



TESTING LABORATORY  
CERTIFICATE # 4821.01



# FCC PART 15.407 TEST REPORT

For

## Grandstream Networks, Inc.

126 Brookline Ave, 3rd Floor Boston, MA 02215, USA

**FCC ID: YZZGWN7630LR**

<b>Report Type:</b> Class II Permissive Change	<b>Product Type:</b> Outdoor Long-Range High-Performance 802.11ac Wi-Fi Access Point
<b>Report Number:</b> <u>RSZ191120013-00A1</u>	
<b>Report Date:</b> <u>2020-01-07</u>	
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## GENERAL INFORMATION

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

Product	Outdoor Long-Range High-Performance 802.11ac Wi-Fi Access Point
Model	GWN7630LR
Frequency Range	5G Wi-Fi: 5250-5350 MHz; 5470-5725 MHz
Average Output Power	5250-5350 MHz: 15.95dBm (802.11a), 15.69dBm(802.11n20), 18.18dBm(802.11n40), 15.66dBm (802.11ac20), 18.29dBm(802.11 ac40), 16.68dBm(802.11 ac80) 5470-5725 MHz 16.86dBm (802.11a), 17.06dBm(802.11n20), 19.32dBm(802.11n40), 17.34dBm (802.11ac20), 19.16dBm(802.11 ac40), 18.68 dBm(802.11 ac80)
Modulation Technique	Wi-Fi: OFDM
Antenna Specification	3.5dBi
Voltage Range	DC 48V from POE
Date of Test	2019/12/08~2019/12/28
Sample serial number	RSZ191120013-RF-S1
Received date	2019/11/20
Sample/EUT Status	Good condition

### Objective

This type approval report is prepared on behalf of *Grandstream Networks, Inc.* in accordance with Part 2-Subpart J, Part 15-Subparts A and E of the Federal Communication Commissions rules.

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

This is a CIIPC application of the device, the difference between the original device and the current one described as following:

Adding DFS bands (5250-5350MHz & 5470-5725MHz.) by software, no any other hardware change or modification to the device.

Based on above difference, add the test for the DFS band.

### Related Submittal(s)/Grant(s)

FCC original certified on 11/25/2019, FCC ID: YZZGWN7630LR.

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

## Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		±5%
RF Output Power with Power meter		±0.73dB
RF conducted test with spectrum		±1.6dB
AC Power Lines Conducted Emissions		±1.95dB
Emissions, Radiated	Below 1GHz	±4.75dB
	Above 1GHz	±4.88dB
Temperature		±1°C
Humidity		±6%
Supply voltages		±0.4%

*Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.*

## Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, 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.: 342867, the FCC Designation No.: CN1221.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062B.

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The system was configured for testing in an engineering mode, which was provided by manufacturer.

The device support 802.11a/n20/n40/ac20/ac40/ac80 modes.

For 5250-5350MHz Band, 7 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	60	5300
54	5270	62	5310
56	5280	64	5320
58	5290	/	/

For 5470-5725MHz Band, 18 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	124	5620
102	5510	126	5630
104	5520	128	5640
106	5530	132	5660
108	5540	134	5670
110	5550	136	5680
112	5560	140	5700
116	5580	/	/
118	5590	/	/
120	5600	/	/
122	5610	/	/

Note: 802.11a/n20/n40/ac20/ac40/ac80 all support SISO&MIMO mode, the pre-scan result for MIMO mode is the worst, so just test MIMO mode.

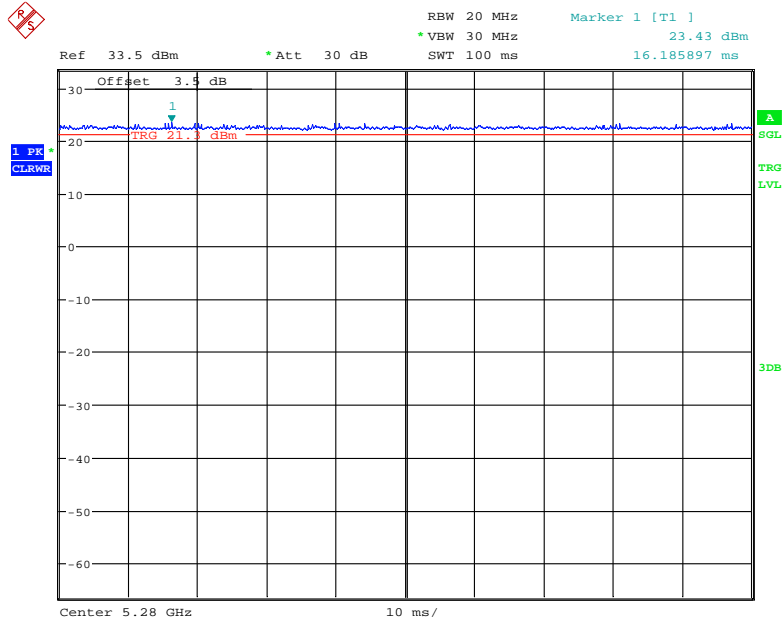
**EUT Exercise Software**

“Putty, QATool” was used in the test. Test frequencies and power level were configured (Ant 0&1&2&3) used the same power level) as below:

U-NII	Mode	Channel Number	Frequency (MHz)	Rate (Mbps)	Power Level
5250 – 5350MHz	802.11 a	CH52	5260	6	10
		CH56	5280	6	10
		CH64	5320	6	10.5
	802.11 n20	CH52	5260	MCS0	10.5
		CH56	5280	MCS0	10.5
		CH64	5320	MCS0	11
	802.11 n40	CH54	5270	MCS0	13.5
		CH62	5310	MCS0	14
	802.11 ac20	CH52	5260	MCS0	10.5
		CH56	5280	MCS0	10.5
		CH64	5320	MCS0	11
	802.11 ac40	CH54	5270	MCS0	13.5
		CH62	5310	MCS0	14
	802.11 ac80	CH58	5290	MCS0	14
	5470 – 5725MHz	802.11 a	CH100	5500	6
CH120			5580	6	11.5
CH140			5700	6	9.5
802.11 n20		CH100	5500	MCS0	12.5
		CH120	5580	MCS0	12
		CH140	5700	MCS0	12
802.11 n40		CH102	5510	MCS0	12
		CH118	5550	MCS0	15
		CH134	5670	MCS0	14.5
802.11 ac20		CH100	5500	MCS0	12.5
		CH120	5580	MCS0	12
		CH140	5700	MCS0	12
802.11 ac40		CH102	5510	MCS0	12
		CH118	5550	MCS0	15
		CH134	5670	MCS0	14.5
802.11 ac80		CH106	5530	MCS0	11.5
		CH122	5610	MCS0	15.5

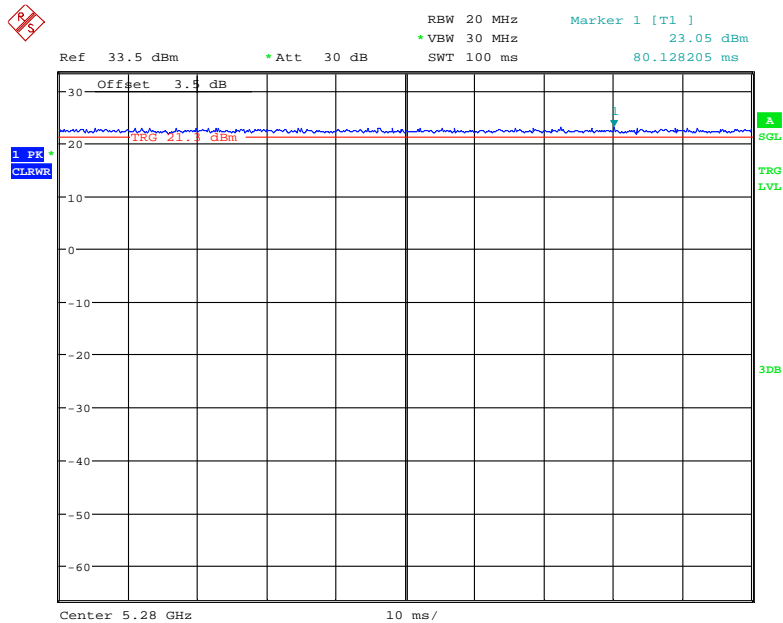
**Duty cycle**  
5250-5350 MHz

**802.11a mode**



Date: 8.DEC.2019 15:13:28

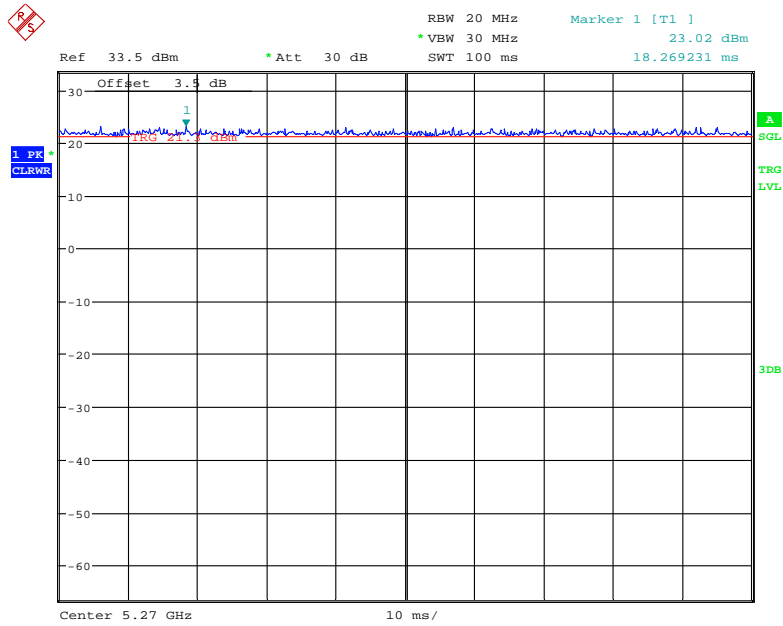
**802.11n20 mode**



Date: 8.DEC.2019 15:13:39

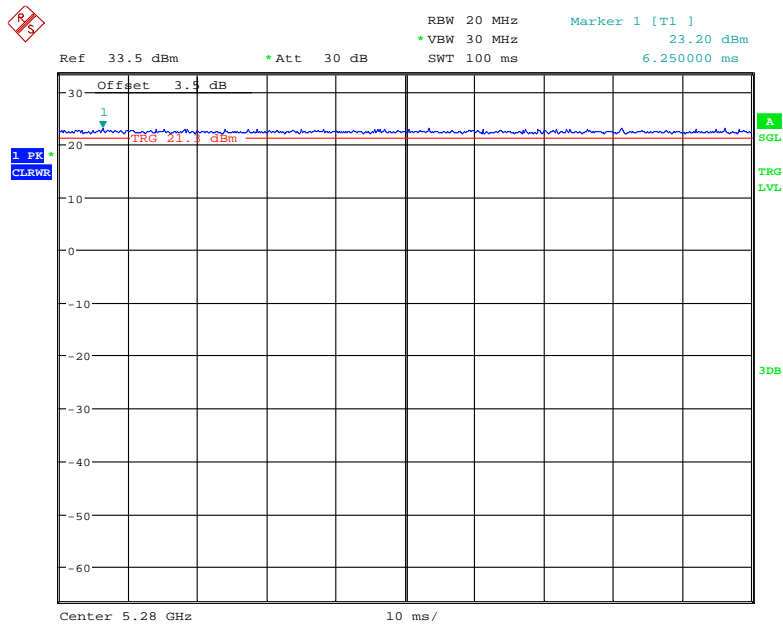


### 802.11n40 mode



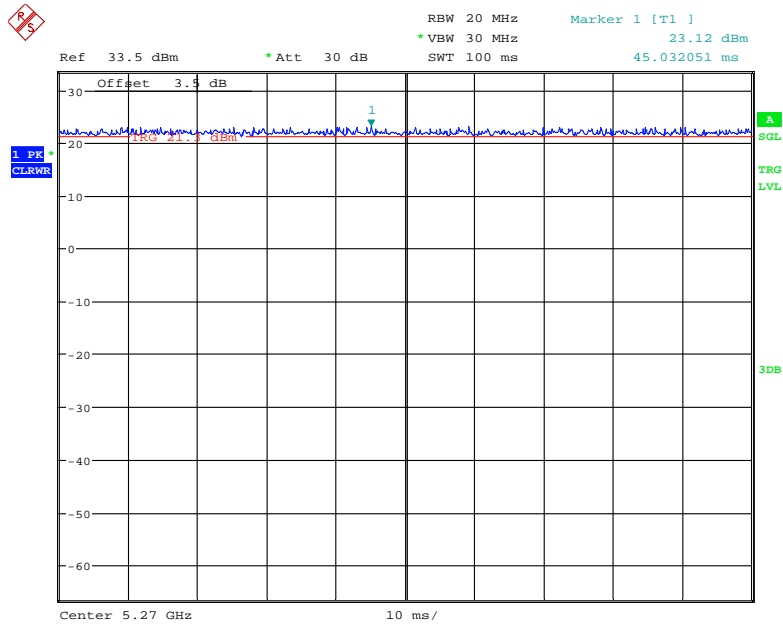
Date: 8.DEC.2019 15:15:19

### 802.11ac20 Mode



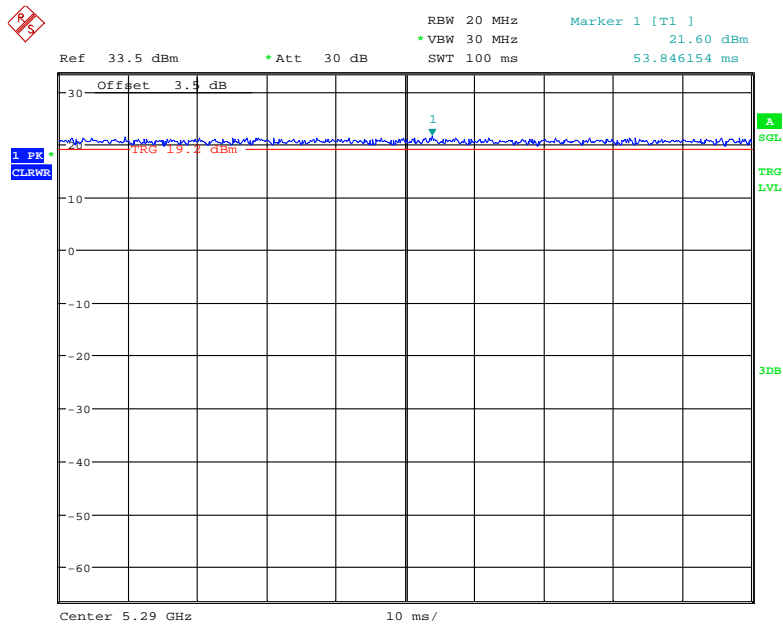
Date: 8.DEC.2019 15:14:01

### 802.11ac40 Mode



Date: 8.DEC.2019 15:14:49

### 802.11ac80 Mode

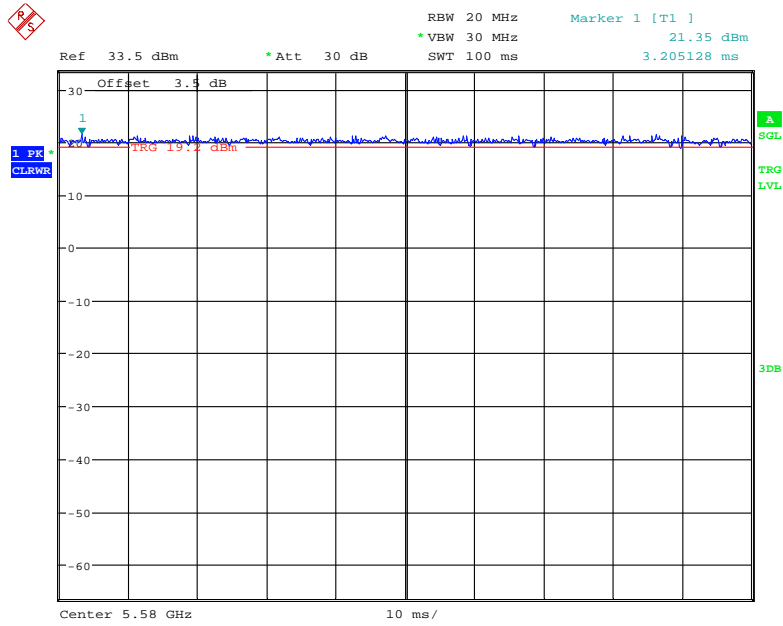


Date: 8.DEC.2019 15:16:49

Band	Duty Cycle (%)	T(ms)	1/T(kHz)	VBW Setting	10log(1/x)
802.11a	100	-	-	10Hz	-
802.11n20	100	-	-	10Hz	-
802.11n40	100	-	-	10Hz	-
802.11ac20	100	-	-	10Hz	-
802.11ac40	100	-	-	10Hz	-
802.11ac80	100	-	-	10Hz	-

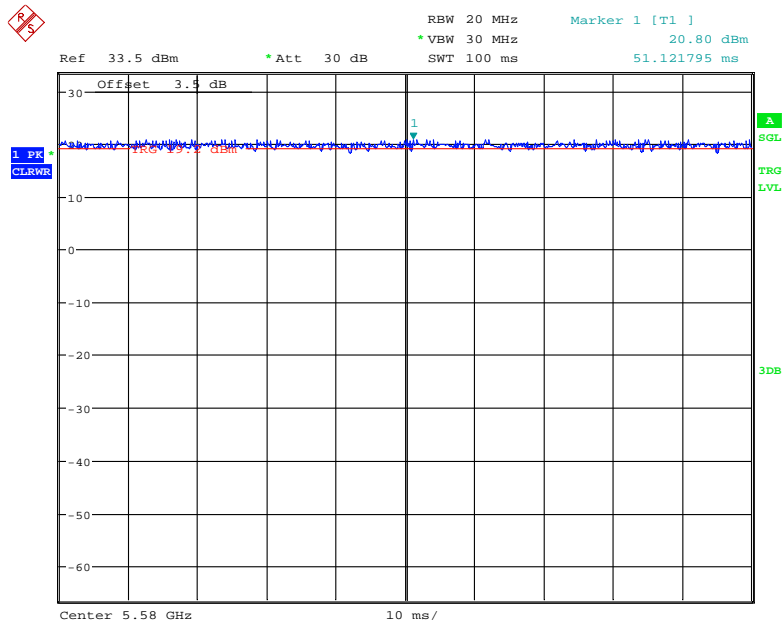
5470-5725 MHz

### 802.11a mode



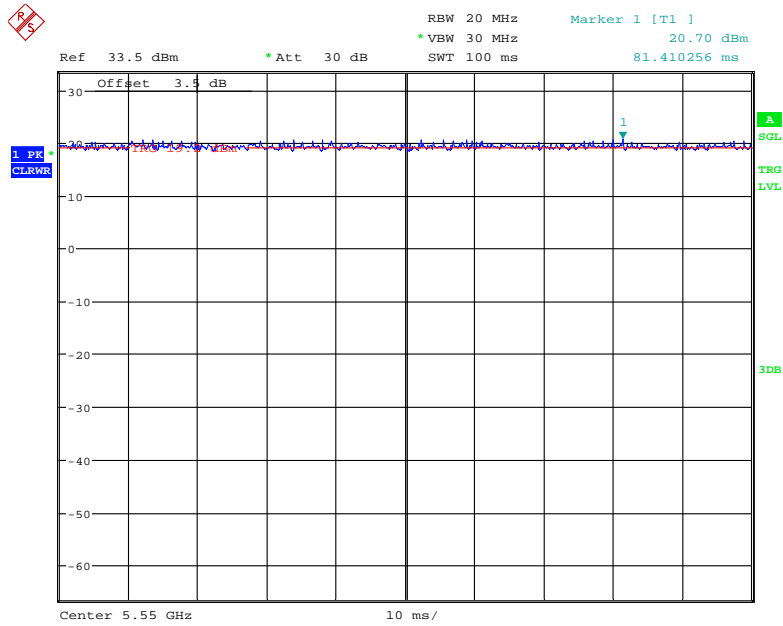
Date: 10.DEC.2019 22:29:48

### 802.11n20 mode



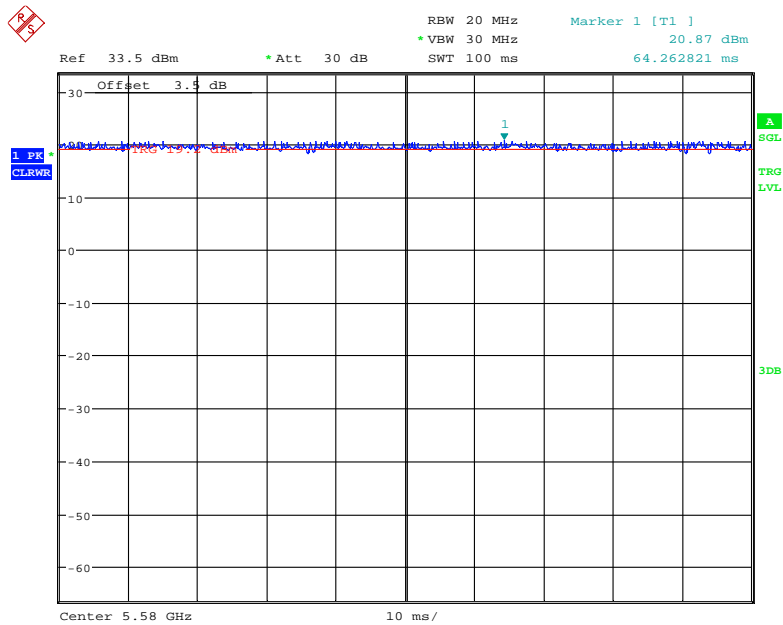
Date: 10.DEC.2019 22:30:18

### 802.11n40 mode



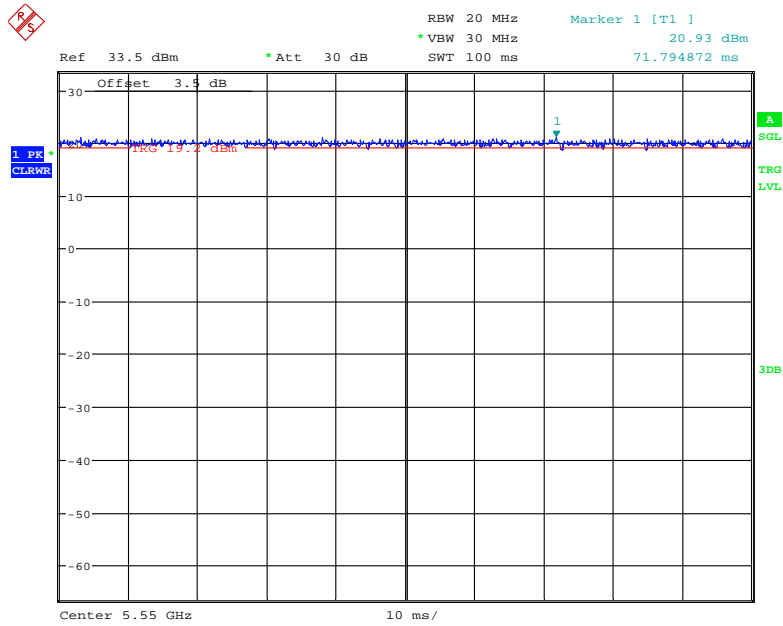
Date: 10.DEC.2019 22:31:51

### 802.11ac20 Mode



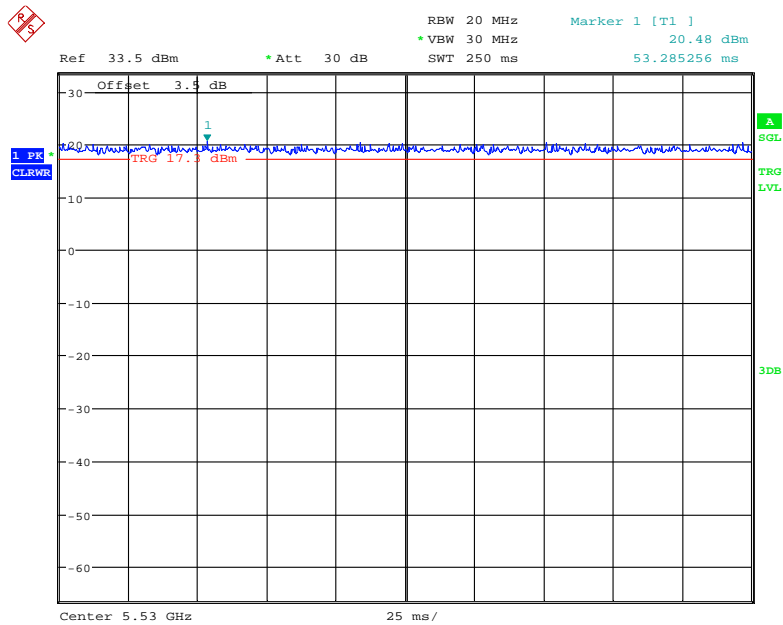
Date: 10.DEC.2019 22:30:31

### 802.11ac40 Mode



Date: 10.DEC.2019 22:31:39

### 802.11ac80 Mode



Date: 10.DEC.2019 22:34:32

Band	Duty Cycle (%)	T(ms)	1/T(kHz)	VBW Setting	10log(1/x)
802.11a	100	-	-	10Hz	-
802.11n20	100	-	-	10Hz	-
802.11n40	100	-	-	10Hz	-
802.11ac20	100	-	-	10Hz	-
802.11ac40	100	-	-	10Hz	-
802.11ac80	100	-	-	10Hz	-

### Equipment Modifications

No modification was made to the EUT tested.

### Support Equipment List and Details

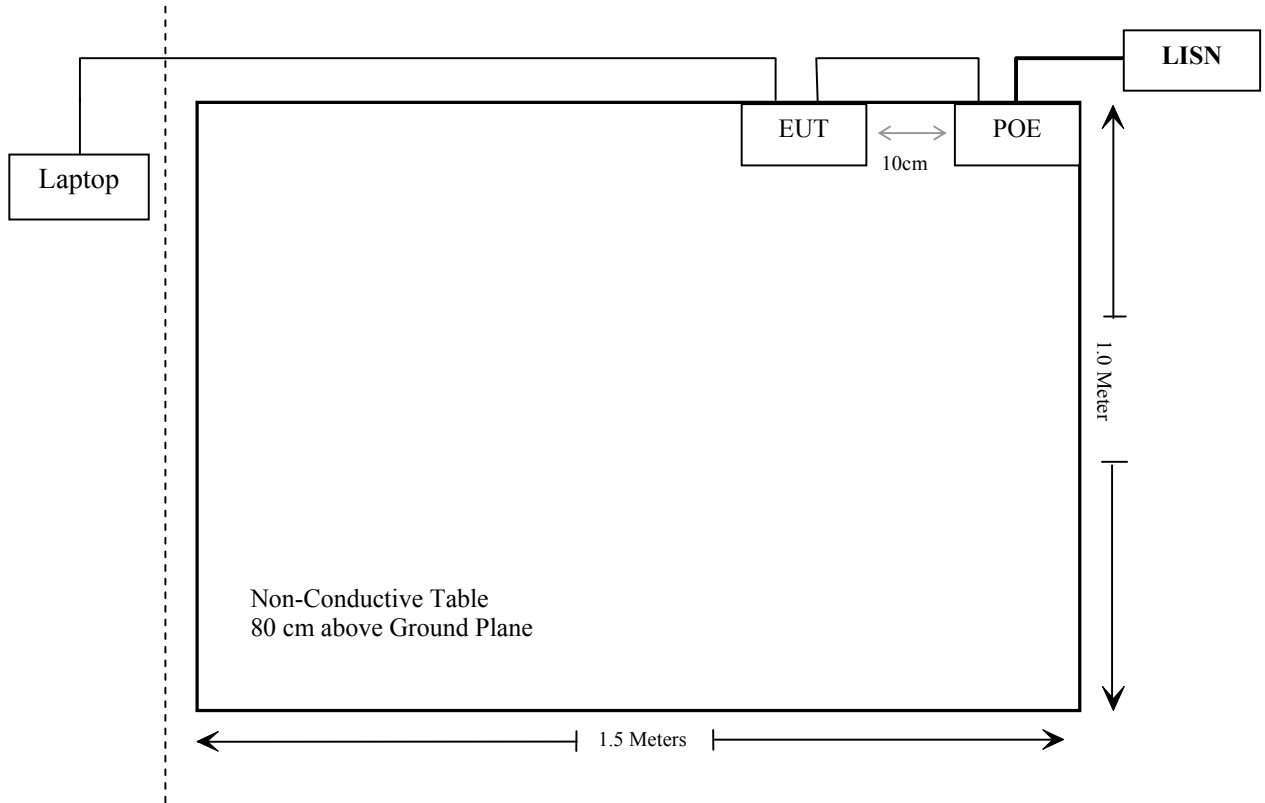
Manufacturer	Description	Model	Serial Number
Unknown	POE	VX-P11000GB	Unknown
HP	Laptop	Compaq CQ45	5CG33407QL

### External I/O Cable

Cable Description	Length (m)	From/Port	To
Unshielded Detachable AC Cable	1.0	LISN	POE
Unshielded Detachable RJ45 Cable	1.2	POE	EUT
Unshielded Detachable RJ45 Cable	1.8	EUT	Laptop

### Block Diagram of Test Setup

For conducted emission:





## SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307 (b) (1) & §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) (2), (3), (6),(7)	Undesirable Emission& Restricted Bands	Compliance
§15.407(a) (1)	26 dB Emission Bandwidth & 6dB Bandwidth	Compliance
§15.407(a) (2)	Conducted Transmitter Output Power	Compliance
§15.407 (a) (2)	Power Spectral Density	Compliance

**Note:** DFS report please refer to RSZ191120011-00A1 issued by Bay Area Compliance Laboratories Corp.(Dongguan).

**TEST EQUIPMENT LIST**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
<b>AC Line Conducted test</b>					
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2019/7/9	2020/7/8
Rohde & Schwarz	LISN	ENV216	101613	2019/1/25	2020/1/24
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2019/11/29	2020/11/28
Unknown	CE Cable	CE Cable	UF A210B-1-0720-504504	2019/11/29	2020/11/28
Rohde & Schwarz	CE Test software	EMC 32	V8.53.0	NCR	NCR
<b>Radiated Emission Test</b>					
R&S	EMI Test Receiver	ESR3	102455	2019/7/9	2020/7/8
Sonoma instrument	Pre-amplifier	310 N	186238	2019/4/20	2020/4/20
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2017/12/22	2020/12/21
Unknown	Cable 2	RF Cable 2	Unknown	2019/11/29	2020/11/28
Unknown	Cable	Chamber Cable 1	Unknown	2019/11/29	2020/11/28
Rohde & Schwarz	Auto test software	EMC 32	V9.10	NCR	NCR
Rohde & Schwarz	Spectrum Analyzer	FSV40-N	102259	2019/7/22	2020/7/21
COM-POWER	Pre-amplifier	PA-122	181919	2019/11/29	2020/11/28
COM-POWER	Amplifier	QLW-18405536-J0	15964001002	2019/11/29	2020/11/28
Sunol Sciences	Horn Antenna	DRH-118	A052604	2017/12/22	2020/12/21
Insulted Wire Inc.	RF Cable	SPS-2503-3150	2222010	2019/11/29	2020/11/28
Unknown	RF Cable	W1101-EQ1 OUT	Unknown	2019/11/29	2020/11/28
SNSD	Band Reject filter	BSF5150-5850MN-0899-004	5G filter	2019/4/20	2020/4/20
Ducommun Technologies	Horn antenna	ARH-4223-02	1007726-02 1304	2017/12/6	2020/12/5
Ducommun Technologies	Horn Antenna	ARH-2823-02	1007726-03	2019-11-18	2022-11-18

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
<b>RF Conducted Test</b>					
Agilent	USB Wideband Power Sensor	U2021XA	MY54250003	2019/7/10	2020/7/9
Rohde & Schwarz	SPECTRUM ANALYZER	FSU26	200120	2019/3/2	2020/3/1
WEINSCHTEL	3dB Attenuator	Unknown	Unknown	2019/11/29	2020/11/28

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

**§1.1307 (b) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)**

**Applicable Standard**

According to subpart 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure

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

**Result**

**Calculated Formulary:**

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

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:

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

Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )
	(dBi)	(numeric)	(dBm)	(mW)			
5250-5350	3.5	2.24	19	79.43	20	0.035	1.0
5470-5725	3.5	2.24	20	100	20	0.045	1.0

Note:

- 1) The conducted power is the tune-up power of the Max Conducted Output Power.
- 2) 2.4GHz or 5GHz Wi-Fi can transmit simultaneously for this device.
- 3) Simultaneous transmitting consideration: (referring to the DTS report, the highest MPE for 2.4G band is 0.22mW/cm<sup>2</sup> refer to RSZ190917002-00C and this report the highest MPE for 5G band is 0.11mW/cm<sup>2</sup>)

The ratio= $MPE_{DTS}/limit + MPE_{UNII}/limit = 0.22 + 0.11 = 0.33 < 1.0$ , simultaneous exposure is not required.

