TESTING LABORATORY
CERTIFICATE #4820.01

FCC PART 15.407
RSS-GEN, ISSUE 5, APRIL 2018
RSS-247, ISSUE 2, FEBRUARY 2017
TEST REPORT

For

Smartlabs Holding Ltd

Nafpliou 15, Limassol, 3025 Cyprus

FCC ID: 2ASFLSML5041W
IC:24800-SML5041W

Report Type:	**Product Name:**
Class II Permissive Change	IPTV Set-top box

Report Number:	RSZ190311811-00A
Report Date:	2019-09-18
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)

The Smartlabs Holding Ltd's product, model number: SML-5041W (the "EUT") in this report was a ***IPTV Set-top box***, rated input voltage: DC 12V form adapter.

**All measurement and test data in this report was gathered from production sample serial number: 190311811 (Assigned by BACL, Dongguan). The EUT was received on 2019-03-13.*

Objective

This type approval report is prepared on behalf of ***Smartlabs Holding Ltd*** 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.

This is Class II Permissive Change application of this device. The defference between the original device and the current one is below:

Enable the frequency band: 5250-5350MHz 5470-5725MHz by software.

Related Submittal(s)/Grant(s)

FCC original certified on 2019-06-20, FCC ID: 2ASFLSML5041W
ISED original approval on 2019-07-23, IC: 24800-SML5041W

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: 4.55 dB,200M~1GHz: 5.92 dB,1G~6GHz: 4.98 dB, 6G~18GHz: 5.89 dB,18G~26.5G:5.47 dB,26.5G~40G:5.63 dB
Unwanted Emissions,conducted	±1.5 dB
Temperature	±1℃
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
AC Power Lines Conducted Emission	3.12 dB (150 kHz to 30 MHz)

Test Facility

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

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

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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

The device supports 802.11a, 802.11n ht20 and ht40, 802.11ac vht 20, vht40 and vht80 modes, the 802.11ac vht20 and vht40 were reducted since the idental parameters with 802.11n ht20 and ht40.

For 5250~5350 MHz band, 7 channels are provided:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	60	5300
54	5270	62	5310
56	5280	64	5320
58	5290	/	/

For 802.11a, 802.11n ht20, Channel 52, 56 and 64 were tested, for 802.11n ht40 Channel 54, 62 were tested, for 802.11ac vht80 channel 58 was tested.

For 5470~5725 MHz band, 20 channels are provided:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	116	5580	132	5660
102	5510	118	5590	134	5670
104	5520	120	5600	136	5680
106	5530	122	5610	138	5690
108	5540	124	5620	140	5700
110	5550	126	5630	142	5710
112	5560	128	5640	/	/

For 802.11a, 802.11n ht20 Channel 100, 116 and 140 were tested, for 802.11n ht40 Channel 102, 110 and 134 were tested, for 802.11ac vht80 channel 106,122.

Channel 142 for 802.11n ht40, 138 for 802.11ac vht80 crossed the band U-NII 2C to U-NII 3, were chosed to test for compliance requirement. 20MHz mode don`t support crossed channel.

For Canada RSS-247, channels 118 to 128 were disabled by software since the frequency occupied the frequency band 5600-5650MHz.

The device supports SISO and MIMO at 802.11n ht20/n ht40/ac vht80 mode, per pre-test, MIMO 2TX mode was the worst and reported.

EUT Exercise Software

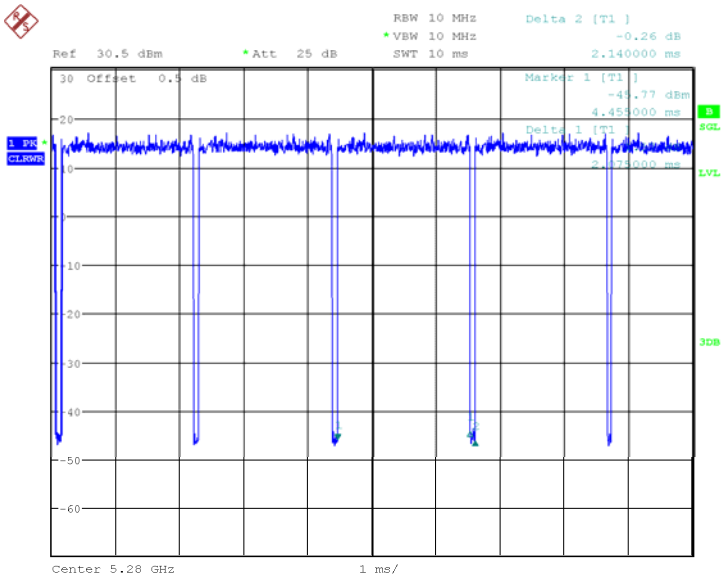
The software “RtkWiFiTest-v1.8.1” was used for testing, the command was provided by manufacturer. The worst-case data rates are determined to be as follows for each mode based upon investigations by measuring the average power and PSD across all data rates, bandwidths, and modulations. The maximum power was configured as below table, that provided by the manufacturer:

Band	Mode	Frequency (MHz)	Data Rate	Power level	
				Chain 0 (Ant A)	Chain 1 (Ant B)
5250 - 5350 MHz	802.11a	5260	6Mbps	59	57
		5280	6Mbps	60	56
		5320	6Mbps	60	56
	802.11n ht20	5260	MCS8	53	53
		5280	MCS8	53	53
		5320	MCS8	54	54
	802.11n ht 40	5270	MCS8	54	48
		5310	MCS8	51	50
	802.11ac vht80	5290	NSS2 MCS8	47	47
5470 - 5725 MHz	802.11a	5500	6Mbps	49	48
		5580	6Mbps	62	49
		5700	6Mbps	57	51
	802.11n ht20	5500	MCS8	58	39
		5580	MCS8	57	40
		5700	MCS8	59	57
	802.11n ht 40	5510	MCS8	51	45
		5550	MCS8	55	46
		5670	MCS8	60	56
		5710	MCS8	60	60
	802.11ac vht80	5530	NSS2 MCS8	47	46
		5610	NSS2 MCS8	52	48
		5690	NSS2 MCS8	56	50

The duty cycle as below:

Mode	T_{on} (ms)	T_{on+off} (ms)	Duty Cycle(x) (%)
802.11 a	2.075	2.140	96.96
802.11n ht20	1.930	2.025	95.31
802.11n ht40	0.950	1.050	90.48
802.11ac vht80	0.468	0.568	82.39

802.11a



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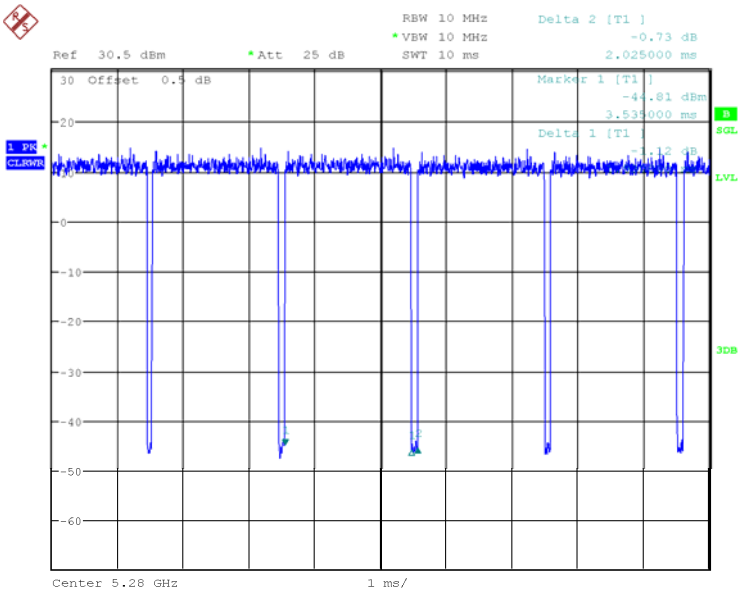
802.11n ht20



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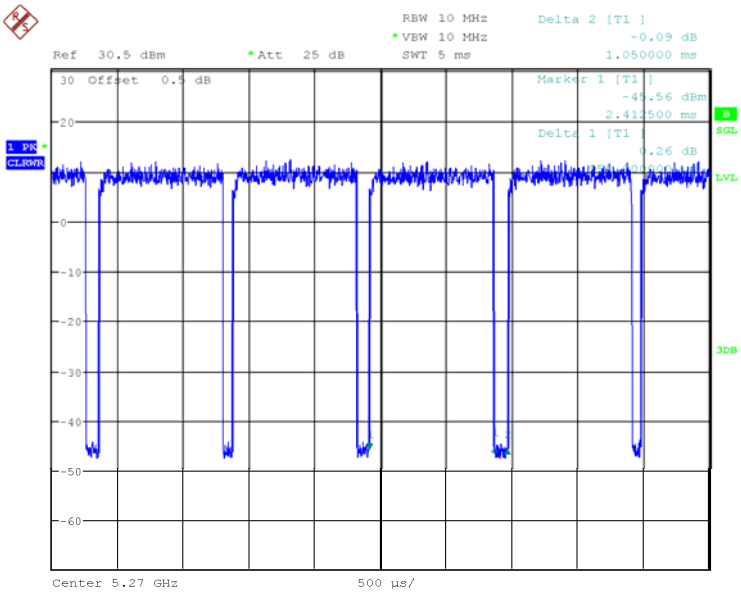
802.11n ht40



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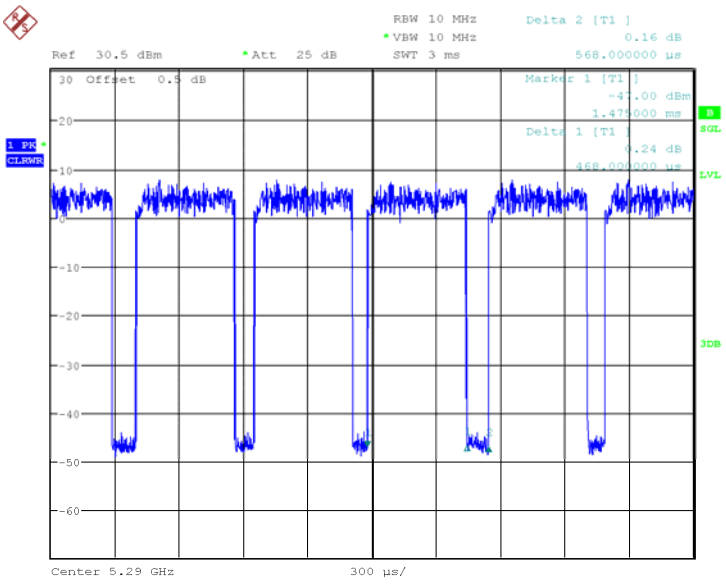
802.11ac vht80



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Equipment Modifications

No modification was made to the EUT.

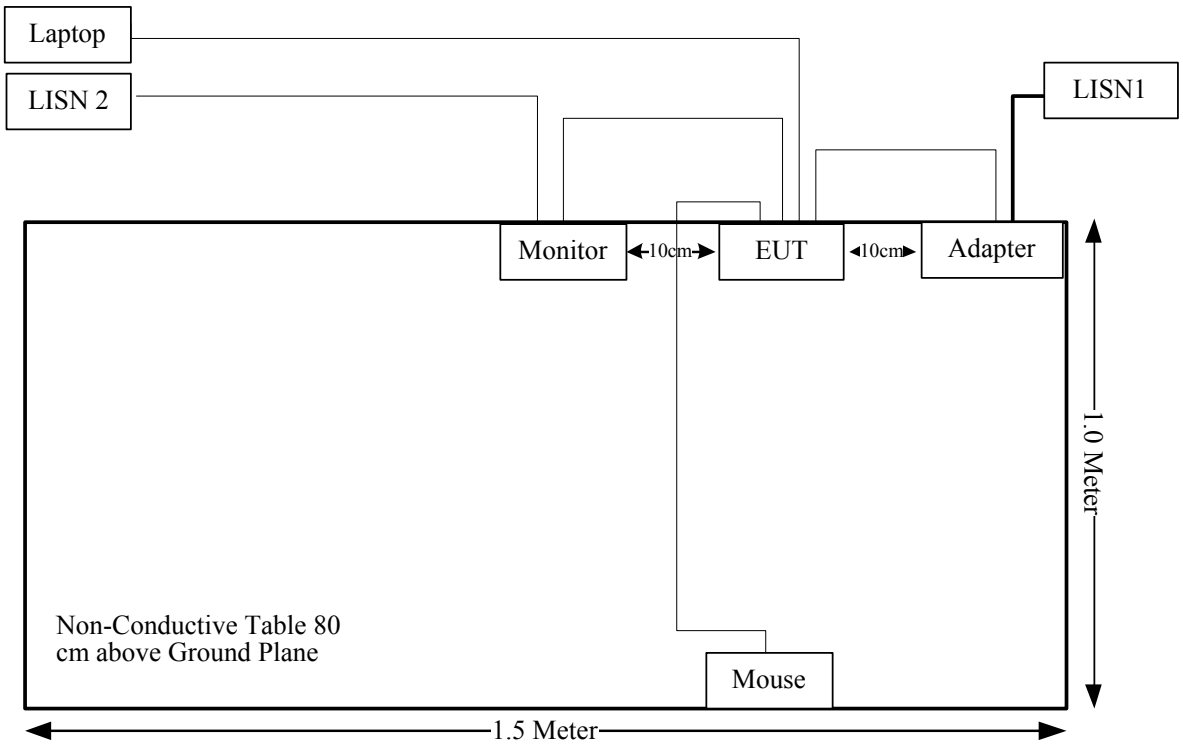
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Dell	Monitor	U3011t	CN-0PH5NY-74445-17M114L
A4TECH	Mouse	OP-520NP	/

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From	To
HDMI cable	Yes	Yes	1.5	EUT	Monitor

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.407 (f) & §1.1310 & §2.1091	Maximum Permissable Exposure (MPE)	Compliance
RSS-102 Clause 2.5.2	Exemption Limits For Routine Evaluation-RF Exposure Evaluation	Compliance
FCC§15.203, RSS-Gen Clause 6.8	Antenna Requirement	Compliance
FCC§15.407(b)(6)& §15.207(a), RSS-Gen Clause 8.8	Conducted Emissions	Compliance*
FCC§15.205& §15.209 &§15.407(b), RSS-247 Clause 6.2	Undesirable Emission& Restricted Bands	Compliance
FCC§15.407(a) (e), RSS-247 Clause 6.2 RSS-Gen Clause 6.7	Emission Bandwidth	Compliance
FCC§15.407(a) RSS-247 Clause 6.2	Conducted Transmitter Output Power	Compliance
FCC§15.407 (a), RSS-247 Clause 6.2	Power Spectral Density	Compliance
FCC§15.407 (h), RSS-247 Clause 6.3	Dynamic Frequency Selection(DFS)	Compliance**

Compliance*: add frequency band have not effect this item, please refer to the original report.
Compliance**: Please refer to the DFS report: RSZ190311811-00A.

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/f^2)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

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

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

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 factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

Frequency Range	**Antenna Gain**		**Max. Target Power including Tolerance**		**Evaluation Distance (cm)**	**Power Density (mW/cm^2)**	**MPE Limit (mW/cm^2)**
	(dBi)	**(numeric)**	**(dBm)**	**(mW)**			
5250-5350	2	1.58	13	19.9526	20.00	0.006	1.0
5470-5725	2	1.58	13	19.9526	20.00	0.006	1.0

Note 1: the Max. Target Power including Tolerance was declared by manufacturer.

Result: Compliance, The device meets MPE requirement for Devices Used by the General Public (Uncontrolled Environment) at distance ≥20 cm.

RSS-102 § 2.5.2 - EXEMPTION LIMITS FOR ROUTINE EVALUATION – RF EXPOSURE EVALUATION

Applicable Standard

According to RSS-102 § (2.5.2):

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

Calculated Data:

The maximum power including tune-up tolerance is 13dBm@ 5250-5350MHz and 5470-5725MHz band, the maximum antenna gain is 2.0 dBi, so the maximum e.r.i.p. is 15 dBm (0.032W)

Exemption from Routine Evaluation Limit is:
$1.31 \times 10^{-2} f^{0.6834} = 1.31 \times 10^{-2} \times 5260^{0.6834} = 4.57 > 0.032\text{W}$

So the device is compliance exemption from Routine Evaluation Limits –RF exposure Evaluation.

Result: Compliance

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 Clause 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 Connector Construction

The EUT has two internal antennas, the antenna gain is 2 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

Antenna Type	input impedance (Ohm)	Antenna Gain /Frequency Range
PIFA	50	2.0 dBi/5.15~5.85GHz

Result: Compliance.

FCC §15.209, §15.205 , §15.407(b) &RSS-247 CLAUSE 6.2, RSS-GEN CLAUSE 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 Clause 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;

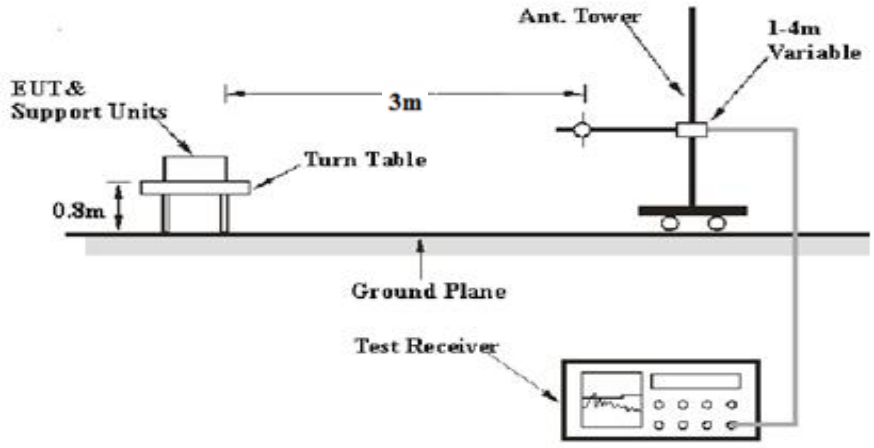
b) 15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges;

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

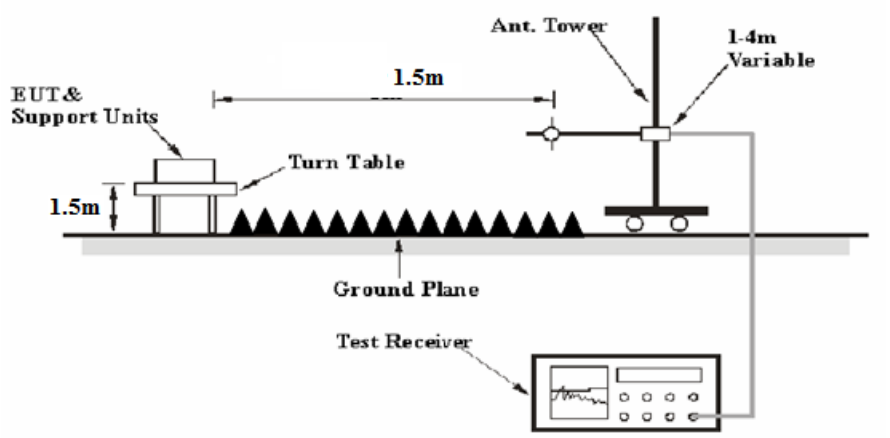
d) -27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.

EUT Setup

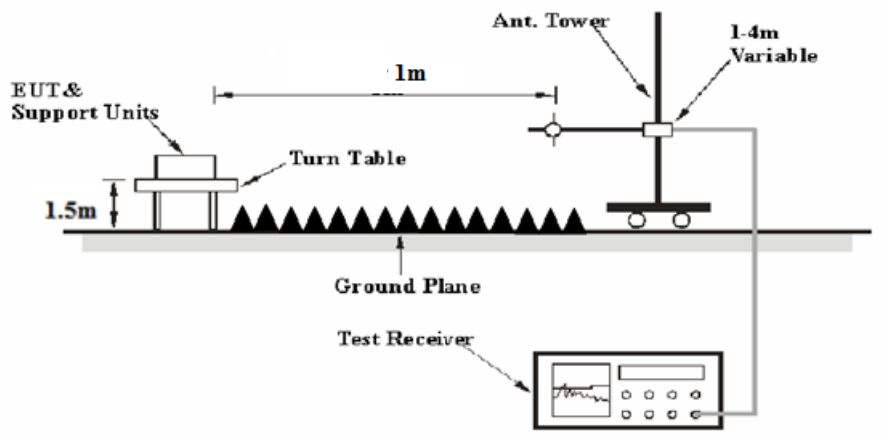
Below 1 GHz:



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 limits 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

Note: T is minimum transmission duration

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

Test Procedure

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

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

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

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

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

Corrected Amplitude & Margin Calculation

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

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

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

Margin = Limit - Corrected Amplitude

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

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

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

Margin = Limit- Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESR3	102453	2019-06-26	2020-06-26
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2018-09-05	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-1400-01	2019-05-06	2020-05-06
HP	Amplifier	8447D	2727A05902	2018-09-05	2019-09-05
Agilent	Spectrum Analyzer	E4440A	SG43360054	2019-01-04	2020-01-04
R&S	Spectrum Analyzer	FSP 38	100478	2018-12-10	2019-12-10
ETS-Lindgren	Horn Antenna	3115	000 527 35	2018-10-12	2021-10-12
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1304	2016-11-18	2019-11-18
Ducommun Technolagies	Horn Antenna	ARH-2823-02	1007726-01 1302	2016-11-18	2019-11-18
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-2.4J2.4J-50	C-0700-02	2019-06-27	2020-06-27
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2018-09-05	2019-09-05
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2019-06-27	2020-06-27
Sinoscite	Bandstop Filters	BSF5150-5850MN-0899-003	0899003	2019-05-06	2020-05-06
Mini Circuits	High Pass Filter	VHF-6010+	31118	2019-06-16	2020-06-16

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

Test Data

Environmental Conditions

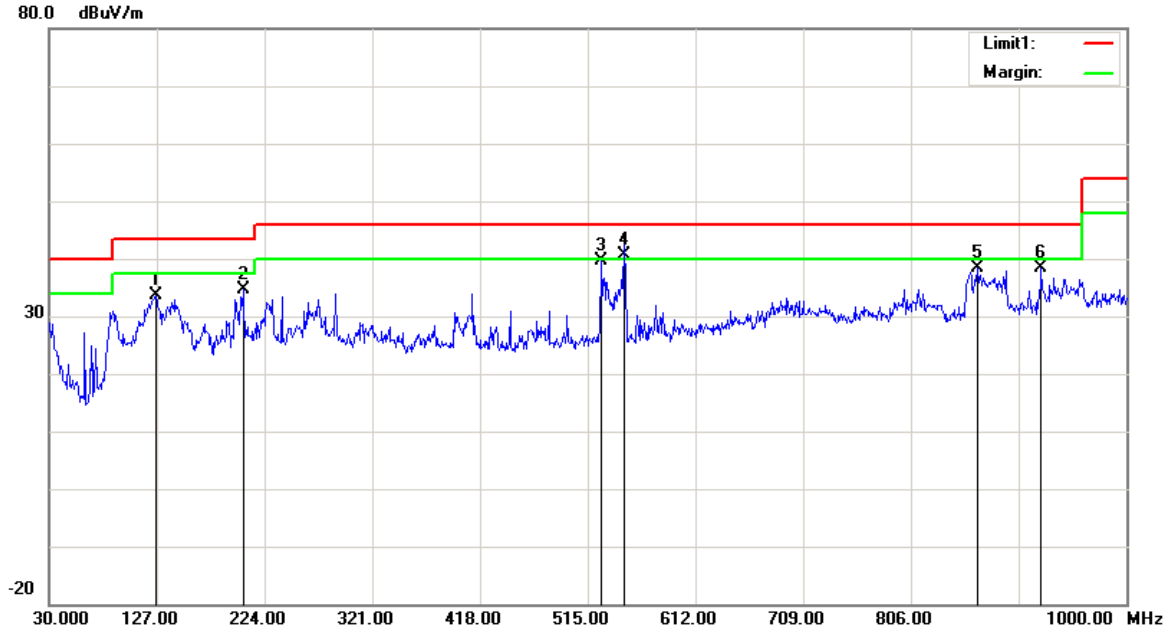
Temperature:	24.8°C
Relative Humidity:	45 %
ATM Pressure:	99.8kPa

** The testing was performed by Neil Liao and Tyler Pan on 2019-09-04.*

Test Mode: Transmitting

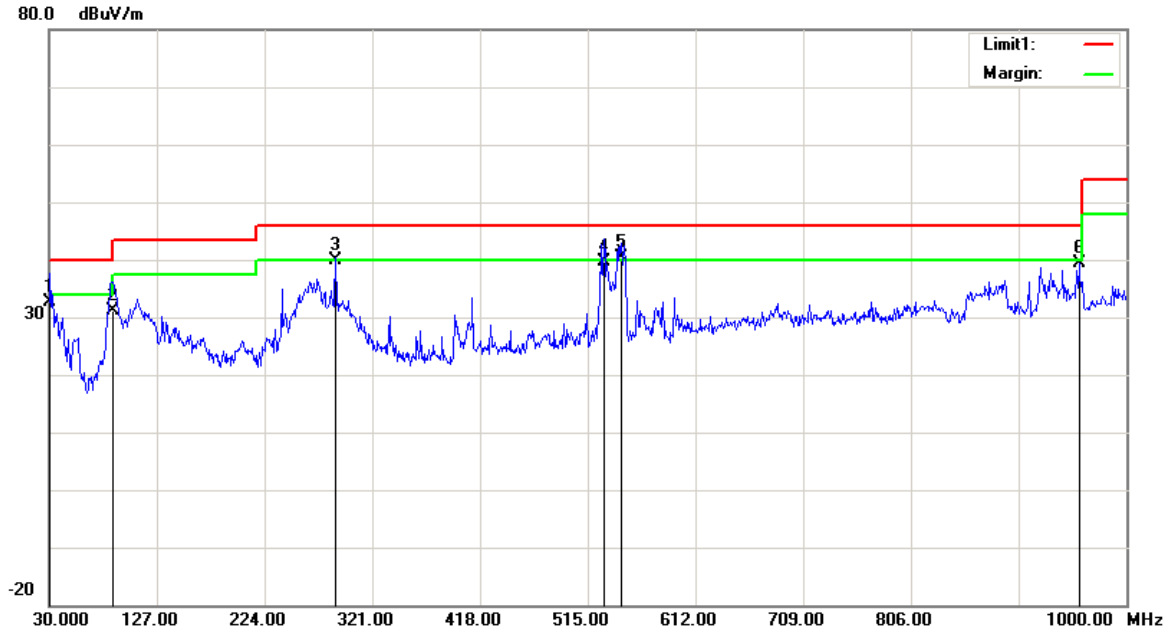
Below 1GHz (802.11n ht20, 5260 MHz was the worst):

