TESTING LABORATORY
CERTIFICATE #4820.01

FCC PART 15.407

TEST REPORT

For

Shenzhen EDUP Electronics Technology Co.,Ltd.

6 Floor, #6 Building, No.48, Kangzheng Road Liantang Industrial Area, Buji Town Shenzhen, China

FCC ID: 2AHRD-EPAC1619

Report Type:	**Product Name:**
Original Report	802.11AC Dual-Band Wi-Fi USB Adapter

Report Number:	RDG190819007-00B
Report Date:	2019-09-20
Reviewed By:	Jerry Zhang EMC Manager
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

TABLE OF CONTENTS

GENERAL INFORMATION **4**
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) 4
OBJECTIVE 4
RELATED SUBMITTAL(S)/GRANT(S) 4
TEST METHODOLOGY 4
MEASUREMENT UNCERTAINTY 5
TEST FACILITY 5
SYSTEM TEST CONFIGURATION **6**
DESCRIPTION OF TEST CONFIGURATION 6
EUT EXERCISE SOFTWARE 6
EQUIPMENT MODIFICATIONS 9
LOCAL SUPPORT EQUIPMENT LIST AND DETAILS 9
SUPPORT CABLE LIST AND DETAILS 9
BLOCK DIAGRAM OF TEST SETUP 9
SUMMARY OF TEST RESULTS **10**
FCC §15.407 (f) & §1.1310 & §2.1093- RF EXPOSURE **11**
APPLICABLE STANDARD 11
FCC §15.203 – ANTENNA REQUIREMENT **12**
APPLICABLE STANDARD 12
ANTENNA CONNECTOR CONSTRUCTION 12
FCC §15.407 (b) (6) §15.207 (a) – CONDUCTED EMISSIONS **13**
APPLICABLE STANDARD 13
EUT SETUP 13
EMI TEST RECEIVER SETUP 13
CORRECTED AMPLITUDE & MARGIN CALCULATION 13
TEST EQUIPMENT LIST AND DETAILS 14
TEST PROCEDURE 14
TEST DATA 14
FCC §15.209, §15.205 & §15.407(b) –UNWANTED EMISSION **17**
APPLICABLE STANDARD 17
EUT SETUP 18
EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP 19
TEST PROCEDURE 19
CORRECTED AMPLITUDE & MARGIN CALCULATION 20
TEST EQUIPMENT LIST AND DETAILS 21
TEST DATA 21
FCC §15.407(a)(e)–EMISSION BANDWIDTH AND OCCUPIED BANDWIDTH **32**
APPLICABLE STANDARD 32
TEST EQUIPMENT LIST AND DETAILS 32
TEST PROCEDURE 32
TEST DATA 32
FCC §15.407(a) –MAXIMUM CONDUCTED OUTPUT POWER **43**
APPLICABLE STANDARD 43
TEST EQUIPMENT LIST AND DETAILS 44

TEST PROCEDURE 44
TEST DATA 44
FCC §15.407(a) - POWER SPECTRAL DENSITY 46
APPLICABLE STANDARD 46
TEST PROCEDURE 47
TEST EQUIPMENT LIST AND DETAILS 47
TEST DATA 47

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:	802.11AC Dual-Band Wi-Fi USB Adapter
EUT Model:	EP-AC1619
Multiple Models:	WT-AC9015
Frequency Range:	5725-5850 MHz
Maximum Output Power (Conducted):	12.35dBm
Modulation Type:	OFDM
Rated Input Voltage:	DC 5V from system
External Dimension:	31.3mm(L)*16.0mm(W)*7.4mm(H)
Serial Number:	190819007
EUT Received Date:	2019/8/22

Notes: *Model EP-AC1619 and WT-AC9015 are identical, EP-AC1619 was selected for fully testing except radiation emission test both modes, the detailed information about the difference among WT-AC9015 and model EP-AC1619 can be referred to the declaration letter which was stated and guaranteed by the manufacturer.*

Objective

This type approval report is prepared on behalf of ***Shenzhen EDUP Electronics Technology Co.,Ltd.*** in accordance with Part 2-Subpart J, Part 15-Subparts A, and E of the Federal Communications Commission's rules.

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

Related Submittal(s)/Grant(s)

FCC Part 15C DTS submissions with FCC ID: 2AHRD-EPAC1619.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices. And KDB 789033 D02 General U-NII Test Procedures New Rules v02r01.

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

Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.61dB
Power Spectral Density, conducted	±0.61 dB
Unwanted Emissions, radiated	30M~200MHz: 4.55 dB,200M~1GHz: 5.92 dB,1G~6GHz: 4.98 dB, 6G~18GHz: 5.89 dB,18G~26.5G:5.47 dB,26.5G~40G:5.63 dB
Unwanted Emissions,conducted	±1.5 dB
Temperature	±1℃
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
AC Power Lines Conducted Emission	3.12 dB (150 kHz to 30 MHz)

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 897218, the FCC Designation No. : CN1220.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0022.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

The system support 802.11a/n ht20/n ht40/ac vht20/ac vht40/ac vht80, the vht20/vht40 were reduced since the identical parameters with 802.11n ht20 and ht40

For 5725~5850MHz band, 8 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	157	5785
151	5755	159	5795
153	5765	161	5805
155	5775	165	5825

802.11a, 802.11n ht20 were tested with Channel 149, 157 and 165,
802.11n ht40 were tested with Channel 151 and 159.
802.11ac vht80 mode was tested with channel 155.

EUT Exercise Software

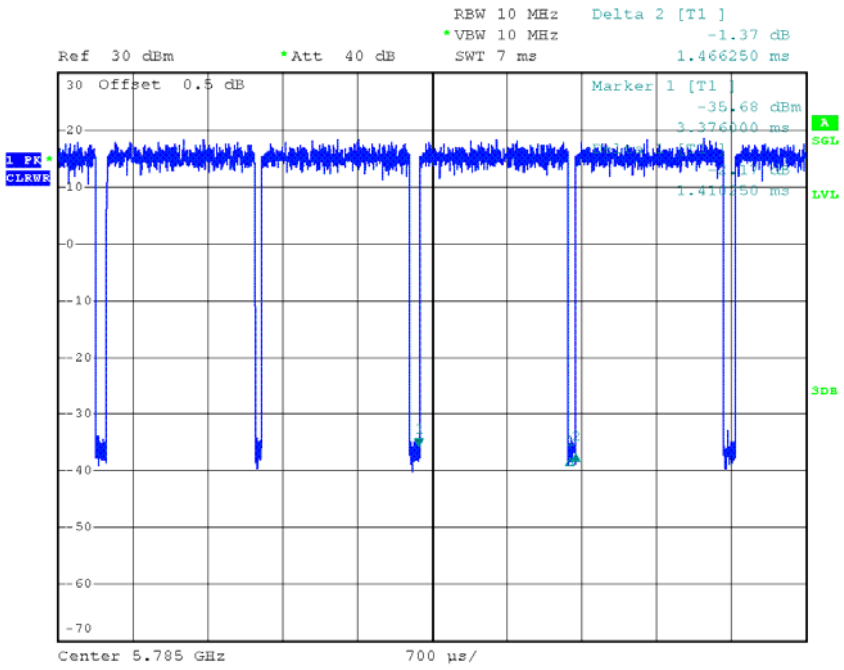
The software "MP_Test" was used for testing, which was provided by manufacturer. The worst-case data rates are determined to be as follows for each mode based upon investigations by measuring the average power and PSD across all data rates, bandwidths, and modulations. The maximum power was configured as below table, that provided by the manufacturer:

Mode	Frequency (MHz)	Data Rate	Power level Setting
802.11a	5745	6Mbps	52
	5785	6Mbps	51
	5825	6Mbps	50
802.11n ht20	5745	MCS8	54
	5785	MCS8	54
	5825	MCS8	54
802.11n ht 40	5755	MCS8	55
	5795	MCS8	55
802.11ac vht80	5775	MCS8	51

The duty cycle as below:

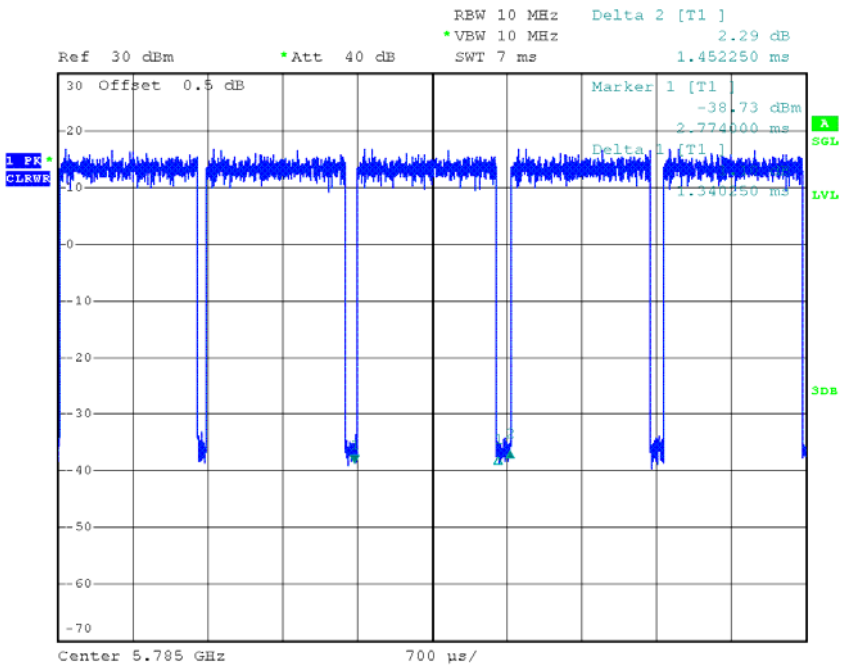
Mode	T_{on} (ms)	T_{on+off} (ms)	Duty Cycle(x) (%)
802.11 a	1.410	1.466	96.18
802.11n ht20	1.340	1.452	92.29
802.11n ht40	0.664	0.796	83.42
802.11ac vht80	0.330	0.486	67.90

802.11a



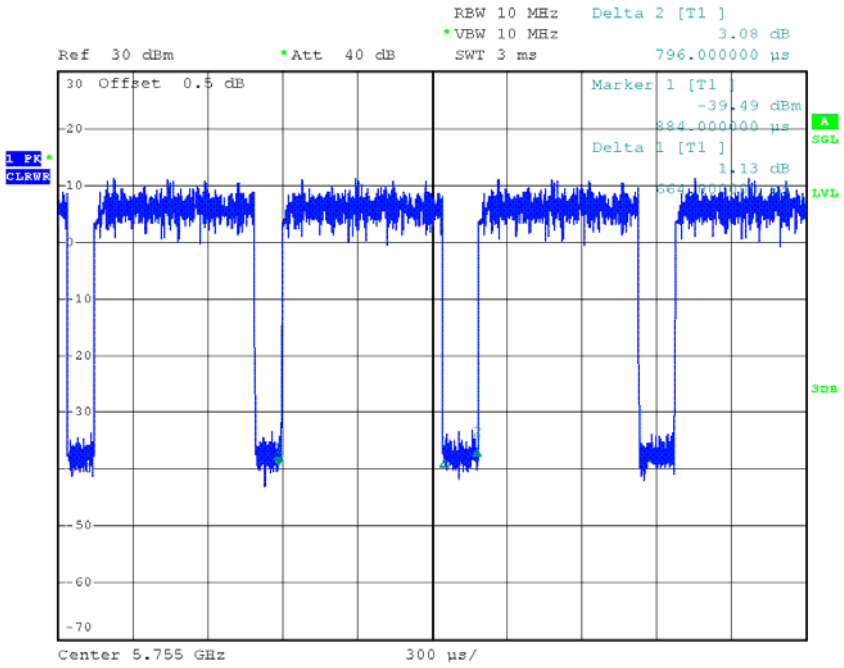
Date: 9.SEP.2019 17:00:31

802.11n ht20



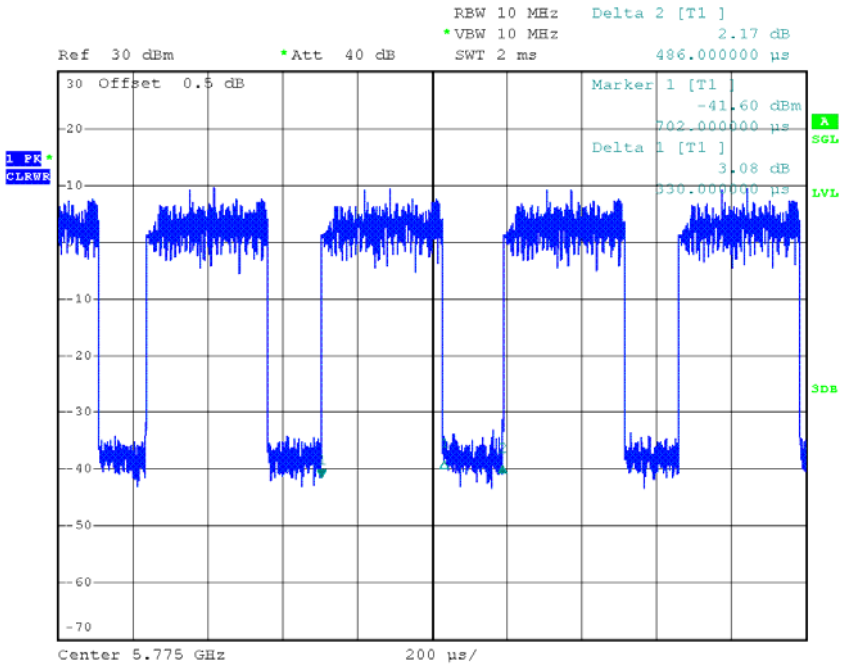
Date: 9.SEP.2019 17:01:56

802.11n ht40



Date: 9.SEP.2019 17:03:44

802.11ac vht80



Date: 9.SEP.2019 17:06:02

Equipment Modifications

No modification was made to the EUT.