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

**Result: Compliance**

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## **FCC §15.203 – ANTENNA REQUIREMENT**

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### **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.

And according to FCC 47 CFR section 15.407 (a), if the transmitting antennas of directional gain greater than 6dBi are used, the transmit power and power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### **Antenna Connector Construction**

The EUT has four external antennas use a unique type of connector to attach to the EUT. The antenna gain is 3.5dBi, fulfill the requirement of this section. Please refer to the EUT photos.

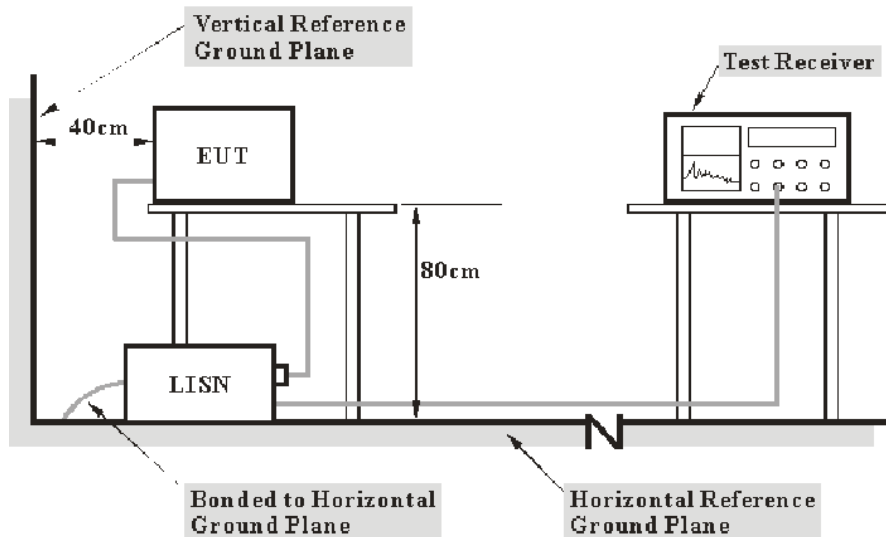
**Result:** Compliance.

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

**Applicable Standard**

FCC §15.207, §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.

**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

**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

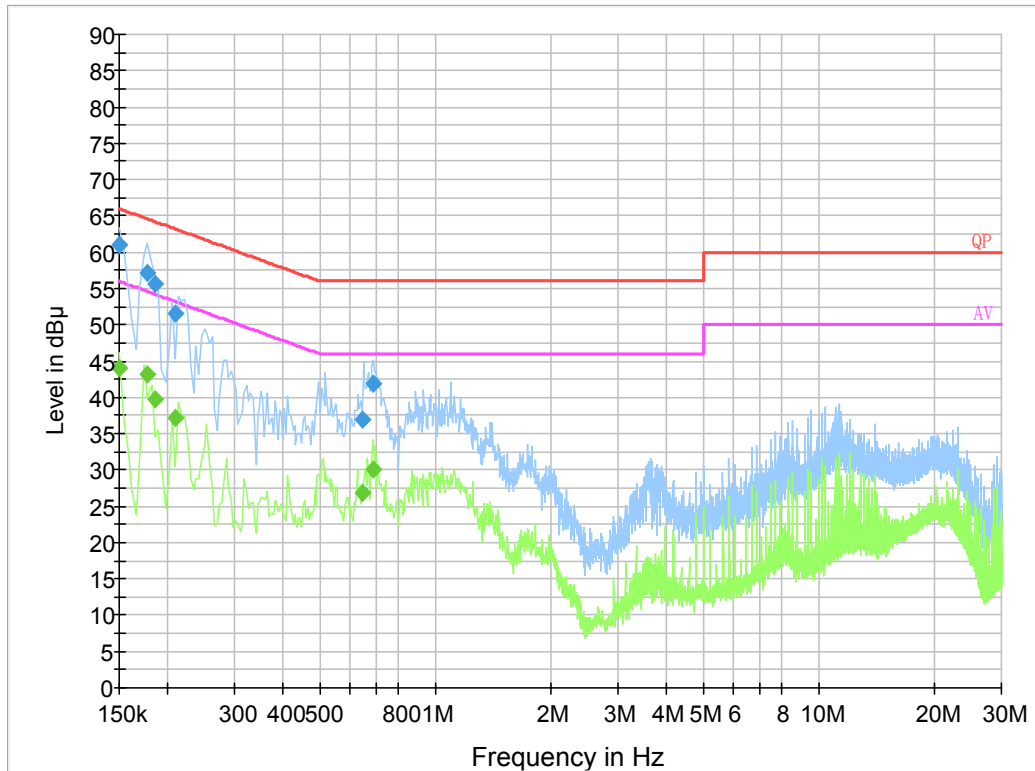
<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	55 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Haiguo Li on 2019-12-28.*

*EUT operation mode: Transmitting (worst case is 802.11a mode, 5700MHz)*

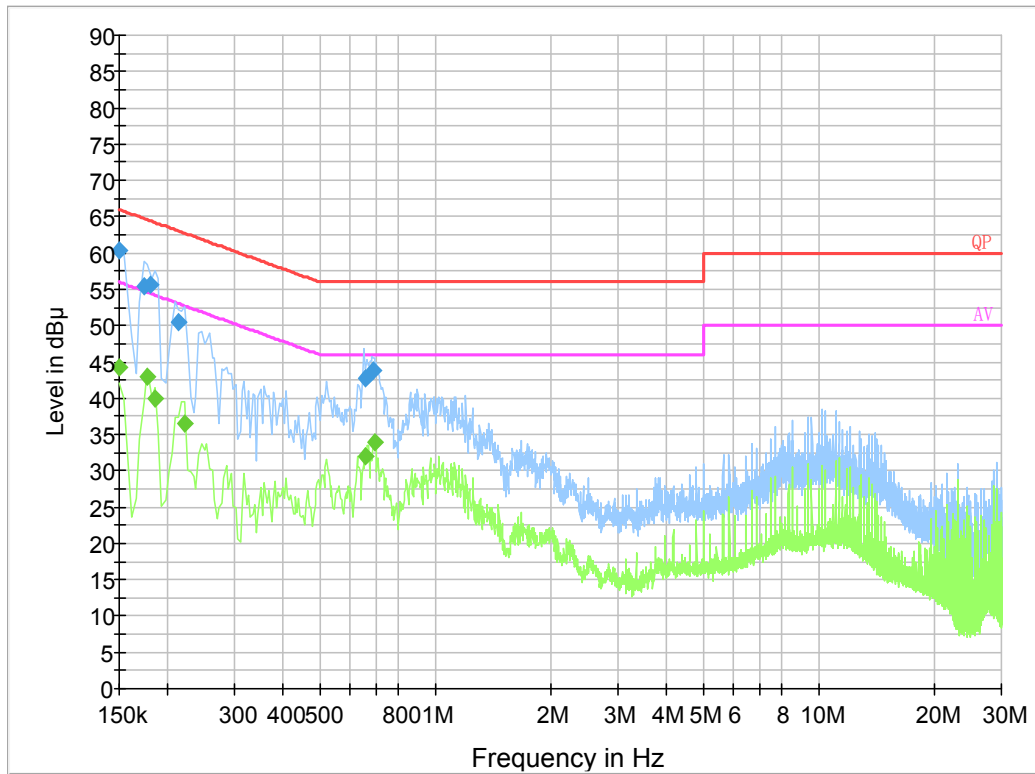


**AC 120 V/60 Hz, Line:**



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.150000	61.1	19.8	66.0	4.9	QP
0.177500	57.2	19.9	64.6	7.4	QP
0.185500	55.7	19.8	64.2	8.5	QP
0.209500	51.6	19.8	63.2	11.6	QP
0.644250	36.9	19.8	56.0	19.1	QP
0.687650	41.9	19.8	56.0	14.1	QP
0.150000	43.9	19.8	56.0	12.1	Ave.
0.177500	43.2	19.9	54.6	11.4	Ave.
0.185500	39.8	19.8	54.2	14.4	Ave.
0.209500	37.2	19.8	53.2	16.0	Ave.
0.644250	26.8	19.8	46.0	19.2	Ave.
0.687650	30.1	19.8	46.0	15.9	Ave.

**AC 120 V/60 Hz, Neutral:**



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/Ave./QP)
0.150000	60.3	19.8	66.0	5.7	QP
0.173500	55.5	19.8	64.8	9.3	QP
0.181500	55.6	19.8	64.4	8.8	QP
0.213500	50.5	19.8	63.1	12.6	QP
0.659750	42.8	19.8	56.0	13.2	QP
0.691710	43.7	19.8	56.0	12.3	QP
0.150000	44.1	19.8	56.0	11.9	Ave.
0.178000	43.0	19.8	54.6	11.6	Ave.
0.186000	40.0	19.8	54.2	14.2	Ave.
0.222000	36.5	19.8	52.7	16.2	Ave.
0.658000	32.1	19.8	46.0	13.9	Ave.
0.698000	33.9	19.8	46.0	12.1	Ave.

**Note:**

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

**§15.205 & §15.209 & §15.407(b) (2), (3), (6),(7) – UNDESIRABLE EMISSION****Applicable Standard**

FCC §15.407 (b) (2), (3), (6), (7); §15.209; §15.205;

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

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

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

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

KDB 789033 D02 General UNII Test Procedures New Rules v02r01, clause G),

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

The general limit of -27 dBm EIRP (= 68.2 dB $\mu$ V/m) is applied for unwanted emission of U-NII devices.

However, compliance with unwanted emissions in restricted bands may need to be considered, *e.g.*, some harmonics may land in the restricted bands below 5.15 GHz and above 5.35 GHz (refer

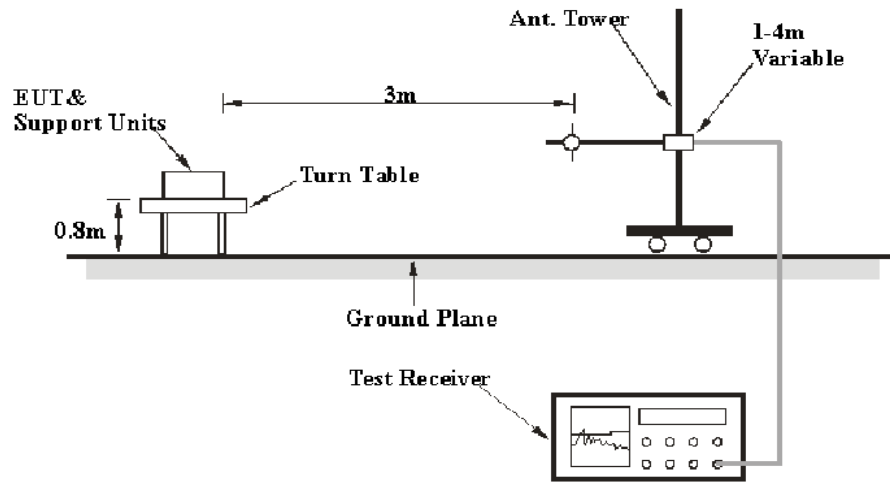
The general limit of -27 dBm EIRP (= 68.2 dB $\mu$ V/m) is applied for unwanted emission of U-NII devices.

However, compliance with unwanted emissions in restricted bands may need to be considered, *e.g.*, some harmonics may land in the restricted bands below 5.15 GHz and above 5.35 GHz (refer to § 15.205 for restricted bands) that have average and peak limits specified in §§ 15.209 and 15.35(b), respectively.

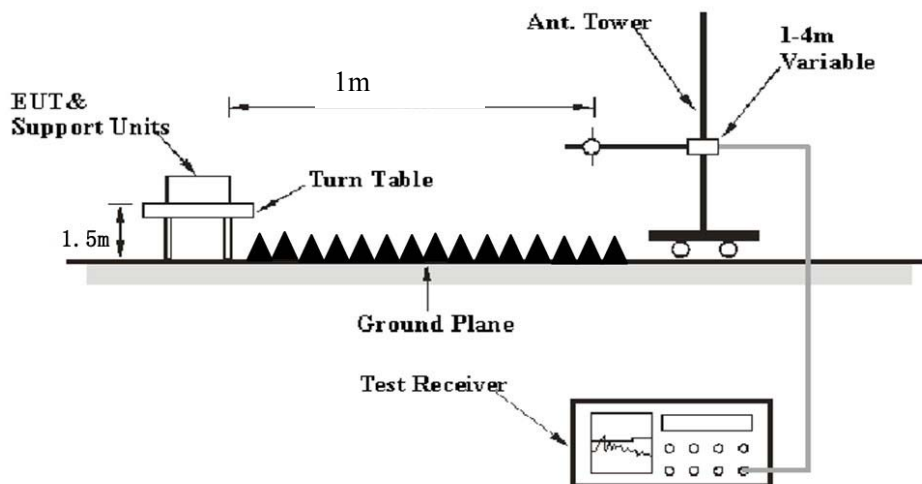
Although the peak limit of 74 dB $\mu$ V/m (20 dB above 54 dB $\mu$ V/m) in the restricted band appears to be higher than 68.2 dB $\mu$ V/m, the lower average limit of 54 dB $\mu$ V/m in the restricted bands needs to be complied to

**EUT Setup**

**Below 1 GHz:**



**Above 1 GHz:**



The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC 15.209 and FCC 15.407 limits.

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

## EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 40 GHz.

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

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	PK
	1MHz	10 Hz <sup>Note 1</sup>	/	Average
	1MHz	> 1/T <sup>Note 2</sup>	/	Average

Note 1: when duty cycle is no less than 98%

Note 2: when duty cycle is less than 98%

## Test Procedure

### Radiated Spurious Emission

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

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all the installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1GHz, peak and Average detection modes for frequencies above 1GHz.

According to ANSI C63.10-2013,9.4: For field strength measurements made at other than the distance at which the applicable limit is specified, extrapolate the measured field strength to the field strength at the distance specified by the limit using an inverse distance correction factor (20 dB/decade of distance). In some cases, a different distance correction factor may be required;

$$E_{\text{SpecLimit}} = E_{\text{Meas}} + 20 \log \left( \frac{d_{\text{Meas}}}{d_{\text{SpecLimit}}} \right)$$

where

$E_{\text{SpecLimit}}$  is the field strength of the emission at the distance specified by the limit, in dB $\mu$ V/m

$E_{\text{Meas}}$  is the field strength of the emission at the measurement distance, in dB $\mu$ V/m

$d_{\text{Meas}}$  is the measurement distance, in m

$d_{\text{SpecLimit}}$  is the distance specified by the limit, in m

So the extrapolation factor of 1m is  $20 \cdot \log(1/3) = -9.5$  dB

### 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:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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:

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

### Test Results Summary

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

### Test Data

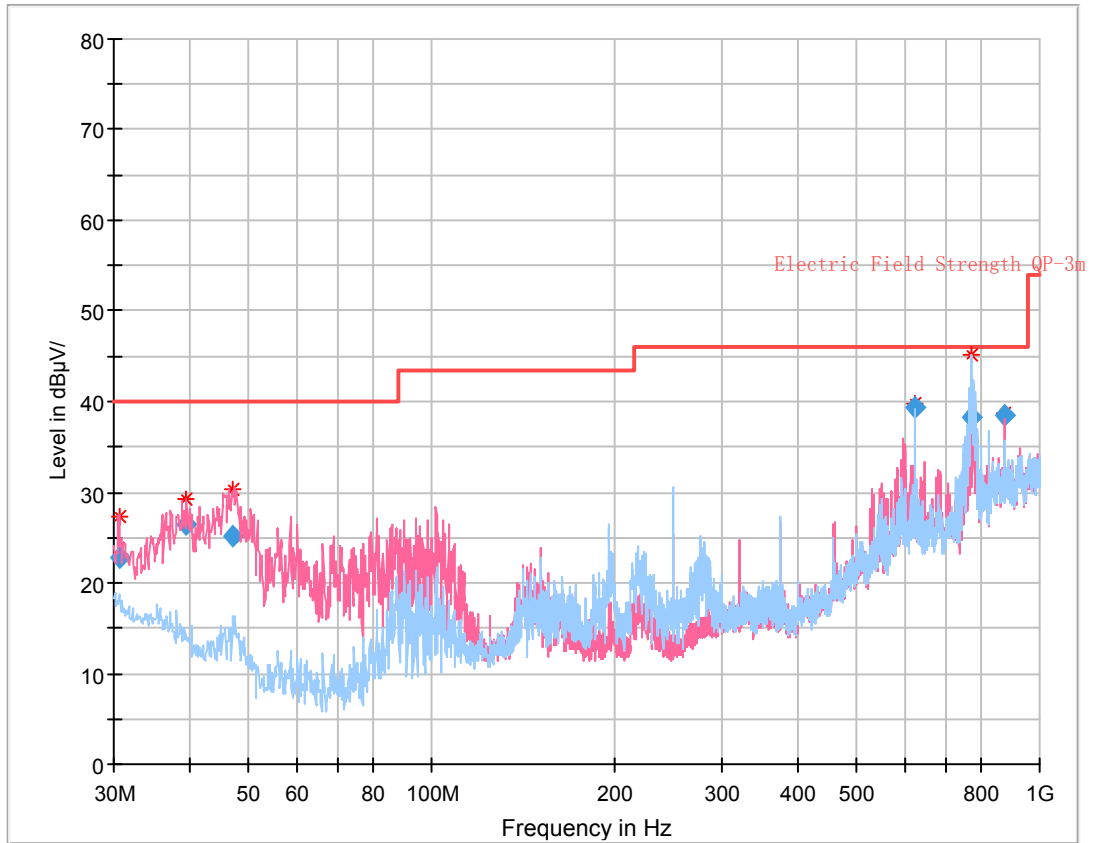
#### Environmental Conditions

<b>Temperature:</b>	23~25 °C
<b>Relative Humidity:</b>	55~56 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Zero Yan on 2019-12-27 for below 1G and by Alan He on 2019-12-21 and 2019-12-23 for above 1G.*

*EUT operation mode: Transmitting*

**30 MHz – 1 GHz:** (worst case is 802.11a mode 5700MHz)



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
30.671750	22.85	109.0	V	29.0	-8.0	40.00	17.15
39.511750	26.38	110.0	V	147.0	-13.4	40.00	13.62
47.007250	25.21	389.0	V	124.0	-18.2	40.00	14.79
625.011000	39.36	118.0	H	137.0	-1.6	46.00	6.64
774.367375	38.35	114.0	H	77.0	0.7	46.00	7.65
875.007375	38.59	118.0	V	163.0	3.6	46.00	7.41

**1G ~ 40 GHz:**

**5250-5350 MHz:**

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11a									
5260 MHz									
5125.51	31.65	PK	164	1.5	V	38.36	70.01	83.5	13.49
5125.51	16.95	Ave.	164	1.5	V	38.36	55.31	63.5	8.19
5427.60	30.99	PK	291	2.5	V	39.19	70.18	83.5	13.32
5427.60	17.02	Ave.	291	2.5	V	39.19	56.21	63.5	7.29
10520.00	49.40	PK	60	1.2	V	17.25	66.65	77.7	11.05
5280 MHz									
10560.00	50.63	PK	263	1.7	V	17.91	68.54	77.7	9.16
5320 MHz									
5108.72	31.48	PK	96	1.1	V	38.26	69.74	83.5	13.76
5108.72	16.77	Ave.	96	1.1	V	38.26	55.03	63.5	8.47
5386.10	31.8	PK	137	1.8	V	39.09	70.89	83.5	12.61
5386.10	17.33	Ave.	137	1.8	V	39.09	56.42	63.5	7.08
10640.00	55.28	PK	271	2.2	V	18.01	73.29	83.5	10.21
10640.00	38.51	Ave.	271	2.2	V	18.01	56.52	63.5	6.98
802.11n20									
5260 MHz									
5108.72	30.77	PK	130	1.9	V	38.26	69.03	83.5	14.47
5114.60	16.53	Ave.	130	1.9	V	38.36	54.89	63.5	8.61
5409.90	31.23	PK	89	1.2	V	39.19	70.42	83.5	13.08
5409.90	16.68	Ave.	89	1.2	V	39.19	55.87	63.5	7.63
10520.00	43.70	PK	15	1.8	V	17.25	60.95	77.7	16.75
5280 MHz									
10560.00	43.66	PK	0	2.3	V	17.91	61.57	77.7	16.13
5320 MHz									
5101.00	31.1	PK	131	2.3	V	38.26	69.36	83.5	14.14
5114.60	16.57	Ave.	131	2.3	V	38.36	54.93	63.5	8.57
5411.00	31.13	PK	140	1.7	V	39.19	70.32	83.5	13.18
5411.00	16.7	Ave.	140	1.7	V	39.19	55.89	63.5	7.61
10640.00	45.29	PK	11	2.5	V	18.01	63.30	83.5	20.20
10640.00	29.60	Ave.	11	2.5	V	18.01	47.61	63.5	15.89



Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11n40									
5270 MHz									
5147.10	31.91	PK	356	2.4	V	38.36	70.27	83.5	13.23
5114.60	17.13	Ave.	356	2.4	V	38.36	55.49	63.5	8.01
5399.60	30.76	PK	19	1.6	V	39.19	69.95	83.5	13.55
5399.60	17.03	Ave.	19	1.6	V	39.19	56.22	63.5	7.28
10540.00	44.17	PK	7	1.8	V	17.25	61.42	77.7	16.28
5310 MHz									
5111.50	31.68	PK	75	1.1	V	38.26	69.94	83.5	13.56
5114.60	17	Ave.	75	1.1	V	38.36	55.36	63.5	8.14
5353.30	36.12	PK	47	1.9	V	39.09	75.21	83.5	8.29
5353.30	18.78	Ave.	47	1.9	V	39.09	57.87	63.5	5.63
10620.00	43.90	PK	120	2.5	V	18.01	61.91	83.5	21.59
10620.00	28.68	Ave.	120	2.5	V	18.01	46.69	63.5	16.81
802.11ac20									
5260 MHz									
5139.90	31.96	PK	346	2.4	V	38.36	70.32	83.5	13.18
5114.60	17.25	Ave.	346	2.4	V	38.36	55.61	63.5	7.89
5450.00	30.89	PK	204	1.1	V	39.37	70.26	83.5	13.24
5450.00	16.95	Ave.	204	1.1	V	39.37	56.32	63.5	7.18
10520.00	49.67	PK	244	2.2	V	17.25	66.92	77.7	10.78
5280 MHz									
10560.00	49.31	PK	288	2.3	V	17.91	67.22	77.7	10.48
5320 MHz									
5112.92	32.29	PK	355	1.8	V	38.26	70.55	83.5	12.95
5114.60	16.83	Ave.	355	1.8	V	38.36	55.19	63.5	8.31
5431.74	31.71	PK	170	2.1	V	39.19	70.90	83.5	12.60
5431.74	17.12	Ave.	170	2.1	V	39.19	56.31	63.5	7.19
10640.00	52.62	PK	221	2.3	V	18.01	70.63	83.5	12.87
10640.00	35.55	Ave.	221	2.3	V	18.01	53.56	63.5	9.94

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11ac40									
5270 MHz									
5133.25	31.27	PK	212	2.4	V	38.36	69.63	83.5	13.87
5114.60	16.97	Ave.	212	2.4	V	38.36	55.33	63.5	8.17
5433.00	31.41	PK	354	1.9	V	39.29	70.70	83.5	12.80
5433.00	17.23	Ave.	354	1.9	V	39.29	56.52	63.5	6.98
10540.00	50.75	PK	231	1.7	V	17.25	68.00	77.7	9.70
5310 MHz									
5129.34	32.79	PK	33	1.5	V	38.36	71.15	83.5	12.35
5114.60	17.15	Ave.	33	1.5	V	38.36	55.51	63.5	7.99
5353.40	41.96	PK	13	1.9	V	39.09	81.05	83.5	2.45
5353.40	20.21	Ave.	13	1.9	V	39.09	59.30	63.5	4.20
10620.00	52.49	PK	327	2.1	V	18.01	70.50	83.5	13.00
10620.00	35.93	Ave.	327	2.1	V	18.01	53.94	63.5	9.56
802.11ac80									
5290 MHz									
5148.80	35.81	PK	136	1.5	V	38.36	74.17	83.5	9.33
5114.60	16.68	Ave.	136	1.5	V	38.36	55.04	63.5	8.46
5353.10	42.59	PK	73	1.4	V	39.09	81.68	83.5	1.82
5353.10	18.82	Ave.	73	1.4	V	39.09	57.91	63.5	5.59
10580.00	50.62	PK	223	1.2	V	17.91	68.53	77.7	9.17

**5470-5725 MHz:**

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11a									
5500 MHz									
5458.63	42.58	PK	245	1.8	V	39.37	81.95	83.5	1.55
5458.63	20.1	Ave.	245	1.8	V	39.37	59.47	63.5	4.03
5789.63	32.87	PK	246	1.8	V	39.61	72.48	77.7	5.22
11000.00	55.53	PK	277	2.4	V	17.66	73.19	83.5	10.31
11000.00	35.71	Ave.	277	2.4	V	17.66	53.37	63.5	10.13
5580 MHz									
11160.00	58.54	PK	47	2.1	V	17.39	75.93	83.5	7.57
11160.00	36.98	Ave.	47	2.1	V	17.39	54.37	63.5	9.13
5700 MHz									
5455.67	32.09	PK	46	2.2	V	39.37	71.46	83.5	12.04
5455.67	16.75	Ave.	46	2.2	V	39.37	56.12	63.5	7.38
5727.55	36.31	PK	237	1.0	V	39.49	75.80	77.7	1.90
11400.00	53.19	PK	10	1.9	V	17.73	70.92	83.5	12.58
11400.00	38.05	Ave.	10	1.9	V	17.73	55.78	63.5	7.72
802.11n20									
5500 MHz									
5465.92	36.82	PK	55	2.3	V	39.37	76.19	77.7	1.51
5745.03	32.84	PK	338	1.2	V	39.49	72.33	77.7	5.37
11000.00	44.78	PK	16	2.5	V	17.66	62.44	83.5	21.06
11000.00	28.99	Ave.	16	2.5	V	17.66	46.65	63.5	16.85
5580 MHz									
11160.00	47.81	PK	171	1.1	V	17.39	65.20	83.5	18.30
11160.00	32.24	Ave.	171	1.1	V	17.39	49.63	63.5	13.87
5700 MHz									
5368.84	30.9	PK	331	2.3	V	39.09	69.99	83.5	13.51
5368.84	16.64	Ave.	331	2.3	V	39.09	55.73	63.5	7.77
5799.84	32.94	PK	111	2.1	V	39.61	72.55	77.7	5.15
11400.00	52.42	PK	328	2.3	V	17.73	70.15	83.5	13.35
11400.00	36.99	Ave.	328	2.3	V	17.73	54.72	63.5	8.78

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11n40									
5510 MHz									
5468.87	36.1	PK	192	1.6	V	39.37	75.47	77.7	2.23
5787.25	32.34	PK	130	1.5	V	39.61	71.95	77.7	5.75
11020.00	42.55	PK	29	2.3	V	17.66	60.21	83.5	23.29
11020.00	28.47	Ave.	29	2.3	V	17.66	46.13	63.5	17.37
5550 MHz									
11100.00	43.96	PK	291	2.1	V	16.72	60.68	83.5	22.82
11100.00	28.55	Ave.	291	2.1	V	16.72	45.27	63.5	18.23
5670 MHz									
5379.78	31.05	PK	327	1.5	V	39.09	70.14	83.5	13.36
5379.78	16.82	Ave.	327	1.5	V	39.09	55.91	63.5	7.59
5730.59	36.07	PK	5	2.0	V	39.49	75.56	77.7	2.14
11340.00	53.13	PK	19	2.5	V	17.43	70.56	83.5	12.94
11340.00	37.38	Ave.	19	2.5	V	17.43	54.81	63.5	8.69
802.11ac20									
5500 MHz									
5466.10	32.5	PK	320	1.2	V	39.37	71.87	77.7	5.83
5743.40	32.34	PK	162	1.2	V	39.49	71.83	77.7	5.87
11000.00	44.02	PK	343	1.9	V	17.66	61.68	83.5	21.82
11000.00	28.72	Ave.	343	1.9	V	17.66	46.38	63.5	17.12
5580 MHz									
11160.00	45.86	PK	34	1.4	V	17.39	63.25	83.5	20.25
11160.00	30.54	Ave.	34	1.4	V	17.39	47.93	63.5	15.57
5700 MHz									
5403.90	30.81	PK	73	1.8	V	39.19	70.00	83.5	13.50
5403.90	16.63	Ave.	73	1.8	V	39.19	55.82	63.5	7.68
5791.48	32.46	PK	231	1.9	V	39.61	72.07	77.7	5.63
11400.00	52.63	PK	196	1.6	V	17.73	70.36	83.5	13.14
11400.00	36.09	Ave.	196	1.6	V	17.73	53.82	63.5	9.68

