FCC PART 15.407

TEST REPORT

For

DSG Global Inc.

2630 Croydon Dr., Suite 312, Surrey, British Columbia, Canada V3Z6T3

Tested Model: DSG-121-VT
FCC ID: 2ARPX-DSG121VT

Report Type:	**Product Name:**
Original Report	Embedded Computer

Report Number:	RSC180927003-0F
Date of Report Issue:	2019-04-23
Reviewed By:	Sula Huang
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Chengdu) No.5040, Huilongwan Plaza, No. 1, Shawan Road, Jinniu District, Chengdu, Sichuan, China Tel: +86-28-65525123 Fax: +86-28-65525125 www.baclcorp.com

Note: This test report is 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). This report must not be used by the customer to claim product certification, approval, or endorsement by A2LA* or any agency of the Federal Government. * This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "*" .

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	DSG Global Inc.
Product	Embedded Computer
Tested Model	DSG-121-VT
FCC ID	2ARPX-DSG121VT
Voltage Range	DC 7.4V (Rechargeable Li-ion battery) or DC12V-75V from golf vehicle
Measure approximately	238 mm (L) x 323 mm (W) x 36 mm (H)
Frequency	5150-5250 MHz, 5725-5850 MHz
Sample serial number	180927003/01 (assigned by the BACL, Chengdu)
Received date	2018-09-27
Sample/EUT Status	Good condition

Note: The EUT conformed to test requirements and all measurement and test data in this report was gathered from final production sample. It may have deviation from any other sample.

Objective

This type approval report is prepared on behalf of **DSG Global Inc.** in accordance with Part 2-Subpart J, Part 15-Subparts A, C and E of the Federal Communications Commission rules.

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

Related Submittal(s)/Grant(s)

FCC Part 15C DTS submissions with FCC ID: 2ARPX-DSG121VT
FCC Part 15C DSS submissions with FCC ID: 2ARPX-DSG121VT
FCC Part 15C DXX submissions with FCC ID: 2ARPX-DSG121VT

Measurement Uncertainty

Item			Uncertainty
Radiated Emission(Field Strength)	30MHz-200MHz	H	4.63 dB
		V	4.88 dB
	200MHz-1GHz	H	5.02 dB
		V	6.06 dB
	1GHz-6GHz		4.51 dB
	6GHz-18GHz		4.49 dB
	18GHz-40GHz		5.48 dB
Conducted RF Power			±0.61dB
Power Spectrum Density			±0.61dB
Occupied Bandwidth			±5%
Conducted Emission			±1.5dB
Humidity			±5%
Temperature			±1℃

Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Methodology

All measurements contained in this report were conducted with:

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

2. KDB789033 D02 UNII Meas Guidance v02r01.

Test Facility

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

Bay Area Compliance Laboratories Corp. (Chengdu) lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4324.01) and the FCC designation No. CN1186 under the FCC KDB 974614 D01. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

For 5150~5250 MHz band, channels are provided to test as follows:

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

For 802.11a, 802.11ac20, 802.11n-HT20: Channel 36, 40 and 48 were tested; for 802.11ac40, 802.11n-HT40: Channel 38, 46 were tested; for 802.11ac80: Channel 42 was tested.

For 5725~5850 MHz band, channels are provided to test as follows:

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

For 802.11a, 802.11ac20, 802.11n-HT20: Channel 149, 157 and 165 were tested.
For 802.11n-HT40, 802.11ac40: Channel 151, 159 were tested; for 802.11 ac80: Channel 155 was tested.

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 data rates bandwidths, and modulations.

Note: 802.11a supports SISO, 802.11n/ac supports SISO and MIMO mode. For Radiated Emission, according to pretest, the worst case of 802.11a is Antenna 0, the worst case of 802.11ac/n are MIMO mode. So 802.11a Antenna 0 and 802.11ac/n MIMO mode test data were recorded in the report.

EUT Exercise Software

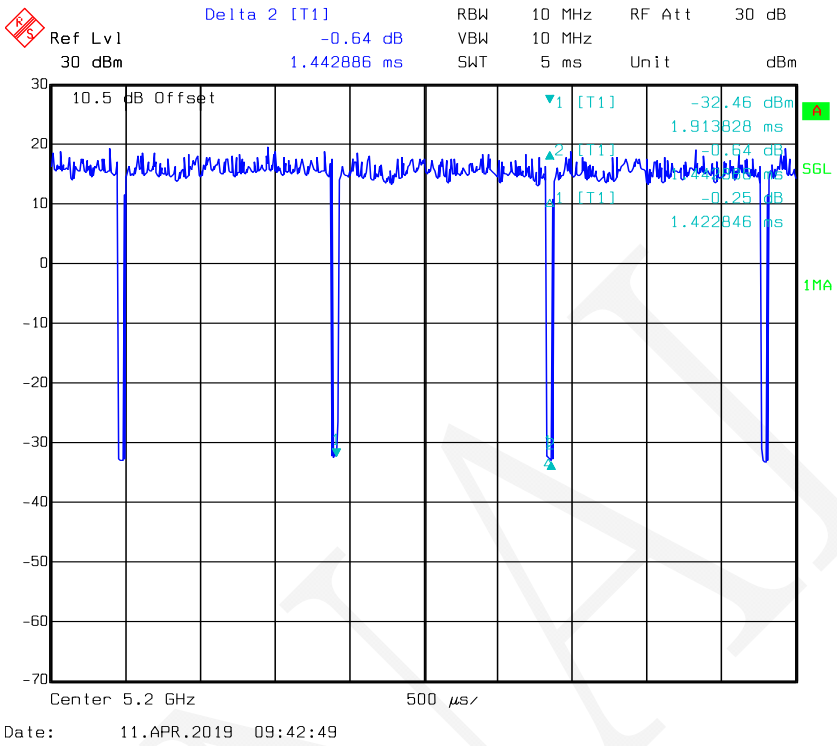
The software "RF Test tool" was used for testing, which was provided by manufacturer. The maximum power with maximum duty cycle was set as below:

Software				RF Test tool			
UNII Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)		Power Level	
				Antenna 0	Antenna 1	Antenna 0	Antenna 1
5150-5250MHz	802.11a	Low	5180	6	6	16	16
		Middle	5200	6	6	16	16
		High	5240	6	6	16	16
	802.11n-HT20	Low	5180	MCS0	MCS0	16	16
		Middle	5200	MCS0	MCS0	16	16
		High	5240	MCS0	MCS0	16	16
	802.11n-HT40	Low	5190	MCS0	MCS0	16	16
		High	5230	MCS0	MCS0	16	16
	802.11ac20	Low	5180	MCS0	MCS0	16	16
		Middle	5200	MCS0	MCS0	16	16
		High	5240	MCS0	MCS0	16	16
	802.11ac40	Low	5190	MCS0	MCS0	16	16
		High	5230	MCS0	MCS0	16	16
	802.11ac80	Middle	5210	MCS0	MCS0	16	16
5725-5850MHz	802.11a	Low	5745	6	6	16	16
		Middle	5785	6	6	16	16
		High	5825	6	6	16	16
	802.11n-HT20	Low	5745	MCS0	MCS0	16	16
		Middle	5785	MCS0	MCS0	16	16
		High	5825	MCS0	MCS0	16	16
	802.11n-HT40	Low	5755	MCS0	MCS0	16	16
		High	5795	MCS0	MCS0	16	16
	802.11ac20	Low	5745	MCS0	MCS0	16	16
		Middle	5785	MCS0	MCS0	16	16
		High	5825	MCS0	MCS0	16	16
	802.11ac40	Low	5755	MCS0	MCS0	16	16
		High	5795	MCS0	MCS0	16	16
	802.11ac80	Middle	5775	MCS0	MCS0	16	16

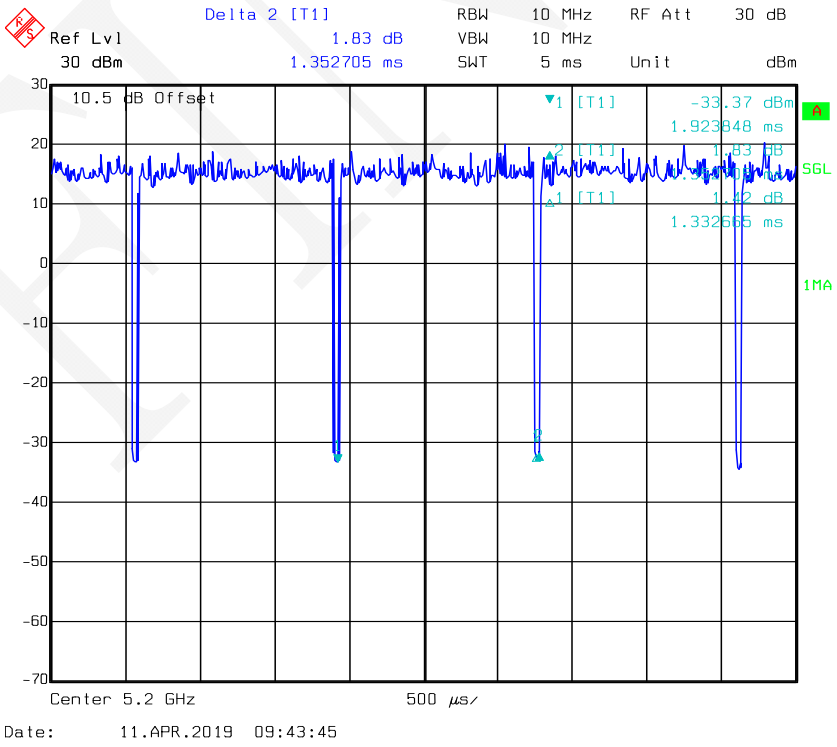
Duty Cycle information is below:

Mode	Ton (ms)	Ton+Toff (ms)	Duty cycle(%)
802.11a	1.42	1.44	98.61
802.11n-HT20	1.33	1.35	98.52
802.11n-HT40	0.67	0.69	97.10
802.11ac20	1.34	1.36	98.53
802.11ac40	0.67	0.69	97.10
802.11ac80	0.34	0.37	91.89

802.11a



802.11n- HT20



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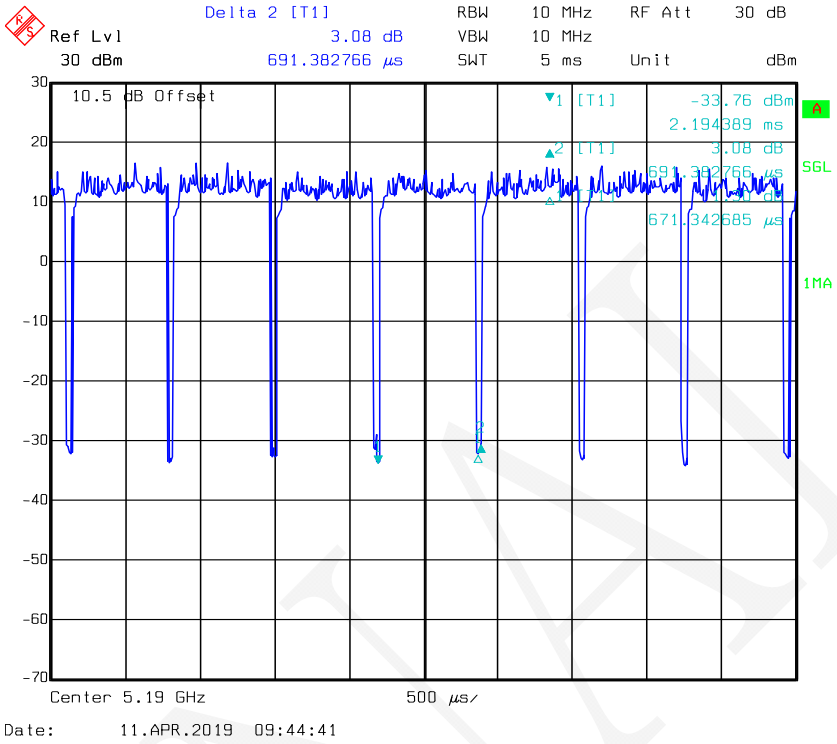
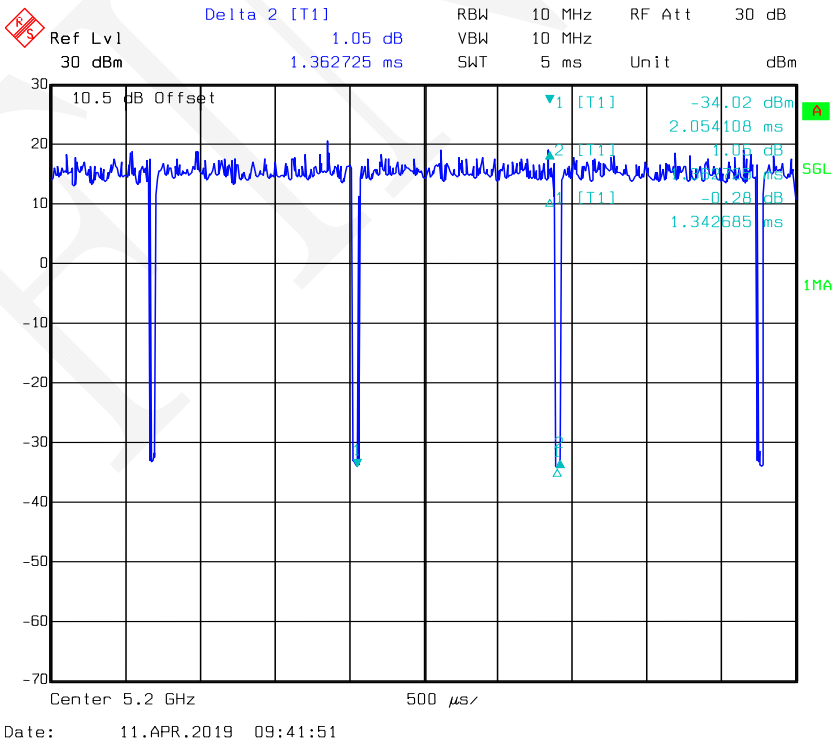


802.11ac20



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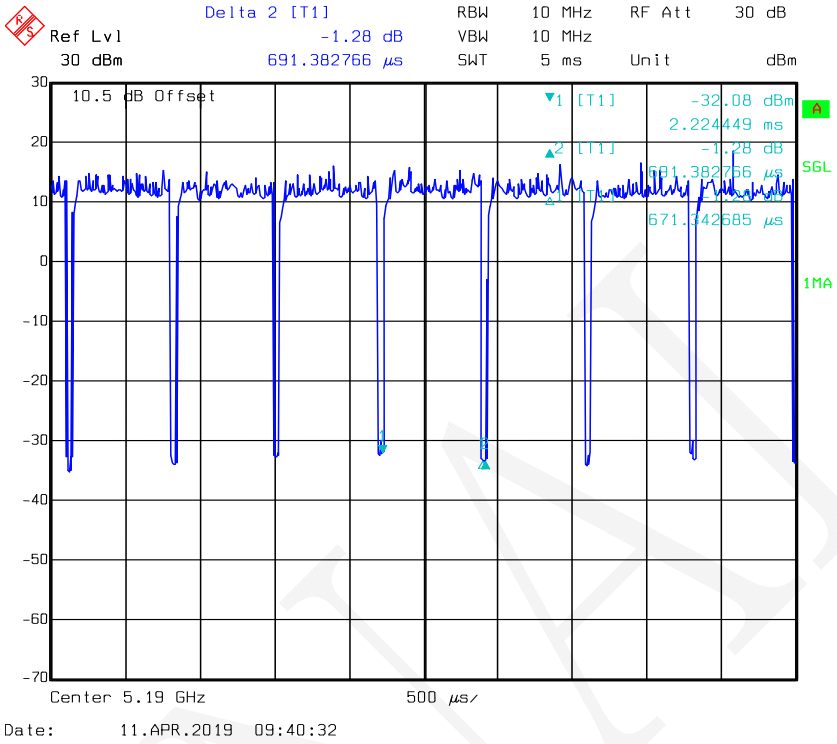
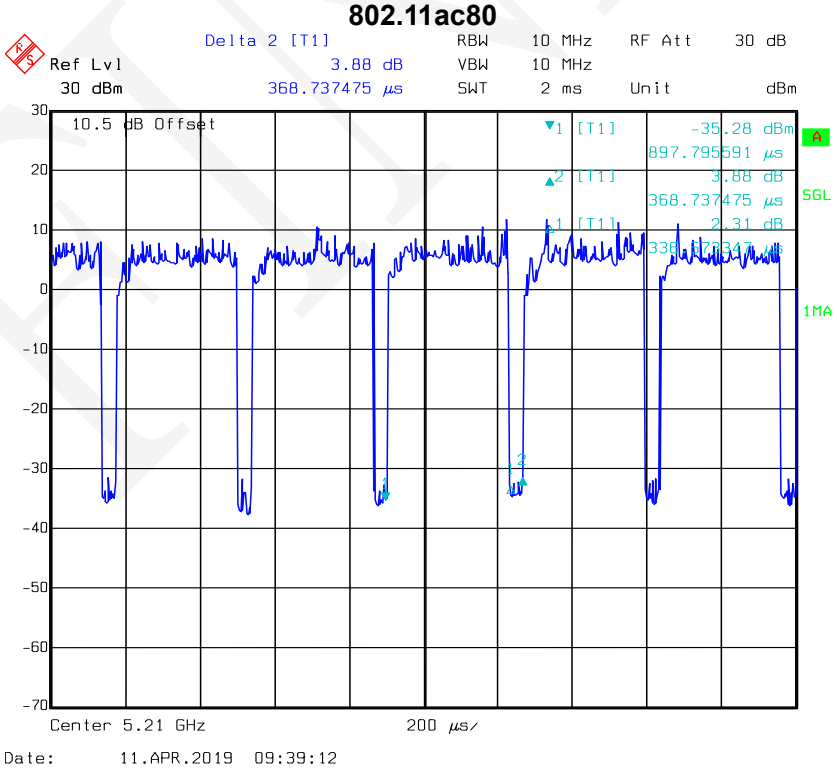


802.11ac80



Support Equipment List and Details

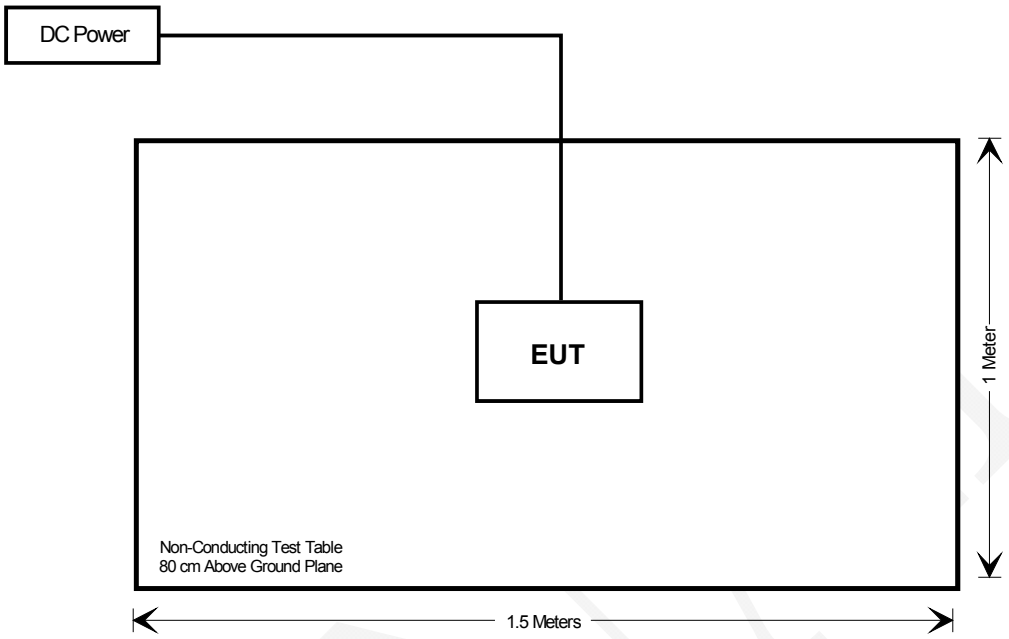
Manufacturer	Description	Model	Serial Number
-	-	-	-

External I/O Cable

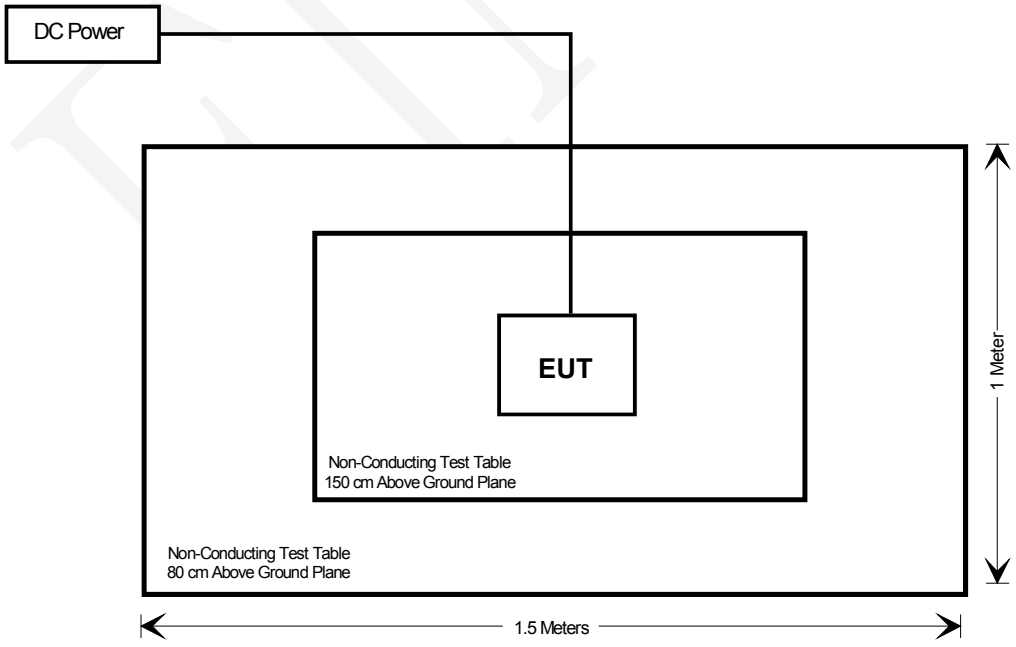
Cable Description	Length (m)	From	To
Power Cable	1.20	EUT	DC Power Source

Block Diagram of Test Setup

Below 1GHz:



Above 1GHz:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.407(f) & §1.1310 & §2.1091	Maximum Permissible Exposure(MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.407(b)(6)& §15.207(a)	Conducted Emissions	Not Applicable
§15.205& §15.209 §15.407(b) (1), (4)(i), (6), (7)	Undesirable Emission& Restricted Bands	Compliance
§15.407(b) (1), (4)(i)	Band Edge	Compliance
§15.407(a) (1),(3) & (e)	26dB & 6dB Bandwidth	Compliance
§15.407(a)(1),(3)	Conducted Transmitter Output Power	Compliance
§15.407 (a)(1),(3),(5)	Power Spectral Density	Compliance

Not Applicable: The device is battery operated equipment and only for golf vehicle use.

TEST EQUIPMENTS LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission					
EMCT	Semi-Anechoic Chamber	966	001	2017-05-18	2020-05-17
SONOMA INSTRUMENT	Amplifier	310 N	186684	2018-08-24	2019-08-23
SUNOL SCIENCES	Broadband Antenna	JB3	A121808	2017-05-19	2020-05-18
Rohde & Schwarz	EMI Test Receiver	ESR 3	102456	2018-06-22	2019-06-21
Rohde & Schwarz	Spectrum Analyzer	FSU26	200835	2019-04-15	2020-04-14
Rohde & Schwarz	Spectrum Analyzer	ESIB40	100215	2019-04-15	2020-04-14
A.H. Systems, Inc	Amplifier	PAM-0118P	467	2018-10-19	2019-10-18
EM Electronics	RF Pre-Amplifier	EM18G40	060725	2019-03-27	2020-03-26
SUNOL SCIENCES	Broadband Antenna	JB3	A121808	2017-05-19	2020-05-18
ETS	Horn Antenna	3115	003-6076	2017-05-19	2020-05-18
A.H. Systems, Inc	Horn Antenna	SAS-574	510	2017-05-19	2020-05-18
INMET	Attenuator	18N-6dB	64671	2018-11-27	2019-11-26
Sinoscite.,Co Ltd	Reject Band Filter	BSF5150-5850MN	0899V2	2018-11-10	2019-11-09
Unknown	RF Cable (below 1GHz)	L-E005	000005	2018-11-27	2019-11-26
Unknown	RF Cable (below 1GHz)	T-E128	000128	2018-11-27	2019-11-26
Unknown	RF Cable (below 1GHz)	T-E129	000129	2018-11-27	2019-11-26
Unknown	RF Cable (above 1GHz)	T-E069	000069	2018-11-10	2019-11-09
Micro-coax	RF Cable (Above 1GHz)	T-E209	MFR 64639 2310	2019-03-14	2020-03-13
Rohde & Schwarz	EMC32	EMC32	V9.10.00	NCR	NCR
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2018-05-09	2019-05-08
WEINSCHEL ENGINEERING	Attenuator	1A 10dB	AA4135	2018-11-10	2019-11-09
Agilent	USB Wideband Power Sensor	U2021XA	MY53320008	2019-01-17	2020-01-16
E-Microwave	DC Block	EMDCB-00036	OE01304225	2018-11-27	2019-11-26
Unknown	RF Cable	No	000007	Each Time	Each Time

Statement of Traceability: BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

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.

Per 447498 D01 General RF Exposure Guidance v06**,** simultaneous transmission MPE test exclusion applies when the sum of the MPE for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modeled or measured field strengths or power density, is ≤ 1.0.

Calculated Formulary:

Predication of MPE limit at a given distance

$$S = PG/4\pi R^2$$

Where:
S = 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:

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

The rated tune-up output power and antenna gain in the below table:

Calculated Data:

(WiFi or Bluetooth) + NFC + WCDMA/LTE module (FCC ID: RI7LE910NAV2)

MPE evaluation for single transmission:

Mode	Frequency Range (MHz)	Antenna Gain		Tune-up Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
WLAN	2412-2462	3.00	2.00	26.0	398.11	20	0.158	1.00
	5180-5240	3.00	2.00	13.00	19.95	20	0.008	1.00
	5745-5825	3.00	2.00	12.50	17.78	20	0.007	1.00
BT3.0	2402-2480	3.00	2.00	7.50	5.62	20	0.002	1.00
BLE	2402-2480	3.00	2.00	6.00	3.98	20	0.002	1.00
NFC	13.56	0.0	1.0	-15.0	0.03	20	0.00001	0.98
WCDMA Band 5	826.4-846.6	3.0	2.00	24.5	281.84	20	0.112	0.55
LTE Band 5	824.7-848.3	3.0	2.00	24.0	251.19	20	0.100	0.55
WCDMA Band 2	1852.4-1907.6	3.0	2.00	24.5	281.84	20	0.112	1.0
LTE Band 2	1850.7-1909.3	3.0	2.00	24.0	251.19	20	0.100	1.0
LTE Band 4	1710.7-1754.3	3.0	2.00	24.0	251.19	20	0.100	1.0
LTE Band 12	699.7-715.3	3.0	2.00	24.0	251.19	20	0.100	0.47
LTE Band 13	779.5-784.5	3.0	2.00	24.0	251.19	20	0.100	0.52
LTE Band 17	706.5-713.5	3.0	2.00	24.0	251.19	20	0.100	0.47

MPE evaluation for simultaneous transmission:

Note: 1. Wi-Fi(2.4G) or Wi-Fi(5G) and Bluetooth can not transmit simultaneously.
2. Wi-Fi(2.4G) and Wi-Fi(5G) can not transmit simultaneously.

Wi-Fi or Bluetooth & NFC & WCDMA/LTE can transmit at the same time, MPE evaluation is as below formula:

PD1/Limit1+PD2/Limit2+……＜1, PD (Power Density)

The worst case is as below:

Max MPE of Wi-Fi + Max MPE of NFC + Max MPE of LTE
= 0.158/1.0+0+0.10/0.47=0.371＜1.0

Result: MPE evaluation of single and simultaneous transmission meet the requirement of standard.

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 user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.
Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

Antenna Connector Construction

The EUT has one Wi-Fi/BT antenna, one Wi-Fi antenna, one NFC antenna, one LTE main antenna and one LTE diversity antenna which are permanently attached and fulfill the requirement of this section. Please refer to the EUT photos.

RF Mode	Manufacturer	Antenna Model	Max. Antenna Gain	Antenna Type
2.4G WLAN	Asian Creation Communication Co., ltd.	Chain 0 AC-Q2458N17-20MHF4	3dBi	PCB Antenna
5G WLAN				
Bluetooth				
2.4G WLAN	Asian Creation Communication Co., ltd.	Chain 1 AC-Q2458N17-20MHF4	3dBi	PCB Antenna
5G WLAN				
NFC	SHENZHEN SUNSHINE GOOD ELECTRONICS CO.,LTD	P134FQ2137A0	0dBi	FPC Antenna
4G (Main)	ShenZhen Master Wireless Technology Co.,Ltd.	JZC-4G-MP-V01	3dBi	PCB Antenna
4G (Diversity)	ShenZhen Master Wireless Technology Co.,Ltd.	JZC-4G-MP-V01	3dBi	PCB Antenna

Result: Compliance.

FCC §15.209, §15.205 & §15.407(b) (1) (4)(i) (6) (7) – UNDESIRABLE EMISSION, RESTRICTED BANDS

Applicable Standard

FCC §15.407 (b) (1) (4)(i), (6), (7); §15.209; §15.205

FCC 15.407 (b)

(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.

(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.

(6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

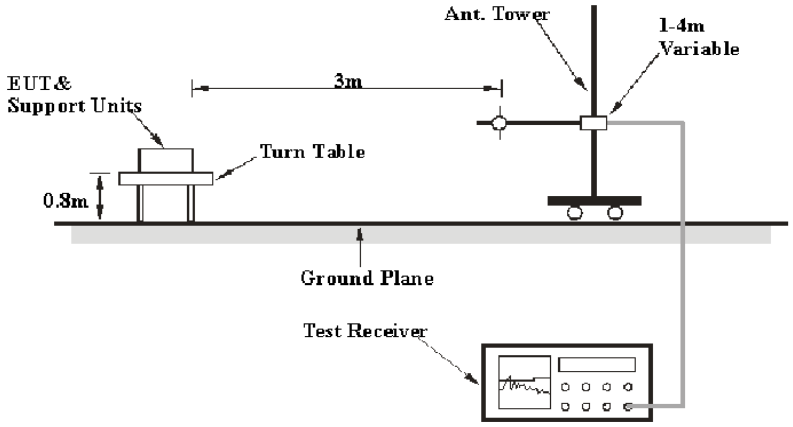
(7) The provisions of §15.205 apply to intentional radiators operating under this section.

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

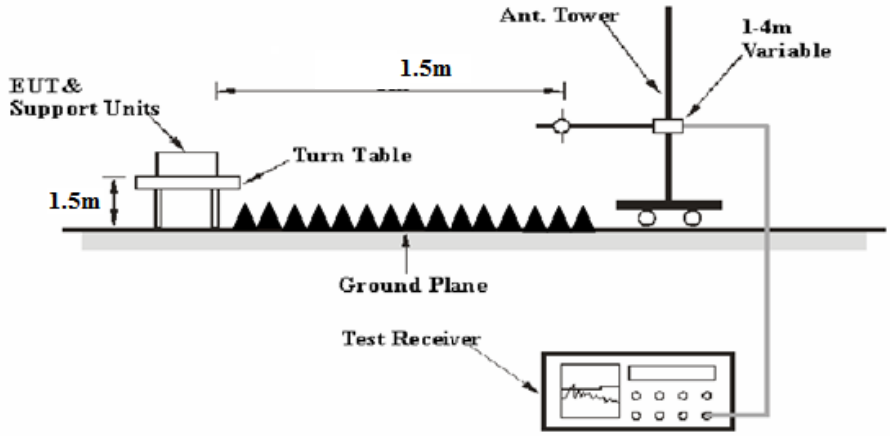
1) For 75 MHz above or below the band edge, a level of -27 dBm/MHz (68.2dBμV/m) was applied.
2) For 25MHz-75 MHz above or below the band edge, a level of 10 dBm/MHz (105.2dBμV/m) was applied.
3) For 5MHz-25 MHz above or below the band edge, a level of 15.6 dBm/MHz (110.8dBμV/m) was applied.
4) For 0 MHz-5 MHz above or below the band edge, a level of 27 dBm/MHz (122.2dBμV/m) was applied.

EUT Setup

Below 1GHz:



Above 1 GHz:



The radiated emission tests were performed in the 3 meters semi-anechoic 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.

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 setup was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1GHz	1MHz	3 MHz	/	PK
	1MHz	3MHz	/	AV

Test Procedure

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 1 GHz.

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

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

Corrected Amplitude & Margin Calculation

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

Corrected Amplitude = Receiver Reading + Cable loss + Antenna Factor – Amplifier Gain

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

Margin = Limit-Corrected Amplitude

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, Section 15.205 and 15.209, Subpart E, Section 15.407.

Test Data

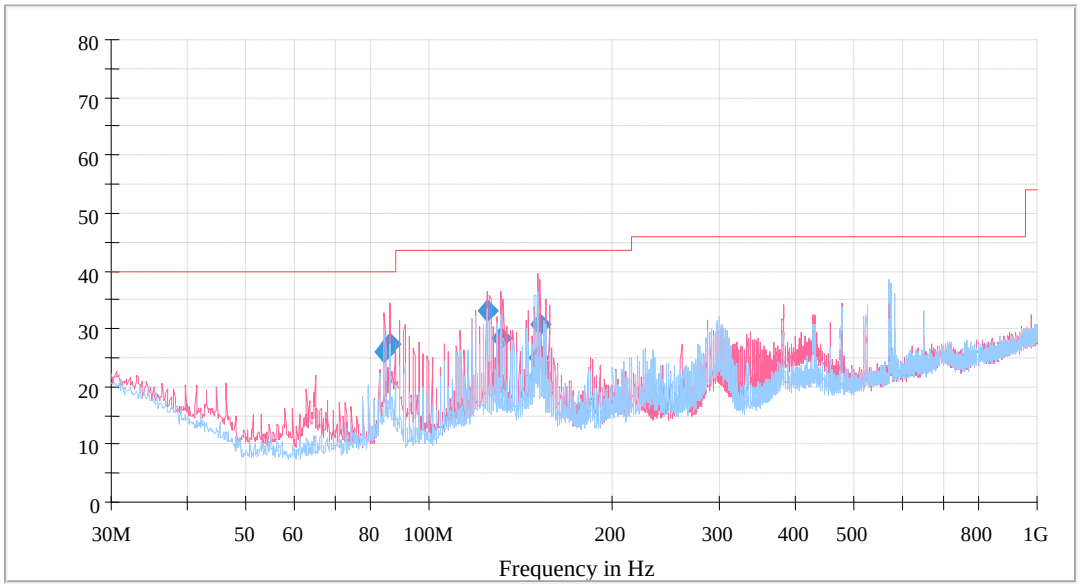
Environmental Conditions

Temperature:	26 °C
Relative Humidity:	55 %
ATM Pressure:	95.4 kPa

The testing was performed by Tom Tang on 2019-04-16.

Test mode: Transmitting –worst case

30 MHz to 1 GHz: (5150-5250 MHz band-802.11ac20-High channel)



Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Polarization	Azimuth (deg)	Corrected Factor (dB/m)
84.562500	26.09	40.00	13.91	131.0	V	5.0	-16.8
86.260000	27.42	40.00	12.58	133.0	V	4.0	-16.8
124.453750	32.93	43.50	10.57	201.0	V	0.0	-11.2
131.001250	28.49	43.50	15.01	100.0	V	161.0	-10.4
150.886250	24.89	43.50	18.61	101.0	V	208.0	-11.2
152.583750	30.59	43.50	12.91	101.0	V	148.0	-11.3

1GHz-40GHz

(Note: Above 1GHz was performed at distance 1.5m)

For 5150-5250 MHz:

For 802.11a mode (SISO) (Antenna 0-Worst Case)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Extrapolation Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Measurement (PK /AV)	Polar (H/V)	Factor (dB/m)						
Frequency: 5180 MHz										
5180	70.63	PK	H	34.51	4.54	0.00	109.68	103.68	N/A	N/A
5180	60.55	AV	H	34.51	4.54	0.00	99.60	93.60	N/A	N/A
5180	72.56	PK	V	34.51	4.54	0.00	111.61	105.61	N/A	N/A
5180	62.43	AV	V	34.51	4.54	0.00	101.48	95.48	N/A	N/A
5150	35.58	PK	V	34.49	4.53	0.00	74.60	68.60	74.00	5.40
5150	16.64	AV	V	34.49	4.53	0.00	55.66	49.66	54.00	4.34
10360	53.03	PK	V	38.67	6.52	44.50	53.72	47.72	68.20	20.48
Frequency: 5200 MHz										
5200	70.34	PK	H	34.52	4.55	0.00	109.41	103.41	N/A	N/A
5200	60.24	AV	H	34.52	4.55	0.00	99.31	93.31	N/A	N/A
5200	73.74	PK	V	34.52	4.55	0.00	112.81	106.81	N/A	N/A
5200	63.49	AV	V	34.52	4.55	0.00	102.56	96.56	N/A	N/A
10400	52.78	PK	V	38.68	6.53	44.53	53.46	47.46	68.20	20.74
Frequency: 5240 MHz										
5240	69.55	PK	H	34.54	4.57	0.00	108.66	102.66	N/A	N/A
5240	59.54	AV	H	34.54	4.57	0.00	98.65	92.65	N/A	N/A
5240	74.83	PK	V	34.54	4.57	0.00	113.94	107.94	N/A	N/A
5240	64.47	AV	V	34.54	4.57	0.00	103.58	97.58	N/A	N/A
5350	27.82	PK	V	34.61	4.62	0.00	67.05	61.05	74.00	12.95
5350	15.36	AV	V	34.61	4.62	0.00	54.59	48.59	54.00	5.41
10480	51.79	PK	V	38.70	6.55	44.59	52.45	46.45	68.20	21.75

For 802.11n-HT20 mode (MIMO)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Measurement (PK /AV)	Polar (H/V)	Factor (dB/m)						
Frequency: 5180 MHz										
5180	70.09	PK	H	34.51	4.54	0.00	109.14	103.14	N/A	N/A
5180	60.19	AV	H	34.51	4.54	0.00	99.24	93.24	N/A	N/A
5180	71.88	PK	V	34.51	4.54	0.00	110.93	104.93	N/A	N/A
5180	62.17	AV	V	34.51	4.54	0.00	101.22	95.22	N/A	N/A
5150	28.42	PK	V	34.49	4.53	0.00	67.44	61.44	74.00	12.56
5150	16.49	AV	V	34.49	4.53	0.00	55.51	49.51	54.00	4.49
10360	51.79	PK	V	38.67	6.52	44.50	52.48	46.48	68.20	21.72
Frequency: 5200 MHz										
5200	69.54	PK	H	34.52	4.55	0.00	108.61	102.61	N/A	N/A
5200	59.48	AV	H	34.52	4.55	0.00	98.55	92.55	N/A	N/A
5200	72.76	PK	V	34.52	4.55	0.00	111.83	105.83	N/A	N/A
5200	61.54	AV	V	34.52	4.55	0.00	100.61	94.61	N/A	N/A
10400	51.11	PK	V	38.68	6.53	44.53	51.79	45.79	68.20	22.41
Frequency: 5240 MHz										
5240	69.29	PK	H	34.54	4.57	0.00	108.40	102.40	N/A	N/A
5240	59.11	AV	H	34.54	4.57	0.00	98.22	92.22	N/A	N/A
5240	73.98	PK	V	34.54	4.57	0.00	113.09	107.09	N/A	N/A
5240	61.12	AV	V	34.54	4.57	0.00	100.23	94.23	N/A	N/A
5350	26.28	PK	V	34.61	4.62	0.00	65.51	59.51	74.00	14.49
5350	15.39	AV	V	34.61	4.62	0.00	54.62	48.62	54.00	5.38
10480	50.94	PK	V	38.70	6.55	44.59	51.60	45.60	68.20	22.60

For 802.11n-HT40 mode (MIMO)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Extrapolation Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Measurement (PK /AV)	Polar (H/V)	Factor (dB/m)						
Frequency: 5190 MHz										
5190	67.05	PK	H	34.51	4.55	0.00	106.11	100.11	N/A	N/A
5190	56.82	AV	H	34.51	4.55	0.00	95.88	89.88	N/A	N/A
5190	71.13	PK	V	34.51	4.55	0.00	110.19	104.19	N/A	N/A
5190	60.19	AV	V	34.51	4.55	0.00	99.25	93.25	N/A	N/A
5150	37.98	PK	V	34.49	4.53	0.00	77.00	71.00	74.00	3.00
5150	19.04	AV	V	34.49	4.53	0.00	58.06	52.06	54.00	1.94
10380	49.02	PK	V	38.68	6.52	44.52	49.70	43.70	68.20	24.50
Frequency: 5230 MHz										
5230	67.09	PK	H	34.54	4.57	0.00	106.20	100.20	N/A	N/A
5230	56.49	AV	H	34.54	4.57	0.00	95.60	89.60	N/A	N/A
5230	71.46	PK	V	34.54	4.57	0.00	110.57	104.57	N/A	N/A
5230	61.34	AV	V	34.54	4.57	0.00	100.45	94.45	N/A	N/A
5350	27.02	PK	V	34.61	4.62	0.00	66.25	60.25	74.00	13.75
5350	15.38	AV	V	34.61	4.62	0.00	54.61	48.61	54.00	5.39
10460	49.87	PK	V	38.69	6.55	44.57	50.54	44.54	68.20	23.66

For 802.11ac20 mode (MIMO)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Extrapolation Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Measurement (PK /AV)	Polar (H/V)	Factor (dB/m)						
Frequency: 5180 MHz										
5180	70.36	PK	H	34.51	4.54	0.00	109.41	103.41	N/A	N/A
5180	60.19	AV	H	34.51	4.54	0.00	99.24	93.24	N/A	N/A
5180	72.12	PK	V	34.51	4.54	0.00	111.17	105.17	N/A	N/A
5180	62.12	AV	V	34.51	4.54	0.00	101.17	95.17	N/A	N/A
5150	28.29	PK	V	34.49	4.53	0.00	67.31	61.31	74.00	12.69
5150	16.49	AV	V	34.49	4.53	0.00	55.51	49.51	54.00	4.49
10360	52.06	PK	V	38.67	6.52	44.50	52.75	46.75	68.20	21.45
Frequency: 5200 MHz										
5200	70.13	PK	H	34.52	4.55	0.00	109.20	103.20	N/A	N/A
5200	60.01	AV	H	34.52	4.55	0.00	99.08	93.08	N/A	N/A
5200	73.59	PK	V	34.52	4.55	0.00	112.66	106.66	N/A	N/A
5200	63.37	AV	V	34.52	4.55	0.00	102.44	96.44	N/A	N/A
10400	51.67	PK	V	38.68	6.53	44.53	52.35	46.35	68.20	21.85
Frequency: 5240 MHz										
5240	69.26	PK	H	34.54	4.57	0.00	108.37	102.37	N/A	N/A
5240	59.39	AV	H	34.54	4.57	0.00	98.50	92.50	N/A	N/A
5240	74.38	PK	V	34.54	4.57	0.00	113.49	107.49	N/A	N/A
5240	64.33	AV	V	34.54	4.57	0.00	103.44	97.44	N/A	N/A
5350	26.11	PK	V	34.61	4.62	0.00	65.34	59.34	74.00	14.66
5350	15.26	AV	V	34.61	4.62	0.00	54.49	48.49	54.00	5.51
10480	50.76	PK	V	38.70	6.55	44.59	51.42	45.42	68.20	22.78

For 802.11ac40 mode (MIMO)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Extrapolation Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Measurement (PK /AV)	Polar (H/V)	Factor (dB/m)						
Frequency: 5190 MHz										
5190	66.95	PK	H	34.51	4.55	0.00	106.01	100.01	N/A	N/A
5190	56.54	AV	H	34.51	4.55	0.00	95.60	89.60	N/A	N/A
5190	70.72	PK	V	34.51	4.55	0.00	109.78	103.78	N/A	N/A
5190	60.23	AV	V	34.51	4.55	0.00	99.29	93.29	N/A	N/A
5150	37.31	PK	V	34.49	4.53	0.00	76.33	70.33	74.00	3.67
5150	19.34	AV	V	34.49	4.53	0.00	58.36	52.36	54.00	1.64
10380	48.14	PK	V	38.68	6.52	44.52	48.82	42.82	68.20	25.38
Frequency: 5230 MHz										
5230	66.78	PK	H	34.54	4.57	0.00	105.89	99.89	N/A	N/A
5230	56.37	AV	H	34.54	4.57	0.00	95.48	89.48	N/A	N/A
5230	71.33	PK	V	34.54	4.57	0.00	110.44	104.44	N/A	N/A
5230	61.31	AV	V	34.54	4.57	0.00	100.42	94.42	N/A	N/A
5350	26.59	PK	V	34.61	4.62	0.00	65.82	59.82	74.00	14.18
5350	15.46	AV	V	34.61	4.62	0.00	54.69	48.69	54.00	5.31
10460	49.52	PK	V	38.69	6.55	44.57	50.19	44.19	68.20	24.01

For 802.11ac80 mode (MIMO)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Extrapolation Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Measurement (PK /AV)	Polar (H/V)	Factor (dB/m)						
Frequency: 5210 MHz										
5210	65.33	PK	H	34.53	4.56	0.00	104.42	98.42	N/A	N/A
5210	53.41	AV	H	34.53	4.56	0.00	92.50	86.50	N/A	N/A
5210	69.14	PK	V	34.53	4.56	0.00	108.23	102.23	N/A	N/A
5210	57.33	AV	V	34.53	4.56	0.00	96.42	90.42	N/A	N/A
5150	32.43	PK	V	34.49	4.53	0.00	71.45	65.45	74.00	8.55
5150	19.33	AV	V	34.49	4.53	0.00	58.35	52.35	54.00	1.65
5350	28.28	PK	V	34.61	4.62	0.00	67.51	61.51	74.00	12.49
5350	15.55	AV	V	34.61	4.62	0.00	54.78	48.78	54.00	5.22
10420	49.34	PK	V	38.68	6.54	44.55	50.01	44.01	68.20	24.19

Note:
Corrected Amplitude = Corrected Factor + Reading
Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Margin = Limit- Corr. Amplitude

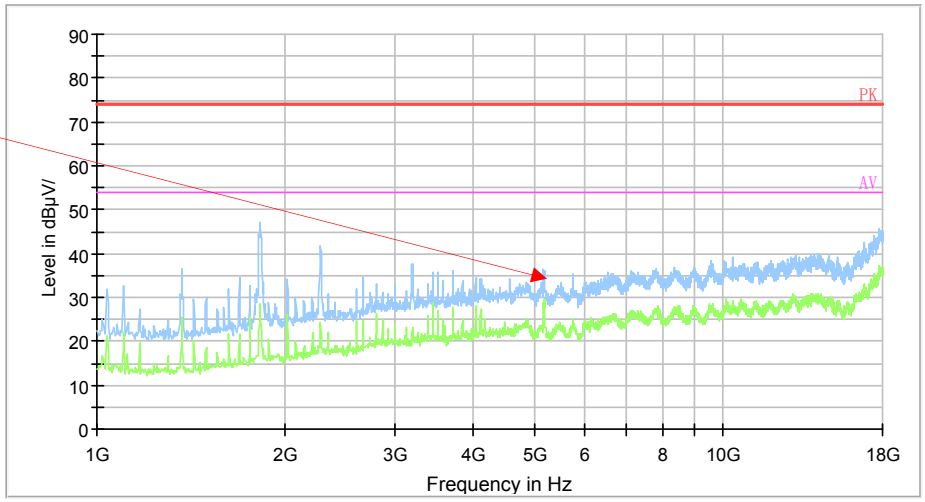
Spurious emissions more than 20 dB below the limit were not reported.

Please refer to the below pre-scan plot of worst case:

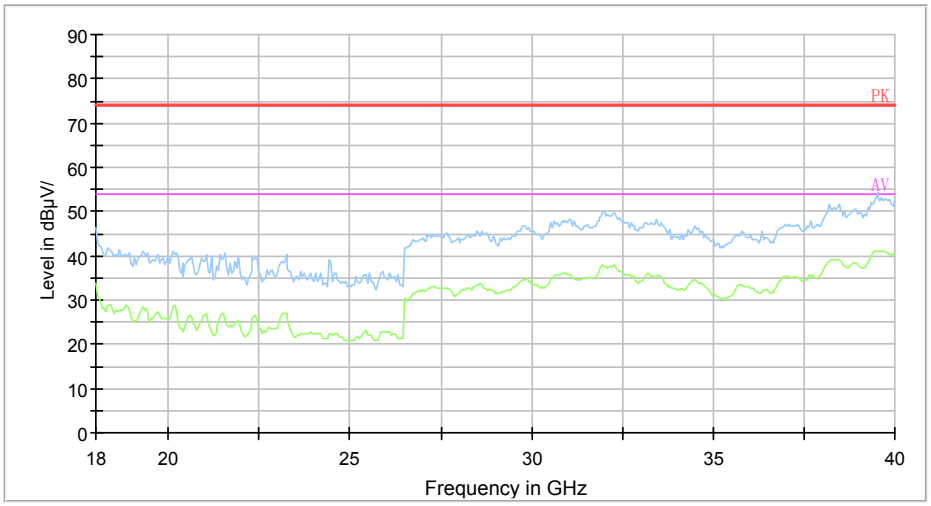
Note: The test distance is 1.5m and distance factor add to the total factor.

802.11ac40 Mode: _Horizontal_1GHz-18GHz

Fundamental with Reject Band Filter

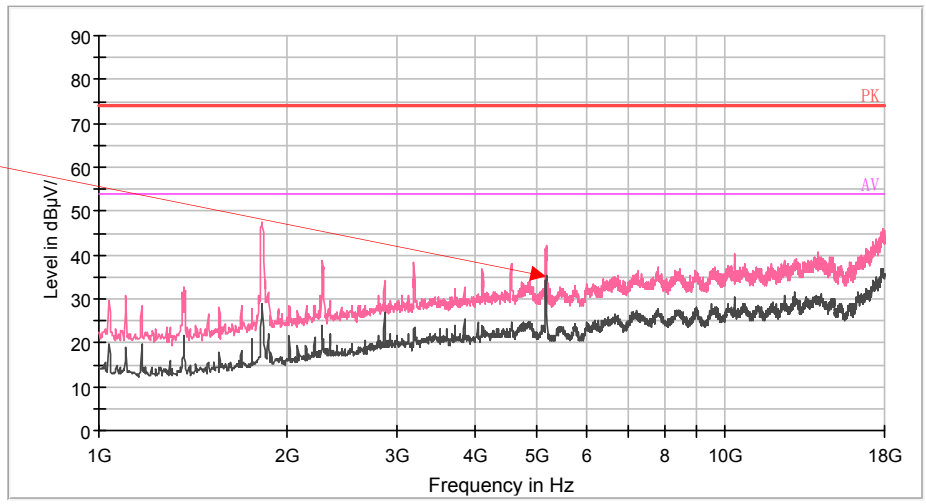


802.11ac40 Mode: Horizontal_18GHz-40GHz

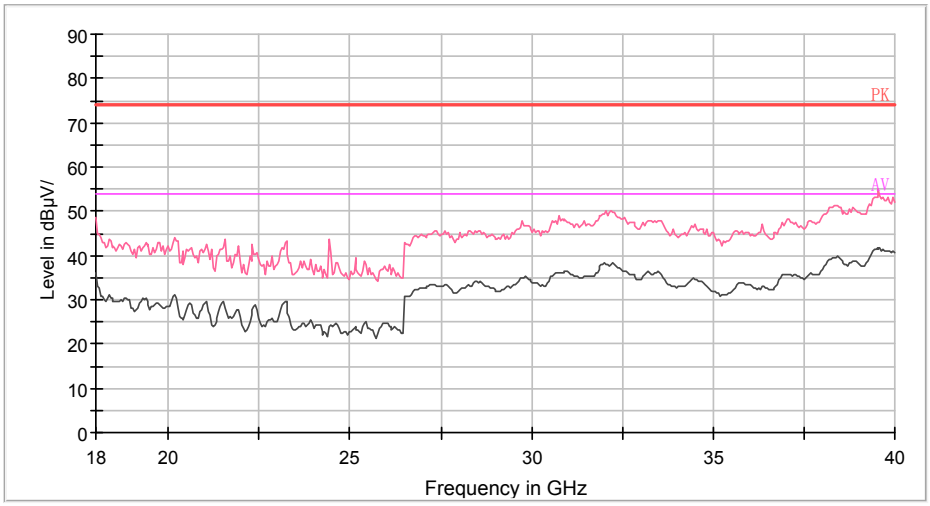


802.11ac40 Mode: Vertical_1GHz-18GHz

Fundamental with Reject Band Filter



802.11ac40 Mode: Vertical_18GHz-40GHz



For 5725-5850 MHz

For 802.11a mode (SISO) (Antenna 0-Worst Case)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Extrapolation Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Measurement (PK /AV)	Polar (H/V)	Factor (dB/m)						
Frequency: 5745 MHz										
5745	64.52	PK	H	34.75	4.81	0.00	104.08	98.08	N/A	N/A
5745	54.49	AV	H	34.75	4.81	0.00	94.05	88.05	N/A	N/A
5745	71.67	PK	V	34.75	4.81	0.00	111.23	105.23	N/A	N/A
5745	61.91	AV	V	34.75	4.81	0.00	101.47	95.47	N/A	N/A
5650	26.43	PK	V	34.73	4.76	0.00	65.92	59.92	68.20	8.28
5700	30.91	PK	V	34.74	4.79	0.00	70.44	64.44	105.20	40.76
5720	40.26	PK	V	34.74	4.80	0.00	79.80	73.80	110.80	37.00
5725	42.12	PK	V	34.75	4.80	0.00	81.67	75.67	122.20	46.53
11490	47.97	PK	V	38.90	6.89	44.64	49.12	43.12	74.00	30.88
11490	41.14	AV	V	38.90	6.89	44.64	42.29	36.29	54.00	17.71
Frequency: 5785 MHz										
5785	63.79	PK	H	34.76	4.83	0.00	103.38	97.38	N/A	N/A
5785	53.63	AV	H	34.76	4.83	0.00	93.22	87.22	N/A	N/A
5785	71.24	PK	V	34.76	4.83	0.00	110.83	104.83	N/A	N/A
5785	60.66	AV	V	34.76	4.83	0.00	100.25	94.25	N/A	N/A
11570	48.54	PK	V	38.91	6.91	44.46	49.90	43.90	74.00	30.10
11570	42.32	AV	V	38.91	6.91	44.46	43.68	37.68	54.00	16.32
Frequency: 5825 MHz										
5825	63.47	PK	H	34.77	4.85	0.00	103.09	97.09	N/A	N/A
5825	53.06	AV	H	34.77	4.85	0.00	92.68	86.68	N/A	N/A
5825	71.04	PK	V	34.77	4.85	0.00	110.66	104.66	N/A	N/A
5825	59.87	AV	V	34.77	4.85	0.00	99.49	93.49	N/A	N/A
5850	28.21	PK	V	34.77	4.86	0.00	67.84	61.84	122.20	60.36
5855	28.03	PK	V	34.77	4.86	0.00	67.66	61.66	110.80	49.14
5875	27.59	PK	V	34.78	4.87	0.00	67.24	61.24	105.20	43.96
5925	27.23	PK	V	34.79	4.89	0.00	66.91	60.91	68.20	7.29
11650	49.37	PK	V	38.93	6.94	44.27	50.97	44.97	74.00	29.03
11650	43.52	AV	V	38.93	6.94	44.27	45.12	39.12	54.00	14.88

For 802.11n-HT20 mode (MIMO)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Measurement (PK /AV)	Polar (H/V)	Factor (dB/m)						
Frequency: 5745 MHz										
5745	64.36	PK	H	34.75	4.81	0.00	103.92	97.92	N/A	N/A
5745	54.11	AV	H	34.75	4.81	0.00	93.67	87.67	N/A	N/A
5745	71.44	PK	V	34.75	4.81	0.00	111.00	105.00	N/A	N/A
5745	61.49	AV	V	34.75	4.81	0.00	101.05	95.05	N/A	N/A
5650	26.41	PK	V	34.73	4.76	0.00	65.90	59.90	68.20	8.30
5700	32.85	PK	V	34.74	4.79	0.00	72.38	66.38	105.20	38.82
5720	41.19	PK	V	34.74	4.80	0.00	80.73	74.73	110.80	36.07
5725	42.66	PK	V	34.75	4.80	0.00	82.21	76.21	122.20	45.99
11490	46.98	PK	V	38.90	6.89	44.64	48.13	42.13	74.00	31.87
11490	40.86	AV	V	38.90	6.89	44.64	42.01	36.01	54.00	17.99
Frequency: 5785 MHz										
5785	63.96	PK	H	34.76	4.83	0.00	103.55	97.55	N/A	N/A
5785	54.07	AV	H	34.76	4.83	0.00	93.66	87.66	N/A	N/A
5785	71.29	PK	V	34.76	4.83	0.00	110.88	104.88	N/A	N/A
5785	61.07	AV	V	34.76	4.83	0.00	100.66	94.66	N/A	N/A
11570	48.22	PK	V	38.91	6.91	44.46	49.58	43.58	74.00	30.42
11570	41.84	AV	V	38.91	6.91	44.46	43.20	37.20	54.00	16.80
Frequency: 5825 MHz										
5825	63.54	PK	H	34.77	4.85	0.00	103.16	97.16	N/A	N/A
5825	53.43	AV	H	34.77	4.85	0.00	93.05	87.05	N/A	N/A
5825	70.84	PK	V	34.77	4.85	0.00	110.46	104.46	N/A	N/A
5825	60.48	AV	V	34.77	4.85	0.00	100.10	94.10	N/A	N/A
5850	28.72	PK	V	34.77	4.86	0.00	68.35	62.35	122.20	59.85
5855	27.39	PK	V	34.77	4.86	0.00	67.02	61.02	110.80	49.78
5875	26.77	PK	V	34.78	4.87	0.00	66.42	60.42	105.20	44.78
5925	26.73	PK	V	34.79	4.89	0.00	66.41	60.41	68.20	7.79
11650	48.87	PK	V	38.93	6.94	44.27	50.47	44.47	74.00	29.53
11650	42.67	AV	V	38.93	6.94	44.27	44.27	38.27	54.00	15.73

For 802.11n-HT40 mode (MIMO)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Measurement (PK /AV)	Polar (H/V)	Factor (dB/m)						
Frequency: 5755 MHz										
5755	64.84	PK	H	34.75	4.81	0.00	104.40	98.40	N/A	N/A
5755	54.39	AV	H	34.75	4.81	0.00	93.95	87.95	N/A	N/A
5755	71.46	PK	V	34.75	4.81	0.00	111.02	105.02	N/A	N/A
5755	61.24	AV	V	34.75	4.81	0.00	100.80	94.80	N/A	N/A
5650	26.98	PK	V	34.73	4.76	0.00	66.47	60.47	68.20	7.73
5700	29.84	PK	V	34.74	4.79	0.00	69.37	63.37	105.20	41.83
5720	33.76	PK	V	34.74	4.80	0.00	73.30	67.30	110.80	43.50
5725	36.86	PK	V	34.75	4.80	0.00	76.41	70.41	122.20	51.79
11510	48.97	PK	V	38.90	6.89	44.61	50.15	44.15	74.00	29.85
11510	41.94	AV	V	38.90	6.89	44.61	43.12	37.12	54.00	16.88
Frequency: 5795 MHz										
5795	64.11	PK	H	34.76	4.83	0.00	103.70	97.70	N/A	N/A
5795	53.47	AV	H	34.76	4.83	0.00	93.06	87.06	N/A	N/A
5795	71.13	PK	V	34.76	4.83	0.00	110.72	104.72	N/A	N/A
5795	60.81	AV	V	34.76	4.83	0.00	100.40	94.40	N/A	N/A
5850	26.29	PK	V	34.77	4.86	0.00	65.92	59.92	122.20	62.28
5855	26.78	PK	V	34.77	4.86	0.00	66.41	60.41	110.80	50.39
5875	27.45	PK	V	34.78	4.87	0.00	67.10	61.10	105.20	44.10
5925	26.63	PK	V	34.79	4.89	0.00	66.31	60.31	68.20	7.89
11590	47.59	PK	V	38.92	6.92	44.41	49.02	43.02	74.00	30.98
11590	39.43	AV	V	38.92	6.92	44.41	40.86	34.86	54.00	19.14

For 802.11ac20 mode (MIMO)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Measurement (PK /AV)	Polar (H/V)	Factor (dB/m)						
Frequency: 5745 MHz										
5745	64.11	PK	H	34.75	4.81	0.00	103.67	97.67	N/A	N/A
5745	54.23	AV	H	34.75	4.81	0.00	93.79	87.79	N/A	N/A
5745	71.45	PK	V	34.75	4.81	0.00	111.01	105.01	N/A	N/A
5745	61.45	AV	V	34.75	4.81	0.00	101.01	95.01	N/A	N/A
5650	26.58	PK	V	34.73	4.76	0.00	66.07	60.07	68.20	8.13
5700	29.24	PK	V	34.74	4.79	0.00	68.77	62.77	105.20	42.43
5720	38.33	PK	V	34.74	4.80	0.00	77.87	71.87	110.80	38.93
5725	39.26	PK	V	34.75	4.80	0.00	78.81	72.81	122.20	49.39
11490	47.65	PK	V	38.90	6.89	44.64	48.80	42.80	74.00	31.20
11490	40.01	AV	V	38.90	6.89	44.64	41.16	35.16	54.00	18.84
Frequency: 5785 MHz										
5785	63.77	PK	H	34.76	4.83	0.00	103.36	97.36	N/A	N/A
5785	53.74	AV	H	34.76	4.83	0.00	93.33	87.33	N/A	N/A
5785	71.08	PK	V	34.76	4.83	0.00	110.67	104.67	N/A	N/A
5785	60.78	AV	V	34.76	4.83	0.00	100.37	94.37	N/A	N/A
11570	48.49	PK	V	38.91	6.91	44.46	49.85	43.85	74.00	30.15
11570	41.51	AV	V	38.91	6.91	44.46	42.87	36.87	54.00	17.13
Frequency: 5825 MHz										
5825	64.02	PK	H	34.77	4.85	0.00	103.64	97.64	N/A	N/A
5825	53.73	AV	H	34.77	4.85	0.00	93.35	87.35	N/A	N/A
5825	71.16	PK	V	34.77	4.85	0.00	110.78	104.78	N/A	N/A
5825	60.89	AV	V	34.77	4.85	0.00	100.51	94.51	N/A	N/A
5850	31.07	PK	V	34.77	4.86	0.00	70.70	64.70	122.20	57.50
5855	27.04	PK	V	34.77	4.86	0.00	66.67	60.67	110.80	50.13
5875	27.13	PK	V	34.78	4.87	0.00	66.78	60.78	105.20	44.42
5925	26.54	PK	V	34.79	4.89	0.00	66.22	60.22	68.20	7.98
11650	49.59	PK	V	38.93	6.94	44.27	51.19	45.19	74.00	28.81
11650	43.17	AV	V	38.93	6.94	44.27	44.77	38.77	54.00	15.23

For 802.11ac40 mode (MIMO)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Extrapolation Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Measurement (PK /AV)	Polar (H/V)	Factor (dB/m)						
Frequency: 5755 MHz										
5755	64.27	PK	H	34.75	4.81	0.00	103.83	97.83	N/A	N/A
5755	54.13	AV	H	34.75	4.81	0.00	93.69	87.69	N/A	N/A
5755	71.84	PK	V	34.75	4.81	0.00	111.40	105.40	N/A	N/A
5755	60.97	AV	V	34.75	4.81	0.00	100.53	94.53	N/A	N/A
5650	26.34	PK	V	34.73	4.76	0.00	65.83	59.83	68.20	8.37
5700	30.82	PK	V	34.74	4.79	0.00	70.35	64.35	105.20	40.85
5720	34.46	PK	V	34.74	4.80	0.00	74.00	68.00	110.80	42.80
5725	36.81	PK	V	34.75	4.80	0.00	76.36	70.36	122.20	51.84
11510	48.42	PK	V	38.90	6.89	44.61	49.60	43.60	74.00	30.40
11510	41.67	AV	V	38.90	6.89	44.61	42.85	36.85	54.00	17.15
Frequency: 5795 MHz										
5795	63.92	PK	H	34.76	4.83	0.00	103.51	97.51	N/A	N/A
5795	53.48	AV	H	34.76	4.83	0.00	93.07	87.07	N/A	N/A
5795	70.59	PK	V	34.76	4.83	0.00	110.18	104.18	N/A	N/A
5795	60.19	AV	V	34.76	4.83	0.00	99.78	93.78	N/A	N/A
5850	27.43	PK	V	34.77	4.86	0.00	67.06	61.06	122.20	61.14
5855	26.83	PK	V	34.77	4.86	0.00	66.46	60.46	110.80	50.34
5875	26.72	PK	V	34.78	4.87	0.00	66.37	60.37	105.20	44.83
5925	26.77	PK	V	34.79	4.89	0.00	66.45	60.45	68.20	7.75
11590	47.96	PK	V	38.92	6.92	44.41	49.39	43.39	74.00	30.61
11590	39.75	AV	V	38.92	6.92	44.41	41.18	35.18	54.00	18.82

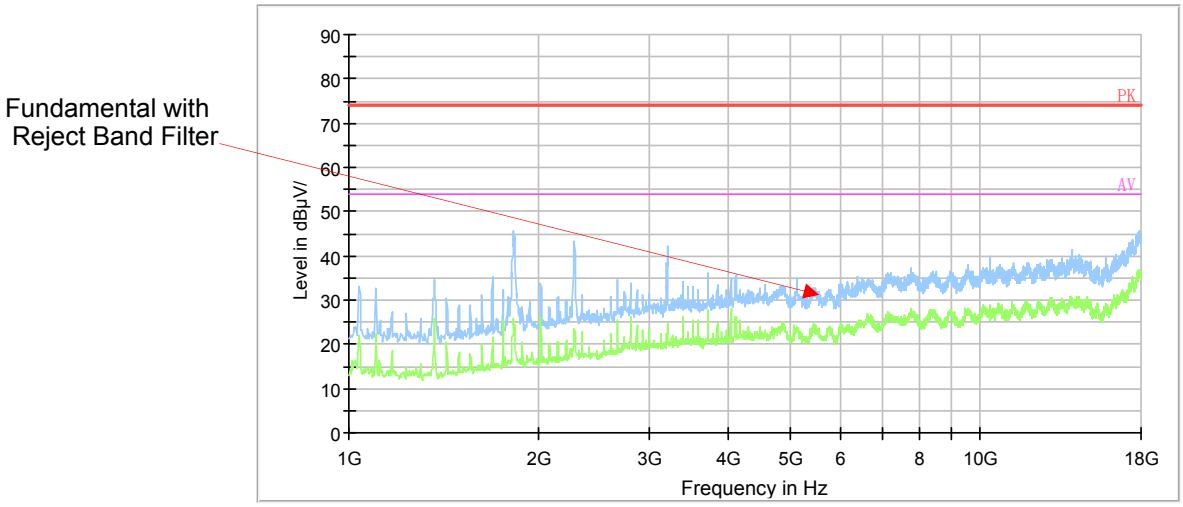
For 802.11ac80 mode (MIMO)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Extrapolation Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Measurement (PK /AV)	Polar (H/V)	Factor (dB/m)						
Frequency: 5775 MHz										
5775	61.09	PK	H	34.76	4.82	0.00	100.67	94.67	N/A	N/A
5775	49.54	AV	H	34.76	4.82	0.00	89.12	83.12	N/A	N/A
5775	69.45	PK	V	34.76	4.82	0.00	109.03	103.03	N/A	N/A
5775	58.28	AV	V	34.76	4.82	0.00	97.86	91.86	N/A	N/A
5650	27.12	PK	V	34.73	4.76	0.00	66.61	60.61	68.20	7.59
5700	28.53	PK	V	34.74	4.79	0.00	68.06	62.06	105.20	43.14
5720	31.04	PK	V	34.74	4.80	0.00	70.58	64.58	110.80	46.22
5725	31.42	PK	V	34.75	4.80	0.00	70.97	64.97	122.20	57.23
5850	27.14	PK	V	34.77	4.86	0.00	66.77	60.77	122.20	61.43
5855	27.72	PK	V	34.77	4.86	0.00	67.35	61.35	110.80	49.45
5875	27.25	PK	V	34.78	4.87	0.00	66.90	60.90	105.20	44.30
5925	27.23	PK	V	34.79	4.89	0.00	66.91	60.91	68.20	7.29
11550	48.33	PK	V	38.91	6.91	44.51	49.64	43.64	74.00	30.36
11550	41.74	AV	V	38.91	6.91	44.51	43.05	37.05	54.00	16.95

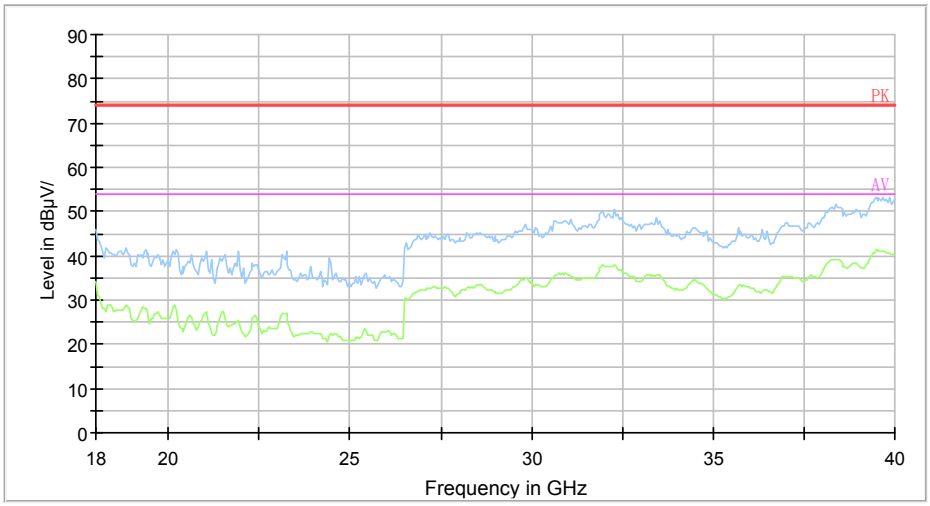
Please refer to the below pre-scan plot of worst case:

Note: The test distance is 1.5m and distance factor add to the total factor.