Horizontal



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
126.0300	38.22	peak	-4.69	33.53	43.50	9.97
204.6000	41.21	peak	-6.57	34.64	43.50	8.86
527.6100	39.39	peak	0.29	39.68	46.00	6.32
547.9800	40.33	QP	0.32	40.65	46.00	5.35
866.1400	36.71	peak	1.55	38.26	46.00	7.74
923.3700	42.10	peak	-3.64	38.46	46.00	7.54

Vertical



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.9700	31.79	QP	0.91	32.70	40.00	7.30
87.2300	42.63	QP	-11.43	31.20	40.00	8.80
288.0200	43.93	QP	-4.03	39.90	46.00	6.10
529.5500	39.21	QP	0.39	39.60	46.00	6.40
545.0700	40.19	QP	0.31	40.50	46.00	5.50
957.3200	42.67	peak	-3.23	39.44	46.00	6.56

1GHz-40GHz:

5250-5350MHz

802.11a (Chain 0 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)	Factor (dB/m)						
Low Channel: 5260 MHz										
5260.00	73.90	PK	H	33.72	3.49	0.00	111.11	105.09	N/A	N/A
5260.00	64.95	AV	H	33.72	3.49	0.00	102.16	96.14	N/A	N/A
5260.00	70.66	PK	V	33.72	3.49	0.00	107.87	101.85	N/A	N/A
5260.00	61.70	AV	V	33.72	3.49	0.00	98.91	92.89	N/A	N/A
5150.00	27.32	PK	H	33.54	3.56	0.00	64.42	58.4	74.00	15.60
5150.00	15.49	AV	H	33.54	3.56	0.00	52.59	46.57	54.00	7.43
10520.00	62.47	PK	H	38.21	6.39	36.89	70.18	64.16	68.20	4.04
15780.00	48.30	PK	H	37.82	8.76	39.22	55.66	49.64	74.00	24.36
15780.00	35.71	AV	H	37.82	8.76	39.22	43.07	37.05	54.00	16.95
Middle Channel: 5280 MHz										
5280.00	73.68	PK	H	33.75	3.45	0.00	110.88	104.86	N/A	N/A
5280.00	64.57	AV	H	33.75	3.45	0.00	101.77	95.75	N/A	N/A
5280.00	70.21	PK	V	33.75	3.45	0.00	107.41	101.39	N/A	N/A
5280.00	61.23	AV	V	33.75	3.45	0.00	98.43	92.41	N/A	N/A
10560.00	61.98	PK	H	38.24	6.40	36.90	69.72	63.7	68.20	4.50
15840.00	48.11	PK	H	37.76	8.74	39.27	55.34	49.32	74.00	24.68
15840.00	35.67	AV	H	37.76	8.74	39.27	42.90	36.88	54.00	17.12
High Channel: 5320 MHz										
5320.00	73.77	PK	H	33.81	3.45	0.00	111.03	105.01	N/A	N/A
5320.00	64.48	AV	H	33.81	3.45	0.00	101.74	95.72	N/A	N/A
5320.00	70.34	PK	V	33.81	3.45	0.00	107.60	101.58	N/A	N/A
5320.00	61.28	AV	V	33.81	3.45	0.00	98.54	92.52	N/A	N/A
5350.00	32.60	PK	H	33.86	3.52	0.00	69.98	63.96	74.00	10.04
5350.00	18.81	AV	H	33.86	3.52	0.00	56.19	50.17	54.00	3.83
10640.00	61.84	PK	H	38.28	6.43	36.93	69.62	63.6	74.00	10.40
10640.00	48.34	AV	H	38.28	6.43	36.93	56.12	50.1	54.00	3.90
15960.00	48.21	PK	H	37.64	8.70	39.36	55.19	49.17	74.00	24.83

802.11n ht20(2Tx 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)	Factor (dB/m)						
Low Channel: 5260 MHz										
5260.00	74.58	PK	H	33.72	3.49	0.00	111.79	105.77	N/A	N/A
5260.00	65.30	AV	H	33.72	3.49	0.00	102.51	96.49	N/A	N/A
5260.00	69.99	PK	V	33.72	3.49	0.00	107.20	101.18	N/A	N/A
5260.00	60.85	AV	V	33.72	3.49	0.00	98.06	92.04	N/A	N/A
5150.00	26.89	PK	H	33.54	3.56	0.00	63.99	57.97	74.00	16.03
5150.00	15.47	AV	H	33.54	3.56	0.00	52.57	46.55	54.00	7.45
10520.00	58.93	PK	H	38.21	6.39	36.89	66.64	60.62	68.20	7.58
15780.00	47.76	PK	H	37.82	8.76	39.22	55.12	49.1	74.00	24.90
15780.00	35.24	AV	H	37.82	8.76	39.22	42.60	36.58	54.00	17.42
Middle Channel: 5280 MHz										
5280.00	73.93	PK	H	33.75	3.45	0.00	111.13	105.11	N/A	N/A
5280.00	64.80	AV	H	33.75	3.45	0.00	102.00	95.98	N/A	N/A
5280.00	68.74	PK	V	33.75	3.45	0.00	105.94	99.92	N/A	N/A
5280.00	59.60	AV	V	33.75	3.45	0.00	96.80	90.78	N/A	N/A
10560.00	57.80	PK	H	38.24	6.40	36.90	65.54	59.52	68.20	8.68
15840.00	48.03	PK	H	37.76	8.74	39.27	55.26	49.24	74.00	24.76
15840.00	35.54	AV	H	37.76	8.74	39.27	42.77	36.75	54.00	17.25
High Channel: 5320 MHz										
5320.00	74.00	PK	H	33.81	3.45	0.00	111.26	105.24	N/A	N/A
5320.00	64.92	AV	H	33.81	3.45	0.00	102.18	96.16	N/A	N/A
5320.00	69.32	PK	V	33.81	3.45	0.00	106.58	100.56	N/A	N/A
5320.00	60.12	AV	V	33.81	3.45	0.00	97.38	91.36	N/A	N/A
5350.00	30.24	PK	H	33.86	3.52	0.00	67.62	61.6	74.00	12.40
5350.00	16.47	AV	H	33.86	3.52	0.00	53.85	47.83	54.00	6.17
10640.00	58.54	PK	H	38.28	6.43	36.93	66.32	60.3	74.00	13.70
10640.00	45.31	AV	H	38.28	6.43	36.93	53.09	47.07	54.00	6.93
15960.00	48.26	PK	H	37.64	8.70	39.36	55.24	49.22	74.00	24.78

802.11n ht40(2Tx 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)	Factor (dB/m)						
Low Channel: 5270 MHz										
5270.00	69.57	PK	H	33.73	3.47	0.00	106.77	100.75	N/A	N/A
5270.00	60.35	AV	H	33.73	3.47	0.00	97.55	91.53	N/A	N/A
5270.00	66.30	PK	V	33.73	3.47	0.00	103.50	97.48	N/A	N/A
5270.00	57.12	AV	V	33.73	3.47	0.00	94.32	88.3	N/A	N/A
5150.00	27.12	PK	H	33.54	3.56	0.00	64.22	58.2	74.00	15.80
5150.00	15.34	AV	H	33.54	3.56	0.00	52.44	46.42	54.00	7.58
10540.00	53.40	PK	H	38.22	6.40	36.89	61.13	55.11	68.20	13.09
15810.00	47.66	PK	H	37.79	8.75	39.25	54.95	48.93	74.00	25.07
15810.00	35.10	AV	H	37.79	8.75	39.25	42.39	36.37	54.00	17.63
High Channel: 5310 MHz										
5310.00	70.14	PK	H	33.80	3.43	0.00	107.37	101.35	N/A	N/A
5310.00	60.74	AV	H	33.80	3.43	0.00	97.97	91.95	N/A	N/A
5310.00	66.59	PK	V	33.80	3.43	0.00	103.82	97.8	N/A	N/A
5310.00	57.10	AV	V	33.80	3.43	0.00	94.33	88.31	N/A	N/A
5350.00	30.56	PK	H	33.86	3.52	0.00	67.94	61.92	74.00	12.08
5350.00	19.43	AV	H	33.86	3.52	0.00	56.81	50.79	54.00	3.21
10620.00	53.76	PK	H	38.27	6.43	36.92	61.54	55.52	74.00	18.48
10620.00	41.39	AV	H	38.27	6.43	36.92	49.17	43.15	54.00	10.85
15930.00	48.21	PK	H	37.67	8.71	39.34	55.25	49.23	74.00	24.77
15930.00	35.80	AV	H	37.67	8.71	39.34	42.84	36.82	54.00	17.18

802.11ac vht80(2Tx 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)	Factor (dB/m)						
Low Channel: 5290 MHz										
5290.00	66.96	PK	H	33.76	3.43	0.00	104.15	98.13	N/A	N/A
5290.00	58.87	AV	H	33.76	3.43	0.00	96.06	90.04	N/A	N/A
5290.00	62.93	PK	V	33.76	3.43	0.00	100.12	94.1	N/A	N/A
5290.00	54.86	AV	V	33.76	3.43	0.00	92.05	86.03	N/A	N/A
5150.00	27.41	PK	H	33.54	3.56	0.00	64.51	58.49	74.00	15.51
5150.00	15.40	AV	H	33.54	3.56	0.00	52.50	46.48	54.00	7.52
5350.00	33.90	PK	H	33.86	3.52	0.00	71.28	65.26	74.00	8.74
5350.00	21.47	AV	H	33.86	3.52	0.00	58.85	52.83	54.00	1.17
10580.00	51.15	PK	H	38.25	6.41	36.91	58.90	52.88	68.20	15.32
15870.00	47.86	PK	H	37.73	8.73	39.29	55.03	49.01	74.00	24.99
15870.00	35.30	AV	H	37.73	8.73	39.29	42.47	36.45	54.00	17.55

5470-5725MHz
802.11a (Chain 0 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)	Factor (dB/m)						
Low Channel: 5500 MHz										
5500.00	71.70	PK	H	34.10	3.54	0.00	109.34	103.32	N/A	N/A
5500.00	61.67	AV	H	34.10	3.54	0.00	99.31	93.29	N/A	N/A
5500.00	68.14	PK	V	34.10	3.54	0.00	105.78	99.76	N/A	N/A
5500.00	59.06	AV	V	34.10	3.54	0.00	96.70	90.68	N/A	N/A
5460.00	31.70	PK	H	34.05	3.56	0.00	69.31	63.29	74.00	10.71
5460.00	16.67	AV	H	34.05	3.56	0.00	54.28	48.26	54.00	5.74
11000.00	53.92	PK	H	38.50	6.57	37.06	61.93	55.91	74.00	18.09
11000.00	40.67	AV	H	38.50	6.57	37.06	48.68	42.66	54.00	11.34
16500.00	46.96	PK	H	38.20	8.63	39.30	54.49	48.47	68.20	19.73
Middle Channel: 5580 MHz										
5580.00	75.56	PK	H	34.14	3.57	0.00	113.27	107.25	N/A	N/A
5580.00	66.77	AV	H	34.14	3.57	0.00	104.48	98.46	N/A	N/A
5580.00	72.04	PK	V	34.14	3.57	0.00	109.75	103.73	N/A	N/A
5580.00	62.87	AV	V	34.14	3.57	0.00	100.58	94.56	N/A	N/A
11160.00	56.77	PK	H	38.70	6.58	37.18	64.87	58.85	74.00	15.15
11160.00	43.50	AV	H	38.70	6.58	37.18	51.60	45.58	54.00	8.42
16740.00	48.04	PK	H	39.40	8.68	38.98	57.14	51.12	68.20	17.08
High Channel: 5700 MHz										
5700.00	72.55	PK	H	34.18	3.68	0.00	110.41	104.39	N/A	N/A
5700.00	63.56	AV	H	34.18	3.68	0.00	101.42	95.4	N/A	N/A
5700.00	69.28	PK	V	34.18	3.68	0.00	107.14	101.12	N/A	N/A
5700.00	60.10	AV	V	34.18	3.68	0.00	97.96	91.94	N/A	N/A
5725.00	35.80	PK	H	34.19	3.69	0.00	73.68	67.66	68.20	0.54
11400.00	54.57	PK	H	38.90	6.59	37.30	62.76	56.74	74.00	17.26
11400.00	41.36	AV	H	38.90	6.59	37.30	49.55	43.53	54.00	10.47
17100.00	47.77	PK	H	40.78	8.75	38.70	58.60	52.58	68.20	15.62

802.11n ht20(2Tx 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)	Factor (dB/m)						
Low Channel: 5500 MHz										
5500.00	73.11	PK	H	34.10	3.54	0.00	110.75	104.73	N/A	N/A
5500.00	64.10	AV	H	34.10	3.54	0.00	101.74	95.72	N/A	N/A
5500.00	69.10	PK	V	34.10	3.54	0.00	106.74	100.72	N/A	N/A
5500.00	60.03	AV	V	34.10	3.54	0.00	97.67	91.65	N/A	N/A
5460.00	35.70	PK	H	34.05	3.56	0.00	73.31	67.29	74.00	6.71
5460.00	19.99	AV	H	34.05	3.56	0.00	57.60	51.58	54.00	2.42
11000.00	54.14	PK	H	38.50	6.57	37.06	62.15	56.13	74.00	17.87
11000.00	40.87	AV	H	38.50	6.57	37.06	48.88	42.86	54.00	11.14
16500.00	47.50	PK	H	38.20	8.63	39.30	55.03	49.01	68.20	19.19
Middle Channel: 5580MHz										
5580.00	73.24	PK	H	34.14	3.57	0.00	110.95	104.93	N/A	N/A
5580.00	64.13	AV	H	34.14	3.57	0.00	101.84	95.82	N/A	N/A
5580.00	69.16	PK	V	34.14	3.57	0.00	106.87	100.85	N/A	N/A
5580.00	60.07	AV	V	34.14	3.57	0.00	97.78	91.76	N/A	N/A
11160.00	54.67	PK	H	38.70	6.58	37.18	62.77	56.75	74.00	17.25
11160.00	41.35	AV	H	38.70	6.58	37.18	49.45	43.43	54.00	10.57
16740.00	47.90	PK	H	39.40	8.68	38.98	57.00	50.98	68.20	17.22
High Channel: 5700 MHz										
5700.00	73.04	PK	H	34.18	3.68	0.00	110.90	104.88	N/A	N/A
5700.00	63.98	AV	H	34.18	3.68	0.00	101.84	95.82	N/A	N/A
5700.00	68.84	PK	V	34.18	3.68	0.00	106.70	100.68	N/A	N/A
5700.00	59.71	AV	V	34.18	3.68	0.00	97.57	91.55	N/A	N/A
5725.00	32.84	PK	H	34.19	3.69	0.00	70.72	64.7	68.2	3.5
11400.00	55.30	PK	H	38.90	6.59	37.30	63.49	57.47	74.00	16.53
11400.00	41.75	AV	H	38.90	6.59	37.30	49.94	43.92	54.00	10.08
17100.00	47.96	PK	H	40.78	8.75	38.70	58.79	52.77	68.20	15.43

802.11n ht40(2Tx 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)	Factor (dB/m)						
Low Channel: 5510 MHz										
5510.00	68.94	PK	H	34.10	3.54	0.00	106.58	100.56	N/A	N/A
5510.00	60.23	AV	H	34.10	3.54	0.00	97.87	91.85	N/A	N/A
5510.00	65.34	PK	V	34.10	3.54	0.00	102.98	96.96	N/A	N/A
5510.00	56.87	AV	V	34.10	3.54	0.00	94.51	88.49	N/A	N/A
5460.00	34.70	PK	H	34.05	3.56	0.00	72.31	66.29	74.00	7.71
5460.00	20.30	AV	H	34.05	3.56	0.00	57.91	51.89	54.00	2.11
11020.00	49.60	PK	H	38.52	6.57	37.07	57.62	51.6	74.00	22.40
11020.00	36.21	AV	H	38.52	6.57	37.07	44.23	38.21	54.00	15.79
16530.00	48.10	PK	H	38.32	8.64	39.27	55.79	49.77	68.20	18.43
Middle Channel: 5550 MHz										
5550.00	69.45	PK	H	34.14	3.57	0.00	107.16	101.14	N/A	N/A
5550.00	60.86	AV	H	34.14	3.57	0.00	98.57	92.55	N/A	N/A
5550.00	65.56	PK	V	34.14	3.57	0.00	103.27	97.25	N/A	N/A
5550.00	57.01	AV	V	34.14	3.57	0.00	94.72	88.7	N/A	N/A
11100.00	49.87	PK	H	38.68	6.58	37.17	57.96	51.94	74.00	22.06
11100.00	36.54	AV	H	38.68	6.58	37.17	44.63	38.61	54.00	15.39
16650.00	47.86	PK	H	39.28	8.68	39.01	56.81	50.79	68.20	17.41
High Channel: 5670 MHz										
5670.00	72.31	PK	H	34.17	3.65	0.00	110.13	104.11	N/A	N/A
5670.00	63.07	AV	H	34.17	3.65	0.00	100.89	94.87	N/A	N/A
5670.00	68.10	PK	V	34.17	3.65	0.00	105.92	99.9	N/A	N/A
5670.00	59.22	AV	V	34.17	3.65	0.00	97.04	91.02	N/A	N/A
5725.00	30.59	PK	H	34.19	3.69	0.00	68.47	62.45	68.2	5.75
11340.00	50.61	PK	H	38.84	6.58	37.26	58.77	52.75	74.00	21.25
11340.00	37.24	AV	H	38.84	6.58	37.26	45.40	39.38	54.00	14.62
17010.00	48.03	PK	H	40.26	8.72	38.76	58.25	52.23	68.20	15.97
Additional Channel: 5710 MHz										
5710.00	73.49	PK	H	34.18	3.68	0.00	111.35	105.33	N/A	N/A
5710.00	62.30	AV	H	34.18	3.68	0.00	100.16	94.14	N/A	N/A
5710.00	70.32	PK	V	34.18	3.68	0.00	108.18	102.16	N/A	N/A
5710.00	61.11	AV	V	34.18	3.68	0.00	98.97	92.95	N/A	N/A
11420.00	51.57	PK	H	38.92	6.59	37.31	59.77	53.75	74.00	20.25
11420.00	38.45	AV	H	38.92	6.59	37.31	46.65	40.63	54.00	13.37
17130.00	47.99	PK	H	40.95	8.75	38.68	59.01	52.99	68.20	15.21

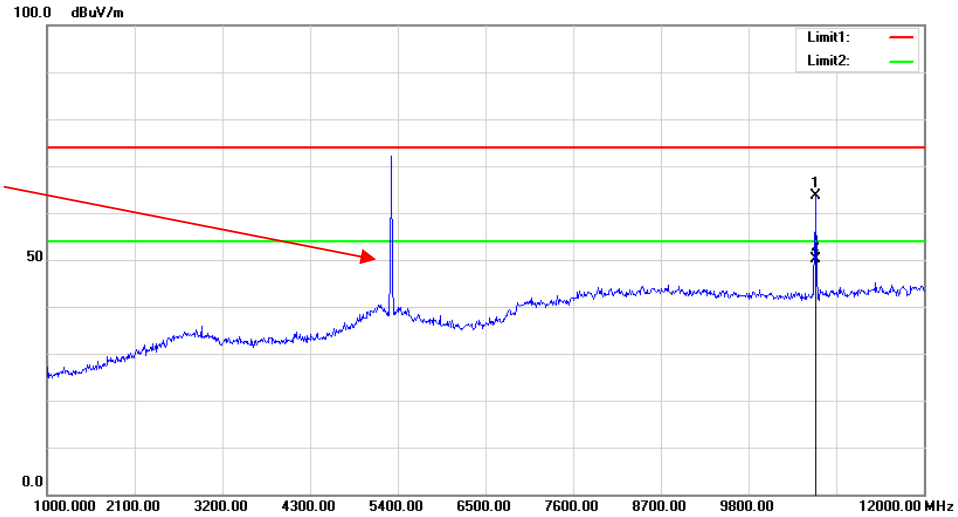
802.11ac vht80(2Tx was the worst)

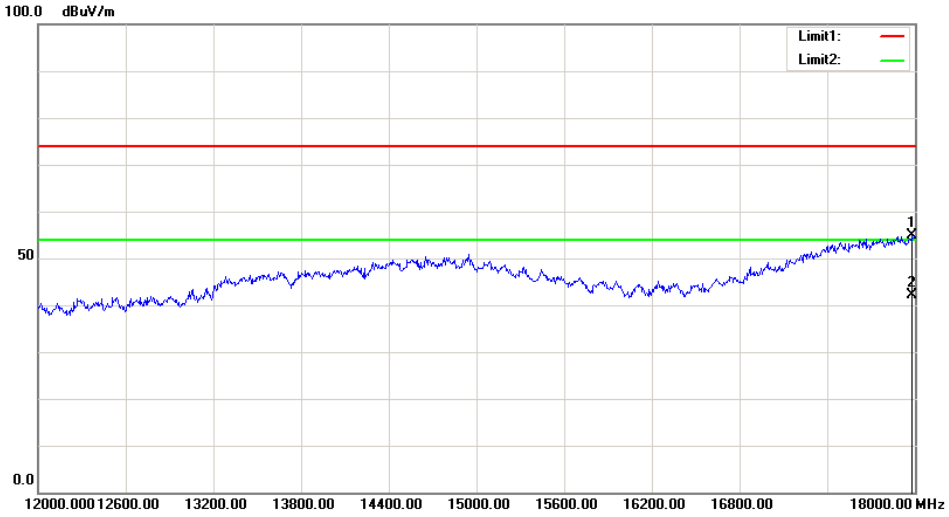
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Extrapolation result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector	Polar (H/V)	Factor (dB/m)						
Low Channel: 5530 MHz										
5530.00	66.82	PK	H	34.11	3.55	0.00	104.48	98.46	N/A	N/A
5530.00	58.67	AV	H	34.11	3.55	0.00	96.33	90.31	N/A	N/A
5530.00	63.24	PK	V	34.11	3.55	0.00	100.90	94.88	N/A	N/A
5530.00	54.87	AV	V	34.11	3.55	0.00	92.53	86.51	N/A	N/A
5460.00	33.10	PK	H	34.05	3.56	0.00	70.71	64.69	74.00	9.31
5460.00	21.03	AV	H	34.05	3.56	0.00	58.64	52.62	54.00	1.38
11060.00	47.67	PK	H	38.56	6.57	37.10	55.70	49.68	74.00	24.32
11060.00	35.10	AV	H	38.56	6.57	37.10	43.13	37.11	54.00	16.89
16590.00	47.54	PK	H	38.56	8.65	39.20	55.55	49.53	68.20	18.67
Middle Channel: 5610 MHz										
5610.00	68.32	PK	H	34.14	3.58	0.00	106.04	100.02	N/A	N/A
5610.00	60.23	AV	H	34.14	3.58	0.00	97.95	91.93	N/A	N/A
5610.00	65.02	PK	V	34.14	3.58	0.00	102.74	96.72	N/A	N/A
5610.00	56.87	AV	V	34.14	3.58	0.00	94.59	88.57	N/A	N/A
5725.00	29.73	PK	H	34.19	3.69	0.00	67.61	61.59	68.2	6.61
11220.00	48.25	PK	H	38.72	6.58	37.19	56.36	50.34	74.00	23.66
11220.00	35.74	AV	H	38.72	6.58	37.19	43.85	37.83	54.00	16.17
16830.00	48.13	PK	H	39.52	8.69	38.95	57.39	51.37	68.20	16.83
Additional Channel: 5690 MHz										
5690.00	68.40	PK	H	34.18	3.67	0.00	106.25	100.23	N/A	N/A
5690.00	60.12	AV	H	34.18	3.67	0.00	97.97	91.95	N/A	N/A
5690.00	64.87	PK	V	34.18	3.67	0.00	102.72	96.7	N/A	N/A
5690.00	56.34	AV	V	34.18	3.67	0.00	94.19	88.17	N/A	N/A
11380.00	47.76	PK	H	38.88	6.59	37.29	55.94	49.92	74.00	24.08
11380.00	35.24	AV	H	38.88	6.59	37.29	43.42	37.4	54.00	16.60
17070.00	47.88	PK	H	40.61	8.74	38.72	58.51	52.49	68.20	15.71

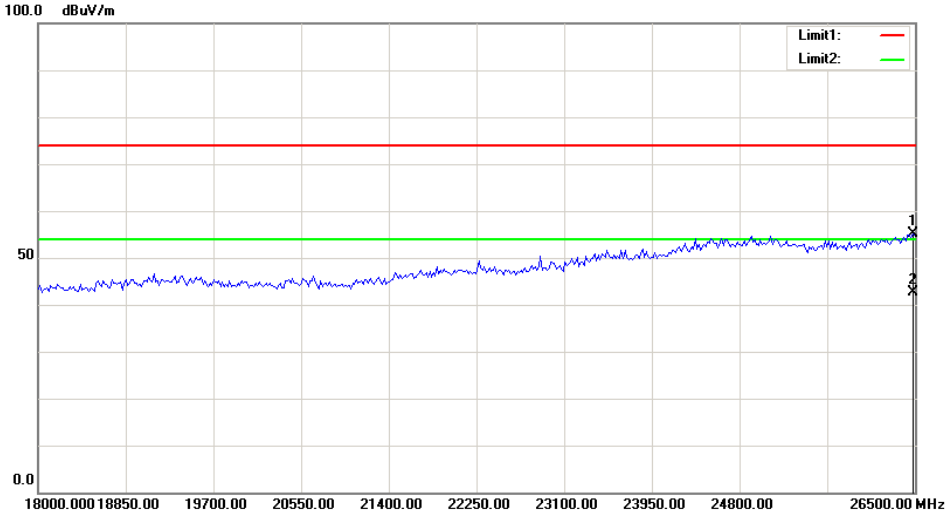
Note: The 5610 MHz is only used for the FCC, not applied to the ISED.