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11ac40									
5510 MHz									
5466.27	36.75	PK	336	1.1	V	39.37	76.12	77.7	1.58
5741.34	32.14	PK	25	2.3	V	39.49	71.63	77.7	6.07
11020.00	43.79	PK	313	1.1	V	17.66	61.45	83.5	22.05
11020.00	28.78	Ave.	313	1.1	V	17.66	46.44	63.5	17.06
5550 MHz									
11100.00	42.96	PK	102	1.2	V	16.72	59.68	83.5	23.82
11100.00	28.49	Ave.	102	1.2	V	16.72	45.21	63.5	18.29
5670 MHz									
5391.94	30.91	PK	354	2.0	V	39.19	70.10	83.5	13.40
5391.94	16.8	Ave.	354	2.0	V	39.19	55.99	63.5	7.51
5728.53	35.05	PK	242	2.0	V	39.49	74.54	77.7	3.16
11340.00	50.98	PK	328	1.1	V	17.43	68.41	83.5	15.09
11340.00	35.13	Ave.	328	1.1	V	17.43	52.56	63.5	10.94
802.11ac80									
5530 MHz									
5467.48	36.97	PK	153	1.8	V	39.37	76.34	77.7	1.36
5779.65	32.2	PK	330	1.6	V	39.61	71.81	77.7	5.89
11060.00	41.59	PK	134	1.2	V	16.72	58.31	83.5	25.19
11060.00	26.65	Ave.	134	1.2	V	16.72	43.37	63.5	20.13
5610 MHz									
5468.87	34.92	PK	128	1.6	V	39.37	74.29	77.7	3.41
5733.30	36.98	PK	275	2.5	V	39.49	76.47	77.7	1.23
11220.00	46.09	PK	299	2.0	V	17.39	63.48	83.5	20.02
11220.00	29.97	Ave.	299	2.0	V	17.39	47.36	63.5	16.14

**2.4G Wi-Fi (802.11b mode, 2412MHz) & 5G Wi-Fi (802.11a mode, 5700MHz) simultaneous transmission:**

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
	Reading (dB $\mu$ V)	PK/QP/Ave.		Height (m)	Polar (H/V)				
774.37	38.26	QP	66	1.1	H	0.7	38.76	46	7.24
727.66	36.52	QP	98	2.4	V	0.7	37.22	46	8.78
2588.36	59.52	PK	41	2.2	H	0.04	59.56	74	14.44
2588.36	28.69	Ave.	41	2.2	H	0.04	28.73	54	25.27
4413.00	63.88	PK	58	2.4	H	4.56	68.44	74	5.56
4413.00	34.62	Ave.	58	2.4	H	4.56	39.18	54	14.82
4824.00	43.96	PK	135	1.4	H	5.40	49.36	74	24.64
4824.00	30.86	Ave.	135	1.4	H	5.40	36.26	54	17.74
11400.00	52.08	PK	144	1.4	H	17.73	69.81	83.5	13.69
11400.00	37.62	Ave.	144	1.4	H	17.73	55.35	63.5	8.15

**Note:**

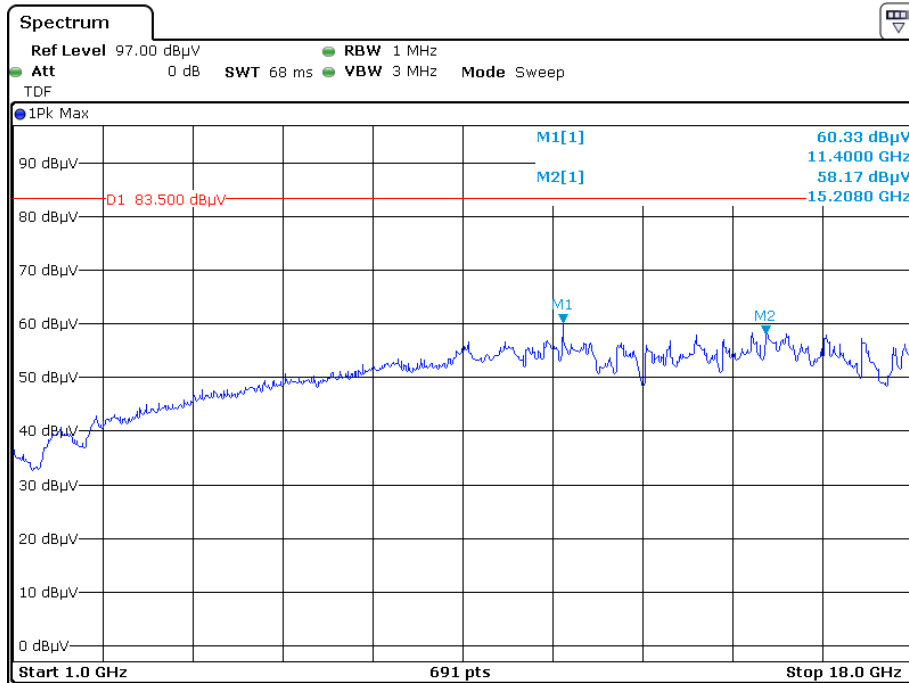
Corrected Amplitude = Corrected Factor + Reading

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

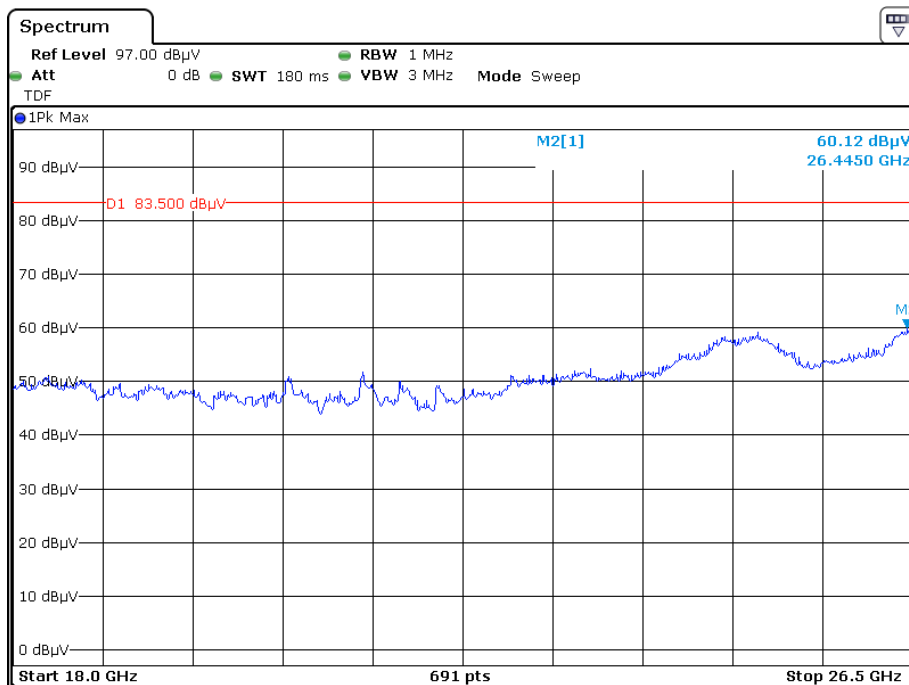
Margin = Limit- Corr. Amplitude

All other spurious emissions are 20 dB below the limit or are on the system noise floor level.

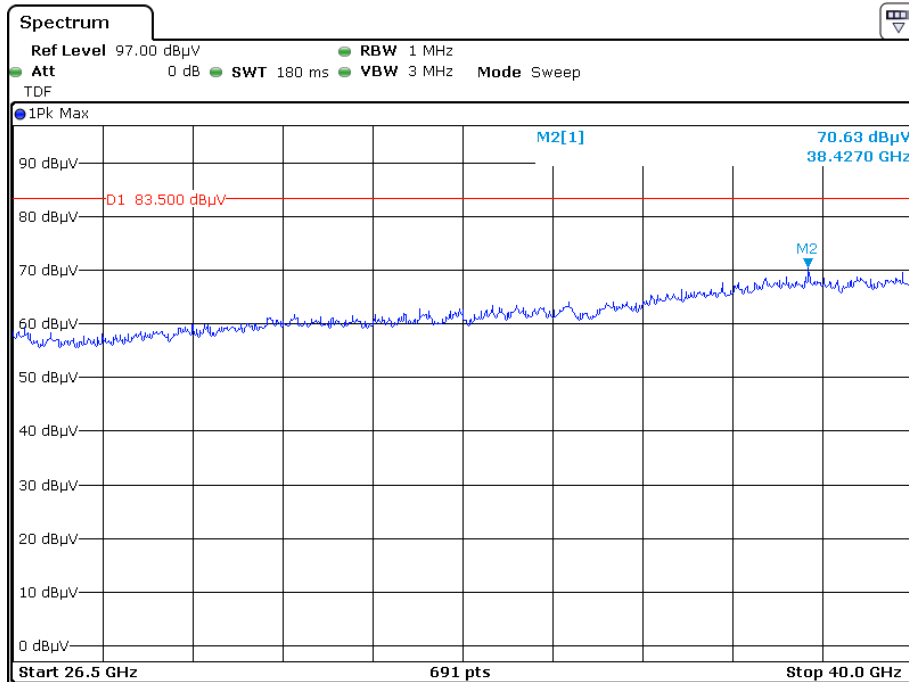
Pre-scan with 802.11a 5700MHz, for Peak Horizontal



Date: 23.DEC.2019 08:19:26

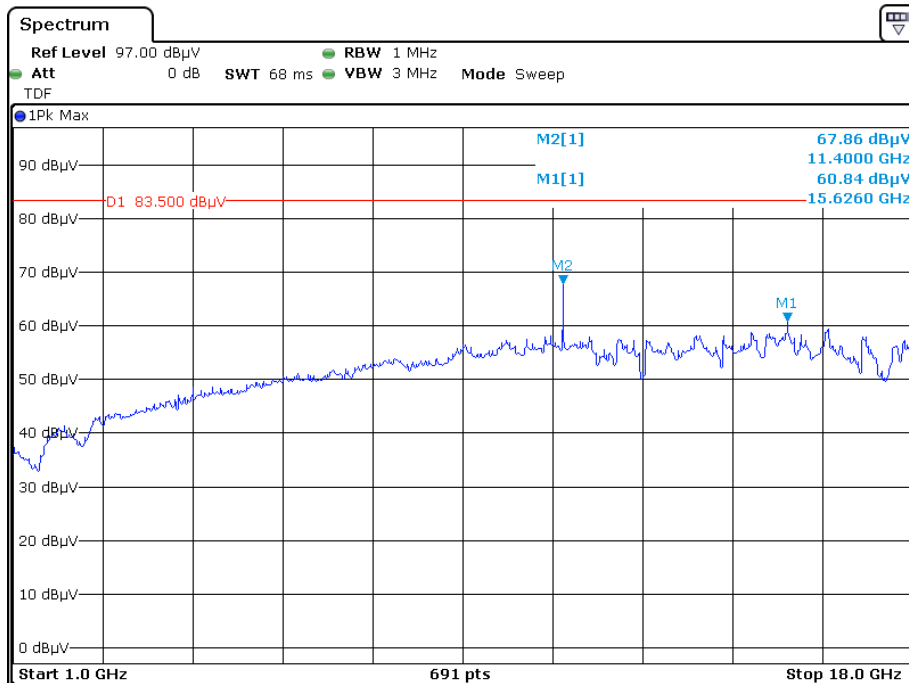


Date: 23.DEC.2019 09:17:49



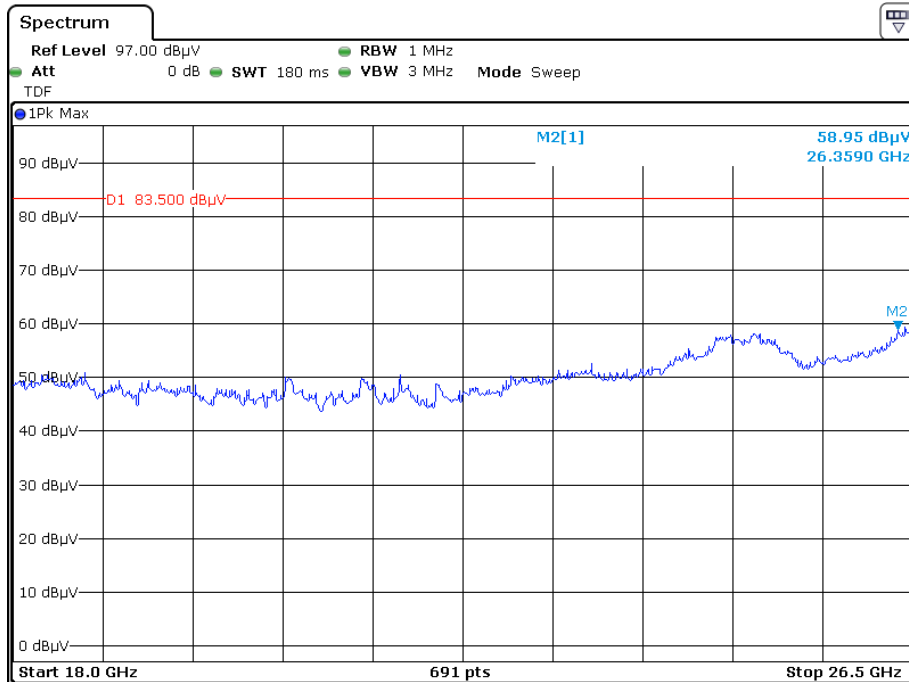
Date: 23.DEC.2019 10:07:14

Vertical

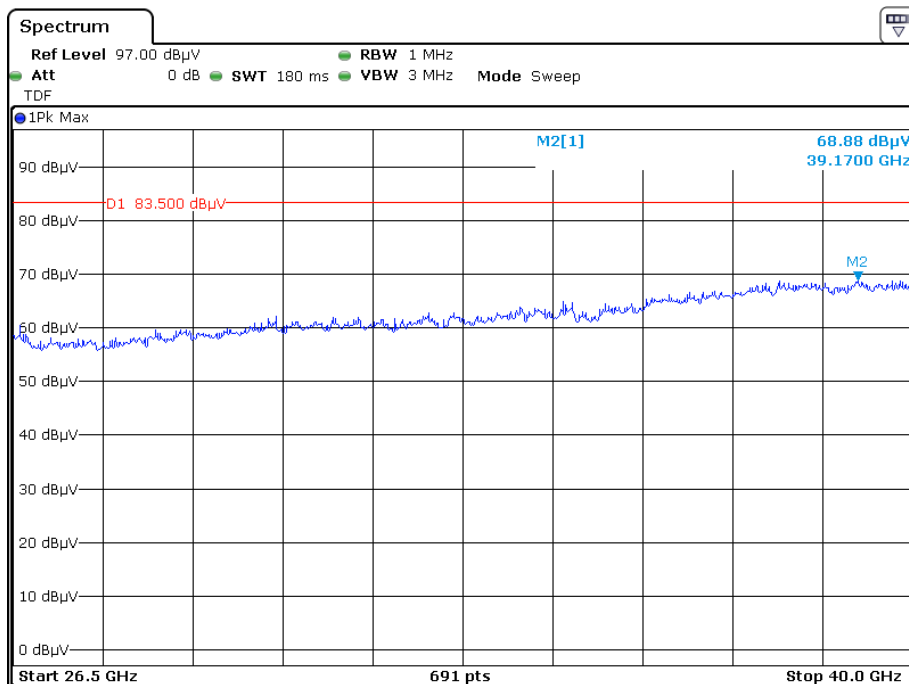


Date: 23.DEC.2019 08:01:54



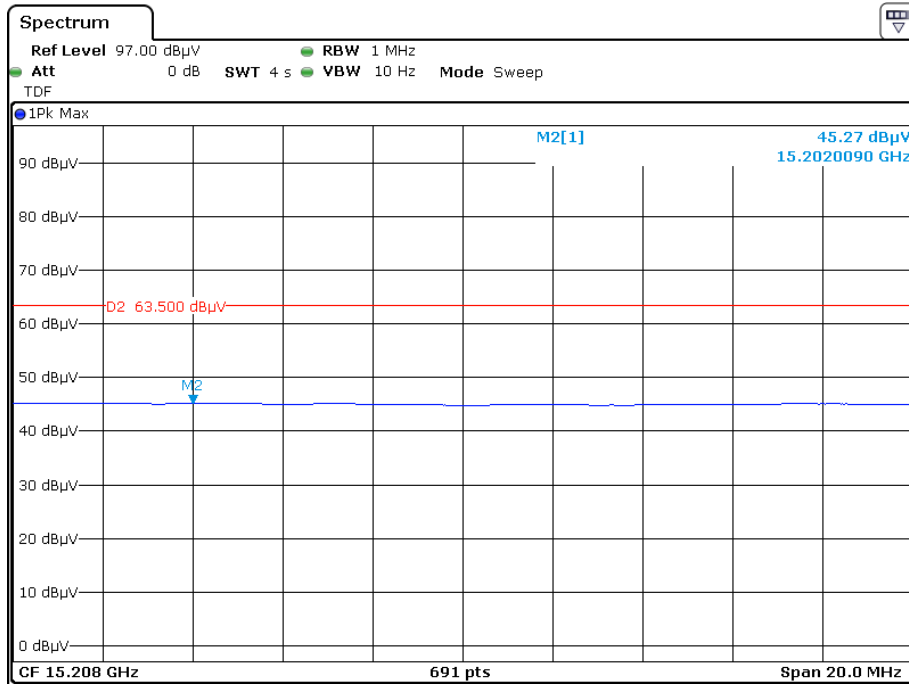


Date: 23.DEC.2019 09:06:10

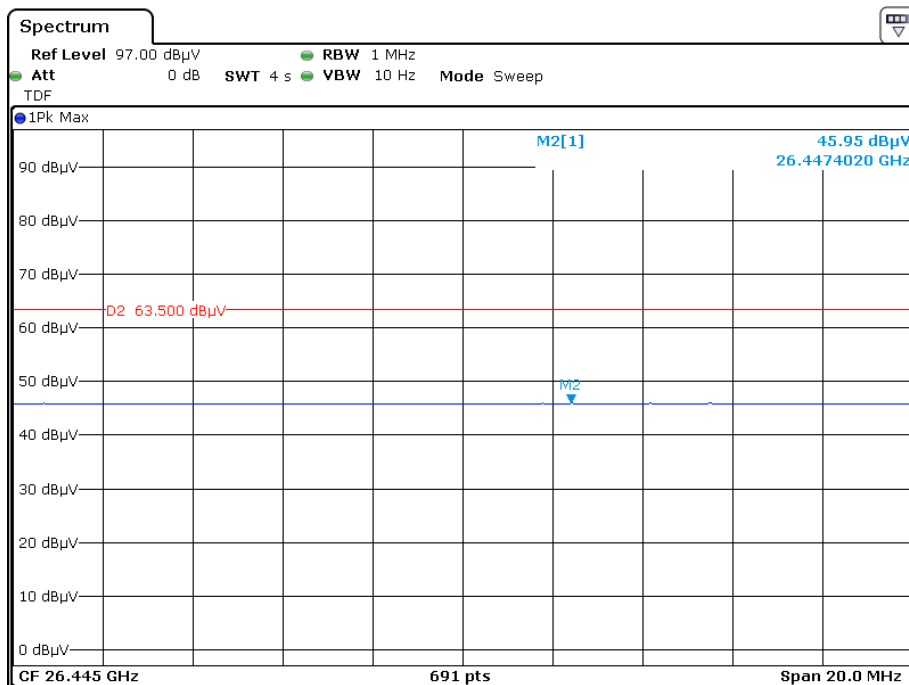


Date: 23.DEC.2019 09:55:55

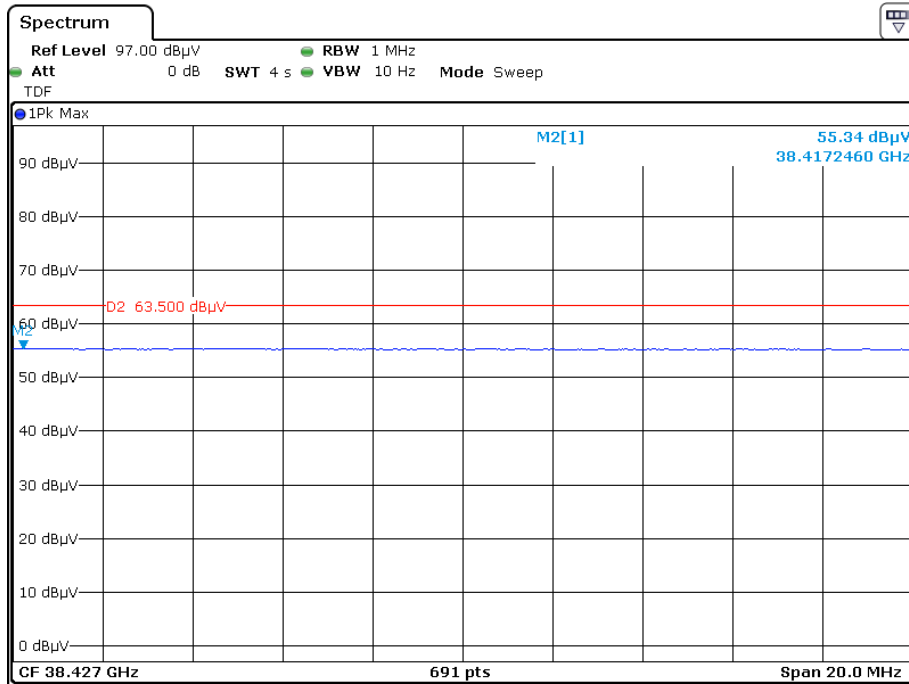
Pre-scan with 802.11a 5700MHz, for Average Horizontal



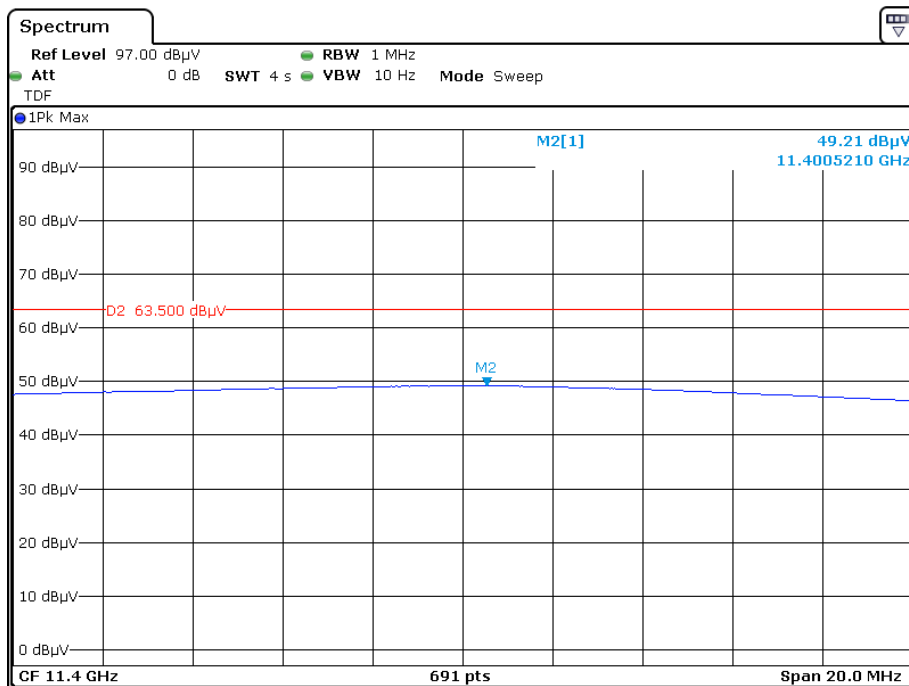
Date: 23.DEC.2019 08:25:01



Date: 23.DEC.2019 09:23:16

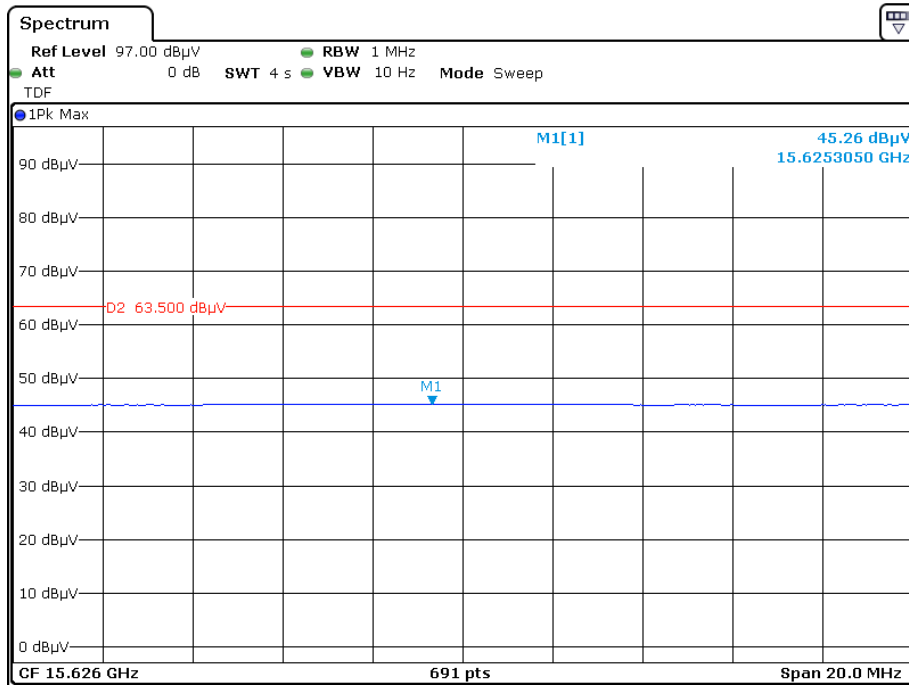


Date: 23.DEC.2019 10:11:42

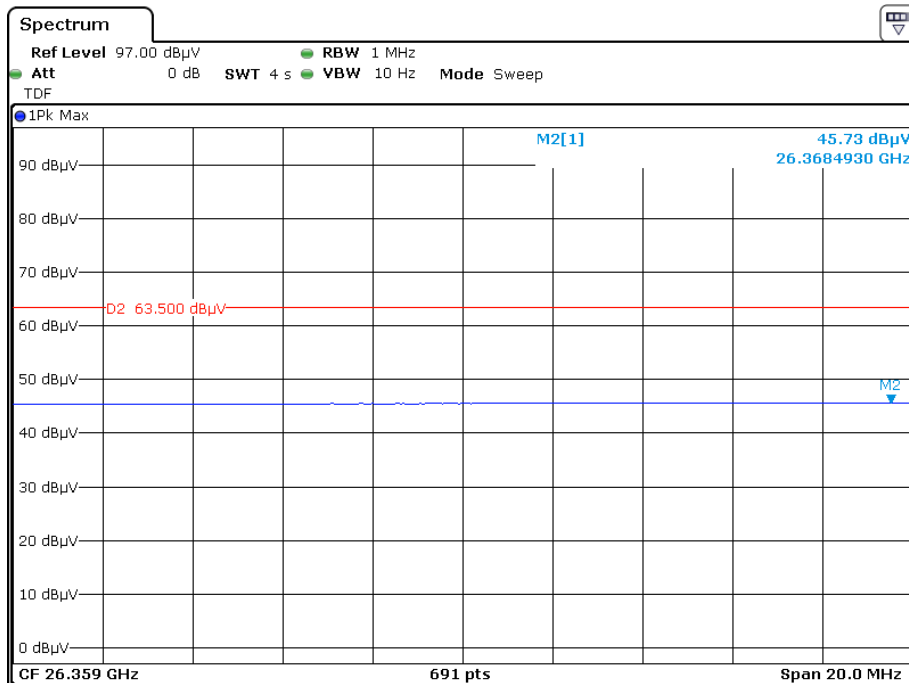


Date: 23.DEC.2019 08:32:29

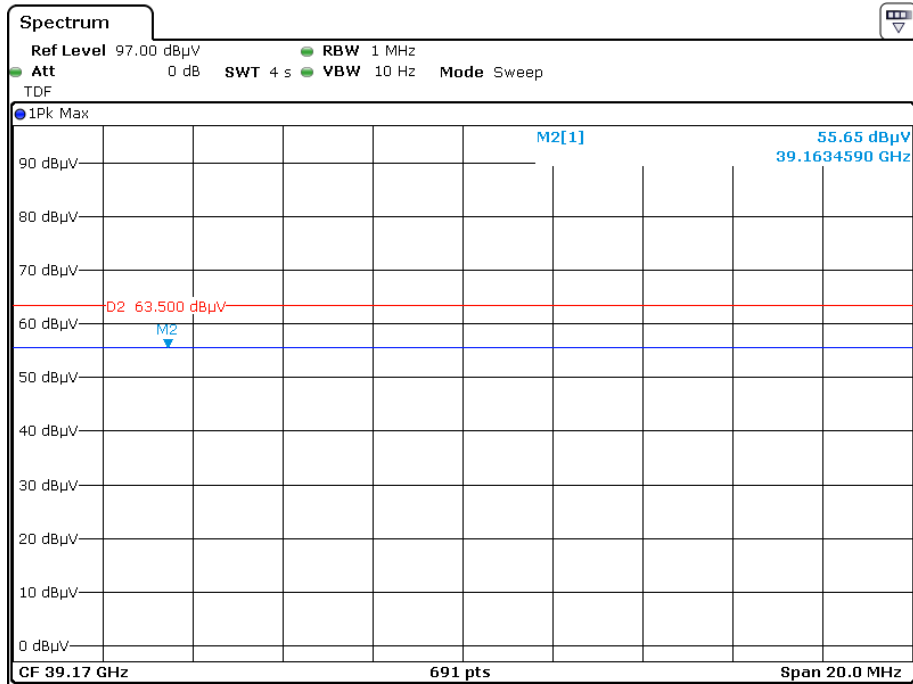
Vertical



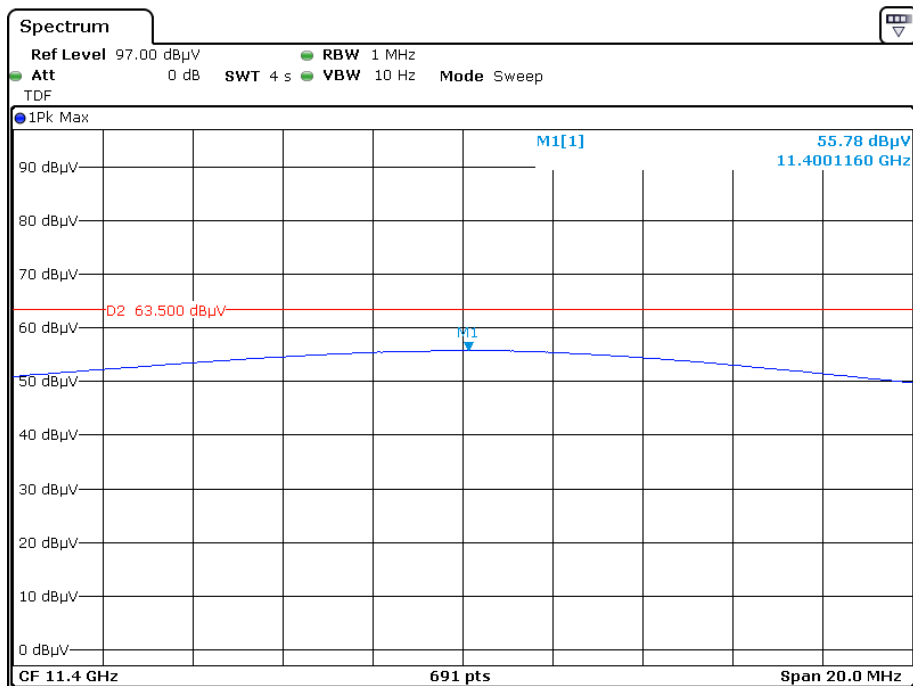
Date: 23.DEC.2019 08:06:38



Date: 23.DEC.2019 09:11:38



Date: 23.DEC.2019 10:01:29



Date: 23.DEC.2019 08:13:04

**FCC §15.407(a) (1) – 26 dB & 6dB EMISSION BANDWIDTH**

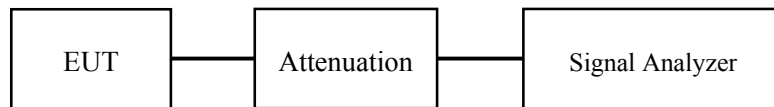
**Applicable Standard**

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**

**1. Emission Bandwidth (EBW)**

- a) Set RBW = approximately 1% of the emission bandwidth.
- b) Set the VBW > RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) 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%.