802.11a Mode: Middle Channel_Horizontal_1GHz-18GHz

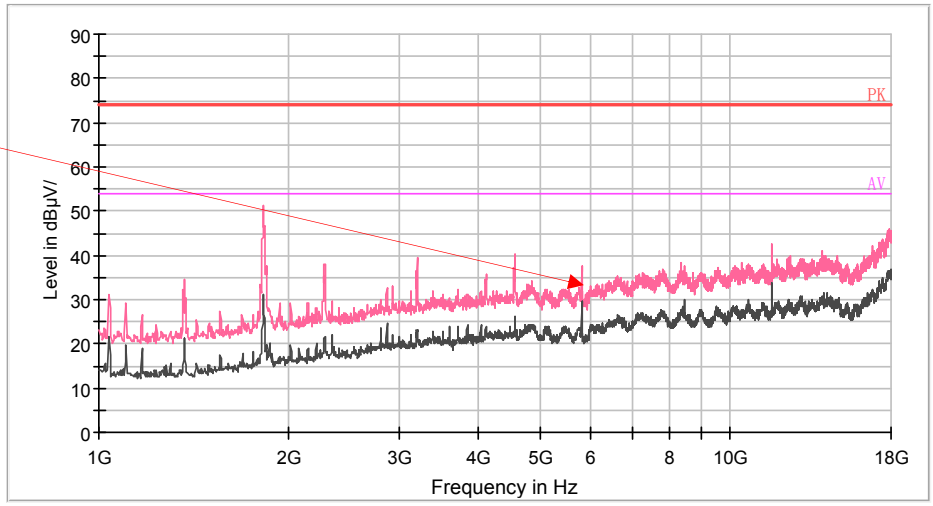


802.11a Mode: Middle Channel_Horizontal_18GHz-40GHz

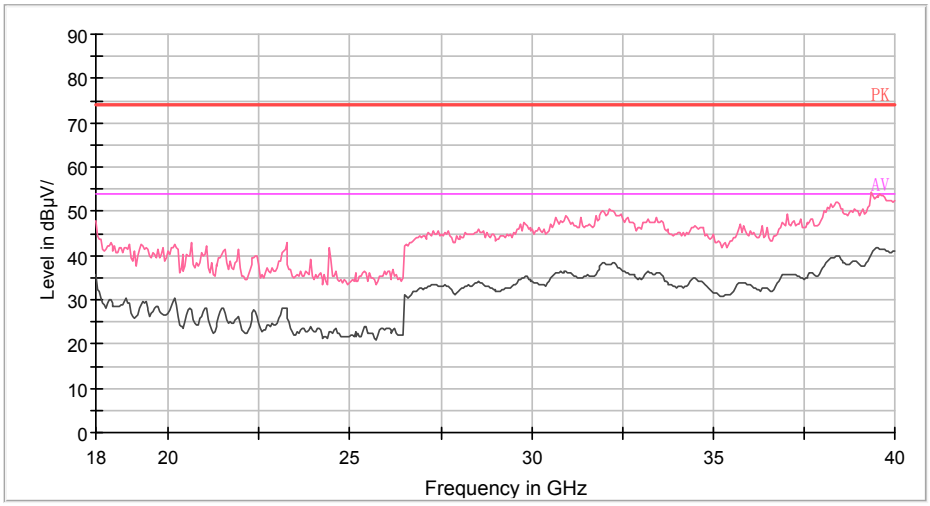


802.11a Mode: Middle Channel_Vertical_1GHz-18GHz

Fundamental with Reject Band Filter



802.11a Mode: Middle Channel_Vertical_18GHz-40GHz



Other Spurious Emissions (Worst case):

Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	Extrapolation Result	Limit	Margin
	Reading	Measurement	Polar	Factor						
MHz	dBµV	PK/AV	H/V	dB(1/m)	dB	dB	dBµV/m	dBµV/m	dBµV/m	dB
1813	74.09	PK	V	26.57	2.66	43.63	59.69	53.69	74.00	20.31
1813	53.64	AV	V	26.57	2.66	43.63	39.24	33.24	54.00	20.76
2360	60.43	PK	V	28.58	3.03	43.93	48.11	42.11	74.00	31.89
2360	44.20	AV	V	28.58	3.03	43.93	31.88	25.88	54.00	28.12
3124	57.99	PK	V	30.90	3.48	44.30	48.07	42.07	74.00	31.93
3124	41.05	AV	V	30.90	3.48	44.30	31.13	25.13	54.00	28.87
1813	68.83	PK	H	26.57	2.66	43.63	54.43	48.43	74.00	25.57
1813	51.29	AV	H	26.57	2.66	43.63	36.89	30.89	54.00	23.11
2360	62.78	PK	H	28.58	3.03	43.93	50.46	44.46	74.00	29.54
2360	44.45	AV	H	28.58	3.03	43.93	32.13	26.13	54.00	27.87
3124	59.53	PK	H	30.90	3.48	44.30	49.61	43.61	74.00	30.39
3124	43.88	AV	H	30.90	3.48	44.30	33.96	27.96	54.00	26.04

Note:
Corrected Amplitude = Corrected Factor + Reading
Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Margin = Limit- Corr. Amplitude

FCC §15.407(b) (1), (4) (i) – BAND EDGE

Applicable Standard

FCC §15.407(b) (1), (4) (i)

(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.

(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.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibration or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 1 MHz and VBW to 3 MHz of spectrum analyzer. Offset the antenna gain and cable loss.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

Test Data

Environmental Conditions

Temperature:	22 °C
Relative Humidity:	59 %
ATM Pressure:	95.3 kPa

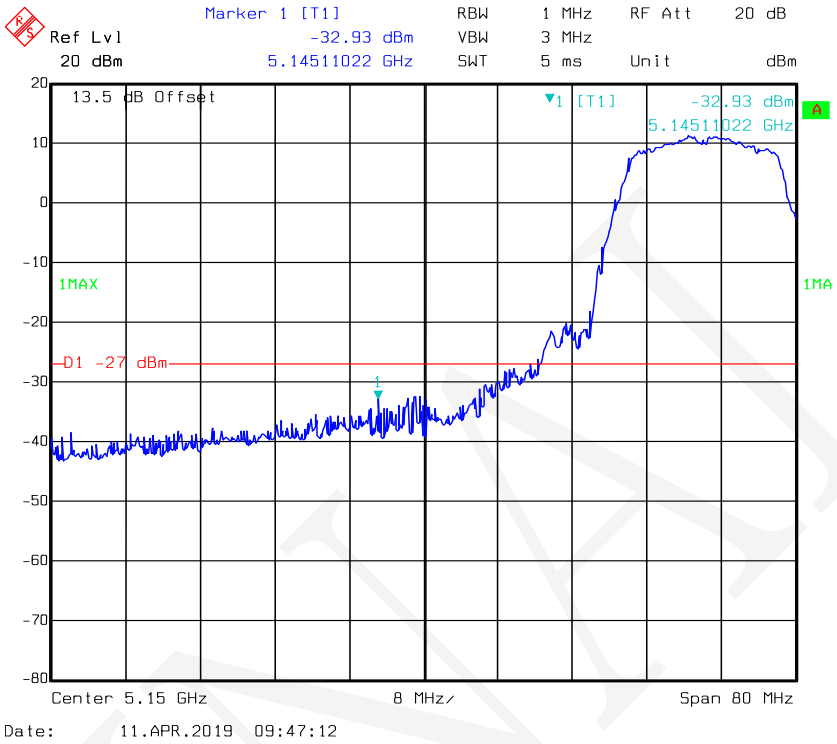
The testing was performed by Tom Tang on 2019-04-11.

Test mode: Transmitting

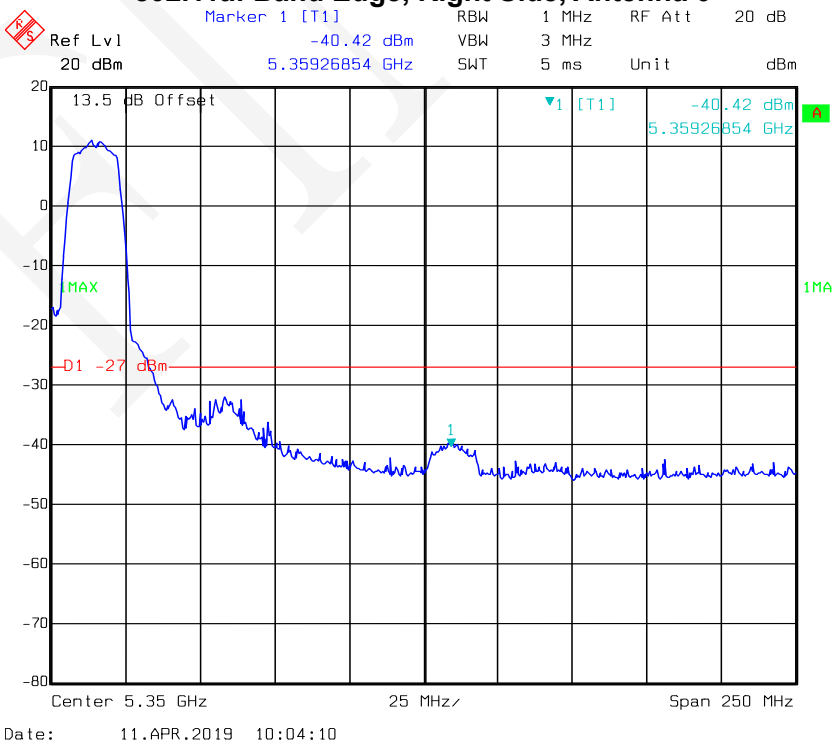
Test Result: Compliance. Please refer to following table and plots.

For 5150-5250 MHz (Note: The antenna gain was set in the offset, all emissions under limit more than 3dBc, so MIMO mode also comply the requirement.)

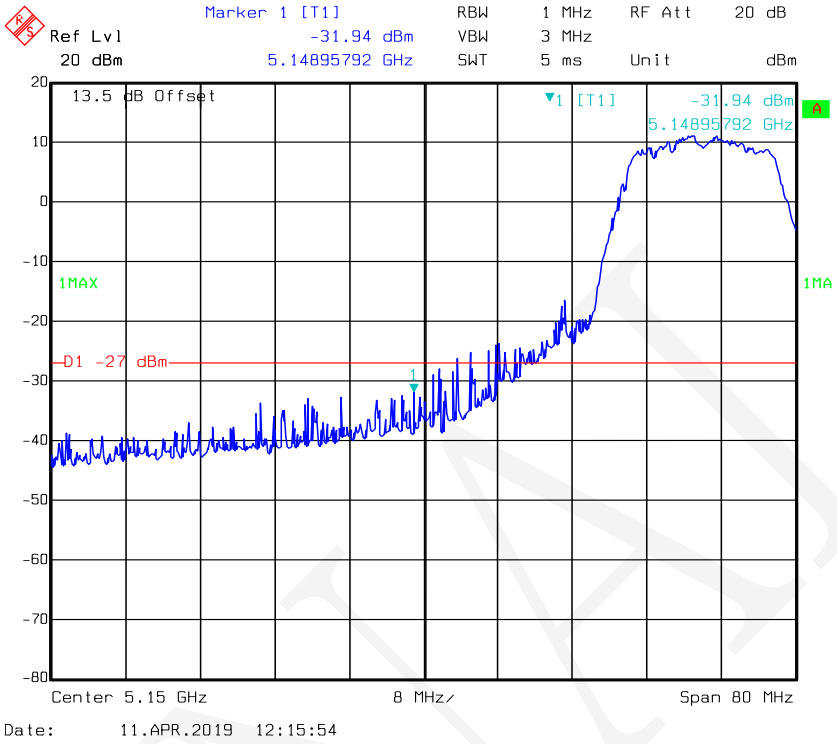
802.11a: Band Edge, Left Side, Antenna 0



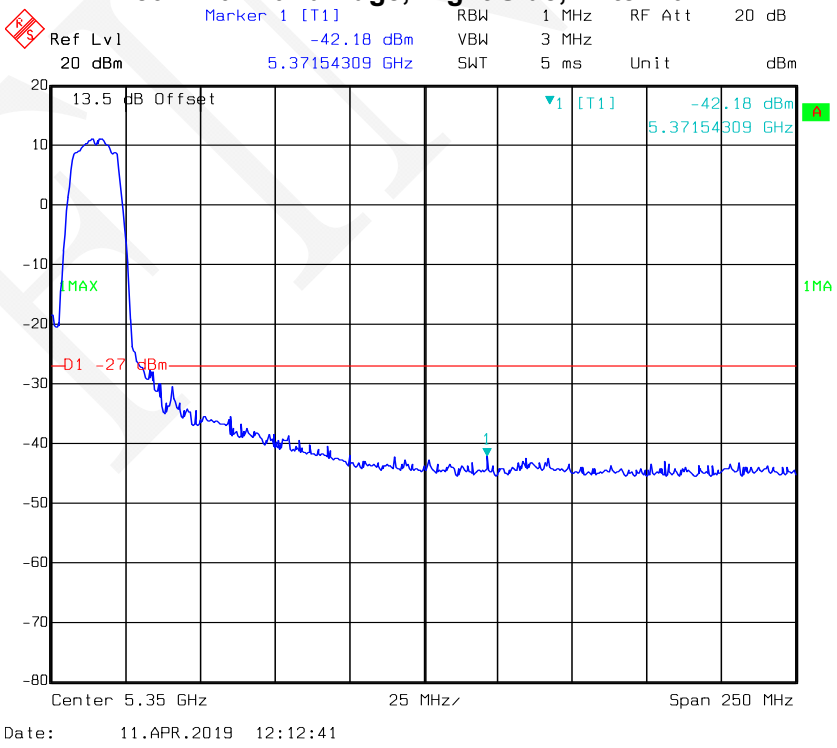
802.11a: Band Edge, Right Side, Antenna 0



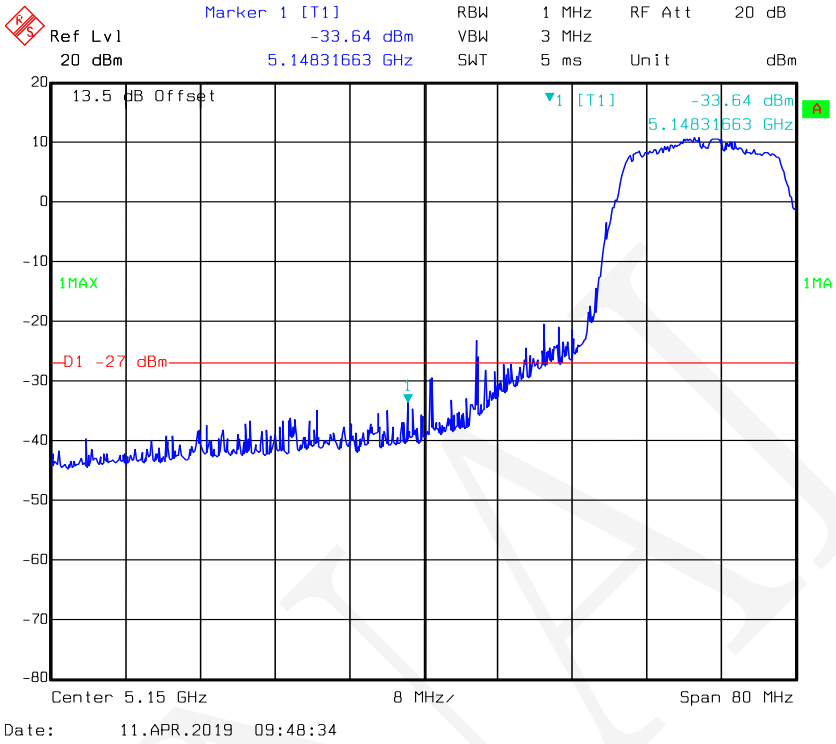
802.11a: Band Edge, Left Side, Antenna 1



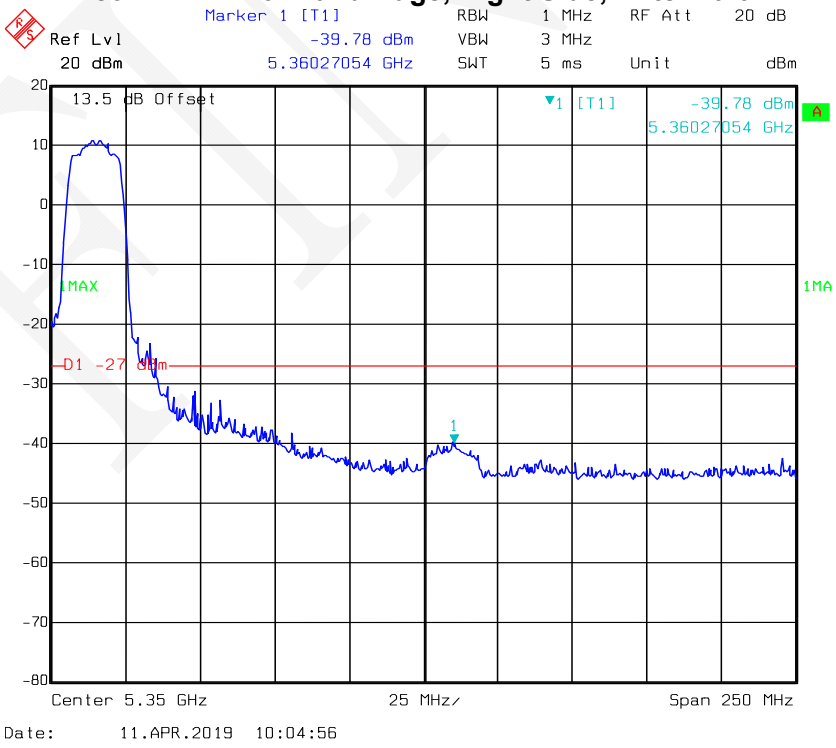
802.11a: Band Edge, Right Side, Antenna 1



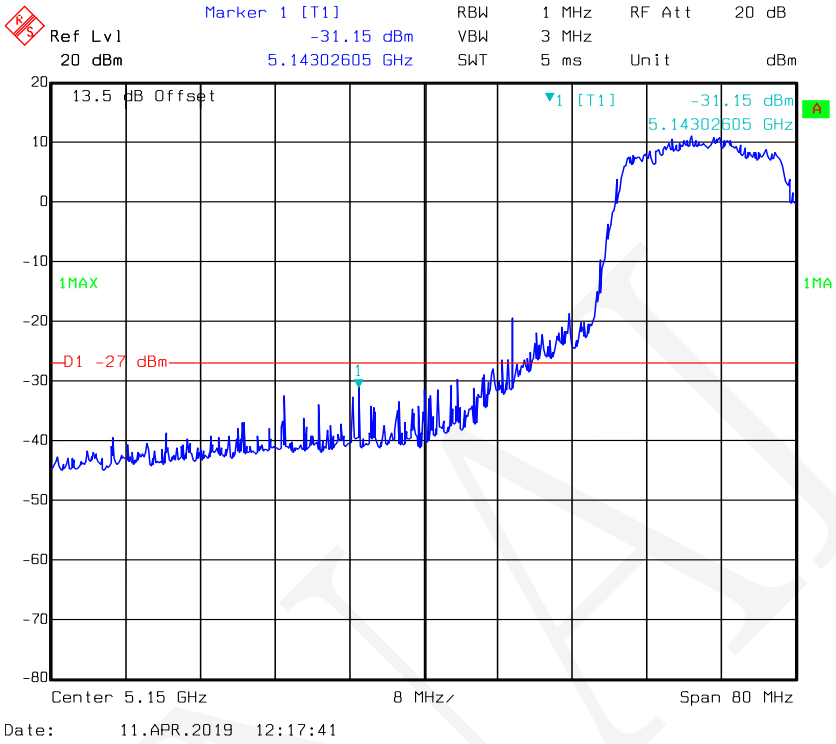
802.11n-HT20: Band Edge, Left Side, Antenna 0



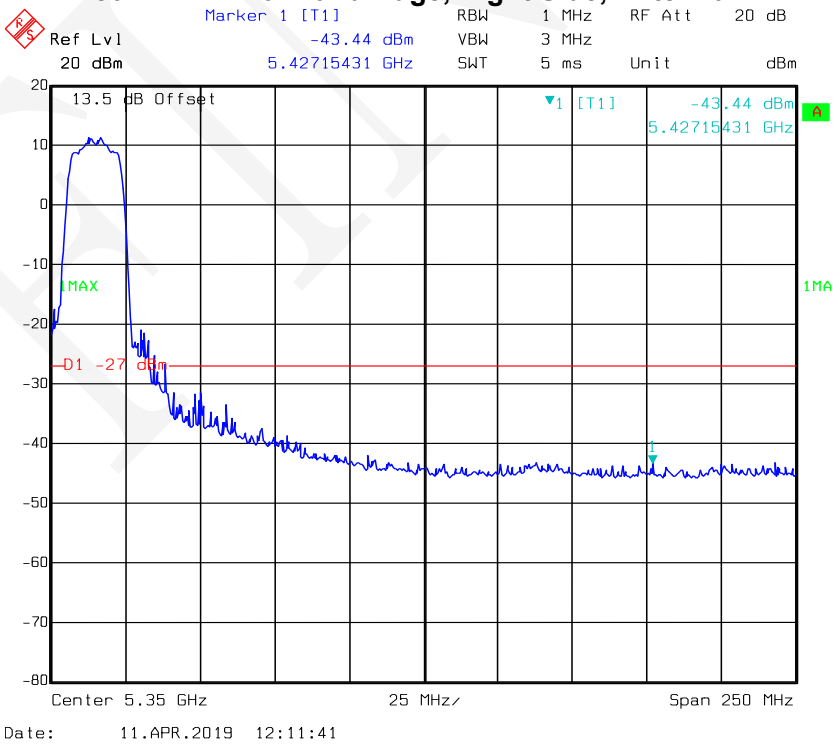
802.11n-HT20: Band Edge, Right Side, Antenna 0



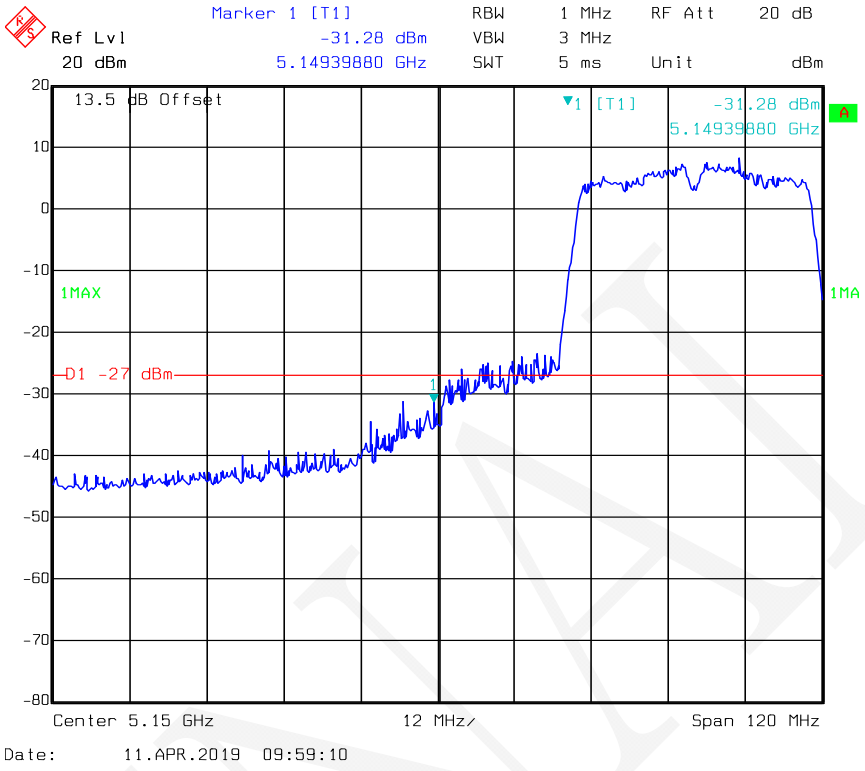
802.11n-HT20: Band Edge, Left Side, Antenna 1



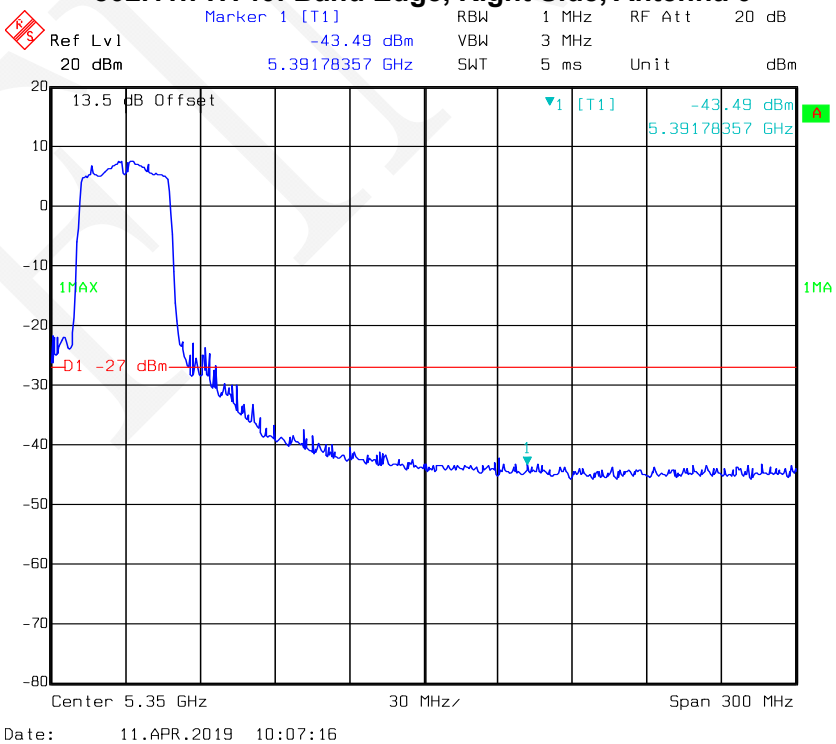
802.11n-HT20: Band Edge, Right Side, Antenna 1



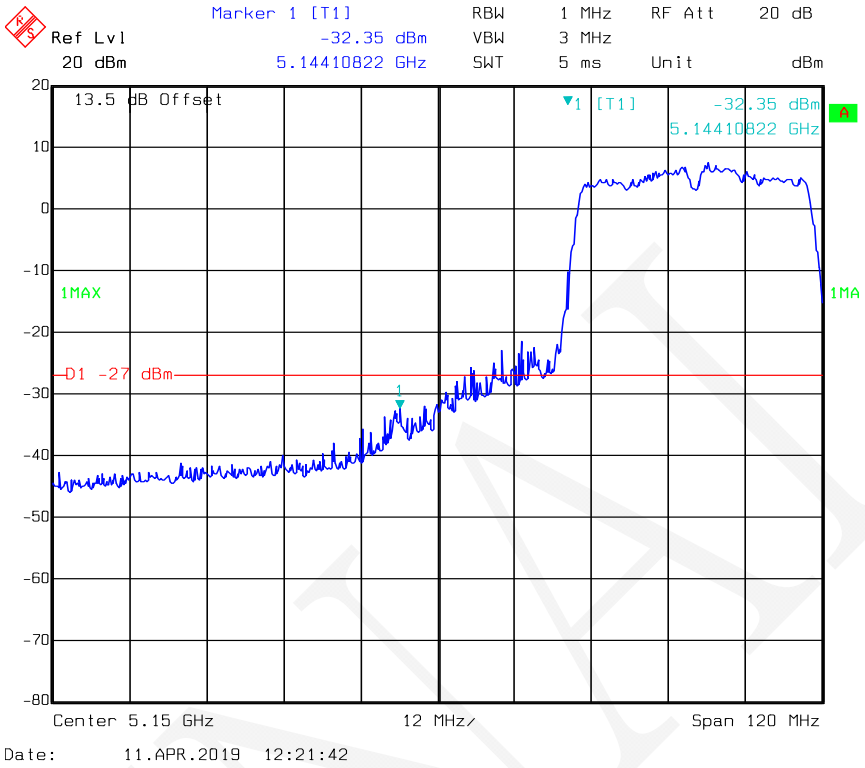
802.11n-HT40: Band Edge, Left Side, Antenna 0



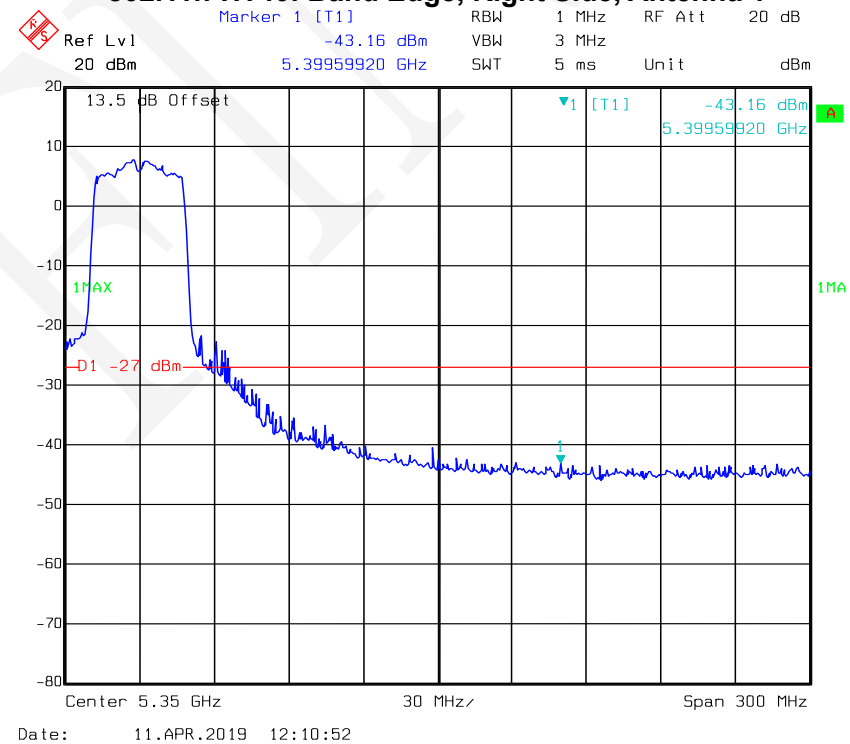
802.11n-HT40: Band Edge, Right Side, Antenna 0



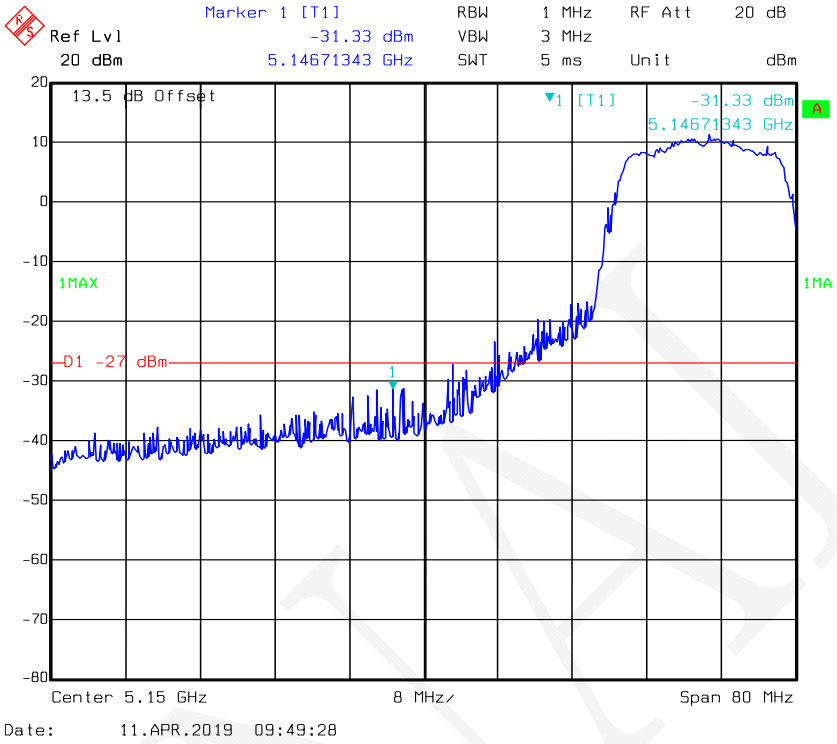
802.11n-HT40: Band Edge, Left Side, Antenna 1



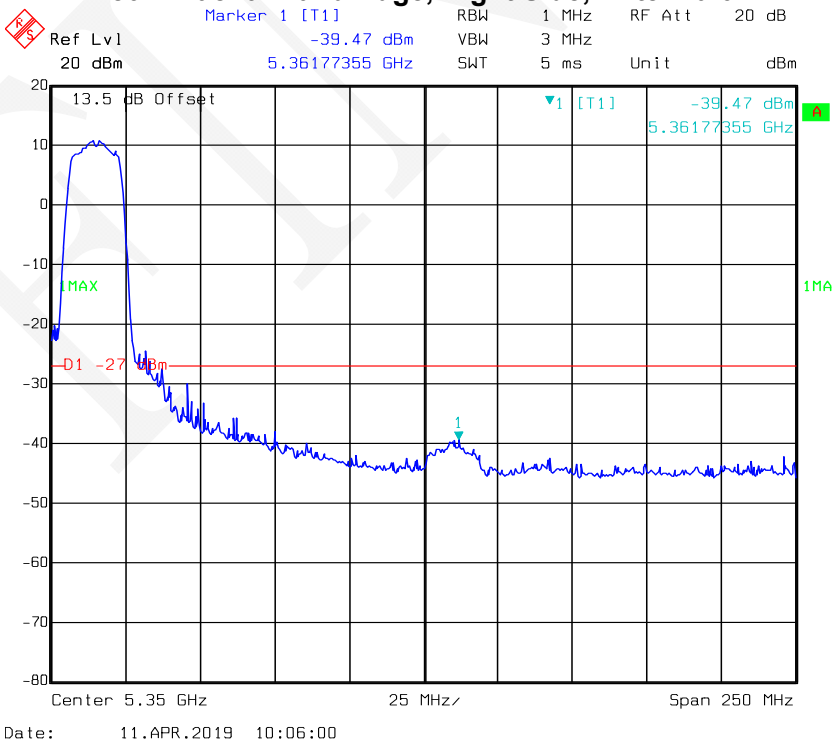
802.11n-HT40: Band Edge, Right Side, Antenna 1



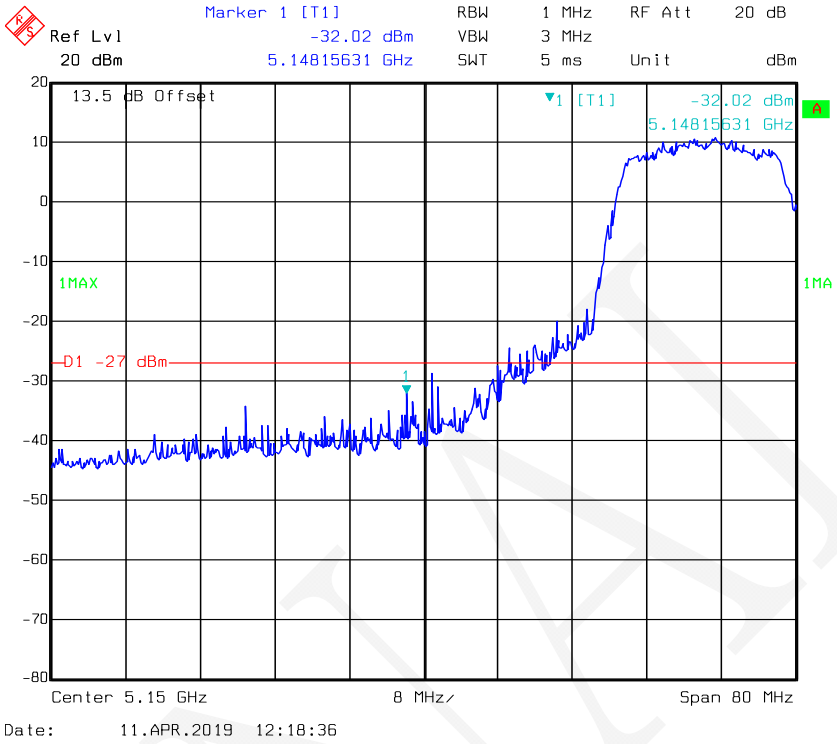
802.11ac20: Band Edge, Left Side, Antenna 0



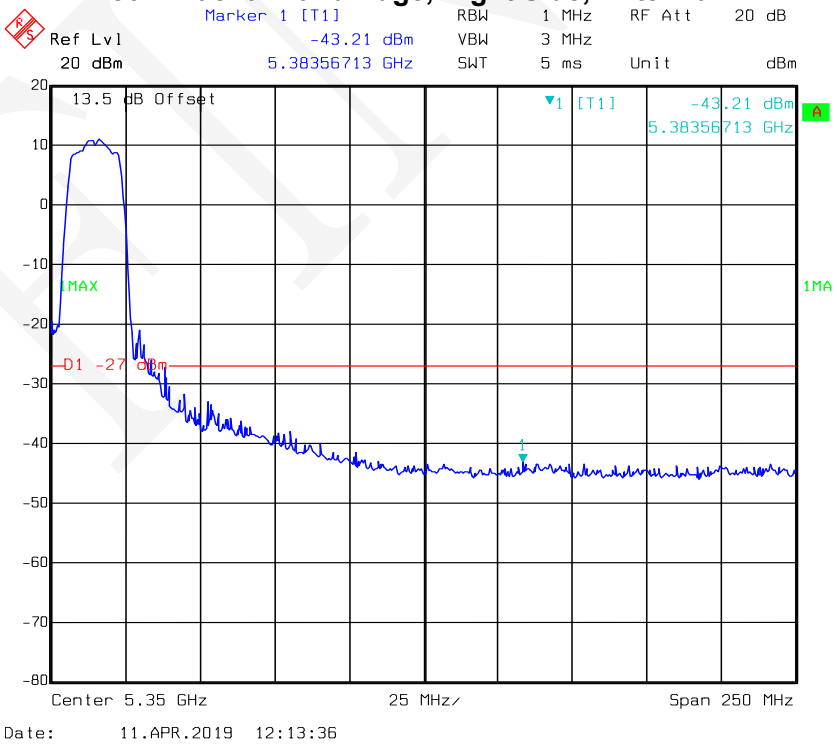
802.11ac20: Band Edge, Right Side, Antenna 0



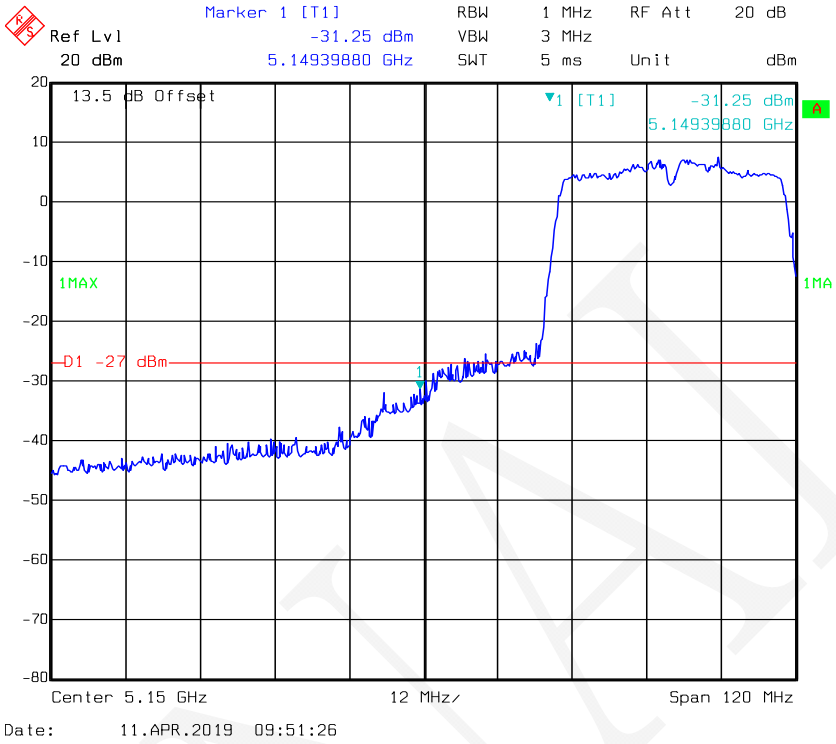
802.11ac20: Band Edge, Left Side, Antenna 1



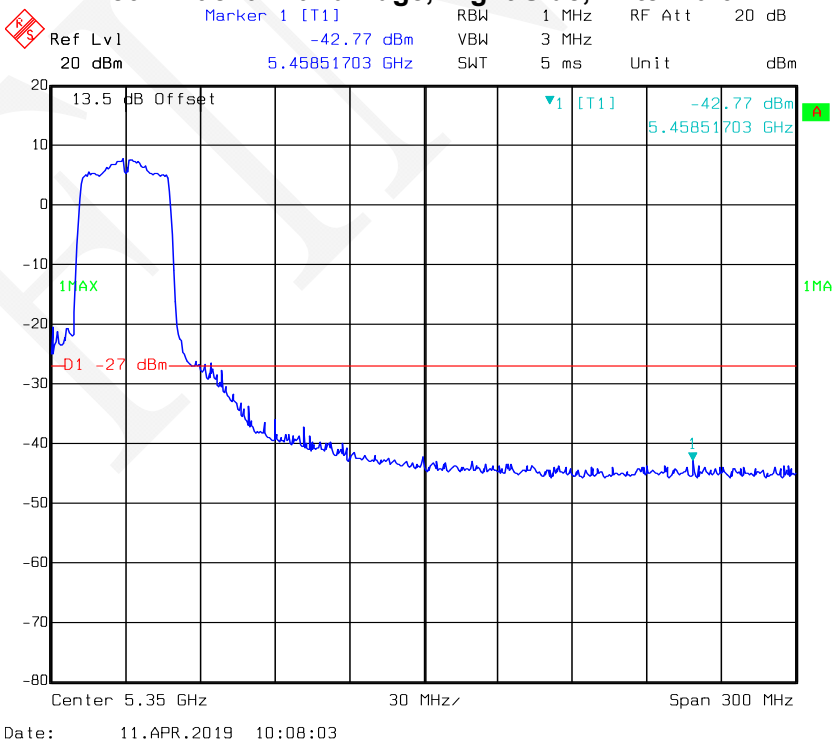
802.11ac20: Band Edge, Right Side, Antenna 1



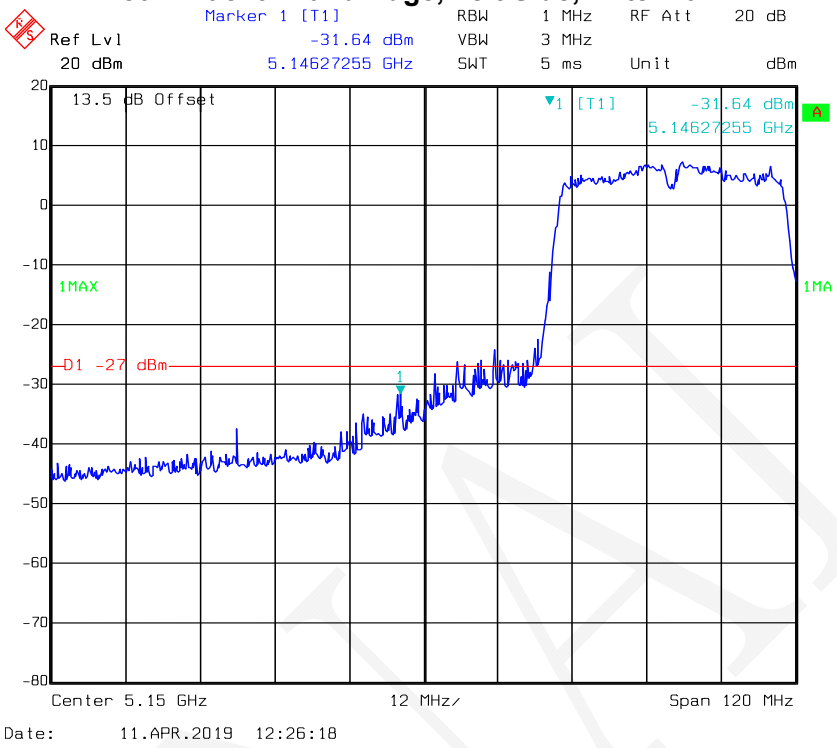
802.11ac40: Band Edge, Left Side, Antenna 0



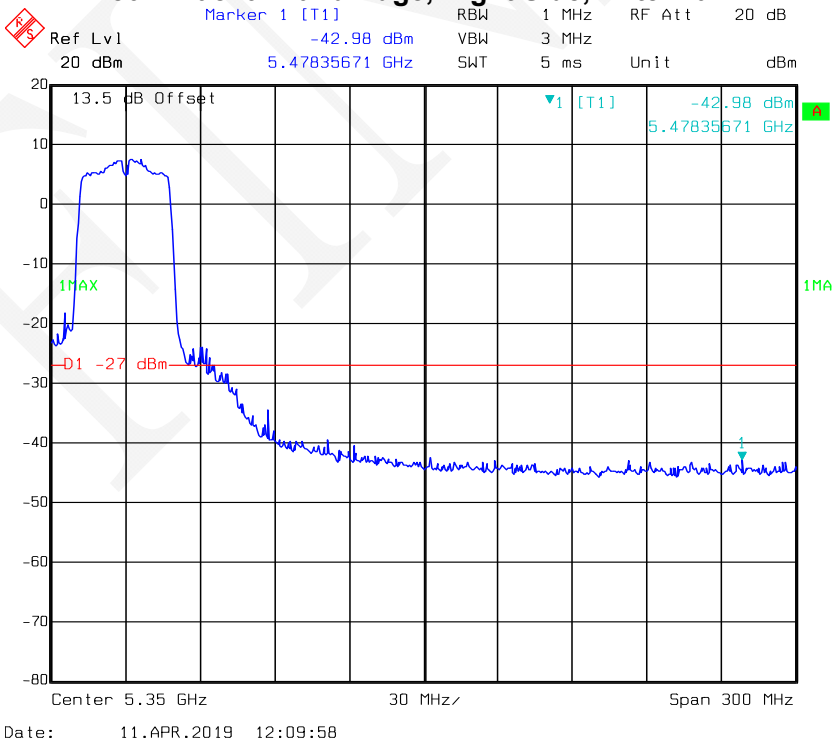
802.11ac40: Band Edge, Right Side, Antenna 0



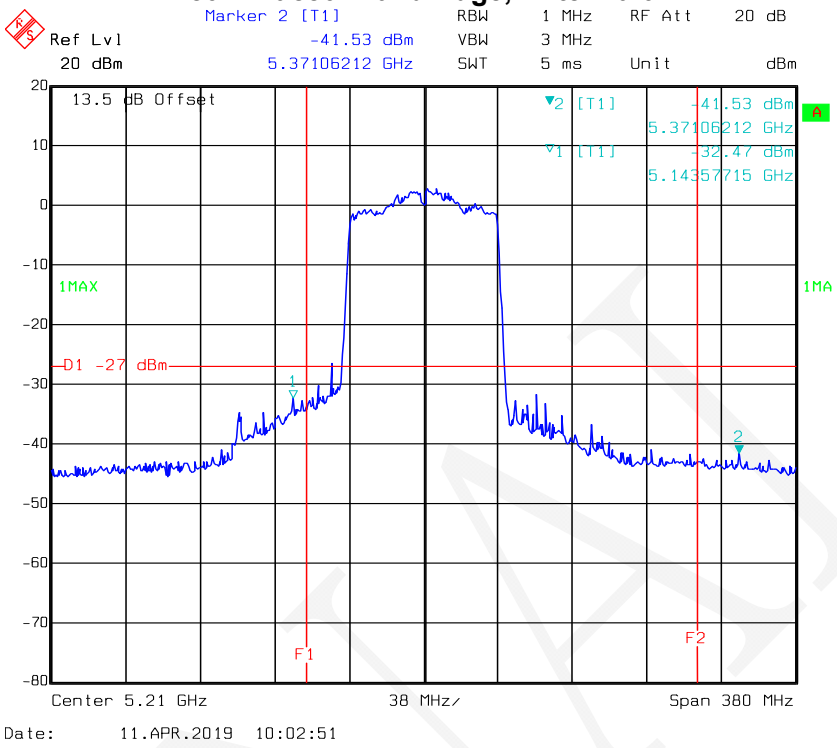
802.11ac40: Band Edge, Left Side, Antenna 1



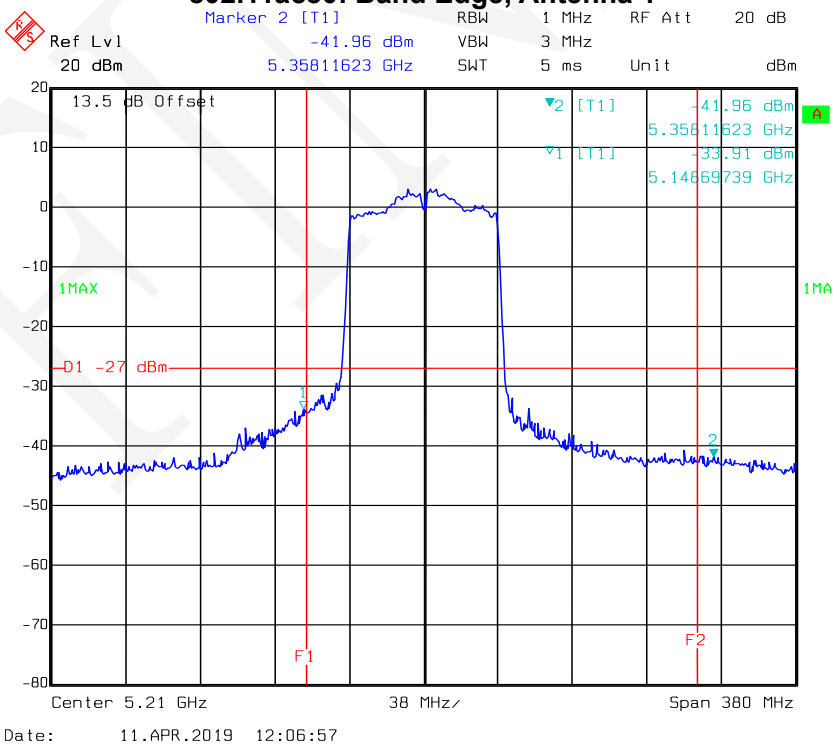
802.11ac40: Band Edge, Right Side, Antenna 1



802.11ac80: Band Edge, Antenna 0

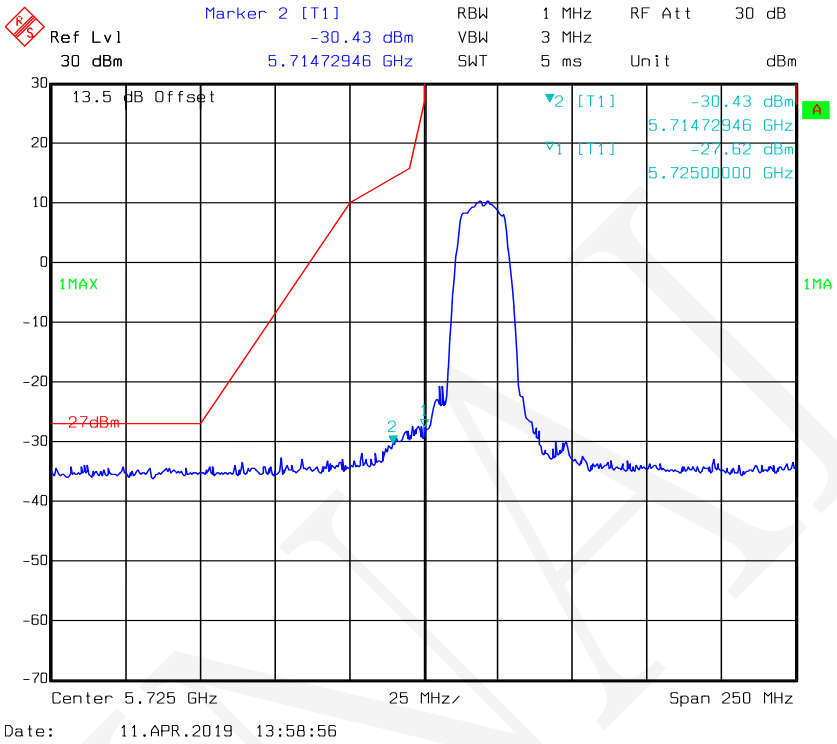


802.11ac80: Band Edge, Antenna 1

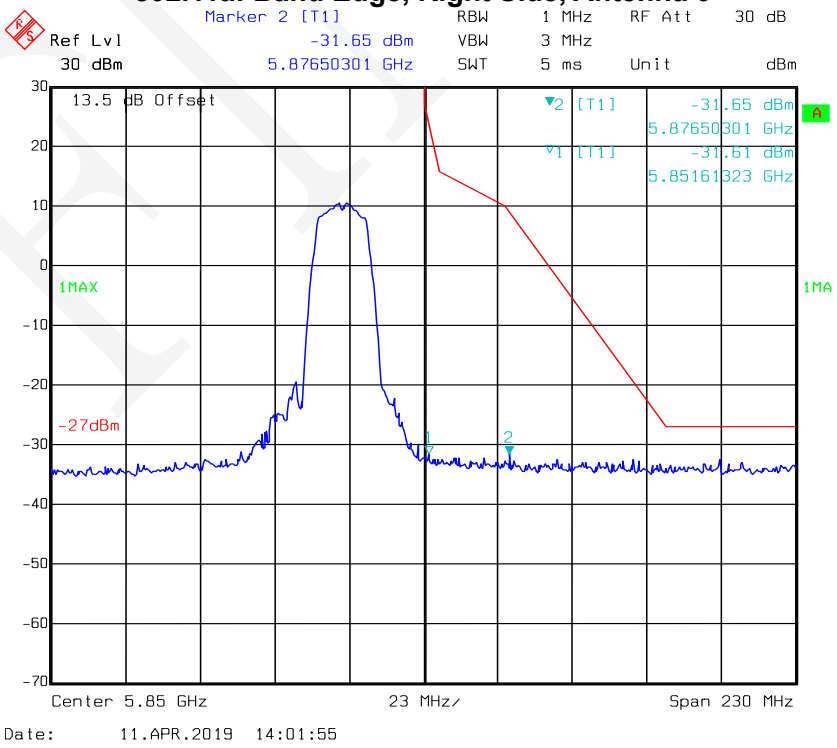


For 5725-5850 MHz: (Note: The antenna gain was set in the offset, all emissions under limit more than 3dBc, so MIMO mode also comply the requirement.)

