




# FCC PART 15.407 TEST REPORT

For

**Chengdu XGimi Technology Co., Ltd.**

Building A4, Tianfu Software Park, Hi-tech Zone, Chengdu, China

**FCC ID: 2AFENXH05L**

<b>Report Type:</b> Original Report	<b>Product Name:</b> LED Projector
<b>Report Number:</b>	RSC180413001-0E
<b>Report Date:</b>	2018-05-24
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**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).

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## GENERAL INFORMATION

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### Product Description for Equipment under Test (EUT)

The **Chengdu XGimi Technology Co., Ltd.**'s product, model number: **XH05L** (FCC ID: 2AFENXH05L) or the "EUT" as referred to in this report was the **LED Projector**.

### Mechanical Description of EUT

The EUT was measured approximately: 192 mm (L) x 192 mm (W) x 47 mm (H).  
Rated input voltage: DC19V from adapter.

#### Adapter Information

Manufacturer: Shenzhen Huntkey Electric Co., Ltd.

Model: HKA06519034-6J

Input: AC 100-240V; 50/60Hz, 1.5A

Output: DC 19V, 3.42A

*Note: The products, test model: XH05L, multiple models: XH06L, XH07L, XH08L, XH09L, XH10L, XH11L, XH12L, XH13L, XH14L, XH15L, XH16L, XH17L, XH18L, XH19L, XH20L, XH21L, XH22L, XH23L, XH24L, XH25L, XH26L, XH27L, XH28L, XH29L, XH30L, XH31L, XH32L, XH33L, XH34L, their differences were presented in Product Difference Statement provided by the applicant. So we selected model XH05L to fully test.*

*\*All measurement and test data in this report was gathered from final production sample, serial number: 180413001/01 (assigned by the BACL, Chengdu). It may have deviation from any other sample. The EUT supplied by the applicant was received on 2018-04-13, and EUT conformed to test requirement.*

### Objective

This type approval report is prepared on behalf of **Chengdu XGimi Technology Co., Ltd.** 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 15.247 DSS submissions with FCC ID: 2AFENXH05L

FCC Part 15.247 DTS submissions with FCC ID: 2AFENXH05L

FCC Part 15.247 DTS submissions with FCC ID: 2AFENB914C

## Measurement Uncertainty

Item			Uncertainty
AC power line conducted emission			2.71 dB
Radiated Emission(Field Strength)	30MHz-200MHz	H	4.57 dB
		V	4.81 dB
	200MHz-1GHz	H	5.69 dB
		V	6.07 dB
	1GHz-6GHz		5.49 dB
	6GHz-18GHz		5.57 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℃

## 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.

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

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

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

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

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 ac80: 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 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.

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

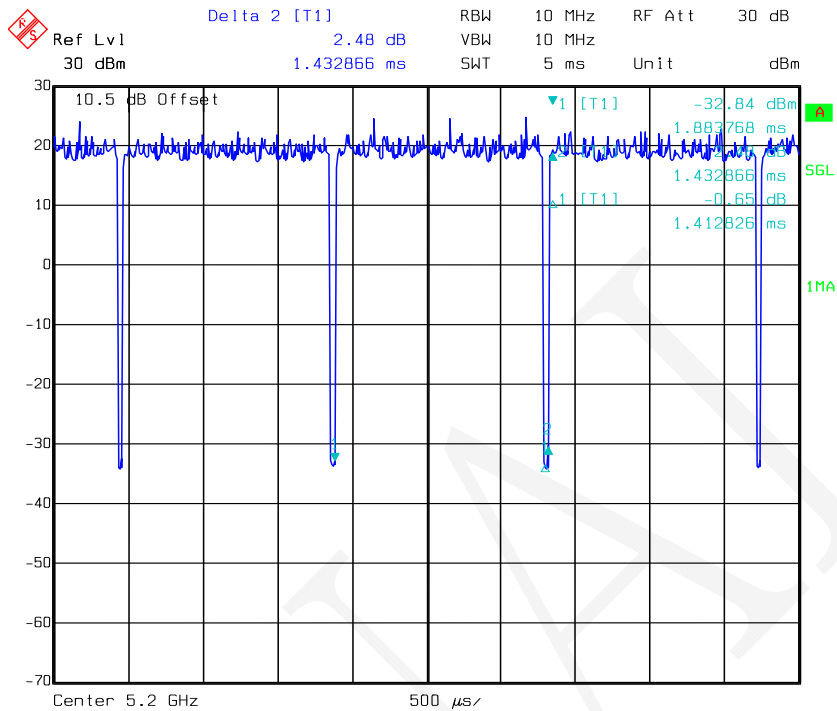
The software “QA Tool” was used for testing, which was provided by manufacturer. The maximum power with maximum duty cycle was set as below:

Software				QA 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	1B	1D
		Middle	5200	6	6	1B	1D
		High	5240	6	6	1B	1D
	802.11n-HT20	Low	5180	MCS0	MCS0	16	18
		Middle	5200	MCS0	MCS0	16	18
		High	5240	MCS0	MCS0	16	18
	802.11n-HT40	Low	5190	MCS0	MCS0	15	16
		High	5230	MCS0	MCS0	15	16
	802.11ac20	Low	5180	MCS0	MCS0	16	17
		Middle	5200	MCS0	MCS0	16	17
		High	5240	MCS0	MCS0	16	17
	802.11ac40	Low	5190	MCS0	MCS0	17	17
		High	5230	MCS0	MCS0	17	17
	802.11ac80	Middle	5210	MCS0	MCS0	16	16
5725-5850MHz	802.11a	Low	5745	6	6	1B	1B
		Middle	5785	6	6	1B	1B
		High	5825	6	6	1B	1B
	802.11n-HT20	Low	5745	MCS0	MCS0	17	17
		Middle	5785	MCS0	MCS0	17	17
		High	5825	MCS0	MCS0	17	17
	802.11n-HT40	Low	5755	MCS0	MCS0	16	16
		High	5795	MCS0	MCS0	16	16
	802.11ac20	Low	5745	MCS0	MCS0	17	17
		Middle	5785	MCS0	MCS0	17	17
		High	5825	MCS0	MCS0	17	17
	802.11ac40	Low	5755	MCS0	MCS0	18	18
		High	5795	MCS0	MCS0	18	18
	802.11ac80	Middle	5775	MCS0	MCS0	18	18

Duty Cycle information is below:

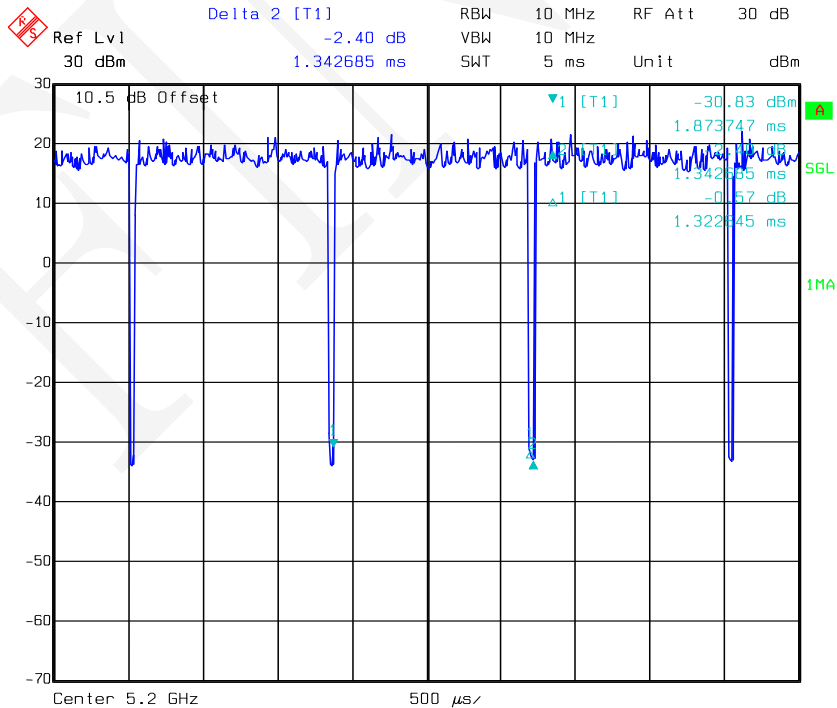
Mode	Ton(ms)	Ton+Toff(ms)	Duty cycle(%)	Duty cycle (dB)
a	1.41	1.43	98.60	0.06
n20	1.32	1.34	98.51	0.07
n40	0.67	0.68	98.53	0.06
ac20	0.69	0.72	95.83	0.18
ac40	0.36	0.39	92.31	0.35
ac80	0.19	0.22	86.36	0.64

### 802.11a



Date: 25.APR.2018 18:52:01

### 802.11n- HT20

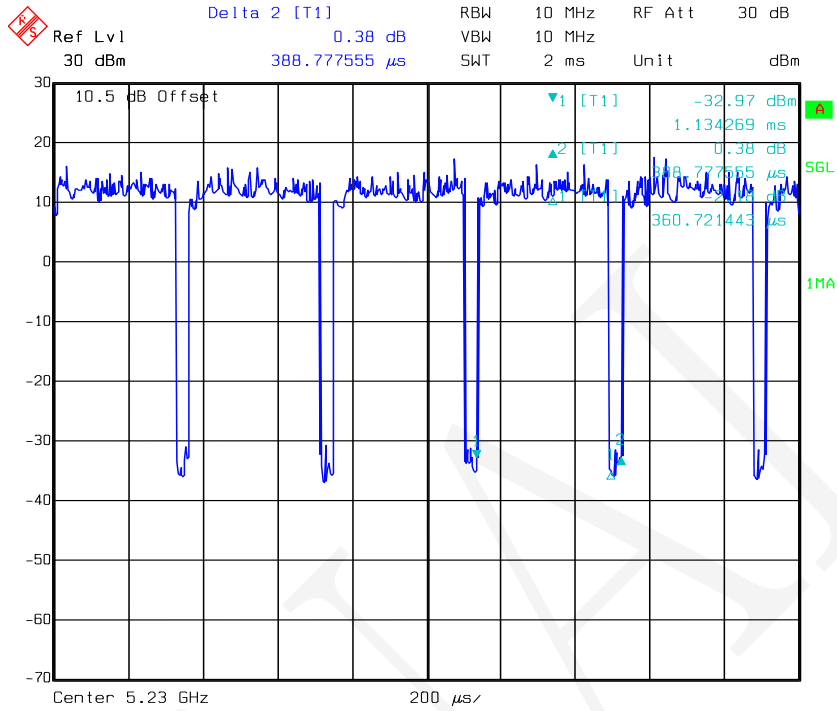


Date: 25.APR.2018 18:53:23



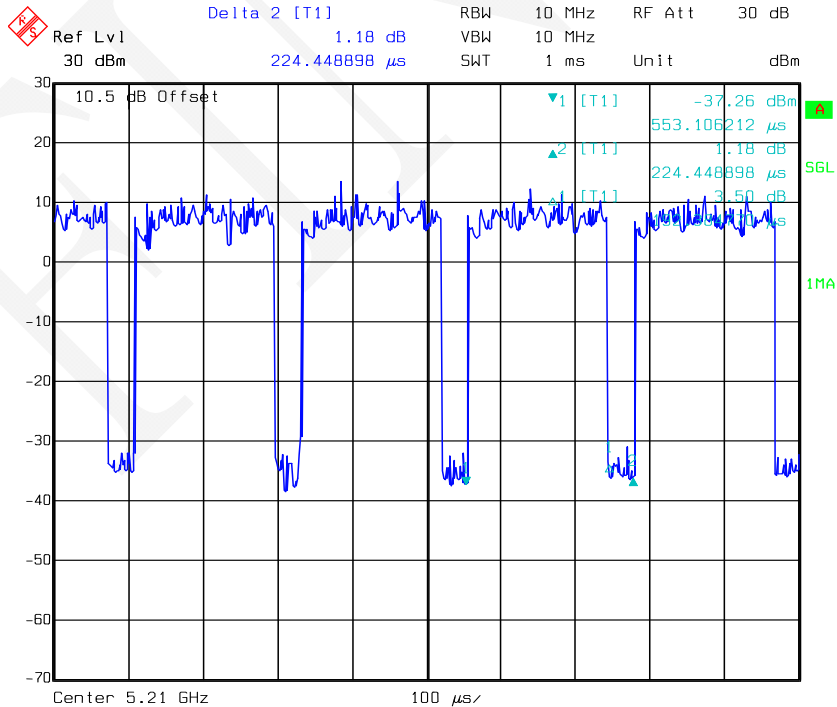


### 802.11ac40



Date: 25.APR.2018 18:27:54

### 802.11ac80



Date: 25.APR.2018 18:34:47

## Support Equipment List and Details

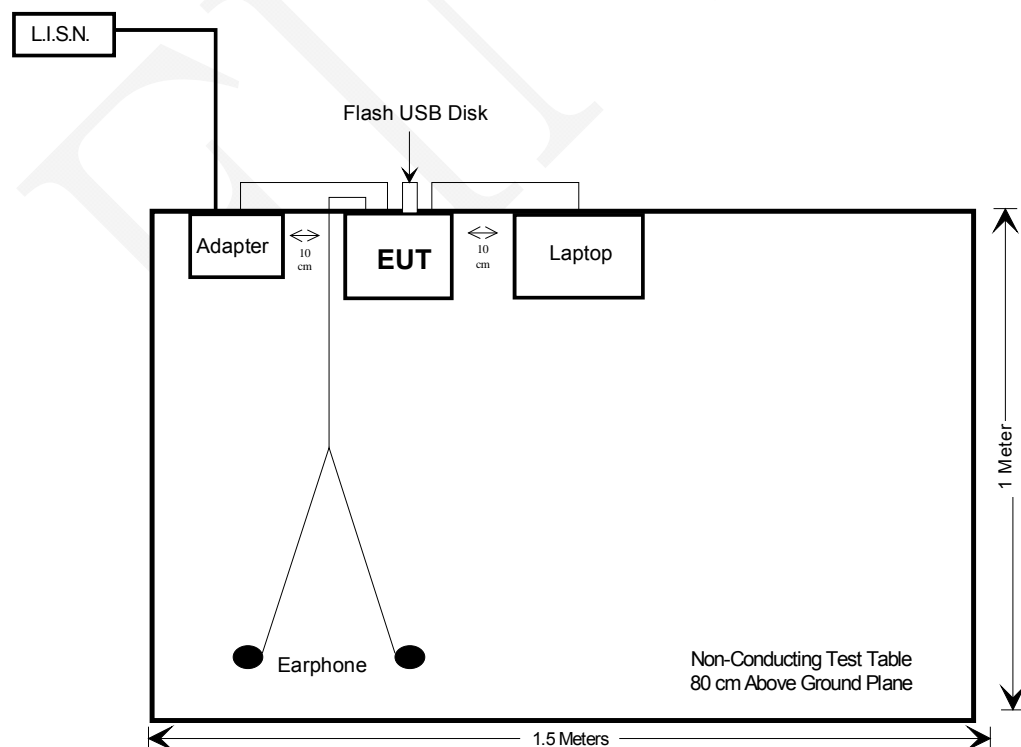
Manufacturer	Description	Model	Serial Number
SONY	Laptop	SVF143A1QT	None
Kingston	Flash USB Disk	DTSE9	7869951
HUAWEI	Earphone	P9	None

## External I/O Cable

Cable Description	Length (m)	From / Port	To
Unshielded Power Cable	1.2	Adapter	EUT
Shielded detachable HDMI Cable with Ferrite Core	1.8	EUT /HDMI port	Laptop
Unshielded Earphone Cable	1.0	EUT/ Earphone	Earphone

## Block Diagram of Test Setup

Conducted Emissions



## SUMMARY OF TEST RESULTS

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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	Compliance
§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

## TEST EQUIPMENTS LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emission					
Rohde & Schwarz	EMI Test Receiver	ESCS 30	836858/0016	2017-12-02	2018-12-01
Rohde & Schwarz	L.I.S.N.	ENV216	100018	2017-05-20	2018-05-19
Rohde & Schwarz	RF Limiter	ESH3Z2	DE14781	2017-11-10	2018-11-09
N/A	Conducted Cable	L-E003	N/A	2017-11-10	2018-11-09
Rohde & Schwarz	EMC32	N/A	V 8.52.0	N/A	N/A
Radiated Emission					
EMCT	Semi-Anechoic Chamber	966	N/A	2017-05-18	2020-05-17
Sonoma	Pre-Amplifier	310N	186684	2017-08-18	2018-08-17
Rohde & Schwarz	EMI Test Receiver	ESIB 40	100215	2017-09-12	2018-09-11
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2017-05-20	2018-05-19
A.H. Systems, Inc	Amplifier	PAM-0118P	467	2017-08-10	2018-08-09
EM Electronics	RF Pre-Amplifier	EM18G40	060725	2018-03-28	2019-03-27
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	2017-11-10	2018-11-09
Sinoscite.,Co Ltd	Reject Band Filter	BSF5150-5850MN	0899V2	2017-11-10	2018-11-09
N/A	RF Cable (below 1GHz)	L-E005	N/A	2017-11-10	2018-11-09
N/A	RF Cable (below 1GHz)	T-E128	N/A	2017-11-10	2018-11-09
N/A	RF Cable (below 1GHz)	T-E129	N/A	2017-11-10	2018-11-09
N/A	RF Cable (above 1GHz)	T-E069	N/A	2017-11-10	2018-11-09
Micro-coax	RF Cable (above 1GHz)	T-E209	MFR 64639 2310	2018-03-14	2019-03-13
Rohde & Schwarz	EMC32	N/A	V 8.52.0	N/A	N/A

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2017-05-18	2018-05-17
WEINSCHTEL ENGINEERING	Attenuator	1A10dB	AA4135	2017-11-10	2018-11-09
Agilent	USB Wideband Power Sensor	U2021XA	MY53320008	2018-01-19	2019-01-18
E-Microwave	DC Block	EMDCB-00036	OE01304225	2017-12-09	2018-12-08
N/A	RF Cable	N/A	N/A	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 <sup>2</sup> )	Averaging Time (minutes)
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f <sup>2</sup> )	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<sup>2</sup>);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

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

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

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

**Calculated Data:**

**MPE evaluation for single transmission:**

Mode	Frequency Range (MHz)	Antenna Gain		Tune-up Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )
		(dBi)	(numeric)	(dBm)	(mW)			
WLAN	2412-2462	3.52	2.25	16.50	44.67	20	0.020	1.00
	5150-5250	5.50	3.55	16.00	39.81	20	0.028	1.00
	5725-5850	5.50	3.55	16.00	39.81	20	0.028	1.00
BT3.0	2402-2480	1.36	1.37	4.50	2.82	20	0.001	1.00
BLE	2402-2480	1.36	1.37	3.00	2.00	20	0.001	1.00

**Note:** The Wi-Fi(2.4G) or Wi-Fi(5G) and Bluetooth can transmit simultaneously.

**MPE evaluation for simultaneous transmission:**

Wi-Fi(2.4G) or Wi-Fi(5G) and Bluetooth can transmit at the same time, MPE evaluation is as below formula:

$PD1/Limit1 + PD2/Limit2 + \dots < 1$ , PD (Power Density)

**MPE evaluation:**

5 G(Wi-Fi) and Bluetooth:

Max MPE of 5G(Wi-Fi) + Max MPE of Bluetooth =  $0.028/1 + 0.001/1 = 0.029 < 1.0$

**Result:** MPE evaluation of single transmission meets 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 used three built in FPC antennas, two of them for Wi-Fi, another for Bluetooth, which connected to the main board with IPEX socket, fulfill the requirement of this section. Please refer to the EUT internal photos and the below table for detail.

#### Antenna Information

Antenna Model Number	Manufacturer	Band	Antenna Gain
Antenna 0 AG-041533-1427	ZHONGSHAN B&T TECHNOLOGY Co.,Ltd	Wi-Fi 2.4GHz	3.52 dBi
		Wi-Fi 5GHz	5.50 dBi
Antenna 1 AG-041533-1428	ZHONGSHAN B&T TECHNOLOGY Co.,Ltd	Wi-Fi 2.4GHz	1.77 dBi
		Wi-Fi 5GHz	5.12 dBi
AG-041333-1429	ZHONGSHAN B&T TECHNOLOGY Co.,Ltd	Bluetooth	1.36 dBi

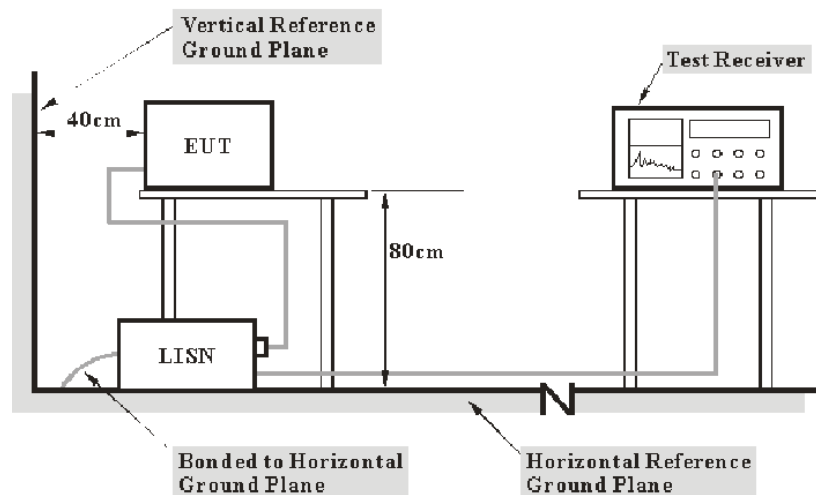
**Result:** Compliance.

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

### Applicable Standard

FCC §15.207, §15.407(b) (6)

### EUT Setup



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

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

The spacing between the peripherals was 10 cm.

The adapter was connected to AC 120V/60Hz power source.

### EMI Test Receiver Setup

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

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

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

## Corrected Amplitude & Margin Calculation

The basic equation is as follows:

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

Herein,

$V_C$  (cord. Reading): corrected voltage amplitude

$V_R$ : reading voltage amplitude

$A_C$ : attenuation caused by cable loss

VDF: voltage division factor of AMN

$C_f$ : Correction Factor

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

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

## Test Procedure

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

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

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

## Test Results Summary

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

## Test Data

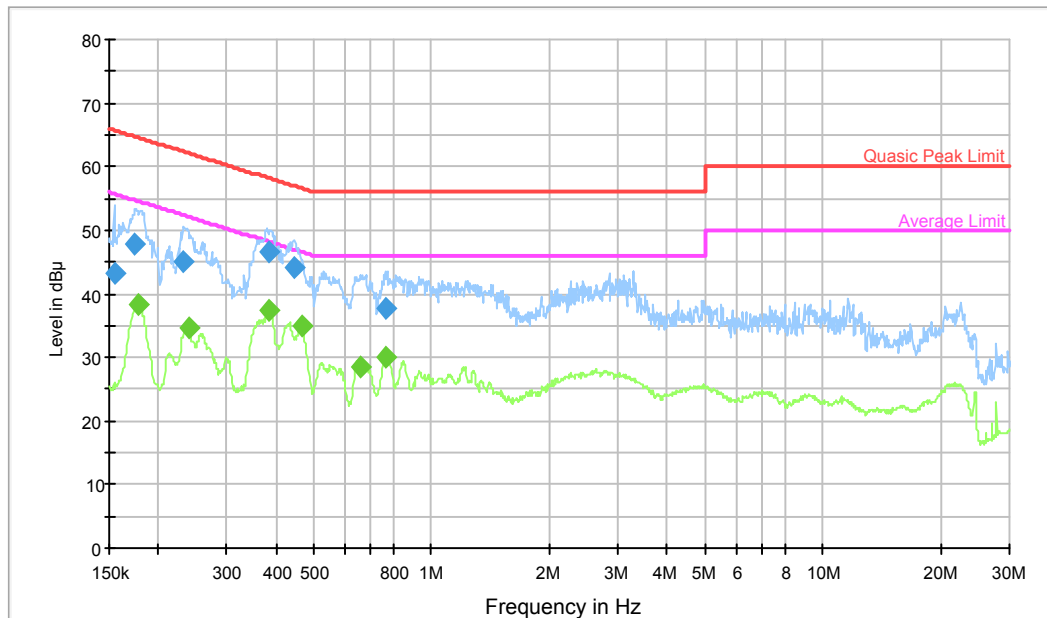
### Environmental Conditions

Temperature:	25 °C
Relative Humidity:	50 %
ATM Pressure:	95.6 kPa

*The testing was performed by Tom Tang on 2018-04-18.*

Test Mode: Transmitting (5725-5850MHz band: 802.11ac40-high channel)-worst case

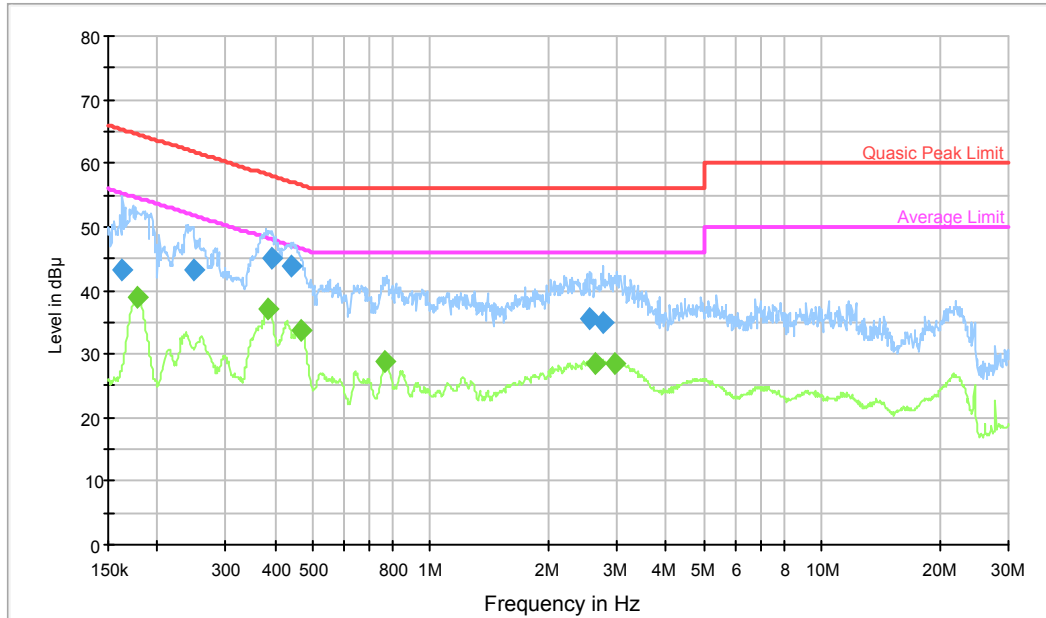
### AC120V/60Hz, Line



Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corrected Factor (dB)	Margin (dB)	Limit (dBμV)
0.154868	43.1	9.000	L1	19.7	22.6	65.7
0.174571	47.8	9.000	L1	19.6	16.9	64.7
0.232702	45.1	9.000	L1	19.7	17.3	62.4
0.384811	46.4	9.000	L1	19.7	11.8	58.2
0.447846	44.0	9.000	L1	19.7	12.9	56.9
0.761575	37.8	9.000	L1	19.6	18.2	56.0

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corrected Factor (dB)	Margin (dB)	Limit (dBμV)
0.177381	38.4	9.000	L1	19.6	16.2	54.6
0.239296	34.8	9.000	L1	19.7	17.2	52.1
0.384811	37.5	9.000	L1	19.7	10.7	48.2
0.464229	34.8	9.000	L1	19.7	11.8	46.6
0.657000	28.6	9.000	L1	19.7	17.4	46.0
0.764621	29.9	9.000	L1	19.6	16.1	46.0

# AC120V/60Hz, Neutral



Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corrected Factor (dB)	Margin (dB)	Limit (dBμV)
0.163117	43.3	9.000	N	19.7	22.0	65.3
0.247062	43.2	9.000	N	19.8	18.7	61.9
0.394140	45.2	9.000	N	19.8	12.8	58.0
0.438996	44.0	9.000	N	19.8	13.1	57.1
2.563075	35.5	9.000	N	19.8	20.5	56.0
2.765043	35.0	9.000	N	19.8	21.0	56.0

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corrected Factor (dB)	Margin (dB)	Limit (dBμV)
0.178091	38.8	9.000	N	19.7	15.8	54.6
0.384811	37.1	9.000	N	19.8	11.1	48.2
0.464229	33.8	9.000	N	19.8	12.8	46.6
0.764621	28.9	9.000	N	19.7	17.1	46.0
2.625207	28.6	9.000	N	19.8	17.4	46.0
2.971042	28.5	9.000	N	19.9	17.5	46.0

Note:

- 1) Corrected Amplitude = Reading + Correction Factor
- 2) Correction Factor = LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter
- 3) Margin = Limit – Corrected Amplitude

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

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### **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.

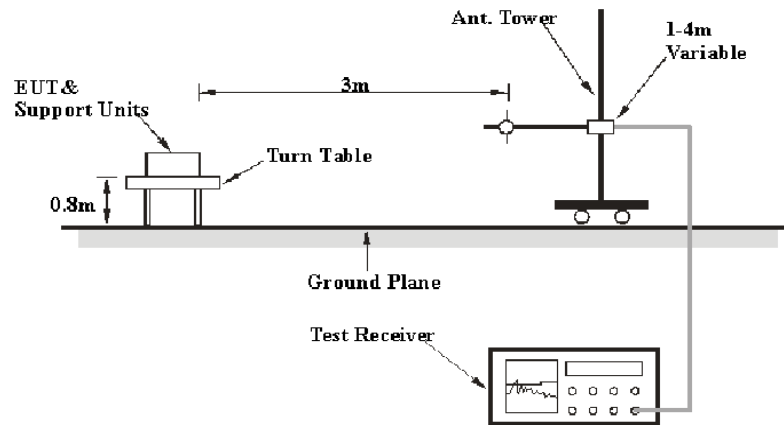
According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, emission shall be computed as:

$E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] + 95.2$ , for  $d = 3$  meters.

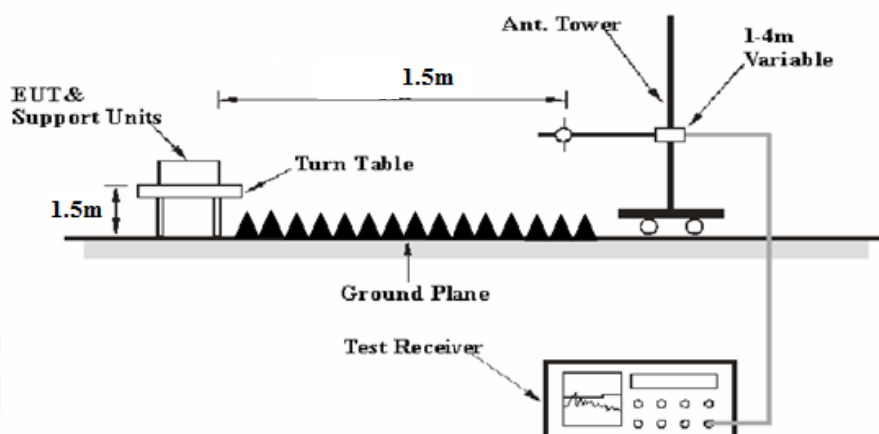
- 1) For 75 MHz above or below the band edge, a level of -27 dBm/MHz (68.2dB $\mu$ V/m) was applied.
- 2) For 25MHz-75 MHz above or below the band edge, a level of 10 dBm/MHz (105.2dB $\mu$ V/m) was applied.
- 3) For 5MHz-25 MHz above or below the band edge, a level of 15.6 dBm/MHz (110.8dB $\mu$ V/m)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

The spacing between the peripherals was 10 cm.

The adapter was connected to AC 120V/60Hz power source.

## 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	Measurement
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP

Frequency Range	RBW	Video B/W	Duty Cycle	Measurement
Above 1 GHz	1MHz	3 MHz	Any	PK
	1MHz	10Hz	>98%	AV
	1MHz	1/T	<98%	AV

Note: T is Transmission Duration

## 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:  $E [dB\mu V/m] = EIRP[dBm] + 95.2$ , 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 =  $20 \log (\text{specific distance } [3m] / \text{test distance } [1.5m])$  dB

Extrapolation result = Corrected Amplitude (dB $\mu$ V/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

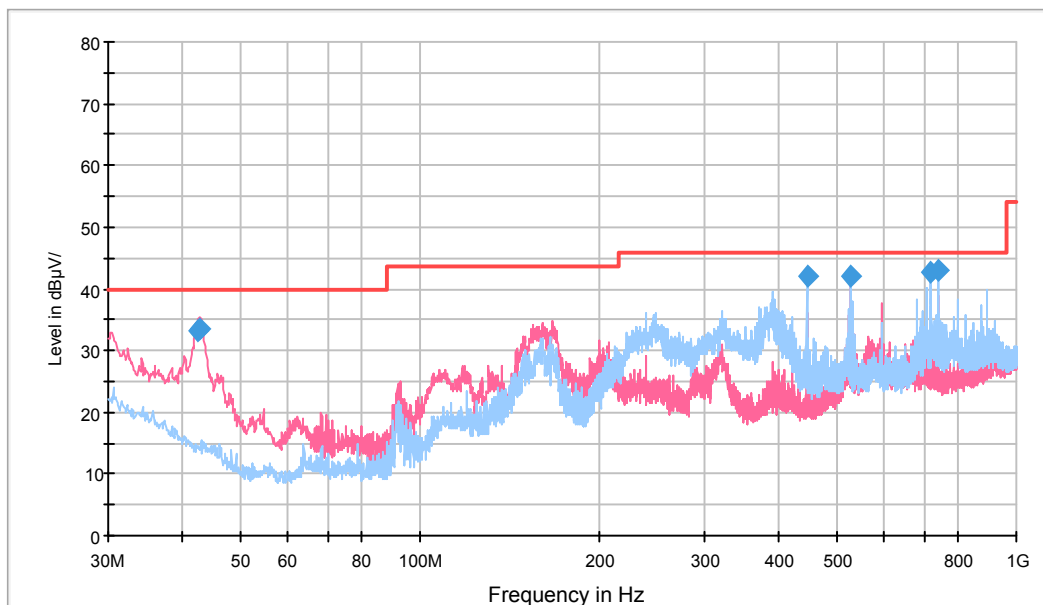
### Environmental Conditions

Temperature:	27 °C
Relative Humidity:	60 %
ATM Pressure:	95.1 kPa

The testing was performed by Tom Tang on 2018-05-04.

Test mode: Transmitting

### 1) 30 MHz to 1 GHz: (5725-5850MHz band: 802.11ac40-high channel)-worst case



Frequency (MHz)	QuasicPeak (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corrected Factor (dB/m)	Margin (dB)	Limit (dBμV/m)
42.488750	33.1	100.0	V	61.0	-12.8	6.9	40.0
42.610000	33.6	100.0	V	61.0	-12.9	6.4	40.0
445.523750	42.2	150.0	H	232.0	-7.8	*3.8	46.0
527.973750	42.0	115.0	V	90.0	-6.0	*4.0	46.0
720.033750	42.8	100.0	H	107.0	-2.9	*3.2	46.0
742.586250	43.1	100.0	H	100.0	-2.9	*2.9	46.0

\*Within measurement uncertainty!

## 2) 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	77.02	PK	H	34.51	4.54	0.00	116.07	110.07	N/A	N/A
5180	66.87	AV	H	34.51	4.54	0.00	105.92	99.92	N/A	N/A
5180	75.85	PK	V	34.51	4.54	0.00	114.90	108.90	N/A	N/A
5180	66.26	AV	V	34.51	4.54	0.00	105.31	99.31	N/A	N/A
5150	29.93	PK	H	34.49	4.53	0.00	68.95	62.95	74.00	11.05
5150	15.41	AV	H	34.49	4.53	0.00	54.43	48.43	54.00	5.57
10360	45.91	PK	H	38.67	6.52	44.50	46.60	40.60	74.00	33.40
10360	31.54	AV	H	38.67	6.52	44.50	32.23	26.23	54.00	27.77
Frequency: 5200 MHz										
5200	77.25	PK	H	34.52	4.55	0.00	116.32	110.32	N/A	N/A
5200	67.39	AV	H	34.52	4.55	0.00	106.46	100.46	N/A	N/A
5200	76.16	PK	V	34.52	4.55	0.00	115.23	109.23	N/A	N/A
5200	66.40	AV	V	34.52	4.55	0.00	105.47	99.47	N/A	N/A
10400	48.24	PK	H	38.68	6.53	44.53	48.92	42.92	74.00	31.08
10400	34.58	AV	H	38.68	6.53	44.53	35.26	29.26	54.00	24.74
Frequency: 5240 MHz										
5240	77.52	PK	H	34.54	4.57	0.00	116.63	110.63	N/A	N/A
5240	68.03	AV	H	34.54	4.57	0.00	107.14	101.14	N/A	N/A
5240	76.58	PK	V	34.54	4.57	0.00	115.69	109.69	N/A	N/A
5240	66.77	AV	V	34.54	4.57	0.00	105.88	99.88	N/A	N/A
5350	30.67	PK	H	34.61	4.62	0.00	69.90	63.90	74.00	10.10
5350	17.02	AV	H	34.61	4.62	0.00	56.25	50.25	54.00	3.75
10480	50.64	PK	H	38.70	6.55	44.59	51.30	45.30	74.00	28.70
10480	37.69	AV	H	38.70	6.55	44.59	38.35	32.35	54.00	21.65

\*Within measurement uncertainty!

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	74.71	PK	H	34.51	4.54	0.00	113.76	107.76	N/A	N/A
5180	65.03	AV	H	34.51	4.54	0.00	104.08	98.08	N/A	N/A
5180	73.06	PK	V	34.51	4.54	0.00	112.11	106.11	N/A	N/A
5180	63.07	AV	V	34.51	4.54	0.00	102.12	96.12	N/A	N/A
5150	29.47	PK	H	34.49	4.53	0.00	68.49	62.49	74.00	11.51
5150	15.67	AV	H	34.49	4.53	0.00	54.69	48.69	54.00	5.31
10360	43.67	PK	H	38.67	6.52	44.50	44.36	38.36	74.00	35.64
10360	29.45	AV	H	38.67	6.52	44.50	30.14	24.14	54.00	29.86
Frequency: 5200 MHz										
5200	74.66	PK	H	34.52	4.55	0.00	113.73	107.73	N/A	N/A
5200	65.06	AV	H	34.52	4.55	0.00	104.13	98.13	N/A	N/A
5200	73.40	PK	V	34.52	4.55	0.00	112.47	106.47	N/A	N/A
5200	63.28	AV	V	34.52	4.55	0.00	102.35	96.35	N/A	N/A
10400	45.84	PK	H	38.68	6.53	44.53	46.52	40.52	74.00	33.48
10400	32.07	AV	H	38.68	6.53	44.53	32.75	26.75	54.00	27.25
Frequency: 5240 MHz										
5240	74.55	PK	H	34.54	4.57	0.00	113.66	107.66	N/A	N/A
5240	65.01	AV	H	34.54	4.57	0.00	104.12	98.12	N/A	N/A
5240	73.23	PK	V	34.54	4.57	0.00	112.34	106.34	N/A	N/A
5240	63.69	AV	V	34.54	4.57	0.00	102.80	96.80	N/A	N/A
5350	29.89	PK	H	34.61	4.62	0.00	69.12	63.12	74.00	10.88
5350	16.94	AV	H	34.61	4.62	0.00	56.17	50.17	54.00	3.83
10480	49.13	PK	H	38.70	6.55	44.59	49.79	43.79	74.00	30.21
10480	35.61	AV	H	38.70	6.55	44.59	36.27	30.27	54.00	23.73

\*Within measurement uncertainty!

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	71.31	PK	H	34.51	4.55	0.00	110.37	104.37	N/A	N/A
5190	59.86	AV	H	34.51	4.55	0.00	98.92	92.92	N/A	N/A
5190	70.01	PK	V	34.51	4.55	0.00	109.07	103.07	N/A	N/A
5190	60.41	AV	V	34.51	4.55	0.00	99.47	93.47	N/A	N/A
5150	30.22	PK	H	34.49	4.53	0.00	69.24	63.24	74.00	10.76
5150	15.18	AV	H	34.49	4.53	0.00	54.20	48.20	54.00	5.80
10380	44.28	PK	H	38.68	6.52	44.52	44.96	38.96	74.00	35.04
10380	29.03	AV	H	38.68	6.52	44.52	29.71	23.71	54.00	30.29
Frequency: 5230 MHz										
5230	71.08	PK	H	34.54	4.57	0.00	110.19	104.19	N/A	N/A
5230	60.63	AV	H	34.54	4.57	0.00	99.74	93.74	N/A	N/A
5230	70.15	PK	V	34.54	4.57	0.00	109.26	103.26	N/A	N/A
5230	60.77	AV	V	34.54	4.57	0.00	99.88	93.88	N/A	N/A
5350	30.14	PK	H	34.61	4.62	0.00	69.37	63.37	74.00	10.63
5350	17.06	AV	H	34.61	4.62	0.00	56.29	50.29	54.00	3.71
10460	44.63	PK	H	38.69	6.55	44.57	45.30	39.30	74.00	34.70
10460	29.73	AV	H	38.69	6.55	44.57	30.40	24.40	54.00	29.60

\*Within measurement uncertainty!

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	74.15	PK	H	34.51	4.54	0.00	113.20	107.20	N/A	N/A
5180	64.18	AV	H	34.51	4.54	0.00	103.23	97.23	N/A	N/A
5180	72.91	PK	V	34.51	4.54	0.00	111.96	105.96	N/A	N/A
5180	62.73	AV	V	34.51	4.54	0.00	101.78	95.78	N/A	N/A
5150	29.61	PK	H	34.49	4.53	0.00	68.63	62.63	74.00	11.37
5150	15.37	AV	H	34.49	4.53	0.00	54.39	48.39	54.00	5.61
10360	43.32	PK	H	38.67	6.52	44.50	44.01	38.01	74.00	35.99
10360	29.04	AV	H	38.67	6.52	44.50	29.73	23.73	54.00	30.27
Frequency: 5200 MHz										
5200	74.60	PK	H	34.52	4.55	0.00	113.67	107.67	N/A	N/A
5200	64.78	AV	H	34.52	4.55	0.00	103.85	97.85	N/A	N/A
5200	73.55	PK	V	34.52	4.55	0.00	112.62	106.62	N/A	N/A
5200	63.76	AV	V	34.52	4.55	0.00	102.83	96.83	N/A	N/A
10400	45.98	PK	H	38.68	6.53	44.53	46.66	40.66	74.00	33.34
10400	32.01	AV	H	38.68	6.53	44.53	32.69	26.69	54.00	27.31
Frequency: 5240 MHz										
5240	74.84	PK	H	34.54	4.57	0.00	113.95	107.95	N/A	N/A
5240	65.21	AV	H	34.54	4.57	0.00	104.32	98.32	N/A	N/A
5240	74.07	PK	V	34.54	4.57	0.00	113.18	107.18	N/A	N/A
5240	64.39	AV	V	34.54	4.57	0.00	103.50	97.50	N/A	N/A
5350	30.69	PK	H	34.61	4.62	0.00	69.92	63.92	74.00	10.08
5350	17.08	AV	H	34.61	4.62	0.00	56.31	50.31	54.00	3.69
10480	49.51	PK	H	38.70	6.55	44.59	50.17	44.17	74.00	29.83
10480	35.75	AV	H	38.70	6.55	44.59	36.41	30.41	54.00	23.59

\*Within measurement uncertainty!

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	71.91	PK	H	34.51	4.55	0.00	110.97	104.97	N/A	N/A
5190	60.81	AV	H	34.51	4.55	0.00	99.87	93.87	N/A	N/A
5190	70.68	PK	V	34.51	4.55	0.00	109.74	103.74	N/A	N/A
5190	60.77	AV	V	34.51	4.55	0.00	99.83	93.83	N/A	N/A
5150	29.43	PK	H	34.49	4.53	0.00	68.45	62.45	74.00	11.55
5150	15.37	AV	H	34.49	4.53	0.00	54.39	48.39	54.00	5.61
10380	43.16	PK	H	38.68	6.52	44.52	43.84	37.84	74.00	36.16
10380	28.67	AV	H	38.68	6.52	44.52	29.35	23.35	54.00	30.65
Frequency: 5230 MHz										
5230	71.69	PK	H	34.54	4.57	0.00	110.80	104.80	N/A	N/A
5230	60.89	AV	H	34.54	4.57	0.00	100.00	94.00	N/A	N/A
5230	70.33	PK	V	34.54	4.57	0.00	109.44	103.44	N/A	N/A
5230	60.11	AV	V	34.54	4.57	0.00	99.22	93.22	N/A	N/A
5350	30.27	PK	H	34.61	4.62	0.00	69.50	63.50	74.00	10.50
5350	17.24	AV	H	34.61	4.62	0.00	56.47	50.47	54.00	3.53
10460	42.91	PK	H	38.69	6.55	44.57	43.58	37.58	74.00	36.42
10460	28.34	AV	H	38.69	6.55	44.57	29.01	23.01	54.00	30.99

*\*Within measurement uncertainty!*

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	68.35	PK	H	34.53	4.56	0.00	107.44	101.44	N/A	N/A
5210	53.21	AV	H	34.53	4.56	0.00	92.30	86.30	N/A	N/A
5210	66.79	PK	V	34.53	4.56	0.00	105.88	99.88	N/A	N/A
5210	51.91	AV	V	34.53	4.56	0.00	91.00	85.00	N/A	N/A
5150	30.91	PK	H	34.49	4.53	0.00	69.93	63.93	74.00	10.07
5150	15.07	AV	H	34.49	4.53	0.00	54.09	48.09	54.00	5.91
5350	29.87	PK	H	34.61	4.62	0.00	69.10	63.10	74.00	10.90
5350	16.74	AV	H	34.61	4.62	0.00	55.97	49.97	54.00	4.03
10420	43.94	PK	H	38.68	6.54	44.55	44.61	38.61	74.00	35.39
10420	30.06	AV	H	38.68	6.54	44.55	30.73	24.73	54.00	29.27

*\*Within measurement uncertainty!*

Note:

Corrected Amplitude = Corrected Factor + Reading

Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor

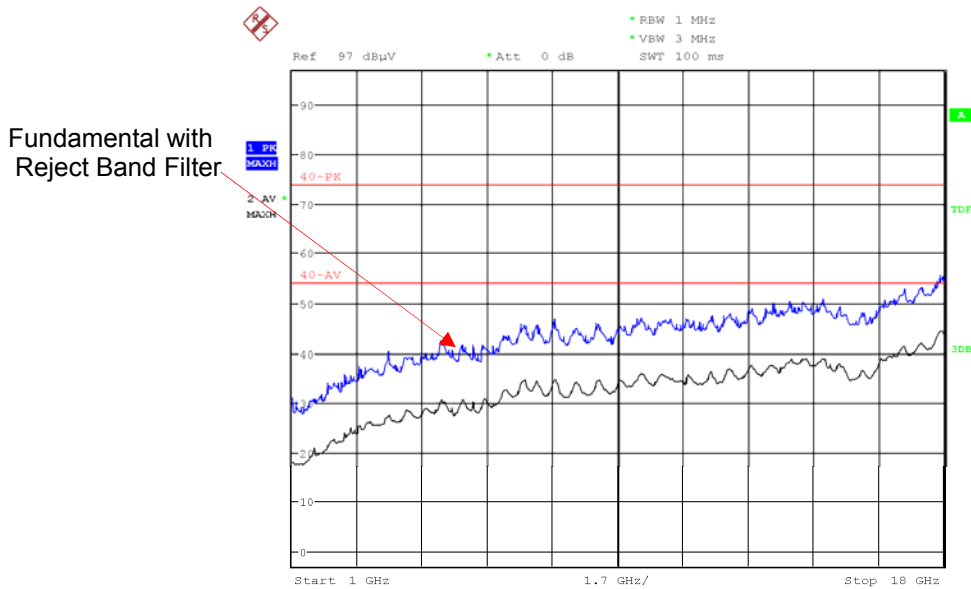
Margin = Limit- Corr. Amplitude

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

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

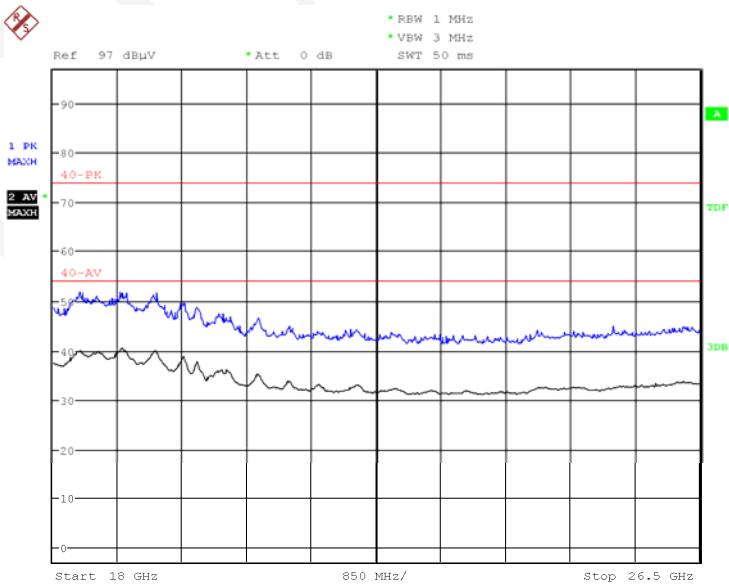
Note: The test distance is 1.5m and distance factor add to the total factor.

### 802.11ac20 Mode: High Channel\_Horizontal\_1GHz-18GHz



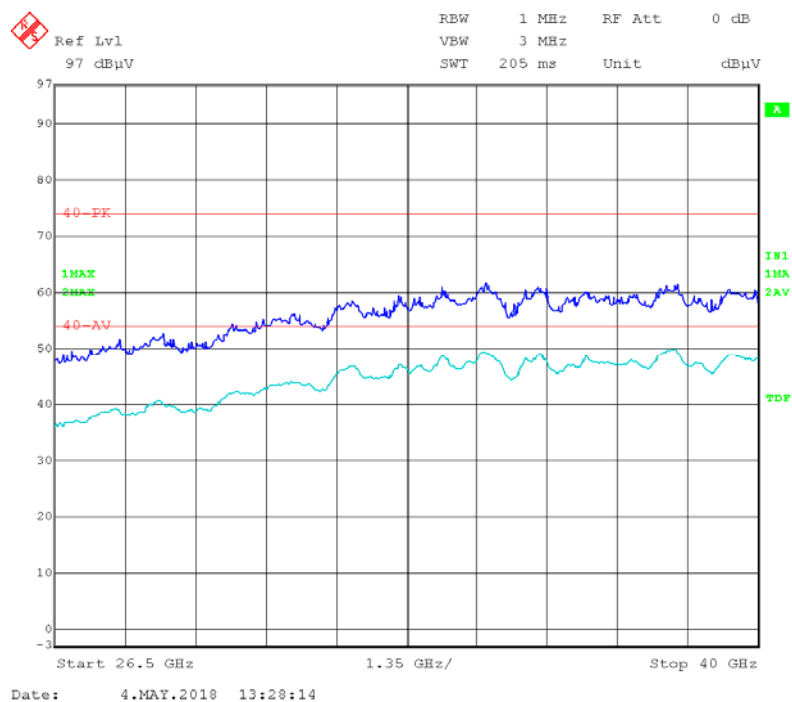
Date: 4.MAY.2018 10:07:38

### 802.11ac20 Mode: High Channel\_Horizontal\_18GHz-26.5GHz

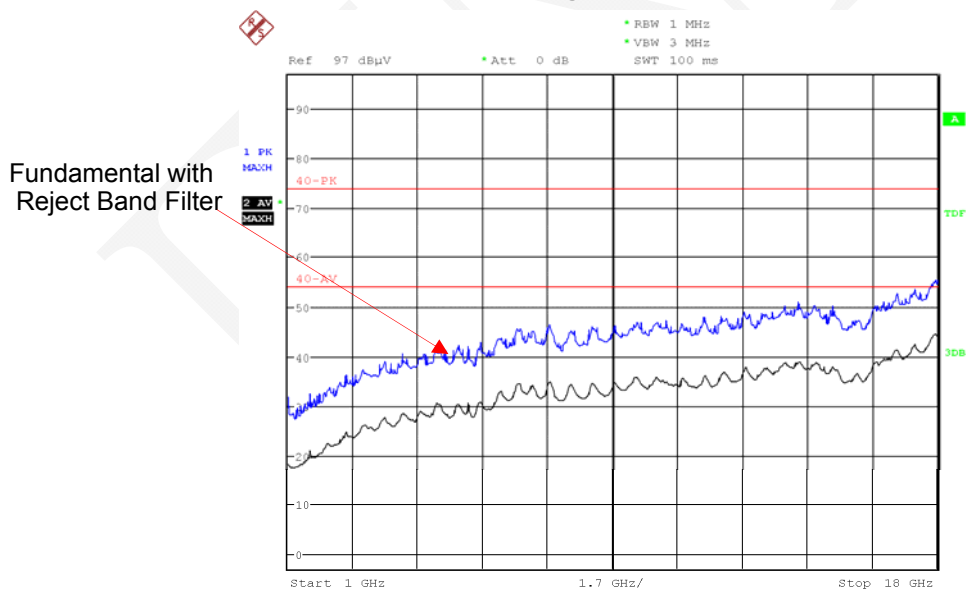


Date: 4.MAY.2018 10:13:44

### 802.11ac20 Mode: High Channel\_Horizontal\_26.5GHz-40GHz



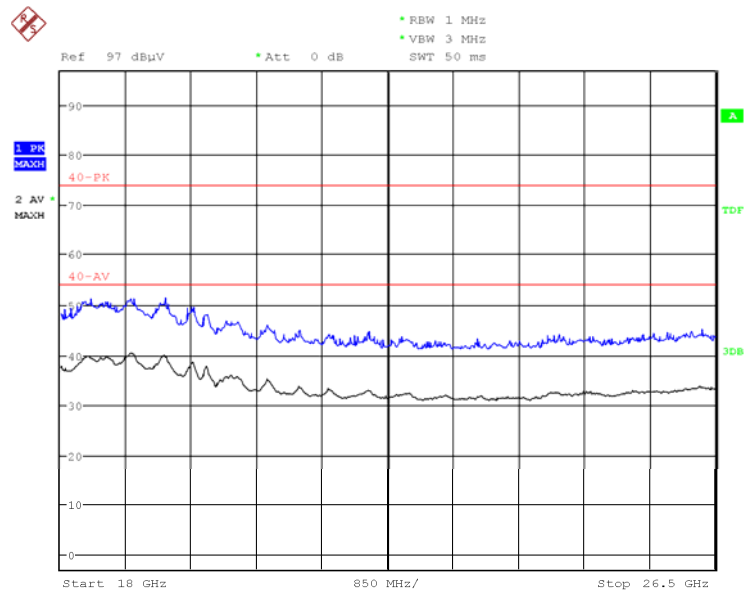
### 802.11ac20 Mode: High Channel\_Vertical\_1GHz-18GHz



Fundamental with  
Reject Band Filter

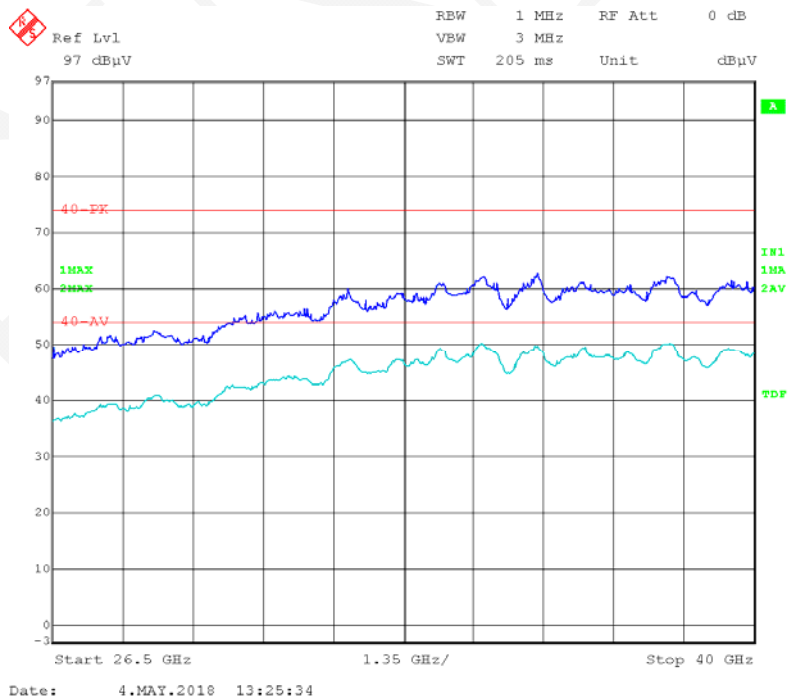


### 802.11ac20 Mode: High Channel\_Vertical\_18GHz-26.5GHz



Date: 4.MAY.2018 10:14:52

### 802.11ac20 Mode: High Channel\_Vertical\_26.5GHz-40GHz



Date: 4.MAY.2018 13:25:34

**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	77.74	PK	H	34.75	4.81	0.00	117.30	111.30	N/A	N/A
5745	67.67	AV	H	34.75	4.81	0.00	107.23	101.23	N/A	N/A
5745	75.38	PK	V	34.75	4.81	0.00	114.94	108.94	N/A	N/A
5745	65.11	AV	V	34.75	4.81	0.00	104.67	98.67	N/A	N/A
5650	31.17	PK	H	34.73	4.76	0.00	70.66	64.66	68.20	3.54
5700	32.57	PK	H	34.74	4.79	0.00	72.10	66.10	105.20	39.10
5720	39.46	PK	H	34.74	4.80	0.00	79.00	73.00	110.80	37.80
5725	46.71	PK	H	34.75	4.80	0.00	86.26	80.26	122.20	41.94
11490	56.53	PK	H	38.90	6.89	44.64	57.68	51.68	74.00	22.32
11490	42.78	AV	H	38.90	6.89	44.64	43.93	37.93	54.00	16.07
Frequency: 5785 MHz										
5785	77.33	PK	H	34.76	4.83	0.00	116.92	110.92	N/A	N/A
5785	67.52	AV	H	34.76	4.83	0.00	107.11	101.11	N/A	N/A
5785	74.60	PK	V	34.76	4.83	0.00	114.19	108.19	N/A	N/A
5785	64.36	AV	V	34.76	4.83	0.00	103.95	97.95	N/A	N/A
11570	55.63	PK	H	38.91	6.91	44.46	56.99	50.99	74.00	23.01
11570	42.29	AV	H	38.91	6.91	44.46	43.65	37.65	54.00	16.35
Frequency: 5825 MHz										
5825	77.64	PK	H	34.77	4.85	0.00	117.26	111.26	N/A	N/A
5825	67.67	AV	H	34.77	4.85	0.00	107.29	101.29	N/A	N/A
5825	74.24	PK	V	34.77	4.85	0.00	113.86	107.86	N/A	N/A
5825	64.23	AV	V	34.77	4.85	0.00	103.85	97.85	N/A	N/A
5850	30.23	PK	H	34.77	4.86	0.00	69.86	63.86	122.20	58.34
5855	28.67	PK	H	34.77	4.86	0.00	68.30	62.30	110.80	48.50
5875	27.92	PK	H	34.78	4.87	0.00	67.57	61.57	105.20	43.63
5925	28.26	PK	H	34.79	4.89	0.00	67.94	61.94	68.20	6.26
11650	55.41	PK	H	38.93	6.94	44.27	57.01	51.01	74.00	22.99
11650	42.04	AV	H	38.93	6.94	44.27	43.64	37.64	54.00	16.36

*\*Within measurement uncertainty!*

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	74.19	PK	H	34.75	4.81	0.00	113.75	107.75	N/A	N/A
5745	64.53	AV	H	34.75	4.81	0.00	104.09	98.09	N/A	N/A
5745	72.32	PK	V	34.75	4.81	0.00	111.88	105.88	N/A	N/A
5745	62.64	AV	V	34.75	4.81	0.00	102.20	96.20	N/A	N/A
5650	26.96	PK	V	34.73	4.76	0.00	66.45	60.45	68.20	7.75
5700	27.97	PK	H	34.74	4.79	0.00	67.50	61.50	105.20	43.70
5720	28.52	PK	H	34.74	4.80	0.00	68.06	62.06	110.80	48.74
5725	37.22	PK	H	34.75	4.80	0.00	76.77	70.77	122.20	51.43
11490	53.13	PK	H	38.90	6.89	44.64	54.28	48.28	74.00	25.72
11490	37.56	AV	H	38.90	6.89	44.64	38.71	32.71	54.00	21.29
Frequency: 5785 MHz										
5785	73.85	PK	H	34.76	4.83	0.00	113.44	107.44	N/A	N/A
5785	64.33	AV	H	34.76	4.83	0.00	103.92	97.92	N/A	N/A
5785	71.85	PK	V	34.76	4.83	0.00	111.44	105.44	N/A	N/A
5785	61.78	AV	V	34.76	4.83	0.00	101.37	95.37	N/A	N/A
11570	53.45	PK	H	38.91	6.91	44.46	54.81	48.81	74.00	25.19
11570	37.99	AV	H	38.91	6.91	44.46	39.35	33.35	54.00	20.65
Frequency: 5825 MHz										
5825	74.39	PK	H	34.77	4.85	0.00	114.01	108.01	N/A	N/A
5825	64.84	AV	H	34.77	4.85	0.00	104.46	98.46	N/A	N/A
5825	71.44	PK	V	34.77	4.85	0.00	111.06	105.06	N/A	N/A
5825	61.73	AV	V	34.77	4.85	0.00	101.35	95.35	N/A	N/A
5850	28.06	PK	H	34.77	4.86	0.00	67.69	61.69	122.20	60.51
5855	28.44	PK	H	34.77	4.86	0.00	68.07	62.07	110.80	48.73
5875	27.06	PK	H	34.78	4.87	0.00	66.71	60.71	105.20	44.49
5925	28.15	PK	H	34.79	4.89	0.00	67.83	61.83	68.20	6.37
11650	54.07	PK	H	38.93	6.94	44.27	55.67	49.67	74.00	24.33
11650	38.46	AV	H	38.93	6.94	44.27	40.06	34.06	54.00	19.94

*\*Within measurement uncertainty!*

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	72.25	PK	H	34.75	4.81	0.00	111.81	105.81	N/A	N/A
5755	62.13	AV	H	34.75	4.81	0.00	101.69	95.69	N/A	N/A
5755	68.28	PK	V	34.75	4.81	0.00	107.84	101.84	N/A	N/A
5755	58.59	AV	V	34.75	4.81	0.00	98.15	92.15	N/A	N/A
5650	26.18	PK	V	34.73	4.76	0.00	65.67	59.67	68.20	8.53
5700	27.13	PK	H	34.74	4.79	0.00	66.66	60.66	105.20	44.54
5720	38.05	PK	H	34.74	4.80	0.00	77.59	71.59	110.80	39.21
5725	37.85	PK	H	34.75	4.80	0.00	77.40	71.40	122.20	50.80
11510	48.03	PK	H	38.90	6.89	44.61	49.21	43.21	74.00	30.79
11510	34.54	AV	H	38.90	6.89	44.61	35.72	29.72	54.00	24.28
Frequency: 5795 MHz										
5795	72.67	PK	H	34.76	4.83	0.00	112.26	106.26	N/A	N/A
5795	62.14	AV	H	34.76	4.83	0.00	101.73	95.73	N/A	N/A
5795	56.92	PK	V	34.76	4.83	0.00	96.51	90.51	N/A	N/A
5795	27.31	AV	V	34.76	4.83	0.00	66.90	60.90	N/A	N/A
5850	26.62	PK	V	34.77	4.86	0.00	66.25	60.25	122.20	61.95
5855	28.47	PK	H	34.77	4.86	0.00	68.10	62.10	110.80	48.70
5875	27.43	PK	H	34.78	4.87	0.00	67.08	61.08	105.20	44.12
5925	27.34	PK	H	34.79	4.89	0.00	67.02	61.02	68.20	7.18
11590	48.24	PK	H	38.92	6.92	44.41	49.67	43.67	74.00	30.33
11590	34.76	AV	H	38.92	6.92	44.41	36.19	30.19	54.00	23.81

\*Within measurement uncertainty!

