TESTING LABORATORY
CERTIFICATE #4820.01

FCC PART 15.407

TEST REPORT

For

SHENZHEN TENDA TECHNOLOGY CO.,LTD.

6-8 Floor, Tower E3, No. 1001, Zhongshanyuan Road, Nanshan District, Shenzhen, China. 518052

FCC ID:V7TAC10V3

Report Type:	**Product Name:**
Original Report	AC1200 MU-MIMO Dual Band Gigabit WiFi Router

Report Number:	RDG200403002-00B
Report Date:	2020-05-13
Reviewed By:	Ivan Cao Assistant 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:		AC1200 MU-MIMO Dual Band Gigabit WiFi Router
EUT Model:		AC10
Operation Frequency:		5180-5240(802.11a/n ht20/ac vht20) 5190-5230 MHz(802.11n ht40/ac vht40) 5210 MHz(802.11ac vht80) 5745-5825(802.11a/n ht20/ac vht20) 5755-5795 MHz(802.11n ht40/ac vht40) 5775 MHz(802.11ac vht80)
Maximum Output Power (Conducted):		5150-5250 MHz:19.75 dBm 5725-5850 MHz:21.43 dBm
Modulation Type:		OFDM
Rated Input Voltage:		DC 9V from Adapter
Adapter Information	**Model:**	BN073-A09009U
	Input:	100-240V 50/60Hz 0.4A
	Output:	9V-1A
Serial Number:		RDG200403002-RF-S1
EUT Received Date:		2020.04.05
EUT Received Status:		Good

Objective

This type approval report is prepared on behalf of ***SHENZHEN TENDA TECHNOLOGY CO.,LTD.*** in accordance with Part 2-Subpart J, Part 15-Subparts A, and E of the Federal Communications Commission's rules.

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

Related Submittal(s)/Grant(s)

FCC Part 15C DTS submissions with FCC ID: V7TAC10V3.

Test Methodology

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

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

Measurement Uncertainty

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

Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage fac vhtor K with the 95% confidence interval.

Test Facility

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

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

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

Declarations

BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol "△ ". Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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This report may contain data that are not covered by the accreditation scope and shall be marked with an asterisk "★".

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

The system supports Beamforming and Non-beamforming modes at 802.11n and 802.11ac modes. The two modes have same output power, and the Beamforming gain is 3 dBi, which are declared by manufacturer.Therefore, the all RF conducted test were performed at Non-beamforming mode only.

For 5150~5250 MHz band, 7 channels are provided:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220
38	5190	46	5230
40	5200	48	5240
42	5210	/	/

For 802.11a, 802.11n ht20,802.11ac vht20 channel 36, 40 and 48 was tested, for 802.11n ht40, 802.11ac vht40 channel 38, 46 were tested, for 802.11ac vht80, channel 42 was tested.

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

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

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

EUT Exercise Software

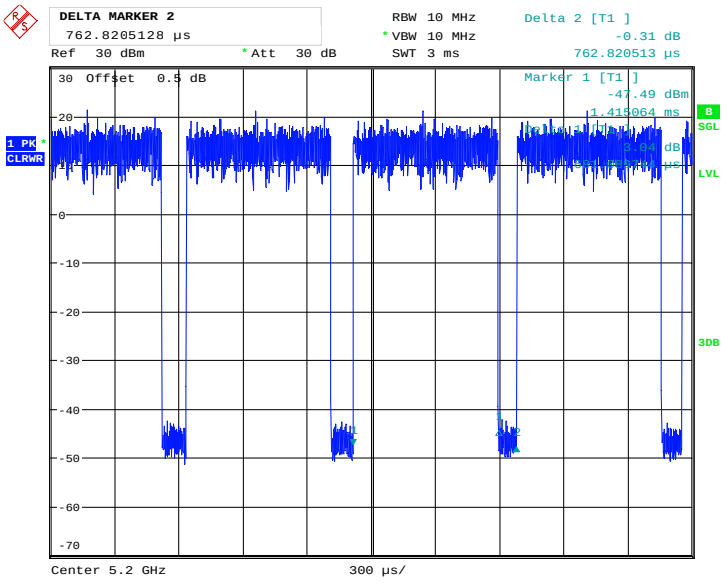
The software “MP TEST.exe” was used for testing, which was provided by Manufacturer. The worst-case data rates are determined to be as follows for each mode based upon investigations by measuring the average power and PSD across all date rates, bandwidths, and modulations. The device supports SISO and MIMO at 802.11n and ac mode, per pre-test, MIMO 2TX mode was the worst and reported. The maximum power was configured as below table, that provided by the Manufacturer:

Band	Mode	Channel	Frequency (MHz)	Data rate	Power level Setting	
					Chain 0	Chain 1
5150 - 5250 MHz	802.11a	Low	5180	6Mbps	100	100
		Middle	5200	6Mbps	100	100
		High	5240	6Mbps	100	100
	802.11n ht20	Low	5180	MCS8	100	100
		Middle	5200	MCS8	100	100
		High	5240	MCS8	100	100
	802.11n ht40	Low	5190	MCS8	100	100
		High	5230	MCS8	100	100
	802.11ac vht80	Middle	5210	MCS9	100	100
5725 - 5850 MHz	802.11a	Low	5745	6Mbps	120	110
		Middle	5785	6Mbps	120	110
		High	5825	6Mbps	120	110
	802.11n ht20	Low	5745	MCS8	120	110
		Middle	5785	MCS8	120	110
		High	5825	MCS8	120	110
	802.11n ht40	Low	5755	MCS8	120	105
		High	5795	MCS8	120	110
	802.11ac vht80	Middle	5775	MCS9	115	105

The duty cycle as below:

Mode	T_{on} (ms)	T_{on+off} (ms)	Duty Cycle (%)
802.11 a	0.681	0.763	89.25
802.11n ht20	1.410	1.556	90.62
802.11n ht40	0.353	0.497	71.03
802.11ac vht80	0.068	0.233	29.18

802.11a



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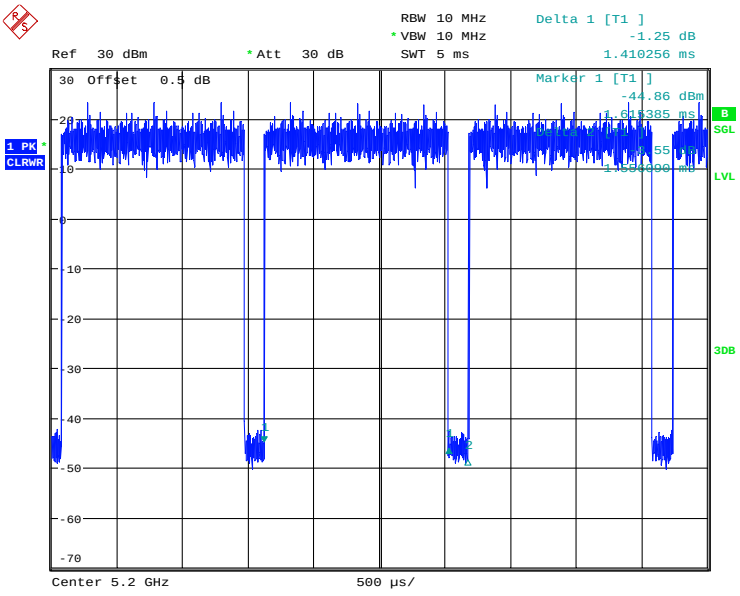
802.11n ht20



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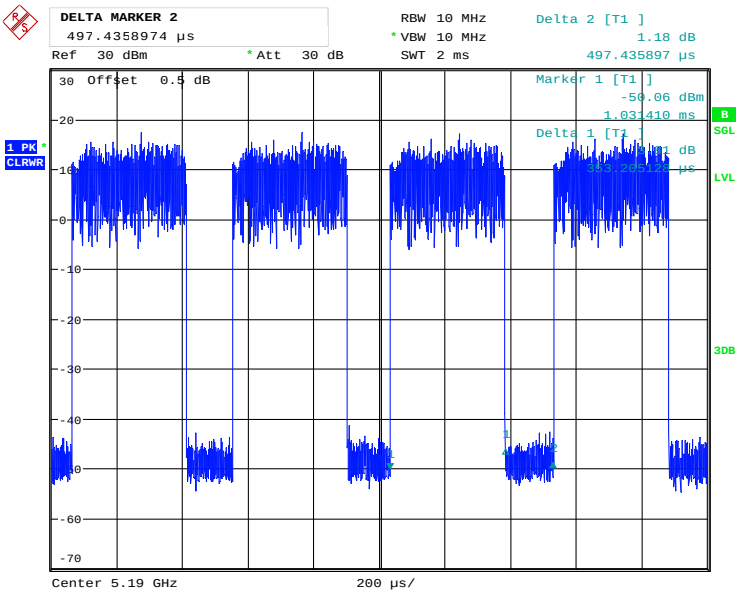
802.11n ht40



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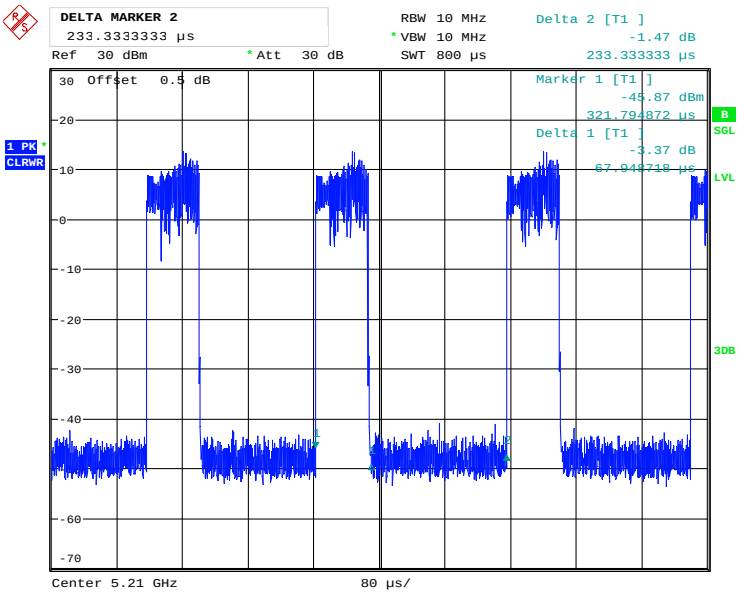
802.11ac vht80



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Equipment Modifications

No modification was made to the EUT.

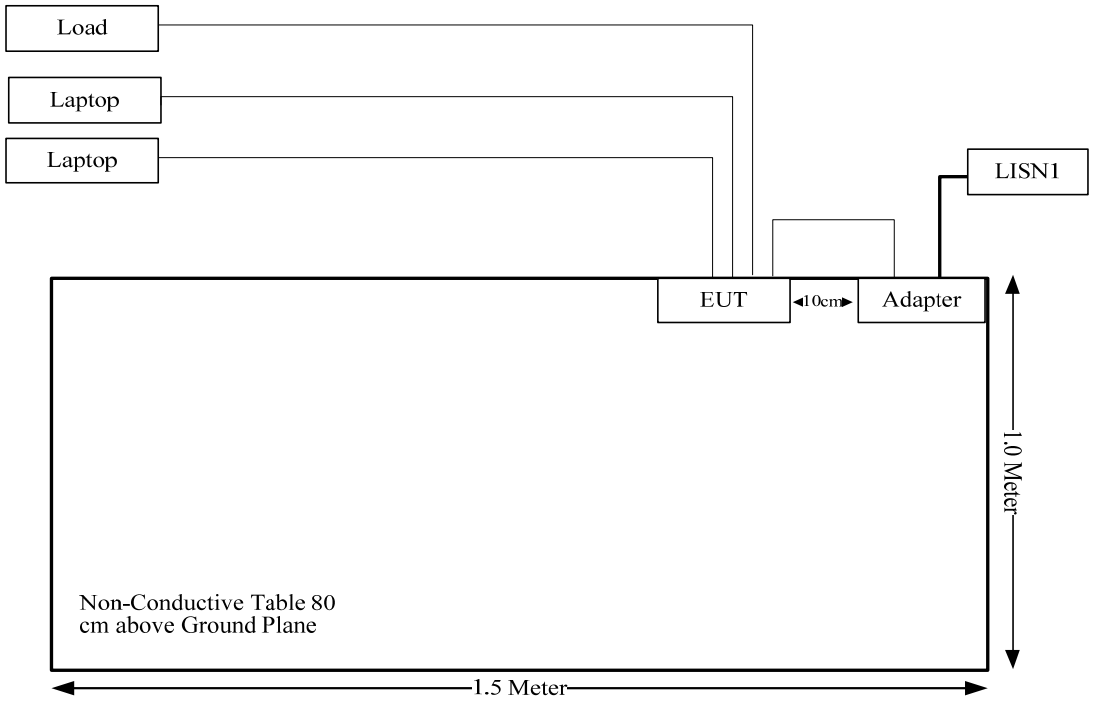
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Laptop	PP11L	QDS-BRCM1232
DELL	Laptop	PP11L	QDS-BRCM1012
Unknown	Load	RJ45 Load	0078

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
Adapter Cable	No	No	1.2	Adapter	EUT
RJ45 Cable	Yes	No	1.0	EUT	Laptop
RJ45 Cable	Yes	No	10	EUT	Laptop
RJ45 Cable*2	Yes	No	10	EUT	Load

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

Rules	Description of Test	Result
FCC §15.407 (f) & §1.1310 & §2.1091	Maximum Permissible Exposure (MPE)	Compliance
FCC§15.203,	Antenna Requirement	Compliance
FCC§15.407(b)(6)& §15.207(a)	Conducted Emissions	Compliance
FCC§15.205& §15.209 &§15.407(b)	Undesirable Emission& Restricted Bands	Compliance
FCC§15.407(b)	Out Of Band Emissions	Compliance
FCC§15.407(a) (e)	Emission Bandwidth	Compliance
FCC§15.407(a) RSS-247 Clause 6.2	Conducted Transmitter Output Power	Compliance
FCC§15.407 (a),	Power Spectral Density	Compliance

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

Applicable Standard

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

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f²)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculation formula:

Prediction of power density at the distance of the applicable MPE limit
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain fac vhtor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

Calculated Data:

Mode	Frequency (MHz)	Antenna Gain		Conducted output power including Tune-up Tolerance		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
WLAN	2412-2462	8	6.31	28	630.96	20.00	0.79	1.0
WLAN	5150-5250	8	6.31	20	100.00	20.00	0.13	1.0
WLAN	5725-5850	8	6.31	22	158.49	20.00	0.20	1.0

Note: the antenna gain is add beamforming gain. The maximum EIRP was used for calculation.

The WLAN 2.4G and 5G can transmit simultaneously:

$$\sum_i \frac{S_i}{S_{Limit,i}}$$

$=S_{2.4}/S_{limit\text{-}2.4}+ S_5/S_{limit\text{-}5}$

$=0.79/1+0.20/1$

$=0.99$

< 1.0

Result: The device meet FCC MPE at 20 cm distance

FCC §15.203- 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.

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 Connector Construction

The EUT has 2 antenna for 2.4G WLAN and 2 antenna for 5G WLAN, the Antenna is permanently attached to the unit, fulfill the requirement of this section. Please refer to the EUT photos and below information:

Antenna	Antenna Type	input impedance (Ohm)	Antenna Gain /Frequency Range
2.4G Chain 0	Dipole	50	5 dBi/2.4-2.5GHz
2.4G Chain 1	Dipole	50	5 dBi/2.4-2.5GHz
5G Chain 0	Dipole	50	5 dBi/5.15-5.85GHz
5G Chain 1	Dipole	50	5 dBi/5.15-5.85GHz

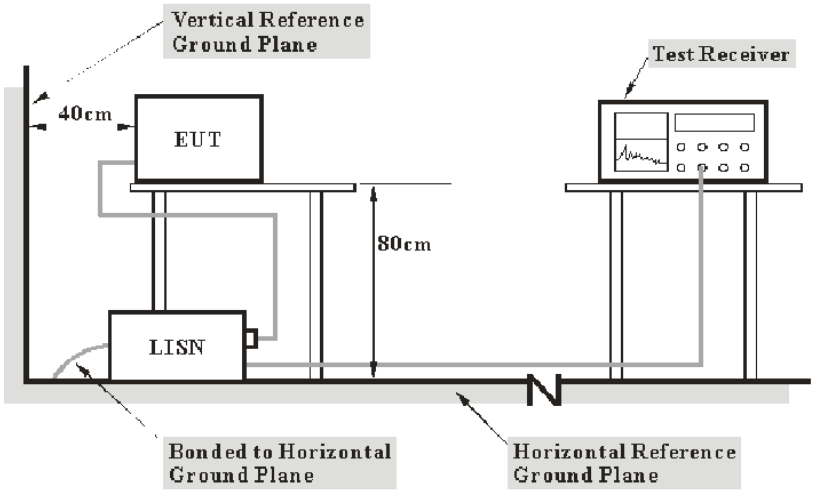
Result: Compliance.

FCC §15.207(a)– CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207(a), §15.407(b) (6).

EUT Setup



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

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

The spacing between the peripherals was 10 cm.

The adapter was connected to the main lisn with a 120 V/60 Hz AC power source.

EMI Test Receiver Setup

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

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

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

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

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

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

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

Margin = Limit – Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-01	2019-09-05	2020-09-05
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A
R&S	Two-line V-network	ENV 216	101614	2019-09-12	2020-09-12
R&S	EMI Test Receiver	ESCI	101121	2019-05-09	2020-05-09

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

Test Procedure

During the conducted emission test, the EUT 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

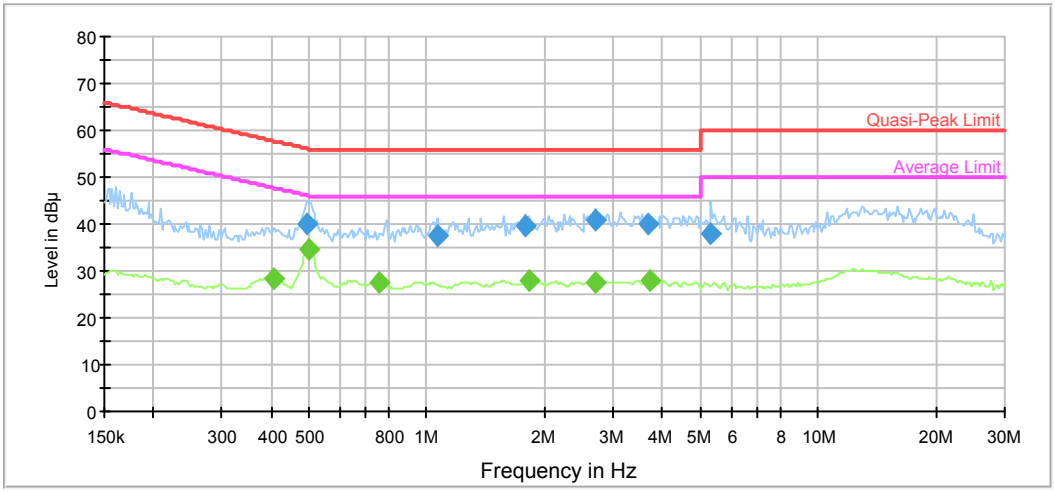
Environmental Conditions

Temperature:	23.7℃
Relative Humidity:	65%
ATM Pressure:	101.2kPa
Tester:	Noyley Lao
Test Date:	2020-04-15

Test Result: Compliance

Test Mode: Transmitting(802.11a Chain 0 5745 MHz was the worst)

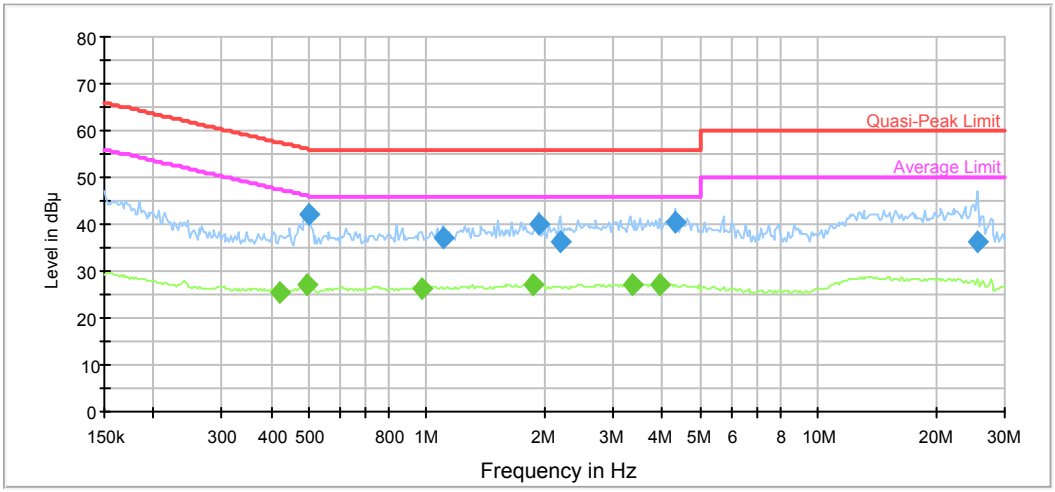
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.495058	40.2	9.000	L1	9.7	15.9	56.1
1.065129	37.3	9.000	L1	9.7	18.7	56.0
1.786955	39.4	9.000	L1	9.8	16.6	56.0
2.714009	40.8	9.000	L1	9.8	15.2	56.0
3.694655	40.2	9.000	L1	9.8	15.8	56.0
5.339059	37.9	9.000	L1	9.8	22.1	60.0

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.405722	28.5	9.000	L1	9.7	19.2	47.7
0.500009	34.5	9.000	L1	9.7	11.5	46.0
0.759409	27.5	9.000	L1	9.7	18.5	46.0
1.822873	27.9	9.000	L1	9.8	18.1	46.0
2.714009	27.4	9.000	L1	9.8	18.6	46.0
3.731602	27.9	9.000	L1	9.8	18.1	46.0

AC120 V, 60 Hz, Neutral:



requency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.500009	42.1	9.000	N	9.6	13.9	56.0
1.097403	37.2	9.000	N	9.6	18.8	56.0
1.935016	40.0	9.000	N	9.6	14.0	56.0
2.202229	36.3	9.000	N	9.6	19.7	56.0
4.332274	40.5	9.000	N	9.7	15.5	56.0
25.463636	36.3	9.000	N	10.0	23.7	60.0

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.422196	25.6	9.000	N	9.6	21.8	47.4
0.495058	27.2	9.000	N	9.6	18.9	46.1
0.973890	26.3	9.000	N	9.6	19.7	46.0
1.859513	26.9	9.000	N	9.6	19.1	46.0
3.344723	27.2	9.000	N	9.6	18.8	46.0
3.921951	27.1	9.000	N	9.6	18.9	46.0

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

Applicable Standard

FCC §15.407; §15.209; §15.205;

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

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

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

(i) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

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

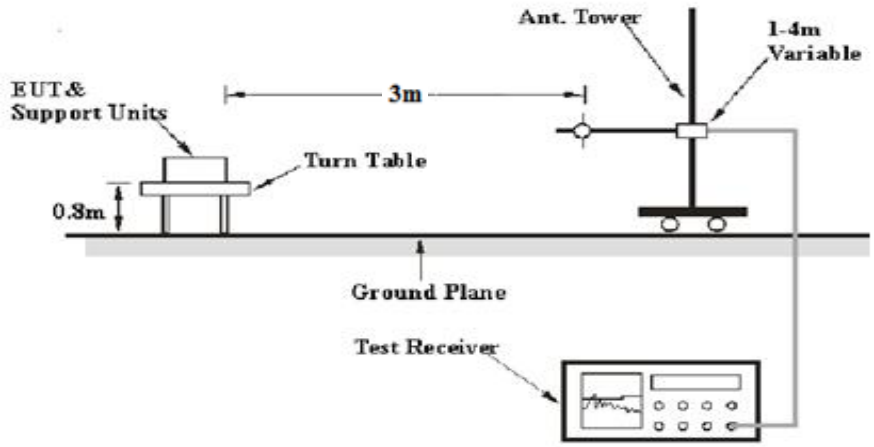
(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

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

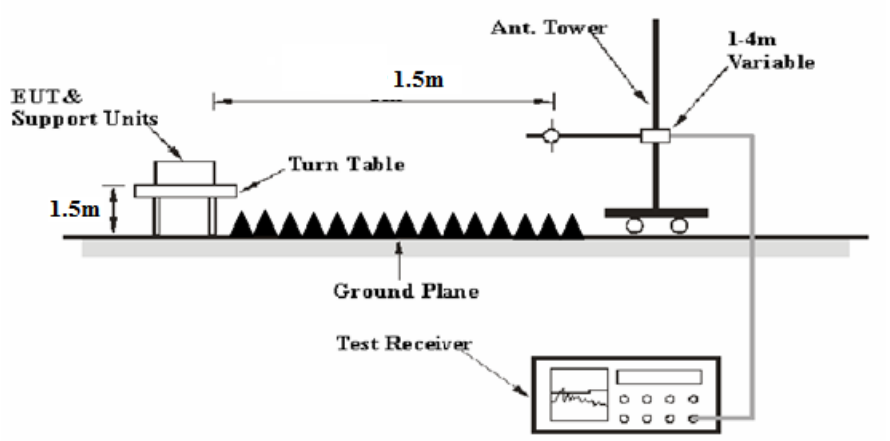
(7) The provisions of §15.205 apply to intentional radiators operating under this section.