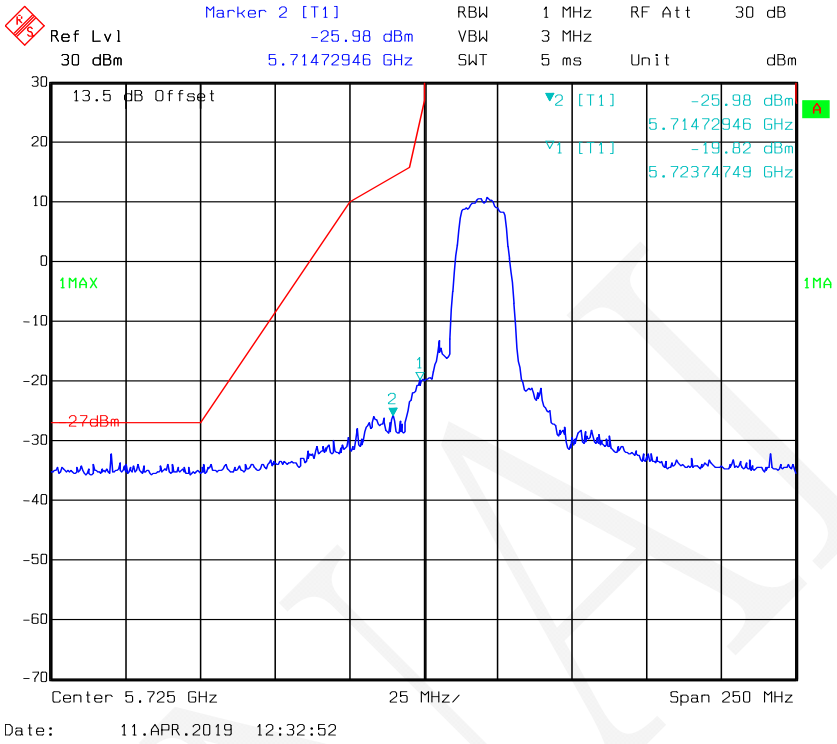
802.11a: Band Edge, Left Side, Antenna 0



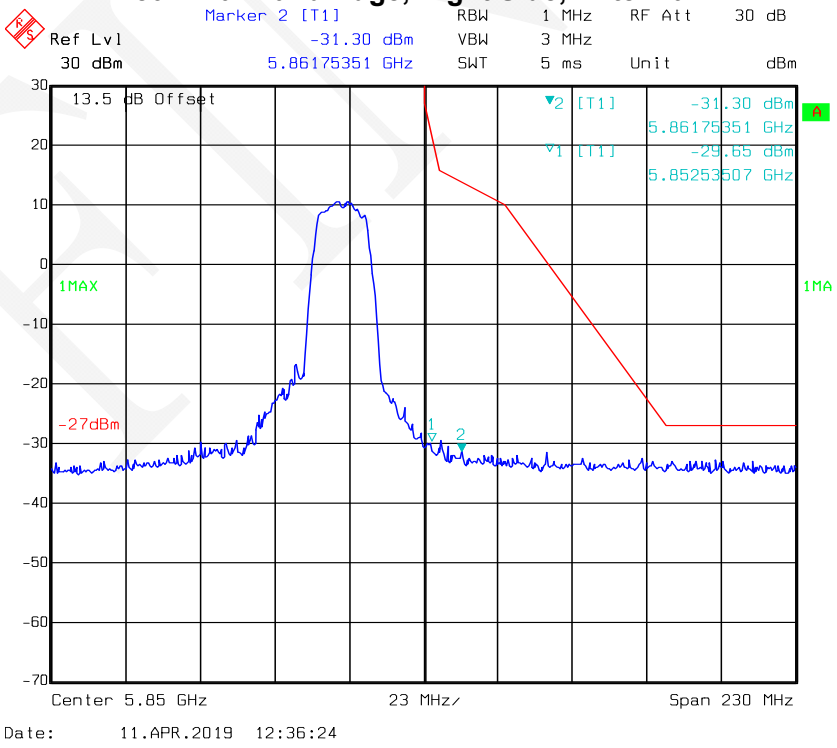
802.11a: Band Edge, Right Side, Antenna 0



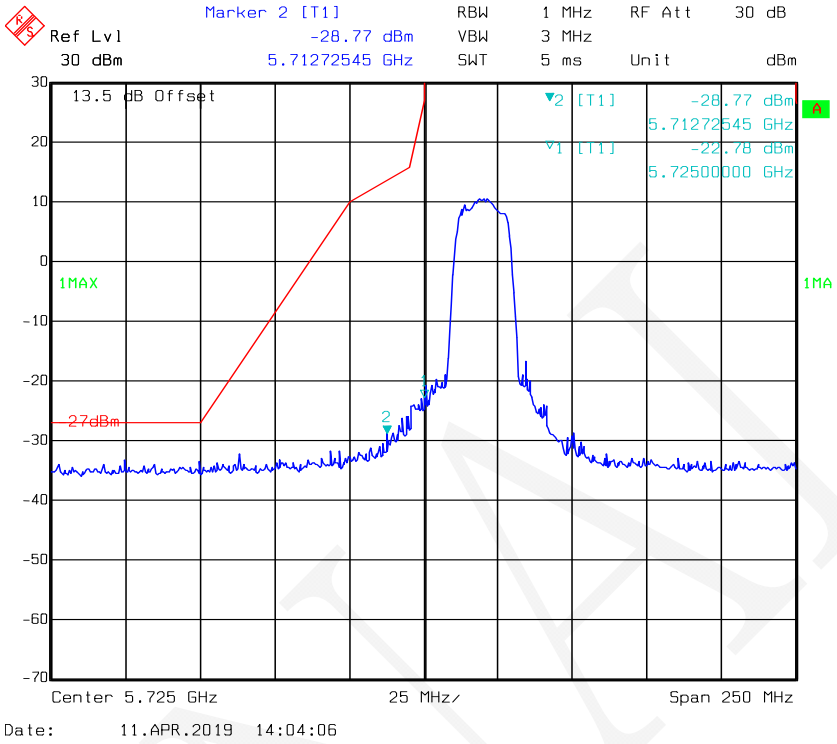
802.11a: Band Edge, Left Side, Antenna 1



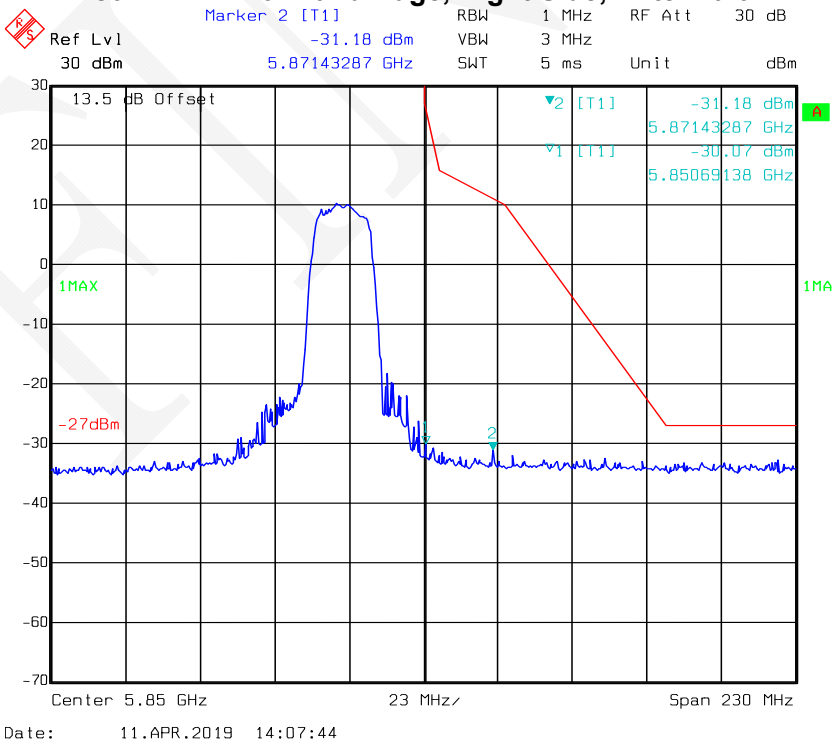
802.11a: Band Edge, Right Side, Antenna 1



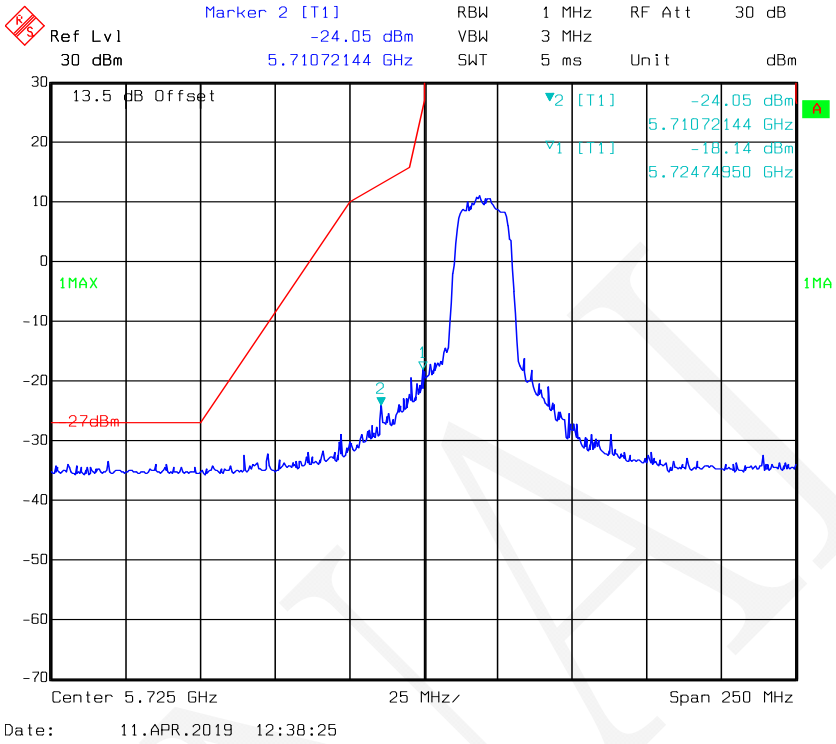
802.11n-HT20: Band Edge, Left Side, Antenna 0



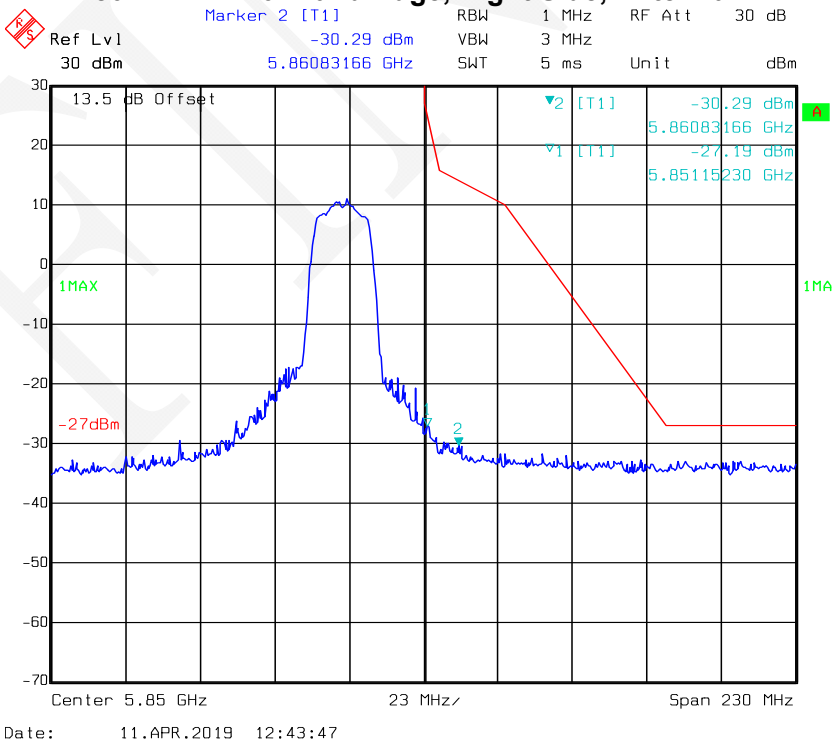
802.11n-HT20: Band Edge, Right Side, Antenna 0



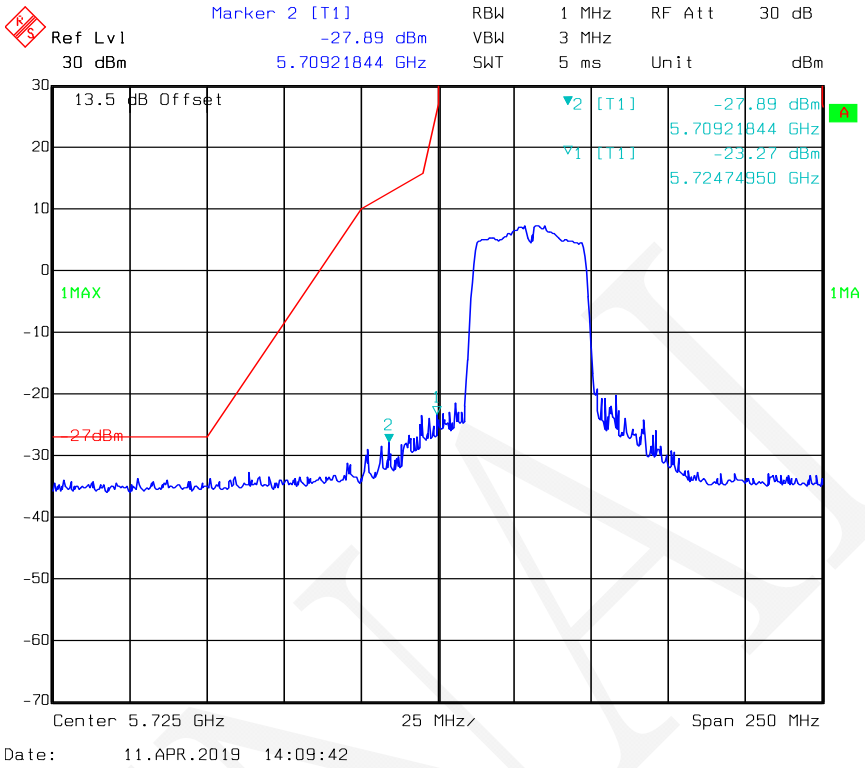
802.11n-HT20: Band Edge, Left Side, Antenna 1



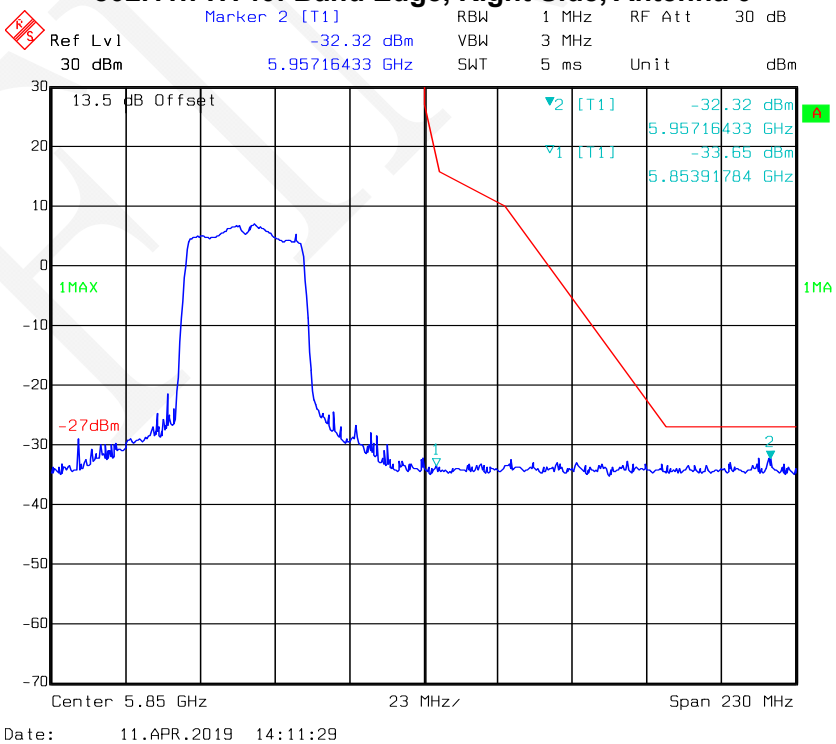
802.11n-HT20: Band Edge, Right Side, Antenna 1



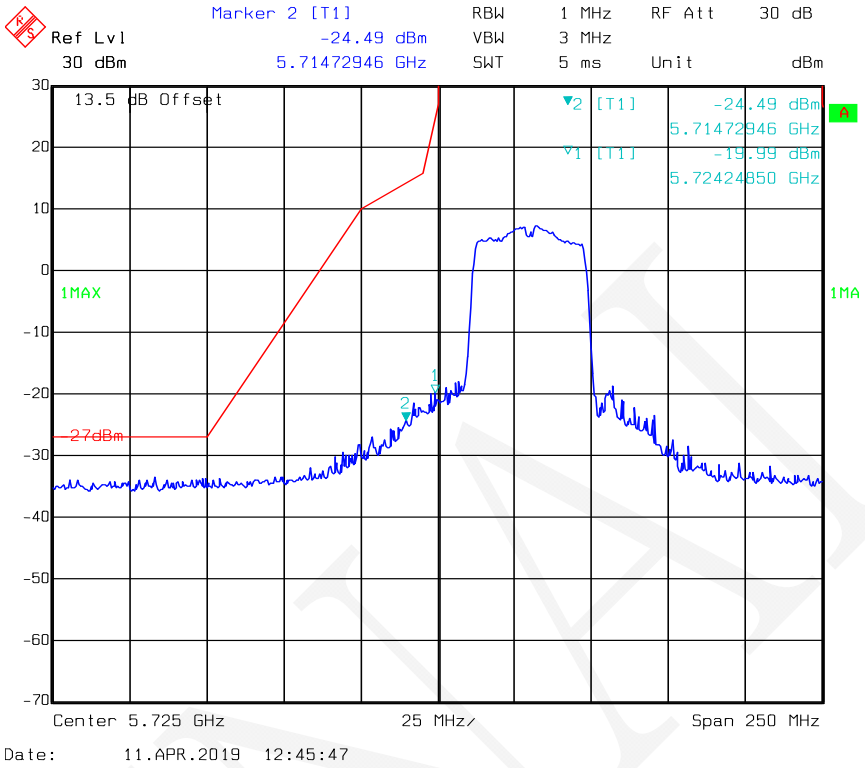
802.11n-HT40: Band Edge, Left Side, Antenna 0



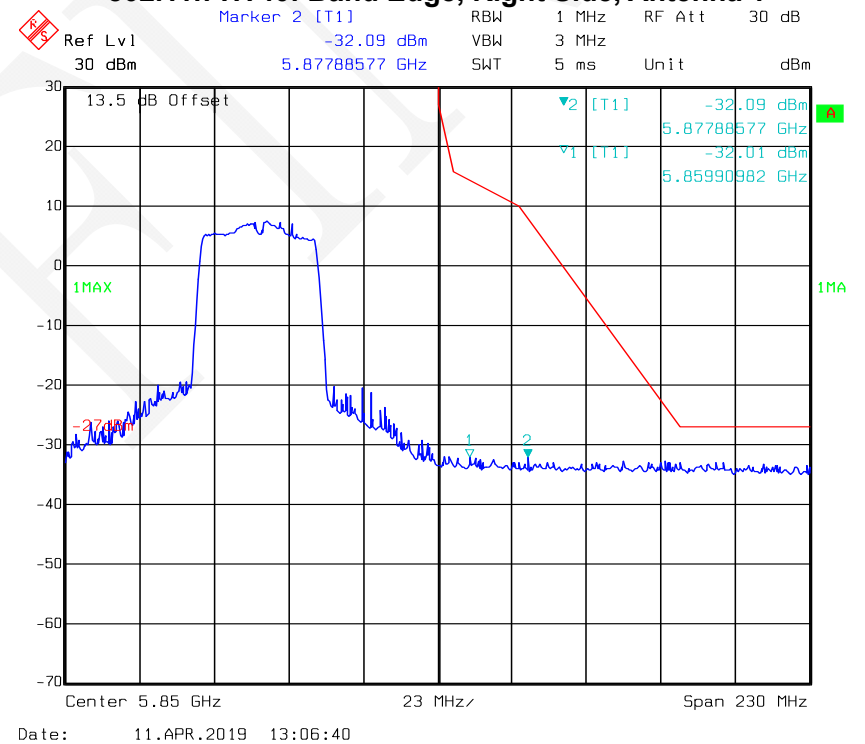
802.11n-HT40: Band Edge, Right Side, Antenna 0



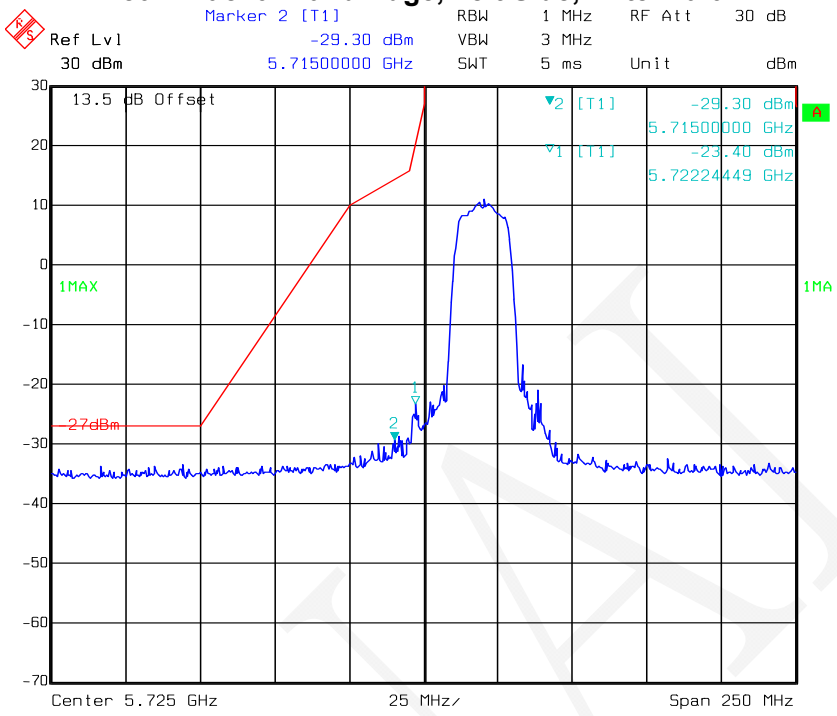
802.11n-HT40: Band Edge, Left Side, Antenna 1



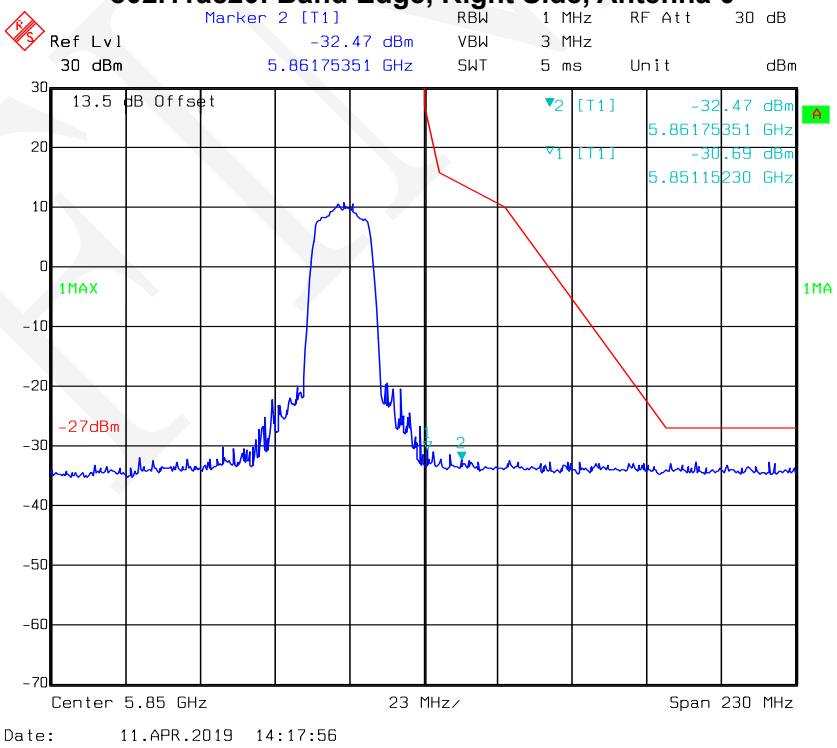
802.11n-HT40: Band Edge, Right Side, Antenna 1



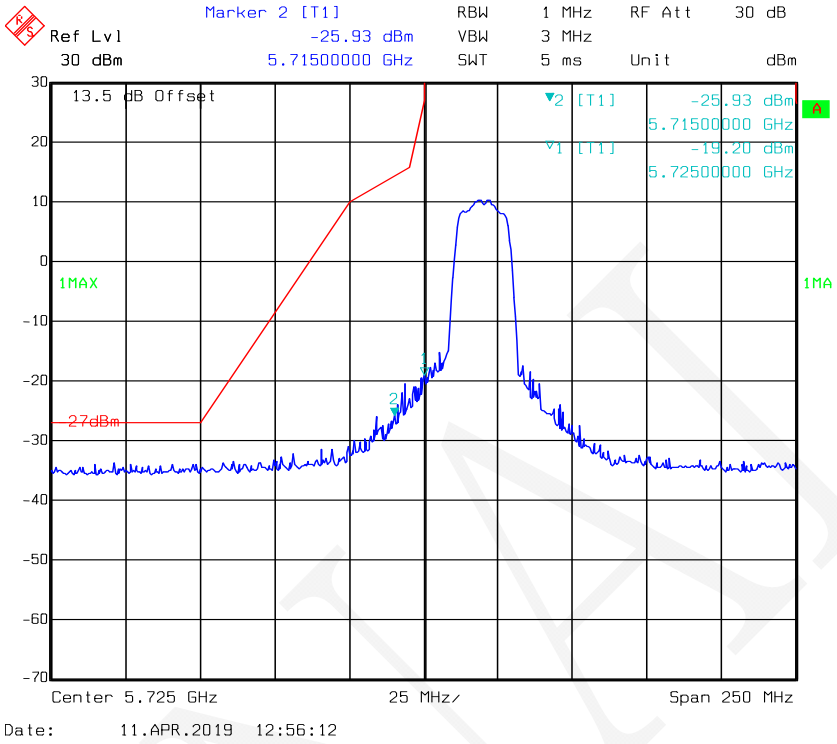
802.11ac20: Band Edge, Left Side, Antenna 0



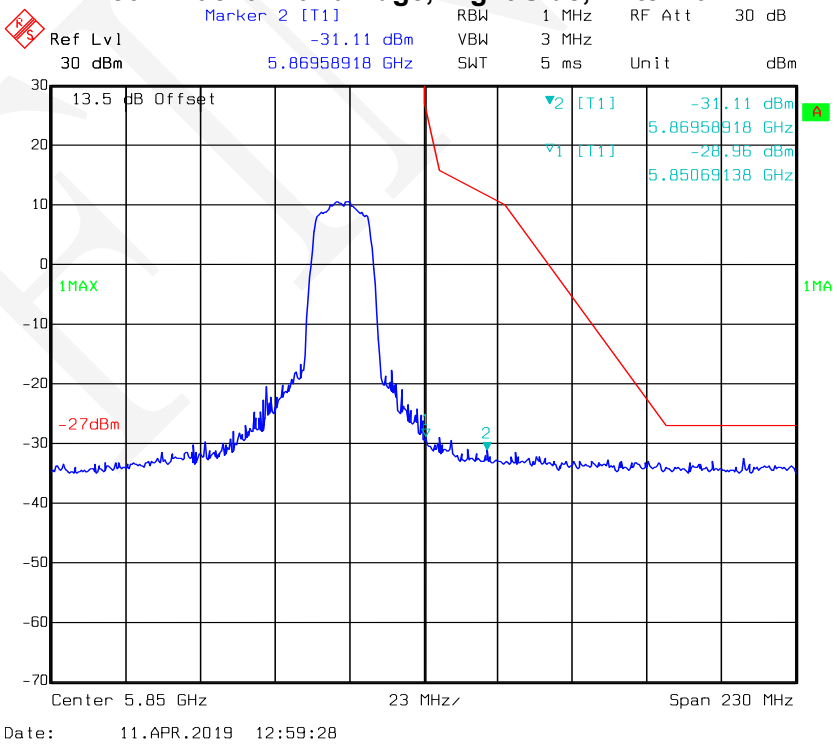
802.11ac20: Band Edge, Right Side, Antenna 0



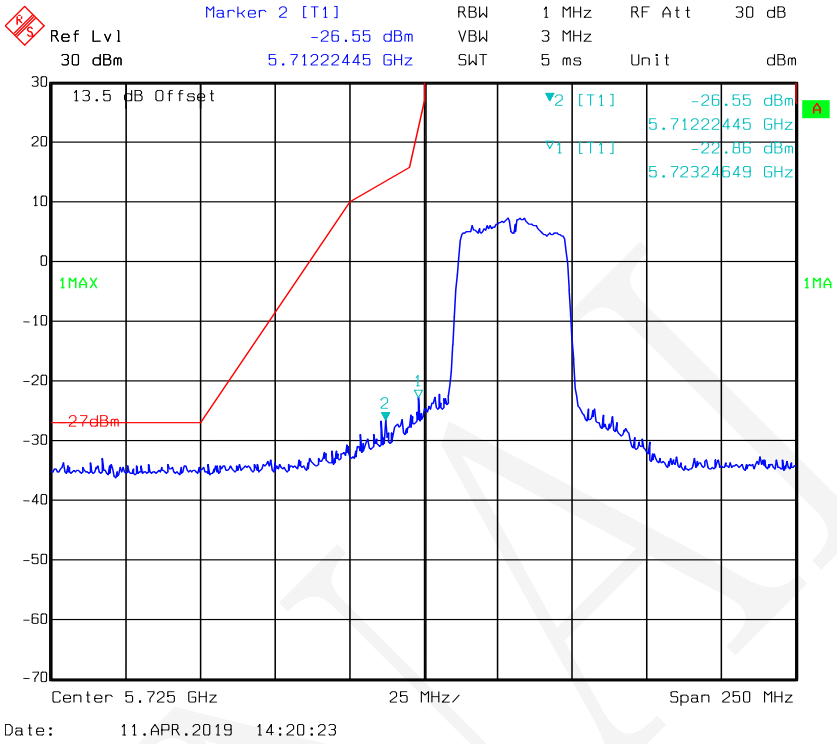
802.11ac20: Band Edge, Left Side, Antenna 1



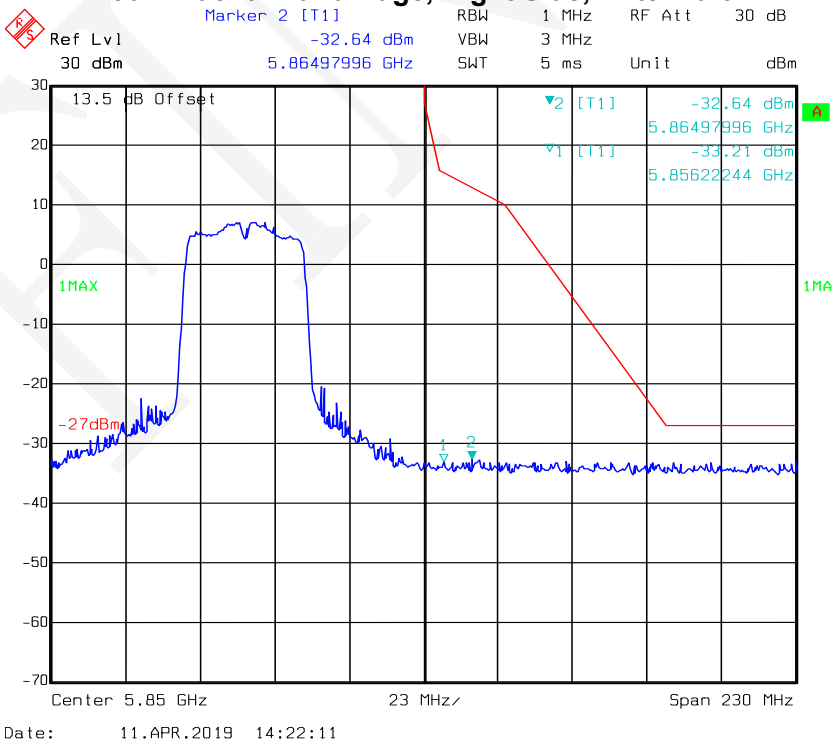
802.11ac20: Band Edge, Right Side, Antenna 1



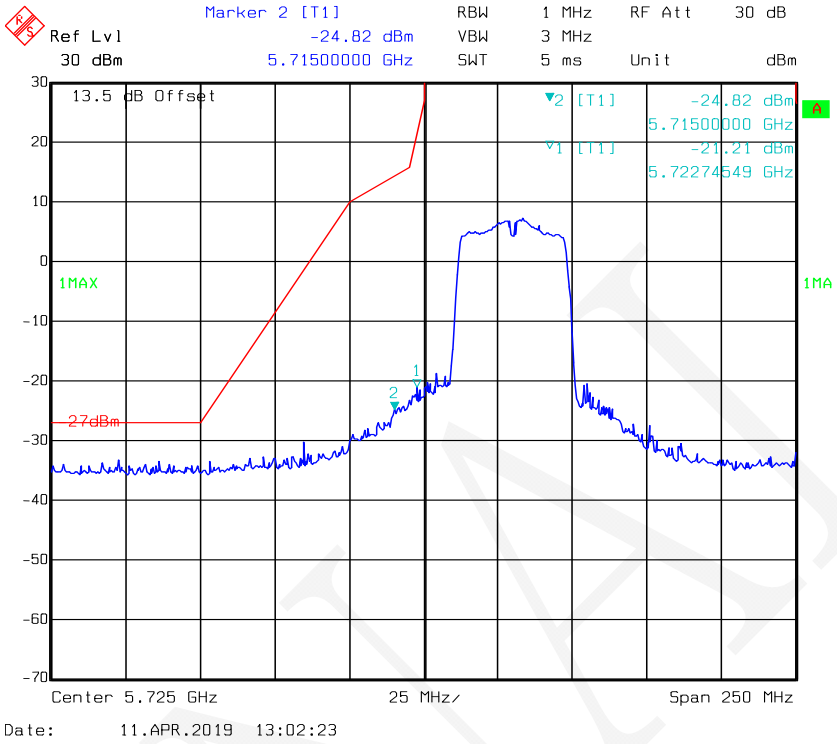
802.11ac40: Band Edge, Left Side, Antenna 0



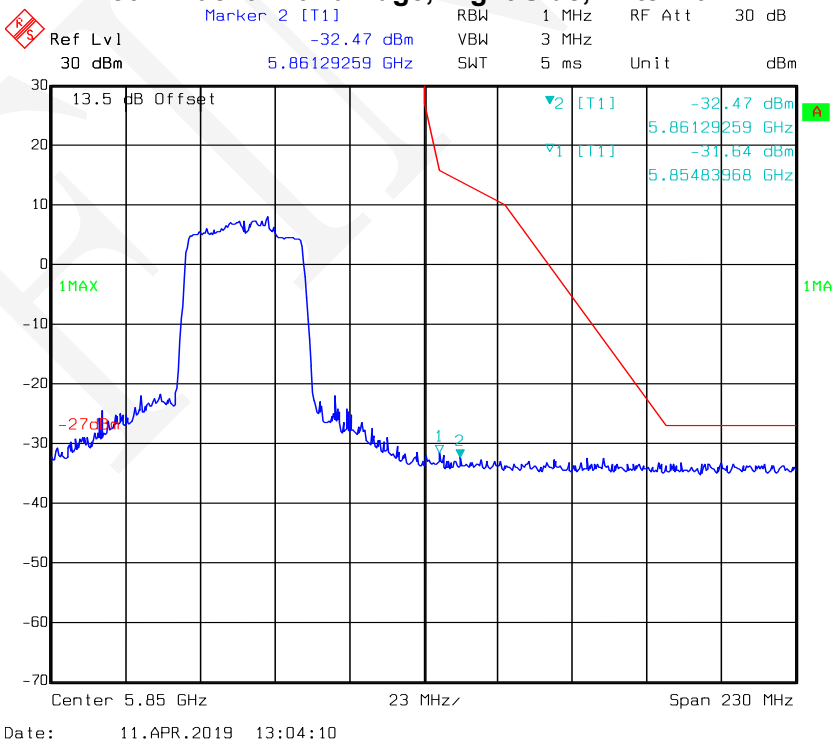
802.11ac40: Band Edge, Right Side, Antenna 0



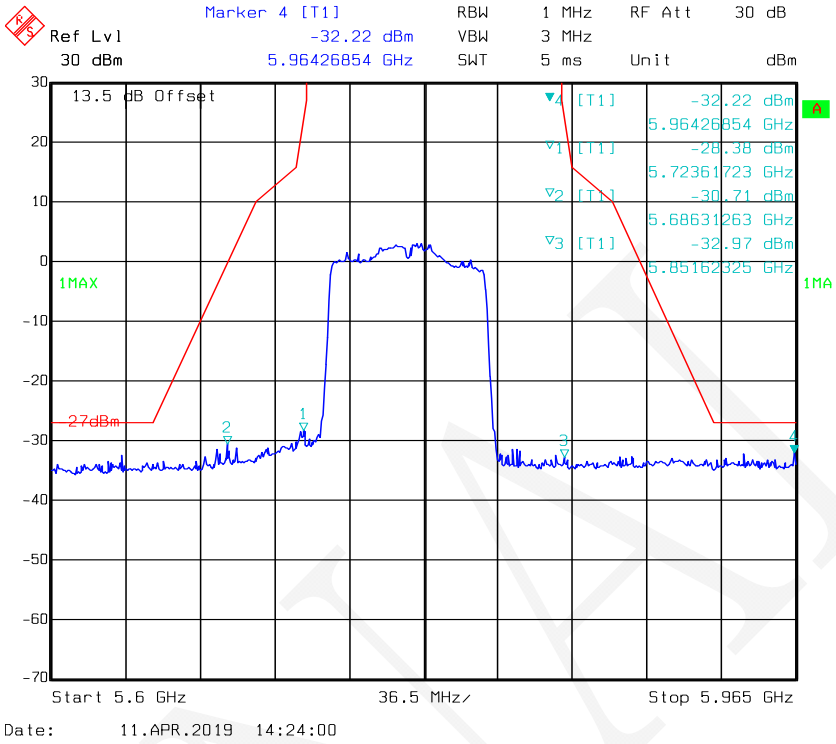
802.11ac40: Band Edge, Left Side, Antenna 1



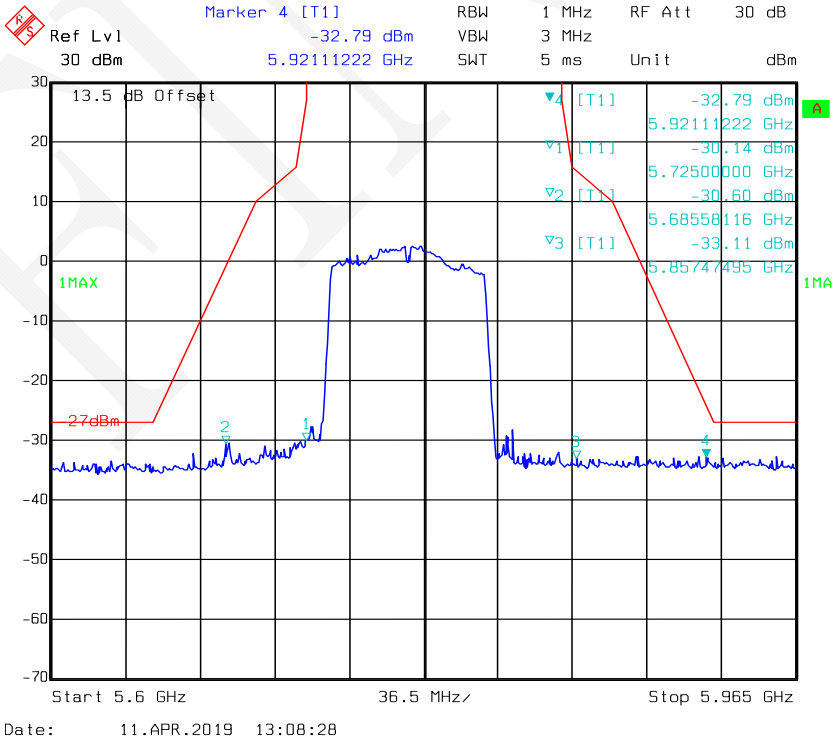
802.11ac40: Band Edge, Right Side, Antenna 1



802.11ac80: Band Edge, Antenna 0



802.11ac80: Band Edge, Antenna 1



FCC §15.407(a) (5) & (e) – 26dB & 6dB BANDWIDTH

Applicable Standard

(a)(5) The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

(e) Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.

3.

(A) 26dB Bandwidth

Set RBW = approximately 1% of the emission bandwidth.
Set the VBW > RBW. Detector= Peak. Trace mode = max hold. Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

(B) 6dB Bandwidth

Set RBW = 100 kHz. Set the video bandwidth (VBW) ≥ 3 × RBW.
Detector = Peak. Trace mode = max hold. Sweep = auto couple. Allow the trace to stabilize. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

(C) 99% Occupied Bandwidth

The following procedure shall be used for measuring (99 %) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW ≥ 3 · RBW
5. Use the 99 % power bandwidth function of the instrument.

4. Repeat above procedures until all frequencies measured were complete.

Test Data

Environmental Conditions

Temperature:	22 °C
Relative Humidity:	59 %
ATM Pressure:	95.3 kPa

The testing was performed by Tom Tang on 2019-04-11.

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

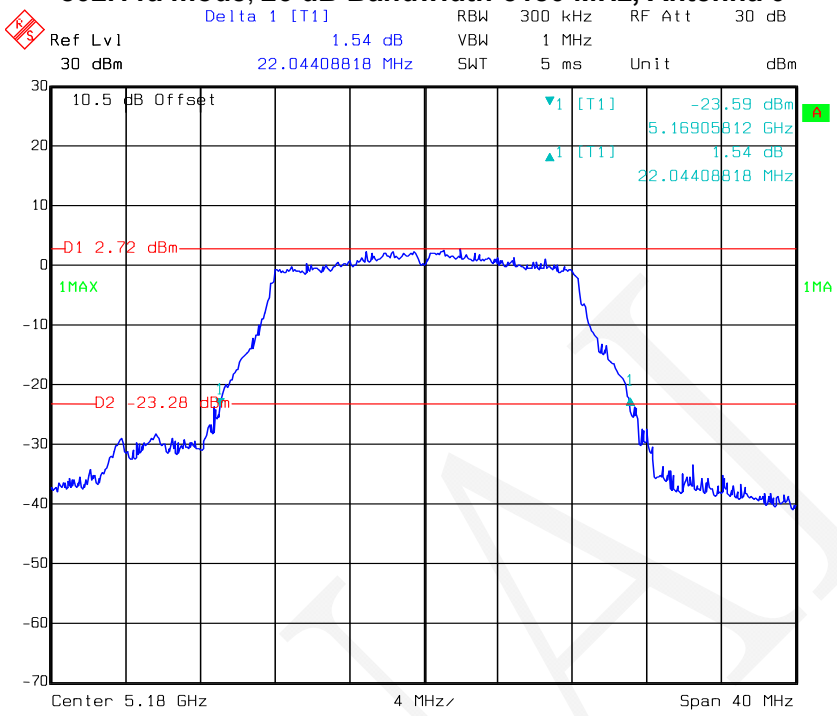
Test mode: Transmitting

For 5150-5250 MHz:

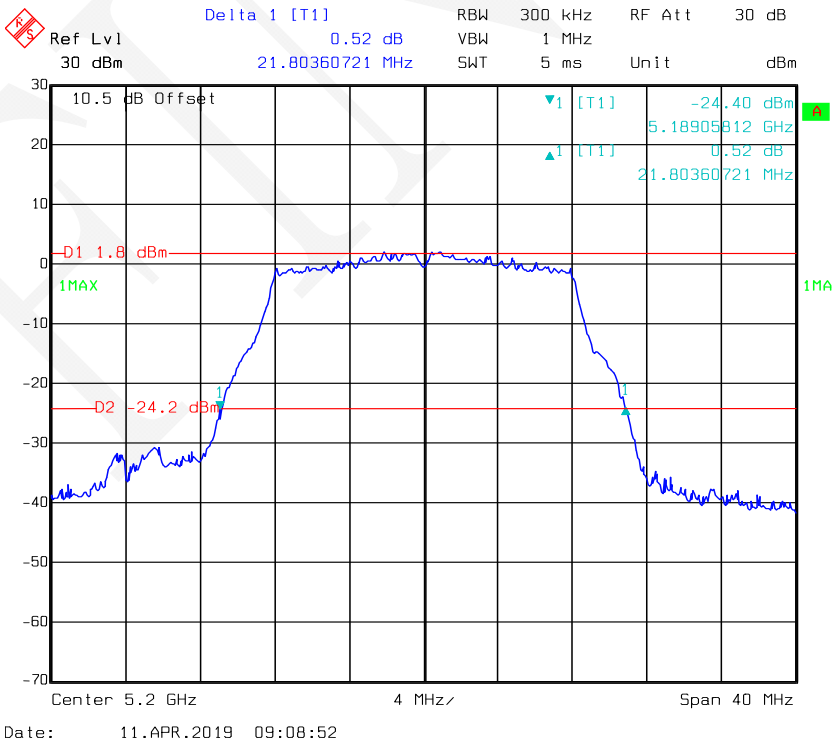
Mode	Channel	Frequency (MHz)	26dB Bandwidth (MHz)		99% Occupied Bandwidth (MHz)	
			Antenna 0	Antenna 1	Antenna 0	Antenna 1
802.11a	Low	5180	22.04	21.72	17.39	17.07
	Middle	5200	21.80	21.80	17.15	17.15
	High	5240	21.72	21.80	17.07	17.07
802.11n-HT20	Low	5180	22.44	21.80	18.44	18.12
	Middle	5200	21.88	22.04	18.20	18.20
	High	5240	22.04	21.88	18.20	18.20
802.11n-HT40	Low	5190	40.24	39.76	36.87	36.87
	High	5230	39.92	39.76	36.87	36.87
802.11ac20	Low	5180	21.88	21.88	18.20	18.20
	Middle	5200	21.88	21.80	18.20	18.20
	High	5240	21.96	21.88	18.20	18.20
802.11ac40	Low	5190	40.08	40.08	36.87	36.71
	High	5230	39.92	39.92	36.71	36.87
802.11ac80	Middle	5210	82.40	82.08	75.67	75.67

Note: the 99% Occupied Bandwidth doesn't extend U-NII-2A band 5250-5350MHz.

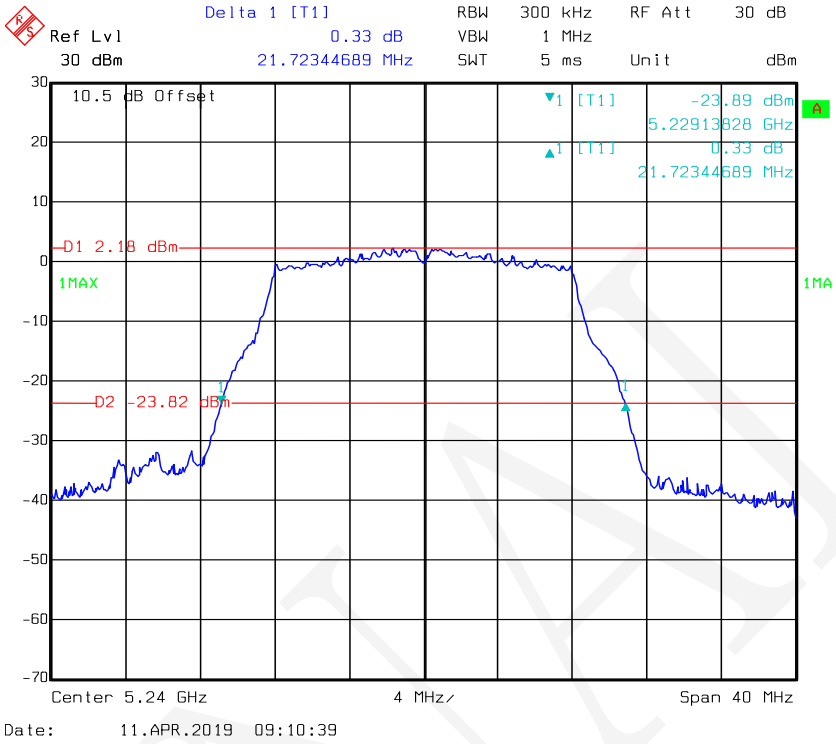
802.11a mode, 26 dB Bandwidth-5180 MHz, Antenna 0



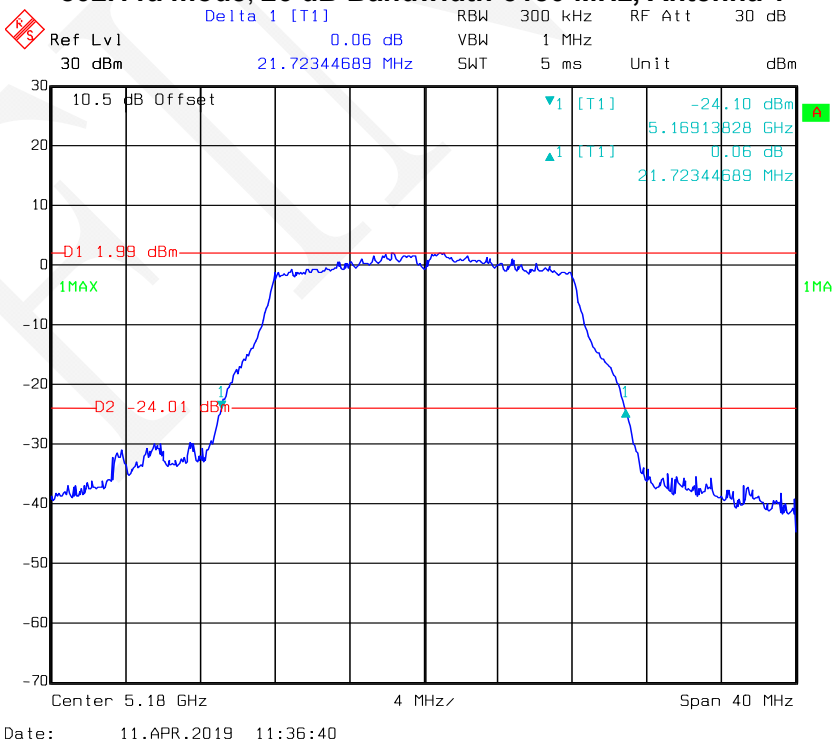
802.11a mode, 26 dB Bandwidth-5200 MHz, Antenna 0



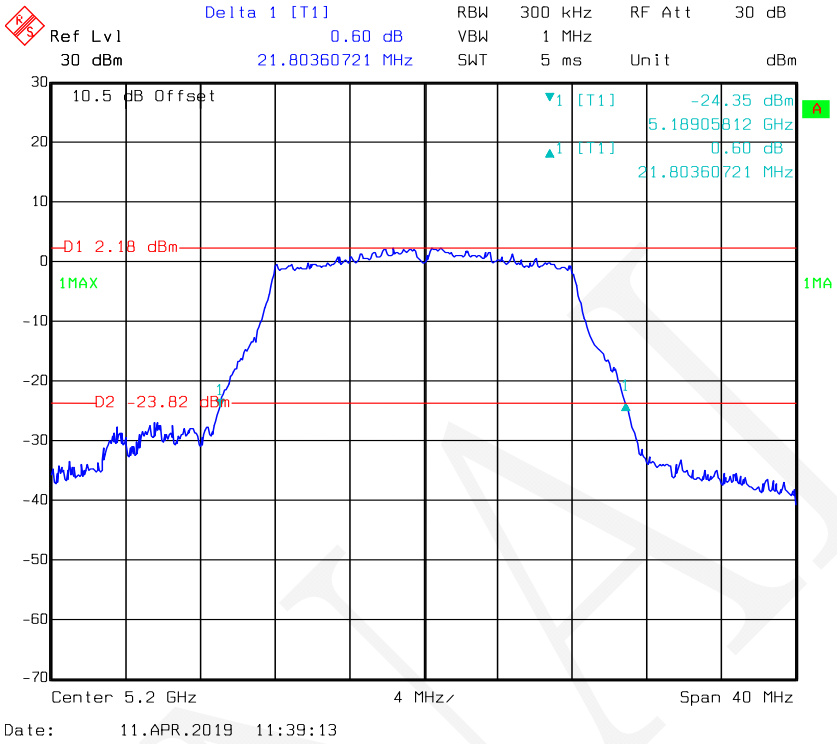
802.11a mode, 26 dB Bandwidth-5240 MHz, Antenna 0



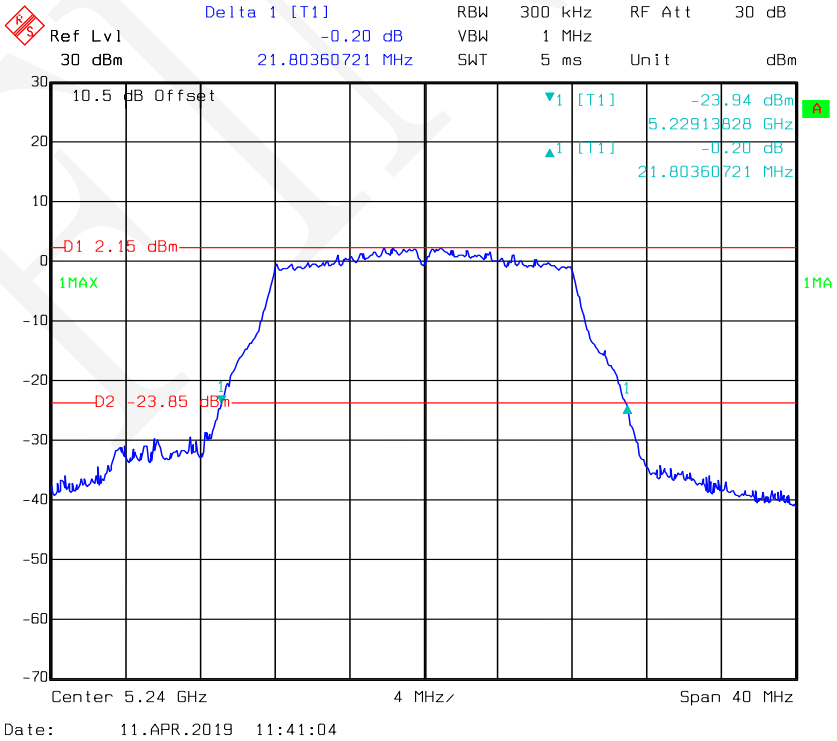
802.11a mode, 26 dB Bandwidth-5180 MHz, Antenna 1



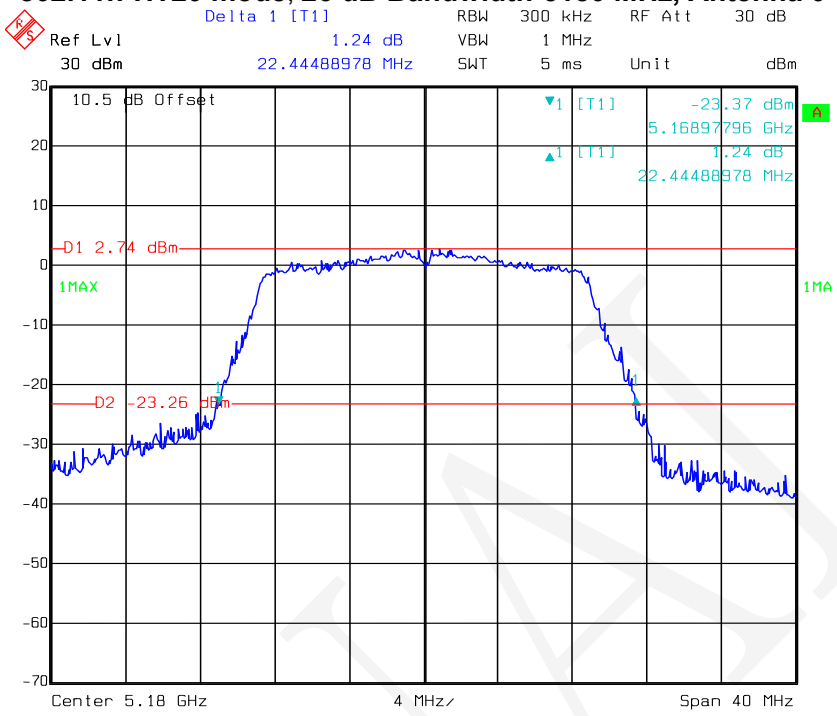
802.11a mode, 26 dB Bandwidth-5200 MHz, Antenna 1



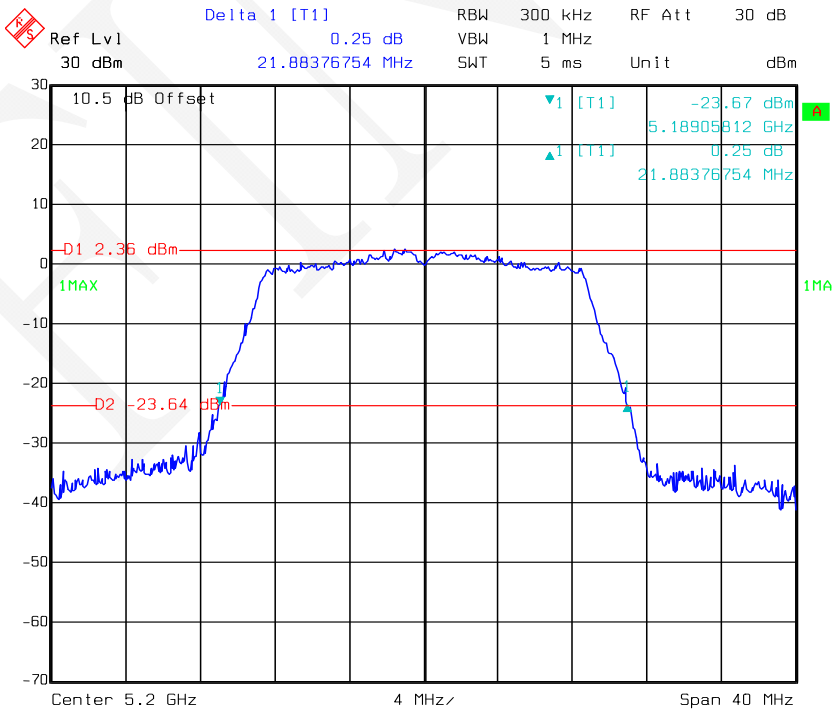
802.11a mode, 26 dB Bandwidth-5240 MHz, Antenna 1



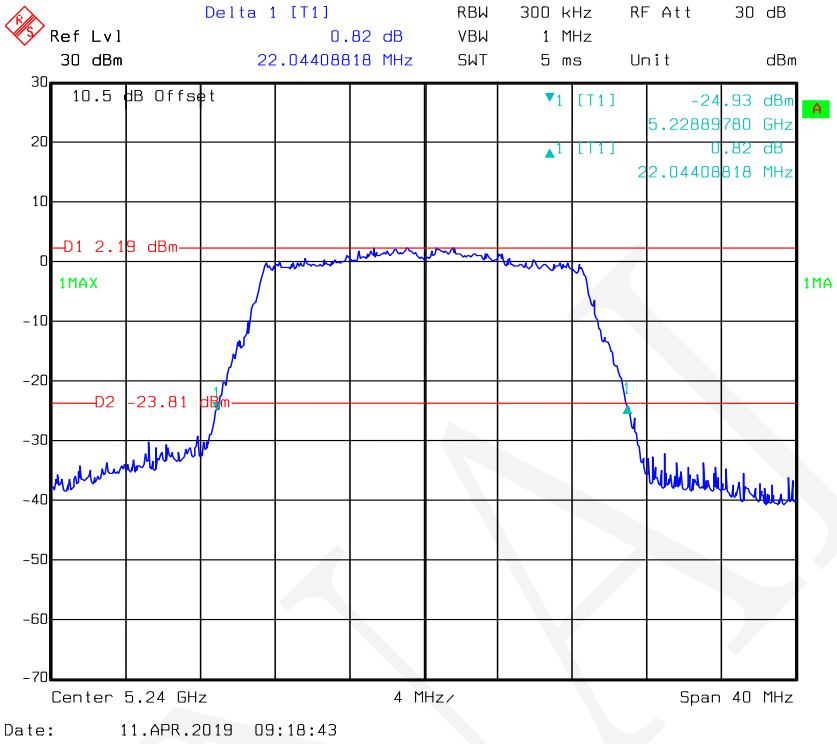
802.11n-HT20 mode, 26 dB Bandwidth-5180 MHz, Antenna 0



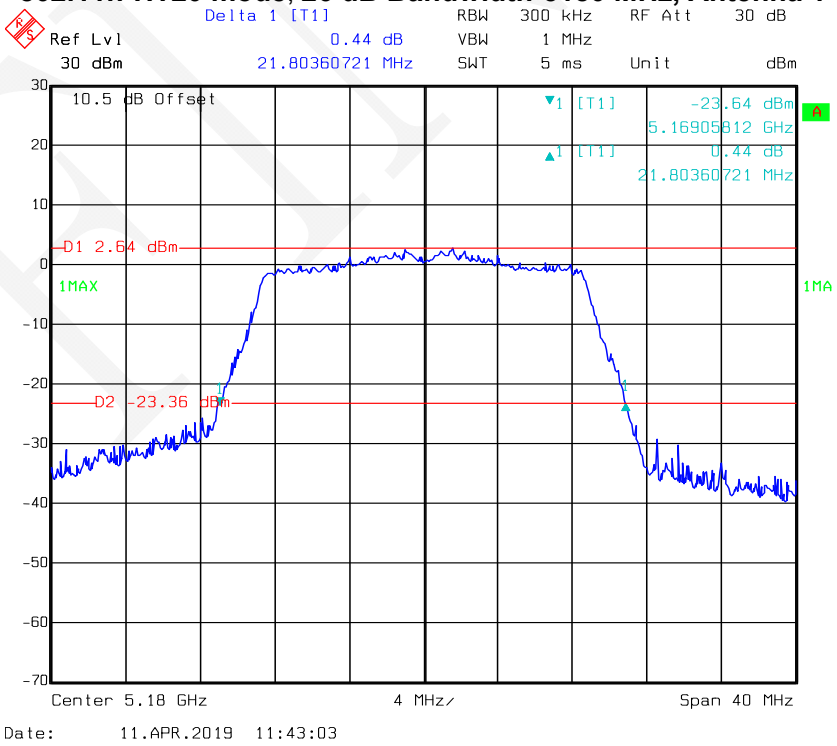
802.11n-HT20 mode, 26 dB Bandwidth-5200 MHz, Antenna 0



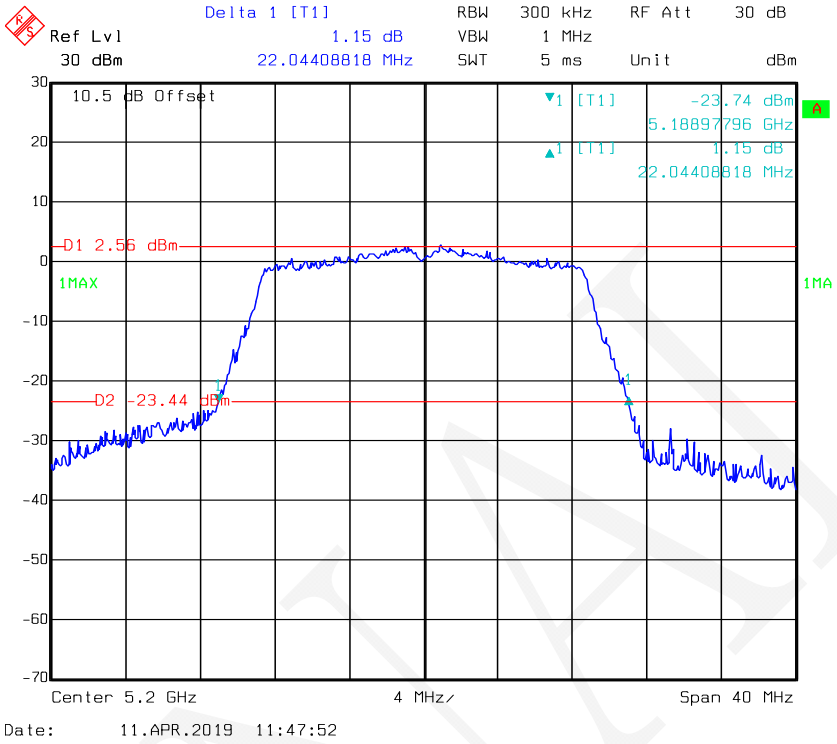
802.11n-HT20 mode, 26 dB Bandwidth-5240 MHz, Antenna 0



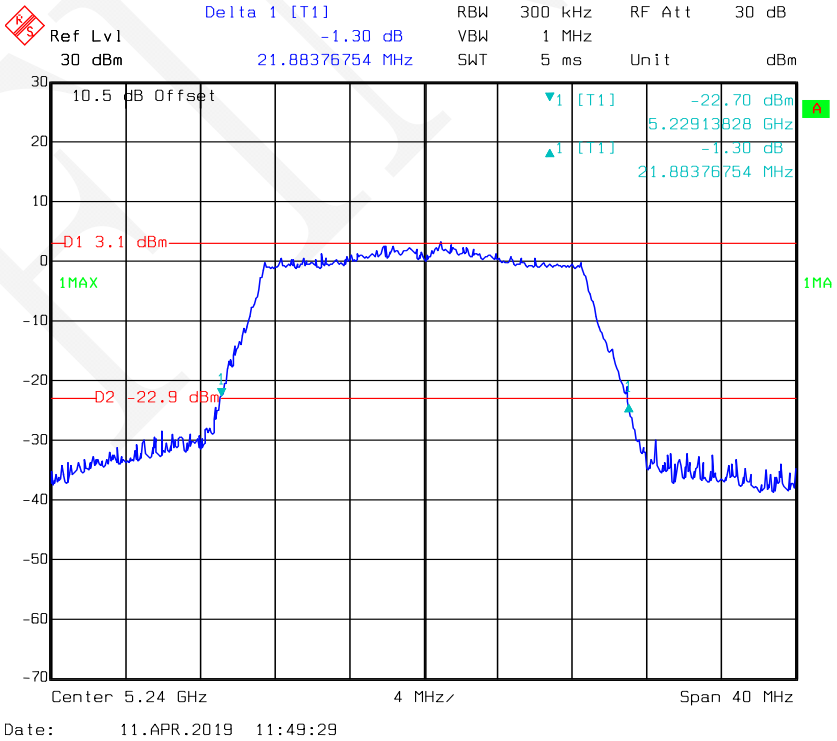
802.11n-HT20 mode, 26 dB Bandwidth-5180 MHz, Antenna 1



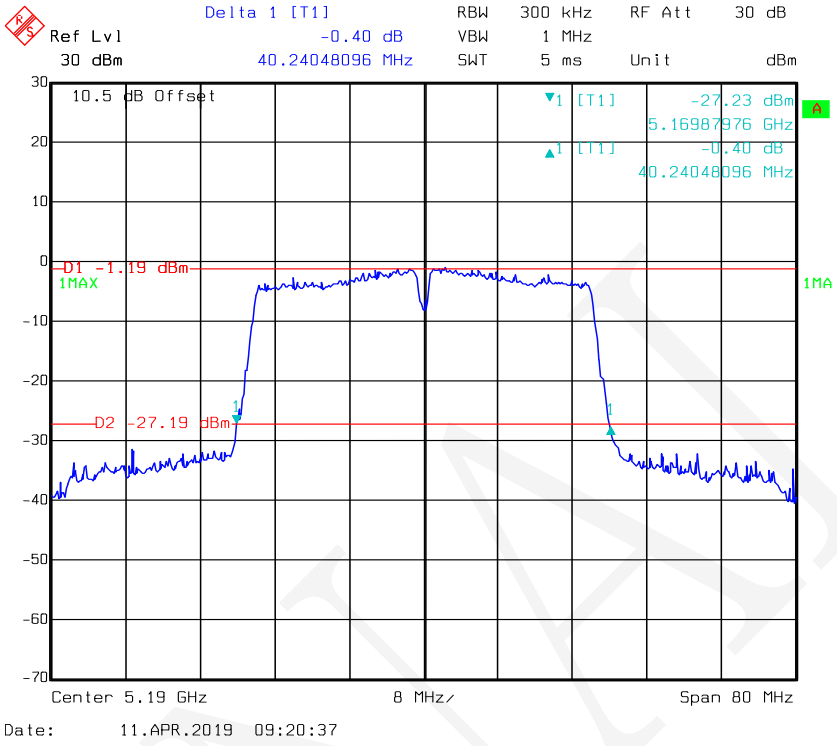
802.11n-HT20 mode, 26 dB Bandwidth-5200 MHz, Antenna 1