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	74.16	PK	H	34.75	4.81	0.00	113.72	107.72	N/A	N/A
5745	64.17	AV	H	34.75	4.81	0.00	103.73	97.73	N/A	N/A
5745	72.11	PK	V	34.75	4.81	0.00	111.67	105.67	N/A	N/A
5745	61.83	AV	V	34.75	4.81	0.00	101.39	95.39	N/A	N/A
5650	26.97	PK	H	34.73	4.76	0.00	66.46	60.46	68.20	7.74
5700	27.06	PK	H	34.74	4.79	0.00	66.59	60.59	105.20	44.61
5720	26.88	PK	H	34.74	4.80	0.00	66.42	60.42	110.80	50.38
5725	31.58	PK	H	34.75	4.80	0.00	71.13	65.13	122.20	57.07
11490	53.04	PK	H	38.90	6.89	44.64	54.19	48.19	74.00	25.81
11490	37.19	AV	H	38.90	6.89	44.64	38.34	32.34	54.00	21.66
Frequency: 5785 MHz										
5785	74.50	PK	H	34.76	4.83	0.00	114.09	108.09	N/A	N/A
5785	64.63	AV	H	34.76	4.83	0.00	104.22	98.22	N/A	N/A
5785	71.88	PK	V	34.76	4.83	0.00	111.47	105.47	N/A	N/A
5785	61.90	AV	V	34.76	4.83	0.00	101.49	95.49	N/A	N/A
11570	53.57	PK	H	38.91	6.91	44.46	54.93	48.93	74.00	25.07
11570	37.84	AV	H	38.91	6.91	44.46	39.20	33.20	54.00	20.80
Frequency: 5825 MHz										
5825	74.63	PK	H	34.77	4.85	0.00	114.25	108.25	N/A	N/A
5825	64.92	AV	H	34.77	4.85	0.00	104.54	98.54	N/A	N/A
5825	71.39	PK	V	34.77	4.85	0.00	111.01	105.01	N/A	N/A
5825	61.43	AV	V	34.77	4.85	0.00	101.05	95.05	N/A	N/A
5850	27.74	PK	H	34.77	4.86	0.00	67.37	61.37	122.20	60.83
5855	28.01	PK	H	34.77	4.86	0.00	67.64	61.64	110.80	49.16
5875	27.09	PK	H	34.78	4.87	0.00	66.74	60.74	105.20	44.46
5925	27.65	PK	H	34.79	4.89	0.00	67.33	61.33	68.20	6.87
11650	53.79	PK	H	38.93	6.94	44.27	55.39	49.39	74.00	24.61
11650	38.17	AV	H	38.93	6.94	44.27	39.77	33.77	54.00	20.23

*\*Within measurement uncertainty!*

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	73.76	PK	H	34.75	4.81	0.00	113.32	107.32	N/A	N/A
5755	62.38	AV	H	34.75	4.81	0.00	101.94	95.94	N/A	N/A
5755	69.54	PK	V	34.75	4.81	0.00	109.10	103.10	N/A	N/A
5755	58.74	AV	V	34.75	4.81	0.00	98.30	92.30	N/A	N/A
5650	27.14	PK	H	34.73	4.76	0.00	66.63	60.63	68.20	7.57
5700	30.24	PK	H	34.74	4.79	0.00	69.77	63.77	105.20	41.43
5720	38.41	PK	H	34.74	4.80	0.00	77.95	71.95	110.80	38.85
5725	37.97	PK	H	34.75	4.80	0.00	77.52	71.52	122.20	50.68
11510	49.25	PK	H	38.90	6.89	44.61	50.43	44.43	74.00	29.57
11510	33.73	AV	H	38.90	6.89	44.61	34.91	28.91	54.00	25.09
Frequency: 5795 MHz										
5795	74.51	PK	H	34.76	4.83	0.00	114.10	108.10	N/A	N/A
5795	62.02	AV	H	34.76	4.83	0.00	101.61	95.61	N/A	N/A
5795	66.95	PK	V	34.76	4.83	0.00	106.54	100.54	N/A	N/A
5795	68.14	AV	V	34.76	4.83	0.00	107.73	101.73	N/A	N/A
5850	57.65	PK	H	34.77	4.86	0.00	97.28	91.28	122.20	30.92
5855	27.12	PK	H	34.77	4.86	0.00	66.75	60.75	110.80	50.05
5875	27.23	PK	H	34.78	4.87	0.00	66.88	60.88	105.20	44.32
5925	27.23	PK	H	34.79	4.89	0.00	66.91	60.91	68.20	7.29
11590	55.85	PK	H	38.92	6.92	44.41	57.28	51.28	74.00	22.72
11590	39.97	AV	H	38.92	6.92	44.41	41.40	35.40	54.00	18.60

\*Within measurement uncertainty!

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	70.64	PK	H	34.76	4.82	0.00	110.22	104.22	N/A	N/A
5775	55.64	AV	H	34.76	4.82	0.00	95.22	89.22	N/A	N/A
5775	66.02	PK	V	34.76	4.82	0.00	105.60	99.60	N/A	N/A
5775	49.74	AV	V	34.76	4.82	0.00	89.32	83.32	N/A	N/A
5650	27.63	PK	H	34.73	4.76	0.00	67.12	61.12	68.20	7.08
5700	31.47	PK	H	34.74	4.79	0.00	71.00	65.00	105.20	40.20
5720	33.56	PK	H	34.74	4.80	0.00	73.10	67.10	110.80	43.70
5725	36.39	PK	H	34.75	4.80	0.00	75.94	69.94	122.20	52.26
5850	30.97	PK	H	34.77	4.86	0.00	70.60	64.60	122.20	57.60
5855	29.06	PK	H	34.77	4.86	0.00	68.69	62.69	110.80	48.11
5875	27.93	PK	H	34.78	4.87	0.00	67.58	61.58	105.20	43.62
5925	27.69	PK	H	34.79	4.89	0.00	67.37	61.37	68.20	6.83
11550	51.96	PK	H	38.91	6.91	44.51	53.27	47.27	74.00	26.73
11550	34.62	AV	H	38.91	6.91	44.51	35.93	29.93	54.00	24.07

\*Within measurement uncertainty!

Note:

Corrected Amplitude = Corrected Factor + Reading

Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor

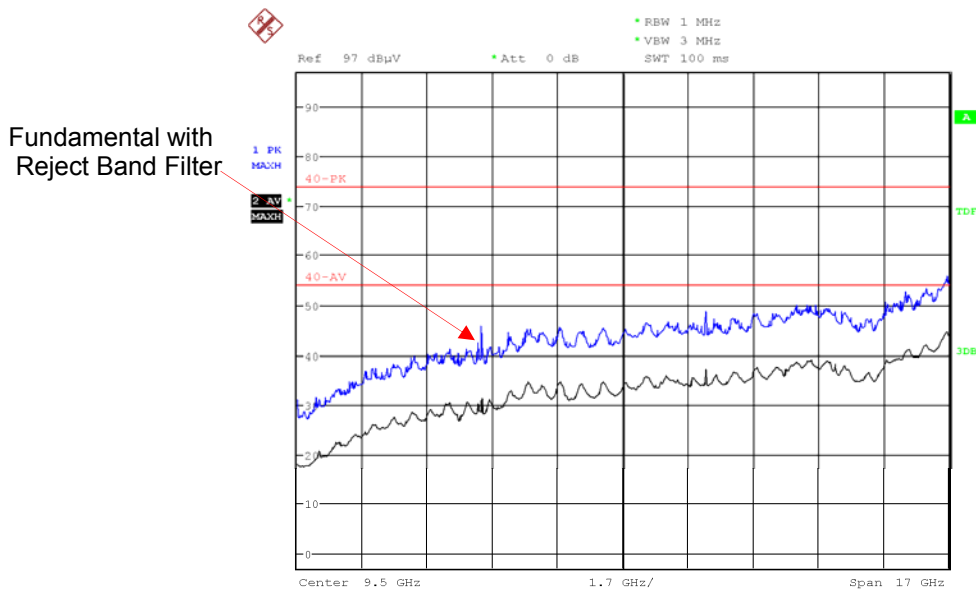
Margin = Limit- Corr. Amplitude

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

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

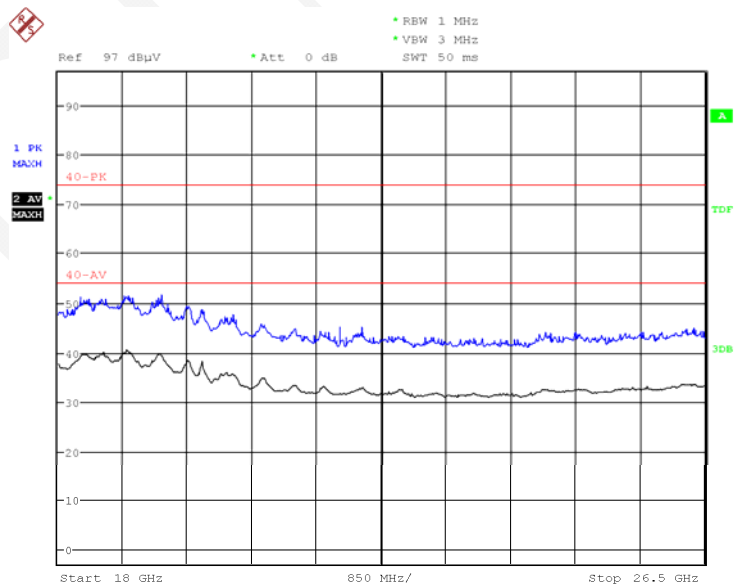
Note: The test distance is 1.5m and distance factor add to the total factor.

### 802.11n20 Mode: High Channel\_Horizontal\_1GHz-18GHz



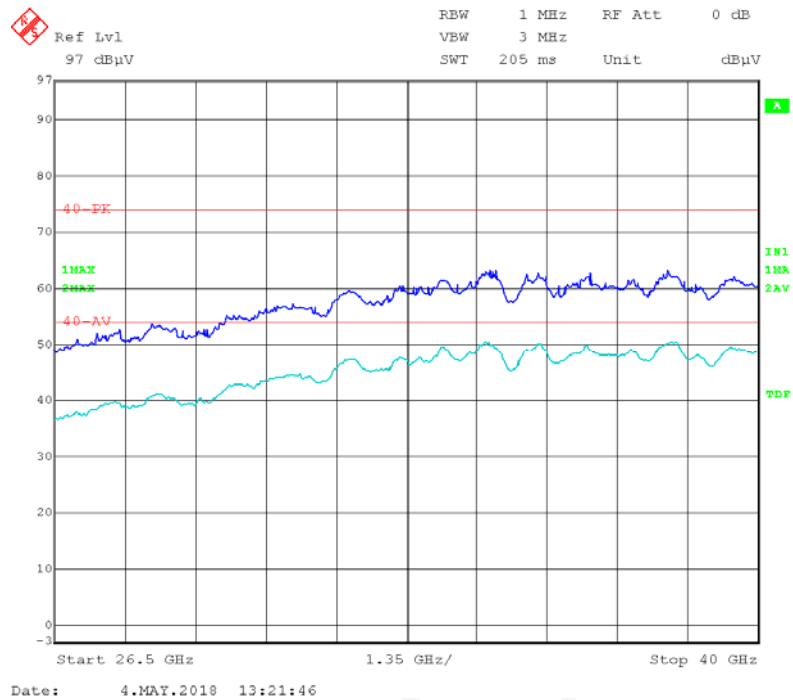
Date: 4.MAY.2018 10:19:14

### 802.11n20 Mode: High Channel\_Horizontal\_18GHz-26.5GHz

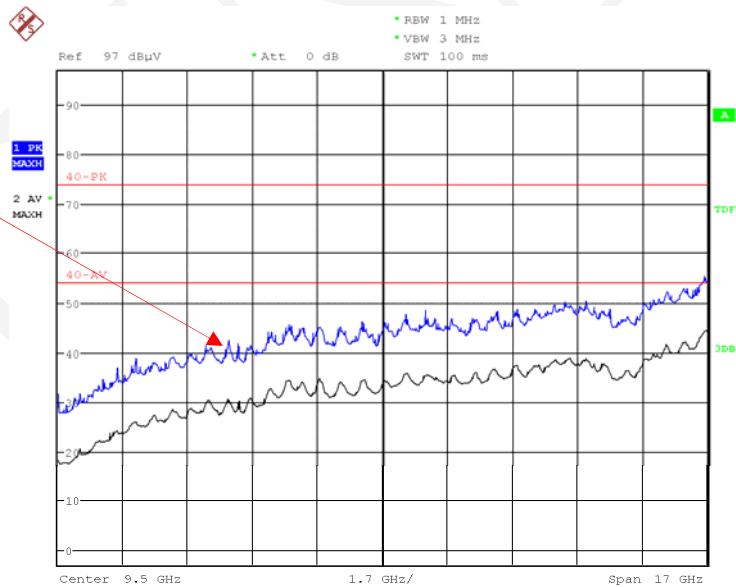


Date: 4.MAY.2018 10:21:49

### 802.11n20 Mode: High Channel\_Horizontal\_26.5GHz-40GHz



### 802.11n20 Mode: High Channel\_Vertical\_1GHz-18GHz

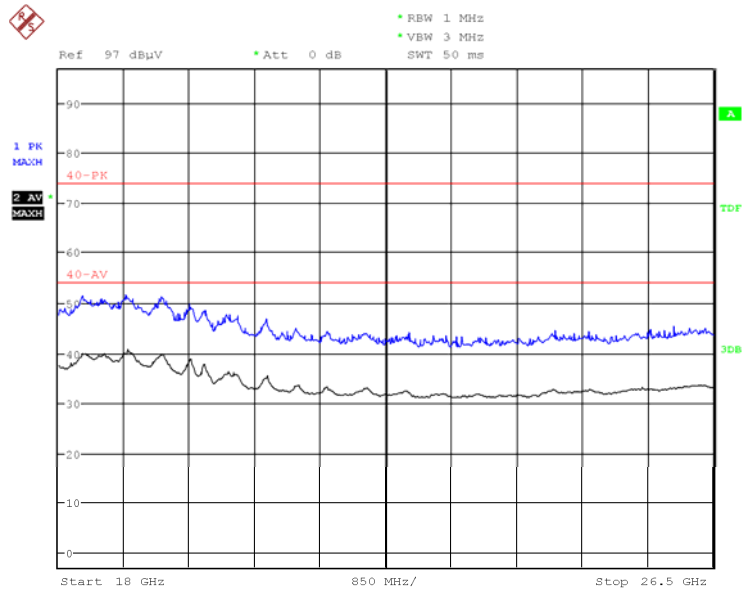


Fundamental with  
Reject Band Filter

Date: 4.MAY.2018 10:20:16

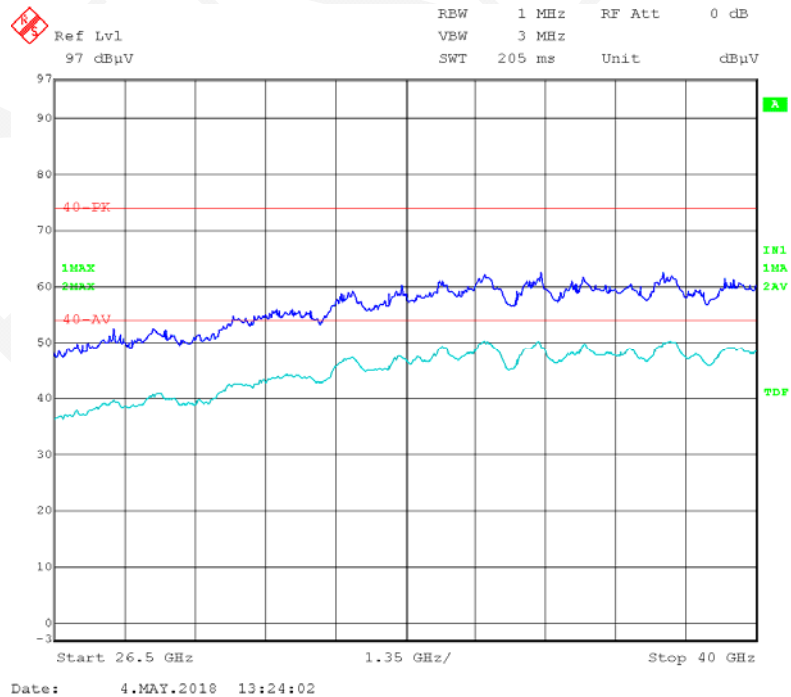


### 802.11n20 Mode: High Channel\_Vertical\_18GHz-26.5GHz



Date: 4.MAY.2018 10:23:17

### 802.11n20 Mode: High Channel\_Vertical\_26.5GHz-40GHz



## 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:	23 °C
Relative Humidity:	46 %
ATM Pressure:	95.7 kPa

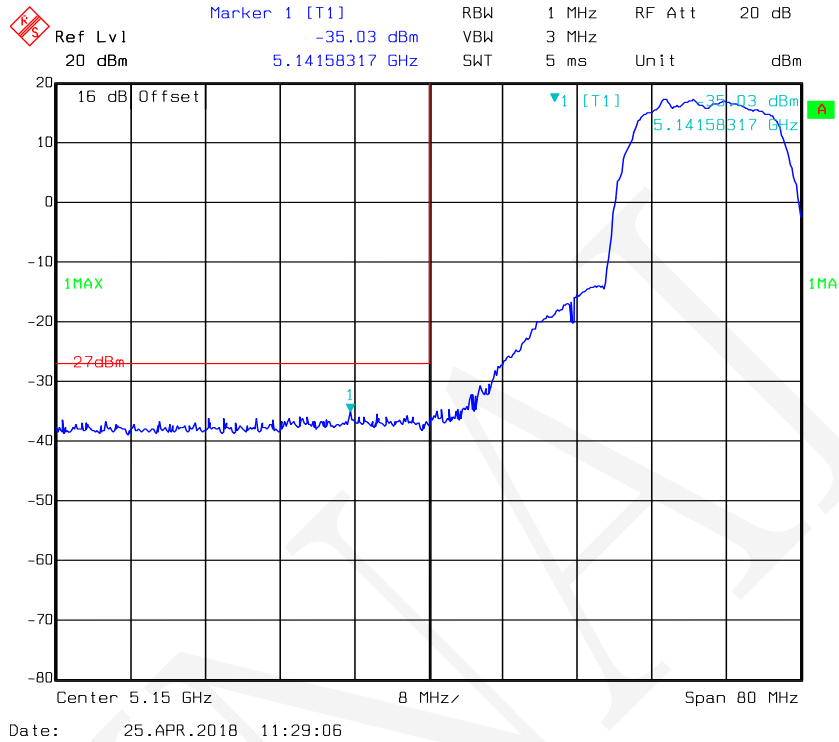
\* The testing was performed by Tom Tang on 2018-04-25.

Test mode: Transmitting

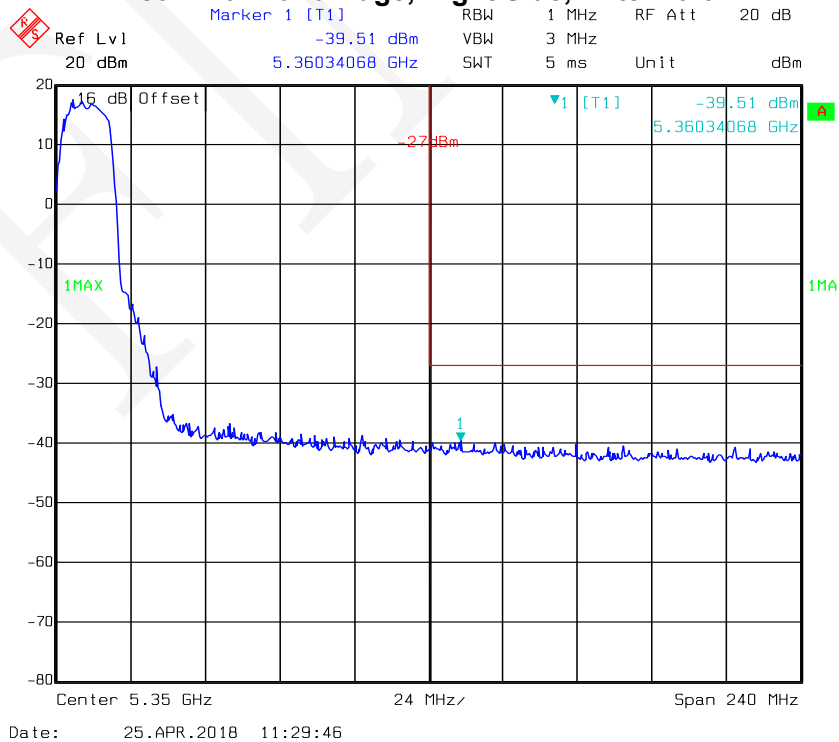
Test Result: Compliance. Please refer to following table and plots.

**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.)**

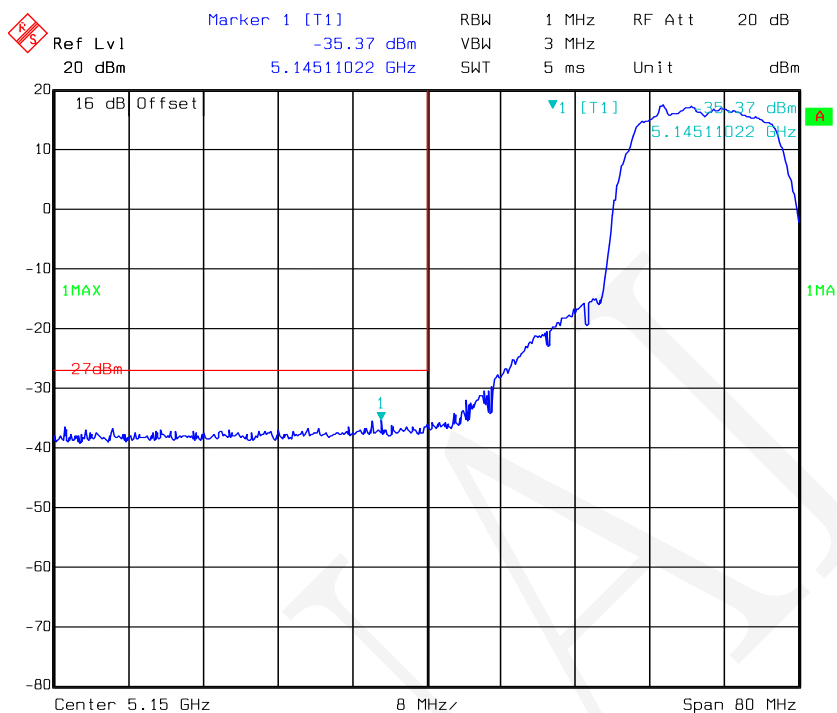
**802.11a: Band Edge, Left Side, Antenna 0**



**802.11a: Band Edge, Right Side, Antenna 0**

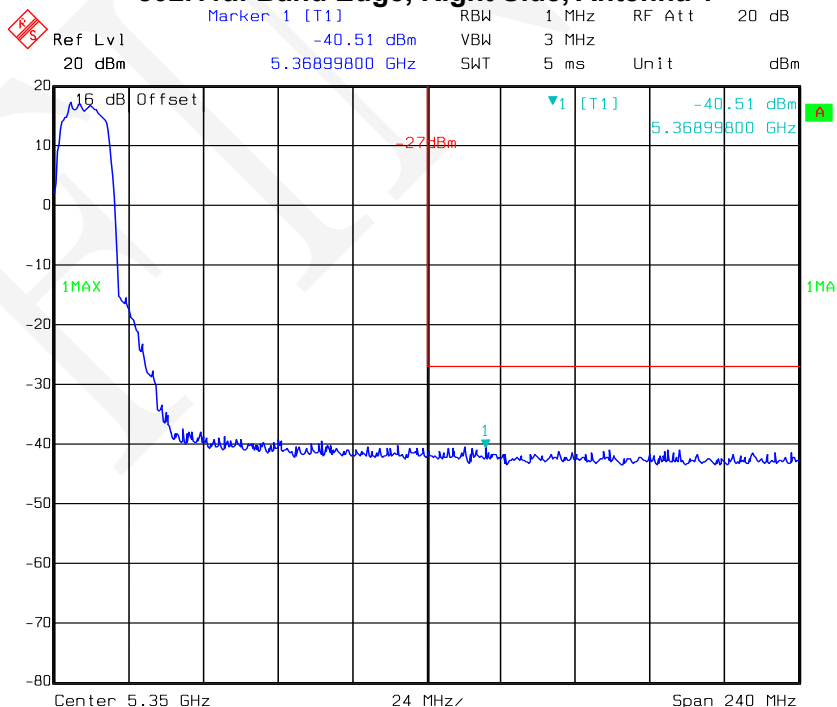


### 802.11a: Band Edge, Left Side, Antenna 1

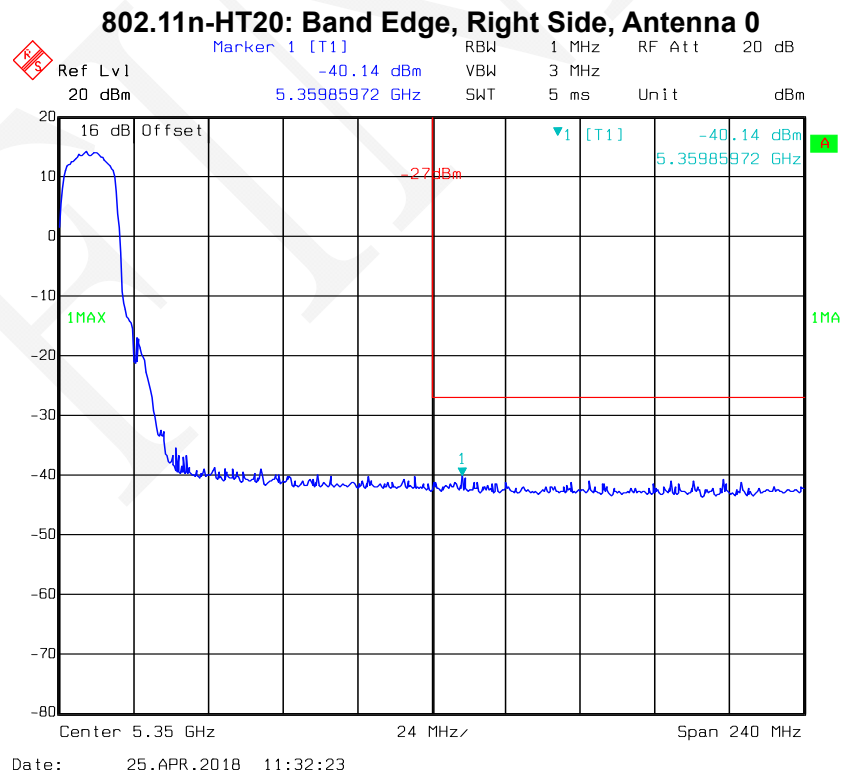
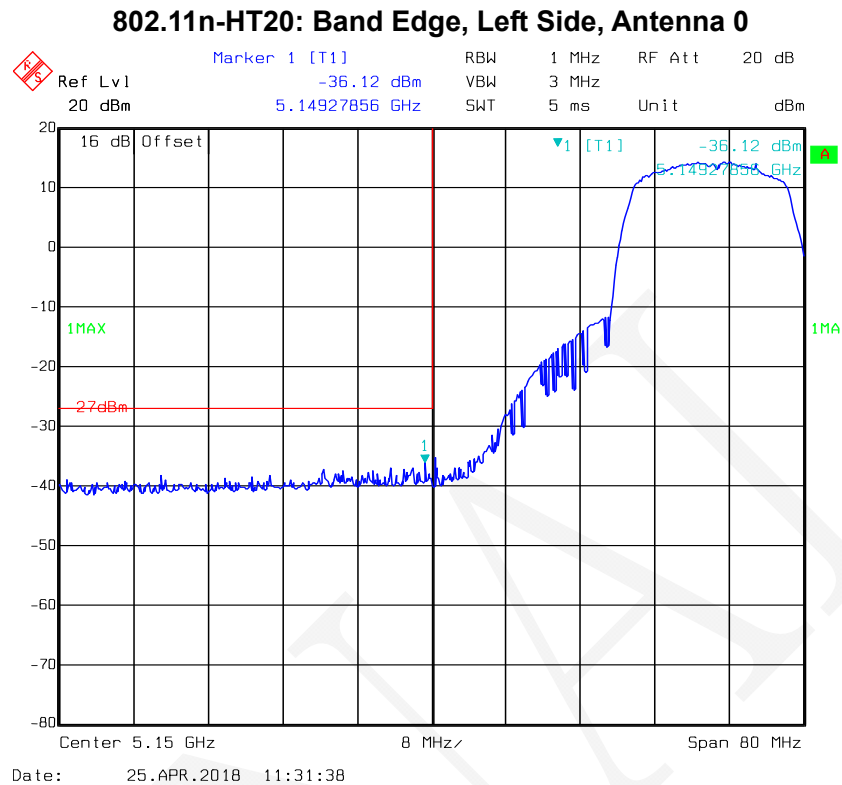


Date: 25.APR.2018 13:50:00

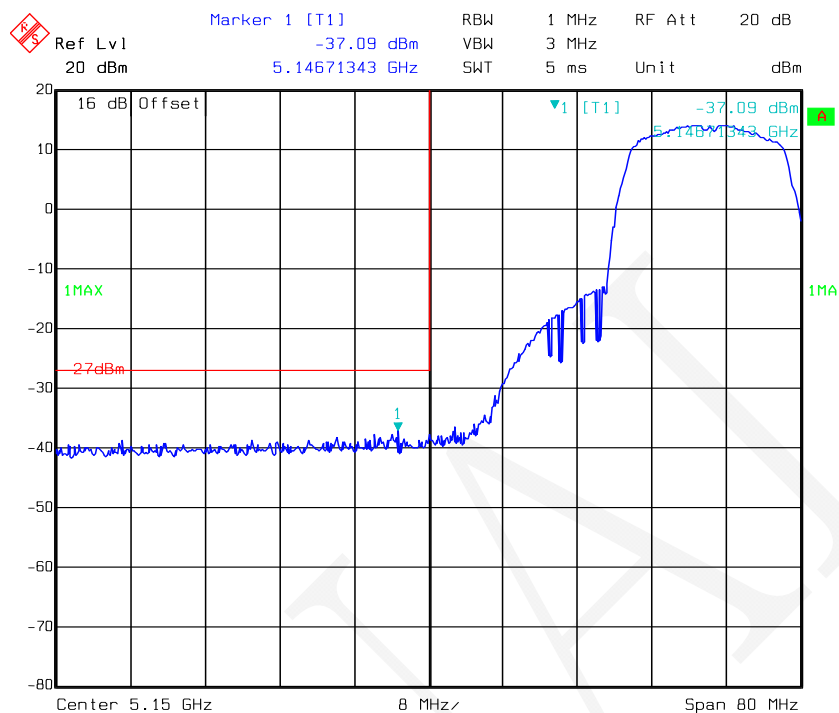
### 802.11a: Band Edge, Right Side, Antenna 1



Date: 25.APR.2018 13:50:36

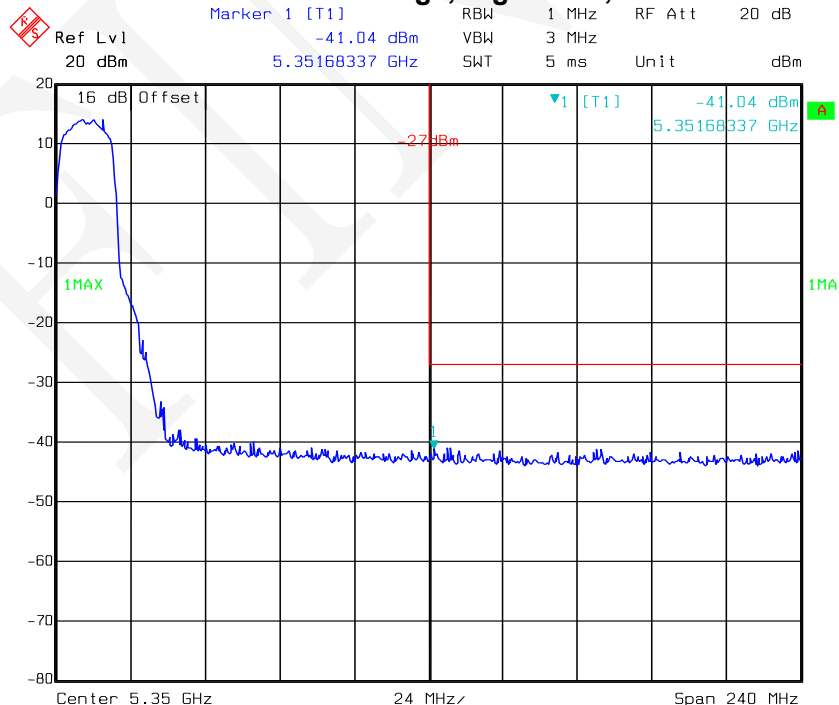


### 802.11n-HT20: Band Edge, Left Side, Antenna 1



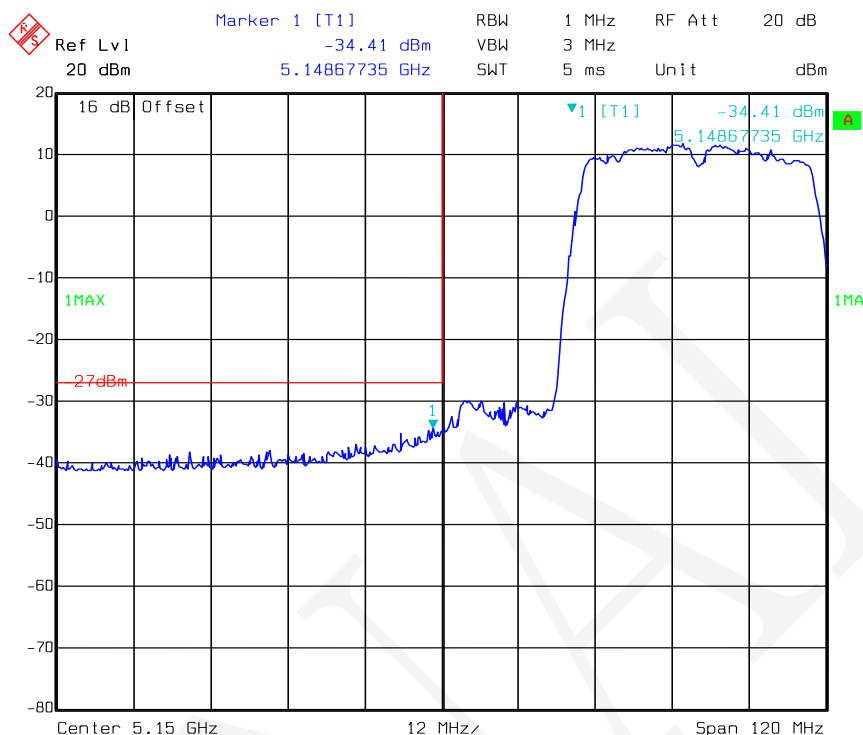
Date: 25.APR.2018 13:52:21

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

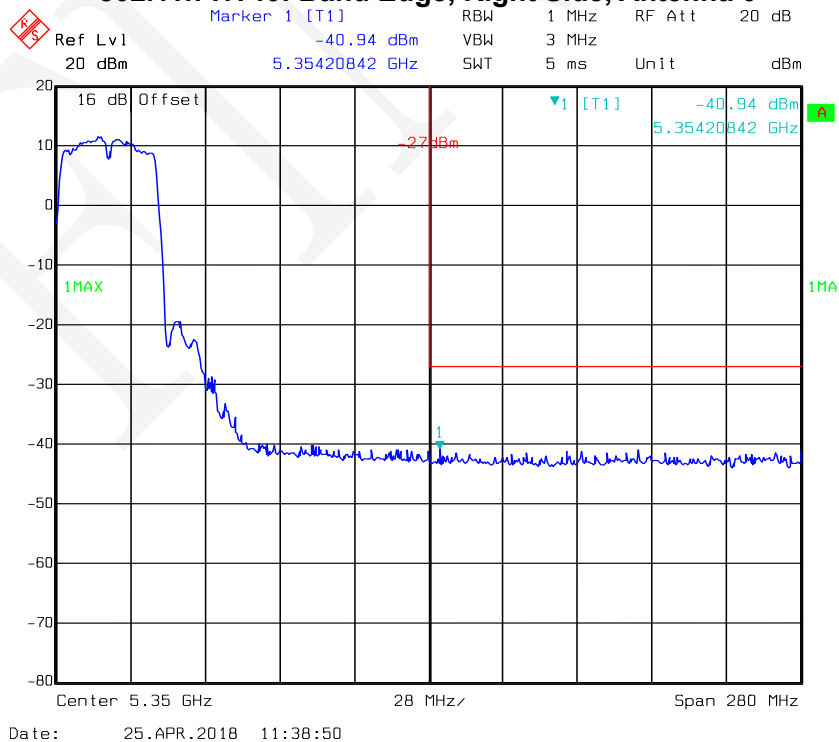


Date: 25.APR.2018 13:53:00

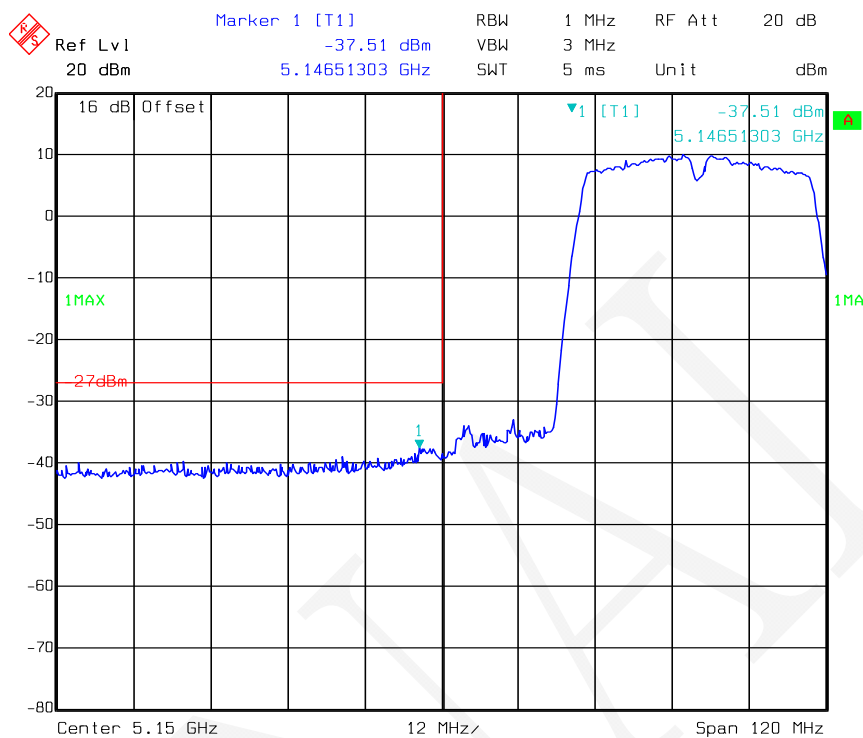
### 802.11n-HT40: Band Edge, Left Side, Antenna 0



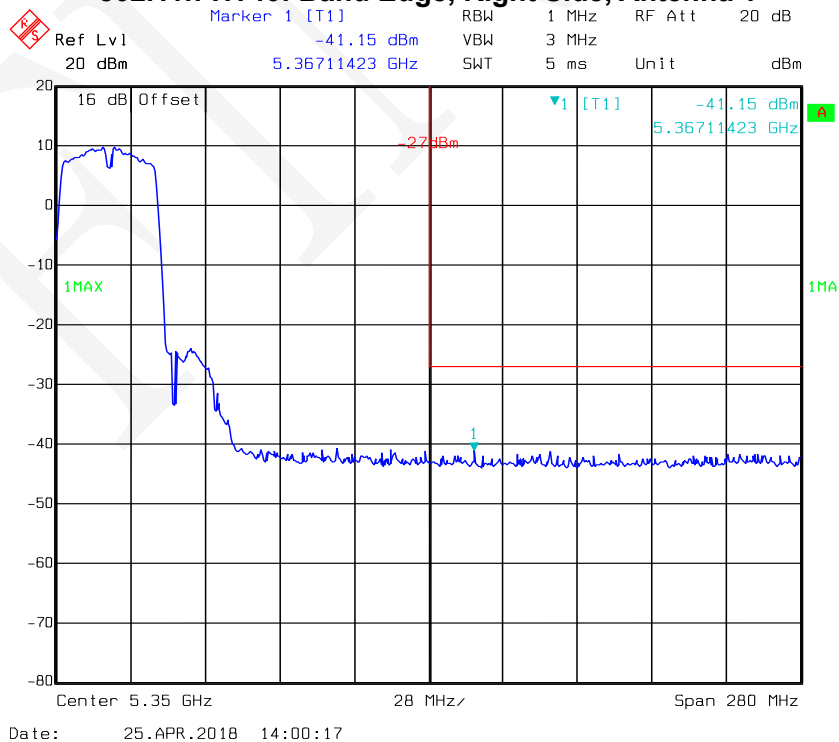
### 802.11n-HT40: Band Edge, Right Side, Antenna 0



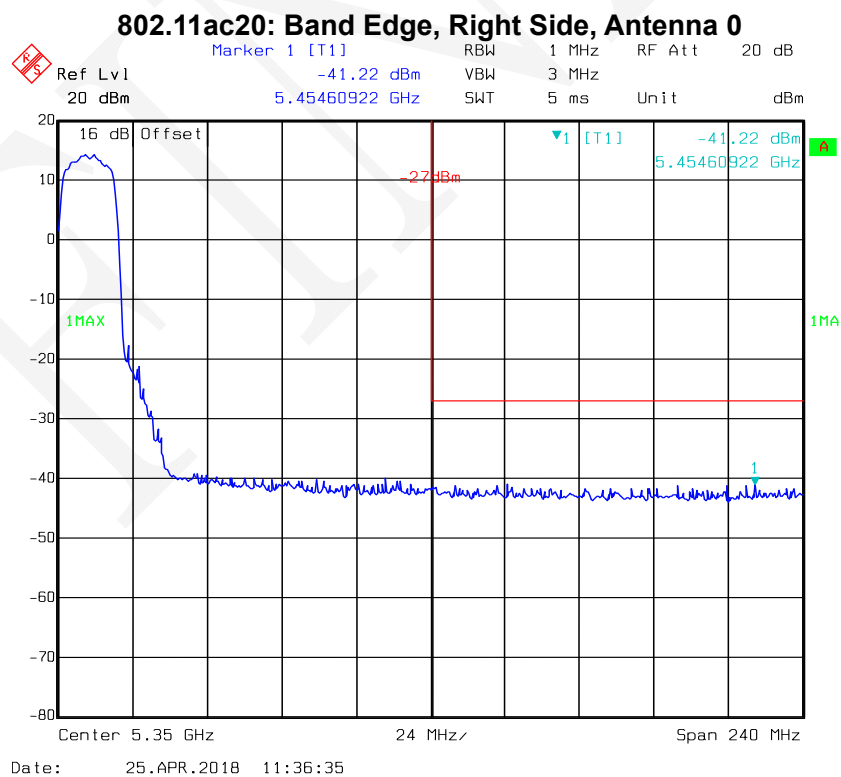
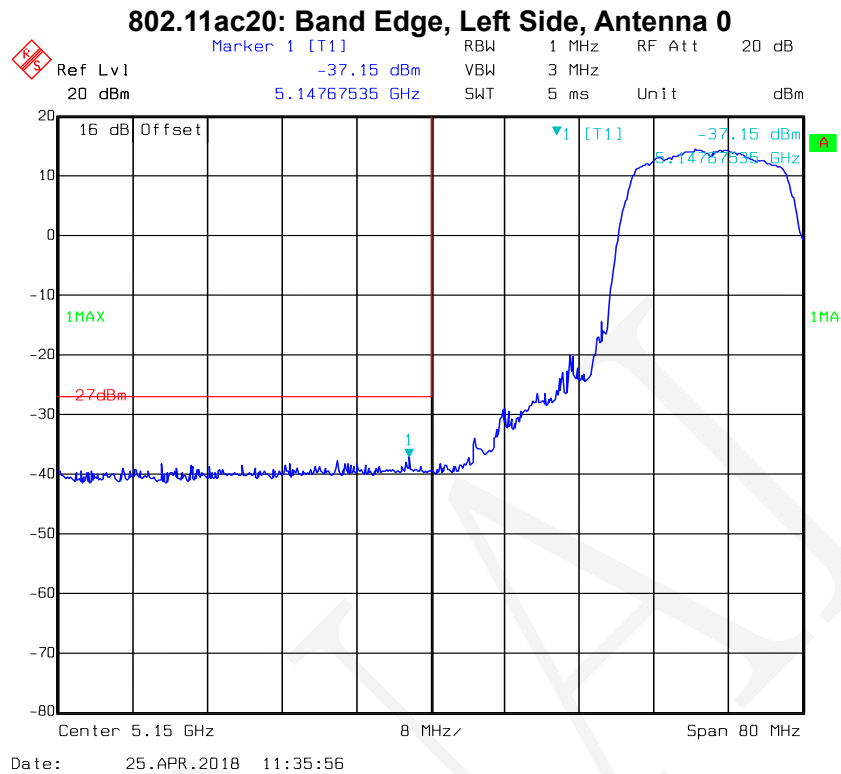
### 802.11n-HT40: Band Edge, Left Side, Antenna 1



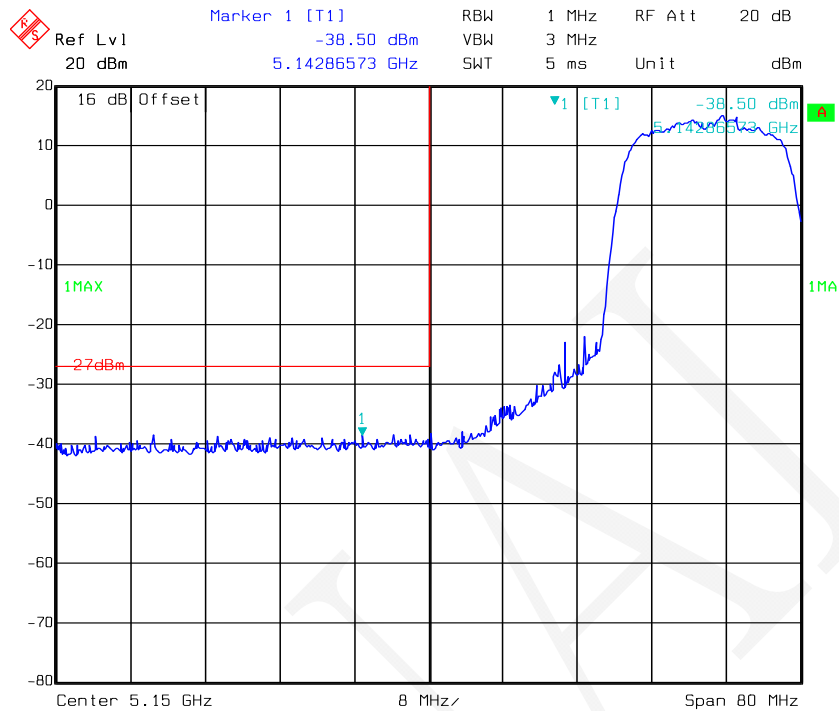
### 802.11n-HT40: Band Edge, Right Side, Antenna 1





