FCC PART 15.407

TEST REPORT

For

ZIONCOM ELECTRONICS (SHENZHEN) LTD.

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

FCC ID: X7DIP04336

Report Type:	Product Name:
Original Report	1200Mbps Smart Home Wi-Fi Router

Report Number:	RDG171206017-00B
Report Date:	2017-12-18
Reviewed By:	Jerry Zhang EMC Manager
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:		1200Mbps Smart Home Wi-Fi Router
EUT Model:		T10
Multiple Models:		IP04336
FCC ID:		X7DIP04336
Rated Input Voltage:		DC 12V from Adapter
Nominal Adapter Information	**Model Name:**	DCP014E121000U
	Input:	100-240V ~ 50/60Hz 0.5A Max
	Output:	DC 12V, 1A
External Dimension:		Length (8.9cm)*Width (8.9cm)*High (6.8cm)
Serial Number:		170912023
EUT Received Date:		2017. 09.12

Note: The series product, models T10, IP04336 are electrically identical, the differences between them just the model name for marketing purpose, we selected T10 for full test , and please refer to the declaration letter for details.

Objective

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

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

Related Submittal(s)/Grant(s)

FCC Part 15C DTS submissions with FCC ID: X7DIP04336.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices. And KDB 789033 D02 General U-NII Test Procedures New Rules v01r04

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

Measurement Uncertainty

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

Test Facility

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

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

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

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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

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

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

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

802.11a, 802.11n ht20 were tested with Channel 36, 40 and 48,
802.11n ht40 were tested with Channel 38 and 46.
802.11ac80 mode was tested with channel 42

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

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

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

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

EUT Exercise Software

The software "MP_TEST.exe" 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:

5150-5250MHz:

Chain 0/ Chain 1				
Test Mode	Test Software Version	MP_TEST.exe		
802.11a	Test Frequency	5180MHz	5200MHz	5240MHz
	Data Rate	OFDM 6M	OFDM 6M	OFDM 6M
	Power Level Setting	33/29	37/34	37/34
802.11n ht20	Test Frequency	5180MHz	5200MHz	5240MHz
	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting	33/30	33/32	33/32
802.11n ht40	Test Frequency	5190MHz	/	5230MHz
	Data Rate	MCS0	/	MCS0
	Power Level Setting	29/33	/	35/32
802.11ac80	Test Frequency	/	5210MHz	/
	Data Rate	/	MCS0	/
	Power Level Setting	/	29/33	/

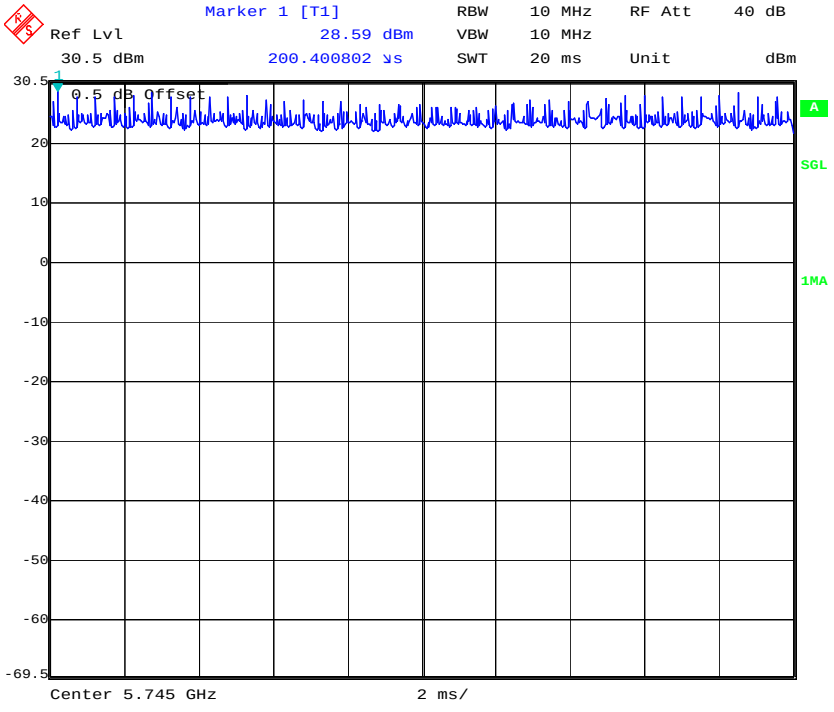
5725-5850MHz:

Chain 0/ Chain 1				
Test Mode	Test Software Version	MP_TEST.exe		
802.11a	Test Frequency	5745MHz	5785MHz	5825MHz
	Data Rate	OFDM 6M	OFDM 6M	OFDM 6M
	Power Level Setting	39/33	39/41	39/41
802.11n ht20	Test Frequency	5745MHz	5785MHz	5825MHz
	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting	37/33	37/40	37/33
802.11n ht40	Test Frequency	5755MHz	/	5795MHz
	Data Rate	MCS0	/	MCS0
	Power Level Setting	39/33	/	39/33
802.11ac80	Test Frequency	/	5775MHz	/
	Data Rate	/	MCS0	/
	Power Level Setting	/	39/33	/

The duty cycle as below:

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

802.11a mode



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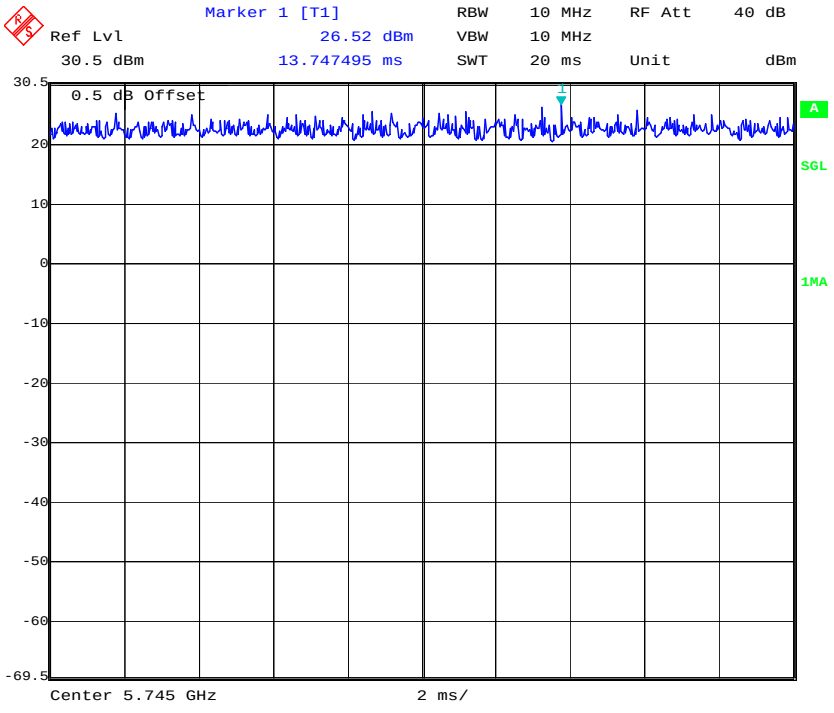
802.11n ht20 mode



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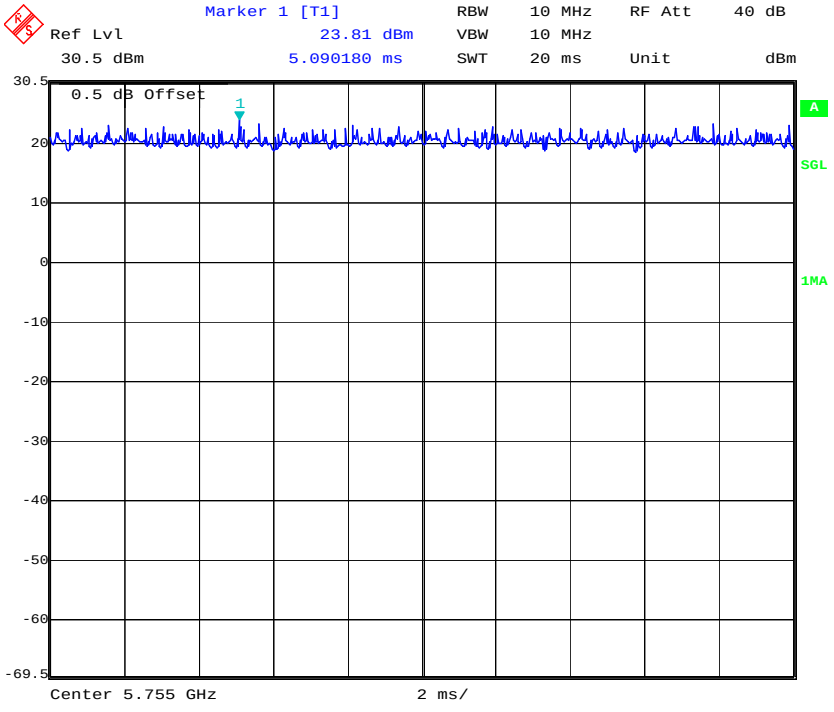
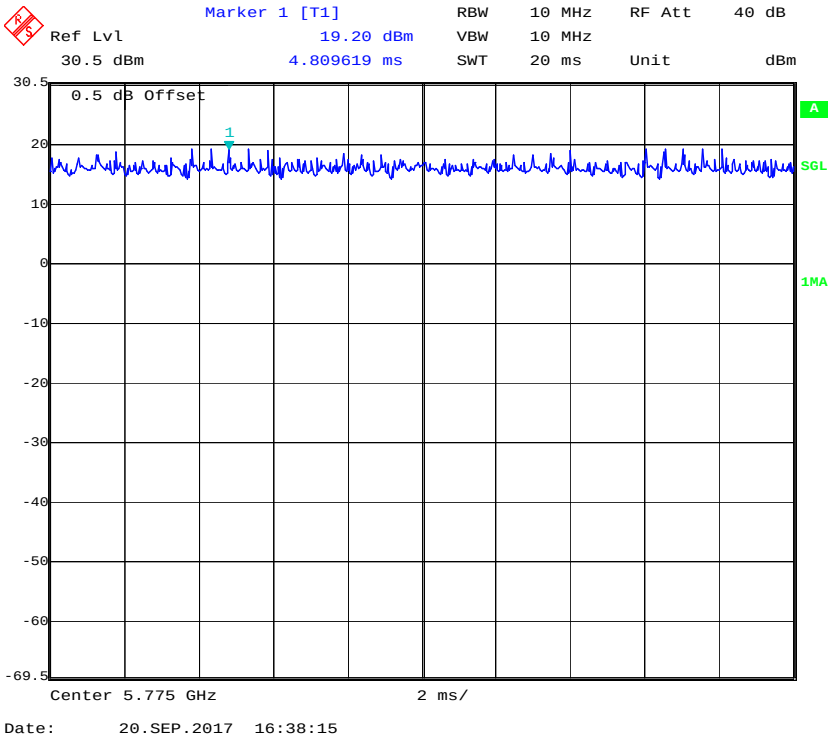
802.11n ht40 mode



802.11ac80 mode



Equipment Modifications

No modification was made to the EUT.

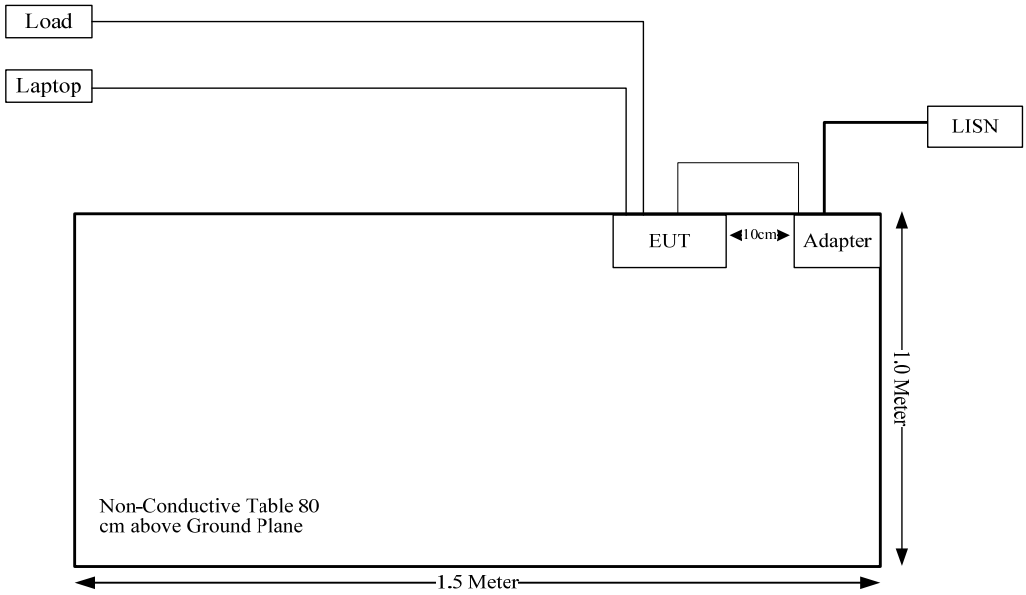
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Laptop	PP11L	QDS-BRCM1017

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
RJ45 Cable	yes	No	10	RJ45 Port of Laptop	EUT
RJ45 Cable*2	yes	No	10	EUT	Load
Adapter Cable	No	No	1.36	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 Band	Antenna Gain		Output Power including Turn-Up tolerance		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
	(dBi)	(numeric)	(dBm)	(mW)			
2.4GHz	2	1.58	29	794.33	20.00	0.25	1.0
5GHz	2	1.58	21	125.89	20.00	0.04	1.0

The 2.4GHz and 5GHz band can transmit simultaneously:

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

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

$=0.25/1+0.04/1$

$=0.29$

< 1.0

Result: The device meet FCC MPE at 20 cm distance

FCC §15.203 – ANTENNA REQUIREMENT

Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.
And according to FCC 47 CFR section 15.407 (a)(1),if transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT have 2 internal antennas for 2.4G Band and 5G band, both antenna gains are 2dBi in 2.4G and 5G band. Please refer to the EUT photo.

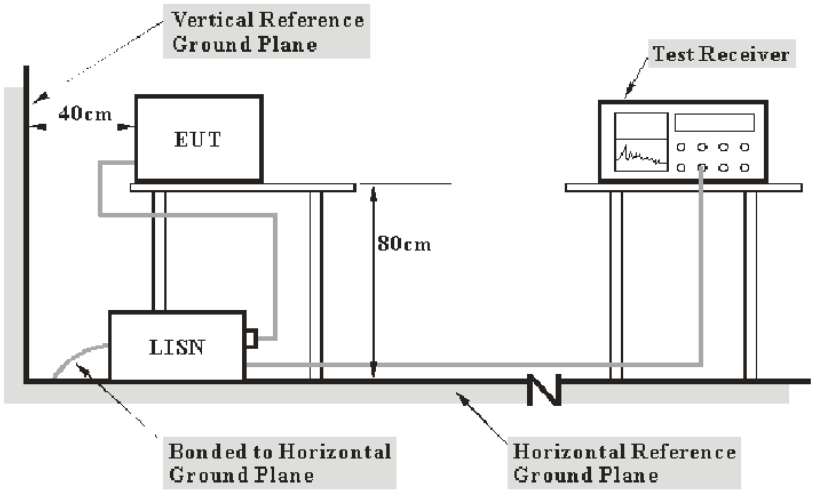
Result: Compliance.

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	2017-09-25	2018-09-25
R&S	Two-line V-network	ENV 216	3560.6550.12	2016-12-08	2017-12-08
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A
N/A	Coaxial Cable	2m	C0200/01	2017-09-05	2018-09-05

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

Test Procedure

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

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

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

Test Data

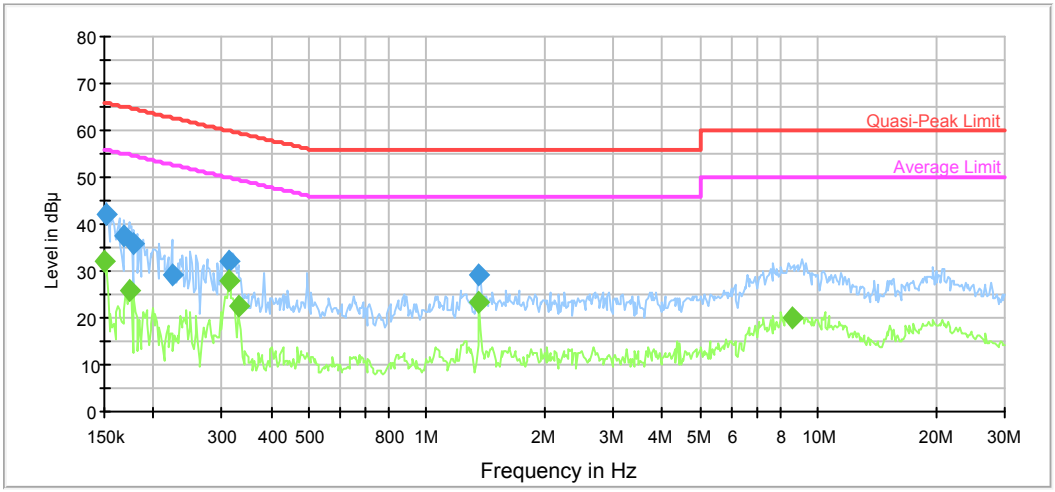
Environmental Conditions

Temperature:	27.3°C
Relative Humidity:	46 %
ATM Pressure:	100.4kPa

The testing was performed by Gaochao Gong on 2017-09-25.

Test Mode: Transmitting

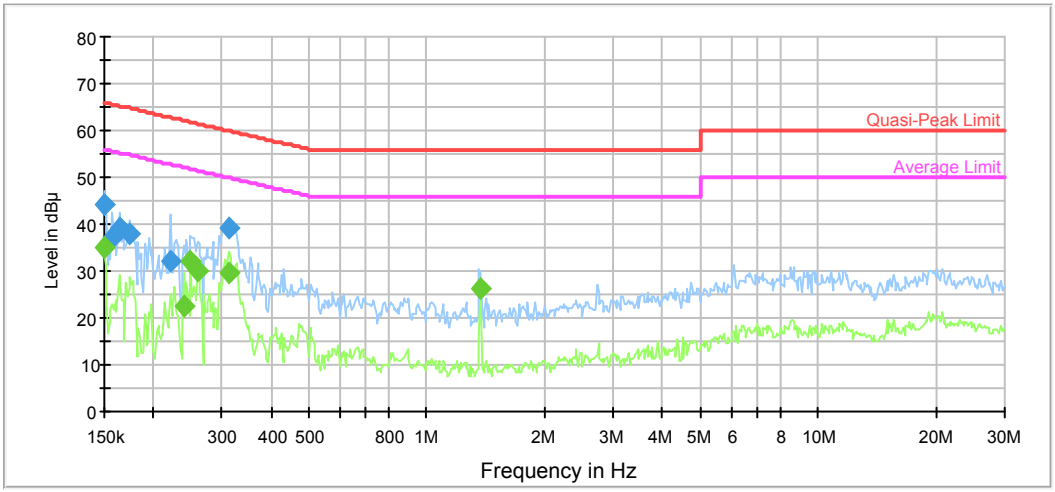
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.152410	42.0	9.000	L1	11.2	23.9	65.9	Compliance
0.169044	37.7	9.000	L1	10.9	27.3	65.0	Compliance
0.178741	35.9	9.000	L1	10.8	28.6	64.5	Compliance
0.223418	29.1	9.000	L1	10.5	33.6	62.7	Compliance
0.312220	32.1	9.000	L1	10.1	27.8	59.9	Compliance
1.363512	29.2	9.000	L1	9.7	26.8	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	32.3	9.000	L1	11.2	23.7	56.0	Compliance
0.173134	25.9	9.000	L1	10.9	28.9	54.8	Compliance
0.312220	27.8	9.000	L1	10.1	22.1	49.9	Compliance
0.330129	22.6	9.000	L1	10.1	26.8	49.4	Compliance
1.363512	23.2	9.000	L1	9.7	22.8	46.0	Compliance
8.590963	19.8	9.000	L1	9.9	30.2	50.0	Compliance

AC120 V, 60 Hz, Neutral:



requency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	44.2	9.000	N	11.2	21.8	66.0	Compliance
0.157346	37.2	9.000	N	11.1	28.4	65.6	Compliance
0.163741	39.0	9.000	N	11.0	26.3	65.3	Compliance
0.174519	37.9	9.000	N	10.9	26.8	64.7	Compliance
0.221645	32.3	9.000	N	10.5	30.5	62.8	Compliance
0.312220	39.1	9.000	N	10.1	20.8	59.9	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	35.1	9.000	N	11.2	20.9	56.0	Compliance
0.240029	22.5	9.000	N	10.4	29.6	52.1	Compliance
0.249785	32.1	9.000	N	10.3	19.7	51.8	Compliance
0.259937	29.9	9.000	N	10.3	21.5	51.4	Compliance
0.312220	29.4	9.000	N	10.1	20.5	49.9	Compliance
1.374420	26.1	9.000	N	9.7	19.9	46.0	Compliance

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

Applicable Standard

FCC §15.407; §15.209; §15.205;

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

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

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

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

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

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

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

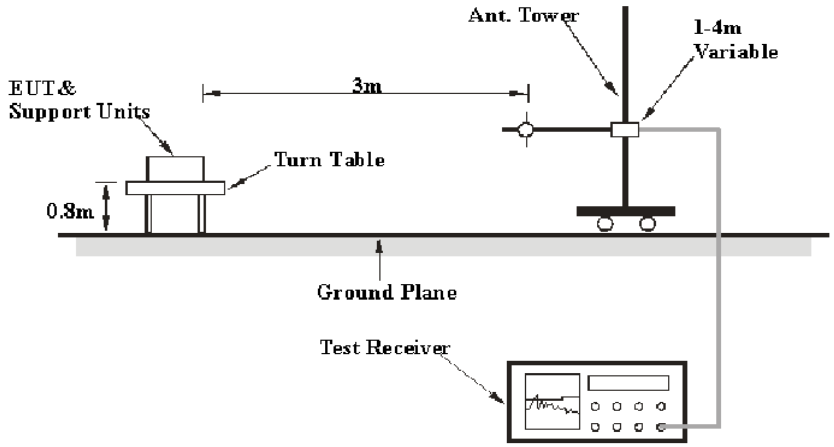
(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

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

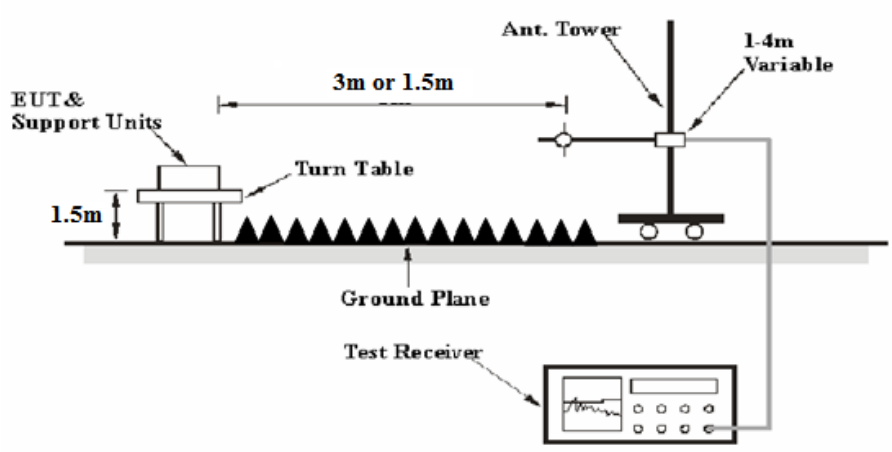
(7) The provisions of §15.205 apply to intentional radiators operating under this section.

EUT Setup

Below 1 GHz:



Above 1 GHz:



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

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

The spacing between the peripherals was 10 cm.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 40 GHz.

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

30-1000MHz:

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

1GHz- 40GHz:

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

Test Procedure

During the radiated emission test, the 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.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

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

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

Margin = Extrapolation result -Limit

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2017-09-01	2018-09-01
Sunol Sciences	Antenna	JB3	A060611-2	2017-08-25	2020-08-25
HP	Amplifier	8447D	2727A05902	2017-09-05	2018-09-05
N/A	Coaxial Cable	C-NJNJ-50	C-0400-01	2017-09-05	2018-09-05
N/A	Coaxial Cable	C-NJNJ-50	C-0075-01	2017-09-05	2018-09-05
N/A	Coaxial Cable	C-NJNJ-50	C-1000-01	2017-09-05	2018-09-05
Agilent	Spectrum Analyzer	E4440A	SG43360054	2016-12-08	2017-12-08
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-05
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2017-09-05	2018-09-05
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-02 1304	2016-11-18	2019-11-18
Ducommun Technolagies	Horn Antenna	ARH-2823-02	1007726-01 1302	2016-11-18	2019-11-18
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2017-06-27	2018-06-27
N/A	Coaxial Cable	C-SJSJ-50	C-0800-01	2017-09-05	2018-09-05
R&S	Spectrum Analyzer	FSP 38	100478	2016-12-08	2017-12-08
Chengdu OuLi	Bandrejector Filter	5725-5850	005	2017-09-05	2018-09-05
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A

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

Test Data

Environmental Conditions

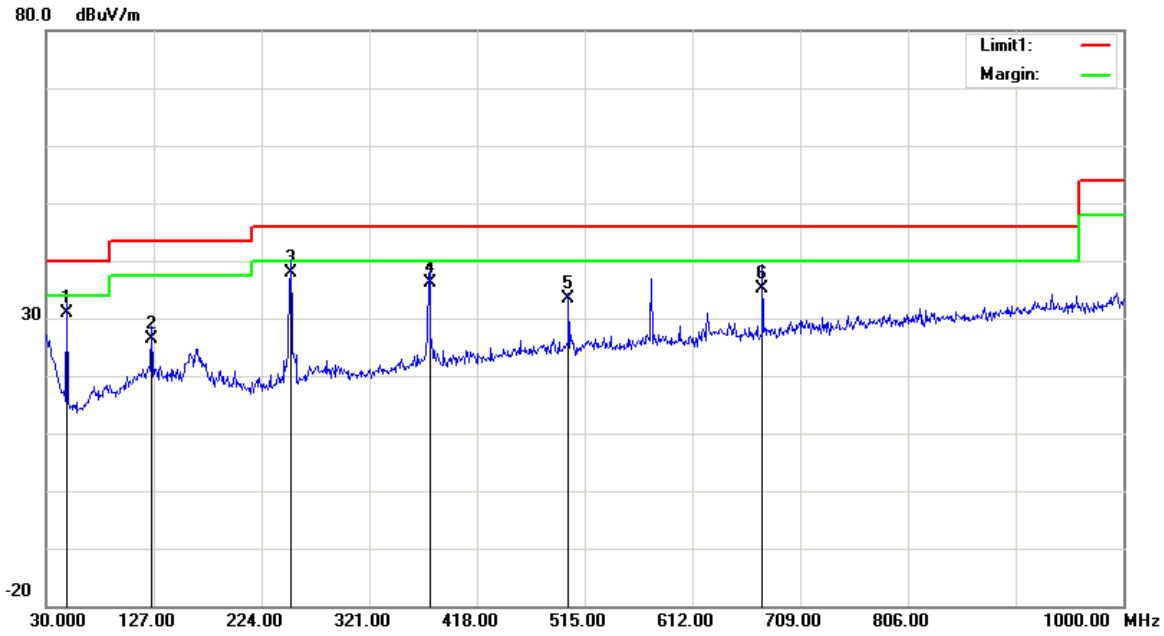
Temperature:	29.1 °C
Relative Humidity:	48 %
ATM Pressure:	100.4 kPa

** The testing was performed by Steven Zuo 2017-09-18.*

Test Mode: Transmitting

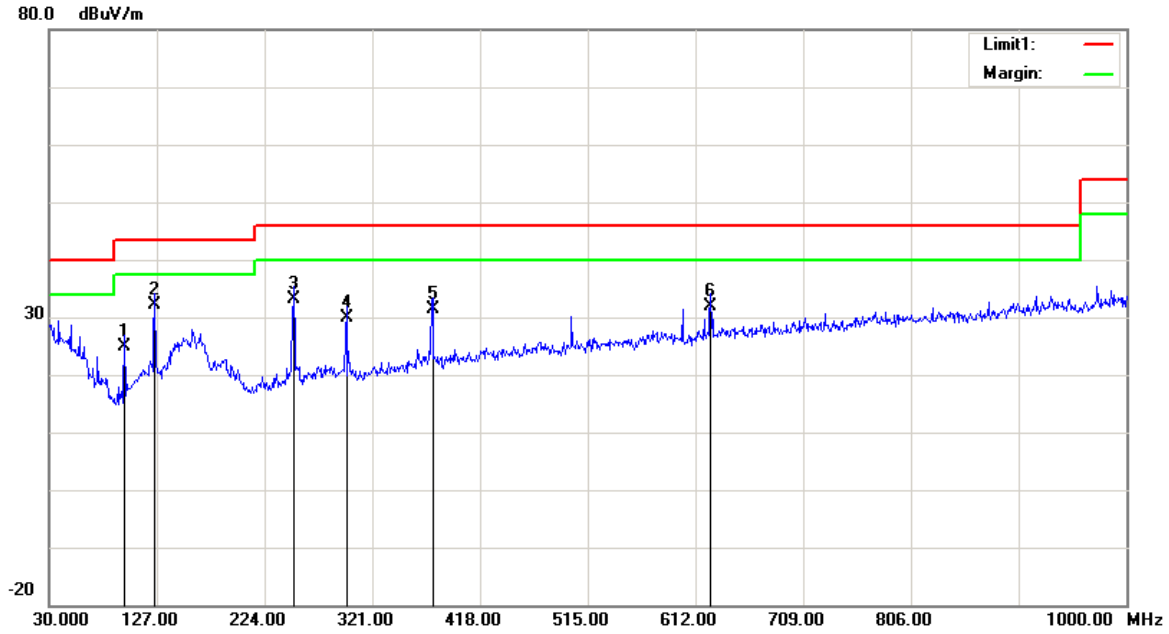
1) Below 1GHz(802.11n ht20 5785 MHz was the worst):

Horizontal



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
48.4300	41.89	QP	-11.09	30.80	40.00	9.20
125.0600	31.33	QP	-4.83	26.50	43.50	17.00
250.1900	44.42	QP	-6.42	38.00	46.00	8.00
375.3200	38.97	QP	-2.77	36.20	46.00	9.80
500.4500	34.37	QP	-1.07	33.30	46.00	12.70
675.0500	33.39	QP	1.81	35.20	46.00	10.80

Vertical



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
97.9000	33.92	QP	-9.02	24.90	43.50	18.60
125.0600	37.03	QP	-4.83	32.20	43.50	11.30
250.1900	39.62	QP	-6.42	33.20	46.00	12.80
297.7200	34.15	QP	-4.35	29.80	46.00	16.20
375.3200	34.07	QP	-2.77	31.30	46.00	14.70
625.5800	30.94	QP	1.06	32.00	46.00	14.00

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

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 5180 MHz									
5180.00	73.48	PK	H	33.59	3.58	0.00	104.63	N/A	N/A
5180.00	65.75	AV	H	33.59	3.58	0.00	96.90	N/A	N/A
5180.00	85.15	PK	V	33.59	3.58	0.00	116.30	N/A	N/A
5180.00	77.63	AV	V	33.59	3.58	0.00	108.78	N/A	N/A
5150.00	35.66	PK	V	33.54	3.56	0.00	66.74	74.00	7.26
5150.00	18.29	AV	V	33.54	3.56	0.00	49.37	54.00	4.63
10360.00	48.64	PK	V	38.17	6.29	36.85	50.23	74.00	23.77
10360.00	34.52	AV	V	38.17	6.29	36.85	36.11	54.00	17.89
15540.00	47.48	PK	V	38.06	8.85	39.04	49.33	74.00	24.67
15540.00	33.16	AV	V	38.06	8.85	39.04	35.01	54.00	18.99
6908.50	54.61	PK	V	35.02	5.10	36.99	51.72	74.00	22.28
6908.50	44.21	AV	V	35.02	5.10	36.99	41.32	54.00	12.68
Middle Channel: 5200 MHz									
5200.00	73.55	PK	H	33.62	3.60	0.00	104.75	N/A	N/A
5200.00	66.84	AV	H	33.62	3.60	0.00	98.04	N/A	N/A
5200.00	83.36	PK	V	33.62	3.60	0.00	114.56	N/A	N/A
5200.00	77.15	AV	V	33.62	3.60	0.00	108.35	N/A	N/A
10400.00	48.71	PK	V	38.18	6.32	36.86	50.33	74.00	23.67
10400.00	34.62	AV	V	38.18	6.32	36.86	36.24	54.00	17.76
15600.00	47.68	PK	V	38.00	8.83	39.09	49.40	74.00	24.6
15600.00	33.32	AV	V	38.00	8.83	39.09	35.04	54.00	18.96
8995.00	46.45	PK	V	37.70	5.49	36.93	46.69	74.00	27.31
8995.00	33.16	AV	V	37.70	5.49	36.93	33.40	54.00	20.6
6935.50	54.31	PK	V	35.07	5.12	36.98	51.50	74.00	22.5
6935.50	42.13	AV	V	35.07	5.12	36.98	39.32	54.00	14.68
High Channel: 5240 MHz									
5240.00	73.55	PK	H	33.68	3.52	0.00	104.73	N/A	N/A
5240.00	66.57	AV	H	33.68	3.52	0.00	97.75	N/A	N/A
5240.00	83.49	PK	V	33.68	3.52	0.00	114.67	N/A	N/A
5240.00	76.42	AV	V	33.68	3.52	0.00	107.60	N/A	N/A
5350.00	27.15	PK	V	33.86	3.52	0.00	58.51	74.00	15.49
5350.00	14.23	AV	V	33.86	3.52	0.00	45.59	54.00	8.41
10480.00	48.77	PK	V	38.20	6.37	36.88	50.44	74.00	23.56
10480.00	34.40	AV	V	38.20	6.37	36.88	36.07	54.00	17.93
15720.00	47.35	PK	V	37.88	8.79	39.18	48.82	74.00	25.18
15720.00	33.31	AV	V	37.88	8.79	39.18	34.78	54.00	19.22
6985.00	54.44	PK	V	35.17	5.17	36.97	51.79	74.00	22.21
6985.00	43.96	AV	V	35.17	5.17	36.97	41.31	54.00	12.69

