FCC PART 15.407

TEST REPORT

For

Humax Co., Ltd.

HUMAX Village, 11-4, Sunae-dong, Bundang-gu, Seongnam city, Gyeonggido, South Korea

FCC ID: O6ZT3

Report Type:	**Product Name:**
Original Report	11N Wireless Roaming Router

Report Number:	RDG170604001-00B
Report Date:	2017-09-14
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 ***Humax Co., Ltd.***'s product, model number: ***QUANTUM T3(FCC ID: O6ZT3)*** (the "EUT") in this report was a ***11N Wireless Roaming Router***, which was measured approximately:
19.84 cm (L) × 13.34 cm (W) × 5.44 cm (H), rated input voltage: DC12V from adapter.

Adapter Information:
Model: MSP-C1500IC12.0-18A-US
P/N: MS1215WWUS9G
Input:100-240V~ 50/60Hz 0.8A max.
Output:DC12.0V 1.5A

**All measurement and test data in this report was gathered from final production sample, serial number: 170604001(assigned by the BACL, Dongguan), Software version: HUMAX_CS181R_T3_IP04307_8197F_SPI_16M128M_5.8.2397_B20170426_ALL. It may have deviation from any other sample. The EUT supplied by the applicant was received on 2017-07-16, and EUT conformed to test requirement.*

Objective

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

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

Related Submittal(s)/Grant(s)

FCC Part 15C DTS submissions with FCC ID: O6ZT3.

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.

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 17025 by CNAS(Lab code: L5662). And accredited to ISO 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 and 802.11ac20 modes were tested with Channel 36, 40 and 48,
802.11n ht40 and 802.11ac40 modes 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 and 802.11ac20 modes were tested with Channel 149, 157 and 165,
802.11n ht40 and 802.11ac40 modes 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 “IPOP” 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:

Test Mode	Test Software Version	IPOP		
802.11a	Test Frequency	5180MHz	5200MHz	5240MHz
	Data Rate	6Mbps	6Mbps	6Mbps
	Chain 0	29	37	25
	Chain 1	41	41	39
802.11n ht20	Test Frequency	5180MHz	5200MHz	5240MHz
	Data Rate	MCS0	MCS0	MCS0
	Chain 0	21	29	29
	Chain 1	34	42	40
802.11n ht40	Test Frequency	5190MHz	/	5230MHz
	Data Rate	MCS0	/	MCS0
	Chain 0	15	/	29
	Chain 1	42	/	40
802.11ac ht80	Test Frequency	/	5210MHz	/
	Data Rate	/	MNSS0	/
	Chain 0	/	27	/
	Chain 1	/	40	/

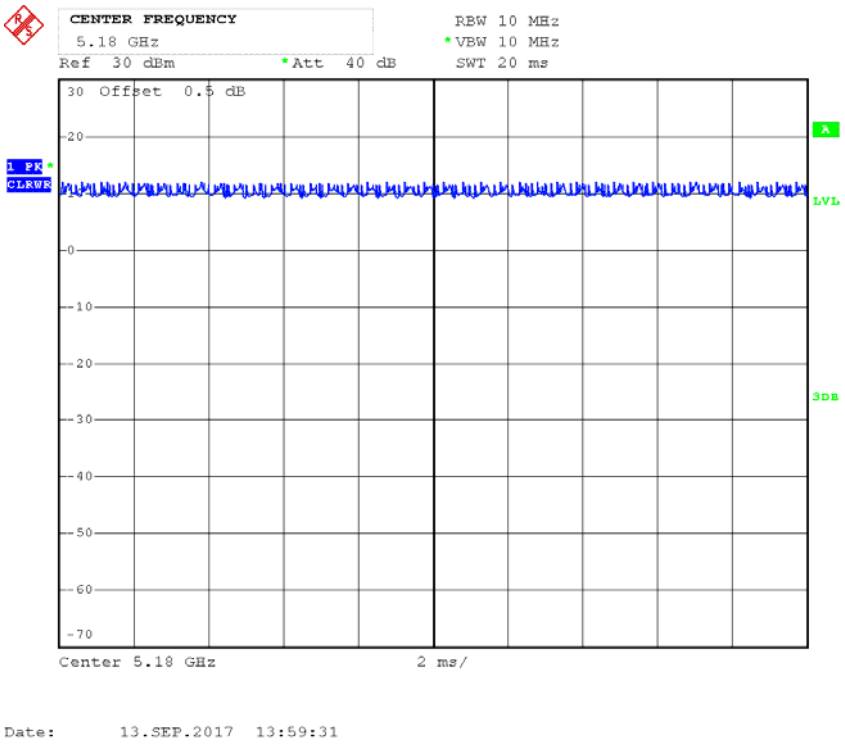
5725-5850MHz:

Test Mode	Test Software Version	IPOP		
802.11a	Test Frequency	5745MHz	5785MHz	5825MHz
	Data Rate	6Mbps	6Mbps	6Mbps
	Chain 0	31	29	29
	Chain 1	33	34	33
802.11n ht20	Test Frequency	5745MHz	5785MHz	5825MHz
	Data Rate	MCS0	MCS0	MCS0
	Chain 0	24	23	20
	Chain 1	20	29	28
802.11n ht40	Test Frequency	5755MHz	/	5795MHz
	Data Rate	MCS0	/	MCS0
	Chain 0	24	/	22
	Chain 1	20	/	28
802.11 ac80	Test Frequency	/	5775MHz	/
	Data Rate	/	MNSS0	/
	Chain 0	/	33	/
	Chain 1	/	33	/

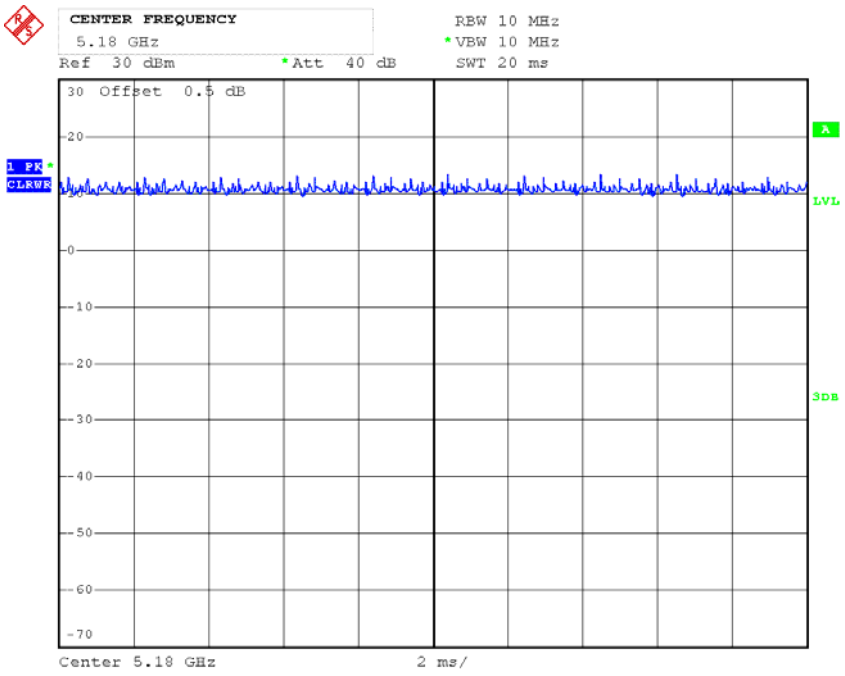
The duty cycle as below:

Mode	T_{on} (ms)	T_{on+off} (ms)	Duty Cycle (%)
802.11 a	20	20	100%
802.11n ht20	20	20	100%
802.11n ht40	20	20	100%
802.11ac80	100	100	100%

802.11a



802.11n ht20



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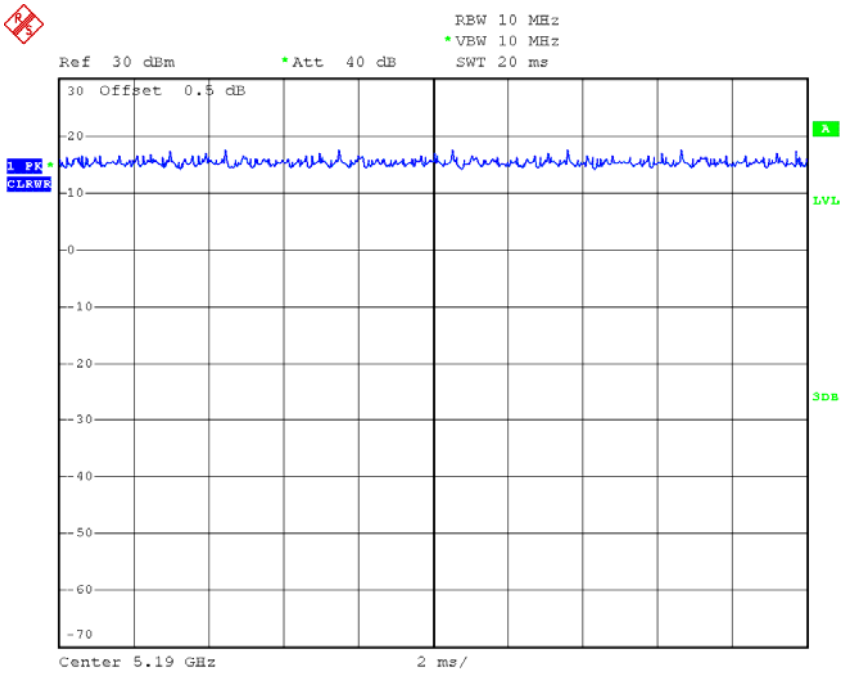

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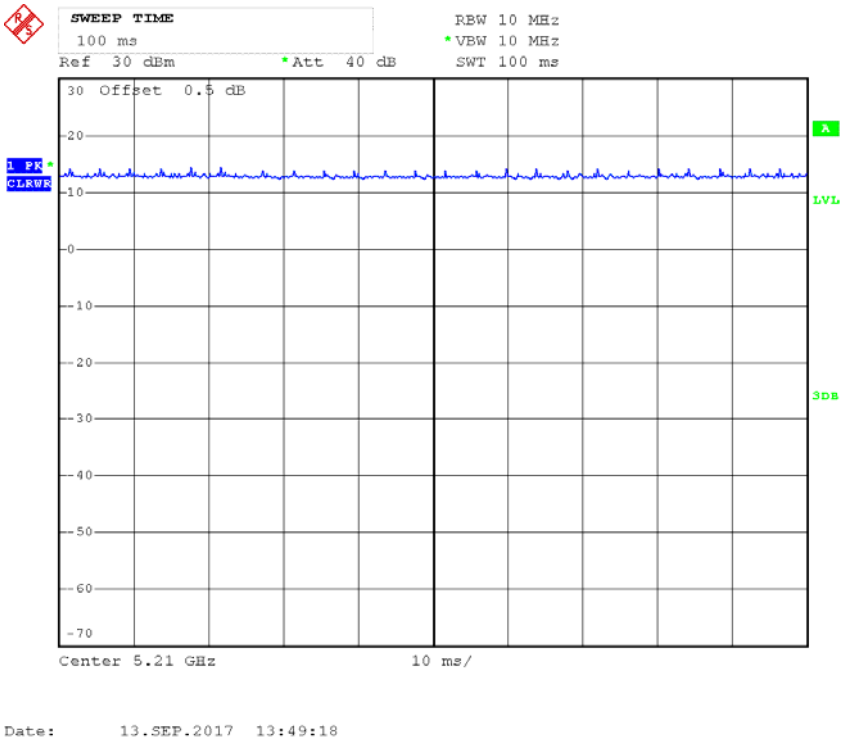
802.11 ac80



Equipment Modifications

No modification was made to the EUT.

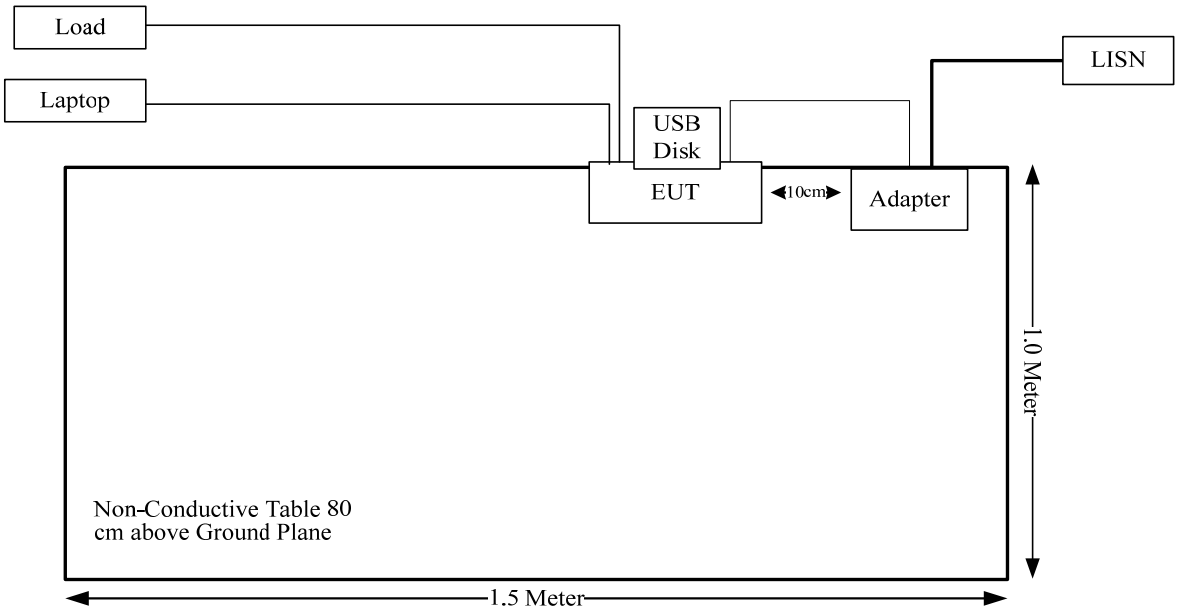
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
IBM	PC	8176	99Y7315
Kingston	USB Disk	8GB	/

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
RJ45 cable	No	No	10	EUT	PC
RJ45 cable*2	No	No	10	EUT	Load
Adapter Cable	No	No	1.6	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	4	2.51	28	630.96	20.00	0.315	1.0
5180-5825	4	2.51	21	125.89	20.00	0.063	1.0

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

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

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

$=0.315/1+0.063/1$

$=0.378$

< 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 4 internal antennas, two for 2.4GHz WLANand two for 5G WLAN, the antennas permanently attached to the unit, both 2.4GHz antenna gain is 4dBi, and both 5GHz antenna gain is 4dBi. Please refer to the EUT photo.

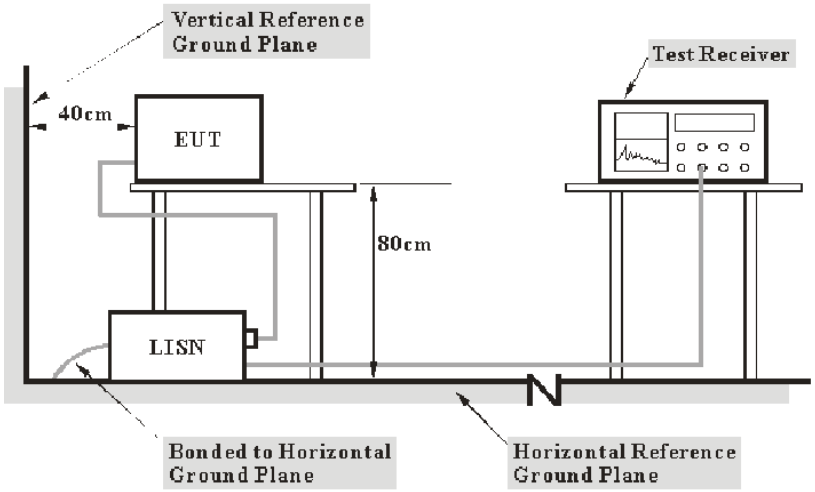
Result: Compliance.

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

Applicable Standard

FCC §15.207(a), §15.407(b) (6).

EUT Setup



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

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

The spacing between the peripherals was 10 cm.

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

EMI Test Receiver Setup

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

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

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

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

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

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

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

Margin = Limit – Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2016-12-08	2017-12-08
R&S	L.I.S.N	ESH2-Z5	892107/021	2016-09-01	2017-09-01
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
Unknown	Coaxial Cable	2m	Con-1	2016-09-01	2017-09-01

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

Test Procedure

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

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

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

Test Data

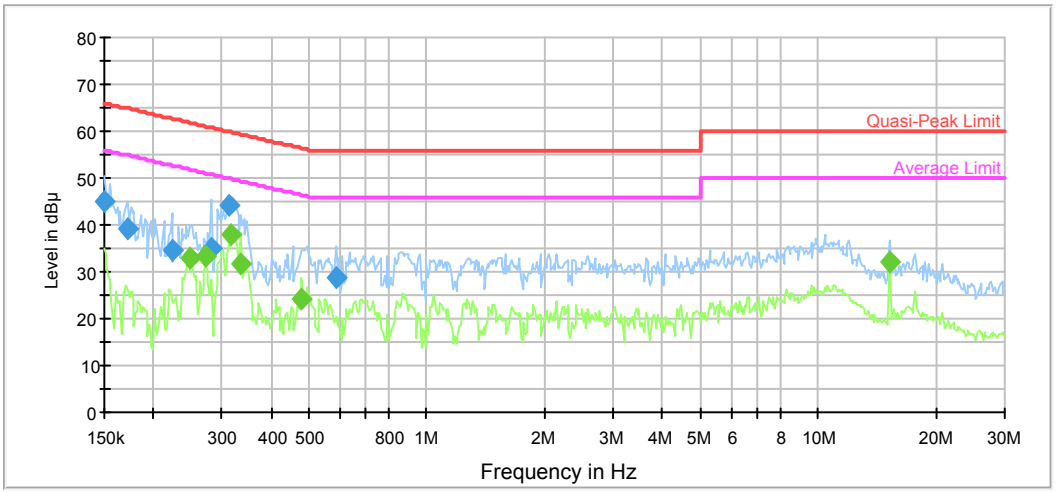
Environmental Conditions

Temperature:	26.1 °C
Relative Humidity:	54.2 %
ATM Pressure:	100.1 kPa

The testing was performed by Gaochao Gong on 2017-08-13.

Test Mode: Transmitting

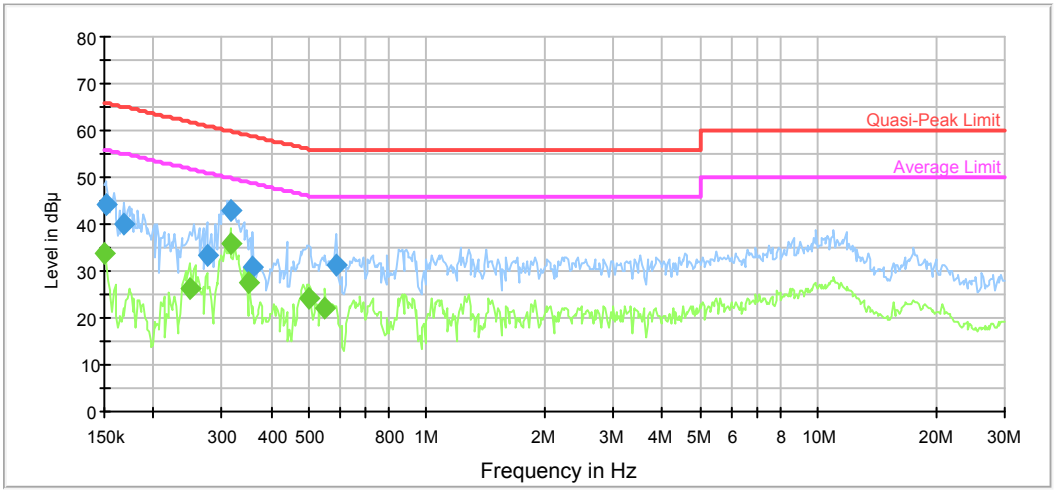
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	45.1	9.000	L1	11.2	20.9	66.0	Compliance
0.171759	39.1	9.000	L1	10.9	25.8	64.9	Compliance
0.223418	34.5	9.000	L1	10.5	28.2	62.7	Compliance
0.281497	34.9	9.000	L1	10.2	25.9	60.8	Compliance
0.312220	44.0	9.000	L1	10.1	15.9	59.9	Compliance
0.585926	28.9	9.000	L1	9.8	27.1	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.247802	32.9	9.000	L1	10.3	18.9	51.8	Compliance
0.272666	33.3	9.000	L1	10.2	17.7	51.0	Compliance
0.317235	38.1	9.000	L1	10.1	11.7	49.8	Compliance
0.335433	31.6	9.000	L1	10.1	17.7	49.3	Compliance
0.480097	24.3	9.000	L1	9.9	22.0	46.3	Compliance
15.247554	32.1	9.000	L1	9.9	17.9	50.0	Compliance

AC120 V, 60 Hz, Neutral:



requency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.151200	44.0	9.000	N	11.1	22.0	65.9	Compliance
0.169044	39.8	9.000	N	10.9	25.2	65.0	Compliance
0.274848	33.5	9.000	N	10.2	27.5	61.0	Compliance
0.314718	43.0	9.000	N	10.1	16.8	59.8	Compliance
0.360371	30.7	9.000	N	10.0	28.0	58.7	Compliance
0.585926	31.4	9.000	N	9.8	24.6	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	33.6	9.000	N	11.2	22.4	56.0	Compliance
0.247802	26.4	9.000	N	10.3	25.4	51.8	Compliance
0.314718	35.7	9.000	N	10.1	14.1	49.8	Compliance
0.351859	27.4	9.000	N	10.0	21.5	48.9	Compliance
0.499611	24.1	9.000	N	9.9	21.9	46.0	Compliance
0.549741	22.0	9.000	N	9.8	24.0	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.

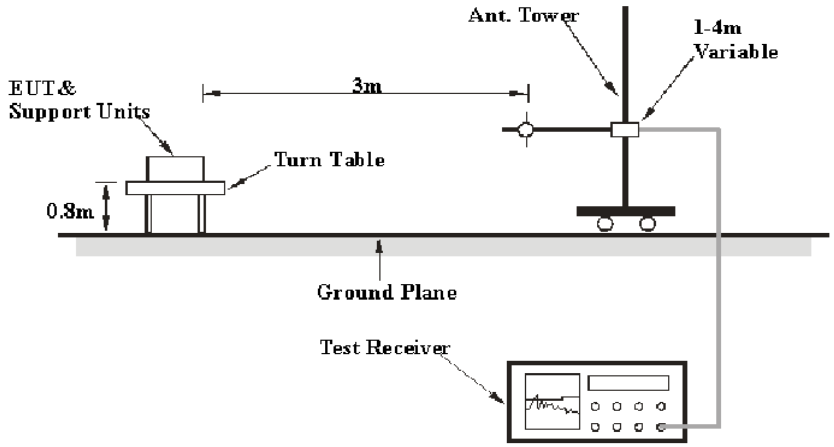
(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

(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.

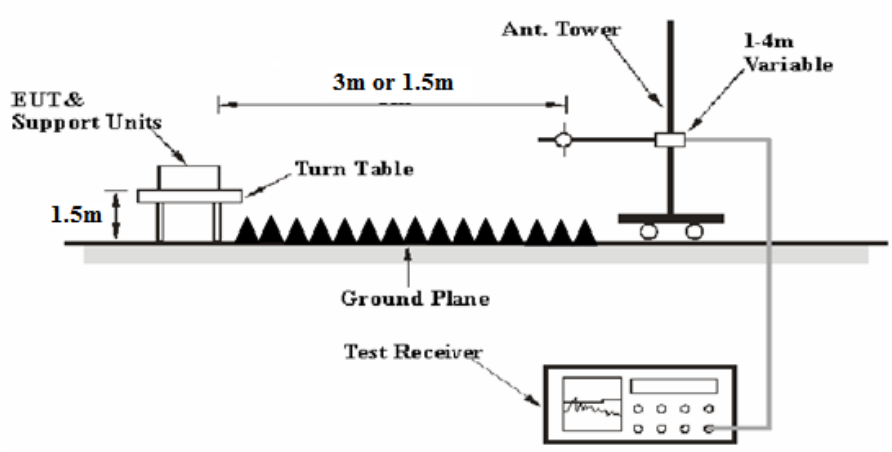
(7) The provisions of §15.205 apply to intentional radiators operating under this section.

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:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP

1GHz- 40GHz:

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

Test Procedure

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

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.

According to C63.10, the above 1G test result shall be extrapolated to the specified distance using an extrapolation factor of 20dB/decade from 3m to 1.5m
Distance extrapolation factor =20 log (specific distance [3m]/test distance [1.5m]) dB
Extrapolation result = Corrected Amplitude (dBμV/m) - distance extrapolation factor (6dB)

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	2016-09-01	2017-08-31
Sunol Sciences	Antenna	JB3	A060611-1	2014-11-06	2017-11-05
HP	Amplifier	8447E	2434A02181	2016-09-01	2017-09-01
R&S	Spectrum Analyzer	FSU 26	200256	2016-12-08	2017-12-08
R&S	Spectrum Analyzer	FSP 38	100478	2016-12-08	2017-12-08
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-04
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
Mini-Circuit	Amplifier	ZVA-213-S+	SN054201245	2017-02-19	2018-02-19
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2016-09-06	2017-09-06
Unknown	Coaxial Cable	Chamber A-1	4m	2016-09-01	2017-09-01
Unknown	Coaxial Cable	Chamber B-1	0.75m	2016-09-01	2017-09-01
Unknown	Coaxial Cable	Chamber A-2	10m	2016-09-01	2017-09-01
Unknown	Coaxial Cable	Chamber B-2	8m	2016-09-01	2017-09-01
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

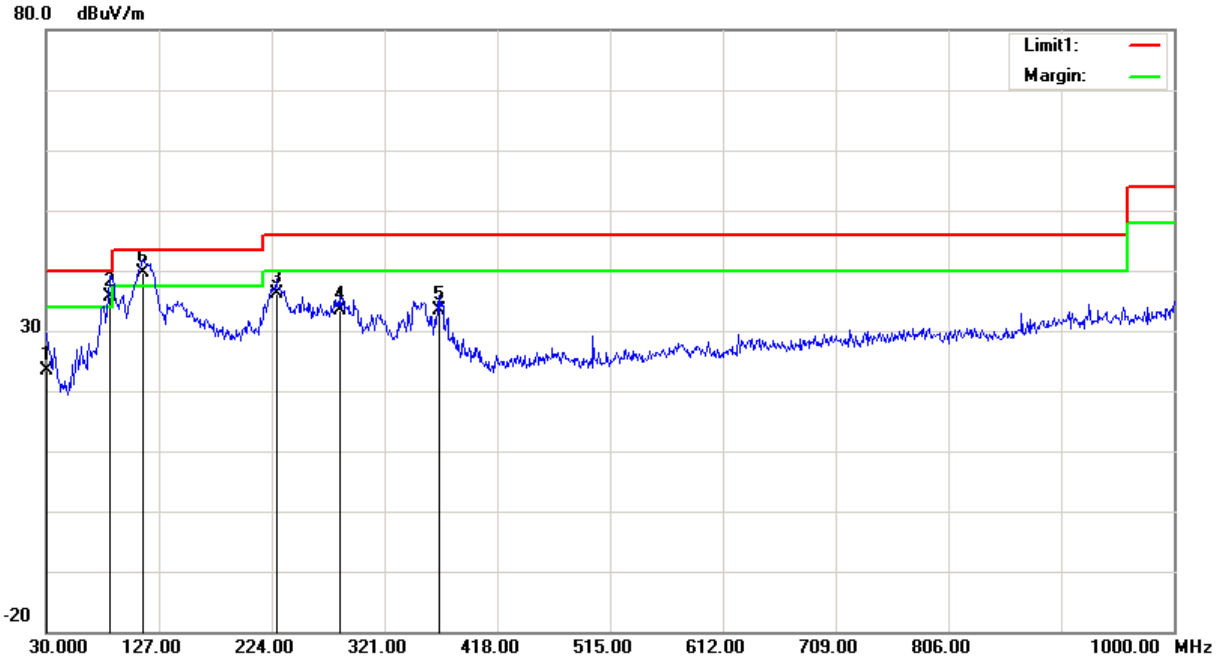
Temperature:	28.9 °C
Relative Humidity:	50.1%
ATM Pressure:	100.1 kPa

** The testing was performed by Steven Zuo on 2017-08-30.*

Test Mode: Transmitting(Above 1GHz test performed at distance 1.5m from EUT to Antenna)

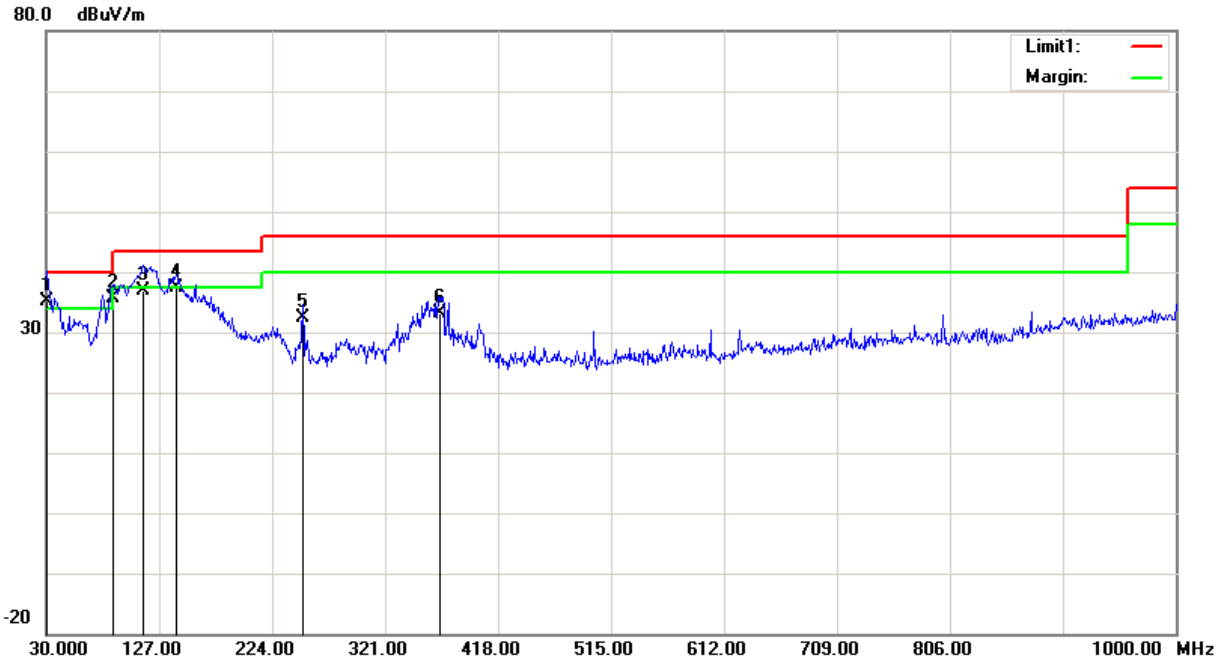
1) Below 1GHz(802.11a 5785MHz was the worst):

