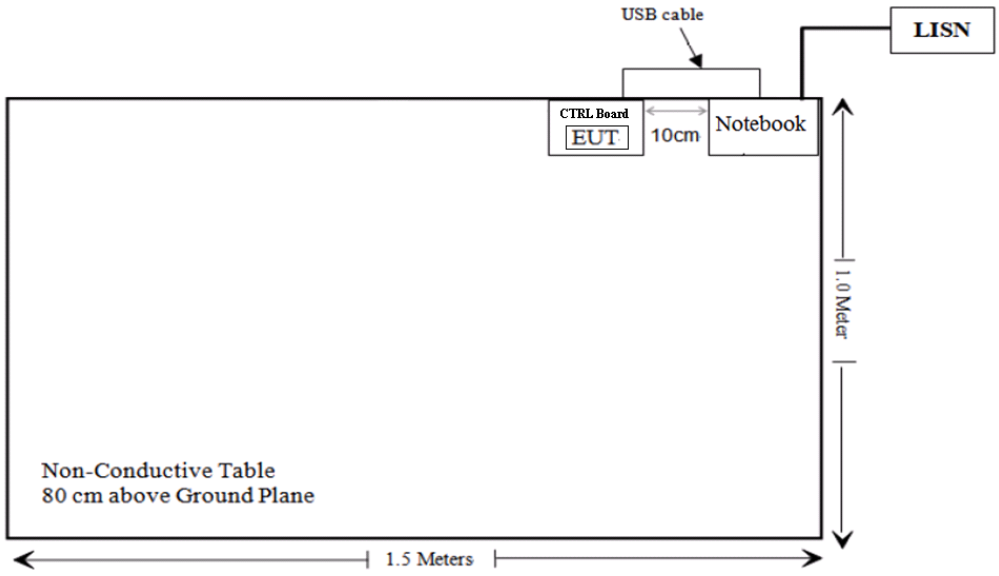
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Lenovo	Notebook	T400	N/A
Alinket	Control Board	N/A	N/A

External Cable

Cable Description	Shielding Type	Length (m)	From Port	To
USB Cable	Unshielding	0.9	Control Board	PC

Block Diagram of Test Setup



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 PERMISSIBLE EXPOSURE (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/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:

5150-5250 MHz

Mode	Frequency (MHz)	Antenna Gain		Target Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
802.11a	5150-5250	1	1.259	13	19.95	20	0.005	1.0
802.11n HT20		1	1.259	13	19.95	20	0.005	1.0

Note: The target power : 802.11a :12±1dBm
802.11n HT20 :12±1dBm
which declared by the Manufacturer.

5725-5850 MHz

Mode	Frequency (MHz)	Antenna Gain		Target Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
802.11a	5725-5850	1	1.259	13	19.95	20	0.005	1.0
802.11n HT20		1	1.259	13	19.95	20	0.005	1.0

Note: The target power : 802.11a :12±1dBm
802.11n HT20 :12±1dBm
which declared by the Manufacturer.

Result: The device meet FCC MPE at 20 cm distance

FCC §15.203 – ANTENNA REQUIREMENT

Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Antenna Connector Construction

The EUT has an IPEX connector to attach an external 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.

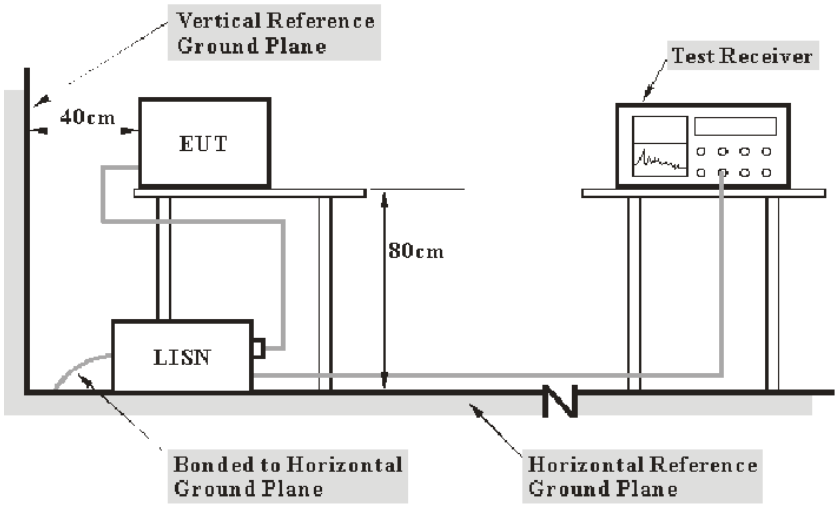
If U_{lab} is greater than U_{cispr} of Table 1, then:
- compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
- non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), 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	934115/007	2015-11-12	2016-11-11
Rohde & Schwarz	LISN	ESH3-Z5	862770/011	2015-11-12	2016-11-11
Rohde & Schwarz	LISN	ESH3-Z5	892239/018	2015-6-23	2016-6-22
Rohde & Schwarz	Pulse limiter	ESH3-Z2	879940/0058	2015-6-19	2016-6-18
HP	Current probe	8710-1744	636	2015-6-19	2016-6-18
FCC	ISN	FCC-TLISN-T8-02	20376	2015-6-23	2016-6-22
Rohde & Schwarz	CE Test software	EMC 32	V 09.10.0	--	--
MICRO-COAX	Coaxial line	UFB-293B-1-0480-50X50	97F0173	2015-10-1	2016-10-1

*** 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:

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

Test Data

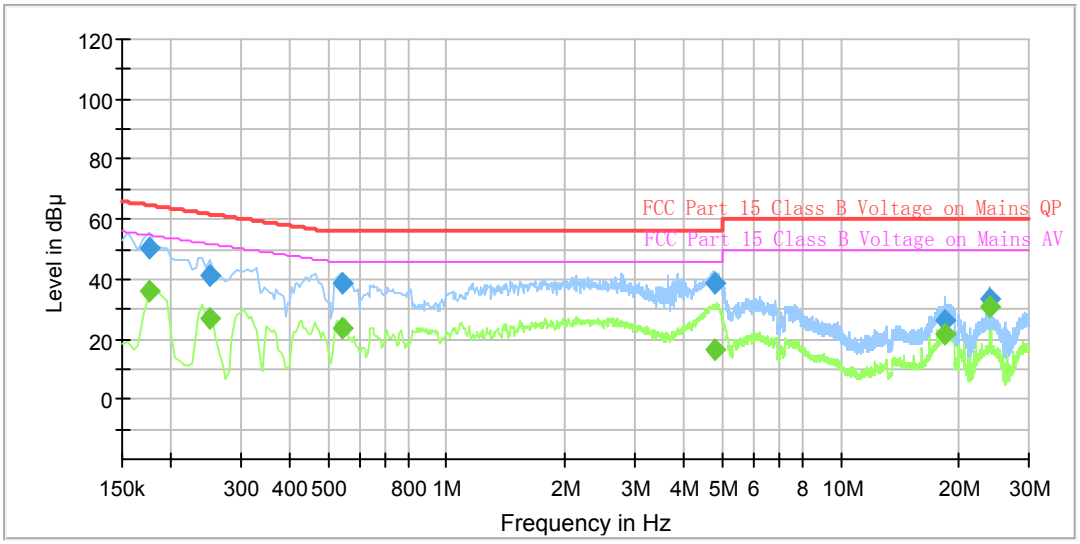
Environmental Conditions

Temperature:	27.2 °C
Relative Humidity:	55 %
ATM Pressure:	100.3 kPa

The testing was performed by Matt Yao on 2016-03-18

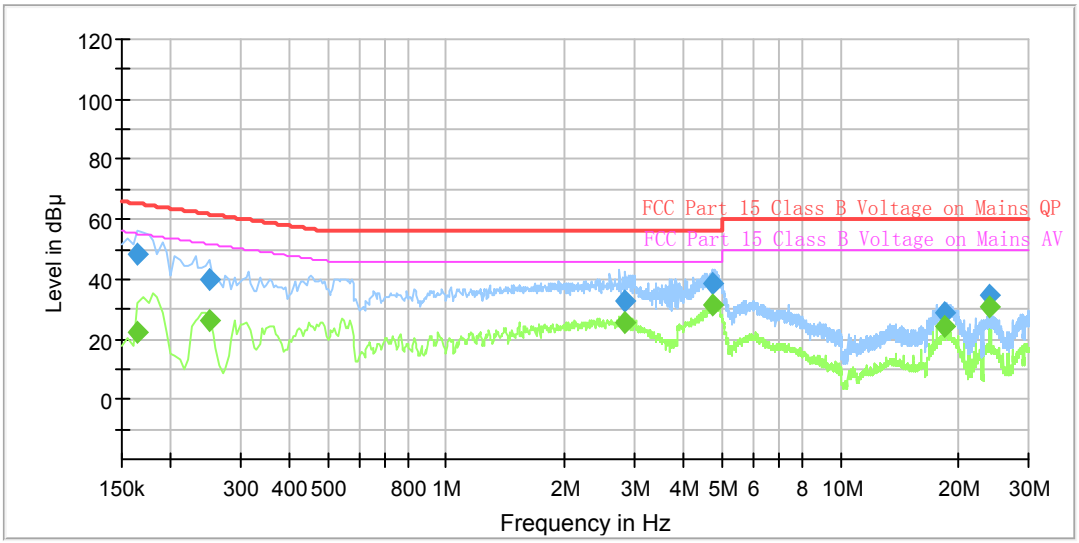
Test Mode: Transmitting

AC 120V/60 Hz, Line



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.175000	---	36.20	9.000	L1	11.0	18.52	54.72	Compliance
0.175000	50.10	---	9.000	L1	11.0	14.62	64.72	Compliance
0.250000	---	26.90	9.000	L1	11.0	24.86	51.76	Compliance
0.250000	41.26	---	9.000	L1	11.0	20.50	61.76	Compliance
0.545000	---	23.86	9.000	L1	11.0	22.14	46.00	Compliance
0.545000	38.89	---	9.000	L1	11.0	17.11	56.00	Compliance
4.785000	---	16.66	9.000	L1	11.3	29.34	46.00	Compliance
4.785000	38.28	---	9.000	L1	11.3	17.72	56.00	Compliance
18.350000	---	21.39	9.000	L1	11.4	28.61	50.00	Compliance
18.350000	26.35	---	9.000	L1	11.4	33.65	60.00	Compliance
24.005000	---	30.50	9.000	L1	11.4	19.50	50.00	Compliance
24.005000	33.18	---	9.000	L1	11.4	26.82	60.00	Compliance

AC 120V/60 Hz, Neutral



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.165000	---	22.52	9.000	N	11.0	32.69	55.21	Compliance
0.165000	48.24	---	9.000	N	11.0	16.97	65.21	Compliance
0.250000	---	26.14	9.000	N	11.0	25.62	51.76	Compliance
0.250000	39.69	---	9.000	N	11.0	22.07	61.76	Compliance
2.850000	---	25.64	9.000	N	11.3	20.36	46.00	Compliance
2.850000	33.01	---	9.000	N	11.3	22.99	56.00	Compliance
4.750000	---	31.37	9.000	N	11.4	14.63	46.00	Compliance
4.750000	38.58	---	9.000	N	11.4	17.42	56.00	Compliance
18.345000	---	24.34	9.000	N	11.4	25.66	50.00	Compliance
18.345000	28.56	---	9.000	N	11.4	31.44	60.00	Compliance
24.000000	---	30.78	9.000	N	11.4	19.22	50.00	Compliance
24.000000	34.87	---	9.000	N	11.4	25.13	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), (2), (3), (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 –27dBm/MHz

For transmitters operating in the 5.47–5.725 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 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz

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.