**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	25~26 °C
<b>Relative Humidity:</b>	52~53 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by George Zhong from 2019-12-08 to 2019-12-11.*

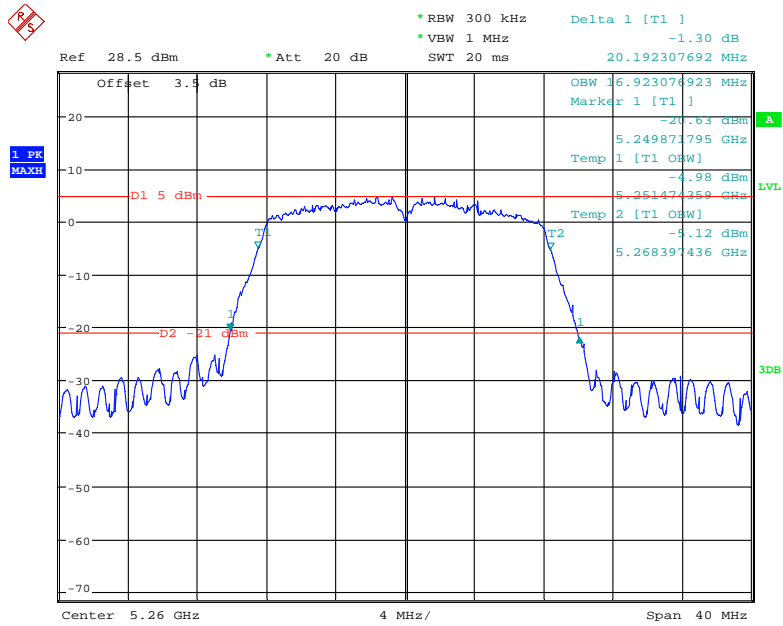
*EUT operation mode: Transmitting (Antenna 3 was the worst case)*

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

**5250 MHz - 5350 MHz:**

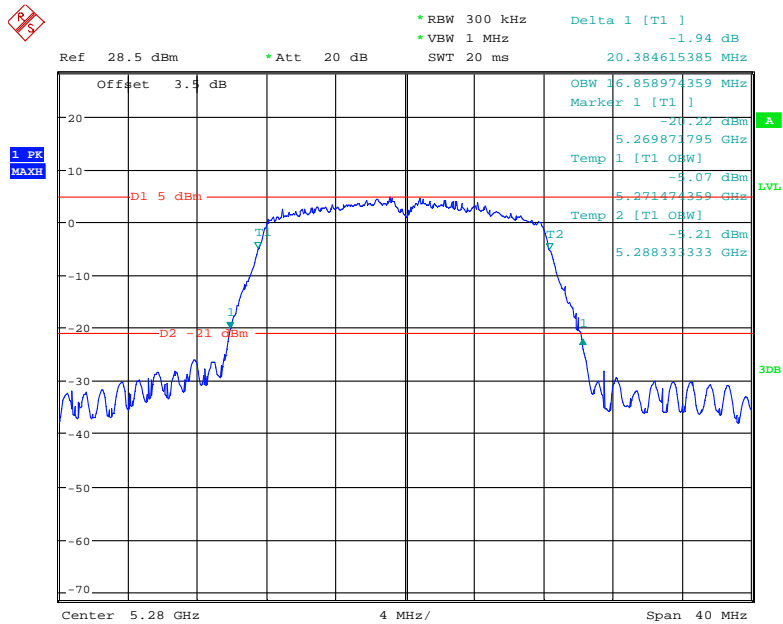
Frequency (MHz)	Antenna Port	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
<b>802.11a</b>			
5260	Antenna 3	20.192	16.923
5280	Antenna 3	20.385	16.859
5320	Antenna 3	20.308	16.859
<b>802.11n20</b>			
5260	Antenna 3	20.577	17.692
5280	Antenna 3	20.513	17.692
5320	Antenna 3	20.577	17.756
<b>802.11n40</b>			
5270	Antenna 3	40.846	36.282
5310	Antenna 3	40.897	36.282
<b>802.11ac20</b>			
5260	Antenna 3	20.641	17.756
5280	Antenna 3	20.513	17.692
5320	Antenna 3	20.641	17.756
<b>802.11ac40</b>			
5270	Antenna 3	41.538	36.410
5310	Antenna 3	41.026	36.282
<b>802.11ac80</b>			
5290	Antenna 3	81.795	75.641

**802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5260 MHz**



Date: 8.DEC.2019 15:38:27

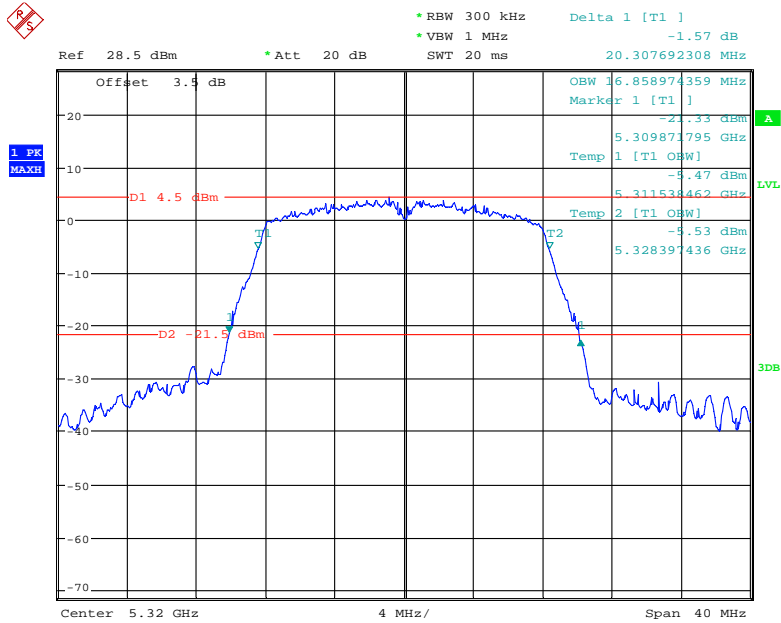
**802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5280 MHz**



Date: 8.DEC.2019 15:49:43

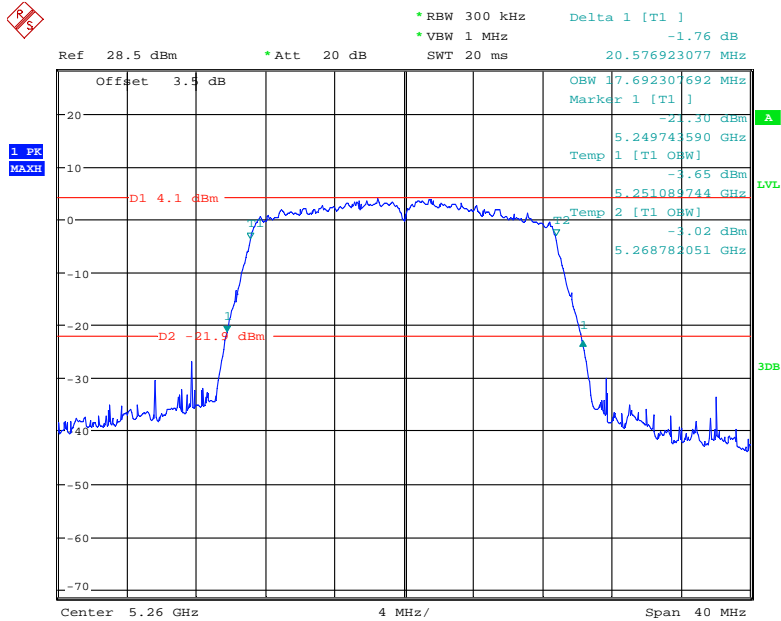


**802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5320 MHz**



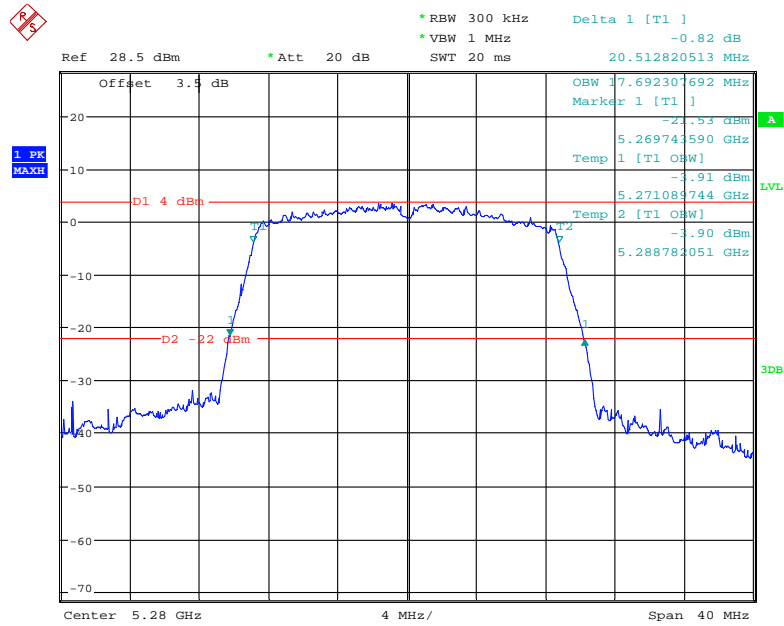
Date: 8.DEC.2019 15:51:38

**802.11n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5260 MHz**



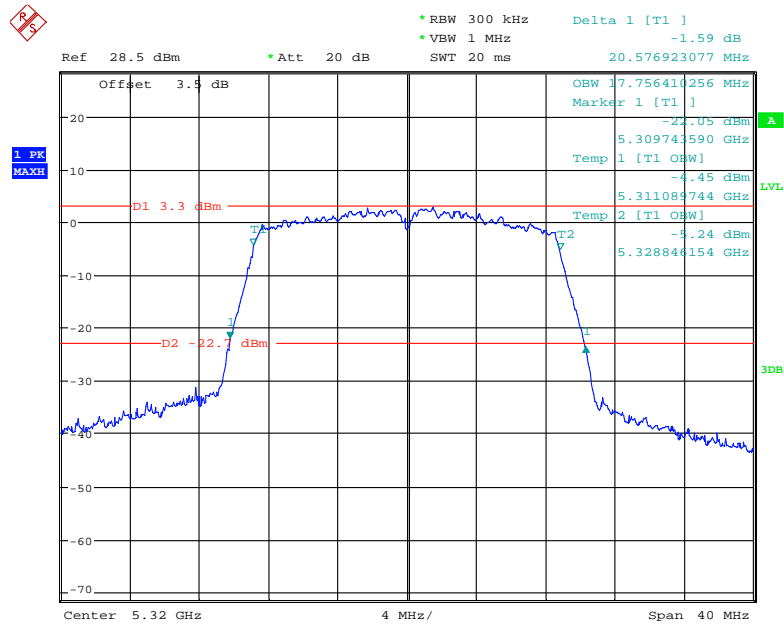
Date: 8.DEC.2019 15:40:33

**802.11n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5280 MHz**



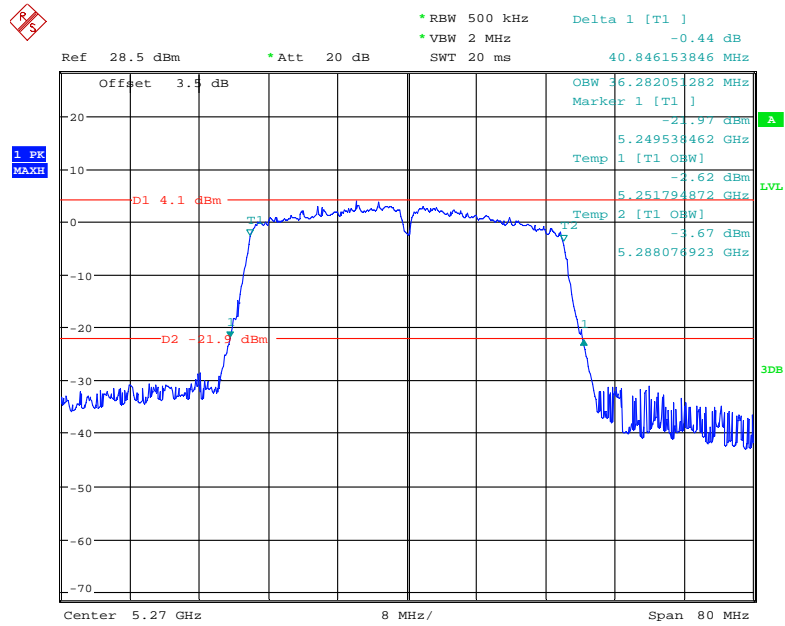
Date: 8.DEC.2019 15:46:37

**802.11n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5320 MHz**



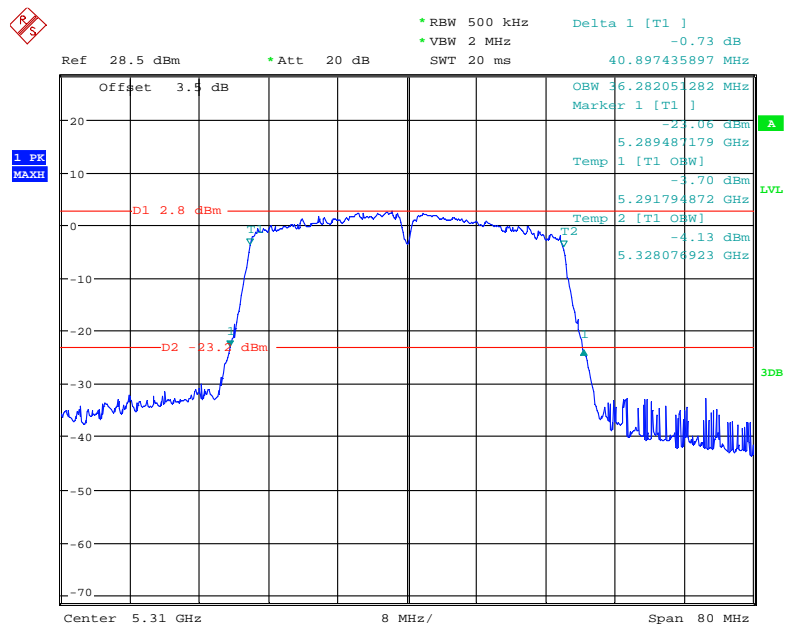
Date: 8.DEC.2019 16:21:00

**802.11n40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5270 MHz**



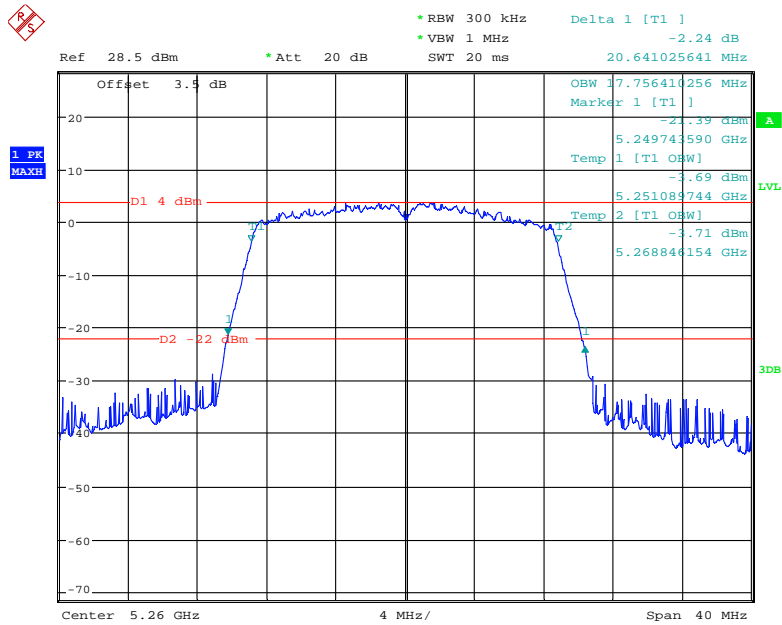
Date: 8.DEC.2019 16:09:56

**802.11n40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5310 MHz**



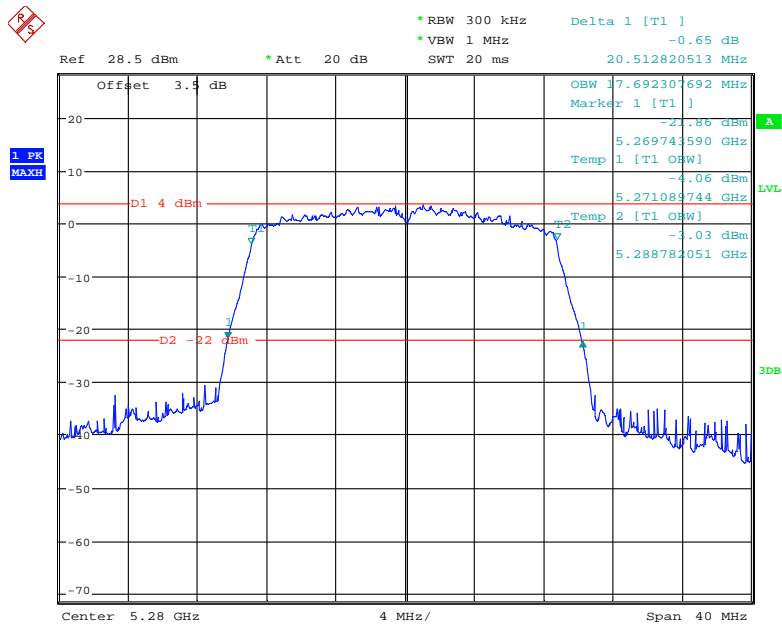
Date: 8.DEC.2019 16:11:43

**802.11ac20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5260 MHz**



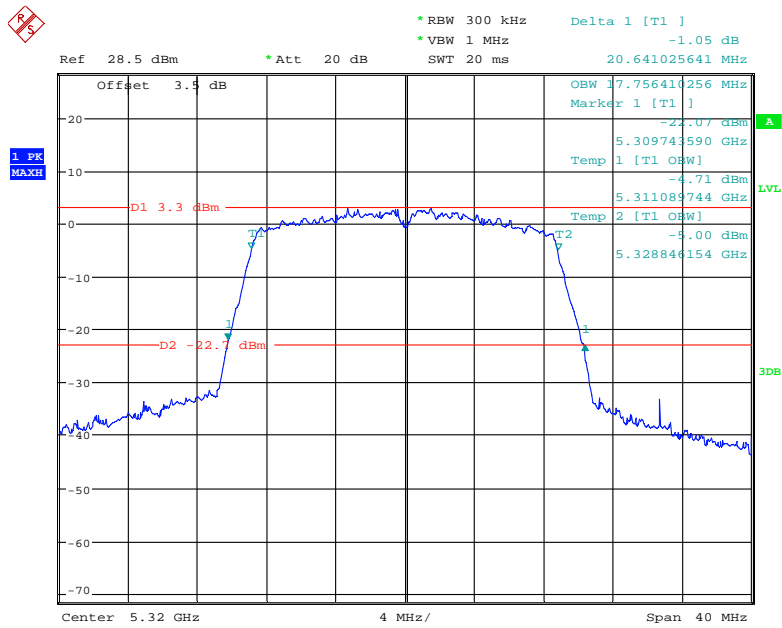
Date: 8.DEC.2019 15:42:32

**802.11ac20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5280 MHz**



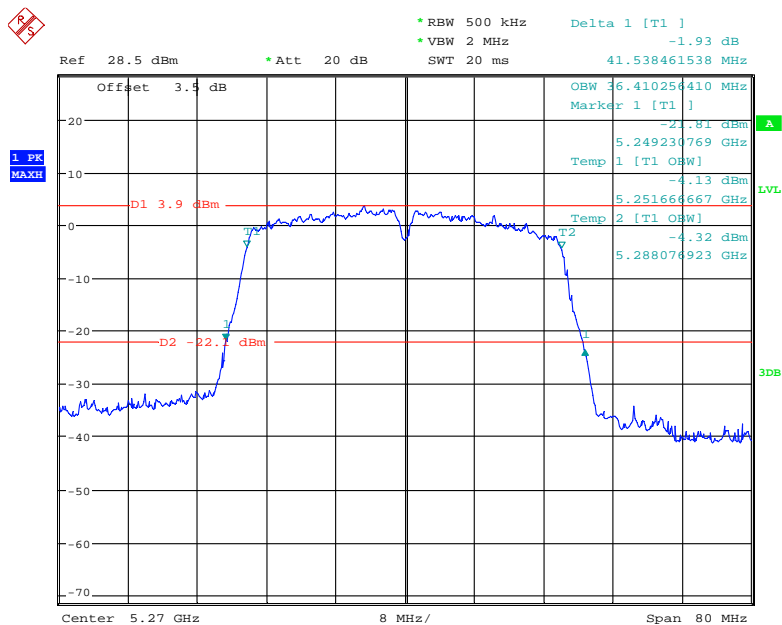
Date: 8.DEC.2019 15:43:48

**802.11ac20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5320 MHz**



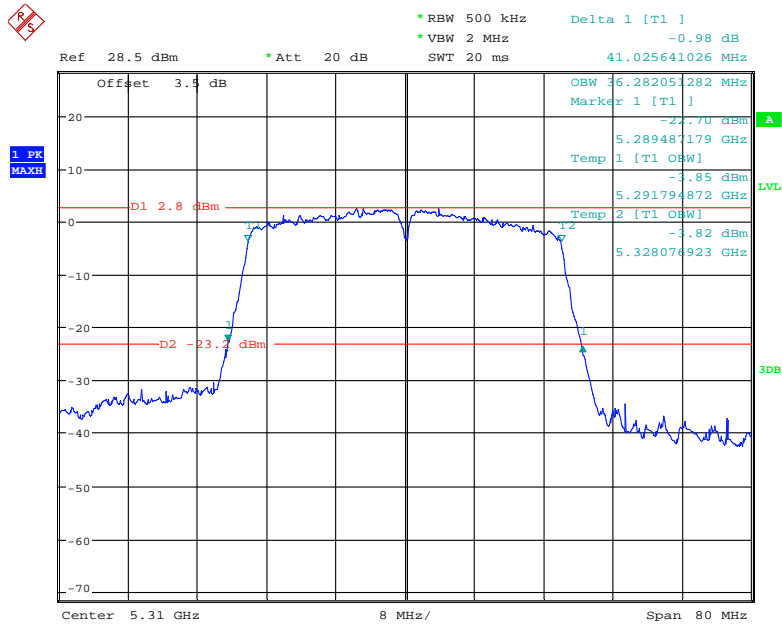
Date: 8.DEC.2019 16:21:44

**802.11ac40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5270 MHz**



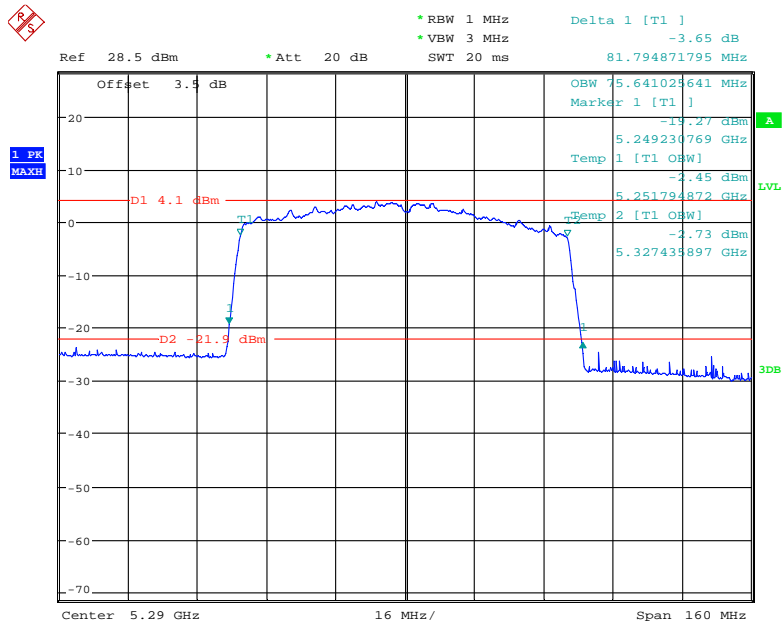
Date: 11.DEC.2019 21:21:34

**802.11ac40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5310 MHz**



Date: 8.DEC.2019 16:13:03

**802.11ac80 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5290 MHz**

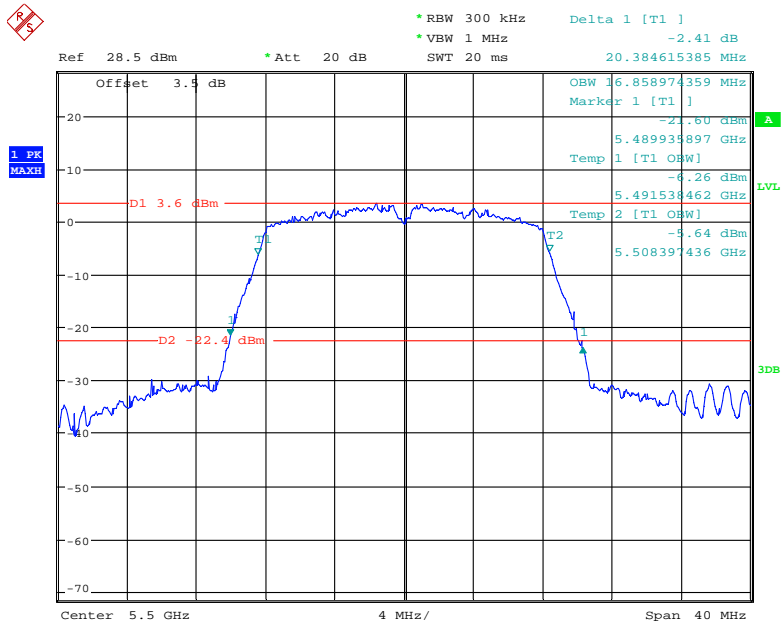


Date: 8.DEC.2019 16:15:31

**5470 MHz – 5725 MHz:**

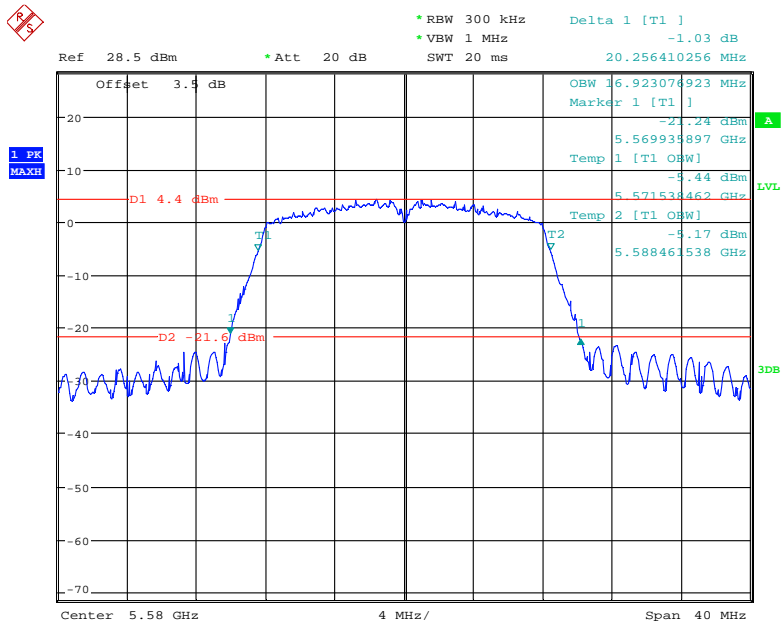
Frequency (MHz)	Antenna Port	26dB bandwidth (MHz)	99% Bandwidth (MHz)
<b>802.11a</b>			
5500	Antenna 3	20.385	16.859
5580	Antenna 3	20.256	16.923
5700	Antenna 3	20.321	16.923
<b>802.11n20</b>			
5500	Antenna 3	20.577	17.756
5580	Antenna 3	20.641	17.821
5700	Antenna 3	20.641	17.692
<b>802.11n40</b>			
5510	Antenna 3	40.897	36.282
5550	Antenna 3	41.282	36.282
5670	Antenna 3	40.846	36.282
<b>802.11ac20</b>			
5500	Antenna 3	20.513	17.756
5580	Antenna 3	20.833	17.885
5700	Antenna 3	20.641	17.756
<b>802.11ac40</b>			
5510	Antenna 3	41.154	36.282
5550	Antenna 3	41.795	36.410
5670	Antenna 3	40.846	36.282
<b>802.11ac80</b>			
5530	Antenna 3	81.846	75.385
5610	Antenna 3	81.795	75.128