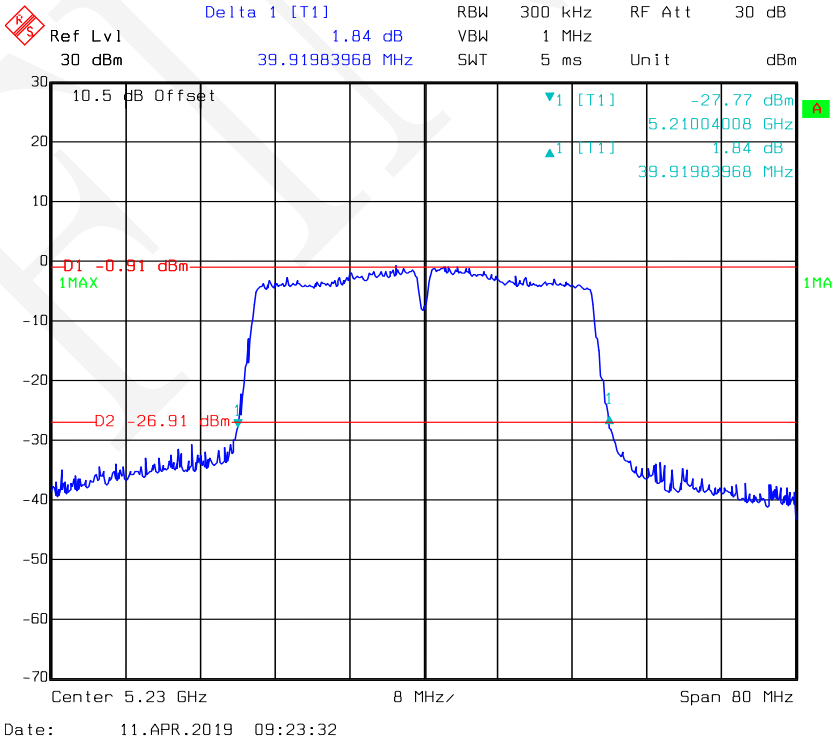
802.11n-HT20 mode, 26 dB Bandwidth-5240 MHz, Antenna 1



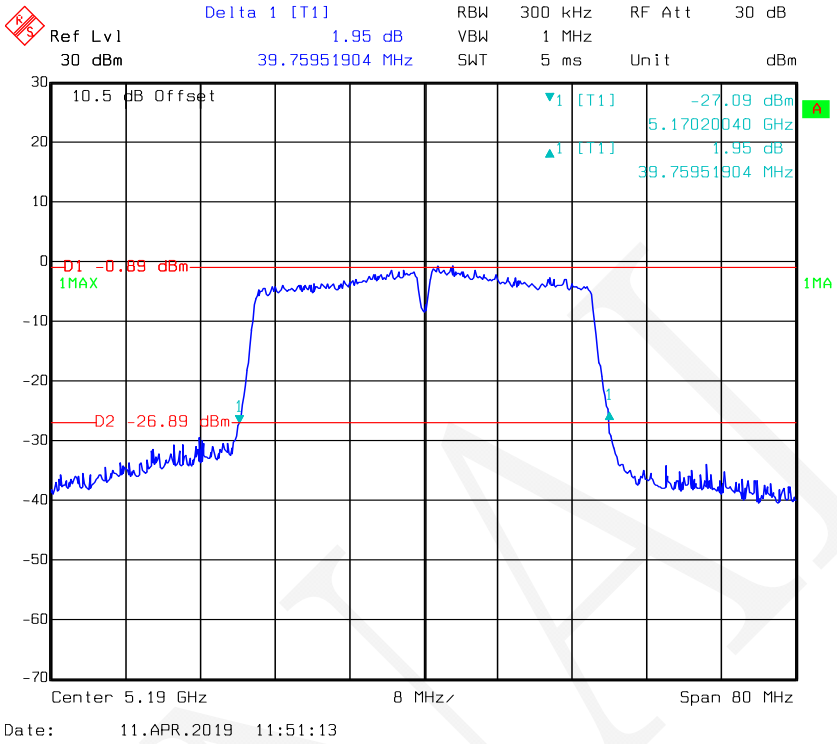
802.11n-HT40 mode, 26 dB Bandwidth-5190 MHz, Antenna 0



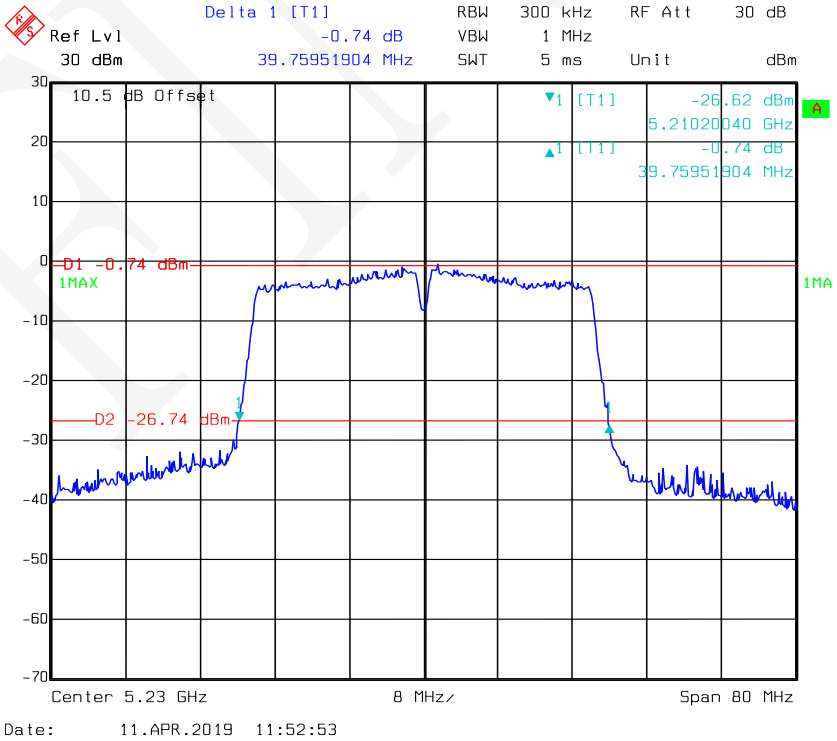
802.11n-HT40 mode, 26 dB Bandwidth-5230 MHz, Antenna 0



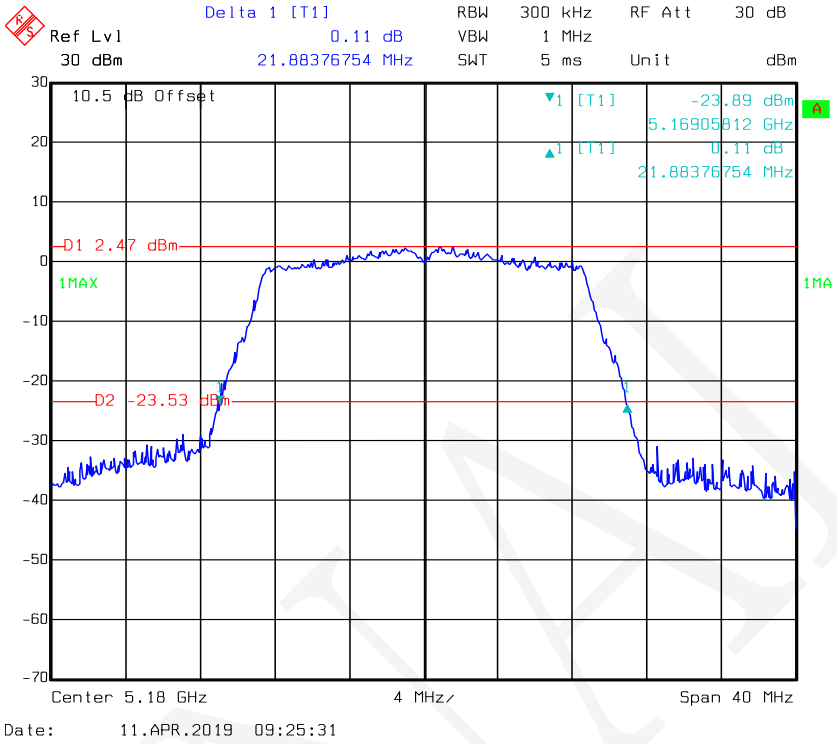
802.11n-HT40 mode, 26 dB Bandwidth-5190 MHz, Antenna 1



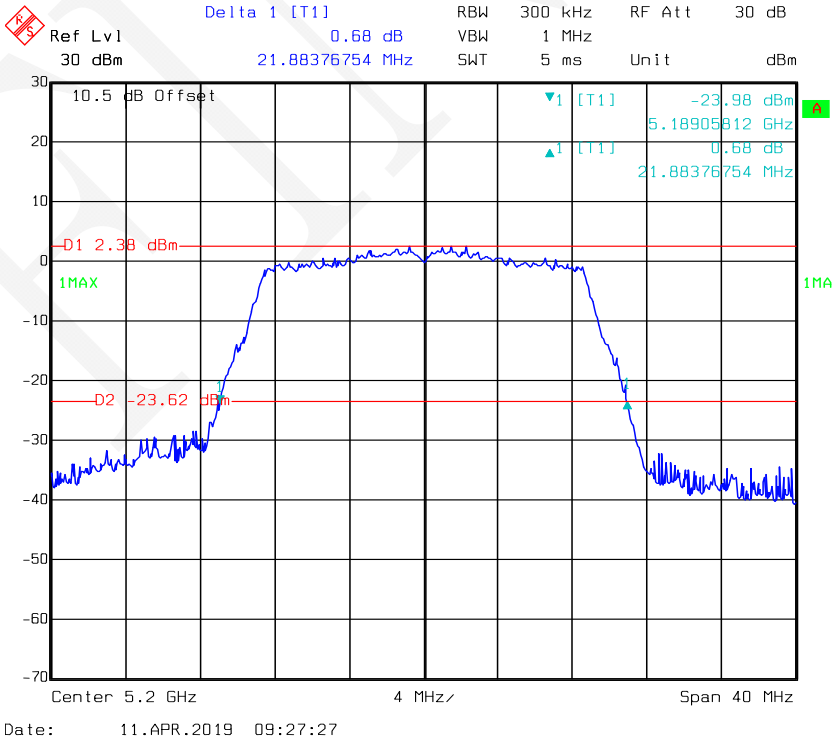
802.11n-HT40 mode, 26 dB Bandwidth-5230 MHz, Antenna 1



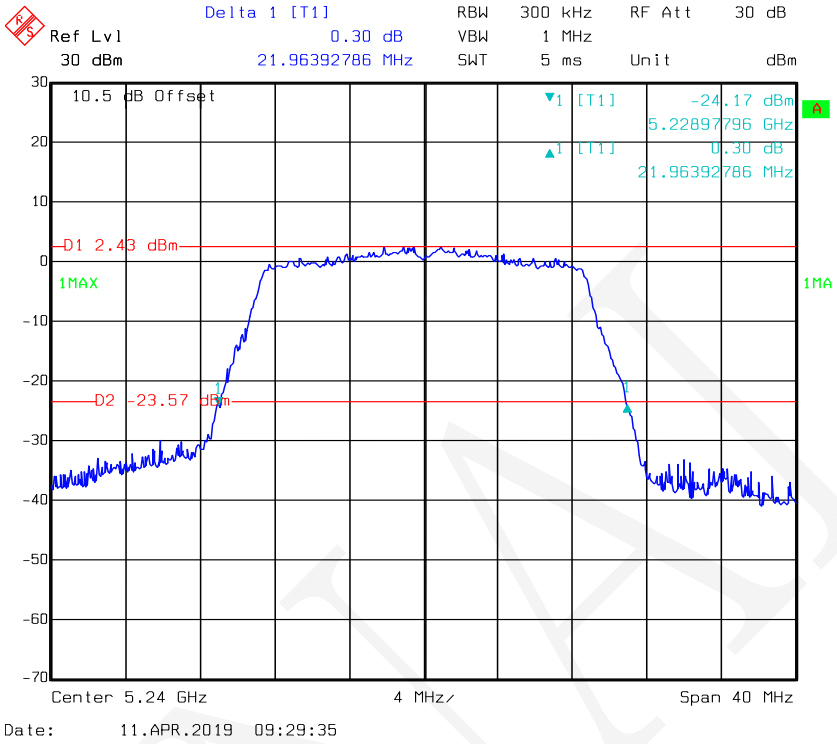
802.11ac20 mode, 26 dB Bandwidth-5180 MHz, Antenna 0



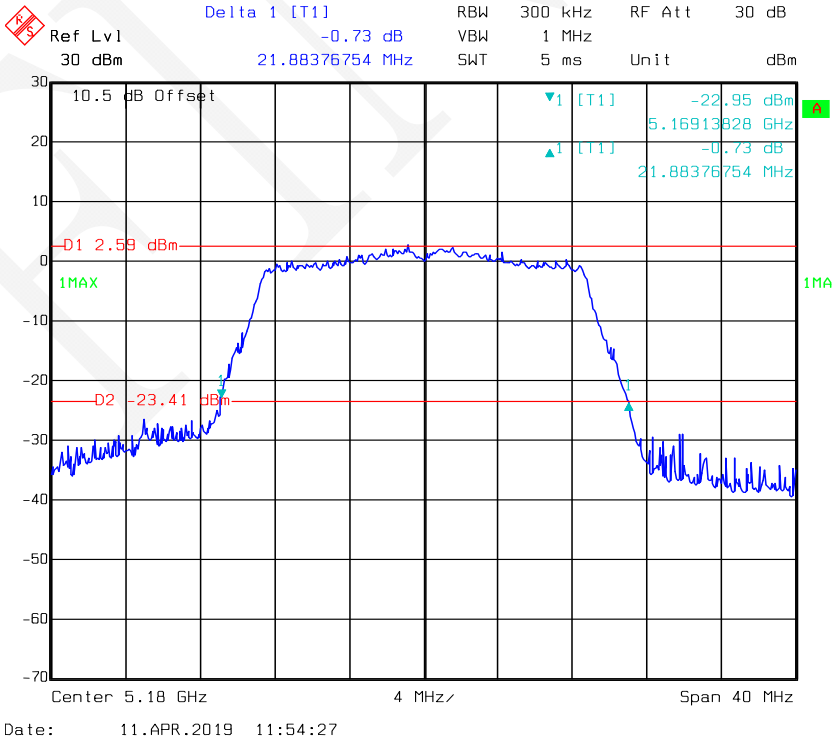
802.11ac20 mode, 26 dB Bandwidth-5200 MHz, Antenna 0



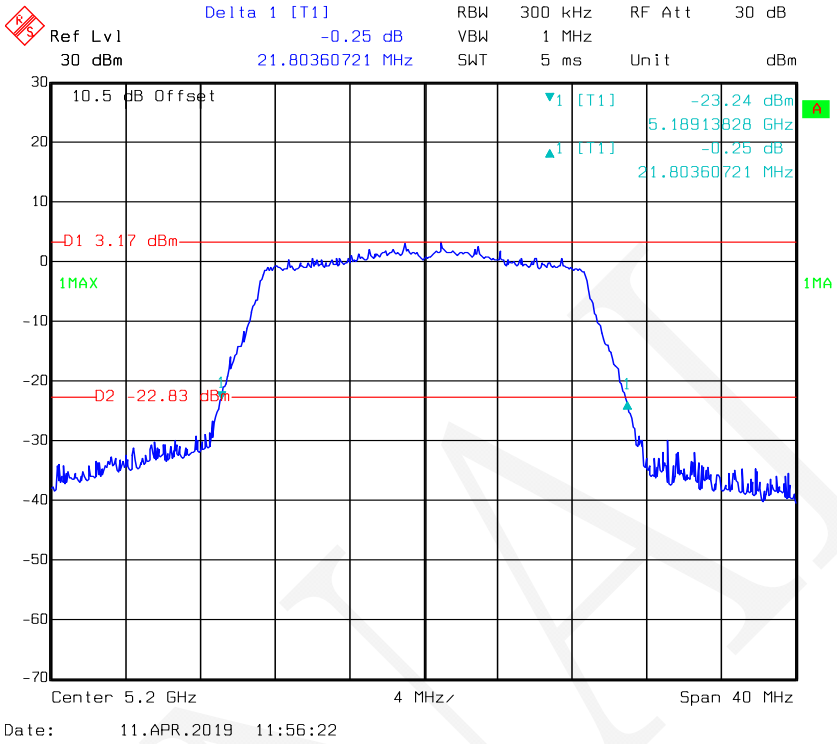
802.11ac20 mode, 26 dB Bandwidth-5240 MHz, Antenna 0



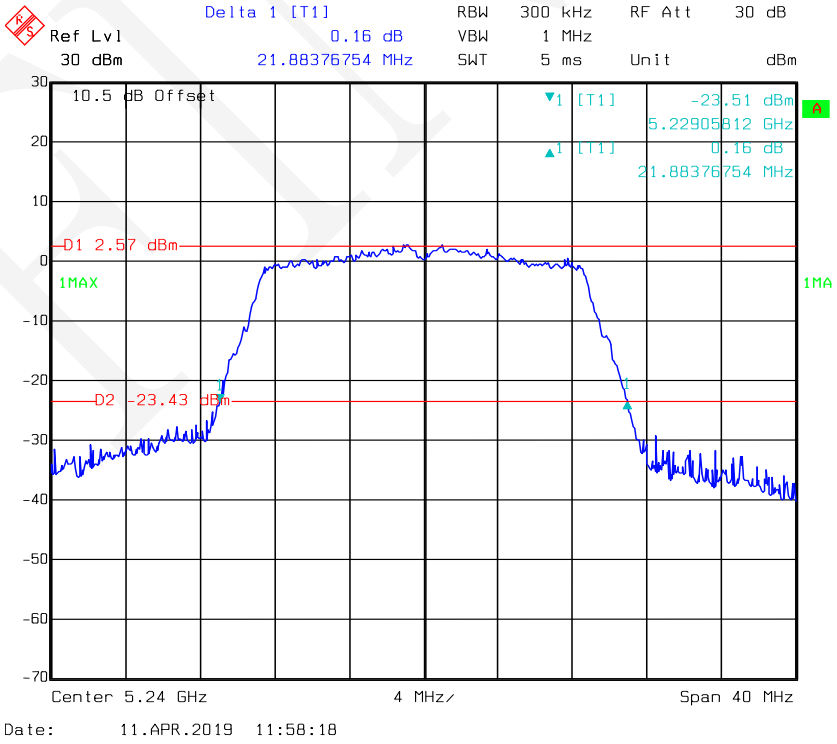
802.11ac20 mode, 26 dB Bandwidth-5180 MHz, Antenna 1



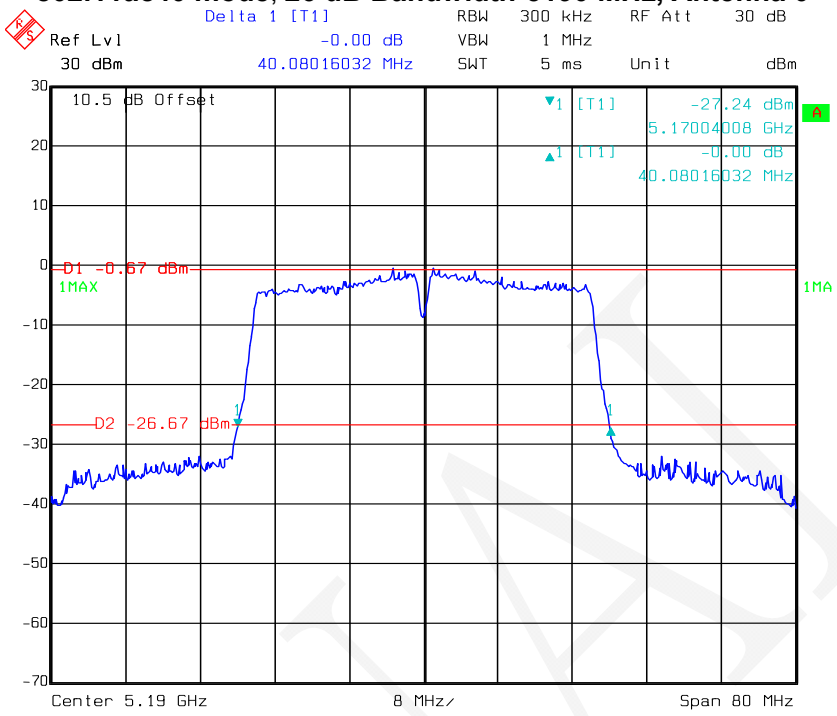
802.11ac20 mode, 26 dB Bandwidth-5200 MHz, Antenna 1



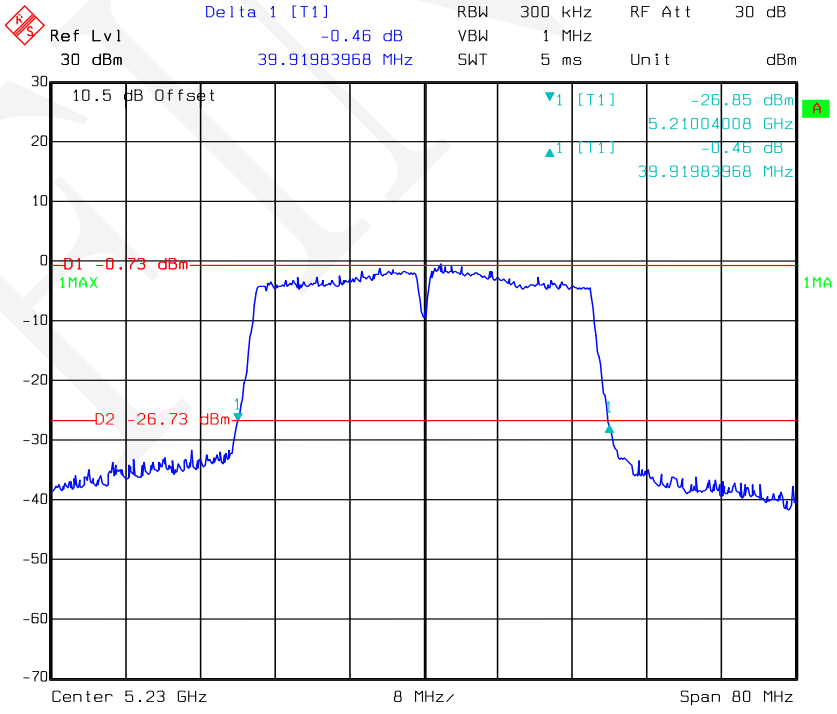
802.11ac20 mode, 26 dB Bandwidth-5240 MHz, Antenna 1



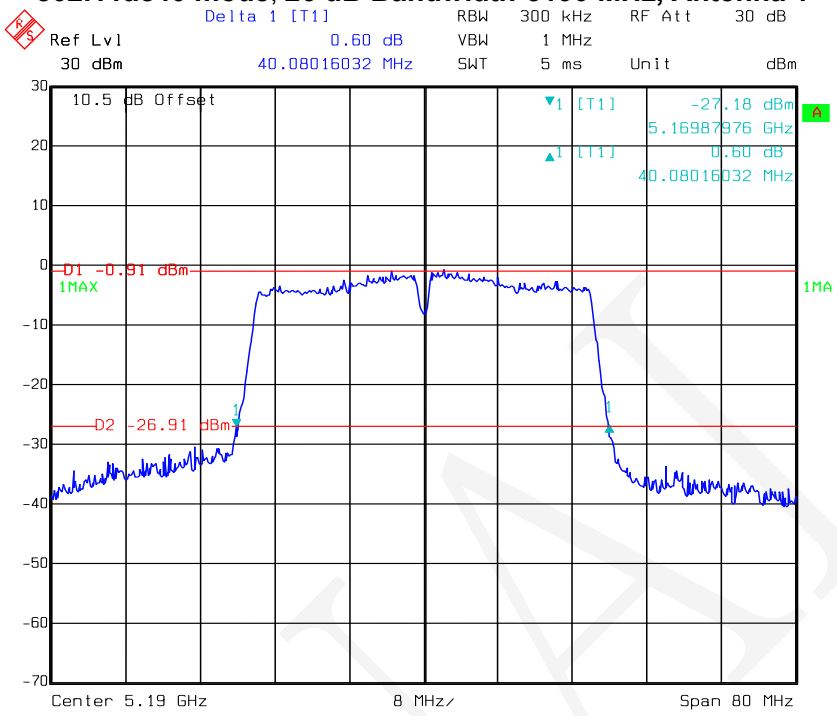
802.11ac40 mode, 26 dB Bandwidth-5190 MHz, Antenna 0



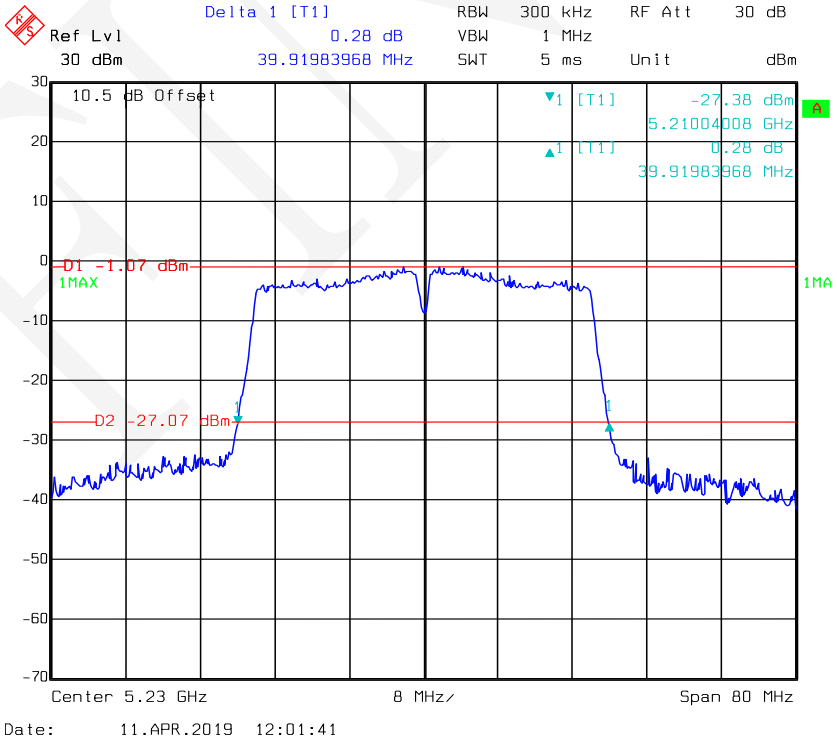
802.11ac40 mode, 26 dB Bandwidth-5230 MHz, Antenna 0



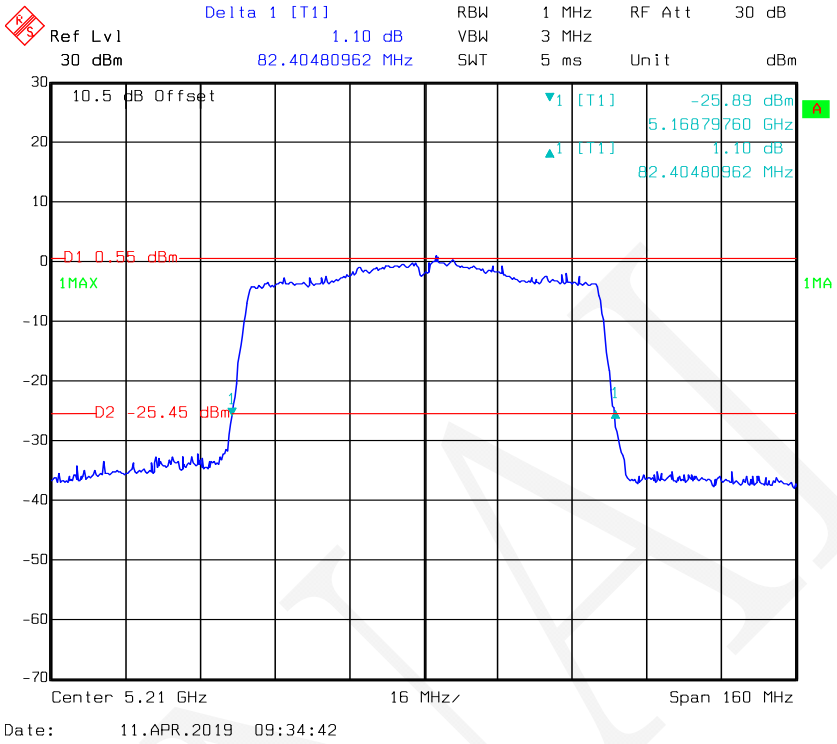
802.11ac40 mode, 26 dB Bandwidth-5190 MHz, Antenna 1



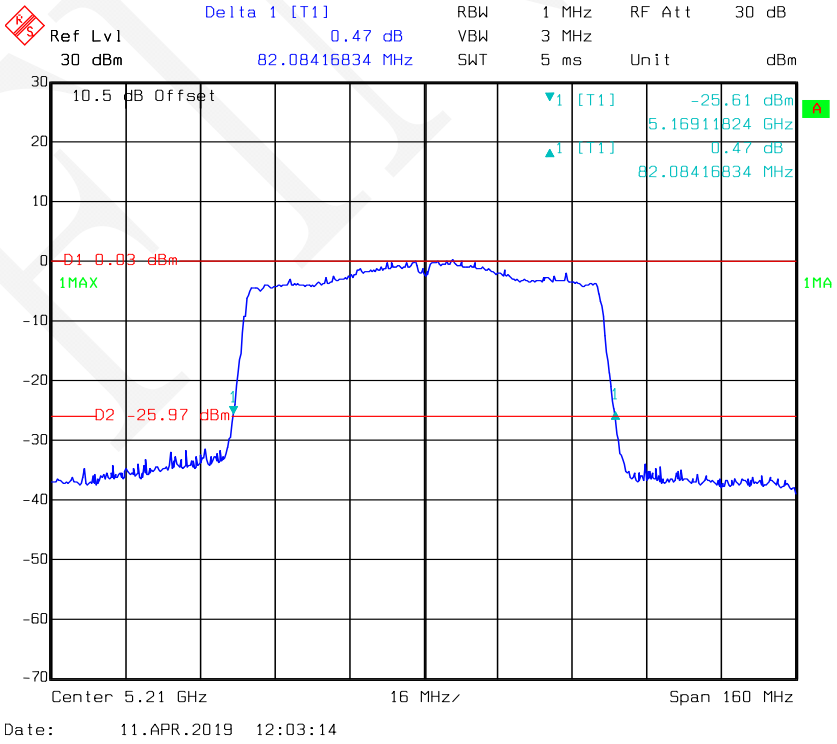
802.11ac40 mode, 26 dB Bandwidth-5230 MHz, Antenna 1



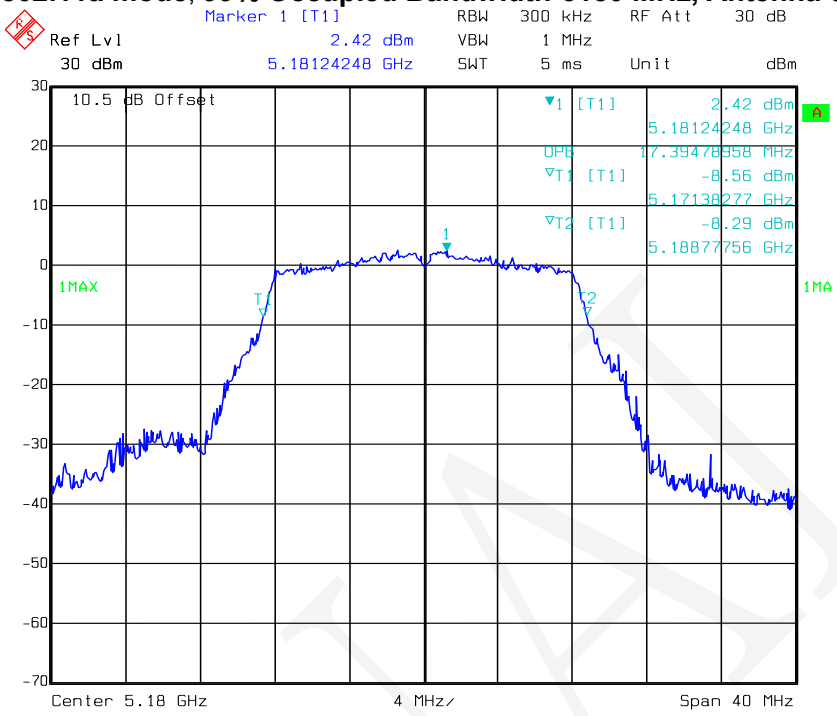
802.11ac80 mode, 26 dB Bandwidth-5210 MHz, Antenna 0



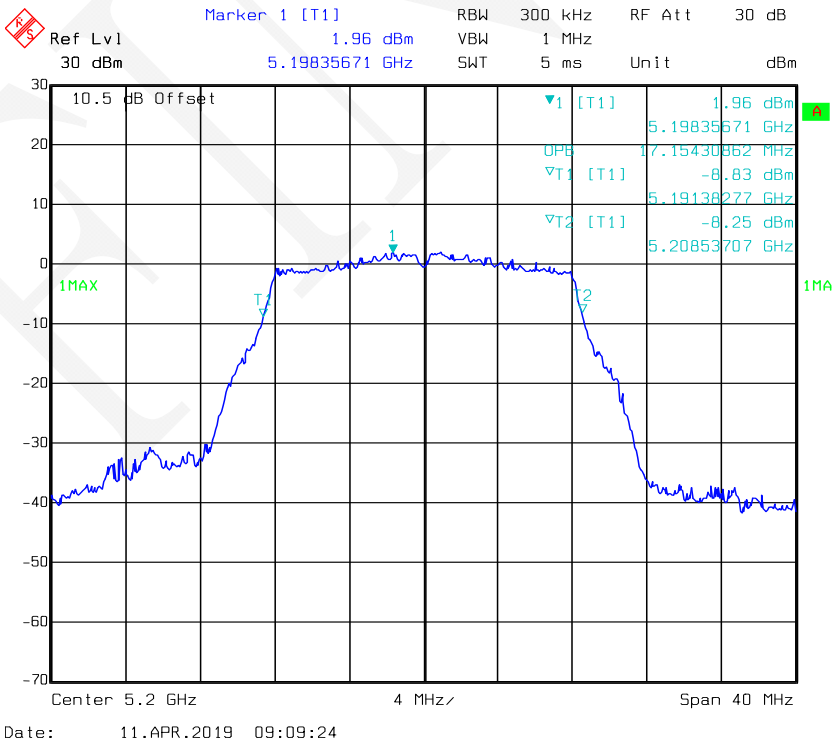
802.11ac80 mode, 26 dB Bandwidth-5210 MHz, Antenna 1



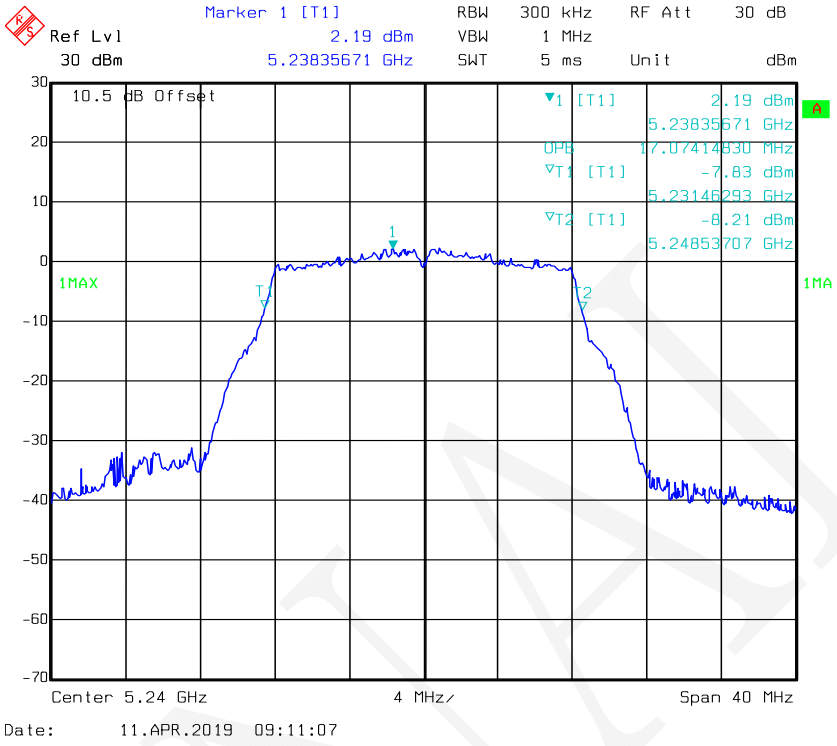
802.11a mode, 99% Occupied Bandwidth-5180 MHz, Antenna 0



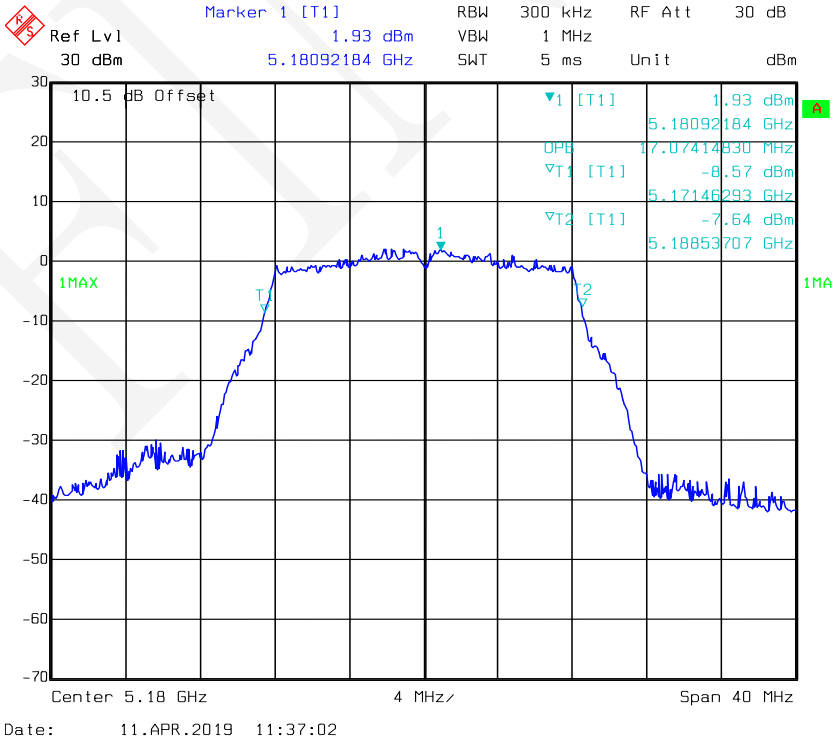
802.11a mode, 99% Occupied Bandwidth -5200 MHz, Antenna 0



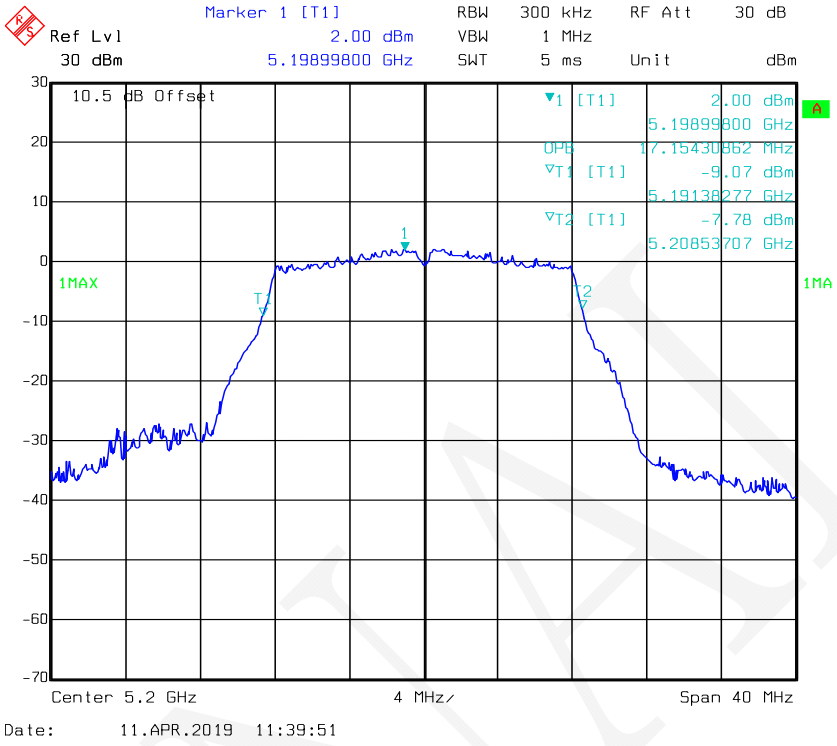
802.11a mode, 99% Occupied Bandwidth -5240 MHz, Antenna 0



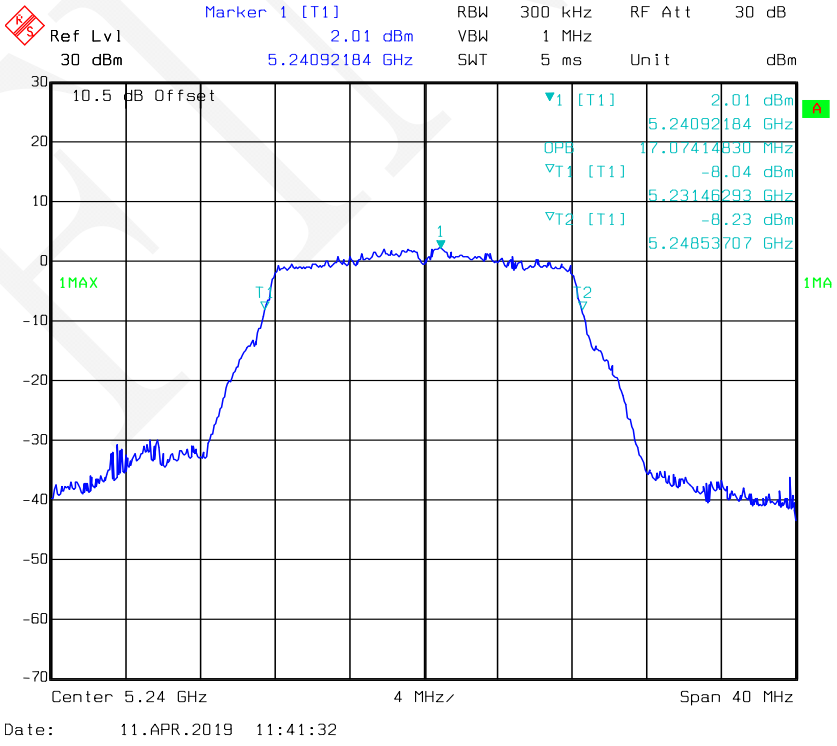
802.11a mode, 99% Occupied Bandwidth-5180 MHz, Antenna 1



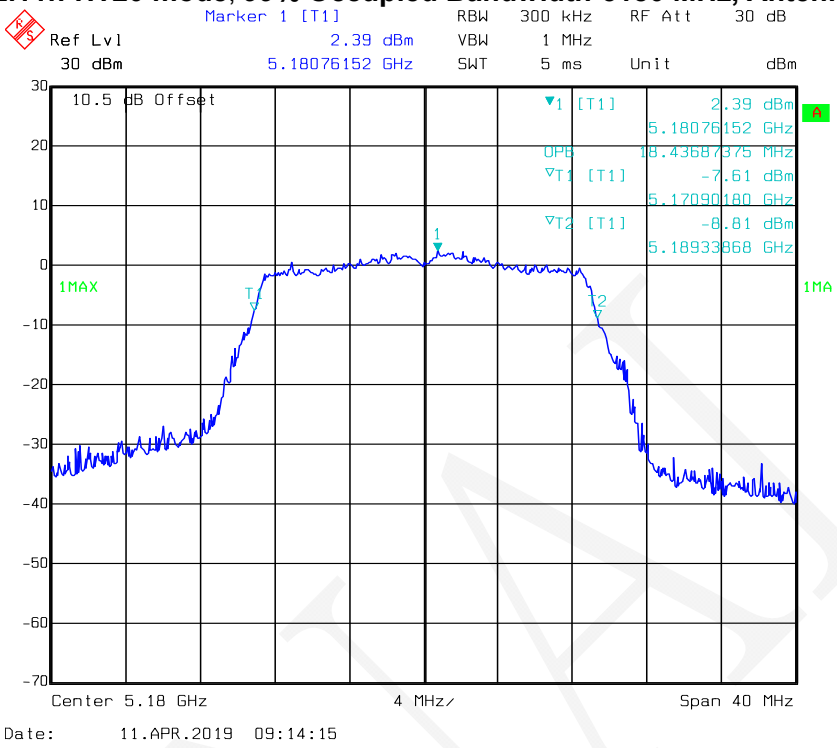
802.11a mode, 99% Occupied Bandwidth -5200 MHz, Antenna 1



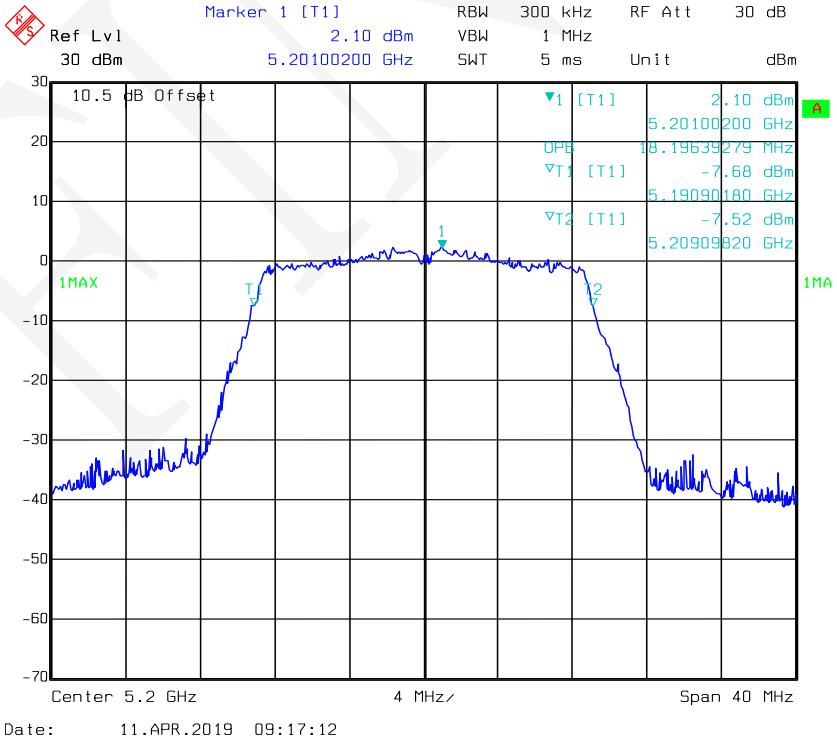
802.11a mode, 99% Occupied Bandwidth -5240 MHz, Antenna 1



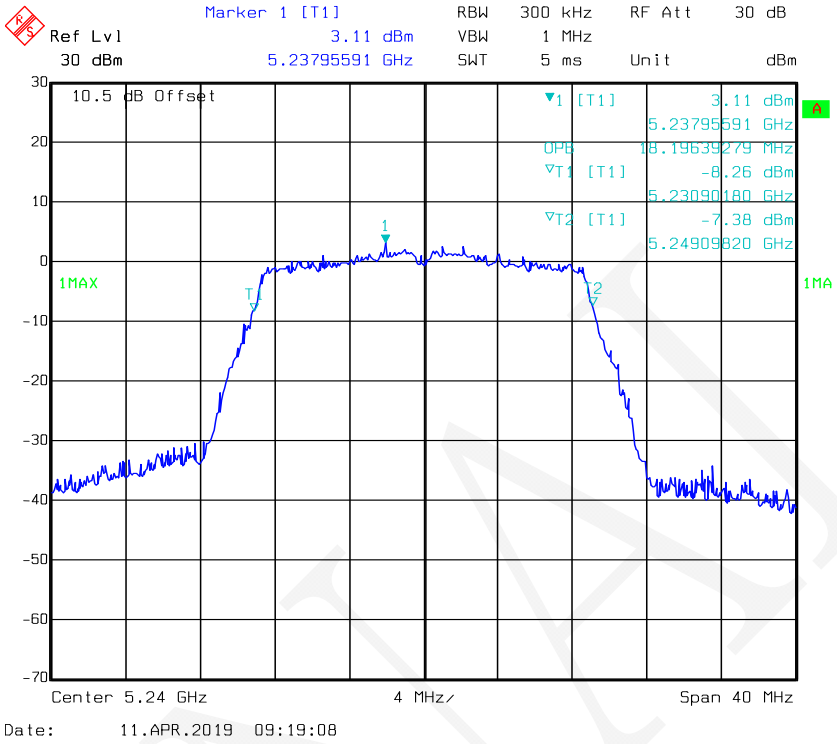
802.11n-HT20 mode, 99% Occupied Bandwidth-5180 MHz, Antenna 0



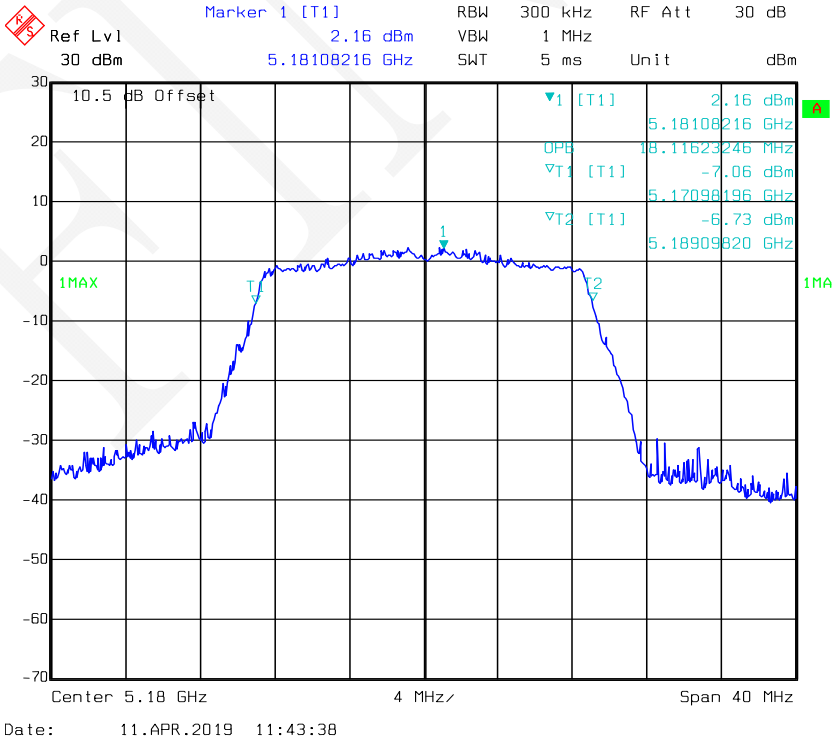
802.11n-HT20 mode, 99% Occupied Bandwidth -5200 MHz, Antenna 0



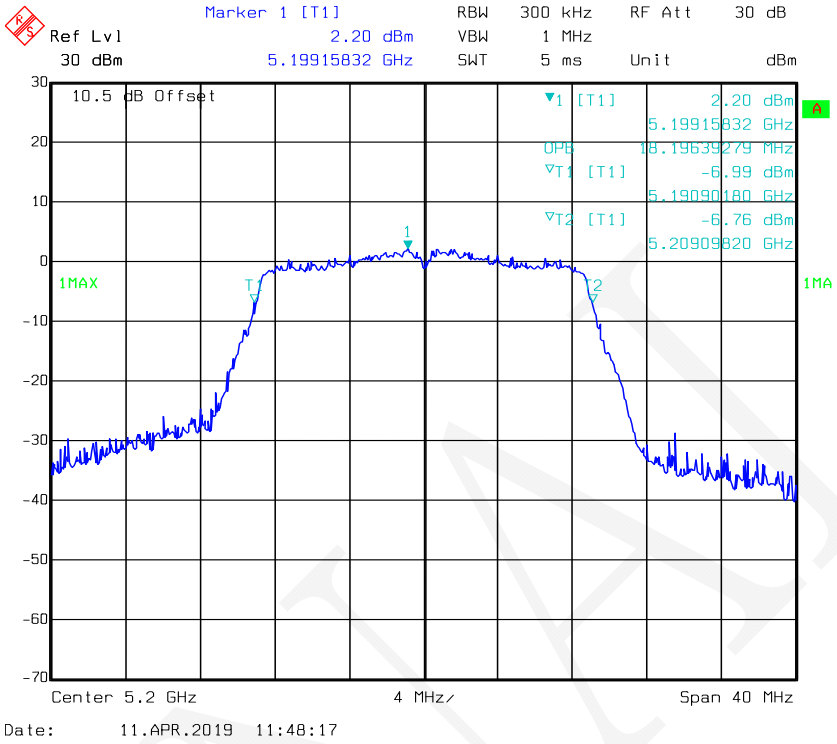
802.11n-HT20 mode, 99% Occupied Bandwidth -5240 MHz, Antenna 0



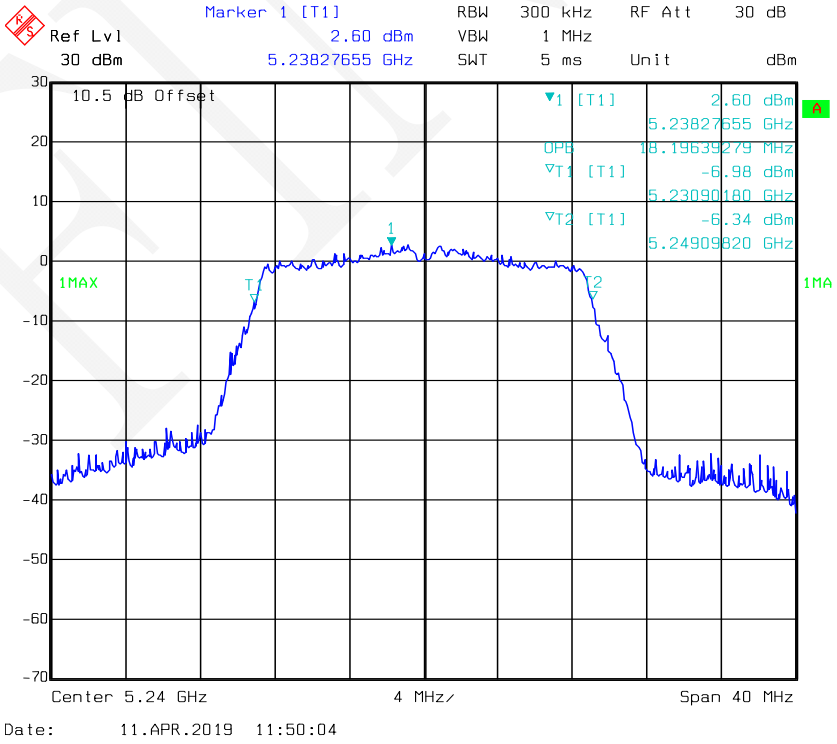
802.11n-HT20 mode, 99% Occupied Bandwidth-5180 MHz, Antenna 1



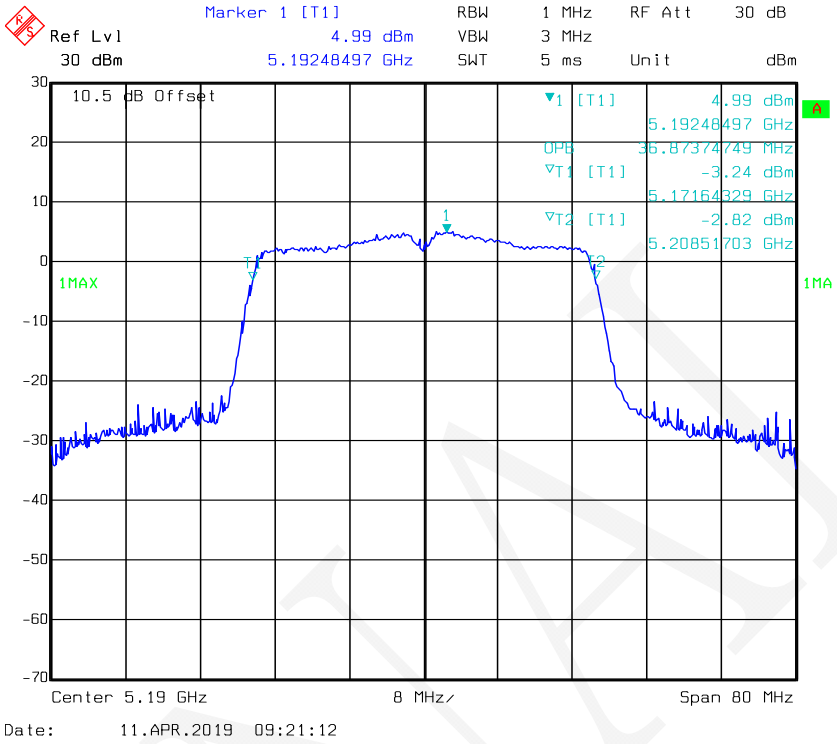
802.11n-HT20 mode, 99% Occupied Bandwidth -5200 MHz, Antenna 1



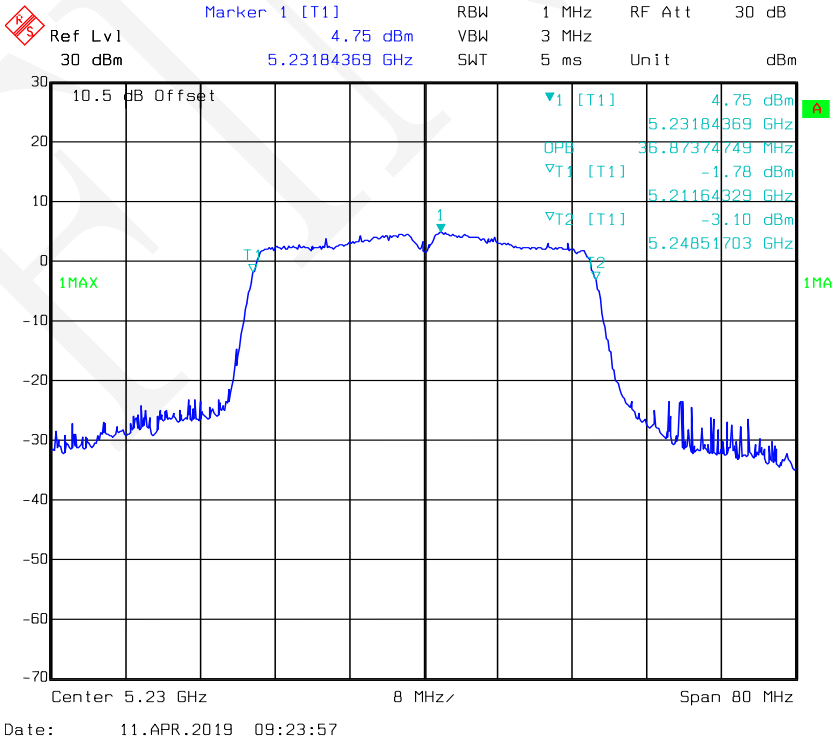
802.11n-HT20 mode, 99% Occupied Bandwidth -5240 MHz, Antenna 1



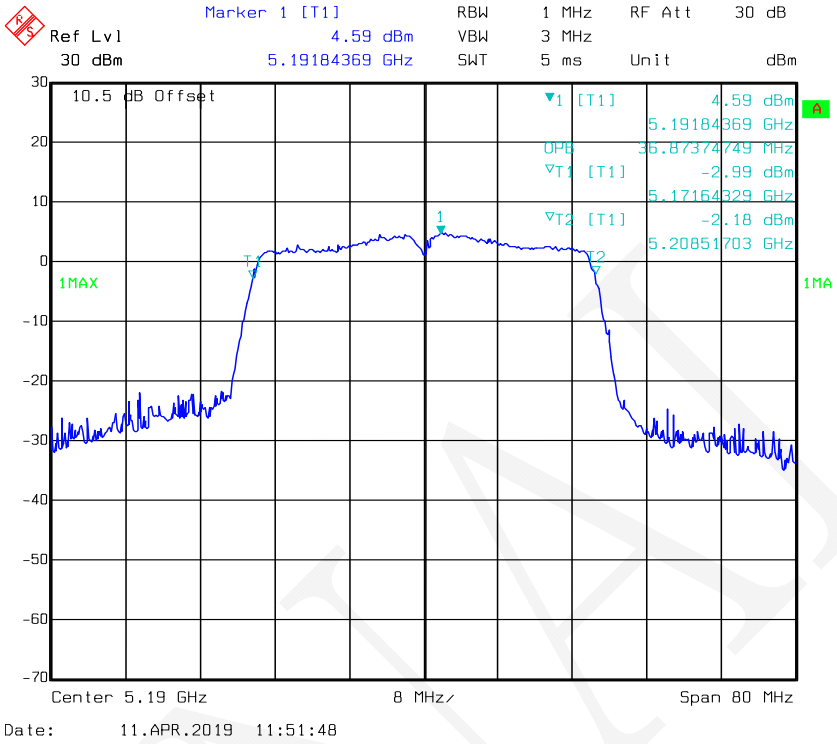
802.11n-HT40 mode, 99% Occupied Bandwidth-5190 MHz, Antenna 0



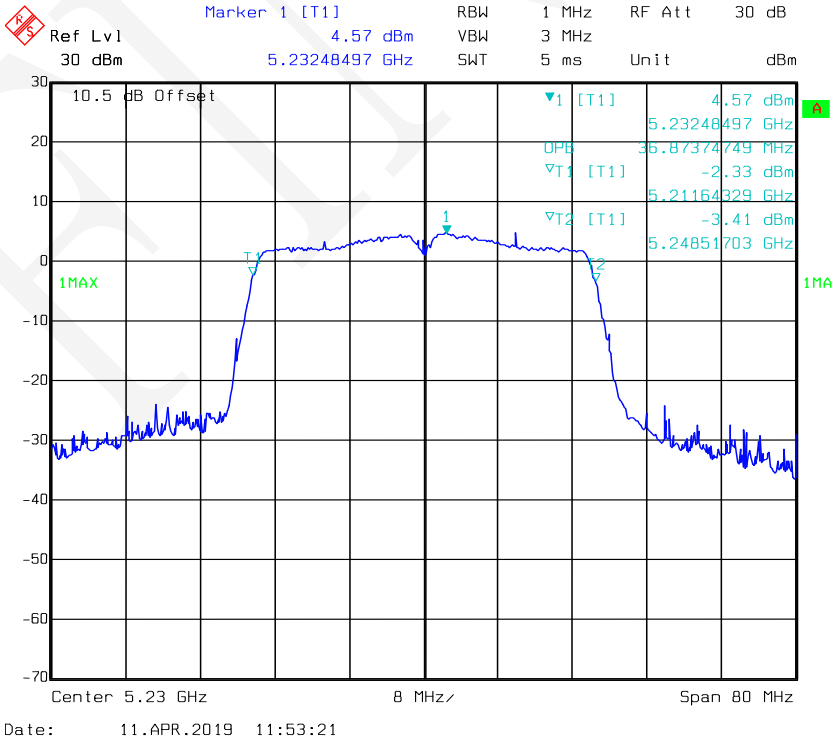
802.11n-HT40 mode, 99% Occupied Bandwidth-5230 MHz, Antenna 0



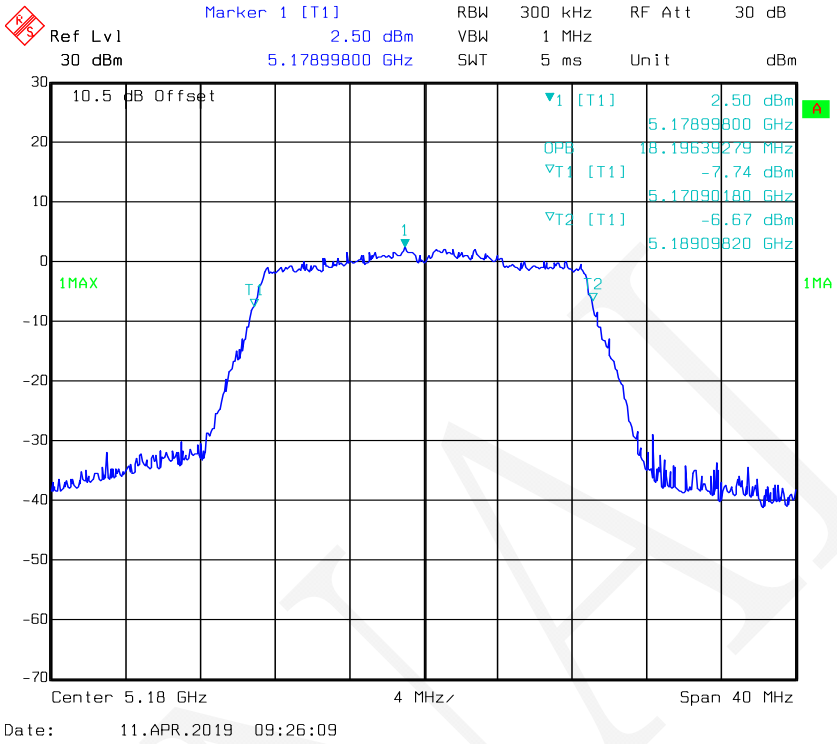
802.11n-HT40 mode, 99% Occupied Bandwidth-5190 MHz, Antenna 1



