TESTING LABORATORY
CERTIFICATE #4820.01

FCC PART 15.407

RSS-GEN, ISSUE 5, APRIL 2018

RSS-247, ISSUE 2, FEBRUARY 2017

TEST REPORT

For

Victor Hasselblad AB

Utvecklingsgatan 2, P.O. Box 220, Gothenburg, SE-40123, Sweden

FCC ID: 2AEFA-X1D1907
IC: 20193-X1D1907

Report Type:	**Product Name:**
Original Report	X1D MARK II

Report Number:	RDG180909002-00A
Report Date:	2019-05-12
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

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:		X1D MARK II
EUT Model:		X1D MARK II
FCC ID:		2AEFA-X1D1907
IC:		20193-X1D1907
Rated Input Voltage:		DC7.27V from battery or DC 5 V from adapter
Nominal Adapter Information	**Model:**	QC24-US
	Input:	100-240V~50/60Hz,0.8AMax
	Output:	3.6~8V;3.0A / 12V;2.0A
External Dimension:		150.4 mm(L)* 98.1mm(W)* 71.4mm(H)(only body) 150.4 mm(L)* 98.1mm(W)* 125mm(H)(with XCD 45mm Lens)
Serial Number:		180909002
EUT Received Date:		2018.09.11

Objective

This type approval report is prepared on behalf of ***Victor Hasselblad AB*** in accordance with Part 2-Subpart J, Part 15-Subparts A, and E of the Federal Communications Commission's rules. And RSS-247, Issue 2, February 2017, RSS-Gen Issue 5, April 2018 of the Innovation, Science and Economic Development Canada.

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 and RSS-247, Issue 2, February 2017, RSS-Gen Issue 5, April 2018 of the Innovation, Science and Economic Development Canada.

Related Submittal(s)/Grant(s)

FCC Part 15C DTS, and Part 15B JAB submissions with FCC ID: 2AEFA-X1D1907.
RSS-247 DTSs submissions with IC: 20193-X1D1907.

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, and RSS-247, Issue 2, February 2017, RSS-Gen Issue 5, April 2018 of the Innovation, Science and Economic Development Canada.

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: 4.58 dB for Horizontal, 4.59 dB for Vertical 200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical 1G~6GHz: 4.45 dB, 6G~40GHz: 5.23 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 test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 897218,the FCC Designation No. : CN1220.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062D.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

The device supports 802.11 a/n ht20/ n ht40/ac vht 20/40/80 modes in 5.8GHz band.

For all modes, the device supports SISO and MIMO modes. And 8 channels are provided to testing:

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

For 802.11a/802.11n ht20/ac vht20, Channel 149, 157 and 165 was tested, for 802.11n ht40/ac vht40, Channel 151, 159 was tested, for 802.11ac vht80, channel 155 was tested.

EUT Exercise Software

Test software: 'DJI RF Certification' was used for test, 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 power setting configured as below table, which was provided by manufacturer:

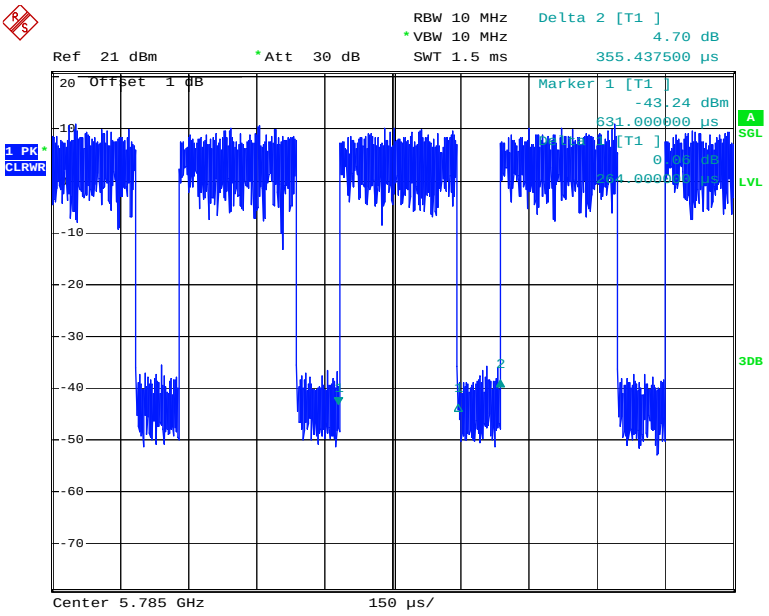
Mode	Channel	Frequency (MHz)	Data rate	Power level	
				Chain 0	Chain 1
802.11a	Low	5745	6 Mbps	13	13
	Middle	5785	6 Mbps	13	13
	High	5825	6 Mbps	14	14
802.11n ht20	Low	5745	MCS8	13	13
	Middle	5785	MCS8	13	13
	High	5825	MCS8	14	14
802.11n ht 40	Low	5755	MCS8	13	13
	High	5795	MCS8	13	13
802.11 ac20	Low	5745	MCS8	13	13
	Middle	5785	MCS8	13	13
	High	5825	MCS8	14	14
802.11 ac40	Low	5755	MCS8	13	13
	High	5795	MCS8	13	13
802.11 ac80	Middle	5775	MCS8	13	13

Pretest SISO and MIMO mode, the MIMO mode was the worst and reported.

The duty cycle as below:

Mode	T_{on} (ms)	T_{on+off} (ms)	Duty Cycle(x) (%)	Duty cycle Factor (10*log(1/x))
802.11a	0.264	0.355	74.37	1.29
802.11n ht20	0.264	0.358	73.74	1.32
802.11n ht40	0.264	0.355	74.37	1.29
802.11 ac20	0.261	0.352	74.15	1.30
802.11 ac40	0.264	0.355	74.37	1.29
802.11ac80	0.268	0.355	75.49	1.22

802.11a mode



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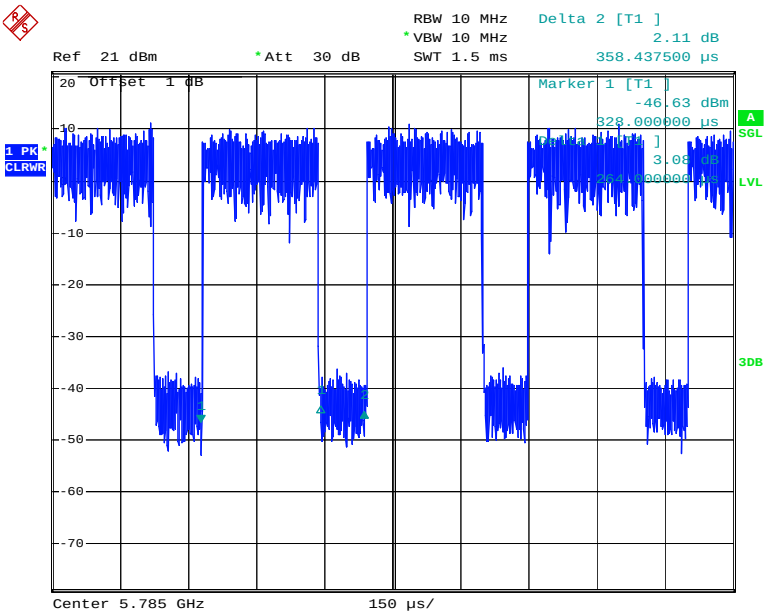
802.11n ht20 mode



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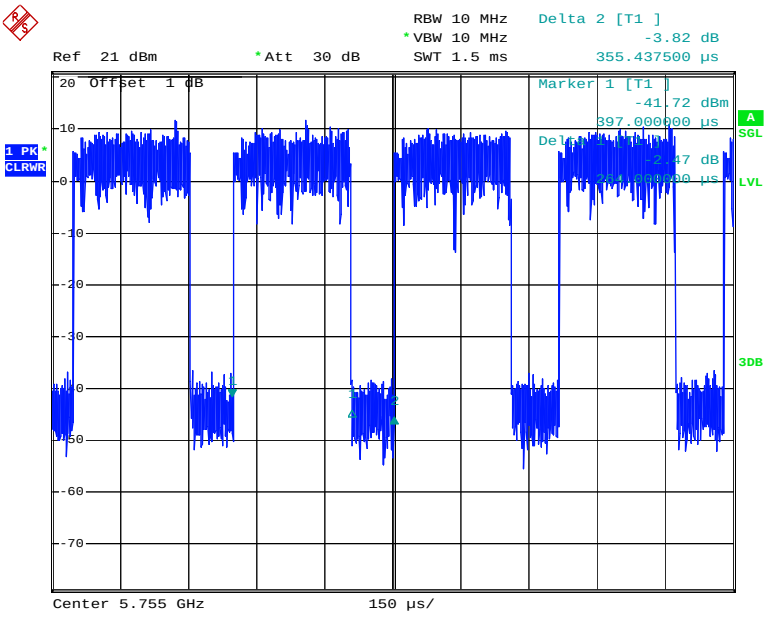
802.11n ht40 mode



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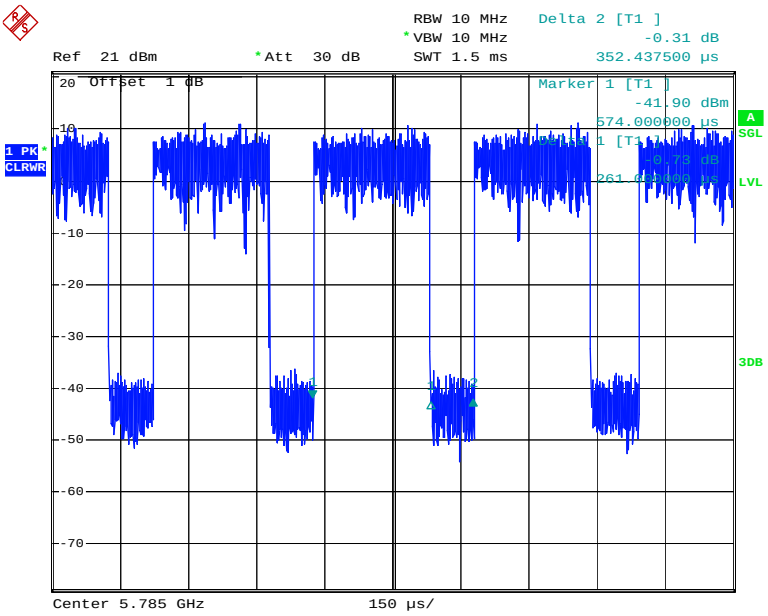
802.11ac20 mode



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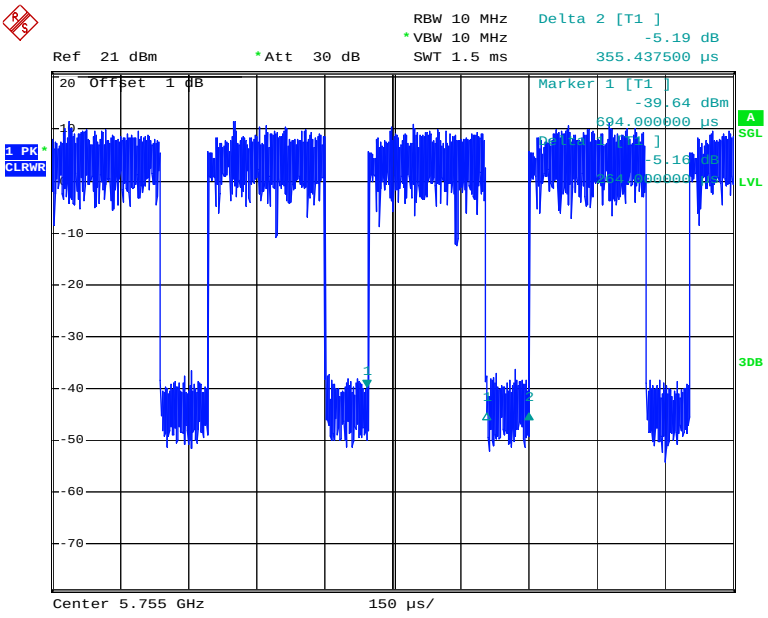
802.11ac40 mode



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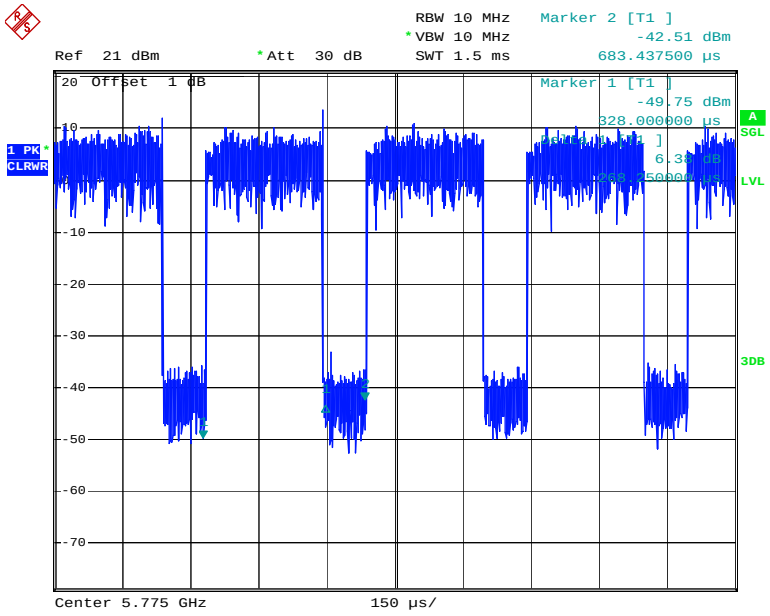
802.11ac80 mode



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Equipment Modifications

No modification was made to the EUT.

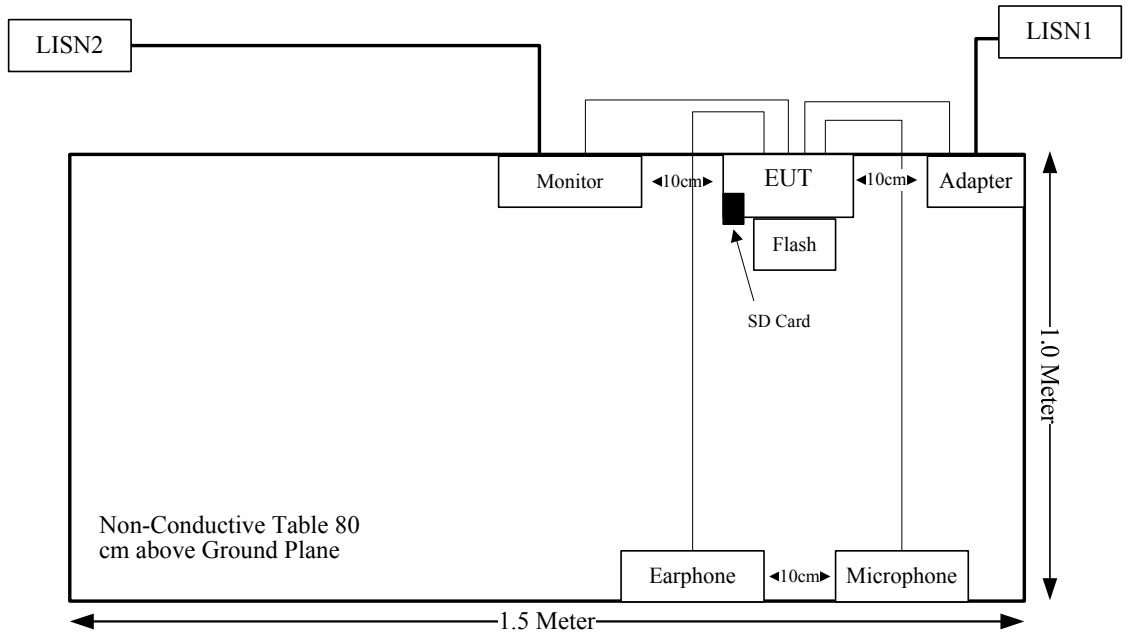
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
SanDisk	SD Card	8G	N/A
SAMSUNG	Monitor	S22C330H	LS22C330HS/XF
KEENION	Earphone	KDM-911	6.9518122E12
KEENION	Microphone	KM-206	N/A
GODOX	Camera Flash	TT585	N/A

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
USB Type-C Cable	Yes	No	1.0	Type-C Port of EUT	Adapter
HDMI Cable	Yes	Yes	1.2	Mini HDMI Port of EUT	Monitor
Earphone Cable	Yes	No	1.5	Audio Out Port of EUT	Earphone
Microphone Cable	Yes	No	2.0	Audio In Port of EUT	Microphone

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

Rules	Description of Test	Result
FCC §15.407 (f) & §1.1310 & §2.1093 RSS-102 §4	RF Exposure	Compliance
FCC§15.203, RSS-GEN§6.8	Antenna Requirement	Compliance
FCC§15.407(b)(6)& §15.207(a), RSS-Gen §8.8	Conducted Emissions	Compliance
FCC§15.205& §15.209 &§15.407(b), RSS-247§6.2	Undesirable Emission& Restricted Bands	Compliance
FCC§15.407(b) RSS-247§6.2	Out Of Band Emissions	Compliance
FCC§15.407(a) (e), RSS-247 §6.2 RSS-Gen§6.7	Emission Bandwidth	Compliance
FCC§15.407(g)	Frequency Stability	Compliance
FCC§15.407(a) RSS-247 §6.2	Conducted Transmitter Output Power	Compliance
FCC§15.407 (a), RSS-247 §6.2	Power Spectral Density	Compliance

FCC §15.407 (f) & §1.1310 & §2.1093, RSS-102 §4- RF EXPOSURE

Applicable Standard

According to§15.407(f),§1.1310 and §2.1093.

According to RSS-102 §4 Table 3, SAR limits for device used by the general public

Body Region	Average SAR (W/Kg)	Averaging Time (minutes)	Mass Average (g)
Whole Body	0.08	6	Whole Body
Localized Head, Neck and Trunk	1.6	6	1
Localized Limbs	4	6	10

Test Result

Compliant, please refer to the SAR report: RDG180909002-20.

FCC §15.203& RSS-GEN CLAUSE 6.8 - ANTENNA REQUIREMENT

Applicable Standard

According to FCC§ 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.
c. Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

According to RSS-Gen §6.8, The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

For licence-exempt equipment with detachable antennas, the user manual shall also contain the following notice in a conspicuous location:

This radio transmitter [enter the device's ISED certification number] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type.

Antenna Information And Connector Construction

The EUT has 2 internal antenna arrangement, use unique connector coupling to the radio board, fulfill the requirement of this section. Please refer to the EUT photos and below information:

Antenna	Manufacturer	Model Number	Antenna Type	Connector Type	input impedance (Ohm)	Antenna Gain /Frequency
WIFI/BT Chain 0	DJI	N/A	PCB	IPEX	50	0 dBi/2.4GHz -1.0 dBi/5.8GHz
WIFI Chain 1	DJI	N/A	PCB	IPEX	50	0 dBi/2.4GHz -1.0 dBi/5.8GHz

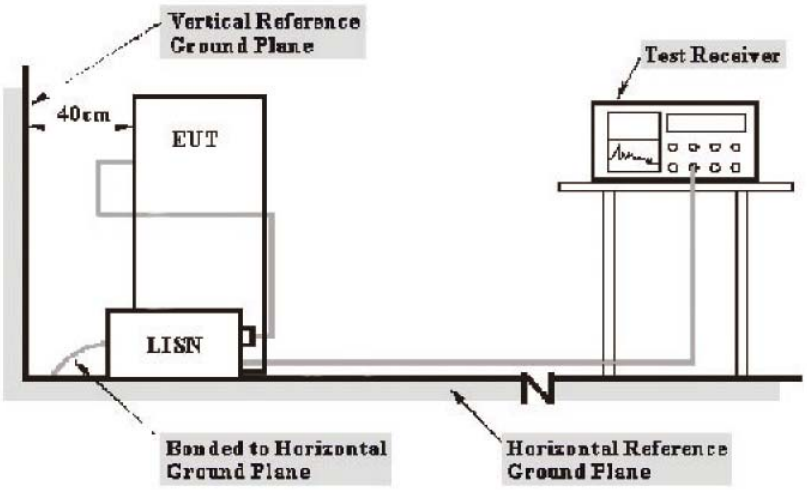
Result: Compliance.

FCC §15.207(a) RSS-GEN CLAUSE 8.8– CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207(a), §15.407(b) (6), RSS-GEN CLAUSE 8.8.

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 and RSS-Gen clause 8.8 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
R&S	EMI Test Receiver	ESCS 30	830245/006	2017-12-11	2018-12-11
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-01	2018-09-05	2019-09-05
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A
R&S	Two-line V-network	ENV 216	101614	2017-12-08	2018-12-08

*** 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

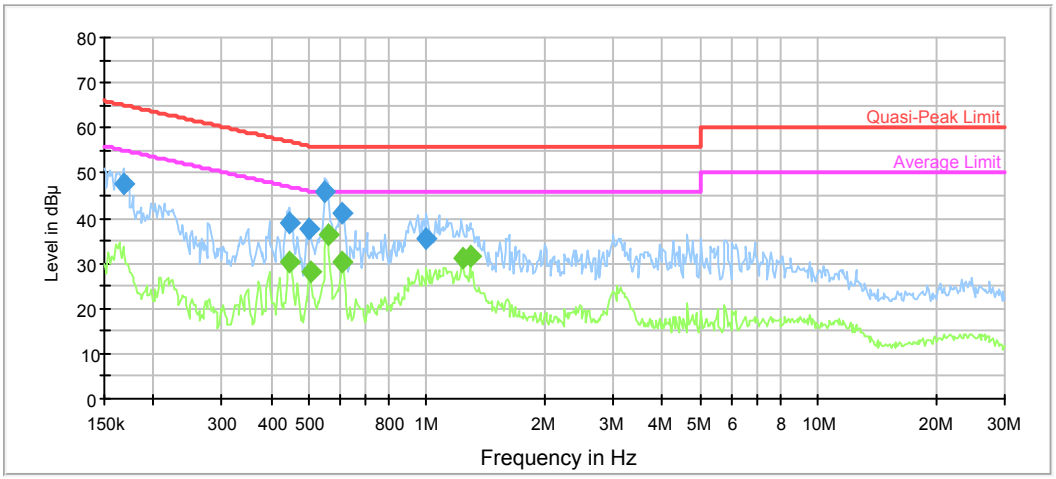
Environmental Conditions

Temperature:	26.4 °C
Relative Humidity:	55 %
ATM Pressure:	100.4 kPa

The testing was performed by Lily Xie on 2018-09-21.

Test Mode: Transmitting

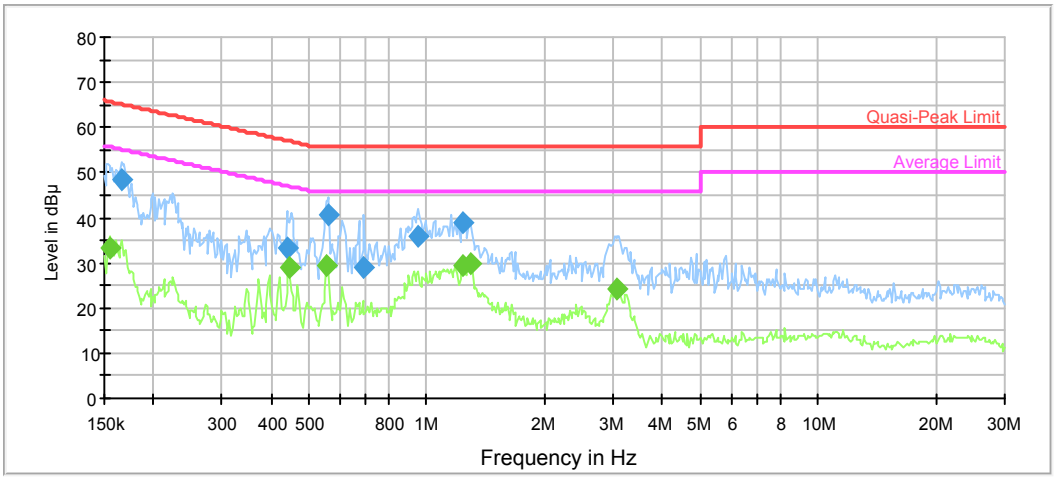
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.167702	47.7	9.000	L1	10.9	17.4	65.1	Compliance
0.446873	39.0	9.000	L1	9.9	17.9	56.9	Compliance
0.499611	37.5	9.000	L1	9.9	18.5	56.0	Compliance
0.549741	45.7	9.000	L1	9.9	10.3	56.0	Compliance
0.604902	41.0	9.000	L1	9.8	15.0	56.0	Compliance
0.999305	35.5	9.000	L1	9.8	20.5	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.446873	30.4	9.000	L1	9.9	16.5	46.9	Compliance
0.503608	28.3	9.000	L1	9.9	17.7	46.0	Compliance
0.558572	36.3	9.000	L1	9.8	9.7	46.0	Compliance
0.609741	30.4	9.000	L1	9.8	15.6	46.0	Compliance
1.239175	31.2	9.000	L1	9.8	14.8	46.0	Compliance
1.289541	31.7	9.000	L1	9.8	14.3	46.0	Compliance

AC120 V, 60 Hz, Neutral:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.166371	48.5	9.000	N	10.9	16.6	65.1	Compliance
0.439808	33.5	9.000	N	9.9	23.6	57.1	Compliance
0.563041	40.8	9.000	N	9.8	15.2	56.0	Compliance
0.692650	29.1	9.000	N	9.8	26.9	56.0	Compliance
0.952654	35.8	9.000	N	9.8	20.2	56.0	Compliance
1.239175	38.7	9.000	N	9.8	17.3	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.154858	33.2	9.000	N	11.1	22.5	55.7	Compliance
0.446873	28.9	9.000	N	9.9	18.0	46.9	Compliance
0.554139	29.5	9.000	N	9.8	16.5	46.0	Compliance
1.239175	29.5	9.000	N	9.8	16.5	46.0	Compliance
1.289541	29.7	9.000	N	9.8	16.3	46.0	Compliance
3.049107	24.2	9.000	N	9.8	21.8	46.0	Compliance

FCC §15.209, §15.205 , §15.407(b) &RSS-247 §6.2, RSS-GEN§8.10 – 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.