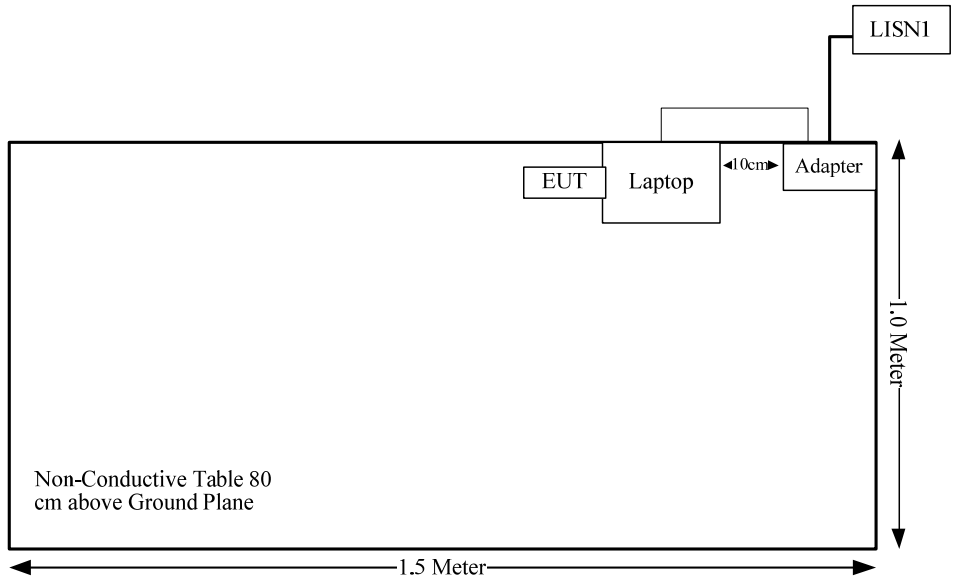
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Lenovo	Laptop	ThinkPad E450	PF-0MR8KV

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
Adapter Cable	Yes	Yes	2	Adapter	Laptop

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC§15.407 (f) & §1.1310 & §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.407(b)(6)& §15.207(a)	Conducted Emissions	Compliance
§15.205& §15.209 &§15.407(b)	Undesirable Emission& Restricted Bands	Compliance
§15.407(a)(e)	Emission Bandwidth	Compliance
§15.407(a)	Conducted Transmitter Output Power	Compliance
§15.407 (a)	Power Spectral Density	Compliance

FCC §15.407 (f) & §1.1310 & §2.1093- RF EXPOSURE

Applicable Standard

According to subpart 15.407(f)and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Result

Compliance, please refer to the SAR report: RDG190819007-20A.

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 antenna permanently attached to the unit, fulfill the requirement of this section. Please refer to the EUT photos.

Antenna Type	input impedance (Ohm)	Antenna Gain /Frequency Range
PIFA	50	3.0 dBi/2.4~2.5GHz 2.0 dBi/5.725~5.85GHz

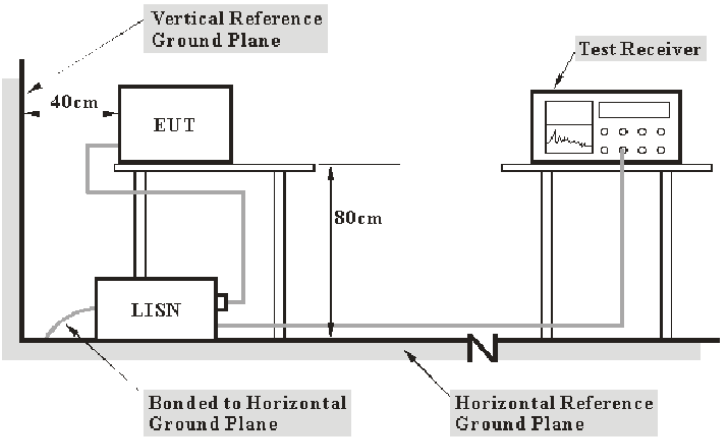
Result: Compliance.

FCC §15.407 (b) (6) §15.207 (a) – CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207(a), §15.407(b) (6)

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 the main lisn with a 120 V/60 Hz AC power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

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

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

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

Margin = Limit – Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-01	2019-09-05	2020-09-05
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A
R&S	Two-line V-network	ENV 216	101614	2018-12-10	2019-12-10
R&S	EMI Test Receiver	ESPI	100120	2019-05-09	2020-05-09

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

Test Procedure

During the conducted emission test, the adapter was connected to the first LISN.

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

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

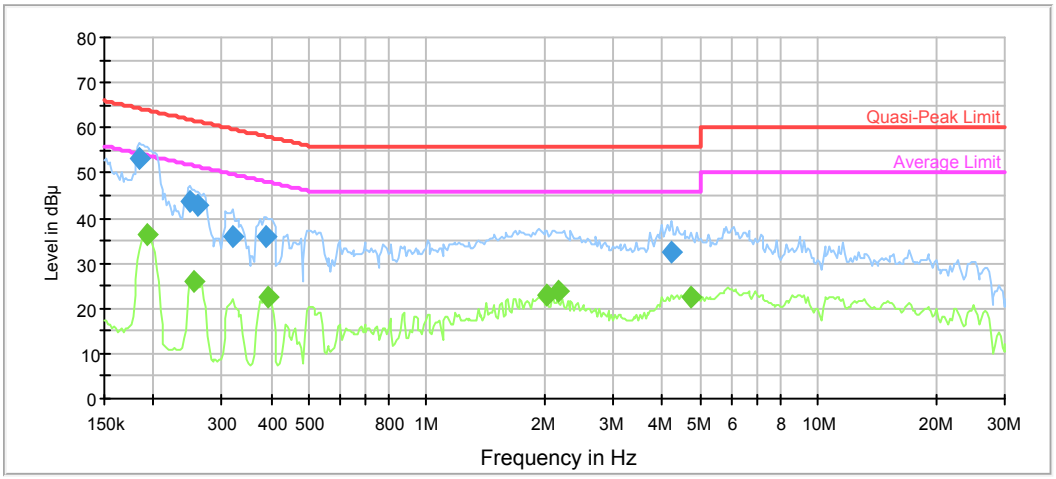
Test Data

Environmental Conditions

Temperature:	27.7 °C
Relative Humidity:	65 %
ATM Pressure:	100.1 kPa
Tester:	Sem Xing
Test Date:	2019-08-18

Test Mode: Transmitting (802.11n ht20 5825MHz was the worst)

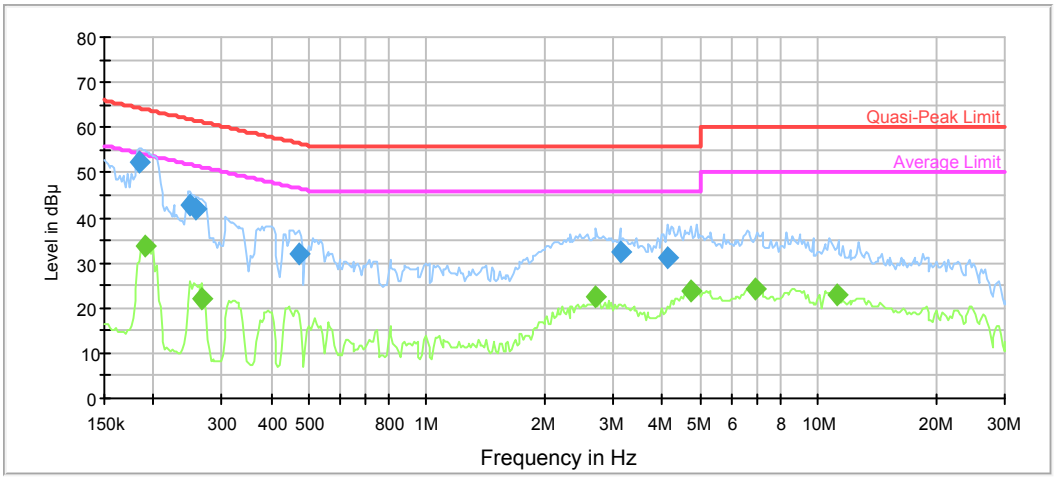
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.184859	53.3	9.000	L1	10.8	11.0	64.3
0.249162	43.5	9.000	L1	10.3	18.3	61.8
0.259279	42.7	9.000	L1	10.3	18.8	61.5
0.319533	36.0	9.000	L1	10.1	23.7	59.7
0.389891	36.1	9.000	L1	10.0	22.0	58.1
4.204862	32.3	9.000	L1	9.8	23.7	56.0

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.192365	36.3	9.000	L1	10.7	17.6	53.9
0.254170	25.9	9.000	L1	10.3	25.7	51.6
0.393790	22.4	9.000	L1	10.0	25.6	48.0
2.033721	22.8	9.000	L1	9.7	23.2	46.0
2.158836	23.6	9.000	L1	9.7	22.4	46.0
4.738144	22.6	9.000	L1	9.8	23.4	46.0

AC120 V, 60 Hz, Neutral:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.184859	52.5	9.000	N	10.7	11.8	64.3
0.249162	42.8	9.000	N	10.3	19.0	61.8
0.256712	42.0	9.000	N	10.3	19.5	61.5
0.471031	31.9	9.000	N	9.9	24.6	56.5
3.119684	32.4	9.000	N	9.8	23.6	56.0
4.122010	31.1	9.000	N	9.8	24.9	56.0

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.190460	33.8	9.000	N	10.7	20.2	54.0
0.267135	22.2	9.000	N	10.3	29.0	51.2
2.714009	22.4	9.000	N	9.8	23.6	46.0
4.738144	23.9	9.000	N	9.8	22.1	46.0
6.915450	24.4	9.000	N	9.8	25.6	50.0
11.149269	22.7	9.000	N	9.8	27.3	50.0

FCC §15.209, §15.205 & §15.407(b) –UNWANTED EMISSION

Applicable Standard

FCC §15.407; §15.209; §15.205;

(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) 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 e.i.r.p. of −27 dBm/MHz.

(2) 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 e.i.r.p. of −27 dBm/MHz.

(3) 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 e.i.r.p. of −27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band:

(i) 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.

(ii) Devices certified before March 2, 2017 with antenna gain greater than 10 dBi may demonstrate compliance with the emission limits in §15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease by March 2, 2018. Devices certified before March 2, 2018 with antenna gain of 10 dBi or less may demonstrate compliance with the emission limits in §15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease before March 2, 2020.

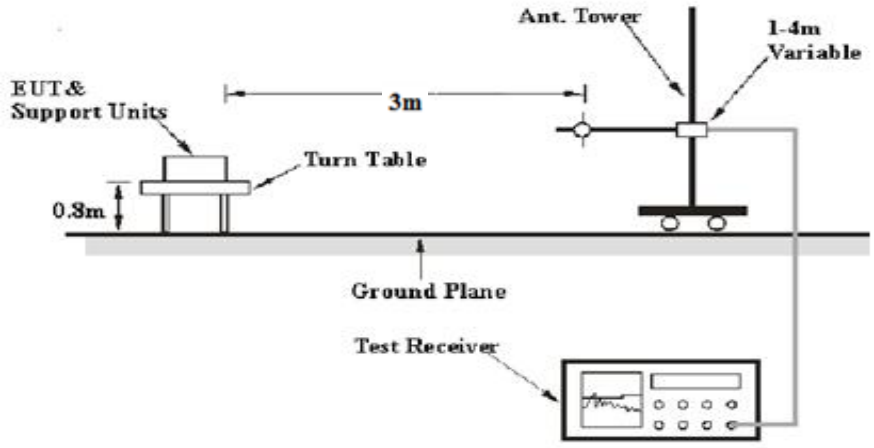
(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

(6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

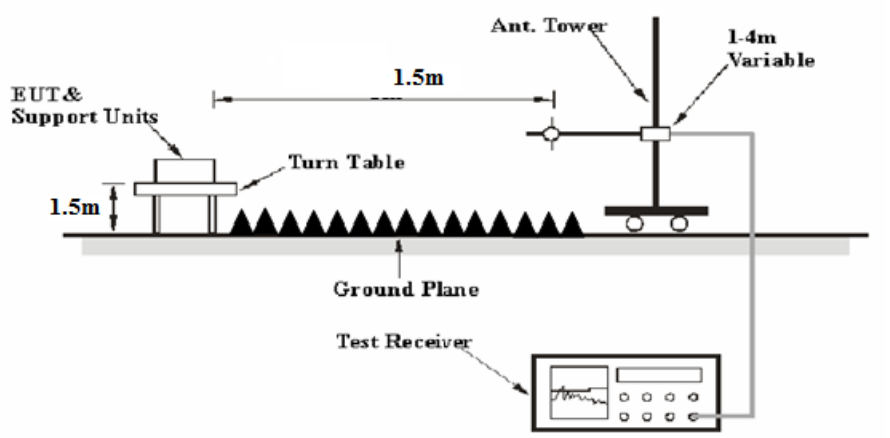
(7) The provisions of §15.205 apply to intentional radiators operating under this section.

EUT Setup

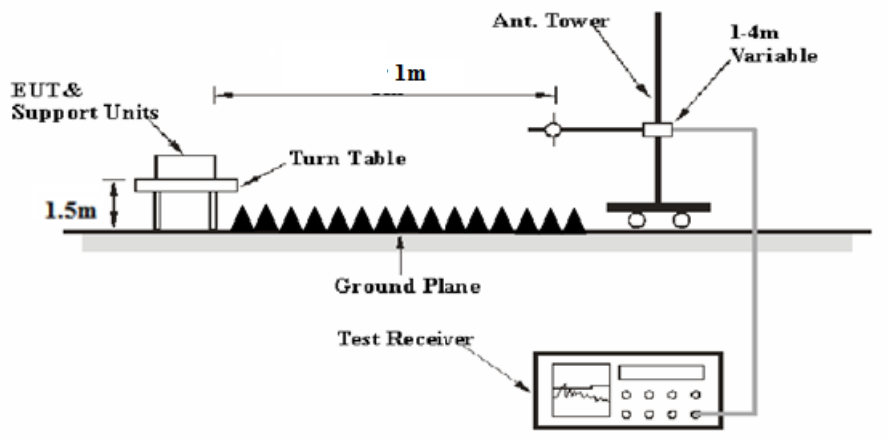
Below 1 GHz:



1-26.5 GHz:



26.5-40 GHz:



The radiated emission below 1GHz tests were performed in the 3 meters chamber test site A, above 1GHz tests were performed in the 3 meters chamber test site B, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.407 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.

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:

30-1000MHz:

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

1GHz- 40GHz:

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

Note: T is minimum transmission duration

If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

Test Procedure

During the radiated emission test, the adapter was connected to the first AC floor outlet.

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

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, emission shall be computed as: E [dBμV/m] = EIRP[dBm] + 95.2, for d = 3 meters.