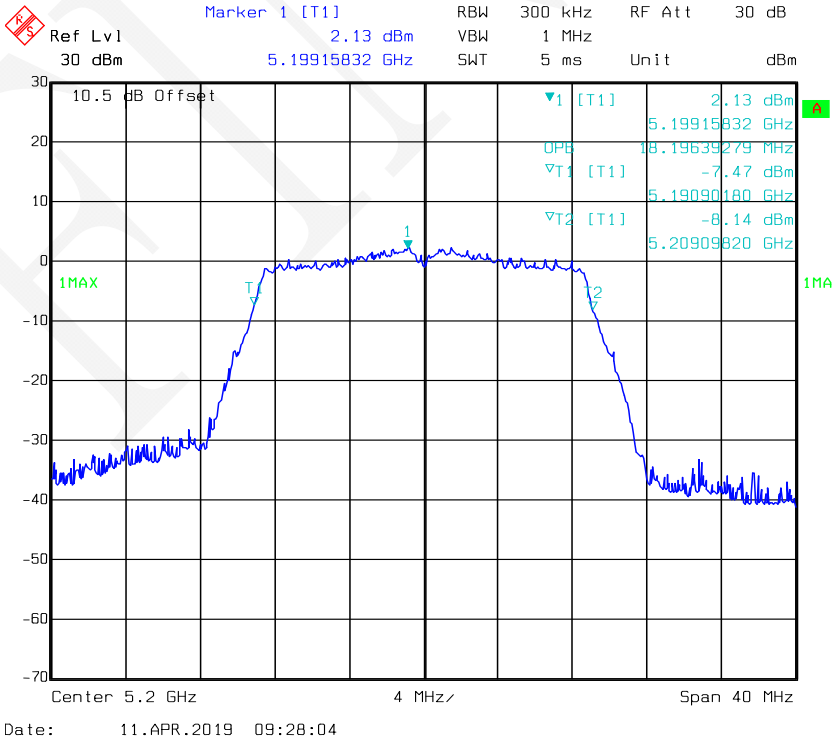
802.11n-HT40 mode, 99% Occupied Bandwidth-5230 MHz, Antenna 1



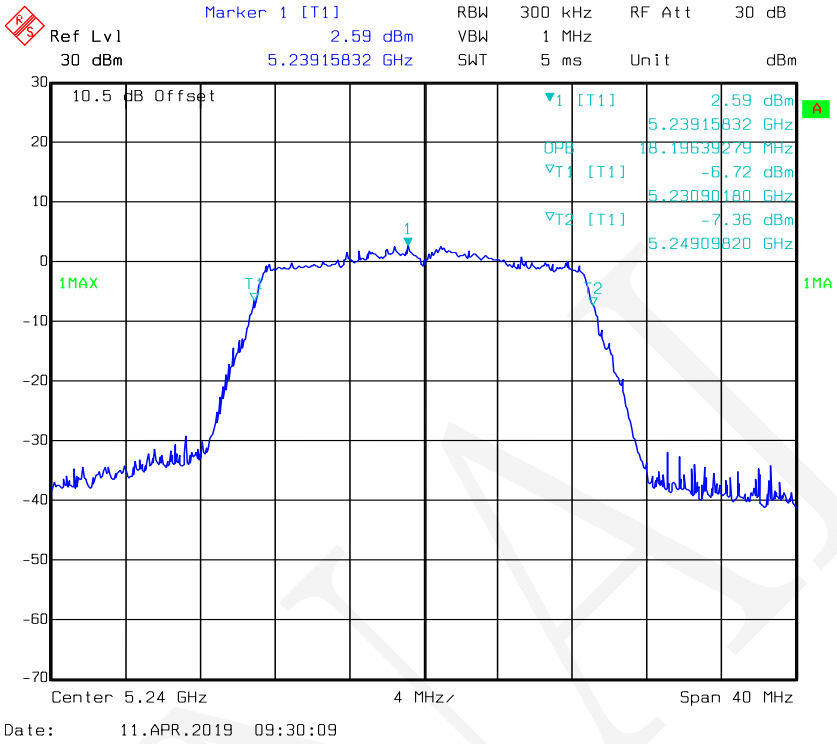
802.11ac20 mode, 99% Occupied Bandwidth-5180 MHz, Antenna 0



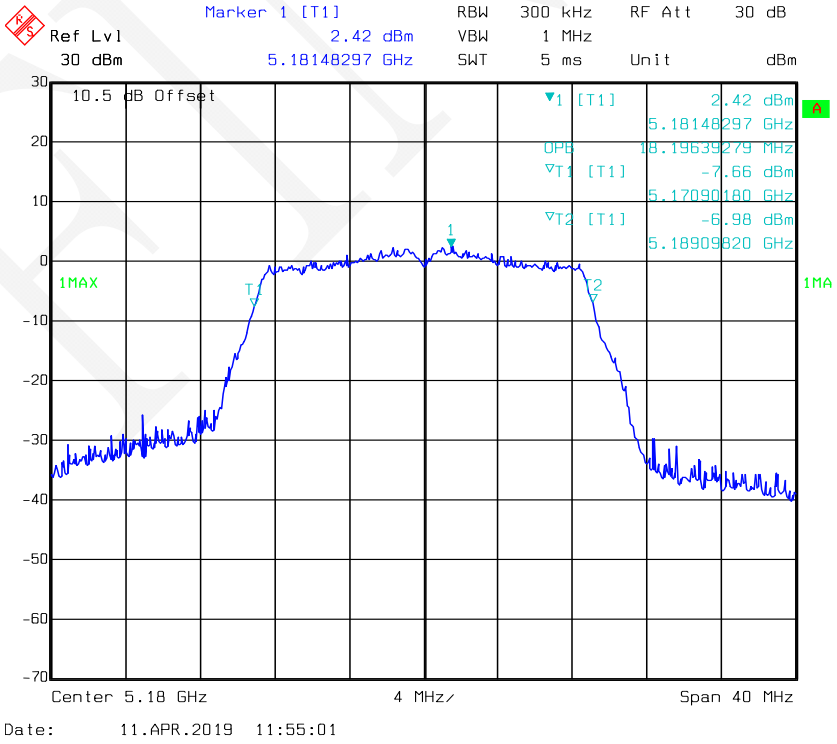
802.11ac20 mode, 99% Occupied Bandwidth-5200 MHz, Antenna 0



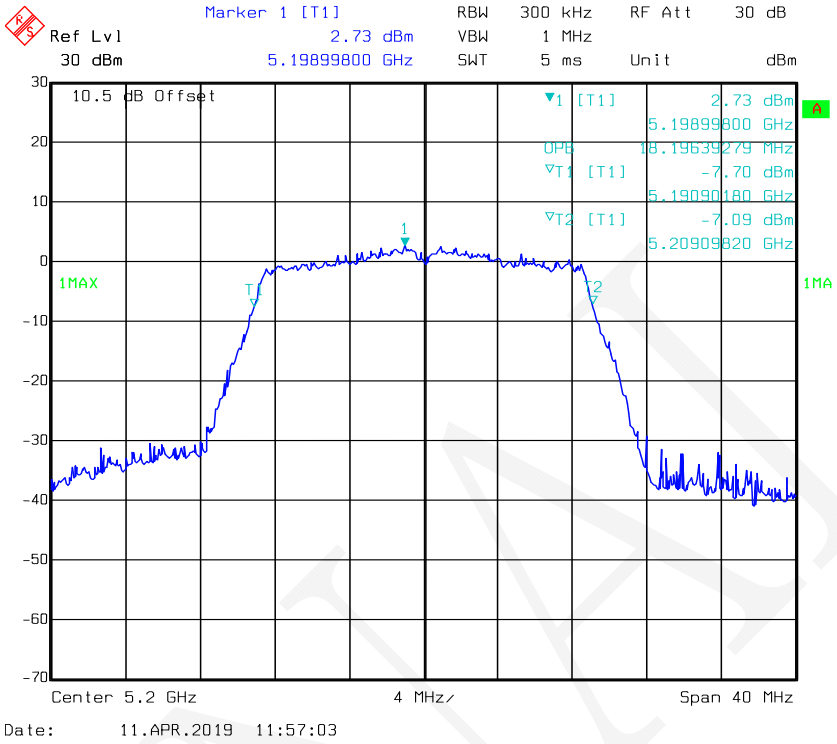
802.11ac20 mode, 99% Occupied Bandwidth-5240 MHz, Antenna 0



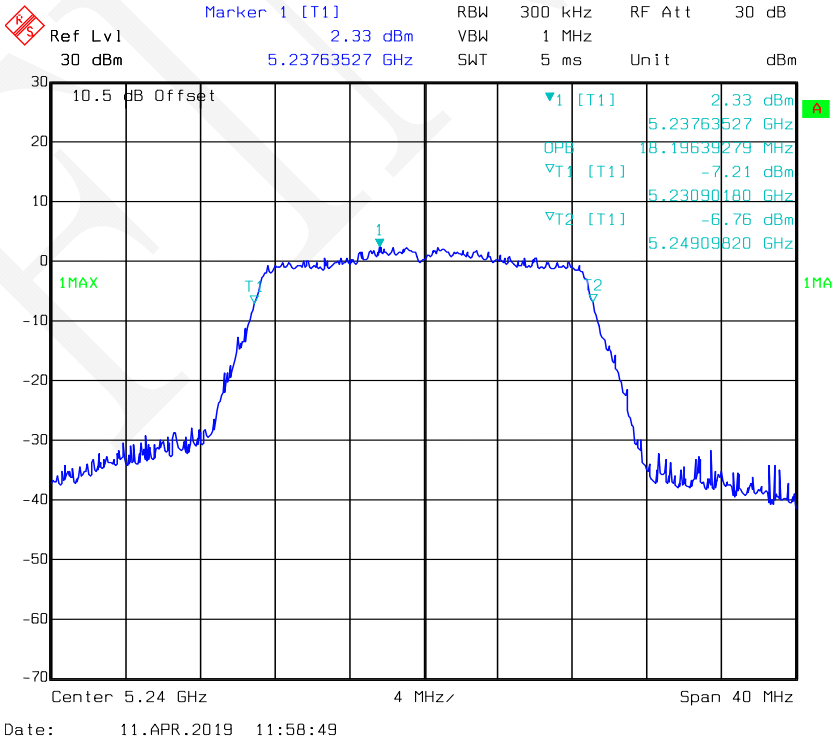
802.11ac20 mode, 99% Occupied Bandwidth-5180 MHz, Antenna 1



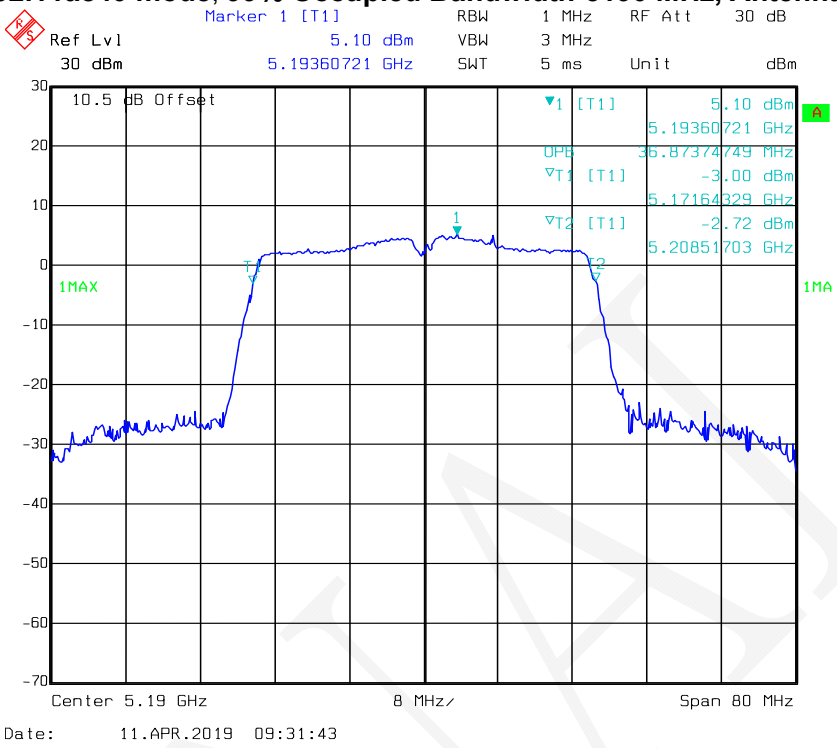
802.11ac20 mode, 99% Occupied Bandwidth-5200 MHz, Antenna 1



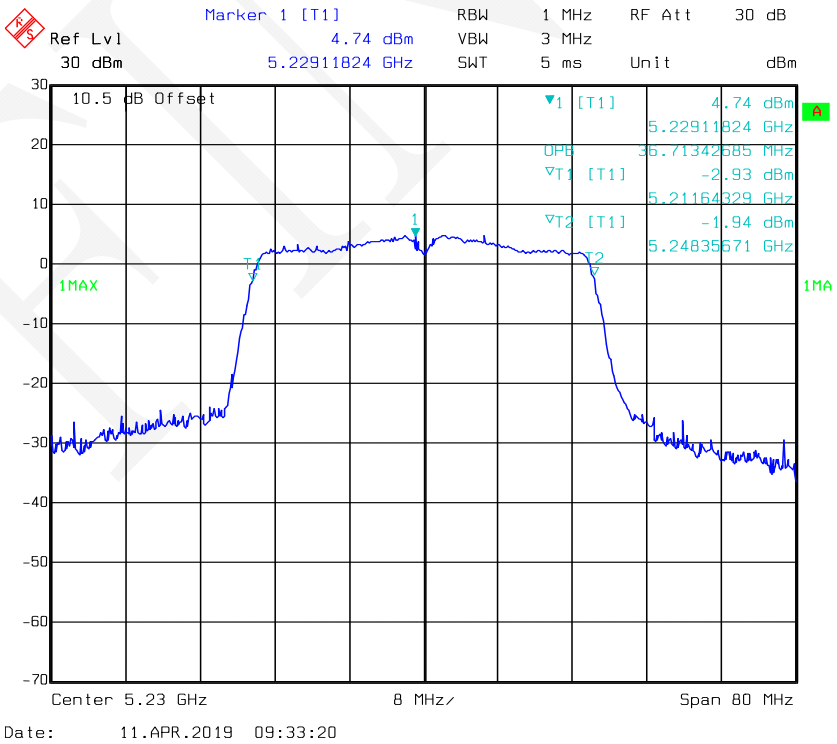
802.11ac20 mode, 99% Occupied Bandwidth-5240 MHz, Antenna 1



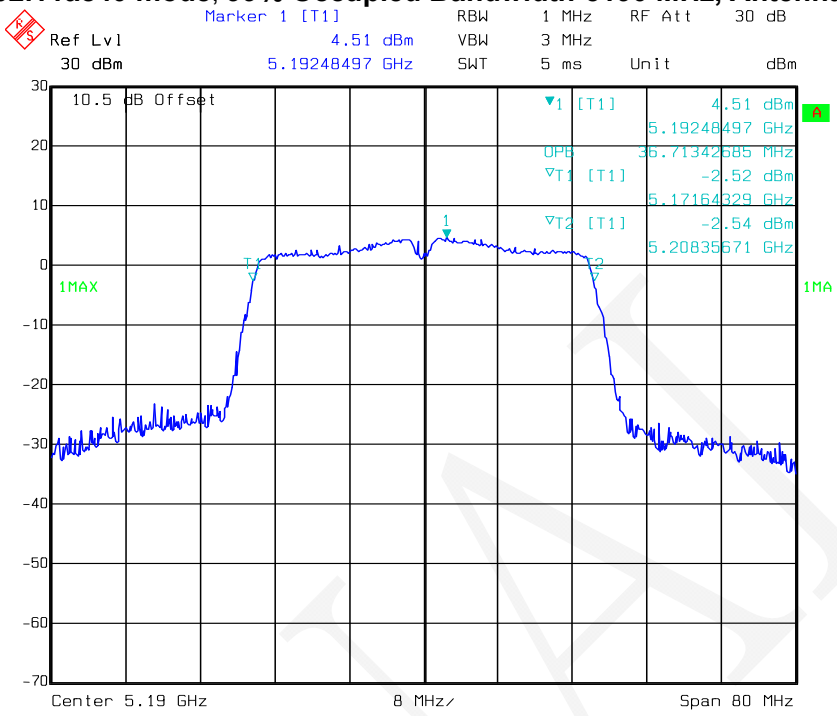
802.11ac40 mode, 99% Occupied Bandwidth-5190 MHz, Antenna 0



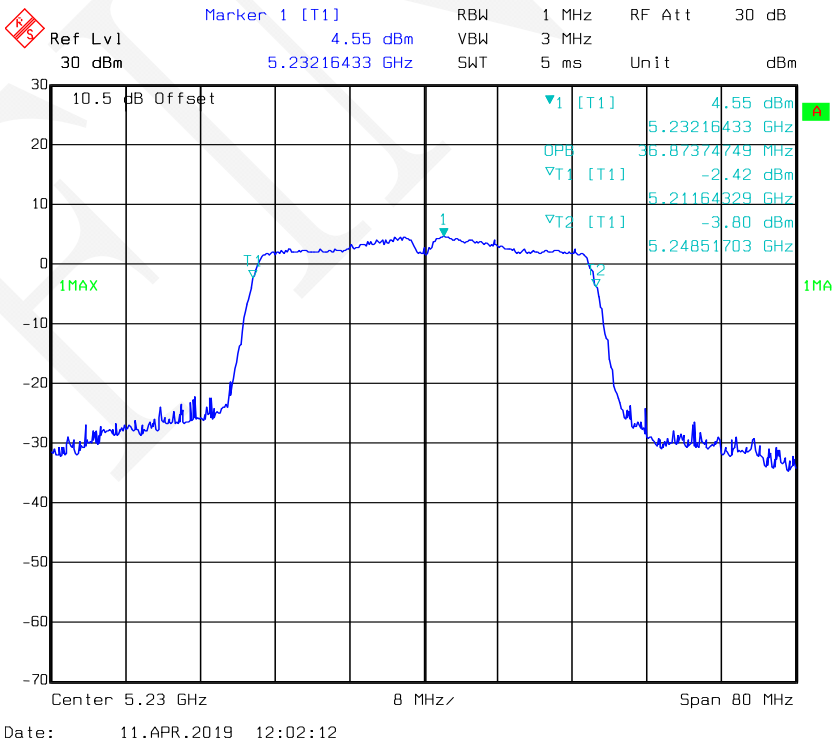
802.11ac40 mode, 99% Occupied Bandwidth-5230 MHz, Antenna 0



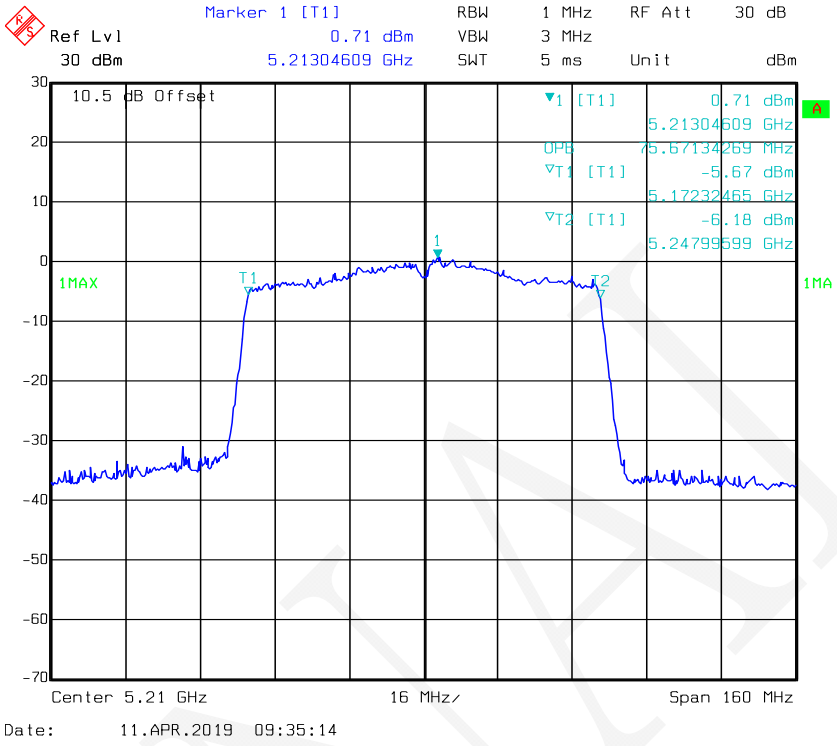
802.11ac40 mode, 99% Occupied Bandwidth-5190 MHz, Antenna 1



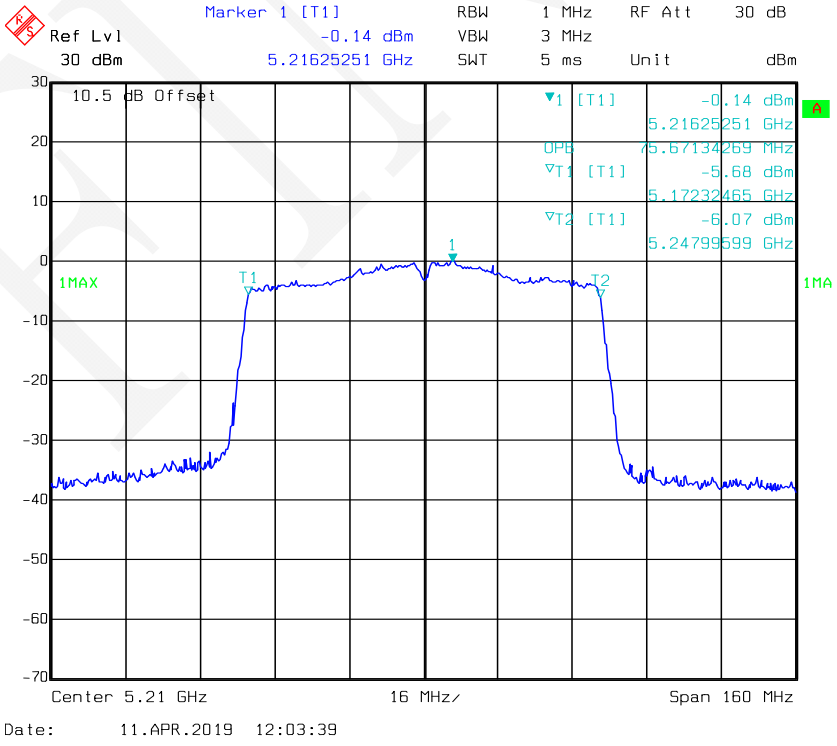
802.11ac40 mode, 99% Occupied Bandwidth-5230 MHz, Antenna 1



802.11ac80 mode, 99% Occupied Bandwidth-5210 MHz, Antenna 0



802.11ac80 mode, 99% Occupied Bandwidth-5210 MHz, Antenna 1

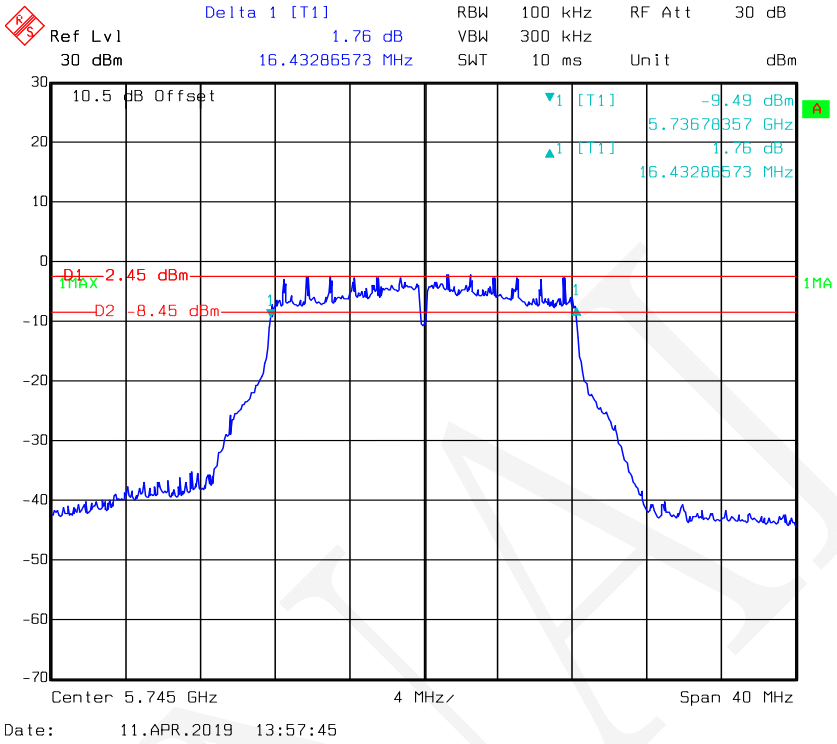


For 5725-5850 MHz:

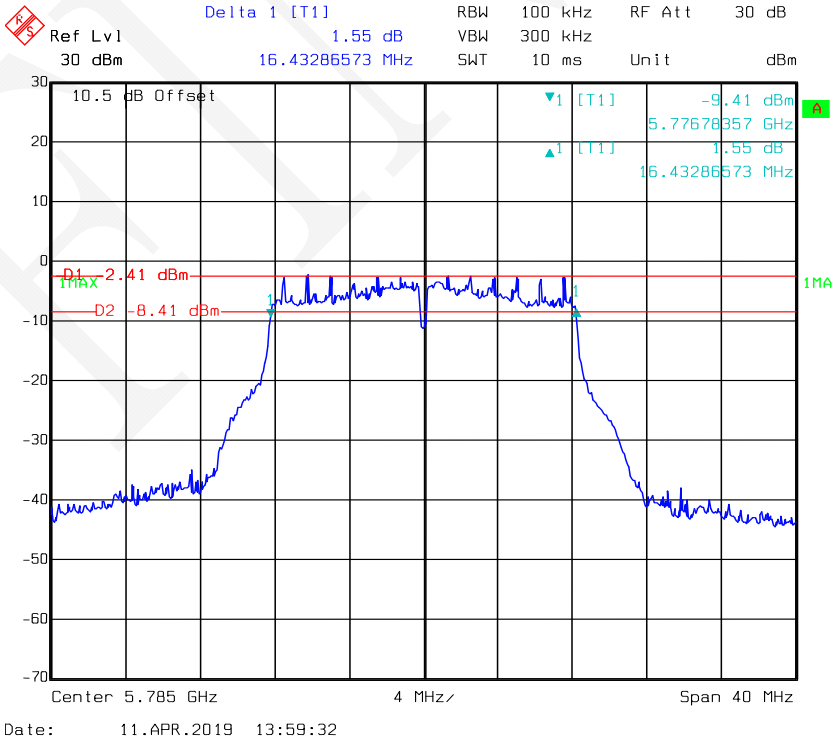
Mode	Channel	Frequency (MHz)	6dB Bandwidth (MHz)		99% Occupied Bandwidth (MHz)	
			Antenna 0	Antenna 1	Antenna 0	Antenna 1
802.11a	Low	5745	16.43	16.43	17.07	17.23
	Middle	5785	16.43	16.43	17.15	17.23
	High	5825	16.43	16.43	17.15	17.15
802.11n-HT20	Low	5745	17.47	17.64	18.20	18.28
	Middle	5785	17.47	17.72	18.20	18.28
	High	5825	17.64	17.56	18.20	18.28
802.11n-HT40	Low	5755	36.23	36.23	36.87	36.87
	High	5795	36.07	36.07	36.71	37.03
802.11ac20	Low	5745	17.47	17.47	18.20	18.28
	Middle	5785	17.64	17.56	18.20	18.28
	High	5825	17.64	17.64	18.20	18.28
802.11ac40	Low	5755	36.23	36.39	36.71	36.87
	High	5795	36.23	36.39	36.71	36.87
802.11ac80	Middle	5775	75.99	75.99	75.67	75.67

Note: the 99% Occupied Bandwidth doesn't extend U-NII-2C band 5470-5725MHz.

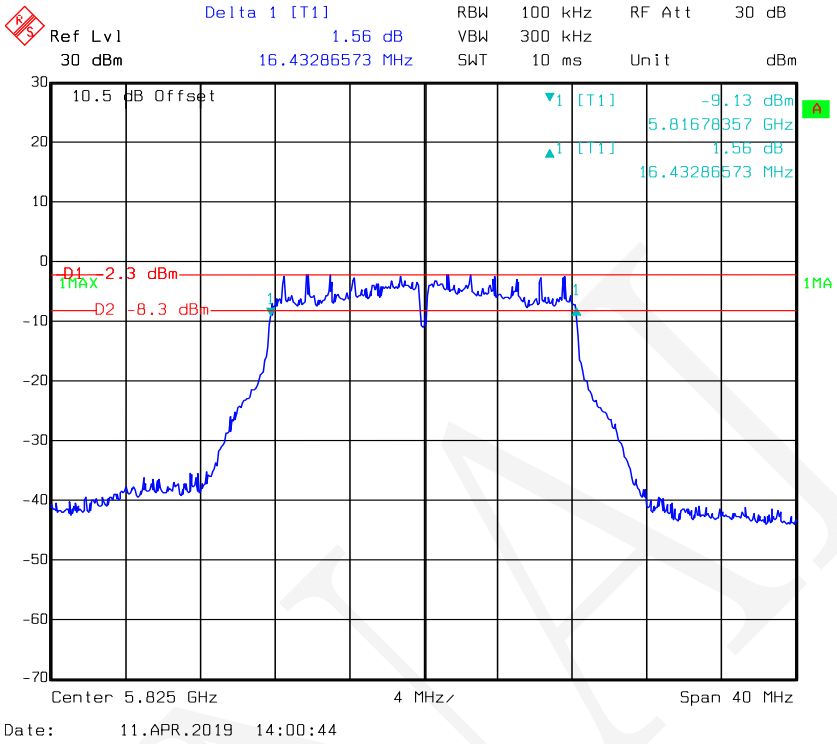
802.11a mode, 6 dB Bandwidth-5745 MHz, Antenna 0



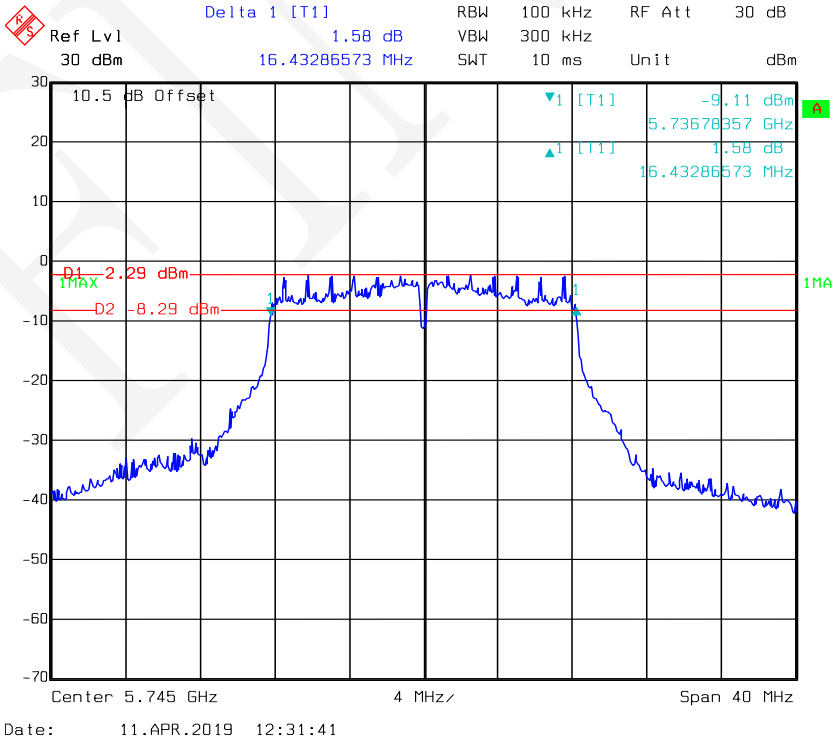
802.11a mode, 6 dB Bandwidth-5785 MHz, Antenna 0



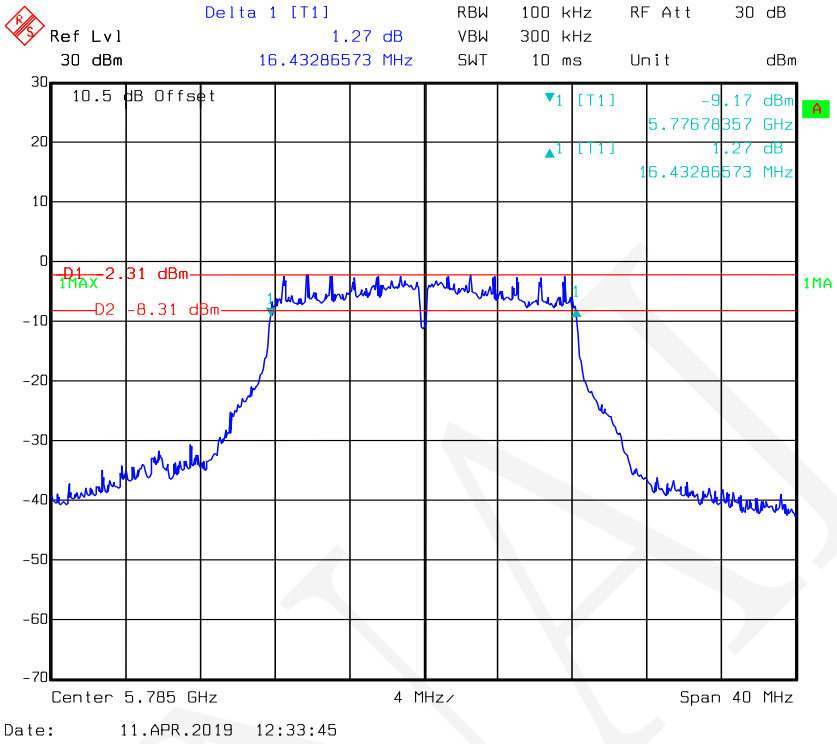
802.11a mode, 6 dB Bandwidth-5825 MHz, Antenna 0



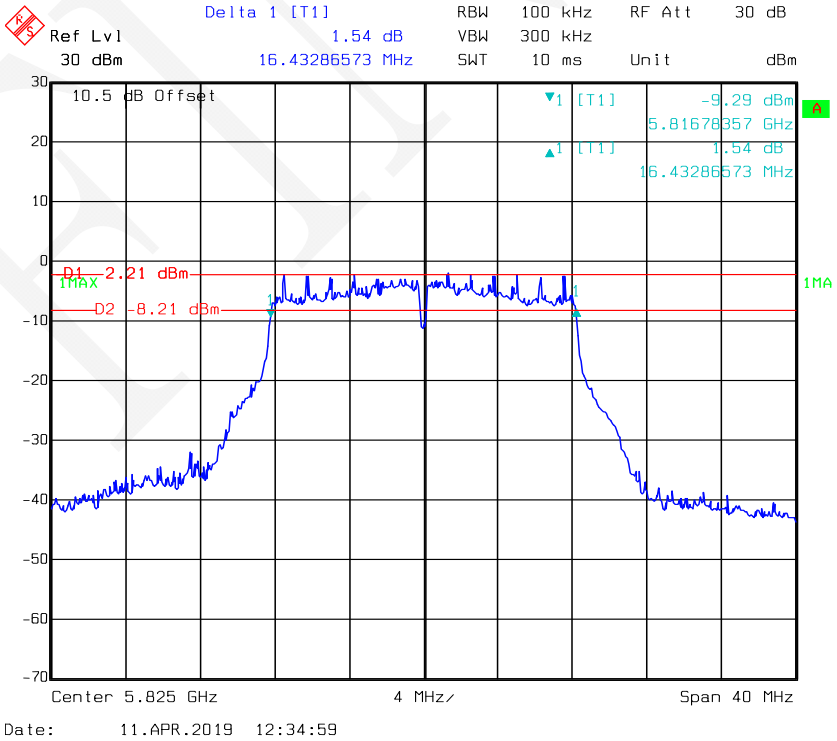
802.11a mode, 6 dB Bandwidth-5745 MHz, Antenna 1



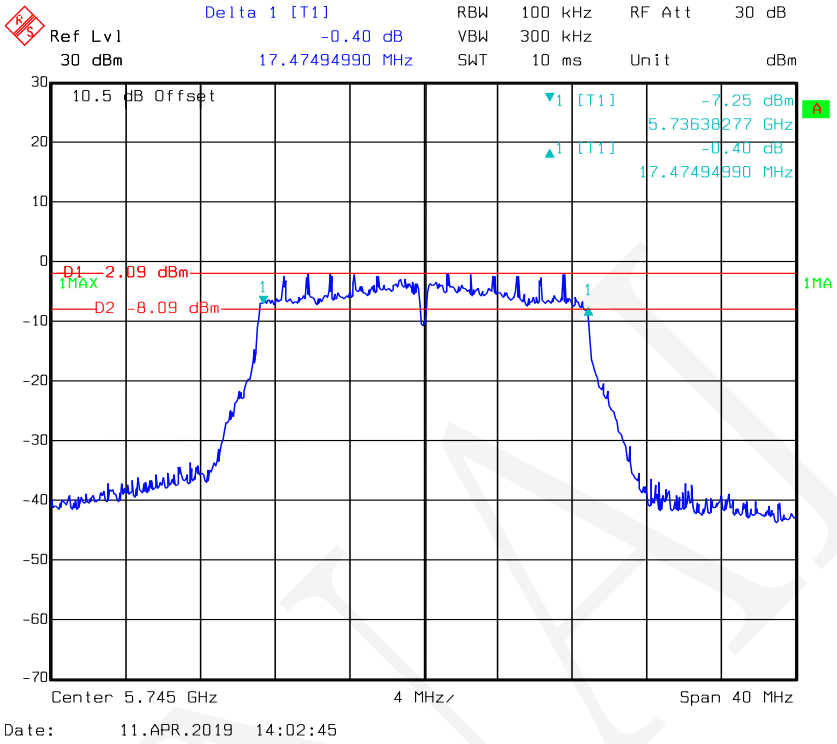
802.11a mode, 6 dB Bandwidth-5785 MHz, Antenna 1



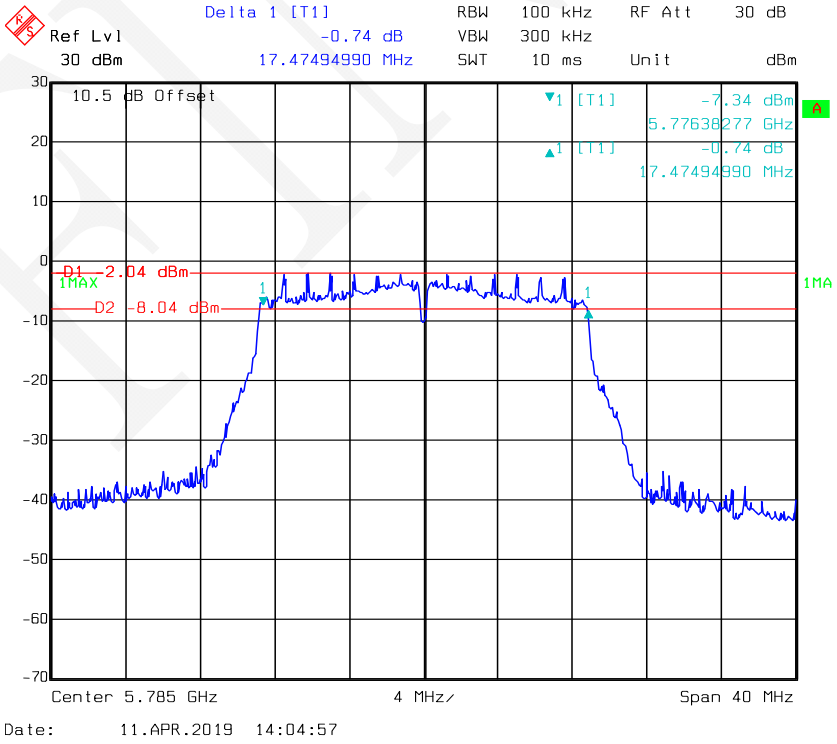
802.11a mode, 6 dB Bandwidth-5825 MHz, Antenna 1



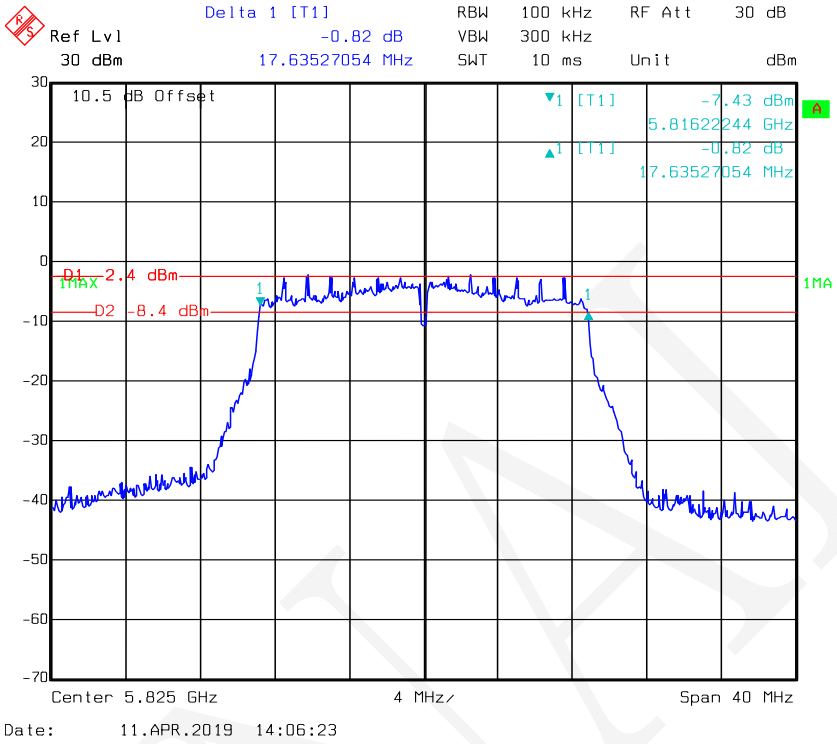
802.11n-HT20 mode, 6 dB Bandwidth-5745 MHz, Antenna 0



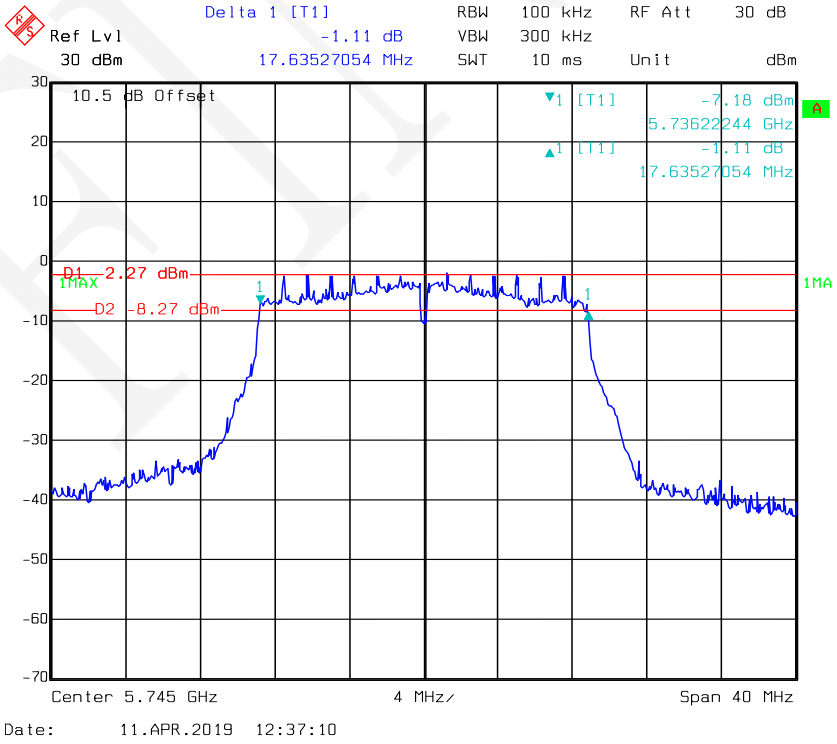
802.11n-HT20 mode, 6 dB Bandwidth-5785 MHz, Antenna 0



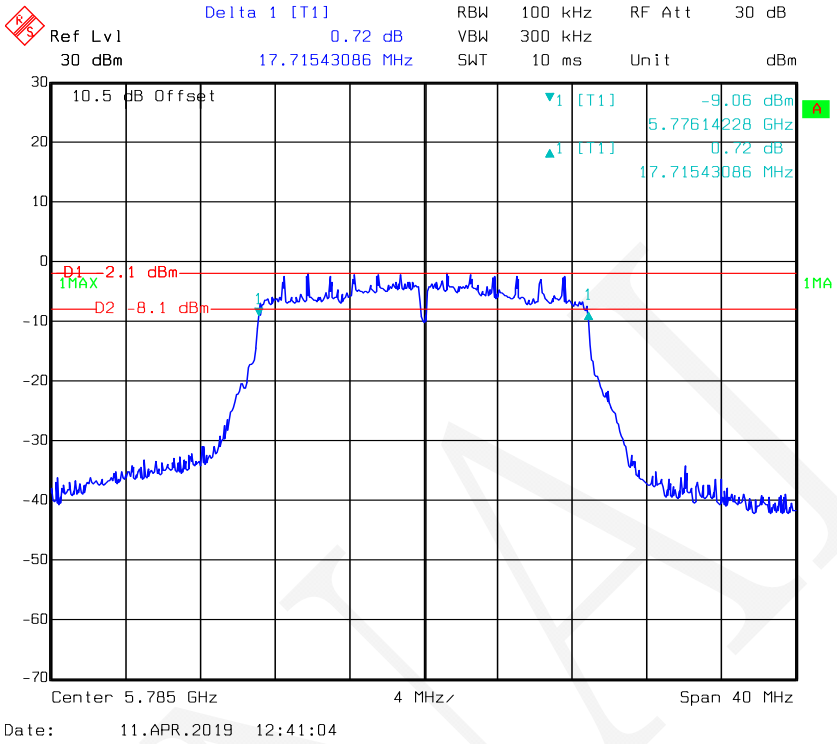
802.11n-HT20 mode, 6 dB Bandwidth-5825 MHz, Antenna 0



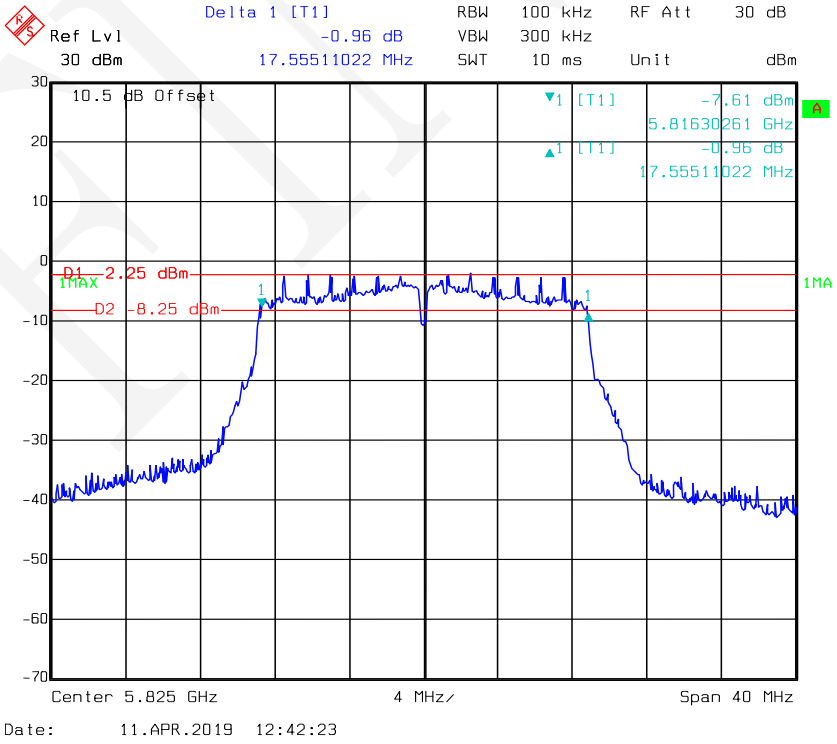
802.11n-HT20 mode, 6 dB Bandwidth-5745 MHz, Antenna 1



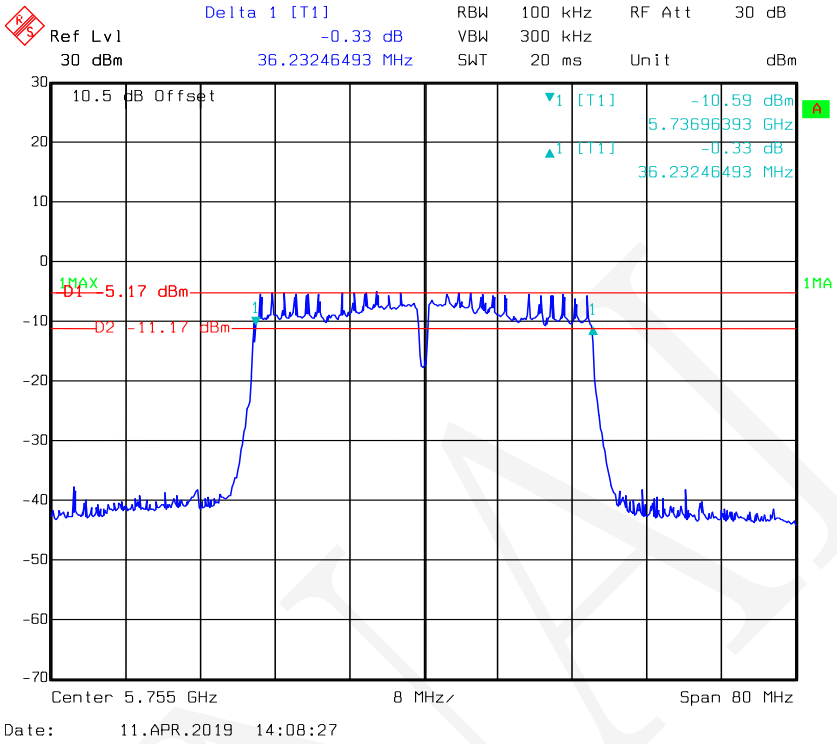
802.11n-HT20 mode, 6 dB Bandwidth-5785 MHz, Antenna 1



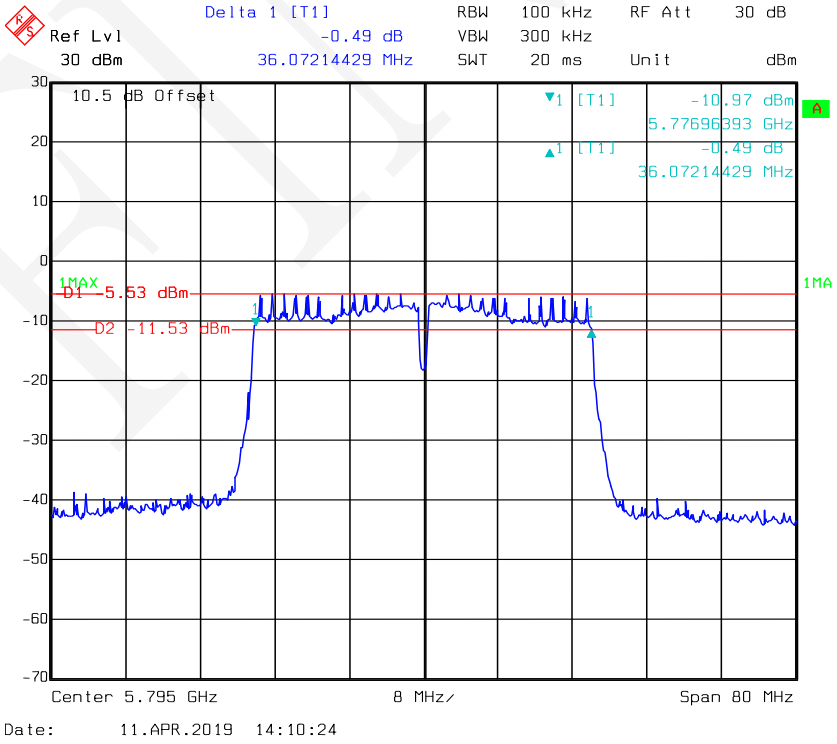
802.11n-HT20 mode, 6 dB Bandwidth-5825 MHz, Antenna 1



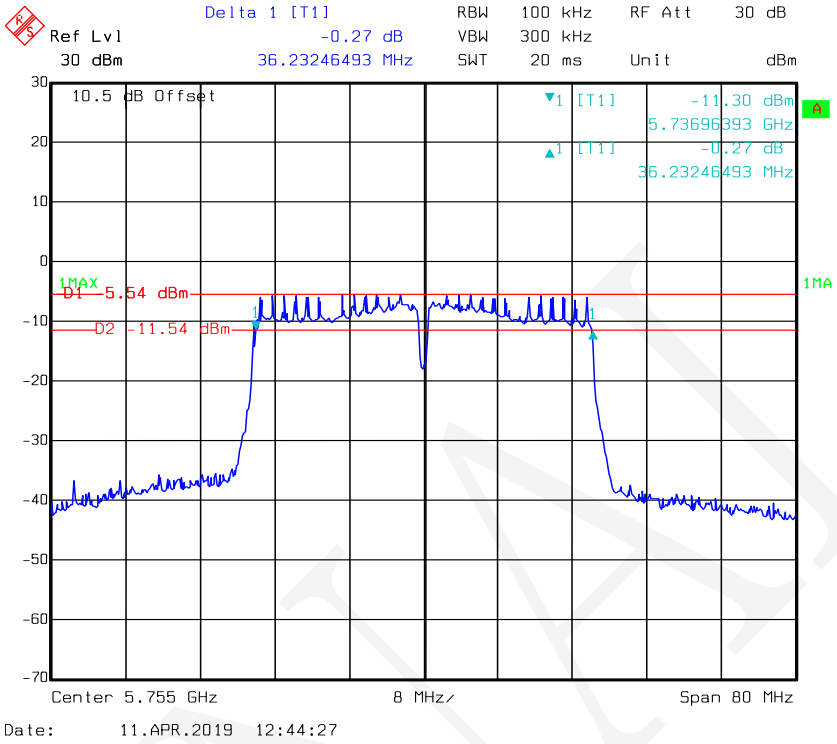
802.11n-HT40 mode, 6 dB Bandwidth-5755 MHz, Antenna 0



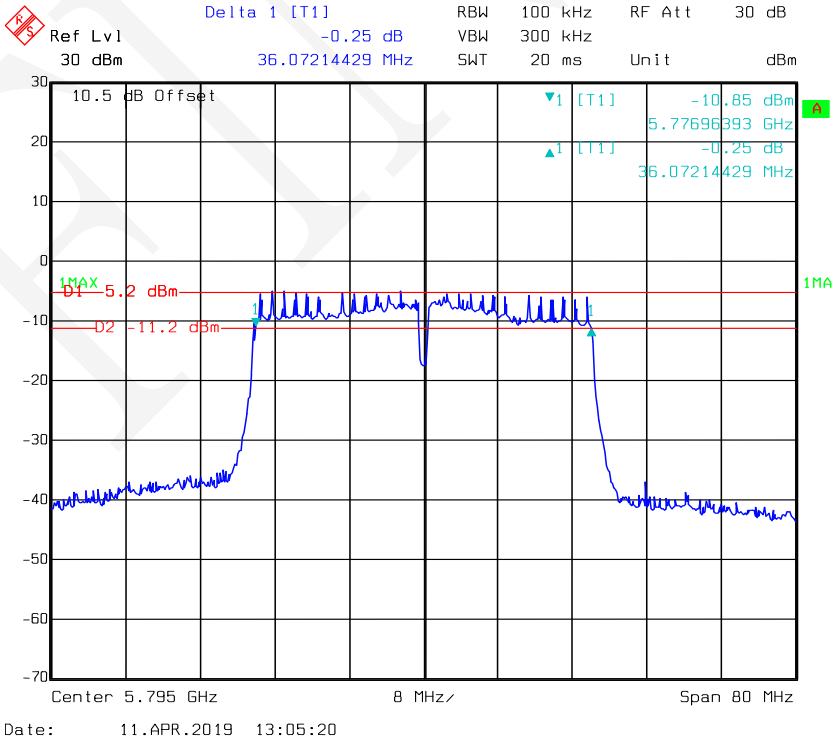
802.11n-HT40 mode, 6 dB Bandwidth-5795 MHz, Antenna 0



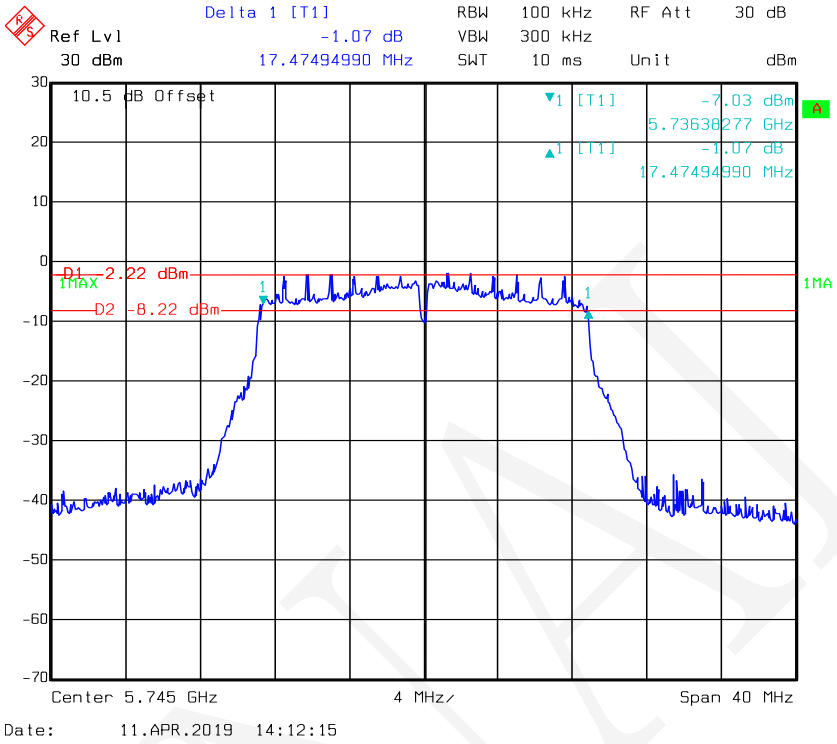
802.11n-HT40 mode, 6 dB Bandwidth-5755 MHz, Antenna 1



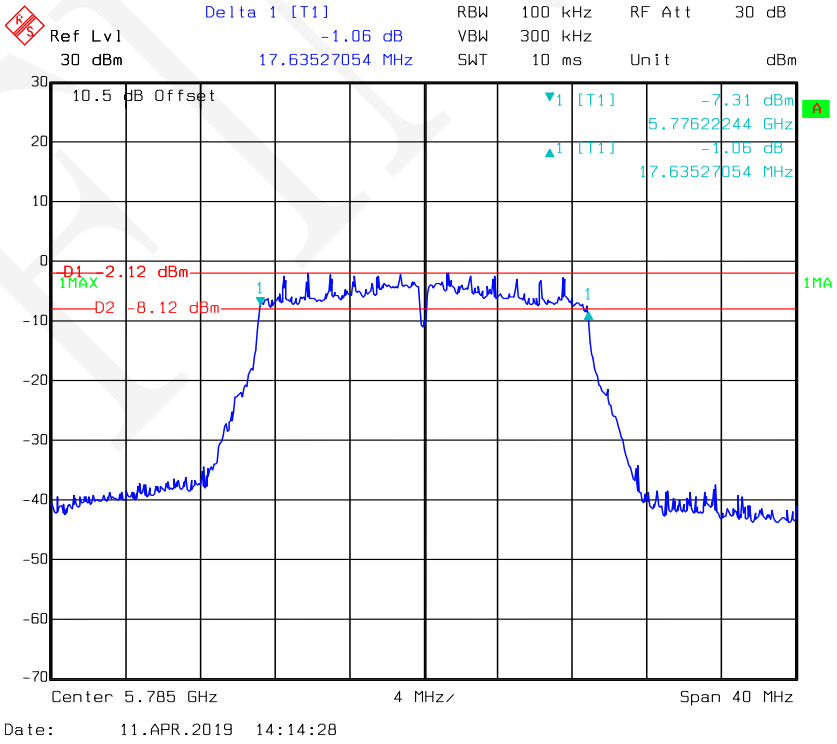
802.11n-HT40 mode, 6 dB Bandwidth-5795 MHz, Antenna 1



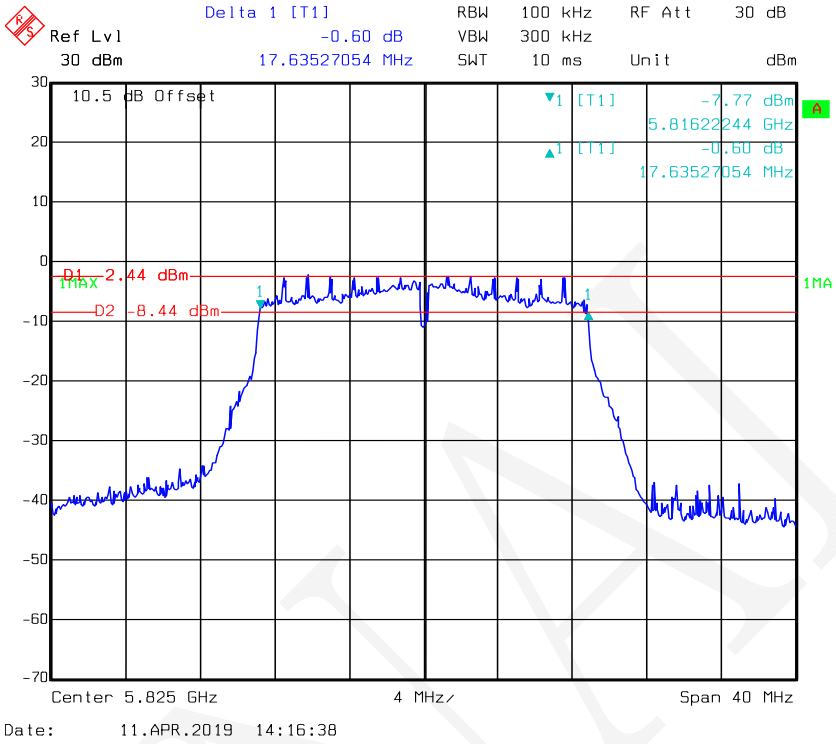
802.11ac20 mode, 6 dB Bandwidth-5745 MHz, Antenna 0



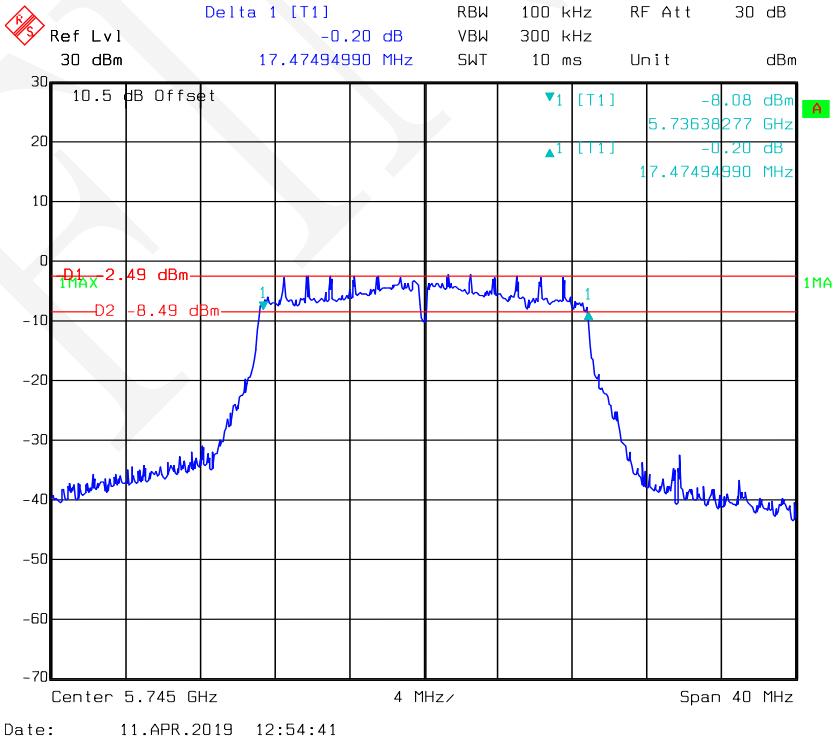
802.11ac20 mode, 6 dB Bandwidth-5785 MHz, Antenna 0



