TESTING LABORATORY
CERTIFICATE #4820.01

FCC PART 15.407

TEST REPORT

For

ZIONCOM ELECTRONICS (SHENZHEN) LTD.

Building A1-A2, Lantian Science and Technology Park, Xinyu Road,Xinqiao Henggang Block, Shajing Street, Baoan District, Shenzhen,China

FCC ID: X7DIP04348

Report Type: Original Report	**Product Name:** AC1200 Wireless Dual Band Gigabit Router

Report Number:	RDG180816001-00B
Report Date:	2018-12-04
Reviewed By:	Jerry Zhang EMC Manager
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:		AC1200 Wireless Dual Band Gigabit Router
EUT Model:		A3100R
Multiple Model:		IP04348
FCC ID:		X7DIP04348
Rated Input Voltage:		9VDC from adapter
Adapter Information	**Model:**	DCP005C09080U
	Input:	AC 100-240V, 50/60Hz, 0.2A
	Output:	DC 9V, 0.8A
External Dimension:		190mm(L)*134mm(W)*32mm(H)
Serial Number:		180816001
EUT Received Date:		2018-08-21

Note: The series product, model IP04348 are electrically identical with the model A3100R, we selected A3100R for fully testing .The difference between them was explained in the attached declaration letter.

Objective

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

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

Related Submittal(s)/Grant(s)

FCC Part 15C DTS submissions with FCC ID: X7DIP04348.

Test Methodology

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

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

Measurement Uncertainty

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

Test Facility

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

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

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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

The device has 3 external antennas for 2.4GHz and 2 external antennas for 5GHz. For 5 GHz band, 2T2R was employed, ANT 1(5G Chain 0) and ANT 2(5G Chain 1) for transmitting and receiving.

The system support 802.11a/n ht20/n ht40/ac vht20/ac vht40/ac vht80, the vh20/vht40 were reduced since the identical parameters with 802.11n ht20 and ht40.

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

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.
802.11ac80 mode was tested with channel 42

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

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

802.11a, 802.11n ht20 were tested with Channel 149, 157 and 165,
802.11n ht40 were tested with Channel 151 and 159.
802.11ac80 mode was tested with channel 155.

The device supports SISO and MIMO at 802.11n ht20/n ht40/AC80 mode, per pre-test, MIMO 2TX mode was the worst and reported.

EUT Exercise Software

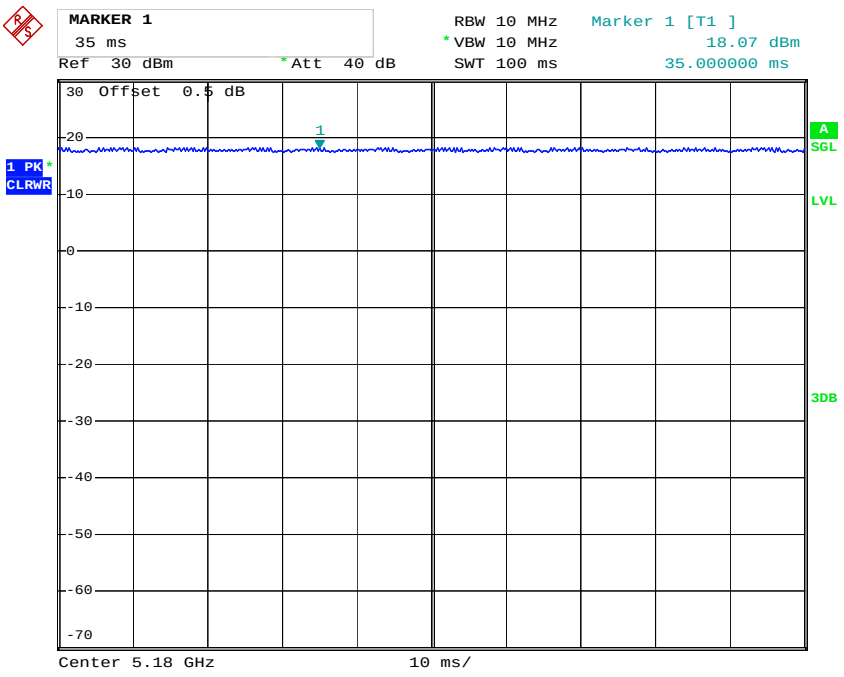
The software “MP-TOOL” was used for testing, which was provided by manufacturer. The worst-case data rates are determined to be as follows for each mode based upon investigations by measuring the average power and PSD across all date rates bandwidths, and modulations. The maximum power was configured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

Band	Mode	Channel	Frequency (MHz)	Data rate	Power level	
					Chain 0	Chain 1
5.15 - 5.25 GHz	802.11a	Low	5180	6 Mbps	38	42
		Middle	5200	6 Mbps	38	42
		High	5240	6 Mbps	36	40
	802.11n ht20	Low	5180	MCS8	38	42
		Middle	5200	MCS8	37	41
		High	5240	MCS8	35	39
	802.11n ht40	Low	5190	MCS8	29	33
		High	5230	MCS8	31	35
	802ac vht80	Middle	5210	MCS8	28	33
5.725 - 5.85 GHz	802.11a	Low	5745	6 Mbps	43	48
		Middle	5785	6 Mbps	43	50
		High	5825	6 Mbps	43	51
	802.11n ht20	Low	5745	MCS8	42	48
		Middle	5785	MCS8	42	49
		High	5825	MCS8	42	50
	802.11n ht40	Low	5755	MCS8	42	48
		High	5795	MCS8	42	49
	802ac vht80	Middle	5775	MCS8	36	43

The duty cycle as below:

Mode	T_{on} (ms)	T_{on+off} (ms)	Duty Cycle(x) (%)
802.11 a	100	100	100
802.11n ht20	100	100	100
802.11n ht40	100	100	100
802.11ac80	100	100	100

802.11a



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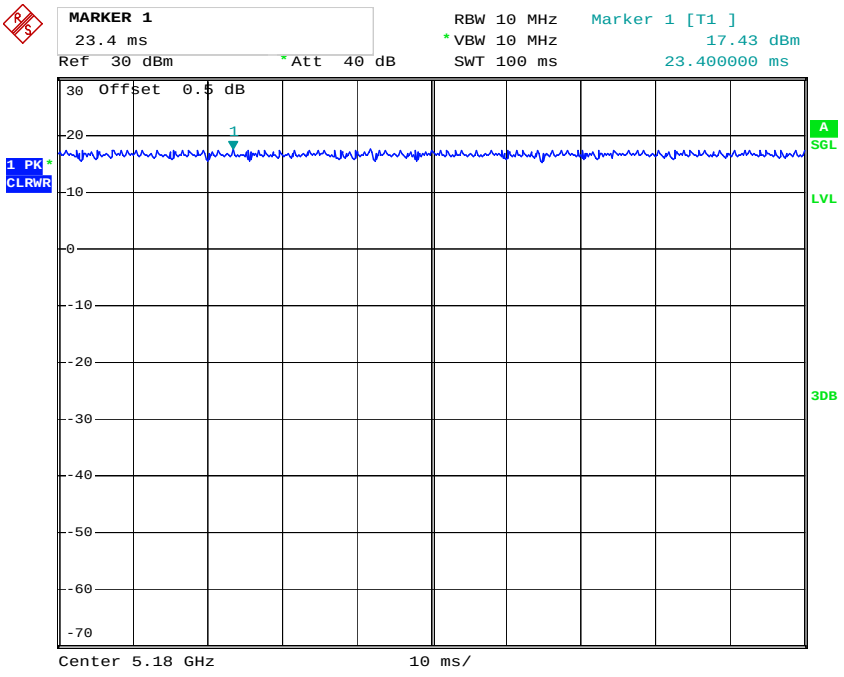
802.11n ht20



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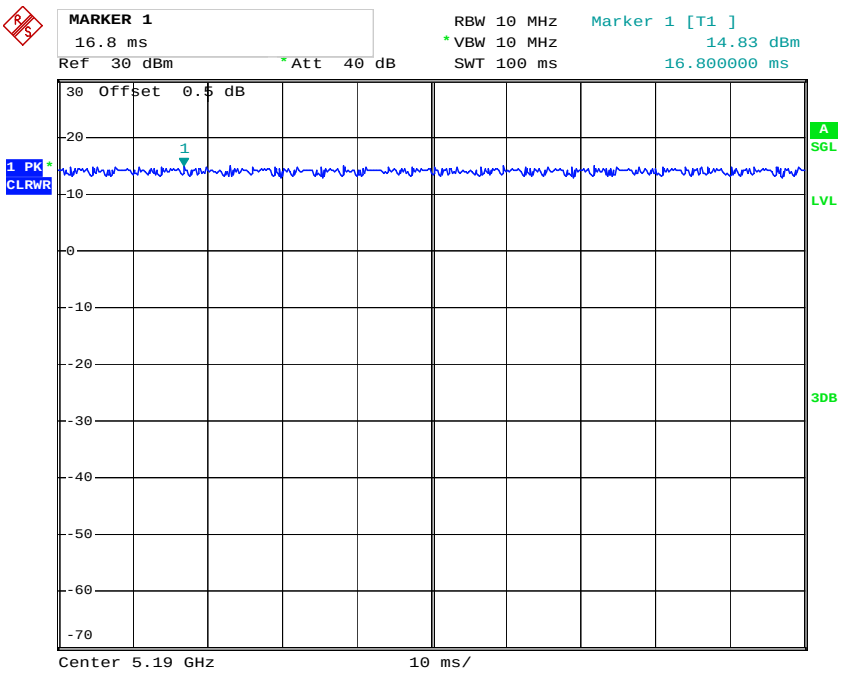
802.11n ht40



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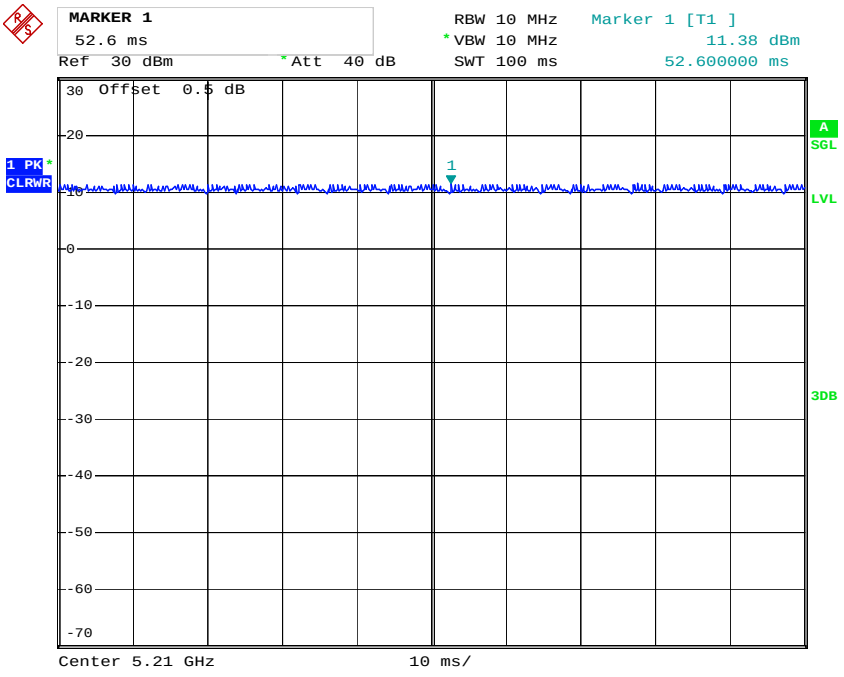
802.11 ac80



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Equipment Modifications

No modification was made to the EUT.

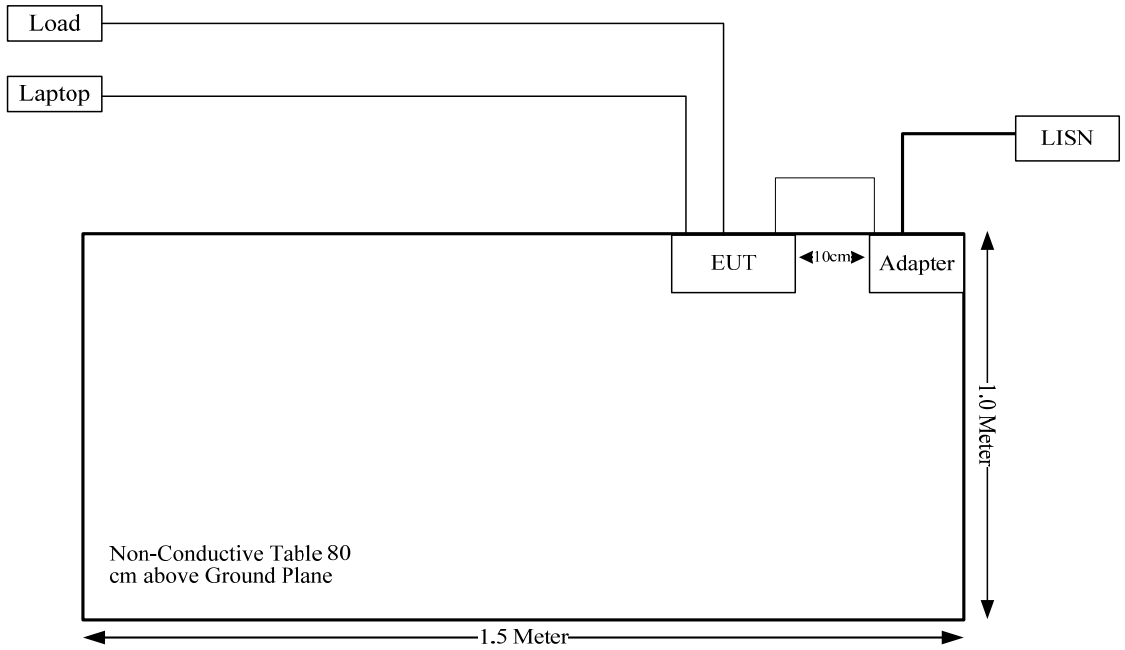
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Laptop	PP11L	QDS-BRCM1232
Un-known	Load	/	

Support Cable List and Details

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

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §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(b)	Out Of Band Emissions	Compliance
§15.407(a) (e)	Emission Bandwidth	Compliance
§15.407(g)	Frequency Stability	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/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

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

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

Calculated Data:

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)			
2412-2462	5	3.16	26	398.11	20.00	0.25	1.0
5150-5250	5	3.16	15	31.62	20.00	0.02	1.0
5725-5850	5	3.16	15	31.62	20.00	0.02	1.0

The 2.4GHz band and 5GHz band can transmit simultaneously:

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

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

$=0.25/1+0.02/1$

$=0.27$

< 1.0

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.
And according to FCC 47 CFR section 15.407 (a)(1),if transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT have 2 external antennas for 5G Band, which were permanently attached to the Unit, all antenna gains are 5dBi. Please refer to the EUT photo.

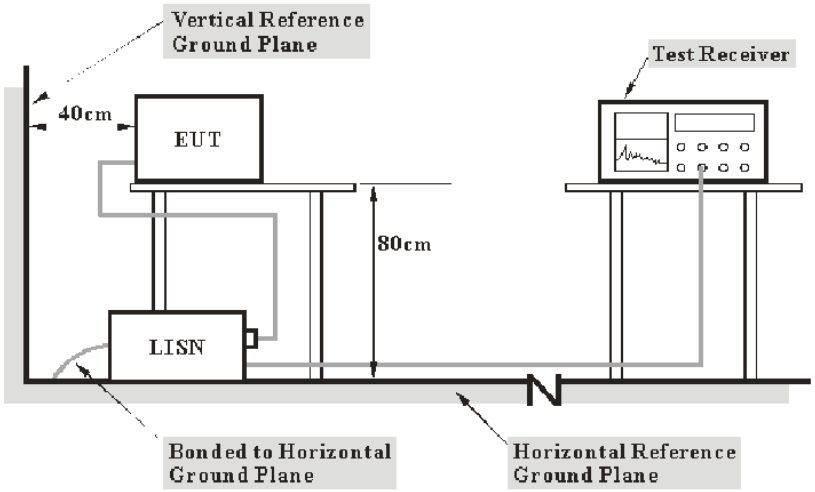
Result: Compliance.

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

Applicable Standard

FCC §15.207(a), §15.407(b) (6).

EUT Setup



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

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

The spacing between the peripherals was 10 cm.

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

EMI Test Receiver Setup

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

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

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

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

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

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

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

Margin = Limit – Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2017-12-11	2018-12-11
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-01	2018-09-05	2019-09-05
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A
R&S	Two-line V-network	ENV 216	101614	2017-12-08	2018-12-08

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

Test Procedure

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

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

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

Test Data

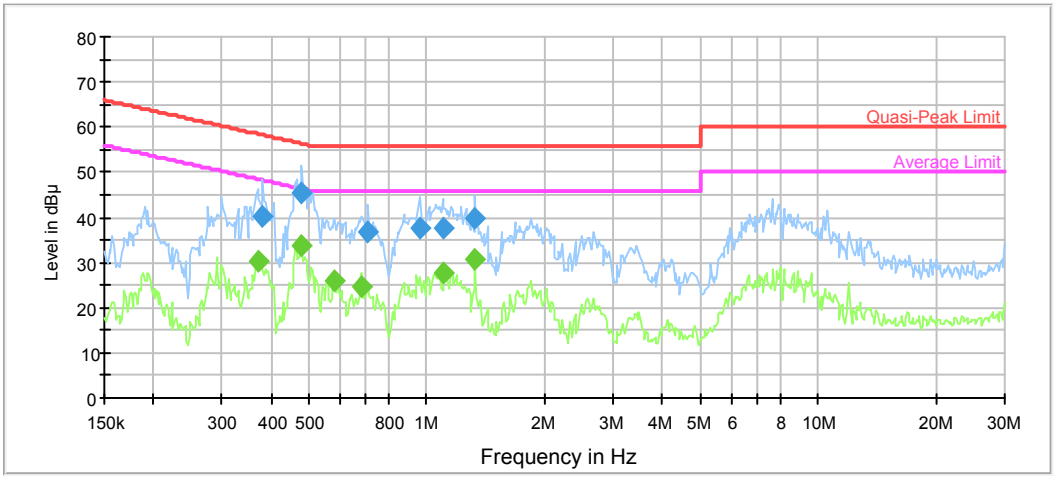
Environmental Conditions

Temperature:	27.6℃
Relative Humidity:	49%
ATM Pressure:	100.7kPa

The testing was performed by Lily Xie on 2018-09-07.

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

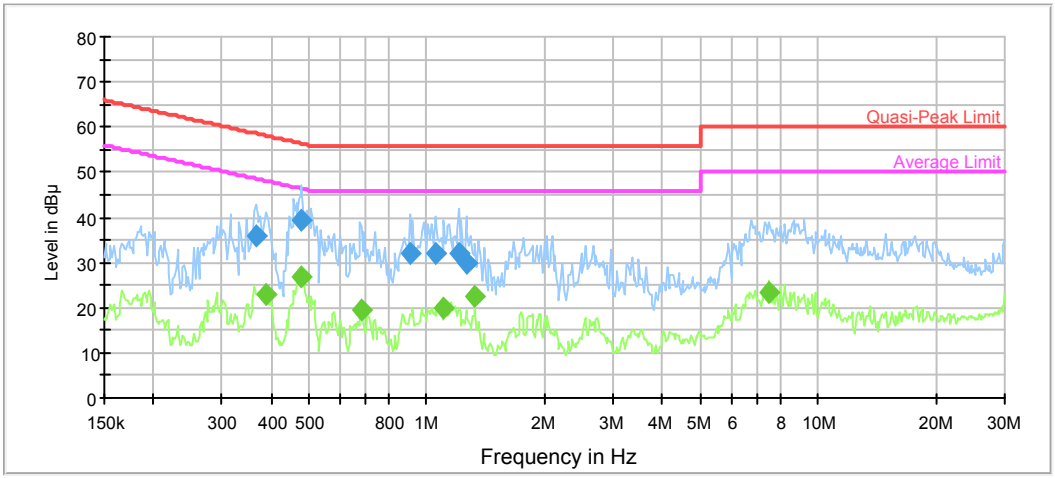
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.381043	40.2	9.000	L1	10.0	18.1	58.3	Compliance
0.480097	45.3	9.000	L1	9.9	11.0	56.3	Compliance
0.709407	36.7	9.000	L1	9.8	19.3	56.0	Compliance
0.960275	37.7	9.000	L1	9.8	18.3	56.0	Compliance
1.099574	37.4	9.000	L1	9.8	18.6	56.0	Compliance
1.331304	39.9	9.000	L1	9.7	16.1	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.369089	30.1	9.000	L1	10.0	18.4	48.5	Compliance
0.480097	33.8	9.000	L1	9.9	12.5	46.3	Compliance
0.581275	25.7	9.000	L1	9.8	20.3	46.0	Compliance
0.681699	24.7	9.000	L1	9.8	21.3	46.0	Compliance
1.108371	27.8	9.000	L1	9.8	18.2	46.0	Compliance
1.331304	30.8	9.000	L1	9.7	15.2	46.0	Compliance

AC120 V, 60 Hz, Neutral:



requency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.366160	35.7	9.000	N	10.0	22.9	58.6	Compliance
0.480097	39.2	9.000	N	9.9	17.1	56.3	Compliance
0.908180	31.8	9.000	N	9.8	24.2	56.0	Compliance
1.048242	32.1	9.000	N	9.8	23.9	56.0	Compliance
1.209904	31.8	9.000	N	9.8	24.2	56.0	Compliance
1.259081	29.6	9.000	N	9.8	26.4	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.387164	22.8	9.000	N	10.0	25.3	48.1	Compliance
0.480097	27.0	9.000	N	9.9	19.3	46.3	Compliance
0.681699	19.6	9.000	N	9.8	26.4	46.0	Compliance
1.108371	20.1	9.000	N	9.8	25.9	46.0	Compliance
1.331304	22.4	9.000	N	9.7	23.6	46.0	Compliance
7.502618	23.4	9.000	N	9.8	26.6	50.0	Compliance

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.

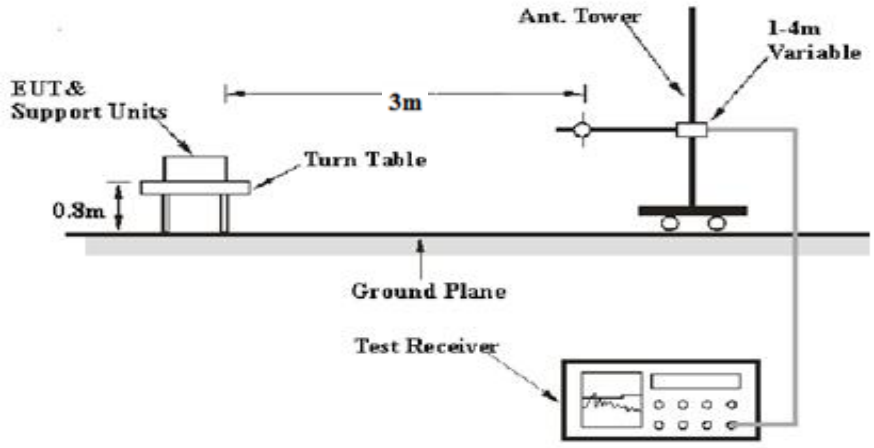
(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

(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.

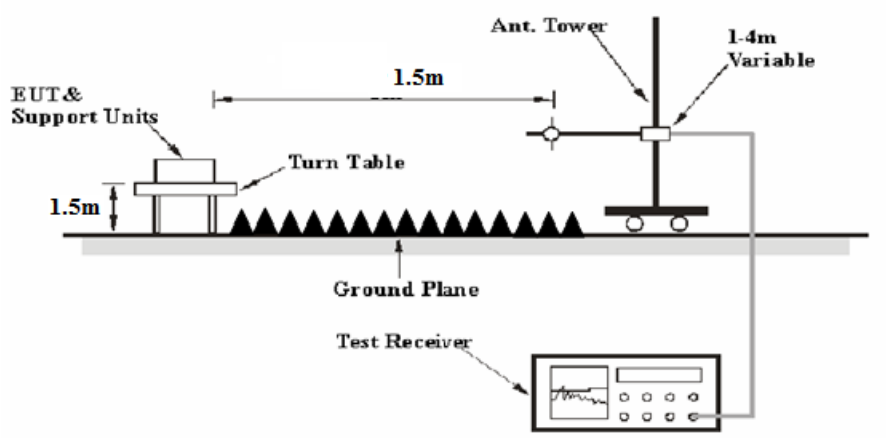
(7) The provisions of §15.205 apply to intentional radiators operating under this section.

EUT Setup

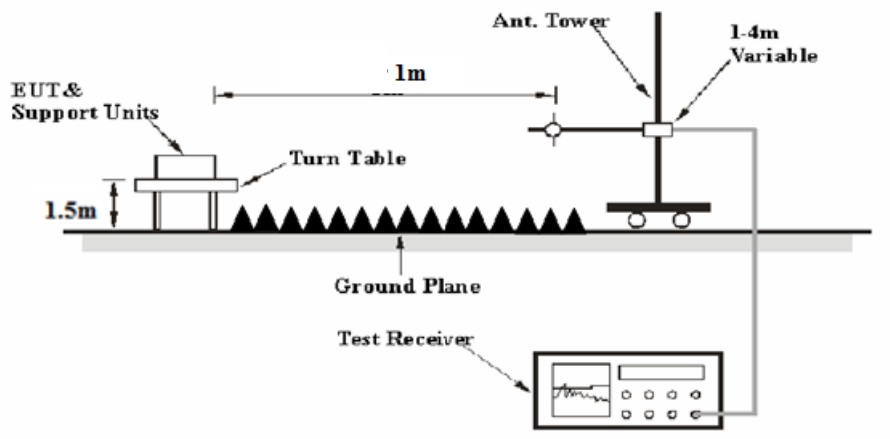
Below 1 GHz:



1-26.5 GHz:



26.5-40 GHz:



The radiated emission Below 1GHz tests were performed in the 10 meters chamber test site , 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

Test Procedure

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

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

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

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

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

Corrected Amplitude & Margin Calculation

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

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

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

Margin = Limit - Corrected Amplitude

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

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

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

Margin = Limit- Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100035	2018-08-03	2019-08-03
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Sunol Sciences	Antenna	JB3	A060611-3	2017-07-21	2019-07-21
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-02	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-02	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-2200-01	2017-09-05	2018-09-05
HP	Amplifier	8447F	2443A01912	2017-09-05	2018-09-05
Agilent	Spectrum Analyzer	E4440A	SG43360054	2018-01-04	2019-01-04
R&S	Spectrum Analyzer	FSP 38	100478	2017-12-08	2018-12-08
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-04
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1304	2016-11-18	2019-11-18
Ducommun Technolagies	Horn Antenna	ARH-2823-02	1007726-01 1302	2016-11-18	2019-11-18
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-2.4J2.4J-50	C-0700-02	2018-06-27	2019-06-27
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2017-09-05	2018-09-05
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2018-06-27	2019-06-27
Sinoscite	Bandstop Filters	BSF5150-5850MN-0899-003	0899003	2018-05-06	2019-05-06
Mini Circuits	High Pass Filter	VHF-6010+	31118	2018-06-16	2019-06-16

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

Test Data

Environmental Conditions

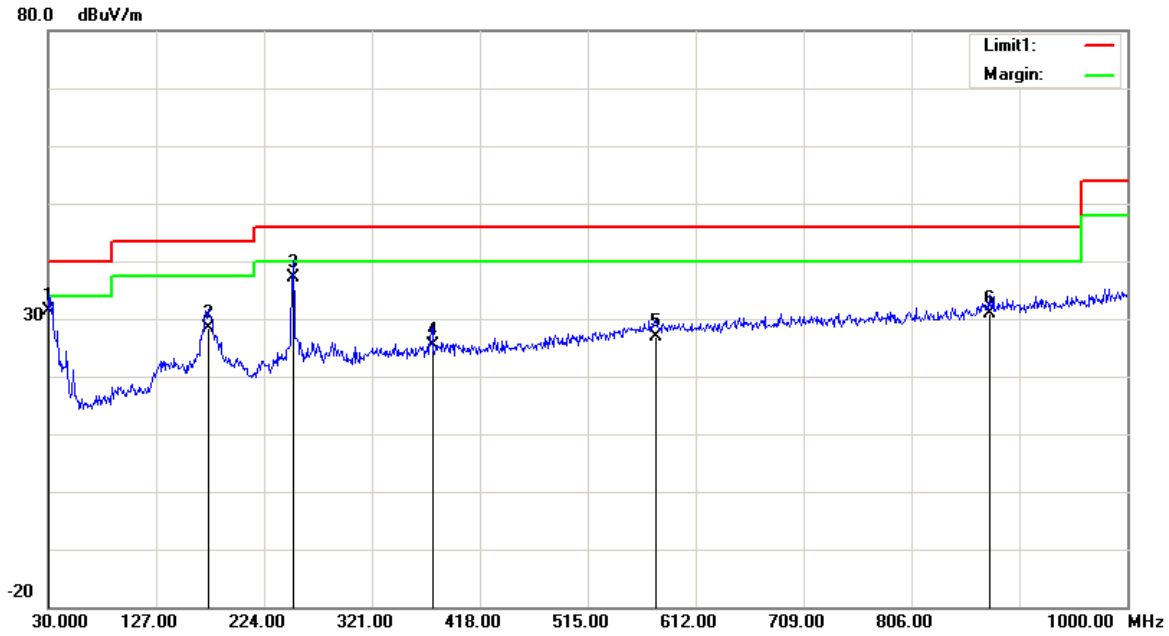
Temperature:	26.6~26.9 °C
Relative Humidity:	41~50 %
ATM Pressure:	99.6~99.9 kPa

** The testing was performed by Vito Chen & Vern Shen on 2018-08-23 & 2018-08-29.*

Test Mode: Transmitting

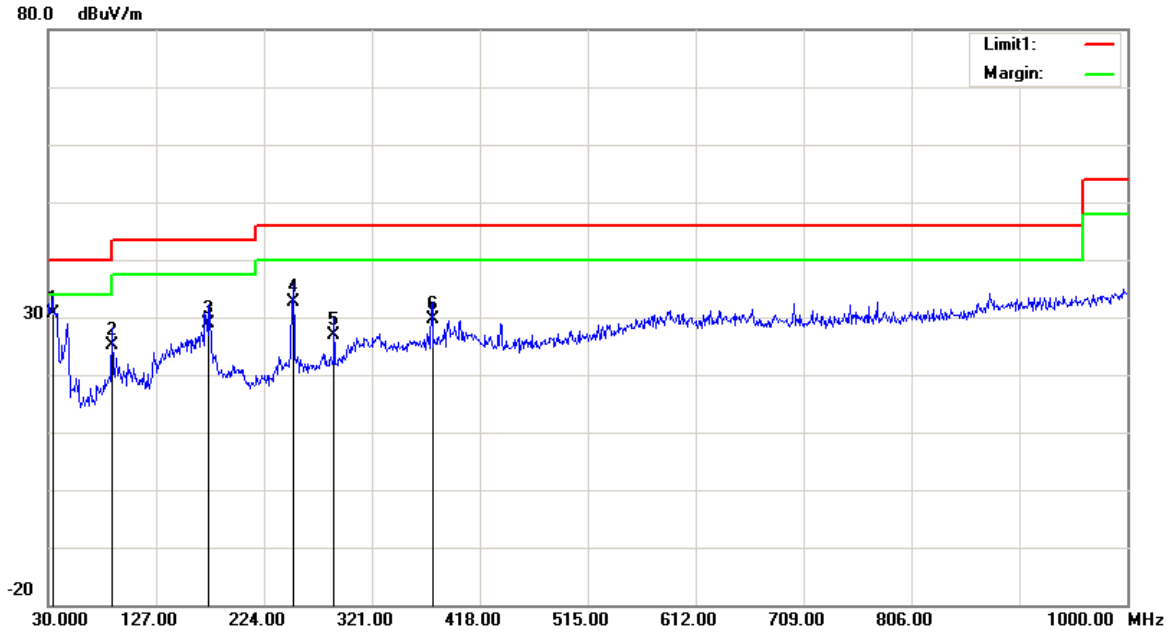
1) Below 1GHz(802.11a 5745 MHz Chain 0 was the worst):

Horizontal



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.9700	33.87	QP	-2.47	31.40	40.00	8.60
173.5600	35.74	QP	-7.24	28.50	43.50	15.00
250.1900	44.79	QP	-7.59	37.20	46.00	8.80
375.3200	28.30	QP	-2.80	25.50	46.00	20.50
576.1100	24.38	QP	2.42	26.80	46.00	19.20
875.8400	23.99	QP	7.01	31.00	46.00	15.00

Vertical



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
33.8800	34.58	QP	-3.88	30.70	40.00	9.30
87.2300	38.12	QP	-12.92	25.20	40.00	14.80
174.5300	36.31	QP	-7.31	29.00	43.50	14.50
250.1900	40.29	QP	-7.59	32.70	46.00	13.30
287.0500	32.50	QP	-5.70	26.80	46.00	19.20
375.3200	32.40	QP	-2.80	29.60	46.00	16.40