According to C63.10, the above 1G test result shall be extrapolated to the specified distance using an extrapolation factor of 20dB/decade from 3m to 1.5m or 1m
Distance extrapolation factor =20 log (specific distance [3m]/test distance [1.5m]) dB= 6.02 dB
or
Distance extrapolation factor =20 log (specific distance [3m]/test distance [1m]) dB= 9.54 dB

All emissions under the average limit and under the noise floor have not recorded in the report.

Corrected Amplitude & Margin Calculation

For the range 30MHz-1GHz, the Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - Amplifier Gain

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

Margin = Limit - Corrected Amplitude

For the range 1GHz-40GHz, Test performed at 1.5m or 1m, the Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading and the Distance extrapolation factor. The basic equation is as follows:

Corrected Amplitude
= Meter Reading + Antenna Factor + Cable Loss - Amplifier Gain-Distance extrapolation factor

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

Margin = Limit- Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiation Below 1GHz					
R&S	EMI Test Receiver	ESR3	102453	2019-06-26	2020-06-26
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2018-10-05	2019-10-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2018-10-05	2019-10-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1400-01	2019-05-06	2020-05-06
HP	Amplifier	8447D	2727A05902	2018-10-05	2019-10-05
Radiation Above 1GHz					
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2019-08-03	2020-08-03
R&S	Spectrum Analyzer	FSP 38	100478	2019-05-09	2020-05-09
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
ETS-Lindgren	Horn Antenna	3115	000 527 35	2018-10-12	2021-10-12
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1304	2016-11-18	2019-11-18
Ducommun Technolagies	Horn Antenna	ARH-2823-02	1007726-01 1302	2016-11-18	2019-11-18
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-2.4J2.4J-50	C-0700-02	2019-06-27	2020-06-27
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2019-09-05	2020-09-05
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2019-06-27	2020-06-27
Sinoscite	Bandstop Filters	BSF5150-5850MN-0899-003	0899003	2019-05-06	2020-05-06
Mini Circuits	High Pass Filter	VHF-6010+	31118	2019-06-16	2020-06-16

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

Test Data

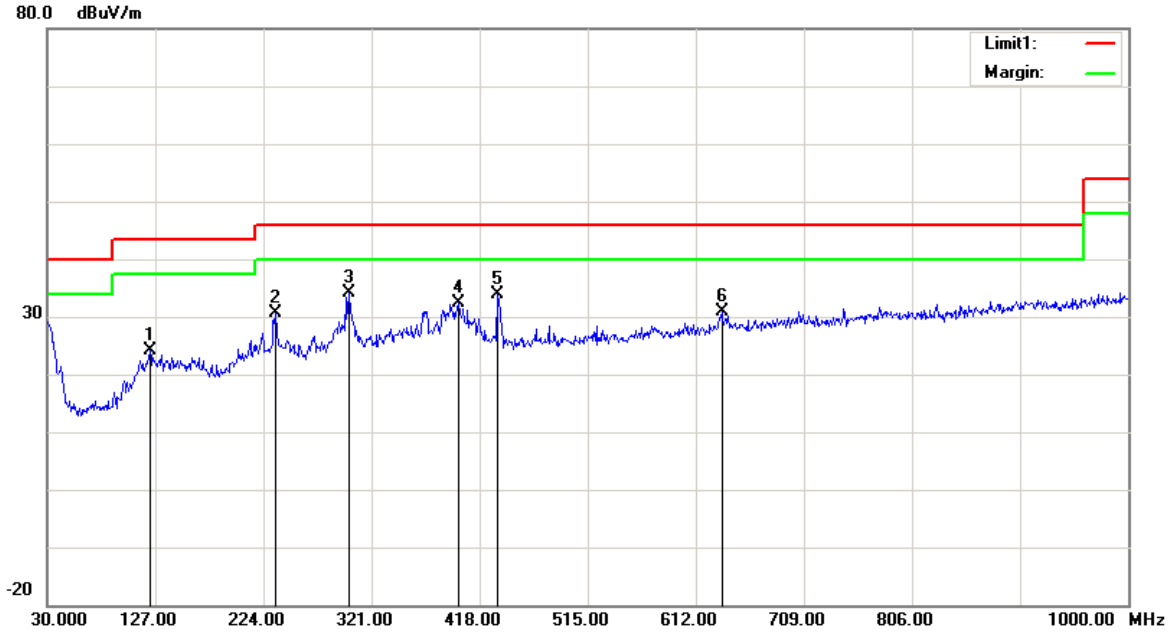
Environmental Conditions

Test Items	Radiation Below 1GHz	Radiation Above 1GHz
Temperature:	27 °C	27.2 °C
Relative Humidity:	50%	56 %
ATM Pressure:	100.3 kPa	100.1 kPa
Tester:	Tyler Pan	Tyler Pan
Test Date:	2019-08-31	2019-09-10

Test Mode: Transmitting

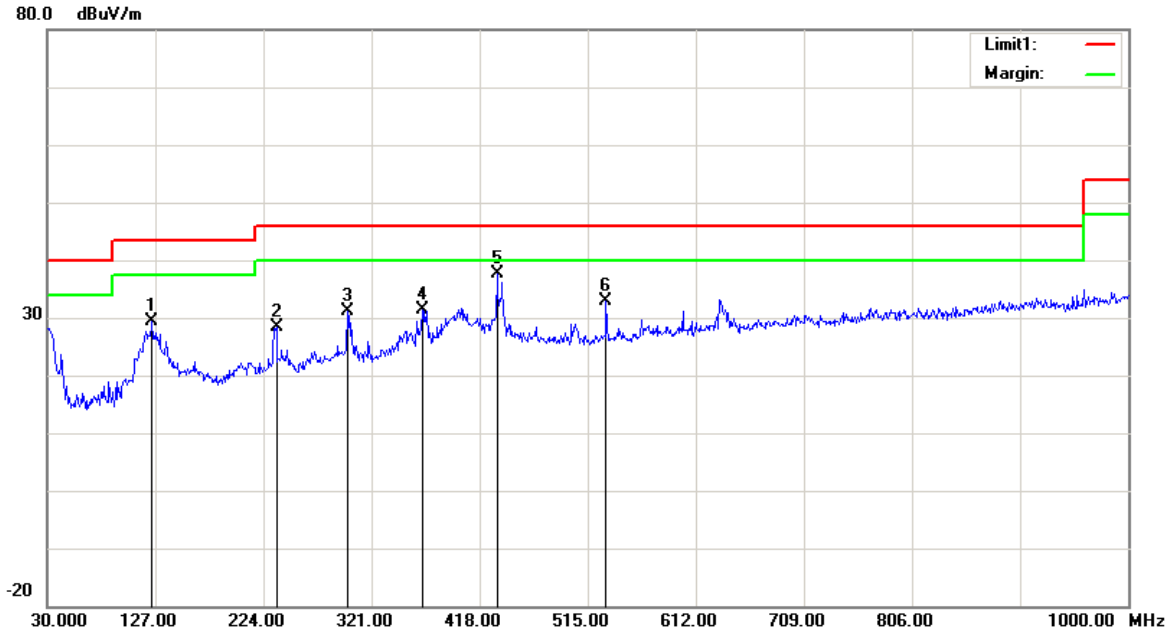
Below 1GHz (802.11n ht20, 5825 MHz was the worst):

Horizontal



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
122.1500	28.62	peak	-4.57	24.05	43.50	19.45
234.6700	36.89	peak	-6.26	30.63	46.00	15.37
300.6300	37.95	peak	-3.79	34.16	46.00	11.84
399.5700	34.49	peak	-2.03	32.46	46.00	13.54
433.5200	35.10	peak	-1.23	33.87	46.00	12.13
635.2800	28.82	peak	2.17	30.99	46.00	15.01

Vertical



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
124.0900	33.88	peak	-4.56	29.32	43.50	14.18
235.6400	34.56	peak	-6.19	28.37	46.00	17.63
299.6600	34.91	peak	-3.83	31.08	46.00	14.92
366.5900	34.09	peak	-2.80	31.29	46.00	14.71
433.5200	38.95	peak	-1.23	37.72	46.00	8.28
531.4900	32.60	peak	0.39	32.99	46.00	13.01

1GHz-40GHz:
802.11a

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Extrapolation result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector	Polar (H/V)	Factor (dB/m)						
Low Channel: 5745 MHz										
5745.00	67.74	PK	H	34.20	3.69	0.00	105.63	99.61	N/A	N/A
5745.00	57.82	AV	H	34.20	3.69	0.00	95.71	89.69	N/A	N/A
5745.00	64.78	PK	V	34.20	3.69	0.00	102.67	96.65	N/A	N/A
5745.00	63.62	AV	V	34.20	3.69	0.00	101.51	95.49	N/A	N/A
5725.00	27.83	PK	H	34.19	3.69	0.00	65.71	59.69	122.20	62.51
5720.00	27.57	PK	H	34.19	3.69	0.00	65.45	59.43	110.80	51.37
5700.00	26.84	PK	H	34.18	3.68	0.00	64.70	58.68	105.20	46.52
5650.00	26.55	PK	H	34.16	3.63	0.00	64.34	58.32	68.20	9.88
11490.00	49.12	PK	H	38.99	6.59	37.35	57.35	51.33	74.00	22.67
11490.00	37.16	AV	H	38.99	6.59	37.35	45.39	39.37	54.00	14.63
17235.00	47.62	PK	H	41.56	8.78	38.61	59.35	53.33	68.20	14.87
Middle Channel: 5785 MHz										
5785.00	68.43	PK	H	34.21	3.71	0.00	106.35	100.33	N/A	N/A
5785.00	58.54	AV	H	34.21	3.71	0.00	96.46	90.44	N/A	N/A
5785.00	64.57	PK	V	34.21	3.71	0.00	102.49	96.47	N/A	N/A
5785.00	54.73	AV	V	34.21	3.71	0.00	92.65	86.63	N/A	N/A
11570.00	49.80	PK	H	39.00	6.61	37.44	57.97	51.95	74.00	22.05
11570.00	37.89	AV	H	39.00	6.61	37.44	46.06	40.04	54.00	13.96
17355.00	47.24	PK	H	42.26	8.81	38.52	59.79	53.77	68.20	14.43
High Channel: 5825 MHz										
5825.00	69.15	PK	H	34.23	3.73	0.00	107.11	101.09	N/A	N/A
5825.00	59.21	AV	H	34.23	3.73	0.00	97.17	91.15	N/A	N/A
5825.00	64.13	PK	V	34.23	3.73	0.00	102.09	96.07	N/A	N/A
5825.00	54.35	AV	V	34.23	3.73	0.00	92.31	86.29	N/A	N/A
5850.00	27.67	PK	H	34.24	3.75	0.00	65.66	59.64	122.20	62.56
5855.00	27.37	PK	H	34.24	3.75	0.00	65.36	59.34	110.80	51.46
5875.00	27.38	PK	H	34.25	3.77	0.00	65.40	59.38	105.20	45.82
5925.00	27.62	PK	H	34.27	3.80	0.00	65.69	59.67	68.20	8.53
11650.00	50.22	PK	H	39.00	6.64	37.53	58.33	52.31	74.00	21.69
11650.00	38.17	AV	H	39.00	6.64	37.53	46.28	40.26	54.00	13.74
17475.00	46.58	PK	H	42.96	8.84	38.44	59.94	53.92	68.20	14.28

802.11n ht20:

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Extrapolation result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector	Polar (H/V)	Factor (dB/m)						
Low Channel: 5745 MHz										
5745.00	73.65	PK	H	34.20	3.69	0.00	111.54	105.52	N/A	N/A
5745.00	63.89	AV	H	34.20	3.69	0.00	101.78	95.76	N/A	N/A
5745.00	72.44	PK	V	34.20	3.69	0.00	110.33	104.31	N/A	N/A
5745.00	62.58	AV	V	34.20	3.69	0.00	100.47	94.45	N/A	N/A
5725.00	42.42	PK	H	34.19	3.69	0.00	80.30	74.28	122.20	47.92
5720.00	34.86	PK	H	34.19	3.69	0.00	72.74	66.72	110.80	44.08
5700.00	30.21	PK	H	34.18	3.68	0.00	68.07	62.05	105.20	43.15
5650.00	28.41	PK	H	34.16	3.63	0.00	66.20	60.18	68.20	8.02
11490.00	57.87	PK	H	38.99	6.59	37.35	66.10	60.08	74.00	13.92
11490.00	44.36	AV	H	38.99	6.59	37.35	52.59	46.57	54.00	7.43
17235.00	48.76	PK	H	41.56	8.78	38.61	60.49	54.47	68.20	13.73
Middle Channel: 5785 MHz										
5785.00	73.45	PK	H	34.21	3.71	0.00	111.37	105.35	N/A	N/A
5785.00	63.60	AV	H	34.21	3.71	0.00	101.52	95.5	N/A	N/A
5785.00	72.19	PK	V	34.21	3.71	0.00	110.11	104.09	N/A	N/A
5785.00	62.34	AV	V	34.21	3.71	0.00	100.26	94.24	N/A	N/A
11570.00	57.46	PK	H	39.00	6.61	37.44	65.63	59.61	74.00	14.39
11570.00	44.21	AV	H	39.00	6.61	37.44	52.38	46.36	54.00	7.64
17355.00	48.75	PK	H	42.26	8.81	38.52	61.30	55.28	68.20	12.92
High Channel: 5825 MHz										
5825.00	74.04	PK	H	34.23	3.73	0.00	112.00	105.98	N/A	N/A
5825.00	64.23	AV	H	34.23	3.73	0.00	102.19	96.17	N/A	N/A
5825.00	72.87	PK	V	34.23	3.73	0.00	110.83	104.81	N/A	N/A
5825.00	62.95	AV	V	34.23	3.73	0.00	100.91	94.89	N/A	N/A
5850.00	39.97	PK	H	34.24	3.75	0.00	77.96	71.94	122.20	50.26
5855.00	39.26	PK	H	34.24	3.75	0.00	77.25	71.23	110.80	39.57
5875.00	32.14	PK	H	34.25	3.77	0.00	70.16	64.14	105.20	41.06
5925.00	27.96	PK	H	34.27	3.80	0.00	66.03	60.01	68.20	8.19
11650.00	58.29	PK	H	39.00	6.64	37.53	66.40	60.38	74.00	13.62
11650.00	44.57	AV	H	39.00	6.64	37.53	52.68	46.66	54.00	7.34
17475.00	48.36	PK	H	42.96	8.84	38.44	61.72	55.7	68.20	12.50

