FCC PART 15.407

TEST REPORT

For

Humax Co., Ltd.

HUMAX BLDG., 2, Yeongmun-ro, Cheoin-gu Yongin-si, Gyeonggi-do, 17040 South Korea

FCC ID: O6ZX3

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

Test Engineer:	*Lorin Bian*
Report Number:	RDG170604008B
Report Date:	2017-11-02
Reviewed By:	Henry Ding EMC Leader
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Chengdu) No. 5040, Huilongwan Plaza, No. 1, Shawan Road, Jinniu District, Chengdu, Sichuan, China Tel: 028-65525123, Fax: 028-65525125 www.baclcorp.com

Note: This test report was prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Chengdu).

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The ***Humax Co., Ltd.***'s product, model number: ***QUANTUM X3 (FCC ID: O6ZX3)*** (the "EUT") in this report was a ***11N Wireless Roaming Extender***, which was measured approximately: 11.2 cm (L) x 7.0 cm (W) x 5.5 cm (H), rated input voltage: AC100-240V.

**All measurement and test data in this report was gathered from final production sample, serial number: 170604008 (assigned by the BACL, Chengdu).It may have deviation from any other sample.The EUT supplied by the applicant was received on 2017-06-06,and EUT conformed to test requirement.*

Objective

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

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

Related Submittal(s)/Grant(s)

FCC Part 15C DTS submissions with FCC ID: O6ZX3.

Test Methodology

All measurements detailed in this Test Report were performed in accordance with ANSI C63.10-2013 "American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices".

All of the measurements detailed in this Test Report were performed by Bay Area Compliance Laboratories Corp. (Chengdu).

The Bay Area Compliance Laboratories Corp. Chengdu's measurement Uncertainties (calculated for a k=2 Coverage Factor corresponding to approximately 95% Coverage) were as follows:

-For all of the AC Line Conducted Emissions Tests reported herein: ±3.17 dB.
-For of all of the Direct Antenna Conducted Emissions Tests reported herein: ±0.56 dB.

-For of all of the direct Radiated Emissions Tests reported herein are:
30 MHz to 200 MHz: ±4.7 dB;
200 MHz to 1 GHz: ±6.0 dB;
1 GHz to 6 GHz: ±5.13dB; and,
6 GHz to 40 GHz: ±5.47dB.

And the uncertainty will not be taken into consideration for all test data recorded in the report.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Chengdu) to collect test data is located on the No.5040, Huilongwan Plaza, No. 1, Shawan Road, Jinniu District, Chengdu, Sichuan, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 910975,the FCC Designation No. : CN1186.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062C-1.

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 and 802.11n ht20 modes were tested with Channel 36, 40 and 48,
802.11n ht40 mode was 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 and 802.11n ht20 modes were tested with Channel 149, 157 and 165,
802.11n ht40 mode was 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” was used for testing, which was provided by manufacturer. The worst-case data rates are determined to be as follows for each mode based upon investigations by measuring the average power and PSD across all date rates bandwidths, and modulations. The maximum power was configured as below table, that provided by the manufacturer:

5125-5250 MHz:

Test Mode	Test Software Version	MP_TEST		
802.11a	Test Frequency	5180MHz	5200MHz	5240MHz
	Data Rate	6Mbps	6Mbps	6Mbps
	Chain 0	42	43	44
	Chain 1	51	50	50
802.11n ht20	Test Frequency	5180MHz	5200MHz	5240MHz
	Data Rate	MCS0	MCS0	MCS0
	Chain 0	46	46	47
	Chain 1	55	54	53
802.11n ht40	Test Frequency	5190MHz	/	5230MHz
	Data Rate	MCS0	/	MCS0
	Chain 0	45	/	46
	Chain 1	53	/	52
802.11ac80	Test Frequency	/	5210MHz	/
	Data Rate	/	MCS0	/
	Chain 0	/	47	/
	Chain 1	/	55	/

5725-5850MHz:

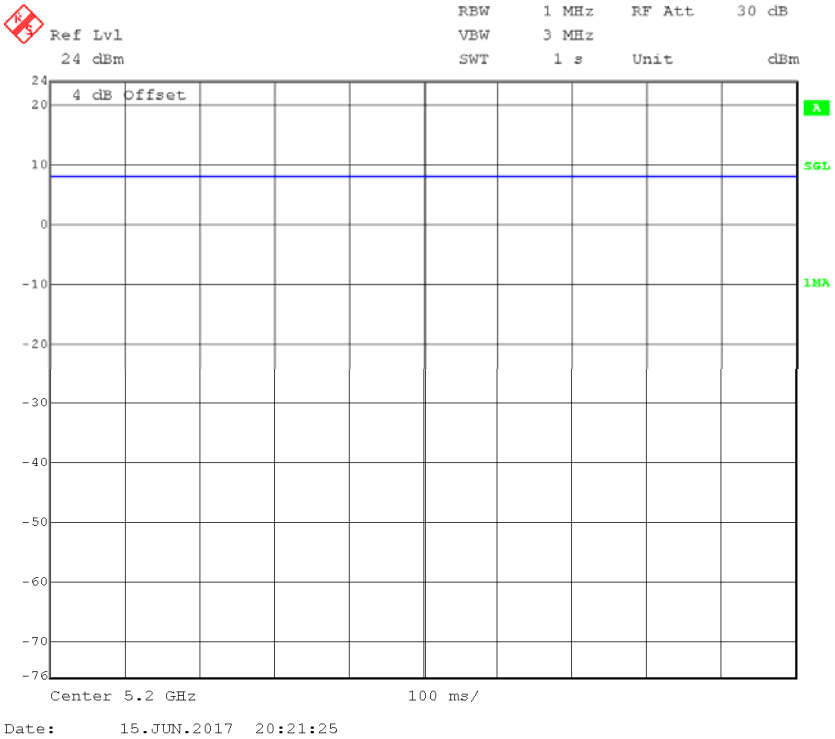
Test Mode	Test Software Version	MP_TEST		
802.11a	Test Frequency	5745MHz	5785MHz	5825MHz
	Data Rate	6Mbps	6Mbps	6Mbps
	Chain 0	30	30	30
	Chain 1	26	25	23
802.11n ht20	Test Frequency	5745MHz	5785MHz	5825MHz
	Data Rate	MCS0	MCS0	MCS0
	Chain 0	22	22	22
	Chain 1	22	22	22
802.11n ht40	Test Frequency	5755MHz	/	5795MHz
	Data Rate	MCS0	/	MCS0
	Chain 0	21	/	21
	Chain 1	21	/	21
802.11 ac80	Test Frequency	/	5775MHz	/
	Data Rate	/	MNSS0	/
	Chain 0	/	22	/
	Chain 1	/	22	/

The duty cycle as below:

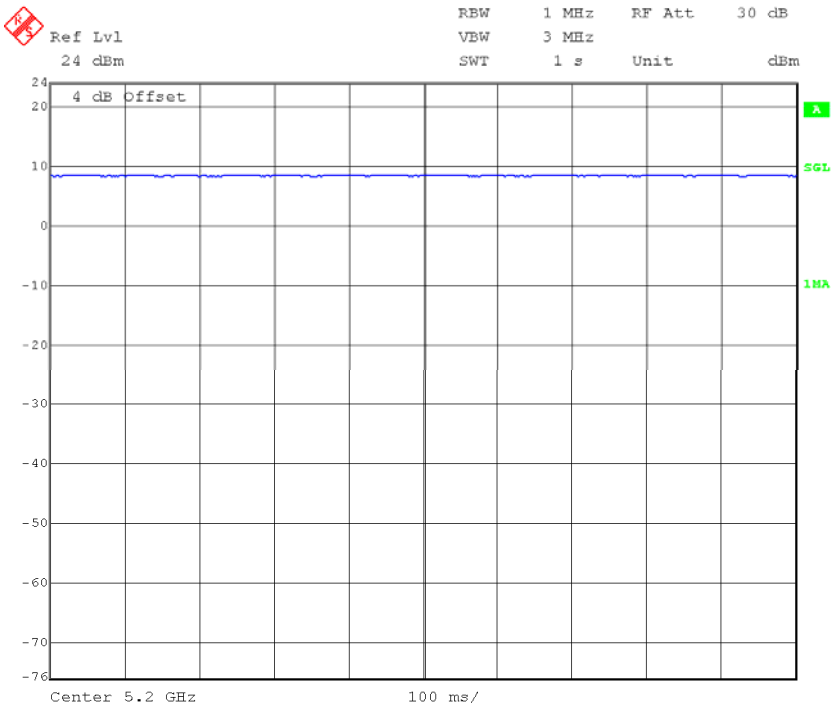
5150~5250 MHz

Mode	T_{on} (ms)	T_{on+off} (ms)	Duty Cycle (%)
802.11 a	1000	1000	100%
802.11n ht20	1000	1000	100%
802.11n ht40	1000	1000	100%
802.11ac80	1000	1000	100%

802.11a



802.11 n20



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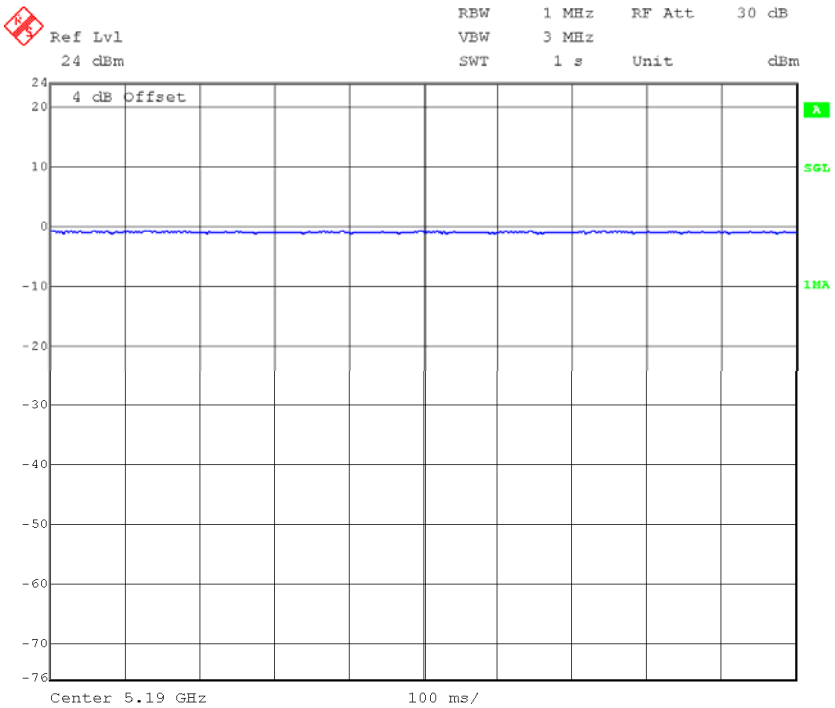
802.11 n40



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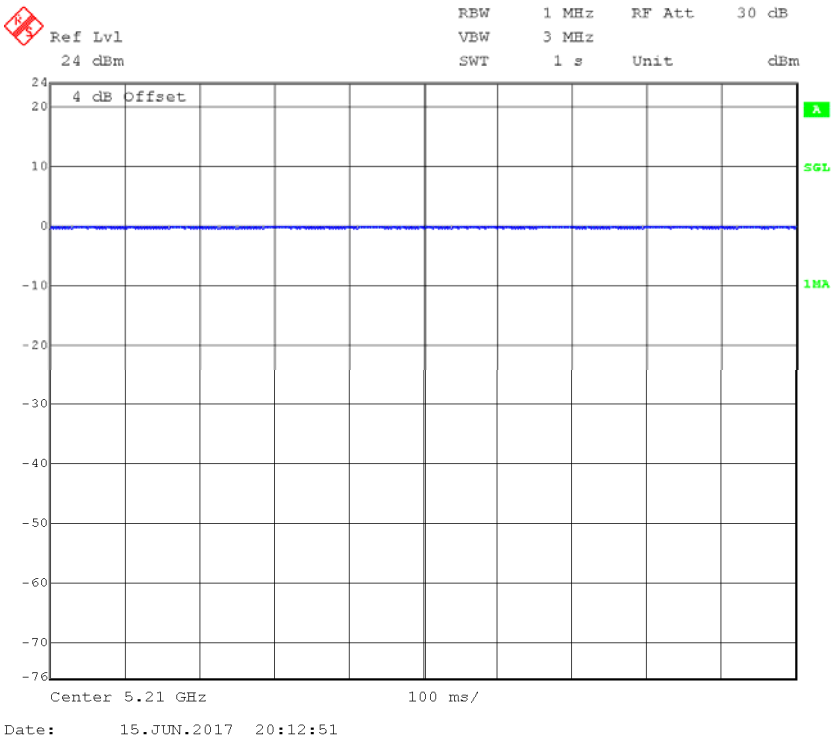
802.11 ac80



Equipment Modifications

No modification was made to the EUT.

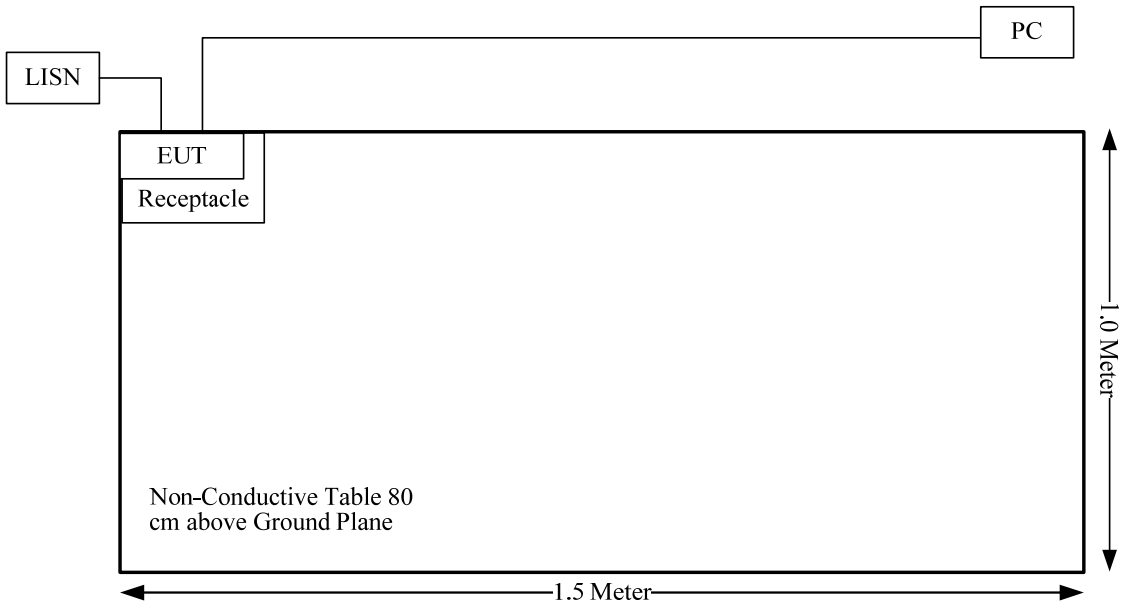
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
IBM	PC	8176	99Y7315

External Cable

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
RJ 45 Cable	no	no	10	EUT	PC

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/f²)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculation formula:

Prediction of power density at the distance of the applicable MPE limit
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

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

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

Calculated Data:

Frequency (MHz)	Antenna Gain		Tune-up Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
	(dBi)	(numeric)	(dBm)	(mW)			
2412-2462	2	1.58	21	125.89	20.00	0.0397	1.0
5150-5850	2	1.58	16	39.81	20.00	0.0126	1.0

The WLAN 2.4GHz and 5GHz can transmit simultaneously:

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

$=S_{2.4}/S_{limit-2.4} + S_5/S_{limit-5}$
=0.0397/1+0.0126/1
=0.05
< 1.0

Result: Compliance, The device meets MPE requirement for Devices Used by the General Public (Uncontrolled Environment) at distance ≥20 cm.

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 has 2 internal antennas for 5GHz, and the antenna gain are 2.0 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

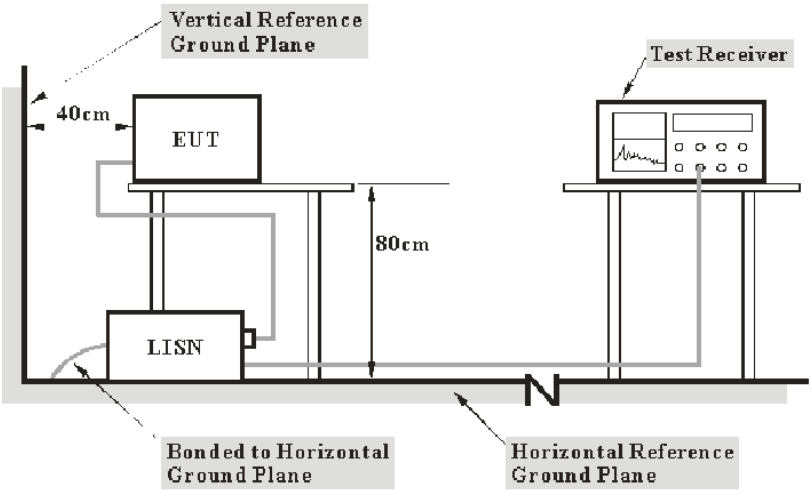
Result: Compliance.

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 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
Rohde & Schwarz	EMI Test Receiver	ESCS 30	836858/0016	2016-12-02	2017-12-01
Rohde & Schwarz	L.I.S.N.	ENV216	100018	2016-12-02	2017-12-01
SOLAR ELECTRONICS	L.I.S.N.	9252-50-24-BNC	984413	2016-12-02	2017-12-01
Rohde & Schwarz	PULSE LIMITER	ESH3Z2	DE14781	2016-10-31	2017-10-30
Unknown	Conducted Cable	Unknown	NO.5	2016-11-10	2017-11-09
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A

*** Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B "Implementation of traceability policy in accredited laboratories".

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 Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207.

Test Data

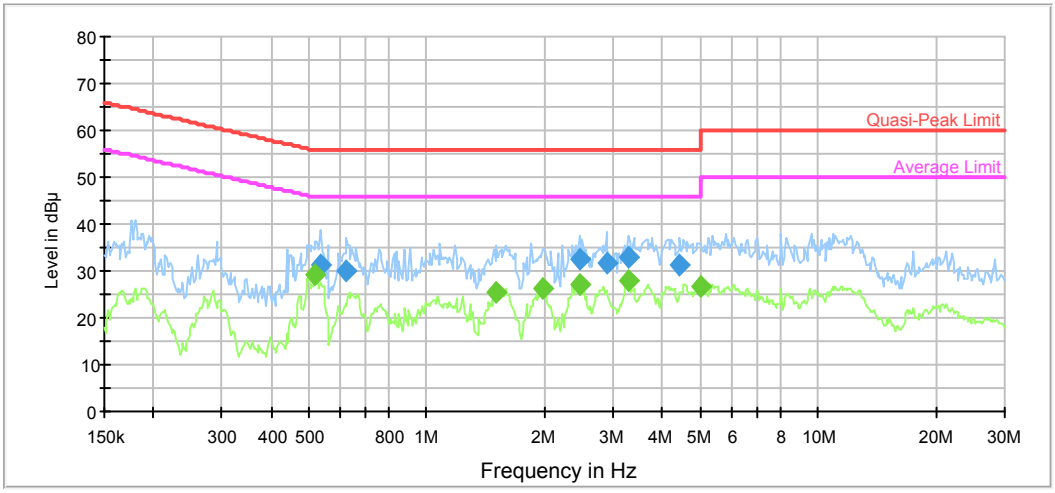
Environmental Conditions

Temperature:	28.4 °C
Relative Humidity:	43.2 %
ATM Pressure:	100.1 kPa

The testing was performed by Lorin Bian on 2017-06-09.

Test Mode: Transmitting

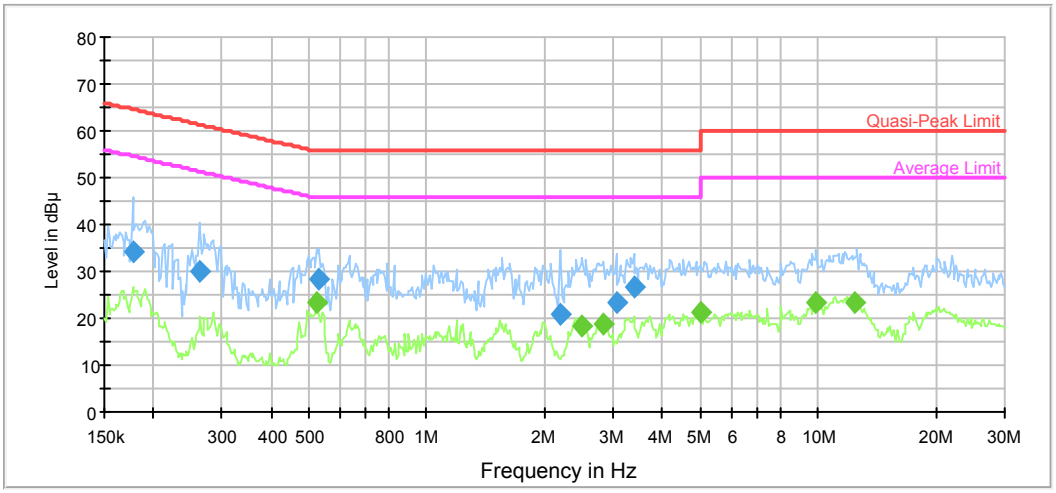
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.536756	31.3	9.000	L1	19.7	24.7	56.0	Compliance
0.624492	29.8	9.000	L1	19.7	26.2	56.0	Compliance
2.458886	32.3	9.000	L1	19.7	23.7	56.0	Compliance
2.883693	31.7	9.000	L1	19.7	24.3	56.0	Compliance
3.275801	32.8	9.000	L1	19.7	23.2	56.0	Compliance
4.434225	31.1	9.000	L1	19.7	24.9	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.519918	29.3	9.000	L1	19.7	16.7	46.0	Compliance
1.512328	25.3	9.000	L1	19.7	20.7	46.0	Compliance
1.982914	26.4	9.000	L1	19.8	19.6	46.0	Compliance
2.458886	27.2	9.000	L1	19.7	18.8	46.0	Compliance
3.275801	27.7	9.000	L1	19.7	18.3	46.0	Compliance
4.997188	26.6	9.000	L1	19.7	19.4	46.0	Compliance

AC120 V, 60 Hz, Neutral:



requency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.177322	34.2	9.000	N	19.7	30.4	64.6	Compliance
0.262017	30.0	9.000	N	19.6	31.4	61.4	Compliance
0.532496	28.5	9.000	N	19.6	27.5	56.0	Compliance
2.199332	21.0	9.000	N	19.7	35.0	56.0	Compliance
3.049107	23.3	9.000	N	19.7	32.7	56.0	Compliance
3.381891	26.9	9.000	N	19.7	29.1	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.524077	23.2	9.000	N	19.6	22.8	46.0	Compliance
2.498385	18.2	9.000	N	19.7	27.8	46.0	Compliance
2.838101	18.7	9.000	N	19.7	27.3	46.0	Compliance
4.997188	21.3	9.000	N	19.7	24.7	46.0	Compliance
9.915884	23.4	9.000	N	19.8	26.6	50.0	Compliance
12.394424	23.2	9.000	N	19.9	26.8	50.0	Compliance

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

Applicable Standard

FCC §15.407; §15.209; §15.205;

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

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

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

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

(4) For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.

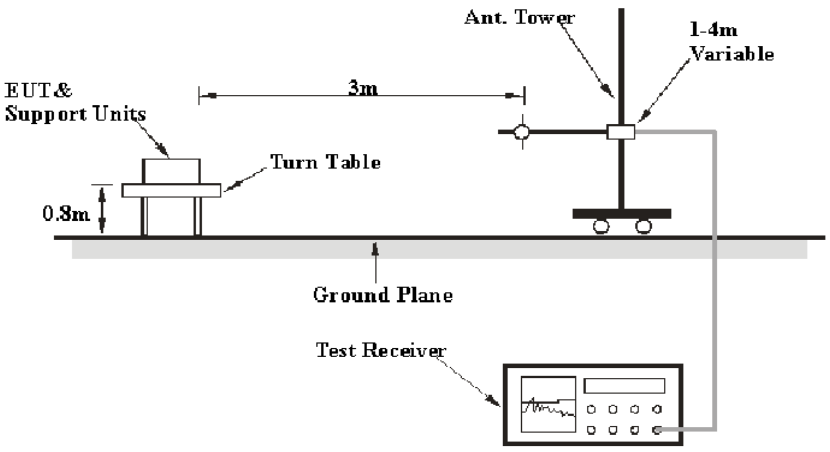
(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

(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.

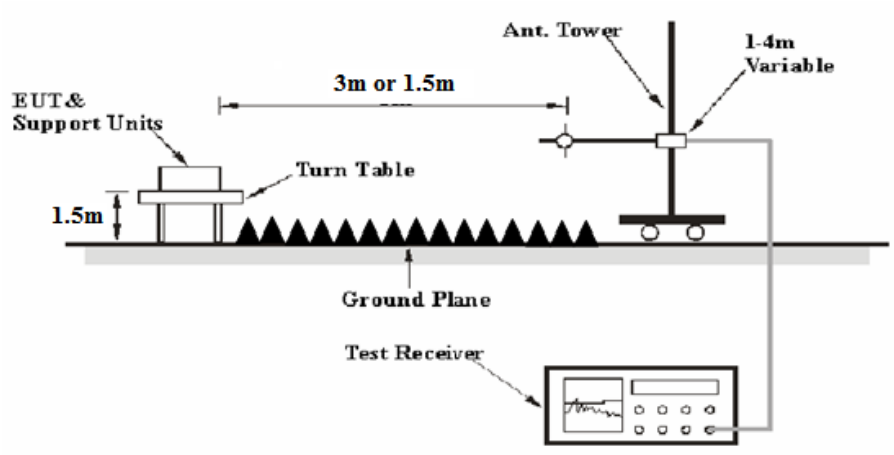
(7) The provisions of §15.205 apply to intentional radiators operating under this section.

EUT Setup

Below 1 GHz:



Above 1 GHz:



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

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

The spacing between the peripherals was 10 cm.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 40 GHz.

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

30-1000MHz:

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

1GHz- 40GHz:

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 Loss and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Loss + 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
Agilent	Amplifier	8447D	2944A10442	2016-12-02	2017-12-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2016-12-02	2017-12-01
Sunol Sciences	Broadband Antenna	JB3	A121808	2016-04-10	2019-04-09
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2016-12-02	2017-12-01
ETS	Horn Antenna	3115	003-6076	2016-12-02	2017-12-01
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-0113024	2014-06-16	2017-06-15
Mini-circuits	Amplifier	ZVA-183-S+	771001215	2017-05-20	2018-05-19
EMCT	Semi-Anechoic Chamber	966	966-1	2015-04-24	2018-04-23
Unknown	RF Cable (below 1GHz)	Unknown	NO.1	2016-11-10	2017-11-09
Unknown	RF Cable (below 1GHz)	Unknown	NO.4	2016-11-10	2017-11-09
Unknown	RF Cable (above 1GHz)	Unknown	NO.2	2016-11-10	2017-11-09
Ducommun Technolagies	Horn Antenna	ARH-2823-02	1007726-01 1312	2016-08-18	2017-08-18
Quinstar	Amplifier	QLW-18405536-JO	15964001032	2016-08-18	2017-08-18
Agilent	Spectrum Analyzer	8564E	5943A01752	2016-08-18	2017-08-18

*** Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B "Implementation of traceability policy in accredited laboratories".

Test Data

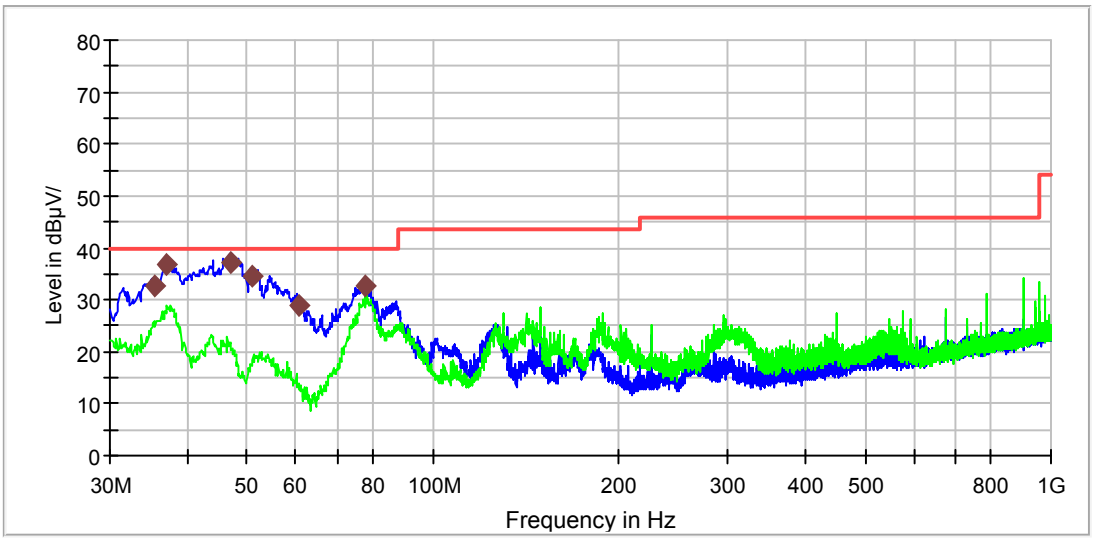
Environmental Conditions

Temperature:	29.6 °C
Relative Humidity:	44.9 %
ATM Pressure:	100.1 kPa

** The testing was performed by Lorin Bian on 2017-10-11.*

Test Mode: Transmitting

30MHz-1GHz:



Frequency (MHz)	QuasiPeak (dB µ V/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB µ V/m)
35.577500	32.8	100.0	V	169.0	-9.3	7.2	40.0
37.032500	36.8	100.0	V	142.0	-10.5	3.2	40.0
47.217500	37.0	100.0	V	276.0	-17.9	3.0	40.0
50.855000	34.7	100.0	V	319.0	-19.4	5.3	40.0
60.797500	29.1	100.0	V	213.0	-20.4	10.9	40.0
77.651250	32.5	100.0	V	293.0	-20.1	7.5	40.0

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

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel:5180 MHz									
5180.00	81.34	PK	H	31.72	5.21	0.00	112.27	N/A	N/A
5180.00	72.39	AV	H	31.72	5.21	0.00	103.32	N/A	N/A
5180.00	77.84	PK	V	31.72	5.21	0.00	108.77	N/A	N/A
5180.00	68.61	AV	V	31.72	5.21	0.00	99.54	N/A	N/A
5150.00	34.91	PK	H	31.67	5.18	0.00	65.76	74.00	8.24
5150.00	20.15	AV	H	31.67	5.18	0.00	51.00	54.00	3.00
10360.00	37.04	PK	H	37.37	7.76	26.37	49.80	74.00	24.20
10360.00	22.32	AV	H	37.37	7.76	26.37	35.08	54.00	18.92
15540.00	31.05	PK	H	39.41	10.22	25.32	49.36	74.00	24.64
15540.00	15.97	AV	H	39.41	10.22	25.32	34.28	54.00	19.72
9355.00	34.64	PK	H	36.94	7.72	26.19	47.11	74.00	26.89
9355.00	20.43	AV	H	36.94	7.72	26.19	32.90	54.00	21.10
Middle Channel:5200 MHz									
5200.00	81.50	PK	H	31.76	5.23	0.00	112.49	N/A	N/A
5200.00	72.44	AV	H	31.76	5.23	0.00	103.43	N/A	N/A
5200.00	77.80	PK	V	31.76	5.23	0.00	108.79	N/A	N/A
5200.00	68.64	AV	V	31.76	5.23	0.00	99.63	N/A	N/A
10400.00	37.33	PK	H	37.38	7.79	26.36	50.14	74.00	23.86
10400.00	22.37	AV	H	37.38	7.79	26.36	35.18	54.00	18.82
15600.00	30.83	PK	H	39.42	10.22	25.31	49.16	74.00	24.84
15600.00	15.90	AV	H	39.42	10.22	25.31	34.23	54.00	19.77
8995.00	35.00	PK	H	36.80	7.29	26.39	46.70	74.00	27.3
8995.00	20.58	AV	H	36.80	7.29	26.39	32.28	54.00	21.72
9352.00	34.05	PK	H	36.94	7.72	26.19	46.52	74.00	27.48
9352.00	20.46	AV	H	36.94	7.72	26.19	32.93	54.00	21.07
High Channel:5240 MHz									
5240.00	82.25	PK	H	31.83	5.27	0.00	113.35	N/A	N/A
5240.00	72.07	AV	H	31.83	5.27	0.00	103.17	N/A	N/A
5240.00	77.74	PK	V	31.83	5.27	0.00	108.84	N/A	N/A
5240.00	68.47	AV	V	31.83	5.27	0.00	99.57	N/A	N/A
5350.00	27.57	PK	H	32.03	5.37	0.00	58.97	74.00	15.03
5350.00	15.25	AV	H	32.03	5.37	0.00	46.65	54.00	7.35
10480.00	37.13	PK	H	37.40	7.84	26.35	50.02	74.00	23.98
10480.00	22.25	AV	H	37.40	7.84	26.35	35.14	54.00	18.86
15720.00	30.73	PK	H	39.44	10.24	25.30	49.11	74.00	24.89
15720.00	15.44	AV	H	39.44	10.24	25.30	33.82	54.00	20.18
9655.00	34.81	PK	H	37.09	7.79	26.21	47.48	74.00	26.52
9655.00	20.76	AV	H	37.09	7.79	26.21	33.43	54.00	20.57