According to RSS-247§6.2

Frequency band 5150-5250 MHz

6.2.1.2 Unwanted emission limits

For transmitters with operating frequencies in the band 5150-5250 MHz, all emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. Any unwanted emissions that fall into the band 5250-5350 MHz shall be attenuated below the channel power by at least 26 dB, when measured using a resolution bandwidth between 1 and 5% of the occupied bandwidth (i.e. 99% bandwidth), above 5250 MHz. The 26 dB bandwidth may fall into the 5250-5350 MHz band; however, if the occupied bandwidth also falls within the 5250-5350 MHz band, the transmission is considered as intentional and the devices shall comply with all requirements in the band 5250-5350 MHz including implementing dynamic frequency selection (DFS) and TPC, on the portion of the emission that resides in the 5250-5350 MHz band.

Frequency band 5250-5350 MHz

6.2.2.2 Unwanted emission limits

Devices shall comply with the following:

a) All emissions outside the band 5250-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p.; or

b) All emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. and its power shall comply with the spectral power density for operation within the band 5150-5250 MHz. The device, except devices installed in vehicles, shall be labelled or include in the user manual the following text “for indoor use only.”

Frequency bands 5470-5600 MHz and 5650-5725 MHz:

6.2.3.2 Unwanted emission limits

Emissions outside the band 5470-5600 MHz and 5650-5725 MHz shall not exceed -27 dBm/MHz e.i.r.p. However, devices with bandwidth overlapping the band edge of 5725 MHz can meet the emission limit of -27 dBm/MHz e.i.r.p. at 5850 MHz instead of 5725 MHz.

Frequency band 5725-5850 MHz

6.2.4.2 Unwanted emission limits

Devices operating in the band 5725-5850 MHz with antenna gain greater than 10 dBi can have unwanted emissions that comply with either the limits in this section or in section 5.5 until six (6) months after the publication date of this standard for certification. Certified devices that do not comply with emission limits in this section shall not be manufactured, imported, distributed, leased, offered for sale or sold after April 1, 2018.

Devices operating in the band 5725-5850 MHz with antenna gain of 10 dBi or less can have unwanted emissions that comply with either the limits in this section or in section 5.5 until April 1, 2018 for certification. Certified devices that do not comply with emission limits in this section shall not be manufactured, imported, distributed, leased, offered for sale or sold after April 1, 2020.

Devices operating in the band 5725-5850 MHz shall have e.i.r.p. of unwanted emissions comply with the following:

a) 27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edges;

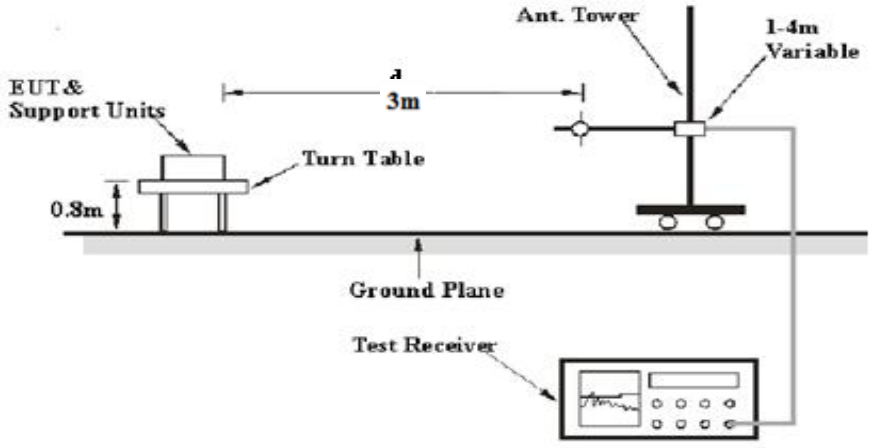
b) 15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges;

c) 10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges; and

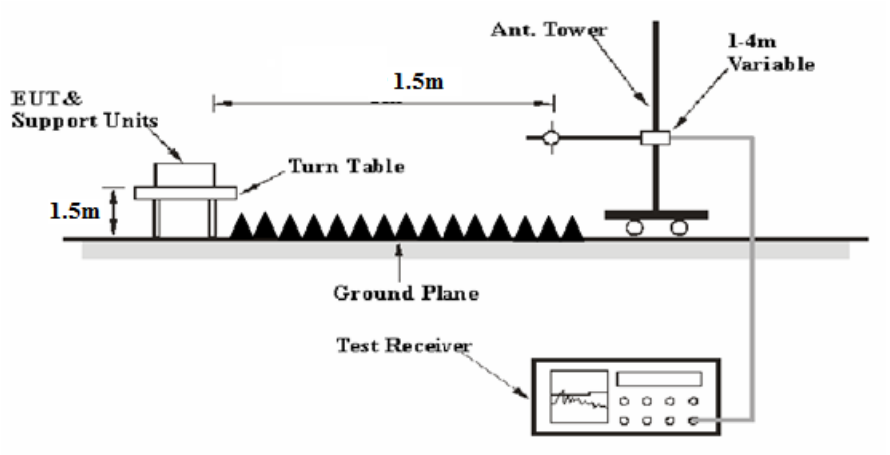
d) -27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.

EUT Setup

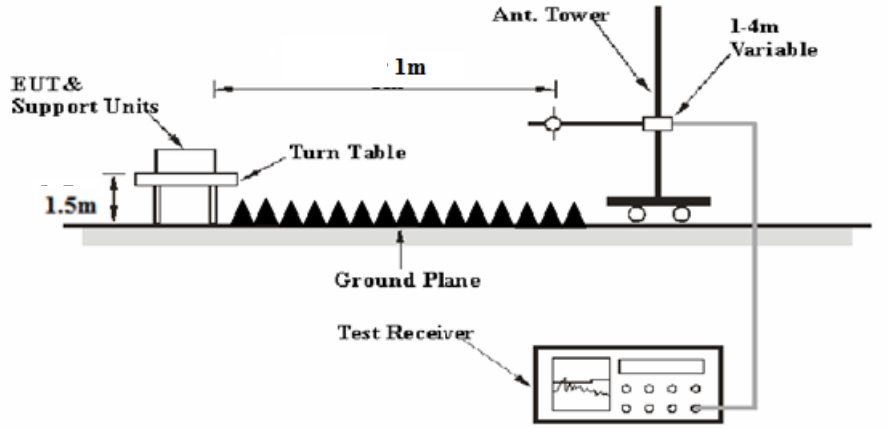
Below 1 GHz:



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 and RSS-247, RSS-Gen 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

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:

Extrapolation result
= 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-Extrapolation result

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2017-12-11	2018-12-11
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2018-09-05	2019-09-05
HP	Amplifier	8447D	2727A05902	2018-09-05	2019-09-05
Agilent	Spectrum Analyzer	E4440A	SG43360054	2018-01-04	2019-01-04
R&S	Spectrum Analyzer	FSP 38	100478	2017-12-08	2018-12-08
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-04
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	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-2.4J2.4J-50	C-0700-02	2018-06-27	2019-06-27
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2018-09-05	2019-09-05
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2018-06-27	2019-06-27
Sinoscite	Bandstop Filters	BSF5150-5850MN-0899-003	0899003	2018-05-06	2019-05-06
Mini Circuits	High Pass Filter	VHF-6010+	31118	2018-06-16	2019-06-16

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

Test Data

Environmental Conditions

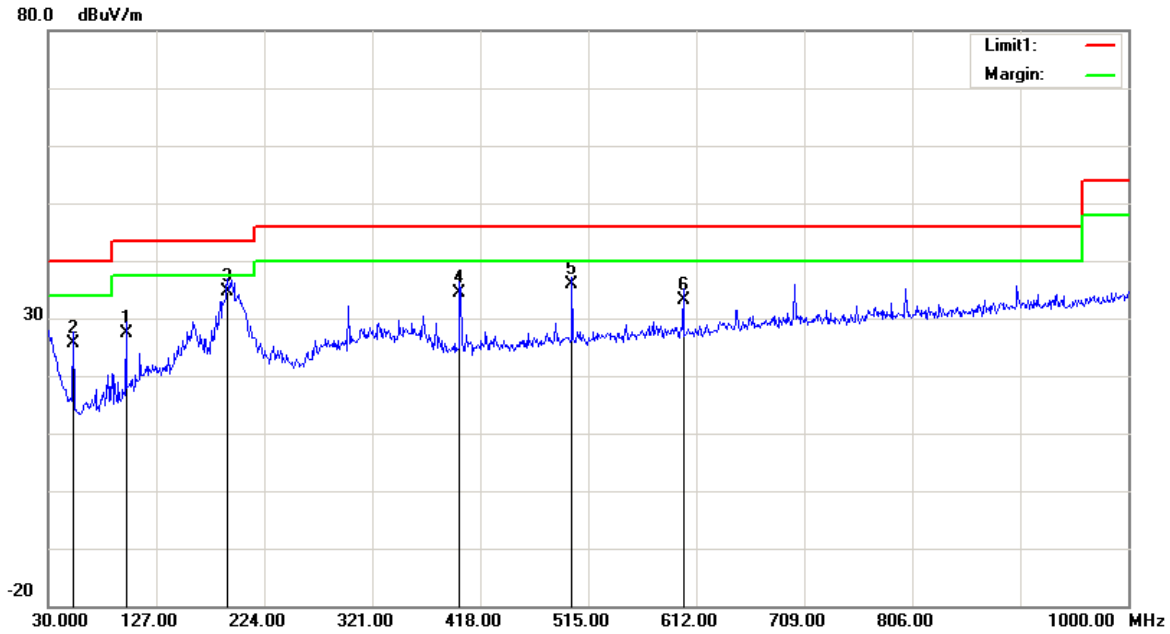
Temperature:	27.4~28.1 °C
Relative Humidity:	42~46 %
ATM Pressure:	100.2 ~100.6 kPa

** The testing was performed by Blake Yang, Sunny Cen from 2018-09-22 to 2018-09-25.*

Test Mode: Transmitting

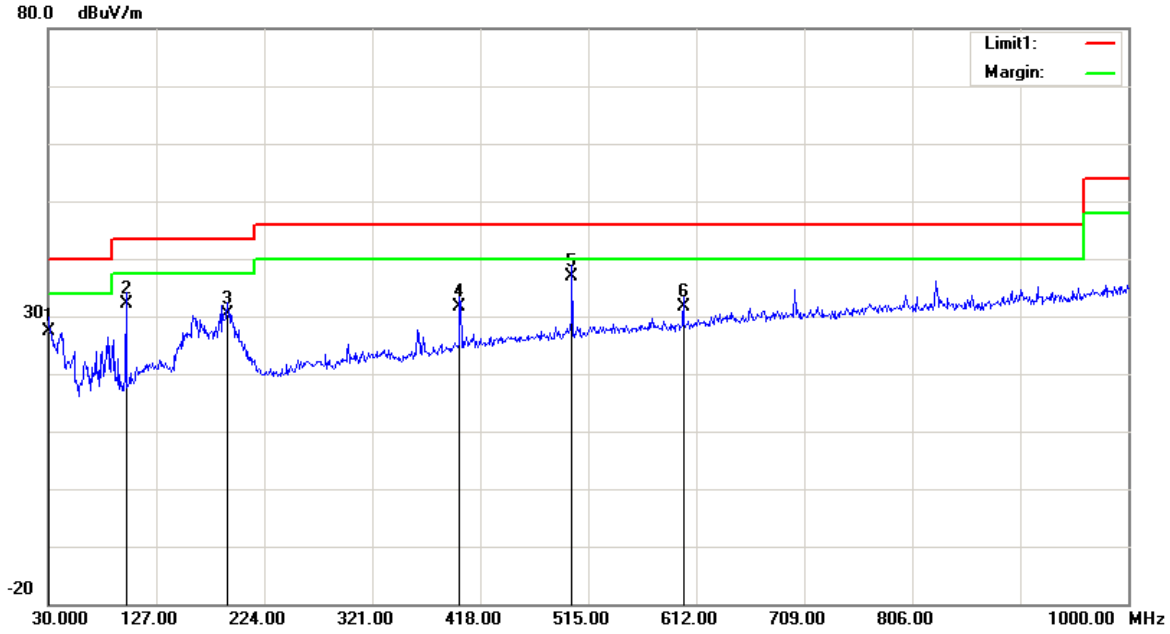
1) 30MHz-1GHz(802.11a middle channel was the worst)

Horizontal



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
99.8400	36.19	QP	-8.89	27.30	43.50	16.20
52.3100	37.64	QP	-11.94	25.70	40.00	14.30
191.0200	41.62	QP	-7.02	34.60	43.50	8.90
399.5700	36.29	QP	-1.79	34.50	46.00	11.50
500.4500	35.87	QP	0.03	35.90	46.00	10.10
600.3600	31.90	QP	1.30	33.20	46.00	12.80

Vertical



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.0000	25.86	QP	1.54	27.40	40.00	12.60
99.8400	40.99	QP	-8.89	32.10	43.50	11.40
191.0200	37.42	QP	-7.02	30.40	43.50	13.10
399.5700	33.39	QP	-1.79	31.60	46.00	14.40
500.4500	36.77	QP	0.03	36.80	46.00	9.20
600.3600	30.30	QP	1.30	31.60	46.00	14.40

2) 1GHz-40GHz:

802.11a(MIMO was the worst)

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 (PK/QP/AV)	Polar (H/V)	Factor (dB/m)						
Low Channel: 5745 MHz										
5745.00	68.16	PK	H	34.20	3.69	0.00	106.05	100.03	N/A	N/A
5745.00	60.18	AV	H	34.20	3.69	0.00	98.07	92.05	N/A	N/A
5745.00	70.98	PK	V	34.20	3.69	0.00	108.87	102.85	N/A	N/A
5745.00	62.25	AV	V	34.20	3.69	0.00	100.14	94.12	N/A	N/A
5725.00	37.56	PK	V	34.19	3.69	0.00	75.44	69.42	122.20	52.78
5720.00	35.72	PK	V	34.19	3.69	0.00	73.60	67.58	110.80	43.22
5700.00	28.06	PK	V	34.18	3.68	0.00	65.92	59.9	105.20	45.30
5650.00	26.73	PK	V	34.16	3.63	0.00	64.52	58.5	68.20	9.70
11490.00	46.63	PK	V	38.99	6.59	37.35	54.86	48.84	74.00	25.16
11490.00	33.75	AV	V	38.99	6.59	37.35	41.98	35.96	54.00	18.04
17235.00	46.85	PK	V	41.56	8.78	38.61	58.58	52.56	68.20	15.64
Middle Channel: 5785 MHz										
5785.00	68.79	PK	H	34.21	3.71	0.00	106.71	100.69	N/A	N/A
5785.00	60.32	AV	H	34.21	3.71	0.00	98.24	92.22	N/A	N/A
5785.00	71.36	PK	V	34.21	3.71	0.00	109.28	103.26	N/A	N/A
5785.00	62.89	AV	V	34.21	3.71	0.00	100.81	94.79	N/A	N/A
11570.00	45.82	PK	V	39.00	6.61	37.44	53.99	47.97	74.00	26.03
11570.00	33.13	AV	V	39.00	6.61	37.44	41.30	35.28	54.00	18.72
17355.00	46.58	PK	V	42.26	8.81	38.52	59.13	53.11	68.20	15.09
High Channel: 5825MHz										
5825.00	70.18	PK	H	34.23	3.73	0.00	108.14	102.12	N/A	N/A
5825.00	61.54	AV	H	34.23	3.73	0.00	99.50	93.48	N/A	N/A
5825.00	73.23	PK	V	34.23	3.73	0.00	111.19	105.17	N/A	N/A
5825.00	64.82	AV	V	34.23	3.73	0.00	102.78	96.76	N/A	N/A
5850.00	38.84	PK	V	34.24	3.75	0.00	76.83	70.81	122.20	51.39
5855.00	36.59	PK	V	34.24	3.75	0.00	74.58	68.56	110.80	42.24
5875.00	27.29	PK	V	34.25	3.77	0.00	65.31	59.29	105.20	45.91
5925.00	26.73	PK	V	34.27	3.80	0.00	64.80	58.78	68.20	9.42
11650.00	47.68	PK	V	39.00	6.64	37.53	55.79	49.77	74.00	24.23
11650.00	35.42	AV	V	39.00	6.64	37.53	43.53	37.51	54.00	16.49
17475.00	47.85	PK	V	42.96	8.84	38.44	61.21	55.19	68.20	13.01

802.11n ht20(MIMO was the worst)

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 (PK/QP/AV)	Polar (H/V)	Factor (dB/m)						
Low Channel: 5745 MHz										
5745.00	68.46	PK	H	34.20	3.69	0.00	106.35	100.33	N/A	N/A
5745.00	59.79	AV	H	34.20	3.69	0.00	97.68	91.66	N/A	N/A
5745.00	70.67	PK	V	34.20	3.69	0.00	108.56	102.54	N/A	N/A
5745.00	62.15	AV	V	34.20	3.69	0.00	100.04	94.02	N/A	N/A
5725.00	38.46	PK	V	34.19	3.69	0.00	76.34	70.32	122.20	51.88
5720.00	36.12	PK	V	34.19	3.69	0.00	74.00	67.98	110.80	42.82
5700.00	27.39	PK	V	34.18	3.68	0.00	65.25	59.23	105.20	45.97
5650.00	26.58	PK	V	34.16	3.63	0.00	64.37	58.35	68.20	9.85
11490.00	45.71	PK	V	38.99	6.59	37.35	53.94	47.92	74.00	26.08
11490.00	32.86	AV	V	38.99	6.59	37.35	41.09	35.07	54.00	18.93
17235.00	46.74	PK	V	41.56	8.78	38.61	58.47	52.45	68.20	15.75
Middle Channel: 5785 MHz										
5785.00	68.57	PK	H	34.21	3.71	0.00	106.49	100.47	N/A	N/A
5785.00	59.87	AV	H	34.21	3.71	0.00	97.79	91.77	N/A	N/A
5785.00	71.62	PK	V	34.21	3.71	0.00	109.54	103.52	N/A	N/A
5785.00	62.35	AV	V	34.21	3.71	0.00	100.27	94.25	N/A	N/A
11570.00	45.85	PK	V	39.00	6.61	37.44	54.02	48	74.00	26.00
11570.00	32.76	AV	V	39.00	6.61	37.44	40.93	34.91	54.00	19.09
17355.00	46.73	PK	V	42.26	8.81	38.52	59.28	53.26	68.20	14.94
High Channel: 5825 MHz										
5825.00	70.44	PK	H	34.23	3.73	0.00	108.40	102.38	N/A	N/A
5825.00	61.25	AV	H	34.23	3.73	0.00	99.21	93.19	N/A	N/A
5825.00	72.69	PK	V	34.23	3.73	0.00	110.65	104.63	N/A	N/A
5825.00	63.18	AV	V	34.23	3.73	0.00	101.14	95.12	N/A	N/A
5850.00	38.41	PK	V	34.24	3.75	0.00	76.40	70.38	122.20	51.82
5855.00	35.87	PK	V	34.24	3.75	0.00	73.86	67.84	110.80	42.96
5875.00	29.57	PK	V	34.25	3.77	0.00	67.59	61.57	105.20	43.63
5925.00	27.32	PK	V	34.27	3.80	0.00	65.39	59.37	68.20	8.83
11650.00	45.68	PK	V	39.00	6.64	37.53	53.79	47.77	74.00	26.23
11650.00	33.05	AV	V	39.00	6.64	37.53	41.16	35.14	54.00	18.86
17475.00	46.72	PK	V	42.96	8.84	38.44	60.08	54.06	68.20	14.14

802.11ac20(MIMO was the worst)

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 (PK/QP/AV)	Polar (H/V)	Factor (dB/m)						
Low Channel: 5745 MHz										
5745.00	68.31	PK	H	34.20	3.69	0.00	106.20	100.18	N/A	N/A
5745.00	59.44	AV	H	34.20	3.69	0.00	97.33	91.31	N/A	N/A
5745.00	70.32	PK	V	34.20	3.69	0.00	108.21	102.19	N/A	N/A
5745.00	61.25	AV	V	34.20	3.69	0.00	99.14	93.12	N/A	N/A
5725.00	38.46	PK	V	34.19	3.69	0.00	76.34	70.32	122.20	51.88
5720.00	36.21	PK	V	34.19	3.69	0.00	74.09	68.07	110.80	42.73
5700.00	28.05	PK	V	34.18	3.68	0.00	65.91	59.89	105.20	45.31
5650.00	26.83	PK	V	34.16	3.63	0.00	64.62	58.6	68.20	9.60
11490.00	45.31	PK	V	38.99	6.59	37.35	53.54	47.52	74.00	26.48
11490.00	32.54	AV	V	38.99	6.59	37.35	40.77	34.75	54.00	19.25
17235.00	46.27	PK	V	41.56	8.78	38.61	58.00	51.98	68.20	16.22
Middle Channel: 5785 MHz										
5785.00	68.79	PK	H	34.21	3.71	0.00	106.71	100.69	N/A	N/A
5785.00	59.86	AV	H	34.21	3.71	0.00	97.78	91.76	N/A	N/A
5785.00	71.54	PK	V	34.21	3.71	0.00	109.46	103.44	N/A	N/A
5785.00	62.43	AV	V	34.21	3.71	0.00	100.35	94.33	N/A	N/A
11570.00	45.72	PK	V	39.00	6.61	37.44	53.89	47.87	74.00	26.13
11570.00	33.24	AV	V	39.00	6.61	37.44	41.41	35.39	54.00	18.61
17355.00	46.85	PK	V	42.26	8.81	38.52	59.40	53.38	68.20	14.82
High Channel: 5825 MHz										
5825.00	69.68	PK	H	34.23	3.73	0.00	107.64	101.62	N/A	N/A
5825.00	60.41	AV	H	34.23	3.73	0.00	98.37	92.35	N/A	N/A
5825.00	72.65	PK	V	34.23	3.73	0.00	110.61	104.59	N/A	N/A
5825.00	63.84	AV	V	34.23	3.73	0.00	101.80	95.78	N/A	N/A
5850.00	37.91	PK	V	34.24	3.75	0.00	75.90	69.88	122.20	52.32
5855.00	37.56	PK	V	34.24	3.75	0.00	75.55	69.53	110.80	41.27
5875.00	28.86	PK	V	34.25	3.77	0.00	66.88	60.86	105.20	44.34
5925.00	27.13	PK	V	34.27	3.80	0.00	65.20	59.18	68.20	9.02
11650.00	45.73	PK	V	39.00	6.64	37.53	53.84	47.82	74.00	26.18
11650.00	32.81	AV	V	39.00	6.64	37.53	40.92	34.9	54.00	19.10
17475.00	46.85	PK	V	42.96	8.84	38.44	60.21	54.19	68.20	14.01

802.11n ht40(MIMO was the worst)

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 (PK/QP/AV)	Polar (H/V)	Factor (dB/m)						
Low Channel: 5755 MHz										
5755.00	65.86	PK	H	34.20	3.70	0.00	103.76	97.74	N/A	N/A
5755.00	56.73	AV	H	34.20	3.70	0.00	94.63	88.61	N/A	N/A
5755.00	68.41	PK	V	34.20	3.70	0.00	106.31	100.29	N/A	N/A
5755.00	59.74	AV	V	34.20	3.70	0.00	97.64	91.62	N/A	N/A
5725.00	39.28	PK	V	34.19	3.69	0.00	77.16	71.14	122.20	51.06
5720.00	39.54	PK	V	34.19	3.69	0.00	77.42	71.4	110.80	39.40
5700.00	30.29	PK	V	34.18	3.68	0.00	68.15	62.13	105.20	43.07
5650.00	28.54	PK	V	34.16	3.63	0.00	66.33	60.31	68.20	7.89
11510.00	45.46	PK	V	39.00	6.59	37.37	53.68	47.66	74.00	26.34
11510.00	32.78	AV	V	39.00	6.59	37.37	41.00	34.98	54.00	19.02
17265.00	46.83	PK	V	41.74	8.79	38.58	58.78	52.76	68.20	15.44
High Channel: 5795 MHz										
5795.00	65.88	PK	H	34.22	3.71	0.00	103.81	97.79	N/A	N/A
5795.00	56.82	AV	H	34.22	3.71	0.00	94.75	88.73	N/A	N/A
5795.00	68.73	PK	V	34.22	3.71	0.00	106.66	100.64	N/A	N/A
5795.00	59.92	AV	V	34.22	3.71	0.00	97.85	91.83	N/A	N/A
5850.00	30.38	PK	V	34.24	3.75	0.00	68.37	62.35	122.20	59.85
5855.00	29.71	PK	V	34.24	3.75	0.00	67.70	61.68	110.80	49.12
5875.00	27.82	PK	V	34.25	3.77	0.00	65.84	59.82	105.20	45.38
5925.00	27.32	PK	V	34.27	3.80	0.00	65.39	59.37	68.20	8.83
11590.00	45.82	PK	V	39.00	6.62	37.46	53.98	47.96	74.00	26.04
11590.00	33.01	AV	V	39.00	6.62	37.46	41.17	35.15	54.00	18.85
17385.00	47.12	PK	V	42.43	8.82	38.50	59.87	53.85	68.20	14.35

