

FCC PART 15.407

TEST REPORT

For

AKUVOX (XIAMEN) NETWORKS CO., LTD.

10/F, No.56, Software Park II , Xiamen, China

FCC ID: 2AHCR-VPR73G

Report Type: Original Report	Product Name: Video Phone
Report Number: RXM190225051-00C	
Report Date: 2019-09-18	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:		Video Phone
EUT Model:		VP-R73G
Multiple Models:		R73G
Frequency Range:		5150-5250 MHz, 5250-5350 MHz, 5470-5725 MHz, 5725-5850 MHz
Maximum Output Power (Conducted):		5150-5250 MHz:10.86dBm 5250-5350MHz:11.15dBm 5470-5725MHz:8.87dBm 5725-5850 MHz:8.52dBm
Modulation Type:		OFDM
Rated Input Voltage:		DC 12V from adapter or DC48V from PoE
Adapter Information	Model:	KL-AD3060VA
	Input:	100-240Vac
	Output:	DC 12V 1.5A
External Dimension:		260mm(L)*90mm(W)*230mm(H)
Serial Number:		190225051
EUT Received Date:		2019/3/2

Notes: Model VP-R73G and R73G are identical, was selected for fully testing except radiation emission test both modes, the detailed information about the difference among R73G and model VP-R73G can be referred to the declaration letter which was stated and guaranteed by the manufacturer.

Objective

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

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

Related Submittal(s)/Grant(s)

FCC Part 15E DTS submissions with FCC ID: 2AHCR-VPR73G
FCC Part 15C DSS submissions with FCC ID: 2AHCR-VPR73G
FCC Part 15B JAB submissions with FCC ID: 2AHCR-VPR73G

Test Methodology

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

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

Measurement Uncertainty

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

Test Facility

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

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

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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

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

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

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

802.11a, 802.11n ht20 were tested with Channel 36, 40 and 48,

802.11n ht40 were tested with Channel 38 and 46.

802.11ac vht80 mode was tested with channel 42.

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	/	/

802.11a, 802.11n ht20 were tested with Channel 52, 56 and 64,

802.11n ht40 were tested with Channel 54 and 62.

802.11ac vht80 mode was tested with channel 58.

For 5470~5725 MHz band, 18 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	140	5700
108	5540	124	5620	/	/
110	5550	126	5630	/	/
112	5560	128	5640	/	/

For 802.11a, 802.11n ht20 Channel 100, 116,120 and 140 were tested, for 802.11n ht40 Channel 102, 118 and 134 were tested, for 802.11ac vht80, channel 106 and 122 were tested.

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

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

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

EUT Exercise Software

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

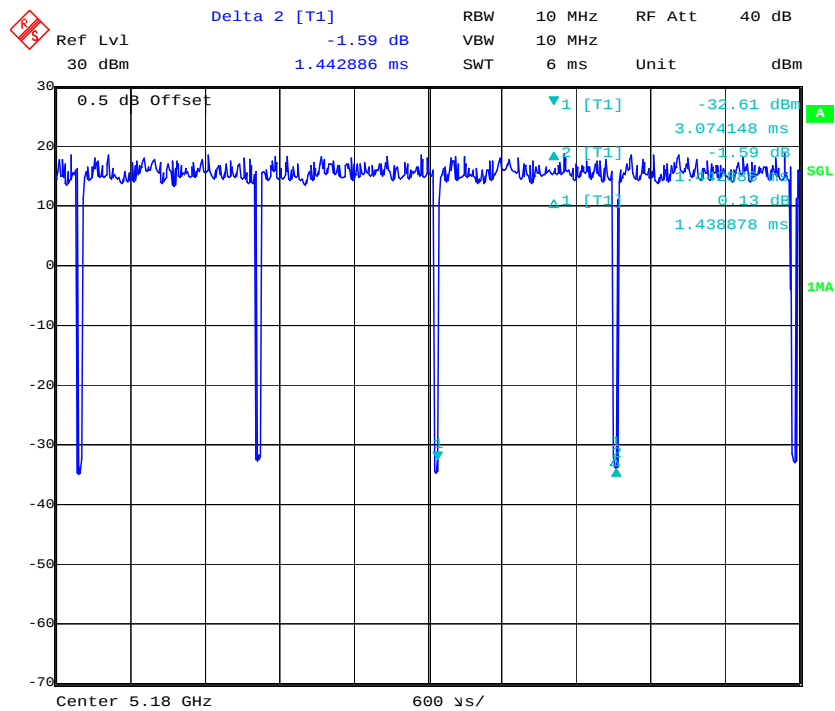
Band	Mode	Channel	Frequency (MHz)	Data rate	Power level
5150 - 5250 MHz	802.11a	Low	5180	6 Mbps	Default
		Middle	5200	6 Mbps	Default
		High	5240	6 Mbps	Default
	802.11n ht20	Low	5180	MCS0	Default
		Middle	5200	MCS0	Default
		High	5240	MCS0	Default
	802.11n ht40	Low	5190	MCS0	Default
		High	5230	MCS0	Default
	802.11ac vht80	middle	5210	MCS0	Default
5250 - 5350 MHz	802.11 a	Low	5260	6 Mbps	Default
		Middle	5280	6 Mbps	Default
		High	5320	6 Mbps	Default
	802.11 n20	Low	5260	MCS0	Default
		Middle	5280	MCS0	Default
		High	5320	MCS0	Default
	802.11 n40	Low	5270	MCS0	Default
		High	5310	MCS0	Default
	802.11ac vht80	middle	5290	MCS0	Default

5470 - 5725 MHz	802.11 a	Low	5500	6 Mbps	Default
		Middle	5580/5600	6 Mbps	Default
		High	5700	6 Mbps	Default
	802.11 n20	Low	5500	MCS0	Default
		Middle	5580/5600	MCS0	Default
		High	5700	MCS0	Default
	802.11 n40	Low	5510	MCS0	Default
		Middle	5590	MCS0	Default
		High	5670	MCS0	Default
	802.11ac vht80	Low	5530	MCS0	Default
		Middle	5610	MCS0	Default
5725 - 5850 MHz	802.11a	Low	5745	6 Mbps	Default
		Middle	5785	6 Mbps	Default
		High	5825	6 Mbps	Default
	802.11n ht20	Low	5745	MCS0	Default
		Middle	5785	MCS0	Default
		High	5825	MCS0	Default
	802.11n ht40	Low	5755	MCS0	Default
		High	5795	MCS0	Default
	802.11ac vht80	middle	5775	MCS0	Default

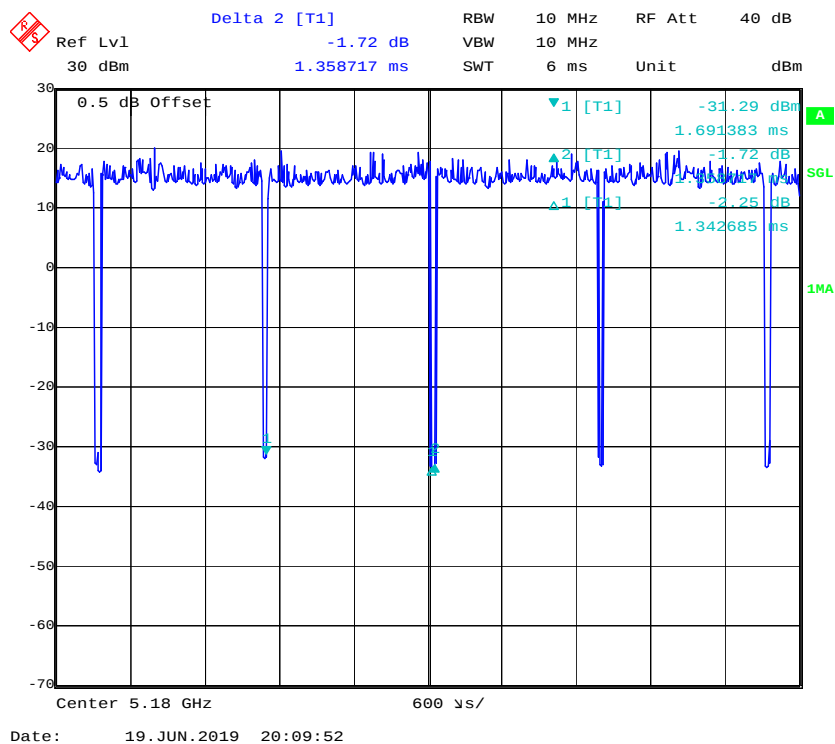
The duty cycle as below:

Mode	T _{on} (ms)	T _{on+off} (ms)	Duty Cycle(x) (%)
802.11 a	1.439	1.443	99.72
802.11n ht20	1.343	1.359	98.82
802.11n ht40	0.659	0.683	96.49
802.11ac vht80	0.330	0.363	90.91

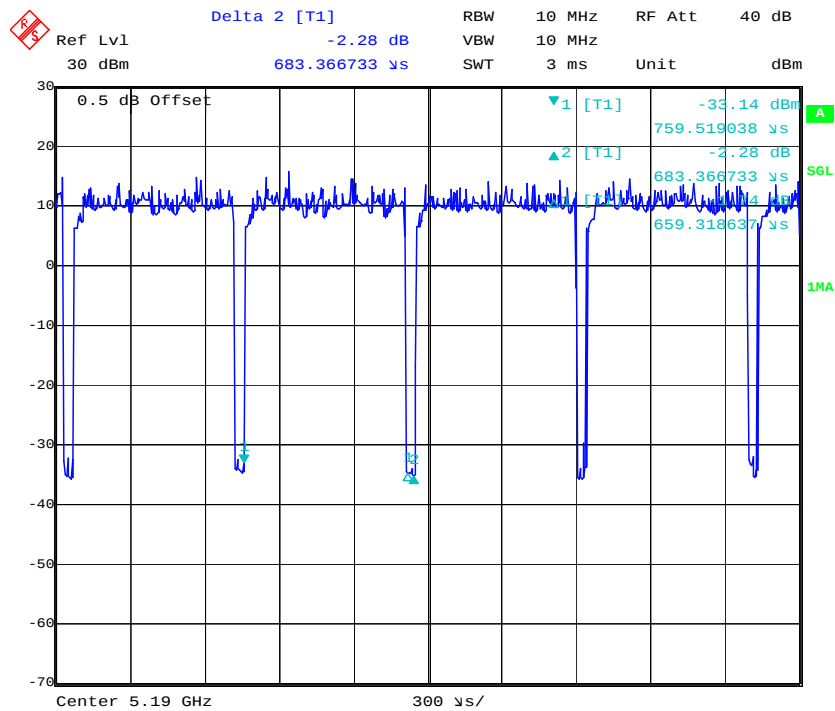
802.11a



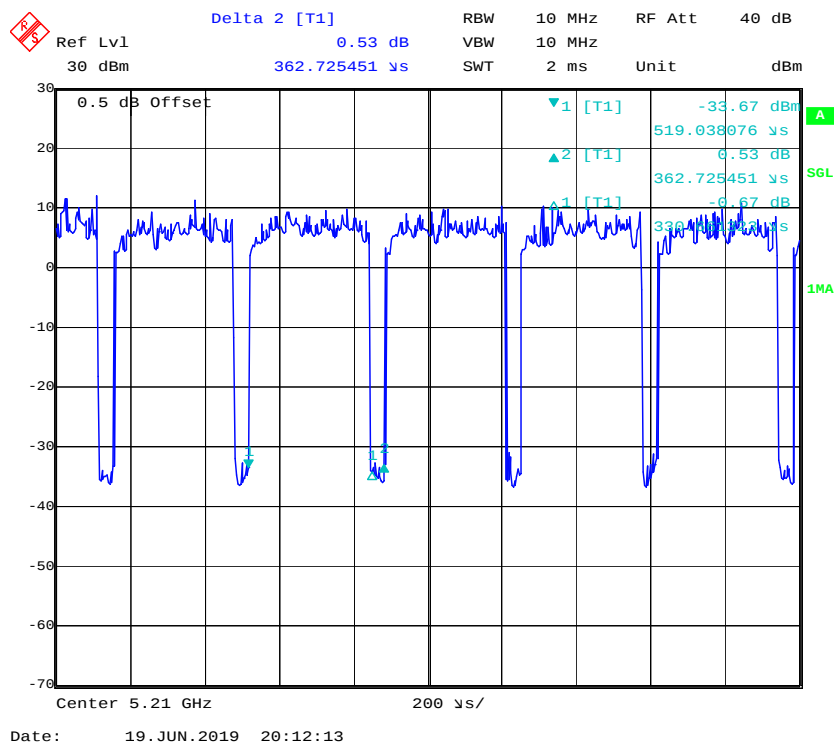
802.11n ht20



802.11n ht40



802.11ac vht80



Equipment Modifications

No modification was made to the EUT.

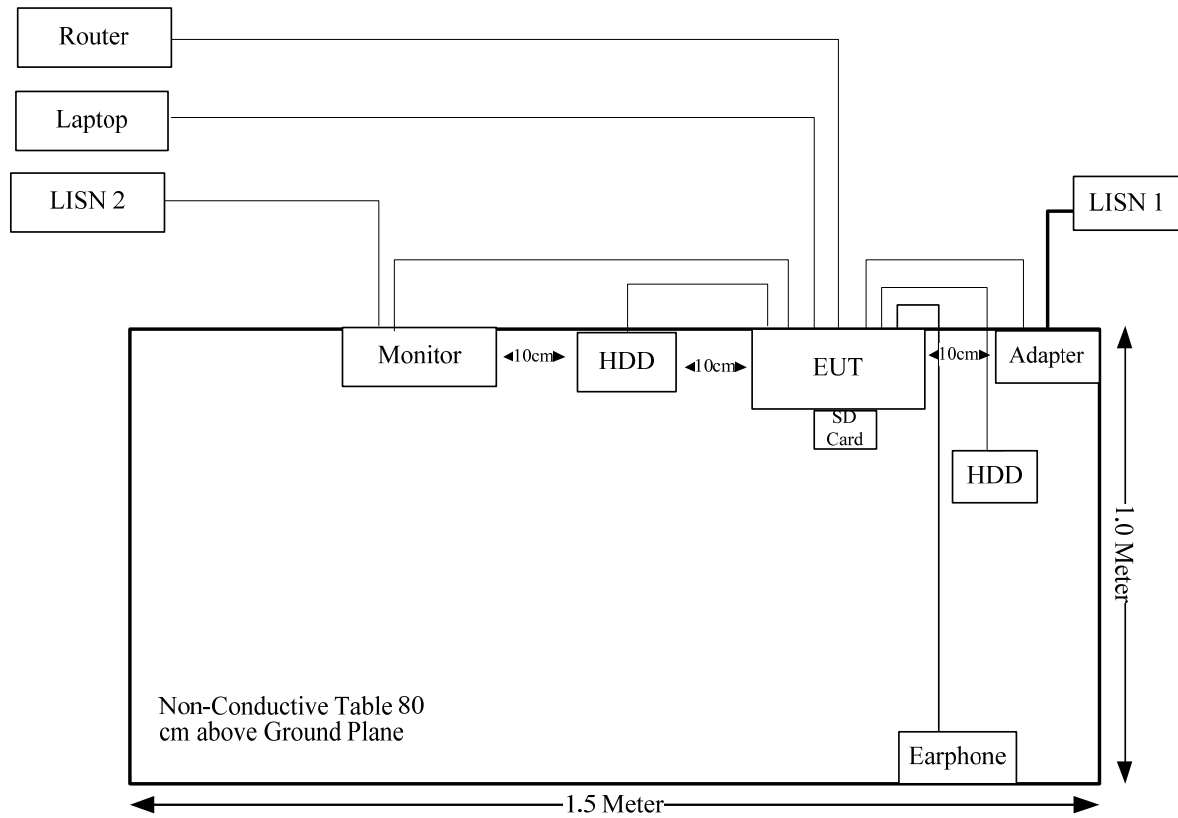
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
SanDisk	SD Card	CZ36	521253
TOSKIBA	USB-HDD	Un-known	/
TOSKIBA	USB-HDD	Un-known	/
Un-known	Earphone	Un-known	/
SAMSUNG	Monitor	S22C330H	JPTVOB2337
A Division of Cisco Systems, Inc	POE	SA06-20S48-V	GPSESU-48P401-AM5BH
DELL	Laptop	PP11L	QDS-BRCM1017
Huawei	Router	WS5200	2.01701E+15

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
Earphone cable	No	No	1	EUT	Earphone
adapter cable	No	No	1.5	adapter	EUT
USB Cable	Yes	No	0.5	EUT	HDD
HDMI Cable	Yes	No	1	EUT	Monitor
RJ45 Cable	No	No	1	Router	EUT
RJ45 Cable	No	No	1	EUT	Laptop

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

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

FCC §15.407 (f) & §1.1310 & §2.1091- 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/cm²);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

Modes	Frequency (MHz)	Antenna Gain		Conducted output power including Tune-up Tolerance		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
2.4G Wifi	2412-2462	2.8	1.91	22	158.49	20.00	0.0601	1.0
Bluetooth BDR/EDR	2402-2480	2.8	1.91	4	2.51	20.00	0.0010	1.0
Bluetooth LE	2402-2480	2.8	1.91	5	3.16	20.00	0.0012	1.0
5G Wifi	5180-5825	6.5	4.47	12	15.85	20.00	0.0141	1.0

Note: The WLAN 2.4G, 5G or Bluetooth can't transmit simultaneously.

Result: The device meet FCC MPE at 20 cm distance

FCC §15.203 – ANTENNA REQUIREMENT**Applicable Standard**

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

Antenna Connector Construction

The EUT has one internal antenna arrangement, fulfill the requirement of this section. Please refer to below information and the EUT photos:

Antenna Type	input impedance (Ohm)	Antenna Gain /Frequency Range
FPC	50	2.8dBi/2.4~2.5GHz 6.5 dBi/5.15~5.85GHz

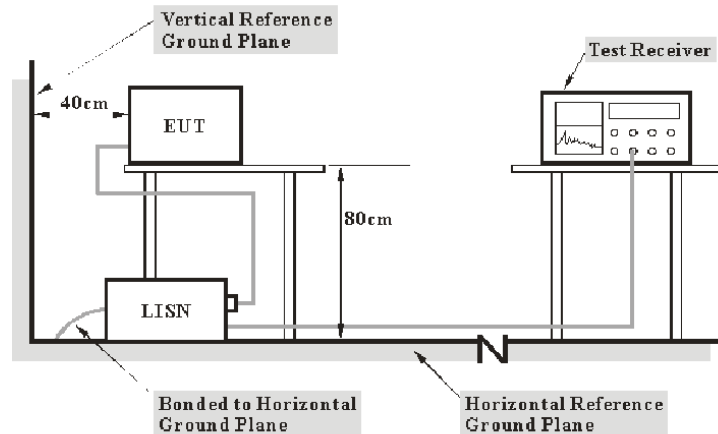
Result: Compliance.

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

Applicable Standard

FCC §15.207(a), §15.407(b) (6)

EUT Setup



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

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

The spacing between the peripherals was 10 cm.

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

EMI Test Receiver Setup

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

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

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

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$$V_C = V_R + A_C + VDF$$

$$C_f = A_C + VDF$$

Herein,

V_C (cord. Reading): corrected voltage amplitude

V_R : reading voltage amplitude

A_c : attenuation caused by cable loss

VDF: voltage division factor of AMN

C_f : Correction Factor

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

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2018-12-10	2019-12-10
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-01	2018-09-05	2019-09-05
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A
R&S	Two-line V-network	ENV 216	101614	2018-12-10	2019-12-10

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

Test Procedure

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

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

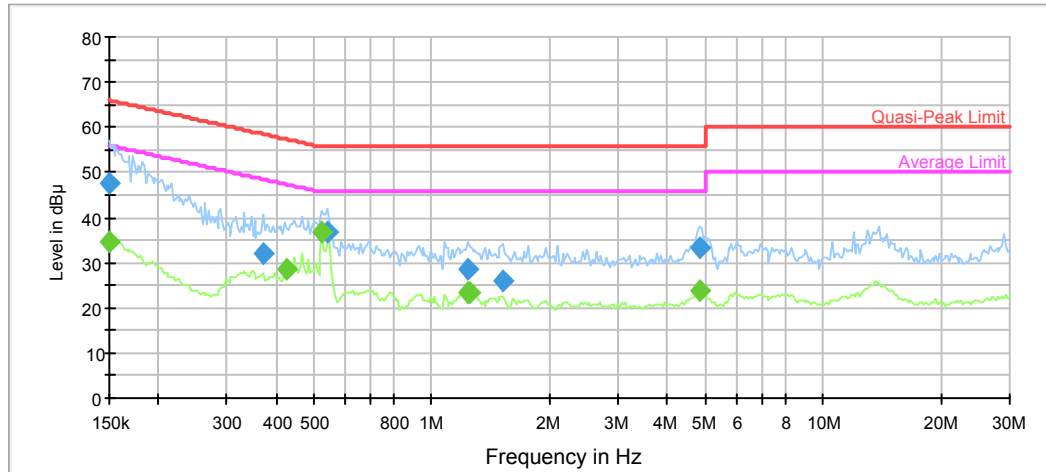
All data was recorded in the Quasi-peak and average detection mode.

Test Data

Environmental Conditions

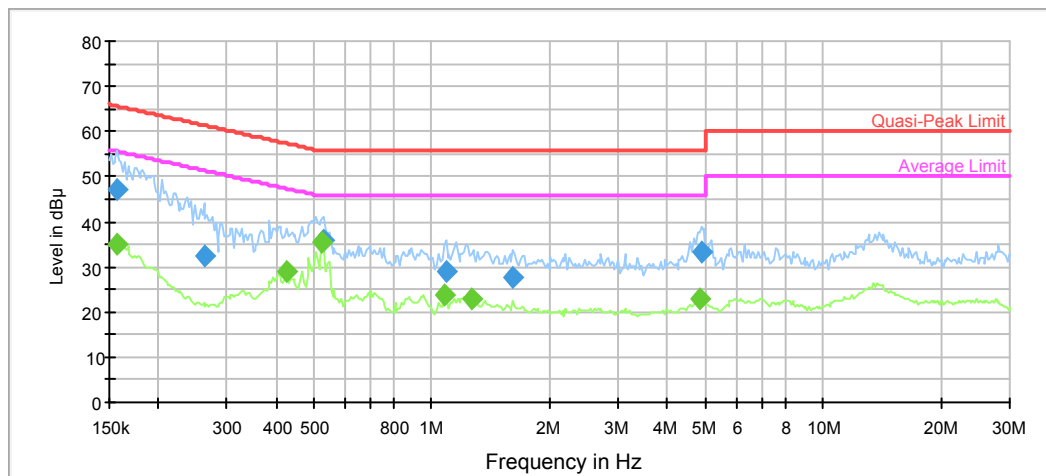
Temperature:	27.1 °C
Relative Humidity:	58 %
ATM Pressure:	99.8 kPa
Tester:	Lily Xie
Test Date:	2019-05-01

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

Adapter:**AC120 V, 60 Hz, Line:**

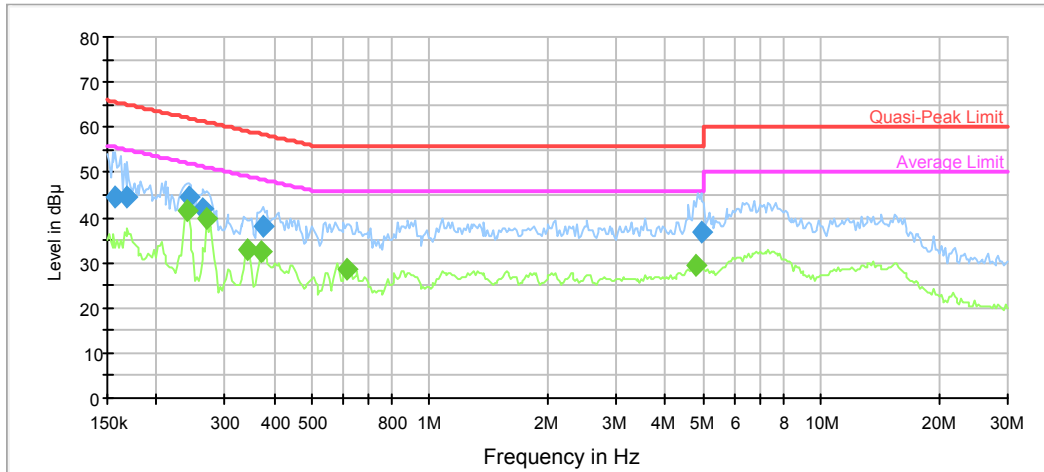
Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	47.4	9.000	L1	11.2	18.6	66.0
0.370968	31.9	9.000	L1	10.0	26.6	58.5
0.541438	37.0	9.000	L1	9.9	19.0	56.0
1.236582	28.5	9.000	L1	9.8	27.5	56.0
1.523953	26.2	9.000	L1	9.7	29.8	56.0
4.833381	33.2	9.000	L1	9.8	22.8	56.0

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	34.4	9.000	L1	11.2	21.6	56.0
0.426418	28.7	9.000	L1	9.9	18.6	47.3
0.525514	36.9	9.000	L1	9.9	9.1	46.0
1.236582	23.4	9.000	L1	9.8	22.6	46.0
1.248947	23.6	9.000	L1	9.8	22.4	46.0
4.833381	23.8	9.000	L1	9.8	22.2	46.0

AC120 V, 60 Hz, Neutral:

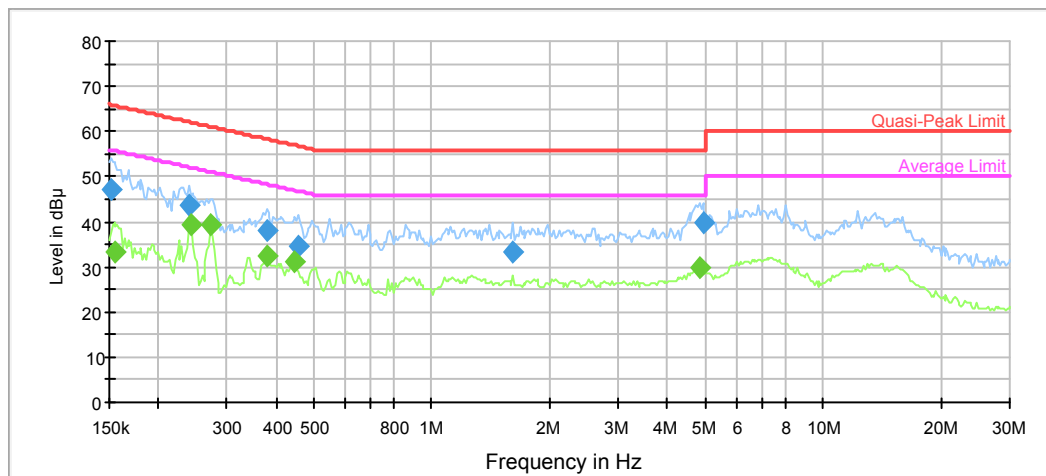
Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.157652	47.2	9.000	N	11.1	18.4	65.6
0.261872	32.6	9.000	N	10.3	28.8	61.4
0.530770	35.7	9.000	N	9.9	20.3	56.0
1.086538	28.9	9.000	N	9.8	27.1	56.0
1.617707	27.7	9.000	N	9.8	28.3	56.0
4.881714	33.4	9.000	N	9.8	22.6	56.0

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.157652	35.2	9.000	N	11.1	20.4	55.6
0.426418	28.8	9.000	N	9.9	18.5	47.3
0.525514	35.5	9.000	N	9.9	10.5	46.0
1.075780	23.8	9.000	N	9.8	22.2	46.0
1.261437	23.1	9.000	N	9.8	22.9	46.0
4.833381	23.0	9.000	N	9.8	23.0	46.0

PoE:**AC120 V, 60 Hz, Line:**

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.157652	44.4	9.000	L1	11.1	21.2	65.6
0.169024	44.7	9.000	L1	10.9	20.3	65.0
0.241834	44.6	9.000	L1	10.4	17.4	62.0
0.264490	42.0	9.000	L1	10.3	19.3	61.3
0.374678	38.0	9.000	L1	10.0	20.4	58.4
4.930532	36.6	9.000	L1	9.8	19.4	56.0

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.239440	41.4	9.000	L1	10.4	10.7	52.1
0.269807	39.8	9.000	L1	10.2	11.3	51.1
0.342583	32.8	9.000	L1	10.0	16.3	49.1
0.370968	32.6	9.000	L1	10.0	15.9	48.5
0.616207	28.6	9.000	L1	9.8	17.4	46.0
4.785525	29.5	9.000	L1	9.8	16.5	46.0

AC120 V, 60 Hz, Neutral:

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.151500	47.2	9.000	N	11.1	18.7	65.9
0.239440	43.9	9.000	N	10.4	18.2	62.1
0.378425	38.0	9.000	N	10.0	20.3	58.3
0.457178	34.6	9.000	N	9.9	22.1	56.7
1.617707	33.4	9.000	N	9.8	22.6	56.0
4.930532	39.6	9.000	N	9.8	16.4	56.0

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.154545	33.5	9.000	N	11.1	22.3	55.8
0.241834	39.5	9.000	N	10.4	12.5	52.0
0.272505	39.3	9.000	N	10.2	11.7	51.0
0.378425	32.2	9.000	N	10.0	16.1	48.3
0.443733	30.9	9.000	N	9.9	16.1	47.0
4.833381	29.9	9.000	N	9.8	16.1	46.0

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

Applicable Standard

FCC §15.407; §15.209; §15.205;

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

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

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

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

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

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

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

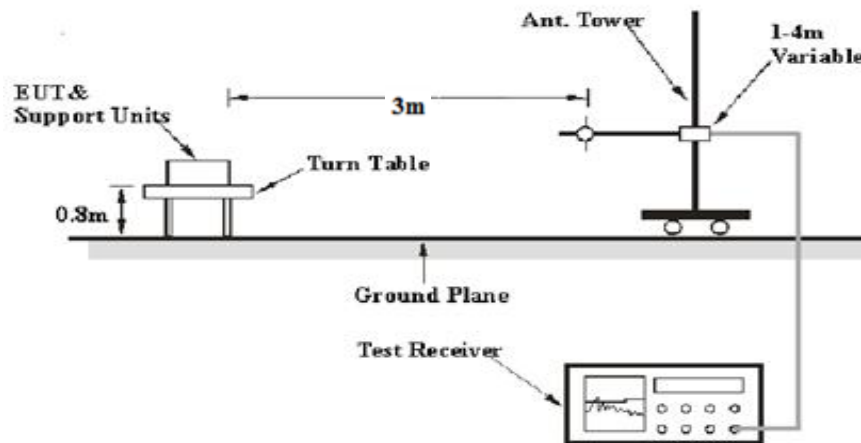
(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

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

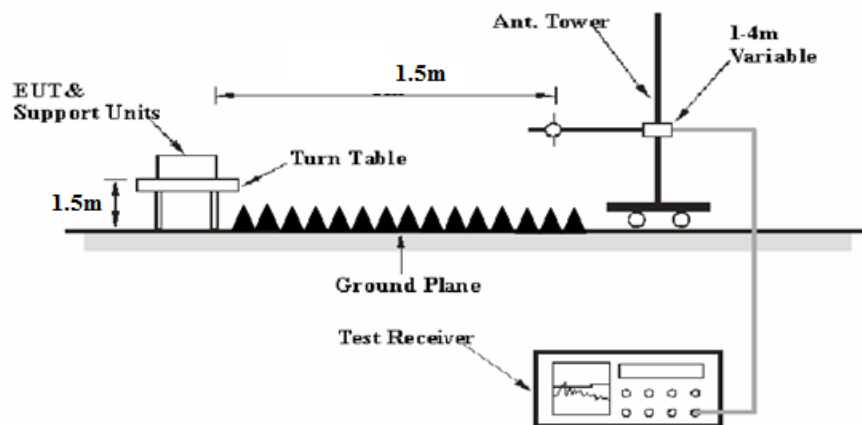
(7) The provisions of §15.205 apply to intentional radiators operating under this section.

EUT Setup

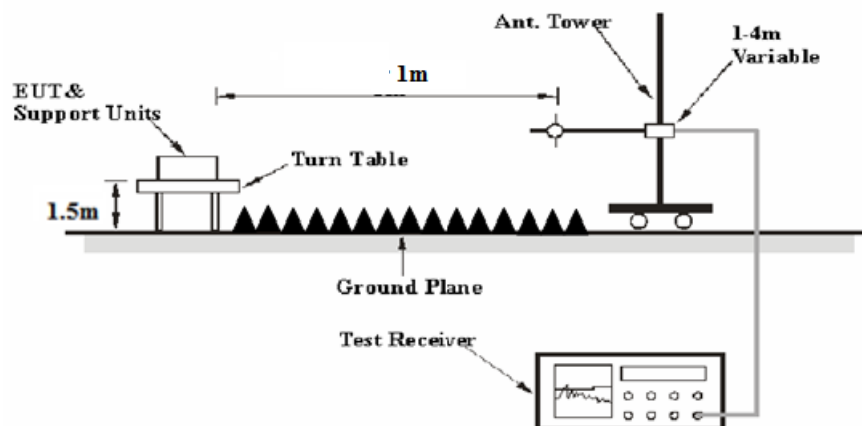
Below 1 GHz:



1-26.5 GHz:



26.5-40 GHz:



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

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

The spacing between the peripherals was 10 cm.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 40 GHz.

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

30-1000MHz:

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

1GHz- 40GHz:

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

Note: T is minimum transmission duration

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

Test Procedure

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

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

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, emission shall be computed as: $E [dB\mu V/m] = EIRP[dBm] + 95.2$, 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 = $20 \log (\text{specific distance } [3m] / \text{test distance } [1.5m])$ dB= 6.02 dB

or

Distance extrapolation factor = $20 \log (\text{specific distance } [3m] / \text{test distance } [1m])$ 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:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

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:

$$\begin{aligned} &\text{Corrected Amplitude} \\ &= \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain} - \text{Distance extrapolation factor} \end{aligned}$$

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:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiation Below 1GHz					
R&S	EMI Test Receiver	ESR3	102453	2018-06-26	2019-06-26
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
Radiation Above 1GHz					
Agilent	Spectrum Analyzer	E4440A	SG43360054	2019-05-09	2020-05-09
R&S	Spectrum Analyzer	FSP 38	100478	2019-05-09	2020-05-09
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
ETS-Lindgren	Horn Antenna	3115	000 527 35	2018-10-12	2021-10-12
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-01 1304	2016-11-18	2019-11-18
Ducommun Technologies	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
MICRO-COAX	Coaxial Cable	UFA147-1-2362- 100100	64639 231029- 001	2019-02-24	2020-02-24
MITEQ	Amplifier	AFS42-00101800- 25-S-42	2001271	2018-09-05	2019-09-05
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2018-06-27	2019-06-27
Sinoscite	Bandstop Filters	BSF5150-5850MN- 0899-003	0899003	2019-05-06	2020-05-06
Micro-tronics	High Pass Filter	HPM50111	S/N-G217	2019-06-16	2020-06-16

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

Test Data**Environmental Conditions**

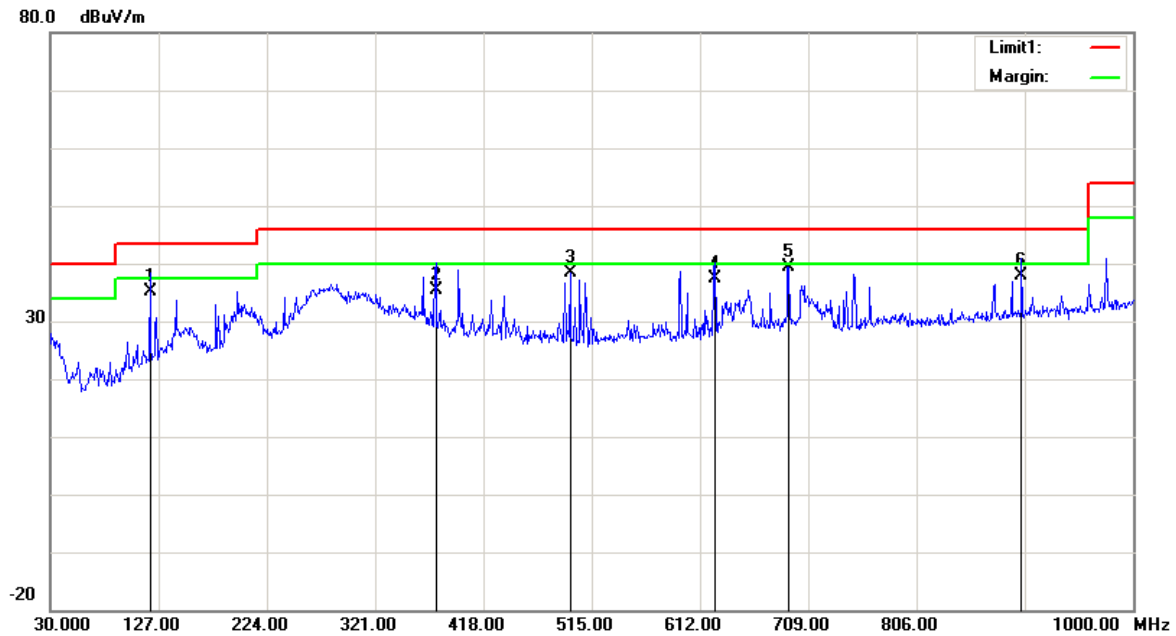
Test Items	Radiation Below 1GHz	Radiation Above 1GHz
Temperature:	27 °C	26.8 °C
Relative Humidity:	50%	61 %
ATM Pressure:	100.5 kPa	101.4 kPa
Tester:	Tyler Pan	Neil Liao
Test Date:	2019-06-23	2019-06-18

Test Mode: Transmitting

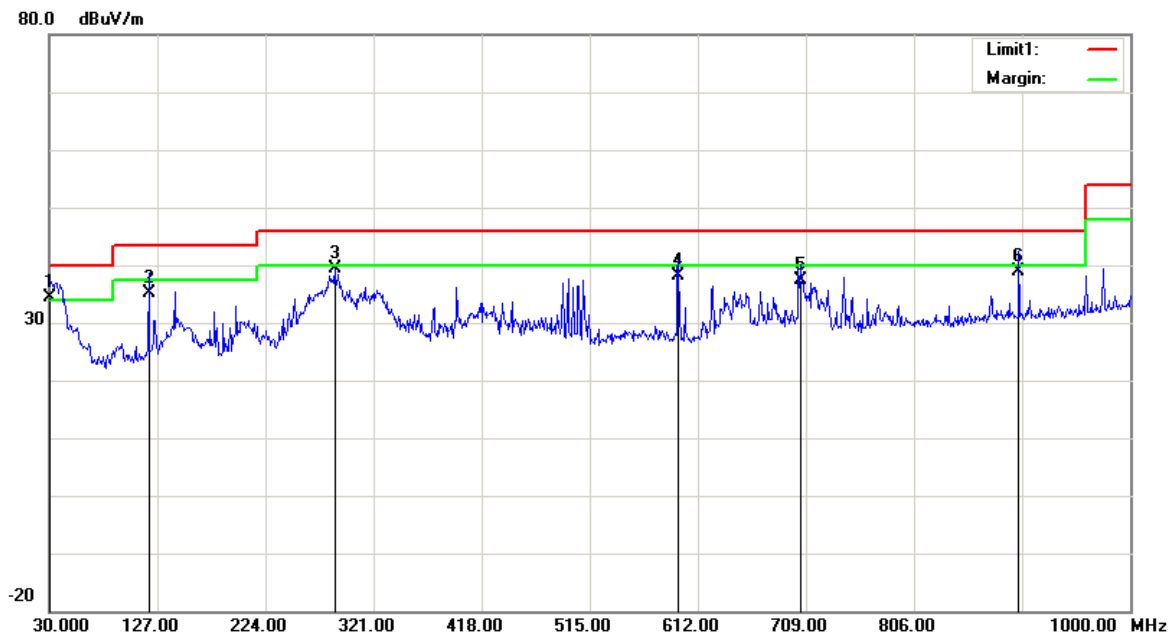
Pre scan Adapter and POE, adapter is the worst case

Below 1GHz (802.11n ht20, 5745 MHz was the worst):