802.11n ht20 mode(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	81.63	PK	H	31.72	5.21	0.00	112.56	N/A	N/A
5180.00	72.30	AV	H	31.72	5.21	0.00	103.23	N/A	N/A
5180.00	78.04	PK	V	31.72	5.21	0.00	108.97	N/A	N/A
5180.00	68.66	AV	V	31.72	5.21	0.00	99.59	N/A	N/A
5150.00	34.82	PK	H	31.67	5.18	0.00	65.67	74.00	8.33
5150.00	19.72	AV	H	31.67	5.18	0.00	50.57	54.00	3.43
10360.00	36.98	PK	H	37.37	7.76	26.37	49.74	74.00	24.26
10360.00	22.35	AV	H	37.37	7.76	26.37	35.11	54.00	18.89
15540.00	31.18	PK	H	39.41	10.22	25.32	49.49	74.00	24.51
15540.00	15.88	AV	H	39.41	10.22	25.32	34.19	54.00	19.81
9355.00	34.80	PK	H	36.94	7.72	26.19	47.27	74.00	26.73
9355.00	20.43	AV	H	36.94	7.72	26.19	32.90	54.00	21.10
Middle Channel:5200 MHz									
5200.00	81.66	PK	H	31.76	5.23	0.00	112.65	N/A	N/A
5200.00	72.22	AV	H	31.76	5.23	0.00	103.21	N/A	N/A
5200.00	78.13	PK	V	31.76	5.23	0.00	109.12	N/A	N/A
5200.00	68.60	AV	V	31.76	5.23	0.00	99.59	N/A	N/A
10400.00	37.36	PK	H	37.38	7.79	26.36	50.17	74.00	23.83
10400.00	22.55	AV	H	37.38	7.79	26.36	35.36	54.00	18.64
15600.00	30.68	PK	H	39.42	10.22	25.31	49.01	74.00	24.99
15600.00	16.10	AV	H	39.42	10.22	25.31	34.43	54.00	19.57
8995.00	34.99	PK	H	36.80	7.29	26.39	46.69	74.00	27.31
8995.00	20.69	AV	H	36.80	7.29	26.39	32.39	54.00	21.61
9352.00	33.86	PK	H	36.94	7.72	26.19	46.33	74.00	27.67
9352.00	20.33	AV	H	36.94	7.72	26.19	32.80	54.00	21.2
High Channel:5240 MHz									
5240.00	82.79	PK	H	31.83	5.27	0.00	113.89	N/A	N/A
5240.00	71.87	AV	H	31.83	5.27	0.00	102.97	N/A	N/A
5240.00	77.87	PK	V	31.83	5.27	0.00	108.97	N/A	N/A
5240.00	68.40	AV	V	31.83	5.27	0.00	99.50	N/A	N/A
5350.00	27.53	PK	H	32.03	5.37	0.00	58.93	74.00	15.07
5350.00	15.38	AV	H	32.03	5.37	0.00	46.78	54.00	7.22
10480.00	37.03	PK	H	37.40	7.84	26.35	49.92	74.00	24.08
10480.00	22.20	AV	H	37.40	7.84	26.35	35.09	54.00	18.91
15720.00	30.70	PK	H	39.44	10.24	25.30	49.08	74.00	24.92
15720.00	15.33	AV	H	39.44	10.24	25.30	33.71	54.00	20.29
9655.00	34.71	PK	H	37.09	7.79	26.21	47.38	74.00	26.62
9655.00	20.66	AV	H	37.09	7.79	26.21	33.33	54.00	20.67

802.11n ht40 mode(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	72.49	PK	H	31.74	5.22	0.00	103.45	N/A	N/A
5190.00	60.55	AV	H	31.74	5.22	0.00	91.51	N/A	N/A
5190.00	70.96	PK	V	31.74	5.22	0.00	101.92	N/A	N/A
5190.00	62.88	AV	V	31.74	5.22	0.00	93.84	N/A	N/A
5150.00	27.01	PK	H	31.67	5.18	0.00	57.86	74.00	16.14
5150.00	13.77	AV	H	31.67	5.18	0.00	44.62	54.00	9.38
10380.00	37.08	PK	H	37.38	7.78	26.37	49.87	74.00	24.13
10380.00	22.44	AV	H	37.38	7.78	26.37	35.23	54.00	18.77
15570.00	30.94	PK	H	39.41	10.22	25.31	49.26	74.00	24.74
15570.00	15.81	AV	H	39.41	10.22	25.31	34.13	54.00	19.87
9355.00	34.81	PK	H	36.94	7.72	26.19	47.28	74.00	26.72
9355.00	20.26	AV	H	36.94	7.72	26.19	32.73	54.00	21.27
Middle Channel:5230 MHz									
5230.00	75.48	PK	H	31.81	5.26	0.00	106.55	N/A	N/A
5230.00	63.40	AV	H	31.81	5.26	0.00	94.47	N/A	N/A
5230.00	72.96	PK	V	31.81	5.26	0.00	104.03	N/A	N/A
5230.00	60.88	AV	V	31.81	5.26	0.00	91.95	N/A	N/A
5350.00	27.60	PK	H	32.03	5.37	0.00	59.00	74.00	15.00
5350.00	14.35	AV	H	32.03	5.37	0.00	45.75	54.00	8.25
10460.00	37.08	PK	H	37.39	7.83	26.36	49.94	74.00	24.06
10460.00	22.25	AV	H	37.39	7.83	26.36	35.11	54.00	18.89
15690.00	30.59	PK	H	39.44	10.24	25.30	48.97	74.00	25.03
15690.00	15.67	AV	H	39.44	10.24	25.30	34.05	54.00	19.95
9655.00	35.02	PK	H	37.09	7.79	26.21	47.69	74.00	26.31
9655.00	20.80	AV	H	37.09	7.79	26.21	33.47	54.00	20.53

802.11n ac80 mode(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:5210 MHz									
5210.00	70.86	PK	H	31.78	5.24	0.00	101.88	N/A	N/A
5210.00	57.72	AV	H	31.78	5.24	0.00	88.74	N/A	N/A
5210.00	68.91	PK	V	31.78	5.24	0.00	99.93	N/A	N/A
5210.00	55.67	AV	V	31.78	5.24	0.00	86.69	N/A	N/A
5150.00	53.58	PK	H	31.67	5.18	26.80	57.63	74.00	16.37
5150.00	41.40	AV	H	31.67	5.18	26.80	45.45	54.00	8.55
5350.00	54.03	PK	H	32.03	5.37	26.69	58.74	74.00	15.26
5350.00	41.50	AV	H	32.03	5.37	26.69	46.21	54.00	7.79
10420.00	36.83	PK	H	37.38	7.80	26.36	49.65	74.00	24.35
10420.00	22.34	AV	H	37.38	7.80	26.36	35.16	54.00	18.84
15630.00	30.73	PK	H	39.43	10.23	25.31	49.08	74.00	24.92
15630.00	15.87	AV	H	39.43	10.23	25.31	34.22	54.00	19.78
9685.00	34.63	PK	H	37.11	7.77	26.22	47.29	74.00	26.71
9685.00	20.43	AV	H	37.11	7.77	26.22	33.09	54.00	20.91

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

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel:5745 MHz									
5745.00	79.36	PK	H	32.59	5.74	0.00	111.69	N/A	N/A
5745.00	69.97	AV	H	32.59	5.74	0.00	102.30	N/A	N/A
5745.00	72.18	PK	V	32.59	5.74	0.00	104.51	N/A	N/A
5745.00	63.10	AV	V	32.59	5.74	0.00	95.43	N/A	N/A
5725.00	44.00	PK	H	32.57	5.72	0.00	76.29	122.20	45.91
5720.00	27.08	PK	H	32.56	5.71	0.00	59.35	110.80	51.45
5700.00	26.13	PK	H	32.54	5.70	0.00	58.37	105.20	46.83
5650.00	25.91	PK	H	32.48	5.65	0.00	58.04	68.20	10.16
11490.00	42.50	PK	H	37.99	8.22	26.02	56.69	74.00	17.31
11490.00	30.39	AV	H	37.99	8.22	26.02	44.58	54.00	9.42
17235.00	35.24	PK	H	42.98	10.82	25.99	57.05	74.00	16.95
17235.00	23.58	AV	H	42.98	10.82	25.99	45.39	54.00	8.61
8966.00	35.11	PK	H	36.77	7.26	26.42	46.72	74.00	27.28
8966.00	20.95	AV	H	36.77	7.26	26.42	32.56	54.00	21.44
Middle Channel:5785 MHz									
5785.00	79.37	PK	H	32.64	5.77	0.00	111.78	N/A	N/A
5785.00	70.10	AV	H	32.64	5.77	0.00	102.51	N/A	N/A
5785.00	72.08	PK	V	32.64	5.77	0.00	104.49	N/A	N/A
5785.00	62.97	AV	V	32.64	5.77	0.00	95.38	N/A	N/A
11570.00	41.33	PK	H	38.03	8.21	26.00	55.57	74.00	18.43
11570.00	28.74	AV	H	38.03	8.21	26.00	42.98	54.00	11.02
17355.00	34.98	PK	H	43.53	11.03	26.16	57.38	74.00	16.62
17355.00	23.59	AV	H	43.53	11.03	26.16	45.99	54.00	8.01
9855.00	36.38	PK	H	37.21	7.64	26.33	48.90	74.00	25.10
9855.00	21.24	AV	H	37.21	7.64	26.33	33.76	54.00	20.24
9677.00	35.21	PK	H	37.11	7.77	26.22	47.87	74.00	26.13
9677.00	20.76	AV	H	37.11	7.77	26.22	33.42	54.00	20.58
High Channel:5825 MHz									
5825.00	79.16	PK	H	32.69	5.81	0.00	111.66	N/A	N/A
5825.00	69.80	AV	H	32.69	5.81	0.00	102.30	N/A	N/A
5825.00	72.07	PK	V	32.69	5.81	0.00	104.57	N/A	N/A
5825.00	63.07	AV	V	32.69	5.81	0.00	95.57	N/A	N/A
5850.00	34.76	PK	H	32.72	5.83	0.00	67.31	122.20	54.89
5855.00	26.98	PK	H	32.73	5.83	0.00	59.54	110.80	51.26
5875.00	25.86	PK	H	32.75	5.85	0.00	58.46	105.20	46.74
5925.00	25.83	PK	H	32.81	5.89	0.00	58.53	68.20	9.67
11650.00	42.18	PK	H	38.06	8.20	25.98	56.46	74.00	17.54
11650.00	30.23	AV	H	38.06	8.20	25.98	44.51	54.00	9.49
17475.00	35.88	PK	H	44.09	11.23	26.33	58.87	74.00	15.13
17475.00	24.18	AV	H	44.09	11.23	26.33	47.17	54.00	6.83
8966.00	35.13	PK	H	36.77	7.26	26.42	46.74	74.00	27.26
8966.00	20.99	AV	H	36.77	7.26	26.42	32.60	54.00	21.40

802.11n ht20 mode(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:5745 MHz									
5745.00	78.68	PK	H	32.59	5.74	0.00	111.01	N/A	N/A
5745.00	69.96	AV	H	32.59	5.74	0.00	102.29	N/A	N/A
5745.00	72.07	PK	V	32.59	5.74	0.00	104.40	N/A	N/A
5745.00	63.16	AV	V	32.59	5.74	0.00	95.49	N/A	N/A
5725.00	44.08	PK	H	32.57	5.72	0.00	76.37	122.20	45.83
5720.00	27.13	PK	H	32.56	5.71	0.00	59.40	110.80	51.40
5700.00	26.23	PK	H	32.54	5.70	0.00	58.47	105.20	46.73
5650.00	26.05	PK	H	32.48	5.65	0.00	58.18	68.20	10.02
11490.00	38.66	PK	H	37.99	8.22	26.02	52.85	74.00	21.15
11490.00	26.27	AV	H	37.99	8.22	26.02	40.46	54.00	13.54
17235.00	31.22	PK	H	42.98	10.82	25.99	53.03	74.00	20.97
17235.00	16.59	AV	H	42.98	10.82	25.99	38.40	54.00	15.60
8966.00	35.03	PK	H	36.77	7.26	26.42	46.64	74.00	27.36
8966.00	20.95	AV	H	36.77	7.26	26.42	32.56	54.00	21.44
Middle Channel:5785 MHz									
5785.00	78.69	PK	H	32.64	5.77	0.00	111.10	N/A	N/A
5785.00	69.90	AV	H	32.64	5.77	0.00	102.31	N/A	N/A
5785.00	71.90	PK	V	32.64	5.77	0.00	104.31	N/A	N/A
5785.00	63.05	AV	V	32.64	5.77	0.00	95.46	N/A	N/A
11570.00	38.35	PK	H	38.03	8.21	26.00	52.59	74.00	21.41
11570.00	26.14	AV	H	38.03	8.21	26.00	40.38	54.00	13.62
17355.00	31.50	PK	H	43.53	11.03	26.16	53.90	74.00	20.10
17355.00	16.94	AV	H	43.53	11.03	26.16	39.34	54.00	14.66
9855.00	35.36	PK	H	37.21	7.64	26.33	47.88	74.00	26.12
9855.00	21.20	AV	H	37.21	7.64	26.33	33.72	54.00	20.28
9677.00	34.24	PK	H	37.11	7.77	26.22	46.90	74.00	27.10
9677.00	20.91	AV	H	37.11	7.77	26.22	33.57	54.00	20.43
High Channel:5825 MHz									
5825.00	78.42	PK	H	32.69	5.81	0.00	110.92	N/A	N/A
5825.00	69.95	AV	H	32.69	5.81	0.00	102.45	N/A	N/A
5825.00	72.00	PK	V	32.69	5.81	0.00	104.50	N/A	N/A
5825.00	62.98	AV	V	32.69	5.81	0.00	95.48	N/A	N/A
5850.00	33.98	PK	H	32.72	5.83	0.00	66.53	122.20	55.67
5855.00	26.77	PK	H	32.73	5.83	0.00	59.33	110.80	51.47
5875.00	25.98	PK	H	32.75	5.85	0.00	58.58	105.20	46.62
5925.00	25.92	PK	H	32.81	5.89	0.00	58.62	68.20	9.58
11650.00	38.27	PK	H	38.06	8.20	25.98	52.55	74.00	21.45
11650.00	25.87	AV	H	38.06	8.20	25.98	40.15	54.00	13.85
17475.00	31.86	PK	H	44.09	11.23	26.33	54.85	74.00	19.15
17475.00	17.19	AV	H	44.09	11.23	26.33	40.18	54.00	13.82
8966.00	34.90	PK	H	36.77	7.26	26.42	46.51	74.00	27.49
8966.00	21.03	AV	H	36.77	7.26	26.42	32.64	54.00	21.36

802.11n ht40 mode(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:5755 MHz									
5755.00	74.85	PK	H	32.61	5.74	0.00	107.20	N/A	N/A
5755.00	66.02	AV	H	32.61	5.74	0.00	98.37	N/A	N/A
5755.00	68.88	PK	V	32.61	5.74	0.00	101.23	N/A	N/A
5755.00	59.82	AV	V	32.61	5.74	0.00	92.17	N/A	N/A
5725.00	27.22	PK	H	32.57	5.72	0.00	59.51	122.20	62.69
5720.00	25.96	PK	H	32.56	5.71	0.00	58.23	110.80	52.57
5700.00	27.49	PK	H	32.54	5.70	0.00	59.73	105.20	45.47
5650.00	26.07	PK	H	32.48	5.65	0.00	58.20	68.20	10.00
11510.00	36.35	PK	H	38.00	8.22	26.02	50.55	74.00	23.45
11510.00	21.46	AV	H	38.00	8.22	26.02	35.66	54.00	18.34
17265.00	31.49	PK	H	43.12	10.88	26.04	53.45	74.00	20.55
17265.00	16.34	AV	H	43.12	10.88	26.04	38.30	54.00	15.70
8966.00	35.10	PK	H	36.77	7.26	26.42	46.71	74.00	27.29
8966.00	20.76	AV	H	36.77	7.26	26.42	32.37	54.00	21.63
Middle Channel:5795 MHz									
5795.00	74.73	PK	H	32.65	5.78	0.00	107.16	N/A	N/A
5795.00	65.85	AV	H	32.65	5.78	0.00	98.28	N/A	N/A
5795.00	68.99	PK	V	32.65	5.78	0.00	101.42	N/A	N/A
5795.00	59.72	AV	V	32.65	5.78	0.00	92.15	N/A	N/A
5850.00	27.07	PK	H	32.72	5.83	0.00	59.62	122.20	62.58
5855.00	25.75	PK	H	32.73	5.83	0.00	58.31	110.80	52.49
5875.00	27.37	PK	H	32.75	5.85	0.00	59.97	105.20	45.23
5925.00	25.73	PK	H	32.81	5.89	0.00	58.43	68.20	9.77
11590.00	36.23	PK	H	38.04	8.21	25.99	50.49	74.00	23.51
11590.00	21.37	AV	H	38.04	8.21	25.99	35.63	54.00	18.37
17385.00	31.90	PK	H	43.67	11.08	26.21	54.44	74.00	19.56
17385.00	16.46	AV	H	43.67	11.08	26.21	39.00	54.00	15.00
8966.00	34.92	PK	H	36.77	7.26	26.42	46.53	74.00	27.47
8966.00	20.89	AV	H	36.77	7.26	26.42	32.50	54.00	21.50

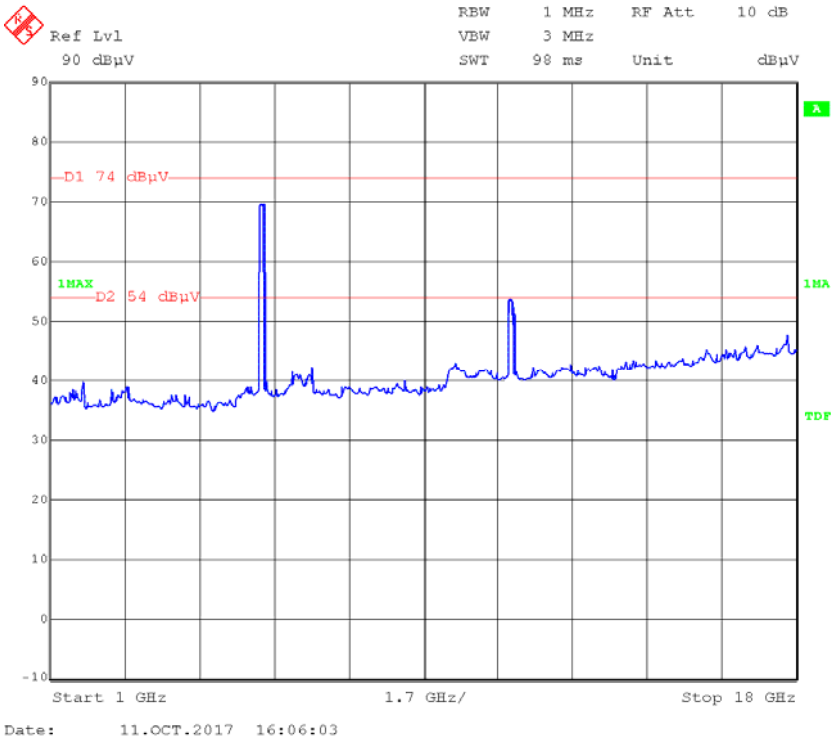
802.11n ac80 mode(2TX was the worst):

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:5755 MHz									
5775.00	72.76	PK	H	32.63	5.76	0.00	105.15	N/A	N/A
5775.00	63.84	AV	H	32.63	5.76	0.00	96.23	N/A	N/A
5775.00	64.87	PK	V	32.63	5.76	0.00	97.26	N/A	N/A
5775.00	56.02	AV	V	32.63	5.76	0.00	88.41	N/A	N/A
5725.00	28.93	PK	H	32.57	5.72	0.00	61.22	122.20	60.98
5720.00	27.83	PK	H	32.56	5.71	0.00	60.10	110.80	50.70
5700.00	27.05	PK	H	32.54	5.70	0.00	59.29	105.20	45.91
5650.00	25.92	PK	H	32.48	5.65	0.00	58.05	68.20	10.15
5850.00	27.66	PK	H	32.72	5.83	0.00	60.21	122.20	61.99
5855.00	27.24	PK	H	32.73	5.83	0.00	59.80	110.80	51.00
5875.00	26.82	PK	H	32.75	5.85	0.00	59.42	105.20	45.78
5925.00	25.74	PK	H	32.81	5.89	0.00	58.44	68.20	9.76
11550.00	36.41	PK	H	38.02	8.21	26.01	50.63	74.00	23.37
11550.00	21.60	AV	H	38.02	8.21	26.01	35.82	54.00	18.18
17325.00	31.50	PK	H	43.40	10.98	26.12	53.76	74.00	20.24
17325.00	16.24	AV	H	43.40	10.98	26.12	38.50	54.00	15.50
8966.00	34.96	PK	H	36.77	7.26	26.42	46.57	74.00	27.43
8966.00	20.90	AV	H	36.77	7.26	26.42	32.51	54.00	21.49

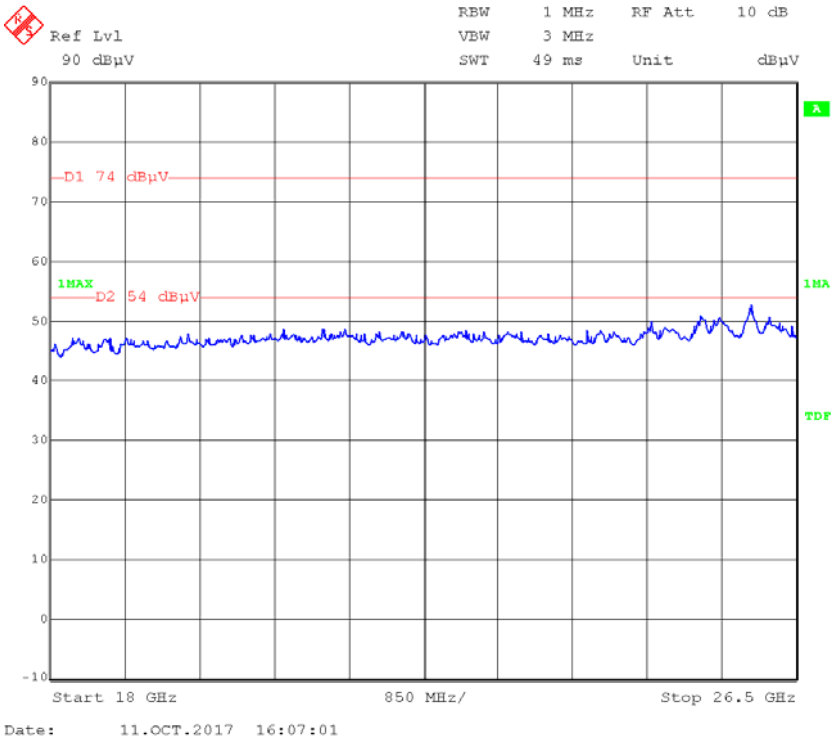
Worst mode plots(5725-5850MHz :802.11a, High channel)

Horizontal:

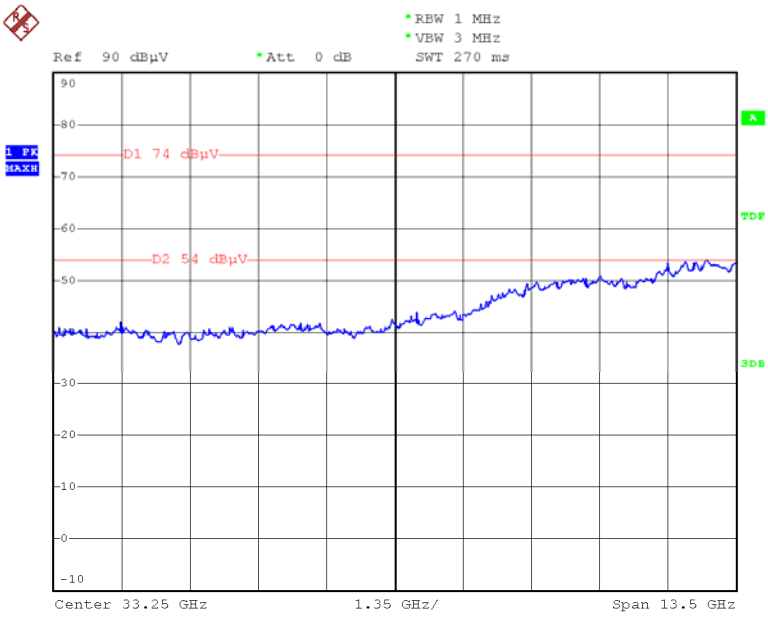
1GHz-18GHz



18GHz-26.5GHz



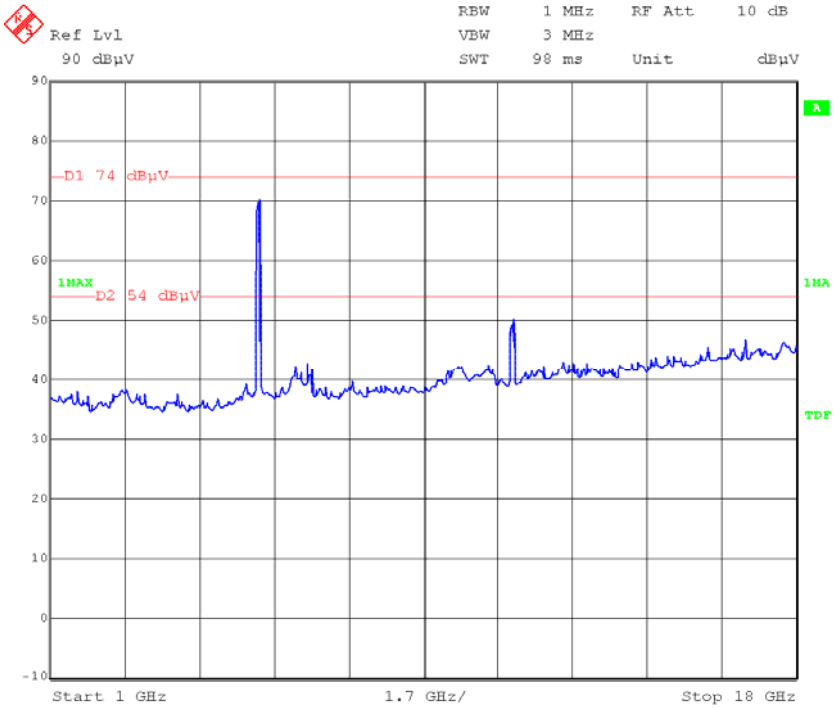
26.5GHz-40GHz



Date: 11.OCT.2017 14:19:46

Vertical:

1GHz-18GHz



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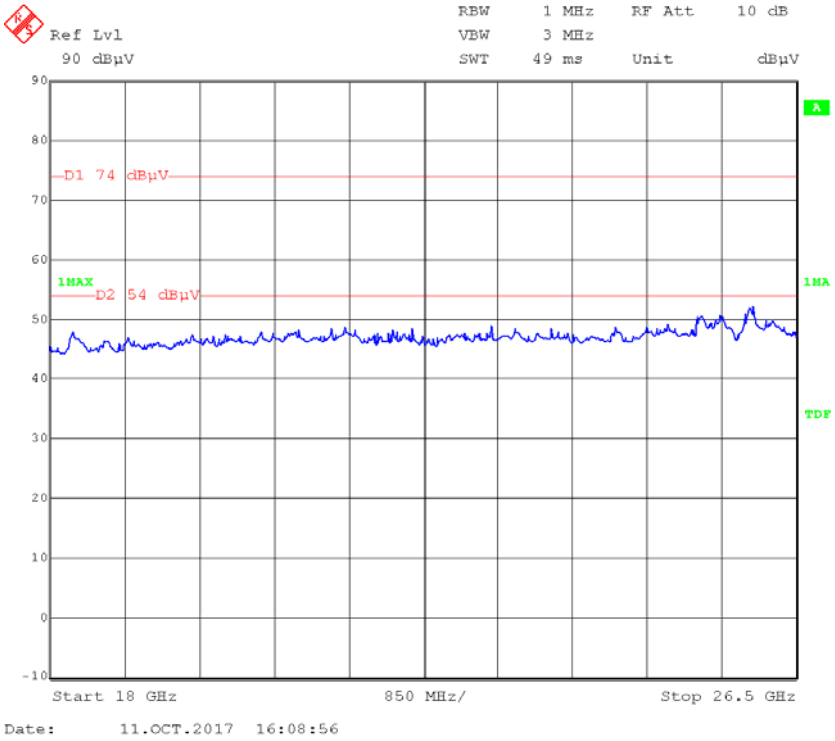
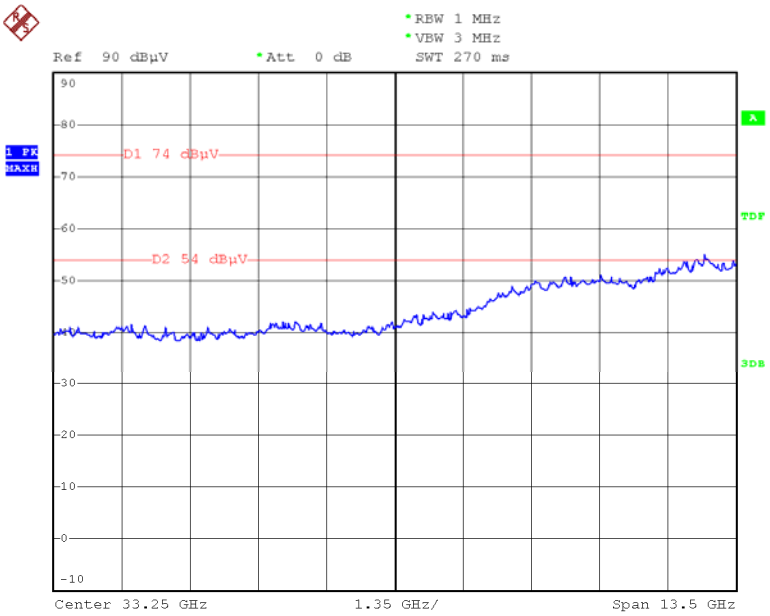
18GHz-26.5GHz



26.5GHz-40GHz



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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
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2016-09-21	2017-09-20
Unknown	RF Cable	Unknown	C-5	Each Time	/

*** Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B "Implementation of traceability policy in accredited laboratories".

Test Data

Environmental Conditions

Temperature:	23.2~26.3 °C
Relative Humidity:	60.8~64.8 %
ATM Pressure:	100.1~101.1 kPa

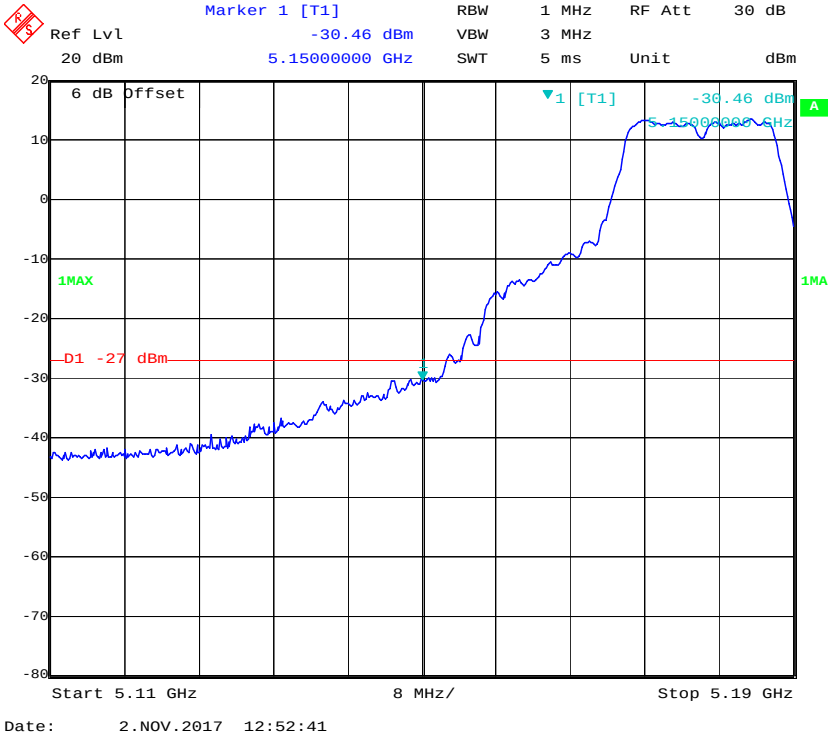
The testing was performed by Lorin Bian from 2017-06-14 to 2017-11-02

Test Result: Pass.
Please refer to the following tables and plots.