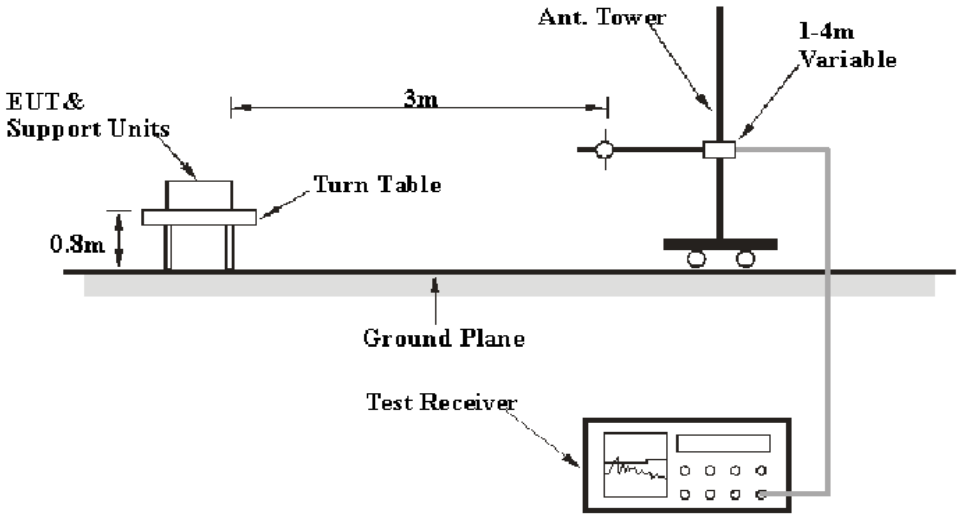
Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:
30M~200MHz: 5.0 dB
200M~1GHz: 6.2 dB
1G~6GHz: 4.45 dB
6G~18GHz: 5.23 dB

Table 1 – Values of U_{cispr}

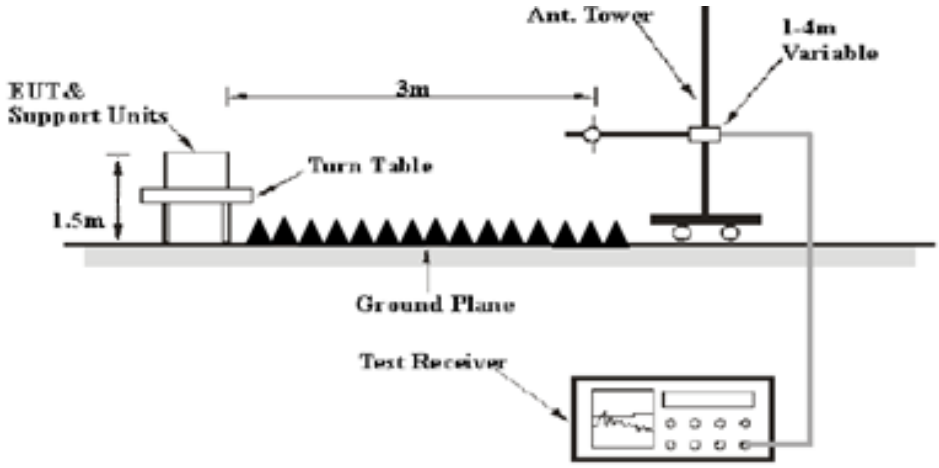
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

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 C63.4-2009. 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	2015-09-16	2016-09-16
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2015-11-12	2016-11-11
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2015-11-07	2016-11-06
ETS	Horn Antenna	3115	6229	2015-11-07	2016-11-06
EMCO	Horn Antenna	3116	9510-2384	2015-11-07	2016-11-06
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2015-11-12	2016-11-11
Rohde & Schwarz	Signal Analyzer	FSV40	101116	2015-09-02	2016-09-02
Mini	Pre-amplifier	ZVA-183-S+	857001418	2015-09-16	2016-09-16
DUCOMMUN	Pre-amplifier	ALN-22093530-01	990147	2015-09-16	2016-09-16
champrotek	Chamber	Chamber A	1#	2015-09-17	2016-09-17
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	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 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:

5.44 dB at **270 M**Hz in the Horizontal polarization for 802.11n ht20 Mode Mode5725-5850 MHz band

Test Data

Environmental Conditions

Temperature:	26.8 °C
Relative Humidity:	62 %
ATM Pressure:	99.9 kPa

The testing was performed by Matt Yao on 2016-03-21

Mode: Transmitting

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

802.11n ht20 Mode:

Frequency	Receiver		Turntable	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Degree	Height (cm)	Polar (H/V)					
Low Channel:5180 MHz										
5180	87.31	PK	120	150.0	V	10.28	97.59	91.59	N/A	N/A
5180	74.01	AV	120	150.0	V	10.28	84.29	78.29	N/A	N/A
5180	84.94	PK	66	200.0	H	10.28	95.22	89.22	N/A	N/A
5180	74.31	AV	66	200.0	H	10.28	84.59	78.59	N/A	N/A
5150	39.11	PK	212	150.0	V	10.25	49.36	43.36	74	30.64
5150	27.7	AV	212	150.0	V	10.25	37.95	31.95	54	22.05
10360	26.2	PK	76	150.0	V	20.06	46.26	40.26	74	33.74
10360	16.08	AV	76	150.0	V	20.06	36.14	30.14	54	23.86
15540	31.39	PK	0	200.0	H	27.2	58.59	52.59	74	21.41
15540	20.48	AV	0	200.0	H	27.2	47.68	41.68	54	12.32
6639	52.75	PK	310	150.0	V	0.51	53.26	47.26	74	26.74
6639	40.08	AV	310	150.0	V	0.51	40.59	34.59	54	19.41
270	49.89	QP	258	100.0	H	-11.4	38.49	/	46	7.51
Middle Channel:5200MHz										
5200	85.33	PK	151	150.0	V	10.28	95.61	89.61	N/A	N/A
5200	75.09	AV	151	150.0	V	10.28	85.37	79.37	N/A	N/A
5200	85	PK	48	200.0	H	10.28	95.28	89.28	N/A	N/A
5200	71.31	AV	48	200.0	H	10.28	81.59	75.59	N/A	N/A
10400	35.56	PK	145	150.0	V	20.06	55.62	49.62	74	24.38
10400	21.63	AV	145	150.0	V	20.06	41.69	35.69	54	18.31
15600	26.99	PK	12	200.0	H	27.2	54.19	48.19	74	25.81
15600	17.09	AV	12	200.0	H	27.2	44.29	38.29	54	15.71
5054	53.11	PK	345	150.0	V	0.51	53.62	47.62	74	26.38
5054	40.38	AV	345	150.0	V	0.51	40.89	34.89	54	19.11
7677	35.39	PK	341	150.0	H	19.9	55.29	49.29	74	24.71
7677	18.09	AV	341	150.0	H	19.9	37.99	31.99	54	22.01
270	48.95	QP	240	100.0	H	-11.4	37.55	/	46	8.45
High Channel:5240MHz										
5240	86.24	PK	120	150.0	V	10.28	96.52	90.52	N/A	N/A
5240	74.31	AV	120	150.0	V	10.28	84.59	78.59	N/A	N/A
5240	85.34	PK	66	200.0	H	10.28	95.62	89.62	N/A	N/A
5240	74.01	AV	66	200.0	H	10.28	84.29	78.29	N/A	N/A
5350	44.81	PK	212	150.0	V	10.45	55.26	49.26	74	24.74
5350	26.44	AV	212	150.0	V	10.45	36.89	30.89	54	23.11
10480	35.57	PK	76	150.0	V	20.06	55.63	49.63	74	24.37
10480	15.15	AV	76	150.0	V	20.06	35.21	29.21	54	24.79
15720	29.09	PK	0	200.0	H	27.2	56.29	50.29	74	23.71
15720	14.64	AV	0	200.0	H	27.2	41.84	35.84	54	18.16
6611	52.08	PK	310	150.0	V	0.51	52.59	46.59	74	27.41
6611	38.97	AV	310	150.0	V	0.51	39.48	33.48	54	20.52
270	50.94	QP	258	100. 0	H	-11.4	39.54	/	46	6.46

Frequency	Receiver		Turntable	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m) (MHz)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Degree	Height (cm)	Polar (H/V)					
Low Channel:5745 MHz										
5745	80.42	PK	120	150.0	V	15.2	95.62	89.62	N/A	N/A
5745	70.16	AV	120	150.0	V	15.2	85.36	79.36	N/A	N/A
5745	80.46	PK	66	200.0	H	15.2	95.66	89.66	N/A	N/A
5745	69.67	AV	66	200.0	H	15.2	84.87	78.87	N/A	N/A
5721	41.16	PK	212	150.0	V	15.1	56.26	50.26	74	23.74
5721	27.74	AV	212	150.0	V	15.1	42.84	36.84	54	17.16
11490	30.45	PK	76	150.0	V	25.2	55.65	49.65	74	24.35
11490	10.74	AV	76	150.0	V	25.2	35.94	29.94	54	24.06
17235	25.75	PK	0	200.0	H	30.8	56.55	50.55	74	23.45
17235	14.11	AV	0	200.0	H	30.8	44.91	38.91	54	15.09
6639	54.11	PK	310	150.0	V	0.51	54.62	48.62	74	25.38
6639	39.08	AV	310	150.0	V	0.51	39.59	33.59	54	20.41
270	50.91	QP	258	100.0	H	-11.4	39.51	/	46	6.49
Middle Channel:5785MHz										
5785	80.06	PK	151	150.0	V	15.2	95.26	89.26	N/A	N/A
5785	69.32	AV	151	150.0	V	15.2	84.52	78.52	N/A	N/A
5785	80.68	PK	48	200.0	H	15.2	95.88	89.88	N/A	N/A
5785	69.64	AV	48	200.0	H	15.2	84.84	78.84	N/A	N/A
11570	30.75	PK	145	150.0	V	25.2	55.95	49.95	74	24.05
11570	7.94	AV	145	150.0	V	25.2	33.14	27.14	54	26.86
17355	24.44	PK	12	200.0	H	31.9	56.34	50.34	74	23.66
17355	13.84	AV	12	200.0	H	31.9	45.74	39.74	54	14.26
6667	52.13	PK	345	150.0	V	0.51	52.64	46.64	74	27.36
6667	39.27	AV	345	150.0	V	0.51	39.78	33.78	54	20.22
7621	30.65	PK	341	150.0	H	20.8	51.45	45.45	74	28.55
7621	17.97	AV	341	150.0	H	20.8	38.77	32.77	54	21.23
270	51.96	QP	240	100.0	H	-11.4	40.56	/	46	5.44
High Channel:5825MHz										
5825	80.06	PK	120	150.0	V	15.2	95.26	89.26	N/A	N/A
5825	70.15	AV	120	150.0	V	15.2	85.35	79.35	N/A	N/A
5825	79.91	PK	66	200.0	H	15.2	95.11	89.11	N/A	N/A
5825	69.39	AV	66	200.0	H	15.2	84.59	78.59	N/A	N/A
5850	41.12	PK	212	150.0	V	15.2	56.32	50.32	74	23.68
5850	20.04	AV	212	150.0	V	15.2	35.24	29.24	54	24.76
11650	28.79	PK	76	150.0	V	27.65	56.44	50.44	74	23.56
11650	7.44	AV	76	150.0	V	27.65	35.09	29.09	54	24.91
17475	23.49	PK	0	200.0	H	32.1	55.59	49.59	74	24.41
17475	12.84	AV	0	200.0	H	32.1	44.94	38.94	54	15.06
6975	53.15	PK	310	150.0	V	0.51	53.66	47.66	74	26.34
6975	38.96	AV	310	150.0	V	0.51	39.47	33.47	54	20.53
270	51.65	QP	258	100.0	H	-11.4	40.25	/	46	5.75

802.11a Mode:

Frequency	Receiver		Turntable	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Degree	Height (cm)	Polar (H/V)					
Low Channel:5180 MHz										
5180	87.37	PK	120	150.0	V	10.28	97.65	91.65	N/A	N/A
5180	74.86	AV	120	150.0	V	10.28	85.14	79.14	N/A	N/A
5180	85.37	PK	66	200.0	H	10.28	95.65	89.65	N/A	N/A
5180	74.07	AV	66	200.0	H	10.28	84.35	78.35	N/A	N/A
5150	44.99	PK	212	150.0	V	10.25	55.24	49.24	74	24.76
5150	30.7	AV	212	150.0	V	10.25	40.95	34.95	54	19.05
10360	35.08	PK	76	150.0	V	20.06	55.14	49.14	74	24.86
10360	16.41	AV	76	150.0	V	20.06	36.47	30.47	54	23.53
15540	28.94	PK	0	200.0	H	27.2	56.14	50.14	74	23.86
15540	17.05	AV	0	200.0	H	27.2	44.25	38.25	54	15.75
6639	53.74	PK	310	150.0	V	0.51	54.25	48.25	74	25.75
6639	38.9	AV	310	150.0	V	0.51	39.41	33.41	54	20.59
270	49.65	QP	258	100.0	H	-11.4	38.25	/	46	7.75
Middle Channel:5200MHz										
5200	83.98	PK	151	150.0	V	10.28	94.26	88.26	N/A	N/A
5200	74.34	AV	151	150.0	V	10.28	84.62	78.62	N/A	N/A
5200	85.4	PK	48	200.0	H	10.28	95.68	89.68	N/A	N/A
5200	72.27	AV	48	200.0	H	10.28	82.55	76.55	N/A	N/A
10400	35.55	PK	145	150.0	V	20.06	55.61	49.61	74	24.39
10400	13.56	AV	145	150.0	V	20.06	33.62	27.62	54	26.38
15600	27.28	PK	12	200.0	H	27.2	54.48	48.48	74	25.52
15600	18.54	AV	12	200.0	H	27.2	45.74	39.74	54	14.26
6653	52.13	PK	345	150.0	V	0.51	52.64	46.64	74	27.36
6653	38.97	AV	345	150.0	V	0.51	39.48	33.48	54	20.52
7505	31.69	PK	341	150.0	H	19.9	51.59	45.59	74	28.41
7505	17.61	AV	341	150.0	H	19.9	37.51	31.51	54	22.49
270	51.54	QP	240	100.0	H	-11.4	40.14	/	46	5.86
High Channel:5240MHz										
5240	86.26	PK	120	150.0	V	10.28	96.54	90.54	N/A	N/A
5240	74.01	AV	120	150.0	V	10.28	84.29	78.29	N/A	N/A
5240	85.34	PK	66	200.0	H	10.28	95.62	89.62	N/A	N/A
5240	75.11	AV	66	200.0	H	10.28	85.39	79.39	N/A	N/A
5350	44.19	PK	212	150.0	V	10.45	54.64	48.64	74	25.36
5350	23.33	AV	212	150.0	V	10.45	33.78	27.78	54	26.22
10480	35.53	PK	76	150.0	V	20.06	55.59	49.59	74	24.41
10480	13.41	AV	76	150.0	V	20.06	33.47	27.47	54	26.53
15720	29.54	PK	0	200.0	H	27.2	56.74	50.74	74	23.26
15720	19.55	AV	0	200.0	H	27.2	46.75	40.75	54	13.25
6639	53.17	PK	310	150.0	V	0.51	53.68	47.68	74	26.32
6639	39.27	AV	310	150.0	V	0.51	39.78	33.78	54	20.22
270	51.04	QP	258	100. 0	H	-11.4	39.64	/	46	6.36

Frequency	Receiver		Turntable	Rx Antenna		Corrected Factor (dB)	Corrected Factor (dB)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Degree	Height (cm)	Polar (H/V)					
Low Channel:5745 MHz										
5745	81.28	PK	120	150.0	V	15.2	96.48	90.48	N/A	N/A
5745	69.95	AV	120	150.0	V	15.2	85.15	79.15	N/A	N/A
5745	80.07	PK	66	200.0	H	15.2	95.27	89.27	N/A	N/A
5745	69.71	AV	66	200.0	H	15.2	84.91	78.91	N/A	N/A
5725	40.38	PK	212	150.0	V	15.1	55.48	49.48	74	24.52
5725	20.4	AV	212	150.0	V	15.1	35.5	29.5	54	24.5
11490	30.64	PK	76	150.0	V	25.2	55.84	49.84	74	24.16
11490	9.89	AV	76	150.0	V	25.2	35.09	29.09	54	24.91
17235	25.68	PK	0	200.0	H	30.8	56.48	50.48	74	23.52
17235	14.77	AV	0	200.0	H	30.8	45.57	39.57	54	14.43
6653	51.85	PK	310	150.0	V	0.51	52.36	46.36	74	27.64
6653	39.38	AV	310	150.0	V	0.51	39.89	33.89	54	20.11
270	49.95	QP	258	100.0	H	-11.4	38.55	/	46	7.45
Middle Channel:5785MHz										
5785	80.12	PK	151	150.0	V	15.2	95.32	89.32	N/A	N/A
5785	70.27	AV	151	150.0	V	15.2	85.47	79.47	N/A	N/A
5785	79.96	PK	48	200.0	H	15.2	95.16	89.16	N/A	N/A
5785	69.44	AV	48	200.0	H	15.2	84.64	78.64	N/A	N/A
11570	30.75	PK	145	150.0	V	25.2	55.95	49.95	74	24.05
11570	11.57	AV	145	150.0	V	25.2	36.77	30.77	54	23.23
17355	23.39	PK	12	200.0	H	31.9	55.29	49.29	74	24.71
17355	13.2	AV	12	200.0	H	31.9	45.1	39.1	54	14.9
6639	52.97	PK	345	150.0	V	0.51	53.48	47.48	74	26.52
6639	39.4	AV	345	150.0	V	0.51	39.91	33.91	54	20.09
7593	33.38	PK	341	150.0	H	20.8	54.18	48.18	74	25.82
7593	18.17	AV	341	150.0	H	20.8	38.97	32.97	54	21.03
270	50.45	QP	240	100.0	H	-11.4	39.05	/	46	6.95
High Channel:5825MHz										
5825	80.68	PK	120	150.0	V	15.2	95.88	89.88	N/A	N/A
5825	70.49	AV	120	150.0	V	15.2	85.69	79.69	N/A	N/A
5825	79.94	PK	66	200.0	H	15.2	95.14	89.14	N/A	N/A
5825	70.41	AV	66	200.0	H	15.2	85.61	79.61	N/A	N/A
5850	40.74	PK	212	150.0	V	15.2	55.94	49.94	74	24.06
5850	22.94	AV	212	150.0	V	15.2	38.14	32.14	54	21.86
11650	29.53	PK	76	150.0	V	27.65	57.18	51.18	74	22.82
11650	8.83	AV	76	150.0	V	27.65	36.48	30.48	54	23.52
17475	23.08	PK	0	200.0	H	32.1	55.18	49.18	74	24.82
17475	12.16	AV	0	200.0	H	32.1	44.26	38.26	54	15.74
6639	52.6	PK	310	150.0	V	0.51	53.11	47.11	74	26.89
6639	39	AV	310	150.0	V	0.51	39.51	33.51	54	20.49
270	50.87	QP	258	100.0	H	-11.4	39.47	/	46	6.53

Note: 2.4 GHz &5 GHz radios can transmit simultaneously, they share the same antenna:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dB μ V/m)	Margin (dB)
2412	95.77	PK	241.00	150.00	V	3.00	98.77	/	/
2412	92.26	Ave	241.00	150.00	V	3.00	95.26	/	/
2412	95.12	PK	162.00	150.00	H	3.00	98.12	/	/
2412	92.24	Ave	162.00	150.00	H	3.00	95.24	/	/
2365	42.75	PK	133.00	150.00	V	2.50	45.25	74.00	28.75
2365	27.61	Ave	133.00	150.00	V	2.50	30.11	54.00	23.89
2395	49.79	PK	219.00	200.00	V	2.90	52.69	74.00	21.31
2395	32.64	Ave	219.00	200.00	V	2.90	35.54	54.00	18.46
4824	42.18	PK	24.00	150.00	H	13.80	55.98	74.00	18.02
4824	22.72	Ave	24.00	150.00	H	13.80	36.52	54.00	17.48
6630	33.42	PK	89.00	200.00	V	18.80	52.22	74.00	21.78
6630	16.65	Ave	89.00	200.00	V	18.80	35.45	54.00	18.55
7236	33.05	PK	110.00	200.00	H	18.80	51.85	74.00	22.15
7236	17.44	Ave	110.00	200.00	H	18.80	36.24	54.00	17.76
2437	95.25	PK	231.00	150.00	V	3.00	98.25	/	/
2437	91.52	Ave	231.00	150.00	V	3.00	94.52	/	/
2437	94.51	PK	123.00	200.00	H	3.00	97.51	/	/
2437	89.15	Ave	123.00	200.00	H	3.00	92.15	/	/
1490	46.24	PK	130.00	150.00	V	0.00	46.24	74.00	27.76
1490	33.95	Ave	130.00	150.00	V	0.00	33.95	54.00	20.05
1705	44.51	PK	167.00	200.00	H	0.70	45.21	74.00	28.79
1705	26.17	Ave	167.00	200.00	H	0.70	26.87	54.00	27.13
4874	41.39	PK	10.00	150.00	V	13.90	55.29	74.00	18.71
4874	21.74	Ave	10.00	150.00	V	13.90	35.64	54.00	18.36
6675	34.34	PK	356.00	200.00	H	18.80	53.14	74.00	20.86
6675	16.46	Ave	356.00	200.00	H	18.80	35.26	54.00	18.74
7311	34.65	PK	237.00	150.00	H	18.90	53.55	74.00	20.45
7311	16.05	Ave	237.00	150.00	H	18.90	34.95	54.00	19.05

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dB μ V/m)	Margin (dB)
2462	94.32	PK	120.00	200.00	V	3.00	97.32	/	/
2462	92.63	Ave	120.00	200.00	V	3.00	95.63	/	/
2462	94.56	PK	180.00	100.00	H	3.00	97.56	/	/
2462	87.35	Ave	180.00	100.00	H	3.00	90.35	/	/
2483.5	50.95	PK	145.00	200.00	V	3.20	54.15	74.00	19.85
2483.5	39.34	Ave	145.00	200.00	V	3.20	42.54	54.00	11.46
2590	43.42	PK	330.00	200.00	V	4.20	47.62	74.00	26.38
2590	30.03	Ave	330.00	200.00	V	4.20	34.23	54.00	19.77
4924	40.36	PK	67.00	200.00	H	14.00	54.36	74.00	19.64
4924	20.24	Ave	67.00	200.00	H	14.00	34.24	54.00	19.76
6685	36.65	PK	123.00	100.00	H	18.80	55.45	74.00	18.55
6685	18.11	Ave	123.00	100.00	H	18.80	36.91	54.00	17.09
7386	33.49	PK	290.00	200.00	H	19.80	53.29	74.00	20.71
7386	14.31	Ave	290.00	200.00	H	19.80	34.11	54.00	19.89
5180	80.55	PK	120.0	150.0	V	10.28	84.83	N/A	N/A
5180	69.35	AV	120.0	150.0	V	10.28	73.63	N/A	N/A
5180	83.26	PK	66.0	200.00	H	10.28	87.54	N/A	N/A
5180	68.03	AV	66.0	200.00	H	10.28	72.31	N/A	N/A
5145	45.00	PK	212.0	150.00	V	10.25	49.25	74	24.75
5145	30.11	AV	212.0	150.00	V	10.25	34.36	54	19.64
10360	35.05	PK	76.0	150.00	V	20.06	49.11	74	24.89
10360	17.79	AV	76.0	150.00	V	20.06	31.85	54	22.15
15540	30.35	PK	0.0	200.00	H	27.2	51.55	74	22.45
15540	10.27	AV	0.0	200.00	H	27.2	31.47	54	22.53
6660	54.04	PK	310.0	150.00	V	0.51	48.55	74	25.45
6660	40.37	AV	310.0	150.00	V	0.51	34.88	54	19.12
850	33.86	QP	258.0	100.00	H	4.5	/	46	7.64

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dB μ V/m)	Margin (dB)
5200	84.83	PK	151.0	150.0	V	10.28	89.11	N/A	N/A
5200	73.31	AV	151.0	150.0	V	10.28	77.59	N/A	N/A
5200	84.76	PK	48.0	200.00	H	10.28	89.04	N/A	N/A
5200	73.08	AV	48.0	200.00	H	10.28	77.36	N/A	N/A
10400	35.81	PK	145.0	150.00	V	20.06	49.87	74	24.13
10400	15.30	AV	145.0	150.00	V	20.06	29.36	54	24.64
15600	29.04	PK	12.0	200.00	H	27.2	50.24	74	23.76
15600	9.46	AV	12.0	200.00	H	27.2	30.66	54	23.34
6651	52.07	PK	345.0	150.00	V	0.51	46.58	74	27.42
6651	40.23	AV	345.0	150.00	V	0.51	34.74	54	19.26
7455	33.06	PK	341.0	150.00	H	19.9	46.96	74	27.04
7455	18.68	AV	341.0	150.00	H	19.9	32.58	54	21.42
850	34.72	QP	240.0	100.00	H	4.5	/	46	6.78
5240	85.74	PK	120.0	150.0	V	10.28	90.02	N/A	N/A
5240	74.96	AV	120.0	150.0	V	10.28	79.24	N/A	N/A
5240	85.49	PK	66.0	200.00	H	10.28	89.77	N/A	N/A
5240	74.97	AV	66.0	200.00	H	10.28	79.25	N/A	N/A
5355	44.06	PK	212.0	150.00	V	10.45	48.51	74	25.49
5355	23.02	AV	212.0	150.00	V	10.45	27.47	54	26.53
10480	35.61	PK	76.0	150.00	V	20.06	49.67	74	24.33
10480	13.08	AV	76.0	150.00	V	20.06	27.14	54	26.86
15720	29.05	PK	0.0	200.00	H	27.2	50.25	74	23.75
15720	9.11	AV	0.0	200.00	H	27.2	30.31	54	23.69
6665	53.18	PK	310.0	150.00	V	0.51	47.69	74	26.31
6665	39.15	AV	310.0	150.00	V	0.51	33.66	54	20.34
850	34.61	QP	258.0	100.00	H	4.5	/	46	6.89

FCC §15.407(b) (1) (4) –BAND EDGE

Applicable Standard

FCC §15.407 (b) (1), (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 5.725–5.850 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	FSIQ26	100048	2015-11-12	2016-11-11
Rohde & Schwarz	Signal Analyzer	FSV40	101116	2015-09-02	2016-09-02
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 Matt Yao on 2016-03-11&2016-06-03.