802.11n ht40

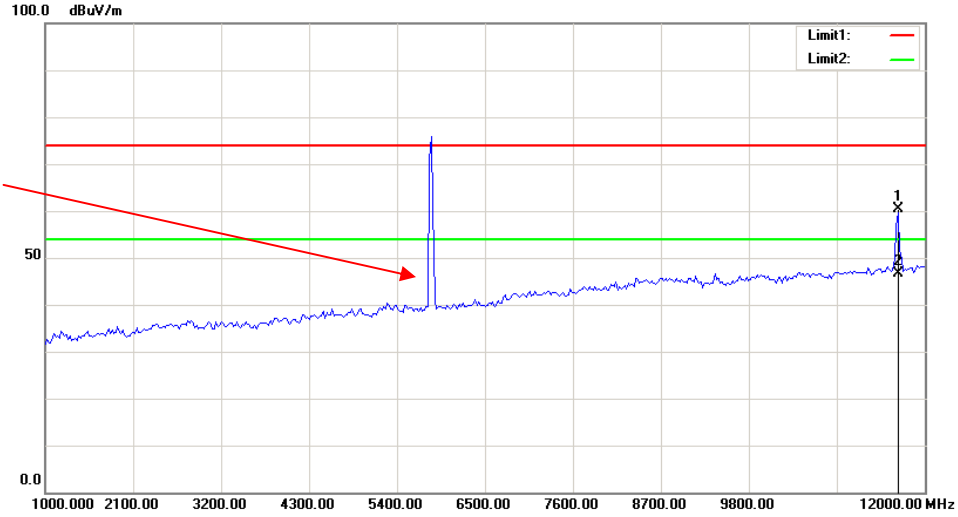
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Extrapolation result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector	Polar (H/V)	Factor (dB/m)						
Low Channel: 5755 MHz										
5755.00	70.42	PK	H	34.20	3.70	0.00	108.32	102.3	N/A	N/A
5755.00	61.72	AV	H	34.20	3.70	0.00	99.62	93.6	N/A	N/A
5755.00	68.93	PK	V	34.20	3.70	0.00	106.83	100.81	N/A	N/A
5755.00	60.31	AV	V	34.20	3.70	0.00	98.21	92.19	N/A	N/A
5725.00	41.20	PK	H	34.19	3.69	0.00	79.08	73.06	122.20	49.14
5720.00	41.36	PK	H	34.19	3.69	0.00	79.24	73.22	110.80	37.58
5700.00	31.36	PK	H	34.18	3.68	0.00	69.22	63.2	105.20	42.00
5650.00	28.99	PK	H	34.16	3.63	0.00	66.78	60.76	68.20	7.44
11510.00	53.74	PK	H	39.00	6.59	37.37	61.96	55.94	74.00	18.06
11510.00	39.76	AV	H	39.00	6.59	37.37	47.98	41.96	54.00	12.04
17265.00	48.65	PK	H	41.74	8.79	38.58	60.60	54.58	68.20	13.62
High Channel: 5795 MHz										
5795.00	70.95	PK	H	34.22	3.71	0.00	108.88	102.86	N/A	N/A
5795.00	61.67	AV	H	34.22	3.71	0.00	99.60	93.58	N/A	N/A
5795.00	69.43	PK	V	34.22	3.71	0.00	107.36	101.34	N/A	N/A
5795.00	60.78	AV	V	34.22	3.71	0.00	98.71	92.69	N/A	N/A
5850.00	34.51	PK	H	34.24	3.75	0.00	72.50	66.48	122.20	55.72
5855.00	32.77	PK	H	34.24	3.75	0.00	70.76	64.74	110.80	46.06
5875.00	29.96	PK	H	34.25	3.77	0.00	67.98	61.96	105.20	43.24
5925.00	28.73	PK	H	34.27	3.80	0.00	66.80	60.78	68.20	7.42
11590.00	53.88	PK	H	39.00	6.62	37.46	62.04	56.02	74.00	17.98
11590.00	39.79	AV	H	39.00	6.62	37.46	47.95	41.93	54.00	12.07
17385.00	48.56	PK	H	42.43	8.82	38.50	61.31	55.29	68.20	12.91

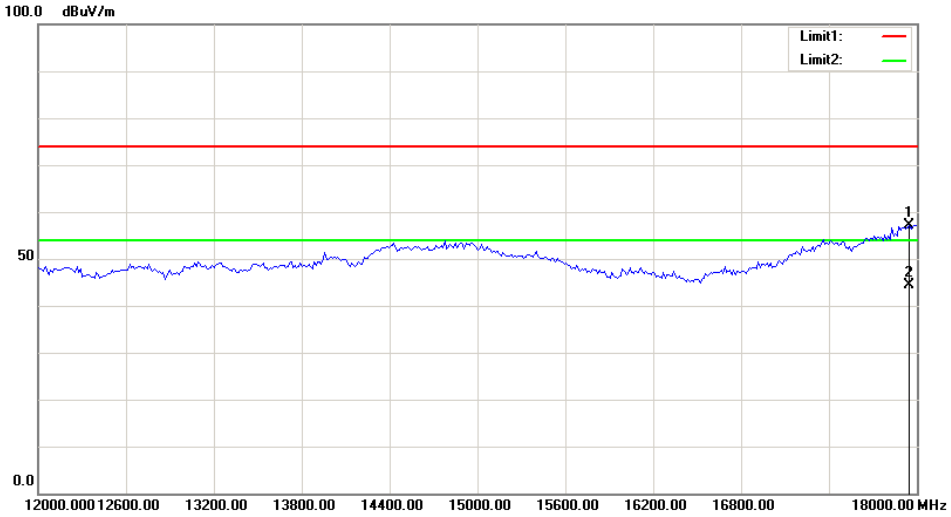
802.11ac vht80

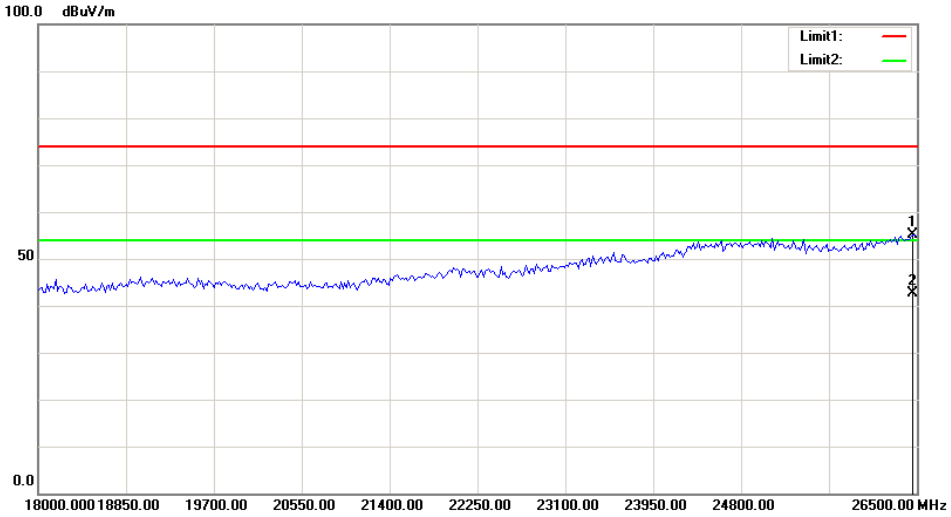
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Extrapolation result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector	Polar (H/V)	Factor (dB/m)						
Low Channel: 5755 MHz										
5775.00	66.52	PK	H	34.21	3.70	0.00	104.43	98.41	N/A	N/A
5775.00	58.10	AV	H	34.21	3.70	0.00	96.01	89.99	N/A	N/A
5775.00	65.13	PK	V	34.21	3.70	0.00	103.04	97.02	N/A	N/A
5775.00	56.42	AV	V	34.21	3.70	0.00	94.33	88.31	N/A	N/A
5725.00	34.99	PK	H	34.19	3.69	0.00	72.87	66.85	122.20	55.35
5720.00	34.67	PK	H	34.19	3.69	0.00	72.55	66.53	110.80	44.27
5700.00	30.90	PK	H	34.18	3.68	0.00	68.76	62.74	105.20	42.46
5650.00	29.99	PK	H	34.16	3.63	0.00	67.78	61.759	68.20	6.44
5850.00	35.68	PK	H	34.24	3.75	0.00	73.67	67.65	122.20	54.55
5855.00	33.14	PK	H	34.24	3.75	0.00	71.13	65.11	110.80	45.69
5875.00	30.87	PK	H	34.25	3.77	0.00	68.89	62.87	105.20	42.33
5925.00	28.74	PK	H	34.27	3.80	0.00	66.81	60.79	68.20	7.41
11550.00	48.36	PK	H	39.00	6.61	37.42	56.55	50.53	74.00	23.47
11550.00	35.77	AV	H	39.00	6.61	37.42	43.96	37.94	54.00	16.06
17325.00	48.24	PK	H	42.09	8.80	38.54	60.59	54.57	68.20	13.63

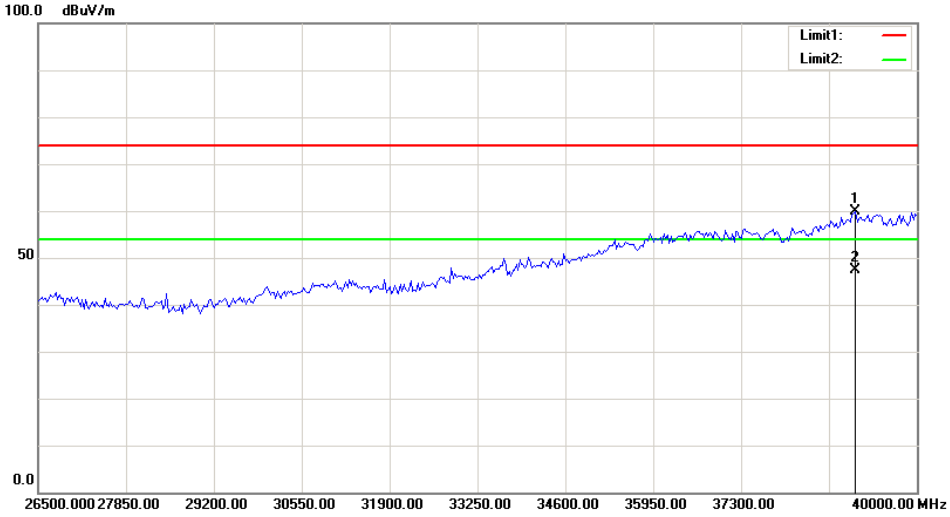
Test Plots(For worst mode 802.11n ht20 5825MHz)
Horizontal

Fundamental Test with Band Rejection Filter



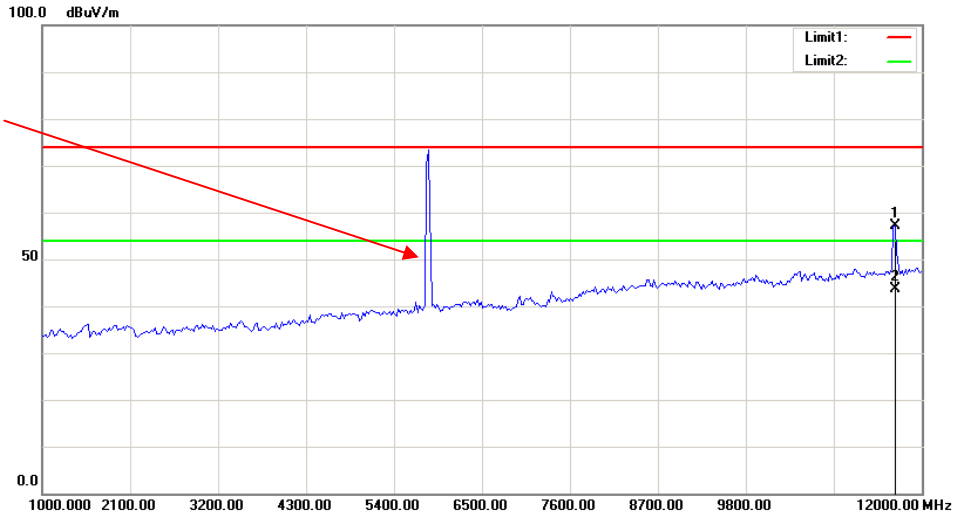


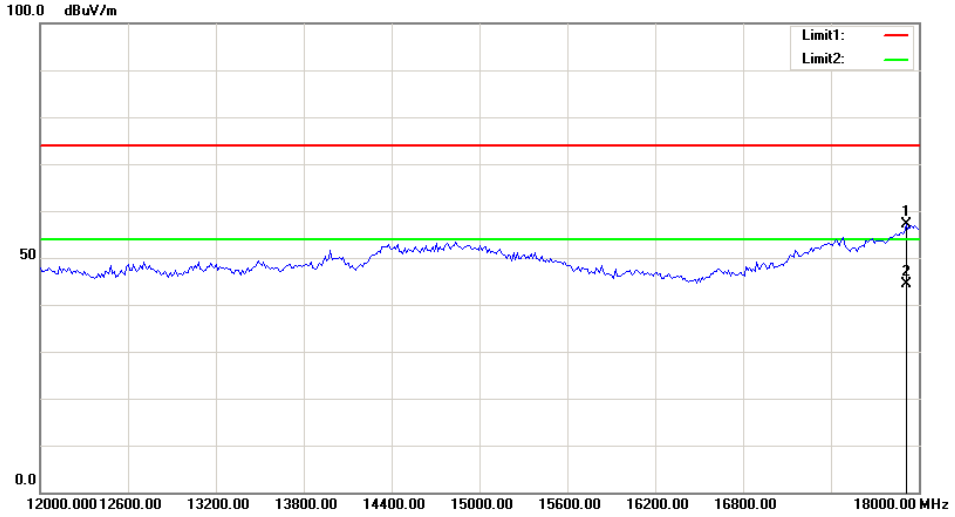


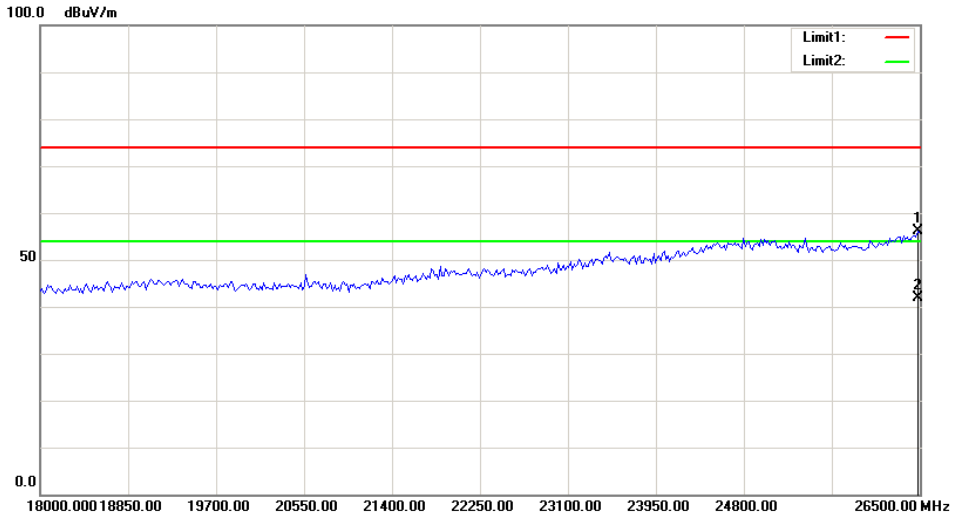

100.0 dBuV/m
Limit1:
Limit2:
50
0.0
1
2
26500.000 27850.00 29200.00 30550.00 31900.00 33250.00 34600.00 35950.00 37300.00 40000.00 MHz