Horizontal



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.9700	23.15	QP	0.35	23.50	40.00	16.50
85.2900	46.88	QP	-11.18	35.70	40.00	4.30
227.8800	42.89	QP	-6.79	36.10	46.00	9.90
282.2000	37.25	QP	-3.85	33.40	46.00	12.60
367.5600	36.55	QP	-3.05	33.50	46.00	12.50
113.4200	45.23	QP	-5.53	39.70	43.50	3.80

Vertical



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.9700	34.85	QP	0.35	35.20	40.00	4.80
87.2300	46.72	QP	-11.12	35.60	40.00	4.40
113.4200	42.33	QP	-5.53	36.80	43.50	6.70
141.5500	43.86	QP	-6.46	37.40	43.50	6.10
250.1900	38.90	QP	-6.50	32.40	46.00	13.60
368.5300	36.15	QP	-3.05	33.10	46.00	12.90

2) 1GHz-40GHz:

5150-5250MHz:
802.11a mode(Chain 0 was the worst)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation Result dBμV/m	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)						
Low Channel:5180 MHz										
5180	69.78	PK	H	33.59	4.78	0.00	108.15	102.15	N/A	N/A
5180	60.68	AV	H	33.59	4.78	0.00	99.05	93.05	N/A	N/A
5180	82.42	PK	V	33.59	4.78	0.00	120.79	114.79	N/A	N/A
5180	70.65	AV	V	33.59	4.78	0.00	109.02	103.02	N/A	N/A
5150	40.12	PK	V	33.54	4.67	0.00	78.33	72.33	74.00	1.67
5150	20.72	AV	V	33.54	4.67	0.00	58.93	52.93	54.00	1.07
10360	65.54	PK	V	38.17	6.56	36.38	73.89	67.89	74.00	6.11
10360	46.29	AV	V	38.17	6.56	36.38	54.64	48.64	54.00	5.36
15540	62.57	PK	V	38.06	8.67	38.13	71.17	65.17	74.00	8.83
15540	44.32	AV	V	38.06	8.67	38.13	52.92	46.92	54.00	7.08
6906	51.82	PK	V	35.01	5.31	35.91	56.23	50.23	74.00	23.77
6906	43.36	AV	V	35.01	5.31	35.91	47.77	41.77	54.00	12.23
Middle Channel:5200 MHz										
5200	70.04	PK	H	33.62	4.85	0.00	108.51	102.51	N/A	N/A
5200	60.16	AV	H	33.62	4.85	0.00	98.63	92.63	N/A	N/A
5200	81.96	PK	V	33.62	4.85	0.00	120.43	114.43	N/A	N/A
5200	70.59	AV	V	33.62	4.85	0.00	109.06	103.06	N/A	N/A
10400	69.85	PK	V	38.18	6.57	36.39	78.21	72.21	74.00	1.79
10400	49.57	AV	V	38.18	6.57	36.39	57.93	51.93	54.00	2.07
15600	63.07	PK	V	38.00	8.64	38.04	71.67	65.67	74.00	8.33
15600	44.45	AV	V	38.00	8.64	38.04	53.05	47.05	54.00	6.95
6933	57.87	PK	V	35.07	5.31	35.92	62.33	56.33	74.00	17.67
6933	54.36	AV	V	35.07	5.31	35.92	58.82	52.82	54.00	1.18
9688	50.16	PK	V	37.98	6.30	36.27	58.17	52.17	74.00	21.83
9688	42.25	AV	V	37.98	6.30	36.27	50.26	44.26	54.00	9.74
High Channel:5240 MHz										
5240	70.14	PK	H	33.68	4.71	0.00	108.53	102.53	N/A	N/A
5240	60.41	AV	H	33.68	4.71	0.00	98.80	92.80	N/A	N/A
5240	82.03	PK	V	33.68	4.71	0.00	120.42	114.42	N/A	N/A
5240	70.55	AV	V	33.68	4.71	0.00	108.94	102.94	N/A	N/A
5350	39.98	PK	V	33.86	4.52	0.00	78.36	72.36	74.00	1.64
5350	20.56	AV	V	33.86	4.52	0.00	58.94	52.94	54.00	1.06
10480	68.78	PK	V	38.20	6.59	36.40	77.17	71.17	74.00	2.83
10480	49.16	AV	V	38.20	6.59	36.40	57.55	51.55	54.00	2.45
15720	62.57	PK	V	37.88	8.57	37.86	71.16	65.16	74.00	8.84
15720	44.76	AV	V	37.88	8.57	37.86	53.35	47.35	54.00	6.65
6987	57.39	PK	V	35.17	5.32	35.94	61.94	55.94	74.00	18.06
6987	53.27	AV	V	35.17	5.32	35.94	57.82	51.82	54.00	2.18

802.11n ht20 mode(2TX was the worst):

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation Result dBμV/m	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)						
Low Channel:5180 MHz										
5180	73.48	PK	H	33.59	4.78	0.00	111.85	105.85	N/A	N/A
5180	62.24	AV	H	33.59	4.78	0.00	100.61	94.61	N/A	N/A
5180	87.07	PK	V	33.59	4.78	0.00	125.44	119.44	N/A	N/A
5180	74.52	AV	V	33.59	4.78	0.00	112.89	106.89	N/A	N/A
5150	37.72	PK	V	33.54	4.67	0.00	75.93	69.93	74.00	4.07
5150	21.28	AV	V	33.54	4.67	0.00	59.49	53.49	54.00	0.51
10360	51.64	PK	V	38.17	6.56	36.38	59.99	53.99	74.00	20.01
10360	37.08	AV	V	38.17	6.56	36.38	45.43	39.43	54.00	14.57
15540	49.68	PK	V	38.06	8.67	38.13	58.28	52.28	74.00	21.72
15540	35.54	AV	V	38.06	8.67	38.13	44.14	38.14	54.00	15.86
6907	54.82	PK	V	35.01	5.31	35.91	59.23	53.23	74.00	20.77
6907	49.07	AV	V	35.01	5.31	35.91	53.48	47.48	54.00	6.52
Middle Channel:5200 MHz										
5200	73.92	PK	H	33.62	4.85	0.00	112.39	106.39	N/A	N/A
5200	61.89	AV	H	33.62	4.85	0.00	100.36	94.36	N/A	N/A
5200	86.22	PK	V	33.62	4.85	0.00	124.69	118.69	N/A	N/A
5200	74.21	AV	V	33.62	4.85	0.00	112.68	106.68	N/A	N/A
10400	52.92	PK	V	38.18	6.57	36.39	61.28	55.28	74.00	18.72
10400	38.66	AV	V	38.18	6.57	36.39	47.02	41.02	54.00	12.98
15600	50.49	PK	V	38.00	8.64	38.04	59.09	53.09	74.00	20.91
15600	35.86	AV	V	38.00	8.64	38.04	44.46	38.46	54.00	15.54
6907	46.89	PK	V	35.01	5.31	35.91	51.30	45.30	74.00	28.70
6907	32.38	AV	V	35.01	5.31	35.91	36.79	30.79	54.00	23.21
9648	51.67	PK	V	37.96	6.28	36.27	59.64	53.64	74.00	20.36
9648	36.58	AV	V	37.96	6.28	36.27	44.55	38.55	54.00	15.45
High Channel:5240 MHz										
5240	73.35	PK	H	33.68	4.71	0.00	111.74	105.74	N/A	N/A
5240	60.02	AV	H	33.68	4.71	0.00	98.41	92.41	N/A	N/A
5240	88.29	PK	V	33.68	4.71	0.00	126.68	120.68	N/A	N/A
5240	75.27	AV	V	33.68	4.71	0.00	113.66	107.66	N/A	N/A
5350	28.92	PK	V	33.86	4.52	0.00	67.30	61.30	74.00	12.70
5350	16.28	AV	V	33.86	4.52	0.00	54.66	48.66	54.00	5.34
10480	52.67	PK	V	38.20	6.59	36.40	61.06	55.06	74.00	18.94
10480	38.69	AV	V	38.20	6.59	36.40	47.08	41.08	54.00	12.92
15720	49.75	PK	V	37.88	8.57	37.86	58.34	52.34	74.00	21.66
15720	35.36	AV	V	37.88	8.57	37.86	43.95	37.95	54.00	16.05
9648	52.63	PK	V	37.96	6.28	36.27	60.60	54.60	74.00	19.40
9648	38.46	AV	V	37.96	6.28	36.27	46.43	40.43	54.00	13.57

802.11n ht40 mode(2TX was the worst)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation Result dBμV/m	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)						
Low Channel:5190 MHz										
5190	78.48	PK	H	33.60	4.81	0.00	116.89	110.89	N/A	N/A
5190	66.35	AV	H	33.60	4.81	0.00	104.76	98.76	N/A	N/A
5190	81.39	PK	V	33.60	4.81	0.00	119.80	113.80	N/A	N/A
5190	66.31	AV	V	33.60	4.81	0.00	104.72	98.72	N/A	N/A
5150	39.95	PK	V	33.54	4.67	0.00	78.16	72.16	74.00	1.84
5150	21.21	AV	V	33.54	4.67	0.00	59.42	53.42	54.00	0.58
10380	60.67	PK	V	38.18	6.57	36.38	69.04	63.04	74.00	10.96
10380	46.42	AV	V	38.18	6.57	36.38	54.79	48.79	54.00	5.21
15570	46.58	PK	V	38.03	8.65	38.09	55.17	49.17	74.00	24.83
15570	32.24	AV	V	38.03	8.65	38.09	40.83	34.83	54.00	19.17
6920	55.35	PK	V	35.04	5.31	35.92	59.78	53.78	74.00	20.22
6920	50.64	AV	V	35.04	5.31	35.92	55.07	49.07	54.00	4.93
High Channel:5230 MHz										
5230	70.24	PK	H	33.67	4.74	0.00	108.65	102.65	N/A	N/A
5230	58.91	AV	H	33.67	4.74	0.00	97.32	91.32	N/A	N/A
5230	83.51	PK	V	33.67	4.74	0.00	121.92	115.92	N/A	N/A
5230	71.27	AV	V	33.67	4.74	0.00	109.68	103.68	N/A	N/A
5350	29.95	PK	V	33.86	4.52	0.00	68.33	62.33	74.00	11.67
5350	16.66	AV	V	33.86	4.52	0.00	55.04	49.04	54.00	4.96
10460	59.76	PK	V	38.19	6.59	36.39	68.15	62.15	74.00	11.85
10460	45.89	AV	V	38.19	6.59	36.39	54.28	48.28	54.00	5.72
15690	48.46	PK	V	37.91	8.59	37.91	57.05	51.05	74.00	22.95
15690	32.69	AV	V	37.91	8.59	37.91	41.28	35.28	54.00	18.72
9648	49.61	PK	V	37.96	6.28	36.27	57.58	51.58	74.00	22.42
9648	44.09	AV	V	37.96	6.28	36.27	52.06	46.06	54.00	7.94
5695	47.58	PK	V	34.18	4.64	35.85	50.55	44.55	74.00	29.45
5695	32.46	AV	V	34.18	4.64	35.85	35.43	29.43	54.00	24.57

802.11n ac80 mode(2TX was the worst):

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation Result dBμV/m	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)						
Middle Channel:5210 MHz										
5210	60.86	PK	H	33.64	4.81	0.00	99.31	93.31	N/A	N/A
5210	50.61	AV	H	33.64	4.81	0.00	89.06	83.06	N/A	N/A
5210	77.55	PK	V	33.64	4.81	0.00	116.00	110.00	N/A	N/A
5210	67.68	AV	V	33.64	4.81	0.00	106.13	100.13	N/A	N/A
5150	36.35	PK	V	33.54	4.67	0.00	74.56	68.56	74.00	5.44
5150	20.76	AV	V	33.54	4.67	0.00	58.97	52.97	54.00	1.03
5350	32.02	PK	V	33.86	4.52	0.00	70.40	64.40	74.00	9.60
5350	16.15	AV	V	33.86	4.52	0.00	54.53	48.53	54.00	5.47
10420	52.98	PK	V	38.18	6.58	36.39	61.35	55.35	74.00	18.65
10420	38.77	AV	V	38.18	6.58	36.39	47.14	41.14	54.00	12.86
15630	51.56	PK	V	37.97	8.62	38.00	60.15	54.15	74.00	19.85
15630	36.48	AV	V	37.97	8.62	38.00	45.07	39.07	54.00	14.93
6947	54.39	PK	V	35.09	5.31	35.93	58.86	52.86	74.00	21.14
6947	51.25	AV	V	35.09	5.31	35.93	55.72	49.72	54.00	4.28

5725-5850MHz:
802.11a mode, (chain 0 was the worst):

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation Result dBμV/m	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)						
Low Channel:5745 MHz										
5745	68.96	PK	H	34.20	4.68	0.00	107.84	101.84	N/A	N/A
5745	58.76	AV	H	34.20	4.68	0.00	97.64	91.64	N/A	N/A
5745	81.39	PK	V	34.20	4.68	0.00	120.27	114.27	N/A	N/A
5745	71.34	AV	V	34.20	4.68	0.00	110.22	104.22	N/A	N/A
5725	47.42	PK	V	34.19	4.67	0.00	86.28	80.28	122.20	41.92
5720	40.58	PK	V	34.19	4.66	0.00	79.43	73.43	110.80	37.37
5700	28.15	PK	V	34.18	4.65	0.00	66.98	60.98	105.20	44.22
5650	25.32	PK	V	34.16	4.60	0.00	64.08	58.08	68.20	10.12
11490	62.12	PK	V	38.99	6.85	36.60	71.36	65.36	74.00	8.64
11490	49.53	AV	V	38.99	6.85	36.60	58.77	52.77	54.00	1.23
17235	54.52	PK	V	41.56	8.68	36.97	67.79	61.79	74.00	12.21
17235	37.02	AV	V	41.56	8.68	36.97	50.29	44.29	54.00	9.71
Middle Channel:5785 MHz										
5785	68.71	PK	H	34.21	4.71	0.00	107.63	101.63	N/A	N/A
5785	59.06	AV	H	34.21	4.71	0.00	97.98	91.98	N/A	N/A
5785	81.39	PK	V	34.21	4.71	0.00	120.31	114.31	N/A	N/A
5785	70.85	AV	V	34.21	4.71	0.00	109.77	103.77	N/A	N/A
11570	60.05	PK	V	39.00	6.87	36.61	69.31	63.31	74.00	10.69
11570	47.02	AV	V	39.00	6.87	36.61	56.28	50.28	54.00	3.72
17355	62.43	PK	V	42.26	8.67	36.79	76.57	70.57	74.00	3.43
17355	42.44	AV	V	42.26	8.67	36.79	56.58	50.58	54.00	3.42
High Channel:5825 MHz										
5825	68.59	PK	H	34.23	4.69	0.00	107.51	101.51	N/A	N/A
5825	59.04	AV	H	34.23	4.69	0.00	97.96	91.96	N/A	N/A
5825	82.07	PK	V	34.23	4.69	0.00	120.99	114.99	N/A	N/A
5825	72.62	AV	V	34.23	4.69	0.00	111.54	105.54	N/A	N/A
5850	42.75	PK	V	34.24	4.67	0.00	81.66	75.66	122.20	46.54
5855	39.21	PK	V	34.24	4.66	0.00	78.11	72.11	110.80	38.69
5875	29.08	PK	V	34.25	4.64	0.00	67.97	61.97	105.20	43.23
5925	28.27	PK	V	34.27	4.63	0.00	67.17	61.17	68.20	7.03
11650	63.51	PK	V	39.00	6.89	36.63	72.77	66.77	74.00	7.23
11650	49.68	AV	V	39.00	6.89	36.63	58.94	52.94	54.00	1.06
17475	61.96	PK	V	42.96	8.65	36.62	76.95	70.95	74.00	3.05
17475	42.13	AV	V	42.96	8.65	36.62	57.12	51.12	54.00	2.88

802.11n ht20 mode(2TX was the worst):

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Extrapolation Result dBµV/m	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)						
Low Channel:5745 MHz										
5745	64.31	PK	H	34.20	4.68	0.00	103.19	97.19	N/A	N/A
5745	52.91	AV	H	34.20	4.68	0.00	91.79	85.79	N/A	N/A
5745	79.37	PK	V	34.20	4.68	0.00	118.25	112.25	N/A	N/A
5745	66.18	AV	V	34.20	4.68	0.00	105.06	99.06	N/A	N/A
5725	31.27	PK	V	34.19	4.67	0.00	70.13	64.13	122.20	58.07
5720	27.95	PK	V	34.19	4.66	0.00	66.80	60.80	110.80	50.00
5700	27.02	PK	V	34.18	4.65	0.00	65.85	59.85	105.20	45.35
5650	27.01	PK	V	34.16	4.60	0.00	65.77	59.77	68.20	8.43
11490	56.21	PK	V	38.99	6.85	36.60	65.45	59.45	74.00	14.55
11490	43.16	AV	V	38.99	6.85	36.60	52.40	46.40	54.00	7.60
17235	52.21	PK	V	41.56	8.68	36.97	65.48	59.48	74.00	14.52
17235	40.52	AV	V	41.56	8.68	36.97	53.79	47.79	54.00	6.21
Middle Channel:5785 MHz										
5785	64.41	PK	H	34.21	4.71	0.00	103.33	97.33	N/A	N/A
5785	55.12	AV	H	34.21	4.71	0.00	94.04	88.04	N/A	N/A
5785	79.92	PK	V	34.21	4.71	0.00	118.84	112.84	N/A	N/A
5785	67.51	AV	V	34.21	4.71	0.00	106.43	100.43	N/A	N/A
11570	53.99	PK	V	39.00	6.87	36.61	63.25	57.25	74.00	16.75
11570	41.29	AV	V	39.00	6.87	36.61	50.55	44.55	54.00	9.45
17355	55.67	PK	V	42.26	8.67	36.79	69.81	63.81	74.00	10.19
17355	39.29	AV	V	42.26	8.67	36.79	53.43	47.43	54.00	6.57
High Channel:5825 MHz										
5825	64.83	PK	H	34.23	4.69	0.00	103.75	97.75	N/A	N/A
5825	53.61	AV	H	34.23	4.69	0.00	92.53	86.53	N/A	N/A
5825	79.58	PK	V	34.23	4.69	0.00	118.50	112.50	N/A	N/A
5825	67.91	AV	V	34.23	4.69	0.00	106.83	100.83	N/A	N/A
5850	32.13	PK	V	34.24	4.67	0.00	71.04	65.04	122.20	57.16
5855	28.92	PK	V	34.24	4.66	0.00	67.82	61.82	110.80	48.98
5875	29.06	PK	V	34.25	4.64	0.00	67.95	61.95	105.20	43.25
5925	28.26	PK	V	34.27	4.63	0.00	67.16	61.16	68.20	7.04
11650	55.72	PK	V	39.00	6.89	36.63	64.98	58.98	74.00	15.02
11650	43.69	AV	V	39.00	6.89	36.63	52.95	46.95	54.00	7.05
17475	54.68	PK	V	42.96	8.65	36.62	69.67	63.67	74.00	10.33
17475	42.61	AV	V	42.96	8.65	36.62	57.60	51.60	54.00	2.40

802.11n ht40 mode(2TX was the worst):

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation Result dBμV/m	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)						
Low Channel:5755 MHz										
5755	63.29	PK	H	34.20	4.69	0.00	102.18	96.18	N/A	N/A
5755	52.91	AV	H	34.20	4.69	0.00	91.80	85.80	N/A	N/A
5755	75.82	PK	V	34.20	4.69	0.00	114.71	108.71	N/A	N/A
5755	64.45	AV	V	34.20	4.69	0.00	103.34	97.34	N/A	N/A
5725	30.05	PK	V	34.19	4.67	0.00	68.91	62.91	122.20	59.29
5720	29.27	PK	V	34.19	4.66	0.00	68.12	62.12	110.80	48.68
5700	27.91	PK	V	34.18	4.65	0.00	66.74	60.74	105.20	44.46
5650	27.13	PK	V	34.16	4.60	0.00	65.89	59.89	68.20	8.31
11510	52.73	PK	V	39.00	6.85	36.60	61.98	55.98	74.00	18.02
11510	40.02	AV	V	39.00	6.85	36.60	49.27	43.27	54.00	10.73
17265	49.53	PK	V	41.74	8.68	36.92	63.03	57.03	74.00	16.97
17265	38.03	AV	V	41.74	8.68	36.92	51.53	45.53	54.00	8.47
High Channel:5795 MHz										
5795	62.61	PK	H	34.22	4.72	0.00	101.55	95.55	N/A	N/A
5795	51.39	AV	H	34.22	4.72	0.00	90.33	84.33	N/A	N/A
5795	76.42	PK	V	34.22	4.72	0.00	115.36	109.36	N/A	N/A
5795	64.37	AV	V	34.22	4.72	0.00	103.31	97.31	N/A	N/A
5850	29.67	PK	V	34.24	4.67	0.00	68.58	62.58	122.20	59.62
5855	28.76	PK	V	34.24	4.66	0.00	67.66	61.66	110.80	49.14
5875	27.42	PK	V	34.25	4.64	0.00	66.31	60.31	105.20	44.89
5925	28.39	PK	V	34.27	4.63	0.00	67.29	61.29	68.20	6.91
11590	52.77	PK	V	39.00	6.88	36.62	62.03	56.03	74.00	17.97
11590	40.08	AV	V	39.00	6.88	36.62	49.34	43.34	54.00	10.66
17385	50.21	PK	V	42.43	8.66	36.75	64.55	58.55	74.00	15.45
17385	39.61	AV	V	42.43	8.66	36.75	53.95	47.95	54.00	6.05

802.11n ac80 mode(2TX was the worst):

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation Result dBμV/m	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)						
Middle Channel:5775 MHz										
5775	72.57	PK	H	34.21	4.70	0.00	111.48	105.48	N/A	N/A
5775	61.54	AV	H	34.21	4.70	0.00	100.45	94.45	N/A	N/A
5775	73.13	PK	V	34.21	4.70	0.00	112.04	106.04	N/A	N/A
5775	59.79	AV	V	34.21	4.70	0.00	98.70	92.70	N/A	N/A
5725	35.56	PK	H	34.19	4.67	0.00	74.42	68.42	122.20	53.78
5720	34.78	PK	H	34.19	4.66	0.00	73.63	67.63	110.80	43.17
5700	28.21	PK	H	34.18	4.65	0.00	67.04	61.04	105.20	44.16
5650	26.45	PK	H	34.16	4.60	0.00	65.21	59.21	68.20	8.99
5850	37.91	PK	H	34.24	4.67	0.00	76.82	70.82	122.20	51.38
5855	30.86	PK	H	34.24	4.66	0.00	69.76	63.76	110.80	47.04
5875	35.82	PK	H	34.25	4.64	0.00	74.71	68.71	105.20	36.49
5925	28.36	AV	H	34.27	4.63	0.00	67.26	61.26	68.20	6.94
11550	64.12	PK	H	39.00	6.86	36.61	73.37	67.37	74.00	6.63
11550	49.47	AV	H	39.00	6.86	36.61	58.72	52.72	54.00	1.28
17325	56.56	PK	H	42.09	8.67	36.84	70.48	64.48	74.00	9.52
17325	39.26	AV	H	42.09	8.67	36.84	53.18	47.18	54.00	6.82

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	EMI Test Receiver	ESPI	100120	2016-12-08	2017-12-08
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:	24.4 °C
Relative Humidity:	48 %
ATM Pressure:	100.4 kPa

The testing was performed by Gavin Xu on 2017-09-13.

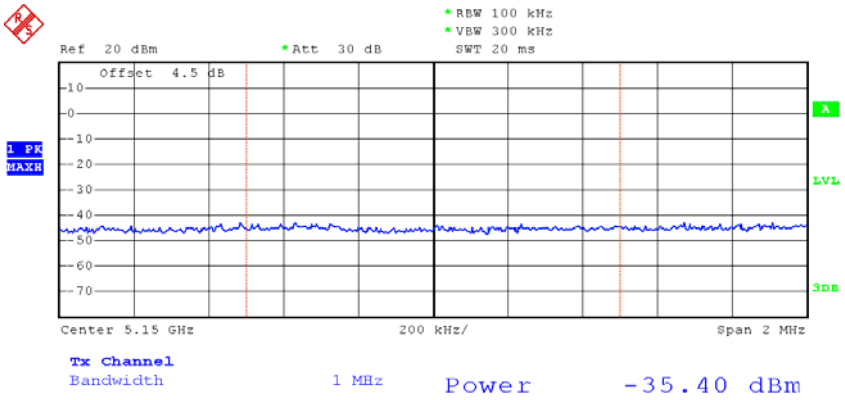
Test Result: Pass.

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)

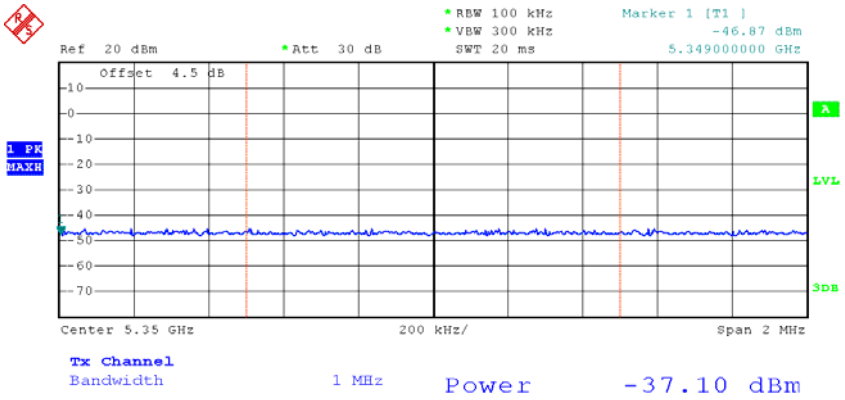
Chain 0:

802.11a Low Channel



Date: 13.SEP.2017 14:04:48

802.11a High Channel



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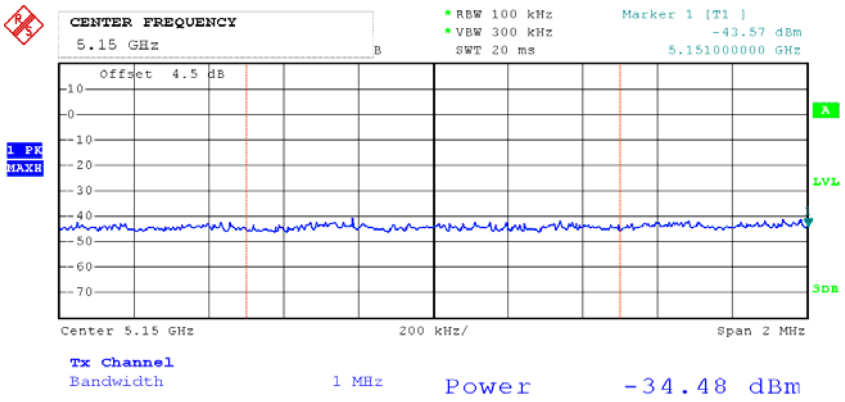
802.11n ht20 Low Channel



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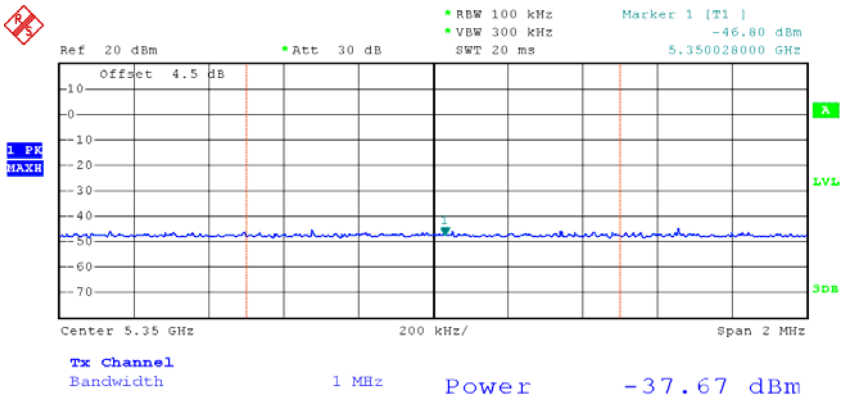
802.11n ht20 High Channel



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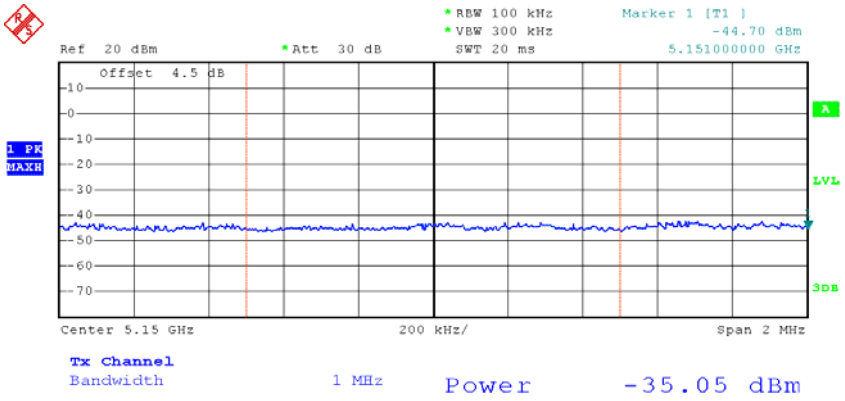
802.11n ht40 Low Channel



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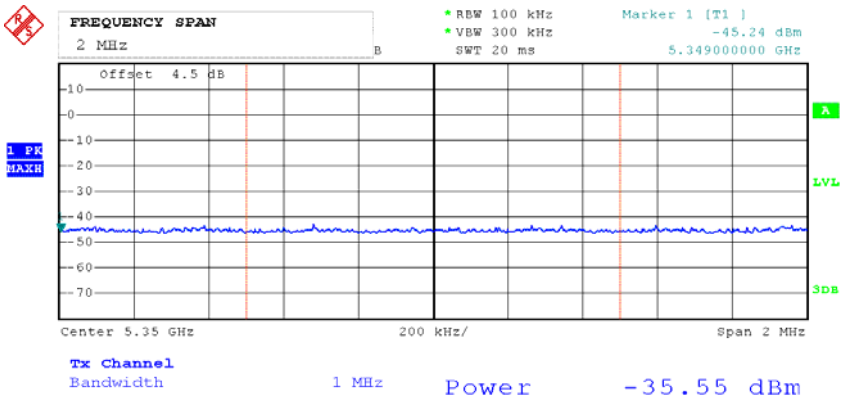
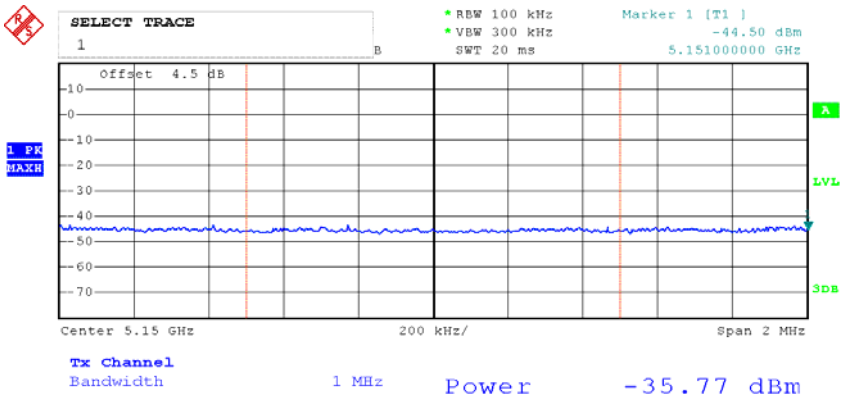
802.11n ht40 High Channel