Please refer to the following table and plots.

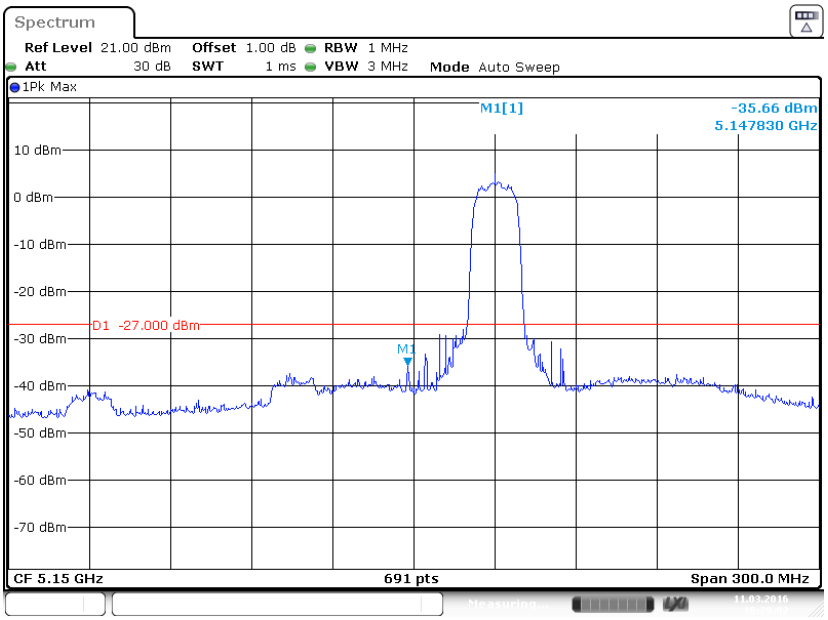
Test mode	Band	Frequency (MHz)	E.I.R.P BAND EDGE (dBm/MHz)	Limits (dBm/MHz)	Result
802.11a	5150-5250 MHz	5141.7	-34.66	-27	PASS
		5350.3	-41.75	-27	PASS
	5725-5850 MHz	5715.4	-29.50	-17	PASS
		5850.0	-28.25	-17	PASS
802.11n ht20	5150-5250 MHz	5140.4	-37.37	-27	PASS
		5355.2	-41.94	-27	PASS
	5725-5850 MHz	5715.0	-29.50	-27	PASS
		5850.0	-24.48	-17	PASS

Note 1: E.I.R.P BAND EDGE= Reading Level+antenna gain (Antenna gain= 1dBi)

Note 2: 5650-5700 MHz is less than –27~10 dBm/MHz.
5700-5715 MHz is less than 10~15.6 dBm/MHz.
5715-5725 MHz is less than 15.6~27 dBm/MHz.
5850-5860 MHz is less than 15.6~27 dBm/MHz.
5860-5875 MHz is less than 10~15.6 dBm/MHz.
5875-5825 MHz is less than –27~10 dBm/MHz.

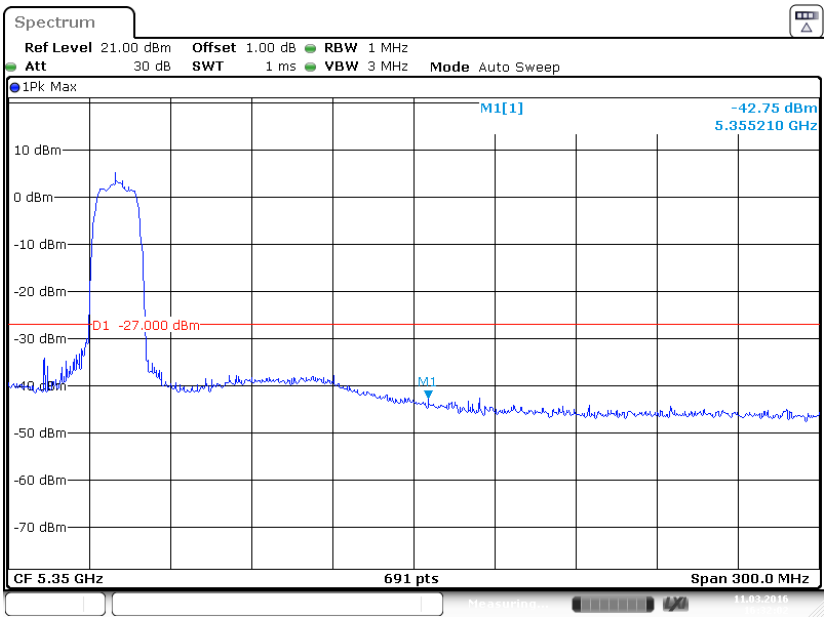
5150-5250 MHz Band:

802.11a Band Edge, Left Side



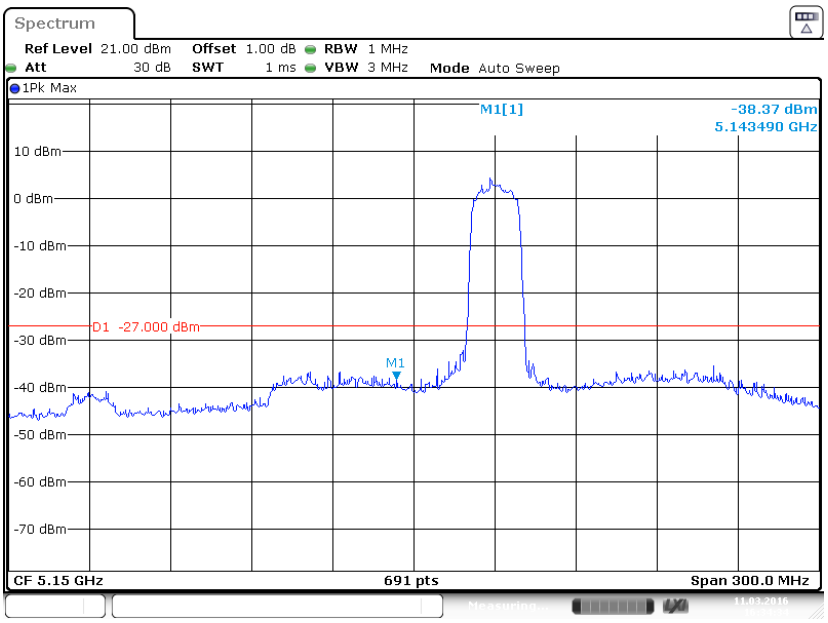
Date: 11.MAR.2016 16:29:02

802.11a Band Edge, Right Side



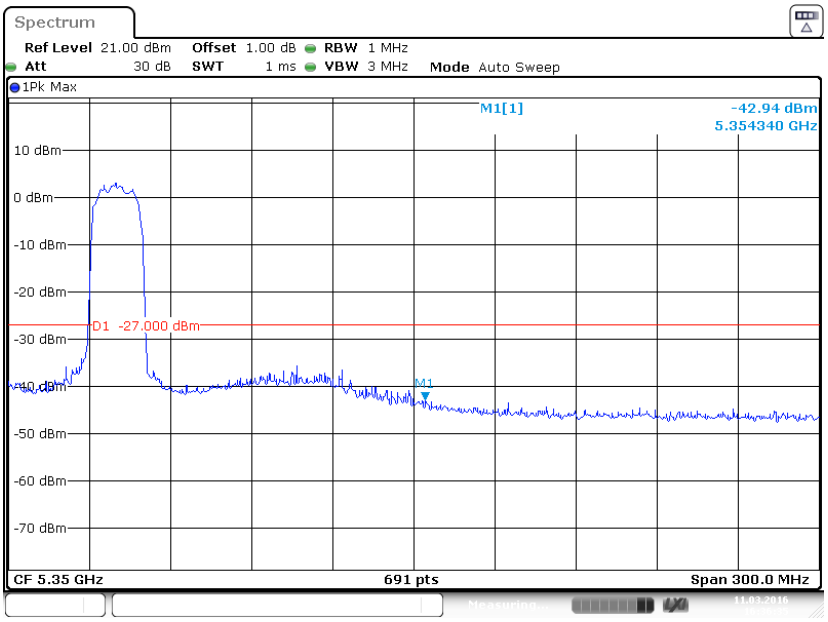
Date: 11.MAR.2016 16:32:02

802.11n ht20 Band Edge, Left Side



Date: 11.MAR.2016 16:34:33

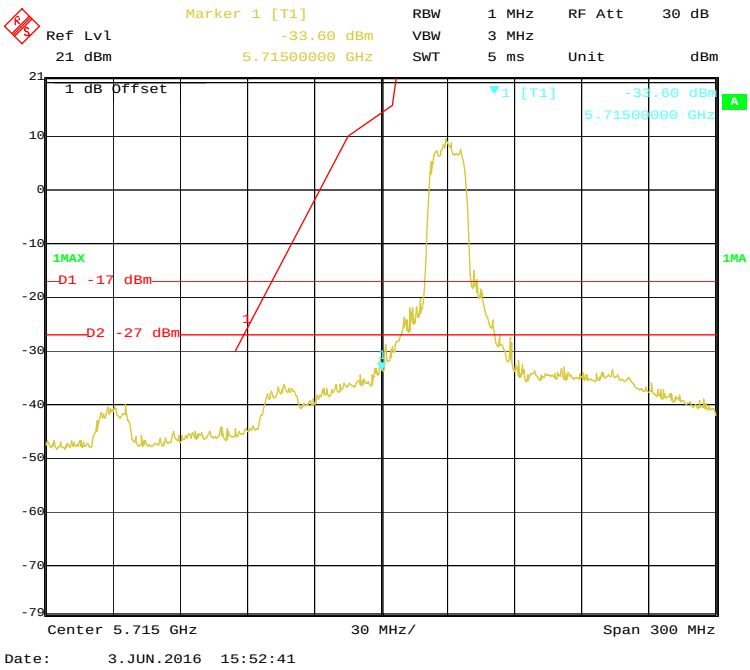
802.11n ht20 Band Edge, Right Side



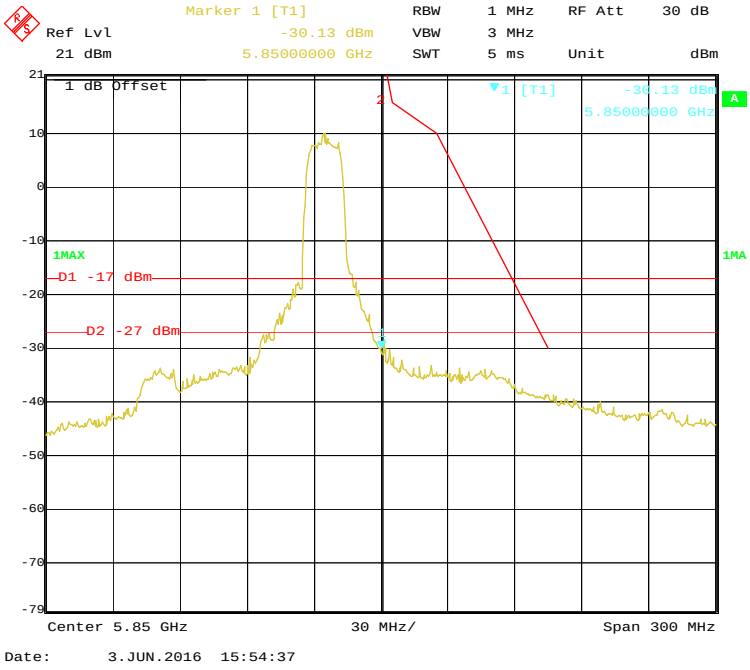
Date: 11.MAR.2016 16:36:36

5725-5850 MHz Band:

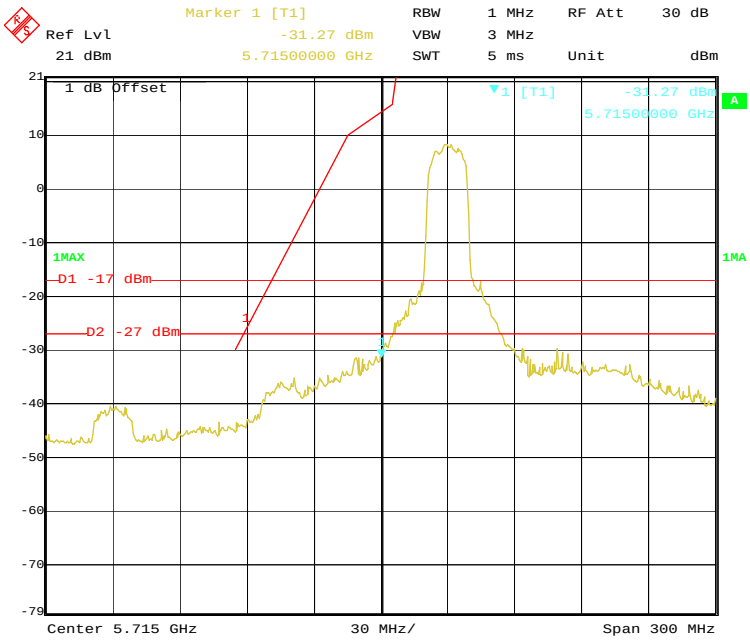
802.11a Band Edge, Left Side



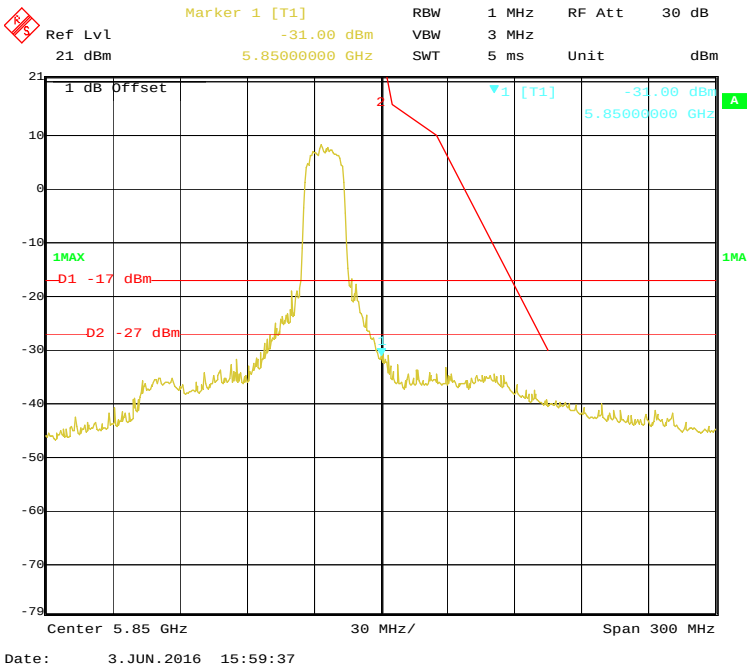
802.11a Band Edge, Right Side



802.11n ht20 Band Edge, Left Side



802.11n ht20 Band Edge, Right Side



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

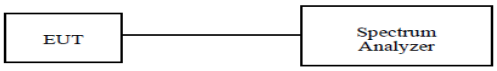
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSV40	101116	2015-09-02	2016-09-02
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-12-16	2016-12-15

*** 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 5.715-5.85 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:	27.5 °C
Relative Humidity:	60 %
ATM Pressure:	99.9 kPa

The testing was performed by Matt Yao on 2016-03-10.

Test Result: Pass.

Please refer to the following tables and plots.

5150-5250 MHz:

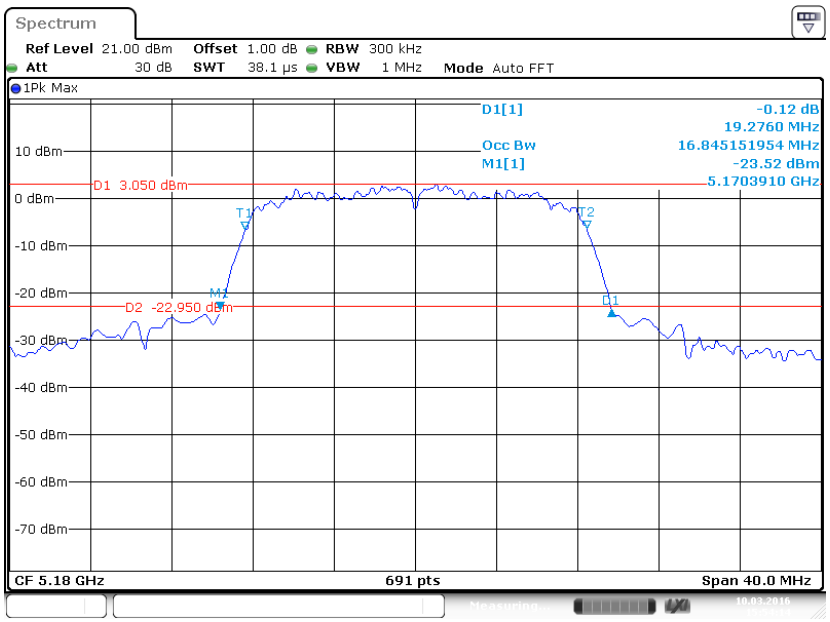
Test mode	Band	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
802.11a	5150-5250 MHz	Low	5180	16.85
		Middle	5200	16.56
		High	5240	16.61
802.11n ht20	5150-5250 MHz	Low	5180	17.60
		Middle	5200	17.60
		High	5240	17.54

5725-5850MHz:

Test mode	Band	Channel	Frequency (MHz)	6dB Bandwidth (MHz)
802.11a	5725-5850 MHz	Low	5745	16.38
		Middle	5785	16.32
		High	5825	16.44
802.11n ht20	5725-5850 MHz	Low	5745	17.60
		Middle	5785	17.60
		High	5825	17.54

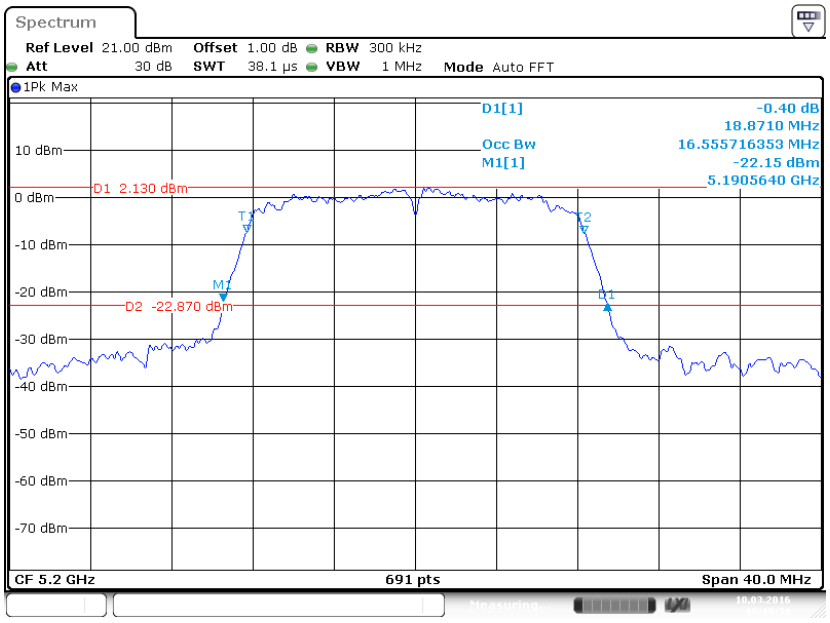
5150-5250 MHz Band:

802.11a mode, 26 Bandwidth-5180MHz



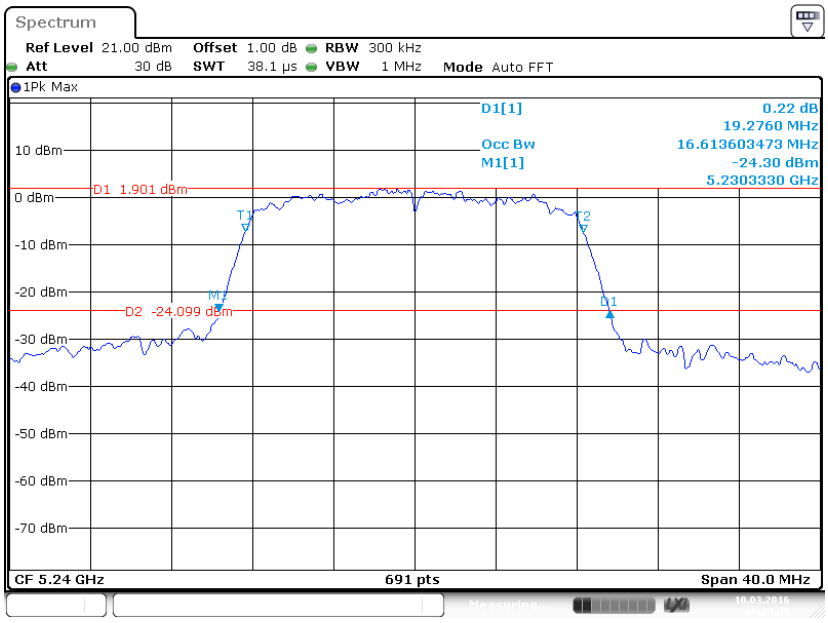
Date:10.MAR.2016 15:54:14

802.11a mode, 26 Bandwidth-5200MHz



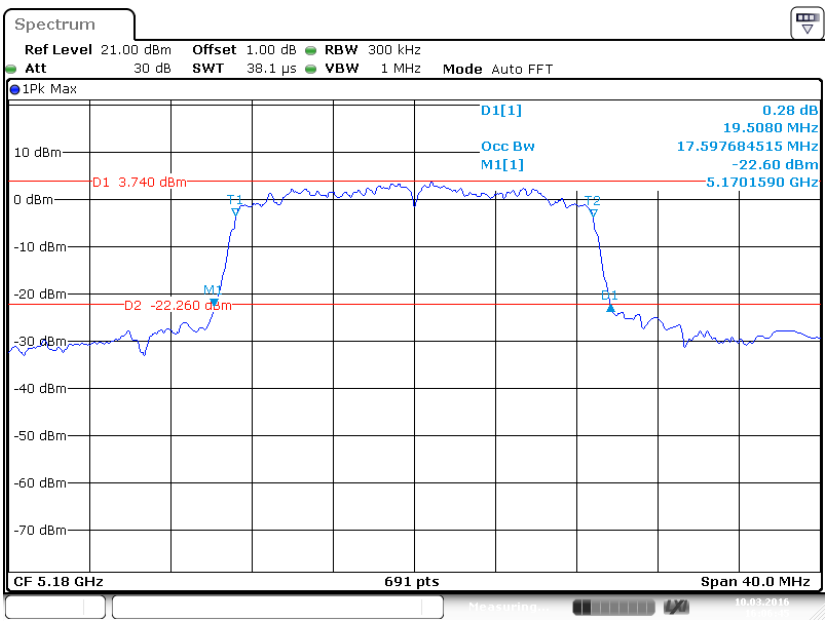
Date:10.MAR.2016 16:19:31

802.11a mode, 26 Bandwidth-5240MHz



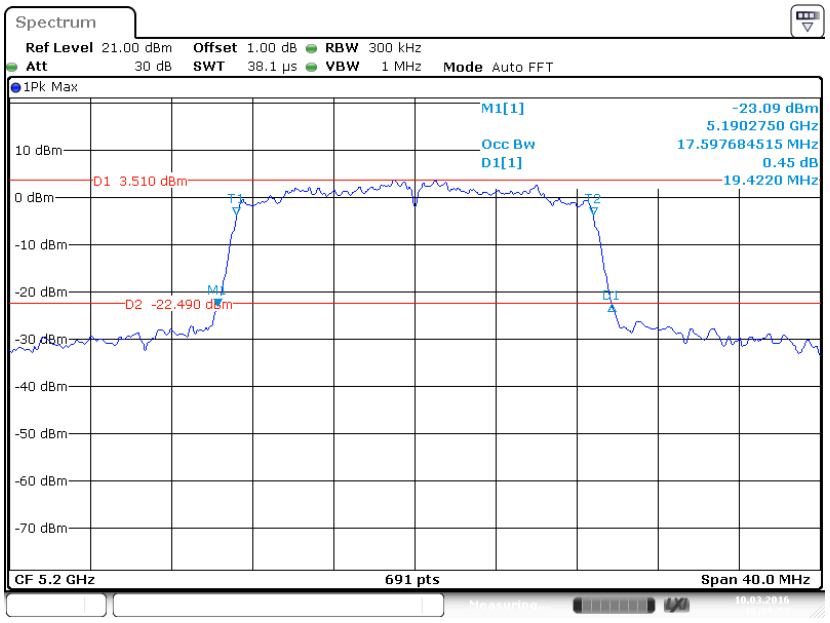
Date:10.MAR.2016 16:24:40

802.11n ht20 mode, 26 Bandwidth-5180MHz



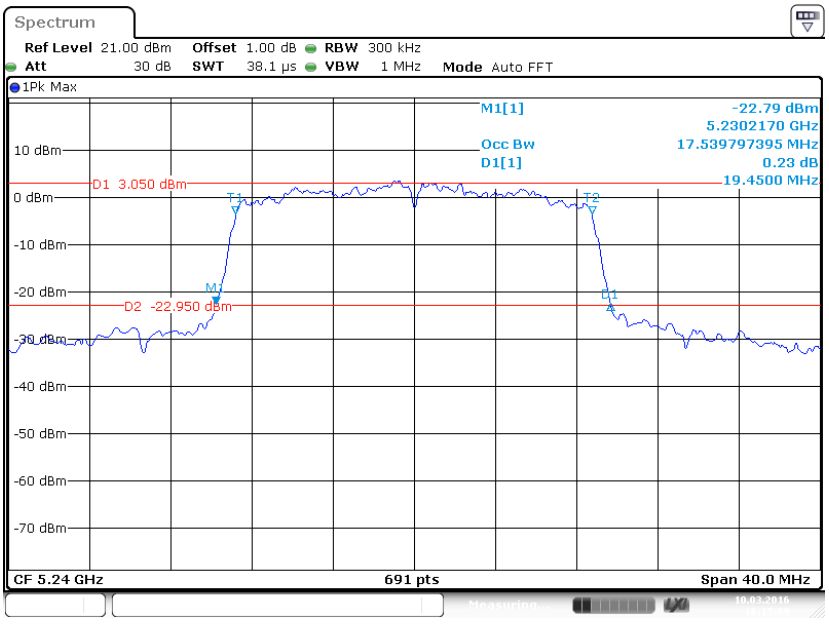
Date:10.MAR.2016 16:06:45

802.11n ht20 mode, 26 Bandwidth-5200MHz



Date:10.MAR.2016 16:09:53

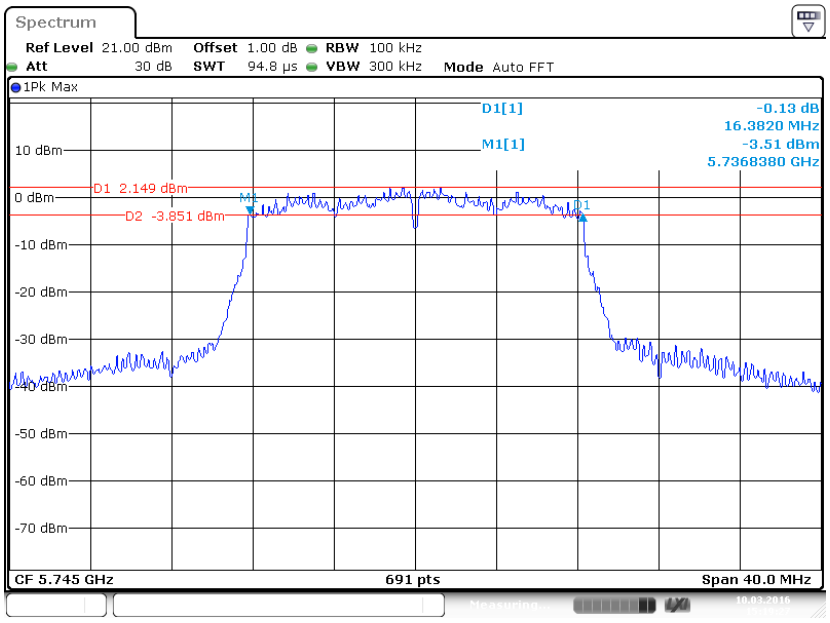
802.11n ht20 mode, 26 Bandwidth-5240MHz



Date:10.MAR.2016 16:15:09

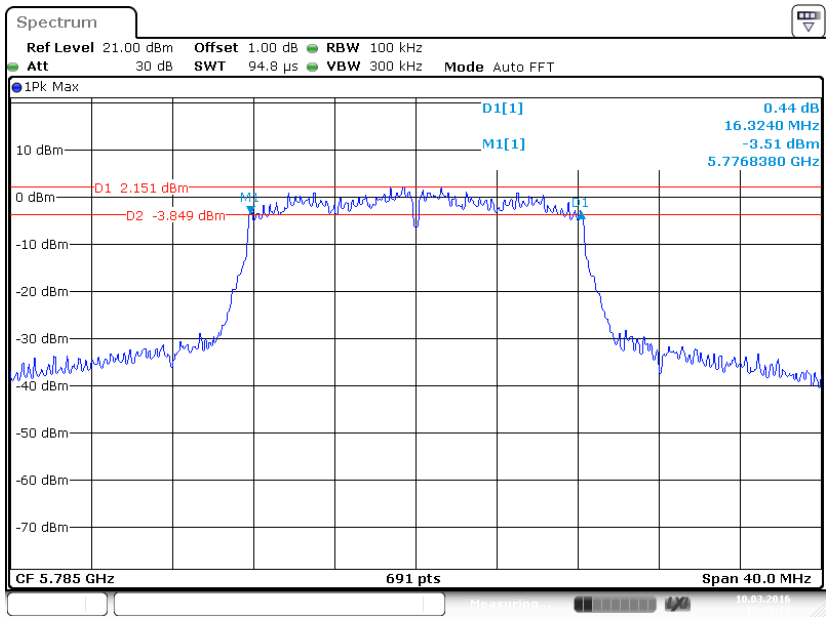
5725-5850 MHz Band:

802.11a mode, 6 Bandwidth-5745MHz



Date:10.MAR.2016 15:19:28

802.11a mode, 6 Bandwidth-5785MHz



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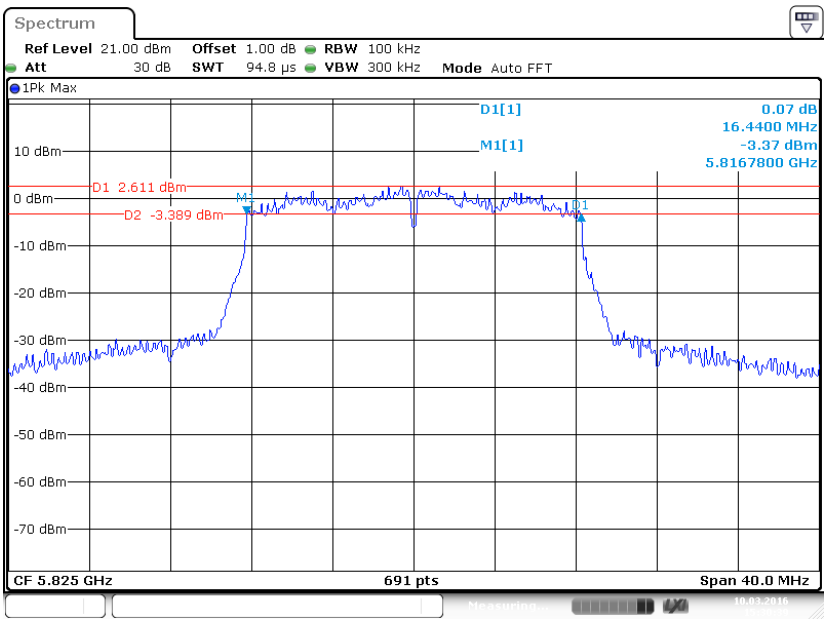
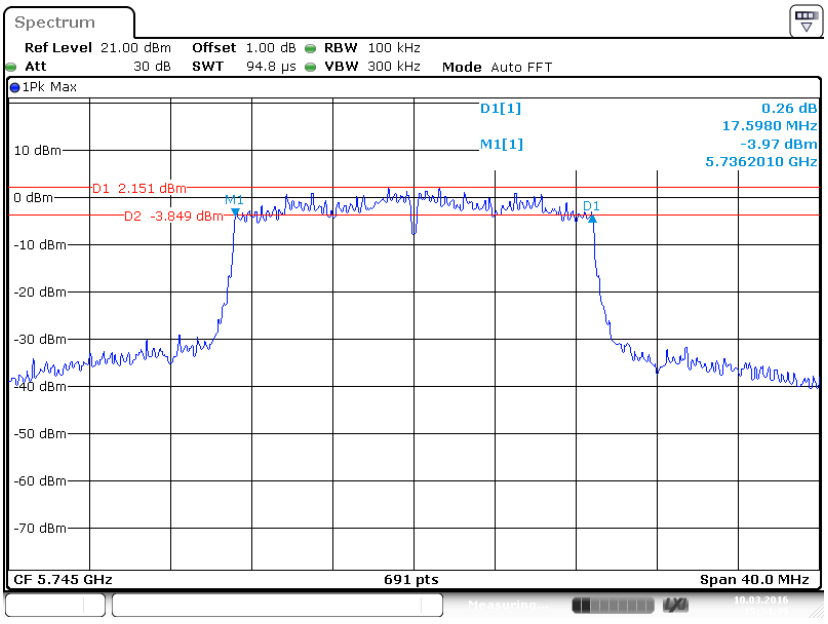
802.11a mode, 6 Bandwidth-5825MHz