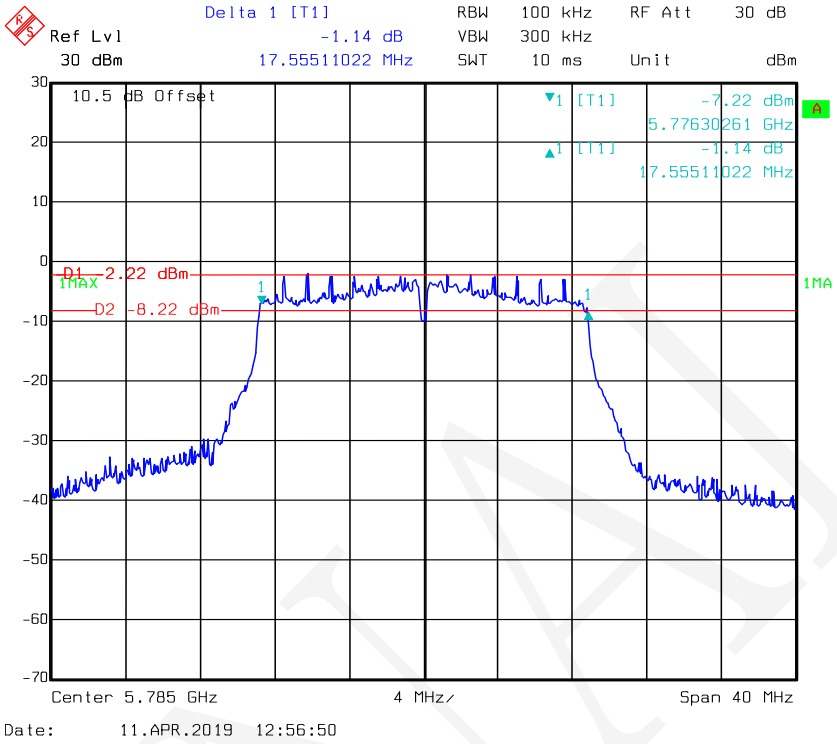
802.11ac20 mode, 6 dB Bandwidth-5825 MHz, Antenna 0



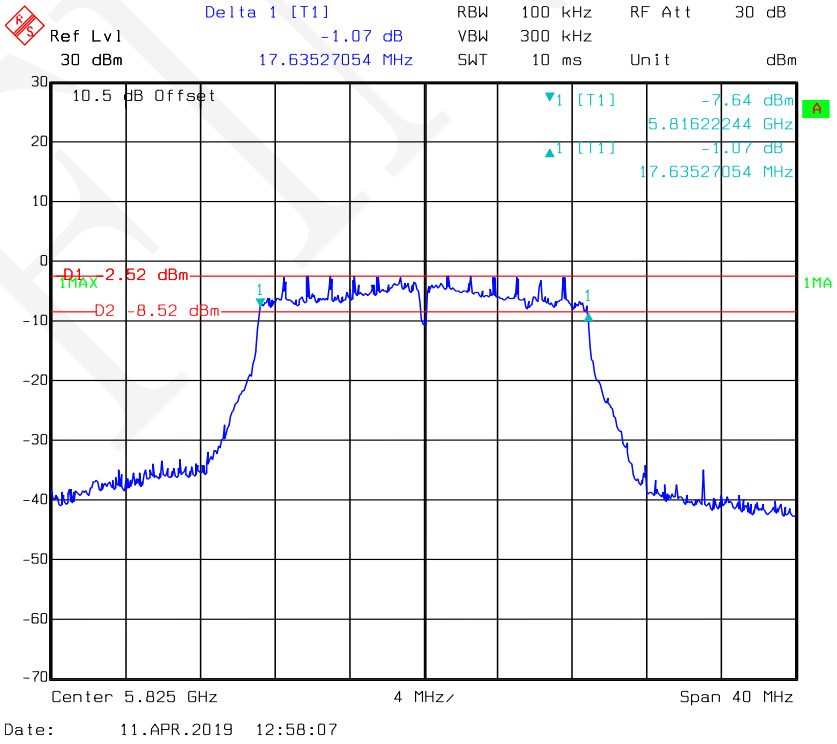
802.11ac20 mode, 6 dB Bandwidth-5745 MHz, Antenna 1



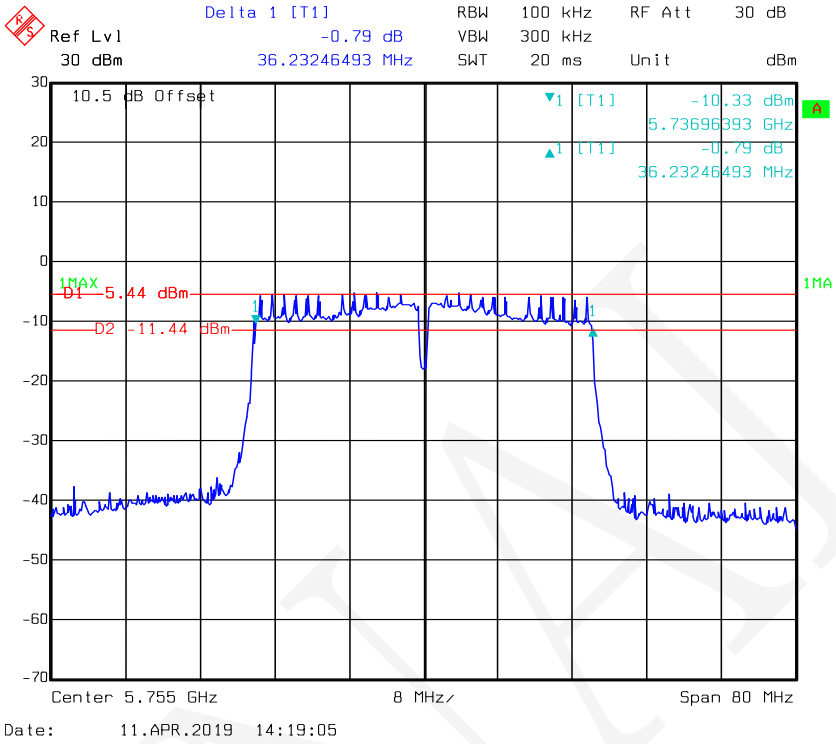
802.11ac20 mode, 6 dB Bandwidth-5785 MHz, Antenna 1



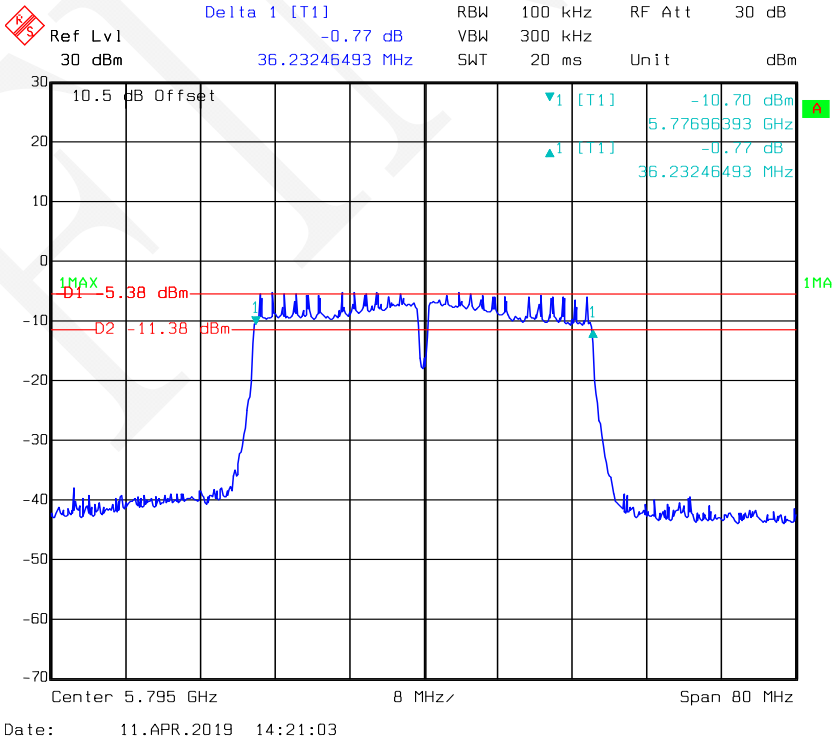
802.11ac20 mode, 6 dB Bandwidth-5825 MHz, Antenna 1



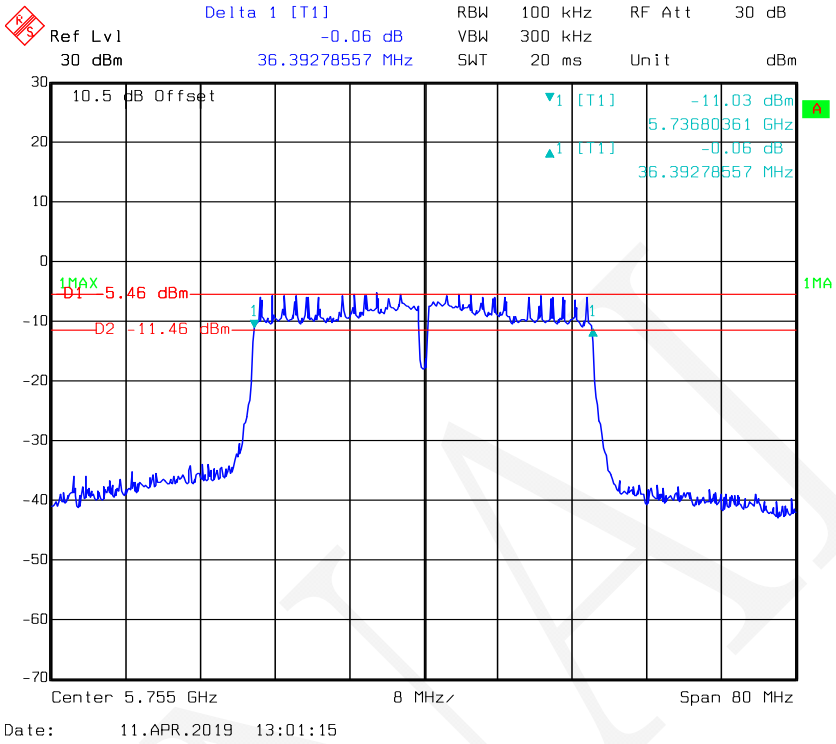
802.11ac40 mode, 6 dB Bandwidth-5755 MHz, Antenna 0



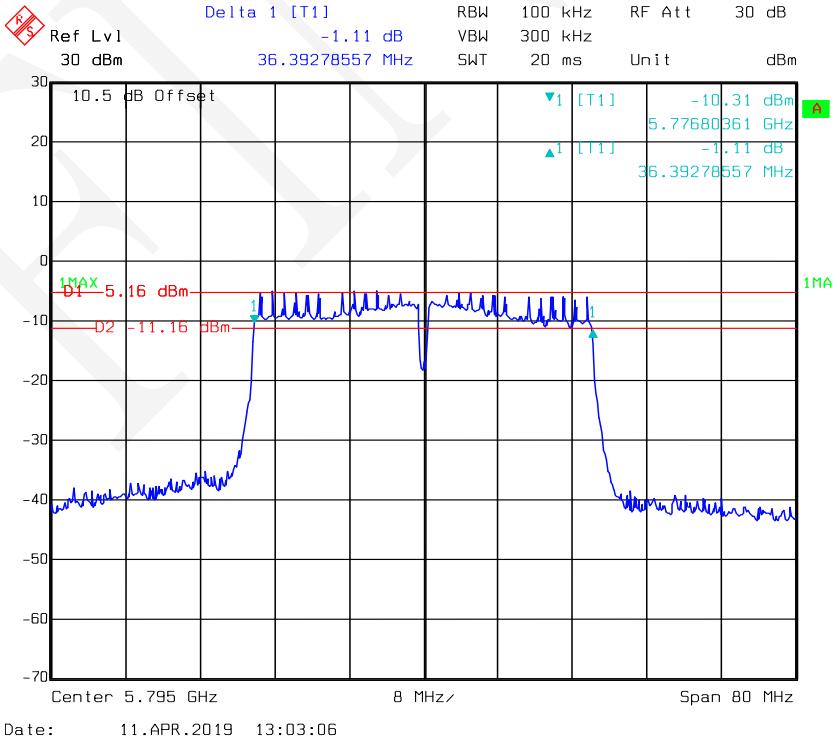
802.11ac40 mode, 6 dB Bandwidth-5795 MHz, Antenna 0



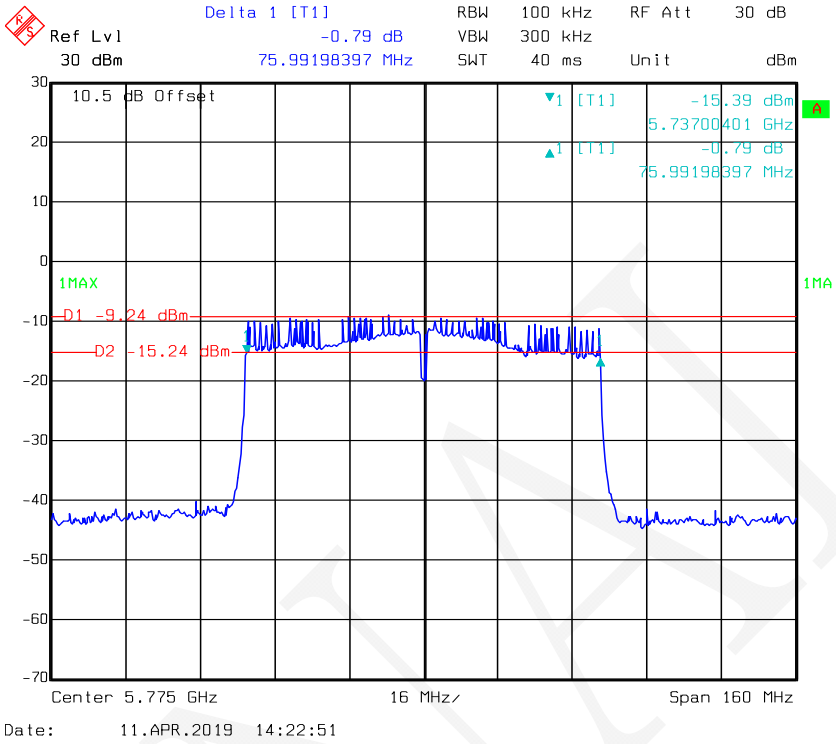
802.11ac40 mode, 6 dB Bandwidth-5755 MHz, Antenna 1



802.11ac40 mode, 6 dB Bandwidth-5795 MHz, Antenna 1

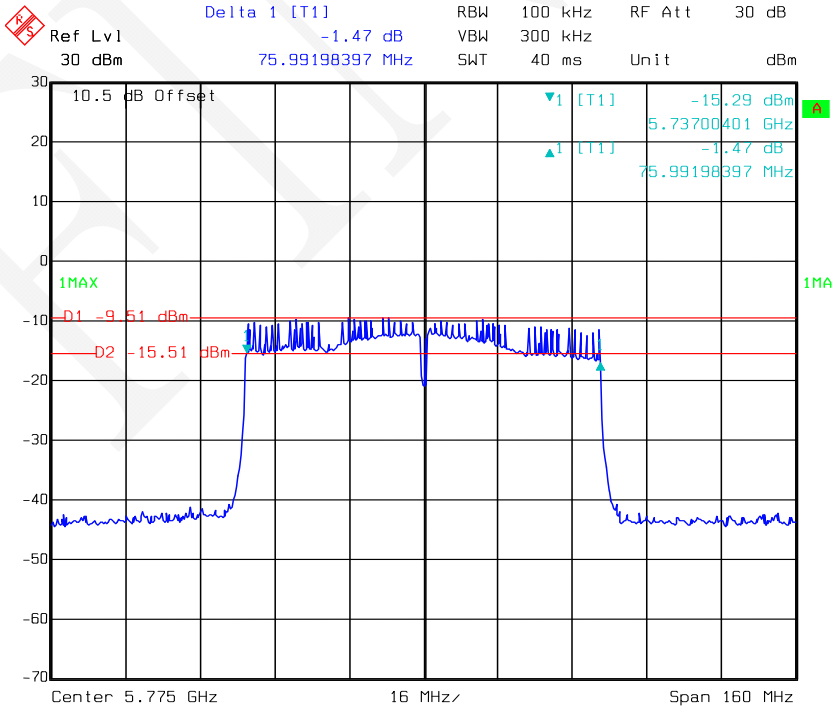


802.11ac80 mode, 6 dB Bandwidth-5775 MHz, Antenna 0



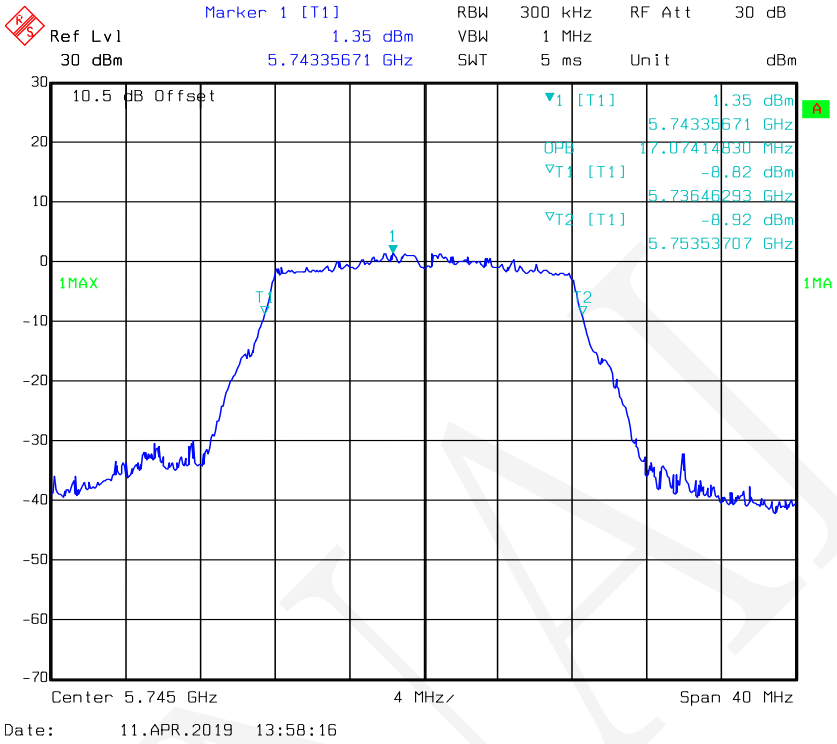
Date: 11.APR.2019 14:22:51

802.11ac80 mode, 6 dB Bandwidth-5775 MHz, Antenna 1

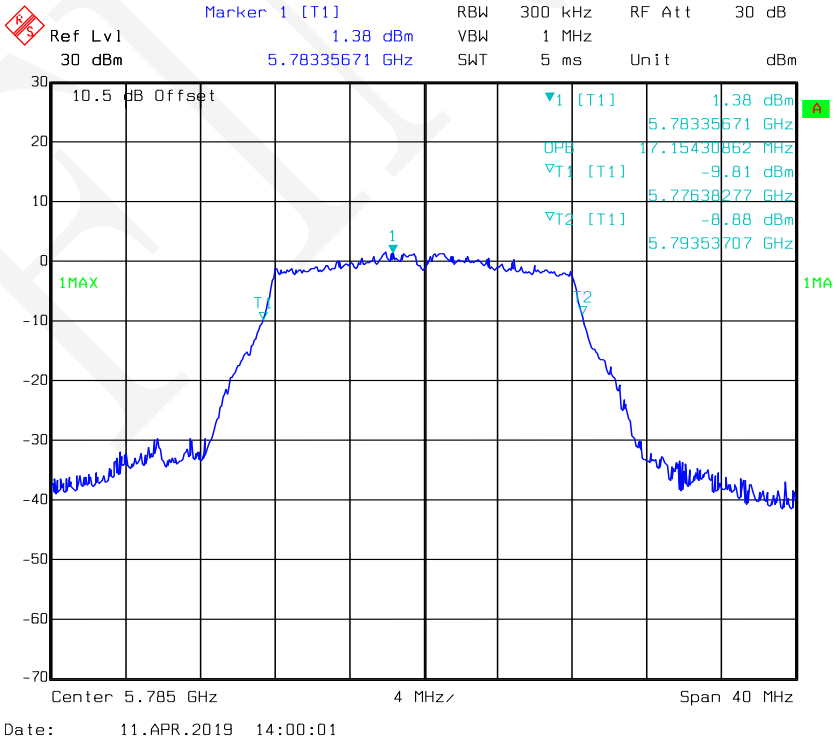


Date: 11.APR.2019 13:07:19

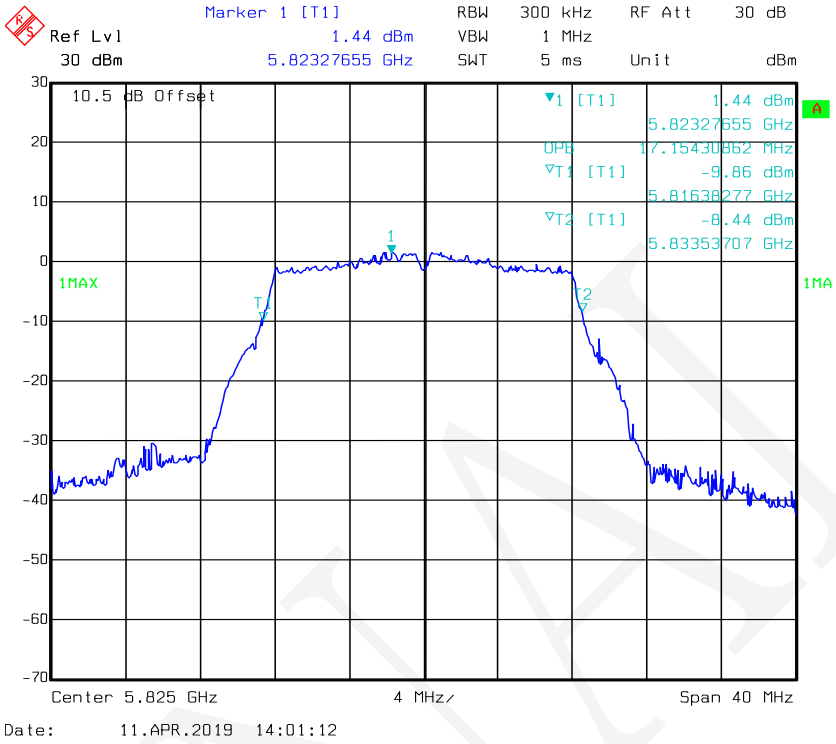
802.11a mode, 99% Occupied Bandwidth-5745 MHz, Antenna 0



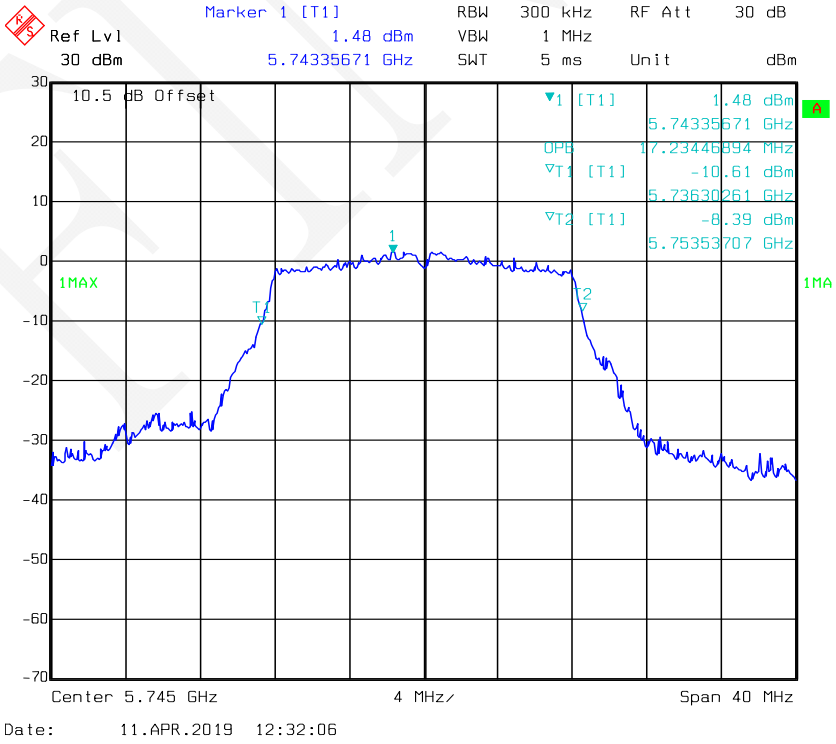
802.11a mode, 99% Occupied Bandwidth -5785 MHz, Antenna 0



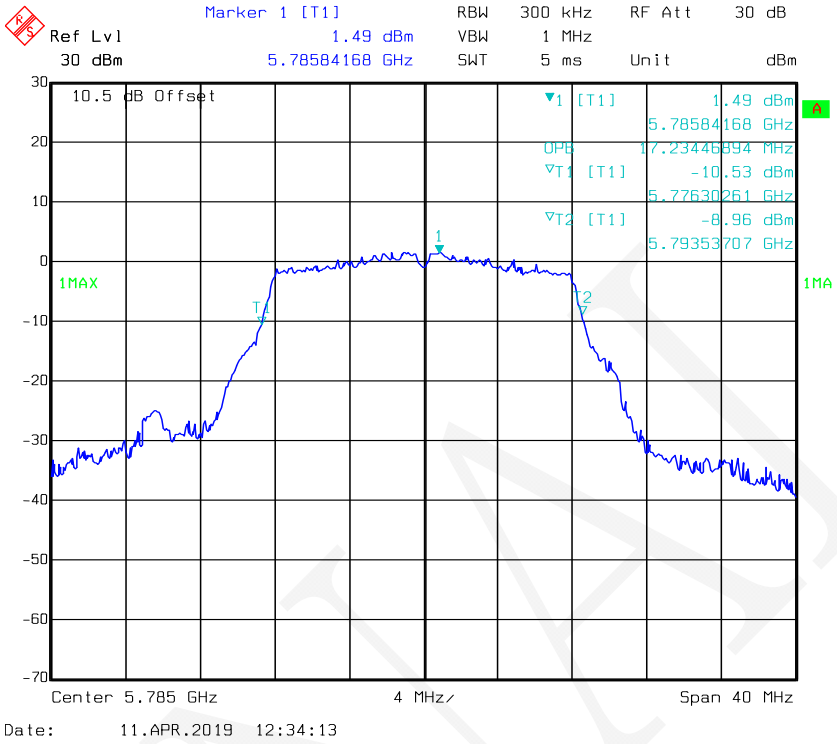
802.11a mode, 99% Occupied Bandwidth -5825 MHz, Antenna 0



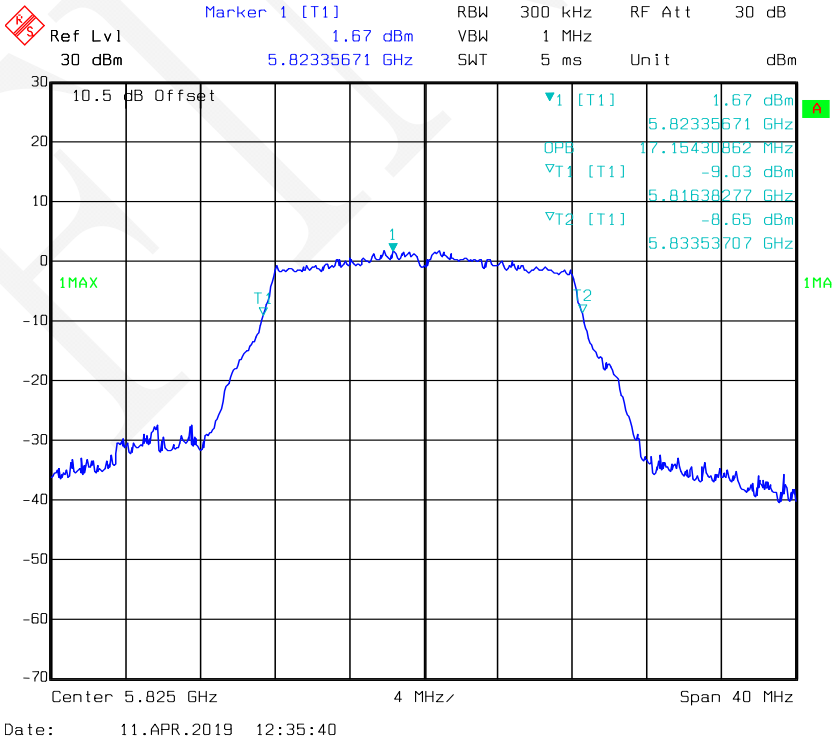
802.11a mode, 99% Occupied Bandwidth-5745 MHz, Antenna 1



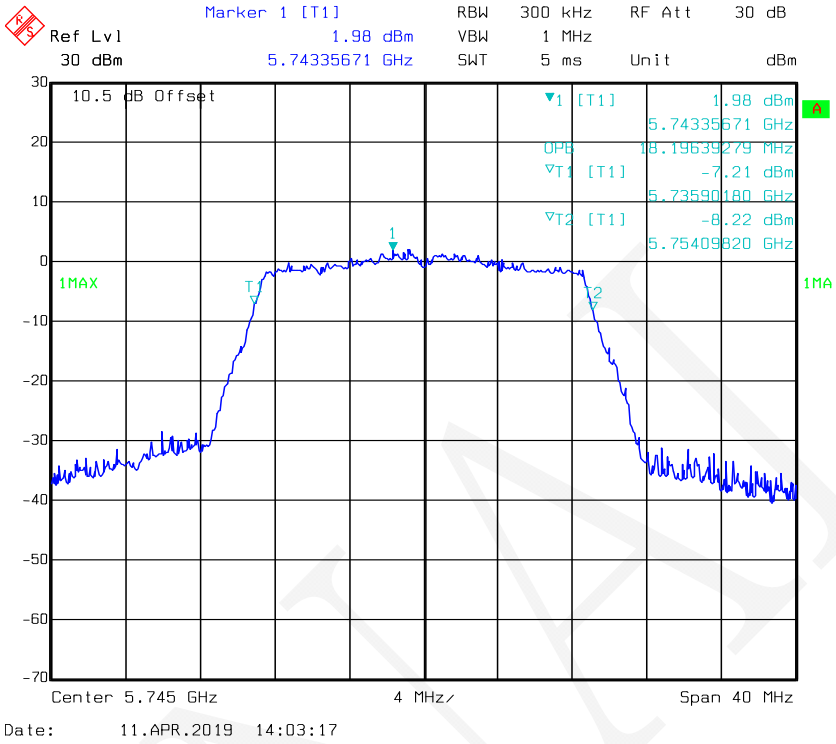
802.11a mode, 99% Occupied Bandwidth -5785 MHz, Antenna 1



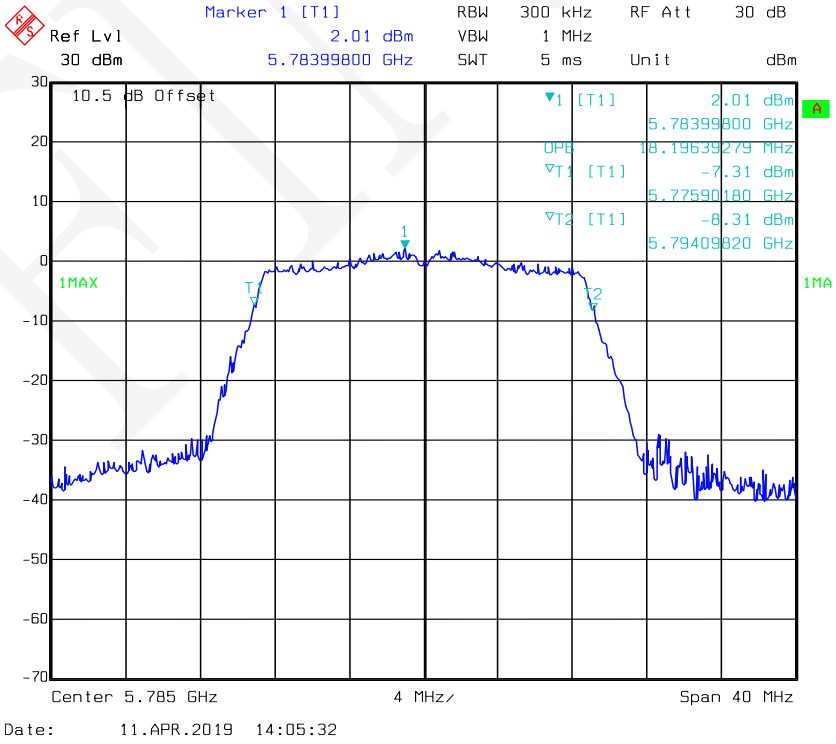
802.11a mode, 99% Occupied Bandwidth -5825 MHz, Antenna 1



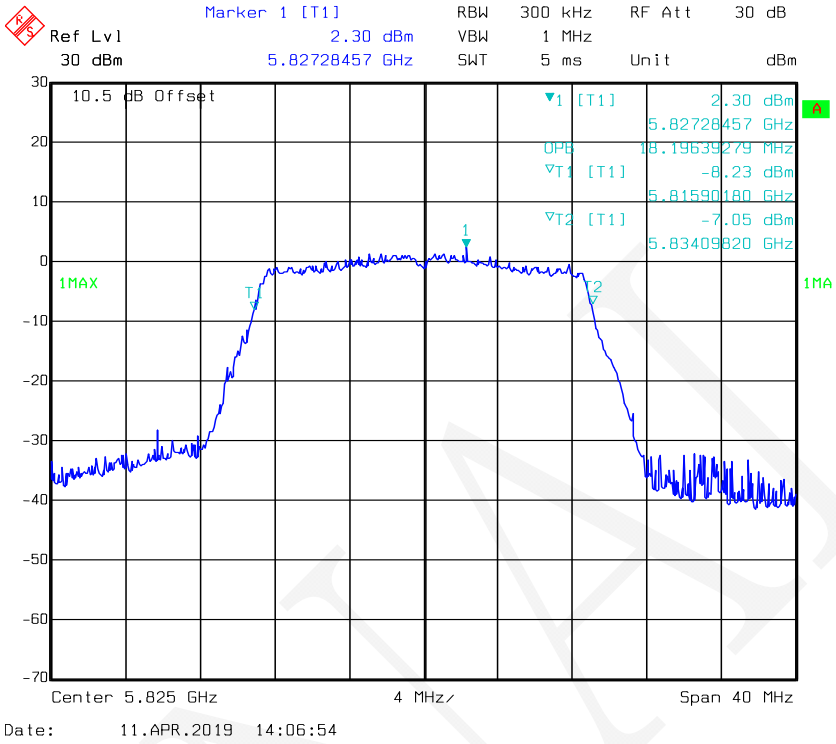
802.11n-HT20 mode, 99% Occupied Bandwidth-5745 MHz, Antenna 0



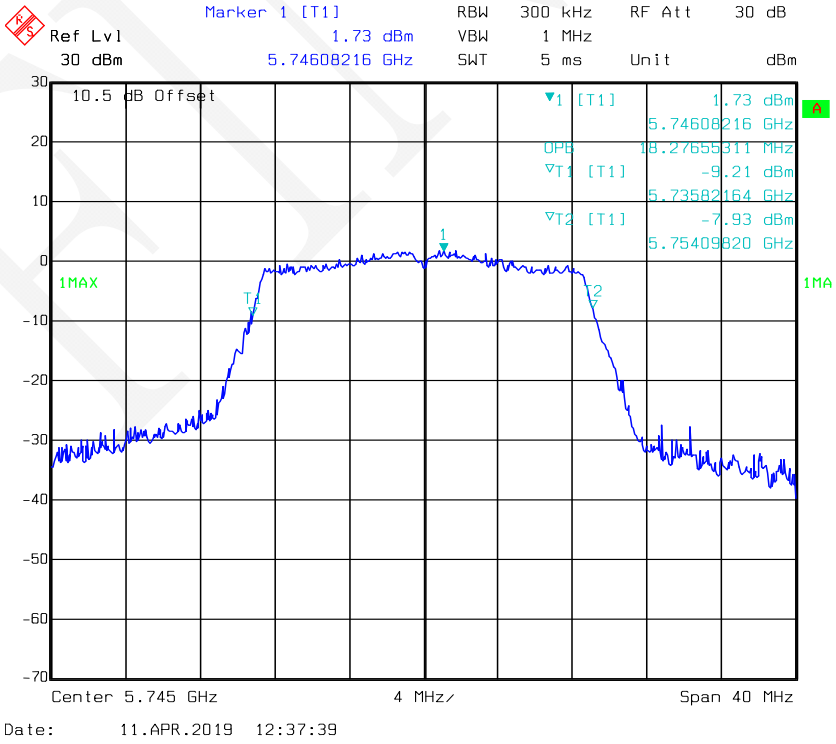
802.11n-HT20 mode, 99% Occupied Bandwidth-5785 MHz, Antenna 0



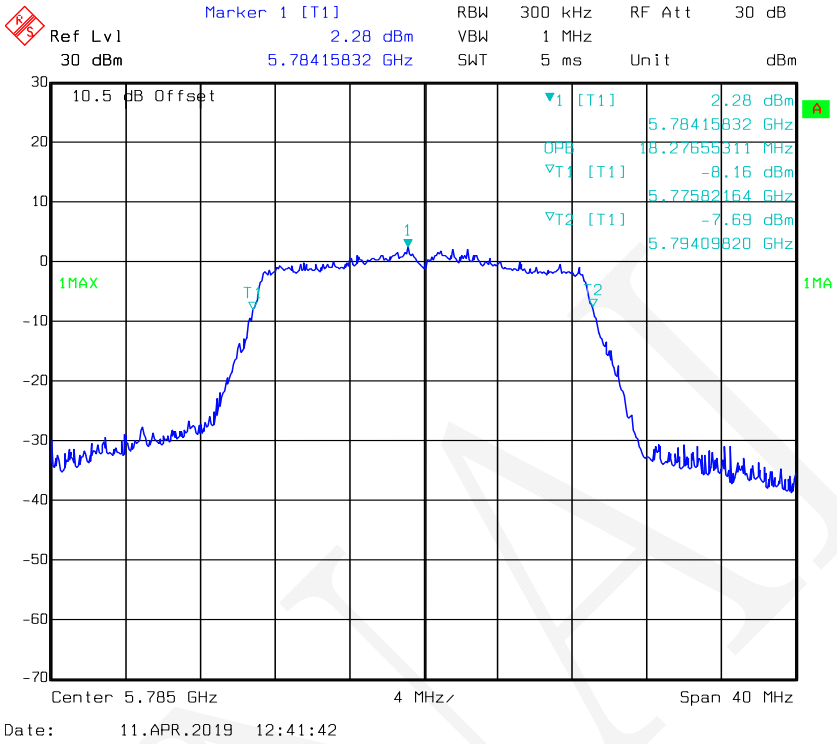
802.11n-HT20 mode, 99% Occupied Bandwidth-5825 MHz, Antenna 0



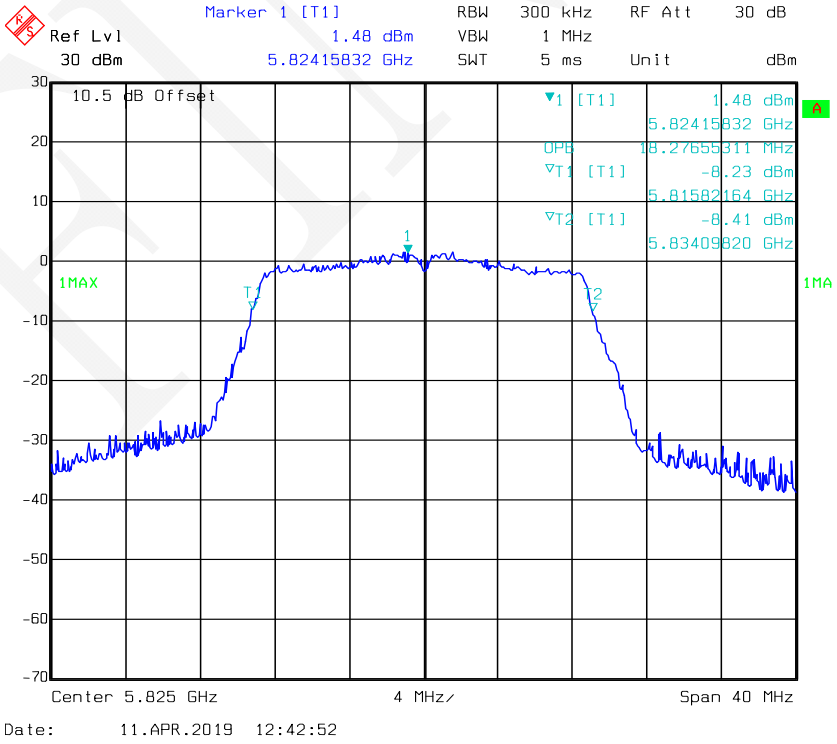
802.11n-HT20 mode, 99% Occupied Bandwidth-5745 MHz, Antenna 1



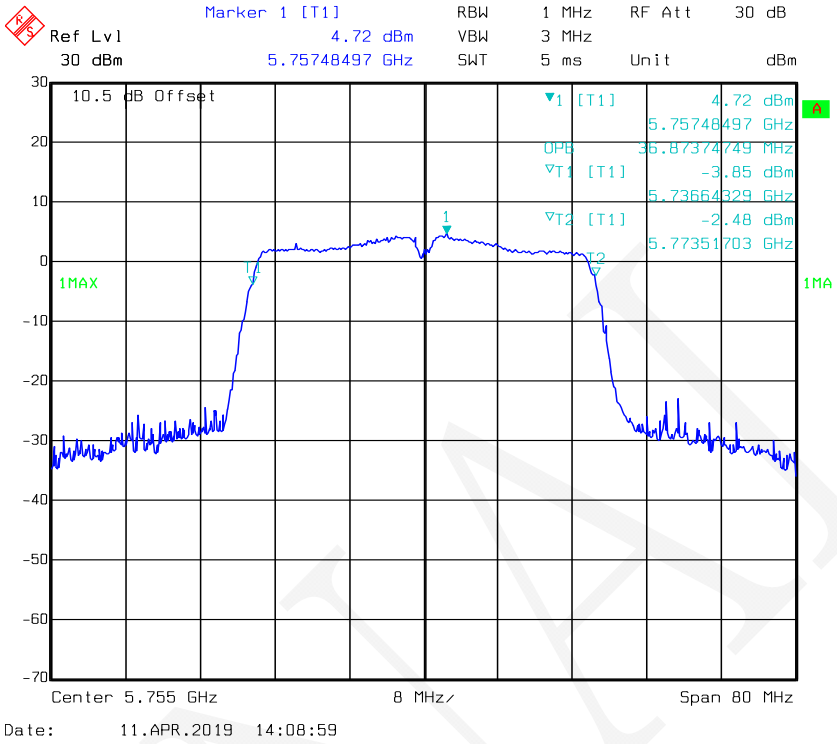
802.11n-HT20 mode, 99% Occupied Bandwidth-5785 MHz, Antenna 1



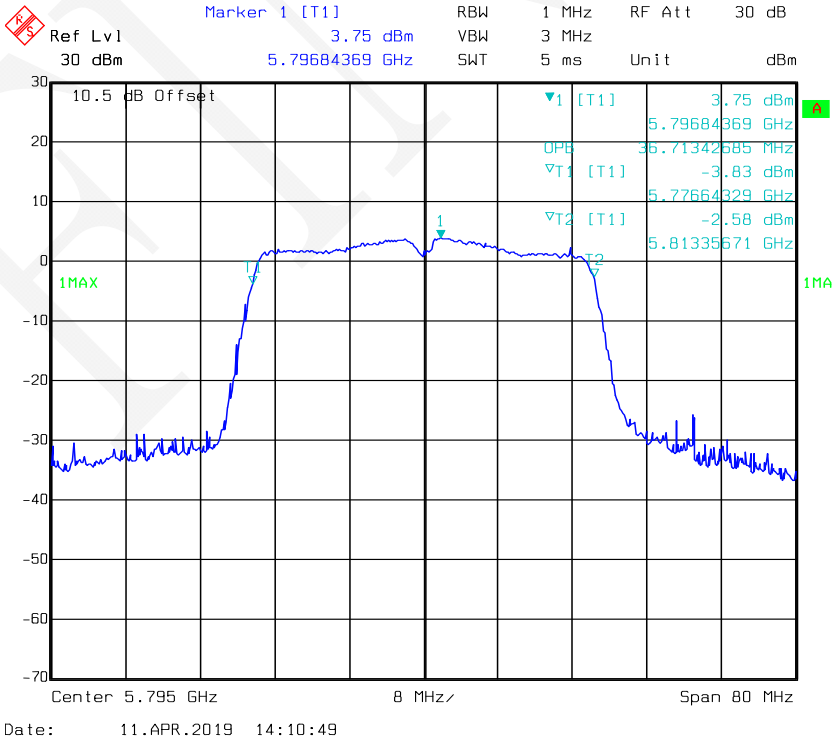
802.11n-HT20 mode, 99% Occupied Bandwidth-5825 MHz, Antenna 1



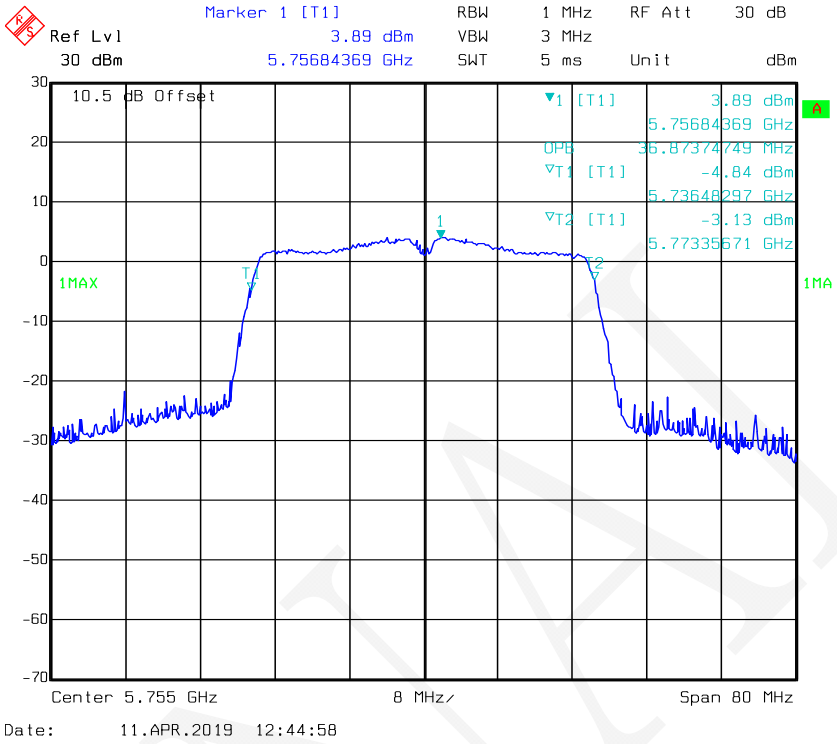
802.11n-HT40 mode, 99% Occupied Bandwidth-5755 MHz, Antenna 0



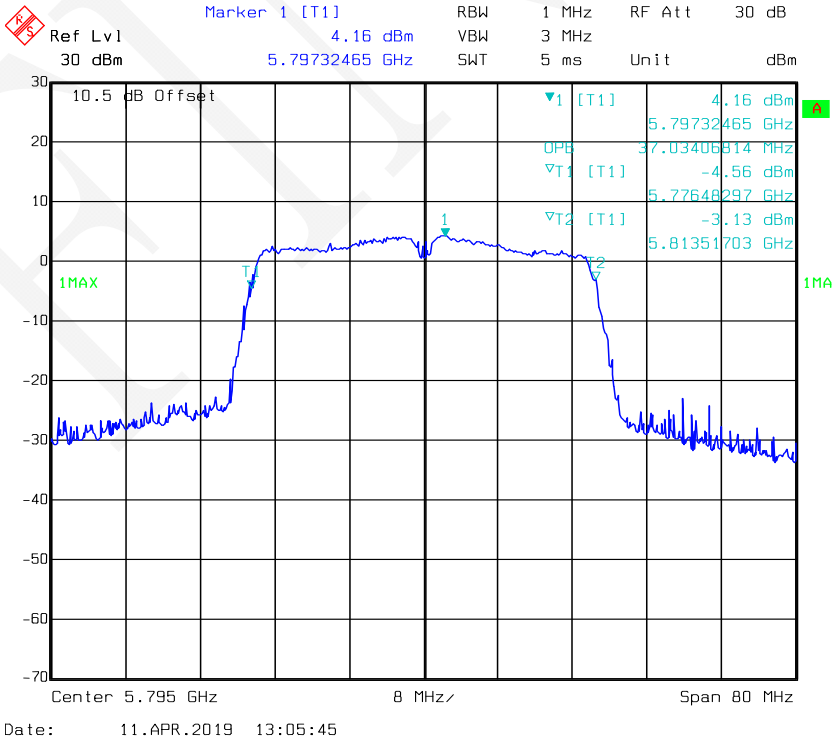
802.11n-HT40 mode, 99% Occupied Bandwidth-5795 MHz, Antenna 0



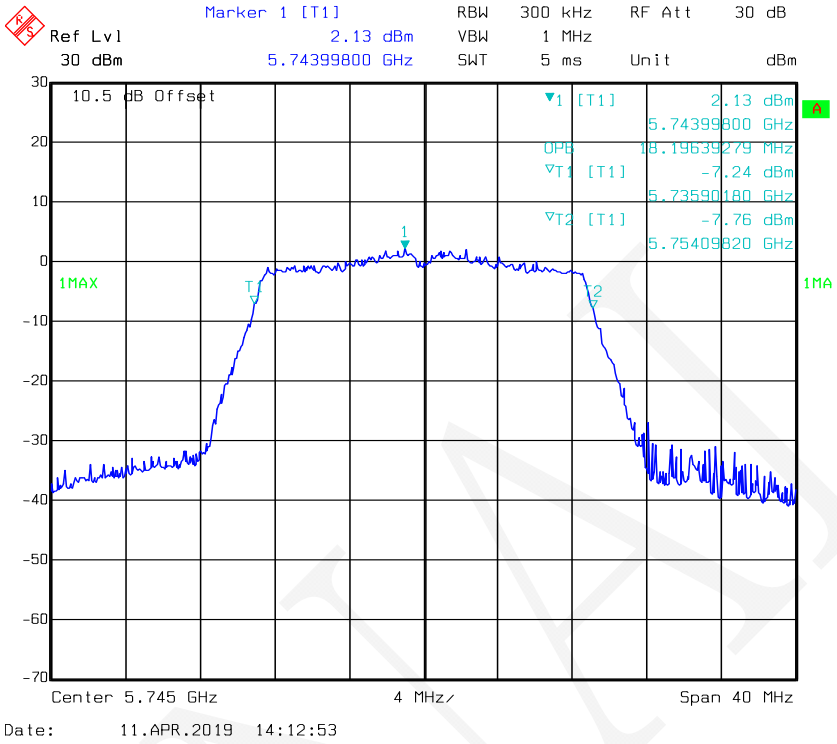
802.11n-HT40 mode, 99% Occupied Bandwidth-5755 MHz, Antenna 1



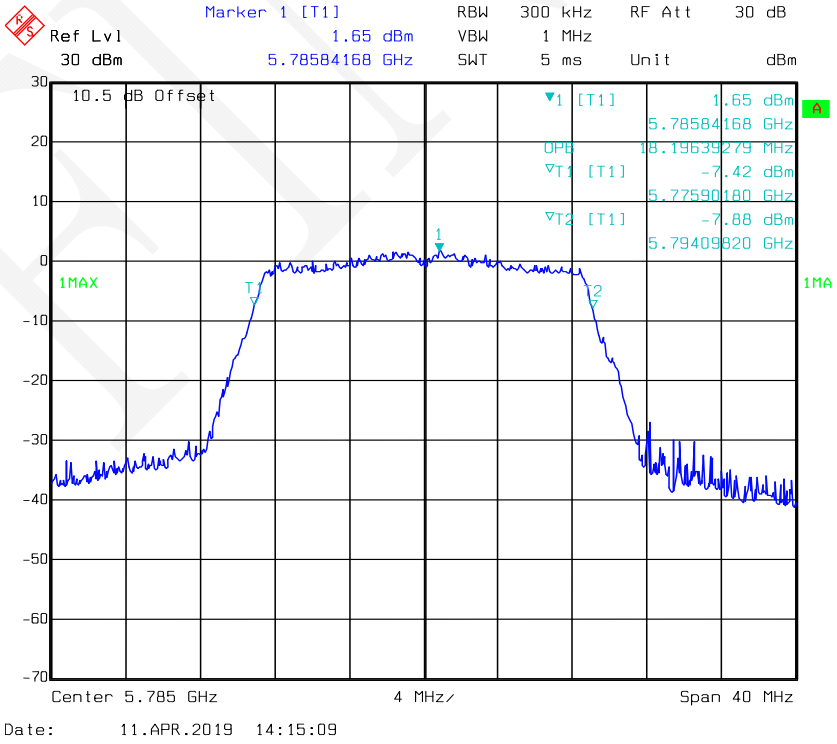
802.11n-HT40 mode, 99% Occupied Bandwidth-5795 MHz, Antenna 1



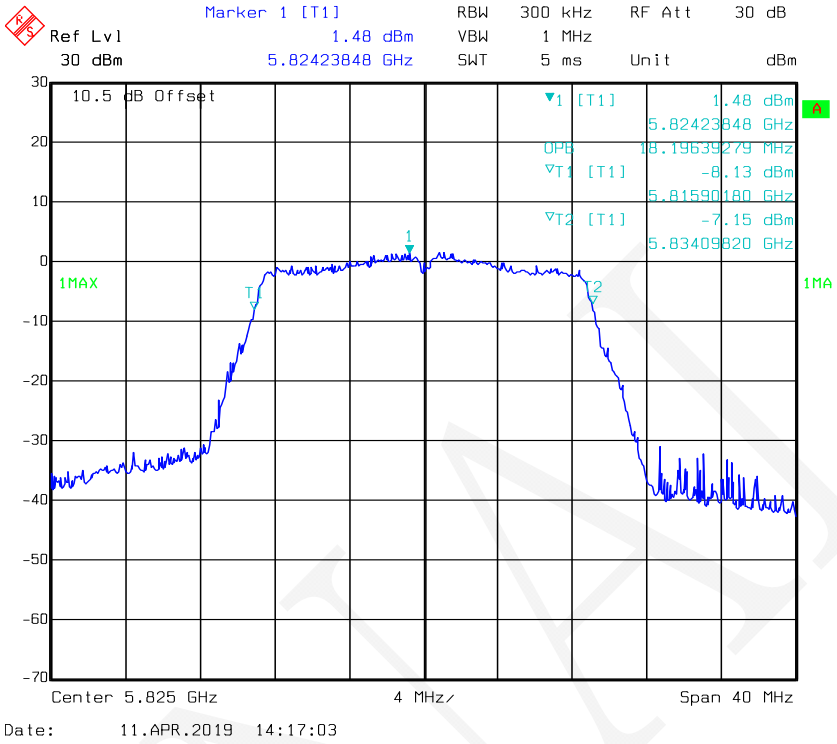
802.11ac20 mode, 99% Occupied Bandwidth-5745 MHz, Antenna 0



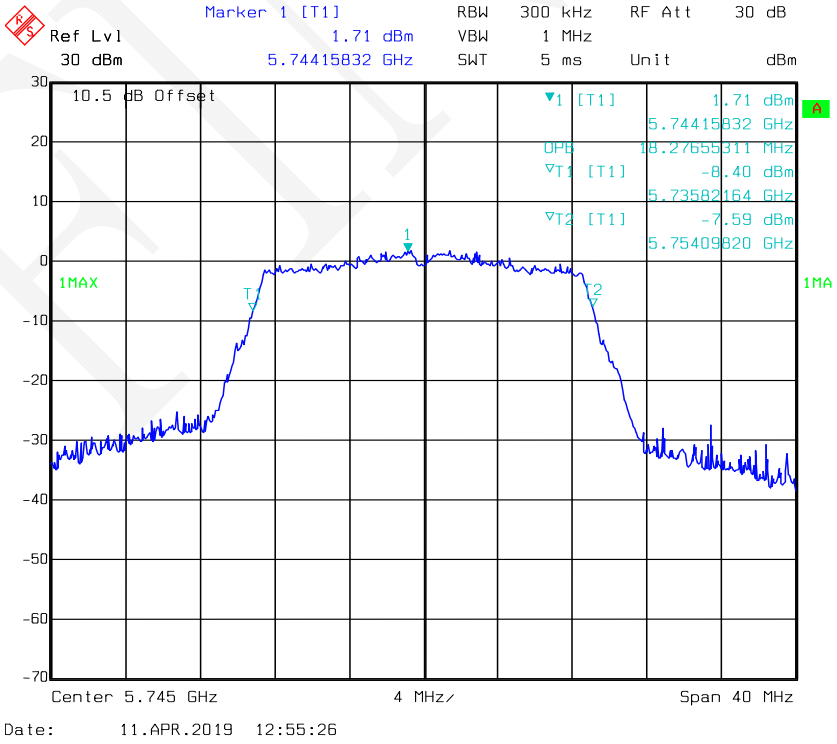
802.11ac20 mode, 99% Occupied Bandwidth-5785 MHz, Antenna 0



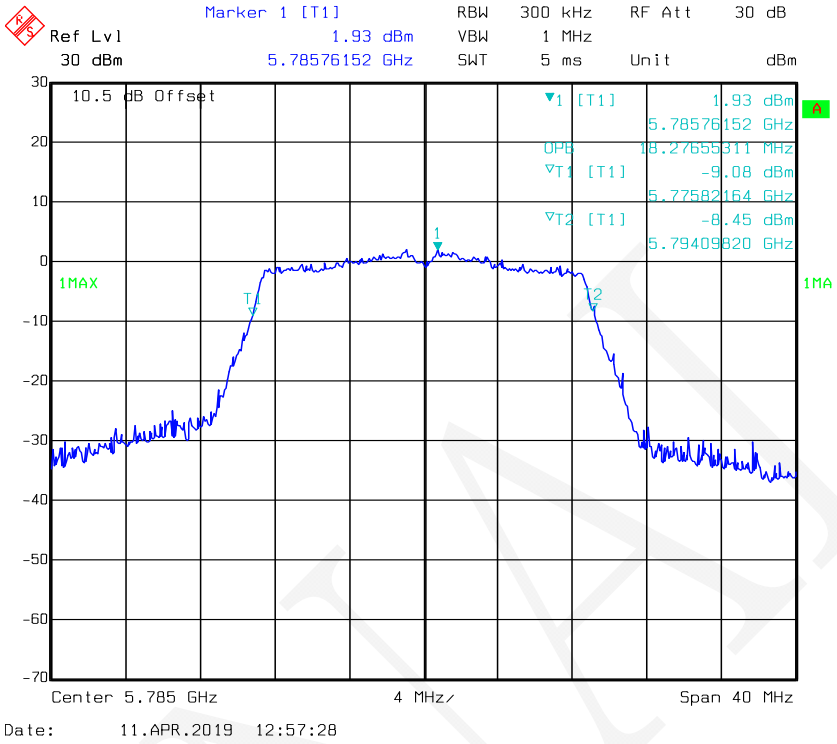
802.11ac20 mode, 99% Occupied Bandwidth-5825 MHz, Antenna 0



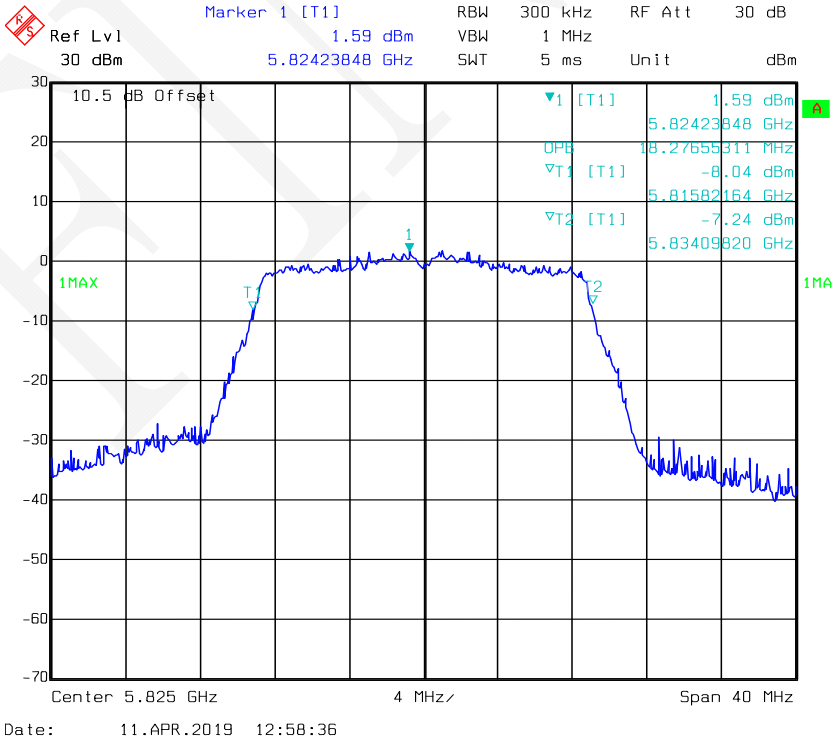
802.11ac20 mode, 99% Occupied Bandwidth-5745 MHz, Antenna 1



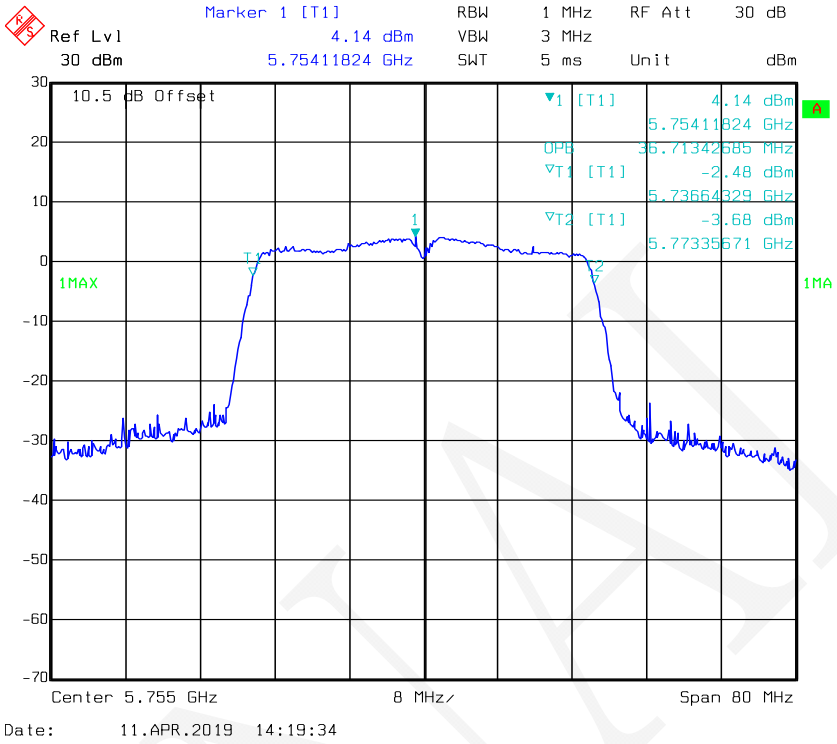
802.11ac20 mode, 99% Occupied Bandwidth-5785 MHz, Antenna 1



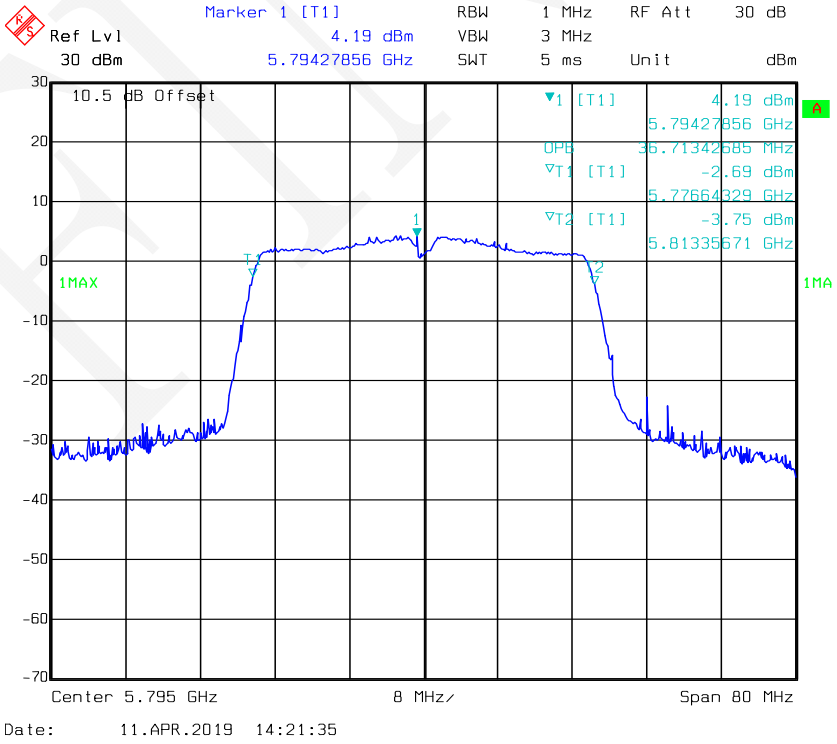
802.11ac20 mode, 99% Occupied Bandwidth-5825 MHz, Antenna 1



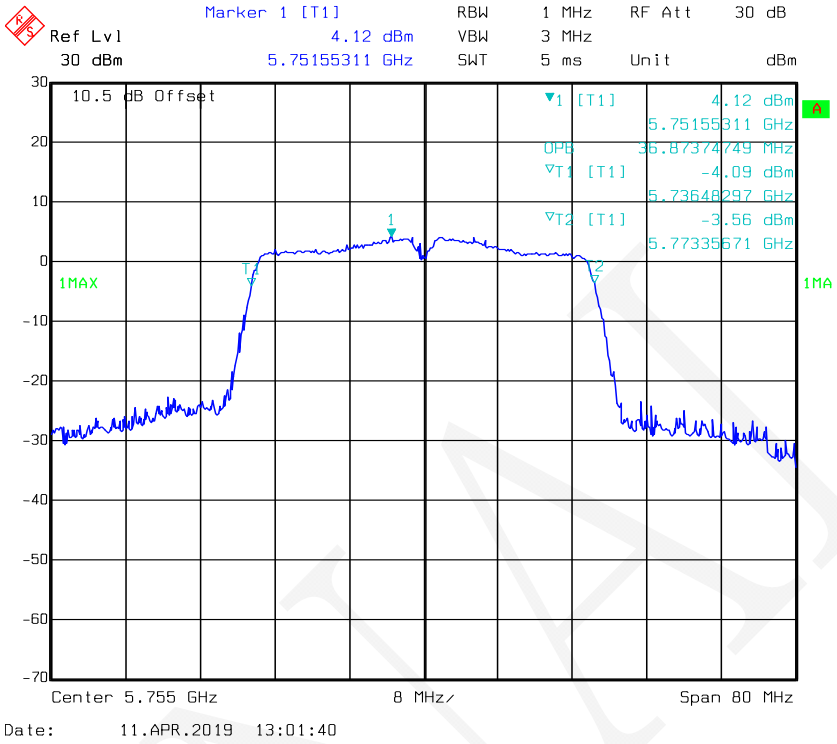
802.11ac40 mode, 99% Occupied Bandwidth-5755 MHz, Antenna 0



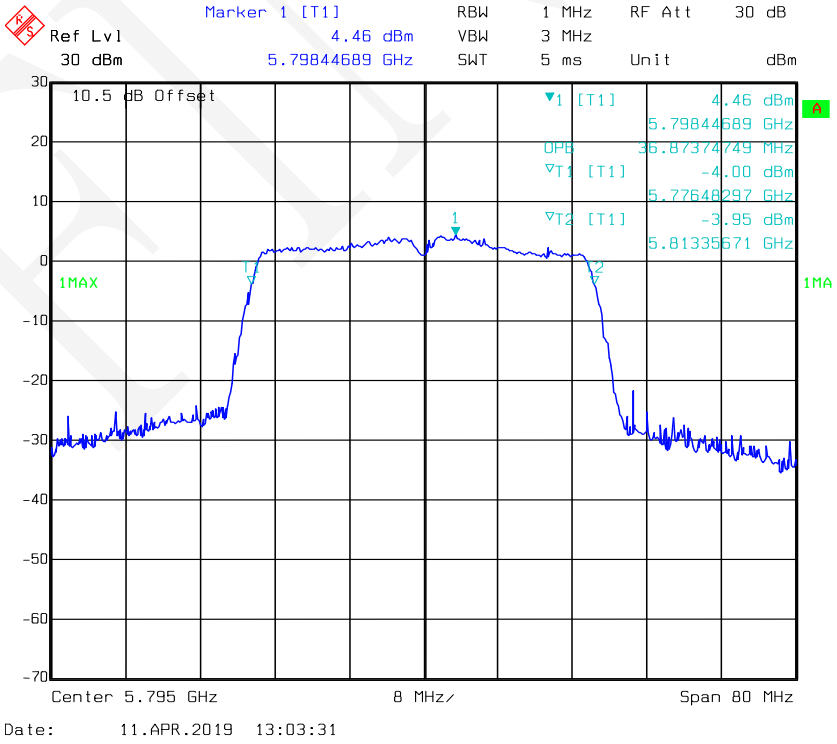
802.11ac40 mode, 99% Occupied Bandwidth-5795 MHz, Antenna 0



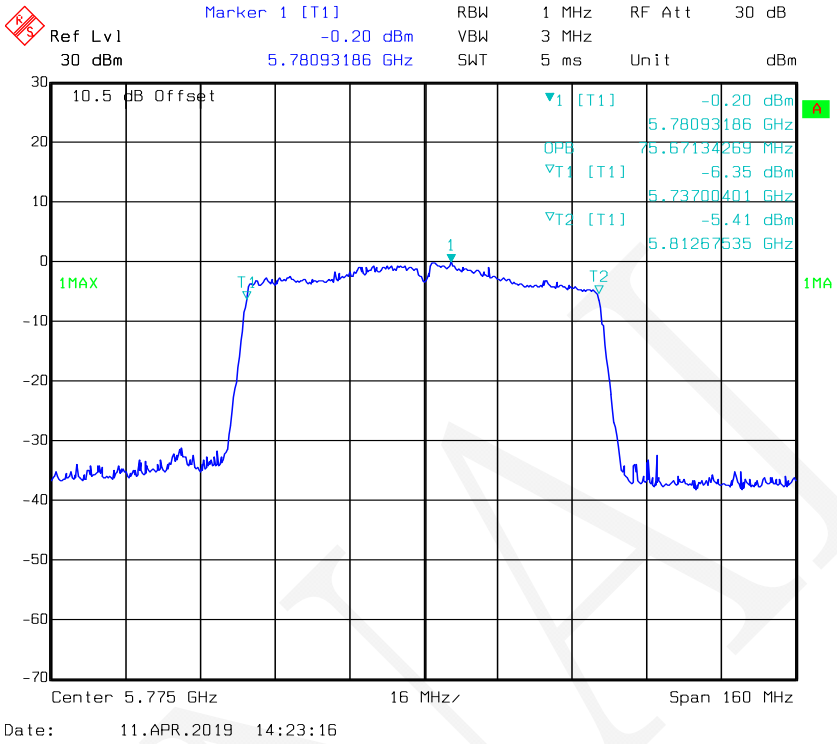
802.11ac40 mode, 99% Occupied Bandwidth-5755 MHz, Antenna 1



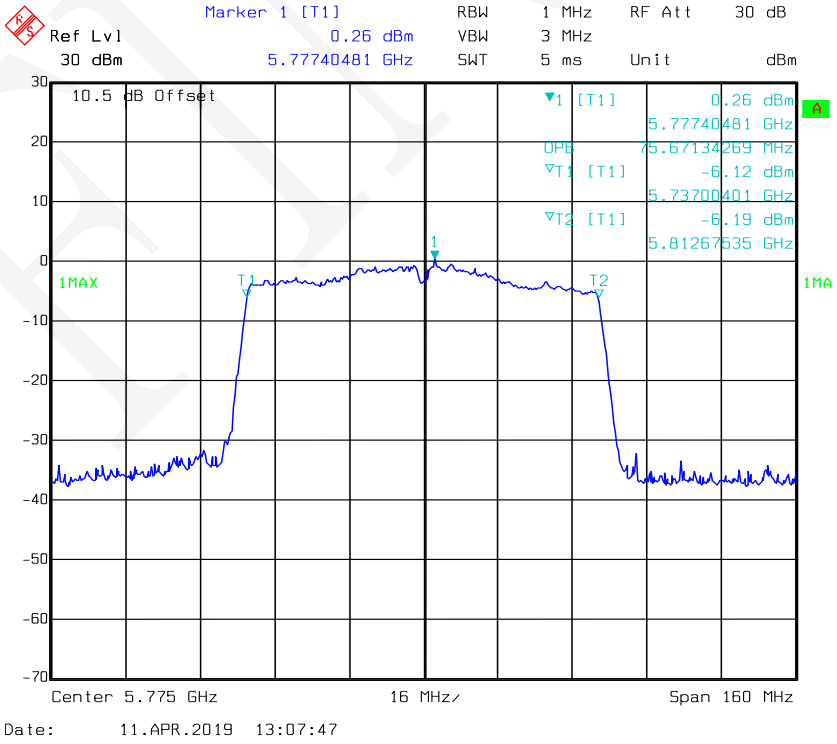
802.11ac40 mode, 99% Occupied Bandwidth-5795 MHz, Antenna 1



802.11ac80 mode, 99% Occupied Bandwidth-5775 MHz, Antenna 0



802.11ac80 mode, 99% Occupied Bandwidth-5775 MHz, Antenna 1



FCC §15.407(a) (1)(IV), (3), (4) – CONDUCTED TRANSMITTER OUTPUT POWER

Applicable Standard

(a) Power limits:

(1) For the band 5.15-5.25 GHz.