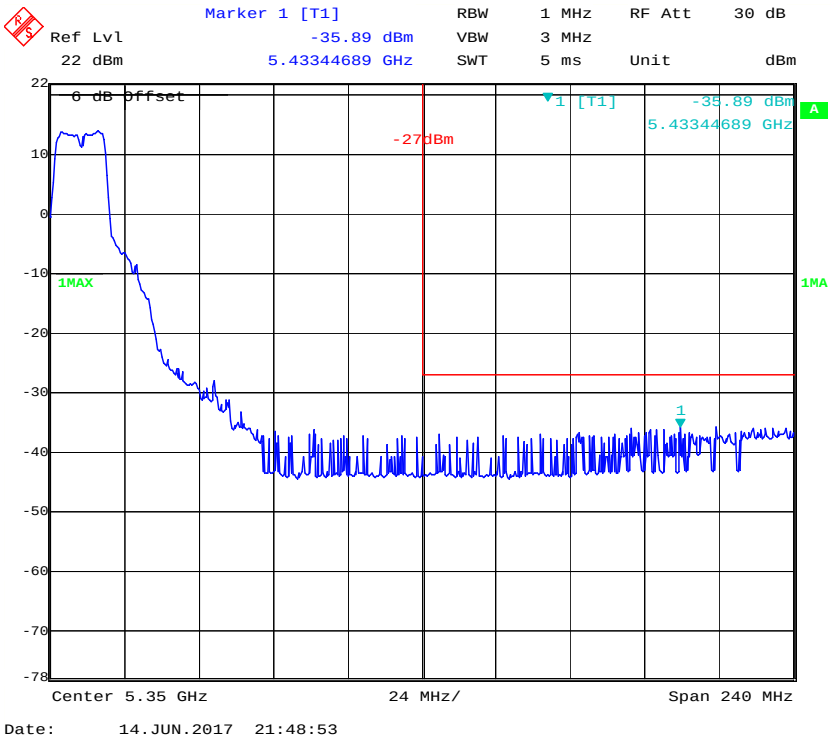
5150-5250MHz(the device has two antennas, offset with antenna gain+cable loss+3dB in the display, so 2TX mode also compliance the requirement)

Chain 0:

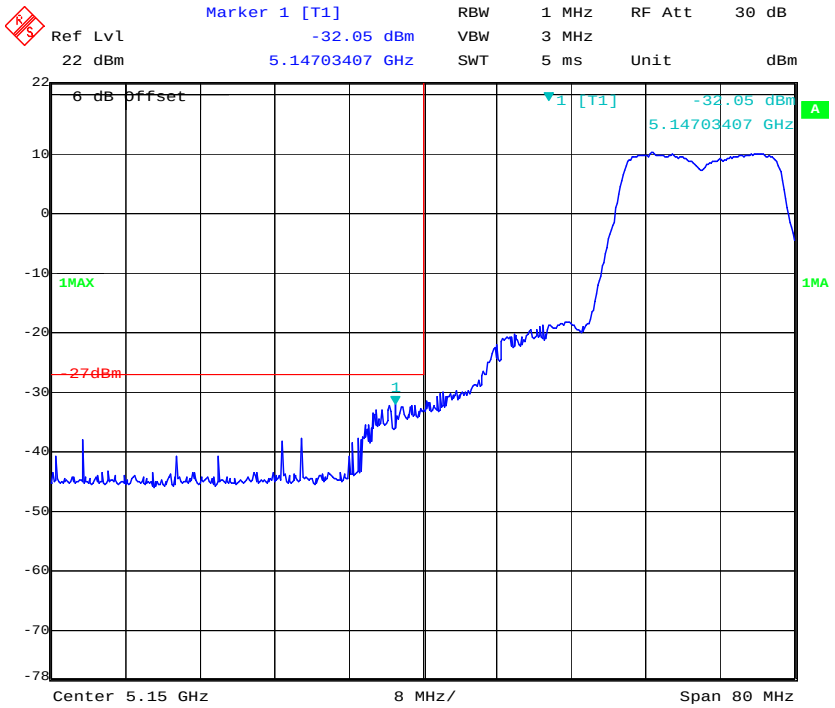
802.11a Low Channel



802.11a High Channel



802.11n ht20 Low Channel



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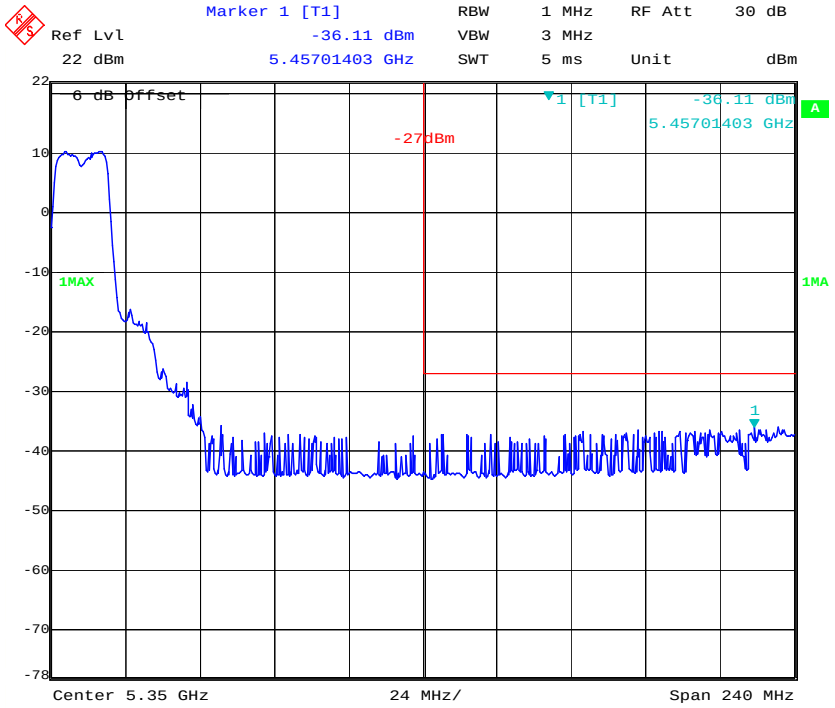
802.11n ht20 High Channel



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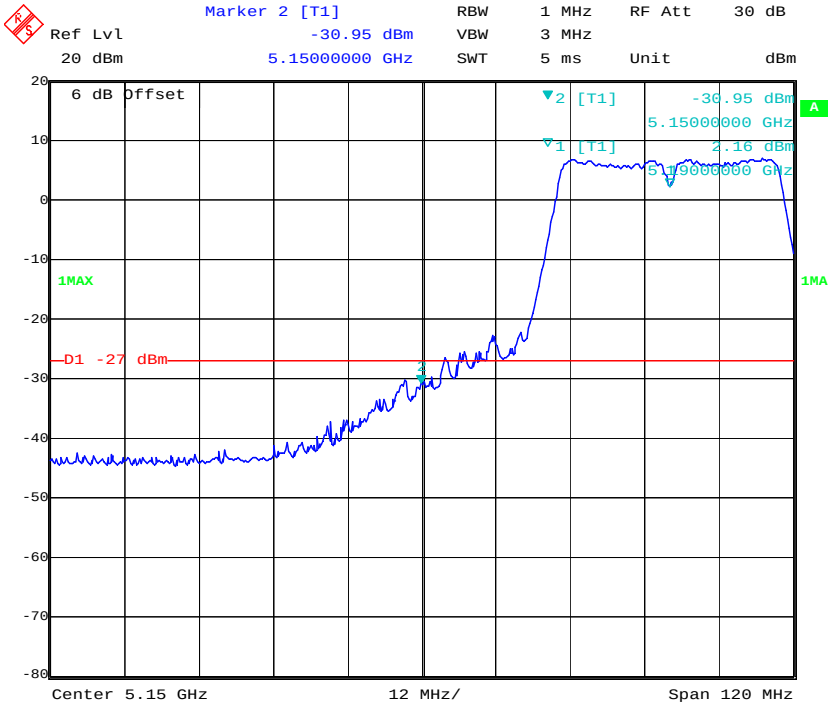
802.11n ht40 Low Channel



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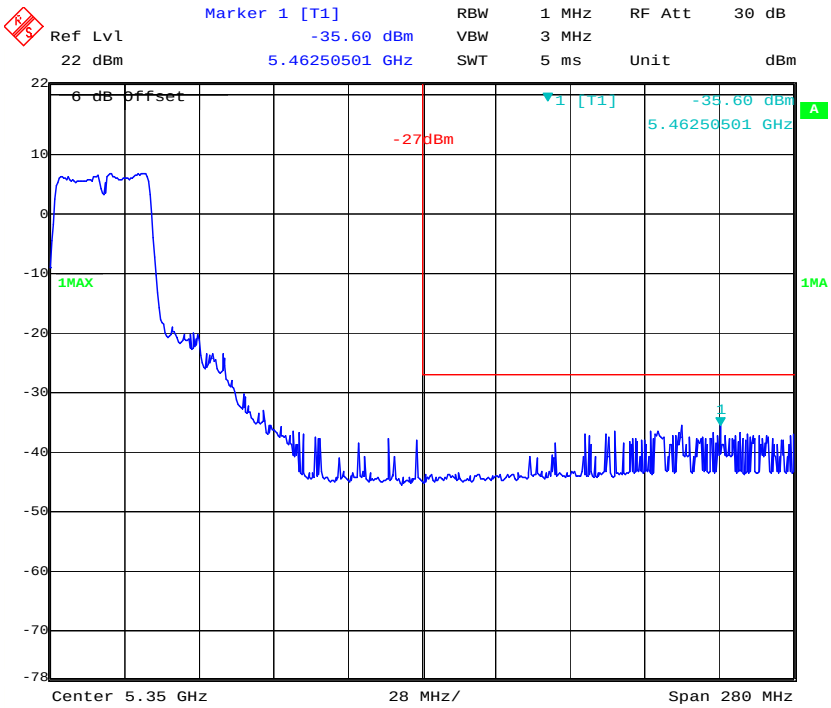
802.11n ht40 High Channel



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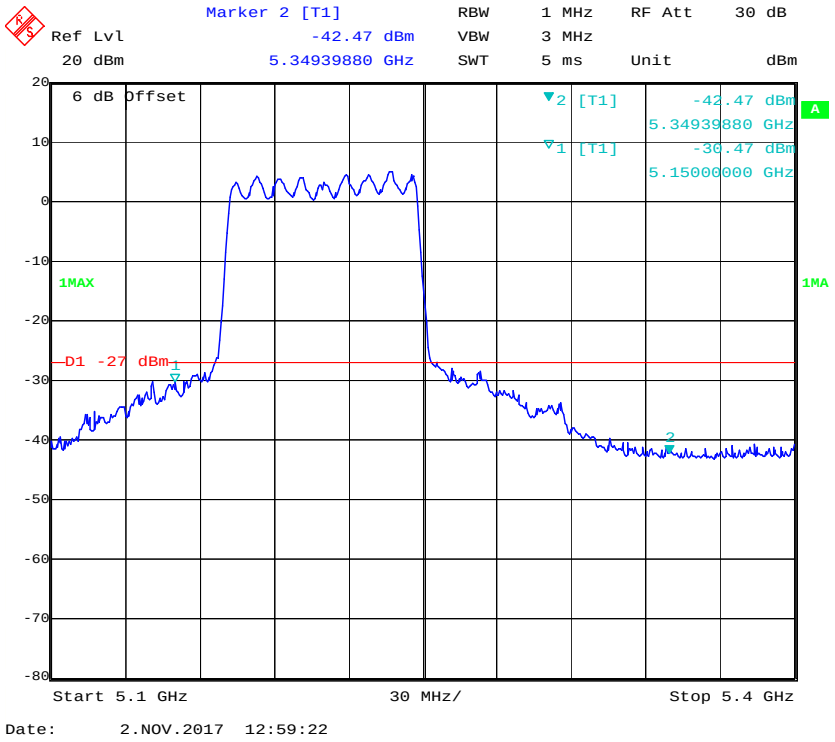
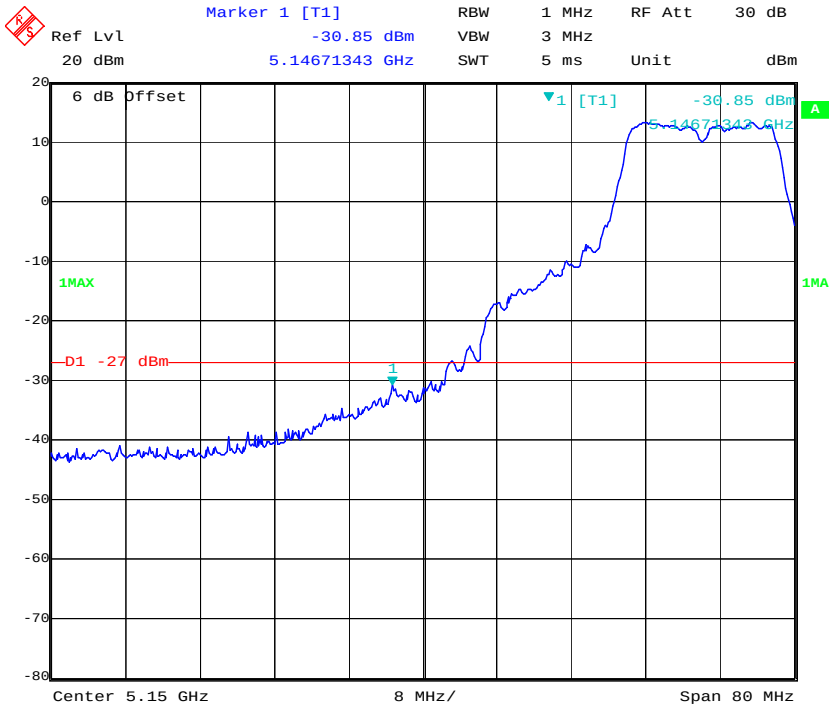
802.11n ac80 Middle Channel



Chain 1:

802.11a Low Channel



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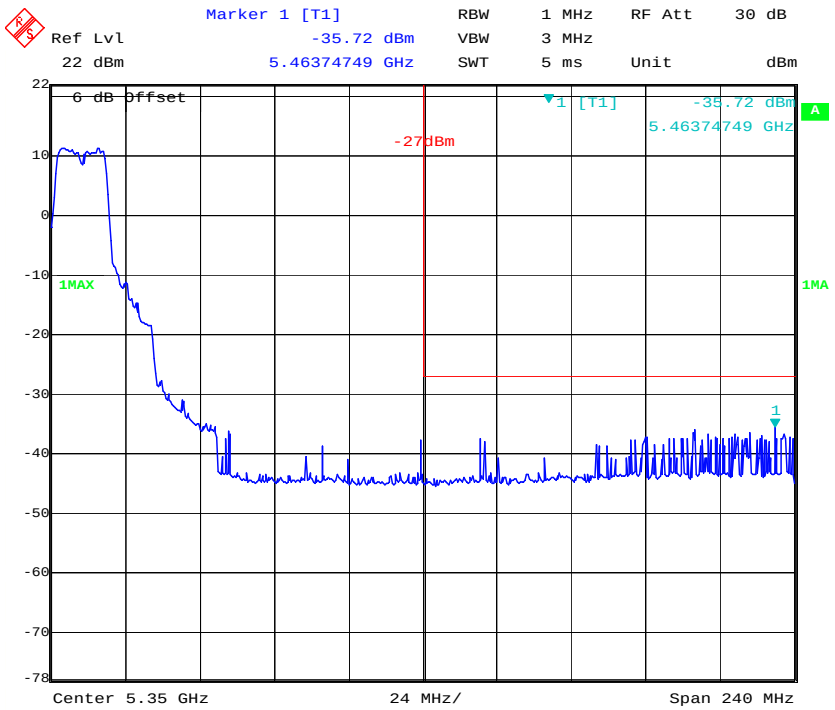
802.11a High Channel



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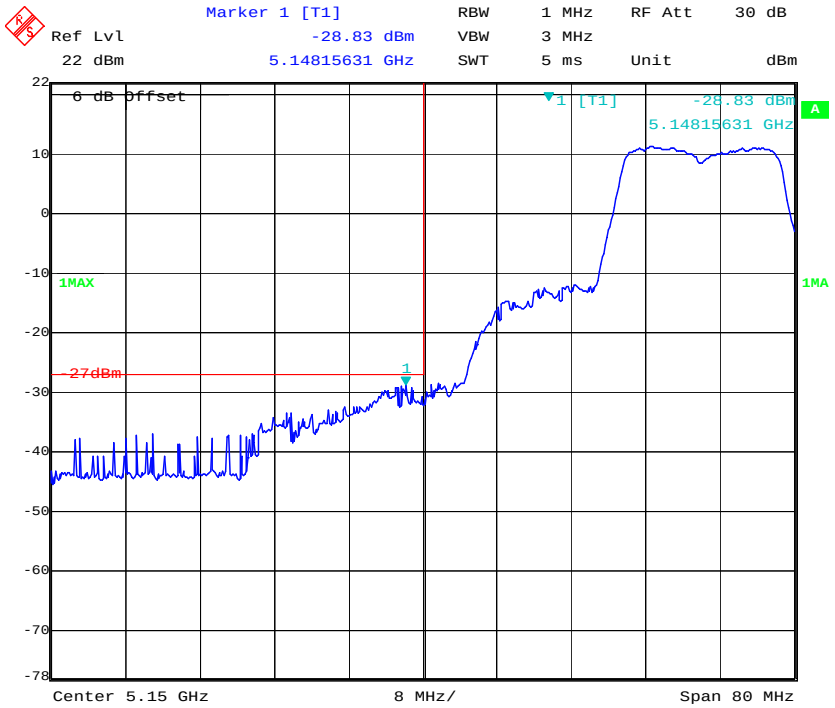
802.11n ht20 Low Channel



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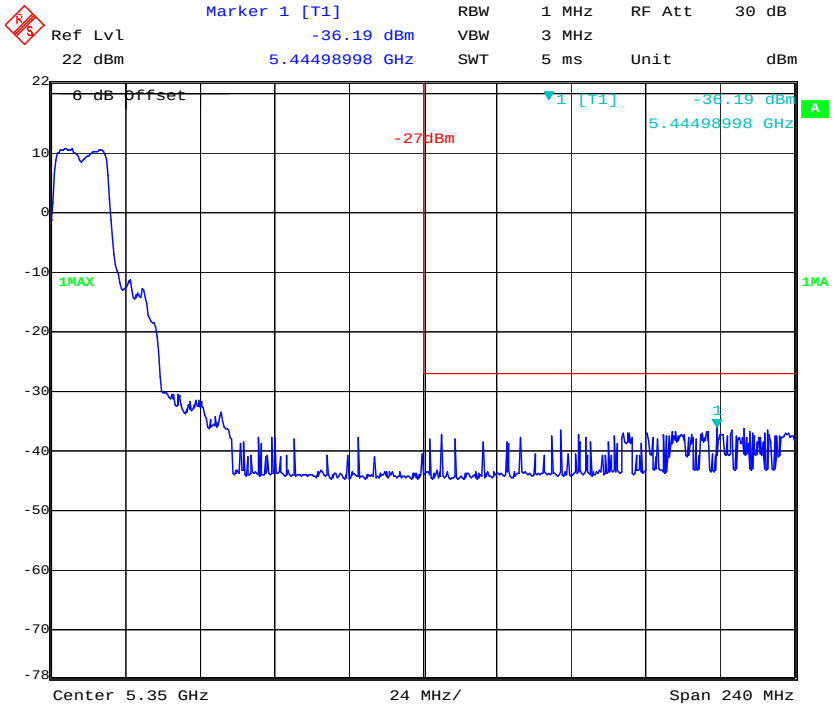
802.11n ht20 High Channel



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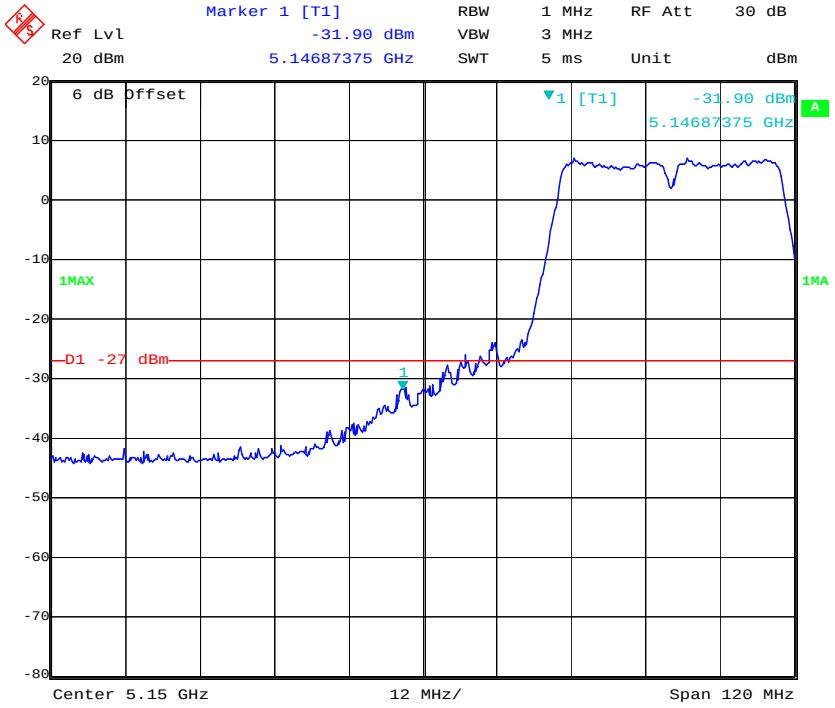
802.11n ht40 Low Channel



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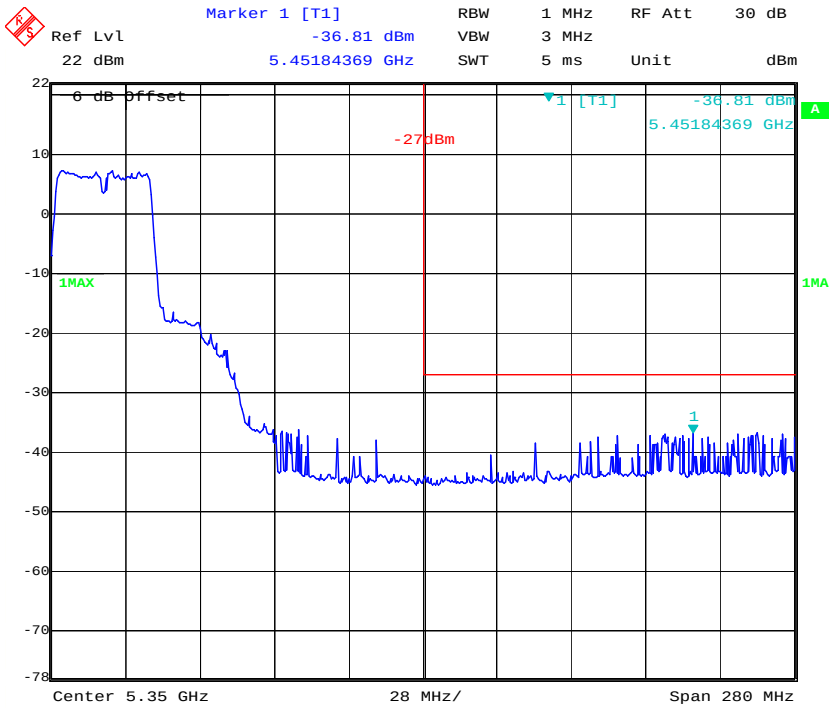
802.11n ht40 High Channel



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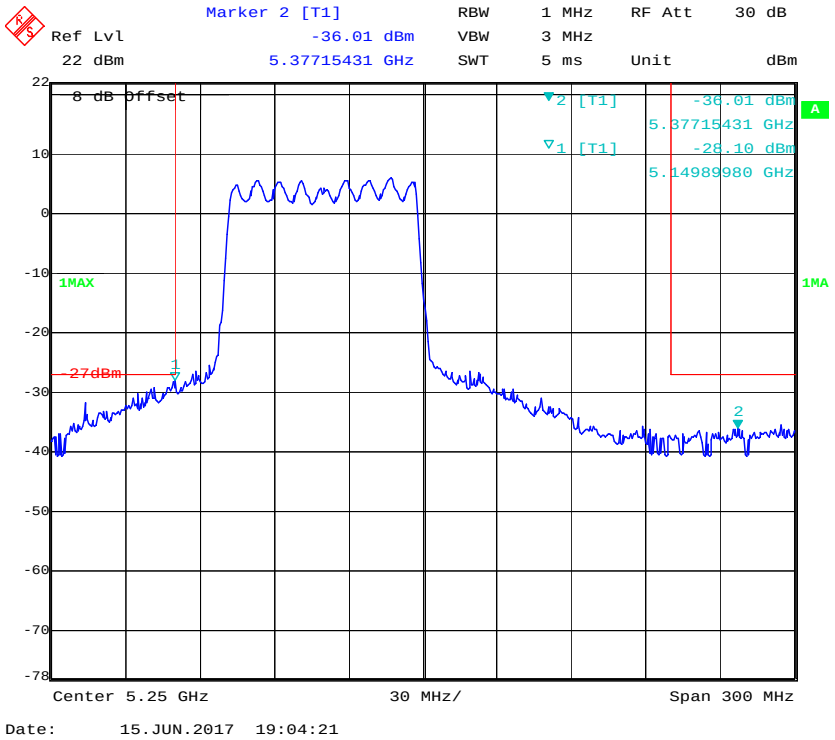
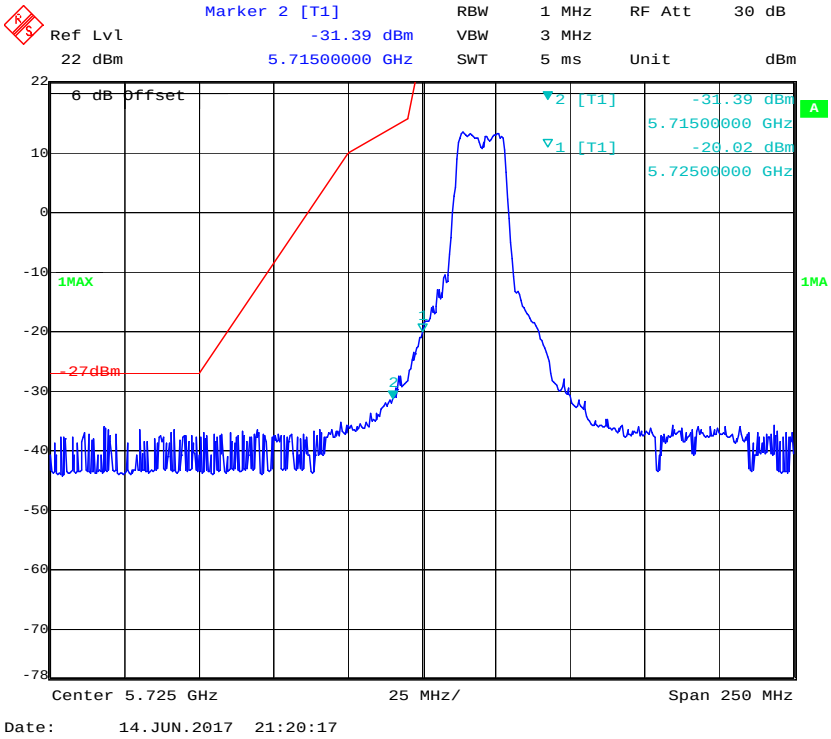
802.11n ac80 Middle Channel

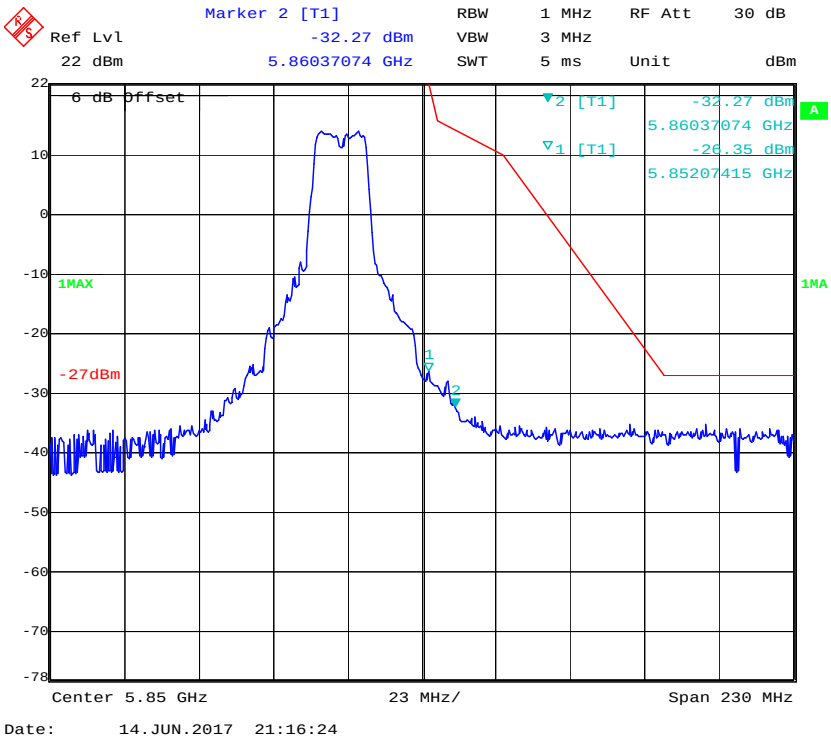


5725-5850MHz(the atenna gain was offset in the display, all emission under limit more than 3dBc, so 2TX mode also compliance the requirement)
Chain 0:

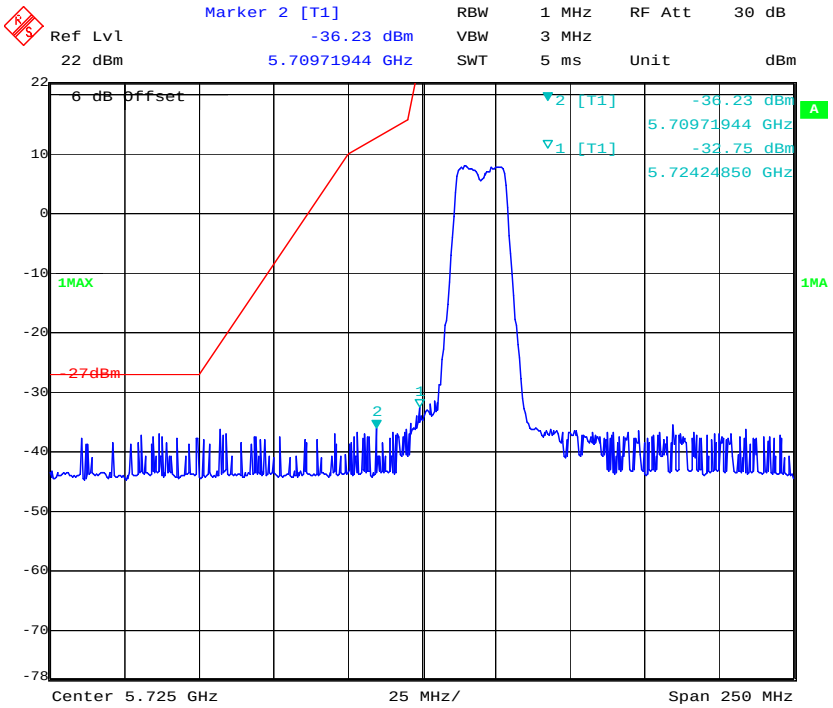
802.11a Low Channel



802.11a High Channel



802.11n ht20 Low Channel



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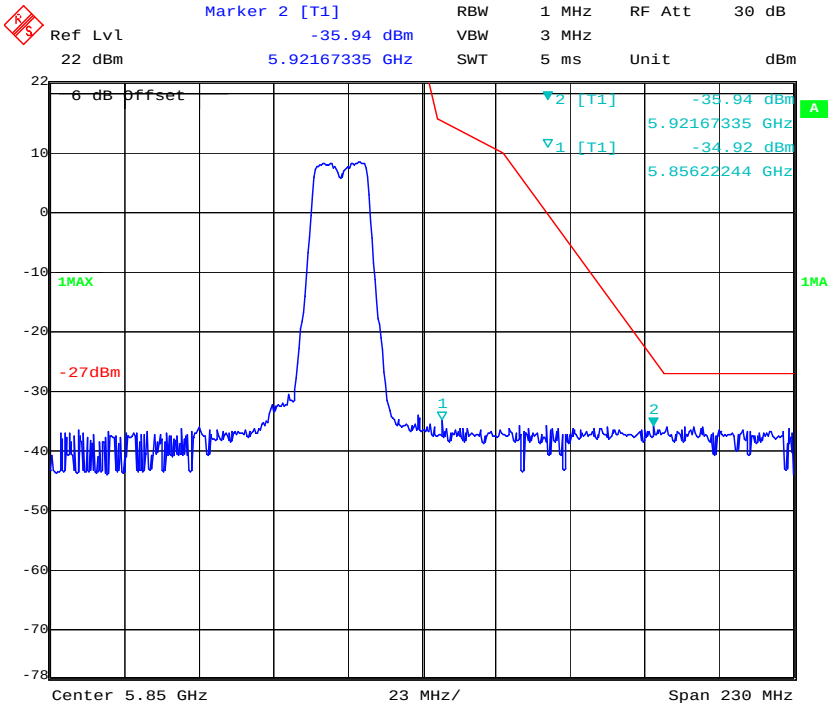
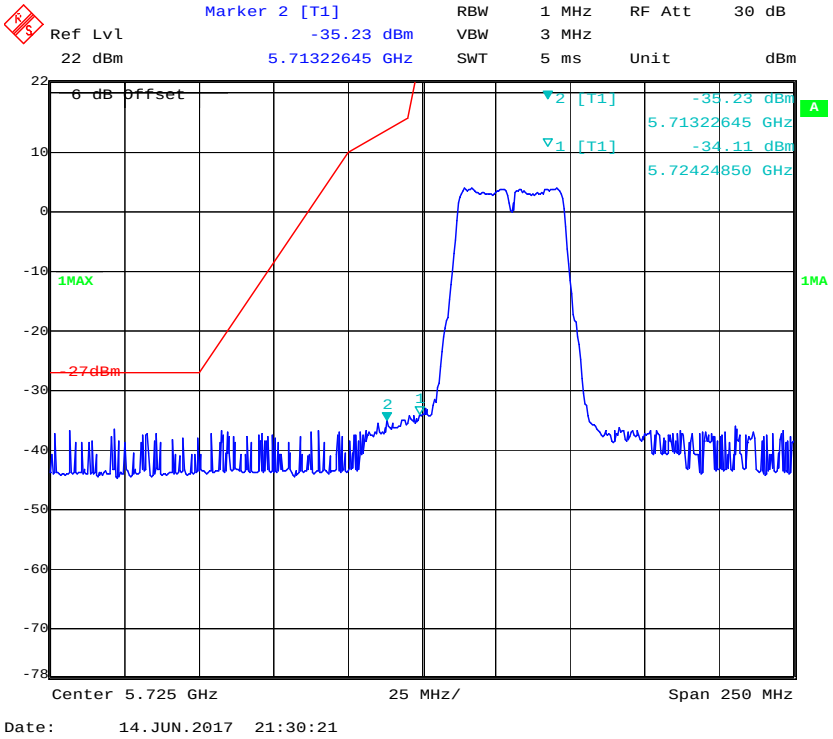
802.11n ht20 High Channel