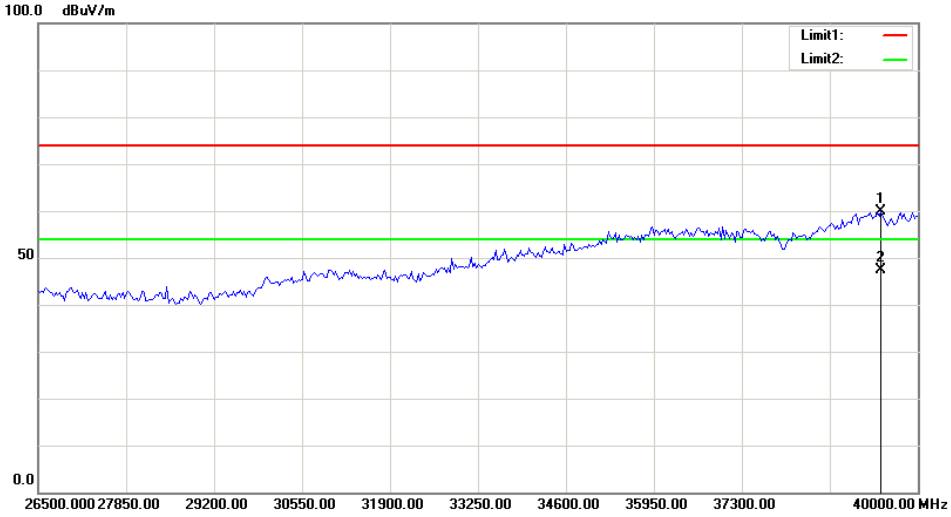
Vertical

Fundamental Test with Band Rejection Filter








100.0 dBuV/m
Limit1:
Limit2:
50
0.0
1
2
26500.000 27850.00 29200.00 30550.00 31900.00 33250.00 34600.00 35950.00 37300.00 40000.00 MHz

FCC §15.407(a)(e)–EMISSION BANDWIDTH AND OCCUPIED BANDWIDTH

Applicable Standard

15.407(a) (e)

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2018-12-10	2019-12-10
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A

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

Test Procedure

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01

Test Data

Environmental Conditions

Temperature:	26.8 °C
Relative Humidity:	63 %
ATM Pressure:	100.1 kPa
Tester:	Blake Yang
Test Date:	2019-09-09

Test Result: Pass.

Please refer to the following tables and plots.

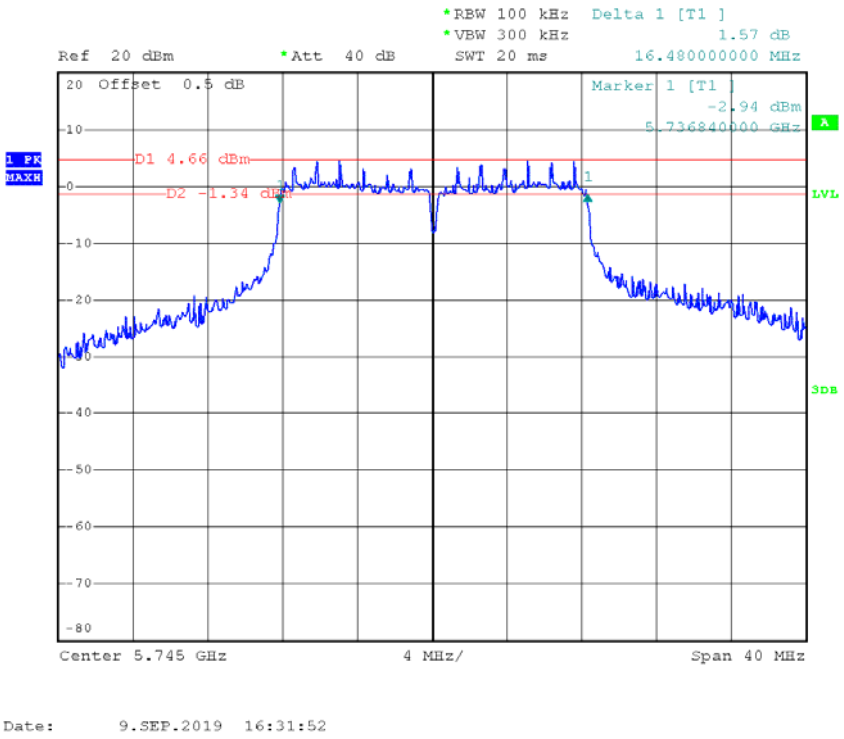
Test mode: Transmitting

Mode	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5745	16.480	18.320
	5785	16.540	18.320
	5825	16.480	18.400
802.11n ht20	5745	17.520	18.560
	5785	17.680	18.480
	5825	17.600	18.480
802.11n ht40	5755	36.320	37.920
	5795	37.120	37.920
802.11ac vht80	5775	75.680	76.160

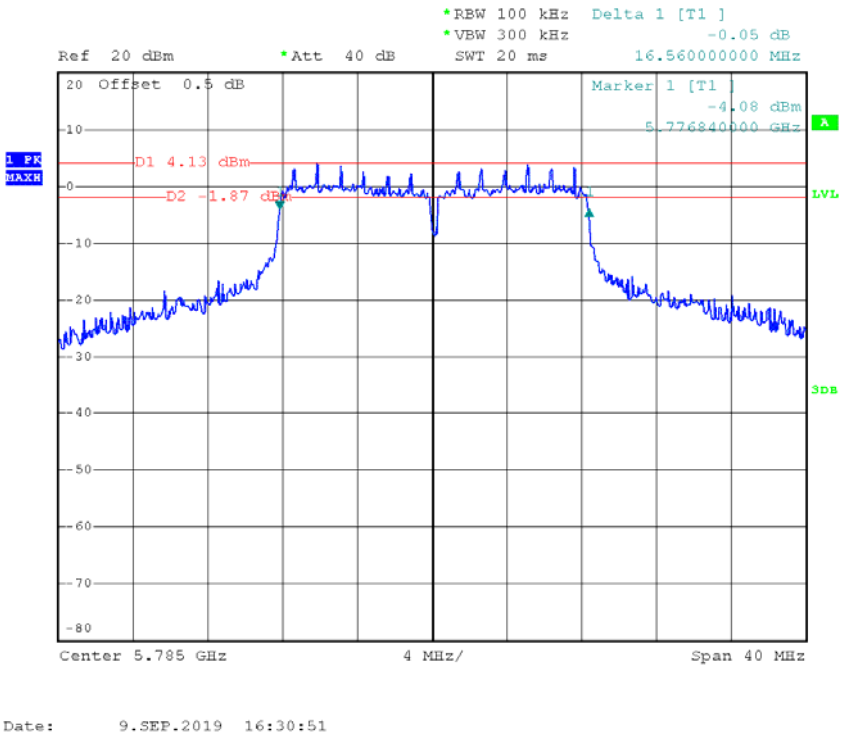
Note: the 99% Occupied Bandwidth have not fall into the band 5470-5725MHz, please refer to the test plots of 99% Occupied Bandwidth.

6dB Bandwidth:

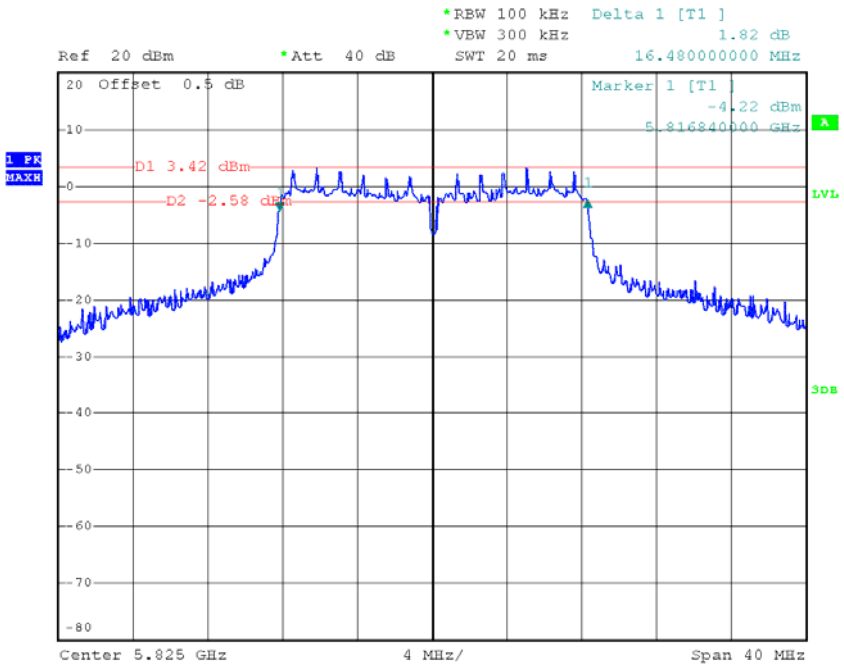
802.11a Low Channel



802.11a Middle Channel

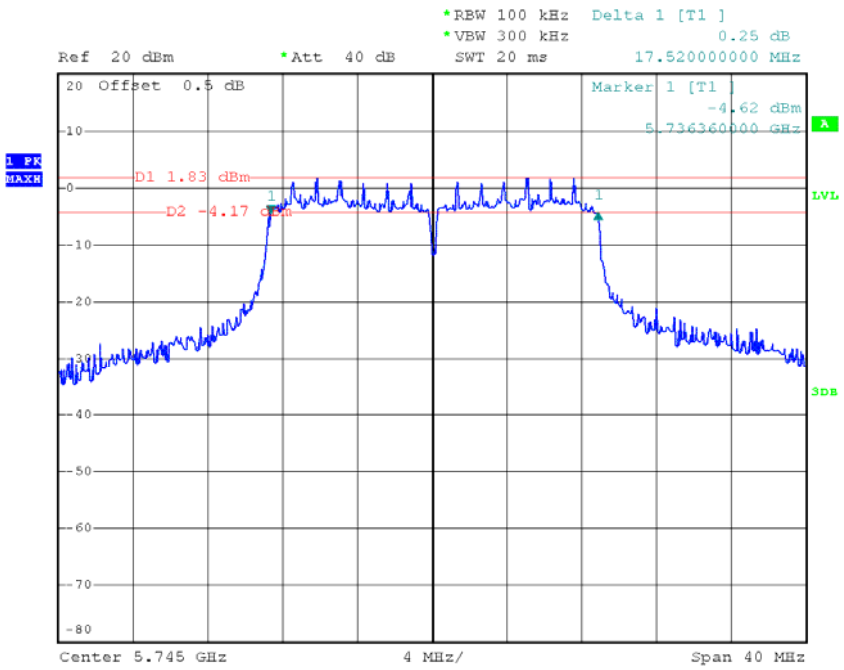


802.11a High Channel



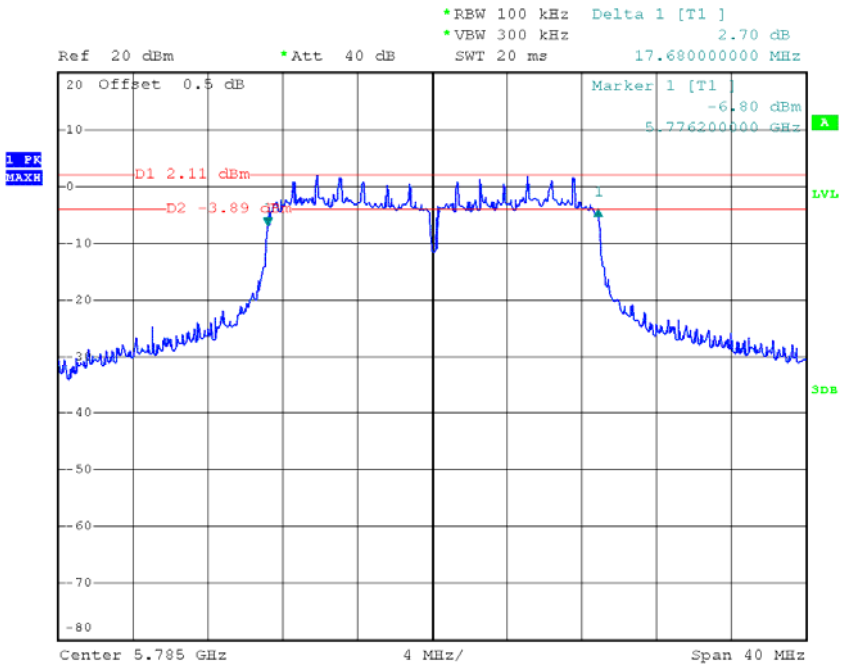
Date: 9.SEP.2019 16:29:39

802.11n ht20 Low Channel



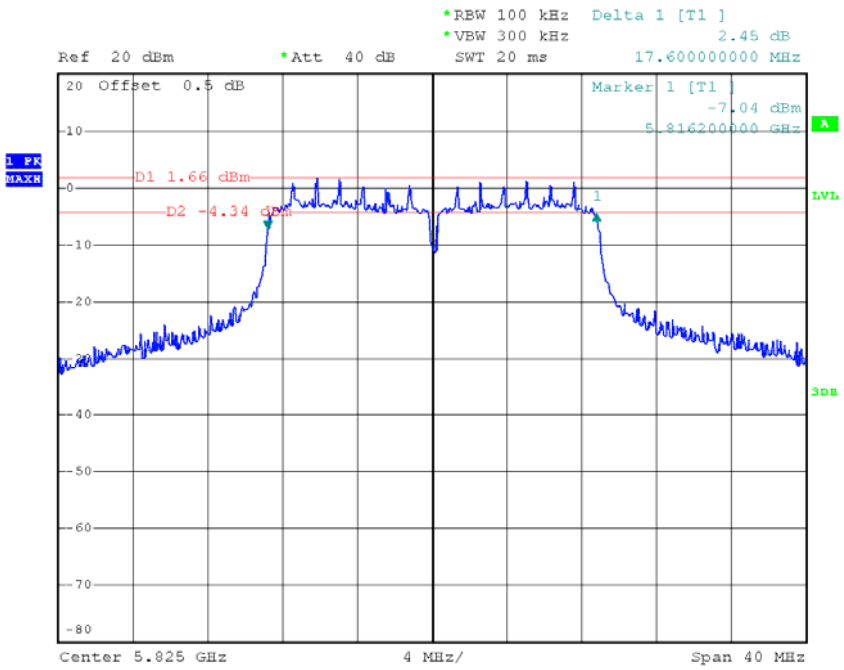
Date: 9.SEP.2019 16:23:17

802.11n ht20 Middle Channel



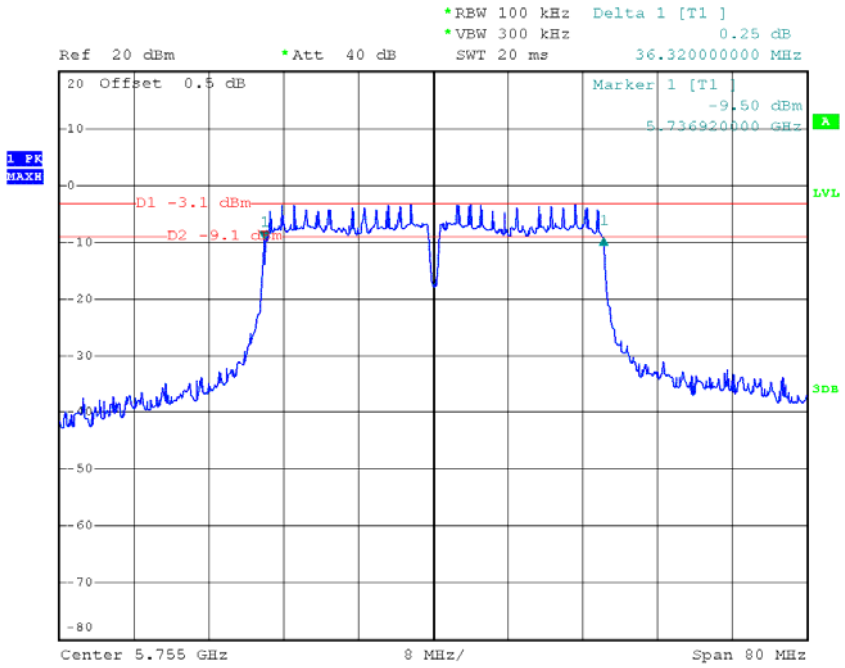
Date: 9.SEP.2019 16:24:42

802.11n ht20 High Channel



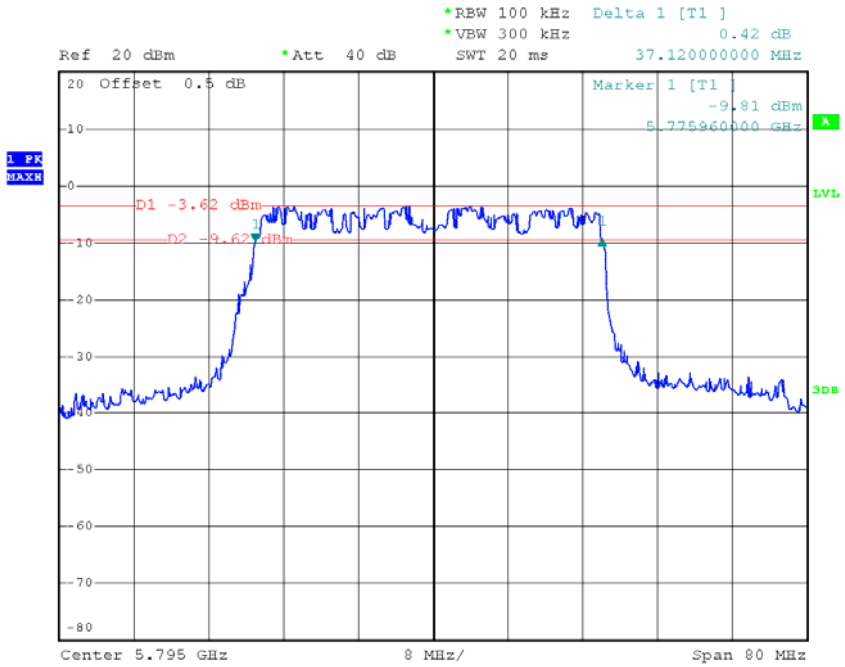
Date: 9.SEP.2019 16:26:52

802.11n ht40 Low Channel



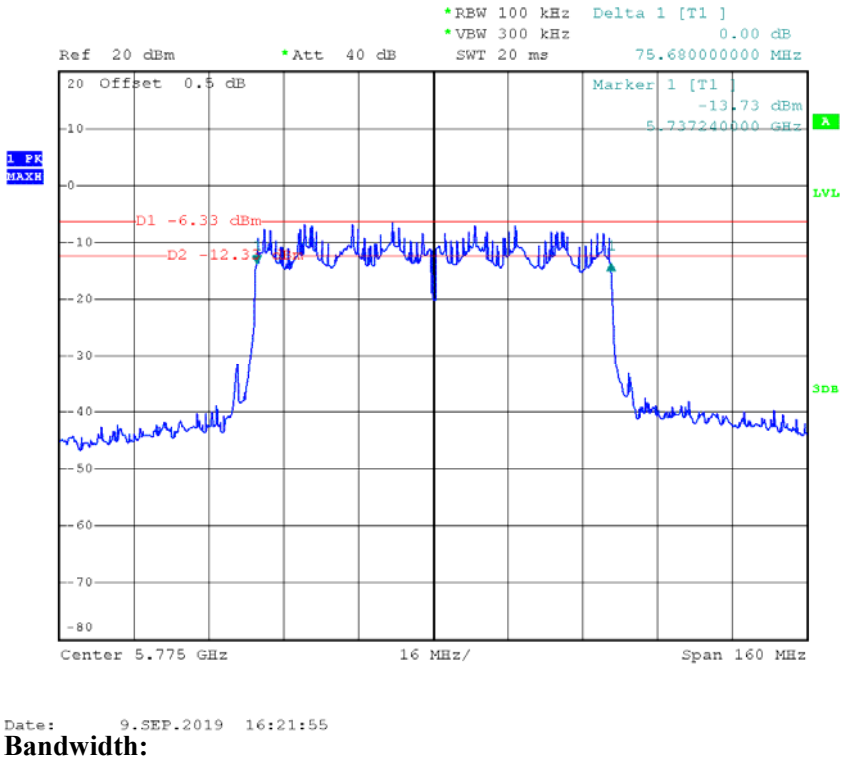
Date: 9.SEP.2019 16:17:25

802.11n ht40 High Channel



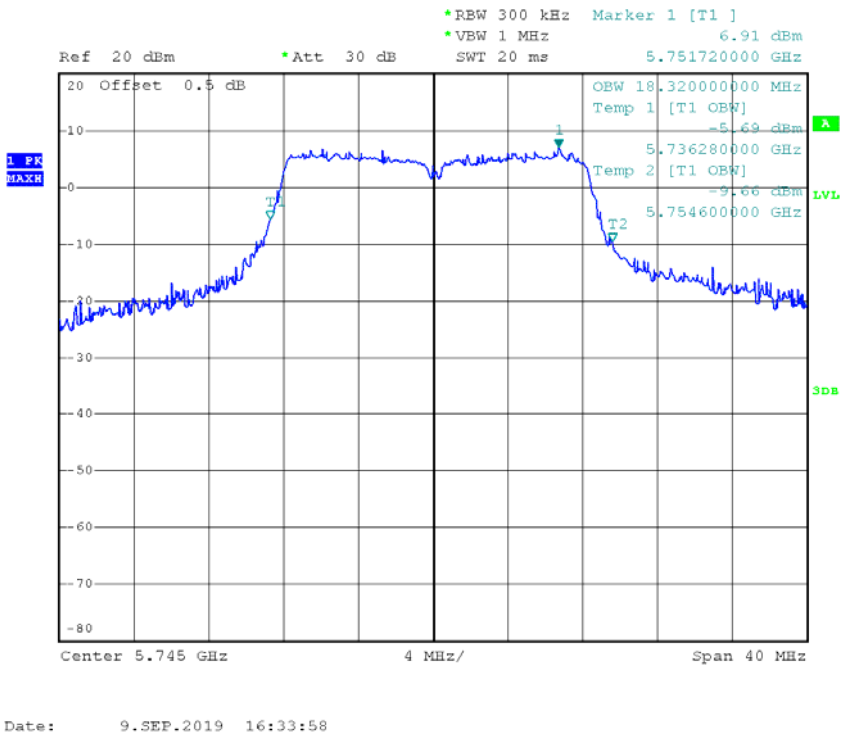
Date: 9.SEP.2019 16:20:16

802.11ac vht80 Middle Channel

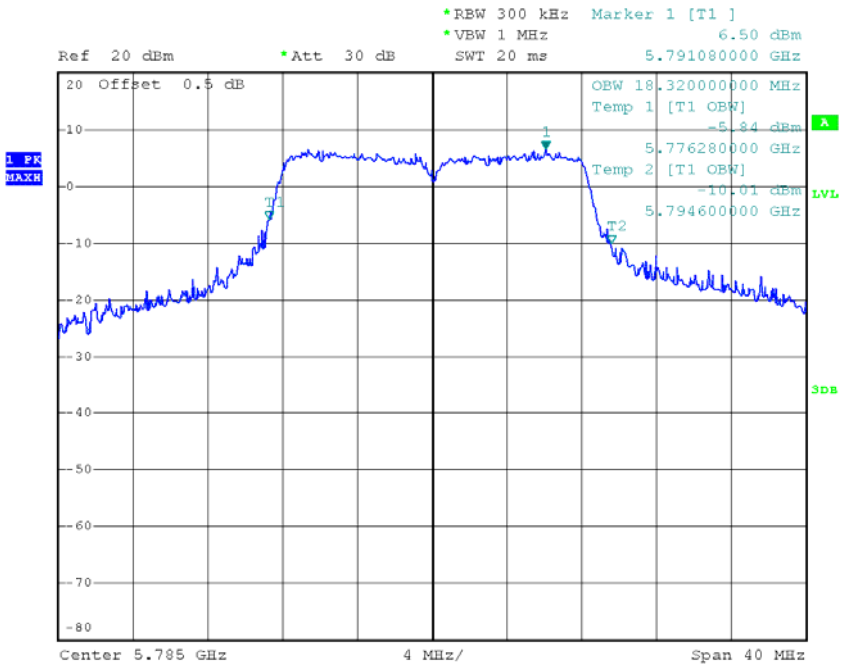


99% Occupied Bandwidth:

802.11a Low Channel

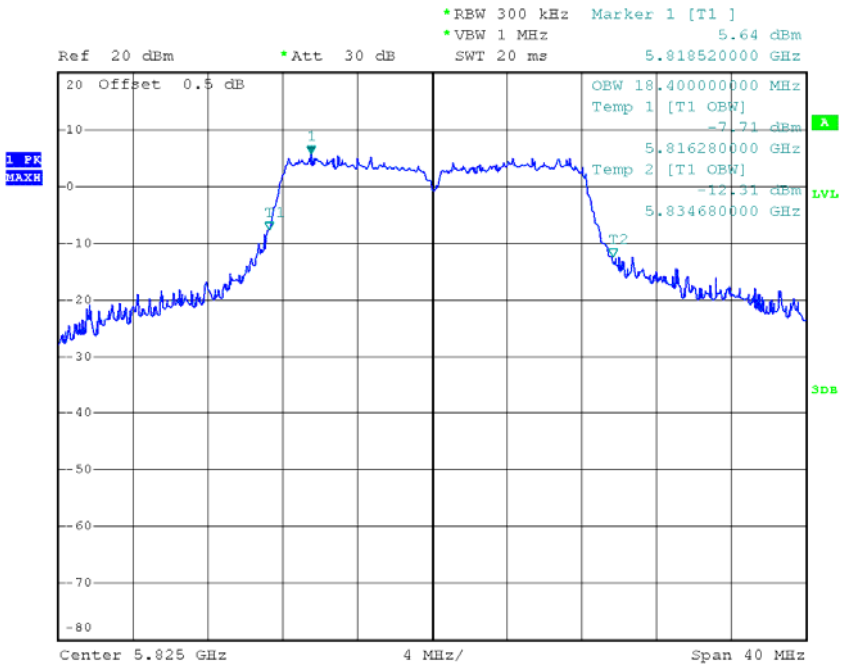


802.11a Middle Channel



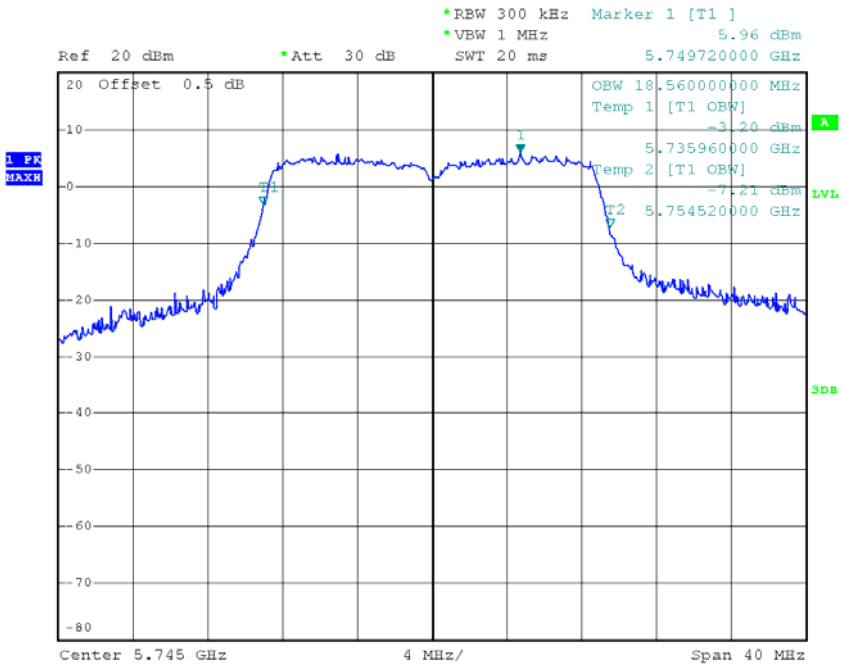
Date: 9.SEP.2019 16:34:36

802.11a High Channel



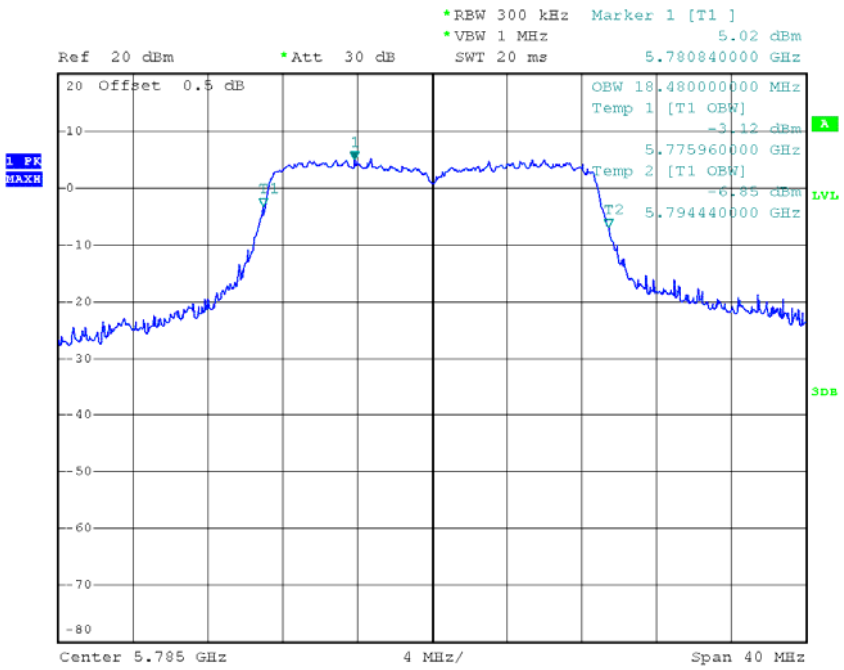
Date: 9.SEP.2019 16:35:25

802.11n ht20 Low Channel



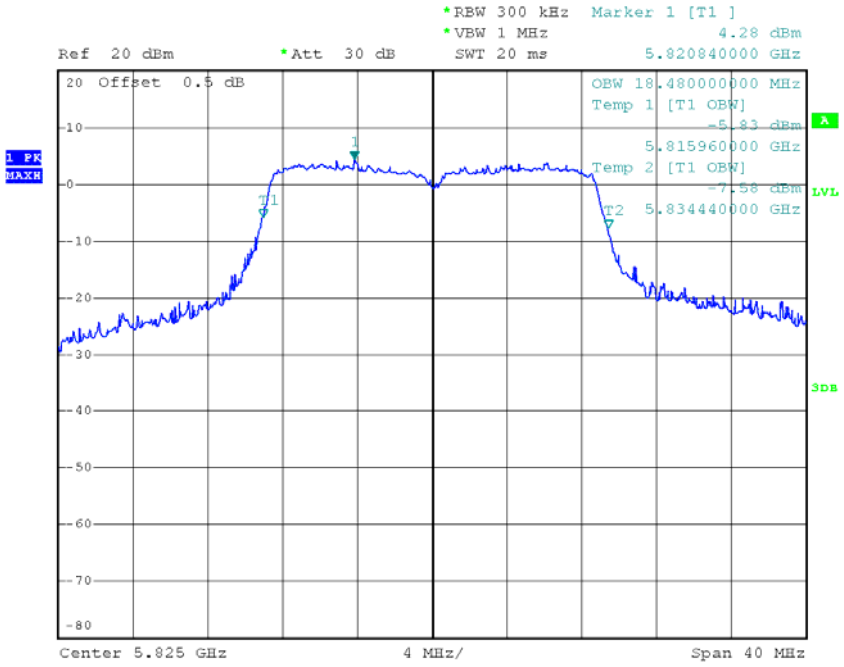
Date: 9.SEP.2019 16:37:26

802.11n ht20 Middle Channel

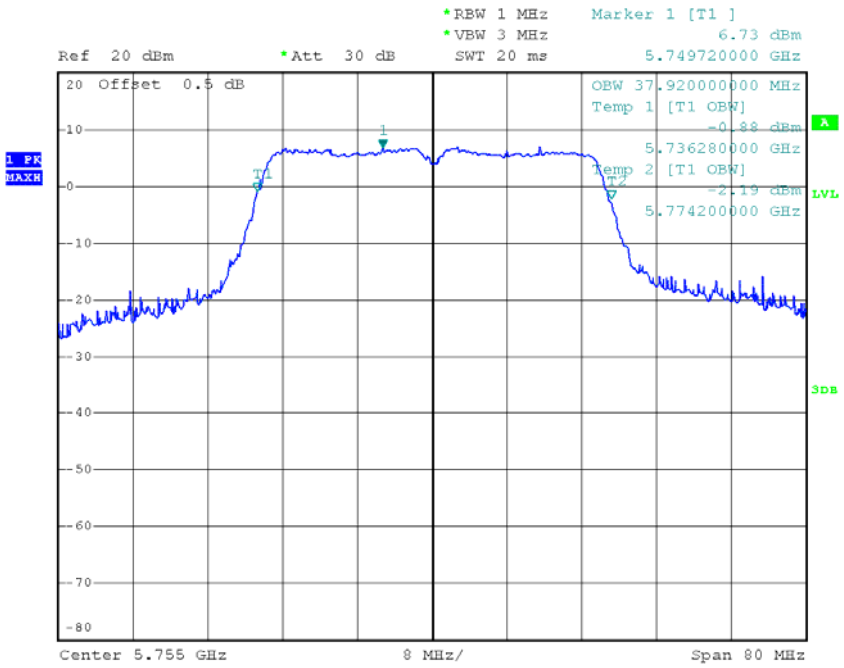


Date: 9.SEP.2019 16:36:56

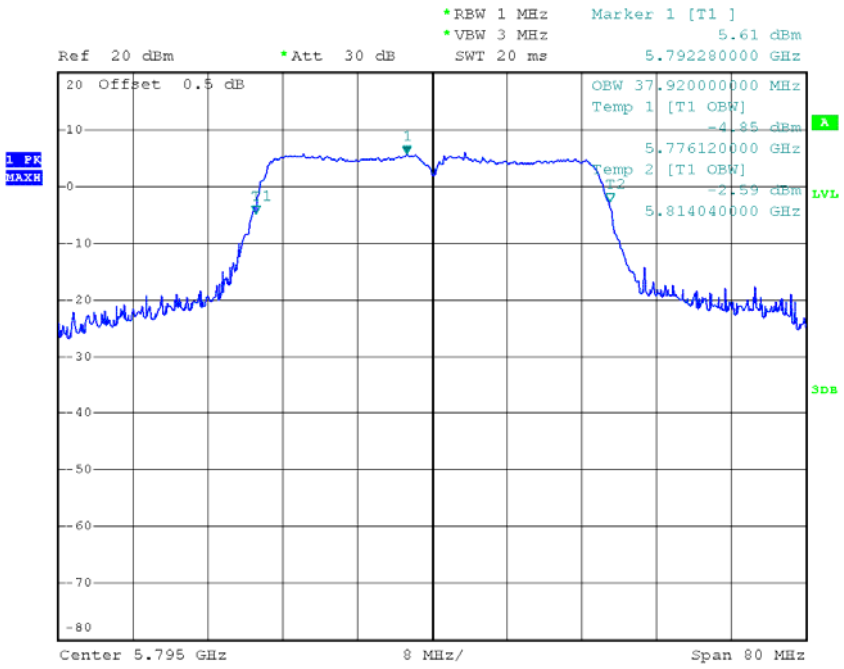
802.11n ht20 High Channel



802.11n ht40 Low Channel

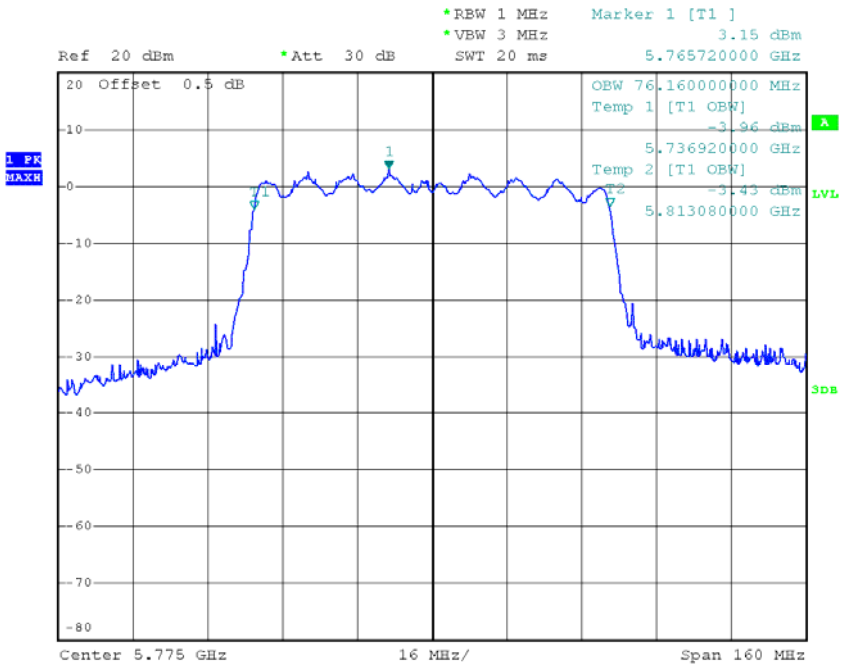


802.11n ht40 High Channel



Date: 9.SEP.2019 16:39:34

802.11ac vht80 Middle Channel



Date: 9.SEP.2019 16:40:37

FCC §15.407(a) –MAXIMUM CONDUCTED OUTPUT POWER

Applicable Standard

(a) Power limits:

(1) For the band 5.15-5.25 GHz.

(i) For an outdoor 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(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. 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.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 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.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 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.

(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.

(4) The maximum conducted output power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	USB Wideband Power Sensor	U2022XA	MY5417006	2018-12-10	2019-12-10
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A

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

Test Procedure

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01

Test Data

Environmental Conditions

Temperature:	26.8 °C
Relative Humidity:	63 %
ATM Pressure:	100.1 kPa
Tester:	Blake Yang
Test Date:	2019-09-09

Test Mode: Transmitting

Mode	Frequency (MHz)	Conducted Average Output Power (dBm)	Limit (dBm)
802.11 a	5745	11.86	30
	5785	12.01	30
	5825	12.35	30
802.11n ht20	5745	11.89	30
	5785	11.93	30
	5825	11.61	30
802.11n ht 40	5755	11.56	30
	5795	11.94	30
802.11ac vht80	5775	9.38	30

Note: The maximum antenna gain is 2.0dBi in 5GHz band.
The duty cycle factor calculated into the result already.

FCC §15.407(a) - POWER SPECTRAL DENSITY

Applicable Standard

(a) Power limits:

(1) For the band 5.15-5.25 GHz.

(i) For an outdoor 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(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. 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.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 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.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 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.

(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

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2018-12-10	2019-12-10
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A

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

Test Data

Environmental Conditions

Temperature:	26.3~26.8 °C
Relative Humidity:	62~63 %
ATM Pressure:	100.1~100.6 kPa
Tester:	Blake Yang
Test Date:	2019-09-09~2019-9-18

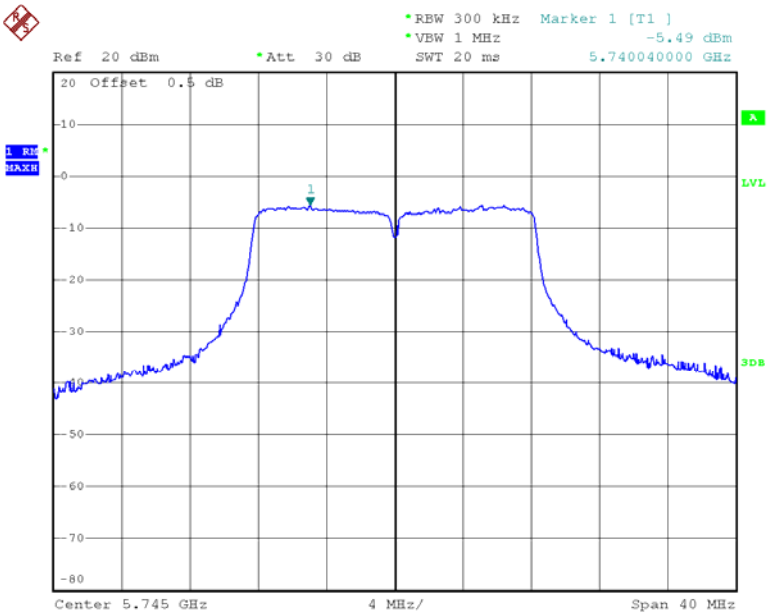
Test Mode: Transmitting

Test Result:Compliance.Please refer to the following table and plot.

