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: X7DIP04281

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

Report Number:	RDG171108011-00C
Report Date:	2017-11-22
Reviewed By:	Jerry Zhang EMC Manager
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The ***ZIONCOM ELECTRONICS (SHENZHEN) LTD.***'s product, model number: ***A3002RU (FCC ID: X7DIP04281)*** (the "EUT") in this report was a ***AC1200 Wireless Dual Band Gigabit Router*** , which was measured approximately: 18.5cm(L)*13.5cm(W)*4.5cm(H), rated power: DC 12V from Adapter.

Adapter Information:
Model: DCP007B122000U
Input: DC100-240V,50/60Hz,0.6A Max
Output: AC12V,2A

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: X7DIP04281.

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 v01r04

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

Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.61dB
Power Spectral Density, conducted	±0.61 dB
Unwanted Emissions, radiated	30M~200MHz: 4.58 dB for Horizontal, 4.59 dB for Vertical 200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical 1G~6GHz: 4.45 dB, 6G~40GHz: 5.23 dB
Unwanted Emissions,conducted	±1.5 dB
Temperature	±1℃
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
AC Power Lines Conducted Emission	3.12 dB (150 kHz to 30 MHz)

Test Facility

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

Bay Area Compliance Laboratories Corp. (Dongguan) has been accredited to ISO/IEC 17025 by CNAS(Lab code: L5662). And accredited to ISO/IEC 17025 by NVLAP(Test Laboratory Accreditation Certificate Number 500069-0), the FCC Designation No. CN5002 under the KDB 974614 D01.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Bay Area Compliance Laboratories Corp. (Dongguan) was registered with ISED Canada under ISED Canada Registration Number 3062D.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

The 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 mode was the worst and reported.

EUT Exercise Software

The software "MP-Tool-v3.4" 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:

5125-5250 MHz:

Antenna 0/ Antenna 1				
Test Mode	Test Software Version	MP-Tool-v3.4		
802.11a	Test Frequency	5180MHz	5200MHz	5240MHz
	Data Rate	6Mbps	6Mbps	6Mbps
	Power Level Setting	41/43	40/43	38/41
802.11n ht20	Test Frequency	5180MHz	5200MHz	5240MHz
	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting	32/33	31/32	29/30
802.11n ht40	Test Frequency	5190MHz	/	5230MHz
	Data Rate	MCS0	/	MCS0
	Power Level Setting	34/35	/	31/33
802.11n ac80	Test Frequency	/	5210MHz	/
	Data Rate	/	MCS0	/
	Power Level Setting	/	31/33	/

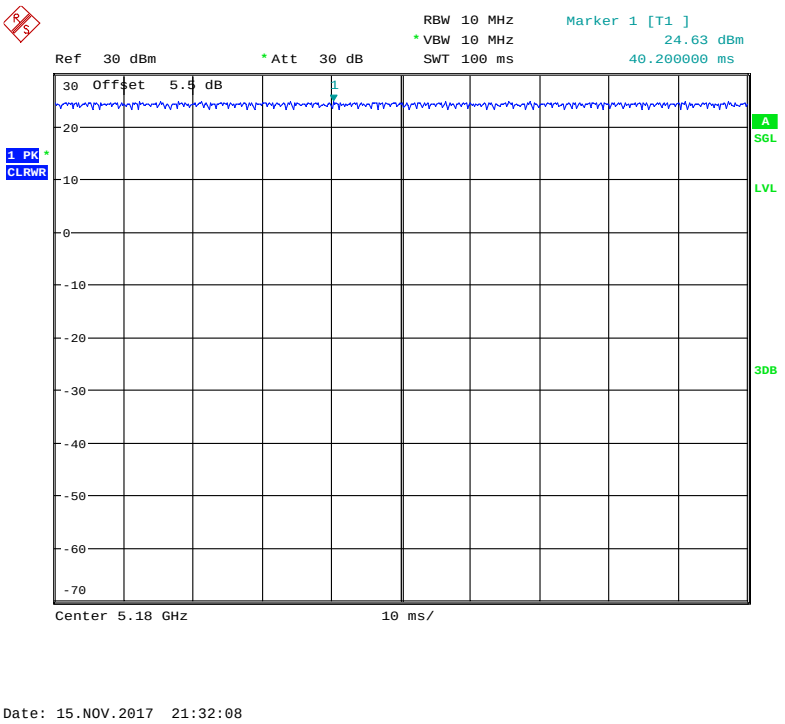
5725-5850MHz:

Antenna 0/ Antenna 1				
Test Mode	Test Software Version	MP-Tool-v3.4		
802.11a	Test Frequency	5745MHz	5785MHz	5825MHz
	Data Rate	6Mbps	6Mbps	6Mbps
	Power Level Setting	38/42	40/42	41/43
802.11n ht20	Test Frequency	5745MHz	5785MHz	5825MHz
	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting	31/35	33/35	34/36
802.11n ht40	Test Frequency	5755MHz	/	5795MHz
	Data Rate	MCS0	/	MCS0
	Power Level Setting	33/36	/	35/36
802.11n ac80	Test Frequency	/	5775MHz	/
	Data Rate	/	MCS0	/
	Power Level Setting	/	33/35	/

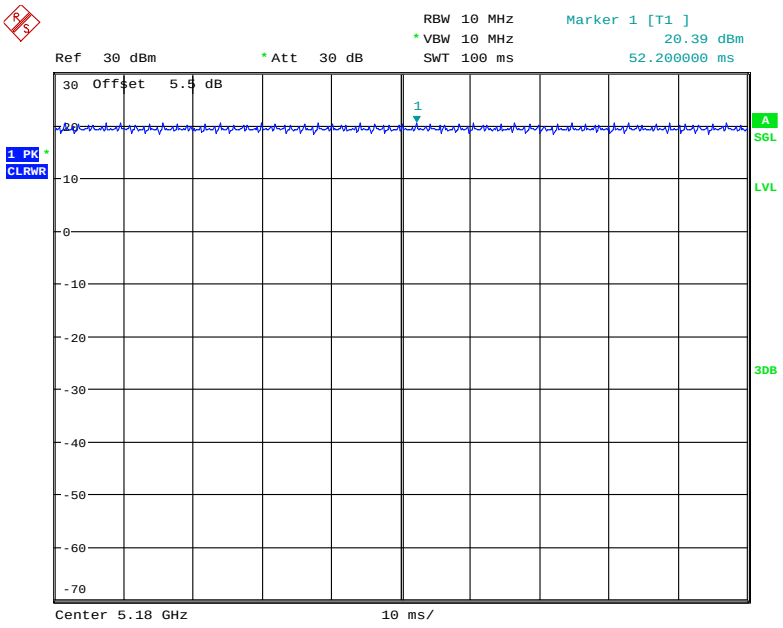
The duty cycle as below:

Mode	T_{on} (ms)	T_{on+off} (ms)	Duty Cycle (%)
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



802.11n ht20



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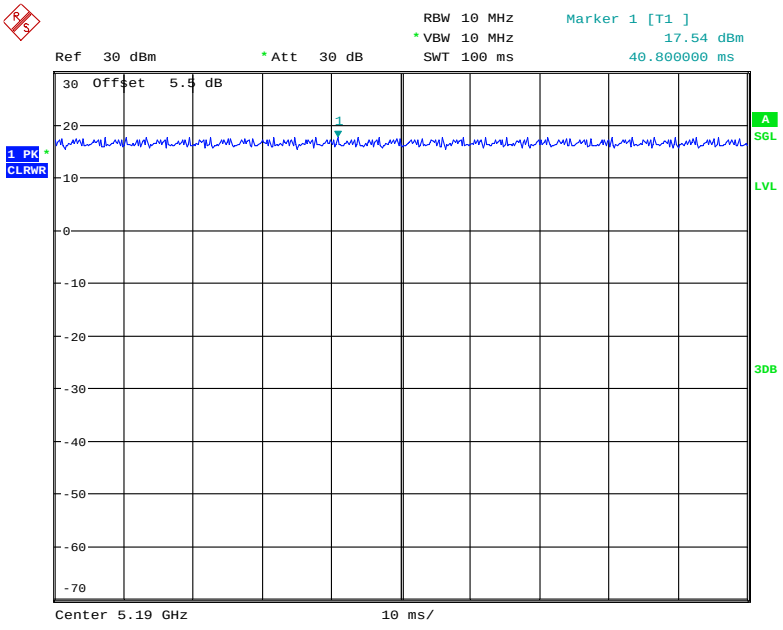
802.11n ht40



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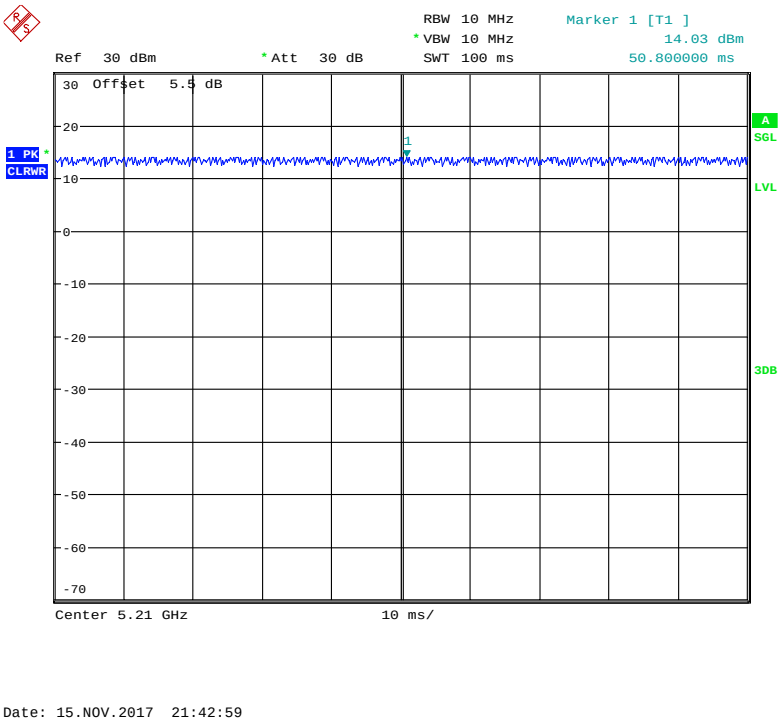
802.11 ac80



Equipment Modifications

No modification was made to the EUT.

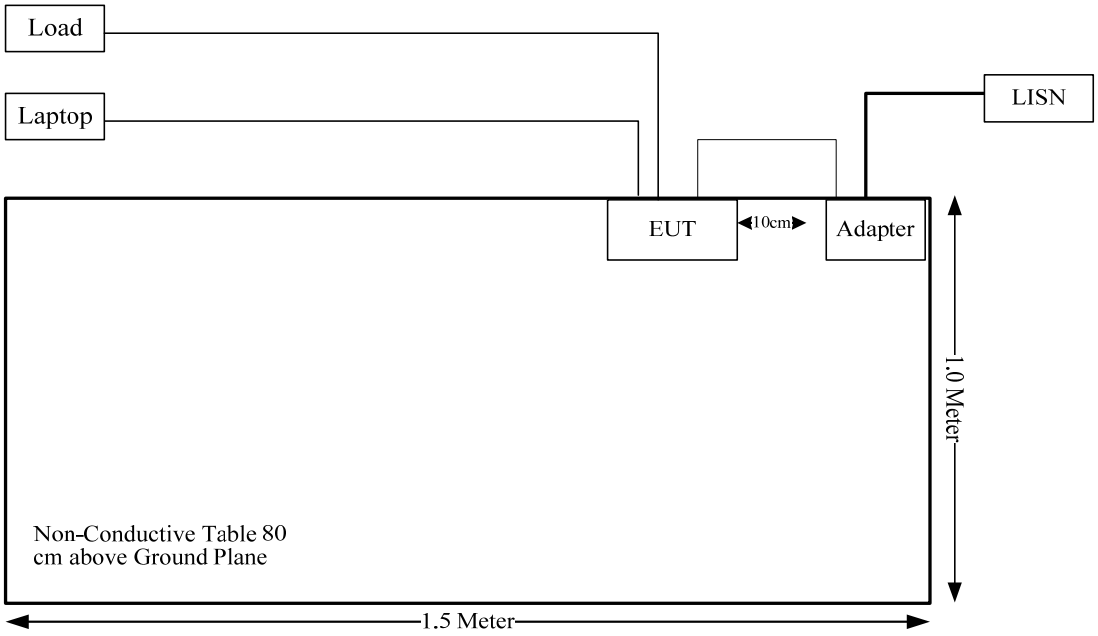
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Laptop	PP11L	QDS-BRCM1017
N/A	Load	N/A	N/A

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
RJ45 Cable	yes	No	10.0	RJ45 Port of Laptop	EUT
RJ45 Cable*4	yes	No	10.0	Load	EUT
Adapter Cable	no	no	1.3	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 Permissable 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	0.2506	1.0
5150-5250 & 5725-5850	5	3.16	13	19.95	20.00	0.0126	1.0

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

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

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

$=0.2506/1+0.0126/1$

$=0.26$

< 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 was permanently attached to the Unit, both antenna gains are 5dBi. Please refer to the EUT photo.

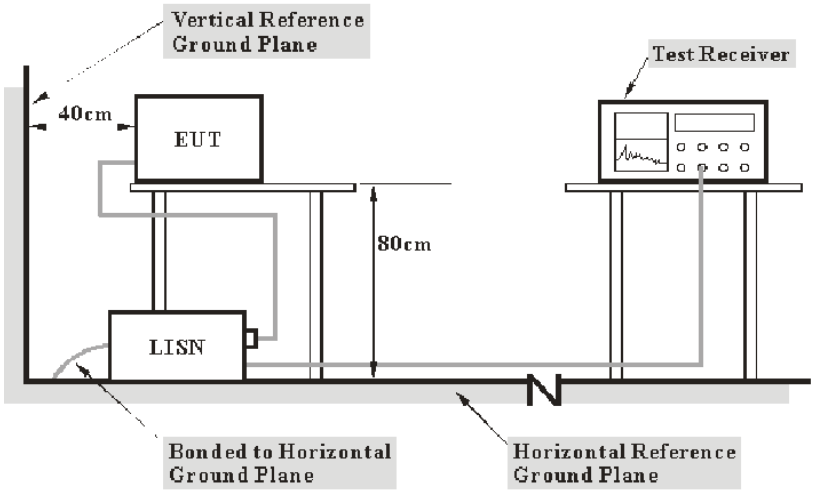
Result: Compliance.

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 EUT 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	2016-12-08	2017-12-08
R&S	L.I.S.N	ESH2-Z5	892107/021	2017-09-01	2018-09-01
R&S	Two-line V-network	ENV 216	3560.6550.12	2016-12-08	2017-12-08
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A
N/A	Coaxial Cable	2m	C0200/01	2017-09-05	2018-09-05

*** 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

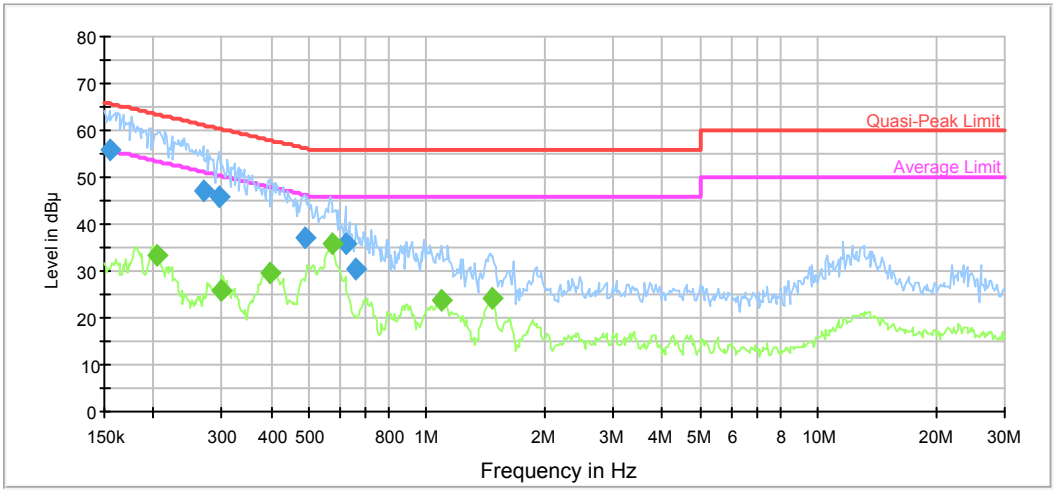
Environmental Conditions

Temperature:	25.1 °C
Relative Humidity:	39 %
ATM Pressure:	100.9 kPa

The testing was performed by Alex You on 2017-11-10.

Test Mode: Transmitting

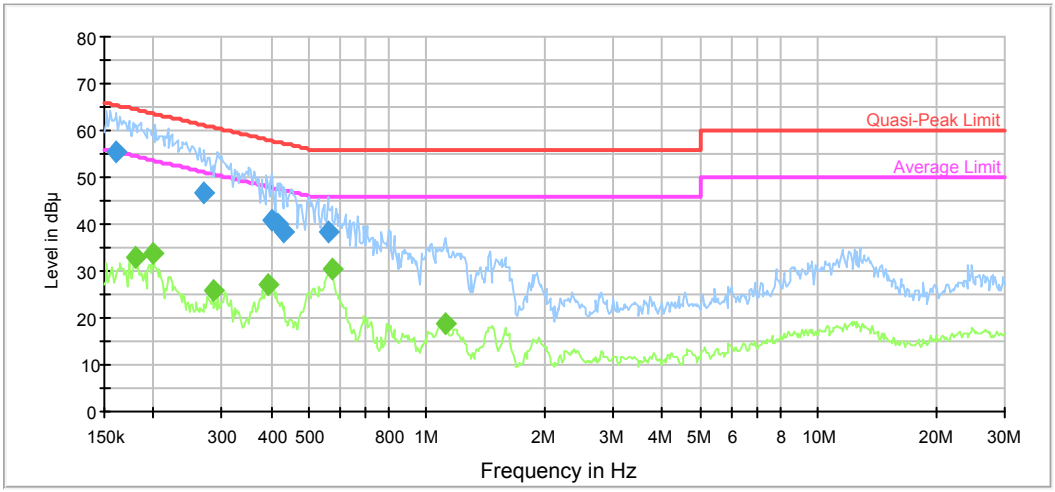
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.154858	55.6	9.000	L1	11.1	10.1	65.7	Compliance
0.268355	47.3	9.000	L1	10.3	13.9	61.2	Compliance
0.295282	46.0	9.000	L1	10.2	14.4	60.4	Compliance
0.487810	37.0	9.000	L1	9.9	19.2	56.2	Compliance
0.619536	35.7	9.000	L1	9.8	20.3	56.0	Compliance
0.660314	30.3	9.000	L1	9.8	25.7	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.204669	33.2	9.000	L1	10.6	20.2	53.4	Compliance
0.300025	26.0	9.000	L1	10.1	24.2	50.2	Compliance
0.396530	29.4	9.000	L1	10.0	18.5	47.9	Compliance
0.572086	35.9	9.000	L1	9.8	10.1	46.0	Compliance
1.090848	23.9	9.000	L1	9.8	22.1	46.0	Compliance
1.464886	24.1	9.000	L1	9.7	21.9	46.0	Compliance

AC120 V, 60 Hz, Neutral:



requency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.161152	55.4	9.000	N	11.0	10.0	65.4	Compliance
0.270502	46.9	9.000	N	10.3	14.2	61.1	Compliance
0.402900	41.0	9.000	N	10.0	16.8	57.8	Compliance
0.415949	39.9	9.000	N	10.0	17.6	57.5	Compliance
0.432855	38.4	9.000	N	9.9	18.8	57.2	Compliance
0.558572	38.2	9.000	N	9.9	17.8	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.180171	33.1	9.000	N	10.8	21.4	54.5	Compliance
0.199835	33.6	9.000	N	10.6	20.0	53.6	Compliance
0.283749	26.0	9.000	N	10.2	24.7	50.7	Compliance
0.393383	27.2	9.000	N	10.0	20.8	48.0	Compliance
0.572086	30.4	9.000	N	9.8	15.6	46.0	Compliance
1.117238	18.8	9.000	N	9.8	27.2	46.0	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.

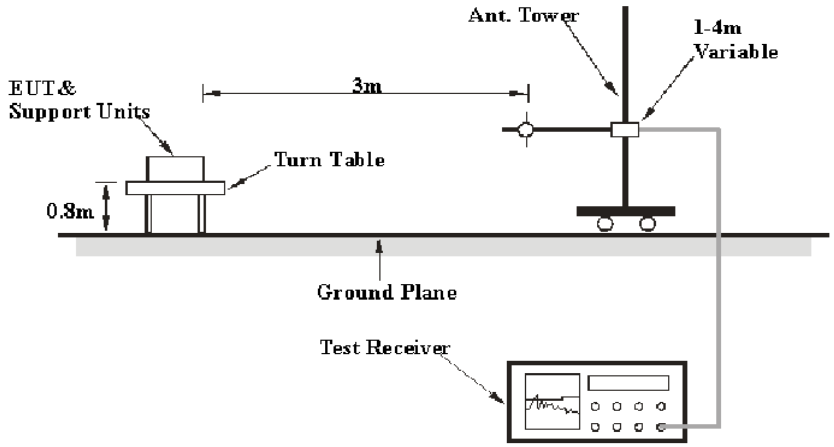
(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

(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.

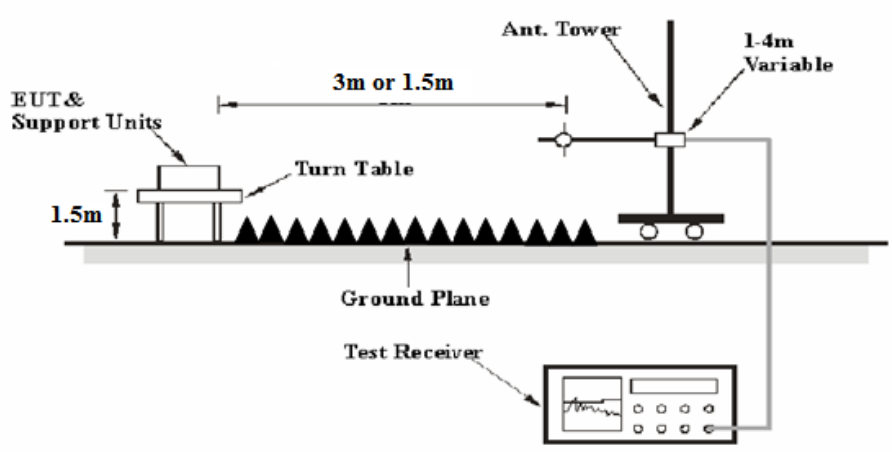
(7) The provisions of §15.205 apply to intentional radiators operating under this section.

EUT Setup

Below 1 GHz:



Above 1 GHz:



The radiated emission tests were performed in the 3 meters chamber test site, 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 EUT was connected to the first AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

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 v01r04, emission shall be computed as: E [dBμV/m] = EIRP[dBm] + 95.2, for d = 3 meters.

Corrected Amplitude & Margin Calculation

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 = Extrapolation result -Limit

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2017-09-01	2018-09-01
Sunol Sciences	Antenna	JB3	A060611-2	2017-08-25	2020-08-25
HP	Amplifier	8447D	2727A05902	2017-09-05	2018-09-05
unknown	Coaxial Cable	4m	C0400/01	2017-09-05	2018-09-05
unknown	Coaxial Cable	0.75m	C0075/01	2017-09-05	2018-09-05
unknown	Coaxial Cable	10m	C1000/01	2017-09-05	2018-09-05
Agilent	Spectrum Analyzer	E4440A	SG43360054	2016-12-08	2017-12-08
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-05
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2017-09-05	2018-09-05
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-02 1304	2017-06-16	2020-06-15
Ducommun Technolagies	Horn Antenna	ARH-2823-02	1007726-01 1302	2016-11-18	2019-11-18
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2017-06-27	2018-06-27
unknown	Coaxial Cable	8m	C0800/01	2017-09-05	2018-09-05
R&S	Spectrum Analyzer	FSP 38	100478	2016-12-08	2017-12-08
Chengdu OuLi	Bandrejector Filter	5725-5850	005	2017-09-05	2018-09-05
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	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

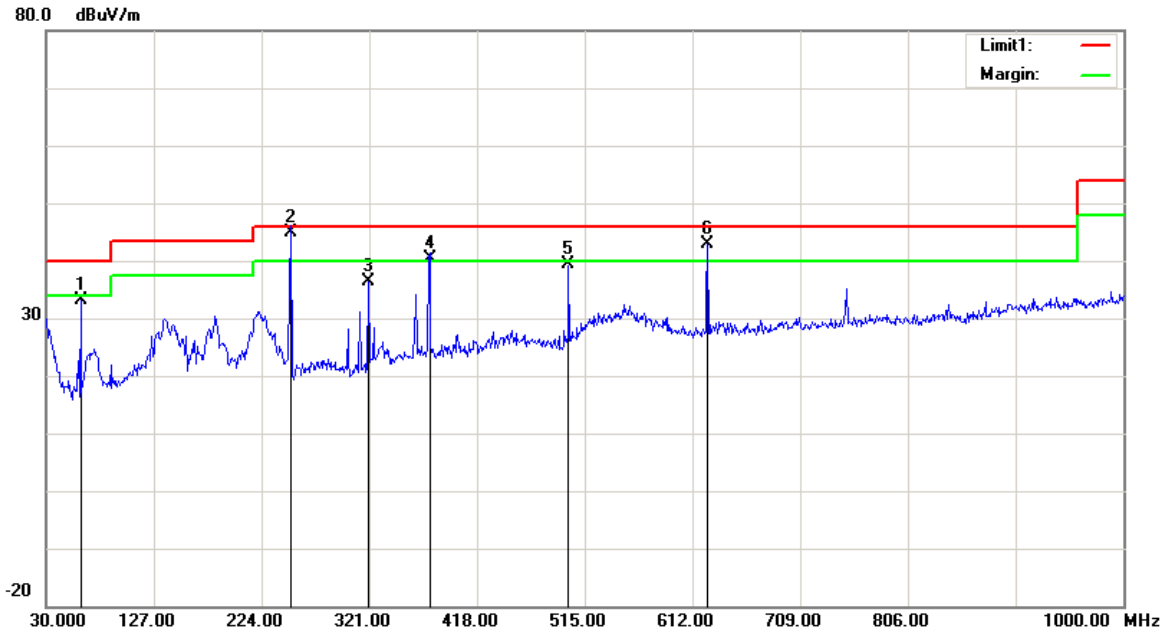
Temperature:	24.8 °C
Relative Humidity:	42 %
ATM Pressure:	101 kPa

** The testing was performed by Steven Zuo 2017-11-17.*

Test Mode: Transmitting

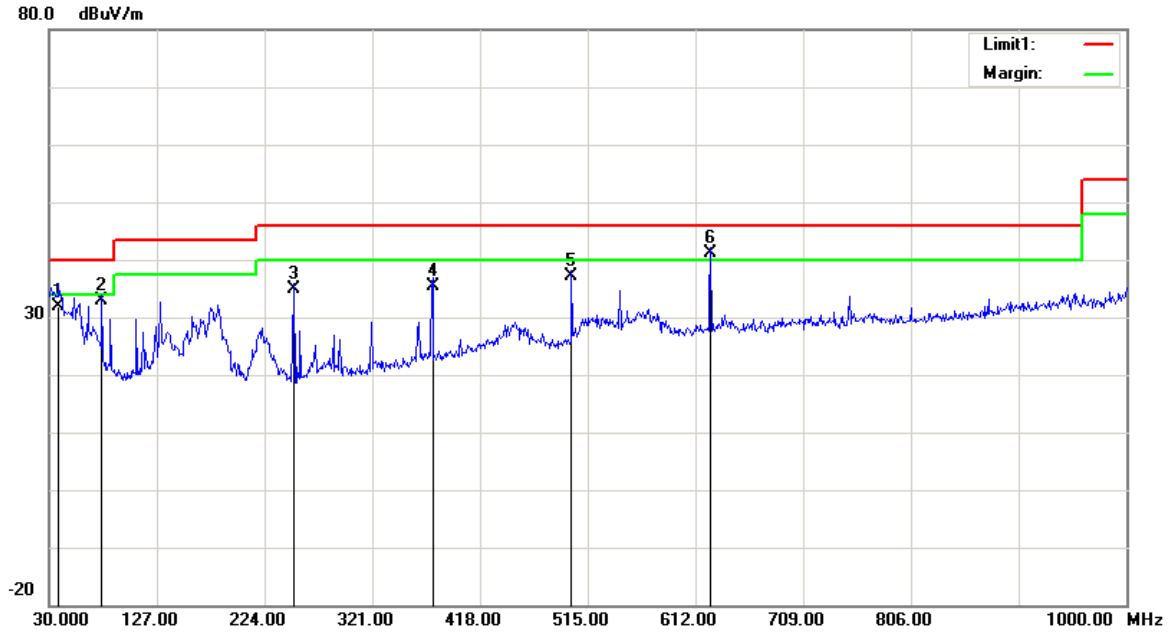
1) Below 1GHz(802.11n ht20 5785 MHz was the worst):

Horizontal



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
61.0400	45.20	QP	-12.10	33.10	40.00	6.90
250.1900	51.22	QP	-6.32	44.90	46.00	1.10
320.0300	40.36	QP	-4.06	36.30	46.00	9.70
375.3200	42.88	QP	-2.58	40.30	46.00	5.70
500.4500	40.47	QP	-0.97	39.50	46.00	6.50
625.5800	41.45	QP	1.35	42.80	46.00	3.20

Vertical



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
38.7300	36.77	QP	-4.97	31.80	40.00	8.20
77.5300	43.98	QP	-11.08	32.90	40.00	7.10
250.1900	41.12	QP	-6.32	34.80	46.00	11.20
375.3200	37.98	QP	-2.58	35.40	46.00	10.60
500.4500	38.17	QP	-0.97	37.20	46.00	8.80
625.5800	39.85	QP	1.35	41.20	46.00	4.80