802.11n ht20(2Tx was the worst)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 5180 MHz									
5180.00	77.53	PK	H	33.59	3.58	0.00	108.68	N/A	N/A
5180.00	67.25	AV	H	33.59	3.58	0.00	98.40	N/A	N/A
5180.00	87.26	PK	V	33.59	3.58	0.00	118.41	N/A	N/A
5180.00	79.35	AV	V	33.59	3.58	0.00	110.50	N/A	N/A
5150.00	39.58	PK	V	33.54	3.56	0.00	70.66	74.00	3.34
5150.00	18.25	AV	V	33.54	3.56	0.00	49.33	54.00	4.67
10360.00	48.76	PK	V	38.17	6.29	36.85	50.35	74.00	23.65
10360.00	34.72	AV	V	38.17	6.29	36.85	36.31	54.00	17.69
15540.00	47.43	PK	V	38.06	8.85	39.04	49.28	74.00	24.72
15540.00	33.12	AV	V	38.06	8.85	39.04	34.97	54.00	19.03
6908.50	53.09	PK	V	35.02	5.10	36.99	50.20	74.00	23.80
6908.50	42.66	AV	V	35.02	5.10	36.99	39.77	54.00	14.23
Middle Channel: 5200 MHz									
5200.00	77.75	PK	H	33.62	3.60	0.00	108.95	N/A	N/A
5200.00	69.58	AV	H	33.62	3.60	0.00	100.78	N/A	N/A
5200.00	87.39	PK	V	33.62	3.60	0.00	118.59	N/A	N/A
5200.00	79.83	AV	V	33.62	3.60	0.00	111.03	N/A	N/A
10400.00	48.70	PK	V	38.18	6.32	36.86	50.32	74.00	23.68
10400.00	34.52	AV	V	38.18	6.32	36.86	36.14	54.00	17.86
15600.00	47.65	PK	V	38.00	8.83	39.09	49.37	74.00	24.63
15600.00	33.03	AV	V	38.00	8.83	39.09	34.75	54.00	19.25
8995.00	46.25	PK	V	37.70	5.49	36.93	46.49	74.00	27.51
8995.00	33.24	AV	V	37.70	5.49	36.93	33.48	54.00	20.52
6935.50	54.82	PK	V	35.07	5.12	36.98	52.01	74.00	21.99
6935.50	43.67	AV	V	35.07	5.12	36.98	40.86	54.00	13.14
High Channel: 5240 MHz									
5240.00	73.63	PK	H	33.68	3.52	0.00	104.81	N/A	N/A
5240.00	67.25	AV	H	33.68	3.52	0.00	98.43	N/A	N/A
5240.00	86.58	PK	V	33.68	3.52	0.00	117.76	N/A	N/A
5240.00	79.36	AV	V	33.68	3.52	0.00	110.54	N/A	N/A
5350.00	26.57	PK	V	33.86	3.52	0.00	57.93	74.00	16.07
5350.00	14.29	AV	V	33.86	3.52	0.00	45.65	54.00	8.35
10480.00	48.59	PK	V	38.20	6.37	36.88	50.26	74.00	23.74
10480.00	34.53	AV	V	38.20	6.37	36.88	36.20	54.00	17.80
15720.00	47.59	PK	V	37.88	8.79	39.18	49.06	74.00	24.94
15720.00	33.18	AV	V	37.88	8.79	39.18	34.65	54.00	19.35
6985.00	53.24	PK	V	35.17	5.17	36.97	50.59	74.00	23.41
6985.00	43.26	AV	V	35.17	5.17	36.97	40.61	54.00	13.39

802.11n ht40(2Tx was the worst)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 5190 MHz									
5190.00	73.34	PK	H	33.60	3.59	0.00	104.51	N/A	N/A
5190.00	67.45	AV	H	33.60	3.59	0.00	98.62	N/A	N/A
5190.00	81.39	PK	V	33.60	3.59	0.00	112.56	N/A	N/A
5190.00	76.36	AV	V	33.60	3.59	0.00	107.53	N/A	N/A
5150.00	28.69	PK	V	33.54	3.56	0.00	59.77	74.00	14.23
5150.00	17.27	AV	V	33.54	3.56	0.00	48.35	54.00	5.65
10380.00	48.55	PK	V	38.18	6.31	36.85	50.17	74.00	23.83
10380.00	34.64	AV	V	38.18	6.31	36.85	36.26	54.00	17.74
15570.00	47.54	PK	V	38.03	8.84	39.06	49.33	74.00	24.67
15570.00	33.31	AV	V	38.03	8.84	39.06	35.10	54.00	18.90
6922.00	54.54	PK	V	35.04	5.11	36.99	51.68	74.00	22.32
6922.00	43.65	AV	V	35.04	5.11	36.99	40.79	54.00	13.21
High Channel: 5230 MHz									
5230.00	61.54	PK	H	33.67	3.54	0.00	92.73	N/A	N/A
5230.00	56.34	AV	H	33.67	3.54	0.00	87.53	N/A	N/A
5230.00	79.55	PK	V	33.67	3.54	0.00	110.74	N/A	N/A
5230.00	72.35	AV	V	33.67	3.54	0.00	103.54	N/A	N/A
5350.00	26.49	PK	V	33.86	3.52	0.00	57.85	74.00	16.15
5350.00	14.98	AV	V	33.86	3.52	0.00	46.34	54.00	7.66
10460.00	48.52	PK	V	38.19	6.36	36.87	50.18	74.00	23.82
10460.00	34.45	AV	V	38.19	6.36	36.87	36.11	54.00	17.89
15690.00	47.41	PK	V	37.91	8.80	39.15	48.95	74.00	25.05
15690.00	33.19	AV	V	37.91	8.80	39.15	34.73	54.00	19.27
6971.50	54.13	PK	V	35.14	5.16	36.98	51.43	74.00	22.57
6971.50	44.28	AV	V	35.14	5.16	36.98	41.58	54.00	12.42

802.11 ac80(2Tx was the worst)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Middle Channel: 5210 MHz									
5210.00	63.76	PK	H	33.64	3.58	0.00	94.96	N/A	N/A
5210.00	57.48	AV	H	33.64	3.58	0.00	88.68	N/A	N/A
5210.00	76.55	PK	V	33.64	3.58	0.00	107.75	N/A	N/A
5210.00	68.59	AV	V	33.64	3.58	0.00	99.79	N/A	N/A
5150.00	36.51	PK	V	33.54	3.56	0.00	67.59	74.00	6.41
5150.00	14.26	AV	V	33.54	3.56	0.00	45.34	54.00	8.66
5350.00	26.22	PK	V	33.86	3.52	0.00	57.58	74.00	16.42
5350.00	13.65	AV	V	33.86	3.52	0.00	45.01	54.00	8.99
10420.00	48.47	PK	V	38.18	6.33	36.86	50.10	74.00	23.90
10420.00	34.49	AV	V	38.18	6.33	36.86	36.12	54.00	17.88
15630.00	47.62	PK	V	37.97	8.82	39.11	49.28	74.00	24.72
15630.00	33.43	AV	V	37.97	8.82	39.11	35.09	54.00	18.91
6944.50	54.44	PK	V	35.09	5.13	36.98	51.66	74.00	22.34
6944.50	44.18	AV	V	35.09	5.13	36.98	41.40	54.00	12.60

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

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 5745MHz									
5745.00	73.24	PK	H	34.20	3.69	0.00	105.11	N/A	N/A
5745.00	63.59	AV	H	34.20	3.69	0.00	95.46	N/A	N/A
5745.00	77.87	PK	V	34.20	3.69	0.00	109.74	N/A	N/A
5745.00	67.89	AV	V	34.20	3.69	0.00	99.76	N/A	N/A
5725.00	53.17	PK	V	34.19	3.69	0.00	85.03	122.20	37.17
5720.00	43.73	PK	V	34.19	3.69	0.00	75.59	110.80	35.21
5700.00	35.42	PK	V	34.18	3.68	0.00	67.26	105.20	37.94
5650.00	26.44	PK	V	34.16	3.63	0.00	58.21	68.20	9.99
11490.00	48.67	PK	V	38.99	6.59	37.35	50.88	74.00	23.12
11490.00	33.58	AV	V	38.99	6.59	37.35	35.79	54.00	18.21
17235.00	47.59	PK	V	41.56	8.78	38.61	53.30	74.00	20.70
17235.00	32.63	AV	V	41.56	8.78	38.61	38.34	54.00	15.66
7660.00	62.57	PK	V	36.60	4.45	37.32	60.28	74.00	13.72
7660.00	48.35	AV	V	36.60	4.45	37.32	46.06	54.00	7.94
Middle Channel: 5785 MHz									
5785.00	68.57	PK	H	34.21	3.71	0.00	100.47	N/A	N/A
5785.00	58.59	AV	H	34.21	3.71	0.00	90.49	N/A	N/A
5785.00	79.87	PK	V	34.21	3.71	0.00	111.77	N/A	N/A
5785.00	69.58	AV	V	34.21	3.71	0.00	101.48	N/A	N/A
11570.00	48.46	PK	V	39.00	6.61	37.44	50.61	74.00	23.39
11570.00	33.53	AV	V	39.00	6.61	37.44	35.68	54.00	18.32
17355.00	47.41	PK	V	42.26	8.81	38.52	53.94	74.00	20.06
17355.00	32.64	AV	V	42.26	8.81	38.52	39.17	54.00	14.83
9855.00	46.74	PK	V	38.04	5.97	36.72	48.01	74.00	25.99
9855.00	32.63	AV	V	38.04	5.97	36.72	33.90	54.00	20.10
7710.00	59.49	PK	V	36.63	4.50	37.23	57.37	74.00	16.63
7710.00	49.55	AV	V	36.63	4.50	37.23	47.43	54.00	6.57
High Channel: 5825 MHz									
5825.00	70.38	PK	H	34.23	3.73	0.00	102.32	N/A	N/A
5825.00	60.29	AV	H	34.23	3.73	0.00	92.23	N/A	N/A
5825.00	75.28	PK	V	34.23	3.73	0.00	107.22	N/A	N/A
5825.00	65.47	AV	V	34.23	3.73	0.00	97.41	N/A	N/A
5850.00	41.05	PK	V	34.24	3.75	0.00	73.02	122.20	49.18
5855.00	38.08	PK	V	34.24	3.75	0.00	70.05	110.80	40.75
5875.00	29.18	PK	V	34.25	3.77	0.00	61.18	105.20	44.02
5925.00	27.55	PK	V	34.27	3.80	0.00	59.60	68.20	8.60
11650.00	48.79	PK	V	39.00	6.64	37.53	50.88	74.00	23.12
11650.00	33.86	AV	V	39.00	6.64	37.53	35.95	54.00	18.05
17475.00	47.6	PK	V	42.96	8.84	38.44	54.94	74.00	19.06
17475.00	32.43	AV	V	42.96	8.84	38.44	39.77	54.00	14.23
7768.00	53.38	PK	V	36.66	4.55	37.13	51.44	74.00	22.56
7768.00	43.26	AV	V	36.66	4.55	37.13	41.32	54.00	12.68

802.11n ht20(2Tx was the worst)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 5745MHz									
5745.00	70.97	PK	H	34.20	3.69	0.00	102.84	N/A	N/A
5745.00	60.23	AV	H	34.20	3.69	0.00	92.10	N/A	N/A
5745.00	77.42	PK	V	34.20	3.69	0.00	109.29	N/A	N/A
5745.00	67.15	AV	V	34.20	3.69	0.00	99.02	N/A	N/A
5725.00	53.57	PK	V	34.19	3.69	0.00	85.43	122.20	36.77
5720.00	43.26	PK	V	34.19	3.69	0.00	75.12	110.80	35.68
5700.00	35.29	PK	V	34.18	3.68	0.00	67.13	105.20	38.07
5650.00	26.81	PK	V	34.16	3.63	0.00	58.58	68.20	9.62
11490.00	48.71	PK	V	38.99	6.59	37.35	50.92	74.00	23.08
11490.00	33.76	AV	V	38.99	6.59	37.35	35.97	54.00	18.03
17235.00	47.87	PK	V	41.56	8.78	38.61	53.58	74.00	20.42
17235.00	32.61	AV	V	41.56	8.78	38.61	38.32	54.00	15.68
7660.00	59.83	PK	V	36.60	4.45	37.32	57.54	74.00	16.46
7660.00	48.65	AV	V	36.60	4.45	37.32	46.36	54.00	7.64
Middle Channel: 5785 MHz									
5785.00	68.76	PK	H	34.21	3.71	0.00	100.66	N/A	N/A
5785.00	58.59	AV	H	34.21	3.71	0.00	90.49	N/A	N/A
5785.00	76.48	PK	V	34.21	3.71	0.00	108.38	N/A	N/A
5785.00	66.59	AV	V	34.21	3.71	0.00	98.49	N/A	N/A
11570.00	48.37	PK	V	39.00	6.61	37.44	50.52	74.00	23.48
11570.00	33.31	AV	V	39.00	6.61	37.44	35.46	54.00	18.54
17355.00	47.28	PK	V	42.26	8.81	38.52	53.81	74.00	20.19
17355.00	32.36	AV	V	42.26	8.81	38.52	38.89	54.00	15.11
9855.00	46.62	PK	V	38.04	5.97	36.72	47.89	74.00	26.11
9855.00	32.59	AV	V	38.04	5.97	36.72	33.86	54.00	20.14
7710.00	58.14	PK	V	36.63	4.50	37.23	56.02	74.00	17.98
7710.00	48.27	AV	V	36.63	4.50	37.23	46.15	54.00	7.85
High Channel: 5825 MHz									
5825.00	65.09	PK	H	34.23	3.73	0.00	97.03	N/A	N/A
5825.00	55.59	AV	H	34.23	3.73	0.00	87.53	N/A	N/A
5825.00	77.18	PK	V	34.23	3.73	0.00	109.12	N/A	N/A
5825.00	67.52	AV	V	34.23	3.73	0.00	99.46	N/A	N/A
5850.00	32.46	PK	V	34.24	3.75	0.00	64.43	122.20	57.77
5855.00	31.57	PK	V	34.24	3.75	0.00	63.54	110.80	47.26
5875.00	26.21	PK	V	34.25	3.77	0.00	58.21	105.20	46.99
5925.00	25.96	PK	V	34.27	3.80	0.00	58.01	68.20	10.19
11650.00	48.78	PK	V	39.00	6.64	37.53	50.87	74.00	23.13
11650.00	33.38	AV	V	39.00	6.64	37.53	35.47	54.00	18.53
17475.00	47.74	PK	V	42.96	8.84	38.44	55.08	74.00	18.92
17475.00	32.84	AV	V	42.96	8.84	38.44	40.18	54.00	13.82
7768.00	57.91	PK	V	36.66	4.55	37.13	55.97	74.00	18.03
7768.00	47.44	AV	V	36.66	4.55	37.13	45.50	54.00	8.50

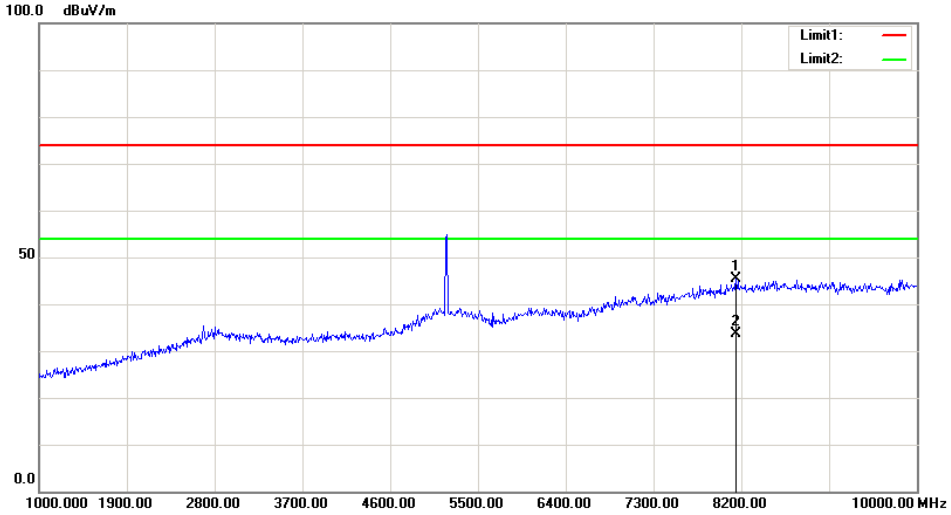
802.11n ht40(2Tx was the worst)

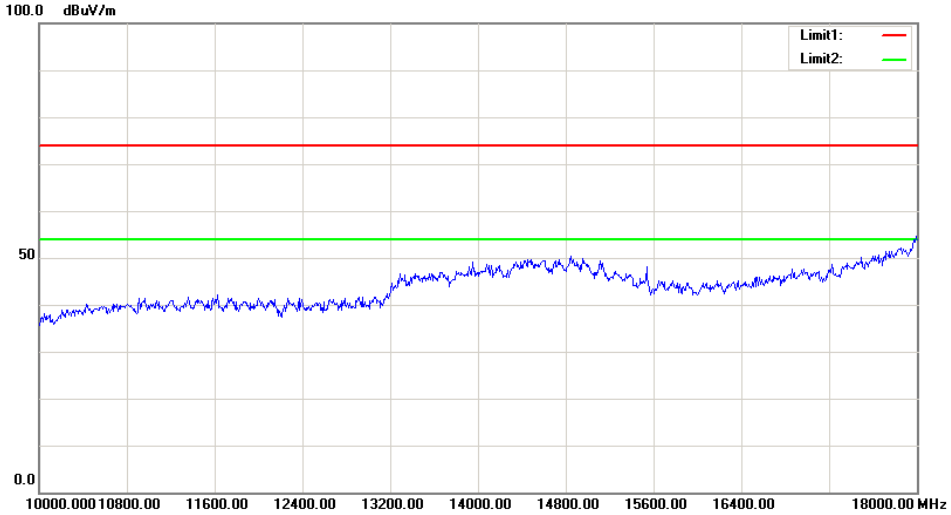
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 5755MHz									
5755.00	65.97	PK	H	34.20	3.70	0.00	97.85	N/A	N/A
5755.00	55.48	AV	H	34.20	3.70	0.00	87.36	N/A	N/A
5755.00	73.19	PK	V	34.20	3.70	0.00	105.07	N/A	N/A
5755.00	63.25	AV	V	34.20	3.70	0.00	95.13	N/A	N/A
5725.00	48.22	PK	V	34.19	3.69	0.00	80.08	122.20	42.12
5720.00	46.05	PK	V	34.19	3.69	0.00	77.91	110.80	32.89
5700.00	35.43	PK	V	34.18	3.68	0.00	67.27	105.20	37.93
5650.00	26.92	PK	V	34.16	3.63	0.00	58.69	68.20	9.51
11510.00	48.81	PK	V	39.00	6.59	37.37	51.01	74.00	22.99
11510.00	33.68	AV	V	39.00	6.59	37.37	35.88	54.00	18.12
17265.00	47.46	PK	V	41.74	8.79	38.58	53.39	74.00	20.61
17265.00	32.33	AV	V	41.74	8.79	38.58	38.26	54.00	15.74
7673.50	59.52	PK	V	36.60	4.47	37.29	57.28	74.00	16.72
7673.50	49.66	AV	V	36.60	4.47	37.29	47.42	54.00	6.58
High Channel: 5795 MHz									
5795.00	67.31	PK	H	34.22	3.71	0.00	99.22	N/A	N/A
5795.00	57.48	AV	H	34.22	3.71	0.00	89.39	N/A	N/A
5795.00	74.98	PK	V	34.22	3.71	0.00	106.89	N/A	N/A
5795.00	64.12	AV	V	34.22	3.71	0.00	96.03	N/A	N/A
5850.00	36.16	PK	V	34.24	3.75	0.00	68.13	122.20	54.07
5855.00	35.18	PK	V	34.24	3.75	0.00	67.15	110.80	43.65
5875.00	29.22	PK	V	34.25	3.77	0.00	61.22	105.20	43.98
5925.00	26.14	PK	V	34.27	3.80	0.00	58.19	68.20	10.01
11590.00	48.52	PK	V	39.00	6.62	37.46	50.66	74.00	23.34
11590.00	33.86	AV	V	39.00	6.62	37.46	36.00	54.00	18.00
17385.00	47.85	PK	V	42.43	8.82	38.50	54.58	74.00	19.42
17385.00	32.92	AV	V	42.43	8.82	38.50	39.65	54.00	14.35
7727.50	51.59	PK	V	36.64	4.51	37.20	49.52	74.00	24.48
7727.50	40.21	AV	V	36.64	4.51	37.20	38.14	54.00	15.86

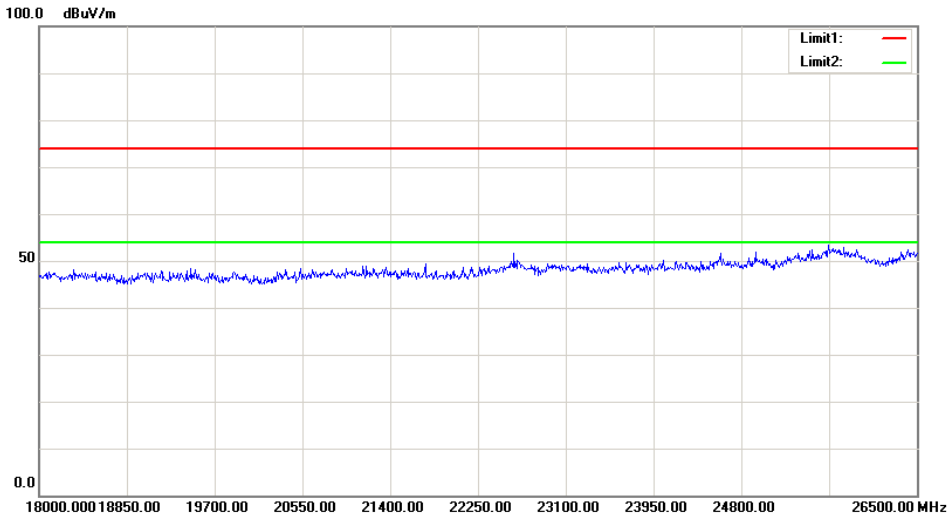
802.11 ac80(2Tx was the worst)

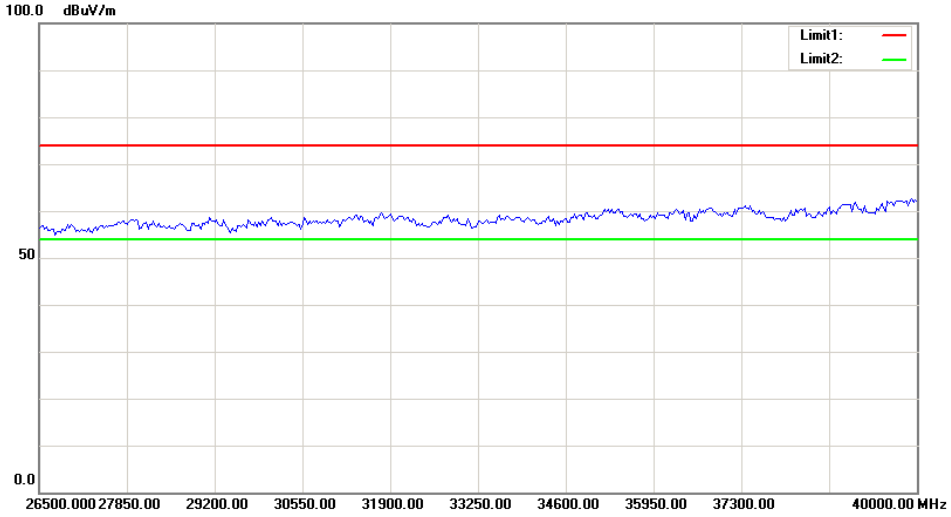
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Middle Channel: 5775 MHz									
5775.00	68.46	PK	H	34.21	3.70	0.00	100.35	N/A	N/A
5775.00	58.25	AV	H	34.21	3.70	0.00	90.14	N/A	N/A
5775.00	78.75	PK	V	34.21	3.70	0.00	110.64	N/A	N/A
5775.00	68.52	AV	V	34.21	3.70	0.00	100.41	N/A	N/A
5725.00	53.08	PK	V	34.19	3.69	0.00	84.94	122.20	37.26
5720.00	48.18	PK	V	34.19	3.69	0.00	80.04	110.80	30.76
5700.00	47.11	PK	V	34.18	3.68	0.00	78.95	105.20	26.25
5650.00	32.26	PK	V	34.16	3.63	0.00	64.03	68.20	4.17
5850.00	52.64	PK	V	34.24	3.75	0.00	84.61	122.20	37.59
5855.00	48.26	PK	V	34.24	3.75	0.00	80.23	110.80	30.57
5875.00	37.84	PK	V	34.25	3.77	0.00	69.84	105.20	35.36
5925.00	29.46	PK	V	34.27	3.80	0.00	61.51	68.20	6.69
11550.00	48.82	PK	V	39.00	6.61	37.42	50.99	74.00	23.01
11550.00	33.46	AV	V	39.00	6.61	37.42	35.63	54.00	18.37
17325.00	47.56	PK	V	42.09	8.80	38.54	53.89	74.00	20.11
17325.00	32.85	AV	V	42.09	8.80	38.54	39.18	54.00	14.82
7700.50	60.46	PK	V	36.62	4.49	37.25	58.30	74.00	15.70
7700.50	50.13	AV	V	36.62	4.49	37.25	47.97	54.00	6.03

Test Plots(For worst mode 802.11n ht20 2Tx 5200MHz)
Horizontal:

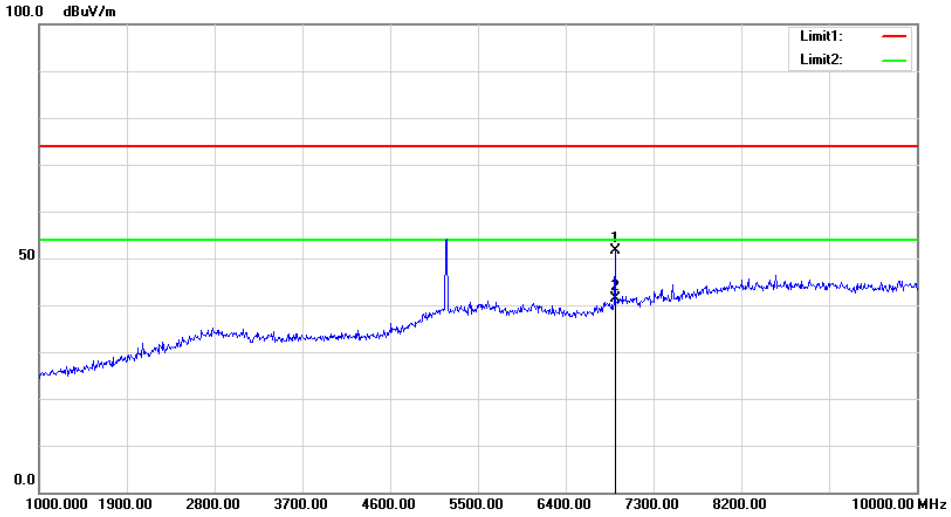


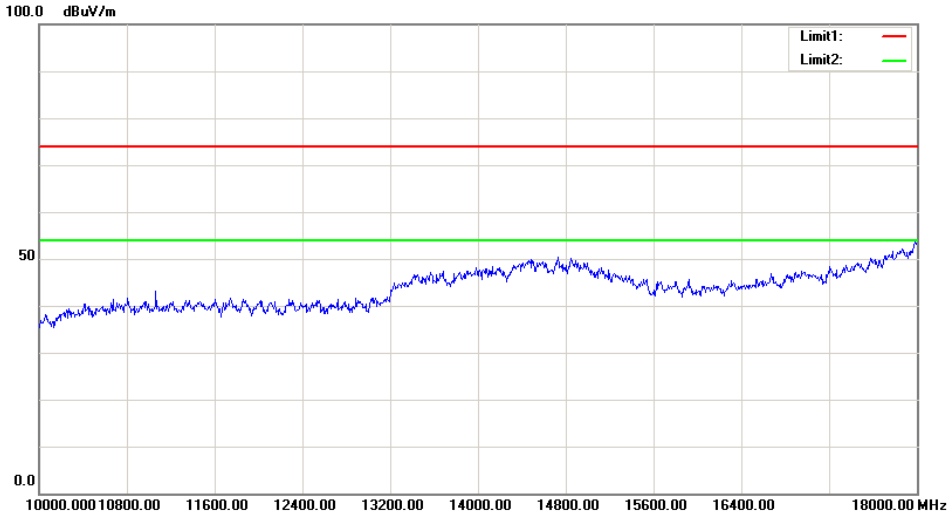


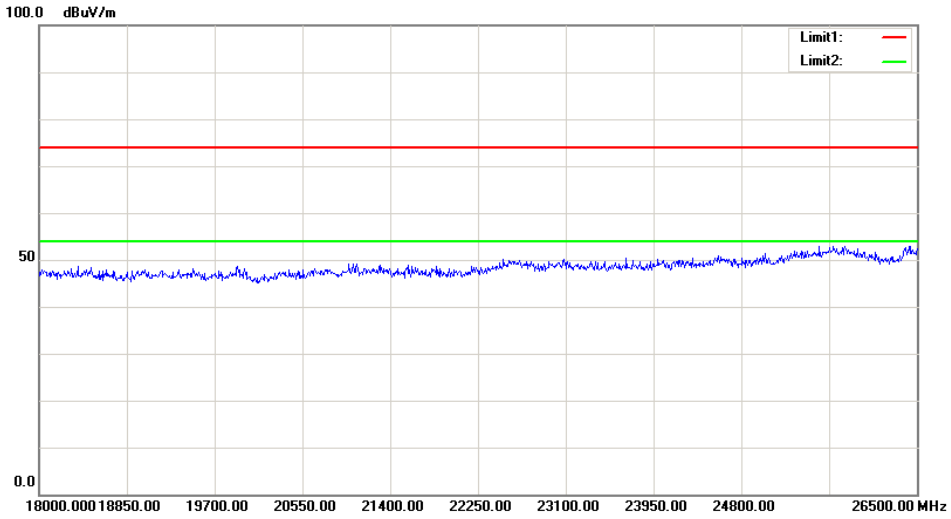


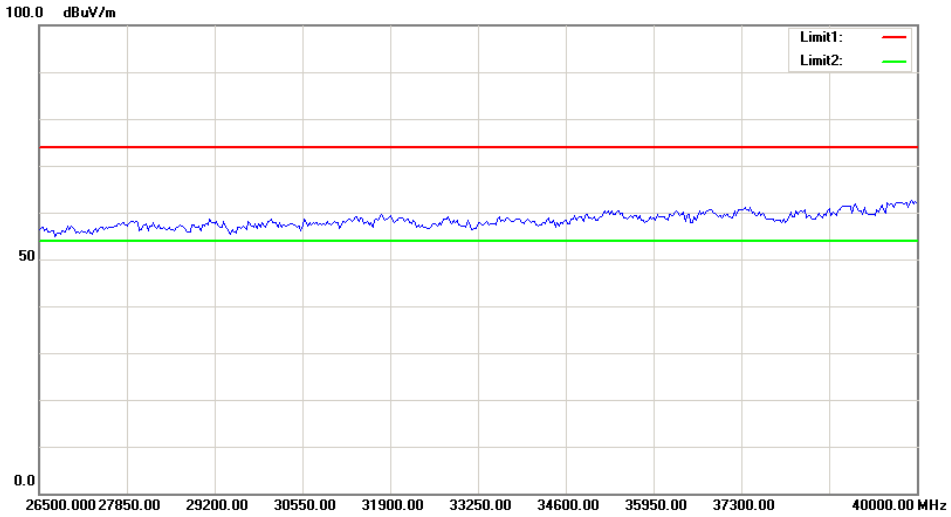

100.0 dBuV/m
Limit1:
Limit2:
50
0.0
26500.000 27850.00 29200.00 30550.00 31900.00 33250.00 34600.00 35950.00 37300.00 40000.00 MHz

Vertical:


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


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


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


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

FCC §15.407(b)–OUT- OF-BAND EMISSIONS

Applicable Standard

FCC §15.407

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

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

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

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

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

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

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

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

Test Procedure

According to KDB 789033 D02 General UNII Test Procedures New Rules v01r04

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSIQ 26	831929/005	2017-08-31	2018-08-31
N/A	Coaxial Cable	C-SJ00-0010	C0010/04	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:	27.6~29.3°C
Relative Humidity:	39~63 %
ATM Pressure:	100.3 ~100.4kPa

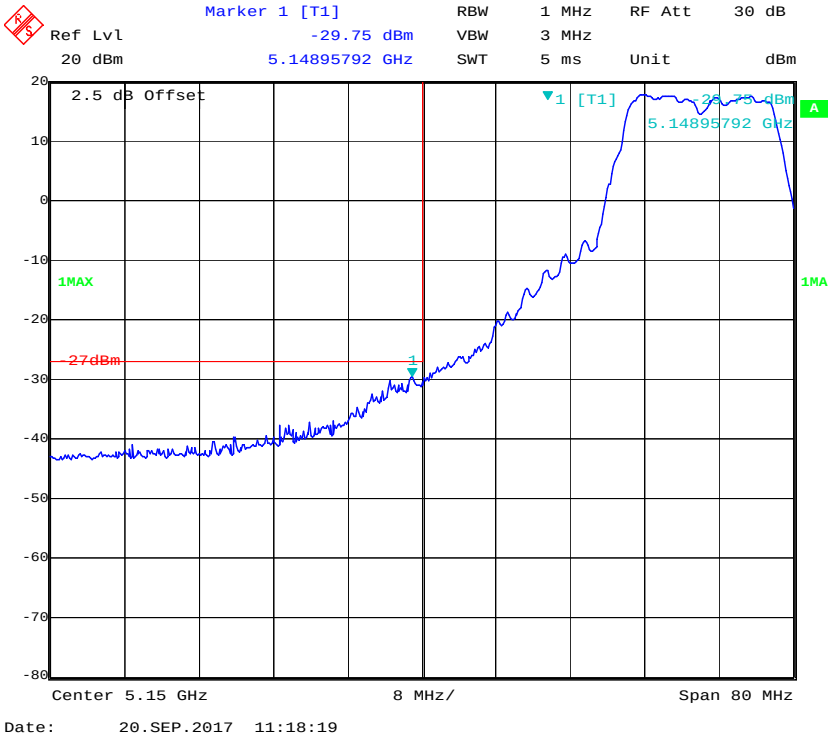
The testing was performed by Rick Chen from 2017-09-20 to 2017-12-18.