Date: 13.SEP.2017 14:17:48

802.11n ac80 Middle Channel



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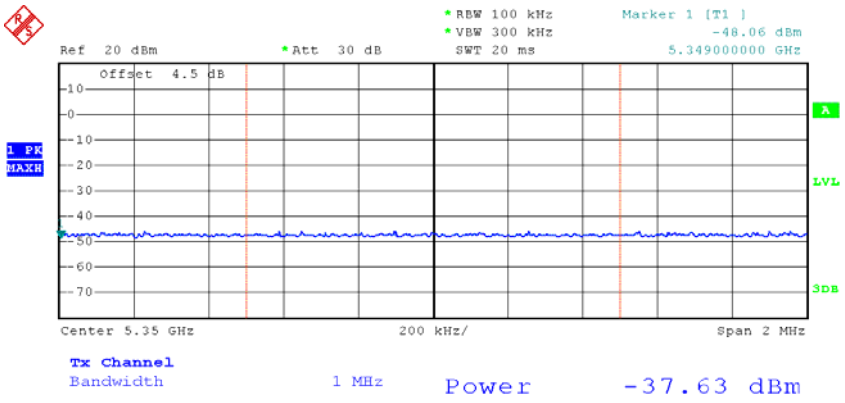
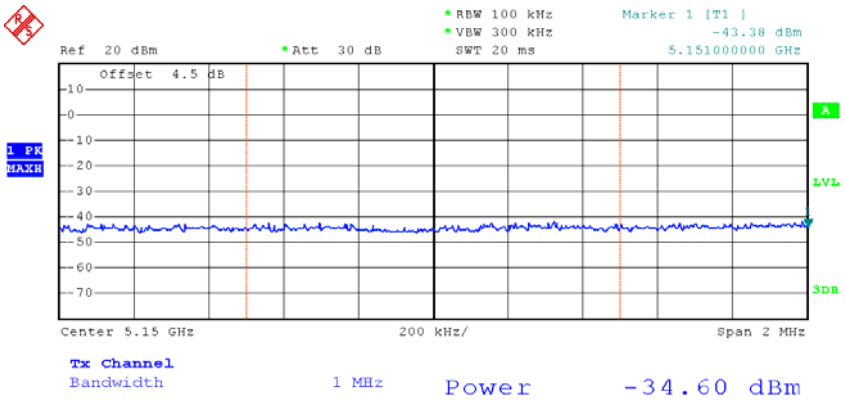


Date: 13.SEP.2017 14:21:28

Chain 1:

802.11a Low Channel



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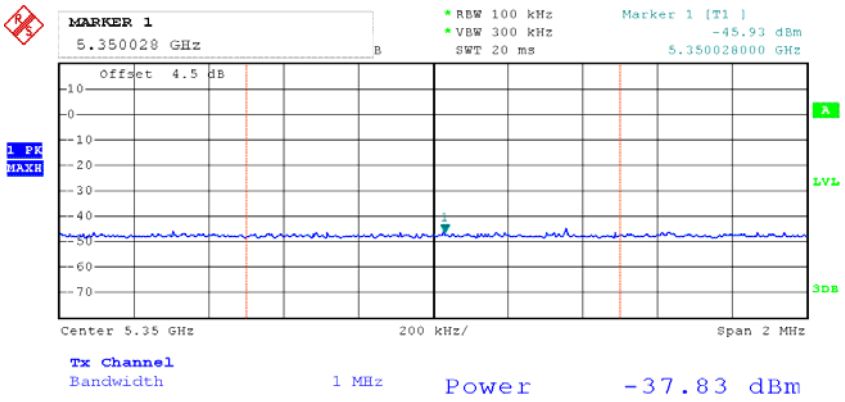
802.11a High Channel



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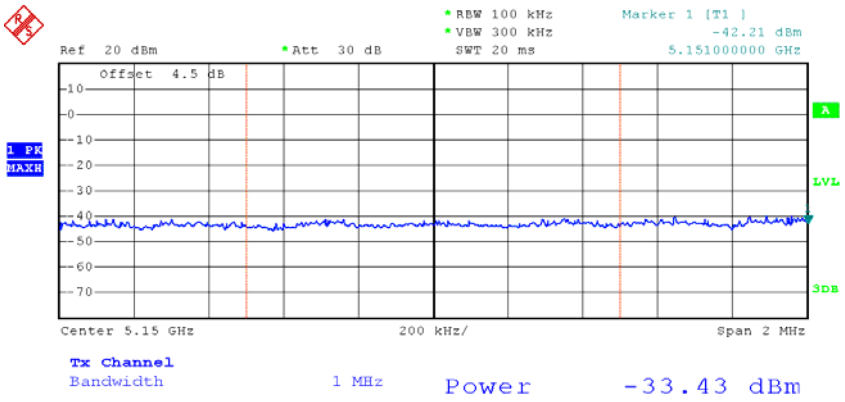
802.11n ht20 Low Channel



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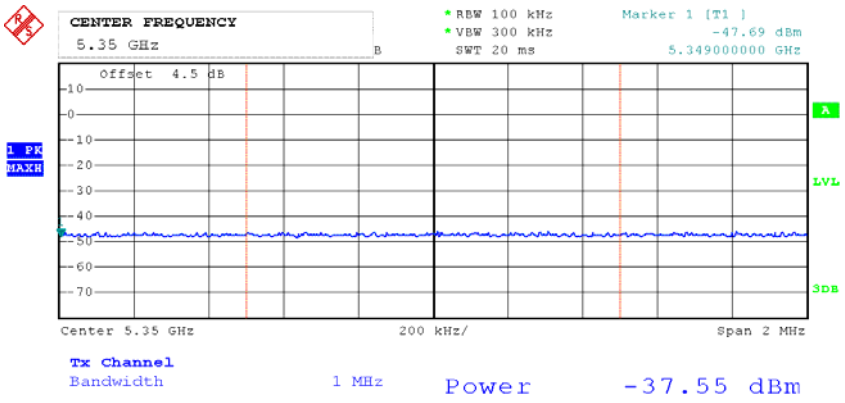
802.11n ht20 High Channel



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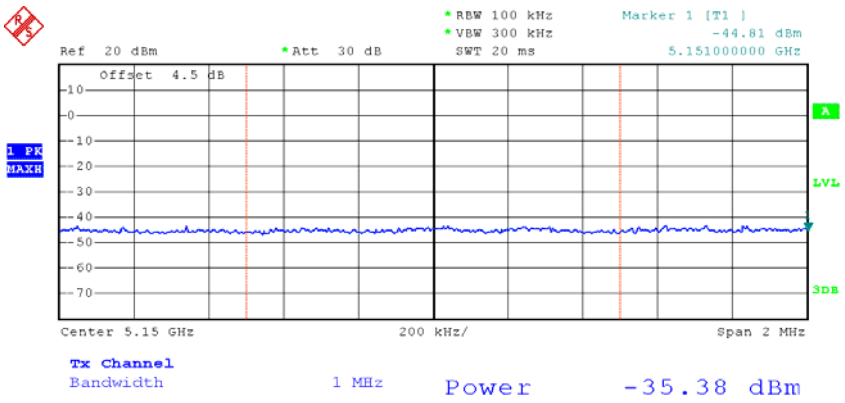
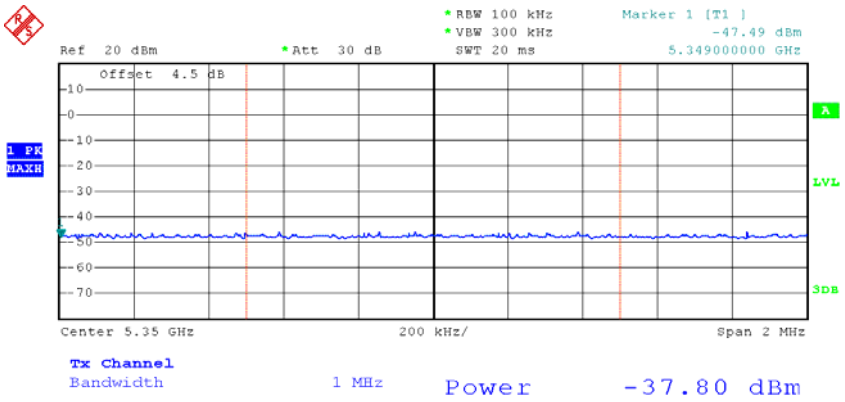
802.11n ht40 Low Channel



Date: 13.SEP.2017 14:30:31

802.11n ht40 High Channel



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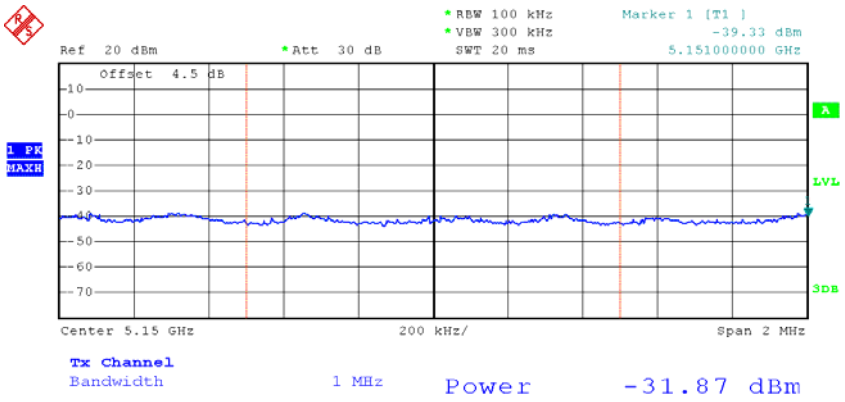
802.11n ac80 Middle Channel



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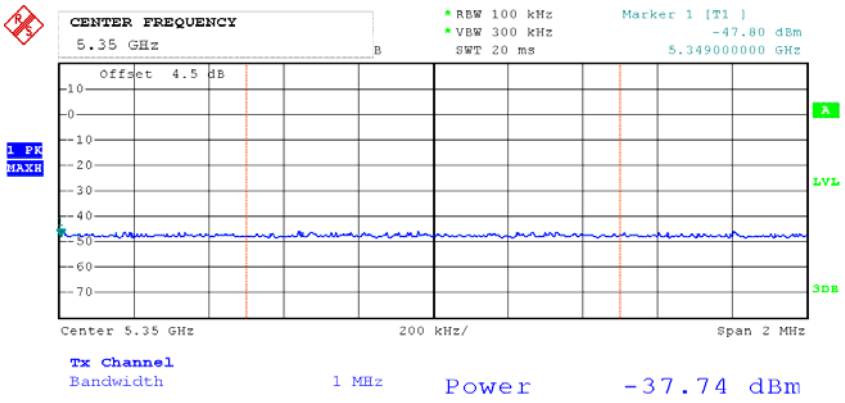
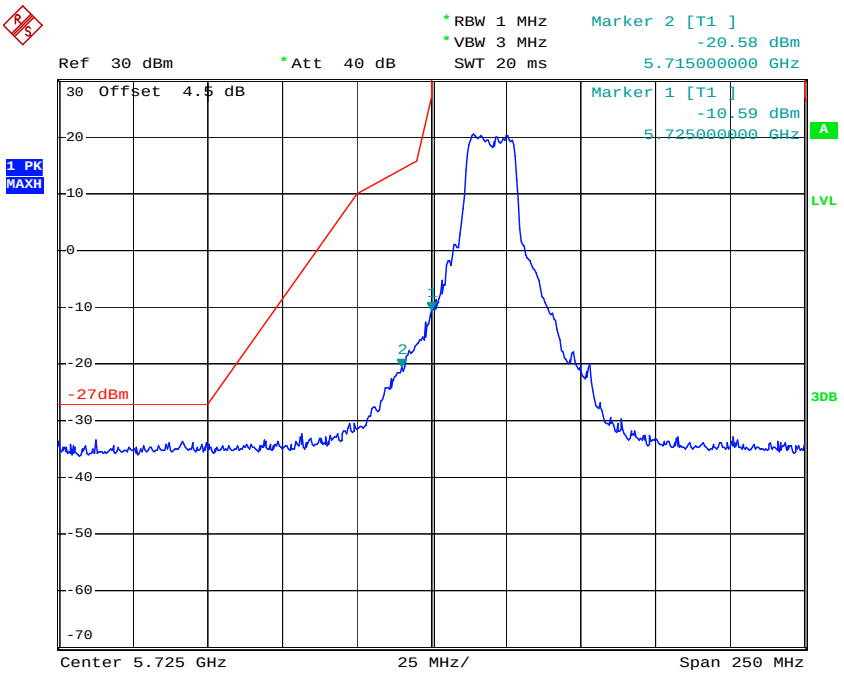


Date: 13.SEP.2017 14:26:05

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



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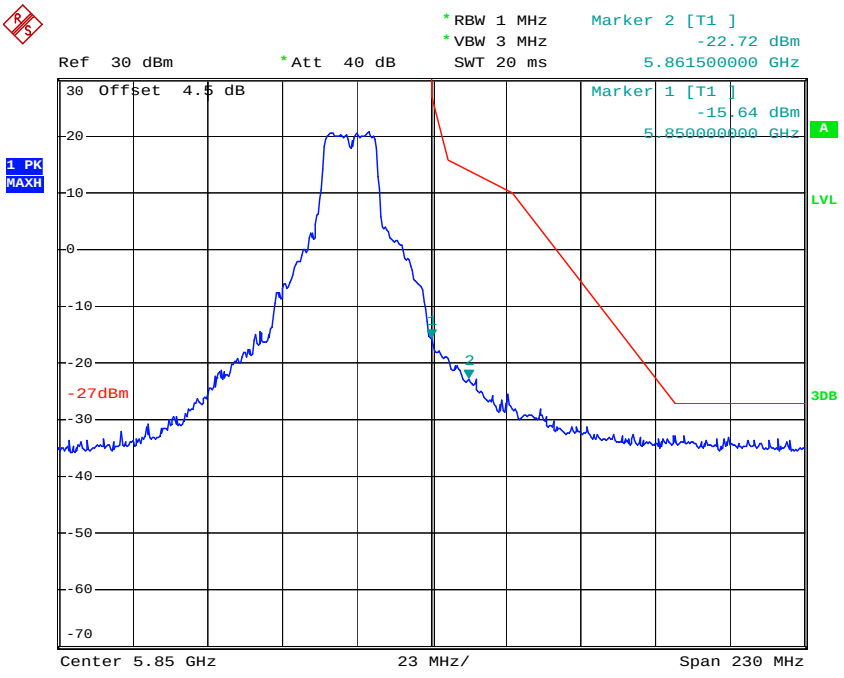
802.11a High Channel



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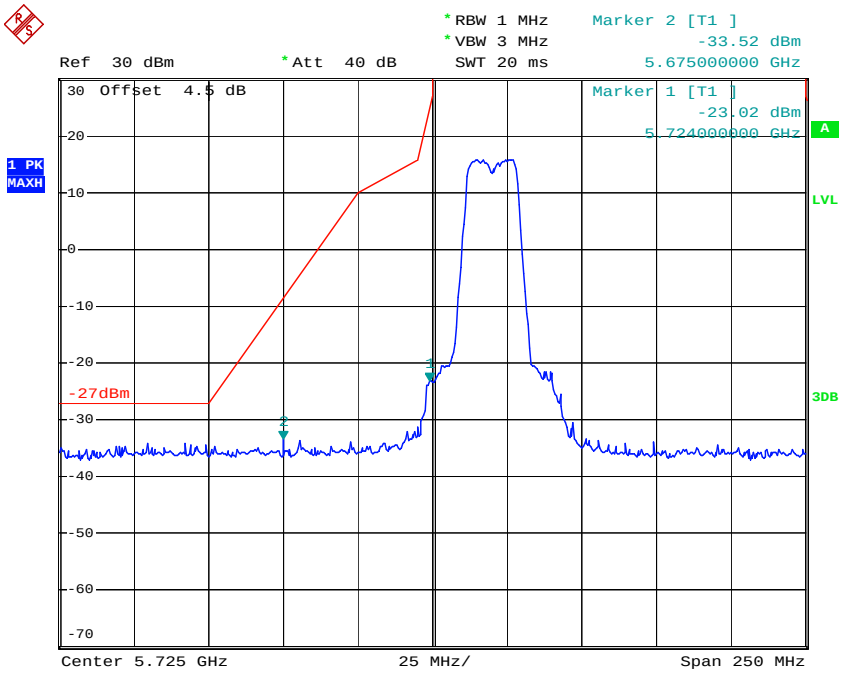
802.11n ht20 Low Channel



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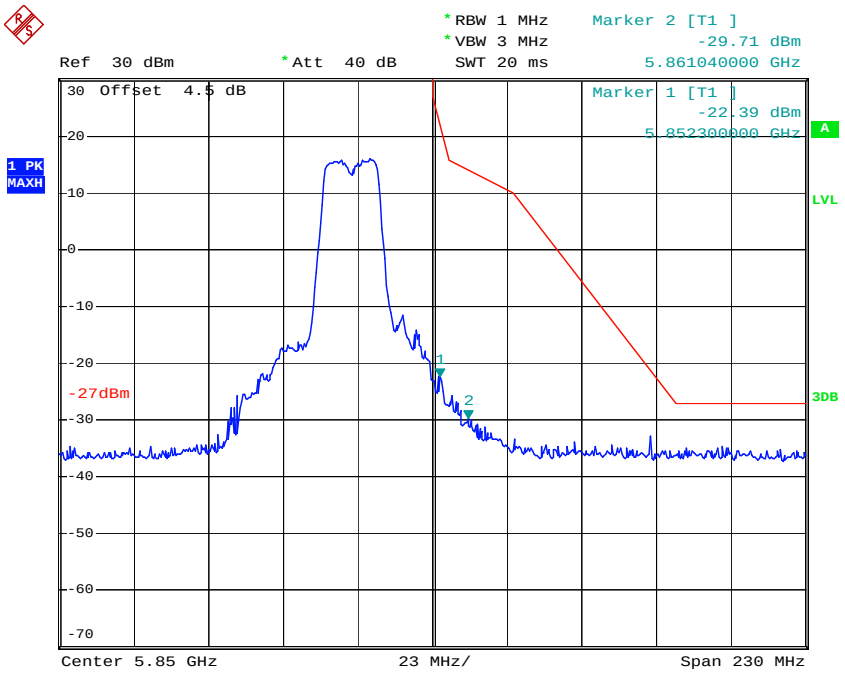
802.11n ht20 High Channel



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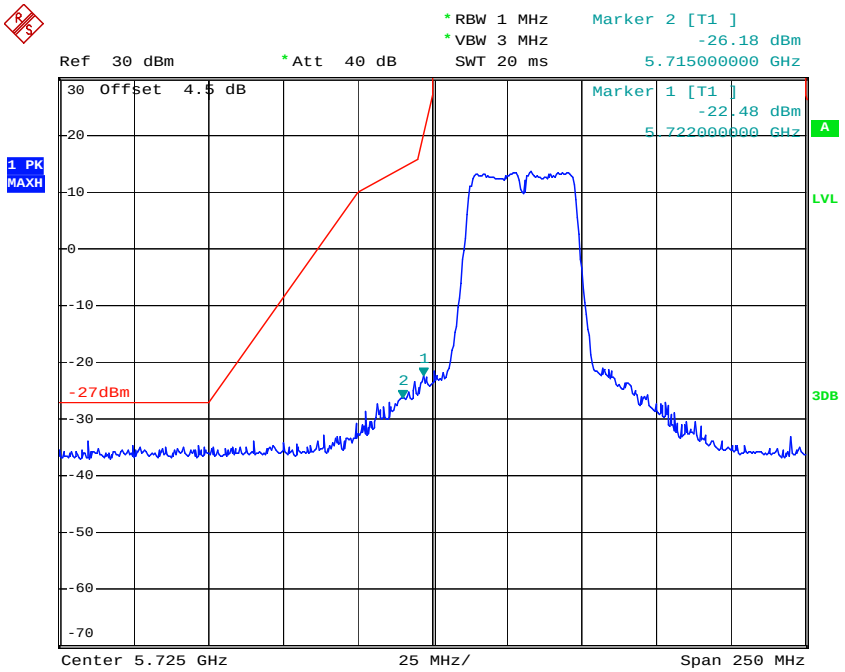
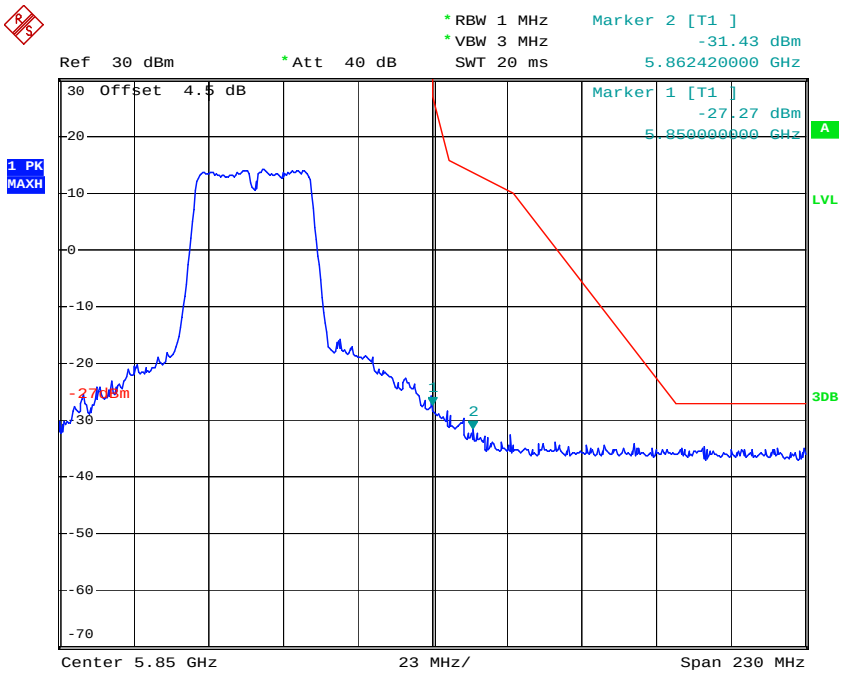
802.11n ht40 Low Channel



Date: 13.SEP.2017 15:16:00

802.11n ht40 High Channel



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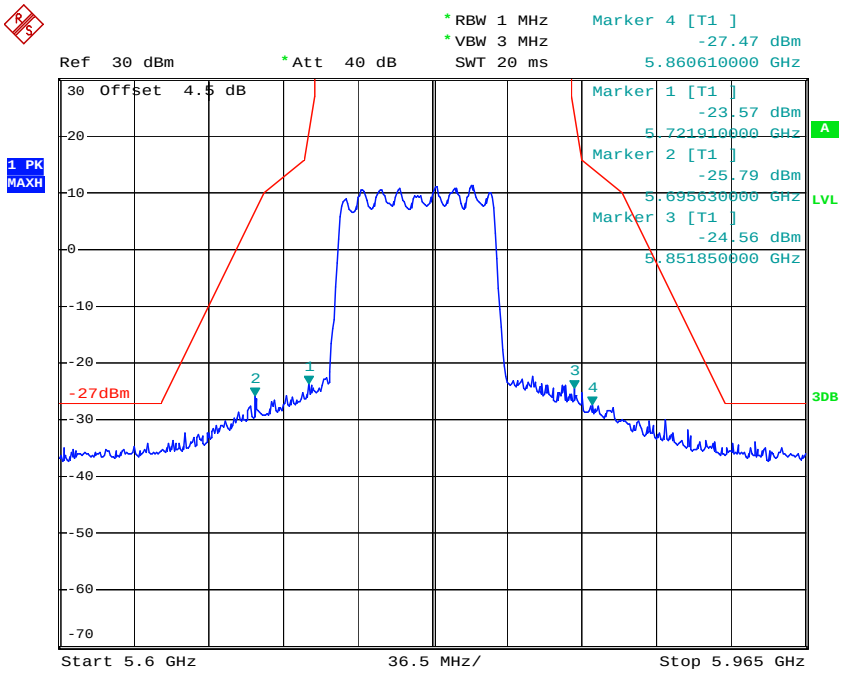
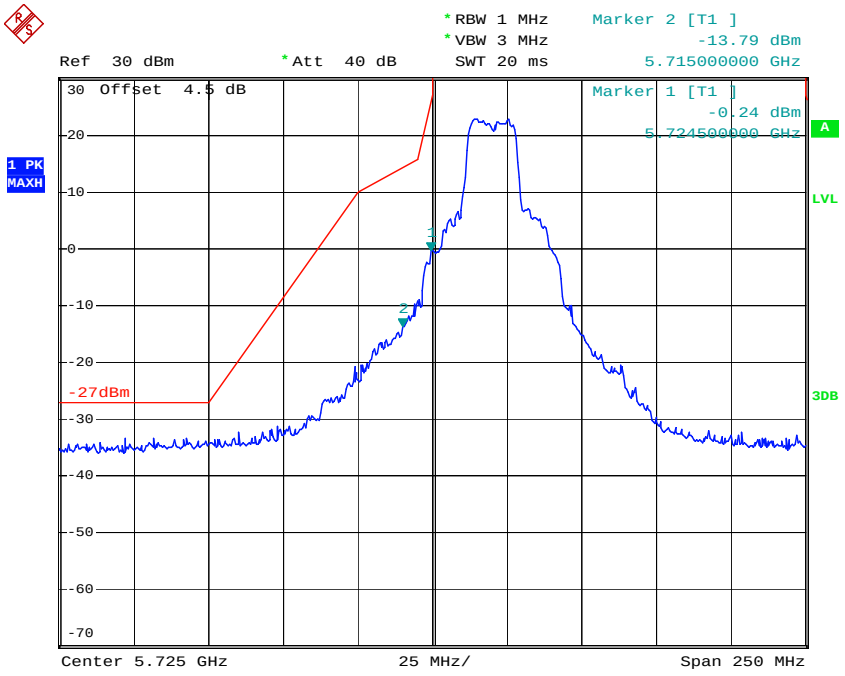
802.11n ac80 Middle Channel

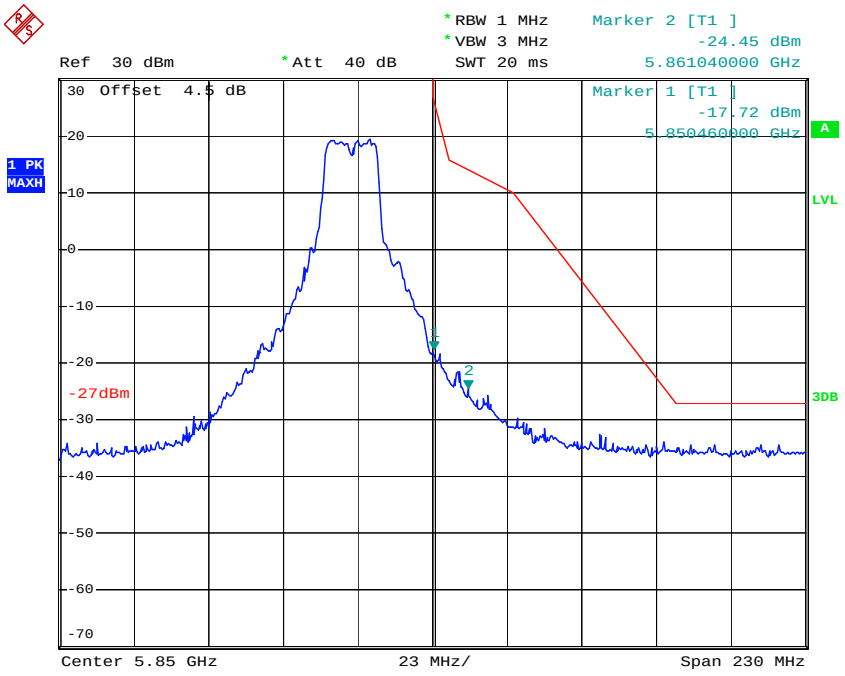


Chain 1:

802.11a Low Channel



802.11a High Channel



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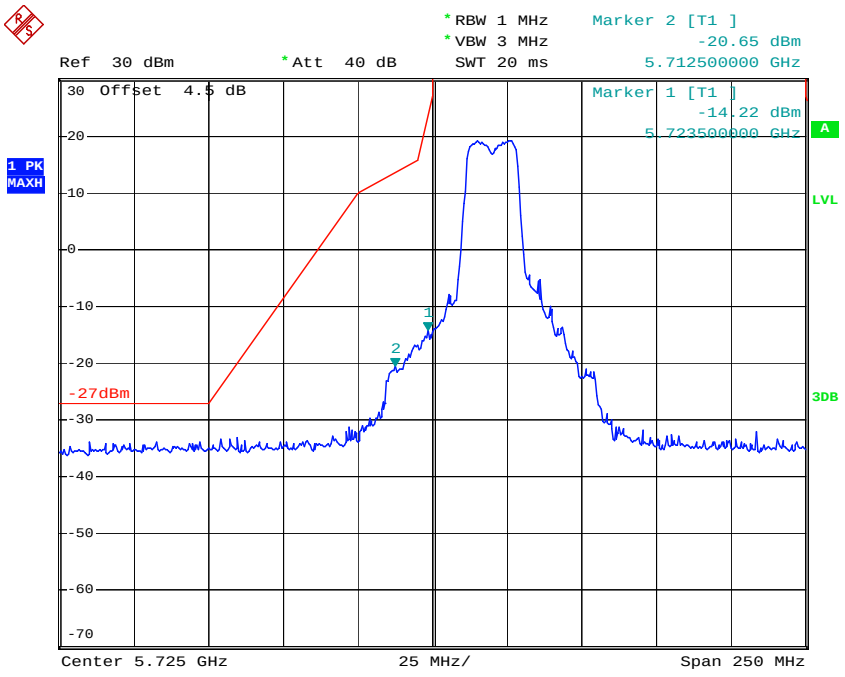
802.11n ht20 Low Channel