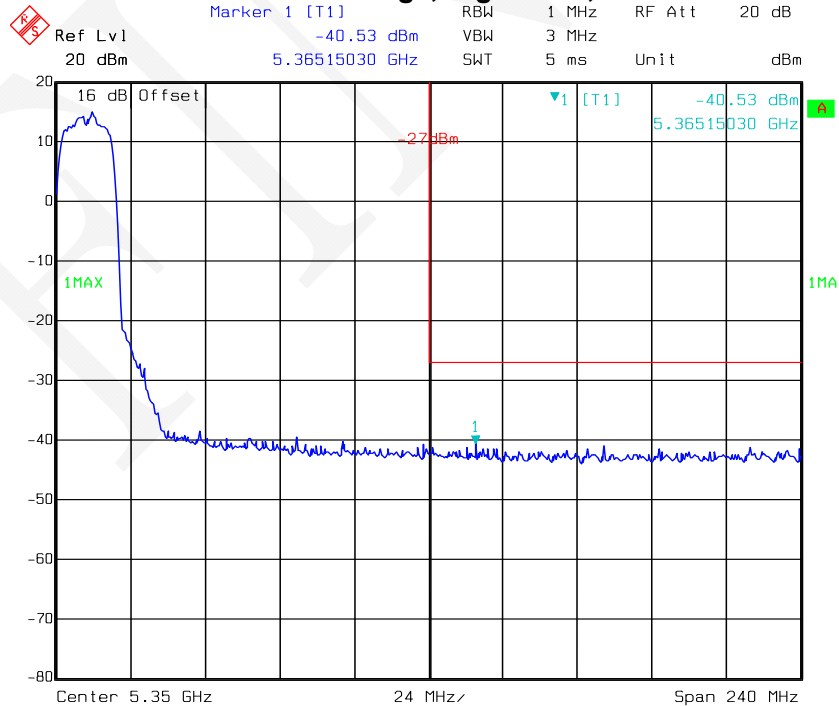


### 802.11ac20: Band Edge, Left Side, Antenna 1



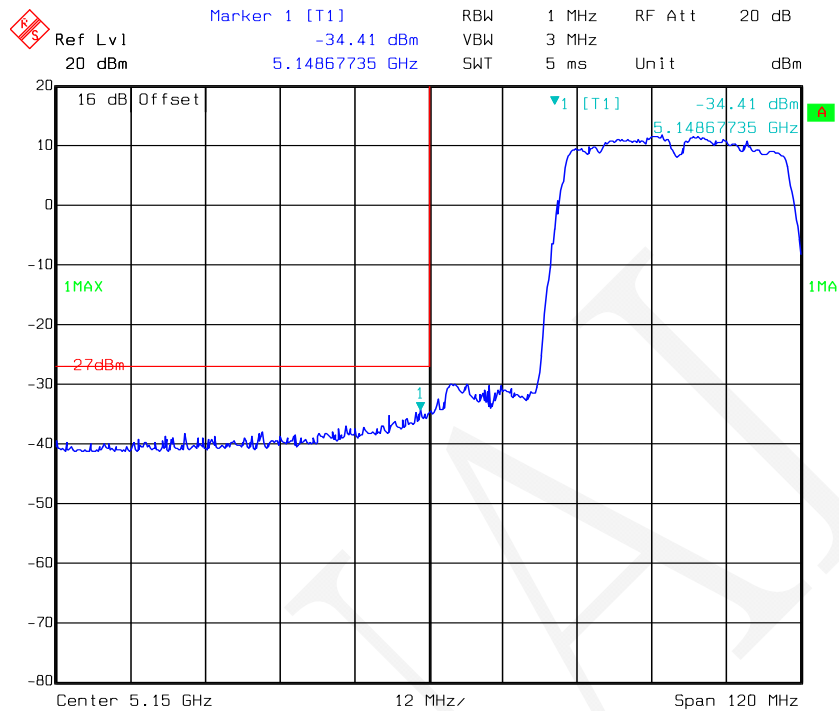
Date: 25.APR.2018 13:54:41

### 802.11ac20: Band Edge, Right Side, Antenna 1



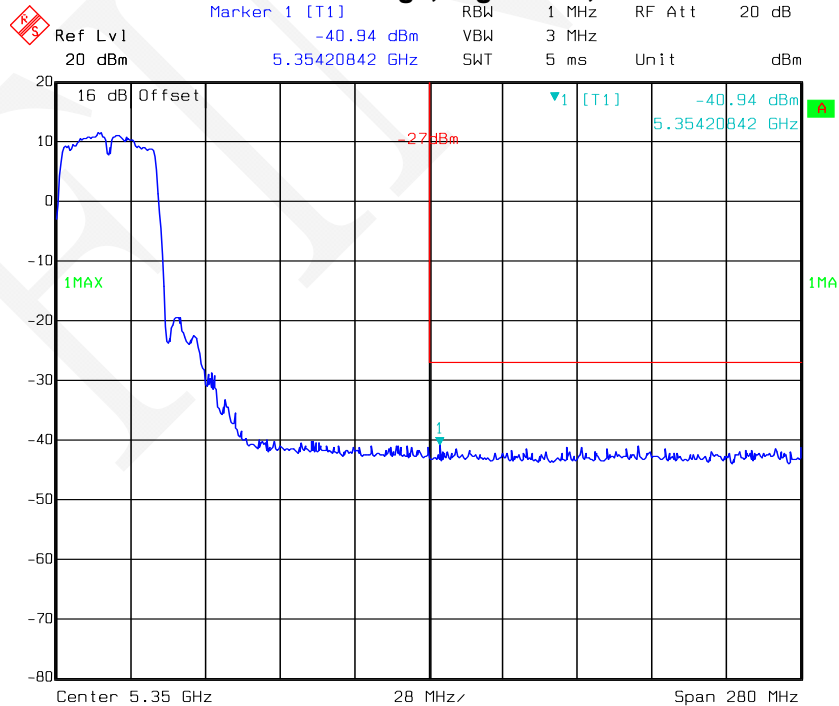
Date: 25.APR.2018 13:55:25

### 802.11ac40: Band Edge, Left Side, Antenna 0



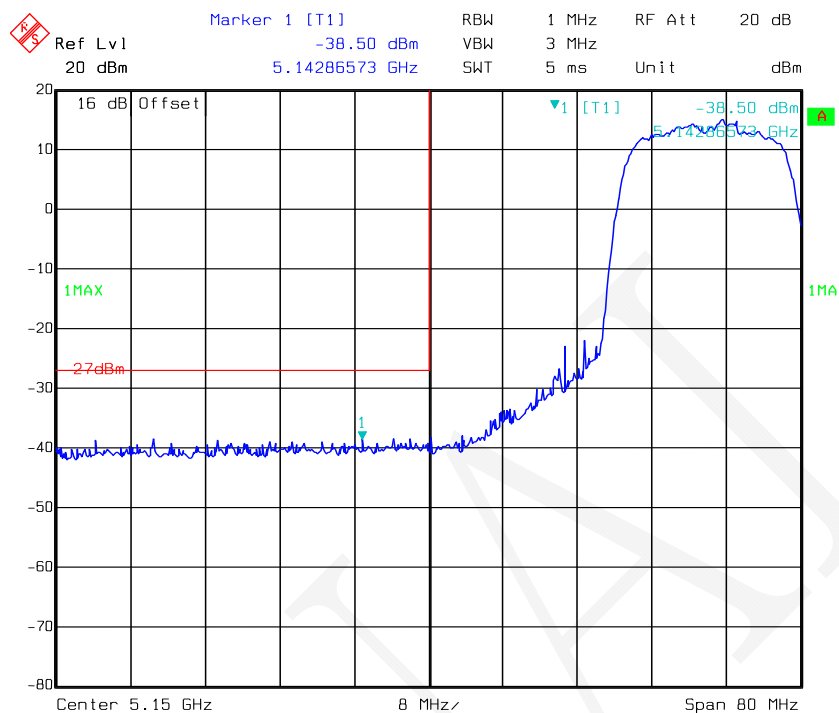
Date: 25.APR.2018 11:38:13

### 802.11ac40: Band Edge, Right Side, Antenna 0



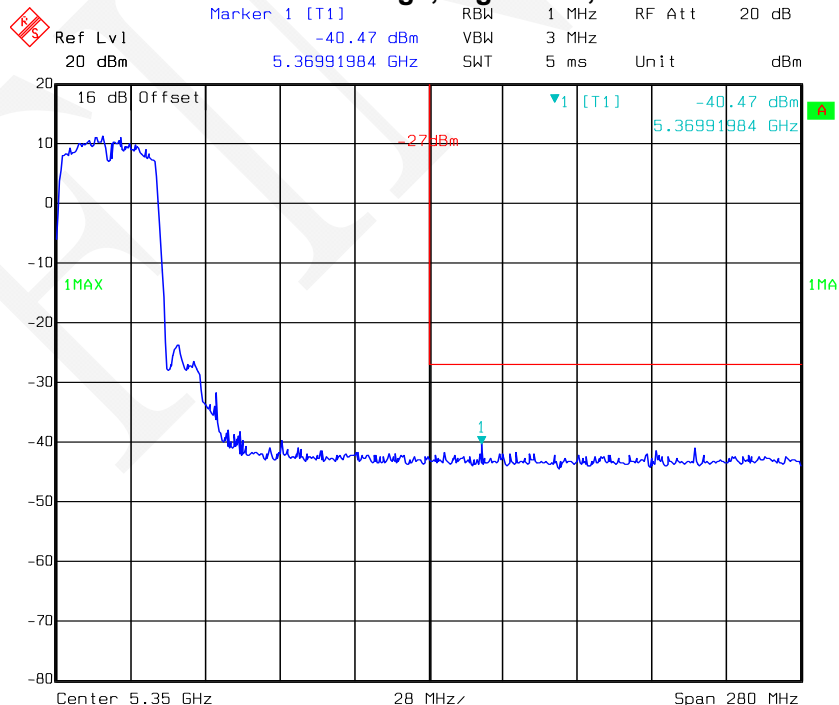
Date: 25.APR.2018 11:38:50

### 802.11ac40: Band Edge, Left Side, Antenna 1



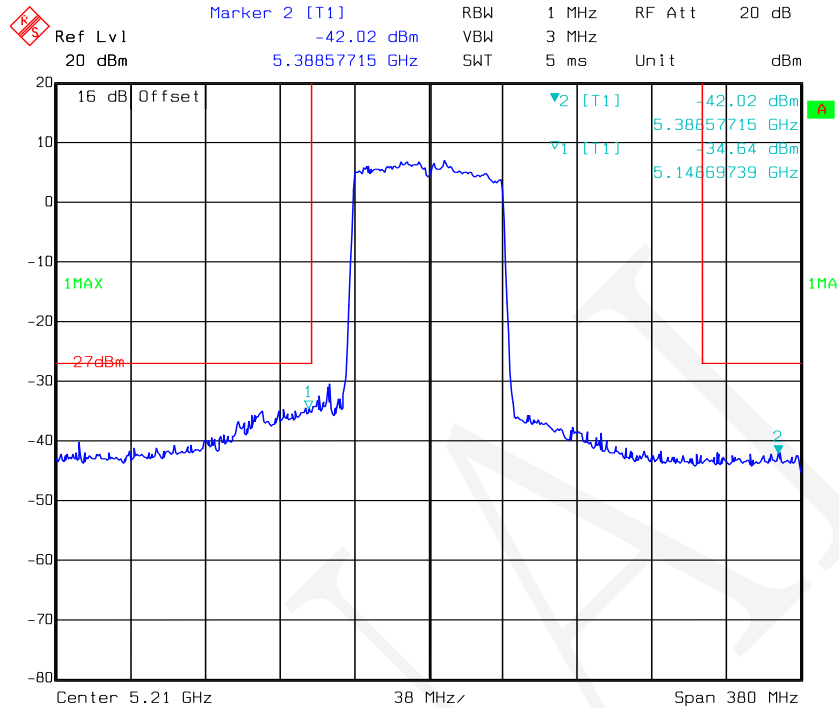
Date: 25.APR.2018 13:54:41

### 802.11ac40: Band Edge, Right Side, Antenna 1



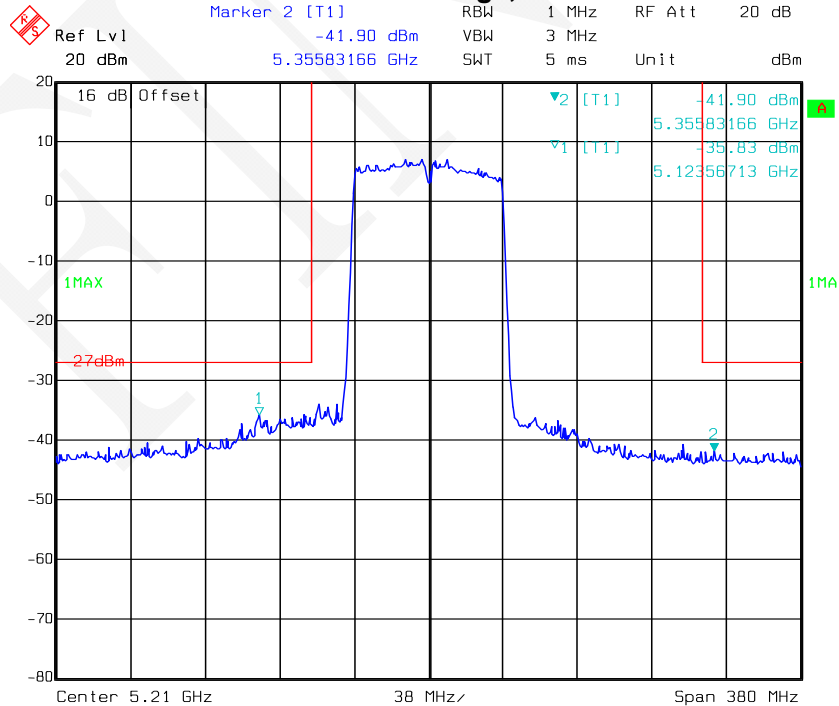
Date: 25.APR.2018 13:58:18

### 802.11ac80: Band Edge, Antenna 0



Date: 25.APR.2018 12:55:34

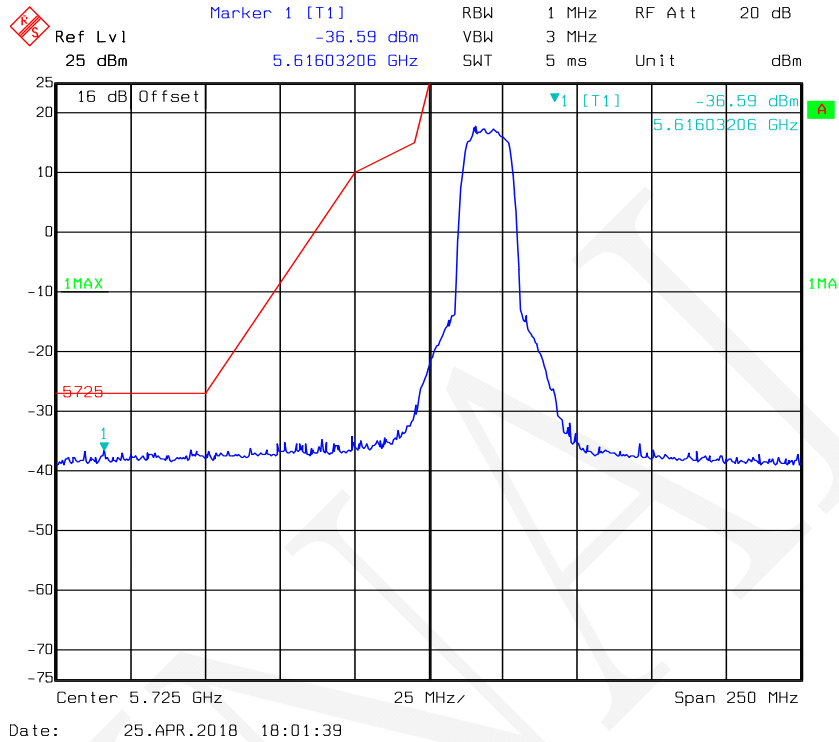
### 802.11ac80: Band Edge, Antenna 1



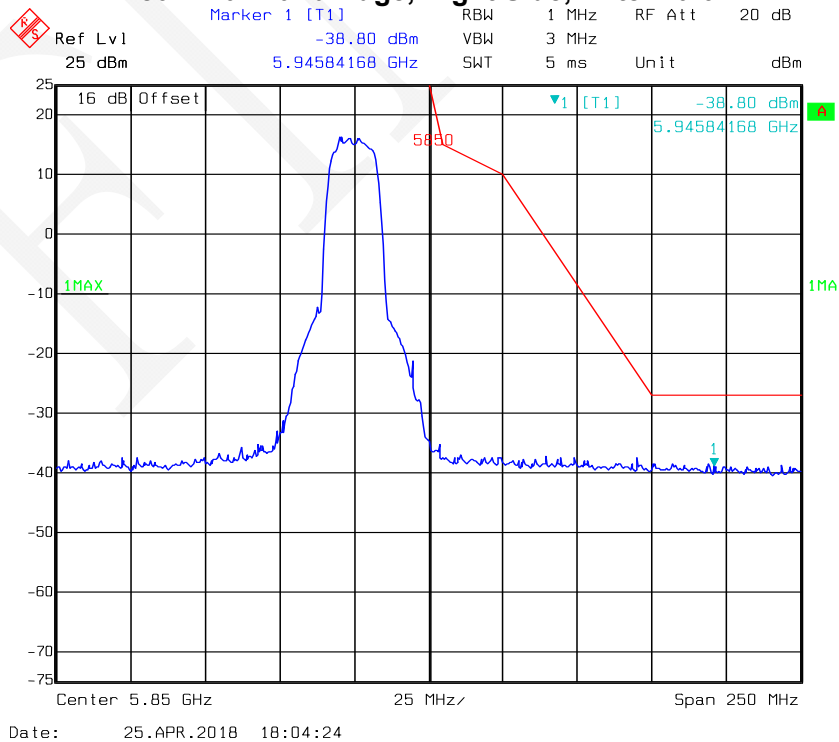
Date: 25.APR.2018 14:01:40

**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.)**

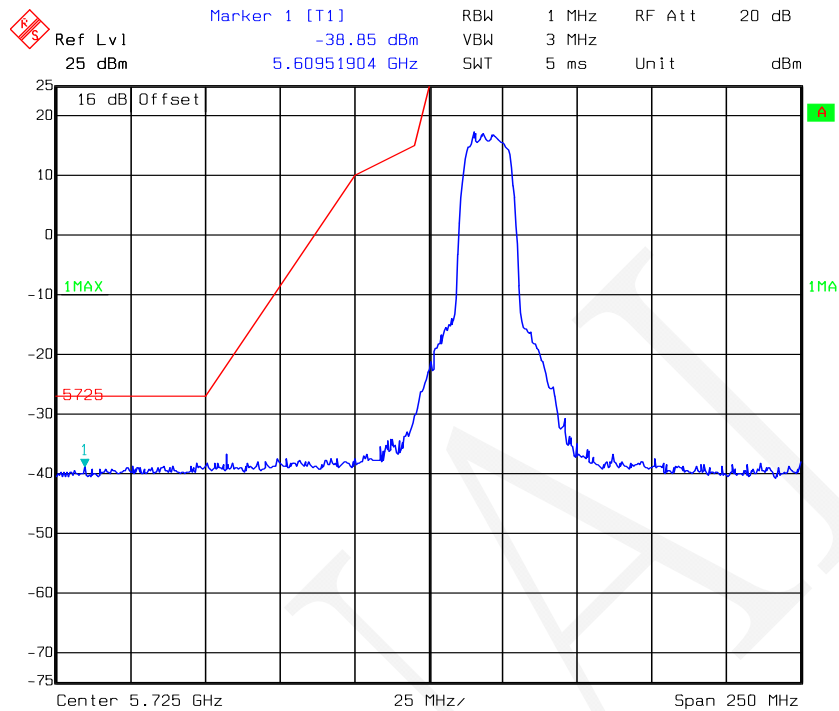
**802.11a: Band Edge, Left Side, Antenna 0**



**802.11a: Band Edge, Right Side, Antenna 0**

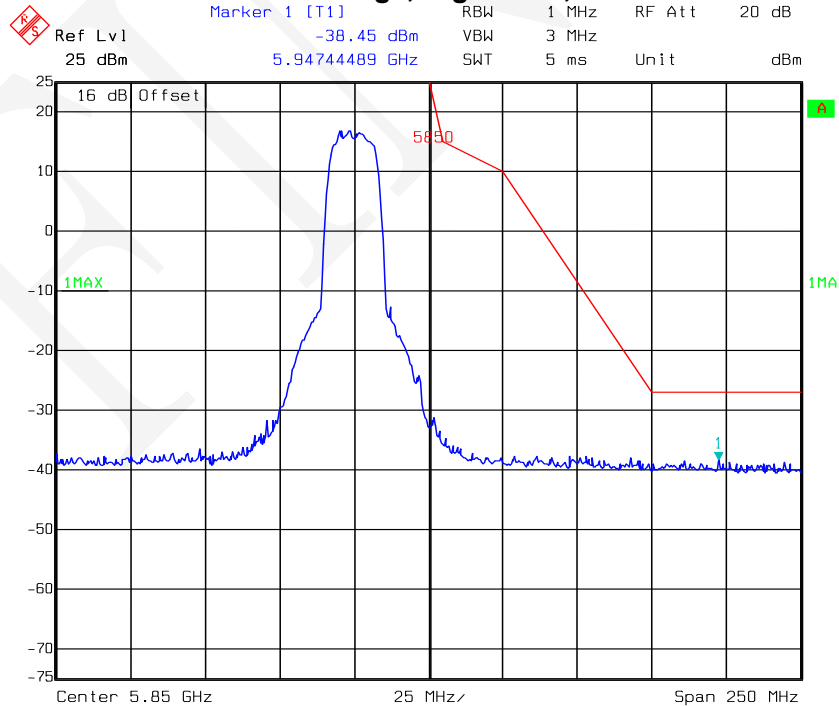


### 802.11a: Band Edge, Left Side, Antenna 1



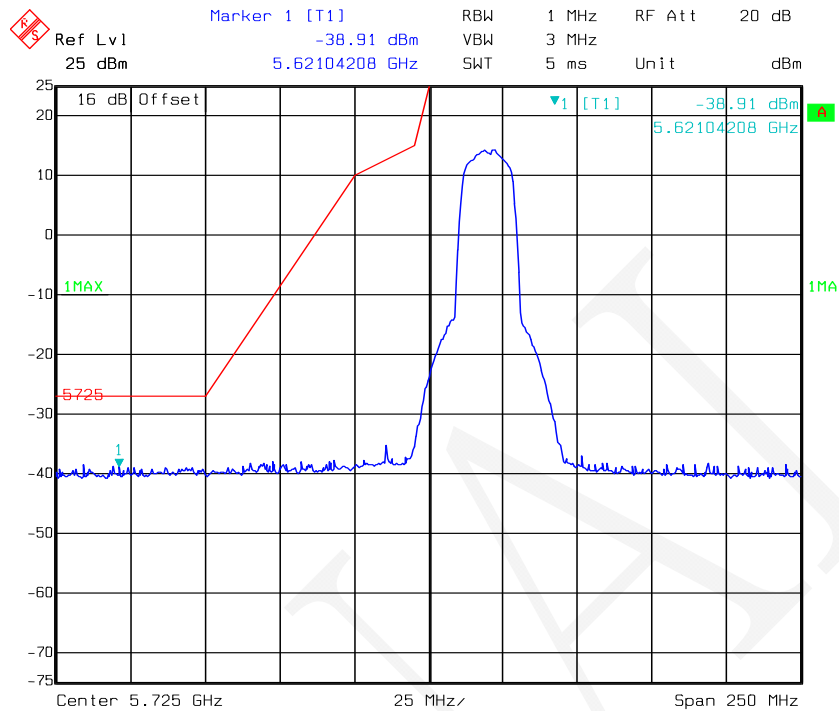
Date: 25.APR.2018 17:07:25

### 802.11a: Band Edge, Right Side, Antenna 1



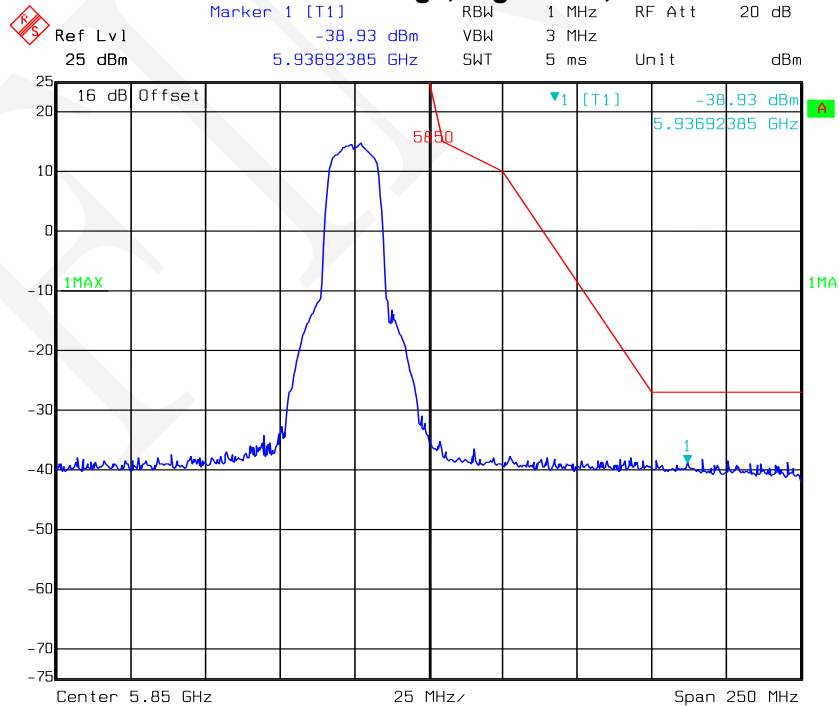
Date: 25.APR.2018 17:16:35

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



Date: 25.APR.2018 17:58:12

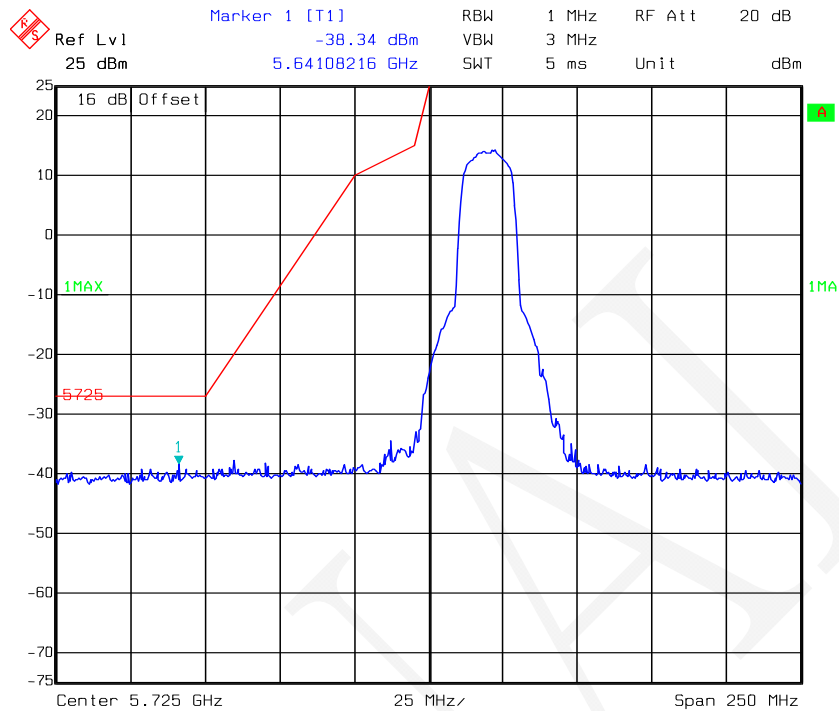
### 802.11n-HT20: Band Edge, Right Side, Antenna 0



Date: 25.APR.2018 18:05:32

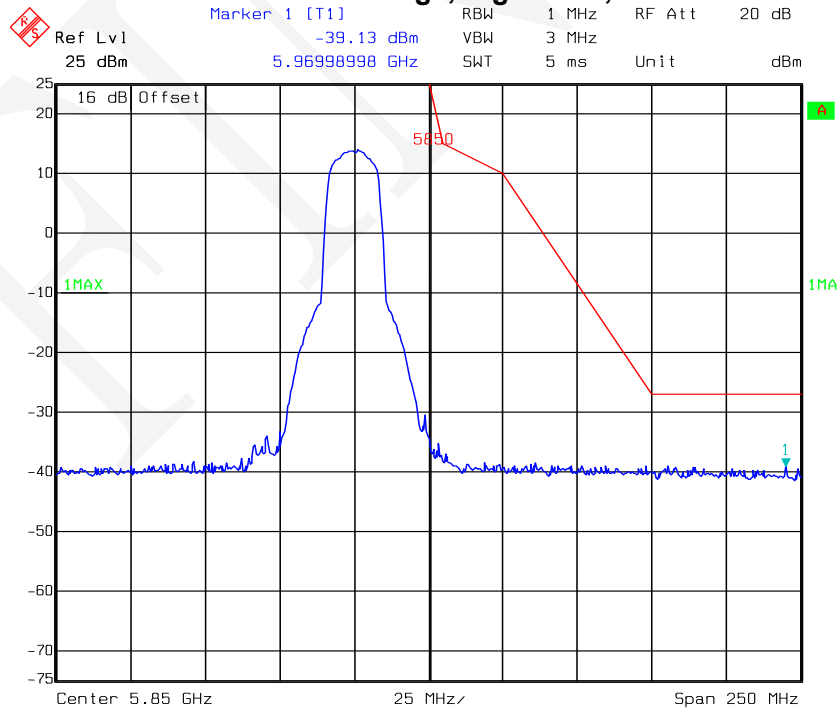


### 802.11n-HT20: Band Edge, Left Side, Antenna 1



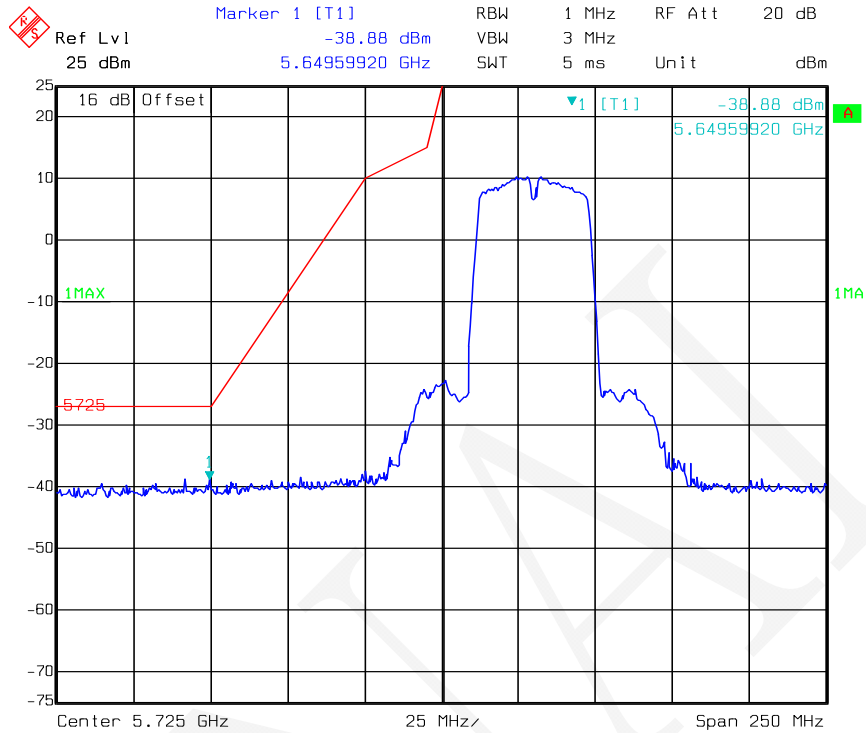
Date: 25.APR.2018 17:08:25

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



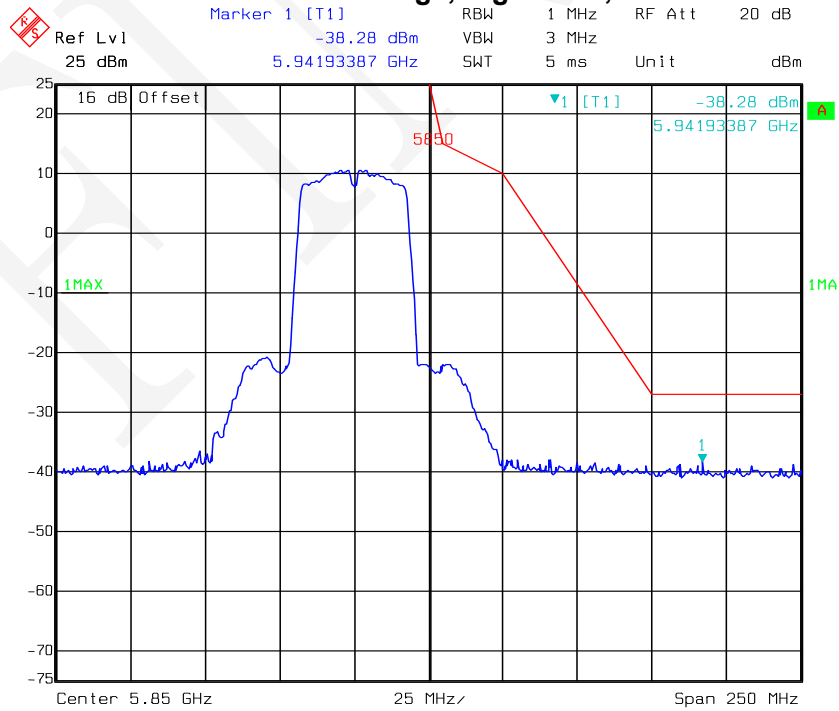
Date: 25.APR.2018 17:12:40

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



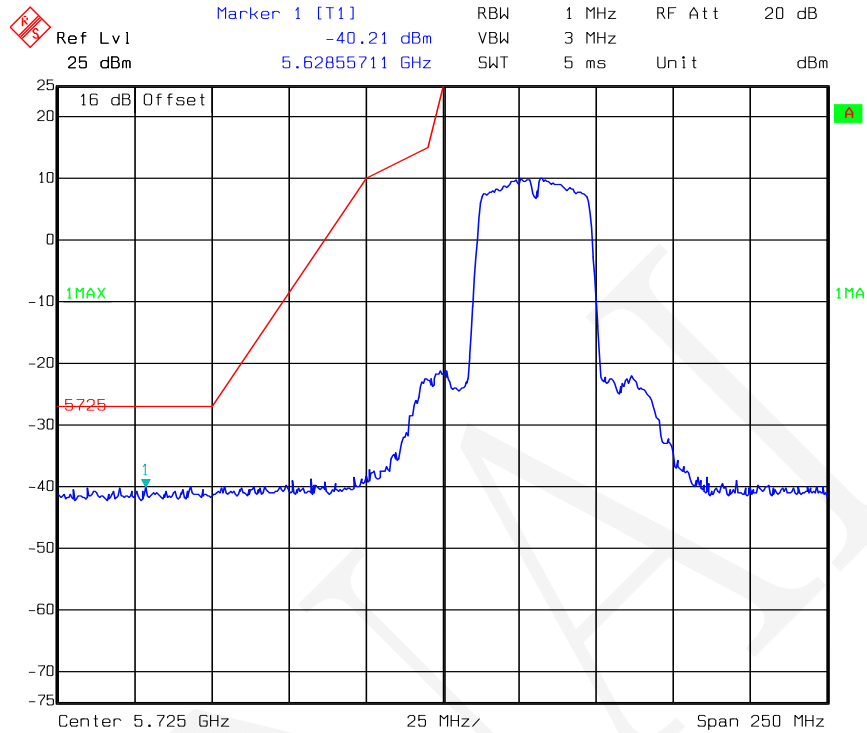
Date: 25.APR.2018 17:55:27

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



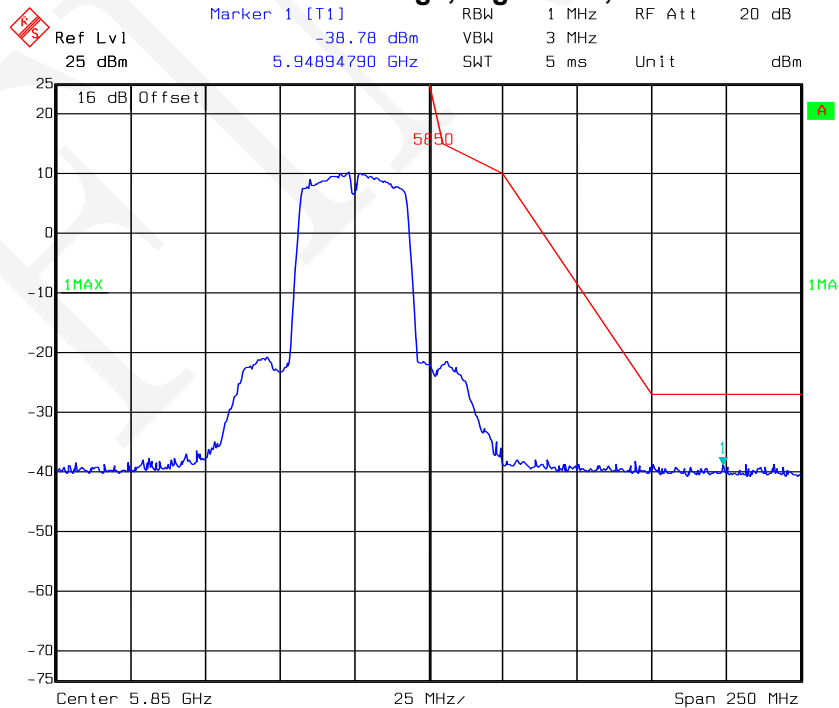
Date: 25.APR.2018 18:10:39

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



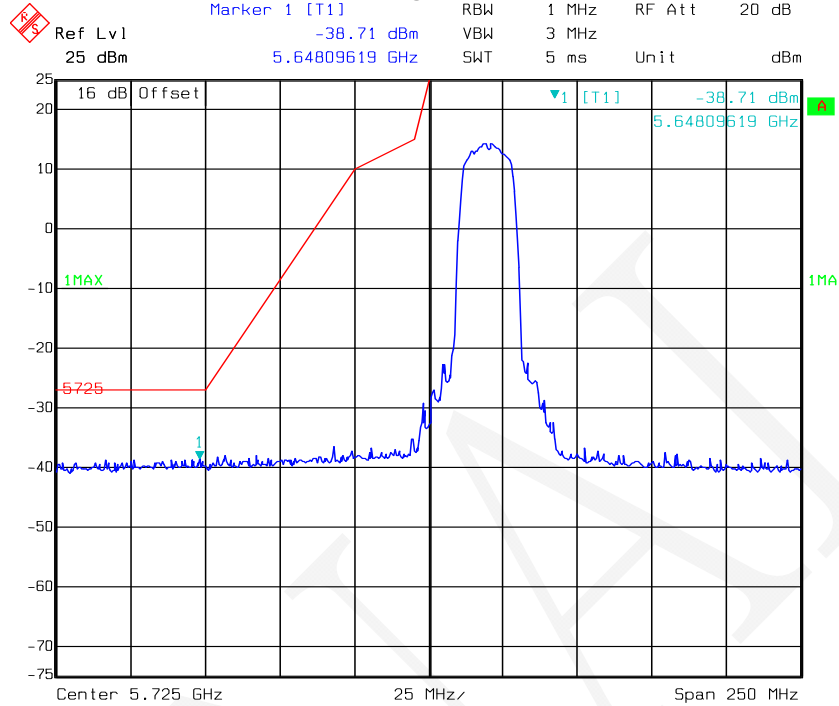
Date: 25.APR.2018 17:02:37

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



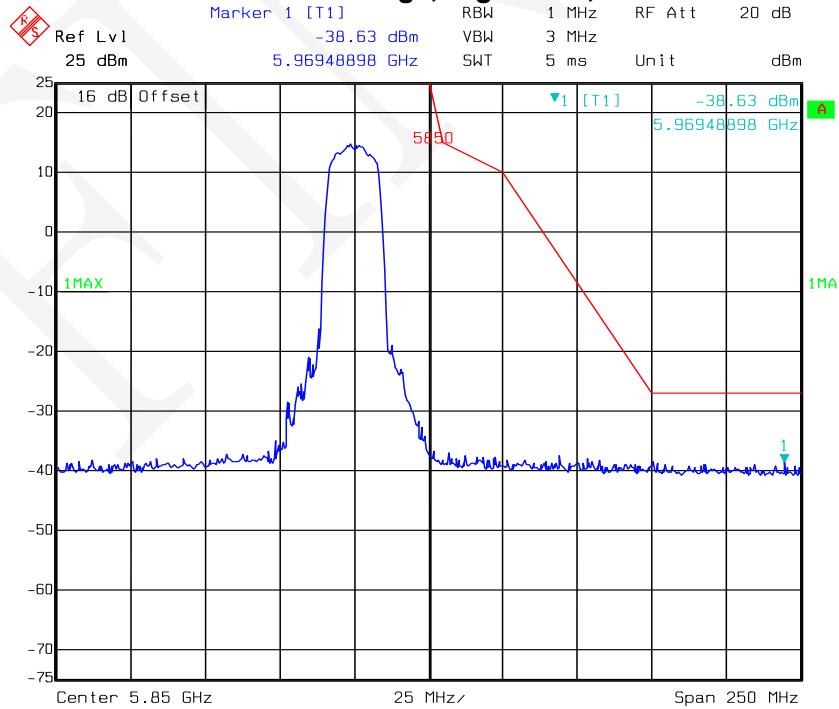
Date: 25.APR.2018 17:18:57

### 802.11ac20: Band Edge, Left Side, Antenna 0



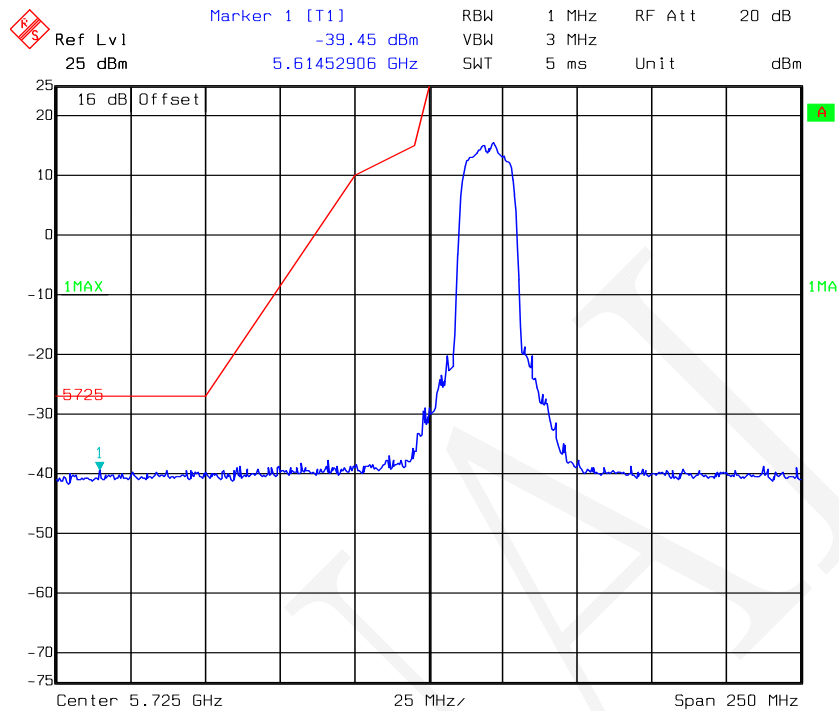
Date: 25.APR.2018 17:59:44

### 802.11ac20: Band Edge, Right Side, Antenna 0



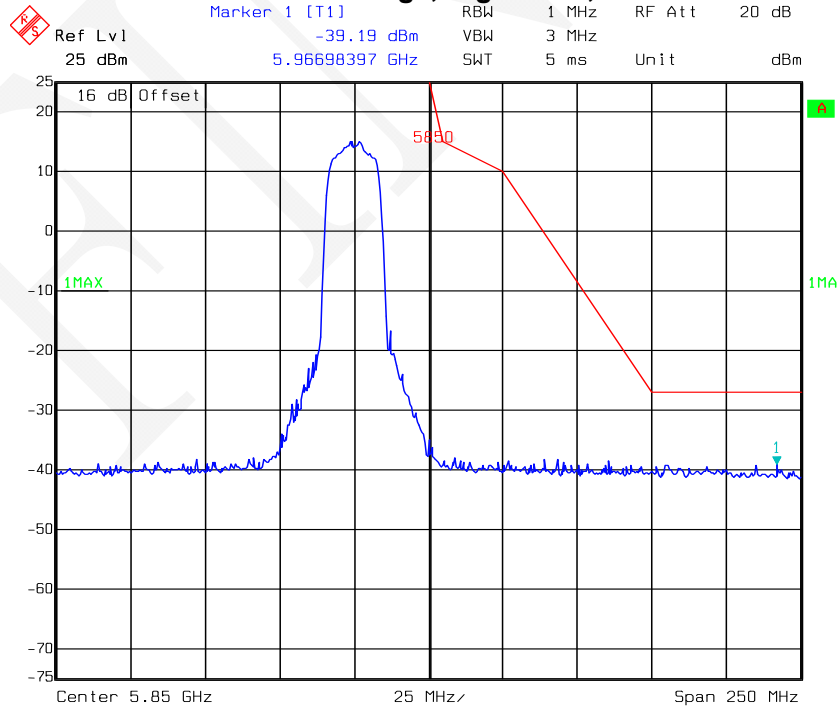
Date: 25.APR.2018 18:06:54

### 802.11ac20: Band Edge, Left Side, Antenna 1



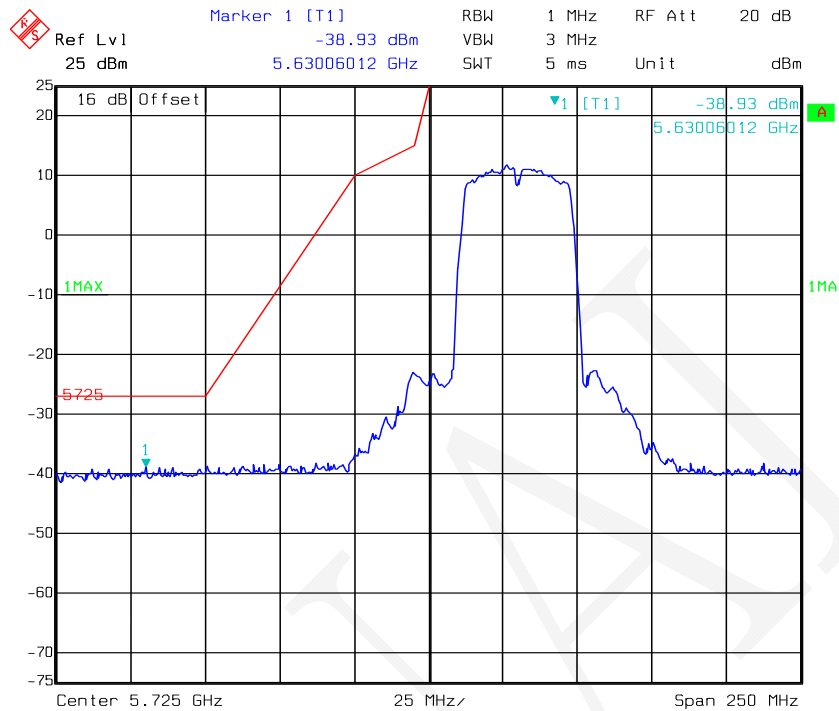
Date: 25.APR.2018 17:10:15

### 802.11ac20: Band Edge, Right Side, Antenna 1



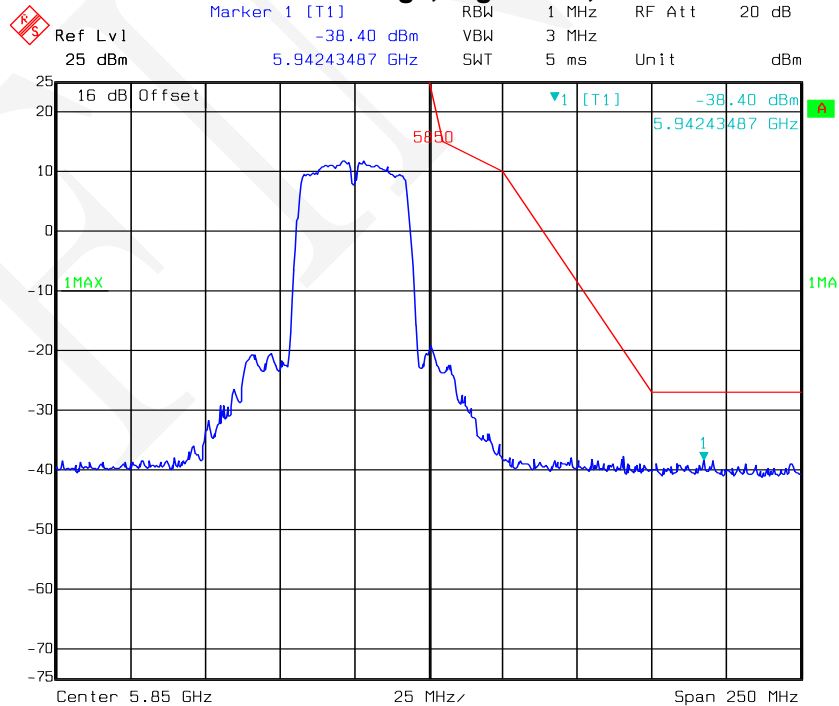
Date: 25.APR.2018 17:11:28

### 802.11ac40: Band Edge, Left Side, Antenna 0



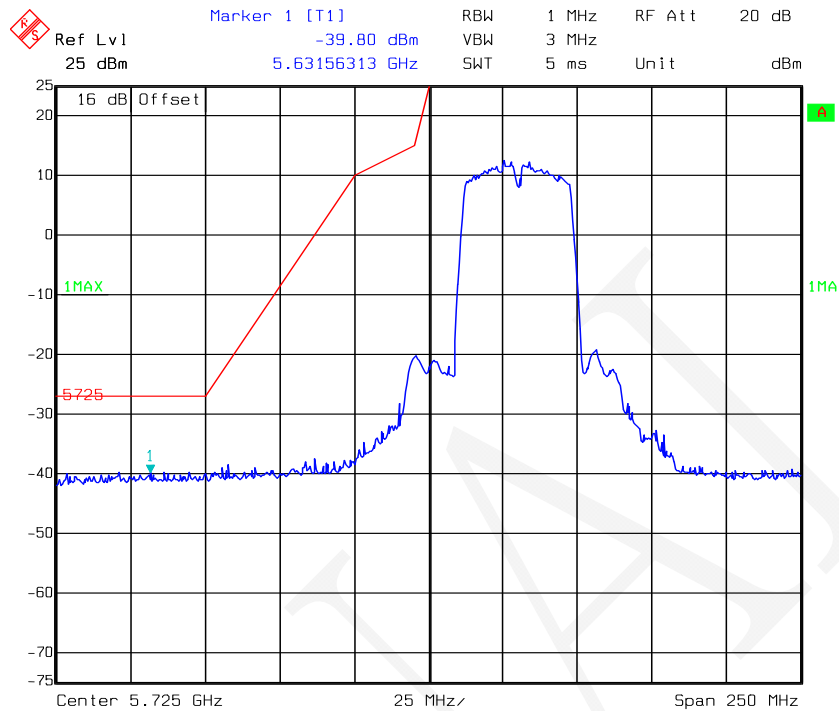
Date: 25.APR.2018 17:53:49

### 802.11ac40: Band Edge, Right Side, Antenna 0



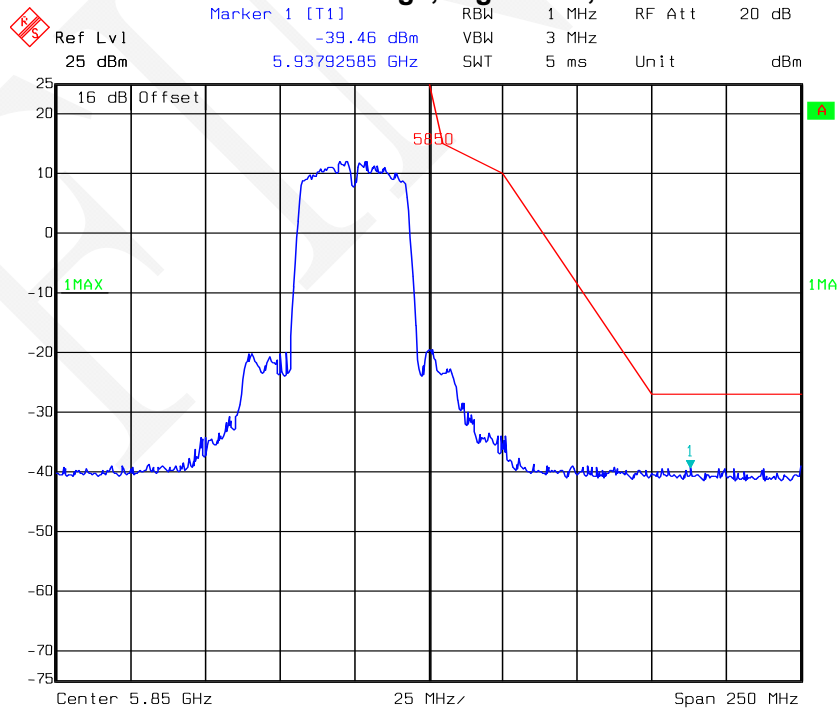
Date: 25.APR.2018 18:08:49

### 802.11ac40: Band Edge, Left Side, Antenna 1



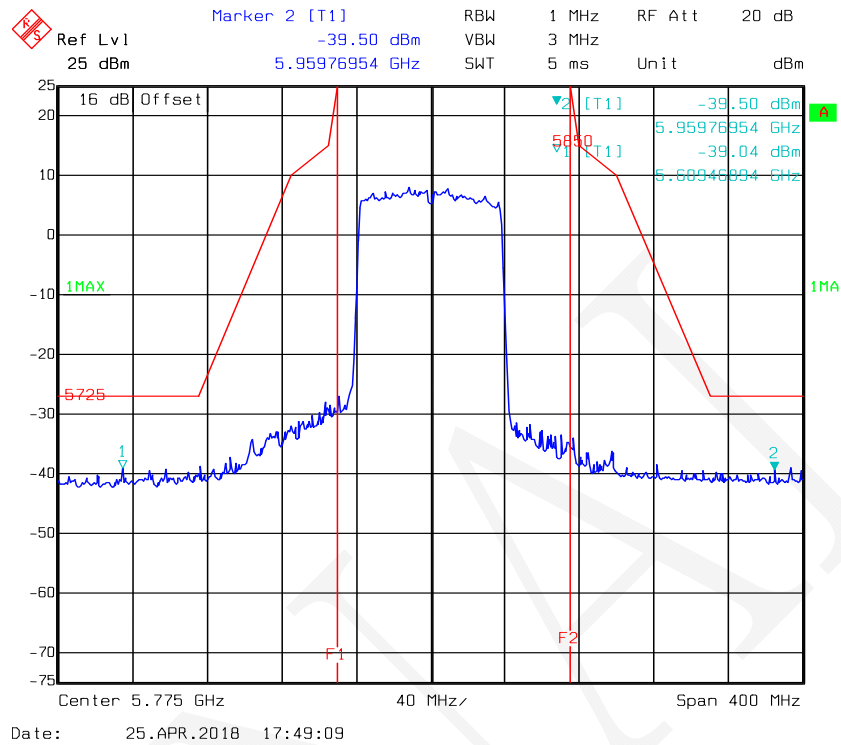
Date: 25.APR.2018 17:00:09

### 802.11ac40: Band Edge, Right Side, Antenna 1

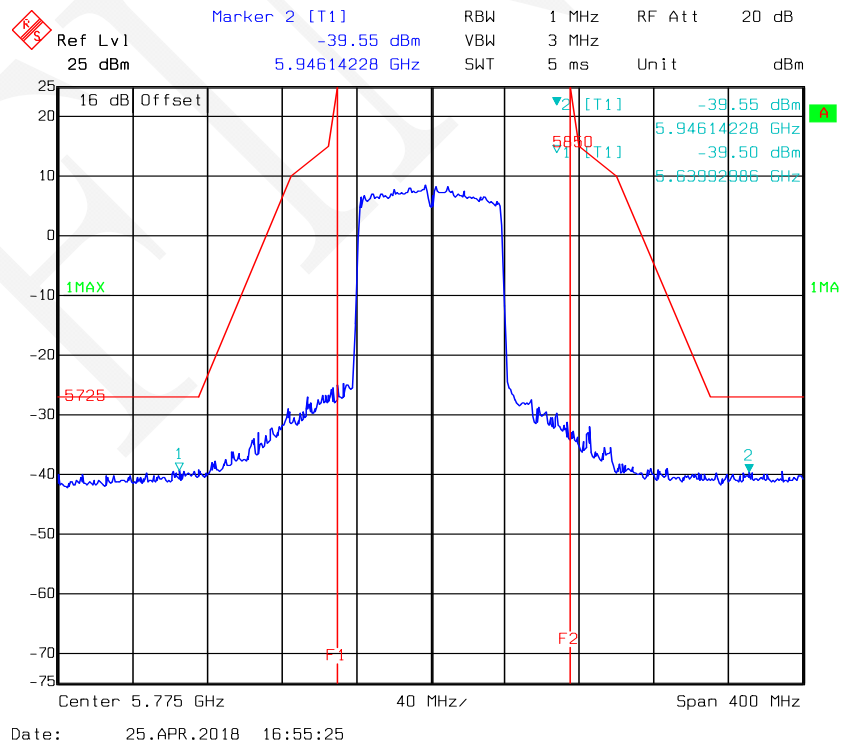


Date: 25.APR.2018 17:21:08

### 802.11ac80: Band Edge, Antenna 0



### 802.11ac80: Band Edge, Antenna 1





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

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### **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)  $\geq 3 \times$  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  $\geq 3 \cdot$  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:	23 °C
Relative Humidity:	46 %
ATM Pressure:	95.7 kPa

\* The testing was performed by Tom Tang on 2018-04-25.

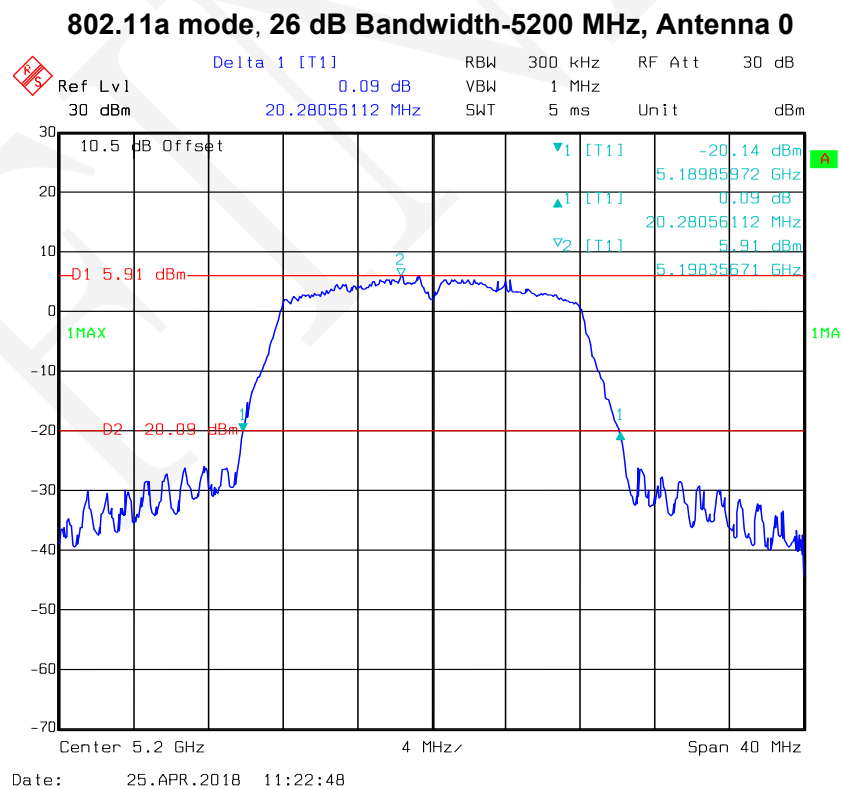
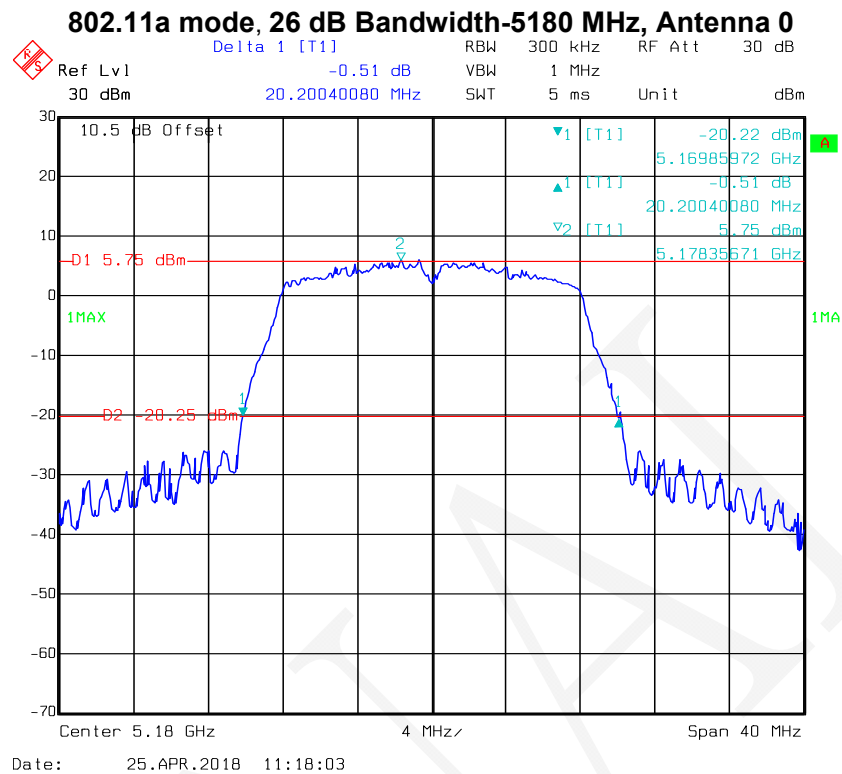
**Test Result:** Pass. Please refer to the following tables and plots.

*Test mode: Transmitting*

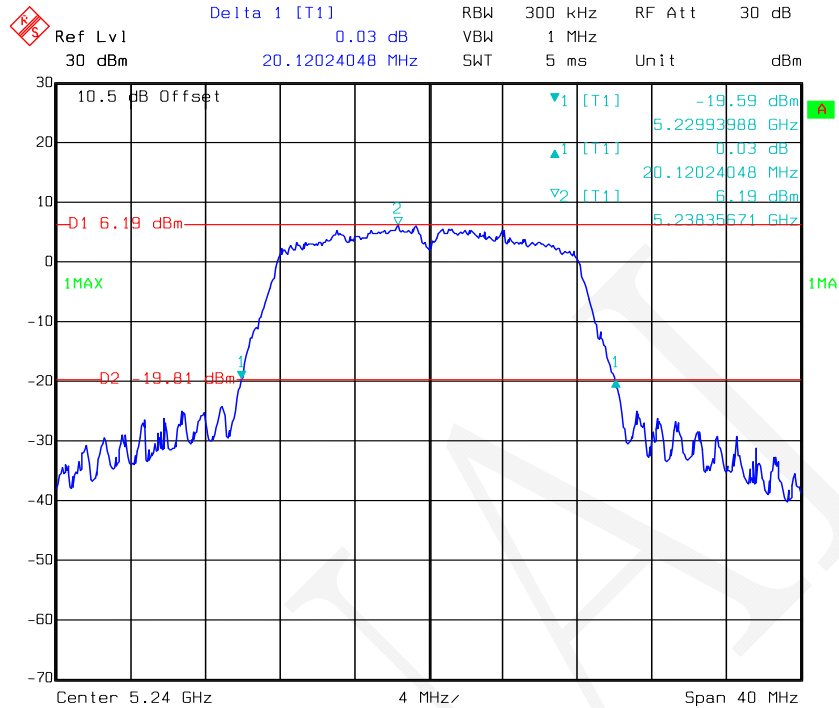
### For 5150-5250 MHz:

Mode	Channel	Frequency (MHz)	26dB Bandwidth (MHz)		99% Occupied Bandwidth (MHz)	
			Antenna 0	Antenna 1	Antenna 0	Antenna 1
802.11a	Low	5180	20.20	20.28	16.67	16.75
	Middle	5200	20.28	20.12	16.83	16.75
	High	5240	20.12	20.28	16.75	16.83
802.11n-HT20	Low	5180	20.44	20.52	17.72	17.72
	Middle	5200	20.44	20.52	17.72	17.80
	High	5240	20.60	20.52	17.72	17.72
802.11n-HT40	Low	5190	40.24	40.24	36.39	36.55
	High	5230	40.24	40.40	36.55	36.39
802.11ac20	Low	5180	20.36	20.28	17.72	17.72
	Middle	5200	20.44	20.28	17.72	17.72
	High	5240	20.44	20.28	17.72	17.72
802.11ac40	Low	5190	40.56	40.24	36.55	36.55
	High	5230	40.88	40.24	36.55	36.55
802.11ac80	-	5210	81.44	81.44	75.99	75.99

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

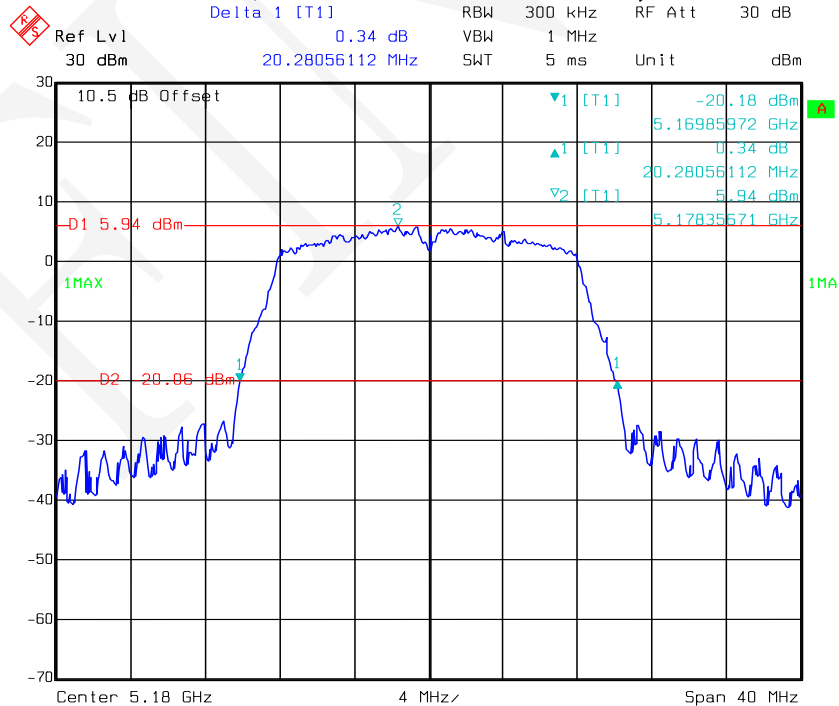


### 802.11a mode, 26 dB Bandwidth-5240 MHz, Antenna 0



Date: 25.APR.2018 11:24:14

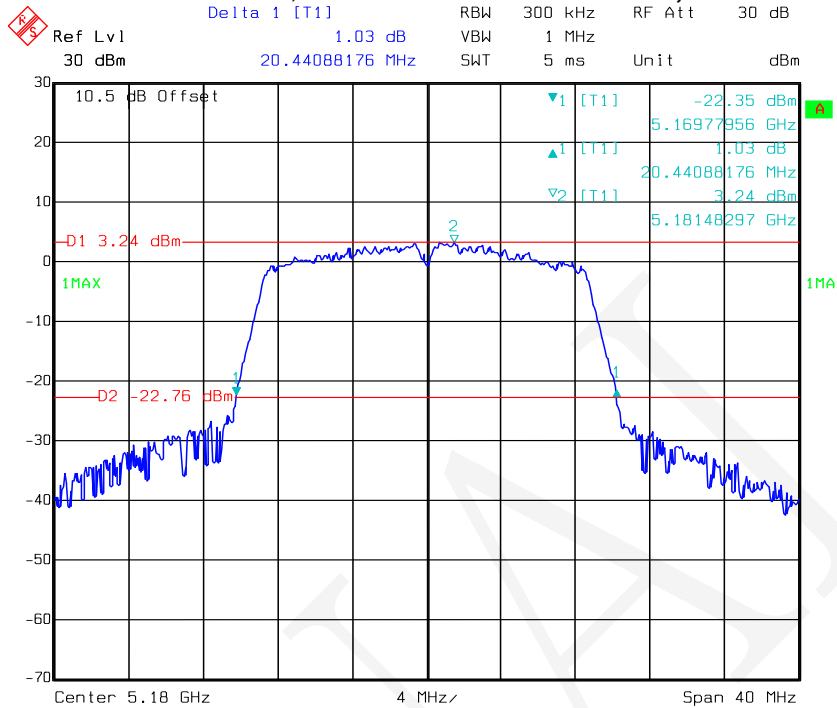
### 802.11a mode, 26 dB Bandwidth-5180 MHz, Antenna 1