Test Result: Pass.

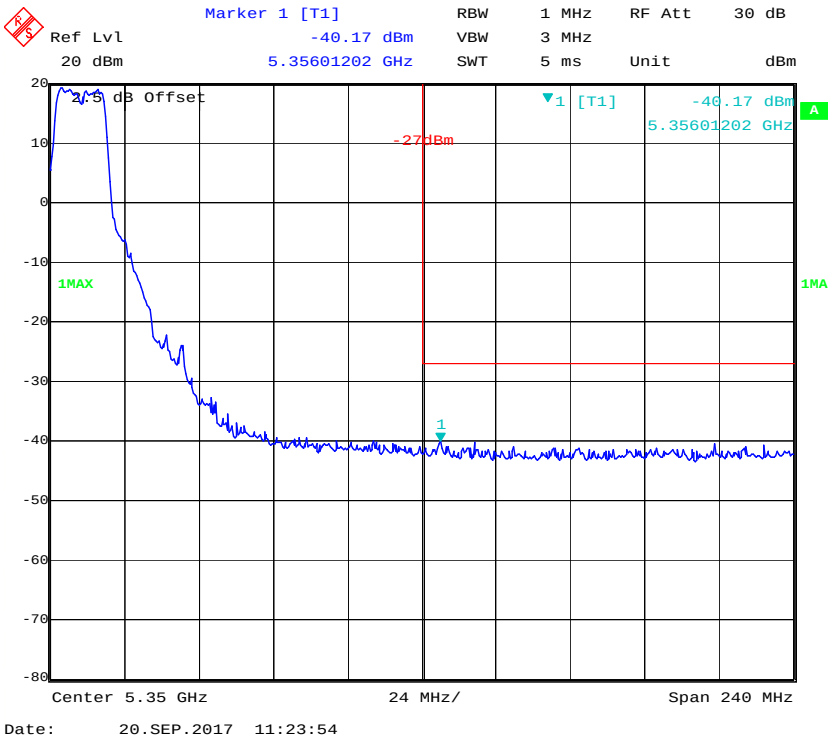
Please refer to the following plots.

5150-5250MHz(the atenna gain was offset in the display, all emission under limit more than 3dBc for 802.11n and ac modes, so 2TX mode also compliance the requirement)
Chain 0:

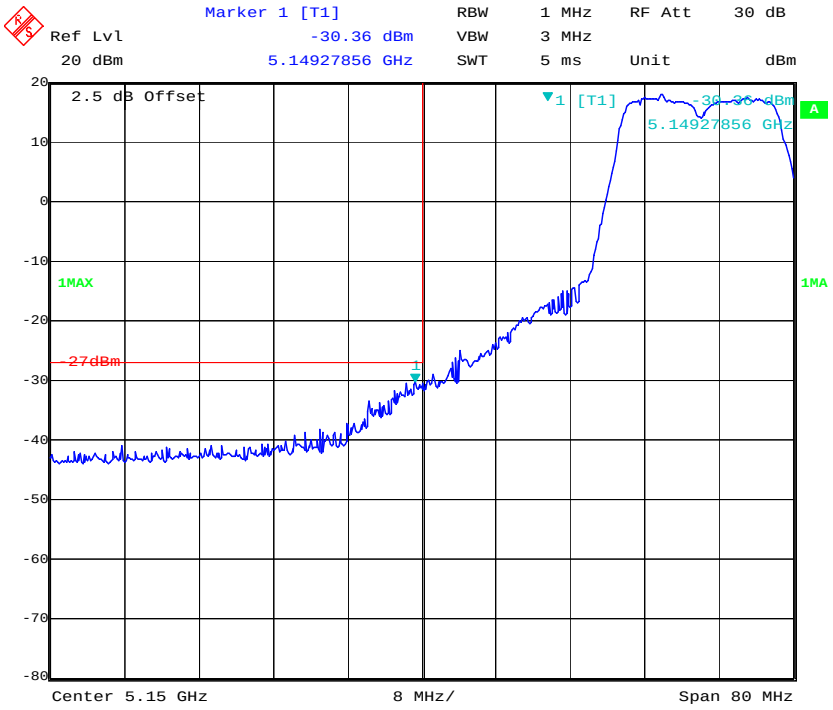
802.11a Low Channel



802.11a High Channel

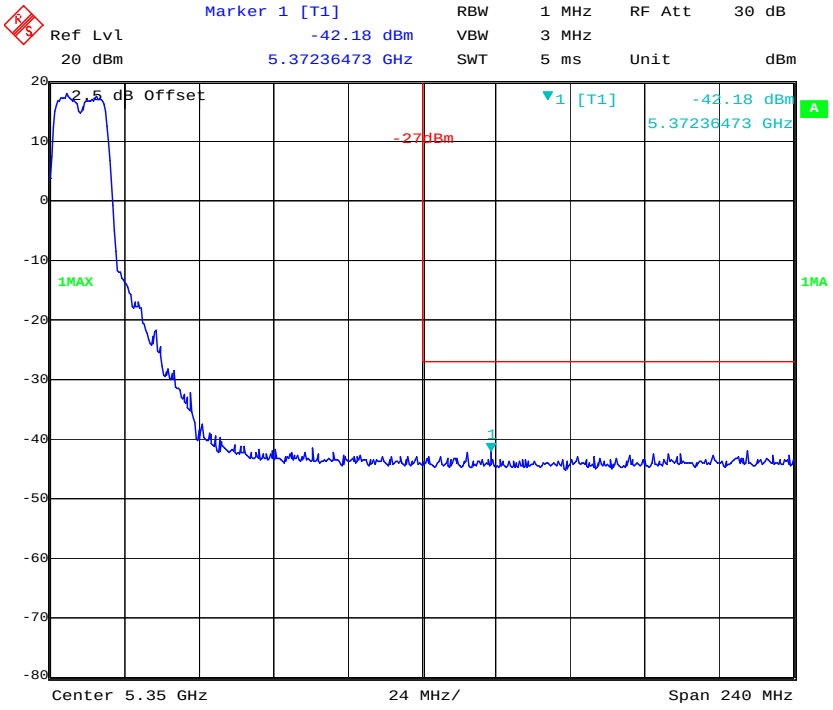


802.11n ht20 Low Channel



Date: 20.SEP.2017 11:30:44

802.11n ht20 High Channel



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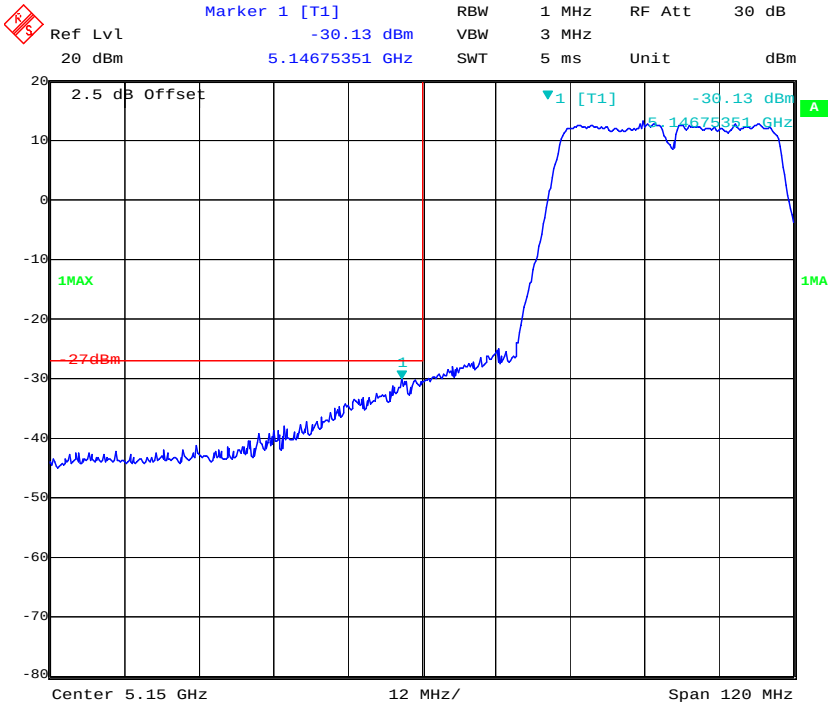
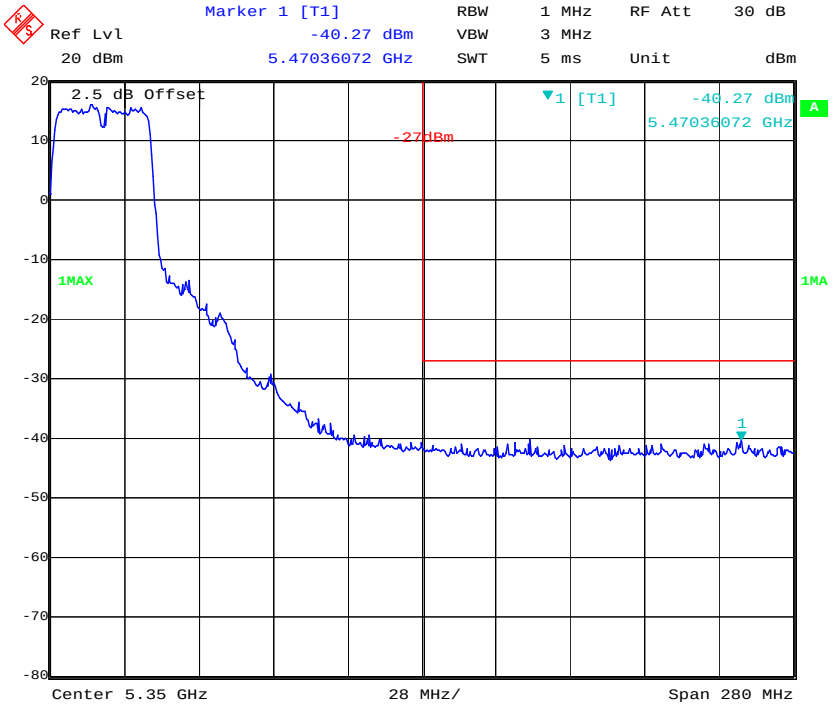
802.11n ht40 Low Channel



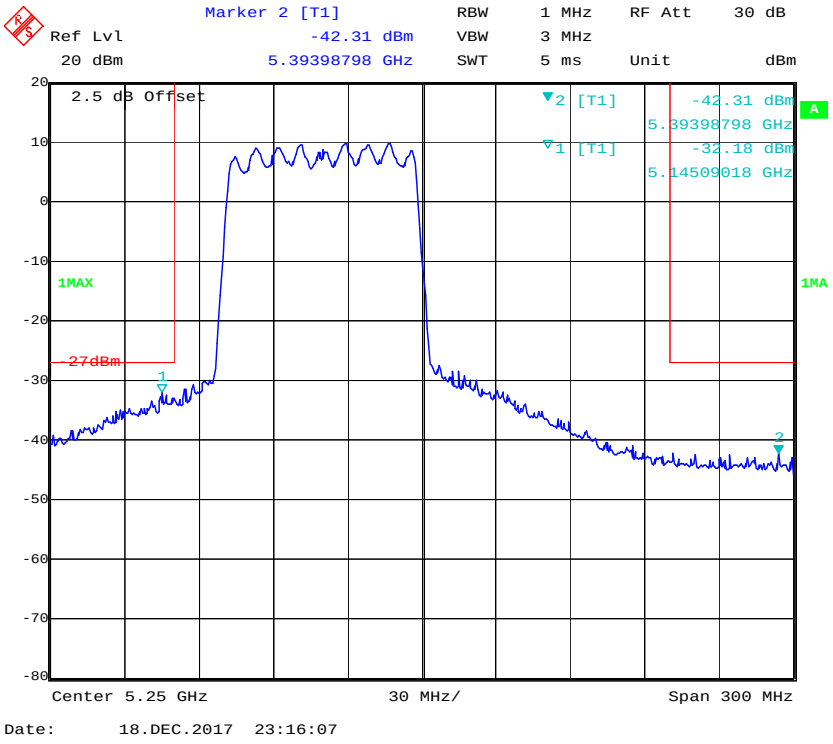
Date: 20.SEP.2017 11:36:45

802.11n ht40 High Channel



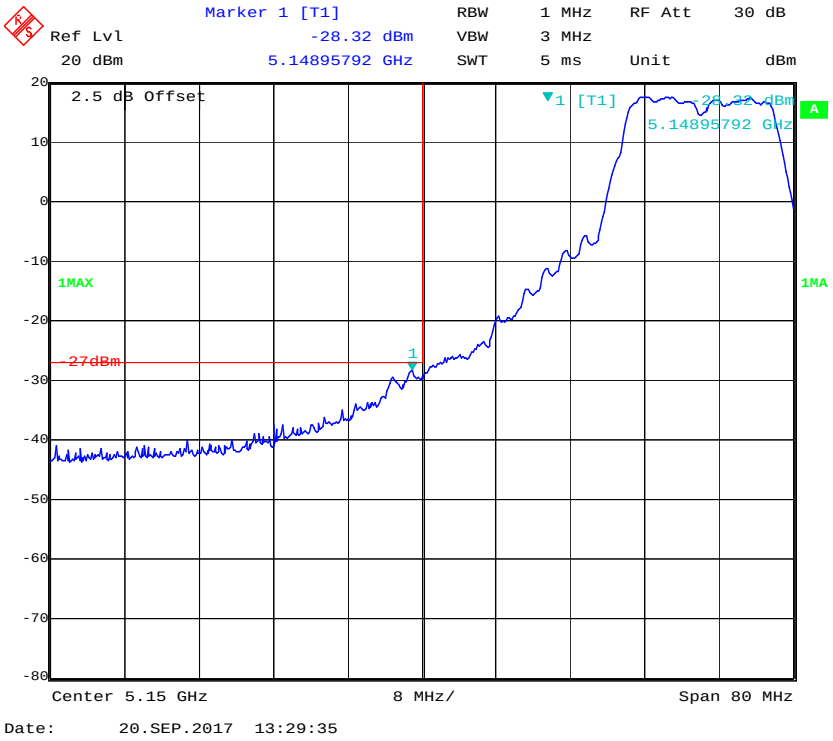
Date: 20.SEP.2017 11:38:57

802.11n ac80 Middle Channel

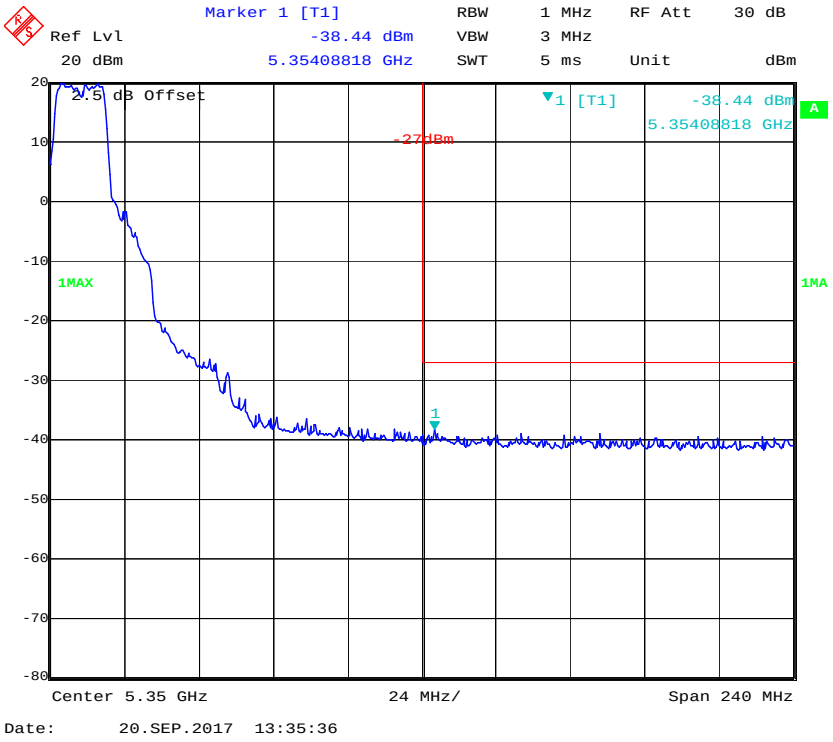


Chain 1:

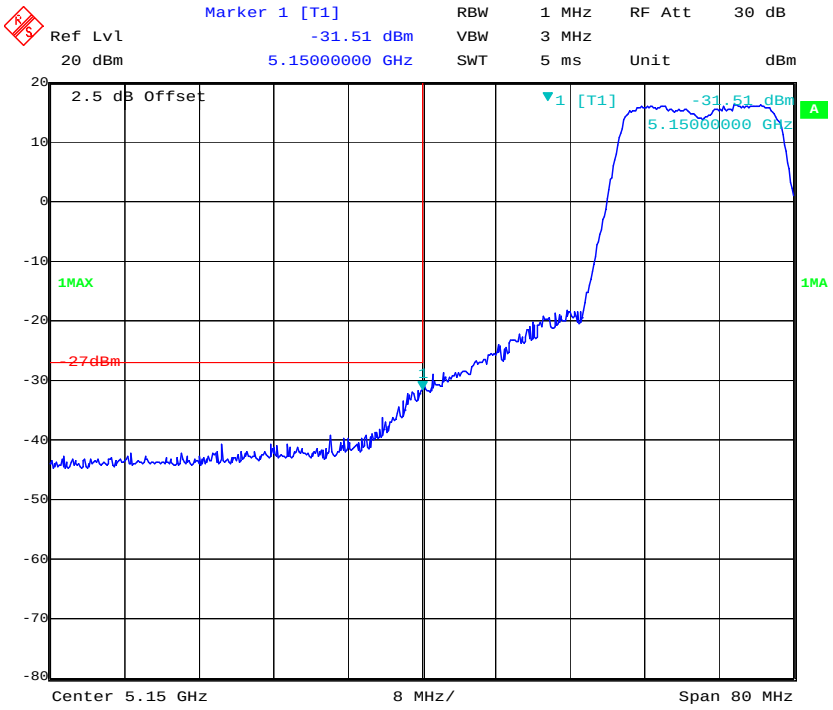
802.11a Low Channel



802.11a High Channel

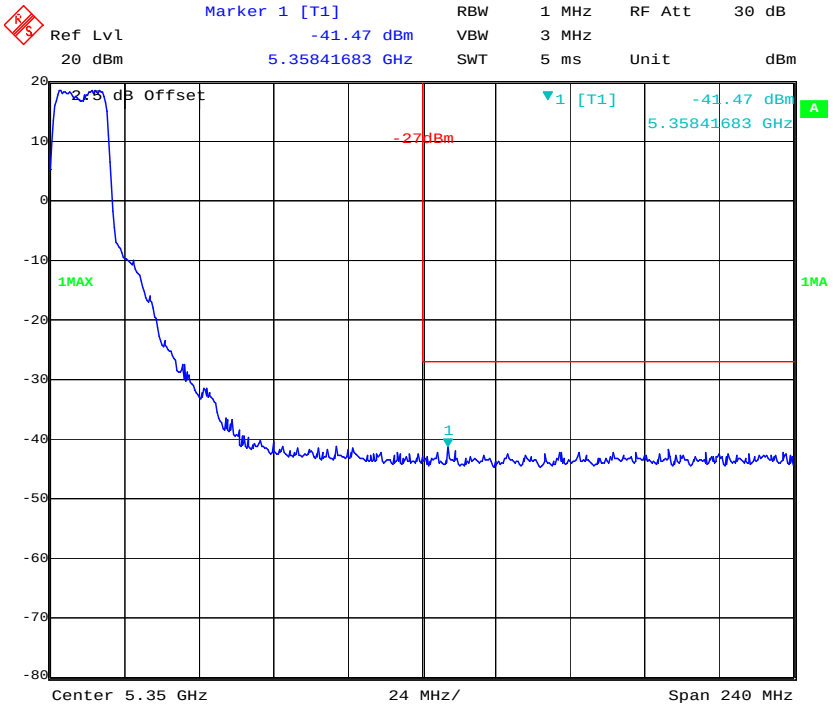


802.11n ht20 Low Channel



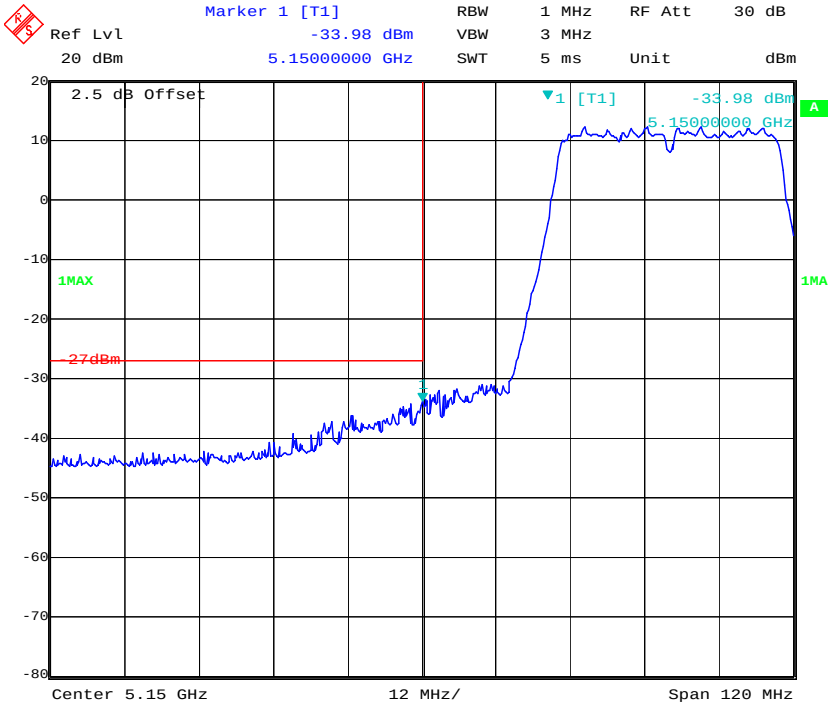
Date: 20.SEP.2017 13:46:37

802.11n ht20 High Channel



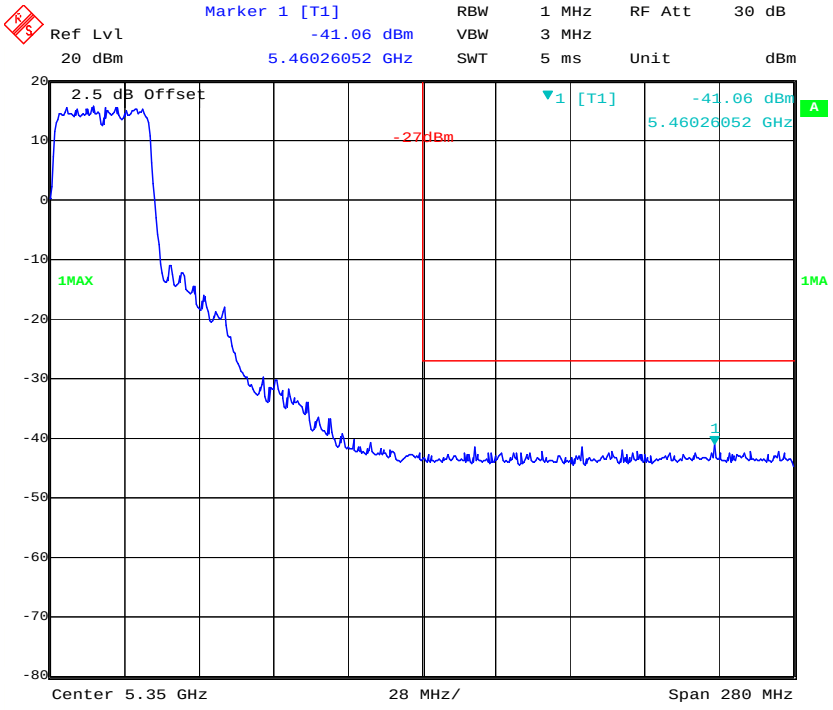
Date: 20.SEP.2017 13:38:11

802.11n ht40 Low Channel



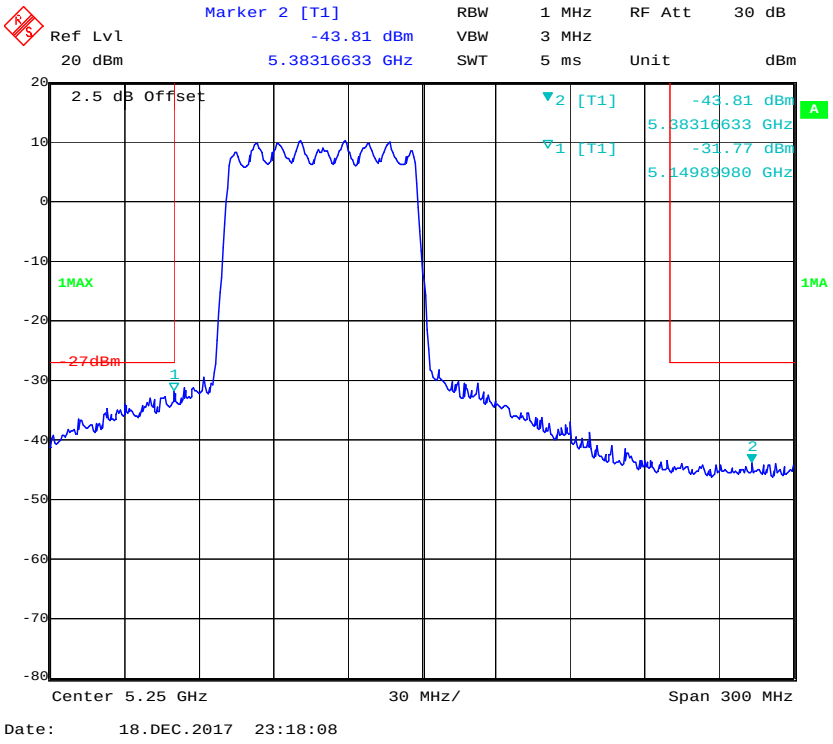
Date: 28.SEP.2017 10:29:48

802.11n ht40 High Channel



Date: 20.SEP.2017 13:55:17

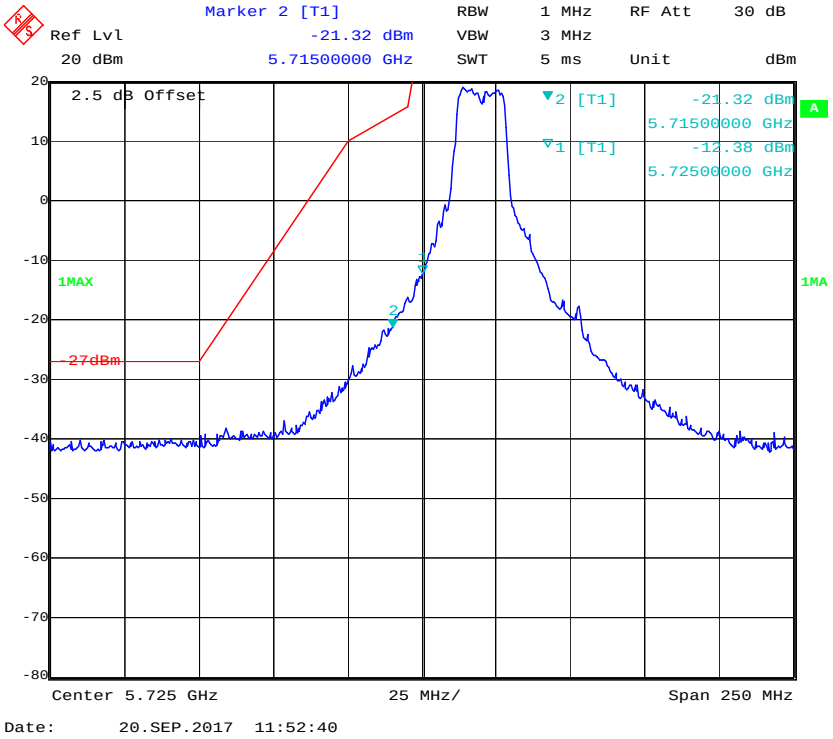
802.11n ac80 Middle Channel



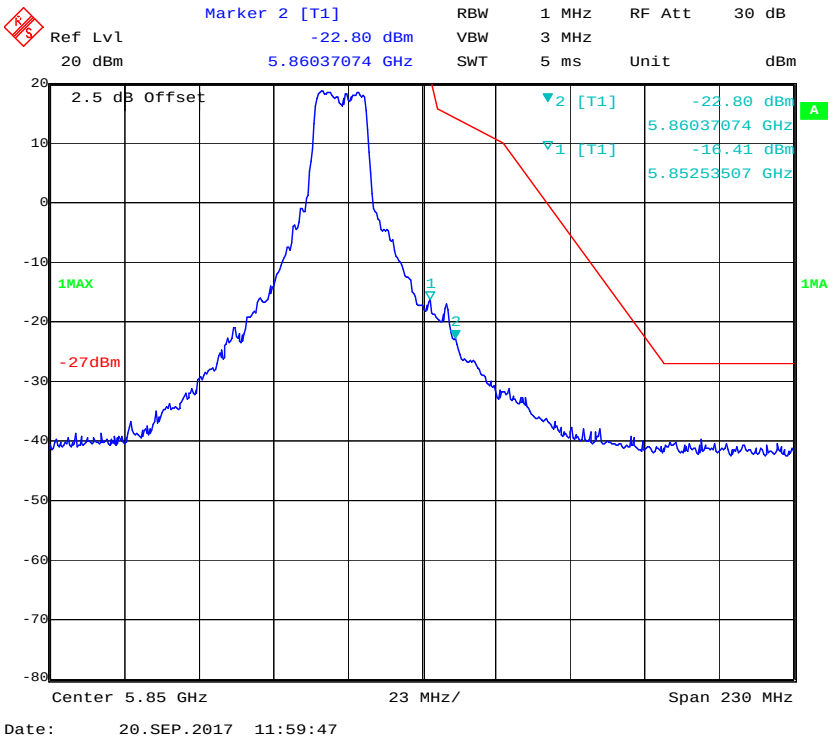
5725-5850MHz(the atenna gain was offset in the display, all emission under limit more than 3dBc, so 2TX mode also compliance the requirement)

Chain 0:

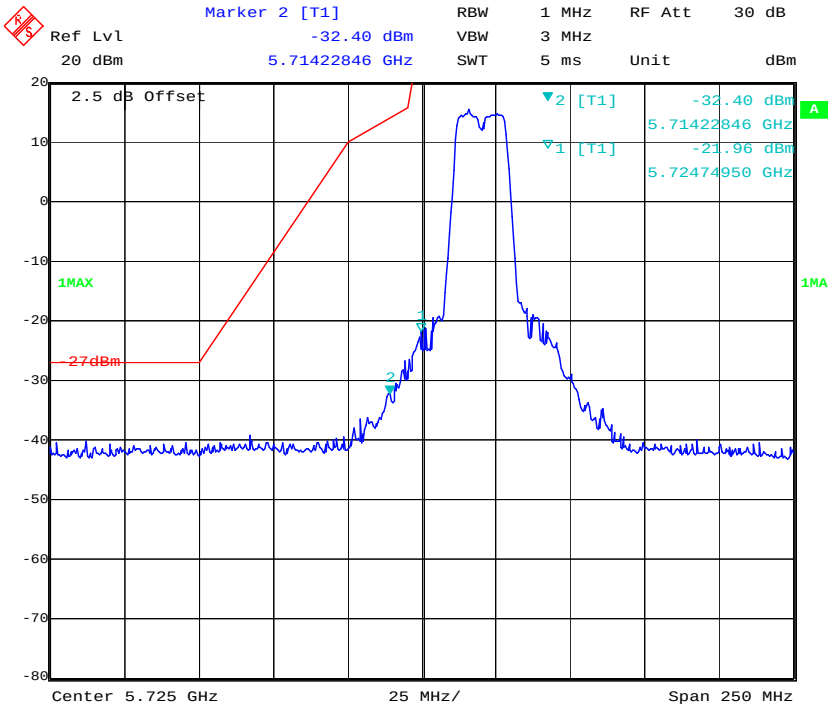
802.11a Low Channel



802.11a High Channel

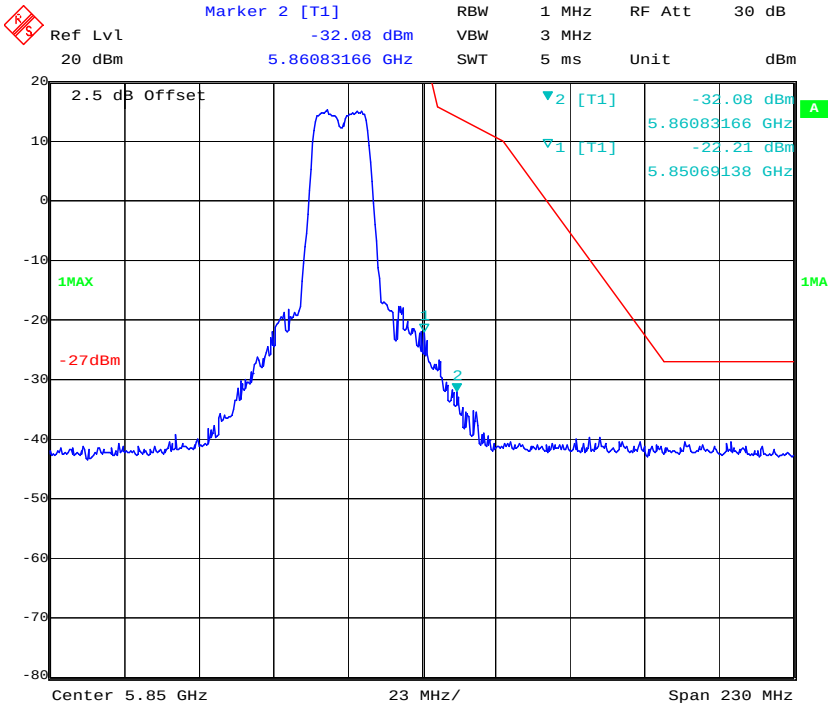


802.11n ht20 Low Channel



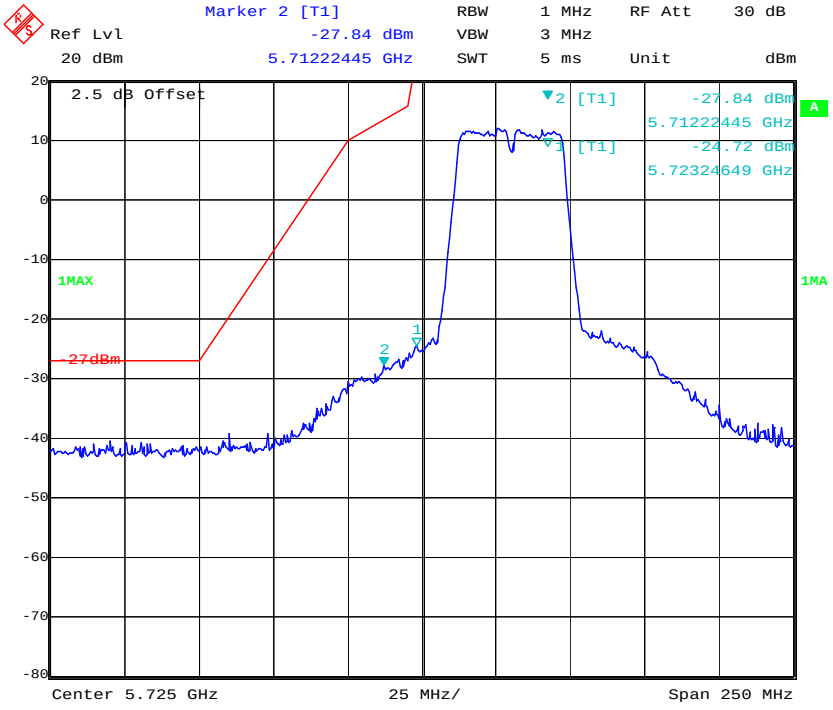
Date: 28.SEP.2017 13:23:36

802.11n ht20 High Channel

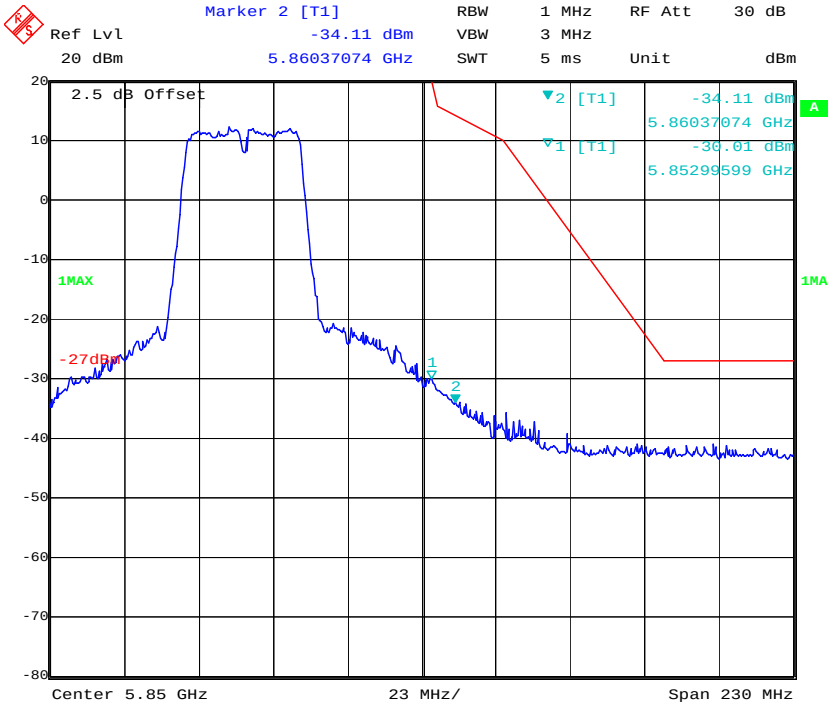


Date: 28.SEP.2017 13:25:39

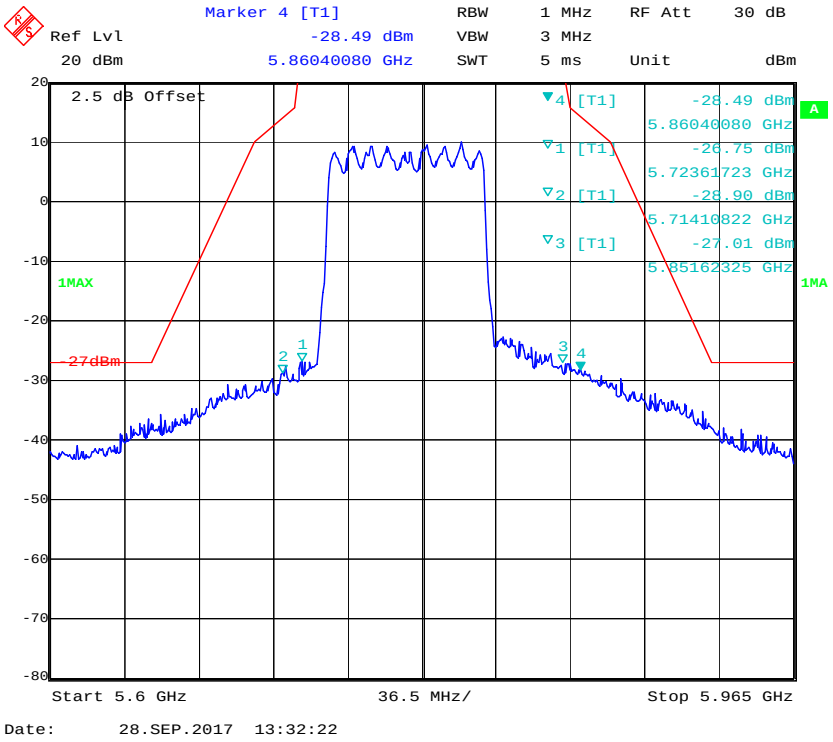
802.11n ht40 Low Channel



802.11n ht40 High Channel

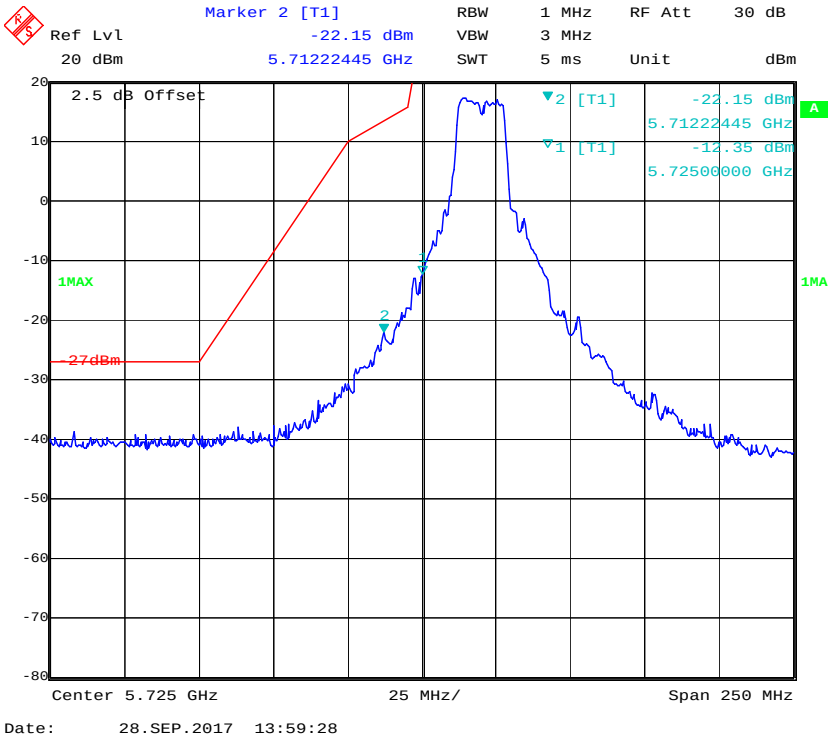


802.11n ac80 Middle Channel

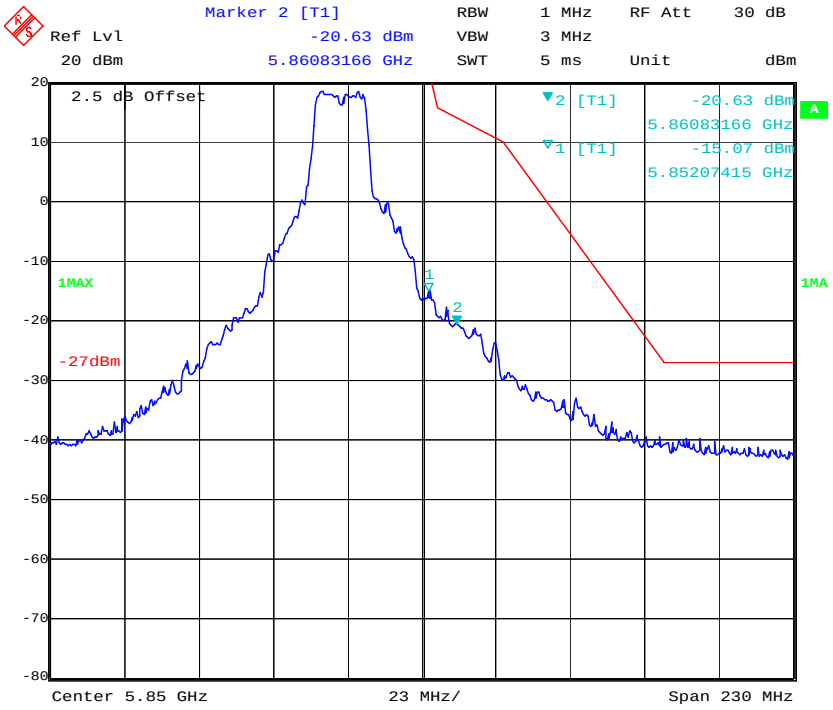


Chain 1:

802.11a Low Channel

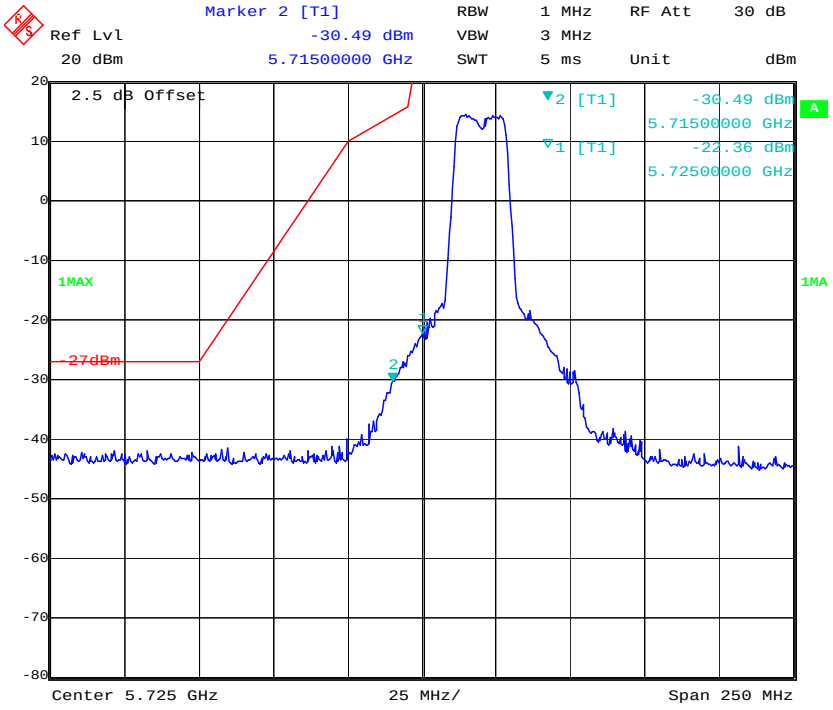


802.11a High Channel



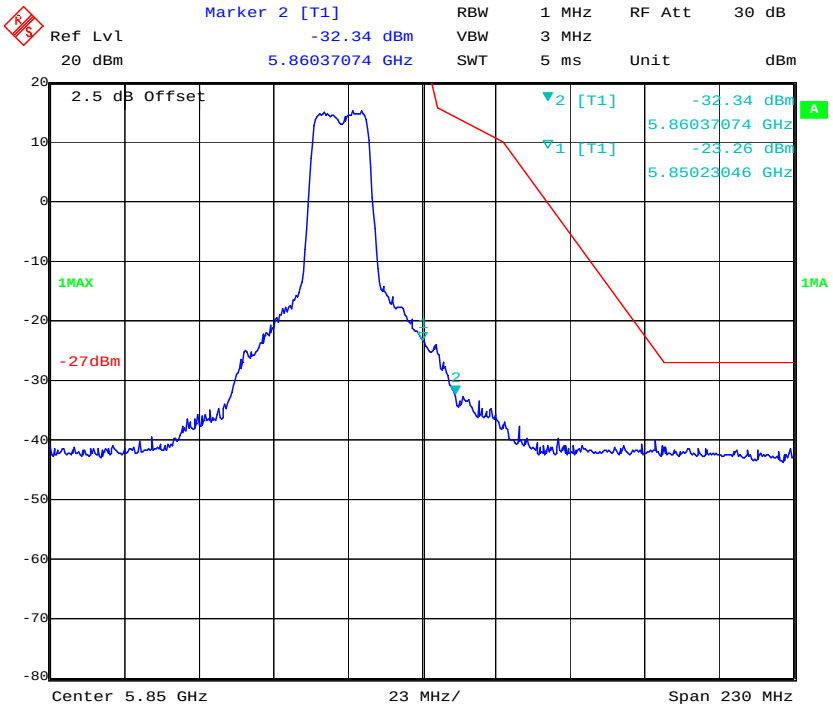
Date: 20.SEP.2017 14:24:13

802.11n ht20 Low Channel



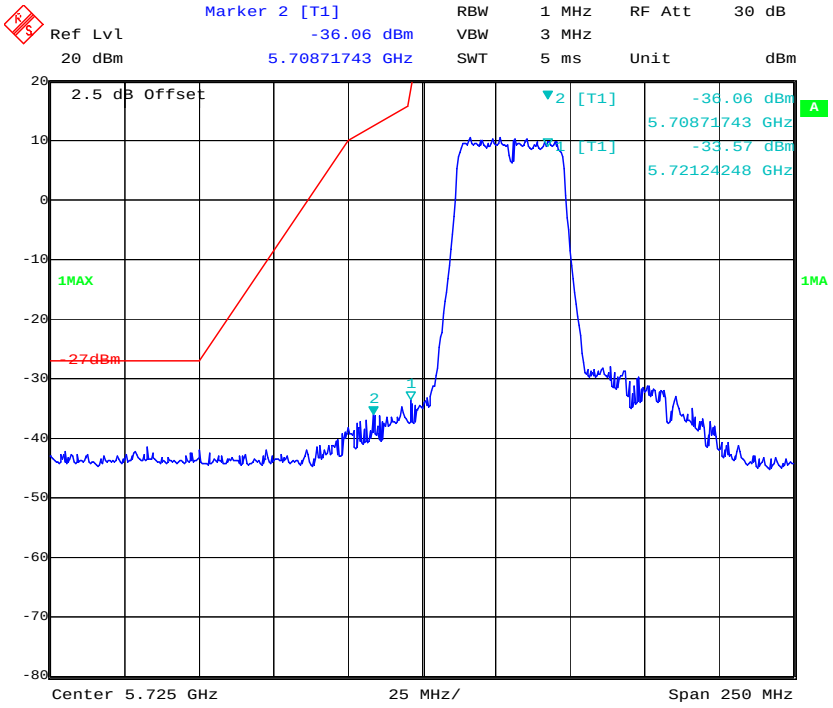
Date: 28.SEP.2017 13:55:27

802.11n ht20 High Channel



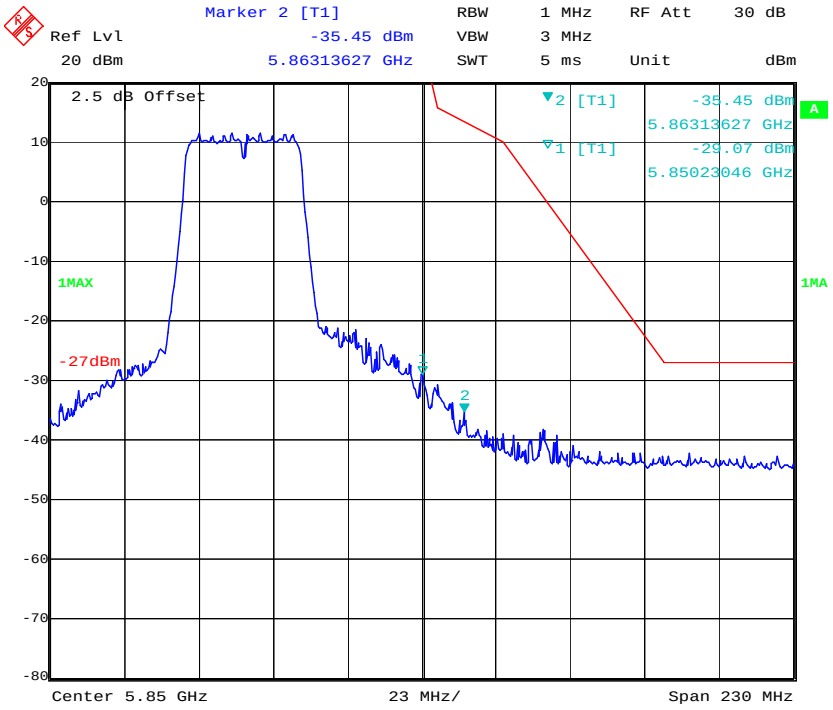
Date: 28.SEP.2017 13:48:15

802.11n ht40 Low Channel



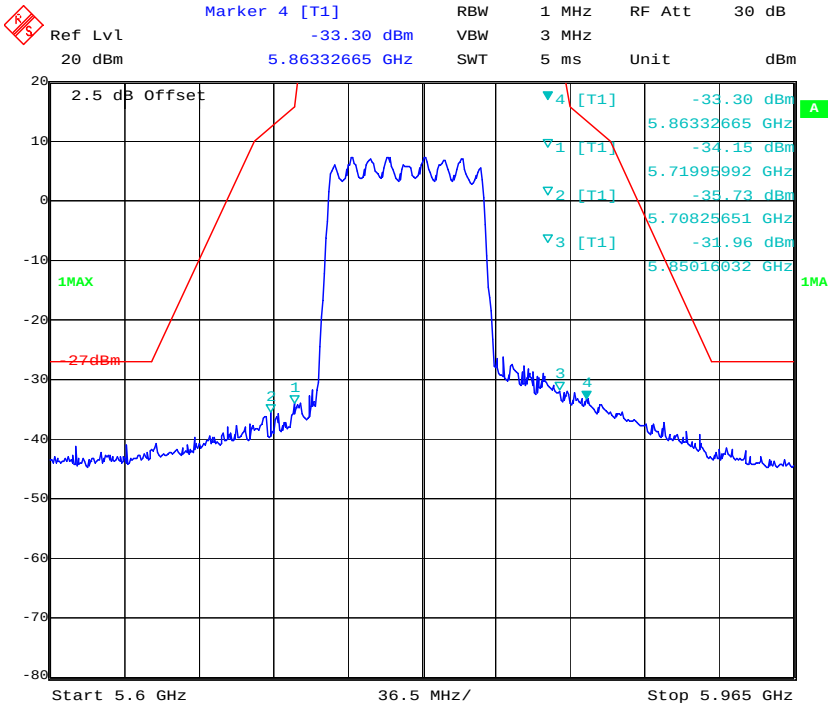
Date: 28.SEP.2017 13:49:53

802.11n ht40 High Channel



Date: 28.SEP.2017 13:52:09

802.11n ac80 Middle Channel



Date: 28.SEP.2017 13:53:22

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

Applicable Standard

15.407(a) (e)

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSIQ 26	831929/005	2017-08-31	2018-08-31
N/A	Coaxial Cable	C-SJ00-0010	C0010/04	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:	27.6°C
Relative Humidity:	39%
ATM Pressure:	100.4kPa

The testing was performed by Rick Chen on 2017-09-20.

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	23.17	16.83
	Middle	5200	26.53	16.99
	High	5240	26.85	16.99
802.11n ht20	Low	5180	21.4	17.8
	Middle	5200	21.32	17.8
	High	5240	21.32	17.8
802.11n ht40	Low	5190	41.84	36.87
	High	5230	41.84	37.03
802.11ac80	Middle	5210	82.08	75.99

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

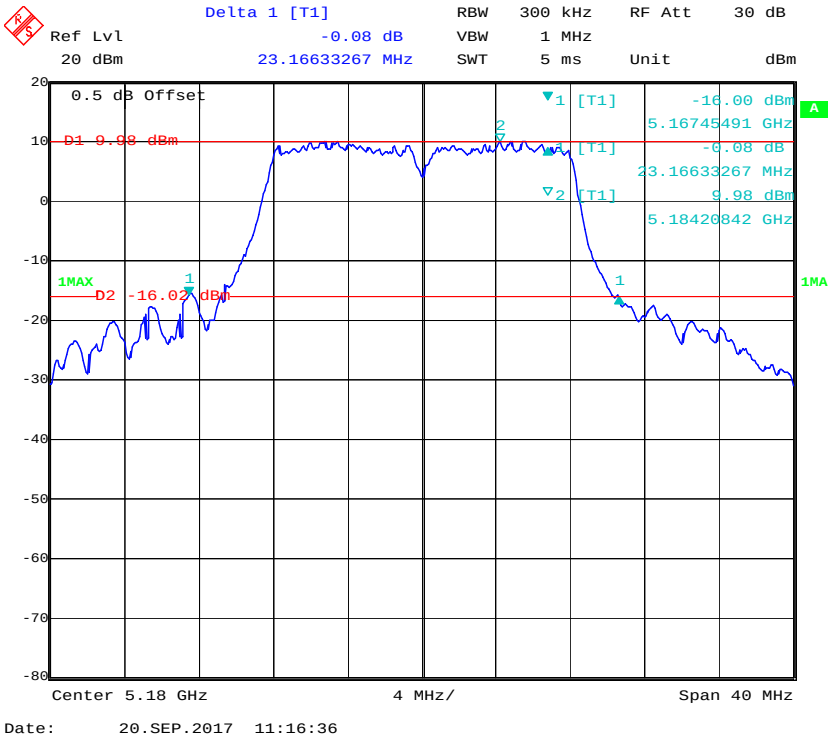
5725-5850MHz:

Mode	Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11 a	Low	5745	16.59	17.23
	Middle	5785	16.59	17.15
	High	5825	16.59	17.15
802.11n ht20	Low	5745	17.72	17.8
	Middle	5785	17.8	17.8
	High	5825	17.8	17.8
802.11n ht40	Low	5755	36.71	37.03
	High	5795	36.71	37.19
802.11ac80	Middle	5775	76.63	75.99

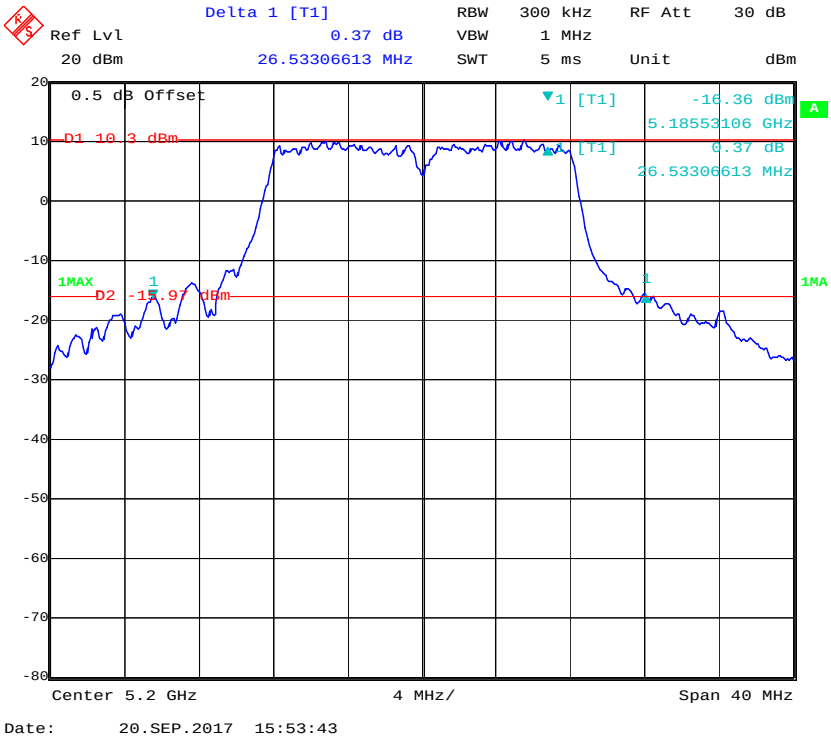
Note: For 5725-5850MHz band, the 99% Occupied Bandwidth have not fall into the band 5470-5725MHz.

5150-5250MHz: 26dB Emission Bandwidth:

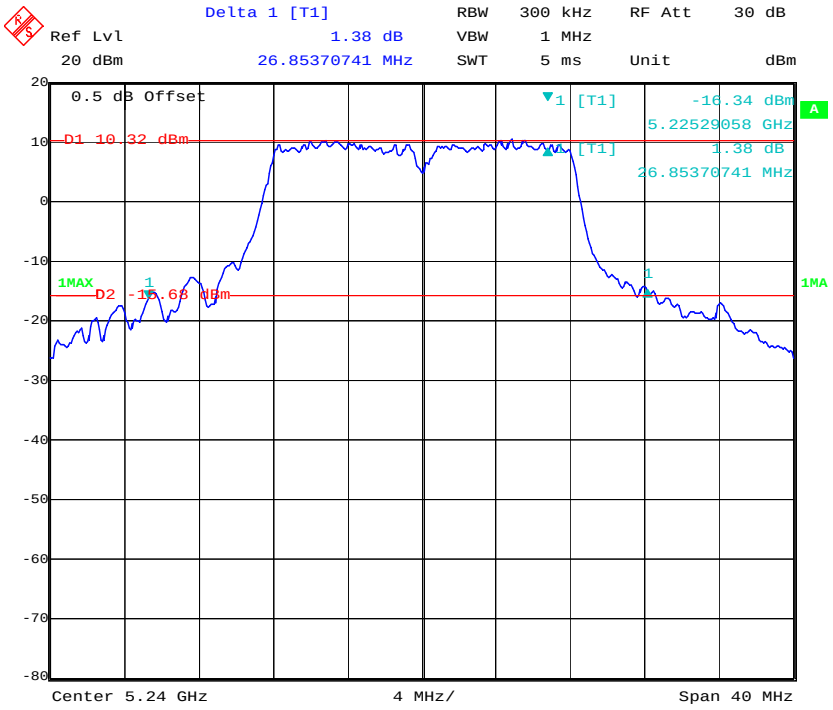
802.11a Low Channel



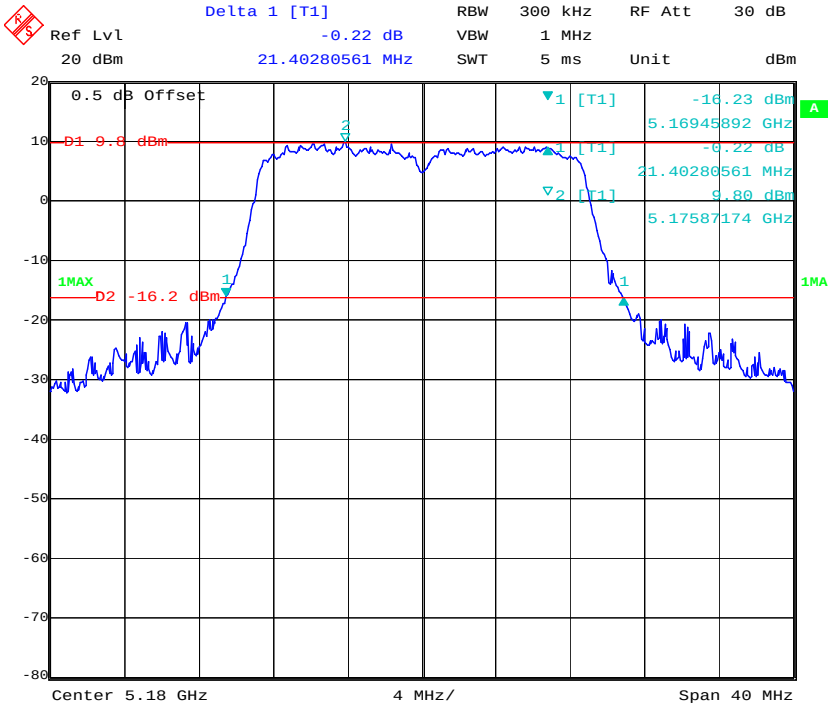
802.11a Middle Channel



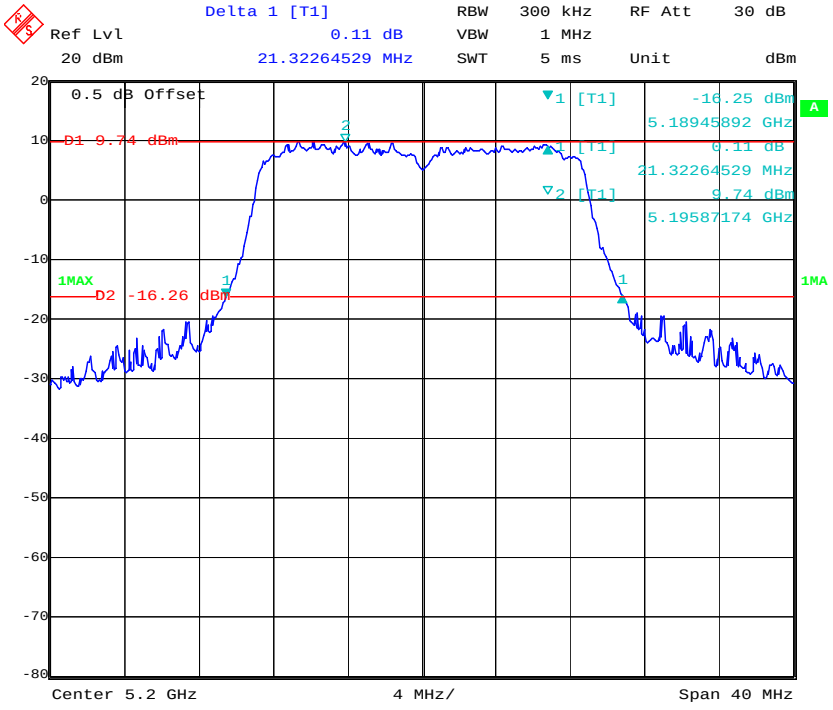
802.11a High Channel



802.11n ht20 Low Channel

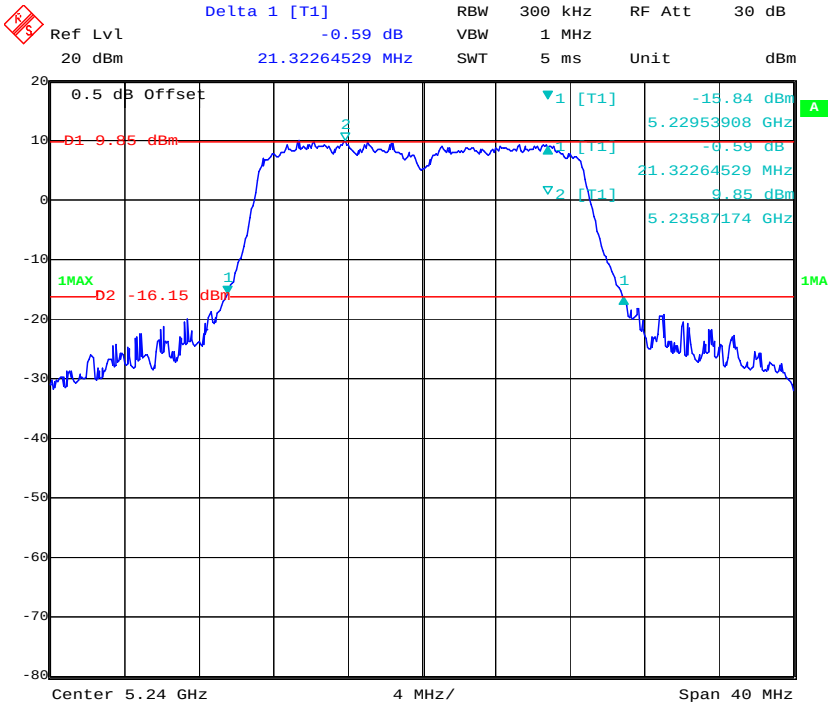


802.11n ht20 Middle Channel



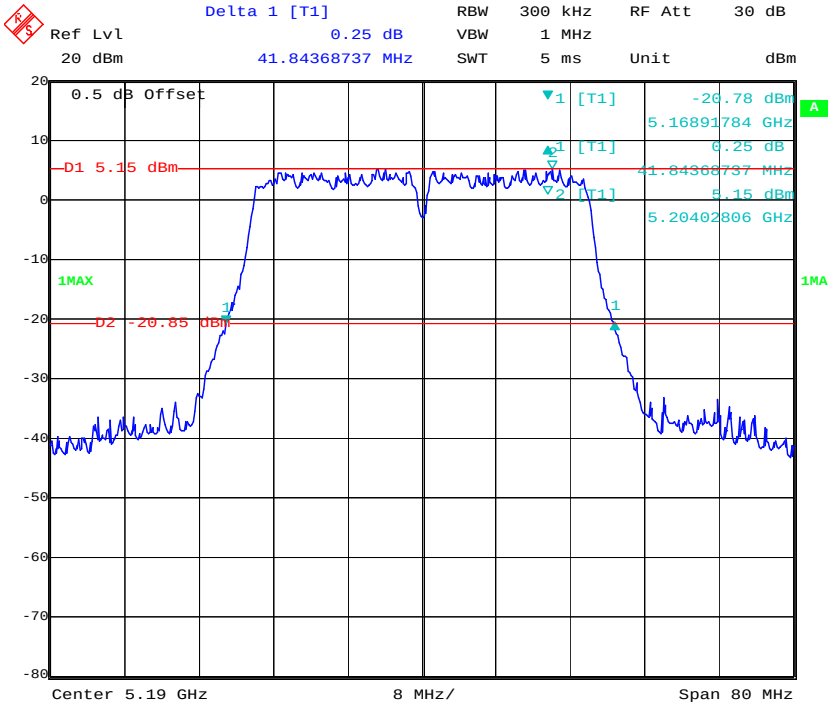
Date: 20.SEP.2017 11:27:02

802.11n ht20 High Channel



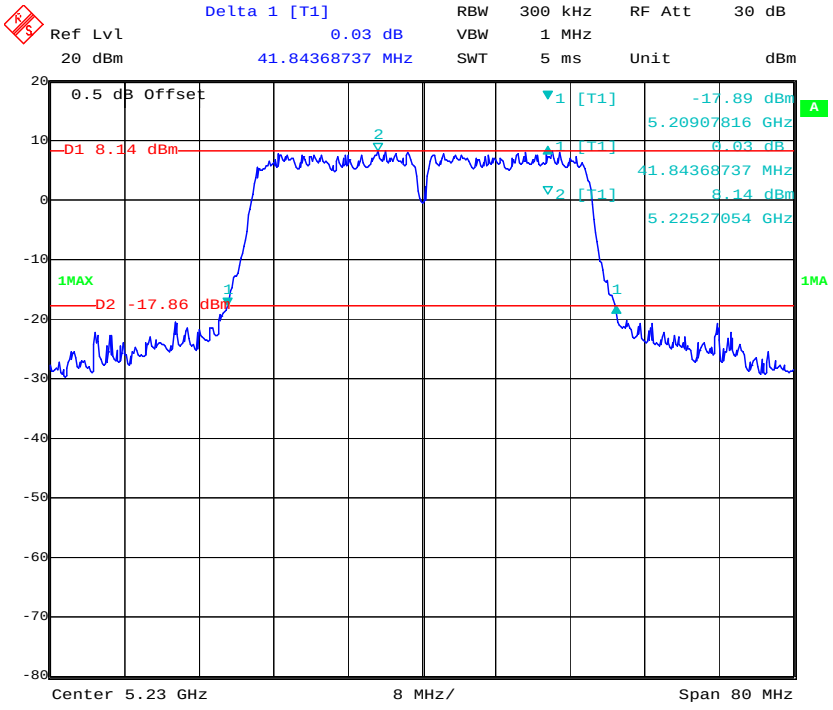
Date: 20.SEP.2017 11:25:00

802.11n ht40 Low Channel



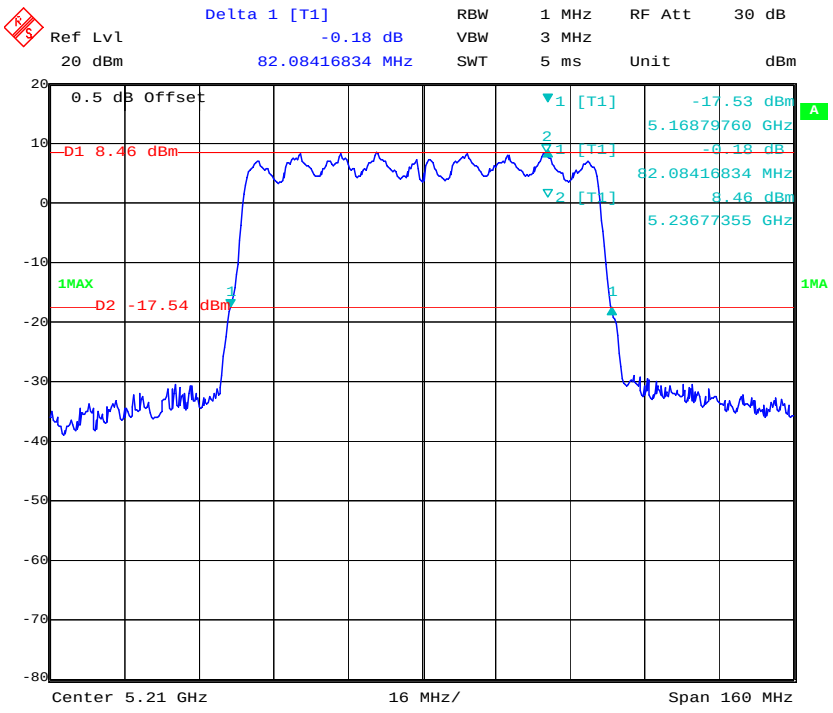
Date: 20.SEP.2017 11:35:18

802.11n ht40 High Channel



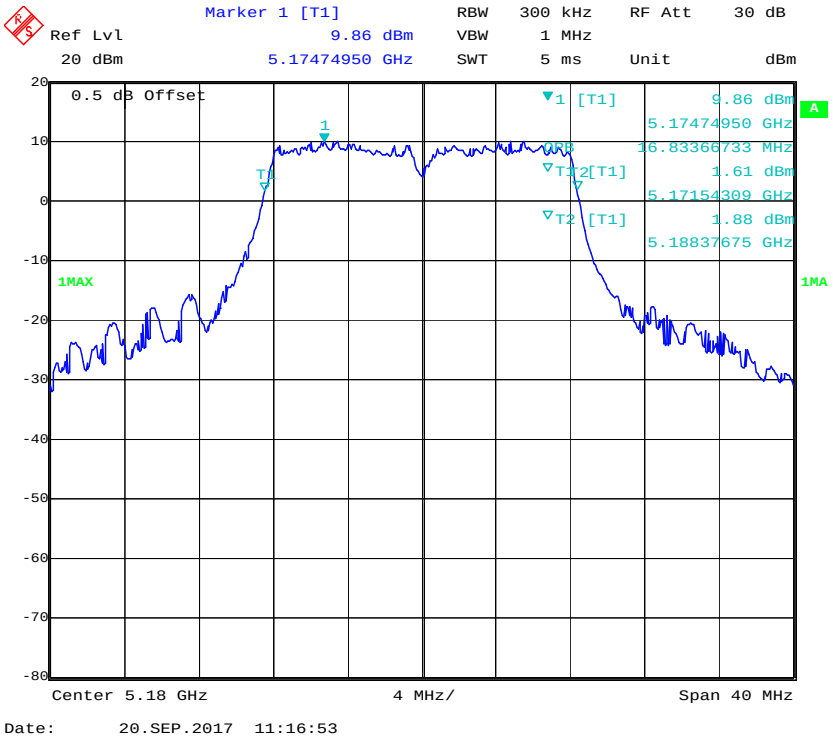
Date: 20.SEP.2017 11:37:36

802.11ac80 Middle Channel

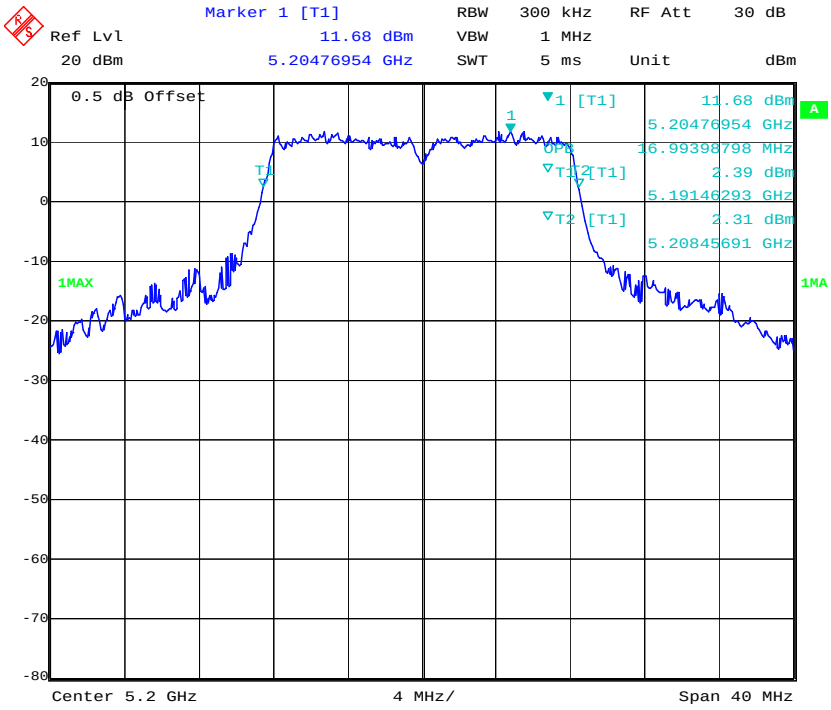


99% Occupied Bandwidth

802.11a Low Channel

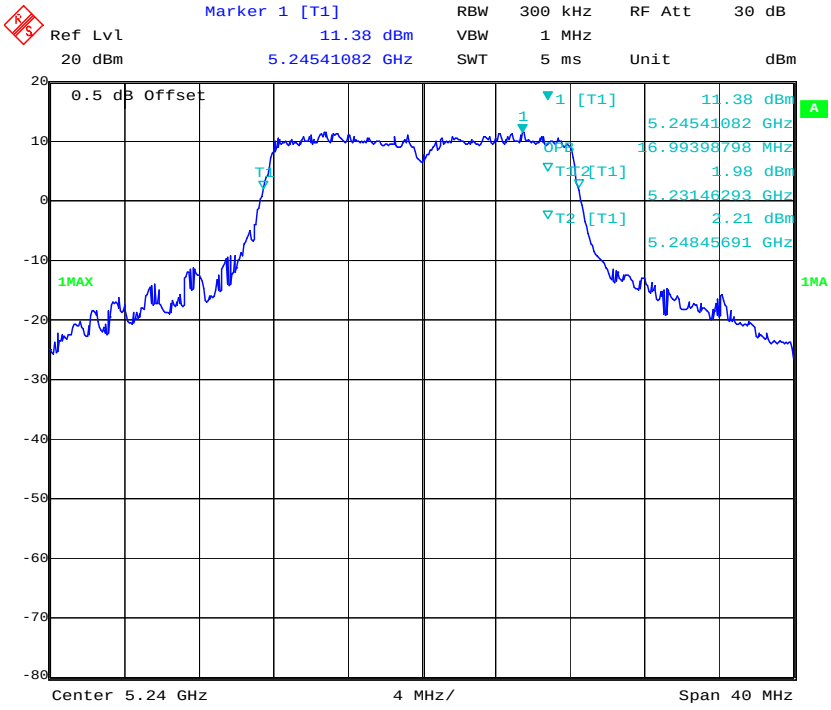


802.11a Middle Channel



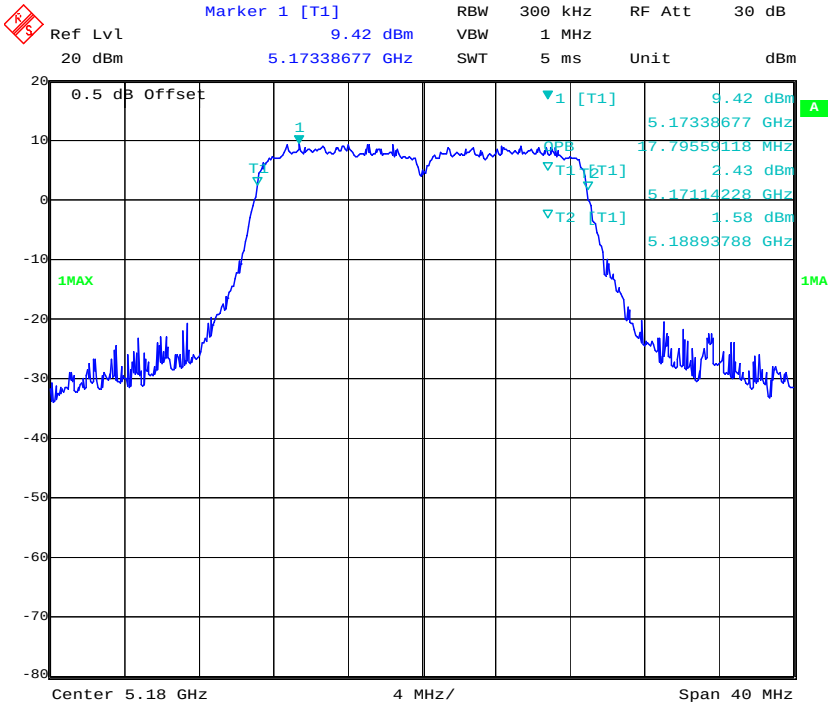
Date: 20.SEP.2017 11:19:19

802.11a High Channel



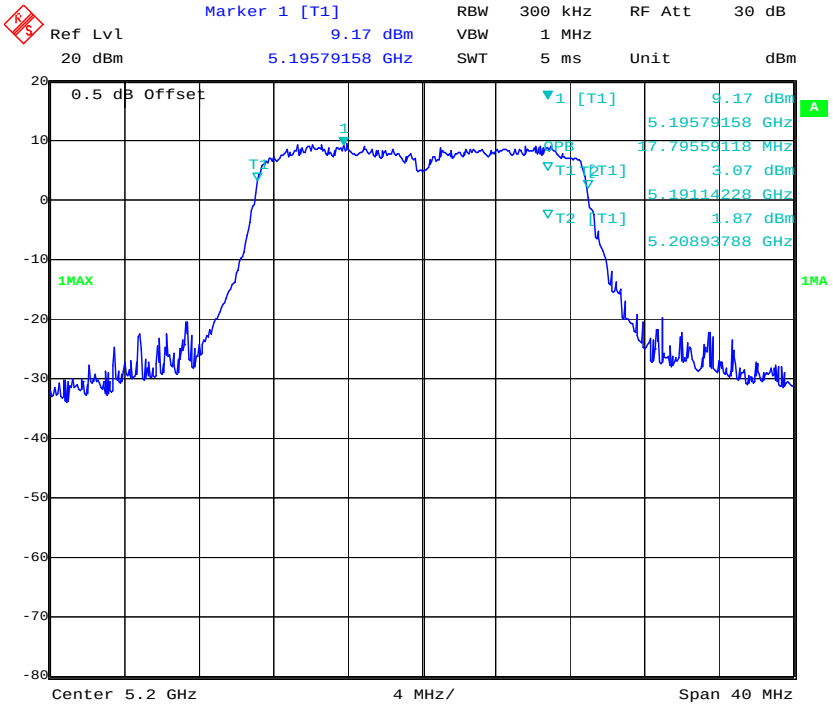
Date: 20.SEP.2017 11:22:42

802.11n ht20 Low Channel



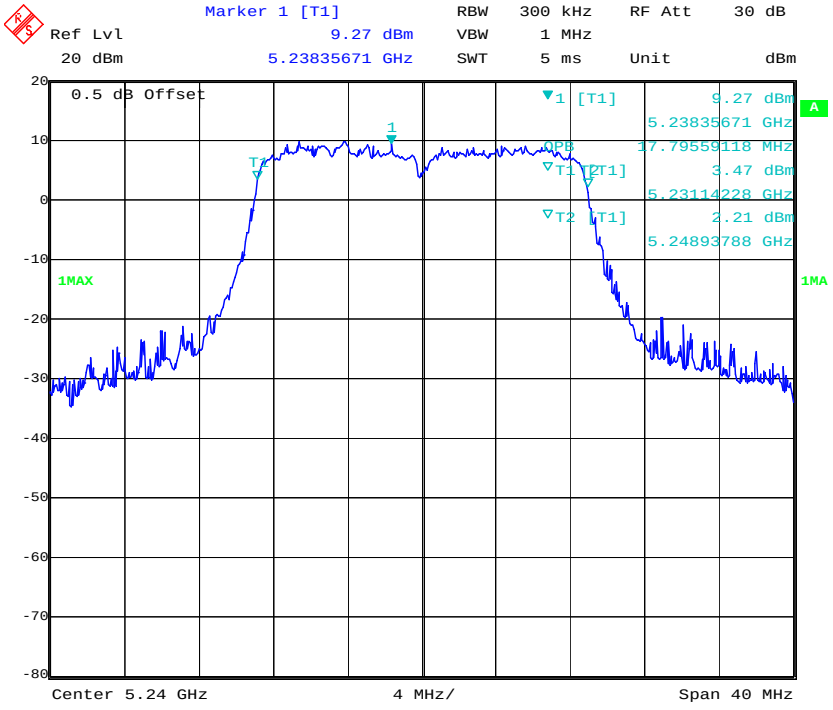
Date: 20.SEP.2017 11:29:40

802.11n ht20 Middle Channel

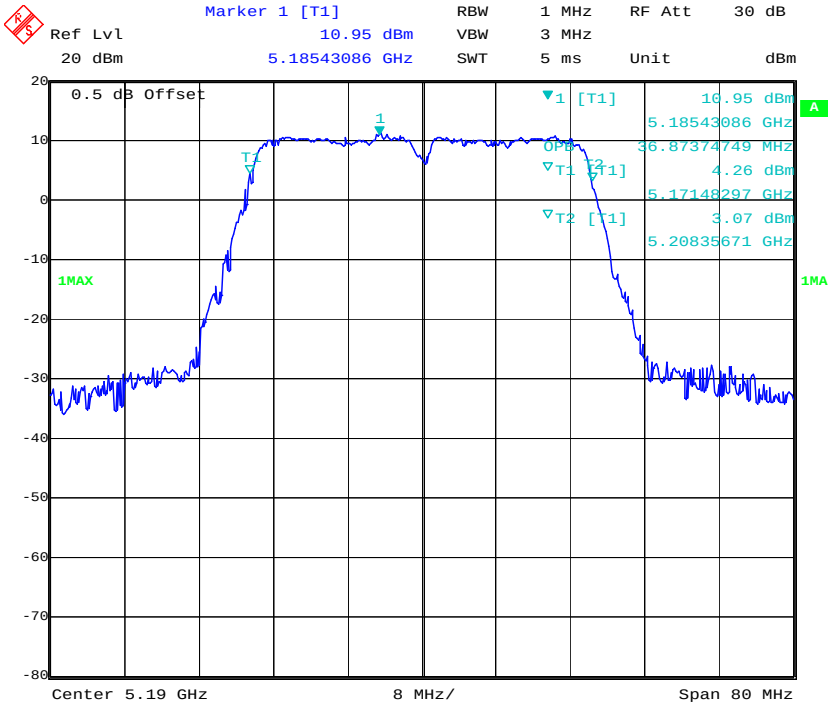


Date: 20.SEP.2017 11:27:17

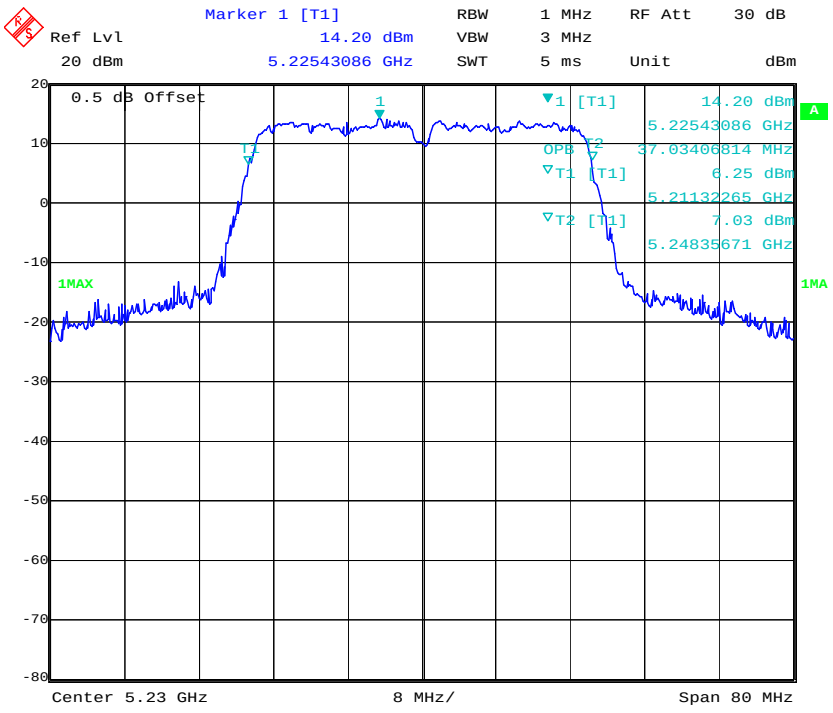
802.11n ht20 High Channel



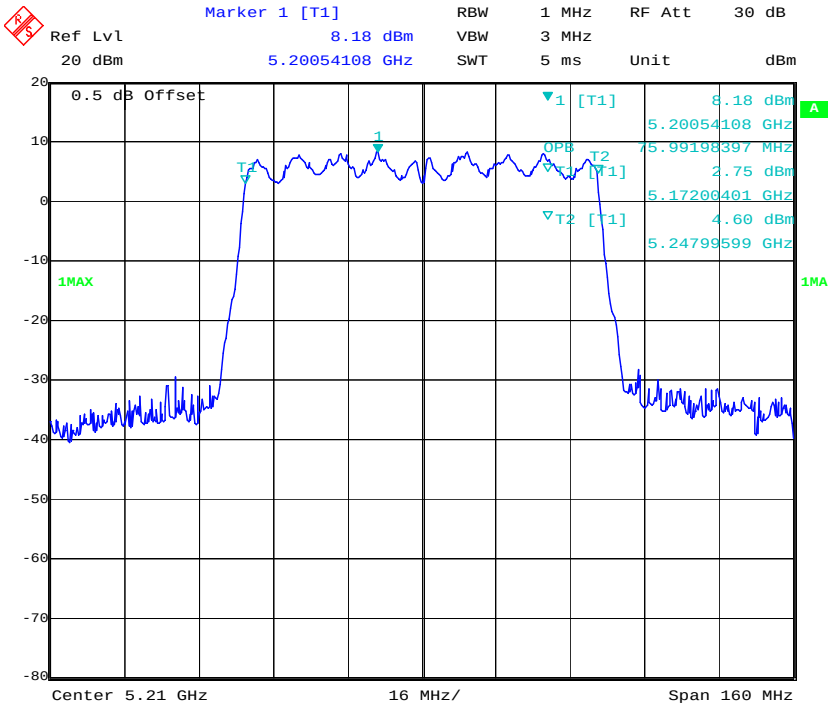
802.11n ht40 Low Channel



802.11n ht40 High Channel

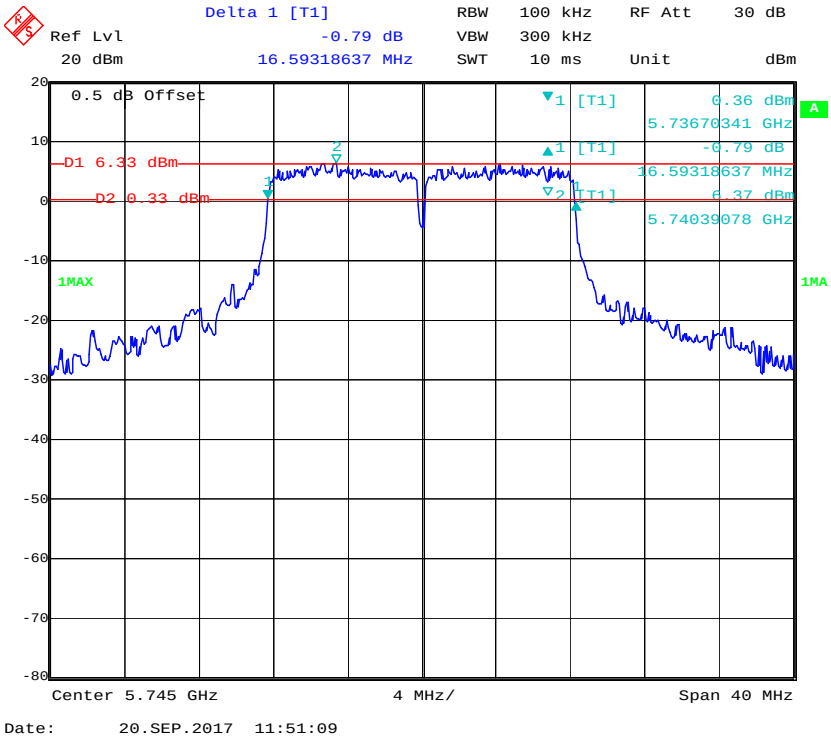


802.11ac80 Middle Channel



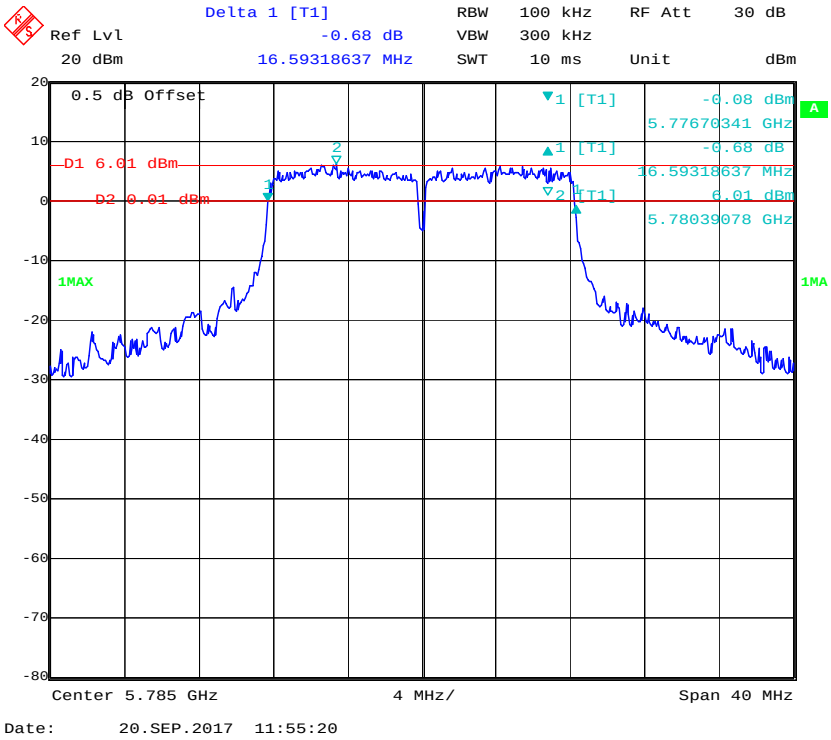
5725-5850MHz:
6dB Bandwidth:

802.11a Low Channel



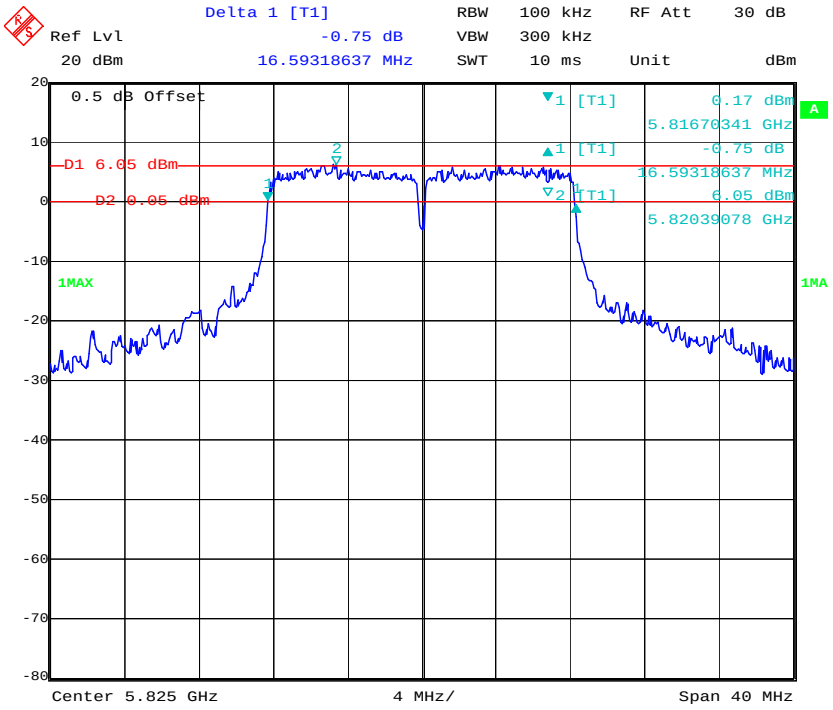
Date: 20.SEP.2017 11:51:09

802.11a Middle Channel



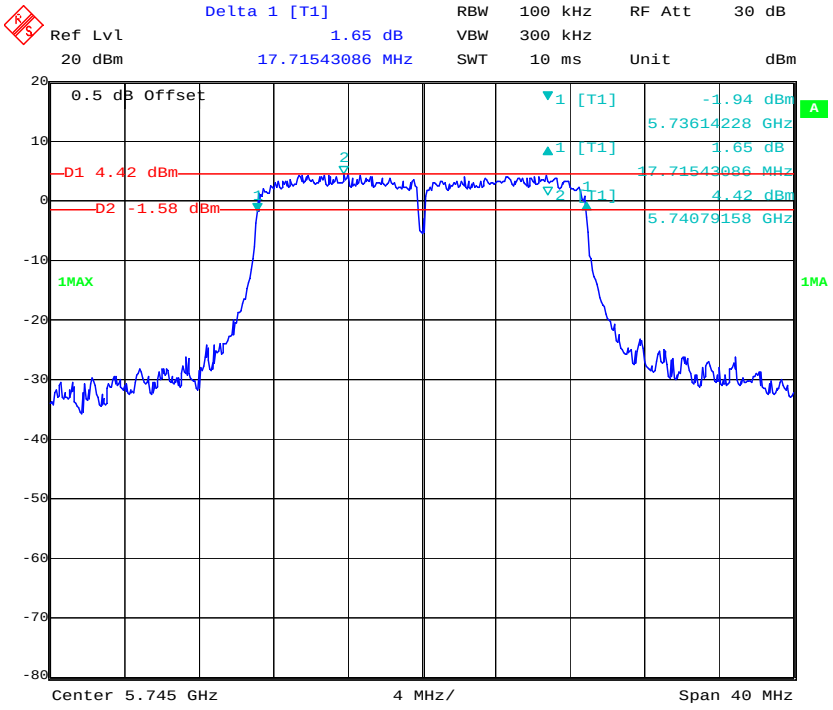
Date: 20.SEP.2017 11:55:20

802.11a High Channel



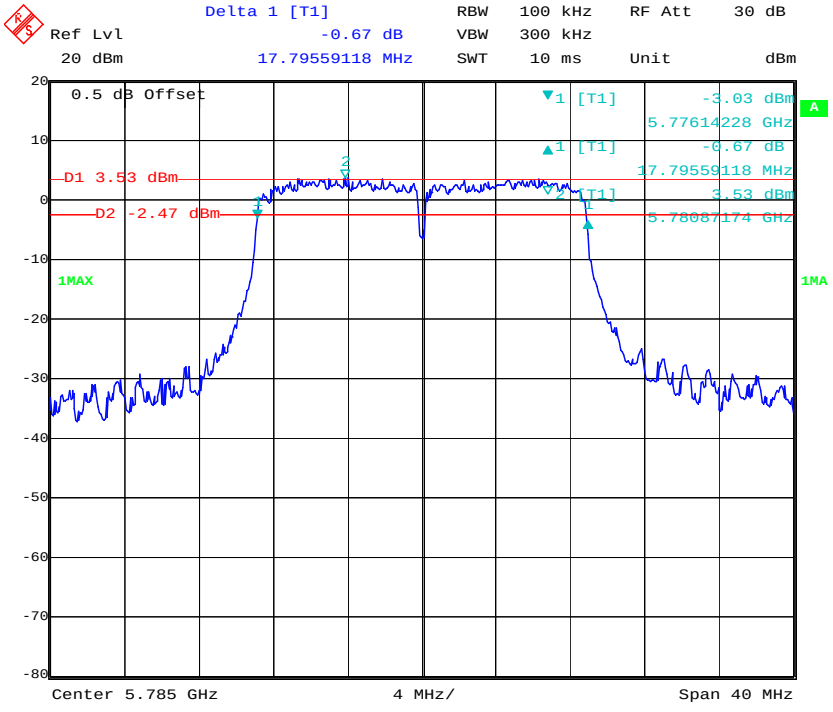
Date: 20.SEP.2017 11:58:24

802.11ht20 Low Channel



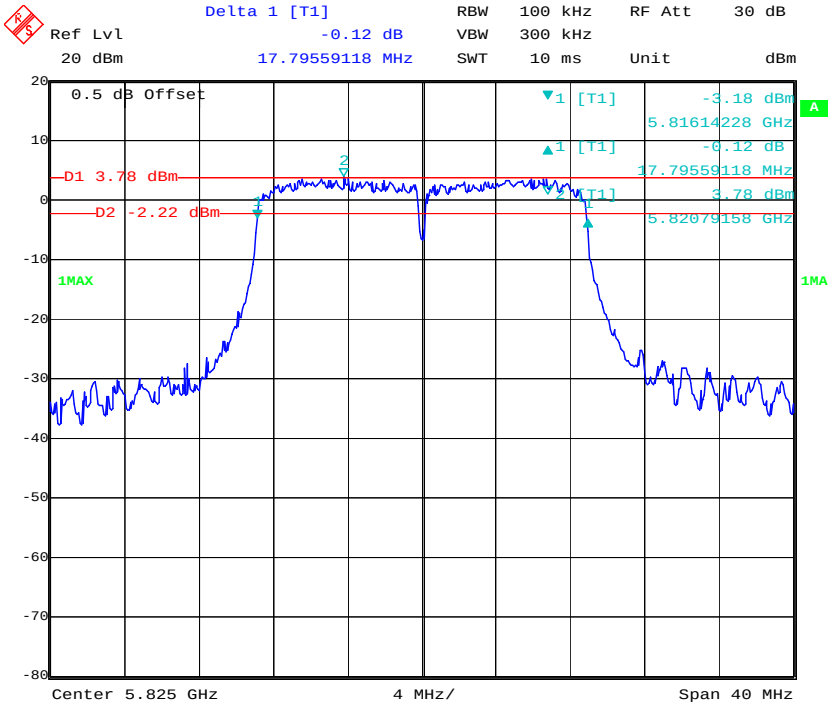
Date: 20.SEP.2017 13:03:27

802.11ht20 Middle Channel



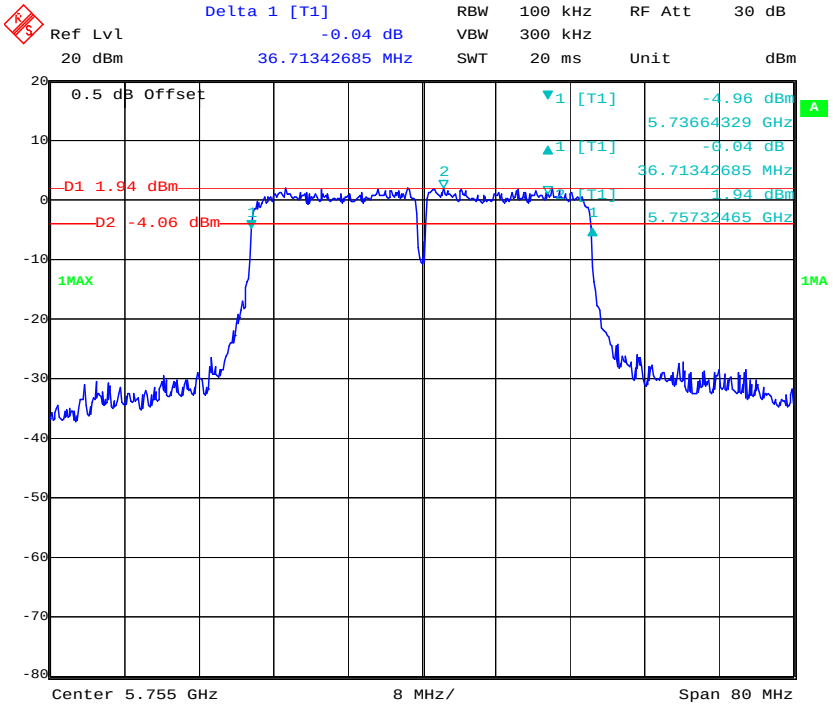
Date: 20.SEP.2017 13:06:04

802.11ht20 High Channel



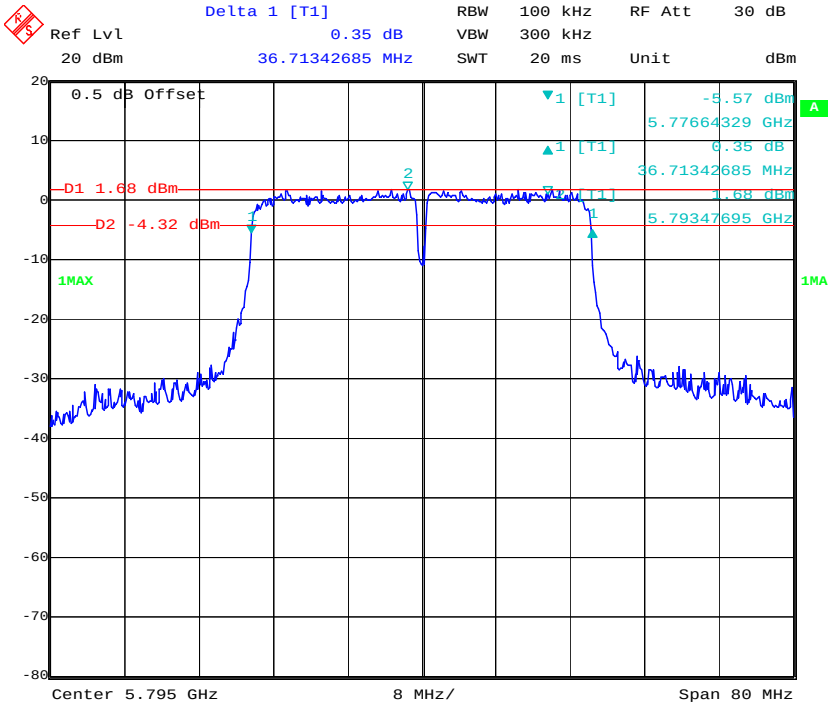
Date: 20.SEP.2017 13:08:22

802.11ht40 Low Channel



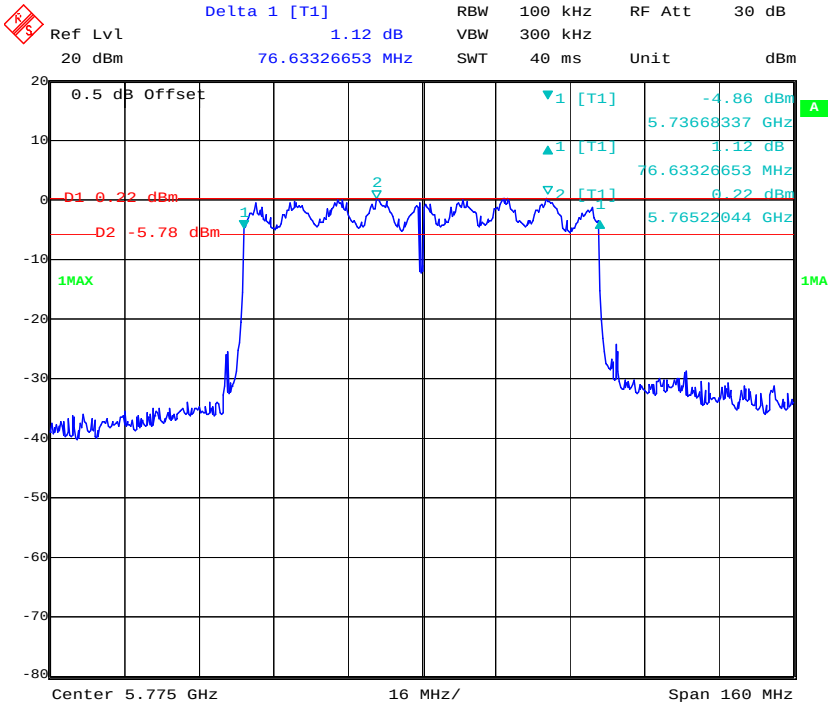
Date: 20.SEP.2017 13:11:12

802.11ht40 High Channel



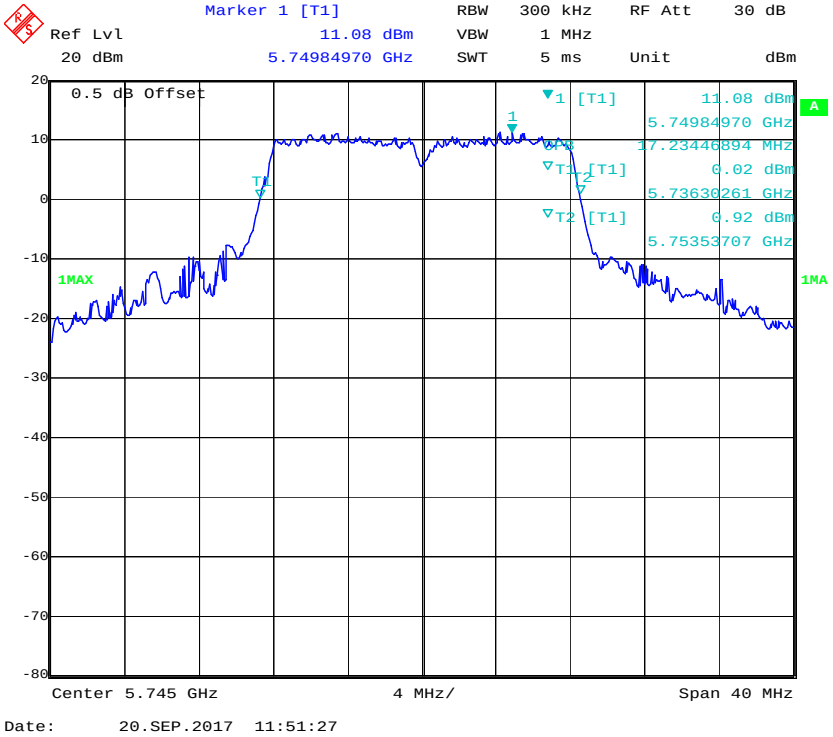
Date: 20.SEP.2017 13:13:35

802.11ac80 Middle Channel

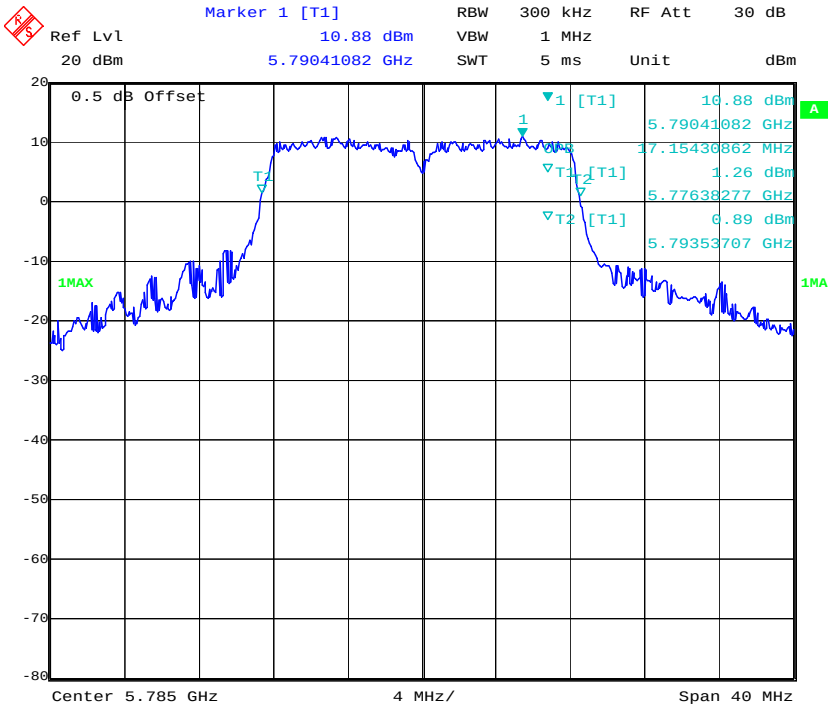


99% Occupied Bandwidth:

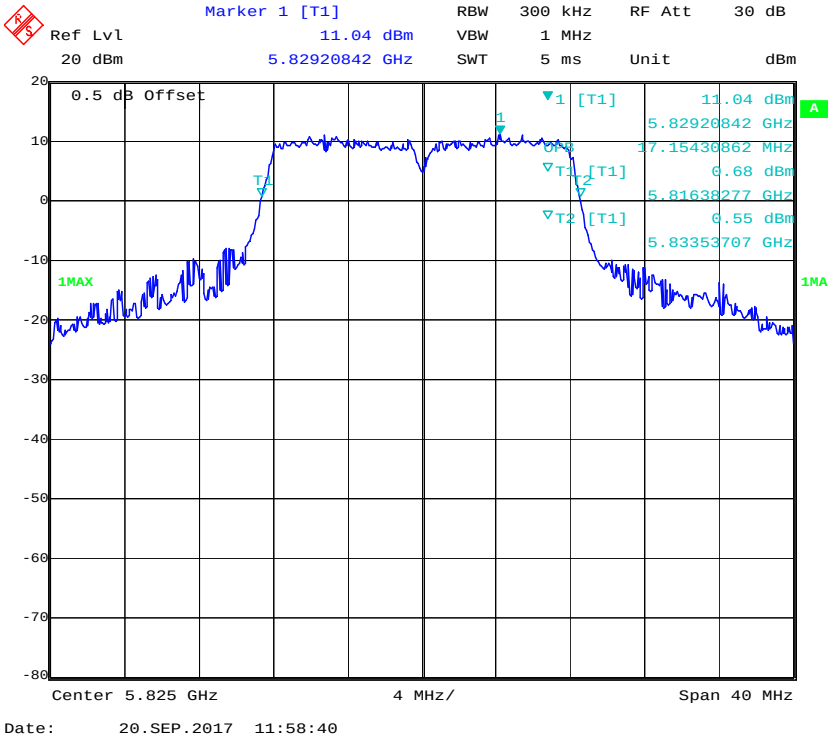
802.11a Low Channel



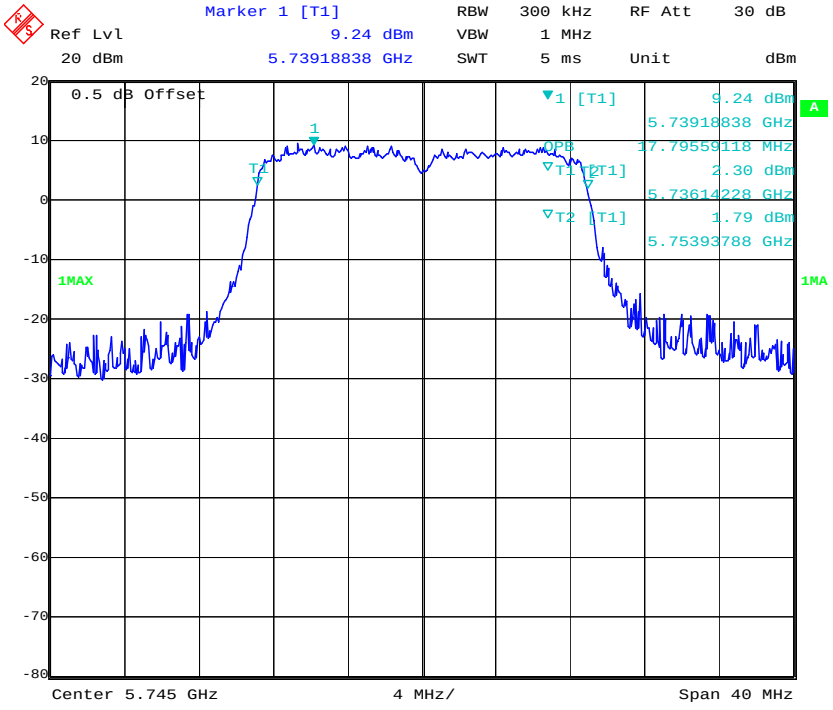
802.11a Middle Channel



802.11a High Channel

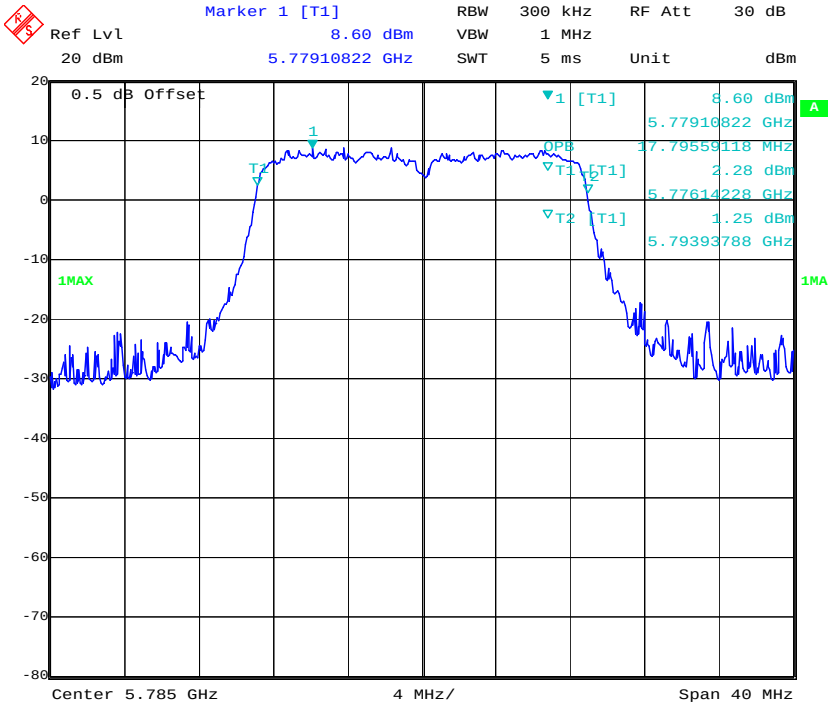


802.11ht20 Low Channel



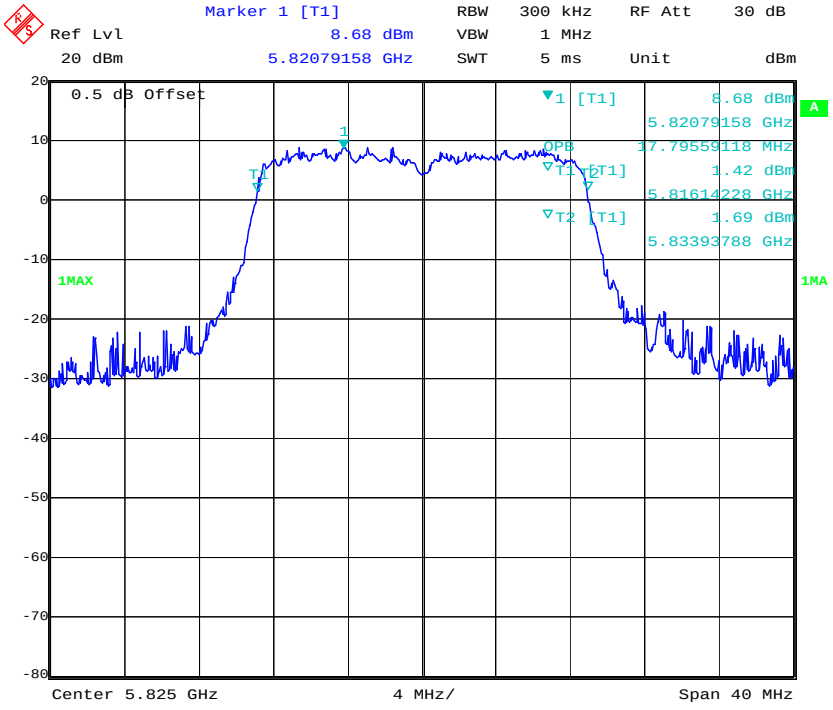
Date: 20.SEP.2017 13:03:47

802.11ht20 Middle Channel



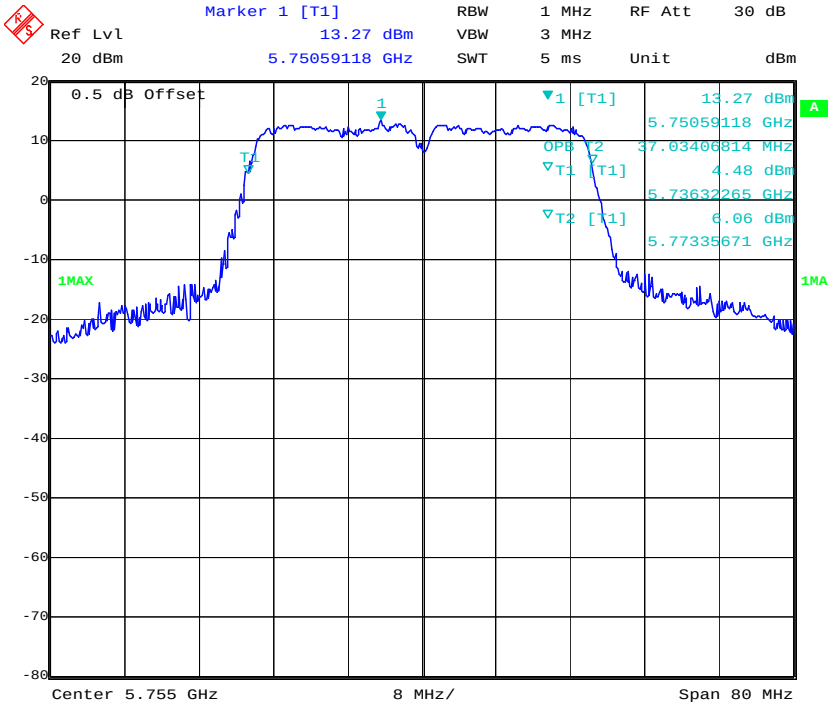
Date: 20.SEP.2017 13:06:22

802.11ht20 High Channel



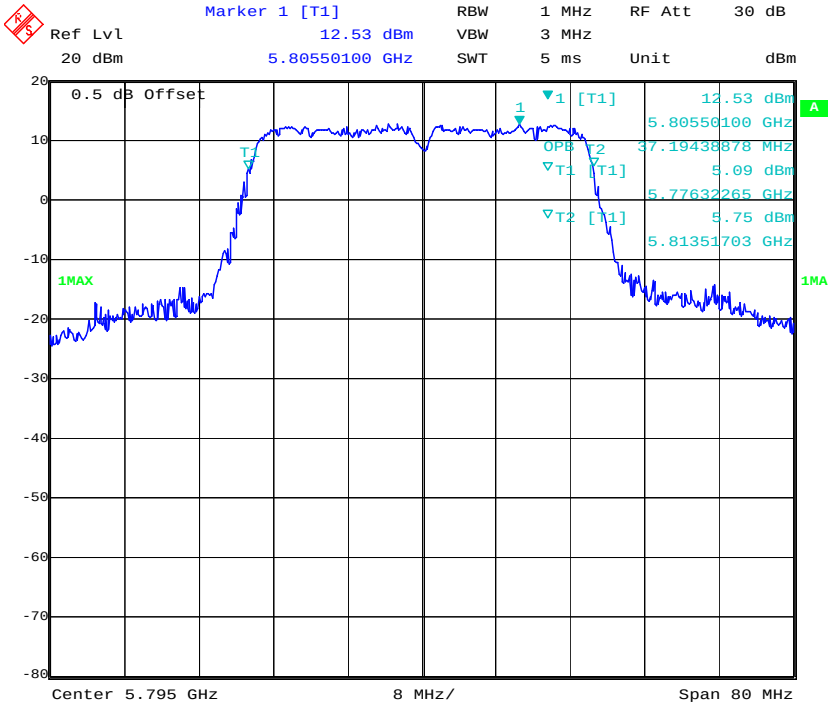
Date: 20.SEP.2017 13:08:39

802.11ht40 Low Channel



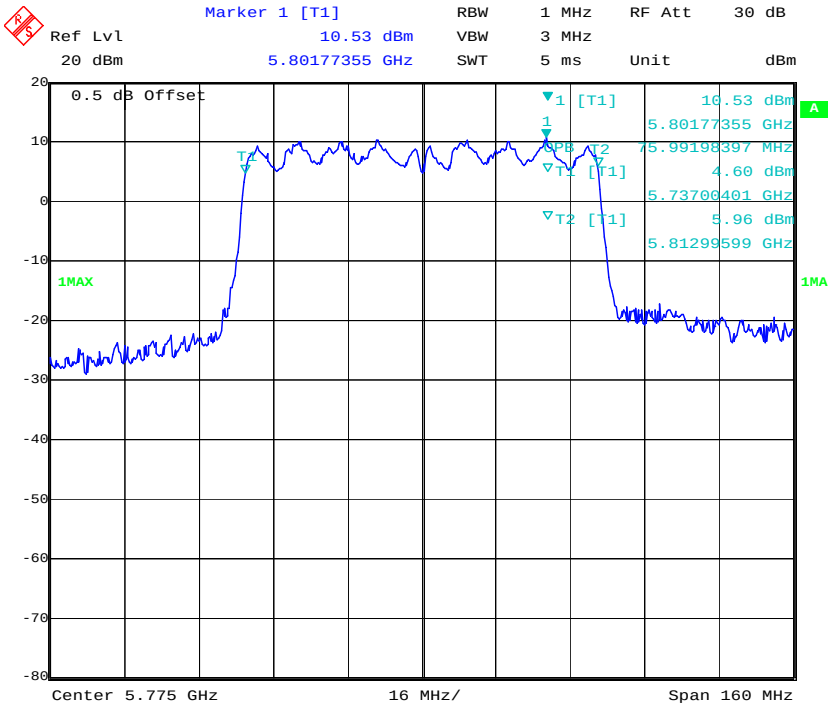
Date: 20.SEP.2017 13:11:29

802.11ht40 High Channel



Date: 20.SEP.2017 13:13:51

802.11ac80 Middle Channel



Date: 20.SEP.2017 13:16:46

FCC §15.407(g)–FREQUENCY STABILITY

Applicable Standard

FCC §15.407(g)

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

Test Procedure

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSIQ 26	831929/005	2017-08-31	2018-08-31
N/A	Coaxial Cable	C-SJ00-0010	C0010/04	Each Time	/
UNI-T	Multimeter	UT39A	M130199938	2017-05-09	2018-05-09
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:	27.6°C
Relative Humidity:	39%
ATM Pressure:	100.4kPa

The testing was performed by Rick Chen on 2017-09-20.

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

Test Result: Pass.

5150-5250MHz:

802.11a

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5171.5431	5248.4569	f_L and f_H Within 5150~5250MHz range
10		5171.5338	5248.4549	
20		5171.5372	5248.4556	
30		5171.5424	5248.4472	
40		5171.5362	5248.4548	
25	102	5171.5399	5248.4526	
25	138	5171.5332	5248.4493	

802.11n ht20:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5171.1423	5248.9379	f_L and f_H Within 5150~5250MHz range
10		5171.139	5248.9298	
20		5171.1397	5248.9436	
30		5171.1412	5248.941	
40		5171.1503	5248.9425	
25	102	5171.1516	5248.9369	
25	138	5171.1334	5248.9456	

802.11n ht40:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5171.483	5248.3567	f_L and f_H Within 5150~5250MHz range
10		5171.473	5248.3571	
20		5171.4875	5248.3646	
30		5171.4771	5248.3599	
40		5171.4767	5248.3634	
25	102	5171.4854	5248.3636	
25	138	5171.482	5248.3541	

802.11ac80:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5172.004	5247.996	f_L and f_H Within 5150~5250MHz range
10		5172.0116	5248.0018	
20		5171.9942	5248.9974	
30		5172.0027	5247.99	
40		5171.9992	5247.9933	
25	102	5172.0057	5247.0032	
25	138	5172.009	5247.9954	

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	5736.3026	5833.5371	f_L and f_H Within 5725~5850MHz range
10		5736.2998	5833.5384	
20		5736.3105	5833.5463	
30		5736.3113	5833.5382	
40		5736.3105	5833.5339	
25	102	5736.2999	5833.5388	
25	138	5736.3031	5833.5379	

802.11n ht20:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5736.1423	5833.9379	f_L and f_H Within 5725~5850MHz range
10		5736.1419	5833.9355	
20		5736.1442	5833.9338	
30		5736.1346	5833.9302	
40		5736.1522	5833.9432	
25	102	5736.1514	5833.9449	
25	138	5736.1453	5833.9472	

802.11n ht40:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5736.3227	5813.517	f_L and f_H Within 5725~5850MHz range
10		5736.3156	5813.5173	
20		5736.3309	5813.5208	
30		5736.315	5813.5256	
40		5736.3141	5813.5103	
25	102	5736.3274	5813.5234	
25	138	5736.324	5813.5203	

802.11ac80:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5737.004	5813.3166	f_L and f_H Within 5725~5850MHz range
10		5737.0026	5813.3097	
20		5736.9976	5813.3088	
30		5737.0059	5813.3203	
40		5737.0121	5813.3187	
25	102	5737.0109	5813.3198	
25	138	5737.009	5813.3262	

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
N/A	Coaxial Cable	C-SJ00-0010	C0010/04	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:	27.6°C
Relative Humidity:	39 %
ATM Pressure:	100.4kPa

The testing was performed by Rick Chen on 2017-09-20.

Test Mode: Transmitting

UNII Band	Mode	Frequency (MHz)	Conducted Average Output Power (dBm)			Limit (dBm)	Result
			Chain 0	Chain 1	Total		
5150-5250 MHz	802.11 a	5180	17.2	17.68	/	30	PASS
		5200	18.18	17.95	/	30	PASS
		5240	17.85	18.2	/	30	PASS
	802.11ht20	5180	17.19	16.6	19.92	30	PASS
		5200	17.01	17.25	20.14	30	PASS
		5240	16.81	17.22	20.03	30	PASS
	802.11ht40	5190	17.54	16.93	20.26	30	PASS
		5230	16.76	17.46	20.13	30	PASS
	802.11 ac80	5210	13.89	16.55	18.43	30	PASS
5725-5850 MHz	802.11 a	5745	17.96	17.47	/	30	PASS
		5785	18.1	17.23	/	30	PASS
		5825	18.26	17.03	/	30	PASS
	802.11ht20	5745	17.21	17.39	20.31	30	PASS
		5785	17.04	17.04	20.05	30	PASS
		5825	16.93	16.77	19.86	30	PASS
	802.11ht40	5755	17.13	17.24	20.20	30	PASS
		5795	17.08	17.1	20.10	30	PASS
	802.11 ac80	5775	16.33	16.3	19.33	30	PASS

Note: The maximum antenna gain is 2.0dBi 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 = 2.0dBi < 6dBi

FCC §15.407(a) - POWER SPECTRAL DENSITY

Applicable Standard

(a) Power limits:

(1) For the band 5.15-5.25 GHz.

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

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

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

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

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

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

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

Test Procedure

According to KDB 789033 D02 General UNII Test Procedures New Rules v01r04

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSIQ 26	831929/005	2017-08-31	2018-08-31
N/A	Coaxial Cable	C-SJ00-0010	C0010/04	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:	27.6°C
Relative Humidity:	39 %
ATM Pressure:	100.4kPa

The testing was performed by Rick Chen on 2017-09-20.

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	8.71	8.33	/	17
	5200	10.2	10.72	/	17
	5240	10.09	10.97	/	17
802.11 ht20	5180	8.14	7.34	10.77	17
	5200	8.21	9.3	11.8	17
	5240	8.34	10.26	12.42	17
802.11 ht40	5190	3.45	4.56	7.05	17
	5230	6.35	6.4	9.39	17
802.11 ac80	5210	1.54	1.23	4.4	17

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	5.97	6.04	8.19	8.26	/	30
	5785	5.93	5.84	8.15	8.06	/	30
	5825	5.79	5.62	8.01	7.84	/	30
802.11 ht20	5745	4.11	6.19	6.33	8.41	10.50	30
	5785	3.79	5.69	6.01	7.91	10.07	30
	5825	3.82	6.15	6.04	8.37	10.37	30
802.11 ht40	5755	1.6	3.32	3.82	5.54	7.77	30
	5795	1.57	2.19	3.79	4.41	7.12	30
802.11 ac80	5775	-0.25	-0.2	1.97	2.02	5.00	30

Note 1:The maximum antenna gain is 2.0dBi in 5GHz band. The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density (PSD) measurements on the devices:

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

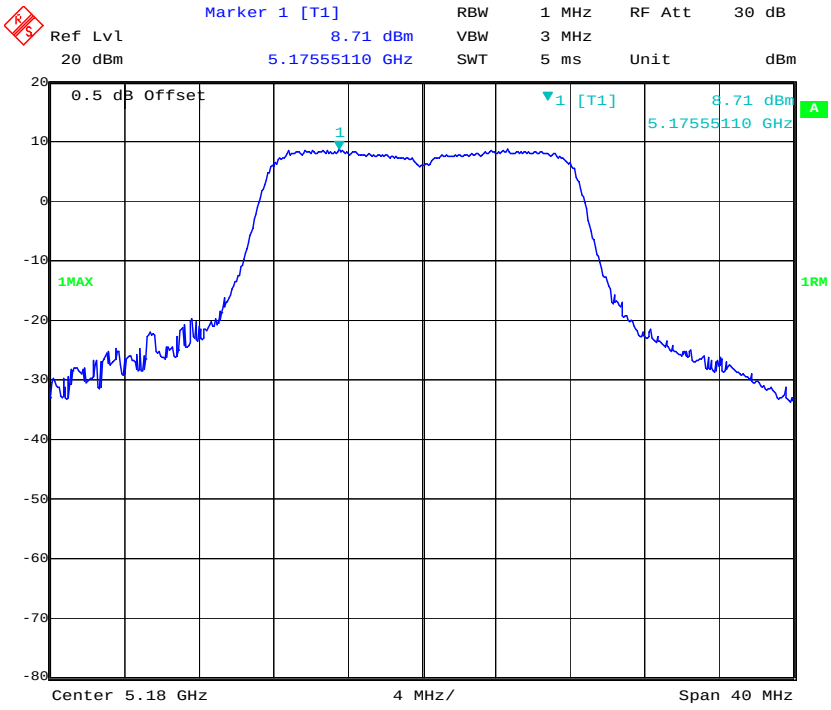
So:

$$\text{Directional gain} = G_{ANT} + \text{Array Gain} = 2.0\text{dBi}+10*\log(2)=5.0\text{dBi}$$

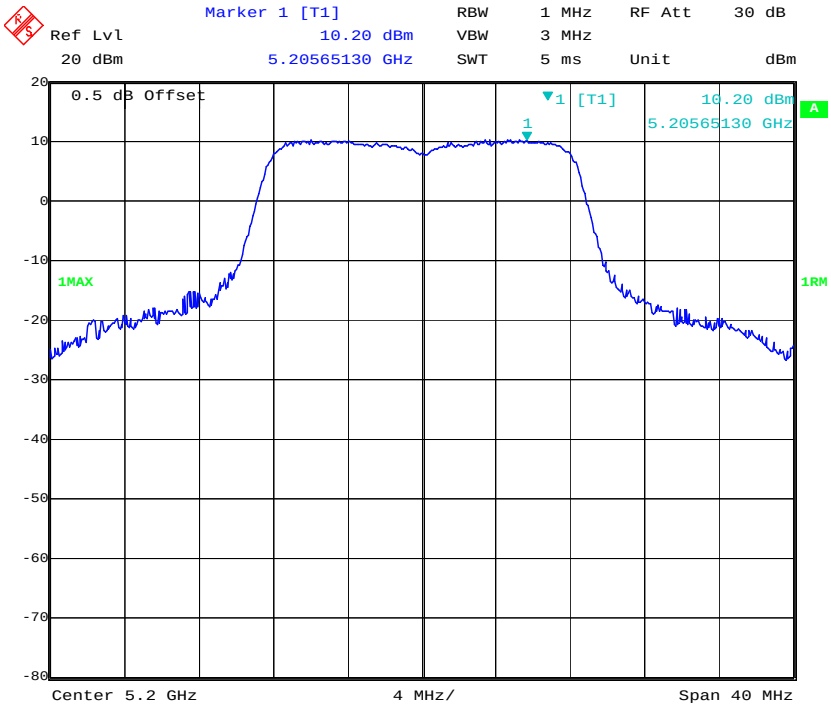
Note 2: For 5.8GHz band, If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 KHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.