802.11ac40(MIMO was the worst)

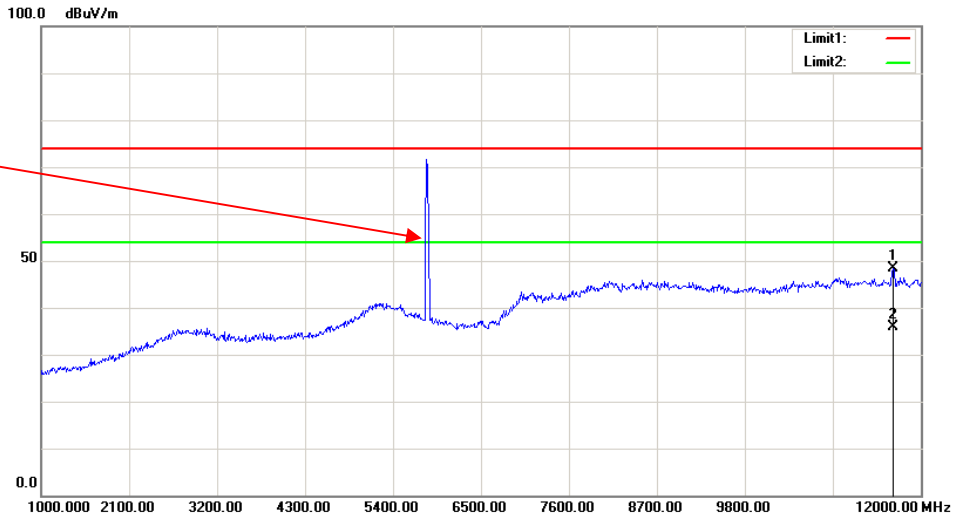
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Extrapolation result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB/m)						
Low Channel: 5755 MHz										
5755.00	65.32	PK	H	34.20	3.70	0.00	103.22	97.2	N/A	N/A
5755.00	56.18	AV	H	34.20	3.70	0.00	94.08	88.06	N/A	N/A
5755.00	68.13	PK	V	34.20	3.70	0.00	106.03	100.01	N/A	N/A
5755.00	59.65	AV	V	34.20	3.70	0.00	97.55	91.53	N/A	N/A
5725.00	39.86	PK	V	34.19	3.69	0.00	77.74	71.72	122.20	50.48
5720.00	37.24	PK	V	34.19	3.69	0.00	75.12	69.1	110.80	41.70
5700.00	30.49	PK	V	34.18	3.68	0.00	68.35	62.33	105.20	42.87
5650.00	28.41	PK	V	34.16	3.63	0.00	66.20	60.18	68.20	8.02
11510.00	45.63	PK	V	39.00	6.59	37.37	53.85	47.83	74.00	26.17
11510.00	33.27	AV	V	39.00	6.59	37.37	41.49	35.47	54.00	18.53
17265.00	47.52	PK	V	41.74	8.79	38.58	59.47	53.45	68.20	14.75
High Channel: 5795 MHz										
5795.00	65.41	PK	H	34.22	3.71	0.00	103.34	97.32	N/A	N/A
5795.00	56.68	AV	H	34.22	3.71	0.00	94.61	88.59	N/A	N/A
5795.00	68.54	PK	V	34.22	3.71	0.00	106.47	100.45	N/A	N/A
5795.00	59.73	AV	V	34.22	3.71	0.00	97.66	91.64	N/A	N/A
5850.00	31.46	PK	V	34.24	3.75	0.00	69.45	63.43	122.20	58.77
5855.00	29.13	PK	V	34.24	3.75	0.00	67.12	61.1	110.80	49.70
5875.00	28.32	PK	V	34.25	3.77	0.00	66.34	60.32	105.20	44.88
5925.00	26.54	PK	V	34.27	3.80	0.00	64.61	58.59	68.20	9.61
11590.00	45.82	PK	V	39.00	6.62	37.46	53.98	47.96	74.00	26.04
11590.00	33.85	AV	V	39.00	6.62	37.46	42.01	35.99	54.00	18.01
17385.00	47.36	PK	V	42.43	8.82	38.50	60.11	54.09	68.20	14.11

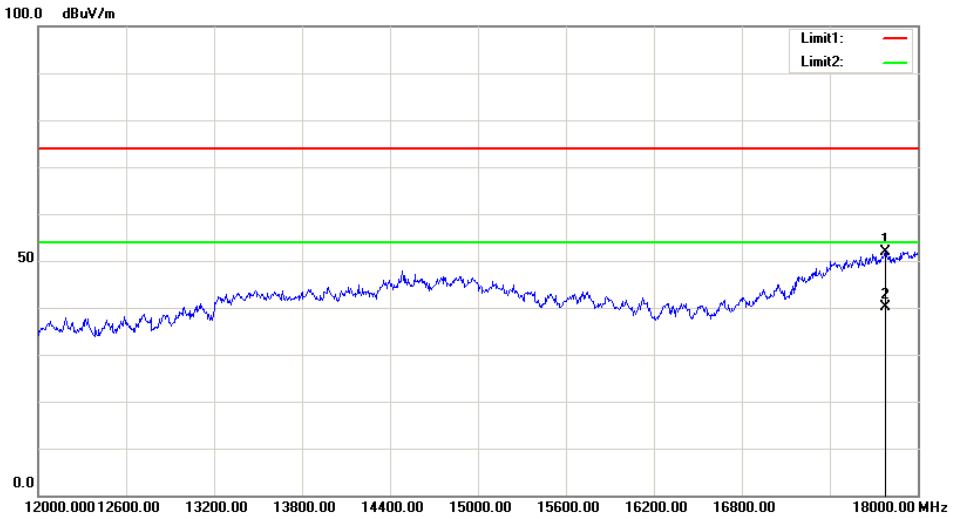
802.11 ac80(MIMO was the worst)

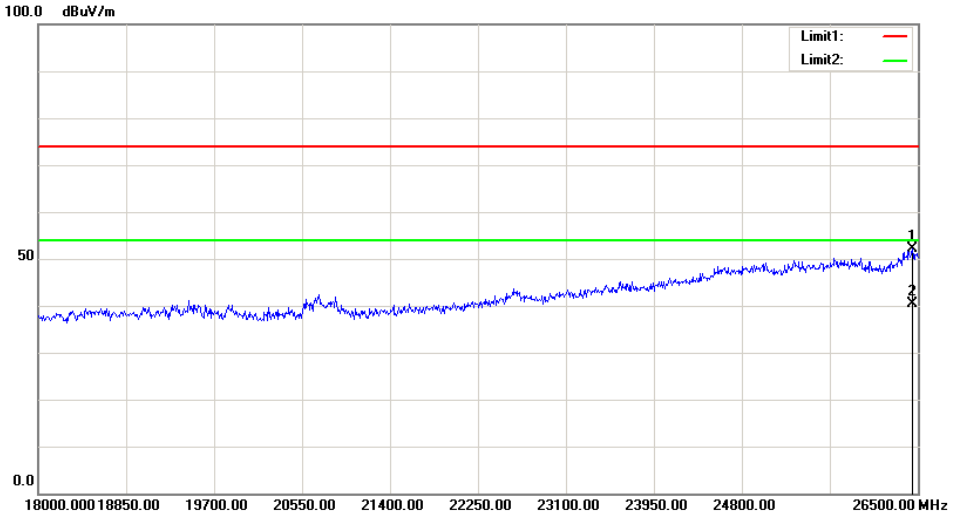
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Extrapolation result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB/m)						
Middle Channel: 5775 MHz										
5775.00	64.21	PK	H	34.21	3.70	0.00	102.12	96.1	N/A	N/A
5775.00	53.08	AV	H	34.21	3.70	0.00	90.99	84.97	N/A	N/A
5775.00	66.68	PK	V	34.21	3.70	0.00	104.59	98.57	N/A	N/A
5775.00	55.96	AV	V	34.21	3.70	0.00	93.87	87.85	N/A	N/A
5725.00	36.48	PK	V	34.19	3.69	0.00	74.36	68.34	122.20	53.86
5720.00	35.12	PK	V	34.19	3.69	0.00	73.00	66.98	110.80	43.82
5700.00	33.09	PK	V	34.18	3.68	0.00	70.95	64.93	105.20	40.27
5650.00	28.54	PK	V	34.16	3.63	0.00	66.33	60.31	68.20	7.89
5850.00	31.62	PK	V	34.24	3.75	0.00	69.61	63.59	122.20	58.61
5855.00	30.89	PK	V	34.24	3.75	0.00	68.88	62.86	110.80	47.94
5875.00	27.62	PK	V	34.25	3.77	0.00	65.64	59.62	105.20	45.58
5925.00	26.24	PK	V	34.27	3.80	0.00	64.31	58.29	68.20	9.91
11550.00	45.63	PK	V	39.00	6.61	37.42	53.82	47.8	74.00	26.20
11550.00	33.52	AV	V	39.00	6.61	37.42	41.71	35.69	54.00	18.31
17325.00	47.35	PK	V	42.09	8.80	38.54	59.70	53.68	68.2	14.52

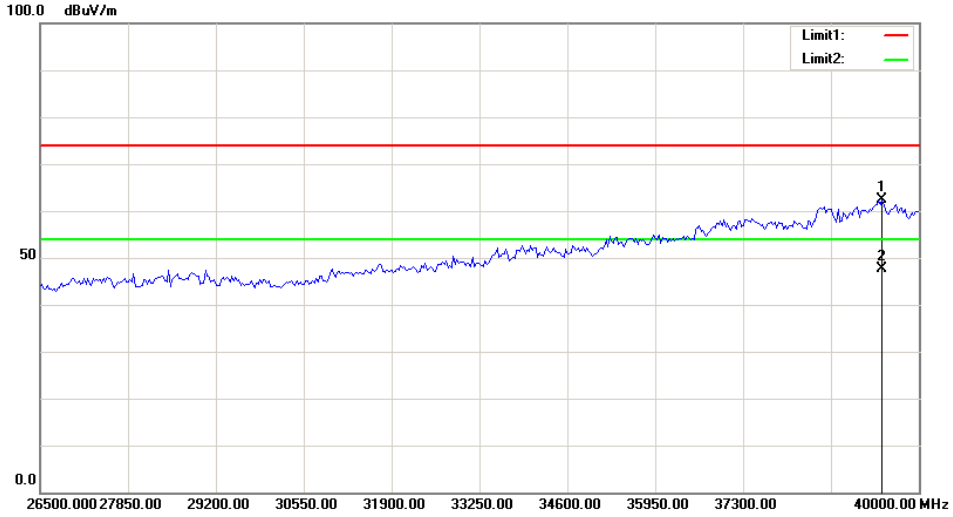
Test Plots(802.11a Mode High channel was the worst)
Horizontal

Fundamental Test with Band Rejection Filter



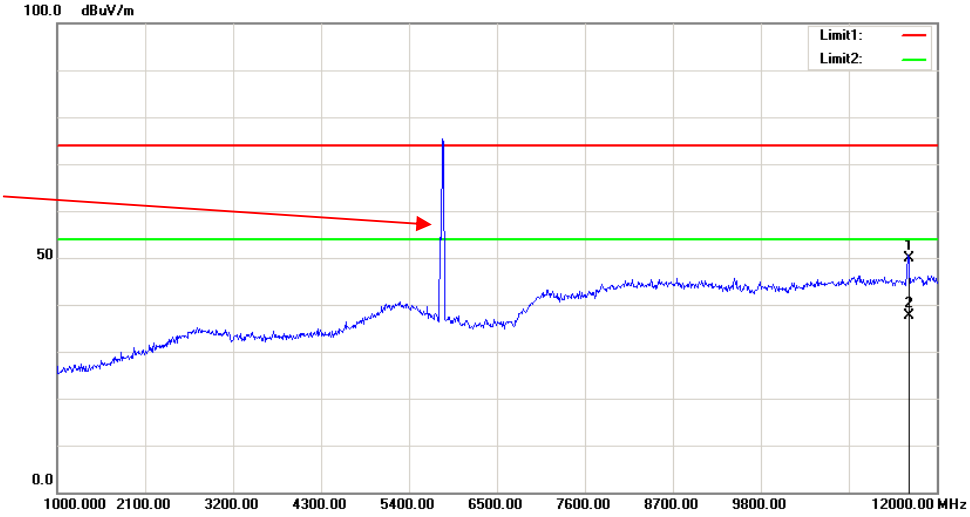


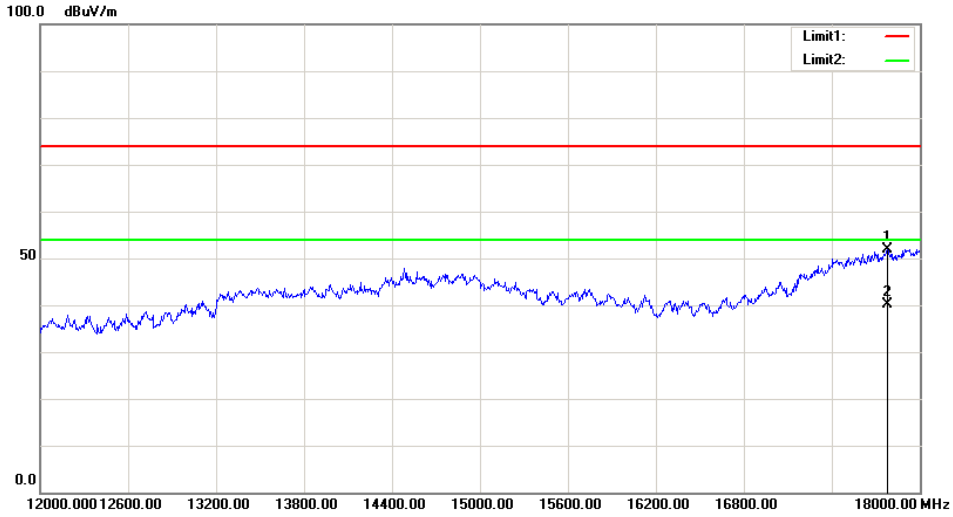


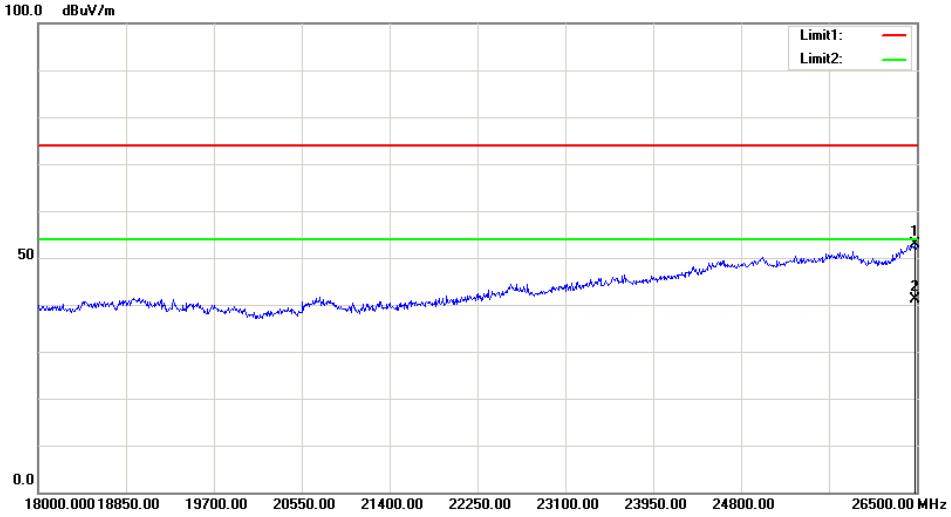


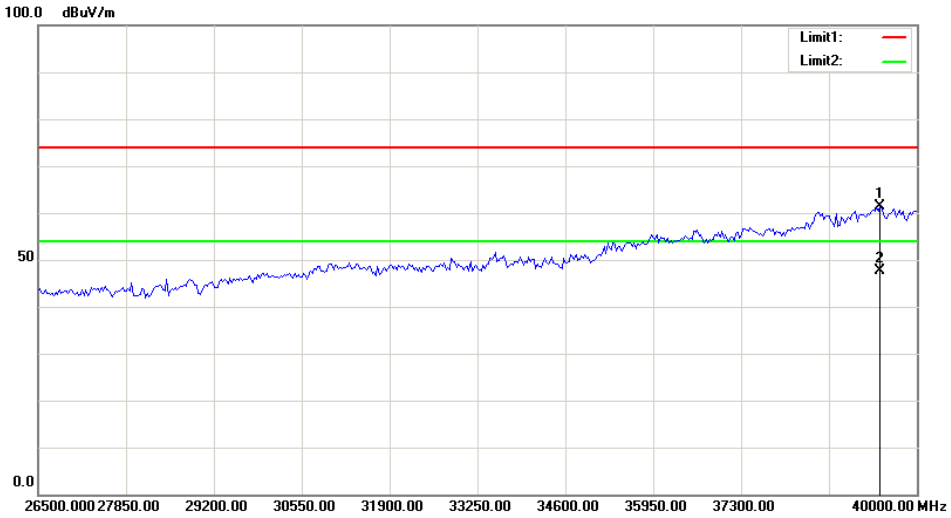
Vertical

Fundamental Test with Band Rejection Filter






100.0 dBuV/m
Limit1:
Limit2:
50
0.0
18000.000 18850.00 19700.00 20550.00 21400.00 22250.00 23100.00 23950.00 24800.00 26500.00 MHz


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

FCC §15.407(b)& RSS-247 §6.2–OUT- OF-BAND EMISSIONS

Applicable Standard

FCC §15.407

(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.

According to RSS-247§6.2

Frequency band 5150-5250 MHz

6.2.1.2 Unwanted emission limits

For transmitters with operating frequencies in the band 5150-5250 MHz, all emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. Any unwanted emissions that fall into the band 5250-5350 MHz shall be attenuated below the channel power by at least 26 dB, when measured using a resolution bandwidth between 1 and 5% of the occupied bandwidth (i.e. 99% bandwidth), above 5250 MHz. The 26 dB bandwidth may fall into the 5250-5350 MHz band; however, if the occupied bandwidth also falls within the 5250-5350 MHz band, the transmission is considered as intentional and the devices shall comply with all requirements in the band 5250-5350 MHz including implementing dynamic frequency selection (DFS) and TPC, on the portion of the emission that resides in the 5250-5350 MHz band.

Frequency band 5250-5350 MHz

6.2.2.2 Unwanted emission limits

Devices shall comply with the following:

a) All emissions outside the band 5250-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p.; or

b) All emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. and its power shall comply with the spectral power density for operation within the band 5150-5250 MHz. The device, except devices installed in vehicles, shall be labelled or include in the user manual the following text "for indoor use only."

Frequency bands 5470-5600 MHz and 5650-5725 MHz:

6.2.3.2 Unwanted emission limits

Emissions outside the band 5470-5600 MHz and 5650-5725 MHz shall not exceed -27 dBm/MHz e.i.r.p. However, devices with bandwidth overlapping the band edge of 5725 MHz can meet the emission limit of -27 dBm/MHz e.i.r.p. at 5850 MHz instead of 5725 MHz.

Frequency band 5725-5850 MHz

6.2.4.2 Unwanted emission limits

Devices operating in the band 5725-5850 MHz with antenna gain greater than 10 dBi can have unwanted emissions that comply with either the limits in this section or in section 5.5 until six (6) months after the publication date of this standard for certification. Certified devices that do not comply with emission limits in this section shall not be manufactured, imported, distributed, leased, offered for sale or sold after April 1, 2018.

Devices operating in the band 5725-5850 MHz with antenna gain of 10 dBi or less can have unwanted emissions that comply with either the limits in this section or in section 5.5 until April 1, 2018 for certification. Certified devices that do not comply with emission limits in this section shall not be manufactured, imported, distributed, leased, offered for sale or sold after April 1, 2020.

Devices operating in the band 5725-5850 MHz shall have e.i.r.p. of unwanted emissions comply with the following:

a) 27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edges;

b) 15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges;

c) 10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges; and

d) -27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.

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	2017-12-08	2018-12-08
Unknown	Coaxial Cable	C-SJ00-0010	C0010/02	Each time	N/A

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

Test Data

Environmental Conditions

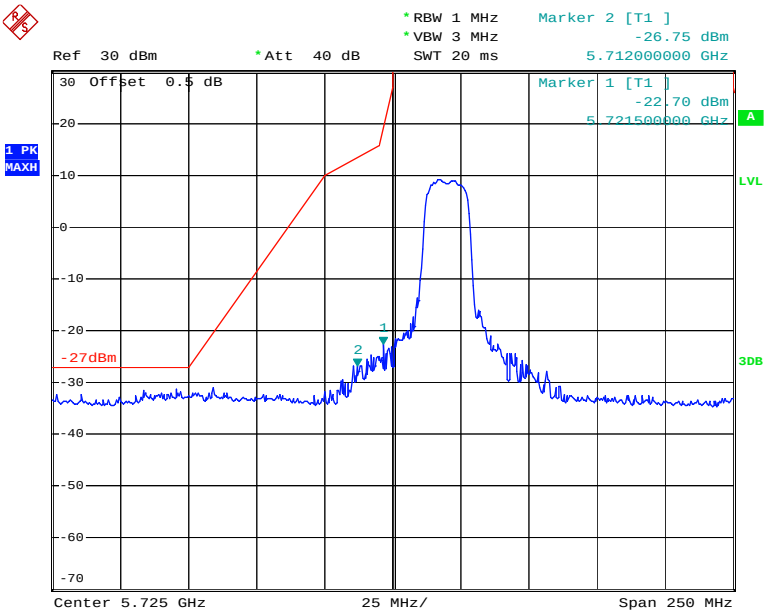
Temperature:	26.9°C
Relative Humidity:	47 %
ATM Pressure:	100.6kPa

The testing was performed by Kami Zhou on 2018-09-20.

Test Result: Pass.

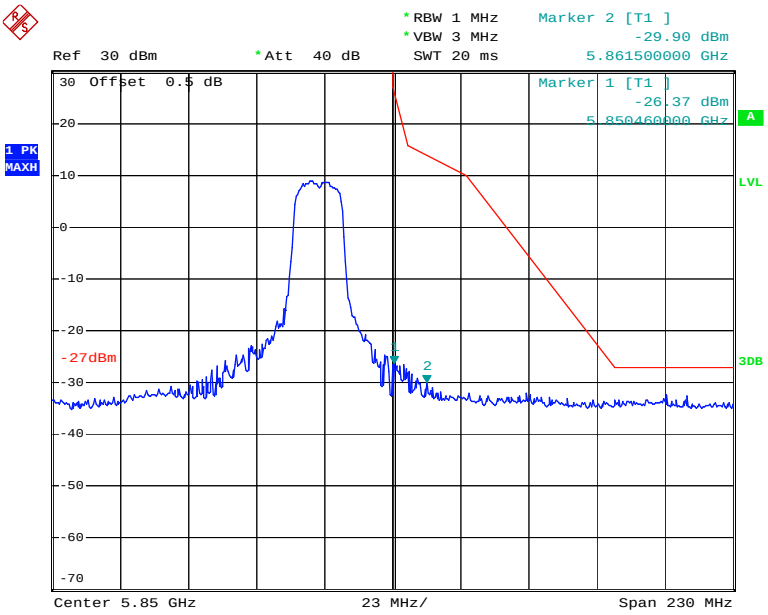
For 802.11a/n/ac the emission under limit more than 4dB, combined two chain compliance the requirement, please refer to the following plots.