Horizontal



Frequency (MHz)	Receiver Reading (dBμV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
119.2400	39.86	QP	-4.84	35.02	43.50	8.48
375.3200	37.98	QP	-2.72	35.26	46.00	10.74
495.6000	38.60	peak	-0.26	38.34	46.00	7.66
625.5800	35.65	QP	1.79	37.44	46.00	8.56
691.5400	36.68	peak	2.77	39.45	46.00	6.55
900.0900	37.80	QP	0.12	37.92	46.00	8.08

Vertical

Frequency (MHz)	Receiver Reading (dB μ V)	Detector	Correction Factor (dB/m)	Cord. Amp. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
30.0000	32.70	QP	1.72	34.42	40.00	5.58
119.2400	39.88	QP	-4.84	35.04	43.50	8.46
286.0800	43.40	peak	-4.03	39.37	46.00	6.63
594.5400	37.35	QP	0.86	38.21	46.00	7.79
704.1500	34.25	QP	3.15	37.40	46.00	8.60
900.0900	38.64	QP	0.12	38.76	46.00	7.24

1GHz-40GHz:
5150-5250MHz

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: 5180 MHz										
5180.00	73.65	PK	H	33.59	3.58	0.00	110.82	104.8	N/A	N/A
5180.00	64.71	AV	H	33.59	3.58	0.00	101.88	95.86	N/A	N/A
5180.00	75.87	PK	V	33.59	3.58	0.00	113.04	107.02	N/A	N/A
5180.00	66.42	AV	V	33.59	3.58	0.00	103.59	97.57	N/A	N/A
5150.00	36.49	PK	V	33.54	3.56	0.00	73.59	67.57	74.00	6.43
5150.00	16.77	AV	V	33.54	3.56	0.00	53.87	47.85	54.00	6.15
10360.00	45.61	PK	V	38.17	6.29	36.85	53.22	47.2	68.20	21.00
15540.00	48.65	PK	V	38.06	8.85	39.04	56.52	50.5	74.00	23.50
15540.00	34.58	AV	V	38.06	8.85	39.04	42.45	36.43	54.00	17.57
Middle Channel: 5200 MHz										
5200.00	73.79	PK	H	33.62	3.60	0.00	111.01	104.99	N/A	N/A
5200.00	64.80	AV	H	33.62	3.60	0.00	102.02	96	N/A	N/A
5200.00	76.10	PK	V	33.62	3.60	0.00	113.32	107.3	N/A	N/A
5200.00	67.32	AV	V	33.62	3.60	0.00	104.54	98.52	N/A	N/A
10400.00	45.74	PK	V	38.18	6.32	36.86	53.38	47.36	68.20	20.84
15600.00	48.36	PK	V	38.00	8.83	39.09	56.10	50.08	74.00	23.92
15600.00	34.22	AV	V	38.00	8.83	39.09	41.96	35.94	54.00	18.06
High Channel: 5240 MHz										
5240.00	73.63	PK	H	33.68	3.52	0.00	110.83	104.81	N/A	N/A
5240.00	64.71	AV	H	33.68	3.52	0.00	101.91	95.89	N/A	N/A
5240.00	75.59	PK	V	33.68	3.52	0.00	112.79	106.77	N/A	N/A
5240.00	66.49	AV	V	33.68	3.52	0.00	103.69	97.67	N/A	N/A
5350.00	25.97	PK	V	33.86	3.52	0.00	63.35	57.33	74.00	16.67
5350.00	14.36	AV	V	33.86	3.52	0.00	51.74	45.72	54.00	8.28
10480.00	45.11	PK	V	38.20	6.37	36.88	52.80	46.78	68.20	21.42
15720.00	48.24	PK	V	37.88	8.79	39.18	55.73	49.71	74.00	24.29
15720.00	34.36	AV	V	37.88	8.79	39.18	41.85	35.83	54.00	18.17

802.11n ht20

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)						
Low Channel: 5180 MHz										
5180.00	74.20	PK	H	33.59	3.58	0.00	111.37	105.35	N/A	N/A
5180.00	64.03	AV	H	33.59	3.58	0.00	101.20	95.18	N/A	N/A
5180.00	76.53	PK	V	33.59	3.58	0.00	113.70	107.68	N/A	N/A
5180.00	66.98	AV	V	33.59	3.58	0.00	104.15	98.13	N/A	N/A
5150.00	39.05	PK	V	33.54	3.56	0.00	76.15	70.13	74.00	3.87
5150.00	17.97	AV	V	33.54	3.56	0.00	55.07	49.05	54.00	4.95
10360.00	45.27	PK	V	38.17	6.29	36.85	52.88	46.86	68.20	21.34
15540.00	46.89	PK	V	38.06	8.85	39.04	54.76	48.74	74.00	25.26
15540.00	33.56	AV	V	38.06	8.85	39.04	41.43	35.41	54.00	18.59
Middle Channel: 5200 MHz										
5200.00	75.83	PK	H	33.62	3.60	0.00	113.05	107.03	N/A	N/A
5200.00	65.94	AV	H	33.62	3.60	0.00	103.16	97.14	N/A	N/A
5200.00	77.27	PK	V	33.62	3.60	0.00	114.49	108.47	N/A	N/A
5200.00	67.48	AV	V	33.62	3.60	0.00	104.70	98.68	N/A	N/A
10400.00	45.74	PK	V	38.18	6.32	36.86	53.38	47.36	68.20	20.84
15600.00	46.58	PK	V	38.00	8.83	39.09	54.32	48.3	74.00	25.70
15600.00	34.22	AV	V	38.00	8.83	39.09	41.96	35.94	54.00	18.06
High Channel: 5240 MHz										
5240.00	74.84	PK	H	33.68	3.52	0.00	112.04	106.02	N/A	N/A
5240.00	64.73	AV	H	33.68	3.52	0.00	101.93	95.91	N/A	N/A
5240.00	76.32	PK	V	33.68	3.52	0.00	113.52	107.5	N/A	N/A
5240.00	66.47	AV	V	33.68	3.52	0.00	103.67	97.65	N/A	N/A
5350.00	27.80	PK	V	33.86	3.52	0.00	65.18	59.16	74.00	14.84
5350.00	14.52	AV	V	33.86	3.52	0.00	51.90	45.88	54.00	8.12
10480.00	46.12	PK	V	38.20	6.37	36.88	53.81	47.79	68.20	20.41
15720.00	45.98	PK	V	37.88	8.79	39.18	53.47	47.45	74.00	26.55
15720.00	32.51	AV	V	37.88	8.79	39.18	40.00	33.98	54.00	20.02

802.11n ht40

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)						
Low Channel: 5190 MHz										
5190.00	70.12	PK	H	33.60	3.59	0.00	107.31	101.29	N/A	N/A
5190.00	60.33	AV	H	33.60	3.59	0.00	97.52	91.5	N/A	N/A
5190.00	72.18	PK	V	33.60	3.59	0.00	109.37	103.35	N/A	N/A
5190.00	62.29	AV	V	33.60	3.59	0.00	99.48	93.46	N/A	N/A
5150.00	37.45	PK	V	33.54	3.56	0.00	74.55	68.53	74.00	5.47
5150.00	18.25	AV	V	33.54	3.56	0.00	55.35	49.33	54.00	4.67
10380.00	47.23	PK	V	38.18	6.31	36.85	54.87	48.85	68.20	19.35
15570.00	46.52	PK	V	38.03	8.84	39.06	54.33	48.31	74.00	25.69
15570.00	33.25	AV	V	38.03	8.84	39.06	41.06	35.04	54.00	18.96
High Channel: 5230 MHz										
5230.00	69.87	PK	H	33.67	3.54	0.00	107.08	101.06	N/A	N/A
5230.00	60.17	AV	H	33.67	3.54	0.00	97.38	91.36	N/A	N/A
5230.00	71.69	PK	V	33.67	3.54	0.00	108.90	102.88	N/A	N/A
5230.00	62.41	AV	V	33.67	3.54	0.00	99.62	93.6	N/A	N/A
5350.00	27.22	PK	V	33.86	3.52	0.00	64.60	58.58	74.00	15.42
5350.00	15.15	AV	V	33.86	3.52	0.00	52.53	46.51	54.00	7.49
10460.00	45.86	PK	V	38.19	6.36	36.87	53.54	47.52	68.20	20.68
15690.00	45.65	PK	V	37.91	8.80	39.15	53.21	47.19	74.00	26.81
15690.00	32.36	AV	V	37.91	8.80	39.15	39.92	33.9	54.00	20.10

802.11ac vht80

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)						
Low Channel: 5210 MHz										
5210.00	68.65	PK	H	33.64	3.58	0.00	105.87	99.85	N/A	N/A
5210.00	57.98	AV	H	33.64	3.58	0.00	95.20	89.18	N/A	N/A
5210.00	70.12	PK	V	33.64	3.58	0.00	107.34	101.32	N/A	N/A
5210.00	58.84	AV	V	33.64	3.58	0.00	96.06	90.04	N/A	N/A
5150.00	32.33	PK	V	33.54	3.56	0.00	69.43	63.41	74.00	10.59
5150.00	17.54	AV	V	33.54	3.56	0.00	54.64	48.62	54.00	5.38
5350.00	28.18	PK	V	33.86	3.52	0.00	65.56	59.54	74.00	14.46
5350.00	15.68	AV	V	33.86	3.52	0.00	53.06	47.04	54.00	6.96
10420.00	46.25	PK	V	38.18	6.33	36.86	53.90	47.88	68.20	20.32
15630.00	48.25	PK	V	37.97	8.82	39.11	55.93	49.91	74.00	24.09
15630.00	36.87	AV	V	37.97	8.82	39.11	44.55	38.53	54.00	15.47

5250-5350MHz**802.11a:**

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)						
Low Channel: 5260 MHz										
5260.00	74.25	PK	H	33.72	3.49	0.00	111.46	105.44	N/A	N/A
5260.00	64.36	AV	H	33.72	3.49	0.00	101.57	95.55	N/A	N/A
5260.00	76.90	PK	V	33.72	3.49	0.00	114.11	108.09	N/A	N/A
5260.00	66.74	AV	V	33.72	3.49	0.00	103.95	97.93	N/A	N/A
5150.00	26.53	PK	V	33.54	3.56	0.00	63.63	57.61	74.00	16.39
5150.00	14.32	AV	V	33.54	3.56	0.00	51.42	45.4	54.00	8.60
10520.00	45.41	PK	V	38.21	6.39	36.89	53.12	47.1	68.20	21.10
15780.00	48.76	PK	V	37.82	8.76	39.22	56.12	50.1	74.00	23.90
15780.00	34.65	AV	V	37.82	8.76	39.22	42.01	35.99	54.00	18.01
Middle Channel: 5280 MHz										
5280.00	74.58	PK	H	33.75	3.45	0.00	111.78	105.76	N/A	N/A
5280.00	64.25	AV	H	33.75	3.45	0.00	101.45	95.43	N/A	N/A
5280.00	76.74	PK	V	33.75	3.45	0.00	113.94	107.92	N/A	N/A
5280.00	66.32	AV	V	33.75	3.45	0.00	103.52	97.5	N/A	N/A
10560.00	45.74	PK	V	38.24	6.40	36.90	53.48	47.46	68.20	20.74
15840.00	46.32	PK	V	37.76	8.74	39.27	53.55	47.53	74.00	26.47
15840.00	33.74	AV	V	37.76	8.74	39.27	40.97	34.95	54.00	19.05
High Channel: 5320 MHz										
5320.00	75.14	PK	H	33.81	3.45	0.00	112.40	106.38	N/A	N/A
5320.00	65.01	AV	H	33.81	3.45	0.00	102.27	96.25	N/A	N/A
5320.00	77.12	PK	V	33.81	3.45	0.00	114.38	108.36	N/A	N/A
5320.00	68.06	AV	V	33.81	3.45	0.00	105.32	99.3	N/A	N/A
5350.00	36.71	PK	V	33.86	3.52	0.00	74.09	68.07	74.00	5.93
5350.00	19.86	AV	V	33.86	3.52	0.00	57.24	51.22	54.00	2.78
10640.00	45.62	PK	V	38.28	6.43	36.93	53.40	47.38	74.00	26.62
10640.00	32.32	AV	V	38.28	6.43	36.93	40.10	34.08	54.00	19.92
15960.00	46.32	PK	V	37.64	8.70	39.36	53.30	47.28	74.00	26.72
15960.00	33.14	AV	V	37.64	8.70	39.36	40.12	34.1	54.00	19.90

802.11n ht20

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)						
Low Channel: 5260 MHz										
5260.00	74.98	PK	H	33.72	3.49	0.00	112.19	106.17	N/A	N/A
5260.00	65.87	AV	H	33.72	3.49	0.00	103.08	97.06	N/A	N/A
5260.00	77.12	PK	V	33.72	3.49	0.00	114.33	108.31	N/A	N/A
5260.00	68.21	AV	V	33.72	3.49	0.00	105.42	99.4	N/A	N/A
5150.00	25.47	PK	V	33.54	3.56	0.00	62.57	56.55	74.00	17.45
5150.00	14.32	AV	V	33.54	3.56	0.00	51.42	45.4	54.00	8.60
10520.00	45.78	PK	V	38.21	6.39	36.89	53.49	47.47	68.20	20.73
15780.00	47.52	PK	V	37.82	8.76	39.22	54.88	48.86	74.00	25.14
15780.00	33.52	AV	V	37.82	8.76	39.22	40.88	34.86	54.00	19.14
Middle Channel: 5280 MHz										
5280.00	75.25	PK	H	33.75	3.45	0.00	112.45	106.43	N/A	N/A
5280.00	65.36	AV	H	33.75	3.45	0.00	102.56	96.54	N/A	N/A
5280.00	77.83	PK	V	33.75	3.45	0.00	115.03	109.01	N/A	N/A
5280.00	67.47	AV	V	33.75	3.45	0.00	104.67	98.65	N/A	N/A
10560.00	45.58	PK	V	38.24	6.40	36.90	53.32	47.3	68.20	20.90
15840.00	46.85	PK	V	37.76	8.74	39.27	54.08	48.06	74.00	25.94
15840.00	34.15	AV	V	37.76	8.74	39.27	41.38	35.36	54.00	18.64
High Channel: 5320 MHz										
5320.00	74.93	PK	H	33.81	3.45	0.00	112.19	106.17	N/A	N/A
5320.00	64.71	AV	H	33.81	3.45	0.00	101.97	95.95	N/A	N/A
5320.00	77.22	PK	V	33.81	3.45	0.00	114.48	108.46	N/A	N/A
5320.00	67.32	AV	V	33.81	3.45	0.00	104.58	98.56	N/A	N/A
5350.00	40.17	PK	V	33.86	3.52	0.00	77.55	71.53	74.00	2.47
5350.00	19.42	AV	V	33.86	3.52	0.00	56.80	50.78	54.00	3.22
10640.00	45.57	PK	V	38.28	6.43	36.93	53.35	47.33	74.00	26.67
10640.00	32.65	AV	V	38.28	6.43	36.93	40.43	34.41	54.00	19.59
15960.00	46.96	PK	V	37.64	8.70	39.36	53.94	47.92	74.00	26.08
15960.00	33.87	AV	V	37.64	8.70	39.36	40.85	34.83	54.00	19.17

802.11n ht40

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)						
Low Channel: 5270 MHz										
5270.00	71.47	PK	H	33.73	3.47	0.00	108.67	102.65	N/A	N/A
5270.00	61.31	AV	H	33.73	3.47	0.00	98.51	92.49	N/A	N/A
5270.00	73.28	PK	V	33.73	3.47	0.00	110.48	104.46	N/A	N/A
5270.00	63.83	AV	V	33.73	3.47	0.00	101.03	95.01	N/A	N/A
5150.00	26.31	PK	V	33.54	3.56	0.00	63.41	57.39	74.00	16.61
5150.00	14.98	AV	V	33.54	3.56	0.00	52.08	46.06	54.00	7.94
10540.00	46.01	PK	V	38.22	6.40	36.89	53.74	47.72	68.20	20.48
15810.00	46.35	PK	V	37.79	8.75	39.25	53.64	47.62	74.00	26.38
15810.00	33.45	AV	V	37.79	8.75	39.25	40.74	34.72	54.00	19.28
High Channel: 5310 MHz										
5310.00	71.32	PK	H	33.80	3.43	0.00	108.55	102.53	N/A	N/A
5310.00	61.24	AV	H	33.80	3.43	0.00	98.47	92.45	N/A	N/A
5310.00	73.91	PK	V	33.80	3.43	0.00	111.14	105.12	N/A	N/A
5310.00	63.11	AV	V	33.80	3.43	0.00	100.34	94.32	N/A	N/A
5350.00	41.70	PK	V	33.86	3.52	0.00	79.08	73.06	74.00	0.94
5350.00	20.35	AV	V	33.86	3.52	0.00	57.73	51.71	54.00	2.29
10620.00	45.74	PK	V	38.27	6.43	36.92	53.52	47.5	74.00	26.50
10620.00	32.84	AV	V	38.27	6.43	36.92	40.62	34.6	54.00	19.40
15930.00	45.65	PK	V	37.67	8.71	39.34	52.69	46.67	74.00	27.33
15930.00	32.35	AV	V	37.67	8.71	39.34	39.39	33.37	54.00	20.63

802.11ac vht80

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)						
Middle Channel:5290MHz										
5290.00	68.54	PK	H	33.76	3.43	0.00	105.73	99.71	N/A	N/A
5290.00	58.96	AV	H	33.76	3.43	0.00	96.15	90.13	N/A	N/A
5290.00	70.81	PK	V	33.76	3.43	0.00	108.00	101.98	N/A	N/A
5290.00	60.17	AV	V	33.76	3.43	0.00	97.36	91.34	N/A	N/A
5150.00	28.06	PK	V	33.54	3.56	0.00	65.16	59.14	74.00	14.86
5150.00	15.62	AV	V	33.54	3.56	0.00	52.72	46.7	54.00	7.30
5350.00	40.78	PK	V	33.86	3.52	0.00	78.16	72.14	74.00	1.86
5350.00	20.08	AV	V	33.86	3.52	0.00	57.46	51.44	54.00	2.56
10580.00	45.35	PK	V	38.25	6.41	36.91	53.10	47.08	68.20	21.12
15870.00	48.14	PK	V	37.73	8.73	39.29	55.31	49.29	74.00	24.71
15870.00	33.95	AV	V	37.73	8.73	39.29	41.12	35.1	54.00	18.90

5470-5725MHz

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	68.14	PK	H	34.10	3.54	0.00	105.78	99.76	N/A	N/A
5500.00	59.64	AV	H	34.10	3.54	0.00	97.28	91.26	N/A	N/A
5500.00	70.75	PK	V	34.10	3.54	0.00	108.39	102.37	N/A	N/A
5500.00	61.90	AV	V	34.10	3.54	0.00	99.54	93.52	N/A	N/A
5460.00	27.69	PK	V	34.05	3.56	0.00	65.30	59.28	74.00	14.72
5460.00	15.75	AV	V	34.05	3.56	0.00	53.36	47.34	54.00	6.66
11000.00	46.64	PK	V	38.50	6.57	37.06	54.65	48.63	74.00	25.37
11000.00	32.47	AV	V	38.50	6.57	37.06	40.48	34.46	54.00	19.54
16500.00	46.36	PK	V	38.20	8.63	39.30	53.89	47.87	68.20	20.33
Middle Channel: 5580 MHz										
5580.00	68.03	PK	H	34.13	3.56	0.00	105.72	99.7	N/A	N/A
5580.00	59.41	AV	H	34.13	3.56	0.00	97.10	91.08	N/A	N/A
5580.00	70.14	PK	V	34.13	3.56	0.00	107.83	101.81	N/A	N/A
5580.00	61.75	AV	V	34.13	3.56	0.00	99.44	93.42	N/A	N/A
11160.00	45.65	PK	V	38.66	6.58	37.16	53.73	47.71	74.00	26.29
11160.00	32.54	AV	V	38.66	6.58	37.16	40.62	34.6	54.00	19.40
16740.00	46.45	PK	V	39.16	8.67	39.05	55.23	49.21	68.20	18.99
High Channel: 5700 MHz										
5700.00	68.36	PK	H	34.18	3.68	0.00	106.22	100.2	N/A	N/A
5700.00	59.46	AV	H	34.18	3.68	0.00	97.32	91.3	N/A	N/A
5700.00	70.68	PK	V	34.18	3.68	0.00	108.54	102.52	N/A	N/A
5700.00	62.05	AV	V	34.18	3.68	0.00	99.91	93.89	N/A	N/A
5725.00	29.65	PK	V	34.19	3.69	0.00	67.53	61.51	68.2	6.69
11400.00	45.98	PK	V	38.90	6.59	37.30	54.17	48.15	74.00	25.85
11400.00	32.74	AV	V	38.90	6.59	37.30	40.93	34.91	54.00	19.09
17100.00	46.99	PK	V	40.78	8.75	38.70	57.82	51.8	68.20	16.40

802.11n ht20

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)						
Low Channel: 5500 MHz										
5500.00	68.41	PK	H	34.10	3.54	0.00	106.05	100.03	N/A	N/A
5500.00	58.17	AV	H	34.10	3.54	0.00	95.81	89.79	N/A	N/A
5500.00	70.47	PK	V	34.10	3.54	0.00	108.11	102.09	N/A	N/A
5500.00	60.15	AV	V	34.10	3.54	0.00	97.79	91.77	N/A	N/A
5460.00	31.10	PK	V	34.05	3.56	0.00	68.71	62.69	74.00	11.31
5460.00	15.70	AV	V	34.05	3.56	0.00	53.31	47.29	54.00	6.71
11000.00	46.33	PK	V	38.50	6.57	37.06	54.34	48.32	74.00	25.68
11000.00	33.14	AV	V	38.50	6.57	37.06	41.15	35.13	54.00	18.87
16500.00	46.45	PK	V	38.20	8.63	39.30	53.98	47.96	68.20	20.24
Middle Channel: 5580 MHz										
5580.00	68.44	PK	H	34.13	3.56	0.00	106.13	100.11	N/A	N/A
5580.00	58.39	AV	H	34.13	3.56	0.00	96.08	90.06	N/A	N/A
5580.00	70.68	PK	V	34.13	3.56	0.00	108.37	102.35	N/A	N/A
5580.00	60.28	AV	V	34.13	3.56	0.00	97.97	91.95	N/A	N/A
11160.00	46.20	PK	V	38.66	6.58	37.16	54.28	48.26	74.00	25.74
11160.00	34.09	AV	V	38.66	6.58	37.16	42.17	36.15	54.00	17.85
16740.00	46.57	PK	V	39.16	8.67	39.05	55.35	49.33	68.20	18.87
High Channel: 5700 MHz										
5700.00	69.56	PK	H	34.18	3.68	0.00	107.42	101.4	N/A	N/A
5700.00	59.43	AV	H	34.18	3.68	0.00	97.29	91.27	N/A	N/A
5700.00	71.52	PK	V	34.18	3.68	0.00	109.38	103.36	N/A	N/A
5700.00	61.37	AV	V	34.18	3.68	0.00	99.23	93.21	N/A	N/A
5725.00	31.50	PK	V	34.19	3.69	0.00	69.38	63.36	68.2	4.84
11400.00	45.78	PK	V	38.90	6.59	37.30	53.97	47.95	74.00	26.05
11400.00	33.15	AV	V	38.90	6.59	37.30	41.34	35.32	54.00	18.68
17100.00	46.36	PK	V	40.78	8.75	38.70	57.19	51.17	68.20	17.03

802.11n ht40

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)						
Low Channel: 5510 MHz										
5510.00	66.35	PK	H	34.10	3.54	0.00	103.99	97.97	N/A	N/A
5510.00	56.74	AV	H	34.10	3.54	0.00	94.38	88.36	N/A	N/A
5510.00	68.44	PK	V	34.10	3.54	0.00	106.08	100.06	N/A	N/A
5510.00	58.08	AV	V	34.10	3.54	0.00	95.72	89.7	N/A	N/A
5460.00	31.07	PK	V	34.05	3.56	0.00	68.68	62.66	74.00	11.34
5460.00	15.99	AV	V	34.05	3.56	0.00	53.60	47.58	54.00	6.42
11020.00	45.78	PK	V	38.52	6.57	37.07	53.80	47.78	74.00	26.22
11020.00	32.54	AV	V	38.52	6.57	37.07	40.56	34.54	54.00	19.46
16530.00	46.36	PK	V	38.32	8.64	39.27	54.05	48.03	68.20	20.17
Middle Channel: 5550 MHz										
5550.00	66.07	PK	H	34.12	3.56	0.00	103.75	97.73	N/A	N/A
5550.00	55.99	AV	H	34.12	3.56	0.00	93.67	87.65	N/A	N/A
5550.00	68.52	PK	V	34.12	3.56	0.00	106.20	100.18	N/A	N/A
5550.00	58.47	AV	V	34.12	3.56	0.00	96.15	90.13	N/A	N/A
11100.00	45.66	PK	V	38.60	6.57	37.12	53.71	47.69	74.00	26.31
11100.00	32.41	AV	V	38.60	6.57	37.12	40.46	34.44	54.00	19.56
16650.00	46.52	PK	V	38.80	8.66	39.14	54.84	48.82	68.20	19.38
High Channel: 5670 MHz										
5670.00	65.07	PK	H	34.17	3.65	0.00	102.89	96.87	N/A	N/A
5670.00	54.65	AV	H	34.17	3.65	0.00	92.47	86.45	N/A	N/A
5670.00	67.29	PK	V	34.17	3.65	0.00	105.11	99.09	N/A	N/A
5670.00	57.04	AV	V	34.17	3.65	0.00	94.86	88.84	N/A	N/A
5725.00	27.56	PK	V	34.19	3.69	0.00	65.44	59.42	68.2	8.78
11340.00	46.25	PK	V	38.84	6.58	37.26	54.41	48.39	74.00	25.61
11340.00	33.04	AV	V	38.84	6.58	37.26	41.20	35.18	54.00	18.82
17010.00	46.15	PK	V	40.26	8.72	38.76	56.37	50.35	68.20	17.85

802.11ac vht80

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)						
Low Channel: 5530 MHz										
5530.00	62.74	PK	H	34.11	3.55	0.00	100.40	94.38	N/A	N/A
5530.00	52.39	AV	H	34.11	3.55	0.00	90.05	84.03	N/A	N/A
5530.00	64.48	PK	V	34.11	3.55	0.00	102.14	96.12	N/A	N/A
5530.00	53.93	AV	V	34.11	3.55	0.00	91.59	85.57	N/A	N/A
5460.00	29.64	PK	V	34.05	3.56	0.00	67.25	61.23	74.00	12.77
5460.00	14.93	AV	V	34.05	3.56	0.00	52.54	46.52	54.00	7.48
11060.00	46.65	PK	V	38.56	6.57	37.10	54.68	48.66	74.00	25.34
11060.00	33.47	AV	V	38.56	6.57	37.10	41.50	35.48	54.00	18.52
16590.00	46.87	PK	V	38.56	8.65	39.20	54.88	48.86	68.20	19.34
Low Channel: 5610 MHz										
5610.00	63.14	PK	H	34.14	3.58	0.00	100.86	94.84	N/A	N/A
5610.00	52.98	AV	H	34.14	3.58	0.00	90.70	84.68	N/A	N/A
5610.00	65.01	PK	V	34.14	3.58	0.00	102.73	96.71	N/A	N/A
5610.00	54.25	AV	V	34.14	3.58	0.00	91.97	85.95	N/A	N/A
5725.00	27.31	PK	V	34.19	3.69	0.00	65.19	59.17	68.2	9.03
11220.00	46.19	PK	V	38.72	6.58	37.19	54.30	48.28	74.00	25.72
11220.00	33.65	AV	V	38.72	6.58	37.19	41.76	35.74	54.00	18.26
16830.00	45.12	PK	V	39.52	8.69	38.95	54.38	48.36	68.20	19.84

5725-5850MHz
802.11a

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)						
Low Channel: 5745 MHz										
5745.00	69.45	PK	H	34.20	3.69	0.00	107.34	101.32	N/A	N/A
5745.00	59.36	AV	H	34.20	3.69	0.00	97.25	91.23	N/A	N/A
5745.00	71.71	PK	V	34.20	3.69	0.00	109.60	103.58	N/A	N/A
5745.00	61.25	AV	V	34.20	3.69	0.00	99.14	93.12	N/A	N/A
5725.00	34.65	PK	V	34.19	3.69	0.00	72.53	66.51	122.20	55.69
5720.00	30.86	PK	V	34.19	3.69	0.00	68.74	62.72	110.80	48.08
5700.00	29.95	PK	V	34.18	3.68	0.00	67.81	61.79	105.20	43.41
5650.00	28.12	PK	V	34.16	3.63	0.00	65.91	59.89	68.20	8.31
11490.00	46.21	PK	V	38.99	6.59	37.35	54.44	48.42	74.00	25.58
11490.00	33.74	AV	V	38.99	6.59	37.35	41.97	35.95	54.00	18.05
17235.00	45.95	PK	V	41.56	8.78	38.61	57.68	51.66	68.20	16.54
Middle Channel: 5785 MHz										
5785.00	68.74	PK	H	34.21	3.71	0.00	106.66	100.64	N/A	N/A
5785.00	58.17	AV	H	34.21	3.71	0.00	96.09	90.07	N/A	N/A
5785.00	71.09	PK	V	34.21	3.71	0.00	109.01	102.99	N/A	N/A
5785.00	60.25	AV	V	34.21	3.71	0.00	98.17	92.15	N/A	N/A
11570.00	46.23	PK	V	39.00	6.61	37.44	54.40	48.38	74.00	25.62
11570.00	33.11	AV	V	39.00	6.61	37.44	41.28	35.26	54.00	18.74
17355.00	45.78	PK	V	42.26	8.81	38.52	58.33	52.31	68.20	15.89
High Channel: 5825 MHz										
5825.00	68.14	PK	H	34.23	3.73	0.00	106.10	100.08	N/A	N/A
5825.00	58.07	AV	H	34.23	3.73	0.00	96.03	90.01	N/A	N/A
5825.00	70.44	PK	V	34.23	3.73	0.00	108.40	102.38	N/A	N/A
5825.00	60.14	AV	V	34.23	3.73	0.00	98.10	92.08	N/A	N/A
5850.00	29.12	PK	V	34.24	3.75	0.00	67.11	61.09	122.20	61.11
5855.00	28.74	PK	V	34.24	3.75	0.00	66.73	60.71	110.80	50.09
5875.00	28.56	PK	V	34.25	3.77	0.00	66.58	60.56	105.20	44.64
5925.00	28.11	PK	V	34.27	3.80	0.00	66.18	60.16	68.20	8.04
11650.00	45.36	PK	V	39.00	6.64	37.53	53.47	47.45	74.00	26.55
11650.00	33.52	AV	V	39.00	6.64	37.53	41.63	35.61	54.00	18.39
17475.00	46.03	PK	V	42.96	8.84	38.44	59.39	53.37	68.20	14.83

802.11n ht20

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)						
Low Channel: 5745MHz										
5745.00	69.58	PK	H	34.20	3.69	0.00	107.47	101.45	N/A	N/A
5745.00	59.14	AV	H	34.20	3.69	0.00	97.03	91.01	N/A	N/A
5745.00	72.05	PK	V	34.20	3.69	0.00	109.94	103.92	N/A	N/A
5745.00	61.78	AV	V	34.20	3.69	0.00	99.67	93.65	N/A	N/A
5725.00	36.98	PK	V	34.19	3.69	0.00	74.86	68.84	122.20	53.36
5720.00	33.08	PK	V	34.19	3.69	0.00	70.96	64.94	110.80	45.86
5700.00	28.05	PK	V	34.18	3.68	0.00	65.91	59.89	105.20	45.31
5650.00	27.65	PK	V	34.16	3.63	0.00	65.44	59.42	68.20	8.78
11490.00	45.55	PK	V	38.99	6.59	37.35	53.78	47.76	74.00	26.24
11490.00	33.01	AV	V	38.99	6.59	37.35	41.24	35.22	54.00	18.78
17235.00	46.02	PK	V	41.56	8.78	38.61	57.75	51.73	68.20	16.47
Middle Channel: 5785 MHz										
5785.00	69.35	PK	H	34.21	3.71	0.00	107.27	101.25	N/A	N/A
5785.00	58.96	AV	H	34.21	3.71	0.00	96.88	90.86	N/A	N/A
5785.00	71.76	PK	V	34.21	3.71	0.00	109.68	103.66	N/A	N/A
5785.00	61.07	AV	V	34.21	3.71	0.00	98.99	92.97	N/A	N/A
11570.00	46.32	PK	V	39.00	6.61	37.44	54.49	48.47	74.00	25.53
11570.00	33.25	AV	V	39.00	6.61	37.44	41.42	35.4	54.00	18.60
17355.00	46.74	PK	V	42.26	8.81	38.52	59.29	53.27	68.20	14.93
High Channel: 5825 MHz										
5825.00	69.36	PK	H	34.23	3.73	0.00	107.32	101.3	N/A	N/A
5825.00	58.75	AV	H	34.23	3.73	0.00	96.71	90.69	N/A	N/A
5825.00	71.23	PK	V	34.23	3.73	0.00	109.19	103.17	N/A	N/A
5825.00	61.29	AV	V	34.23	3.73	0.00	99.25	93.23	N/A	N/A
5850.00	30.56	PK	V	34.24	3.75	0.00	68.55	62.53	122.20	59.67
5855.00	29.29	PK	V	34.24	3.75	0.00	67.28	61.26	110.80	49.54
5875.00	28.45	PK	V	34.25	3.77	0.00	66.47	60.45	105.20	44.75
5925.00	28.12	PK	V	34.27	3.80	0.00	66.19	60.17	68.20	8.03
11650.00	46.02	PK	V	39.00	6.64	37.53	54.13	48.11	74.00	25.89
11650.00	33.01	AV	V	39.00	6.64	37.53	41.12	35.1	54.00	18.90
17475.00	46.02	PK	V	42.96	8.84	38.44	59.38	53.36	68.20	14.84

802.11n ht40

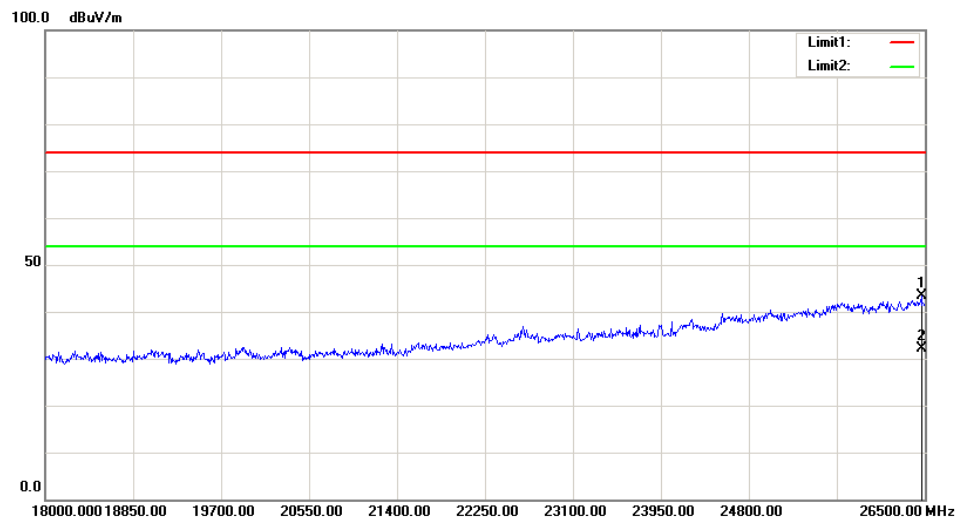
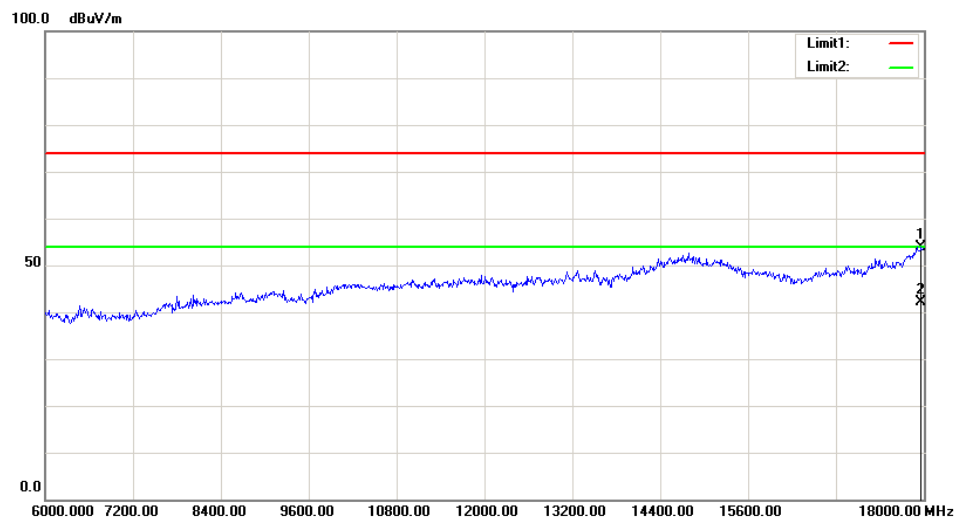
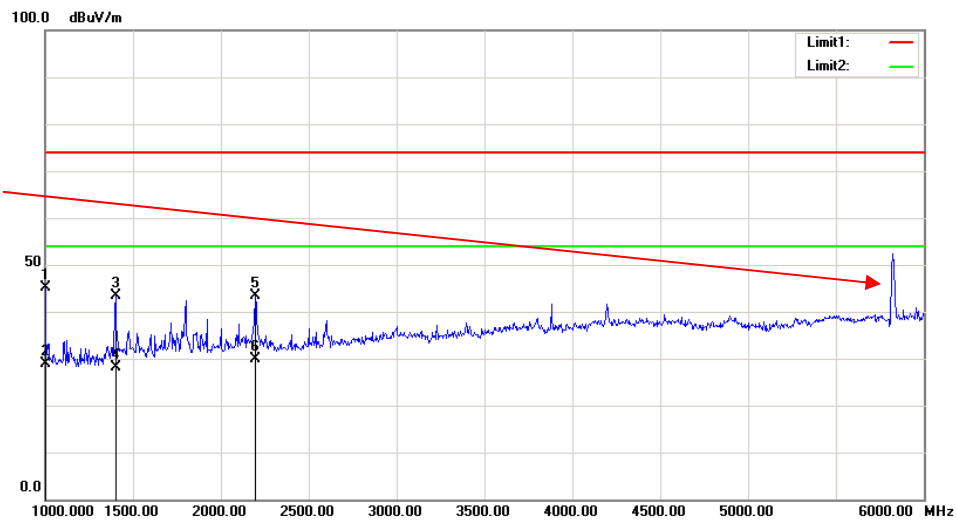
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)						
Low Channel: 5755 MHz										
5755.00	65.12	PK	H	34.20	3.70	0.00	103.02	97	N/A	N/A
5755.00	54.56	AV	H	34.20	3.70	0.00	92.46	86.44	N/A	N/A
5755.00	67.65	PK	V	34.20	3.70	0.00	105.55	99.53	N/A	N/A
5755.00	57.41	AV	V	34.20	3.70	0.00	95.31	89.29	N/A	N/A
5725.00	35.66	PK	V	34.19	3.69	0.00	73.54	67.52	122.20	54.68
5720.00	34.26	PK	V	34.19	3.69	0.00	72.14	66.12	110.80	44.68
5700.00	28.22	PK	V	34.18	3.68	0.00	66.08	60.06	105.20	45.14
5650.00	28.16	PK	V	34.16	3.63	0.00	65.95	59.93	68.20	8.27
11510.00	45.78	PK	V	39.00	6.59	37.37	54.00	47.98	74.00	26.02
11510.00	32.56	AV	V	39.00	6.59	37.37	40.78	34.76	54.00	19.24
17265.00	46.14	PK	V	41.74	8.79	38.58	58.09	52.07	68.20	16.13
High Channel: 5795 MHz										
5795.00	65.74	PK	H	34.22	3.71	0.00	103.67	97.65	N/A	N/A
5795.00	55.41	AV	H	34.22	3.71	0.00	93.34	87.32	N/A	N/A
5795.00	67.90	PK	V	34.22	3.71	0.00	105.83	99.81	N/A	N/A
5795.00	57.65	AV	V	34.22	3.71	0.00	95.58	89.56	N/A	N/A
5850.00	31.03	PK	V	34.24	3.75	0.00	69.02	63	122.20	59.20
5855.00	30.25	PK	V	34.24	3.75	0.00	68.24	62.22	110.80	48.58
5875.00	29.32	PK	V	34.25	3.77	0.00	67.34	61.32	105.20	43.88
5925.00	28.21	PK	V	34.27	3.80	0.00	66.28	60.26	68.20	7.94
11590.00	45.87	PK	V	39.00	6.62	37.46	54.03	48.01	74.00	25.99
11590.00	32.65	AV	V	39.00	6.62	37.46	40.81	34.79	54.00	19.21
17385.00	46.21	PK	V	42.43	8.82	38.50	58.96	52.94	68.20	15.26