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

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 5180 MHz									
5180.00	68.95	PK	H	33.59	3.58	0.00	100.10	N/A	N/A
5180.00	58.46	AV	H	33.59	3.58	0.00	89.61	N/A	N/A
5180.00	82.13	PK	V	33.59	3.58	0.00	113.28	N/A	N/A
5180.00	71.76	AV	V	33.59	3.58	0.00	102.91	N/A	N/A
5150.00	37.56	PK	V	33.54	3.56	0.00	68.64	74.00	5.36
5150.00	16.94	AV	V	33.54	3.56	0.00	48.02	54.00	5.98
10360.00	49.56	PK	V	38.17	6.29	36.85	51.15	74.00	22.85
10360.00	33.64	AV	V	38.17	6.29	36.85	35.23	54.00	18.77
15540.00	48.65	PK	V	38.06	8.85	39.04	50.50	74.00	23.50
15540.00	33.42	AV	V	38.06	8.85	39.04	35.27	54.00	18.73
9649.00	46.19	PK	V	37.96	5.84	36.66	47.31	74.00	26.69
9649.00	33.82	AV	V	37.96	5.84	36.66	34.94	54.00	19.06
Middle Channel: 5200 MHz									
5200.00	68.76	PK	H	33.62	3.60	0.00	99.96	N/A	N/A
5200.00	58.51	AV	H	33.62	3.60	0.00	89.71	N/A	N/A
5200.00	82.07	PK	V	33.62	3.60	0.00	113.27	N/A	N/A
5200.00	71.48	AV	V	33.62	3.60	0.00	102.68	N/A	N/A
10400.00	49.63	PK	V	38.18	6.32	36.86	51.25	74.00	22.75
10400.00	33.73	AV	V	38.18	6.32	36.86	35.35	54.00	18.65
15600.00	48.78	PK	V	38.00	8.83	39.09	50.50	74.00	23.5
15600.00	33.52	AV	V	38.00	8.83	39.09	35.24	54.00	18.76
8995.00	47.02	PK	V	37.70	5.49	36.93	47.26	74.00	26.74
8995.00	32.28	AV	V	37.70	5.49	36.93	32.52	54.00	21.48
9352.00	46.37	PK	V	37.84	5.67	36.70	47.16	74.00	26.84
9352.00	32.16	AV	V	37.84	5.67	36.70	32.95	54.00	21.05
High Channel: 5240 MHz									
5240.00	68.89	PK	H	33.68	3.52	0.00	100.07	N/A	N/A
5240.00	58.62	AV	H	33.68	3.52	0.00	89.80	N/A	N/A
5240.00	81.12	PK	V	33.68	3.52	0.00	112.30	N/A	N/A
5240.00	70.53	AV	V	33.68	3.52	0.00	101.71	N/A	N/A
5350.00	26.54	PK	V	33.86	3.52	0.00	57.90	74.00	16.10
5350.00	13.49	AV	V	33.86	3.52	0.00	44.85	54.00	9.15
10480.00	49.02	PK	V	38.20	6.37	36.88	50.69	74.00	23.31
10480.00	33.34	AV	V	38.20	6.37	36.88	35.01	54.00	18.99
15720.00	48.82	PK	V	37.88	8.79	39.18	50.29	74.00	23.71
15720.00	33.58	AV	V	37.88	8.79	39.18	35.05	54.00	18.95
9655.00	47.01	PK	V	37.96	5.84	36.66	48.13	74.00	25.87
9655.00	32.11	AV	V	37.96	5.84	36.66	33.23	54.00	20.77

802.11n ht20(2Tx was the worst)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 5180 MHz									
5180.00	64.28	PK	H	33.59	3.58	0.00	95.43	N/A	N/A
5180.00	53.67	AV	H	33.59	3.58	0.00	84.82	N/A	N/A
5180.00	75.18	PK	V	33.59	3.58	0.00	106.33	N/A	N/A
5180.00	64.63	AV	V	33.59	3.58	0.00	95.78	N/A	N/A
5150.00	28.42	PK	V	33.54	3.56	0.00	59.50	74.00	14.50
5150.00	14.36	AV	V	33.54	3.56	0.00	45.44	54.00	8.56
10360.00	48.85	PK	V	38.17	6.29	36.85	50.44	74.00	23.56
10360.00	33.92	AV	V	38.17	6.29	36.85	35.51	54.00	18.49
15540.00	47.19	PK	V	38.06	8.85	39.04	49.04	74.00	24.96
15540.00	32.29	AV	V	38.06	8.85	39.04	34.14	54.00	19.86
9355.00	46.37	PK	V	37.84	5.67	36.70	47.16	74.00	26.84
9355.00	32.21	AV	V	37.84	5.67	36.70	33.00	54.00	21.00
Middle Channel: 5200 MHz									
5200.00	63.98	PK	H	33.62	3.60	0.00	95.18	N/A	N/A
5200.00	53.24	AV	H	33.62	3.60	0.00	84.44	N/A	N/A
5200.00	74.89	PK	V	33.62	3.60	0.00	106.09	N/A	N/A
5200.00	64.15	AV	V	33.62	3.60	0.00	95.35	N/A	N/A
10400.00	48.77	PK	V	38.18	6.32	36.86	50.39	74.00	23.61
10400.00	33.65	AV	V	38.18	6.32	36.86	35.27	54.00	18.73
15600.00	47.18	PK	V	38.00	8.83	39.09	48.90	74.00	25.1
15600.00	32.28	AV	V	38.00	8.83	39.09	34.00	54.00	20
8995.00	46.37	PK	V	37.70	5.49	36.93	46.61	74.00	27.39
8995.00	32.12	AV	V	37.70	5.49	36.93	32.36	54.00	21.64
9352.00	45.38	PK	V	37.84	5.67	36.70	46.17	74.00	27.83
9352.00	32.24	AV	V	37.84	5.67	36.70	33.03	54.00	20.97
High Channel: 5240 MHz									
5240.00	63.24	PK	H	33.68	3.52	0.00	94.42	N/A	N/A
5240.00	52.49	AV	H	33.68	3.52	0.00	83.67	N/A	N/A
5240.00	74.72	PK	V	33.68	3.52	0.00	105.90	N/A	N/A
5240.00	64.38	AV	V	33.68	3.52	0.00	95.56	N/A	N/A
5350.00	28.53	PK	V	33.86	3.52	0.00	59.89	74.00	14.11
5350.00	14.62	AV	V	33.86	3.52	0.00	45.98	54.00	8.02
10480.00	48.69	PK	V	38.20	6.37	36.88	50.36	74.00	23.64
10480.00	33.78	AV	V	38.20	6.37	36.88	35.45	54.00	18.55
15720.00	47.16	PK	V	37.88	8.79	39.18	48.63	74.00	25.37
15720.00	32.44	AV	V	37.88	8.79	39.18	33.91	54.00	20.09
9655.00	46.46	PK	V	37.96	5.84	36.66	47.58	74.00	26.42
9655.00	32.14	AV	V	37.96	5.84	36.66	33.26	54.00	20.74

802.11n ht40(2Tx was the worst)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 5190 MHz									
5190.00	61.48	PK	H	33.60	3.59	0.00	92.65	N/A	N/A
5190.00	50.76	AV	H	33.60	3.59	0.00	81.93	N/A	N/A
5190.00	72.73	PK	V	33.60	3.59	0.00	103.90	N/A	N/A
5190.00	61.59	AV	V	33.60	3.59	0.00	92.76	N/A	N/A
5150.00	28.92	PK	V	33.54	3.56	0.00	60.00	74.00	14.00
5150.00	14.87	AV	V	33.54	3.56	0.00	45.95	54.00	8.05
10380.00	48.84	PK	V	38.18	6.31	36.85	50.46	74.00	23.54
10380.00	34.04	AV	V	38.18	6.31	36.85	35.66	54.00	18.34
15570.00	47.21	PK	V	38.03	8.84	39.06	49.00	74.00	25.00
15570.00	32.23	AV	V	38.03	8.84	39.06	34.02	54.00	19.98
9355.00	46.24	PK	V	37.84	5.67	36.70	47.03	74.00	26.97
9355.00	32.03	AV	V	37.84	5.67	36.70	32.82	54.00	21.18
High Channel: 5230 MHz									
5230.00	61.23	PK	H	33.67	3.54	0.00	92.42	N/A	N/A
5230.00	50.57	AV	H	33.67	3.54	0.00	81.76	N/A	N/A
5230.00	72.35	PK	V	33.67	3.54	0.00	103.54	N/A	N/A
5230.00	61.84	AV	V	33.67	3.54	0.00	93.03	N/A	N/A
5350.00	27.65	PK	V	33.86	3.52	0.00	59.01	74.00	14.99
5350.00	14.26	AV	V	33.86	3.52	0.00	45.62	54.00	8.38
10460.00	48.77	PK	V	38.19	6.36	36.87	50.43	74.00	23.57
10460.00	33.91	AV	V	38.19	6.36	36.87	35.57	54.00	18.43
15690.00	47.35	PK	V	37.91	8.80	39.15	48.89	74.00	25.11
15690.00	32.13	AV	V	37.91	8.80	39.15	33.67	54.00	20.33
9655.00	46.49	PK	V	37.96	5.84	36.66	47.61	74.00	26.39
9655.00	32.16	AV	V	37.96	5.84	36.66	33.28	54.00	20.72

802.11 ac80(2Tx was the worst)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Middle Channel: 5210 MHz									
5210.00	59.96	PK	H	33.64	3.58	0.00	91.16	N/A	N/A
5210.00	50.02	AV	H	33.64	3.58	0.00	81.22	N/A	N/A
5210.00	70.24	PK	V	33.64	3.58	0.00	101.44	N/A	N/A
5210.00	60.67	AV	V	33.64	3.58	0.00	91.87	N/A	N/A
5150.00	28.46	PK	V	33.54	3.56	0.00	59.54	74.00	14.46
5150.00	14.54	AV	V	33.54	3.56	0.00	45.62	54.00	8.38
5350.00	27.49	PK	V	33.86	3.52	0.00	58.85	74.00	15.15
5350.00	13.68	AV	V	33.86	3.52	0.00	45.04	54.00	8.96
10420.00	48.74	PK	V	38.18	6.33	36.86	50.37	74.00	23.63
10420.00	33.91	AV	V	38.18	6.33	36.86	35.54	54.00	18.46
15630.00	47.37	PK	V	37.97	8.82	39.11	49.03	74.00	24.97
15630.00	32.26	AV	V	37.97	8.82	39.11	33.92	54.00	20.08
9685.00	46.18	PK	V	37.97	5.86	36.67	47.32	74.00	26.68
9685.00	32.48	AV	V	37.97	5.86	36.67	33.62	54.00	20.38

802.11a(Chain 0 was the worst)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 5745MHz									
5745.00	64.18	PK	H	34.20	3.69	0.00	96.05	N/A	N/A
5745.00	54.26	AV	H	34.20	3.69	0.00	86.13	N/A	N/A
5745.00	77.87	PK	V	34.20	3.69	0.00	109.74	N/A	N/A
5745.00	67.59	AV	V	34.20	3.69	0.00	99.46	N/A	N/A
5725.00	28.45	PK	V	34.19	3.69	0.00	60.31	122.20	61.89
5720.00	27.94	PK	V	34.19	3.69	0.00	59.80	110.80	51.00
5700.00	26.76	PK	V	34.18	3.68	0.00	58.60	105.20	46.60
5650.00	26.35	PK	V	34.16	3.63	0.00	58.12	68.20	10.08
11490.00	48.67	PK	V	38.99	6.59	37.35	50.88	74.00	23.12
11490.00	33.58	AV	V	38.99	6.59	37.35	35.79	54.00	18.21
17235.00	47.59	PK	V	41.56	8.78	38.61	53.30	74.00	20.70
17235.00	32.63	AV	V	41.56	8.78	38.61	38.34	54.00	15.66
8695.00	45.05	PK	V	37.52	5.29	37.05	44.79	74.00	29.21
8695.00	33.27	AV	V	37.52	5.29	37.05	33.01	54.00	20.99
Middle Channel: 5785 MHz									
5785.00	64.76	PK	H	34.21	3.71	0.00	96.66	N/A	N/A
5785.00	54.62	AV	H	34.21	3.71	0.00	86.52	N/A	N/A
5785.00	78.73	PK	V	34.21	3.71	0.00	110.63	N/A	N/A
5785.00	68.34	AV	V	34.21	3.71	0.00	100.24	N/A	N/A
11570.00	48.46	PK	V	39.00	6.61	37.44	50.61	74.00	23.39
11570.00	33.53	AV	V	39.00	6.61	37.44	35.68	54.00	18.32
17355.00	47.41	PK	V	42.26	8.81	38.52	53.94	74.00	20.06
17355.00	32.64	AV	V	42.26	8.81	38.52	39.17	54.00	14.83
9855.00	46.74	PK	V	38.04	5.97	36.72	48.01	74.00	25.99
9855.00	32.63	AV	V	38.04	5.97	36.72	33.90	54.00	20.10
9677.00	46.44	PK	V	37.97	5.86	36.67	47.58	74.00	26.42
9677.00	32.42	AV	V	37.97	5.86	36.67	33.56	54.00	20.44
High Channel: 5825 MHz									
5825.00	64.15	PK	H	34.23	3.73	0.00	96.09	N/A	N/A
5825.00	54.38	AV	H	34.23	3.73	0.00	86.32	N/A	N/A
5825.00	78.73	PK	V	34.23	3.73	0.00	110.67	N/A	N/A
5825.00	68.29	AV	V	34.23	3.73	0.00	100.23	N/A	N/A
5850.00	28.43	PK	V	34.24	3.75	0.00	60.40	122.20	61.80
5855.00	27.46	PK	V	34.24	3.75	0.00	59.43	110.80	51.37
5875.00	26.34	PK	V	34.25	3.77	0.00	58.34	105.20	46.86
5925.00	26.18	PK	V	34.27	3.80	0.00	58.23	68.20	9.97
11650.00	48.79	PK	V	39.00	6.64	37.53	50.88	74.00	23.12
11650.00	33.86	AV	V	39.00	6.64	37.53	35.95	54.00	18.05
17475.00	47.6	PK	V	42.96	8.84	38.44	54.94	74.00	19.06
17475.00	32.43	AV	V	42.96	8.84	38.44	39.77	54.00	14.23
8966.00	46.64	PK	V	37.68	5.47	36.94	46.83	74.00	27.17
8966.00	32.72	AV	V	37.68	5.47	36.94	32.91	54.00	21.09

802.11n ht20(2Tx was the worst)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 5745MHz									
5745.00	59.63	PK	H	34.20	3.69	0.00	91.50	N/A	N/A
5745.00	49.27	AV	H	34.20	3.69	0.00	81.14	N/A	N/A
5745.00	74.62	PK	V	34.20	3.69	0.00	106.49	N/A	N/A
5745.00	64.35	AV	V	34.20	3.69	0.00	96.22	N/A	N/A
5725.00	28.43	PK	V	34.19	3.69	0.00	60.29	122.20	61.91
5720.00	27.26	PK	V	34.19	3.69	0.00	59.12	110.80	51.68
5700.00	26.87	PK	V	34.18	3.68	0.00	58.71	105.20	46.49
5650.00	26.45	PK	V	34.16	3.63	0.00	58.22	68.20	9.98
11490.00	48.71	PK	V	38.99	6.59	37.35	50.92	74.00	23.08
11490.00	33.7	AV	V	38.99	6.59	37.35	35.91	54.00	18.09
17235.00	47.87	PK	V	41.56	8.78	38.61	53.58	74.00	20.42
17235.00	32.61	AV	V	41.56	8.78	38.61	38.32	54.00	15.68
8966.00	46.33	PK	V	37.68	5.47	36.94	46.52	74.00	27.48
8966.00	32.73	AV	V	37.68	5.47	36.94	32.92	54.00	21.08
Middle Channel: 5785 MHz									
5785.00	60.23	PK	H	34.21	3.71	0.00	92.13	N/A	N/A
5785.00	50.18	AV	H	34.21	3.71	0.00	82.08	N/A	N/A
5785.00	75.68	PK	V	34.21	3.71	0.00	107.58	N/A	N/A
5785.00	65.09	AV	V	34.21	3.71	0.00	96.99	N/A	N/A
11570.00	48.37	PK	V	39.00	6.61	37.44	50.52	74.00	23.48
11570.00	33.31	AV	V	39.00	6.61	37.44	35.46	54.00	18.54
17355.00	47.28	PK	V	42.26	8.81	38.52	53.81	74.00	20.19
17355.00	32.36	AV	V	42.26	8.81	38.52	38.89	54.00	15.11
9855.00	46.62	PK	V	38.04	5.97	36.72	47.89	74.00	26.11
9855.00	32.59	AV	V	38.04	5.97	36.72	33.86	54.00	20.14
9677.00	46.67	PK	V	37.97	5.86	36.67	47.81	74.00	26.19
9677.00	32.55	AV	V	37.97	5.86	36.67	33.69	54.00	20.31
High Channel: 5825 MHz									
5825.00	60.29	PK	H	34.23	3.73	0.00	92.23	N/A	N/A
5825.00	50.13	AV	H	34.23	3.73	0.00	82.07	N/A	N/A
5825.00	75.42	PK	V	34.23	3.73	0.00	107.36	N/A	N/A
5825.00	64.85	AV	V	34.23	3.73	0.00	96.79	N/A	N/A
5850.00	28.64	PK	V	34.24	3.75	0.00	60.61	122.20	61.59
5855.00	28.27	PK	V	34.24	3.75	0.00	60.24	110.80	50.56
5875.00	27.59	PK	V	34.25	3.77	0.00	59.59	105.20	45.61
5925.00	26.43	PK	V	34.27	3.80	0.00	58.48	68.20	9.72
11650.00	48.78	PK	V	39.00	6.64	37.53	50.87	74.00	23.13
11650.00	33.38	AV	V	39.00	6.64	37.53	35.47	54.00	18.53
17475.00	47.74	PK	V	42.96	8.84	38.44	55.08	74.00	18.92
17475.00	32.84	AV	V	42.96	8.84	38.44	40.18	54.00	13.82
8966.00	46.52	PK	V	37.68	5.47	36.94	46.71	74.00	27.29
8966.00	32.75	AV	V	37.68	5.47	36.94	32.94	54.00	21.06

802.11n ht40(2Tx was the worst)

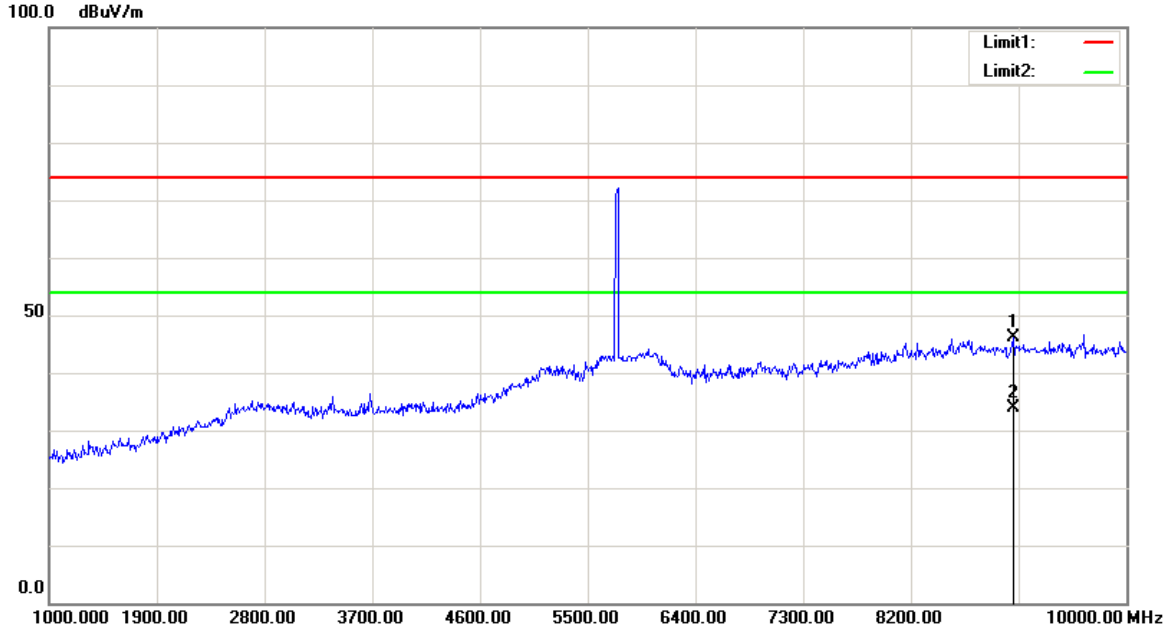
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 5755MHz									
5755.00	58.27	PK	H	34.20	3.70	0.00	90.15	N/A	N/A
5755.00	48.19	AV	H	34.20	3.70	0.00	80.07	N/A	N/A
5755.00	71.65	PK	V	34.20	3.70	0.00	103.53	N/A	N/A
5755.00	60.84	AV	V	34.20	3.70	0.00	92.72	N/A	N/A
5725.00	28.94	PK	V	34.19	3.69	0.00	60.80	122.20	61.40
5720.00	28.36	PK	V	34.19	3.69	0.00	60.22	110.80	50.58
5700.00	27.43	PK	V	34.18	3.68	0.00	59.27	105.20	45.93
5650.00	26.57	PK	V	34.16	3.63	0.00	58.34	68.20	9.86
11510.00	48.81	PK	V	39.00	6.59	37.37	51.01	74.00	22.99
11510.00	33.68	AV	V	39.00	6.59	37.37	35.88	54.00	18.12
17265.00	47.46	PK	V	41.74	8.79	38.58	53.39	74.00	20.61
17265.00	32.33	AV	V	41.74	8.79	38.58	38.26	54.00	15.74
8966.00	46.6	PK	V	37.68	5.47	36.94	46.79	74.00	27.21
8966.00	32.66	AV	V	37.68	5.47	36.94	32.85	54.00	21.15
High Channel: 5795 MHz									
5795.00	57.62	PK	H	34.22	3.71	0.00	89.53	N/A	N/A
5795.00	47.36	AV	H	34.22	3.71	0.00	79.27	N/A	N/A
5795.00	72.28	PK	V	34.22	3.71	0.00	104.19	N/A	N/A
5795.00	61.75	AV	V	34.22	3.71	0.00	93.66	N/A	N/A
5850.00	28.67	PK	V	34.24	3.75	0.00	60.64	122.20	61.56
5855.00	28.24	PK	V	34.24	3.75	0.00	60.21	110.80	50.59
5875.00	27.59	PK	V	34.25	3.77	0.00	59.59	105.20	45.61
5925.00	26.43	PK	V	34.27	3.80	0.00	58.48	68.20	9.72
11590.00	48.52	PK	V	39.00	6.62	37.46	50.66	74.00	23.34
11590.00	33.86	AV	V	39.00	6.62	37.46	36.00	54.00	18.00
17385.00	47.85	PK	V	42.43	8.82	38.50	54.58	74.00	19.42
17385.00	32.92	AV	V	42.43	8.82	38.50	39.65	54.00	14.35
8966.00	46.78	PK	V	37.68	5.47	36.94	46.97	74.00	27.03
8966.00	32.48	AV	V	37.68	5.47	36.94	32.67	54.00	21.33

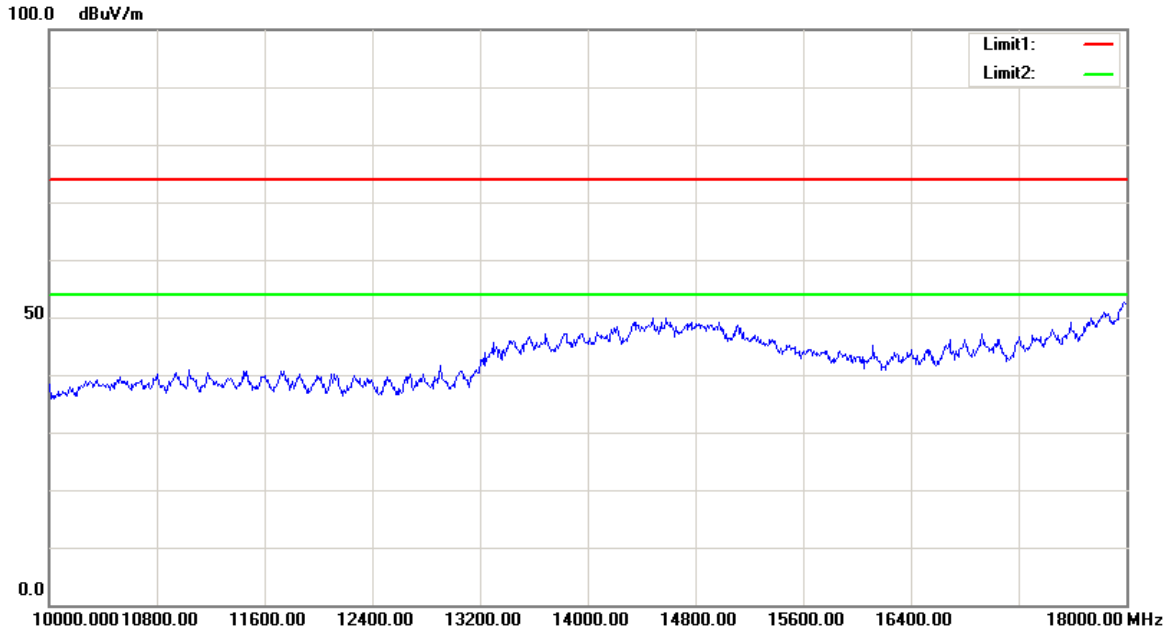
802.11 ac80(2Tx was the worst)

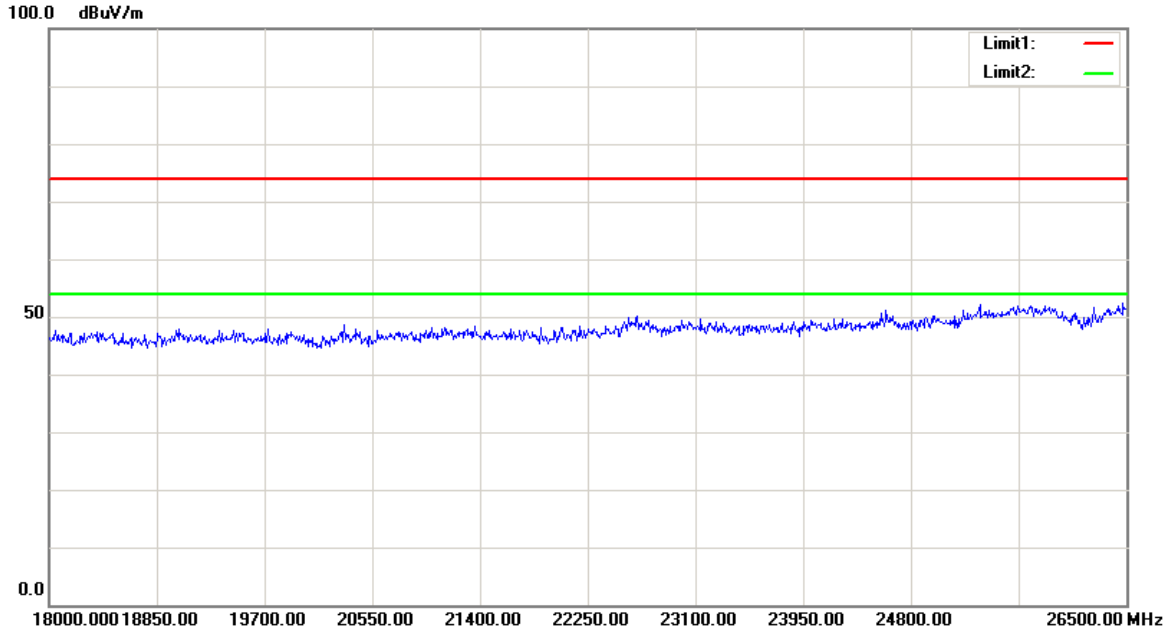
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Middle Channel: 5775 MHz									
5775.00	53.37	PK	H	34.21	3.70	0.00	85.26	N/A	N/A
5775.00	43.24	AV	H	34.21	3.70	0.00	75.13	N/A	N/A
5775.00	68.75	PK	V	34.21	3.70	0.00	100.64	N/A	N/A
5775.00	58.28	AV	V	34.21	3.70	0.00	90.17	N/A	N/A
5725.00	28.46	PK	V	34.19	3.69	0.00	60.32	122.20	61.88
5720.00	27.59	PK	V	34.19	3.69	0.00	59.45	110.80	51.35
5700.00	26.84	PK	V	34.18	3.68	0.00	58.68	105.20	46.52
5650.00	26.35	PK	V	34.16	3.63	0.00	58.12	68.20	10.08
5850.00	28.24	PK	V	34.24	3.75	0.00	60.21	122.20	61.99
5855.00	27.64	PK	V	34.24	3.75	0.00	59.61	110.80	51.19
5875.00	26.75	PK	V	34.25	3.77	0.00	58.75	105.20	46.45
5925.00	26.18	PK	V	34.27	3.80	0.00	58.23	68.20	9.97
11550.00	48.82	PK	V	39.00	6.61	37.42	50.99	74.00	23.01
11550.00	33.46	AV	V	39.00	6.61	37.42	35.63	54.00	18.37
17325.00	47.56	PK	V	42.09	8.80	38.54	53.89	74.00	20.11
17325.00	32.85	AV	V	42.09	8.80	38.54	39.18	54.00	14.82
8966.00	46.54	PK	V	37.68	5.47	36.94	46.73	74.00	27.27
8966.00	32.42	AV	V	37.68	5.47	36.94	32.61	54.00	21.39

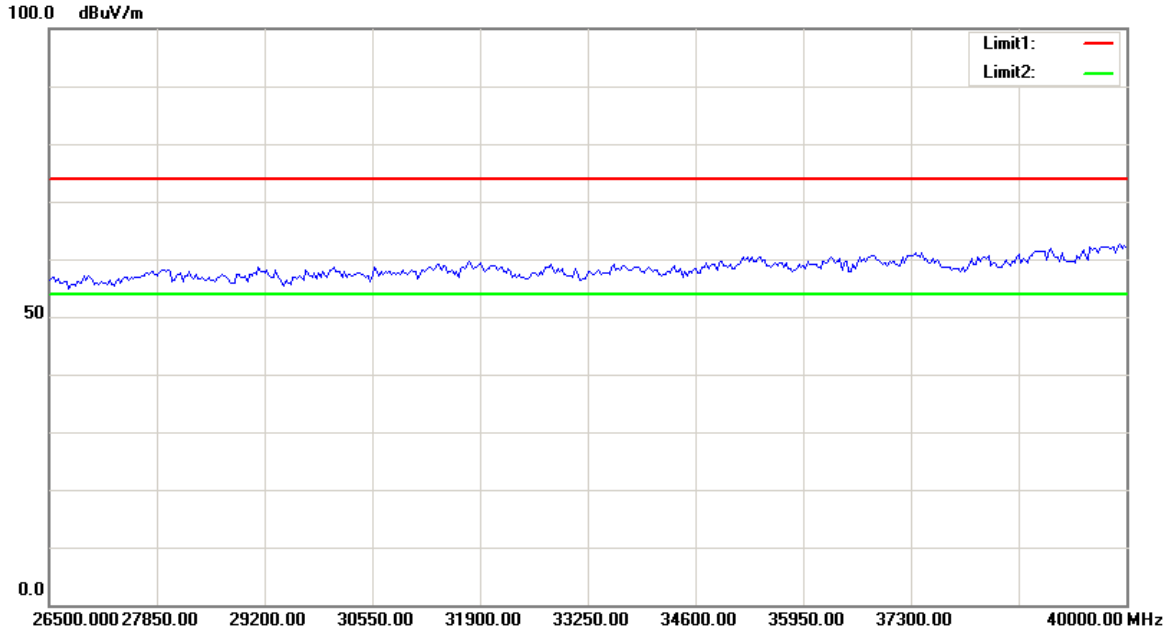
Test Plots(For worst mode 802.11n ht20 2Tx 5785MHz)