Mode	Frequency (MHz)	Reading (dBm/300kHz)	Result (dBm/500kHz)	Limit (dBm/500kHz)
802.11 a	5745	-5.49	-3.27	30
	5785	-3.79	-1.57	30
	5825	-3.39	-1.17	30
802.11n ht20	5745	-0.42	1.80	30
	5785	-1.83	0.39	30
	5825	-2.07	0.15	30
802.11n ht 40	5755	-5.24	-3.02	30
	5795	-5.71	-3.49	30
802.11ac vht80	5775	-9.42	-7.20	30

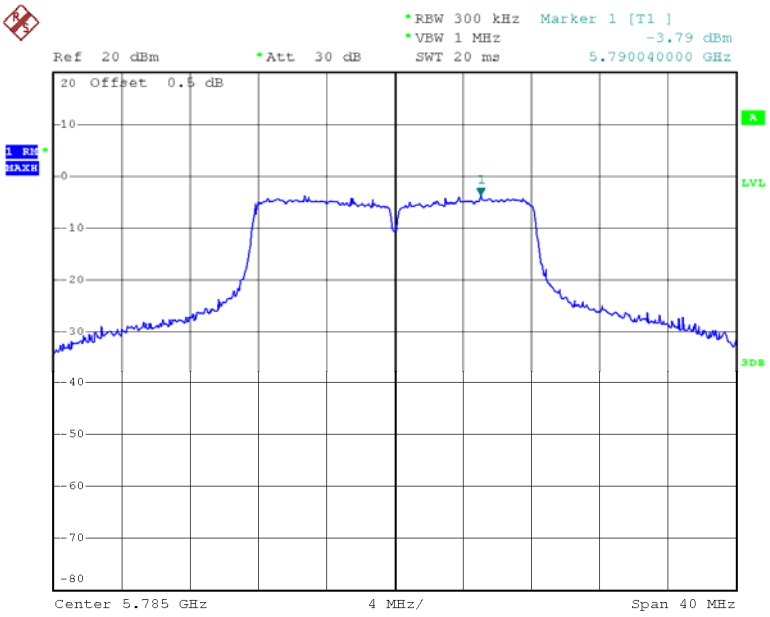
Note:
The maximum antenna gain is 2.0 dBi in 5GHz band.
For 5.8GHz band, If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
Method SA-3 in KDB 789033 D02 General UNII Test Procedures New Rules v02r01was used for PSD test.

802.11a Low Channel



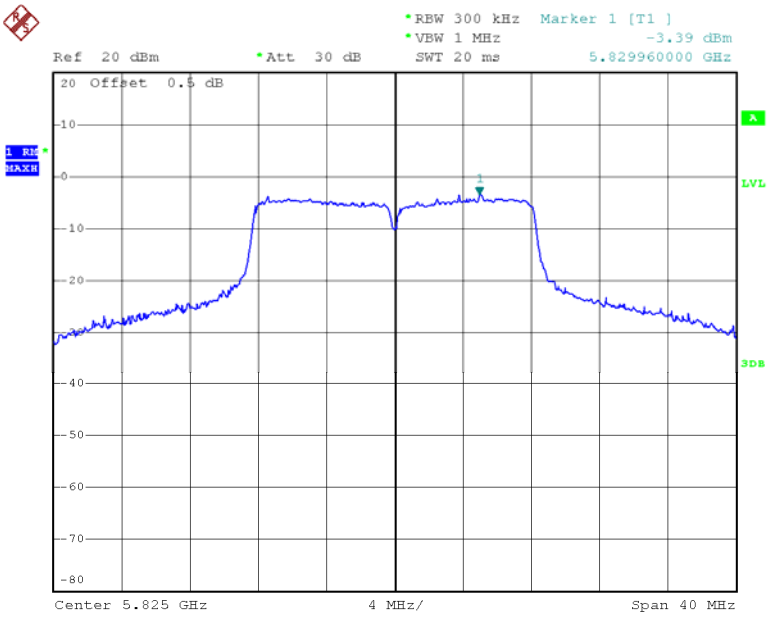
Date: 18.SEP.2019 16:23:57

802.11a Middle Channel



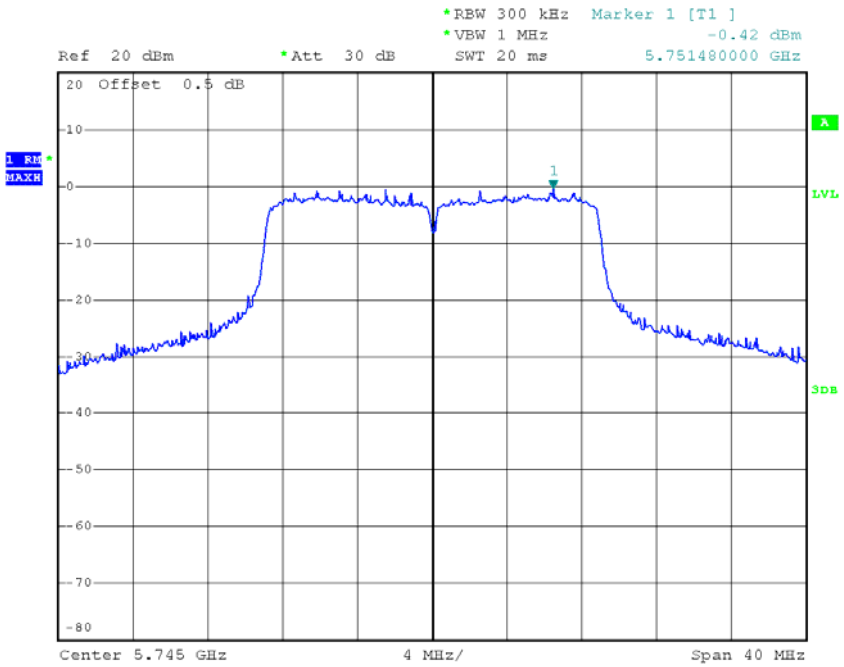
Date: 18.SEP.2019 16:25:38

802.11a High Channel



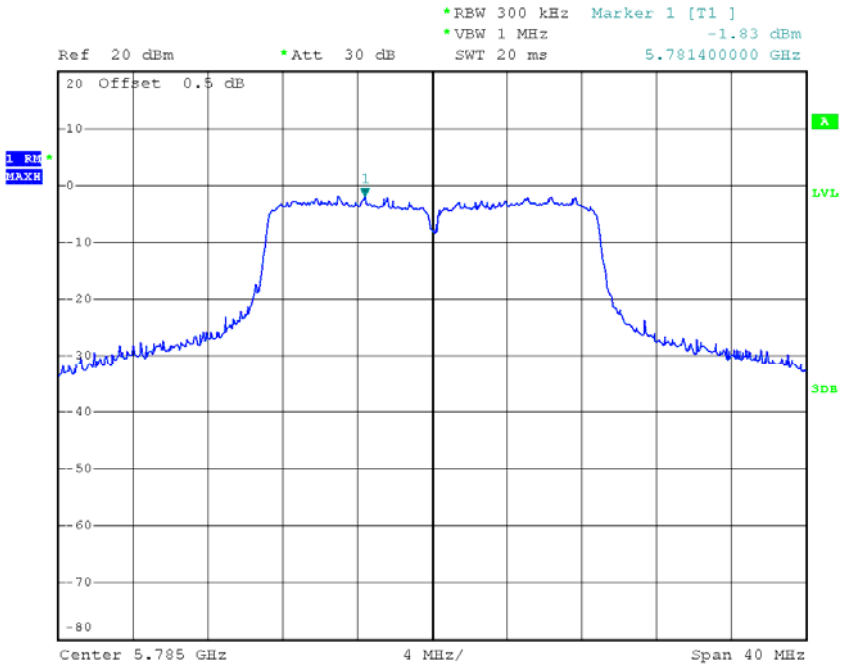
Date: 18.SEP.2019 16:26:35

802.11n ht20 Low Channel



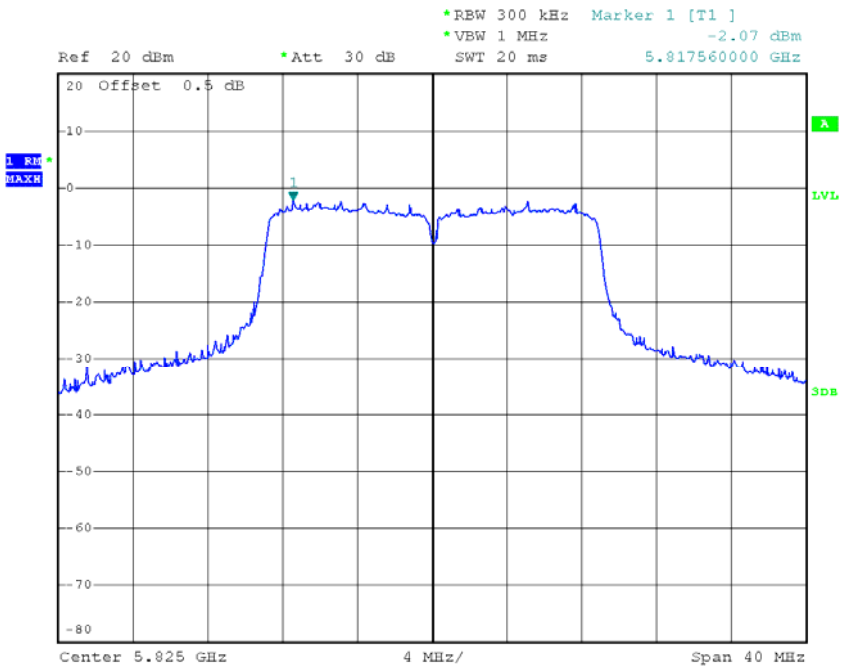
Date: 9.SEP.2019 16:47:12

802.11n ht20 Middle Channel



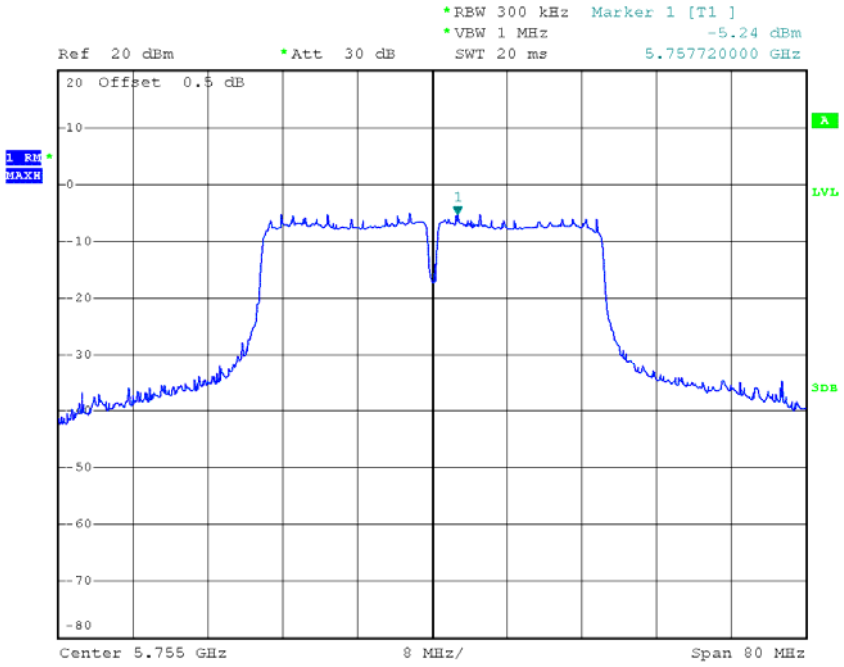
Date: 9.SEP.2019 16:47:56

802.11n ht20 High Channel



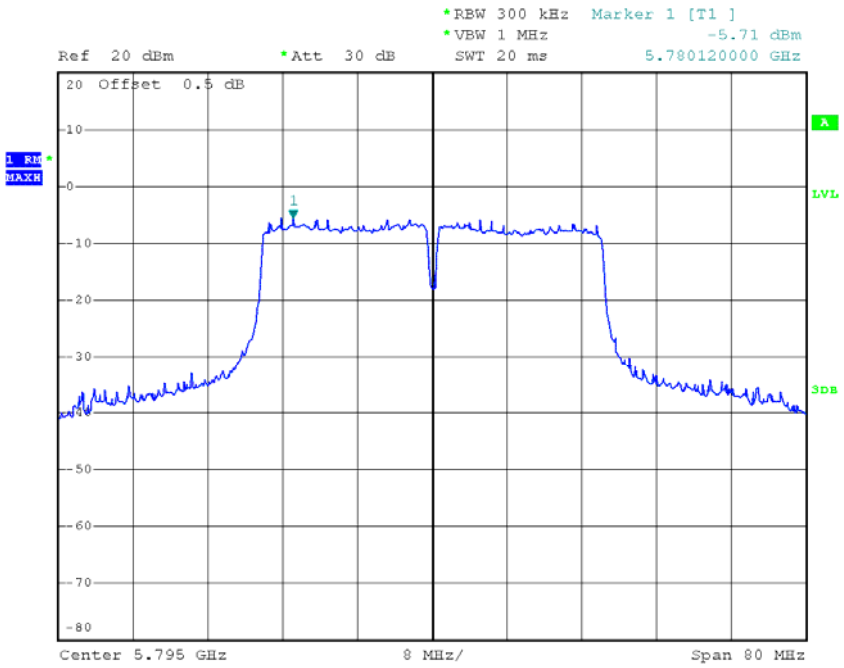
Date: 9.SEP.2019 16:48:52

802.11n ht40 Low Channel



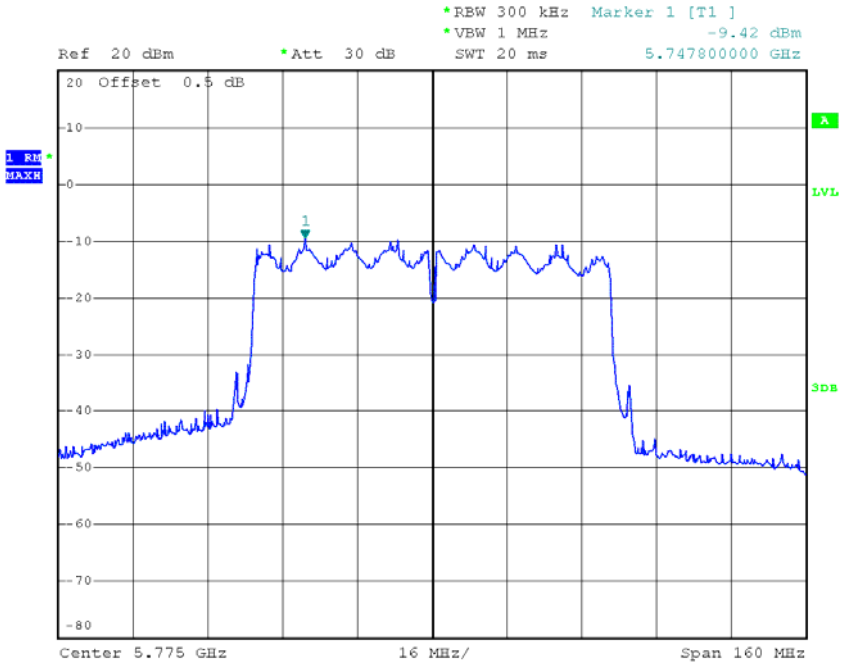
Date: 9.SEP.2019 16:45:54

802.11n ht40 High Channel



Date: 9.SEP.2019 16:46:34

802.11 ac80 Middle Channel



Date: 9.SEP.2019 16:44:35

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