EUT Setup

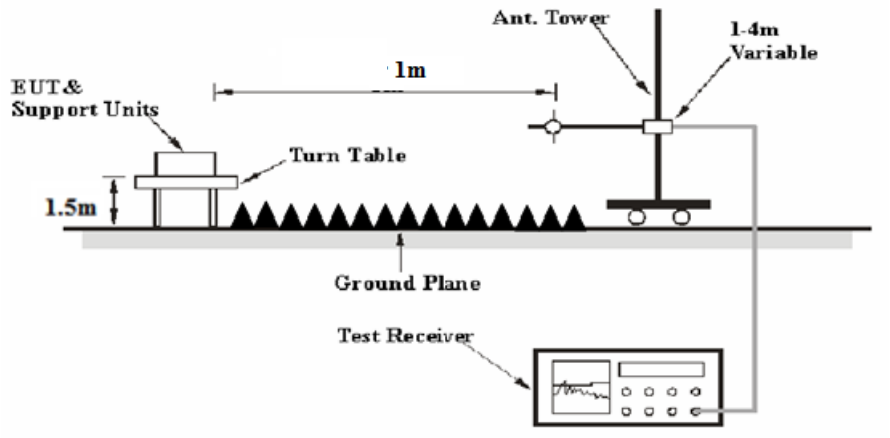
Below 1 GHz:



1-26.5 GHz:



26.5-40 GHz:



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

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

The spacing between the peripherals was 10 cm.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 40 GHz.

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

30-1000MHz:

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

1GHz- 40GHz:

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

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

Test Procedure

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

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

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

According to C63.10, the above 1G test result shall be extrapolated to the specified distance using an extrapolation fac vhtor of 20dB/decade from 3m to 1.5m or 1m
Distance extrapolation fac vhtor =20 log (specific distance [3m]/test distance [1.5m]) dB= 6.02 dB
or
Distance extrapolation fac vhtor =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 Fac vhtor and Cable Loss, and subtrac vhting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Fac vhtor + 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 Fac vhtor and Cable Loss, and subtrac vhting the Amplifier Gain from the Meter Reading and the Distance extrapolation fac vhtor. The basic equation is as follows:

Corrected Amplitude
= Meter Reading + Antenna Fac vhtor + Cable Loss - Amplifier Gain-Distance extrapolation fac vhtor

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

Margin = Limit- Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESR3	102453	2019-09-12	2020-09-12
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	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1400-01	2019-05-06	2020-05-06
HP	Amplifier	8447D	2727A05902	2019-09-05	2020-09-05
Agilent	Spectrum Analyzer	E4440A	SG43360054	2019-05-09	2020-05-09
R&S	Spectrum Analyzer	FSV40	101474	2019-01-09	2020-05-09
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
ETS-Lindgren	Horn Antenna	3115	000 527 35	2018-10-12	2021-10-12
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-02 1304	2017-12-06	2020-12-05
Ducommun Technolagies	Horn Antenna	ARH-2823-02	1007726-02 1302	2017-12-06	2020-12-05
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-2.4J2.4J-50	C-0700-02	2019-06-27	2020-06-27
Mini-Circuit	Amplifier	ZVA-213-S+	54201245	2019-09-05	2020-09-05
Sinoscite	Bandstop Filters	BSF5150-5850MN-0899-003	0899003	2019-05-06	2020-05-06
Mini Circuits	High Pass Filter	VHF-6010+	31118	2019-06-16	2020-06-16
Agilent	Signal Generator	E8247C	MY43321350	2018-12-10	2019-12-10

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

Test Data

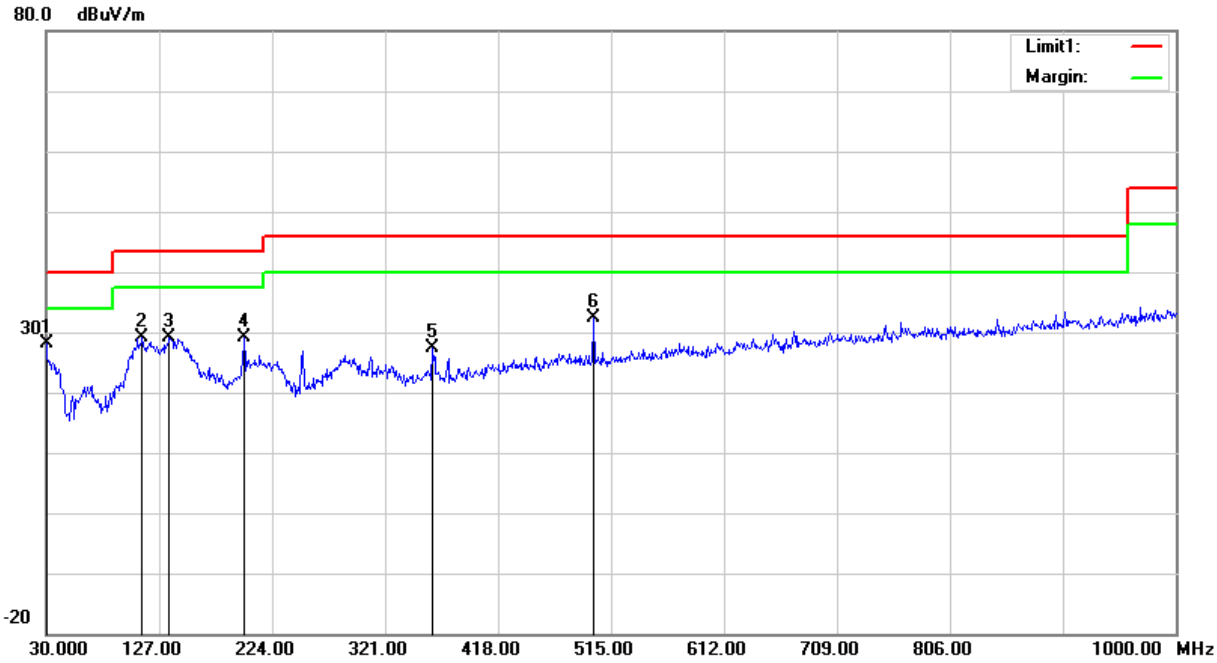
Environmental Conditions

Test Items	Radiation Below 1GHz	Radiation Above 1GHz
Temperature:	25.1°C	23.6°C
Relative Humidity:	52 %	53%
ATM Pressure:	100.8kPa	100.8kPa
Tester:	Jalon Liu	Jalon Liu
Test Date:	2020-05-05	2020-05-05

Test Mode: Transmitting

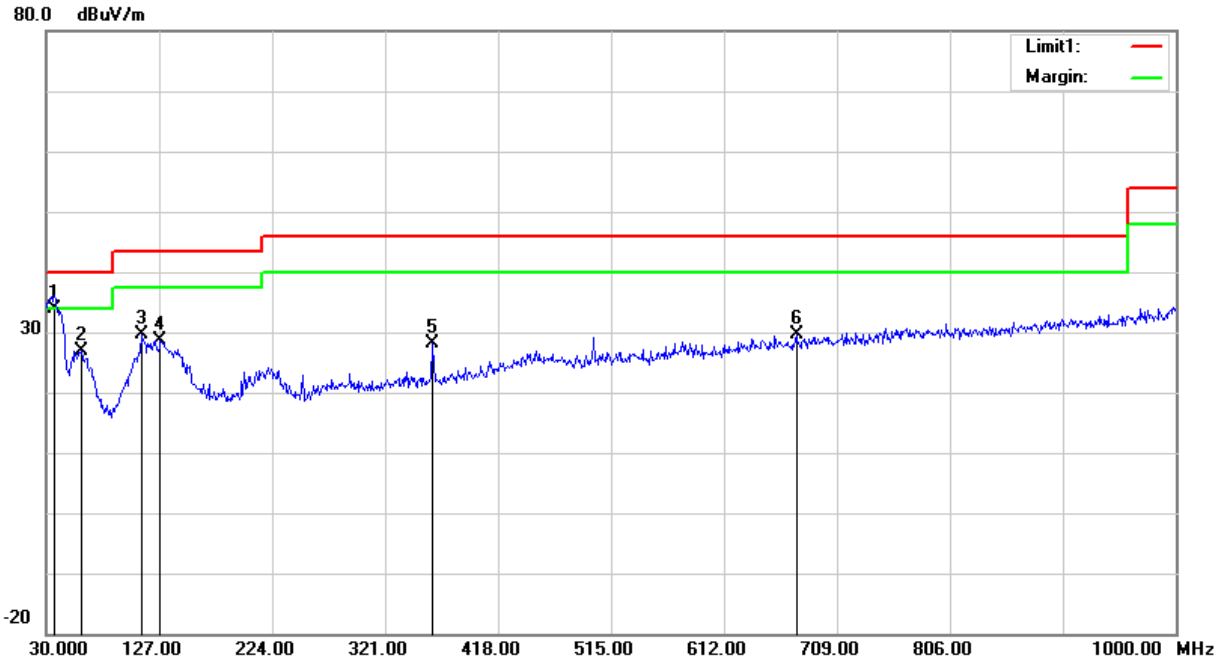
1) Below 1GHz(802.11a chain 0 5745MHz was the worst):

Horizontal



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Fac vhtor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.0000	26.29	peak	1.72	28.01	40.00	11.99
112.4500	35.00	peak	-5.80	29.20	43.50	14.30
135.7300	34.19	peak	-5.15	29.04	43.50	14.46
199.7500	35.02	peak	-5.92	29.10	43.50	14.40
361.7400	30.22	peak	-2.80	27.42	46.00	18.58
500.4500	32.74	peak	-0.32	32.42	46.00	13.58

Vertical



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Fac vhtor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
36.7900	37.24	QP	-3.38	33.86	40.00	6.14
60.0700	38.87	peak	-12.09	26.78	40.00	13.22
111.4800	35.59	peak	-6.03	29.56	43.50	13.94
127.9700	33.46	peak	-4.76	28.70	43.50	14.80
361.7400	30.90	peak	-2.80	28.10	46.00	17.90
674.0800	27.09	peak	2.47	29.56	46.00	16.44

2) 1GHz-40GHz:

5150-5250MHz
802.11a,Chain 0:

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Fac vhtor (dB/m)						
Low Channel: 5180 MHz										
5180.00	65.06	PK	H	33.59	3.58	0.00	102.23	96.21	N/A	N/A
5180.00	54.56	AV	H	33.59	3.58	0.00	91.73	85.71	N/A	N/A
5180.00	74.87	PK	V	33.59	3.58	0.00	112.04	106.02	N/A	N/A
5180.00	65.51	AV	V	33.59	3.58	0.00	102.68	96.66	N/A	N/A
5150.00	27.70	PK	V	33.54	3.56	0.00	64.80	58.78	74.00	15.22
5150.00	15.21	AV	V	33.54	3.56	0.00	52.31	46.29	54.00	7.71
10360.00	49.44	PK	V	38.17	6.29	25.46	68.44	62.42	68.20	5.78
15540.00	37.90	PK	V	38.06	8.85	24.27	60.54	54.52	74.00	19.48
15540.00	23.63	AV	V	38.06	8.85	24.27	46.27	40.25	54.00	13.75
Middle Channel: 5200 MHz										
5200.00	66.21	PK	H	33.62	3.60	0.00	103.43	97.41	N/A	N/A
5200.00	57.02	AV	H	33.62	3.60	0.00	94.24	88.22	N/A	N/A
5200.00	75.60	PK	V	33.62	3.60	0.00	112.82	106.8	N/A	N/A
5200.00	66.28	AV	V	33.62	3.60	0.00	103.50	97.48	N/A	N/A
10400.00	48.15	PK	V	38.18	6.32	25.46	67.19	61.17	68.20	7.03
15600.00	37.89	PK	V	38.00	8.83	24.31	60.41	54.39	74.00	19.61
15600.00	24.14	AV	V	38.00	8.83	24.31	46.66	40.64	54.00	13.36
High Channel: 5240 MHz										
5240.00	65.48	PK	H	33.68	3.52	0.00	102.68	96.66	N/A	N/A
5240.00	56.89	AV	H	33.68	3.52	0.00	94.09	88.07	N/A	N/A
5240.00	74.81	PK	V	33.68	3.52	0.00	112.01	105.99	N/A	N/A
5240.00	65.40	AV	V	33.68	3.52	0.00	102.60	96.58	N/A	N/A
5350.00	26.92	PK	V	33.86	3.52	0.00	64.30	58.28	74.00	15.72
5350.00	14.75	AV	V	33.86	3.52	0.00	52.13	46.11	54.00	7.89
10480.00	47.15	PK	V	38.20	6.37	25.47	66.25	60.23	68.20	7.97
15720.00	39.04	PK	V	37.88	8.79	24.39	61.32	55.3	74.00	18.70
15720.00	24.42	AV	V	37.88	8.79	24.39	46.70	40.68	54.00	13.32

802.11a,Chain 1:

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Extrapolation result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector	Polar (H/V)	Fac vhtor (dB/m)						
Low Channel: 5180 MHz										
5180.00	64.66	PK	H	33.59	3.58	0.00	101.83	95.81	N/A	N/A
5180.00	54.32	AV	H	33.59	3.58	0.00	91.49	85.47	N/A	N/A
5180.00	74.47	PK	V	33.59	3.58	0.00	111.64	105.62	N/A	N/A
5180.00	65.18	AV	V	33.59	3.58	0.00	102.35	96.33	N/A	N/A
5150.00	27.42	PK	V	33.54	3.56	0.00	64.52	58.5	74.00	15.50
5150.00	14.86	AV	V	33.54	3.56	0.00	51.96	45.94	54.00	8.06
10360.00	49.13	PK	V	38.17	6.29	25.46	68.13	62.11	68.20	6.09
15540.00	37.50	PK	V	38.06	8.85	24.27	60.14	54.12	74.00	19.88
15540.00	23.33	AV	V	38.06	8.85	24.27	45.97	39.95	54.00	14.05
Middle Channel: 5200 MHz										
5200.00	65.80	PK	H	33.62	3.60	0.00	103.02	97	N/A	N/A
5200.00	56.70	AV	H	33.62	3.60	0.00	93.92	87.9	N/A	N/A
5200.00	75.31	PK	V	33.62	3.60	0.00	112.53	106.51	N/A	N/A
5200.00	66.00	AV	V	33.62	3.60	0.00	103.22	97.2	N/A	N/A
10400.00	47.90	PK	V	38.18	6.32	25.46	66.94	60.92	68.20	7.28
15600.00	37.49	PK	V	38.00	8.83	24.31	60.01	53.99	74.00	20.01
15600.00	23.90	AV	V	38.00	8.83	24.31	46.42	40.4	54.00	13.60
High Channel: 5240 MHz										
5240.00	65.09	PK	H	33.68	3.52	0.00	102.29	96.27	N/A	N/A
5240.00	56.69	AV	H	33.68	3.52	0.00	93.89	87.87	N/A	N/A
5240.00	74.60	PK	V	33.68	3.52	0.00	111.80	105.78	N/A	N/A
5240.00	65.00	AV	V	33.68	3.52	0.00	102.20	96.18	N/A	N/A
5350.00	26.51	PK	V	33.86	3.52	0.00	63.89	57.87	74.00	16.13
5350.00	14.40	AV	V	33.86	3.52	0.00	51.78	45.76	54.00	8.24
10480.00	46.82	PK	V	38.20	6.37	25.47	65.92	59.9	68.20	8.30
15720.00	38.81	PK	V	37.88	8.79	24.39	61.09	55.07	74.00	18.93
15720.00	24.20	AV	V	37.88	8.79	24.39	46.48	40.46	54.00	13.54

802.11n ht20 (2Tx Beamforming mode 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	Polar (H/V)	Fac vhtor (dB/m)						
Low Channel: 5180 MHz										
5180.00	64.95	PK	H	33.59	3.58	0.00	102.12	96.1	N/A	N/A
5180.00	56.43	AV	H	33.59	3.58	0.00	93.60	87.58	N/A	N/A
5180.00	74.69	PK	V	33.59	3.58	0.00	111.86	105.84	N/A	N/A
5180.00	65.35	AV	V	33.59	3.58	0.00	102.52	96.5	N/A	N/A
5150.00	27.33	PK	V	33.54	3.56	0.00	64.43	58.41	74.00	15.59
5150.00	15.20	AV	V	33.54	3.56	0.00	52.30	46.28	54.00	7.72
10360.00	48.69	PK	V	38.17	6.29	25.46	67.69	61.67	68.20	6.53
15540.00	37.76	PK	V	38.06	8.85	24.27	60.40	54.38	74.00	19.62
15540.00	23.51	AV	V	38.06	8.85	24.27	46.15	40.13	54.00	13.87
Middle Channel: 5200 MHz										
5200.00	66.08	PK	H	33.62	3.60	0.00	103.30	97.28	N/A	N/A
5200.00	57.01	AV	H	33.62	3.60	0.00	94.23	88.21	N/A	N/A
5200.00	75.34	PK	V	33.62	3.60	0.00	112.56	106.54	N/A	N/A
5200.00	66.19	AV	V	33.62	3.60	0.00	103.41	97.39	N/A	N/A
10400.00	48.34	PK	V	38.18	6.32	25.46	67.38	61.36	68.20	6.84
15600.00	37.91	PK	V	38.00	8.83	24.31	60.43	54.41	74.00	19.59
15600.00	24.28	AV	V	38.00	8.83	24.31	46.80	40.78	54.00	13.22
High Channel: 5240 MHz										
5240.00	66.42	PK	H	33.68	3.52	0.00	103.62	97.6	N/A	N/A
5240.00	57.41	AV	H	33.68	3.52	0.00	94.61	88.59	N/A	N/A
5240.00	75.32	PK	V	33.68	3.52	0.00	112.52	106.5	N/A	N/A
5240.00	66.08	AV	V	33.68	3.52	0.00	103.28	97.26	N/A	N/A
5350.00	27.01	PK	V	33.86	3.52	0.00	64.39	58.37	74.00	15.63
5350.00	13.98	AV	V	33.86	3.52	0.00	51.36	45.34	54.00	8.66
10480.00	47.20	PK	V	38.20	6.37	25.47	66.30	60.28	68.20	7.92
15720.00	39.07	PK	V	37.88	8.79	24.39	61.35	55.33	74.00	18.67
15720.00	24.53	AV	V	37.88	8.79	24.39	46.81	40.79	54.00	13.21

802.11n ht40(2Tx Beamforming mode 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	Polar (H/V)	Fac vhtor (dB/m)						
Low Channel: 5190 MHz										
5190.00	65.75	PK	H	33.60	3.59	0.00	102.94	96.92	N/A	N/A
5190.00	56.89	AV	H	33.60	3.59	0.00	94.08	88.06	N/A	N/A
5190.00	76.14	PK	V	33.60	3.59	0.00	113.33	107.31	N/A	N/A
5190.00	66.62	AV	V	33.60	3.59	0.00	103.81	97.79	N/A	N/A
5150.00	27.41	PK	V	33.54	3.56	0.00	64.51	58.49	74.00	15.51
5150.00	14.12	AV	V	33.54	3.56	0.00	51.22	45.2	54.00	8.80
10380.00	44.95	PK	V	38.18	6.31	25.46	63.98	57.96	68.20	10.24
15570.00	35.24	PK	V	38.03	8.84	24.29	57.82	51.8	74.00	22.20
15570.00	23.06	AV	V	38.03	8.84	24.29	45.64	39.62	54.00	14.38
High Channel: 5230 MHz										
5230.00	64.72	PK	H	33.67	3.54	0.00	101.93	95.91	N/A	N/A
5230.00	55.81	AV	H	33.67	3.54	0.00	93.02	87	N/A	N/A
5230.00	75.89	PK	V	33.67	3.54	0.00	113.10	107.08	N/A	N/A
5230.00	67.52	AV	V	33.67	3.54	0.00	104.73	98.71	N/A	N/A
5350.00	27.82	PK	V	33.86	3.52	0.00	65.20	59.18	74.00	14.82
5350.00	14.75	AV	V	33.86	3.52	0.00	52.13	46.11	54.00	7.89
10460.00	44.87	PK	V	38.19	6.36	25.47	63.95	57.93	68.20	10.27
15690.00	35.18	PK	V	37.91	8.80	24.37	57.52	51.5	74.00	22.50
15690.00	23.01	AV	V	37.91	8.80	24.37	45.35	39.33	54.00	14.67

802.11ac vht80(2Tx Beamforming mode 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	Polar (H/V)	Fac vhtor (Db/m)						
Middle Channel: 5210 MHz										
5210.00	66.89	PK	H	33.64	3.58	0.00	104.11	98.09	N/A	N/A
5210.00	57.71	AV	H	33.64	3.58	0.00	94.93	88.91	N/A	N/A
5210.00	76.21	PK	V	33.64	3.58	0.00	113.43	107.41	N/A	N/A
5210.00	67.89	AV	V	33.64	3.58	0.00	105.11	99.09	N/A	N/A
5150.00	27.41	PK	V	33.54	3.56	0.00	64.51	58.49	74.00	15.51
5150.00	14.12	AV	V	33.54	3.56	0.00	51.22	45.2	54.00	8.80
5350.00	27.56	PK	V	33.86	3.52	0.00	64.94	58.92	74.00	15.08
5350.00	13.41	AV	V	33.86	3.52	0.00	50.79	44.77	54.00	9.23
10420.00	44.82	PK	V	38.18	6.33	25.47	63.86	57.84	68.20	10.36
15630.00	35.12	PK	V	37.97	8.82	24.33	57.58	51.56	74.00	22.44
15630.00	22.94	AV	V	37.97	8.82	24.33	45.40	39.38	54.00	14.62

5725-5850MHz

802.11a, Chain 0:

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Fac vhtor (dB/m)						
Low Channel: 5745 MHz										
5745.00	61.83	PK	H	34.20	3.69	0.00	99.72	93.7	N/A	N/A
5745.00	51.59	AV	H	34.20	3.69	0.00	89.48	83.46	N/A	N/A
5745.00	69.78	PK	V	34.20	3.69	0.00	107.67	101.65	N/A	N/A
5745.00	61.19	AV	V	34.20	3.69	0.00	99.08	93.06	N/A	N/A
5725.00	27.36	PK	V	34.19	3.69	0.00	65.24	59.22	122.20	62.98
5720.00	26.99	PK	V	34.19	3.69	0.00	64.87	58.85	110.80	51.95
5700.00	26.98	PK	V	34.18	3.68	0.00	64.84	58.82	105.20	46.38
5650.00	26.56	PK	V	34.16	3.63	0.00	64.35	58.33	68.20	9.87
11490.00	48.39	PK	V	38.99	6.59	25.51	68.46	62.44	74.00	11.56
11490.00	35.13	AV	V	38.99	6.59	25.51	55.20	49.18	54.00	4.82
17235.00	34.43	PK	V	41.56	8.78	23.72	61.05	55.03	68.20	13.17
Middle Channel: 5785 MHz										
5785.00	61.84	PK	H	34.21	3.71	0.00	99.76	93.74	N/A	N/A
5785.00	51.23	AV	H	34.21	3.71	0.00	89.15	83.13	N/A	N/A
5785.00	69.95	PK	V	34.21	3.71	0.00	107.87	101.85	N/A	N/A
5785.00	61.85	AV	V	34.21	3.71	0.00	99.77	93.75	N/A	N/A
11570.00	44.35	PK	V	39.00	6.61	25.46	64.50	58.48	74.00	15.52
11570.00	31.07	AV	V	39.00	6.61	25.46	51.22	45.2	54.00	8.80
17355.00	34.38	PK	V	42.26	8.81	23.60	61.85	55.83	68.20	12.37
High Channel: 5825 MHz										
5825.00	62.81	PK	H	34.23	3.73	0.00	100.77	94.75	N/A	N/A
5825.00	52.24	AV	H	34.23	3.73	0.00	90.20	84.18	N/A	N/A
5825.00	70.32	PK	V	34.23	3.73	0.00	108.28	102.26	N/A	N/A
5825.00	61.89	AV	V	34.23	3.73	0.00	99.85	93.83	N/A	N/A
5850.00	27.26	PK	V	34.24	3.75	0.00	65.25	59.23	122.20	62.97
5855.00	26.92	PK	V	34.24	3.75	0.00	64.91	58.89	110.80	51.91
5875.00	26.95	PK	V	34.25	3.77	0.00	64.97	58.95	105.20	46.25
5925.00	26.54	PK	V	34.27	3.80	0.00	64.61	58.59	68.20	9.61
11650.00	44.42	PK	V	39.00	6.64	25.41	64.65	58.63	74.00	15.37
11650.00	31.16	AV	V	39.00	6.64	25.41	51.39	45.37	54.00	8.63
17475.00	34.55	PK	V	42.96	8.84	23.48	62.87	56.85	68.20	11.35