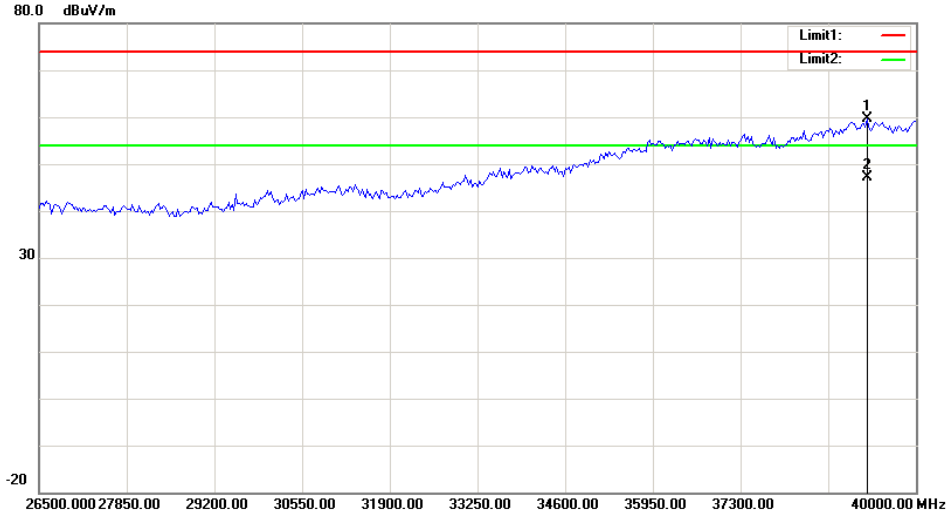
Test Plots(For worst mode 802.11a chain 0 5320MHz)
Horizontal

Fundamental Test with Band Rejection Filter



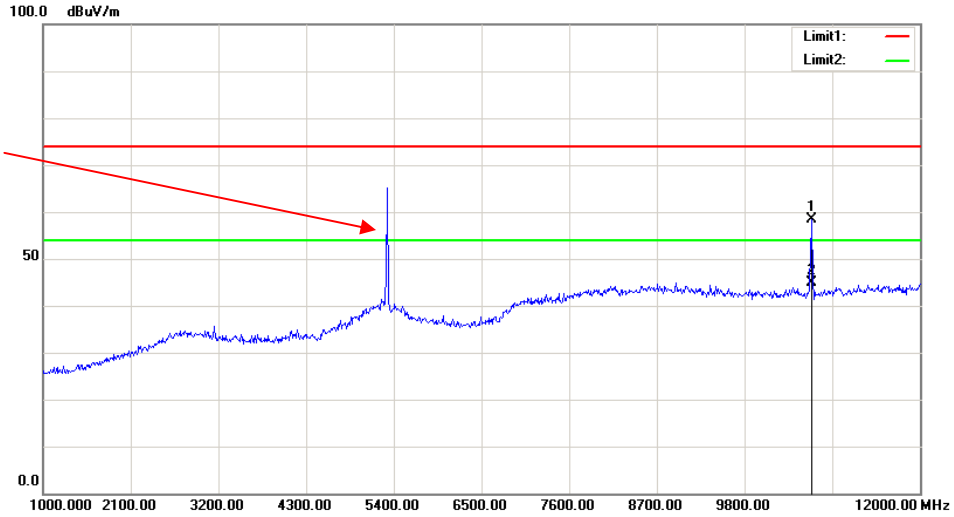


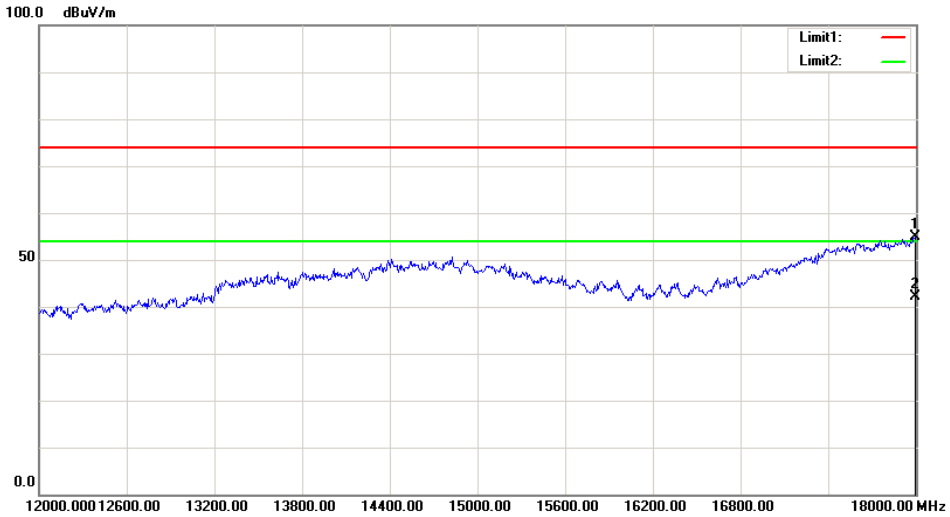


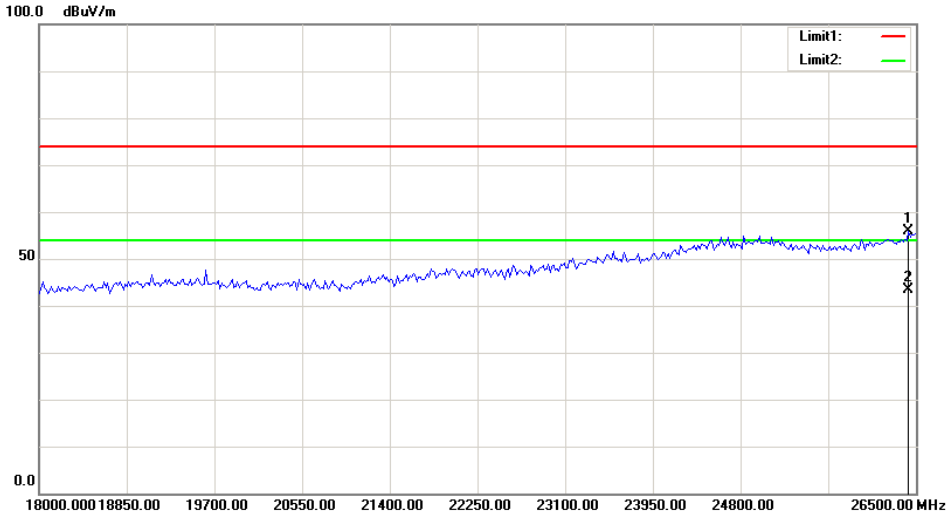


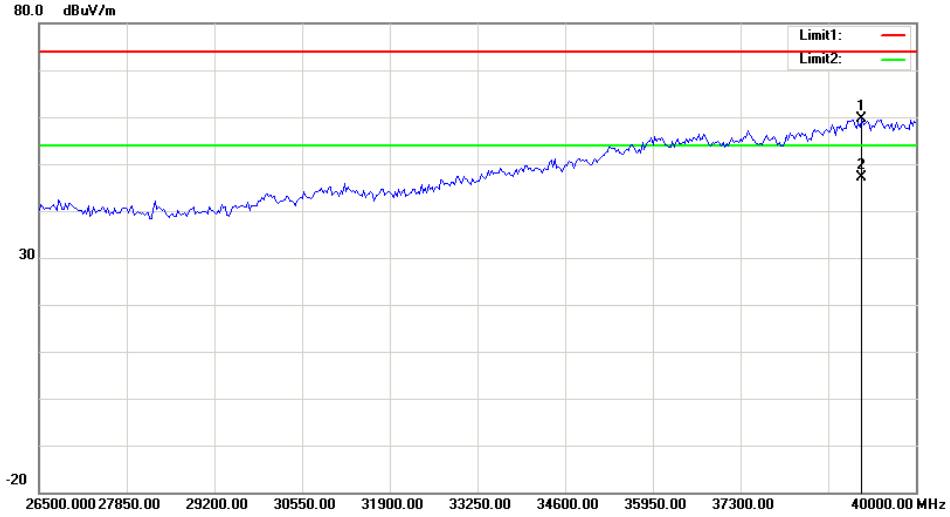
Vertical

Fundamental Test with Band Rejection Filter






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


80.0 dBuV/m
Limit1:
Limit2:
30
-20
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) & RSS-247 CLAUSE 6.2,RSS-Gen CLAUSE 6.7– EMISSION BANDWIDTH AND OCCUPIED BANDWIDTH

Applicable Standard

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
conducted emission	Spectrum Analyzer	FSP 38	100478	2018-12-10	2019-12-10
R&S	Spectrum Analyzer	FSU 26	200256	2019-01-04	2020-01-04
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A

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

Test Procedure

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

Test Data

Environmental Conditions

Temperature:	26.4°C~27.4°C
Relative Humidity:	49 %~49 %
ATM Pressure:	102 kPa~102 kPa

The testing was performed by Elena Lei on 2019-04-01~2019-09-17.

Test Result: Pass.

Please refer to the following tables and plots.

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

5250-5350MHz:

Mode	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11 a	5260	21.865	17.440
	5280	21.864	17.760
	5320	21.354	17.440
802.11n ht20	5260	21.723	18.080
	5280	21.242	18.000
	5320	22.846	17.920
802.11n ht40	5270	43.983	36.960
	5310	42.645	36.960
802.11ac vht80	5290	83.046	76.800

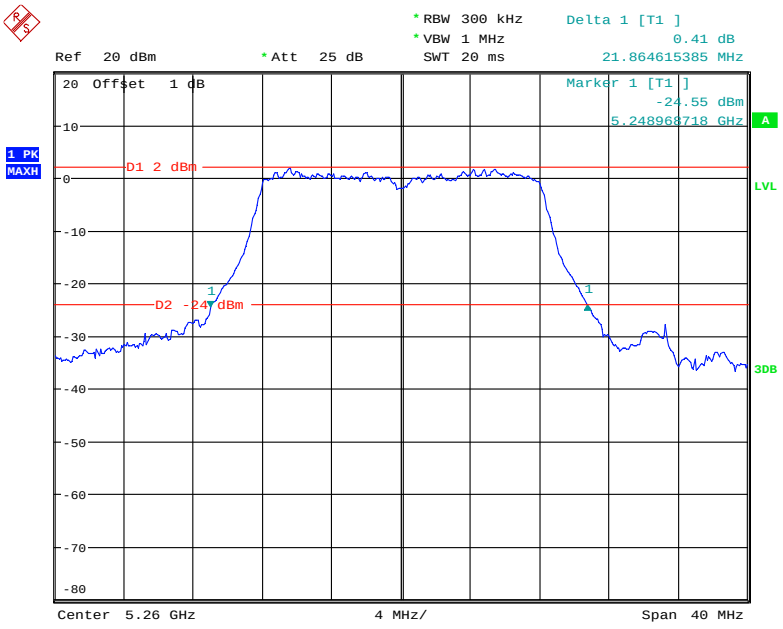
5470-5725MHz:

Mode	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11 a	5500	22.044	17.120
	5580	22.302	18.320
	5700	21.577	17.280
802.11n ht20	5500	22.365	18.880
	5580	22.249	18.160
	5700	22.123	18.080
802.11n ht40	5510	43.531	37.120
	5550	43.226	37.280
	5670	43.310	37.440
	5710	43.200	37.440
802.11ac vht80	5530	86.410	76.800
	5610	87.360	76.480
	5690	85.932	76.480

Note: The 5610 MHz is only used for the FCC, not applied to the ISED.

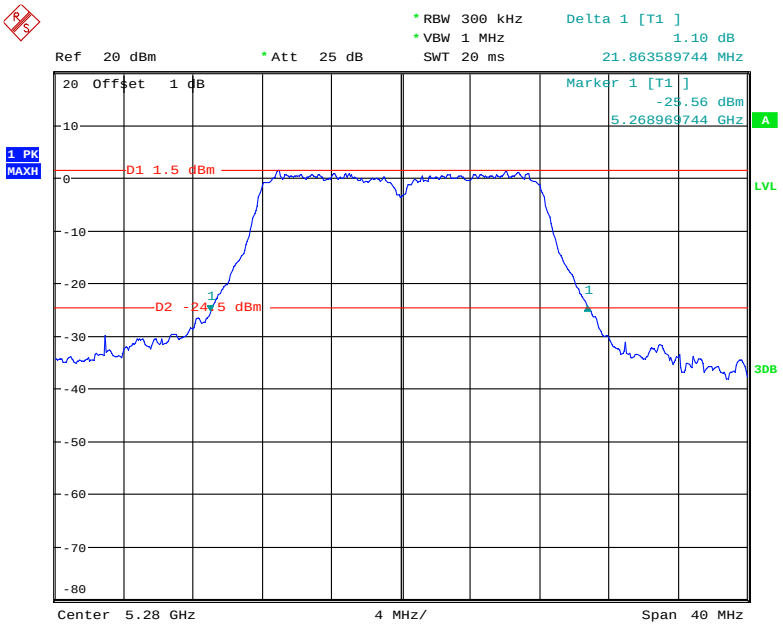
5250-5350MHz:
26dB Emission Bandwidth:

802.11a Low Channel



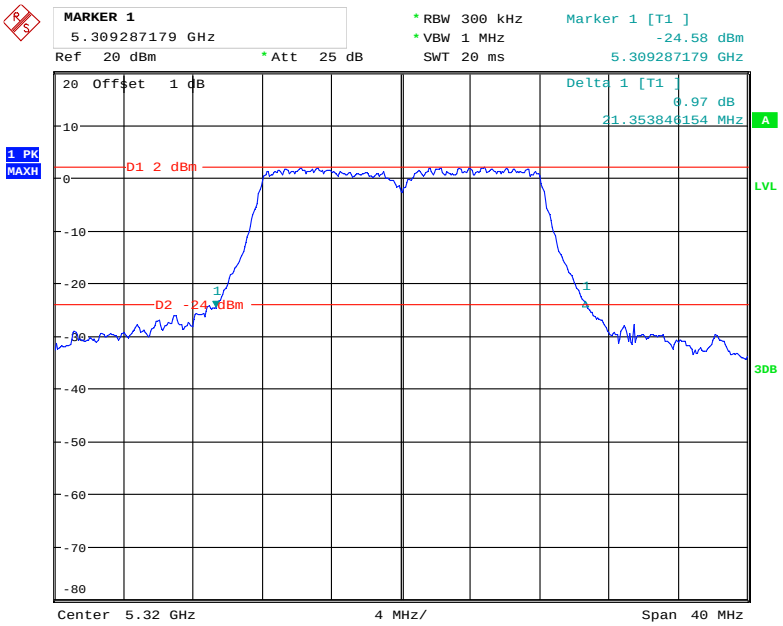
Date: 1.APR.2019 21:43:16

802.11a Middle Channel



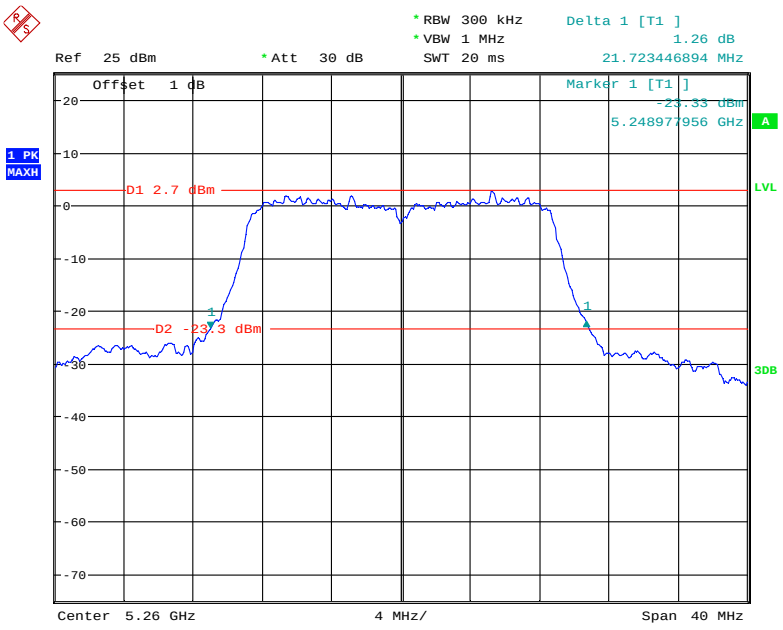
Date: 1.APR.2019 21:44:37

802.11a High Channel



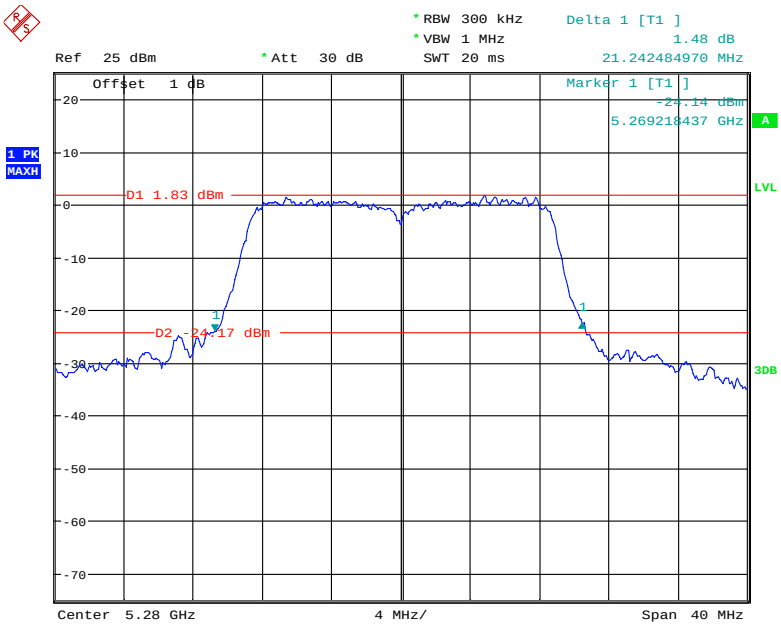
Date: 1.APR.2019 21:45:54

802.11n ht20 Low Channel



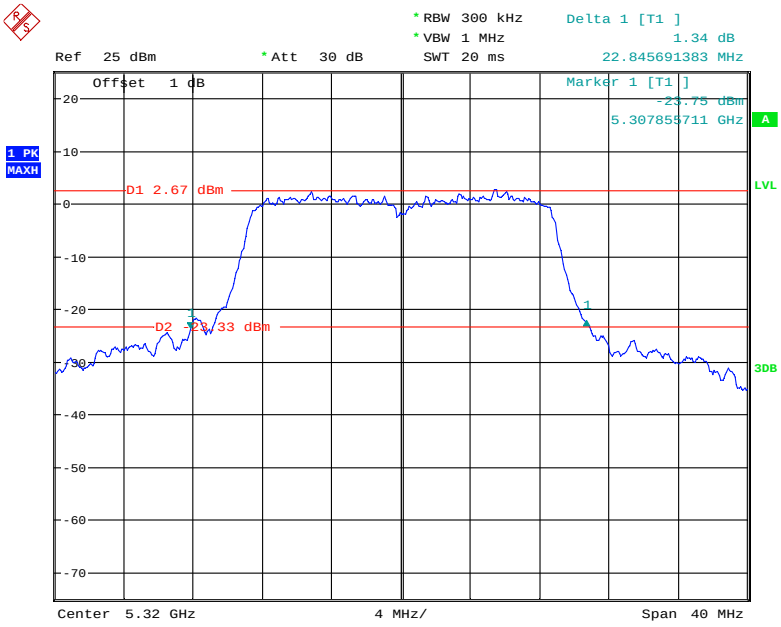
Date: 1.APR.2019 16:56:42

802.11n ht20 Middle Channel



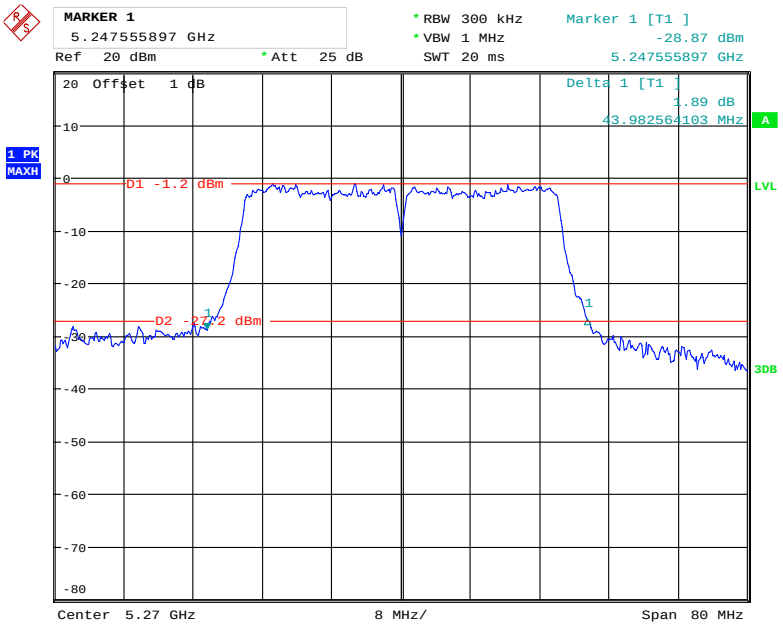
Date: 1.APR.2019 16:57:47

802.11n ht20 High Channel



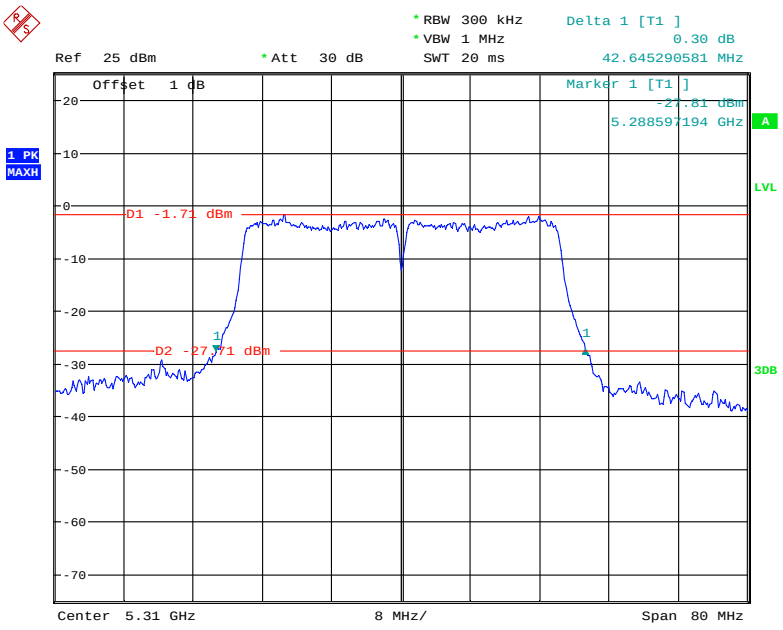
Date: 1.APR.2019 16:58:58

802.11n ht40 Low Channel



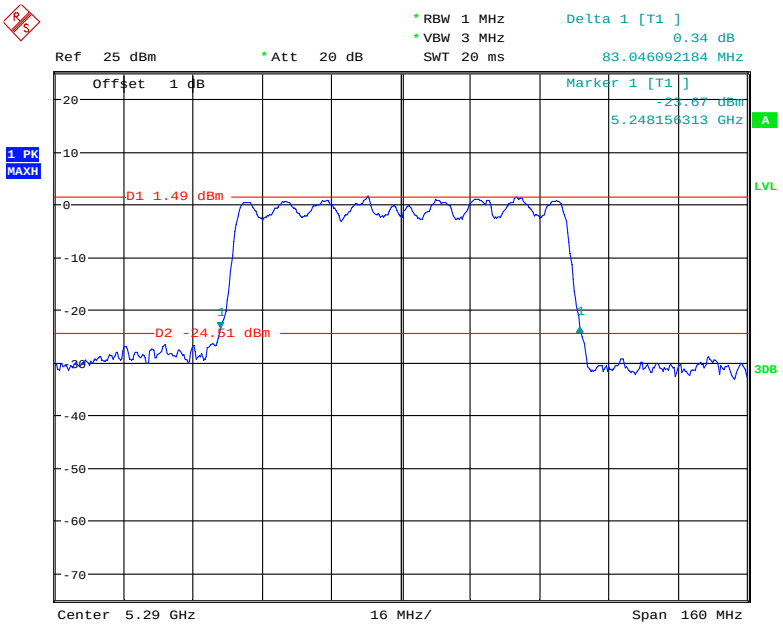
Date: 1.APR.2019 21:03:14

802.11n ht40 High Channel



Date: 1.APR.2019 17:01:20

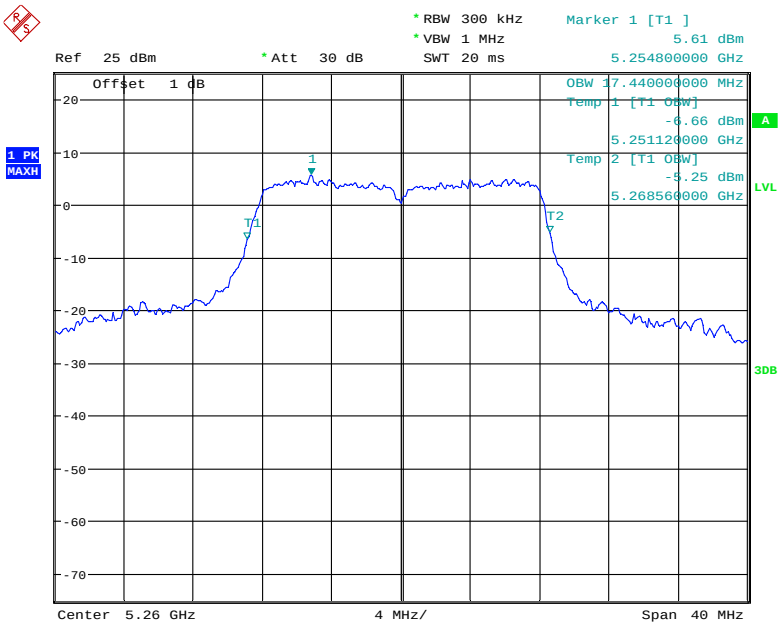
802.11 ac80 Middle Channel



Date: 1.APR.2019 20:29:18

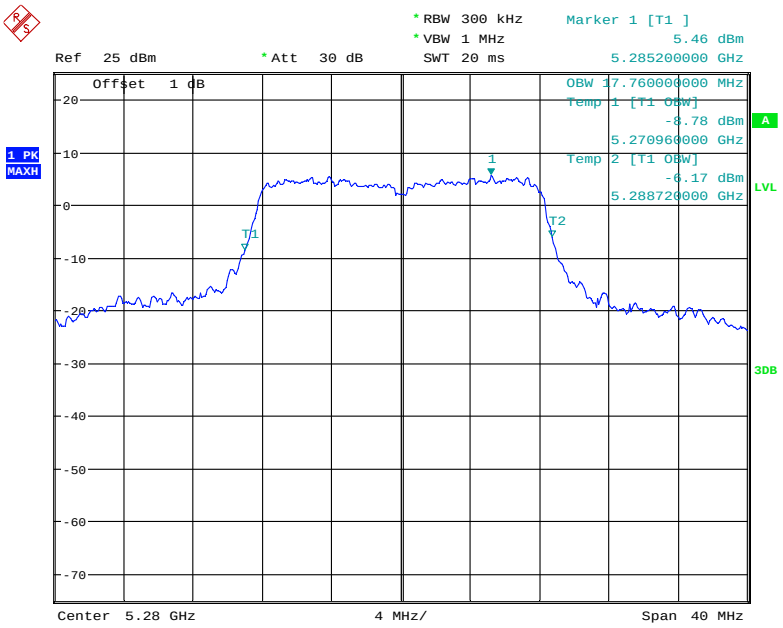
99% Occupied Bandwidth:

802.11a Low Channel



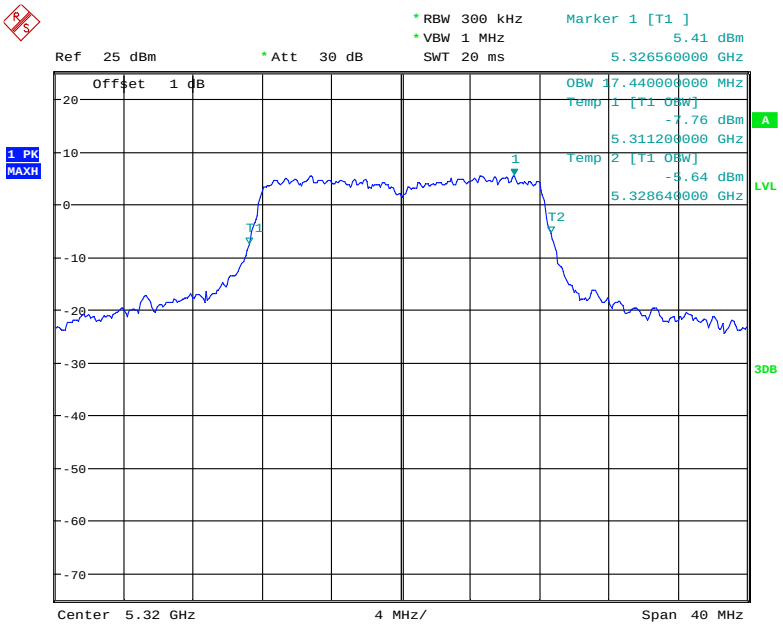
Date: 1.APR.2019 16:13:27

802.11a Middle Channel



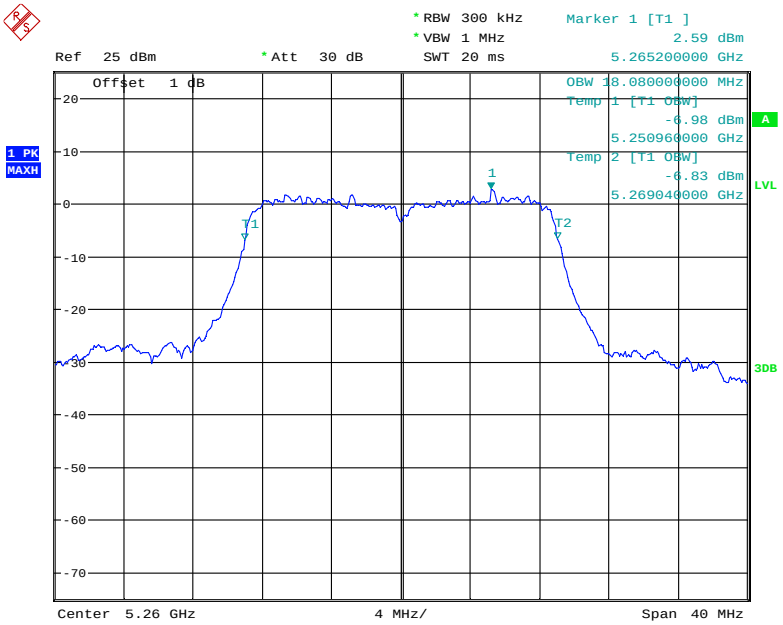
Date: 1.APR.2019 16:14:44

802.11a High Channel



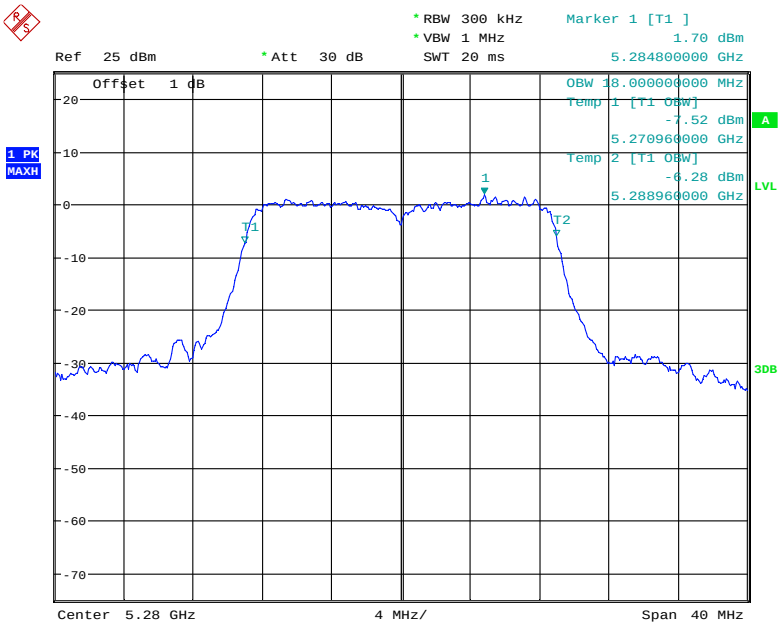
Date: 1.APR.2019 16:16:33

802.11n ht20 Low Channel



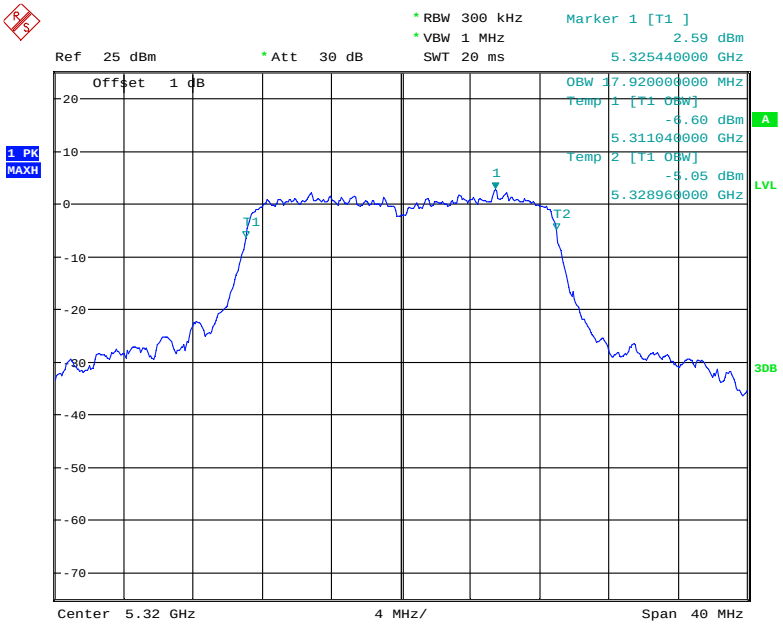
Date: 1.APR.2019 16:56:57

802.11n ht20 Middle Channel



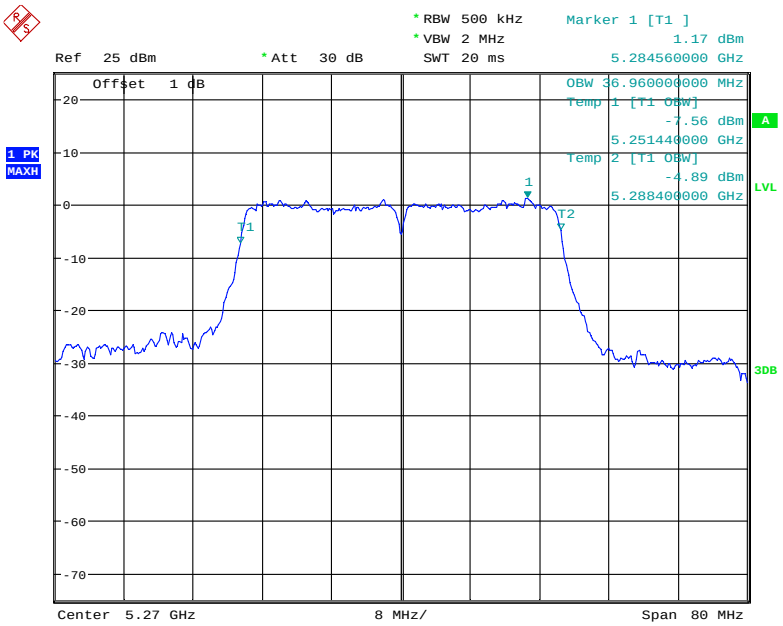
Date: 1.APR.2019 16:58:03

802.11n ht20 High Channel



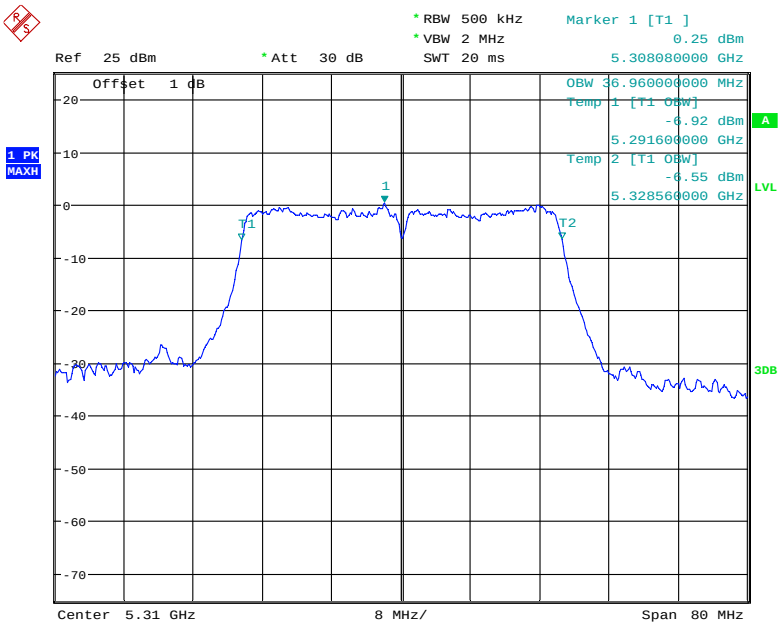
Date: 1.APR.2019 16:59:13

802.11n ht40 Low Channel



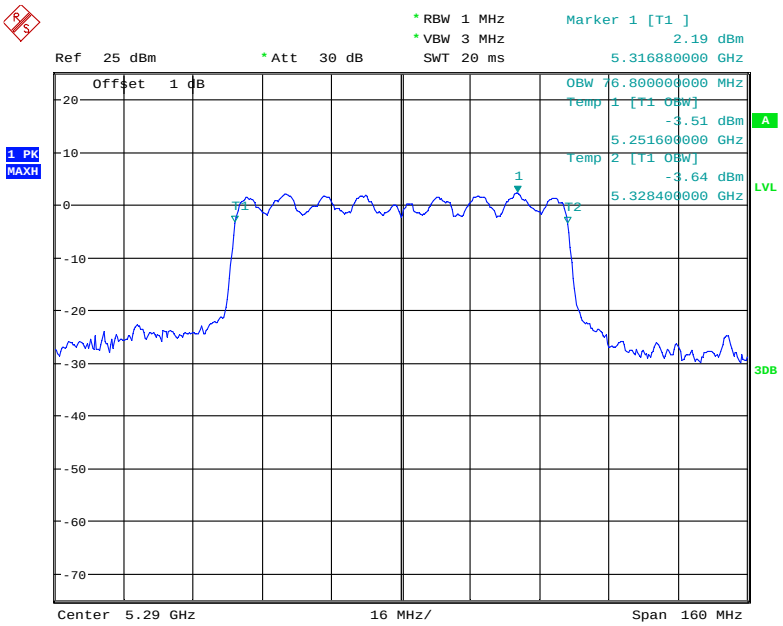
Date: 1.APR.2019 17:00:33

802.11n ht40 High Channel



Date: 1.APR.2019 17:01:35

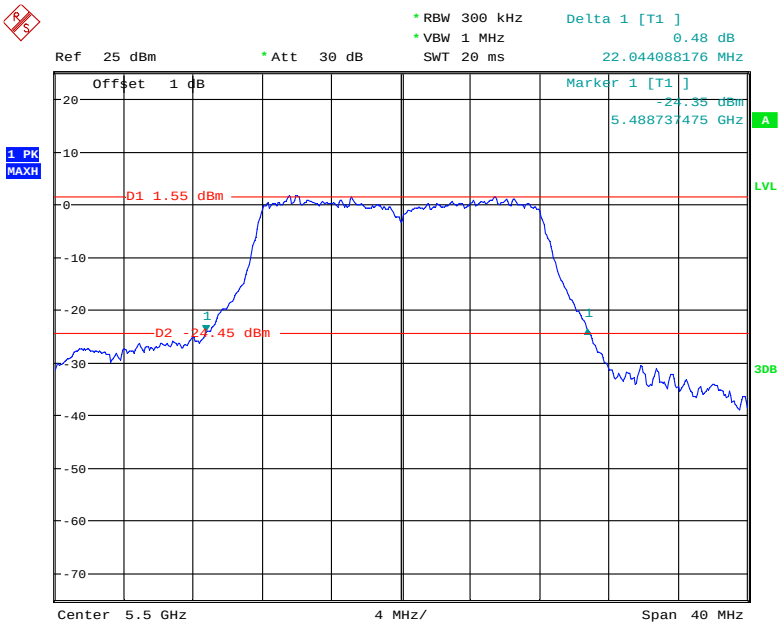
802.11ac vht80 Middle Channel



Date: 1.APR.2019 17:04:31

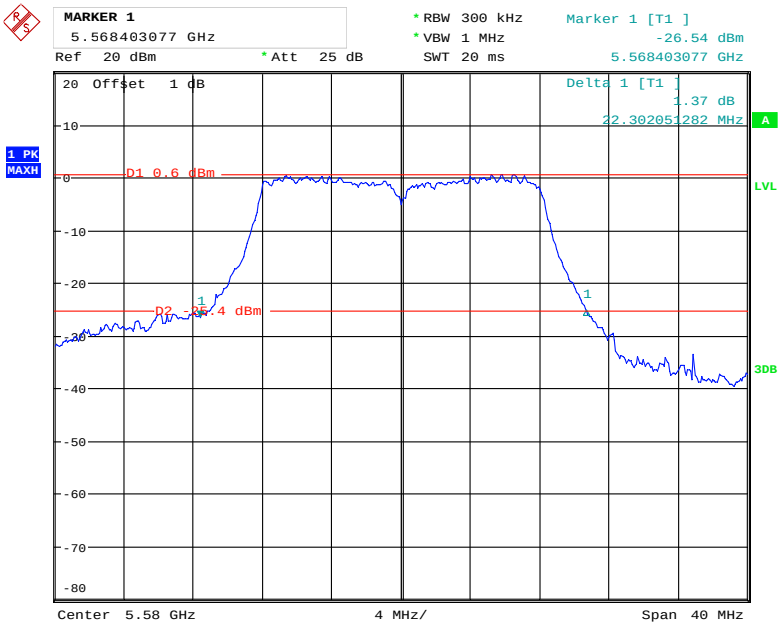
5470-5725MHz:
26dB Emission Bandwidth:

802.11a Low Channel



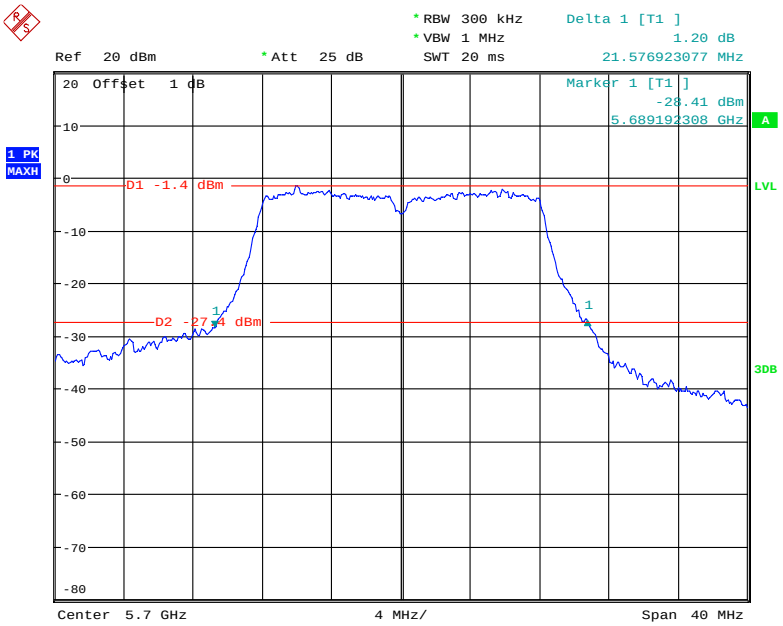
Date: 1.APR.2019 17:17:01

802.11a Middle Channel



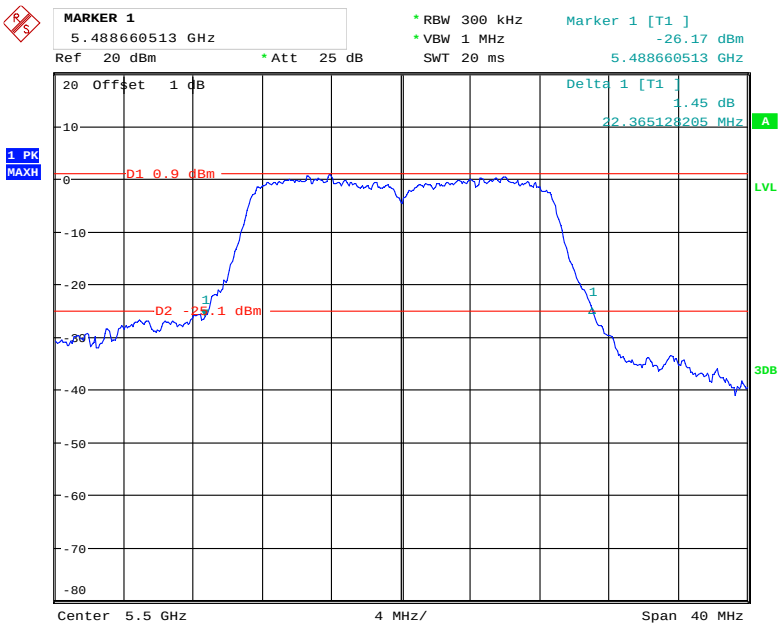
Date: 1.APR.2019 21:49:53

802.11a High Channel



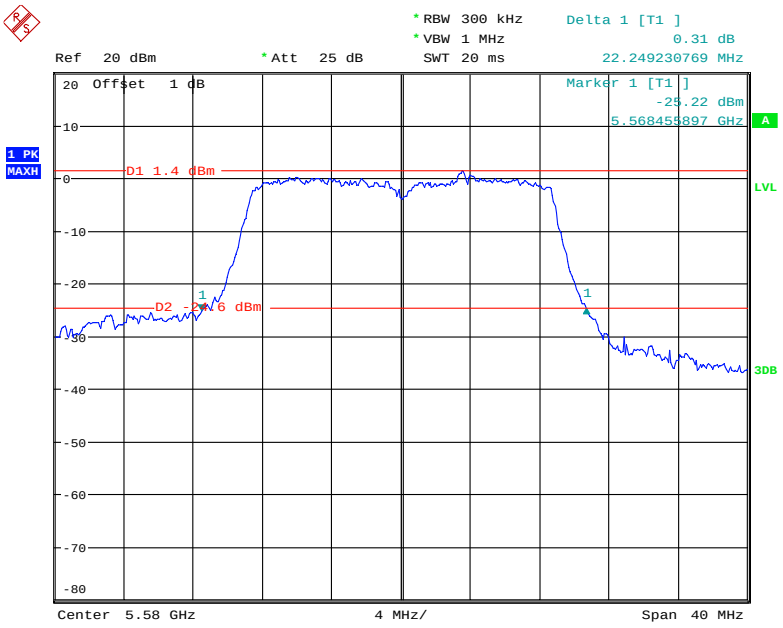
Date: 1.APR.2019 21:51:26

802.11n ht20 Low Channel



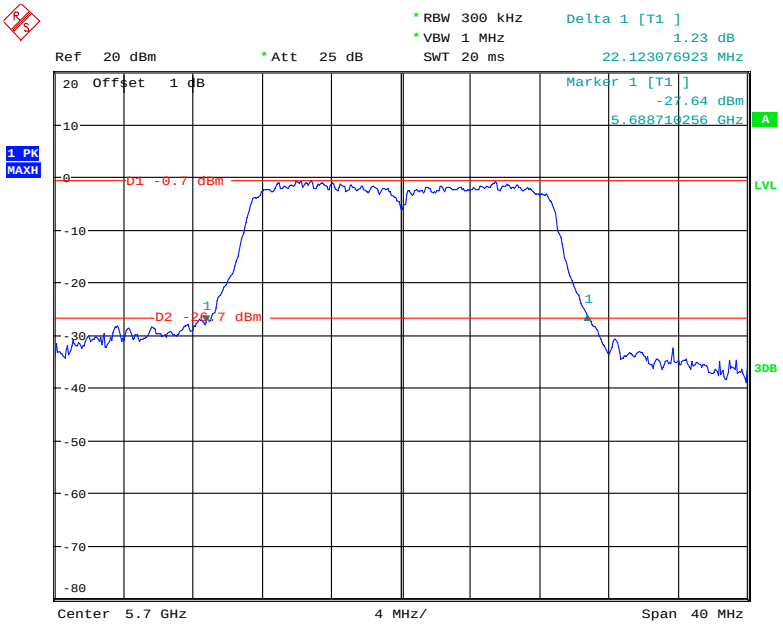
Date: 1.APR.2019 21:30:58

802.11n ht20 Middle Channel



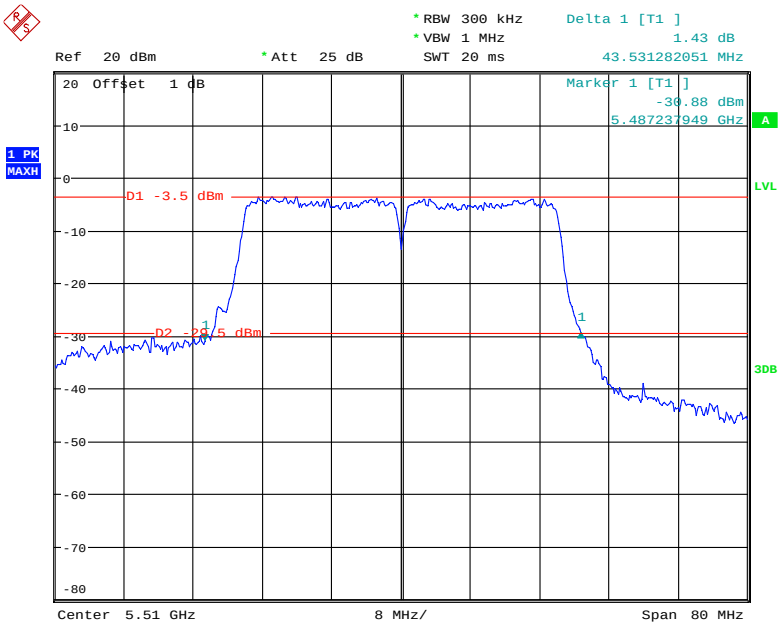
Date: 1.APR.2019 21:32:27

802.11n ht20 High Channel



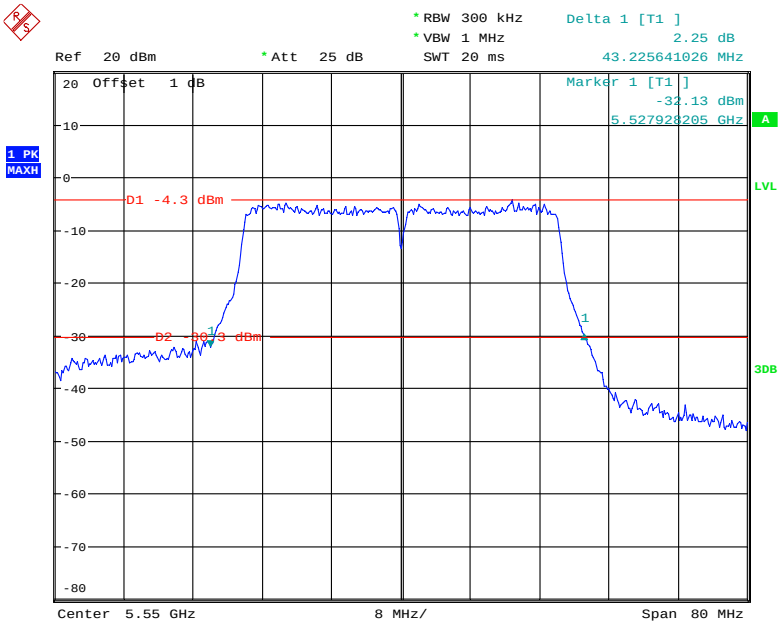
Date: 1.APR.2019 21:35:56

802.11n ht40 Low Channel



Date: 1.APR.2019 21:23:46

802.11n ht40 Middle Channel



Date: 1.APR.2019 21:26:16

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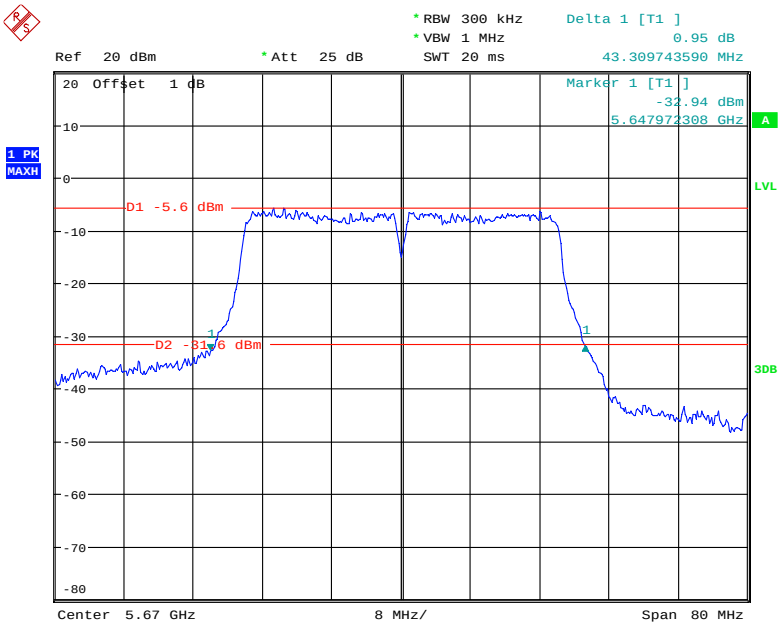
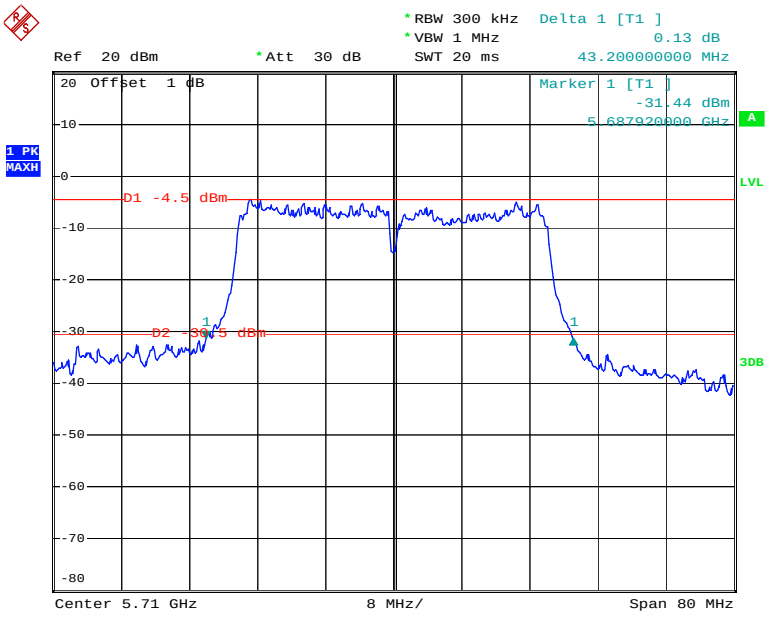