2) 1GHz-40GHz:
5150-5250MHz
802.11a (Chain 0 was the worst)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Extrapolation result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector	Polar (H/V)	Factor (dB/m)						
Low Channel: 5180 MHz										
5180.00	64.71	PK	H	33.59	3.58	0.00	101.88	95.86	N/A	N/A
5180.00	56.24	AV	H	33.59	3.58	0.00	93.41	87.39	N/A	N/A
5180.00	75.32	PK	V	33.59	3.58	0.00	112.49	106.47	N/A	N/A
5180.00	66.78	AV	V	33.59	3.58	0.00	103.95	97.93	N/A	N/A
5150.00	29.55	PK	V	33.54	3.56	0.00	66.65	60.63	74.00	13.37
5150.00	16.06	AV	V	33.54	3.56	0.00	53.16	47.14	54.00	6.86
10360.00	58.27	PK	V	38.17	6.29	36.85	65.88	59.86	74.00	14.14
10360.00	43.46	AV	V	38.17	6.29	36.85	51.07	45.05	54.00	8.95
15540.00	48.34	PK	V	38.06	8.85	39.04	56.21	50.19	74.00	23.81
15540.00	36.31	AV	V	38.06	8.85	39.04	44.18	38.16	54.00	15.84
6906.87	48.93	PK	V	35.01	5.10	36.99	52.05	46.03	74.00	27.97
6906.87	43.64	AV	V	35.01	5.10	36.99	46.76	40.74	54.00	13.26
Middle Channel: 5200 MHz										
5200.00	66.18	PK	H	33.62	3.60	0.00	103.40	97.38	N/A	N/A
5200.00	57.60	AV	H	33.62	3.60	0.00	94.82	88.8	N/A	N/A
5200.00	76.16	PK	V	33.62	3.60	0.00	113.38	107.36	N/A	N/A
5200.00	67.63	AV	V	33.62	3.60	0.00	104.85	98.83	N/A	N/A
10400.00	59.08	PK	V	38.18	6.32	36.86	66.72	60.7	74.00	13.30
10400.00	44.87	AV	V	38.18	6.32	36.86	52.51	46.49	54.00	7.51
15600.00	49.57	PK	V	38.00	8.83	39.09	57.31	51.29	74.00	22.71
15600.00	37.64	AV	V	38.00	8.83	39.09	45.38	39.36	54.00	14.64
6933.25	49.22	PK	V	35.07	5.12	36.98	52.43	46.41	74.00	27.59
6933.25	44.31	AV	V	35.07	5.12	36.98	47.52	41.5	54.00	12.50
High Channel: 5240 MHz										
5240.00	65.34	PK	H	33.68	3.52	0.00	102.54	96.52	N/A	N/A
5240.00	56.80	AV	H	33.68	3.52	0.00	94.00	87.98	N/A	N/A
5240.00	75.81	PK	V	33.68	3.52	0.00	113.01	106.99	N/A	N/A
5240.00	67.36	AV	V	33.68	3.52	0.00	104.56	98.54	N/A	N/A
5350.00	26.65	PK	V	33.86	3.52	0.00	64.03	58.01	74.00	15.99
5350.00	15.49	AV	V	33.86	3.52	0.00	52.87	46.85	54.00	7.15
10480.00	62.27	PK	V	38.20	6.37	36.88	69.96	63.94	74.00	10.06
10480.00	48.47	AV	V	38.20	6.37	36.88	56.16	50.14	54.00	3.86
15720.00	48.80	PK	V	37.88	8.79	39.18	56.29	50.27	74.00	23.73
15720.00	36.44	AV	V	37.88	8.79	39.18	43.93	37.91	54.00	16.09
6986.71	50.28	PK	V	35.17	5.17	36.97	53.65	47.63	74.00	26.37
6986.71	45.16	AV	V	35.17	5.17	36.97	48.53	42.51	54.00	11.49

802.11n ht20(2Tx was the worst)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)						
Low Channel: 5180 MHz										
5180.00	68.89	PK	H	33.59	3.58	0.00	106.06	100.04	N/A	N/A
5180.00	58.78	AV	H	33.59	3.58	0.00	95.95	89.93	N/A	N/A
5180.00	79.81	PK	V	33.59	3.58	0.00	116.98	110.96	N/A	N/A
5180.00	69.79	AV	V	33.59	3.58	0.00	106.96	100.94	N/A	N/A
5150.00	29.44	PK	V	33.54	3.56	0.00	66.54	60.52	74.00	13.48
5150.00	16.66	AV	V	33.54	3.56	0.00	53.76	47.74	54.00	6.26
10360.00	55.81	PK	V	38.17	6.29	36.85	63.42	57.4	74.00	16.60
10360.00	41.85	AV	V	38.17	6.29	36.85	49.46	43.44	54.00	10.56
15540.00	48.38	PK	V	38.06	8.85	39.04	56.25	50.23	74.00	23.77
15540.00	36.20	AV	V	38.06	8.85	39.04	44.07	38.05	54.00	15.95
6906.87	48.31	PK	V	35.01	5.10	36.99	51.43	45.41	74.00	28.59
6906.87	43.64	AV	V	35.01	5.10	36.99	46.76	40.74	54.00	13.26
Middle Channel: 5200 MHz										
5200.00	67.88	PK	H	33.62	3.60	0.00	105.10	99.08	N/A	N/A
5200.00	57.76	AV	H	33.62	3.60	0.00	94.98	88.96	N/A	N/A
5200.00	79.30	PK	V	33.62	3.60	0.00	116.52	110.5	N/A	N/A
5200.00	69.33	AV	V	33.62	3.60	0.00	106.55	100.53	N/A	N/A
10400.00	54.96	PK	V	38.18	6.32	36.86	62.60	56.58	74.00	17.42
10400.00	41.13	AV	V	38.18	6.32	36.86	48.77	42.75	54.00	11.25
15600.00	48.25	PK	V	38.00	8.83	39.09	55.99	49.97	74.00	24.03
15600.00	35.88	AV	V	38.00	8.83	39.09	43.62	37.6	54.00	16.40
6933.40	48.77	PK	V	35.07	5.12	36.98	51.98	45.96	74.00	28.04
6933.40	43.54	AV	V	35.07	5.12	36.98	46.75	40.73	54.00	13.27
High Channel: 5240 MHz										
5240.00	66.46	PK	H	33.68	3.52	0.00	103.66	97.64	N/A	N/A
5240.00	56.47	AV	H	33.68	3.52	0.00	93.67	87.65	N/A	N/A
5240.00	77.91	PK	V	33.68	3.52	0.00	115.11	109.09	N/A	N/A
5240.00	67.86	AV	V	33.68	3.52	0.00	105.06	99.04	N/A	N/A
5350.00	26.31	PK	V	33.86	3.52	0.00	63.69	57.67	74.00	16.33
5350.00	15.48	AV	V	33.86	3.52	0.00	52.86	46.84	54.00	7.16
10480.00	56.93	PK	V	38.20	6.37	36.88	64.62	58.6	74.00	15.40
10480.00	42.77	AV	V	38.20	6.37	36.88	50.46	44.44	54.00	9.56
15720.00	48.33	PK	V	37.88	8.79	39.18	55.82	49.8	74.00	24.20
15720.00	35.91	AV	V	37.88	8.79	39.18	43.40	37.38	54.00	16.62
6986.67	48.67	PK	V	35.17	5.17	36.97	52.04	46.02	74.00	27.98
6986.67	43.46	AV	V	35.17	5.17	36.97	46.83	40.81	54.00	13.19

802.11n ht40(2Tx was the worst)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Extrapolation result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector	Polar (H/V)	Factor (dB/m)						
Low Channel: 5190 MHz										
5190.00	59.67	PK	H	33.60	3.59	0.00	96.86	90.84	N/A	N/A
5190.00	50.13	AV	H	33.60	3.59	0.00	87.32	81.3	N/A	N/A
5190.00	68.88	PK	V	33.60	3.59	0.00	106.07	100.05	N/A	N/A
5190.00	59.32	AV	V	33.60	3.59	0.00	96.51	90.49	N/A	N/A
5150.00	26.61	PK	V	33.54	3.56	0.00	63.71	57.69	74.00	16.31
5150.00	15.95	AV	V	33.54	3.56	0.00	53.05	47.03	54.00	6.97
10380.00	46.30	PK	V	38.18	6.31	36.85	53.94	47.92	74.00	26.08
10380.00	34.02	AV	V	38.18	6.31	36.85	41.66	35.64	54.00	18.36
15570.00	48.13	PK	V	38.03	8.84	39.06	55.94	49.92	74.00	24.08
15570.00	35.67	AV	V	38.03	8.84	39.06	43.48	37.46	54.00	16.54
6920.11	49.46	PK	V	35.04	5.11	36.99	52.62	46.6	74.00	27.40
6920.11	44.26	AV	V	35.04	5.11	36.99	47.42	41.4	54.00	12.60
High Channel: 5230 MHz										
5230.00	61.78	PK	H	33.67	3.54	0.00	98.99	92.97	N/A	N/A
5230.00	52.03	AV	H	33.67	3.54	0.00	89.24	83.22	N/A	N/A
5230.00	71.43	PK	V	33.67	3.54	0.00	108.64	102.62	N/A	N/A
5230.00	61.59	AV	V	33.67	3.54	0.00	98.80	92.78	N/A	N/A
5350.00	26.57	PK	V	33.86	3.52	0.00	63.95	57.93	74.00	16.07
5350.00	15.31	AV	V	33.86	3.52	0.00	52.69	46.67	54.00	7.33
10460.00	48.87	PK	V	38.19	6.36	36.87	56.55	50.53	74.00	23.47
10460.00	36.10	AV	V	38.19	6.36	36.87	43.78	37.76	54.00	16.24
15690.00	48.30	PK	V	37.91	8.80	39.15	55.86	49.84	74.00	24.16
15690.00	35.64	AV	V	37.91	8.80	39.15	43.20	37.18	54.00	16.82
6973.28	49.95	PK	V	35.15	5.16	36.98	53.28	47.26	74.00	26.74
6973.28	37.24	AV	V	35.15	5.16	36.98	40.57	34.55	54.00	19.45

802.11 ac80(2Tx was the worst)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)						
Middle Channel: 5210 MHz										
5210.00	59.45	PK	H	33.64	3.58	0.00	96.67	90.65	N/A	N/A
5210.00	49.60	AV	H	33.64	3.58	0.00	86.82	80.8	N/A	N/A
5210.00	67.49	PK	V	33.64	3.58	0.00	104.71	98.69	N/A	N/A
5210.00	57.77	AV	V	33.64	3.58	0.00	94.99	88.97	N/A	N/A
5150.00	28.52	PK	V	33.54	3.56	0.00	65.62	59.6	74.00	14.40
5150.00	16.17	AV	V	33.54	3.56	0.00	53.27	47.25	54.00	6.75
5350.00	25.95	PK	V	33.86	3.52	0.00	63.33	57.31	74.00	16.69
5350.00	14.20	AV	V	33.86	3.52	0.00	51.58	45.56	54.00	8.44
10420.00	47.33	PK	V	38.18	6.33	36.86	54.98	48.96	74.00	25.04
10420.00	34.75	AV	V	38.18	6.33	36.86	42.40	36.38	54.00	17.62
15630.00	47.85	PK	V	37.97	8.82	39.11	55.53	49.51	74.00	24.49
15630.00	35.33	AV	V	37.97	8.82	39.11	43.01	36.99	54.00	17.01
6946.89	49.87	PK	V	35.09	5.13	36.98	53.11	47.09	74.00	26.91
6946.89	44.30	AV	V	35.09	5.13	36.98	47.54	41.52	54.00	12.48

5725-5850MHz
802.11a(Chain 0 was the worst)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Extrapolation result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector	Polar (H/V)	Factor (dB/m)						
Low Channel: 5745 MHz										
5745.00	68.07	PK	H	34.20	3.69	0.00	105.96	99.94	N/A	N/A
5745.00	59.03	AV	H	34.20	3.69	0.00	96.92	90.9	N/A	N/A
5745.00	79.07	PK	V	34.20	3.69	0.00	116.96	110.94	N/A	N/A
5745.00	69.95	AV	V	34.20	3.69	0.00	107.84	101.82	N/A	N/A
5725.00	38.47	PK	V	34.19	3.69	0.00	76.35	70.33	122.20	51.87
5720.00	29.51	PK	V	34.19	3.69	0.00	67.39	61.37	110.80	49.43
5700.00	27.73	PK	V	34.18	3.68	0.00	65.59	59.57	105.20	45.63
5650.00	26.78	PK	V	34.16	3.63	0.00	64.57	58.55	68.20	9.65
11490.00	60.76	PK	V	38.99	6.59	37.35	68.99	62.97	74.00	11.03
11490.00	47.57	AV	V	38.99	6.59	37.35	55.80	49.78	54.00	4.22
17235.00	50.54	PK	V	41.56	8.78	38.61	62.27	56.25	74.00	17.75
17235.00	38.10	AV	V	41.56	8.78	38.61	49.83	43.81	54.00	10.19
7660.12	55.85	PK	V	36.60	4.45	37.32	59.58	53.56	74.00	20.44
7660.12	53.17	AV	V	36.60	4.45	37.32	56.90	50.88	54.00	3.12
Middle Channel: 5785 MHz										
5785.00	68.10	PK	H	34.21	3.71	0.00	106.02	100	N/A	N/A
5785.00	58.97	AV	H	34.21	3.71	0.00	96.89	90.87	N/A	N/A
5785.00	77.54	PK	V	34.21	3.71	0.00	115.46	109.44	N/A	N/A
5785.00	68.37	AV	V	34.21	3.71	0.00	106.29	100.27	N/A	N/A
11570.00	59.87	PK	V	39.00	6.61	37.44	68.04	62.02	74.00	11.98
11570.00	46.51	AV	V	39.00	6.61	37.44	54.68	48.66	54.00	5.34
17355.00	49.28	PK	V	42.26	8.81	38.52	61.83	55.81	74.00	18.19
17355.00	36.77	AV	V	42.26	8.81	38.52	49.32	43.3	54.00	10.70
7713.35	55.19	PK	V	36.63	4.50	37.22	59.10	53.08	74.00	20.92
7713.35	52.56	AV	V	36.63	4.50	37.22	56.47	50.45	54.00	3.55
High Channel: 5825 MHz										
5825.00	67.85	PK	H	34.23	3.73	0.00	105.81	99.79	N/A	N/A
5825.00	58.32	AV	H	34.23	3.73	0.00	96.28	90.26	N/A	N/A
5825.00	76.44	PK	V	34.23	3.73	0.00	114.40	108.38	N/A	N/A
5825.00	67.83	AV	V	34.23	3.73	0.00	105.79	99.77	N/A	N/A
5850.00	29.32	PK	V	34.24	3.75	0.00	67.31	61.29	122.20	60.91
5855.00	27.98	PK	V	34.24	3.75	0.00	65.97	59.95	110.80	50.85
5875.00	27.13	PK	V	34.25	3.77	0.00	65.15	59.13	105.20	46.07
5925.00	26.41	PK	V	34.27	3.80	0.00	64.48	58.46	68.20	9.74
11650.00	56.91	PK	V	39.00	6.64	37.53	65.02	59	74.00	15.00
11650.00	43.66	AV	V	39.00	6.64	37.53	51.77	45.75	54.00	8.25
17475.00	48.67	PK	V	42.96	8.84	38.44	62.03	56.01	74.00	17.99
17475.00	36.25	AV	V	42.96	8.84	38.44	49.61	43.59	54.00	10.41
7766.68	54.84	PK	V	36.66	4.55	37.13	58.92	52.9	74.00	21.10
7766.68	52.45	AV	V	36.66	4.55	37.13	56.53	50.51	54.00	3.49

802.11n ht20(2Tx was the worst)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)						
Low Channel: 5745 MHz										
5745.00	68.58	PK	H	34.20	3.69	0.00	106.47	100.45	N/A	N/A
5745.00	59.43	AV	H	34.20	3.69	0.00	97.32	91.3	N/A	N/A
5745.00	80.78	PK	V	34.20	3.69	0.00	118.67	112.65	N/A	N/A
5745.00	71.79	AV	V	34.20	3.69	0.00	109.68	103.66	N/A	N/A
5725.00	40.96	PK	V	34.19	3.69	0.00	78.84	72.82	122.20	49.38
5720.00	34.55	PK	V	34.19	3.69	0.00	72.43	66.41	110.80	44.39
5700.00	27.67	PK	V	34.18	3.68	0.00	65.53	59.51	105.20	45.69
5650.00	26.84	PK	V	34.16	3.63	0.00	64.63	58.61	68.20	9.59
11490.00	54.78	PK	V	38.99	6.59	37.35	63.01	56.99	74.00	17.01
11490.00	39.83	AV	V	38.99	6.59	37.35	48.06	42.04	54.00	11.96
17235.00	47.12	PK	V	41.56	8.78	38.61	58.85	52.83	74.00	21.17
17235.00	34.85	AV	V	41.56	8.78	38.61	46.58	40.56	54.00	13.44
7660.25	55.75	PK	V	36.60	4.45	37.32	59.48	53.46	74.00	20.54
7660.25	52.73	AV	V	36.60	4.45	37.32	56.46	50.44	54.00	3.56
Middle Channel: 5785 MHz										
5785.00	68.32	PK	H	34.21	3.71	0.00	106.24	100.22	N/A	N/A
5785.00	59.44	AV	H	34.21	3.71	0.00	97.36	91.34	N/A	N/A
5785.00	81.15	PK	V	34.21	3.71	0.00	119.07	113.05	N/A	N/A
5785.00	72.54	AV	V	34.21	3.71	0.00	110.46	104.44	N/A	N/A
11570.00	51.62	PK	V	39.00	6.61	37.44	59.79	53.77	74.00	20.23
11570.00	38.53	AV	V	39.00	6.61	37.44	46.70	40.68	54.00	13.32
17355.00	46.81	PK	V	42.26	8.81	38.52	59.36	53.34	74.00	20.66
17355.00	34.27	AV	V	42.26	8.81	38.52	46.82	40.8	54.00	13.20
7713.44	55.35	PK	V	36.63	4.50	37.22	59.26	53.24	74.00	20.76
7713.44	52.56	AV	V	36.63	4.50	37.22	56.47	50.45	54.00	3.55
High Channel: 5825 MHz										
5825.00	67.96	PK	H	34.23	3.73	0.00	105.92	99.9	N/A	N/A
5825.00	58.34	AV	H	34.23	3.73	0.00	96.30	90.28	N/A	N/A
5825.00	81.92	PK	V	34.23	3.73	0.00	119.88	113.86	N/A	N/A
5825.00	72.86	AV	V	34.23	3.73	0.00	110.82	104.8	N/A	N/A
5850.00	35.82	PK	V	34.24	3.75	0.00	73.81	67.79	122.20	54.41
5855.00	29.09	PK	V	34.24	3.75	0.00	67.08	61.06	110.80	49.74
5875.00	27.15	PK	V	34.25	3.77	0.00	65.17	59.15	105.20	46.05
5925.00	26.53	PK	V	34.27	3.80	0.00	64.60	58.58	68.20	9.62
11650.00	52.54	PK	V	39.00	6.64	37.53	60.65	54.63	74.00	19.37
11650.00	37.52	AV	V	39.00	6.64	37.53	45.63	39.61	54.00	14.39
17475.00	46.85	PK	V	42.96	8.84	38.44	60.21	54.19	74.00	19.81
17475.00	34.13	AV	V	42.96	8.84	38.44	47.49	41.47	54.00	12.53
7766.72	54.39	PK	V	36.66	4.55	37.13	58.47	52.45	74.00	21.55
7766.72	52.01	AV	V	36.66	4.55	37.13	56.09	50.07	54.00	3.93

802.11n ht40(2Tx was the worst)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Extrapolation result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector	Polar (H/V)	Factor (dB/m)						
Low Channel: 5755MHz										
5755.00	66.21	PK	H	34.20	3.70	0.00	104.11	98.09	N/A	N/A
5755.00	56.87	AV	H	34.20	3.70	0.00	94.77	88.75	N/A	N/A
5755.00	79.94	PK	V	34.20	3.70	0.00	117.84	111.82	N/A	N/A
5755.00	70.29	AV	V	34.20	3.70	0.00	108.19	102.17	N/A	N/A
5725.00	45.31	PK	V	34.19	3.69	0.00	83.19	77.17	122.20	45.03
5720.00	44.59	PK	V	34.19	3.69	0.00	82.47	76.45	110.80	34.35
5700.00	28.33	PK	V	34.18	3.68	0.00	66.19	60.17	105.20	45.03
5650.00	25.92	PK	V	34.16	3.63	0.00	63.71	57.69	68.20	10.51
11510.00	51.63	PK	V	39.00	6.59	37.37	59.85	53.83	74.00	20.17
11510.00	37.12	AV	V	39.00	6.59	37.37	45.34	39.32	54.00	14.68
17265.00	46.85	PK	V	41.74	8.79	38.58	58.80	52.78	74.00	21.22
17265.00	34.05	AV	V	41.74	8.79	38.58	46.00	39.98	54.00	14.02
7673.60	53.86	PK	V	36.60	4.47	37.29	57.64	51.62	74.00	22.38
7673.60	52.42	AV	V	36.60	4.47	37.29	56.20	50.18	54.00	3.82
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	56.68	AV	H	34.22	3.71	0.00	94.61	88.59	N/A	N/A
5795.00	78.94	PK	V	34.22	3.71	0.00	116.87	110.85	N/A	N/A
5795.00	69.55	AV	V	34.22	3.71	0.00	107.48	101.46	N/A	N/A
5850.00	30.32	PK	V	34.24	3.75	0.00	68.31	62.29	122.20	59.91
5855.00	27.30	PK	V	34.24	3.75	0.00	65.29	59.27	110.80	51.53
5875.00	26.83	PK	V	34.25	3.77	0.00	64.85	58.83	105.20	46.37
5925.00	26.51	PK	V	34.27	3.80	0.00	64.58	58.56	68.20	9.64
11590.00	50.71	PK	V	39.00	6.62	37.46	58.87	52.85	74.00	21.15
11590.00	36.87	AV	V	39.00	6.62	37.46	45.03	39.01	54.00	14.99
17385.00	47.21	PK	V	42.43	8.82	38.50	59.96	53.94	74.00	20.06
17385.00	34.26	AV	V	42.43	8.82	38.50	47.01	40.99	54.00	13.01
7726.70	55.24	PK	V	36.64	4.51	37.20	59.19	53.17	74.00	20.83
7726.70	52.38	AV	V	36.64	4.51	37.20	56.33	50.31	54.00	3.69

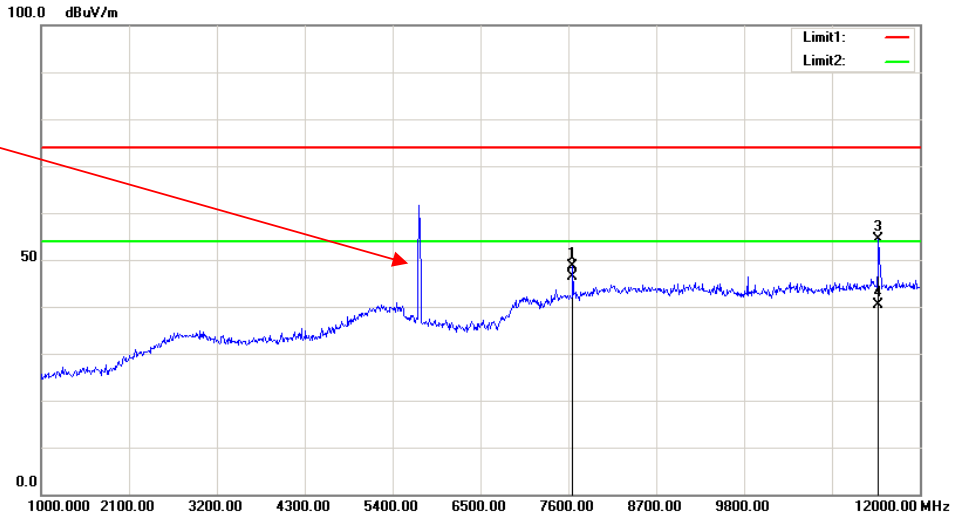
802.11 ac80(2Tx was the worst)

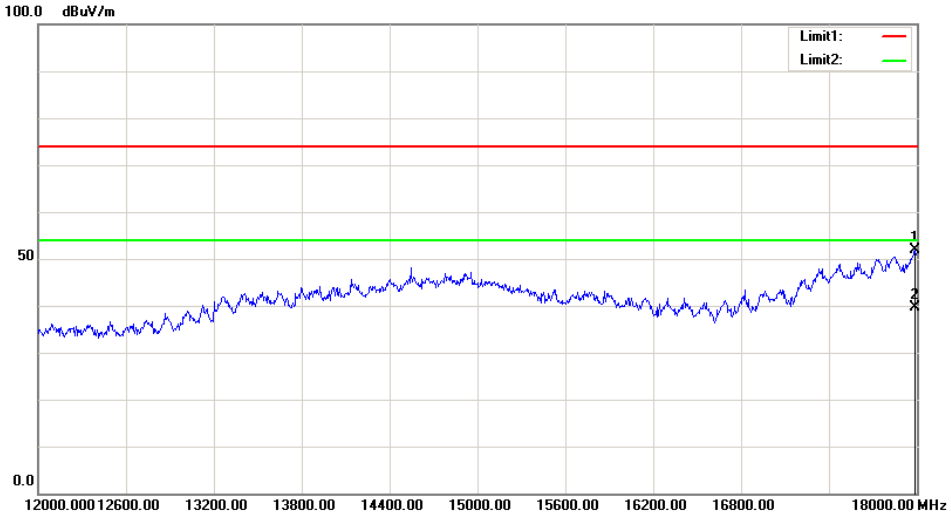
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)						
Middle Channel: 5775 MHz										
5775.00	62.13	PK	H	34.21	3.70	0.00	100.04	94.02	N/A	N/A
5775.00	51.57	AV	H	34.21	3.70	0.00	89.48	83.46	N/A	N/A
5775.00	76.91	PK	V	34.21	3.70	0.00	114.82	108.8	N/A	N/A
5775.00	68.02	AV	V	34.21	3.70	0.00	105.93	99.91	N/A	N/A
5725.00	30.21	PK	V	34.19	3.69	0.00	68.09	62.07	122.20	60.13
5720.00	27.72	PK	V	34.19	3.69	0.00	65.60	59.58	110.80	51.22
5700.00	27.18	PK	V	34.18	3.68	0.00	65.04	59.02	105.20	46.18
5650.00	26.03	PK	V	34.16	3.63	0.00	63.82	57.8	68.20	10.40
5850.00	27.96	PK	V	34.24	3.75	0.00	65.95	59.93	122.20	62.27
5855.00	26.35	PK	V	34.24	3.75	0.00	64.34	58.32	110.80	52.48
5875.00	25.46	PK	V	34.25	3.77	0.00	63.48	57.46	105.20	47.74
5925.00	25.17	PK	V	34.27	3.80	0.00	63.24	57.22	68.20	10.98
11550.00	50.86	PK	V	39.00	6.61	37.42	59.05	53.03	74.00	20.97
11550.00	37.13	AV	V	39.00	6.61	37.42	45.32	39.3	54.00	14.70
17325.00	47.63	PK	V	42.09	8.80	38.54	59.98	53.96	74.00	20.04
17325.00	34.57	AV	V	42.09	8.80	38.54	46.92	40.9	54.00	13.10
7700.00	55.43	PK	V	36.62	4.49	37.25	59.29	53.27	74.00	20.73
7700.00	52.81	AV	V	36.62	4.49	37.25	56.67	50.65	54.00	3.35

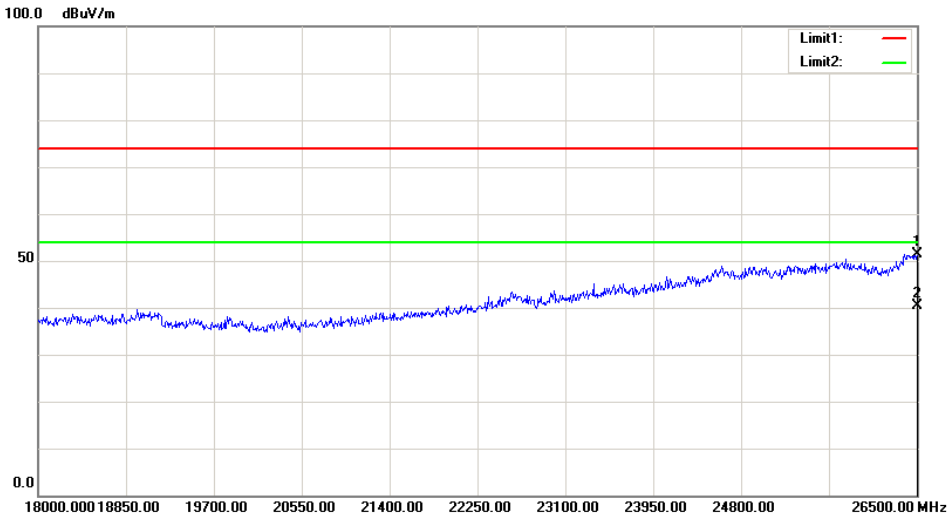
Test Plots(For worst mode 802.11a chain 0 5745 MHz)

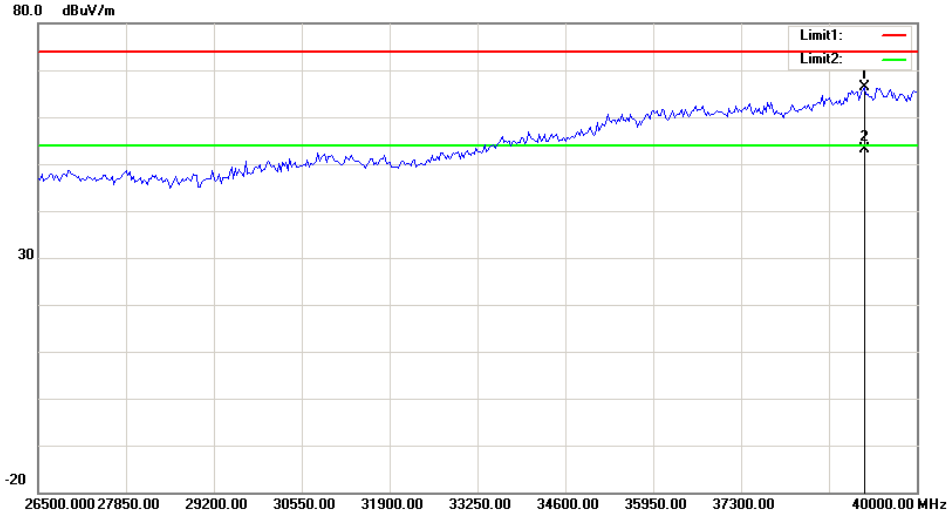
Horizontal

Fundamental Test with Band Rejection Filter



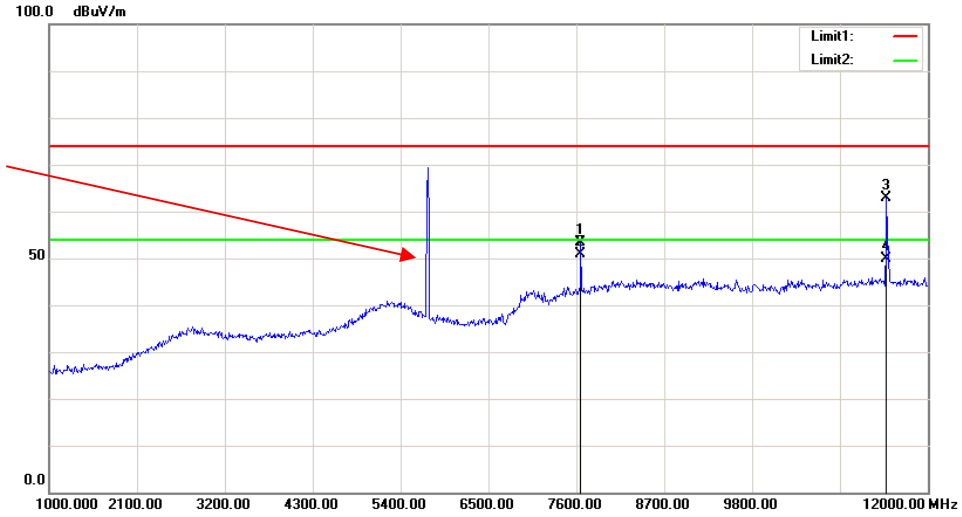


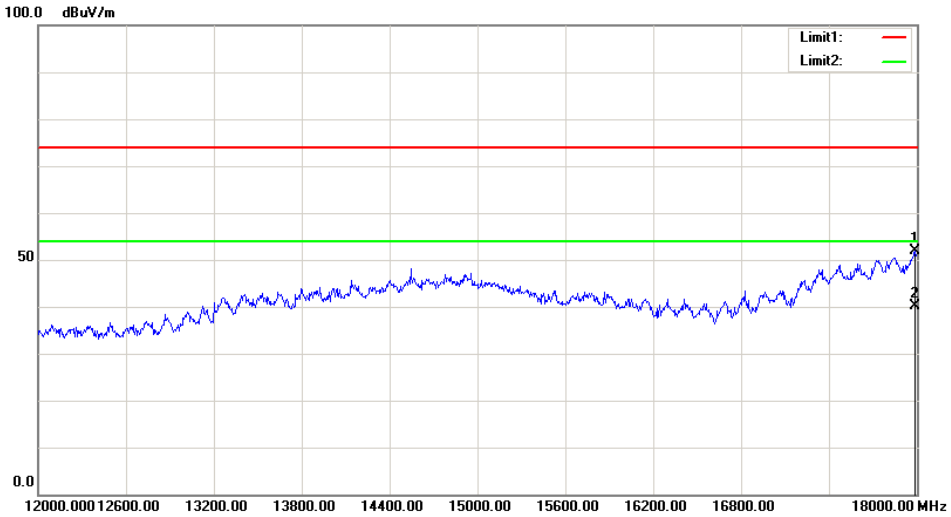


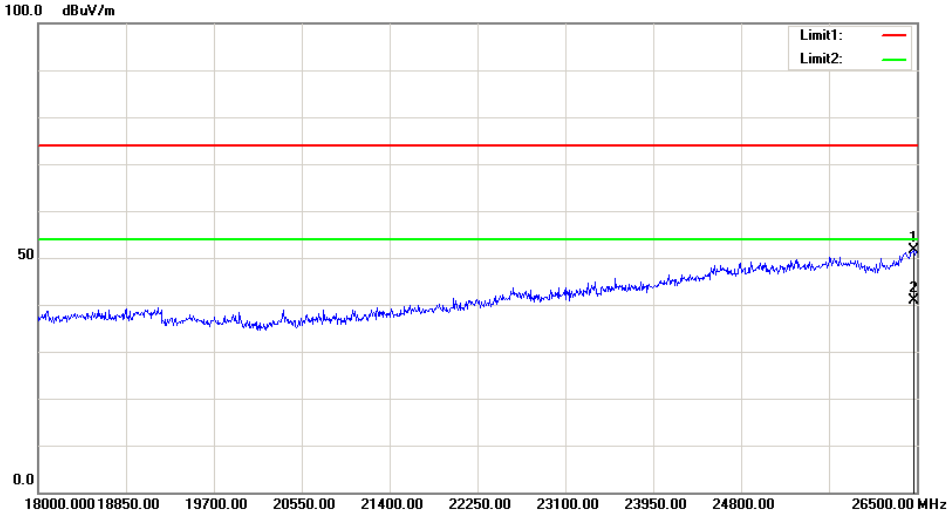


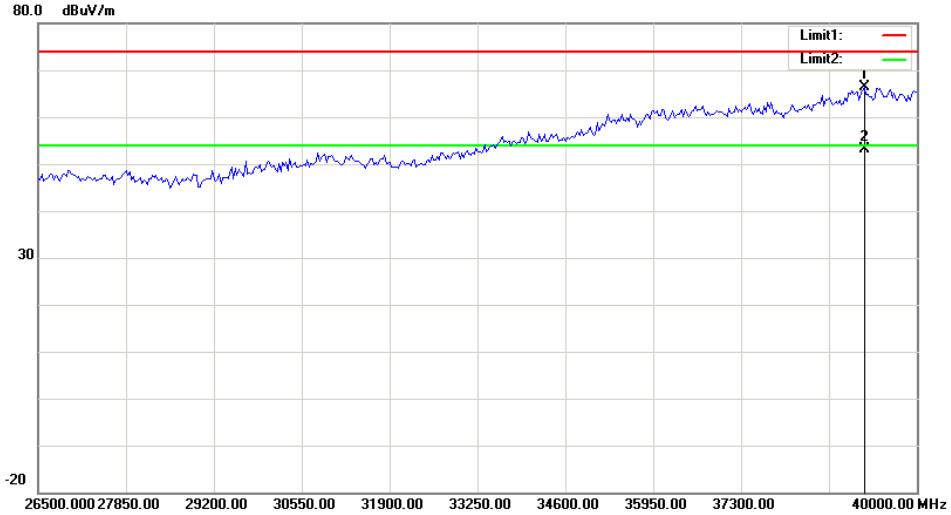
Vertical

Fundamental Test with Band Rejection Filter






100.0 dBuV/m
Limit1:
Limit2:
50
0.0
1
2
18000.000 18850.00 19700.00 20550.00 21400.00 22250.00 23100.00 23950.00 24800.00 26500.00 MHz


80.0 dBuV/m
Limit1:
Limit2:
30
-20
1
2
26500.000 27850.00 29200.00 30550.00 31900.00 33250.00 34600.00 35950.00 37300.00 40000.00 MHz

FCC §15.407(b)–OUT- OF-BAND EMISSIONS

Applicable Standard

FCC §15.407

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

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

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

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

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

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

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

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

Test Procedure

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESPI	100120	2017-12-11	2018-12-11
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A

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

Test Data

Environmental Conditions

Temperature:	27.5°C
Relative Humidity:	61 %
ATM Pressure:	99.9 kPa

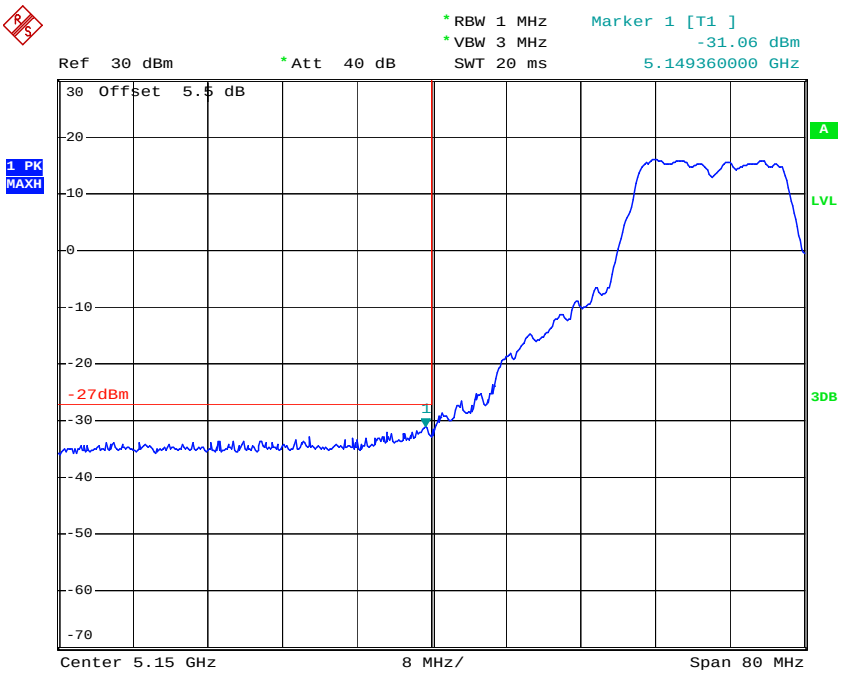
The testing was performed by Elena Lei on 2018-08-25 .