802.11a, Chain 1:

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Extrapolation result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector	Polar (H/V)	Fac vhtor (dB/m)						
Low Channel: 5745 MHz										
5745.00	61.44	PK	H	34.20	3.69	0.00	99.33	93.31	N/A	N/A
5745.00	51.28	AV	H	34.20	3.69	0.00	89.17	83.15	N/A	N/A
5745.00	69.38	PK	V	34.20	3.69	0.00	107.27	101.25	N/A	N/A
5745.00	60.80	AV	V	34.20	3.69	0.00	98.69	92.67	N/A	N/A
5725.00	27.01	PK	V	34.19	3.69	0.00	64.89	58.87	122.20	63.33
5720.00	26.69	PK	V	34.19	3.69	0.00	64.57	58.55	110.80	52.25
5700.00	26.64	PK	V	34.18	3.68	0.00	64.50	58.48	105.20	46.72
5650.00	26.20	PK	V	34.16	3.63	0.00	63.99	57.97	68.20	10.23
11490.00	43.98	PK	V	38.99	6.59	25.51	64.05	58.03	74.00	15.97
11490.00	30.82	AV	V	38.99	6.59	25.51	50.89	44.87	54.00	9.13
17235.00	34.11	PK	V	41.56	8.78	23.72	60.73	54.71	68.20	13.49
Middle Channel: 5785 MHz										
5785.00	61.57	PK	H	34.21	3.71	0.00	99.49	93.47	N/A	N/A
5785.00	51.01	AV	H	34.21	3.71	0.00	88.93	82.91	N/A	N/A
5785.00	69.73	PK	V	34.21	3.71	0.00	107.65	101.63	N/A	N/A
5785.00	61.48	AV	V	34.21	3.71	0.00	99.40	93.38	N/A	N/A
11570.00	43.97	PK	V	39.00	6.61	25.46	64.12	58.1	74.00	15.90
11570.00	30.84	AV	V	39.00	6.61	25.46	50.99	44.97	54.00	9.03
17355.00	34.04	PK	V	42.26	8.81	23.60	61.51	55.49	68.20	12.71
High Channel: 5825 MHz										
5825.00	62.49	PK	H	34.23	3.73	0.00	100.45	94.43	N/A	N/A
5825.00	51.98	AV	H	34.23	3.73	0.00	89.94	83.92	N/A	N/A
5825.00	70.04	PK	V	34.23	3.73	0.00	108.00	101.98	N/A	N/A
5825.00	61.62	AV	V	34.23	3.73	0.00	99.58	93.56	N/A	N/A
5850.00	26.87	PK	V	34.24	3.75	0.00	64.86	58.84	122.20	63.36
5855.00	26.69	PK	V	34.24	3.75	0.00	64.68	58.66	110.80	52.14
5875.00	26.67	PK	V	34.25	3.77	0.00	64.69	58.67	105.20	46.53
5925.00	26.33	PK	V	34.27	3.80	0.00	64.40	58.38	68.20	9.82
11650.00	44.08	PK	V	39.00	6.64	25.41	64.31	58.29	74.00	15.71
11650.00	30.81	AV	V	39.00	6.64	25.41	51.04	45.02	54.00	8.98
17475.00	34.32	PK	V	42.96	8.84	23.48	62.64	56.62	68.20	11.58

802.11n ht20(2Tx Beamforming mode 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	Polar (H/V)	Fac vhtor (dB/m)						
Low Channel: 5745 MHz										
5745.00	63.59	PK	H	34.20	3.69	0.00	101.48	95.46	N/A	N/A
5745.00	52.56	AV	H	34.20	3.69	0.00	90.45	84.43	N/A	N/A
5745.00	70.01	PK	V	34.20	3.69	0.00	107.90	101.88	N/A	N/A
5745.00	61.56	AV	V	34.20	3.69	0.00	99.45	93.43	N/A	N/A
5725.00	27.32	PK	V	34.19	3.69	0.00	65.20	59.18	122.20	63.02
5720.00	26.82	PK	V	34.19	3.69	0.00	64.70	58.68	110.80	52.12
5700.00	26.99	PK	V	34.18	3.68	0.00	64.85	58.83	105.20	46.37
5650.00	26.53	PK	V	34.16	3.63	0.00	64.32	58.3	68.20	9.90
11490.00	44.22	PK	V	38.99	6.59	25.51	64.29	58.27	74.00	15.73
11490.00	31.13	AV	V	38.99	6.59	25.51	51.20	45.18	54.00	8.82
17235.00	34.43	PK	V	41.56	8.78	23.72	61.05	55.03	68.20	13.17
Middle Channel: 5785 MHz										
5785.00	61.92	PK	H	34.21	3.71	0.00	99.84	93.82	N/A	N/A
5785.00	51.91	AV	H	34.21	3.71	0.00	89.83	83.81	N/A	N/A
5785.00	70.21	PK	V	34.21	3.71	0.00	108.13	102.11	N/A	N/A
5785.00	61.98	AV	V	34.21	3.71	0.00	99.90	93.88	N/A	N/A
11570.00	44.56	PK	V	39.00	6.61	25.46	64.71	58.69	74.00	15.31
11570.00	31.36	AV	V	39.00	6.61	25.46	51.51	45.49	54.00	8.51
17355.00	34.51	PK	V	42.26	8.81	23.60	61.98	55.96	68.20	12.24
High Channel: 5825 MHz										
5825.00	64.21	PK	H	34.23	3.73	0.00	102.17	96.15	N/A	N/A
5825.00	52.98	AV	H	34.23	3.73	0.00	90.94	84.92	N/A	N/A
5825.00	70.58	PK	V	34.23	3.73	0.00	108.54	102.52	N/A	N/A
5825.00	62.02	AV	V	34.23	3.73	0.00	99.98	93.96	N/A	N/A
5850.00	27.12	PK	V	34.24	3.75	0.00	65.11	59.09	122.20	63.11
5855.00	26.85	PK	V	34.24	3.75	0.00	64.84	58.82	110.80	51.98
5875.00	26.69	PK	V	34.25	3.77	0.00	64.71	58.69	105.20	46.51
5925.00	26.85	PK	V	34.27	3.80	0.00	64.92	58.9	68.20	9.30
11650.00	44.37	PK	V	39.00	6.64	25.41	64.60	58.58	74.00	15.42
11650.00	31.28	AV	V	39.00	6.64	25.41	51.51	45.49	54.00	8.51
17475.00	34.61	PK	V	42.96	8.84	23.48	62.93	56.91	68.20	11.29

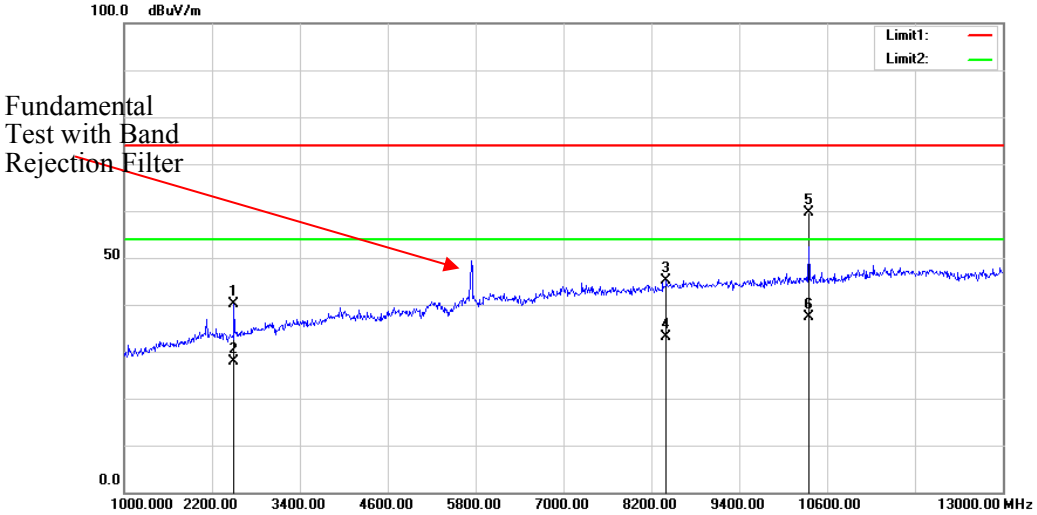
802.11n ht40(2Tx Beamforming mode was the worst):

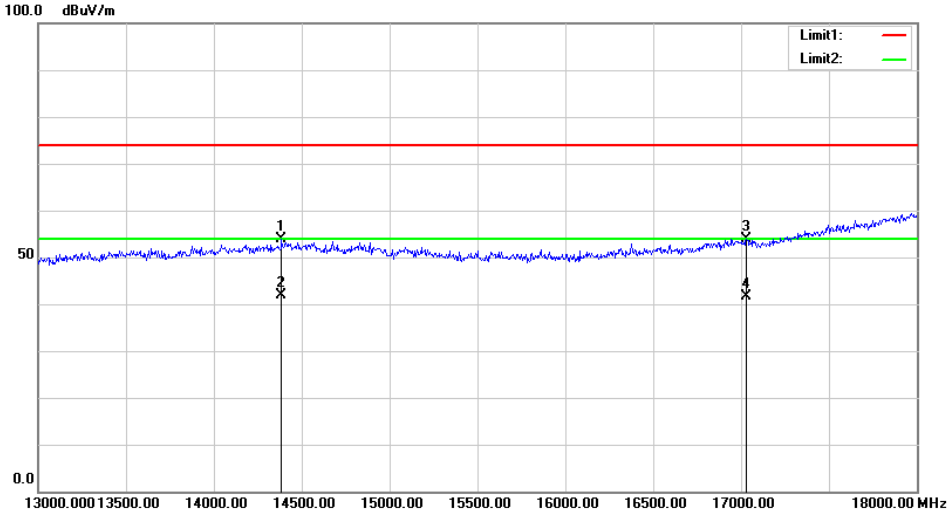
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Extrapolation result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector	Polar (H/V)	Fac vhtor (dB/m)						
Low Channel: 5755 MHz										
5755.00	64.49	PK	H	34.20	3.70	0.00	102.39	96.37	N/A	N/A
5755.00	52.75	AV	H	34.20	3.70	0.00	90.65	84.63	N/A	N/A
5755.00	70.23	PK	V	34.20	3.70	0.00	108.13	102.11	N/A	N/A
5755.00	62.21	AV	V	34.20	3.70	0.00	100.11	94.09	N/A	N/A
5725.00	27.32	PK	V	34.19	3.69	0.00	65.20	59.18	122.20	63.02
5720.00	26.79	PK	V	34.19	3.69	0.00	64.67	58.65	110.80	52.15
5700.00	26.85	PK	V	34.18	3.68	0.00	64.71	58.69	105.20	46.51
5650.00	26.65	PK	V	34.16	3.63	0.00	64.44	58.42	68.20	9.78
11510.00	44.49	PK	V	39.00	6.59	25.50	64.58	58.56	74.00	15.44
11510.00	31.65	AV	V	39.00	6.59	25.50	51.74	45.72	54.00	8.28
17265.00	34.33	PK	V	41.74	8.79	23.69	61.17	55.15	68.20	13.05
High Channel: 5795 MHz										
5795.00	64.29	PK	H	34.22	3.71	0.00	102.22	96.2	N/A	N/A
5795.00	52.21	AV	H	34.22	3.71	0.00	90.14	84.12	N/A	N/A
5795.00	69.58	PK	V	34.22	3.71	0.00	107.51	101.49	N/A	N/A
5795.00	61.45	AV	V	34.22	3.71	0.00	99.38	93.36	N/A	N/A
5850.00	26.98	PK	V	34.24	3.75	0.00	64.97	58.95	122.20	63.25
5855.00	26.72	PK	V	34.24	3.75	0.00	64.71	58.69	110.80	52.11
5875.00	26.92	PK	V	34.25	3.77	0.00	64.94	58.92	105.20	46.28
5925.00	26.78	PK	V	34.27	3.80	0.00	64.85	58.83	68.20	9.37
11590.00	43.97	PK	V	39.00	6.62	25.45	64.14	58.12	74.00	15.88
11590.00	31.05	AV	V	39.00	6.62	25.45	51.22	45.2	54.00	8.80
17385.00	34.20	PK	V	42.43	8.82	23.57	61.88	55.86	68.20	12.34

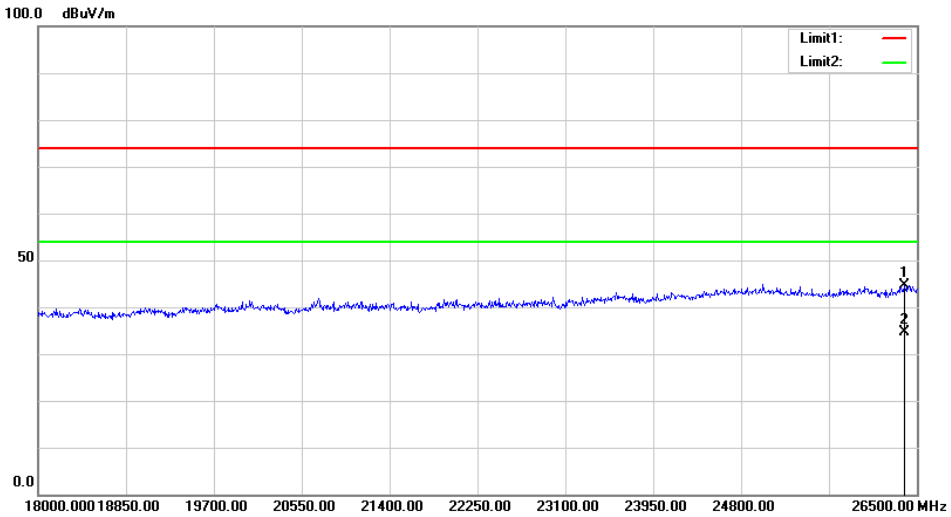
802.11ac vht80(2Tx Beamforming mode was the worst):

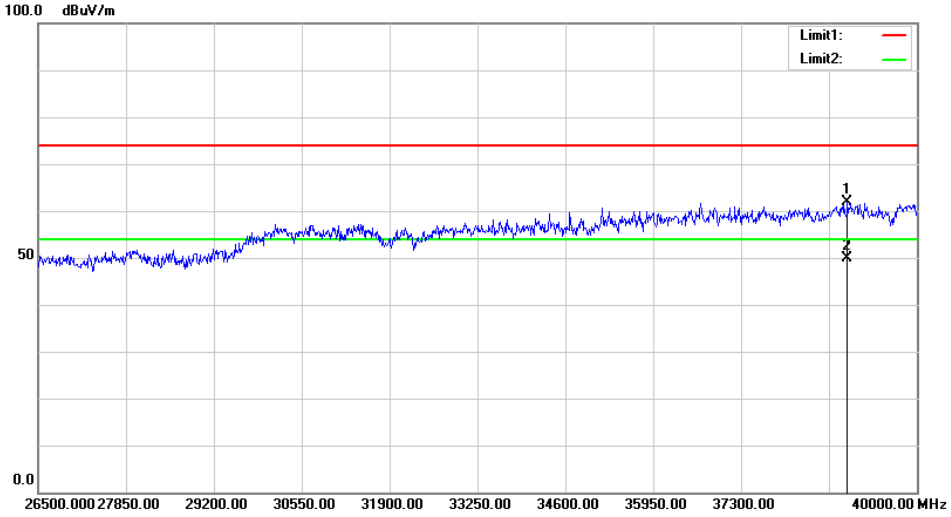
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Extrapolation result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector	Polar (H/V)	Fac vhtor (dB/m)						
Middle Channel: 5775 MHz										
5775.00	64.75	PK	H	34.21	3.70	0.00	102.66	96.64	N/A	N/A
5775.00	52.35	AV	H	34.21	3.70	0.00	90.26	84.24	N/A	N/A
5775.00	69.98	PK	V	34.21	3.70	0.00	107.89	101.87	N/A	N/A
5775.00	61.54	AV	V	34.21	3.70	0.00	99.45	93.43	N/A	N/A
5725.00	26.88	PK	V	34.19	3.69	0.00	64.76	58.74	122.20	63.46
5720.00	26.72	PK	V	34.19	3.69	0.00	64.60	58.58	110.80	52.22
5700.00	26.89	PK	V	34.18	3.68	0.00	64.75	58.73	105.20	46.47
5650.00	26.89	PK	V	34.16	3.63	0.00	64.68	58.66	68.20	9.54
5850.00	26.87	PK	V	34.24	3.75	0.00	64.86	58.84	122.20	63.36
5855.00	27.05	PK	V	34.24	3.75	0.00	65.04	59.02	110.80	51.78
5875.00	26.98	PK	V	34.25	3.77	0.00	65.00	58.98	105.20	46.22
5925.00	26.79	PK	V	34.27	3.80	0.00	64.86	58.84	68.20	9.36
11550.00	44.19	PK	V	39.00	6.61	25.48	64.32	58.3	74.00	15.70
11550.00	31.03	AV	V	39.00	6.61	25.48	51.16	45.14	54.00	8.86
17325.00	34.22	PK	V	42.09	8.80	23.63	61.48	55.46	68.20	12.74

Test Plots(For worst mode 802.11a chain 0 5745MHz)
Horizontal

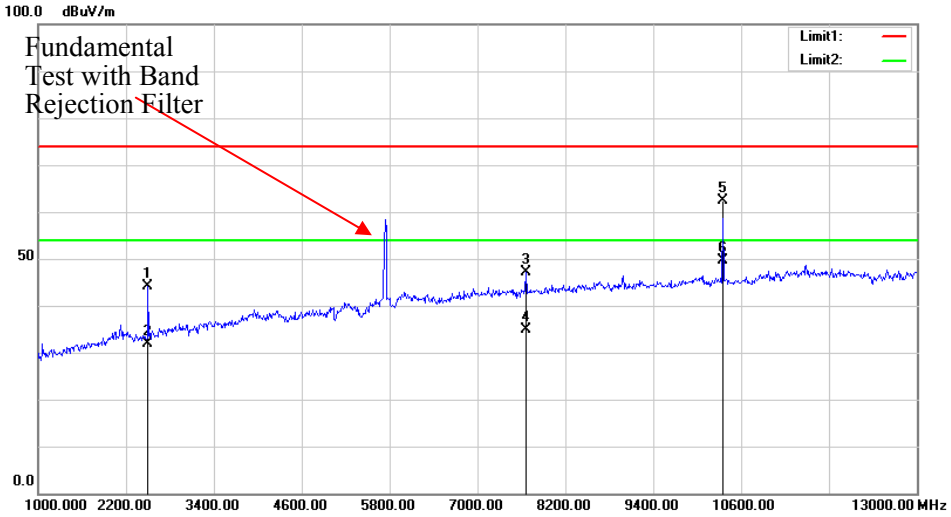


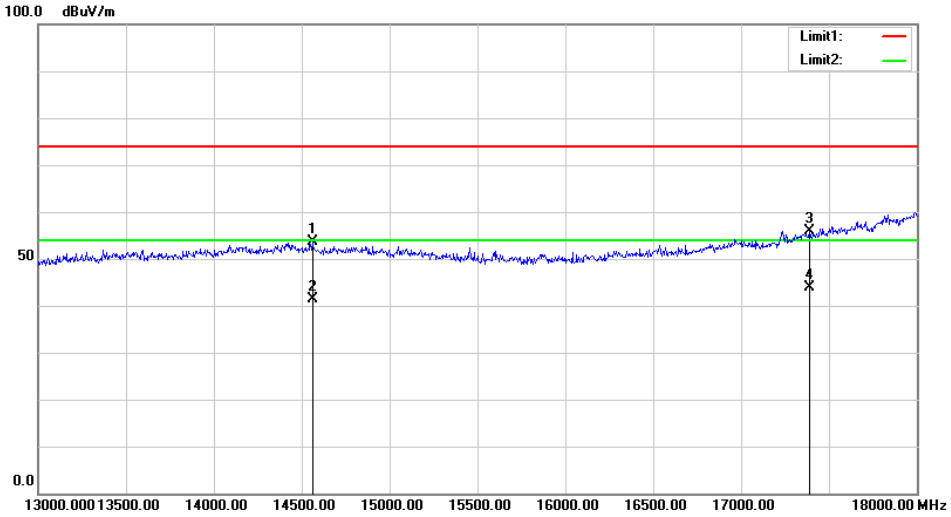


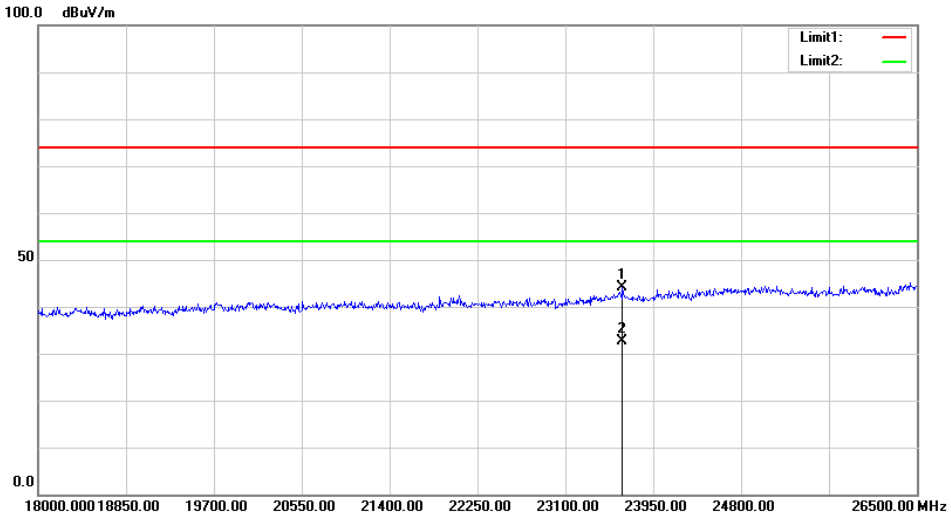


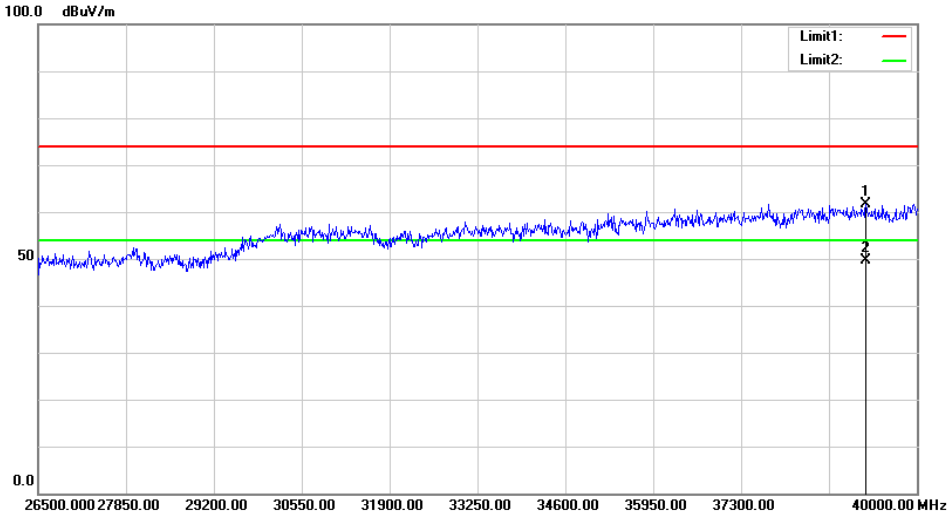

100.0 dBuV/m
Limit1:
Limit2:
50
0.0
26500.000 27850.00 29200.00 30550.00 31900.00 33250.00 34600.00 35950.00 37300.00 40000.00 MHz

Vertical


100.0 dBuV/m
Fundamental
Test with Band
Rejection Filter
Limit1:
Limit2:
50
0.0
1000.000 2200.00 3400.00 4600.00 5800.00 7000.00 8200.00 9400.00 10600.00 13000.00 MHz


100.0 dBuV/m
Limit1:
Limit2:
50
0.0
13000.000 13500.00 14000.00 14500.00 15000.00 15500.00 16000.00 16500.00 17000.00 18000.00 MHz


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

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

Applicable Standard

15.407(a) (e).

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	200256	2019-05-09	2020-05-09
R&S	Spectrum Analyzer	FSU 26	200256	2020-05-09	2021-05-09
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:	26.3～26.5 °C
Relative Humidity:	62～71%
ATM Pressure:	100.5～101.4 kPa
Tester:	Chris Mo
Test Date:	2020-04-20～2020-06-01

Test Result: Compliance.