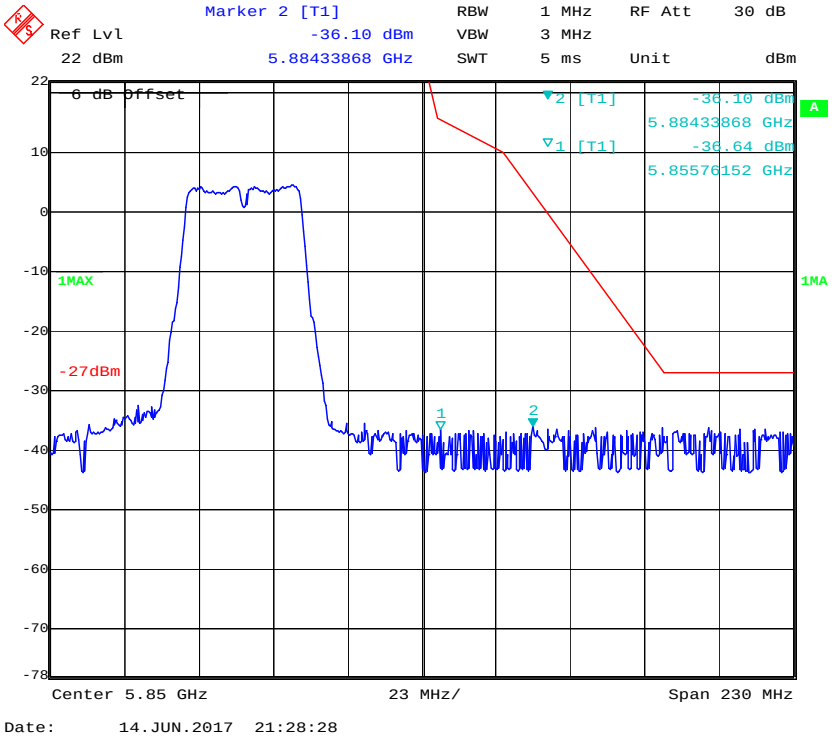


Date: 14.JUN.2017 21:26:19

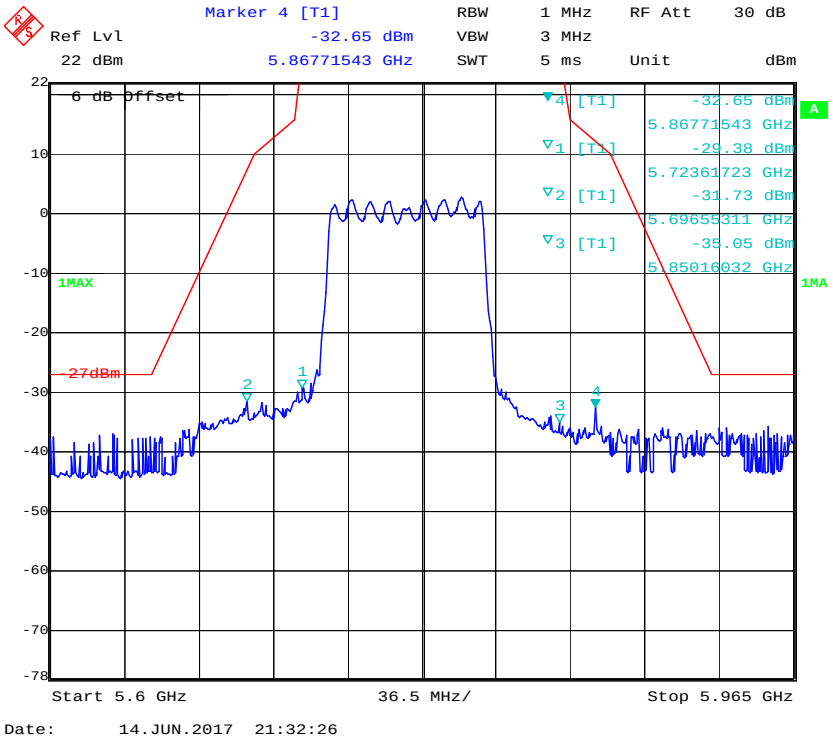
802.11n ht40 Low Channel



802.11n ht40 High Channel

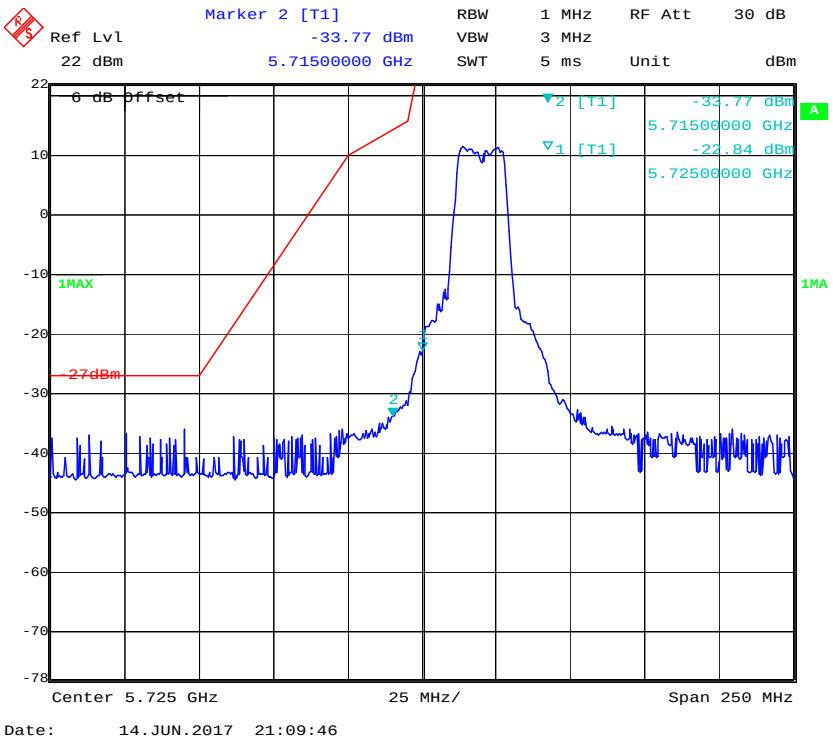


802.11n ac80 Middle Channel

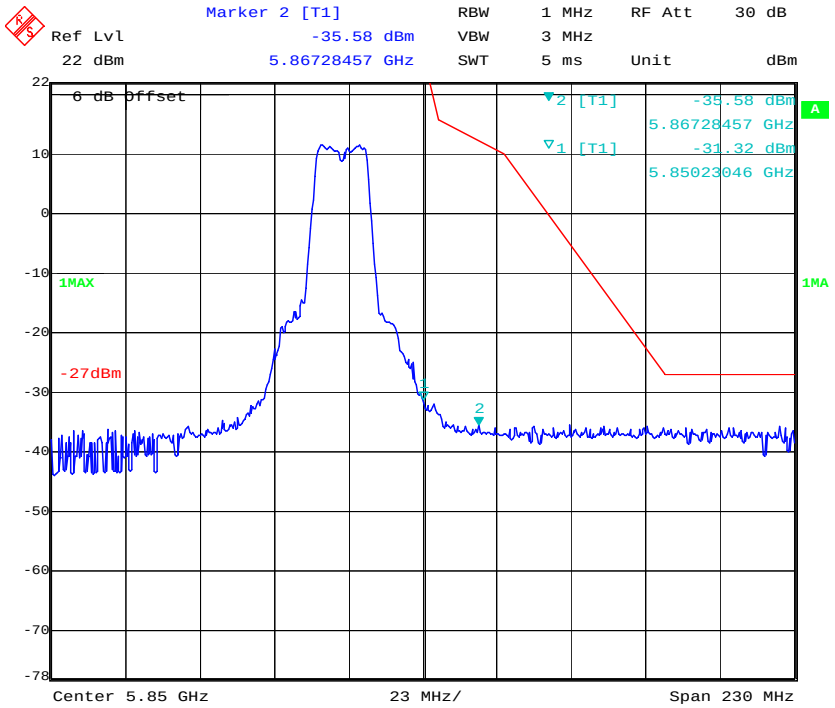


Chain 1:

802.11a Low Channel

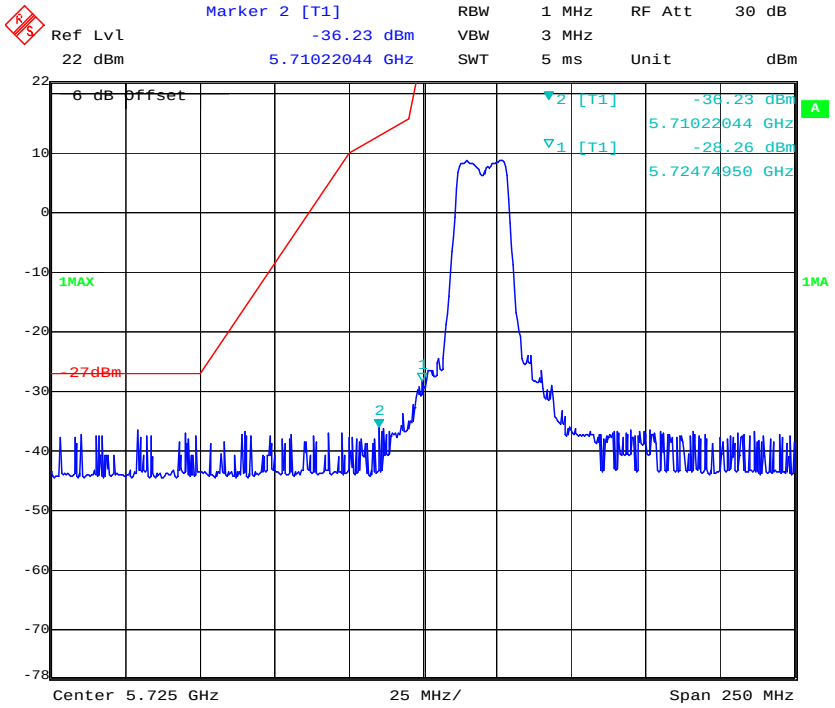


802.11a High Channel



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

802.11n ht20 Low Channel



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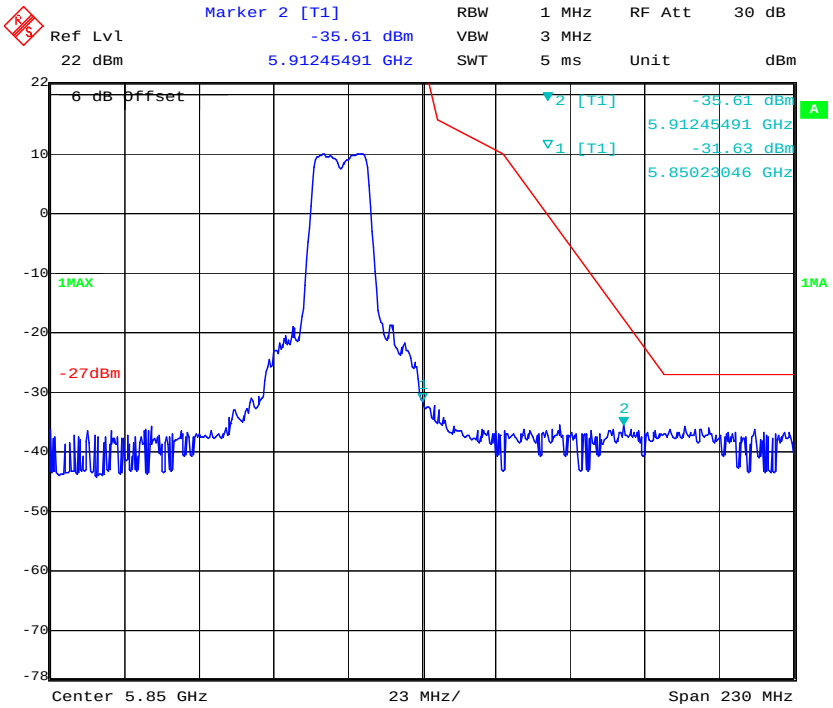
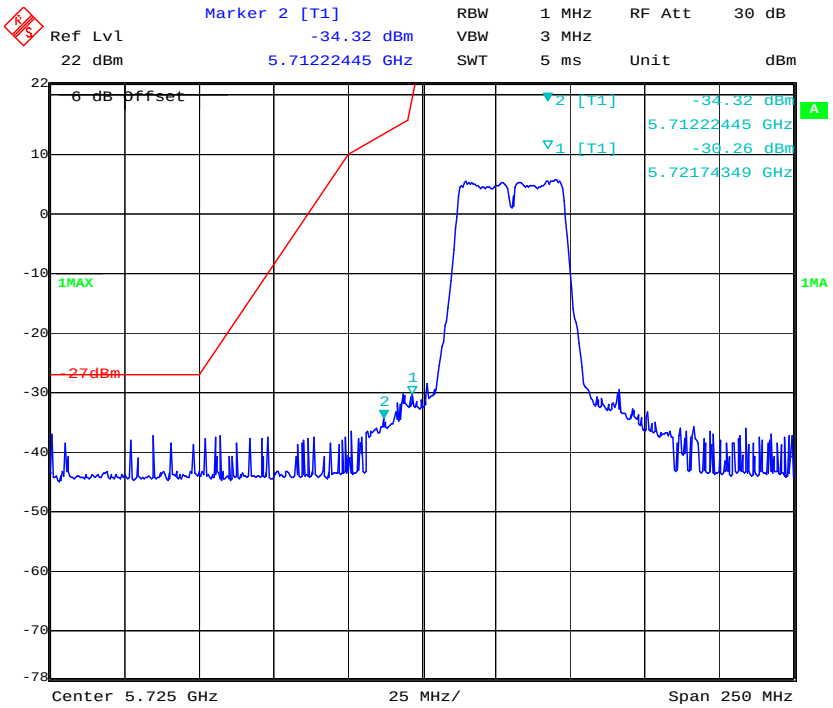
802.11n ht20 High Channel



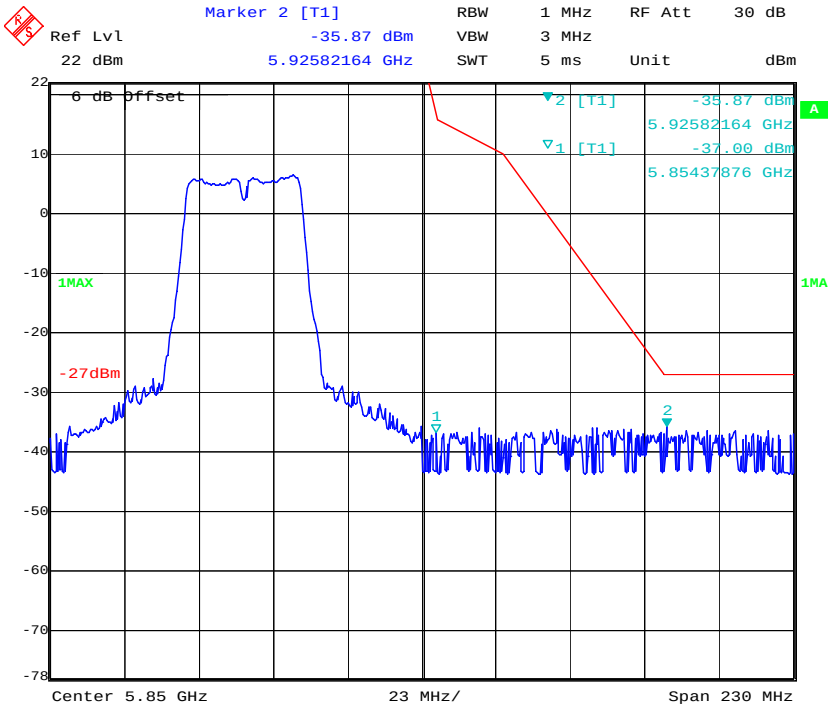
Date: 14.JUN.2017 21:03:27

802.11n ht40 Low Channel



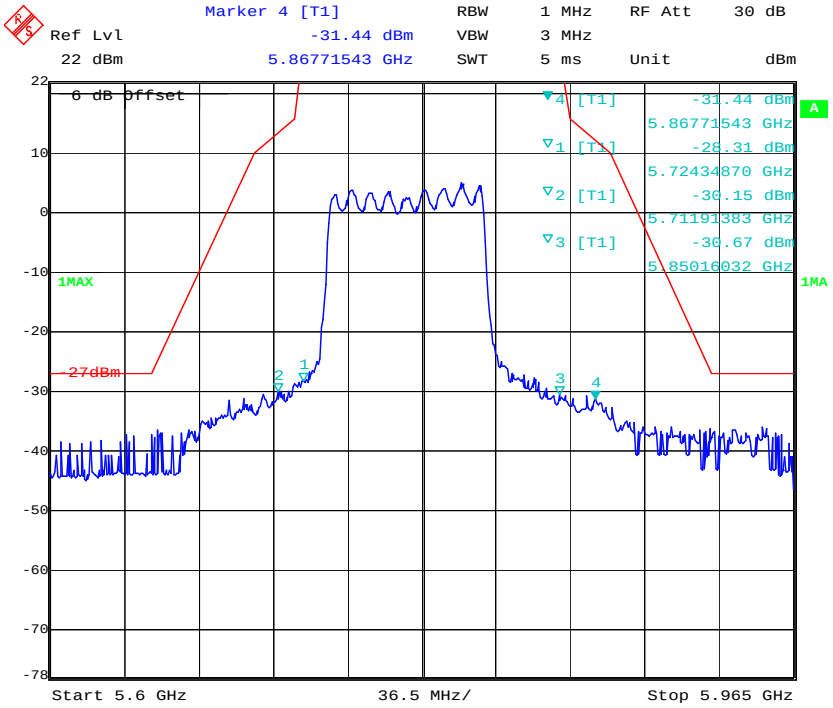
Date: 14.JUN.2017 20:58:44

802.11n ht40 High Channel



Date: 14.JUN.2017 21:00:53

802.11n ac80 Middle Channel



Date: 14.JUN.2017 20:56:05

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

Applicable Standard

15.407(a) (e)

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2016-09-21	2017-09-20
Unknown	RF Cable	Unknown	C-5	Each Time	/

*** Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B "Implementation of traceability policy in accredited laboratories".

Test Procedure

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

Test Data

Environmental Conditions

Temperature:	26.3 °C
Relative Humidity:	64.8 %
ATM Pressure:	100.1 kPa

The testing was performed by Lorin Bian on 2017-06-14.

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	33.11	20.12
	Middle	5200	32.59	18.28
	High	5240	33.11	19
802.11n ht20	Low	5180	22.61	17.8
	Middle	5200	22.69	17.8
	High	5240	26.77	17.96
802.11n ht40	Low	5190	50.34	37.35
	High	5230	52.59	37.19
802.11ac80	Middle	5210	86.57	76.31

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

5725-5850MHz:

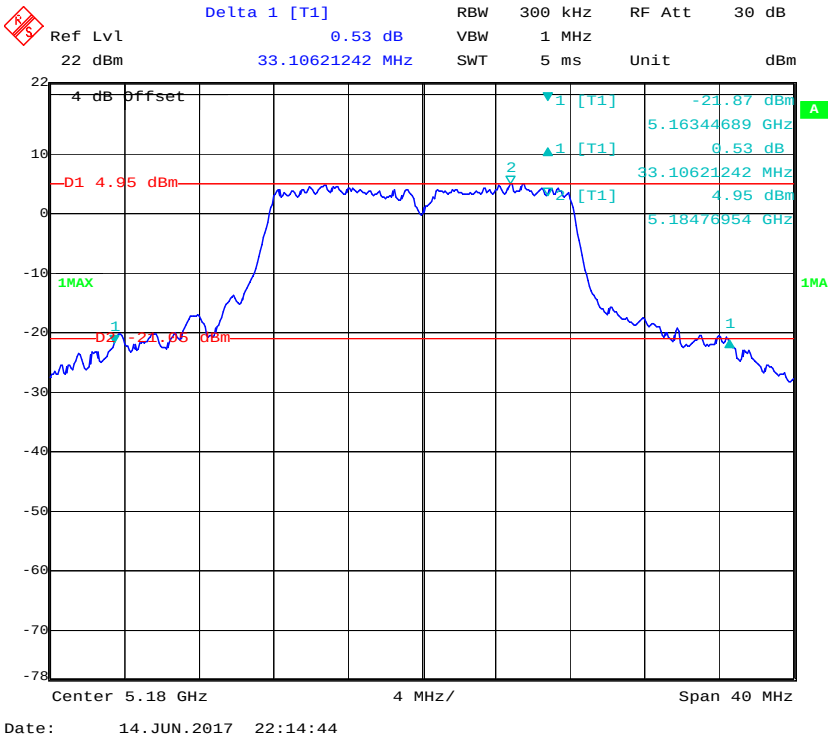
Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
802.11 a	Low	5745	16.99
	Middle	5785	16.99
	High	5825	16.99
802.11n ht20	Low	5745	17.88
	Middle	5785	17.88
	High	5825	17.88
802.11n ht40	Low	5755	37.03
	High	5795	36.87
802.11ac80	Middle	5775	76.31

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

Mode	Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limits (MHz)	Result
802.11 a	Low	5745	16.59	⩾0.5	PASS
	Middle	5785	16.59	⩾0.5	PASS
	High	5825	17.07	⩾0.5	PASS
802.11n ht20	Low	5745	17.8	⩾0.5	PASS
	Middle	5785	17.72	⩾0.5	PASS
	High	5825	17.72	⩾0.5	PASS
802.11n ht40	Low	5755	36.55	⩾0.5	PASS
	High	5795	36.55	⩾0.5	PASS
802.11ac80	Middle	5775	76.63	⩾0.5	PASS

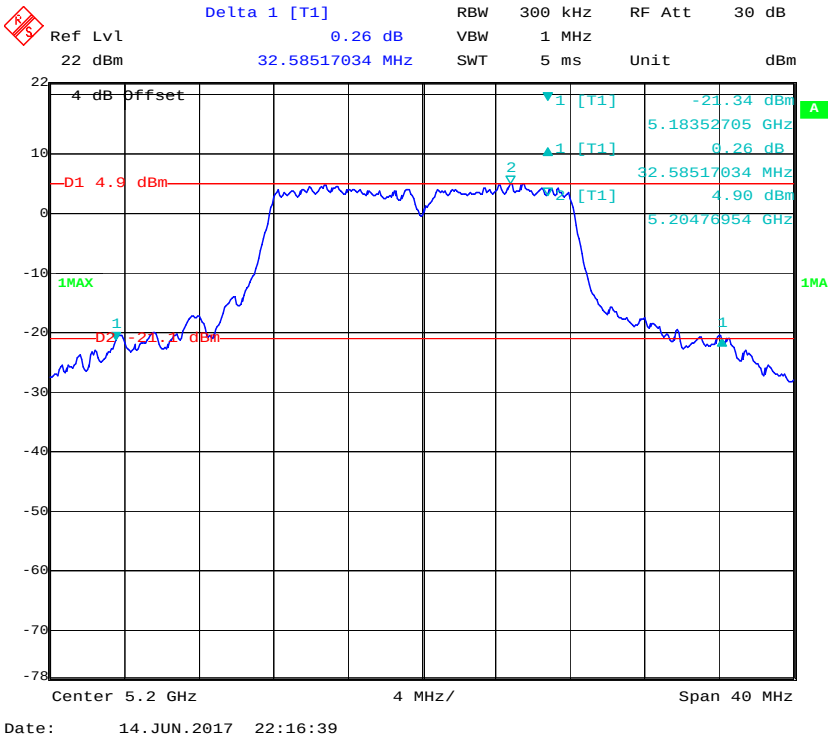
5150-5250MHz: 26dB Emission Bandwidth:

802.11a Low Channel



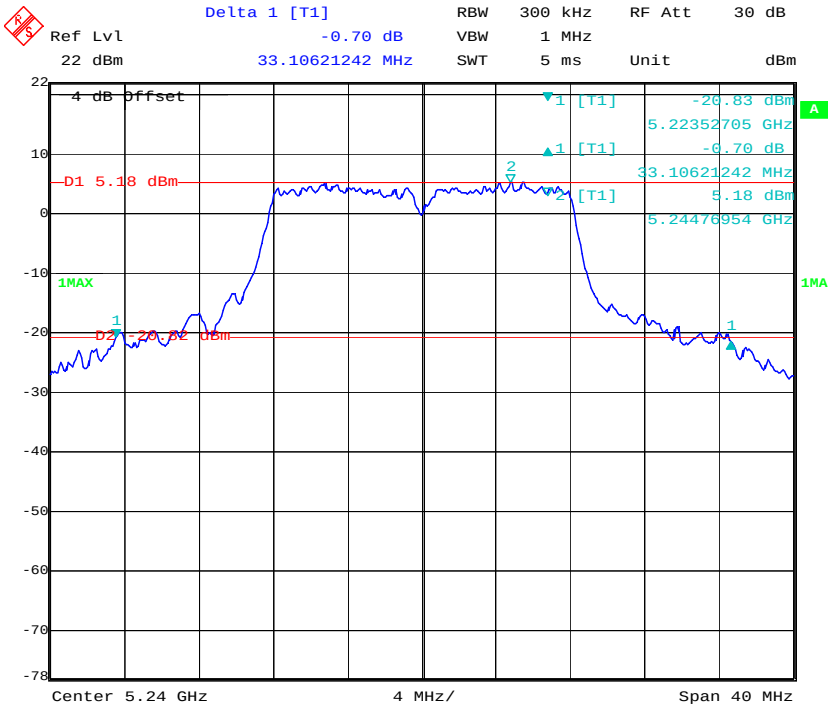
Date: 14.JUN.2017 22:14:44

802.11a Middle Channel



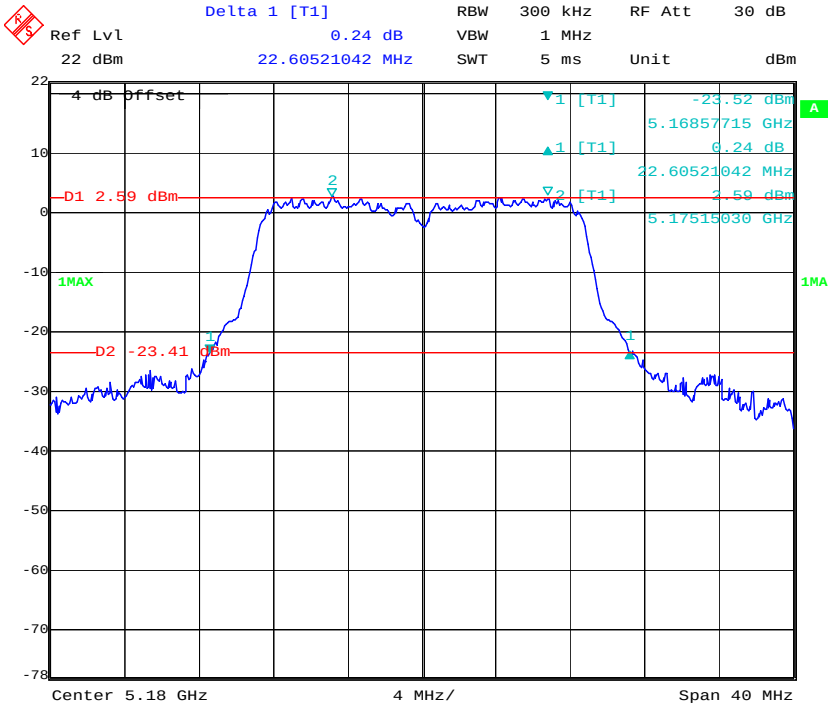
Date: 14.JUN.2017 22:16:39

802.11a High Channel



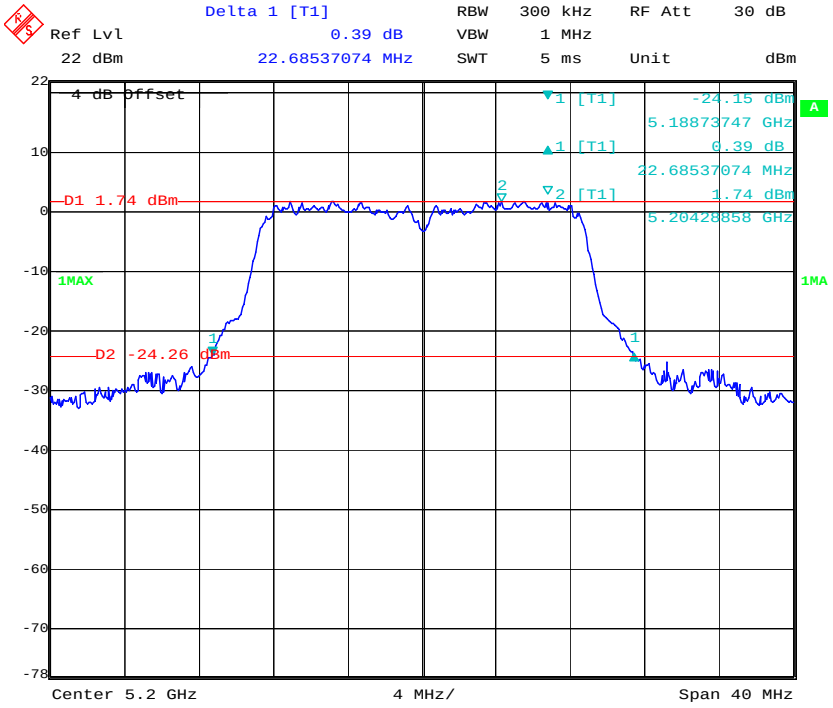
Date: 14.JUN.2017 22:17:58

802.11n ht20 Low Channel



Date: 14.JUN.2017 21:42:40

802.11n ht20 Middle Channel



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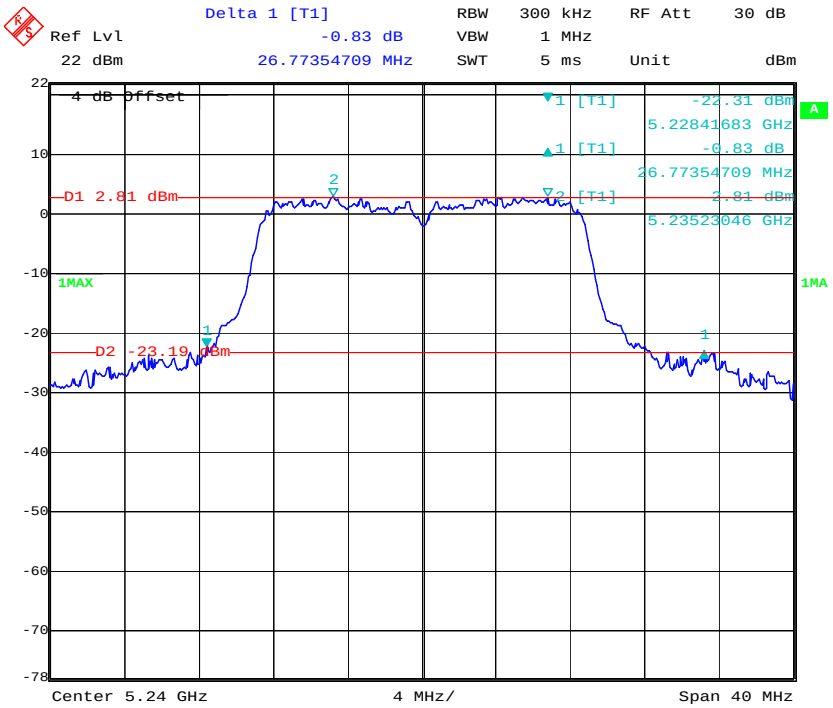
802.11n ht20 High Channel



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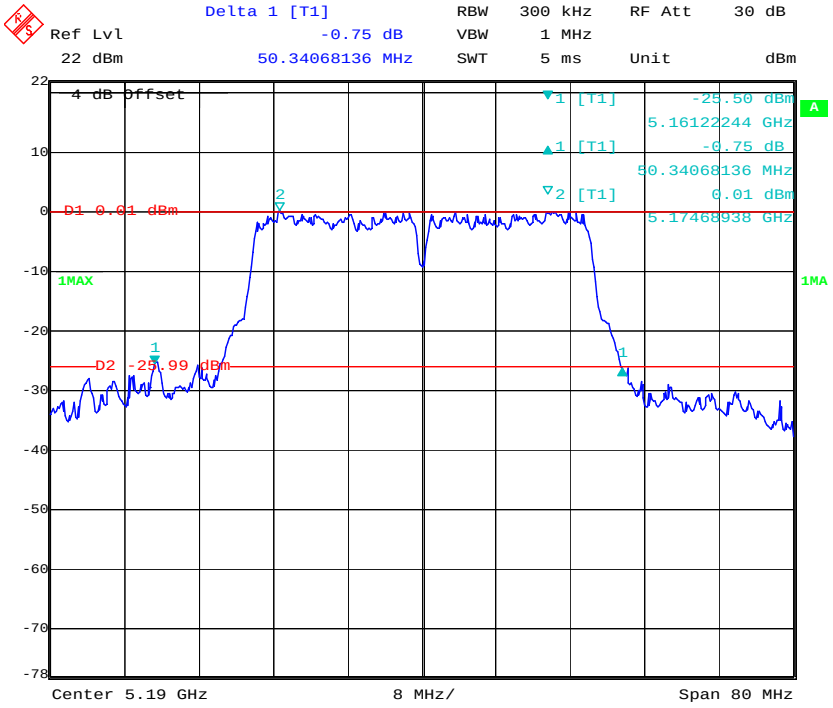
802.11n ht40 Low Channel