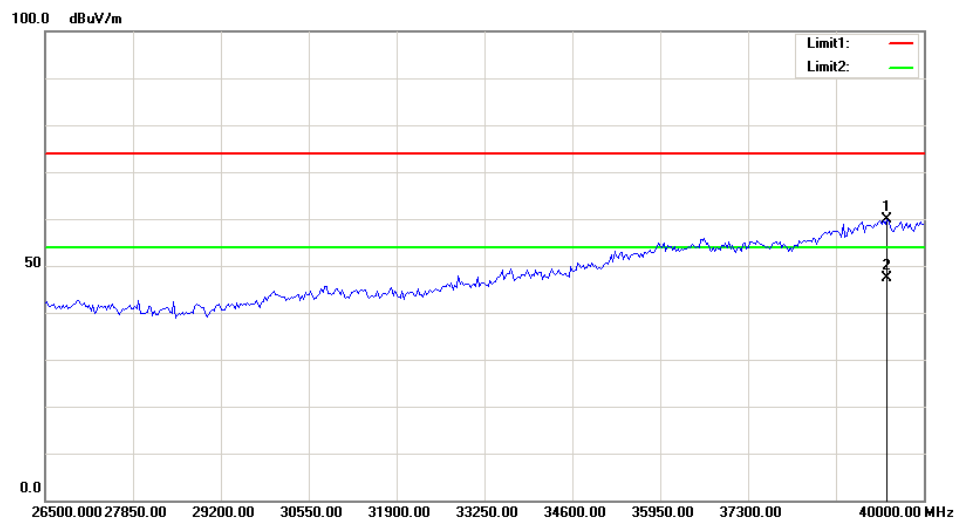
802.11ac vht80

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)						
5775.00	63.25	PK	H	34.21	3.70	0.00	101.16	95.14	N/A	N/A
5775.00	52.76	AV	H	34.21	3.70	0.00	90.67	84.65	N/A	N/A
5775.00	65.32	PK	V	34.21	3.70	0.00	103.23	97.21	N/A	N/A
5775.00	54.36	AV	V	34.21	3.70	0.00	92.27	86.25	N/A	N/A
5725.00	33.52	PK	V	34.19	3.69	0.00	71.40	65.38	122.20	56.82
5720.00	32.63	PK	V	34.19	3.69	0.00	70.51	64.49	110.80	46.31
5700.00	30.29	PK	V	34.18	3.68	0.00	68.15	62.13	105.20	43.07
5650.00	27.32	PK	V	34.16	3.63	0.00	65.11	59.09	68.20	9.11
5850.00	28.96	PK	V	34.24	3.75	0.00	66.95	60.93	122.20	61.27
5855.00	28.54	PK	V	34.24	3.75	0.00	66.53	60.51	110.80	50.29
5875.00	28.36	PK	V	34.25	3.77	0.00	66.38	60.36	105.20	44.84
5925.00	28.07	PK	V	34.27	3.80	0.00	66.14	60.12	68.20	8.08
11550.00	45.36	PK	V	39.00	6.61	37.42	53.55	47.53	74.00	26.47
11550.00	32.54	AV	V	39.00	6.61	37.42	40.73	34.71	54.00	19.29
17325.00	45.33	PK	V	42.09	8.80	38.54	57.68	51.66	68.20	16.54

**Test Plots(For worst mode 802.11a 5825MHz)
Horizontal**

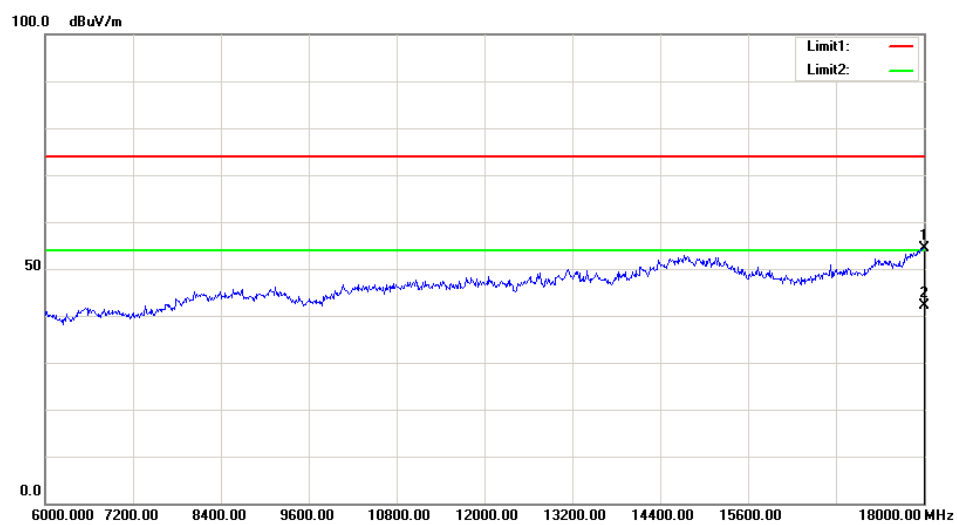
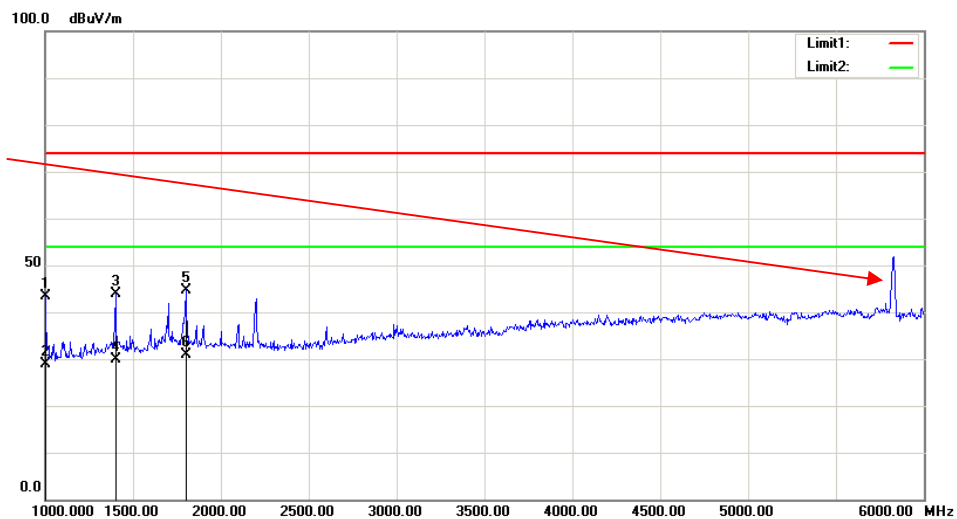
Fundamental
Test with Band
Rejection Filter

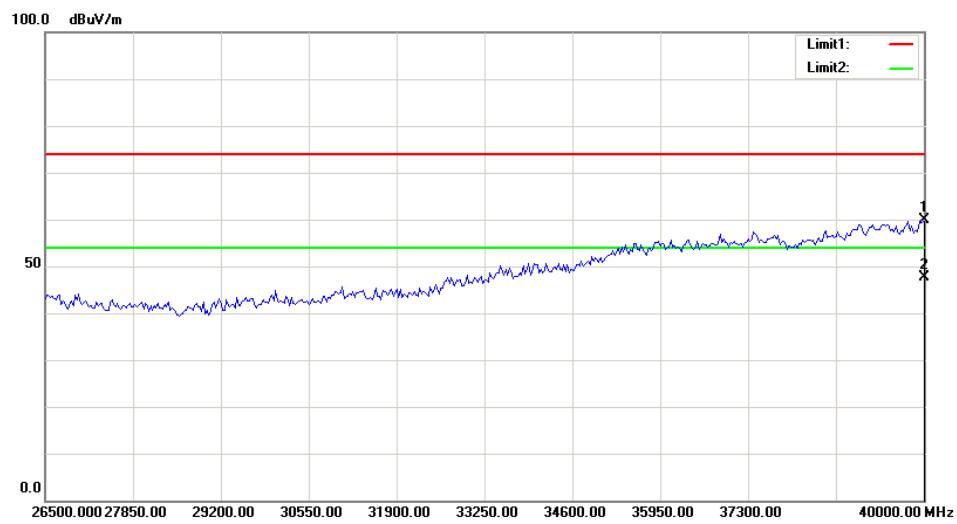
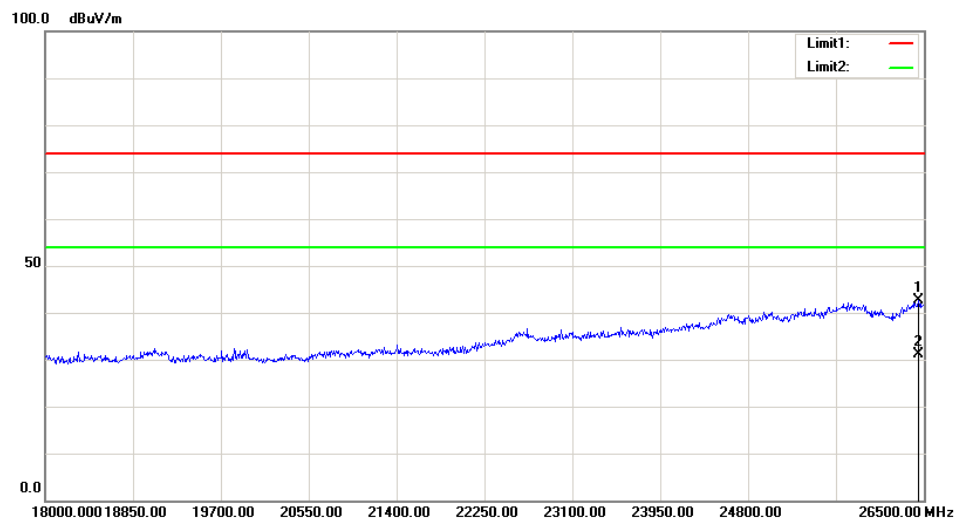




Vertical

Fundamental
Test with Band
Rejection Filter





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

15.407(a) (e)

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2018-08-03	2019-08-03
Unknown	Coaxial Cable	C-SJ00-0010	C0010/06	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:	28.3 °C
Relative Humidity:	63 %
ATM Pressure:	100.3 kPa
Tester:	Lily Xie
Test Date:	2019-06-19

Test Result: Pass.

Please refer to the following tables and plots.

Test mode: Transmitting

5150-5250MHz:

Mode	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5180	21.723	17.154
	5200	21.723	17.154
	5240	21.723	16.994
802.11n ht20	5180	22.044	18.196
	5200	21.884	18.196
	5240	21.964	18.196
802.11n ht40	5190	39.76	36.874
	5230	39.92	36.874
802.11ac vht80	5210	82.405	75.671

5250-5350MHz:

Mode	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5260	21.643	17.154
	5280	21.723	17.154
	5320	21.643	17.154
802.11n ht20	5260	21.964	18.196
	5280	21.884	18.196
	5320	21.884	18.277
802.11n ht40	5270	40.08	36.874
	5310	39.92	37.034
802.11ac vht80	5290	84.329	75.992

5470-5725MHz:

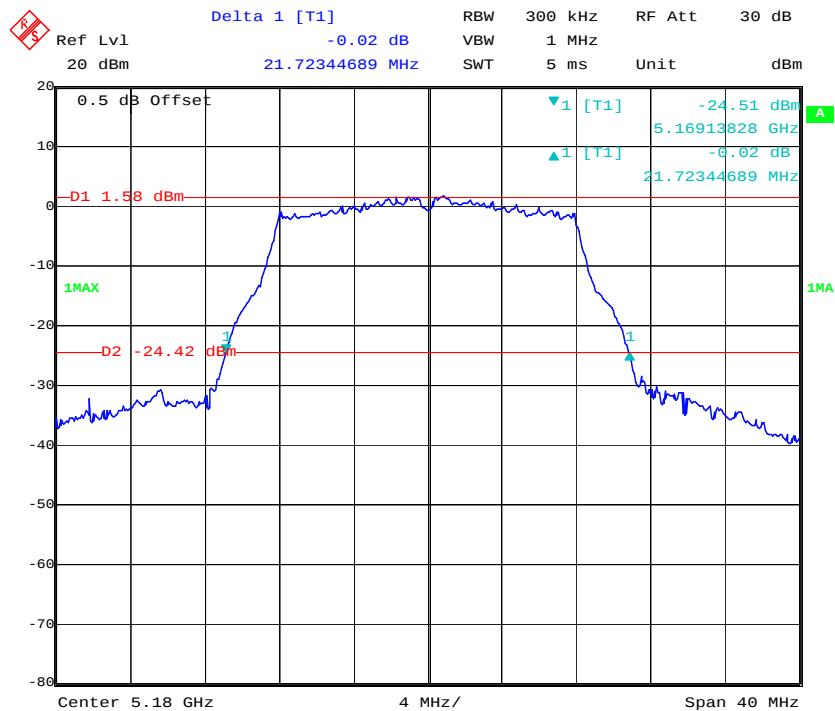
Mode	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5500	21.723	17.074
	5600	22.365	17.395
	5700	21.804	17.074
802.11n ht20	5500	21.804	18.116
	5600	23.006	/
	5580	/	18.277
	5700	21.884	18.116
802.11n ht40	5510	39.920	36.713
	5590	46.493	36.393
	5670	39.920	36.874
802.11ac vht80	5530	82.405	75.671
	5610	83.367	75.351

5725-5850MHz:

Mode	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5745	16.353	17.074
	5785	16.353	17.074
	5825	16.353	17.074
802.11n ht20	5745	17.635	18.196
	5785	17.475	18.196
	5825	17.555	18.196
802.11n ht40	5755	36.393	36.874
	5795	36.072	36.713
802.11ac vht80	5775	75.992	75.992

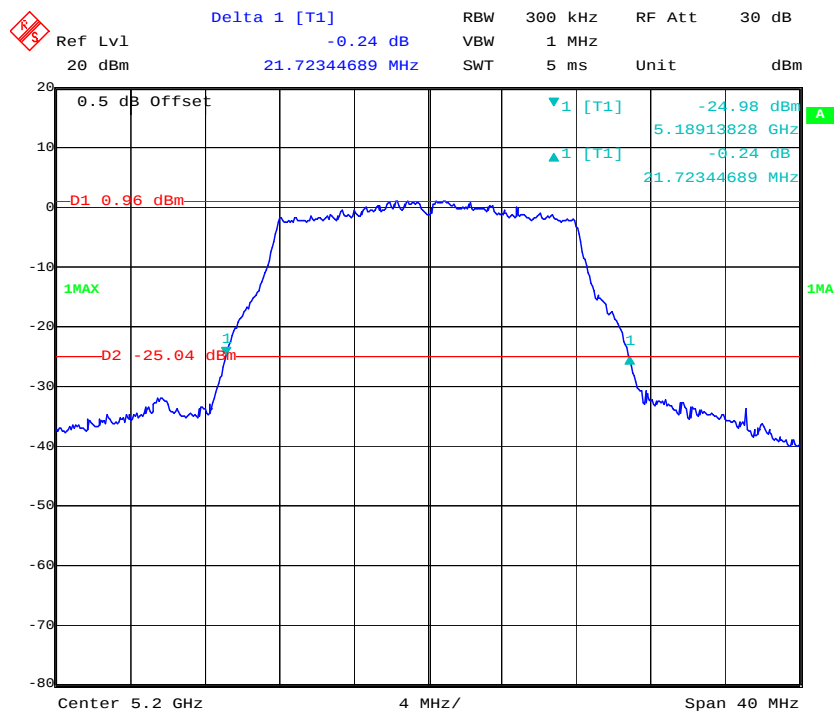
26dB Bandwidth:
5150-5250 MHz band:

802.11a Low Channel



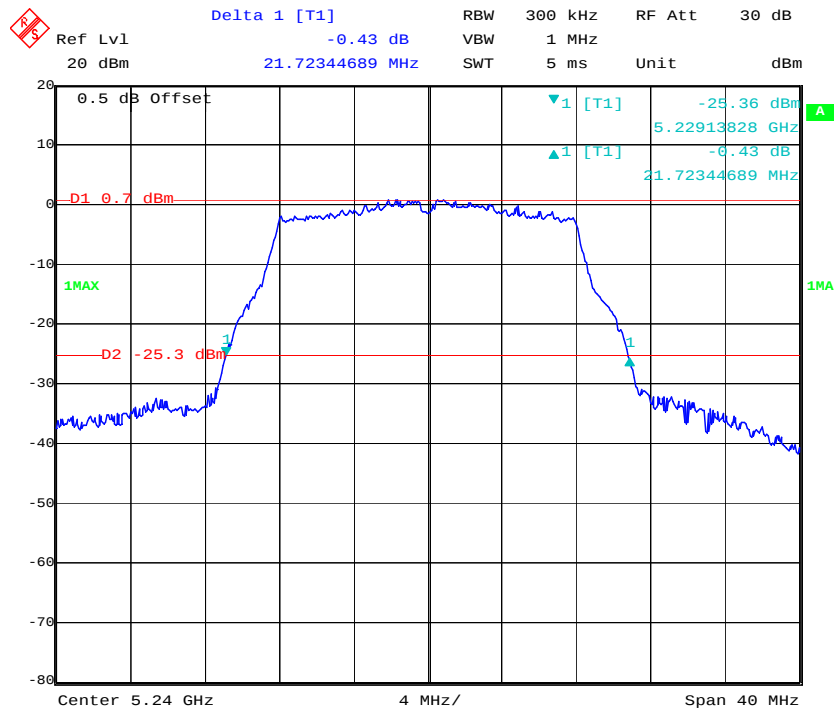
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802.11a Middle Channel

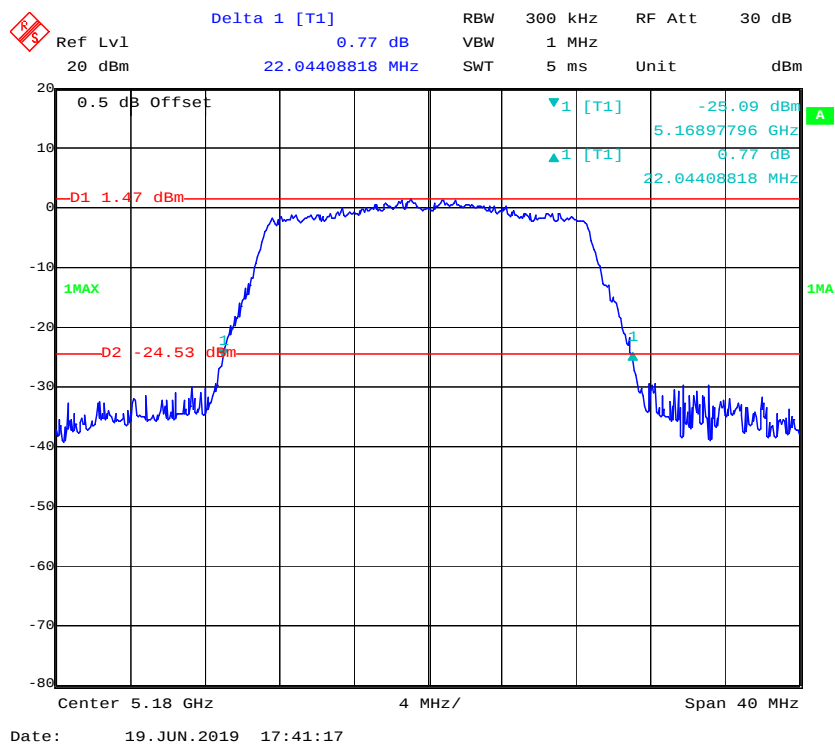


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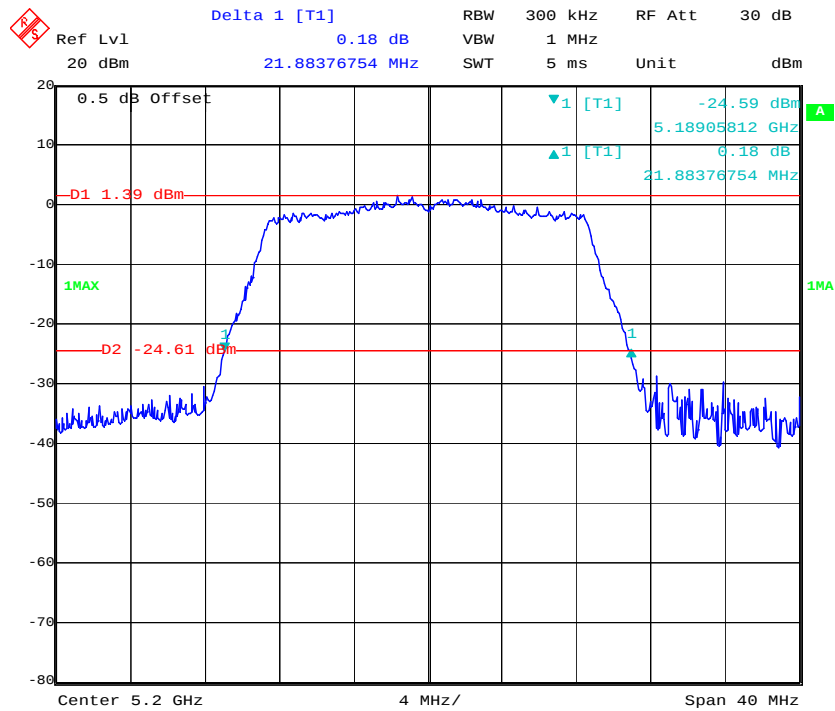
802.11a High Channel



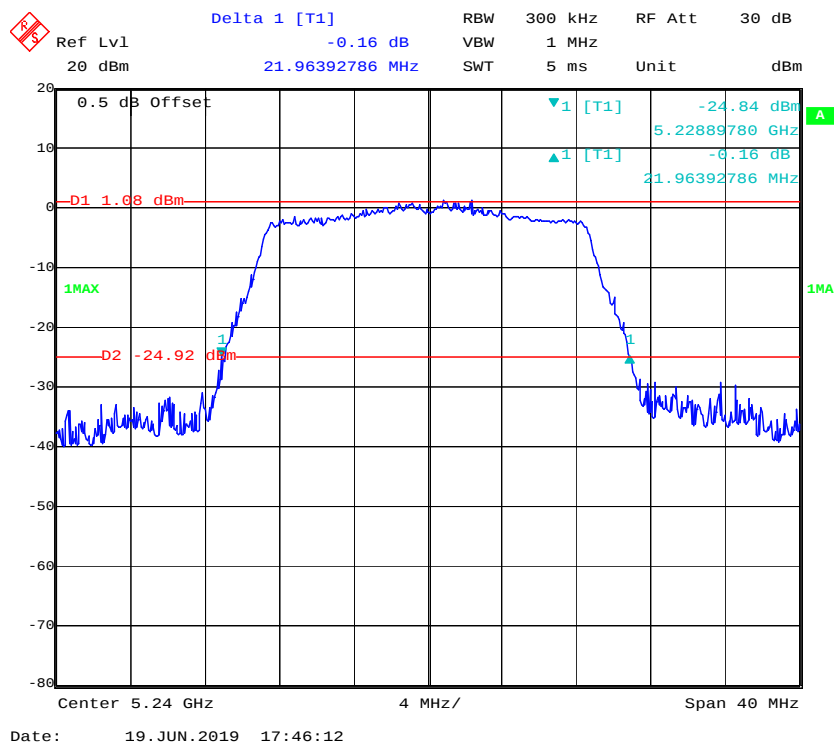
802.11n ht20 Low Channel



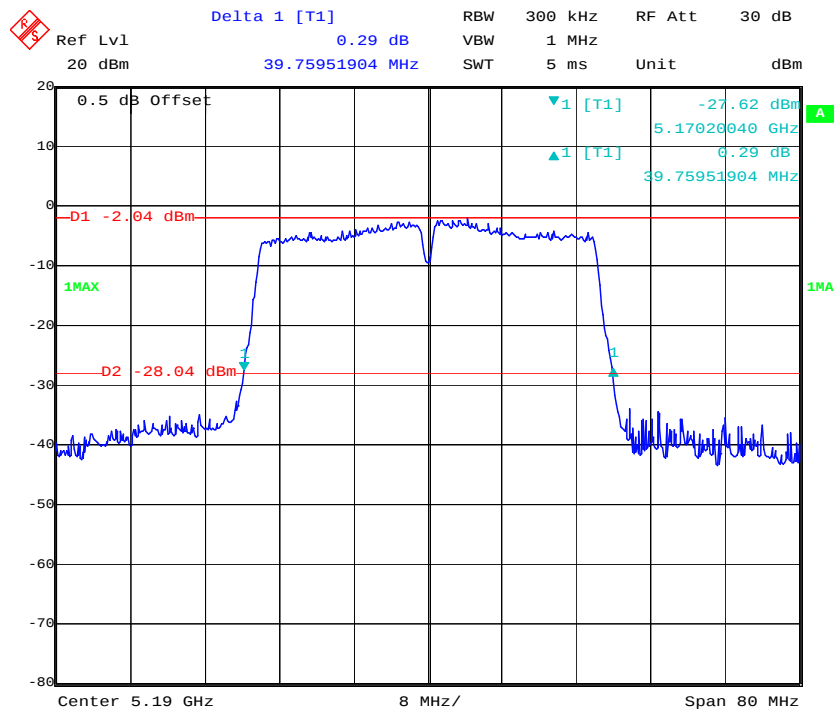
802.11n ht20 Middle Channel



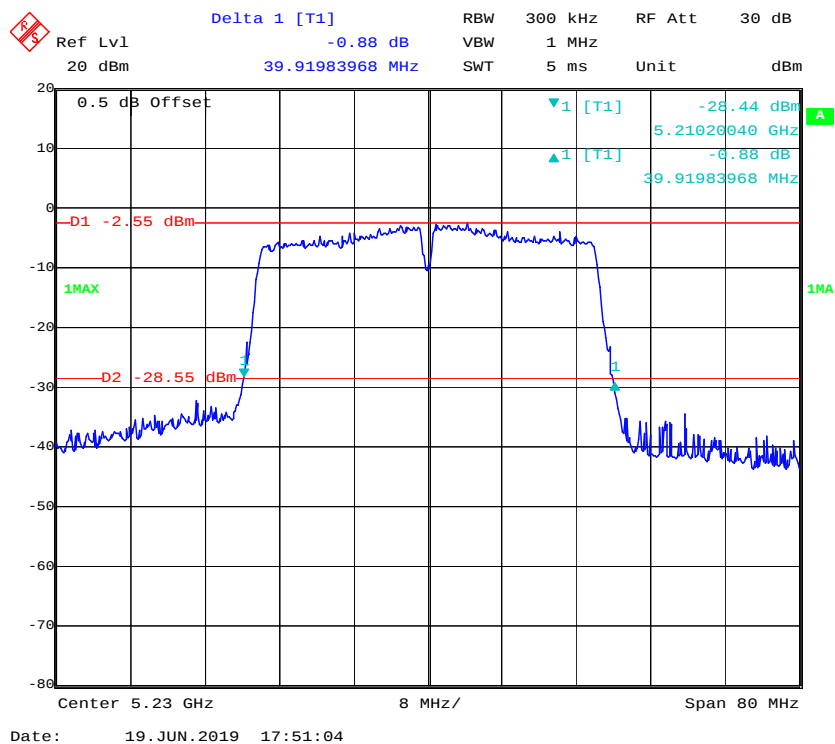
802.11n ht20 High Channel



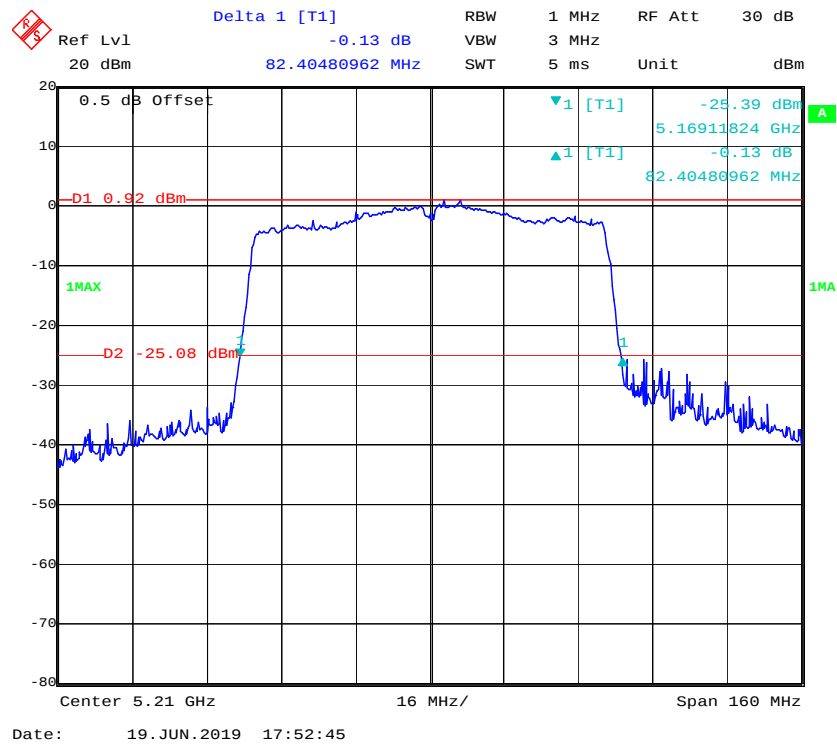
802.11n ht40 Low Channel



802.11n ht40 High Channel

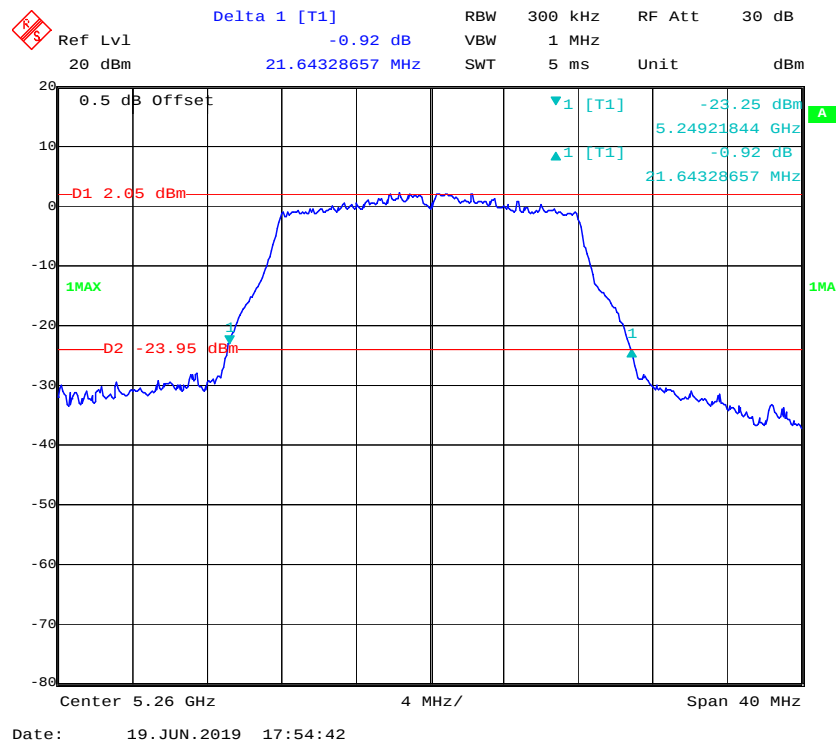


802.11ac vht80 Middle Channel

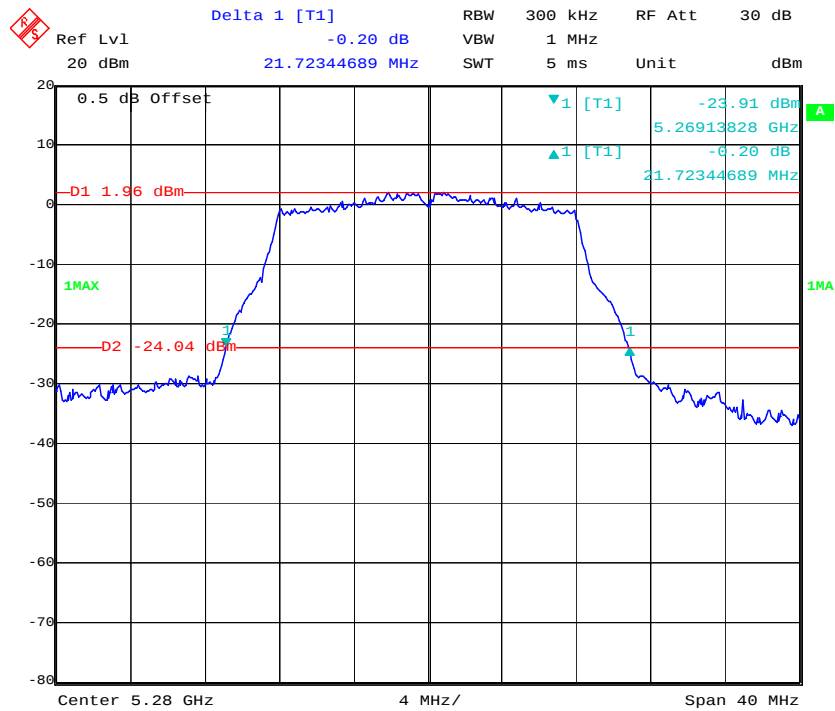


5250-5350 MHz:

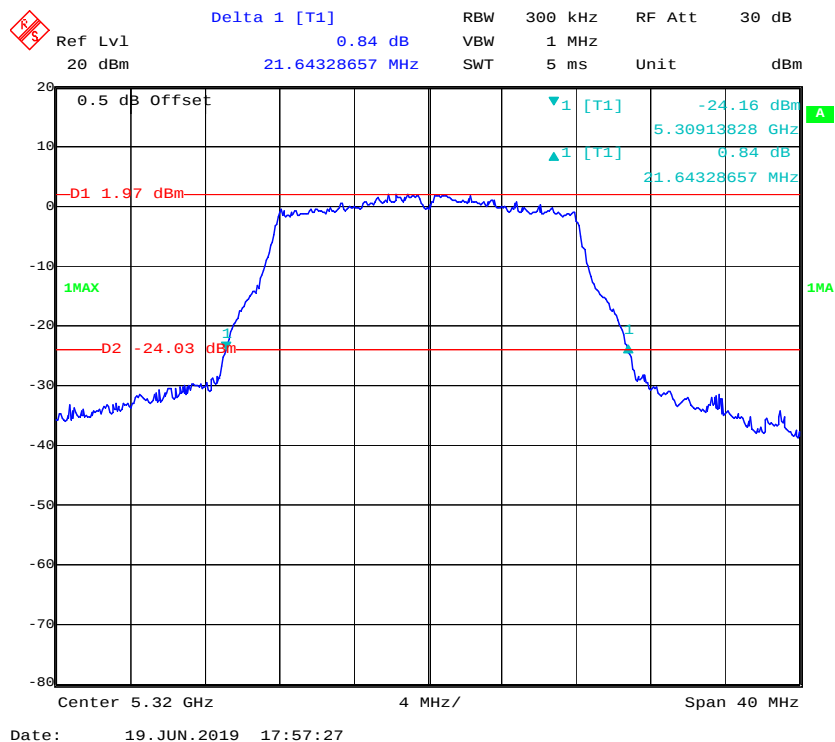
802.11a Low Channel



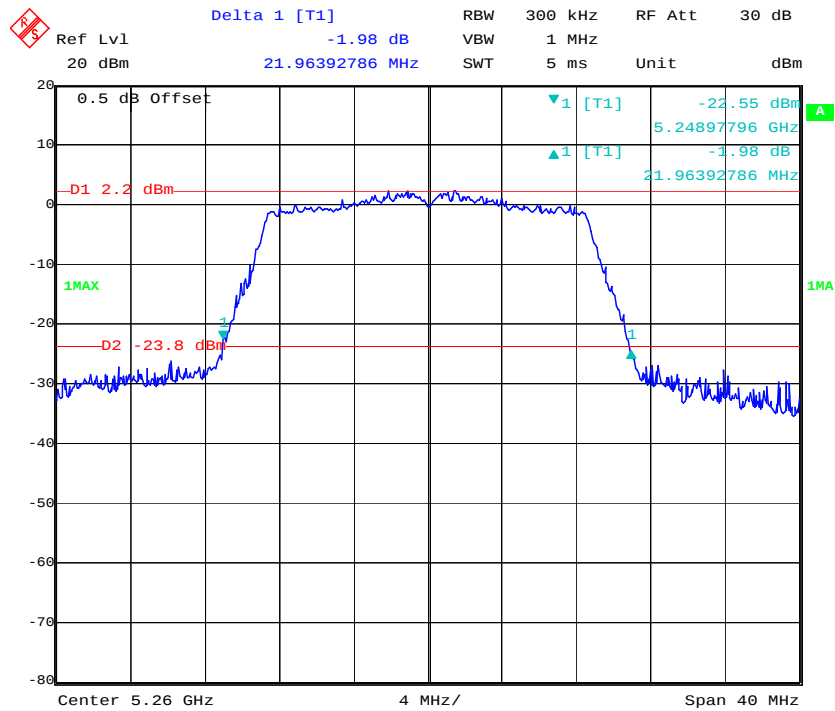
802.11a Middle Channel



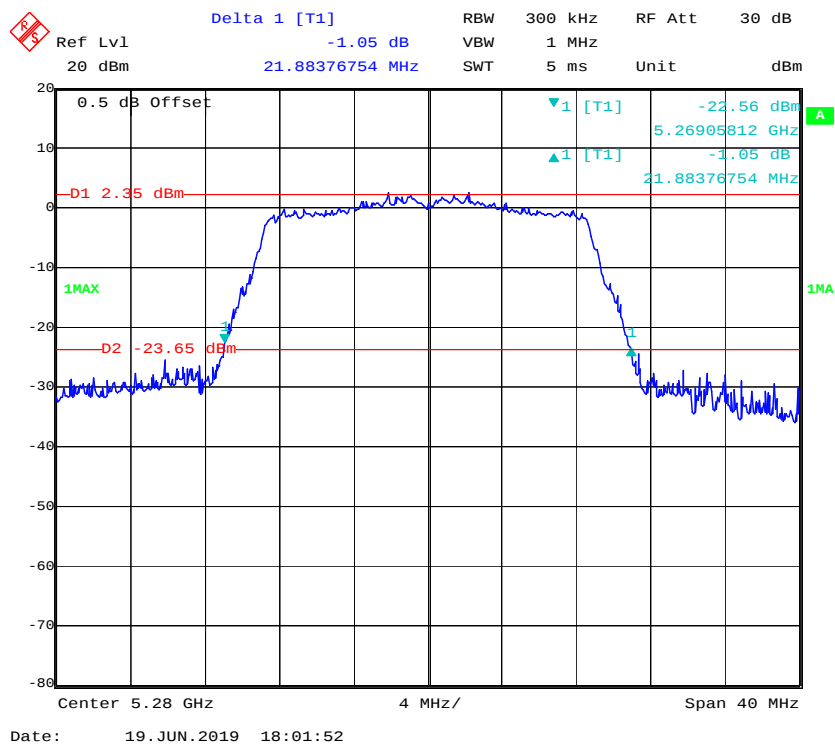
802.11a High Channel



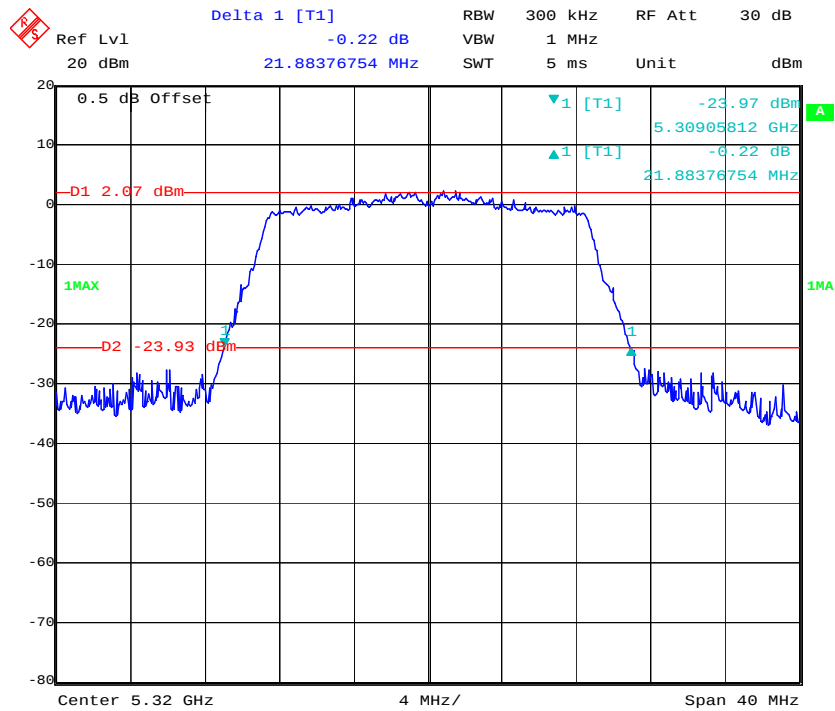
802.11n ht20 Low Channel



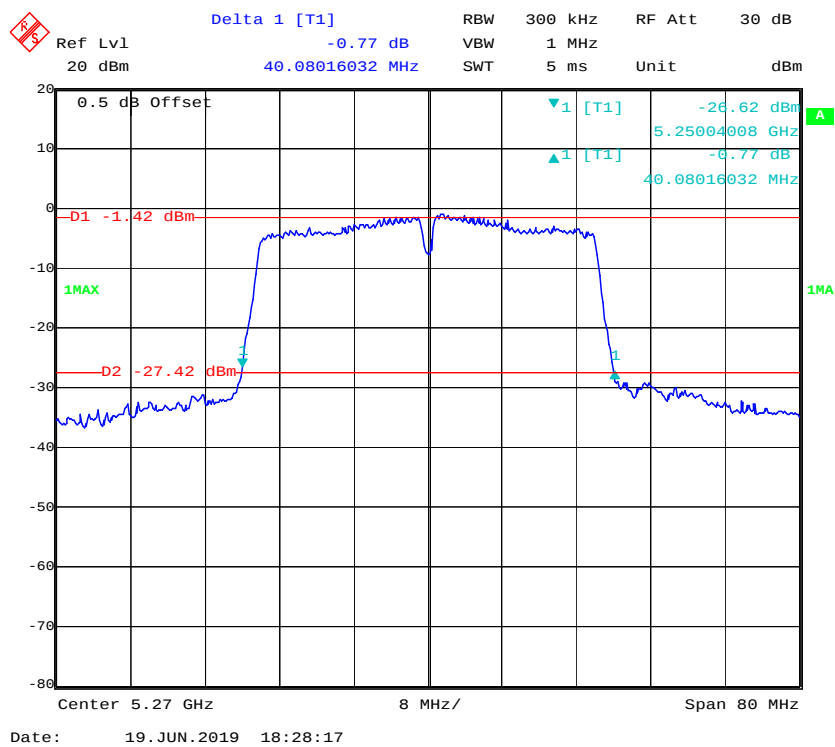
802.11n ht20 Middle Channel



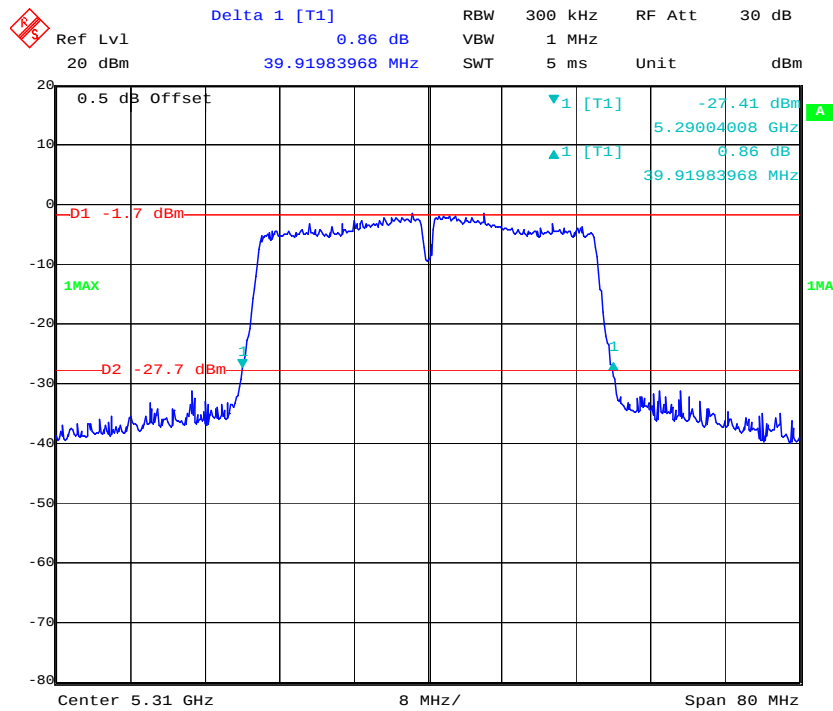
802.11n ht20 High Channel



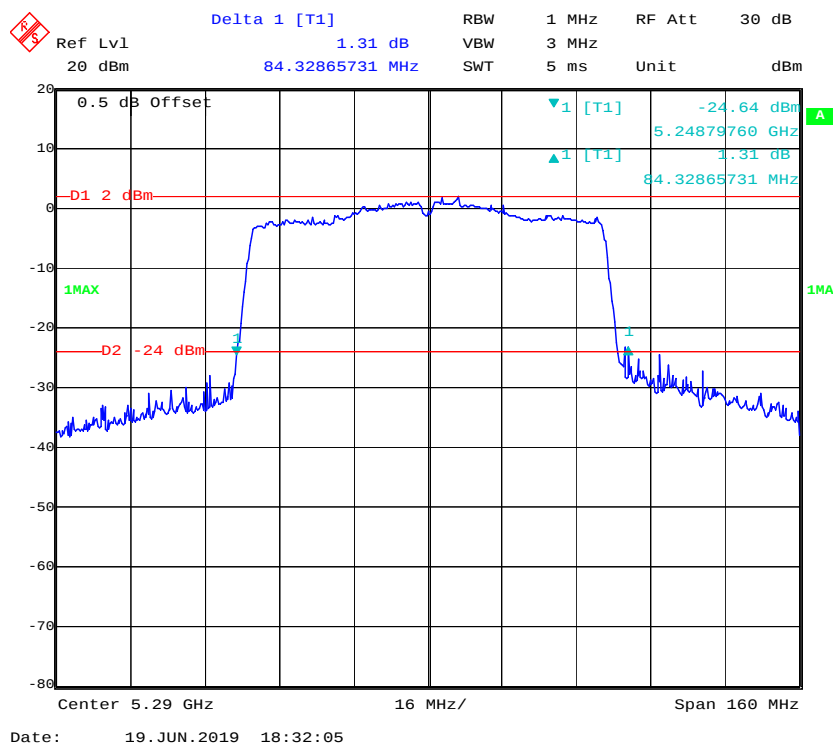
802.11n ht40 Low Channel



802.11n ht40 High Channel

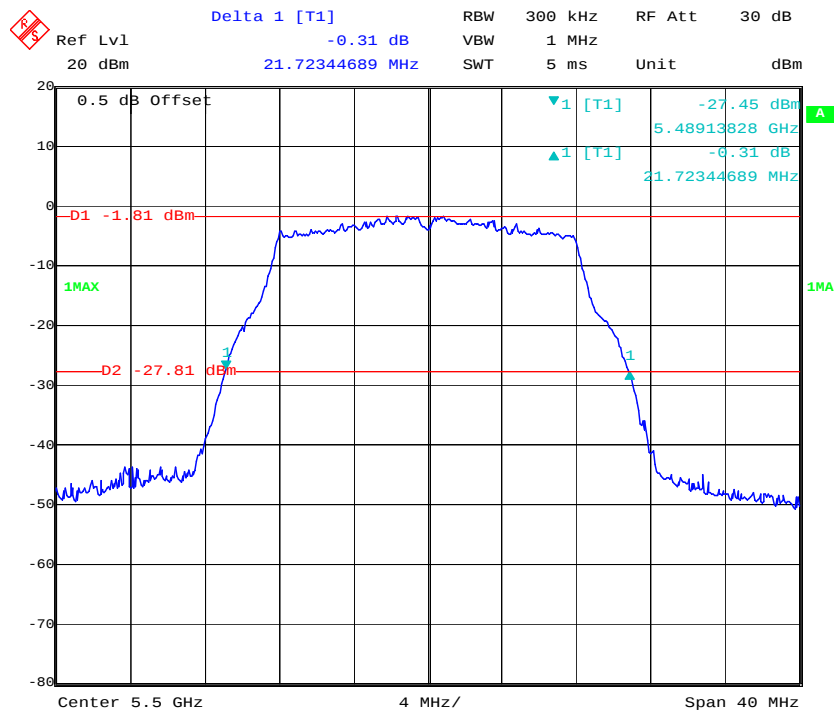


802.11ac vht80 Middle Channel



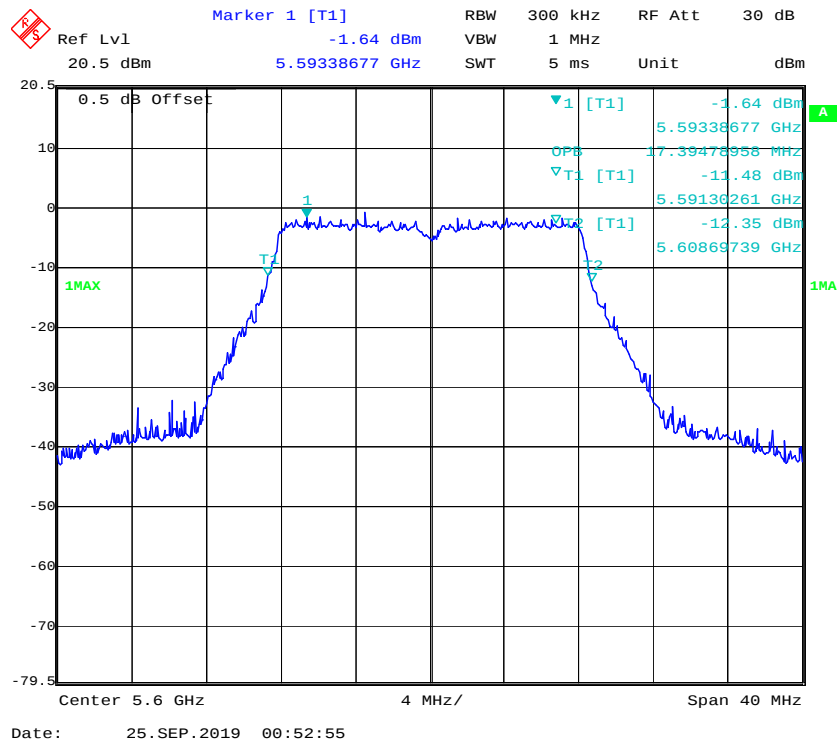
5470-5725 MHz band:

802.11a Low Channel

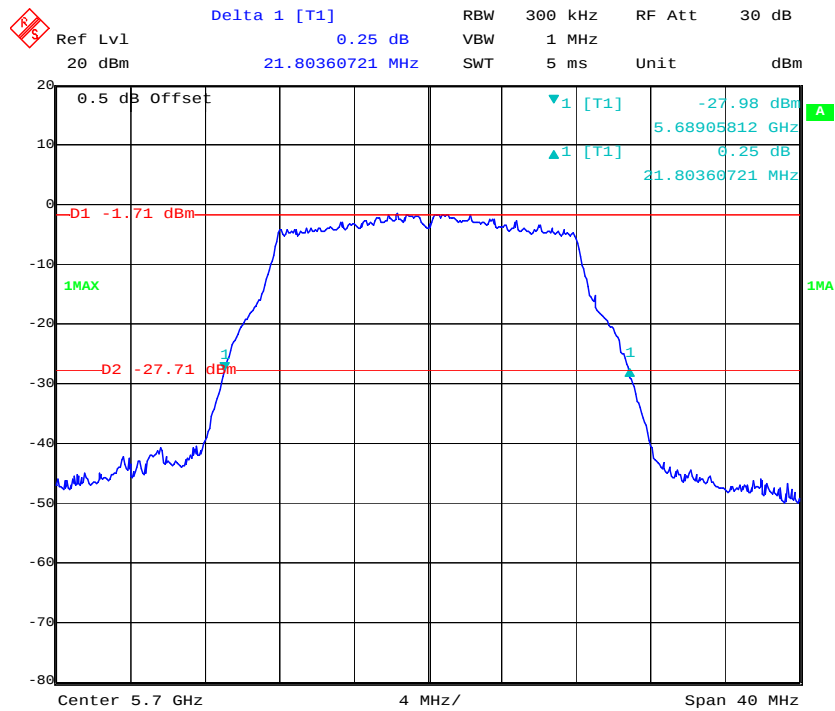
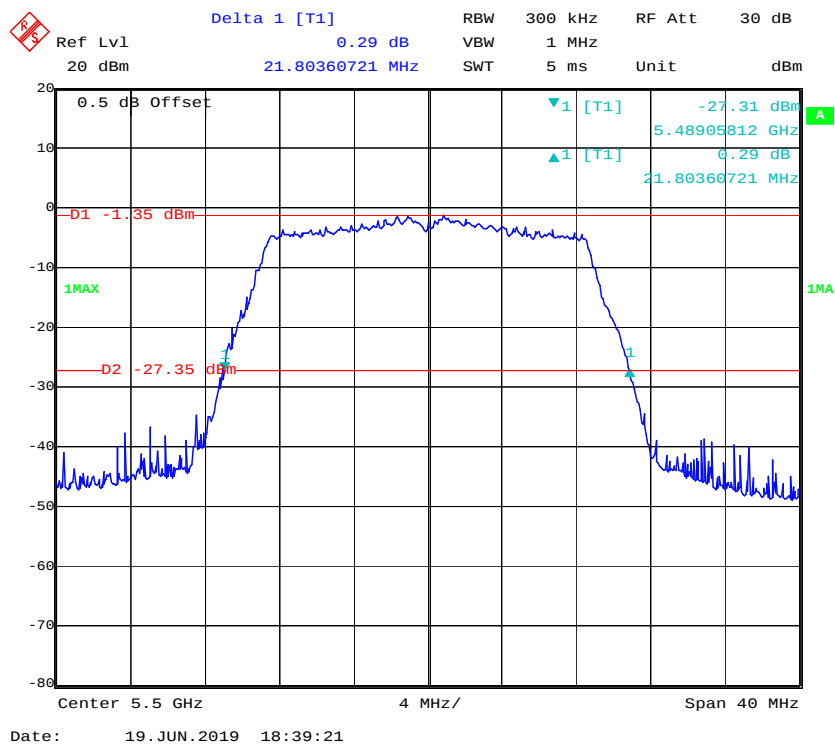


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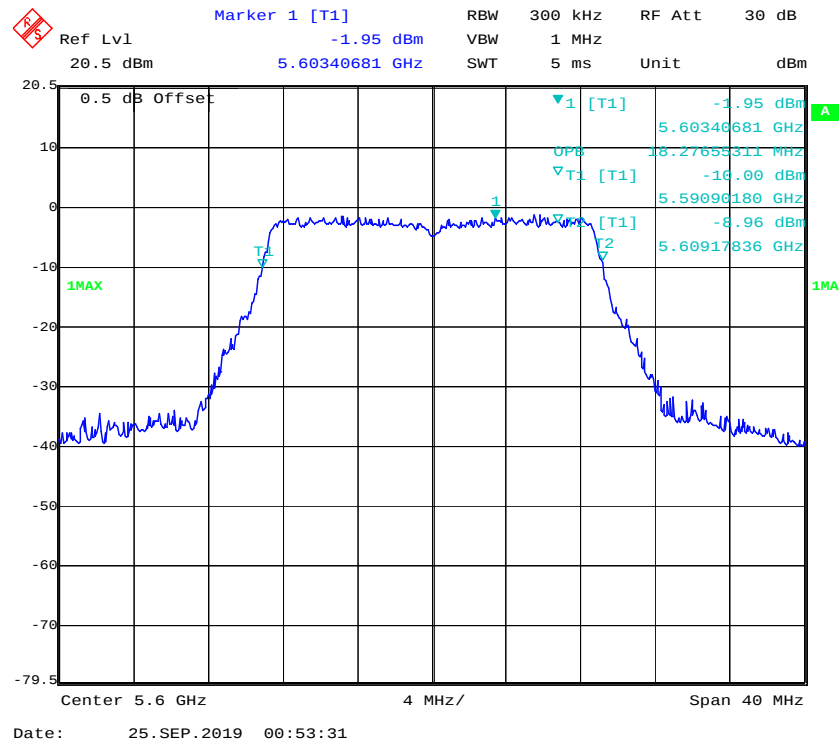
802.11a Middle Channel



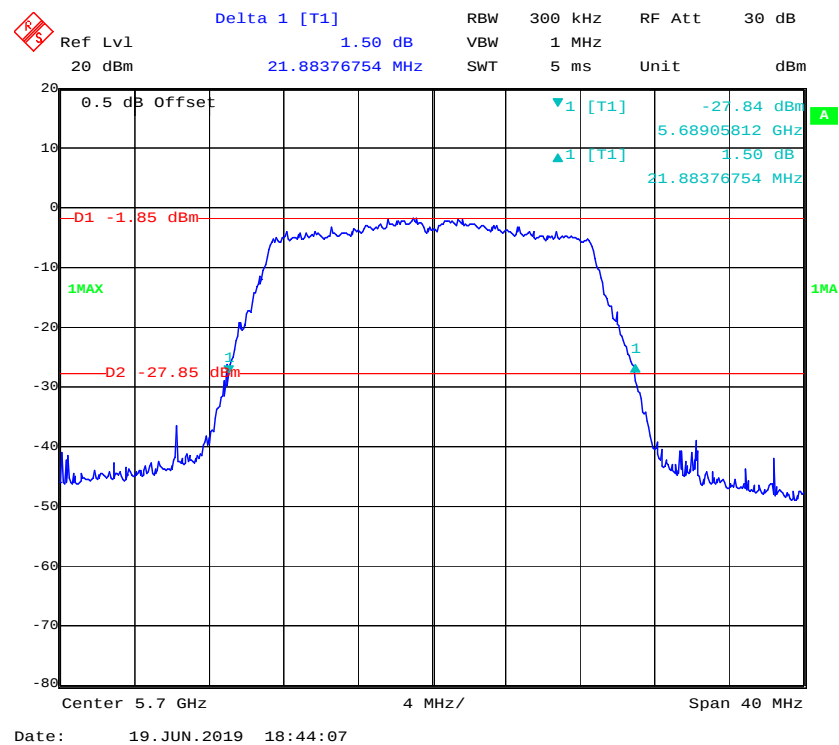
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802.11a High Channel**802.11n ht20 Low Channel**

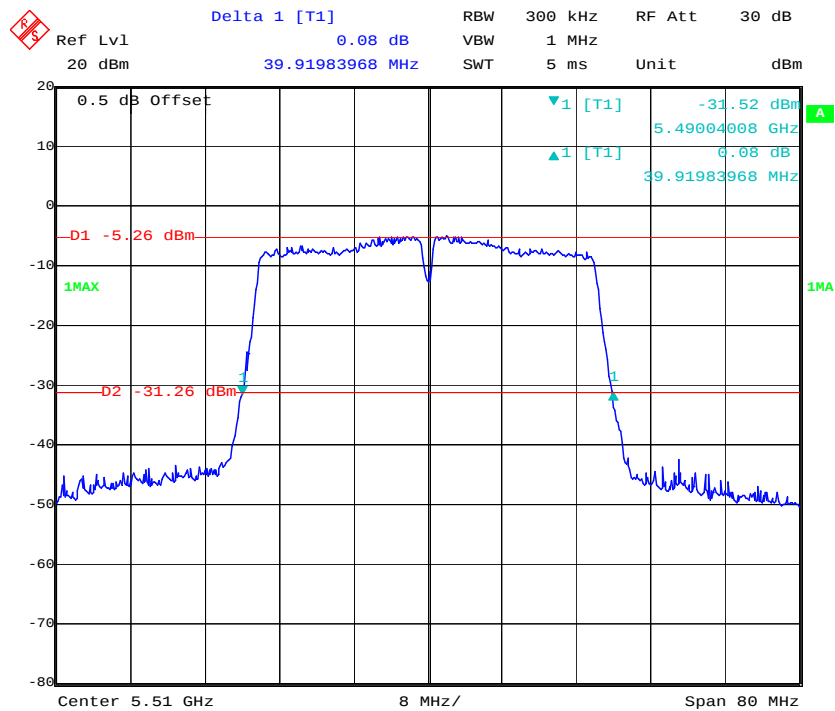
802.11n ht20 Middle Channel



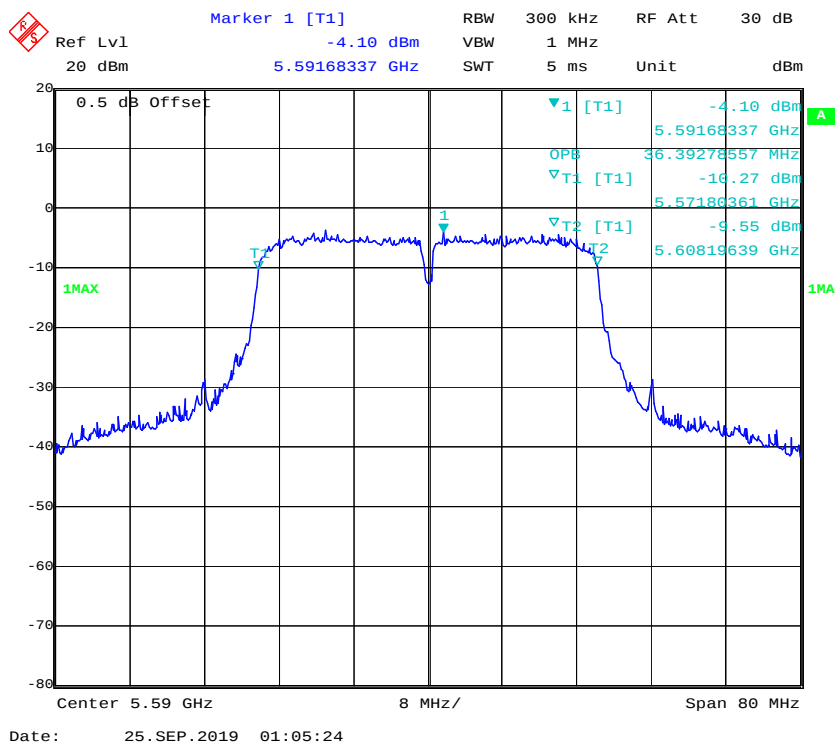
802.11n ht20 High Channel

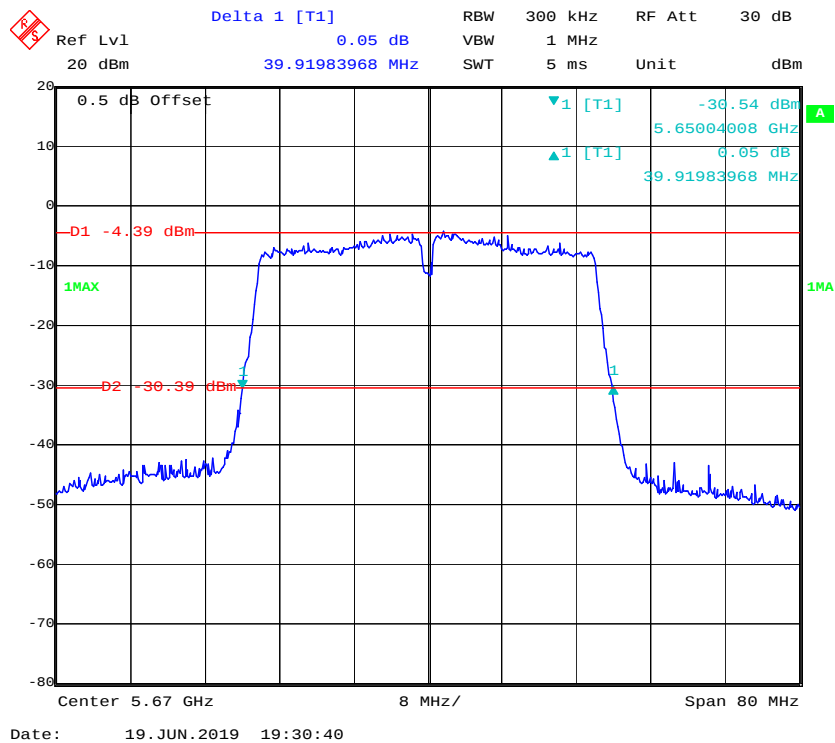
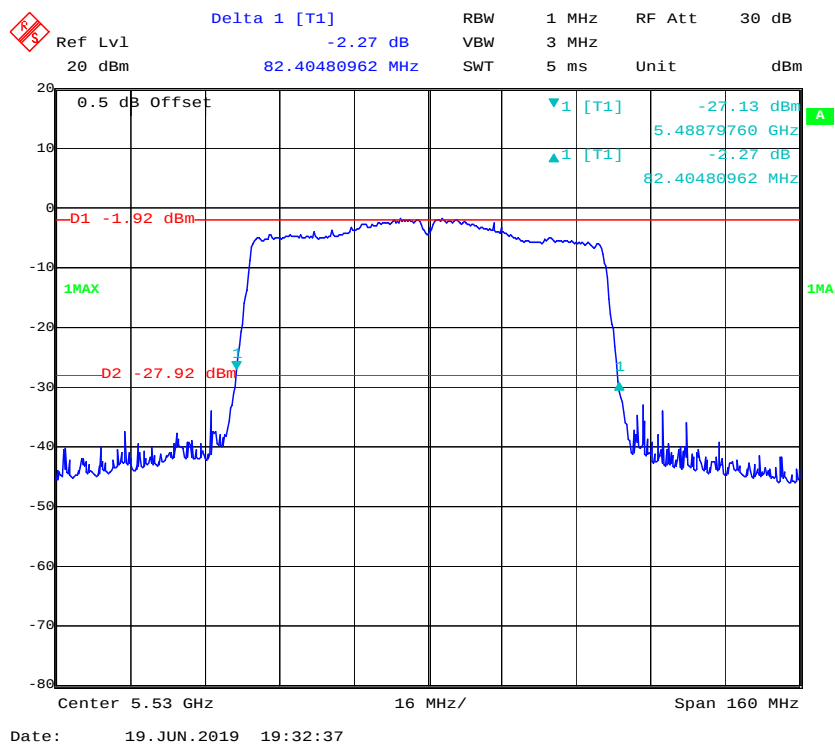


802.11n ht40 Low Channel

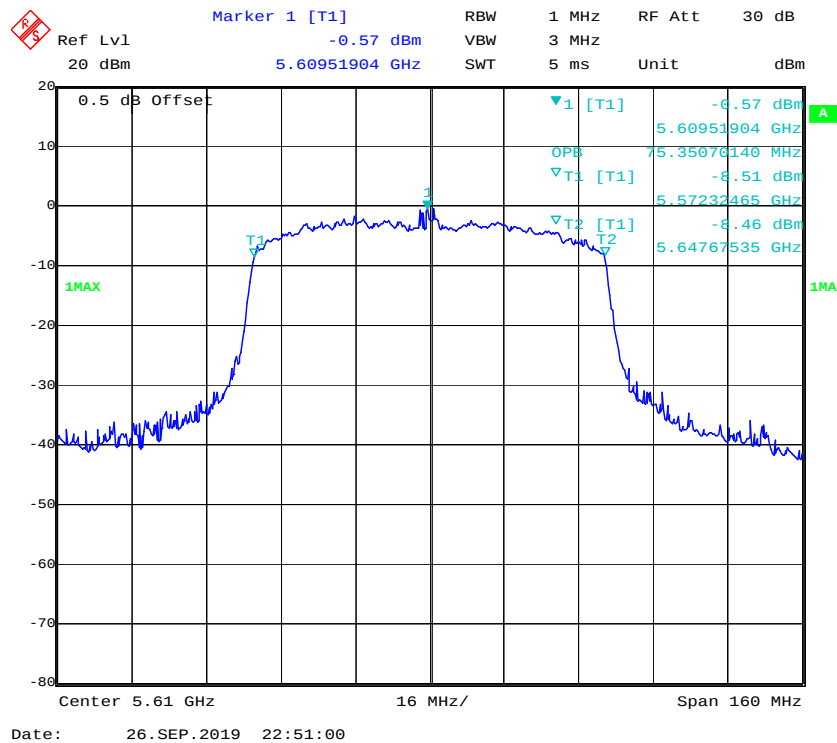


802.11n ht40 Middle Channel



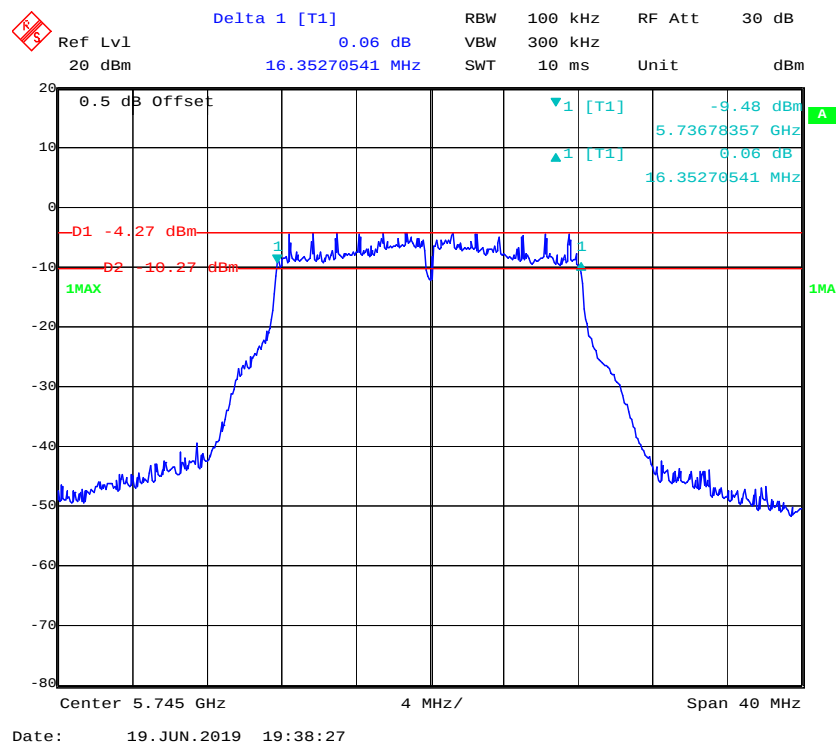
802.11n ht40 High Channel**802.11ac vht80 Low Channel**

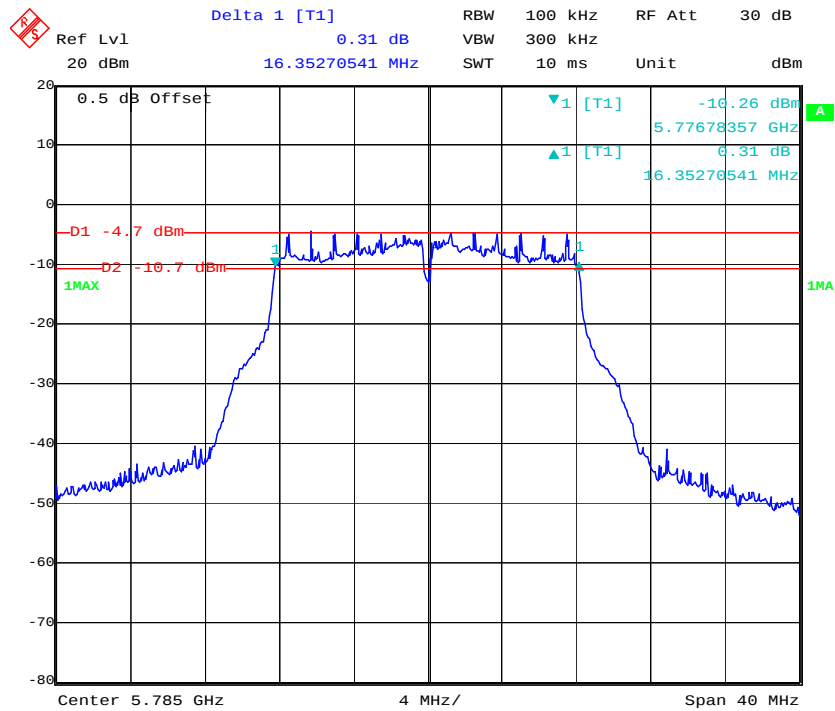
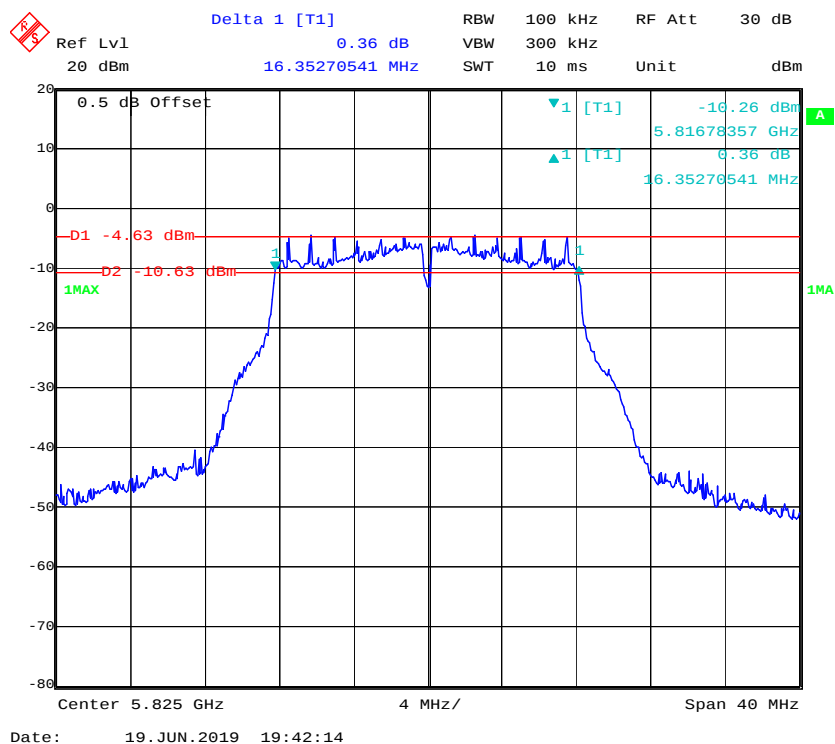
802.11ac vht80 High Channel



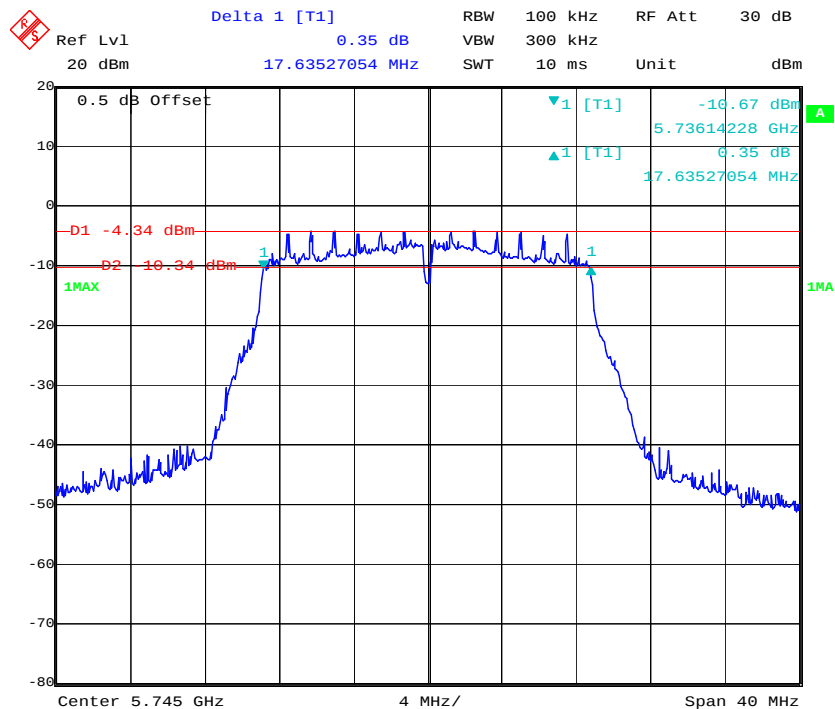
5725-5850 MHz:
6dB Bandwidth:

802.11a Low Channel



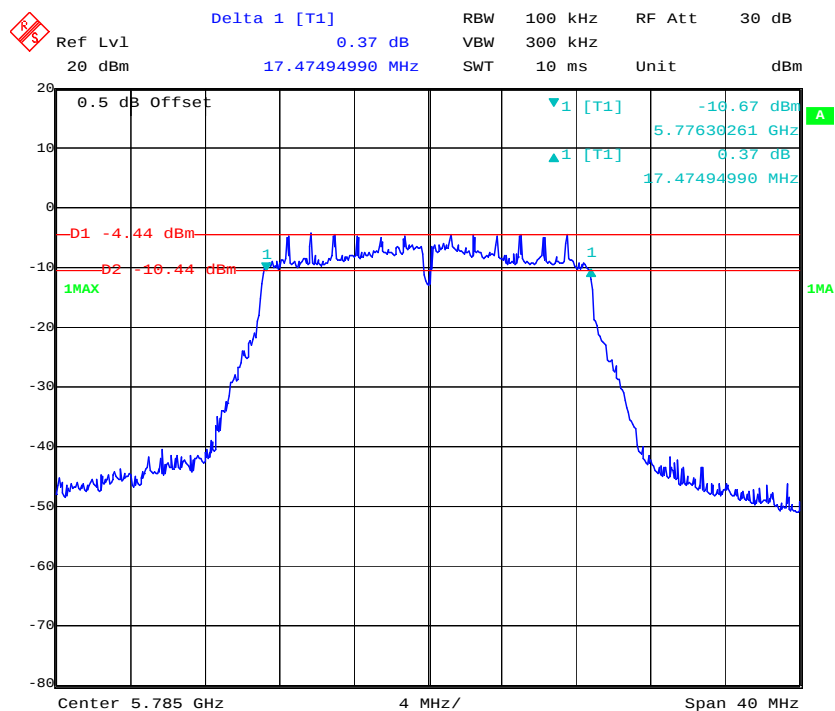
802.11a Middle Channel**802.11a High Channel**