**802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5500 MHz**



Date: 8.DEC.2019 16:45:52

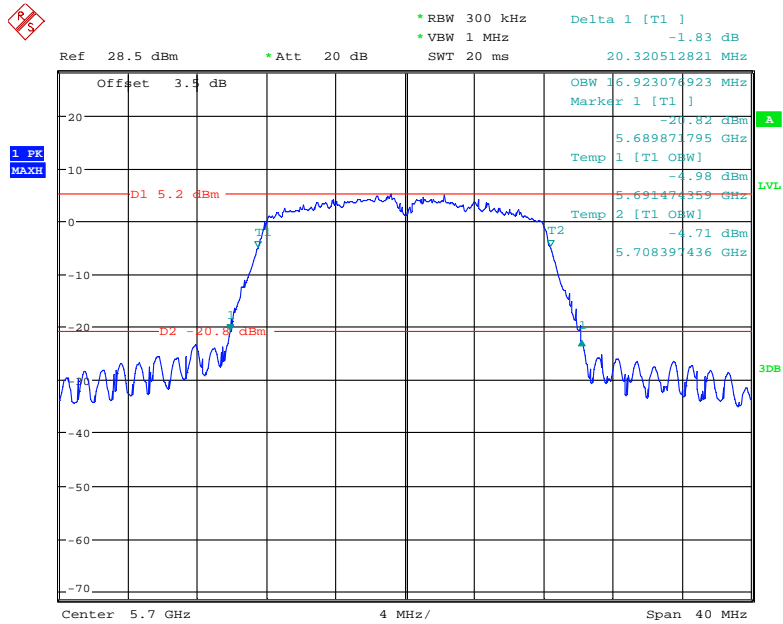
**802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5580 MHz**



Date: 10.DEC.2019 22:42:21

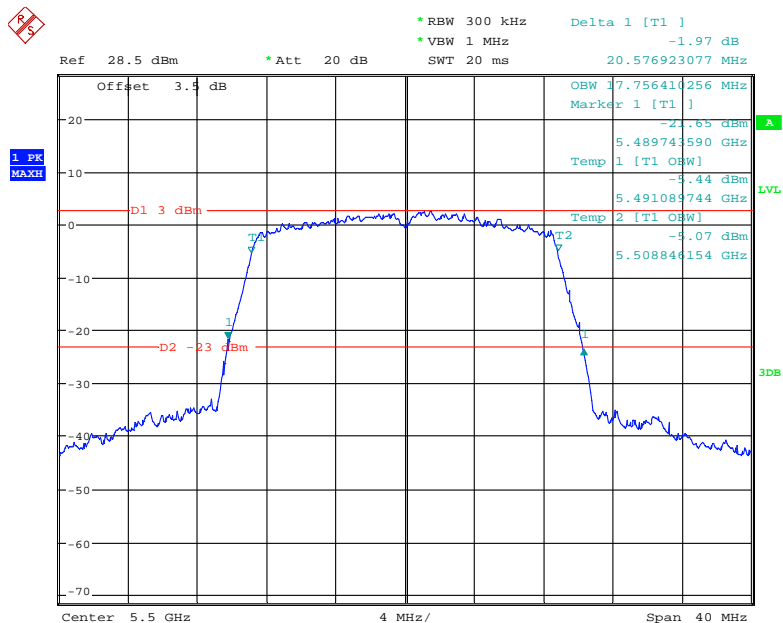


**802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5700 MHz**



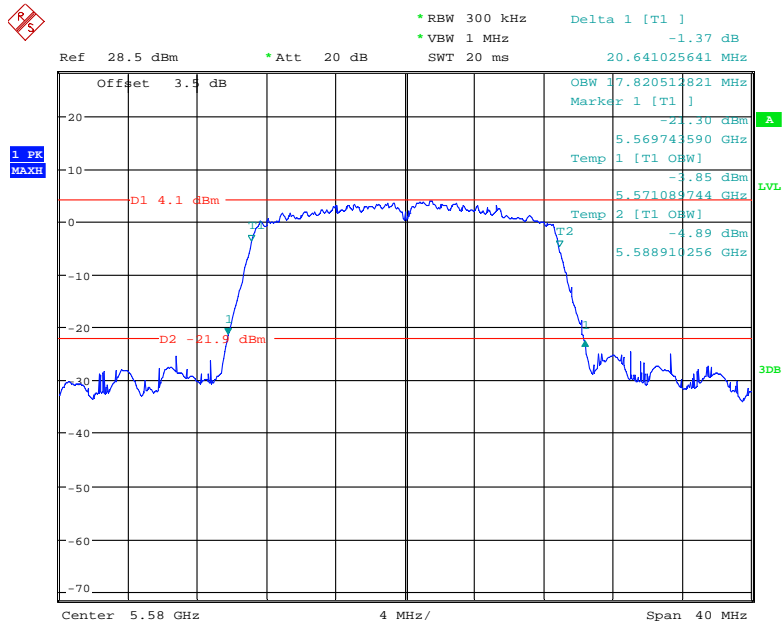
Date: 8.DEC.2019 16:56:45

**802.11n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5500 MHz**



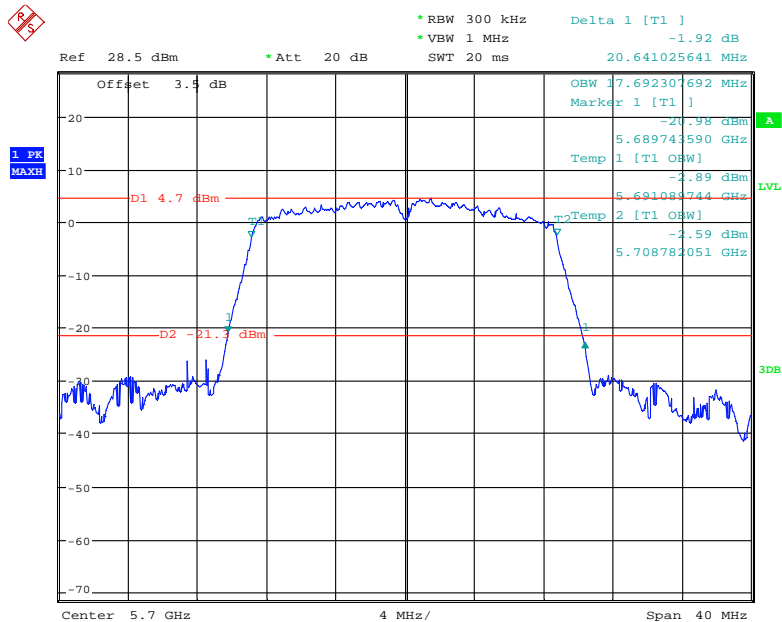
Date: 8.DEC.2019 16:40:41

**802.11n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5580 MHz**



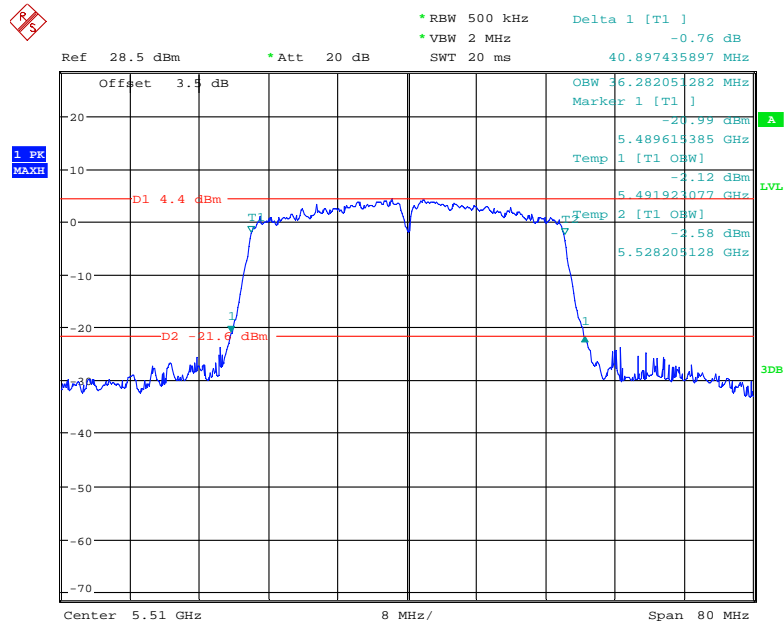
Date: 10.DEC.2019 22:44:28

**802.11n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5700 MHz**



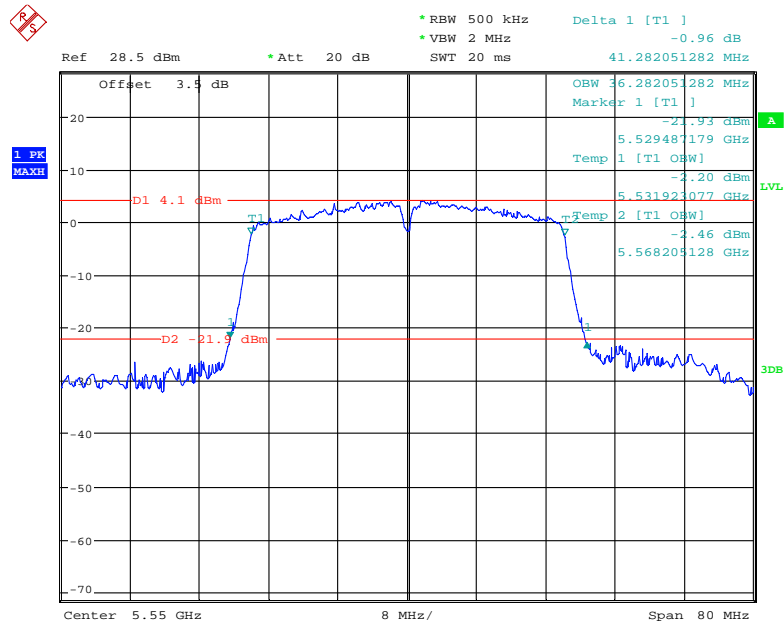
Date: 8.DEC.2019 16:55:21

**802.11n40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5510 MHz**



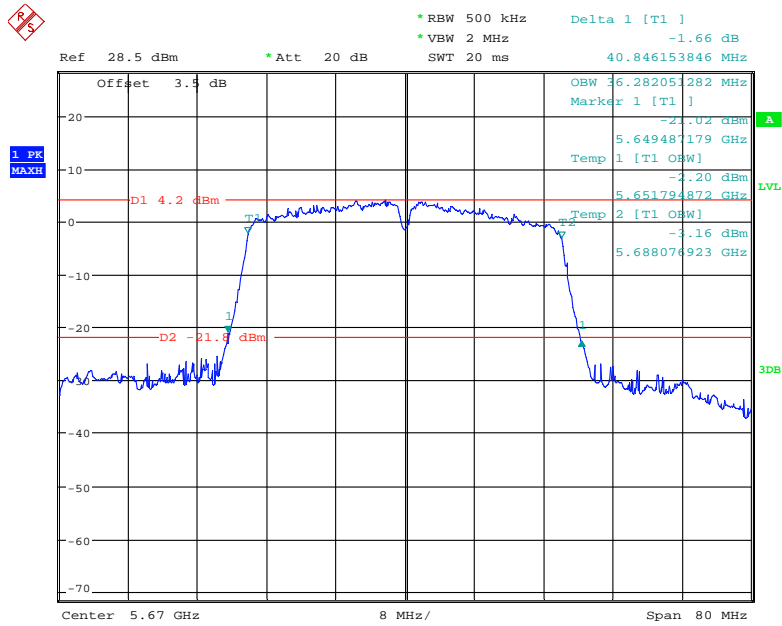
Date: 8.DEC.2019 16:59:50

**802.11n40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5550 MHz**



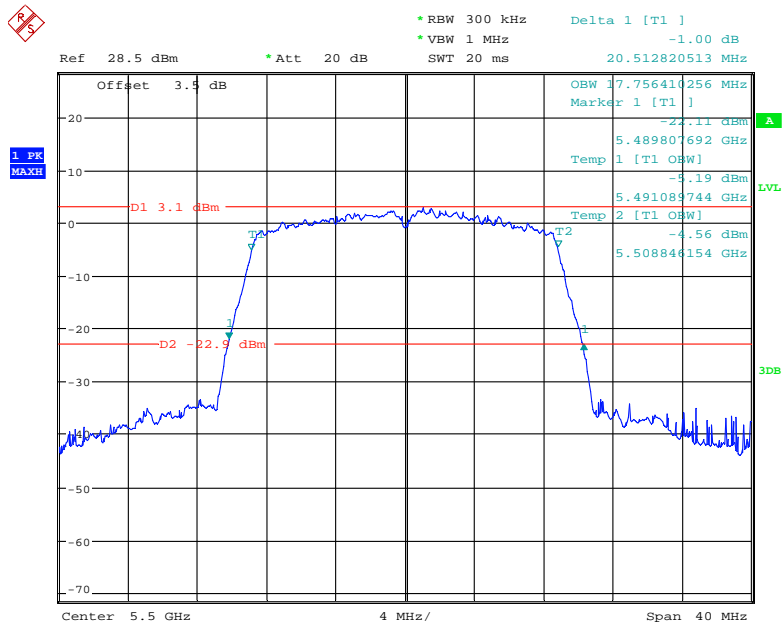
Date: 10.DEC.2019 22:50:29

802.11 n40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5670 MHz



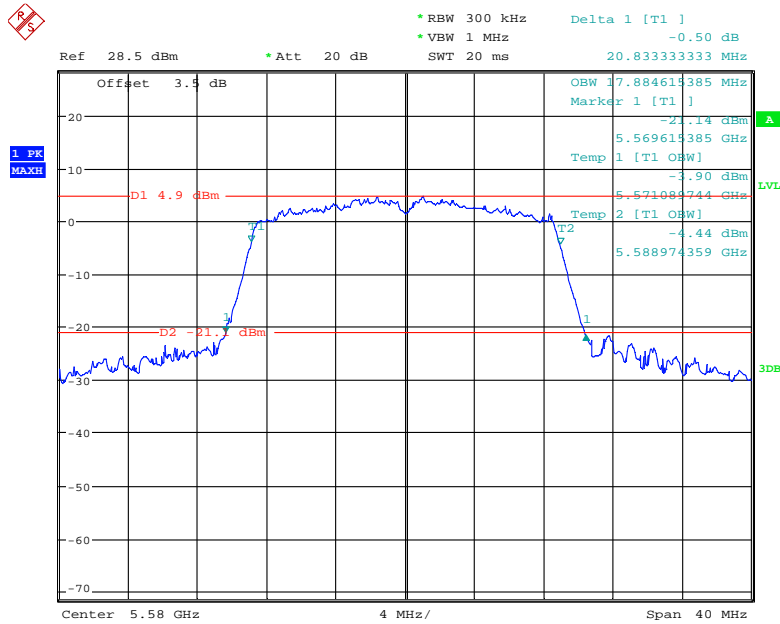
Date: 8.DEC.2019 17:05:25

802.11ac20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5500 MHz



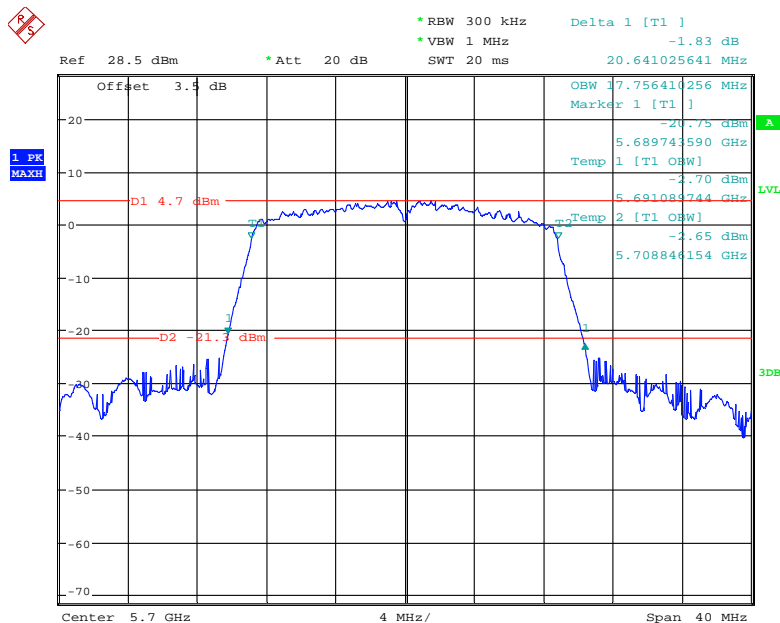
Date: 8.DEC.2019 16:26:07

**802.11ac20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5580 MHz**



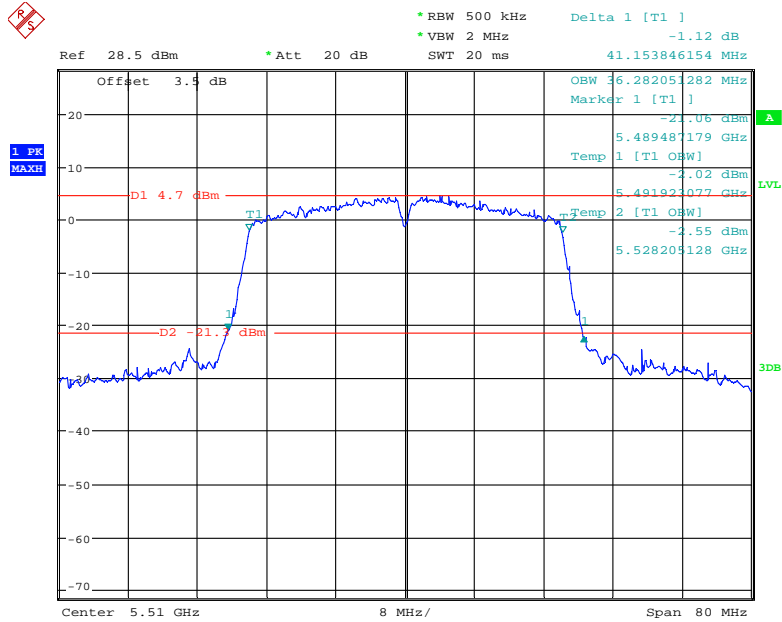
Date: 10.DEC.2019 22:46:02

**802.11ac20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5700 MHz**



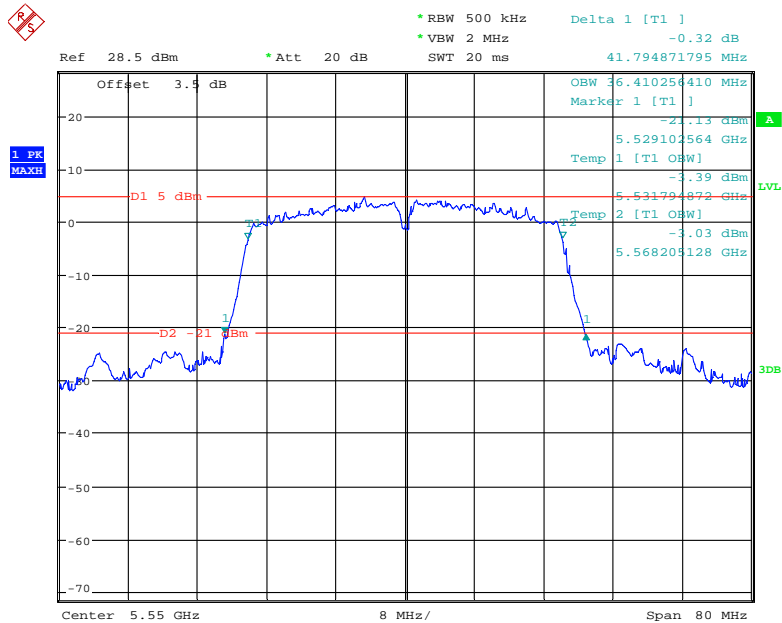
Date: 8.DEC.2019 16:54:31

**802.11ac40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5510 MHz**



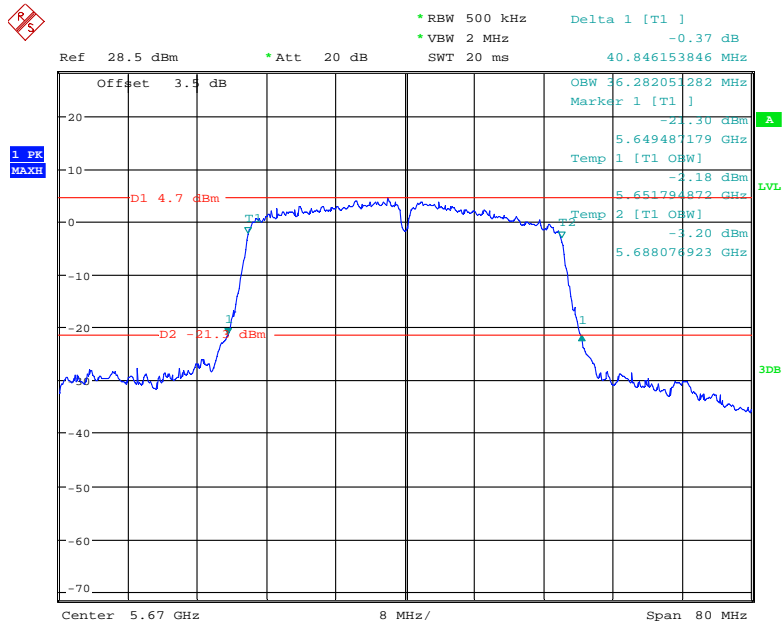
Date: 8.DEC.2019 17:00:55

**802.11ac40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5550 MHz**



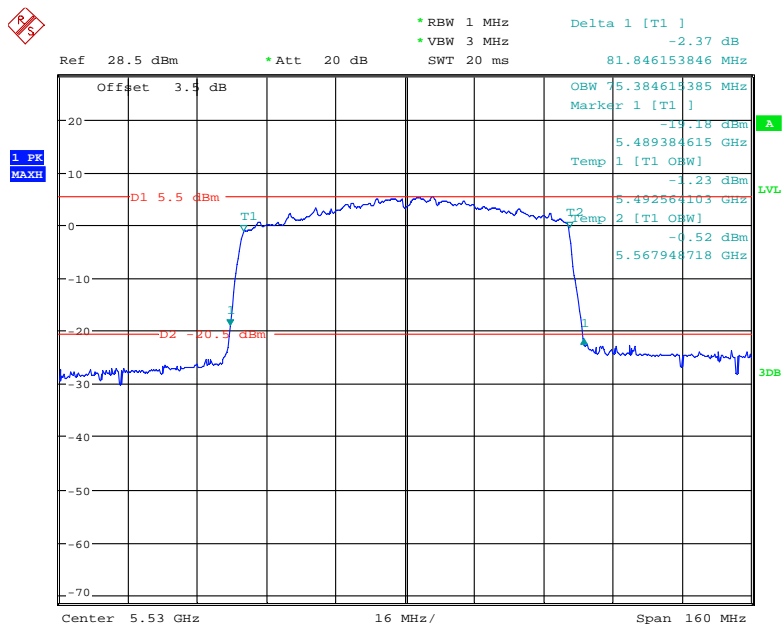
Date: 10.DEC.2019 22:48:12

**802.11ac40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5670 MHz**



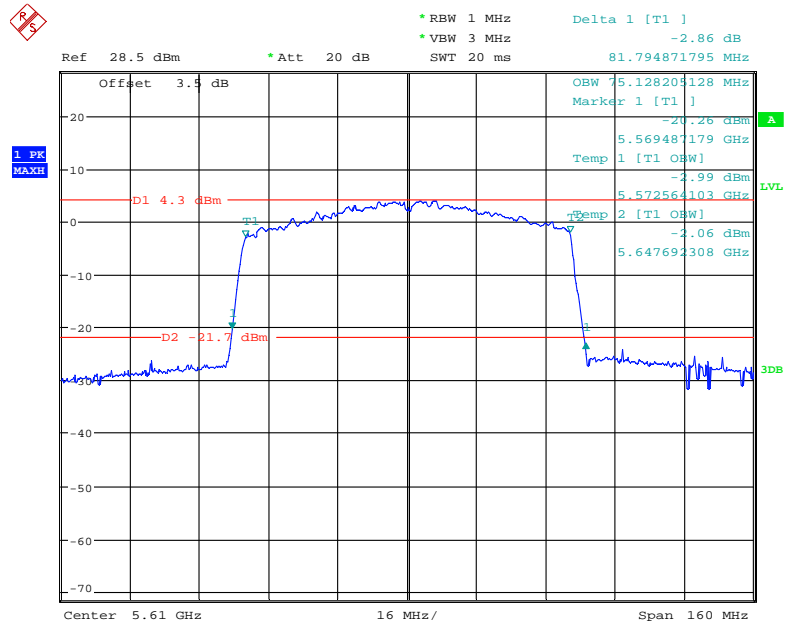
Date: 8.DEC.2019 17:06:43

**802.11ac80 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5530 MHz**



Date: 8.DEC.2019 17:11:01

802.11ac80 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5610 MHz



Date: 8.DEC.2019 17:08:40



## **FCC §15.407(a) (2) – CONDUCTED TRANSMITTER OUTPUT POWER**

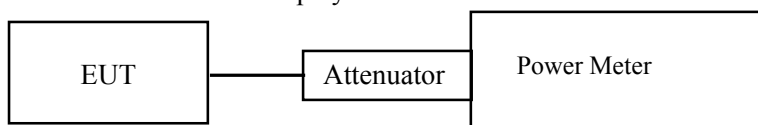
### **Applicable Standard**

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

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### **Test Procedure**

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
3. Add a correction factor to the display.



### **Test Data**

#### **Environmental Conditions**

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	52 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by George Zhong on 2019-12-10.*

*EUT operation mode: Transmitting*

*Note: According to KDB 662911 D01 v02r01, For power measurement on IEEE 802.11 devices Array Gain = 0 dB (i.e., no array gain) for  $N_{Ant} \leq 4$ ; So the directional gain in this chapter is 3.5dBi, it's less than 6dBi.*

**Test Result:** Pass

Please refer to the following tables.

**5250 MHz – 5350 MHz:**

Frequency (MHz)	Antenna Port	Average Output Power (dBm)	Total Power (dBm)	Limit (dBm)
802.11a				
5260	0	9.02	15.84	24
	1	9.14		
	2	11.14		
	3	9.64		
5280	0	8.61	15.45	
	1	9.24		
	2	10.29		
	3	9.42		
5320	0	8.6	15.95	
	1	10.61		
	2	10.32		
	3	9.93		
802.11n20				
5260	0	8.72	15.54	
	1	8.96		
	2	10.77		
	3	9.31		
5280	0	8.36	15.16	
	1	8.89		
	2	10.03		
	3	9.12		
5320	0	8.5	15.69	
	1	10.39		
	2	9.95		
	3	9.62		
802.11n40				
5270	0	11.49	17.98	
	1	11.44		
	2	12.58		
	3	12.23		
5310	0	11.63	18.18	
	1	12.09		
	2	12.47		
	3	12.41		

Frequency (MHz)	Antenna Port	Average Output Power (dBm)	Total Power (dBm)	Limit (dB)
802.11ac20				
5260	0	8.77	15.55	24
	1	8.88		
	2	10.82		
	3	9.33		
5280	0	8.35	15.20	
	1	8.98		
	2	10		
	3	9.21		
5320	0	8.47	15.66	
	1	10.31		
	2	9.96		
	3	9.6		
802.11ac40				
5270	0	11.59	18.07	
	1	11.48		
	2	12.72		
	3	12.29		
5310	0	11.69	18.29	
	1	12.34		
	2	12.5		
	3	12.49		
802.11ac80				
5290	0	10.18	16.68	
	1	10.51		
	2	10.83		
	3	11.08		

**5470 MHz – 5725 MHz:**

Frequency (MHz)	Antenna Port	Average Output Power (dBm)	Total Power (dBm)	Limit (dBm)
802.11a				
5500	0	9.16	16.09	24
	1	10.42		
	2	10.53		
	3	10.02		
5580	0	10.29	16.86	
	1	11.38		
	2	11.26		
	3	10.29		
5700	0	8.62	15.21	
	1	9.33		
	2	9.26		
	3	9.51		
802.11n20				
5500	0	10.29	16.86	
	1	10.38		
	2	11.32		
	3	11.25		
5580	0	10.84	17.05	
	1	11.3		
	2	11.52		
	3	10.37		
5700	0	10.95	17.06	
	1	10.59		
	2	11.31		
	3	11.26		
802.11n40				
5510	0	10.34	16.54	
	1	10.77		
	2	11.01		
	3	9.88		
5550	0	12.87	19.32	
	1	13.95		
	2	13.28		
	3	13.02		
5670	0	12.79	19.27	
	1	13.64		
	2	13.58		
	3	12.92		

Frequency (MHz)	Antenna Port	Average Output Power (dBm)	Total Power (dBm)	Limit (dBm/MHz)
802.11ac20				
5500	0	10.68	17.25	24
	1	12.05		
	2	11.62		
	3	10.34		
5580	0	10.95	17.34	
	1	11.68		
	2	11.58		
	3	11.02		
5700	0	10.69	17.18	
	1	11.38		
	2	11.52		
	3	10.98		
802.11ac40				
5510	0	9.69	16.18	
	1	10.38		
	2	10.58		
	3	9.93		
5550	0	12.48	19.16	
	1	13.25		
	2	13.84		
	3	12.85		
5670	0	12.67	19.13	
	1	13.05		
	2	13.42		
	3	13.26		
802.11ac80				
5530	0	9.04	15.42	
	1	9.55		
	2	9.62		
	3	9.38		
5610	0	12.18	18.68	
	1	12.92		
	2	12.88		
	3	12.62		

## FCC §15.407(a) (2) - POWER SPECTRAL DENSITY

### Applicable Standard

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

### Test Procedure

For devices operating in the bands 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, "provided that the measured power is integrated over the full reference bandwidth" to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:

- Set  $\text{RBW} \geq 1/T$ , where T is defined in section II.B.1.a).
- Set  $\text{VBW} \geq 3 \text{ RBW}$ .
- If measurement bandwidth of Maximum PSD is specified in 500 kHz, add  $10 \log (500 \text{ kHz}/\text{RBW})$  to the measured result, whereas  $\text{RBW} (< 500 \text{ kHz})$  is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
- If measurement bandwidth of Maximum PSD is specified in 1 MHz, add  $10 \log (1\text{MHz}/\text{RBW})$  to the measured result, whereas  $\text{RBW} (< 1 \text{ MHz})$  is the reduced resolution bandwidth of spectrum analyzer set during measurement.
- Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

### Test Data

#### Environmental Conditions

Temperature:	24~25 °C
Relative Humidity:	50~52 %
ATM Pressure:	101.0 kPa

The testing was performed by George Zhong from 2019-12-09 to 2019-12-26.