Date: 25.APR.2018 13:03:48

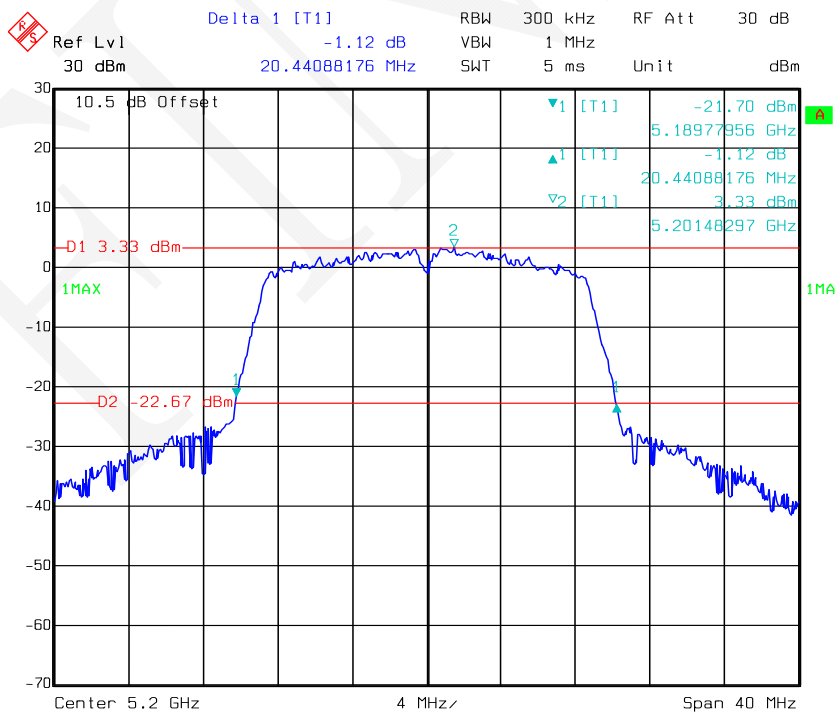


### 802.11n-HT20 mode, 26 dB Bandwidth-5180 MHz, Antenna 0



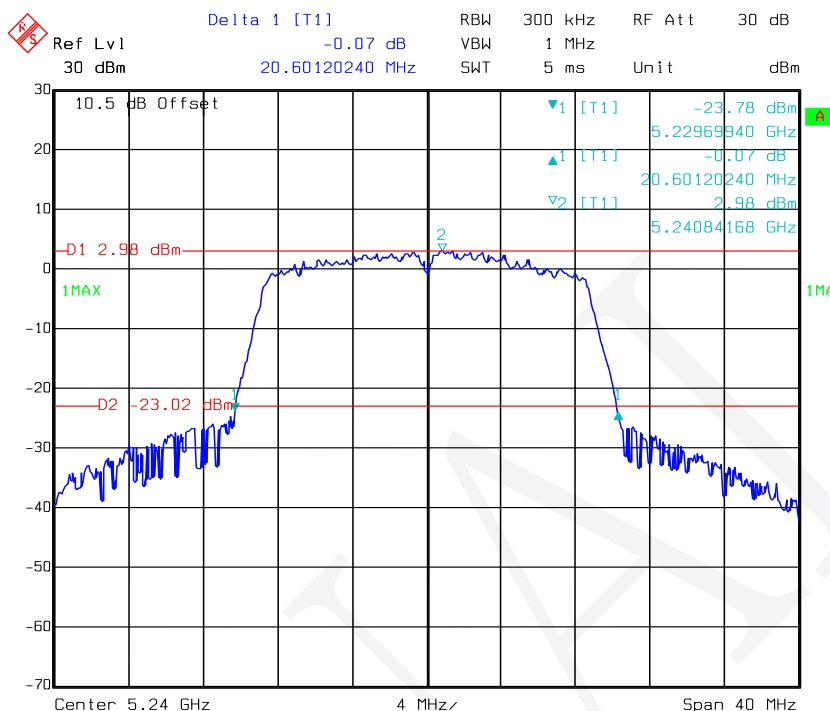
Date: 25.APR.2018 10:45:49

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

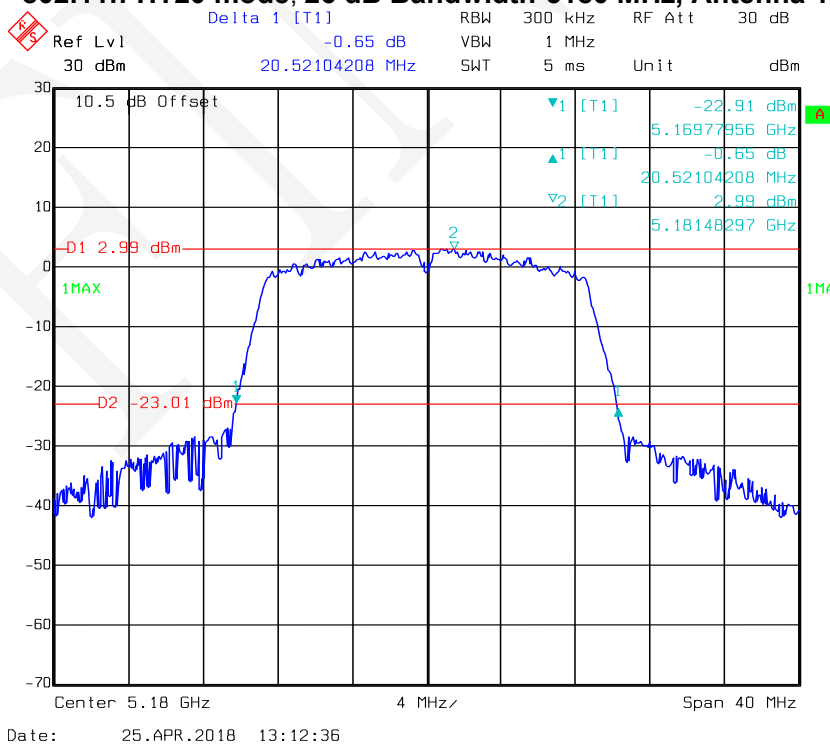


Date: 25.APR.2018 10:47:31

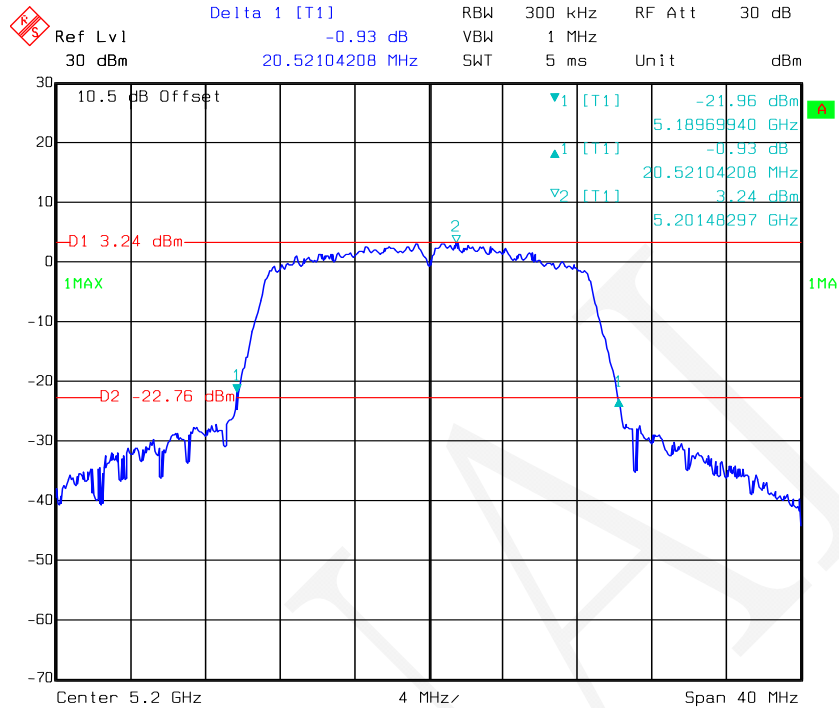
### 802.11n-HT20 mode, 26 dB Bandwidth-5240 MHz, Antenna 0



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

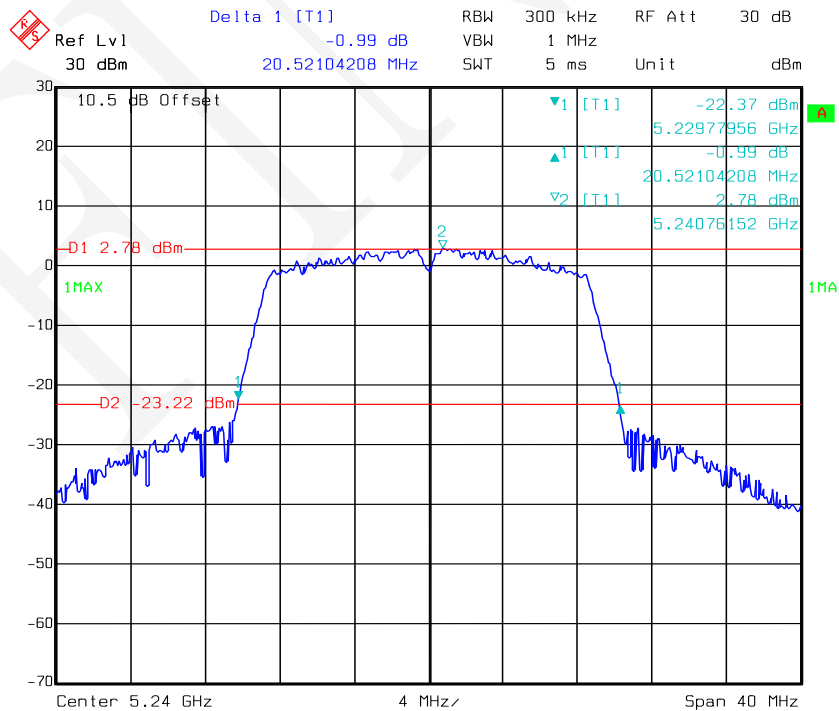


### 802.11n-HT20 mode, 26 dB Bandwidth-5200 MHz, Antenna 1



Date: 25.APR.2018 13:15:05

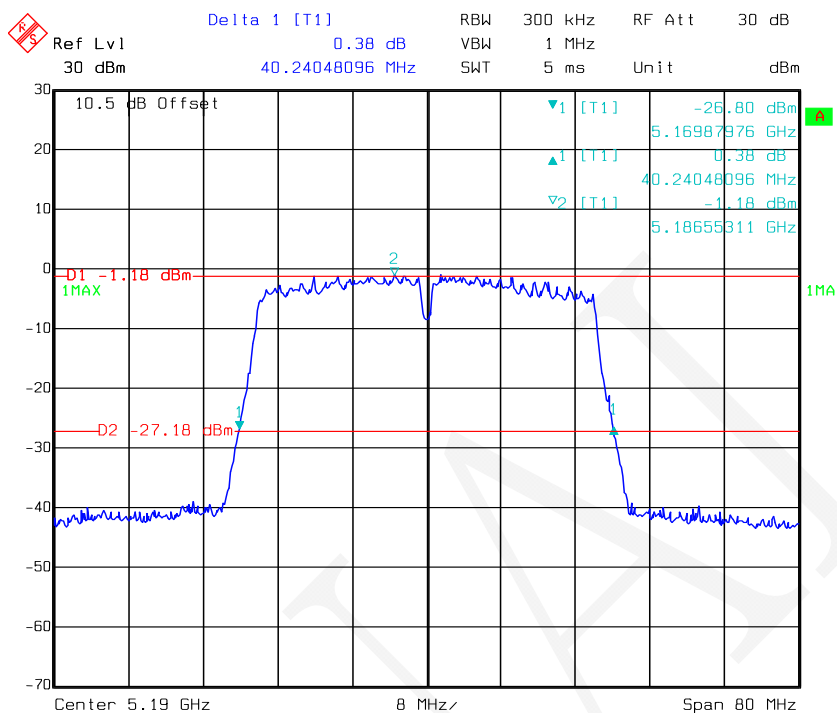
### 802.11n-HT20 mode, 26 dB Bandwidth-5240 MHz, Antenna 1



Date: 25.APR.2018 13:16:28

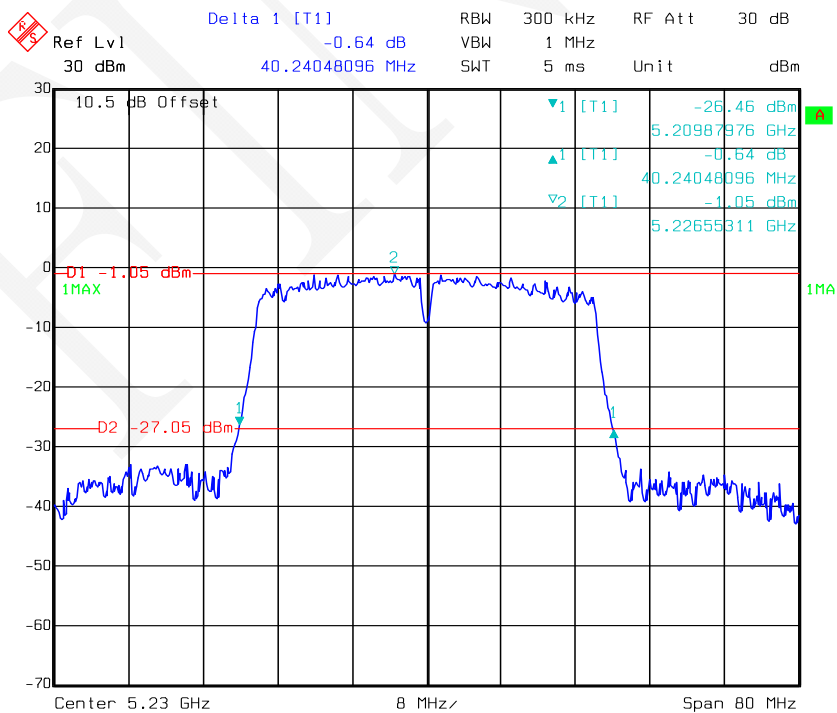


### 802.11n-HT40 mode, 26 dB Bandwidth-5190 MHz, Antenna 0



Date: 25.APR.2018 11:01:42

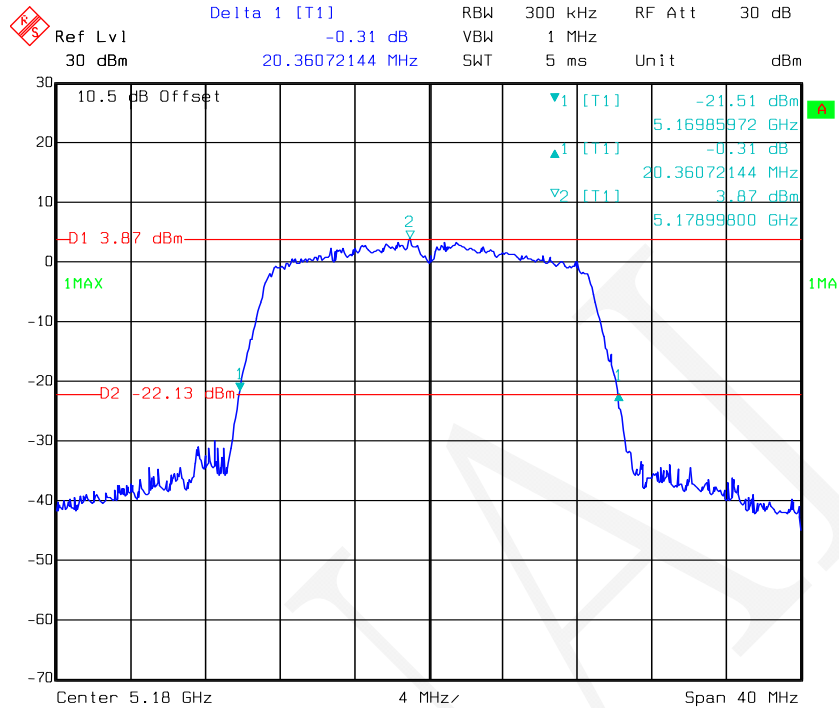
### 802.11n-HT40 mode, 26 dB Bandwidth-5230 MHz, Antenna 0



Date: 25.APR.2018 11:03:13

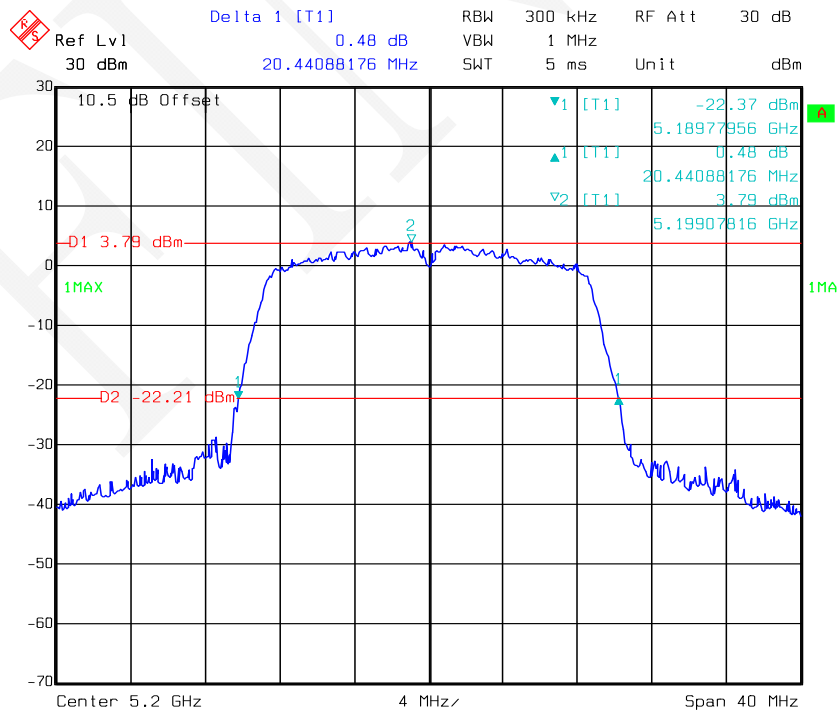


### 802.11ac20 mode, 26 dB Bandwidth-5180 MHz, Antenna 0



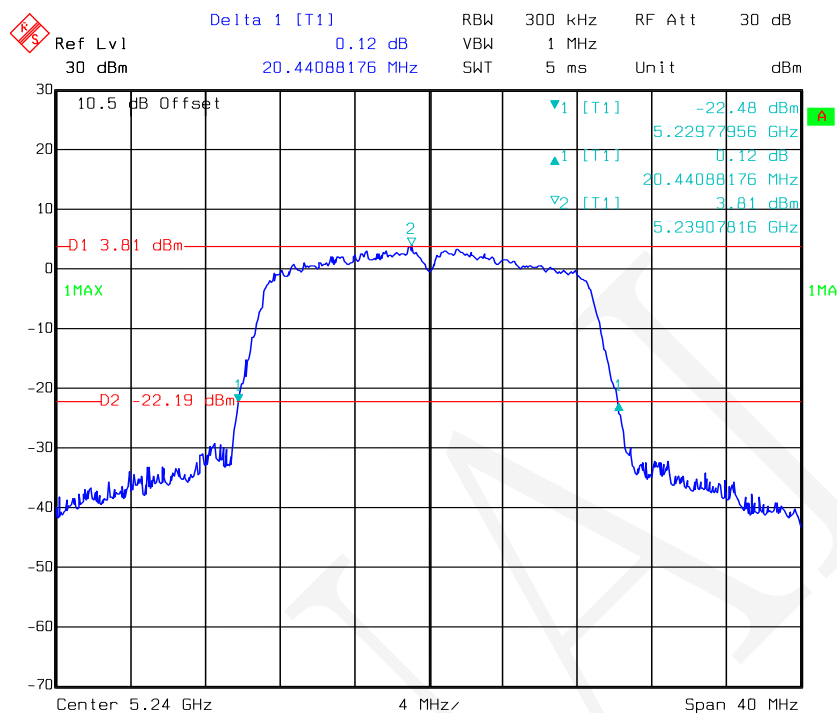
Date: 25.APR.2018 10:51:05

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



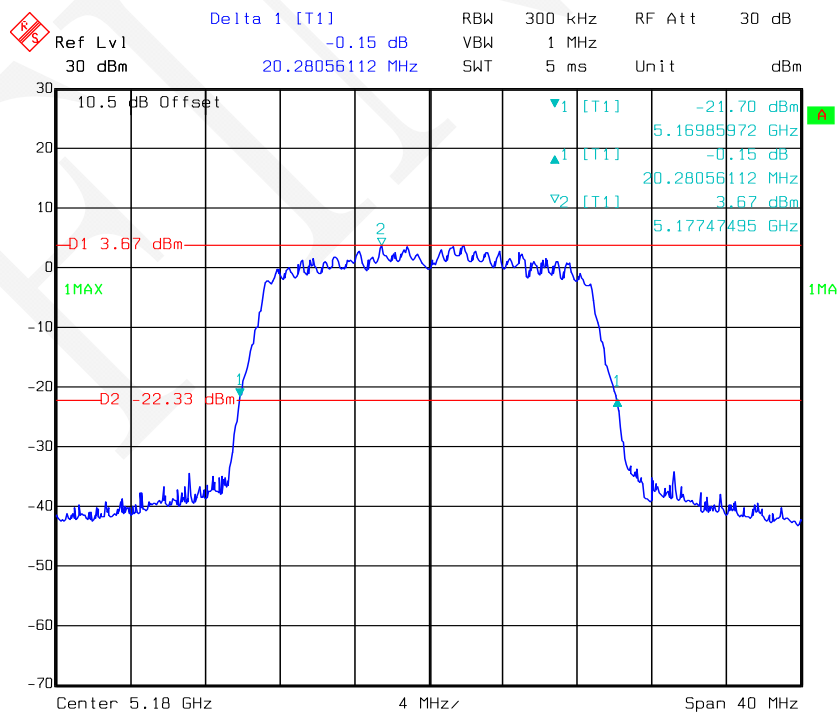
Date: 25.APR.2018 10:52:40

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



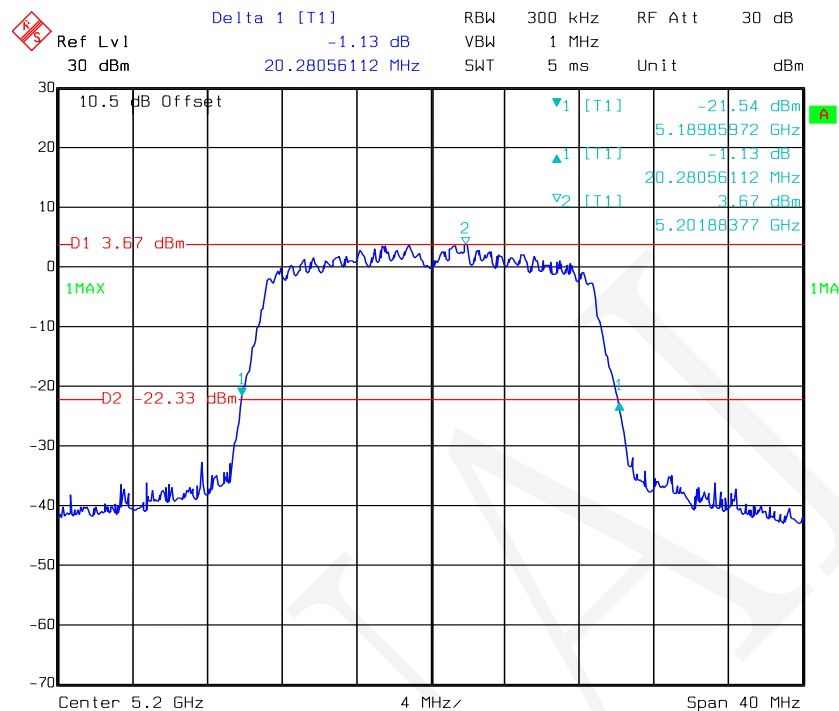
Date: 25.APR.2018 10:54:31

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



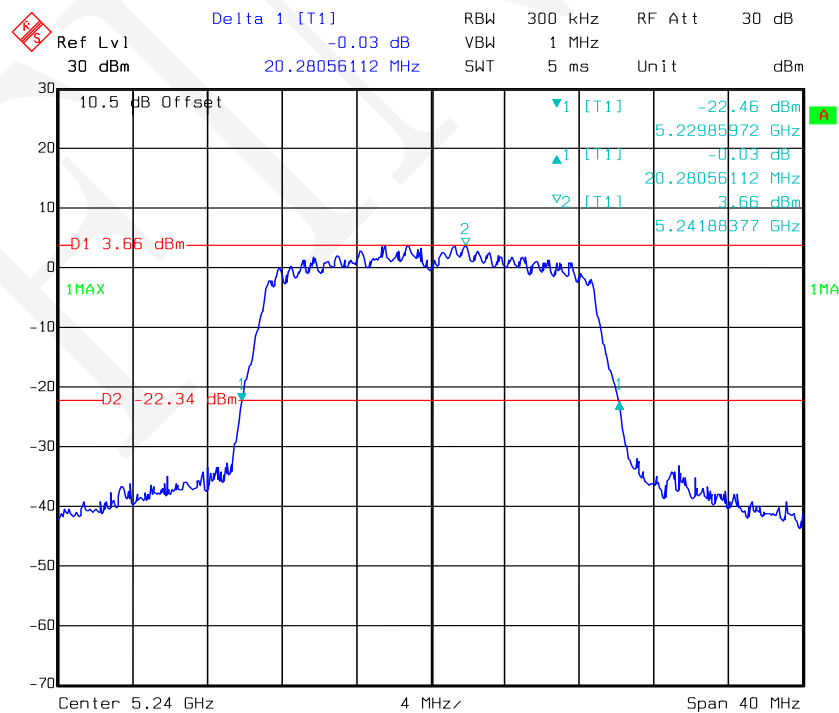
Date: 25.APR.2018 13:21:34

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



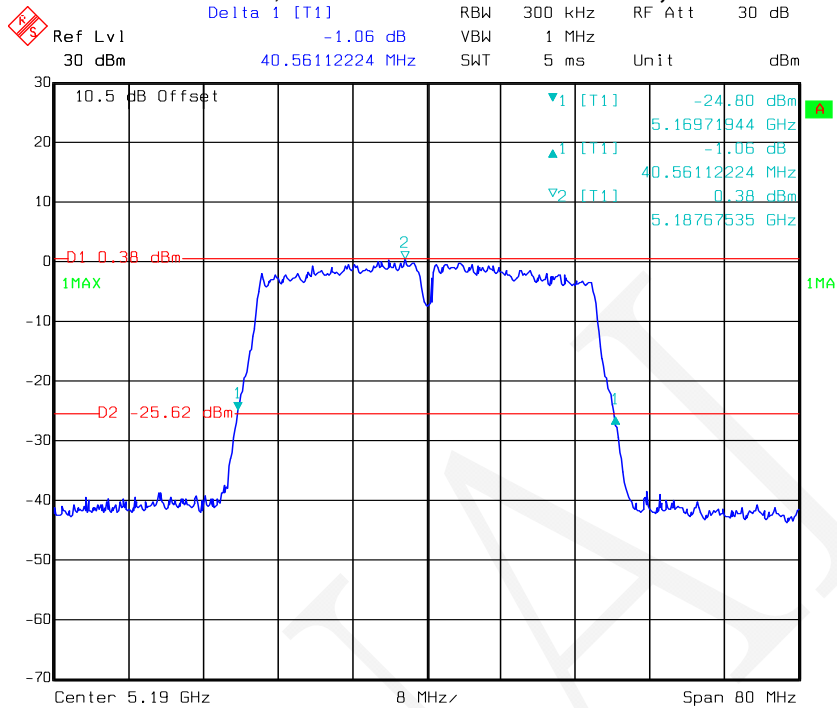
Date: 25.APR.2018 13:22:56

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



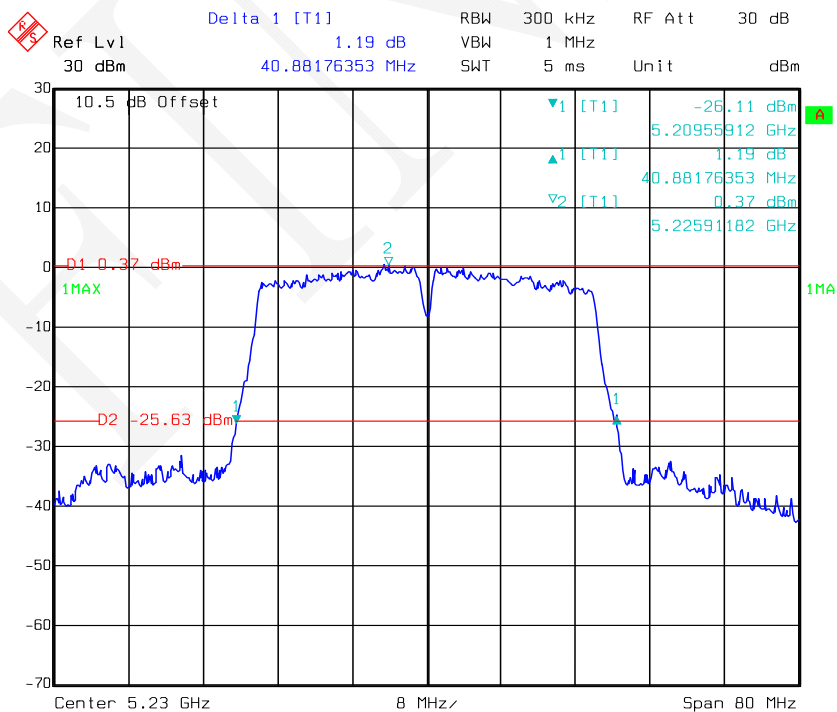
Date: 25.APR.2018 13:24:17

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



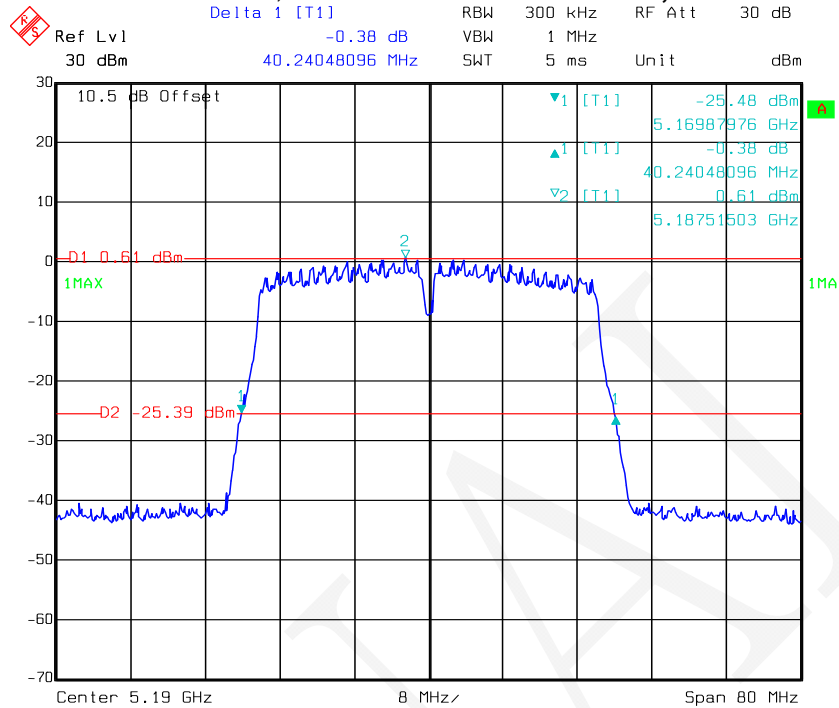
Date: 25.APR.2018 11:05:13

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

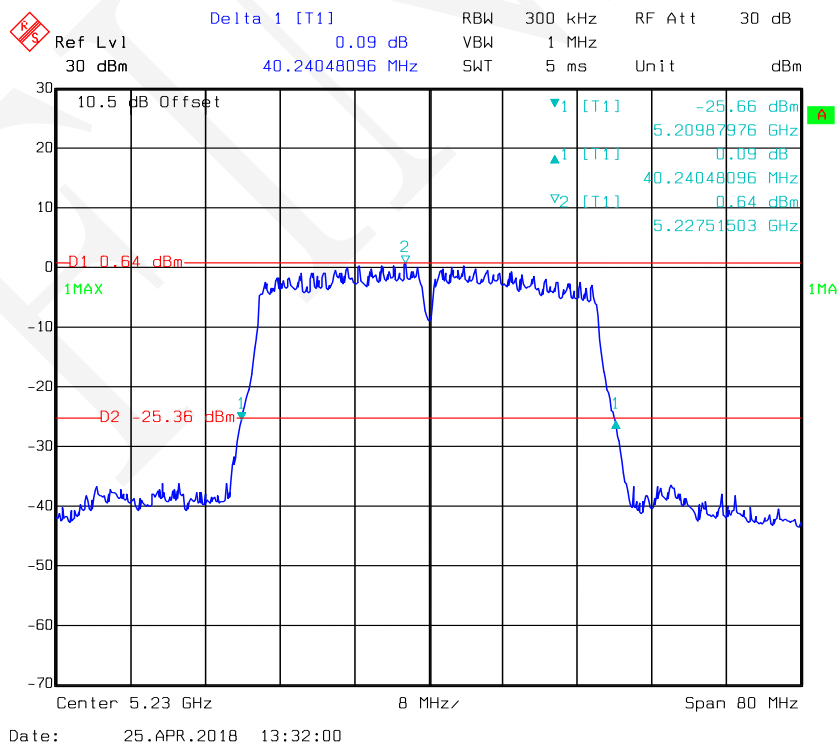


Date: 25.APR.2018 11:09:40

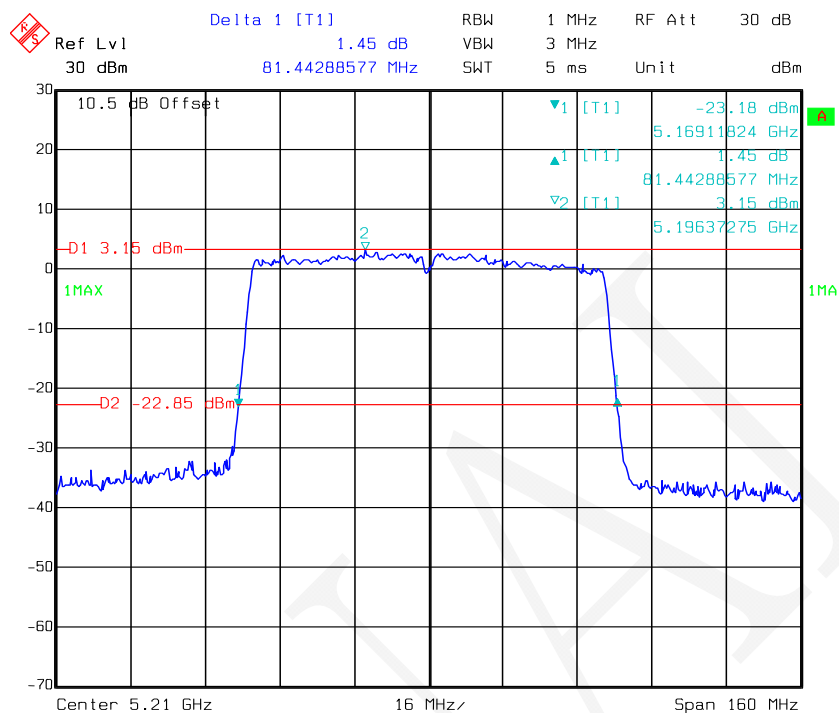
### 802.11ac40 mode, 26 dB Bandwidth-5190 MHz, Antenna 1



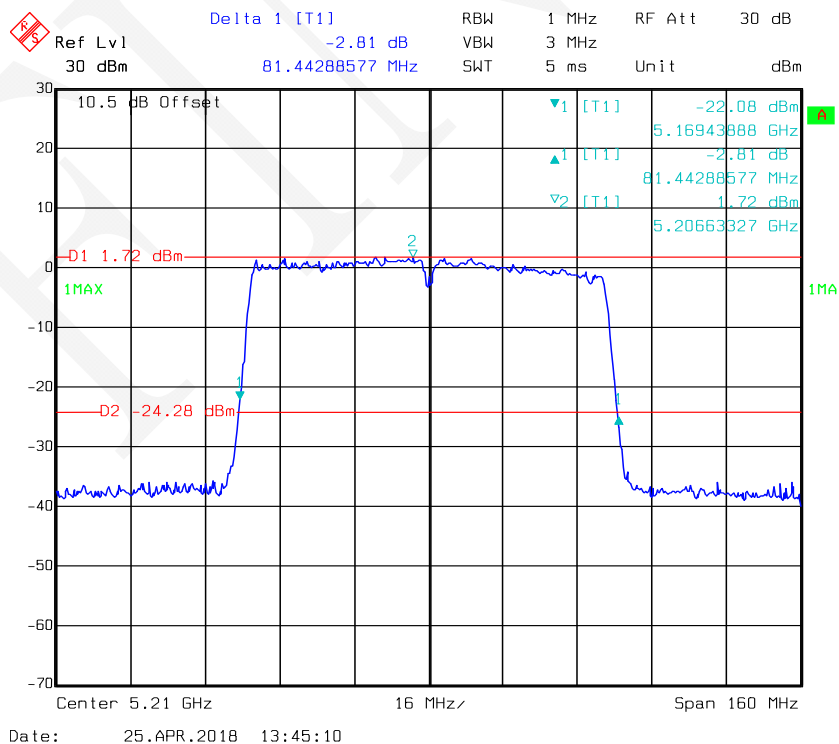
### 802.11ac40 mode, 26 dB Bandwidth-5230 MHz, Antenna 1



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

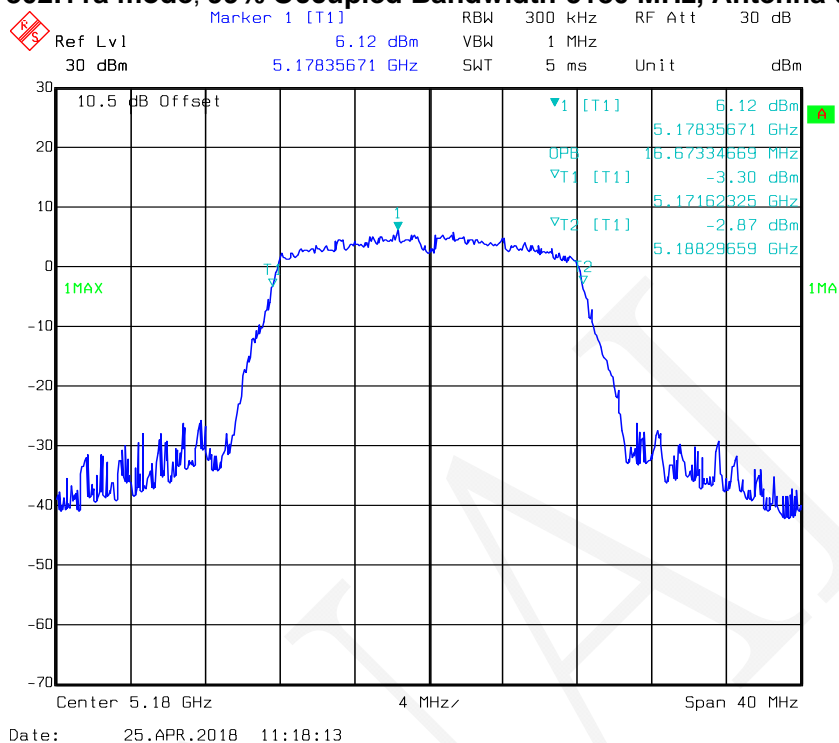


### 802.11ac80 mode, 26 dB Bandwidth-5210 MHz, Antenna 1

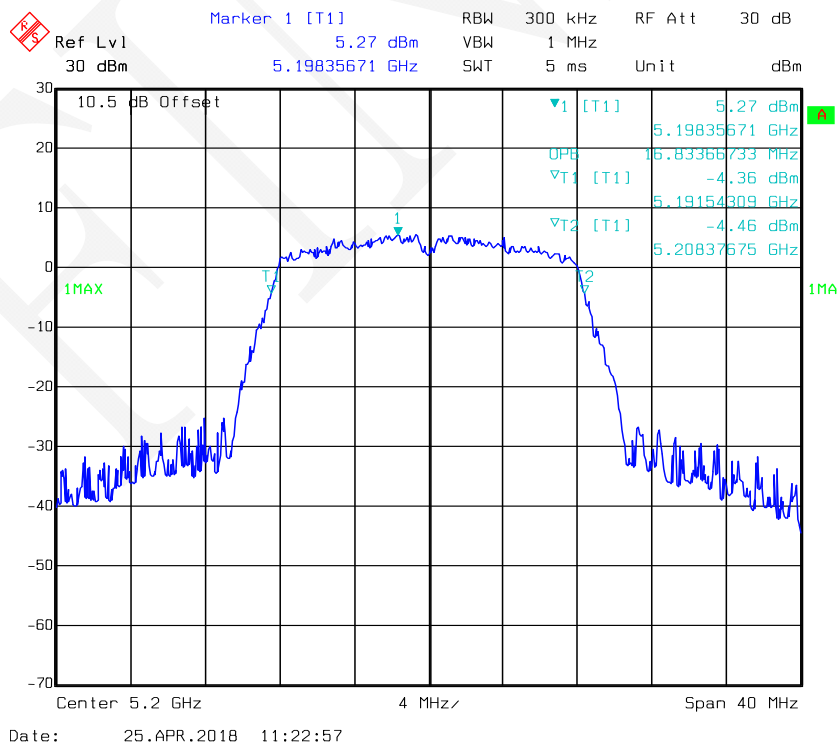




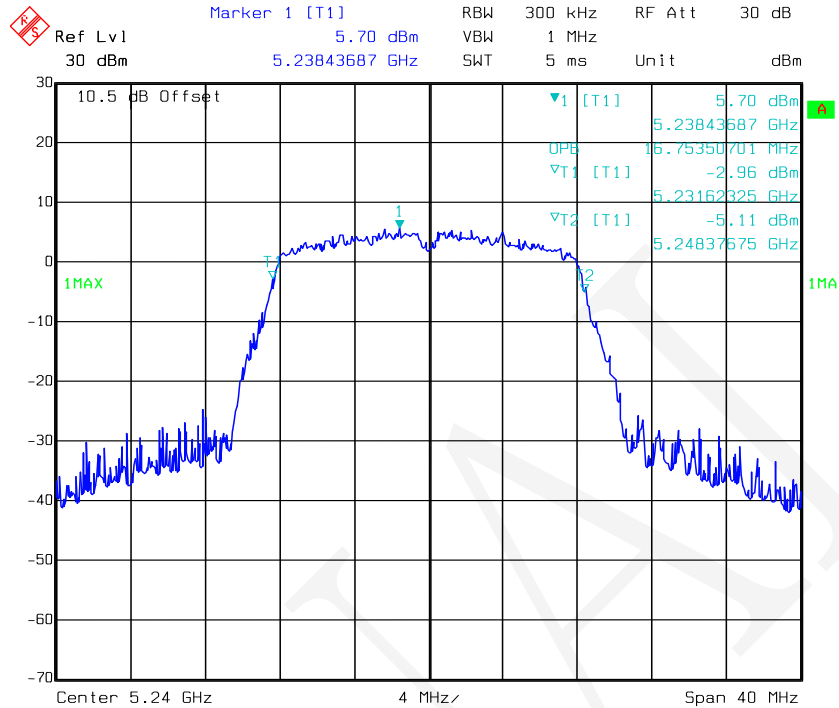
### 802.11a mode, 99% Occupied Bandwidth-5180 MHz, Antenna 0



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

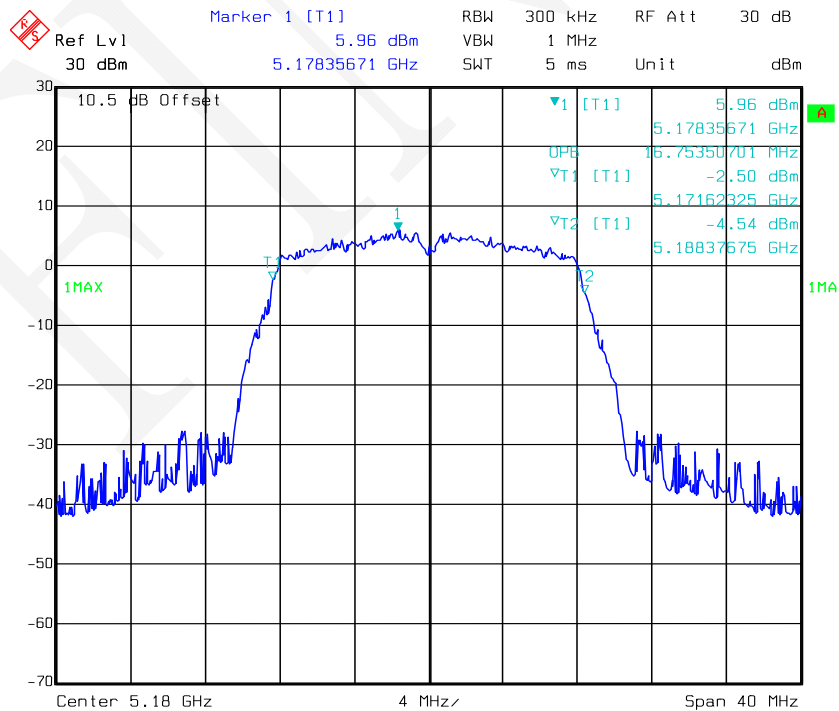


### 802.11a mode, 99% Occupied Bandwidth -5240 MHz, Antenna 0



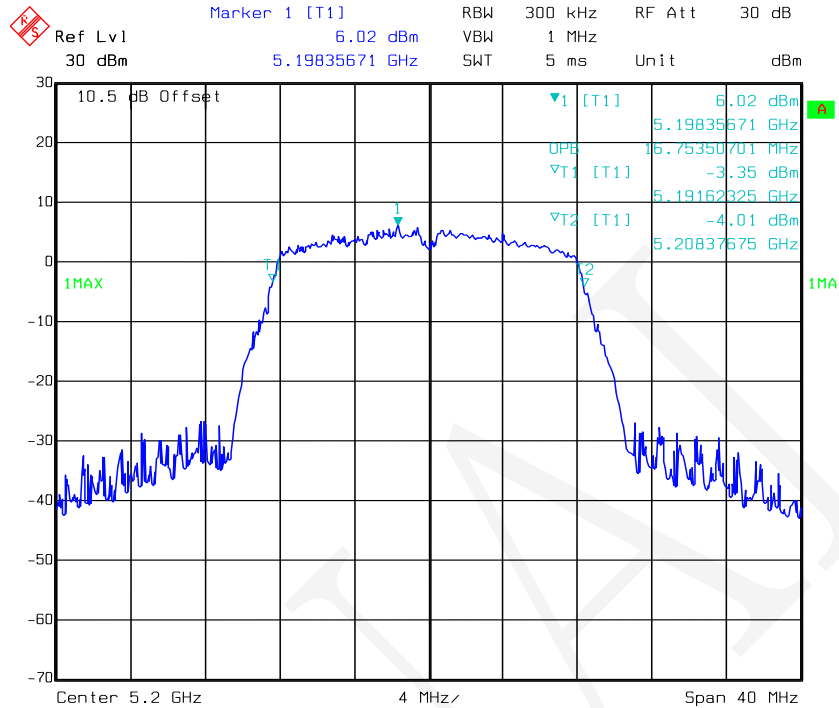
Date: 25.APR.2018 11:24:24

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

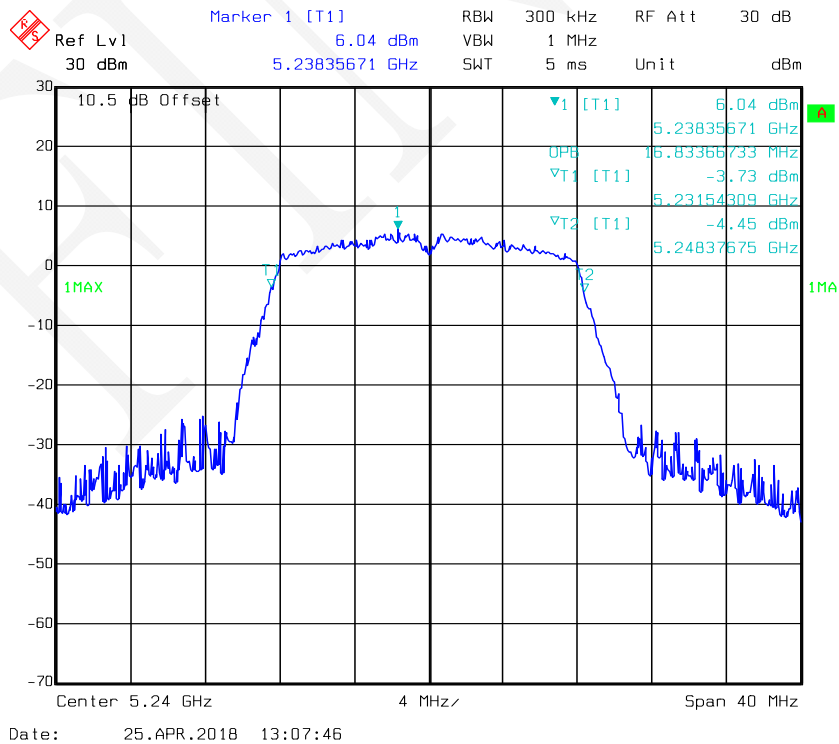


Date: 25.APR.2018 13:03:58

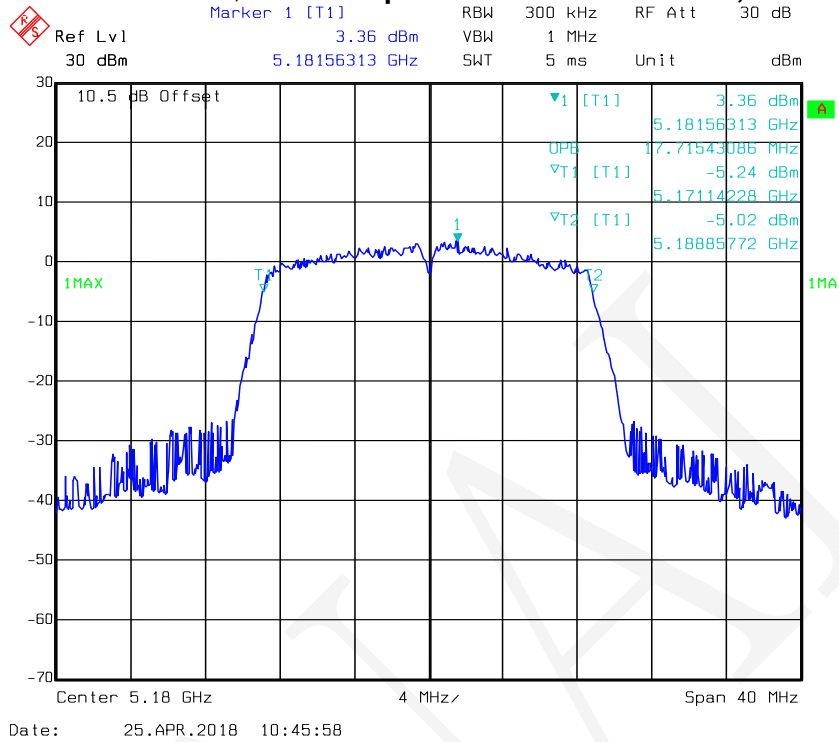
### 802.11a mode, 99% Occupied Bandwidth -5200 MHz, Antenna 1



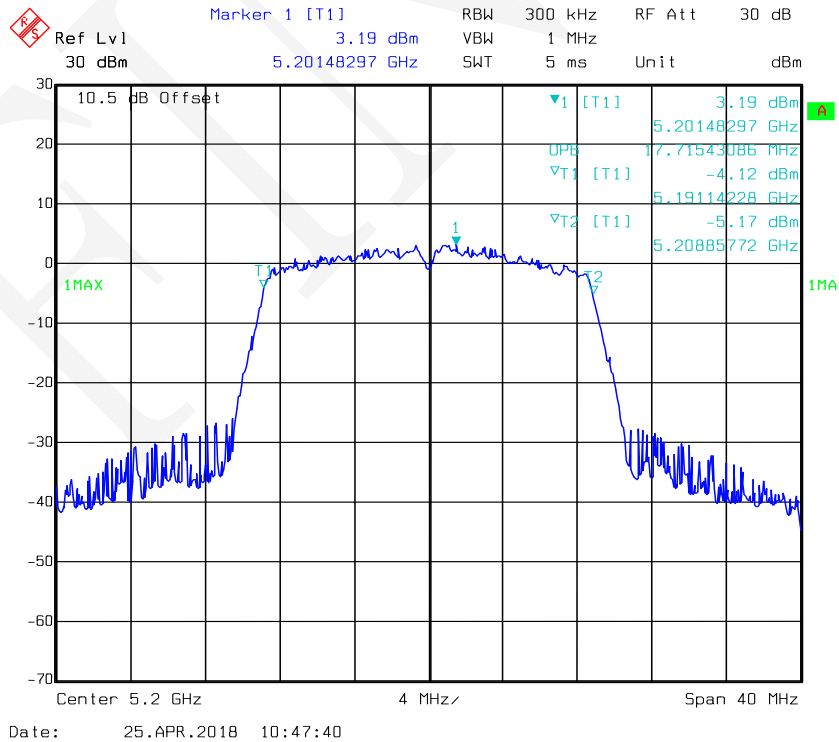
### 802.11a mode, 99% Occupied Bandwidth -5240 MHz, Antenna 1



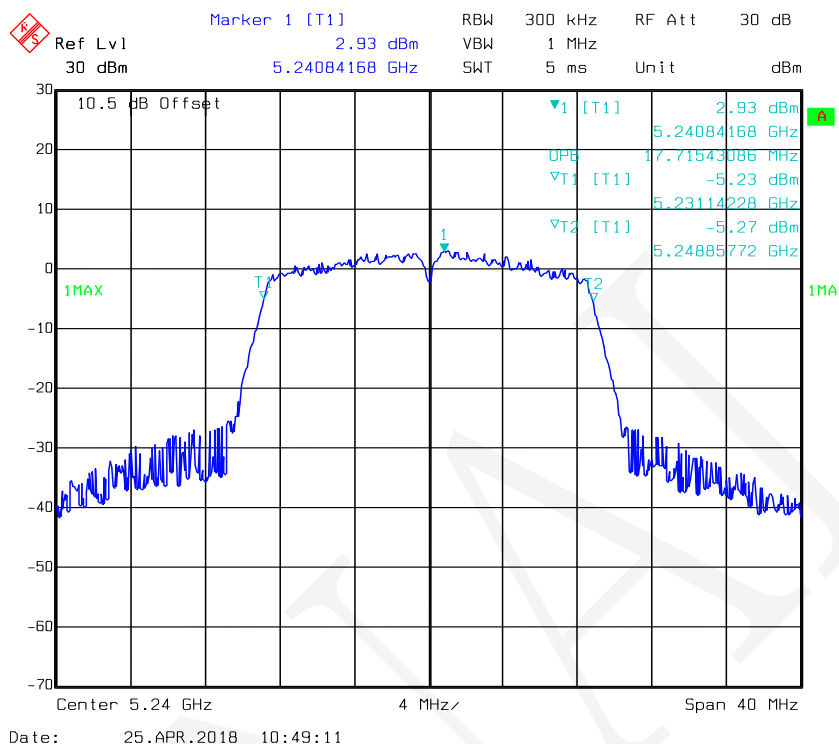
### 802.11n-HT20 mode, 99% Occupied Bandwidth-5180 MHz, Antenna 0



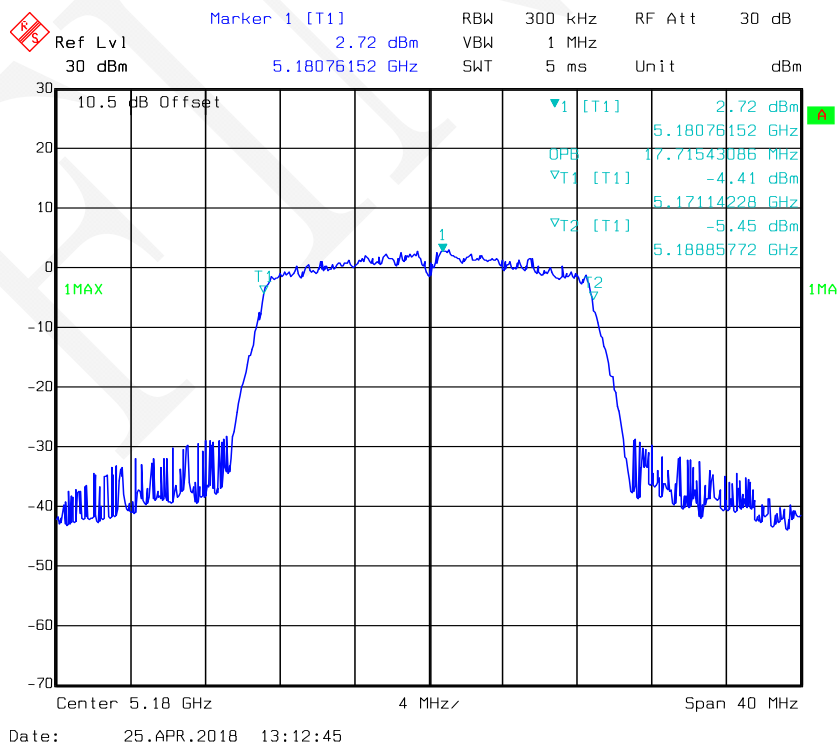
### 802.11n-HT20 mode, 99% Occupied Bandwidth -5200 MHz, Antenna 0



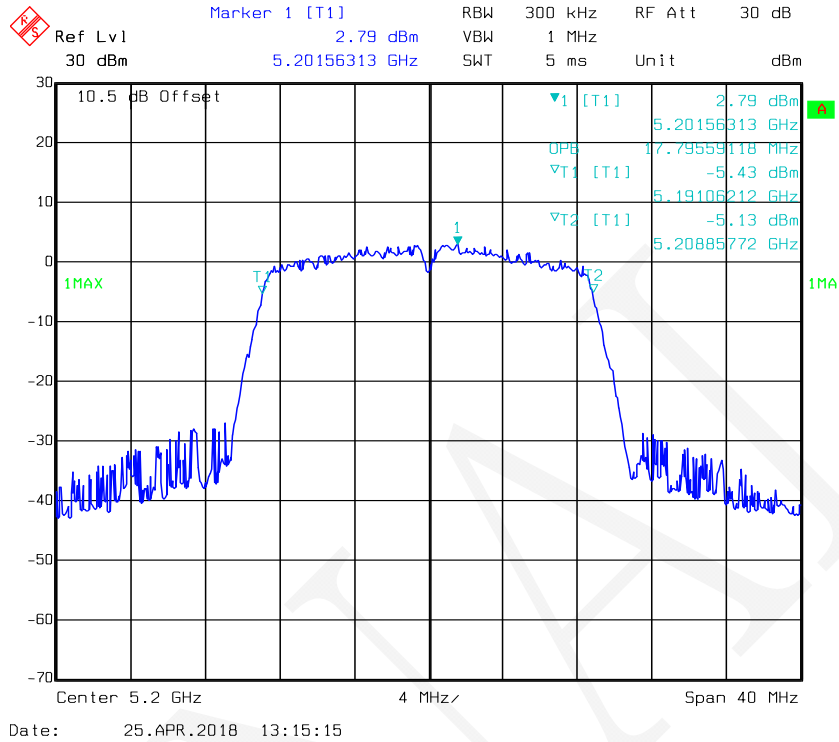
### 802.11n-HT20 mode, 99% Occupied Bandwidth -5240 MHz, Antenna 0



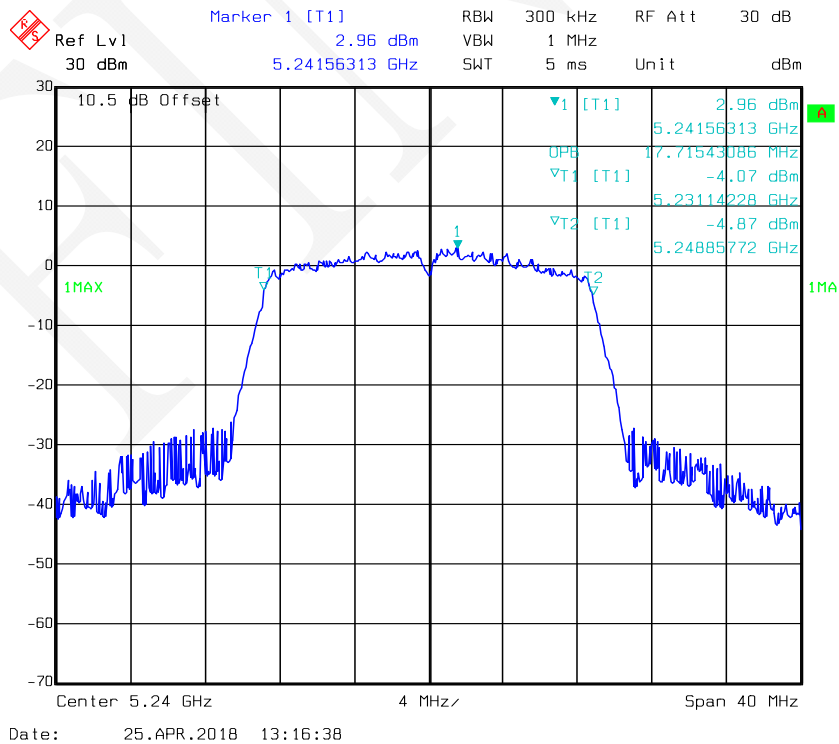
### 802.11n-HT20 mode, 99% Occupied Bandwidth-5180 MHz, Antenna 1



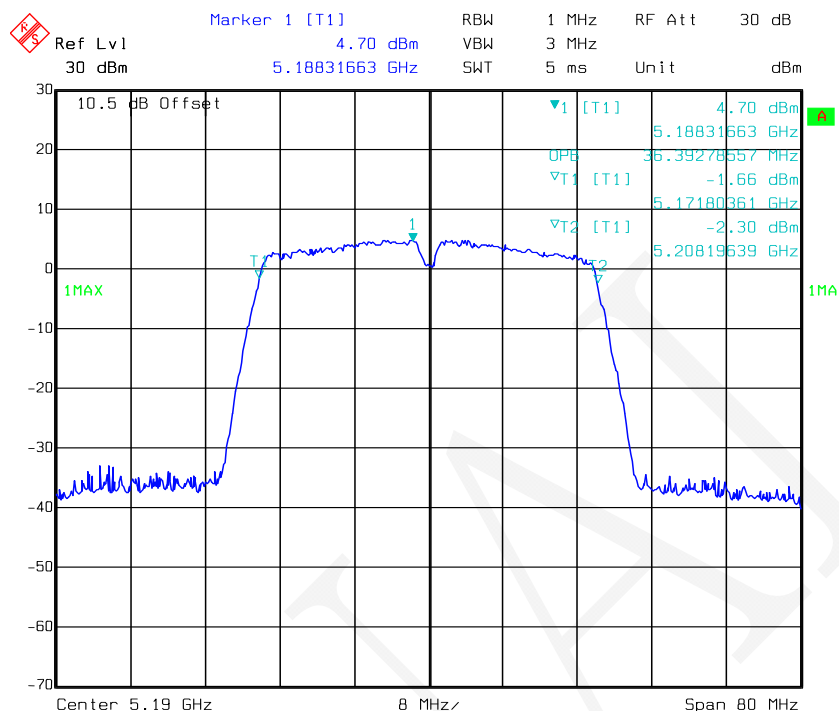
### 802.11n-HT20 mode, 99% Occupied Bandwidth -5200 MHz, Antenna 1