802.11n ht20 Low Channel



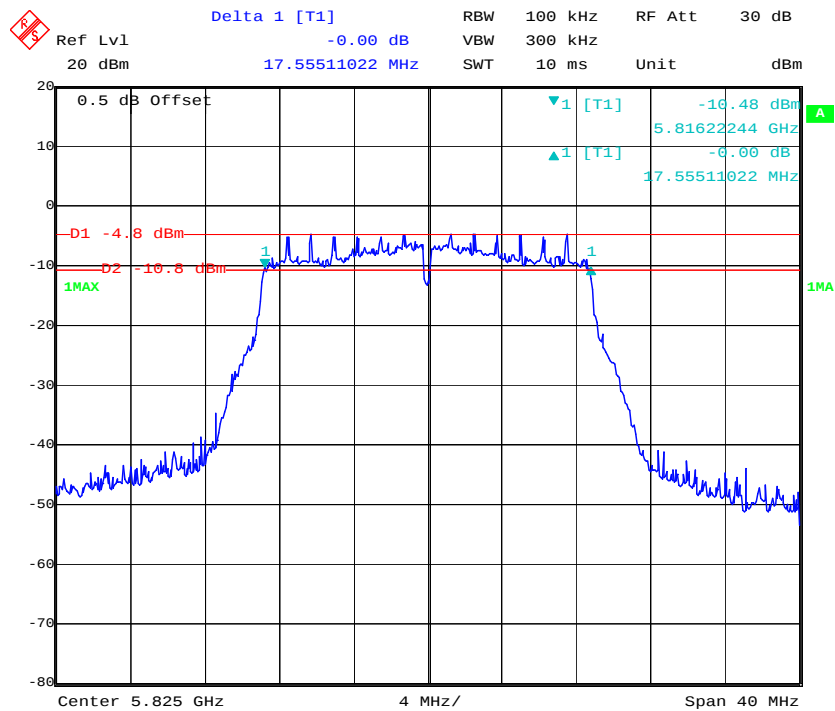
Date: 19 JUN 2019 19:45:00

802.11n ht20 Middle Channel

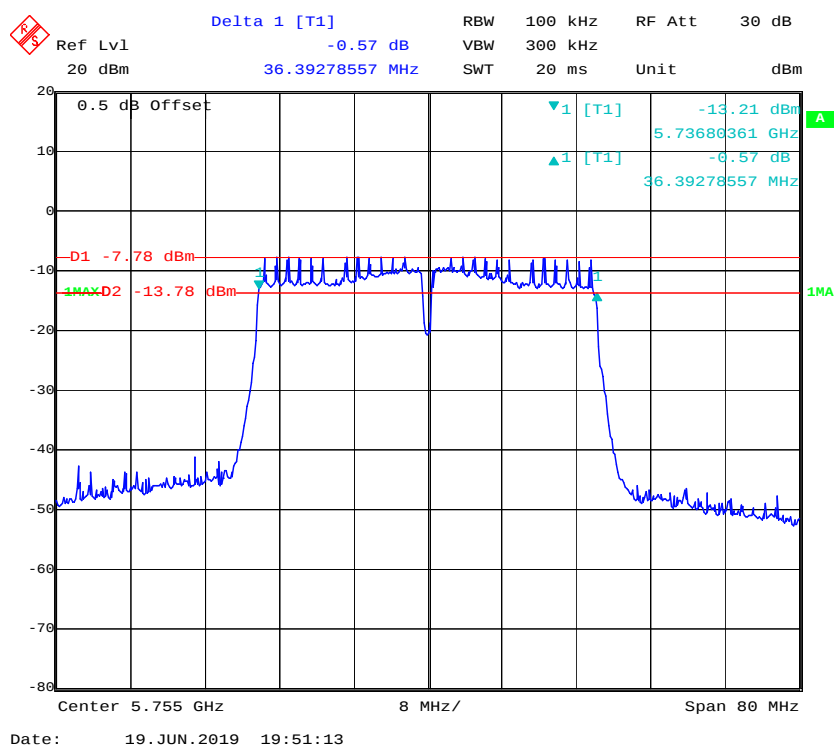


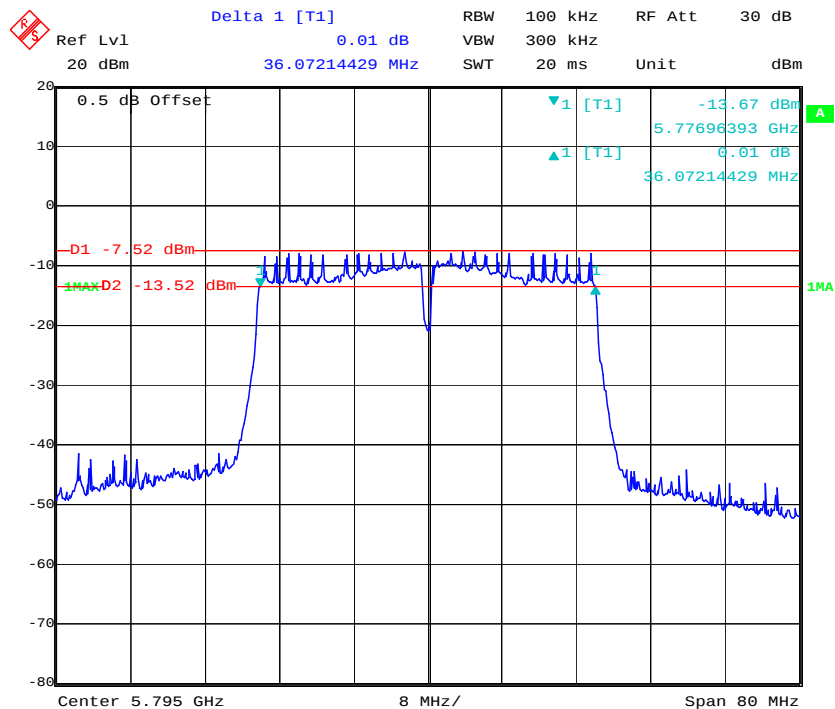
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802.11n ht20 High Channel

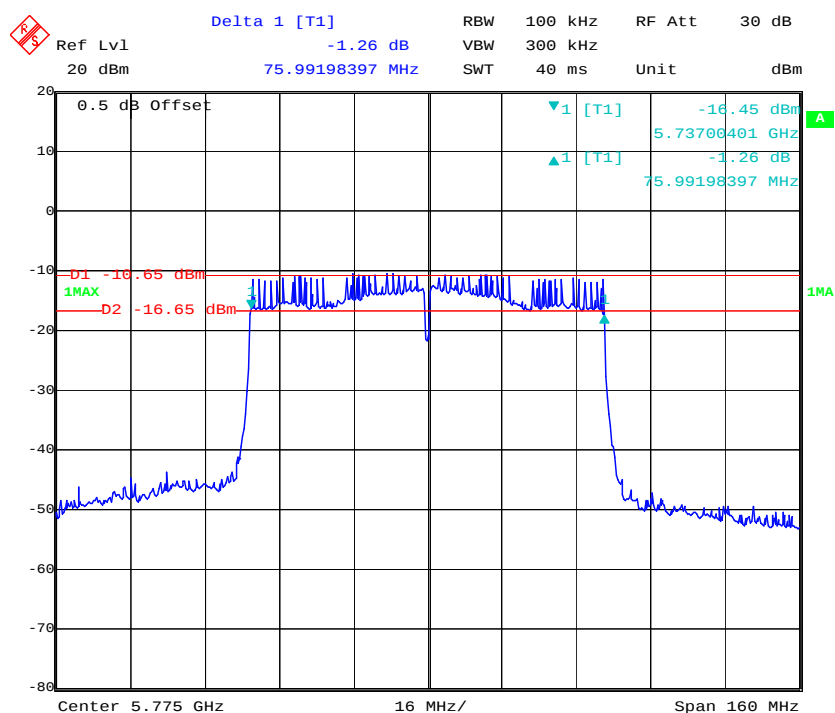


802.11n ht40 Low Channel



802.11n ht40 High Channel

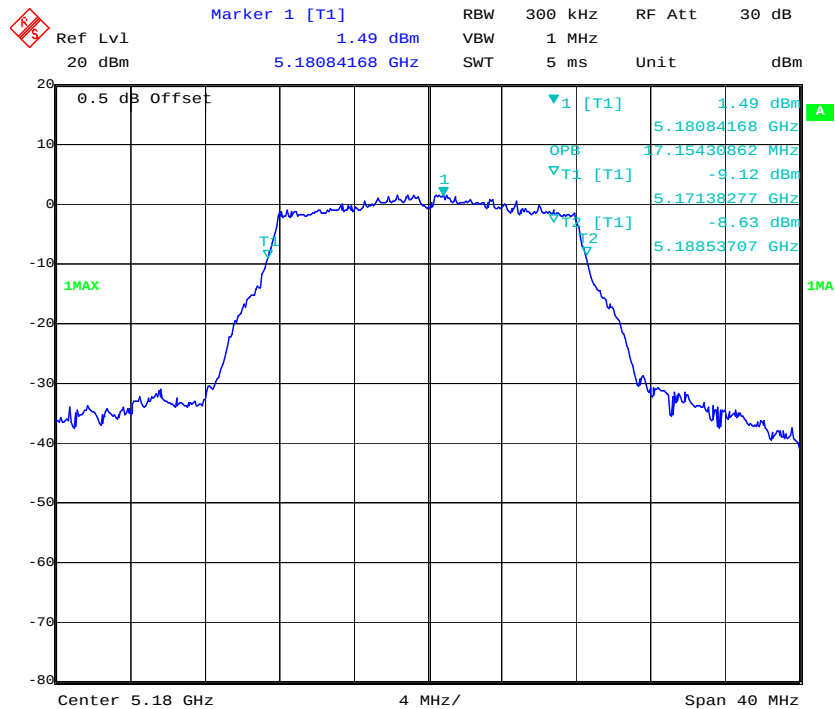
Date: 19.JUN.2019 19:53:05

802.11ac vht80 Middle Channel

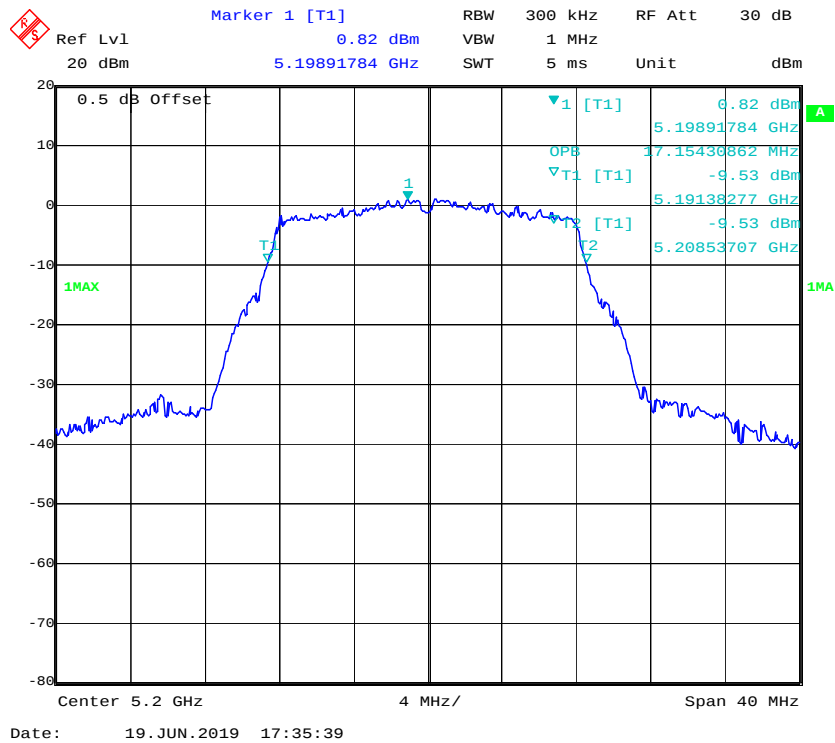
Date: 19.JUN.2019 19:54:44

**99% Occupied Bandwidth:
5150-5250 MHz band:**

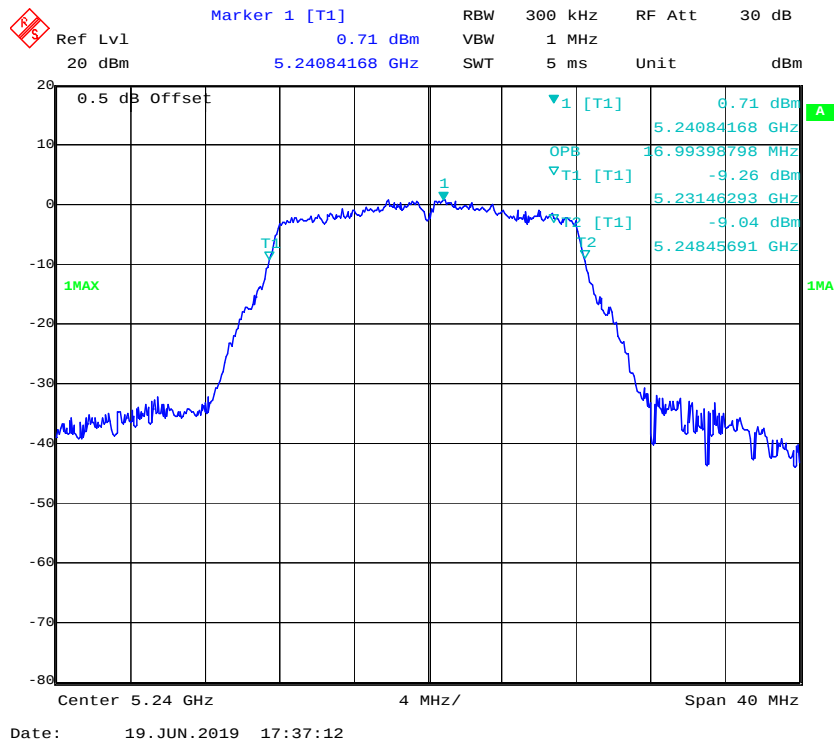
802.11a Low Channel



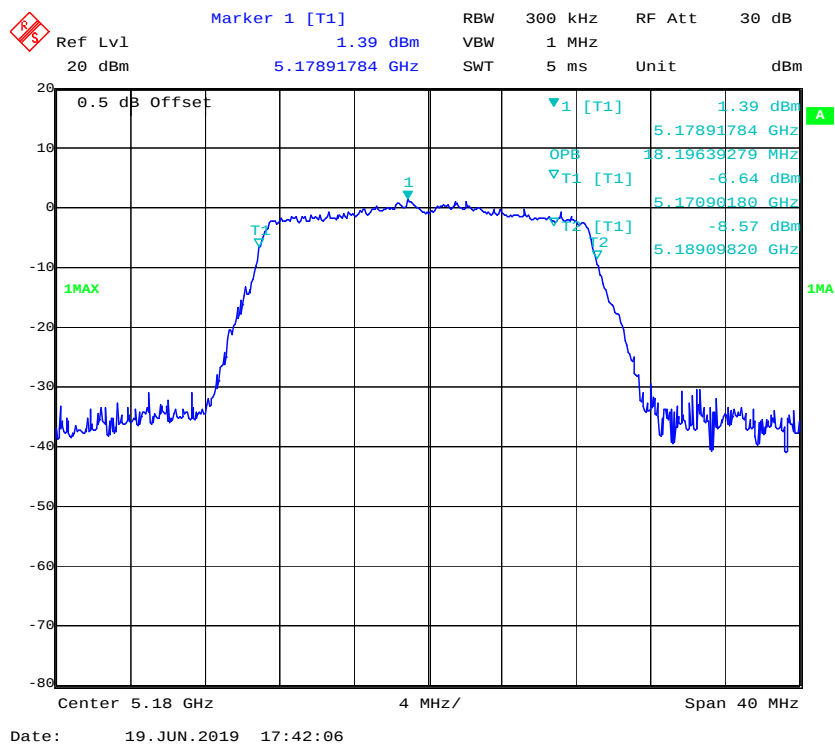
802.11a Middle Channel



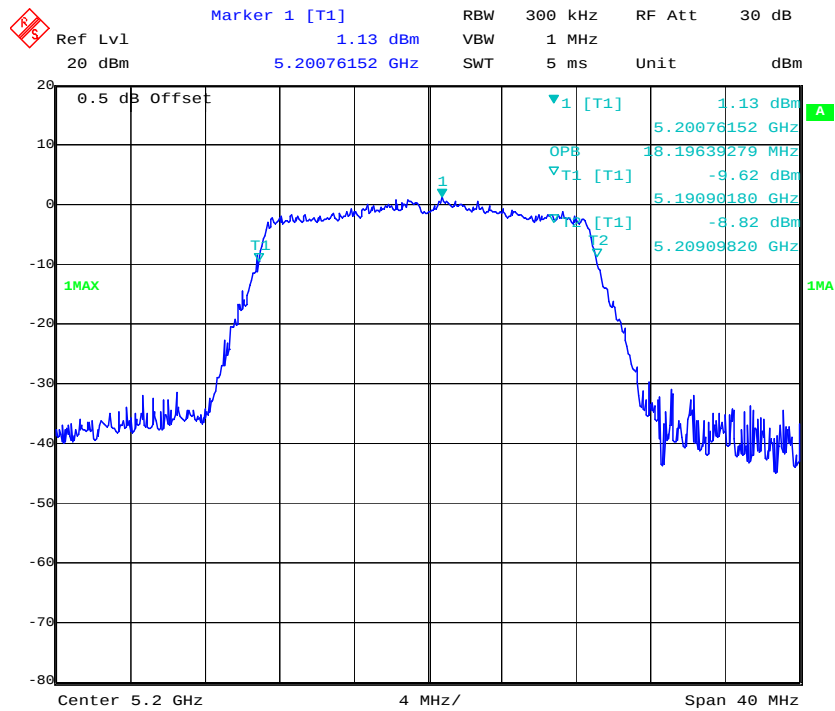
802.11a High Channel



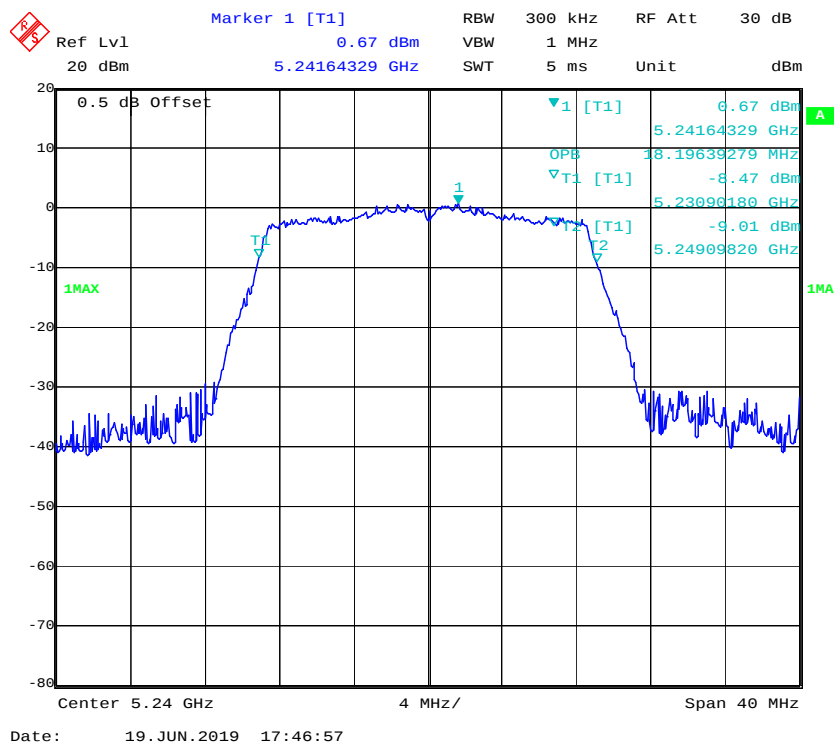
802.11n ht20 Low Channel



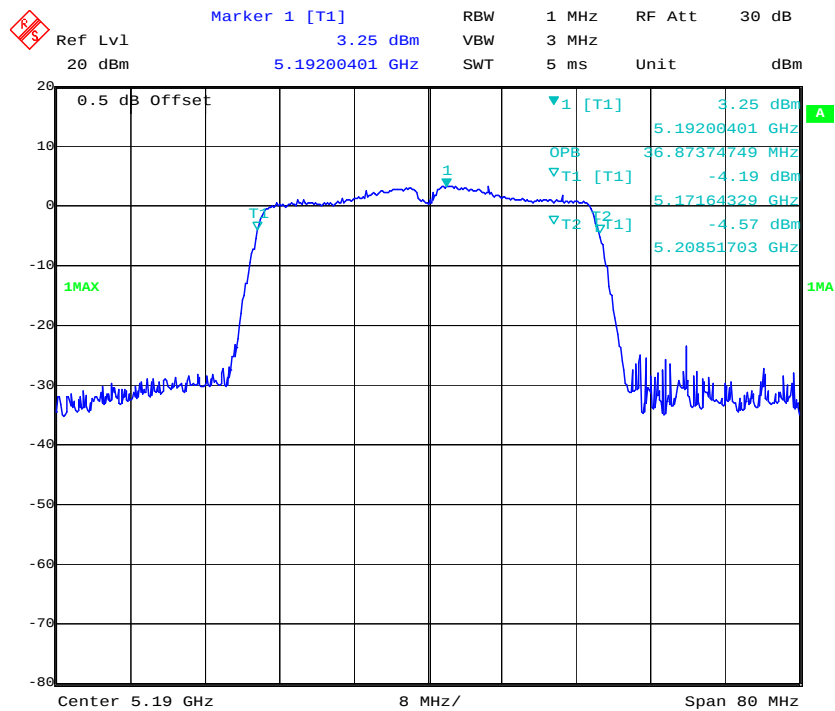
802.11n ht20 Middle Channel



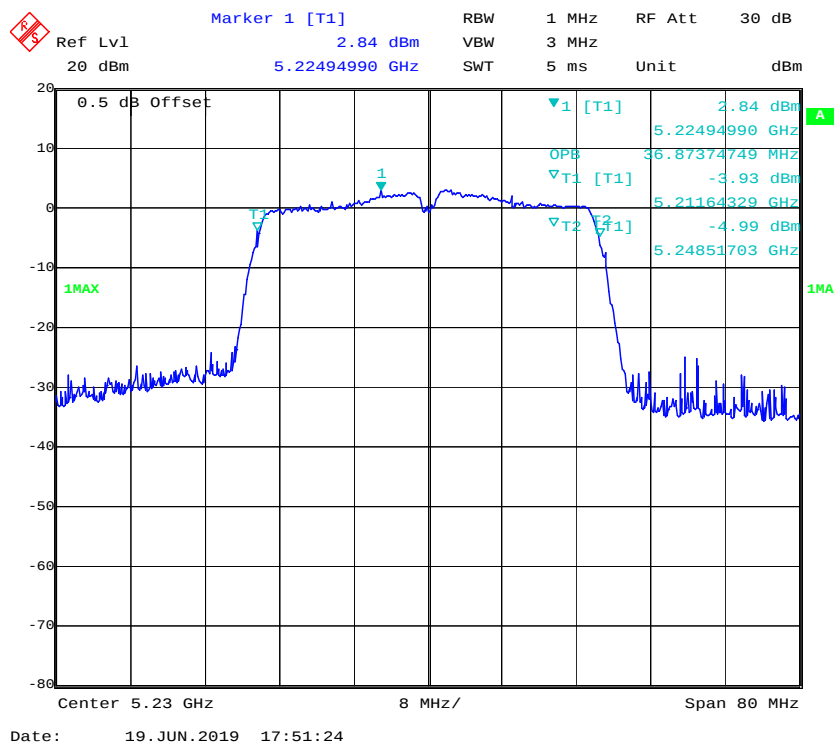
802.11n ht20 High Channel



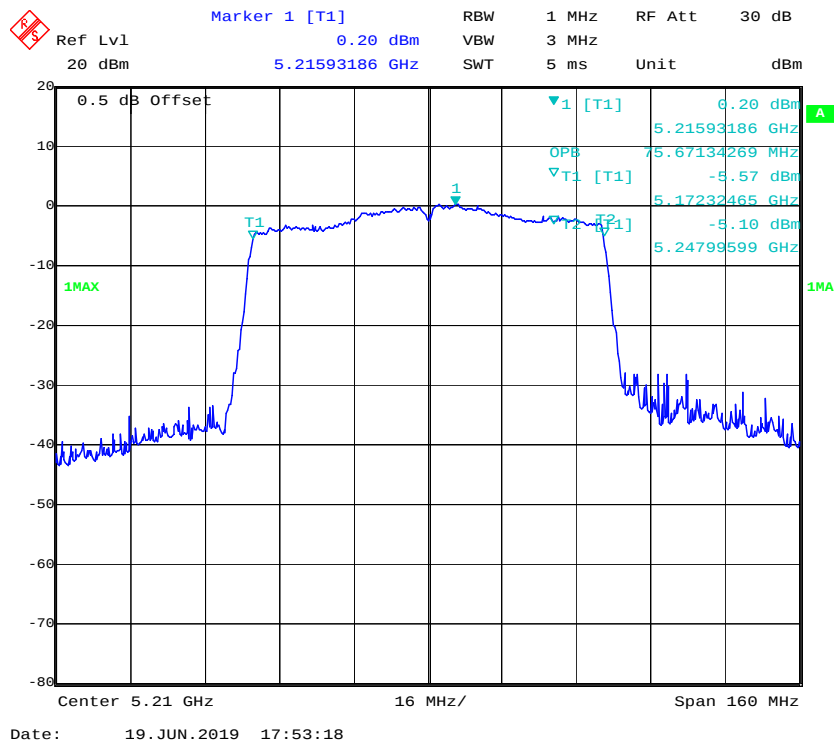
802.11n ht40 Low Channel



802.11n ht40 High Channel

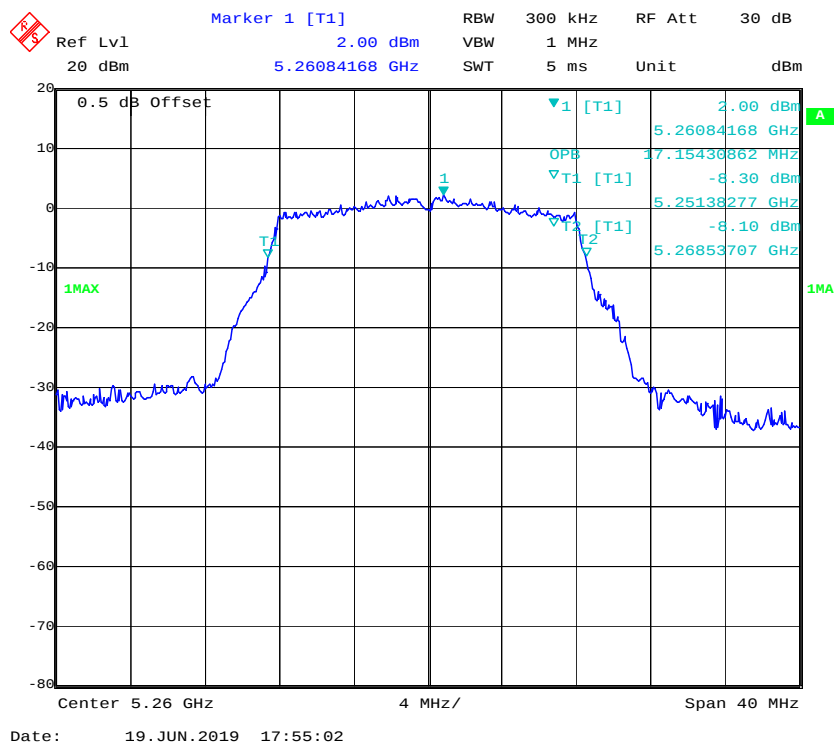


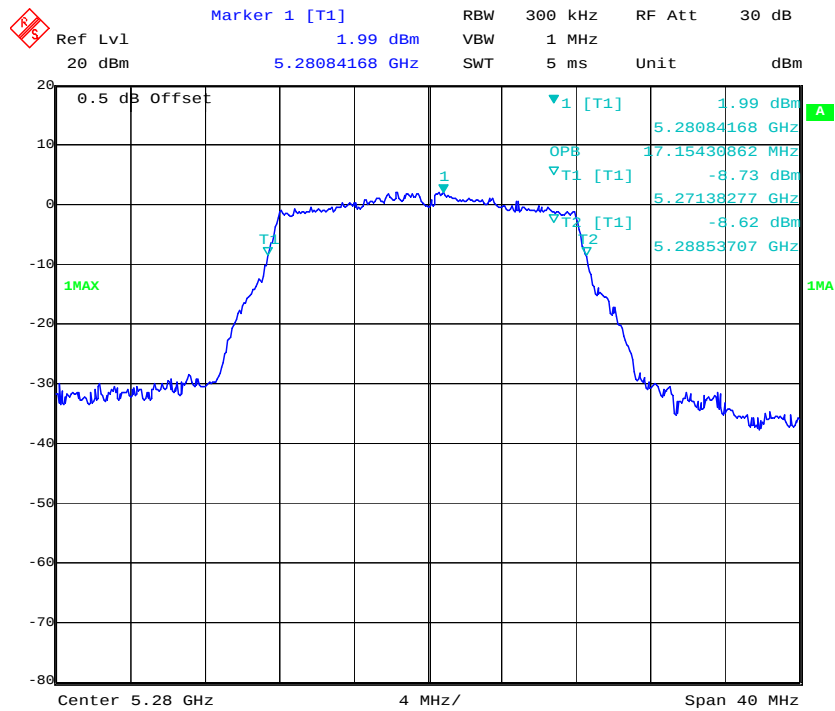
802.11ac vht80 Middle Channel



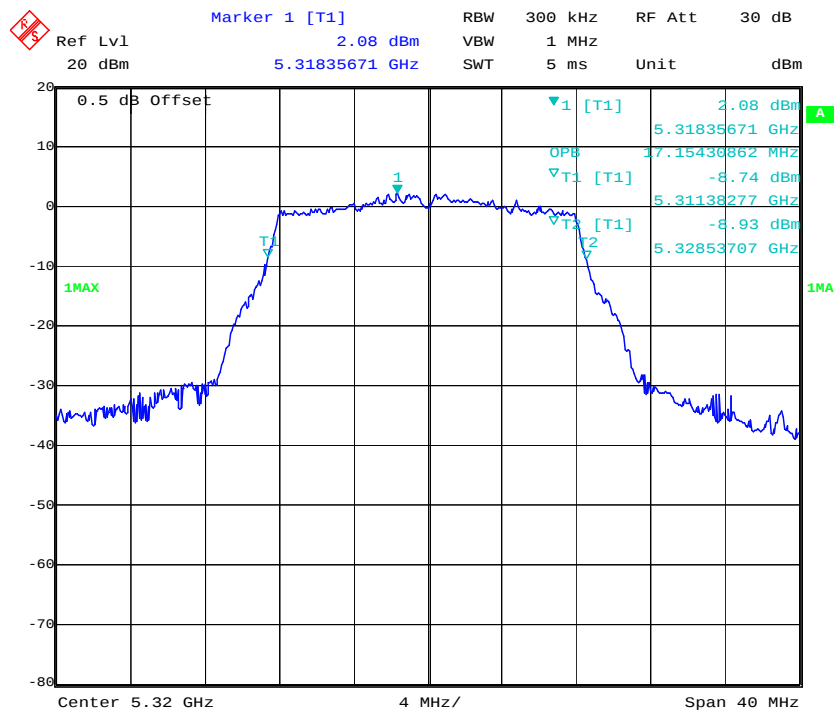
5250-5350 MHz:

802.11a Low Channel



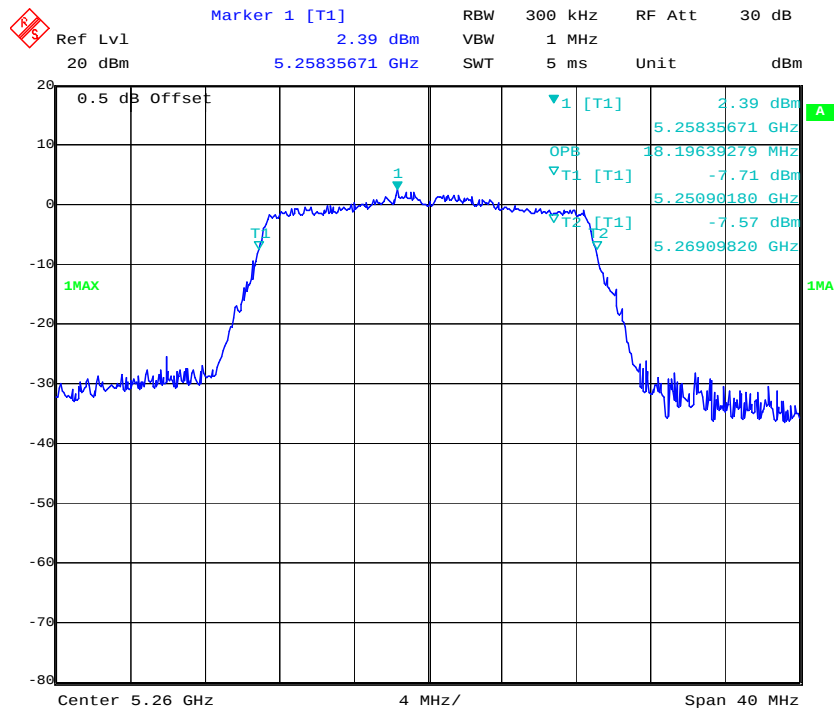
802.11a Middle Channel

Date: 19.JUN.2019 17:56:30

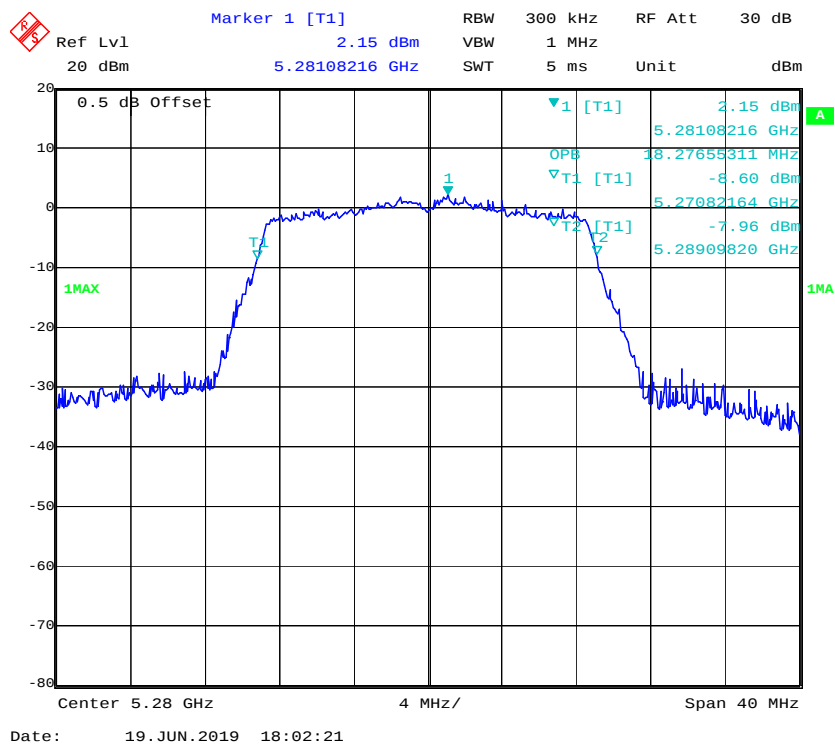
802.11a High Channel

Date: 19.JUN.2019 17:57:53

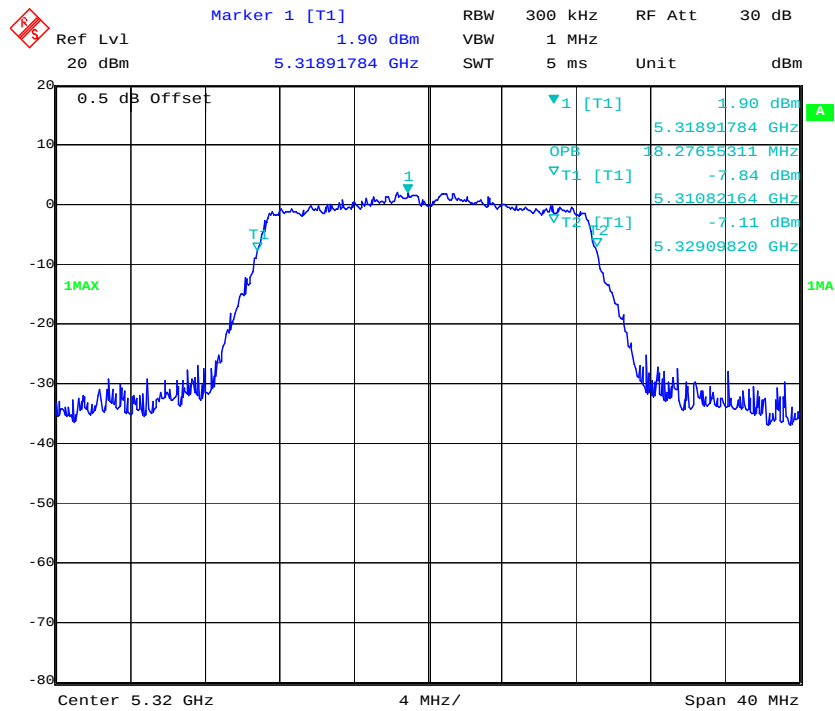
802.11n ht20 Low Channel



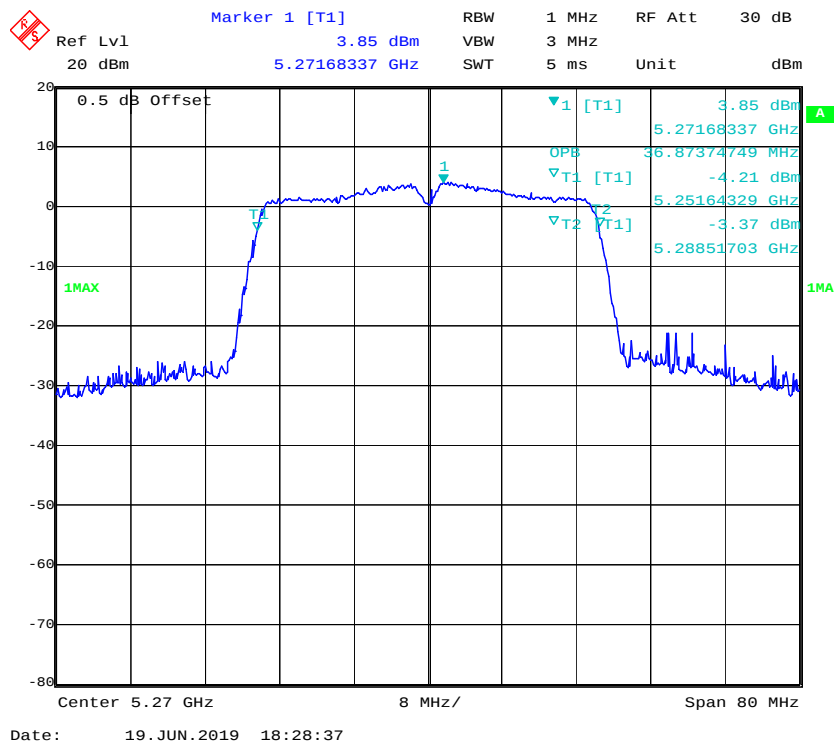
802.11n ht20 Middle Channel

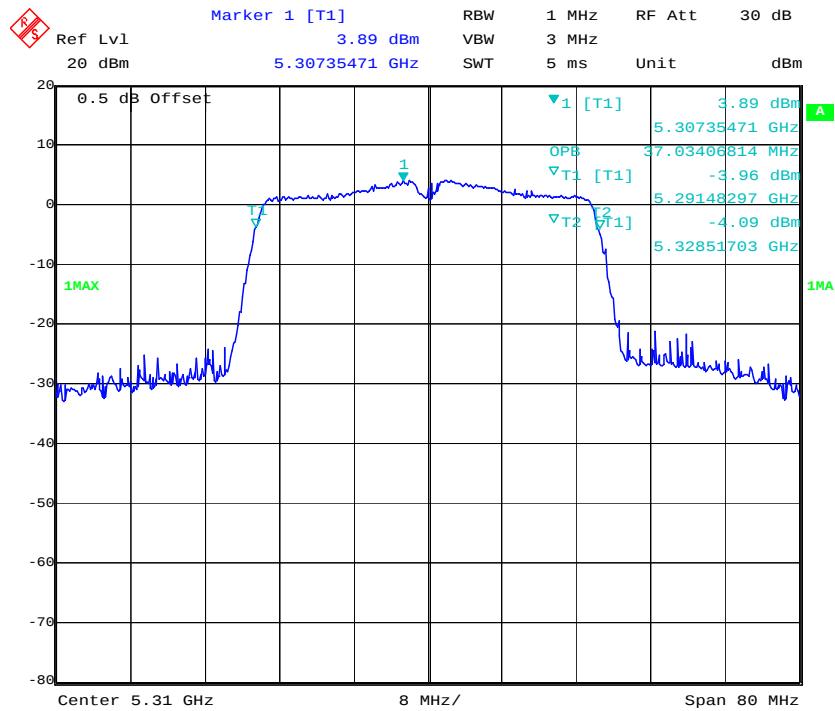
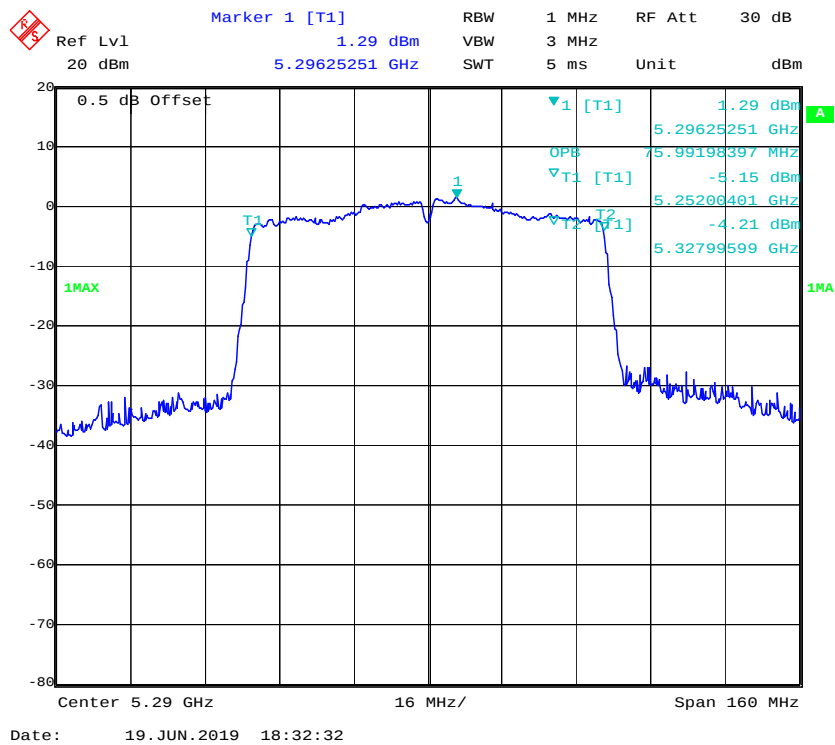