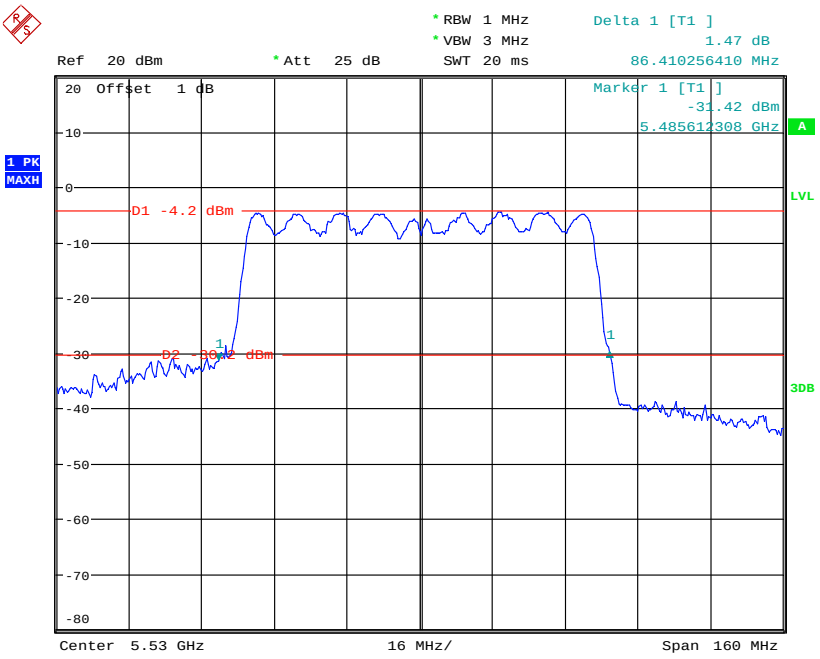
Date: 1.APR.2019 21:27:05

802.11n ht40 Additional Channel



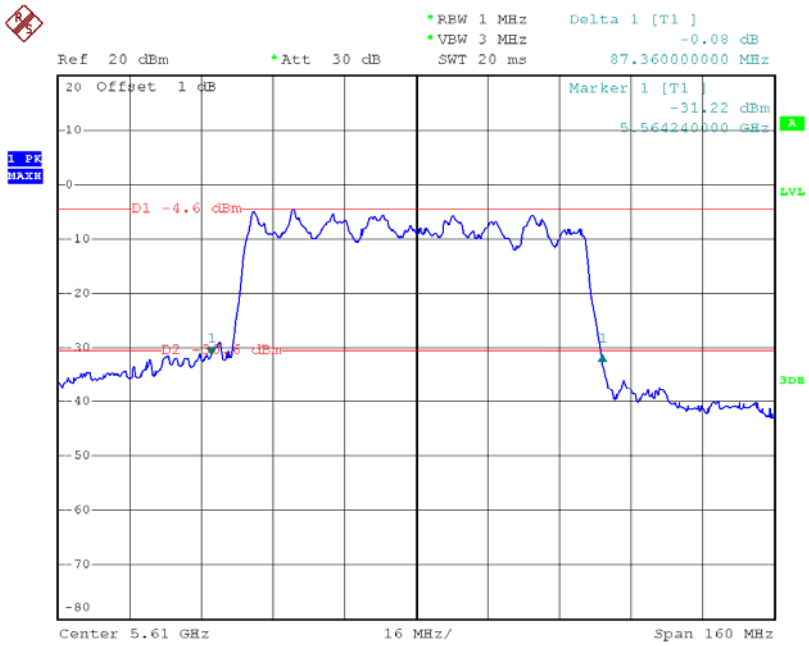
Date: 17.SEP.2019 15:01:46

802.11ac vht80 Low Channel



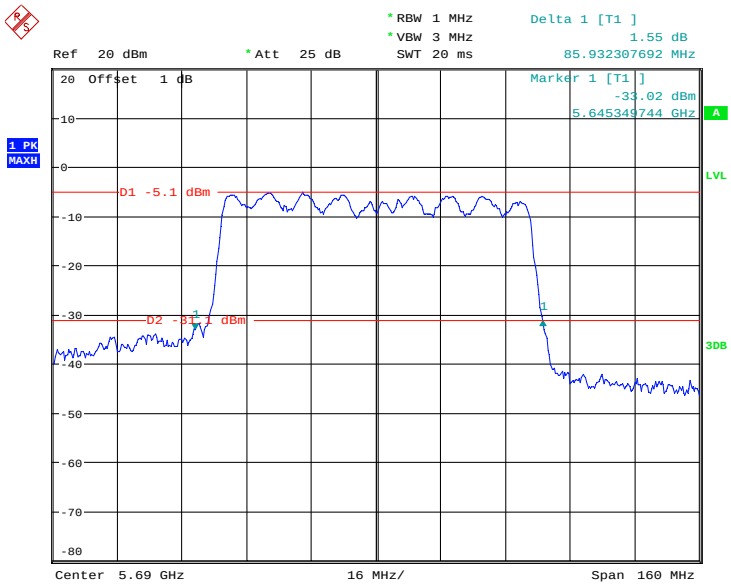
Date: 1.APR.2019 20:55:16

802.11ac vht80 Middle Channel



Date: 17.SEP.2019 15:37:42

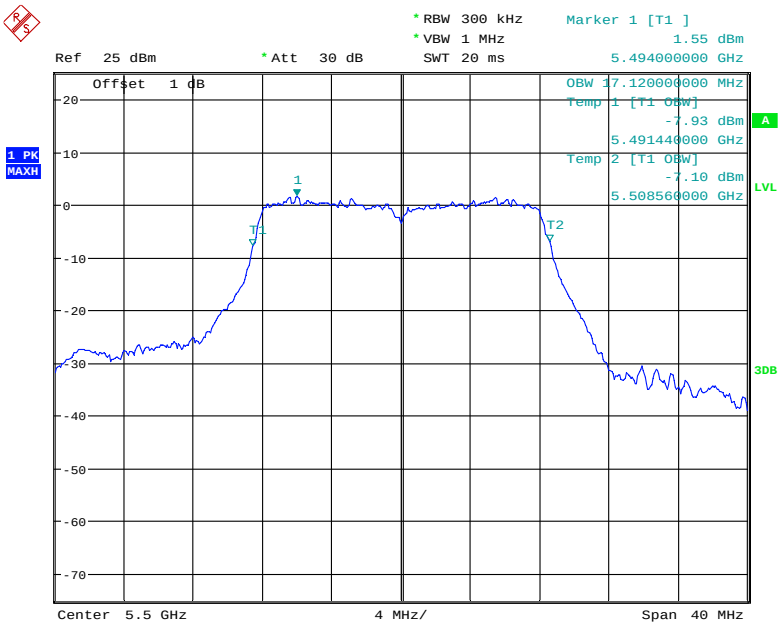
802.11ac vht80 Additional Channel



Date: 1.APR.2019 20:57:42

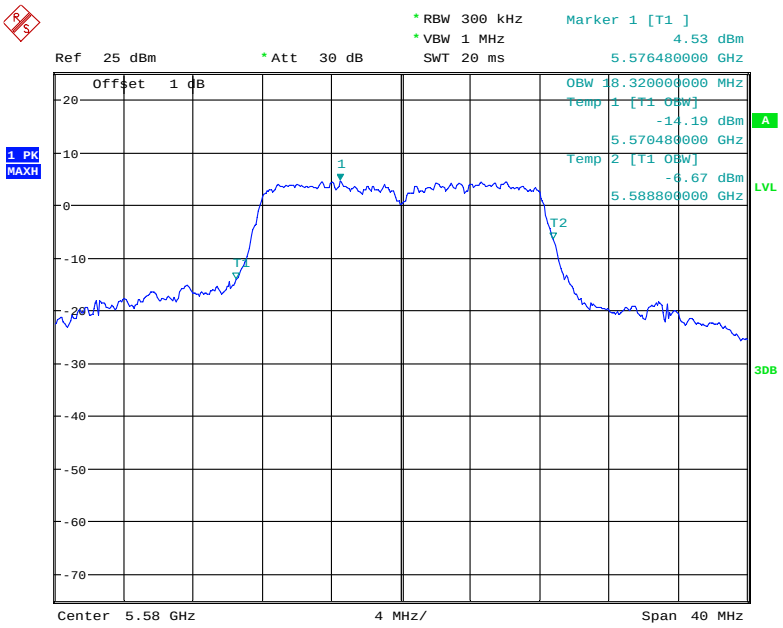
99% Occupied Bandwidth:

802.11a Low Channel



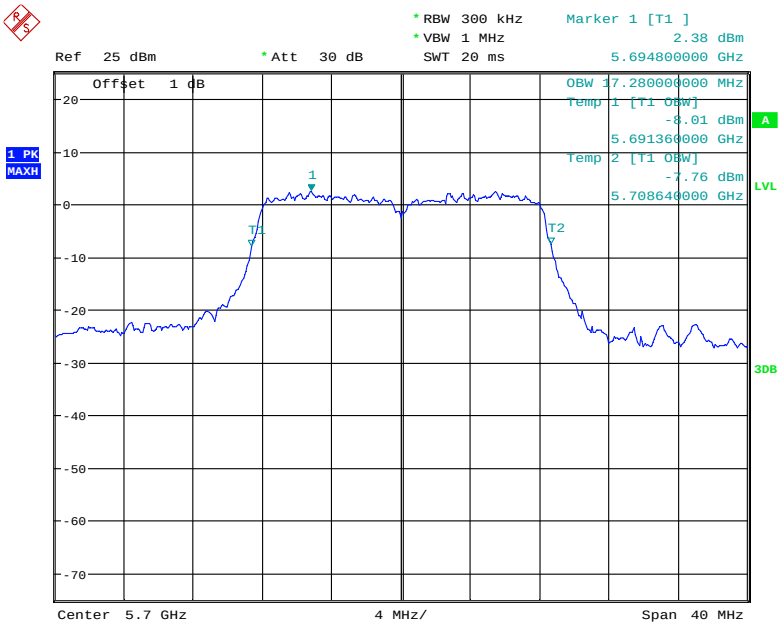
Date: 1.APR.2019 17:17:17

802.11a Middle Channel



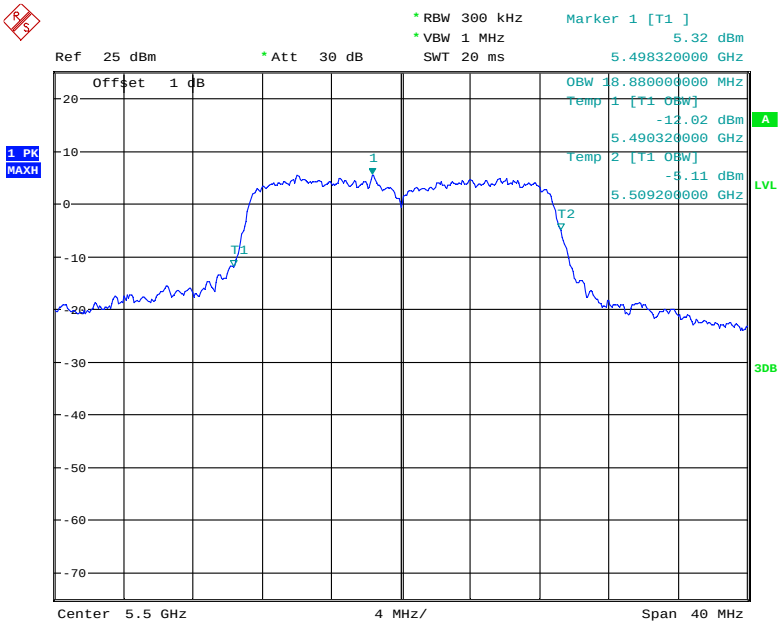
Date: 1.APR.2019 17:16:16

802.11a High Channel



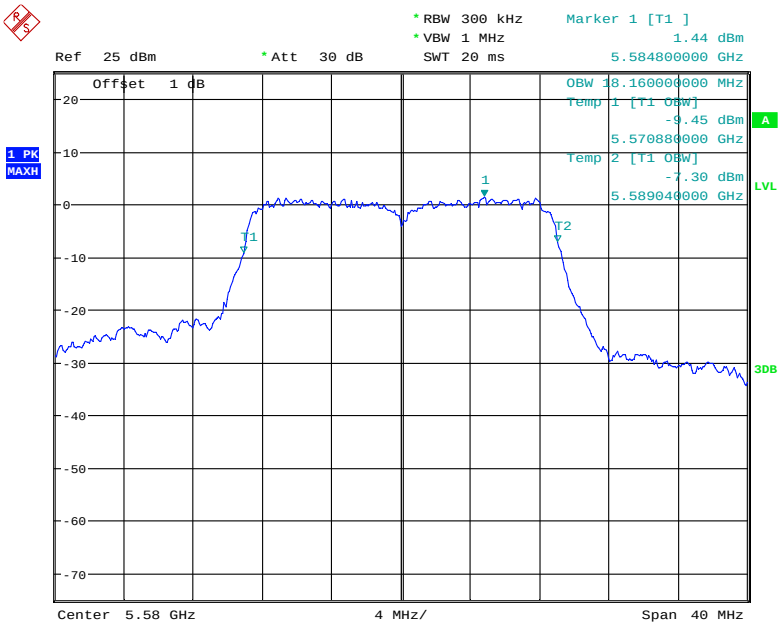
Date: 1.APR.2019 17:15:11

802.11n ht20 Low Channel



Date: 1.APR.2019 17:11:48

802.11n ht20 Middle Channel



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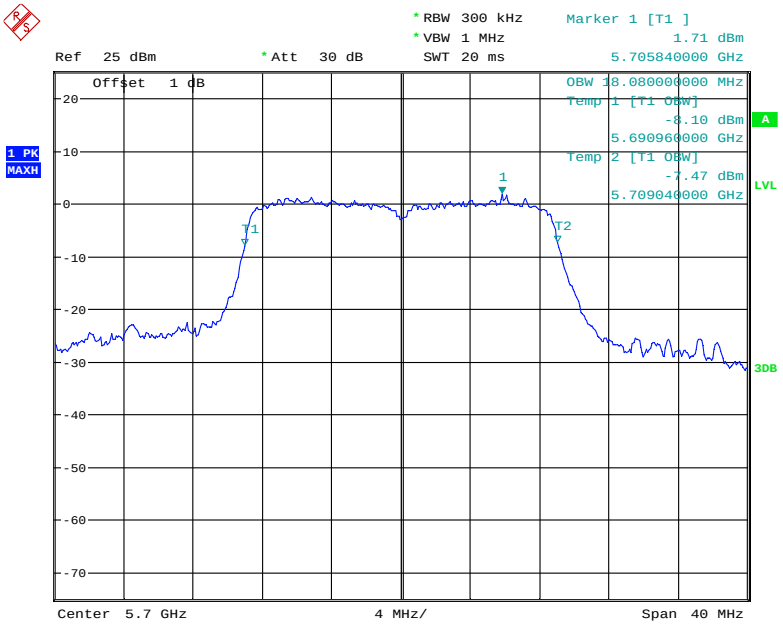
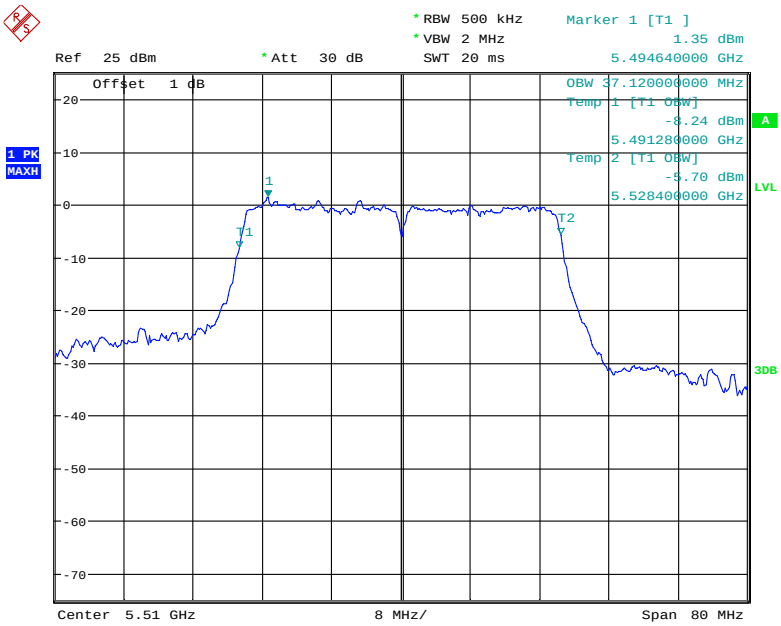
802.11n ht20 High Channel



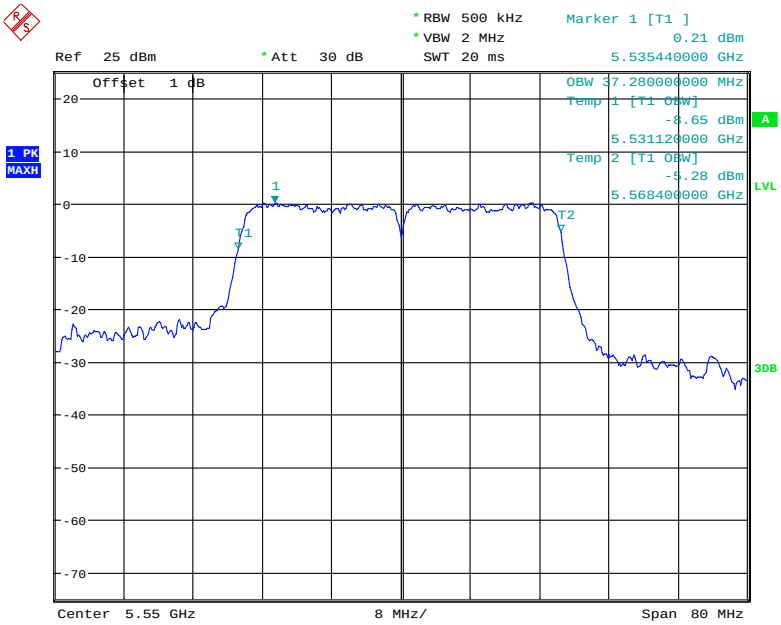
Date: 1.APR.2019 17:13:52

802.11n ht40 Low Channel



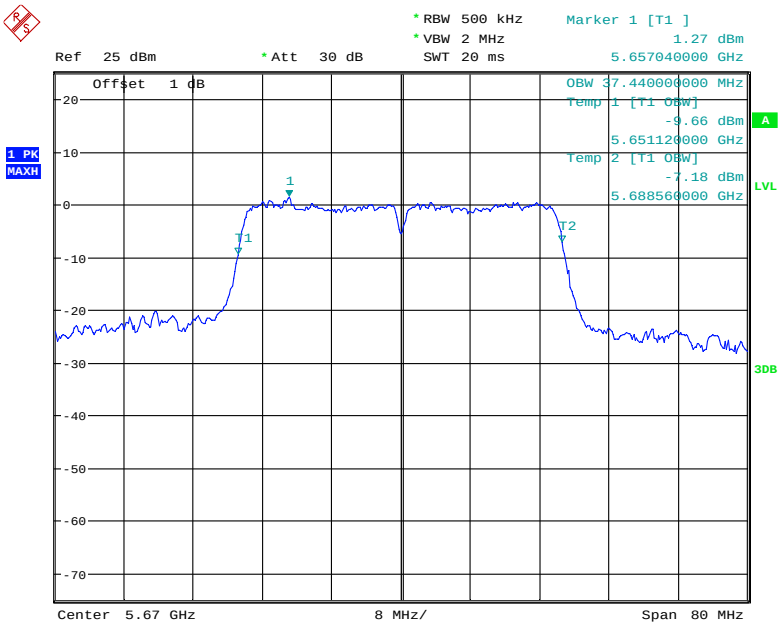
Date: 1.APR.2019 17:08:30

802.11n ht40 Middle Channel



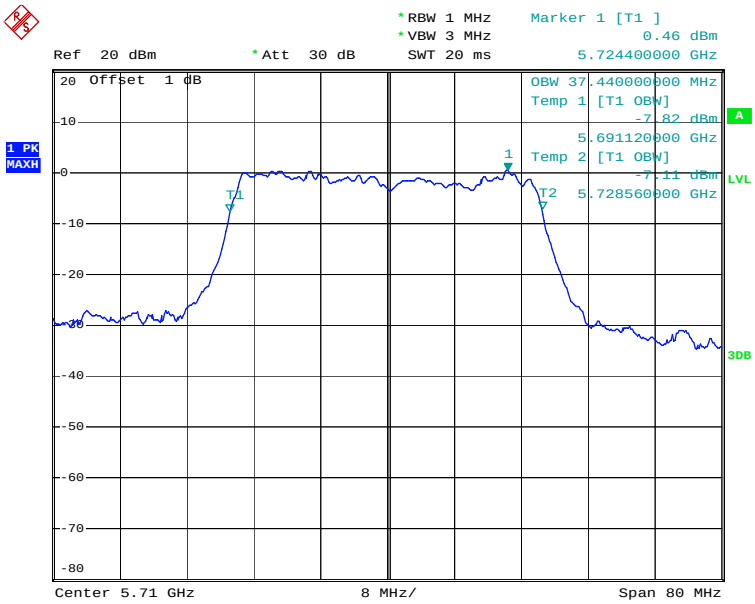
Date: 1.APR.2019 17:09:38

802.11n ht40 High Channel



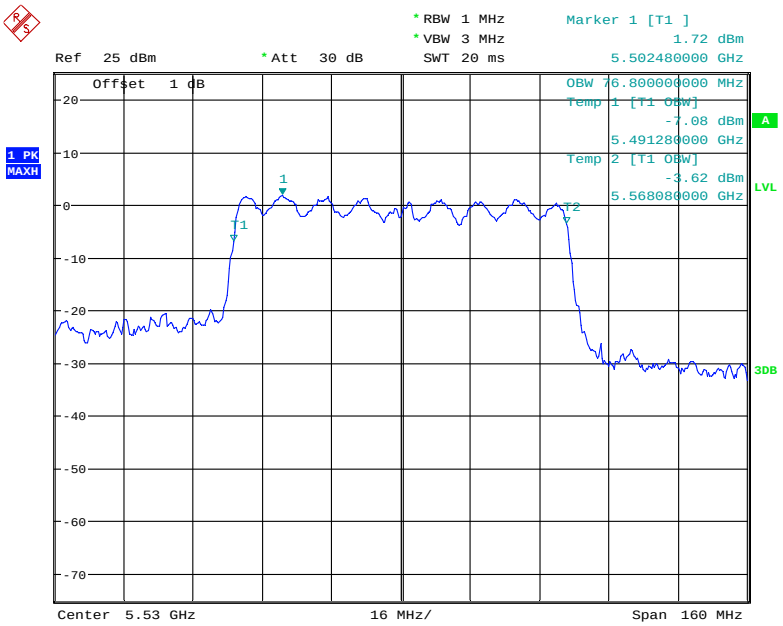
Date: 1.APR.2019 17:10:35

802.11n ht40 Additional Channel



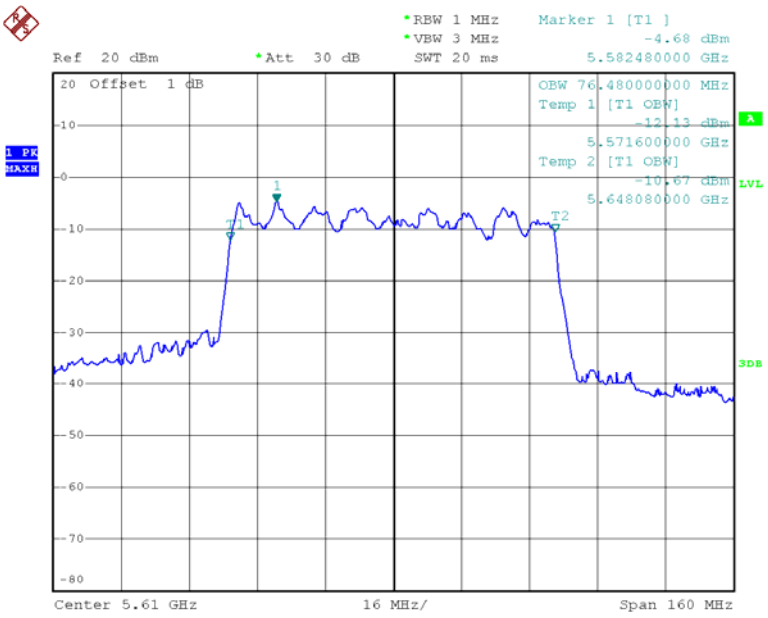
Date: 17.SEP.2019 15:05:08

802.11ac vht80 Low Channel



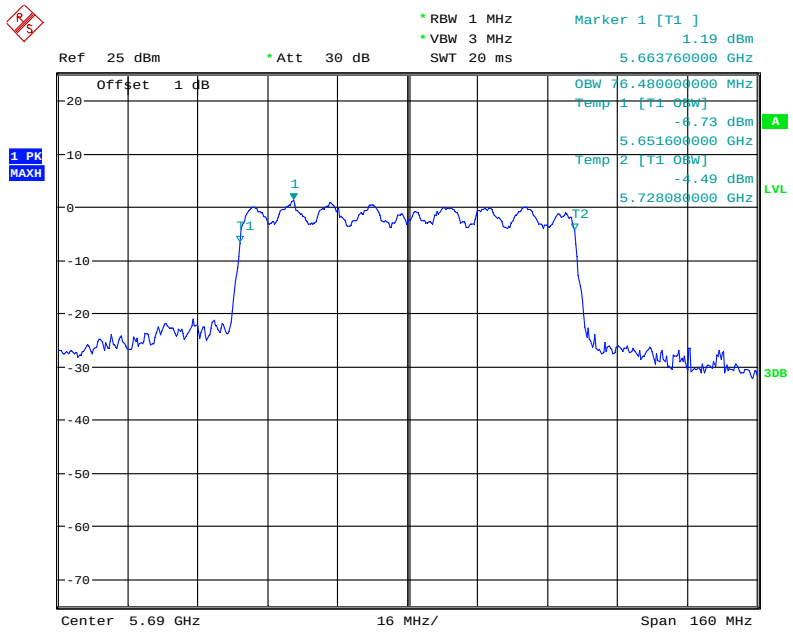
Date: 1.APR.2019 17:05:35

802.11ac vht80 Middle Channel



Date: 17.SEP.2019 15:38:31

802.11ac vht80 Additional Channel



Date: 1.APR.2019 17:06:56

FCC §15.407(a) & RSS-247 CLAUSE 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 Clause 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
Agilent	USB Wideband Power Sensor	U2022XA	MY5417006	2018-12-10	2019-12-10
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A

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

Test Procedure

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

Test Data

Environmental Conditions

Temperature:	26.4°C
Relative Humidity:	49 %
ATM Pressure:	102 kPa

The testing was performed by Elena Lei on 2019-04-01.