802.11a, Chain 0, Low Channel



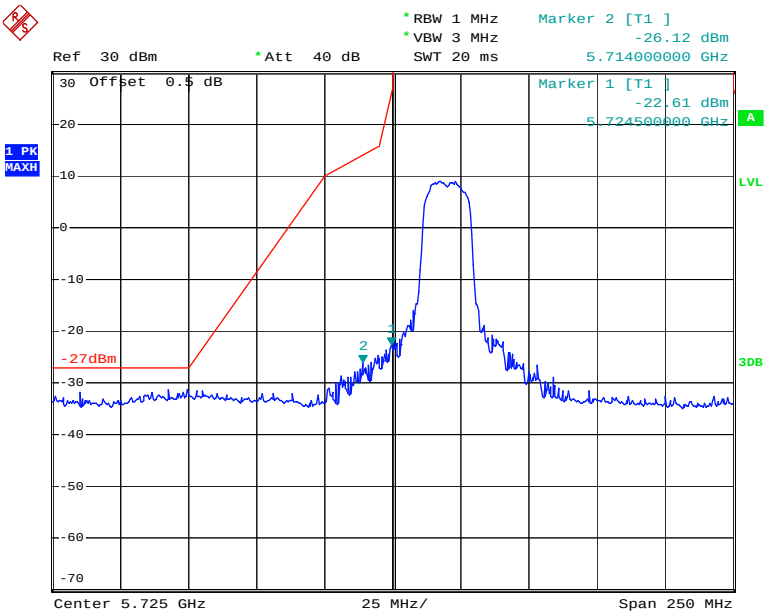
Date: 20.SEP.2018 09:54:43

802.11a, Chain 0, High Channel



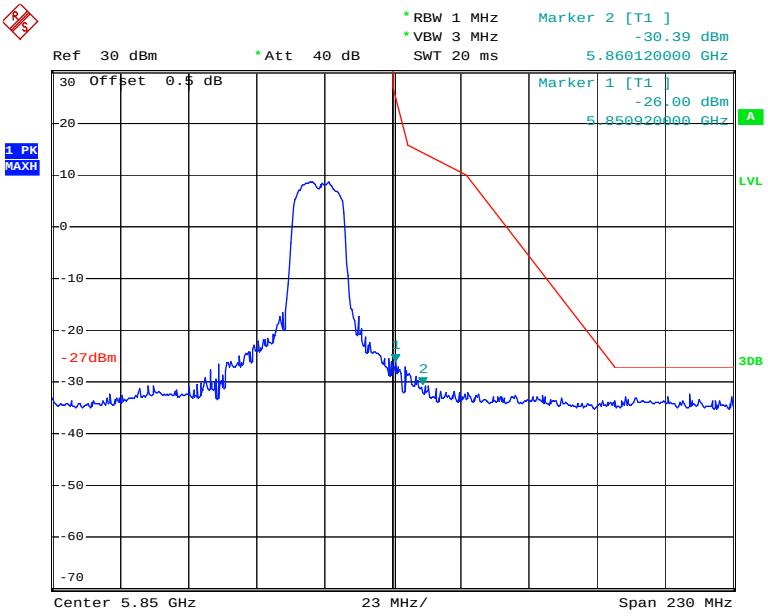
Date: 20.SEP.2018 10:02:32

802.11n ht20, Chain 0, Low Channel



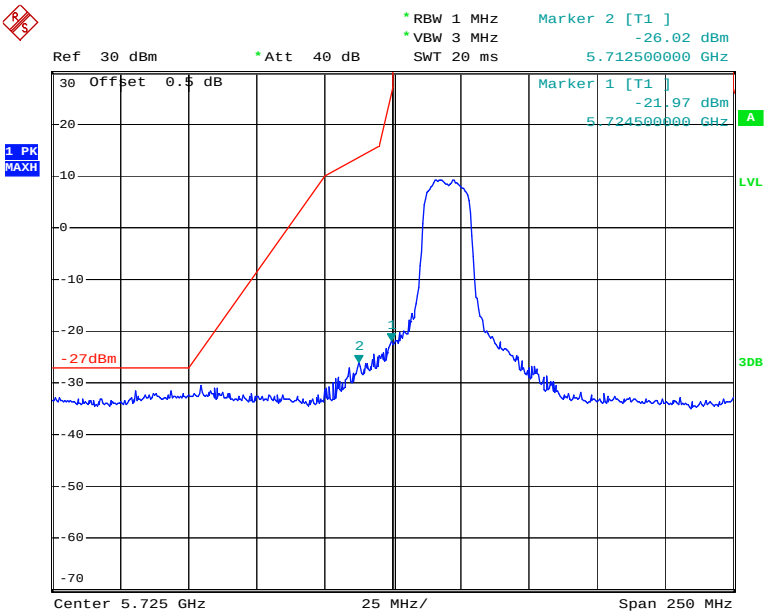
Date: 20.SEP.2018 10:14:44

802.11n ht20, Chain 0, High Channel



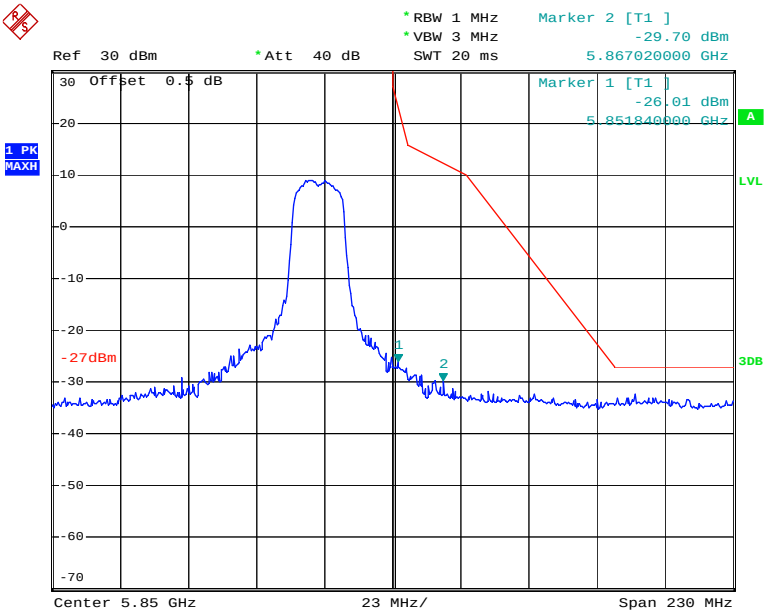
Date: 20.SEP.2018 10:05:58

802.11ac20, Chain 0, Low Channel



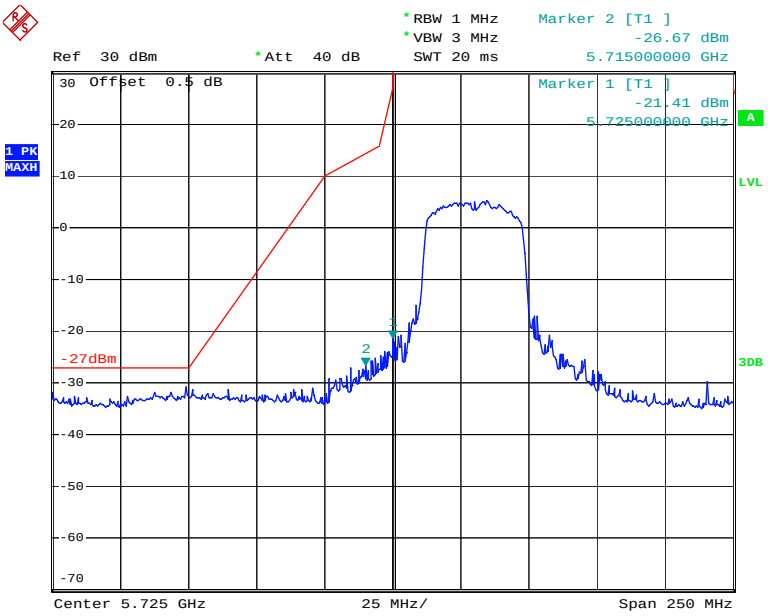
Date: 20.SEP.2018 10:18:51

802.11ac20, Chain 0, High Channel



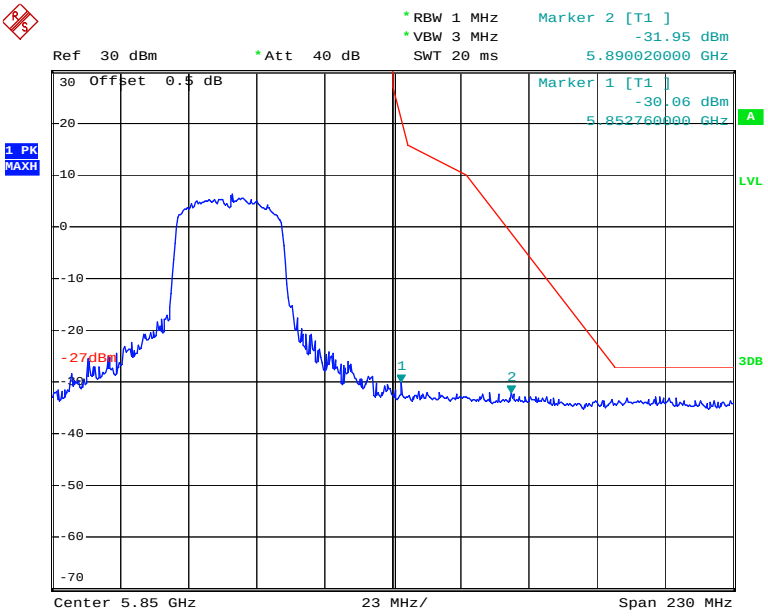
Date: 20.SEP.2018 10:27:22

802.11n ht40, Chain 0, Low Channel



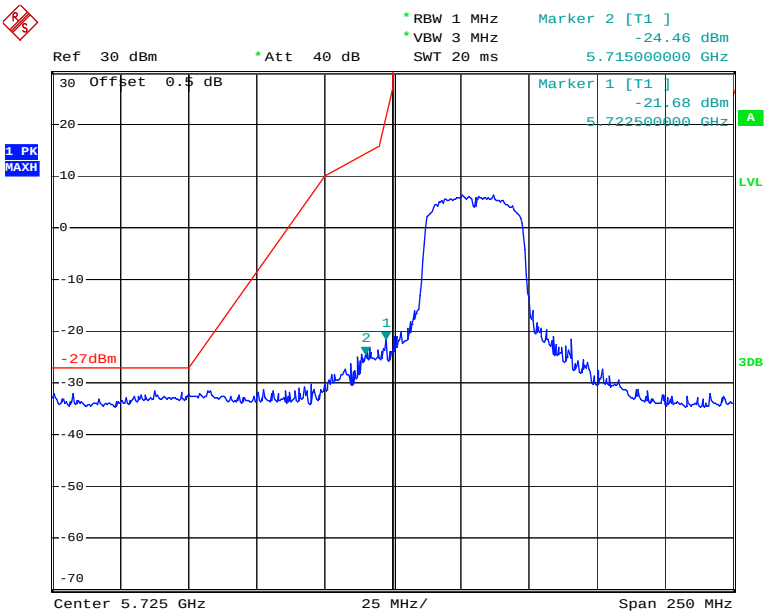
Date: 20.SEP.2018 10:46:26

802.11n ht40, Chain 0, High Channel



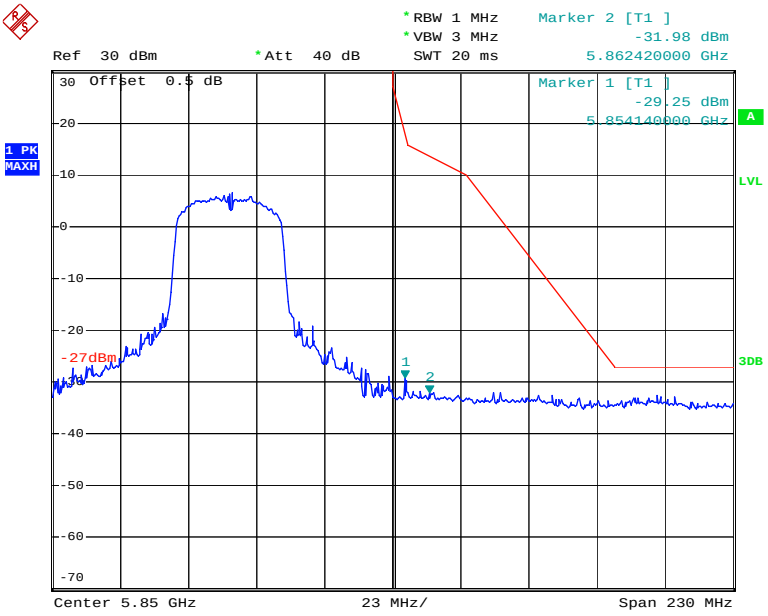
Date: 20.SEP.2018 10:42:47

802.11ac40, Chain 0, Low Channel



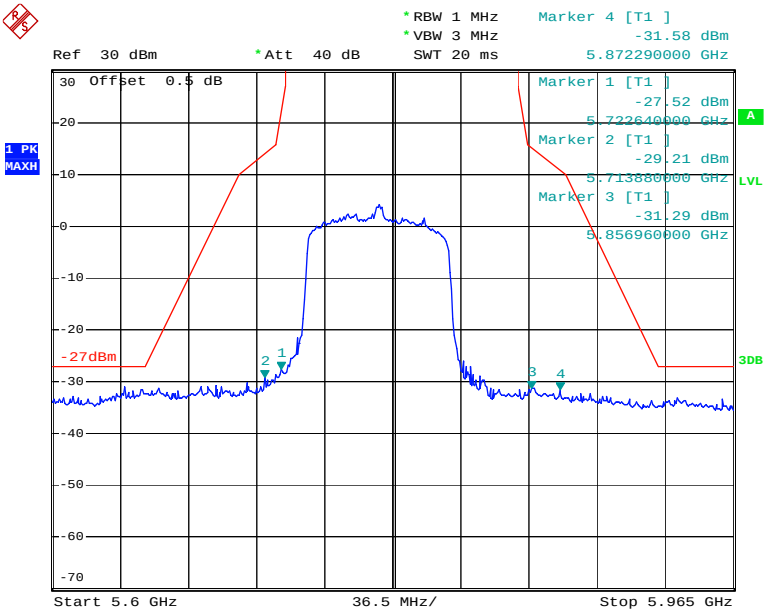
Date: 20.SEP.2018 10:34:59

802.11ac40, Chain 0, High Channel



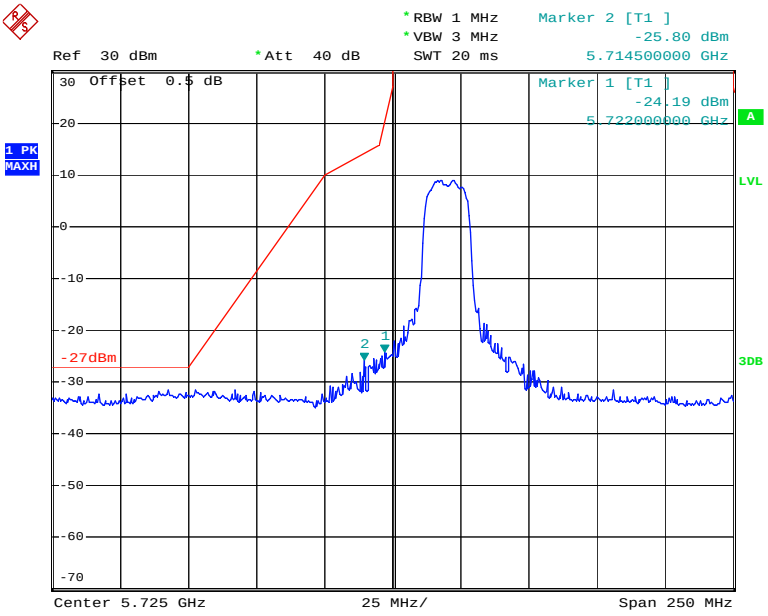
Date: 20.SEP.2018 10:38:34

802.11n ac80 Chain 0, Middle Channel



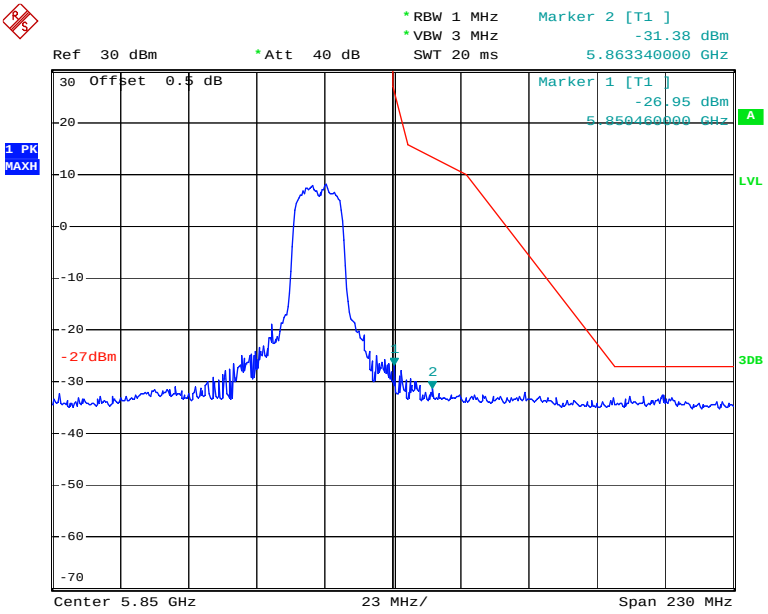
Date: 20.SEP.2018 10:50:00

802.11a, Chain 1, Low Channel



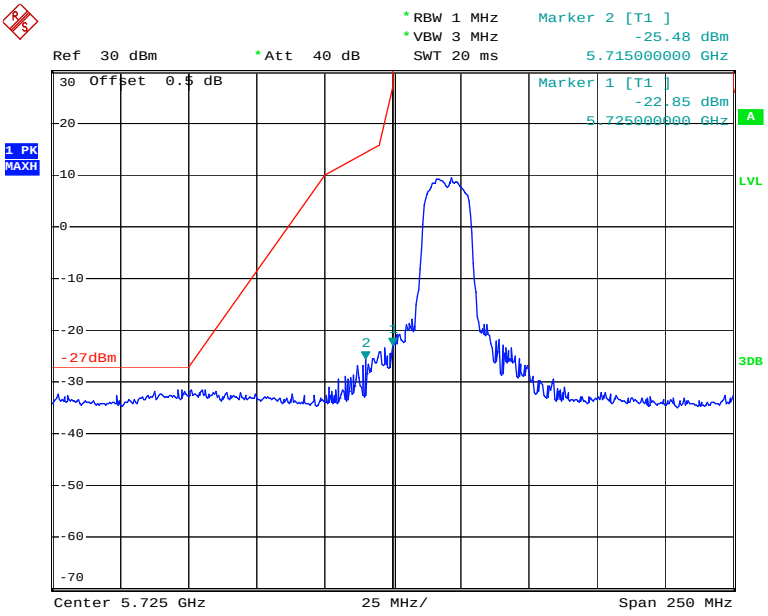
Date: 20.SEP.2018 11:51:17

802.11a, Chain 1, High Channel



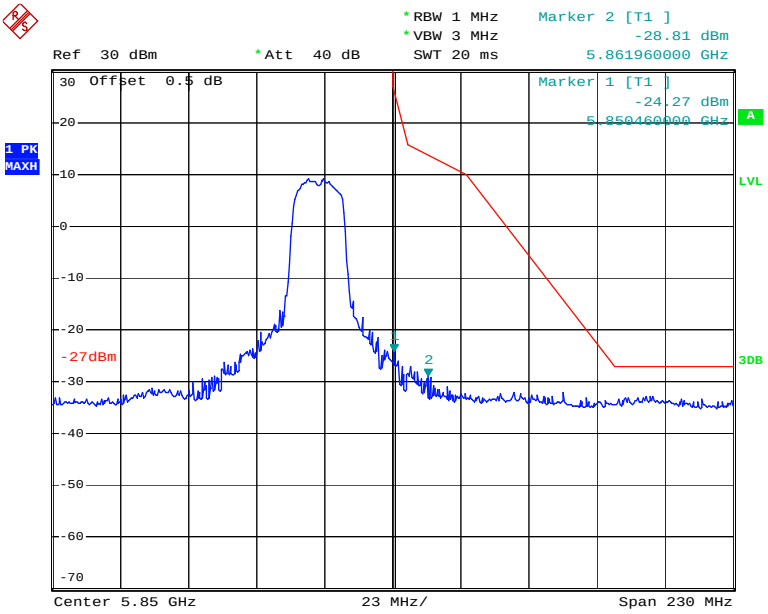
Date: 20.SEP.2018 11:44:19

802.11n ht20, Chain 1, Low Channel



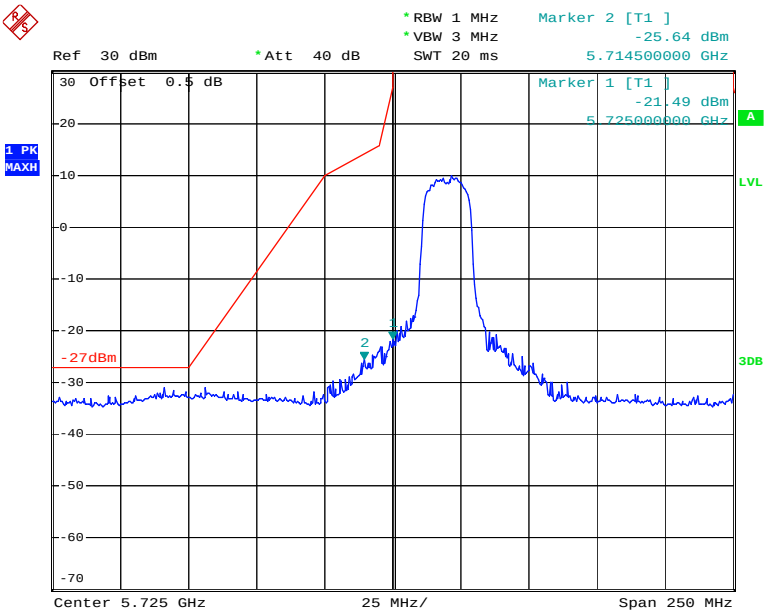
Date: 20.SEP.2018 11:31:29

802.11n ht20, Chain 1, High Channel



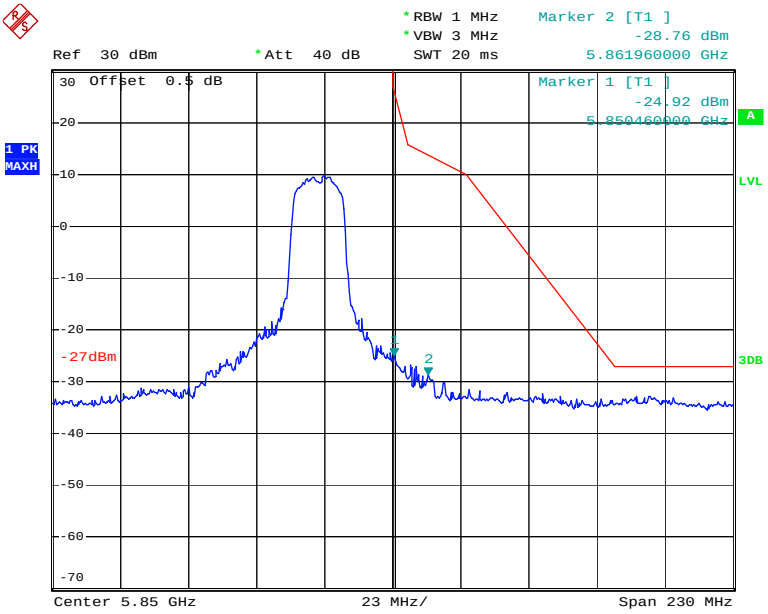
Date: 20.SEP.2018 11:38:29

802.11ac20, Chain 1, Low Channel



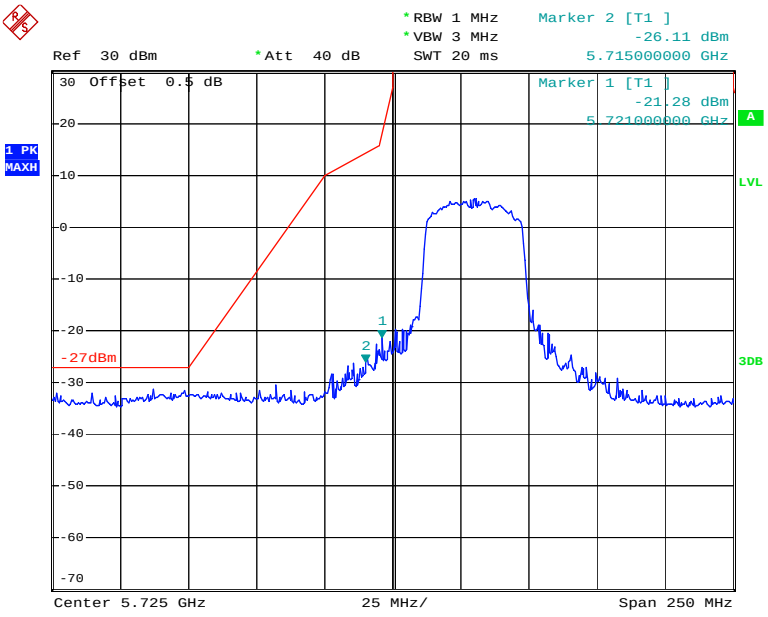
Date: 20.SEP.2018 11:05:39

802.11ac20, Chain 1, High Channel



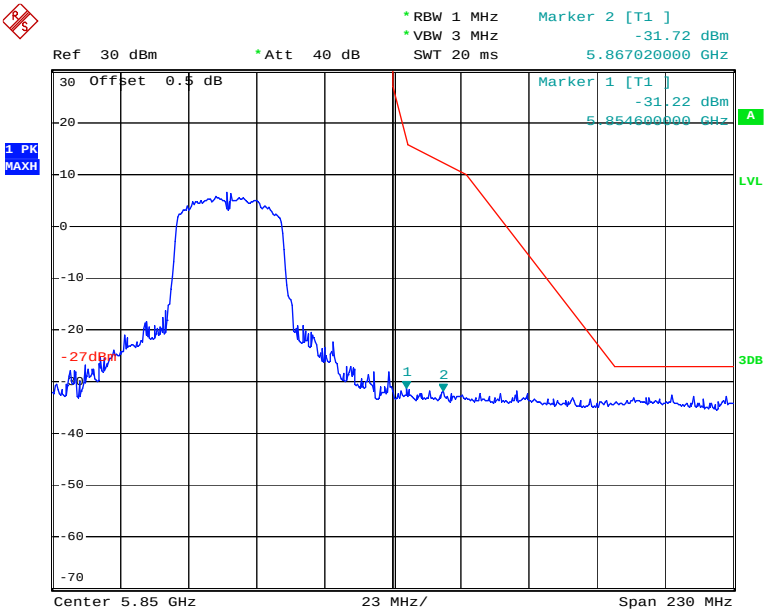
Date: 20.SEP.2018 11:12:35

802.11n ht40, Chain 1, Low Channel



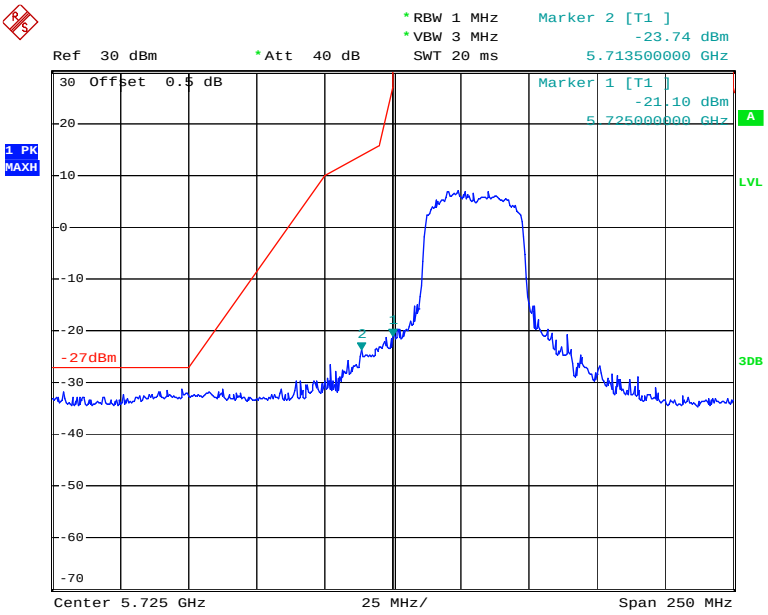
Date: 20.SEP.2018 11:20:27

802.11n ht40, Chain 1, High Channel



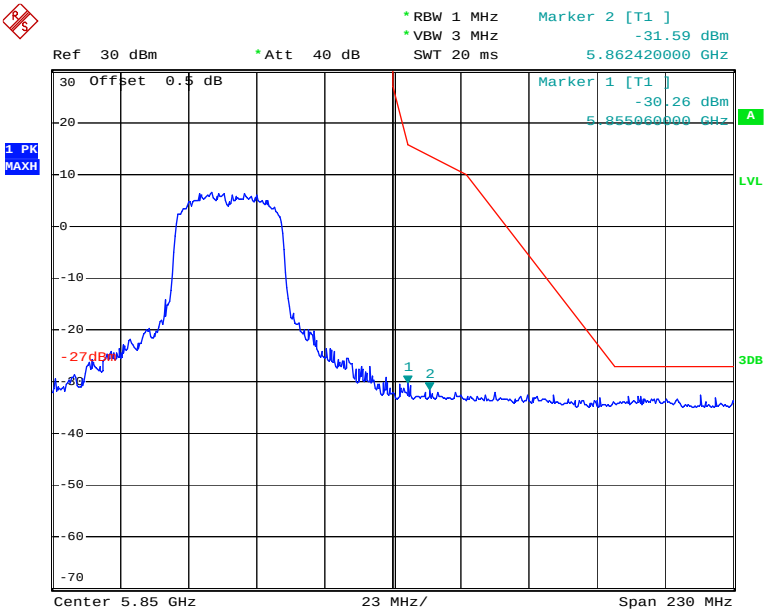