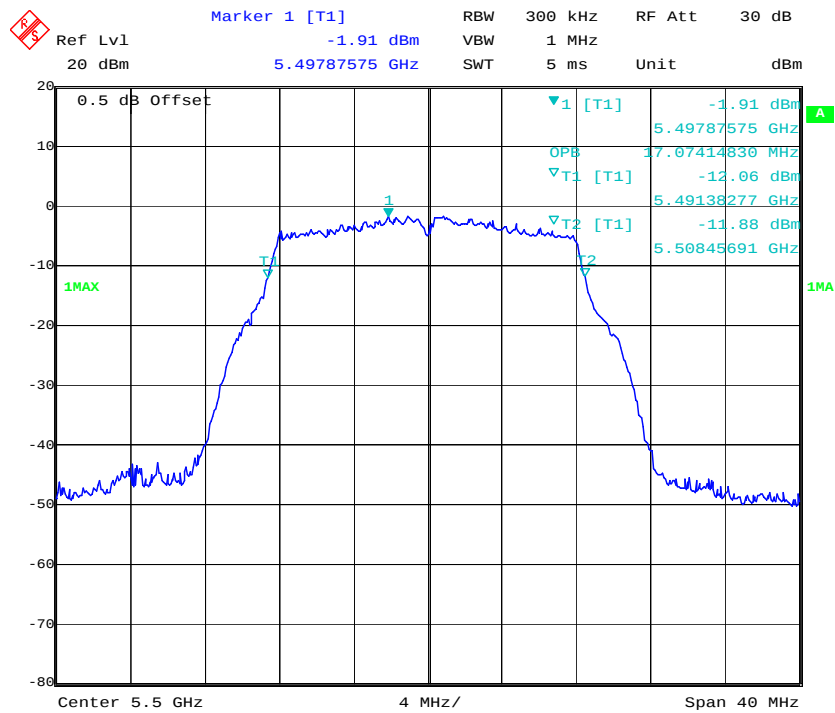
802.11n ht20 High Channel



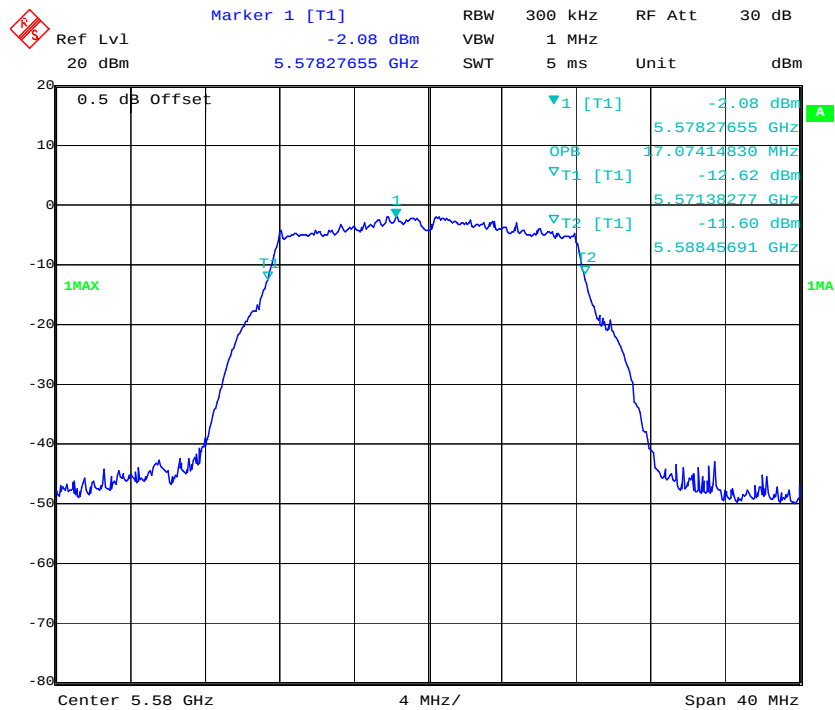
802.11n ht40 Low Channel



802.11n ht40 High Channel**802.11ac vht80 Middle Channel**

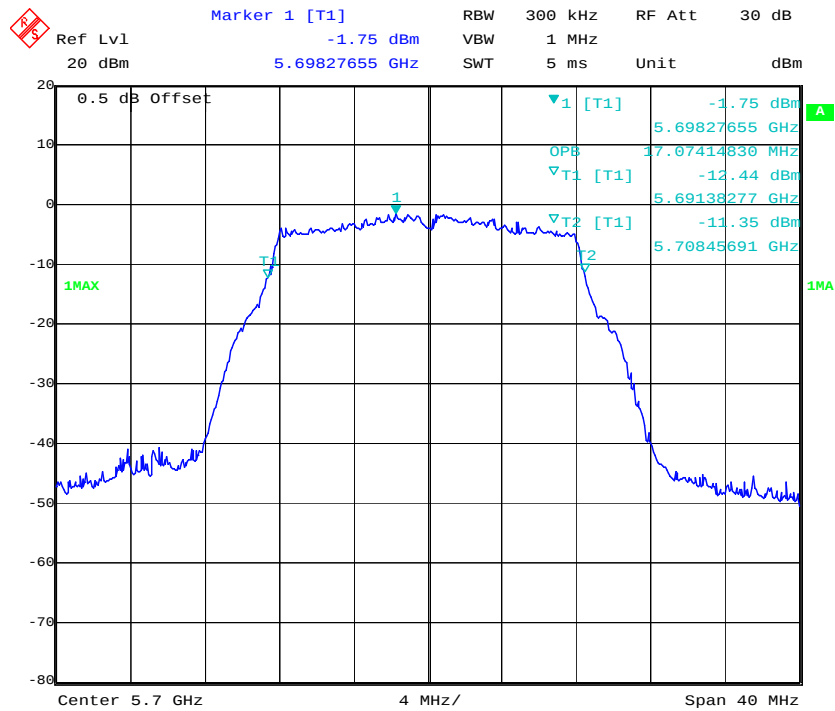
5470-5725 MHz band:**802.11a Low Channel**

Date: 19.JUN.2019 18:34:11

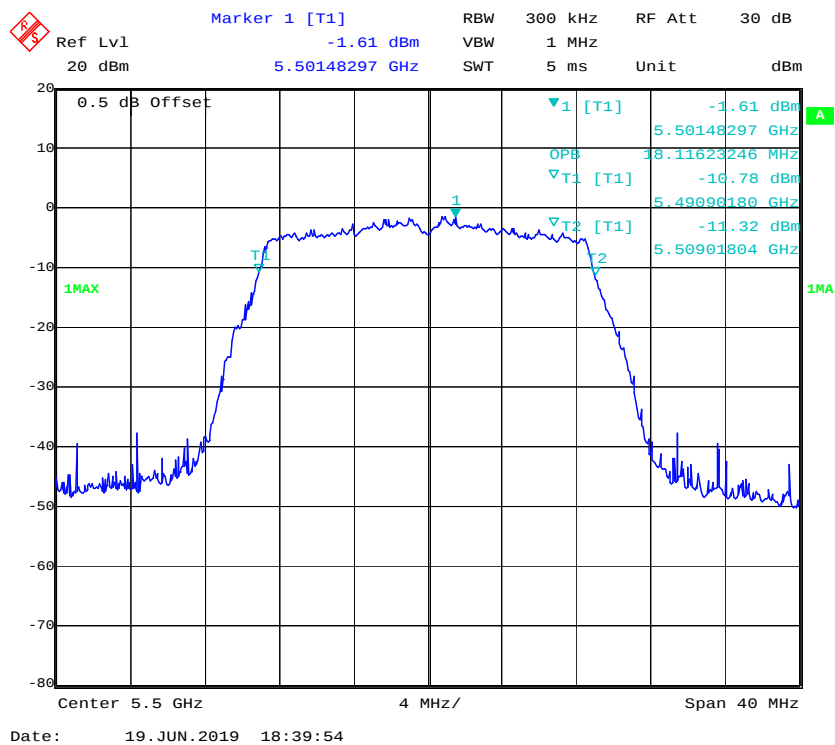
802.11a Middle Channel

Date: 19.JUN.2019 18:35:54

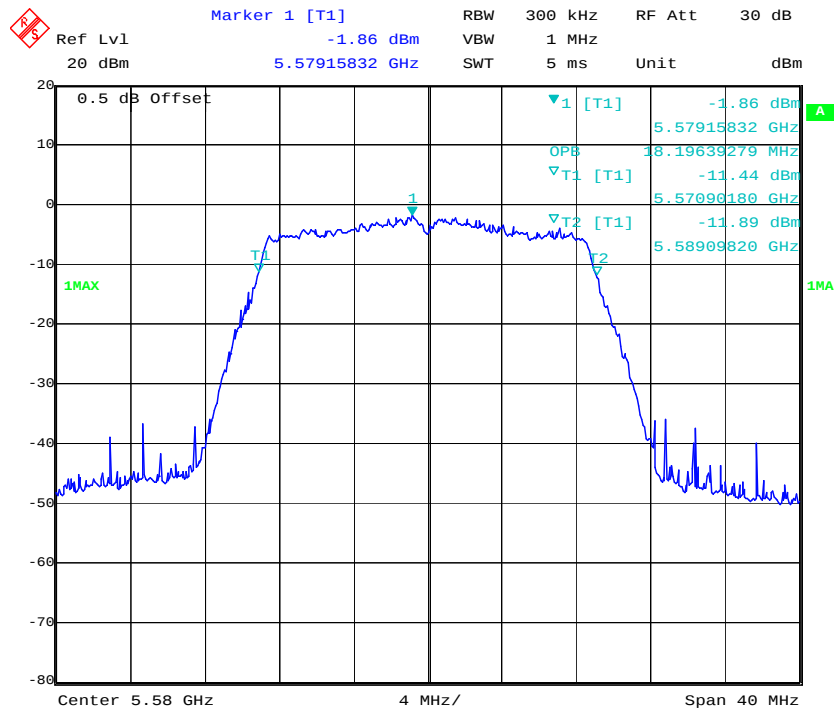
802.11a High Channel



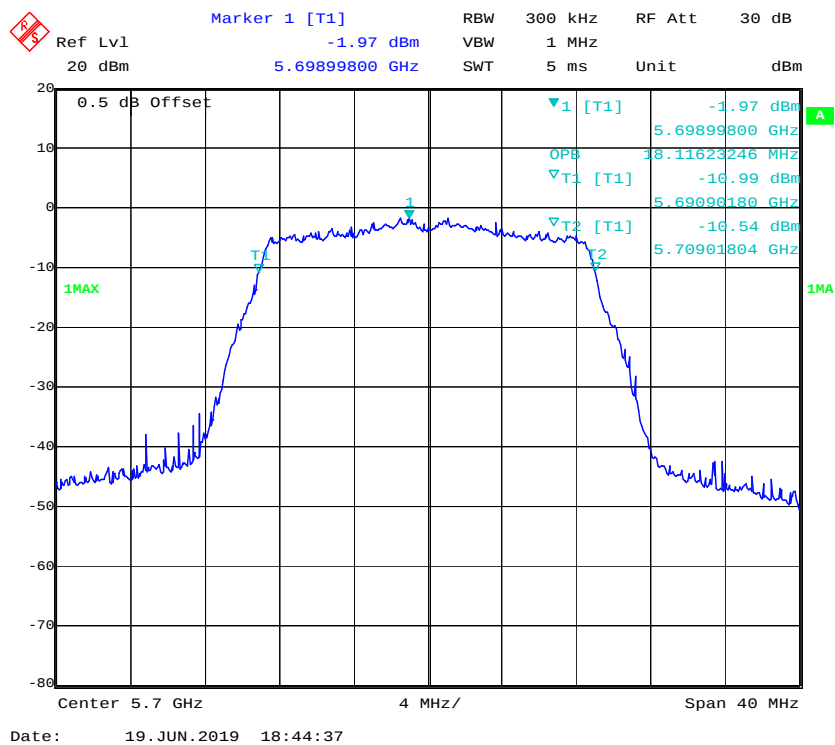
802.11n ht20 Low Channel



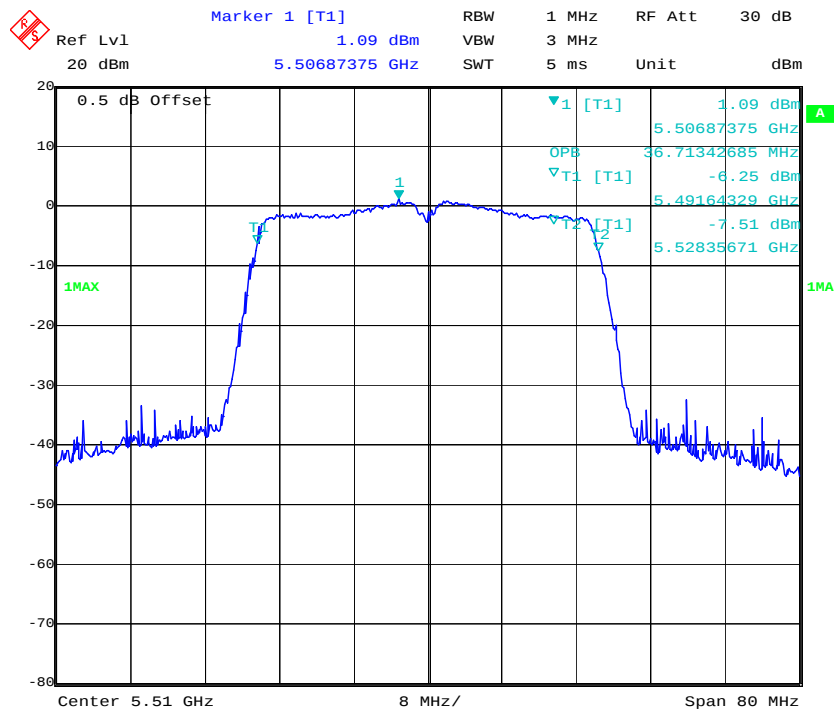
802.11n ht20 Middle Channel



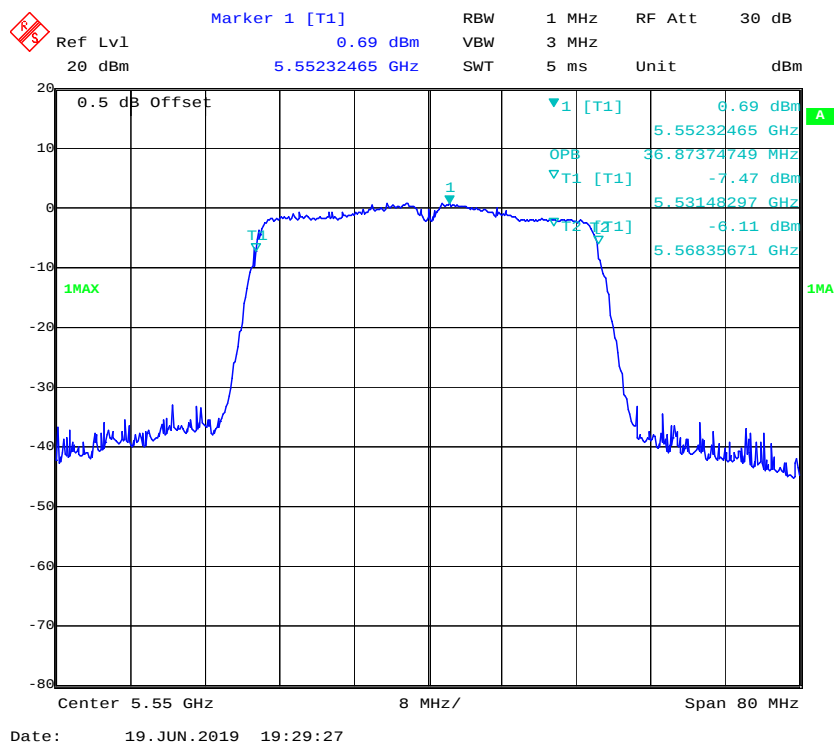
802.11n ht20 High Channel

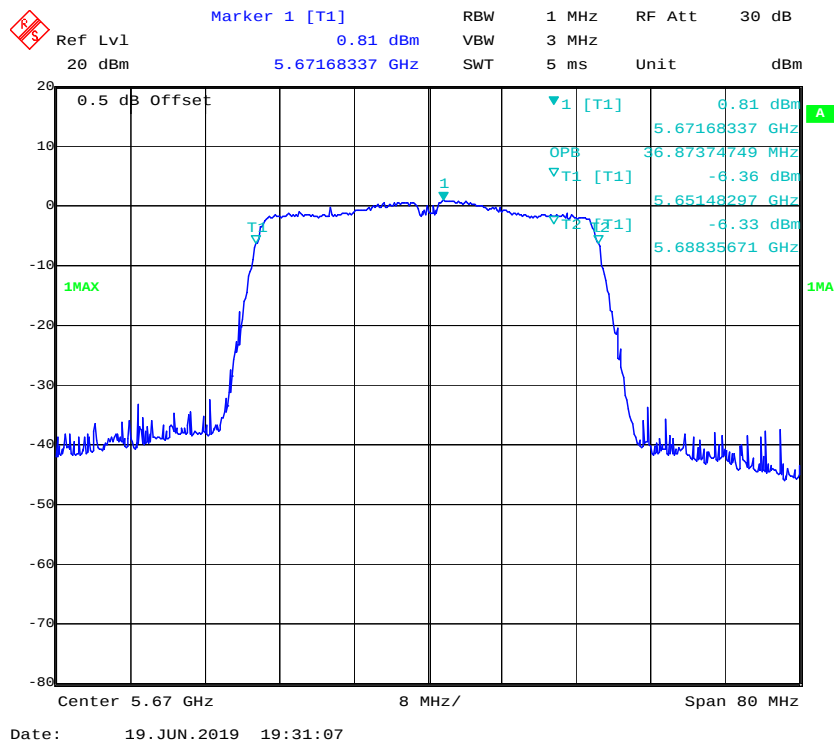
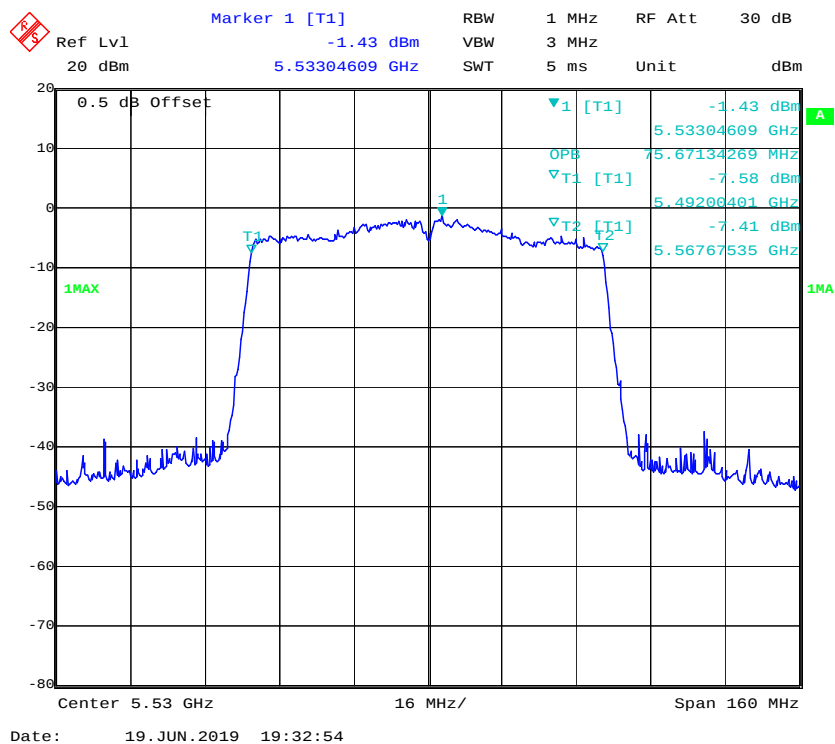


802.11n ht40 Low Channel

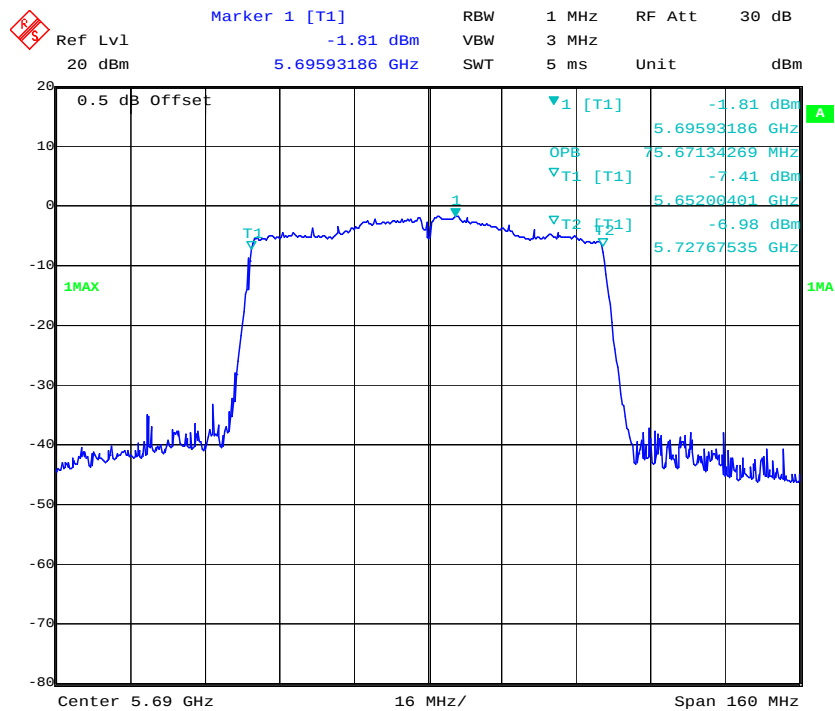


802.11n ht40 Middle Channel



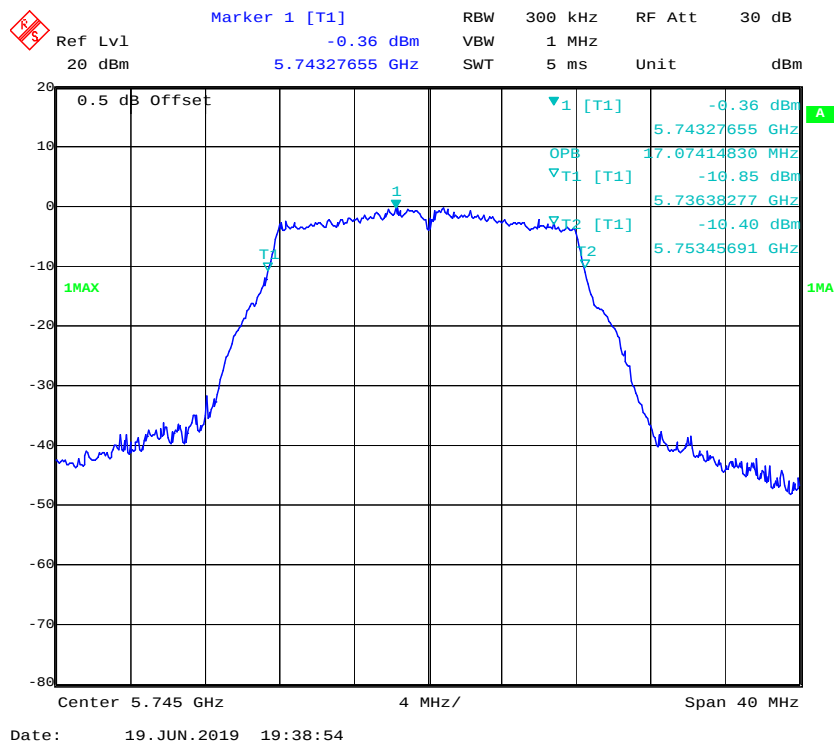
802.11n ht40 High Channel**802.11ac vht80 Low Channel**

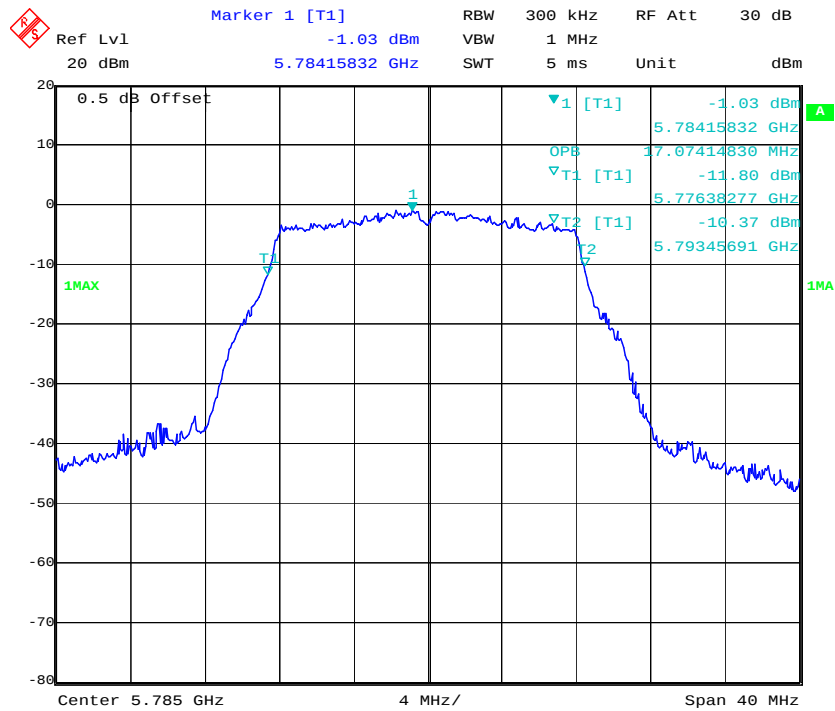
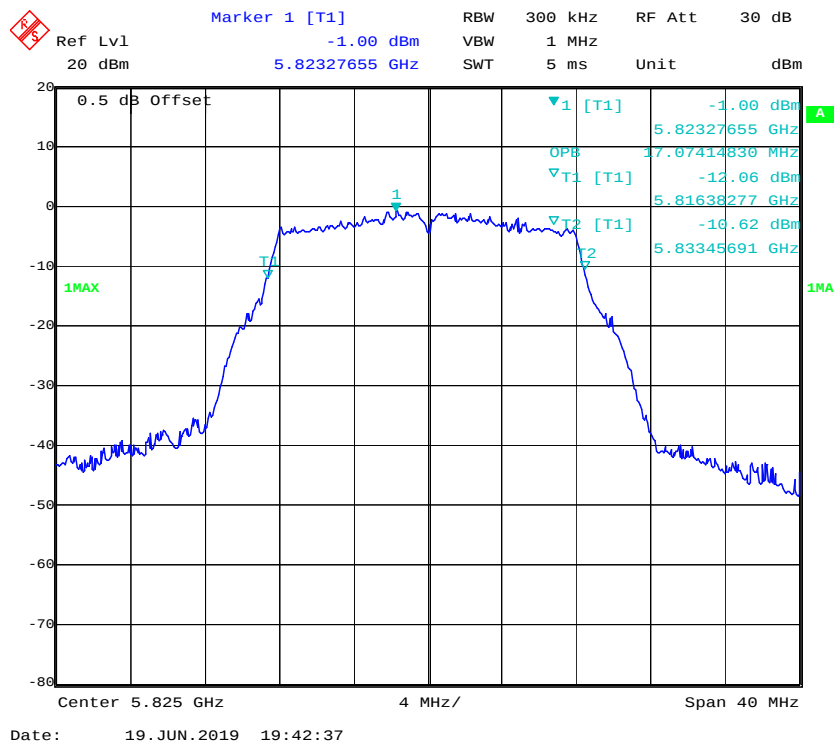
802.11ac vht80 High Channel



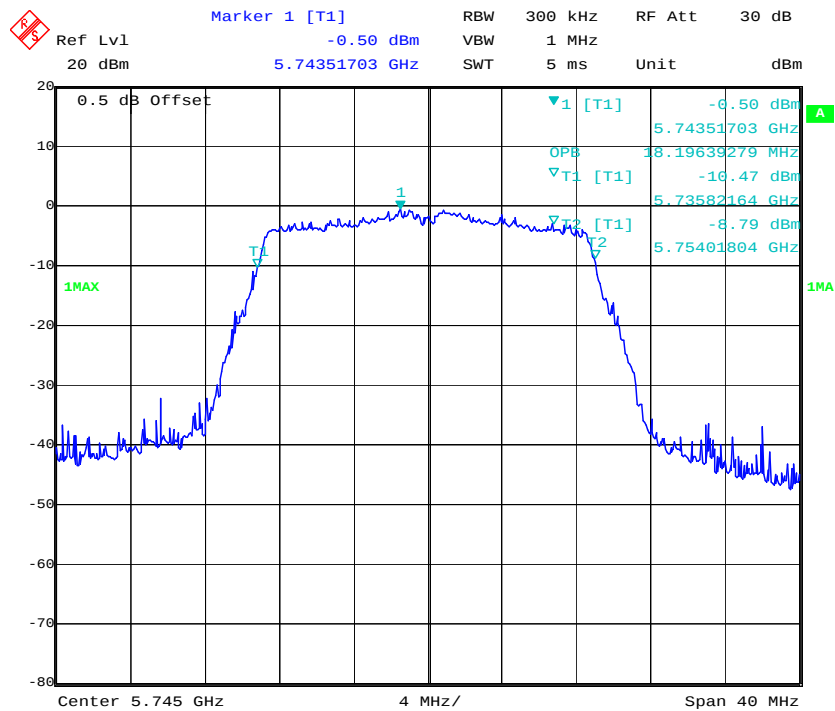
5725-5850 MHz:

802.11a Low Channel

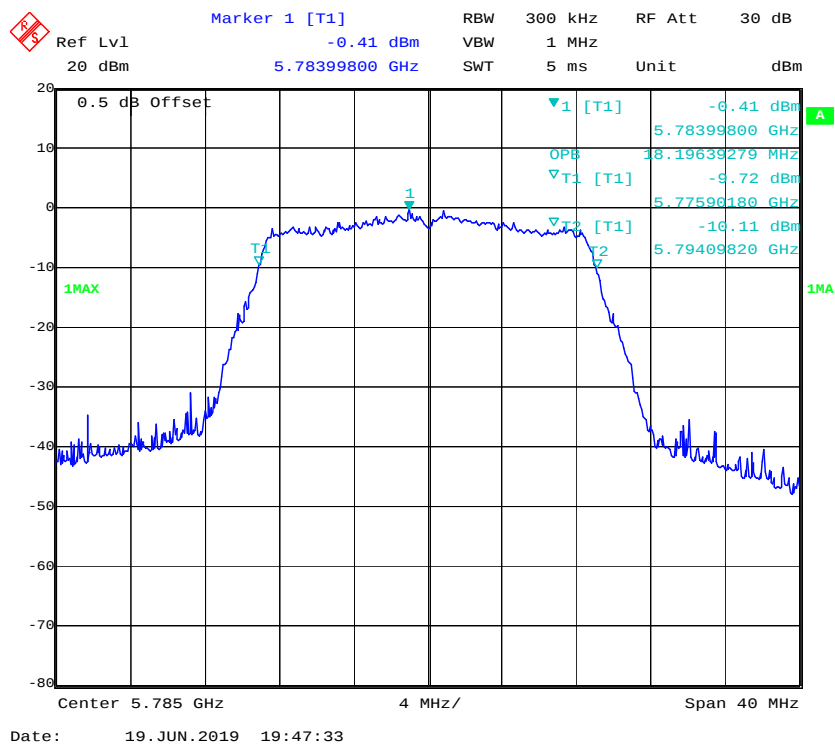


802.11a Middle Channel**802.11a High Channel**

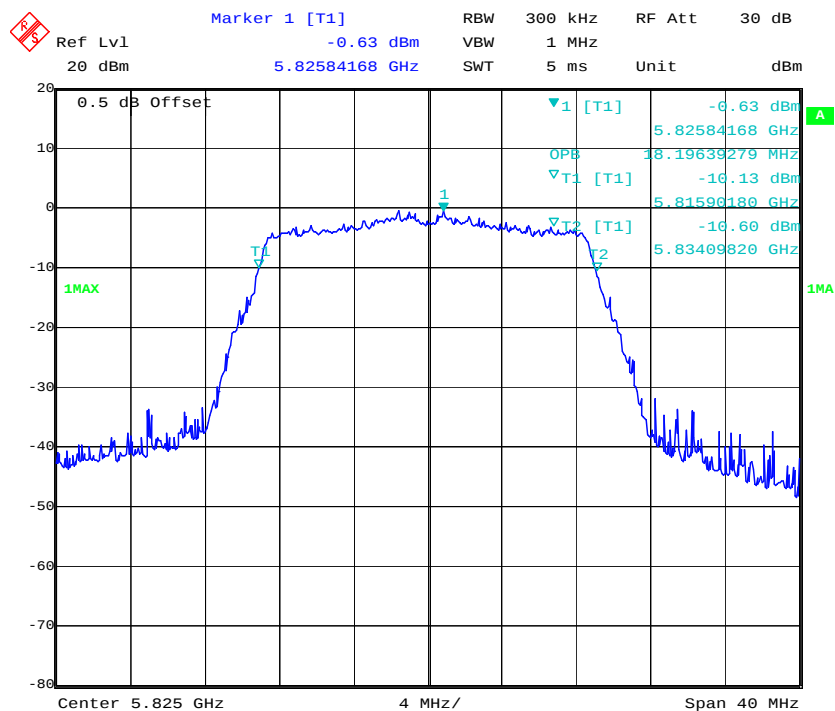
802.11n ht20 Low Channel



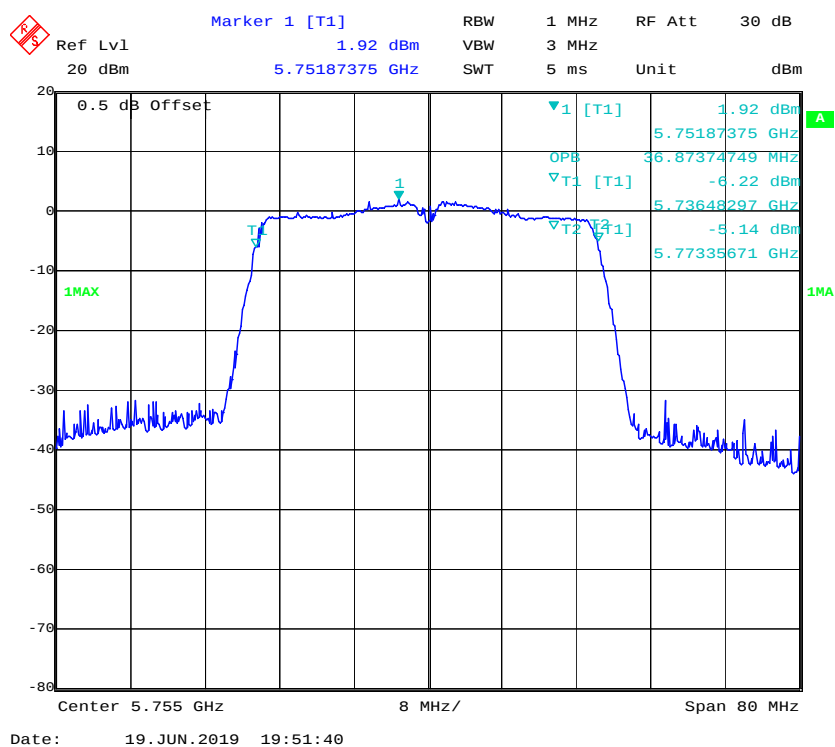
802.11n ht20 Middle Channel

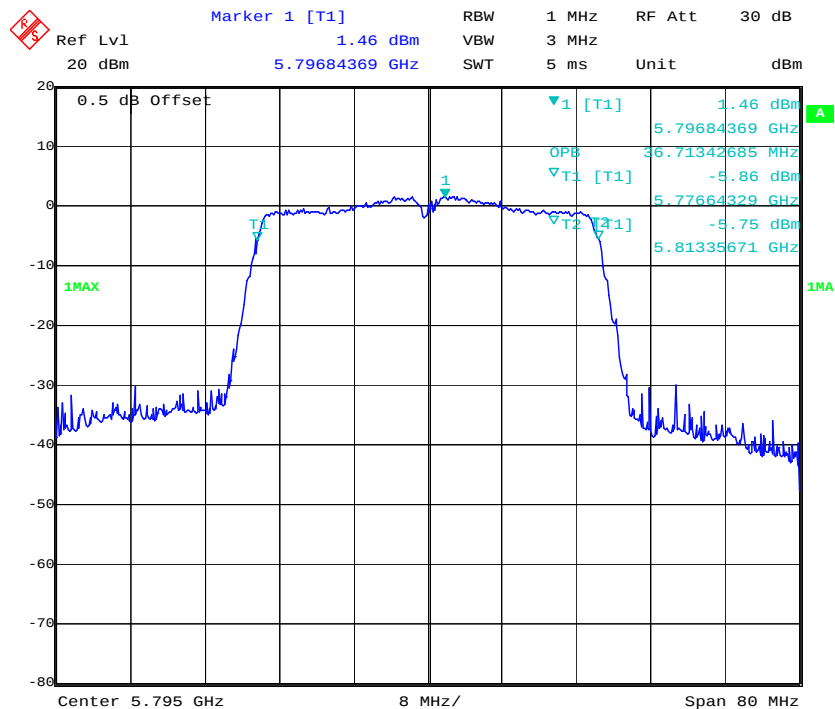
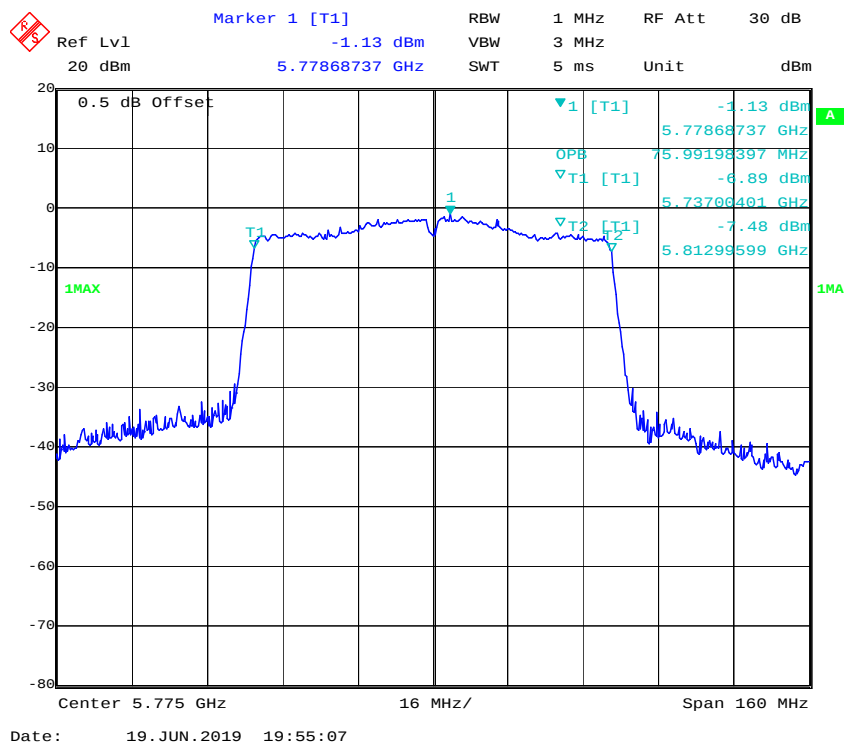


802.11n ht20 High Channel



802.11n ht40 Low Channel



802.11n ht40 High Channel**802.11ac vht80 Middle Channel**

FCC §15.407(a) –MAXIMUM CONDUCTED OUTPUT POWER

Applicable Standard

(a) Power limits:

(1) For the band 5.15-5.25 GHz.