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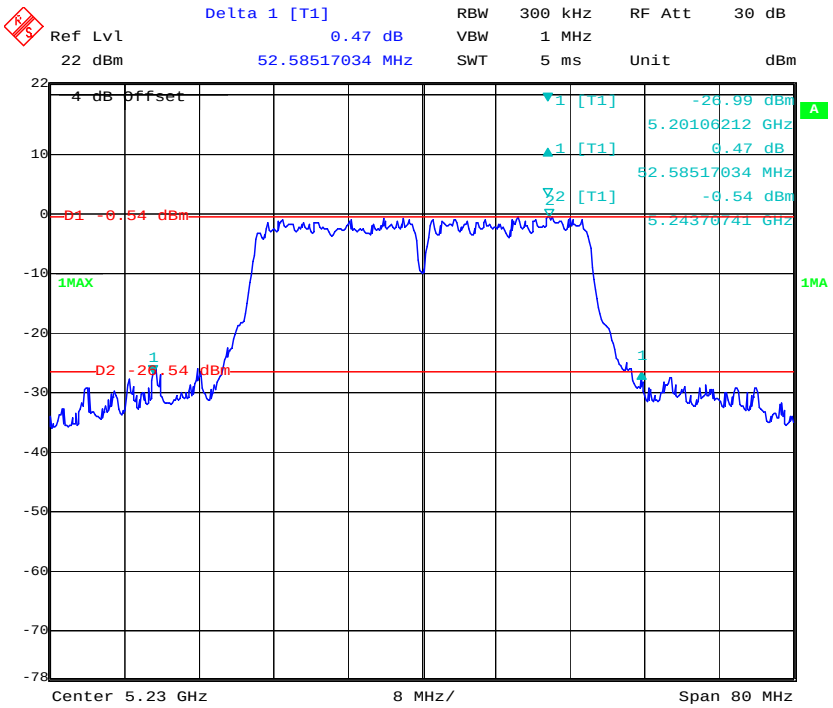
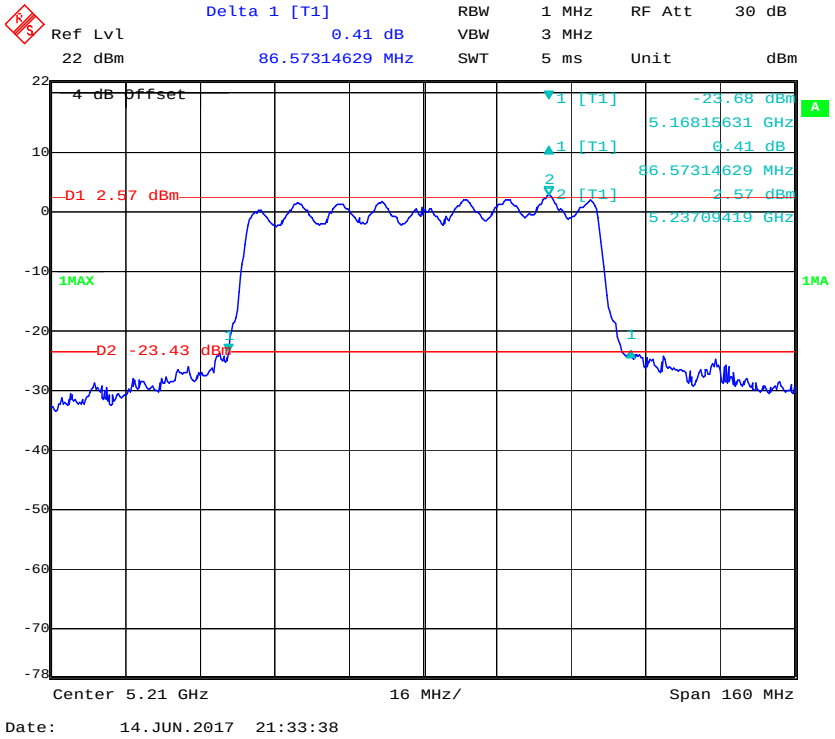


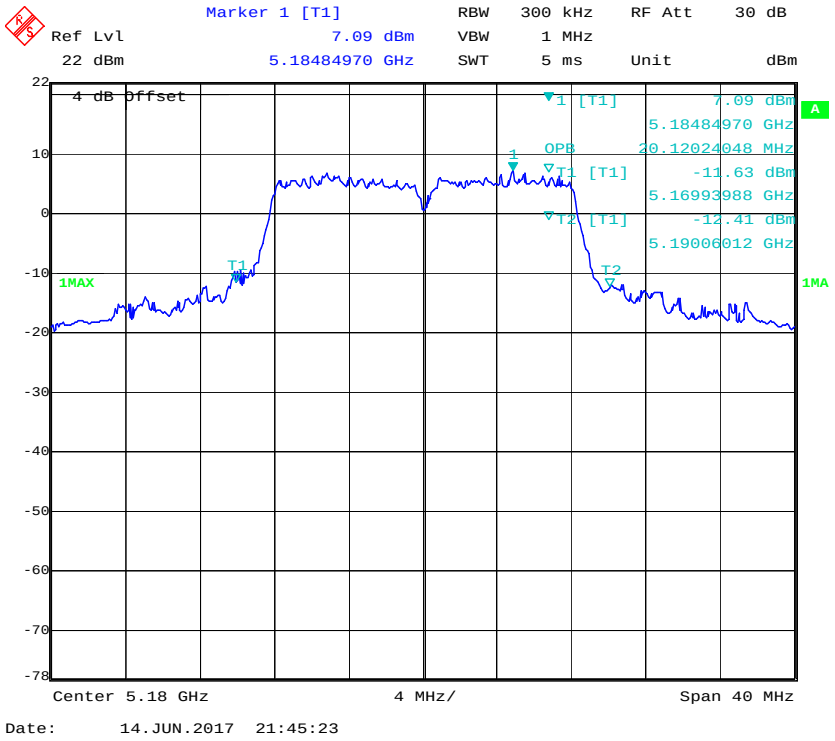
Date: 14.JUN.2017 21:37:41

802.11ac80 Middle Channel

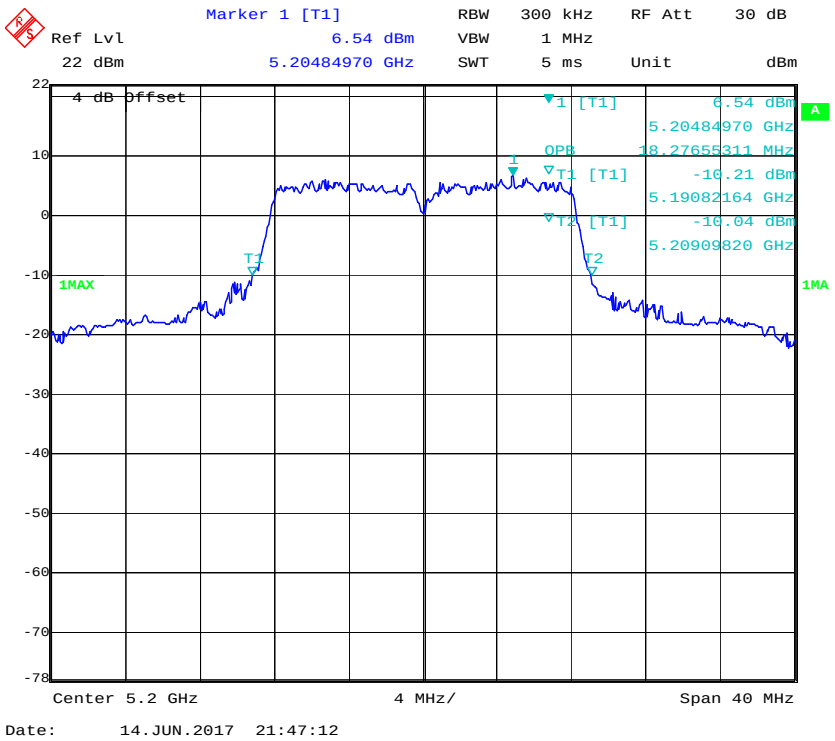


99% Occupied Bandwidth

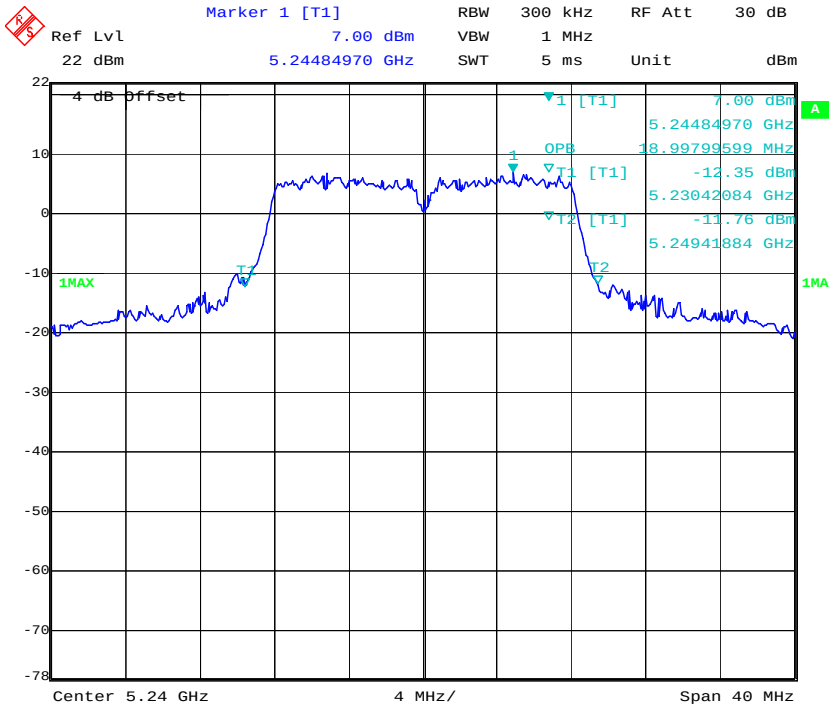
802.11a Low Channel



802.11a Middle Channel



802.11a High Channel



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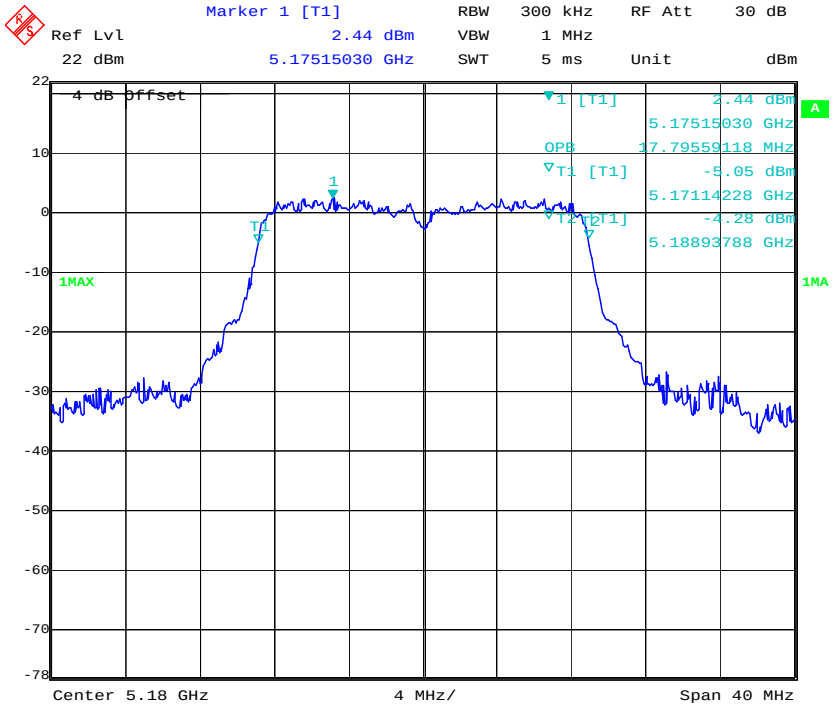
802.11n ht20 Low Channel



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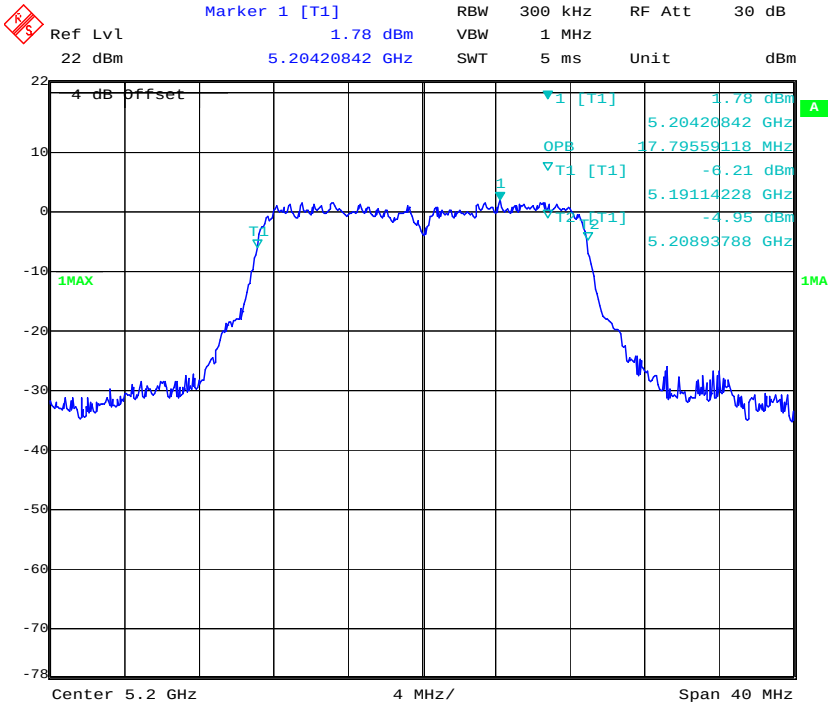
802.11n ht20 Middle Channel



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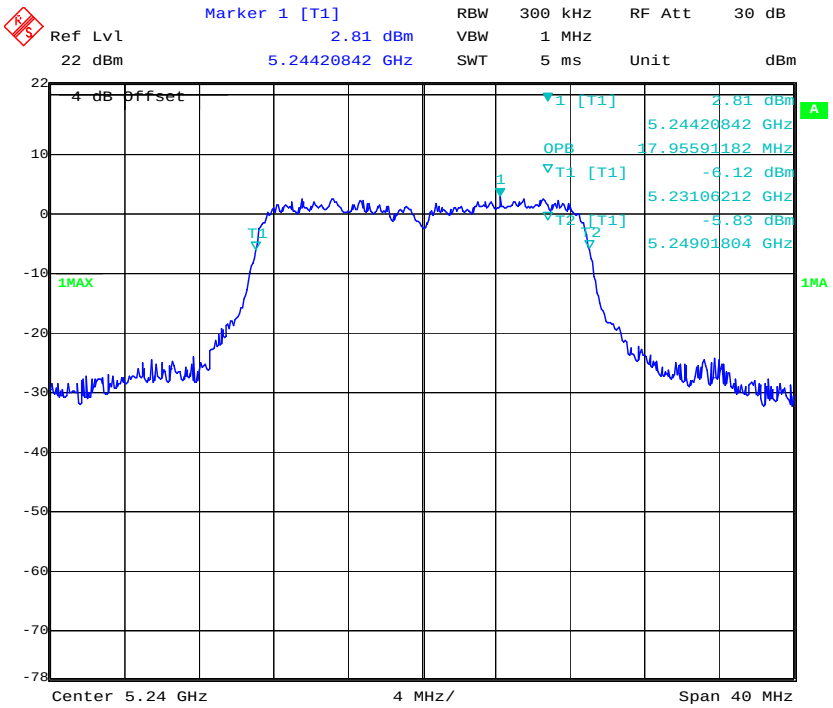
802.11n ht20 High Channel



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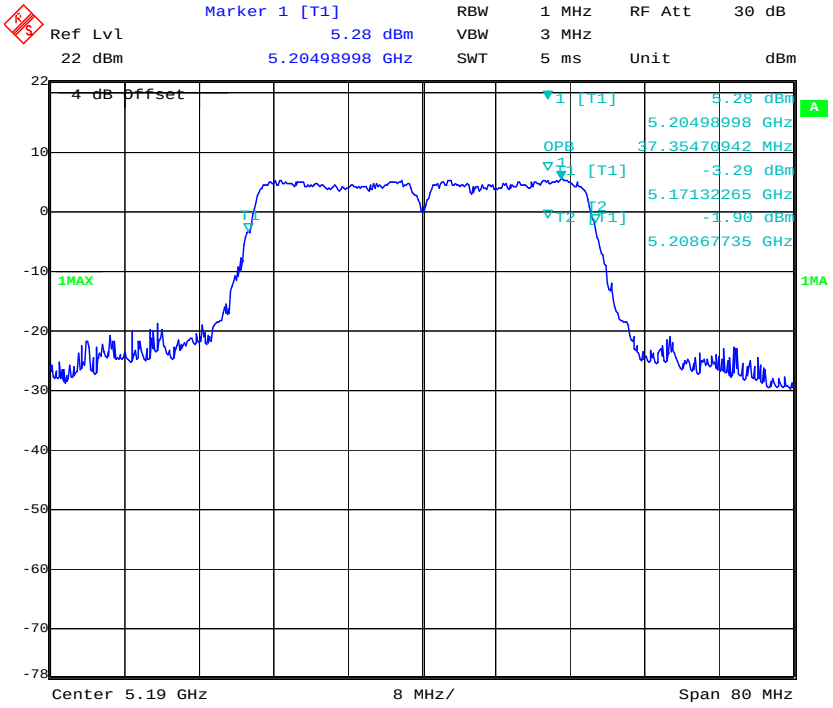
802.11n ht40 Low Channel



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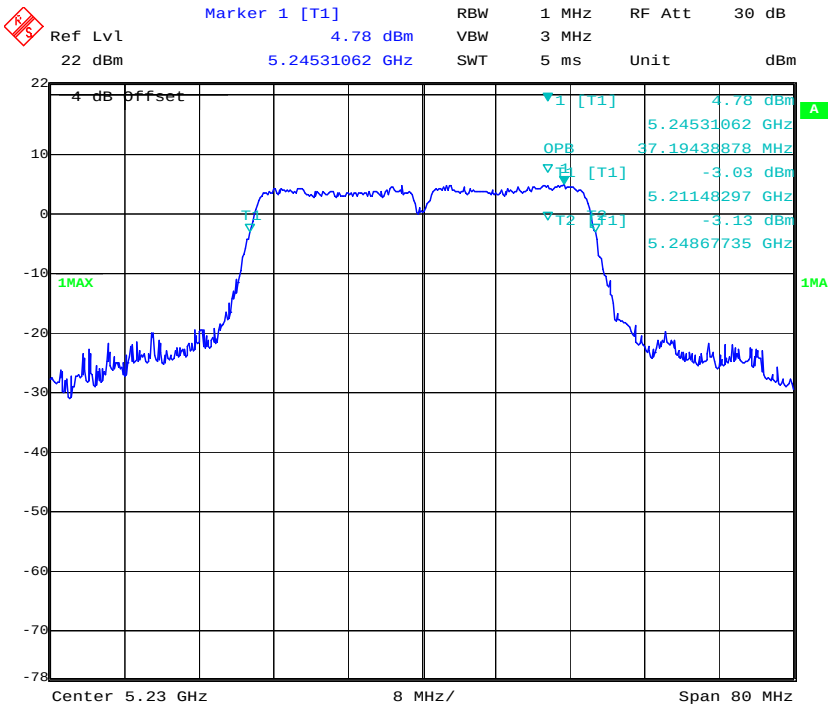
802.11n ht40 High Channel



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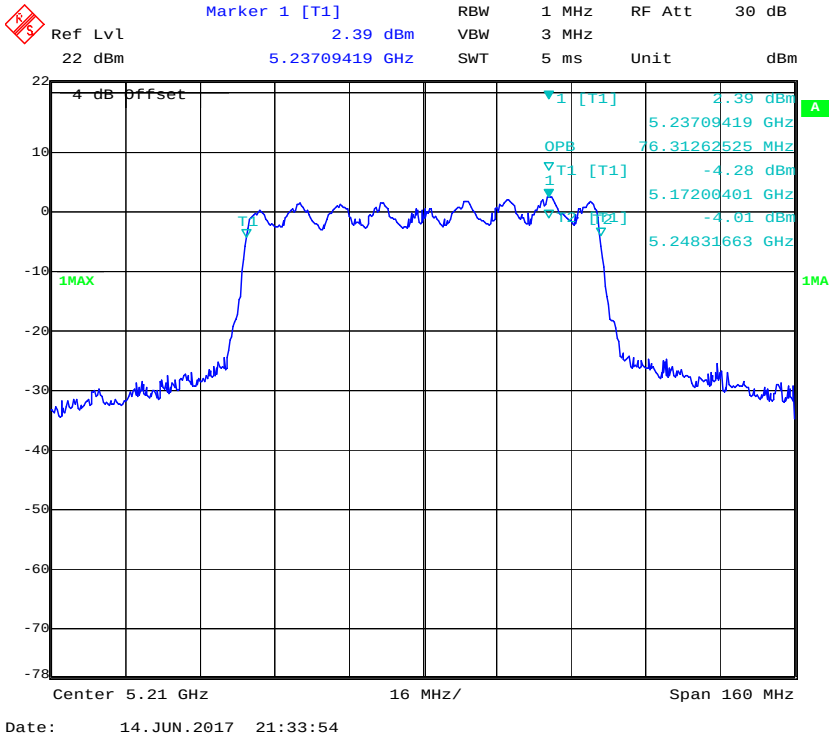
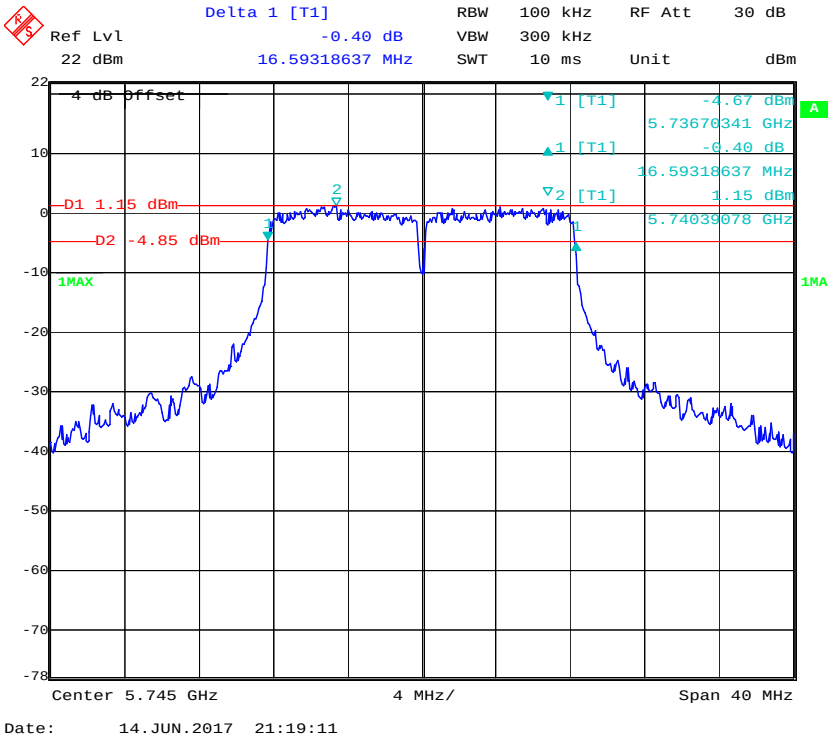
802.11ac80 Middle Channel



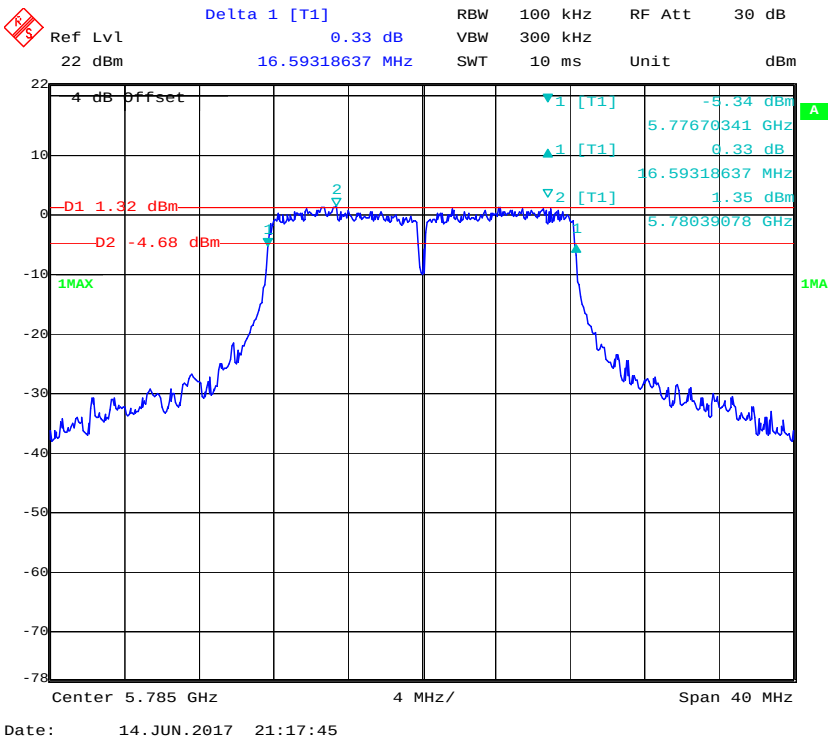
5725-5850MHz:
6dB Bandwidth:

802.11a Low Channel



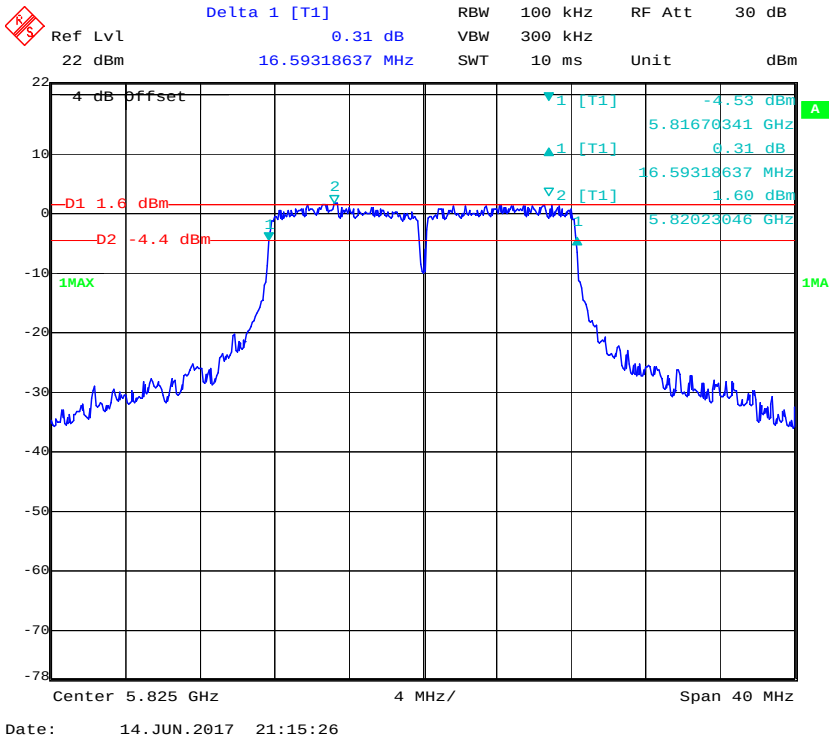
Date: 14.JUN.2017 21:19:11

802.11a Middle Channel



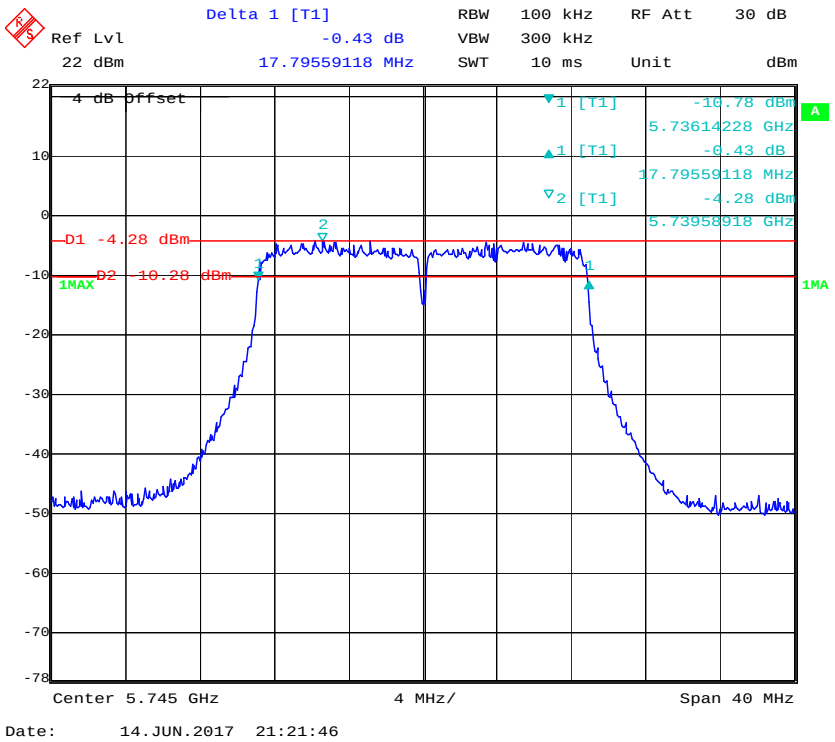
Date: 14.JUN.2017 21:17:45

802.11a High Channel



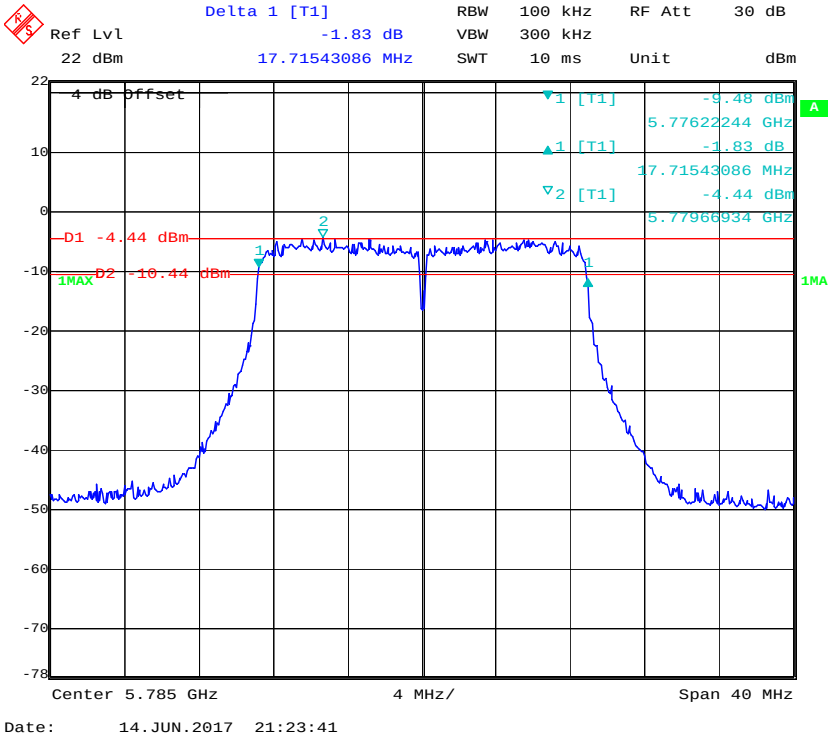
Date: 14.JUN.2017 21:15:26

802.11n ht20 Low Channel



Date: 14.JUN.2017 21:21:46

802.11n ht20 Middle Channel



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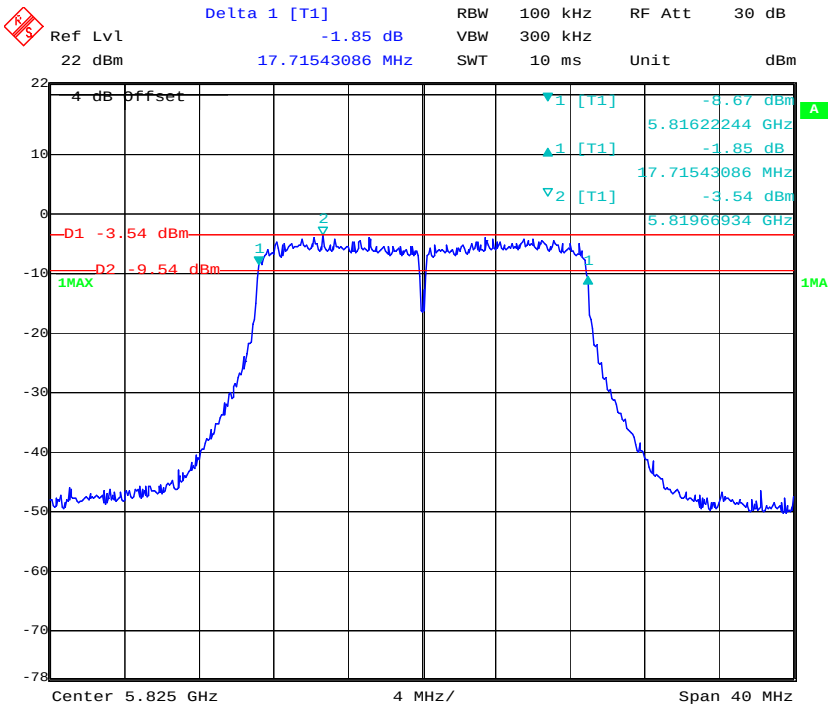
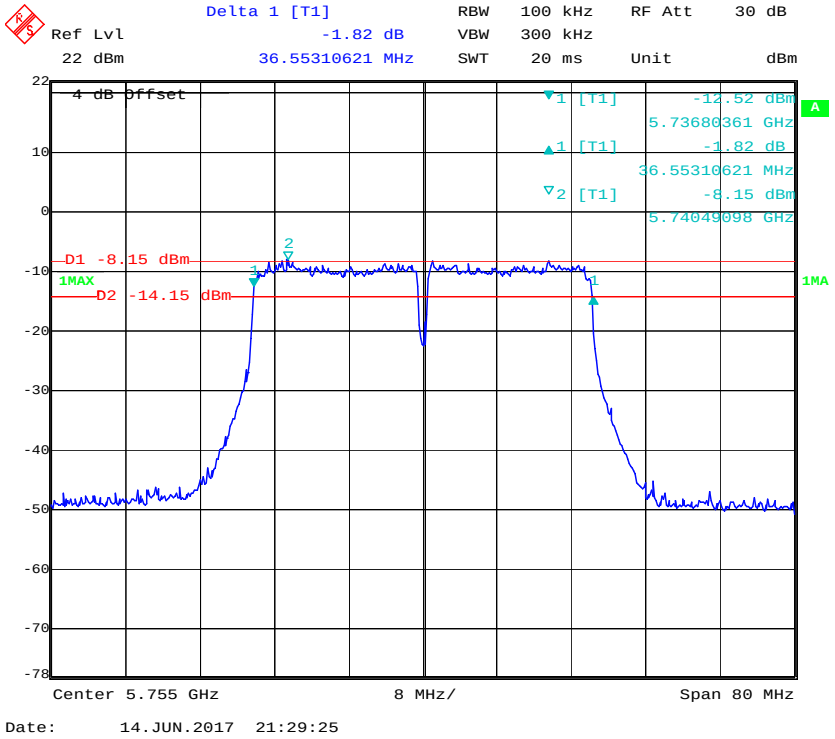
802.11n ht20 High Channel