Date: 20.SEP.2018 11:24:52

802.11ac40, Chain 1, Low Channel



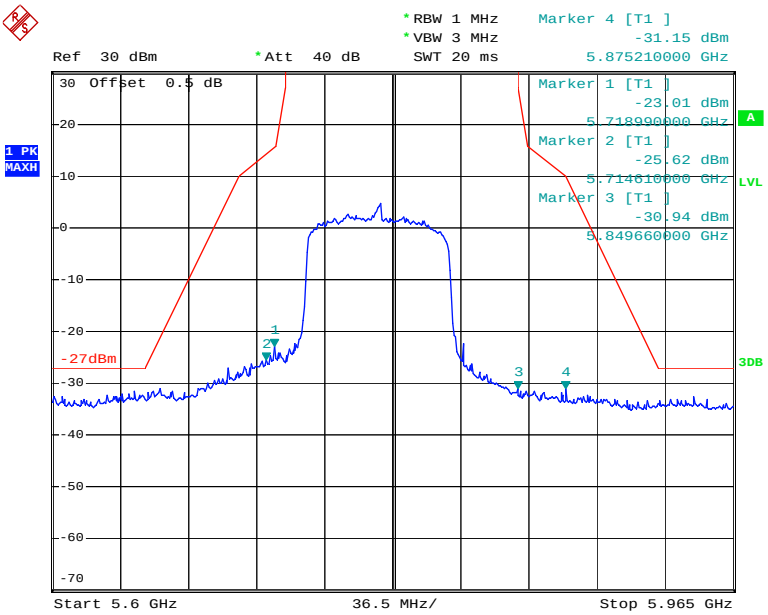
Date: 20.SEP.2018 10:57:28

802.11ac40, Chain 1, High Channel



Date: 20.SEP.2018 11:01:32

802.11n ac80 Chain 1, Middle Channel



Date: 20.SEP.2018 10:53:33

FCC §15.407(a)(e) & RSS-247 §6.2,RSS-Gen §6.7–EMISSION BANDWIDTH AND OCCUPIED BANDWIDTH

Applicable Standard

15.407(a) (e), RSS-247 §6.2 and RSS-Gen §6.7

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2017-12-08	2018-12-08
Unknown	Coaxial Cable	C-SJ00-0010	C0010/02	Each time	N/A

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

Test Procedure

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

Test Data

Environmental Conditions

Temperature:	26.9 °C
Relative Humidity:	47 %
ATM Pressure:	100.6 kPa

The testing was performed by Kami Zhou on 2018-09-20.

Test Result: Pass.

Please refer to the following tables and plots.

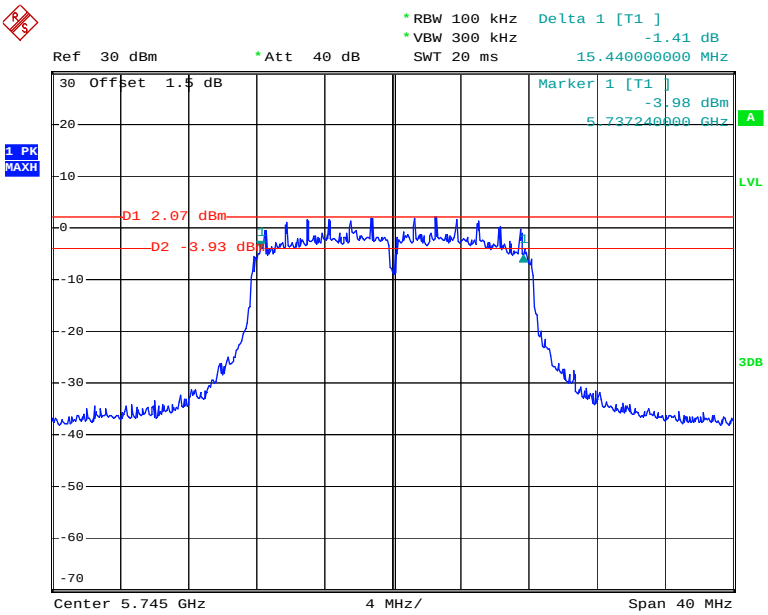
Test mode: Transmitting (for 802.11a/n/ac, test only performed at chain 0)

Mode	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11 a	5745	15.44	16.48
	5785	15.44	16.48
	5825	15.44	16.48
802.11 n20	5745	15.20	17.60
	5785	15.20	17.60
	5825	15.28	17.60
802.11 ac20	5745	15.44	17.60
	5785	15.28	17.60
	5825	15.28	17.60
802.11 n40	5755	35.20	36.64
	5795	35.36	36.64
802.11 ac40	5755	35.20	36.64
	5795	35.36	36.64
802.11 ac80	5775	75.52	75.20

Note: the 99% Occupied Bandwidth have not fall into the band 5470-5725MHz.

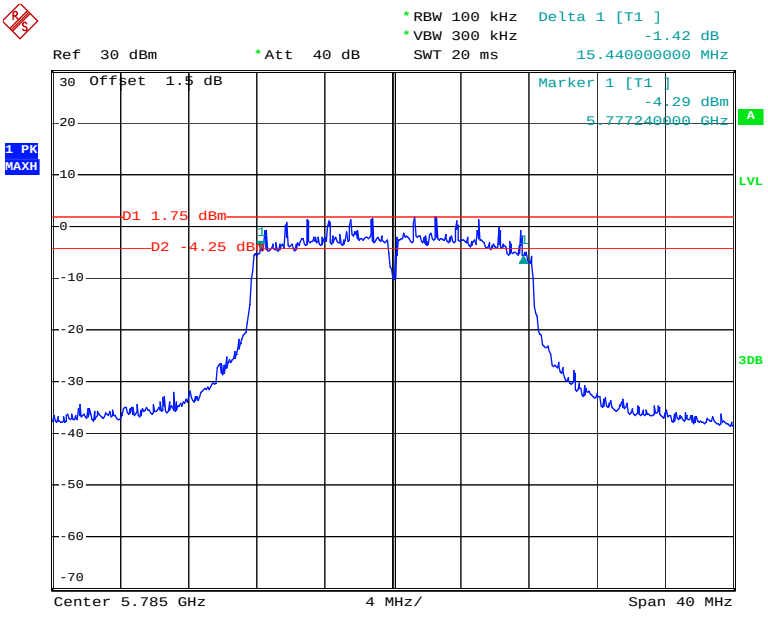
6dB Minimum Emission Bandwidth:

802.11a Low Channel



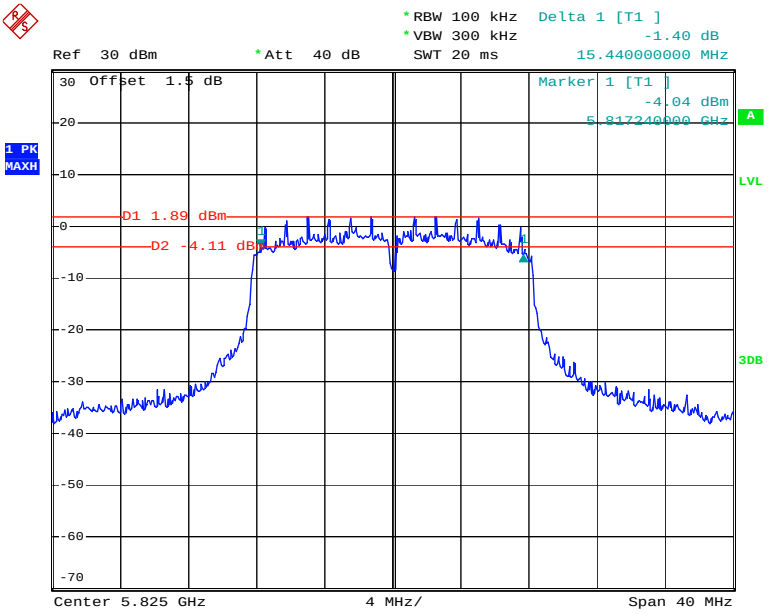
Date: 20.SEP.2018 09:52:09

802.11a Middle Channel



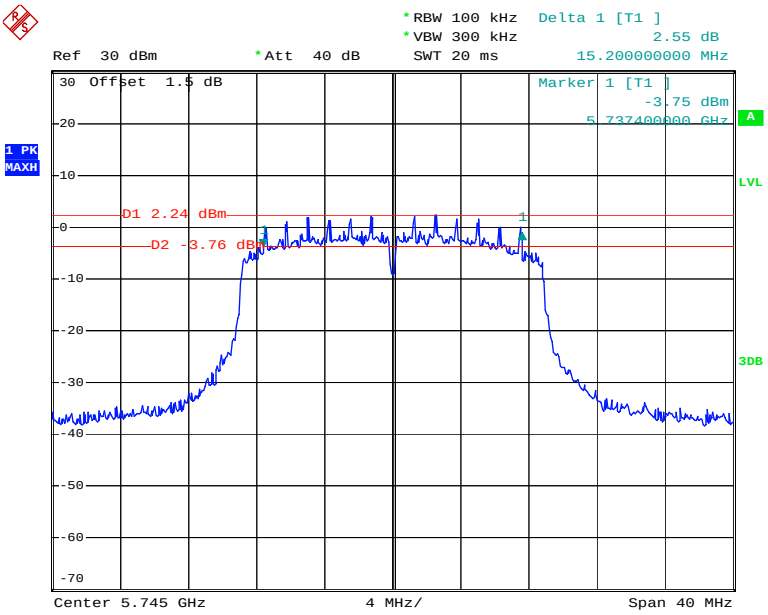
Date: 20.SEP.2018 09:56:26

802.11a High Channel



Date: 20.SEP.2018 10:00:12

802.11n ht20 Low Channel



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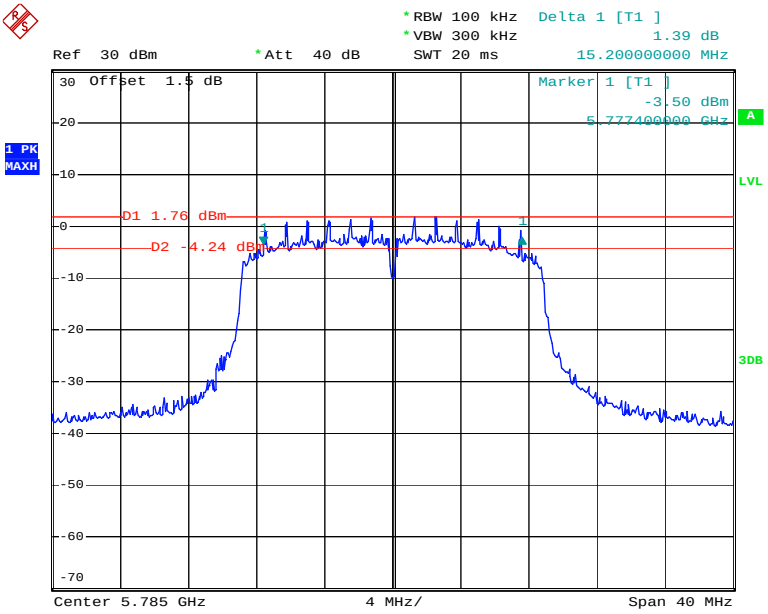
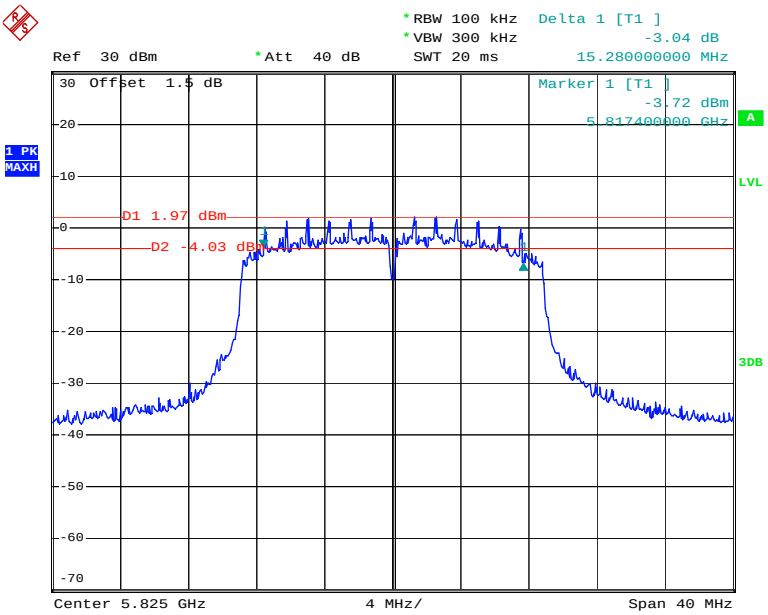
802.11n ht20 Middle Channel