(iv) For 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.

(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.

NOTE TO PARAGRAPH (A)(3): The Commission strongly recommends that parties employing U-NII devices to provide critical communications services should determine if there are any nearby Government radar systems that could affect their operation.

(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 Procedure

According to 789033 D02 General UNII Test Procedures New Rules v02r01

Test Data

Environmental Conditions

Temperature:	22 °C
Relative Humidity:	55 %
ATM Pressure:	95.1 kPa

The testing was performed by Tom Tang from 2019-04-11.

Test Mode: Transmitting

For 5150-5250 MHz:

Mode	Channel	Frequency (MHz)	Conducted Average Power (dBm)		Duty Cycle Factor	Total (dBm)		Limit (dBm)
			Antenna 0	Antenna 1	(dB)	Antenna 0	Antenna 1	
802.11a	Low	5180	9.25	9.54	0.06	9.31	9.60	24
	Middle	5200	9.46	9.61	0.06	9.52	9.67	24
	High	5240	9.44	9.73	0.06	9.50	9.79	24

Mode	Channel	Frequency (MHz)	Conducted Average Power (dBm)		Duty Cycle Factor	Total (dBm)	Limit (dBm)
			Antenna 0	Antenna 1	(dB)		
802.11n-HT20	Low	5180	9.32	9.52	0.06	12.49	24
	Middle	5200	9.46	9.60	0.06	12.60	24
	High	5240	9.39	9.68	0.06	12.61	24
802.11n-HT40	Low	5190	8.73	9.07	0.13	12.04	24
	High	5230	9.01	9.00	0.13	12.15	24
802.11ac20	Low	5180	9.34	9.37	0.06	12.43	24
	Middle	5200	9.29	9.55	0.06	12.49	24
	High	5240	9.42	9.67	0.06	12.62	24
802.11ac40	Low	5190	9.03	8.91	0.13	12.11	24
	High	5230	8.93	8.94	0.13	12.08	24
802.11ac 80	Middle	5210	6.46	6.61	0.37	9.92	24

For 5725-5850 MHz:

Mode	Channel	Frequency (MHz)	Conducted Average Power (dBm)		Duty Cycle Factor (dB)	Total (dBm)		Limit (dBm)
			Antenna 0	Antenna 1		Antenna 0	Antenna 1	
802.11a	Low	5745	9.21	8.92	0.06	9.27	8.98	30
	Middle	5785	9.17	9.09	0.06	9.23	9.15	30
	High	5825	8.96	9.10	0.06	9.02	9.16	30

Mode	Channel	Frequency (MHz)	Conducted Average Power (dBm)		Duty Cycle Factor	Total (dBm)	Limit (dBm)
			Antenna 0	Antenna 1	(dB)		
802.11n-HT20	Low	5745	9.02	9.03	0.06	12.10	30
	Middle	5785	8.97	8.93	0.06	12.02	30
	High	5825	9.09	8.92	0.06	12.08	30
802.11n-HT40	Low	5755	8.43	8.39	0.13	11.55	30
	High	5795	8.46	8.37	0.13	11.56	30
802.11ac20	Low	5745	8.87	8.99	0.06	12.00	30
	Middle	5785	8.94	8.92	0.06	12.00	30
	High	5825	8.93	8.82	0.06	11.95	30
802.11ac40	Low	5755	8.28	8.57	0.13	11.57	30
	High	5795	8.45	8.31	0.13	11.52	30
802.11ac 80	Middle	5775	6.77	6.59	0.37	10.06	30

Note:
1. The max antenna gain is 3 dBi.
2. 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 =3.0 dBi < 6dBi

No power limit was reduced in MIMO mode.

FCC §15.407(a) (1) (iv) (3) (5) - POWER SPECTRAL DENSITY

Applicable Standard

(a) Power limits:

(1) For the band 5.15-5.25 GHz.

(iv) For 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.

(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.

(5) The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

Test Procedure

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

Test Data

Environmental Conditions

Temperature:	22 °C
Relative Humidity:	59 %
ATM Pressure:	95.3 kPa

The testing was performed by Tom Tang on 2019-04-11.

Test Mode: Transmitting

Test Result: Pass

For 5150-5250 MHz:

Mode	Channel	Frequency (MHz)	Power Spectral Density (dBm/MHz)		Duty Cycle Factor (dB)	Total (dBm/MHz)		Limit (dBm/MHz)
			Antenna 0	Antenna 1		Antenna 0	Antenna 1	
802.11a	Low	5180	1.17	0.79	0.06	1.23	0.85	11
	Middle	5200	0.80	1.05	0.06	0.86	1.11	11
	High	5240	0.97	1.44	0.06	1.03	1.50	11

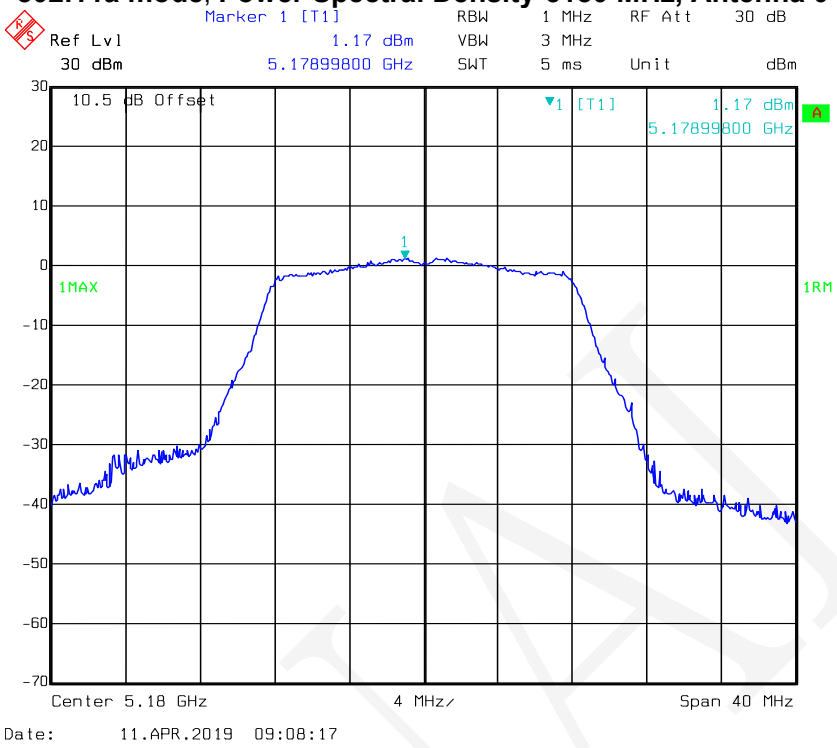
Mode	Channel	Frequency (MHz)	Power Spectral Density (dBm/MHz)		Duty Cycle Factor (dB)	Total (dBm/MHz)	Limit (dBm/MHz)
			Antenna 0	Antenna 1			
802.11n-HT20	Low	5180	0.63	0.97	0.06	3.87	11
	Middle	5200	1.07	0.95	0.06	4.08	11
	High	5240	0.90	0.94	0.06	3.99	11
802.11n-HT40	Low	5190	-2.37	-2.54	0.13	0.69	11
	High	5230	-2.45	-2.42	0.13	0.71	11
802.11ac20	Low	5180	0.78	0.93	0.06	3.93	11
	Middle	5200	0.82	1.06	0.06	4.01	11
	High	5240	0.97	1.45	0.06	4.29	11
802.11ac40	Low	5190	-2.29	-2.31	0.13	0.84	11
	High	5230	-2.50	-2.65	0.13	0.57	11
802.11ac80	Middle	5210	-7.20	-7.04	0.37	-3.74	11

Note:
1. The max antenna gain is 3dBi.
2. The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density measurements on IEEE 802.11 devices:
   Array Gain = $10*\log(N_{ANT}/N_{SS})$dB

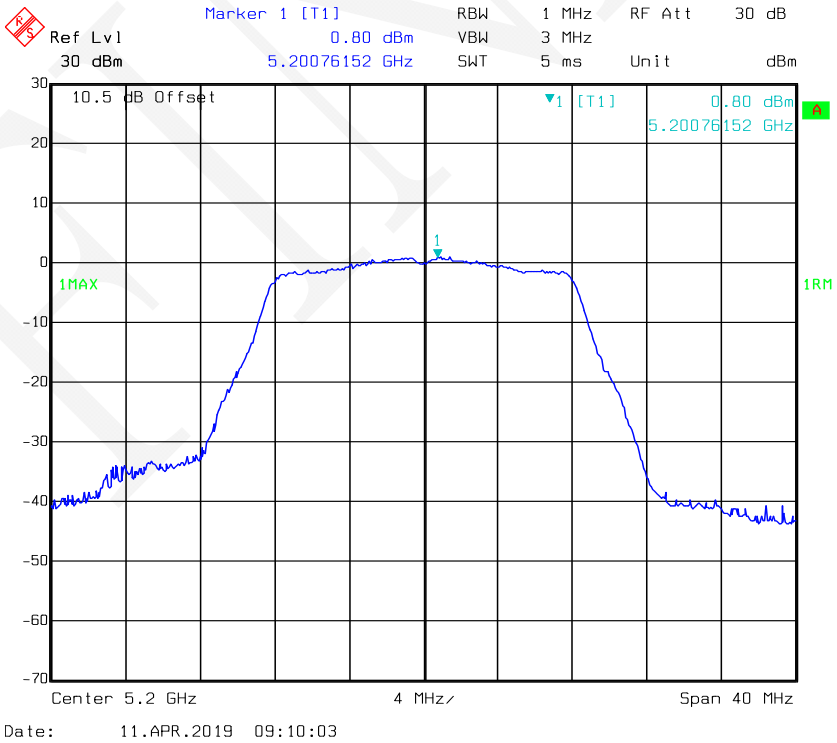
So:

Directional gain = GANT + Array Gain = 3+10*log(2)= 6 dBi
No power density Limit was reduced in MIMO mode.

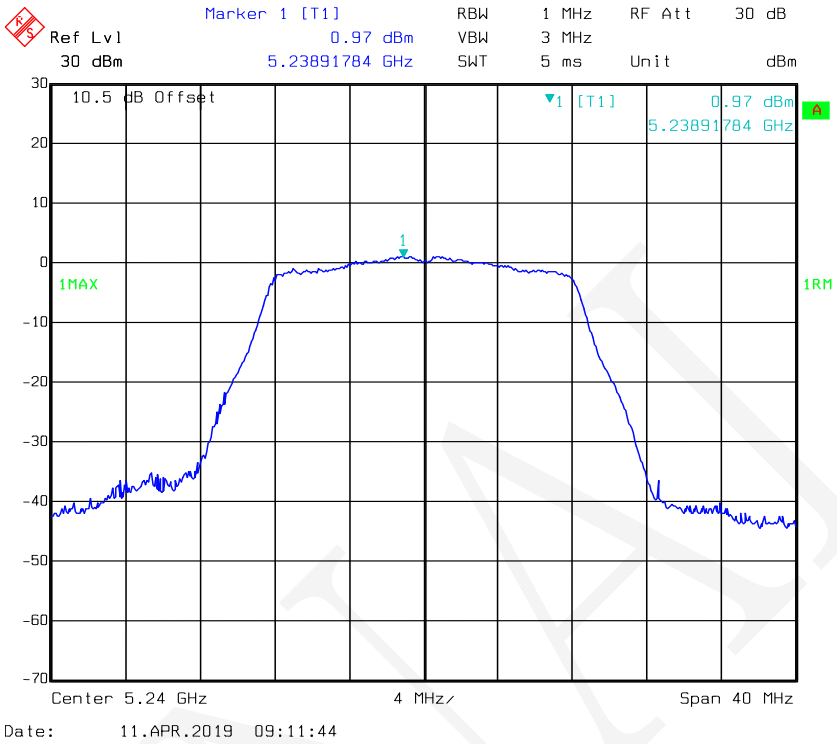
802.11a mode, Power Spectral Density-5180 MHz, Antenna 0



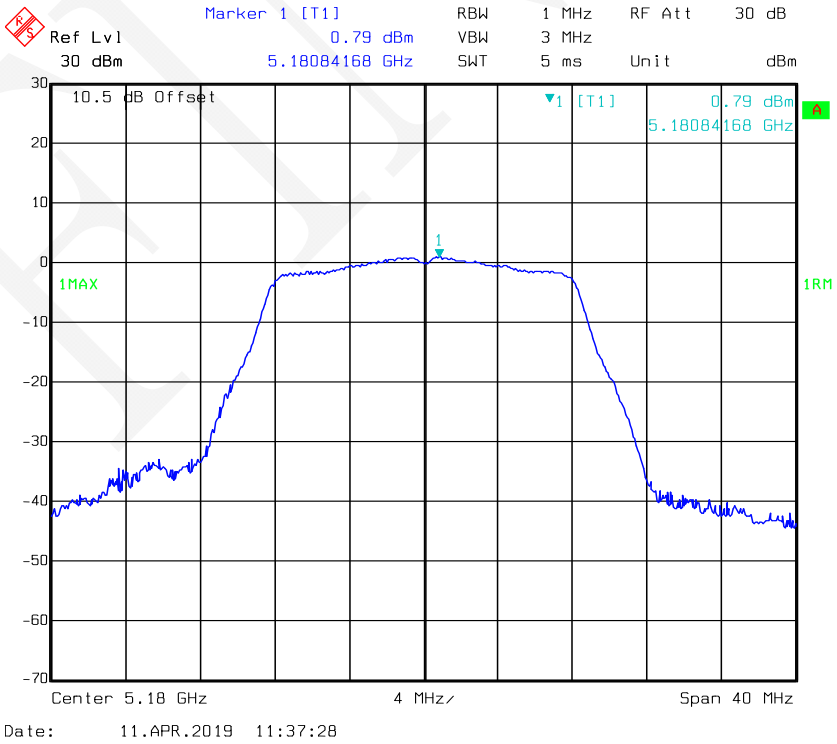
802.11a mode, Power Spectral Density-5200 MHz, Antenna 0



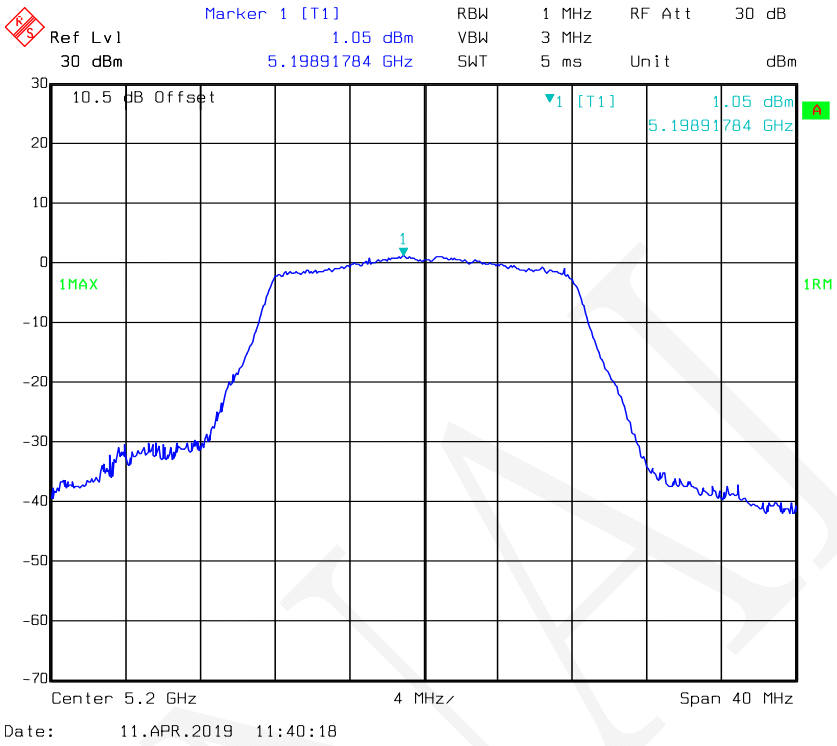
802.11a mode, Power Spectral Density-5240 MHz, Antenna 0



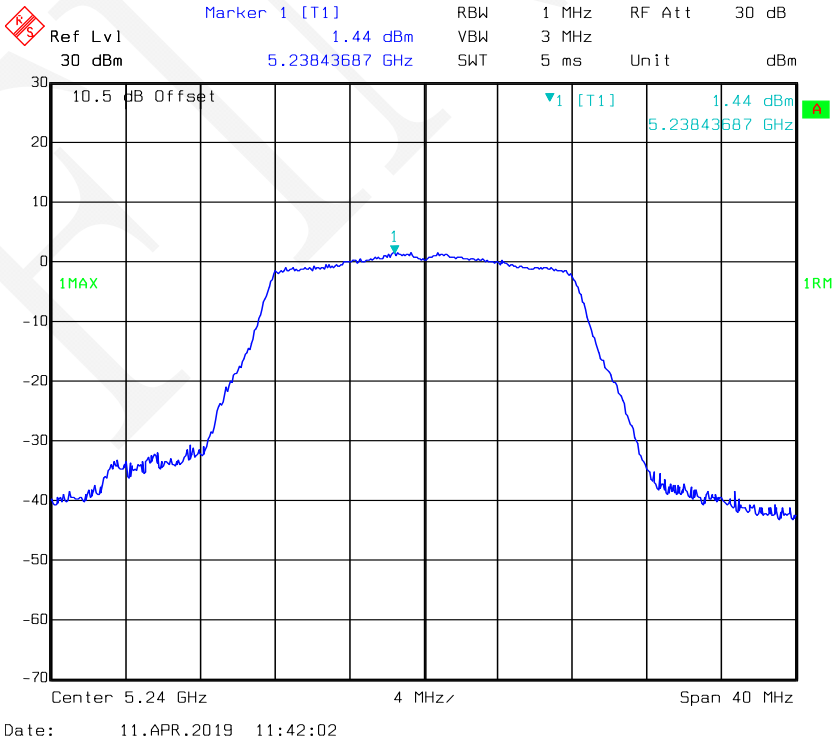
802.11a mode, Power Spectral Density-5180 MHz, Antenna 1



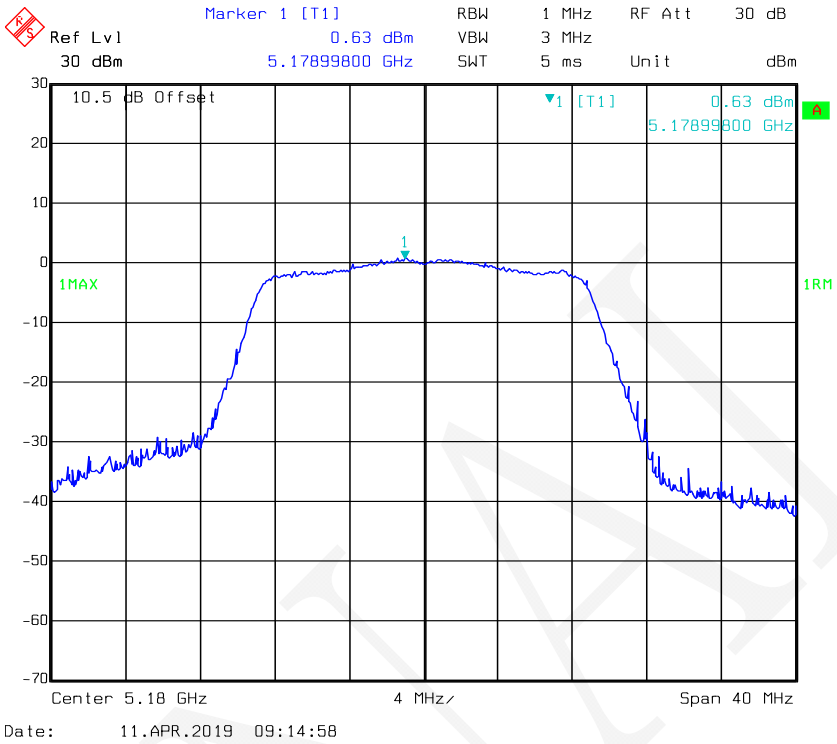
802.11a mode, Power Spectral Density-5200 MHz, Antenna 1



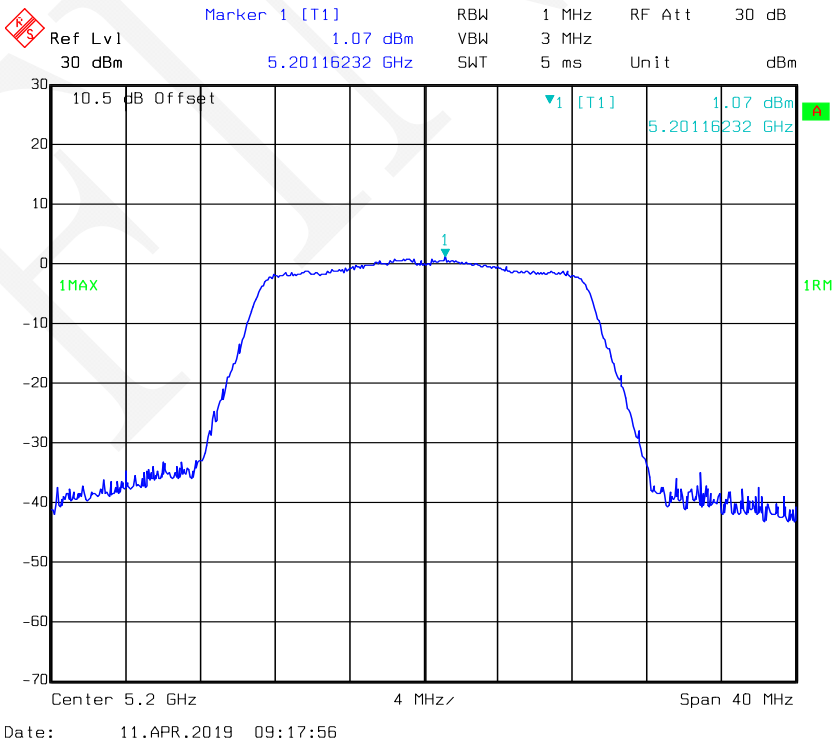
802.11a mode, Power Spectral Density-5240 MHz, Antenna 1



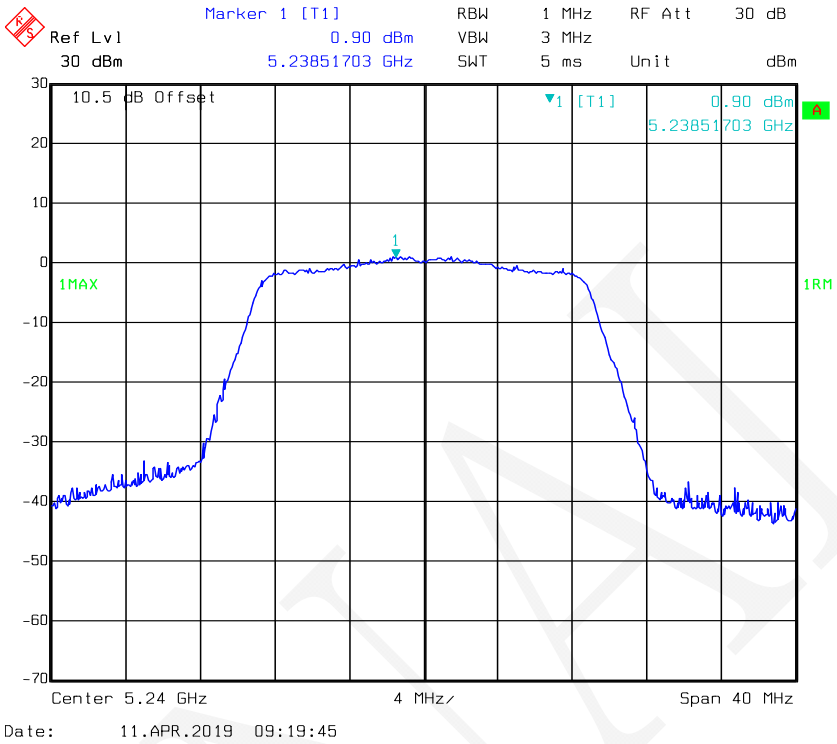
802.11n-HT20 mode, Power Spectral Density-5180 MHz, Antenna 0



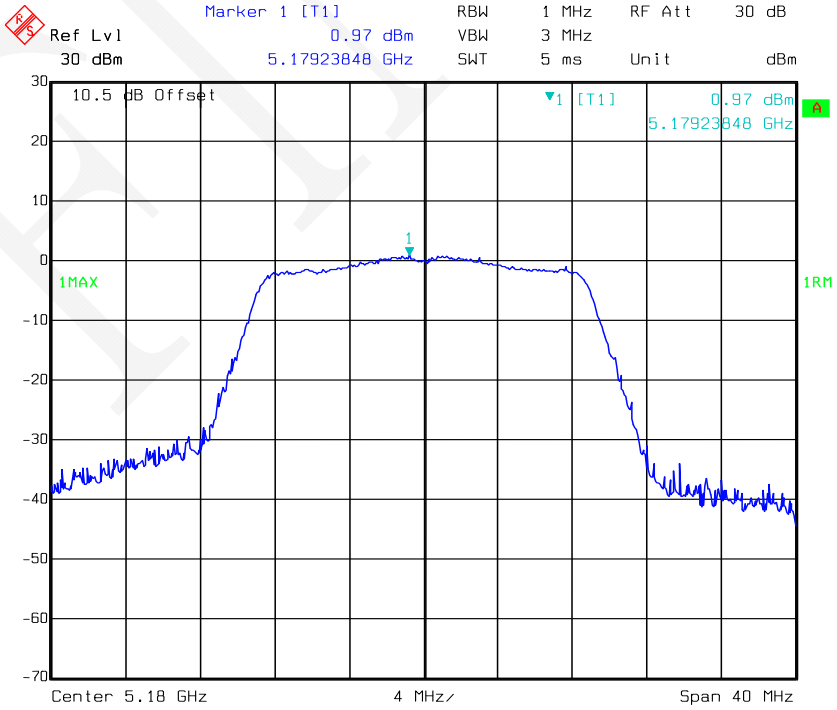
802.11n-HT20 mode, Power Spectral Density-5200 MHz, Antenna 0



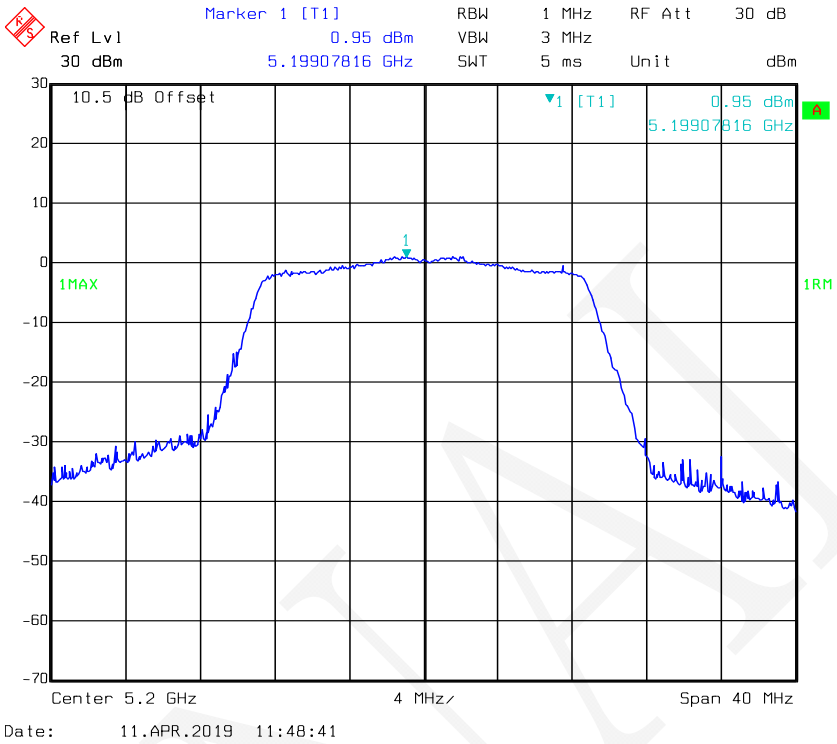
802.11n-HT20 mode, Power Spectral Density-5240 MHz, Antenna 0



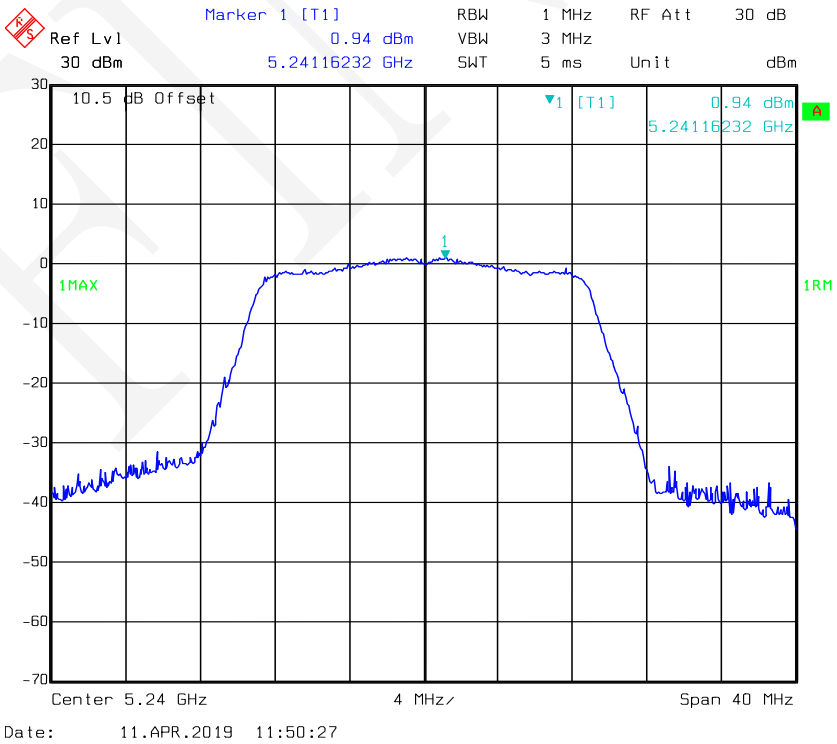
802.11n-HT20 mode, Power Spectral Density-5180 MHz, Antenna 1



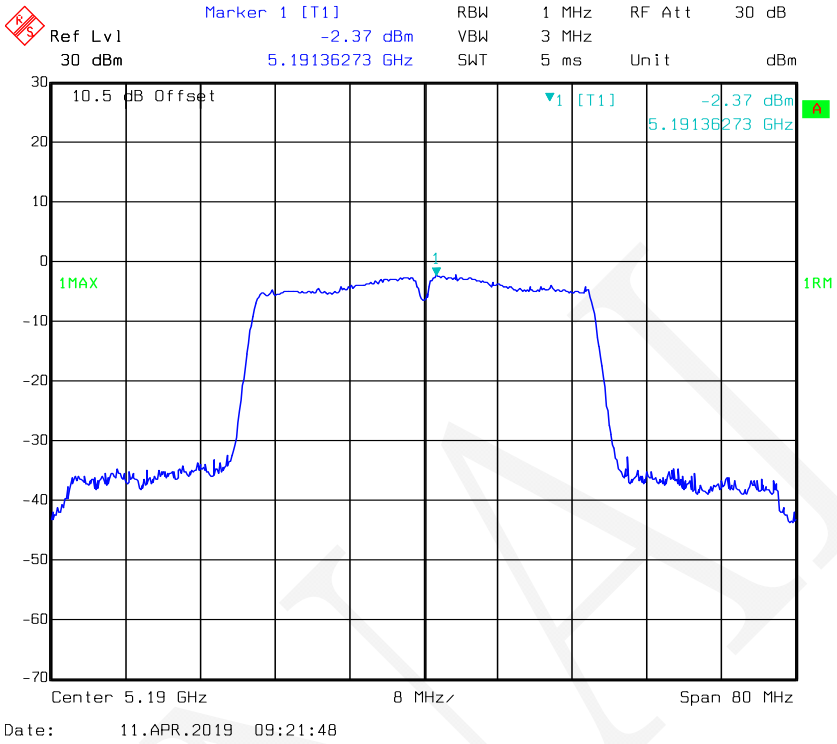
802.11n-HT20 mode, Power Spectral Density-5200 MHz, Antenna 1



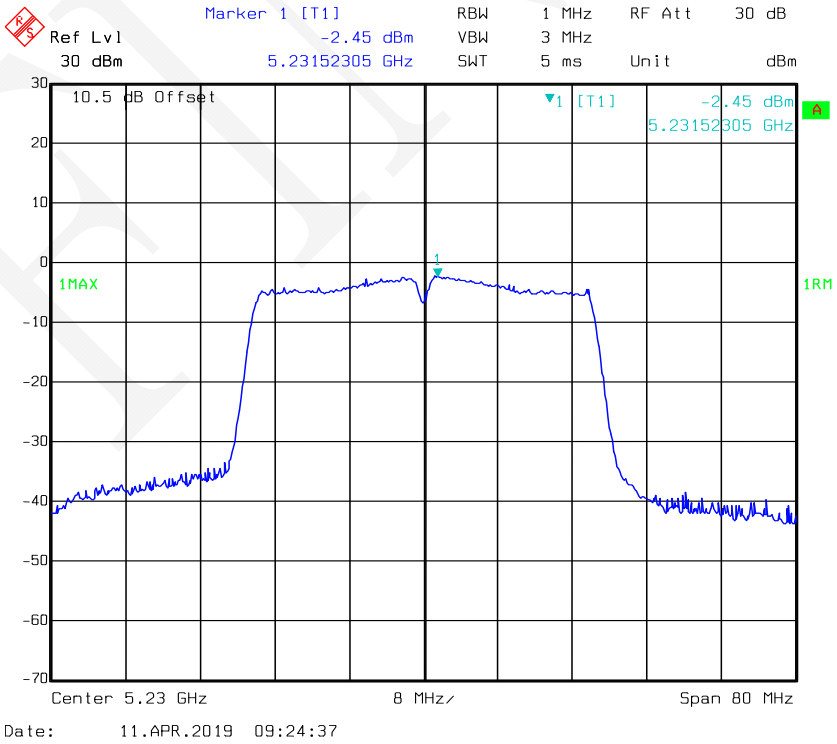
802.11n-HT20 mode, Power Spectral Density-5240 MHz, Antenna 1



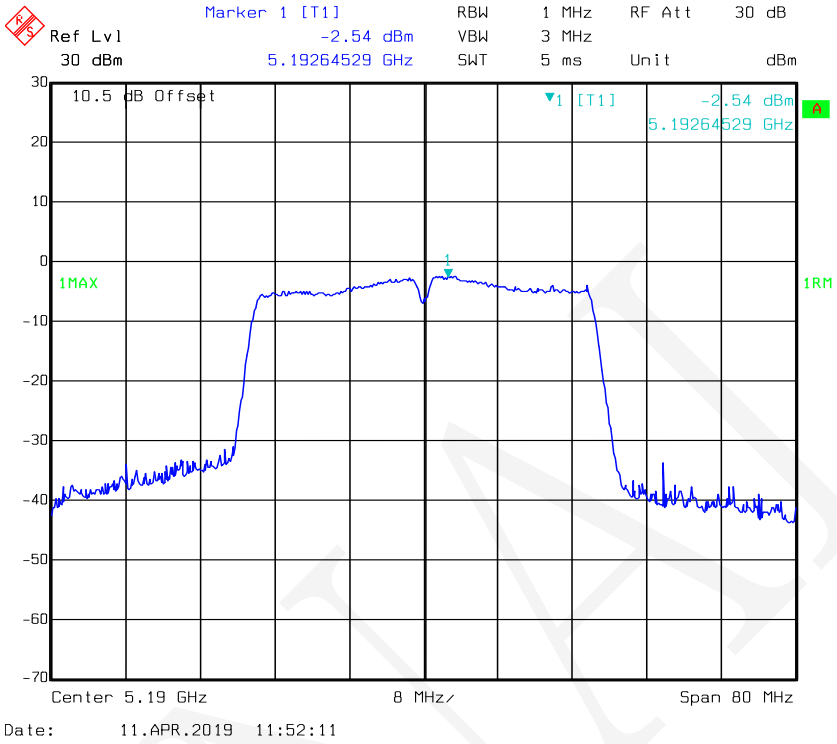
802.11n-HT40 mode, Power Spectral Density-5190 MHz, Antenna 0



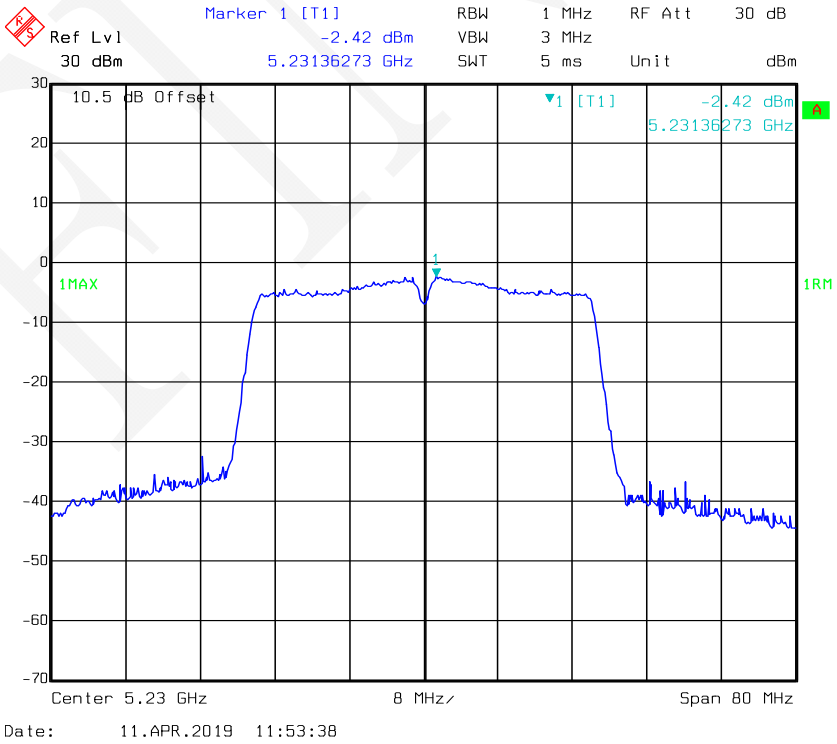
802.11n-HT40 mode, Power Spectral Density-5230 MHz, Antenna 0



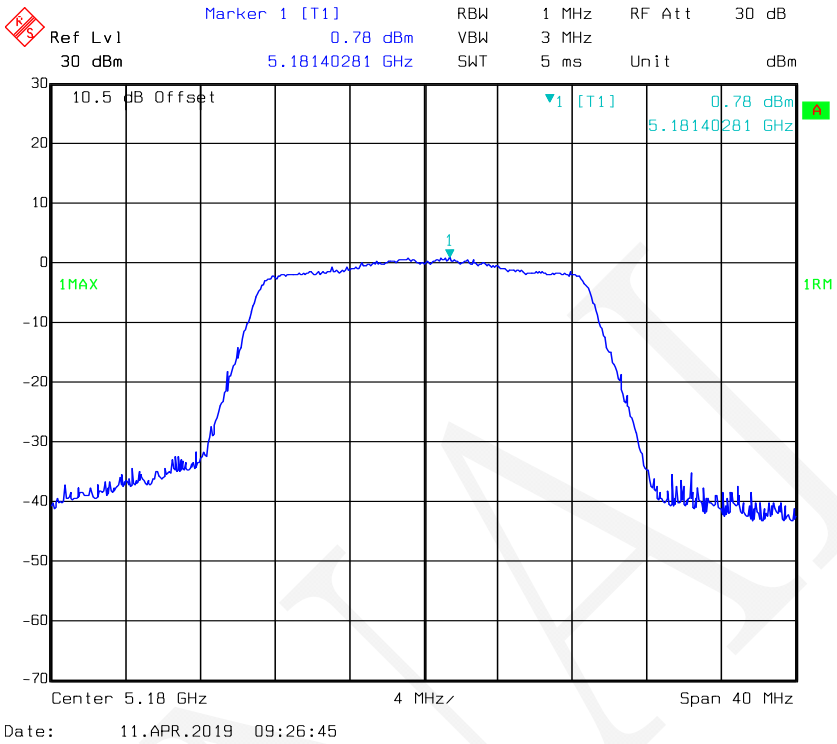
802.11n-HT40 mode, Power Spectral Density-5190 MHz, Antenna 1



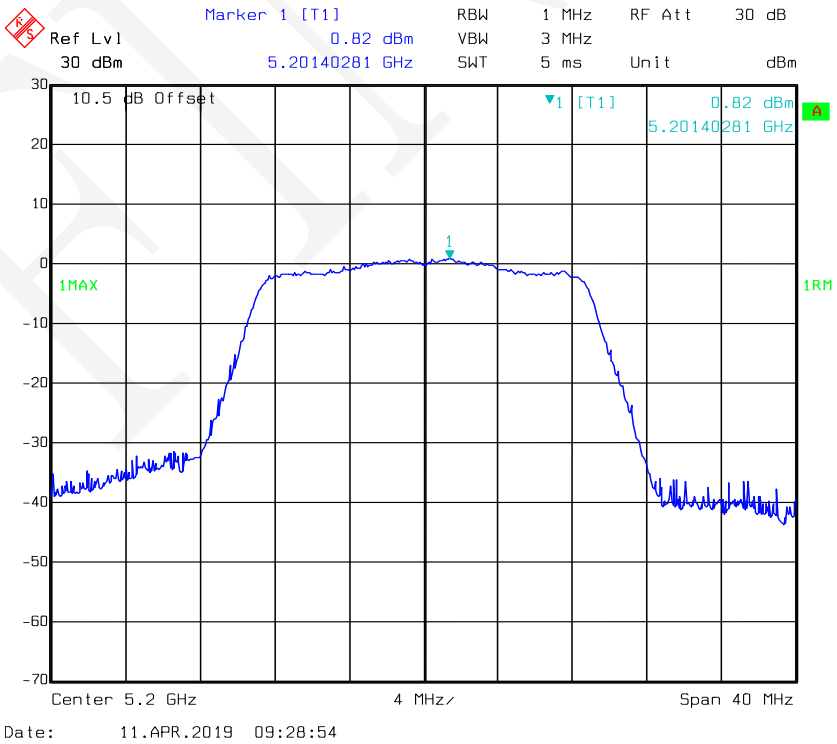
802.11n-HT40 mode, Power Spectral Density-5230 MHz, Antenna 1



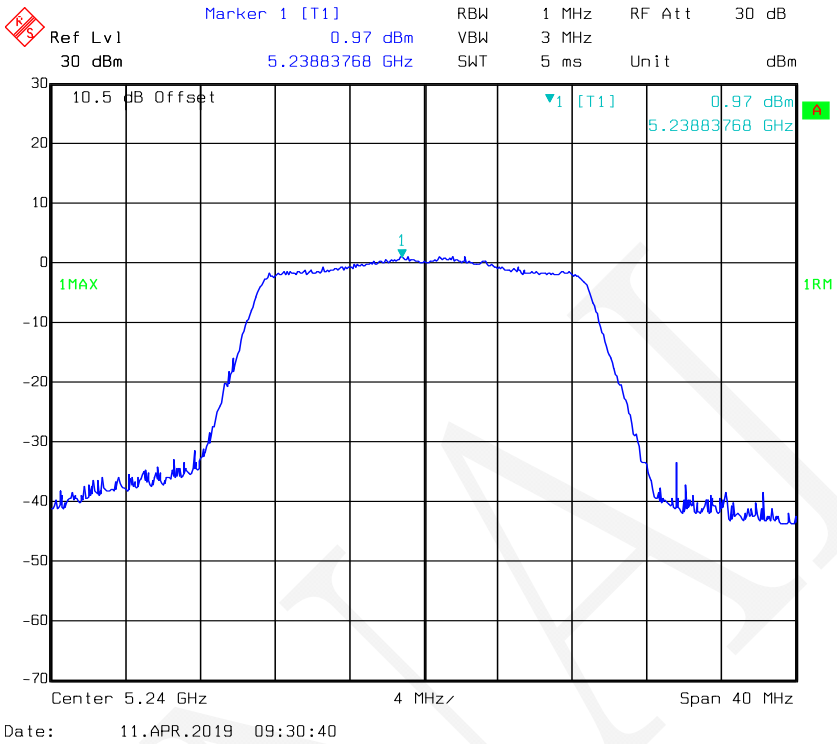
802.11ac20 mode, Power Spectral Density-5180 MHz, Antenna 0



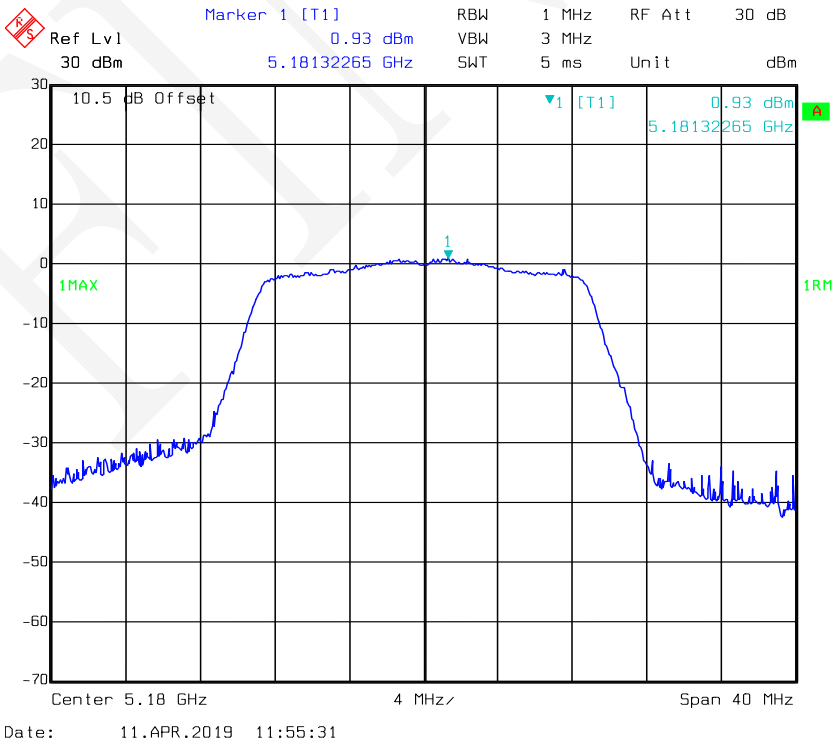
802.11ac20 mode, Power Spectral Density-5200 MHz, Antenna 0



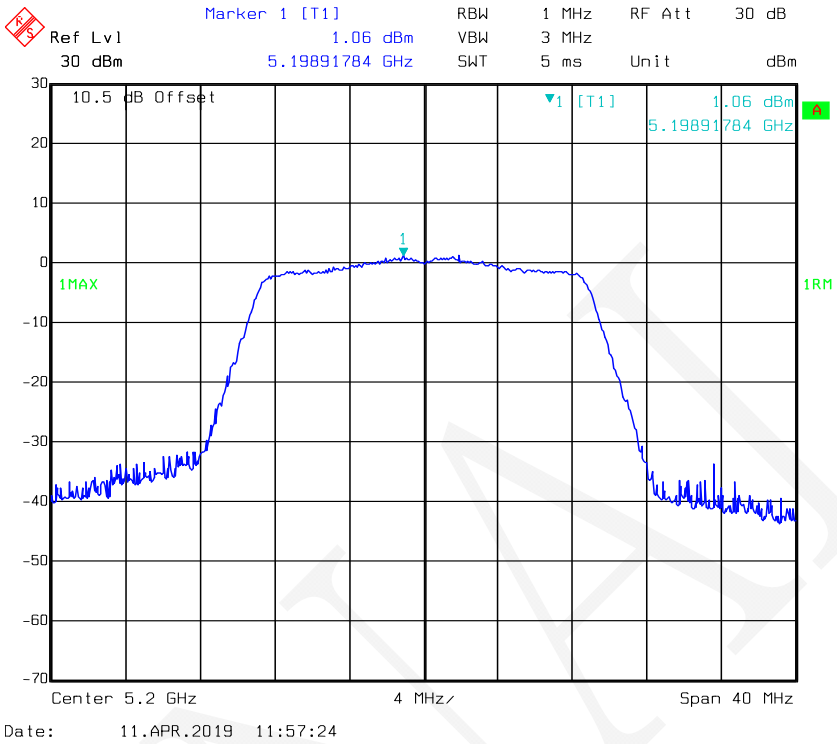
802.11ac20 mode, Power Spectral Density-5240 MHz, Antenna 0



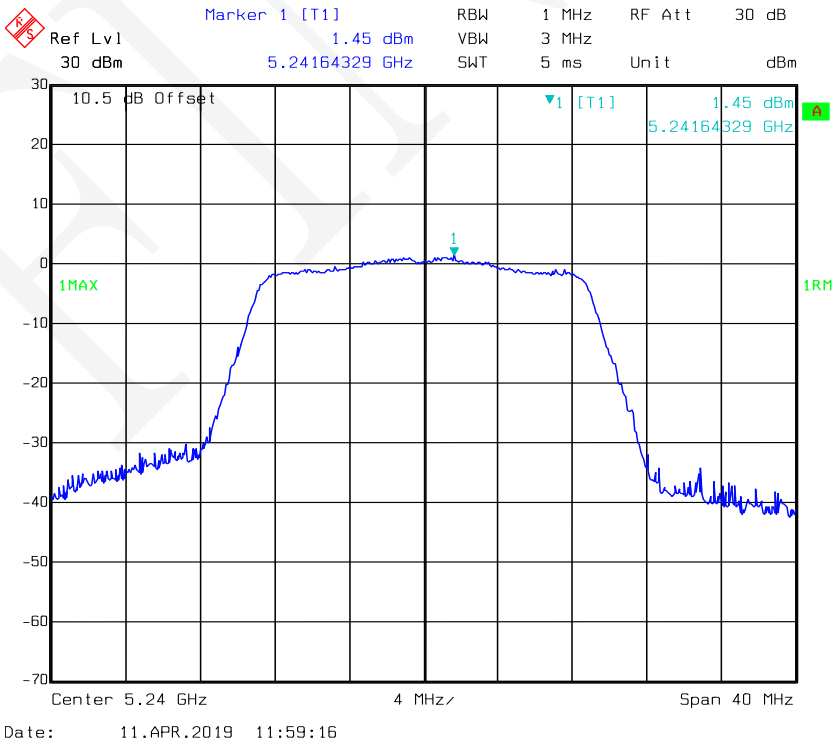
802.11ac20 mode, Power Spectral Density-5180 MHz, Antenna 1



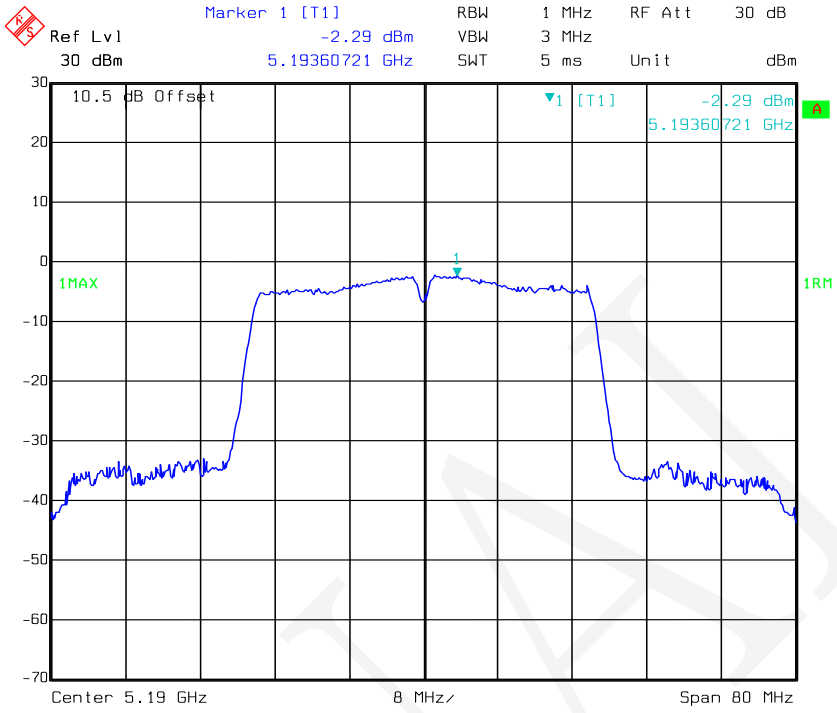
802.11ac20 mode, Power Spectral Density-5200 MHz, Antenna 1



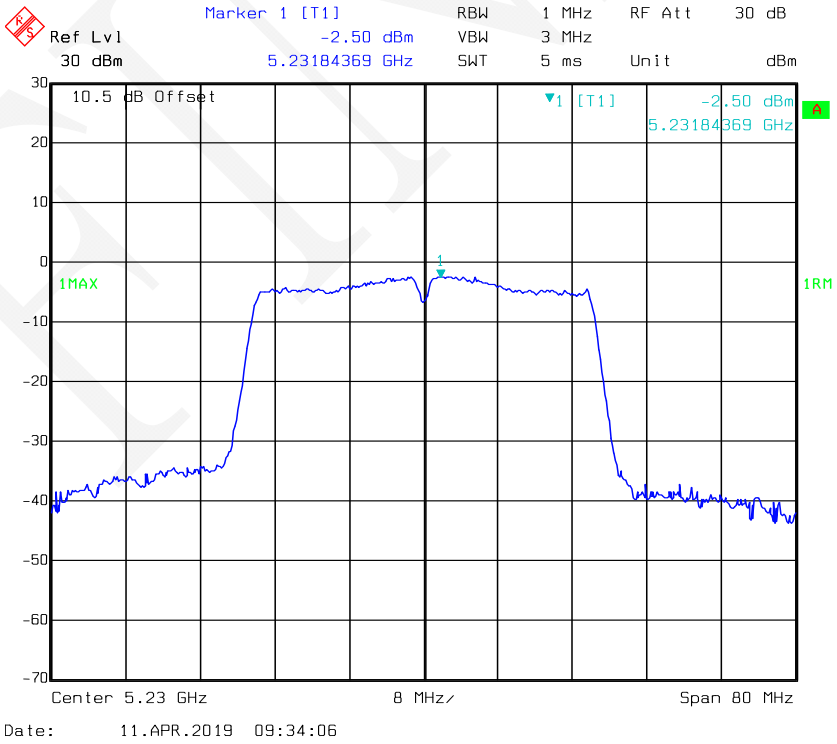
802.11ac20 mode, Power Spectral Density-5240 MHz, Antenna 1



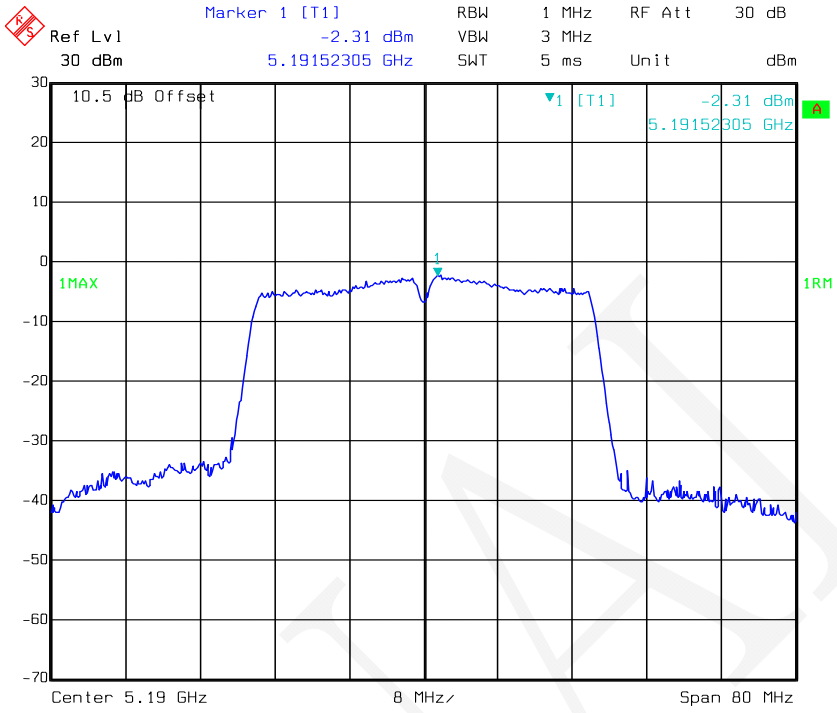
802.11ac40 mode, Power Spectral Density-5190 MHz, Antenna 0