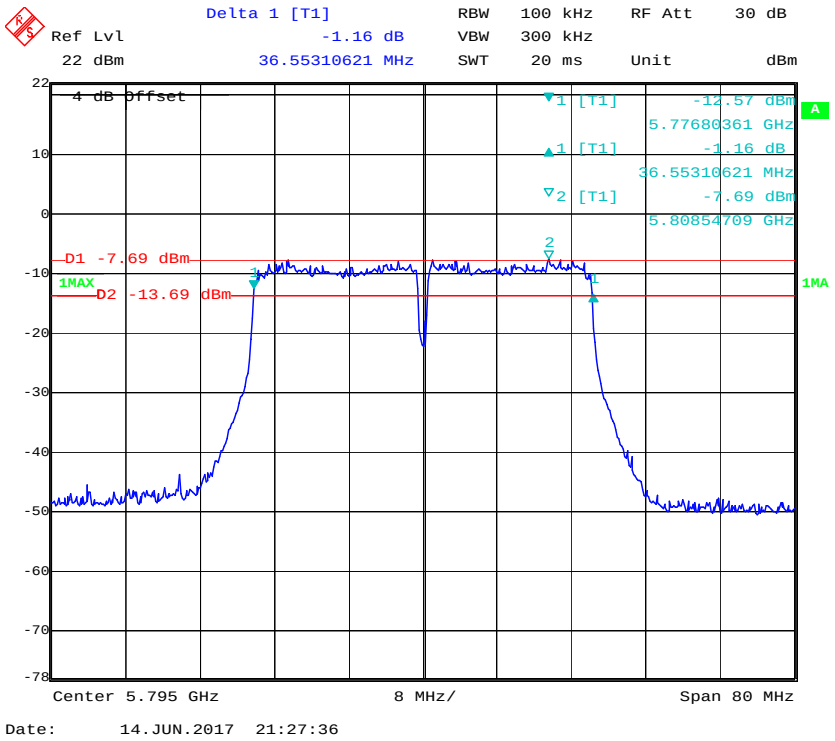


Date: 14.JUN.2017 21:25:13

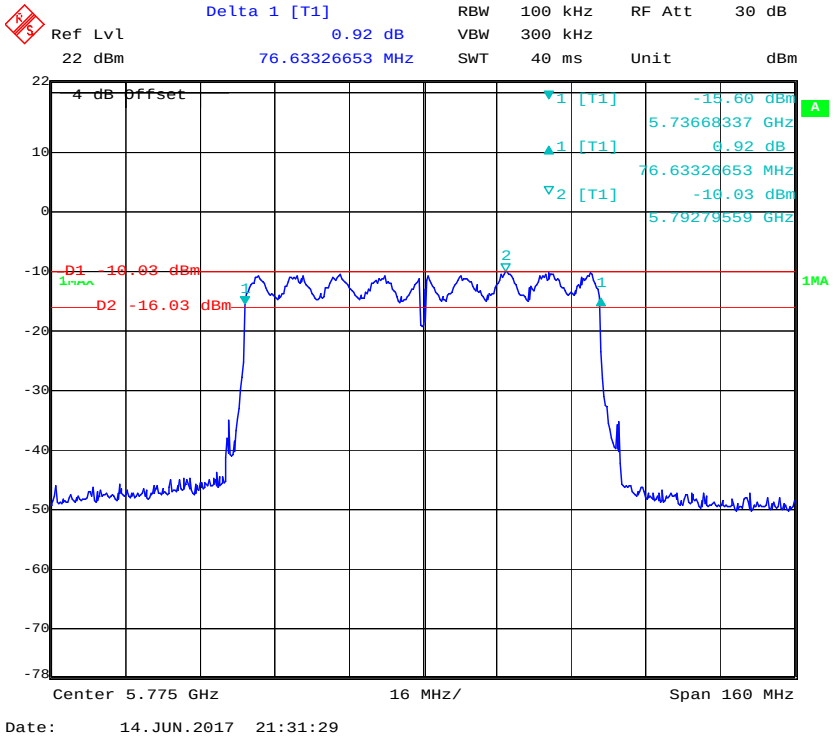
802.11n ht40 Low Channel



802.11n ht40 High Channel

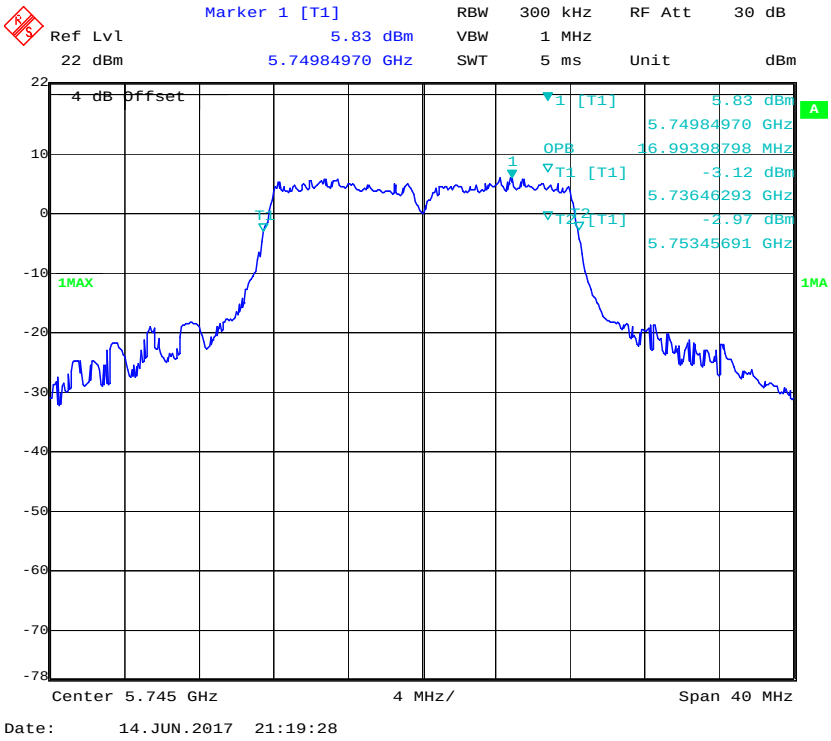


802.11ac80 Middle Channel

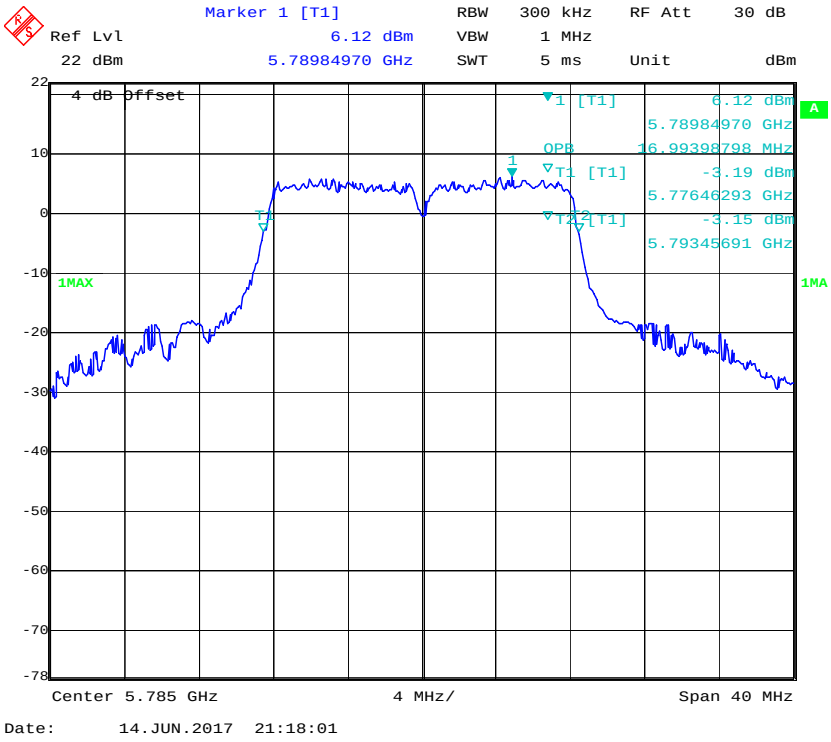


99% Occupied Bandwidth

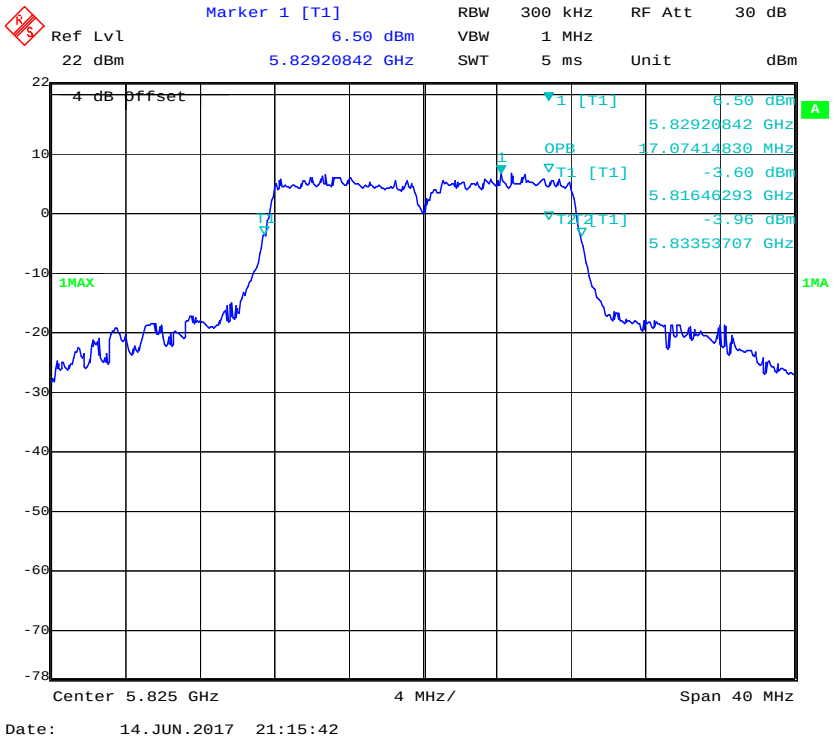
802.11a Low Channel



802.11a Middle Channel

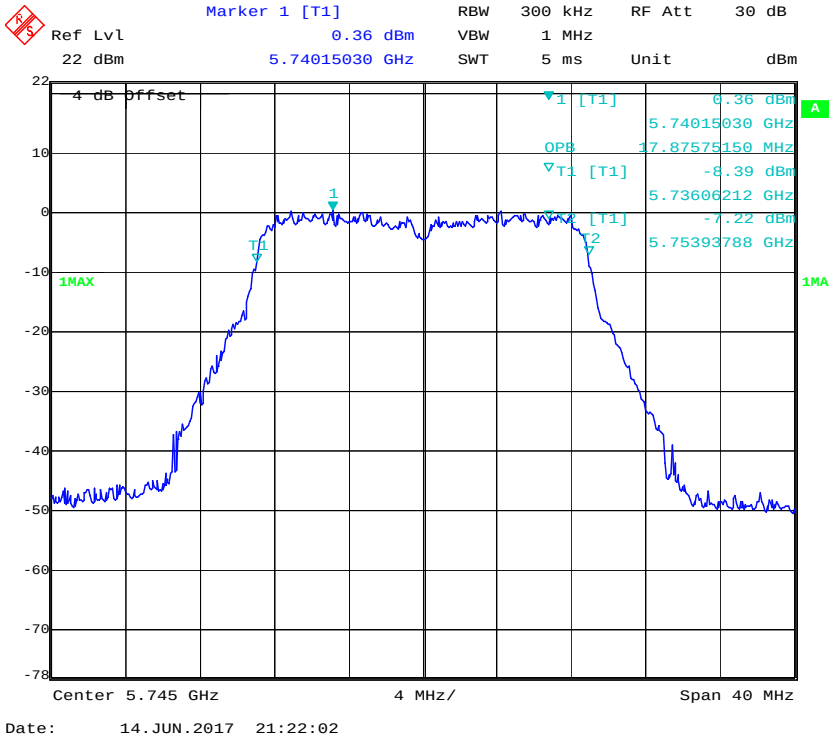


802.11a High Channel



Date: 14.JUN.2017 21:15:42

802.11n ht20 Low Channel



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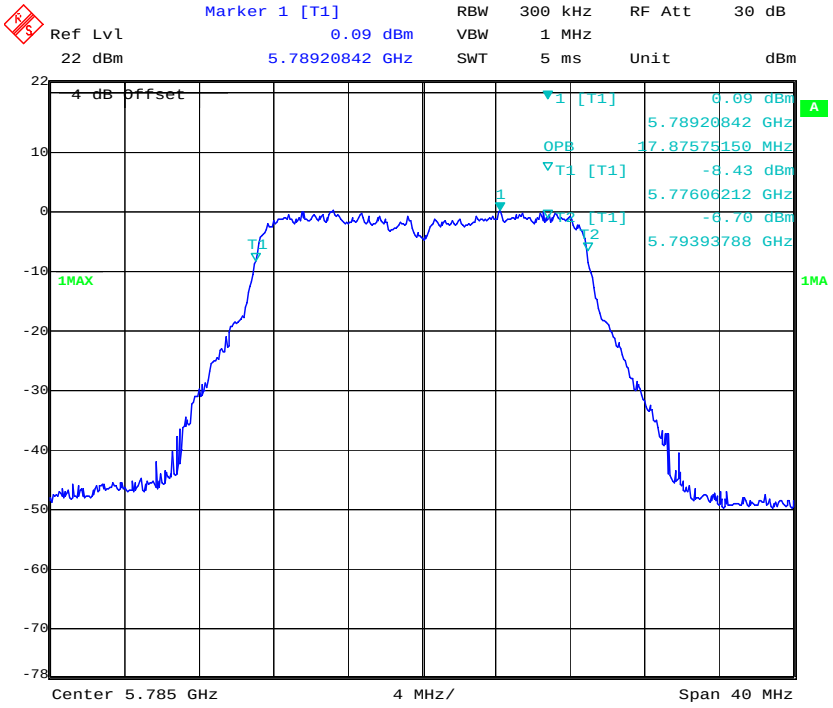
802.11n ht20 Middle Channel



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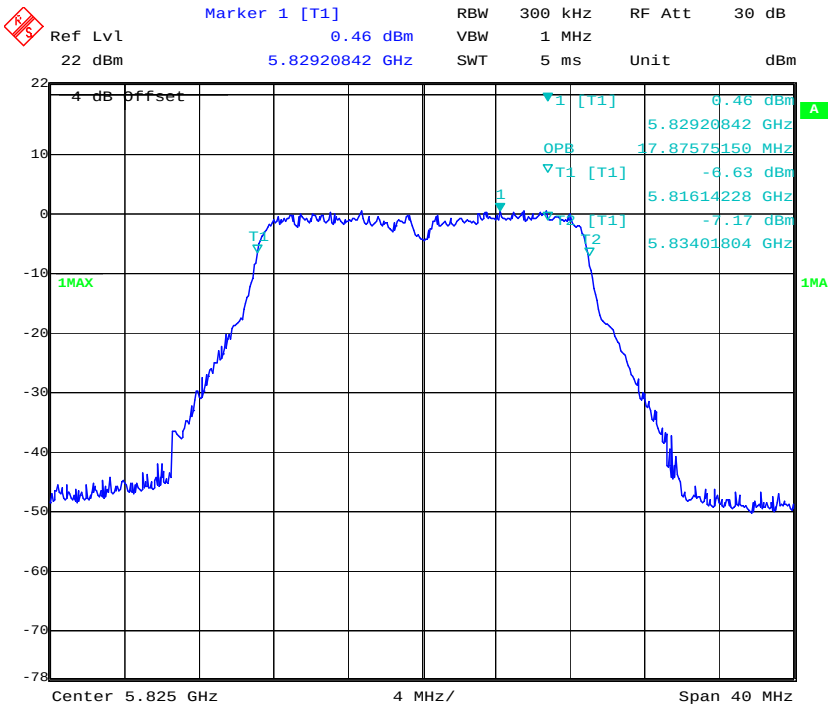
802.11n ht20 High Channel



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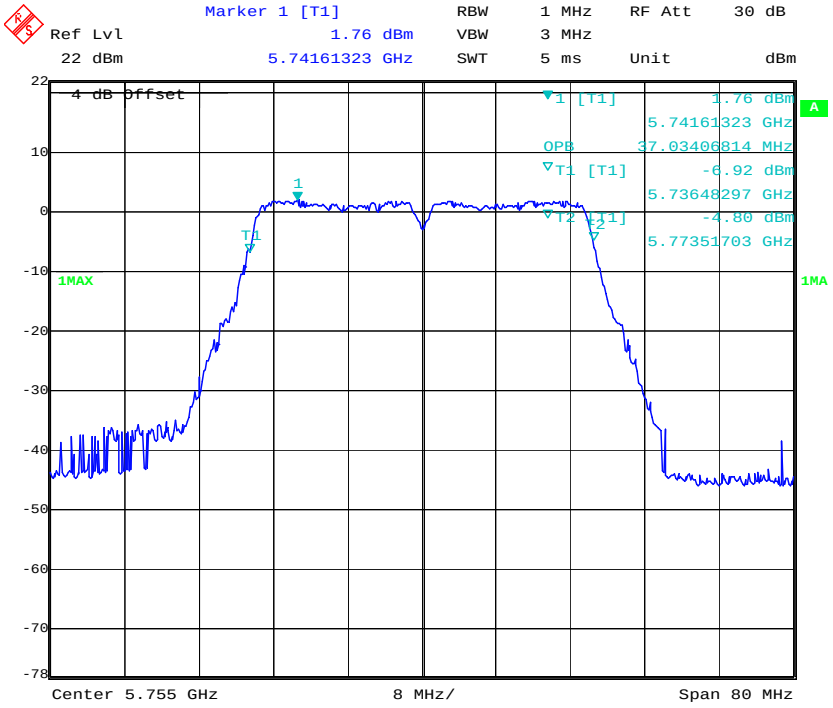
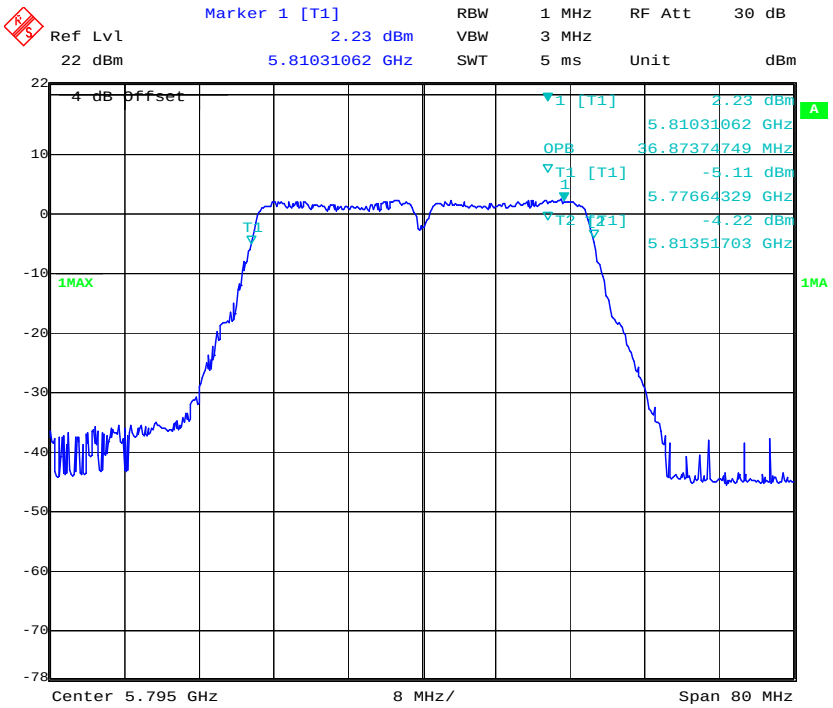
802.11n ht40 Low Channel



Date: 14.JUN.2017 21:29:40

802.11n ht40 High Channel



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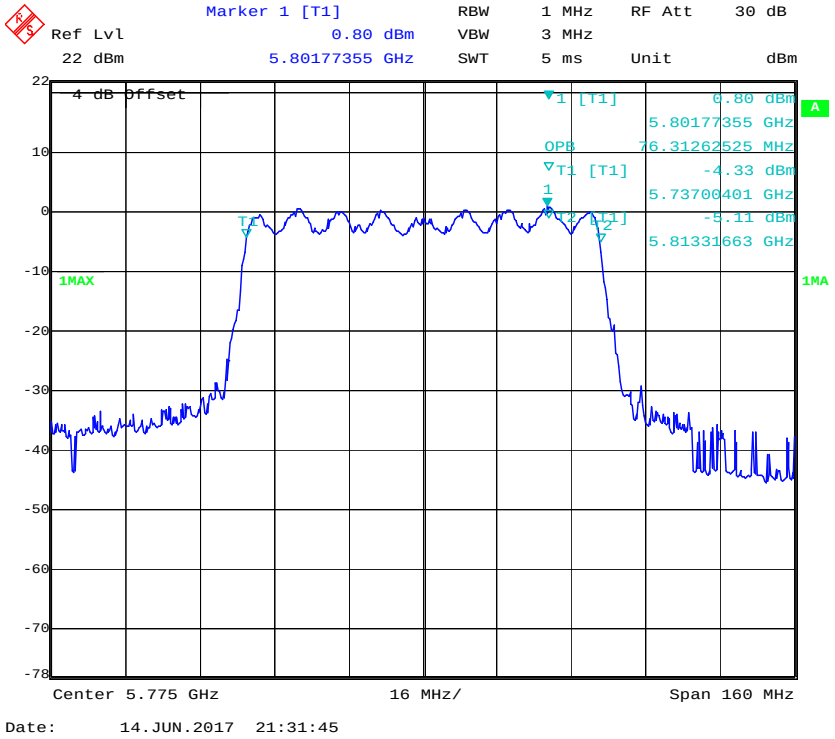
802.11ac80 Middle Channel



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
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2016-09-21	2017-09-20
Unknown	RF Cable	Unknown	C-5	Each Time	/
FLUKE	Multimeter	1587	27870099	2016-12-30	2017-12-29
BACL	High Temperature Test Chamber	BTH-150	30024	2016-12-02	2017-12-01

*** Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B “Implementation of traceability policy in accredited laboratories”.

Test Data

Environmental Conditions

Temperature:	26.3 °C
Relative Humidity:	64.8 %
ATM Pressure:	100.1 kPa

The testing was performed by Lorin Bian on 2017-06-14.

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

Test Result: Pass.

5150-5250MHz:

802.11a

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5169.9398	5249.4188	f_L and f_H Within 5150~5250MHz range
10		5169.9392	5249.4182	
20		5169.9393	5249.4184	
30		5169.9396	5249.4186	
40		5169.9397	5249.4182	
25	102	5169.9393	5249.4183	
25	138	5169.9398	5249.4184	

802.11n ht20:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5171.3226	5248.6773	f_L and f_H Within 5150~5250MHz range
10		5171.3223	5248.6772	
20		5171.3221	5248.6776	
30		5171.3223	5248.6773	
40		5171.3222	5248.6772	
25	102	5171.3223	5248.6779	
25	138	5171.3226	5248.6772	

802.11n ht40:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5171.1422	5249.0180	f_L and f_H Within 5150~5250MHz range
10		5171.1431	5249.0183	
20		5171.1425	5249.0182	
30		5171.1428	5249.0181	
40		5171.1425	5249.0186	
25	102	5171.1424	5249.0189	
25	138	5171.1425	5249.0182	

802.11ac80:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5172.2002	5248.2168	f_L and f_H Within 5150~5250MHz range
10		5172.2021	5248.2165	
20		5172.2012	5248.2163	
30		5172.2013	5248.2164	
40		5172.2023	5248.2164	
25	102	5172.2015	5248.2166	
25	138	5172.2006	5248.2169	

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	5736.4629	5833.5371	f_L and f_H Within 5725~5850MHz range
10		5736.4622	5833.5378	
20		5736.4624	5833.5373	
30		5736.4625	5833.5374	
40		5736.4623	5833.5375	
25	102	5736.4621	5833.5373	
25	138	5736.4625	5833.5371	

802.11n ht20:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5736.0621	5834.0180	f_L and f_H Within 5725~5850MHz range
10		5736.0623	5834.0181	
20		5736.0625	5834.0185	
30		5736.0626	5834.0182	
40		5736.0622	5834.0183	
25	102	5736.0623	5834.0187	
25	138	5736.0624	5834.0182	

802.11n ht40:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5736.4829	5813.5170	f_L and f_H Within 5725~5850MHz range
10		5736.4822	5813.5171	
20		5736.4823	5813.5172	
30		5736.4821	5813.5175	
40		5736.4822	5813.5172	
25	102	5736.4822	5813.5176	
25	138	5736.4825	5813.5173	

802.11ac80:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{AC}	MHz	MHz	
0	120	5737.0040	5813.3166	f_L and f_H Within 5725~5850MHz range
10		5737.0043	5813.3164	
20		5737.0044	5813.3162	
30		5737.0046	5813.3165	
40		5737.0047	5813.3167	
25	102	5737.0041	5813.3161	
25	138	5737.0043	5813.3163	

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	MY54170074	2017-01-03	2018-01-03
Agilent	P-Series Power Meter	N1912A	MY5000798	2017-01-03	2018-01-03
Unknown	RF Cable	Unknown	C-5	Each Time	/

*** Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B “Implementation of traceability policy in accredited laboratories”.

Test Procedure

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

Test Data

Environmental Conditions

Temperature:	26.3 °C
Relative Humidity:	64.8 %
ATM Pressure:	100.1 kPa

The testing was performed by Lorin Bian on 2017-06-14.

Test Mode: Transmitting

UNII Band	Mode	Channel	Frequency (MHz)	Conducted Average Output Power (dBm)			Limit (dBm)	Result
				Chain 0	Chain 1	Total		
5150-5250MHz	802.11 a	Low	5180	15.36	15.75	/	24	PASS
		Middle	5200	14.95	15.15	/	24	PASS
		High	5240	15.36	15.5	/	24	PASS
	802.11n ht20	Low	5180	11.53	12.86	15.26	24	PASS
		Middle	5200	11.46	13.01	15.31	24	PASS
		High	5240	11.86	13.46	15.74	24	PASS
	802.11n ht40	Low	5190	11.61	12.69	15.19	24	PASS
		High	5230	11.86	13.15	15.56	24	PASS
	802.11 ac80	Middle	5210	11.61	11.31	14.47	24	PASS
5725-5850MHz	802.11 a	Low	5745	15.5	15.12	/	30	PASS
		Middle	5785	15.25	15.32	/	30	PASS
		High	5825	15.1	15.12	/	30	PASS
	802.11n ht20	Low	5745	11.74	11.3	14.54	30	PASS
		Middle	5785	11.89	12.19	15.05	30	PASS
		High	5825	11.99	12.96	15.51	30	PASS
	802.11n ht40	Low	5755	11.53	11.8	14.68	30	PASS
		High	5795	11.77	12.34	15.07	30	PASS
	802.11 ac80	Middle	5775	10.45	12.09	14.36	30	PASS

Note 1: the device can be configured as a client device.
Note 2:The maximum antenna gain is 2dBi 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 = 2dBi < 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
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2016-09-21	2017-09-20
Unknown	RF Cable	Unknown	C-5	Each Time	/

*** Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B “Implementation of traceability policy in accredited laboratories”.

Test Data

Environmental Conditions

Temperature:	26.3 °C
Relative Humidity:	64.8 %
ATM Pressure:	100.1 kPa

The testing was performed by Lorin Bian on 2017-06-14.

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	5.4	4.46	/	11
	5200	4.89	3.1	/	11
	5240	5.36	2.65	/	11
802.11n ht20	5180	0.99	2.3	4.7	11
	5200	0.45	2.66	4.7	11
	5240	1.38	2.13	4.78	11
802.11n ht40	5190	-1.5	-0.54	2.02	11
	5230	-1.94	-1.45	1.32	11
802.11 ac80	5210	-4.43	-3.58	-0.97	11

5725-5850MHz

Mode	Frequency (MHz)	Reading (dBm/300kHz)		Power Spectral Density (dBm/500kHz)			
		Chain 0	Chain 1	Chain 0	Chain 1	Total	Limits
802.11 a	5745	0.74	-1.16	2.96	1.06	/	30
	5785	0.88	-0.88	3.1	1.34	/	30
	5825	1.39	-0.87	3.61	1.35	/	30
802.11n ht20	5745	-4.42	-4.09	-2.2	-1.87	0.98	30
	5785	-4.47	-3.32	-2.25	-1.1	1.37	30
	5825	-3.97	-2.35	-1.75	-0.13	2.15	30
802.11n ht40	5755	-8.53	-6.71	-6.31	-4.49	-2.3	30
	5795	-8.03	-6.3	-5.81	-4.08	-1.85	30
802.11 ac80	5775	-9.36	-7.85	-7.14	-5.63	-3.31	30

Note 1: the device can be configured as a client device.