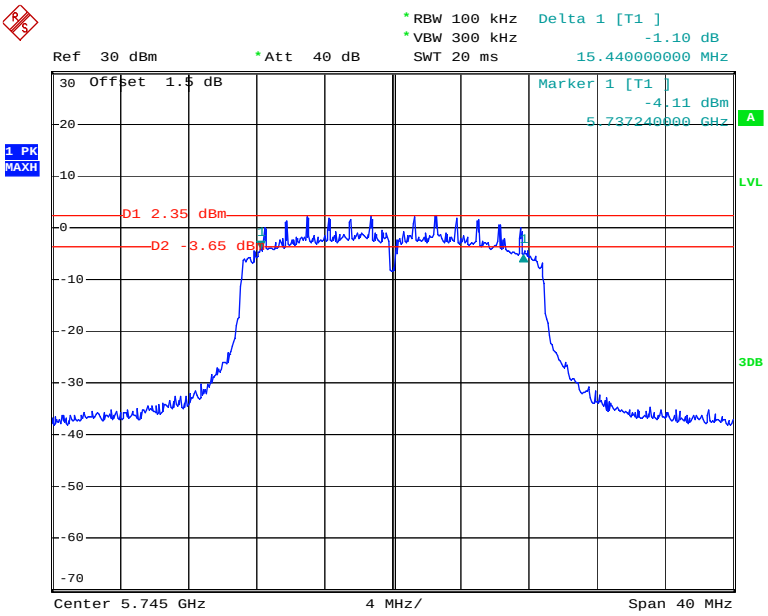
Date: 20.SEP.2018 10:07:40

802.11n ht20 High Channel



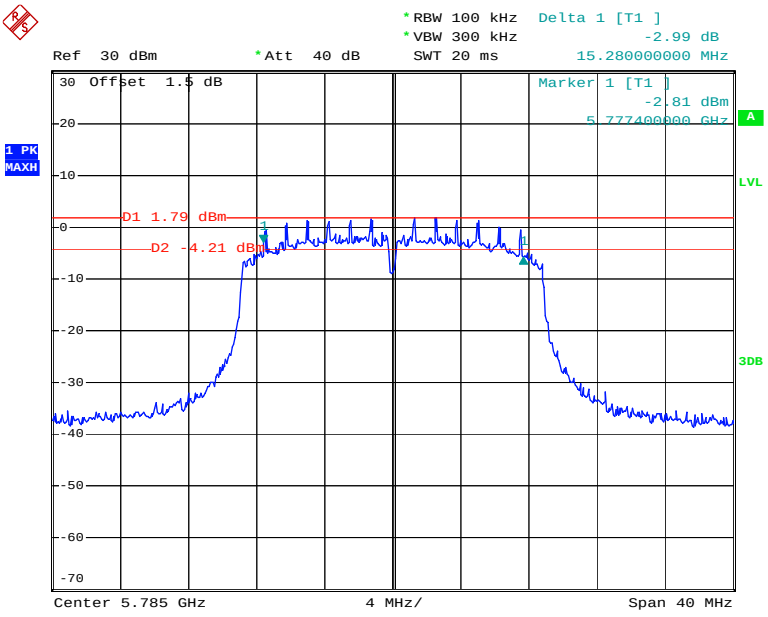
Date: 20.SEP.2018 10:03:56

802.11ac20 Low Channel



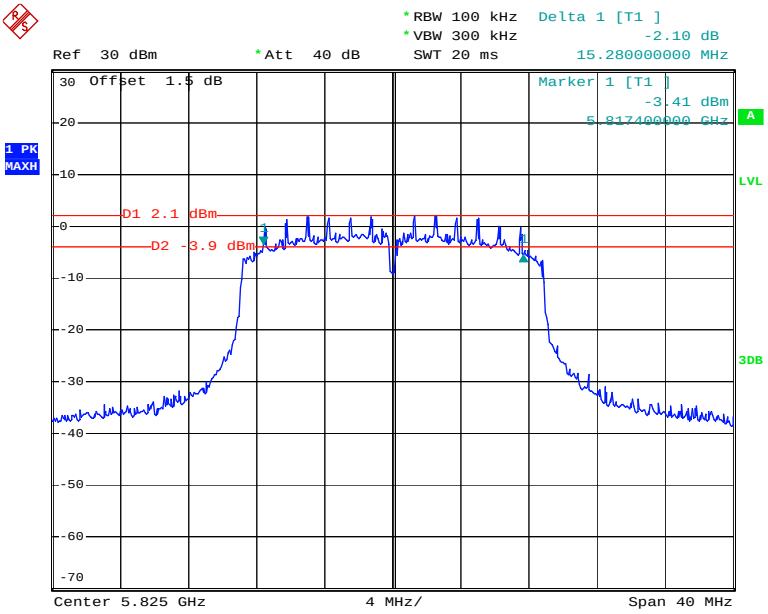
Date: 20.SEP.2018 10:16:04

802.11ac20 Middle Channel



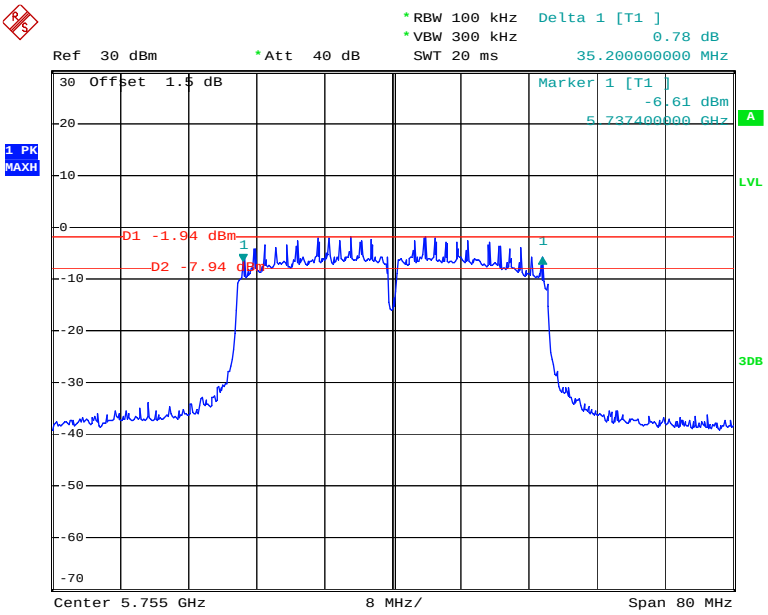
Date: 20.SEP.2018 10:20:18

802.11ac20 High Channel



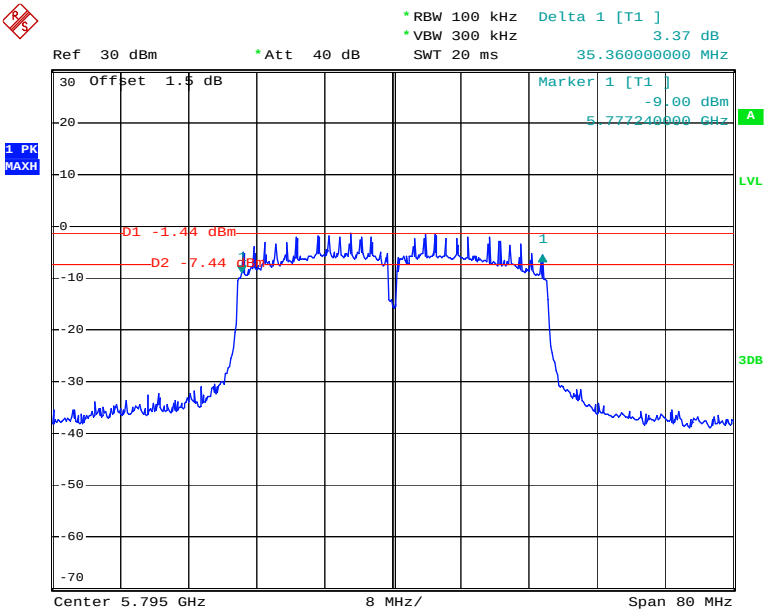
Date: 20.SEP.2018 10:25:02

802.11n ht40 Low Channel



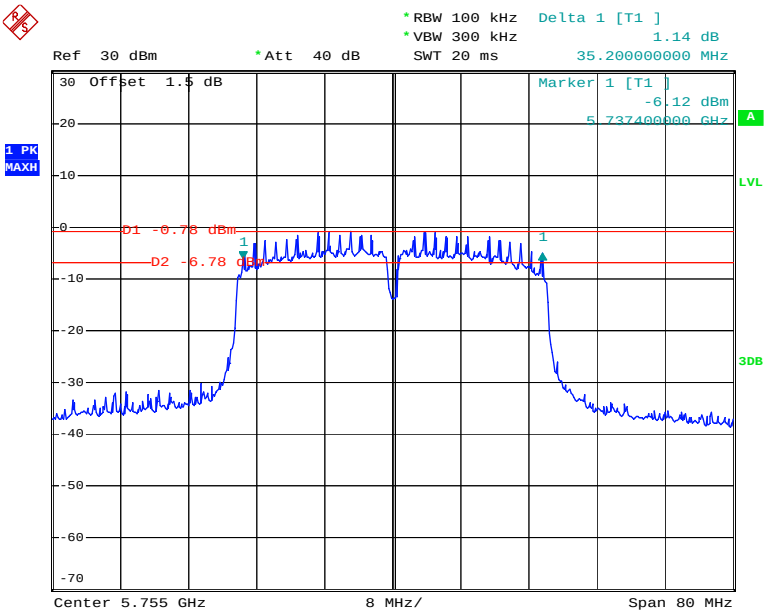
Date: 20.SEP.2018 10:44:03

802.11n ht40 High Channel



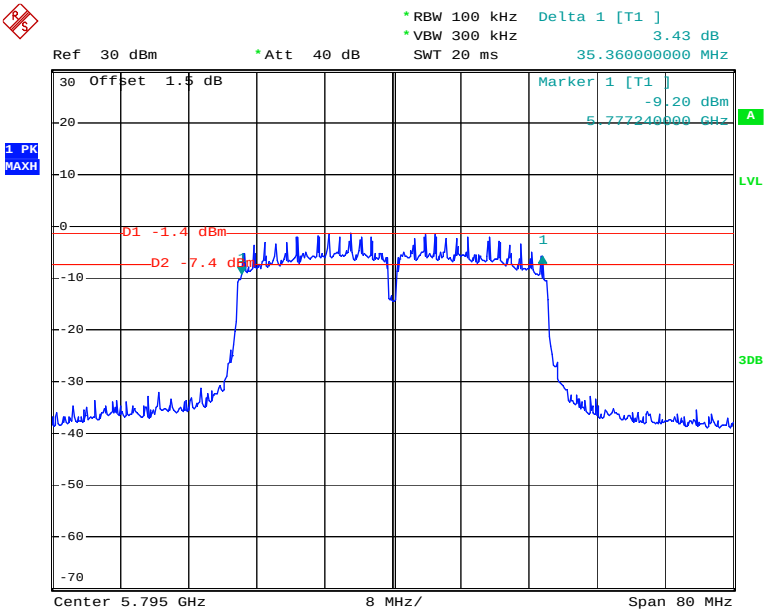
Date: 20.SEP.2018 10:39:58

802.11ac40 Low Channel



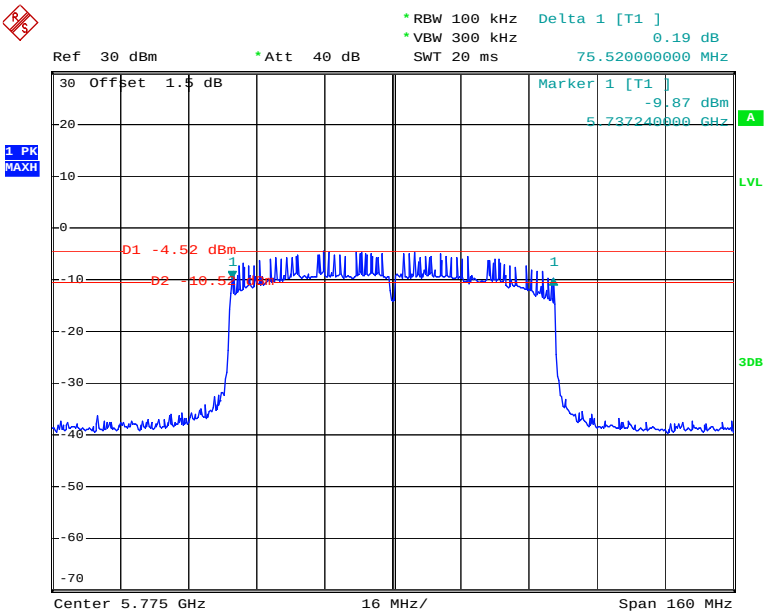
Date: 20.SEP.2018 10:32:44

802.11ac40 High Channel



Date: 20.SEP.2018 10:36:11

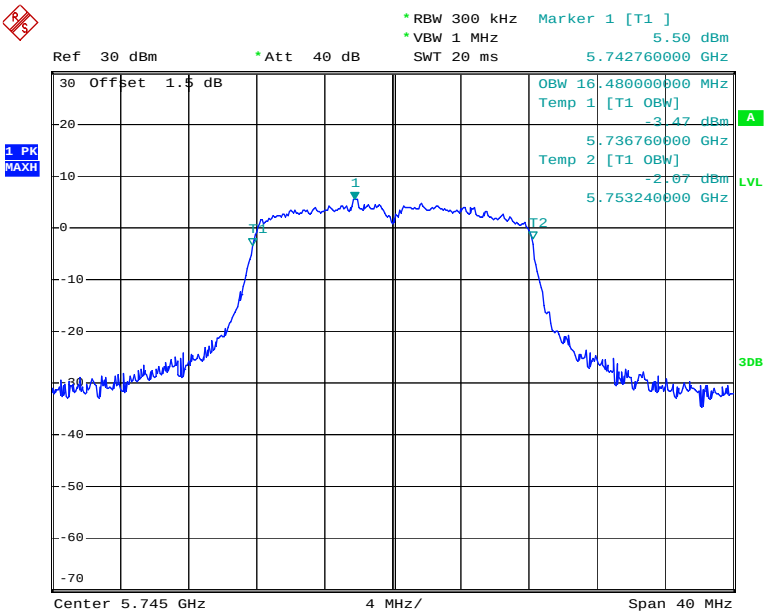
802.11ac80 Middle Channel



Date: 20.SEP.2018 10:47:53

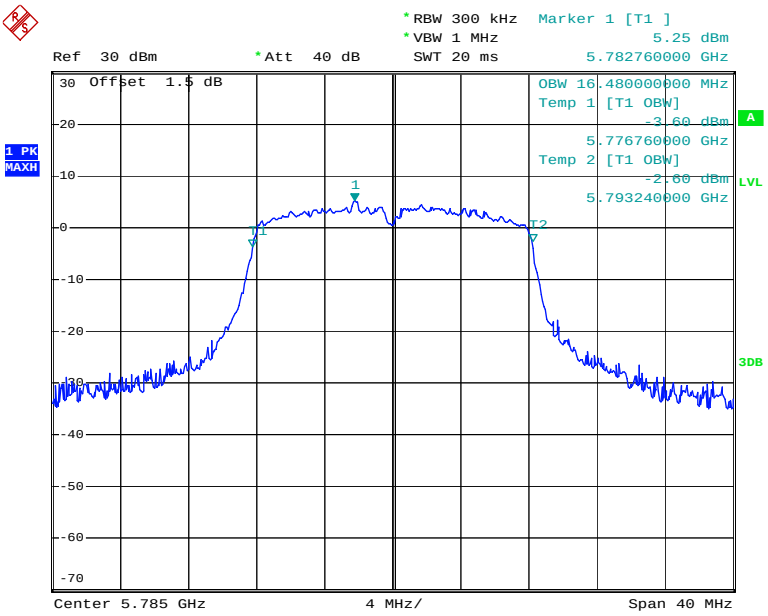
99% Occupied Bandwidth:

802.11a Low Channel



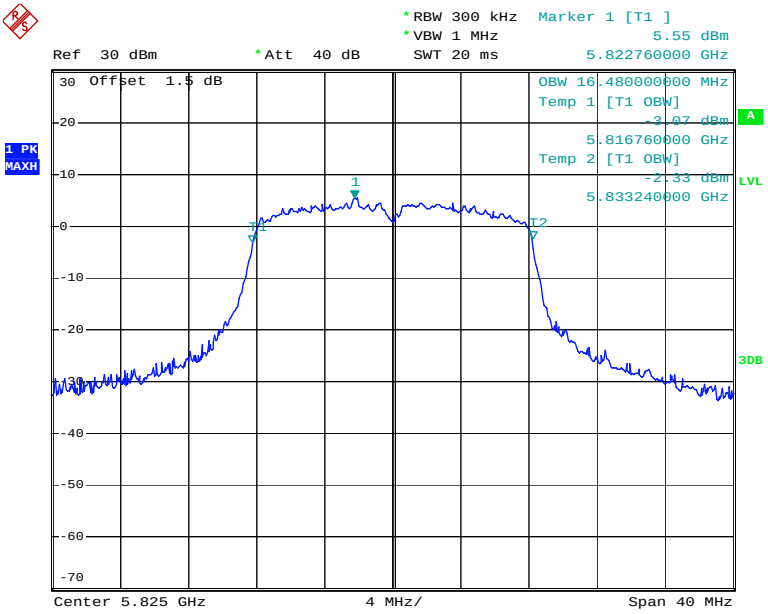
Date: 20.SEP.2018 09:52:49

802.11a Middle Channel



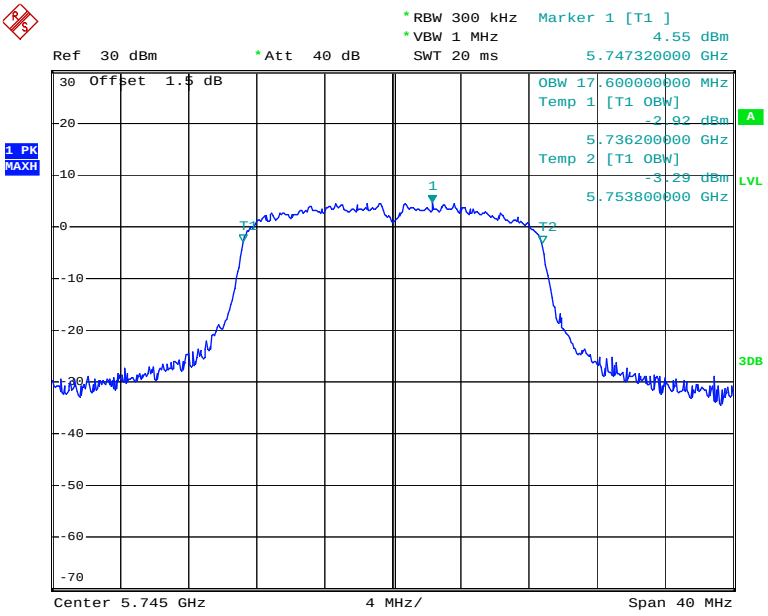
Date: 20.SEP.2018 09:56:56

802.11a High Channel



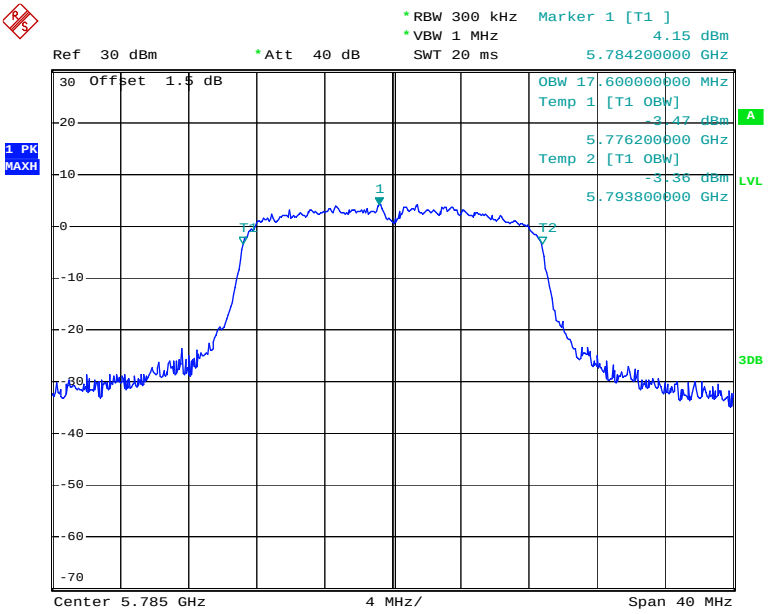
Date: 20.SEP.2018 10:00:42

802.11n ht20 Low Channel



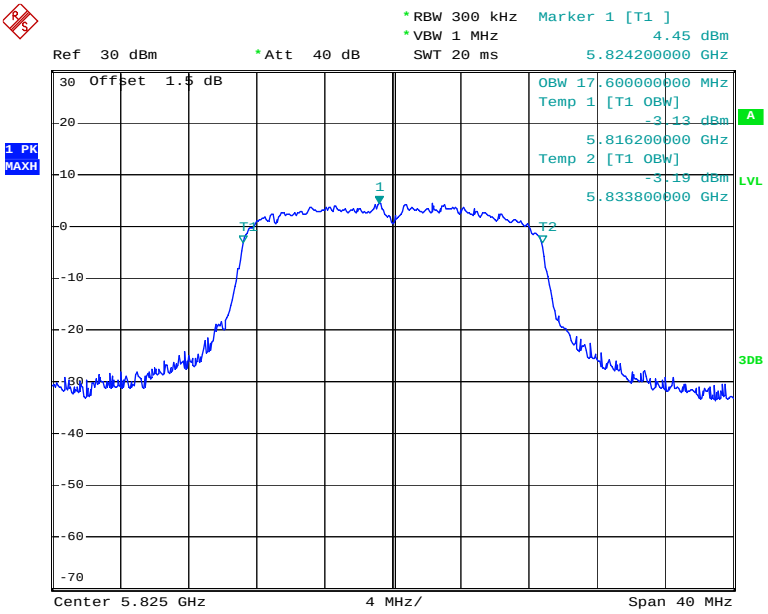
Date: 20.SEP.2018 10:12:54

802.11n ht20 Middle Channel



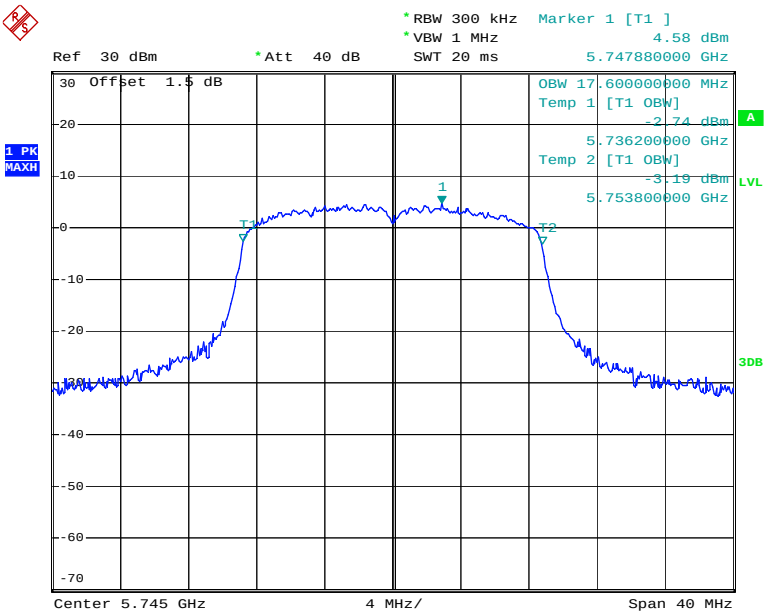
Date: 20.SEP.2018 10:08:20

802.11n ht20 High Channel



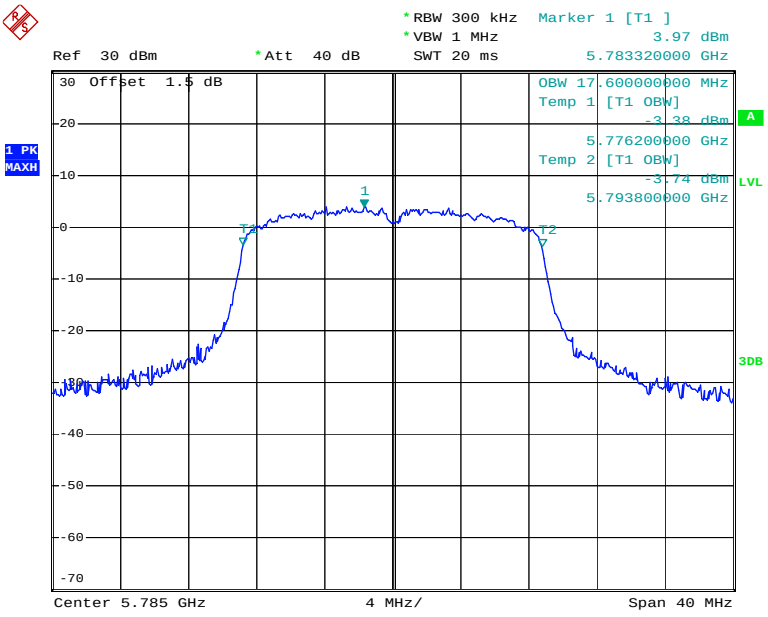
Date: 20.SEP.2018 10:04:22

802.11ac20 Low Channel



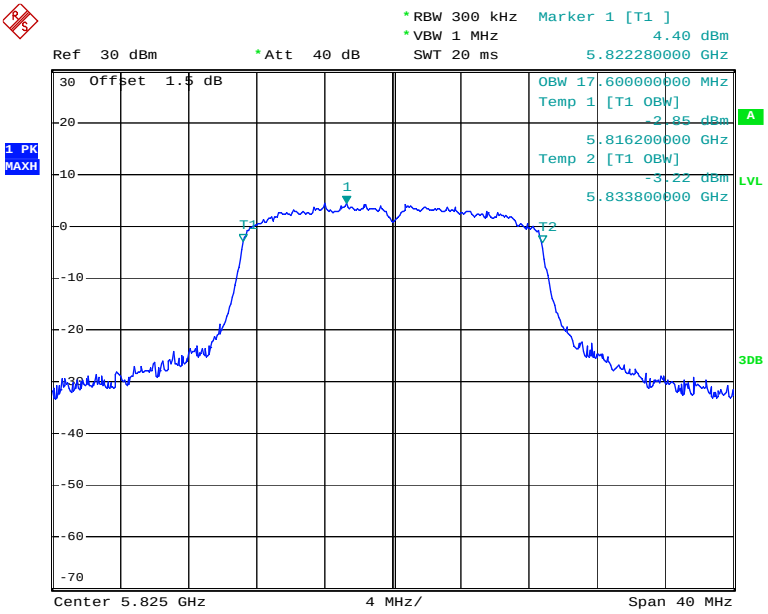
Date: 20.SEP.2018 10:16:41

802.11ac20 Middle Channel



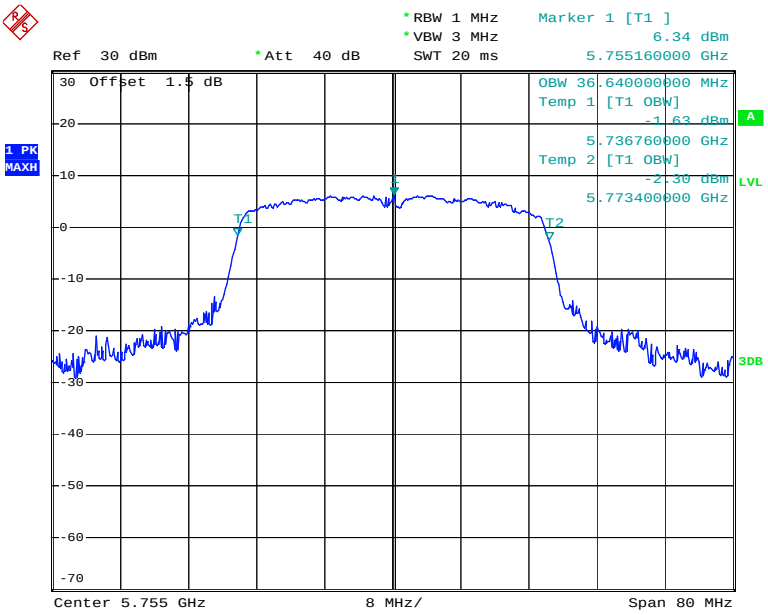
Date: 20.SEP.2018 10:20:51

802.11ac20 High Channel



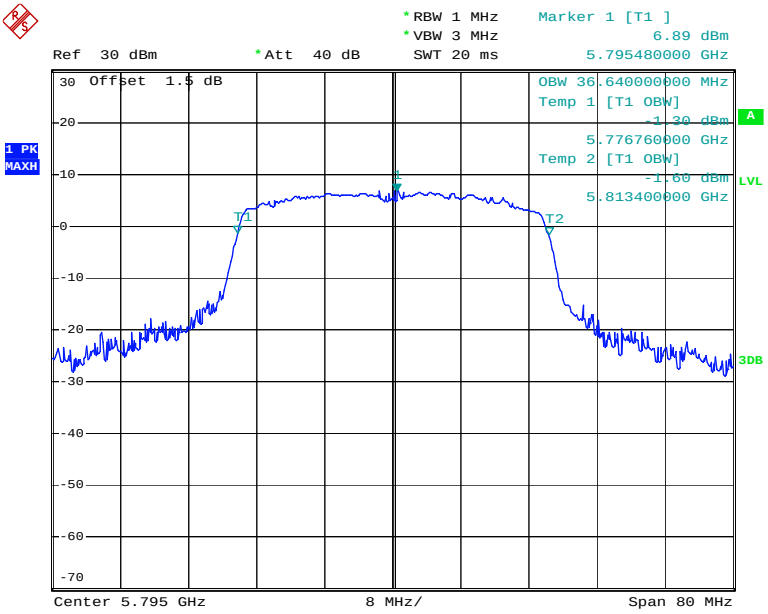
Date: 20.SEP.2018 10:25:35

802.11n ht40 Low Channel



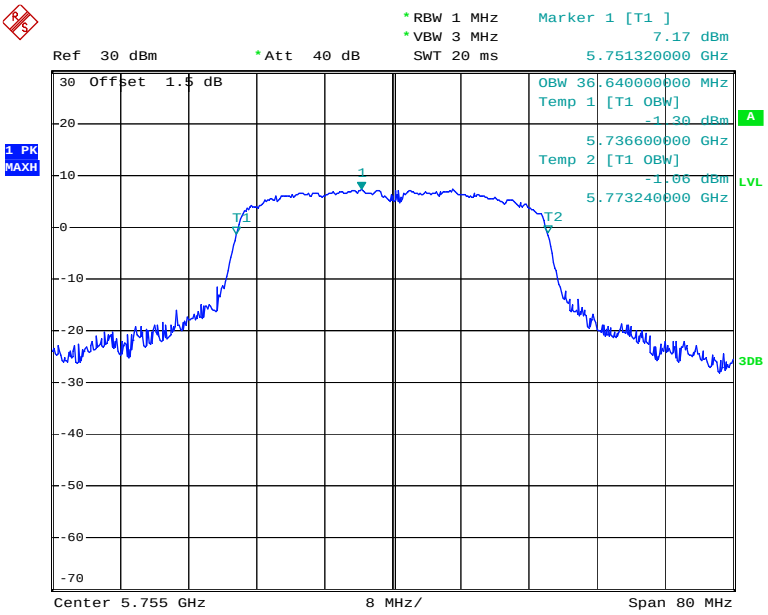
Date: 20.SEP.2018 10:44:39

802.11n ht40 High Channel



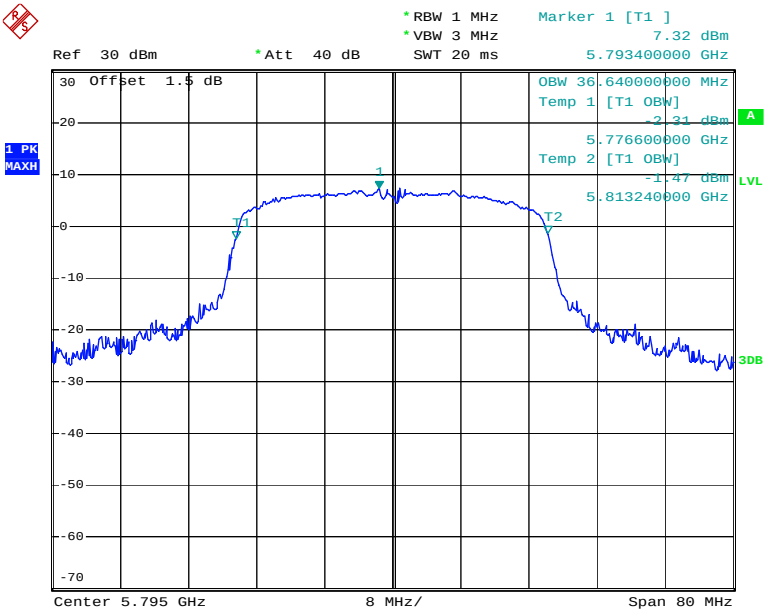
Date: 20.SEP.2018 10:40:42

802.11ac40 Low Channel



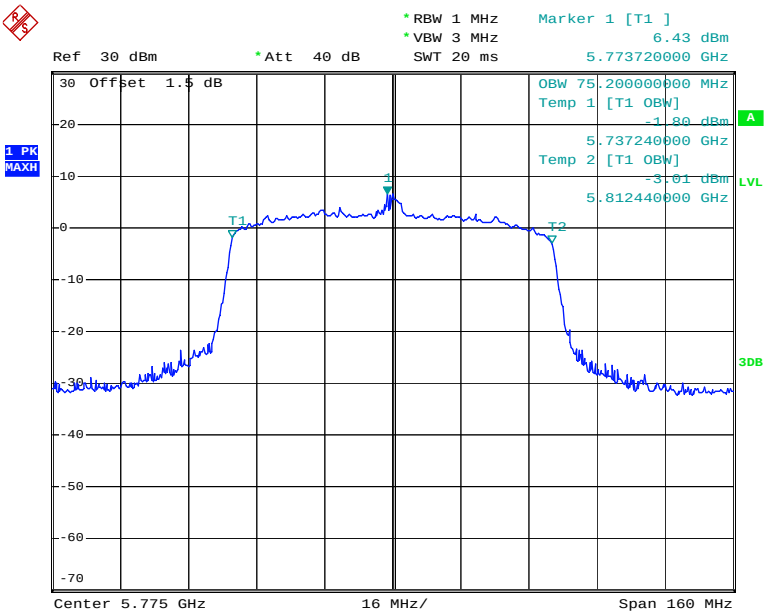
Date: 20.SEP.2018 10:33:13

802.11ac High Channel



Date: 20.SEP.2018 10:36:52

802.11ac80 Middle Channel



Date: 20.SEP.2018 10:48:27

FCC §15.407(a) & RSS-247 §6.2 –MAXIMUM CONDUCTED OUTPUT POWER

Applicable Standard

According to FCC §15.407(a)

(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.