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

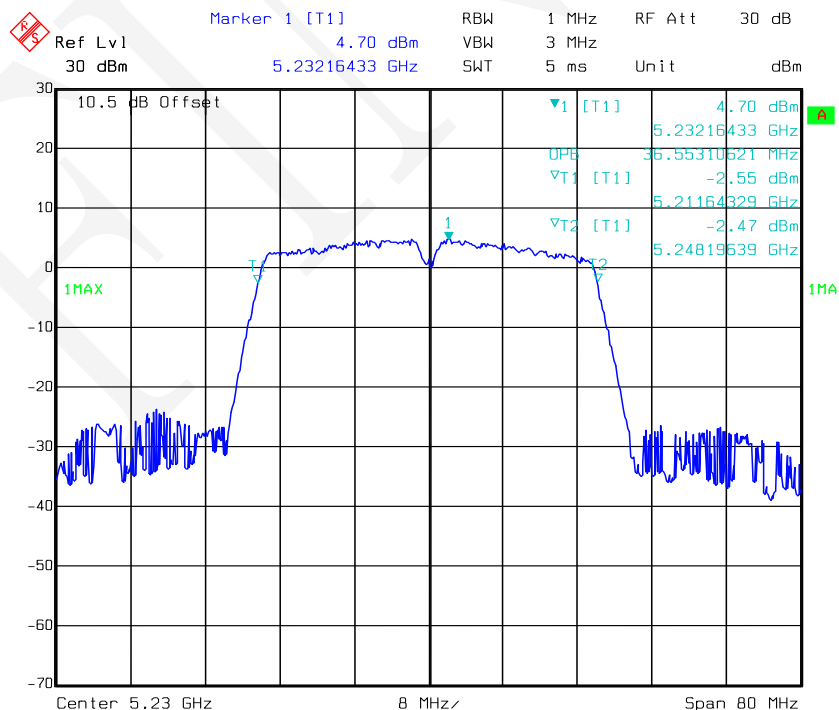


### 802.11n-HT40 mode, 99% Occupied Bandwidth-5190 MHz, Antenna 0



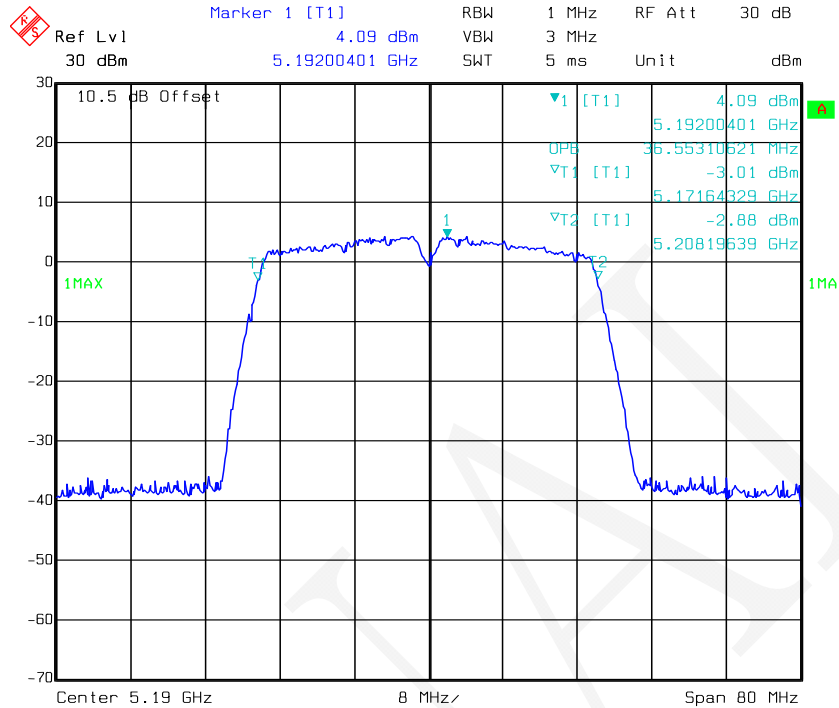
Date: 25.APR.2018 11:01:52

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



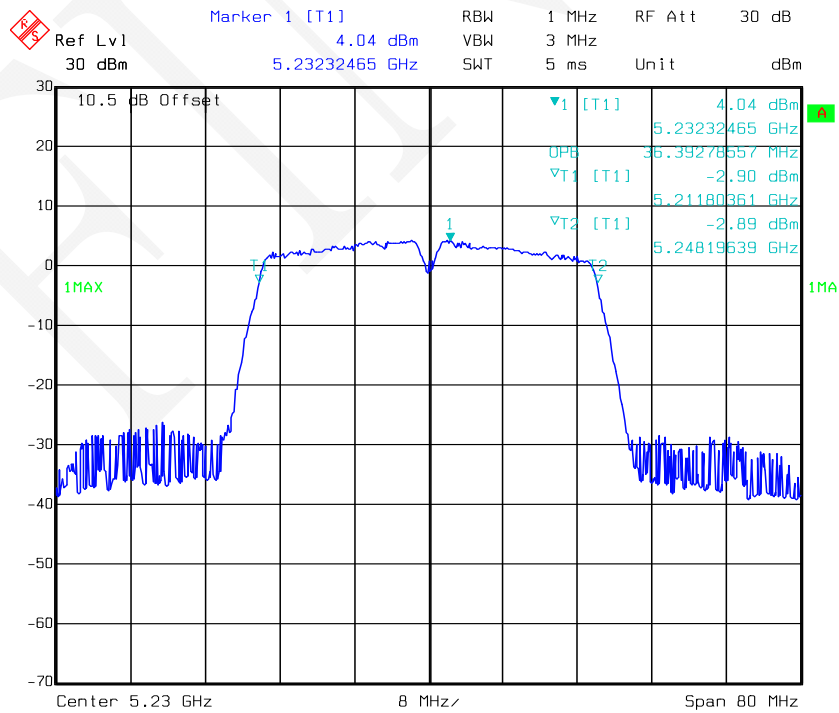
Date: 25.APR.2018 11:03:22

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



Date: 25.APR.2018 13:37:19

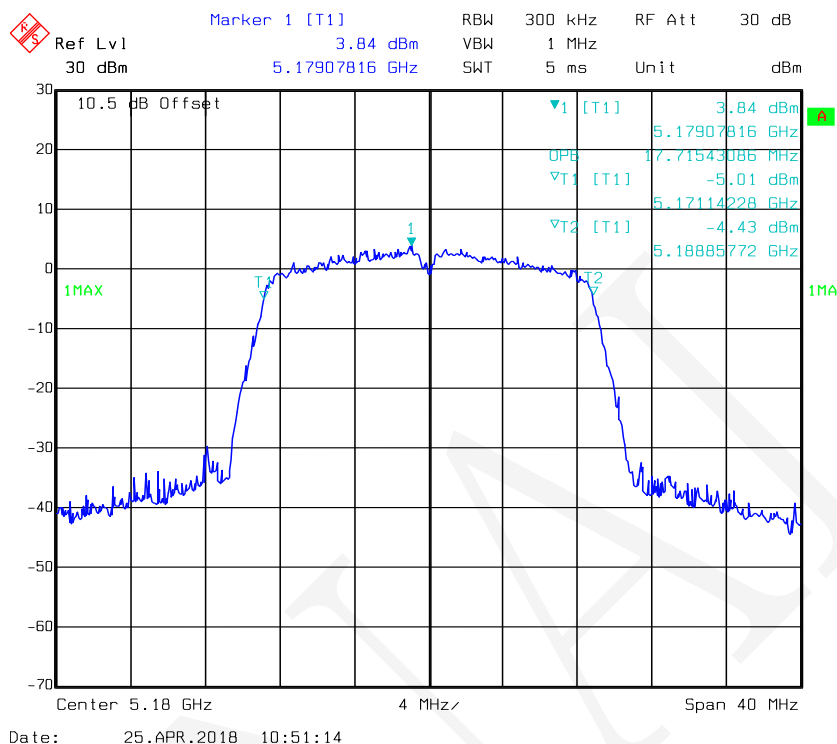
### 802.11n-HT40 mode, 99% Occupied Bandwidth-5230 MHz, Antenna 1



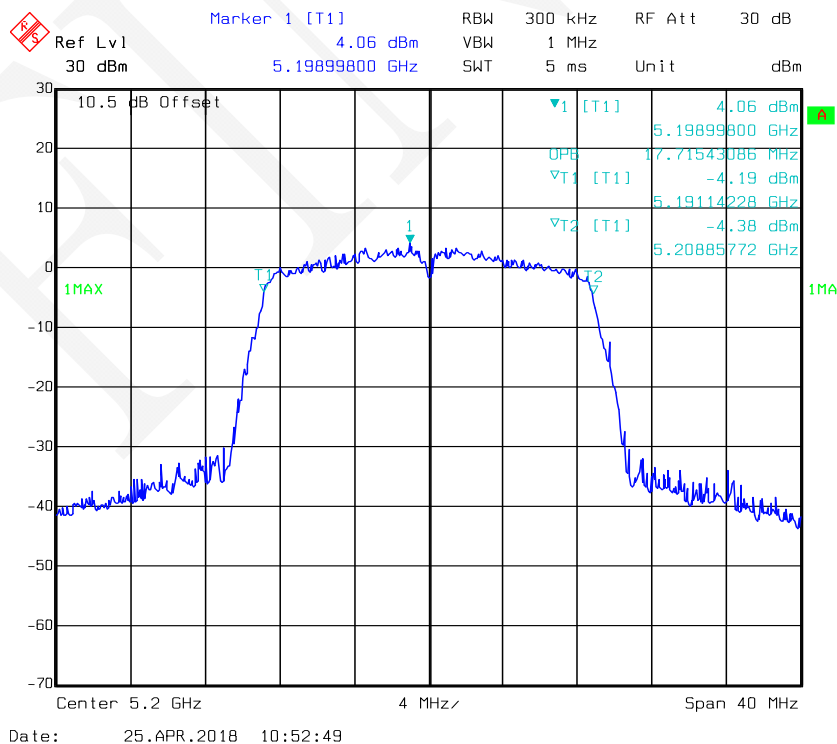
Date: 25.APR.2018 13:39:32



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

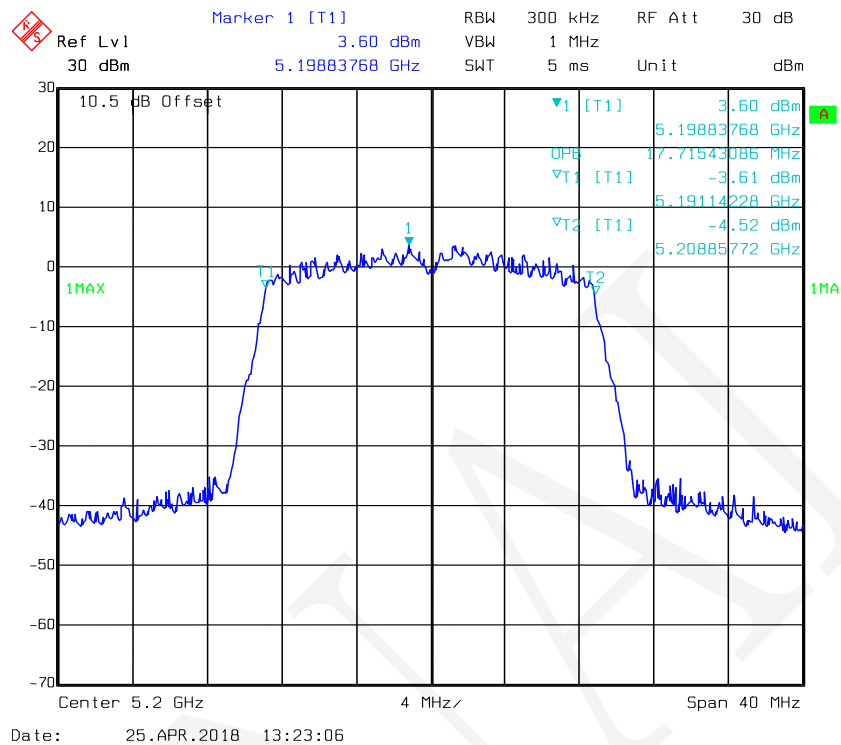


### 802.11ac20 mode, 99% Occupied Bandwidth-5200 MHz, Antenna 0

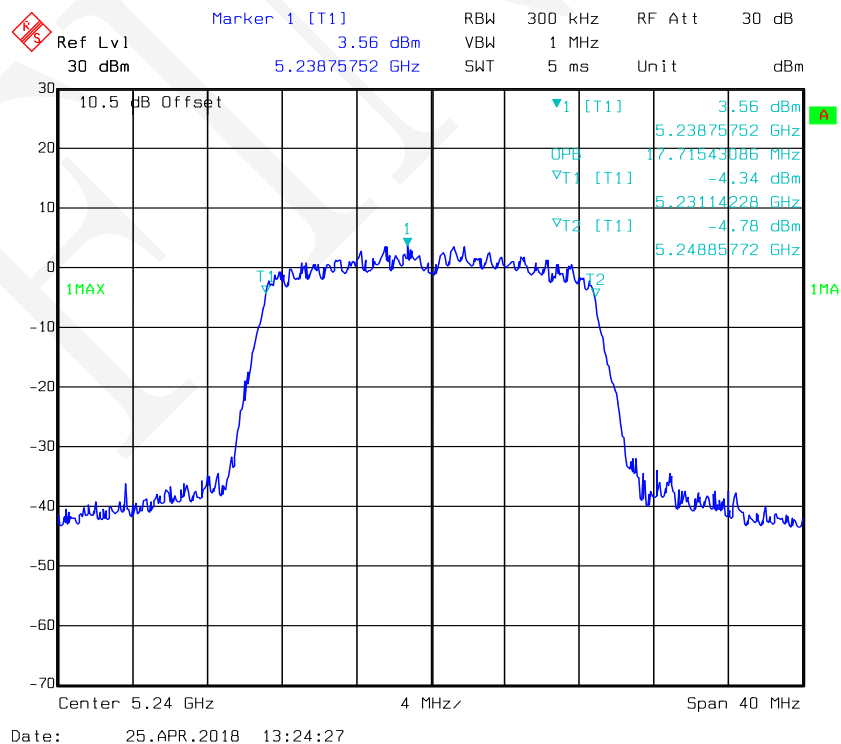




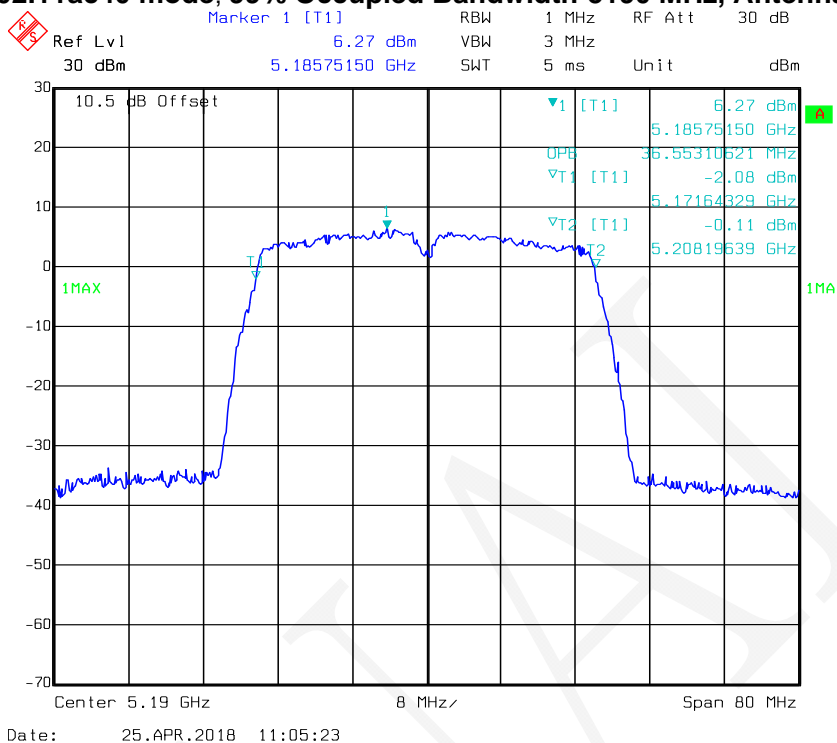
### 802.11ac20 mode, 99% Occupied Bandwidth-5200 MHz, Antenna 1



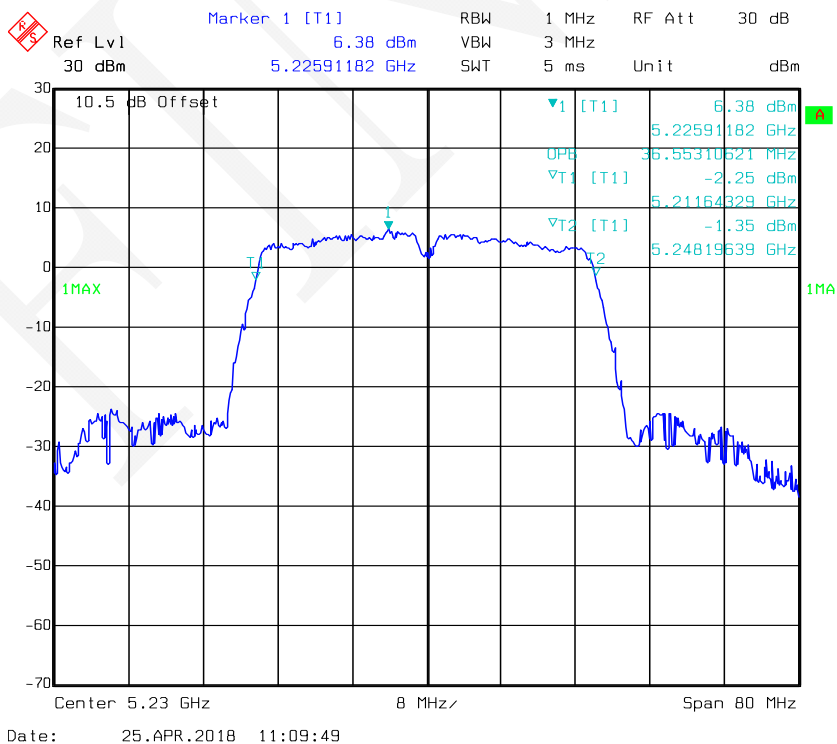
### 802.11ac20 mode, 99% Occupied Bandwidth-5240 MHz, Antenna 1



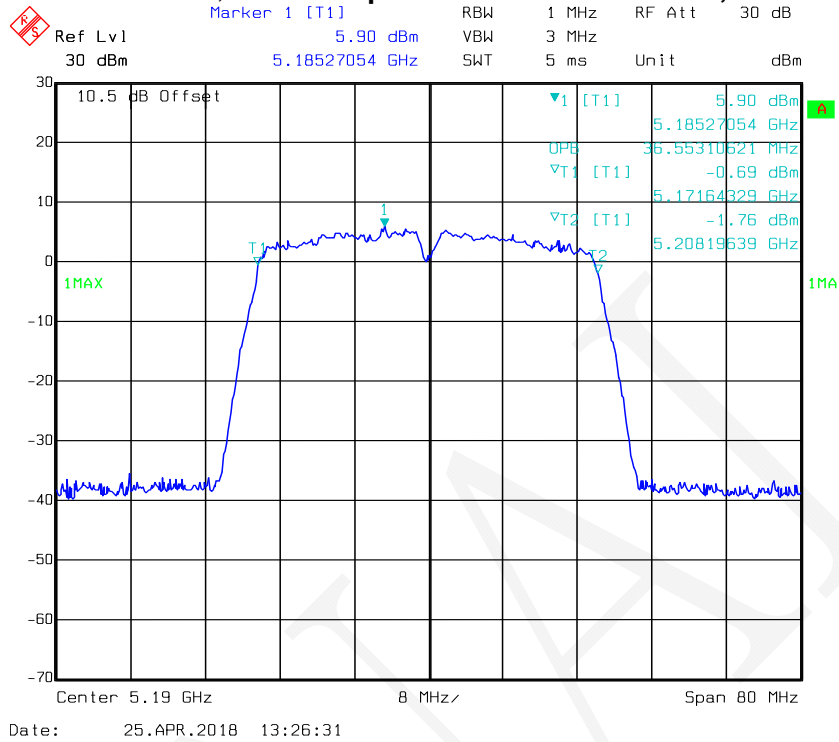
### 802.11ac40 mode, 99% Occupied Bandwidth-5190 MHz, Antenna 0



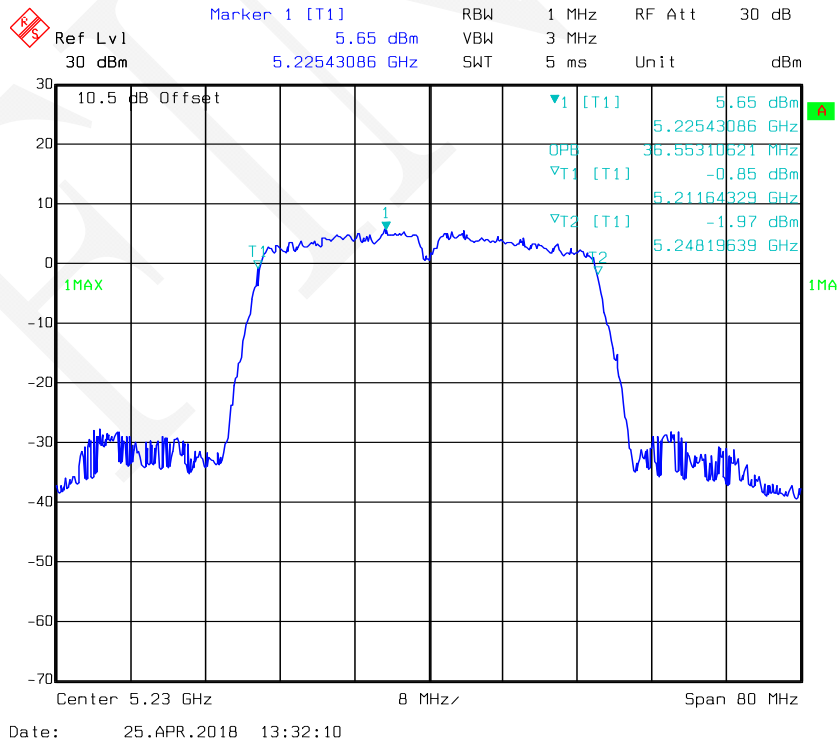
### 802.11ac40 mode, 99% Occupied Bandwidth-5230 MHz, Antenna 0



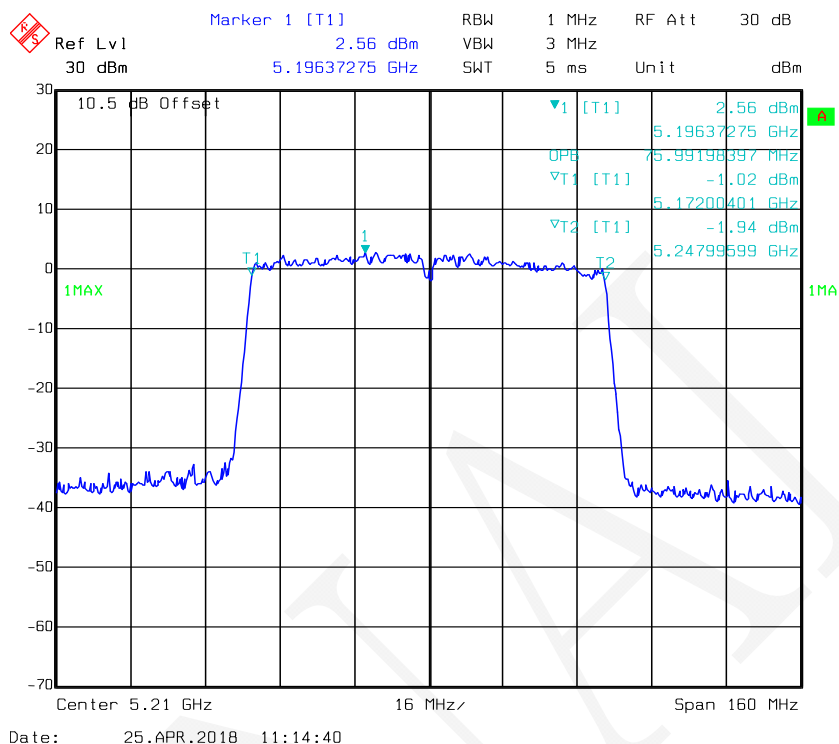
### 802.11ac40 mode, 99% Occupied Bandwidth-5190 MHz, Antenna 1



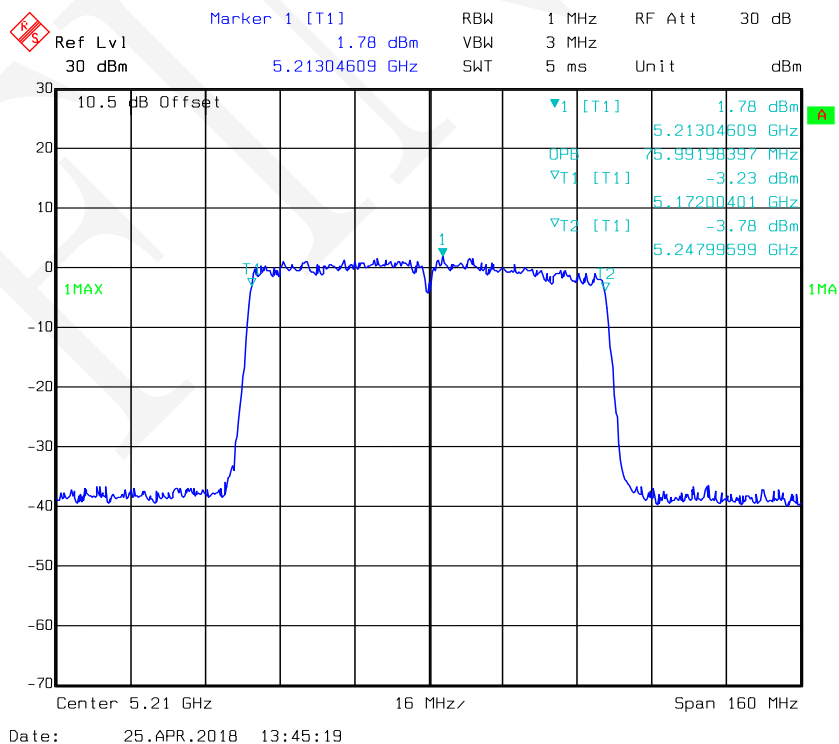
### 802.11ac40 mode, 99% Occupied Bandwidth-5230 MHz, Antenna 1



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



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

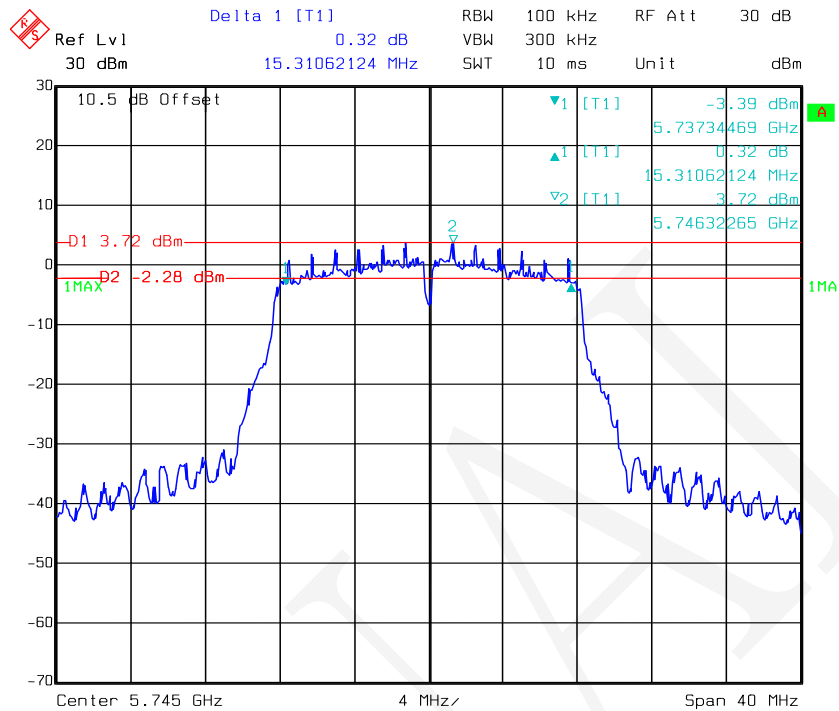


**For 5725-5850 MHz:**

Mode	Channel	Frequency (MHz)	6dB Bandwidth (MHz)		99% Occupied Bandwidth (MHz)	
			Antenna 0	Antenna 1	Antenna 0	Antenna 1
802.11a	Low	5745	15.31	15.31	16.83	16.83
	Middle	5785	15.23	15.31	16.75	16.83
	High	5825	15.31	15.31	16.75	16.83
802.11n-HT20	Low	5745	15.15	15.23	17.72	17.72
	Middle	5785	15.23	15.23	17.72	17.72
	High	5825	15.23	15.23	17.72	17.72
802.11n-HT40	Low	5755	35.43	35.43	36.39	36.39
	High	5795	35.43	35.43	36.39	36.55
802.11ac20	Low	5745	15.31	15.31	17.72	17.72
	Middle	5785	15.31	15.31	17.72	17.72
	High	5825	15.23	15.31	17.72	17.72
802.11ac40	Low	5755	35.43	35.43	36.55	36.55
	High	5795	35.43	35.43	36.55	36.55
802.11ac80	-	5775	76.31	75.99	75.99	75.99

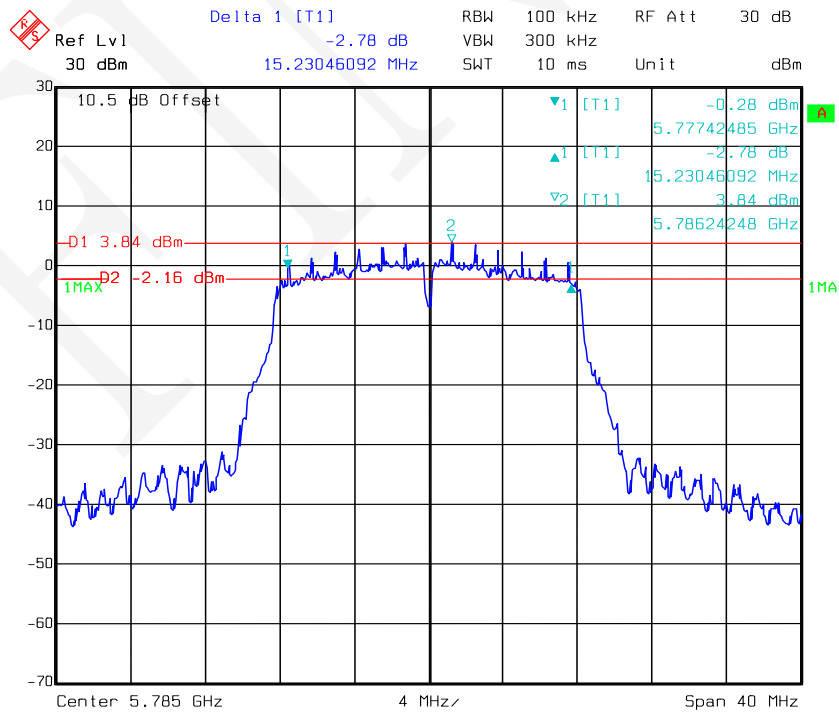
Note: the 99% Occupied Bandwidth doesn't extend U-NII-2C band 5470-5725MHz.

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



Date: 25.APR.2018 14:07:49

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

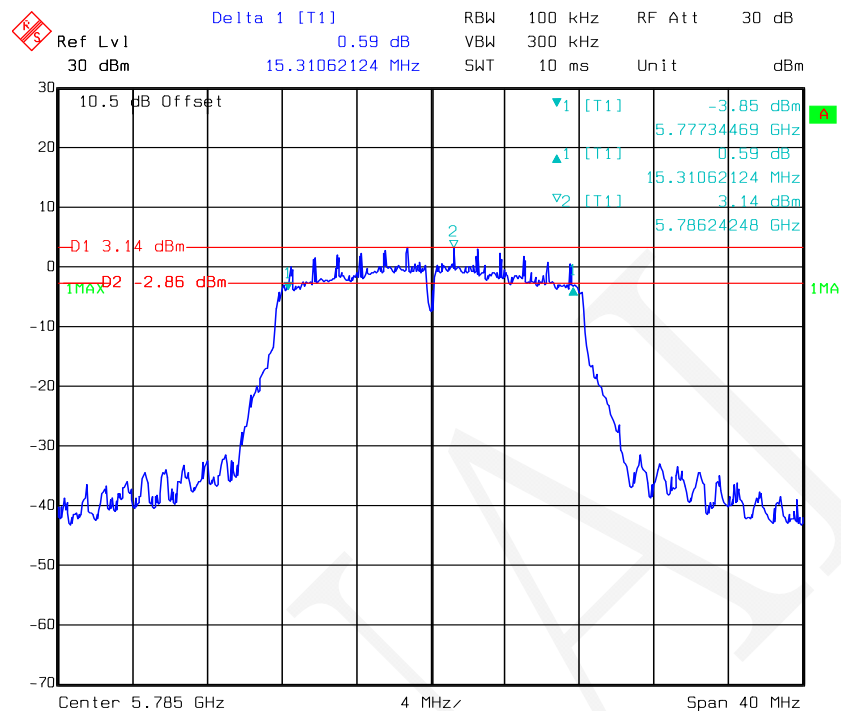


Date: 25.APR.2018 14:09:29



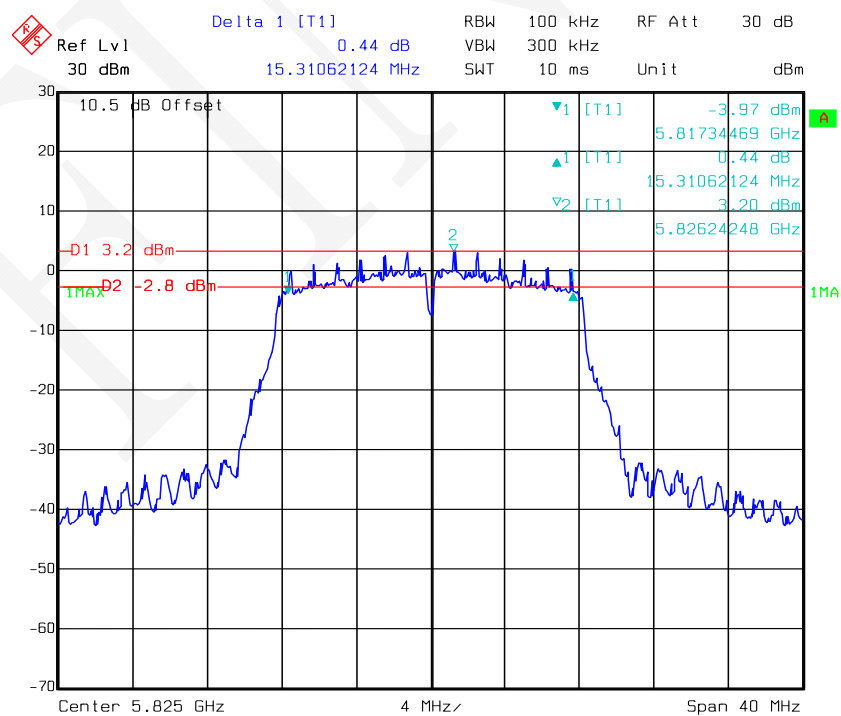


### 802.11a mode, 6 dB Bandwidth-5785 MHz, Antenna 1



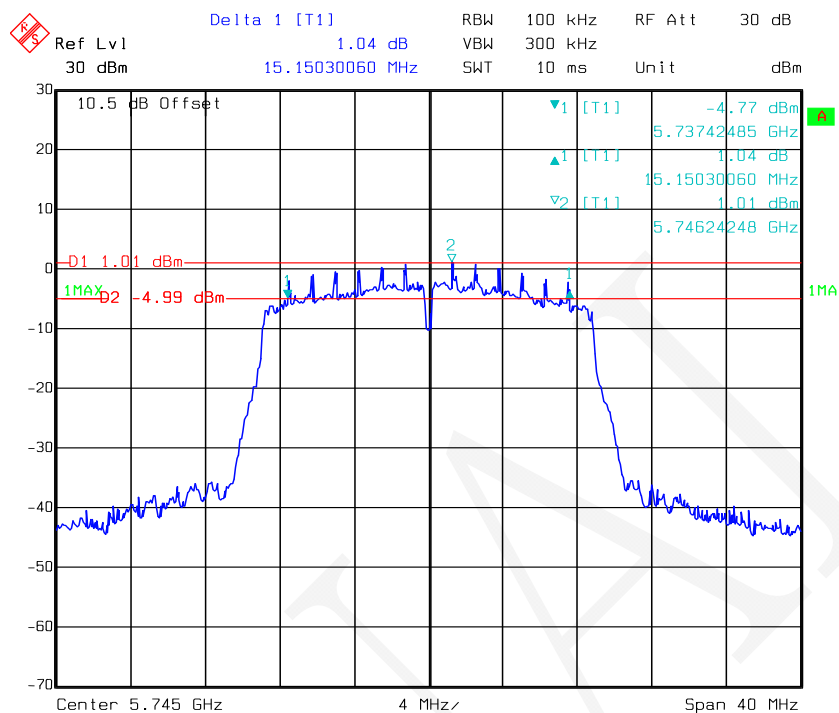
Date: 25.APR.2018 16:28:04

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



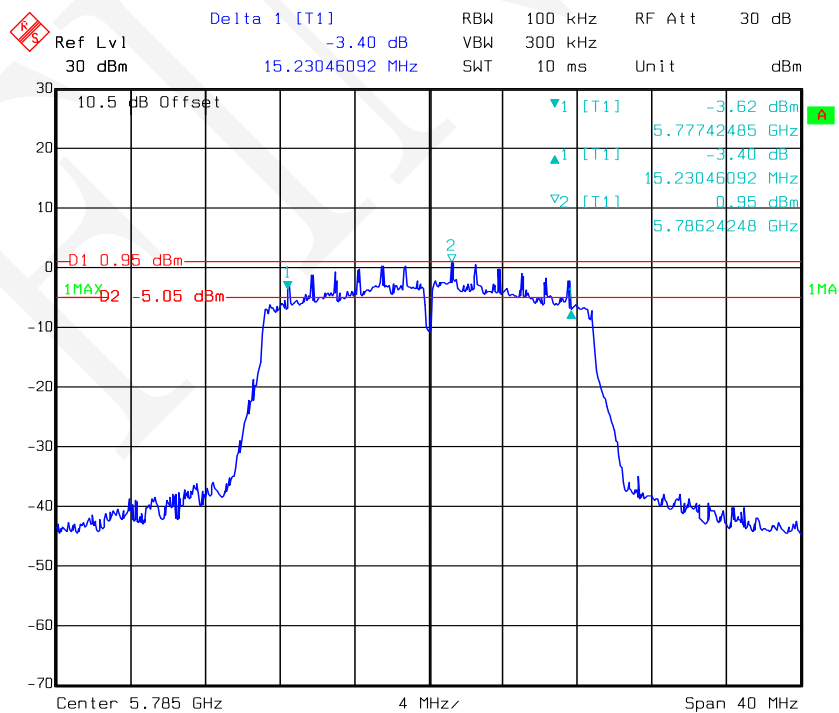
Date: 25.APR.2018 16:29:31

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



Date: 25.APR.2018 14:16:39

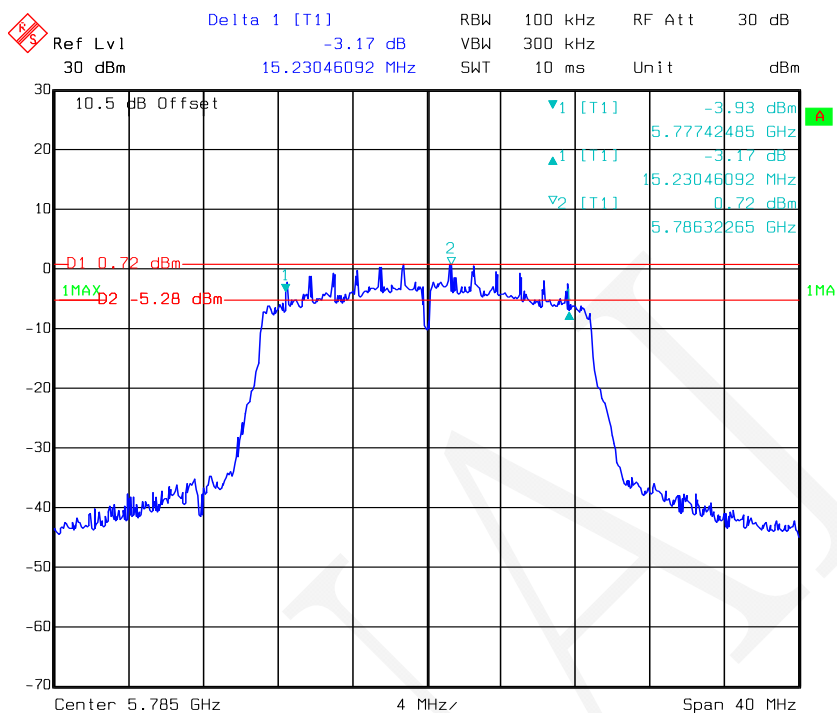
### 802.11n-HT20 mode, 6 dB Bandwidth-5785 MHz, Antenna 0



Date: 25.APR.2018 14:17:55

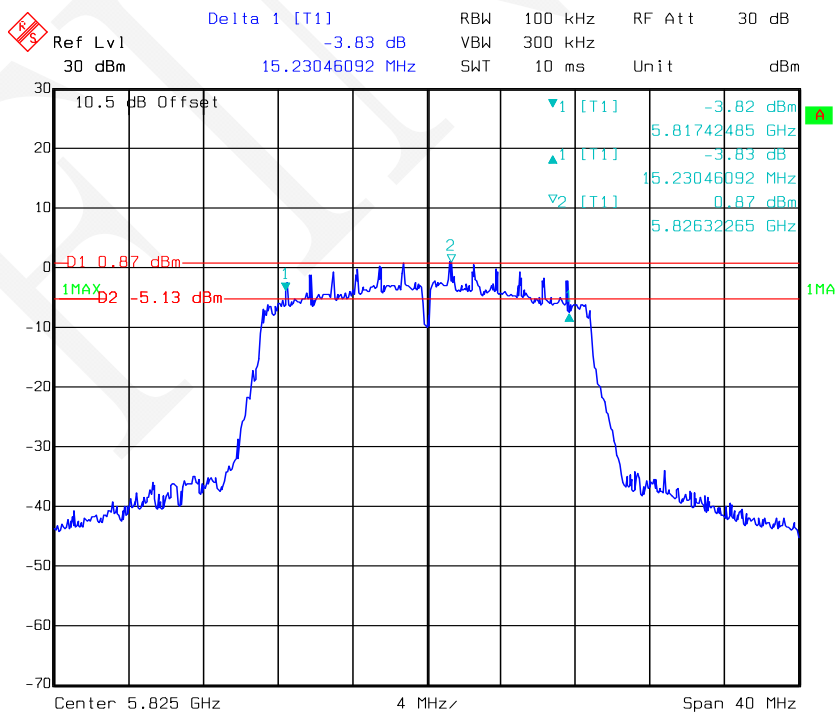


### 802.11n-HT20 mode, 6 dB Bandwidth-5785 MHz, Antenna 1



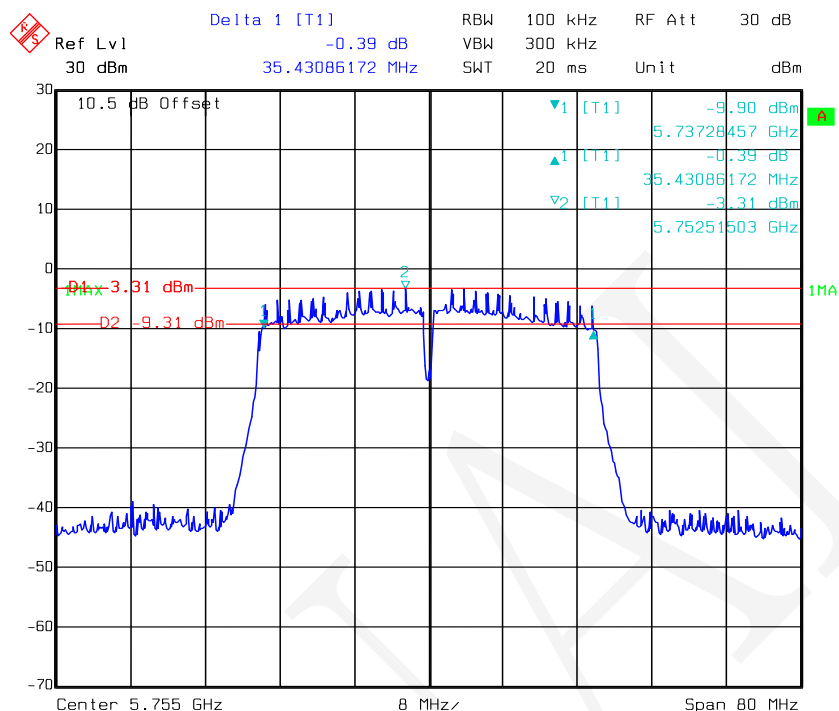
Date: 25.APR.2018 16:17:27

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

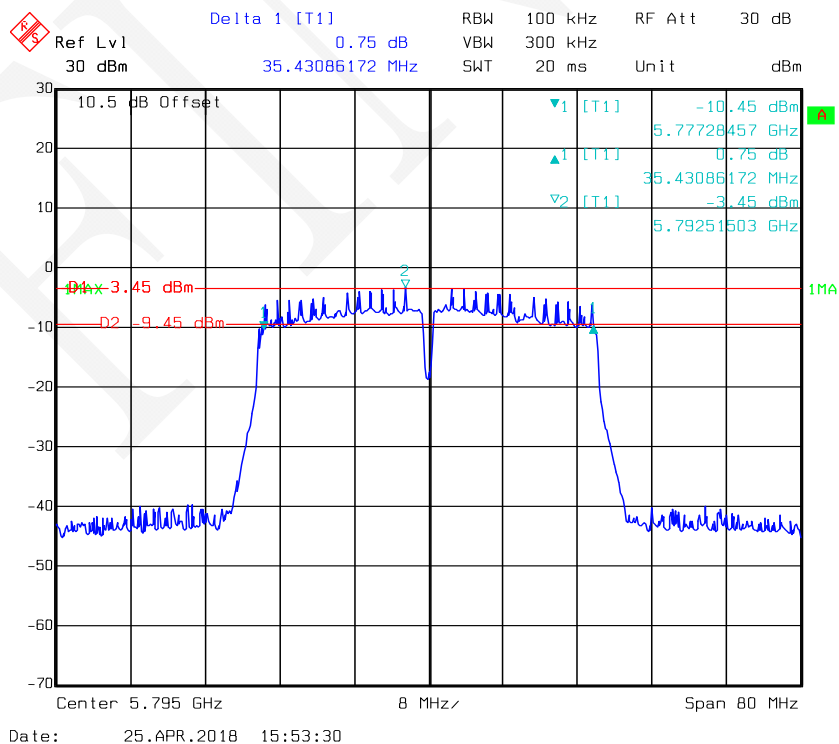


Date: 25.APR.2018 16:18:47

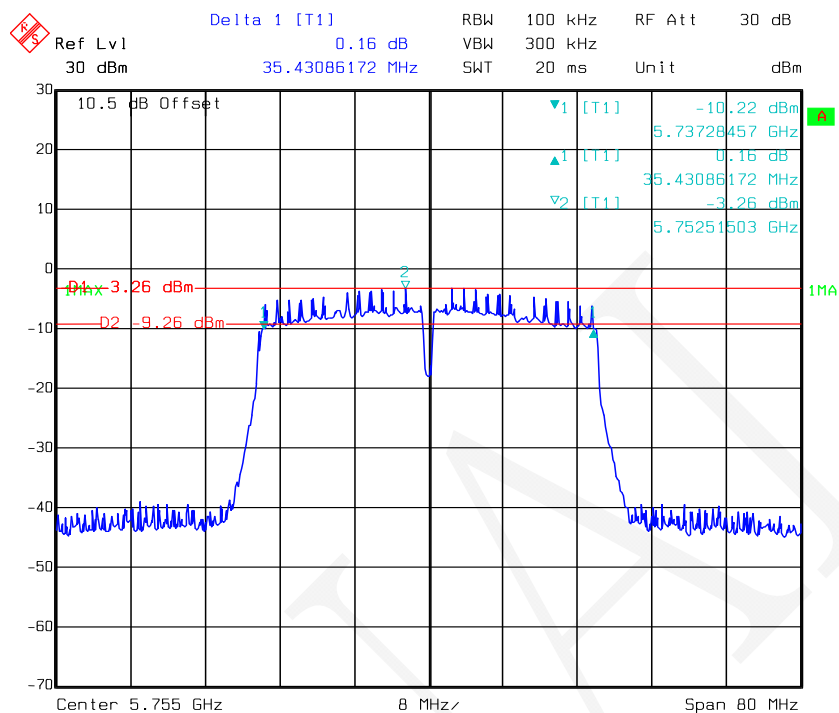
### 802.11n-HT40 mode, 6 dB Bandwidth-5755 MHz, Antenna 0



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

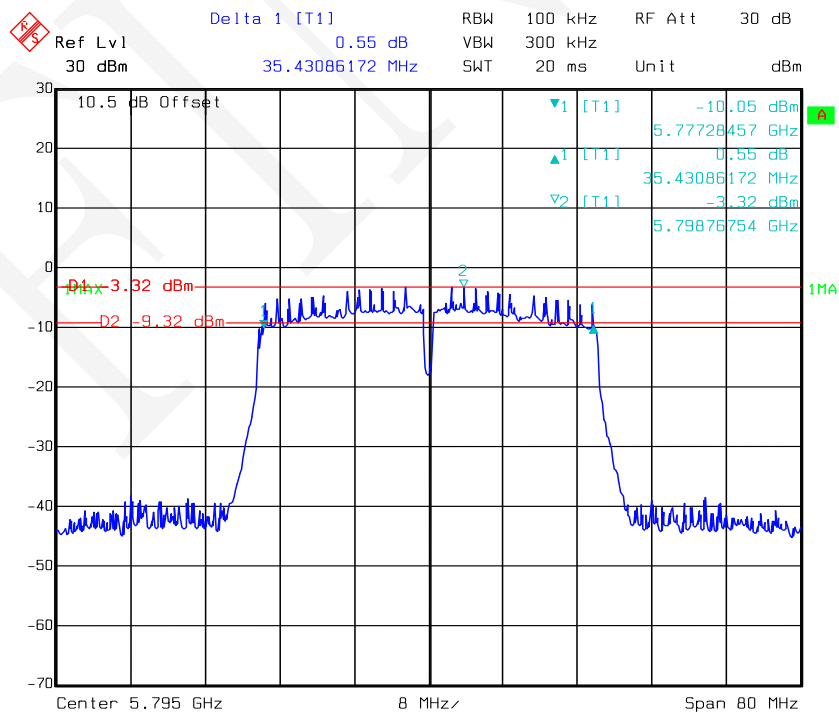


### 802.11n-HT40 mode, 6 dB Bandwidth-5755 MHz, Antenna 1



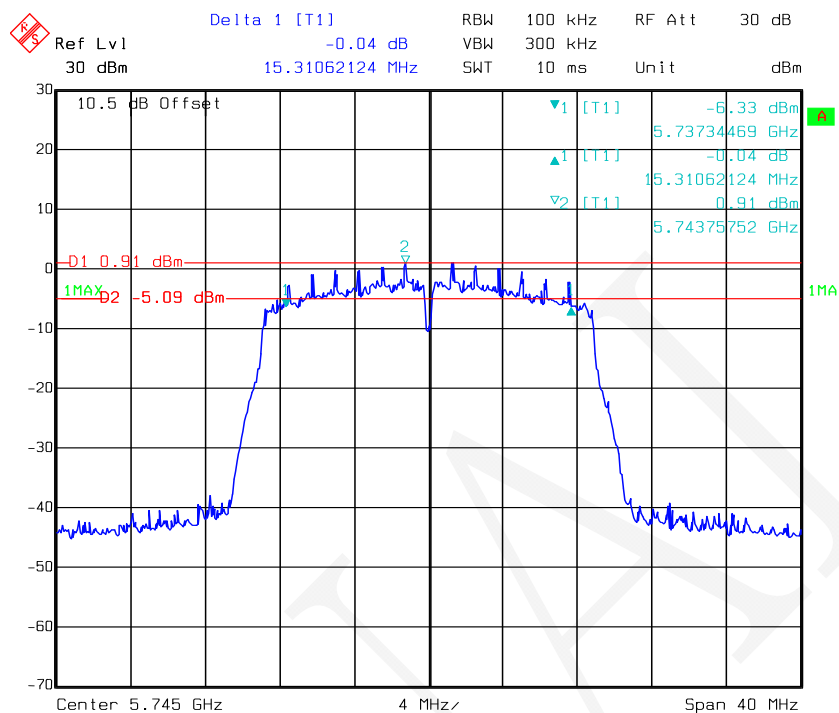
Date: 25.APR.2018 16:11:02

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



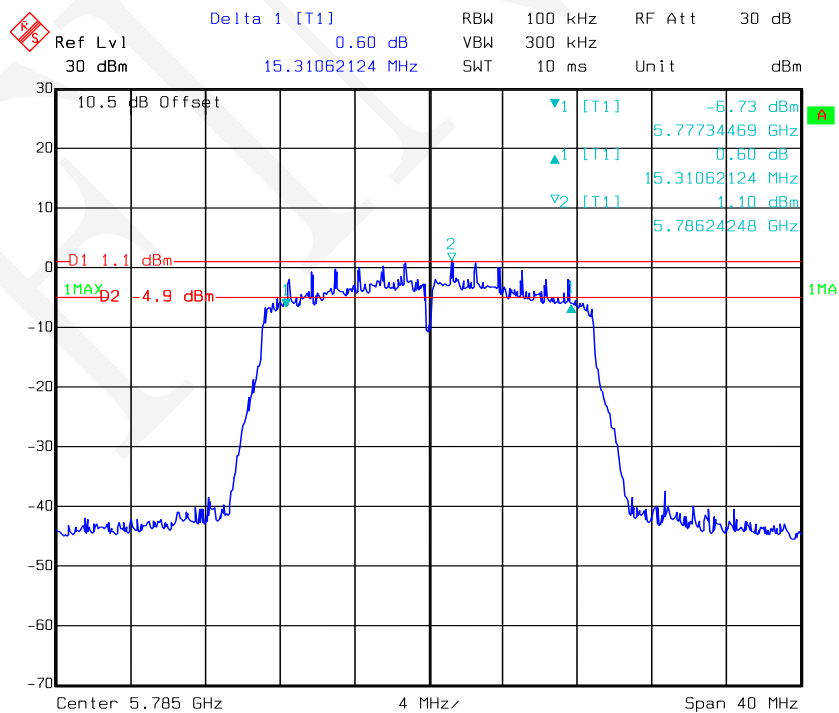
Date: 25.APR.2018 16:13:27

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



Date: 25.APR.2018 14:25:10

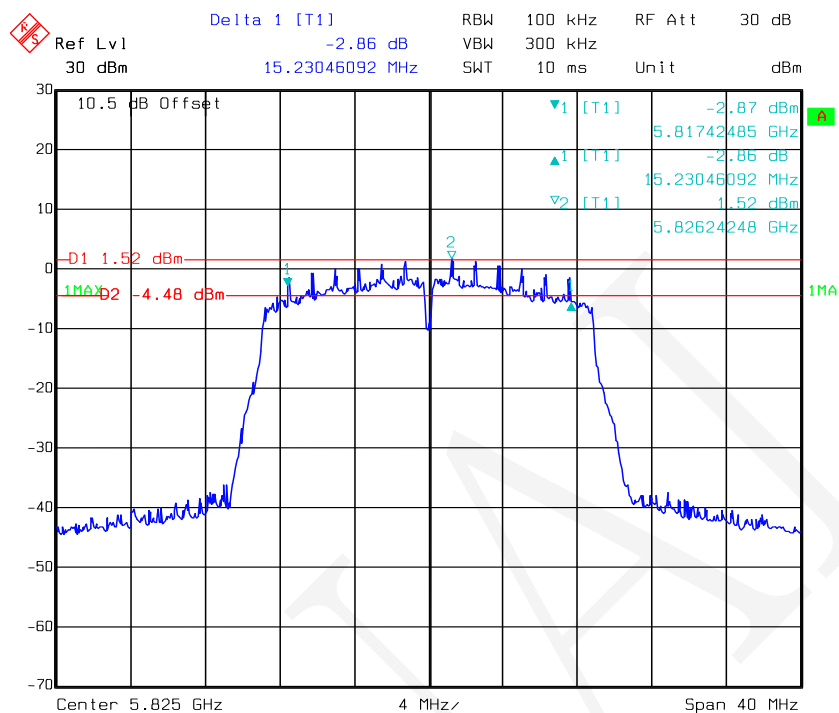
### 802.11ac20 mode, 6 dB Bandwidth-5785 MHz, Antenna 0