Horizontal

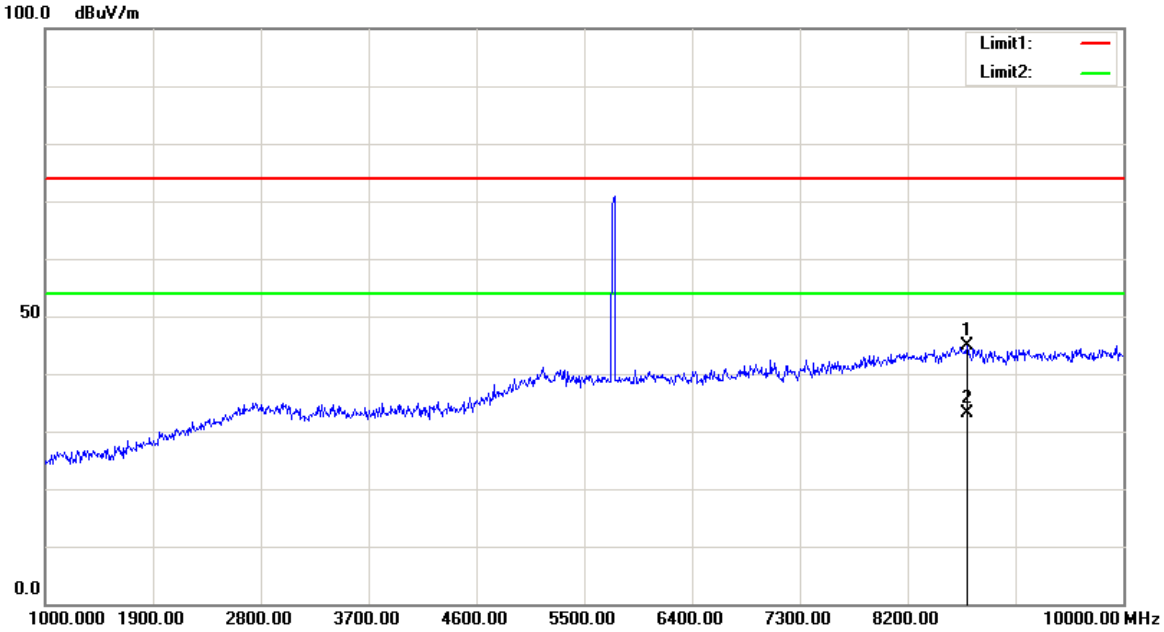


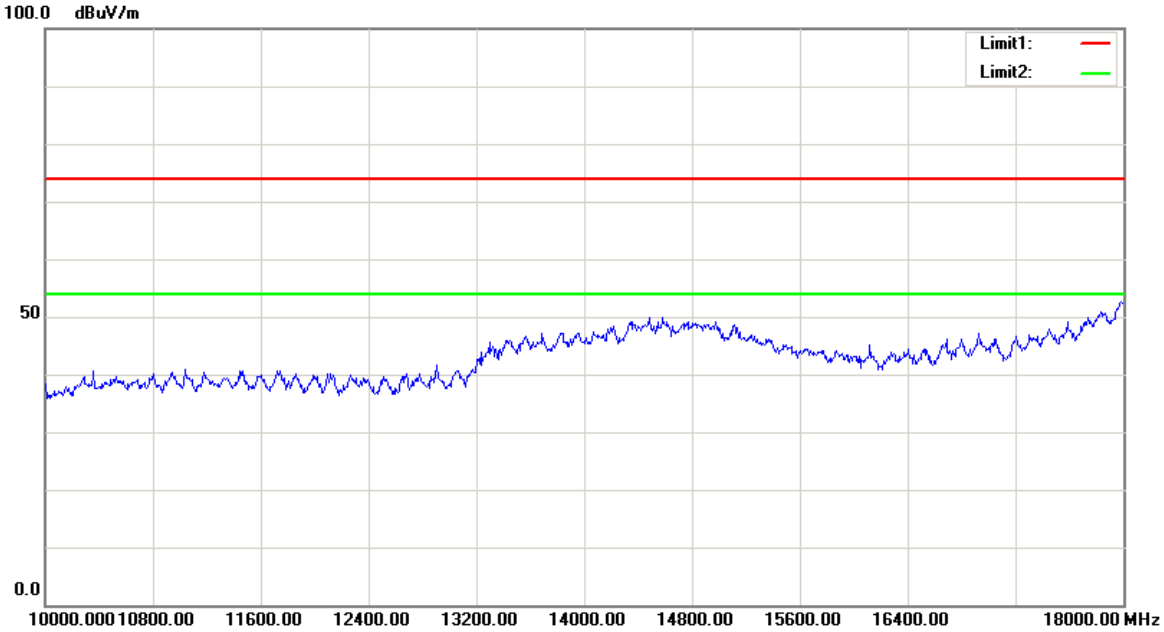


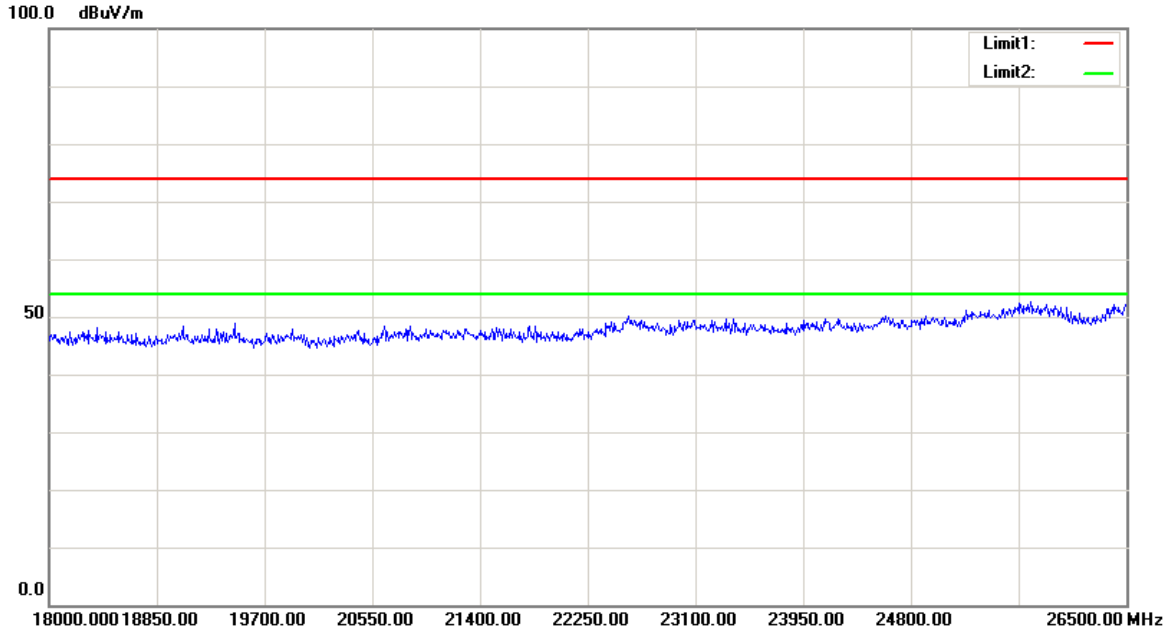

100.0 dBuV/m
Limit1:
Limit2:
50
0.0
18000.000 18850.00 19700.00 20550.00 21400.00 22250.00 23100.00 23950.00 24800.00 26500.00 MHz

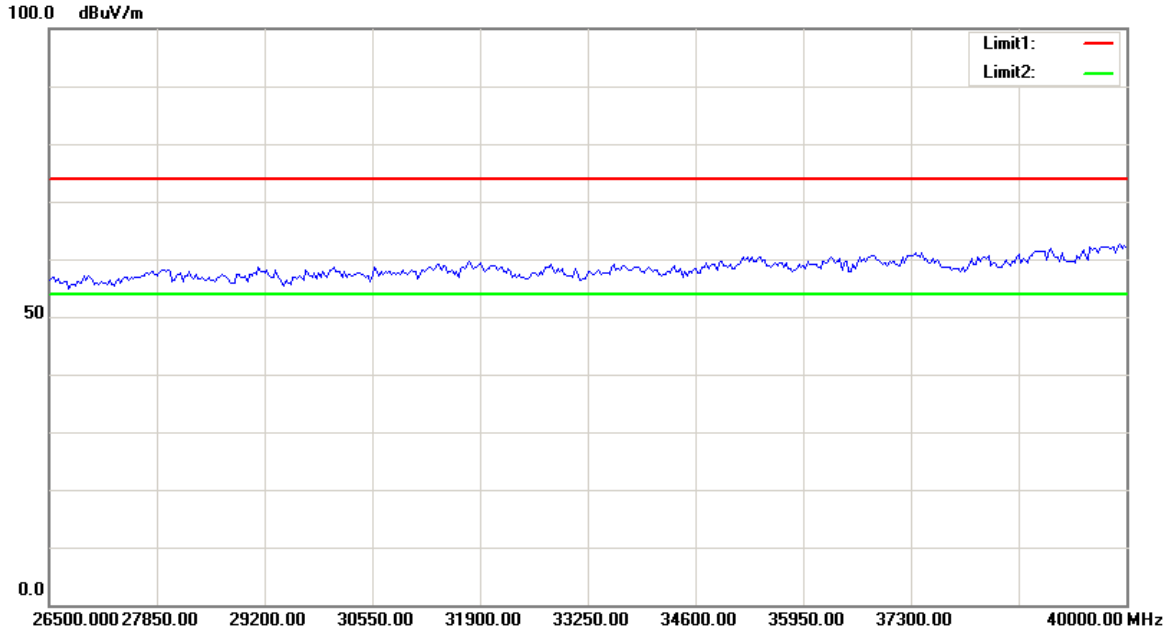

100.0 dBuV/m
Limit1:
Limit2:
50
0.0
26500.000 27850.00 29200.00 30550.00 31900.00 33250.00 34600.00 35950.00 37300.00 40000.00 MHz

Vertical


100.0 dBuV/m
Limit1:
Limit2:
50
0.0
1
2
1000.000 1900.00 2800.00 3700.00 4600.00 5500.00 6400.00 7300.00 8200.00 10000.00 MHz


100.0 dBuV/m
Limit1:
Limit2:
50
0.0
10000.000 10800.00 11600.00 12400.00 13200.00 14000.00 14800.00 15600.00 16400.00 18000.00 MHz


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


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

FCC §15.407(b)–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 v01r04

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSIQ	831929/005	2017-08-31	2018-08-31
Unknown	RF Cable	Unknown	C-4	Each Time	/

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

Test Data

Environmental Conditions

Temperature:	24.3~24.9°C
Relative Humidity:	38~39 %
ATM Pressure:	101.3 ~101.6kPa

The testing was performed by Mark Pan from 2017-11-14 to 2017-11-15.

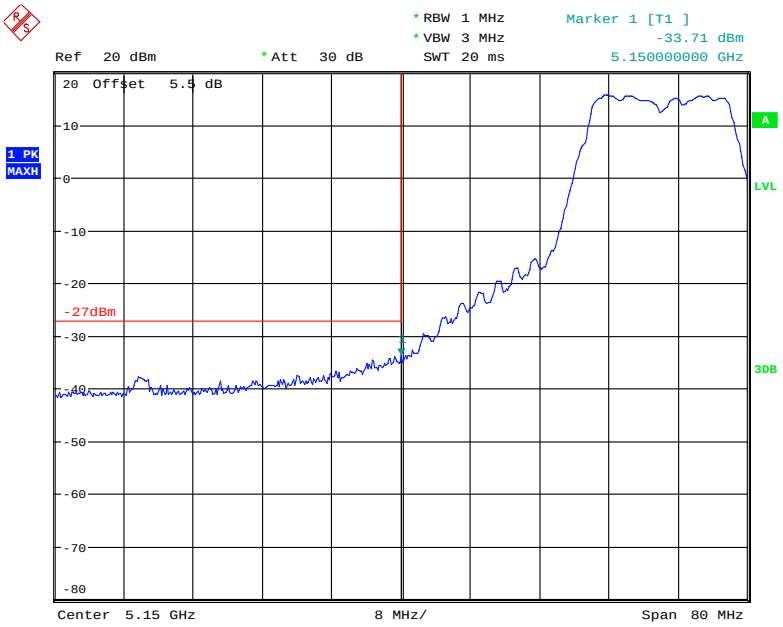
Test Result: Pass.

Please refer to the following plots.

5150-5250MHz(the atenna gain was offset in the display, all emission under limit more than 3dBc, so 2TX mode also compliance the requirement)

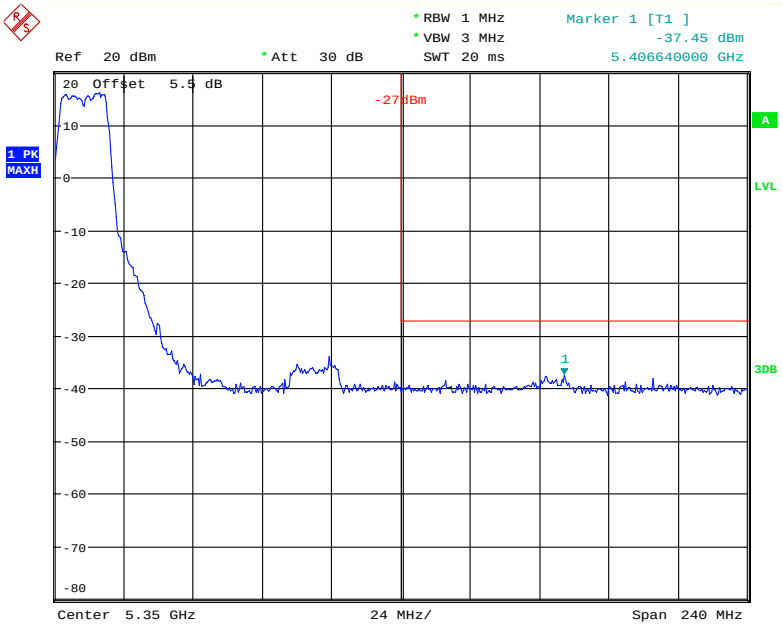
Chain 0:

802.11a Low Channel



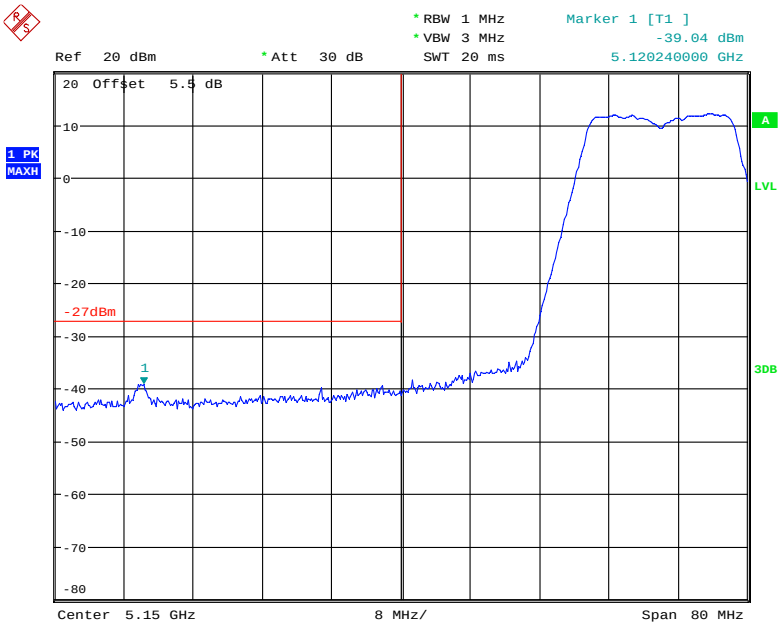
Date: 14.NOV.2017 22:46:33

802.11a High Channel



Date: 14.NOV.2017 22:57:38

802.11n ht20 Low Channel



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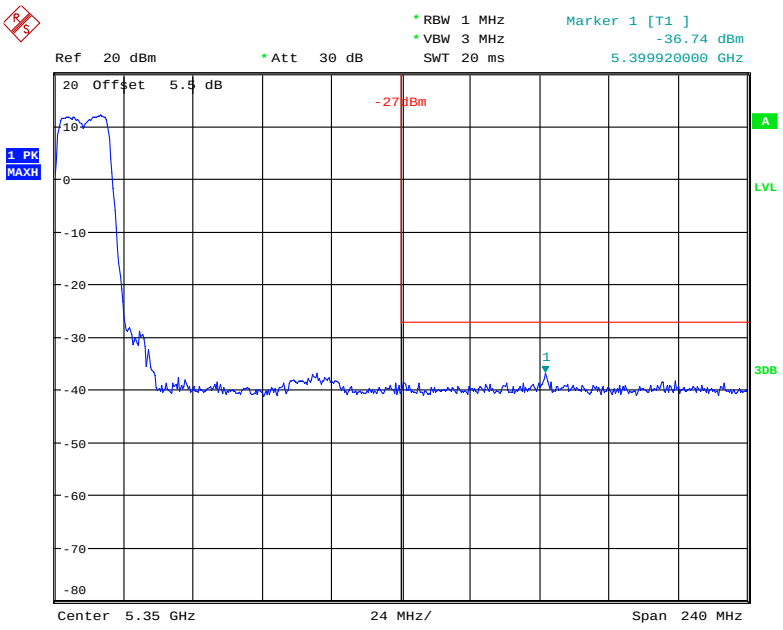
802.11n ht20 High Channel



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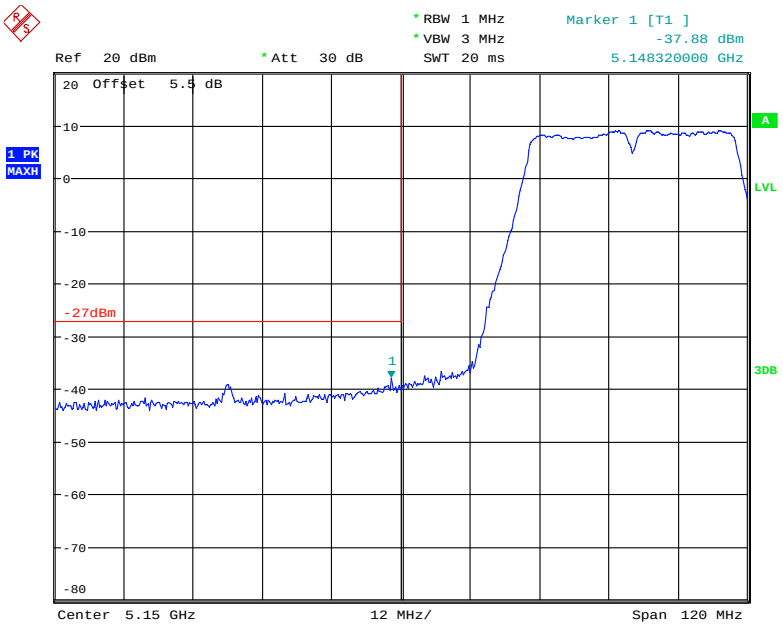
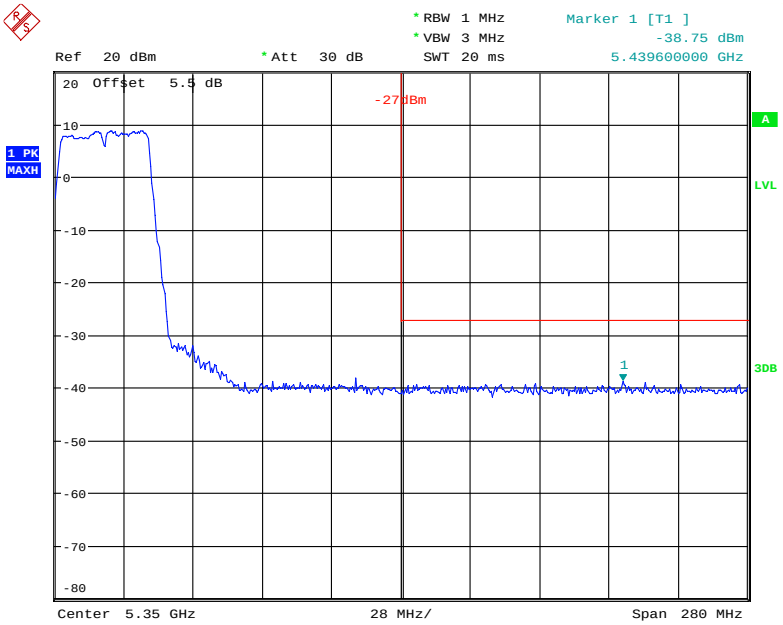
802.11n ht40 Low Channel



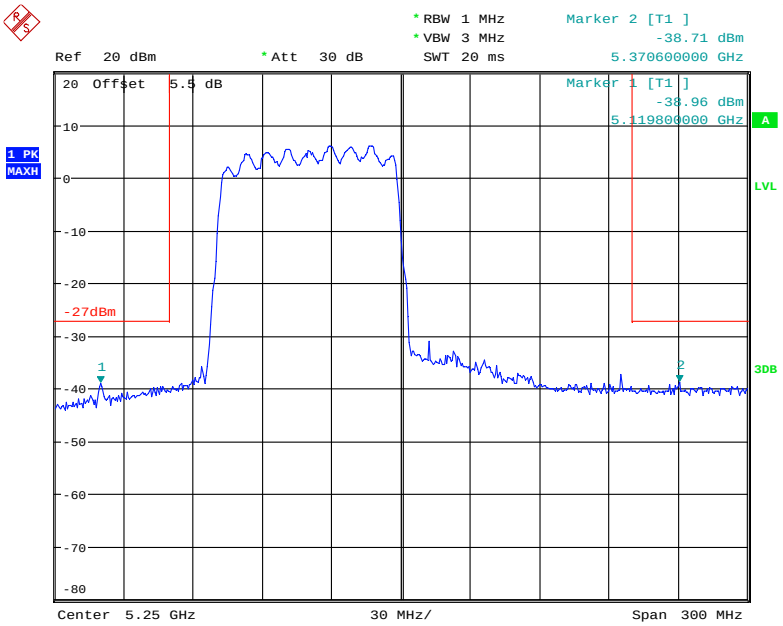
Date: 14.NOV.2017 23:30:59

802.11n ht40 High Channel



Date: 14.NOV.2017 23:33:52

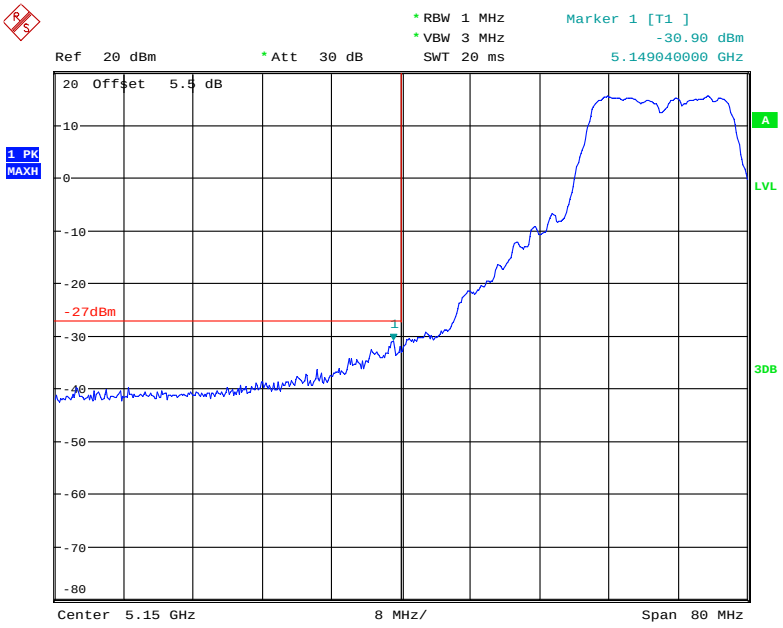
802.11n ac80 Middle Channel



Date: 14.NOV.2017 23:52:16

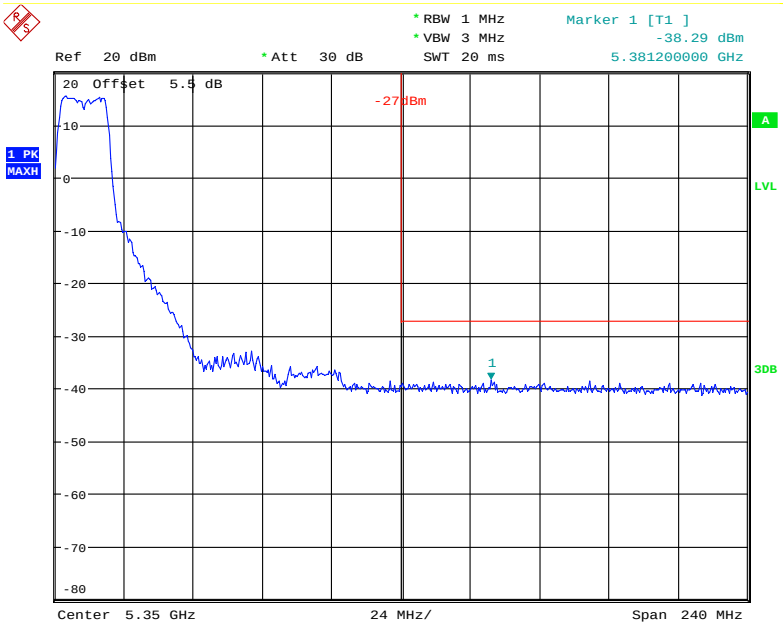
Chain 1:

802.11a Low Channel



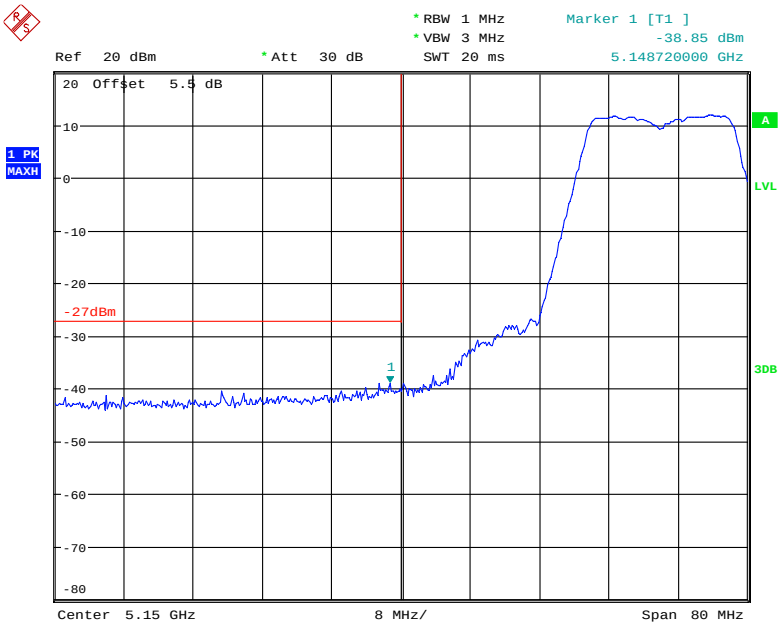
Date: 14.NOV.2017 23:05:49

802.11a High Channel



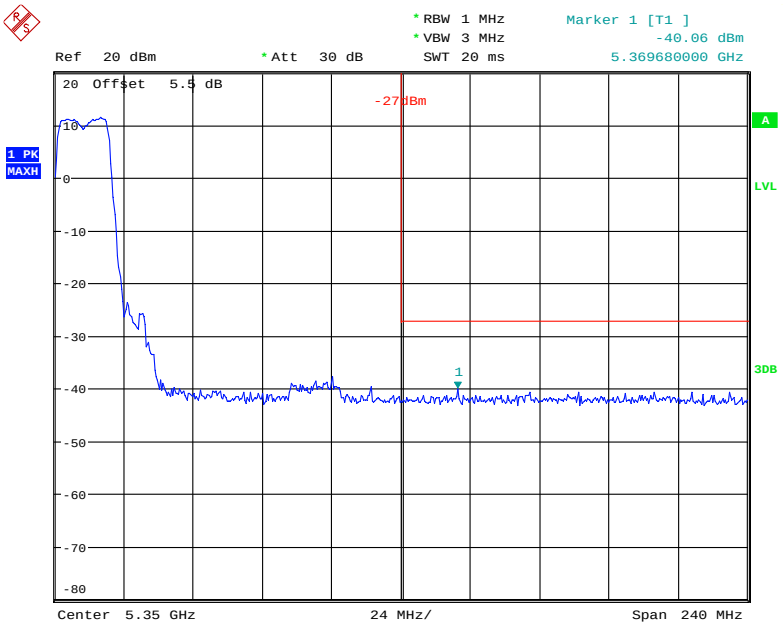
Date: 14.NOV.2017 23:01:22

802.11n ht20 Low Channel



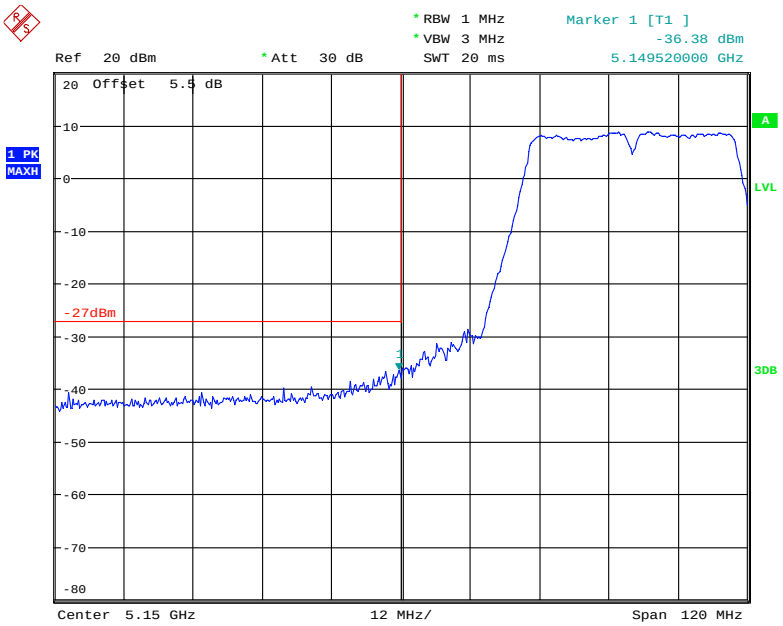
Date: 14.NOV.2017 23:21:49

802.11n ht20 High Channel



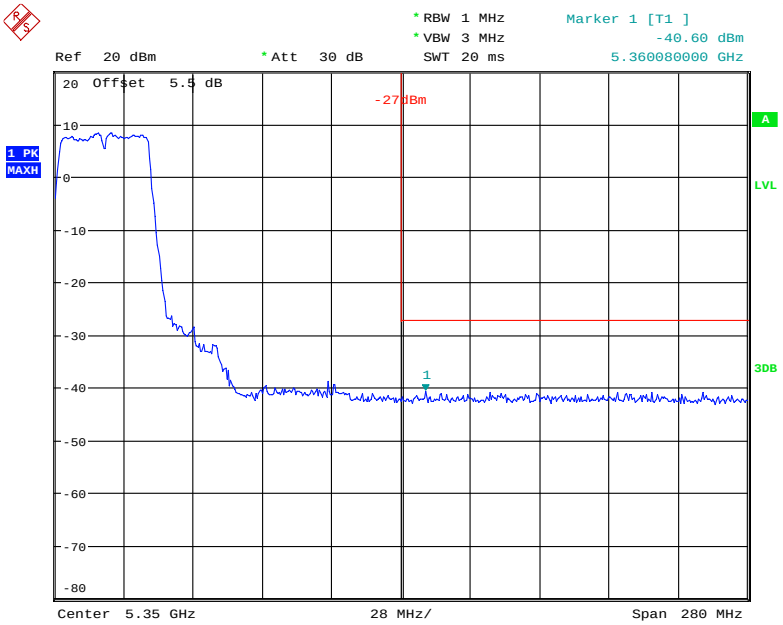
Date: 14.NOV.2017 23:27:09

802.11n ht40 Low Channel



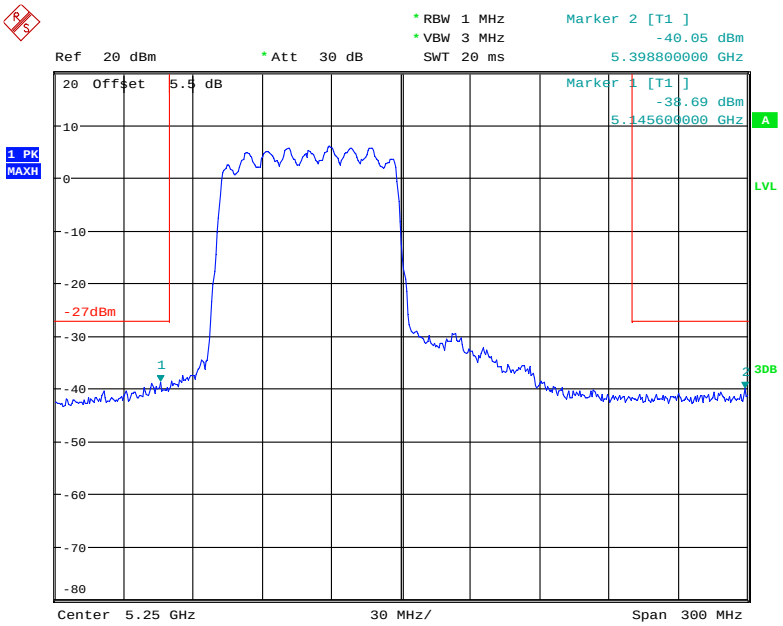
Date: 14.NOV.2017 23:39:00

802.11n ht40 High Channel



Date: 14.NOV.2017 23:41:25

802.11n ac80 Middle Channel

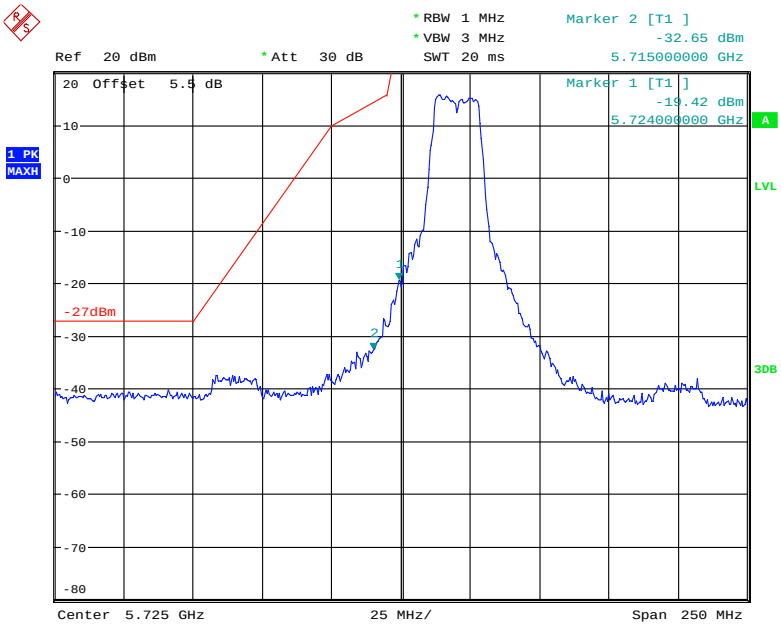


Date: 14.NOV.2017 23:47:14

5725-5850MHz(the atenna gain was offset in the display, all emission under limit more than 3dBc, so 2TX mode also compliance the requirement)

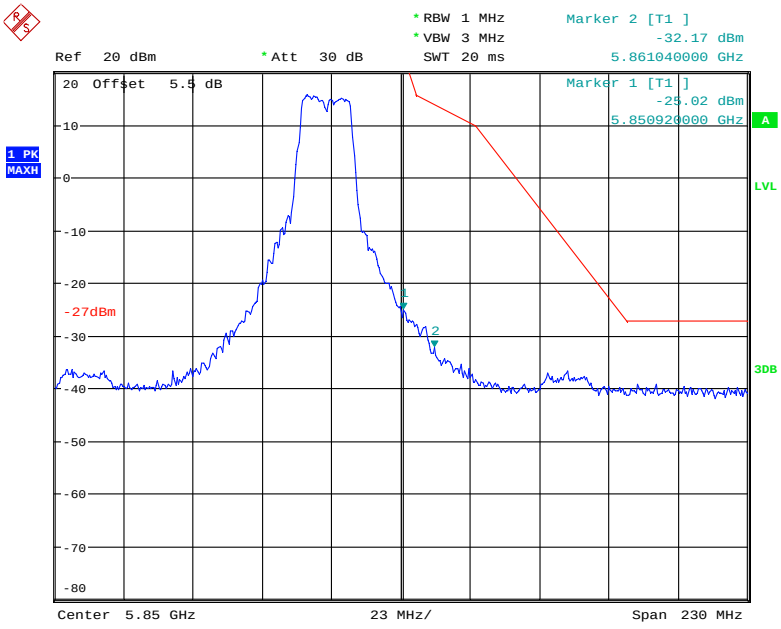
Chain 0:

802.11a Low Channel



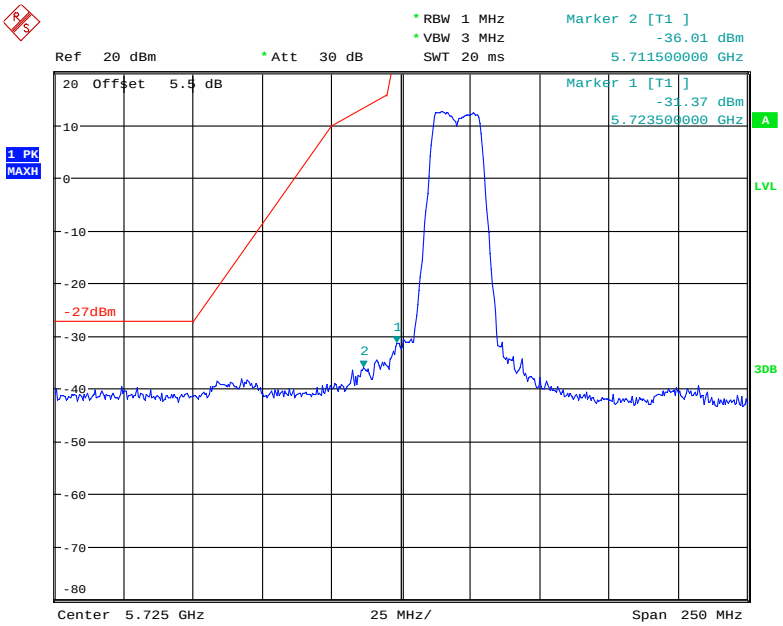
Date: 14.NOV.2017 23:59:22

802.11a High Channel



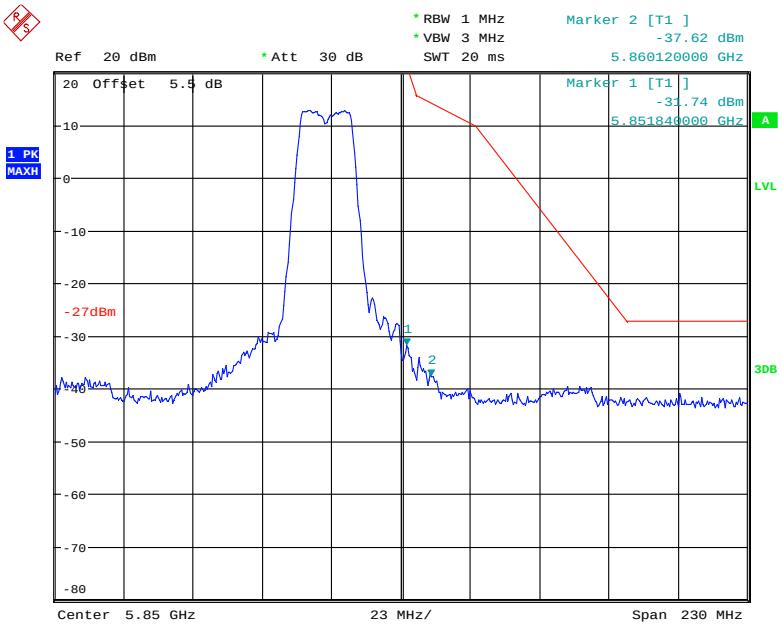
Date: 15.NOV.2017 00:06:31

802.11n ht20 Low Channel



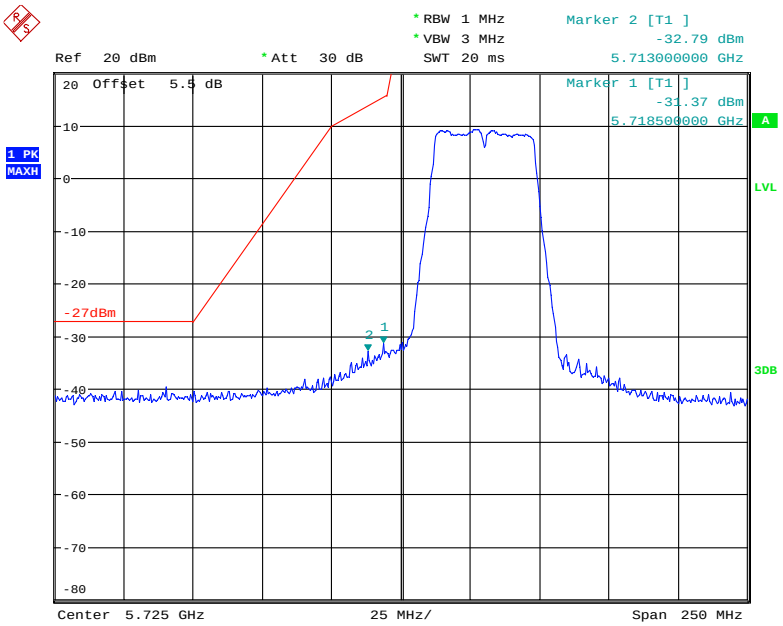
Date: 15.NOV.2017 00:27:26

802.11n ht20 High Channel



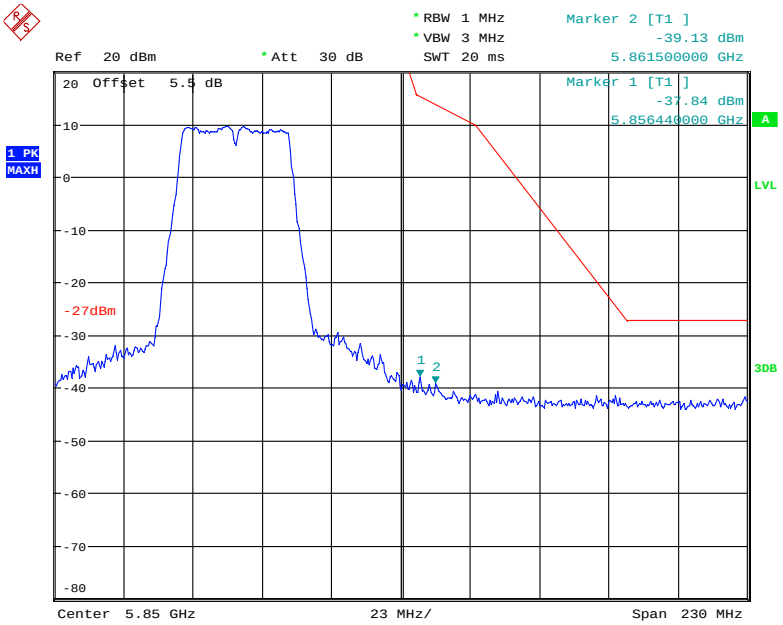
Date: 15.NOV.2017 00:32:37

802.11n ht40 Low Channel



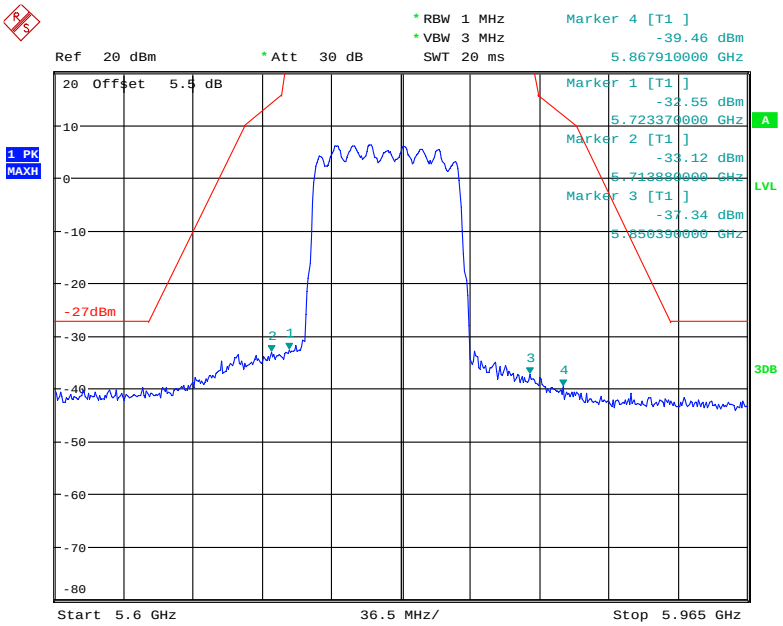
Date: 15.NOV.2017 00:53:40

802.11n ht40 High Channel



Date: 15.NOV.2017 00:50:51

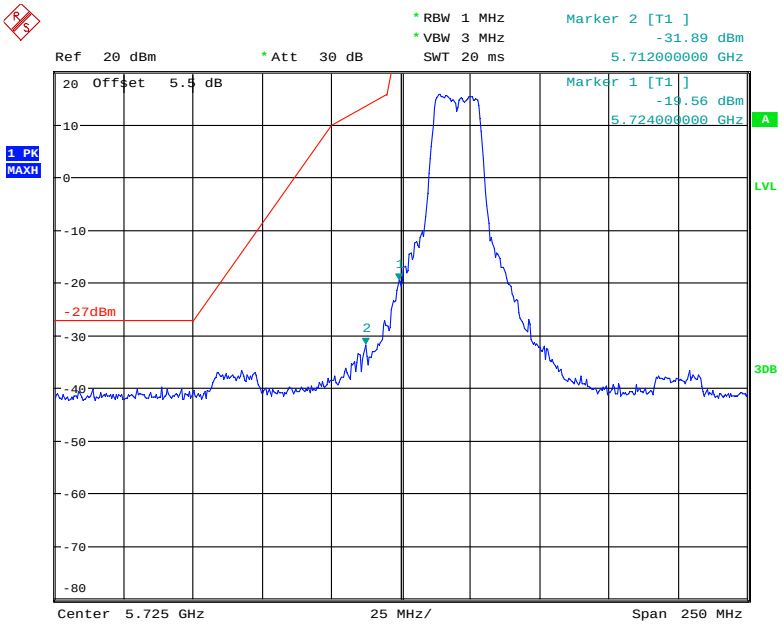
802.11n ac80 Middle Channel



Date: 15.NOV.2017 18:46:12

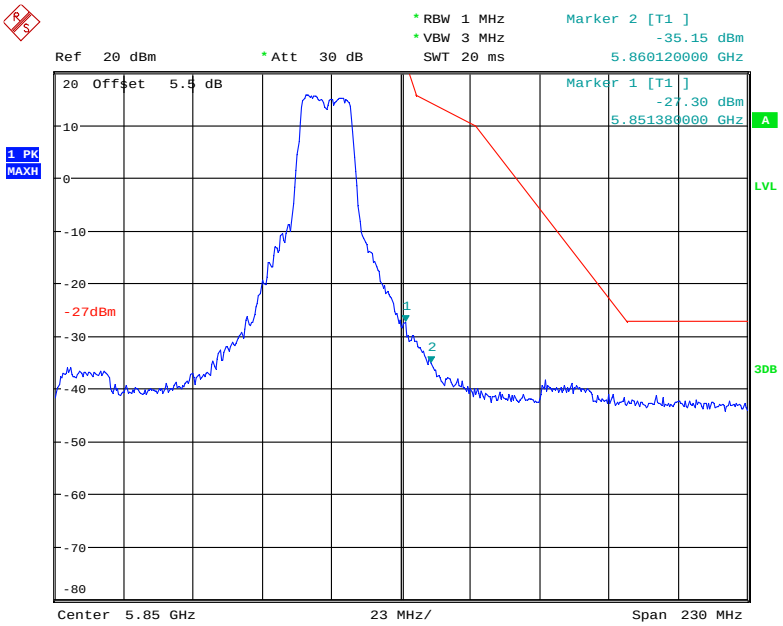
Chain 1:

802.11a Low Channel



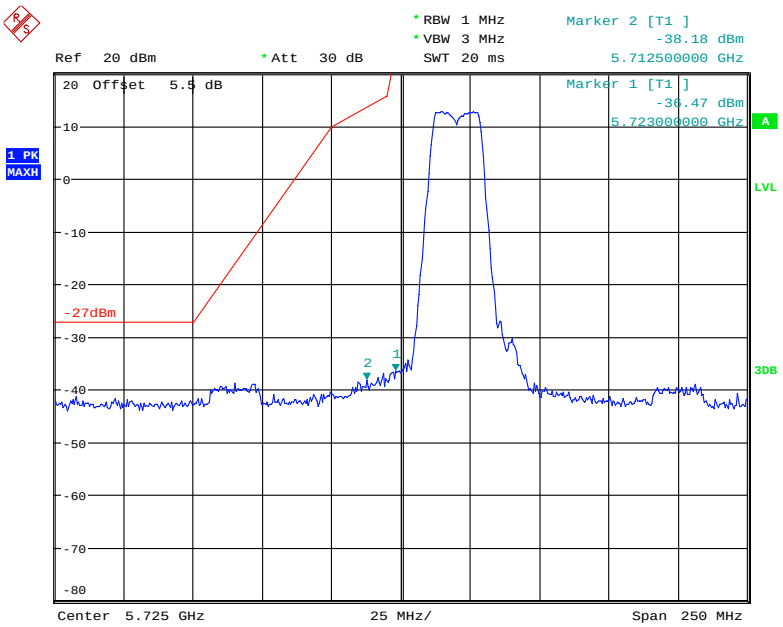
Date: 15.NOV.2017 00:12:55

802.11a High Channel



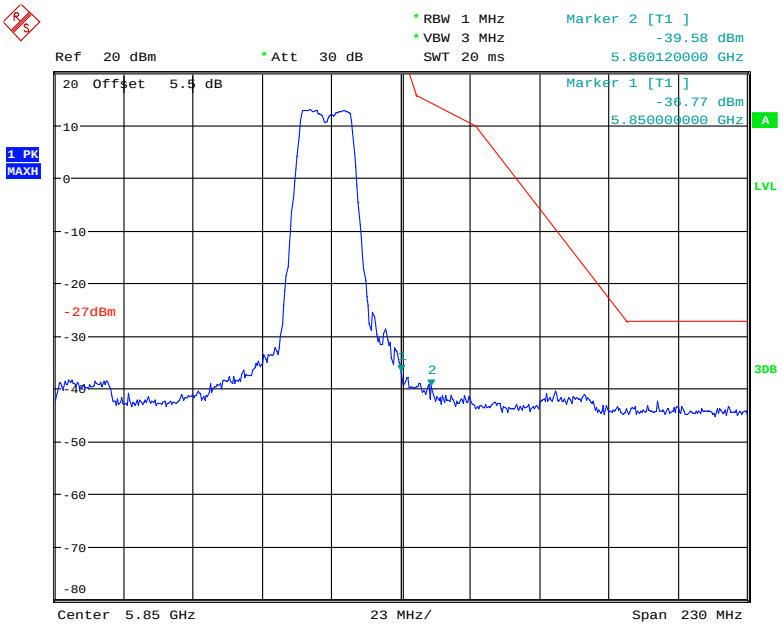
Date: 15.NOV.2017 00:21:53

802.11n ht20 Low Channel



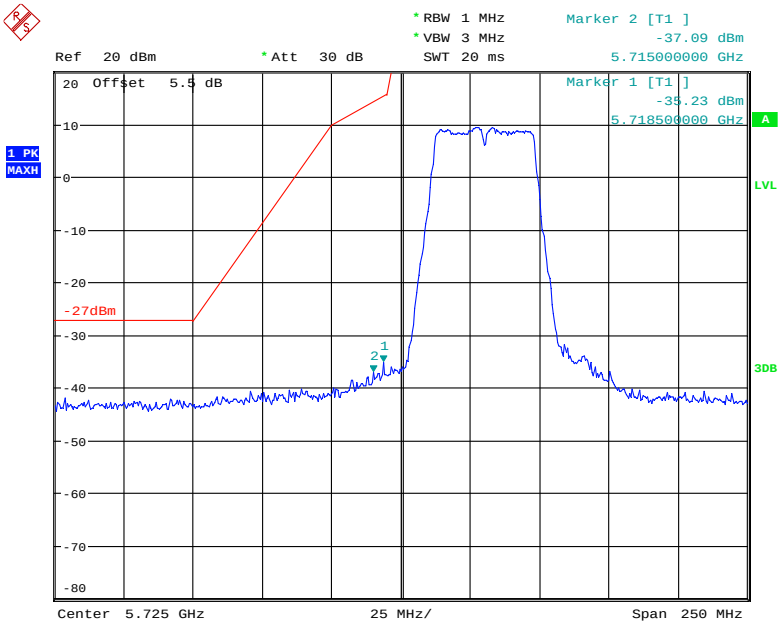
Date: 15.NOV.2017 00:37:15

802.11n ht20 High Channel



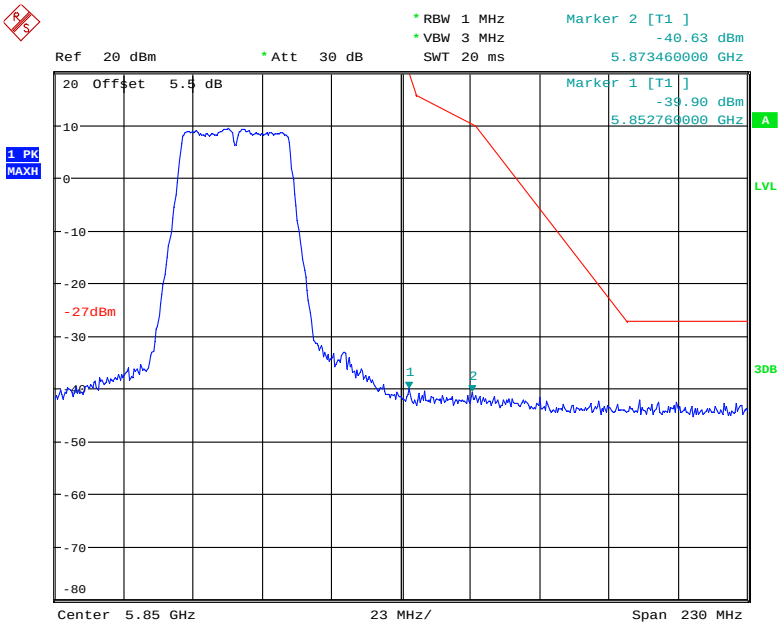
Date: 15.NOV.2017 00:41:57

802.11n ht40 Low Channel



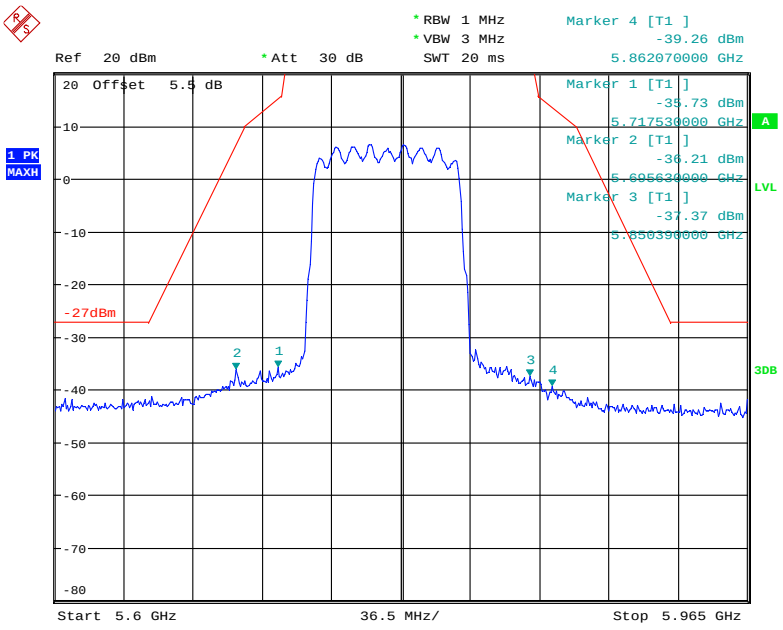
Date: 15.NOV.2017 00:45:30

802.11n ht40 High Channel



Date: 15.NOV.2017 00:47:55

802.11n ac80 Middle Channel



Date: 15.NOV.2017 18:43:37

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

Applicable Standard

15.407(a) (e)

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSIQ	831929/005	2017-08-31	2018-08-31
Unknown	RF Cable	Unknown	C-4	Each Time	/

*** 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 v01r04

Test Data

Environmental Conditions

Temperature:	24.3~24.9°C
Relative Humidity:	38~39 %
ATM Pressure:	101.3 ~101.6kPa

The testing was performed by Mark Pan from 2017-11-14 to 2017-11-15.

Test Result: Pass.

Please refer to the following tables and plots.