Test Result: Pass.

Please refer to the following table and plots.

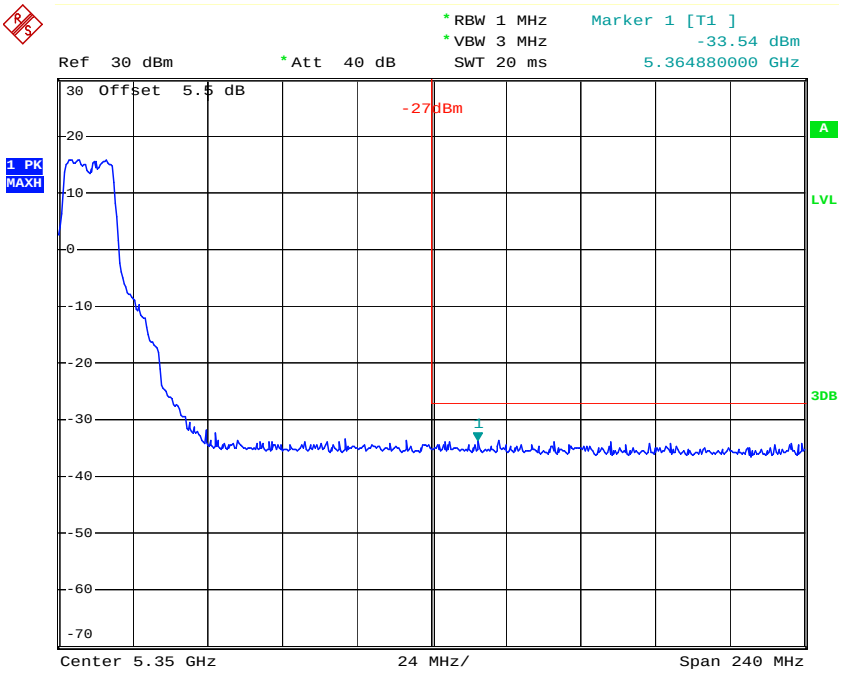
5150-5250MHz(the atenna gain was offset in the display, for 802.11n and ac mode, since the emissions under limit more than 3dBc, complaince the requirement for MIMO transmission)
Chain 0:

802.11a Low Channel



Date: 25.AUG.2018 11:15:39

802.11a High Channel



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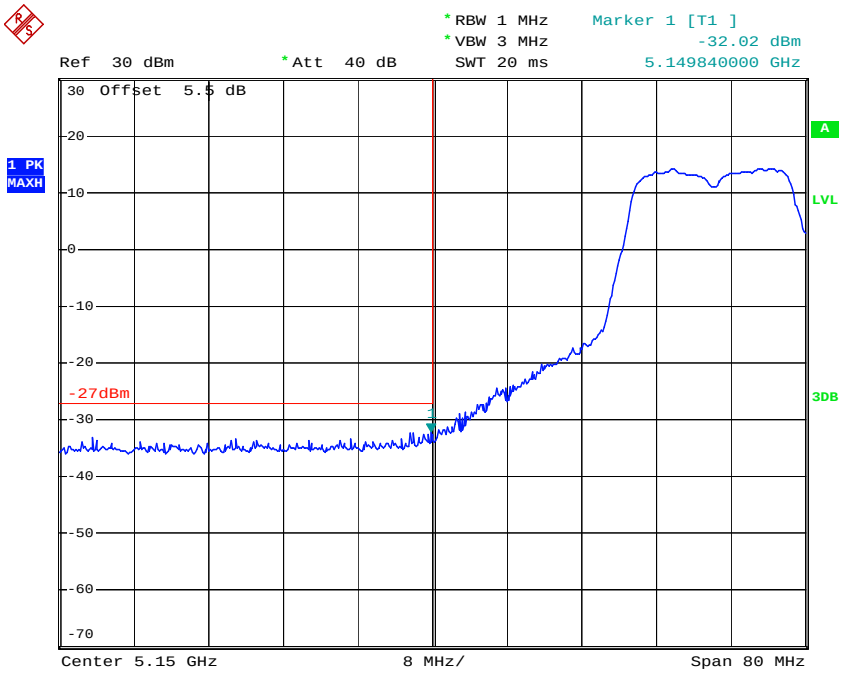
802.11n ht20 Low Channel



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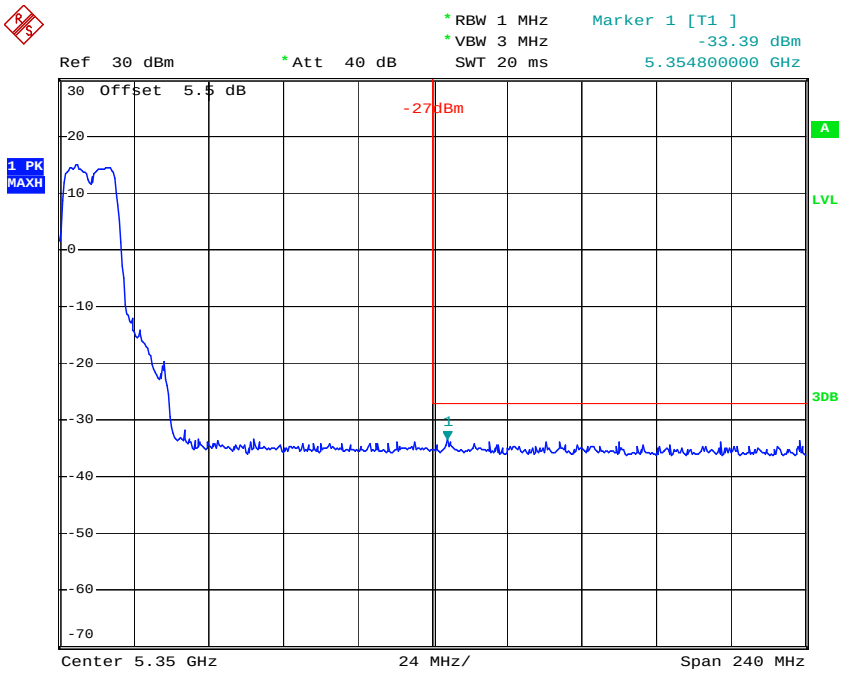
802.11n ht20 High Channel



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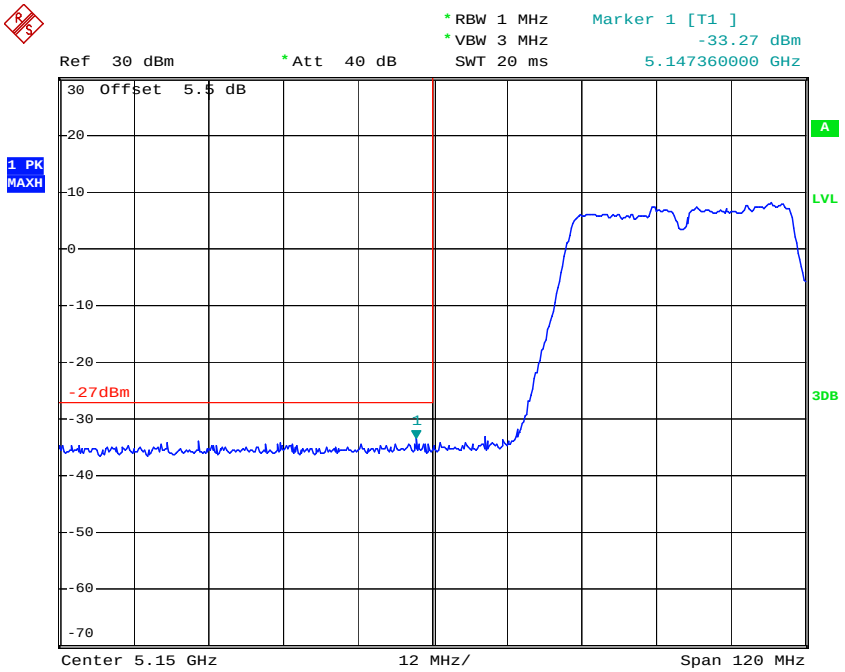
802.11n ht40 Low Channel



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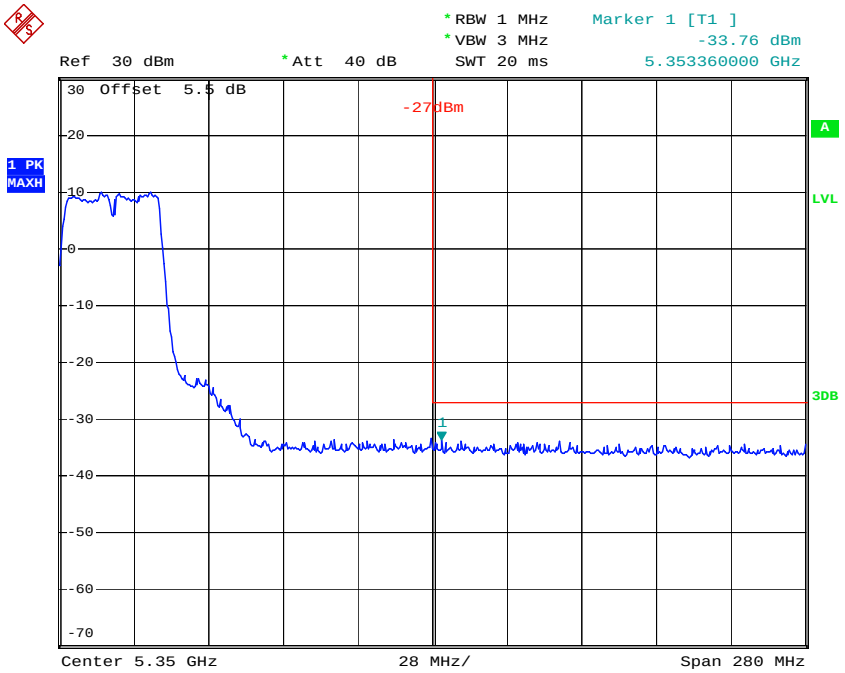
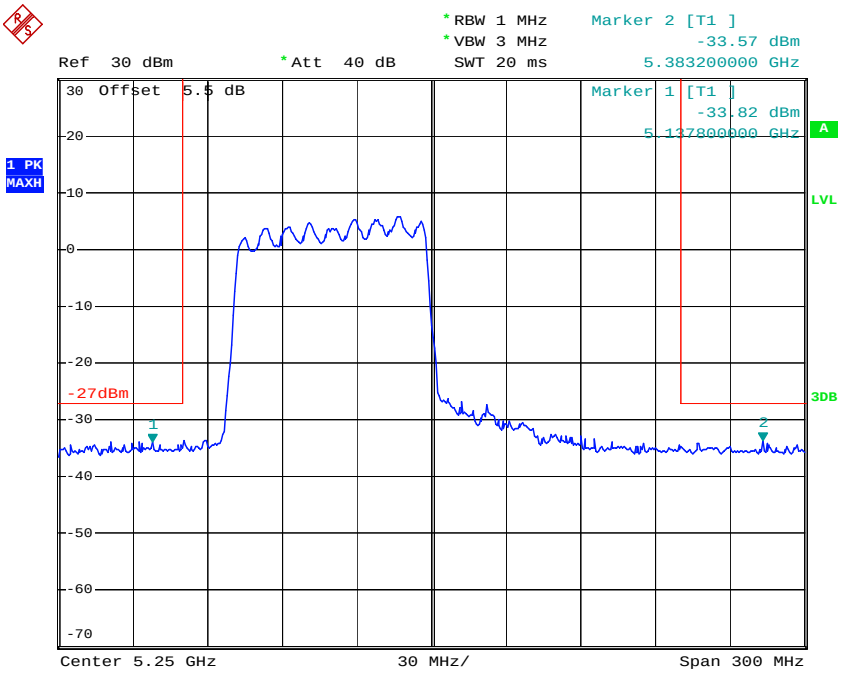
802.11n ht40 High Channel



Date: 25.AUG.2018 13:15:43

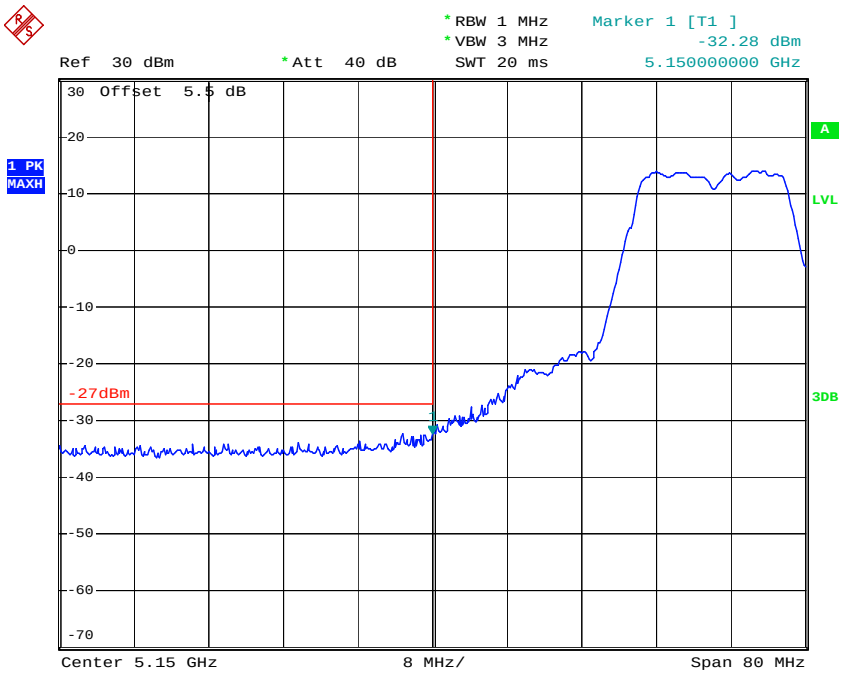
802.11n ac80 Middle Channel



Date: 25.AUG.2018 13:21:35

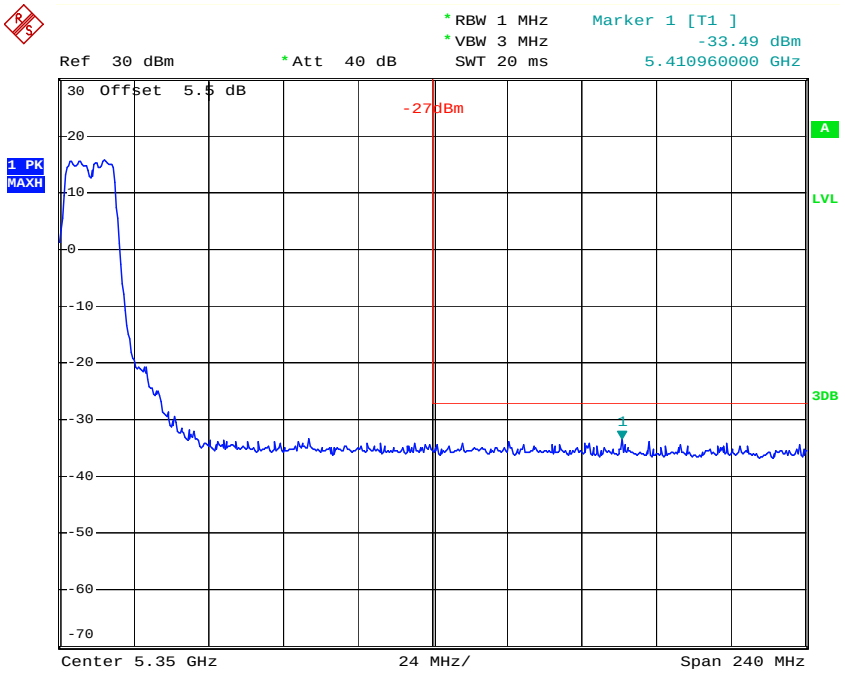
Chain 1:

802.11a Low Channel



Date: 25.AUG.2018 11:46:36

802.11a High Channel



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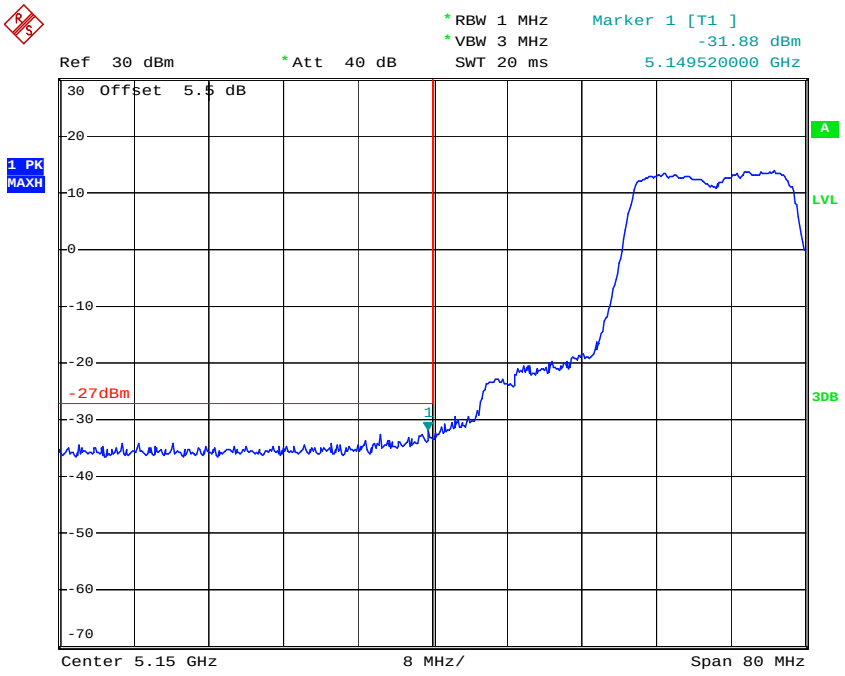
802.11n ht20 Low Channel



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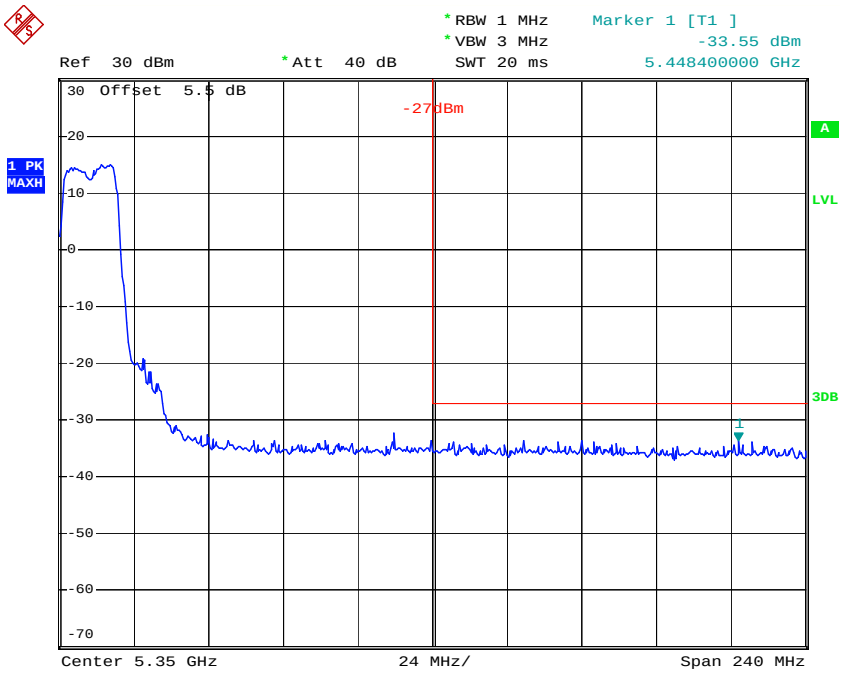
802.11n ht20 High Channel



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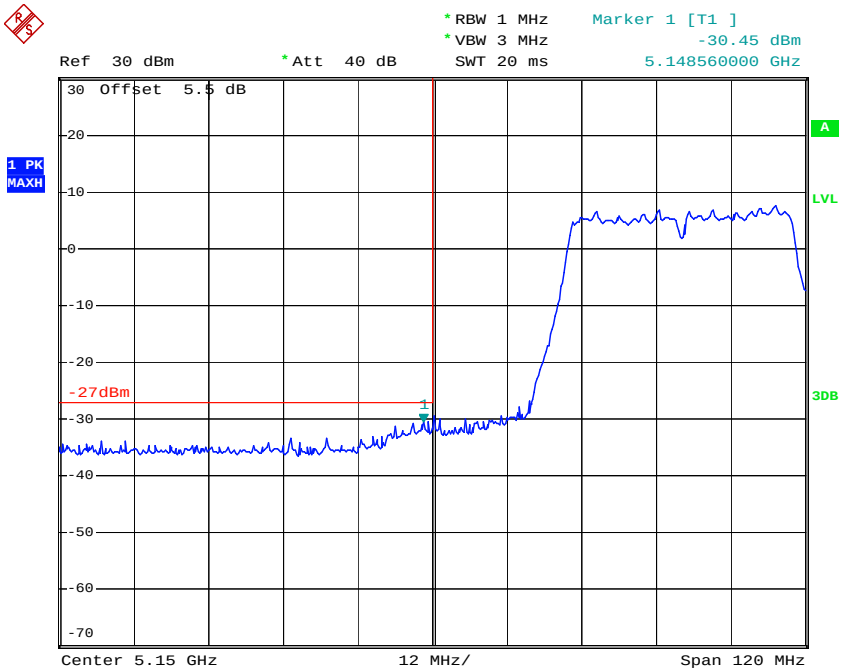
802.11n ht40 Low Channel



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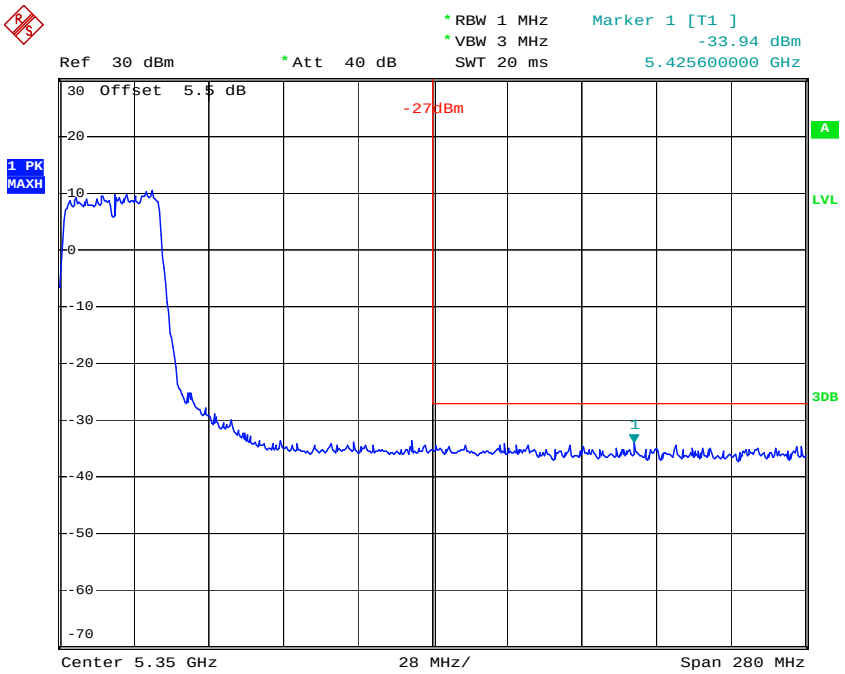
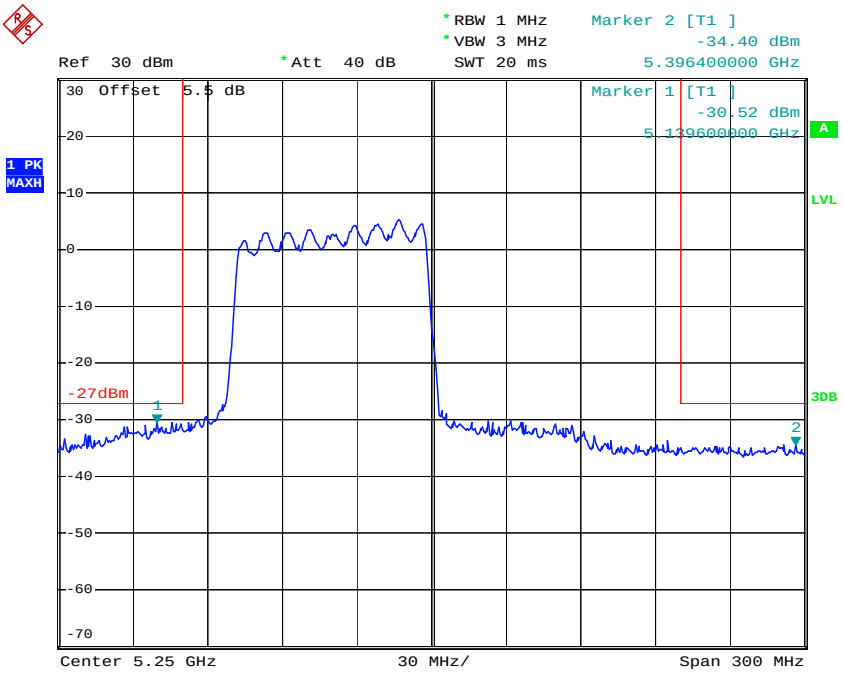
802.11n ht40 High Channel



Date: 25.AUG.2018 13:03:33

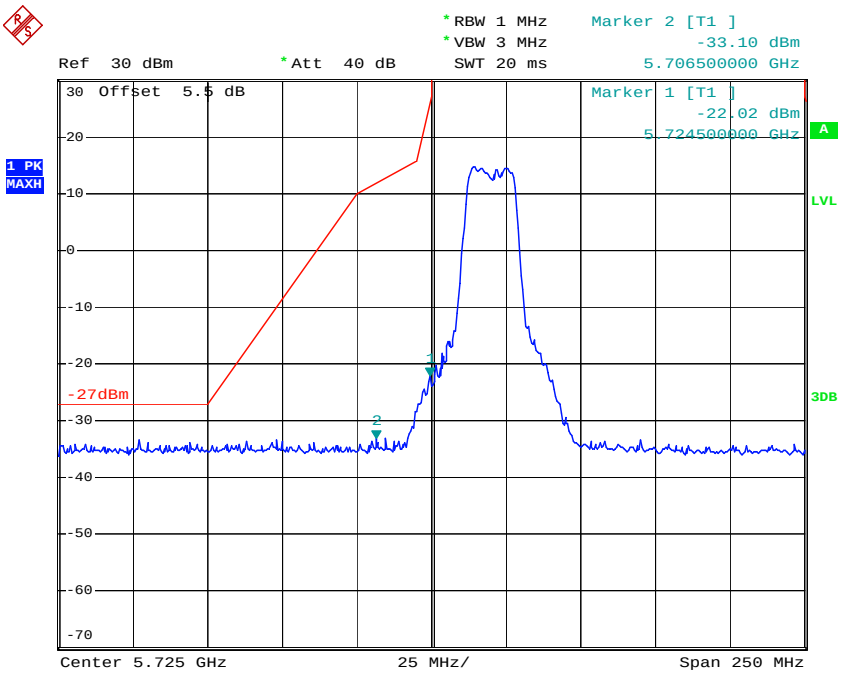
802.11n ac80 Middle Channel



Date: 25.AUG.2018 13:20:24

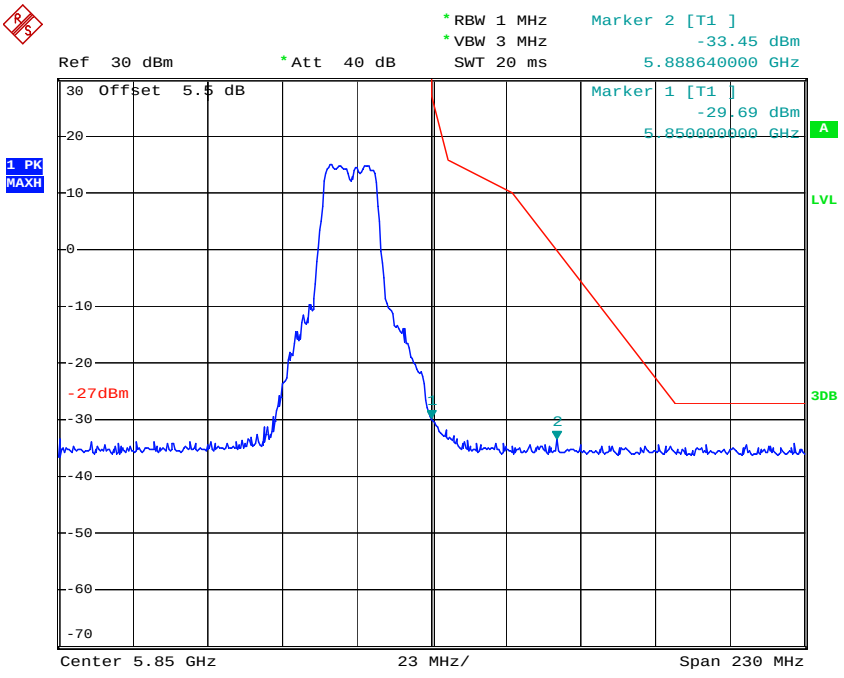
5725-5850MHz(the atenna gain was offset in the display, for 802.11n and ac mode, since the emissions under limit more than 3dBc, complaince the requirement for MIMO transmission)
Chain 0:

802.11a Low Channel



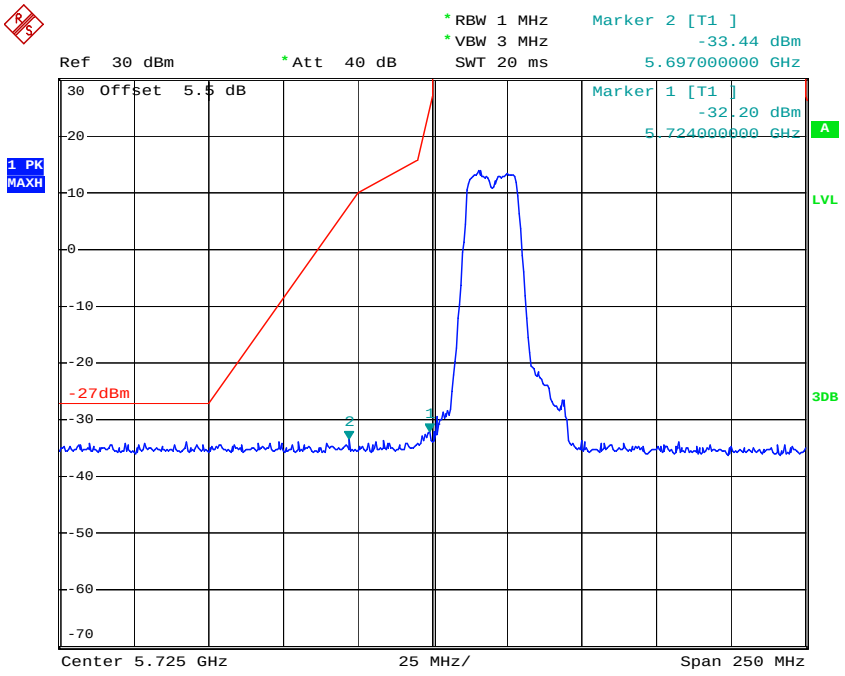
Date: 25.AUG.2018 14:18:17

802.11a High Channel



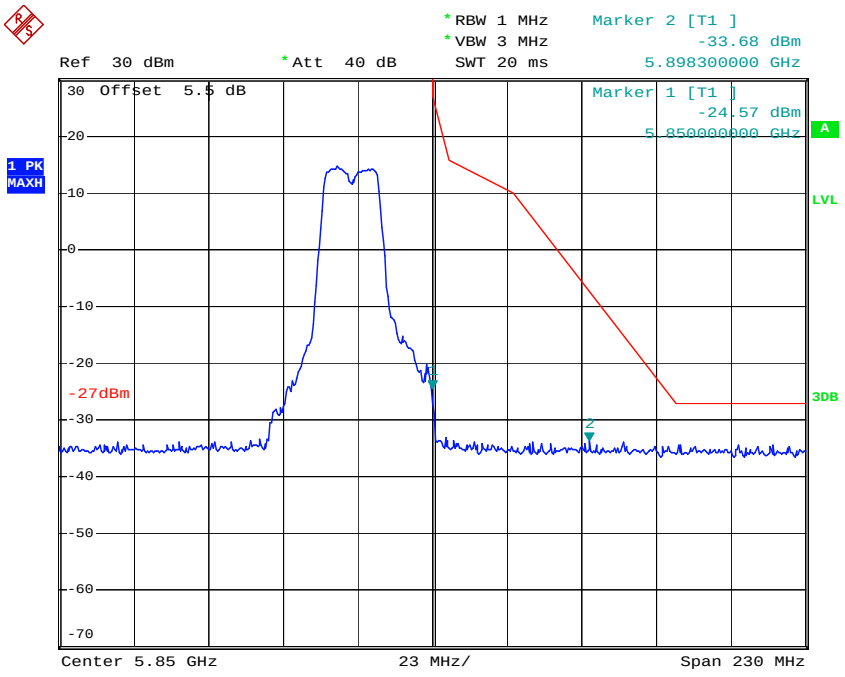
Date: 25.AUG.2018 14:21:11

802.11n ht20 Low Channel



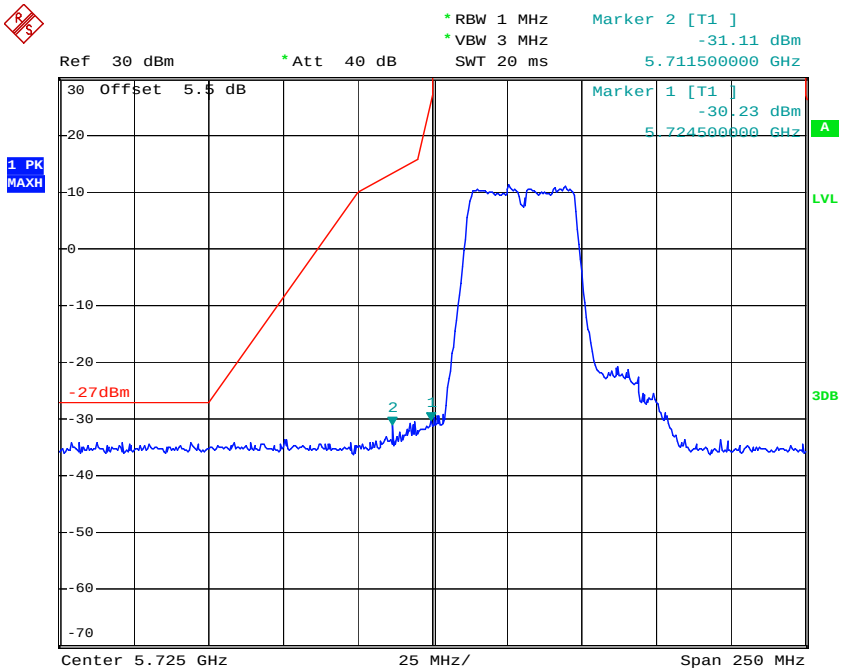
Date: 25.AUG.2018 14:25:52

802.11n ht20 High Channel



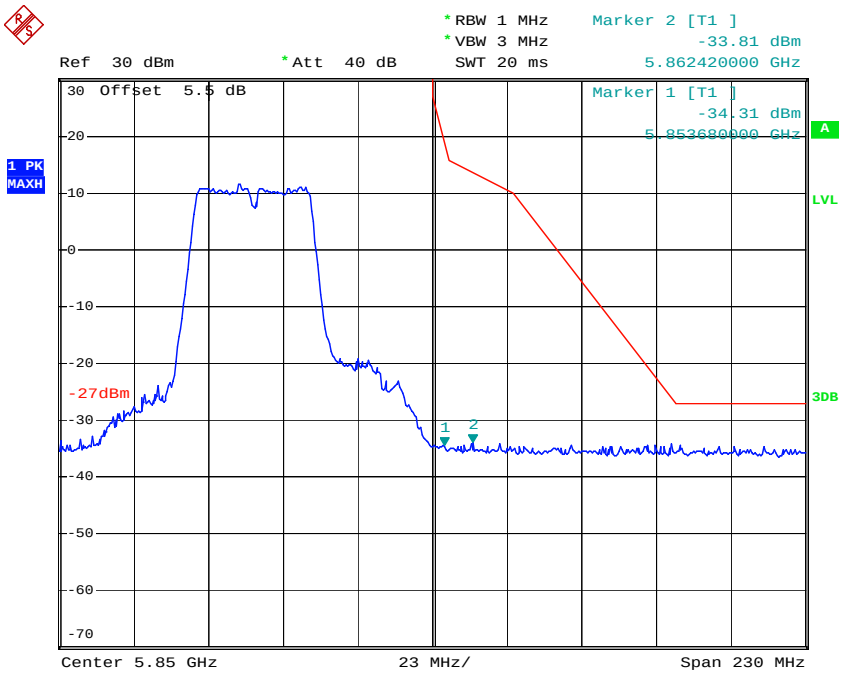
Date: 25.AUG.2018 14:22:20

802.11n ht40 Low Channel



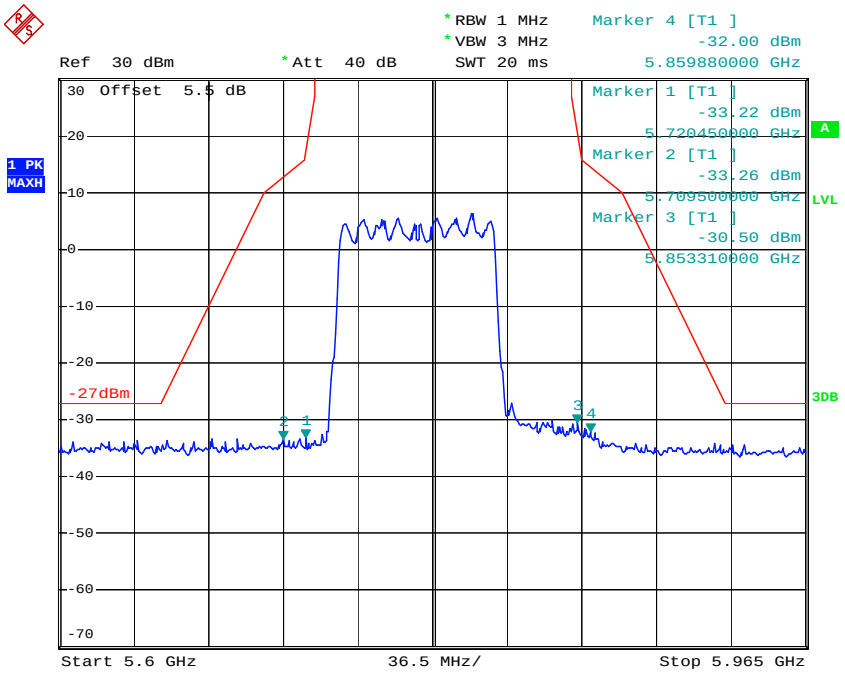
Date: 25.AUG.2018 14:28:19

802.11n ht40 High Channel



Date: 25.AUG.2018 14:29:39

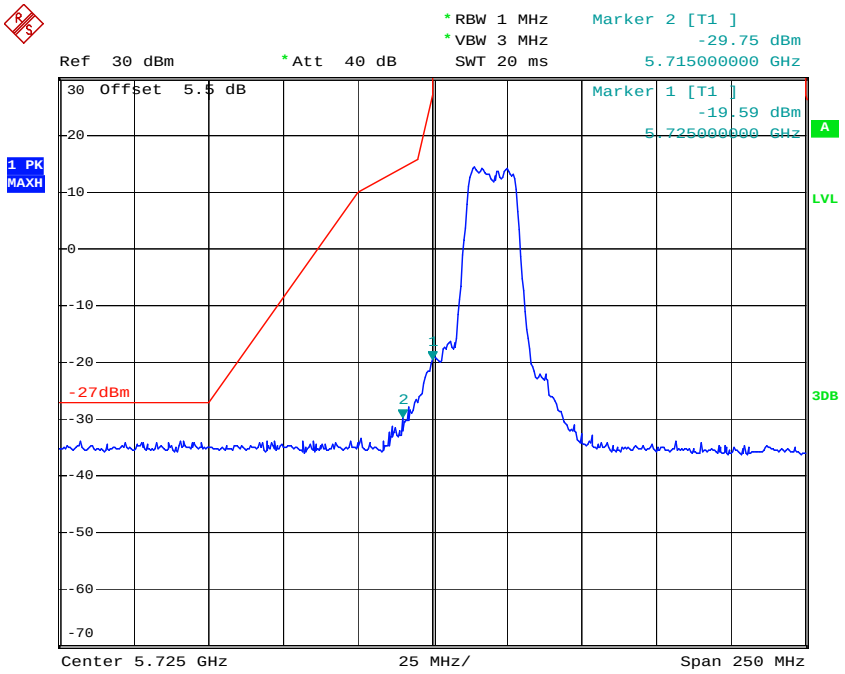
802.11n ac80 Middle Channel



Date: 25.AUG.2018 14:42:00

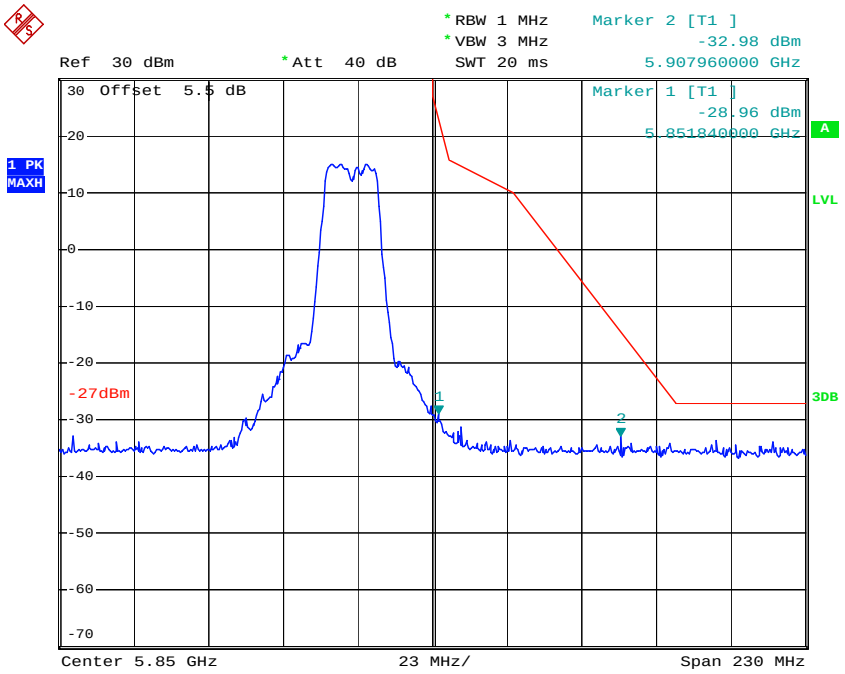
Chain 1:

802.11a Low Channel



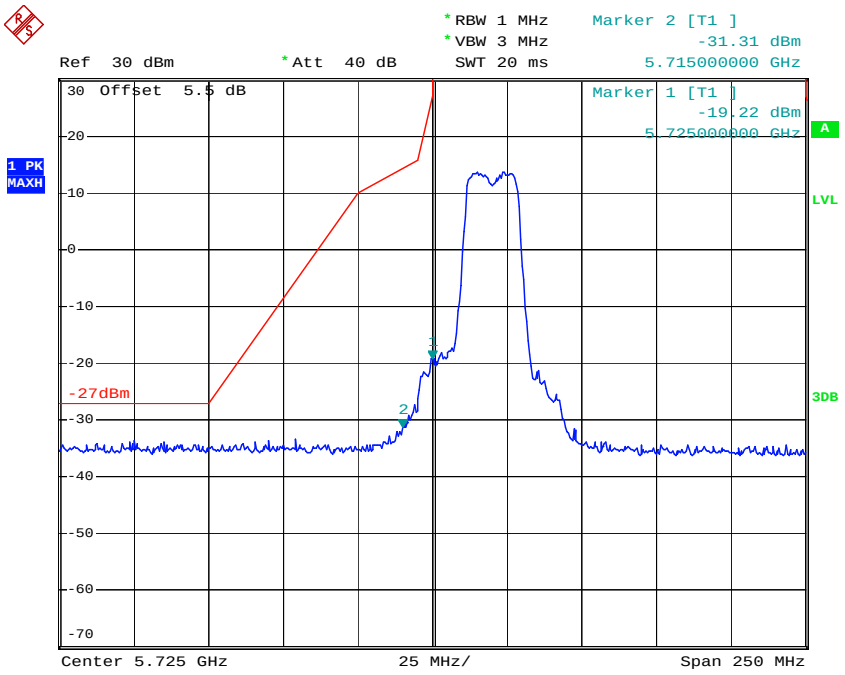
Date: 25.AUG.2018 13:56:26

802.11a High Channel



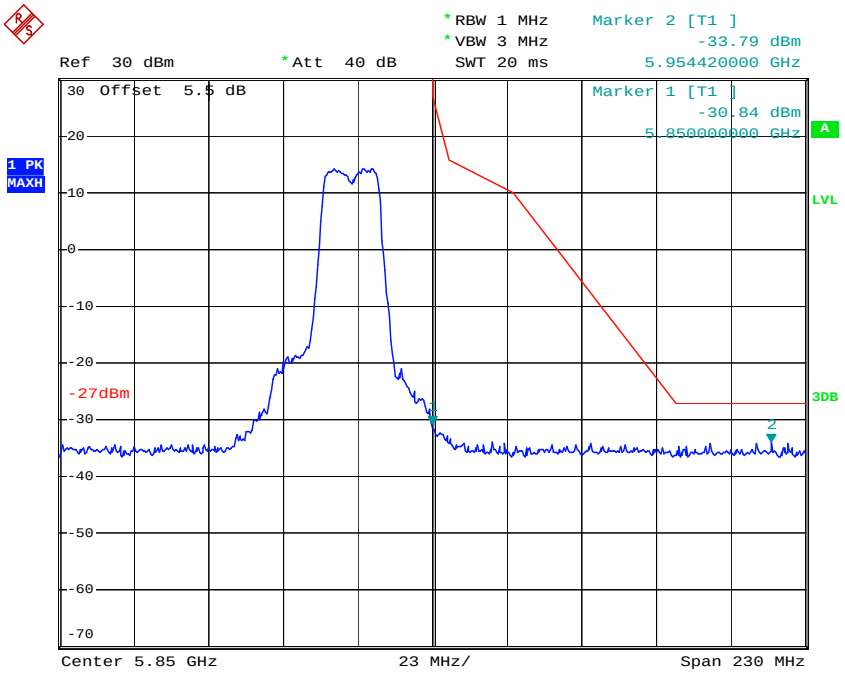
Date: 25.AUG.2018 13:58:08

802.11n ht20 Low Channel



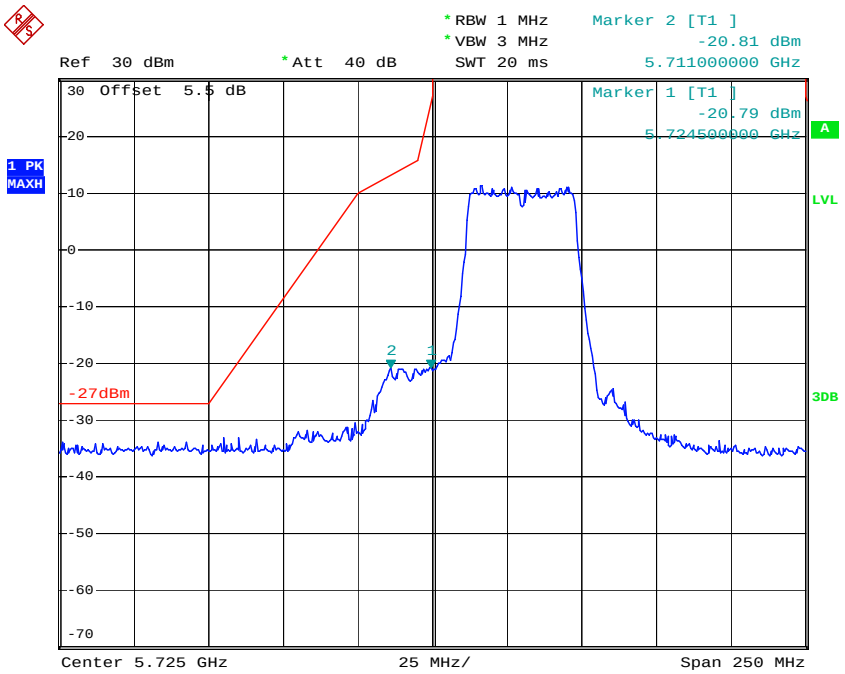
Date: 25.AUG.2018 14:01:53

802.11n ht20 High Channel



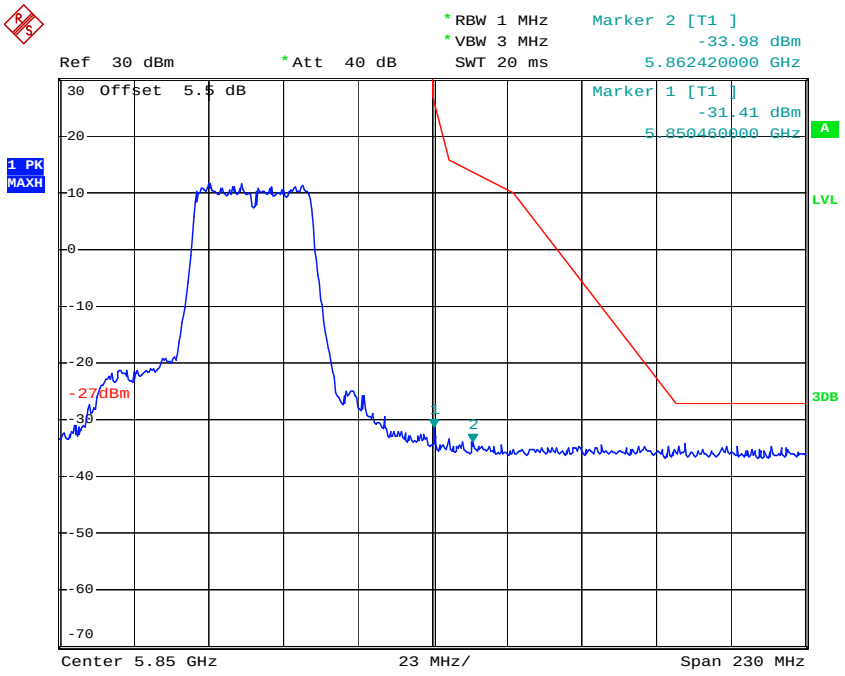
Date: 25.AUG.2018 13:59:50

802.11n ht40 Low Channel



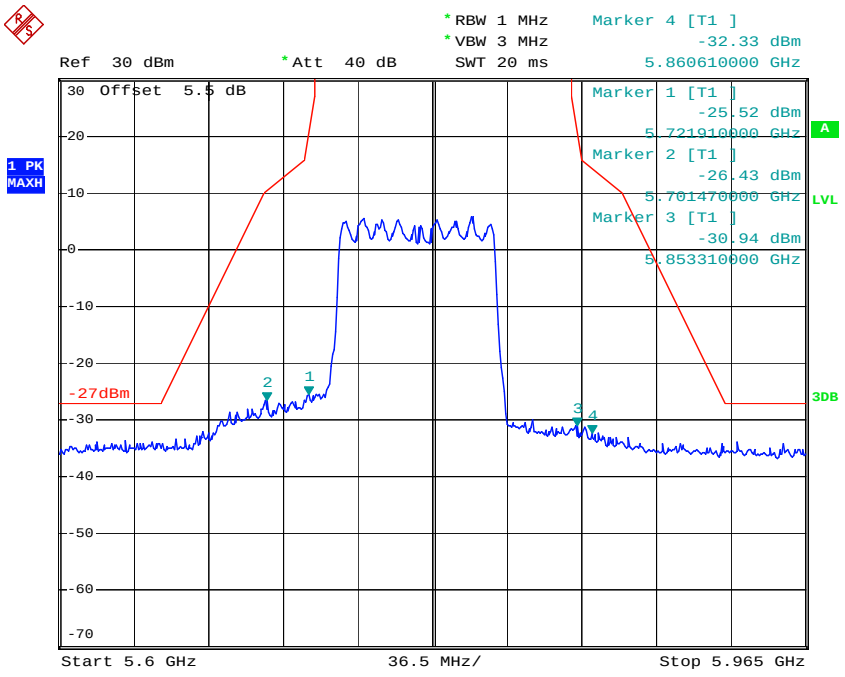
Date: 25.AUG.2018 14:04:58

802.11n ht40 High Channel



Date: 25.AUG.2018 14:09:15

802.11n ac80 Middle Channel



Date: 25.AUG.2018 14:37:46

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

Applicable Standard

15.407(a) (e)

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESPI	100120	2017-12-11	2018-12-11
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:	27.5°C
Relative Humidity:	61 %
ATM Pressure:	99.9 kPa

The testing was performed by Elena Lei on 2018-08-25.

Test Result: Pass.

Please refer to the following tables and plots.

Test mode: Transmitting(Test performed at chain 0)

5150-5250MHz:

Mode	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11 a	5180	21.280	16.880
	5200	21.360	16.880
	5240	21.200	16.800
802.11n ht20	5180	21.360	17.760
	5200	21.360	17.760
	5240	21.200	17.760
802.11n ht40	5190	42.720	37.440
	5230	42.560	37.440
802.11ac80	5210	81.600	75.840

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

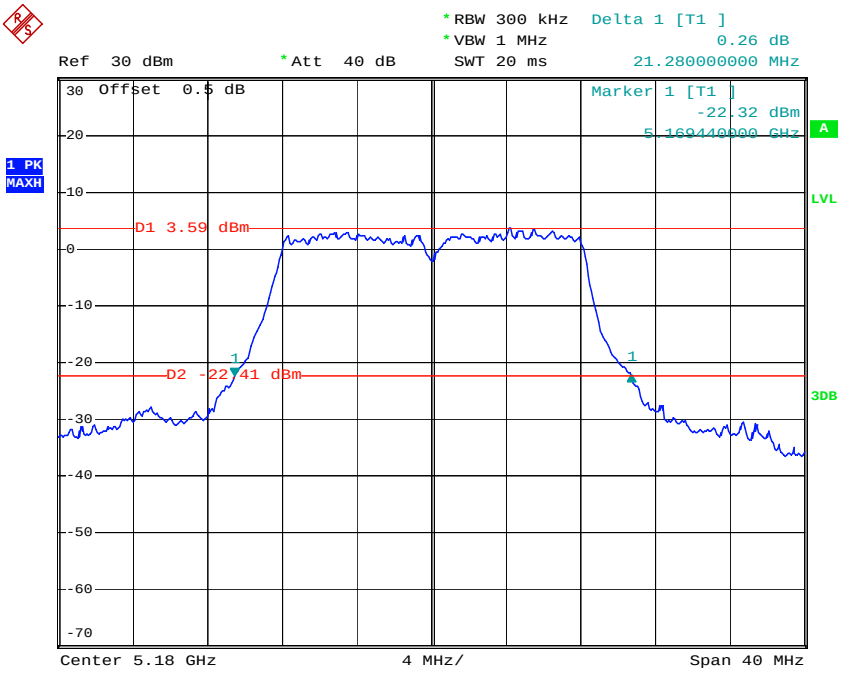
5725-5850MHz:

Mode	Channel	6 dB Emission Bandwidth (MHz)	6 dB Emission Bandwidth Limits (MHz)	99% Occupied Bandwidth (MHz)
802.11 a	Low	16.560	≥0.5	16.880
	Middle	16.560	≥0.5	16.880
	High	16.560	≥0.5	16.880
802.11n ht20	Low	17.680	≥0.5	17.840
	Middle	17.680	≥0.5	17.840
	High	17.680	≥0.5	17.760
802.11n ht40	Low	36.640	≥0.5	36.960
	High	36.640	≥0.5	36.960
802.11ac80	Middle	76.480	≥0.5	76.160

Note: For 5725-5850MHz band, the 99% Occupied Bandwidth have not fall into the band 5470-5725MHz.

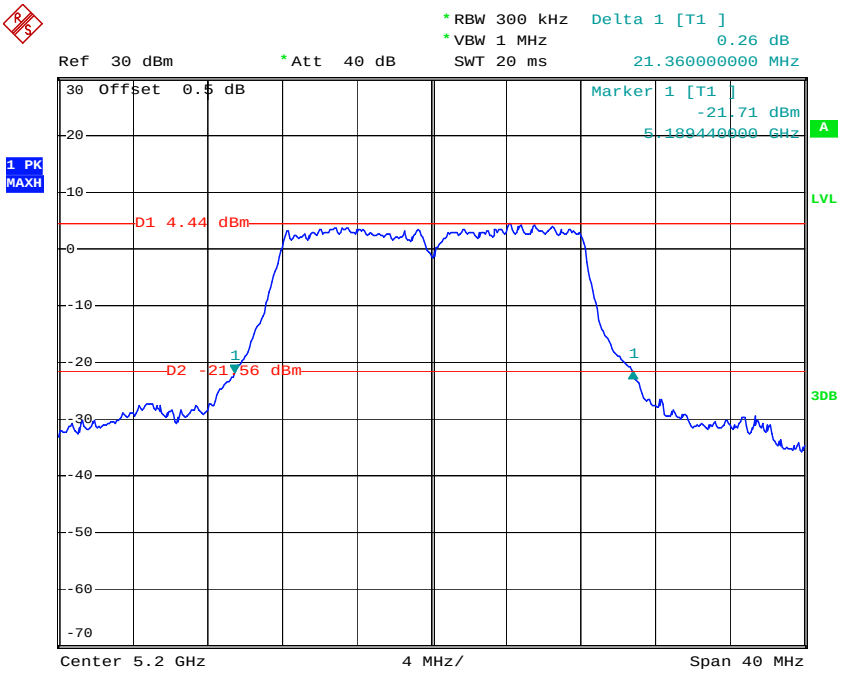
5150-5250MHz: 26dB Emission Bandwidth:
Chain0