Please refer to the following tables and plots.

Test mode: Transmitting (test was only performed at chain 0)

5150-5250MHz:

Mode	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11 a	5180	24.551	16.640
	5200	24.423	16.640
	5240	24.628	16.640
802.11n ht20	5180	19.920	17.680
	5200	19.920	17.760
	5240	20.769	17.680
802.11n ht40	5190	40.960	36.640
	5230	40.960	36.480
802.11ac vht80	5210	102.821	75.840

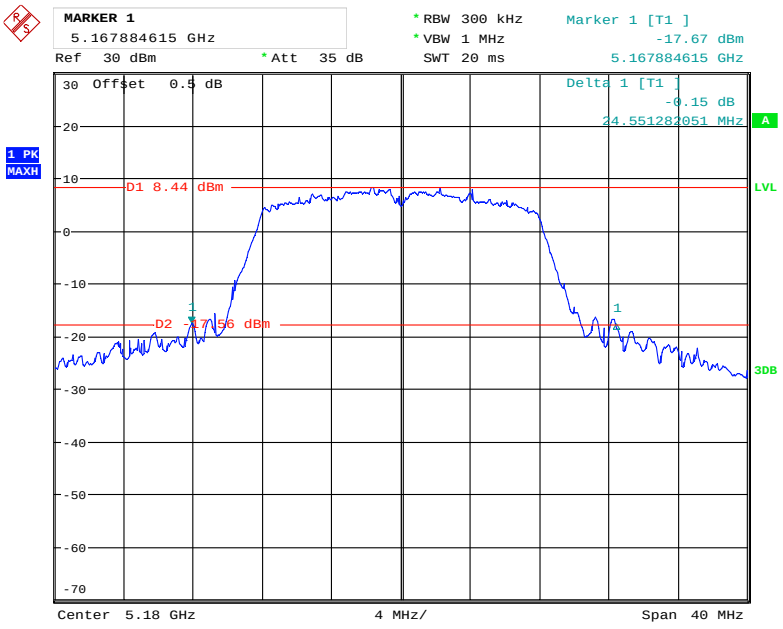
5725-5850MHz:

Mode	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	6 dB Emission Bandwidth Limits (MHz)	99% Occupied Bandwidth (MHz)
802.11 a	5745	16.240	≥0.5	18.560
	5785	16.000	≥0.5	17.440
	5825	16.400	≥0.5	17.280
802.11n ht20	5745	17.280	≥0.5	17.840
	5785	17.520	≥0.5	17.840
	5825	17.120	≥0.5	17.840
802.11n ht40	5755	35.520	≥0.5	37.120
	5795	35.520	≥0.5	37.120
802.11ac vht80	5775	75.840	≥0.5	77.120

Note: the 99% Occupied Bandwidth have not fall into the band 5250-5350MHz or 5470-5725MHz, please refer to the test plots of 99% Occupied Bandwidth.

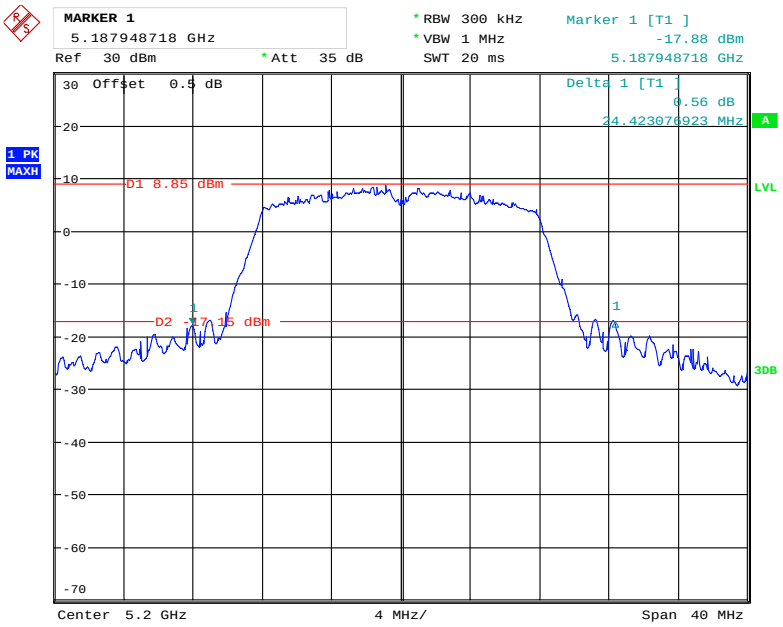
5150-5250MHz:
26dB Emission Bandwidth:

802.11a Low Channel



Date: 1.JUN.2020 12:41:01

802.11a Middle Channel



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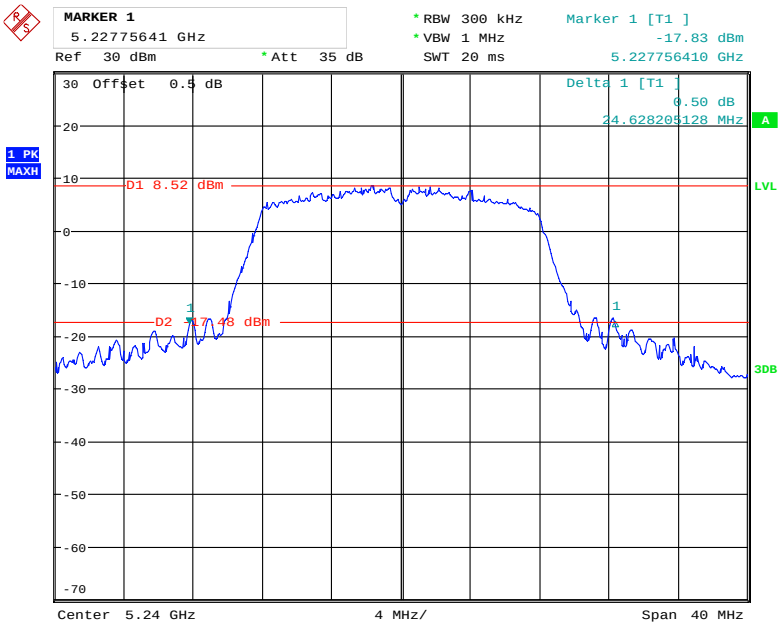
802.11a High Channel



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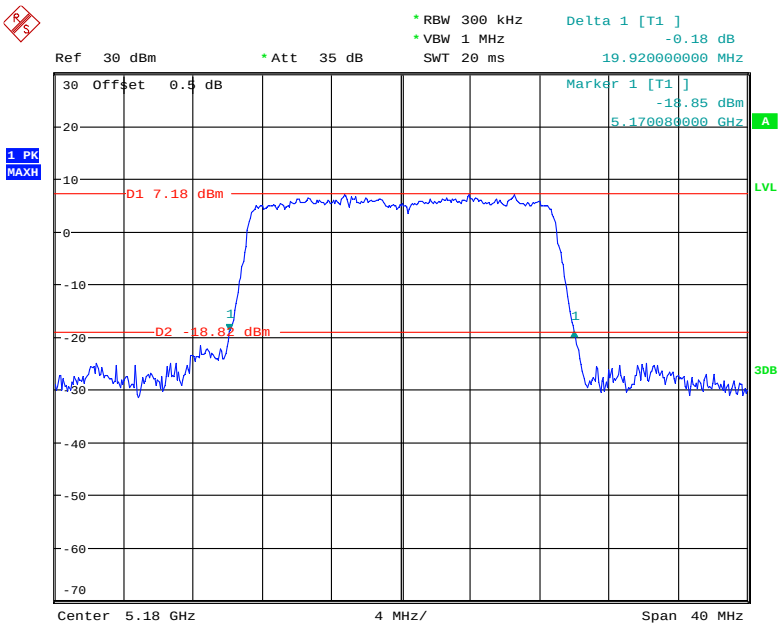
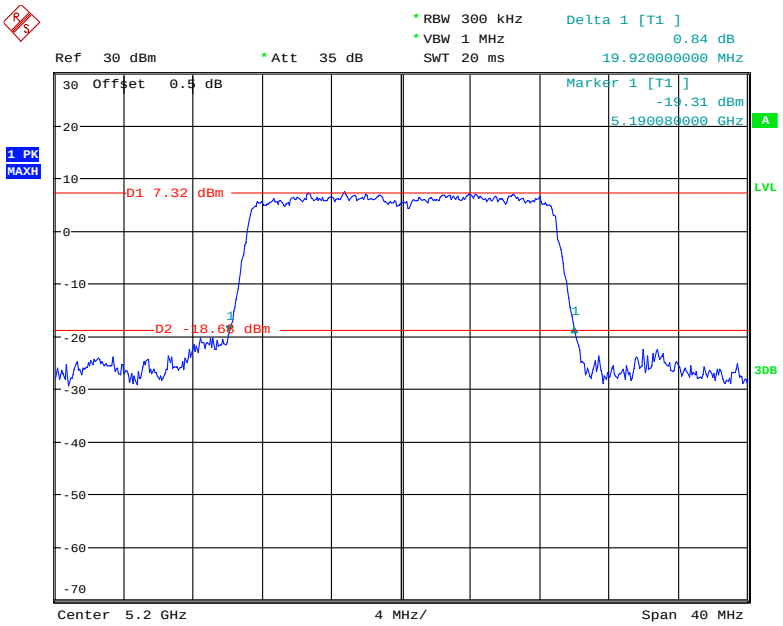
802.11n ht20 Low Channel



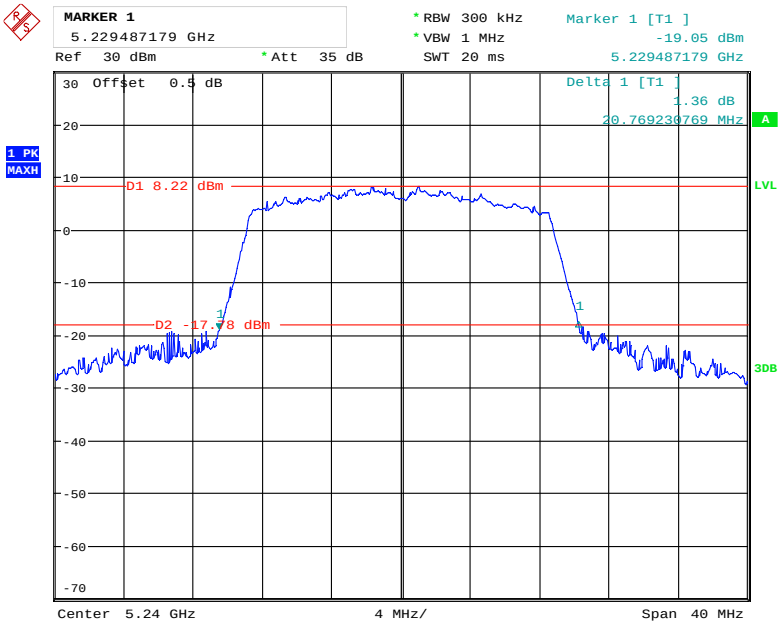
Date: 20.APR.2020 17:01:11

802.11n ht20 Middle Channel



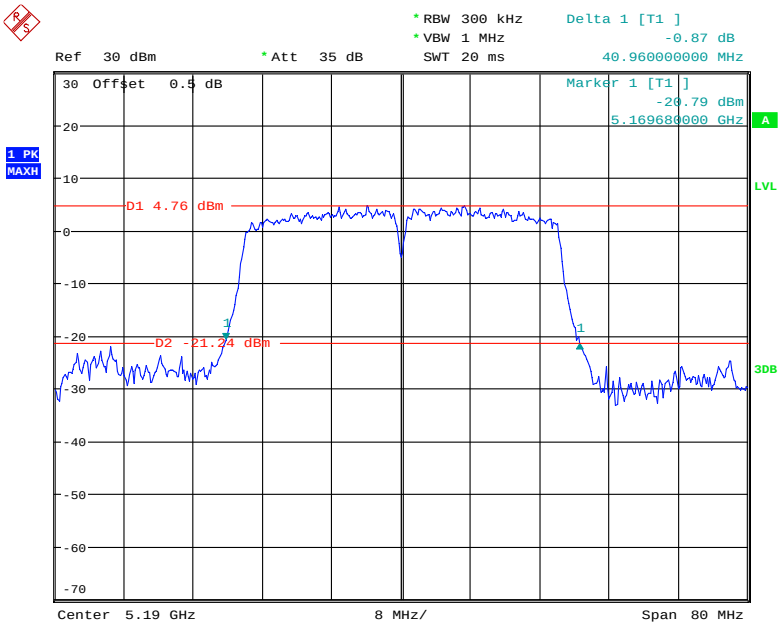
Date: 20.APR.2020 17:00:10

802.11n ht20 High Channel



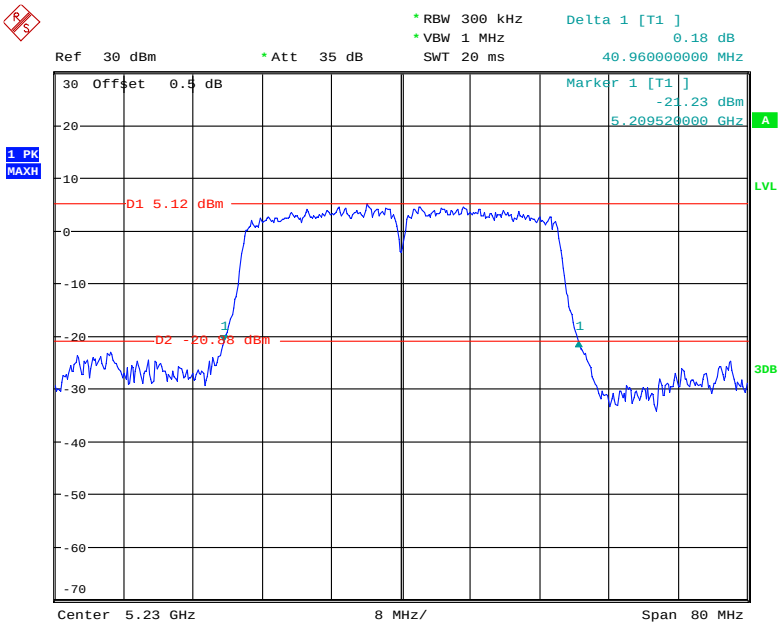
Date: 1.JUN.2020 12:34:05

802.11n ht40 Low Channel



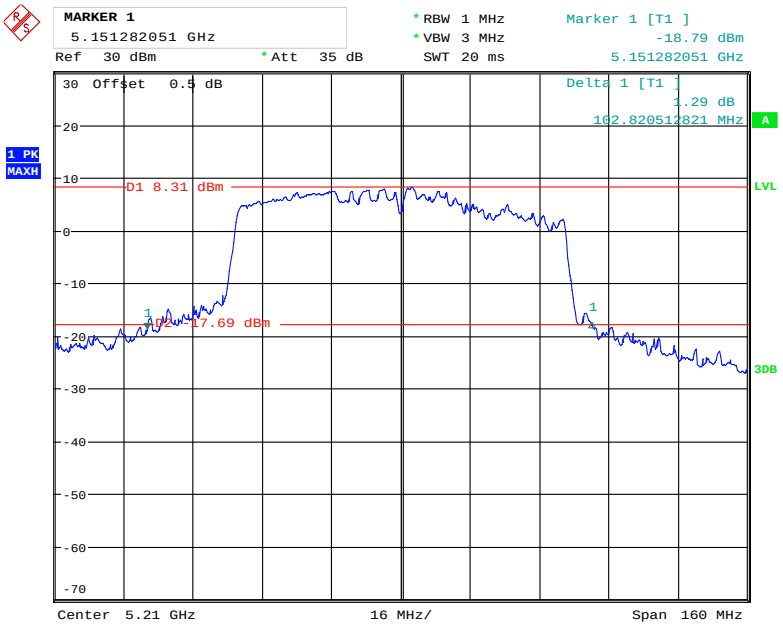
Date: 20.APR.2020 17:07:18

802.11n ht40 High Channel



Date: 20.APR.2020 17:08:12

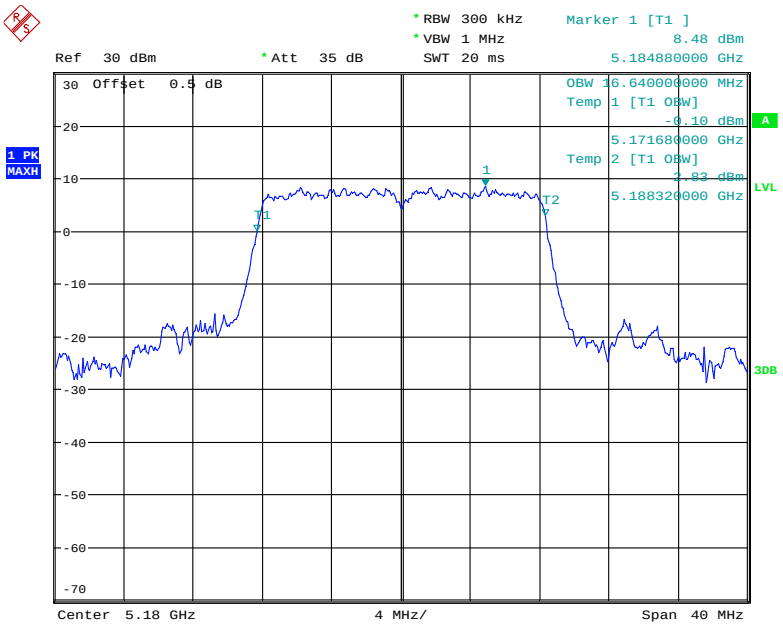
802.11ac vht80 Middle Channel



Date: 1.JUN.2020 12:29:20

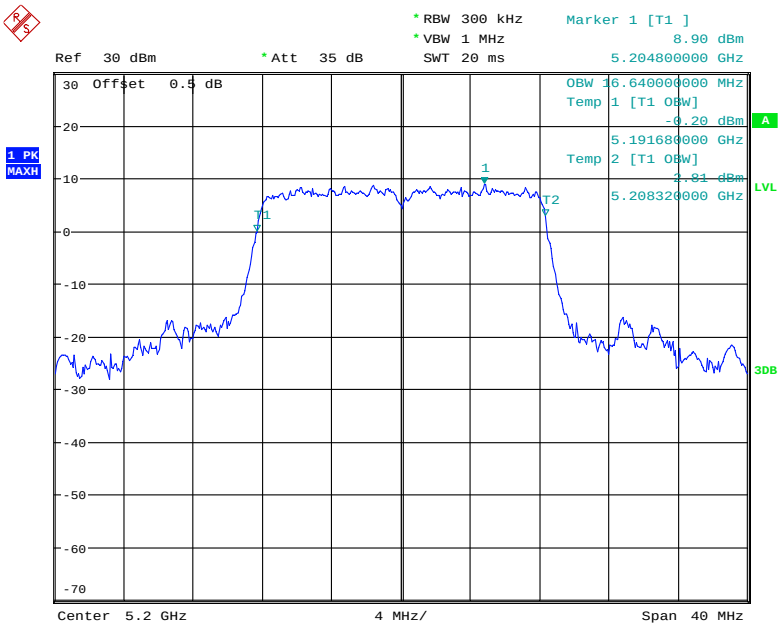
99% Occupied Bandwidth:

802.11a Low Channel



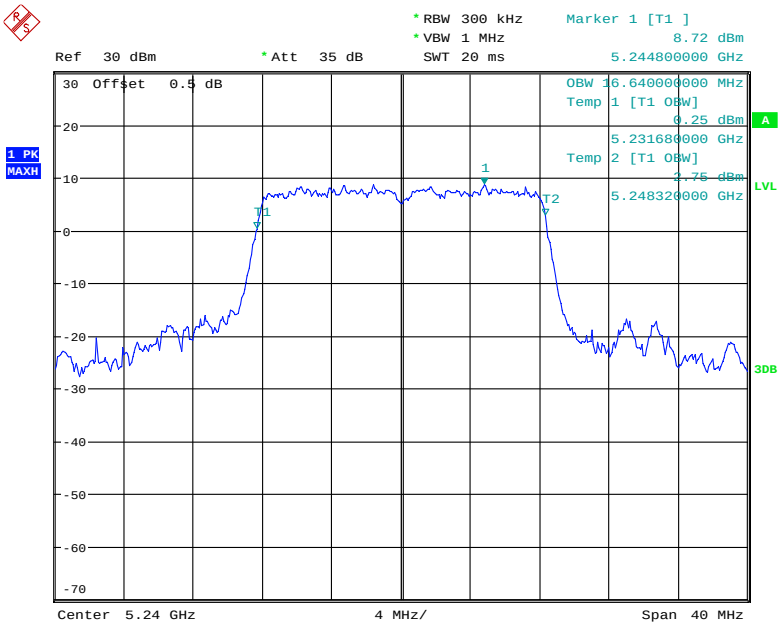
Date: 20.APR.2020 16:50:54

802.11a Middle Channel



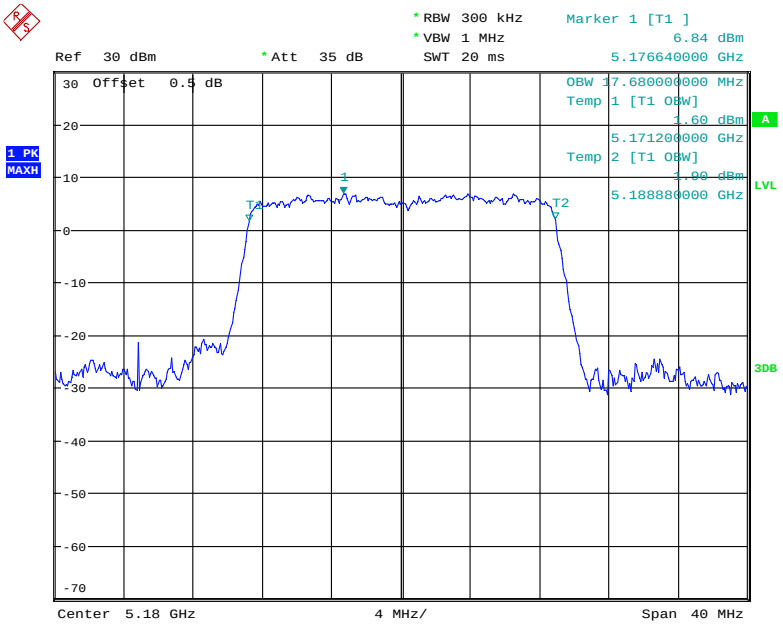
Date: 20.APR.2020 16:53:24

802.11a High Channel



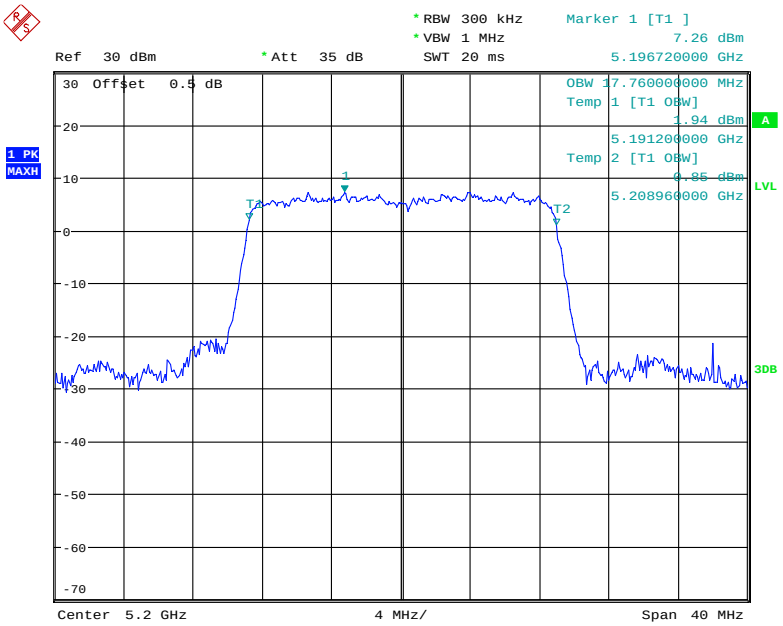
Date: 20.APR.2020 16:58:26

802.11n ht20 Low Channel



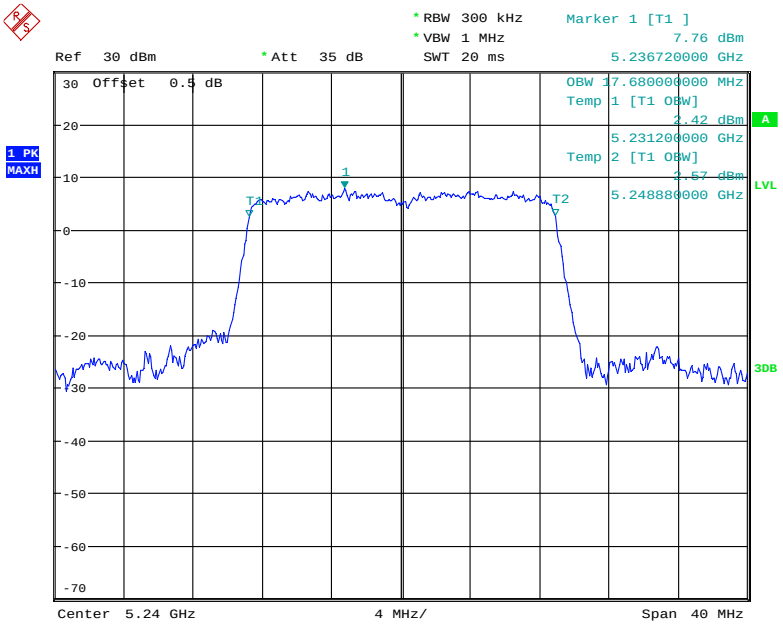
Date: 20.APR.2020 17:01:24

802.11n ht20 Middle Channel



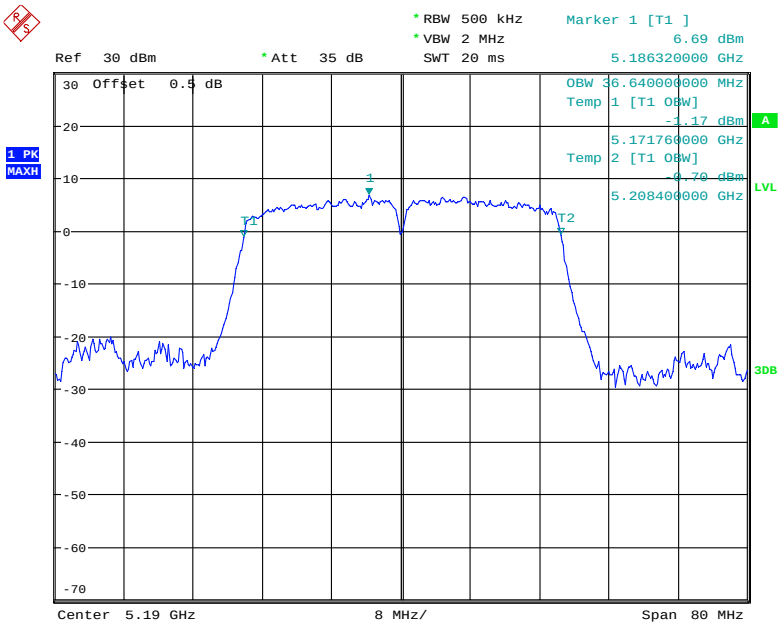
Date: 20.APR.2020 17:00:22

802.11n ht20 High Channel



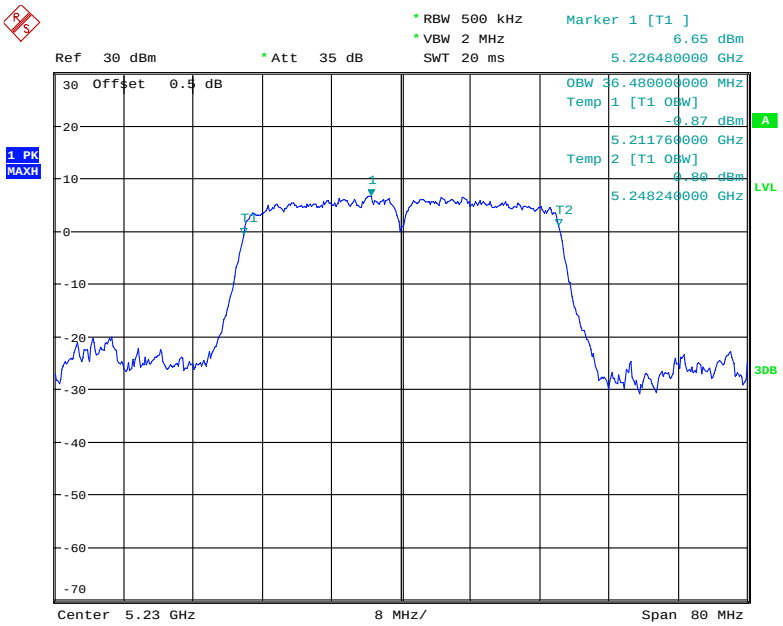
Date: 20.APR.2020 16:59:29

802.11n ht40 Low Channel



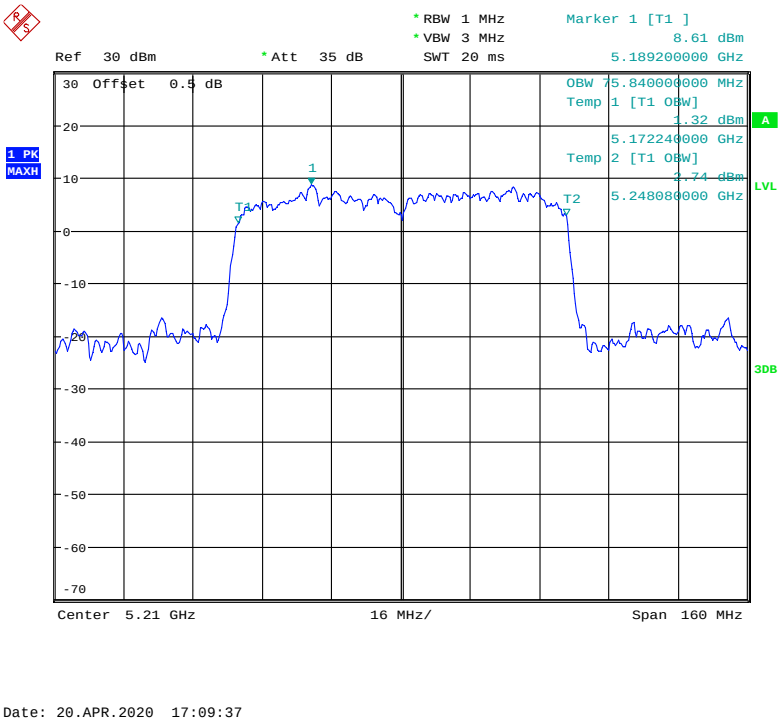
Date: 20.APR.2020 17:07:30

802.11n ht40 High Channel



Date: 20.APR.2020 17:08:25

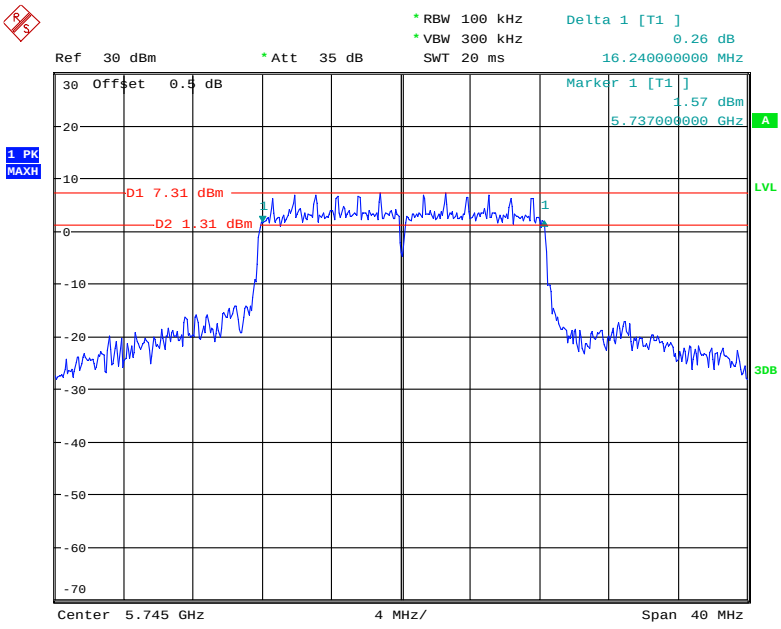
802.11ac vht80 Middle Channel



Date: 20.APR.2020 17:09:37

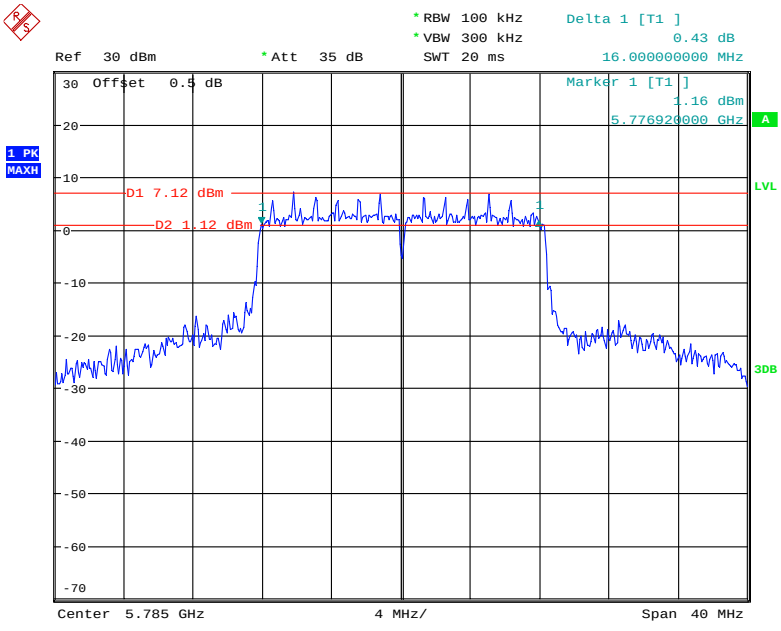
5725-5850MHz:
6dB Emission Bandwidth:

802.11a Low Channel



Date: 20.APR.2020 17:21:29

802.11a Middle Channel



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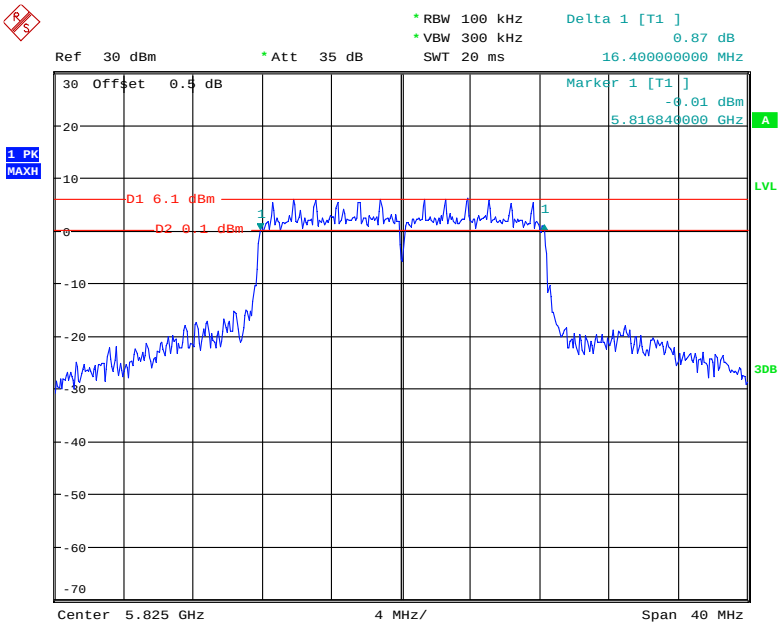
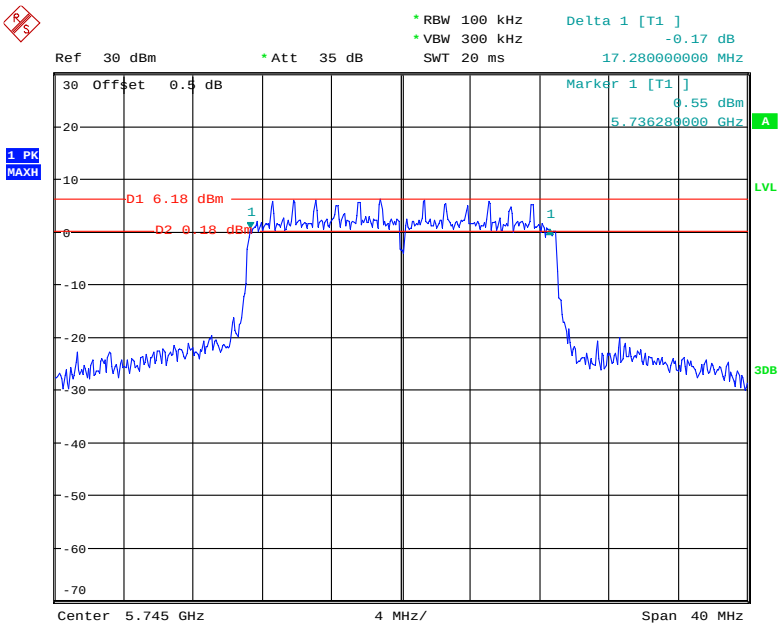
802.11a High Channel



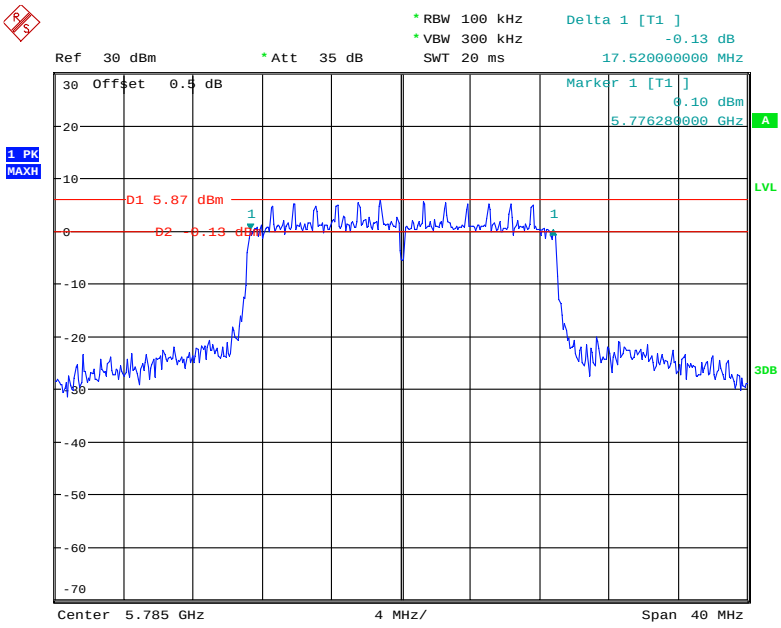
Date: 20.APR.2020 17:24:35

802.11n ht20 Low Channel



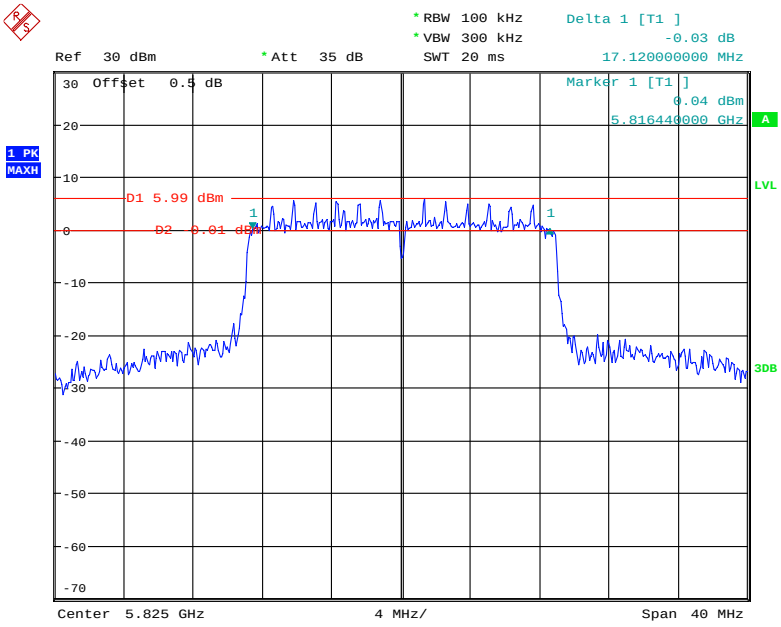
Date: 20.APR.2020 17:28:17

802.11n ht20 Middle Channel



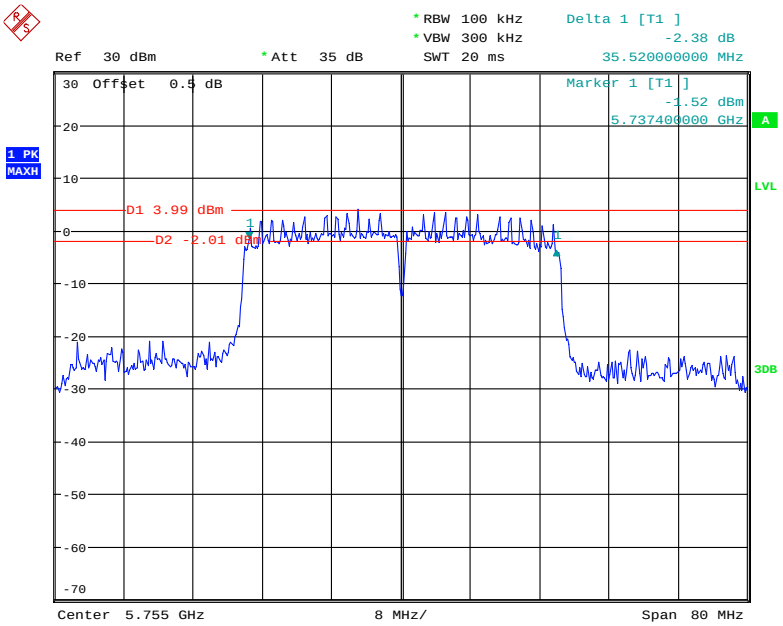
Date: 20.APR.2020 17:27:14

802.11n ht20 High Channel



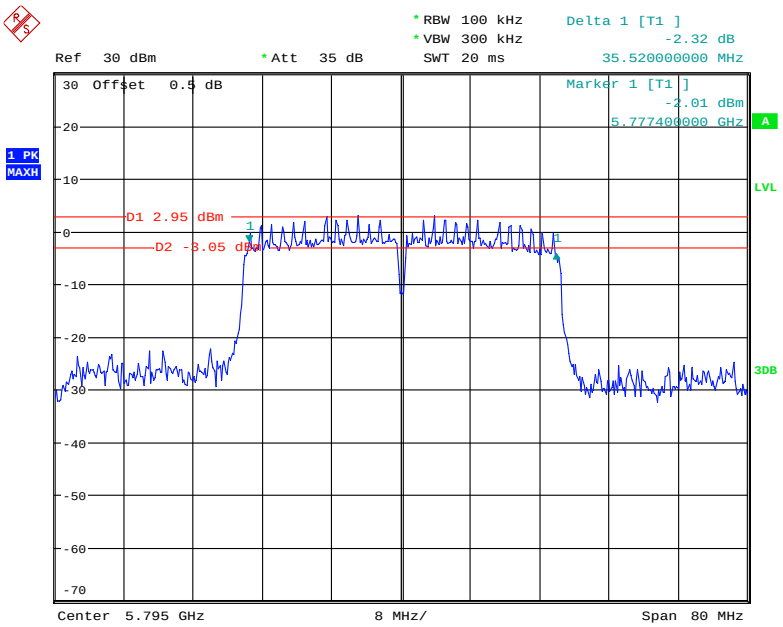
Date: 20.APR.2020 17:26:11

802.11n ht40 Low Channel



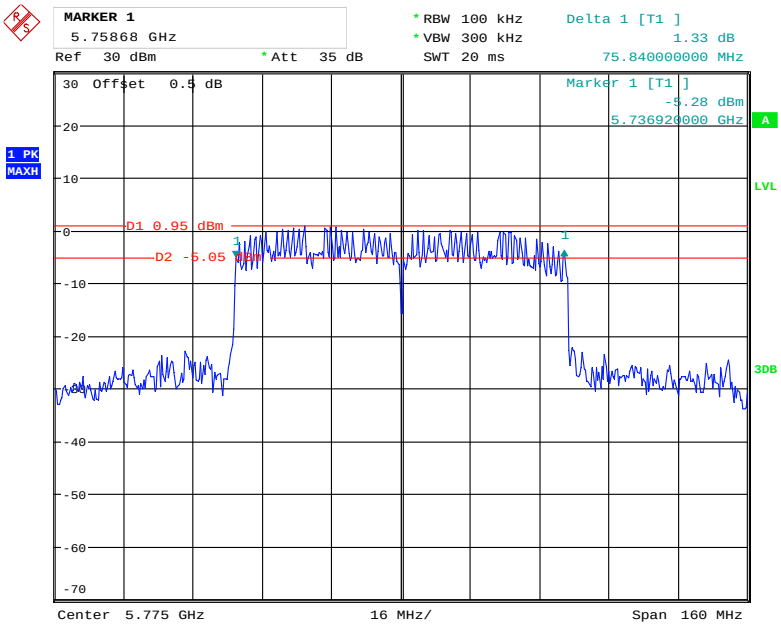
Date: 20.APR.2020 17:29:43

802.11n ht40 High Channel



Date: 20.APR.2020 17:30:45

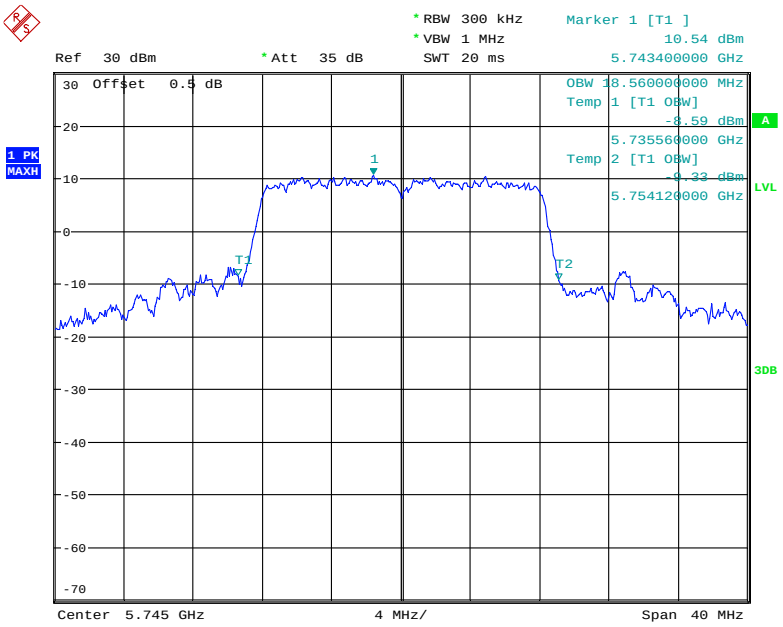
802.11ac vht80 Middle Channel



Date: 20.APR.2020 17:43:23

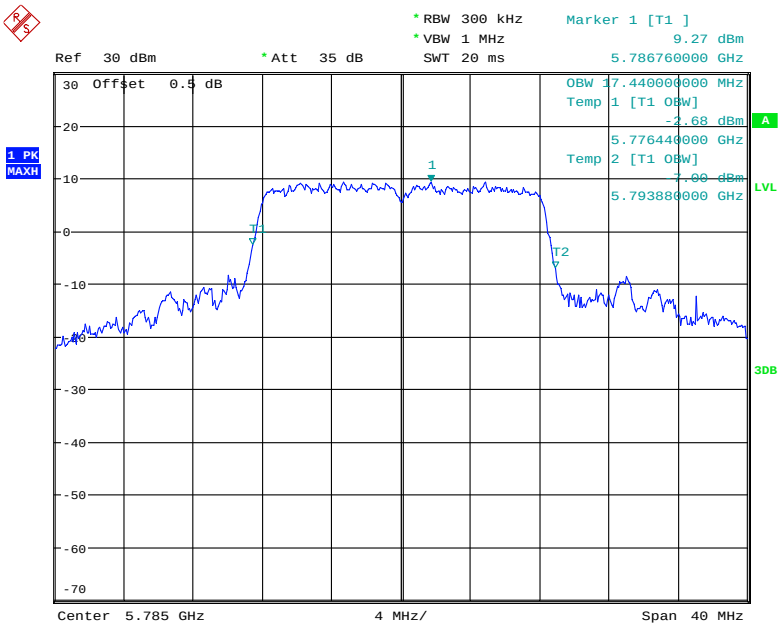
99% Occupied Bandwidth:

802.11a Low Channel



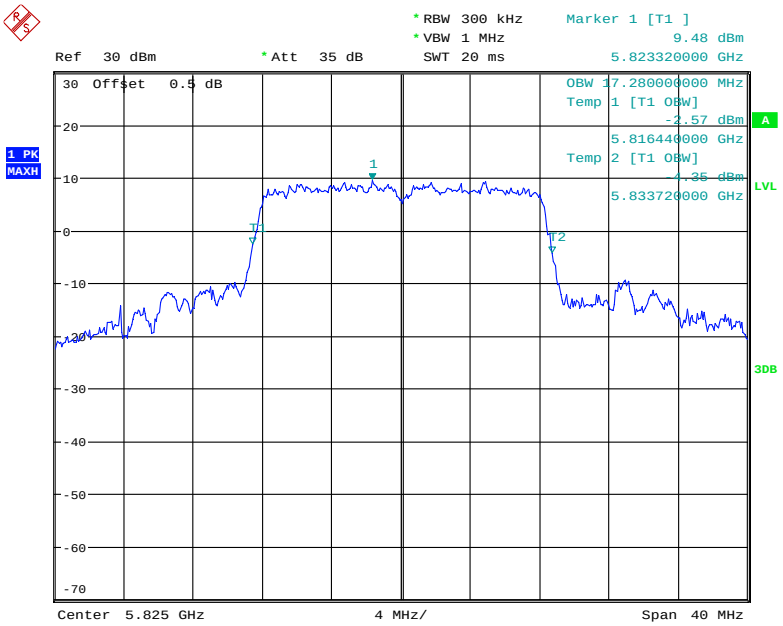
Date: 20.APR.2020 17:22:15

802.11a Middle Channel



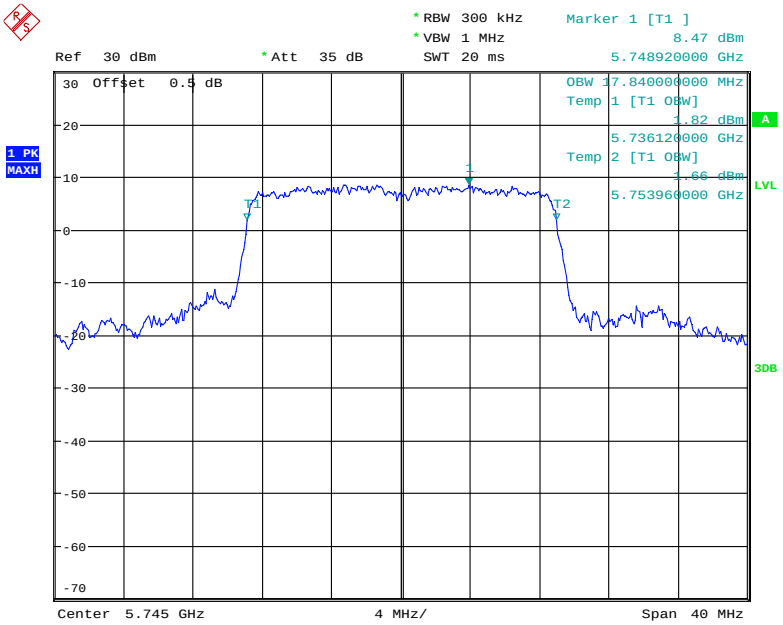
Date: 20.APR.2020 17:23:26

802.11a High Channel



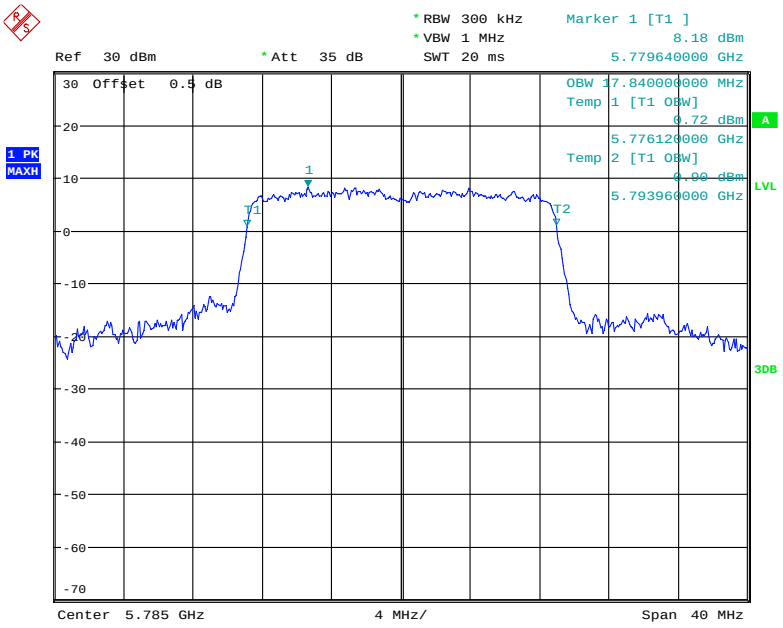
Date: 20.APR.2020 17:24:47

802.11n ht20 Low Channel



Date: 20.APR.2020 17:28:29

802.11n ht20 Middle Channel



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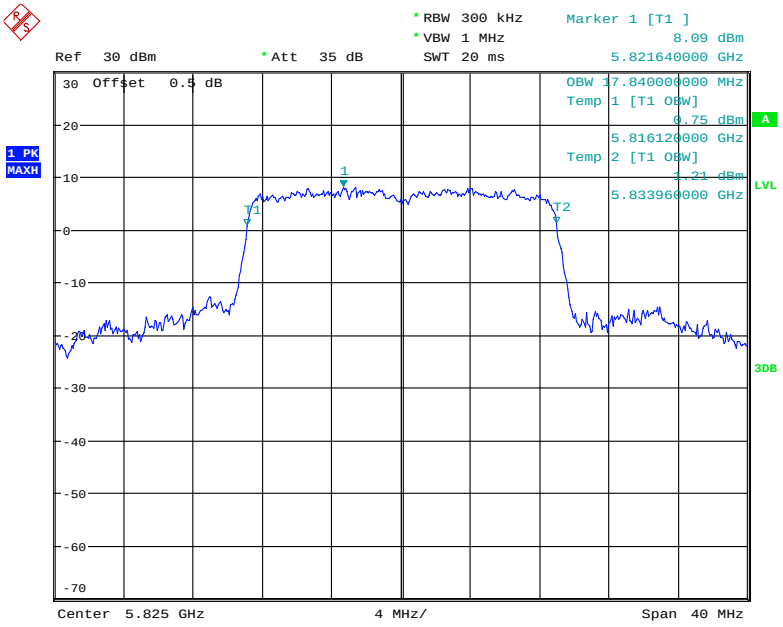
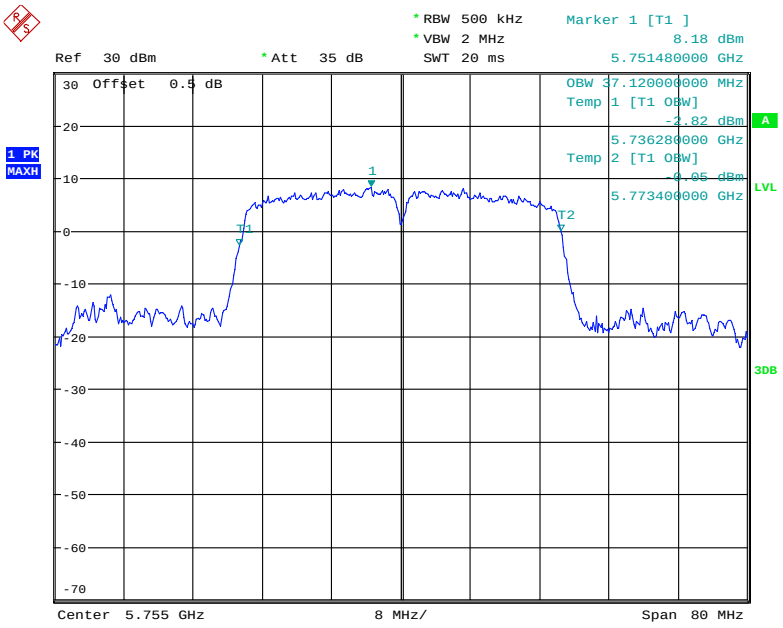


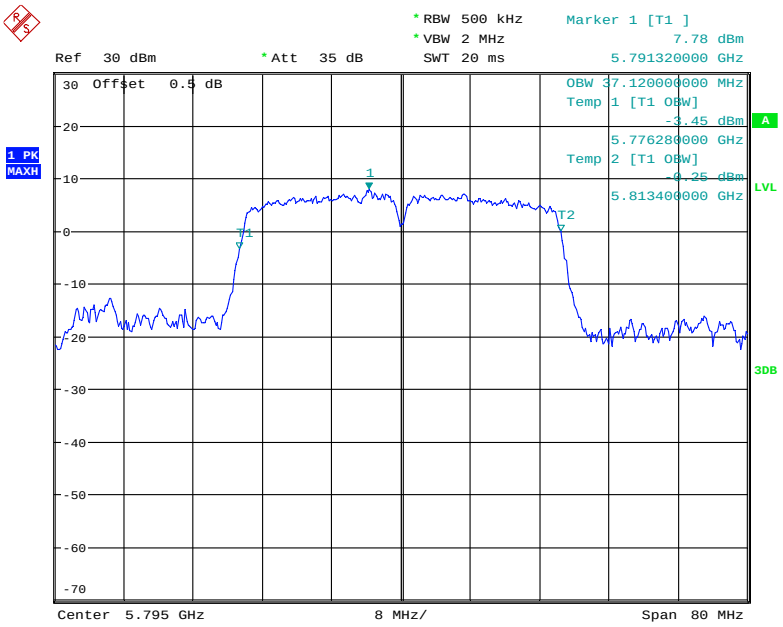
Date: 20.APR.2020 17:26:23

802.11n ht40 Low Channel



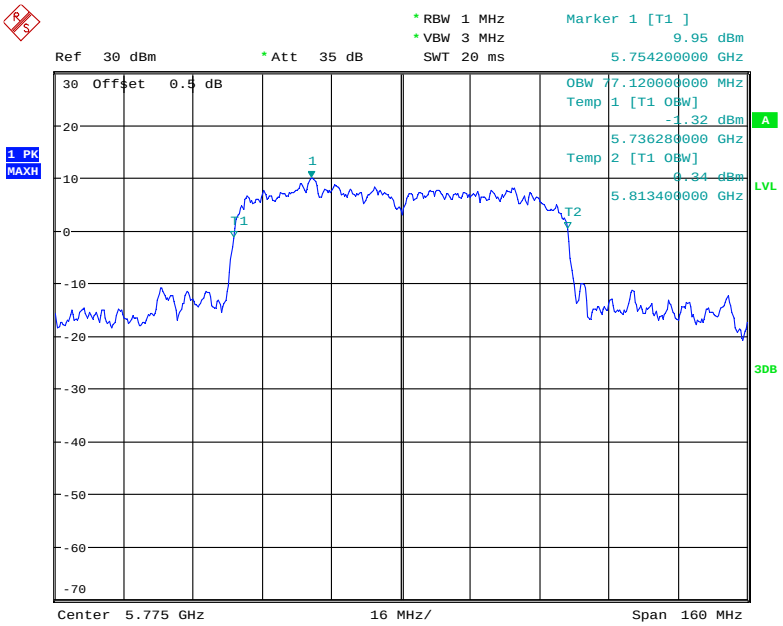
Date: 20.APR.2020 17:29:56

802.11n ht40 High Channel



Date: 20.APR.2020 17:30:57

802.11ac vht80 Middle Channel



Date: 20.APR.2020 17:43:37

FCC §15.407(a) –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.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
E-Microwave	Coaxial Attenuators	EMCA10-5RN-6	OE01203239	Each time	N/A
Unknown	Coaxial Cable	C-SJ00-0010	C0010/02	Each time	N/A
Agilent	USB Wideband Power Sensor	U2021XA	MY5425009	2019-05-09	2020-05-09

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

Test Procedure

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

Test Data

Environmental Conditions

Temperature:	26.5 °C
Relative Humidity:	71%
ATM Pressure:	101.4 kPa
Tester:	Chris Mo
Test Date:	2020-04-20

Test Mode: Transmitting

Band	Mode	Frequency (MHz)	Conducted Average Output Power (dBm)			Limit For Non-beamforming (dBm)	Limit For Beamforming (dBm)
			Chain 0	Chain 1	Total		
5150 - 5250 MHz	802.11 a	5180	17.40	16.65	/	30	/
		5200	17.81	16.87	/	30	/
		5240	17.93	17.42	/	30	/
	802.11n ht20	5180	16.88	16.04	19.49	30	28
		5200	16.98	16.26	19.65	30	28
		5240	17.20	16.23	19.75	30	28
	802.11n ht40	5190	16.65	16.25	19.46	30	28
		5230	16.83	16.44	19.65	30	28
	802.11ac vht80	5210	14.54	13.56	17.09	30	28
5725 - 5850 MHz	802.11 a	5745	18.76	18.82	/	30	/
		5785	18.46	19.48	/	30	/
		5825	18.59	19.92	/	30	/
	802.11n ht20	5745	17.54	17.94	20.75	30	28
		5785	17.20	18.41	20.86	30	28
		5825	17.10	18.86	21.08	30	28
	802.11n ht40	5755	17.66	17.39	20.54	30	28
		5795	17.12	18.07	20.63	30	28
	802.11ac vht80	5775	18.66	18.17	21.43	30	28

Note:
The device is an indoor AP.
The duty cycle factor has been calculated into the test data.

The maximum antenna gain is 5dBi in 5GHz band. The device 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 $N_{ANT} \leq 4$;

So:
For Non-beamforming mode:
Directional gain = 5dBi

For Beamforming mode:
Directional gain = 5+3 =8 dBi

FCC §15.407(a) - 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.

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	FSU 26	200256	2019-05-09	2020-05-09
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:	26.5 °C
Relative Humidity:	71%
ATM Pressure:	101.4 kPa
Tester:	Chris Mo
Test Date:	2020-04-20

Test Mode: Transmitting

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

5150-5250MHz:

Mode	Frequency (MHz)	Maximum Power Spectral Density (dBm/MHz)			Limit (dBm/MHz)
		Chain 0	Chain 1	Total	
802.11a	5180	6.02	5.13	/	17
	5200	6.28	5.06	/	17
	5240	6.47	4.94	/	17
802.11n ht20	5180	5.07	4.75	7.92	12
	5200	5.13	4.19	7.70	12
	5240	5.43	4.49	8.00	12
802.11n ht40	5190	2.44	1.77	5.13	12
	5230	2.42	1.19	4.86	12
802.11ac vht80	5210	0.23	-0.24	3.01	12

5725-5850 MHz:

Mode	Frequency (MHz)	Maximum Power Spectral Density (dBm/500kHz)			Limit (dBm/500kHz)
		Chain 0	Chain 1	Total	
802.11a	5745	5.27	5.55	/	30
	5785	4.84	5.68	/	30
	5825	4.87	6.28	/	30
802.11n ht20	5745	4.78	5.04	7.92	25
	5785	4.13	5.25	7.74	25
	5825	4.43	5.59	8.06	25
802.11n ht40	5755	1.48	0.92	4.22	25
	5795	0.92	1.25	4.10	25
802.11ac vht80	5775	-0.37	0.41	3.05	25

Note:
The maximum antenna gain is 5.0dBi in 5GHz band. And beamforming gain is 3dBi.The device employed 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:

$$\text{Array Gain} = 10 \log(N_{ANT}/N_{SS}) \text{ dB}.$$

So:

Directional gain = G_{ANT} + Array Gain = 5dBi+10*log(2/1)=8 dBi for Non-beamforming mode

Directional gain = G_{ANT} + Array Gain = 5dBi+3+10*log(2/1)=11 dBi for Beamforming mode

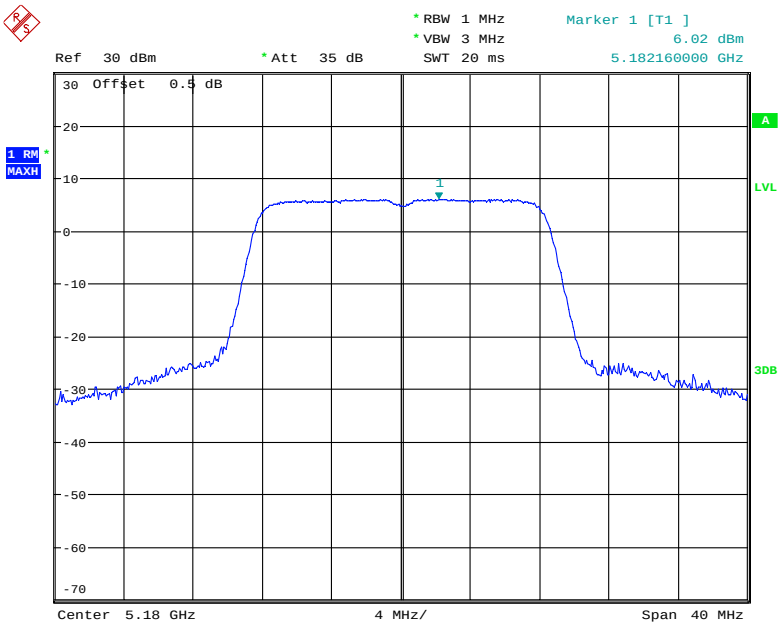
The worst limit Beamforming mode was used in the table.

For 5.8GHz band, If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 KHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.

Method SA-3 in KDB 789033 D02 General UNII Test Procedures New Rules v02r01was used for PSD test.

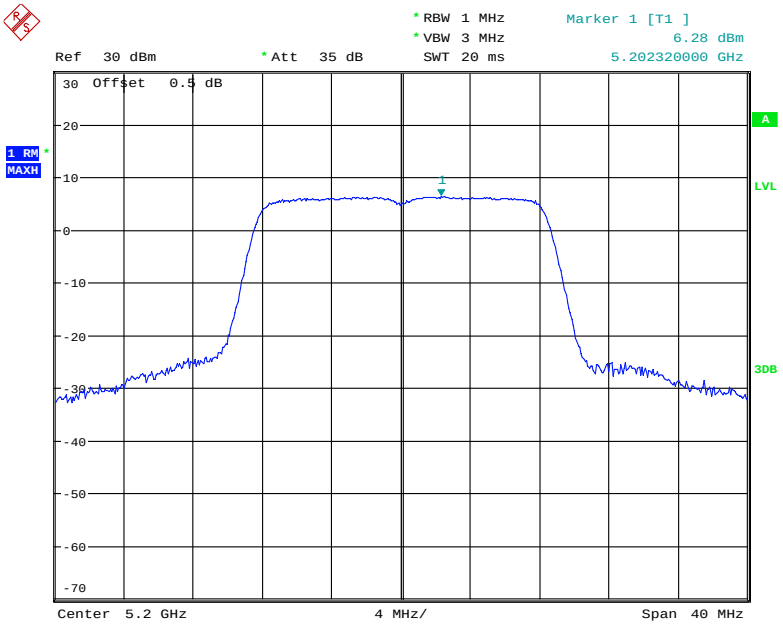
5150-5250MHz
Chain 0

802.11a Low Channel



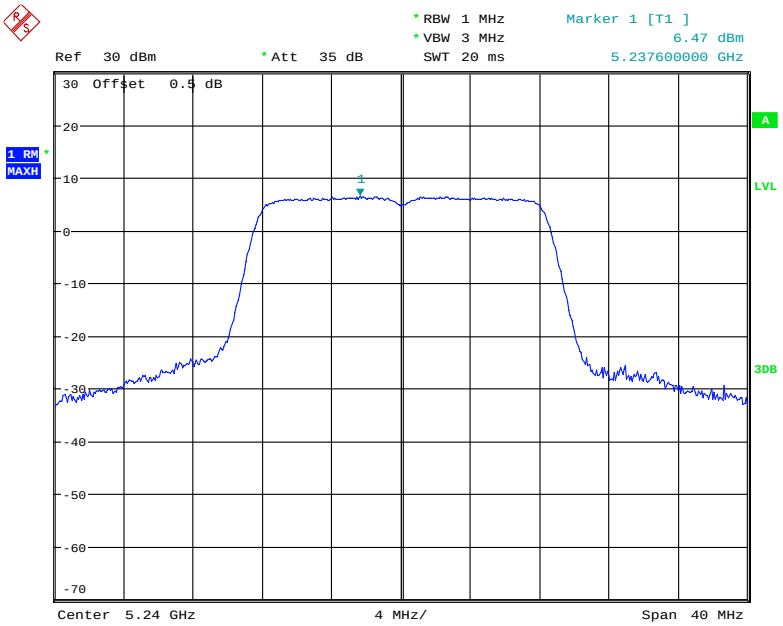
Date: 20.APR.2020 16:51:06

802.11a Middle Channel



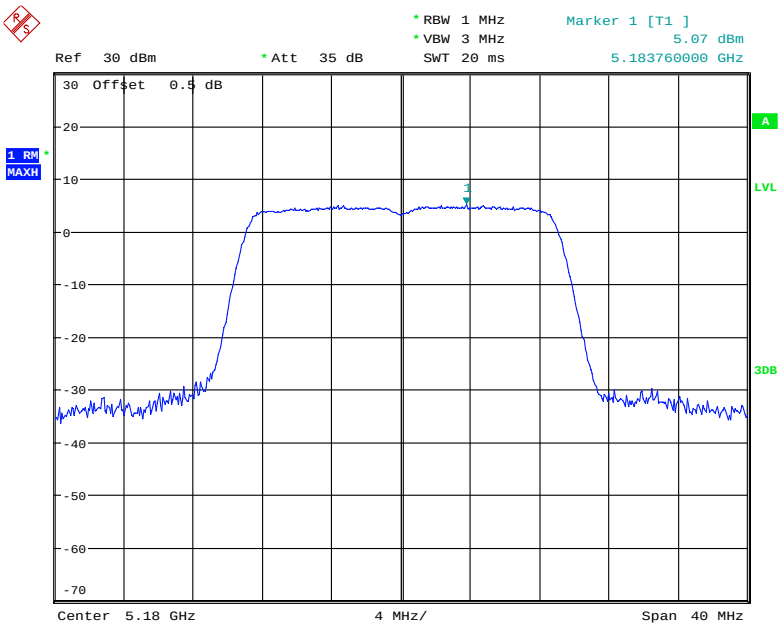
Date: 20.APR.2020 16:53:36

802.11a High Channel



Date: 20.APR.2020 16:58:38

802.11n ht20 Low Channel



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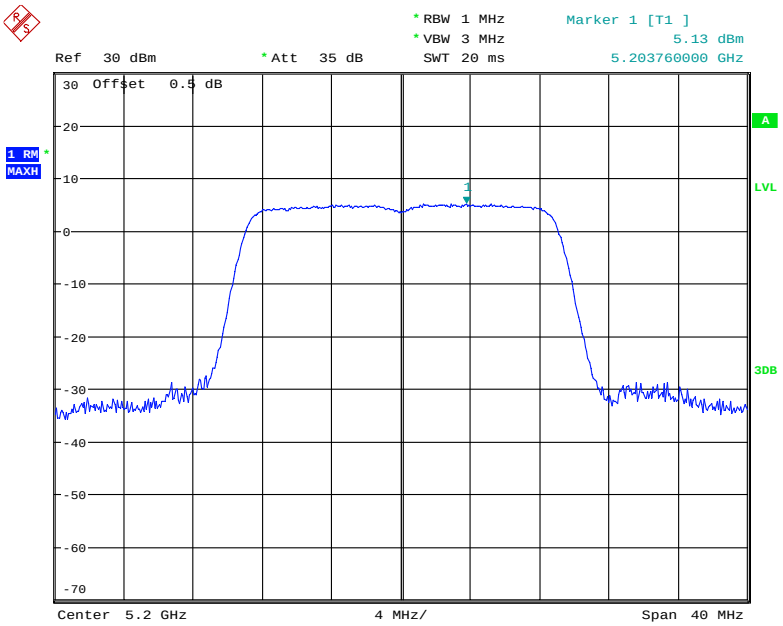
802.11n ht20 Middle Channel



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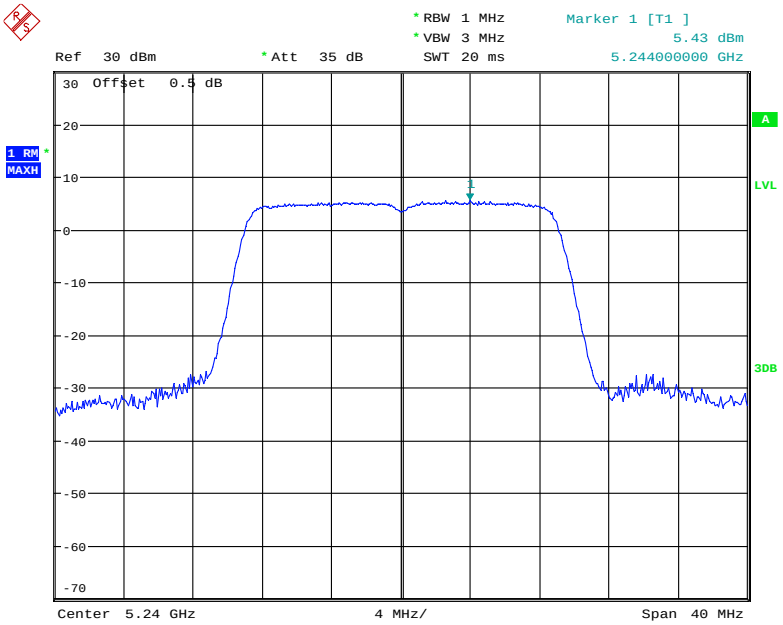
802.11n ht20 High Channel