5150-5250MHz
Chain 0:

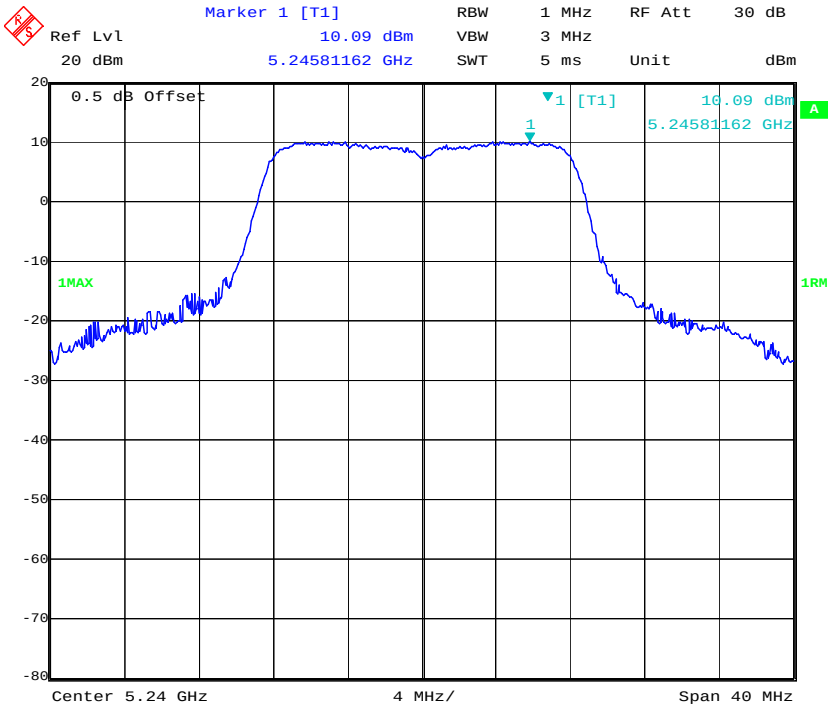
802.11a Low Channel



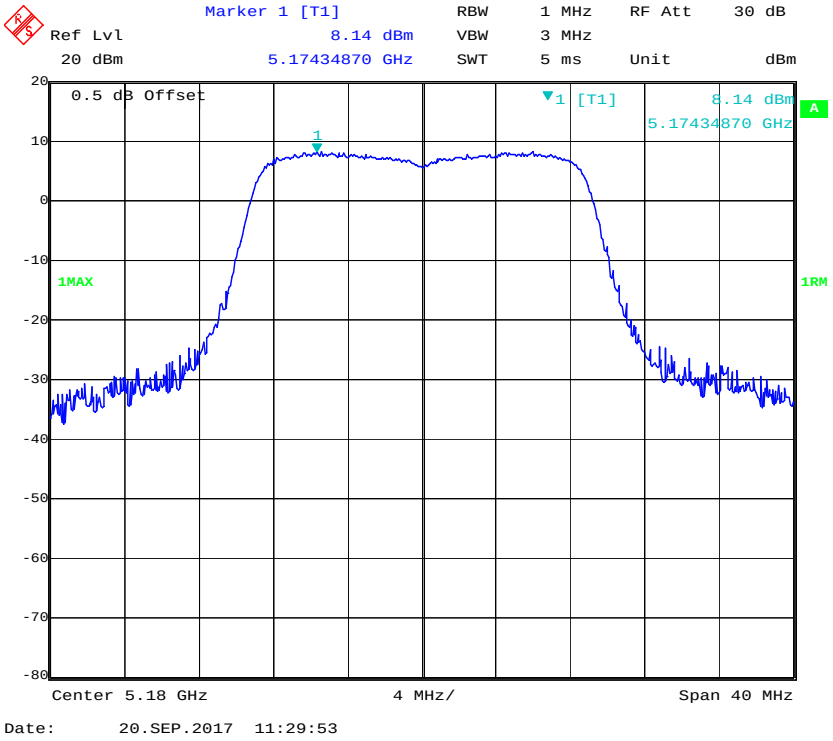
802.11a Middle Channel



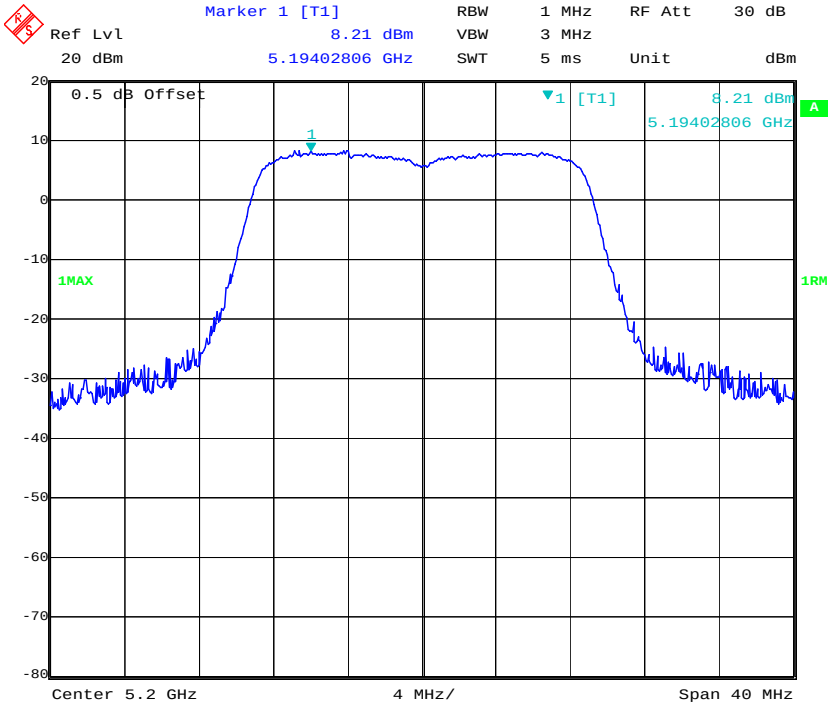
802.11a High Channel



802.11n ht20 Low Channel



802.11n ht20 Middle Channel



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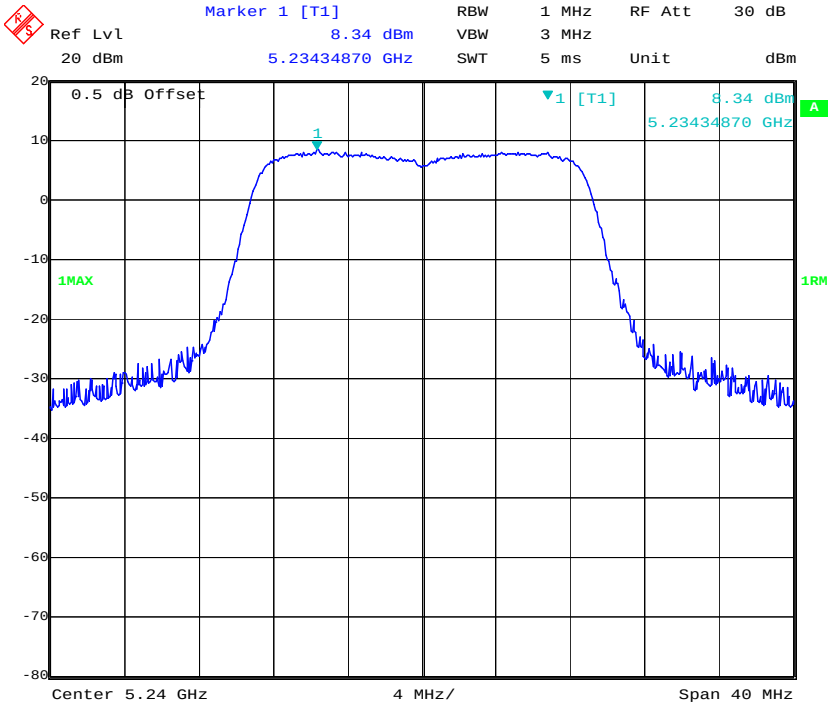
802.11n ht20 High Channel



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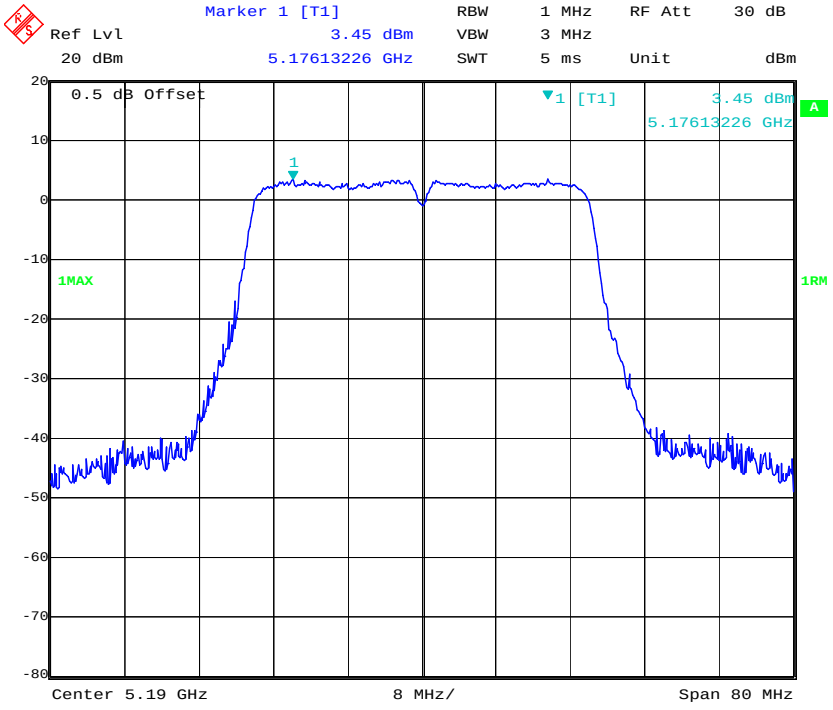
802.11n ht40 Low Channel



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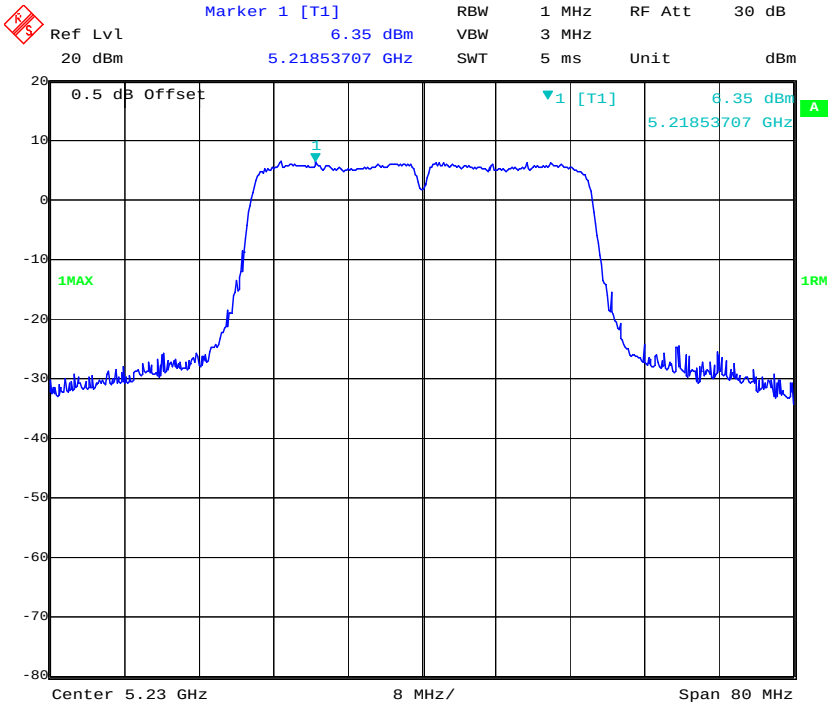
802.11n ht40 High Channel



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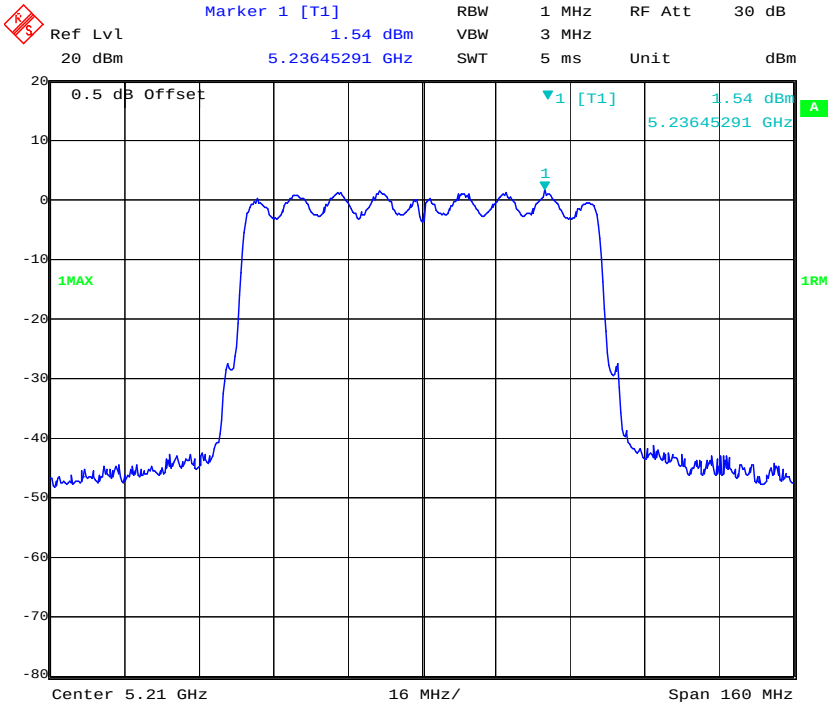
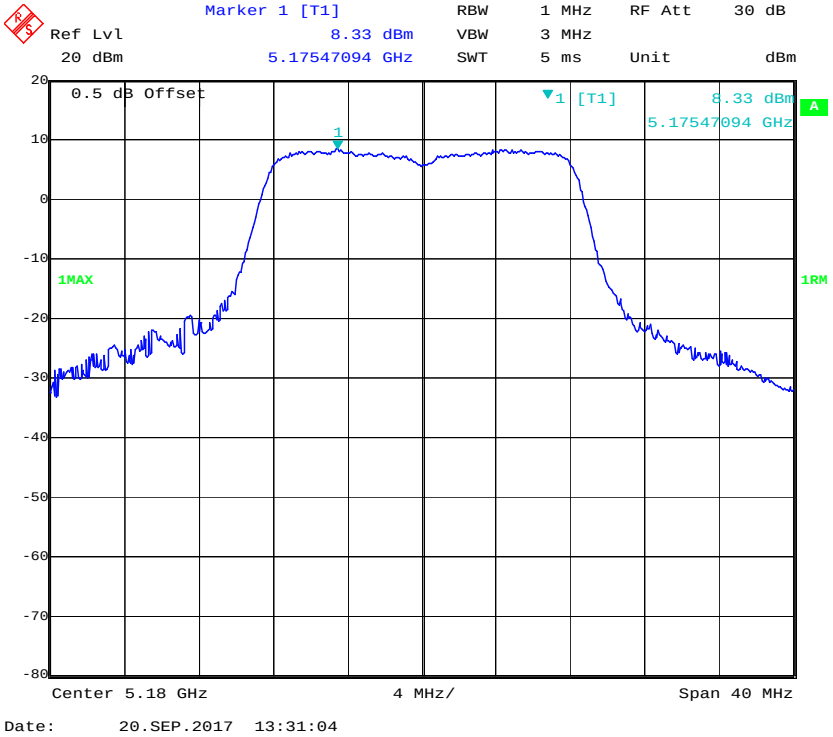
802.11ac80 Middle Channel

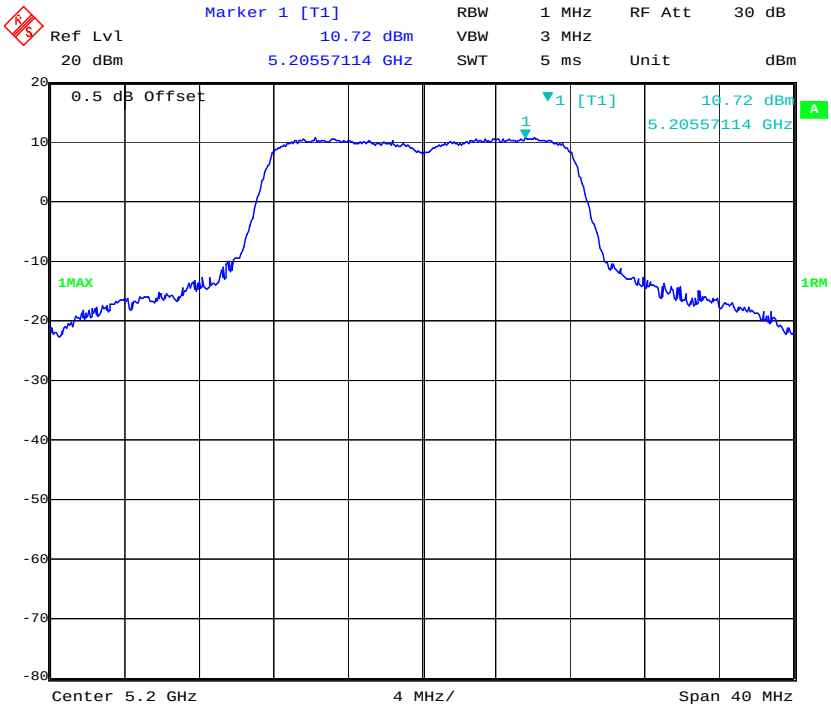


Chain 1:

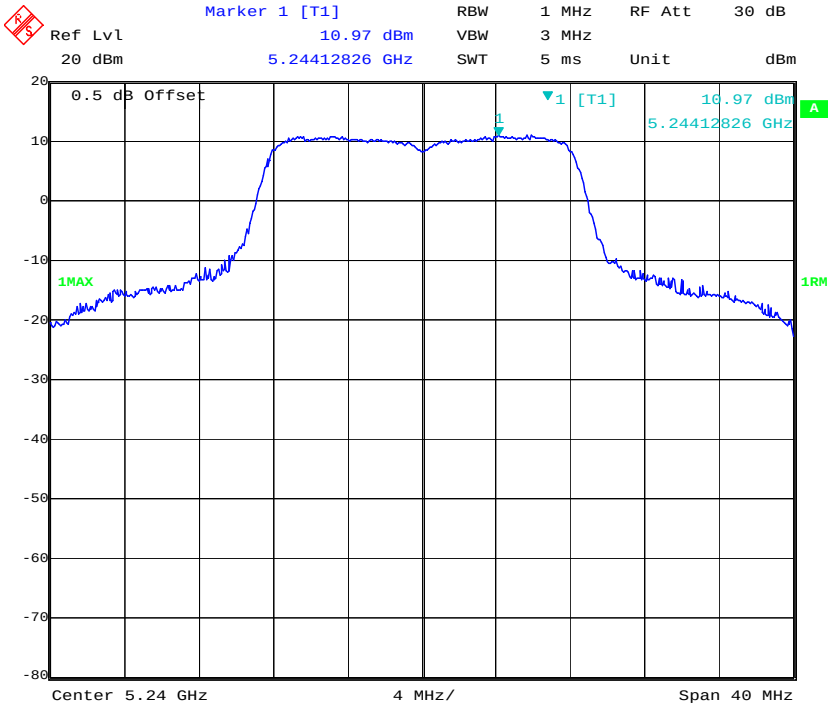
802.11a Low Channel



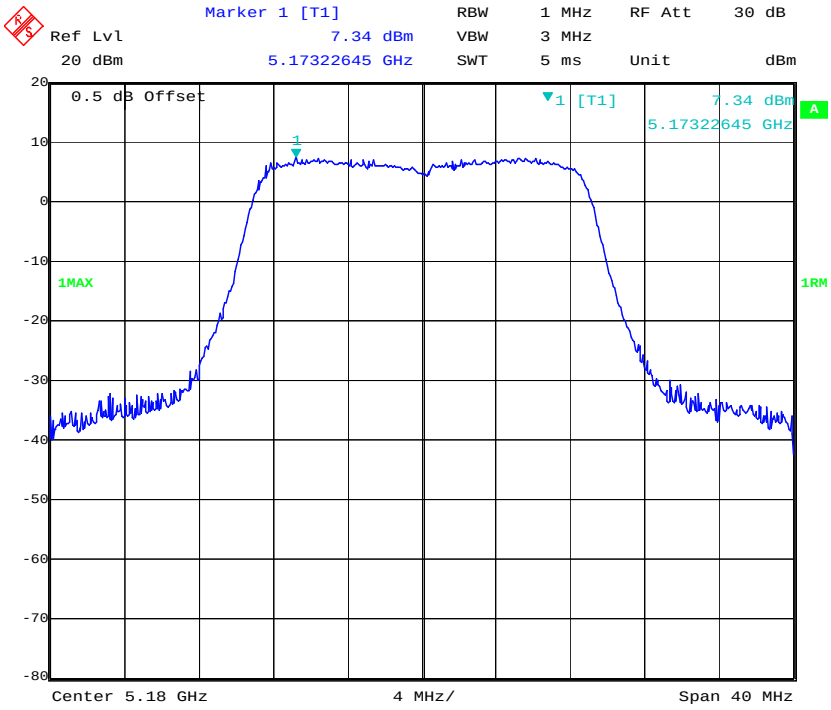
802.11a Middle Channel



802.11a High Channel



802.11n ht20 Low Channel



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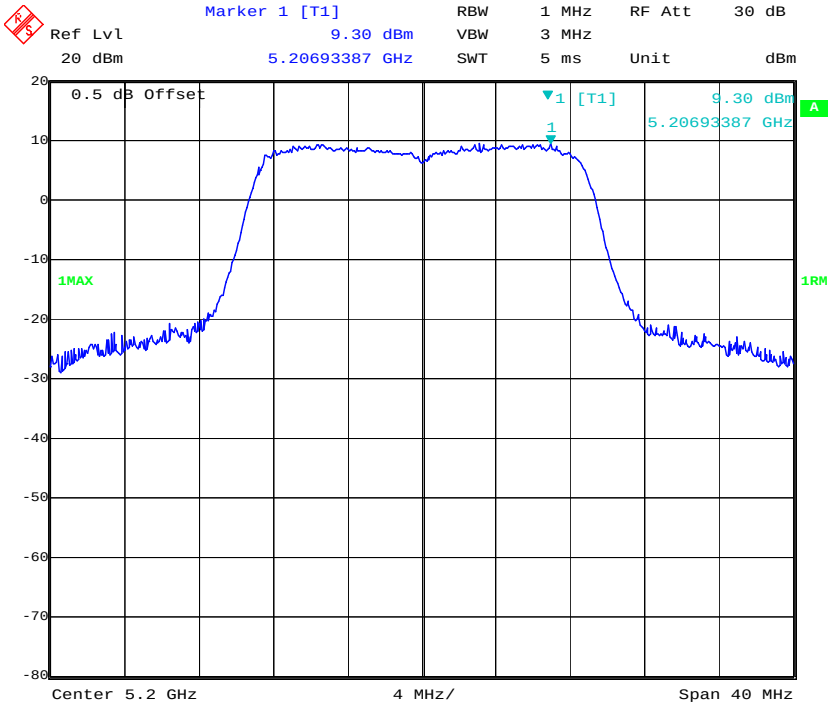
802.11n ht20 Middle Channel



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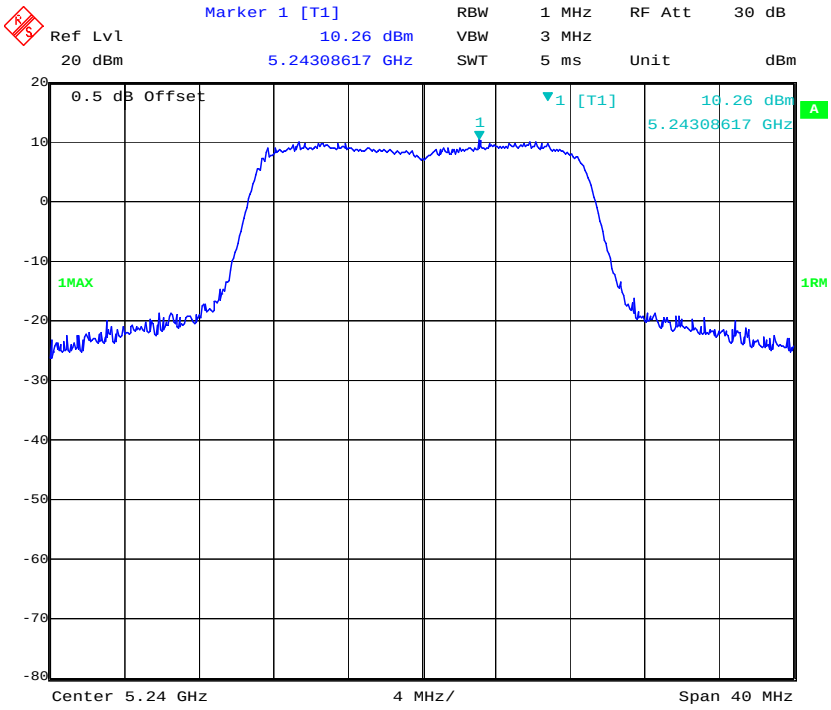
802.11n ht20 High Channel



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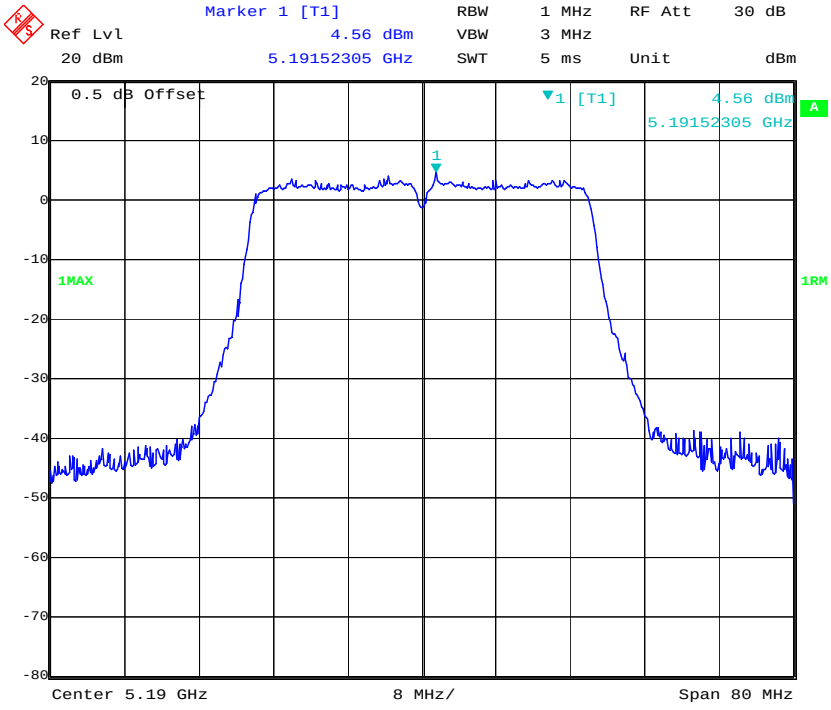
802.11n ht40 Low Channel



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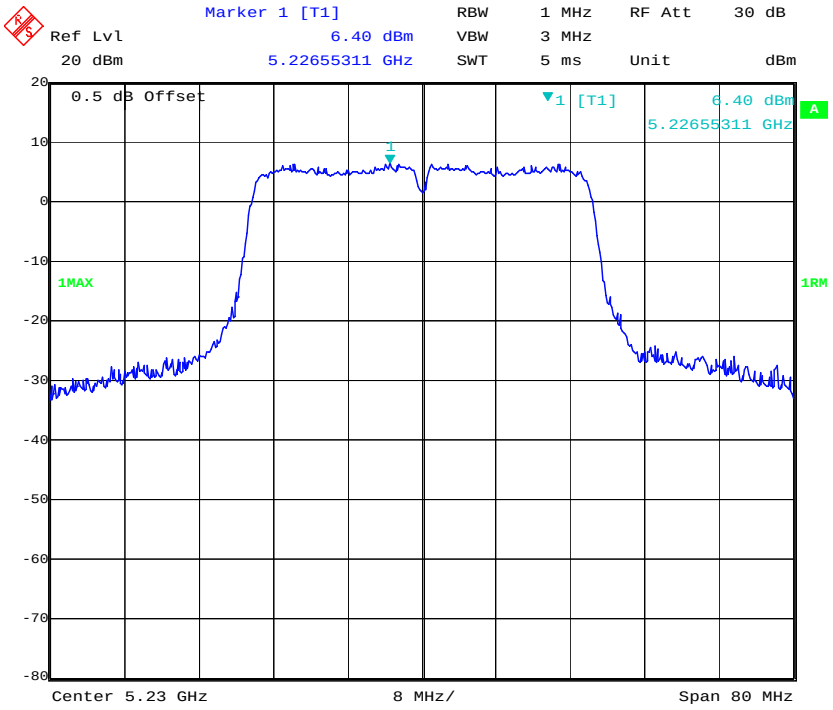
802.11n ht40 High Channel



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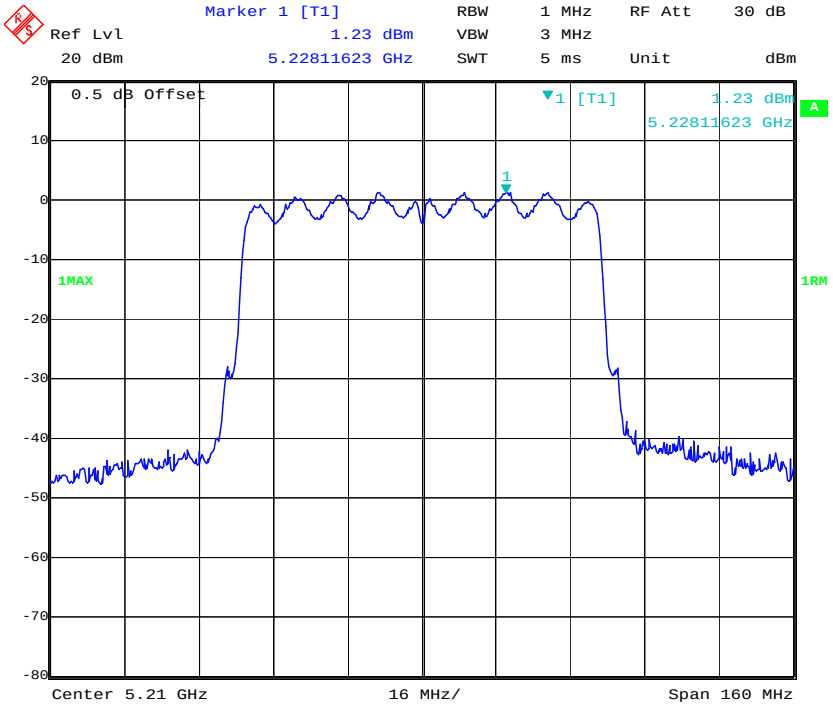
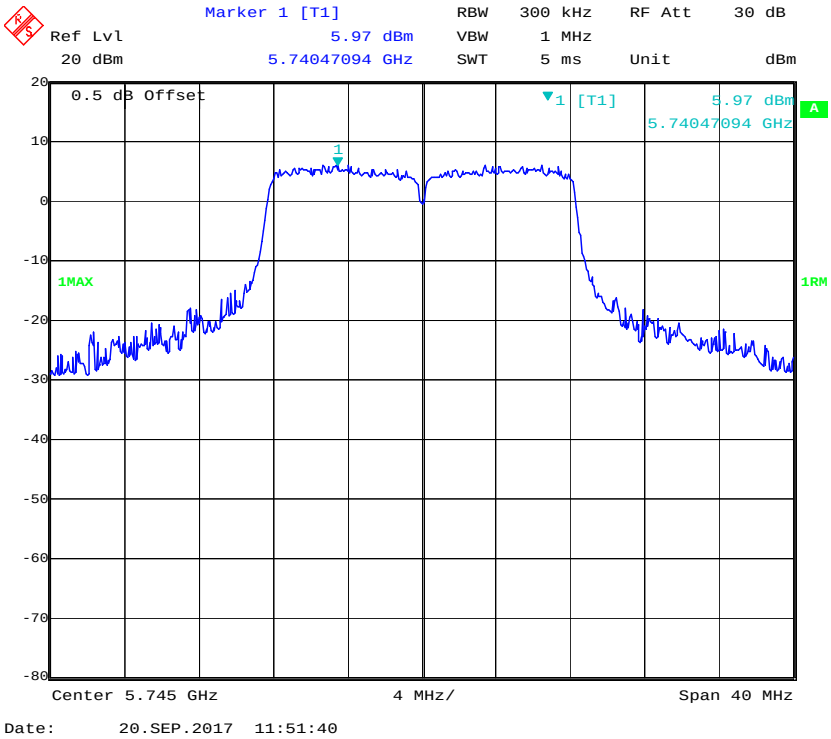
802.11ac80 Middle Channel