802.11a Low Channel



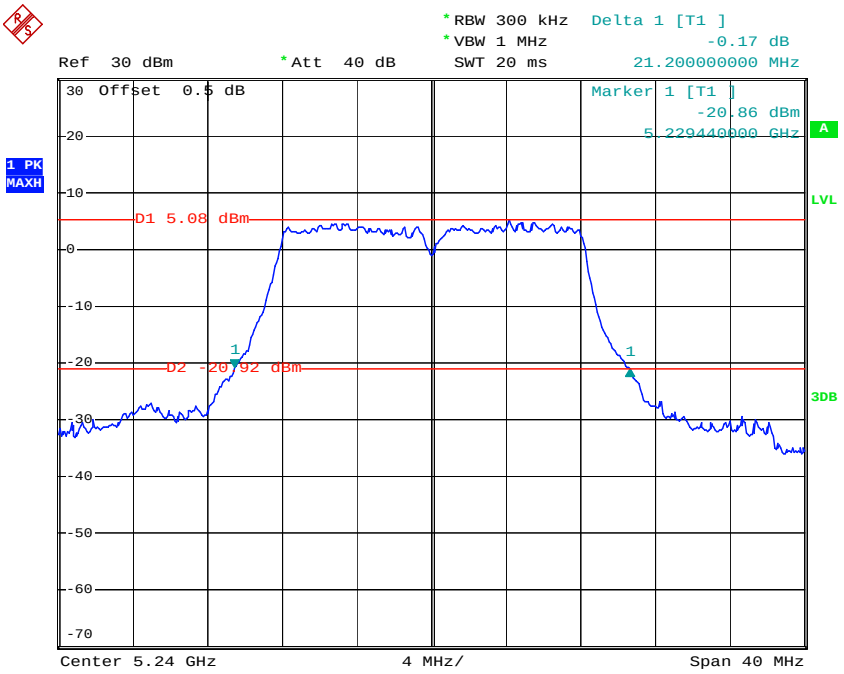
Date: 25.AUG.2018 13:43:20

802.11a Middle Channel



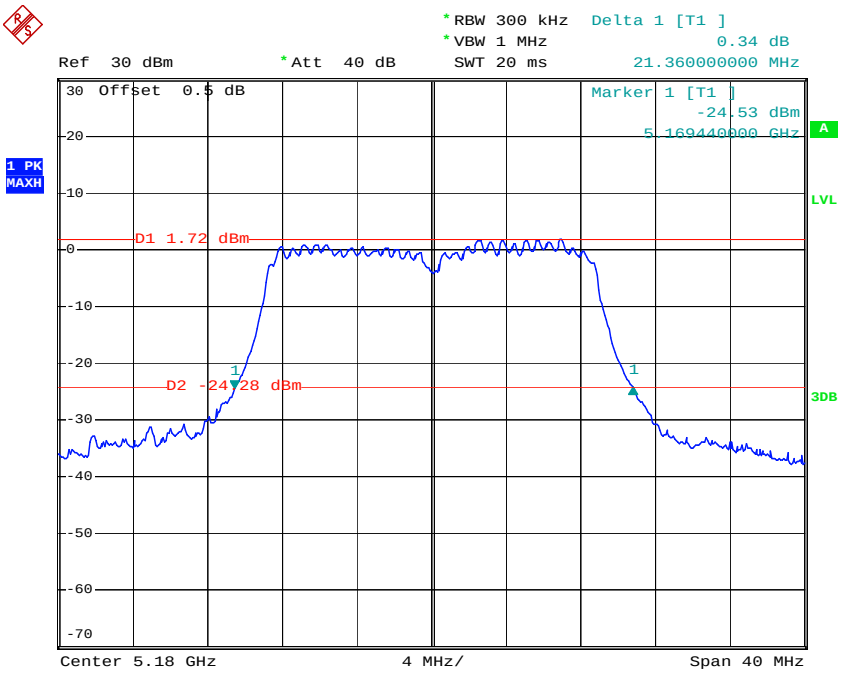
Date: 25.AUG.2018 13:43:44

802.11a High Channel



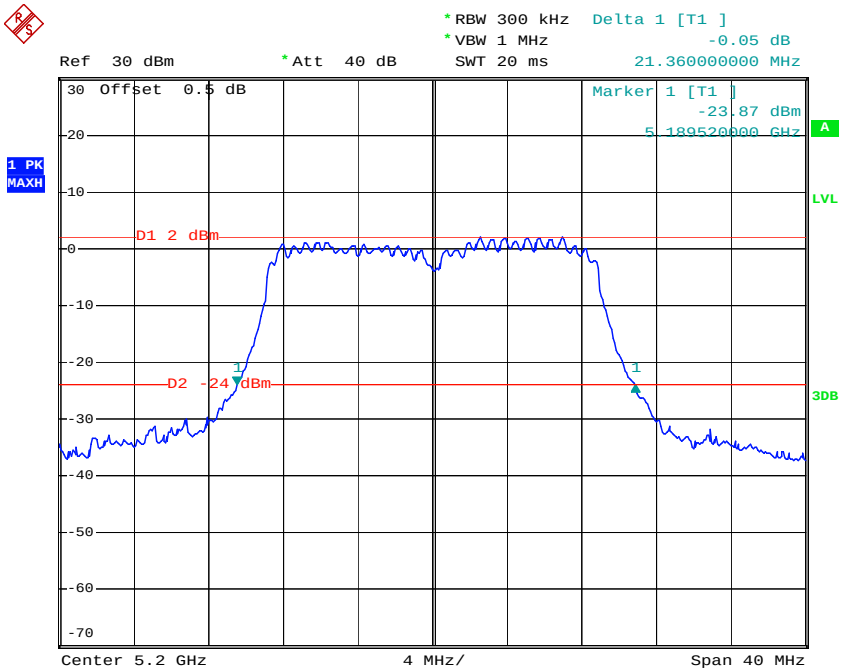
Date: 25.AUG.2018 13:44:06

802.11n ht20 Low Channel



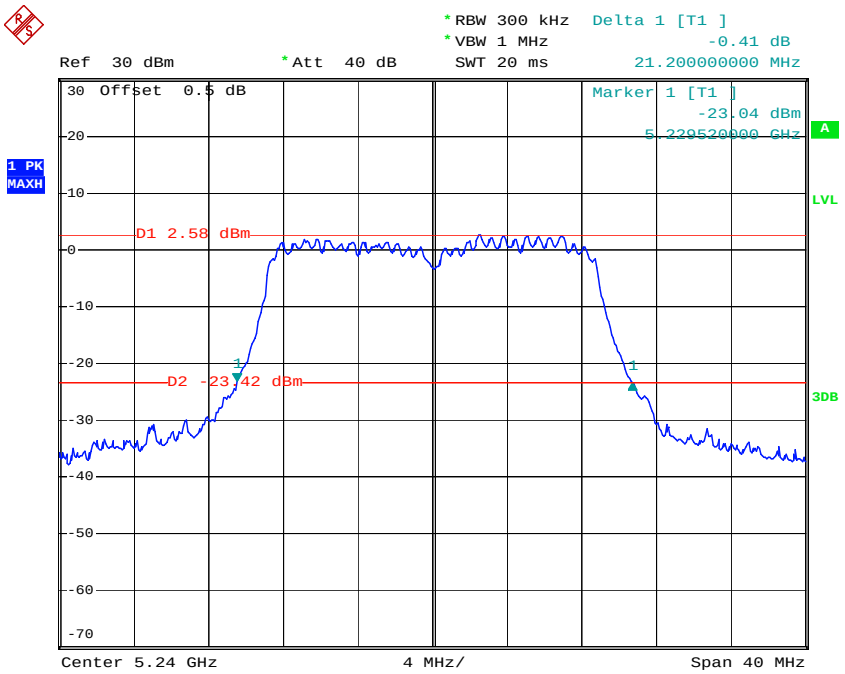
Date: 25.AUG.2018 13:46:58

802.11n ht20 Middle Channel



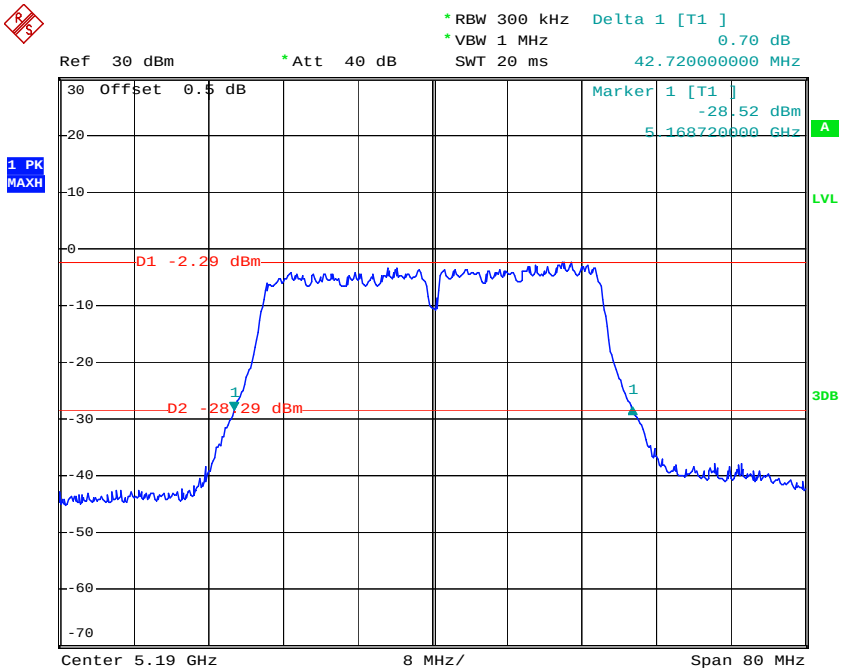
Date: 25.AUG.2018 13:47:37

802.11n ht20 High Channel



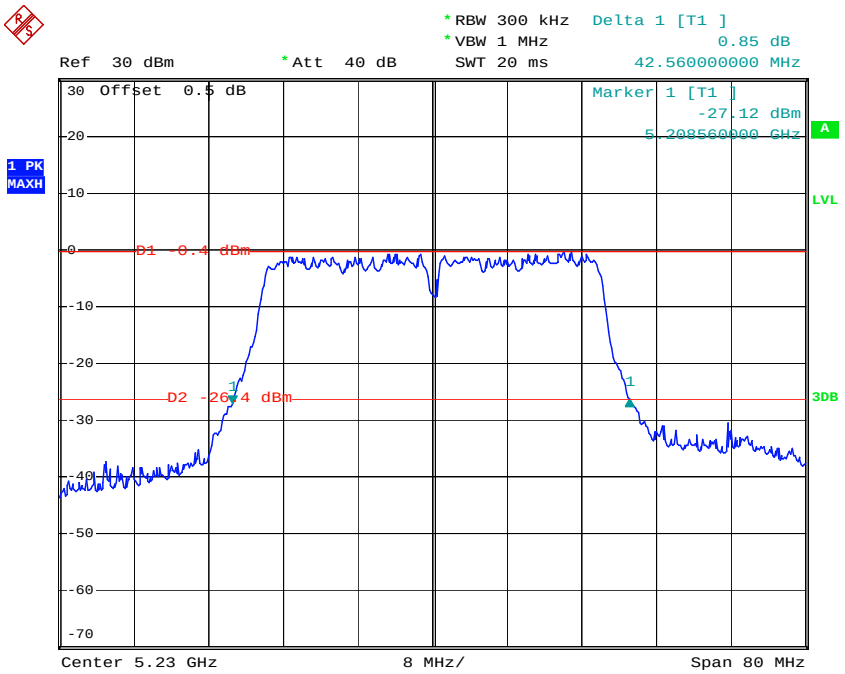
Date: 25.AUG.2018 13:48:13

802.11n ht40 Low Channel



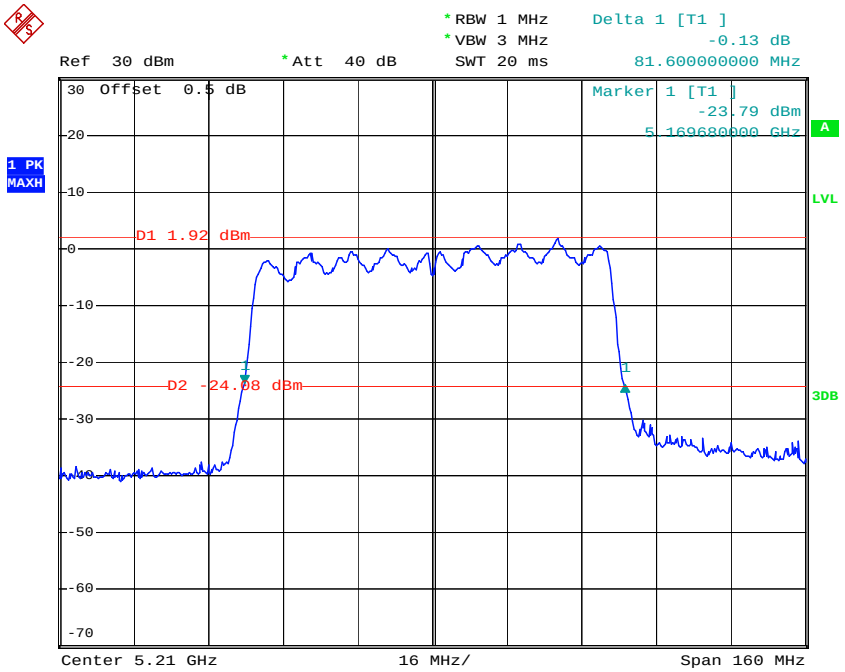
Date: 25.AUG.2018 13:31:51

802.11n ht40 High Channel



Date: 25.AUG.2018 13:33:18

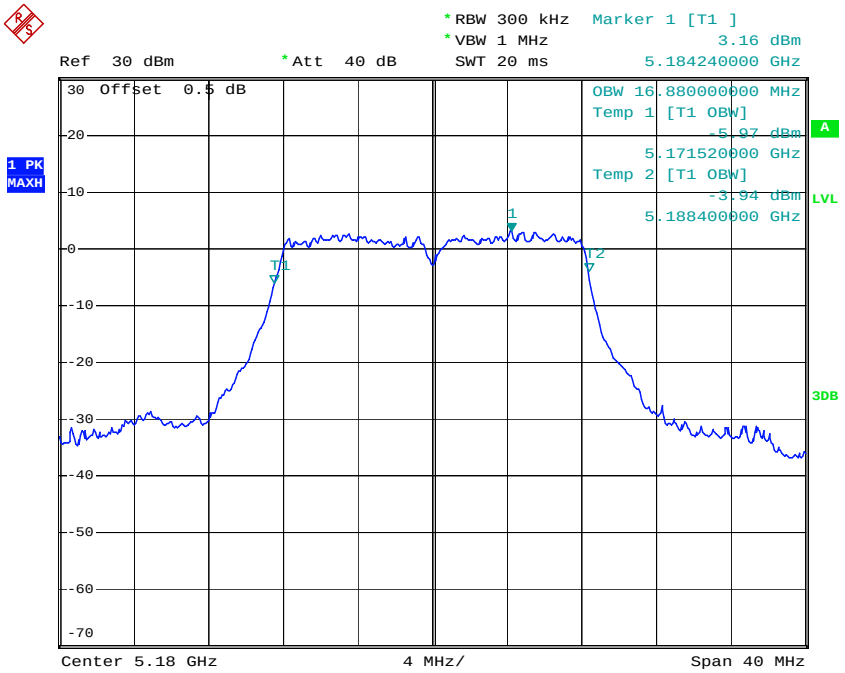
802.11ac80 Middle Channel



Date: 25.AUG.2018 13:40:22

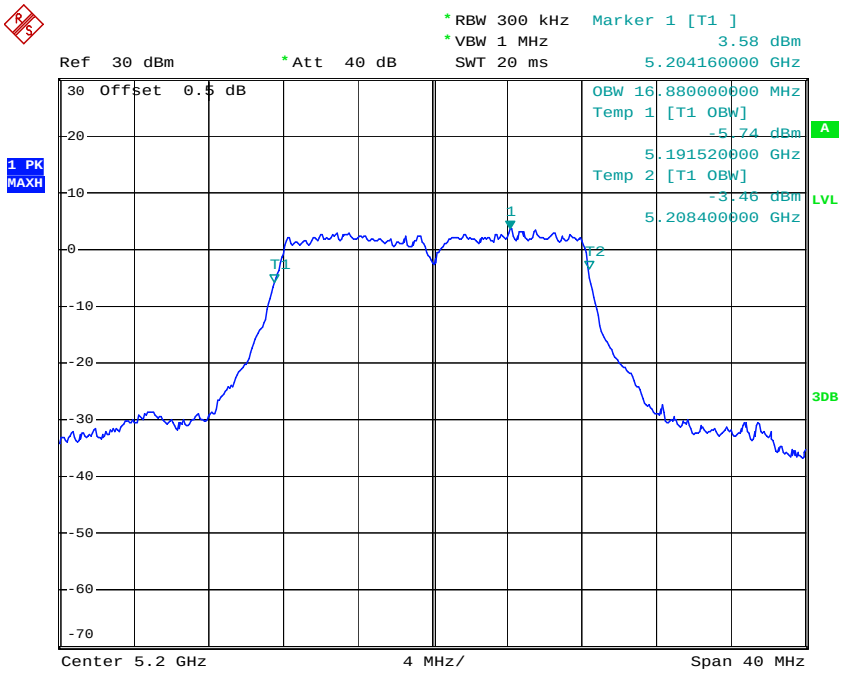
99% Occupied Bandwidth:

802.11a Low Channel



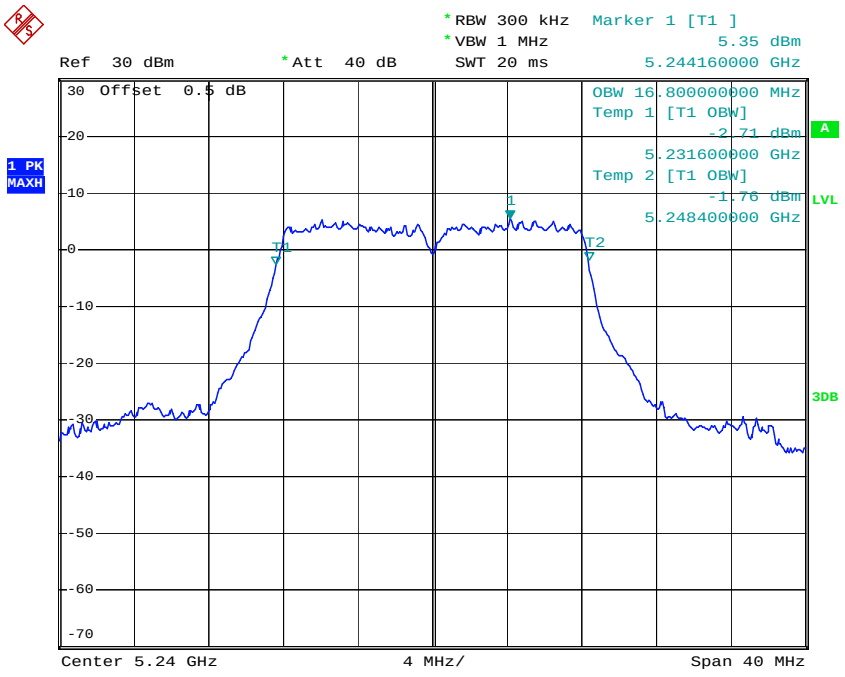
Date: 25.AUG.2018 13:45:46

802.11a Middle Channel



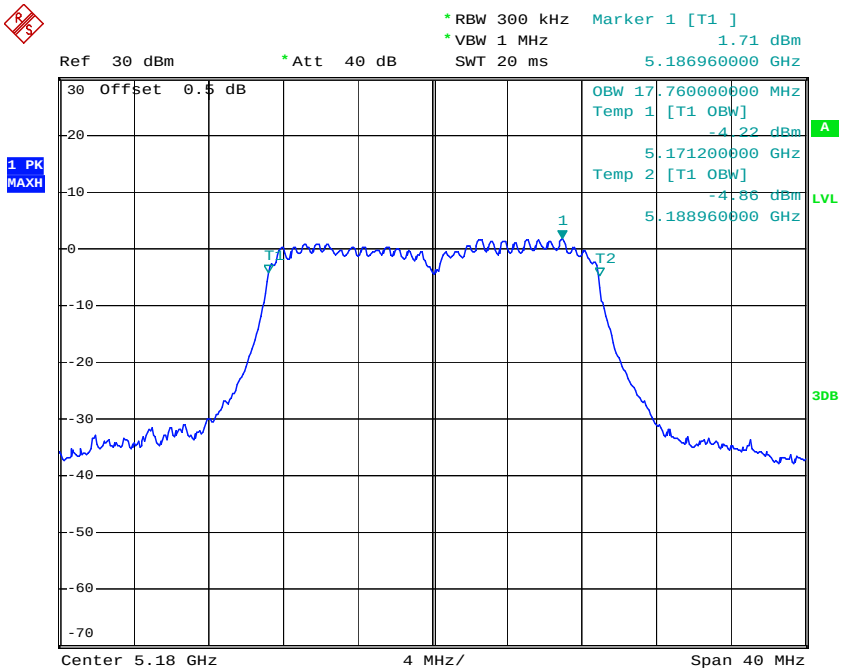
Date: 25.AUG.2018 13:45:29

802.11a High Channel



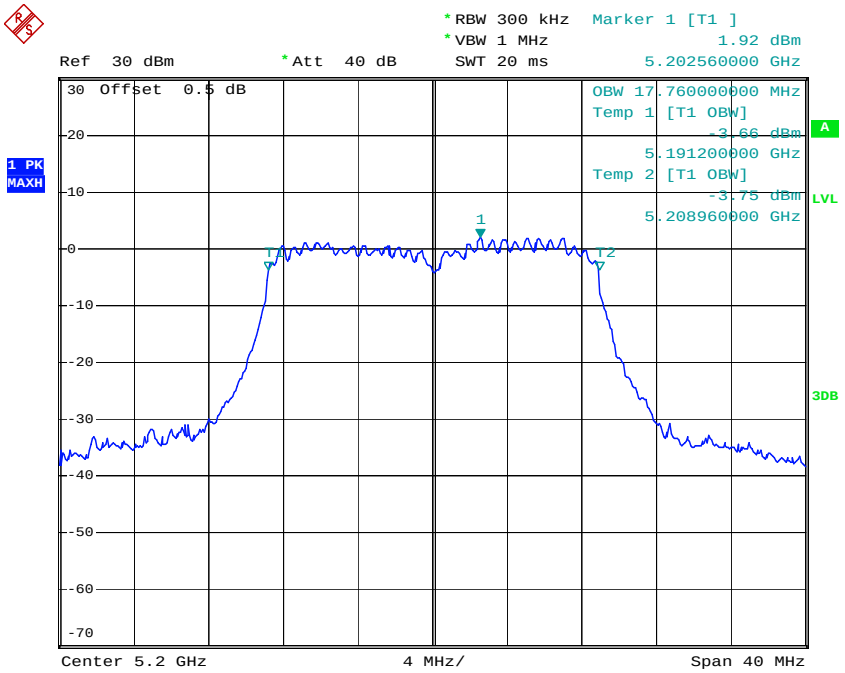
Date: 25.AUG.2018 13:45:06

802.11n ht20 Low Channel



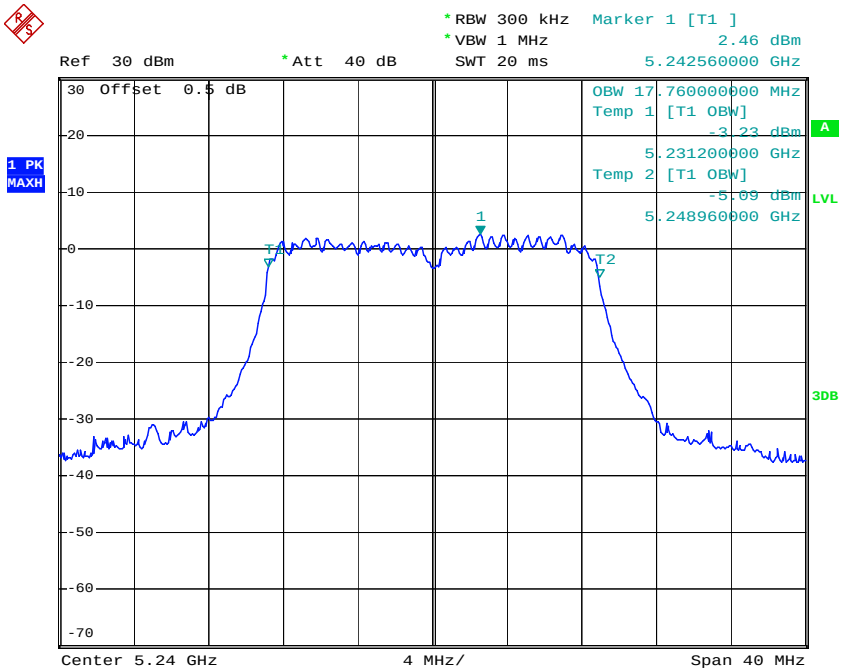
Date: 25.AUG.2018 13:47:14

802.11n ht20 Middle Channel



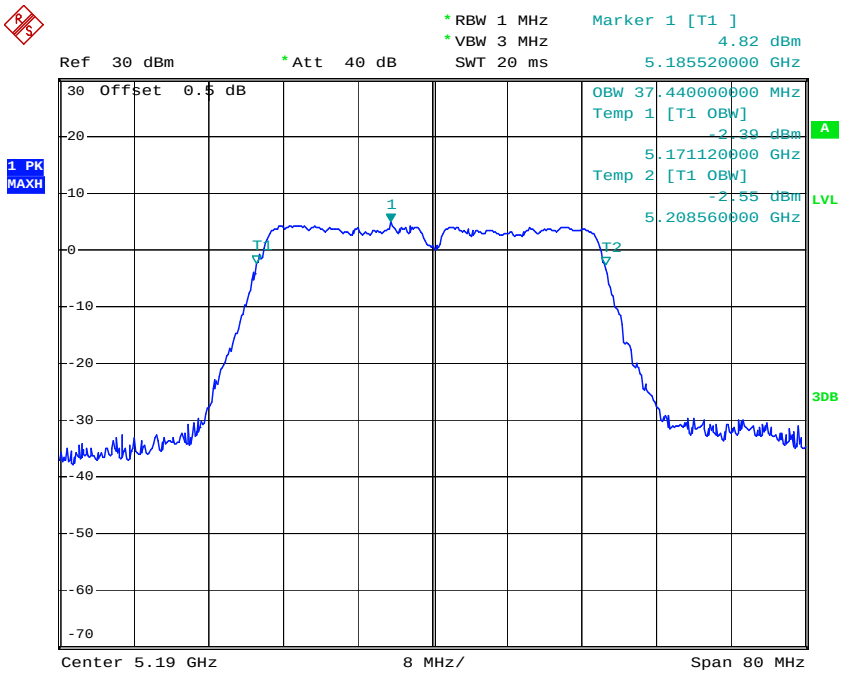
Date: 25.AUG.2018 13:47:48

802.11n ht20 High Channel



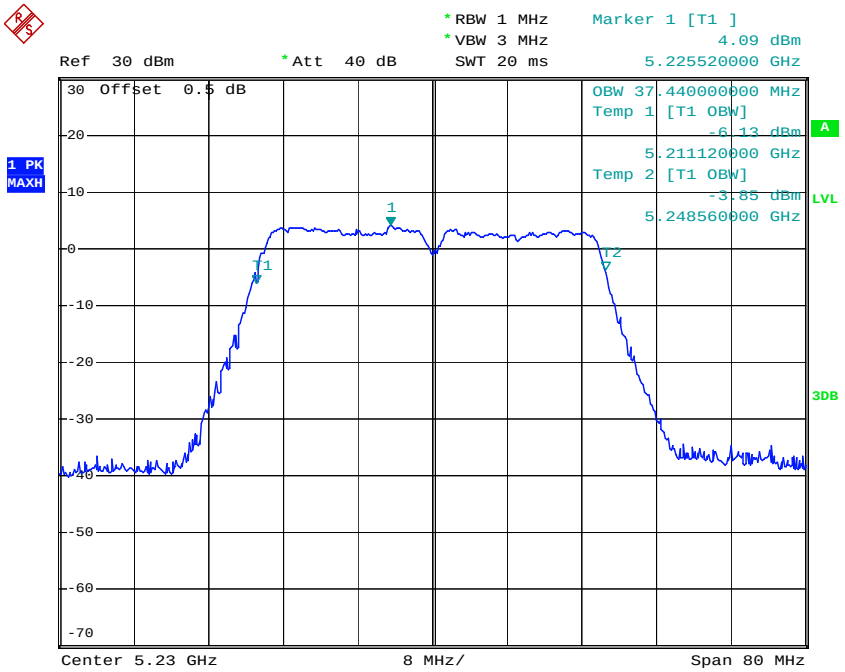
Date: 25.AUG.2018 13:48:32

802.11n ht40 Low Channel



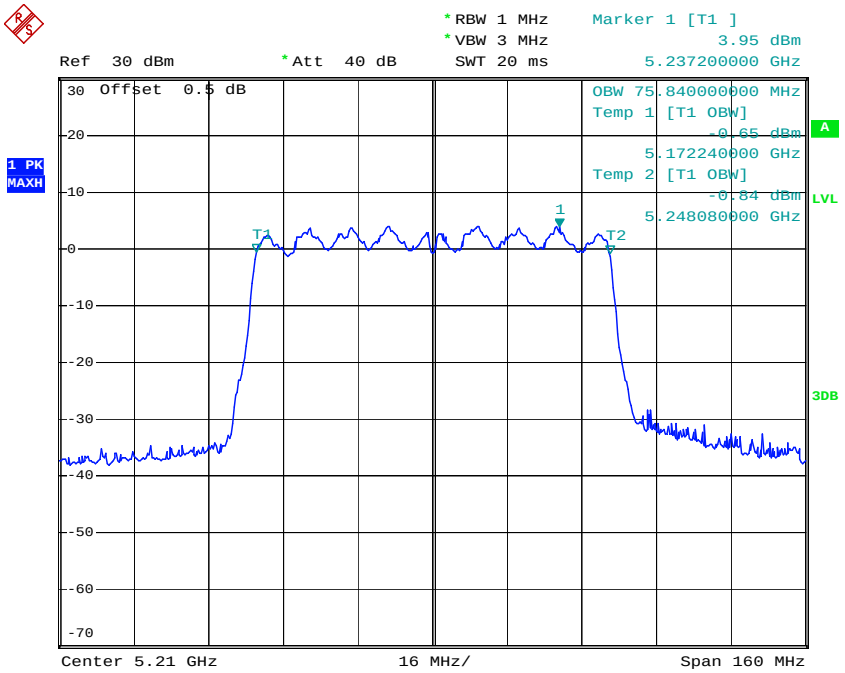
Date: 25.AUG.2018 11:30:46

802.11n ht40 High Channel



Date: 25.AUG.2018 11:31:57

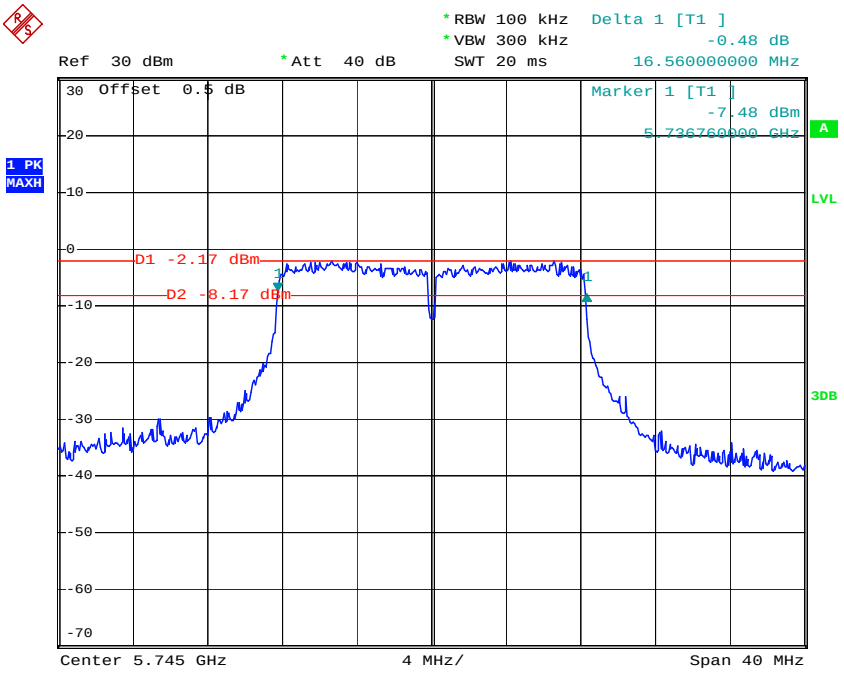
802.11ac80 Middle Channel



Date: 25.AUG.2018 11:35:19

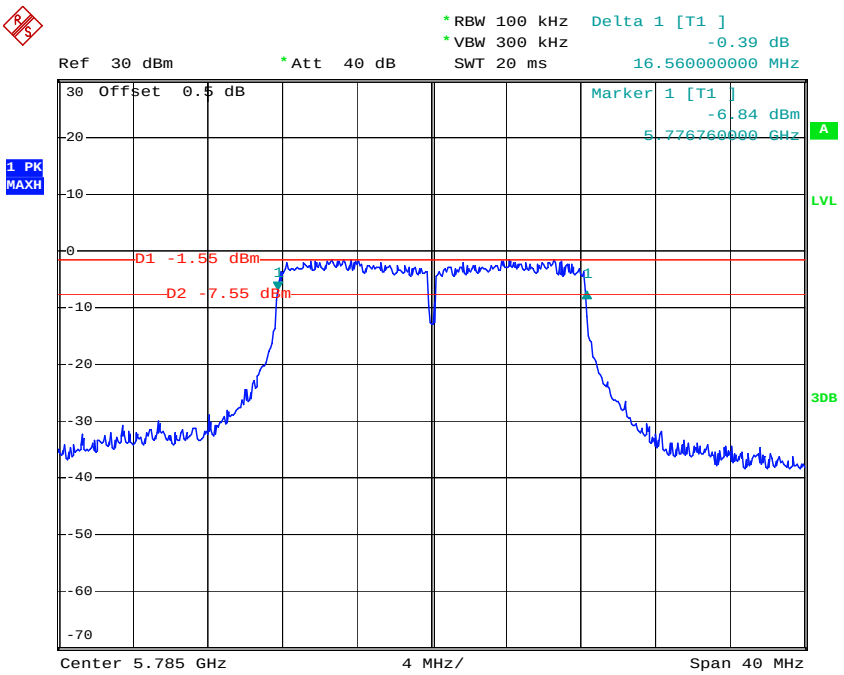
5725-5850MHz(Chain0):
6dB Bandwidth:

802.11a Low Channel



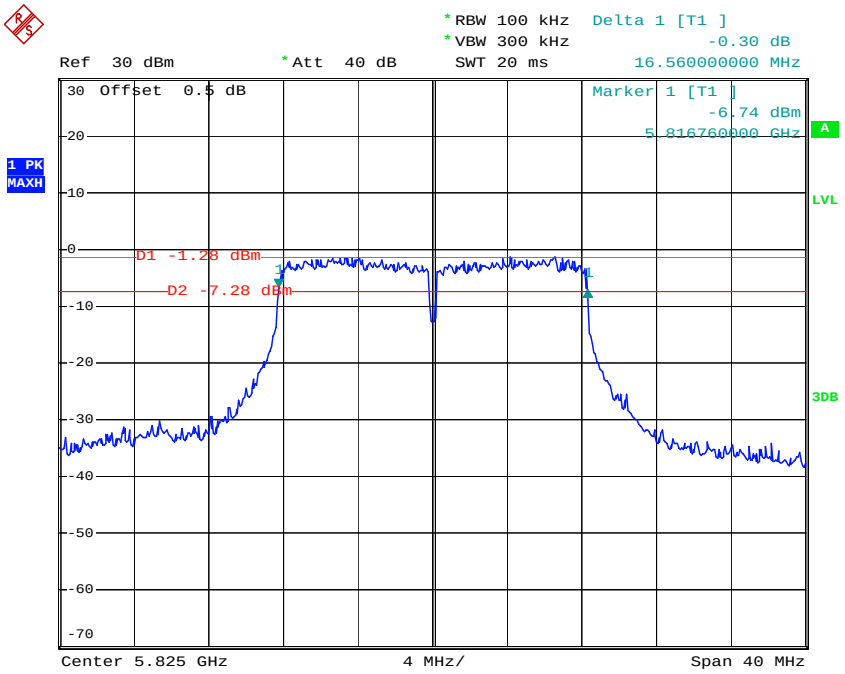
Date: 25.AUG.2018 13:55:22

802.11a Middle Channel



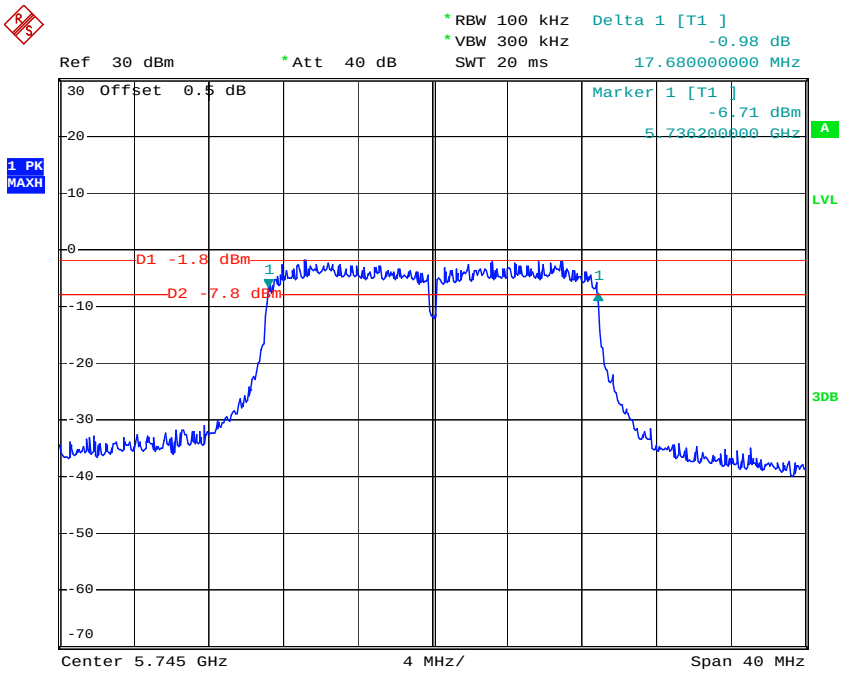
Date: 25.AUG.2018 14:14:03

802.11a High Channel



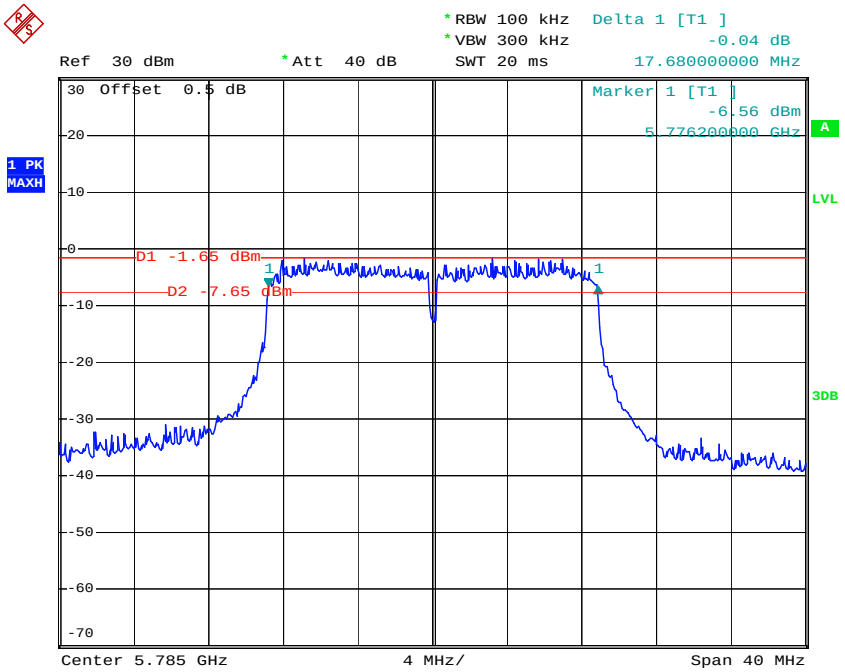
Date: 25.AUG.2018 13:57:00

802.11ht20 Low Channel



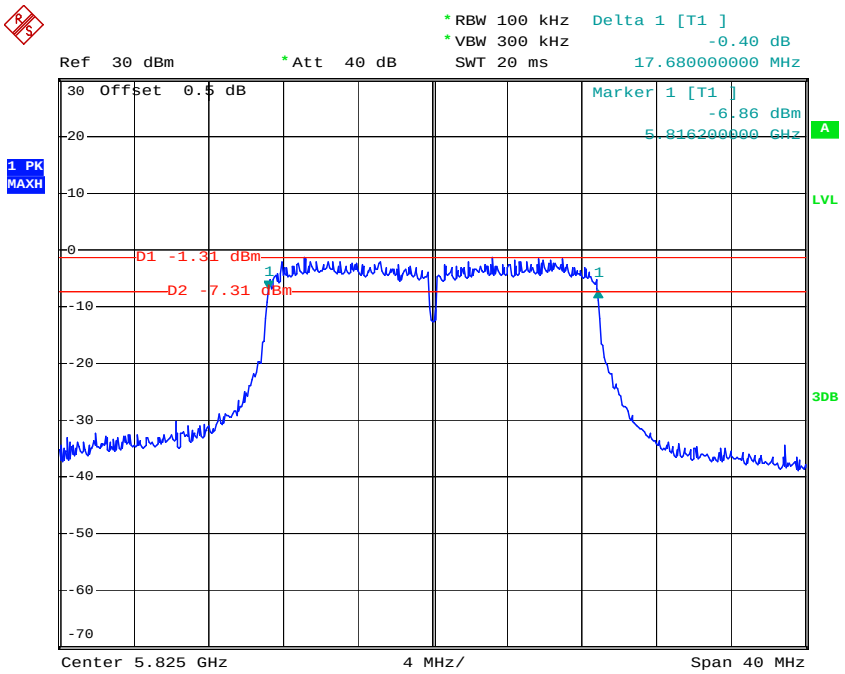
Date: 25.AUG.2018 14:00:51

802.11ht20 Middle Channel



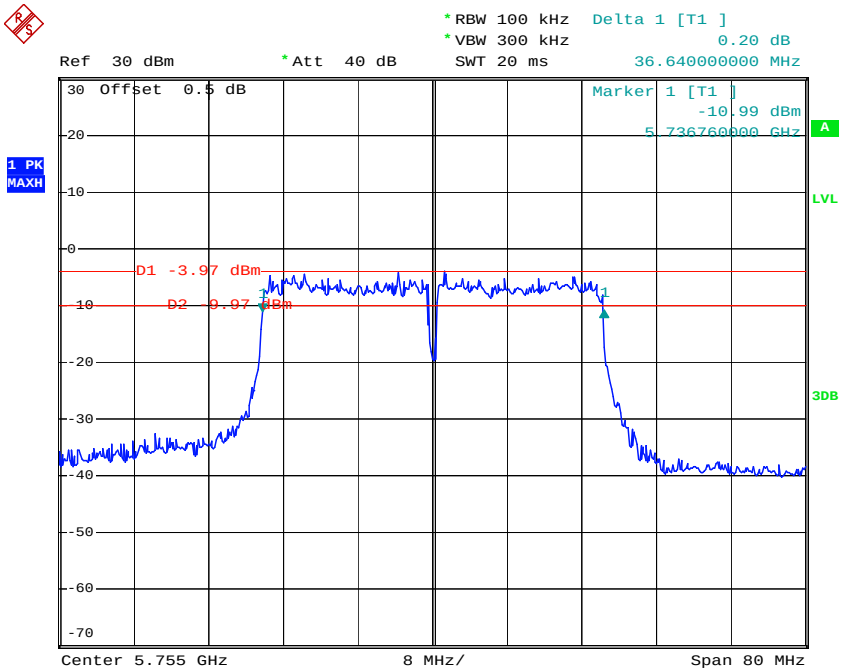
Date: 25.AUG.2018 14:15:46

802.11ht20 High Channel



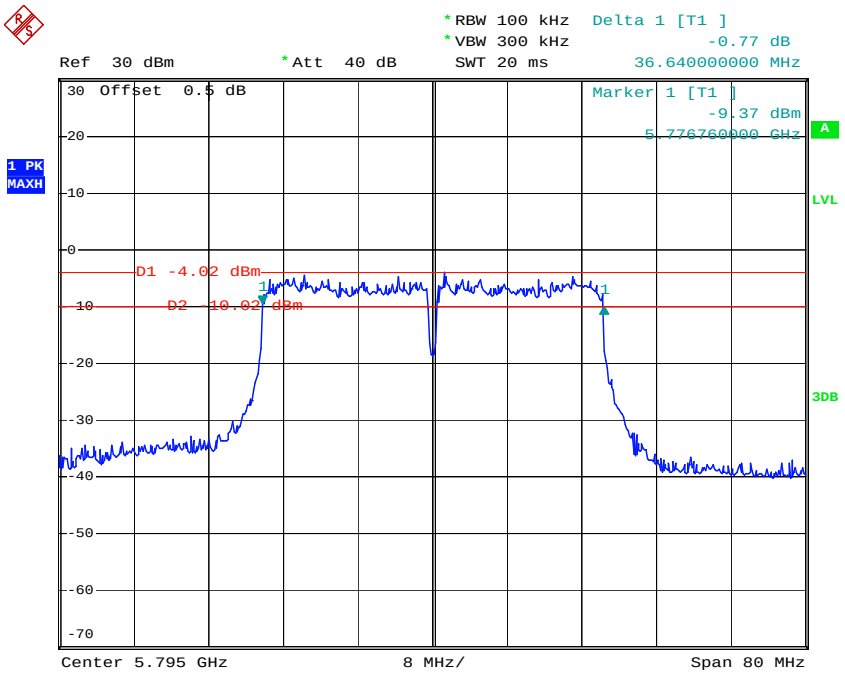
Date: 25.AUG.2018 13:58:46

802.11ht40 Low Channel



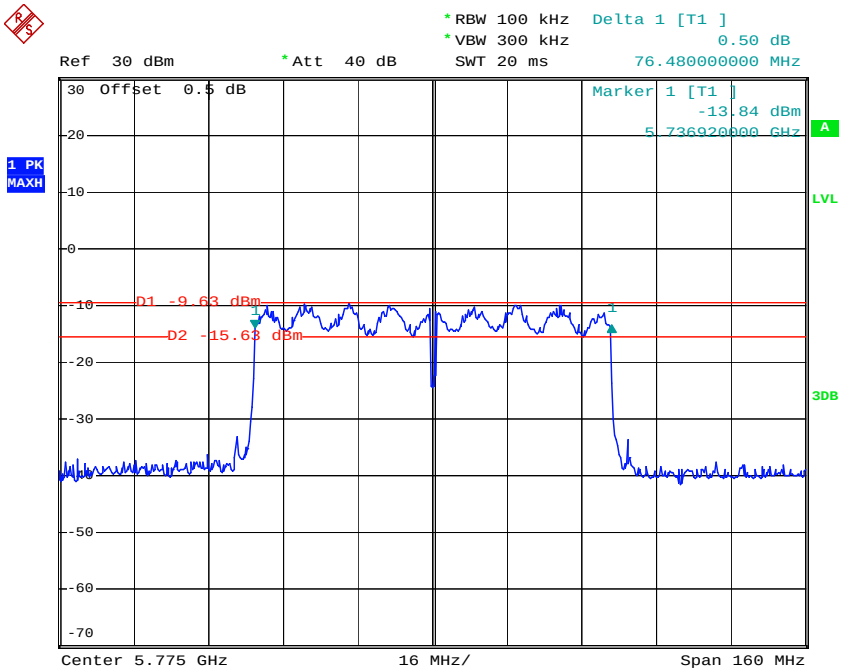
Date: 25.AUG.2018 14:03:54

802.11ht40 High Channel



Date: 25.AUG.2018 14:08:08

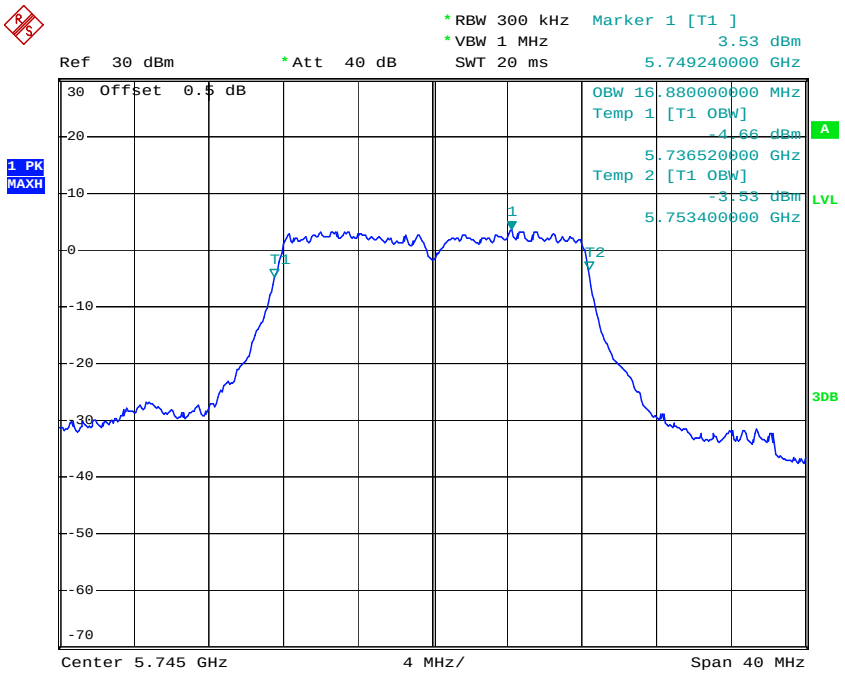
802.11ac80 Middle Channel



Date: 25.AUG.2018 14:38:17

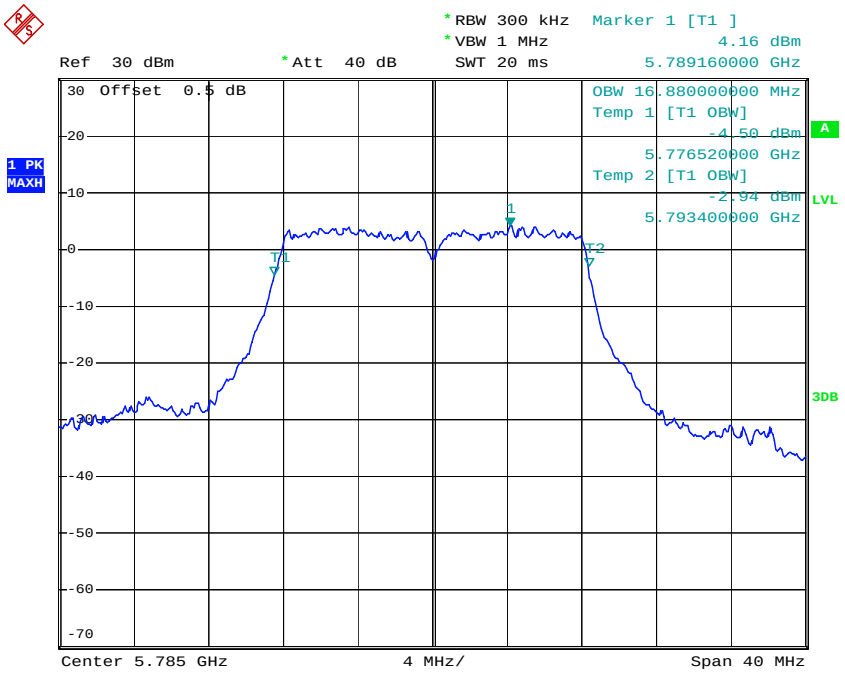
99% Occupied Bandwidth:

802.11a Low Channel



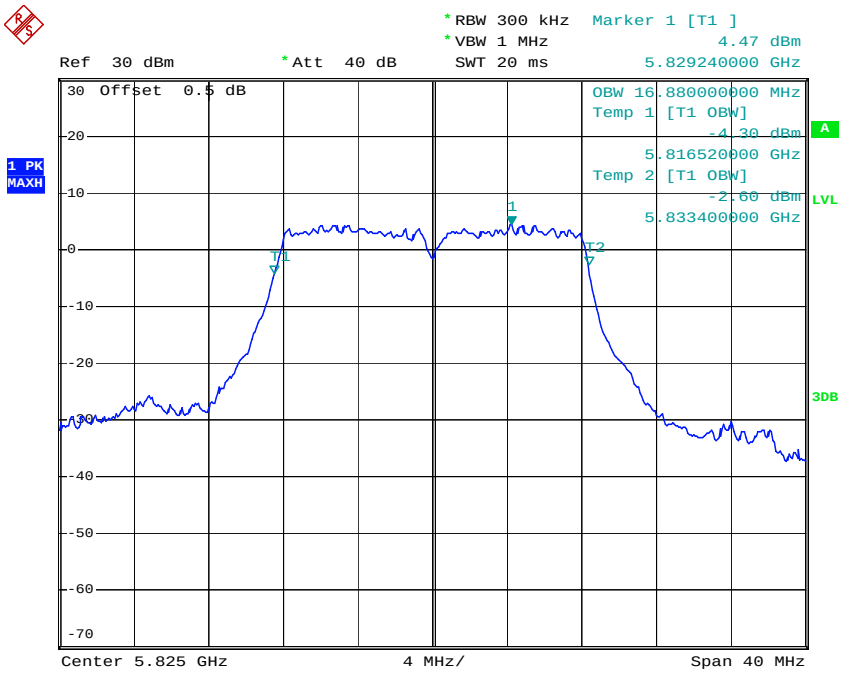
Date: 25.AUG.2018 13:55:35

802.11a Middle Channel



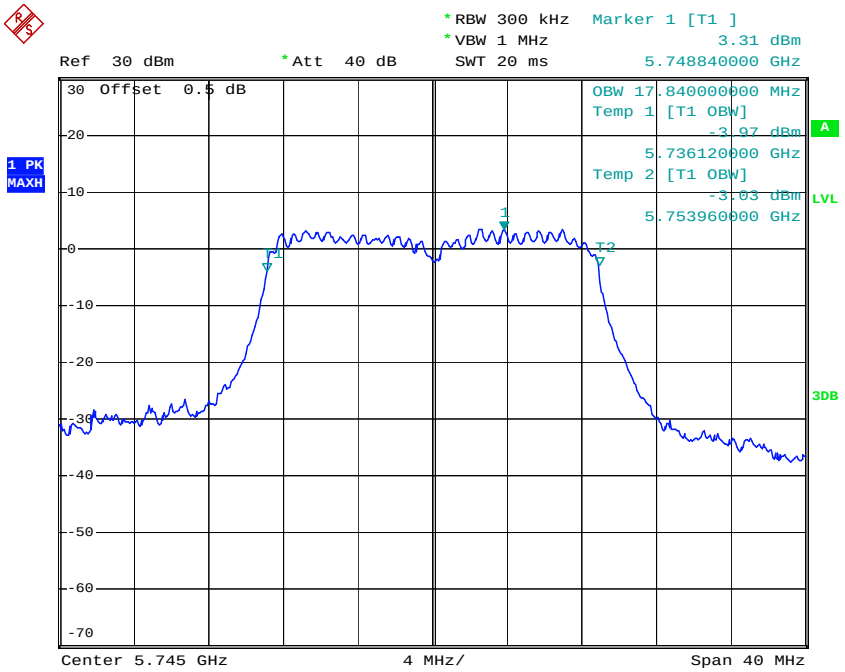
Date: 25.AUG.2018 14:14:17

802.11a High Channel



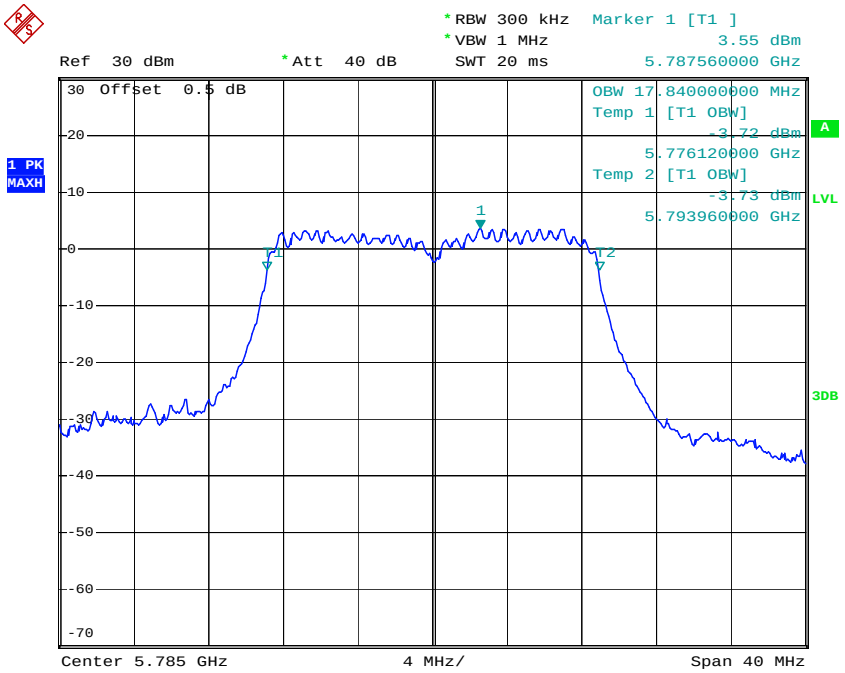
Date: 25.AUG.2018 13:57:14

802.11ht20 Low Channel



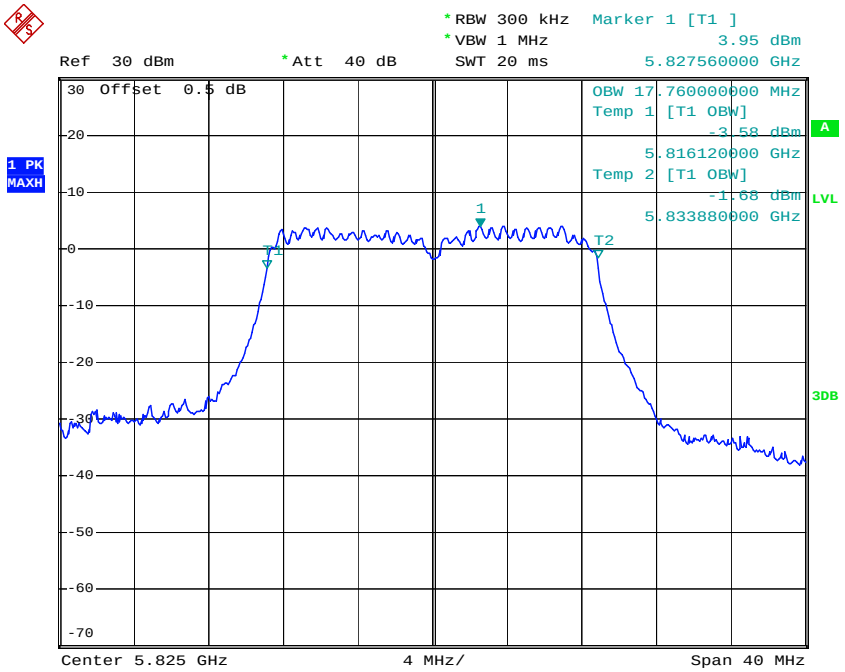
Date: 25.AUG.2018 14:01:05

802.11ht20 Middle Channel



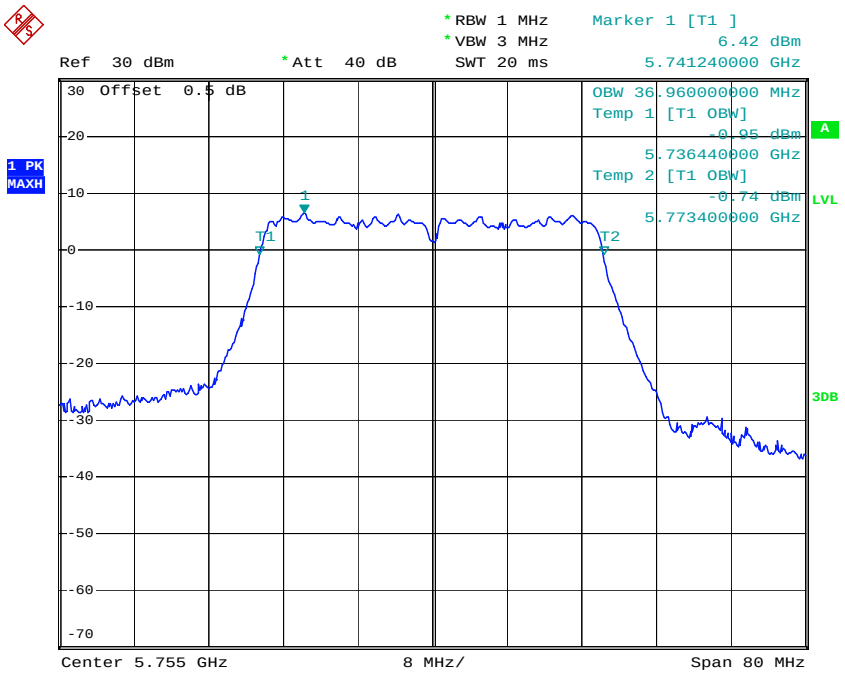
Date: 25.AUG.2018 14:15:59

802.11ht20 High Channel



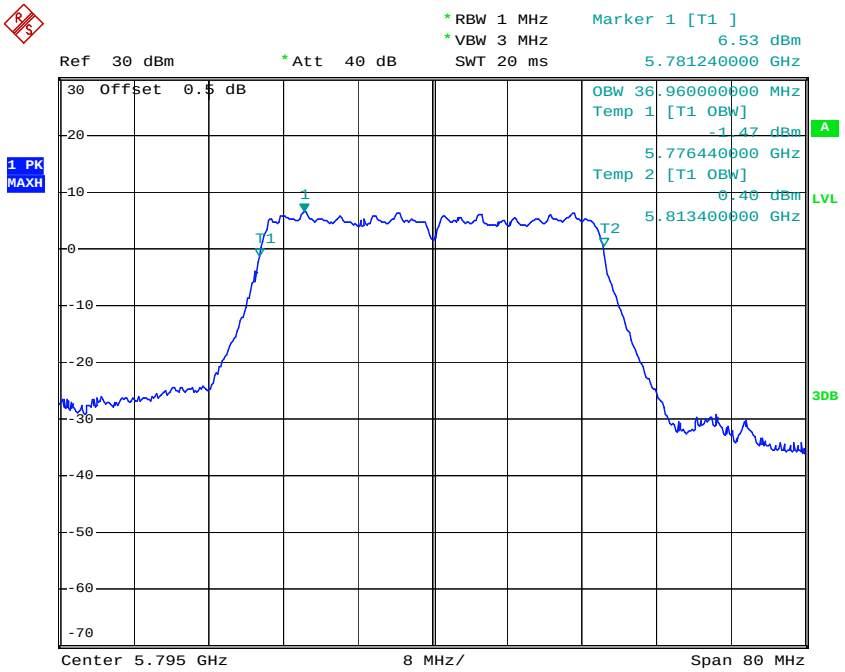
Date: 25.AUG.2018 13:59:02

802.11ht40 Low Channel



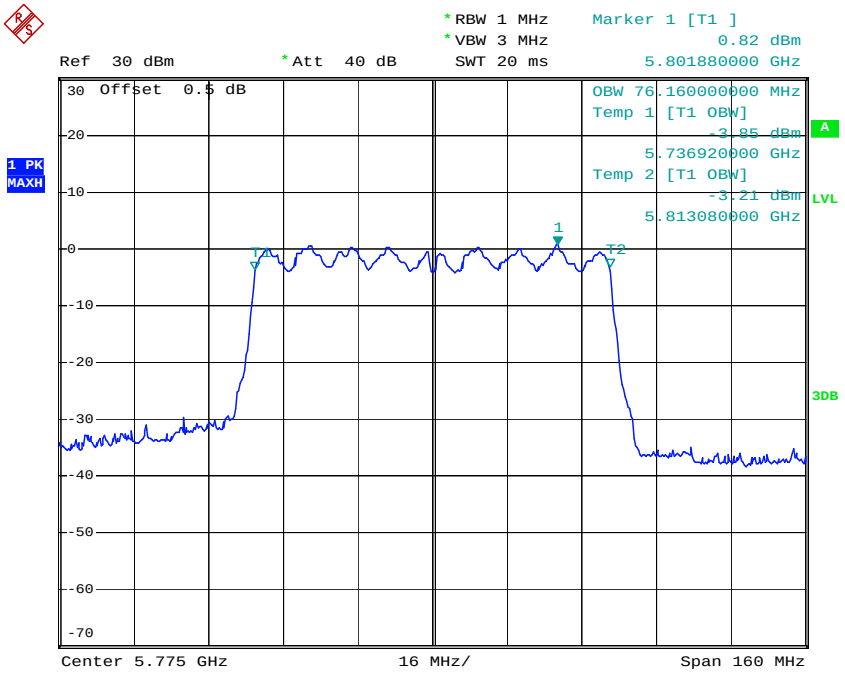
Date: 25.AUG.2018 14:04:11

802.11ht40 High Channel



Date: 25.AUG.2018 14:08:24

802.11ac80 Middle Channel



Date: 25.AUG.2018 14:38:36

FCC §15.407(a) –MAXIMUM CONDUCTED OUTPUT POWER

Applicable Standard

(a) Power limits:

(1) For the band 5.15-5.25 GHz.

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

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

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

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

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

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

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
E-Microwave	Coaxial Attenuators	EMCA10-5RN-6	OE01203239	2017-09-05	2018-09-05
Agilent	USB Wideband Power Sensor	U2022XA	MY5417006	2017-12-11	2018-12-11

*** 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:	27.5°C
Relative Humidity:	61 %
ATM Pressure:	99.9 kPa

The testing was performed by Elena Lei on 2018-08-24.

Test Mode: Transmitting

UNII Band	Mode	Frequency (MHz)	Conducted Average Output Power (dBm)			Limit (dBm)	Result
			Chain 0	Chain 1	Total		
5150 - 5250 MHz	802.11 a	5180	12.68	12.76	/	30	PASS
		5200	13.84	12.58	/	30	PASS
		5240	12.99	12.46	/	30	PASS
	802.11ht20	5180	11.79	11.47	14.64	30	PASS
		5200	11.89	11.64	14.78	30	PASS
		5240	11.73	11.83	14.79	30	PASS
	802.11ht40	5190	7.81	7.46	10.65	30	PASS
		5230	9.83	9.22	12.55	30	PASS
	802.11 ac80	5210	7.60	7.48	10.55	30	PASS
5725 - 5850 MHz	802.11 a	5745	12.52	12.47	/	30	PASS
		5785	12.62	12.51	/	30	PASS
		5825	12.67	12.51	/	30	PASS
	802.11ht20	5745	11.68	11.58	14.64	30	PASS
		5785	11.69	11.50	14.61	30	PASS
		5825	11.78	11.67	14.74	30	PASS
	802.11ht40	5755	11.67	11.69	14.69	30	PASS
		5795	11.75	11.46	14.62	30	PASS
	802.11 ac80	5775	8.68	8.69	11.70	30	PASS

Note:
The duty cycle was calculated into the reading already.
The maximum antenna gain is 5dBi in 5GHz band. The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power measurements on IEEE 802.11 devices:

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

So:

Directional gain = G_{ANT} + Array Gain = 5dBi < 6dBi

FCC §15.407(a) - POWER SPECTRAL DENSITY

Applicable Standard

(a) Power limits:

(1) For the band 5.15-5.25 GHz.

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

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

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

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

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

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

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

Test Procedure

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

Test Equipment List and Details

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

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

Test Data

Environmental Conditions

Temperature:	27.5°C
Relative Humidity:	61 %
ATM Pressure:	99.9 kPa

The testing was performed by Elena Lei on 2018-08-25.

Test Mode: Transmitting

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

5150-5250MHz

Mode	Frequency (MHz)	Result (dBm/MHz)			Limit (dBm/MHz)
		Chain 0	Chain 1	Total	
802.11a	5180	1.78	1.32	/	17
	5200	2.77	2.13	/	
	5240	2.75	2.50	/	
802.11n ht20	5180	1.32	0.59	3.98	
	5200	1.71	1.00	4.38	
	5240	1.46	1.61	4.55	
802.11n ht40	5190	-5.21	-6.14	-2.64	
	5230	-3.53	-3.41	-0.46	
802.11ac 80	5210	-7.06	-8.32	-4.63	

5725-5850MHz

Mode	Frequency (MHz)	Reading (dBm/300kHz)		Result (dBm/500kHz)			Limit (dBm/MHz)
		Chain 0	Chain 1	Chain 0	Chain 1	Total	
802.11a	5745	-2.44	-2.86	-0.22	-0.64	/	30
	5785	-1.90	-2.15	0.32	0.07	/	
	5825	-2.04	-2.05	0.18	0.17	/	
802.11n ht20	5745	-3.50	-3.09	-1.28	-0.87	1.94	
	5785	-3.12	-2.63	-0.90	-0.41	2.36	
	5825	-2.60	-2.62	-0.38	-0.40	2.62	
802.11n ht40	5755	-6.09	-6.34	-3.87	-4.12	-0.98	
	5795	-5.44	-5.42	-3.22	-3.20	-0.20	
802.11ac 80	5775	-10.64	-10.26	-8.42	-8.04	-5.22	

Note 1:The maximum antenna gain is 5dBi in 5GHz band. The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density (PSD) measurements on the devices:

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

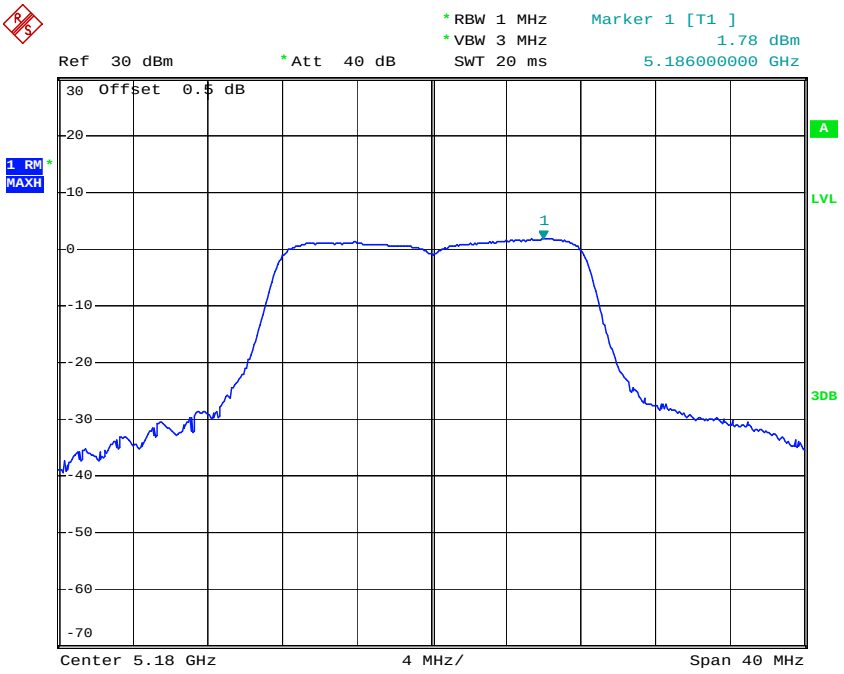
So:

$$\text{Directional gain} = G_{ANT} + \text{Array Gain} = 5.0\text{dBi}+10*\log(2/2)=5\text{dBi}$$

Note 2: For 5.8GHz band, If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 KHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.