EUT operation mode: Transmitting

Note: The device employed Cyclic Delay Diversity (CDD) for the 802.11 MIMO transmitting, per KDB 662911 D01 v02r01, for power measurement on IEEE 802.11 devices  
 Array Gain =  $10 \log N = 6 \text{ dB}$ ; The maximum antenna gain is 3.5dBi

So

Directional gain =  $G_{\text{ANT}} + \text{Array Gain} = 9.5 \text{ dBi}$

**Test Result:** Pass

Please refer to the following tables and plots.

**5250 MHz – 5350 MHz:**

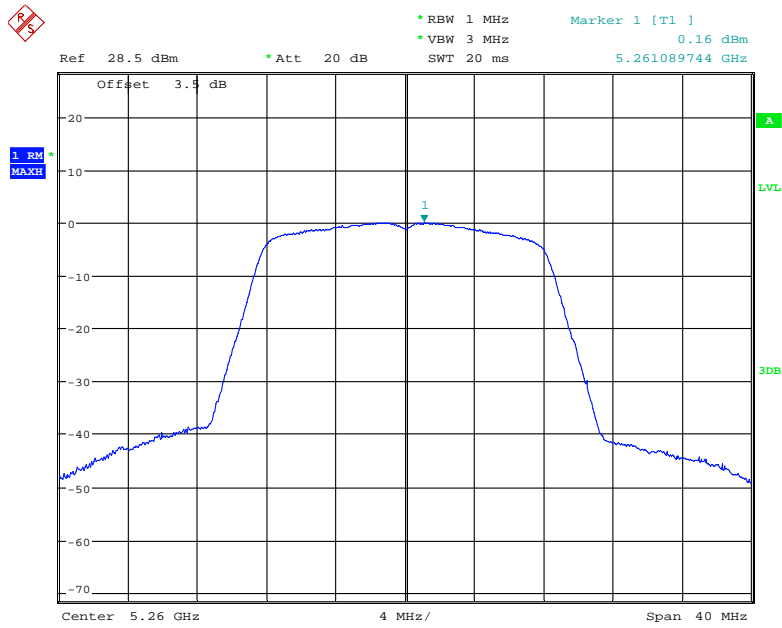
Frequency (MHz)	Antenna Port	Power Spectral Density (dBm/MHz)	Total Power Spectral (dBm/MHz)	Limit (dBm/MHz)
802.11a				
5260	0	0.16	6.95	7.5
	1	0.39		
	2	2		
	3	0.91		
5280	0	-0.12	6.74	
	1	0.6		
	2	1.65		
	3	0.55		
5320	0	-0.3	7.19	
	1	1.49		
	2	2.14		
	3	1.01		
802.11n20				
5260	0	0.38	6.96	
	1	0.37		
	2	1.96		
	3	0.84		
5280	0	-0.25	6.62	
	1	0.43		
	2	1.59		
	3	0.41		
5320	0	-0.11	7	
	1	0.98		
	2	1.89		
	3	0.91		
802.11n40				
5270	0	0.63	7.03	
	1	0.84		
	2	1.56		
	3	0.95		
5310	0	0.6	7.19	
	1	1.57		
	2	1.43		
	3	1		

Frequency (MHz)	Antenna Port	Power Spectral Density (dBm/MHz)	Total Power Spectral (dBm/MHz)	Limit (dBm/MHz)
802.11ac20				
5260	0	0.04	6.77	7.5
	1	0.23		
	2	1.79		
	3	0.71		
5280	0	-0.29	6.5	
	1	0.23		
	2	1.44		
	3	0.33		
5320	0	-0.26	6.98	
	1	0.96		
	2	2		
	3	0.85		
802.11ac40				
5270	0	1.07	7.18	7.5
	1	1.01		
	2	1.42		
	3	1.11		
5310	0	0.73	7.24	
	1	1.55		
	2	1.27		
	3	1.29		
802.11ac80				
5290	0	-2	4.73	7.5
	1	-2		
	2	-1.2		
	3	-0.71		



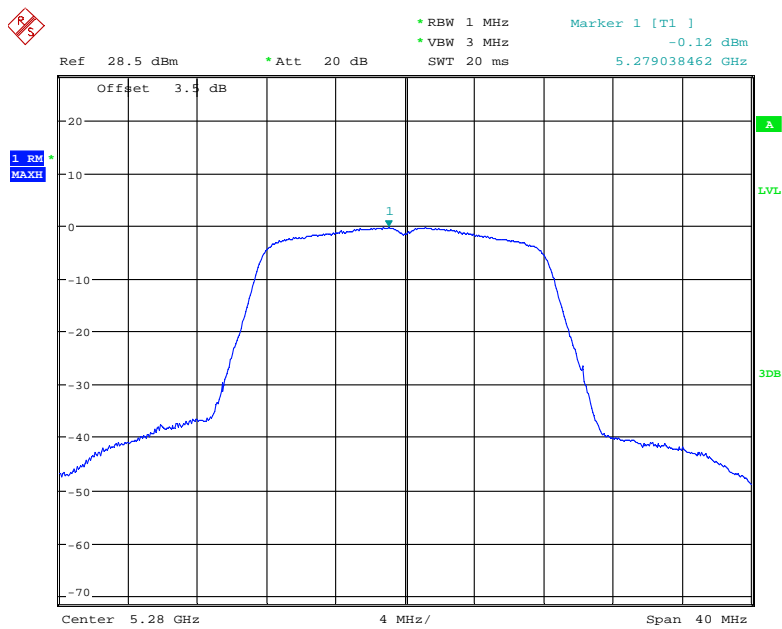
Antenna 0:

802.11a mode, Power Spectral Density, 5260 MHz



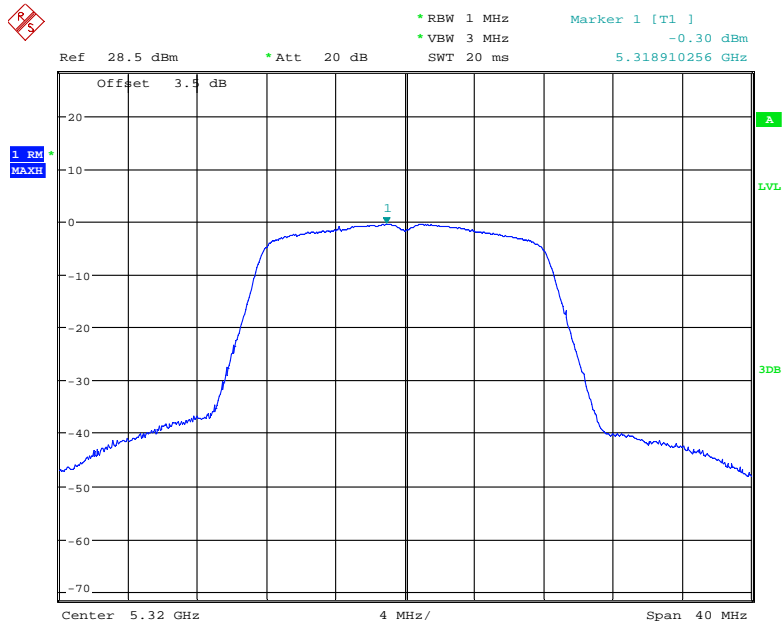
Date: 9.DEC.2019 21:17:03

802.11a mode, Power Spectral Density, 5280 MHz



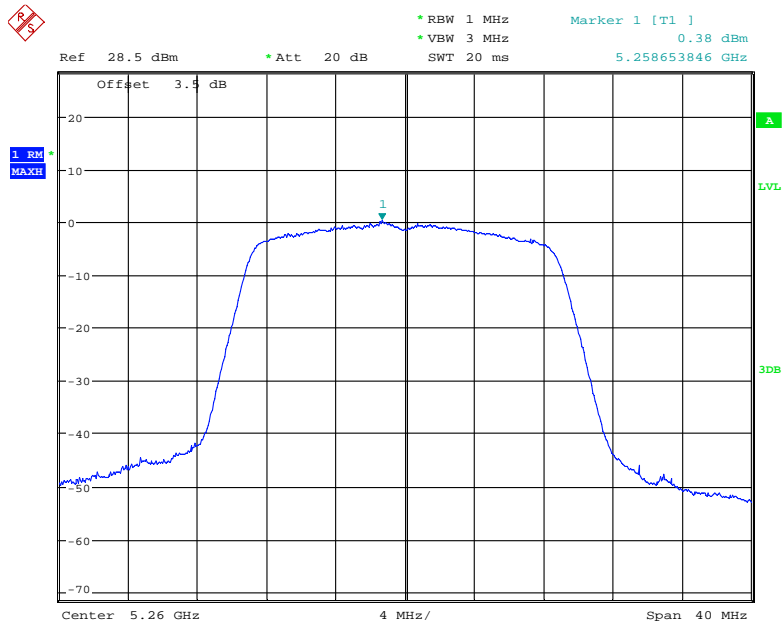
Date: 9.DEC.2019 21:18:51

### 802.11a mode, Power Spectral Density, 5320 MHz



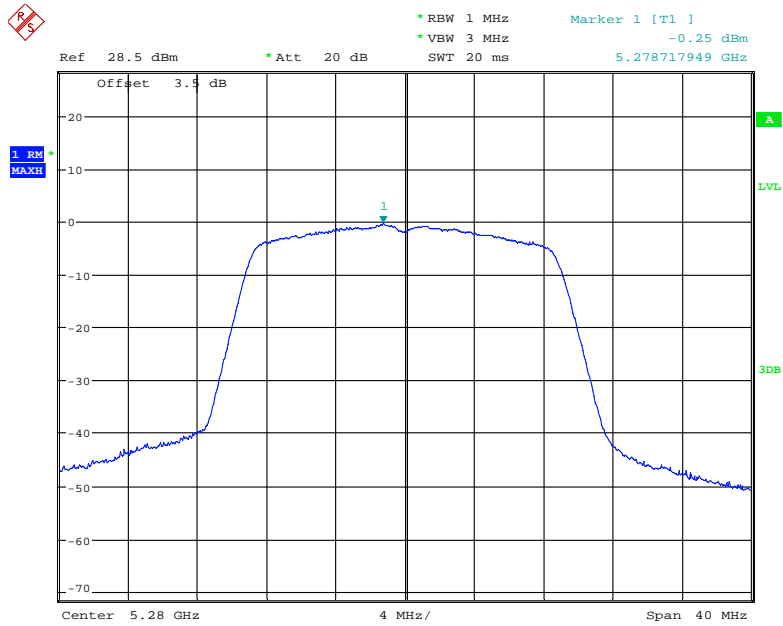
Date: 9.DEC.2019 21:23:43

### 802.11n20 mode, Power Spectral Density, 5260 MHz



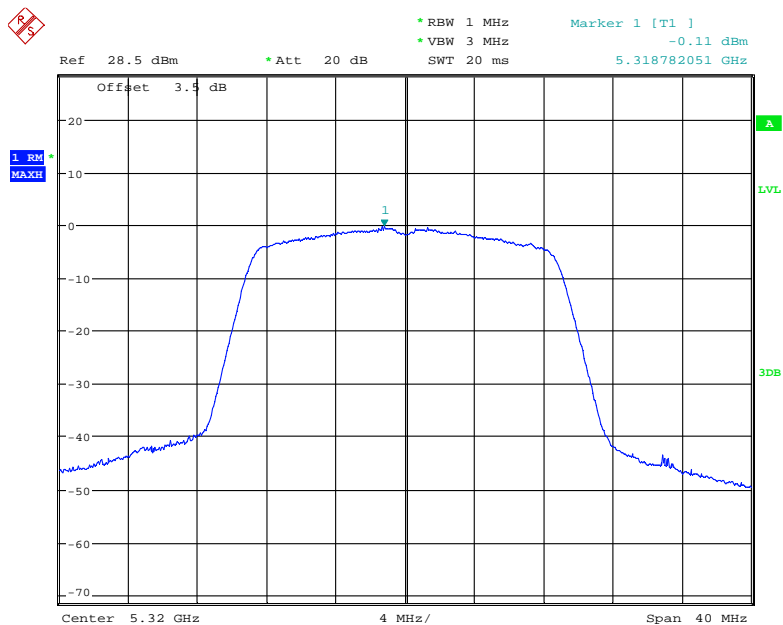
Date: 9.DEC.2019 21:24:11

### 802.11n20 mode, Power Spectral Density, 5280 MHz



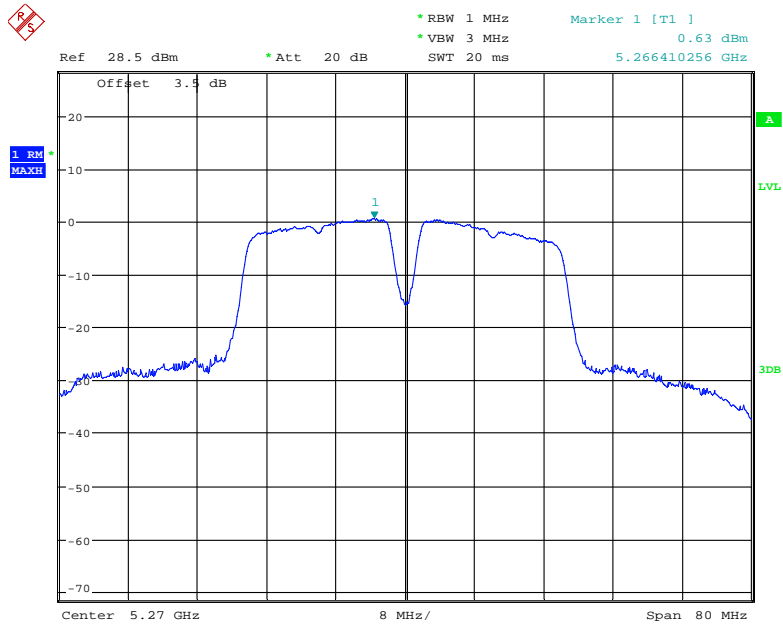
Date: 9.DEC.2019 21:25:53

### 802.11n20 mode, Power Spectral Density, 5320 MHz



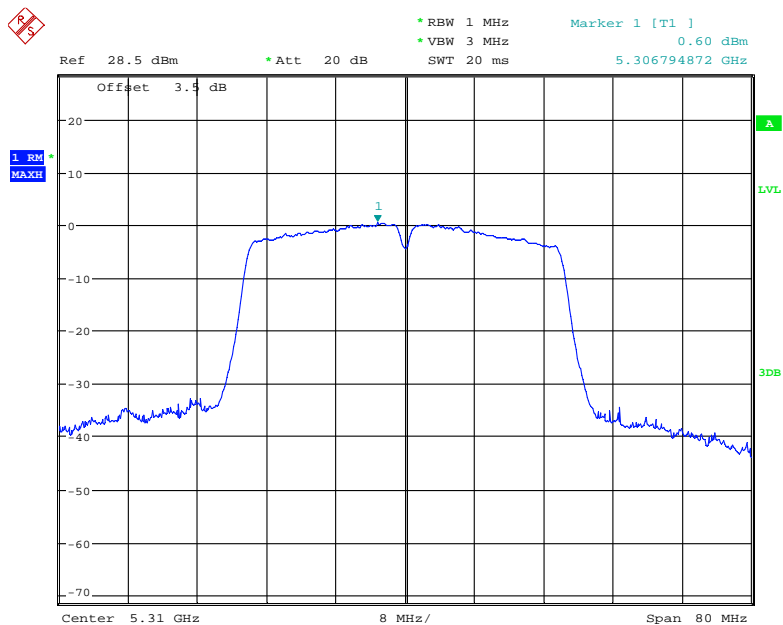
Date: 9.DEC.2019 21:26:46

### 802.11n40 mode, Power Spectral Density, 5270 MHz



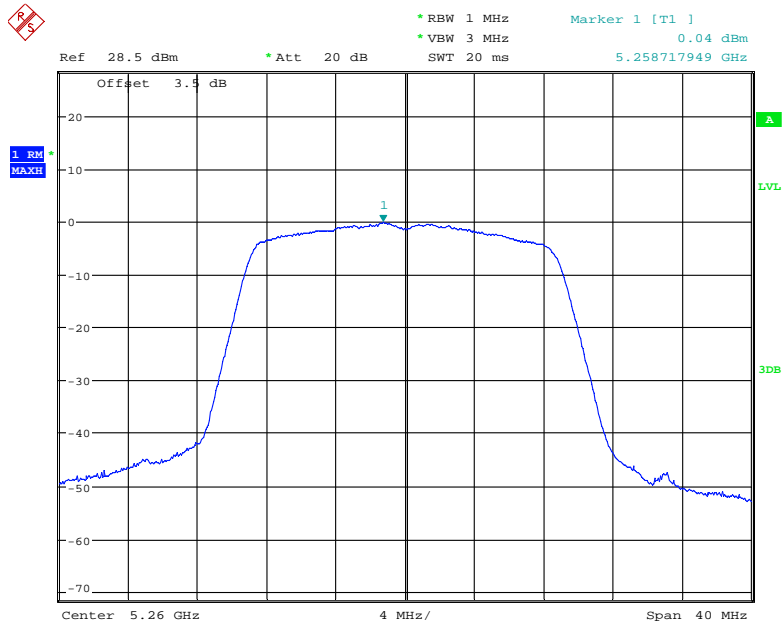
Date: 9.DEC.2019 22:49:19

### 802.11n40 mode, Power Spectral Density, 5310 MHz



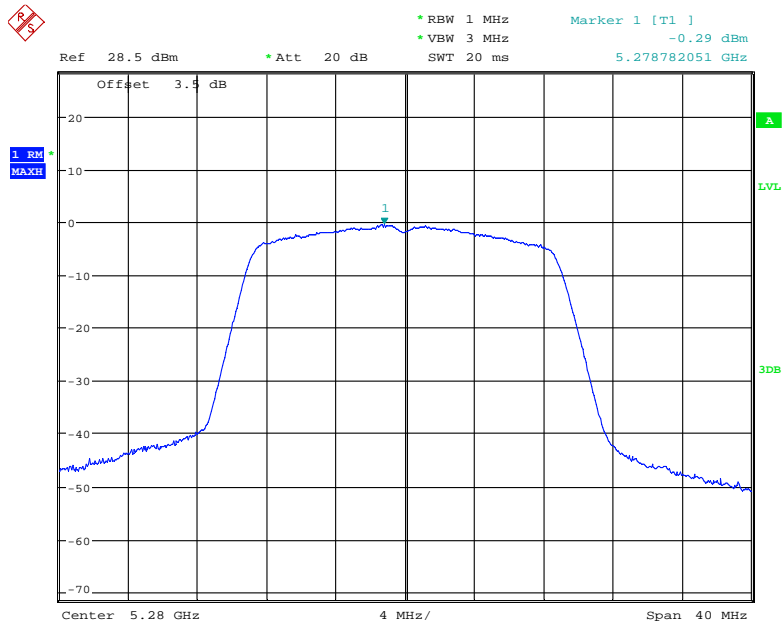
Date: 9.DEC.2019 22:52:45

### 802.11ac20 mode, Power Spectral Density, 5260 MHz



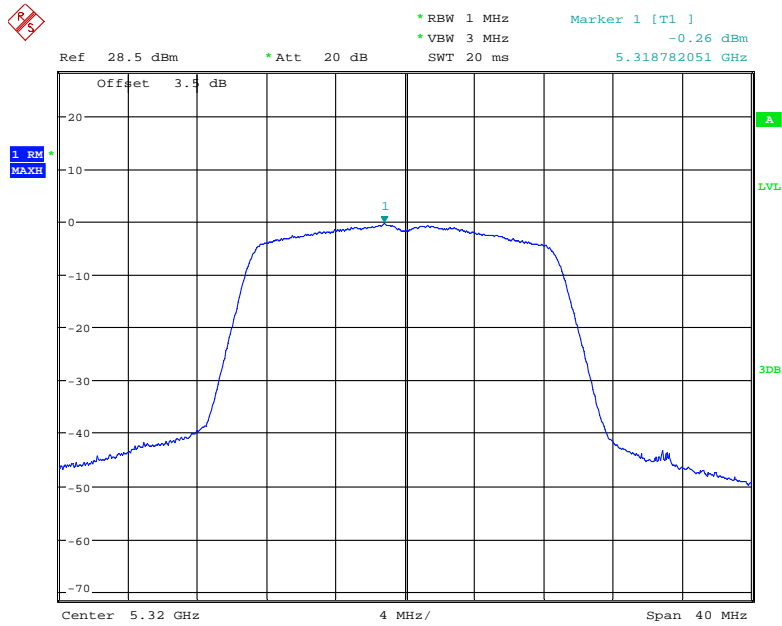
Date: 9.DEC.2019 21:24:45

### 802.11ac20 mode, Power Spectral Density, 5280 MHz



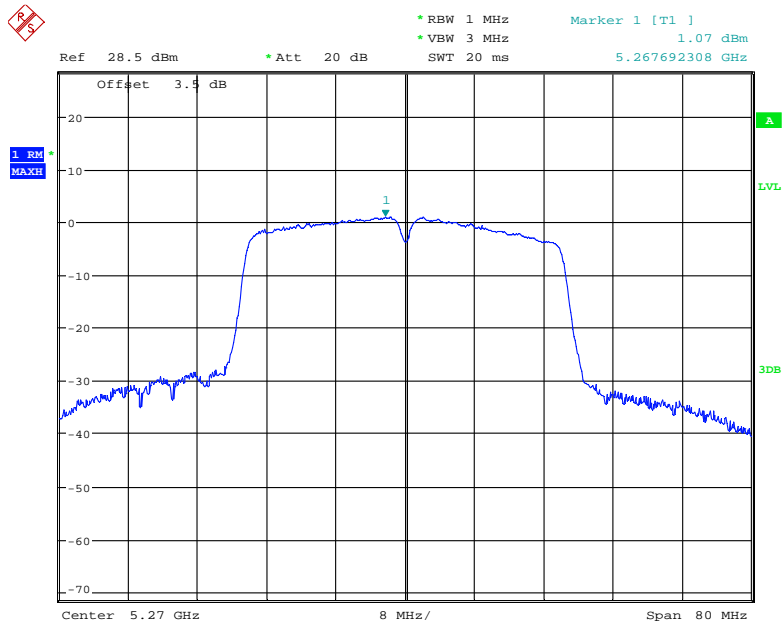
Date: 9.DEC.2019 21:25:36

### 802.11ac20 mode, Power Spectral Density, 5320 MHz



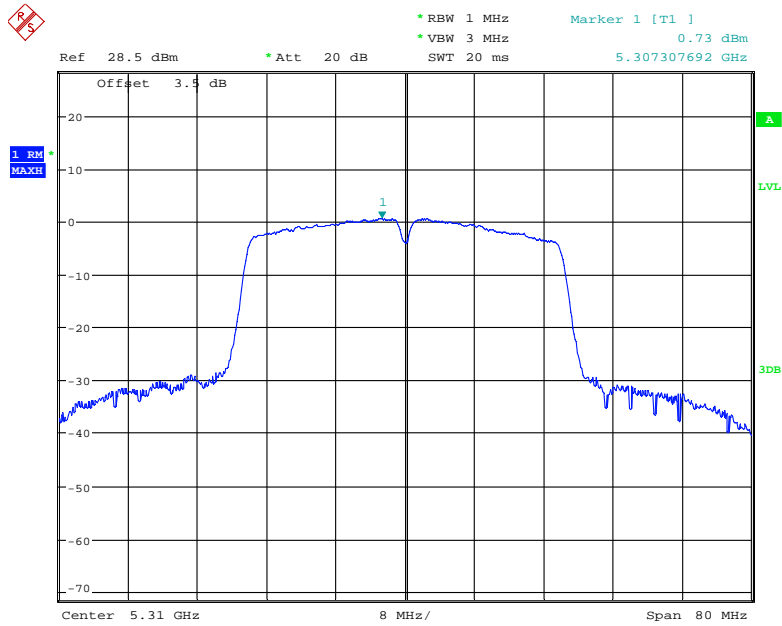
Date: 9.DEC.2019 21:27:06

### 802.11ac40 mode, Power Spectral Density, 5270 MHz



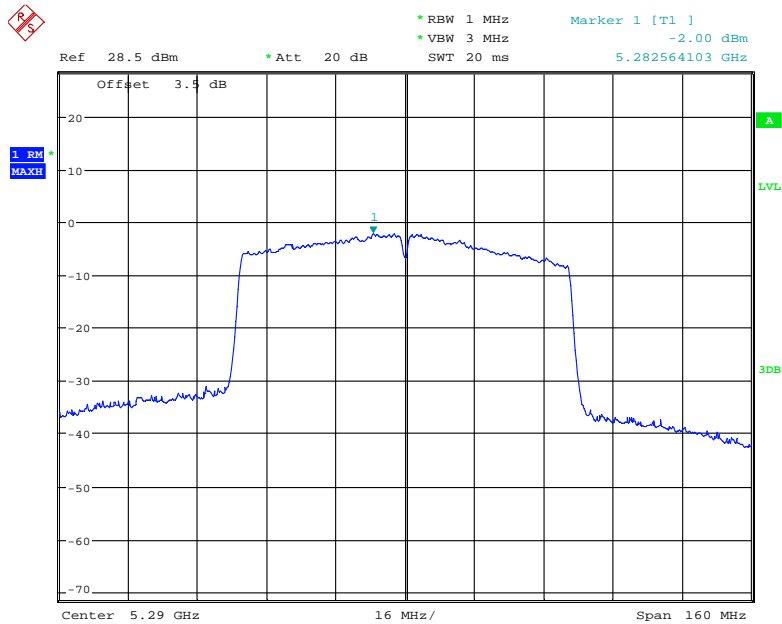
Date: 9.DEC.2019 22:55:45

### 802.11ac40 mode, Power Spectral Density, 5310 MHz



Date: 9.DEC.2019 22:55:04

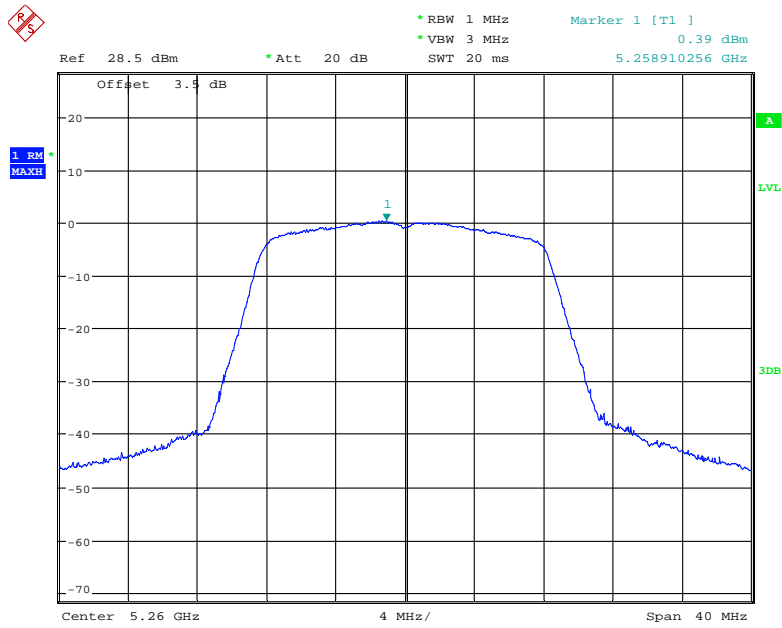
### 802.11ac80 mode, Power Spectral Density, 5290 MHz



Date: 26.DEC.2019 18:53:31

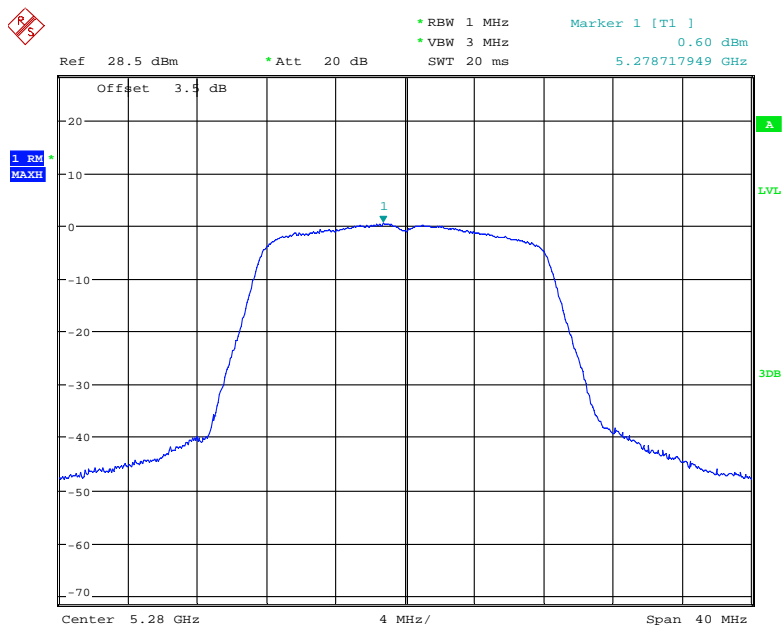
Antenna 1:

802.11a mode, Power Spectral Density, 5260 MHz



Date: 9.DEC.2019 22:19:51

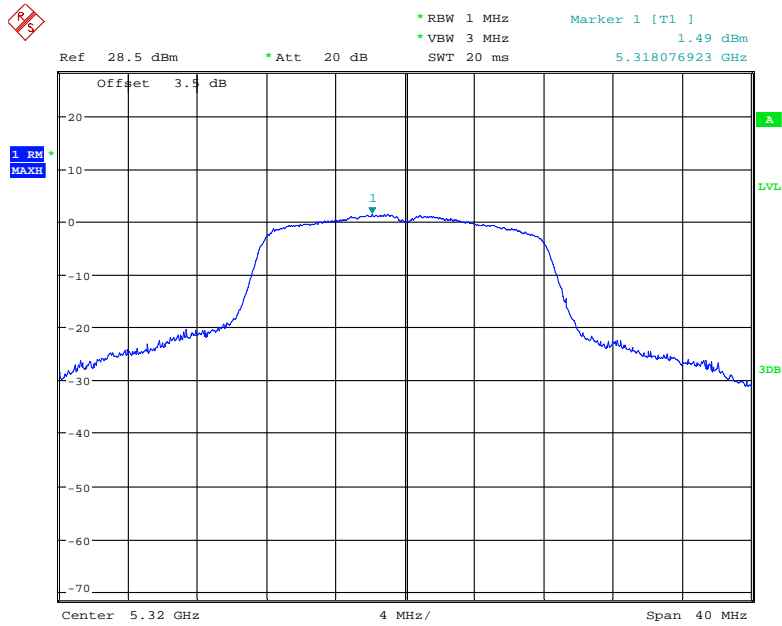
802.11a mode, Power Spectral Density, 5280 MHz