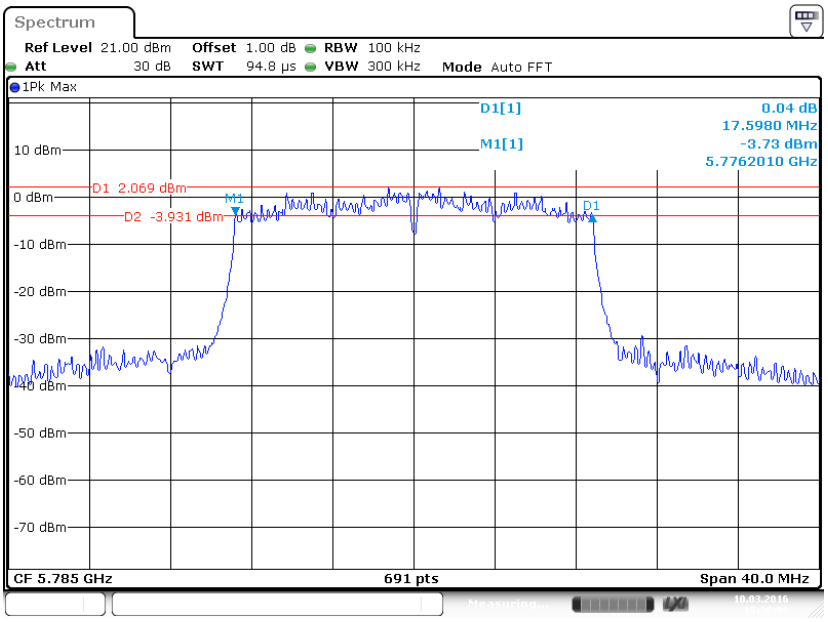
Date:10.MAR.2016 15:30:39

802.11n ht20 mode, 6 Bandwidth-5745MHz



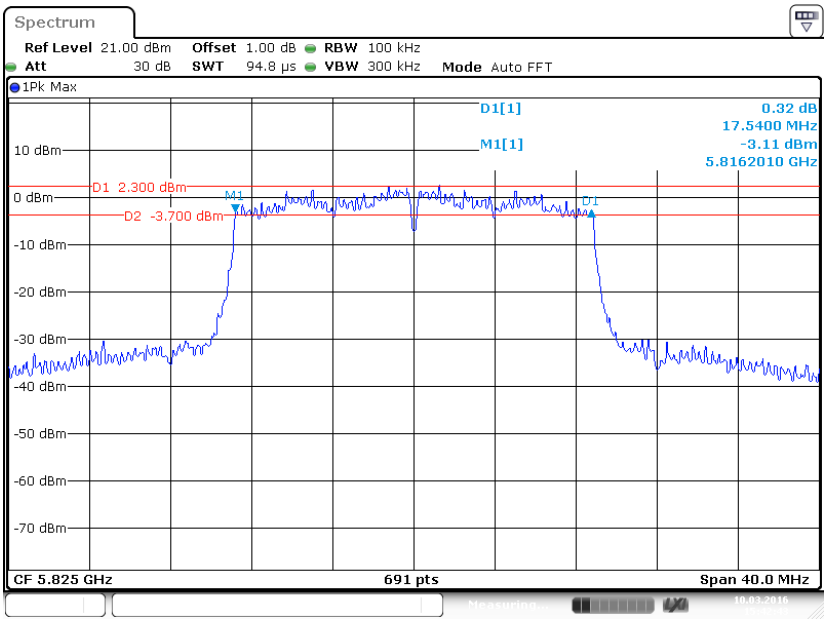
Date:10.MAR.2016 15:34:39

802.11n ht20 mode, 6 Bandwidth-5785MHz



Date:10.MAR.2016 15:38:08

802.11n ht20 mode, 6 Bandwidth-5825MHz



Date:10.MAR.2016 15:42:44

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.

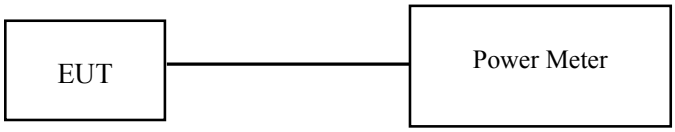
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	OSP120 BASE UNIT	OSP120	101247	2014-05-27	2016-05-27
Rohde & Schwarz	Power Sensor	NRP-Z91	200014	2015-08-1	2017-07-31
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:	27.5 °C
Relative Humidity:	60 %
ATM Pressure:	99.9 kPa

The testing was performed by Matt Yao on 2016-03-11.

Test Mode: Transmitting

Test mode	Band	Channel	Frequency (MHz)	Maximum Conducted Output Power (dBm)	Limit (dBm)	Result
802.11a	5150-5250 MHz	Low	5180	11.54	30	PASS
		Middle	5200	12.23	30	PASS
		High	5240	12.83	30	PASS
	5725-5850 MHz	Low	5745	11.62	30	PASS
		Middle	5785	12.22	30	PASS
		High	5825	12.77	30	PASS
802.11n ht20	5150-5250 MHz	Low	5180	11.23	30	PASS
		Middle	5200	12.33	30	PASS
		High	5240	11.75	30	PASS
	5725-5850 MHz	Low	5745	11.21	30	PASS
		Middle	5785	12.12	30	PASS
		High	5825	12.41	30	PASS

Note:

The transmitting duty cycle is 100%.

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 v01: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	FSV40 SIGNAL ANALYZER 40GHz	FSV40	101116	2016-09-02	2017-09-02
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 byMatt Yao on 2016-03-10.

Test Mode: Transmitting

5150MHz-5250MHz:

Mode	Channel	Frequency MHz	PSD (dBm/MHz)	Limit (dBm/MHz)	Result
802.11a	Low	5180	9.66	17	PASS
	Middle	5200	9.92	17	PASS
	High	5240	8.52	17	PASS
802.11n20	Low	5180	9.77	17	PASS
	Middle	5200	10.25	17	PASS
	High	5240	9.62	17	PASS

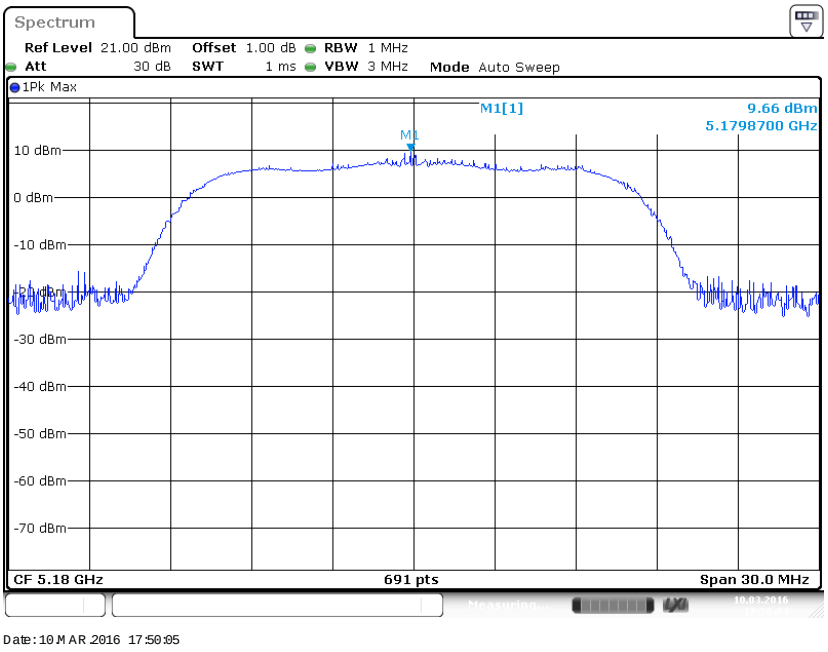
5725MHz-5850MHz:

Mode	Channel	Frequency (MHz)	PSD (dBm/500kHz)	Limit (dBm/500kHz)	Result
802.11a	Low	5745	9.09	30	PASS
	Middle	5785	9.71	30	PASS
	High	5825	9.67	30	PASS
802.11n20	Low	5745	8.34	30	PASS
	Middle	5785	8.19	30	PASS
	High	5825	8.74	30	PASS

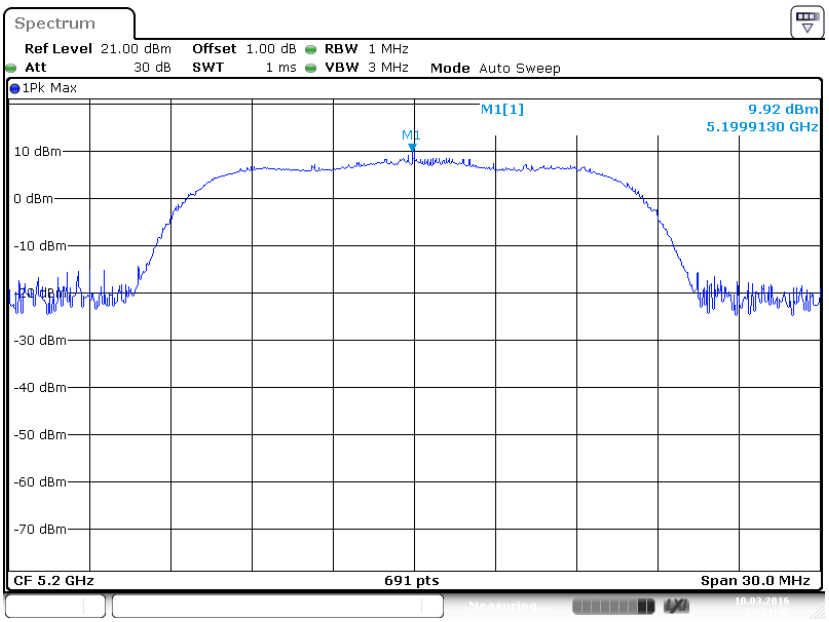
Note:
PSD(dBm/500kHz)= PSD(dBm/MHz)+10log(500kHz/1MHz)

5150MHz-5250MHz Band:

802.11a mode, Power spectral density-5180MHz



802.11a mode, Power spectral density-5200MHz



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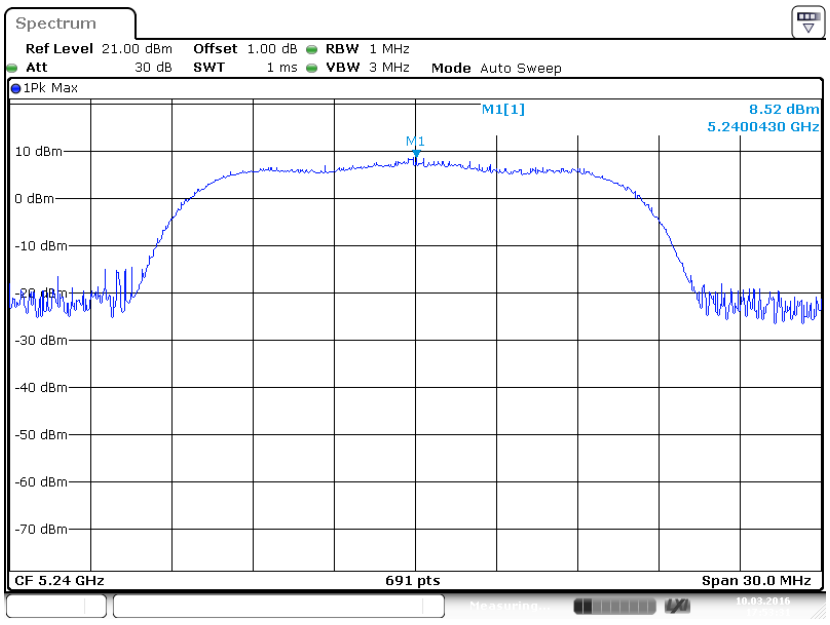
802.11a mode, Power spectral density-5240MHz



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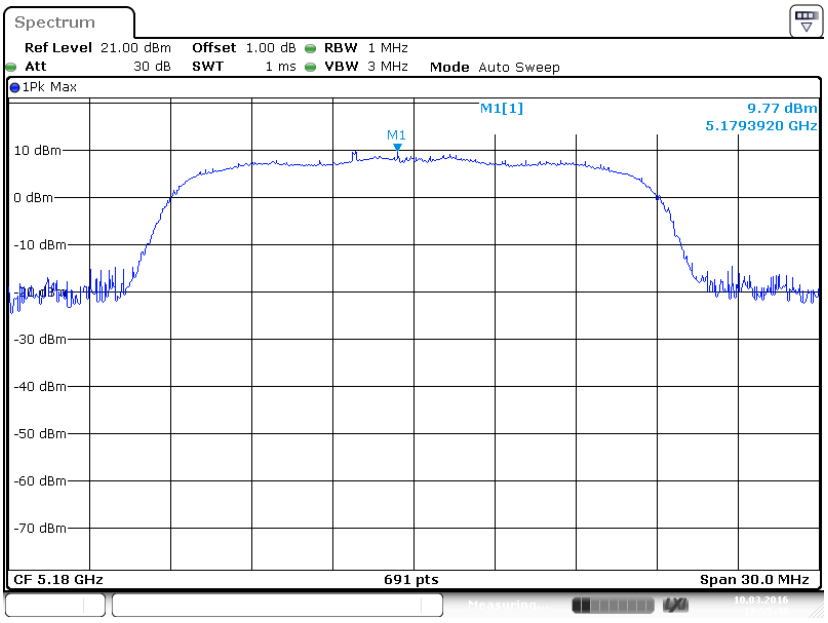
802.11n ht20 mode, Power spectral density-5180MHz