Test mode: Transmitting(Test performed at chain 0)

5150-5250MHz:

Mode	Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11 a	Low	5180	21.32	16.96
	Middle	5200	21.32	16.96
	High	5240	21.24	16.96
802.11n ht20	Low	5180	22.04	17.92
	Middle	5200	21.96	17.92
	High	5240	21.8	17.92
802.11n ht40	Low	5190	42.97	37.44
	High	5230	42.97	37.44
802.11ac80	Middle	5210	82.4	75.2

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

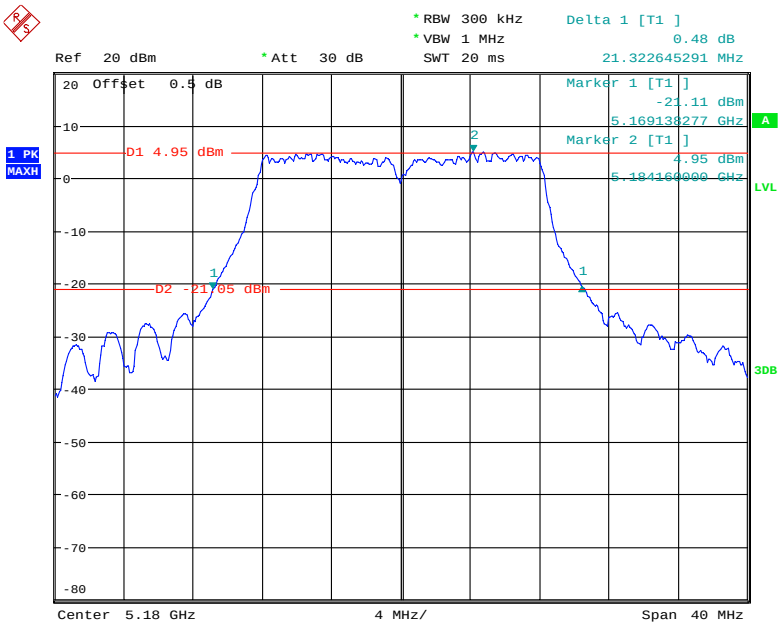
5725-5850MHz:

Mode	Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11 a	Low	5745	16.51	16.96
	Middle	5785	16.51	16.96
	High	5825	16.51	17.04
802.11n ht20	Low	5745	17.56	18.0
	Middle	5785	17.56	18.0
	High	5825	17.56	18.0
802.11n ht40	Low	5755	36.39	37.44
	High	5795	36.39	37.44
802.11ac80	Middle	5775	75.35	75.84

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

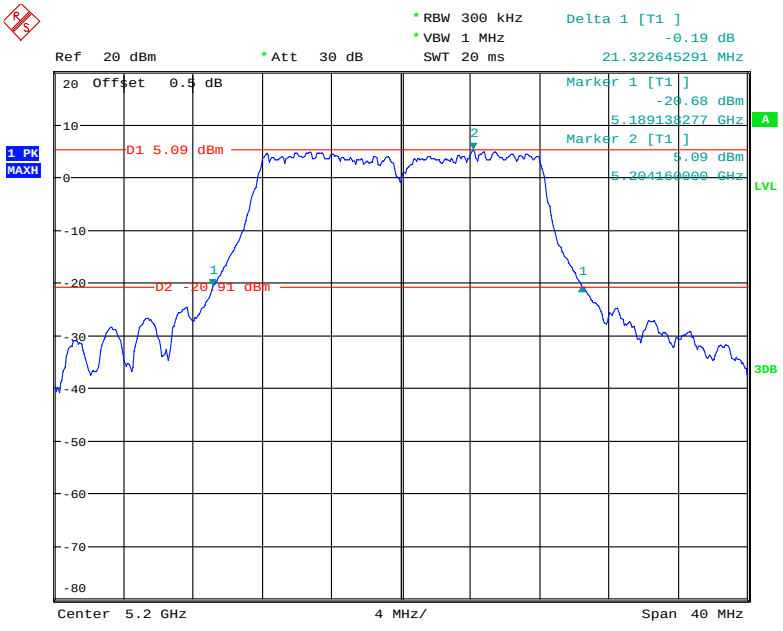
5150-5250MHz: 26dB Emission Bandwidth:

802.11a Low Channel



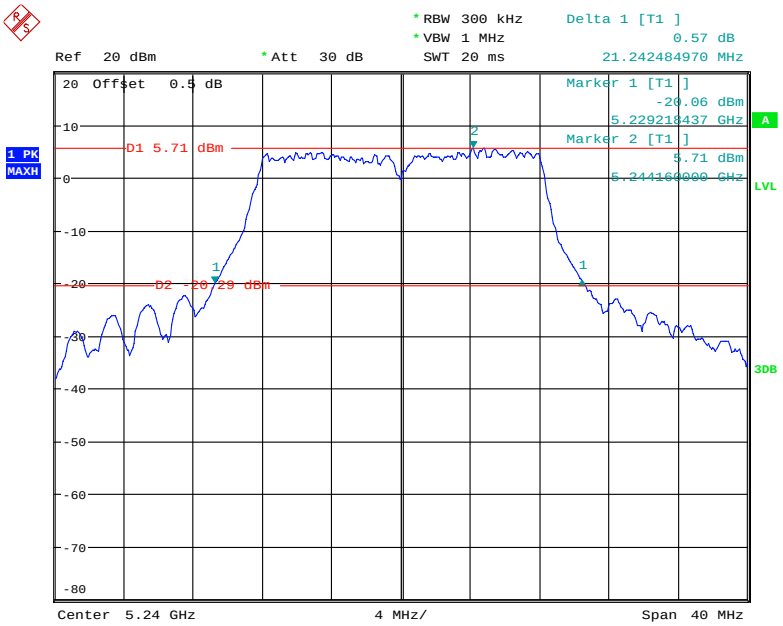
Date: 14.NOV.2017 22:45:09

802.11a Middle Channel



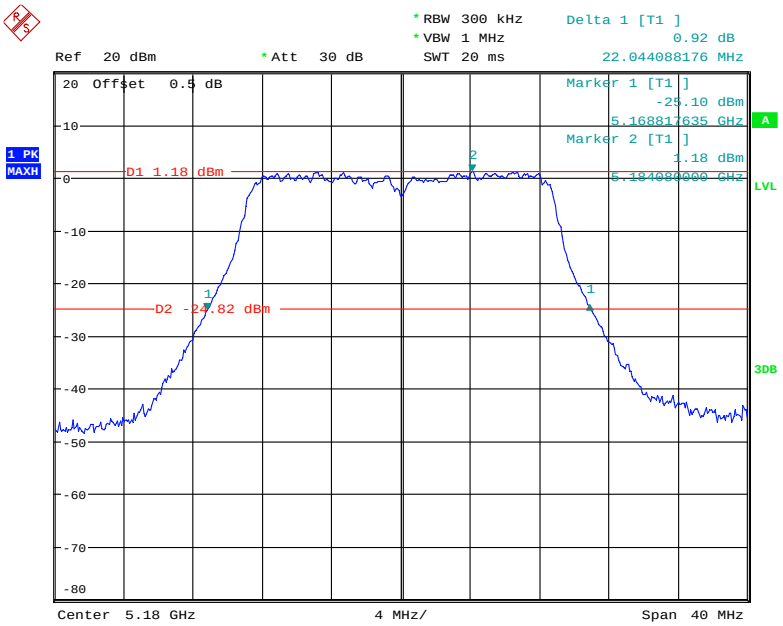
Date: 14.NOV.2017 22:50:45

802.11a High Channel



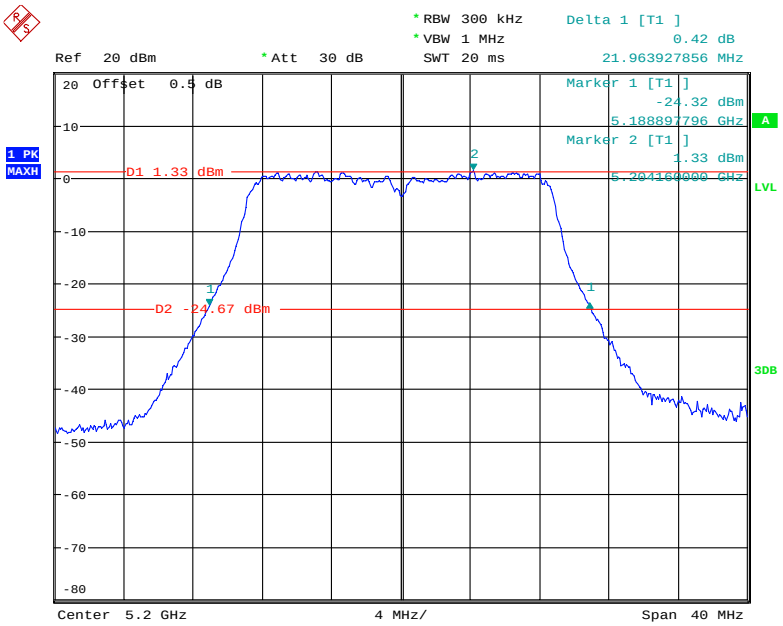
Date: 14.NOV.2017 22:56:14

802.11n ht20 Low Channel



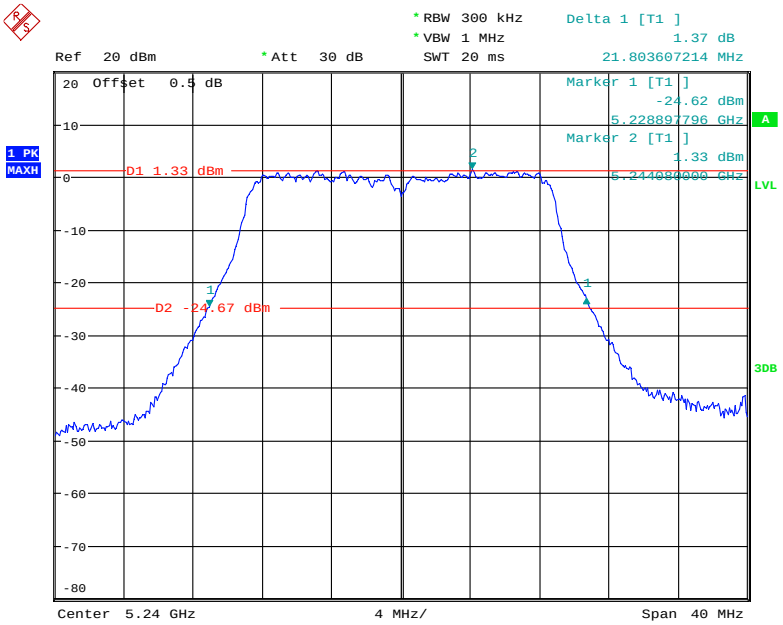
Date: 14.NOV.2017 23:09:51

802.11n ht20 Middle Channel



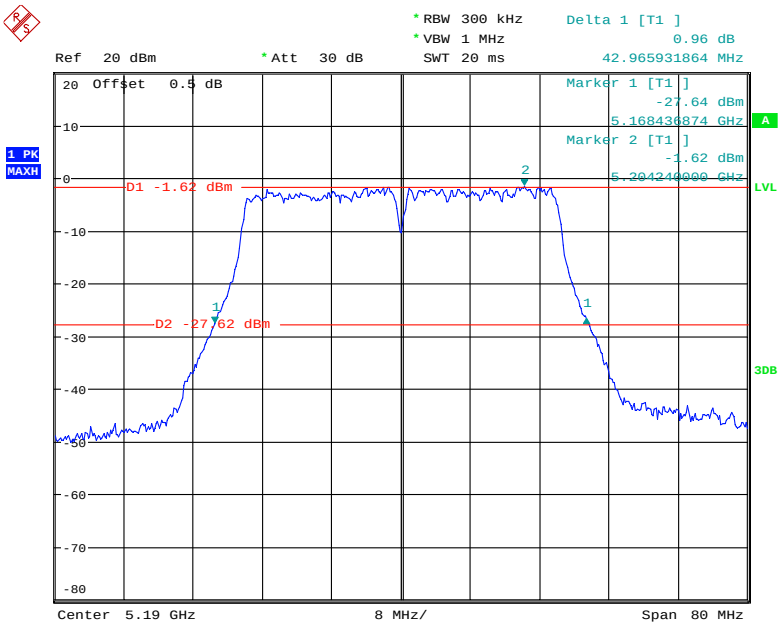
Date: 14.NOV.2017 23:13:50

802.11n ht20 High Channel



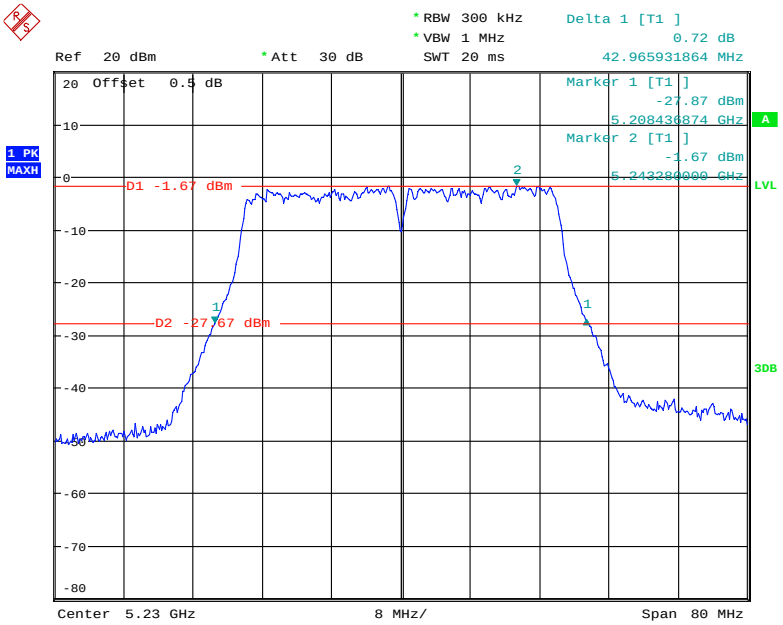
Date: 14.NOV.2017 23:15:48

802.11n ht40 Low Channel



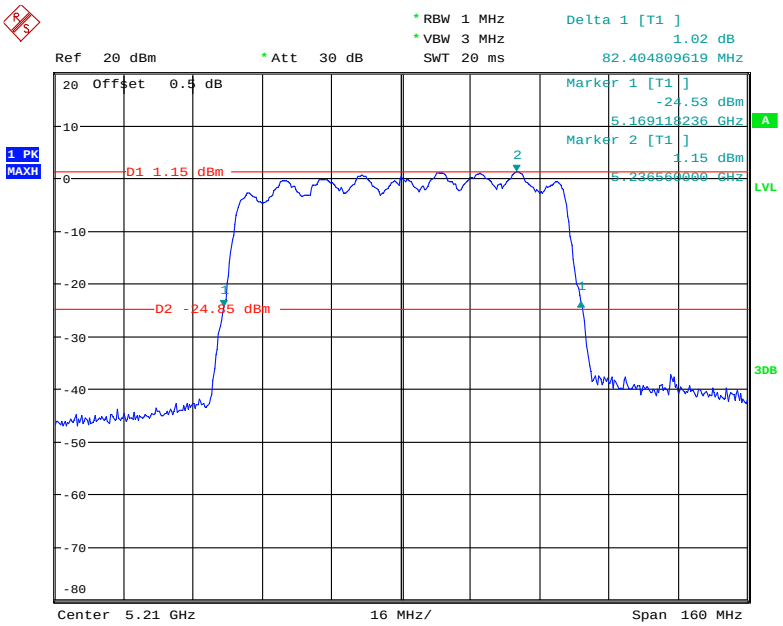
Date: 14.NOV.2017 23:29:38

802.11n ht40 High Channel



Date: 14.NOV.2017 23:32:36

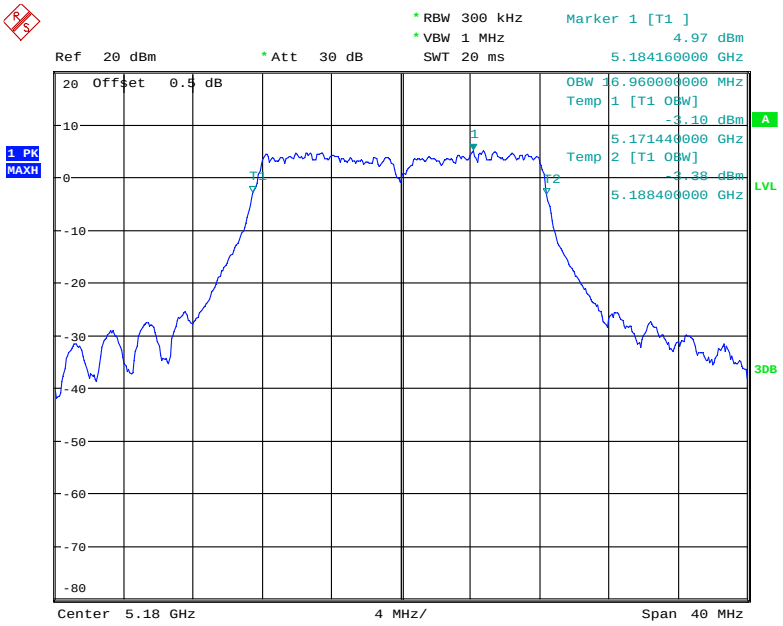
802.11ac80 Middle Channel



Date: 14.NOV.2017 23:50:58

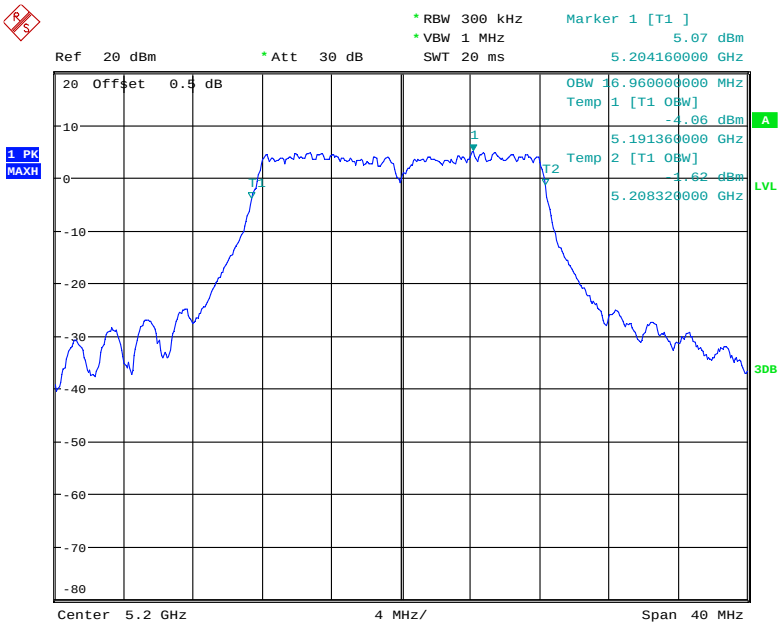
99% Occupied Bandwidth

802.11a Low Channel



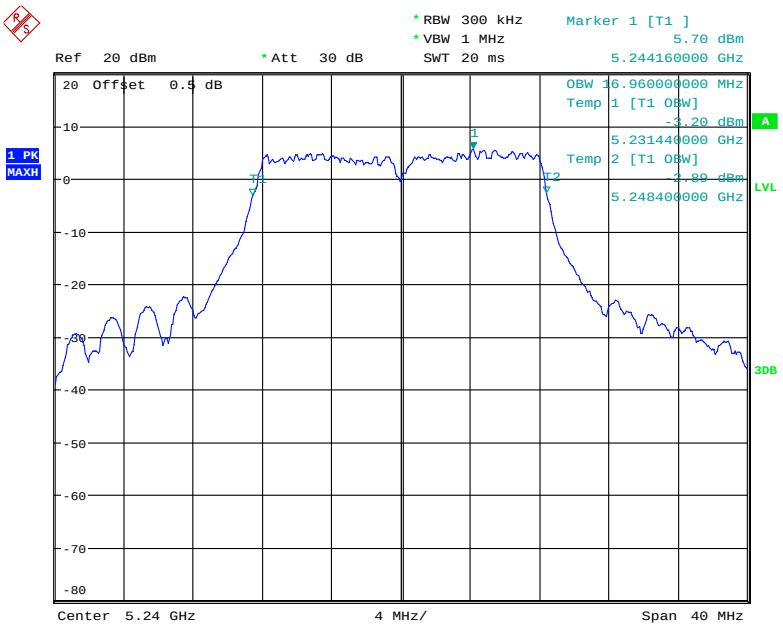
Date: 14.NOV.2017 22:45:21

802.11a Middle Channel



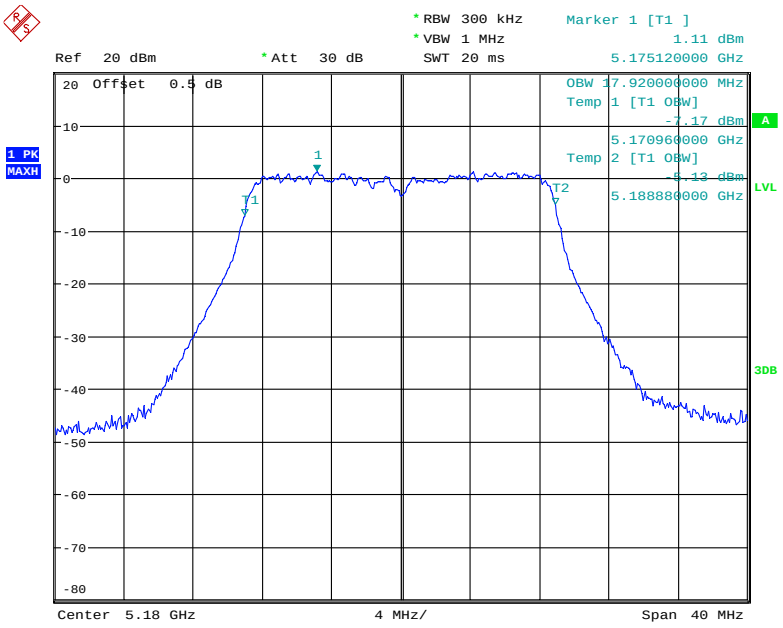
Date: 14.NOV.2017 22:50:58

802.11a High Channel



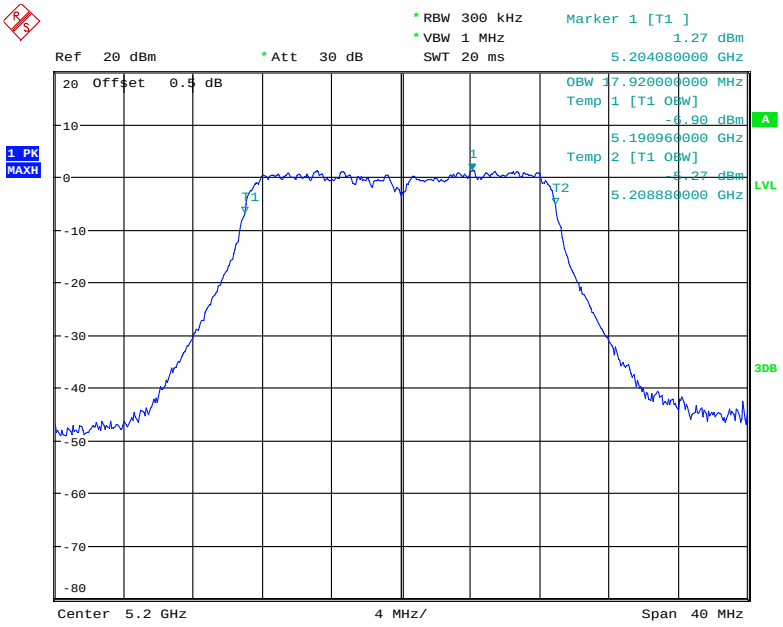
Date: 14.NOV.2017 22:56:26

802.11n ht20 Low Channel



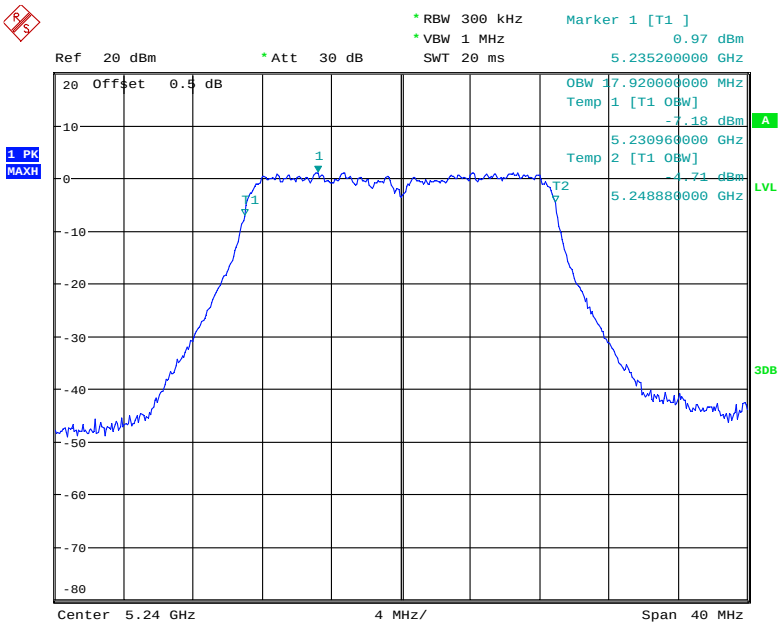
Date: 14.NOV.2017 23:10:04

802.11n ht20 Middle Channel



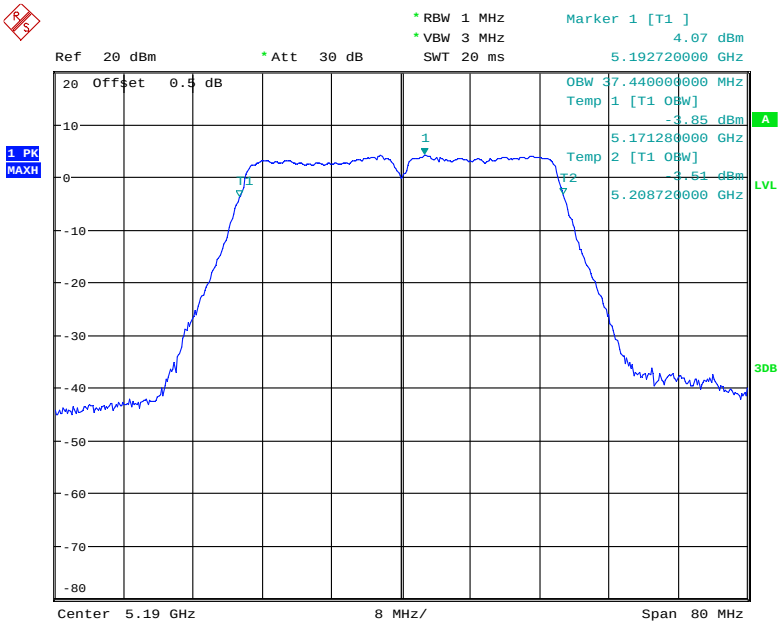
Date: 14.NOV.2017 23:14:02

802.11n ht20 High Channel



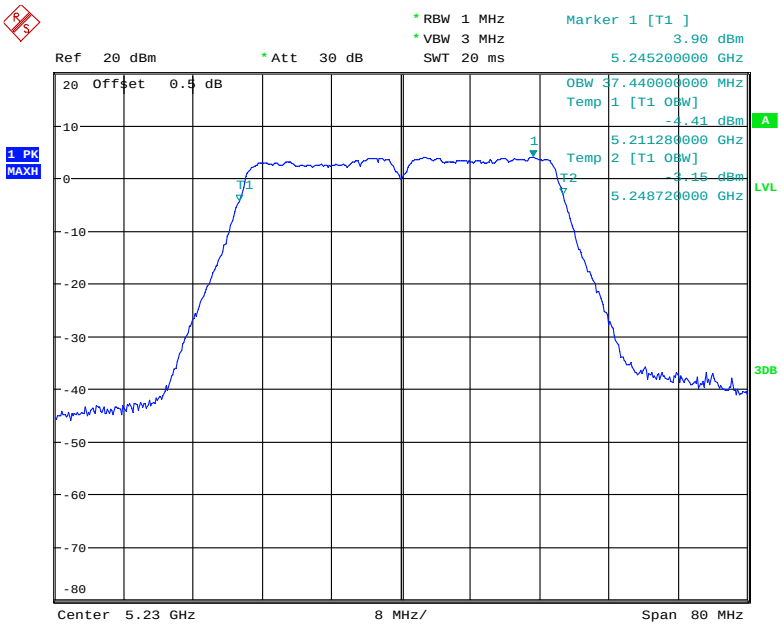
Date: 14.NOV.2017 23:16:01

802.11n ht40 Low Channel



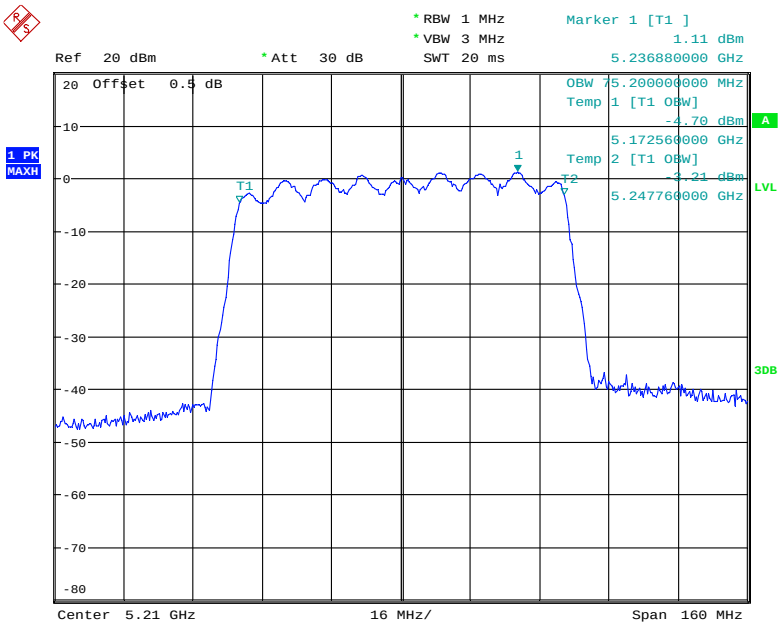
Date: 14.NOV.2017 23:29:51

802.11n ht40 High Channel



Date: 14.NOV.2017 23:32:48

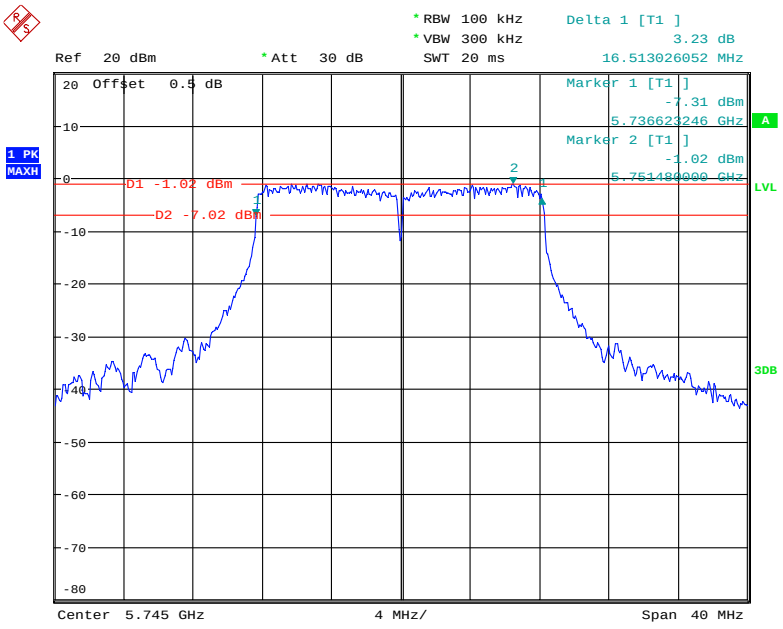
802.11ac80 Middle Channel



Date: 14.NOV.2017 23:51:10

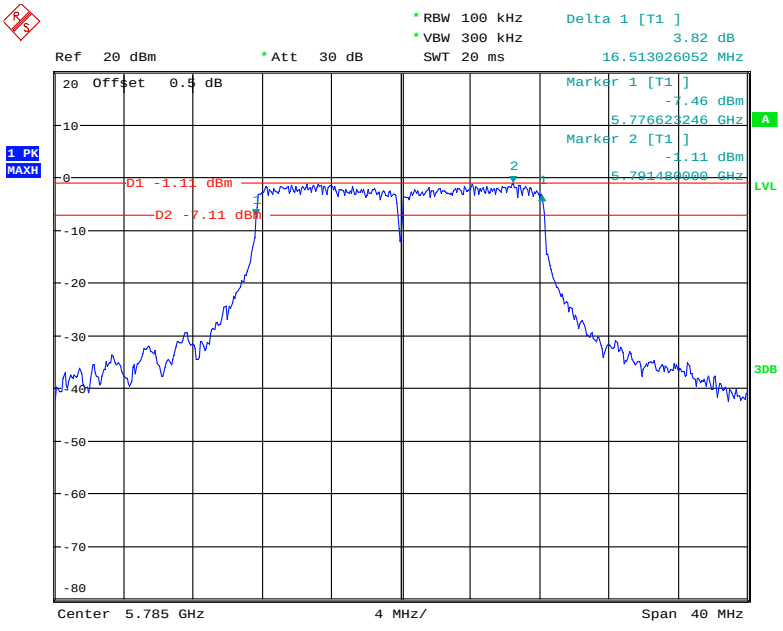
5725-5850MHz:
6dB Bandwidth:

802.11a Low Channel



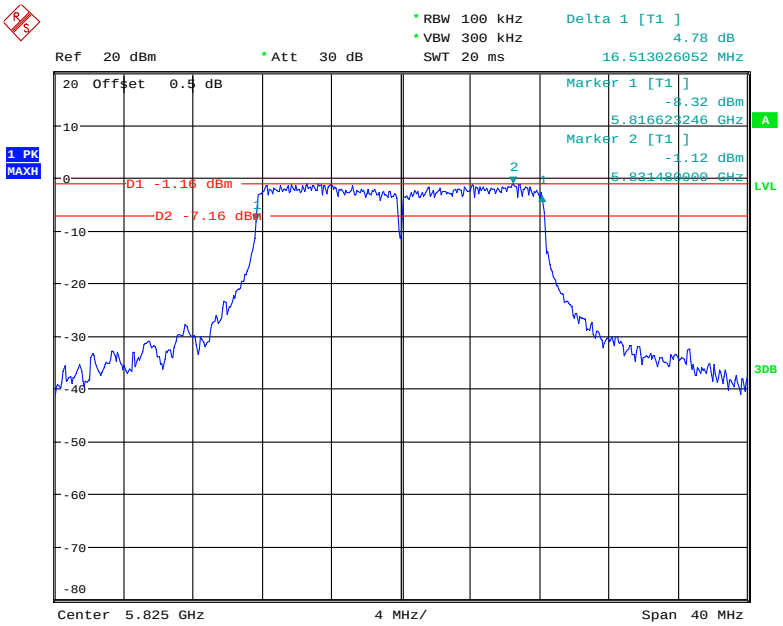
Date: 14.NOV.2017 23:58:04

802.11a Middle Channel



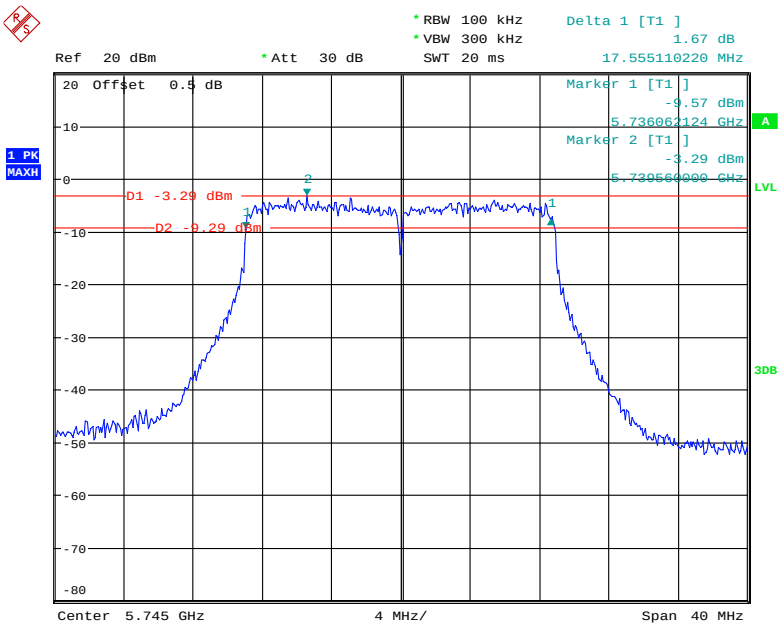
Date: 15.NOV.2017 00:02:55

802.11a High Channel



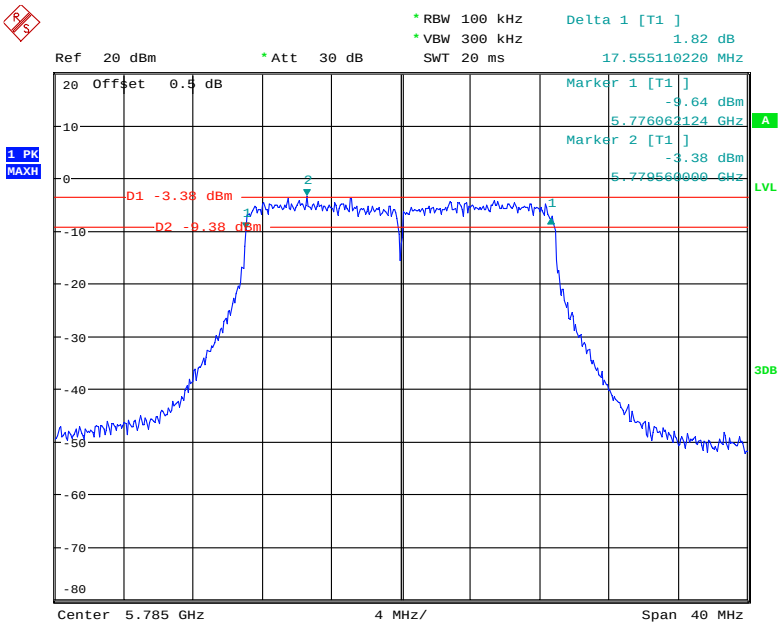
Date: 15.NOV.2017 00:05:10

802.11ht20 Low Channel



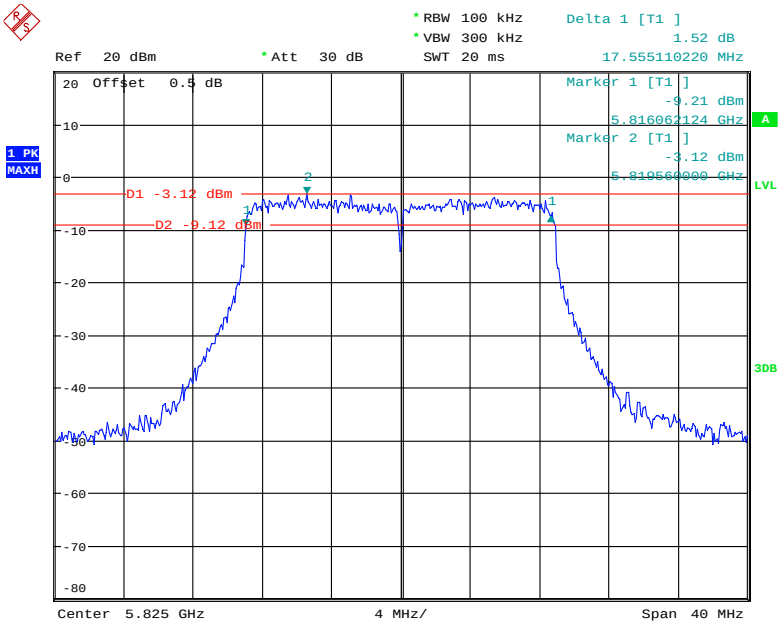
Date: 15.NOV.2017 00:26:06

802.11ht20 Middle Channel



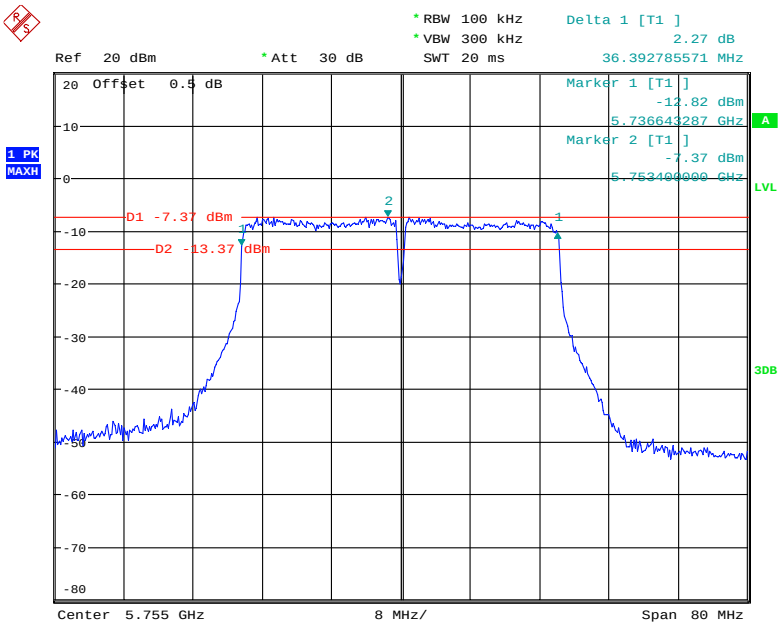
Date: 15.NOV.2017 00:28:54

802.11ht20 High Channel



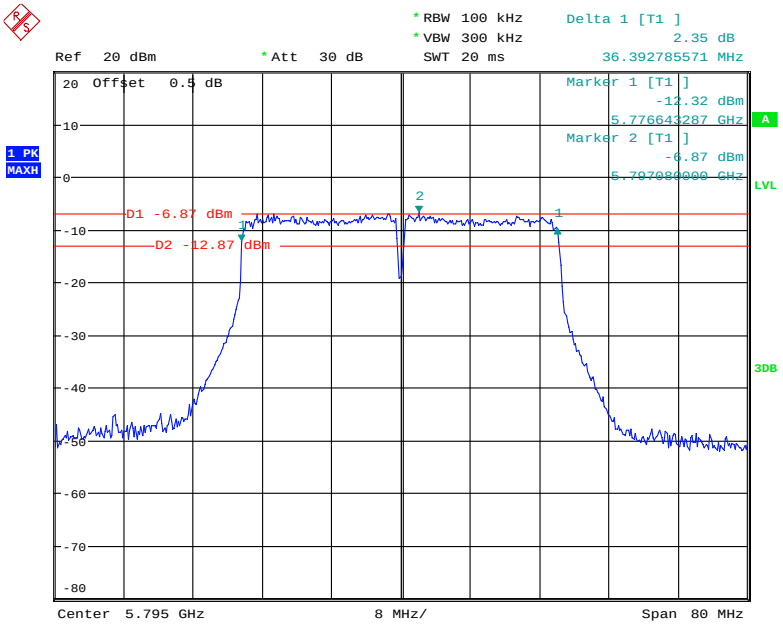
Date: 15.NOV.2017 00:31:14

802.11ht40 Low Channel



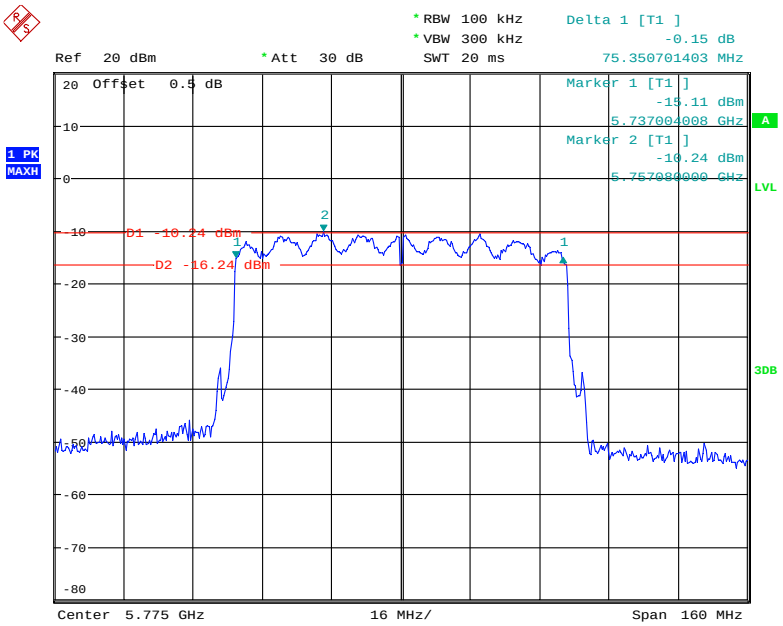
Date: 15.NOV.2017 00:52:26

802.11ht40 High Channel



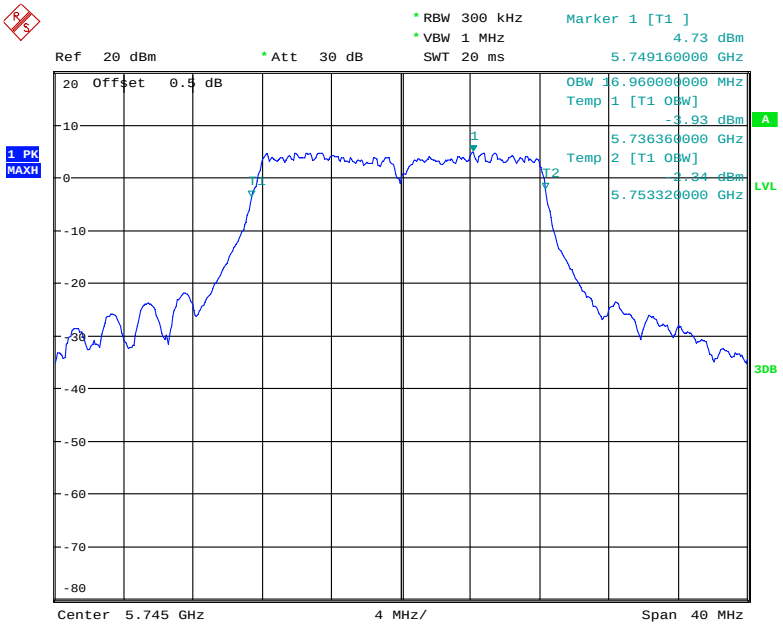
Date: 15.NOV.2017 00:49:35

802.11ac80 Middle Channel

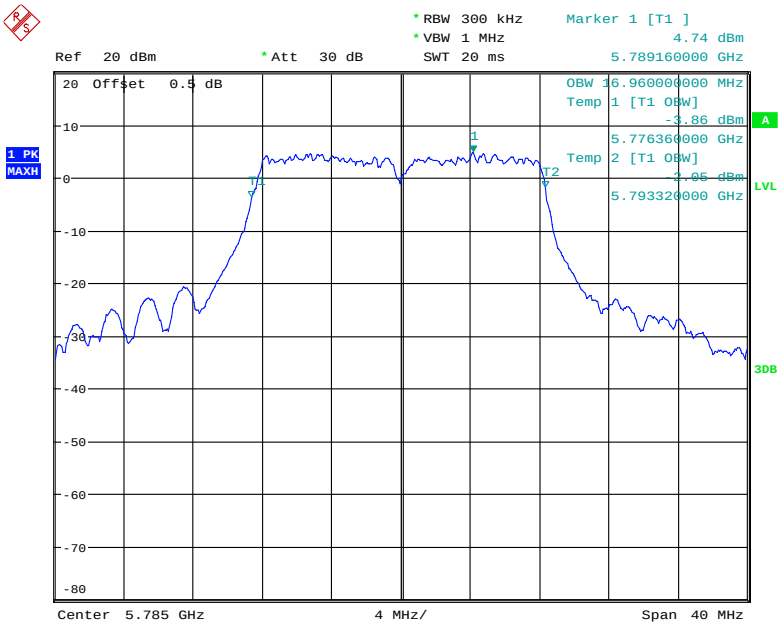


99% Occupied Bandwidth:

802.11a Low Channel

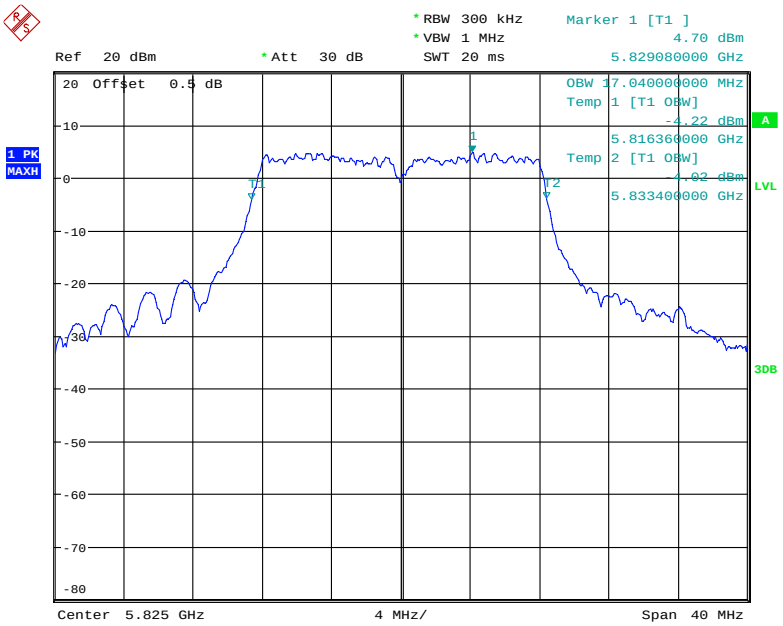


802.11a Middle Channel



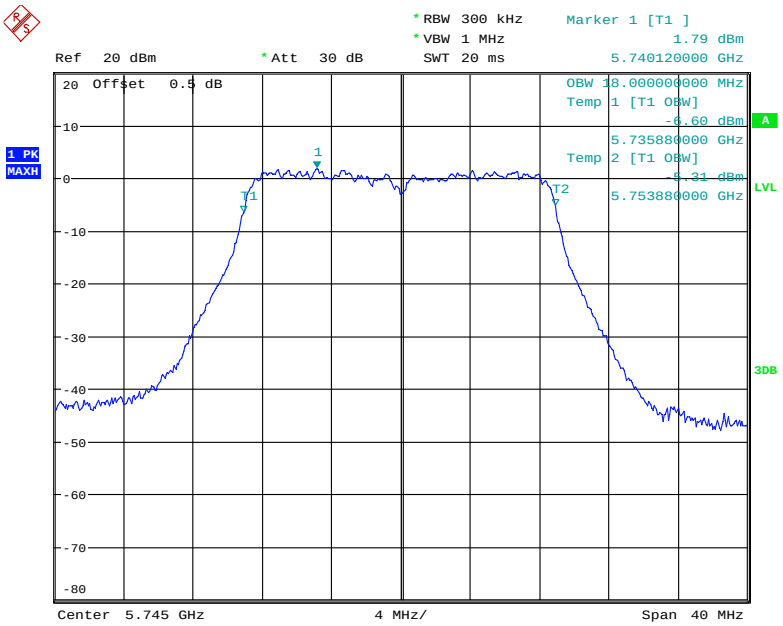
Date: 15.NOV.2017 00:03:06

802.11a High Channel



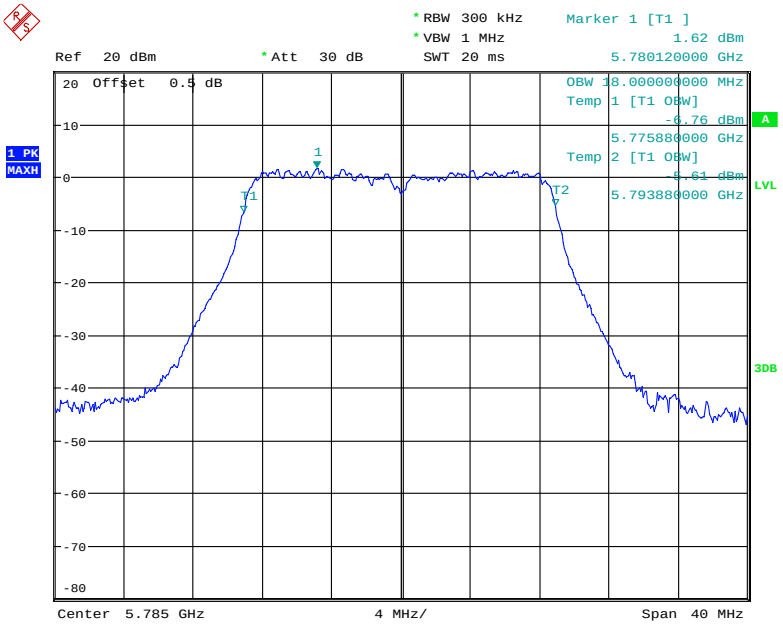
Date: 15.NOV.2017 00:05:23

802.11ht20 Low Channel



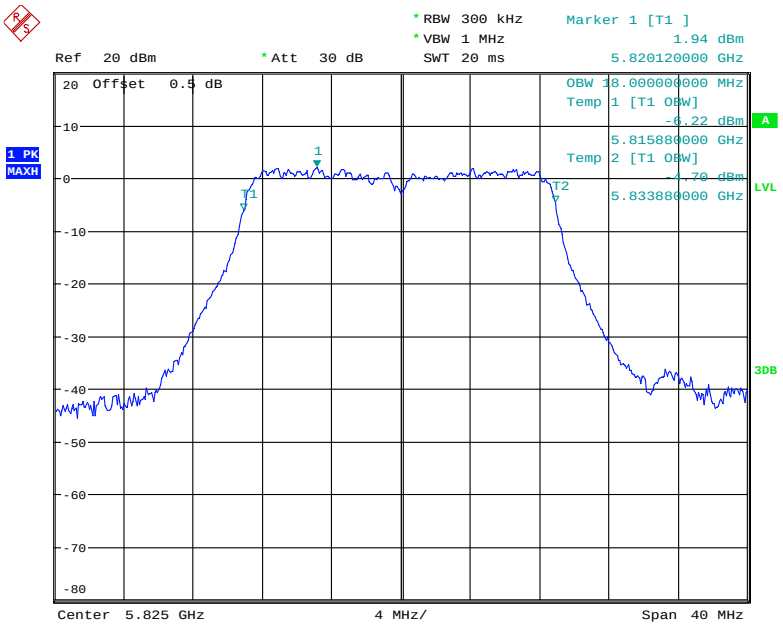
Date: 15.NOV.2017 00:26:18

802.11ht20 Middle Channel



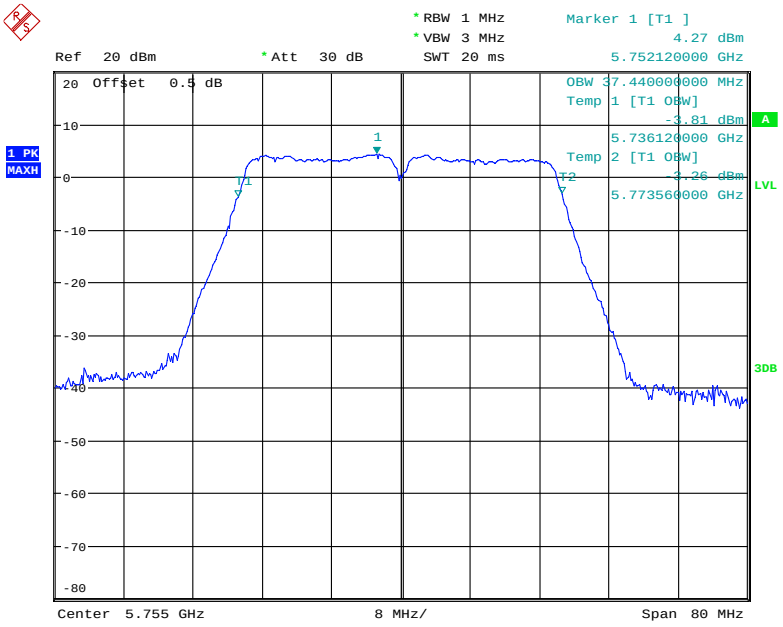
Date: 15.NOV.2017 00:29:07

802.11ht20 High Channel



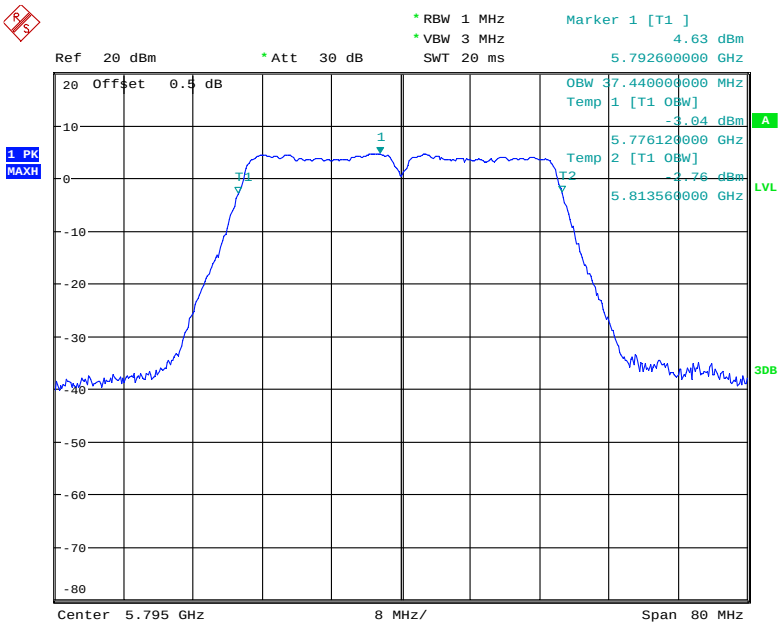
Date: 15.NOV.2017 00:31:26

802.11ht40 Low Channel



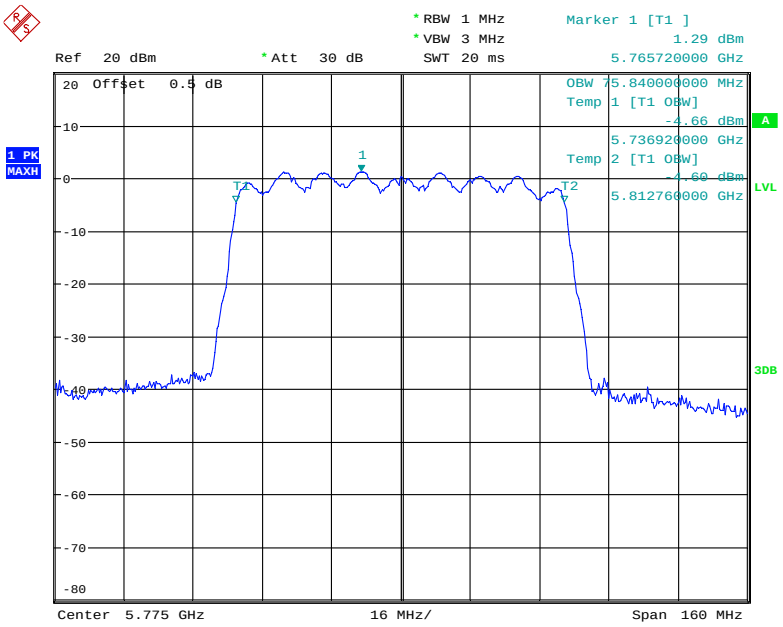
Date: 15.NOV.2017 00:52:38

802.11ht40 High Channel



Date: 15.NOV.2017 00:49:47

802.11ac80 Middle Channel



Date: 15.NOV.2017 18:44:59

FCC §15.407(g)–FREQUENCY STABILITY

Applicable Standard

FCC §15.407(g)

(g) Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

Test Procedure

According to ANSI C63.10-2013 "American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices".

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSIQ	831929/005	2017-08-31	2018-08-31
Unknown	RF Cable	Unknown	C-4	Each Time	/
UNI-T	Multimeter	UT39A	M130199938	2017-04-10	2018-04-10
Dongzhixu	High Temperature Test Chamber	DP1000	201105083-4	2017-09-10	2018-09-09

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

Test Data

Environmental Conditions

Temperature:	26.6°C
Relative Humidity:	47 %
ATM Pressure:	101 kPa

The testing was performed by Kami Zhou on 2017-10-23.

Test Mode: Transmitting(Test was performed at Chain 0)

Test Result: Pass.

5150-5250MHz:

802.11a

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5171.4400	5248.4012	f_L and f_H Within 5150~5250MHz range
10		5171.4412	5248.4014	
20		5171.4414	5248.4015	
30		5171.4416	5248.4017	
40		5171.4403	5248.4006	
25	102	5171.4405	5248.4005	
25	138	5171.4407	5248.4003	

802.11n ht20:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5170.9600	5248.8800	f_L and f_H Within 5150~5250MHz range
10		5170.9612	5248.8804	
20		5170.9605	5248.8806	
30		5170.9607	5248.8807	
40		5170.9603	5248.8802	
25	102	5170.9601	5248.8803	
25	138	5170.9603	5248.8804	

802.11n ht40:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5171.2800	5248.7212	f_L and f_H Within 5150~5250MHz range
10		5171.2812	5248.7213	
20		5171.2814	5248.7217	
30		5171.2817	5248.7216	
40		5171.2818	5248.7212	
25	102	5171.2813	5248.7212	
25	138	5171.2811	5248.7214	

802.11ac80:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5172.5600	5247.7600	f_L and f_H Within 5150~5250MHz range
10		5172.5612	5247.7622	
20		5172.5614	5247.7612	
30		5172.5617	5247.7615	
40		5172.5613	5247.7617	
25	102	5172.5611	5247.7615	
25	138	5172.5609	5247.7611	

Note: the f_L and f_H determined by 99% Occupied bandwidth low edge at Low test channel and High edge at High test channel.

5725-5850MHz:

802.11a

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5736.3600	5833.4000	f_L and f_H Within 5725~5850MHz range
10		5736.3612	5833.4011	
20		5736.3623	5833.4014	
30		5736.3612	5833.4015	
40		5736.3632	5833.4016	
25	102	5736.3613	5833.4018	
25	138	5736.3614	5833.4002	

802.11n ht20:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5735.8800	5833.8803	f_L and f_H Within 5725~5850MHz range
10		5735.8812	5833.8804	
20		5735.8813	5833.8807	
30		5735.8808	5833.8801	
40		5735.8809	5833.8803	
25	102	5735.8805	5833.8805	
25	138	5735.8806	5833.8806	

802.11n ht40:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5736.1200	5813.5600	f_L and f_H Within 5725~5850MHz range
10		5736.1212	5813.5612	
20		5736.1214	5813.5614	
30		5736.1214	5813.5607	
40		5736.1218	5813.5609	
25	102	5736.12113	5813.5606	
25	138	5736.1205	5813.5602	

802.11ac80:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5736.9200	5812.7600	f_L and f_H Within 5725~5850MHz range
10		5736.9203	5812.7613	
20		5736.9206	5812.7604	
30		5736.9202	5812.7608	
40		5736.9206	5812.7607	
25	102	5736.9203	5812.7606	
25	138	5736.9204	5812.7605	

Note: the f_L and f_H determined by 99% Occupied bandwidth low edge at Low test channel and High edge at High test channel.

FCC §15.407(a) –MAXIMUM CONDUCTED OUTPUT POWER

Applicable Standard

(a) Power limits:

(1) For the band 5.15-5.25 GHz.

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

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

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple 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
Agilent	Wideband Power Sensor	N1921A	MY54210016	2017-11-03	2018-11-03
Agilent	Wideband Power Sensor	N1921A	MY54170013	2017-11-03	2018-11-03
Agilent	P-Series Power Meter	N1912A	MY5000448	2017-11-03	2018-11-03
Unknown	RF Cable	Unknown	C-4	Each Time	/

*** 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 v01r04

Test Data

Environmental Conditions

Temperature:	24.3°C
Relative Humidity:	38 %
ATM Pressure:	101.3kPa

The testing was performed by Mark Pan on 2017-11-15.