Date: 20.SEP.2017 13:59:59

5725-5850MHz
Chain 0:

802.11a Low Channel



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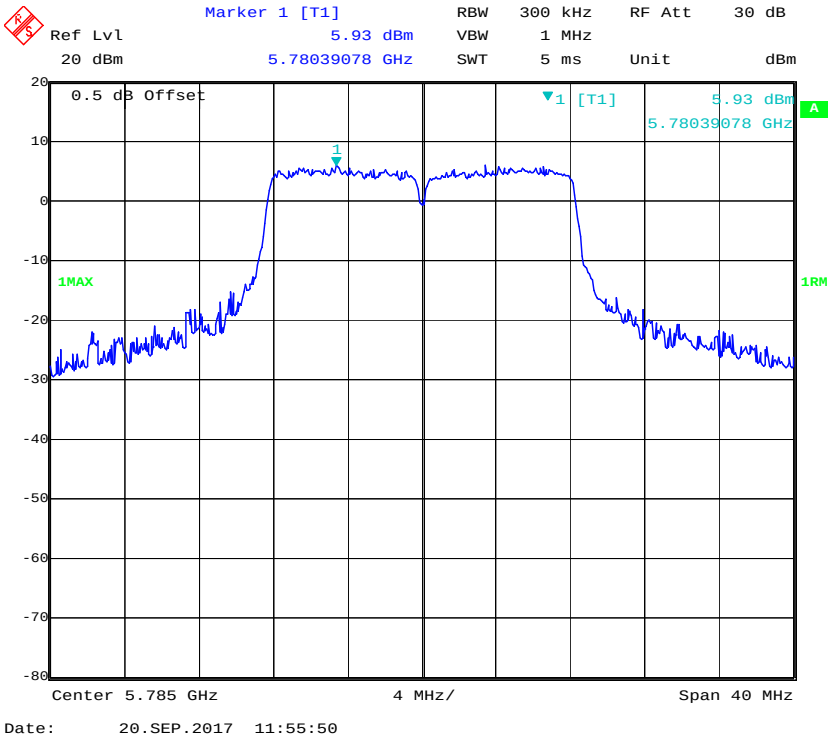
802.11a Middle Channel



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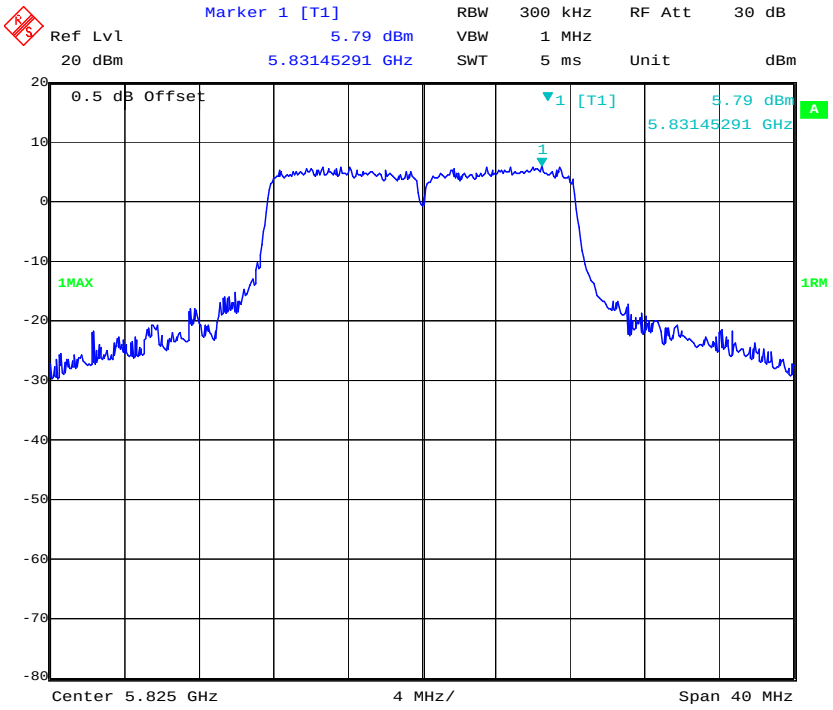
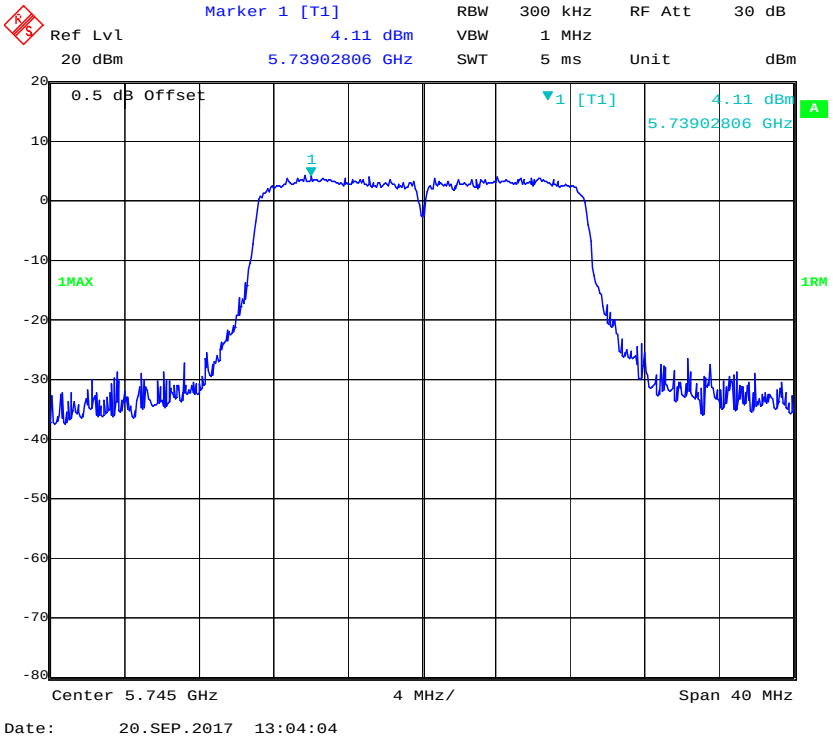
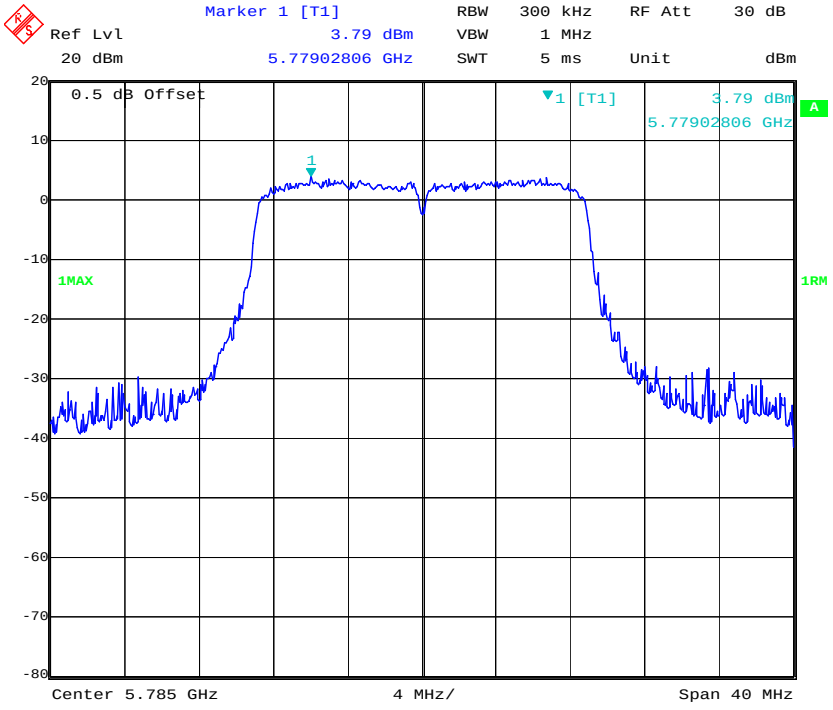
802.11a High Channel



802.11n ht20 Low Channel



802.11n ht20 Middle Channel



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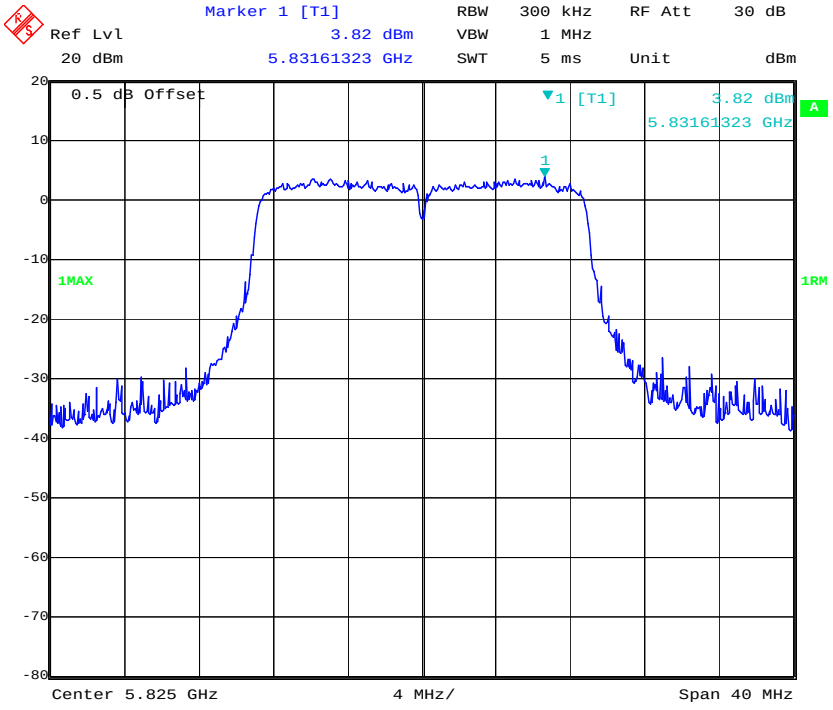
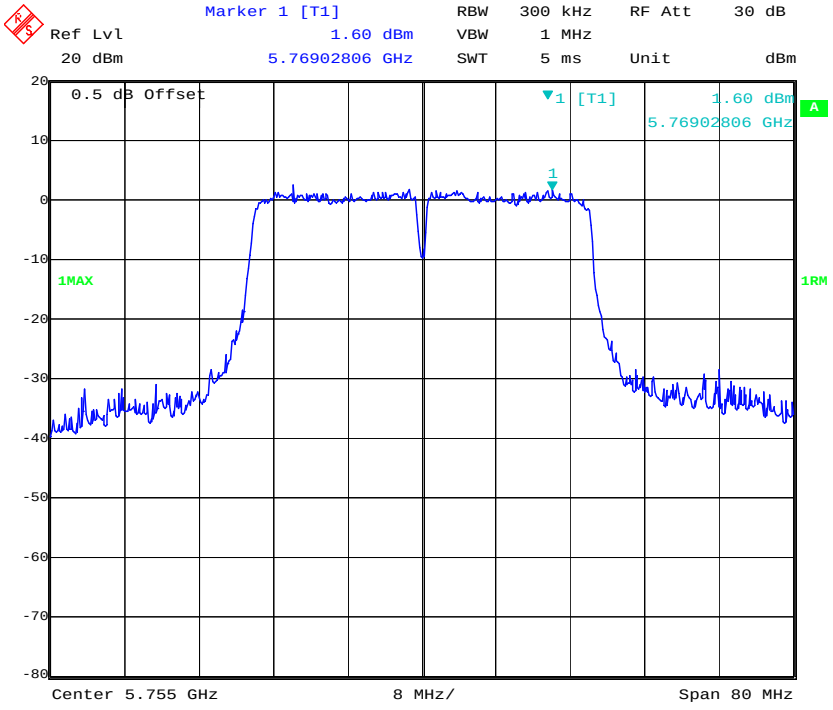


802.11n ht40 Low Channel



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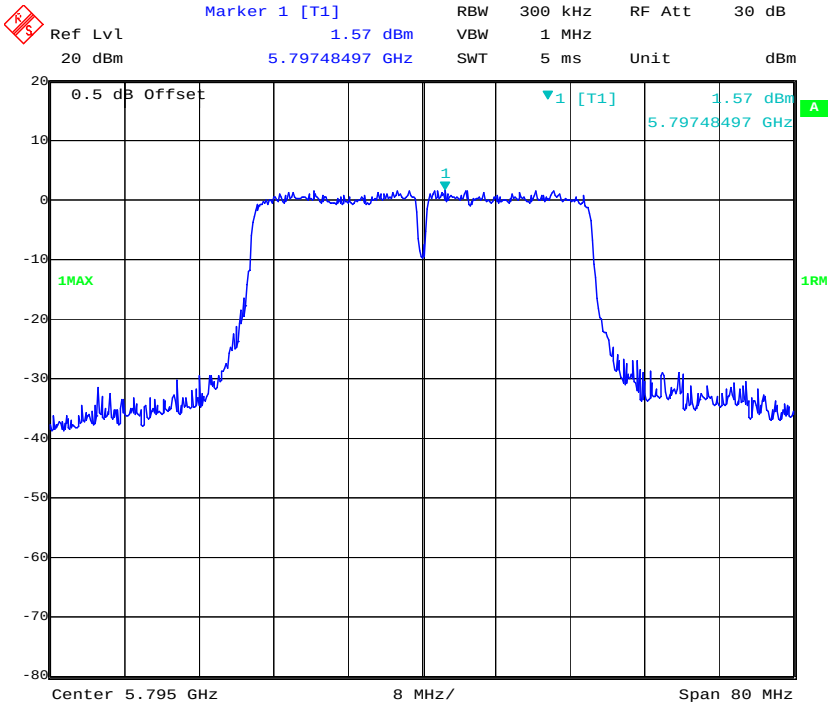
802.11n ht40 High Channel



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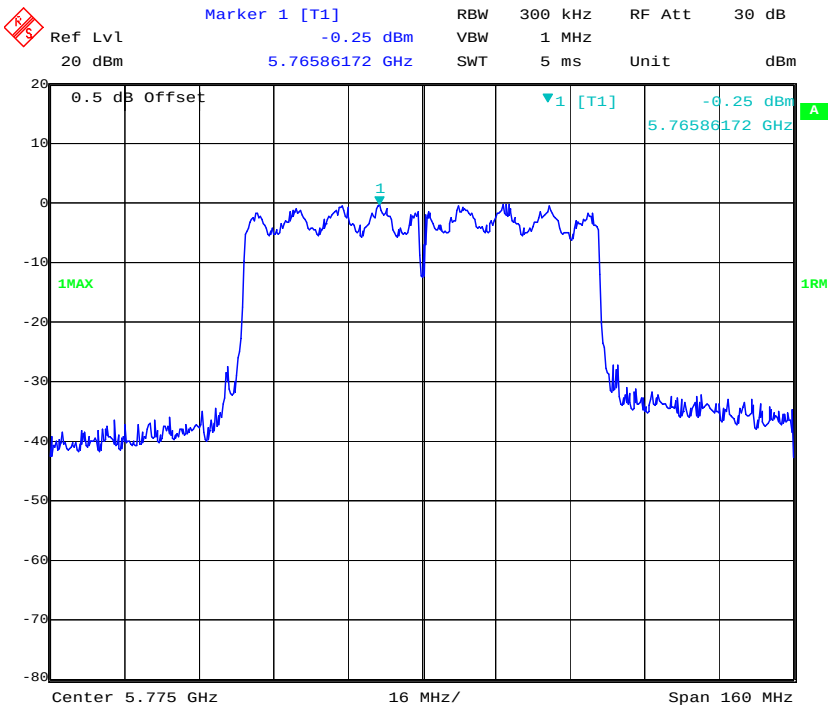
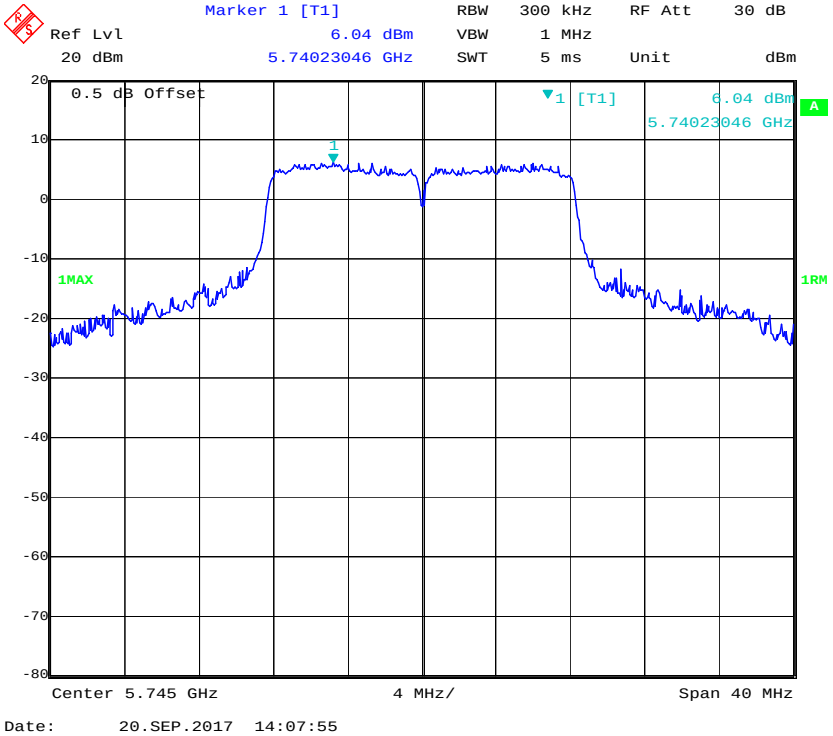
802.11ac80 Middle Channel

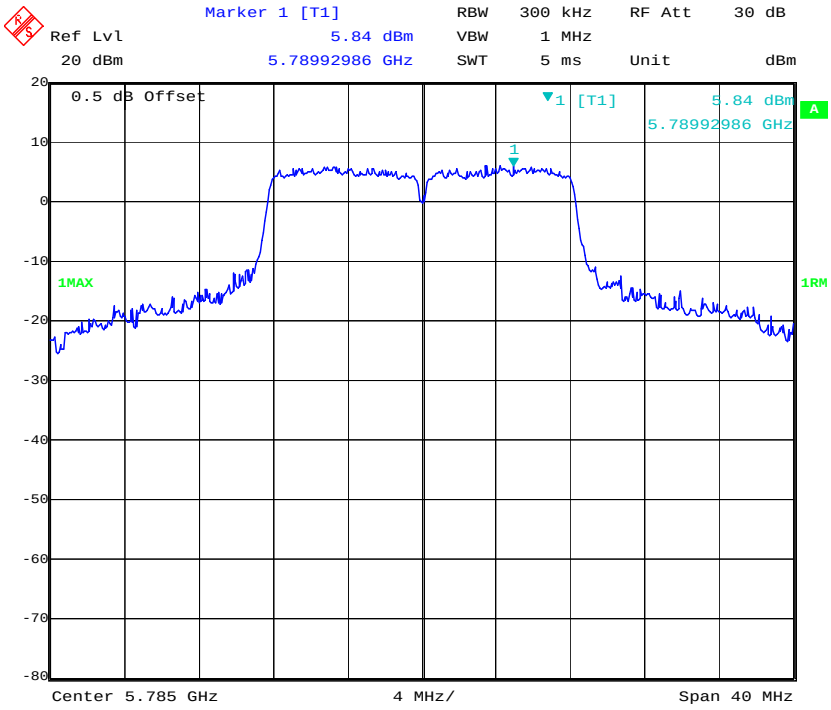


Chain 1:

802.11a Low Channel



802.11a Middle Channel



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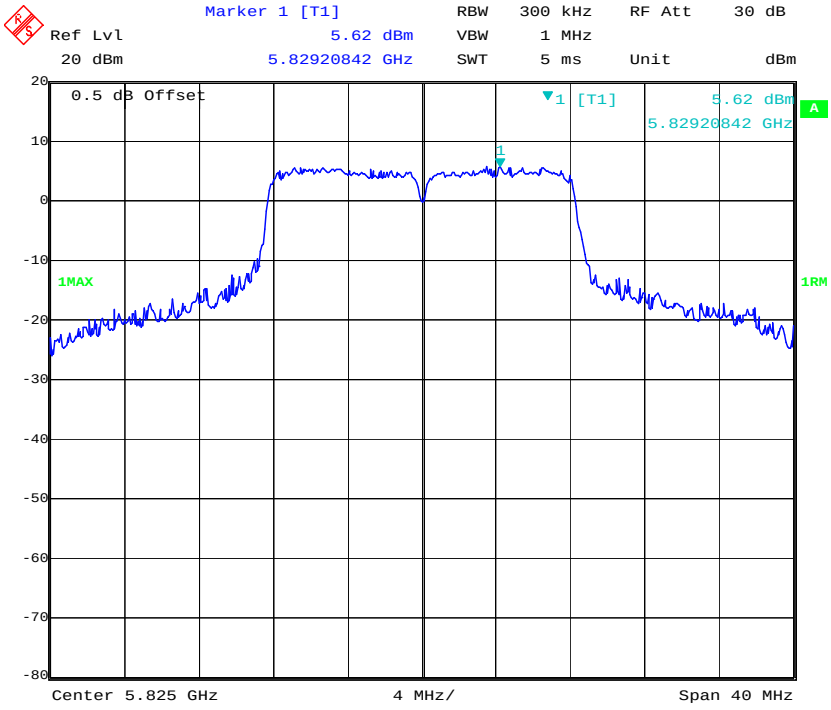
802.11a High Channel



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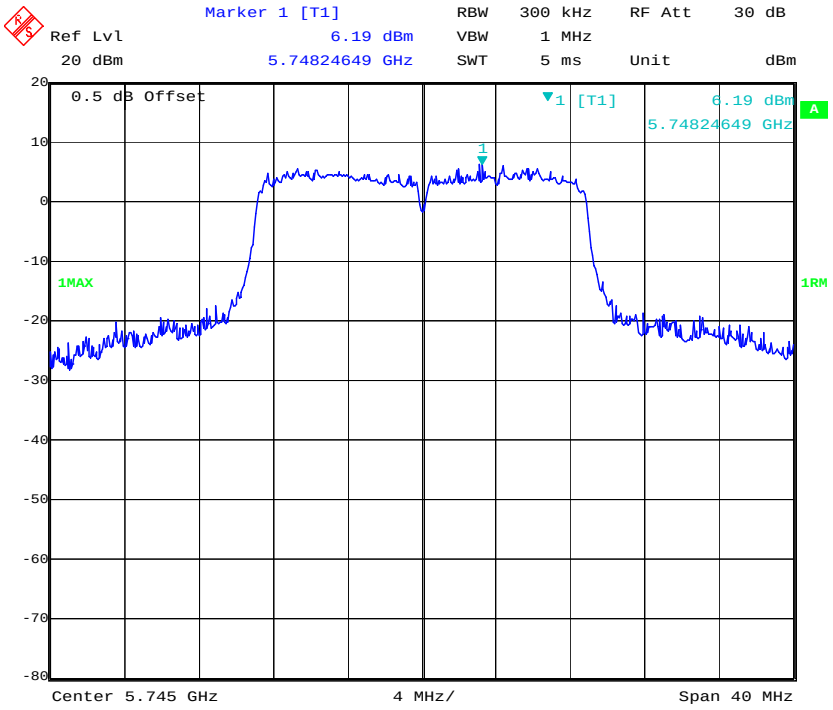

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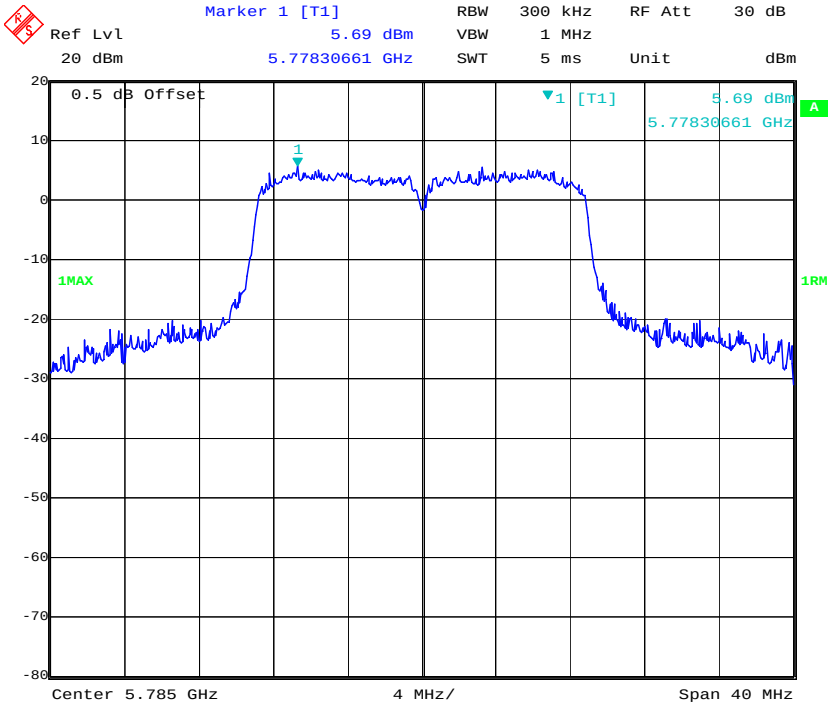
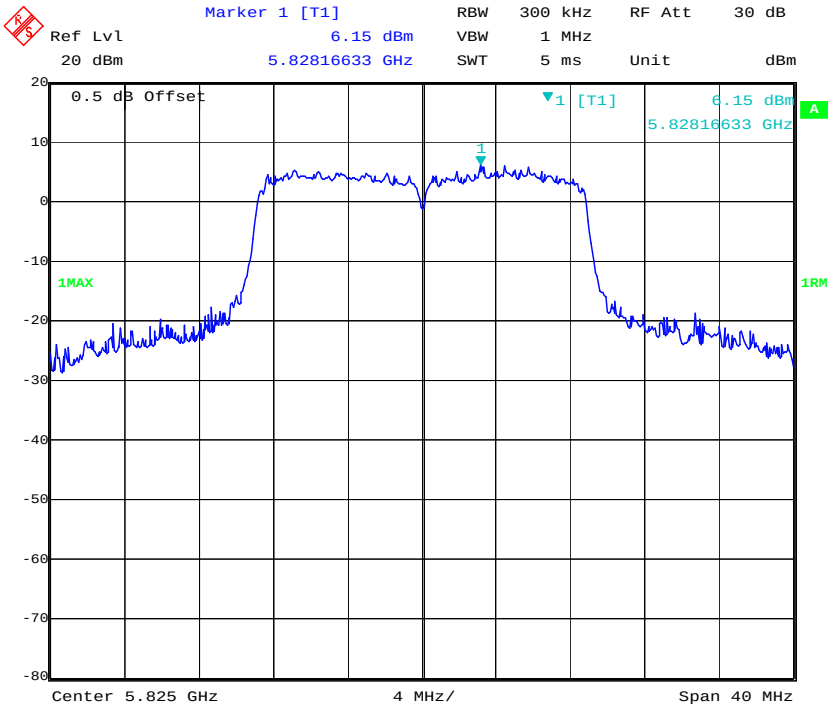
802.11n ht20 Middle Channel



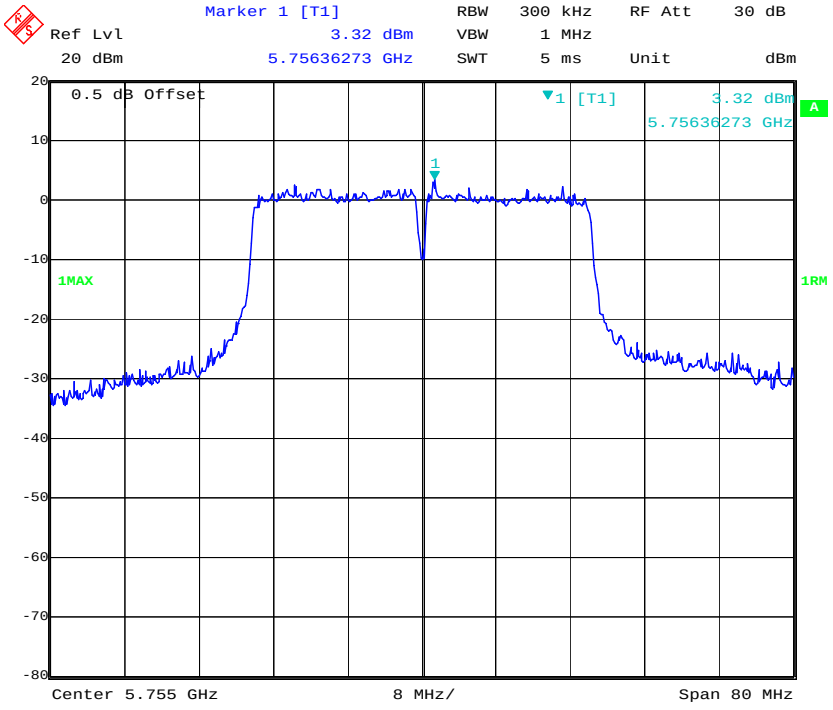
Date: 20.SEP.2017 14:28:38

802.11 n ht20 High Channel



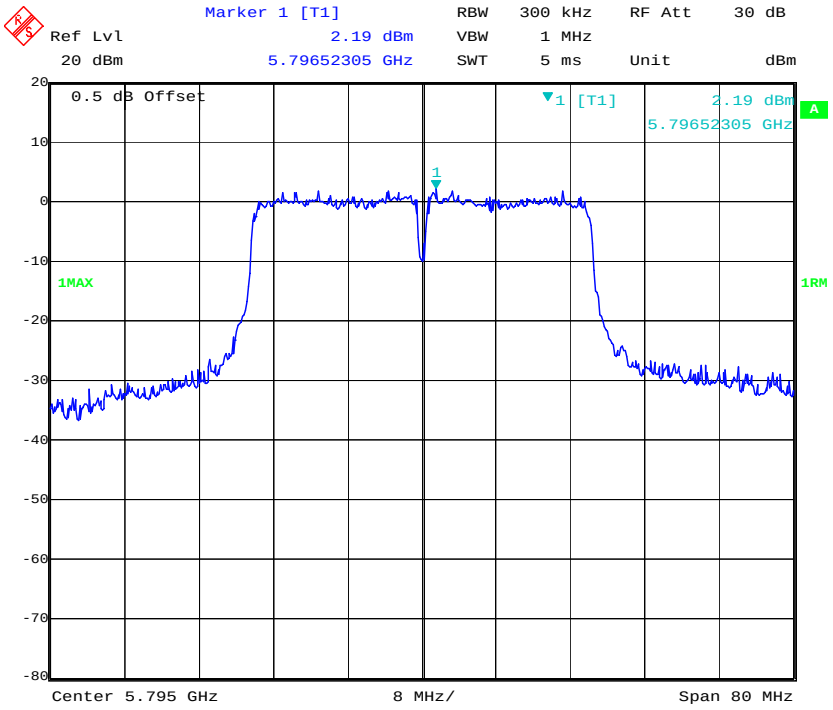
Date: 20.SEP.2017 14:26:09

802.11n ht40 Low Channel



Date: 20.SEP.2017 14:33:46

802.11n ht40 High Channel



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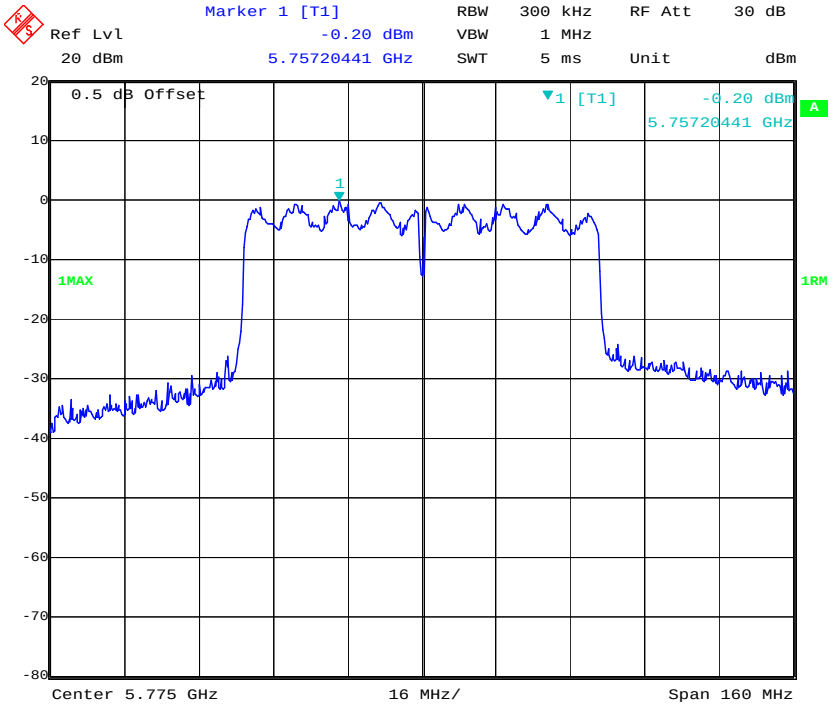
802.11ac80 Middle Channel



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