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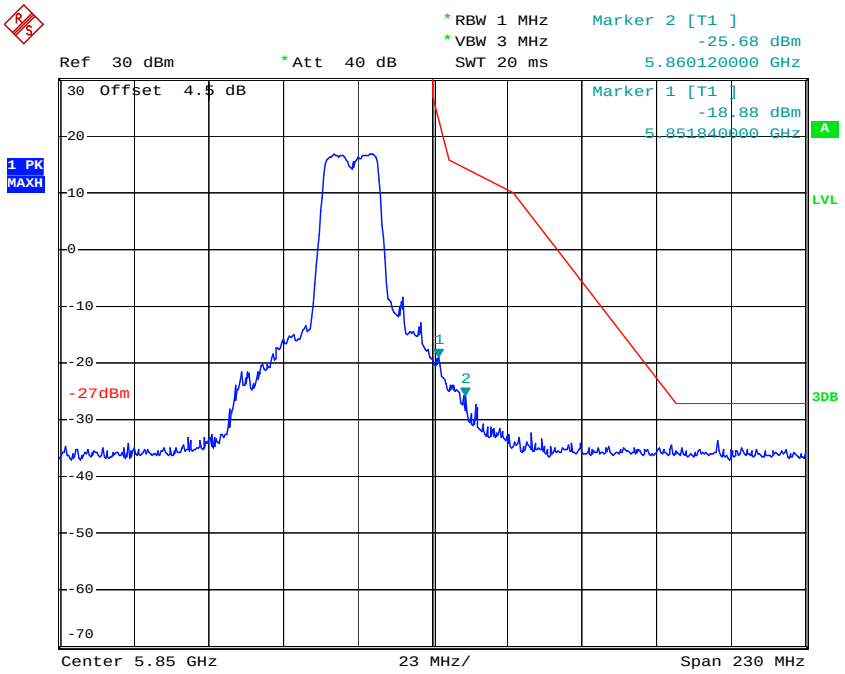
802.11n ht20 High Channel



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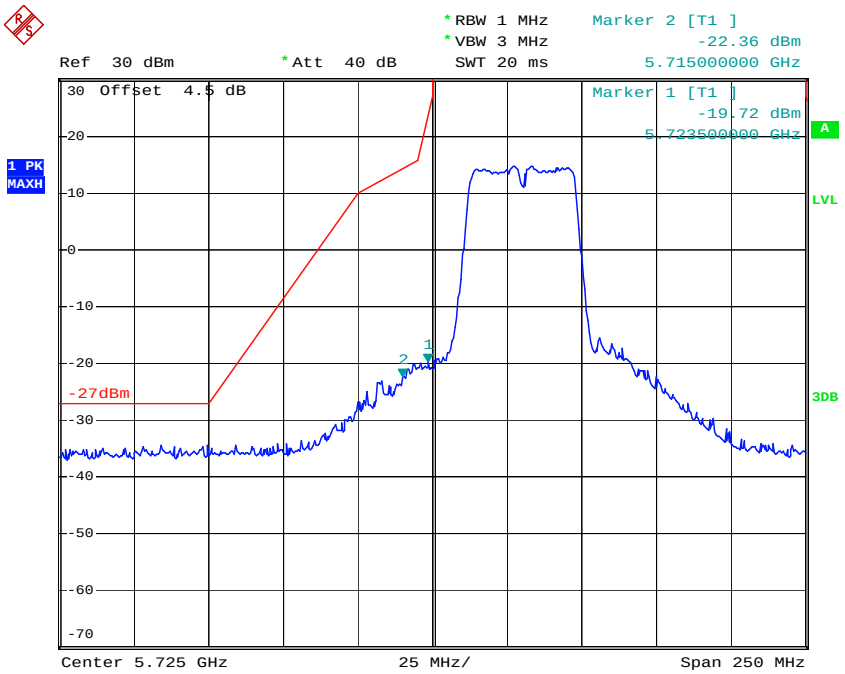
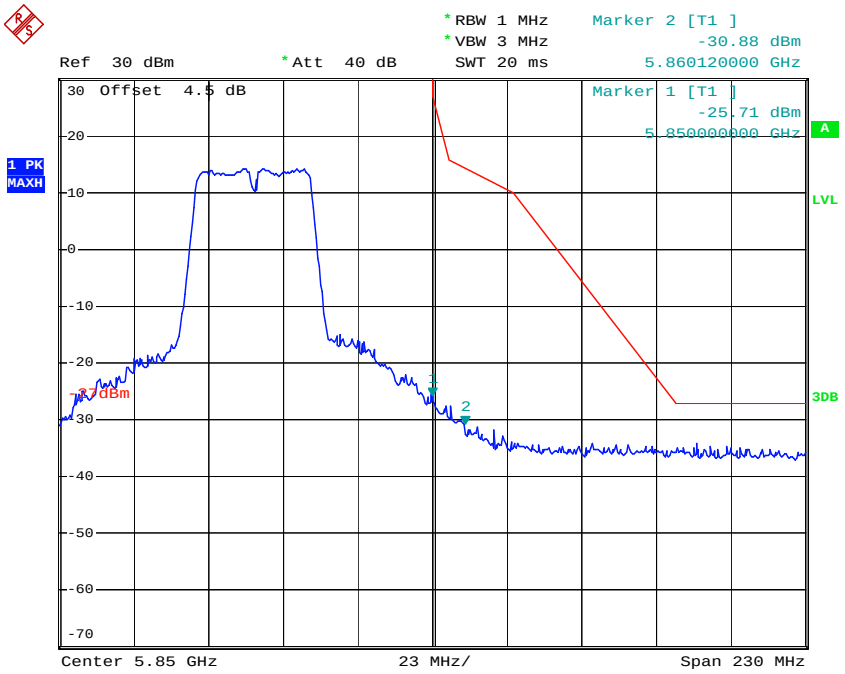
802.11n ht40 Low Channel



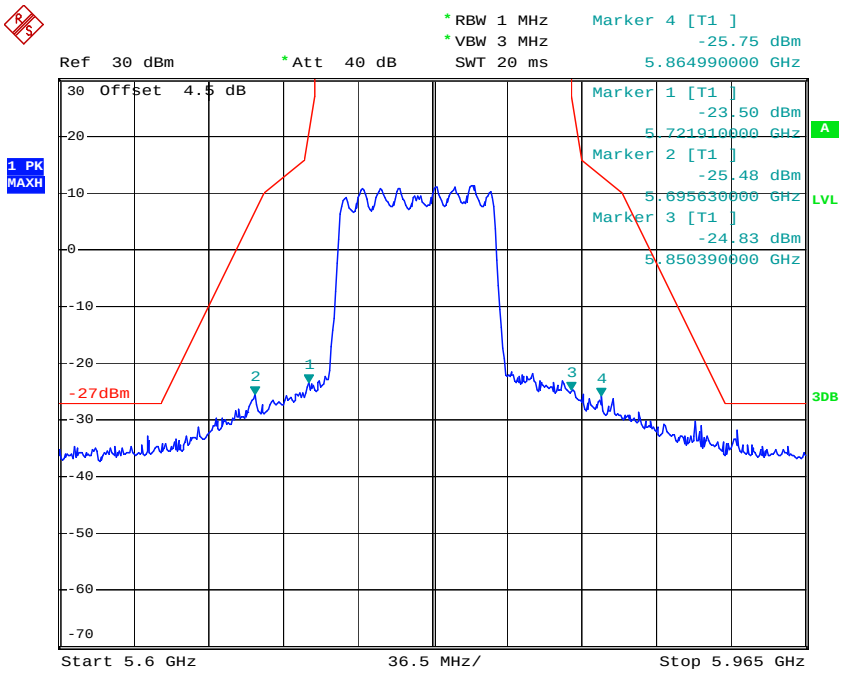
Date: 13.SEP.2017 15:30:16

802.11n ht40 High Channel



Date: 13.SEP.2017 15:31:44

802.11n ac80 Middle Channel



Date: 13.SEP.2017 15:26:27

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

Applicable Standard

15.407(a) (e)

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESPI	100120	2016-12-08	2017-12-08
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:	24.4°C
Relative Humidity:	48 %
ATM Pressure:	100.4 kPa

The testing was performed by Gavin Xu on 2017-09-13.

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	22.64	16.8
	Middle	5200	20.56	16.8
	High	5240	20.56	16.8
802.11n ht20	Low	5180	21.44	17.76
	Middle	5200	21.36	17.76
	High	5240	21.2	17.76
802.11n ht40	Low	5190	41.76	36.96
	High	5230	41.76	36.8
802.11ac80	Middle	5210	83.2	75.84

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:

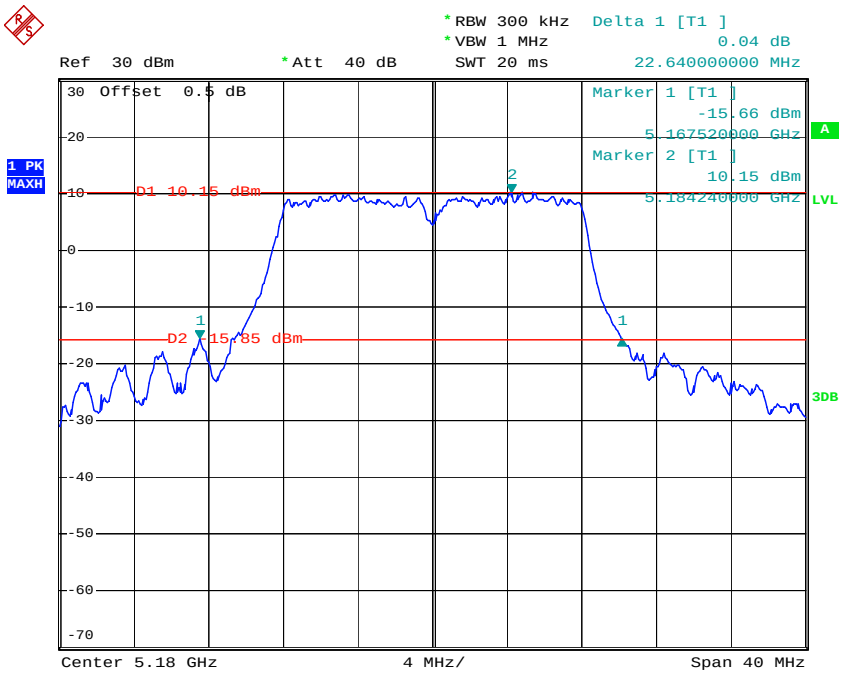
Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
802.11 a	Low	5745	17.28
	Middle	5785	18
	High	5825	20.8
802.11n ht20	Low	5745	17.76
	Middle	5785	17.76
	High	5825	17.76
802.11n ht40	Low	5755	36.96
	High	5795	36.96
802.11ac80	Middle	5775	75.84

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

Mode	Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limits (MHz)
802.11 a	Low	5745	16.56	≥0.5
	Middle	5785	16.64	≥0.5
	High	5825	16.56	≥0.5
802.11n ht20	Low	5745	17.6	≥0.5
	Middle	5785	17.76	≥0.5
	High	5825	17.68	≥0.5
802.11n ht40	Low	5755	36.64	≥0.5
	High	5795	36.64	≥0.5
802.11ac80	Middle	5775	76.48	≥0.5

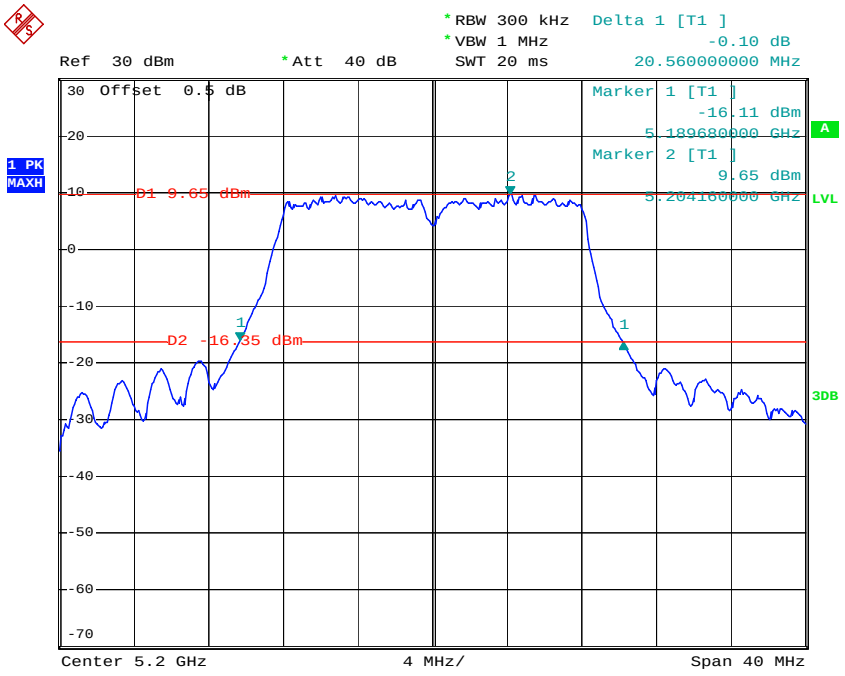
5150-5250MHz: 26dB Emission Bandwidth:

802.11a Low Channel



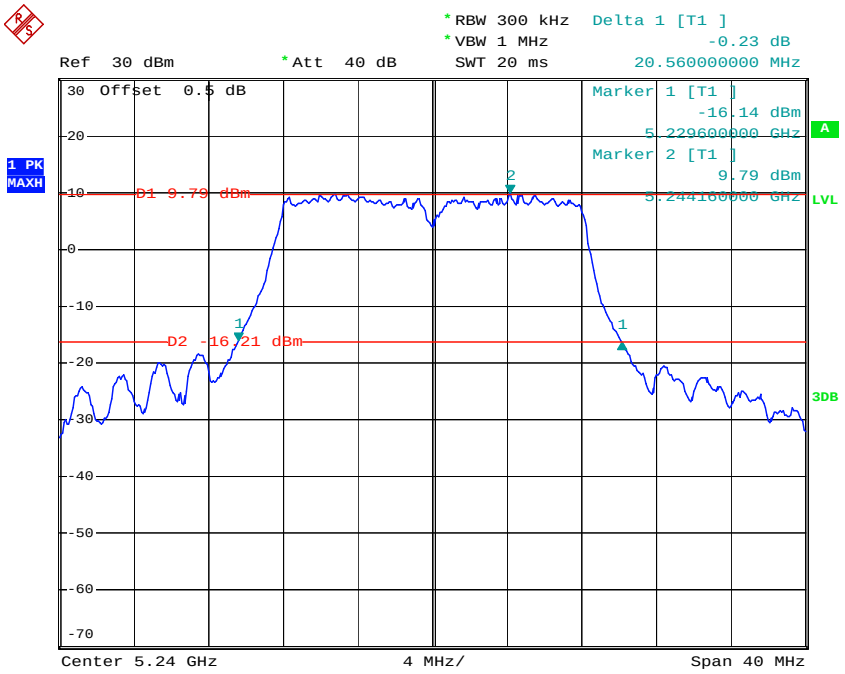
Date: 13.SEP.2017 11:04:21

802.11a Middle Channel



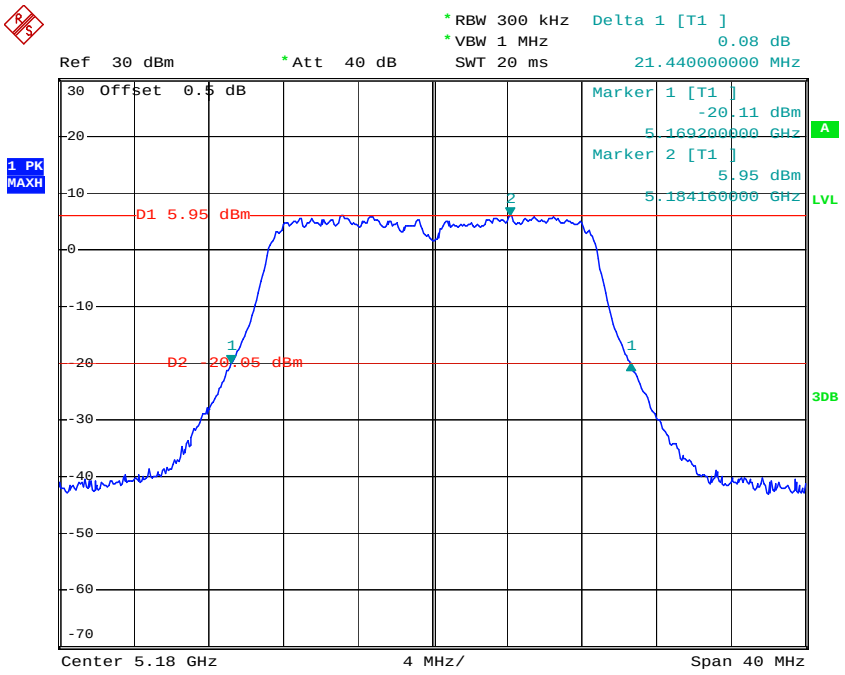
Date: 13.SEP.2017 11:07:08

802.11a High Channel



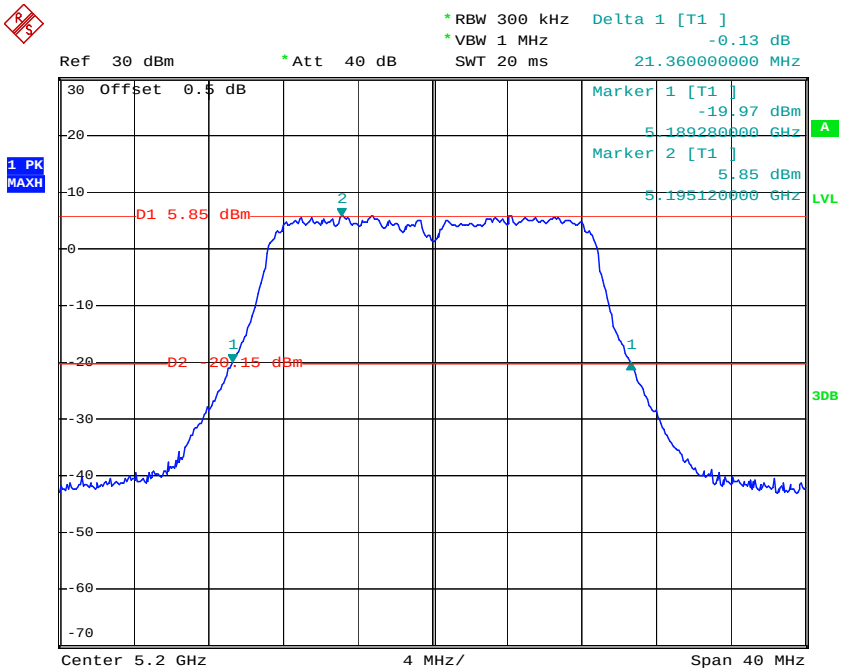
Date: 13.SEP.2017 11:09:26

802.11n ht20 Low Channel



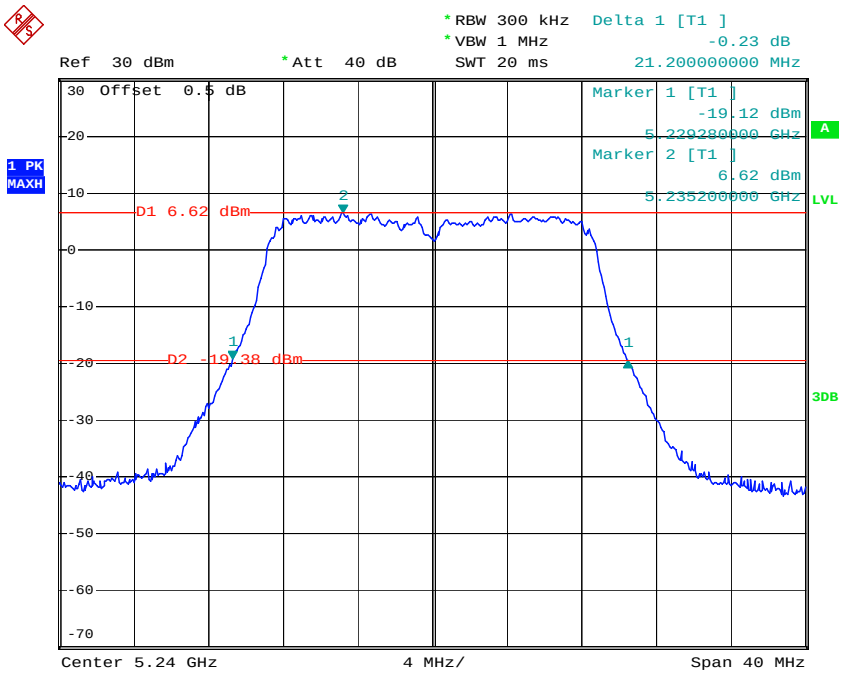
Date: 13.SEP.2017 11:22:08

802.11n ht20 Middle Channel



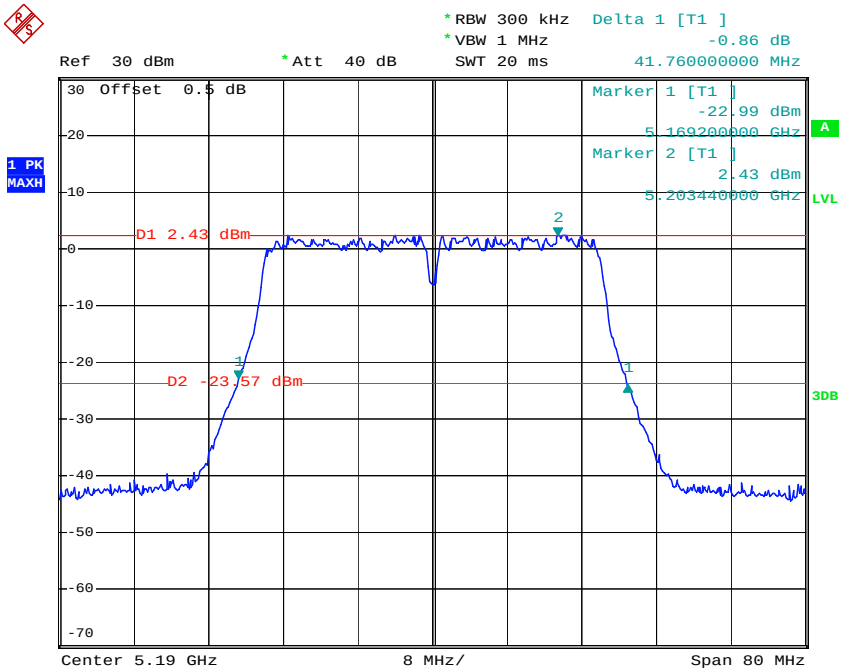
Date: 13.SEP.2017 11:19:19

802.11n ht20 High Channel



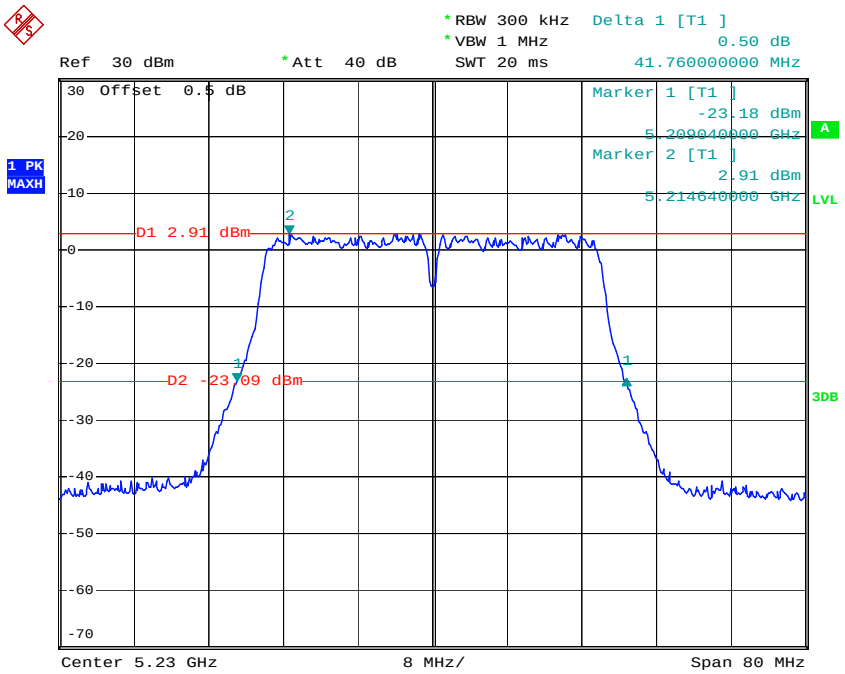
Date: 13.SEP.2017 11:16:58

802.11n ht40 Low Channel



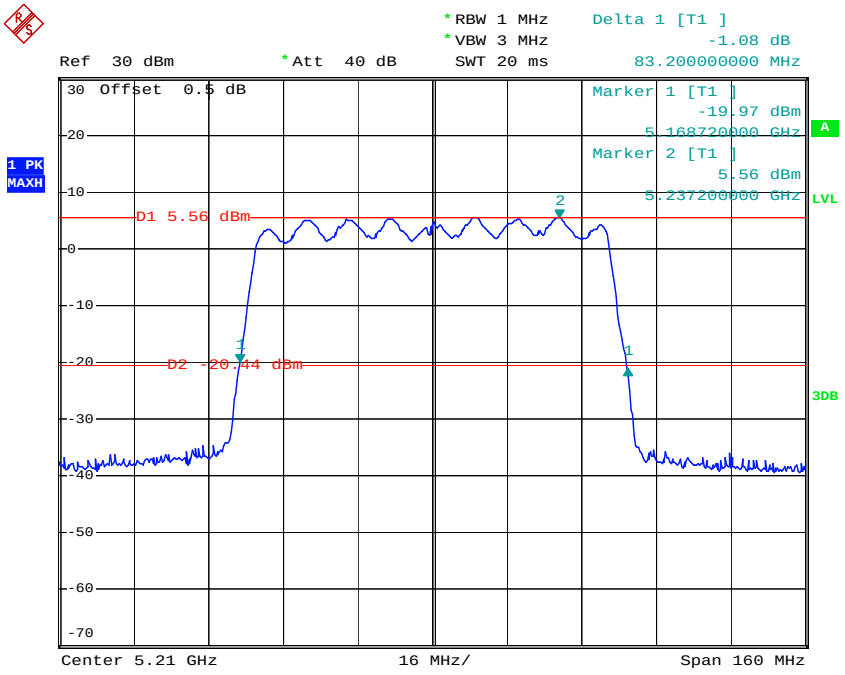
Date: 13.SEP.2017 11:29:15

802.11n ht40 High Channel



Date: 13.SEP.2017 11:30:33

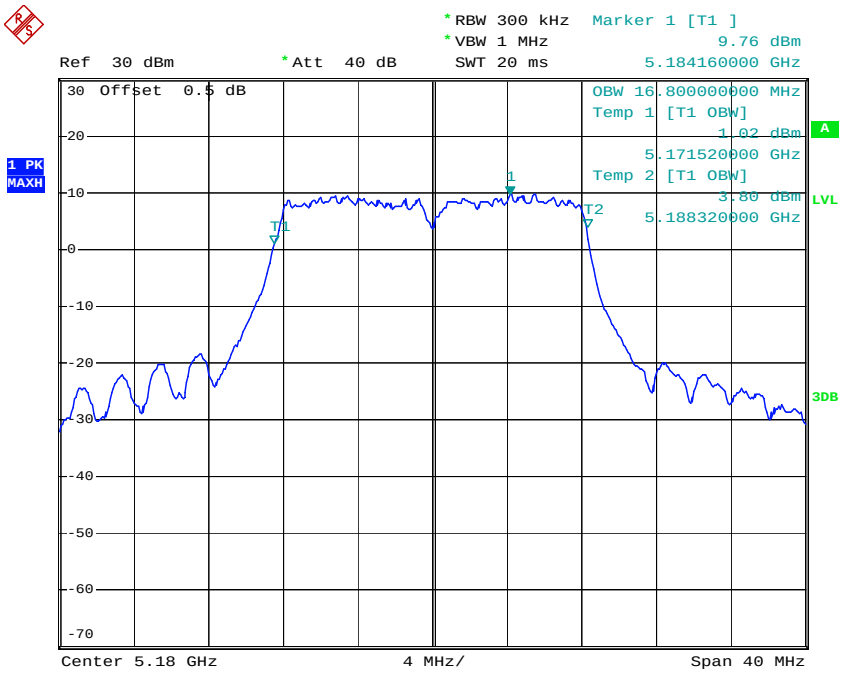
802.11ac80 Middle Channel



Date: 13.SEP.2017 11:39:01

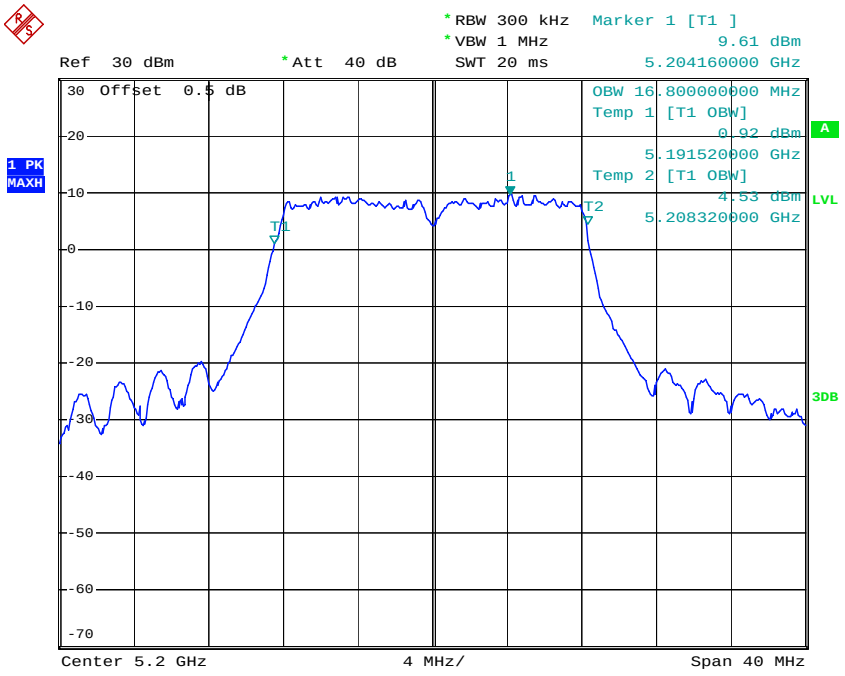
99% Occupied Bandwidth

802.11a Low Channel



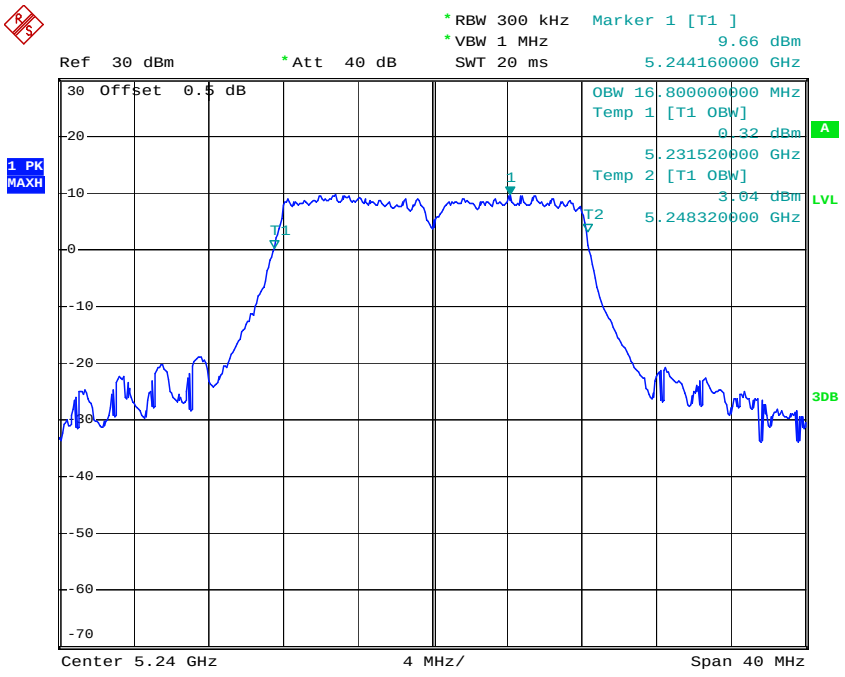
Date: 13.SEP.2017 11:04:33

802.11a Middle Channel



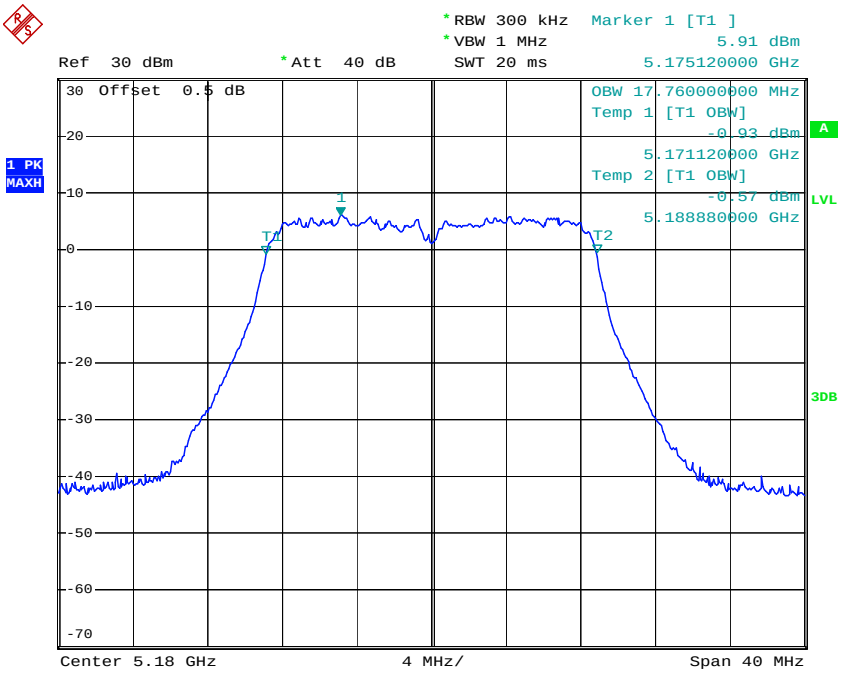
Date: 13.SEP.2017 11:07:19

802.11a High Channel



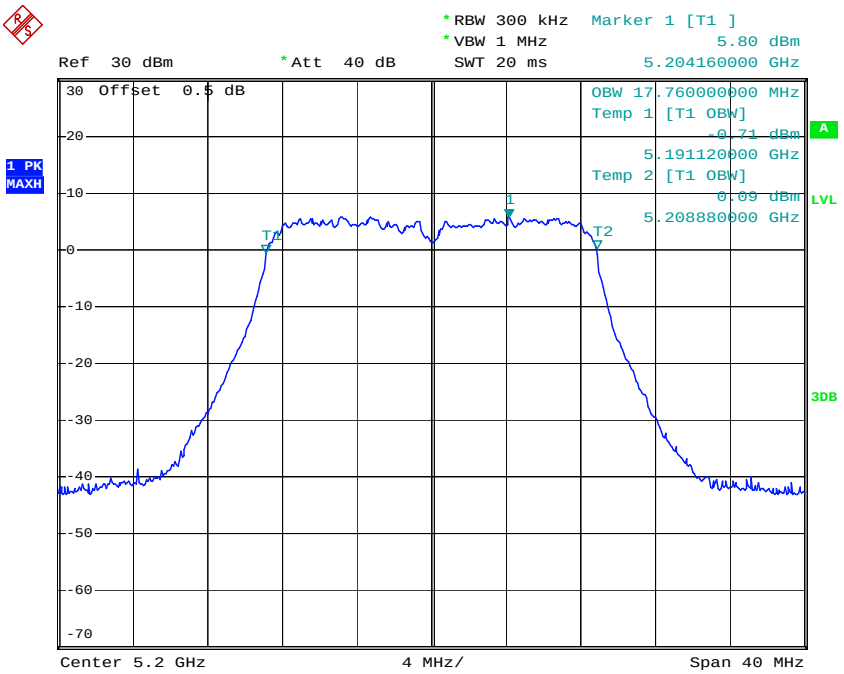
Date: 13.SEP.2017 11:09:38

802.11n ht20 Low Channel



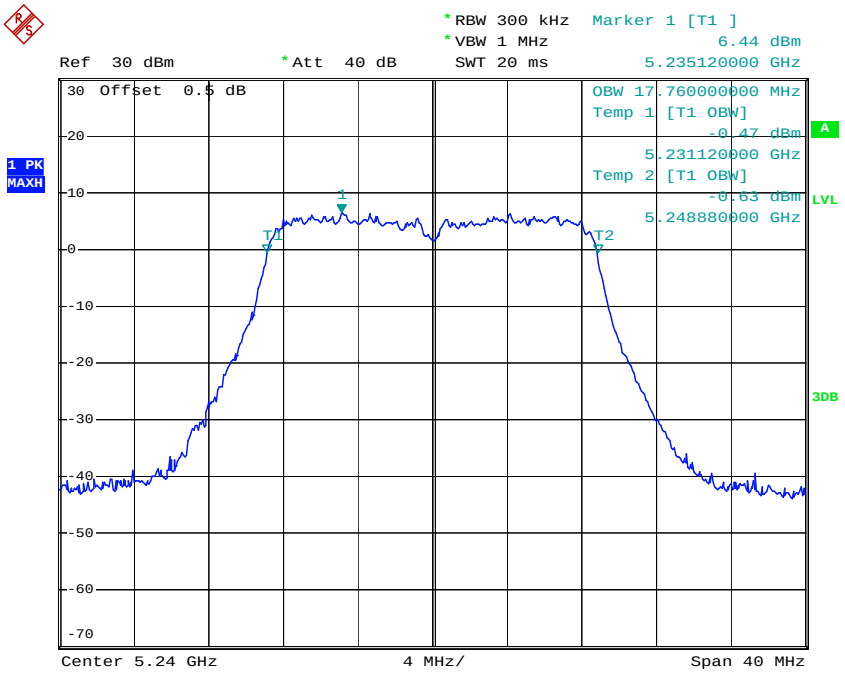
Date: 13.SEP.2017 11:22:20

802.11n ht20 Middle Channel



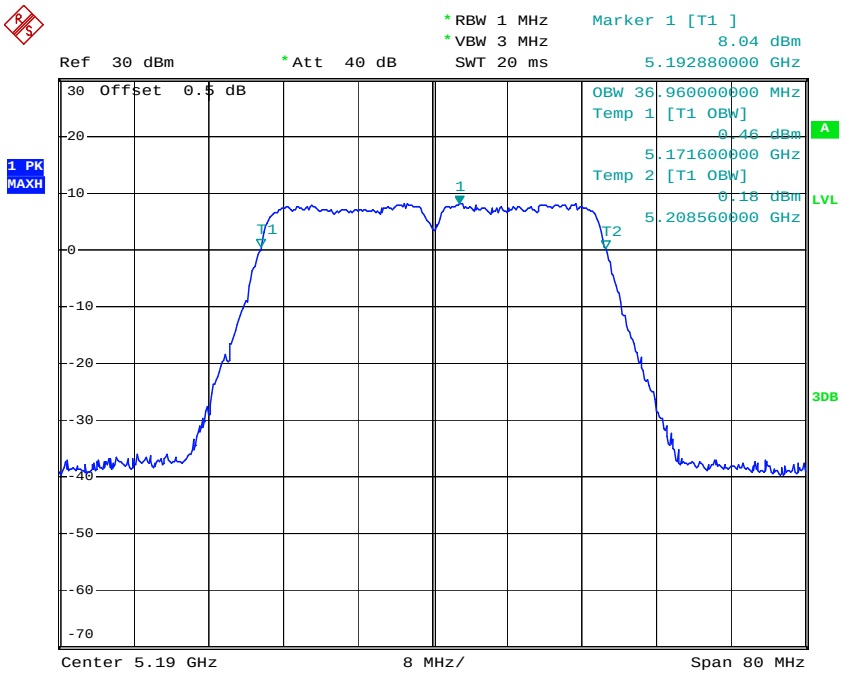
Date: 13.SEP.2017 11:19:32

802.11n ht20 High Channel



Date: 13.SEP.2017 11:17:11

802.11n ht40 Low Channel



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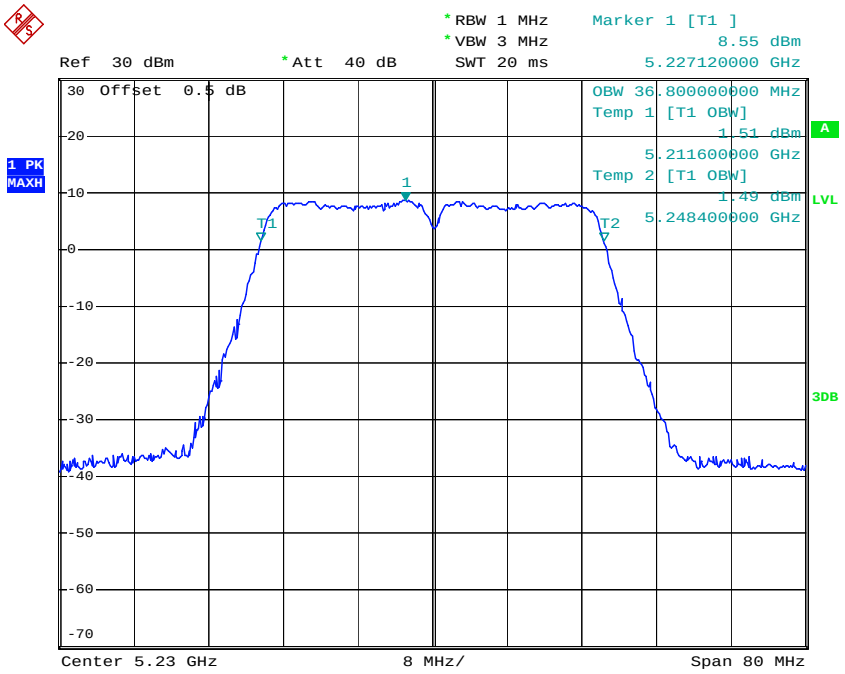
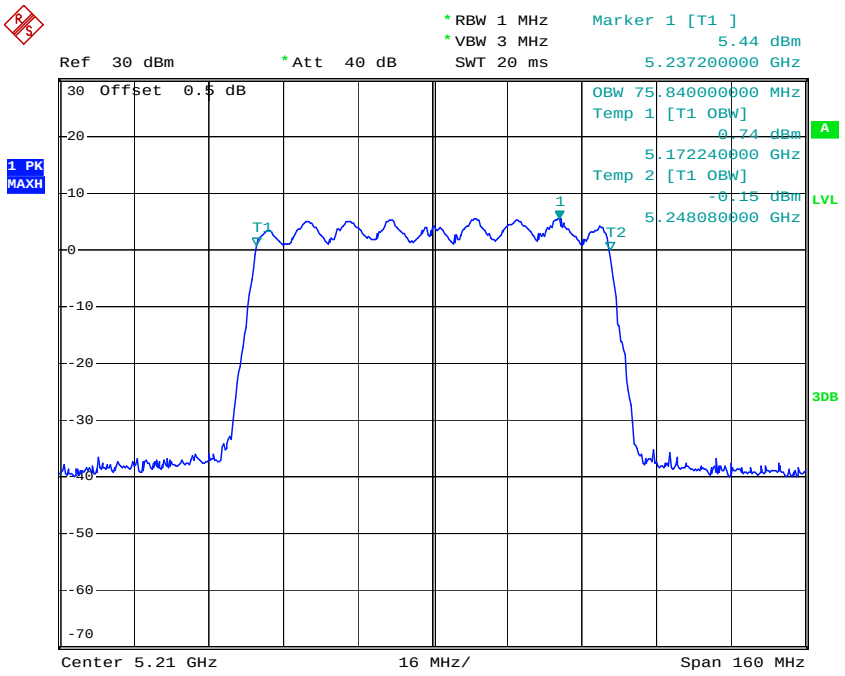
802.11n ht40 High Channel



Date: 13.SEP.2017 11:30:46

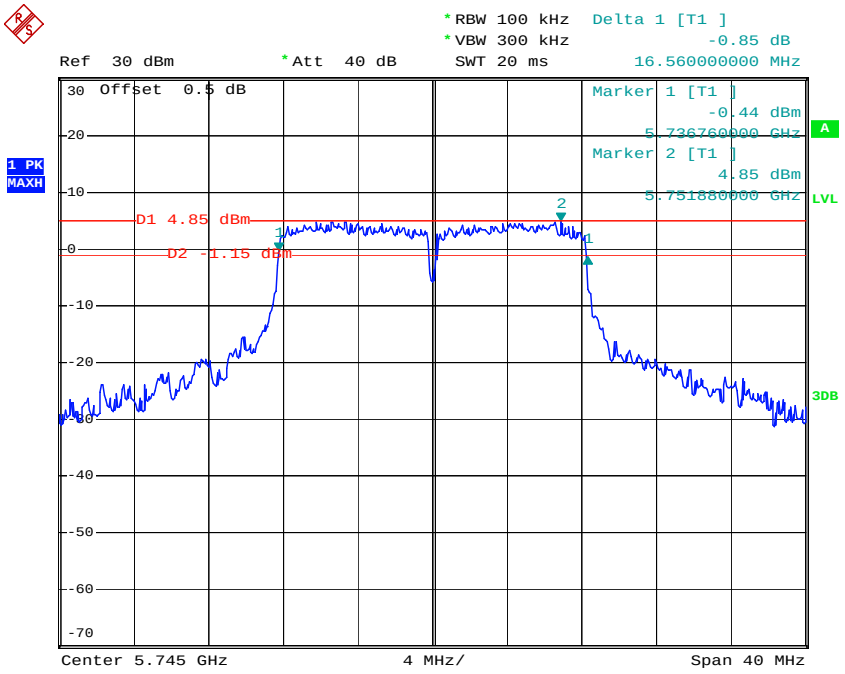
802.11ac80 Middle Channel



Date: 13.SEP.2017 11:39:14

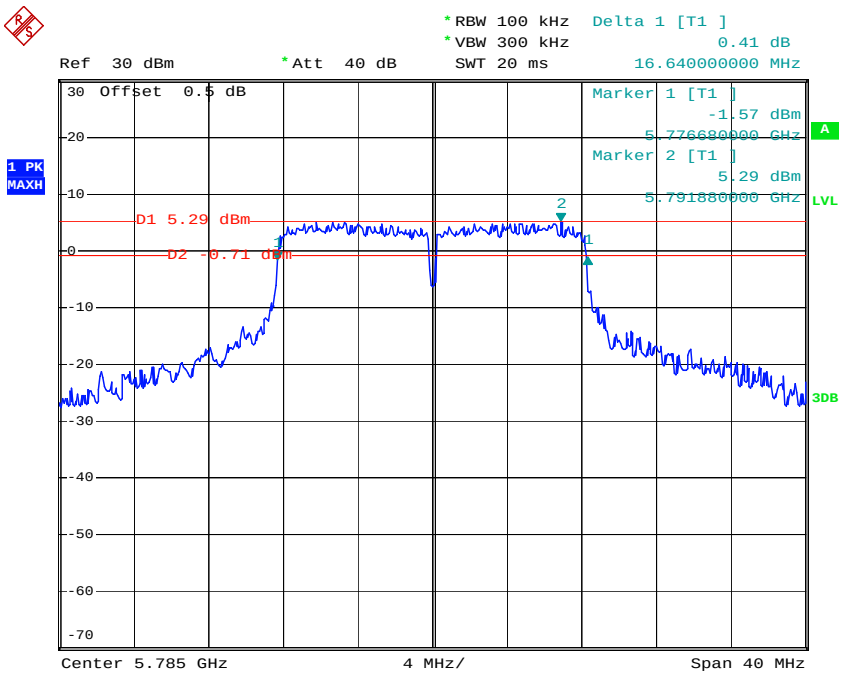
5725-5850MHz:
6dB Bandwidth:

802.11a Low Channel



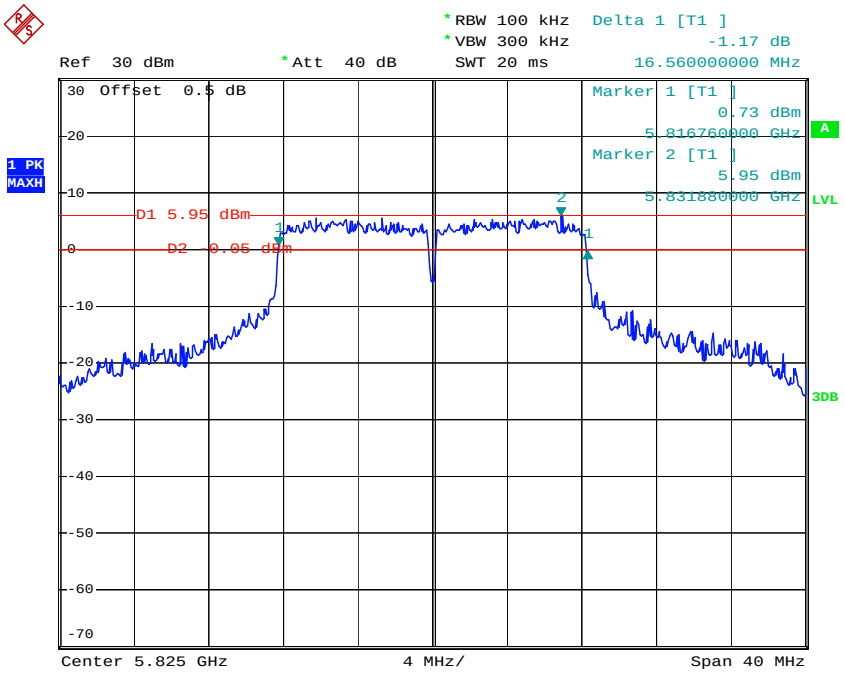
Date: 13.SEP.2017 14:57:08

802.11a Middle Channel



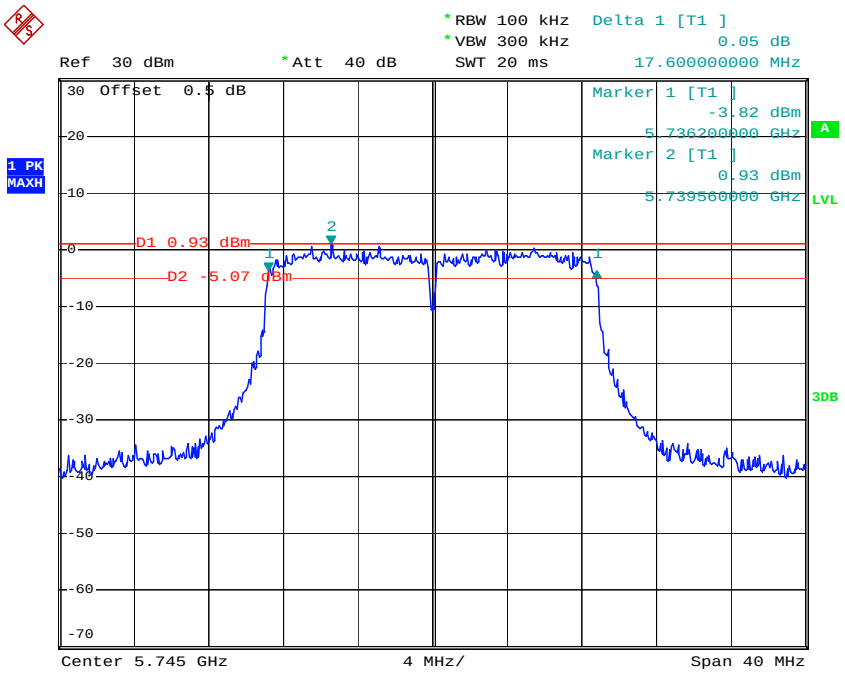
Date: 13.SEP.2017 14:59:01

802.11a High Channel



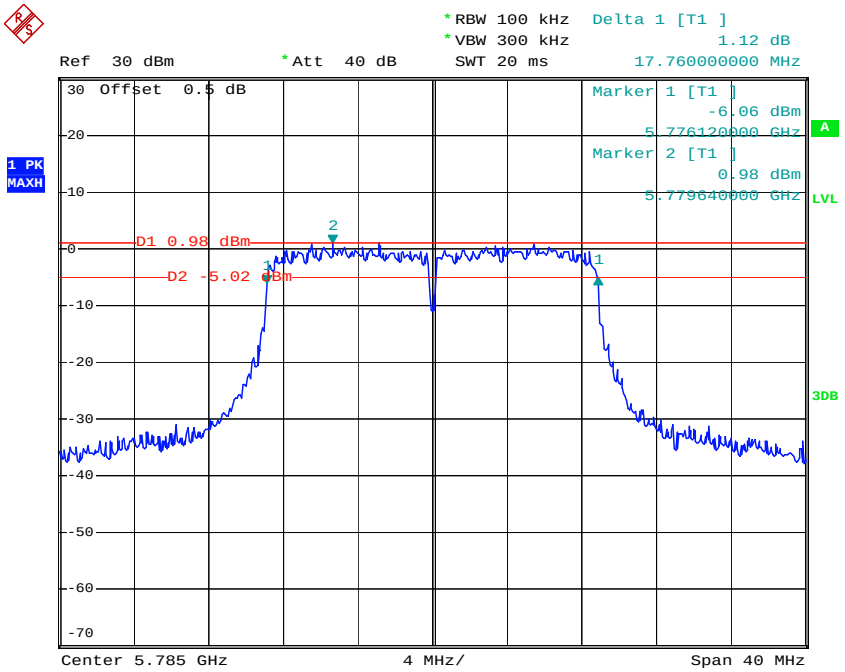
Date: 13.SEP.2017 15:00:19

802.11ht20 Low Channel



Date: 13.SEP.2017 15:10:31

802.11ht20 Middle Channel



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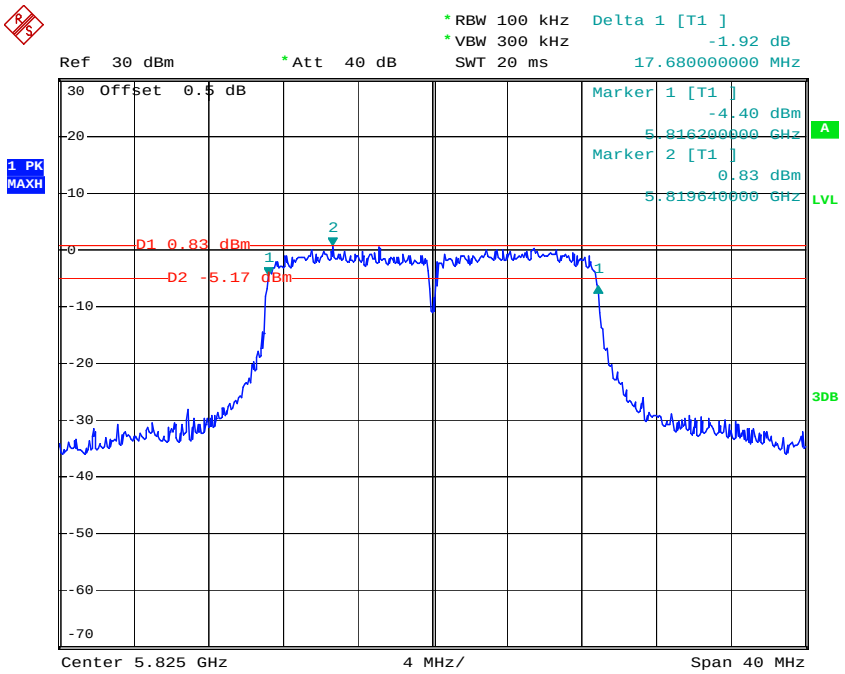
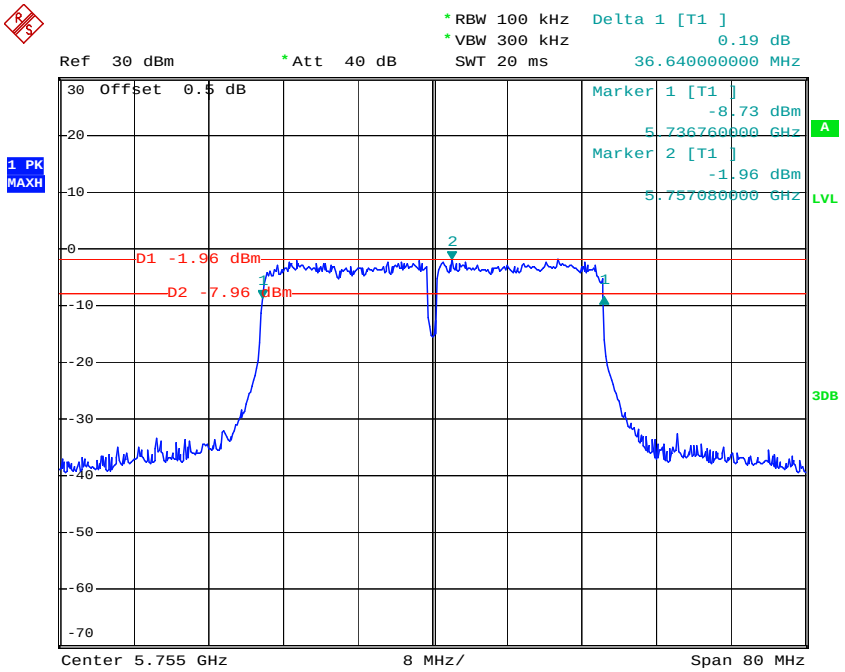
802.11ht20 High Channel



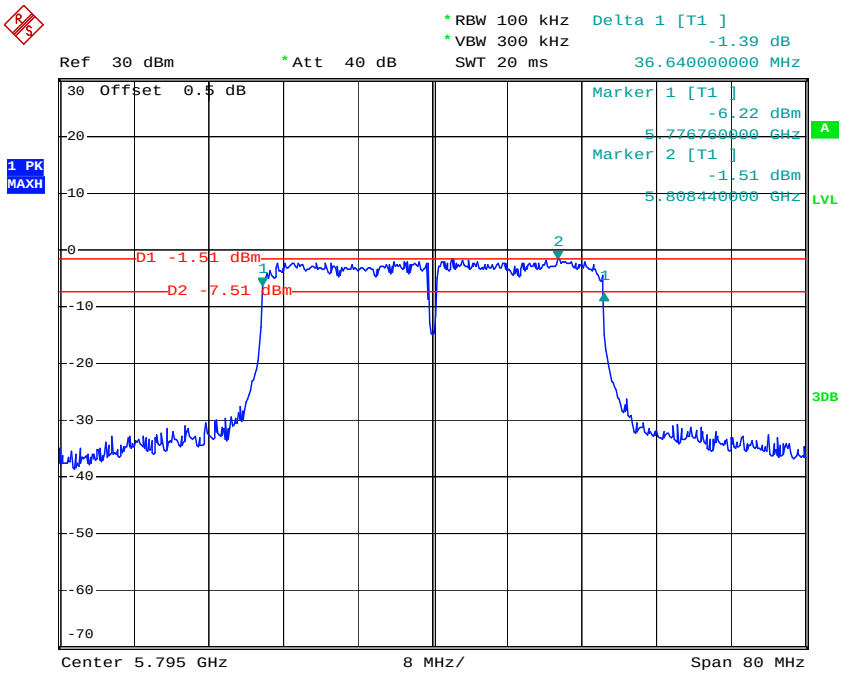
Date: 13.SEP.2017 15:06:16

802.11ht40 Low Channel



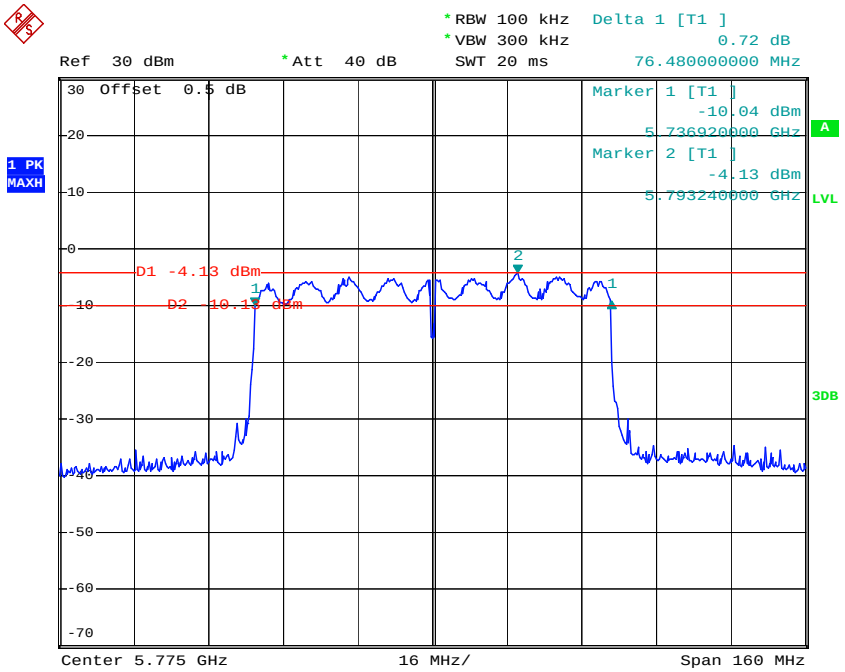
Date: 13.SEP.2017 15:15:28

802.11ht40 High Channel



Date: 13.SEP.2017 15:19:05

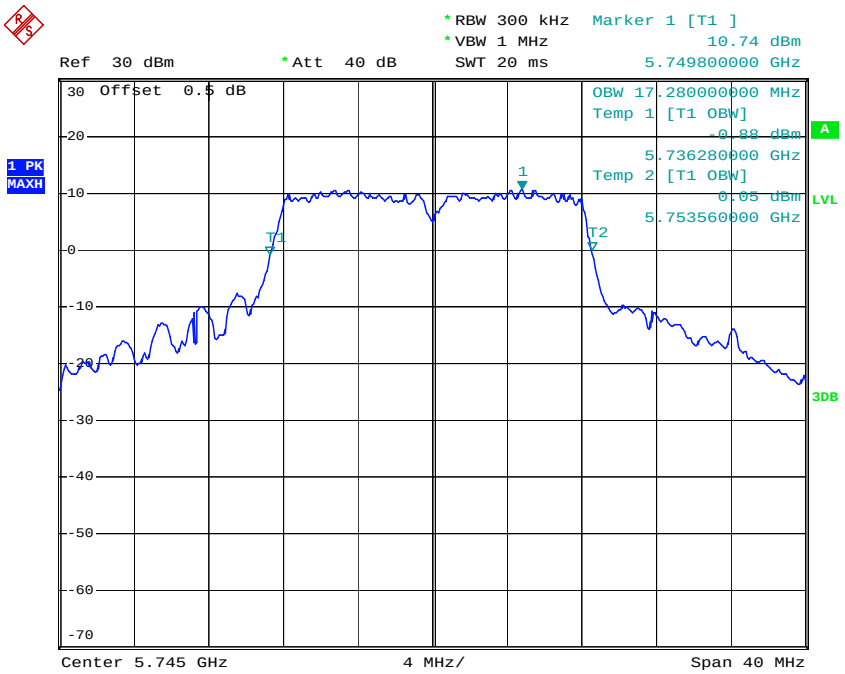
802.11ac80 Middle Channel



Date: 13.SEP.2017 15:22:39

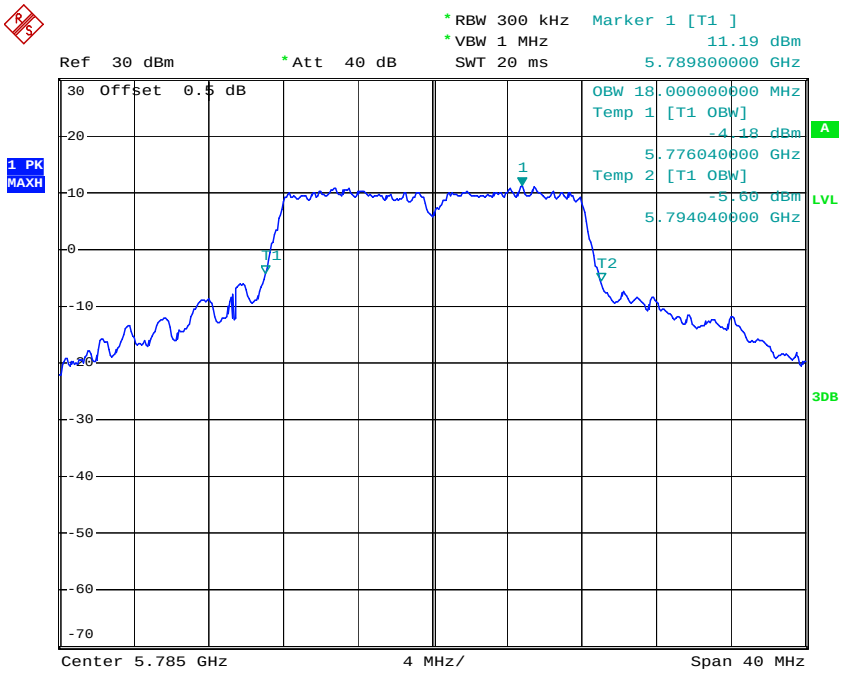
99% Occupied Bandwidth:

802.11a Low Channel



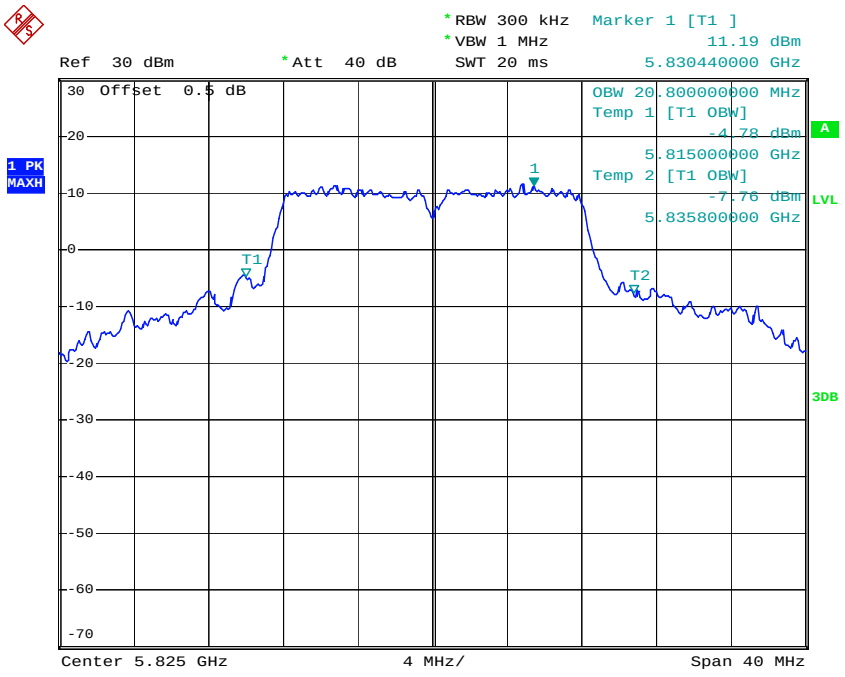
Date: 13.SEP.2017 14:57:19

802.11a Middle Channel



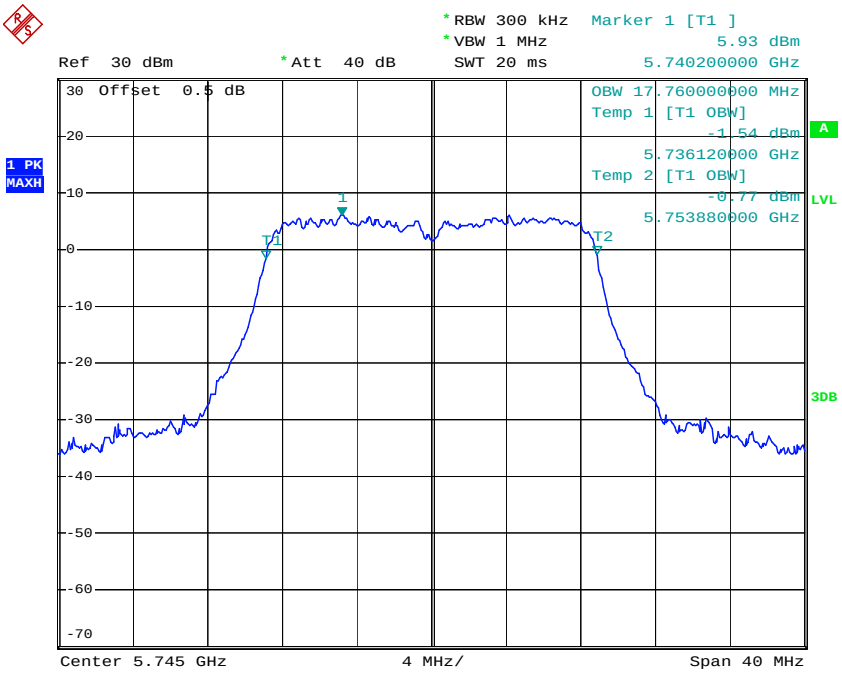
Date: 13.SEP.2017 14:59:14

802.11a High Channel



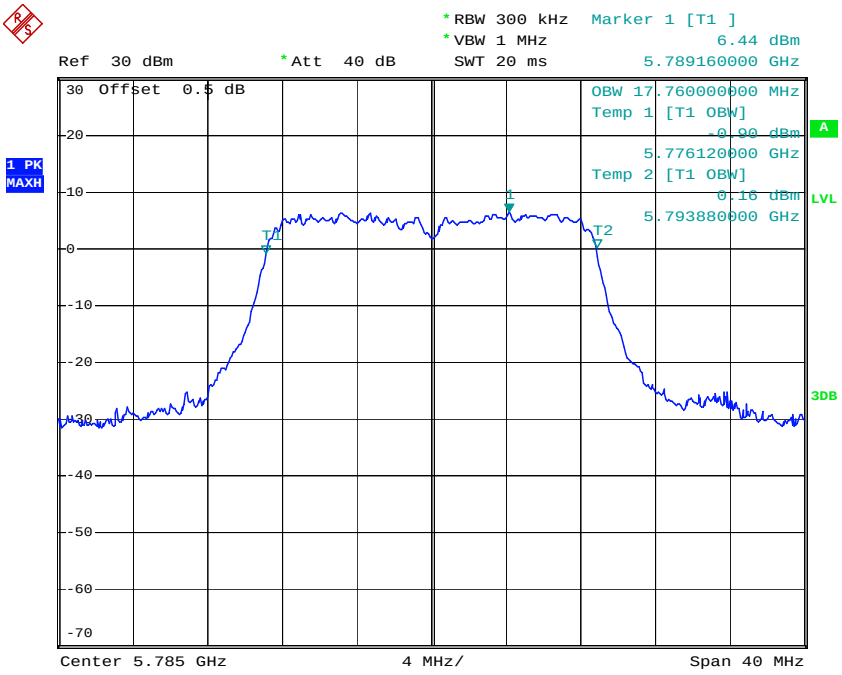
Date: 13.SEP.2017 15:00:31

802.11ht20 Low Channel



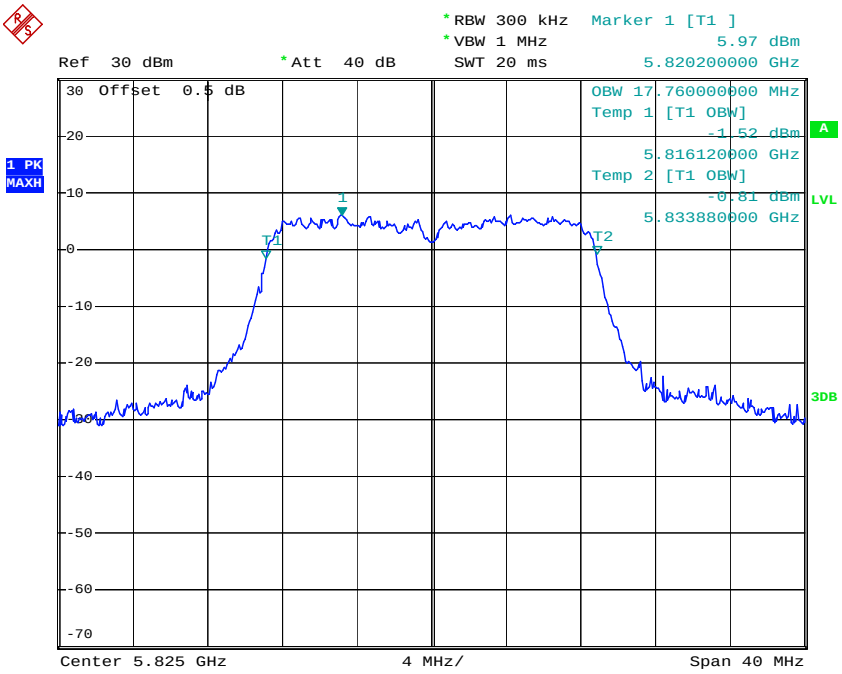
Date: 13.SEP.2017 15:10:45

802.11ht20 Middle Channel



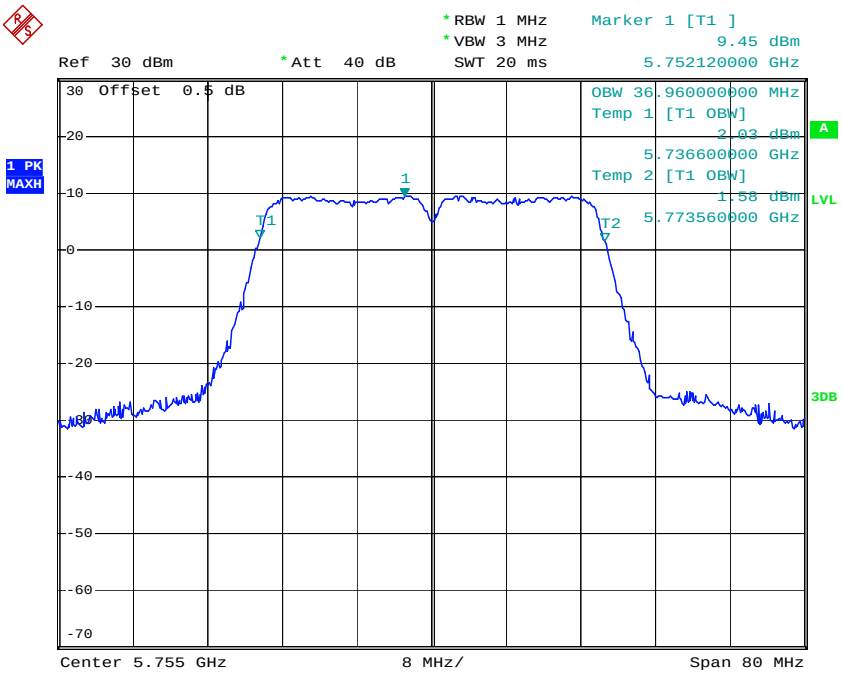
Date: 13.SEP.2017 15:12:13

802.11ht20 High Channel



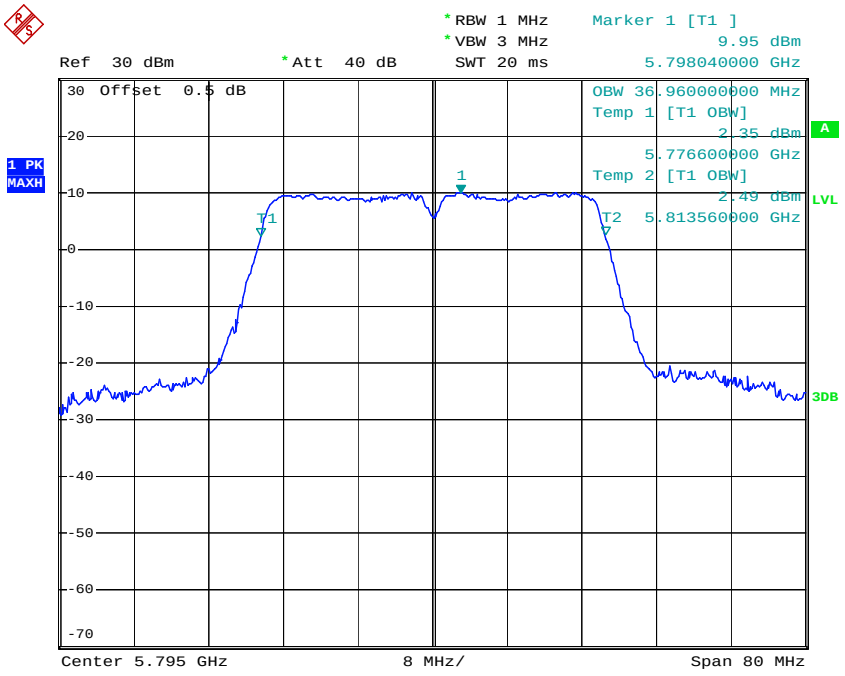
Date: 13.SEP.2017 15:06:28

802.11ht40 Low Channel



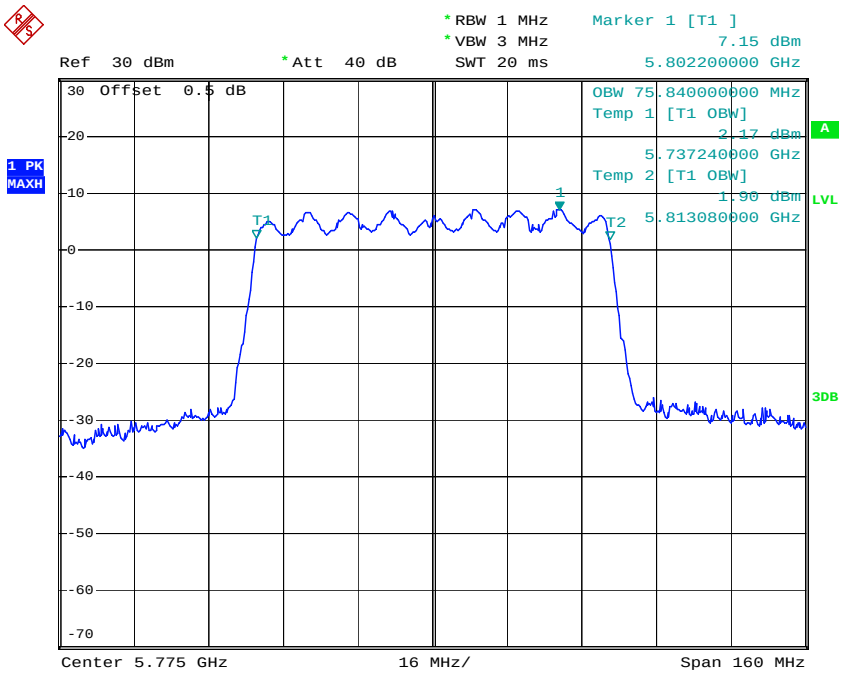
Date: 13.SEP.2017 15:15:40

802.11ht40 High Channel



Date: 13.SEP.2017 15:19:18

802.11ac80 Middle Channel



Date: 13.SEP.2017 15:22:51

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	FSEM	DE23437	2016-11-22	2017-11-22
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:	25.8 °C
Relative Humidity:	58.6 %
ATM Pressure:	100.1 kPa

The testing was performed by Gavin Xu on 2017-09-14.

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	5170.7415	5248.6172	f_L and f_H Within 5150~5250MHz range
10		5170.7418	5248.6179	
20		5170.7419	5248.6176	
30		5170.7412	5248.6173	
40		5170.7409	5248.6166	
25	102	5170.7404	5248.6176	
25	138	5170.7409	5248.6167	

802.11n ht20:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5171.0621	5249.0177	f_L and f_H Within 5150~5250MHz range
10		5171.0623	5249.0189	
20		5171.0624	5249.0145	
30		5171.0625	5249.0179	
40		5171.0626	5249.0188	
25	102	5171.0624	5249.0182	
25	138	5171.0622	5249.0183	

802.11n ht40:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5171.3226	5248.3567	f_L and f_H Within 5150~5250MHz range
10		5171.3223	5248.3564	
20		5171.3221	5248.3562	
30		5171.3224	5248.3564	
40		5171.3222	5248.3563	
25	102	5171.3221	5248.3562	
25	138	5171.3222	5248.3561	

802.11ac80:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5172.0042	5247.9967	f_L and f_H Within 5150~5250MHz range
10		5172.0045	5247.9955	
20		5172.0041	5247.9946	
30		5172.0045	5247.9942	
40		5172.0043	5247.9953	
25	102	5172.0041	5247.9952	
25	138	5172.0044	5247.9959	

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	5736.6274	5833.4556	f_L and f_H Within 5725~5850MHz range
10		5736.6255	5833.4575	
20		5736.6274	5833.4588	
30		5736.6255	5833.4574	
40		5736.6222	5833.4567	
25	102	5736.6274	5833.4565	
25	138	5736.6245	5833.4562	

802.11n ht20:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5735.9819	5834.0984	f_L and f_H Within 5725~5850MHz range
10		5735.9812	5834.0912	
20		5735.9813	5834.0923	
30		5735.9812	5834.0967	
40		5735.9813	5834.0982	
25	102	5735.9802	5834.0981	
25	138	5735.9841	5834.0983	

802.11n ht40:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5736.6437	5813.5169	f_L and f_H Within 5725~5850MHz range
10		5736.6440	5813.5158	
20		5736.6454	5813.5165	
30		5736.6452	5813.5157	
40		5736.6437	5813.5177	
25	102	5736.6438	5813.5175	
25	138	5736.6435	5813.5172	

802.11ac80:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5737.0040	5812.9952	f_L and f_H Within 5725~5850MHz range
10		5737.0049	5812.9954	
20		5737.0045	5812.9952	
30		5737.0042	5812.9959	
40		5737.0044	5812.9954	
25	102	5737.0045	5812.9953	
25	138	5737.0064	5812.9952	

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	2016-11-03	2017-11-03
Agilent	Wideband Power Sensor	N1921A	MY54170013	2016-11-03	2017-11-03
Agilent	P-Series Power Meter	N1912A	MY5000448	2016-11-03	2017-11-03
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:	28.2 °C
Relative Humidity:	56.4 %
ATM Pressure:	100.1 kPa

The testing was performed by Gavin Xu on 2017-08-23.

Test Mode: Transmitting

UNII Band	Mode	Channel	Frequency (MHz)	Conducted Average Output Power (dBm)			Limit (dBm)	Result
				Chain 0	Chain 1	Total		
5150-5250MHz	802.11 a	Low	5180	17.55	15.14	/	30	PASS
		Middle	5200	17.52	17.68	/	30	PASS
		High	5240	17.57	13.62	/	30	PASS
	802.11ht20	Low	5180	13.99	13.65	16.83	30	PASS
		Middle	5200	13.68	13.75	16.73	30	PASS
		High	5240	13.67	13.69	16.69	30	PASS
	802.11ht40	Low	5190	13.41	13.61	16.52	30	PASS
		High	5230	13.72	13.72	16.73	30	PASS
	802.11 ac80	Middle	5210	11.7	12.77	15.28	30	PASS
5725-5850MHz	802.11 a	Low	5745	17.77	20.65	/	30	PASS
		Middle	5785	17.81	17.62	/	30	PASS
		High	5825	17.93	17.11	/	30	PASS
	802.11ht20	Low	5745	13.65	14.54	17.13	30	PASS
		Middle	5785	13.86	13.78	16.83	30	PASS
		High	5825	13.89	13.75	16.83	30	PASS
	802.11ht40	Low	5755	13.87	14.03	16.96	30	PASS
		High	5795	13.98	13.8	16.9	30	PASS
	802.11 ac80	Middle	5775	12.72	13.41	16.09	30	PASS

Note 1: The maximum antenna gain is 4dBi 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 = 4dBi < 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	EMI Test Receiver	ESPI	100120	2016-12-08	2017-12-08
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:	24.4°C
Relative Humidity:	48 %
ATM Pressure:	100.4 kPa

The testing was performed by Gavin Xu on 2017-09-13.

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	7.41	7.00	/	17
	5200	7.34	7.33	/	17
	5240	7.52	7.41	/	17
802.11 ht20	5180	3.76	3.56	6.67	16
	5200	3.65	3.90	6.79	16
	5240	4.04	3.76	6.91	16
802.11 ht40	5190	0.12	1.04	3.61	16
	5230	0.42	0.43	3.44	16
802.11 ac80	5210	-2.28	-1.37	0.91	16

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	4.33	7.09	6.53	9.29	/	30
	5785	4.78	3.93	6.98	6.13	/	30
	5825	4.87	3.3	7.07	5.5	/	30
802.11 ht20	5745	0.16	3.27	2.36	5.47	7.22	29
	5785	0.12	1.07	2.32	3.27	5.85	29
	5825	0.4	0.23	2.6	2.43	5.54	29
802.11 ht40	5755	-2.36	-1.36	-0.16	0.84	3.4	29
	5795	-2.03	-1.68	0.17	0.52	3.38	29
802.11 ac80	5775	-5.08	-4.75	-2.88	-2.55	0.32	29

Note 1:The maximum antenna gain is 4dBi in 5GHz band. The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density (PSD) measurements on the devices:

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

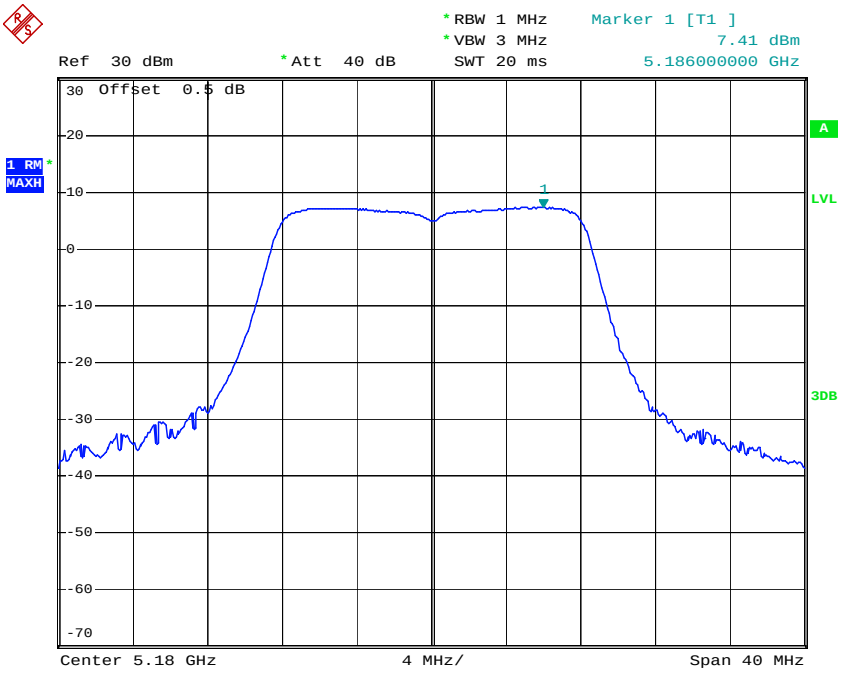
So:

Directional gain = G_{ANT} + Array Gain = 4.0dBi+10*log(2)=7dBi

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.

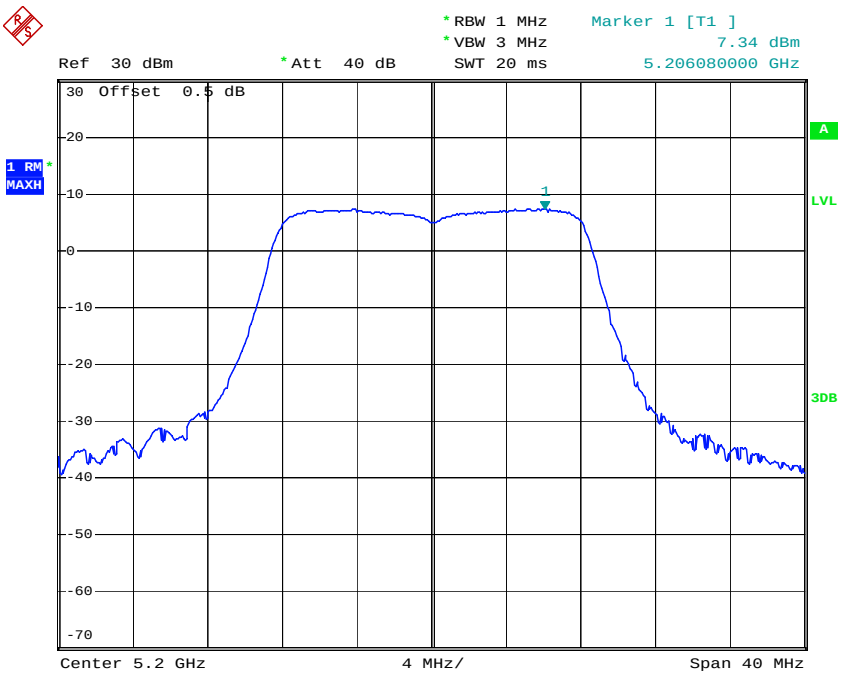
5150-5250MHz
Chain 0:

802.11a Low Channel



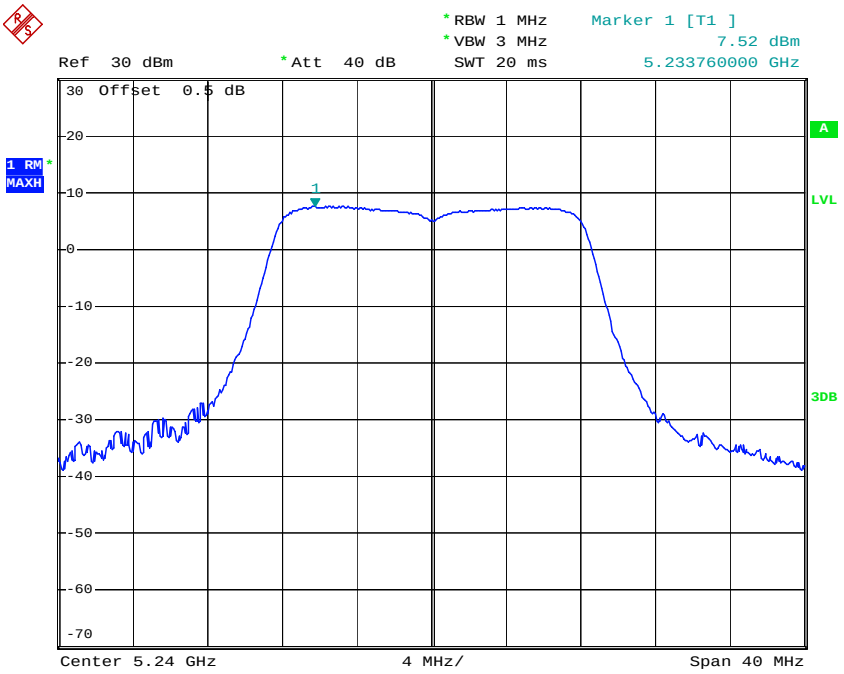
Date: 13.SEP.2017 11:04:44

802.11a Middle Channel



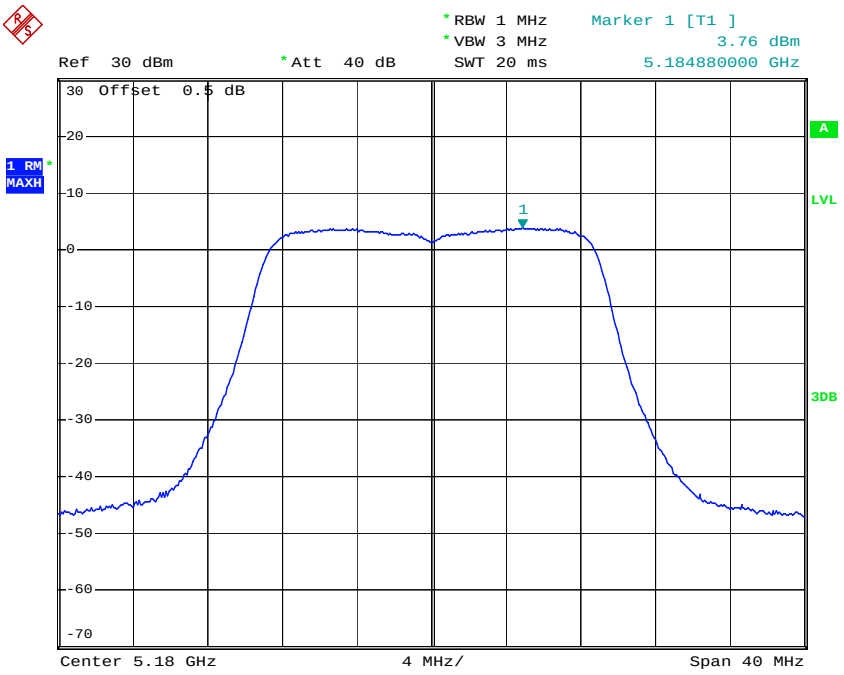
Date: 13.SEP.2017 11:07:30

802.11a High Channel



Date: 13.SEP.2017 11:09:49

802.11n ht20 Low Channel



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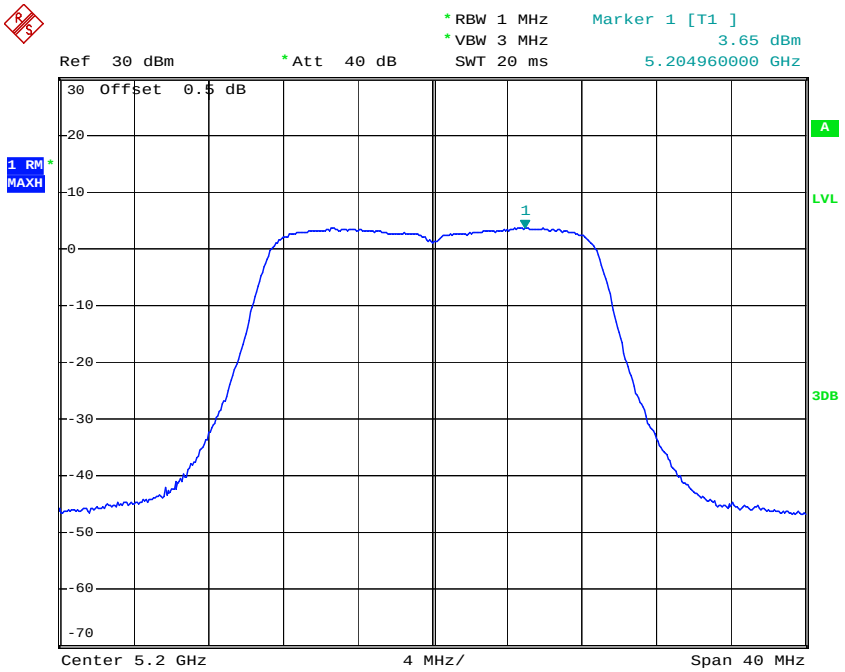
802.11n ht20 Middle Channel