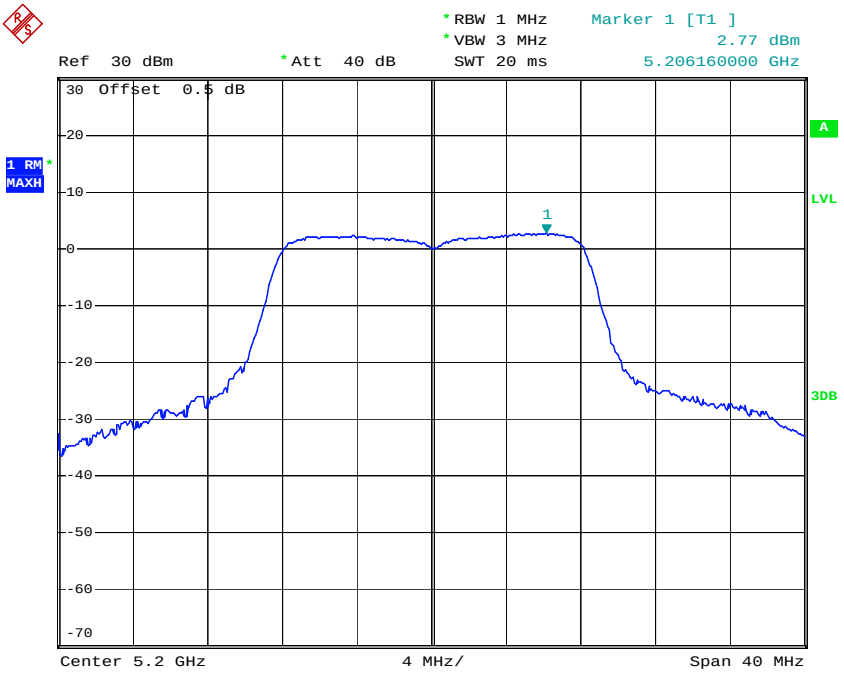
5150-5250MHz
Chain 0:

802.11a Low Channel



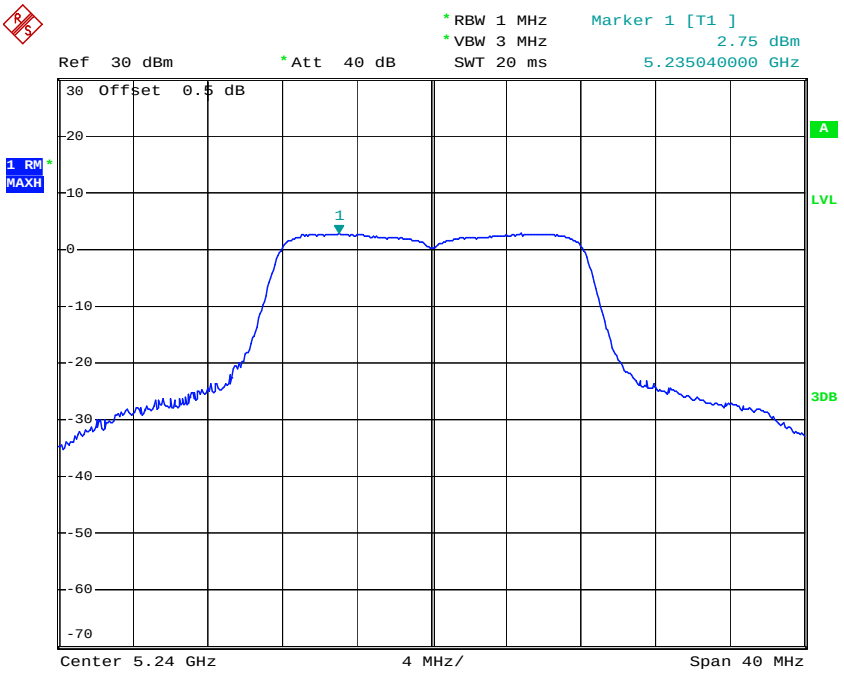
Date: 25.AUG.2018 13:22:21

802.11a Middle Channel



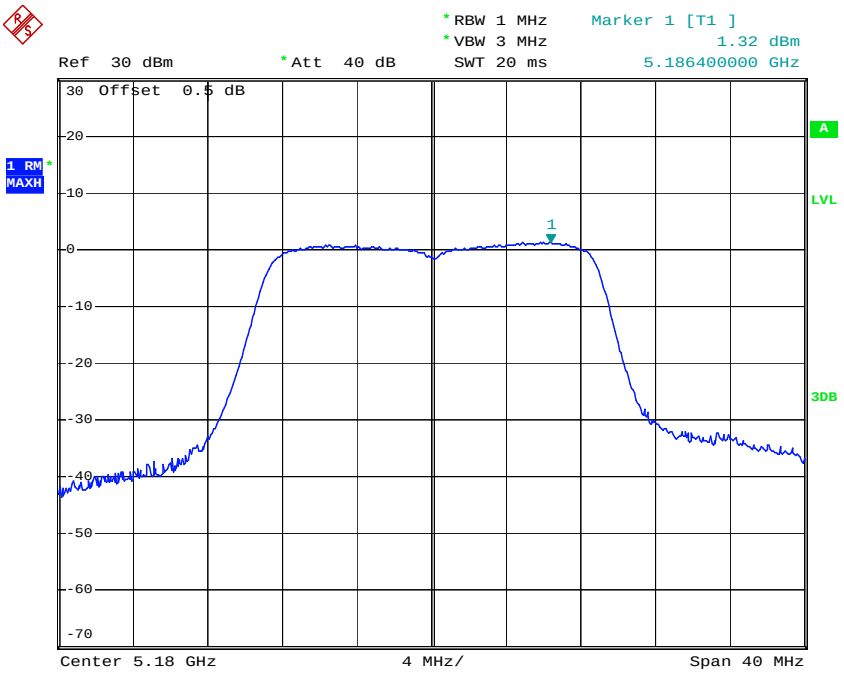
Date: 25.AUG.2018 13:10:41

802.11a High Channel



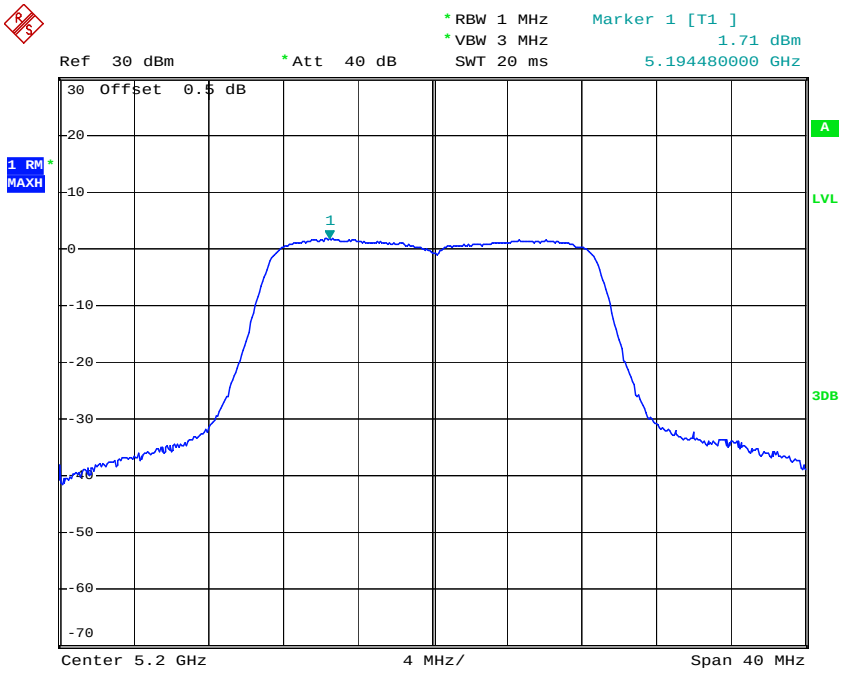
Date: 25.AUG.2018 11:44:11

802.11n ht20 Low Channel



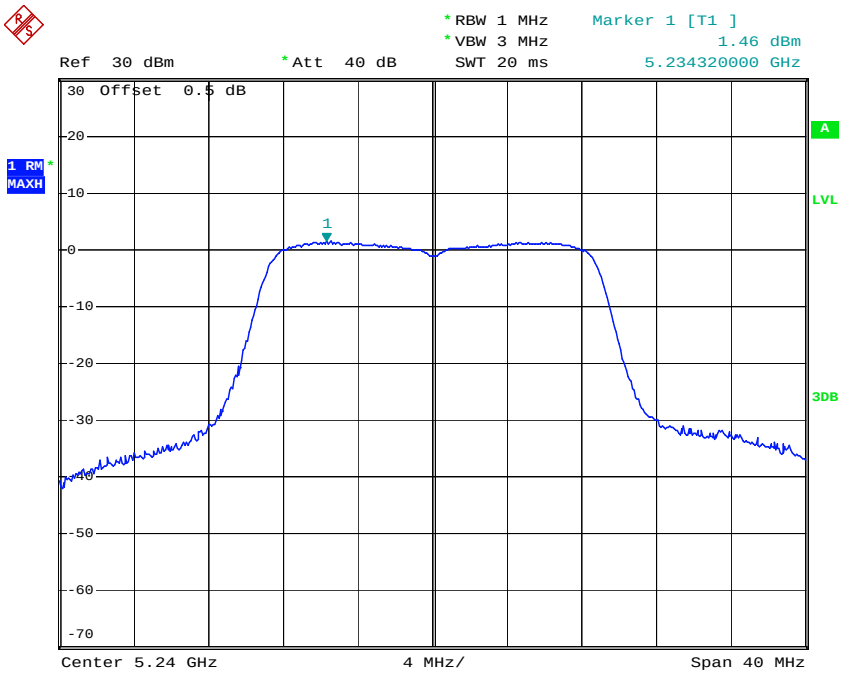
Date: 25.AUG.2018 13:11:35

802.11n ht20 Middle Channel



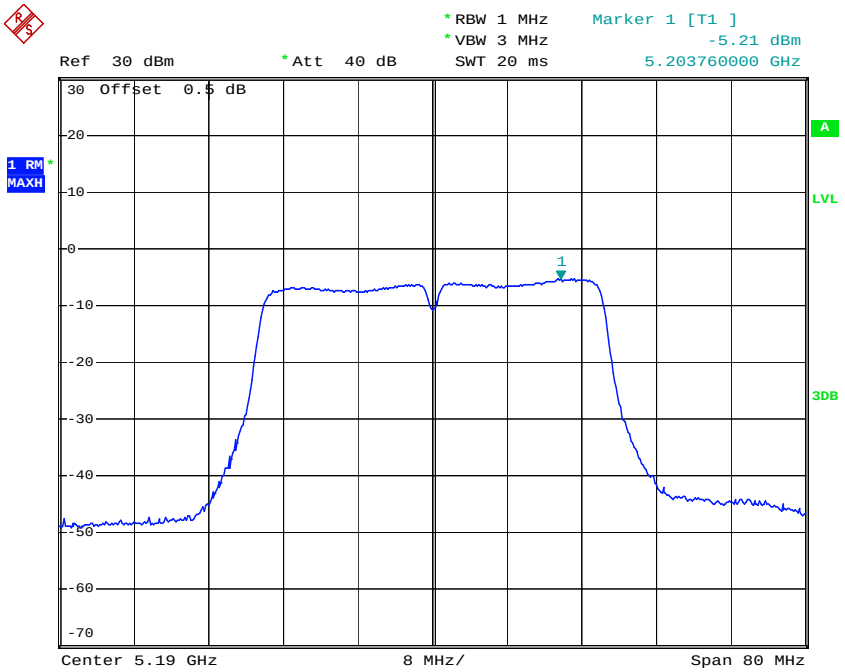
Date: 25.AUG.2018 11:28:03

802.11n ht20 High Channel



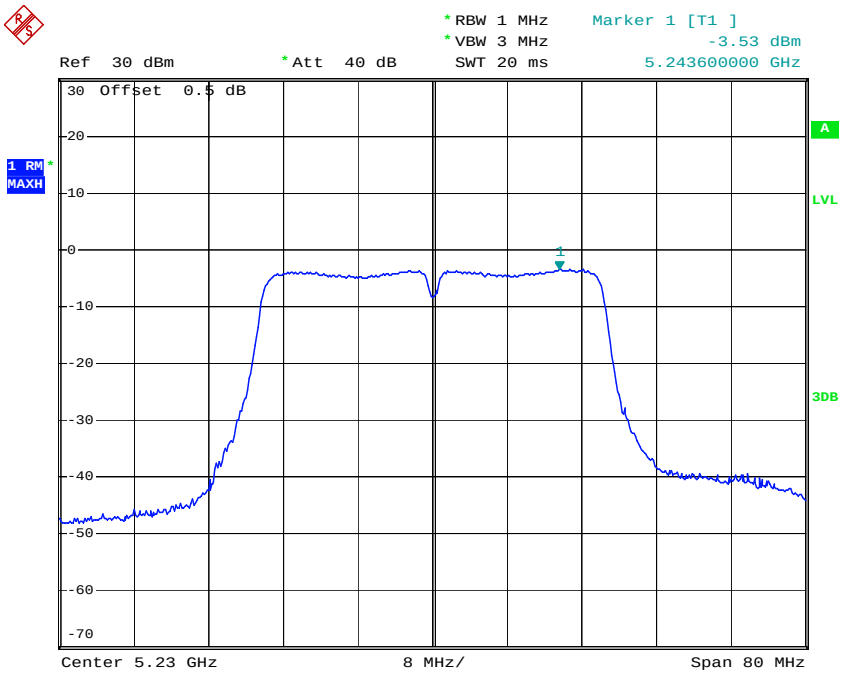
Date: 25.AUG.2018 13:13:12

802.11n ht40 Low Channel



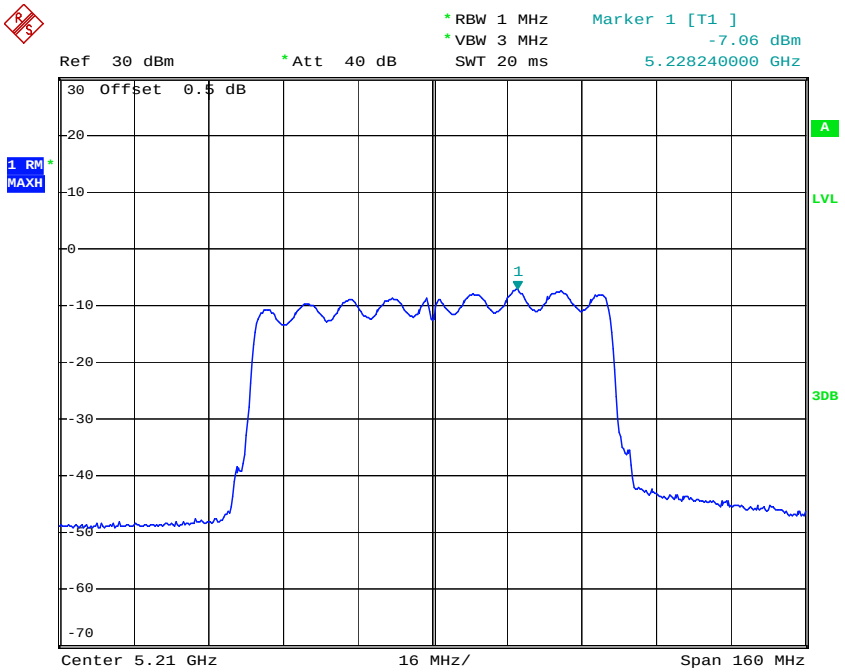
Date: 25.AUG.2018 13:27:30

802.11n ht40 High Channel



Date: 25.AUG.2018 13:15:19

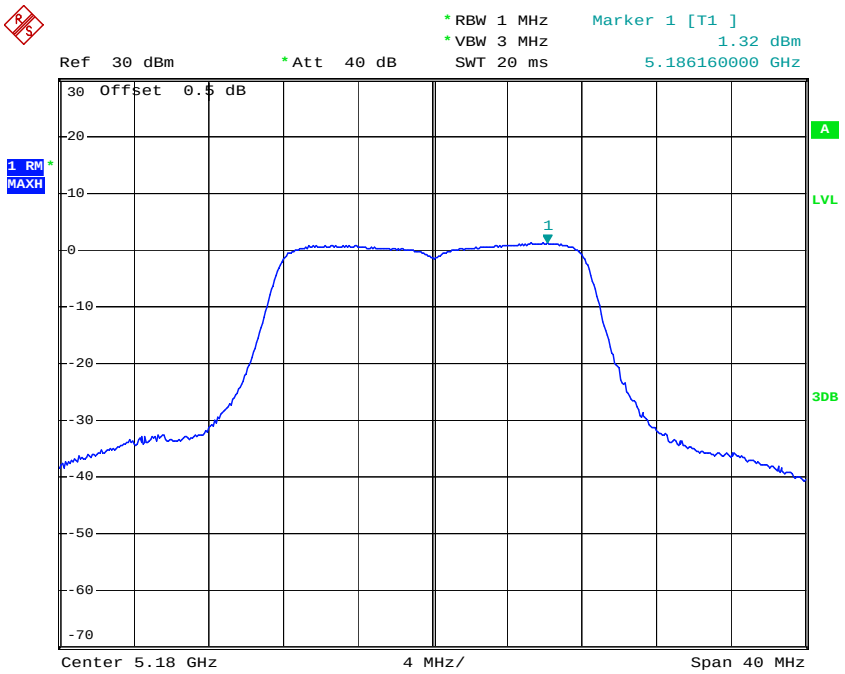
802.11ac80 Middle Channel



Date: 25.AUG.2018 13:21:09

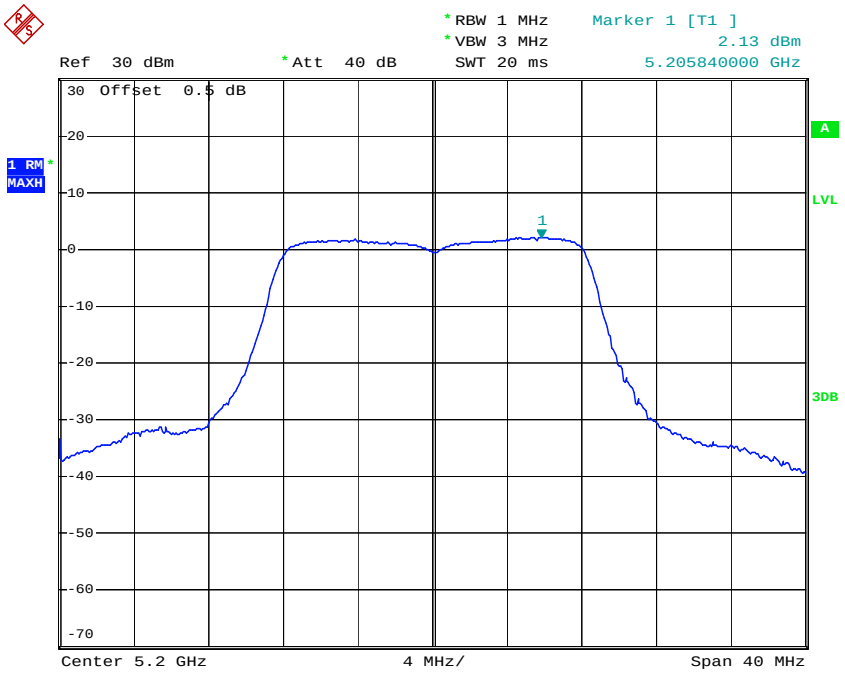
Chain 1:

802.11a Low Channel



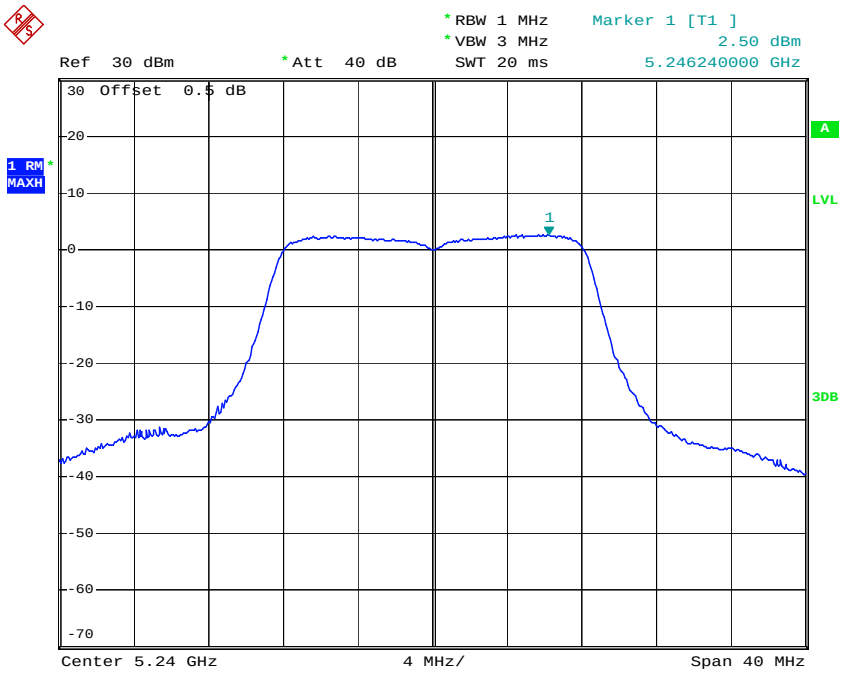
Date: 25.AUG.2018 11:46:18

802.11a Middle Channel



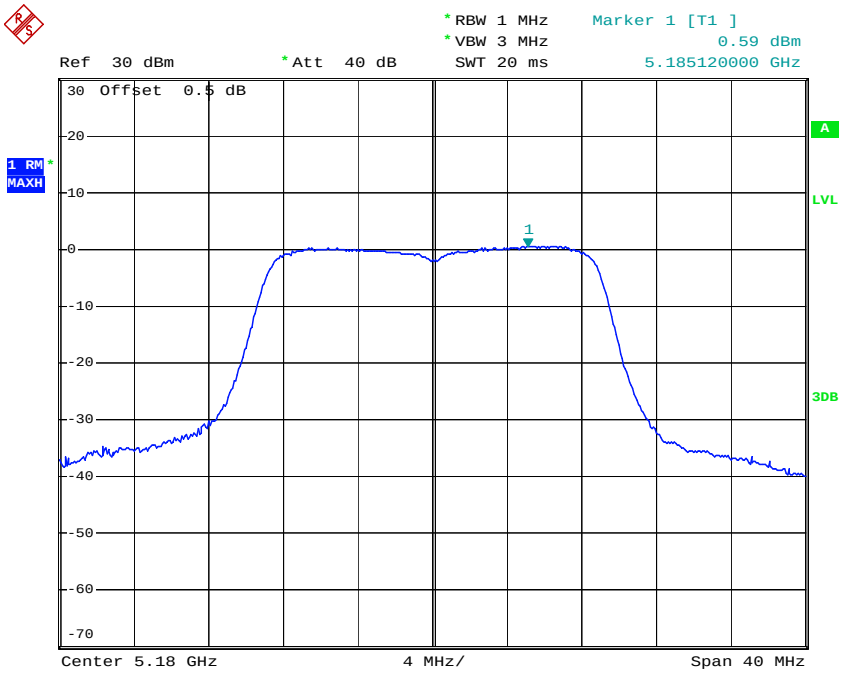
Date: 25.AUG.2018 11:46:58

802.11a High Channel



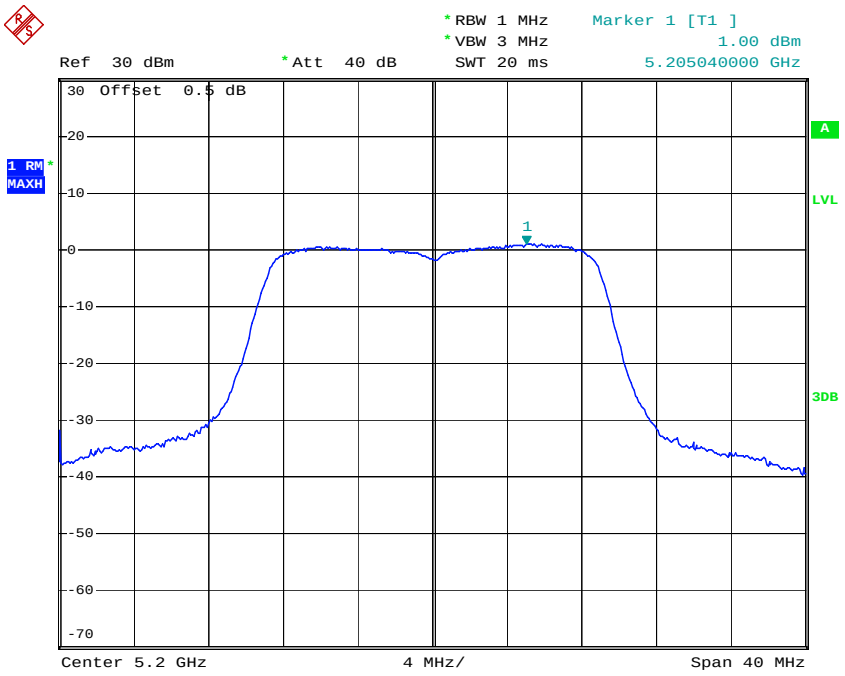
Date: 25.AUG.2018 11:42:58

802.11n ht20 Low Channel



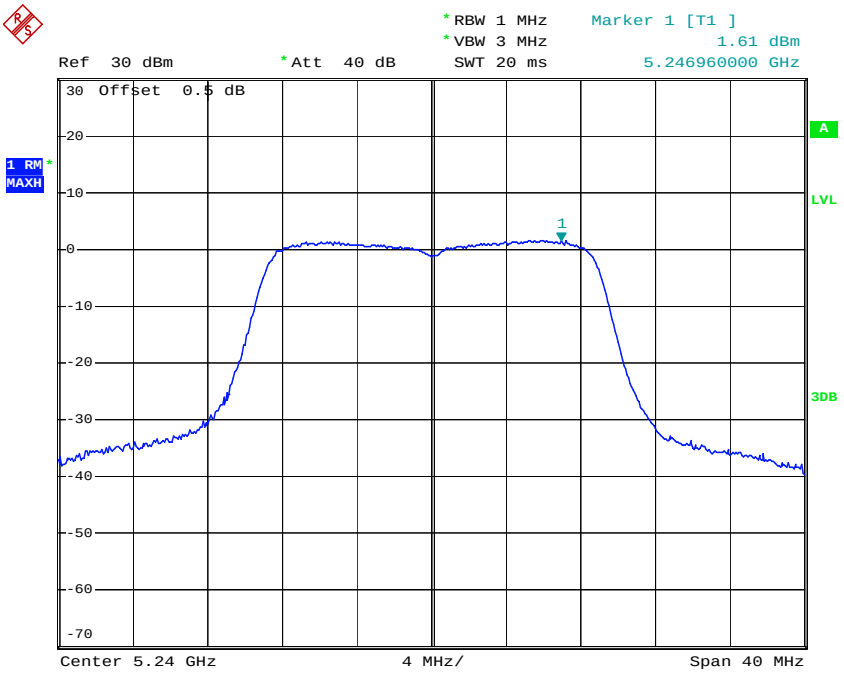
Date: 25.AUG.2018 11:49:00

802.11n ht20 Middle Channel



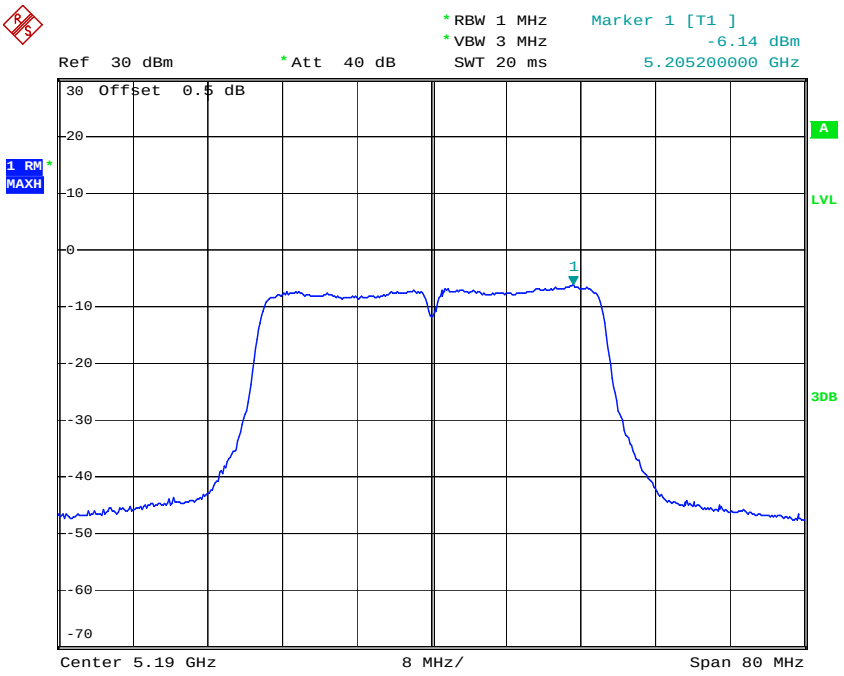
Date: 25.AUG.2018 11:48:38

802.11n ht20 High Channel



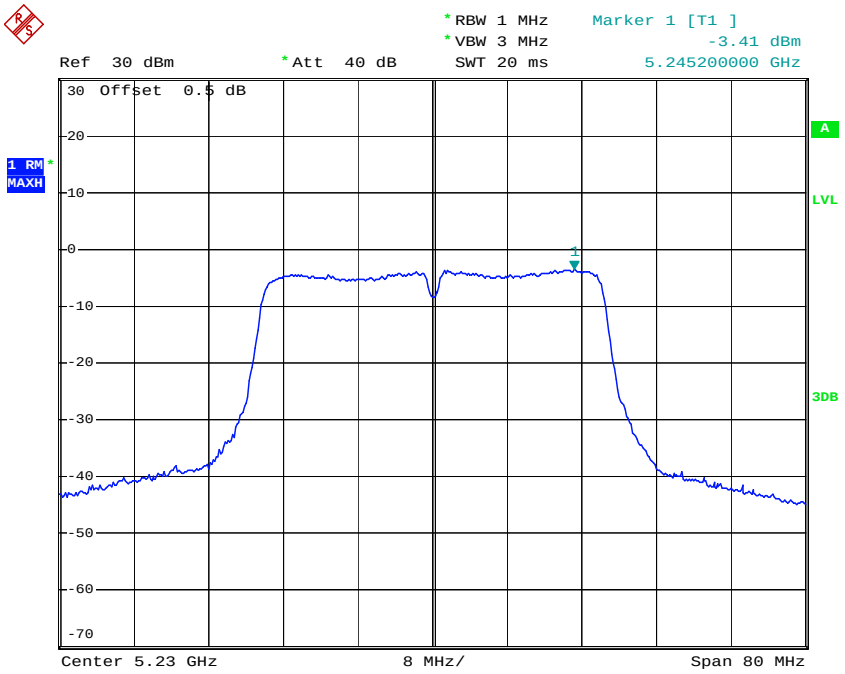
Date: 25.AUG.2018 11:47:55

802.11n ht40 Low Channel



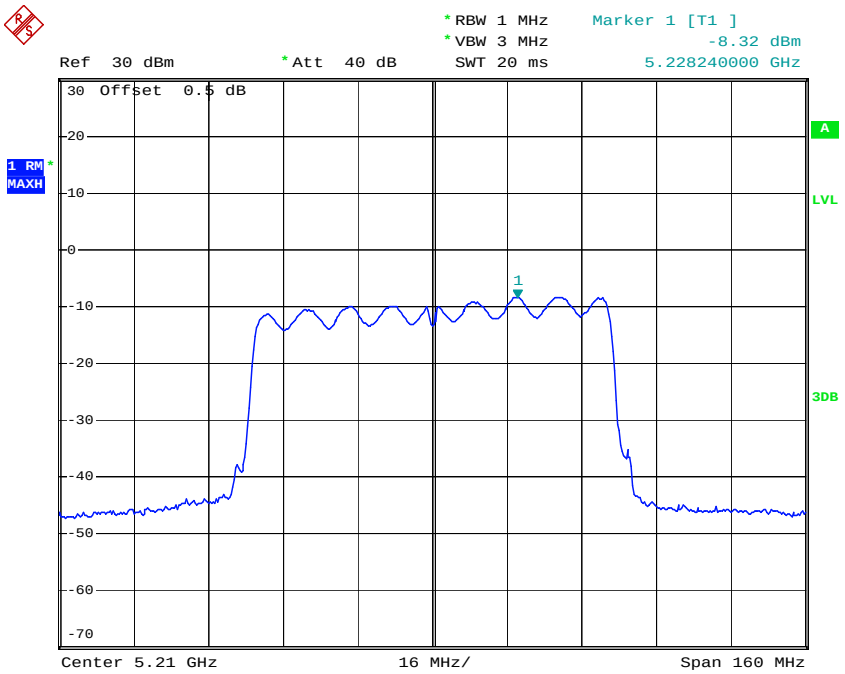
Date: 25.AUG.2018 13:25:19

802.11n ht40 High Channel



Date: 25.AUG.2018 13:03:16

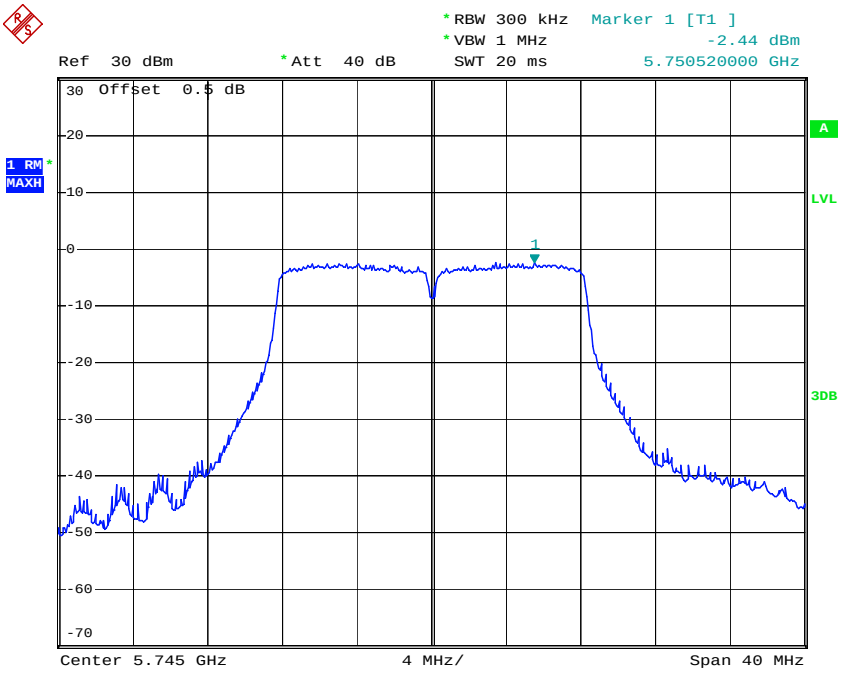
802.11ac80 Middle Channel



Date: 25.AUG.2018 13:20:00

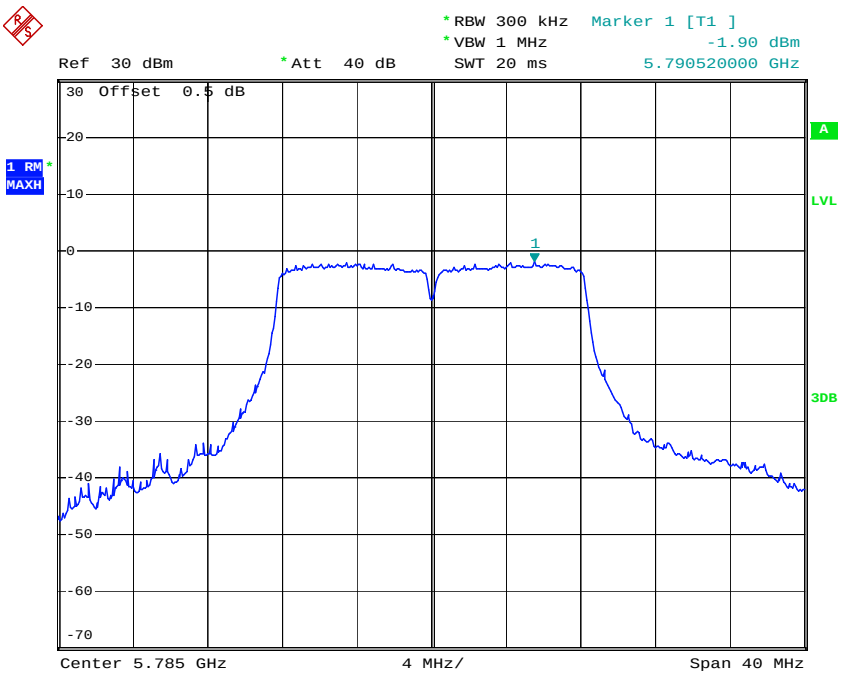
5725-5850MHz
Chain 0:

802.11a Low Channel



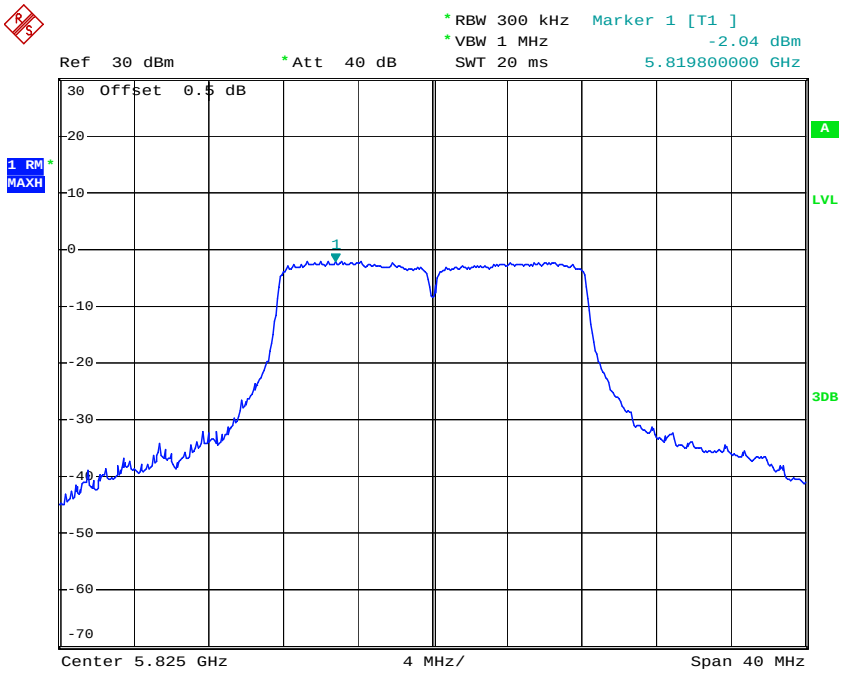
Date: 25.AUG.2018 14:17:42

802.11a Middle Channel



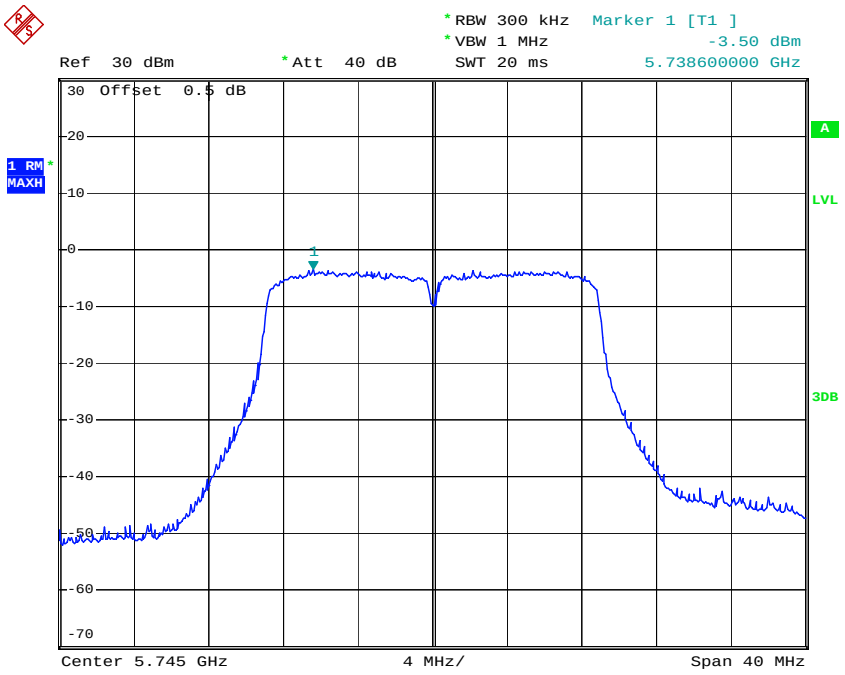
Date: 25.AUG.2018 14:19:41

802.11a High Channel



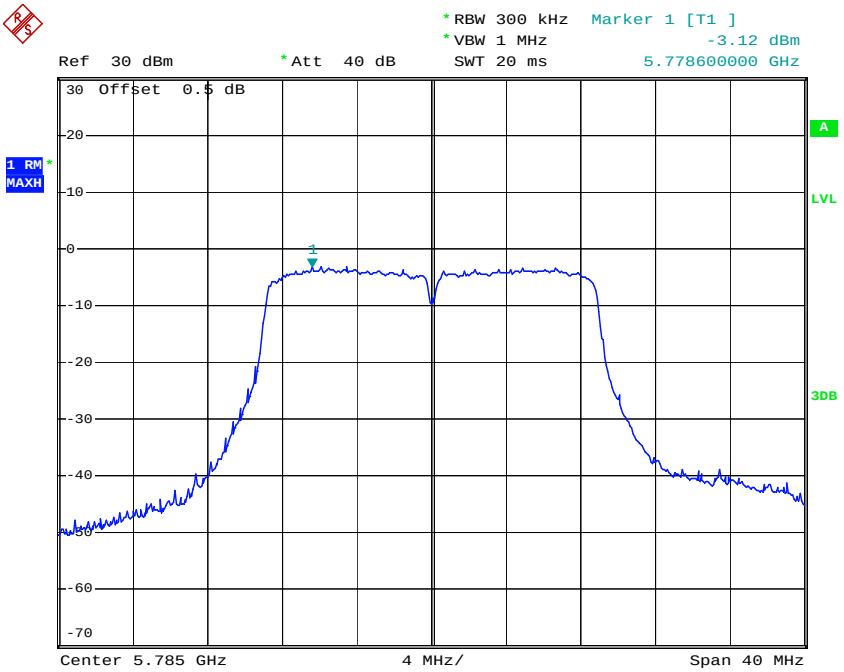
Date: 25.AUG.2018 14:20:41

802.11n ht20 Low Channel



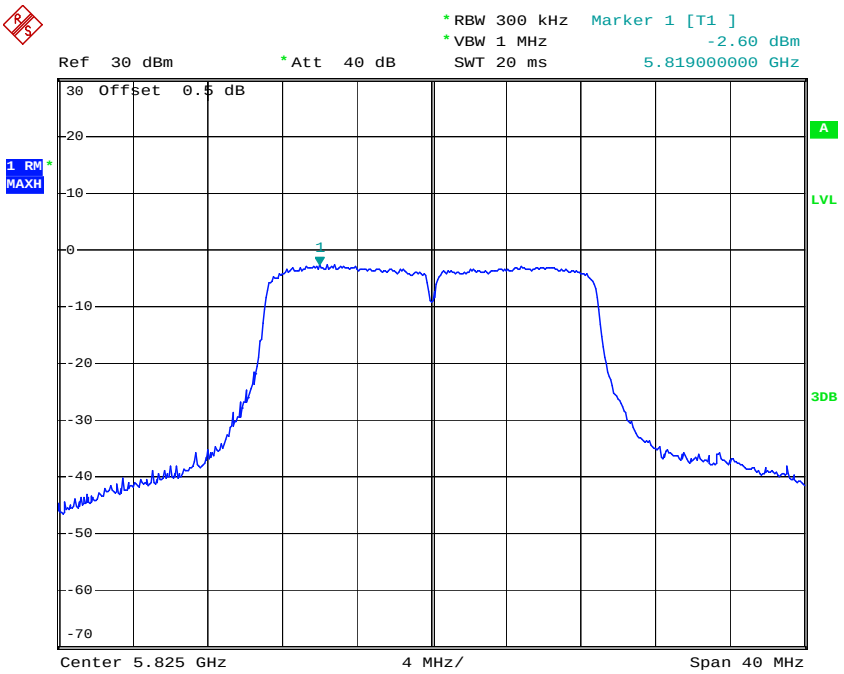
Date: 25.AUG.2018 14:25:19

802.11n ht20 Middle Channel



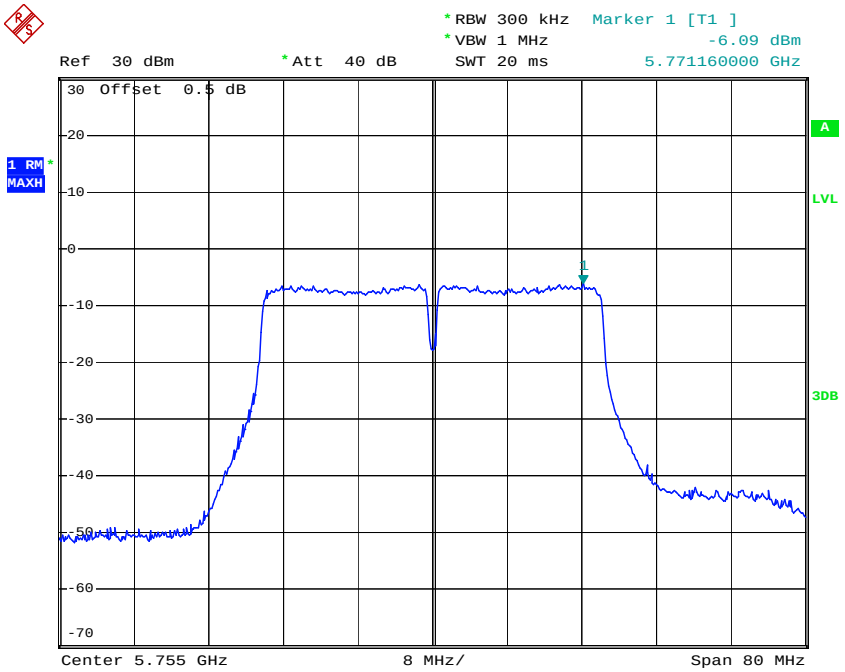
Date: 25.AUG.2018 14:22:53

802.11n ht20 High Channel



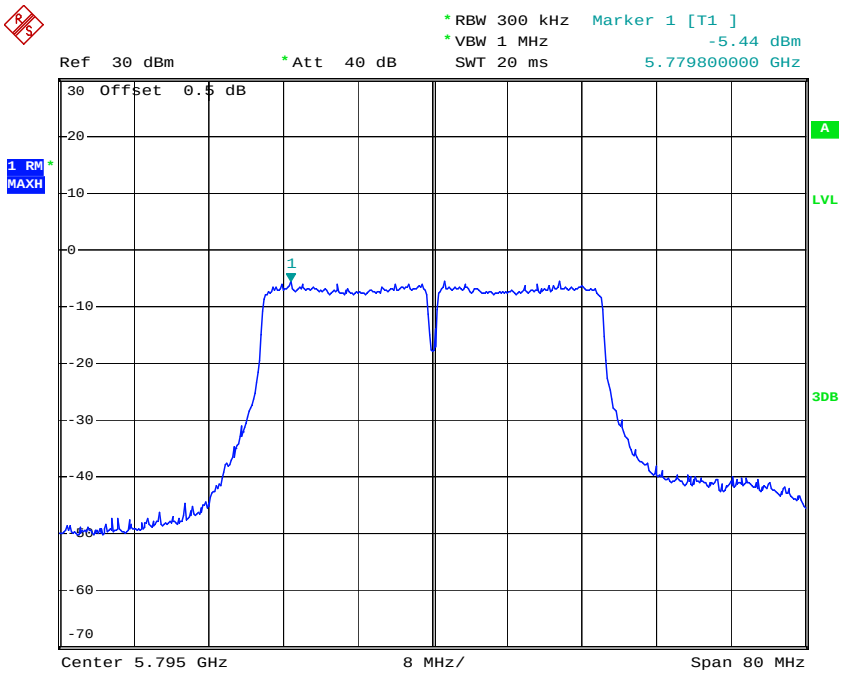
Date: 25.AUG.2018 14:21:44

802.11n ht40 Low Channel



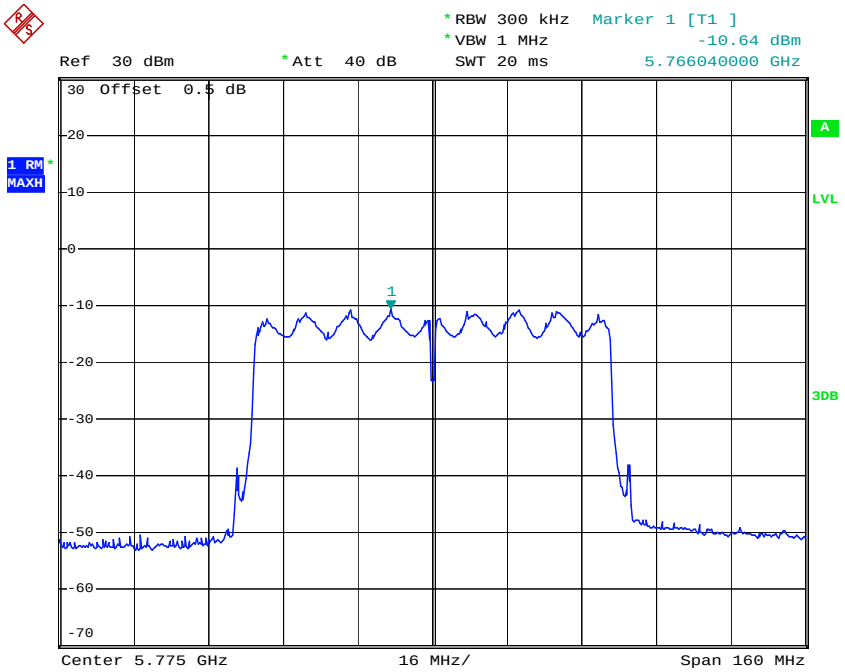
Date: 25.AUG.2018 14:27:46

802.11n ht40 High Channel



Date: 25.AUG.2018 14:29:00

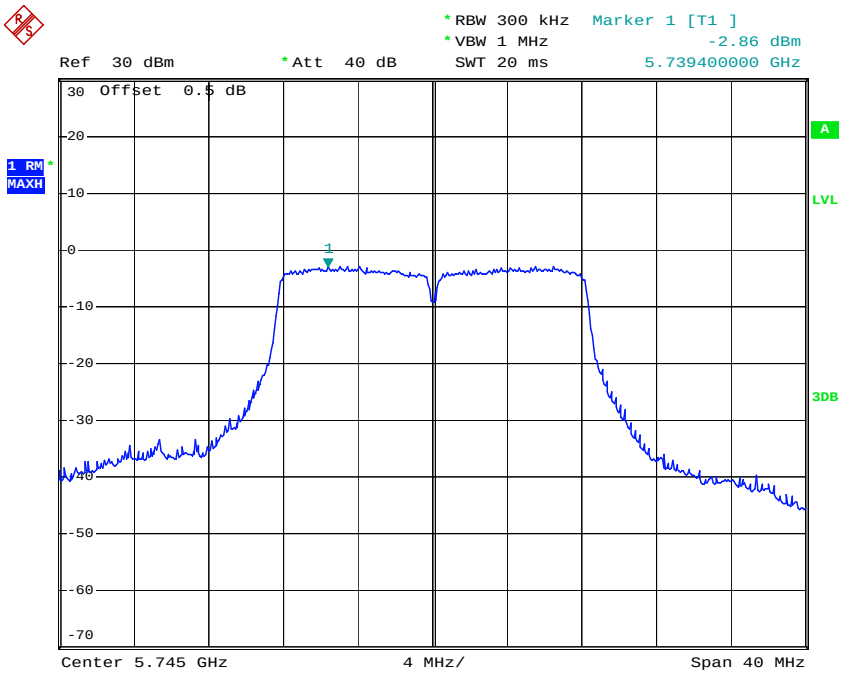
802.11ac80 Middle Channel



Date: 25.AUG.2018 14:41:21

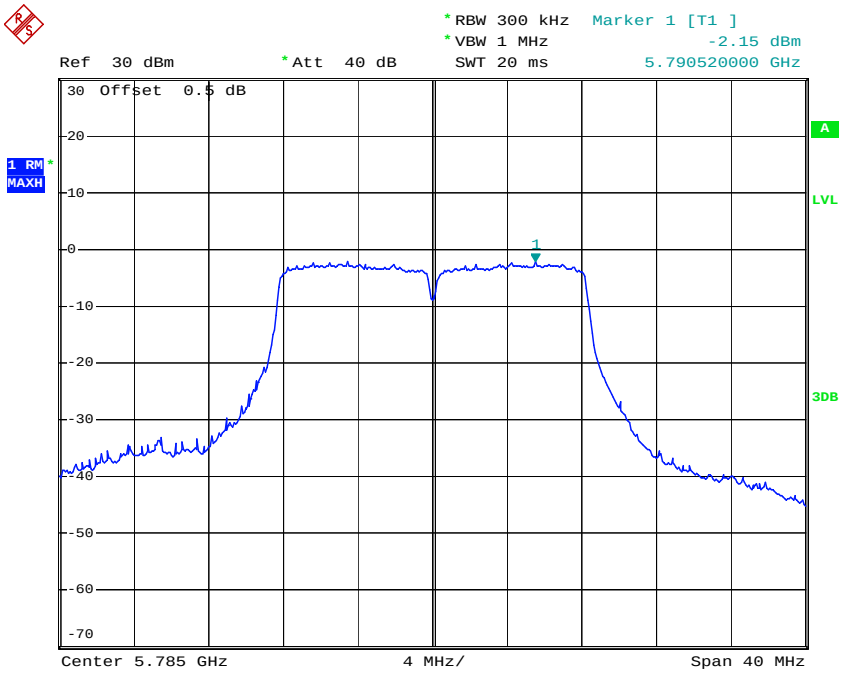
Chain 1:

802.11a Low Channel



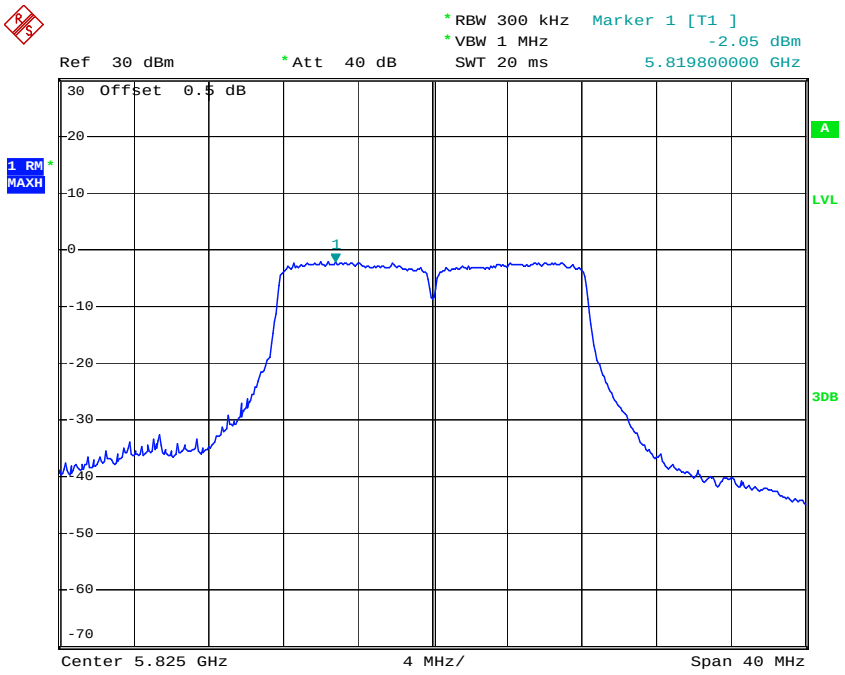
Date: 25.AUG.2018 13:55:47

802.11a Middle Channel



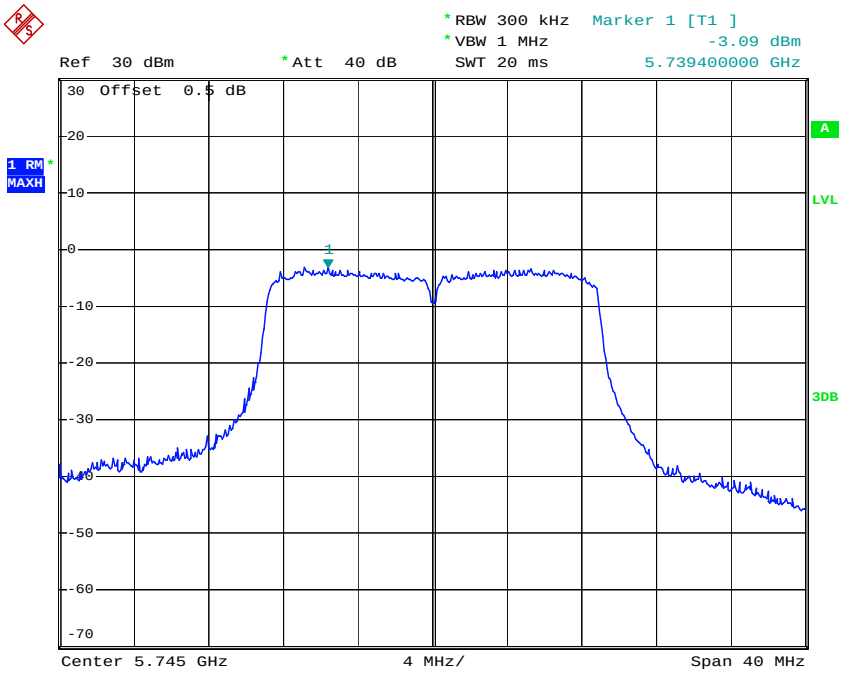
Date: 25.AUG.2018 14:14:29

802.11a High Channel



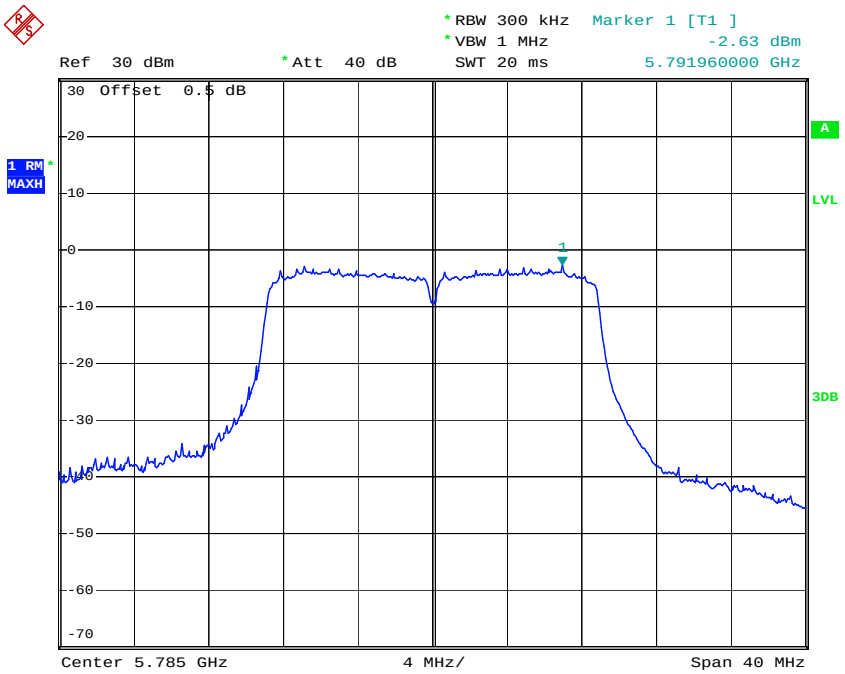
Date: 25.AUG.2018 13:57:26

802.11n ht20 Low Channel



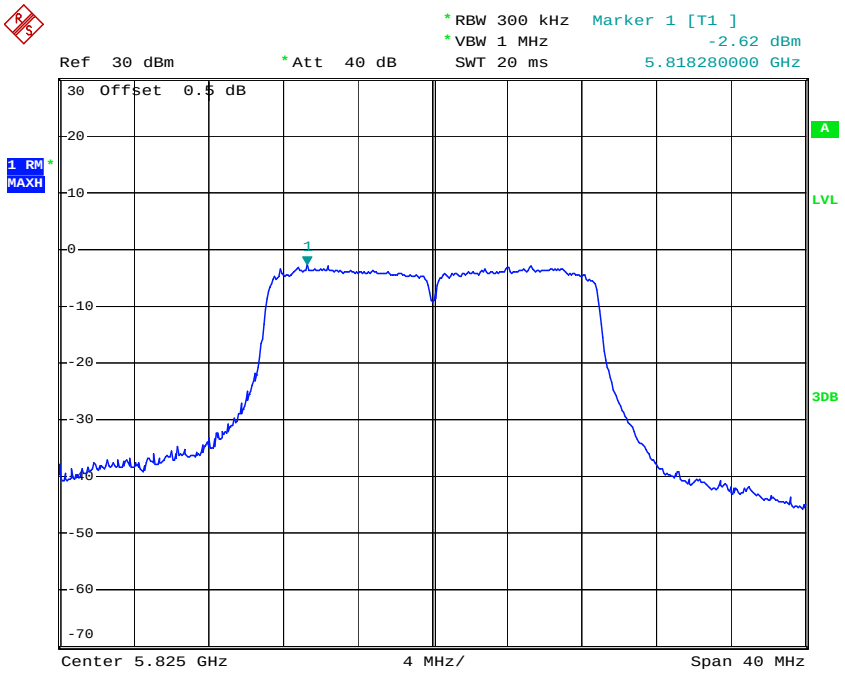
Date: 25.AUG.2018 14:01:17

802.11n ht20 Middle Channel



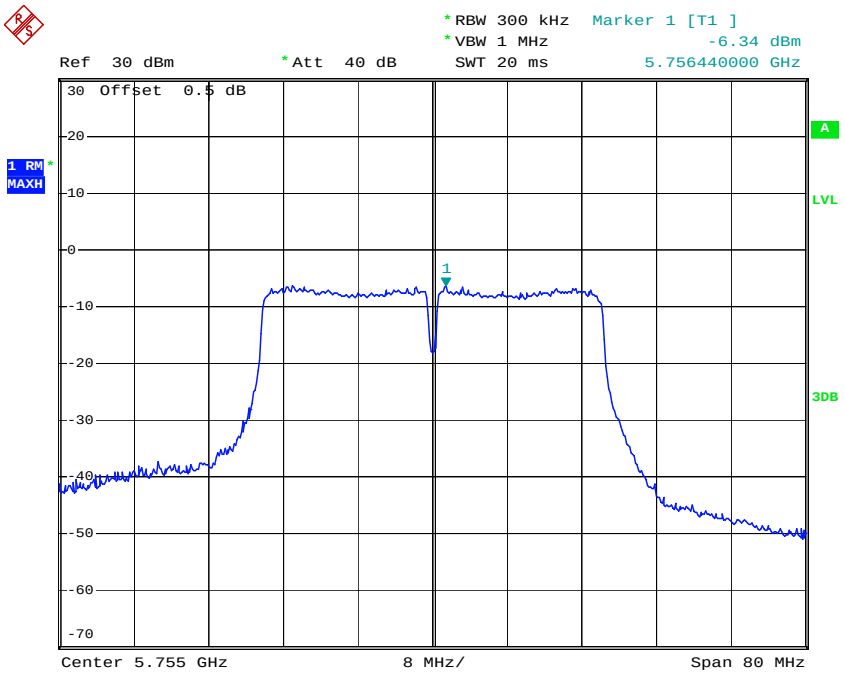
Date: 25.AUG.2018 14:16:14

802.11 n ht20 High Channel



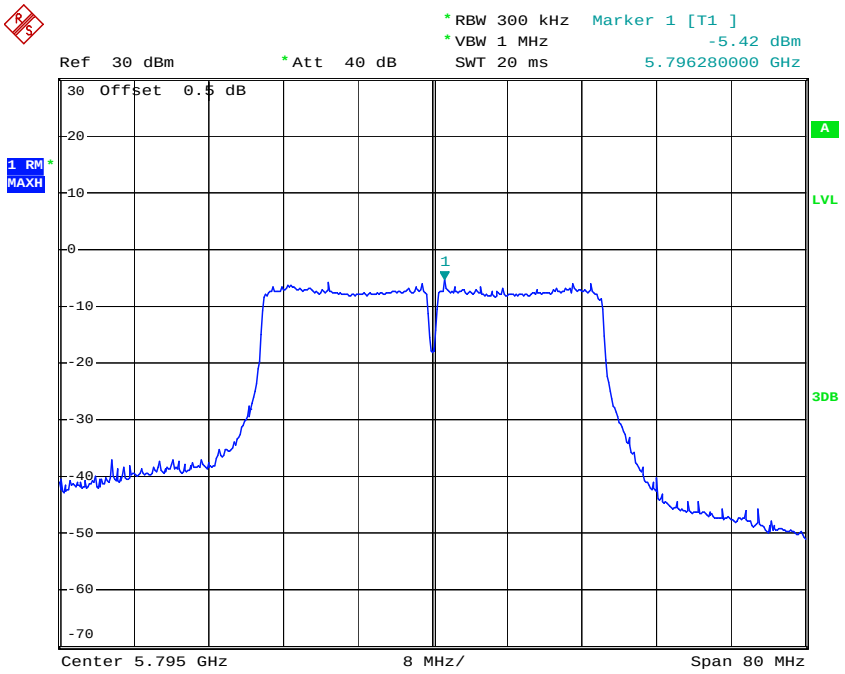
Date: 25.AUG.2018 13:59:18

802.11n ht40 Low Channel



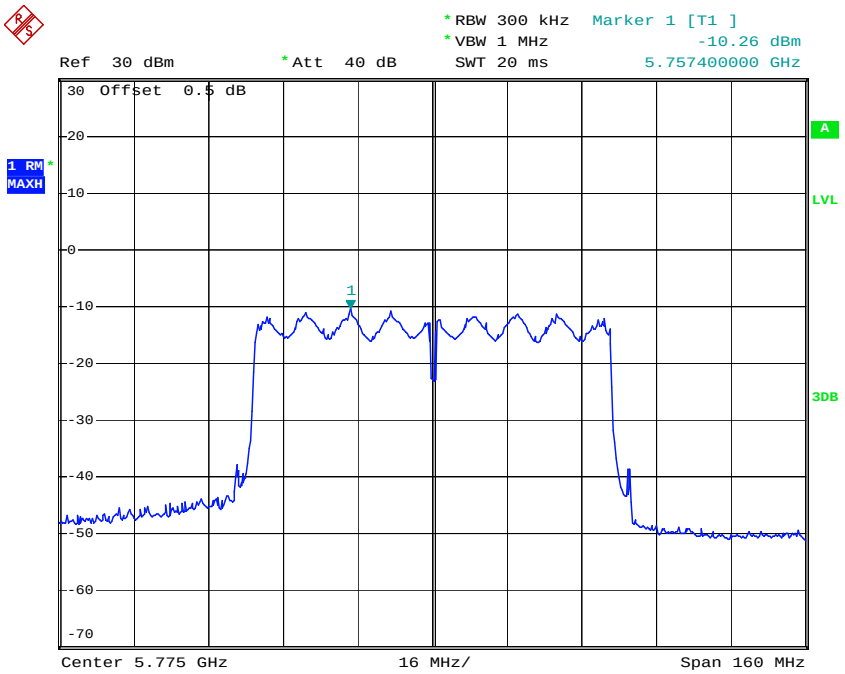
Date: 25.AUG.2018 14:04:26

802.11n ht40 High Channel



Date: 25.AUG.2018 14:08:39

802.11ac80 Middle Channel



Date: 25.AUG.2018 14:37:00

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