Note 2:The maximum antenna gain is 2dBi in 5GHz band. The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density (PSD) measurements on the devices:

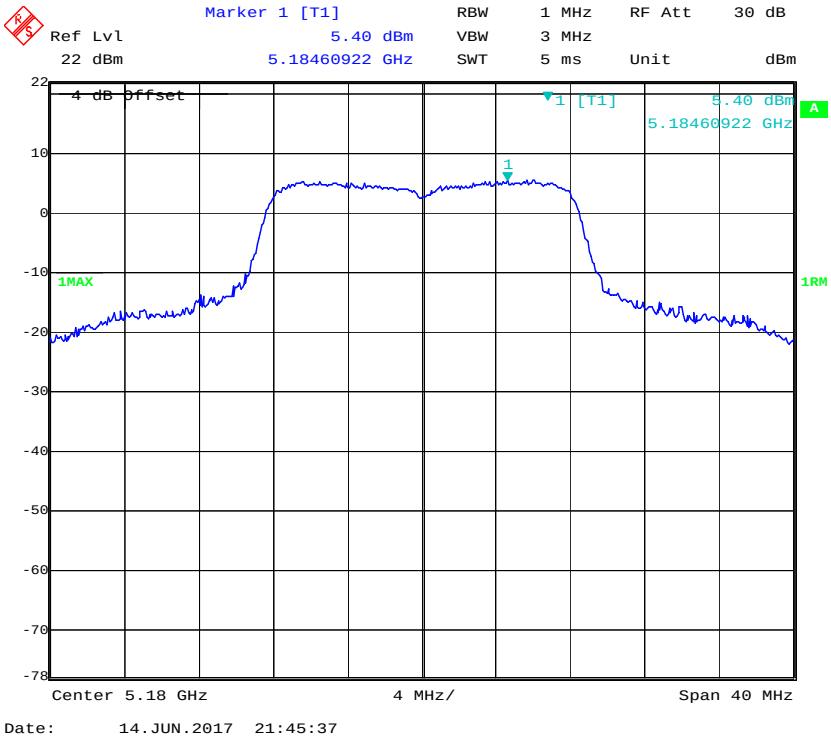
Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

So:

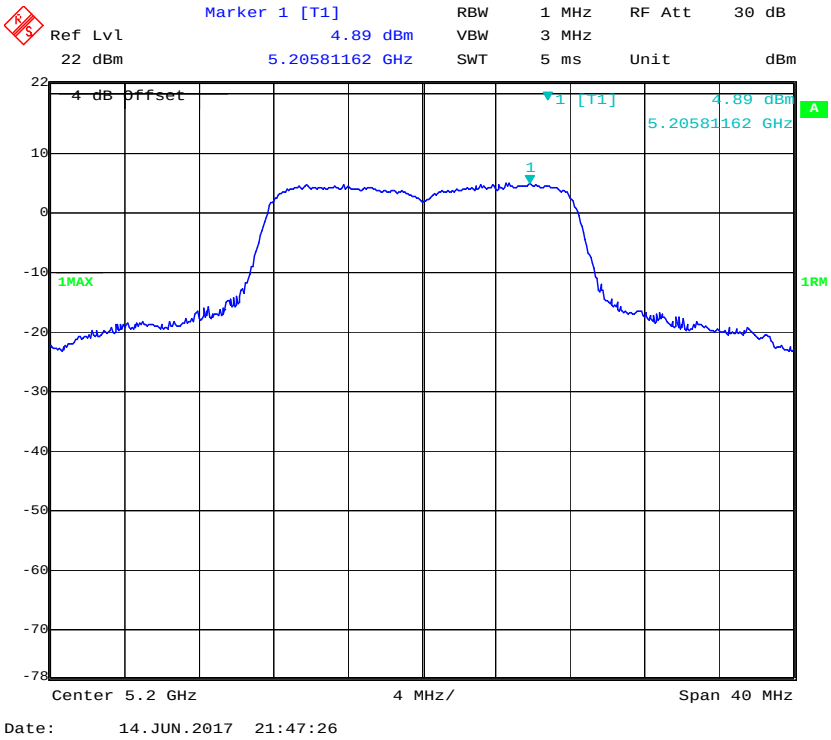
Directional gain = G_{ANT} + Array Gain = 2.0dBi+10*log(2)=5dBi

5150-5250MHz
Chain 0:

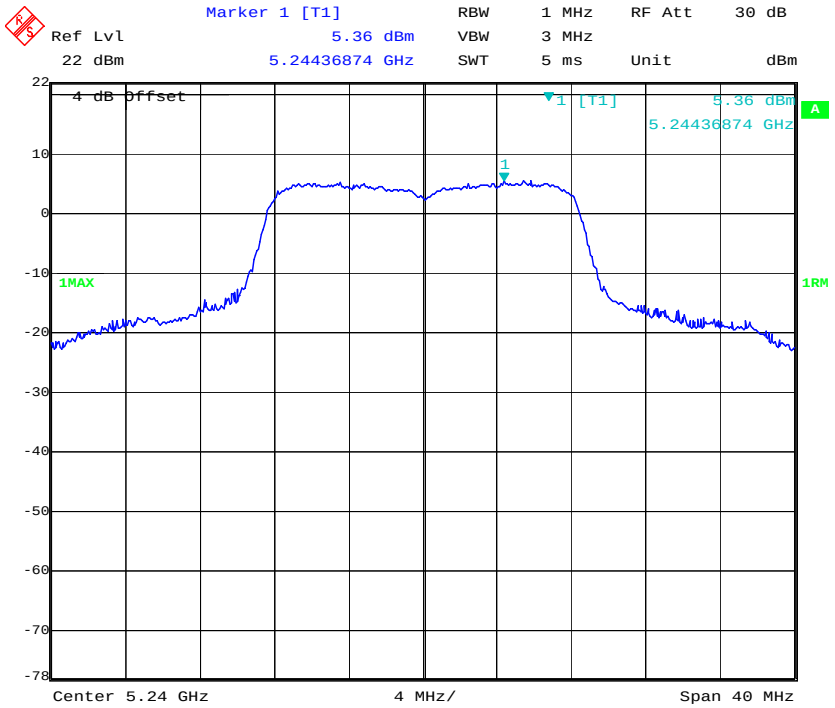
802.11a Low Channel



802.11a Middle Channel



802.11a High Channel



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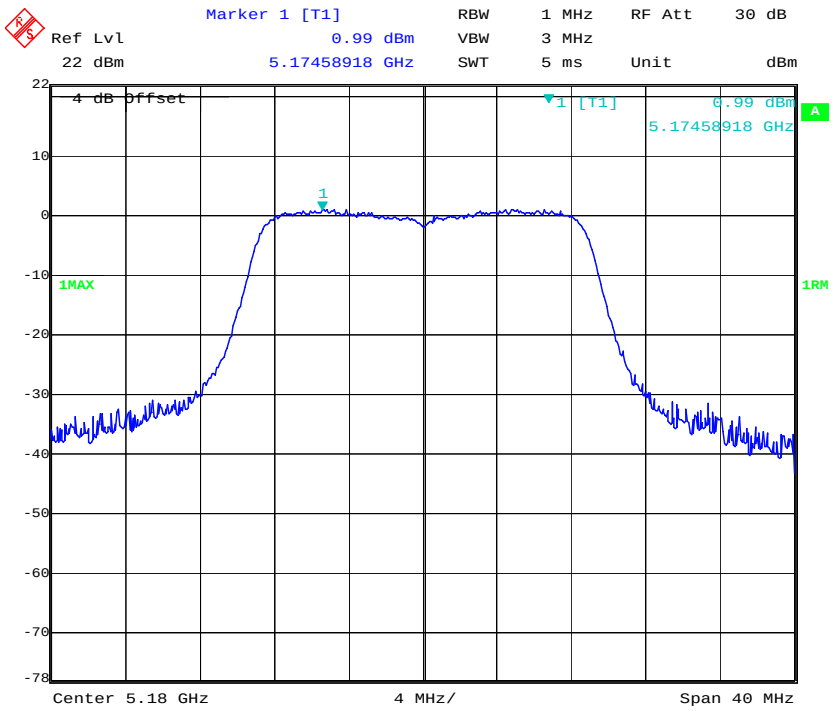
802.11n ht20 Low Channel



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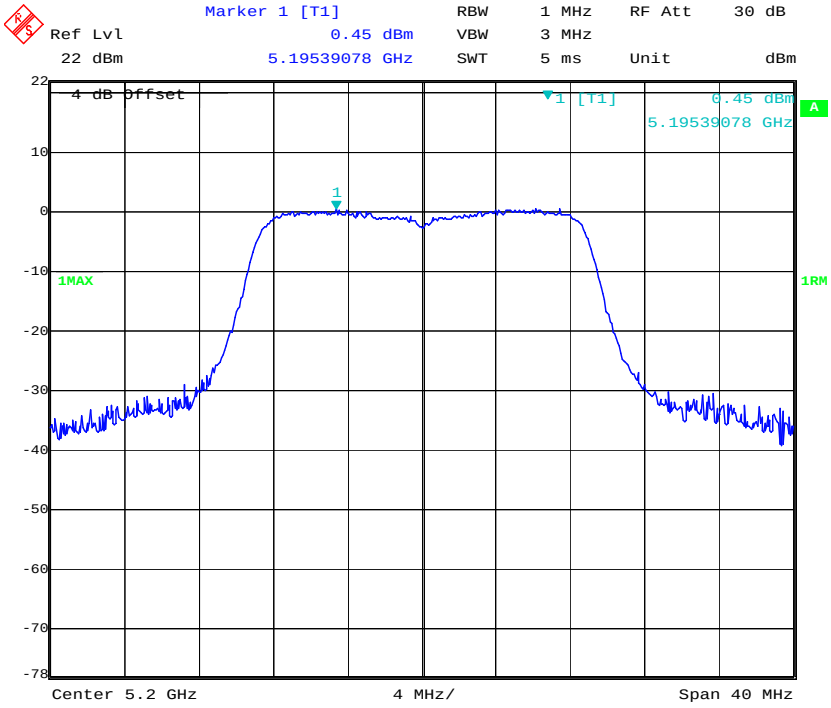
802.11n ht20 Middle Channel



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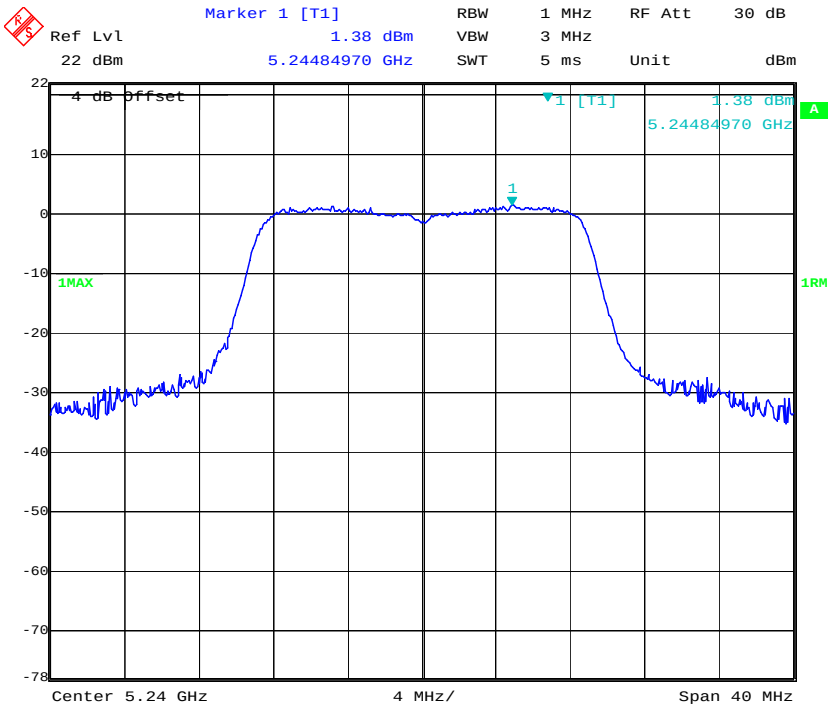
802.11n ht20 High Channel



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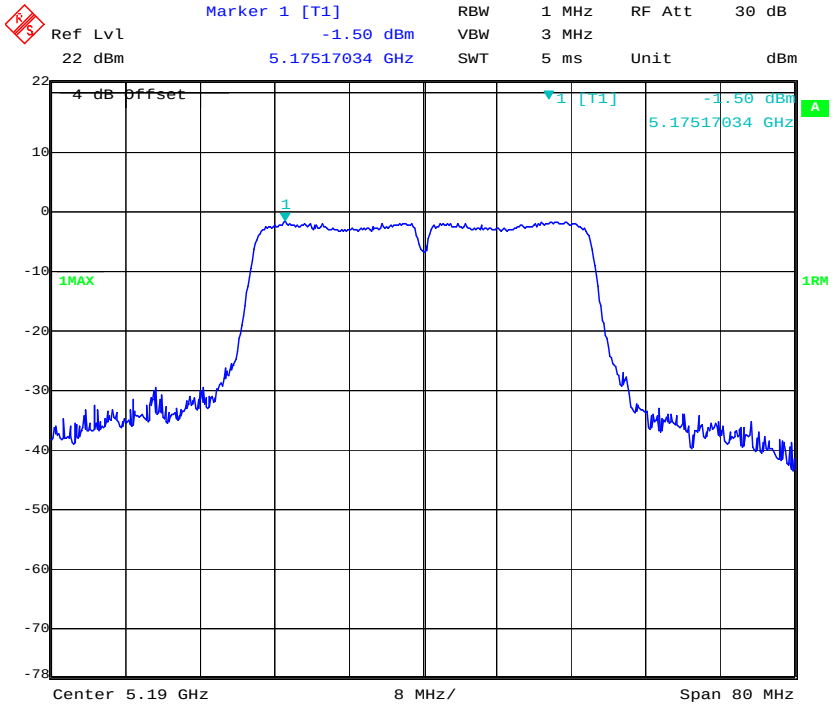
802.11n ht40 Low Channel



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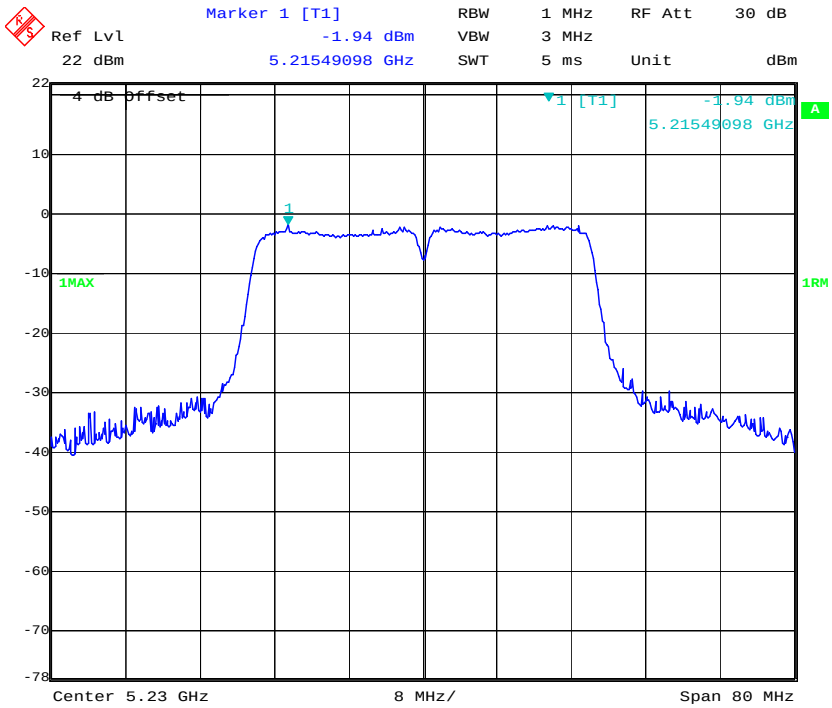
802.11n ht40 High Channel



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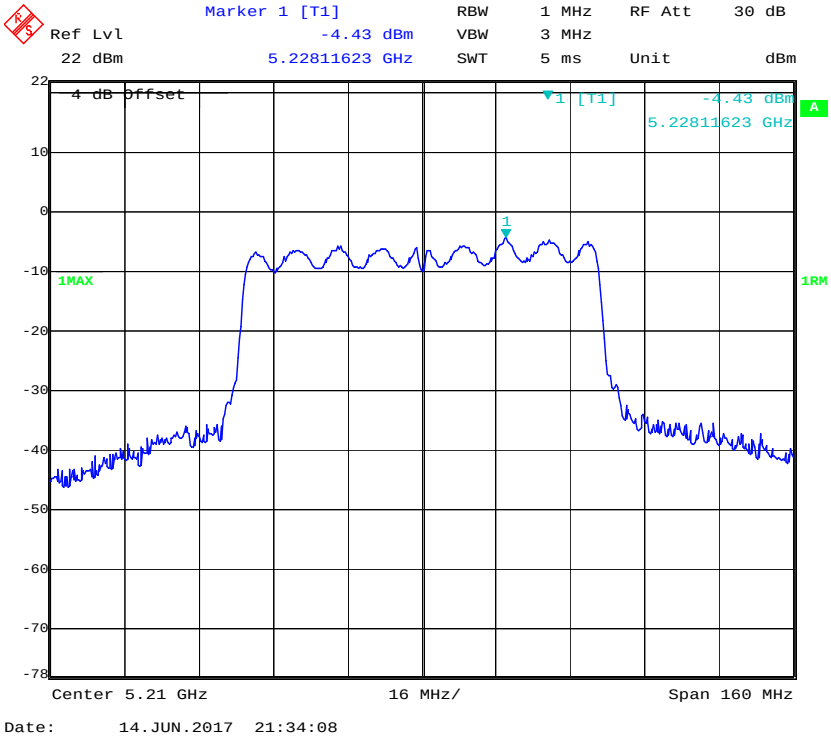
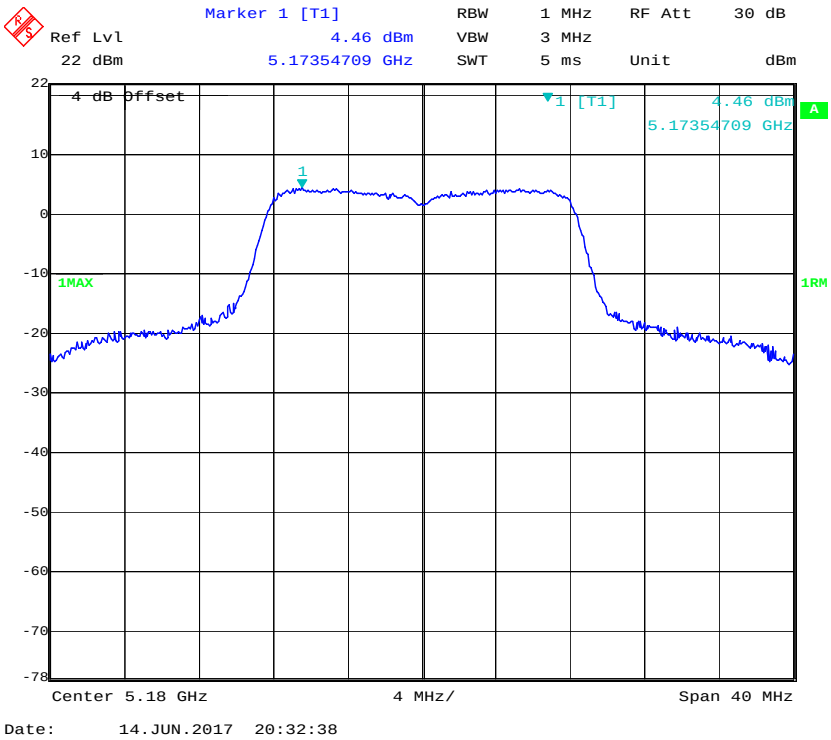
802.11ac80 Middle Channel

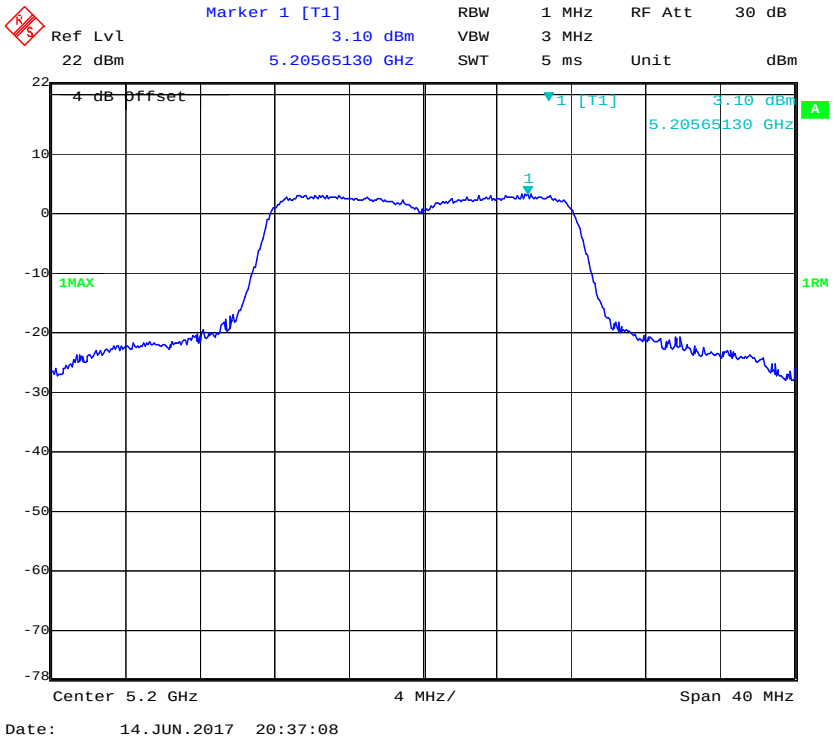


Chain 1:

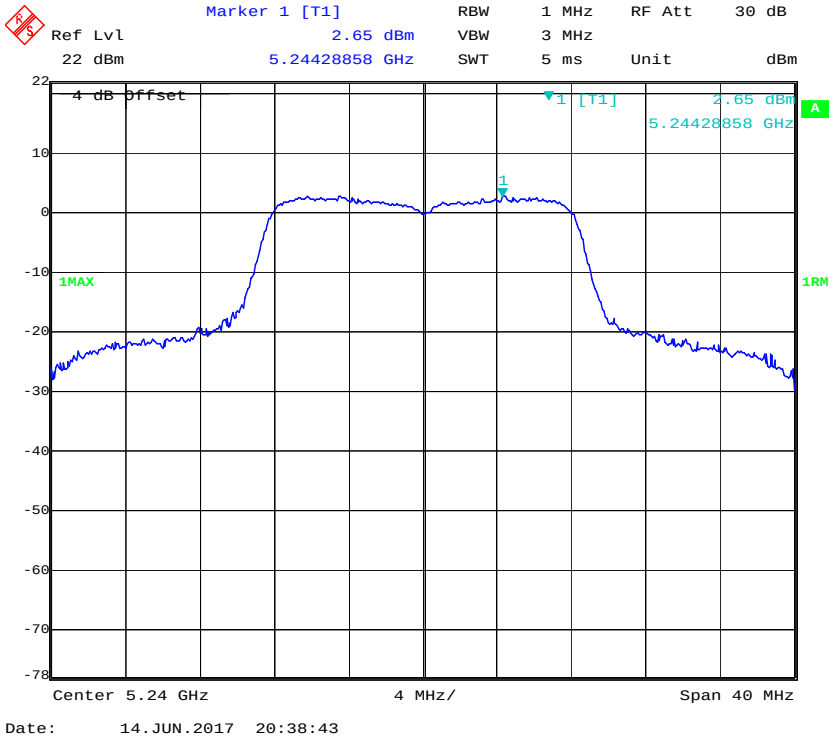
802.11a Low Channel



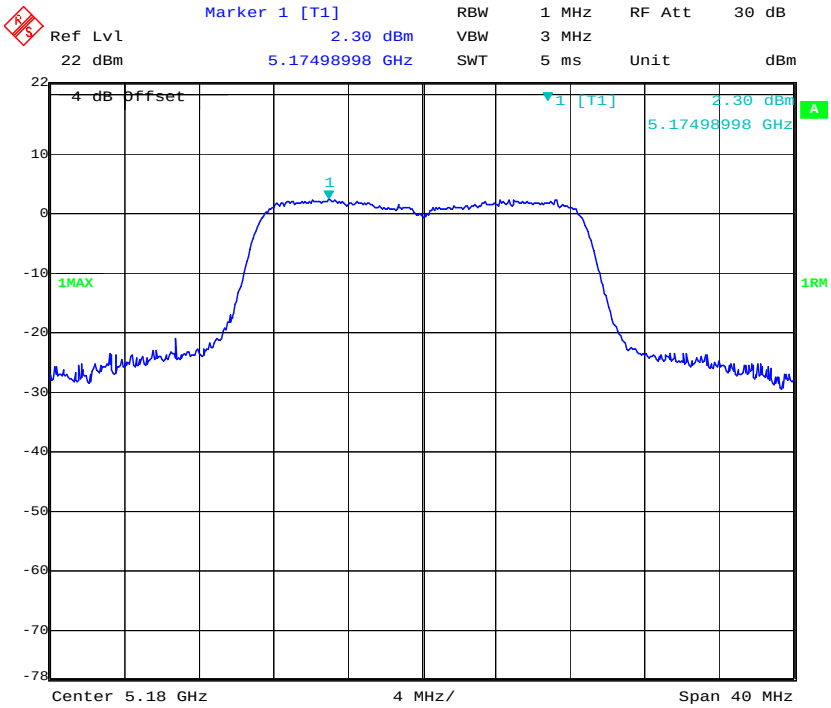
802.11a Middle Channel



802.11a High Channel

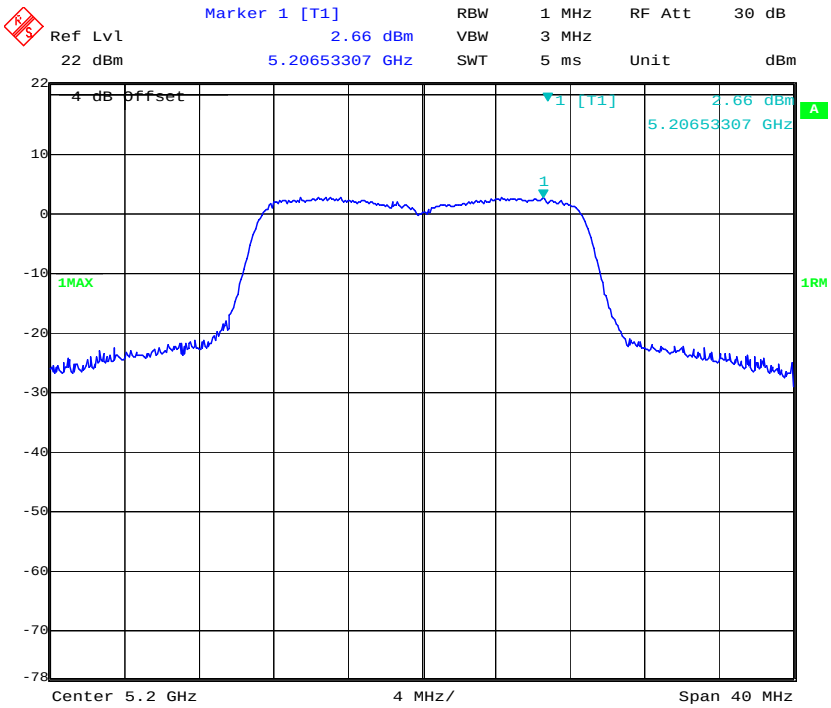


802.11n ht20 Low Channel



Date: 14.JUN.2017 20:44:56

802.11n ht20 Middle Channel



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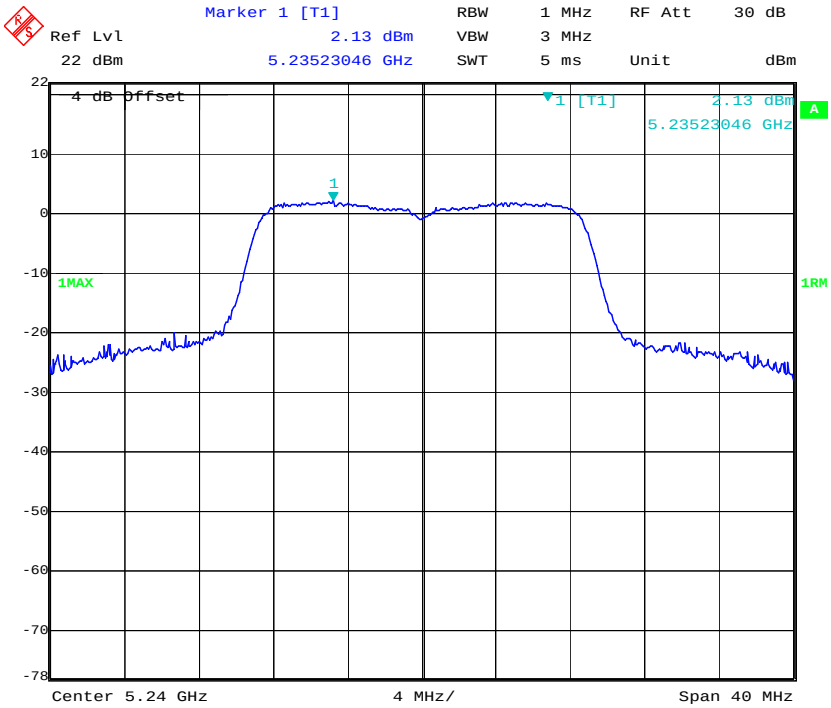
802.11n ht20 High Channel



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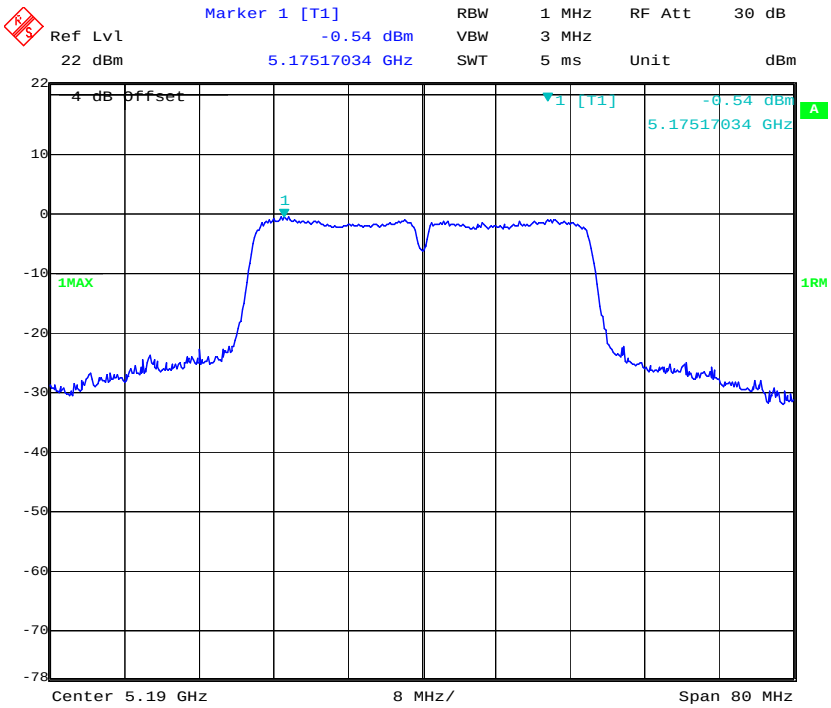
802.11n ht40 Low Channel



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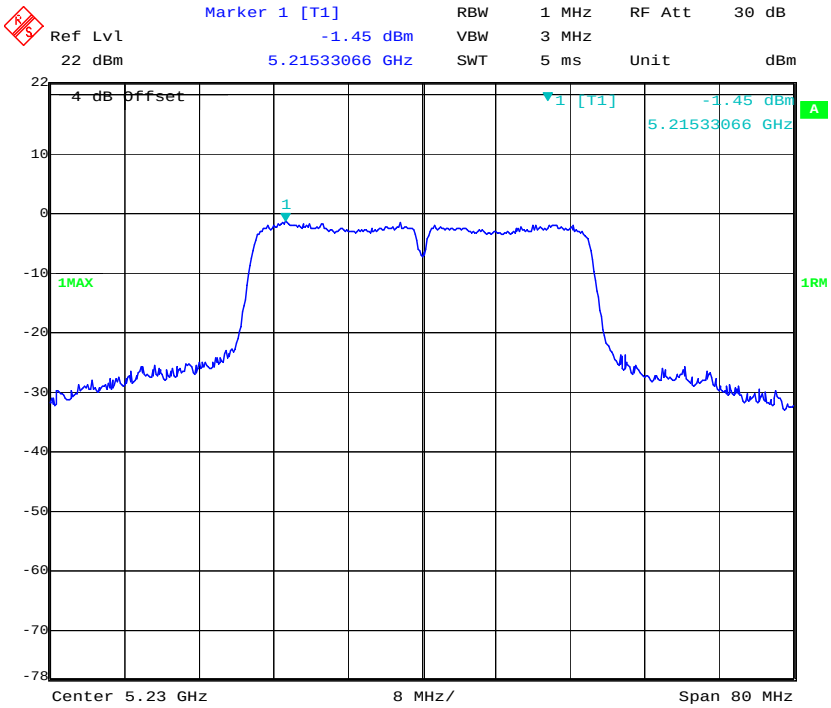
802.11n ht40 High Channel



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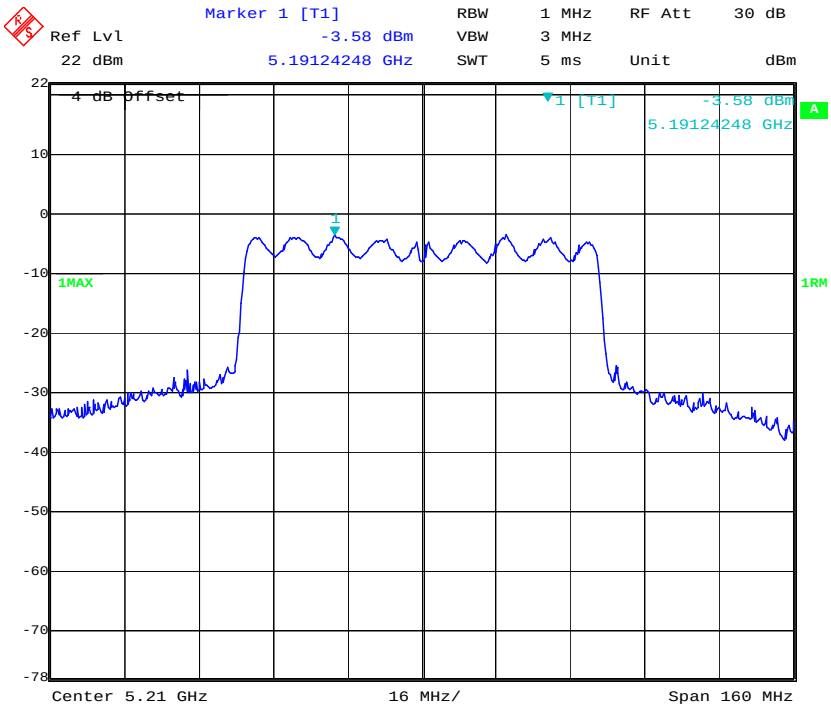
802.11ac80 Middle Channel