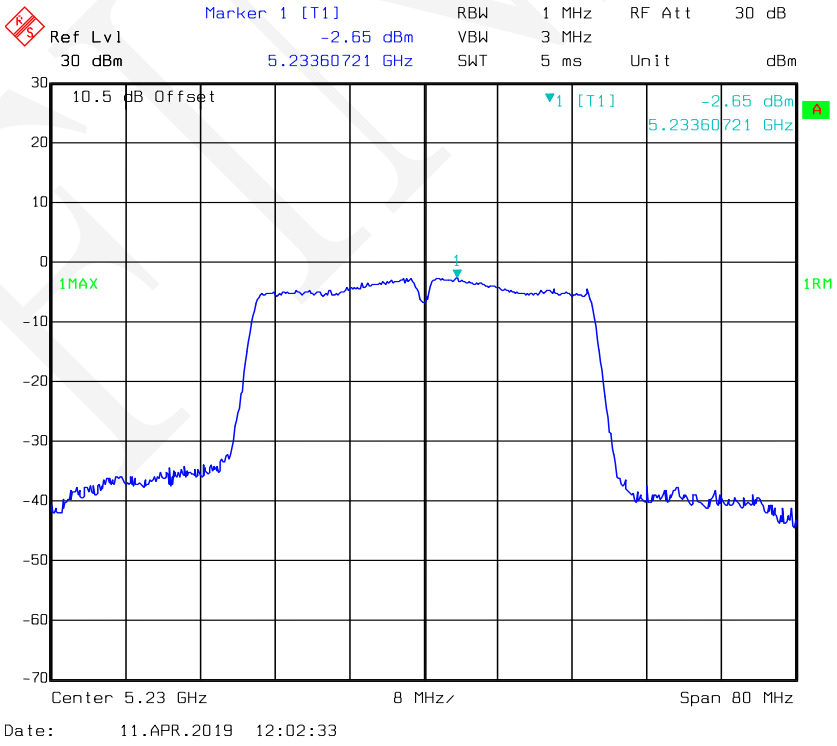
802.11ac40 mode, Power Spectral Density-5230 MHz, Antenna 0



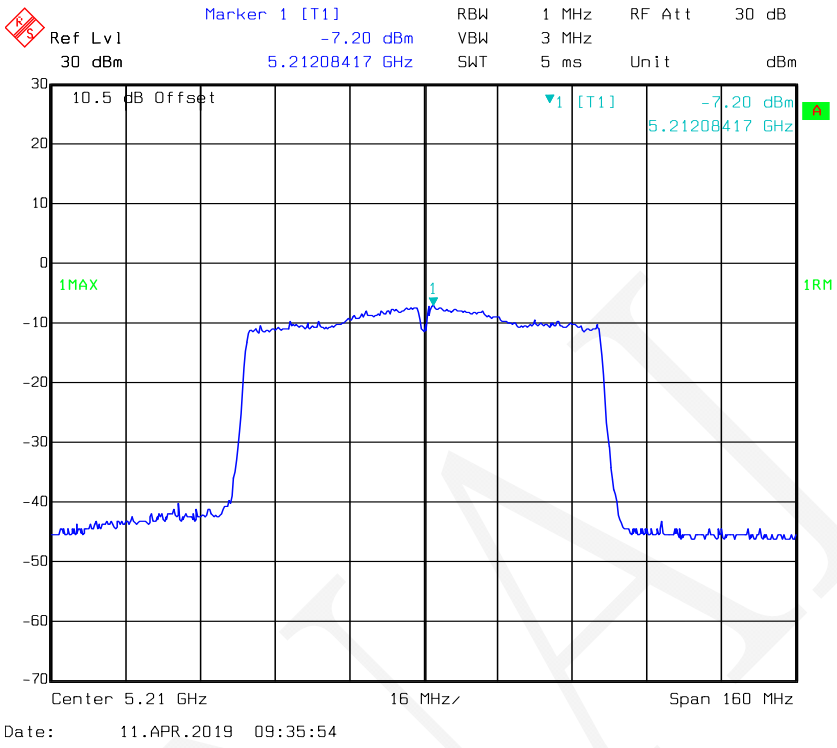
802.11ac40 mode, Power Spectral Density-5190 MHz, Antenna 1



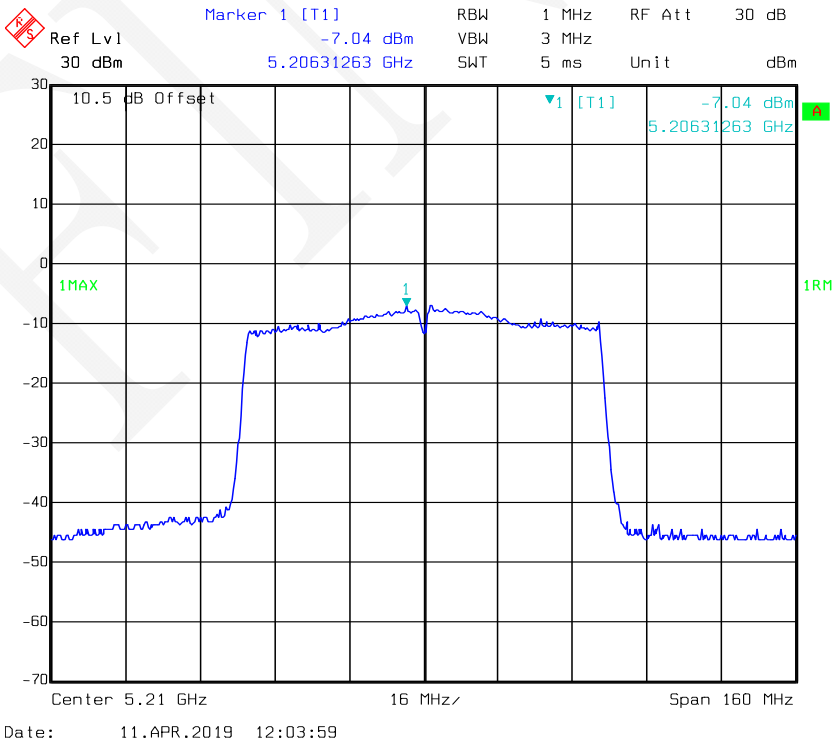
802.11ac40 mode, Power Spectral Density-5230 MHz, Antenna 1



802.11ac 80 mode, Power Spectral Density-5210 MHz, Antenna 0



802.11ac 80 mode, Power Spectral Density-5210 MHz, Antenna 1



For 5725-5850 MHz:

Mode	Channel	Frequency (MHz)	Power Spectral Density (dBm/500kHz)		Duty Cycle Factor (dB)	Total (dBm/500kHz)		Limit (dBm/500kHz)
			Antenna 0	Antenna 1		Antenna 0	Antenna 1	
802.11a	Low	5745	-1.36	-1.63	0.06	-1.30	-1.57	30
	Middle	5785	-1.52	-1.69	0.06	-1.46	-1.63	30
	High	5825	-1.44	-1.95	0.06	-1.38	-1.89	30

Mode	Channel	Frequency (MHz)	Power Spectral Density (dBm/500kHz)		Duty Cycle Factor (dB)	Total (dBm/500kHz)	Limit (dBm/500kHz)
			Antenna 0	Antenna 1			
802.11n-HT20	Low	5745	-1.81	-1.77	0.06	1.28	30
	Middle	5785	-1.74	-1.52	0.06	1.44	30
	High	5825	-1.78	-1.64	0.06	1.36	30
802.11n-HT40	Low	5755	-5.63	-5.53	0.13	-2.44	30
	High	5795	-5.22	-5.06	0.13	-2.00	30
802.11ac20	Low	5745	-1.73	-1.85	0.06	1.28	30
	Middle	5785	-1.88	-1.85	0.06	1.21	30
	High	5825	-1.87	-1.61	0.06	1.33	30
802.11ac40	Low	5755	-5.17	-5.39	0.13	-2.14	30
	High	5795	-5.43	-5.16	0.13	-2.15	30
802.11ac80	Middle	5775	-9.62	-9.72	0.37	-6.29	30

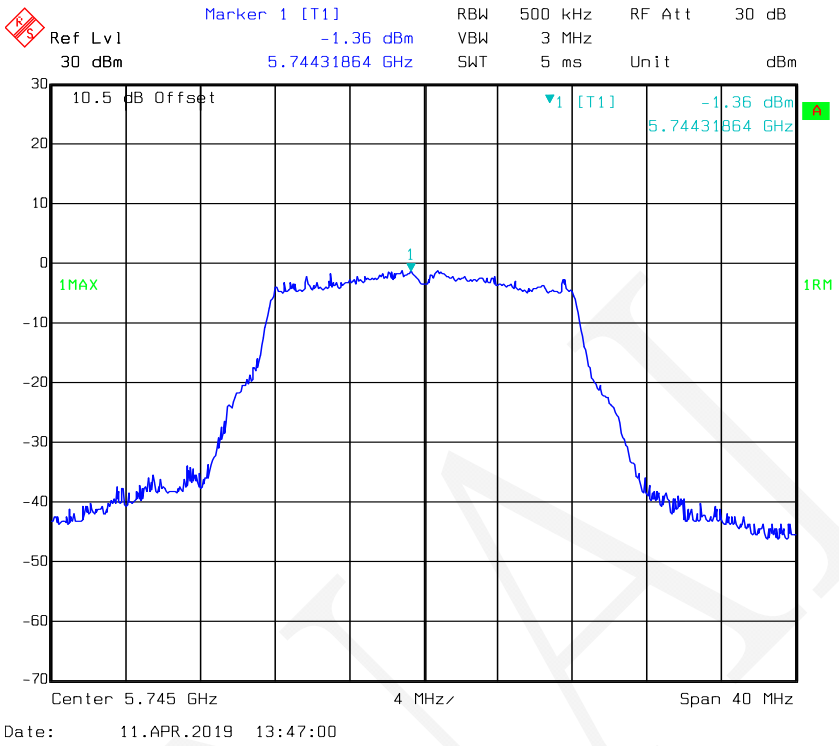
Note:
1. The max antenna gain is 3dBi.
2. The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density measurements on IEEE 802.11 devices:

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

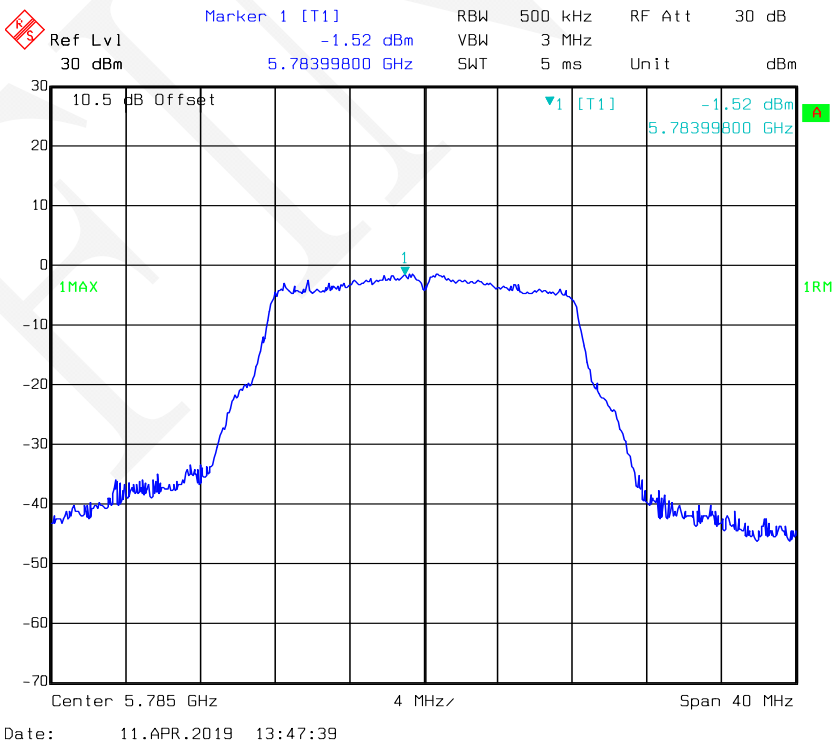
So:

Directional gain = GANT + Array Gain = 3+10*log(2)=6.0dBi
No power density Limit was reduced in MIMO mode.

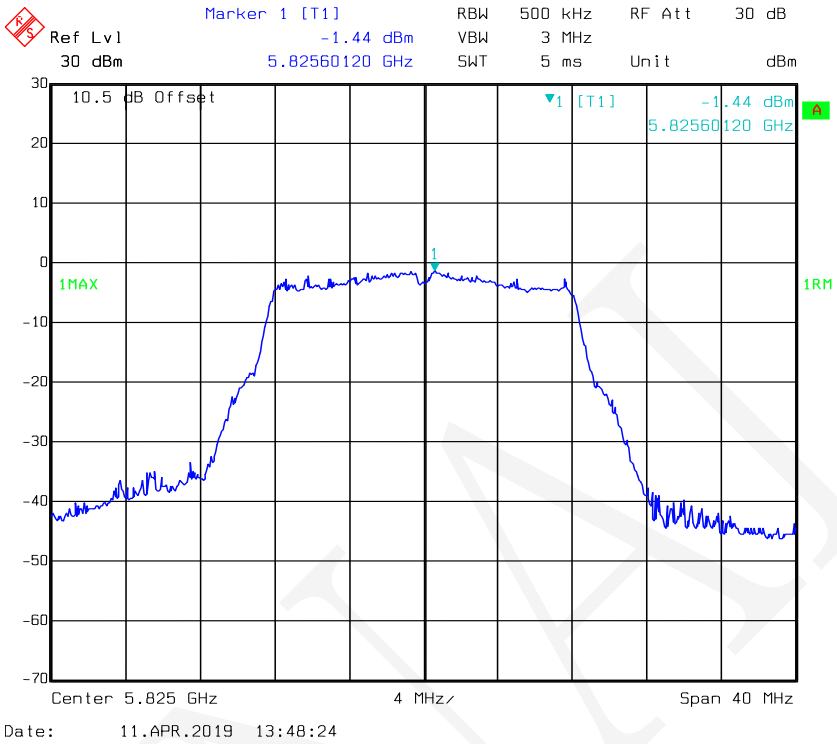
802.11a mode, Power Spectral Density-5745 MHz, Antenna 0



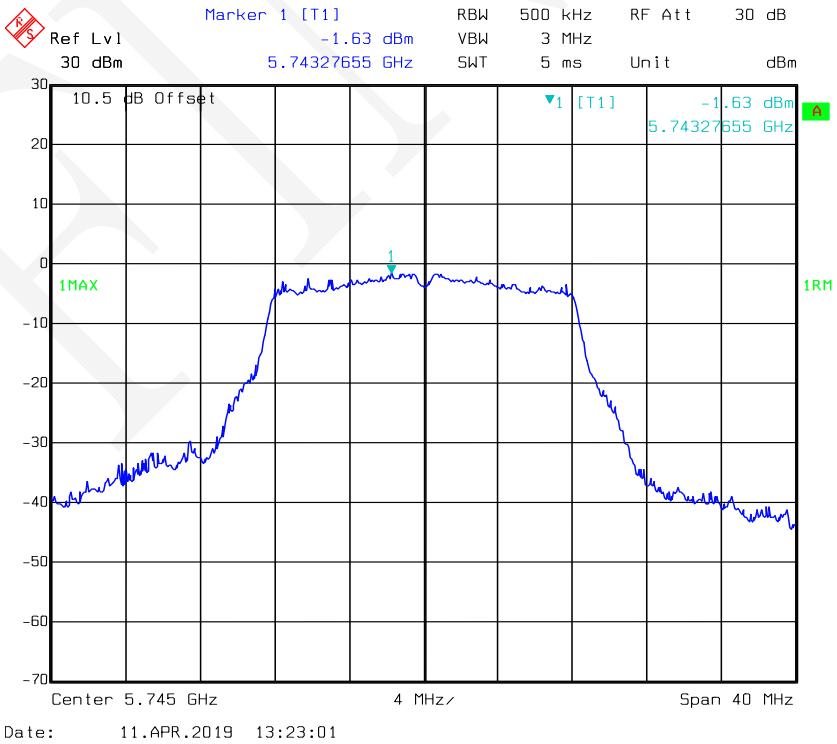
802.11a mode, Power Spectral Density-5785 MHz, Antenna 0



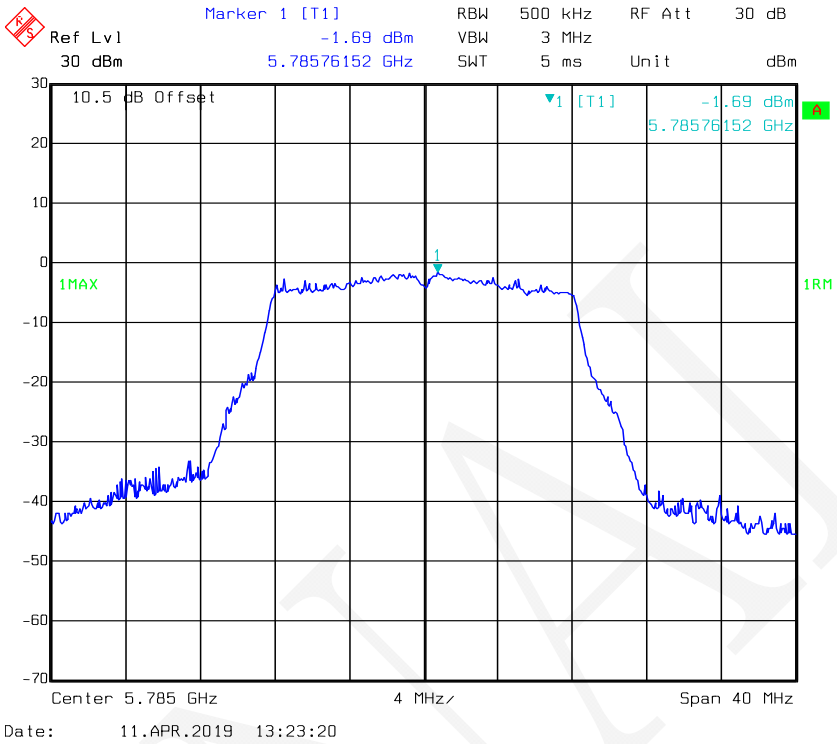
802.11a mode, Power Spectral Density-5825 MHz, Antenna 0



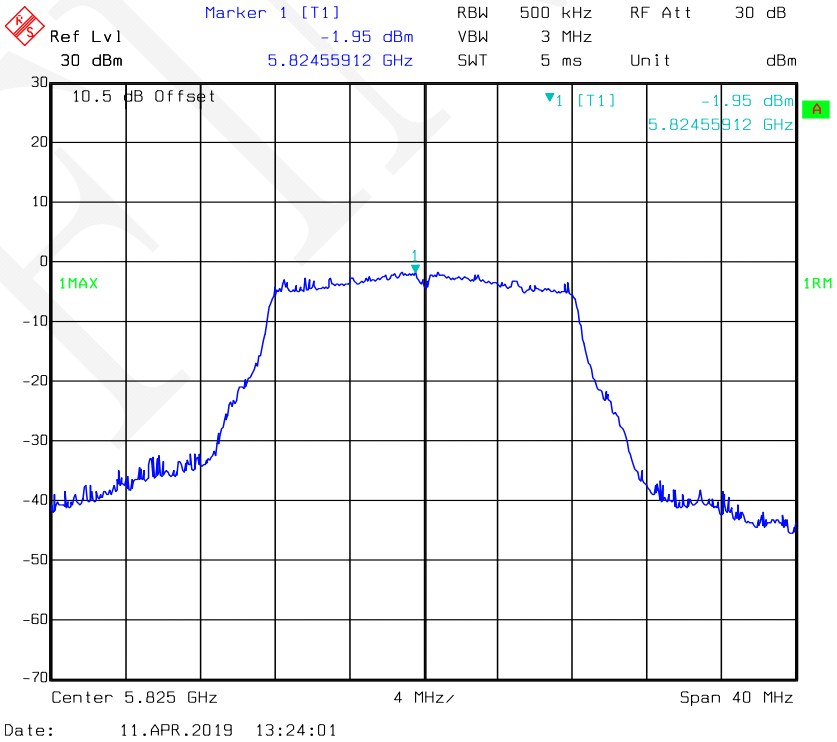
802.11a mode, Power Spectral Density-5745 MHz, Antenna 1



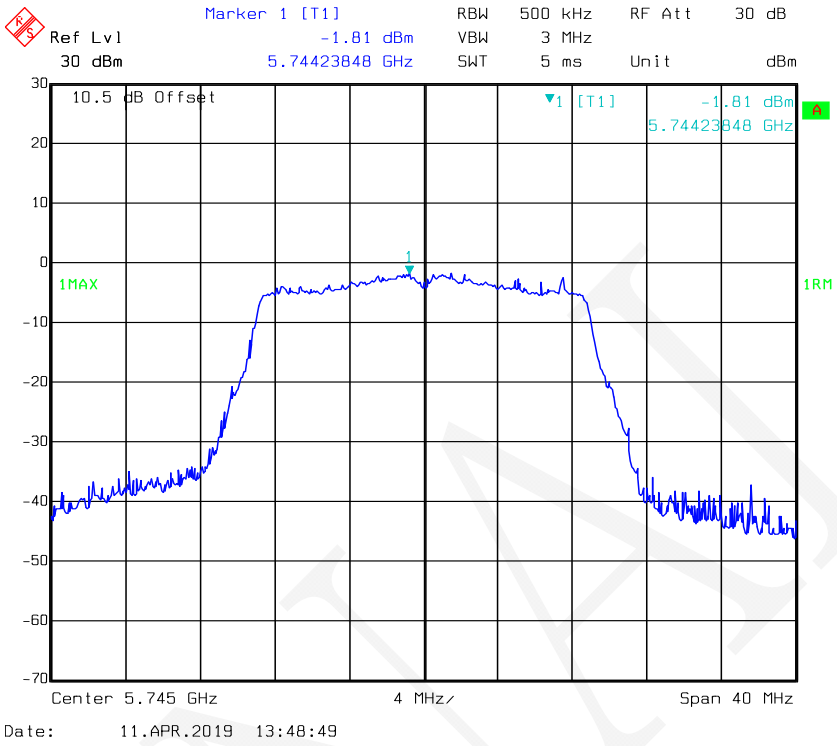
802.11a mode, Power Spectral Density-5785 MHz, Antenna 1



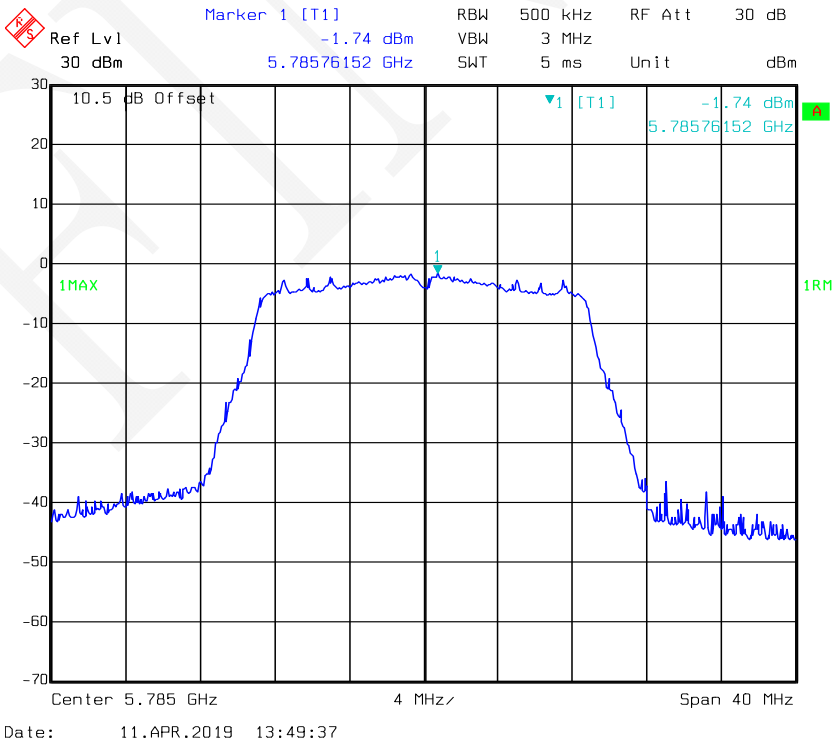
802.11a mode, Power Spectral Density-5825 MHz, Antenna 1



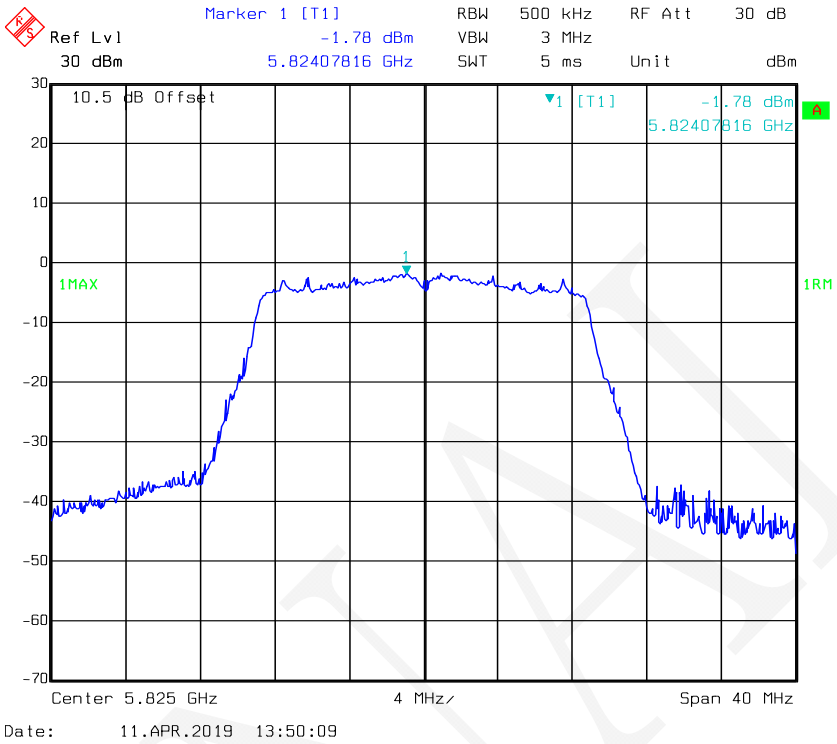
802.11n-HT20 mode, Power Spectral Density-5745 MHz, Antenna 0



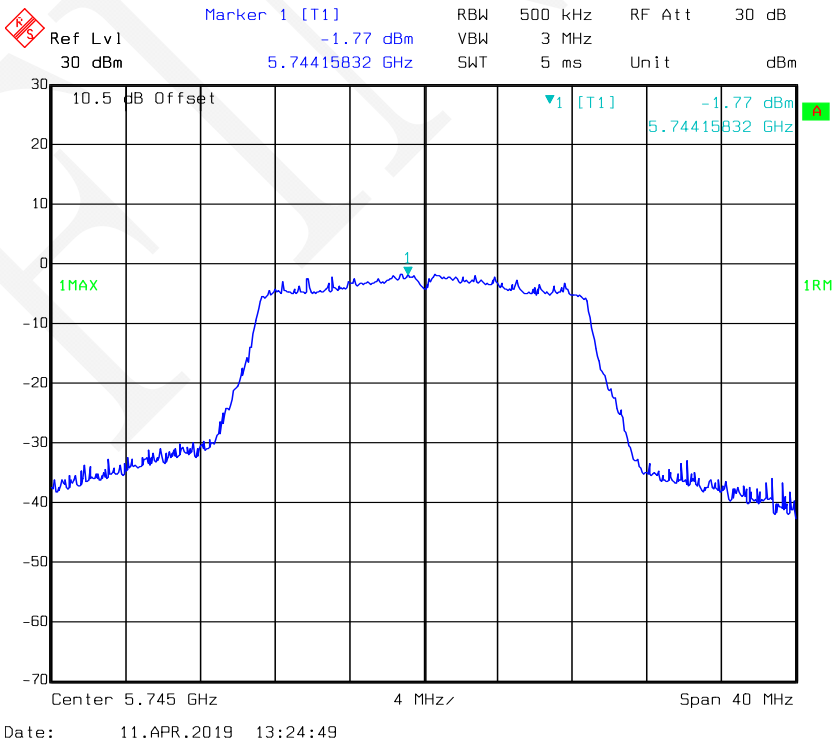
802.11n-HT20 mode, Power Spectral Density-5785 MHz, Antenna 0



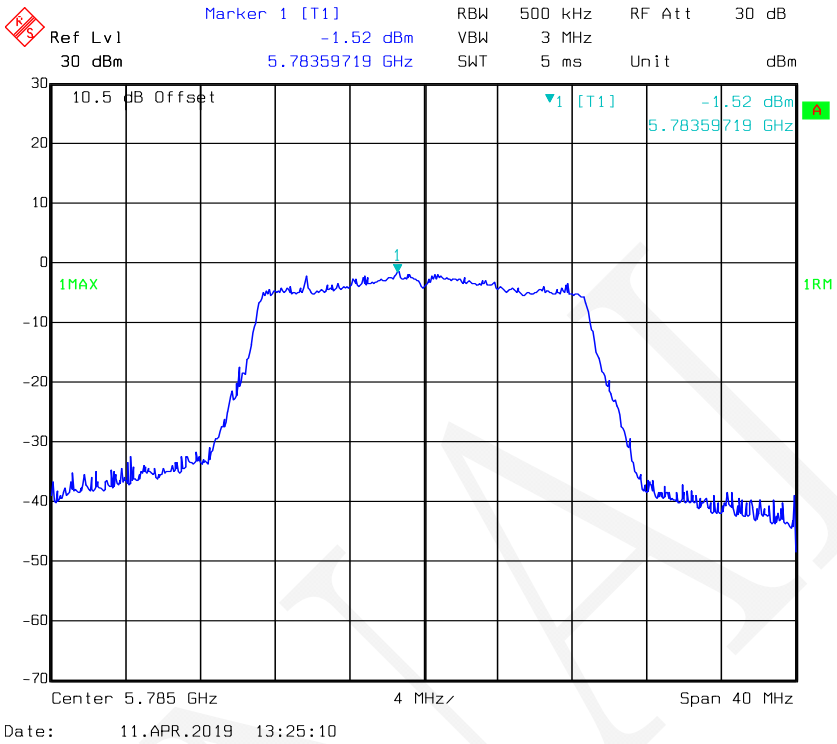
802.11n-HT20 mode, Power Spectral Density-5825 MHz, Antenna 0



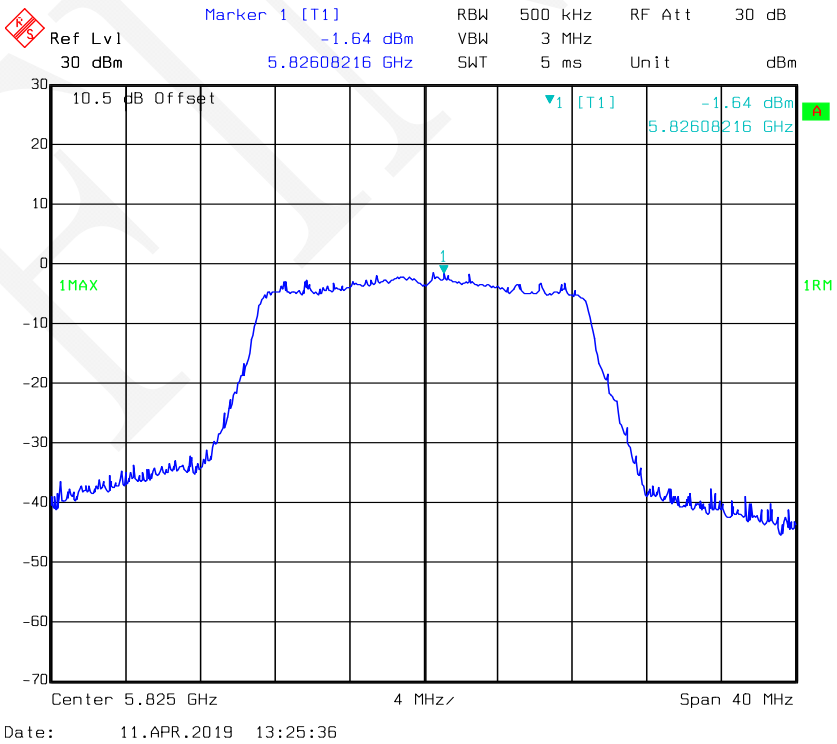
802.11n-HT20 mode, Power Spectral Density-5745 MHz, Antenna 1



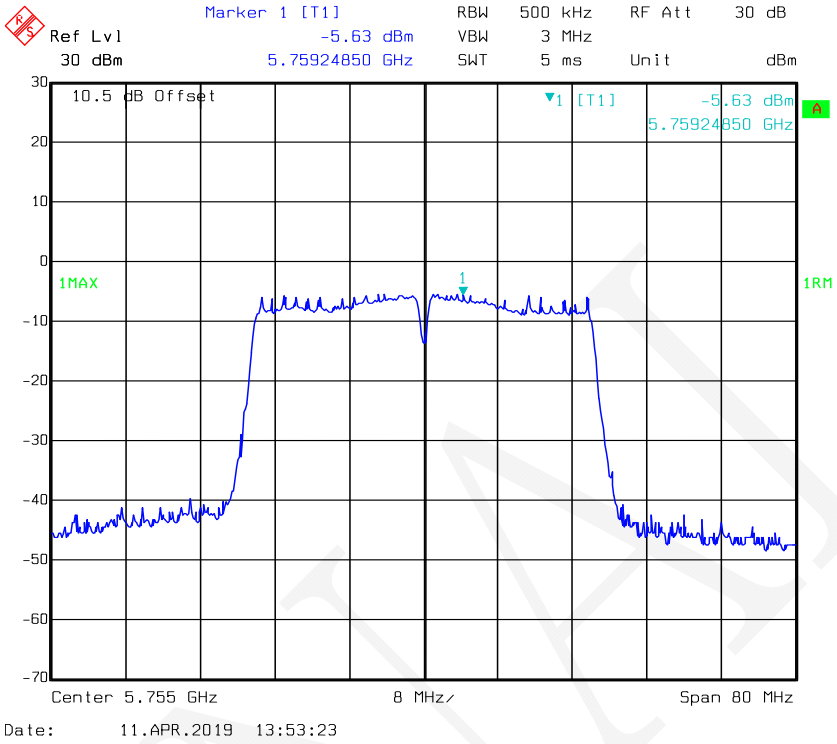
802.11n-HT20 mode, Power Spectral Density-5785 MHz, Antenna 1



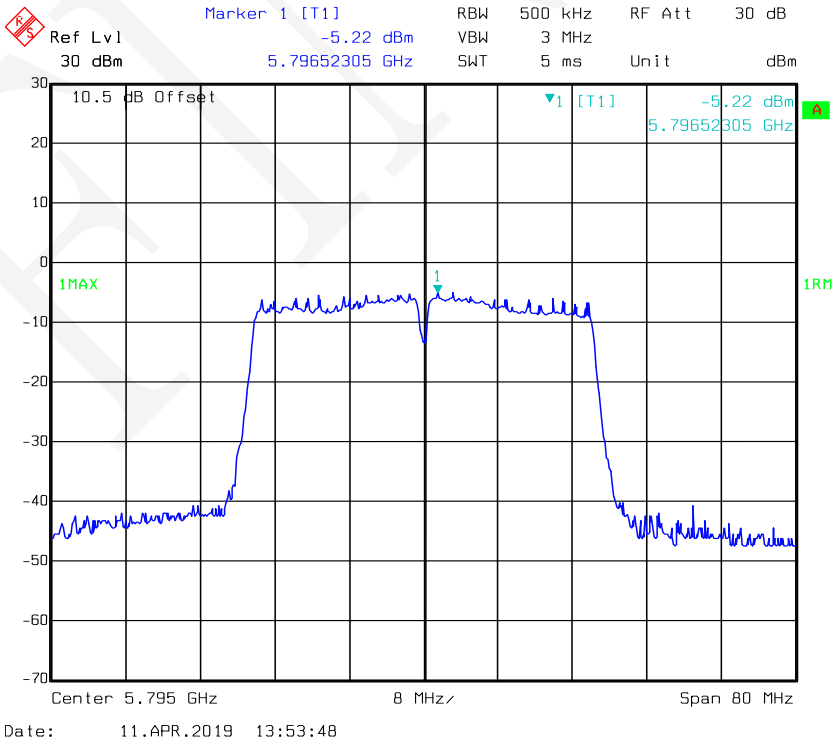
802.11n-HT20 mode, Power Spectral Density-5825 MHz, Antenna 1



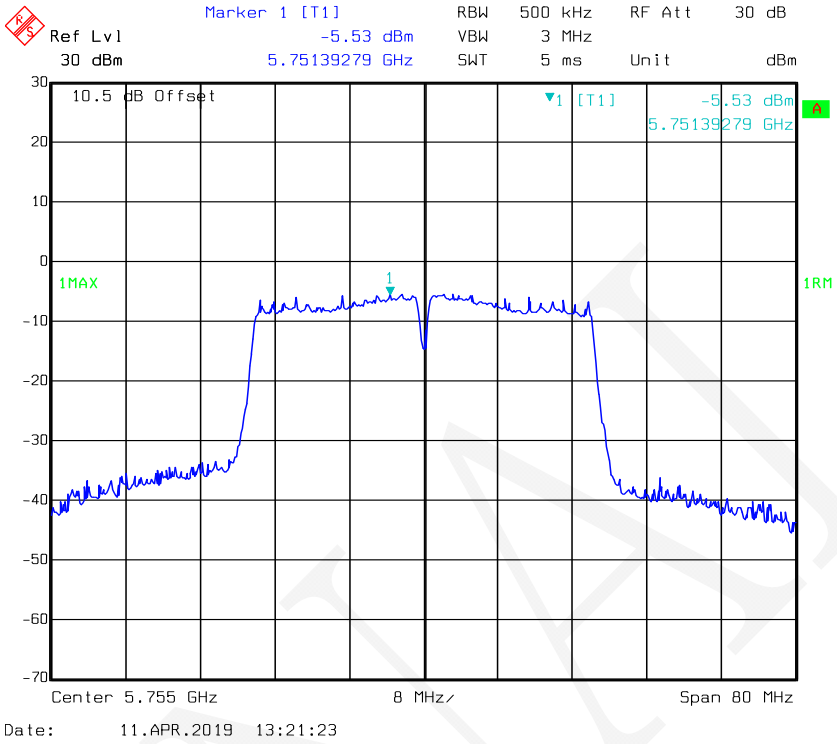
802.11n-HT40 mode, Power Spectral Density-5755 MHz, Antenna 0



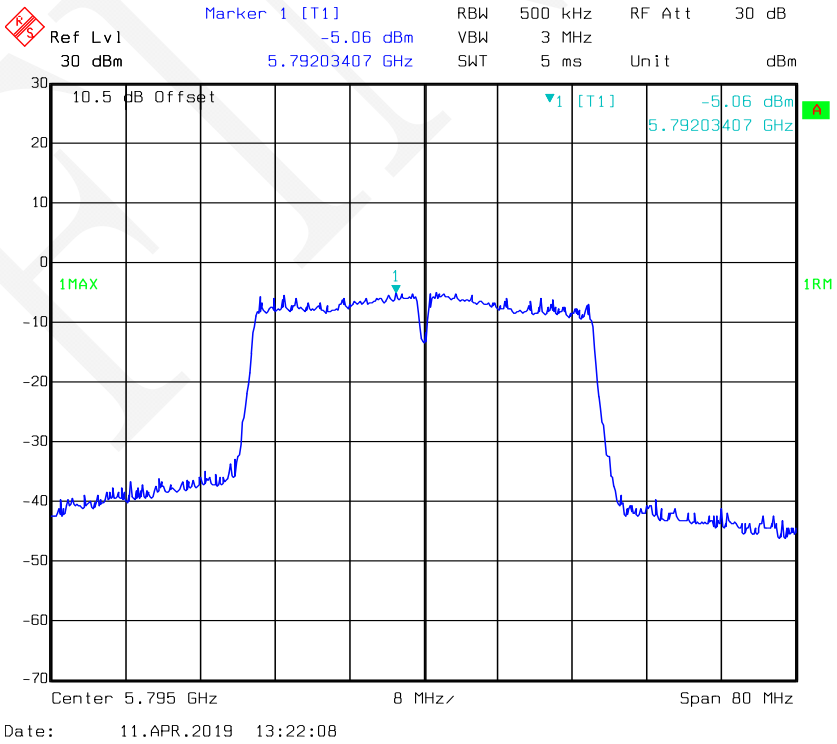
802.11n-HT40 mode, Power Spectral Density-5795 MHz, Antenna 0



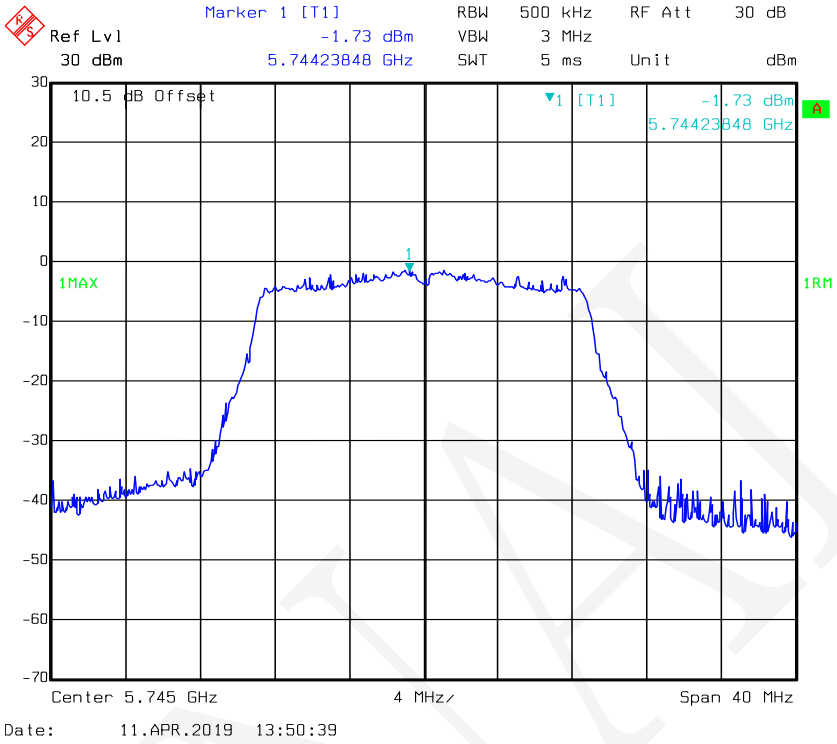
802.11n-HT40 mode, Power Spectral Density-5755 MHz, Antenna 1



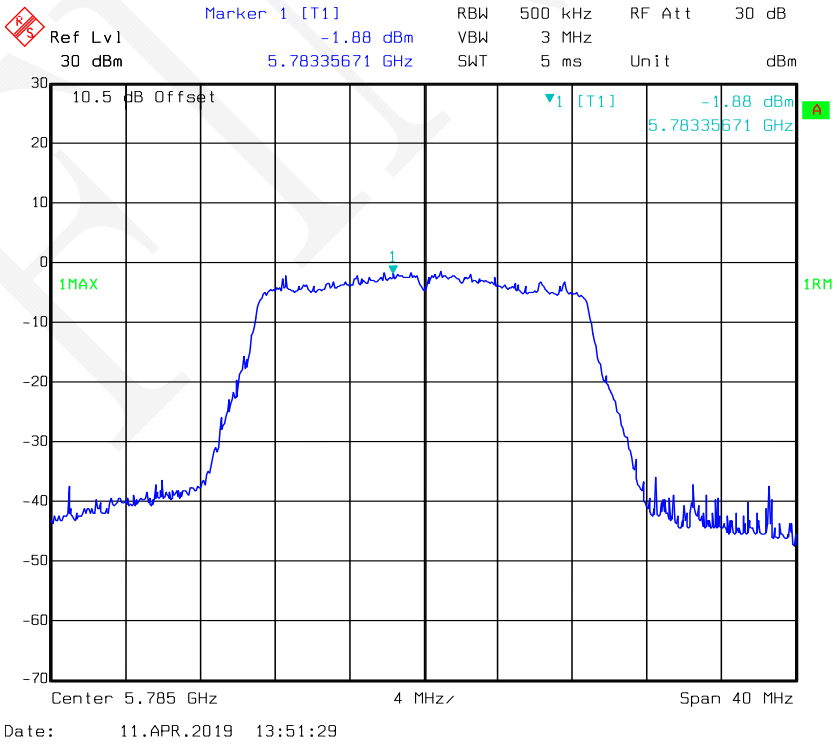
802.11n-HT40 mode, Power Spectral Density-5795 MHz, Antenna 1



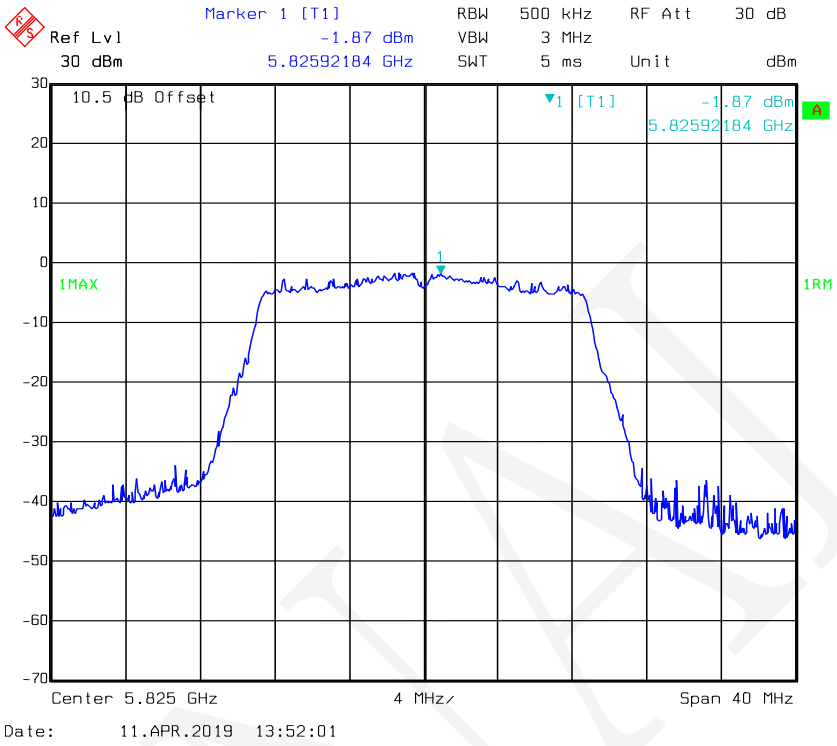
802.11ac20 mode, Power Spectral Density-5745 MHz, Antenna 0



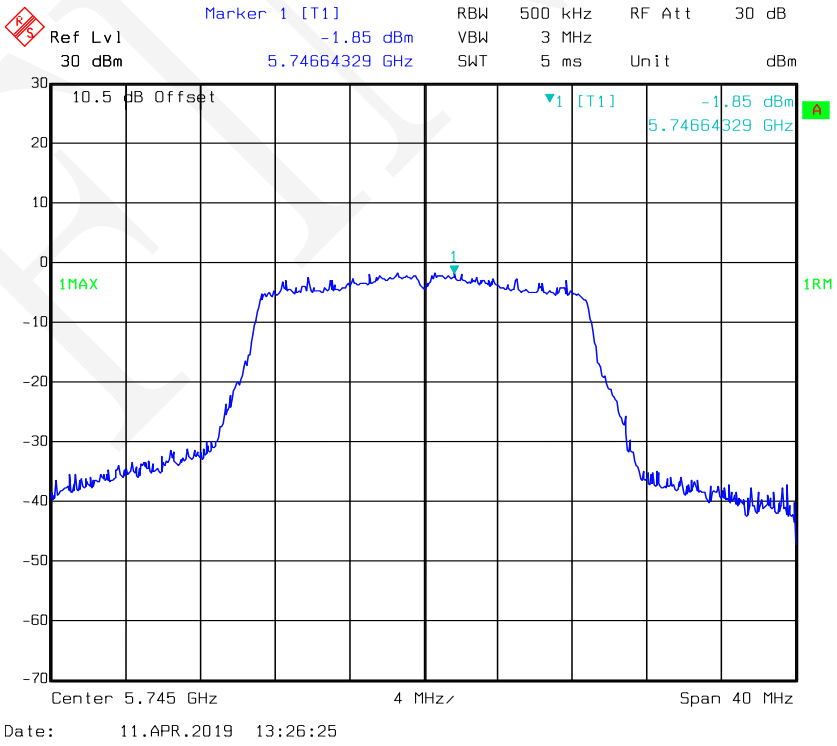
802.11ac20 mode, Power Spectral Density-5785 MHz, Antenna 0



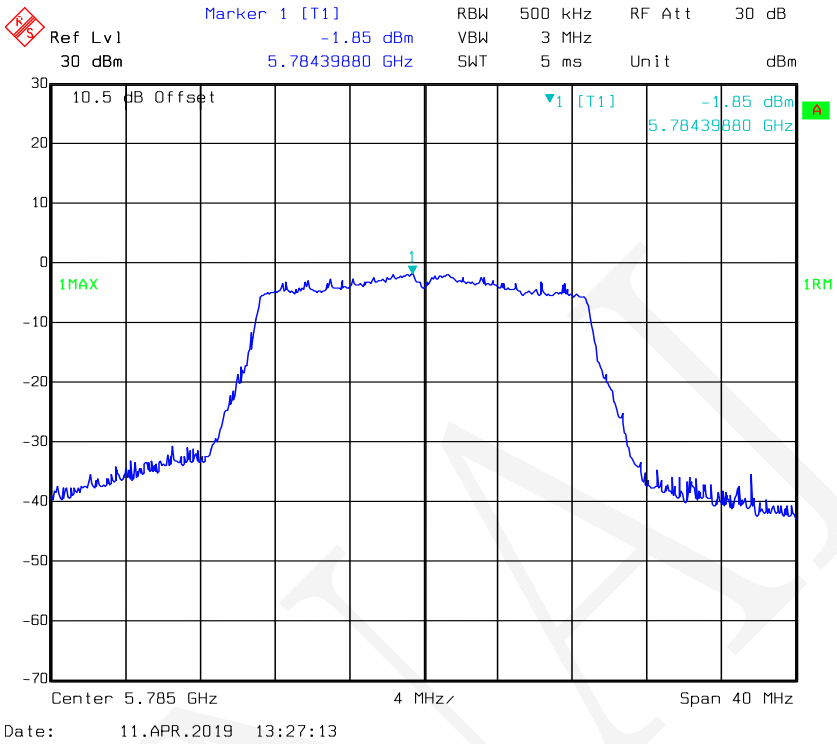
802.11ac20 mode, Power Spectral Density-5825 MHz, Antenna 0



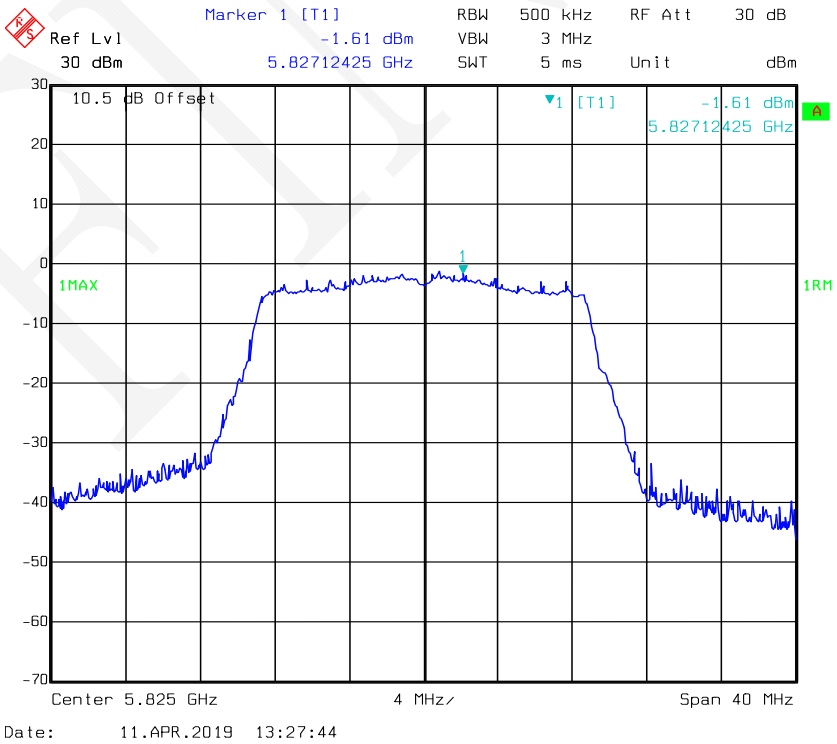
802.11ac20 mode, Power Spectral Density-5745 MHz, Antenna 1



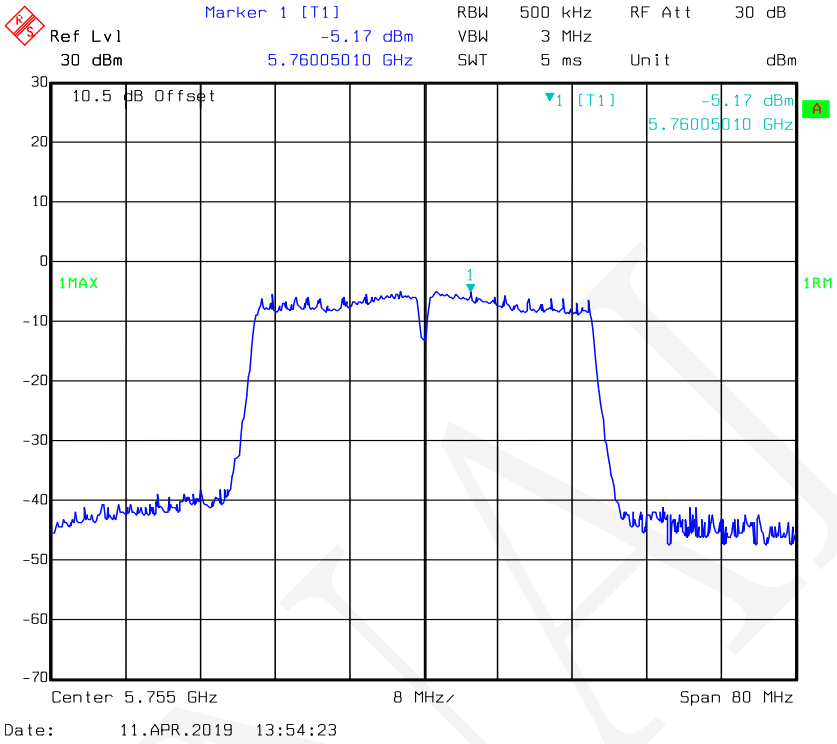
802.11ac20 mode, Power Spectral Density-5785 MHz, Antenna 1



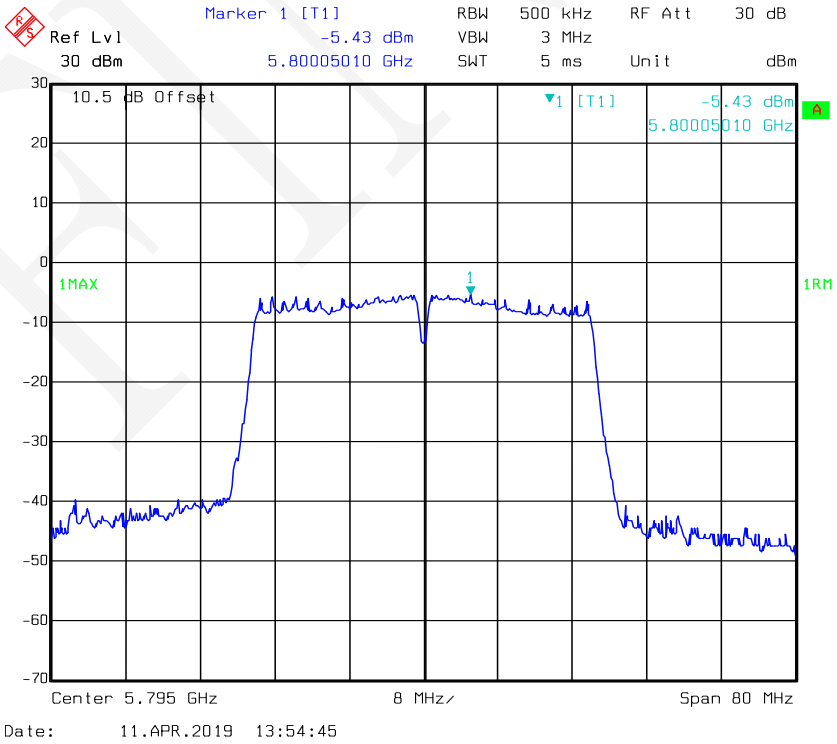
802.11ac20 mode, Power Spectral Density-5825 MHz, Antenna 1



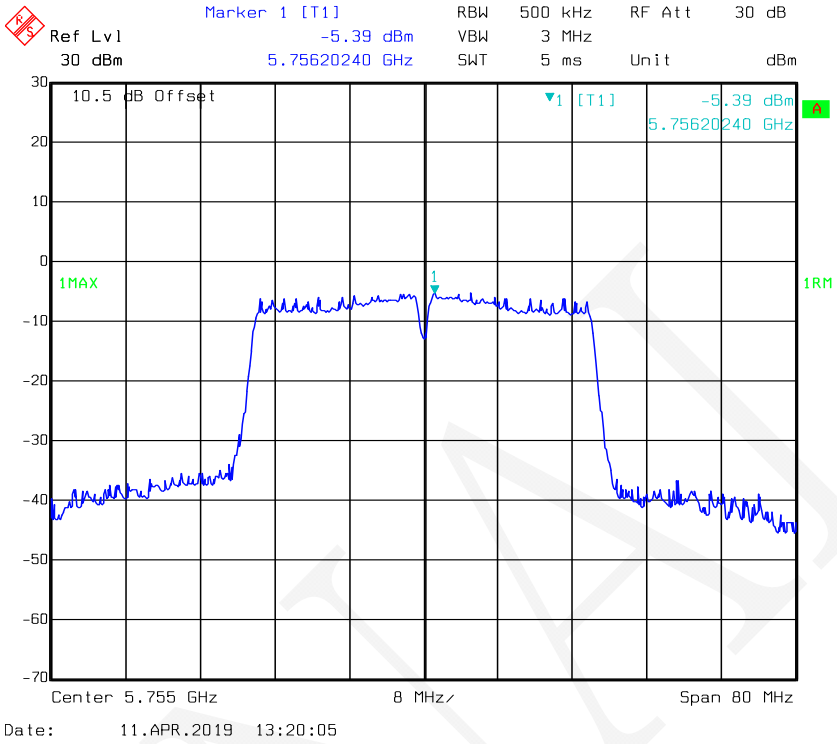
802.11ac40 mode, Power Spectral Density-5755 MHz, Antenna 0



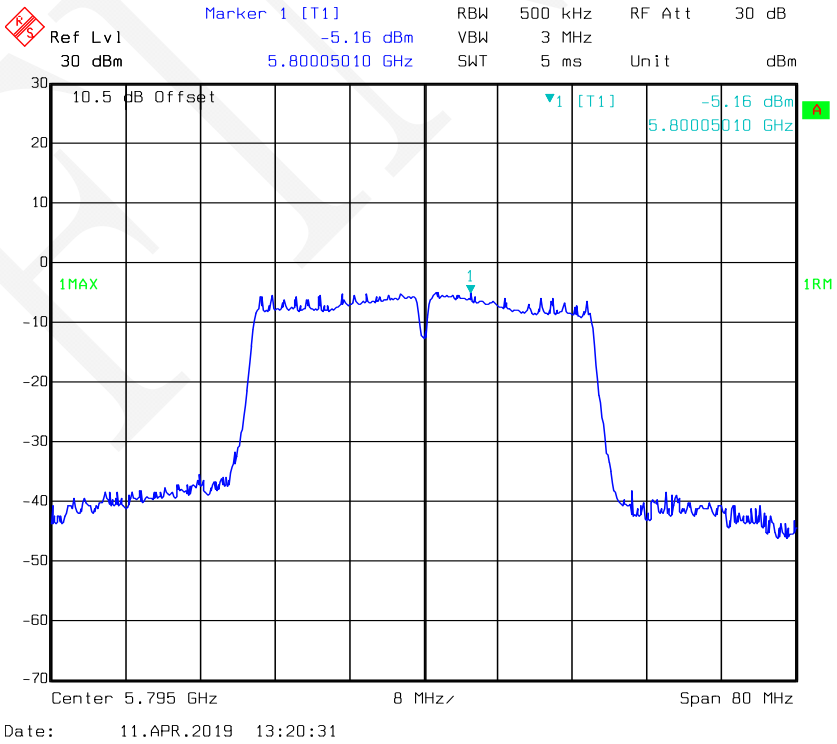
802.11ac40 mode, Power Spectral Density-5795 MHz, Antenna 0



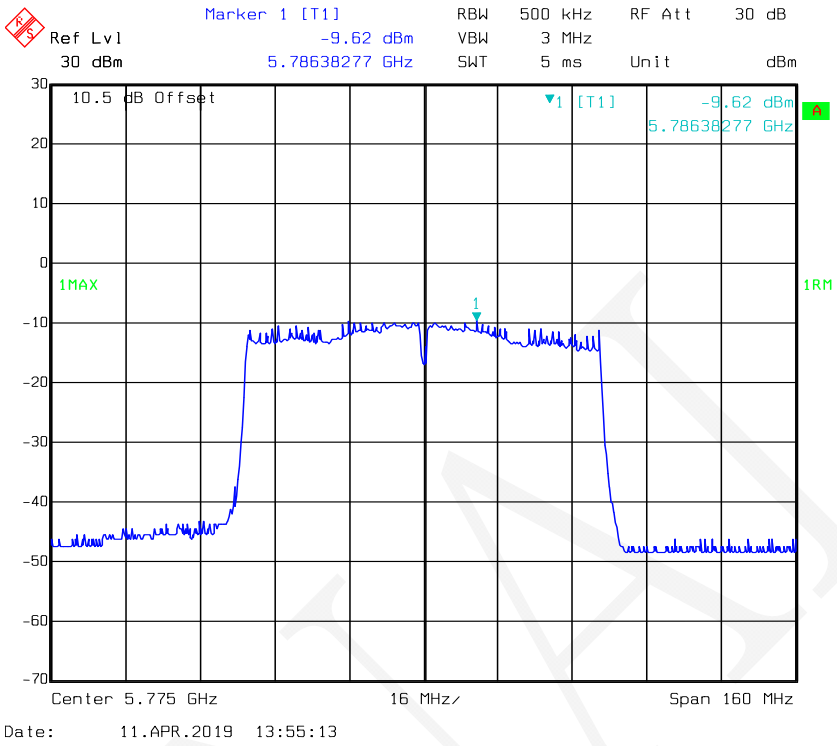
802.11ac40 mode, Power Spectral Density-5755 MHz, Antenna 1



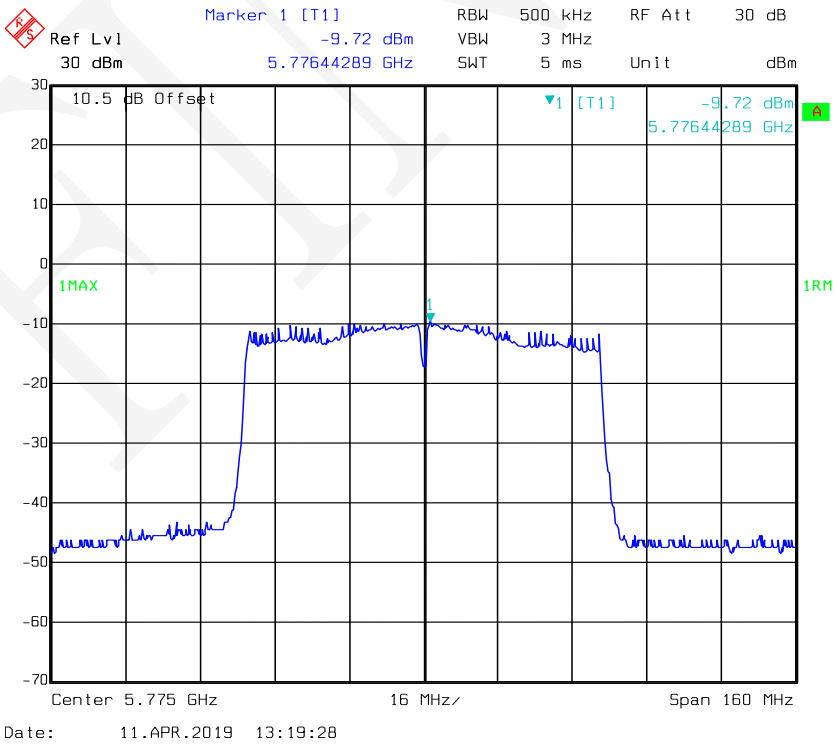
802.11ac40 mode, Power Spectral Density-5795 MHz, Antenna 1



802.11ac80 mode, Power Spectral Density-5775 MHz, Antenna 0



802.11ac80 mode, Power Spectral Density-5775 MHz, Antenna 1



END OF REPORT