Date: 25.APR.2018 14:27:11

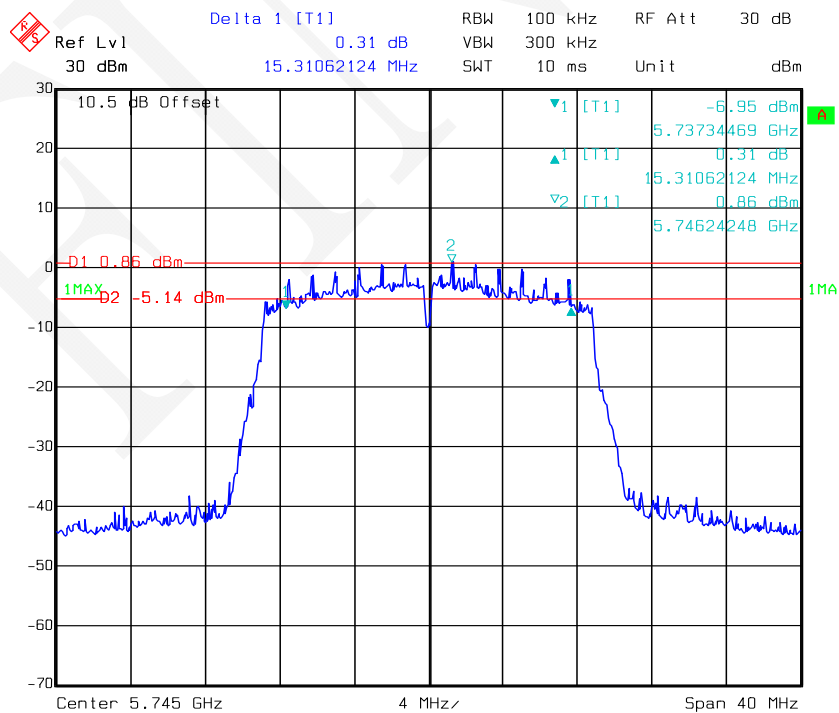


### 802.11ac20 mode, 6 dB Bandwidth-5825 MHz, Antenna 0



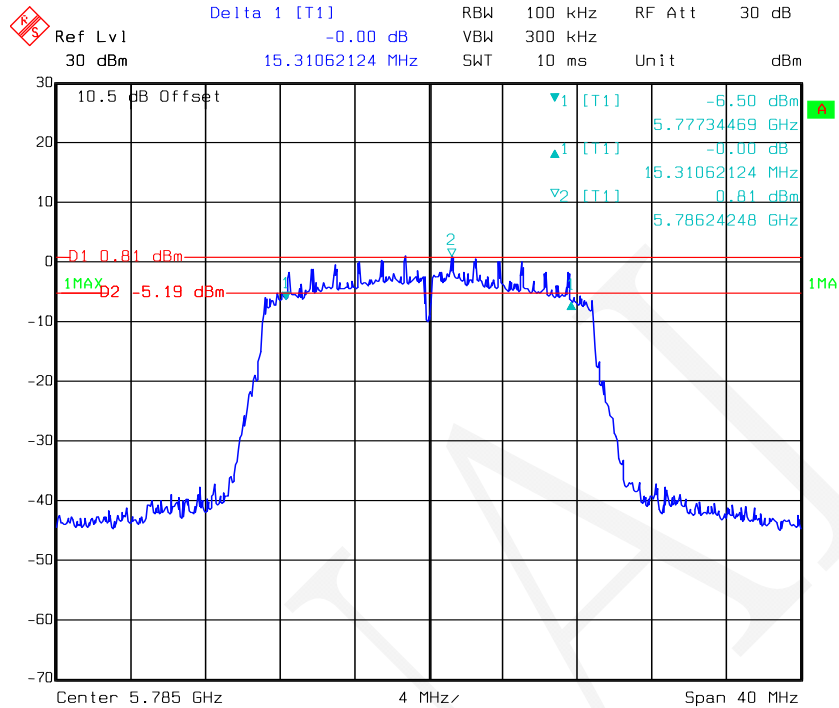
Date: 25.APR.2018 14:52:04

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

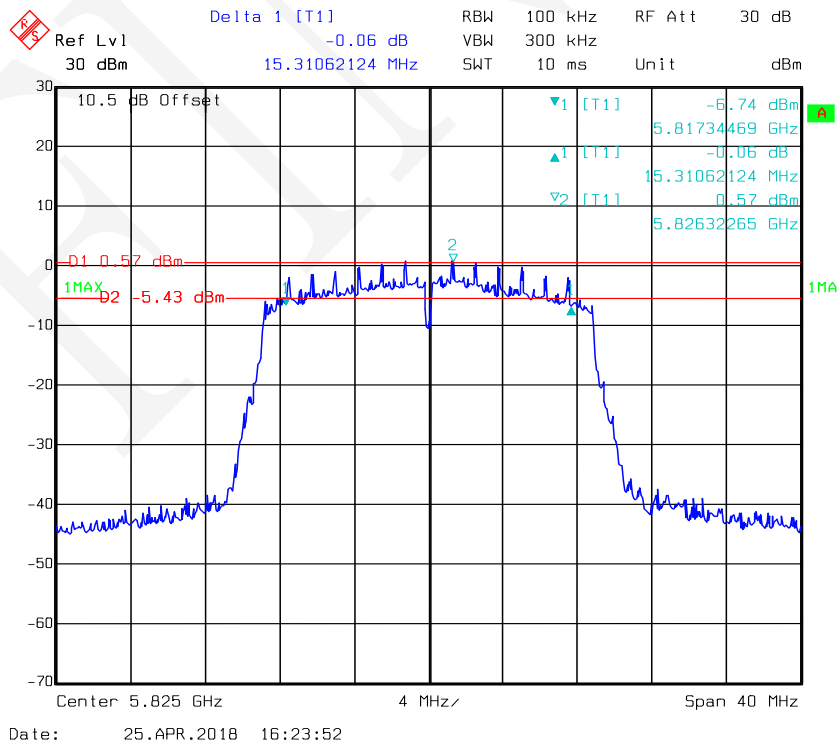


Date: 25.APR.2018 16:20:47

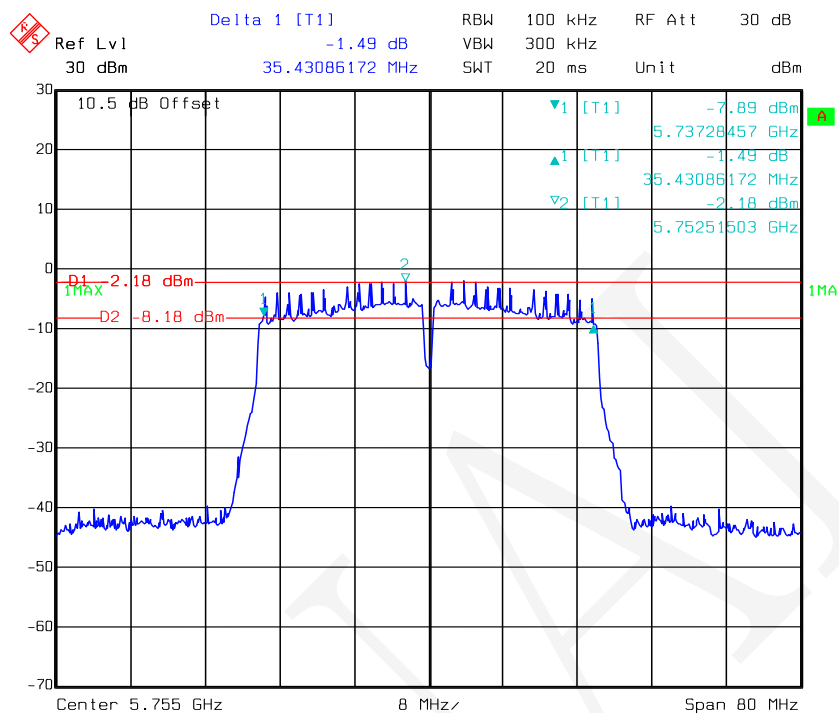
### 802.11ac20 mode, 6 dB Bandwidth-5785 MHz, Antenna 1



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

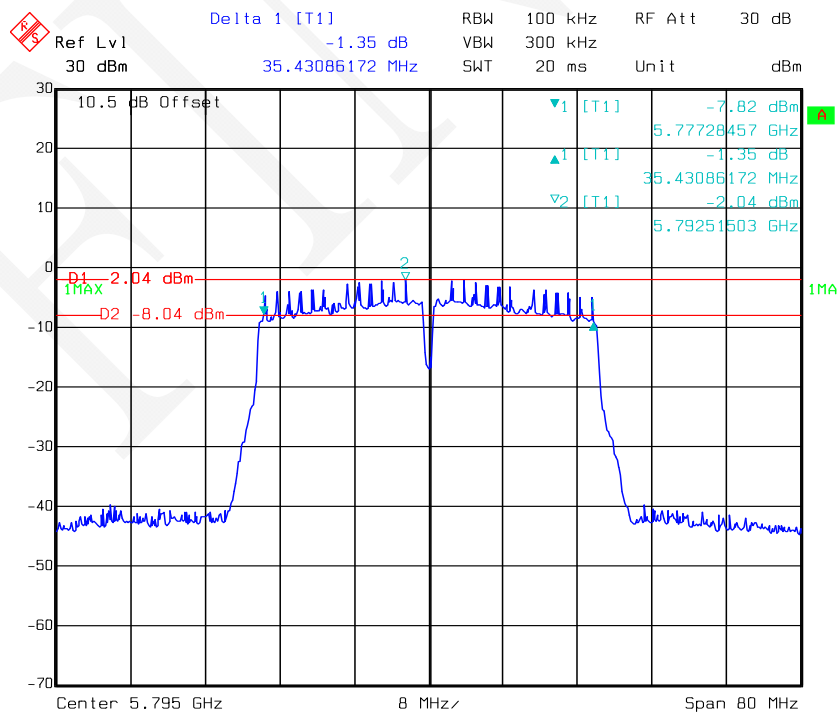


### 802.11ac40 mode, 6 dB Bandwidth-5755 MHz, Antenna 0



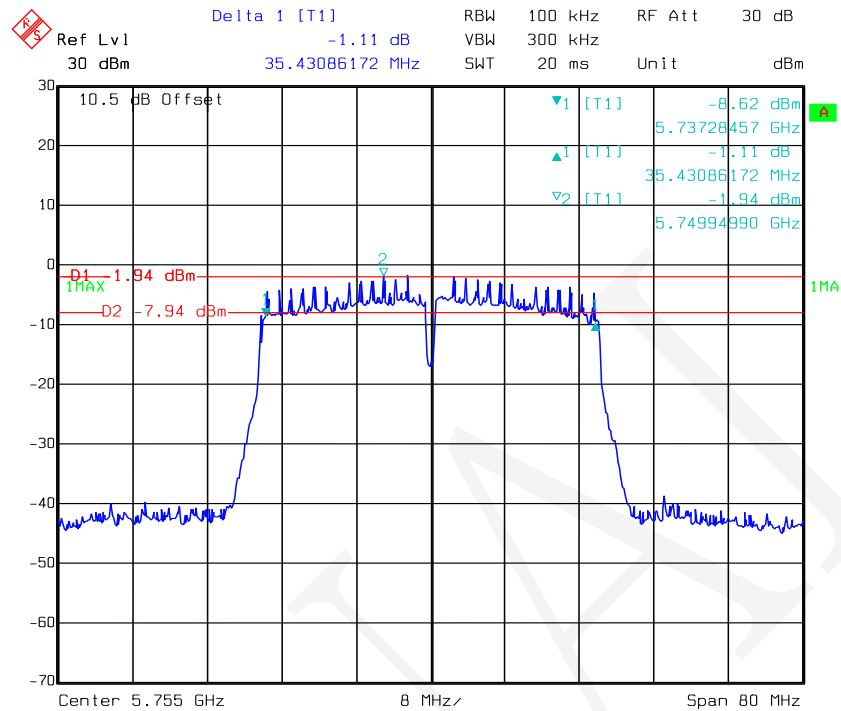
Date: 25.APR.2018 15:46:26

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



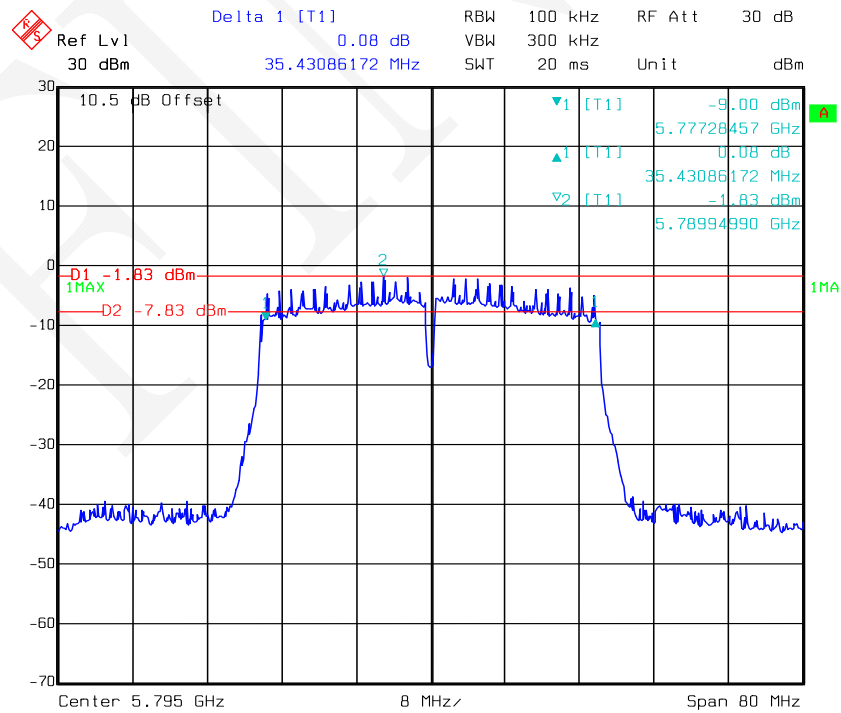
Date: 25.APR.2018 15:48:09

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



Date: 25.APR.2018 16:09:25

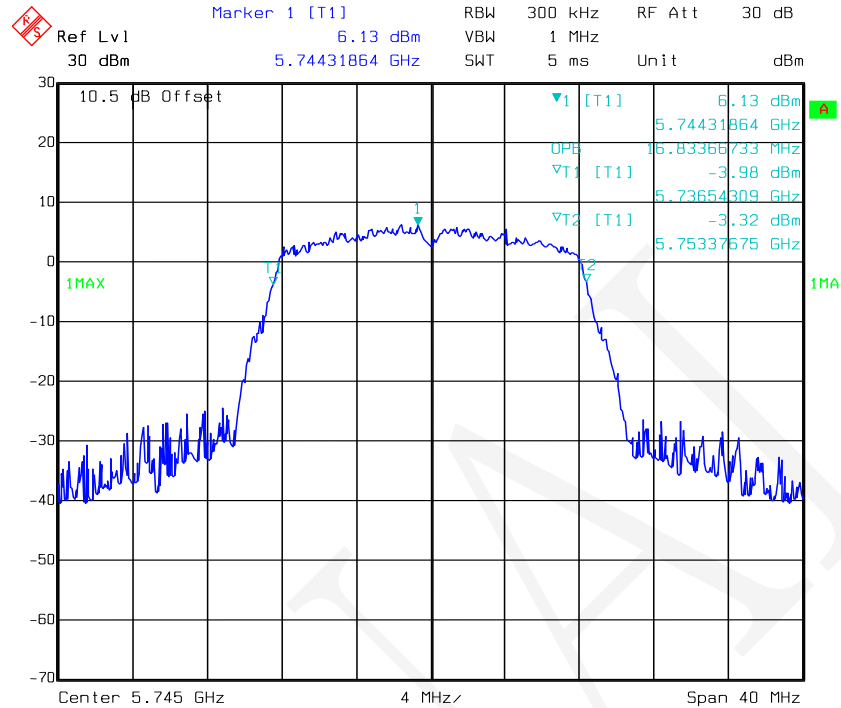
### 802.11ac40 mode, 6 dB Bandwidth-5795 MHz, Antenna 1



Date: 25.APR.2018 16:05:26

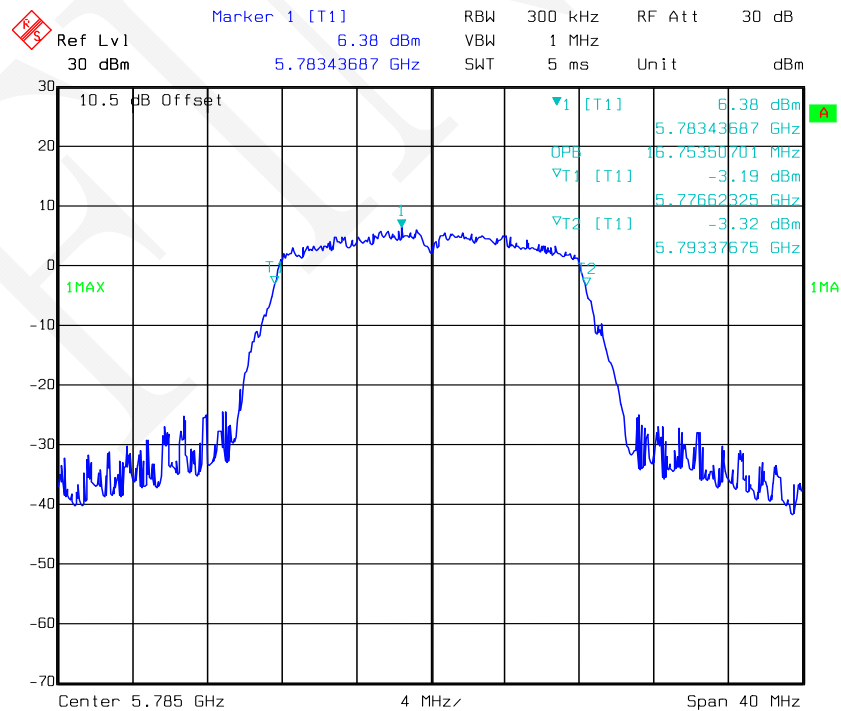


### 802.11a mode, 99% Occupied Bandwidth-5745 MHz, Antenna 0



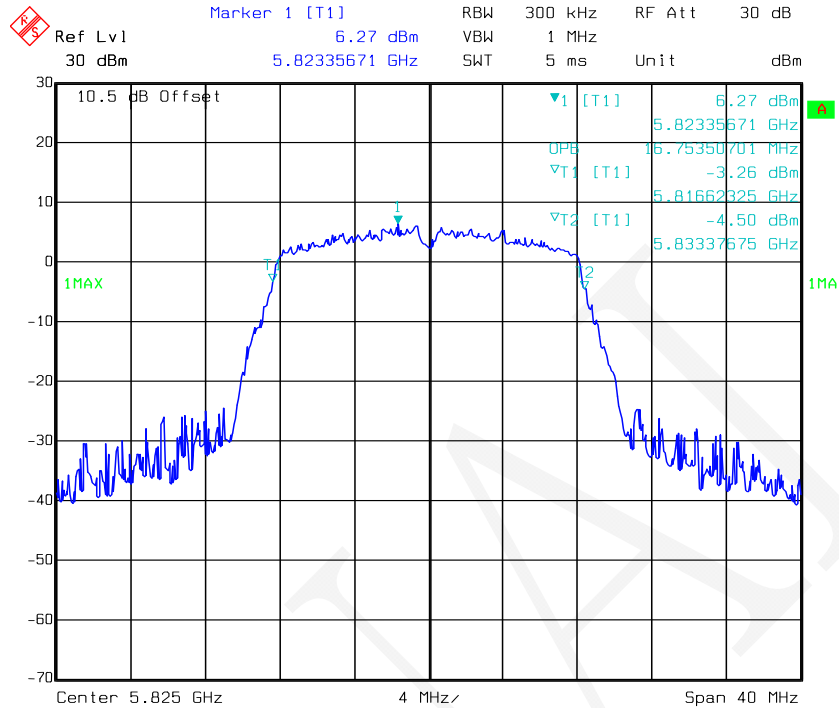
Date: 25.APR.2018 14:07:58

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



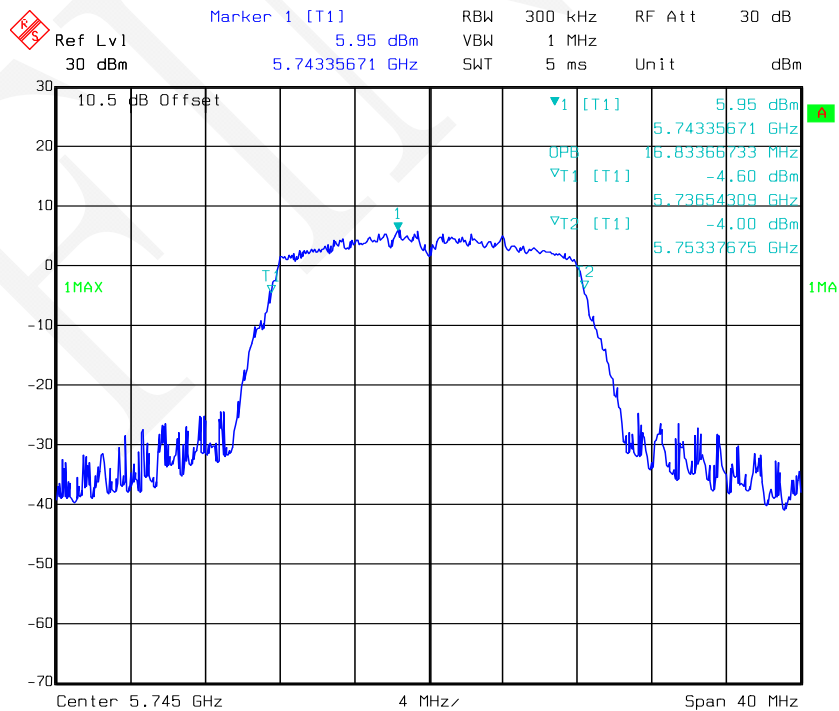
Date: 25.APR.2018 14:09:39

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



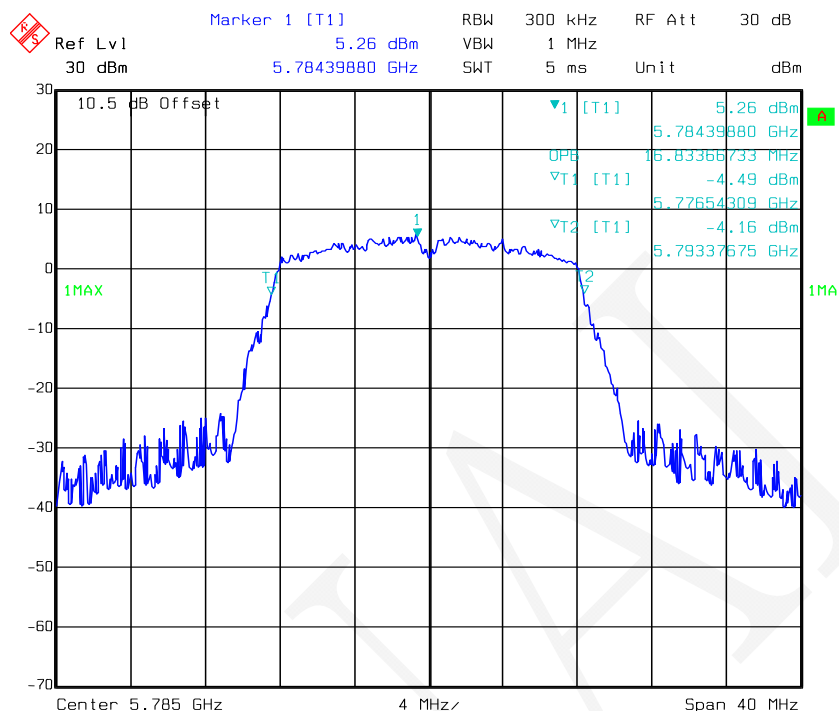
Date: 25.APR.2018 14:11:59

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



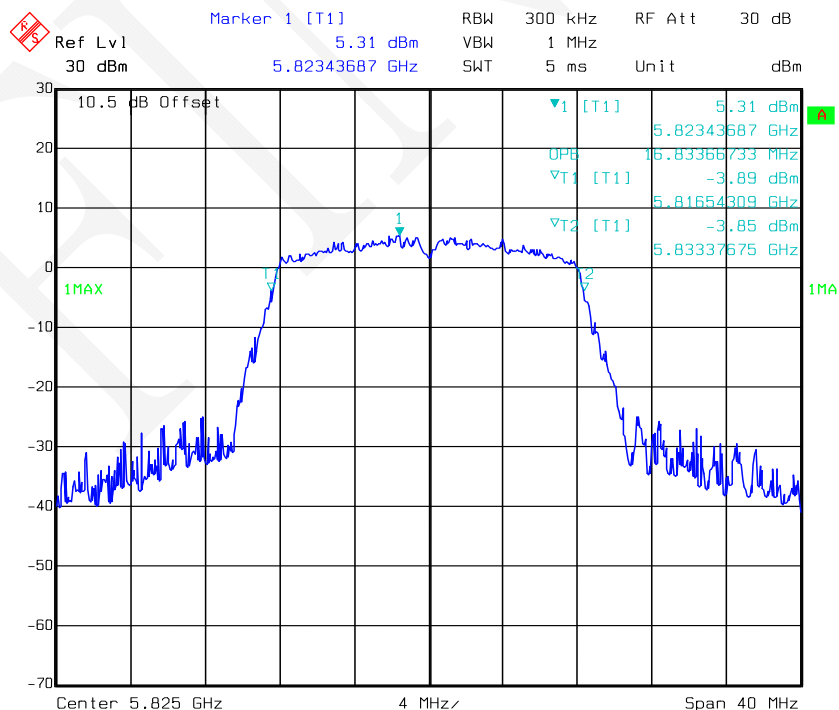
Date: 25.APR.2018 16:26:53

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



Date: 25.APR.2018 16:28:15

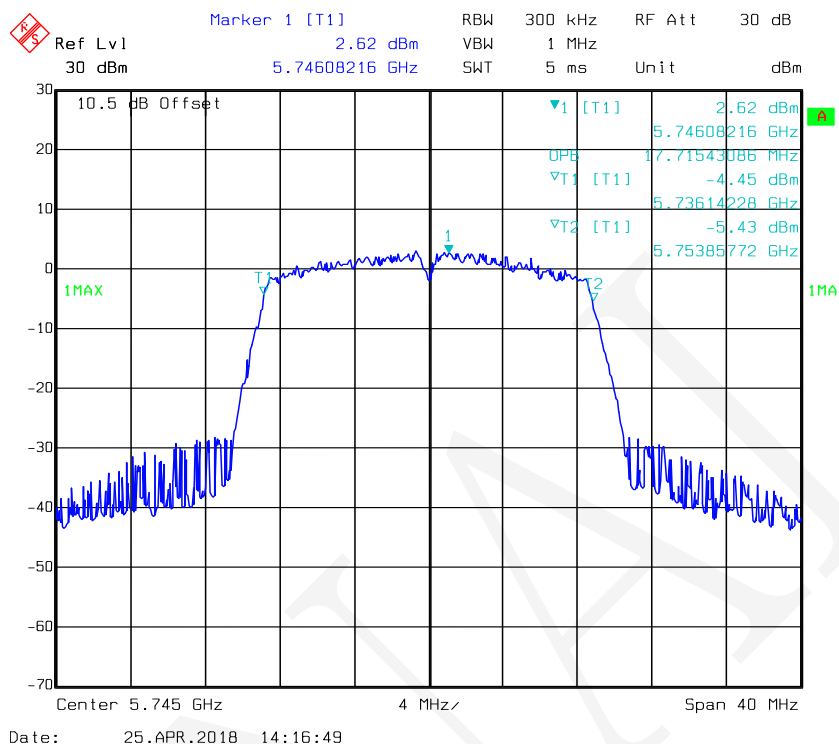
### 802.11a mode, 99% Occupied Bandwidth -5825 MHz, Antenna 1



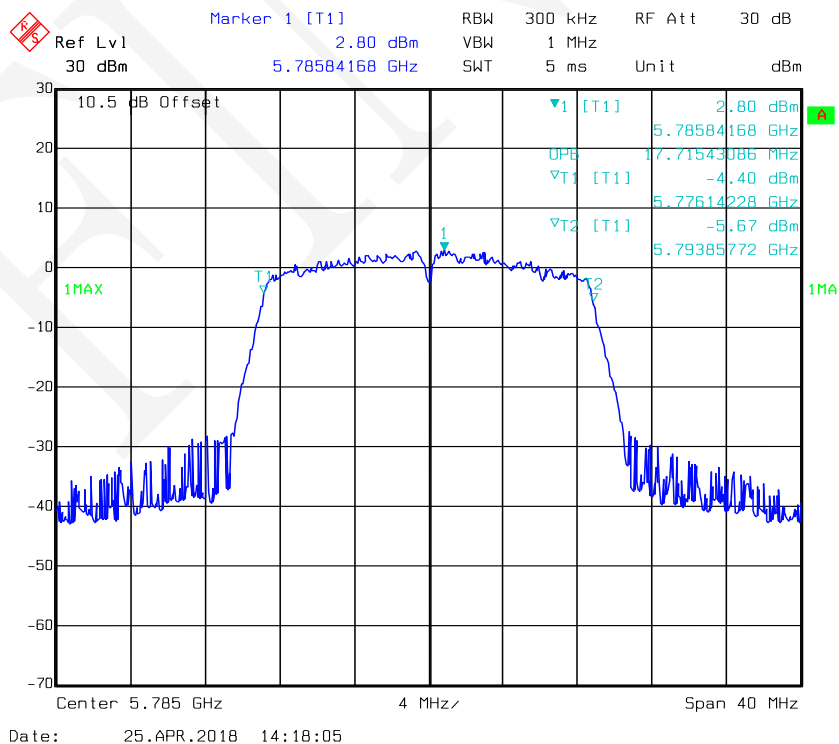
Date: 25.APR.2018 16:29:41



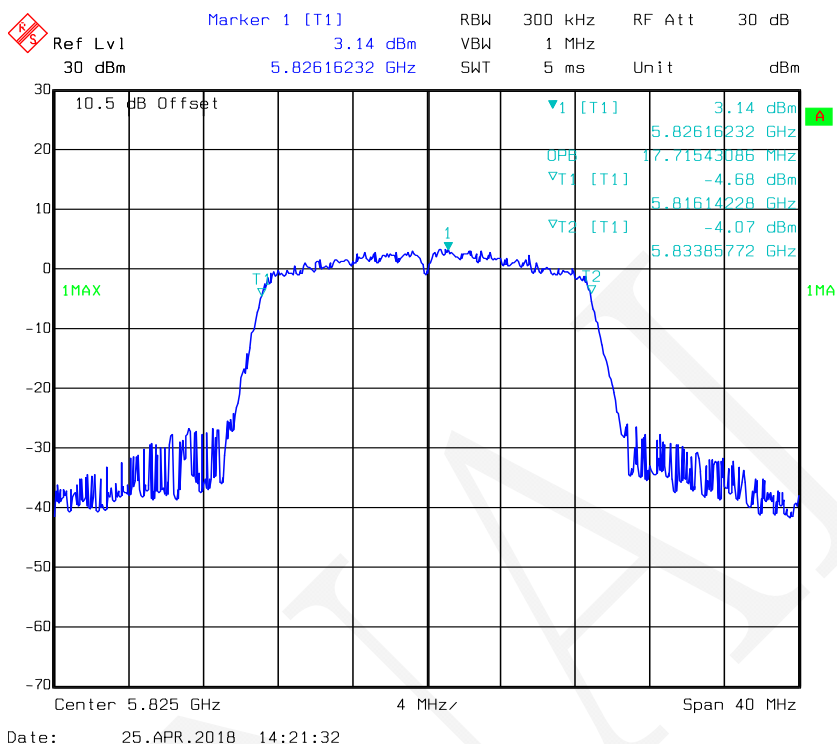
### 802.11n-HT20 mode, 99% Occupied Bandwidth-5745 MHz, Antenna 0



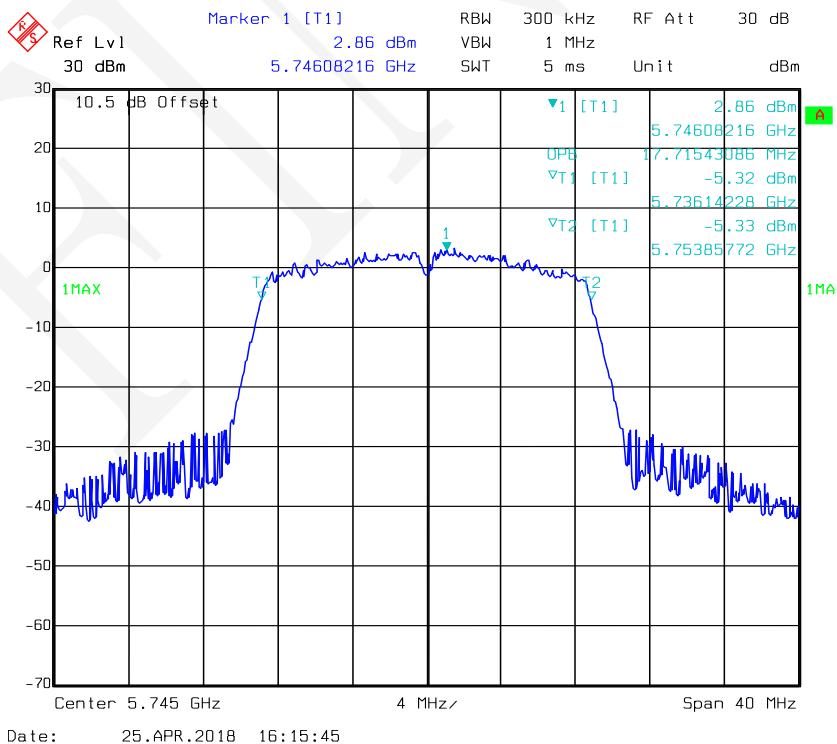
### 802.11n-HT20 mode, 99% Occupied Bandwidth-5785 MHz, Antenna 0



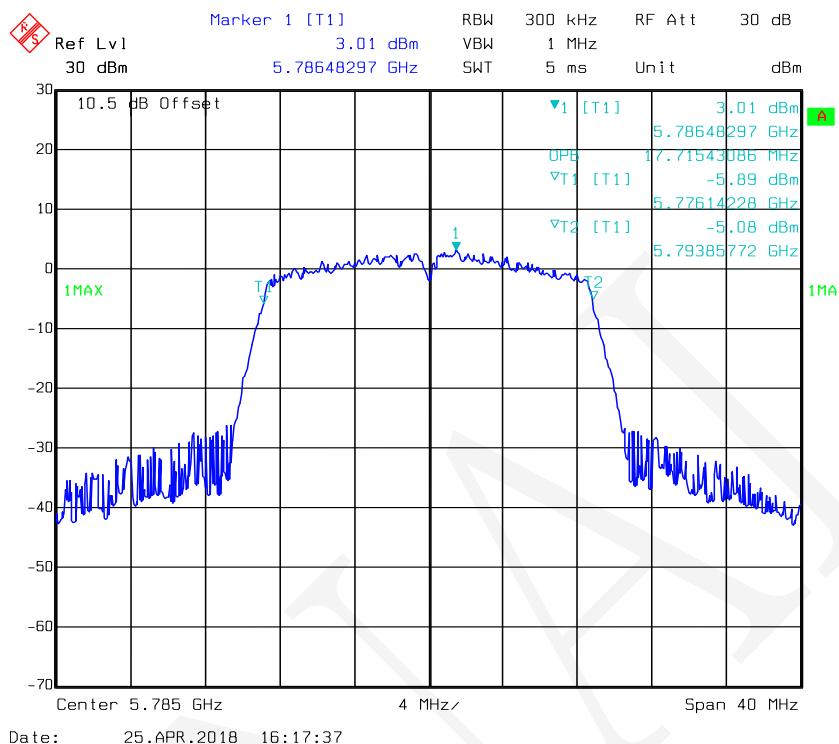
### 802.11n-HT20 mode, 99% Occupied Bandwidth-5825 MHz, Antenna 0



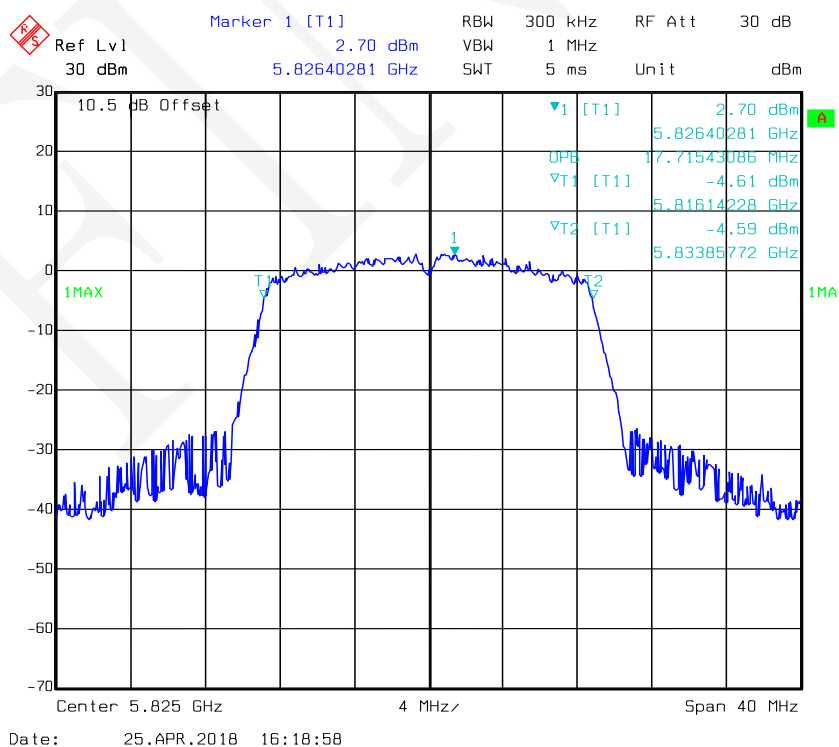
### 802.11n-HT20 mode, 99% Occupied Bandwidth-5745 MHz, Antenna 1



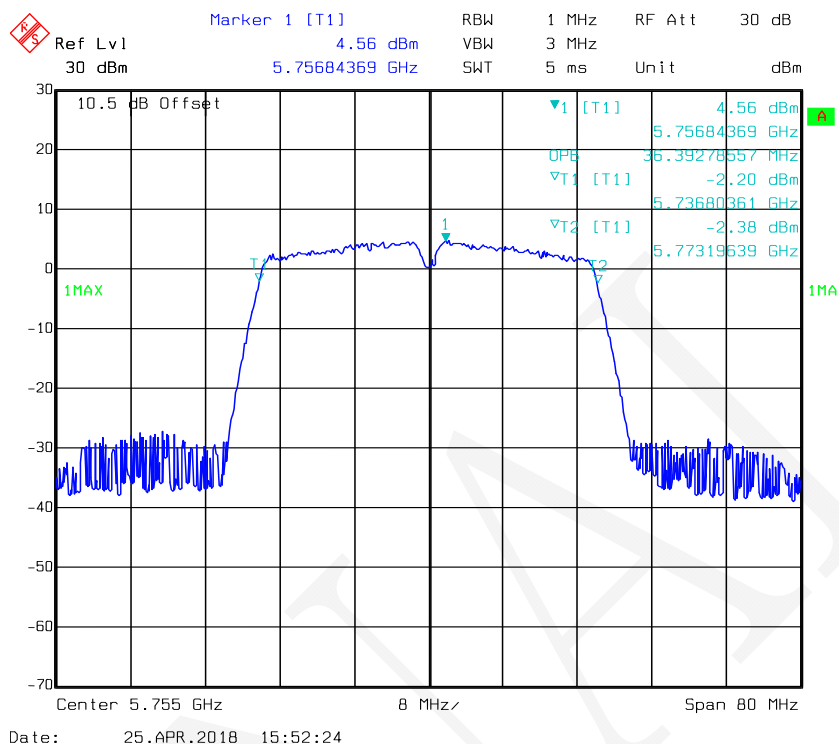
### 802.11n-HT20 mode, 99% Occupied Bandwidth-5785 MHz, Antenna 1



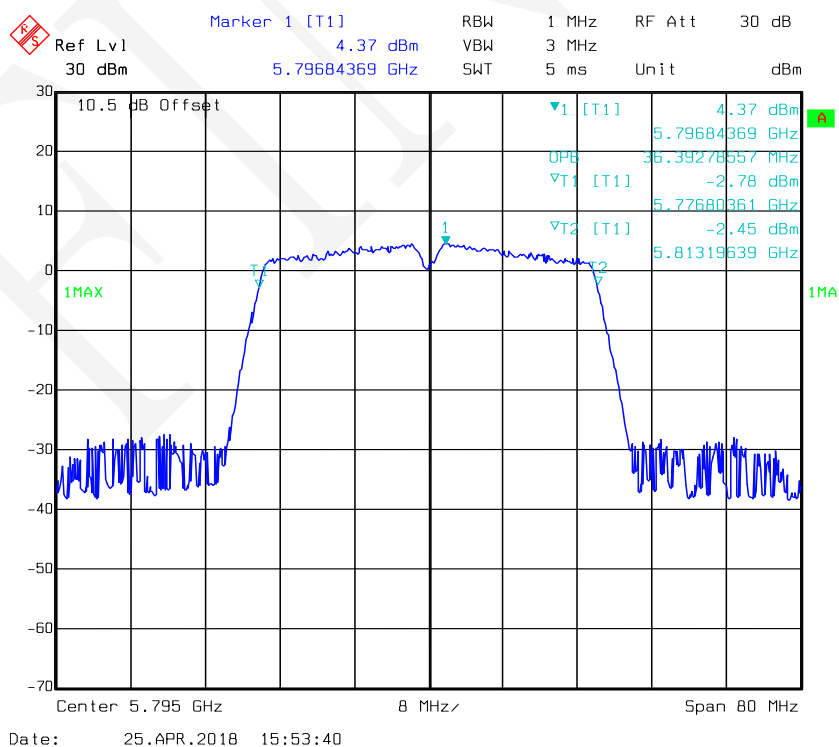
### 802.11n-HT20 mode, 99% Occupied Bandwidth-5825 MHz, Antenna 1



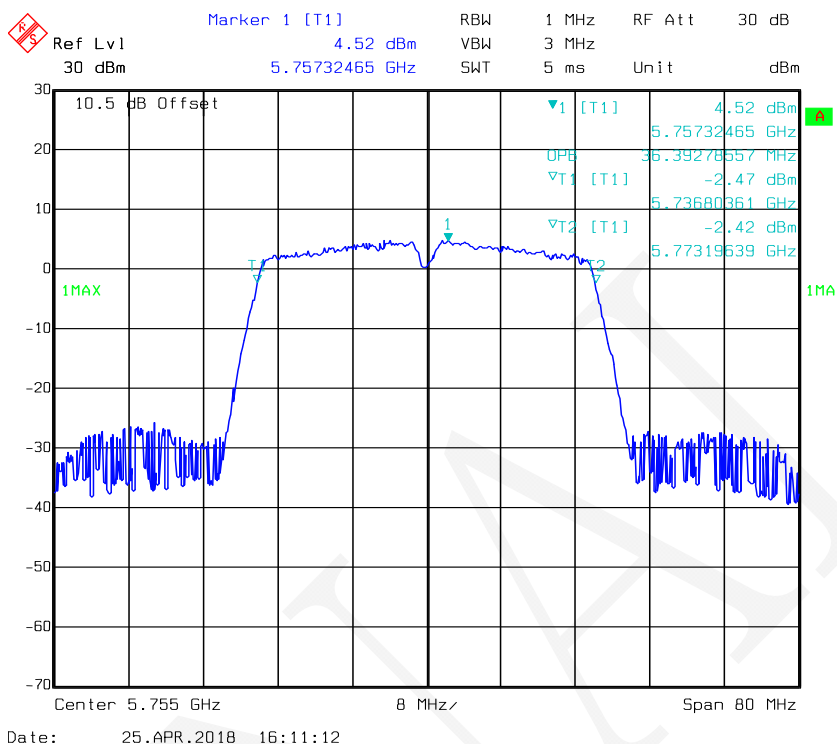
### 802.11n-HT40 mode, 99% Occupied Bandwidth-5755 MHz, Antenna 0



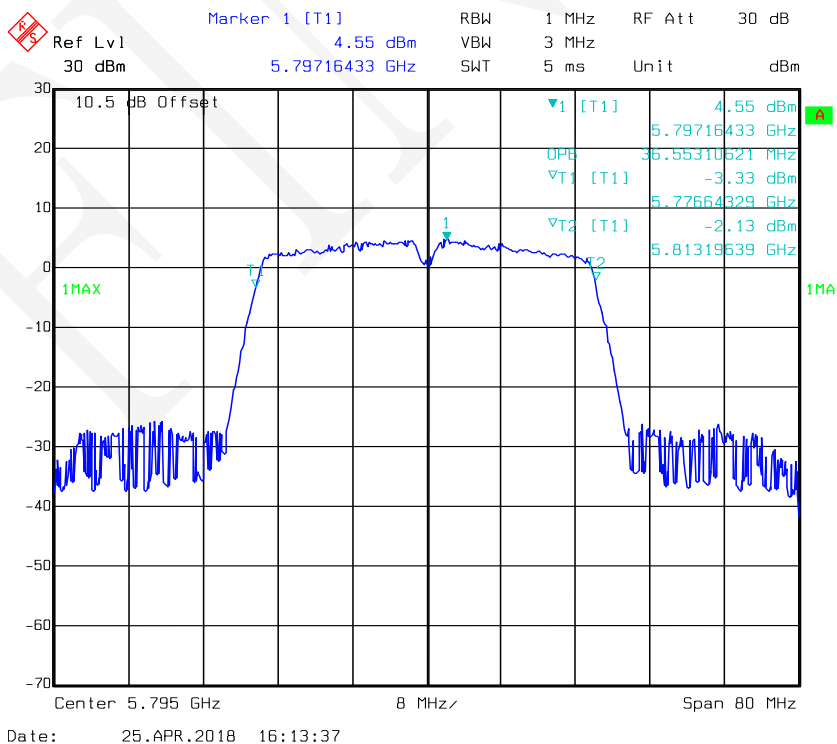
### 802.11n-HT40 mode, 99% Occupied Bandwidth-5795 MHz, Antenna 0



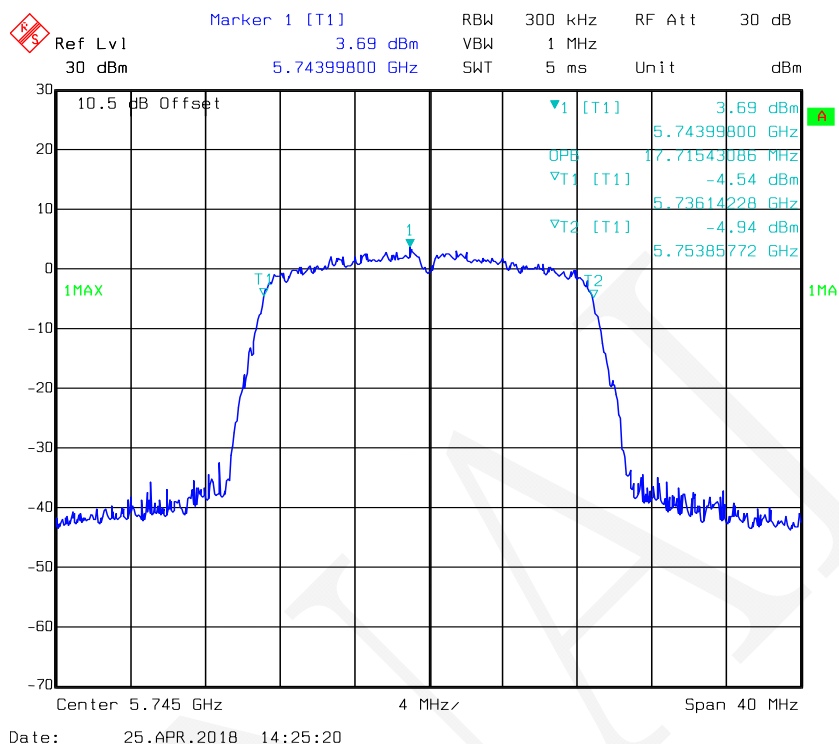
### 802.11n-HT40 mode, 99% Occupied Bandwidth-5755 MHz, Antenna 1



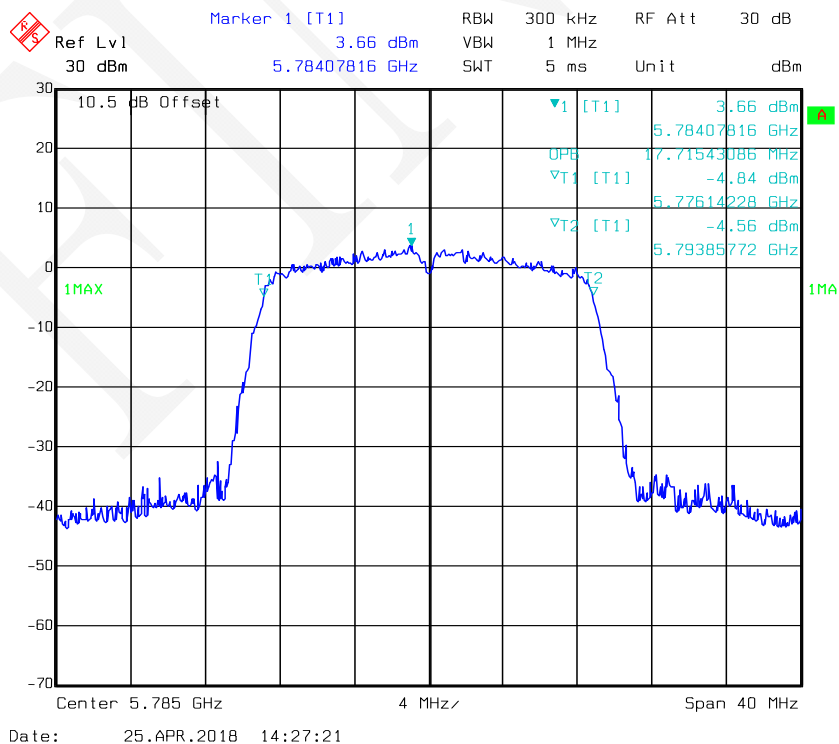
### 802.11n-HT40 mode, 99% Occupied Bandwidth-5795 MHz, Antenna 1



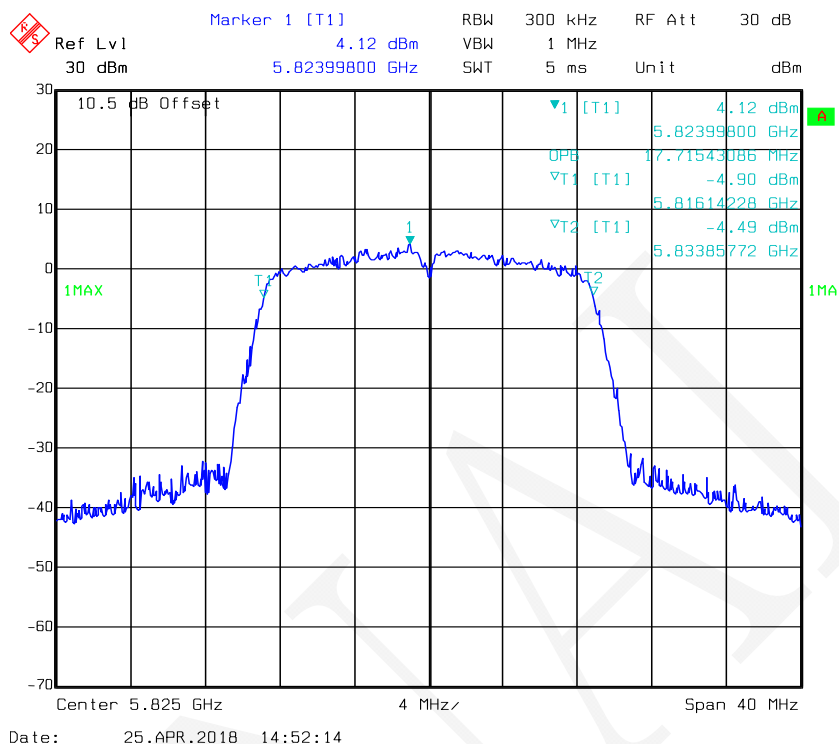
### 802.11ac20 mode, 99% Occupied Bandwidth-5745 MHz, Antenna 0



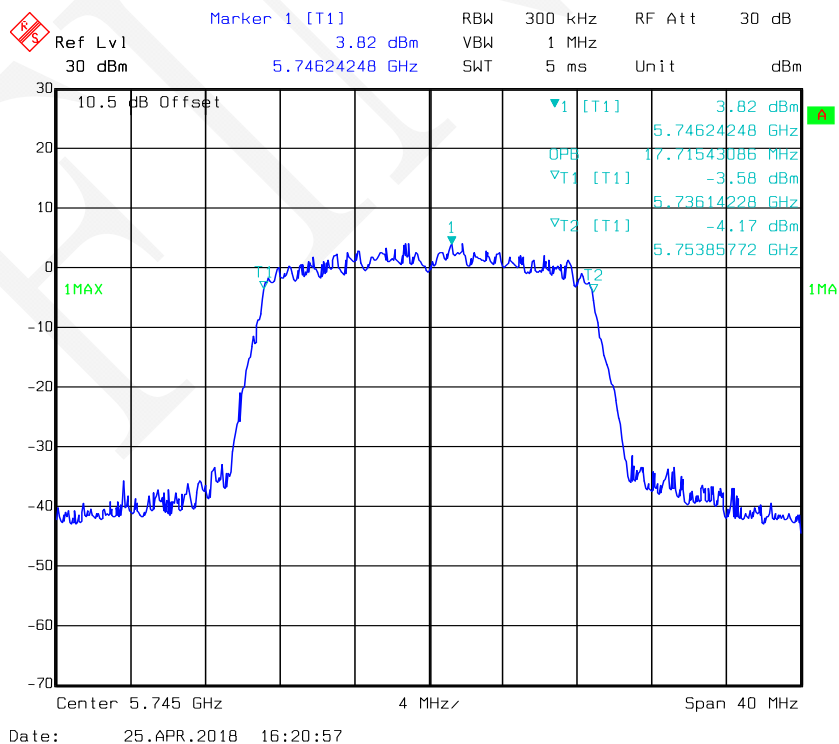
### 802.11ac20 mode, 99% Occupied Bandwidth-5785 MHz, Antenna 0



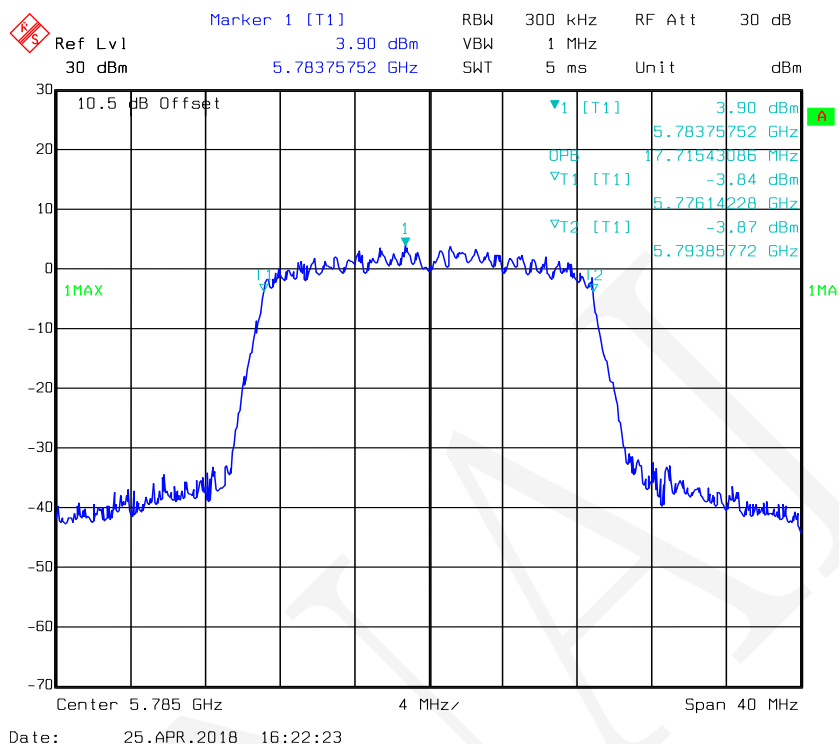
### 802.11ac20 mode, 99% Occupied Bandwidth-5825 MHz, Antenna 0



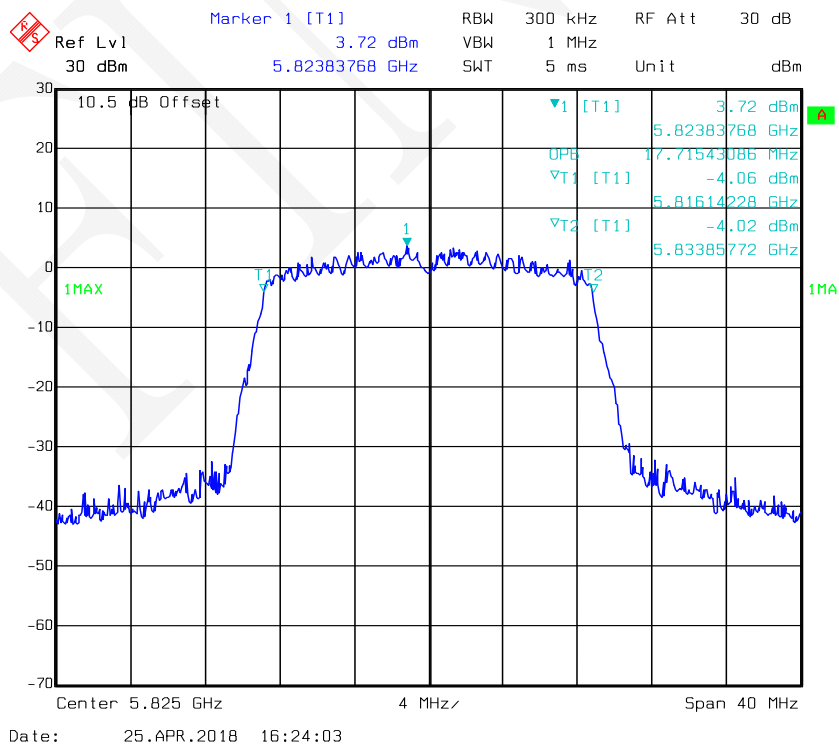
### 802.11ac20 mode, 99% Occupied Bandwidth-5745 MHz, Antenna 1



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

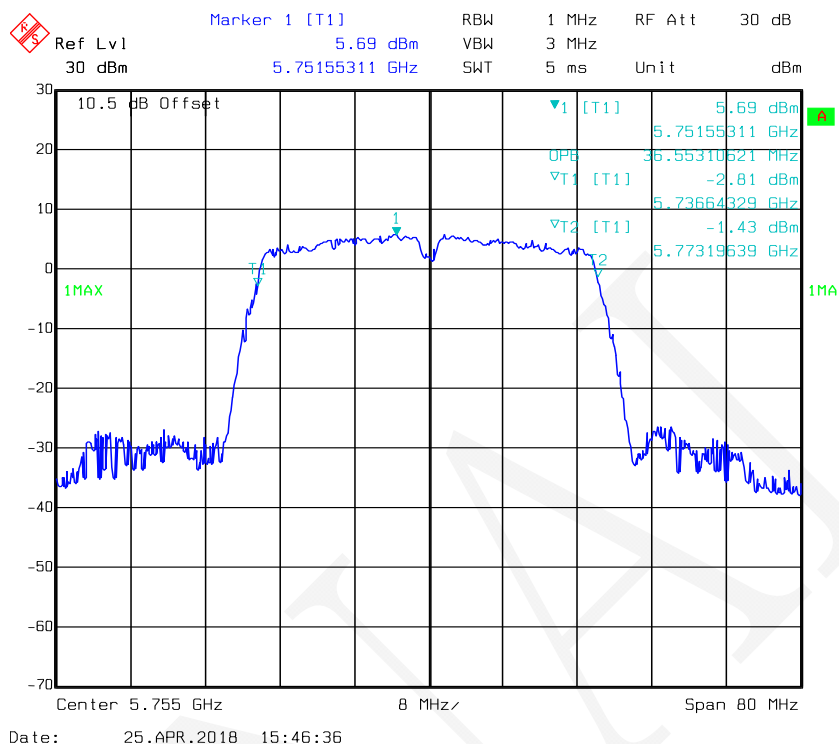


### 802.11ac20 mode, 99% Occupied Bandwidth-5825 MHz, Antenna 1

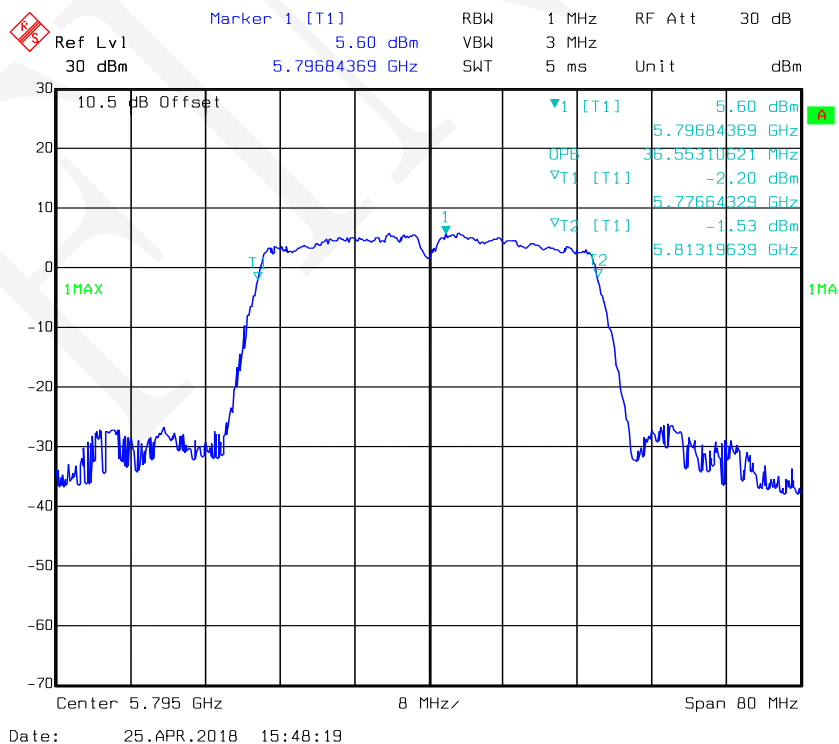




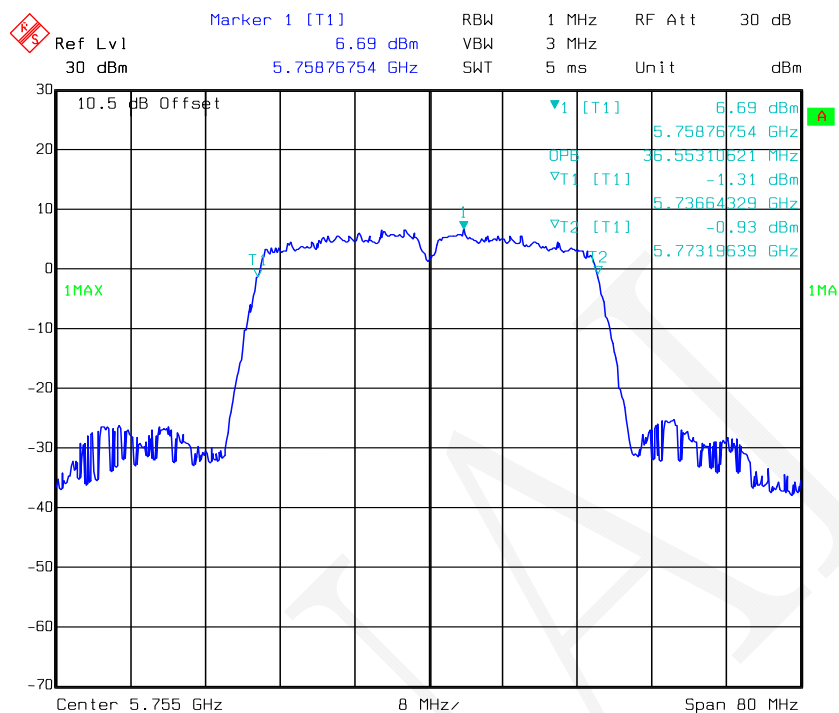
### 802.11ac40 mode, 99% Occupied Bandwidth-5755 MHz, Antenna 0



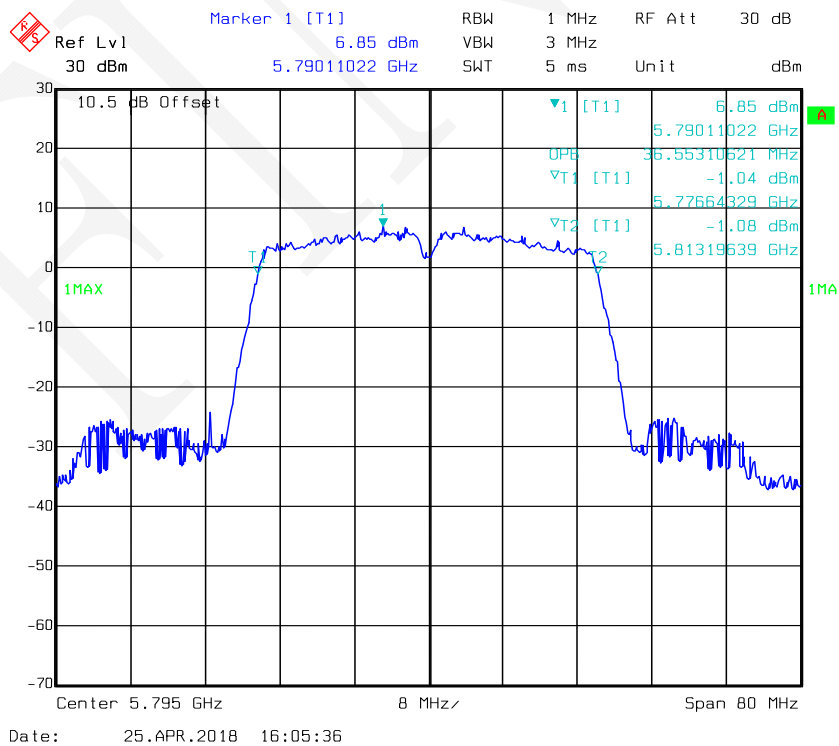
### 802.11ac40 mode, 99% Occupied Bandwidth-5795 MHz, Antenna 0



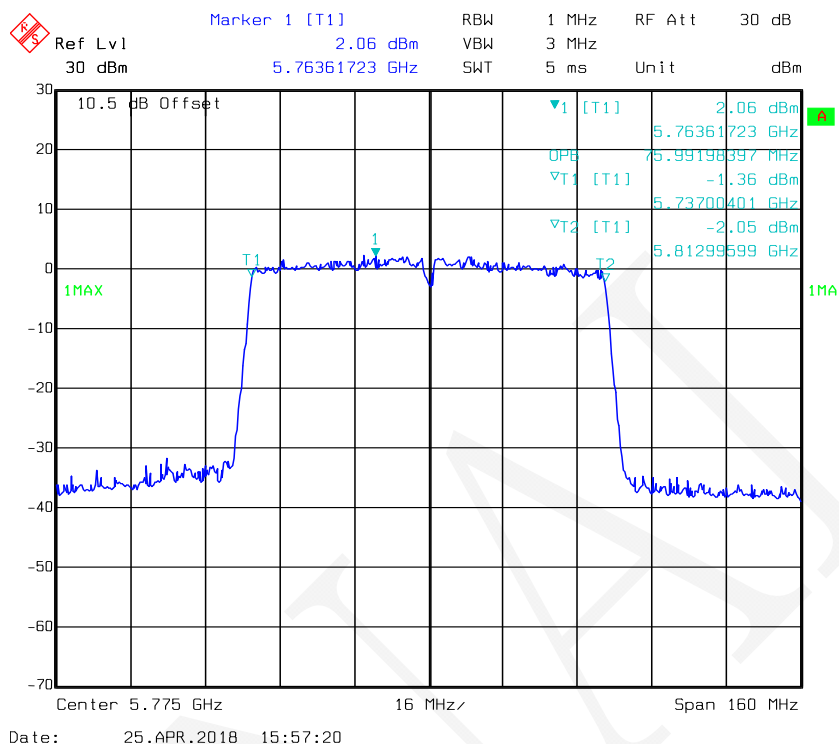
### 802.11ac40 mode, 99% Occupied Bandwidth-5755 MHz, Antenna 1



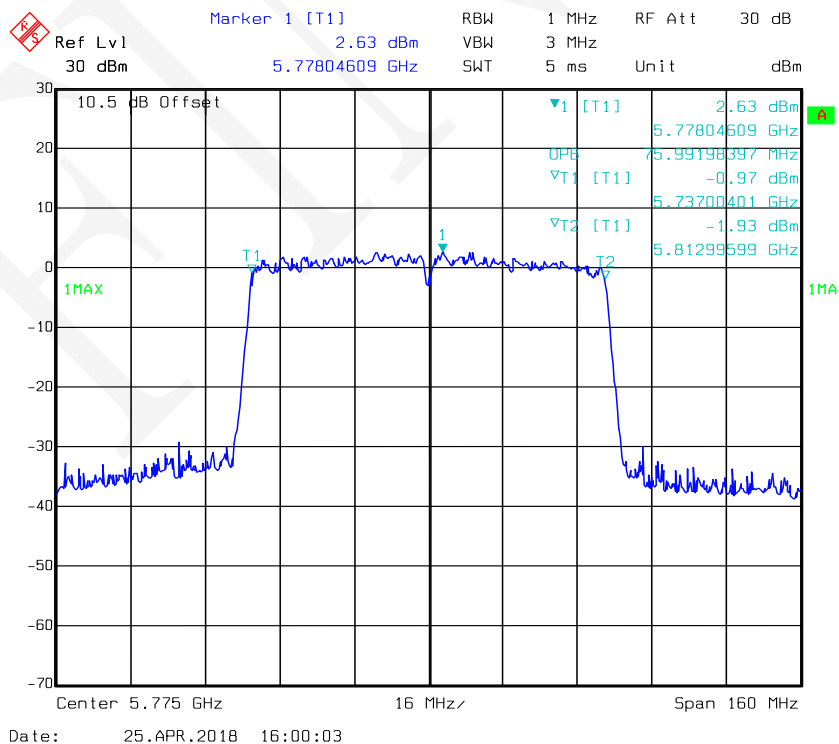
### 802.11ac40 mode, 99% Occupied Bandwidth-5795 MHz, Antenna 1



### 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**

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### **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 colocated 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

<b>Temperature:</b>	21 °C
<b>Relative Humidity:</b>	60 %
<b>ATM Pressure:</b>	95.9 kPa

The testing was performed by Tom Tang from 2018-04-25.