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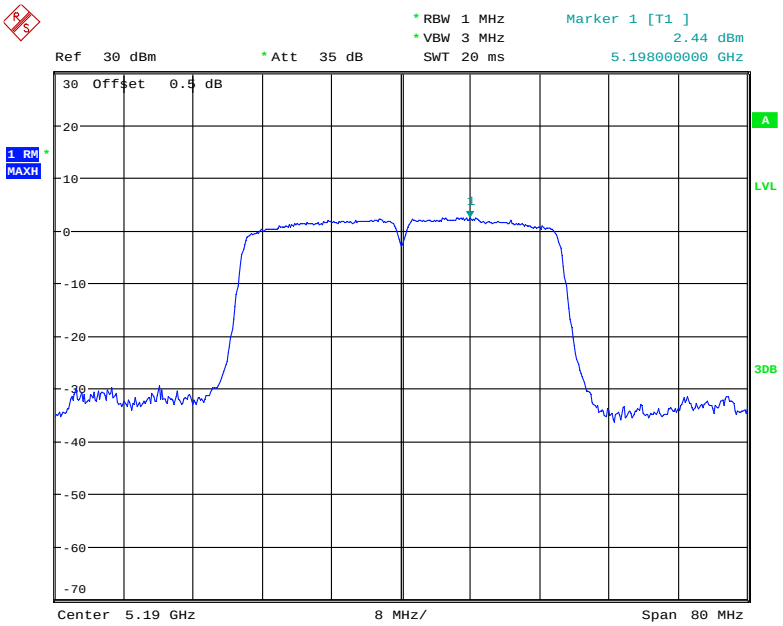
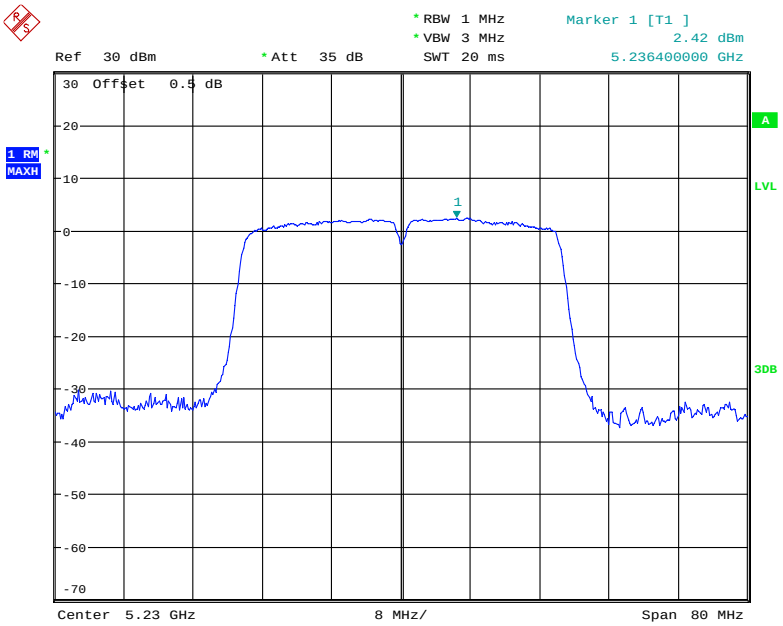
802.11n ht40 Low Channel



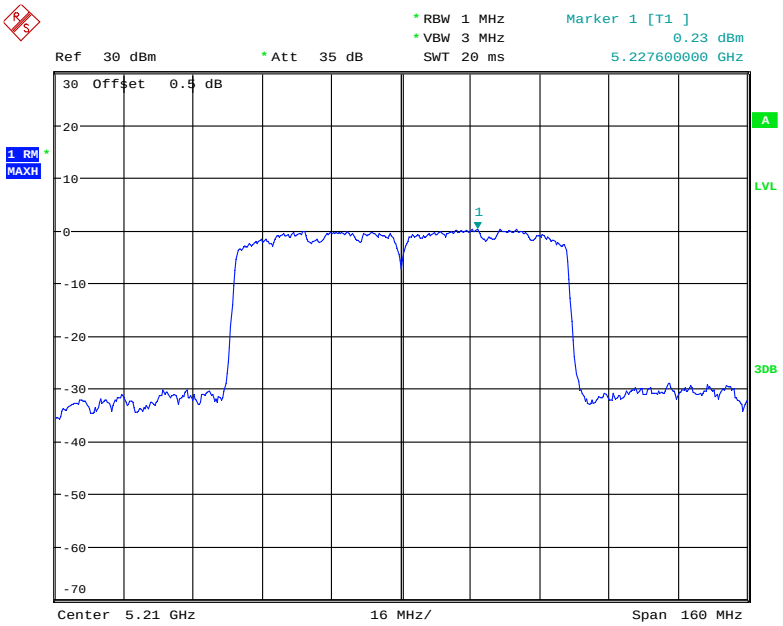
Date: 20.APR.2020 17:07:42

802.11n ht40 High Channel



Date: 20.APR.2020 17:08:33

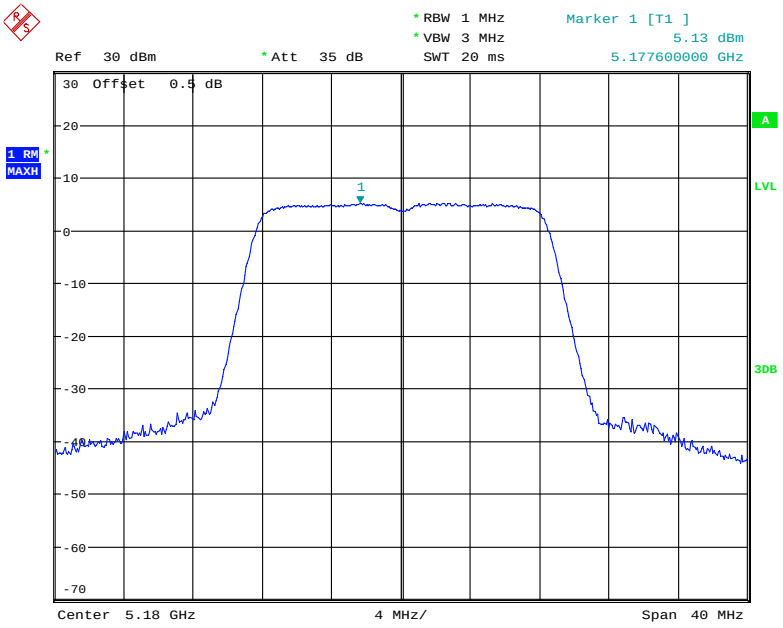
802.11ac vht80 Middle Channel



Date: 20.APR.2020 17:09:48

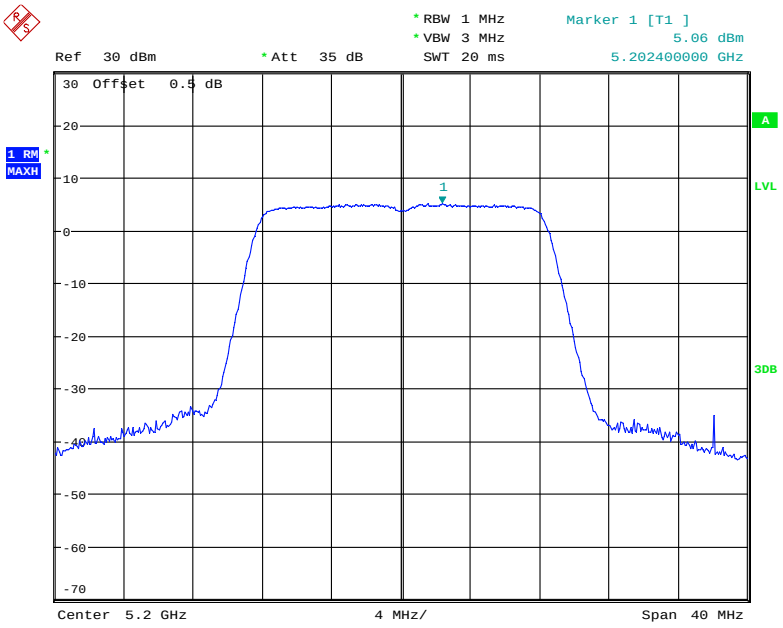
Chain 1

802.11a Low Channel



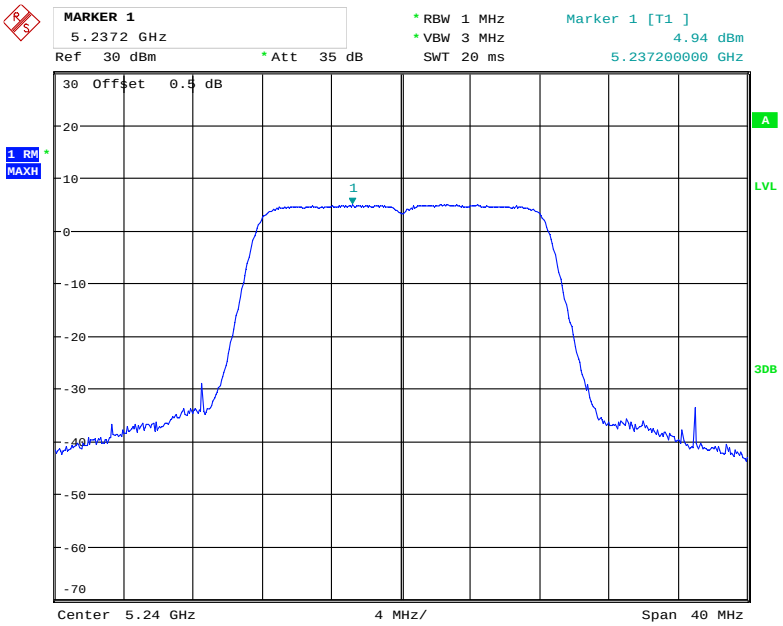
Date: 20.APR.2020 18:22:34

802.11a Middle Channel



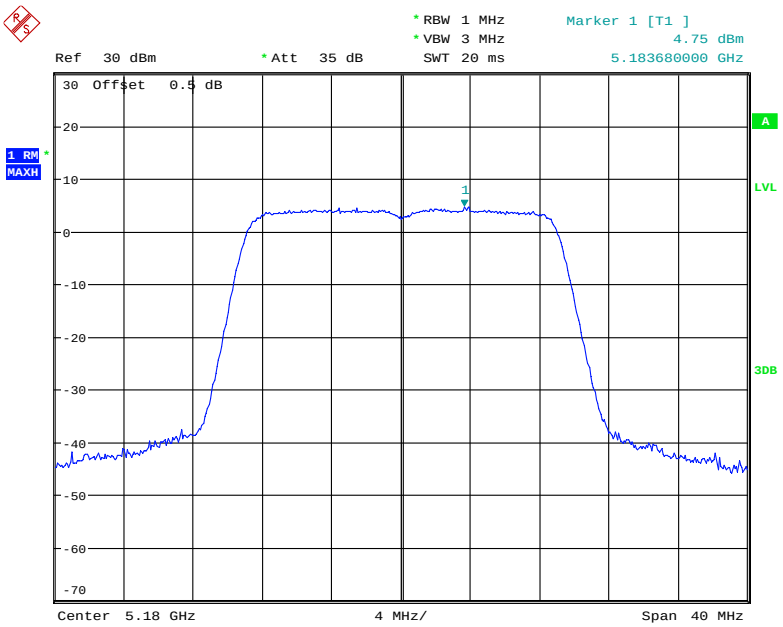
Date: 20.APR.2020 18:23:01

802.11a High Channel



Date: 20.APR.2020 18:25:26

802.11n ht20 Low Channel



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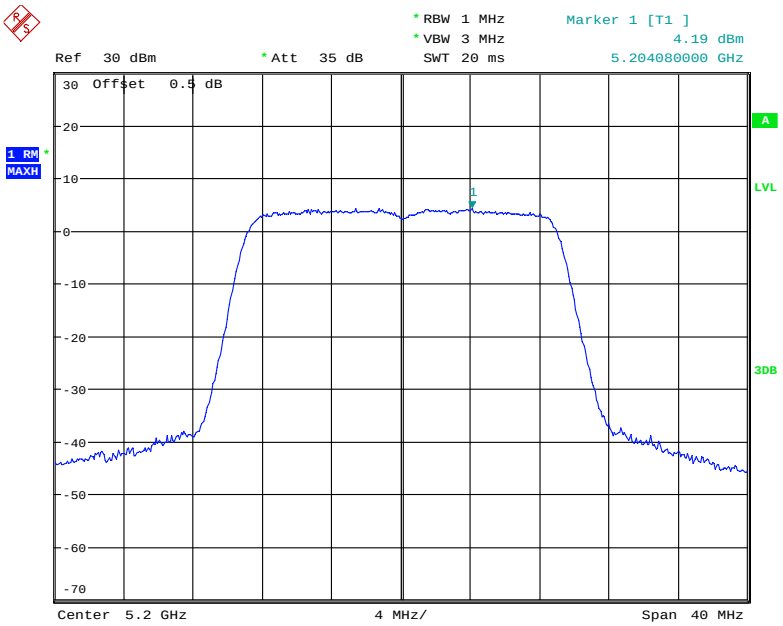
802.11n ht20 Middle Channel



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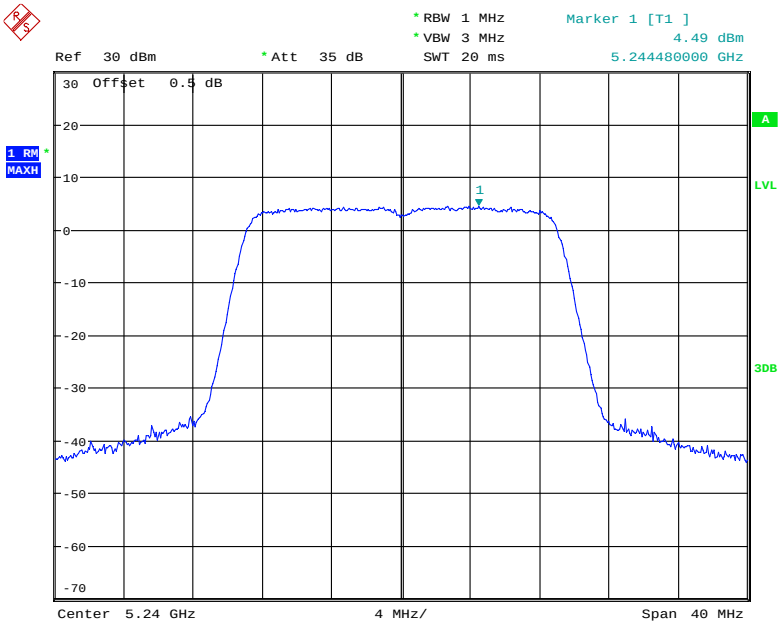
802.11n ht20 High Channel



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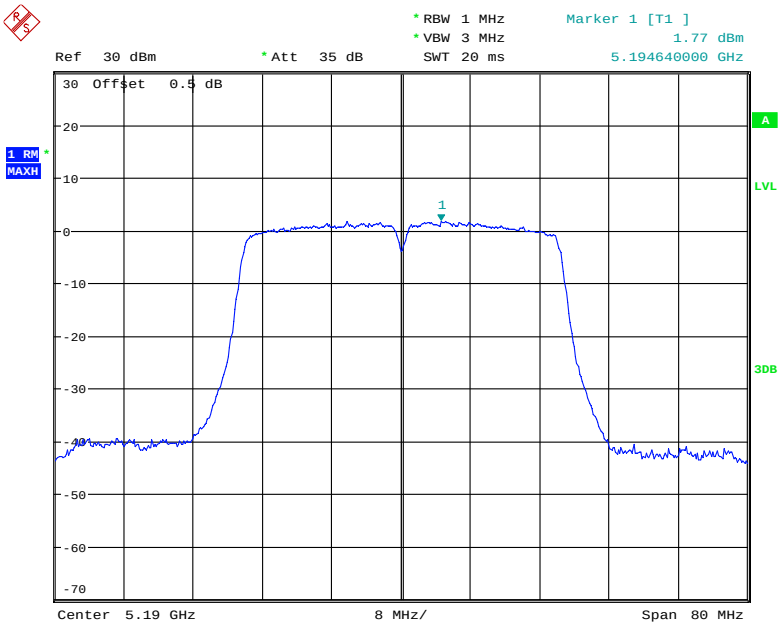
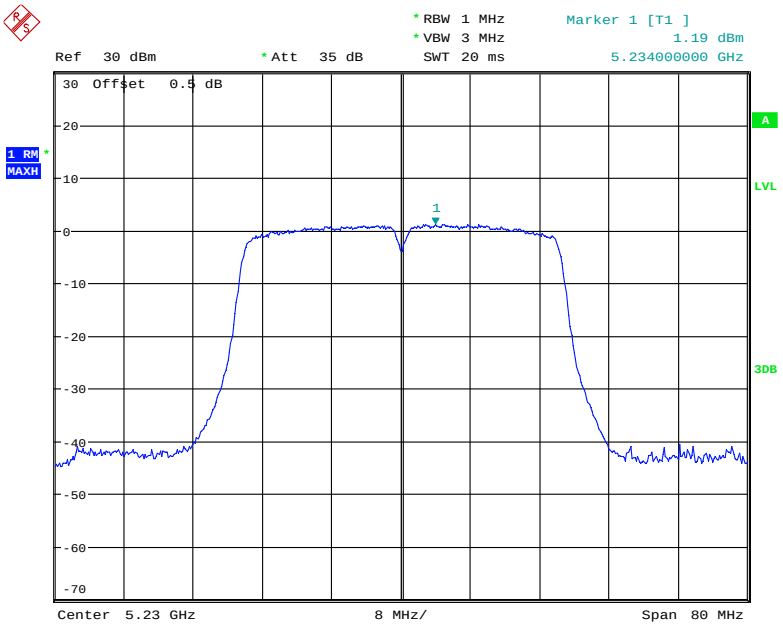
802.11n ht40 Low Channel



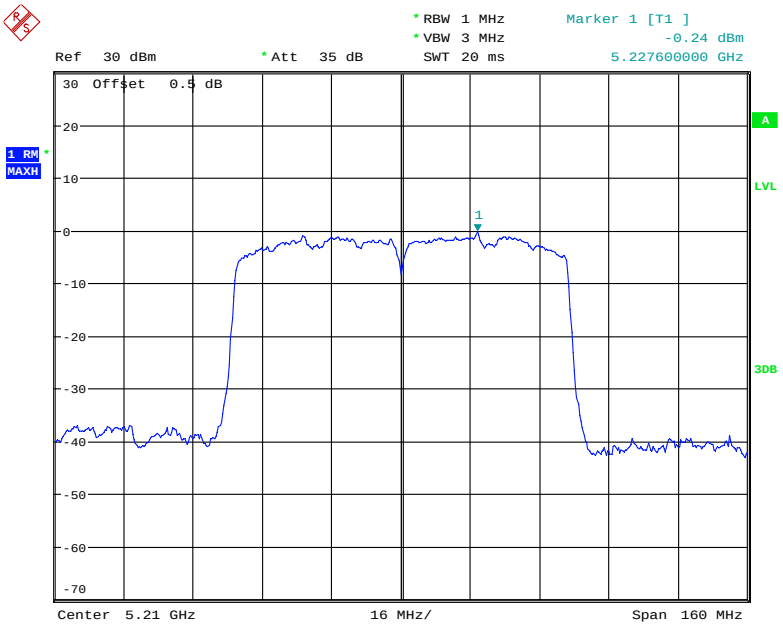
Date: 20.APR.2020 17:11:36

802.11n ht40 High Channel



Date: 20.APR.2020 17:12:10

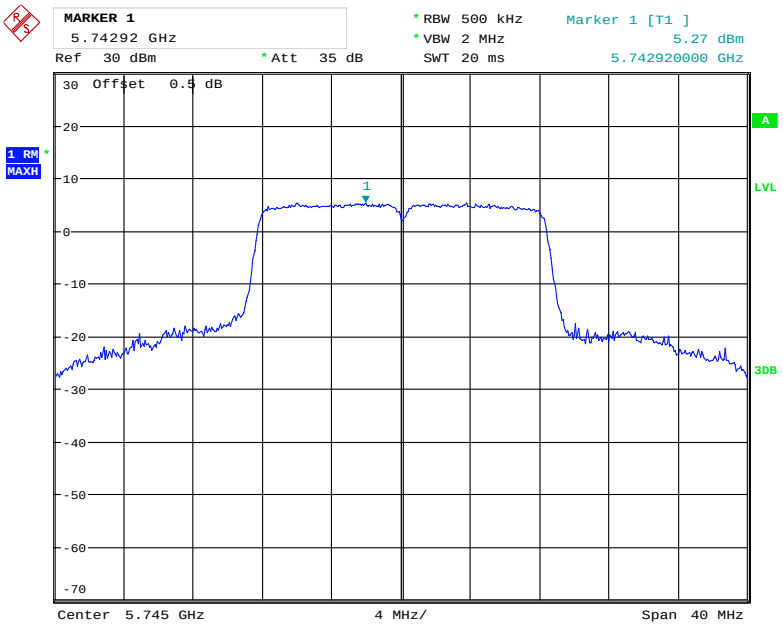
802.11ac vht80 Middle Channel



Date: 20.APR.2020 17:11:01

5725-5850MHz
Chain 0

802.11a Low Channel



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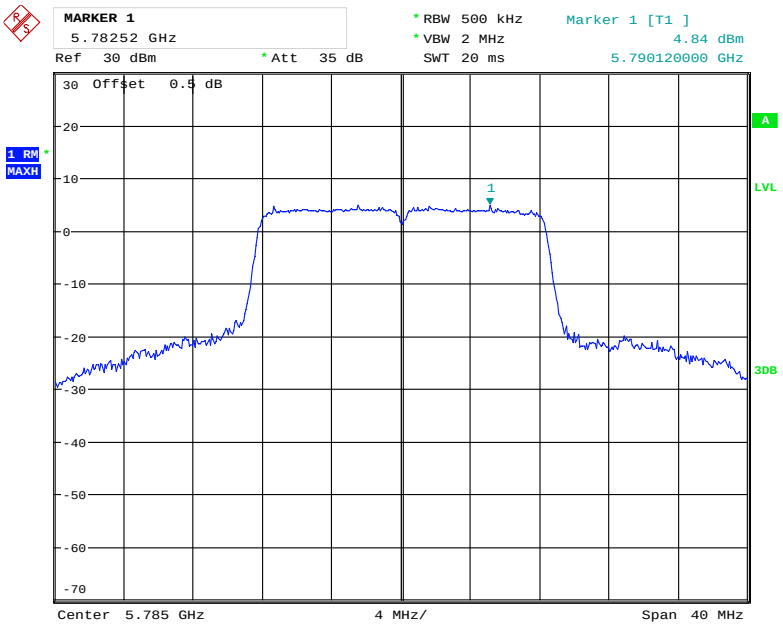
802.11a Middle Channel