Date: 9.DEC.2019 22:19:33

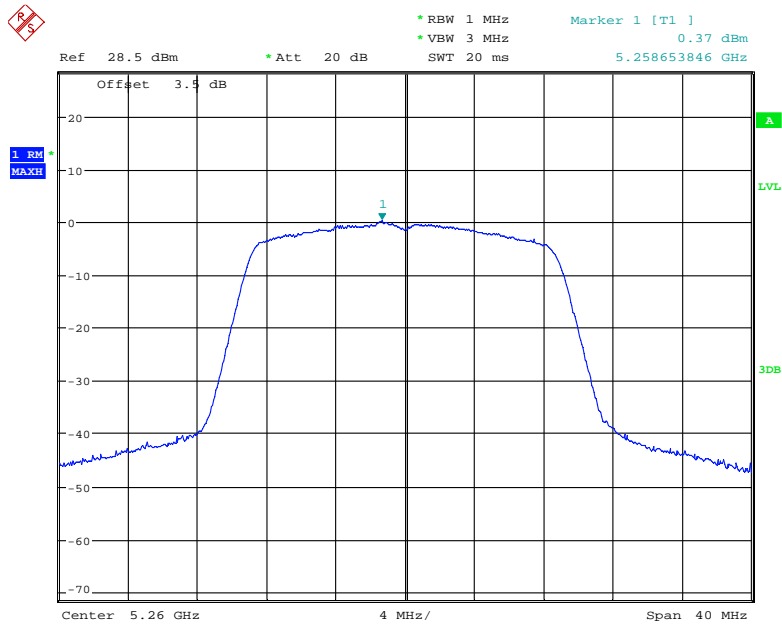


### 802.11a mode, Power Spectral Density, 5320 MHz



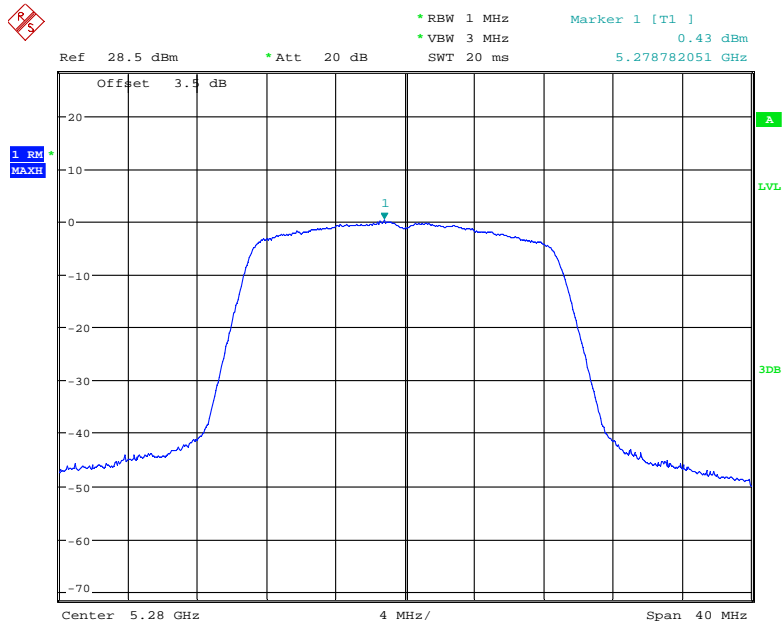
Date: 9.DEC.2019 22:19:09

### 802.11n20 mode, Power Spectral Density, 5260 MHz



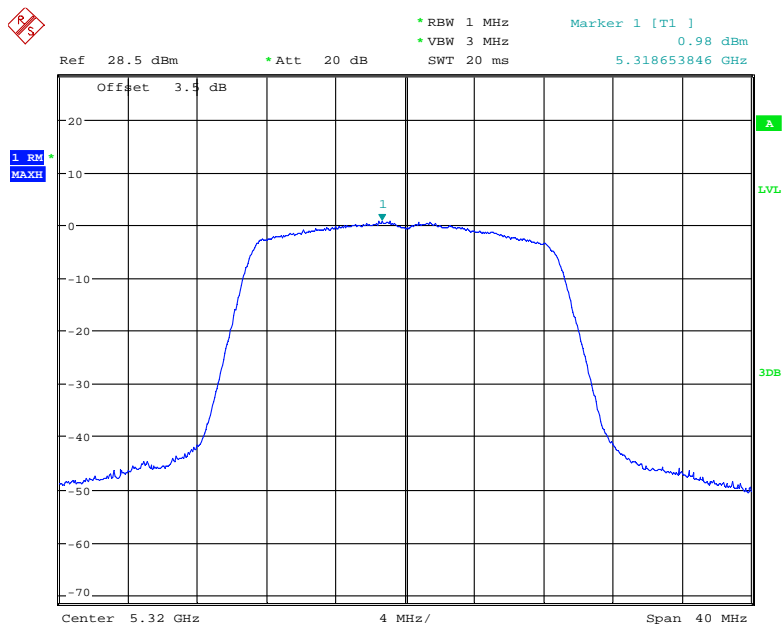
Date: 9.DEC.2019 22:20:12

### 802.11n20 mode, Power Spectral Density, 5280 MHz



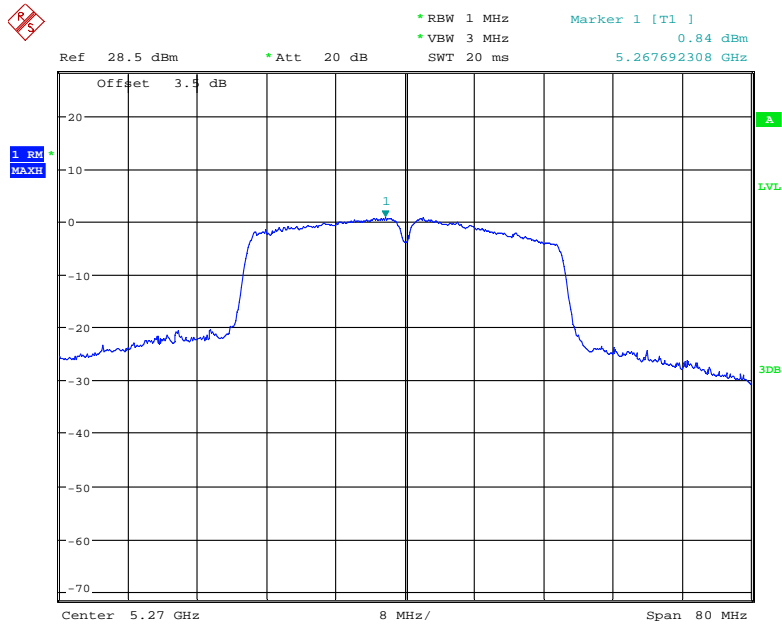
Date: 9.DEC.2019 22:21:20

### 802.11n20 mode, Power Spectral Density, 5320 MHz



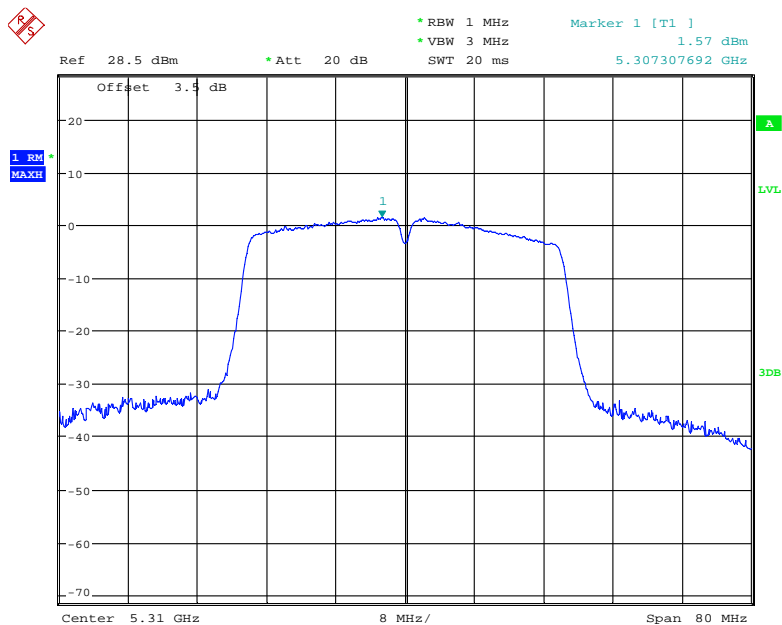
Date: 9.DEC.2019 22:21:43

### 802.11n40 mode, Power Spectral Density, 5270 MHz



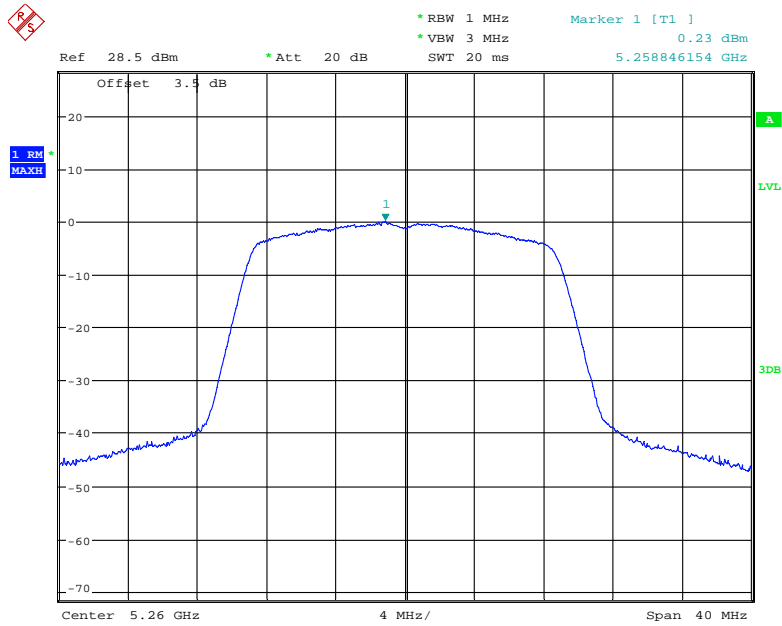
Date: 9.DEC.2019 22:58:02

### 802.11n40 mode, Power Spectral Density, 5310 MHz



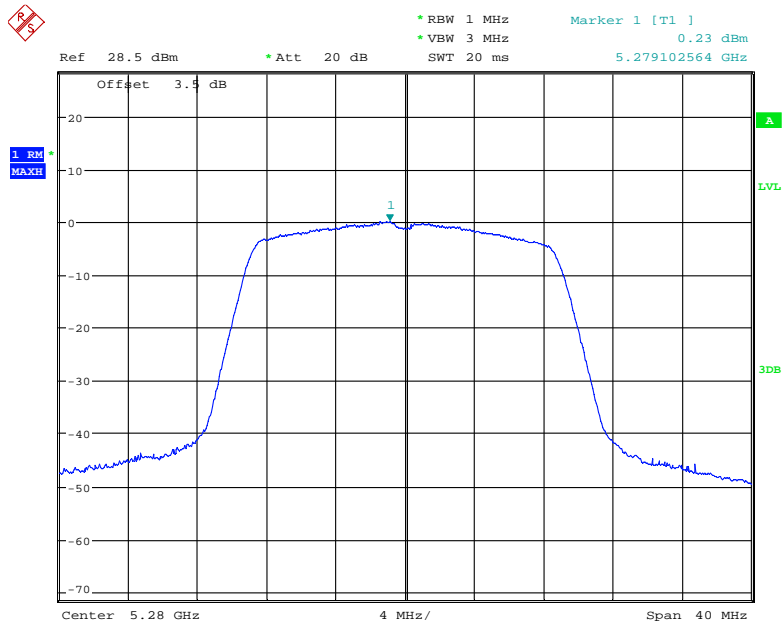
Date: 9.DEC.2019 22:58:30

### 802.11ac20 mode, Power Spectral Density, 5260 MHz



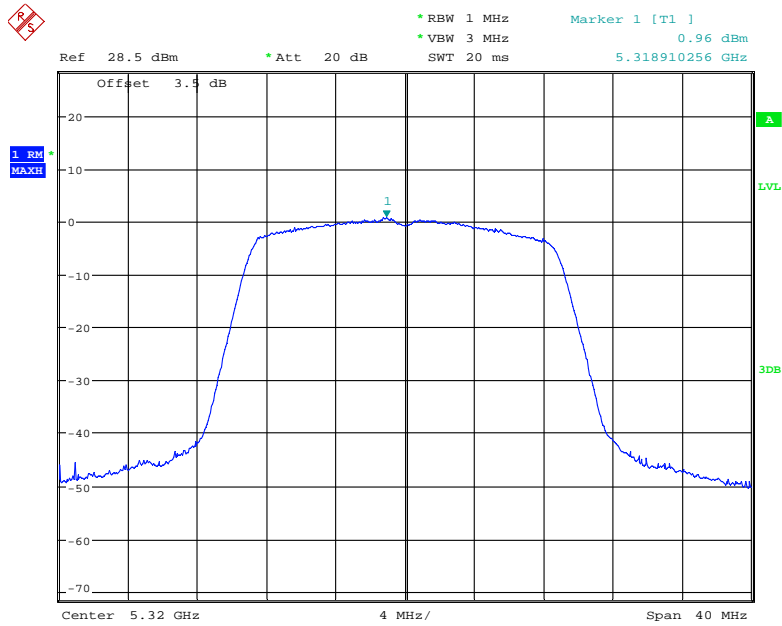
Date: 9.DEC.2019 22:20:30

### 802.11ac20 mode, Power Spectral Density, 5280 MHz



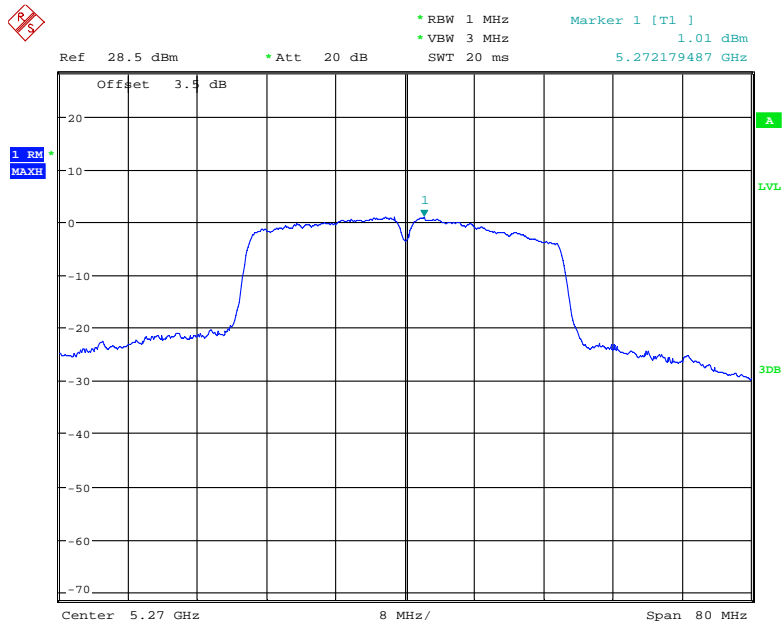
Date: 9.DEC.2019 22:21:01

### 802.11ac20 mode, Power Spectral Density, 5320 MHz



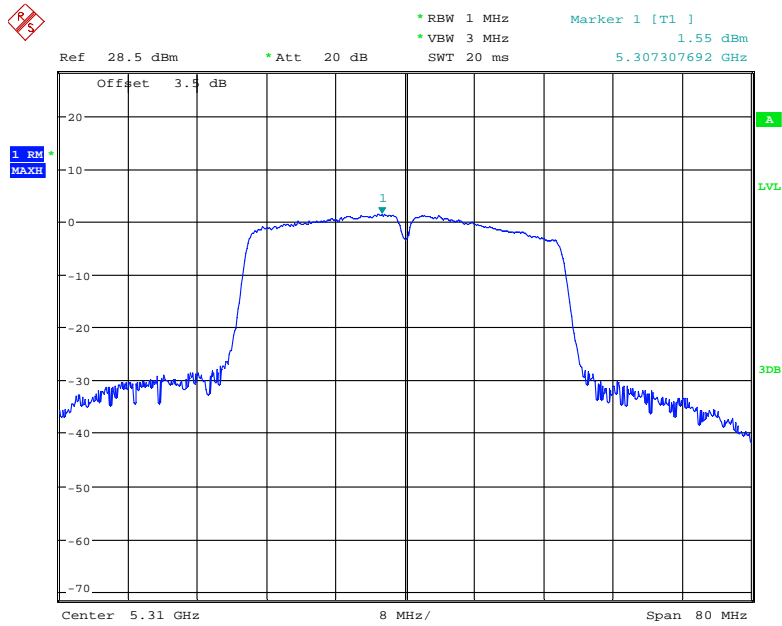
Date: 9.DEC.2019 22:22:00

### 802.11ac40 mode, Power Spectral Density, 5270 MHz



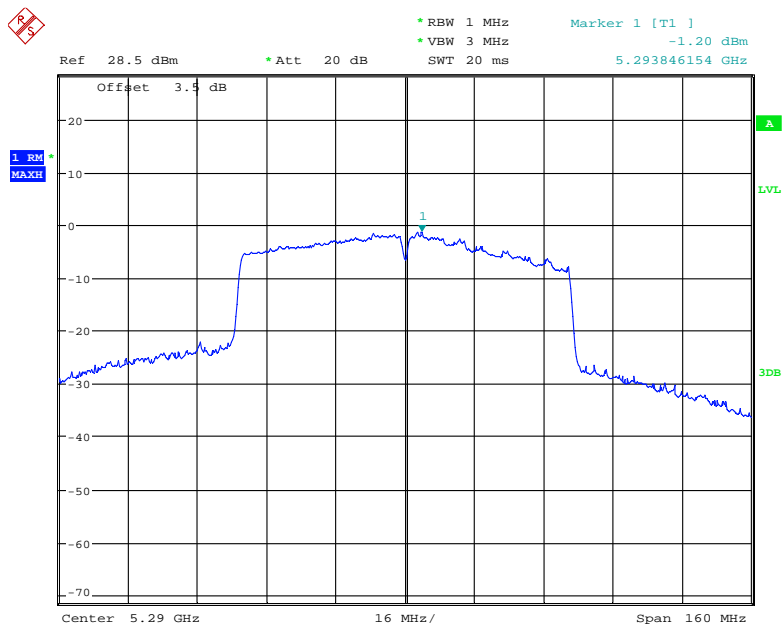
Date: 9.DEC.2019 22:57:31

### 802.11ac40 mode, Power Spectral Density, 5310 MHz



Date: 9.DEC.2019 22:58:50

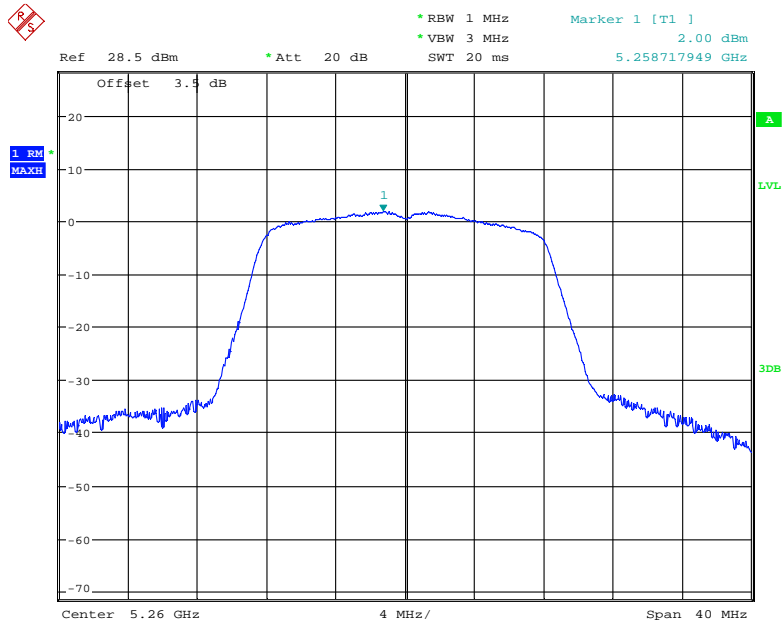
### 802.11ac80 mode, Power Spectral Density, 5290 MHz



Date: 26.DEC.2019 18:54:37

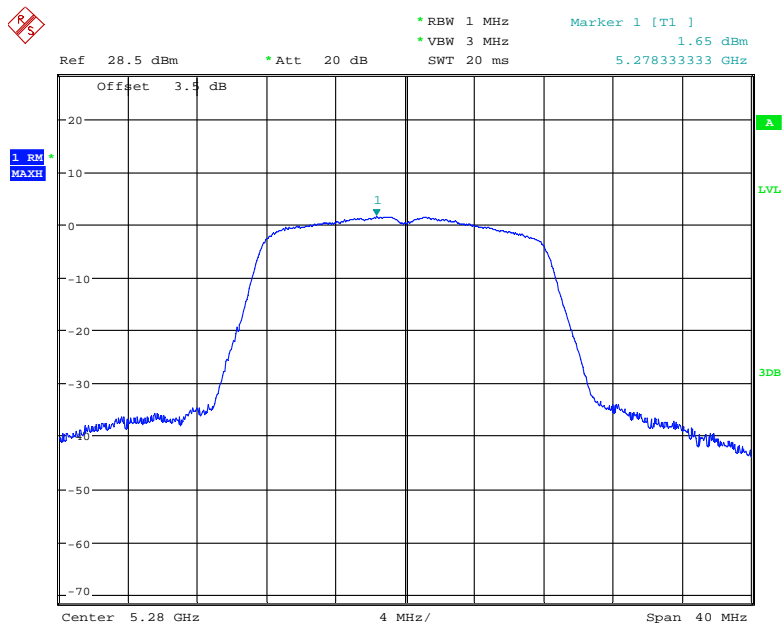
Antenna 2:

802.11a mode, Power Spectral Density, 5260 MHz



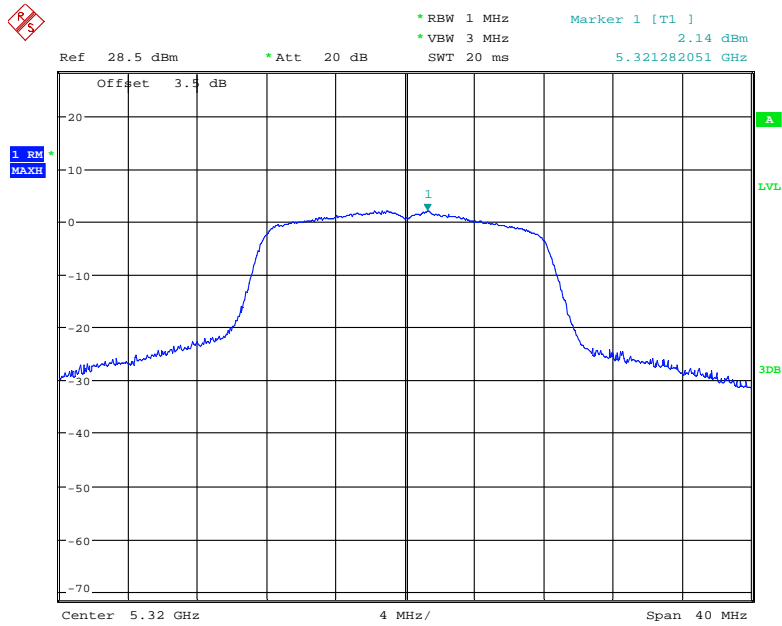
Date: 9.DEC.2019 22:28:18

802.11a mode, Power Spectral Density, 5280 MHz



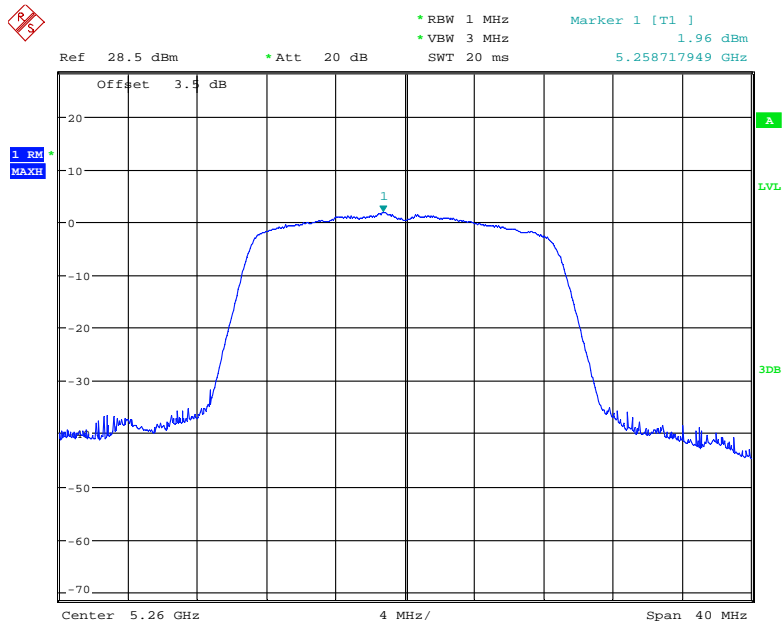
Date: 9.DEC.2019 22:24:24

### 802.11a mode, Power Spectral Density, 5320 MHz



Date: 9.DEC.2019 22:24:00

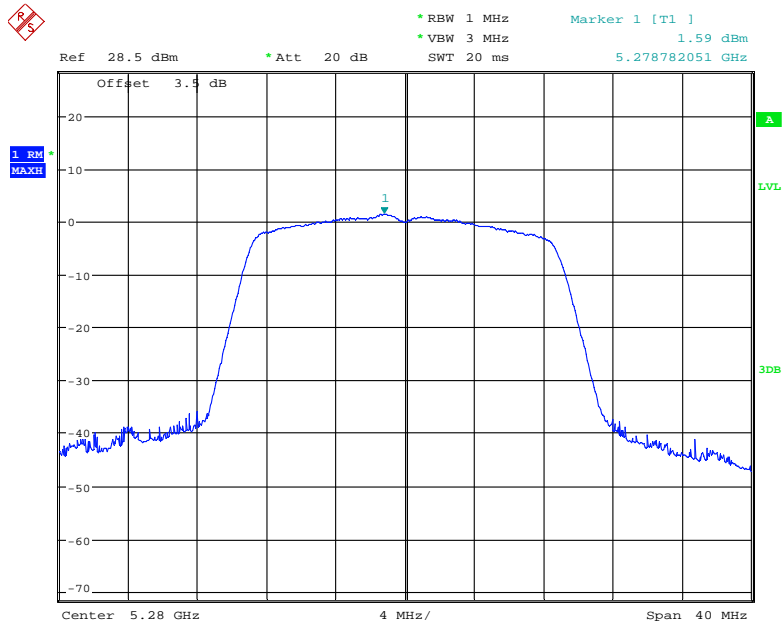
### 802.11n20 mode, Power Spectral Density, 5260 MHz