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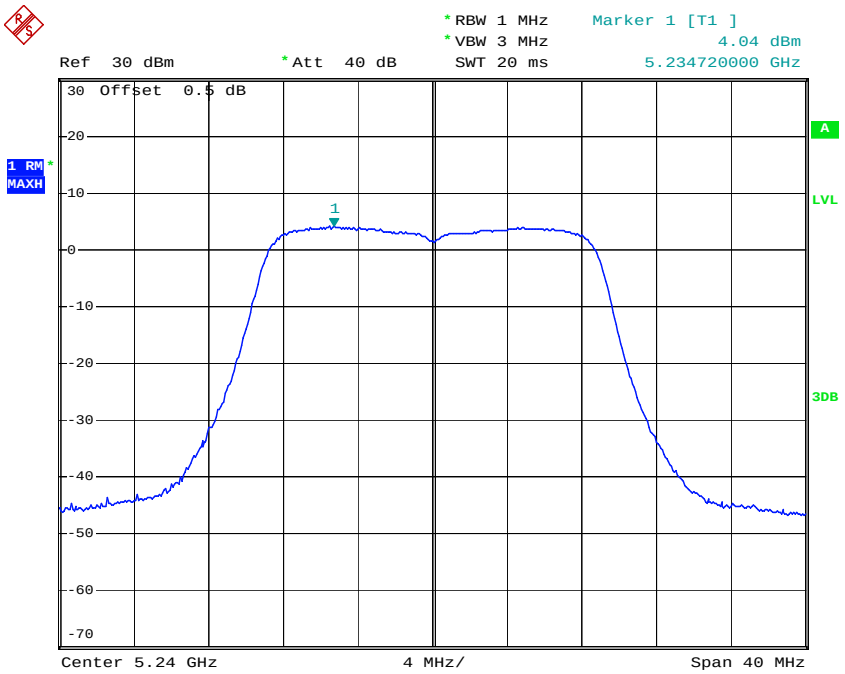

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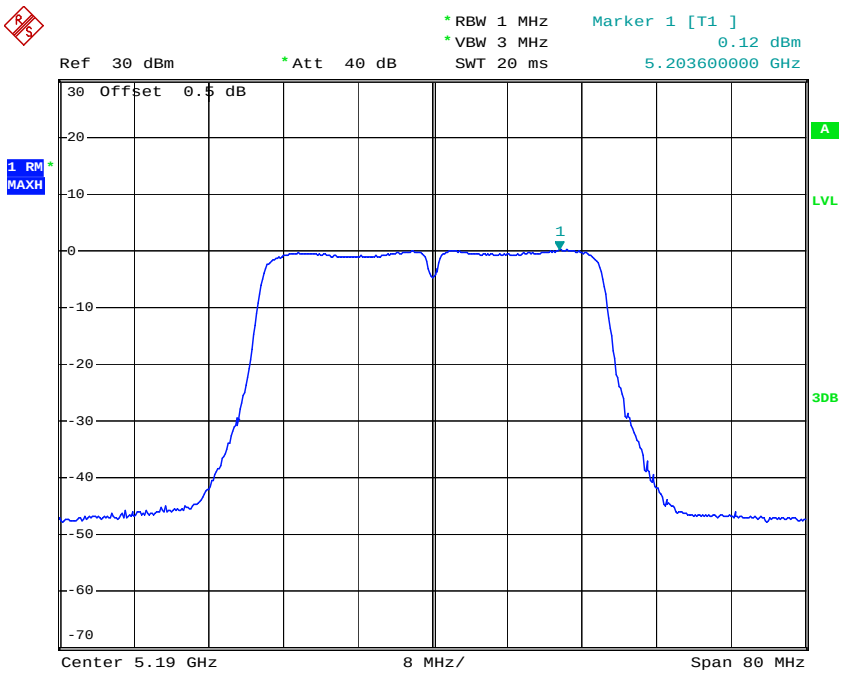
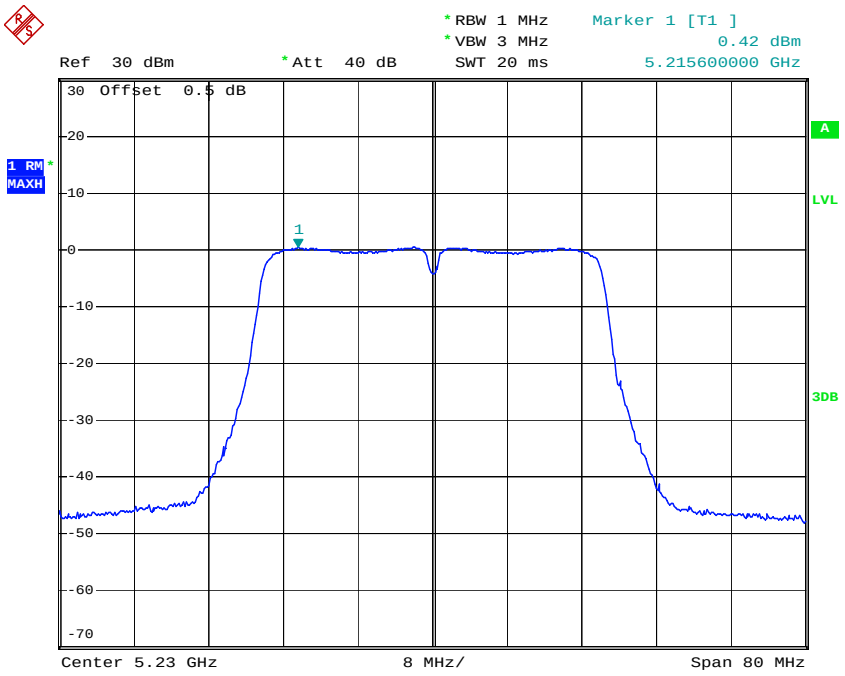
802.11n ht40 Low Channel



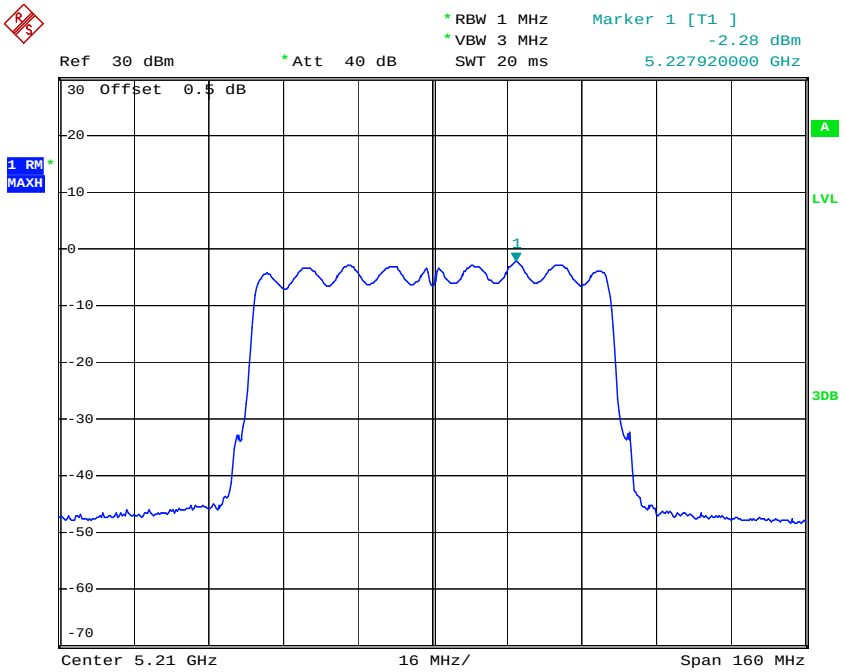
Date: 13.SEP.2017 11:29:36

802.11n ht40 High Channel



Date: 13.SEP.2017 11:30:55

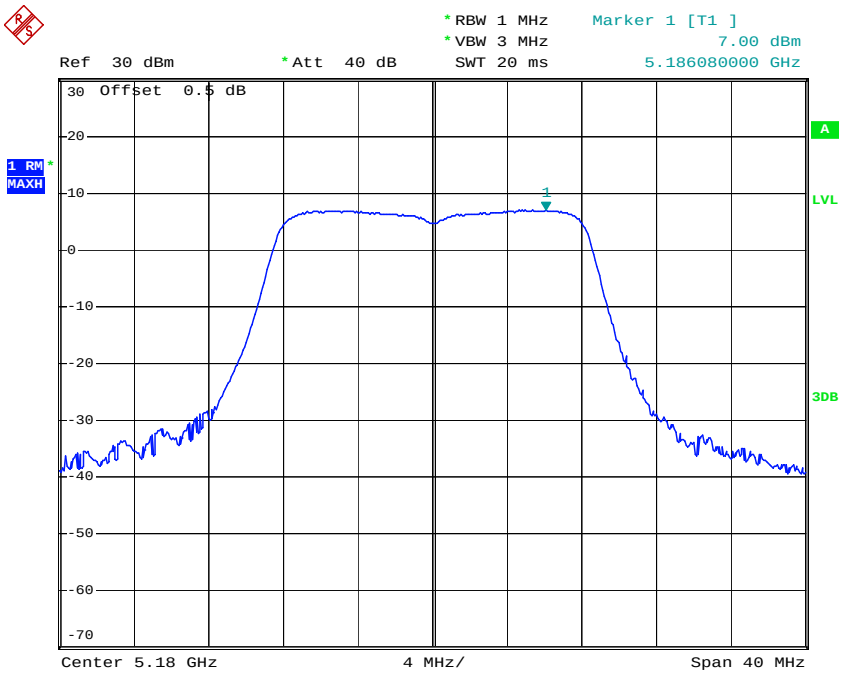
802.11ac80 Middle Channel



Date: 13.SEP.2017 11:39:23

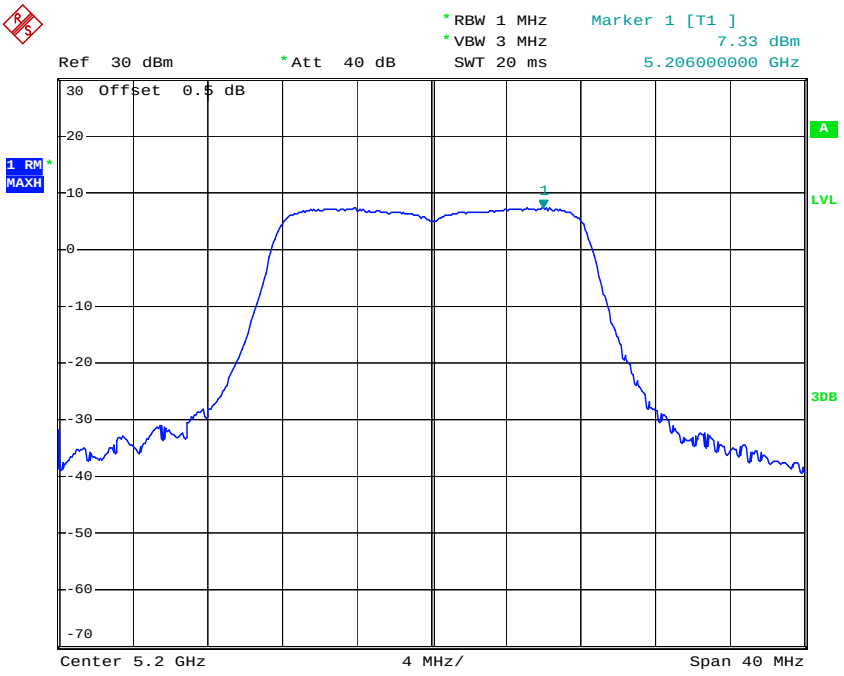
Chain 1:

802.11a Low Channel



Date: 13.SEP.2017 11:12:25

802.11a Middle Channel



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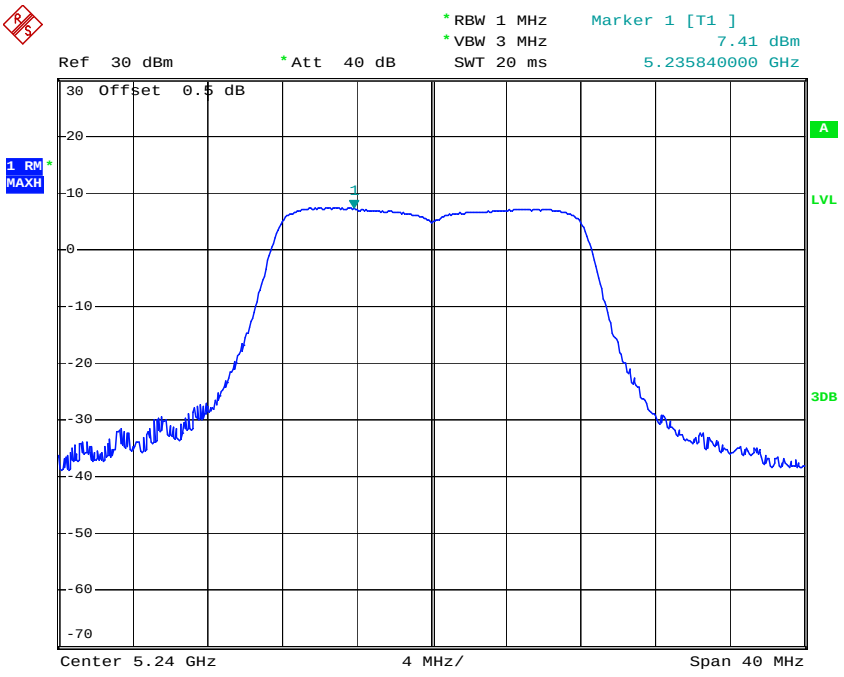
802.11a High Channel



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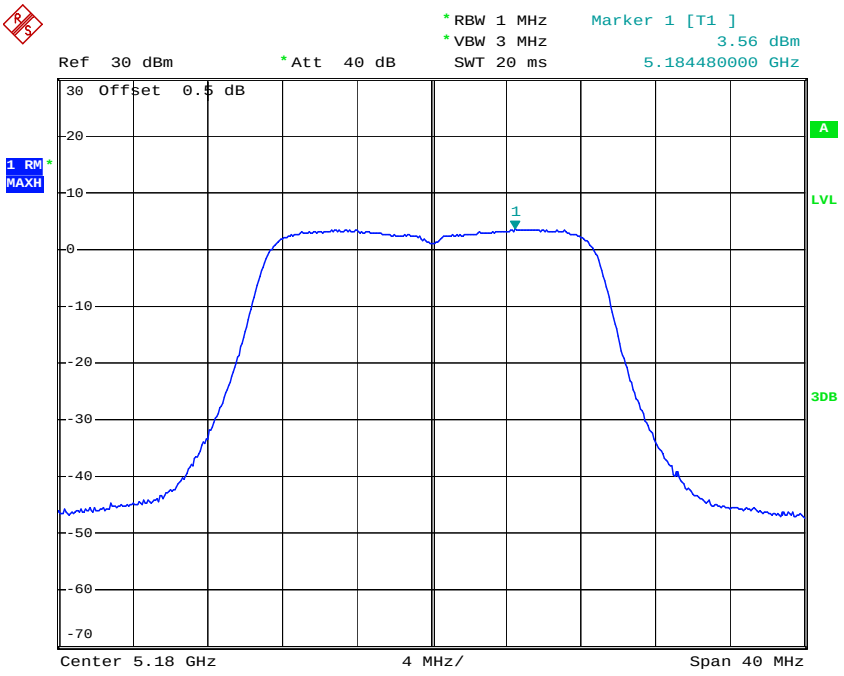
802.11n ht20 Low Channel



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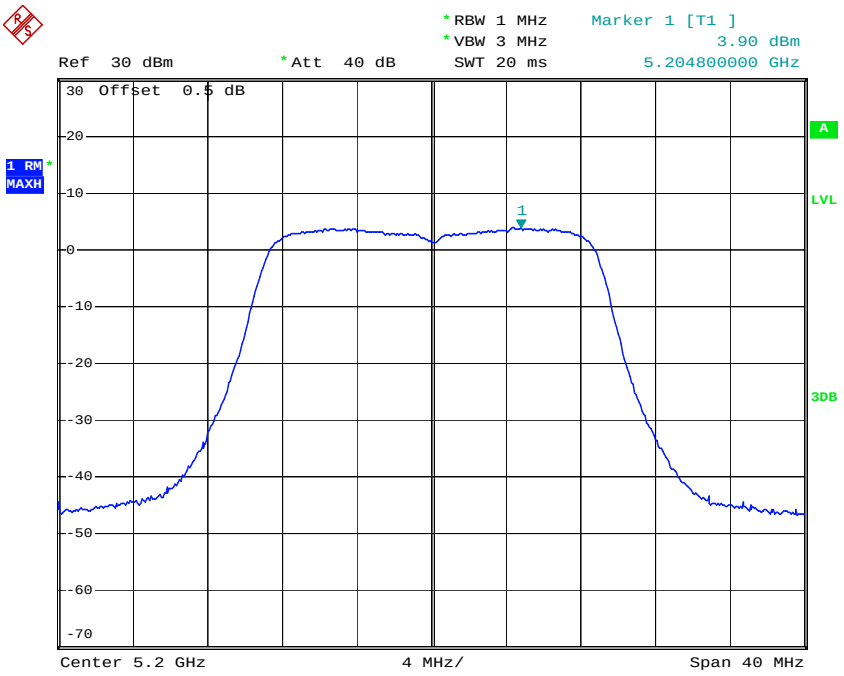
802.11n ht20 Middle Channel



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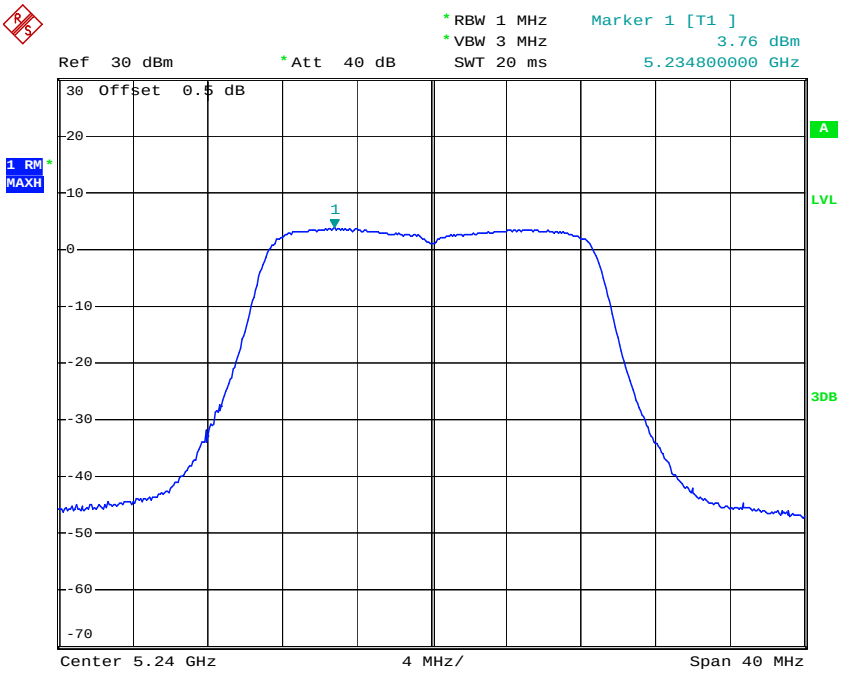
802.11n ht20 High Channel



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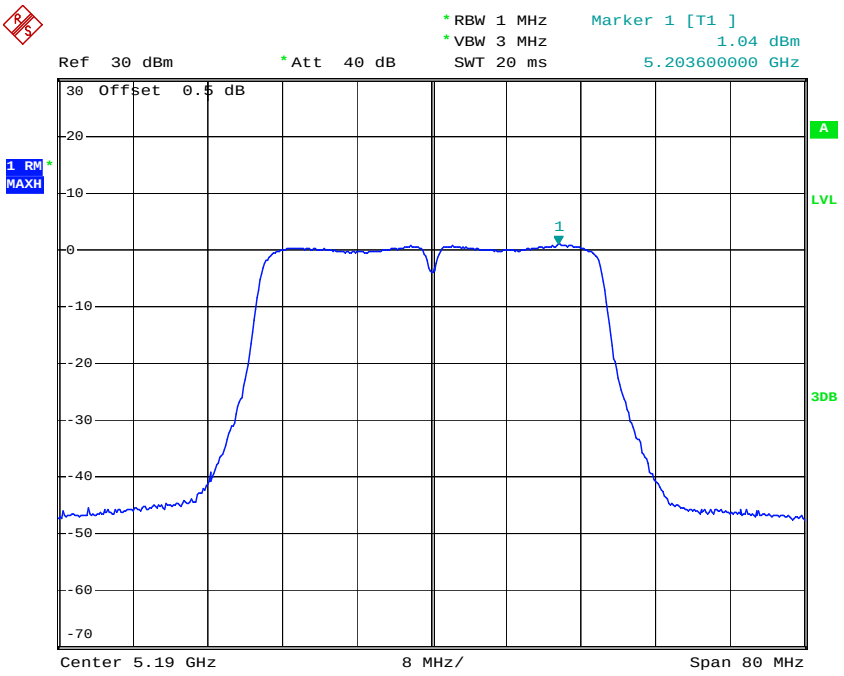
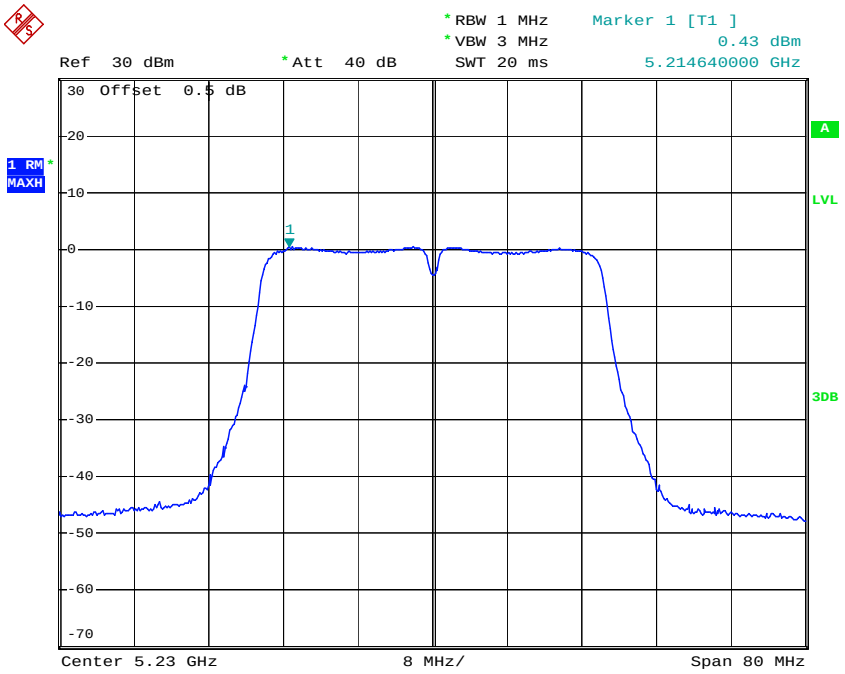
802.11n ht40 Low Channel



Date: 13.SEP.2017 11:32:49

802.11n ht40 High Channel



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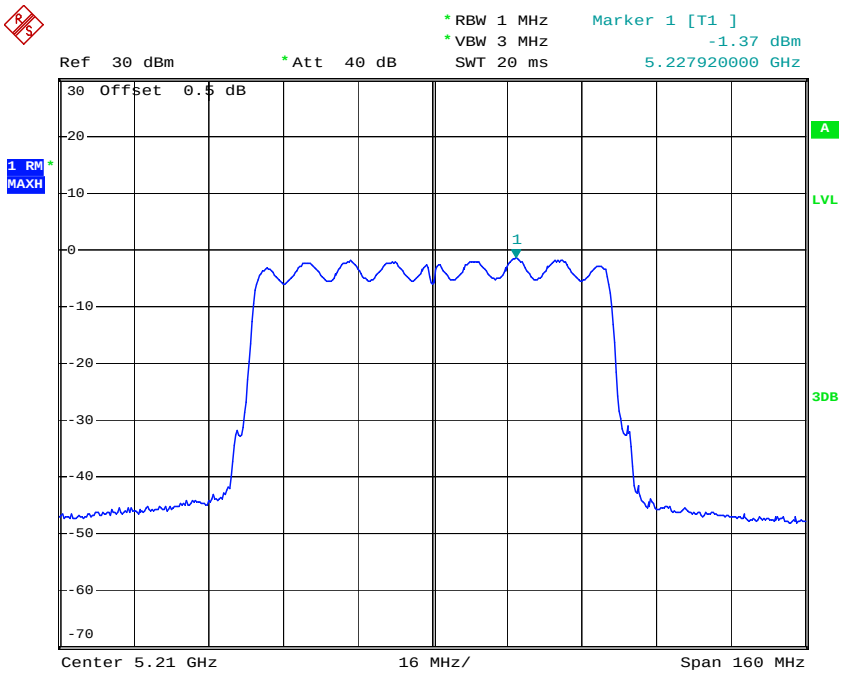
802.11ac80 Middle Channel



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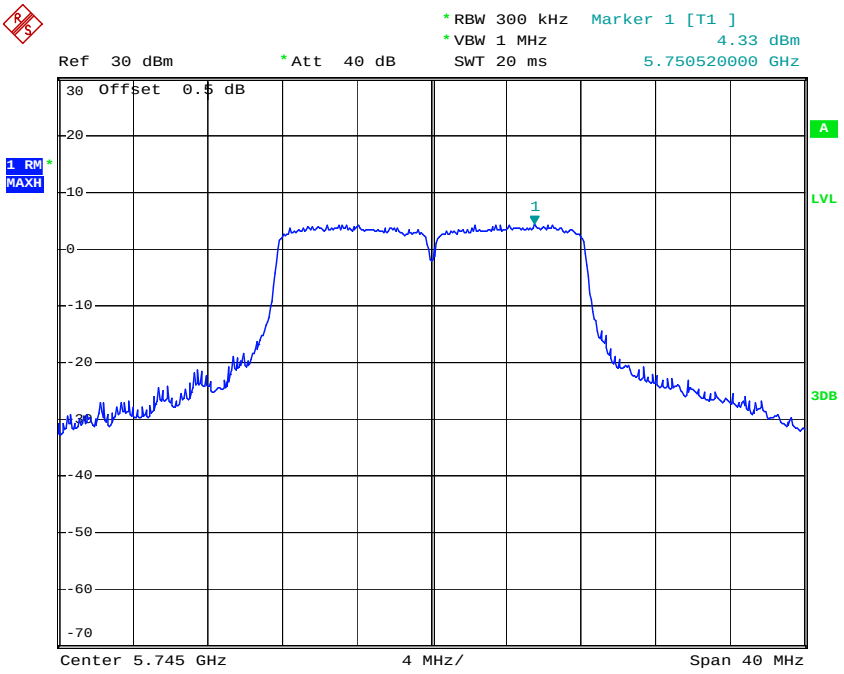
5725-5850MHz
Chain 0:

802.11a Low Channel



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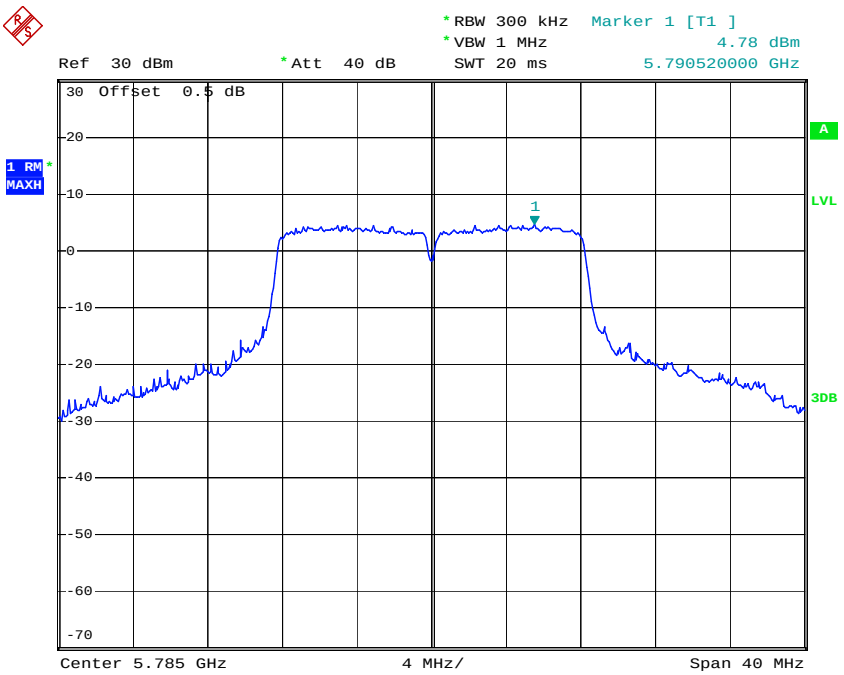
802.11a Middle Channel