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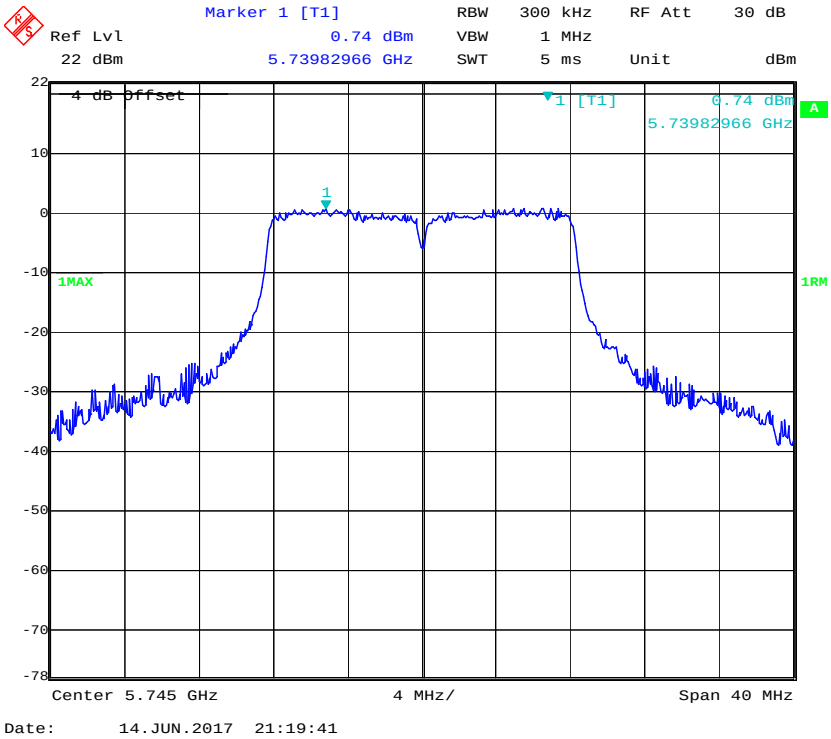
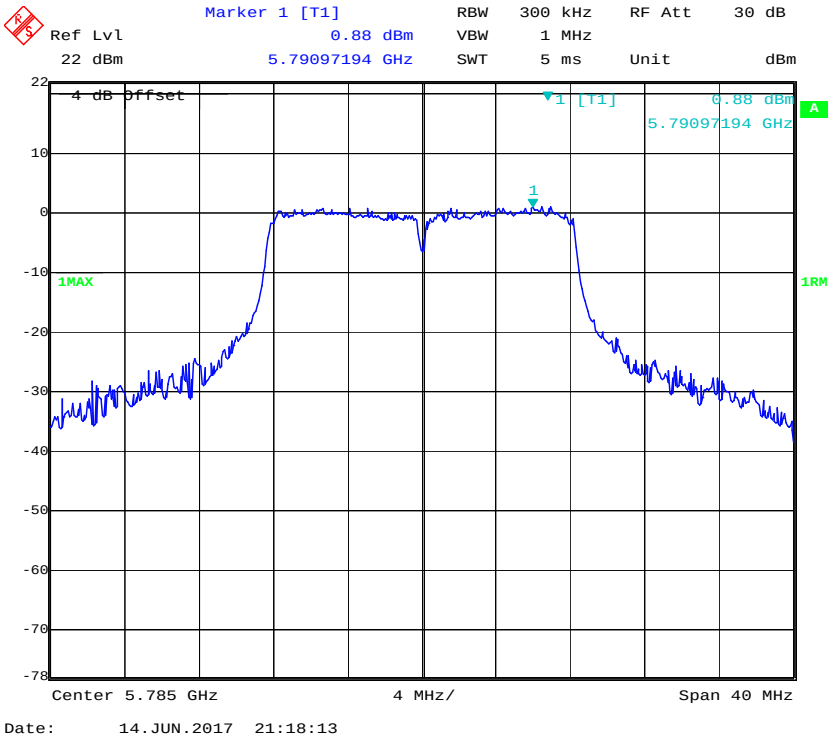
5725-5850MHz
Chain 0:

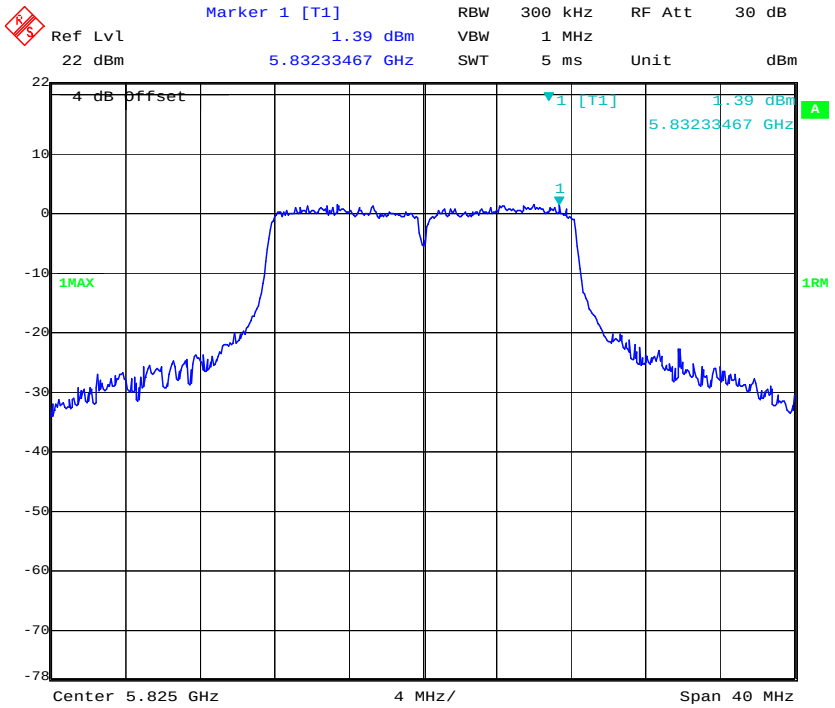
802.11a Low Channel



802.11a Middle Channel



802.11a High Channel



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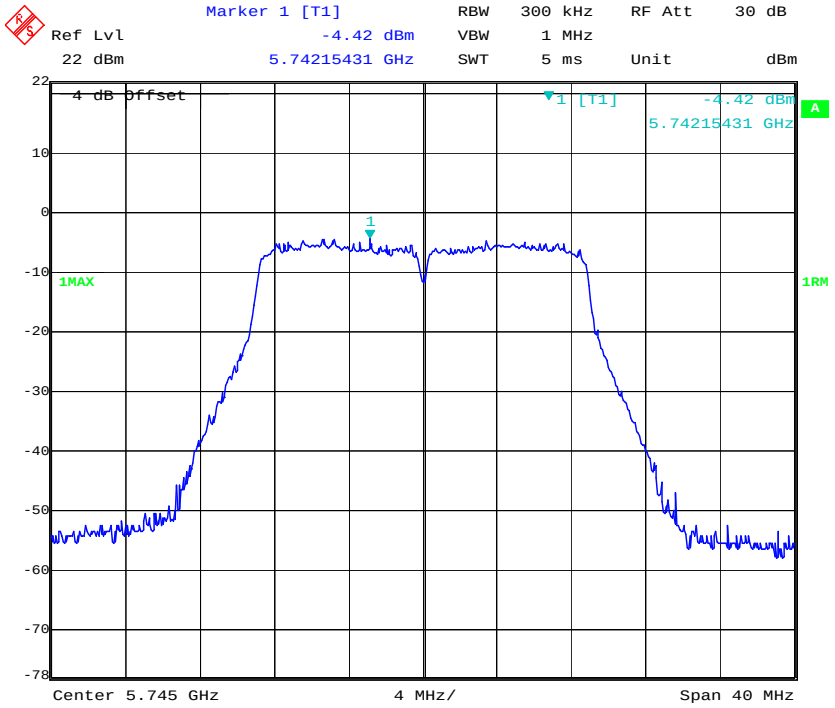
802.11n ht20 Low Channel



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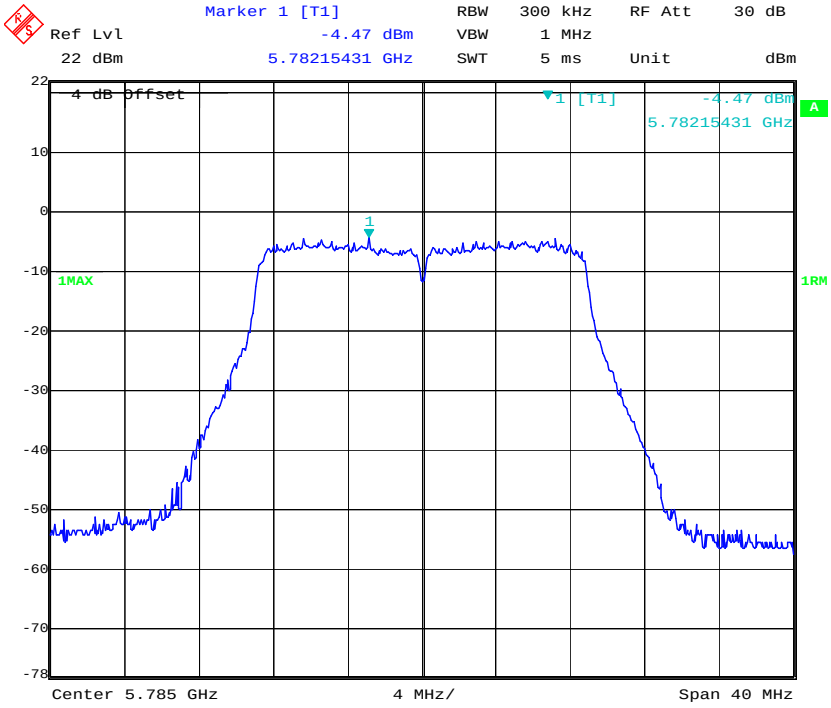
802.11n ht20 Middle Channel



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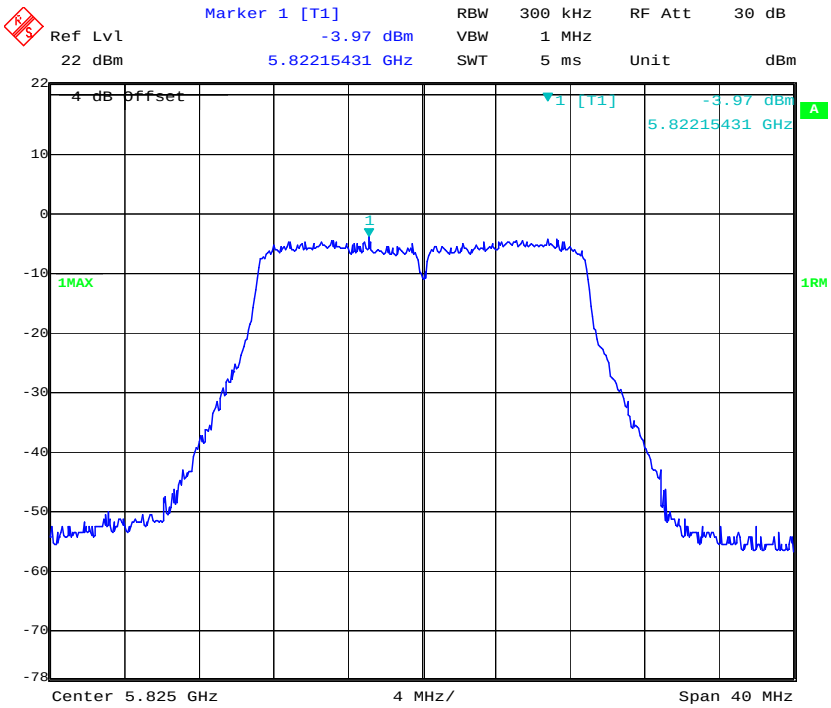
802.11n ht20 High Channel



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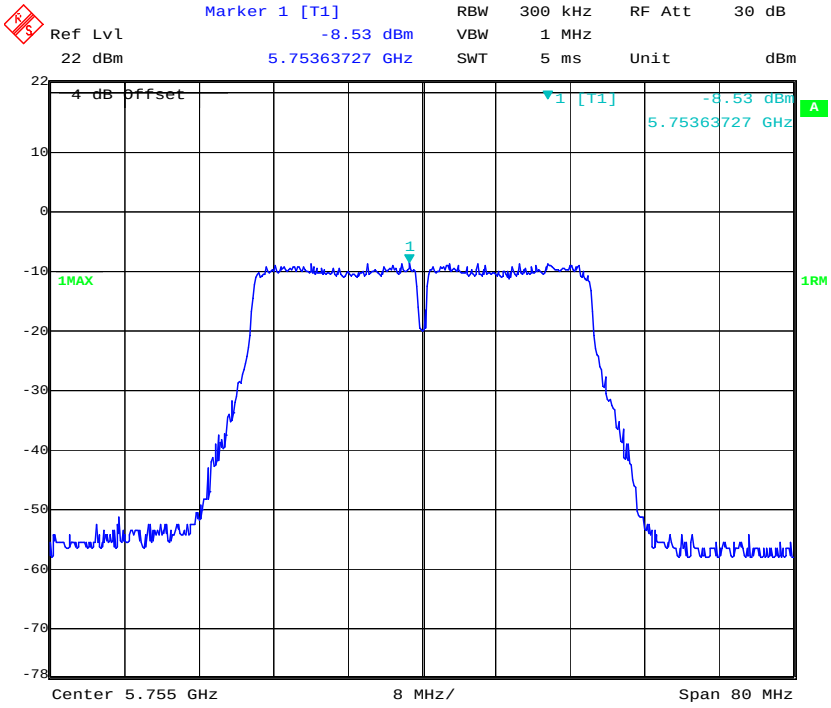
802.11n ht40 Low Channel



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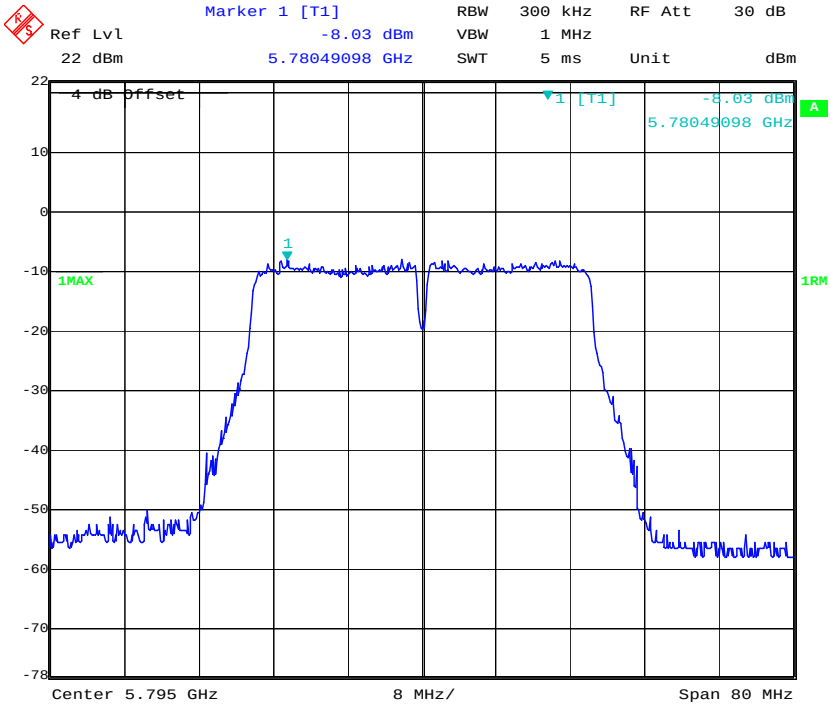
802.11n ht40 High Channel



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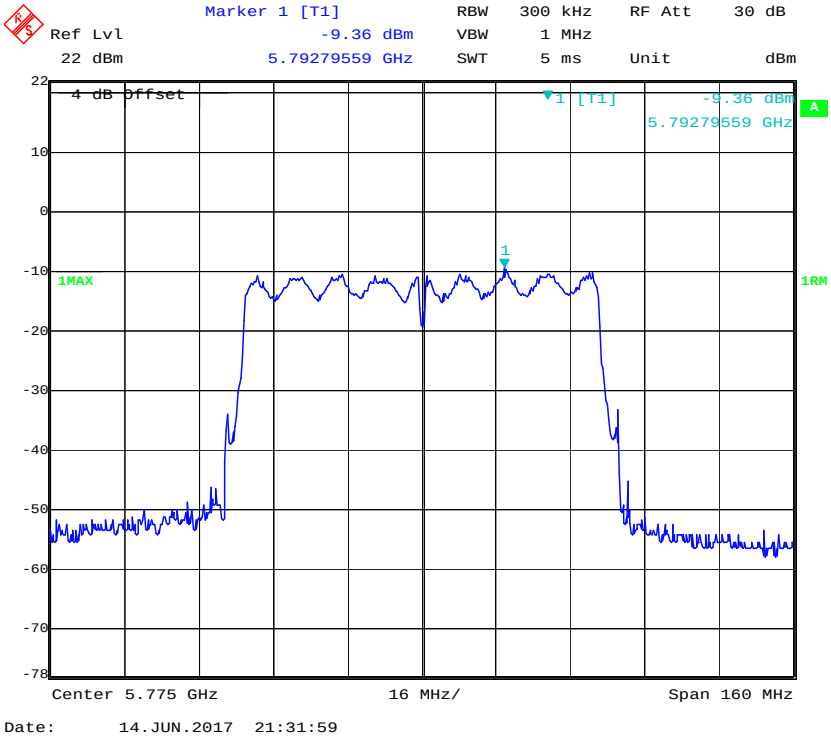
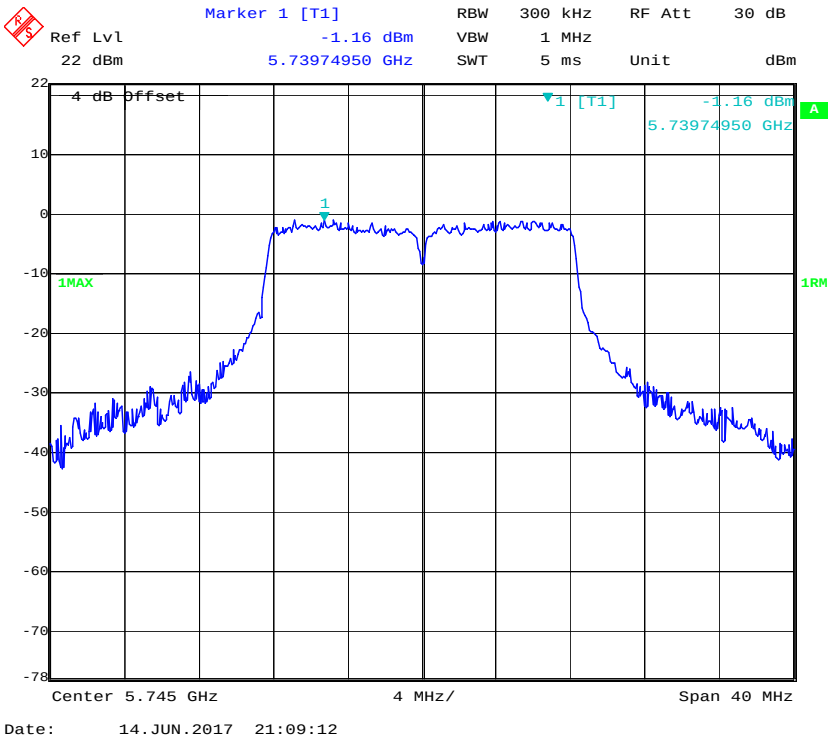
802.11ac80 Middle Channel

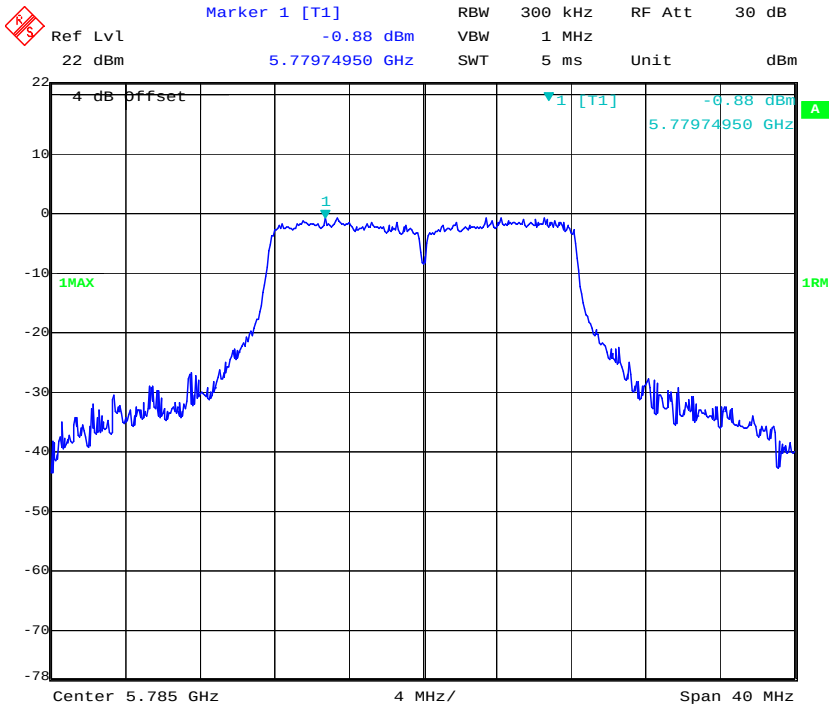


Chain 1:

802.11a Low Channel



802.11a Middle Channel



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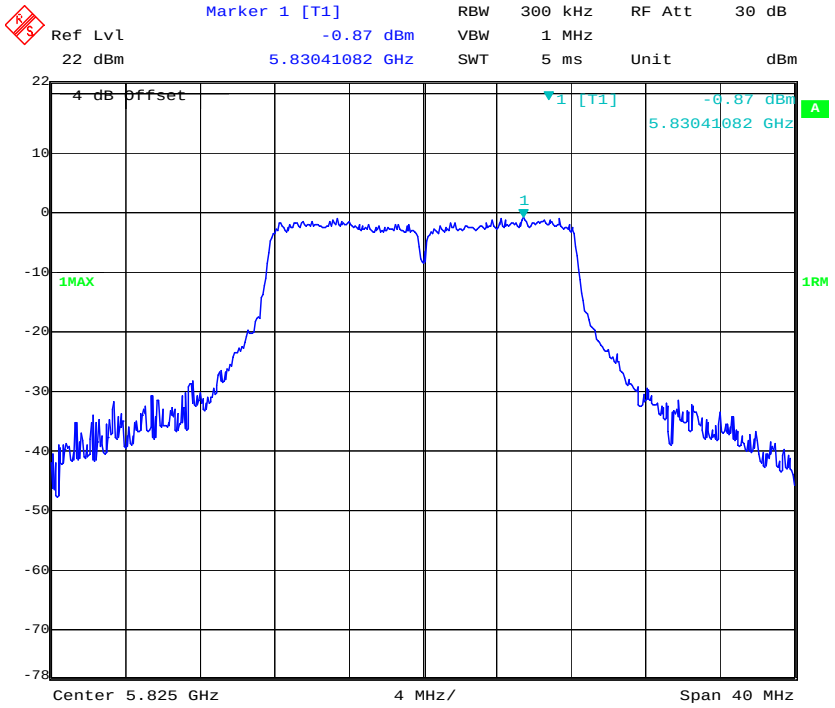
802.11a High Channel



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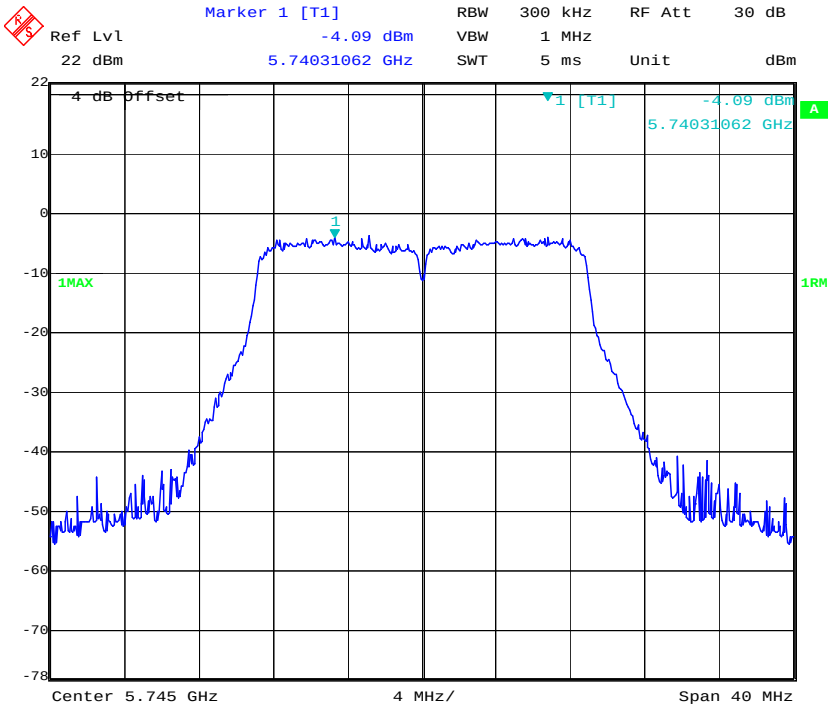
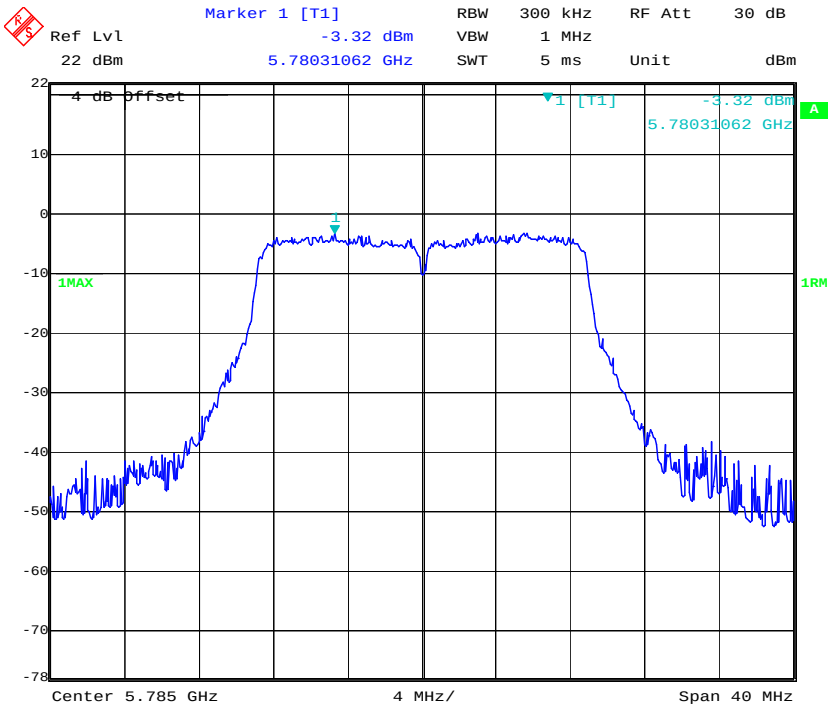
802.11n ht20 Low Channel



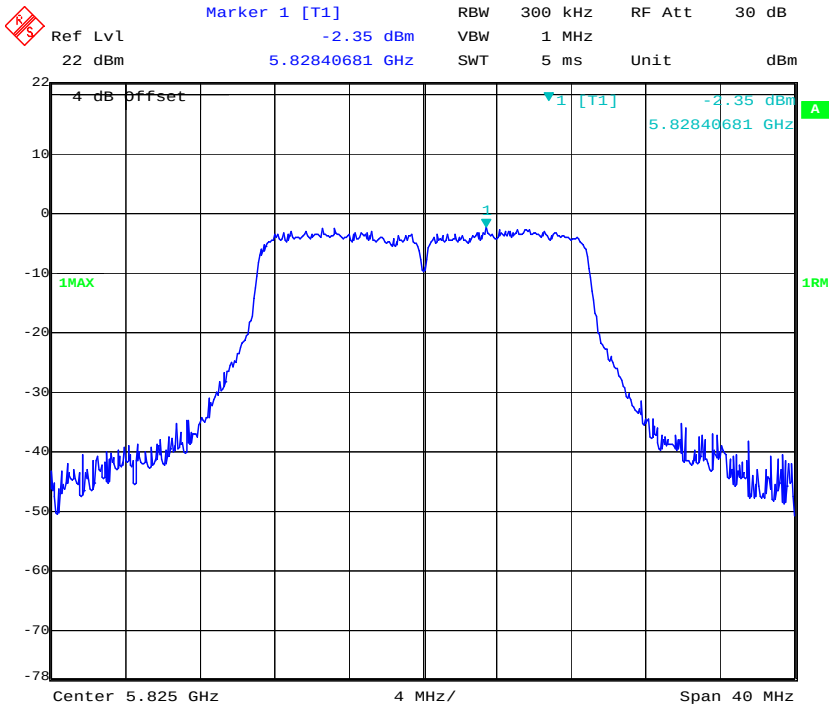
Date: 14.JUN.2017 21:06:32

802.11n ht20 Middle Channel



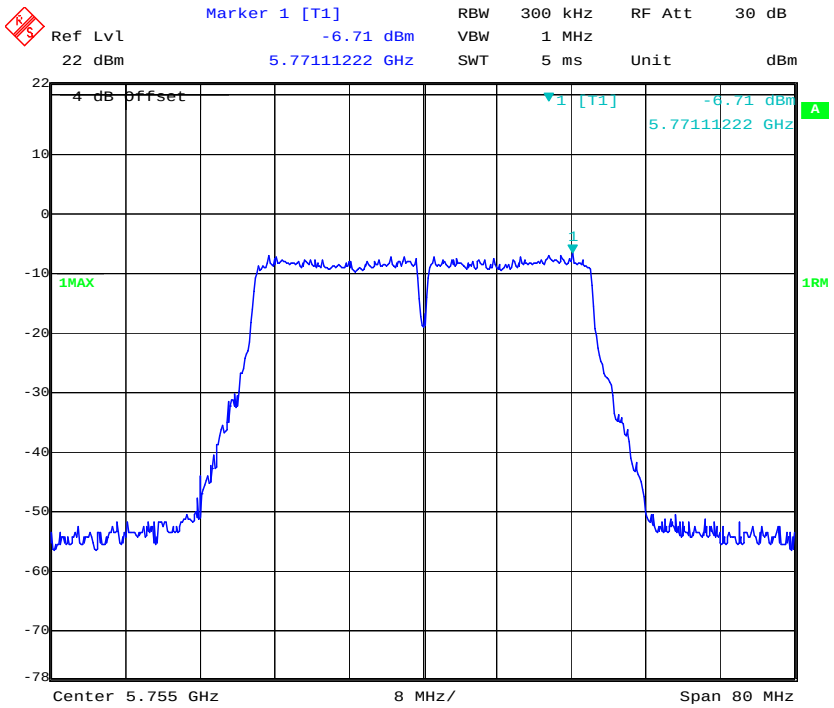
Date: 14.JUN.2017 21:04:58

802.11 n ht20 High Channel



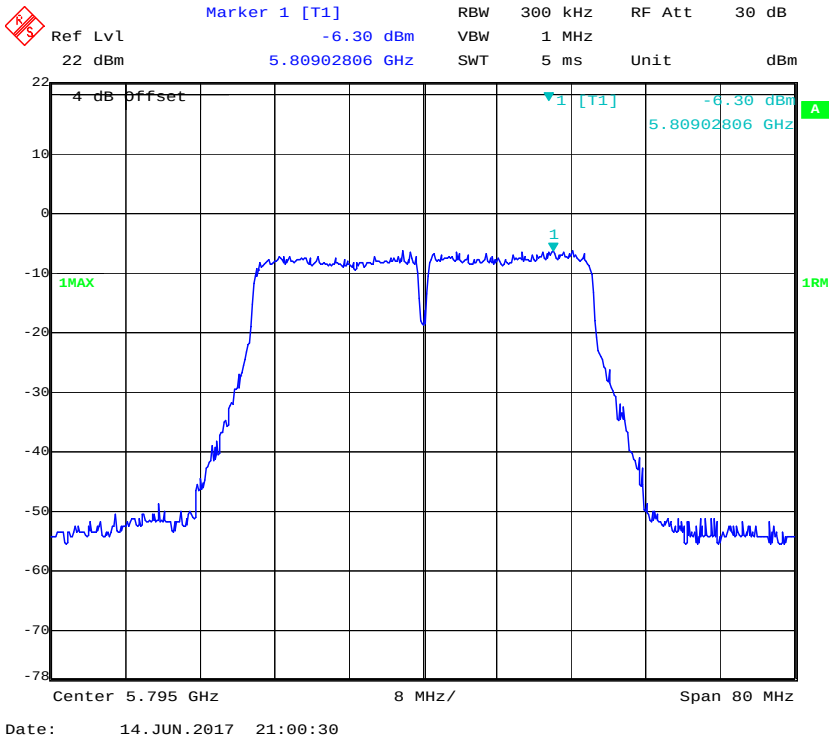
Date: 14.JUN.2017 21:02:59

802.11n ht40 Low Channel

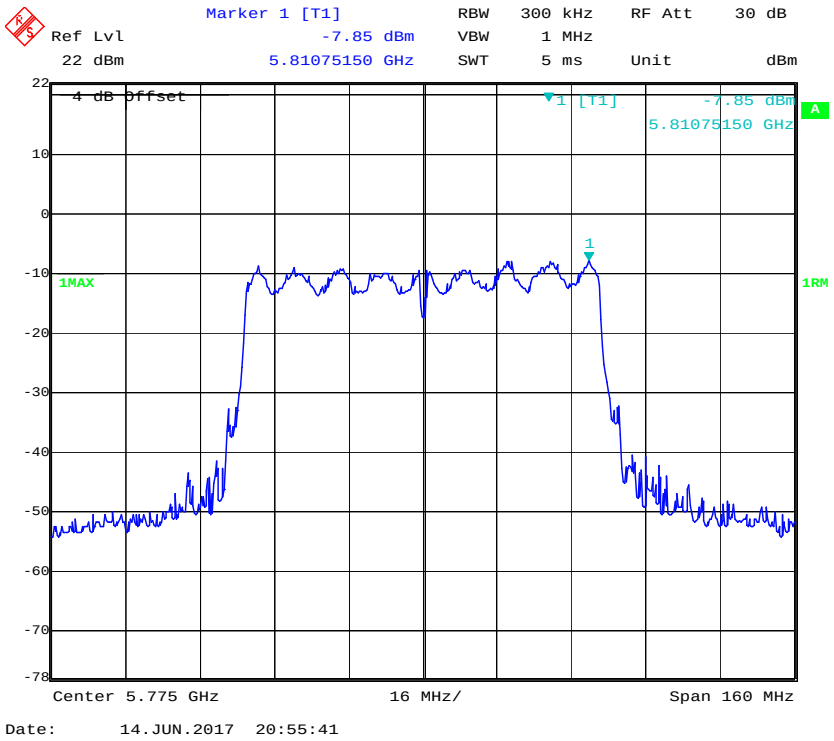


Date: 14.JUN.2017 20:58:22

802.11n ht40 High Channel



802.11ac80 Middle Channel



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