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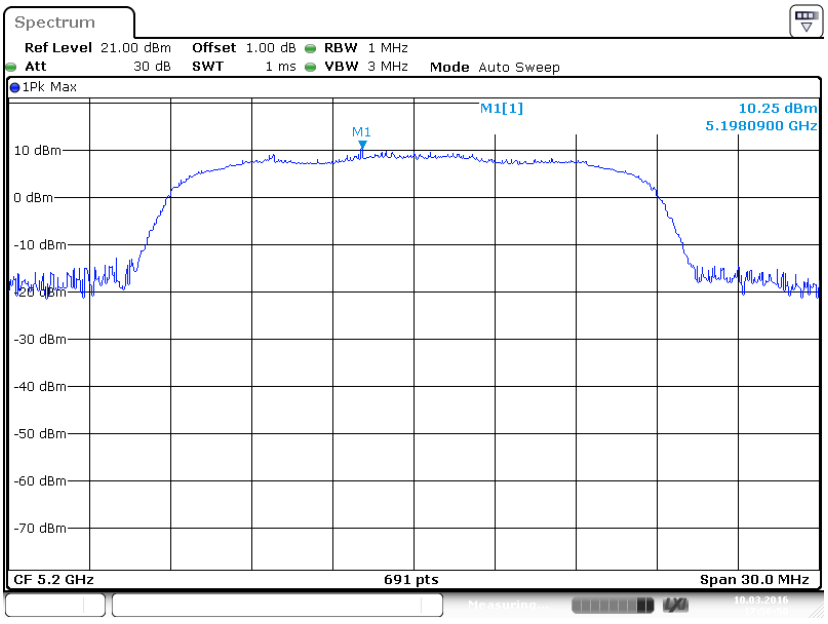
802.11n ht20 mode, Power spectral density-5200MHz



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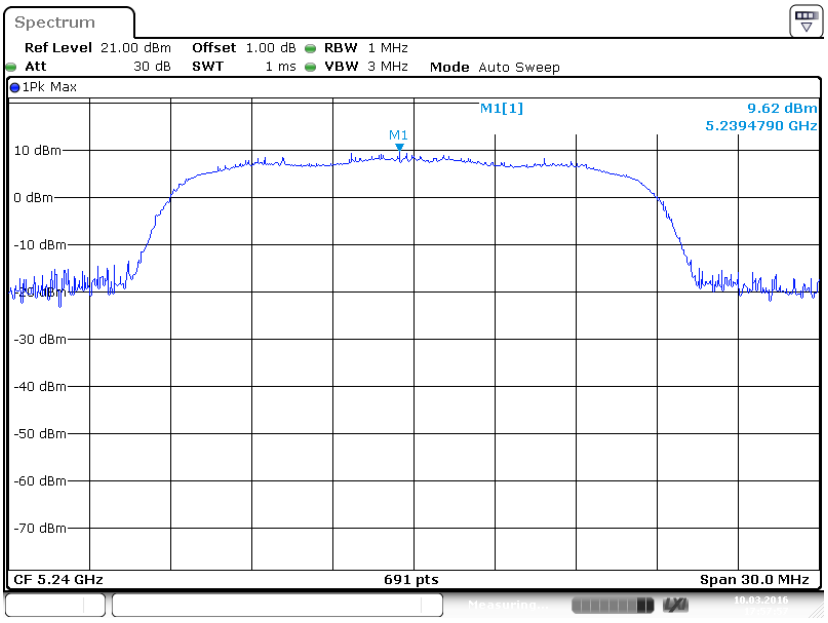
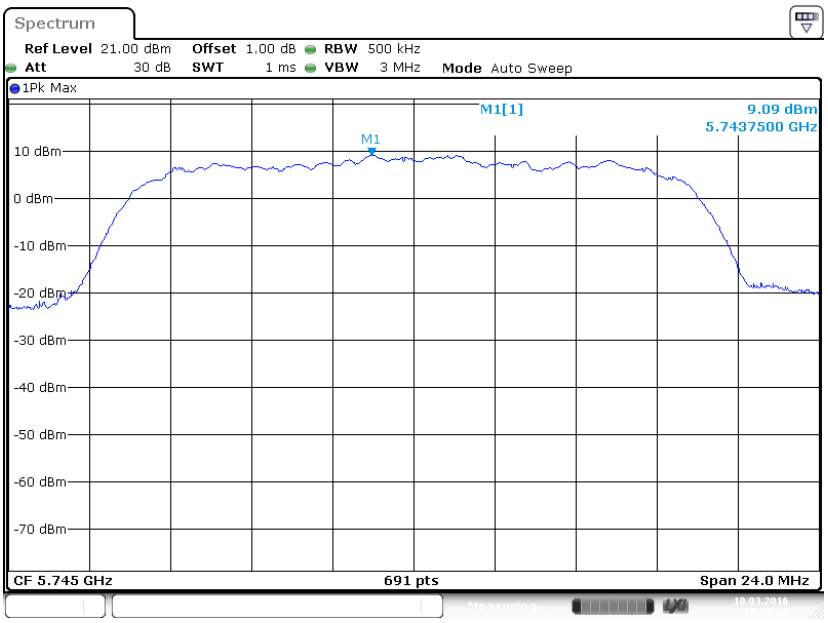
802.11n ht20 mode, Power spectral density-5240MHz

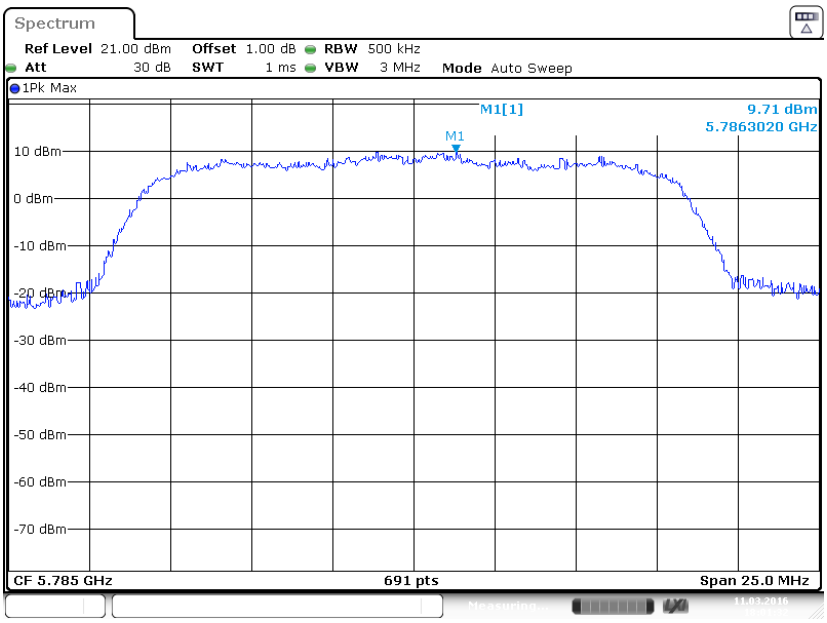


5725-5850 MHz:

802.11a mode, Power spectral density-5745MHz



802.11a mode, Power spectral density-5785MHz



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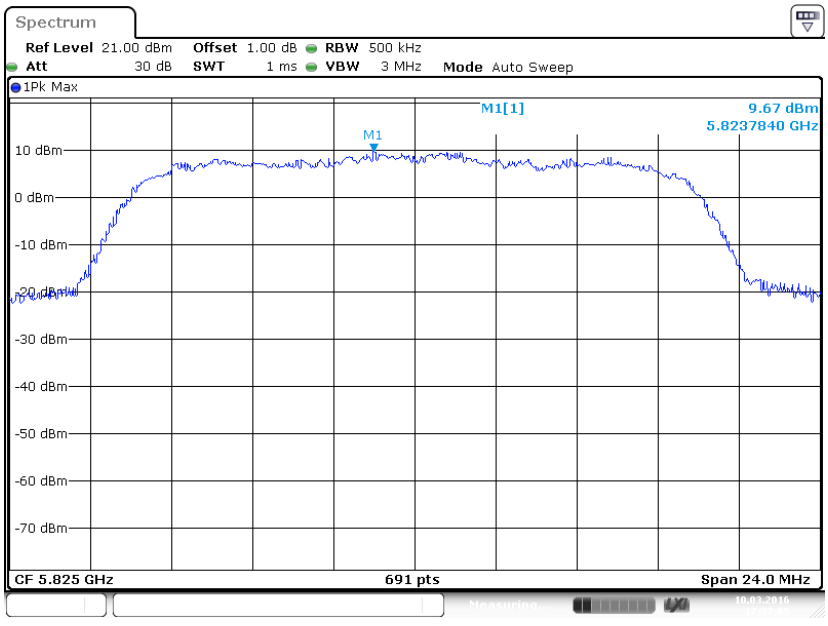
802.11a mode, Power spectral density-5825MHz



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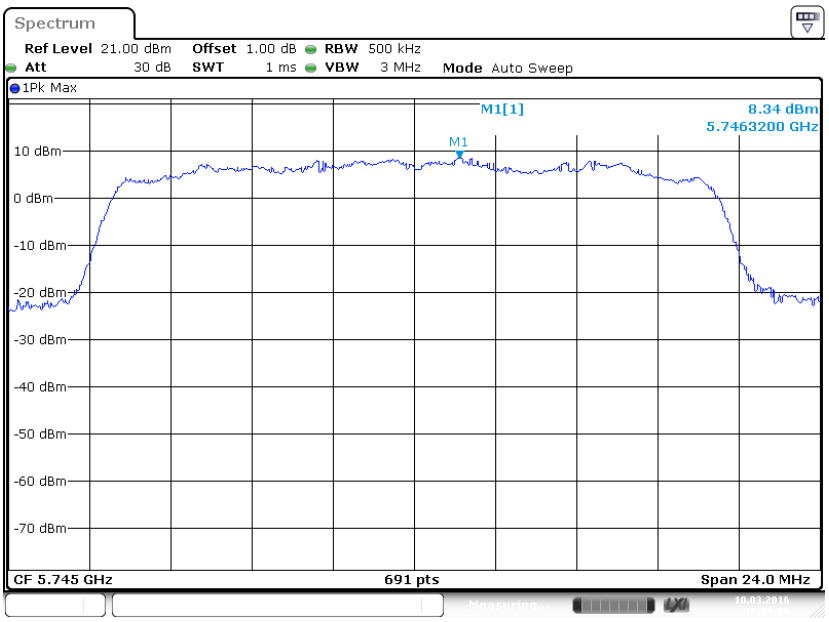
802.11n ht20 mode, Power spectral density-5745MHz



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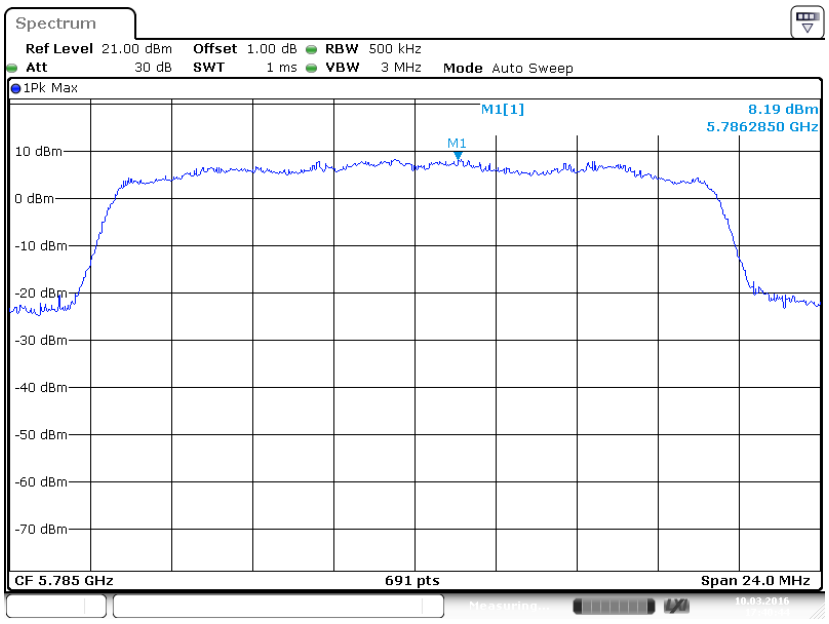
802.11n ht20 mode, Power spectral density-5785MHz



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802.11n ht20 mode, Power spectral density-5825MHz