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple colocated 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 $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

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

Test Equipment List and Details

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

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

Test Procedure

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

Test Data

Environmental Conditions

Temperature:	28.3 °C
Relative Humidity:	63 %
ATM Pressure:	100.3 kPa
Tester:	Lily Xie
Test Date:	2019-06-19

Test Mode: Transmitting

Band	Mode	Frequency (MHz)	Conducted Average Output Power (dBm)	Limit (dBm)
5150 - 5250 MHz	802.11 a	5180	10.86	23.5
		5200	10.31	23.5
		5240	9.87	23.5
	802.11n ht20	5180	10.67	23.5
		5200	10.09	23.5
		5240	9.67	23.5
	802.11n ht 40	5190	9.47	23.5
		5230	9.04	23.5
	802.11ac vht80	5210	9.19	23.5
5250 - 5350 MHz	802.11 a	5260	11.15	23.5
		5280	11.01	23.5
		5320	10.98	23.5
	802.11n ht20	5260	10.65	23.5
		5280	10.57	23.5
		5320	10.41	23.5
	802.11n ht 40	5270	10.03	23.5
		5310	9.78	23.5
	802.11ac vht80	5290	9.85	23.5
5470 - 5725 MHz	802.11 a	5500	8.87	23.5
		5600	7.98	23.5
		5700	7.02	23.5
	802.11n ht20	5500	8.48	23.5
		5600	7.52	23.5
		5700	6.72	23.5
	802.11n ht 40	5510	8.08	23.5
		5590	7.57	23.5
	802.11ac vht80	5670	6.47	23.5
		5530	7.76	23.5
5725 - 5850 MHz	802.11 a	5610	6.67	23.5
		5745	8.21	29.5
		5785	8.34	29.5
	802.11n ht20	5825	8.52	29.5
		5745	8.09	29.5
		5785	8.15	29.5
	802.11n ht 40	5825	8.08	29.5
		5755	7.61	29.5
	802.11ac vht80	5795	7.82	29.5
		5775	7.36	29.5

Note:

The device is a client device.

The duty cycle factor has been calculated into the Conducted power result. Antenna gain is 6.5dBi.

FCC §15.407(a) - POWER SPECTRAL DENSITY

Applicable Standard

(a) Power limits:

(1) For the band 5.15-5.25 GHz.

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm $10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output

power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Procedure

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2018-08-03	2019-08-03
Unknown	Coaxial Cable	C-SJ00-0010	C0010/06	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:	28.3 °C
Relative Humidity:	63 %
ATM Pressure:	100.3 kPa
Tester:	Lily Xie
Test Date:	2019-06-19

Test Mode: Transmitting

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

5150-5250 MHz:

Mode	Frequency (MHz)	Maximum Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)
802.11 a	5180	0.42	10.5
	5200	0.04	10.5
	5240	-0.32	10.5
802.11n ht20	5180	-0.14	10.5
	5200	-0.54	10.5
	5240	-0.72	10.5
802.11n ht 40	5190	-3.74	10.5
	5230	-4.39	10.5
802.11ac vht80	5210	-6.93	10.5

5250-5350 MHz:

Mode	Frequency (MHz)	Maximum Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)
802.11 a	5260	0.87	10.5
	5280	0.76	10.5
	5320	0.83	10.5
802.11n ht20	5260	0.57	10.5
	5280	0.66	10.5
	5320	0.73	10.5
802.11n ht 40	5270	-3.34	10.5
	5310	-3.11	10.5
802.11ac vht80	5290	-5.80	10.5

5470-5725 MHz:

Mode	Frequency (MHz)	Maximum Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)
802.11 a	5500	-2.82	10.5
	5600	-2.97	10.5
	5700	-2.86	10.5
802.11n ht20	5500	-3.17	10.5
	5600	-3.25	10.5
	5700	-3.28	10.5
802.11n ht 40	5510	-6.25	10.5
	5590	-5.94	10.5
	5670	-6.16	10.5
802.11ac vht80	5530	-9.02	10.5
	5610	-8.98	10.5

5725-5850MHz

Mode	Frequency (MHz)	Reading (dBm/300kHz)	Maximum Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)
802.11 a	5745	-4.66	-2.44	29.5
	5785	-4.58	-2.36	29.5
	5825	-4.88	-2.66	29.5
802.11n ht20	5745	-4.36	-2.14	29.5
	5785	-5.21	-2.99	29.5
	5825	-5.04	-2.82	29.5
802.11n ht 40	5755	-8.02	-5.80	29.5
	5795	-7.80	-5.58	29.5
802.11ac vht80	5775	-10.90	-8.68	29.5

Note:

The device is a client device.

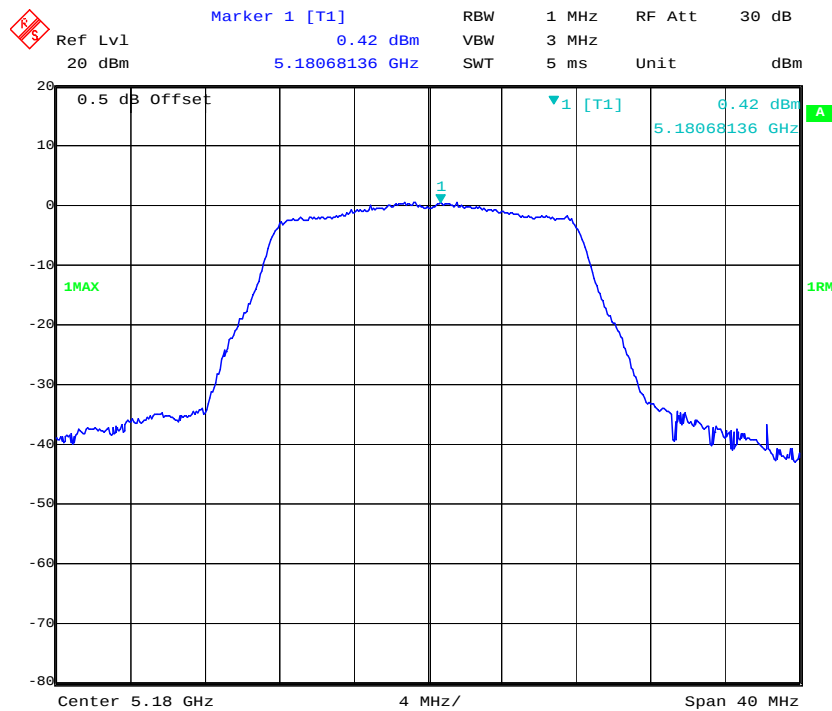
The duty cycle factor has been calculated into the Conducted power result. Antenna gain is 6.5dBi.

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

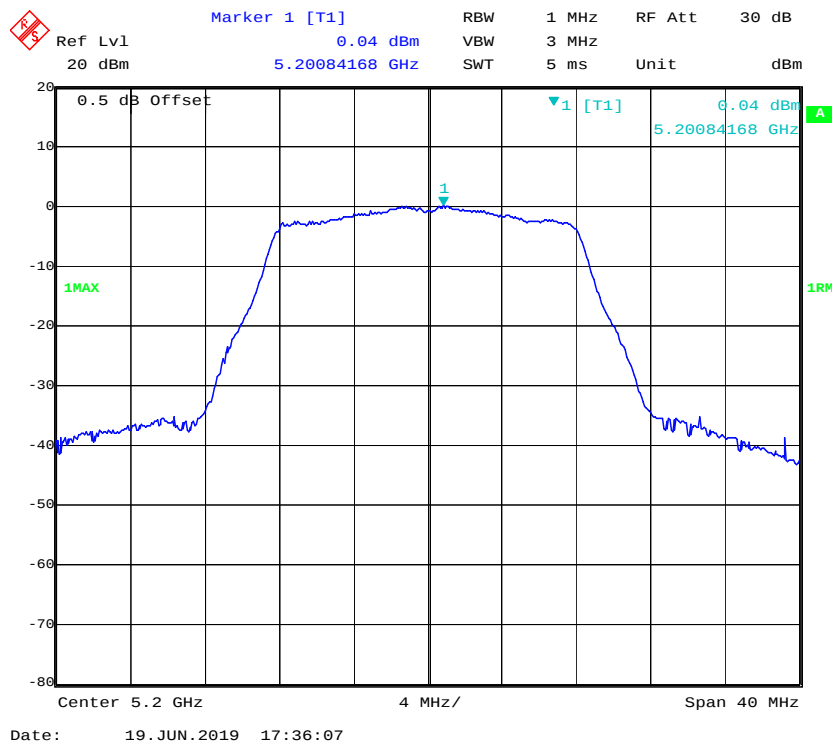
Method SA-3 in KDB 789033 D02 General UNII Test Procedures New Rules v02r01 was used for PSD test.

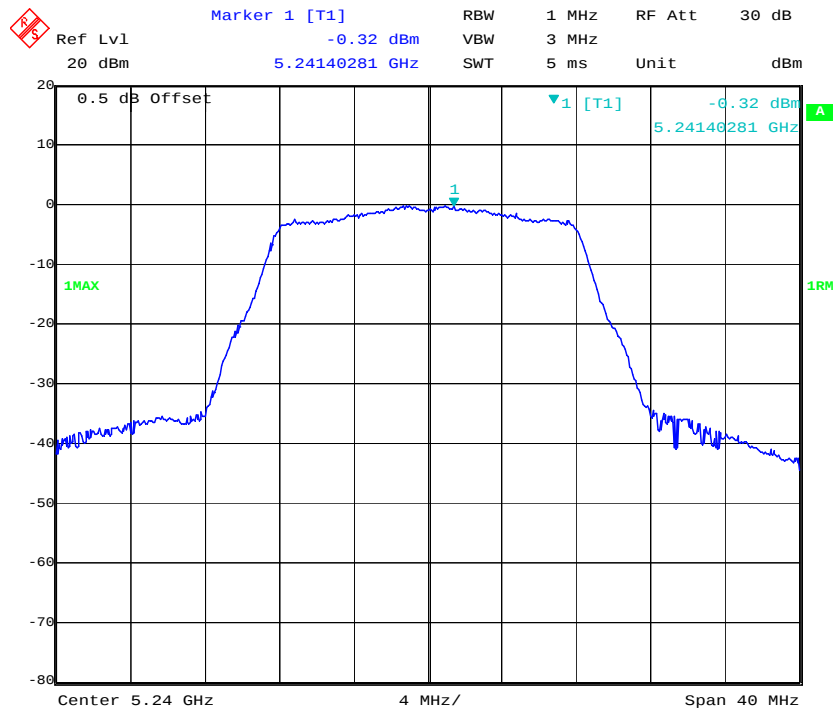
5150-5250 MHz

802.11a Low Channel

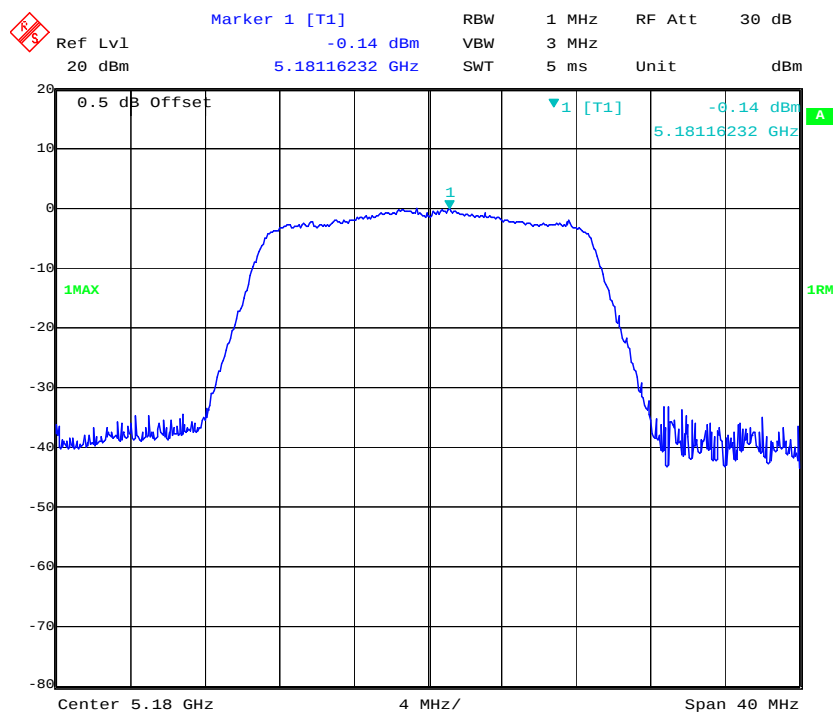


802.11a Middle Channel



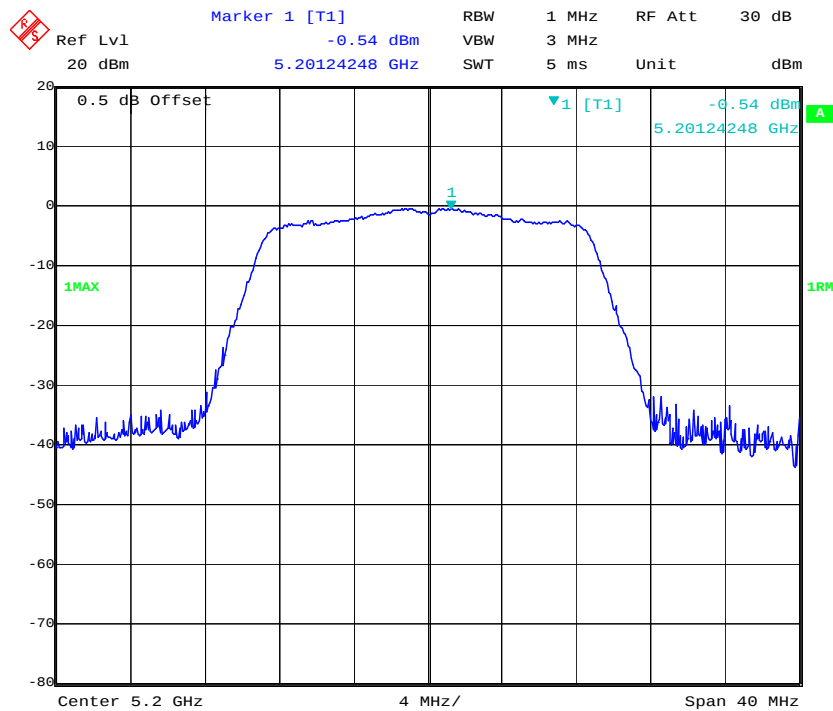
802.11a High Channel

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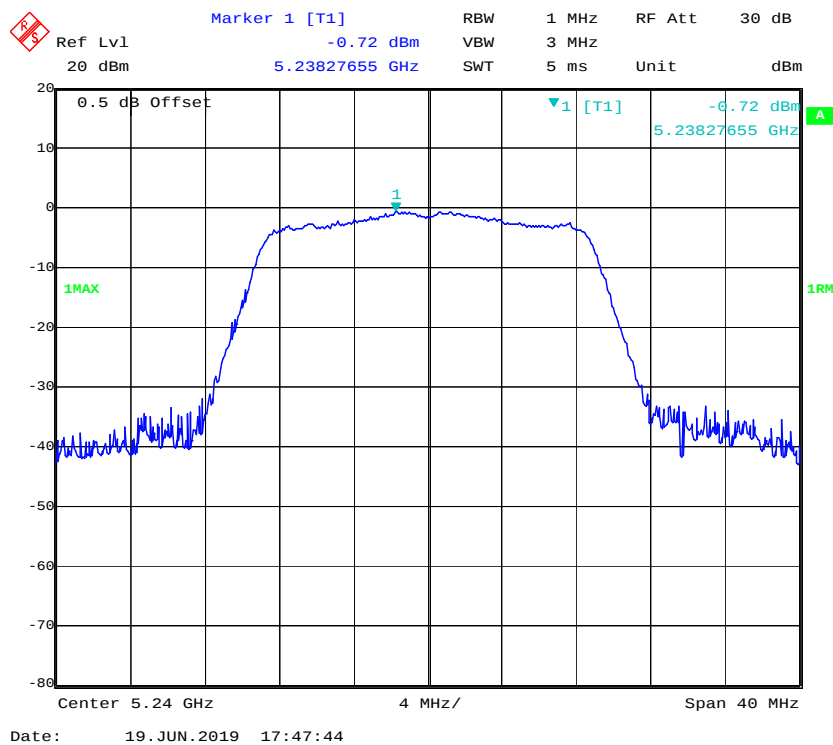
802.11n ht20 Low Channel

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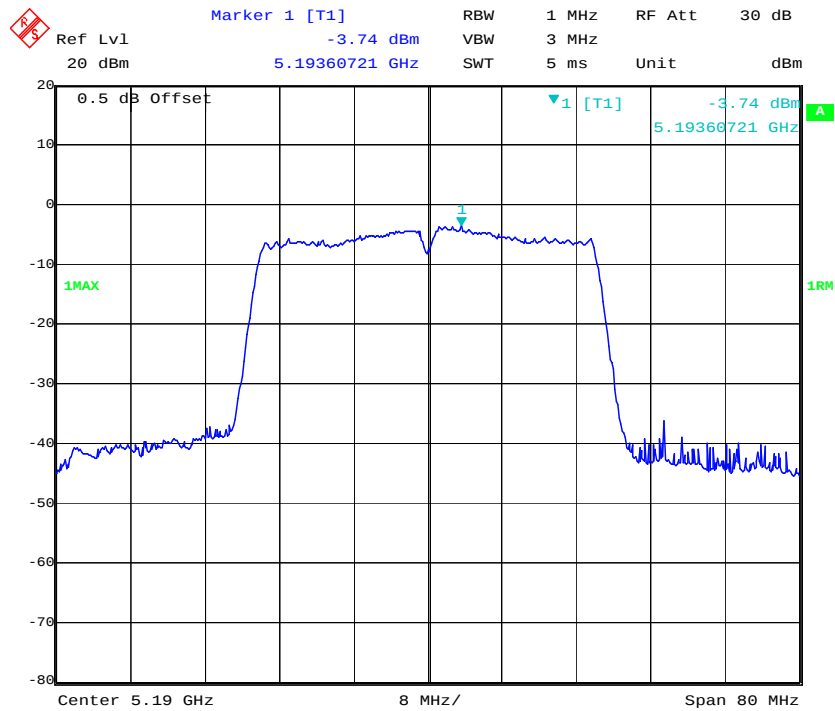
802.11n ht20 Middle Channel



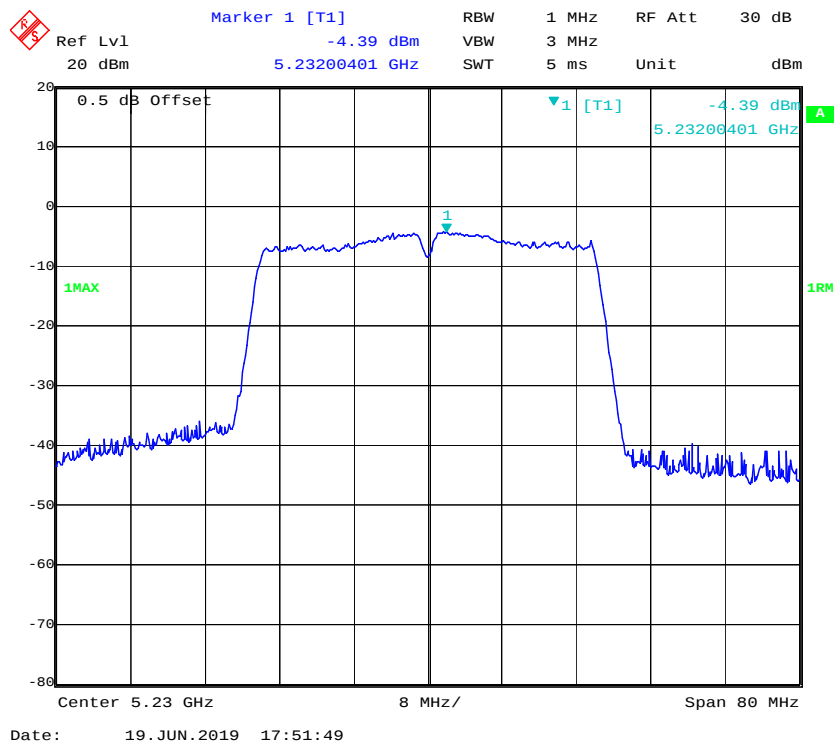
802.11n ht20 High Channel



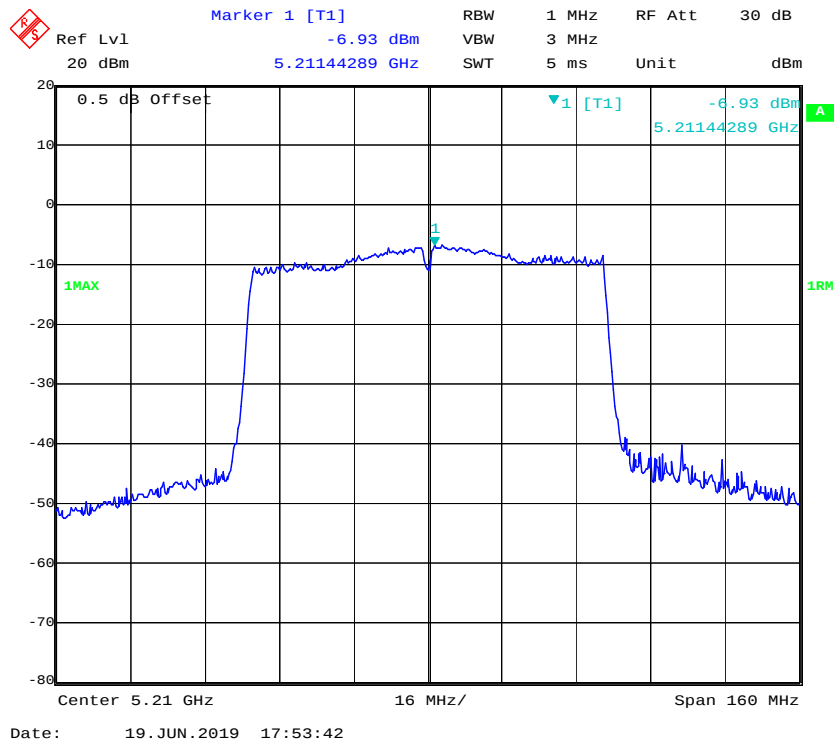
802.11n ht40 Low Channel



802.11n ht40 High Channel

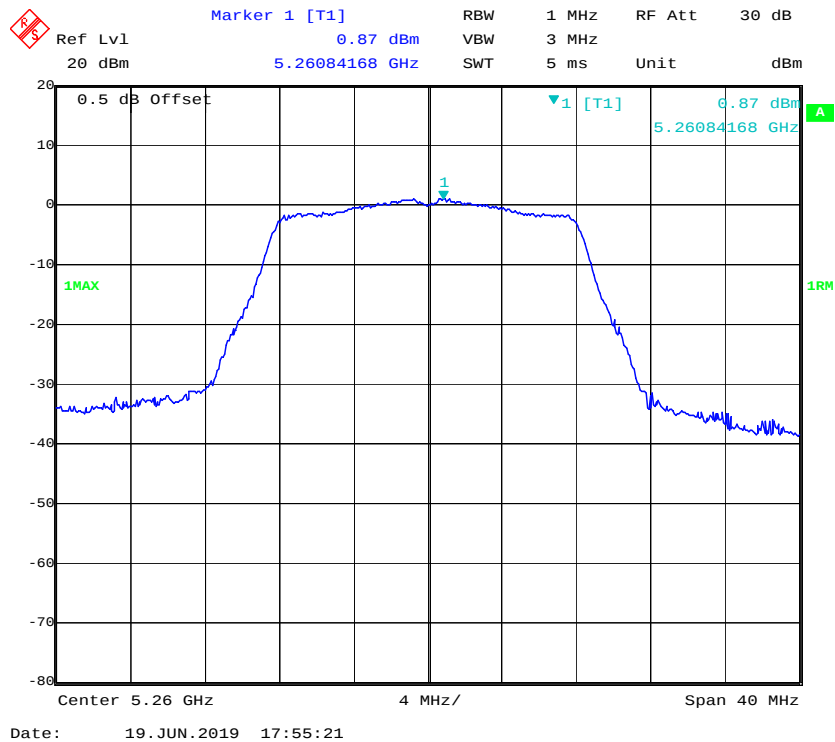


802.11ac80 Middle Channel

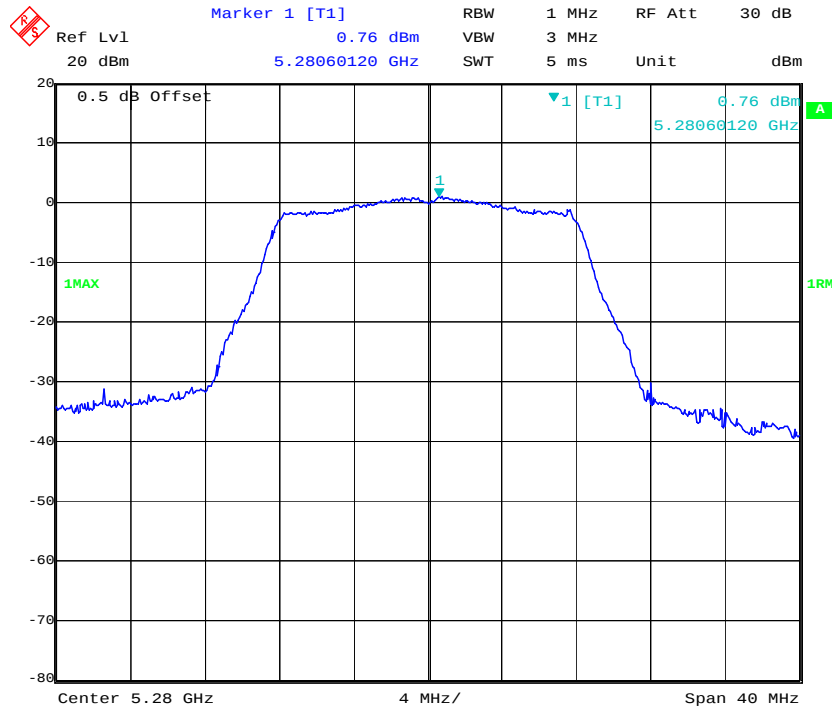


5250-5350 MHz:

802.11a Low Channel

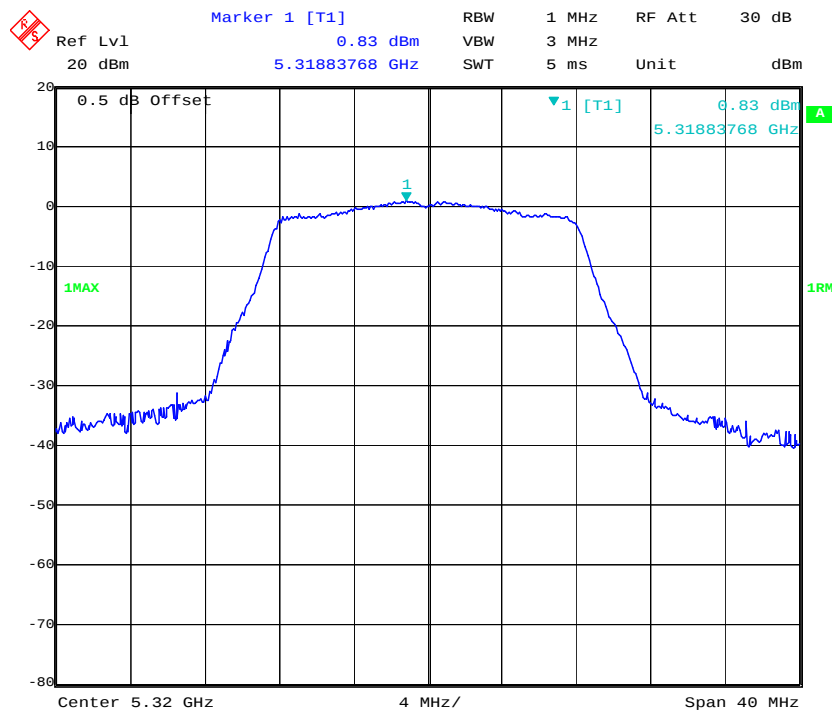


802.11a Middle Channel



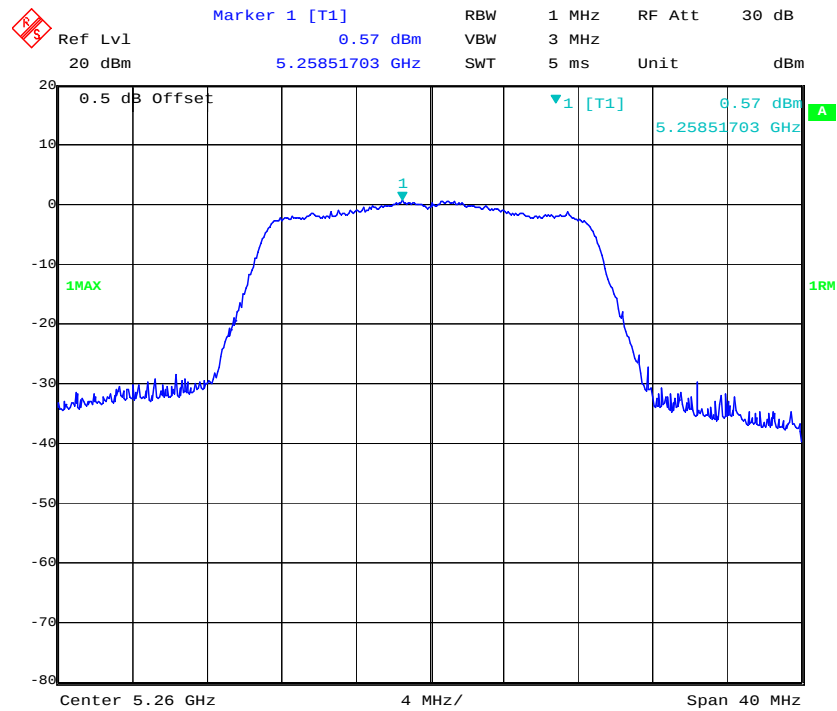
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802.11a High Channel



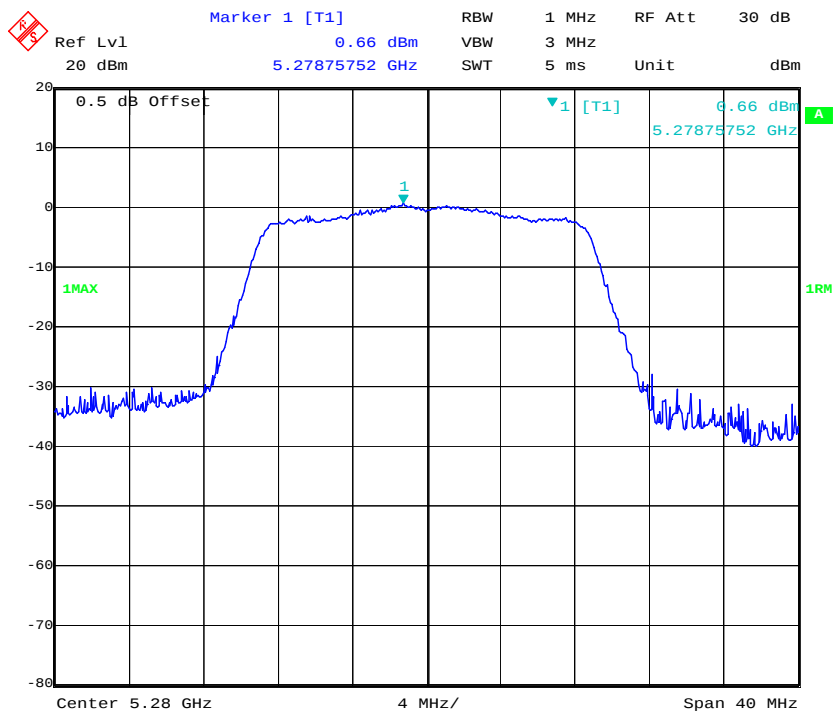
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802.11n ht20 Low Channel



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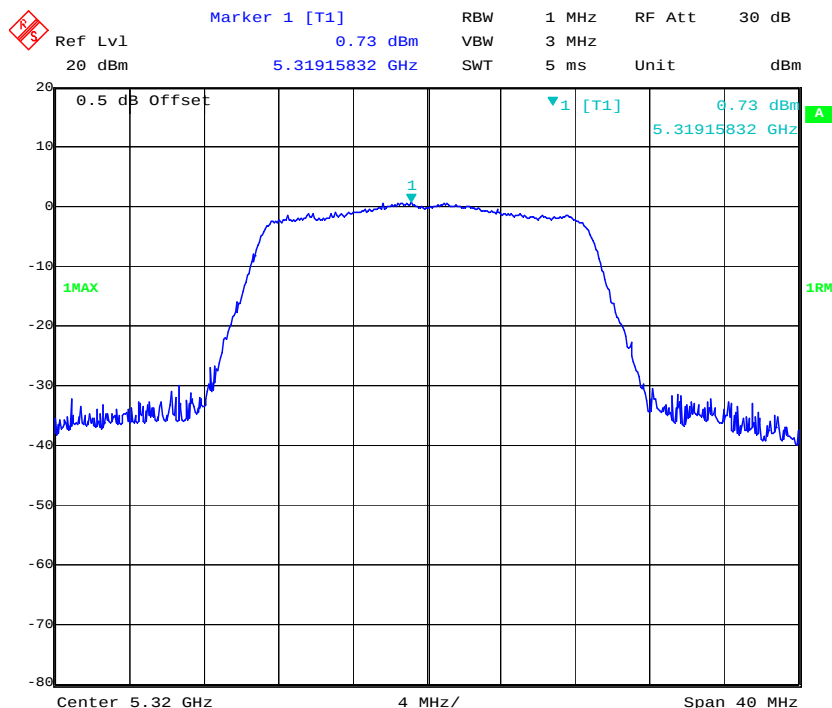
802.11n ht20 Middle Channel



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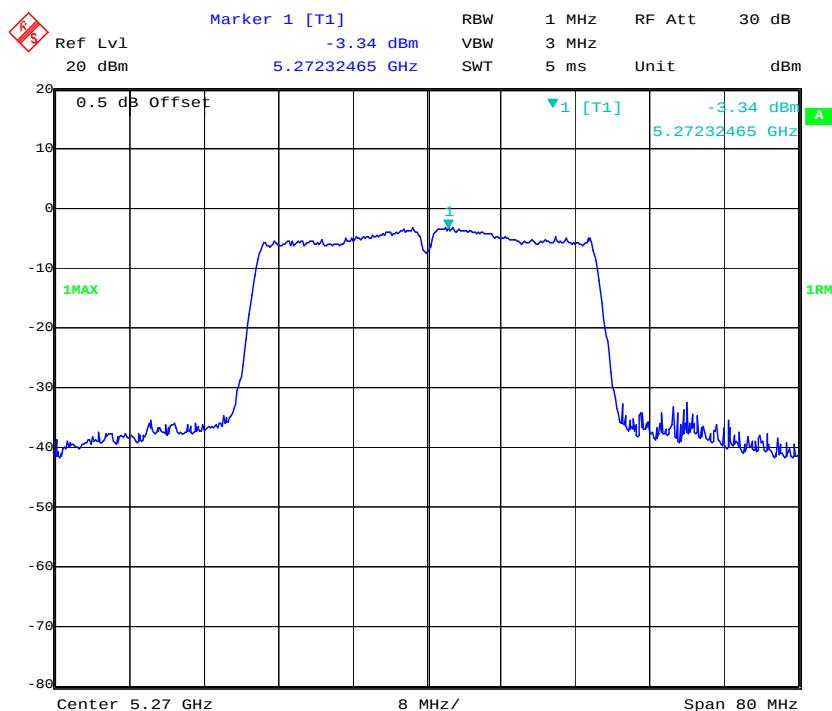
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802.11n ht20 High Channel

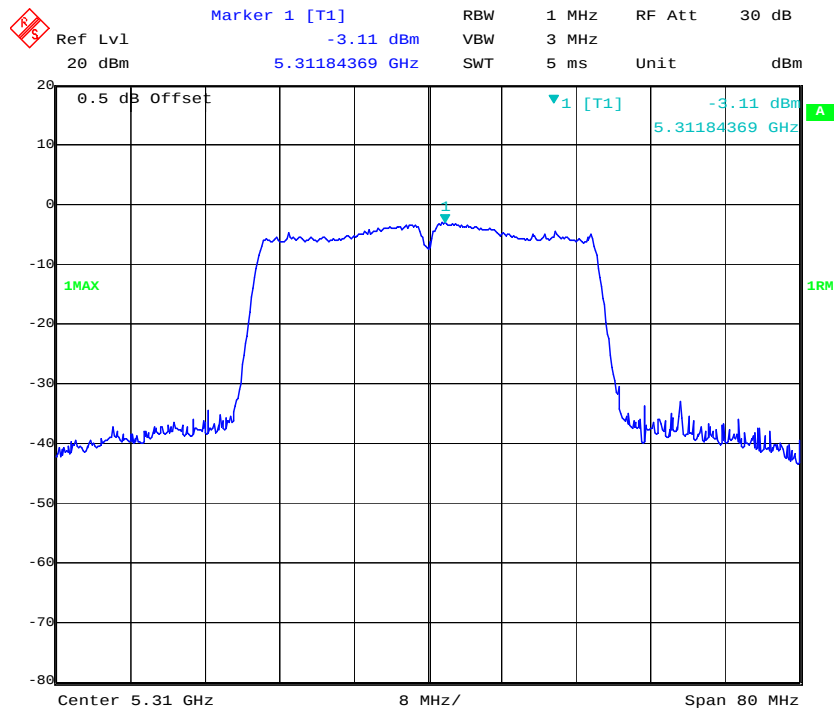


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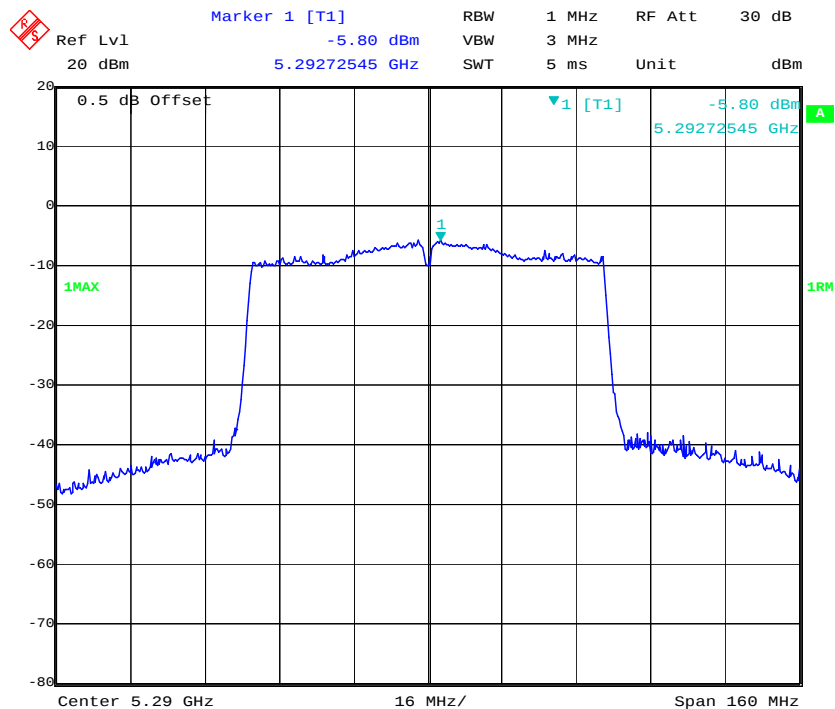
802.11n ht40 Low Channel