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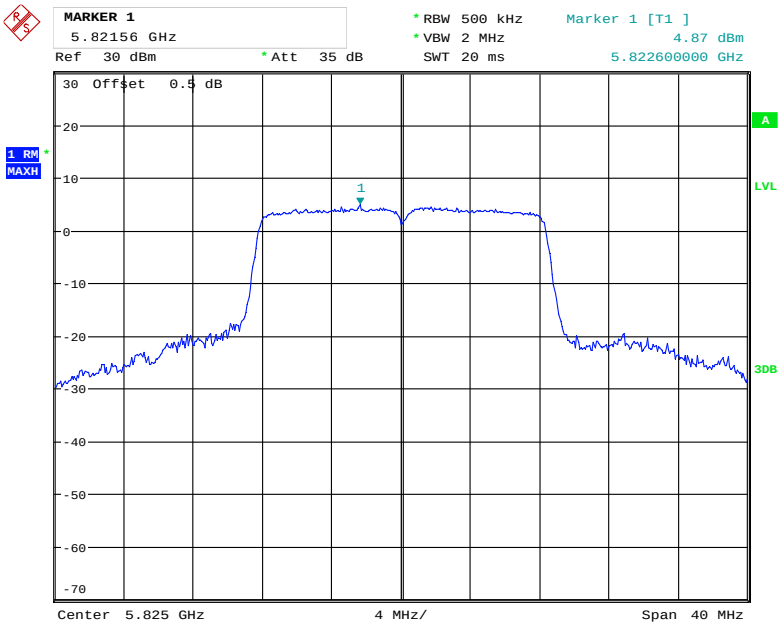
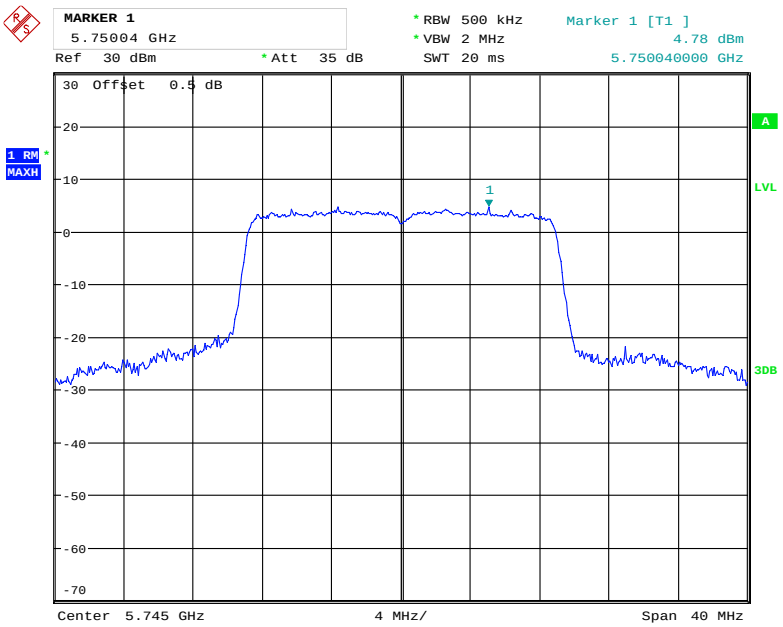
802.11a High Channel



Date: 20.APR.2020 17:25:07

802.11n ht20 Low Channel



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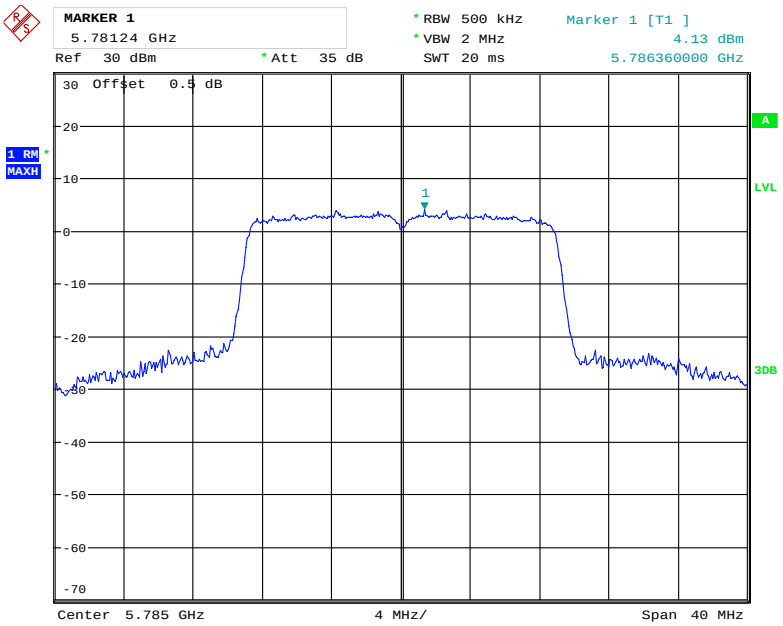
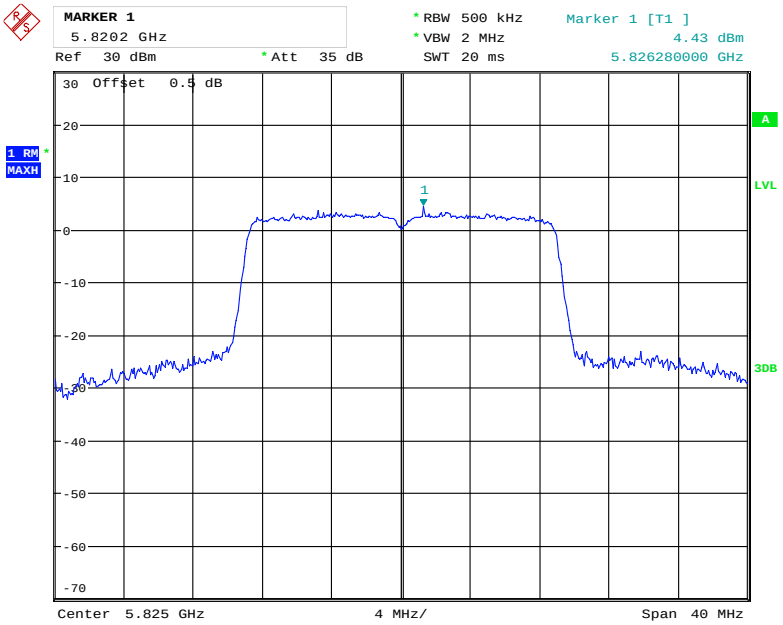
802.11n ht20 Middle Channel



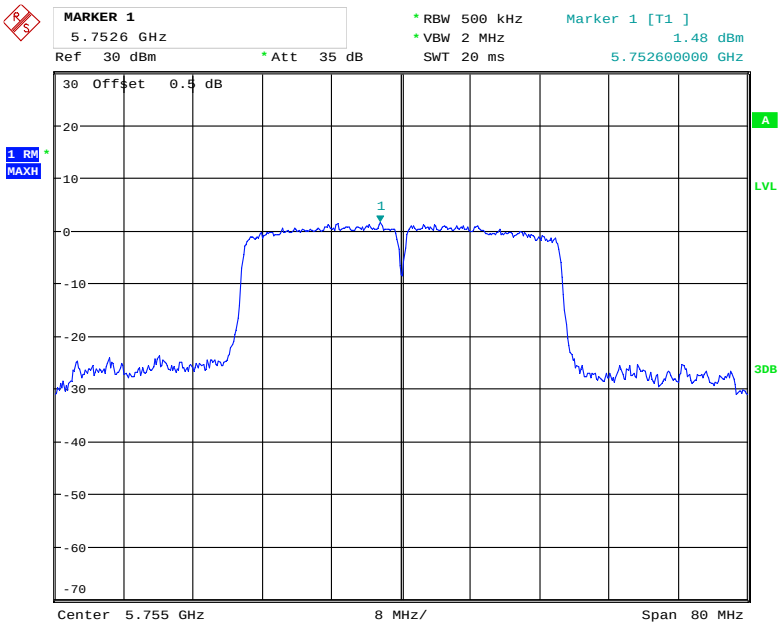
Date: 20.APR.2020 17:27:44

802.11n ht20 High Channel



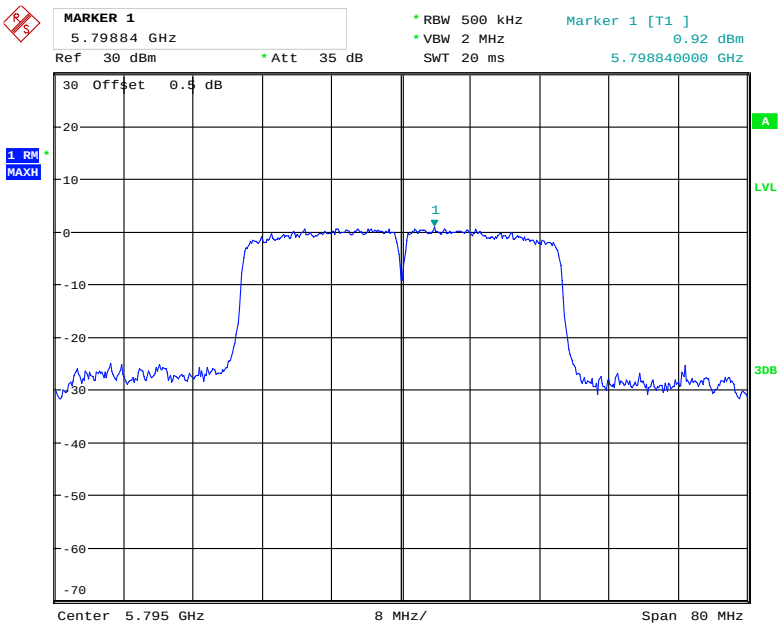
Date: 20.APR.2020 17:26:41

802.11n ht40 Low Channel



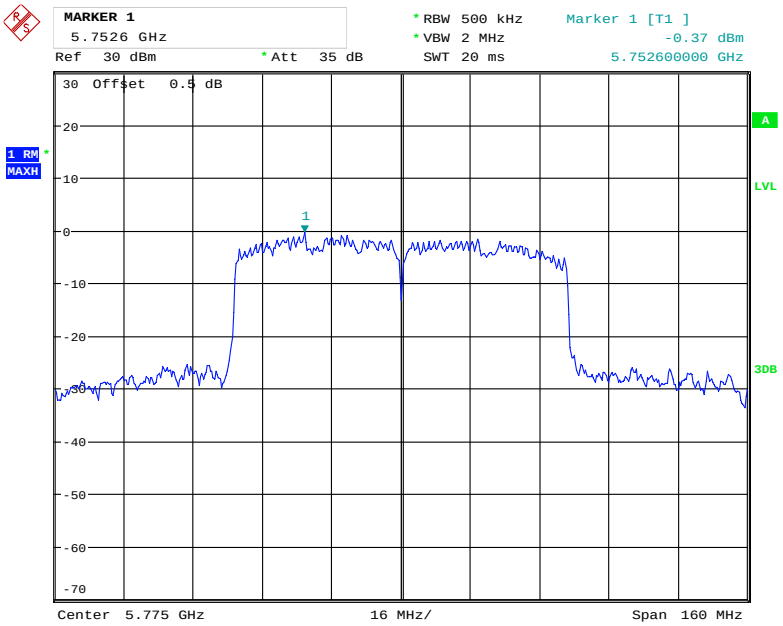
Date: 20.APR.2020 17:30:15

802.11n ht40 High Channel



Date: 20.APR.2020 17:31:17

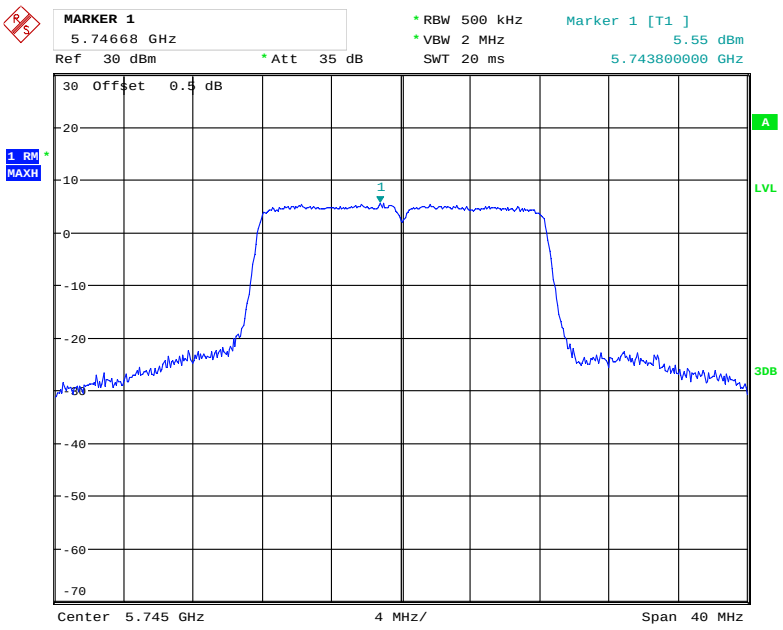
802.11ac vht80 Middle Channel



Date: 20.APR.2020 17:44:22

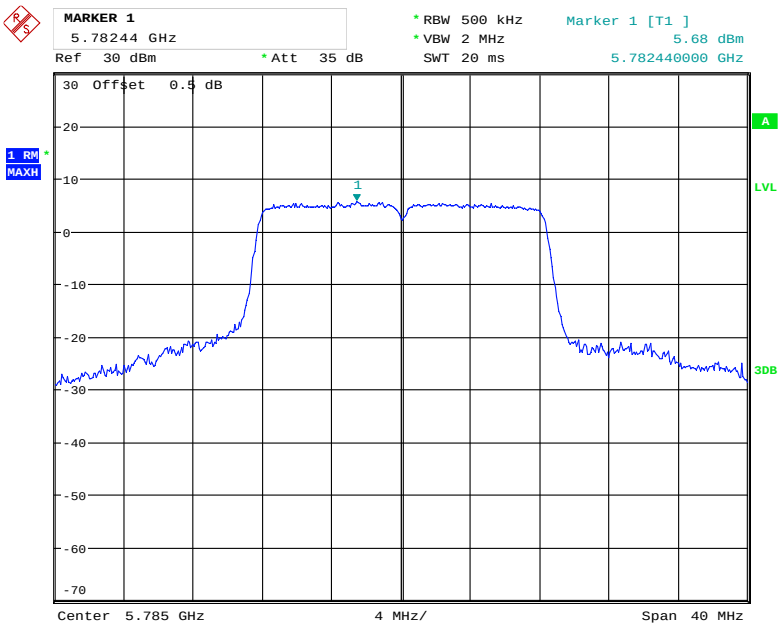
Chain 1:

802.11a Low Channel



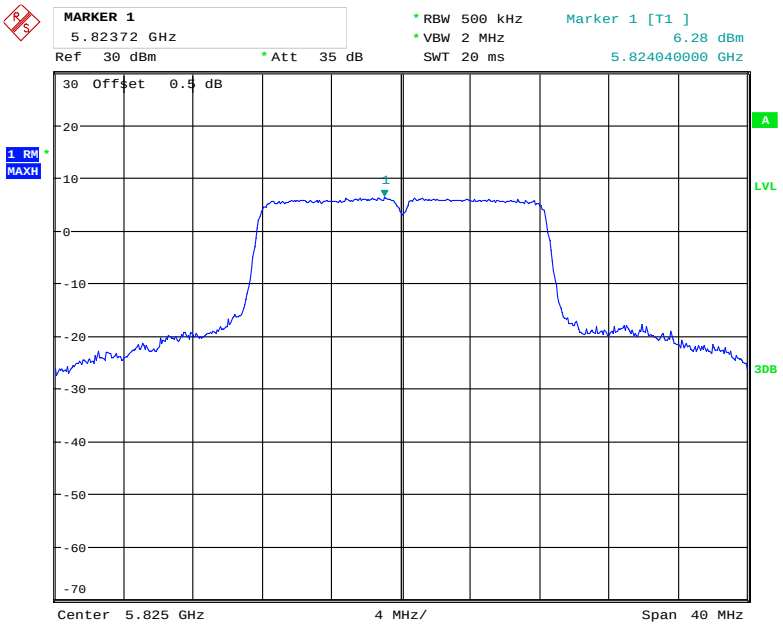
Date: 20.APR.2020 18:17:49

802.11a Middle Channel



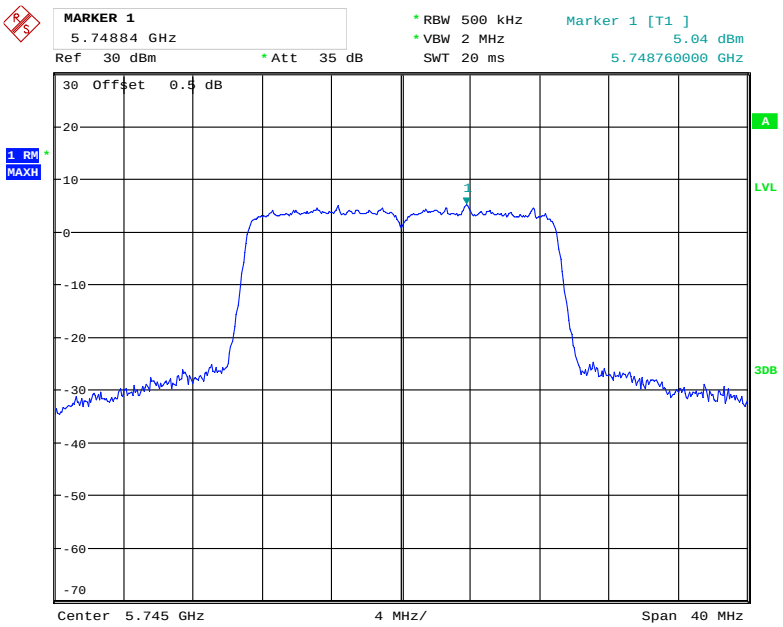
Date: 20.APR.2020 18:15:50

802.11a High Channel



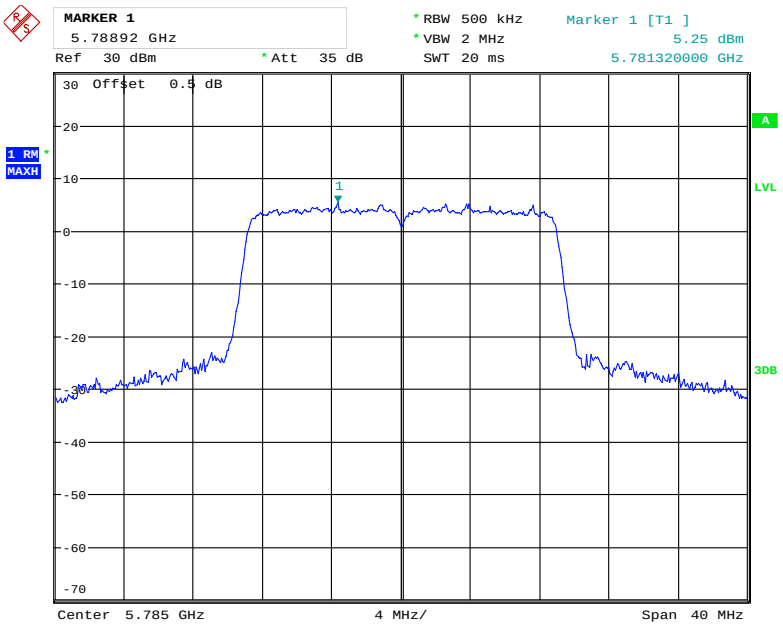
Date: 20.APR.2020 18:19:50

802.11n ht20 Low Channel



Date: 20.APR.2020 18:12:17

802.11n ht20 Middle Channel



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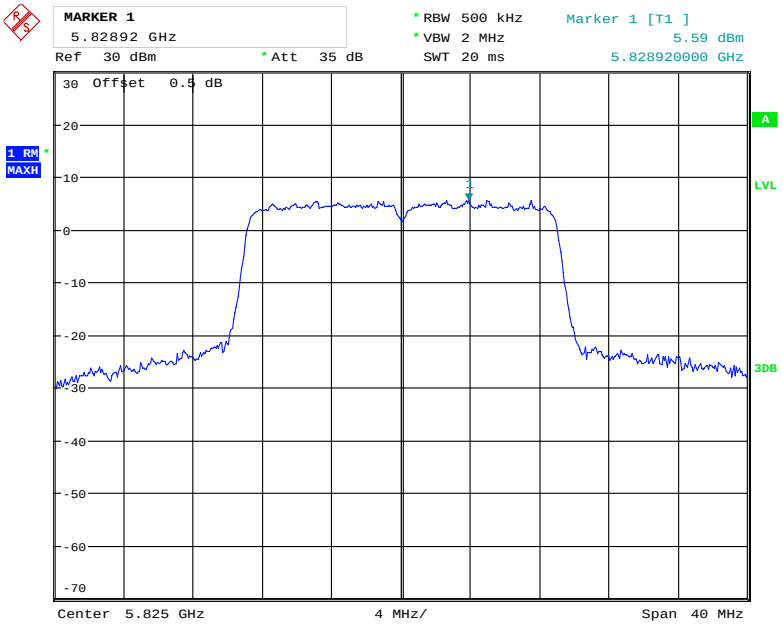
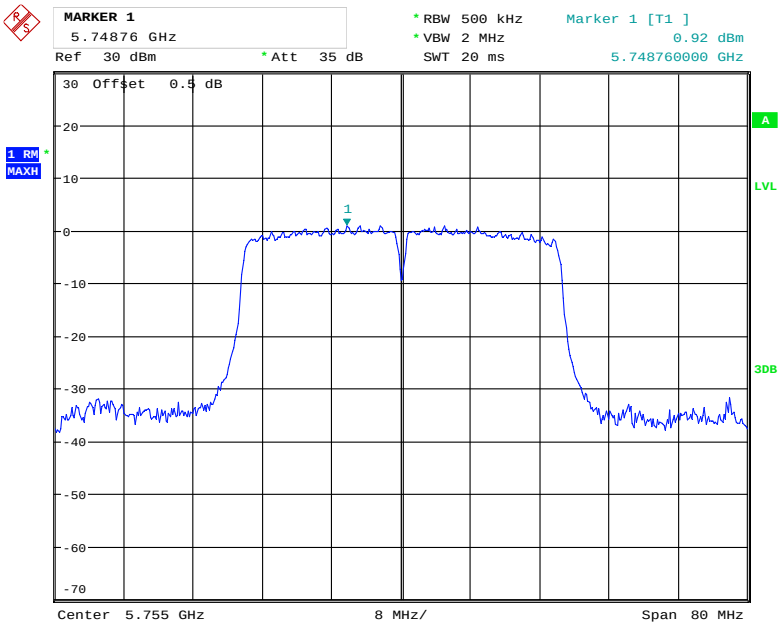
802.11n ht20 High Channel



Date: 20.APR.2020 18:11:27

802.11n ht40 Low Channel



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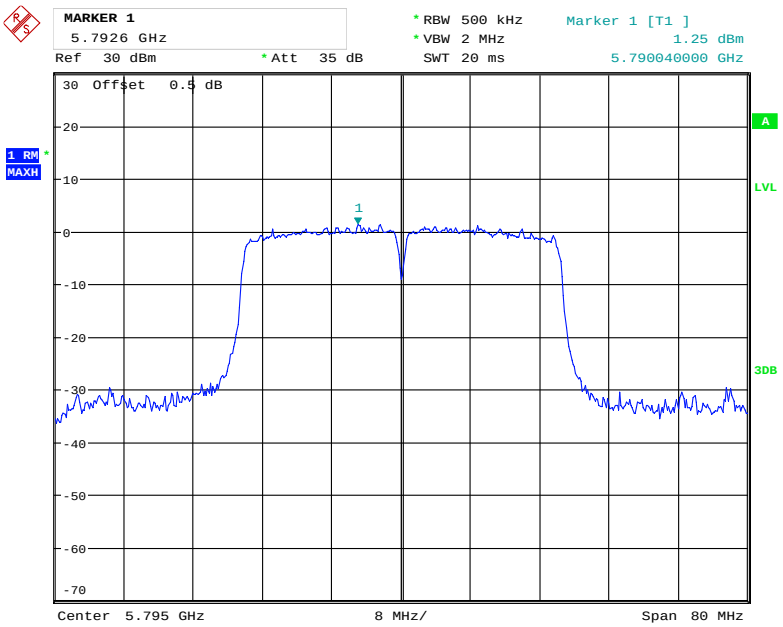
802.11n ht40 High Channel



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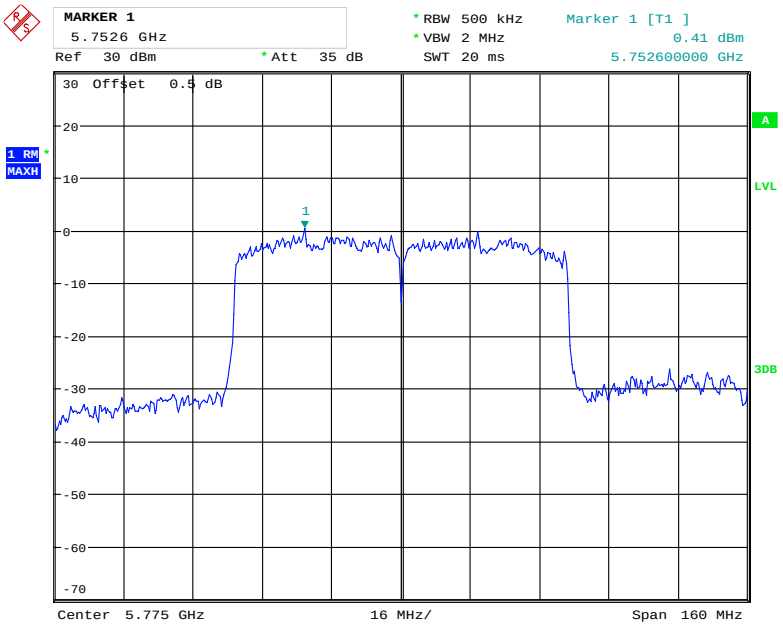
802.11ac vht80 Middle Channel



Date: 20.APR.2020 17:59:45

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