According to RSS-247 §6.2:

Frequency band 5150-5250 MHz

6.2.1.1 Power limits

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or 1.76 + 10 $\log_{10}$B, dBm, whichever is less stringent. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

For other devices, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 $\log_{10}$B, dBm, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

Frequency band 5250-5350 MHz

6.2.2.1 Power limits

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or 1.76 + 10 $\log_{10}$B, dBm, whichever is less. Devices shall implement TPC in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

Devices, other than devices installed in vehicles, shall comply with the following:

a) The maximum conducted output power shall not exceed 250 mW or 11 + 10 $\log_{10}$B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band;

b) The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 $\log_{10}$B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

Frequency bands 5470-5600 MHz and 5650-5725 MHz

6.2.3.1 Power limits

The maximum conducted output power shall not exceed 250 mW or 11 + 10 $\log_{10}$B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 $\log_{10}$B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

Frequency band 5725-5850 MHz

6.2.4.1 Power limits

For equipment operating in the band 5725-5850 MHz, the minimum 6 dB bandwidth shall be at least 500 kHz.

The maximum conducted output power shall not exceed 1 W. The output 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 output 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 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[3] systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
E-Microwave	Blocking Control	EMDCB-00036	0E01201048	Each Time	N/A
E-Microwave	Coaxial Attenuators	EMCA10-5RN-6	OE01203239	Each Time	N/A
Agilent	USB Wideband Power Sensor	U2021XA	MY5425009	2018-03-21	2019-03-21

*** 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:	26.9 °C
Relative Humidity:	47 %
ATM Pressure:	100.6 kPa

The testing was performed by Kami Zhou on 2018-09-20.

Test Mode: Transmitting

802.11a/n/ac mode:

Mode	Frequency (MHz)	Maximum Conducted Average Output Power (dBm)			Limit (dBm)
		Chain 0	Chain 1	Total	
802.11 a	5745	13.43	13.37	16.41	30
	5785	13.26	12.89	16.09	30
	5825	13.24	13.17	16.22	30
802.11n ht20	5745	13.34	13.24	16.30	30
	5785	13.20	12.92	16.07	30
	5825	13.36	13.05	16.22	30
802.11 ac20	5745	13.46	13.39	16.44	30
	5785	13.24	13.29	16.28	30
	5825	13.44	13.06	16.26	30
802.11n ht40	5755	13.43	13.11	16.28	30
	5795	12.91	12.95	15.94	30
802.11 ac40	5755	13.41	13.39	16.41	30
	5795	13.09	13.03	16.07	30
802.11 ac80	5775	12.78	12.35	15.58	30

Note:
The device is a client device.
The duty cycle factor has been calculated into the result.
The 2 antenna maximum atenna gains are -1.0 dBi @ 5.8G band, and employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power measurements on IEEE 802.11 devices:

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;

So:

Directional gain = GANT + Array Gain = -1.0dBi @ 5.8GHz band

FCC §15.407(a)& RSS-247 §6.2- POWER SPECTRAL DENSITY

Applicable Standard

According to FCC §15.407(a)

(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.

According to RSS-247 §6.2:

Frequency band 5150-5250 MHz

6.2.1.1 Power limits

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or 1.76 + 10 $\log_{10}$B, dBm, whichever is less stringent. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

For other devices, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 $\log_{10}$B, dBm, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

Frequency band 5250-5350 MHz

6.2.2.1 Power limits

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or 1.76 + 10 $\log_{10}$B, dBm, whichever is less. Devices shall implement TPC in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

Devices, other than devices installed in vehicles, shall comply with the following:

a) The maximum conducted output power shall not exceed 250 mW or 11 + 10 $\log_{10}$B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band;

b) The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 $\log_{10}$B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

Frequency bands 5470-5600 MHz and 5650-5725 MHz

6.2.3.1 Power limits

The maximum conducted output power shall not exceed 250 mW or 11 + 10 $\log_{10}$B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 $\log_{10}$B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

Frequency band 5725-5850 MHz

6.2.4.1 Power limits

For equipment operating in the band 5725-5850 MHz, the minimum 6 dB bandwidth shall be at least 500 kHz.

The maximum conducted output power shall not exceed 1 W. The output 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 output 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 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[3] systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

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	2017-12-08	2018-12-08
Unknown	Coaxial Cable	C-SJ00-0010	C0010/02	Each time	N/A

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

Test Data

Environmental Conditions

Temperature:	26.6 ~ 28.3°C
Relative Humidity:	45 ~ 66 %
ATM Pressure:	100.1 ~ 101.2 kPa

The testing was performed by Kami Zhou from 2018-09-20 to 2018-10-22.

Test Result:Compliance.

Test Mode: Transmitting

Mode	Frequency (MHz)	Reading (dBm/300kHz)		Power Spectral Density (dBm/500kHz)			Limit (dBm/500KHz)
		Chain 0	Chain 1	Chain 0	Chain 1	Total	
802.11 a	5745	-1.47	-2.30	0.75	-0.08	4.66	30
	5785	-1.76	-2.45	0.46	-0.23	4.43	
	5825	-1.54	-2.21	0.68	0.01	4.66	
802.11n ht20	5745	-0.68	-0.78	1.54	1.44	5.82	
	5785	-1.04	-1.20	1.18	1.02	5.43	
	5825	-0.86	-0.81	1.36	1.41	5.72	
802.11 ac20	5745	-0.81	-0.98	1.41	1.24	5.64	
	5785	-1.25	-1.00	0.97	1.22	5.41	
	5825	-1.12	-1.20	1.1	1.02	5.37	
802.11n ht40	5755	-3.87	-4.09	-1.65	-1.87	2.54	
	5795	-4.79	-4.49	-2.57	-2.27	1.88	
802.11 ac40	5755	-3.73	-3.44	-1.51	-1.22	2.94	
	5795	-4.69	-4.16	-2.47	-2.3	1.92	
802.11 ac80	5775	-8.33	-7.97	-6.11	-5.75	-1.70	

Note:
The duty cycle factor was calculated into the total result for 802.11a/n/ac modes.
According to KDB789033 D02 General U-NII Test Procedures New Rules v02r01, the test value for 5725-5850 MHz should add 10*log(500kHz/RBW) to the measured result.
The device employs Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density (PSD) measurements on the devices:

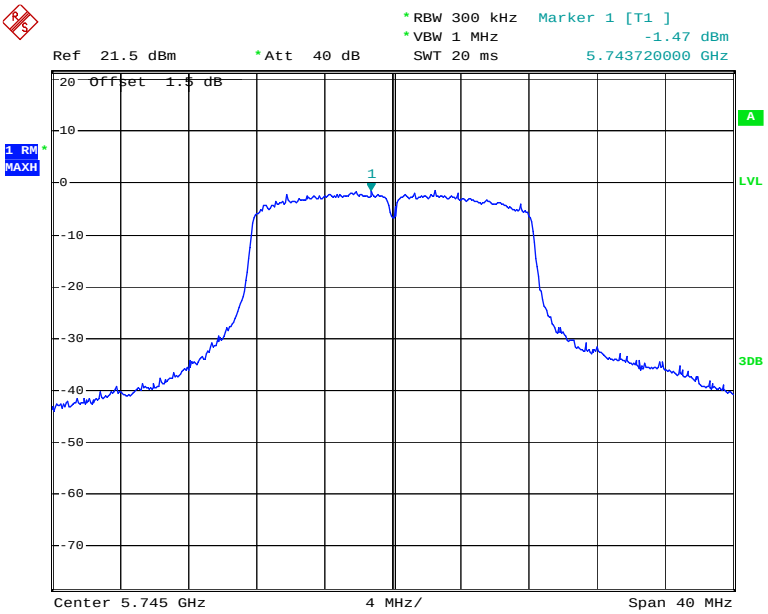
Array Gain = 10 log(NANT/NSS) dB.

So:

Directional gain = GANT + Array Gain = -1.0+10*log(2/1) =2dBi for 5.8GHz band

802.11a,

Chain 0,Low Channel



Date: 20.SEP.2018 13:39:28

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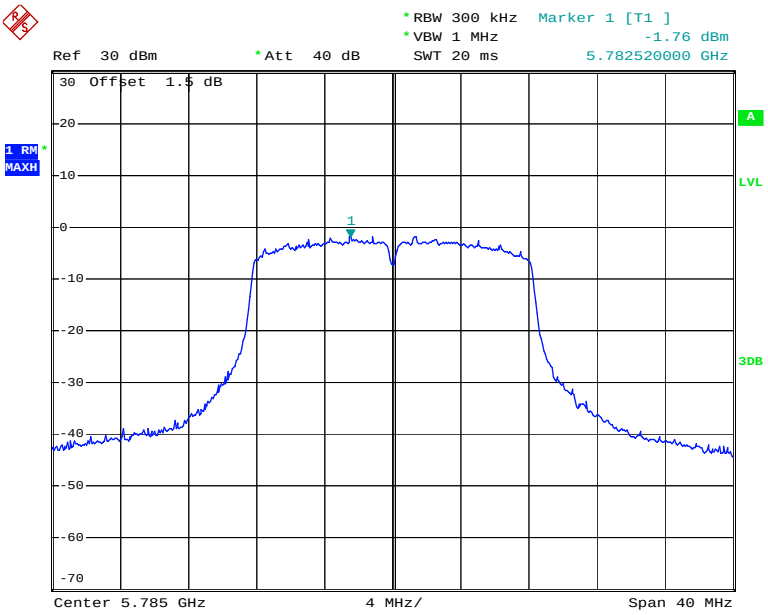

Date: 20.SEP.2018 09:57:18

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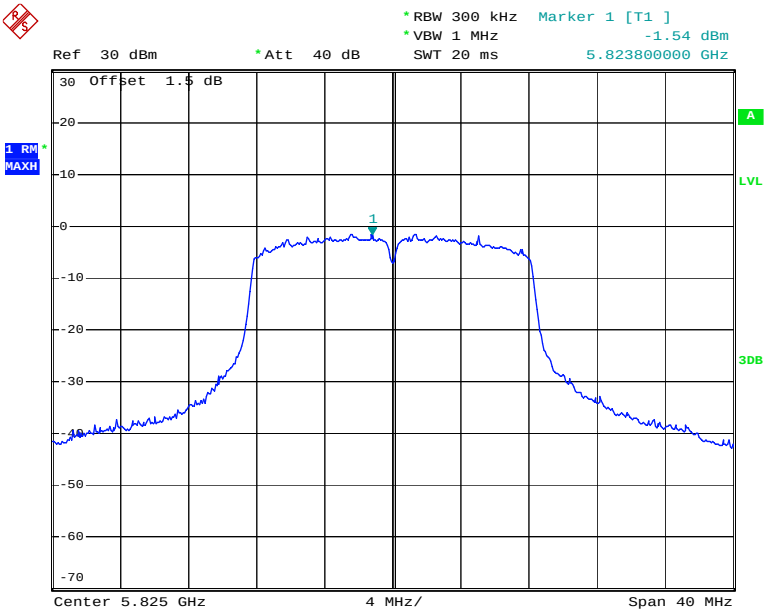
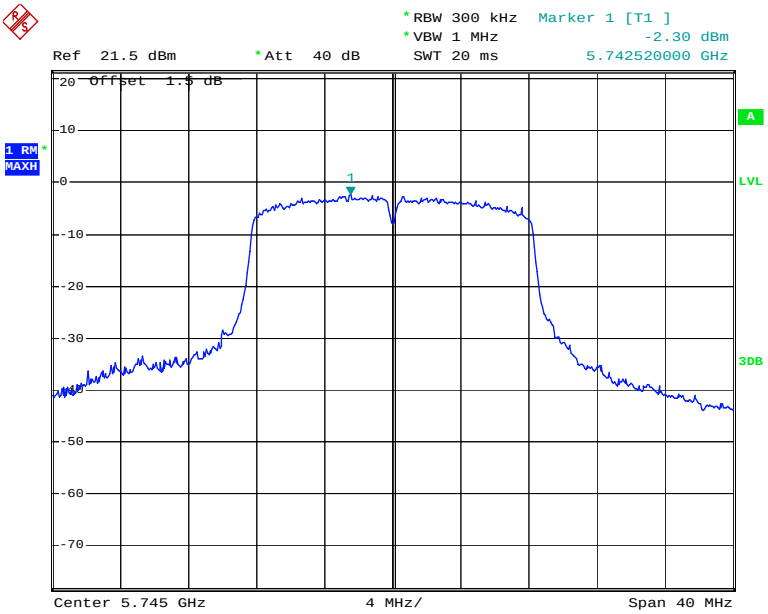


Date: 20.SEP.2018 10:01:03

Chain 1,Low Channel



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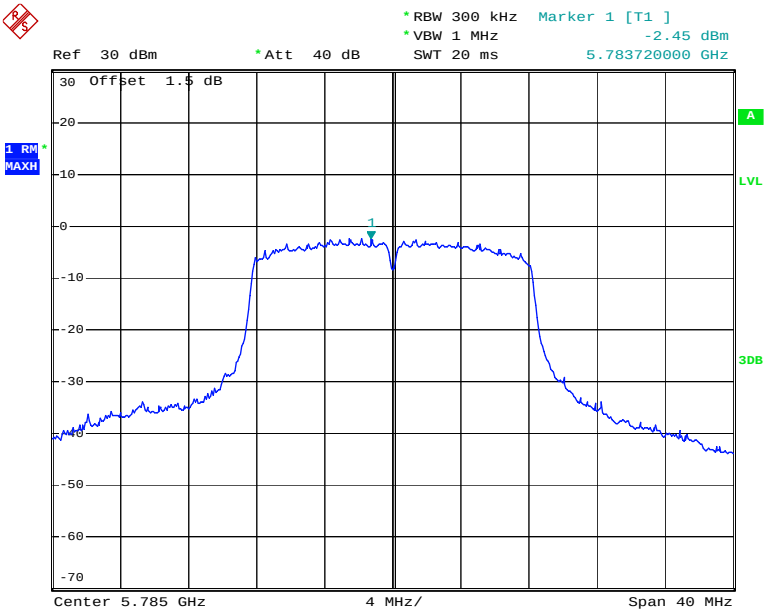
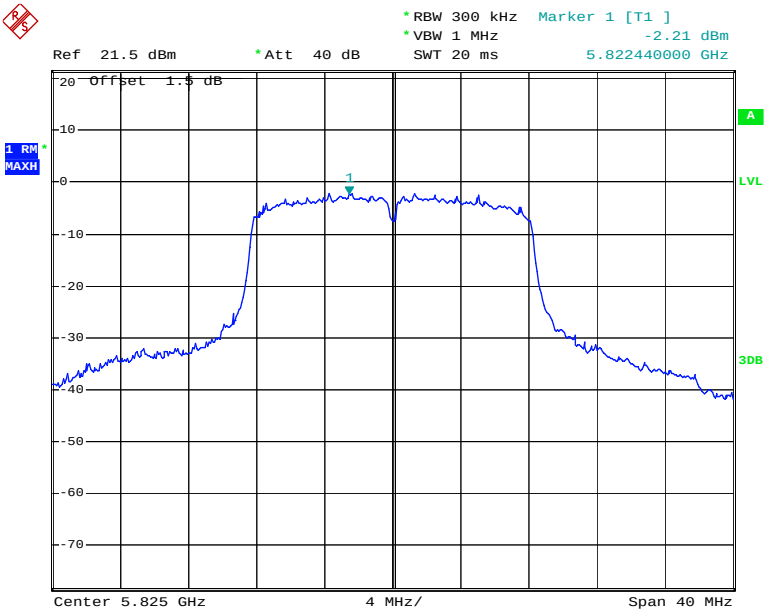


Date: 20.SEP.2018 11:46:29

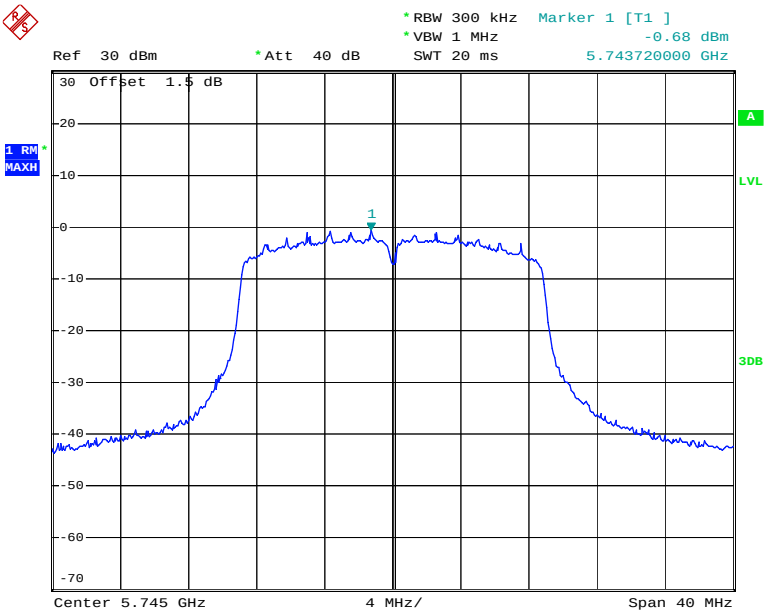
Chain 1,High Channel



Date: 20.SEP.2018 13:35:59

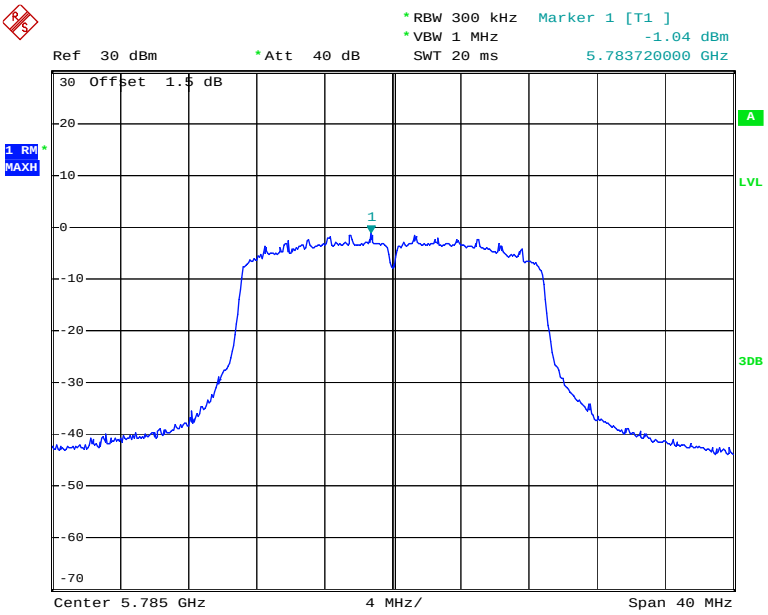
802.11n ht20

Chain 0,Low Channel



Date: 20.SEP.2018 10:13:15

Chain 0,Middle Channel



Date: 20.SEP.2018 10:08:38

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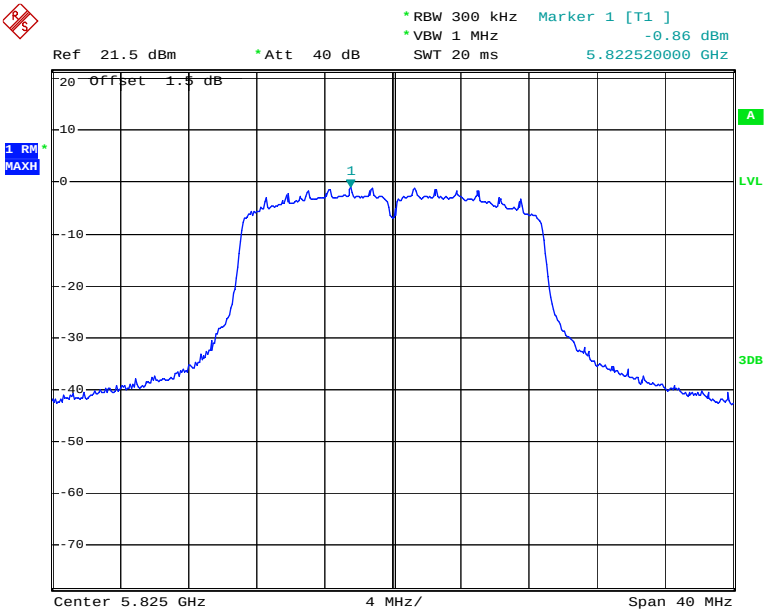
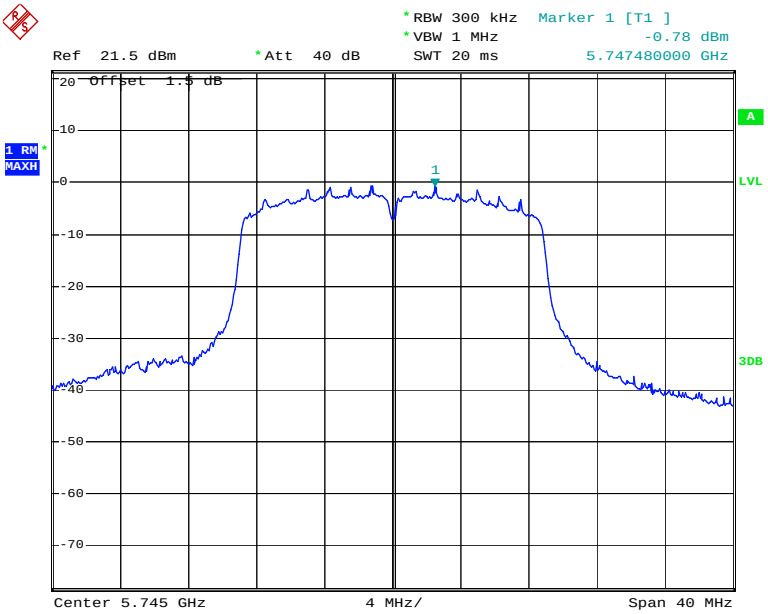


Date: 20.SEP.2018 13:42:00

Chain 1,Low Channel



Date: 20.SEP.2018 13:44:05

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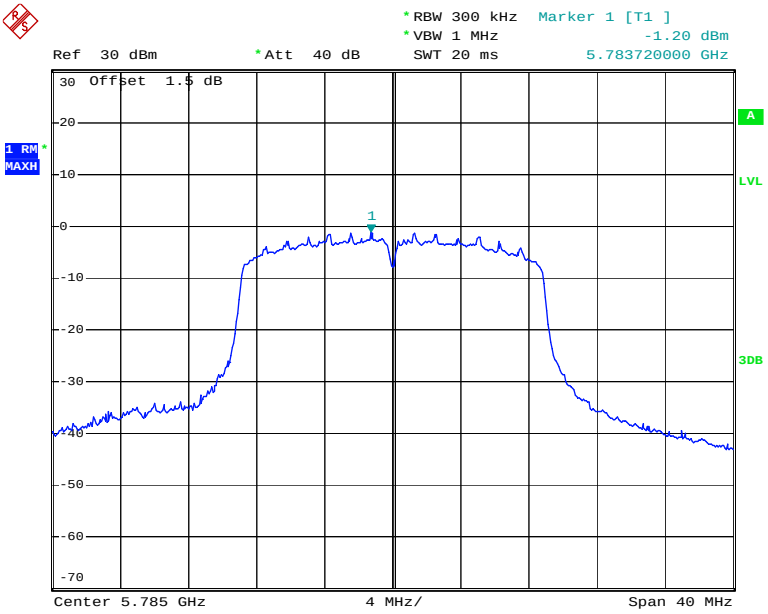