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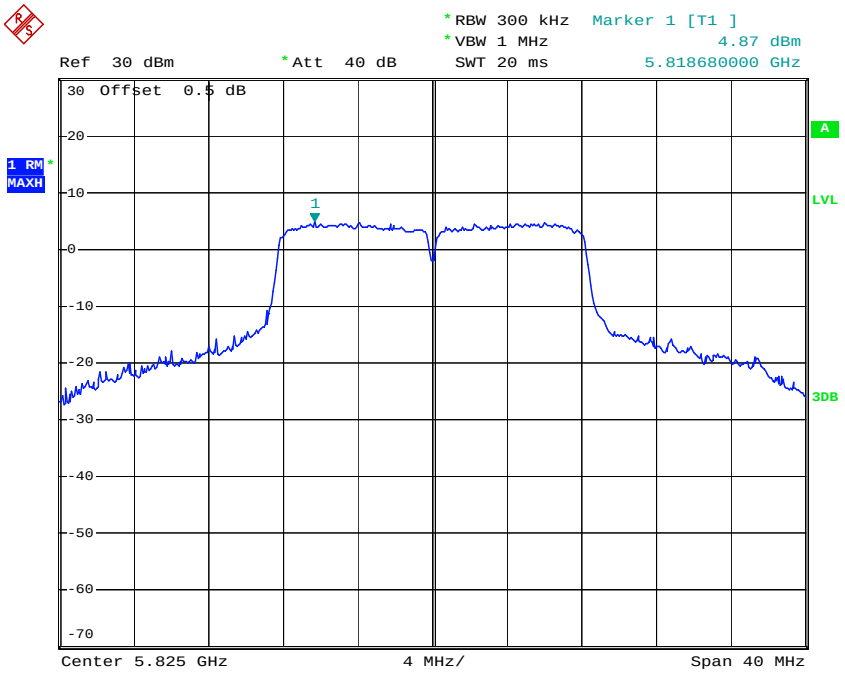
802.11a High Channel



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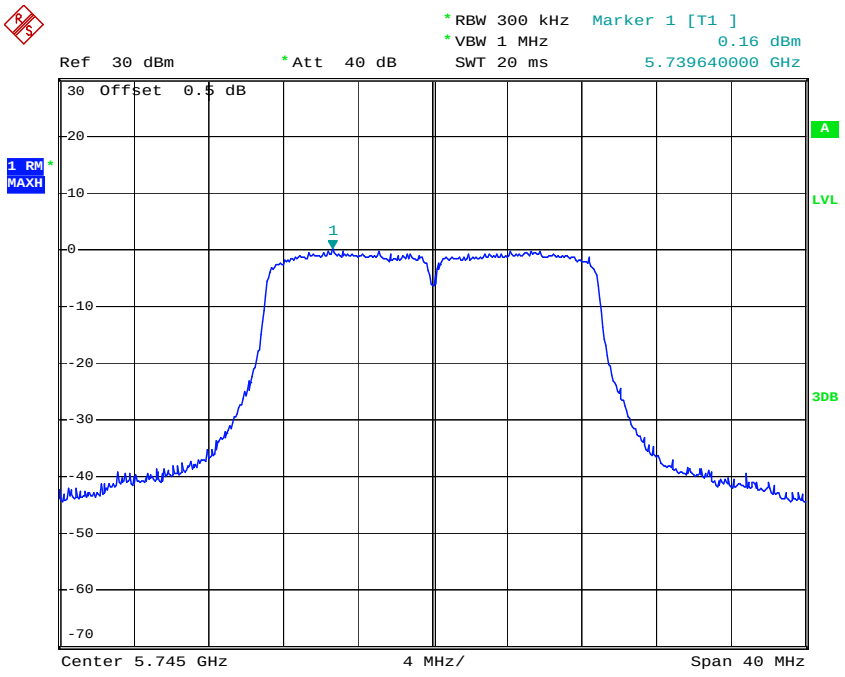
802.11n ht20 Low Channel



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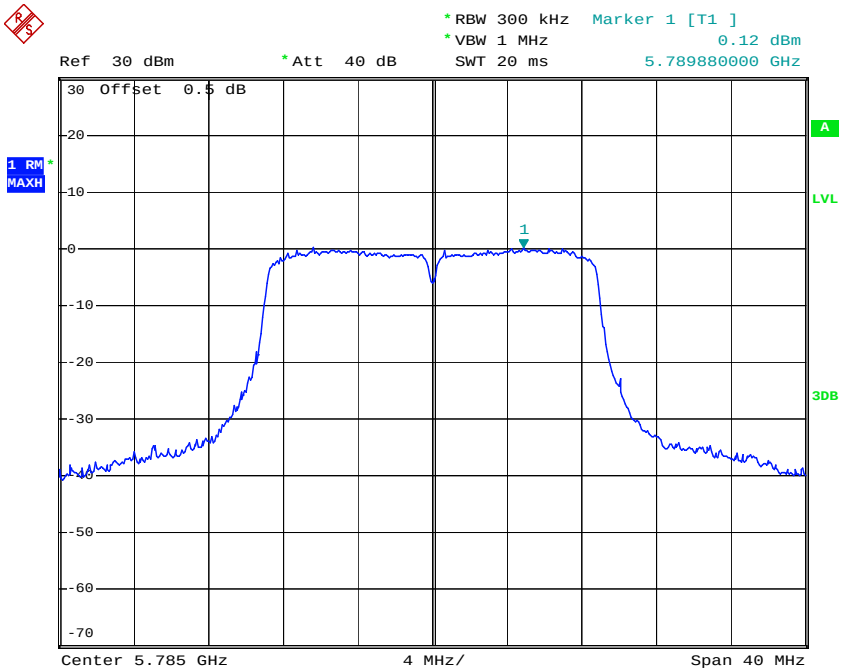
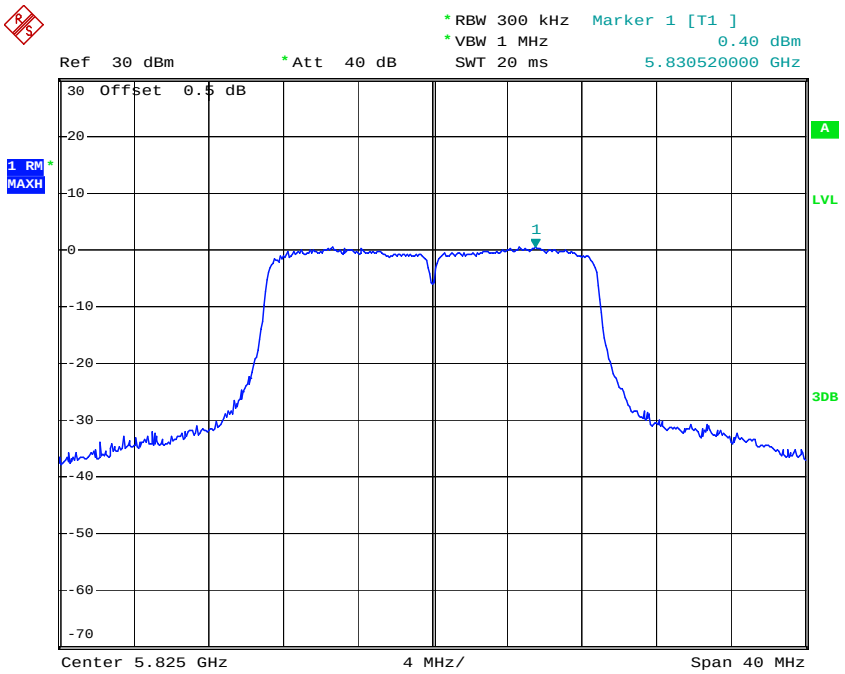
802.11n ht20 Middle Channel



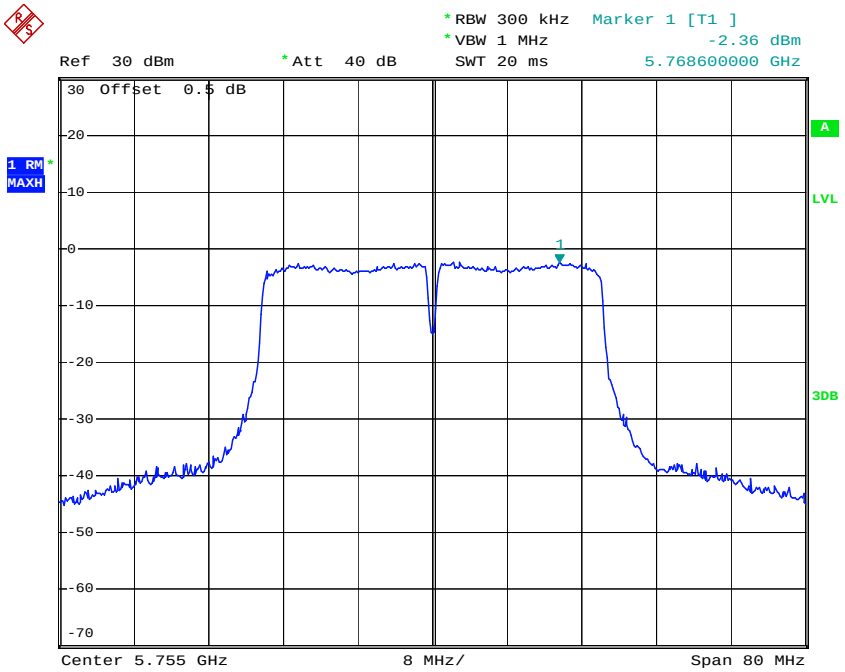
Date: 13.SEP.2017 15:08:42

802.11n ht20 High Channel



Date: 13.SEP.2017 15:07:55

802.11n ht40 Low Channel



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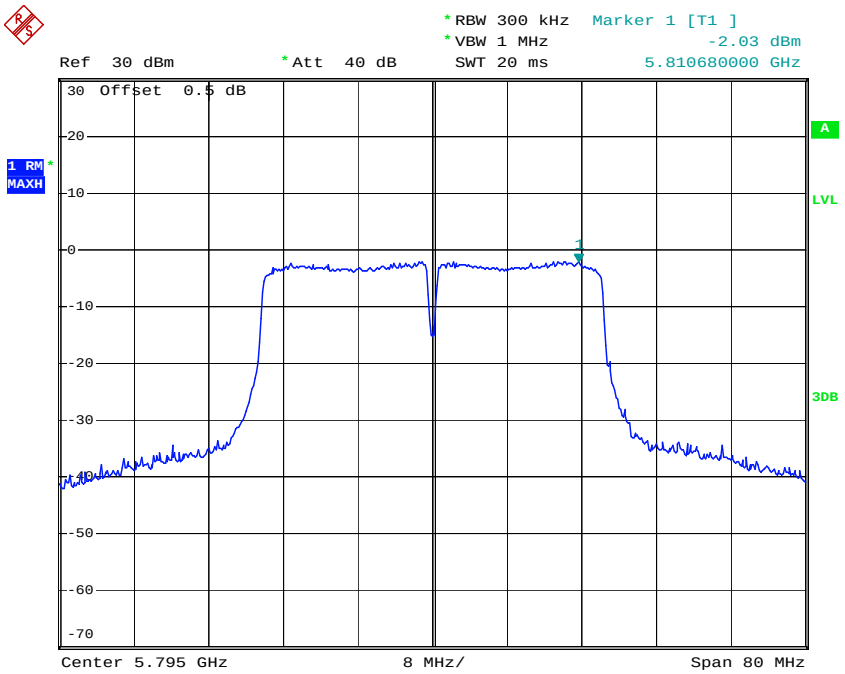
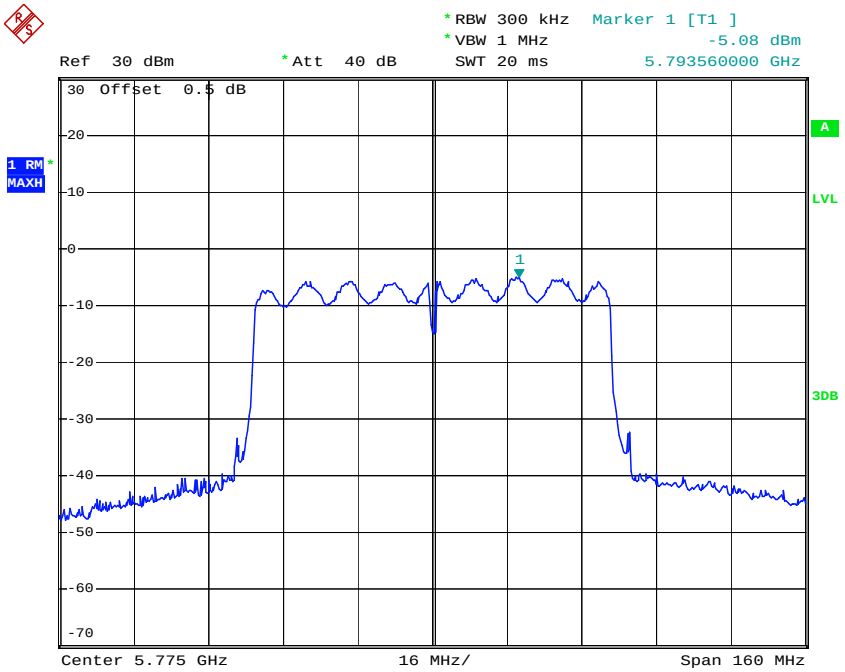
802.11n ht40 High Channel



Date: 13.SEP.2017 15:18:17

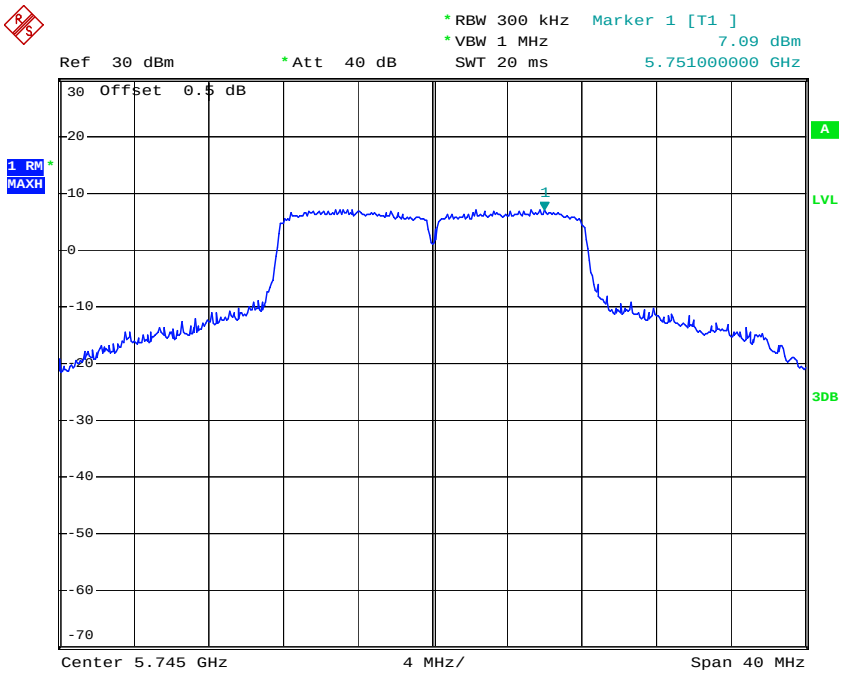
802.11ac80 Middle Channel



Date: 13.SEP.2017 15:21:44

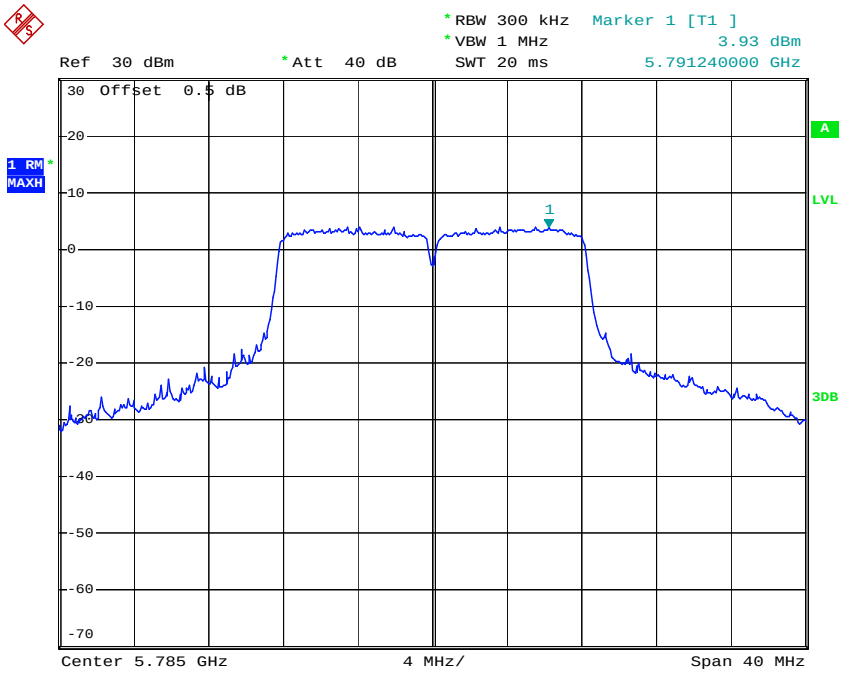
Chain 1:

802.11a Low Channel



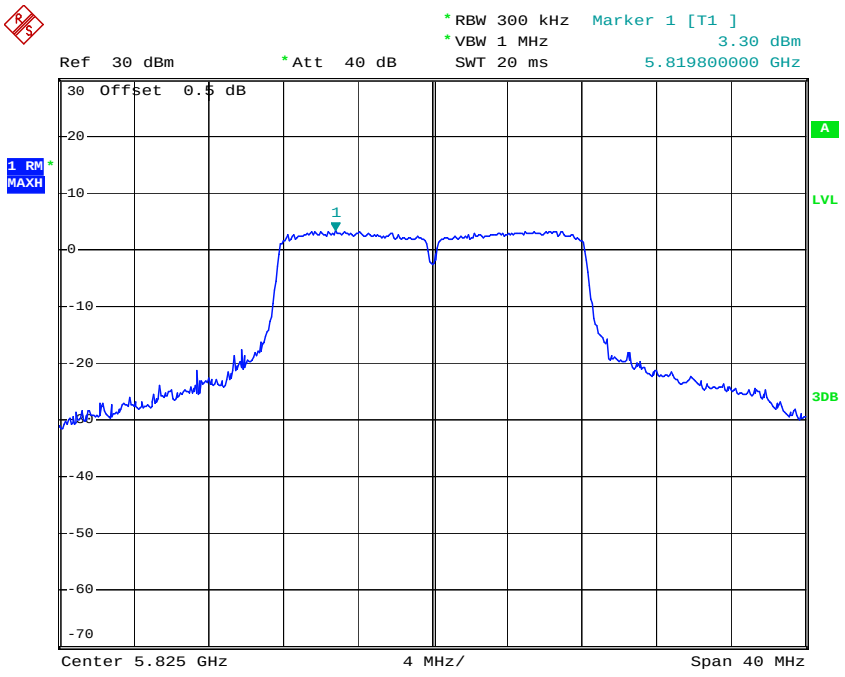
Date: 13.SEP.2017 15:57:19

802.11a Middle Channel



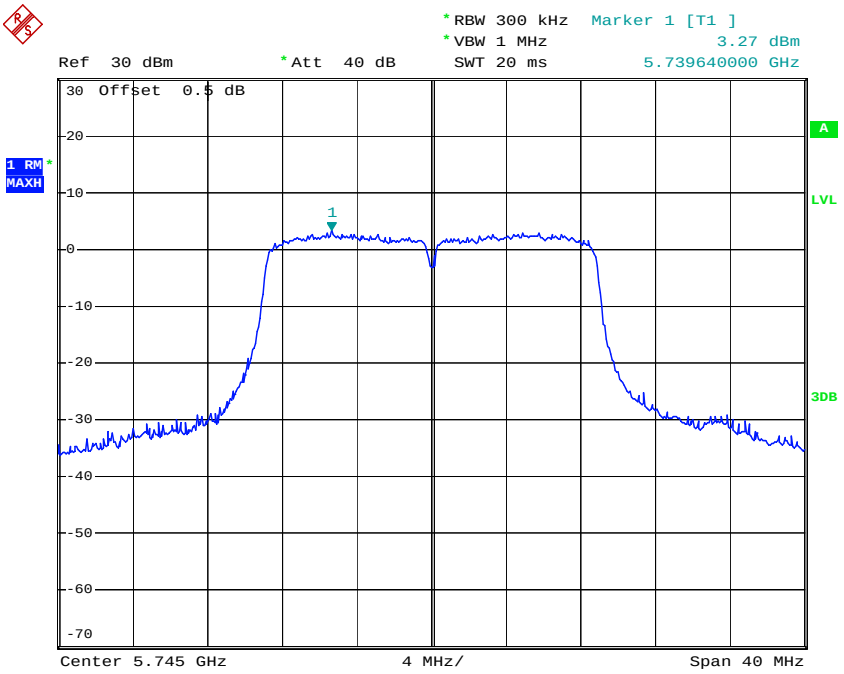
Date: 13.SEP.2017 15:59:18

802.11a High Channel



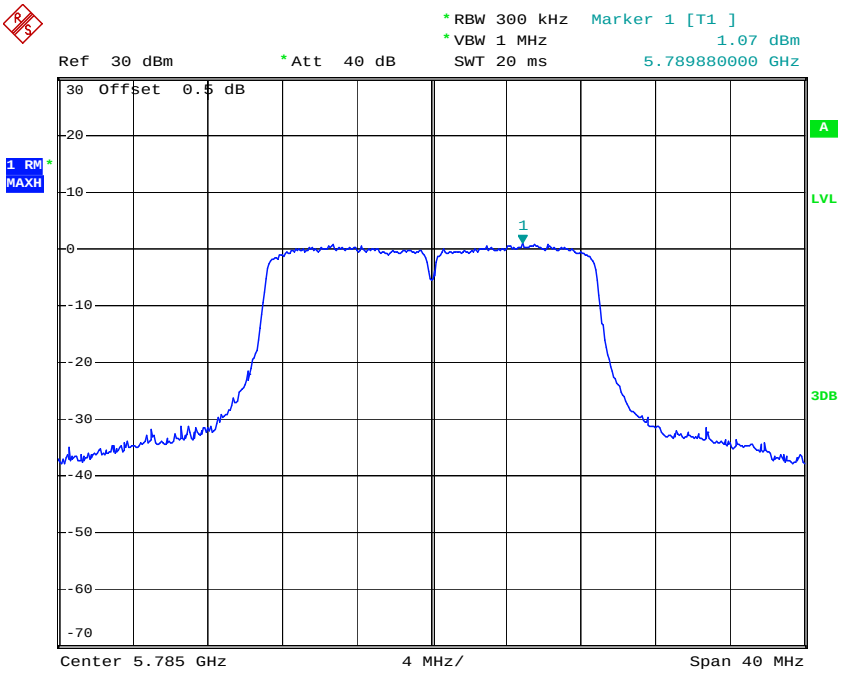
Date: 13.SEP.2017 16:00:08

802.11n ht20 Low Channel



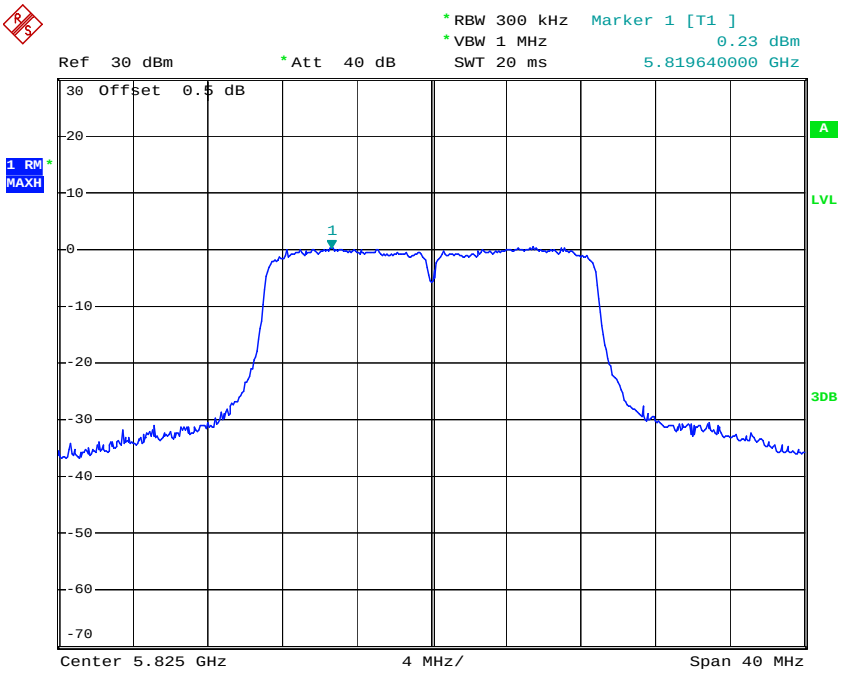
Date: 13.SEP.2017 15:45:18

802.11n ht20 Middle Channel



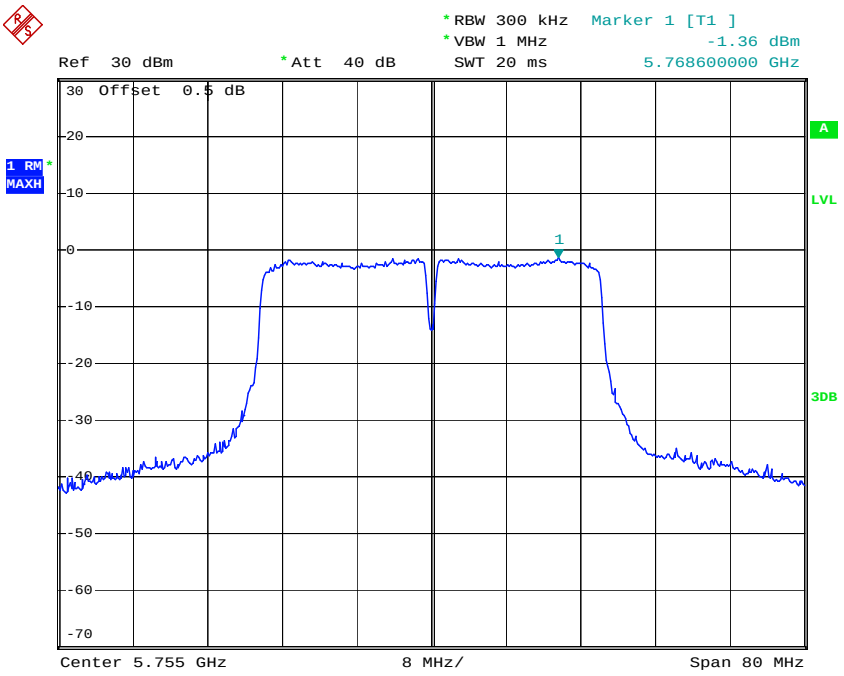
Date: 13.SEP.2017 15:37:08

802.11 n ht20 High Channel



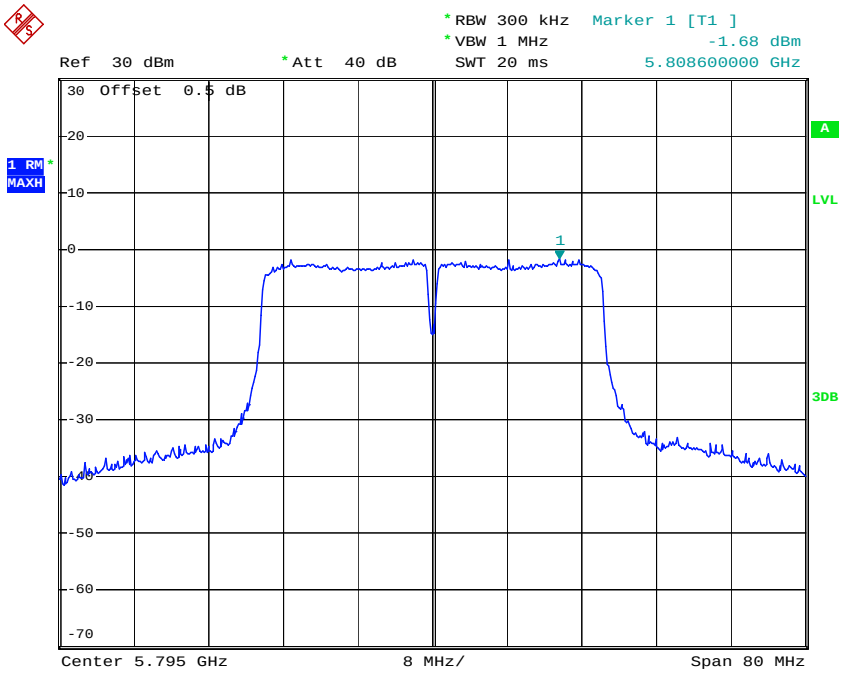
Date: 13.SEP.2017 15:38:11

802.11n ht40 Low Channel



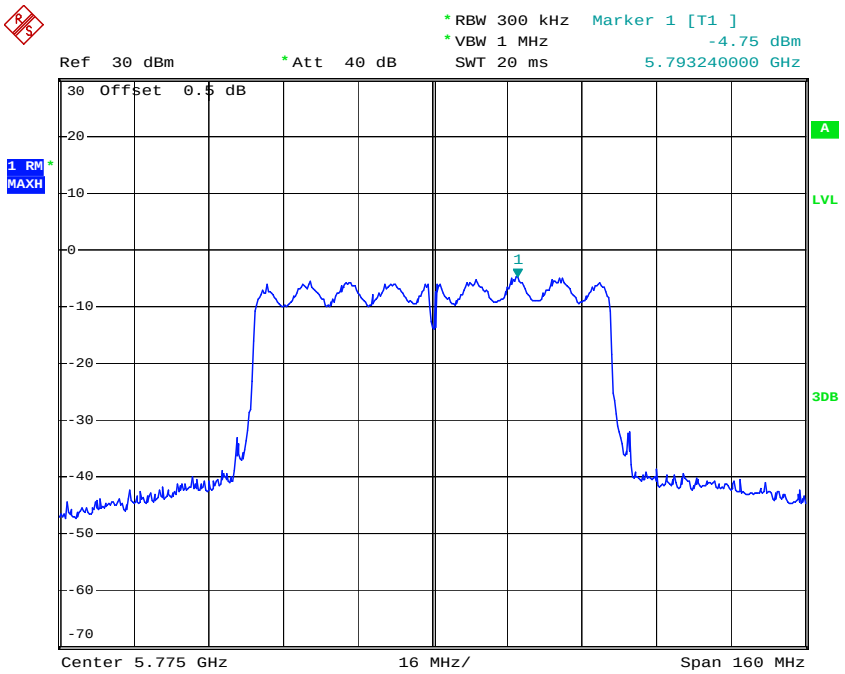
Date: 13.SEP.2017 15:29:53

802.11n ht40 High Channel



Date: 13.SEP.2017 15:31:17

802.11ac80 Middle Channel



Date: 13.SEP.2017 15:26:01

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