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	11.55	11.51	/	30	PASS
		5200	11.59	11.84	/	30	PASS
		5240	12.06	11.57	/	30	PASS
	802.11ht20	5180	8.16	8.00	11.09	30	PASS
		5200	8.22	7.71	10.98	30	PASS
		5240	8.11	7.45	10.8	30	PASS
	802.11ht40	5190	8.37	8.10	11.25	30	PASS
		5230	8.26	7.70	11.00	30	PASS
	802.11 ac80	5210	7.25	7.18	10.23	30	PASS
5725-5850 MHz	802.11 a	5745	11.35	11.41	/	30	PASS
		5785	11.27	11.4	/	30	PASS
		5825	11.36	11.43	/	30	PASS
	802.11ht20	5745	8.50	8.76	11.64	30	PASS
		5785	8.44	8.81	11.64	30	PASS
		5825	8.83	8.89	11.87	30	PASS
	802.11ht40	5755	8.45	8.65	11.56	30	PASS
		5795	8.89	8.58	11.75	30	PASS
	802.11 ac80	5775	7.45	7.88	10.68	30	PASS

Note 1: the duty cycle have been calculated in the result.
Note 2: 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 v01r04

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSIQ	831929/005	2017-08-31	2018-08-31
Unknown	RF Cable	Unknown	C-4	Each Time	/

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

Test Data

Environmental Conditions

Temperature:	24.3~24.9°C
Relative Humidity:	38~39 %
ATM Pressure:	101.3 ~101.6kPa

The testing was performed by Makr Pan from 2017-11-14 to 2017-11-15.

Test Mode: Transmitting

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

5150-5250MHz

Mode	Frequency (MHz)	Power Spectral Density (dBm/MHz)			
		Chain 0	Chain 1	Total	Limits
802.11 a	5180	2.77	2.68	/	17
	5200	2.9	2.98	/	17
	5240	3.5	2.64	/	17
802.11 ht20	5180	-1.02	-1.11	1.95	15
	5200	-0.93	-1.36	1.87	15
	5240	-1.04	-1.79	1.61	15
802.11 ht40	5190	-3.82	-4.11	-0.95	15
	5230	-3.91	-4.64	-1.25	15
802.11 ac80	5210	-6.63	-6.92	-3.76	15

5725-5850MHz

Mode	Frequency (MHz)	Reading (dBm/300kHz)		Power Spectral Density (dBm/500kHz)			
		Chain 0	Chain 1	Chain 0	Chain 1	Total	Limit
802.11 a	5745	-1.6	-1.51	0.62	0.71	/	30
	5785	-1.97	-1.64	0.25	0.58	/	30
	5825	-1.8	-1.51	0.42	0.71	/	30
802.11 ht20	5745	-4.44	-4.59	-2.22	-2.37	0.72	28
	5785	-4.64	-4.43	-2.42	-2.21	0.70	28
	5825	-4.34	-4.18	-2.12	-1.96	0.97	28
802.11 ht40	5755	-8.06	-7.91	-5.84	-5.69	-2.75	28
	5795	-7.57	-8.04	-5.35	-5.82	-2.57	28
802.11 ac80	5775	-11.09	-10.57	-8.87	-8.35	-5.59	28

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:

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

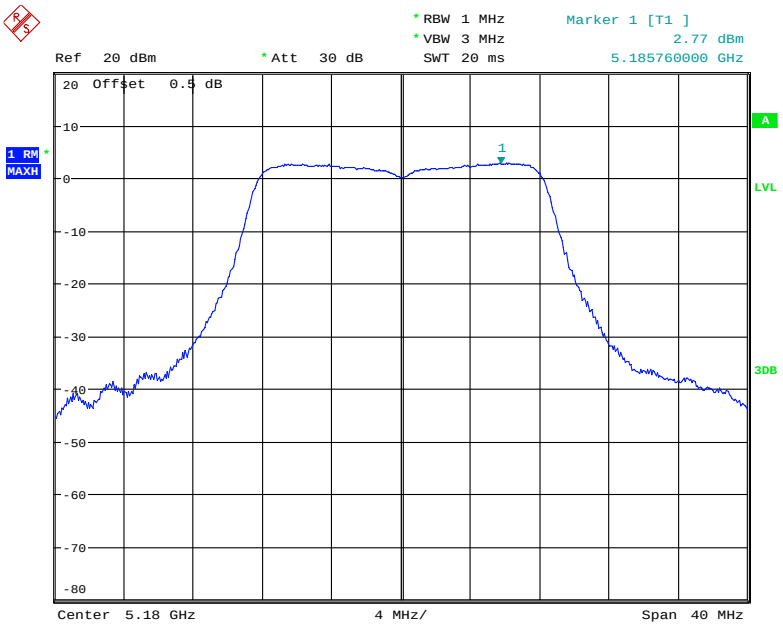
So:

$$\text{Directional gain} = G_{ANT} + \text{Array Gain} = 5.0\text{dBi}+10*\log(2)=8\text{dBi}$$

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.

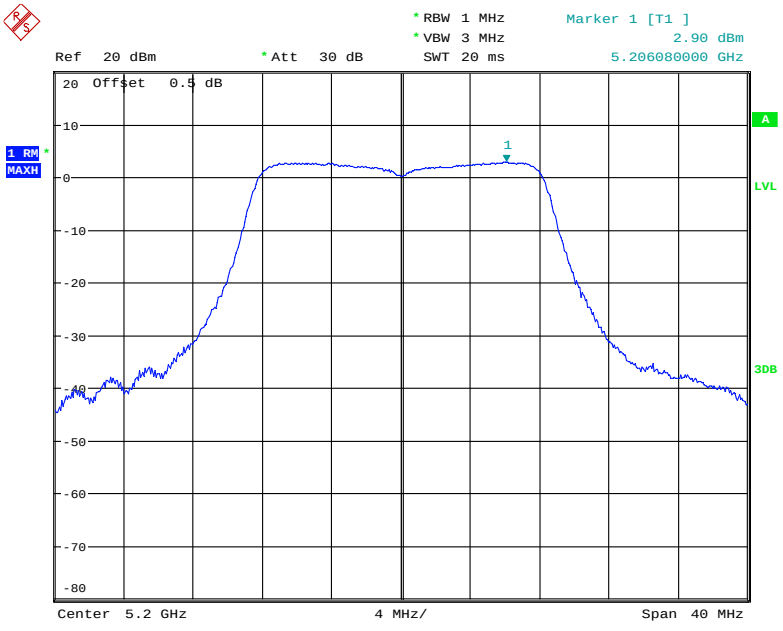
5150-5250MHz
Chain 0:

802.11a Low Channel



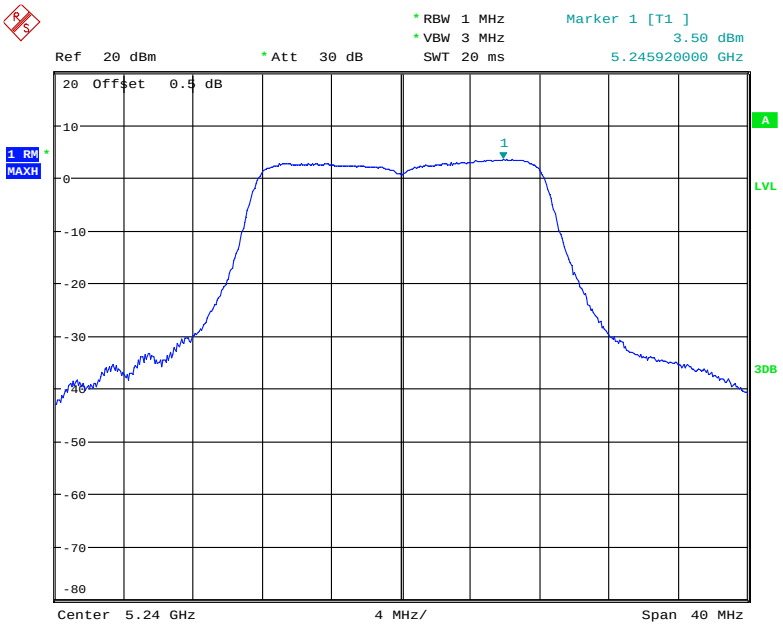
Date: 14.NOV.2017 22:45:42

802.11a Middle Channel



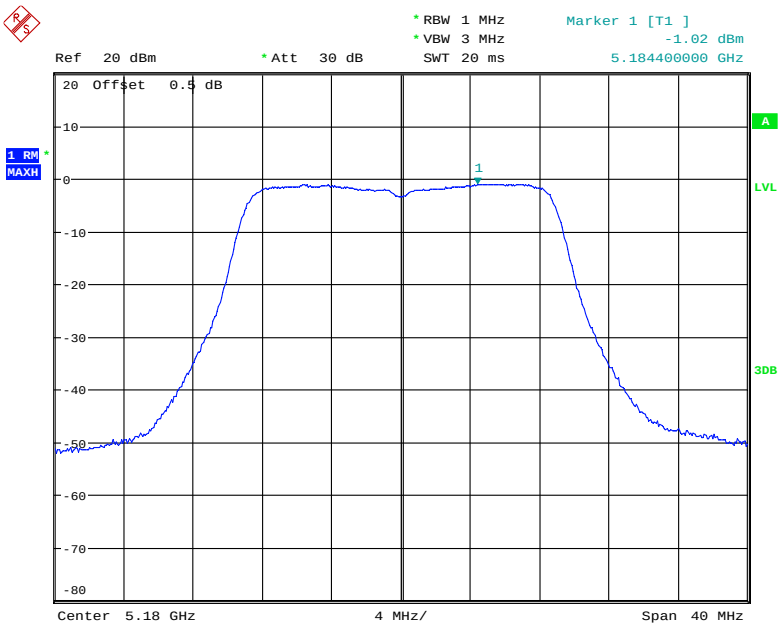
Date: 14.NOV.2017 22:51:18

802.11a High Channel



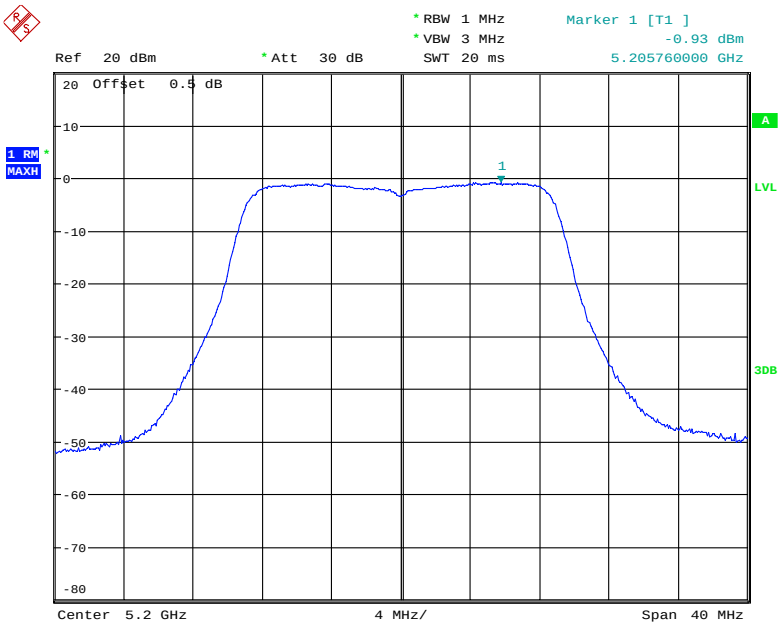
Date: 14.NOV.2017 22:56:47

802.11n ht20 Low Channel



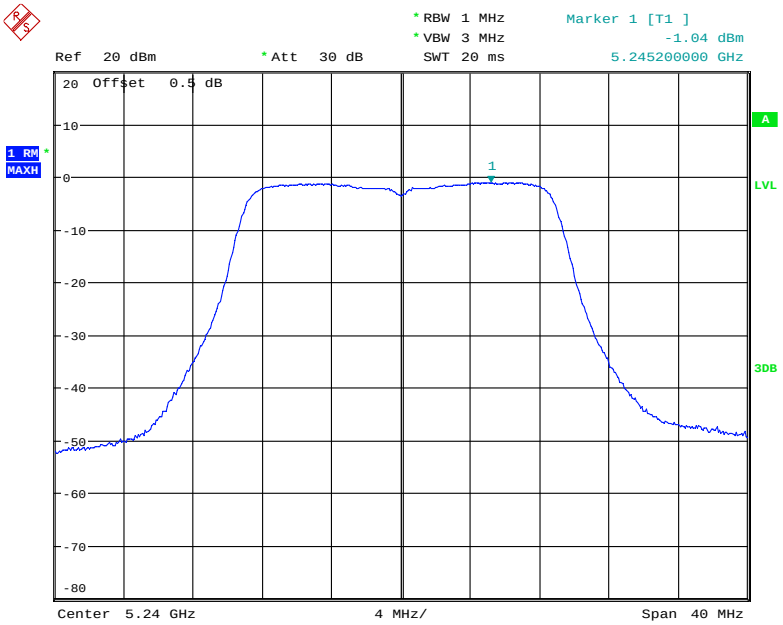
Date: 14.NOV.2017 23:10:24

802.11n ht20 Middle Channel



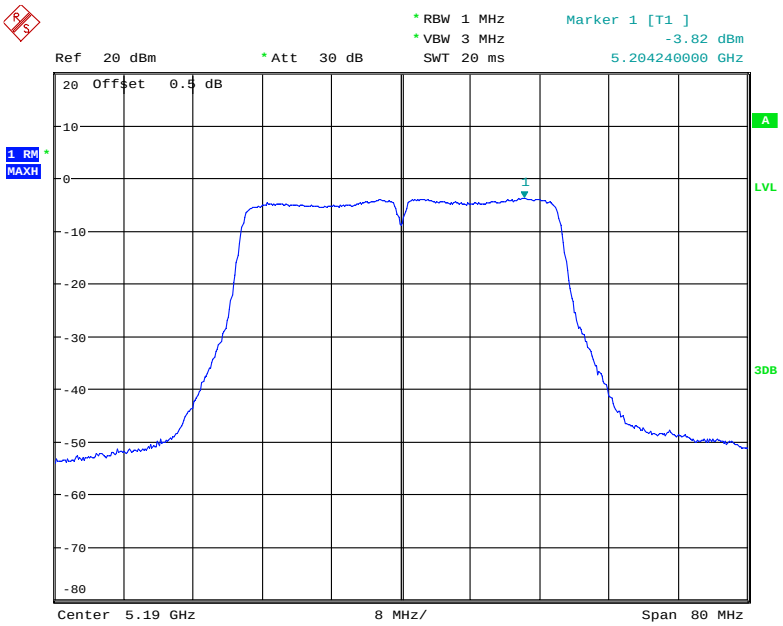
Date: 14.NOV.2017 23:14:23

802.11n ht20 High Channel



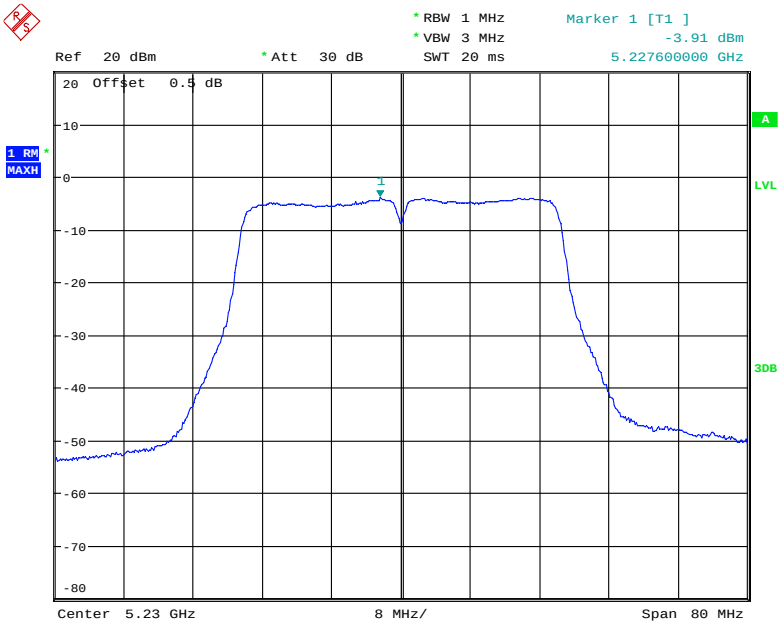
Date: 14.NOV.2017 23:16:23

802.11n ht40 Low Channel



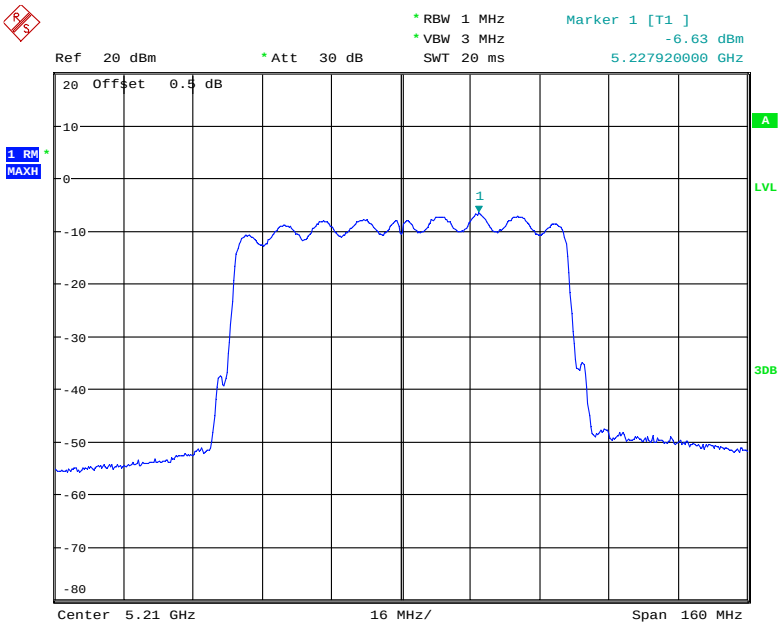
Date: 14.NOV.2017 23:30:13

802.11n ht40 High Channel



Date: 14.NOV.2017 23:33:11

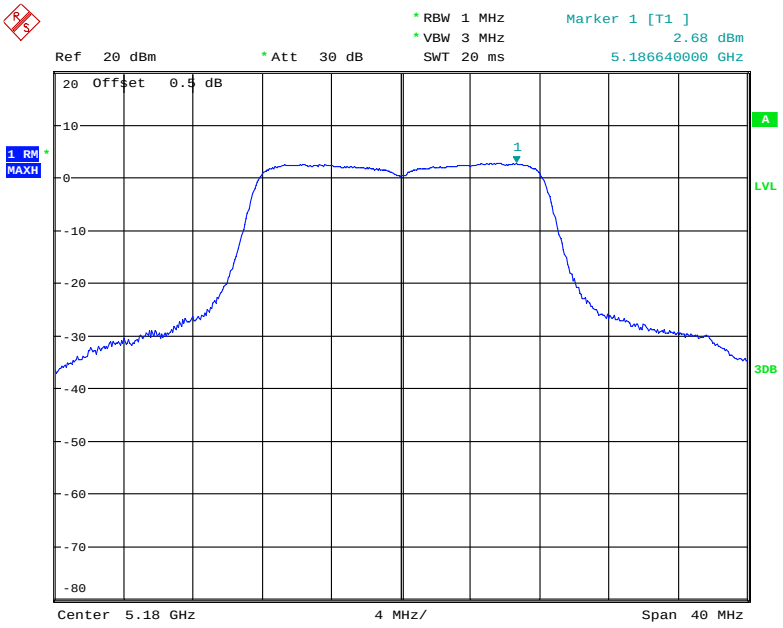
802.11ac80 Middle Channel



Date: 14.NOV.2017 23:51:35

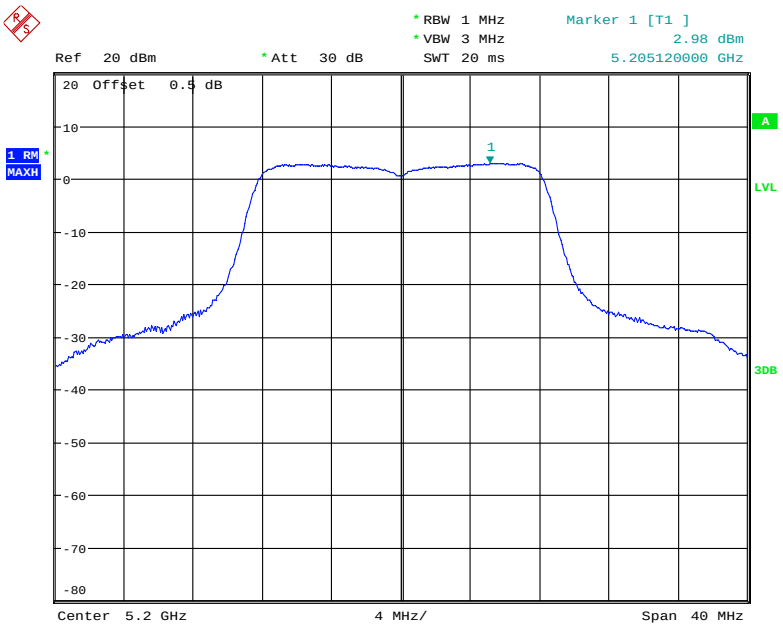
Chain 1:

802.11a Low Channel



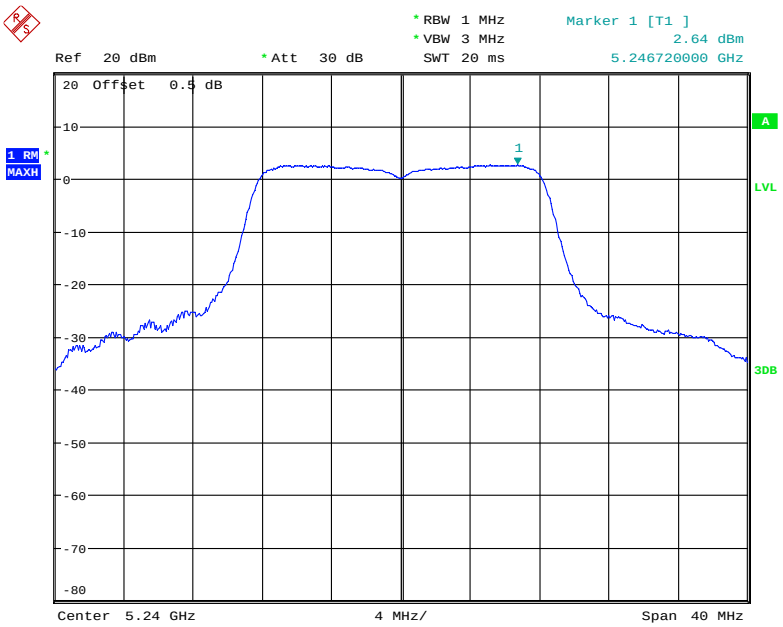
Date: 14.NOV.2017 23:05:08

802.11a Middle Channel



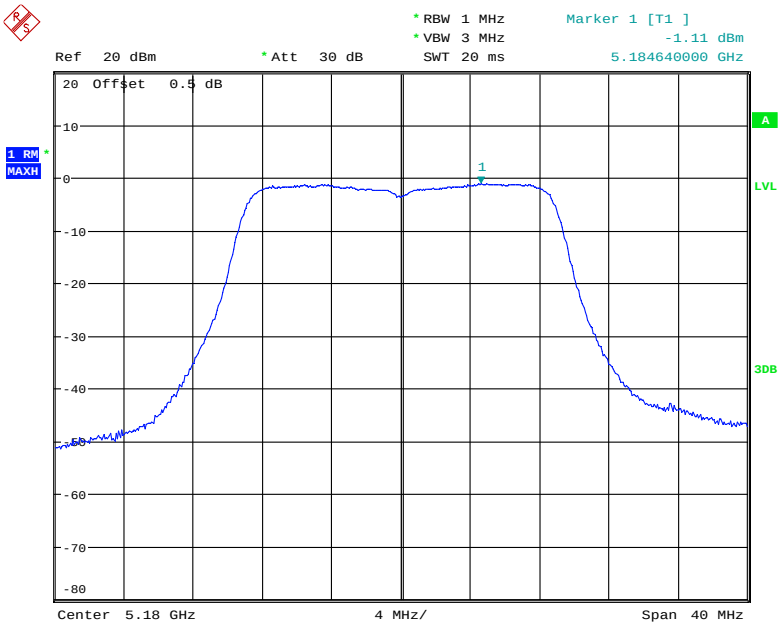
Date: 14.NOV.2017 23:03:24

802.11a High Channel



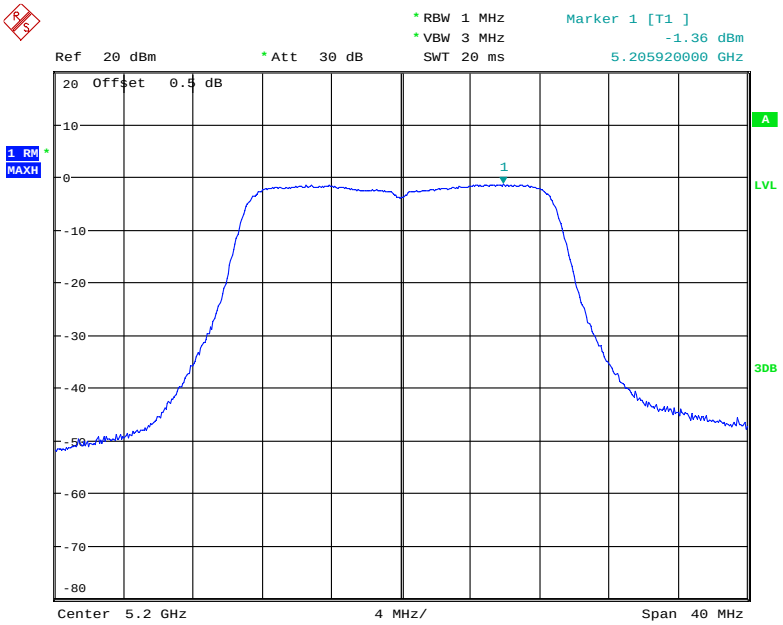
Date: 14.NOV.2017 23:00:41

802.11n ht20 Low Channel



Date: 14.NOV.2017 23:21:08

802.11n ht20 Middle Channel



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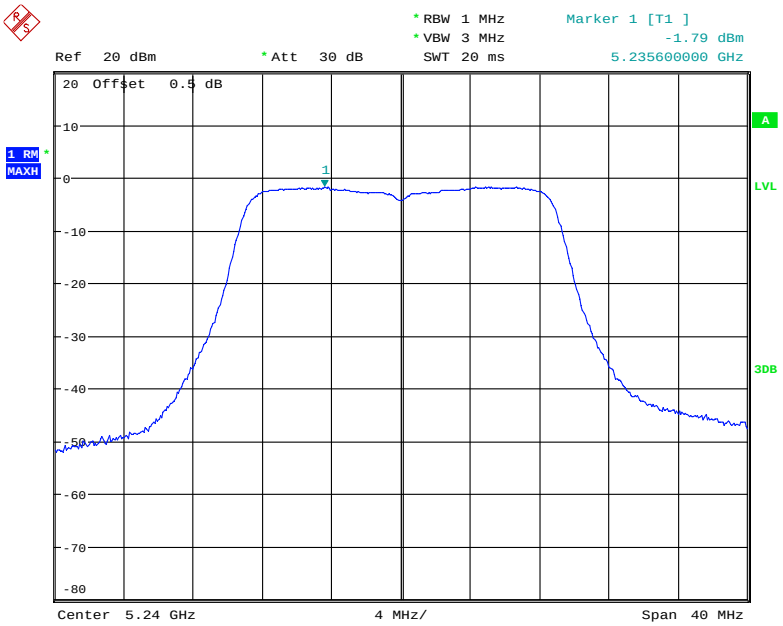
802.11n ht20 High Channel



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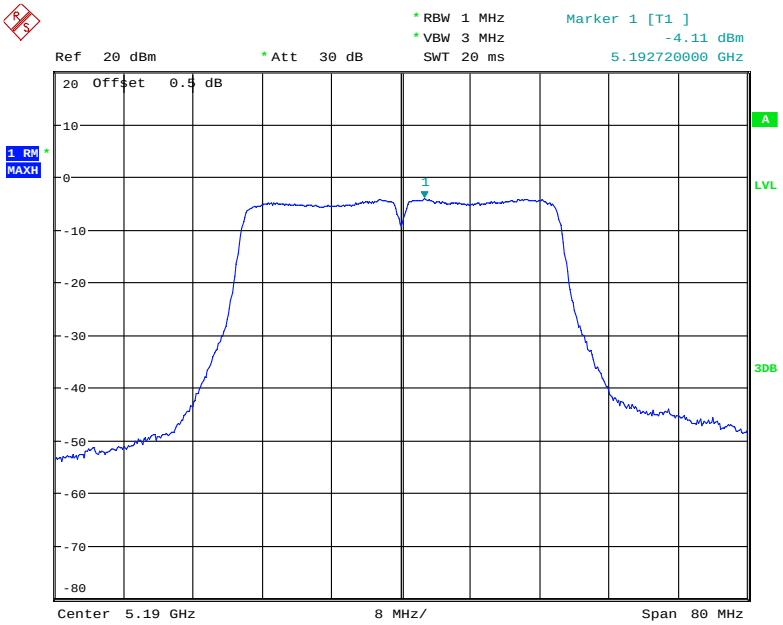
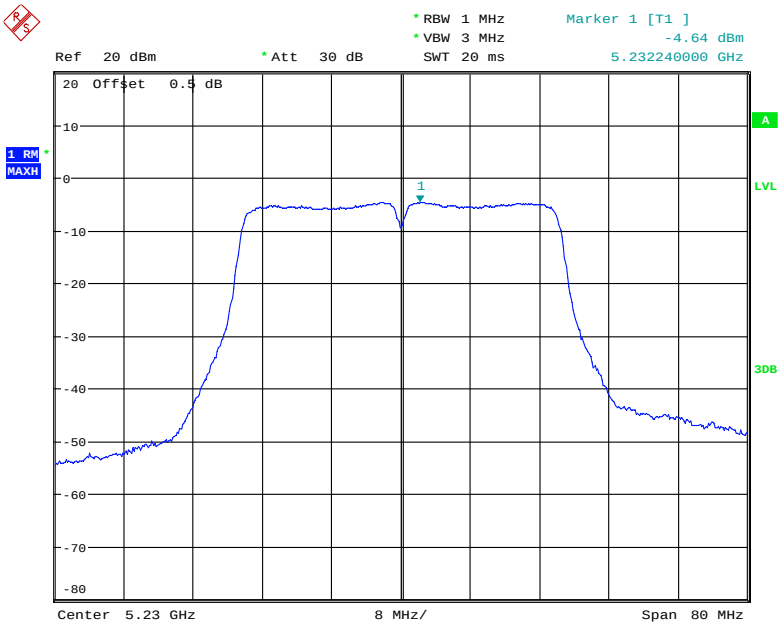
802.11n ht40 Low Channel