Date: 20.SEP.2018 11:33:39

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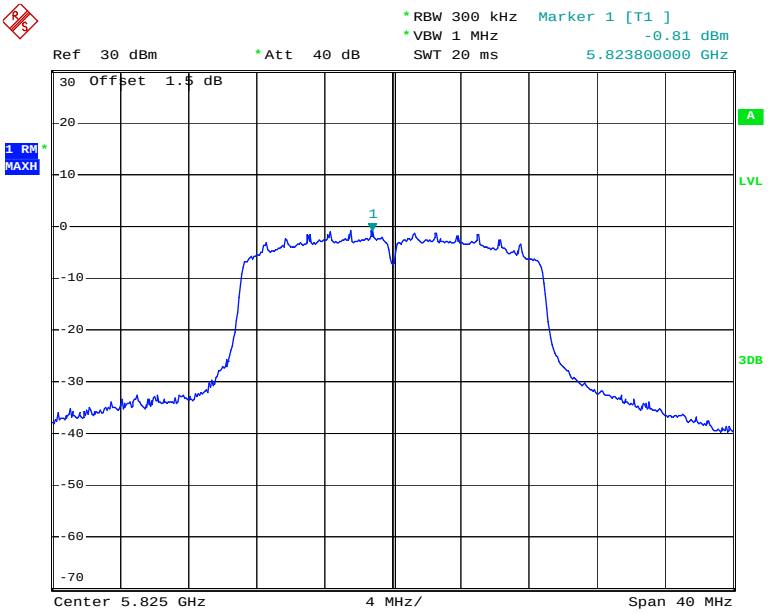
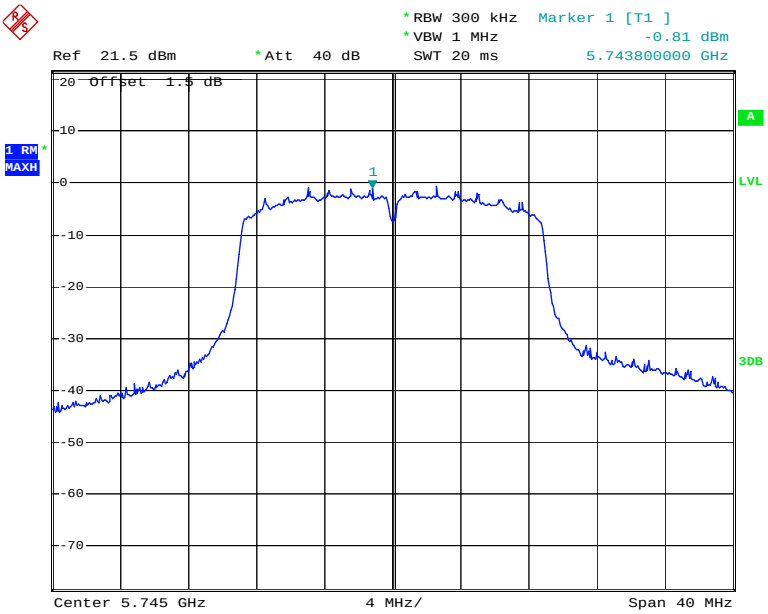


Date: 20.SEP.2018 11:37:08

802.11ac20

Chain 0,Low Channel



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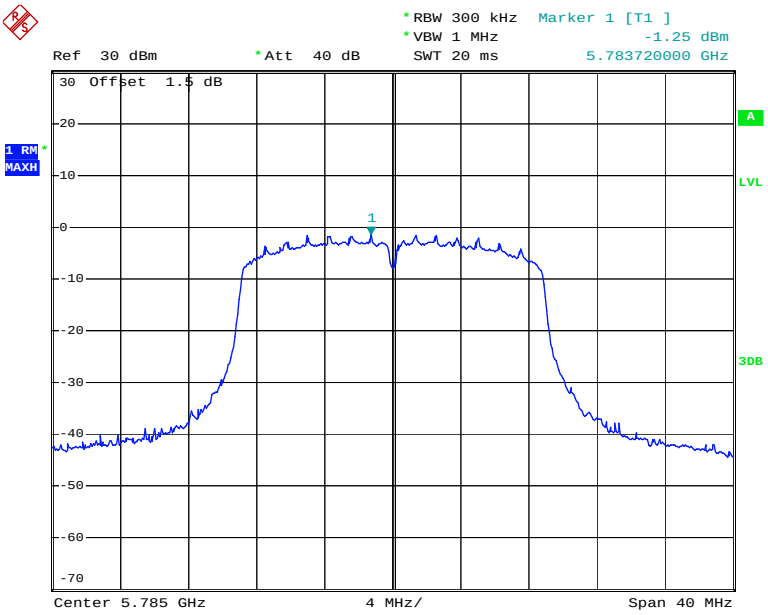
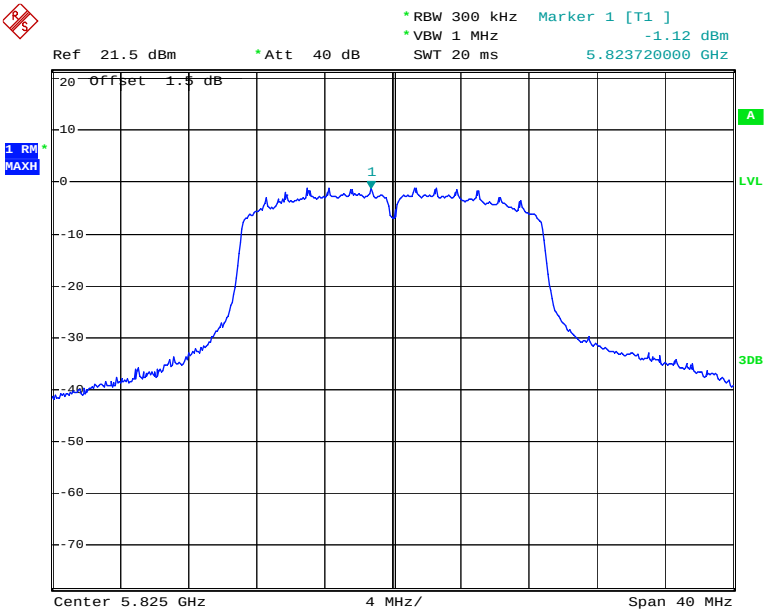


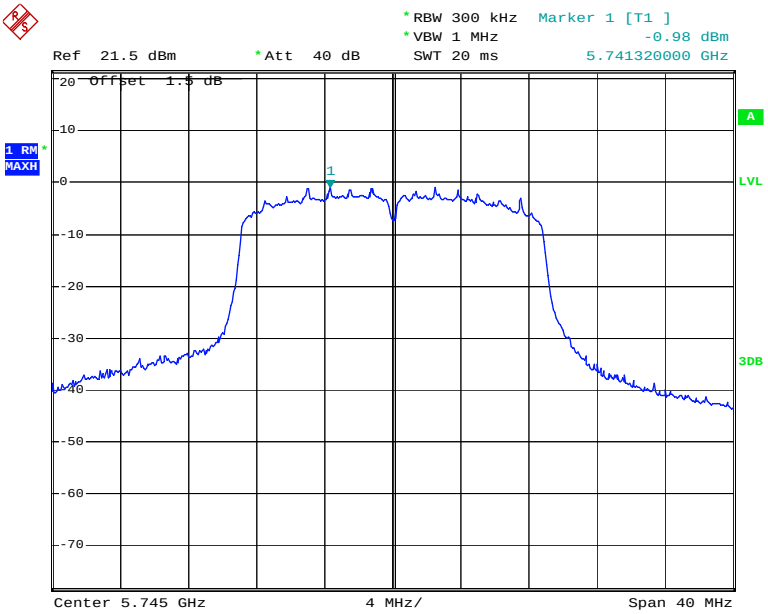
Date: 20.SEP.2018 10:21:12

Chain 0,High Channel



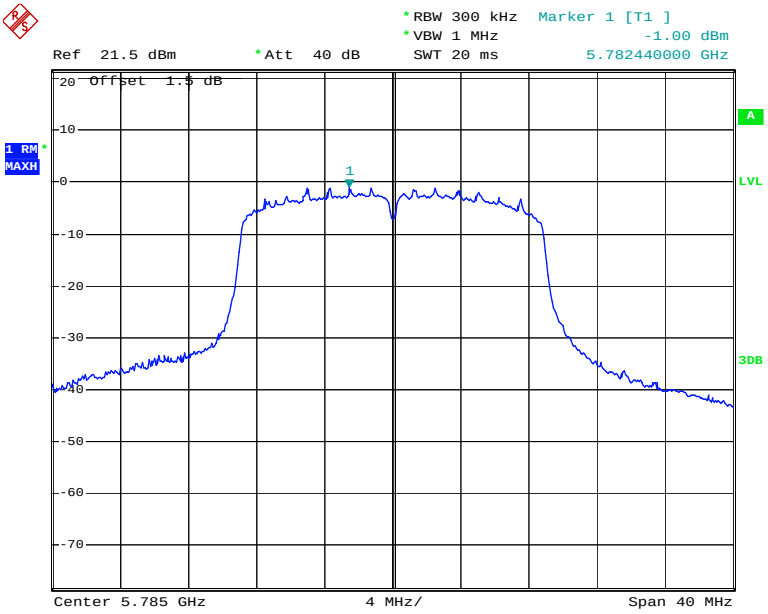
Date: 20.SEP.2018 13:51:58

Chain 1,Low Channel



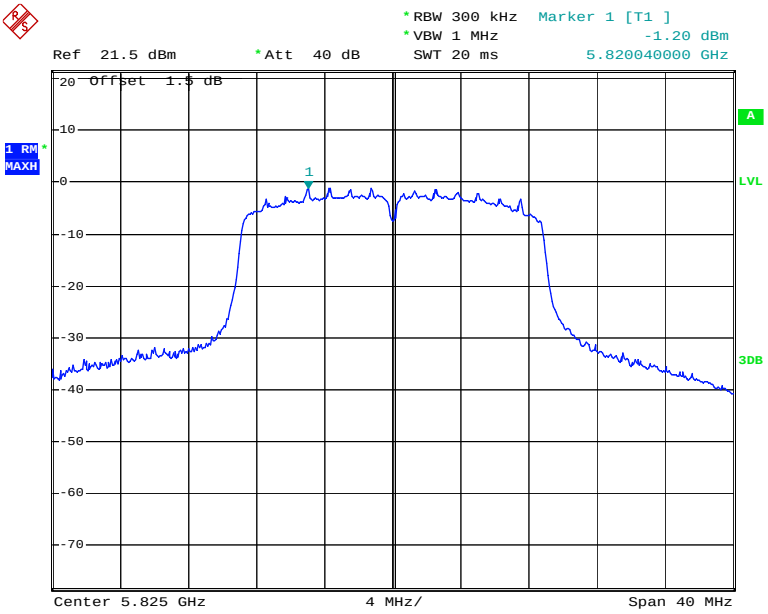
Date: 20.SEP.2018 13:57:12

Chain 1,Middle Channel



Date: 20.SEP.2018 13:49:30

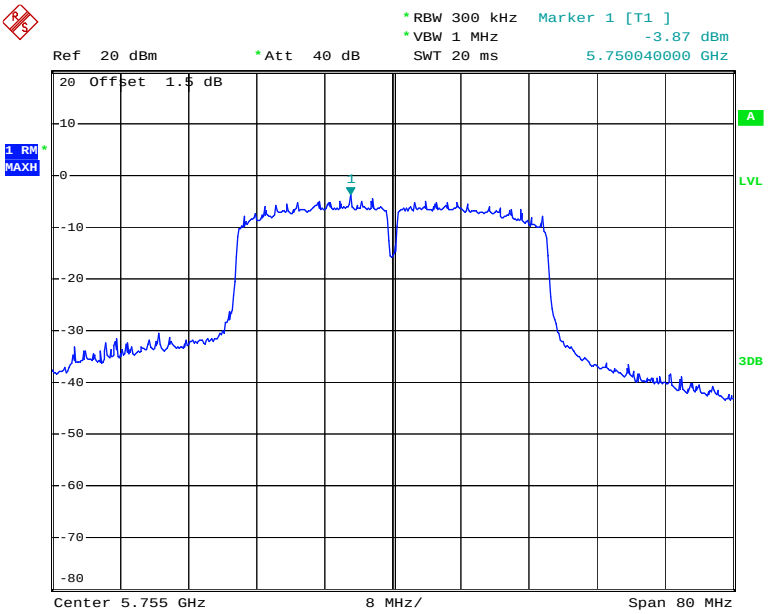
Chain 1,High Channel



Date: 20.SEP.2018 13:55:41

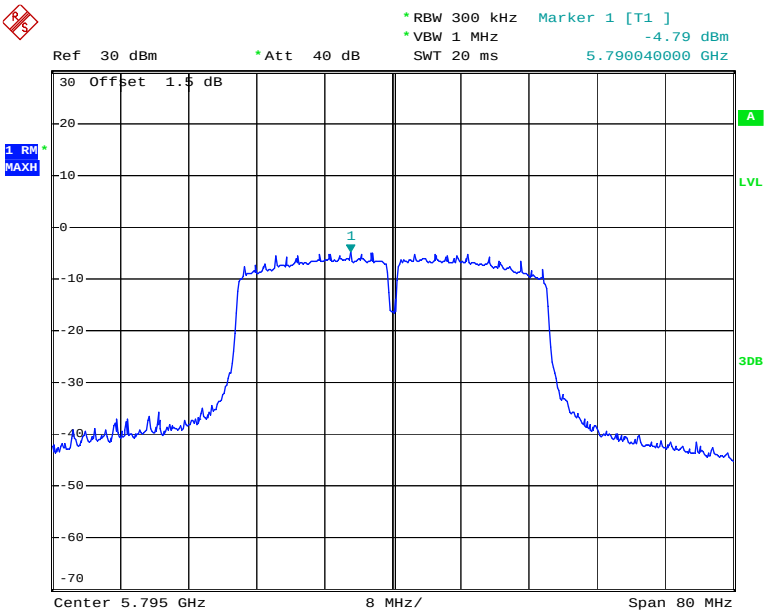
802.11n ht40

Chain 0,Low Channel



Date: 21.SEP.2018 15:52:57

Chain 0,High Channel



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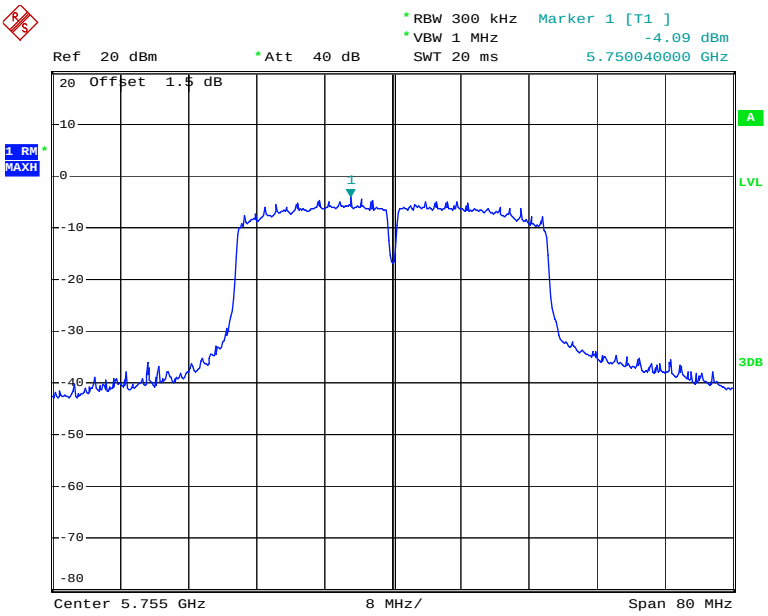
Chain 1,Low Channel



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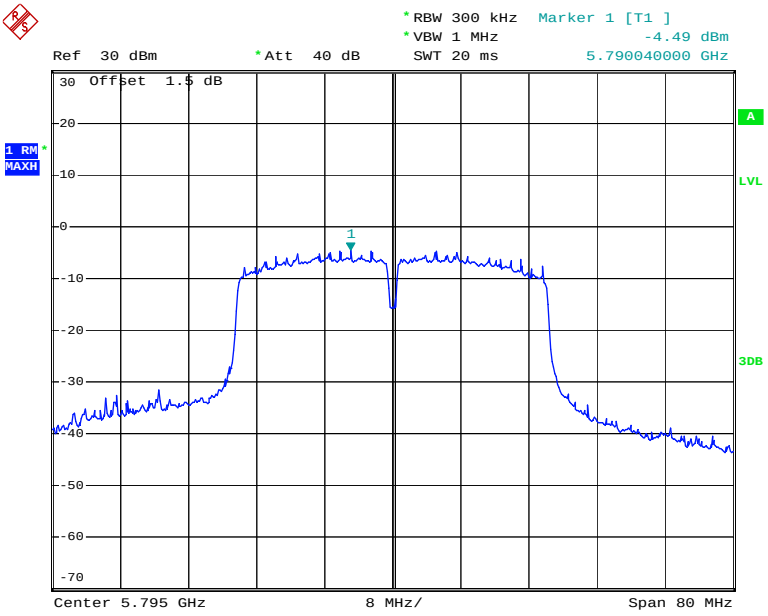
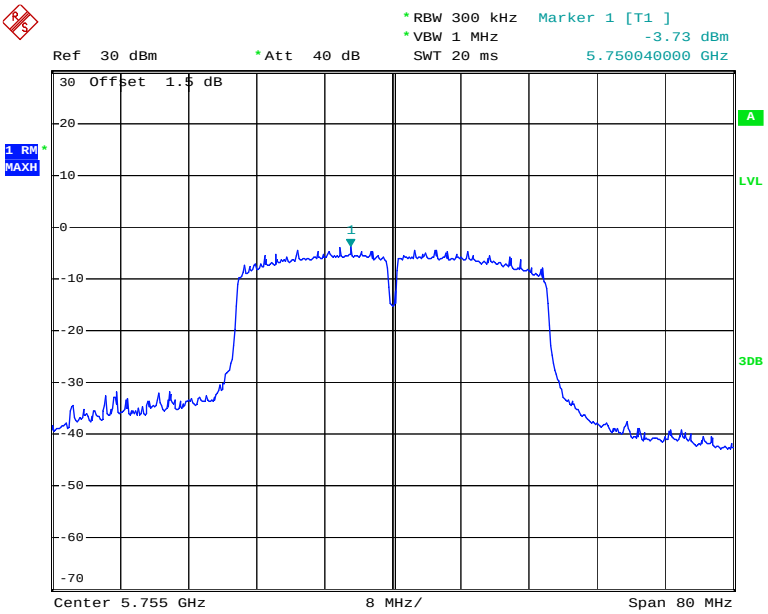


Date: 20.SEP.2018 11:23:34

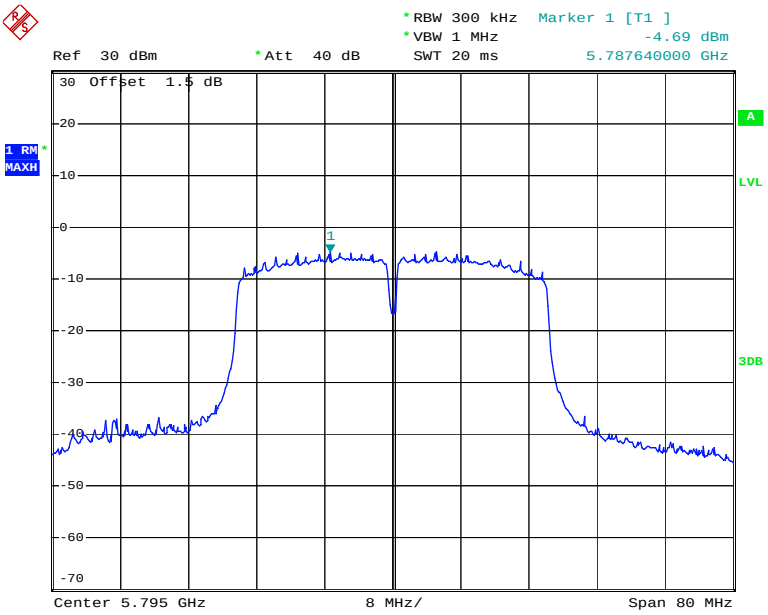
802.11ac40

Chain 0,Low Channel



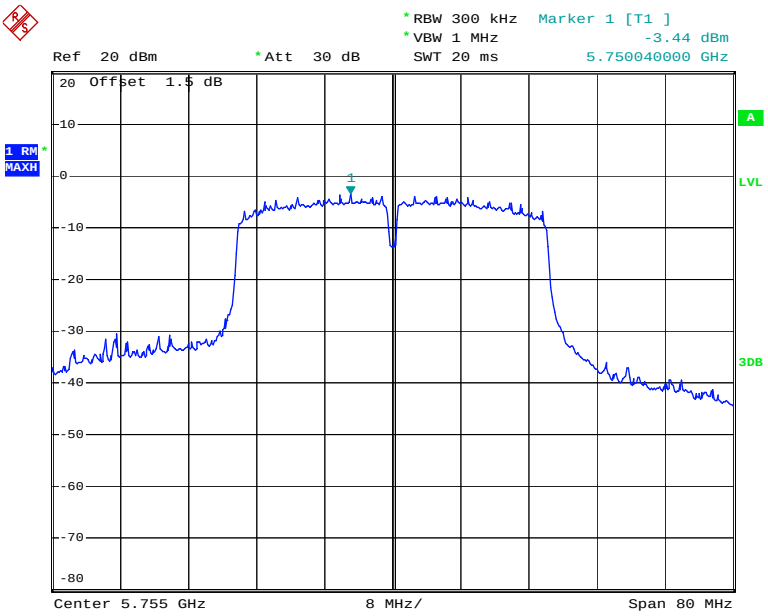
Date: 20.SEP.2018 10:55:52

Chain 0,High Channel



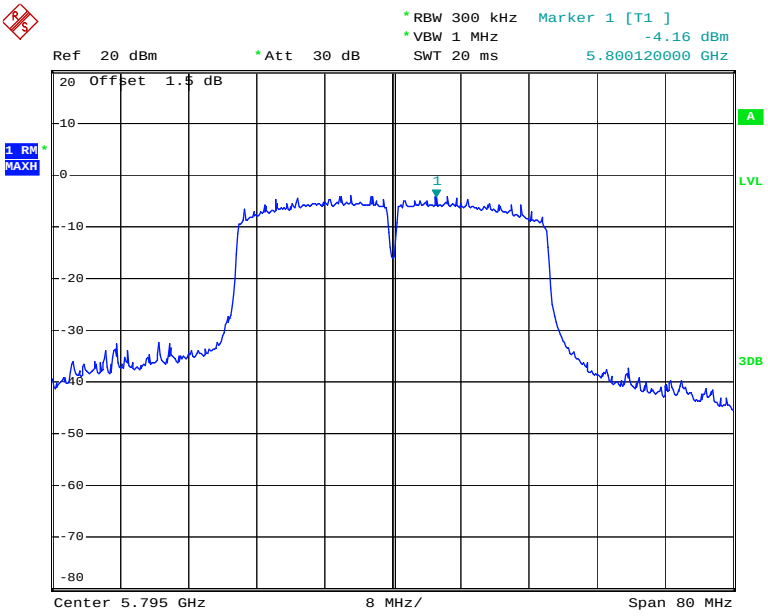
Date: 20.SEP.2018 10:37:10

Chain 1,Low Channel



Date: 22.OCT.2018 08:53:31

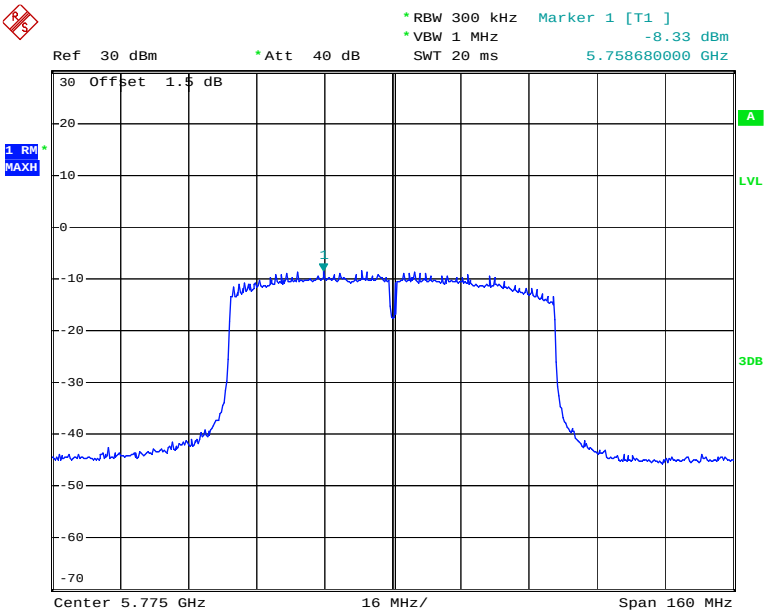
Chain 1,High Channel



Date: 22.OCT.2018 08:54:23

802.11 ac80

Chain 0, Middle Channel



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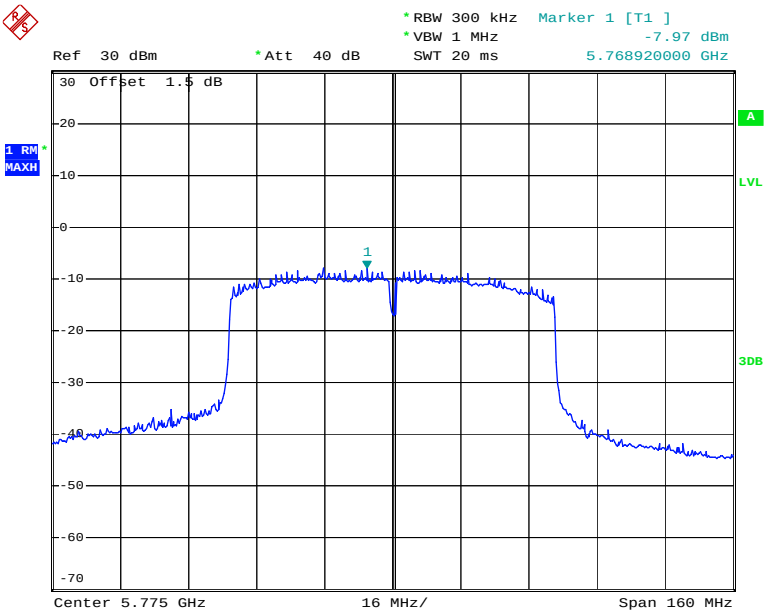
Chain 1, Middle Channel



Date: 20.SEP.2018 10:52:15

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