Test Mode: Transmitting

### For 5150-5250 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	5180	14.80	14.58	0.06	14.86	14.64	24
	Middle	5200	14.77	14.66	0.06	14.83	14.72	24
	High	5240	14.70	14.61	0.06	14.76	14.67	24

Mode	Channel	Frequency (MHz)	Conducted Average Power (dBm)		Duty Cycle Factor (dB)	Total (dBm)	Limit (dBm)
			Antenna 0	Antenna 1			
802.11n-HT20	Low	5180	12.34	12.03	0.07	15.27	24
	Middle	5200	12.19	12.12	0.07	15.24	24
	High	5240	12.11	11.95	0.07	15.11	24
802.11n-HT40	Low	5190	11.32	10.65	0.06	14.07	24
	High	5230	11.22	10.63	0.06	14.01	24
802.11ac20	Low	5180	12.37	12.19	0.18	15.47	24
	Middle	5200	12.46	12.02	0.18	15.44	24
	High	5240	12.34	11.97	0.18	15.35	24
802.11ac40	Low	5190	12.45	11.80	0.35	15.50	24
	High	5230	12.44	11.79	0.35	15.49	24
802.11ac 80	-	5210	12.46	11.45	0.64	15.63	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	15.08	14.62	0.06	15.14	14.68	24
	Middle	5785	15.01	14.58	0.06	15.07	14.64	24
	High	5825	14.91	14.38	0.06	14.97	14.44	24

Mode	Channel	Frequency (MHz)	Conducted Average Power (dBm)		Duty Cycle Factor (dB)	Total (dBm)	Limit (dBm)
			Antenna 0	Antenna 1			
802.11n-HT20	Low	5745	12.12	12.04	0.07	15.16	30
	Middle	5785	11.97	11.95	0.07	15.04	30
	High	5825	12.57	11.97	0.07	15.36	30
802.11n-HT40	Low	5755	11.05	11.09	0.06	14.14	30
	High	5795	10.88	11.08	0.06	14.05	30
802.11ac20	Low	5745	12.07	12.60	0.18	15.53	30
	Middle	5785	12.26	12.44	0.18	15.54	30
	High	5825	12.59	12.26	0.18	15.62	30
802.11ac40	Low	5755	12.21	12.74	0.35	15.84	30
	High	5795	12.26	12.73	0.35	15.86	30
802.11ac 80	-	5775	12.09	12.46	0.64	15.93	30

Note:

1. The max antenna gain is 5.5dBi.
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  $N_{ANT} \leq 4$ ;

So:

Directional gain =  $G_{ANT} + \text{Array Gain} = 5.5 \text{ dBi} < 6 \text{ dBi}$

No power limit was reduced in MIMO mode.

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

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### **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:	21 °C
Relative Humidity:	60 %
ATM Pressure:	96.8 kPa

\* The testing was performed by Tom Tang on 2018-04-25.

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	4.66	4.58	0.06	4.72	4.64	11
	Middle	5200	4.68	4.47	0.06	4.74	4.53	11
	High	5240	4.74	4.43	0.06	4.80	4.49	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	2.15	1.70	0.07	5.01	8.5
	Middle	5200	2.00	1.95	0.07	5.06	8.5
	High	5240	1.84	1.71	0.07	4.86	8.5
802.11n-HT40	Low	5190	-2.38	-2.86	0.06	0.46	8.5
	High	5230	-2.36	-3.05	0.06	0.38	8.5
802.11ac20	Low	5180	2.09	1.94	0.18	5.21	8.5
	Middle	5200	1.99	1.90	0.18	5.14	8.5
	High	5240	2.05	2.19	0.18	5.31	8.5
802.11ac40	Low	5190	-1.24	-1.68	0.35	1.91	8.5
	High	5230	-1.32	-1.36	0.35	2.02	8.5
802.11ac80	-	5210	-4.61	-5.48	0.64	-1.37	8.5

Note:

1. The max antenna gain is 5.5dBi.
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:

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

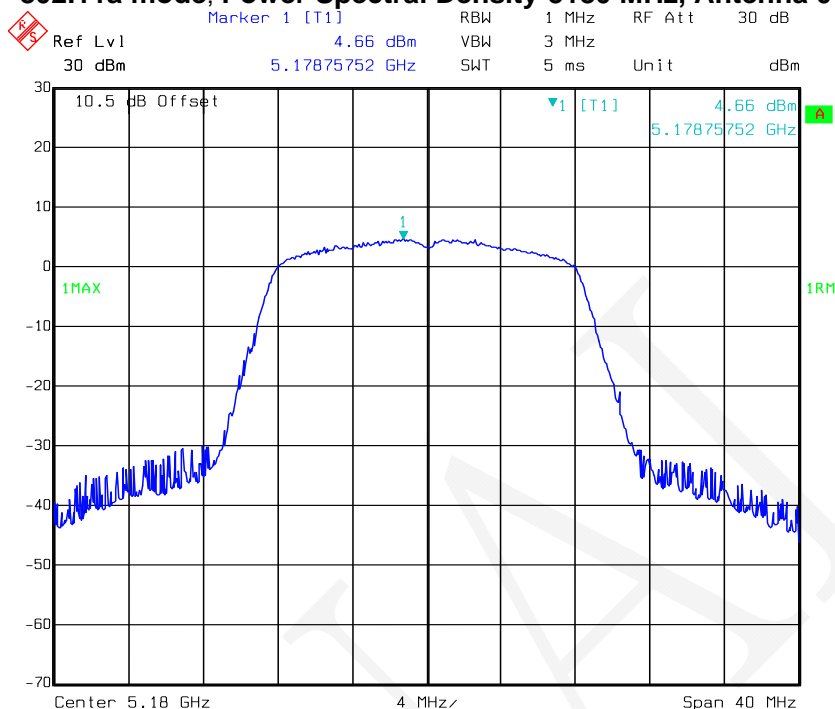
So:

$$\text{Directional gain} = G_{\text{ANT}} + \text{Array Gain} = 5.5 + 10 \cdot \log(2) = 8.5 \text{dBi} > 6 \text{dBi}$$

The power density Limit was reduced 2.5dB in MIMO mode.

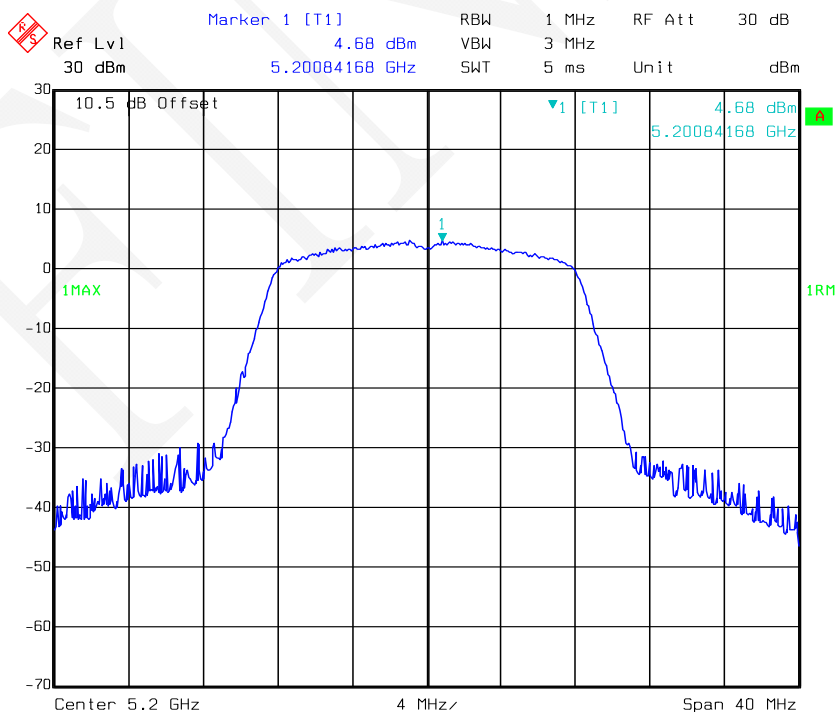


### 802.11a mode, Power Spectral Density-5180 MHz, Antenna 0



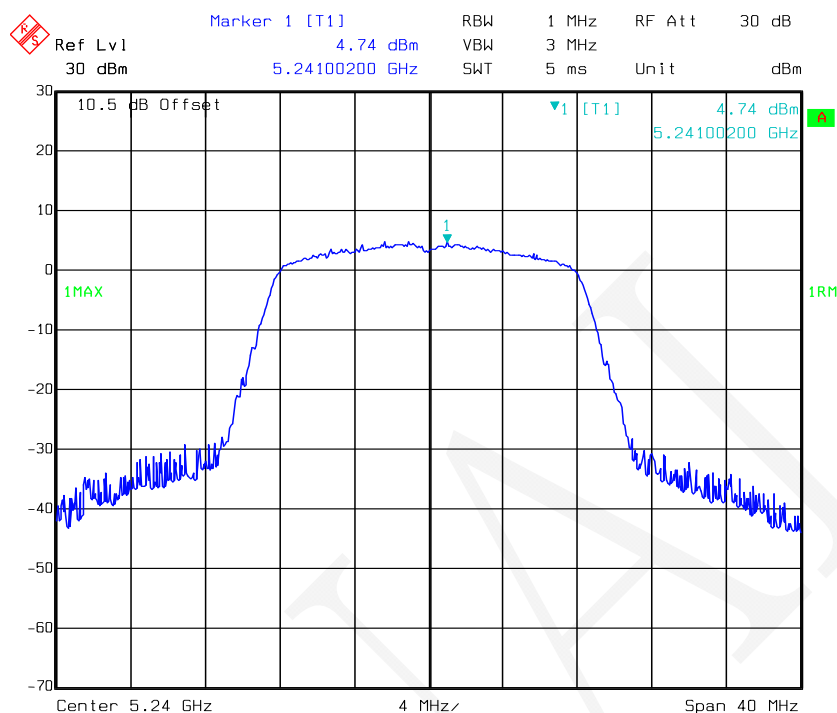
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### 802.11a mode, Power Spectral Density-5200 MHz, Antenna 0



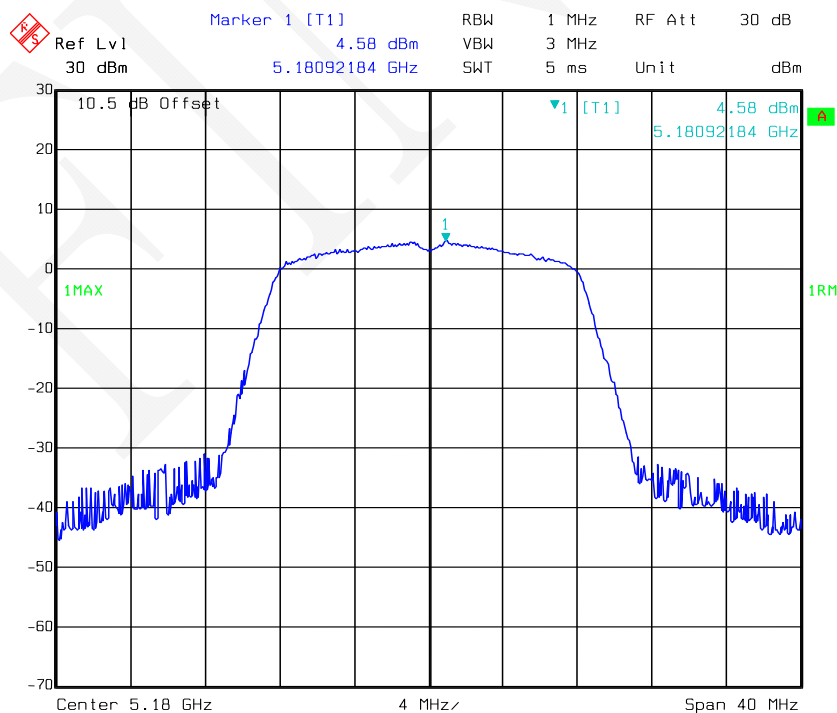
Date: 25.APR.2018 11:23:17

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



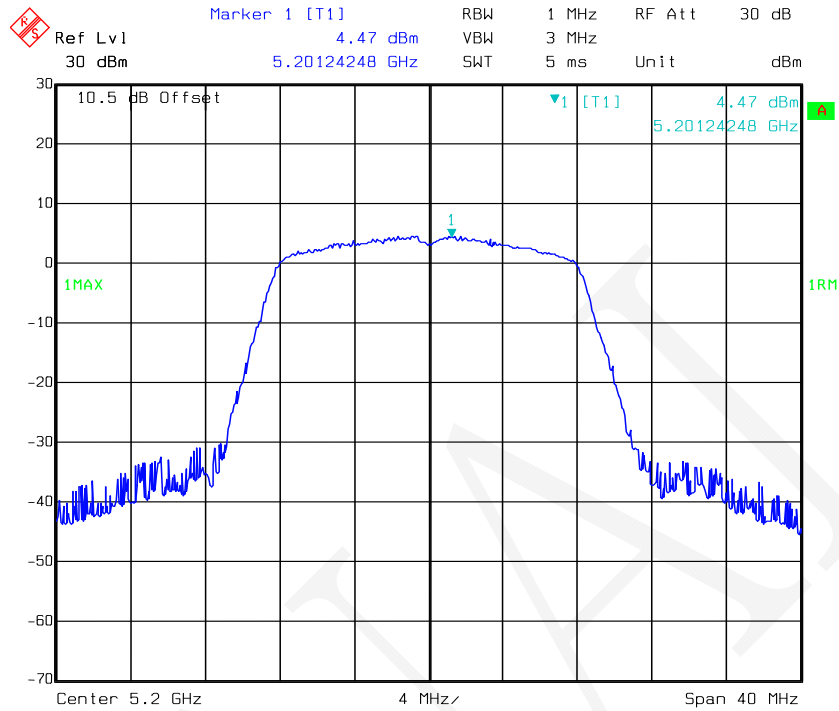
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### 802.11a mode, Power Spectral Density-5180 MHz, Antenna 1

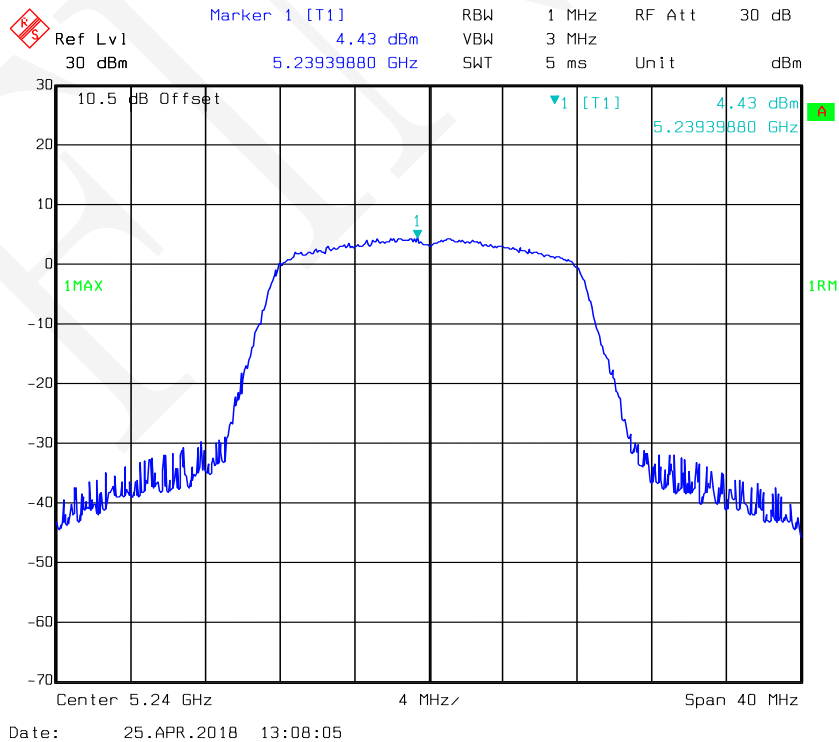


Date: 25.APR.2018 13:04:19

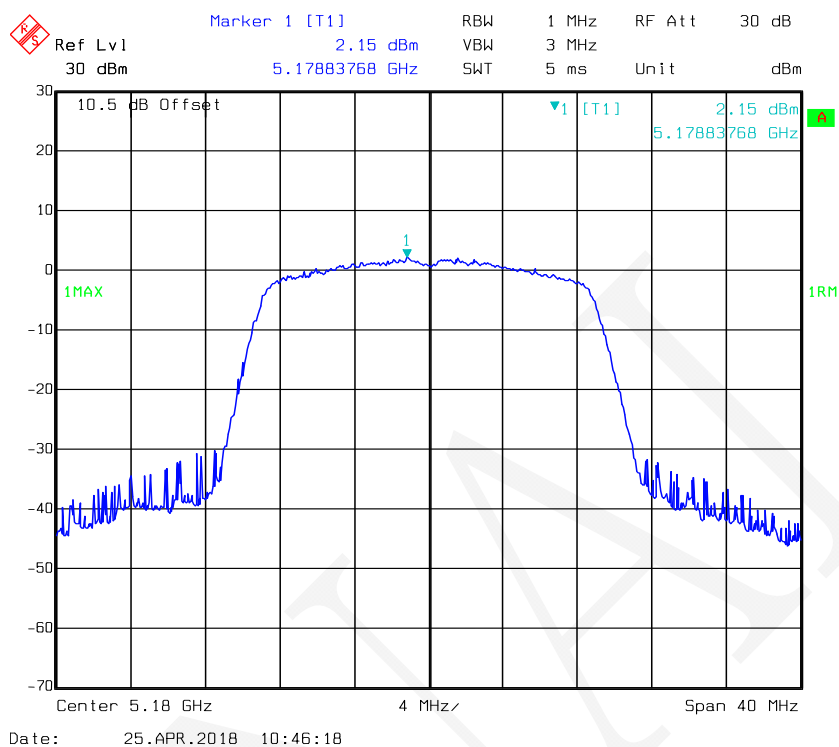
### 802.11a mode, Power Spectral Density-5200 MHz, Antenna 1



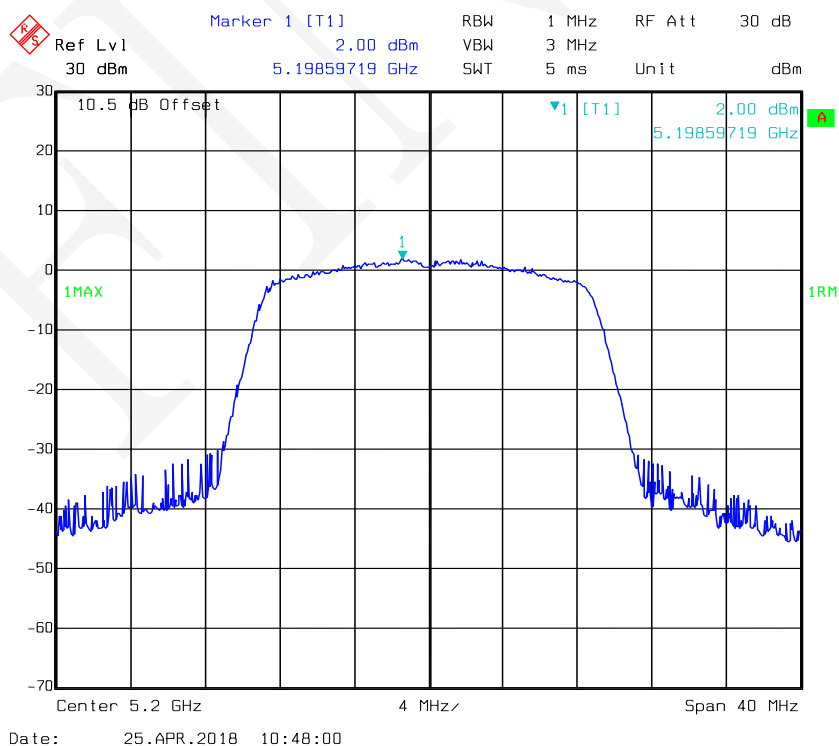
### 802.11a mode, Power Spectral Density-5240 MHz, Antenna 1



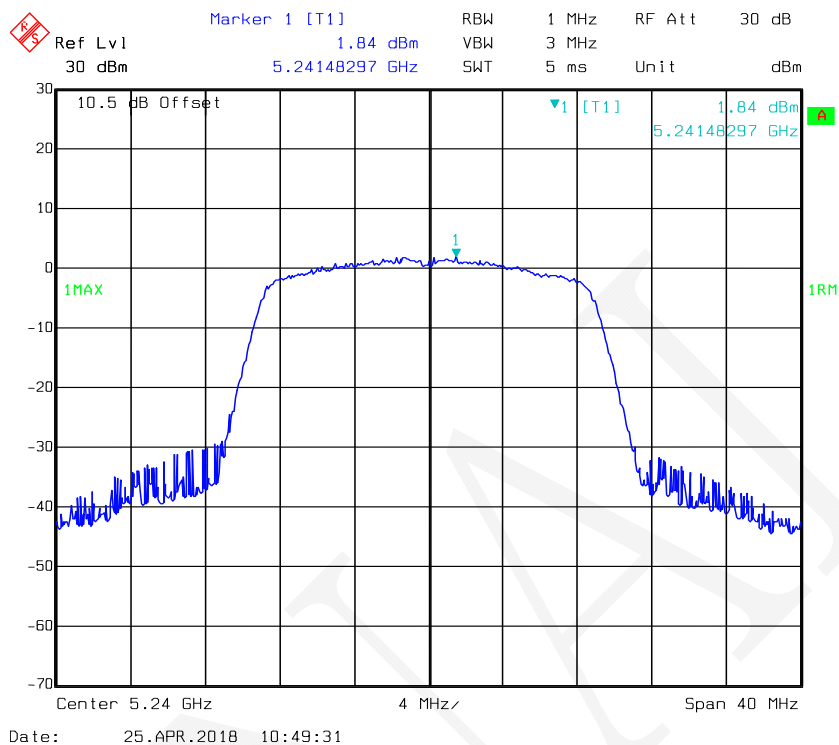
### 802.11n-HT20 mode, Power Spectral Density-5180 MHz, Antenna 0



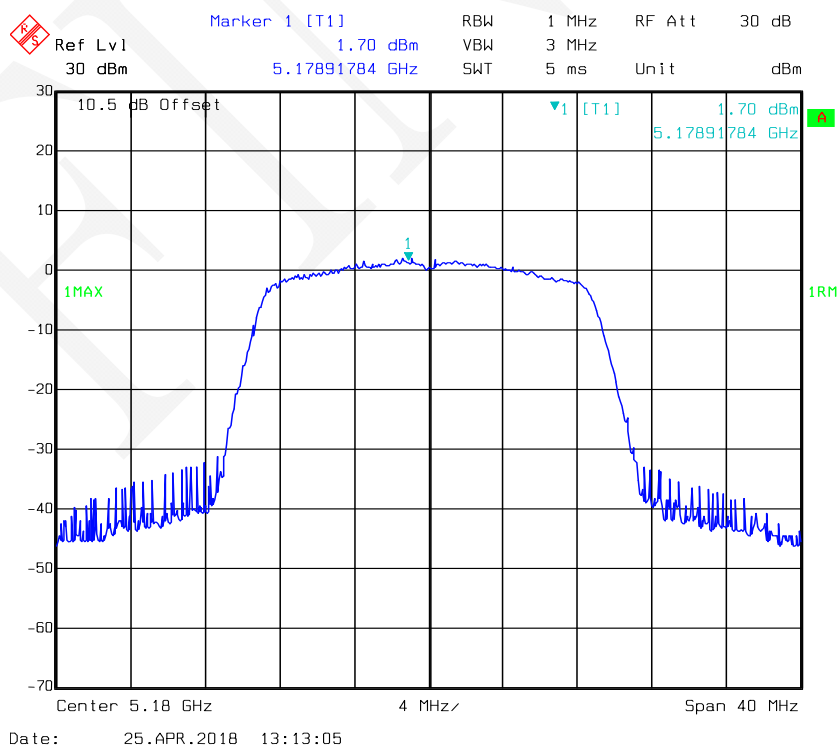
### 802.11n-HT20 mode, Power Spectral Density-5200 MHz, Antenna 0



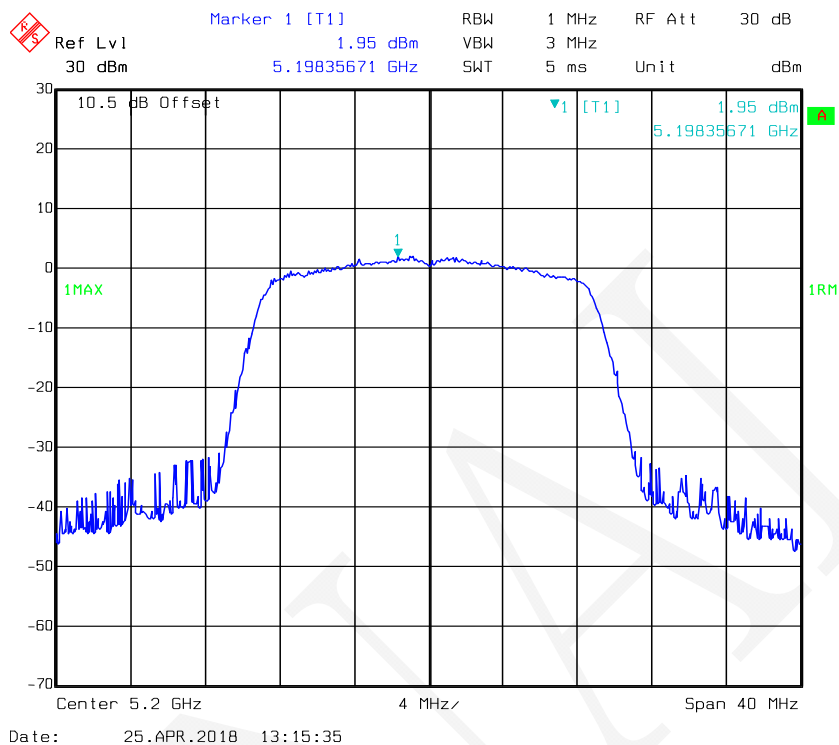
### 802.11n-HT20 mode, Power Spectral Density-5240 MHz, Antenna 0



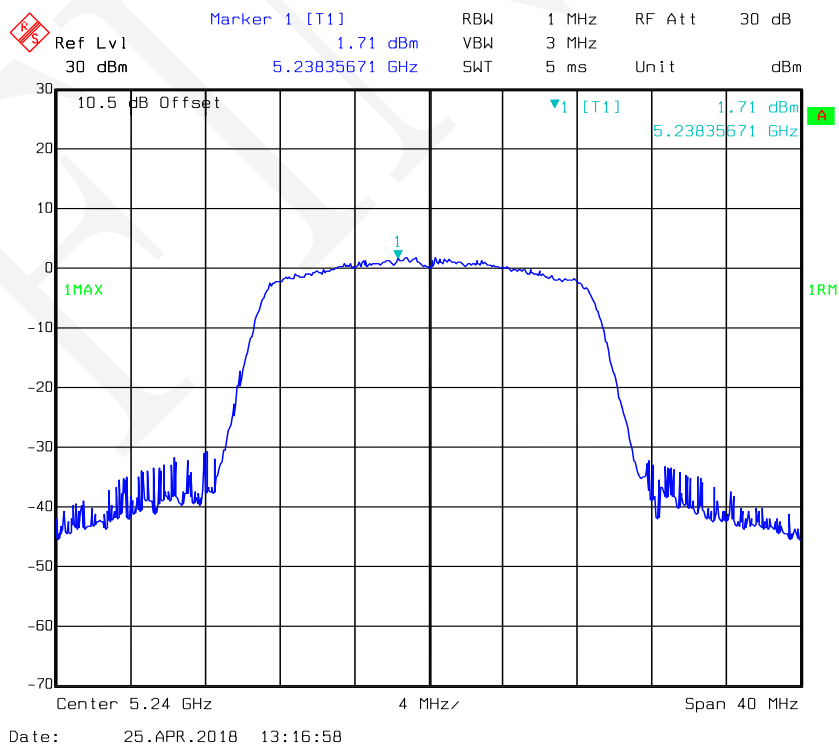
### 802.11n-HT20 mode, Power Spectral Density-5180 MHz, Antenna 1



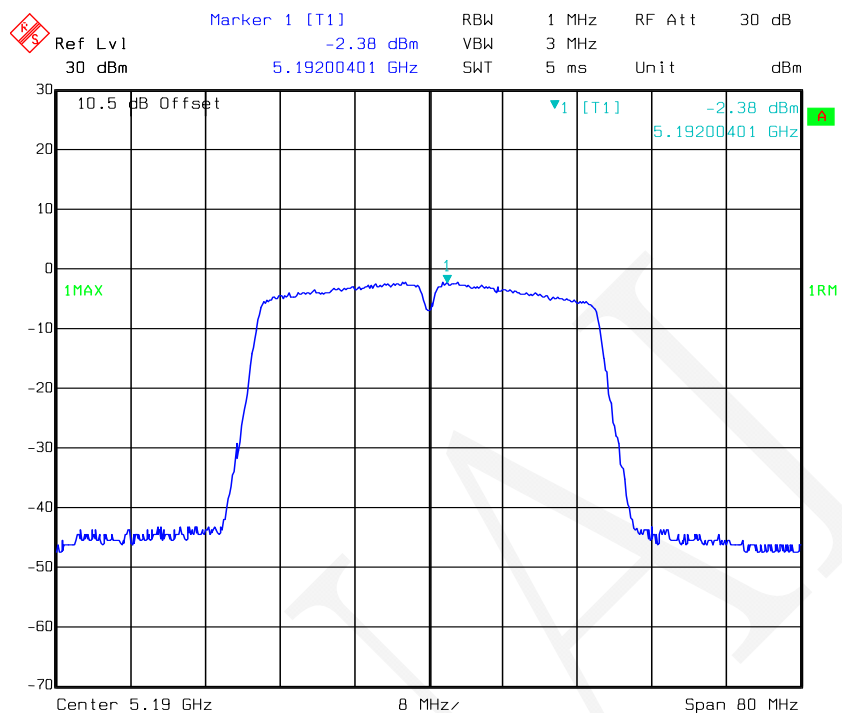
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### 802.11n-HT20 mode, Power Spectral Density-5240 MHz, Antenna 1

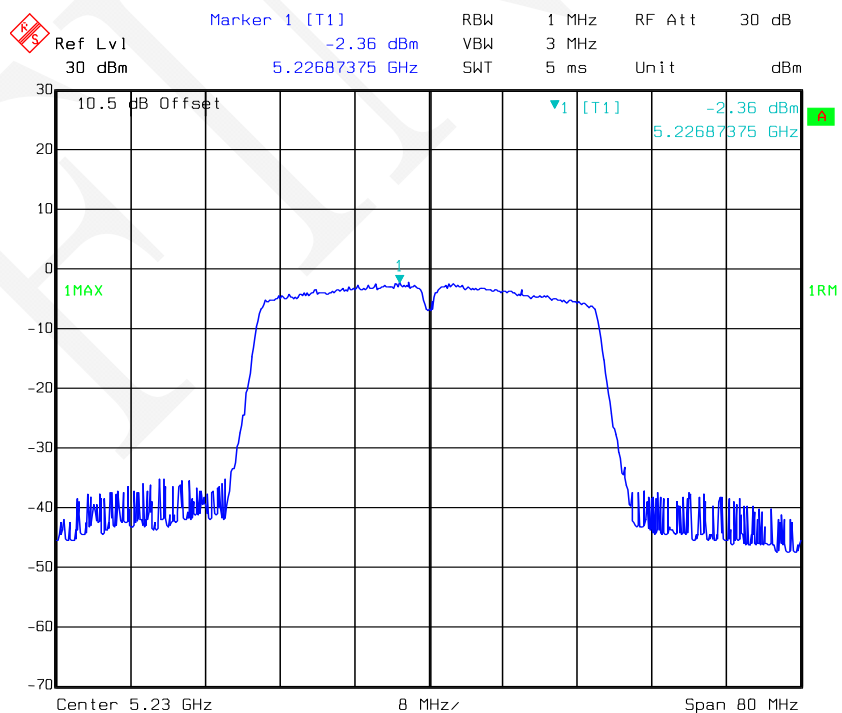


### 802.11n-HT40 mode, Power Spectral Density-5190 MHz, Antenna 0



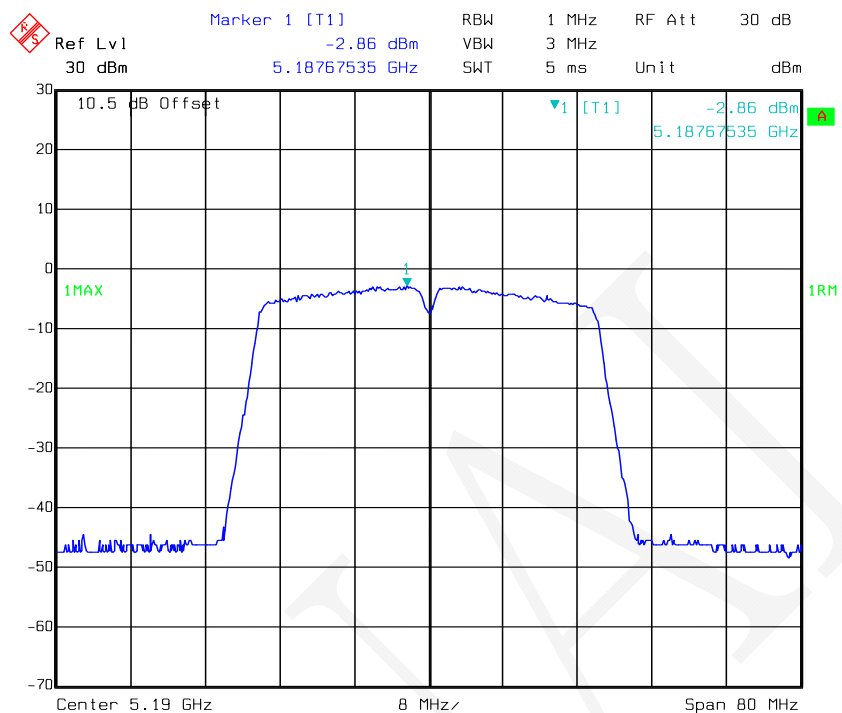
Date: 25.APR.2018 11:02:12

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



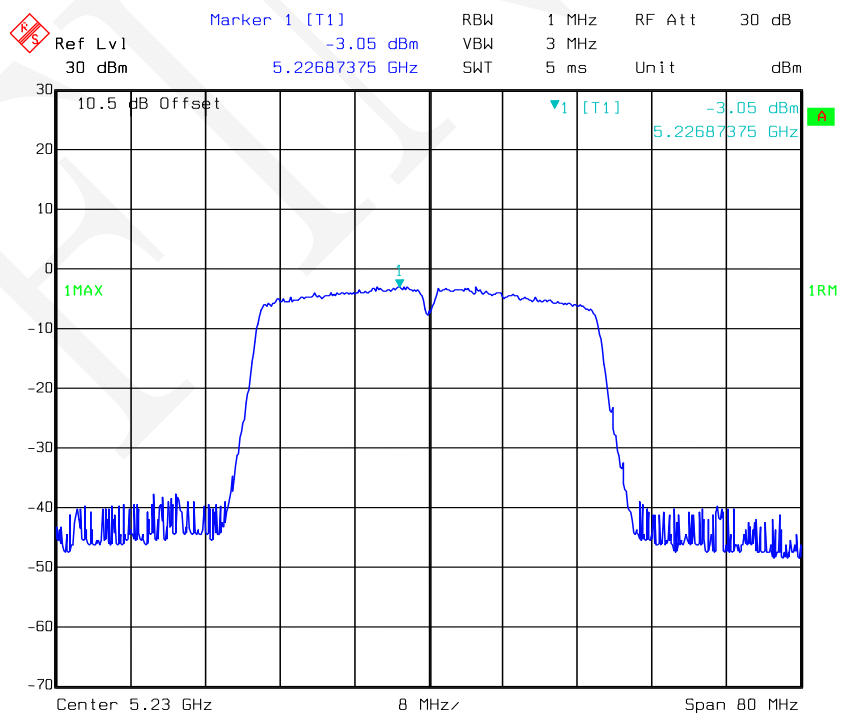
Date: 25.APR.2018 11:03:42

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



Date: 25.APR.2018 13:37:41

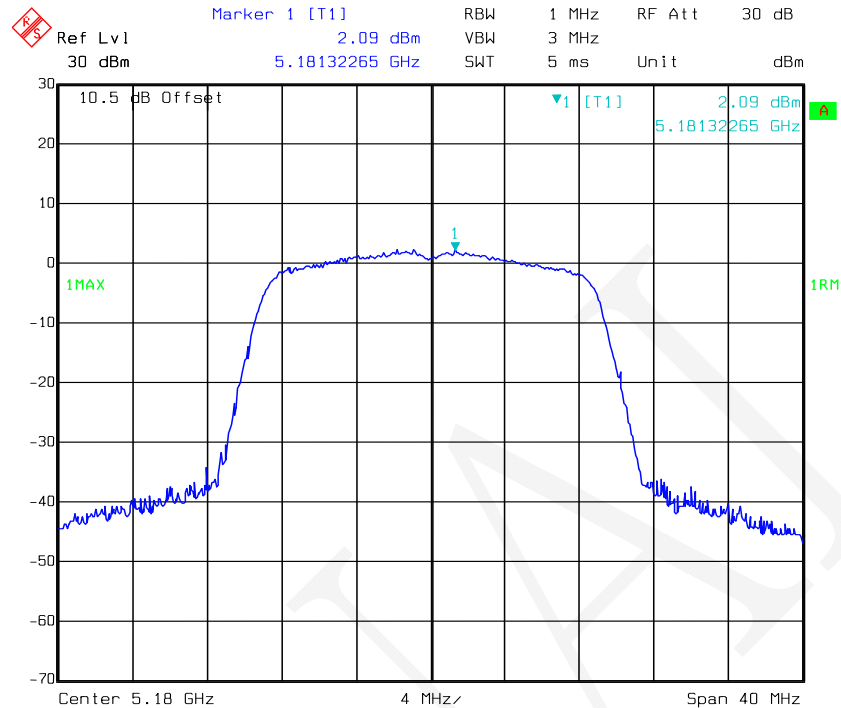
### 802.11n-HT40 mode, Power Spectral Density-5230 MHz, Antenna 1



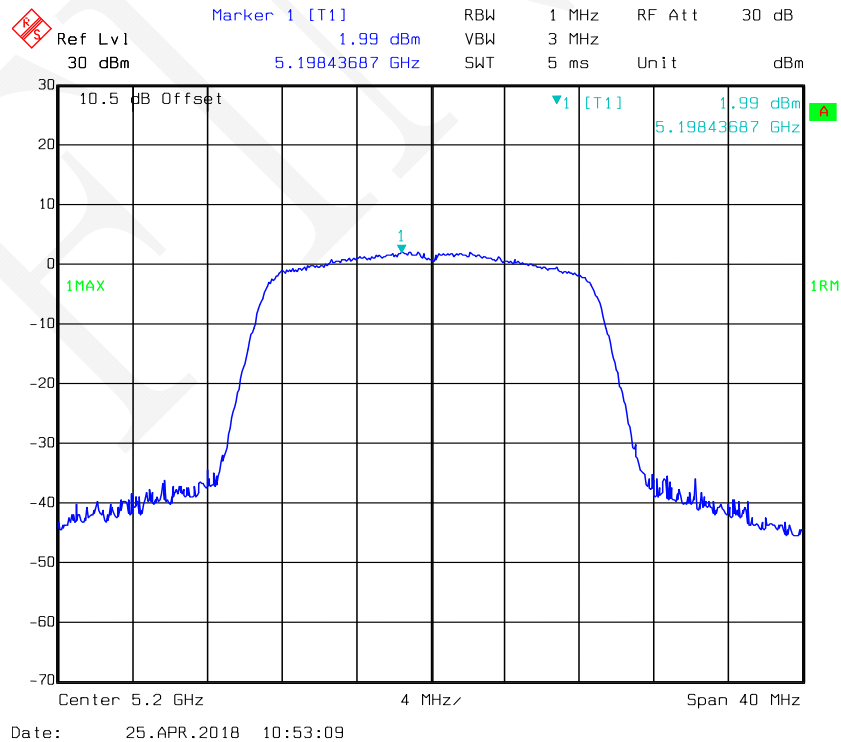
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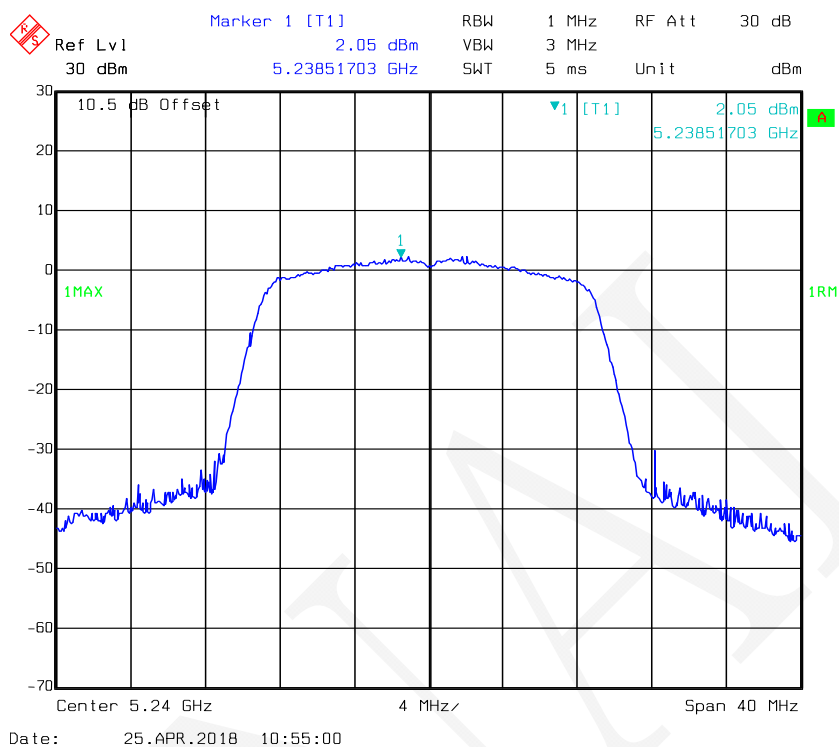
802.11ac20 mode, Power Spectral Density-5180 MHz, Antenna 0



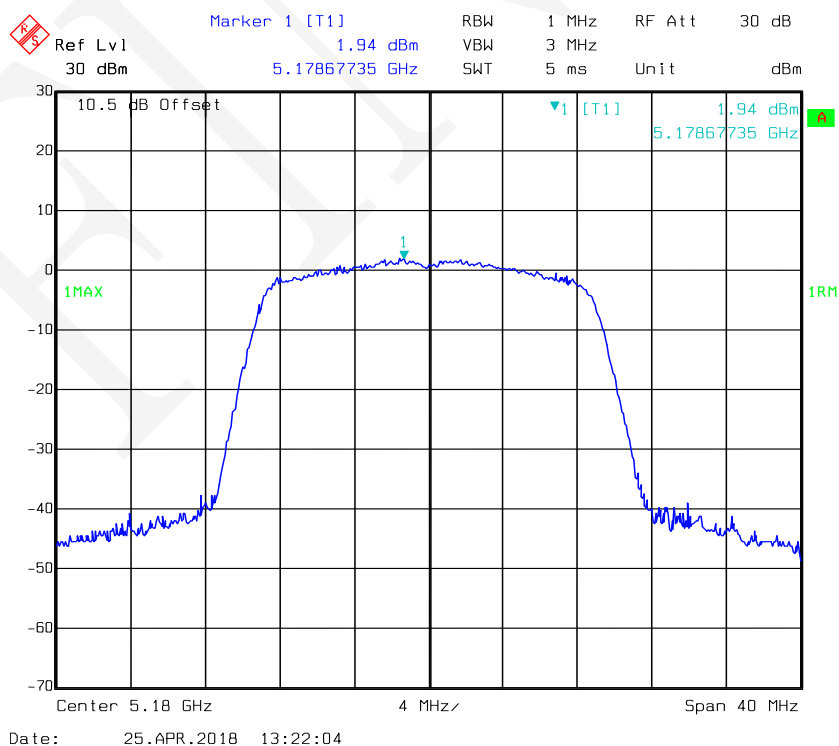
802.11ac20 mode, Power Spectral Density-5200 MHz, Antenna 0



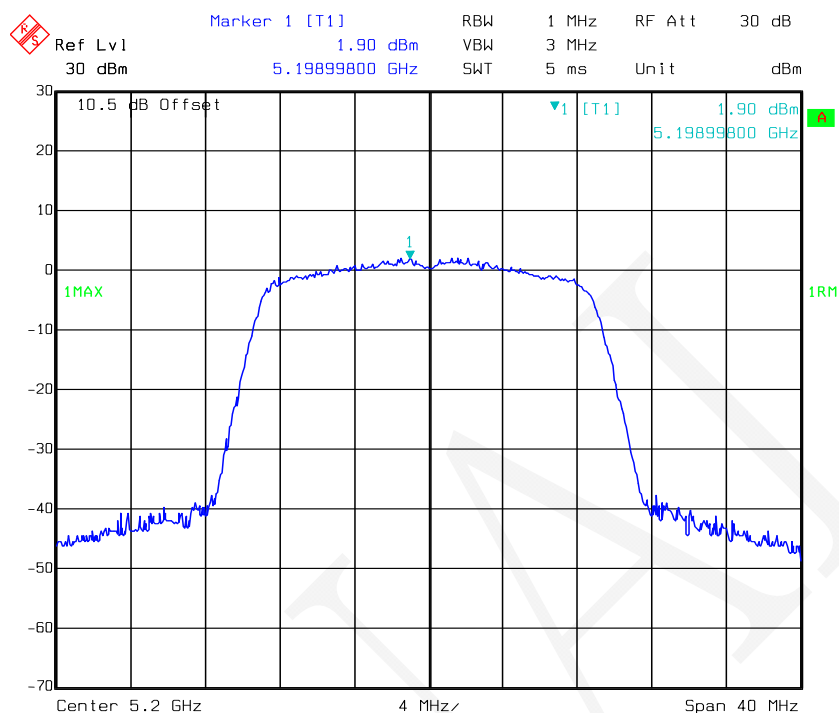
### 802.11ac20 mode, Power Spectral Density-5240 MHz, Antenna 0



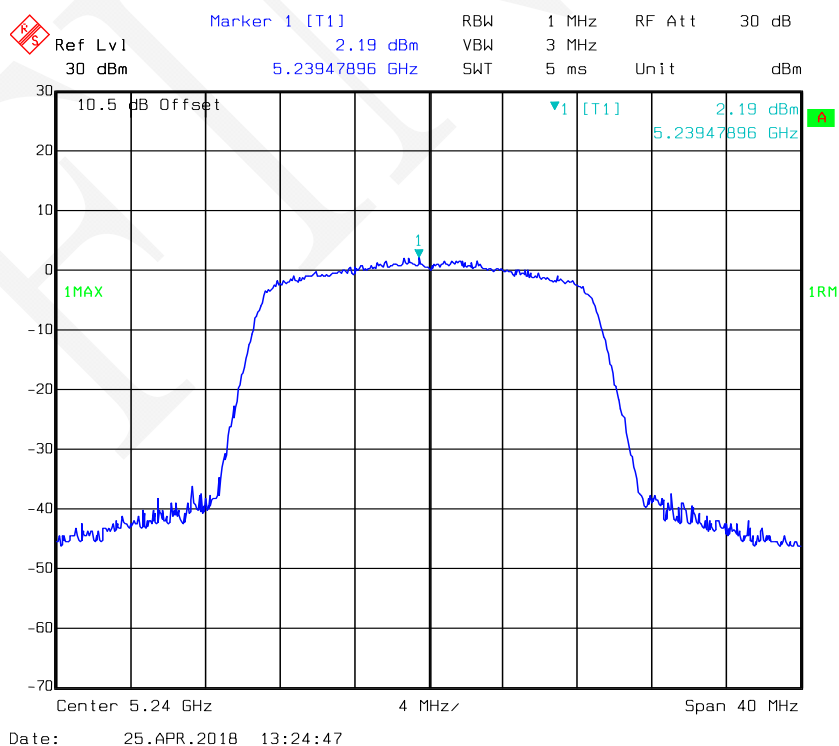
### 802.11ac20 mode, Power Spectral Density-5180 MHz, Antenna 1



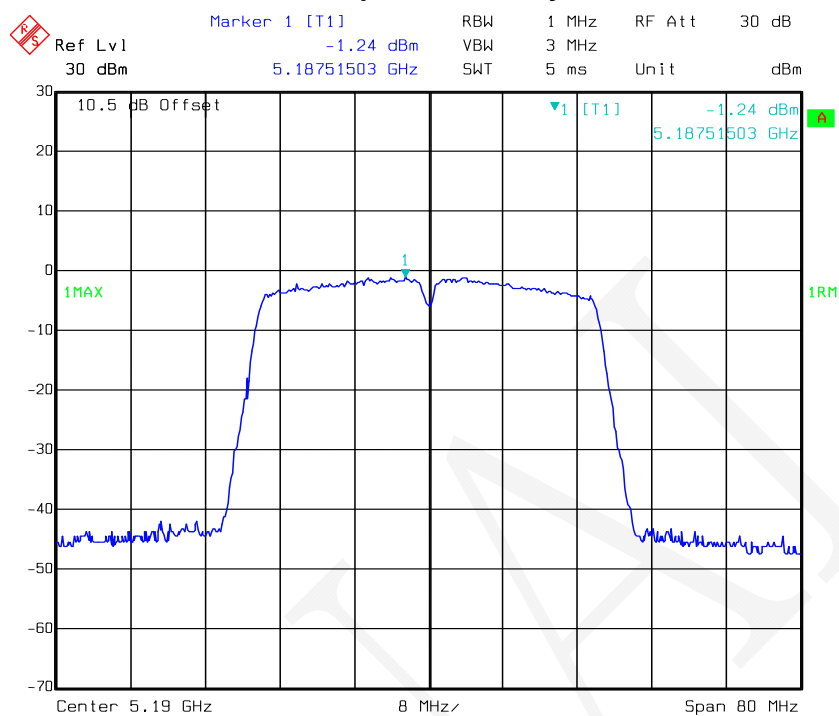
802.11ac20 mode, Power Spectral Density-5200 MHz, Antenna 1



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

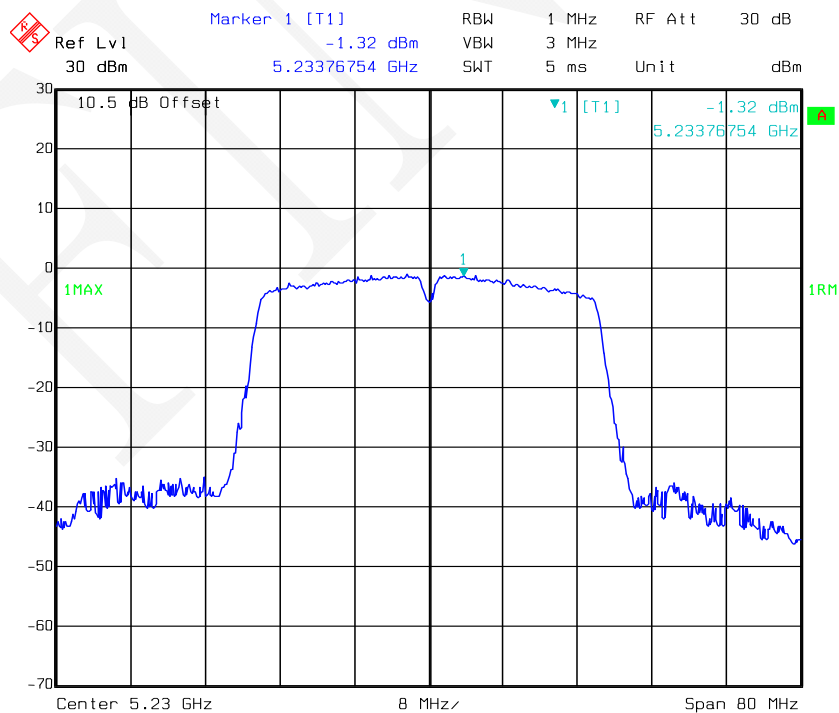


### 802.11ac40 mode, Power Spectral Density-5190 MHz, Antenna 0



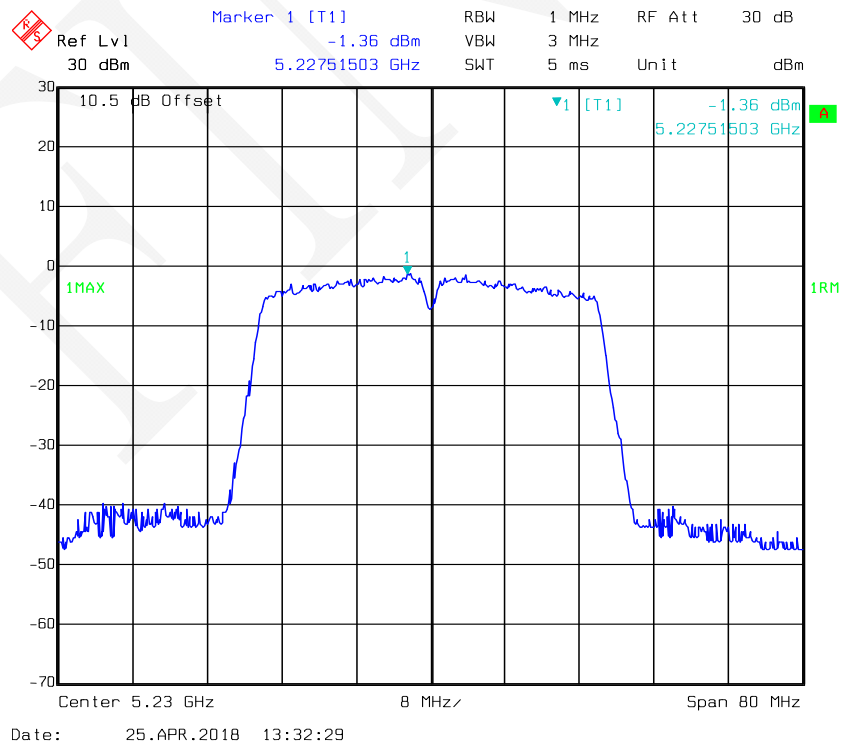
Date: 25.APR.2018 11:05:43

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

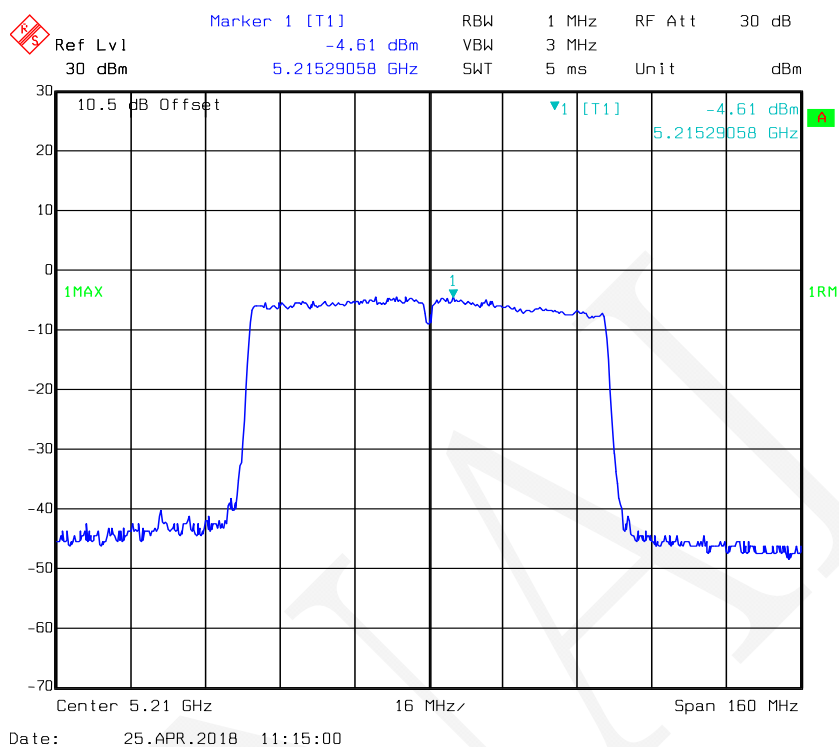


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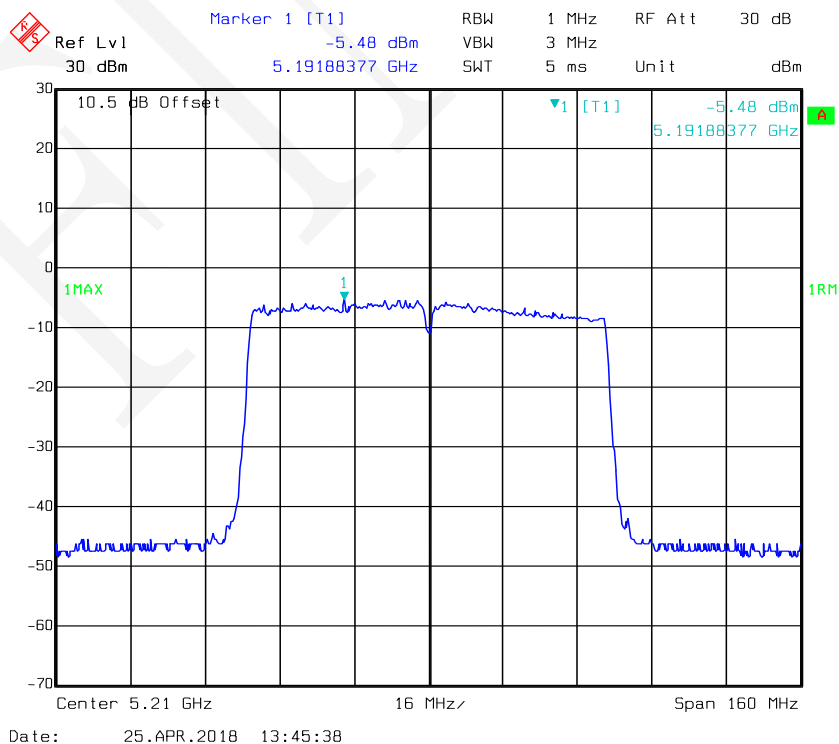
### 802.11ac40 mode, Power Spectral Density-5230 MHz, Antenna 1



### 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	3.41	3.11	0.06	3.47	3.17	30
	Middle	5785	3.25	3.10	0.06	3.31	3.16	30
	High	5825	3.19	3.00	0.06	3.25	3.06	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	0.85	0.61	0.07	3.81	27.5
	Middle	5785	0.44	0.72	0.07	3.66	27.5
	High	5825	0.70	0.35	0.07	3.61	27.5
802.11n-HT40	Low	5755	-3.75	-3.72	0.06	-0.66	27.5
	High	5795	-3.78	-3.49	0.06	-0.56	27.5
802.11ac20	Low	5745	0.58	0.59	0.18	3.78	27.5
	Middle	5785	0.57	0.69	0.18	3.82	27.5
	High	5825	1.00	0.59	0.18	3.99	27.5
802.11ac40	Low	5755	-2.40	-2.18	0.35	1.07	27.5
	High	5795	-2.33	-2.16	0.35	1.12	27.5
802.11ac80	-	5775	-5.50	-6.20	0.64	-2.19	27.5

Note:

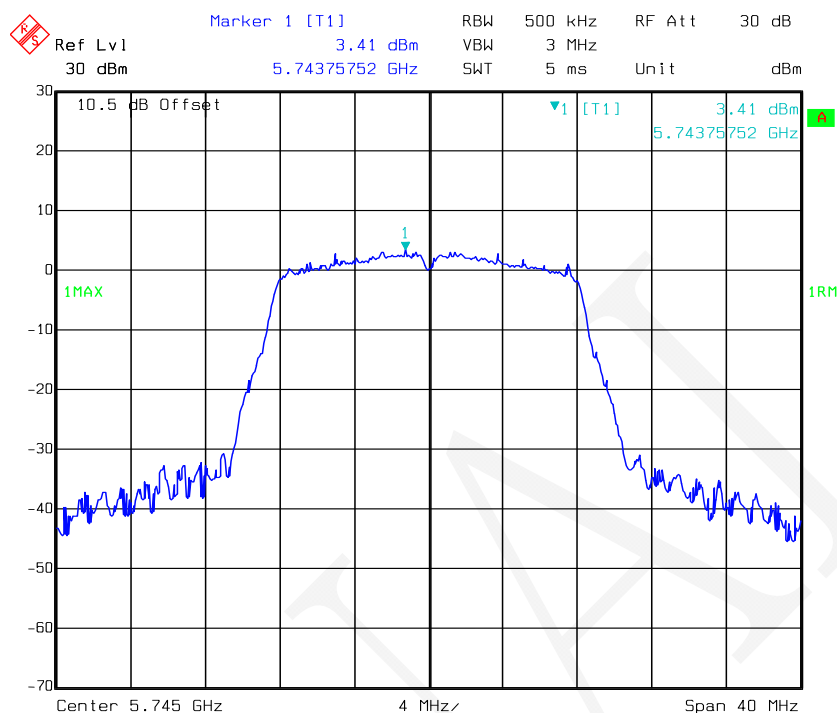
1. The max antenna gain is 5.5dBi.
2. The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density measurements on IEEE 802.11 devices:

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

So:

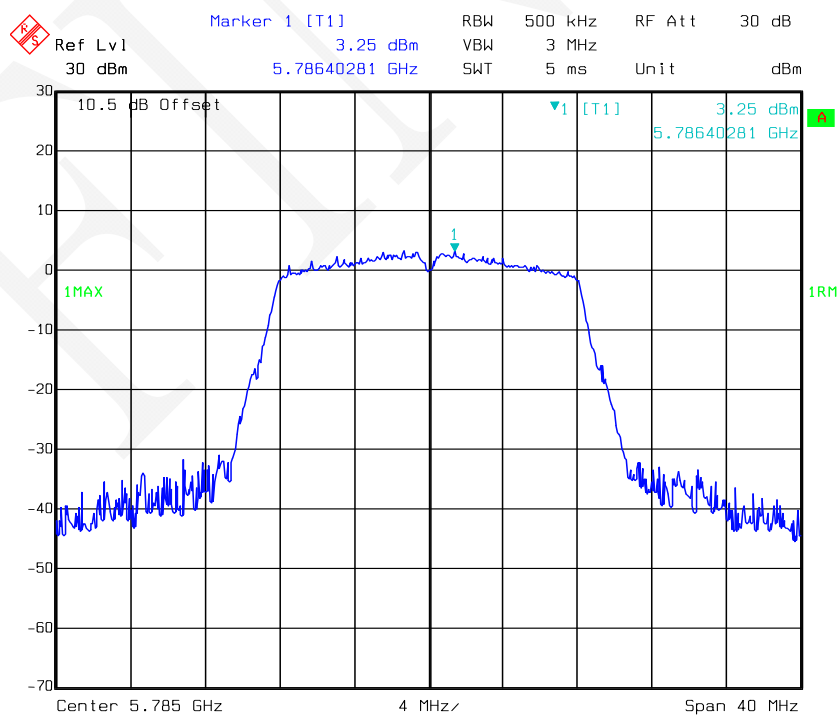
Directional gain = GANT + Array Gain = 5.5+10\*log(2)=8.5dBi>6dBi  
The power density Limit was reduced 2.5dB in MIMO mode.