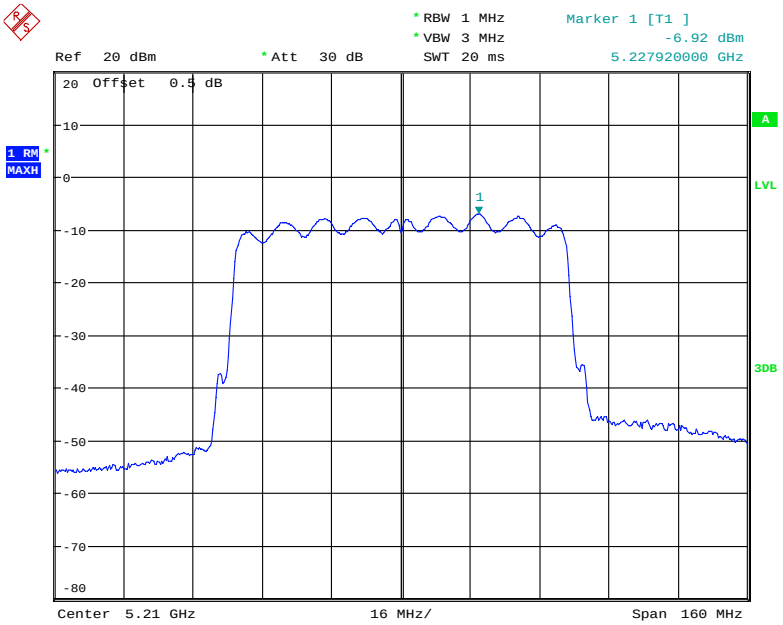
Date: 14.NOV.2017 23:38:15

802.11n ht40 High Channel



Date: 14.NOV.2017 23:40:33

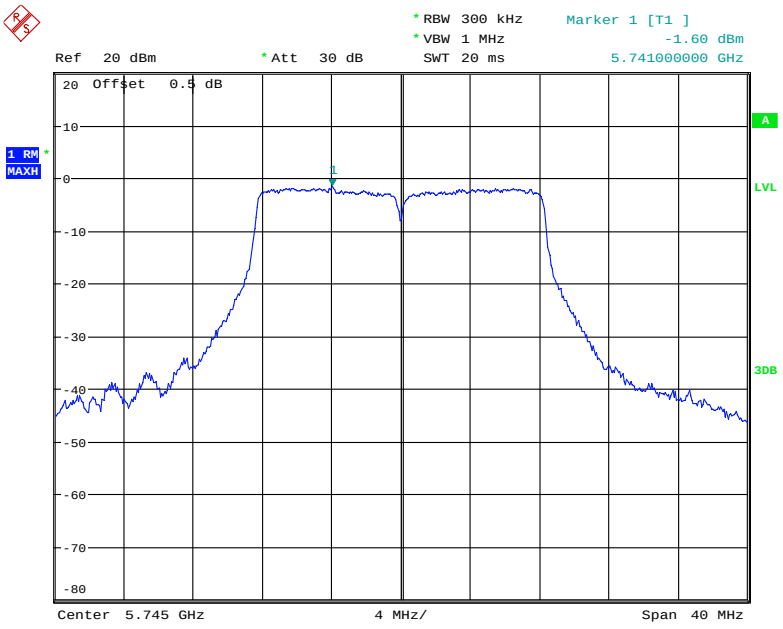
802.11ac80 Middle Channel



Date: 14.NOV.2017 23:46:21

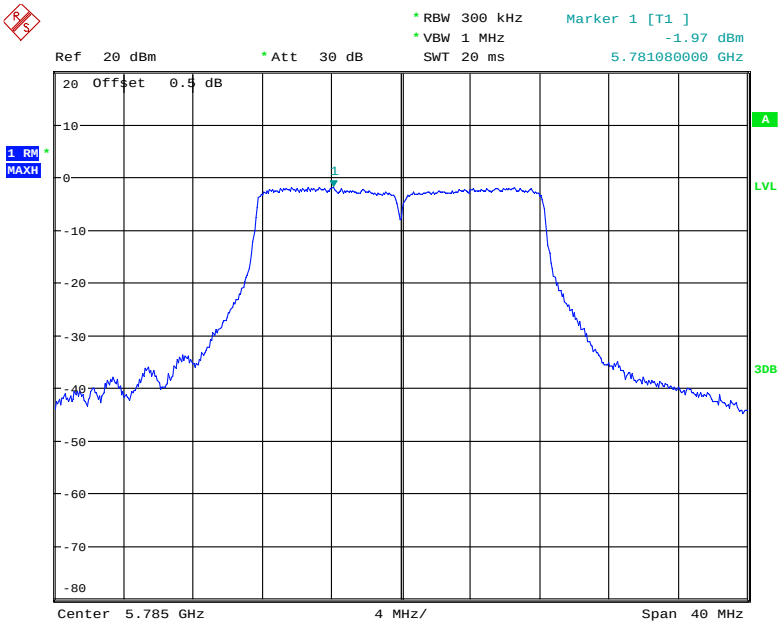
5725-5850MHz
Chain 0:

802.11a Low Channel



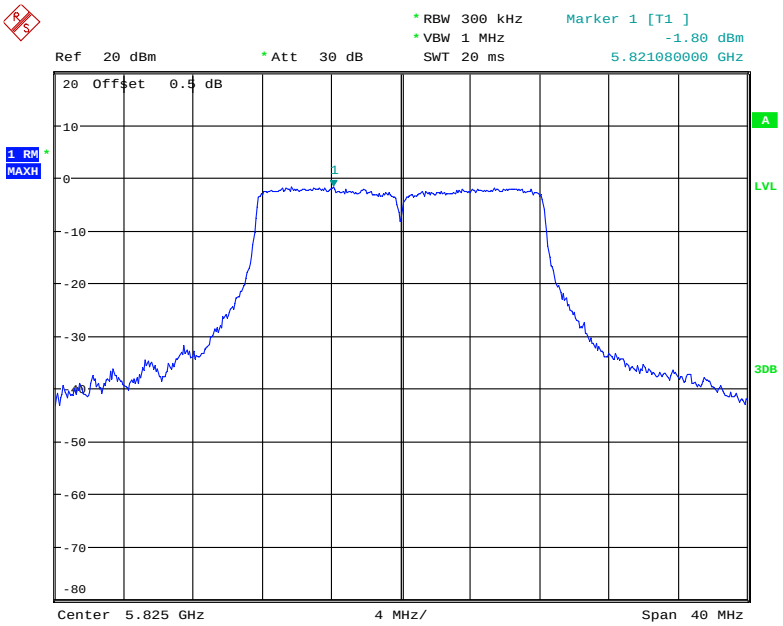
Date: 14.NOV.2017 23:58:36

802.11a Middle Channel



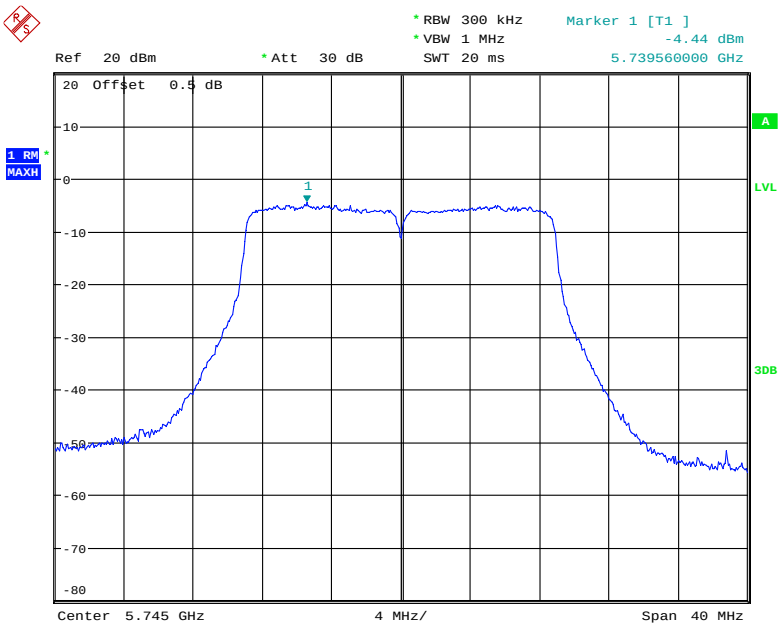
Date: 15.NOV.2017 00:03:27

802.11a High Channel



Date: 15.NOV.2017 00:05:44

802.11n ht20 Low Channel



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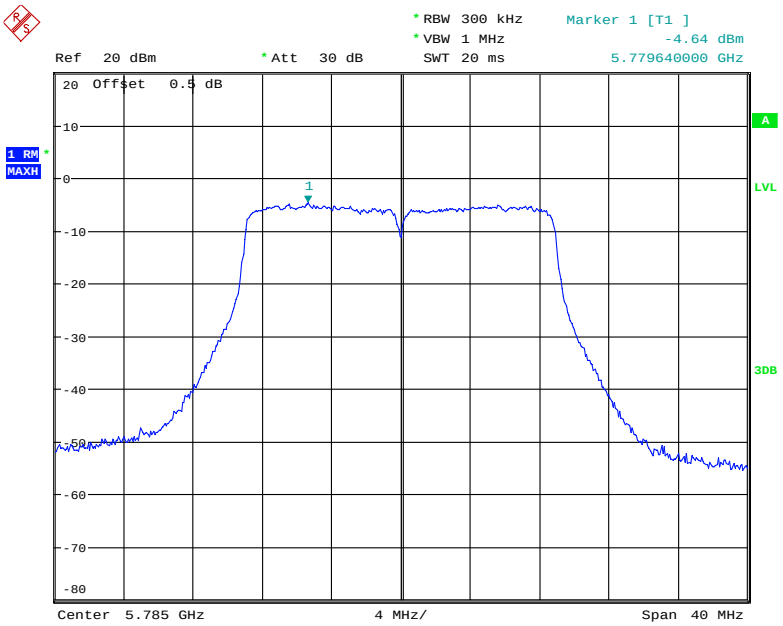

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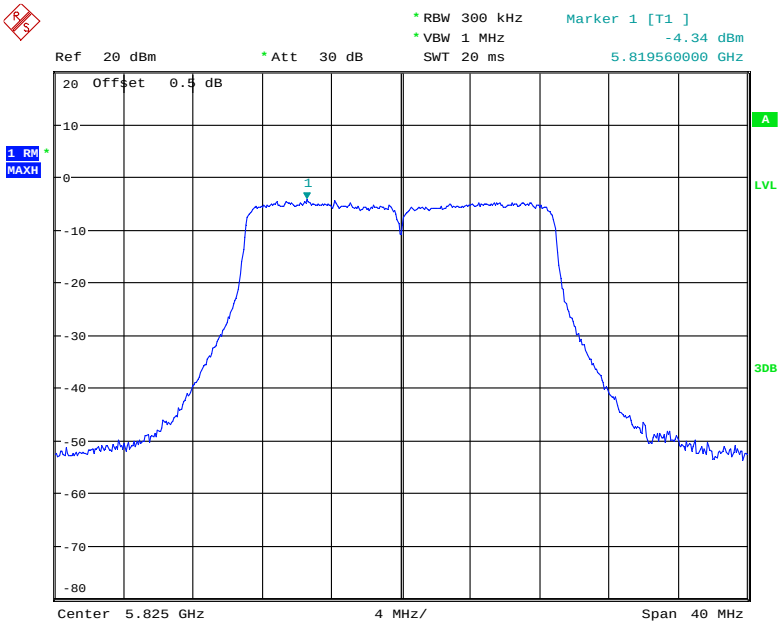
802.11n ht20 High Channel



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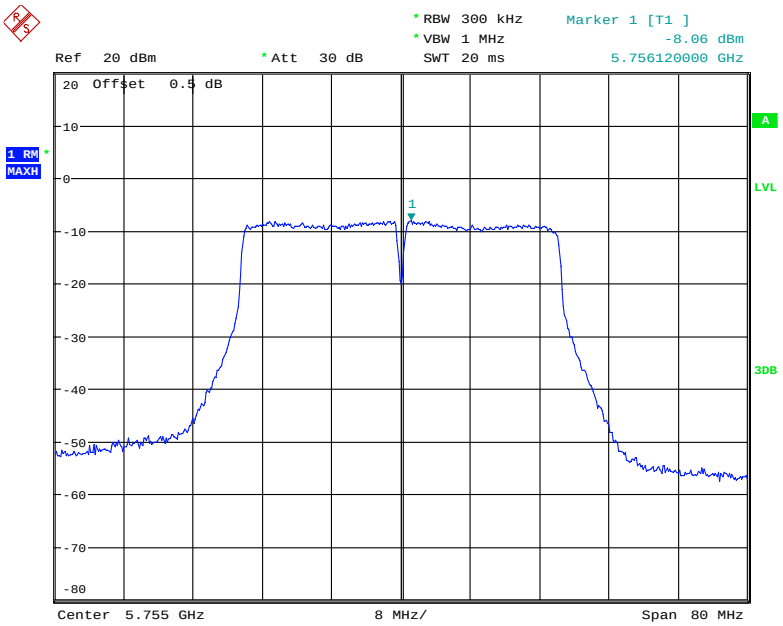
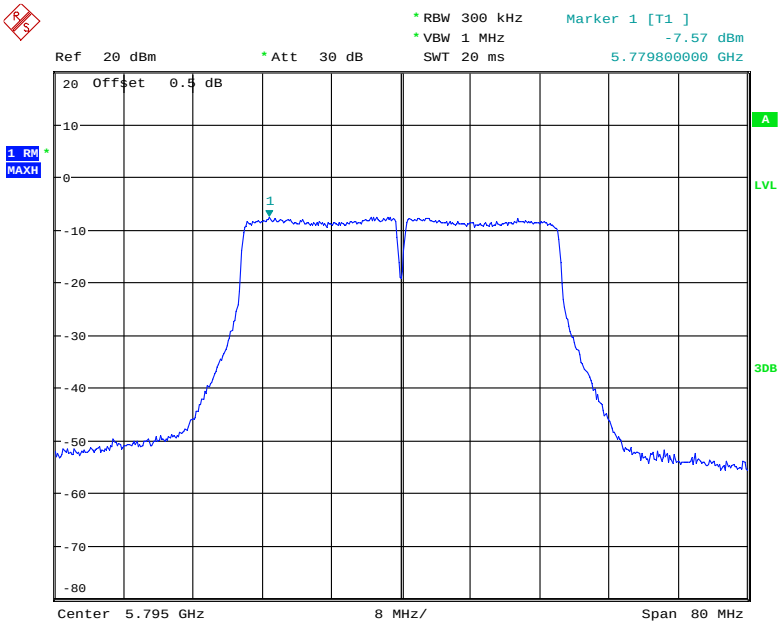
802.11n ht40 Low Channel



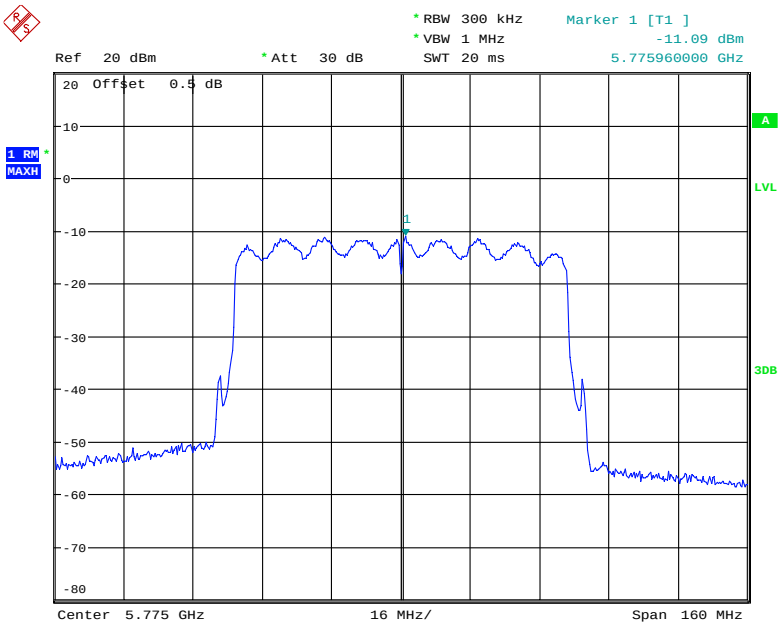
Date: 15.NOV.2017 00:52:59

802.11n ht40 High Channel



Date: 15.NOV.2017 00:50:09

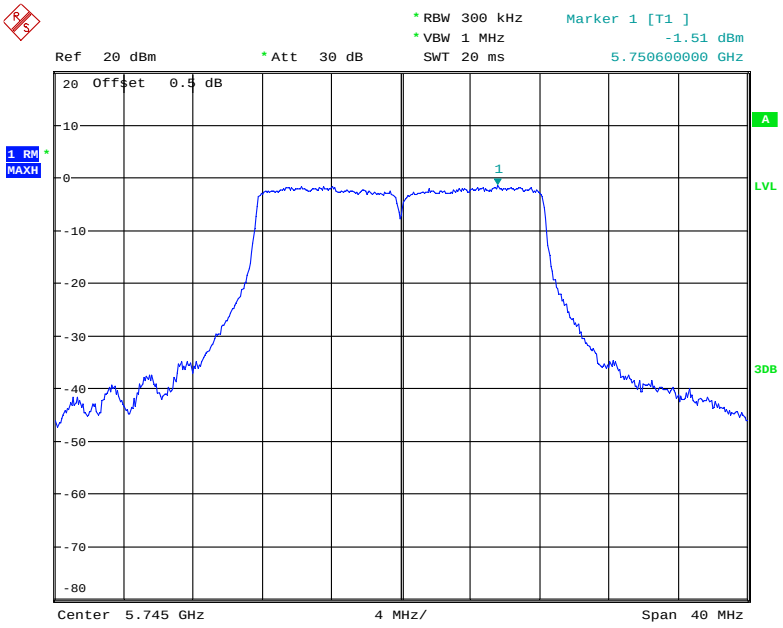
802.11ac80 Middle Channel



Date: 15.NOV.2017 18:45:24

Chain 1:

802.11a Low Channel



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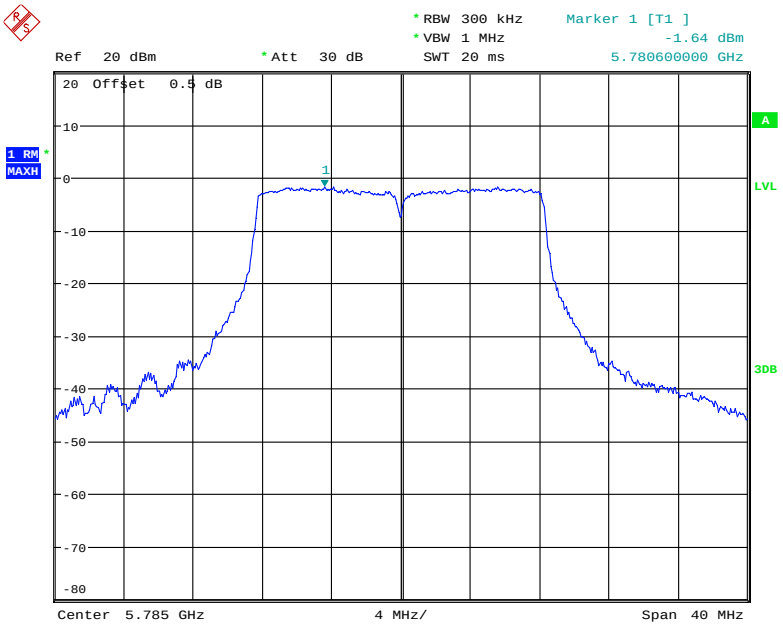
802.11a Middle Channel



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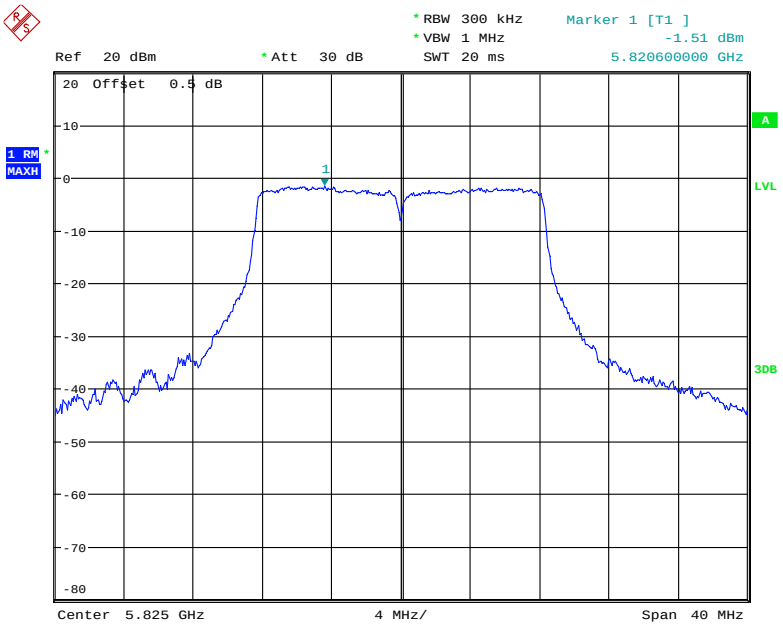
802.11a High Channel



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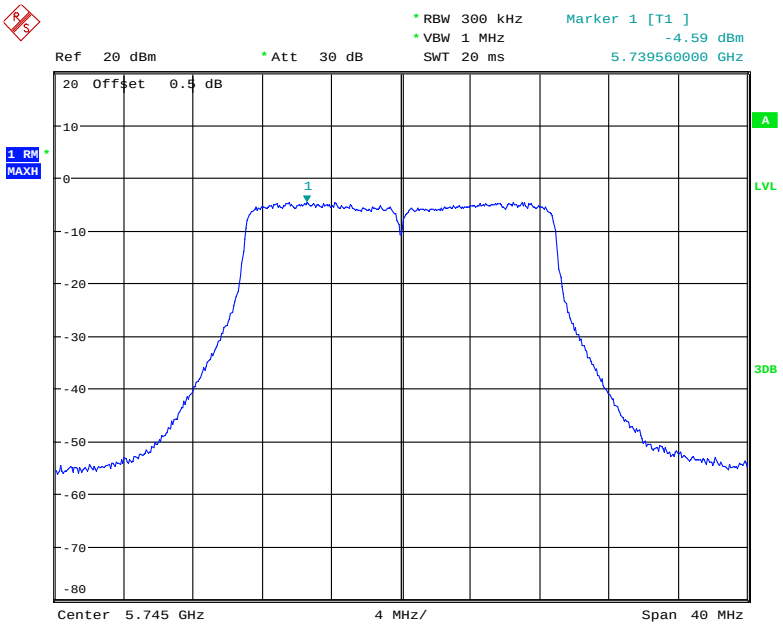

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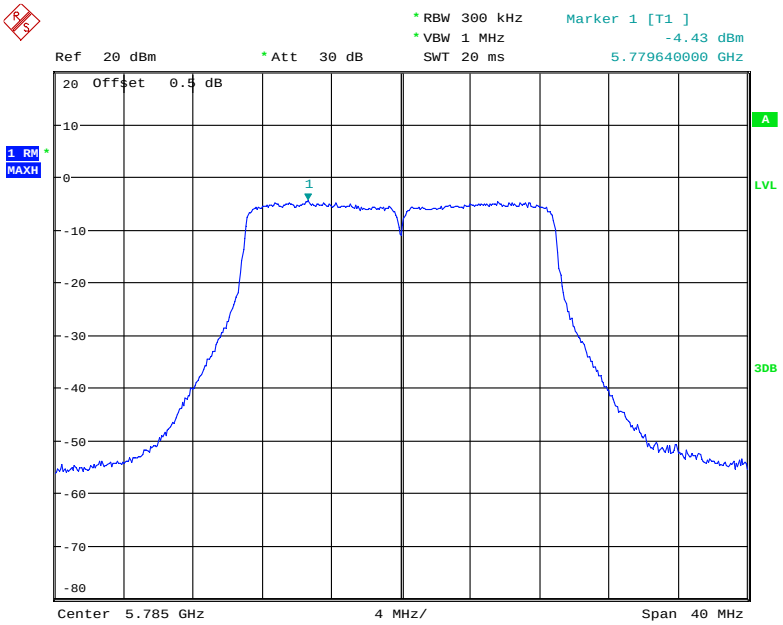

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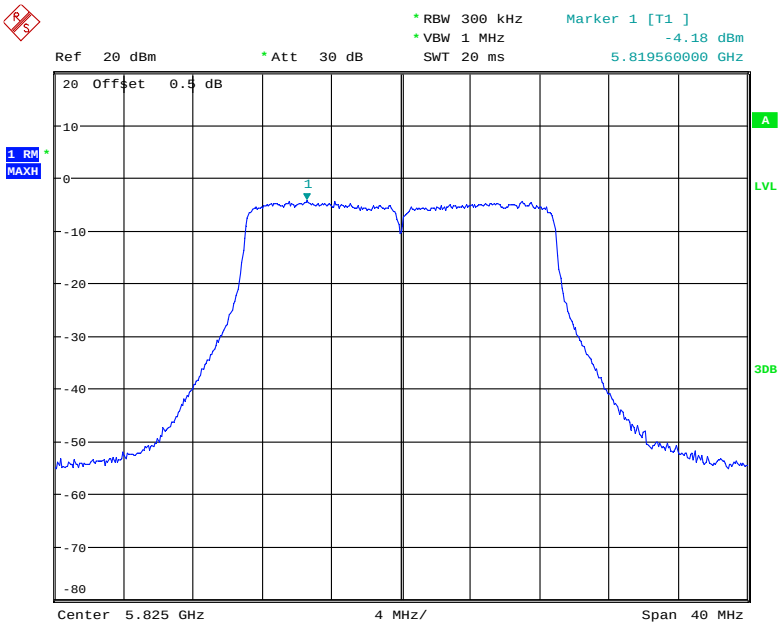
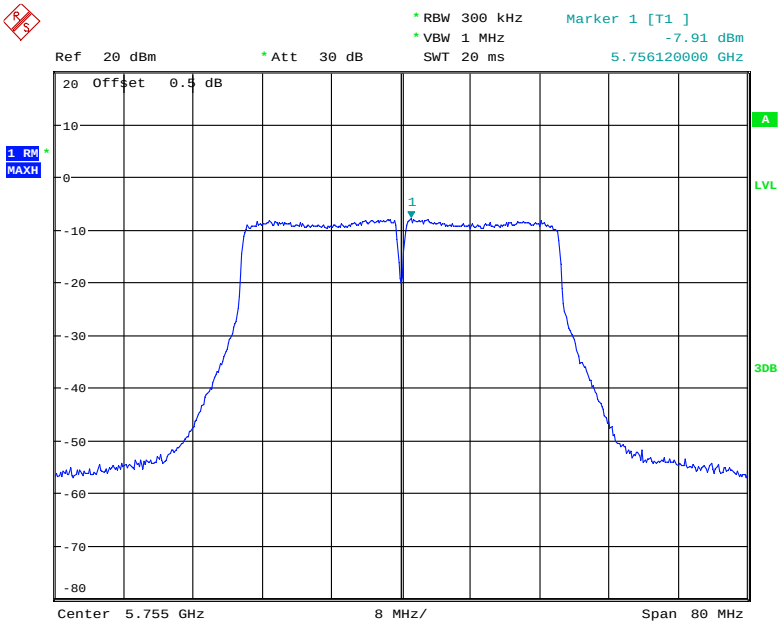
802.11 n ht20 High Channel



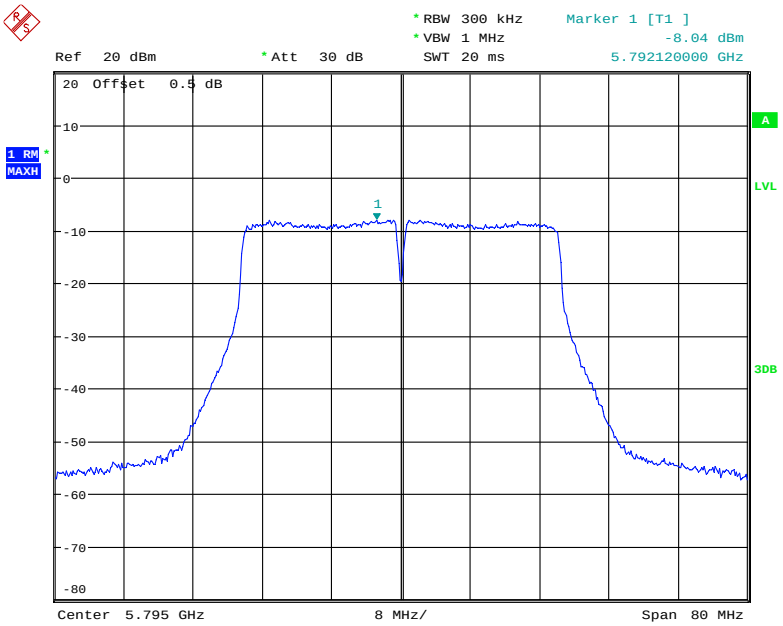
Date: 15.NOV.2017 00:41:17

802.11n ht40 Low Channel



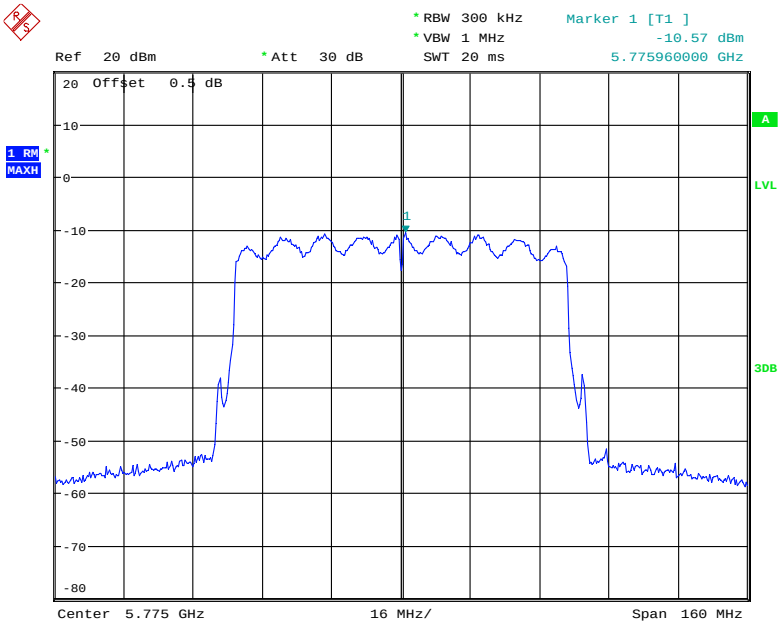
Date: 15.NOV.2017 00:44:49

802.11n ht40 High Channel



Date: 15.NOV.2017 00:47:08

802.11ac80 Middle Channel



Date: 15.NOV.2017 18:42:50

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