Test Mode: Transmitting

Band	Mode	Frequency (MHz)	Conducted Average Output Power (dBm)				
			Chain 0	Chain 1	Total	FCC Limit	ISEDC Limit
5250 - 5350 MHz	802.11 a	5260	12.76	12.84	/	24	23.42
		5280	12.79	12.83	/	24	23.49
		5320	12.77	12.77	/	24	23.42
	802.11n ht20	5260	9.30	9.67	12.50	24	23.57
		5280	9.98	9.94	12.97	24	23.55
		5320	9.68	9.87	12.79	24	23.53
	802.11n ht40	5270	9.76	9.89	12.84	24	24
		5310	9.52	9.85	12.70	24	24
	802.11ac Vht80	5290	7.36	8.06	10.73	24	24
5470 - 5725 MHz	802.11 a	5500	12.73	12.80	/	24	23.34
		5580	12.88	12.80	/	24	23.63
		5700	12.51	12.69	/	24	23.38
	802.11n ht20	5500	9.75	9.99	12.88	24	23.76
		5580	9.63	9.86	12.76	24	23.59
		5700	9.88	9.91	12.91	24	23.57
	802.11n ht40	5510	9.59	9.98	12.80	24	24
		5550	9.56	9.87	12.73	24	24
		5670	9.58	9.60	12.60	24	24
		5710	9.65	9.82	12.75	24	24
	802.11ac Vht80	5530	7.75	8.07	10.92	24	24
		5610	7.65	7.73	10.70	24	24
		5690	7.97	7.94	10.97	24	24

Note 1:
The duty cycle factor has been calculated into the test data.
The maximum antenna gain is 2dBi 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:

Directional gain = G_{ANT} + Array Gain = 2dBi

The antanna gain is 2dBi, meet the EIRp requirement of RSS-247.

Note 2: The 5610 MHz is only used for the FCC, not applied to the ISED.

FCC §15.407(a)& RSS-247 CLAUSE 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 Clause 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
conducted emission	Spectrum Analyzer	FSP 38	100478	2018-12-10	2019-12-10
R&S	Spectrum Analyzer	FSU 26	200256	2019-01-04	2020-01-04
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A

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

Test Data

Environmental Conditions

Temperature:	26.4°C~27.4°C
Relative Humidity:	49 %~49 %
ATM Pressure:	102 kPa~102 kPa

The testing was performed by Elena Lei on 2019-04-01~2019-09-17.
Test Mode: Transmitting

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

5250-5350MHz

Mode	Frequency (MHz)	Result (dBm/MHz)			Limit (dBm/MHz)
		Chain 0	Chain 1	Total	
802.11a	5260	2.70	2.53	/	11
	5280	3.18	2.53	/	11
	5320	2.99	3.07	/	11
802.11n ht20	5260	-0.80	0.14	2.71	11
	5280	-1.11	-0.04	2.47	11
	5320	-0.51	0.60	3.09	11
802.11n ht40	5270	-4.22	-5.36	-1.74	11
	5310	-3.69	-3.61	-0.64	11
802.11ac vht80	5290	-5.63	-4.40	-1.96	11

5470-5725 MHz

Mode	Frequency (MHz)	Result (dBm/MHz)			Limit (dBm/MHz)
		Chain 0	Chain 1	Total	
802.11a	5500	1.42	1.88	/	11
	5580	2.15	1.36	/	11
	5700	-0.09	-1.27	/	11
802.11n ht20	5500	-0.76	-0.84	2.21	11
	5580	-1.05	-0.99	1.99	11
	5700	-1.17	-0.77	2.04	11
802.11n ht40	5510	-3.75	-2.20	0.10	11
	5550	-3.90	-3.00	-0.42	11
	5670	-3.78	-3.13	-0.43	11
	5710	-3.26	-3.10	-0.17	11
802.11ac vht80	5530	-7.57	-7.27	-4.41	11
	5610	-7.66	-7.44	-4.54	11
	5690	-6.93	-7.44	-4.17	11

Note 1:
The maximum antenna gain is 2dBi 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 spectral density (PSD) measurements on the devices:

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

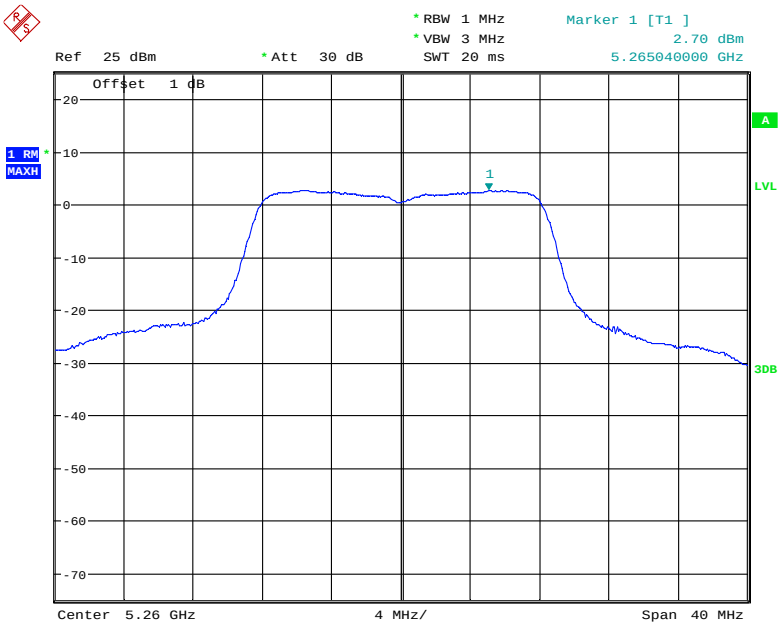
So:

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

Method SA-3 in KDB 789033 D02 General UNII Test Procedures New Rules v02r01was used for PSD test.
Note 2: The 5610 MHz is only used for the FCC, not applied to the ISED.

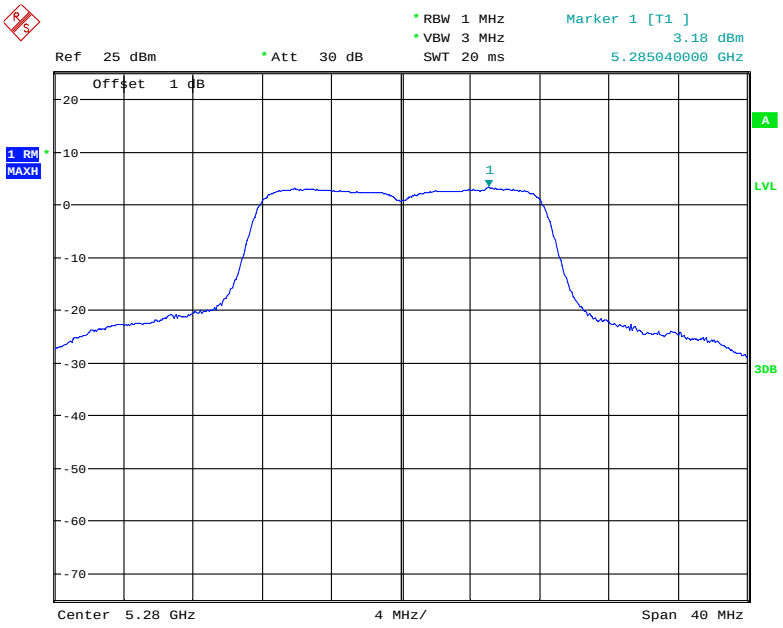
Chain 0:
5250-5350MHz

802.11a Low Channel



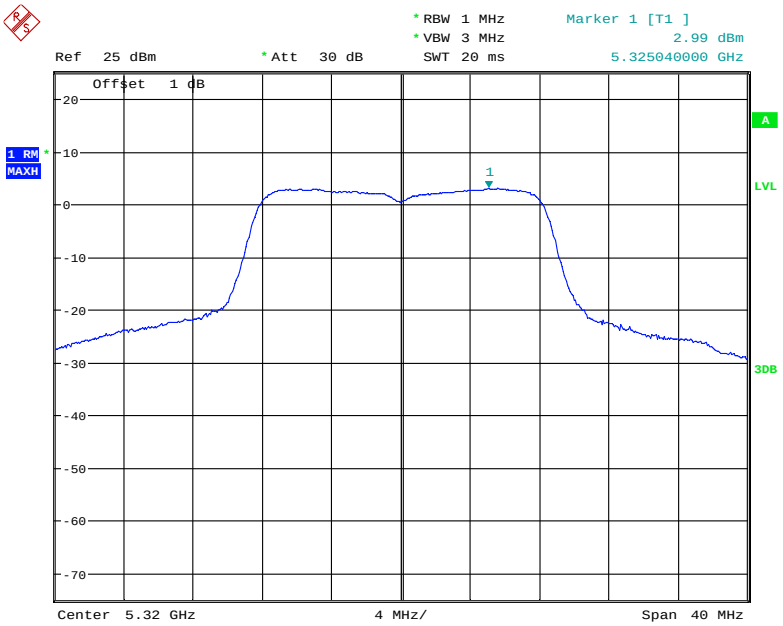
Date: 1.APR.2019 16:13:41

802.11a Middle Channel



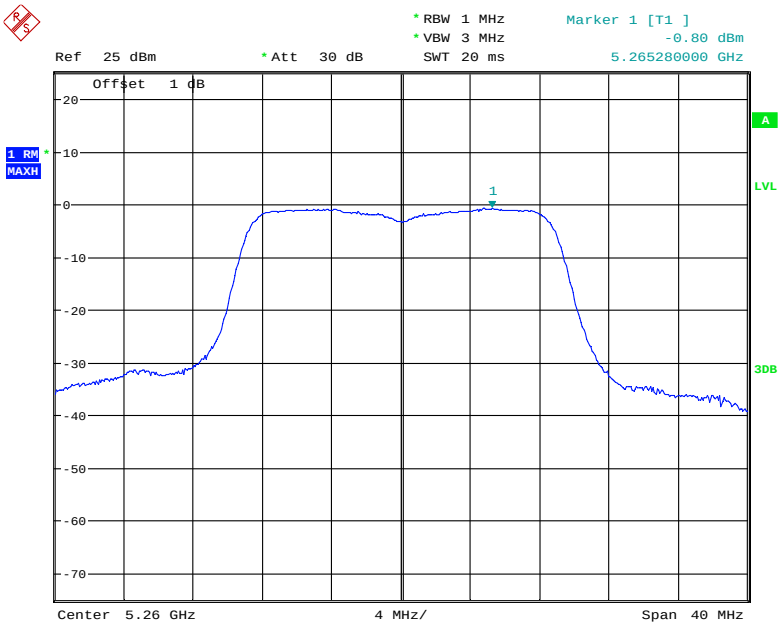
Date: 1.APR.2019 16:14:58

802.11a High Channel



Date: 1.APR.2019 16:16:47

802.11n ht20 Low Channel



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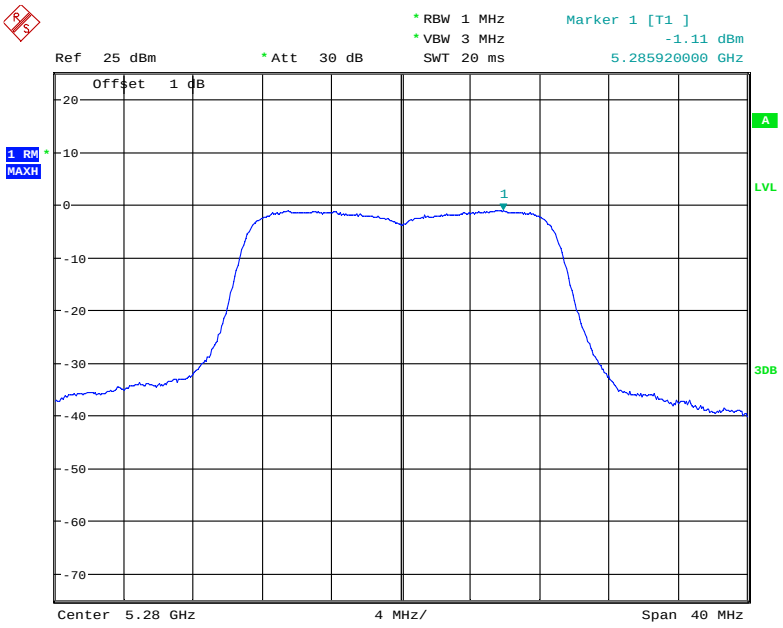
802.11n ht20 Middle Channel



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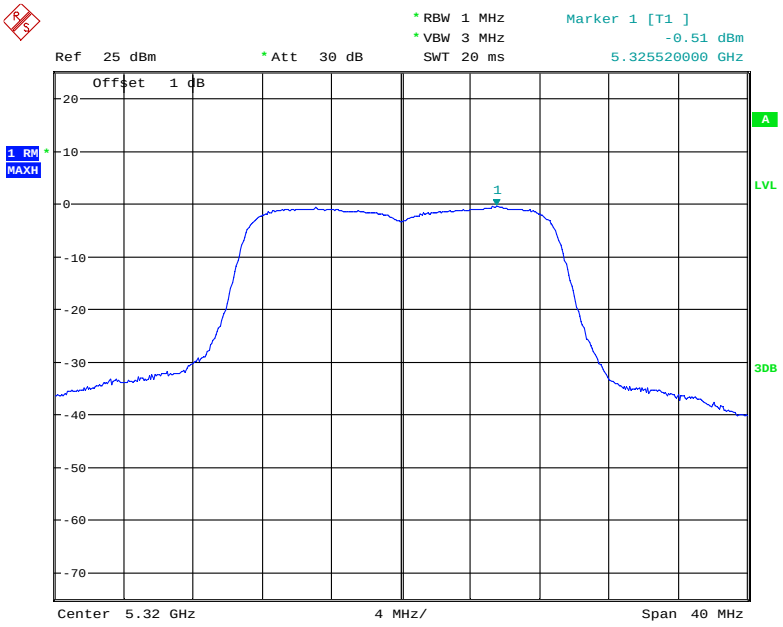
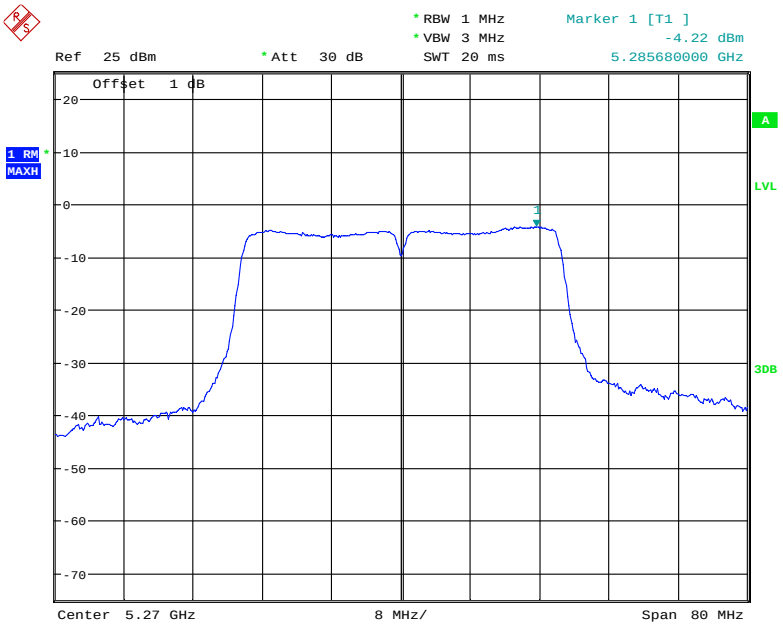
802.11n ht20 High Channel



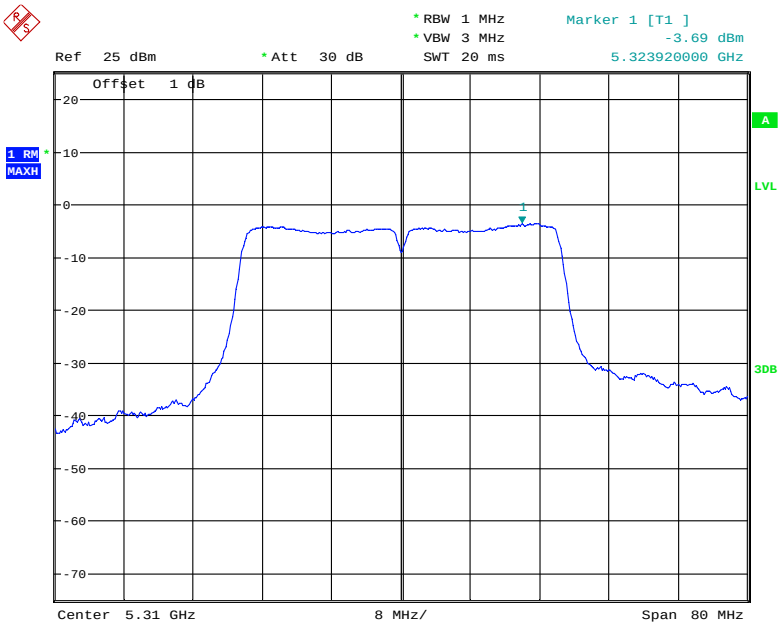
Date: 1.APR.2019 16:59:27

802.11n ht40 Low Channel



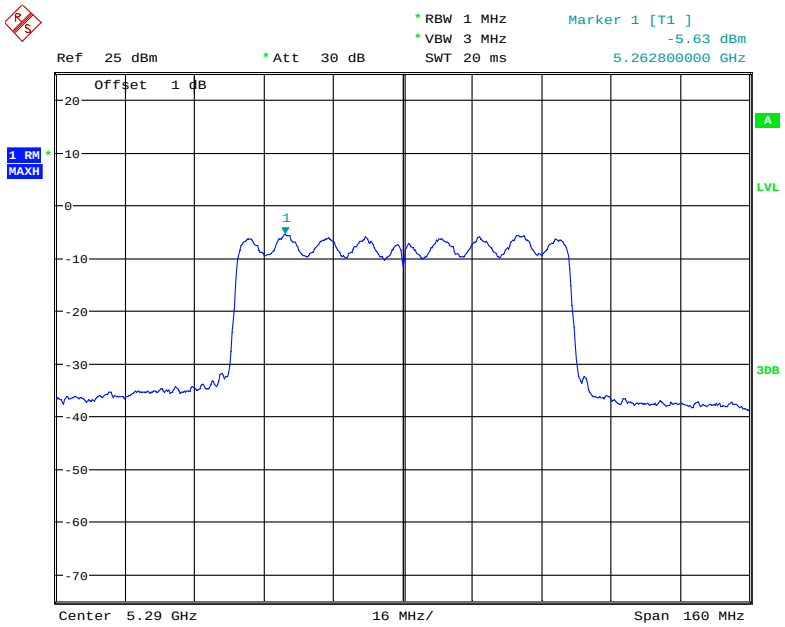
Date: 1.APR.2019 20:03:19

802.11n ht40 High Channel



Date: 1.APR.2019 20:05:53

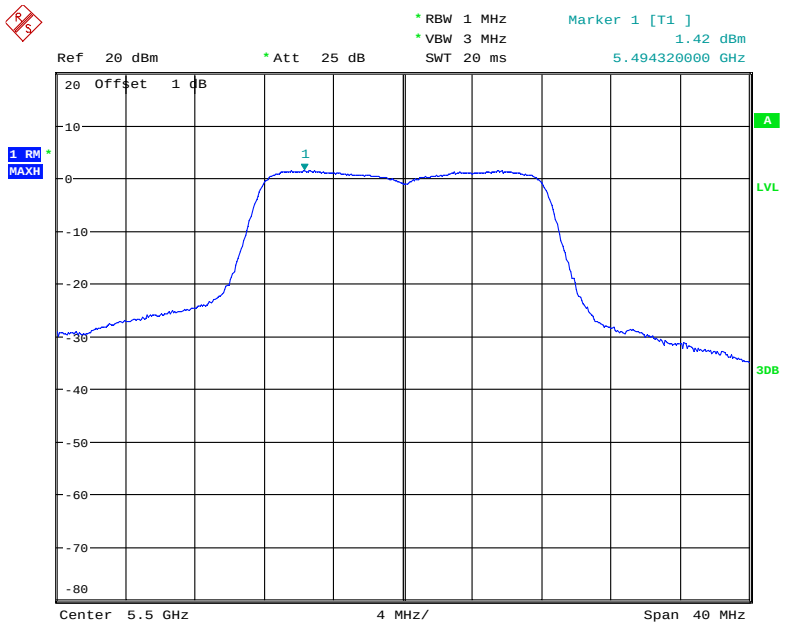
802.11ac vht80 Middle Channel



Date: 1.APR.2019 17:04:45

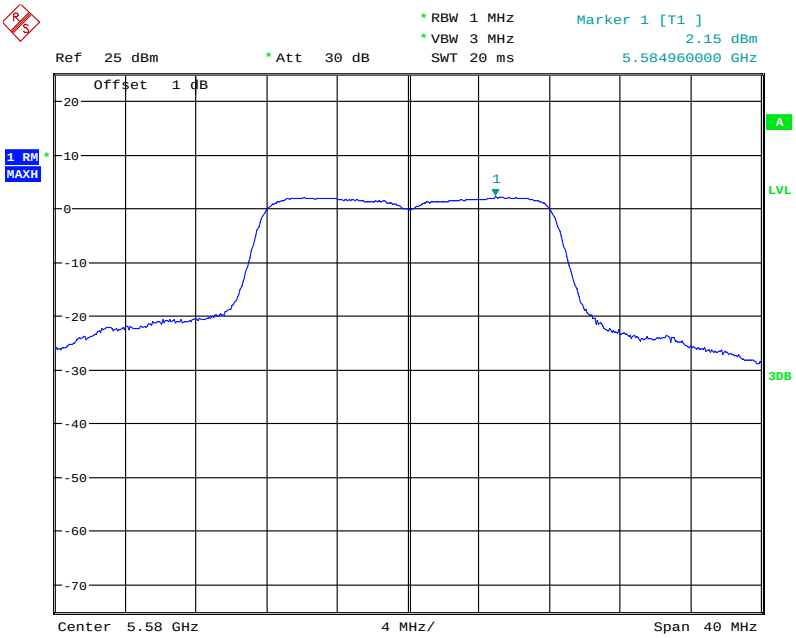
5470-5725MHz:

802.11a Low Channel



Date: 1.APR.2019 22:09:11

802.11a Middle Channel



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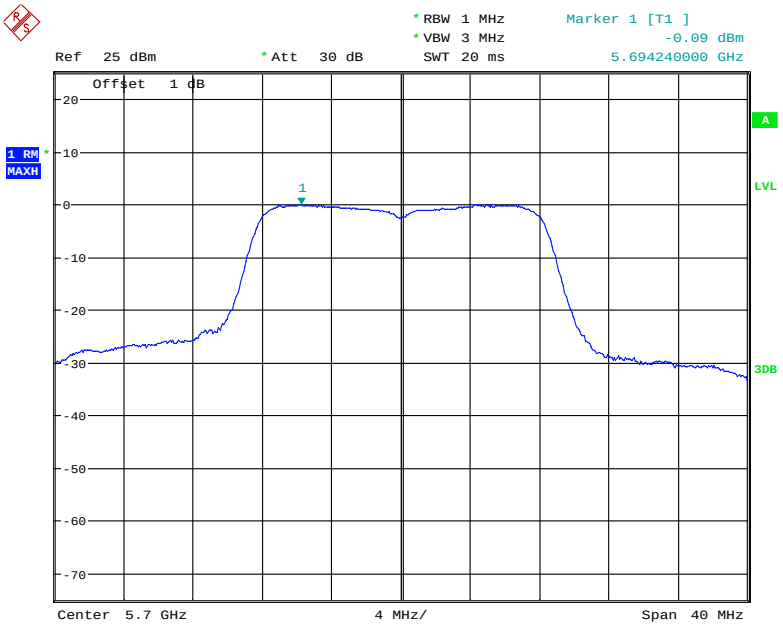
802.11a High Channel



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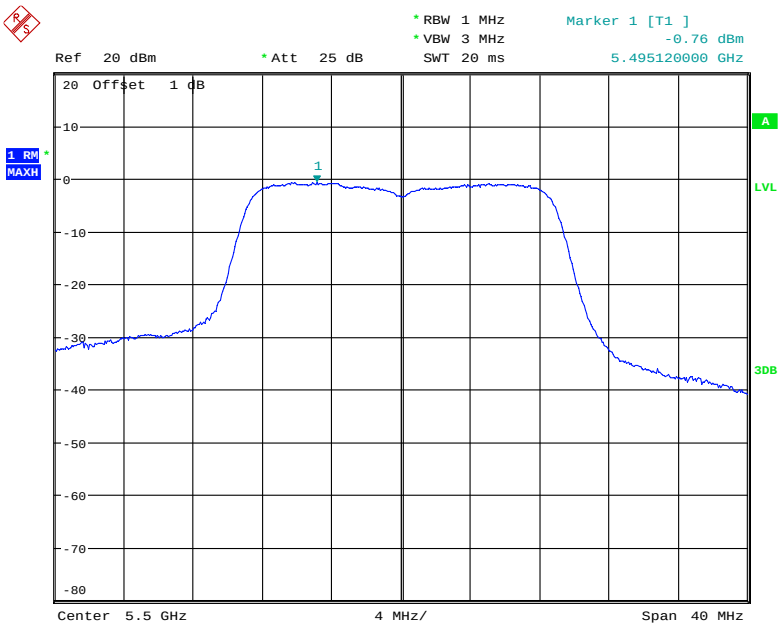
802.11n ht20 Low Channel



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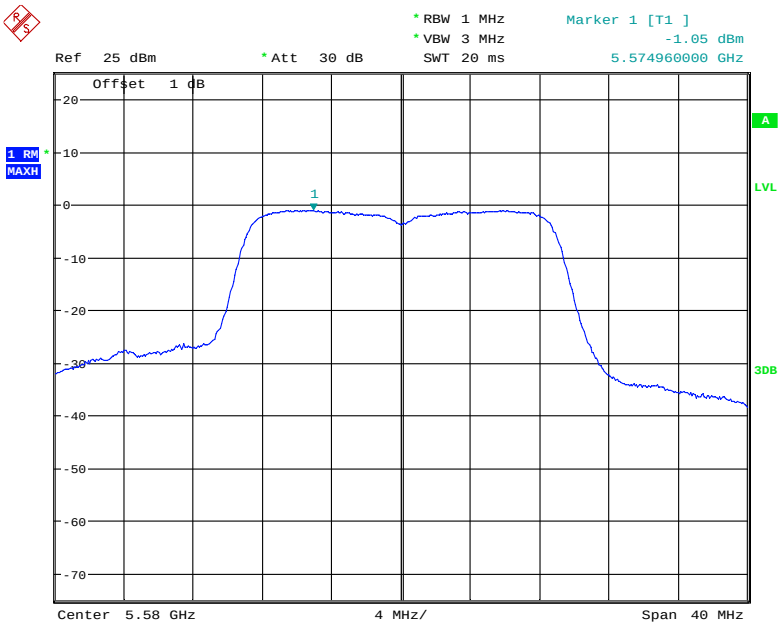
802.11n ht20 Middle Channel



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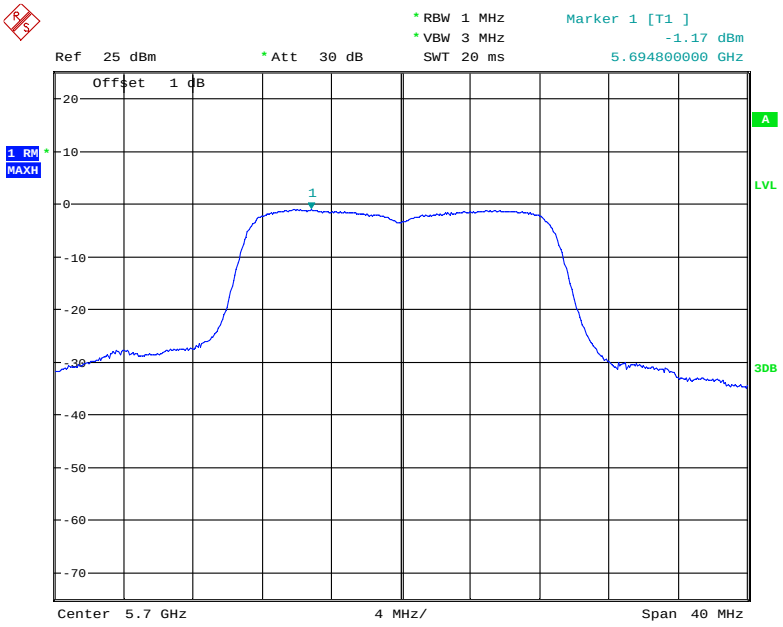

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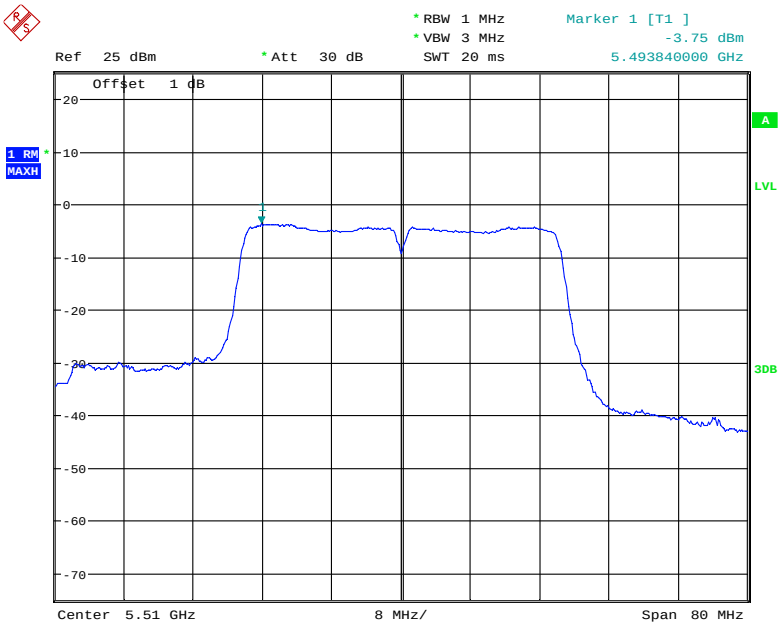
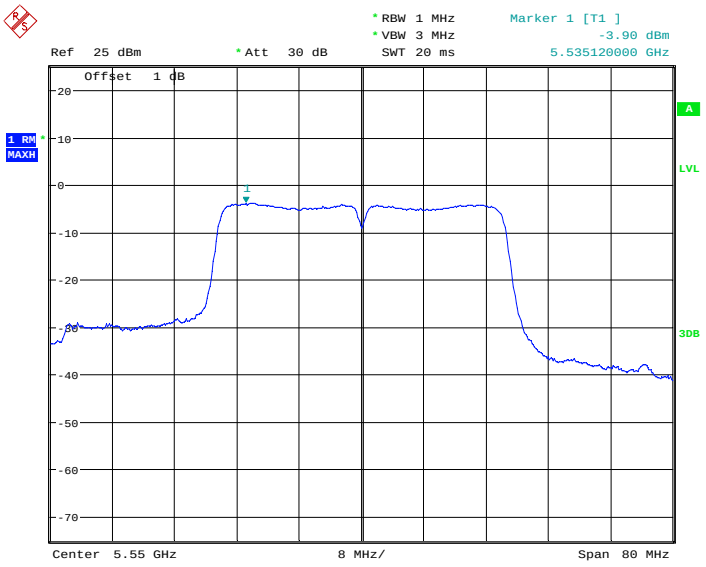
802.11n ht40 Low Channel



Date: 1.APR.2019 17:08:41

802.11n ht40 Middle Channel



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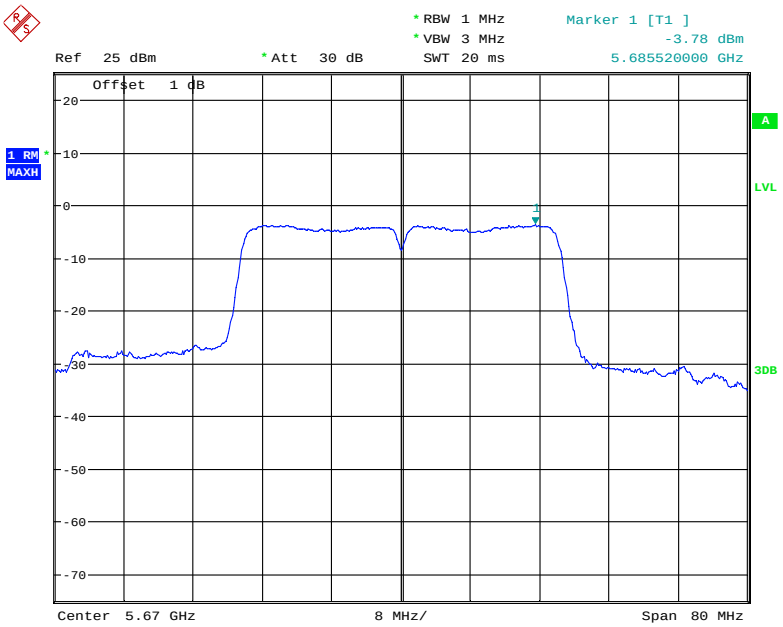
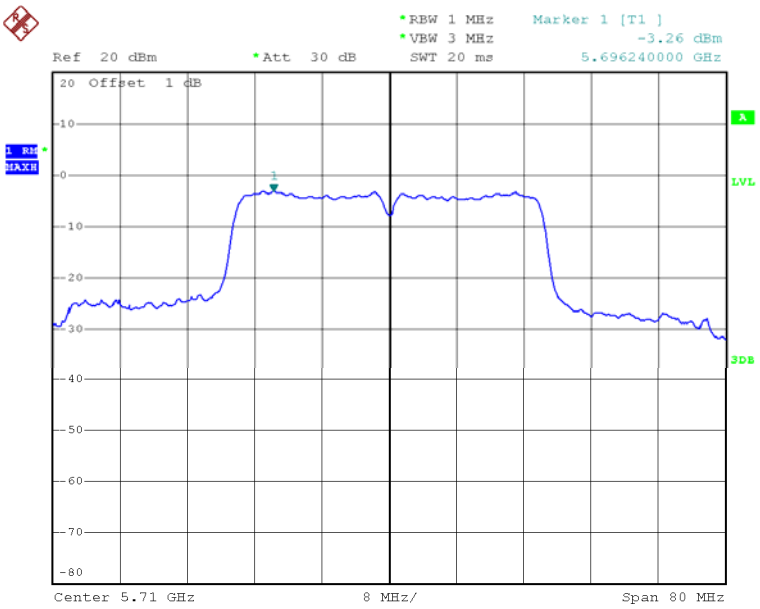


Date: 1.APR.2019 17:10:45

802.11n ht40 Additional Channel



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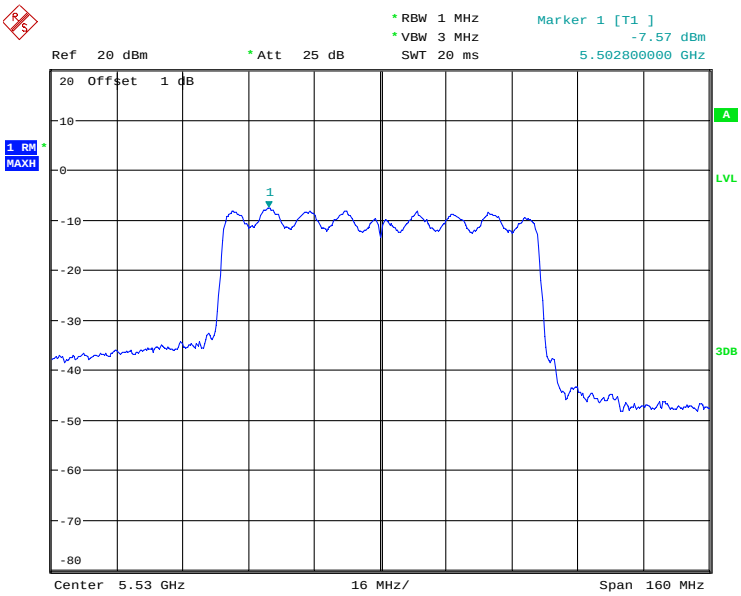
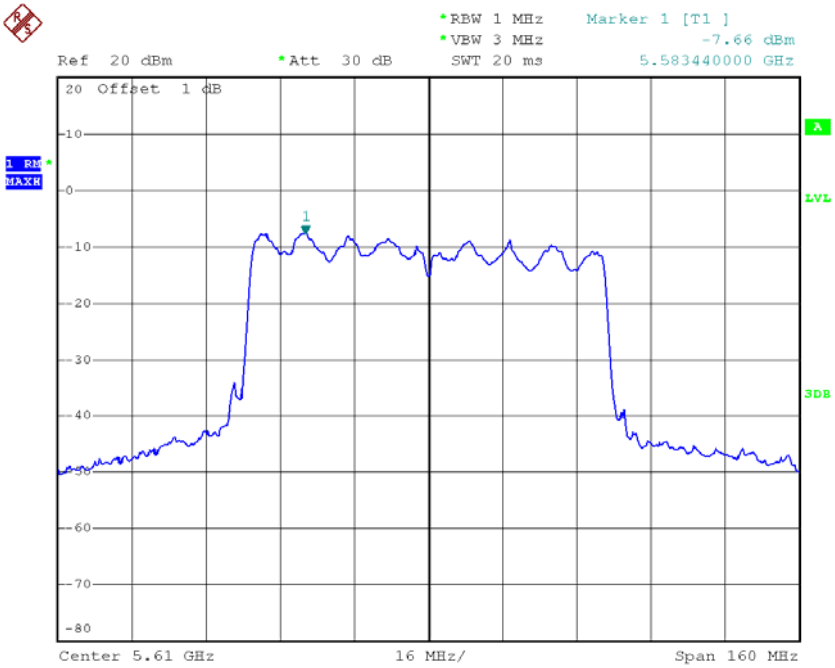
802.11ac vht80 Low Channel



Date: 1.APR.2019 22:02:37

802.11ac vht80 Middle Channel



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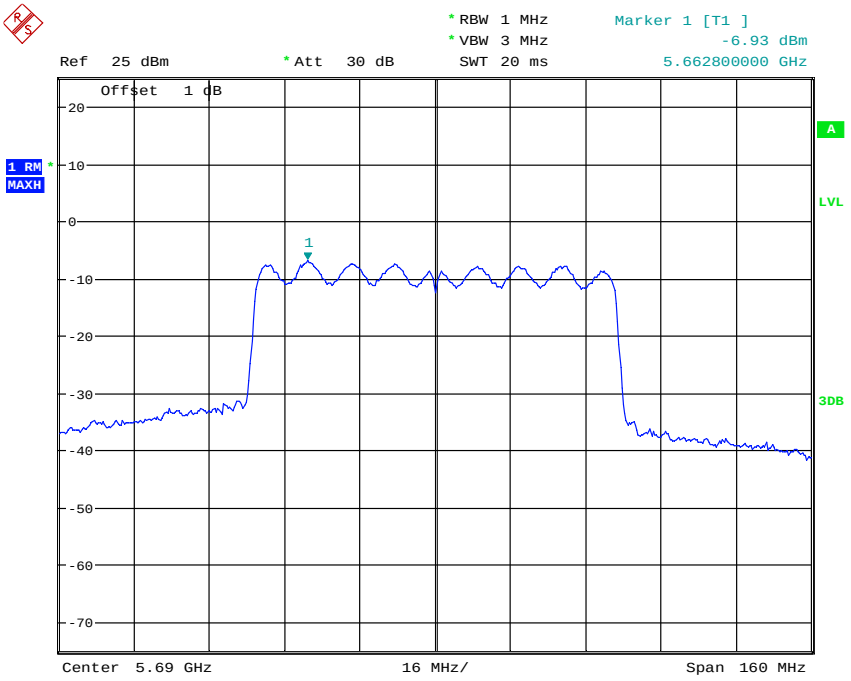
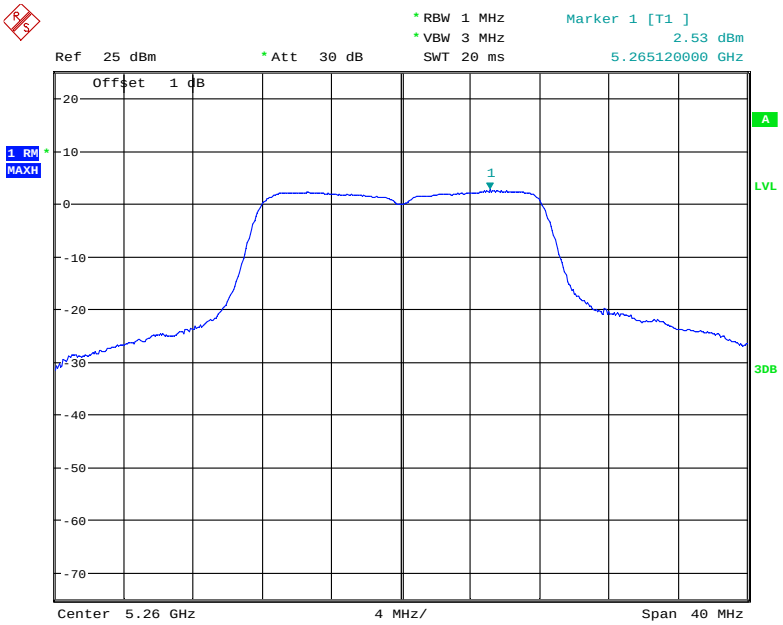
802.11ac vht80 Additional Channel



Date: 1.APR.2019 17:07:06

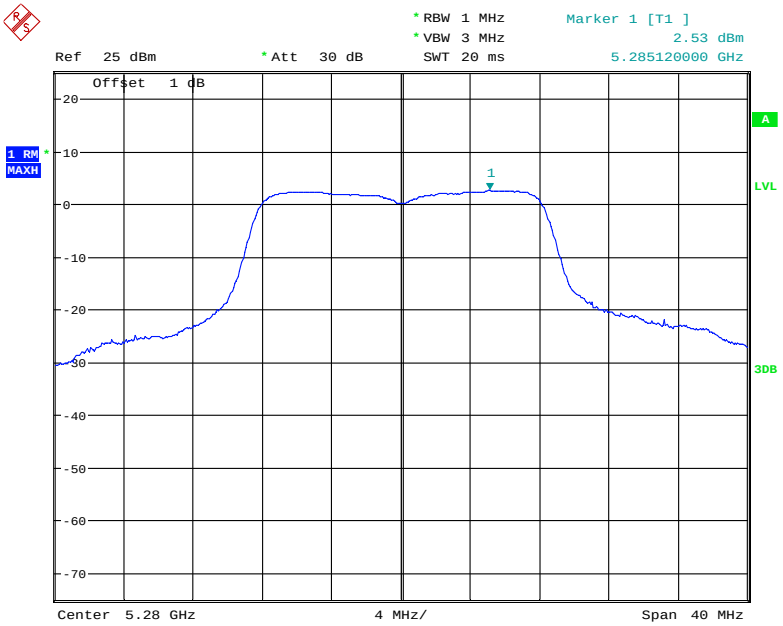
Chain 1:
5260-5320MHz

802.11a Low Channel



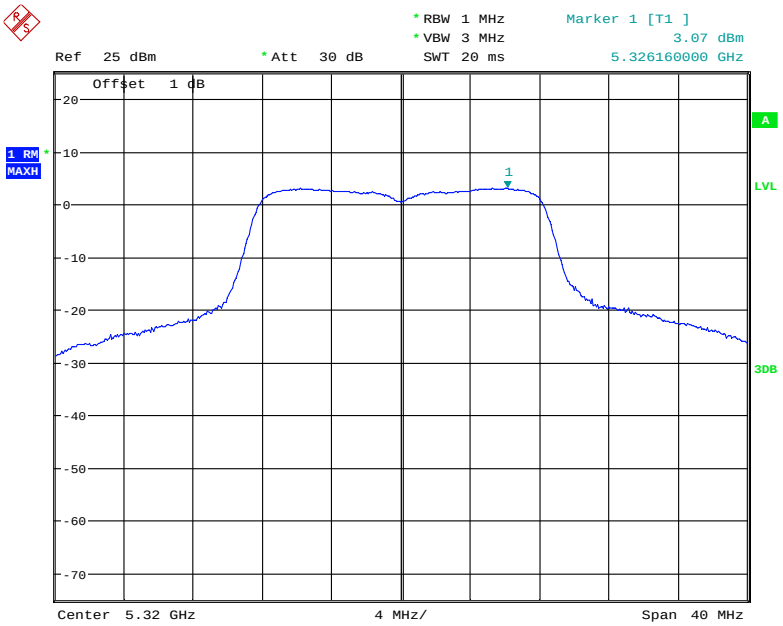
Date: 1.APR.2019 17:19:17

802.11a Middle Channel



Date: 1.APR.2019 17:20:24

802.11a High Channel



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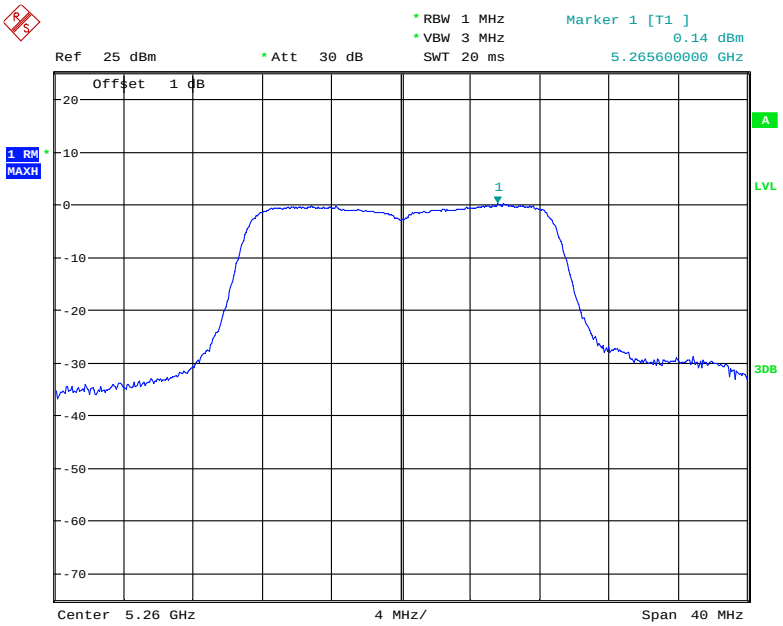
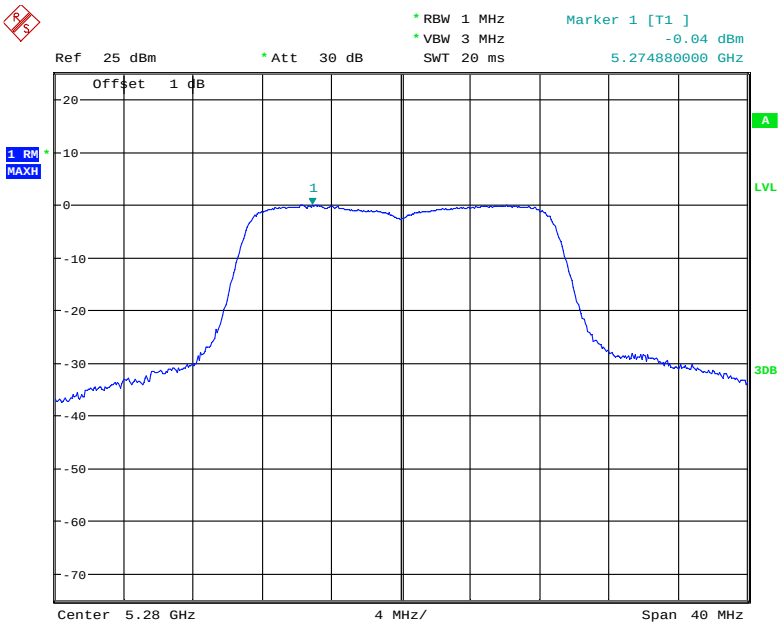
802.11n ht20 Low Channel