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



Date: 25.APR.2018 17:25:19

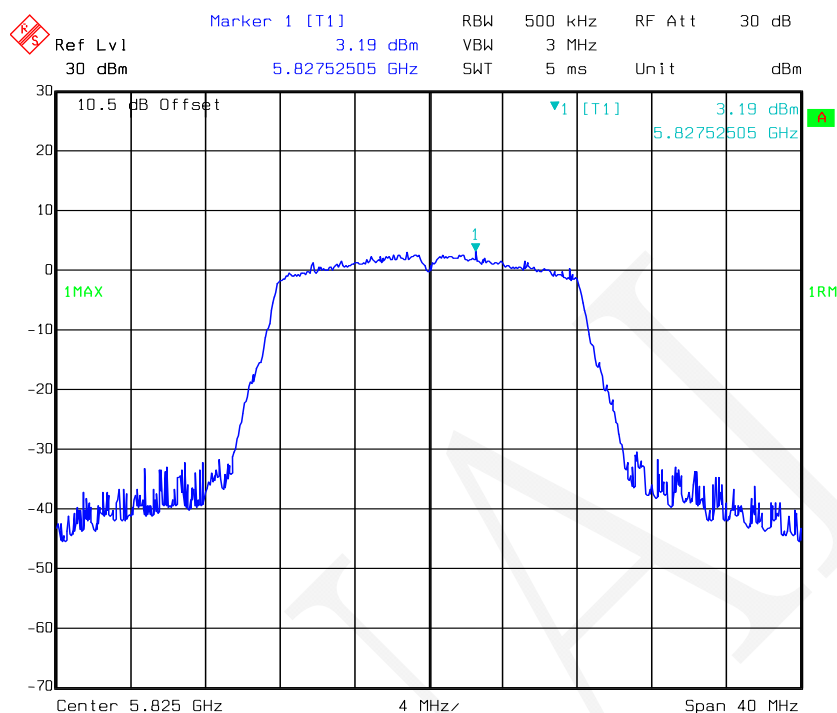
### 802.11a mode, Power Spectral Density-5785 MHz, Antenna 0



Date: 25.APR.2018 17:26:18

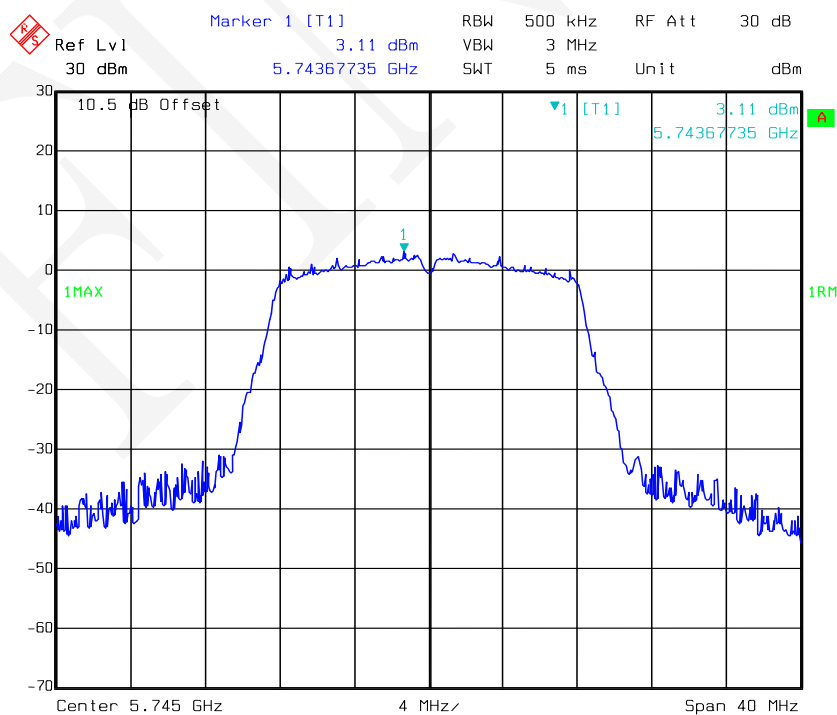


### 802.11a mode, Power Spectral Density-5825 MHz, Antenna 0



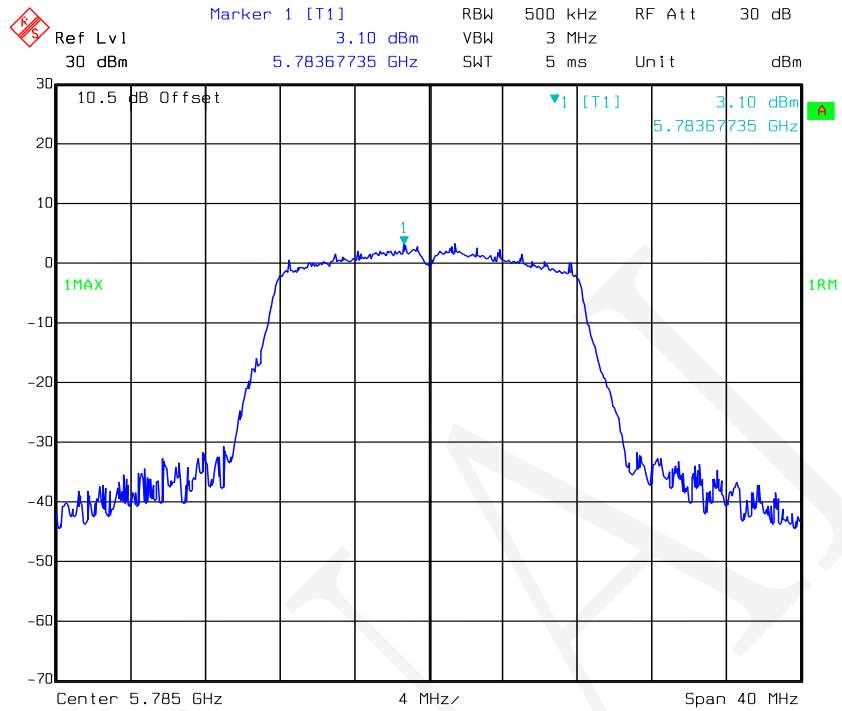
Date: 25.APR.2018 17:27:45

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



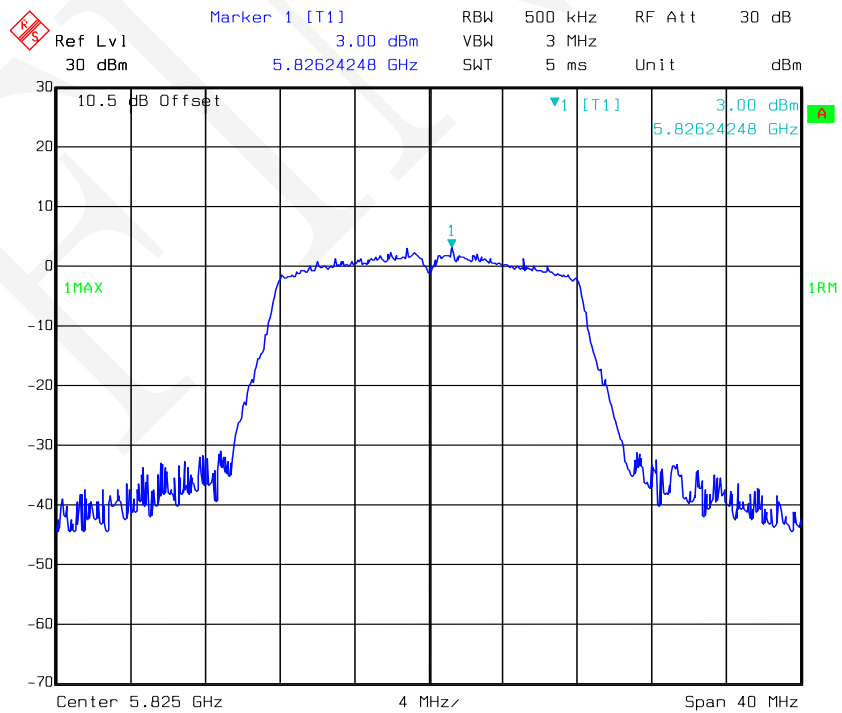
Date: 25.APR.2018 16:36:03

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



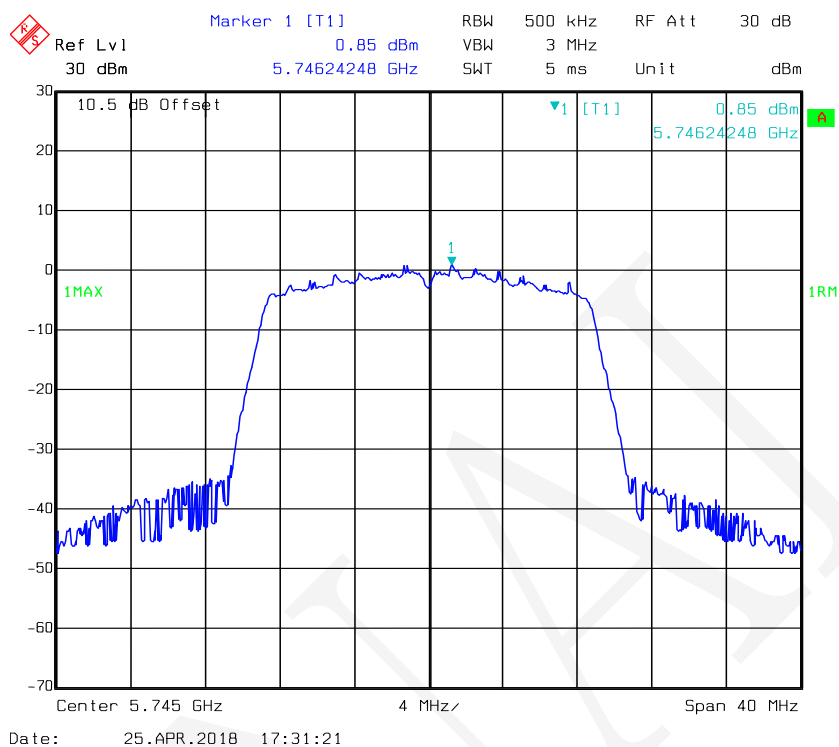
Date: 25.APR.2018 16:37:19

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

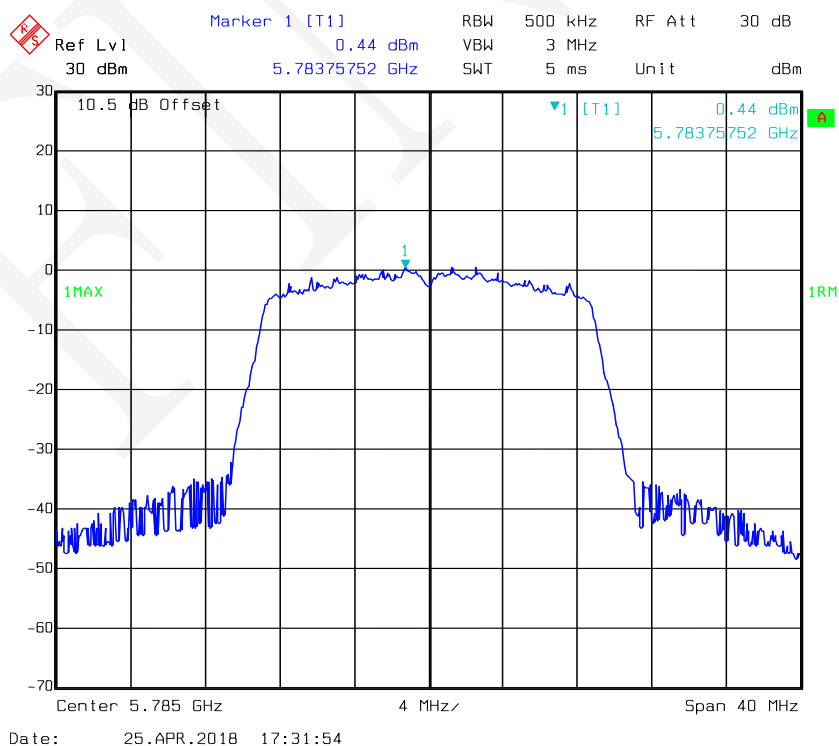


Date: 25.APR.2018 16:37:53

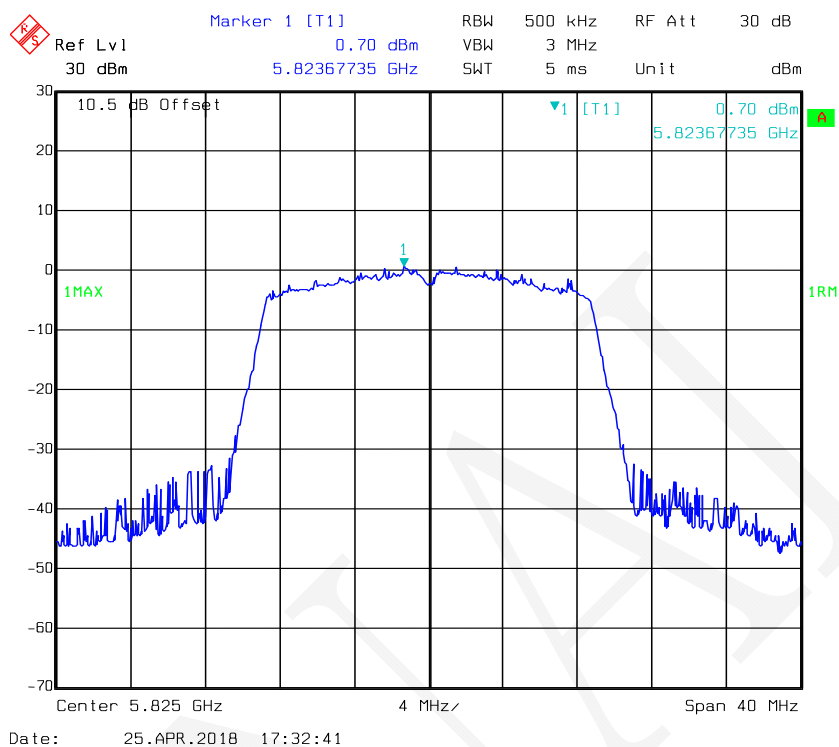
802.11n-HT20 mode, Power Spectral Density-5745 MHz, Antenna 0



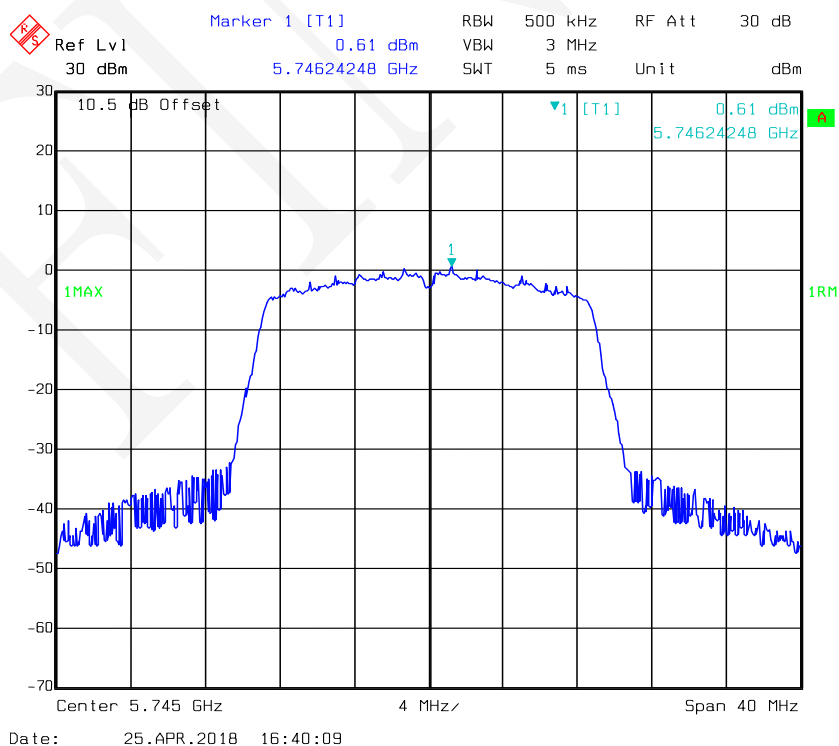
802.11n-HT20 mode, Power Spectral Density-5785 MHz, Antenna 0



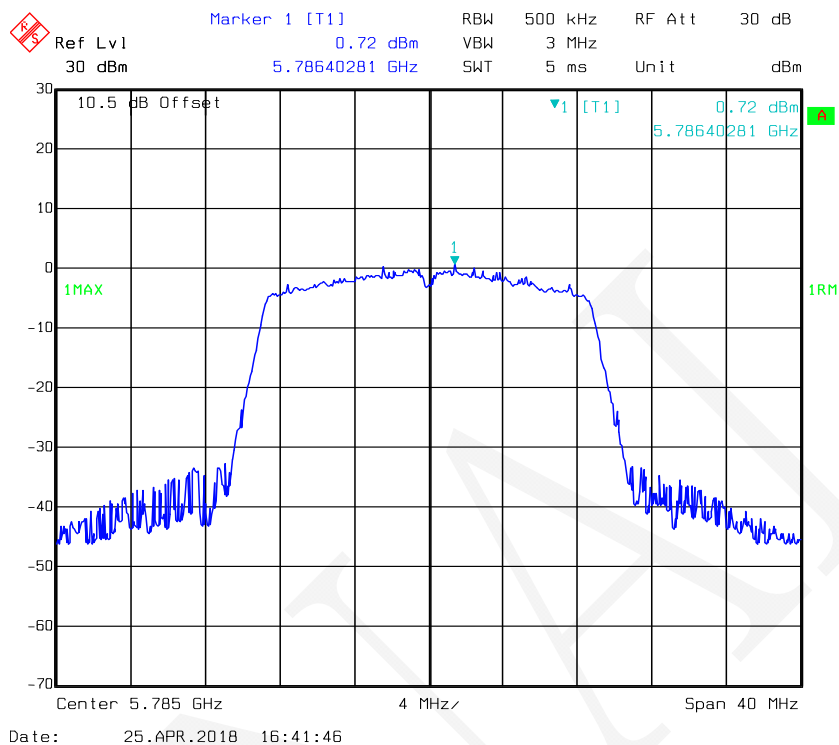
### 802.11n-HT20 mode, Power Spectral Density-5825 MHz, Antenna 0



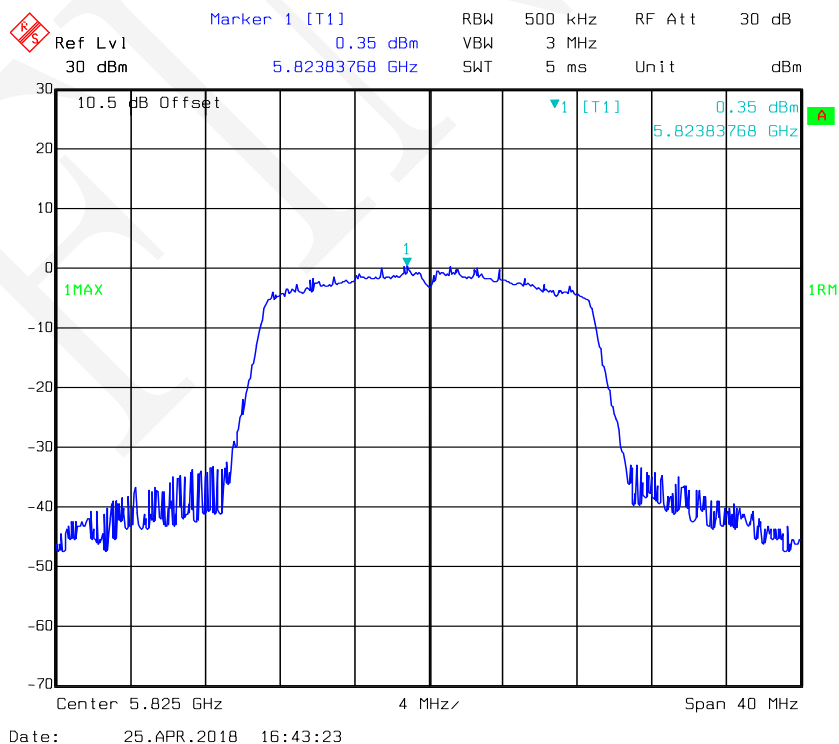
### 802.11n-HT20 mode, Power Spectral Density-5745 MHz, Antenna 1



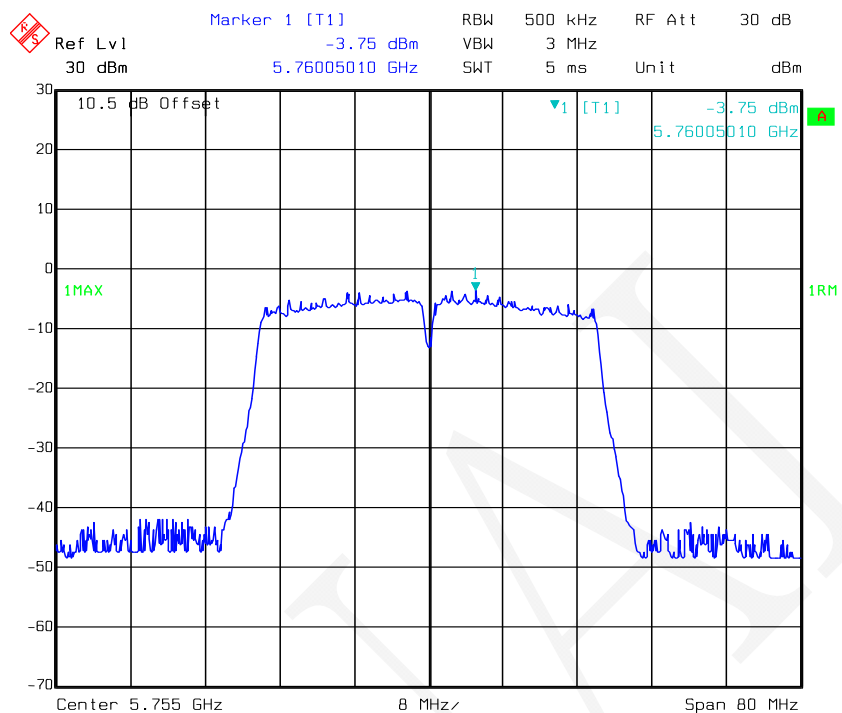
### 802.11n-HT20 mode, Power Spectral Density-5785 MHz, Antenna 1



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

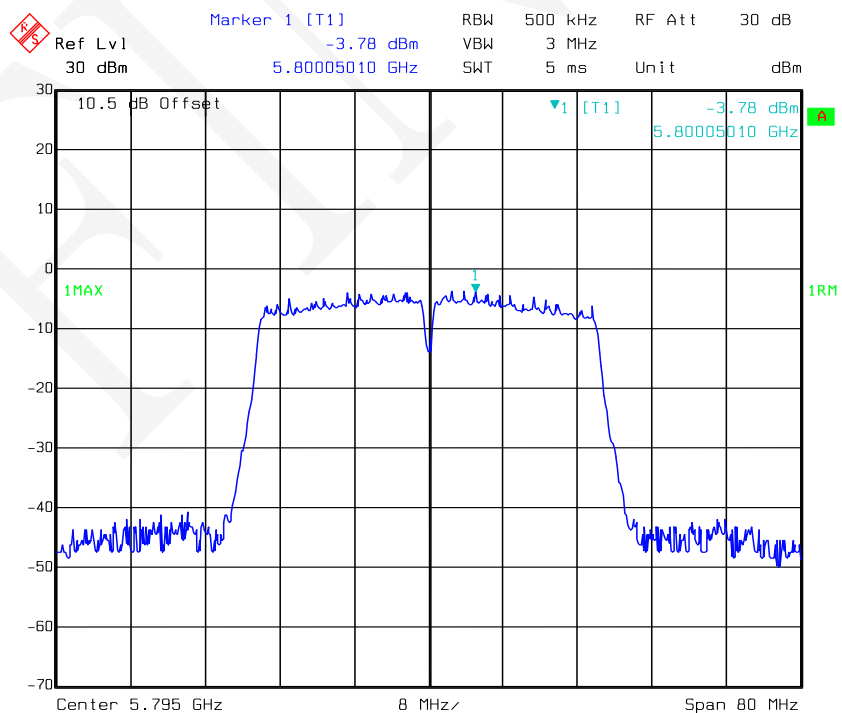


### 802.11n-HT40 mode, Power Spectral Density-5755 MHz, Antenna 0



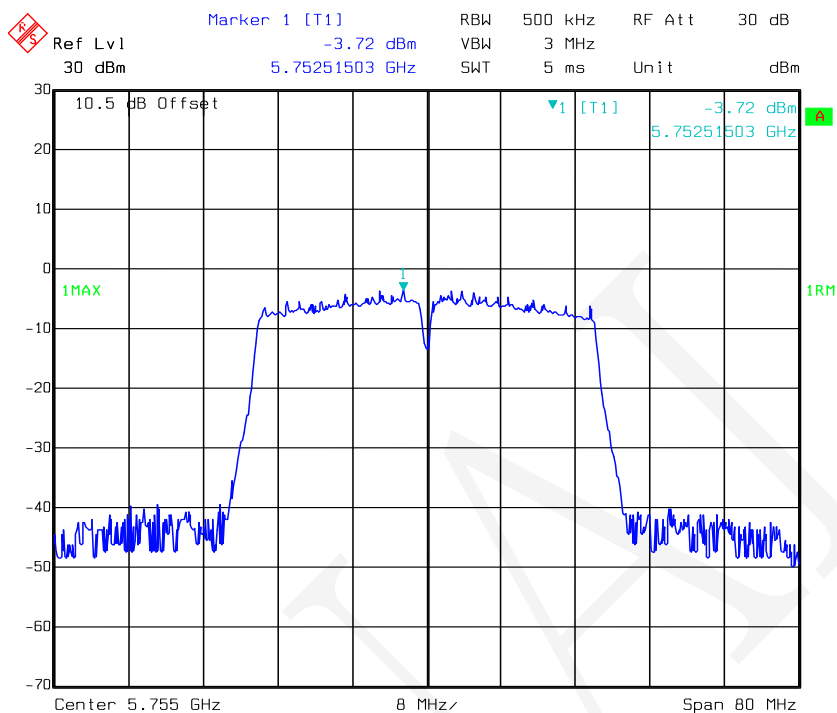
Date: 25.APR.2018 17:42:48

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



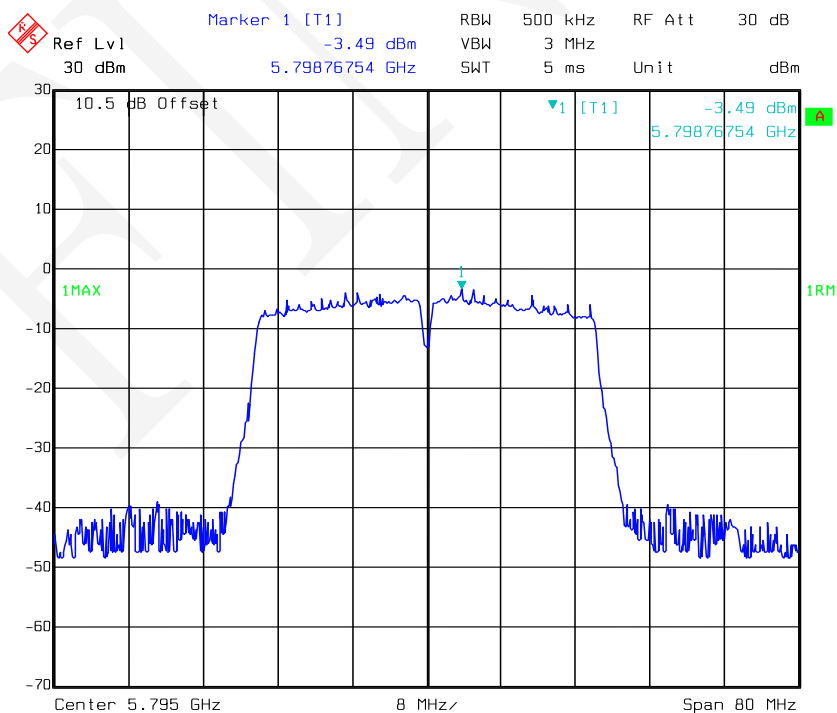
Date: 25.APR.2018 17:43:39

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



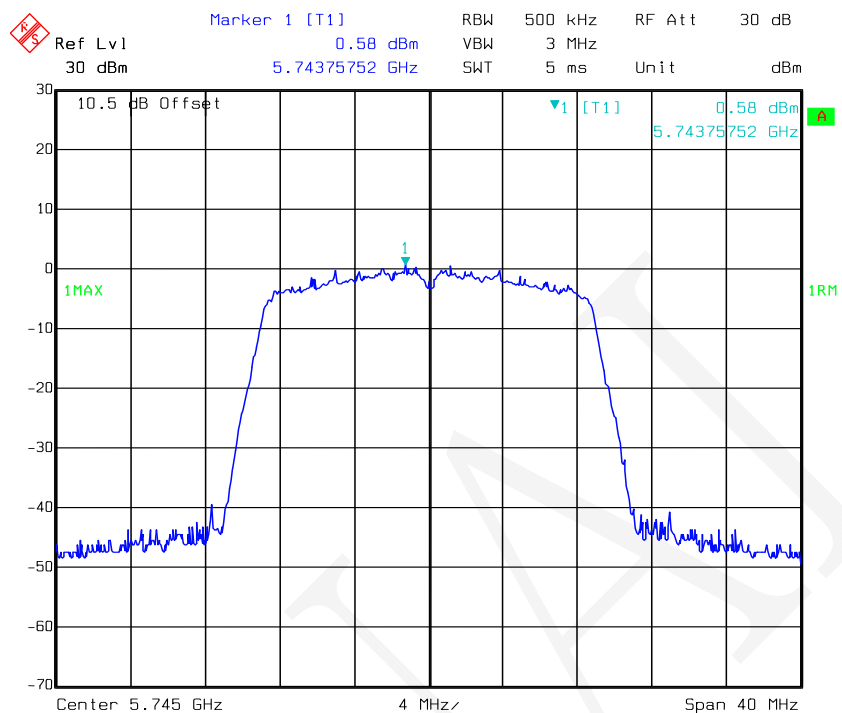
Date: 25.APR.2018 16:50:52

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

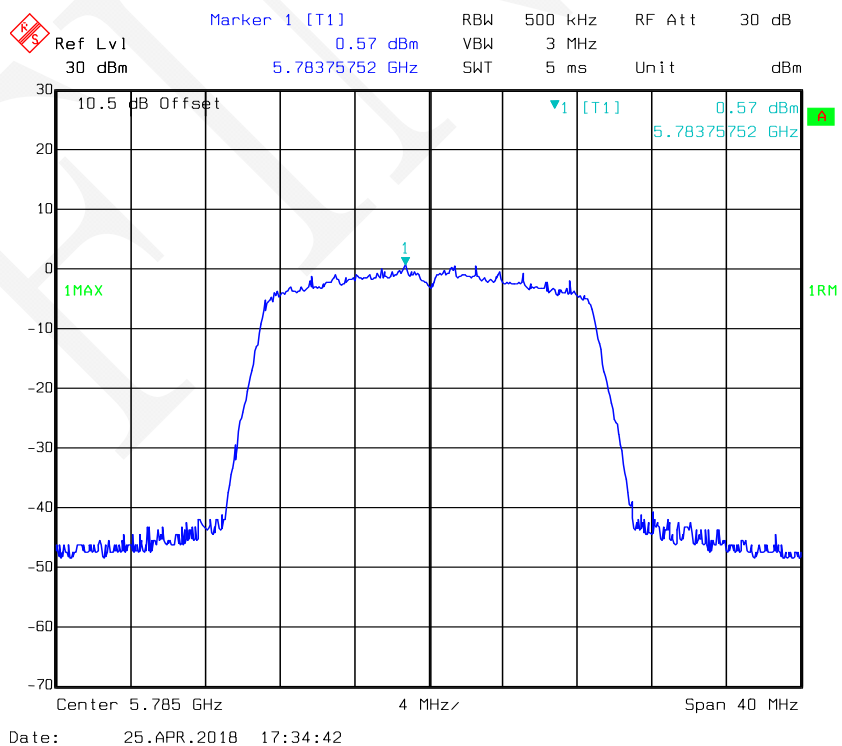


Date: 25.APR.2018 16:51:24

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

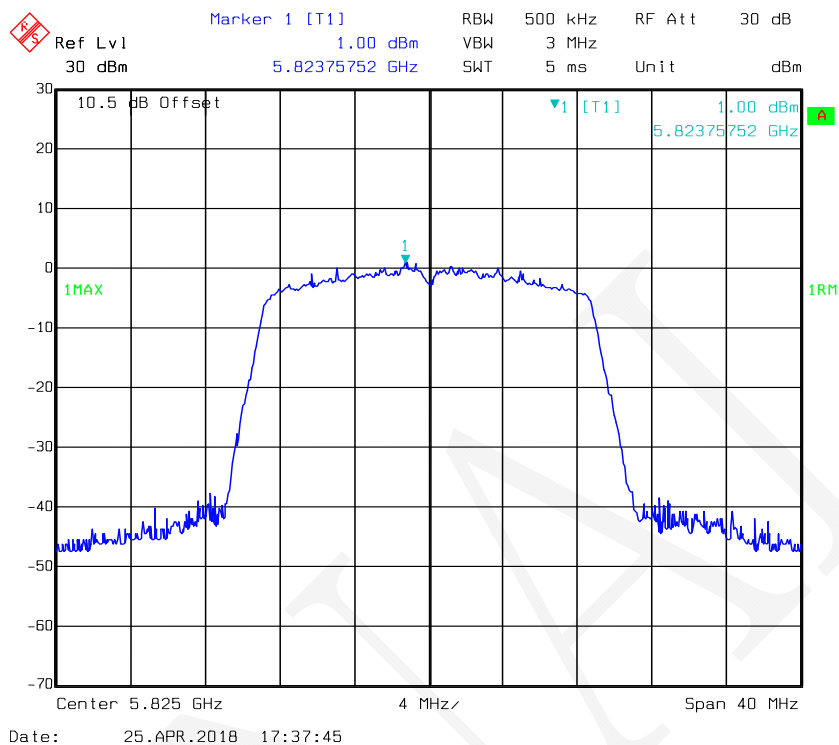


### 802.11ac20 mode, Power Spectral Density-5785 MHz, Antenna 0

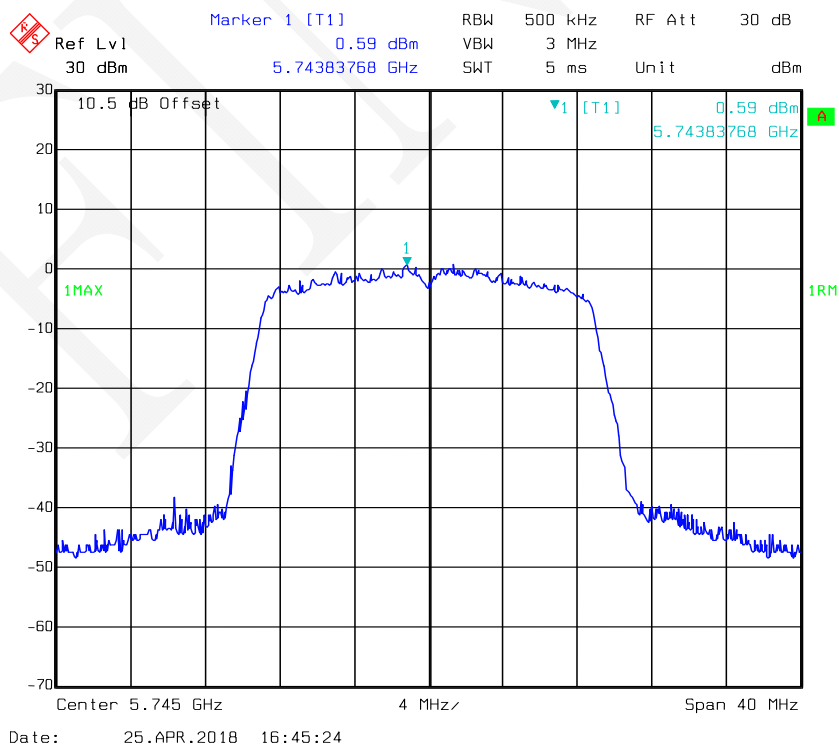




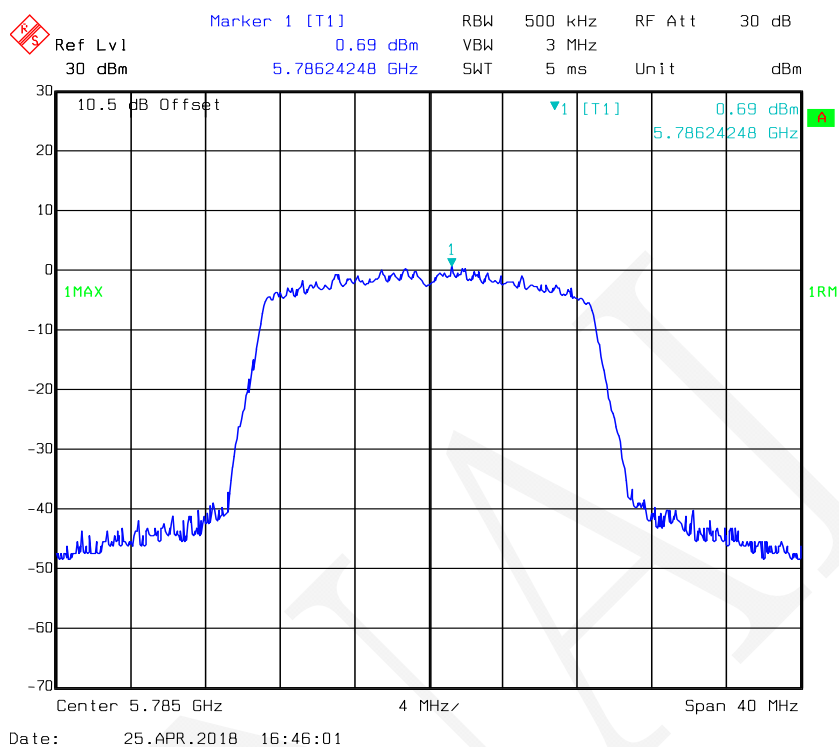
### 802.11ac20 mode, Power Spectral Density-5825 MHz, Antenna 0



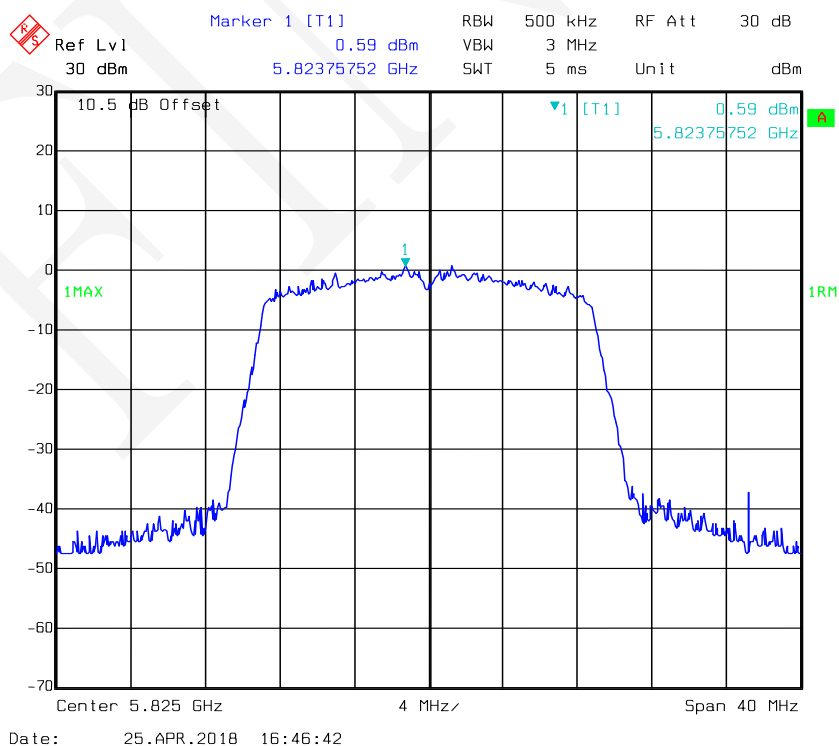
### 802.11ac20 mode, Power Spectral Density-5745 MHz, Antenna 1



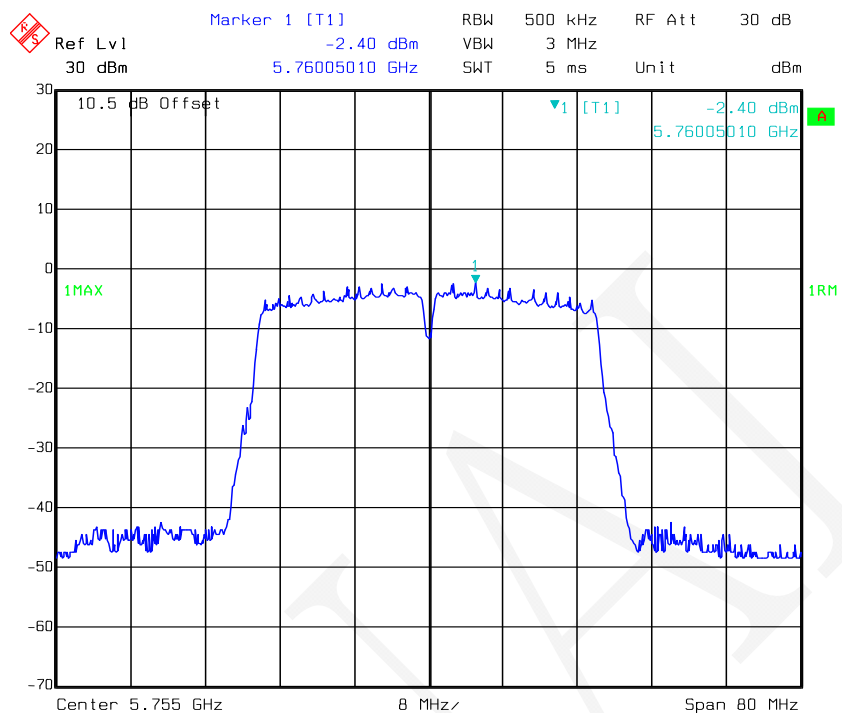
802.11ac20 mode, Power Spectral Density-5785 MHz, Antenna 1



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

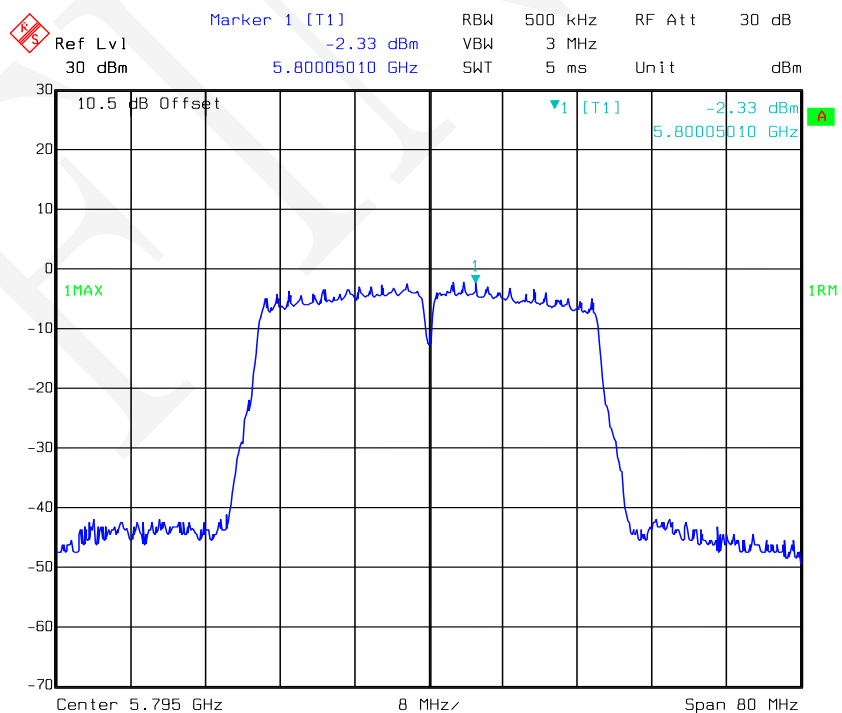


### 802.11ac40 mode, Power Spectral Density-5755 MHz, Antenna 0



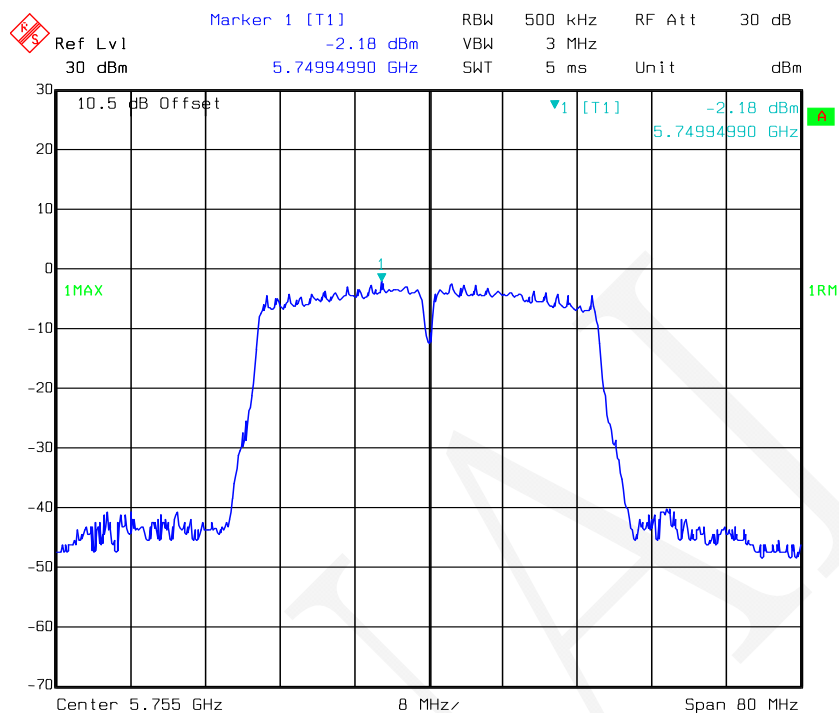
Date: 25.APR.2018 17:41:21

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



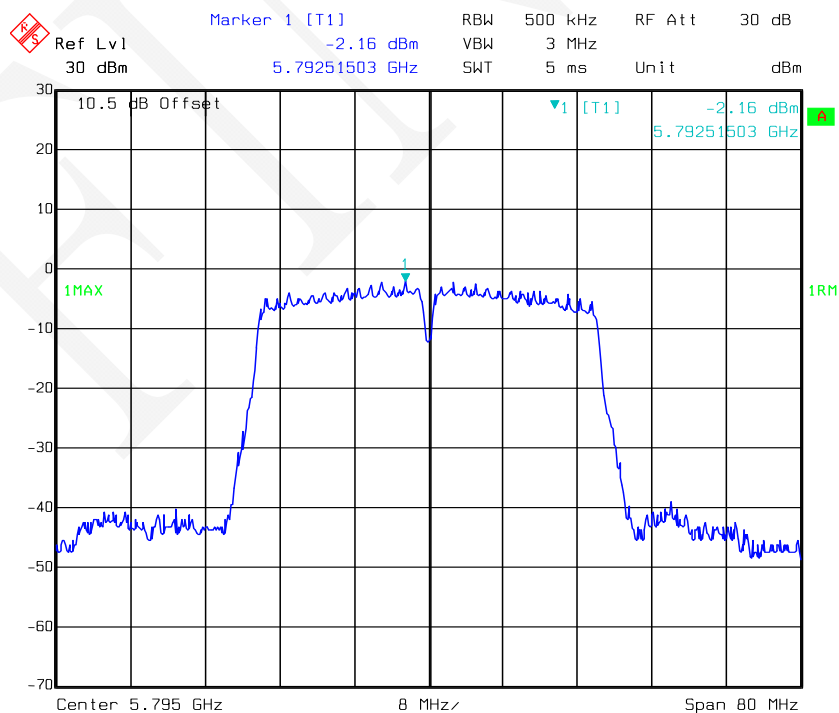
Date: 25.APR.2018 17:40:21

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



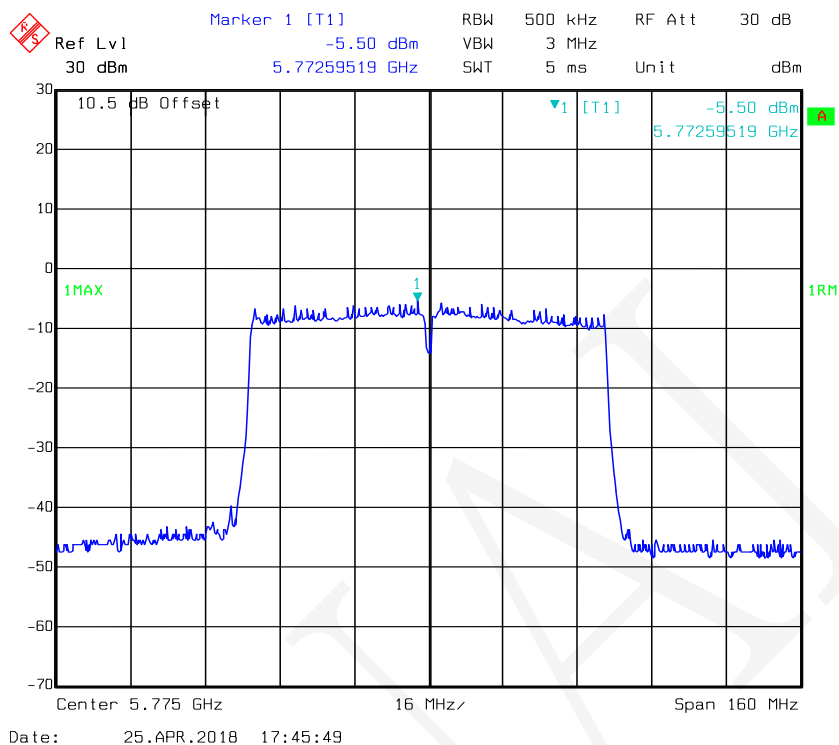
Date: 25.APR.2018 16:48:12

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

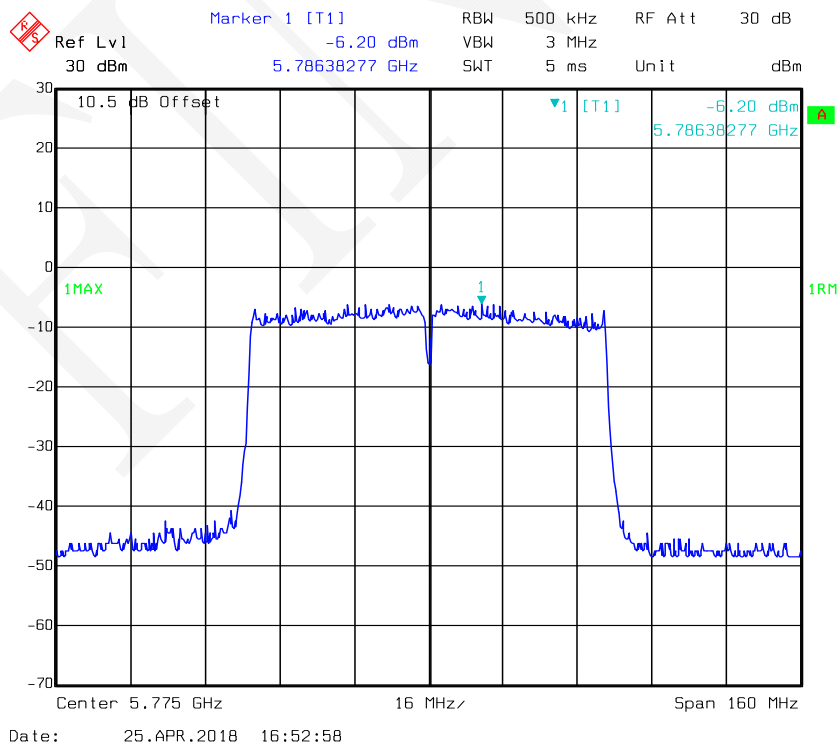


Date: 25.APR.2018 16:49:17

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



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



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