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802.11n ht40 High Channel

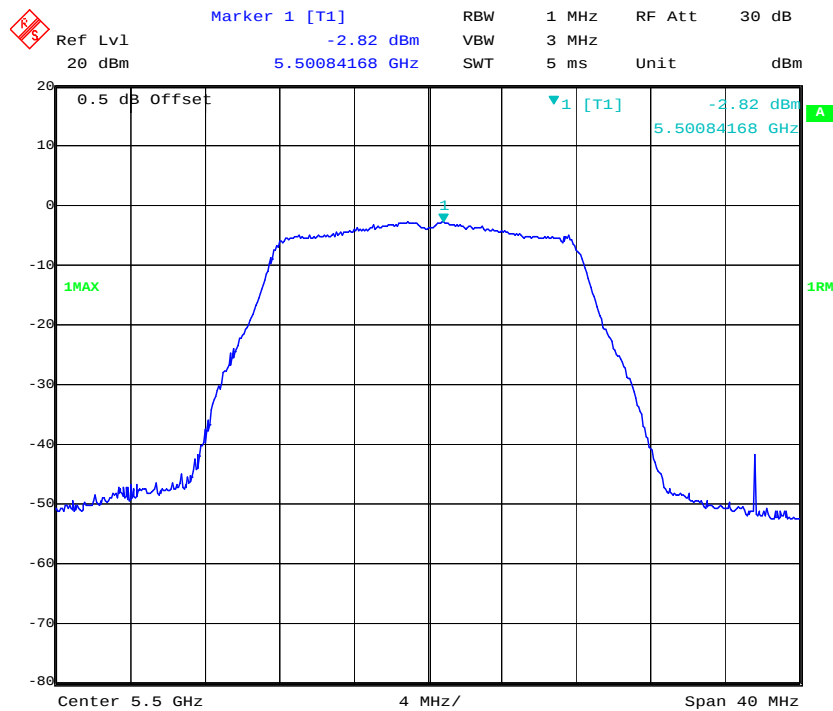
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802.11ac80 Middle Channel

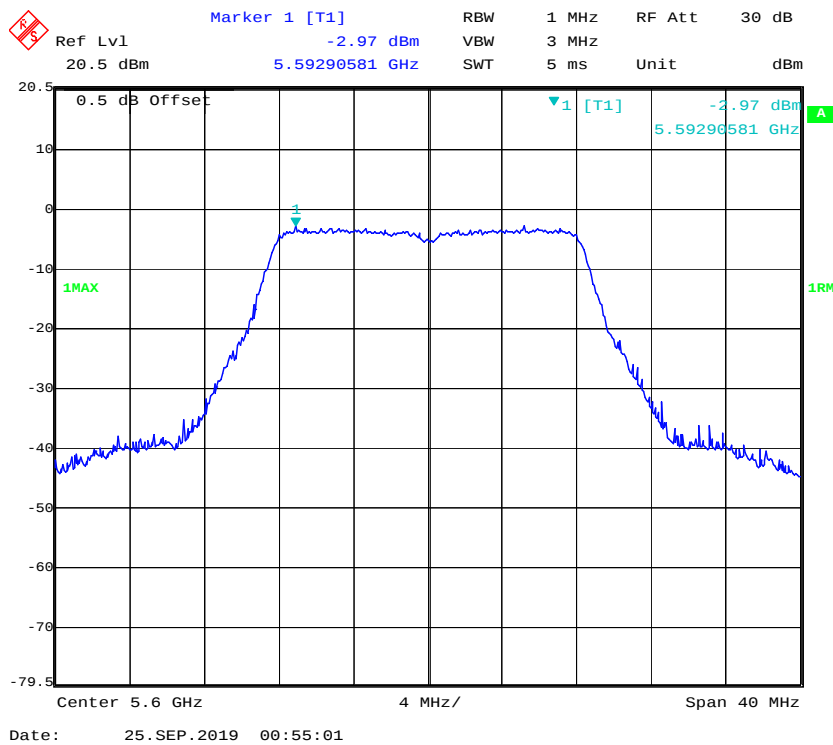
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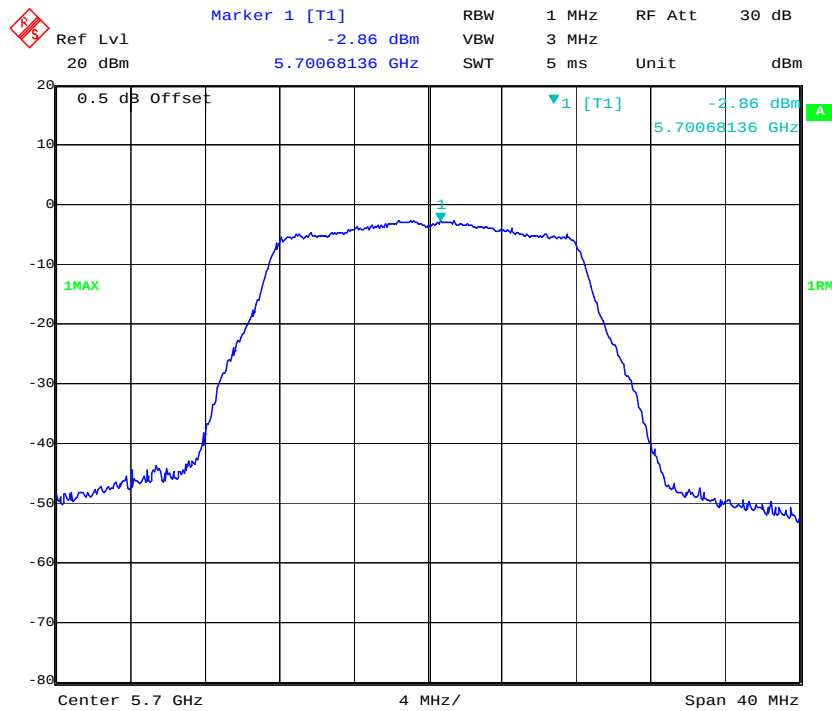
5470-5725 MHz:

802.11a Low Channel

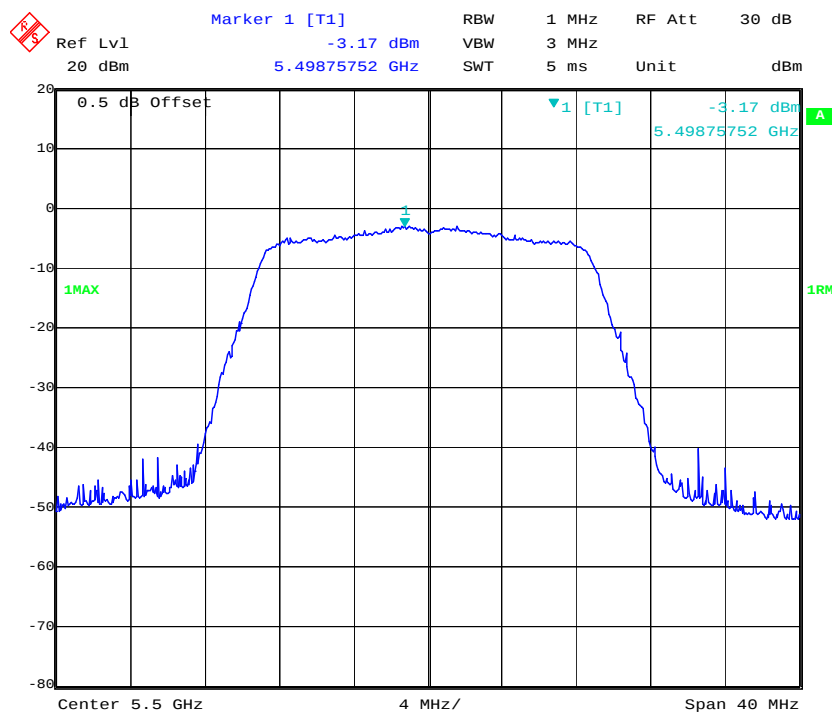


802.11a Middle Channel



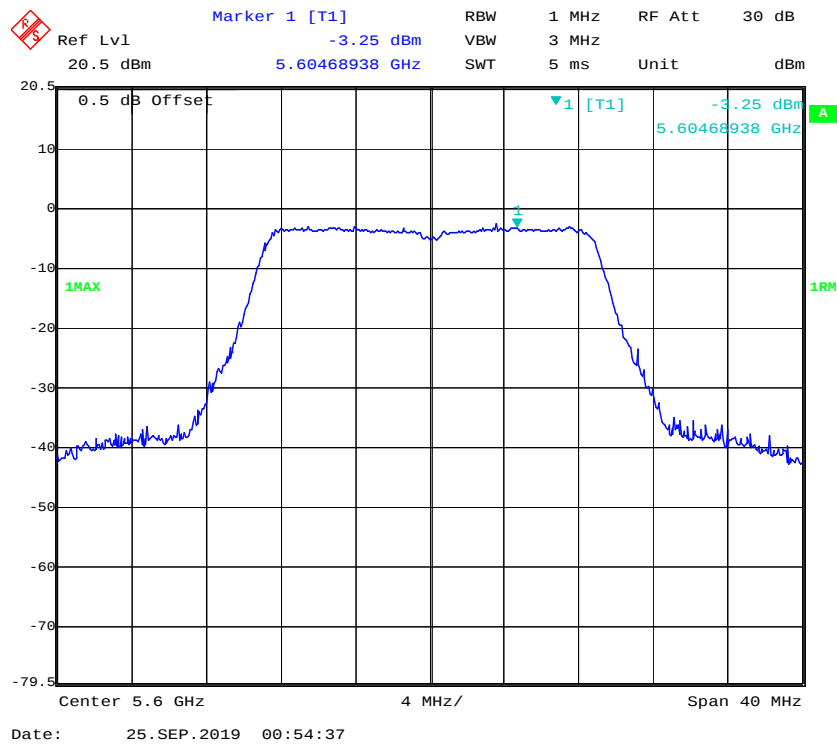
802.11a High Channel

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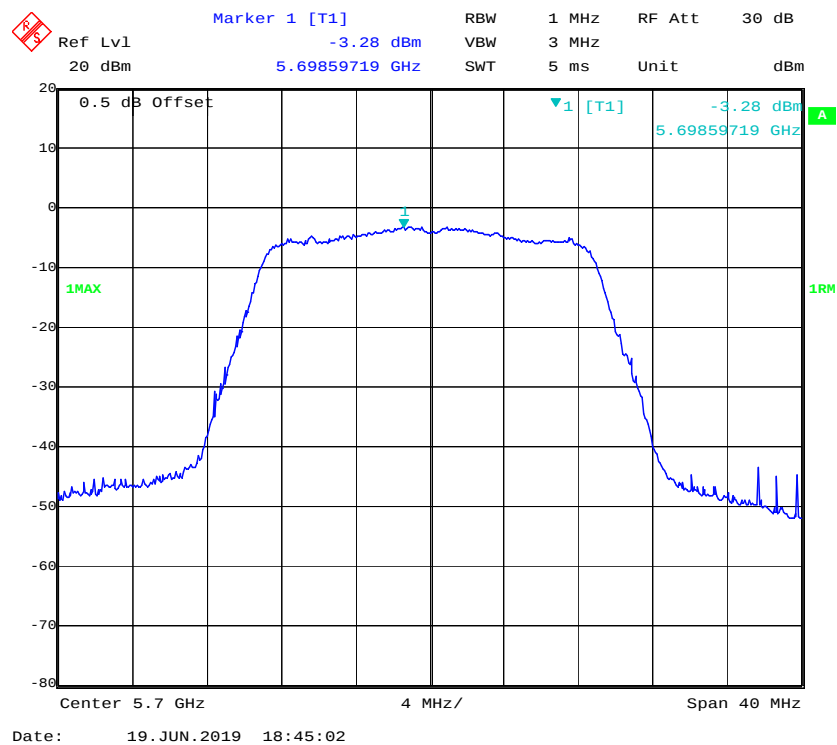
802.11n ht20 Low Channel

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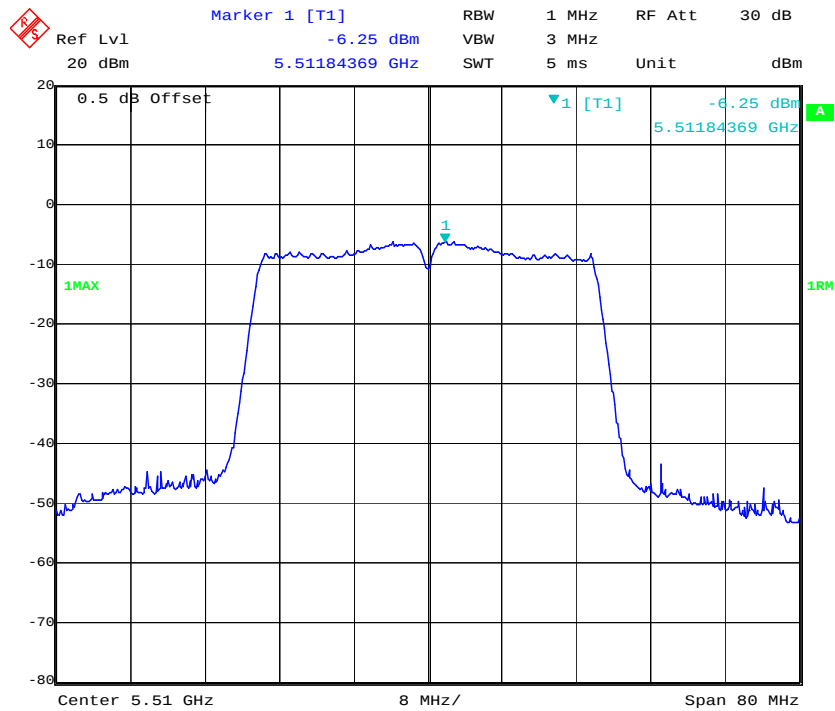
802.11n ht20 Middle Channel



802.11n ht20 High Channel

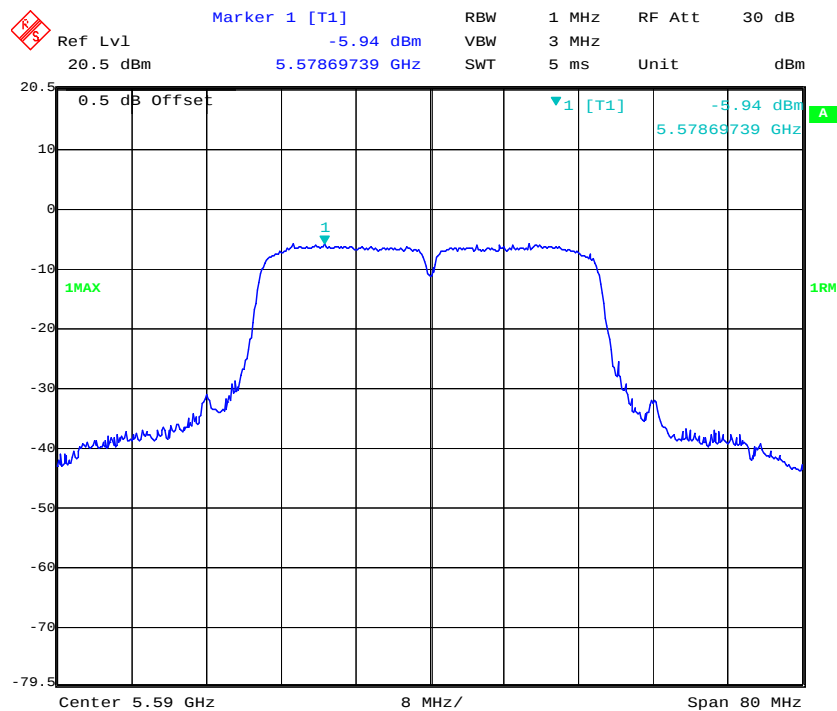


802.11n ht40 Low Channel

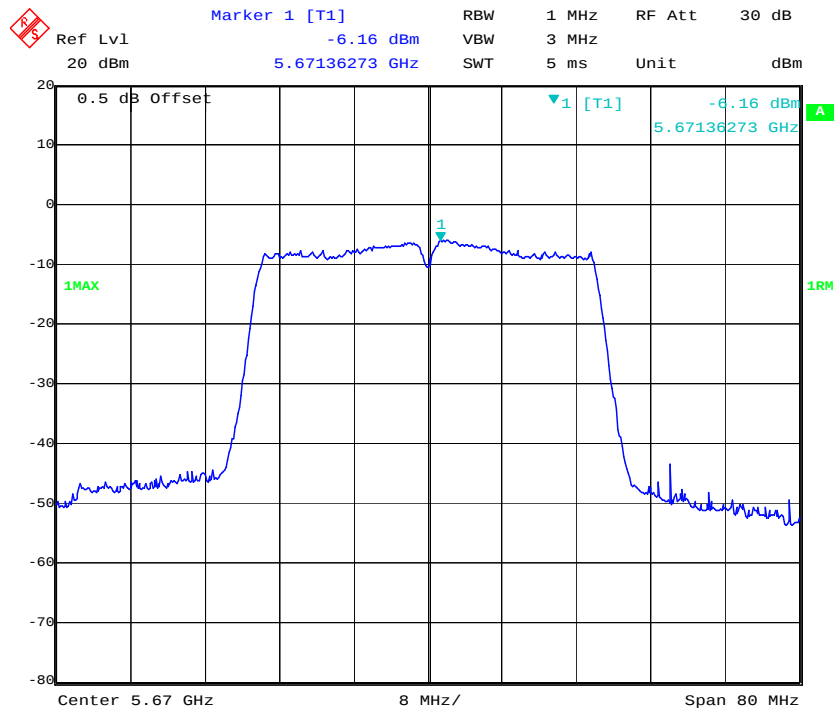


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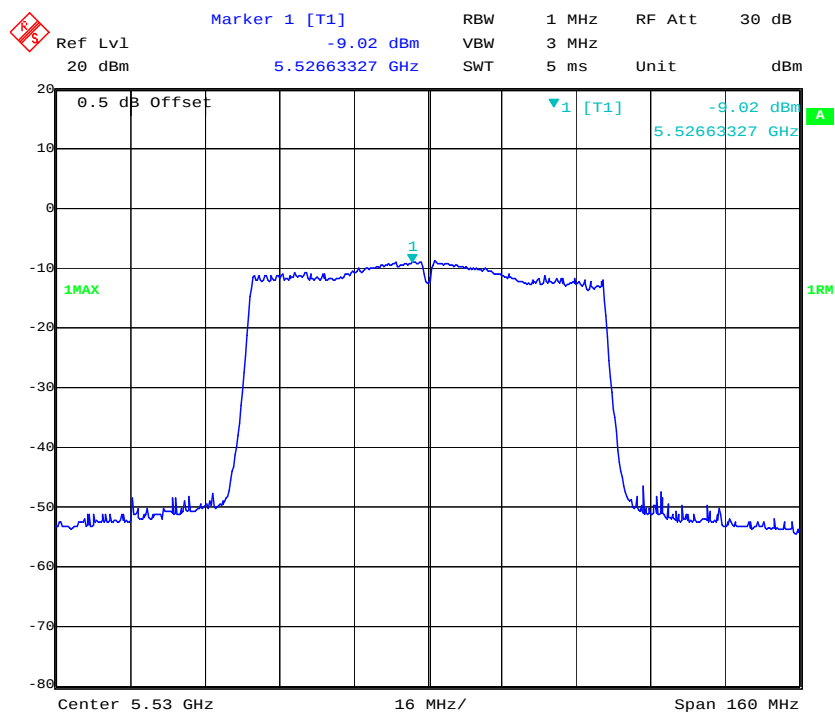
802.11n ht40 Middle Channel



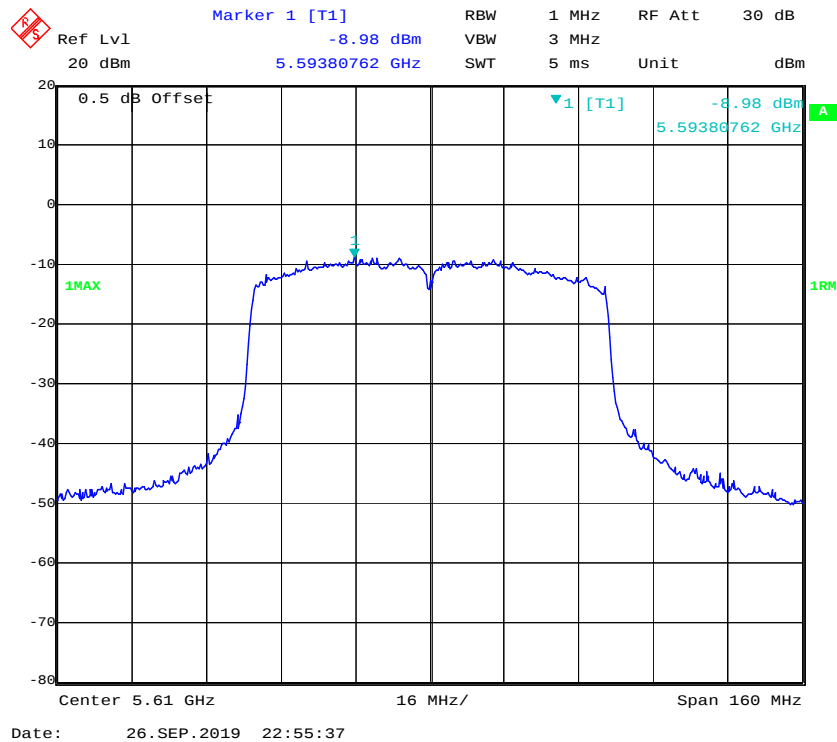
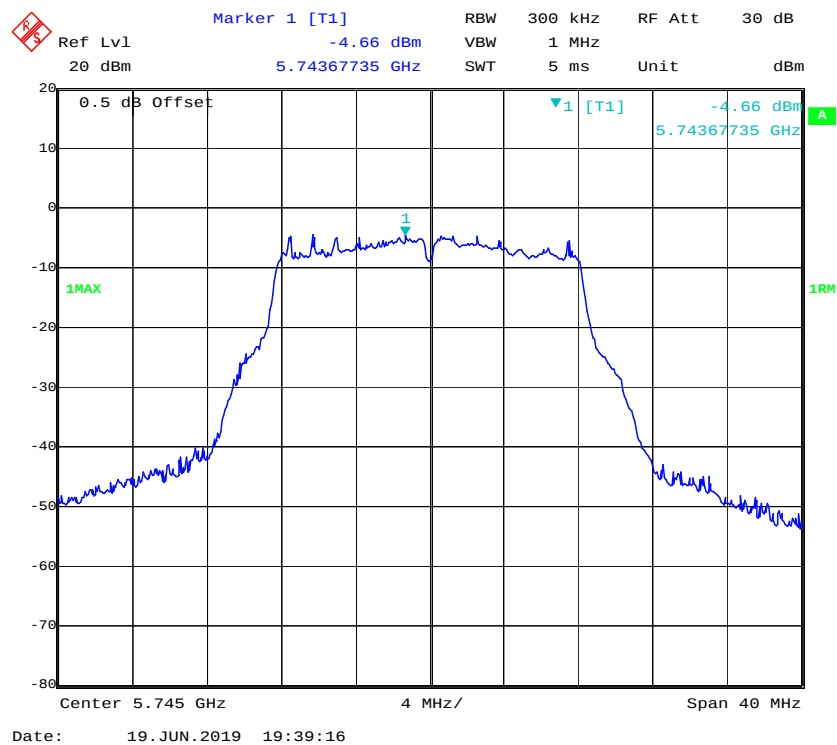
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802.11n ht40 High Channel

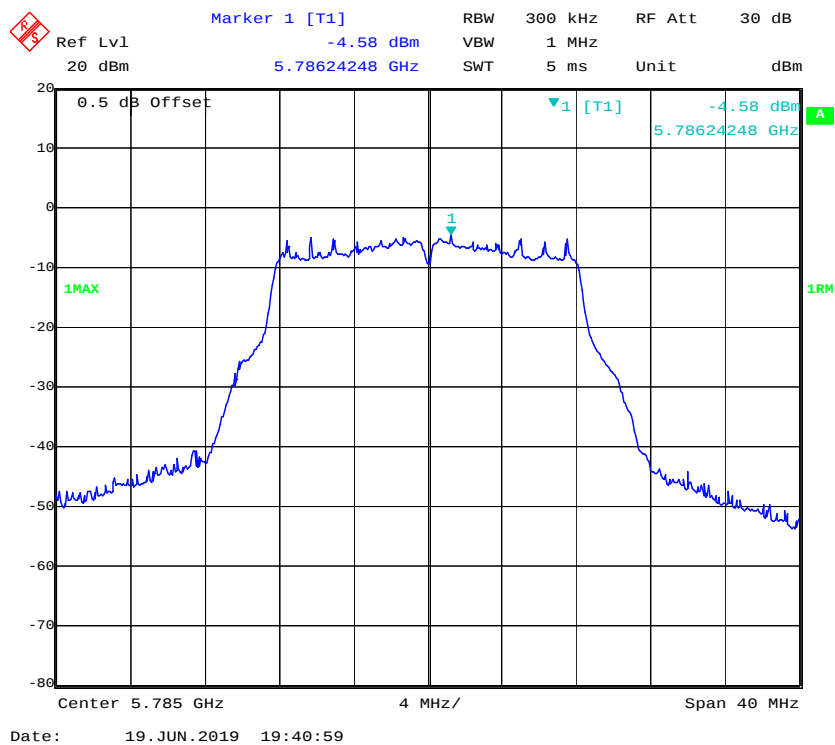
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802.11 ac80 Low Channel

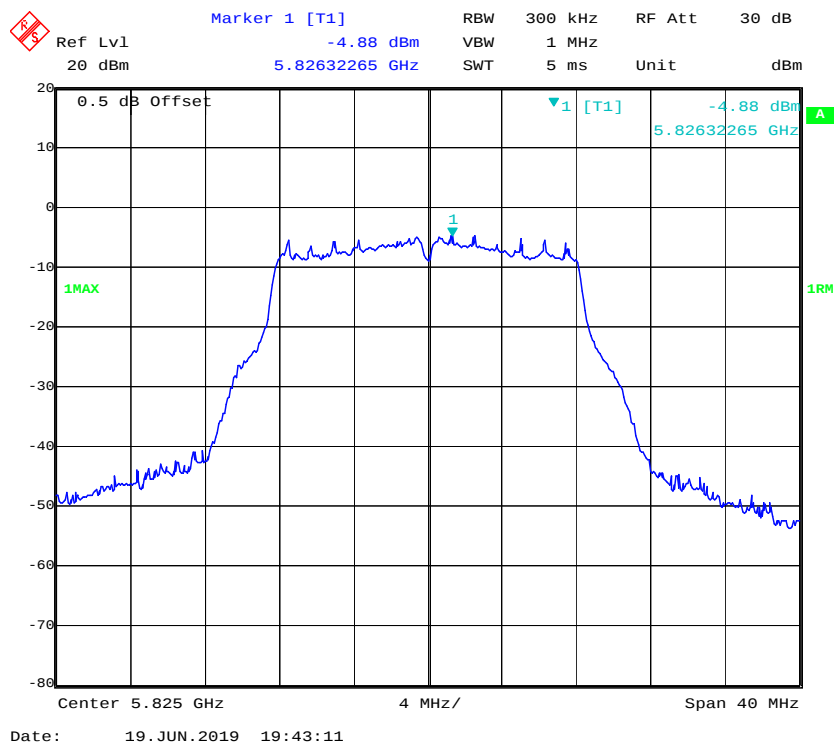
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802.11 ac80 High Channel**5725-5850 MHz:****802.11a Low Channel**

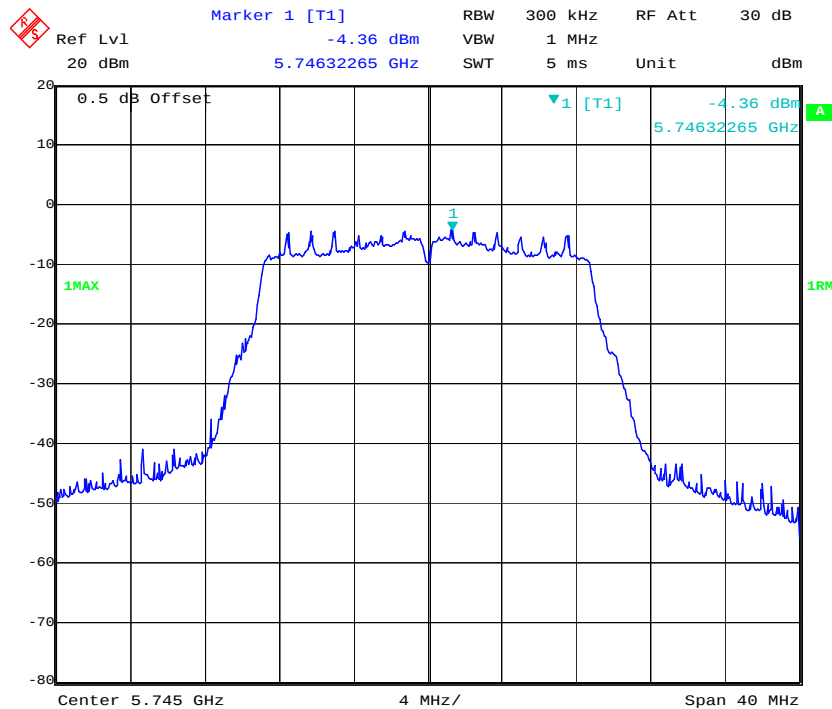
802.11a Middle Channel



802.11a High Channel

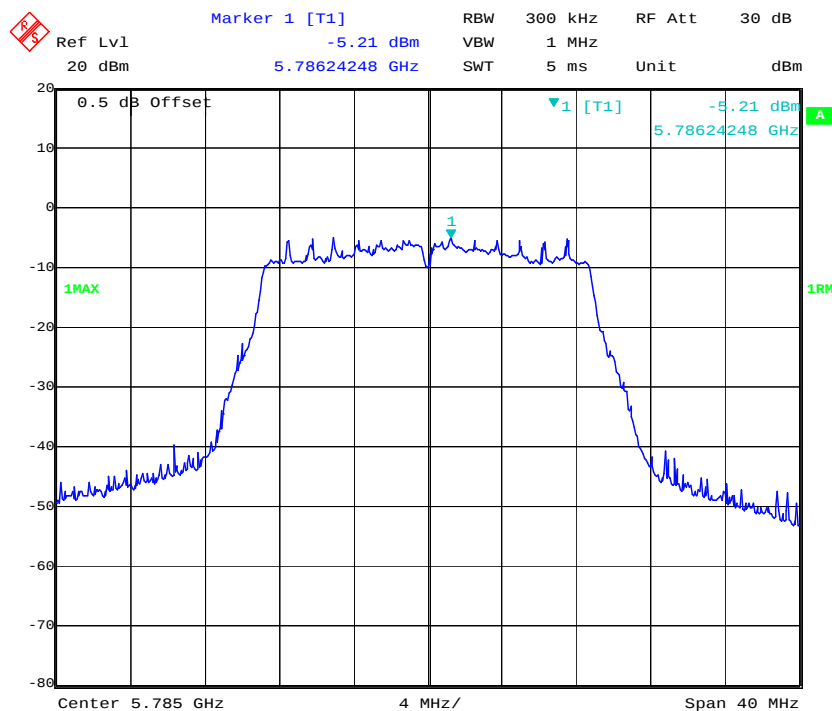


802.11n ht20 Low Channel



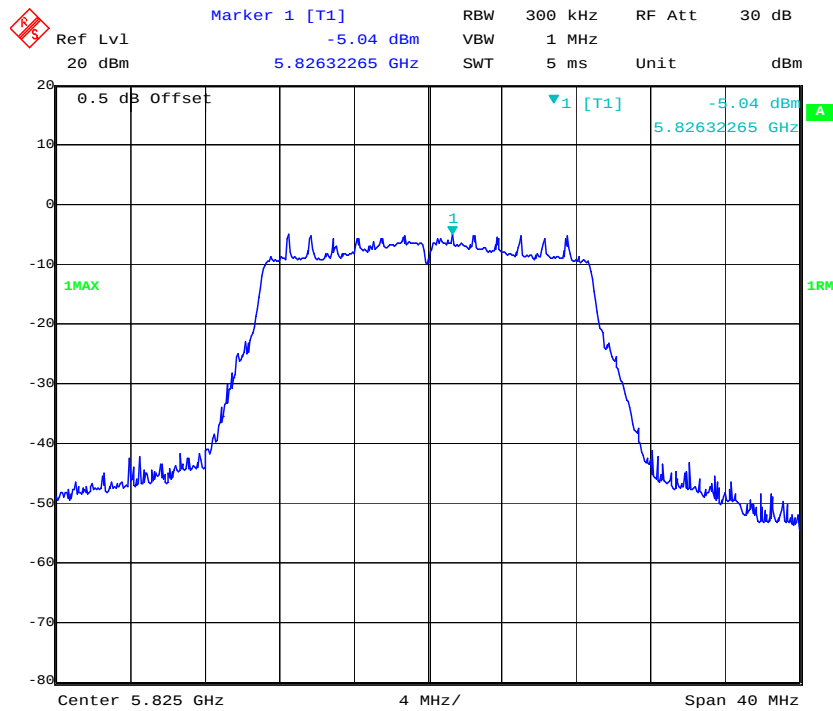
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802.11n ht20 Middle Channel



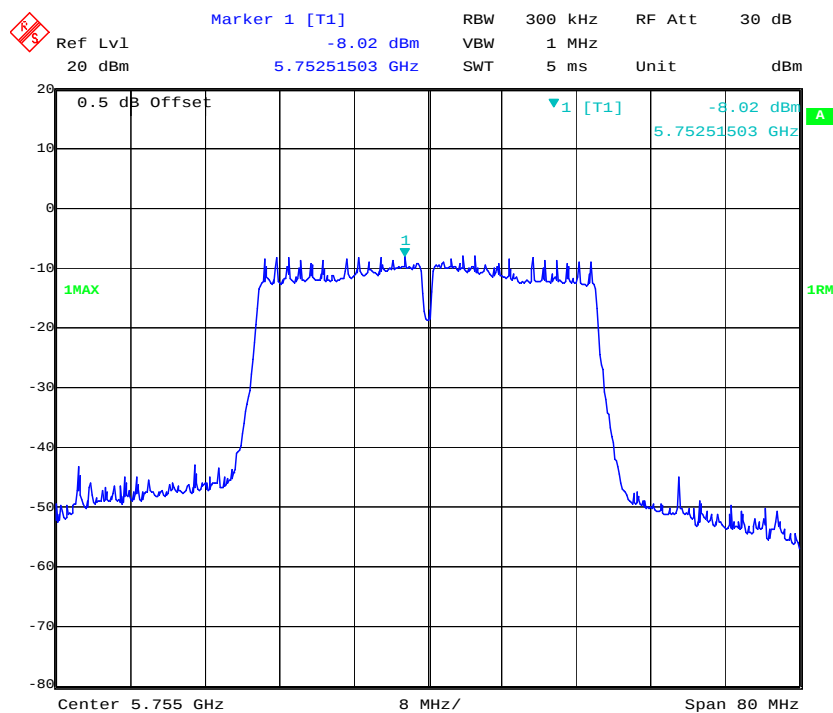
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802.11n ht20 High Channel

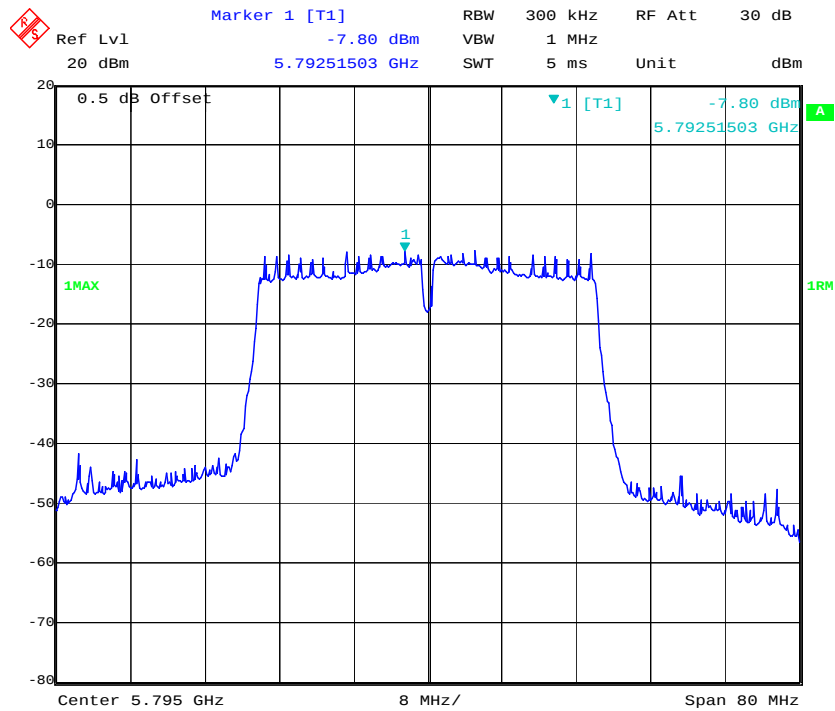
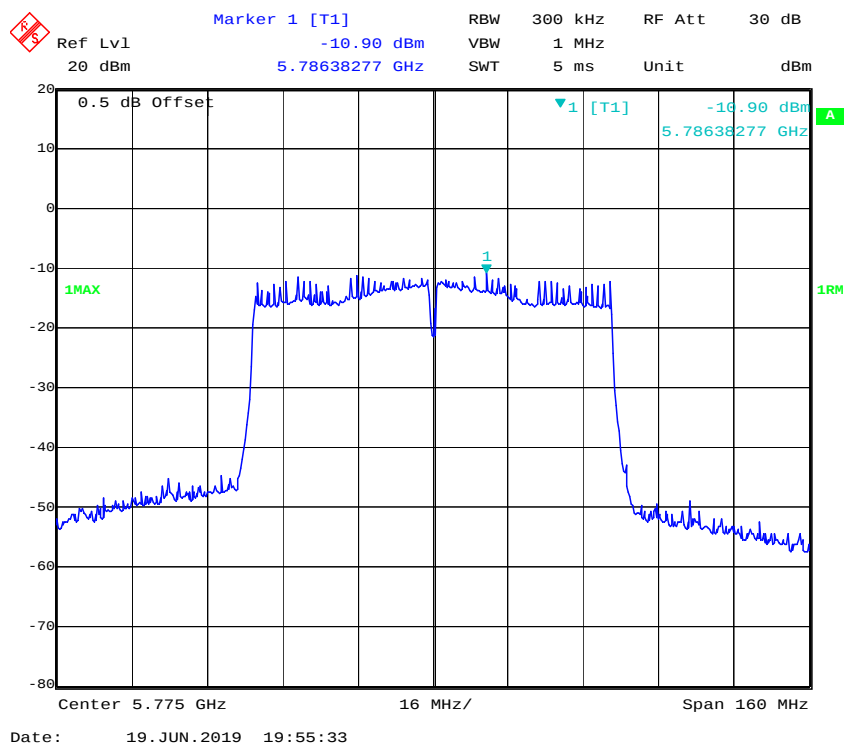


Date: 19.JUN.2019 19:50:06

802.11n ht40 Low Channel



Date: 19.JUN.2019 19:52:05

802.11n ht40 High Channel**802.11 ac80 Middle Channel**

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