Date: 1.APR.2019 17:23:59

802.11n ht20 Middle Channel



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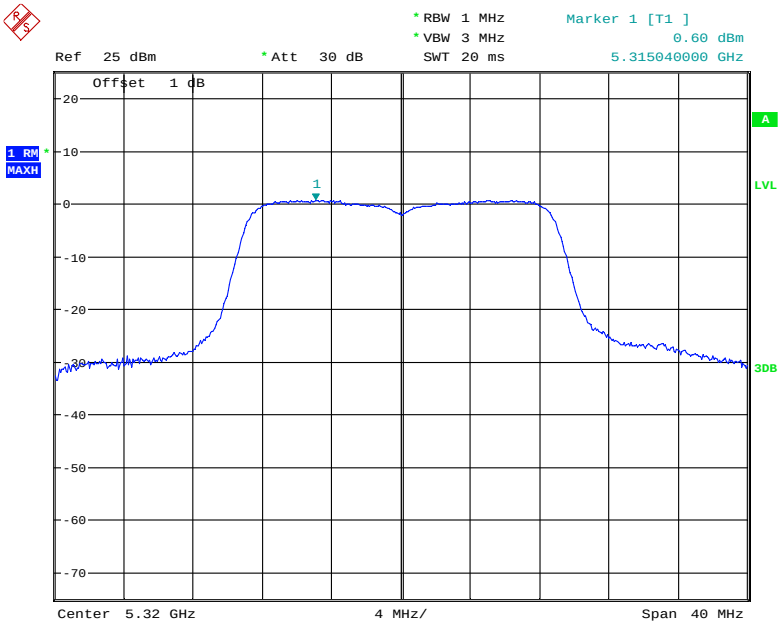
802.11n ht20 High Channel



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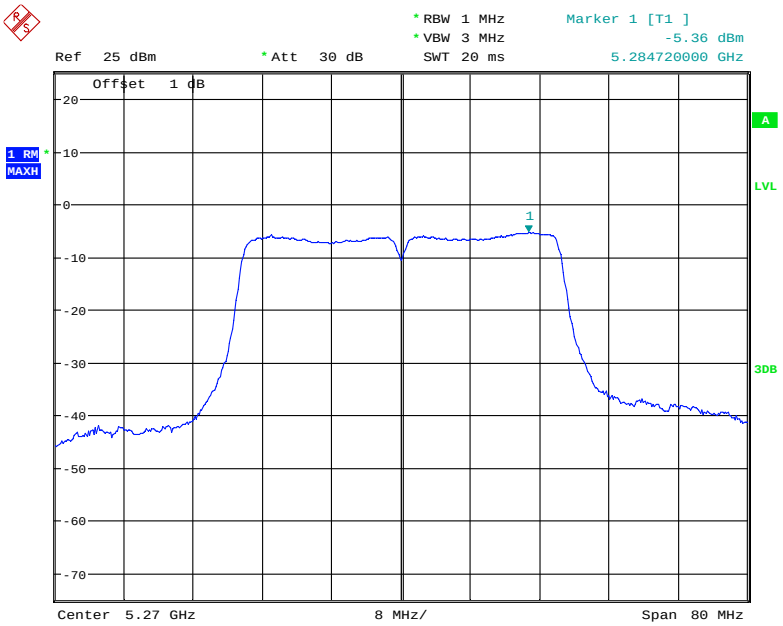
802.11n ht40 Low Channel



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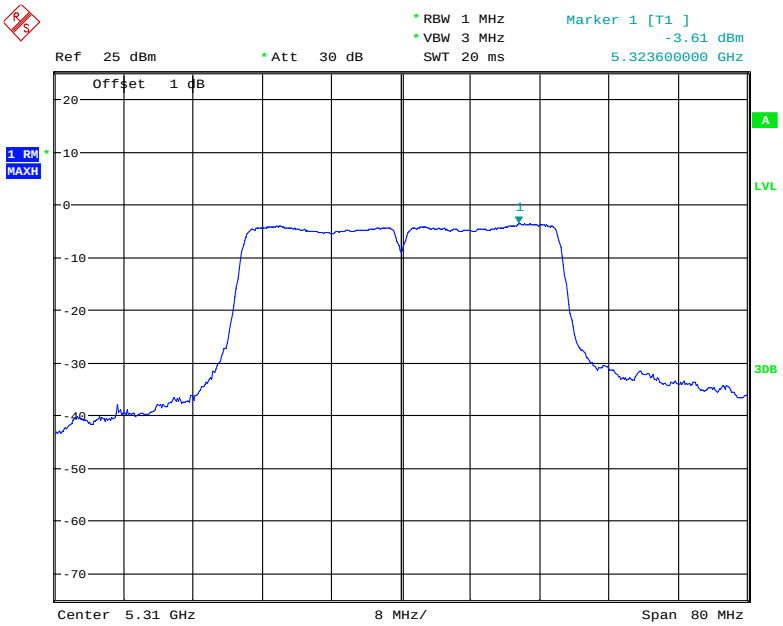
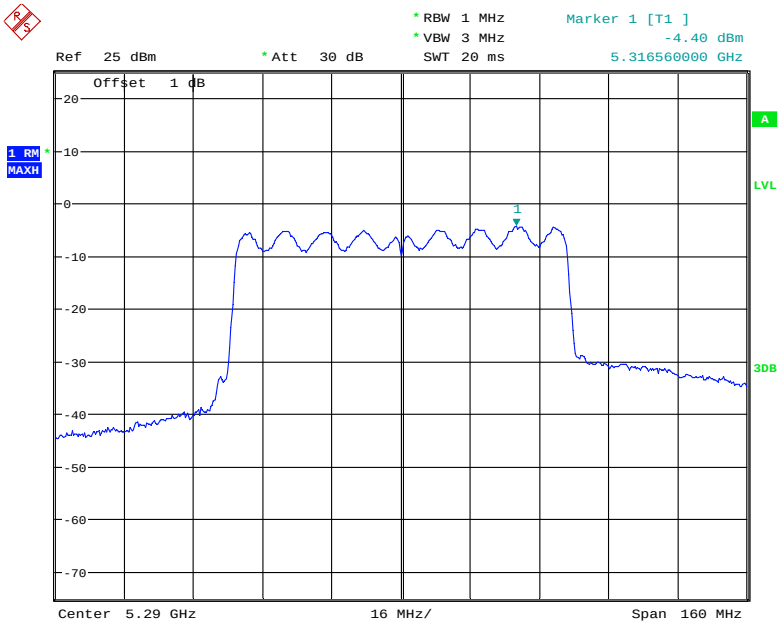
802.11n ht40 High Channel



Date: 1.APR.2019 20:13:06

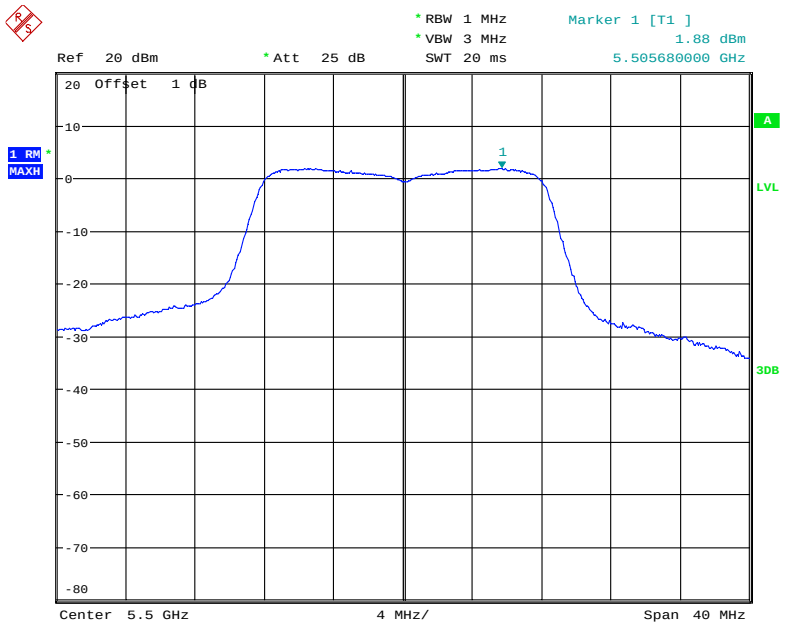
802.11ac vht80 Middle Channel



Date: 1.APR.2019 20:16:41

5470-5725MHz

802.11a Low Channel



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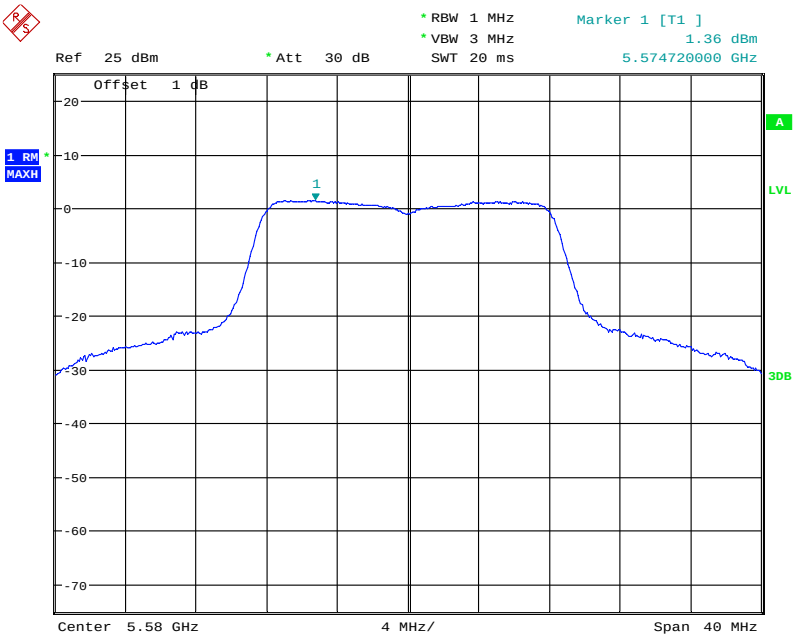
802.11a Middle Channel



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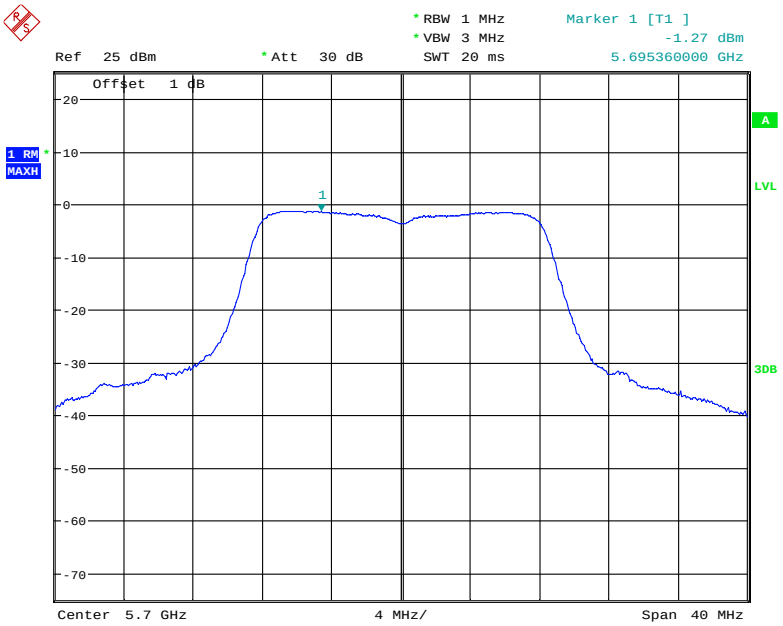
802.11a High Channel



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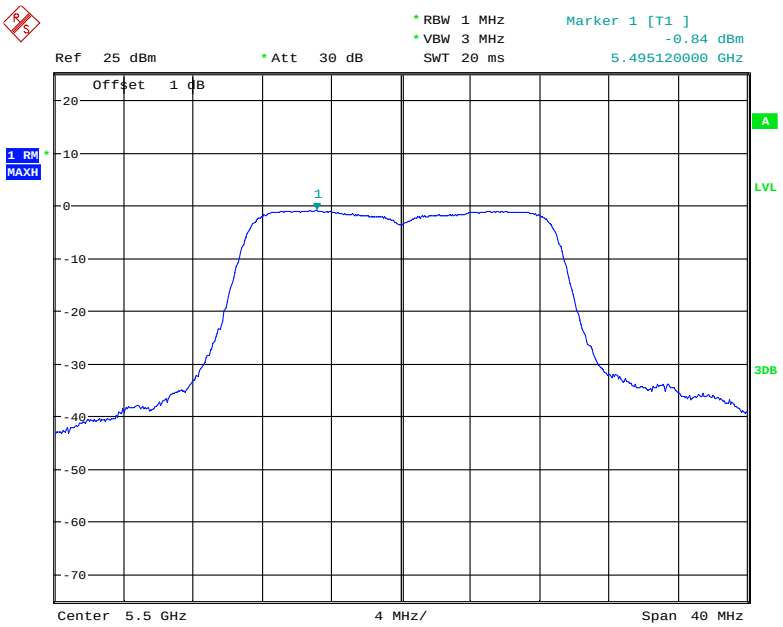
802.11n ht20 Low Channel



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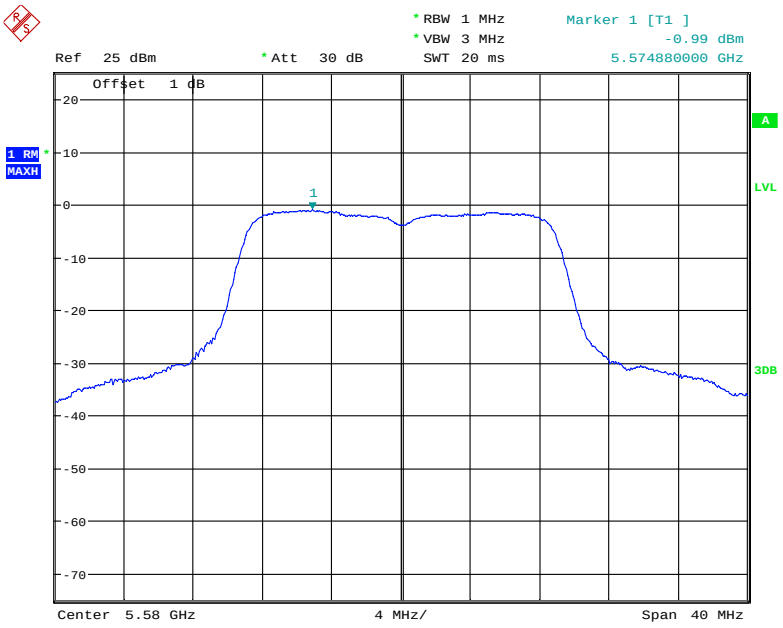
802.11n ht20 Middle Channel



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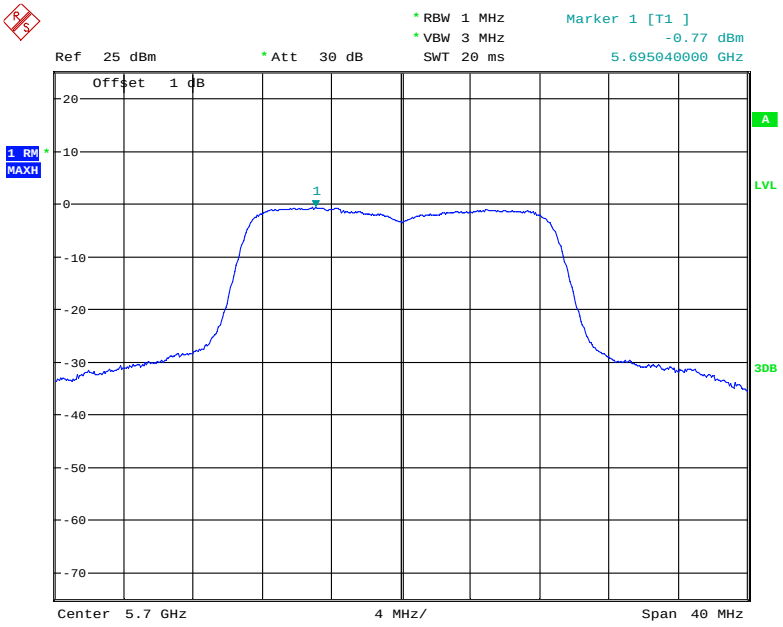
802.11n ht20 High Channel



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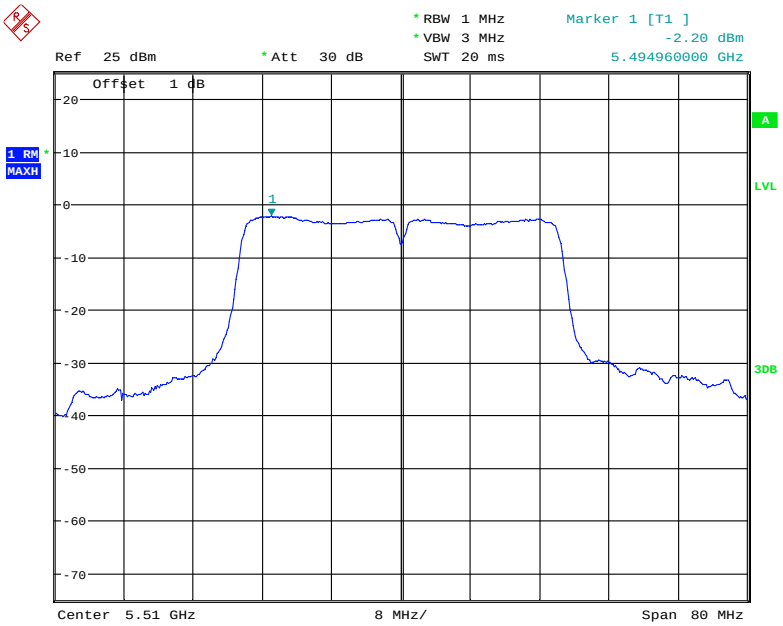
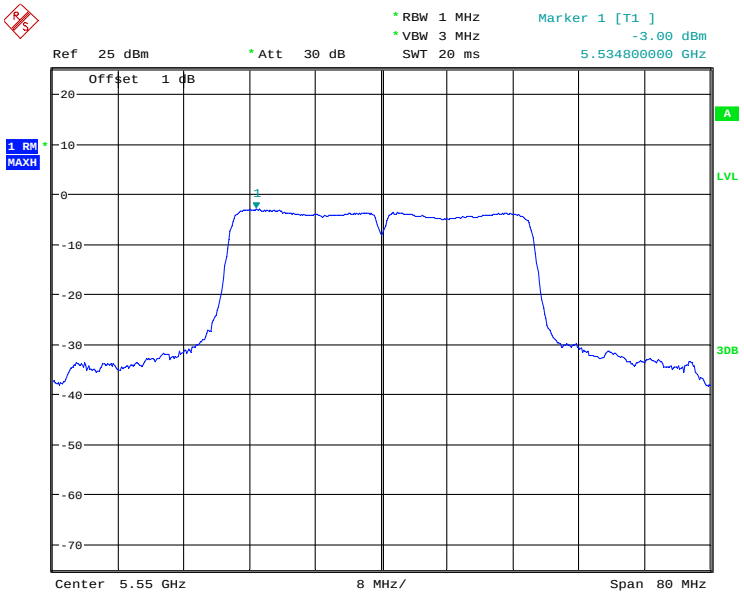
802.11n ht40 Low Channel



Date: 1.APR.2019 20:07:47

802.11n ht40 Middle Channel



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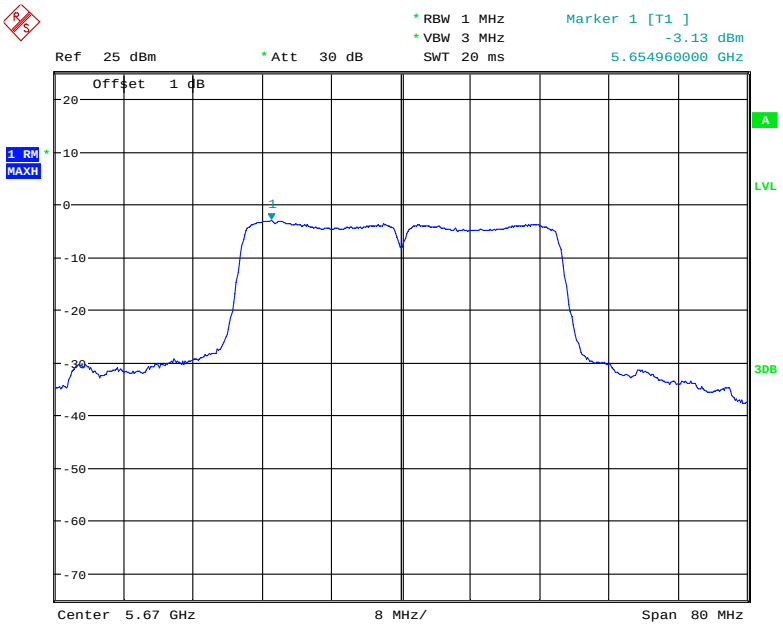

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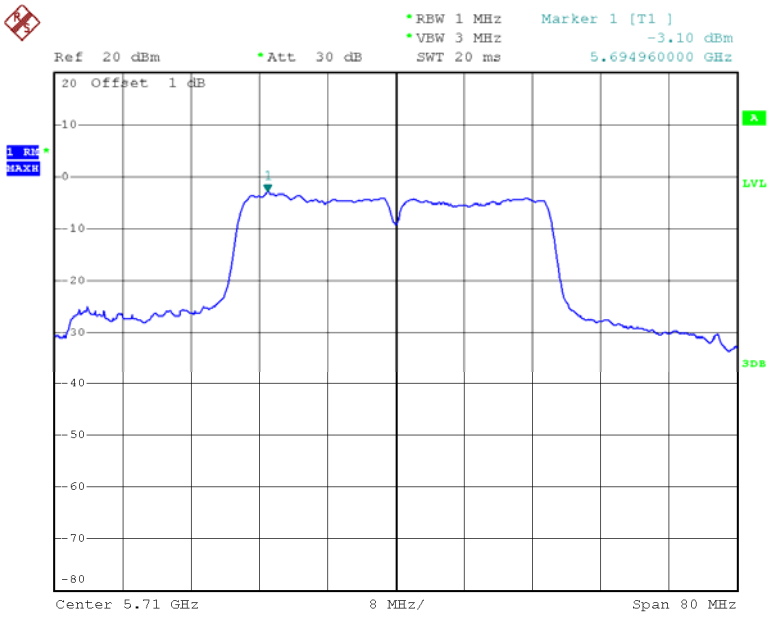
802.11n ht40 Additional Channel



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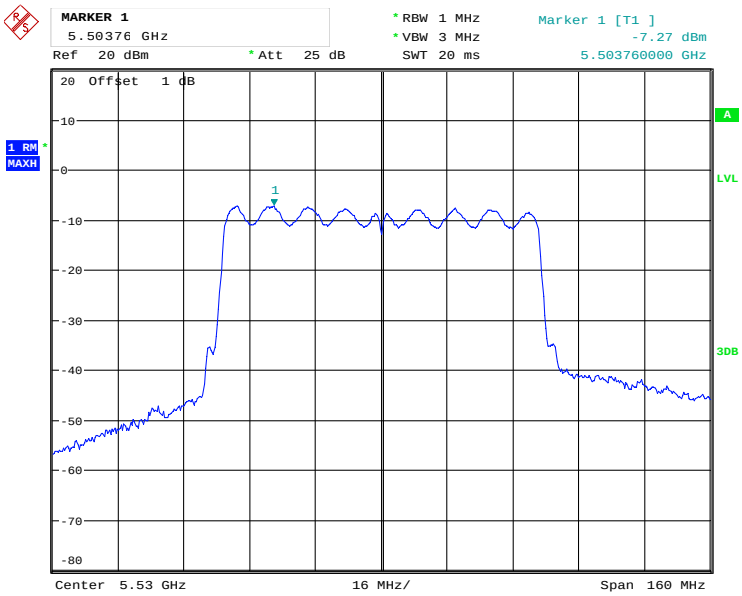
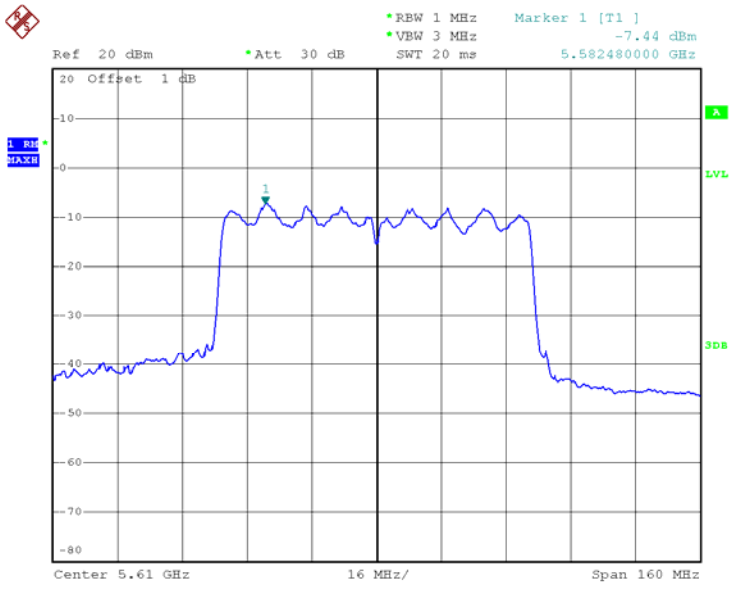
802.11ac vht80 Low Channel



Date: 1.APR.2019 22:03:41

802.11ac vht80 Middle Channel



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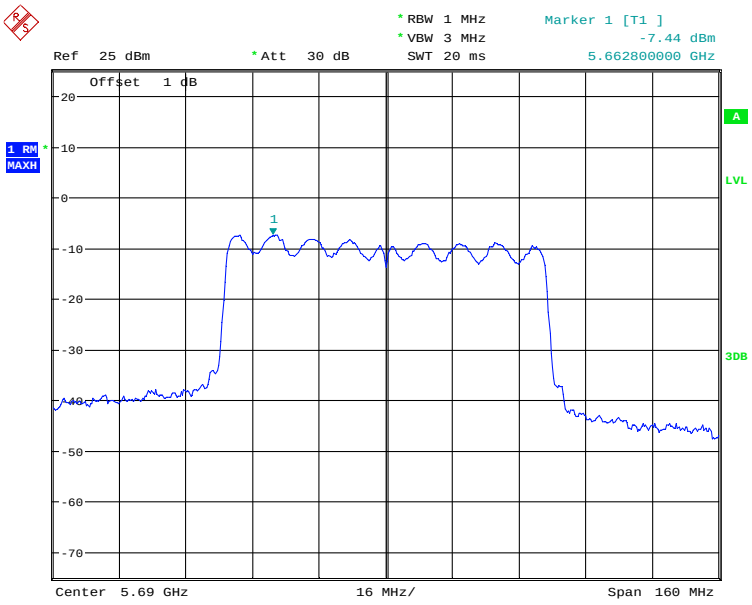
802.11ac vht80 Additional Channel



Date: 1.APR.2019 20:18:07

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