Date: 9.DEC.2019 22:27:55

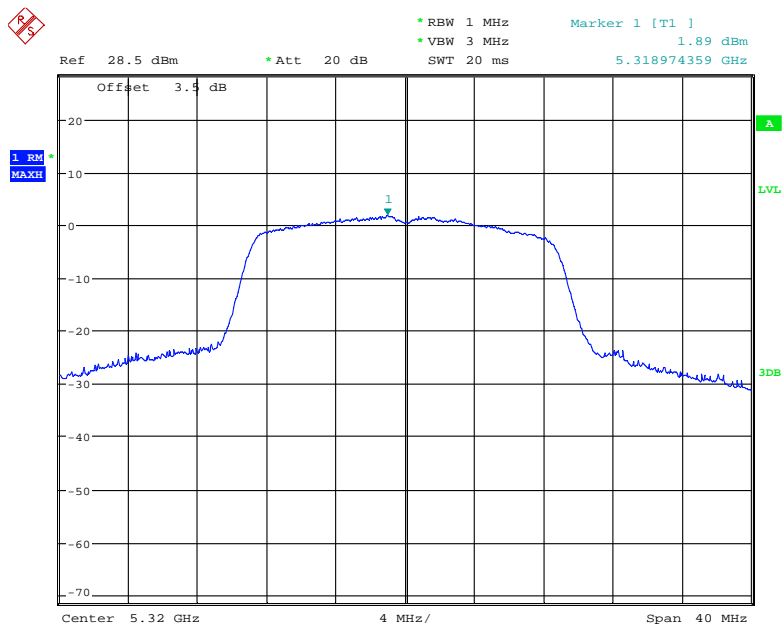


### 802.11n20 mode, Power Spectral Density, 5280 MHz



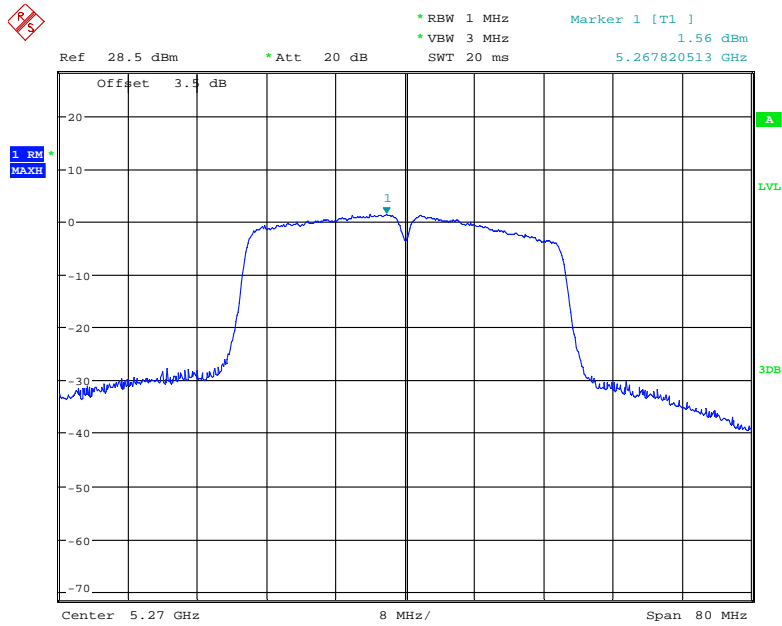
Date: 9.DEC.2019 22:25:00

### 802.11n20 mode, Power Spectral Density, 5320 MHz



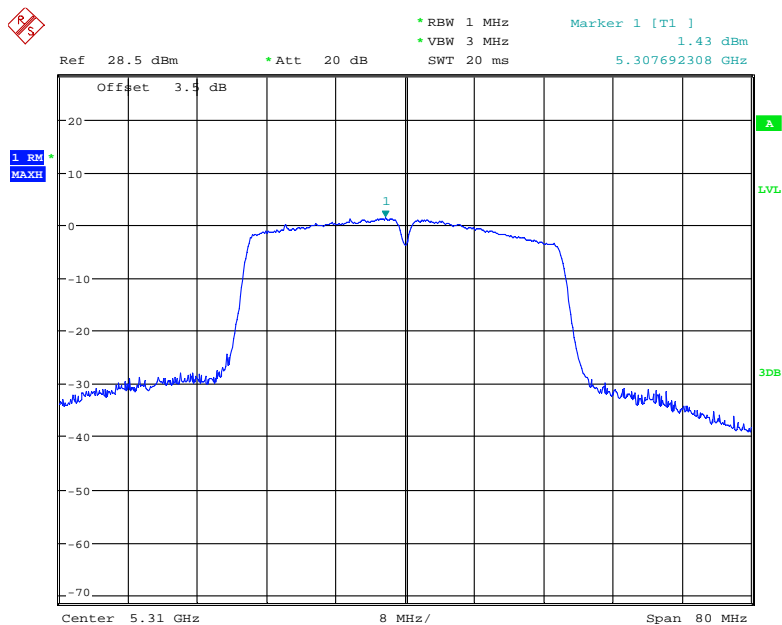
Date: 9.DEC.2019 22:23:35

### 802.11n40 mode, Power Spectral Density, 5270 MHz



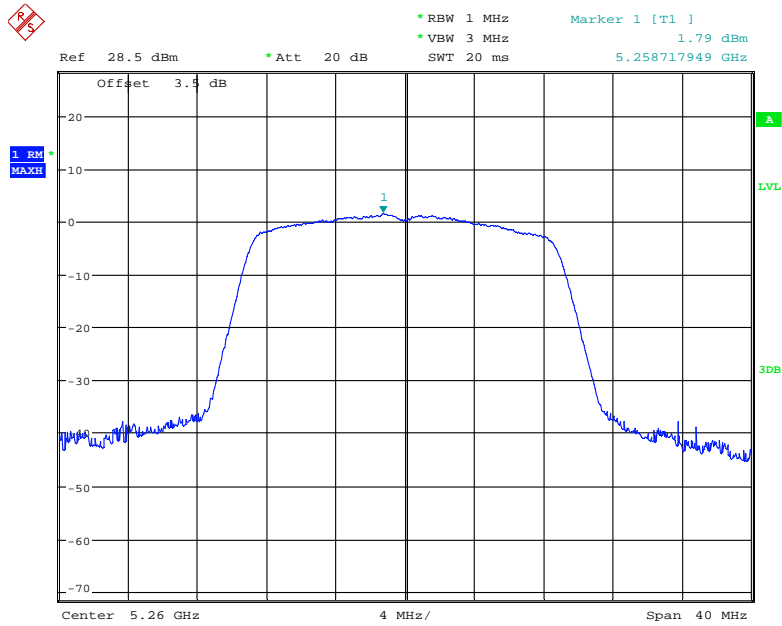
Date: 9.DEC.2019 23:04:20

### 802.11n40 mode, Power Spectral Density, 5310 MHz



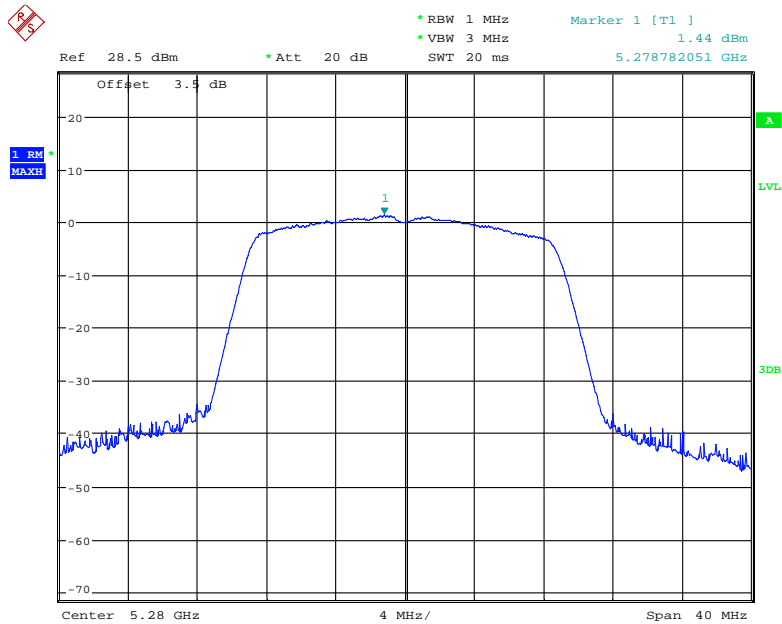
Date: 9.DEC.2019 23:03:18

### 802.11ac20 mode, Power Spectral Density, 5260 MHz



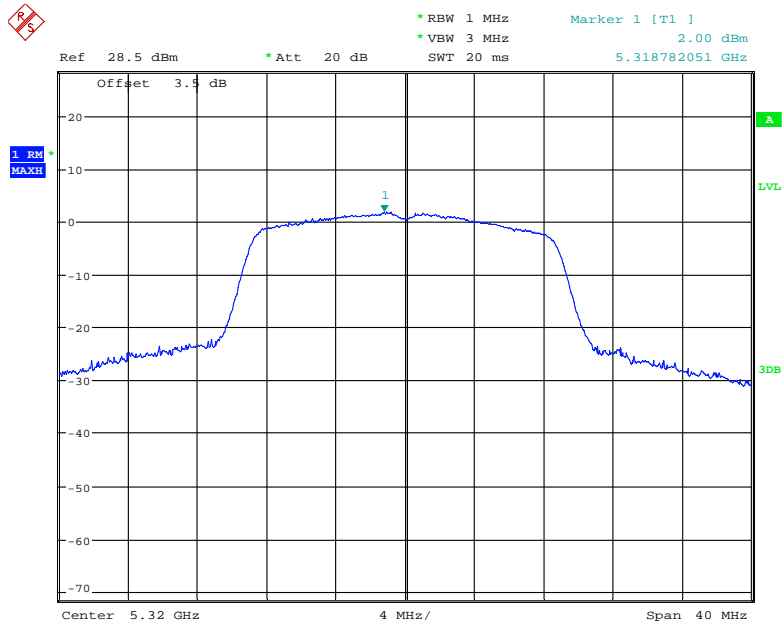
Date: 9.DEC.2019 22:26:34

### 802.11ac20 mode, Power Spectral Density, 5280 MHz



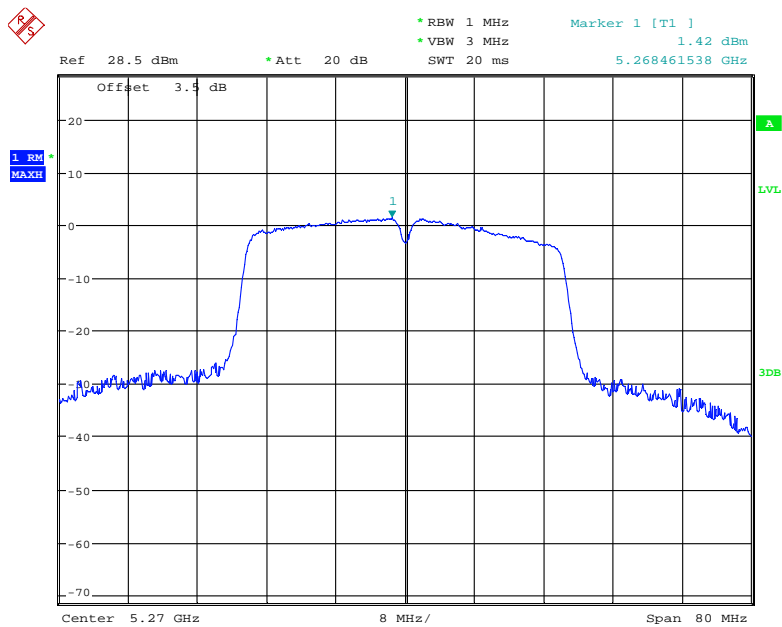
Date: 9.DEC.2019 22:26:03

### 802.11ac20 mode, Power Spectral Density, 5320 MHz



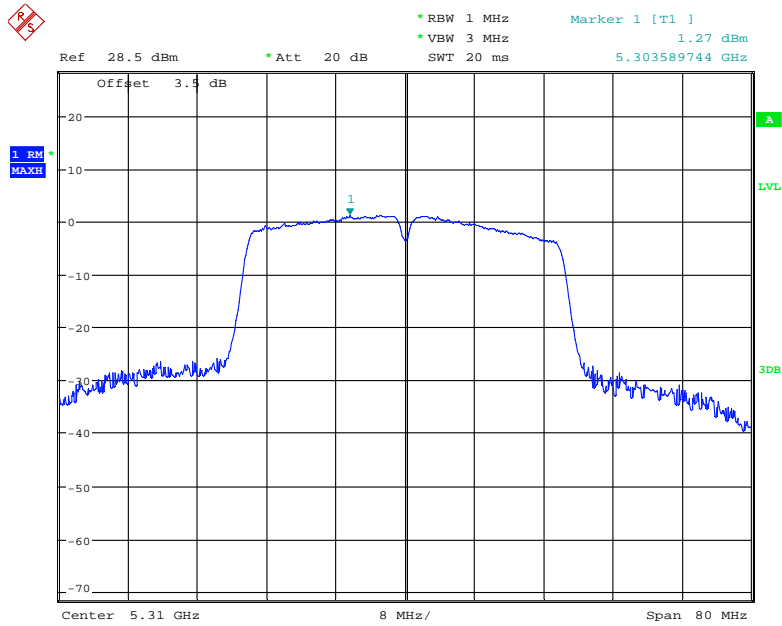
Date: 9.DEC.2019 22:23:12

### 802.11ac40 mode, Power Spectral Density, 5270 MHz



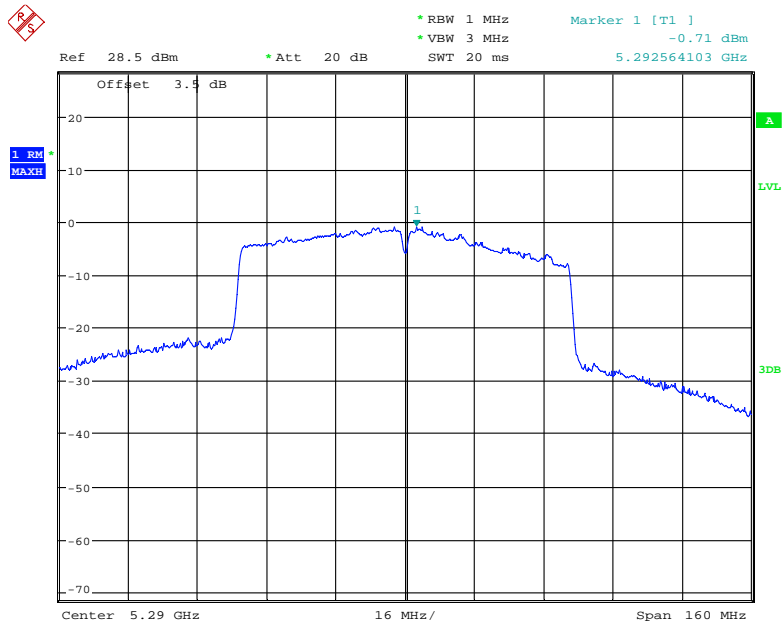
Date: 9.DEC.2019 23:04:04

### 802.11ac40 mode, Power Spectral Density, 5310 MHz



Date: 9.DEC.2019 23:03:38

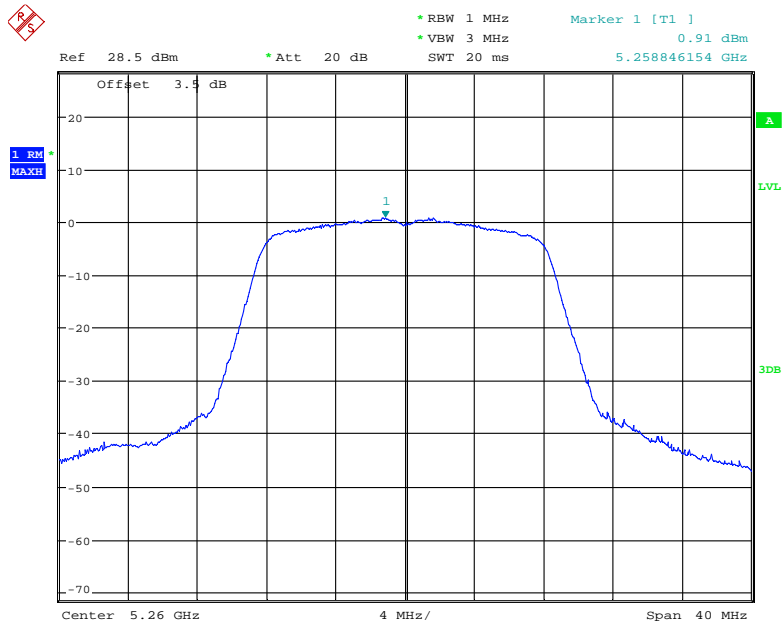
### 802.11ac80 mode, Power Spectral Density, 5290 MHz



Date: 26.DEC.2019 18:55:07

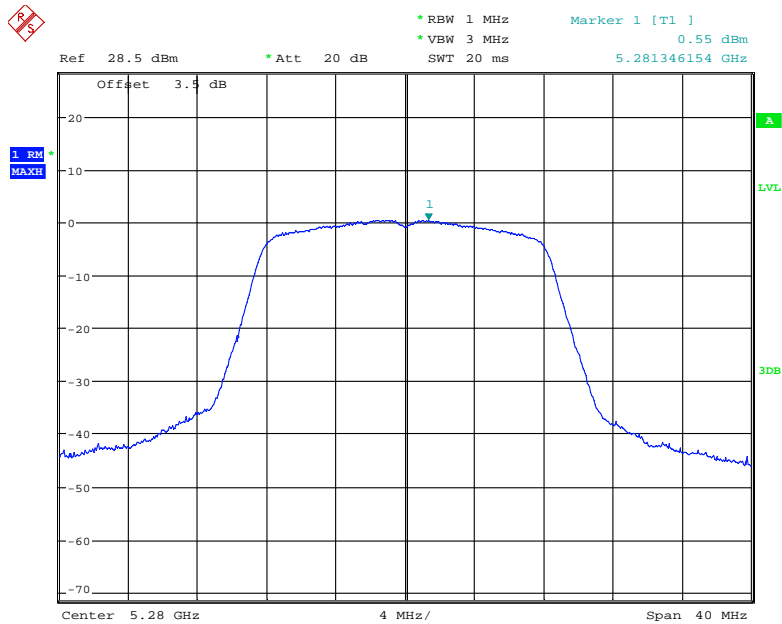
Antenna 3:

802.11a mode, Power Spectral Density, 5260 MHz



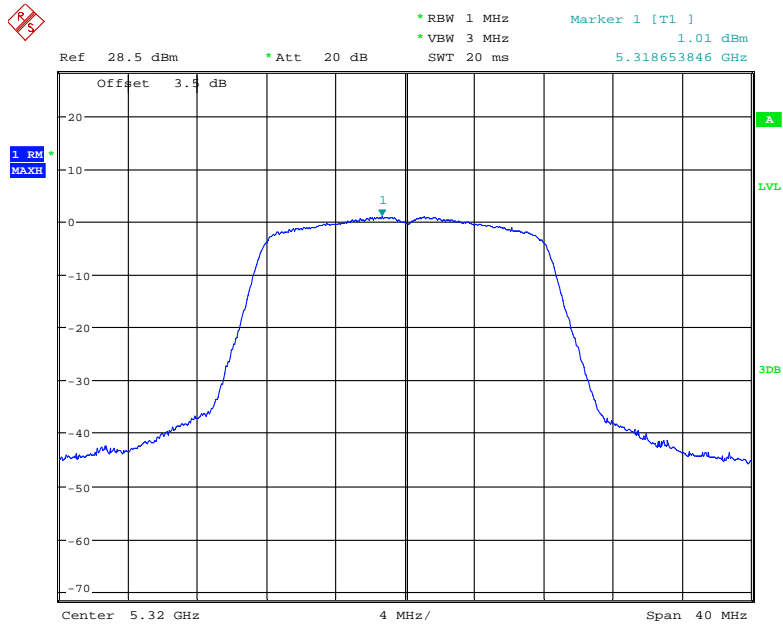
Date: 9.DEC.2019 21:32:20

802.11a mode, Power Spectral Density, 5280 MHz



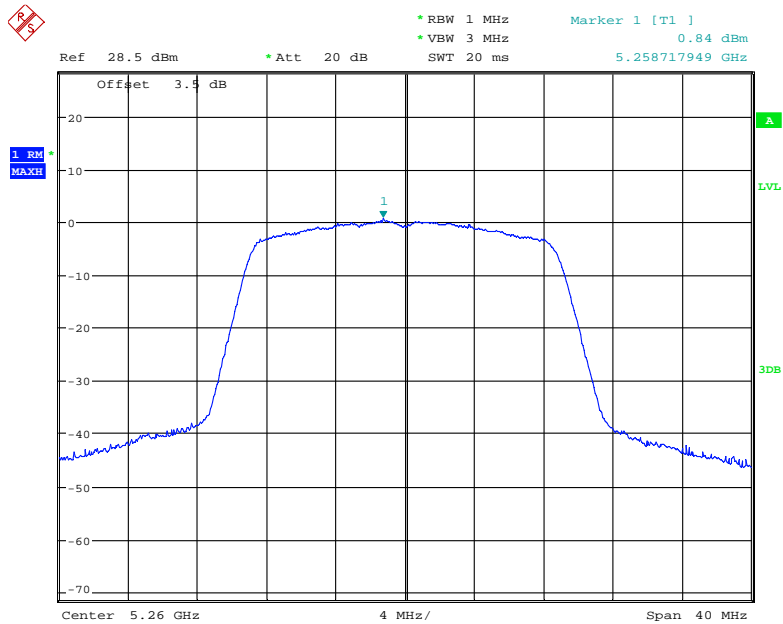
Date: 9.DEC.2019 21:32:39

### 802.11a mode, Power Spectral Density, 5320 MHz



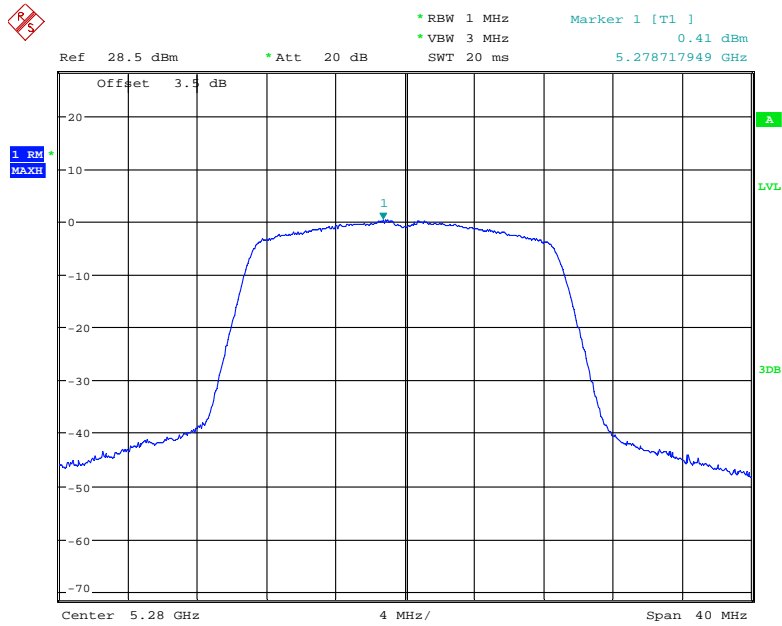
Date: 9.DEC.2019 21:33:04

### 802.11n20 mode, Power Spectral Density, 5260 MHz



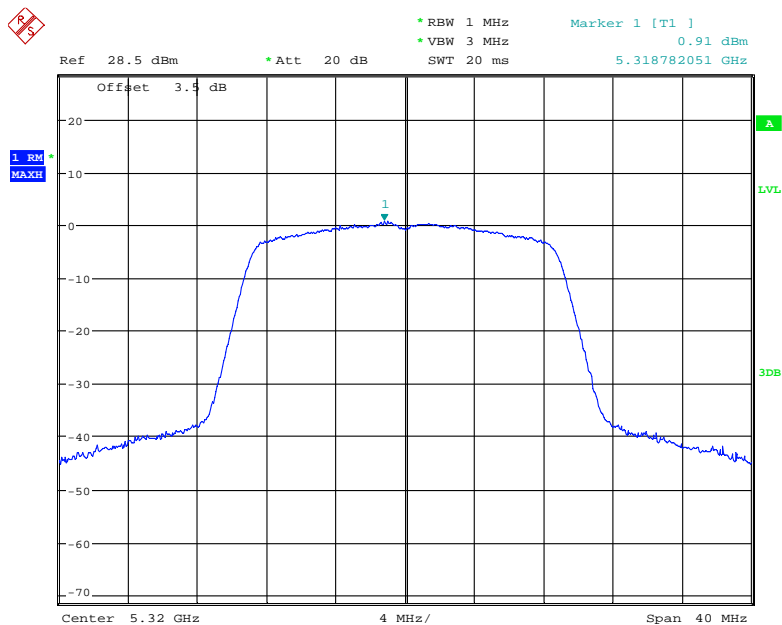
Date: 9.DEC.2019 21:31:37

### 802.11n20 mode, Power Spectral Density, 5280 MHz



Date: 9.DEC.2019 21:30:36

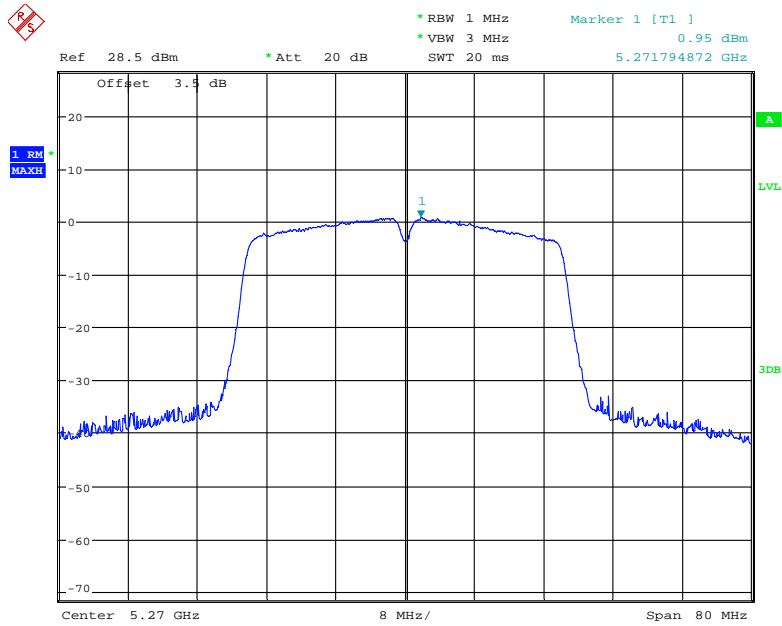
### 802.11n20 mode, Power Spectral Density, 5320 MHz



Date: 9.DEC.2019 21:30:06

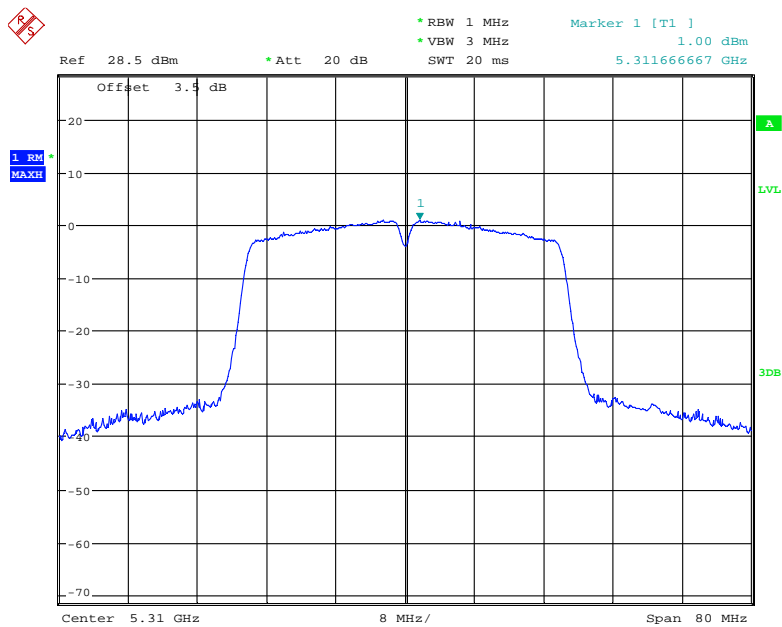


### 802.11n40 mode, Power Spectral Density, 5270 MHz



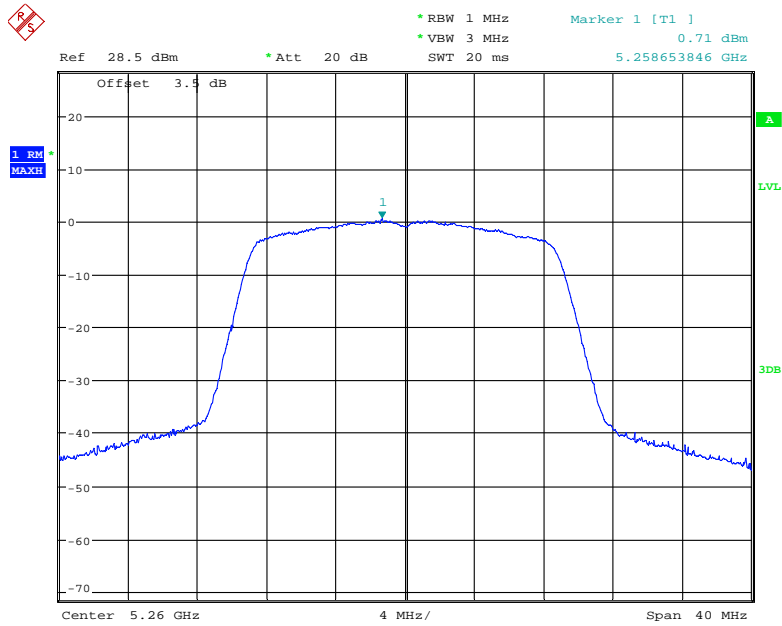
Date: 9.DEC.2019 23:00:39

### 802.11n40 mode, Power Spectral Density, 5310 MHz



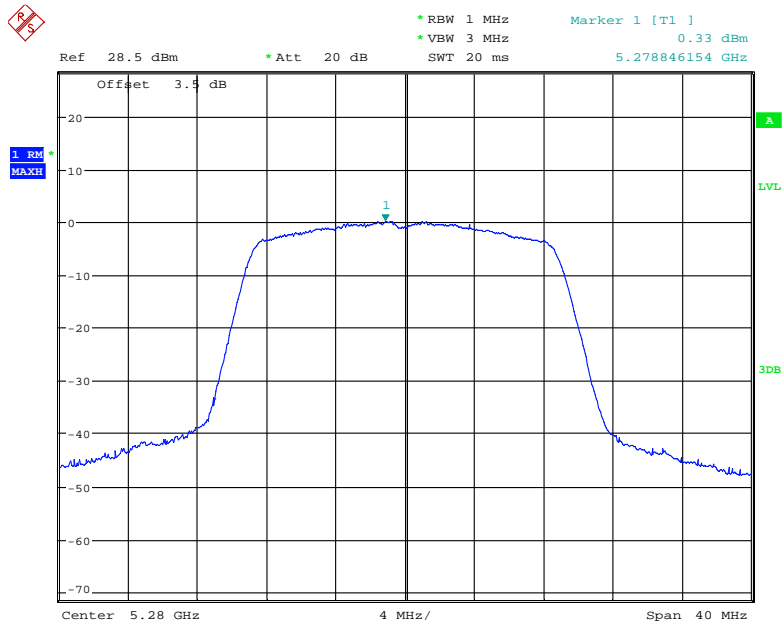
Date: 9.DEC.2019 23:00:11

### 802.11ac20 mode, Power Spectral Density, 5260 MHz



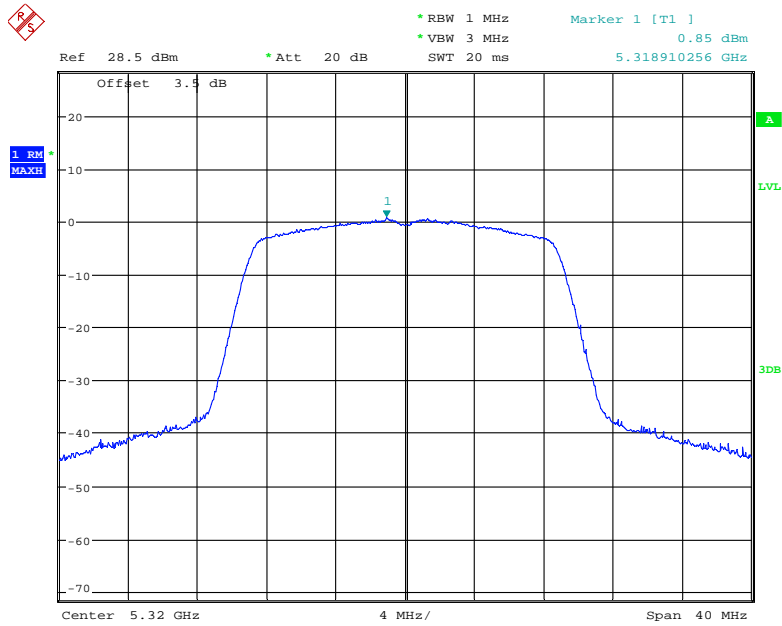
Date: 9.DEC.2019 21:31:16

### 802.11ac20 mode, Power Spectral Density, 5280 MHz



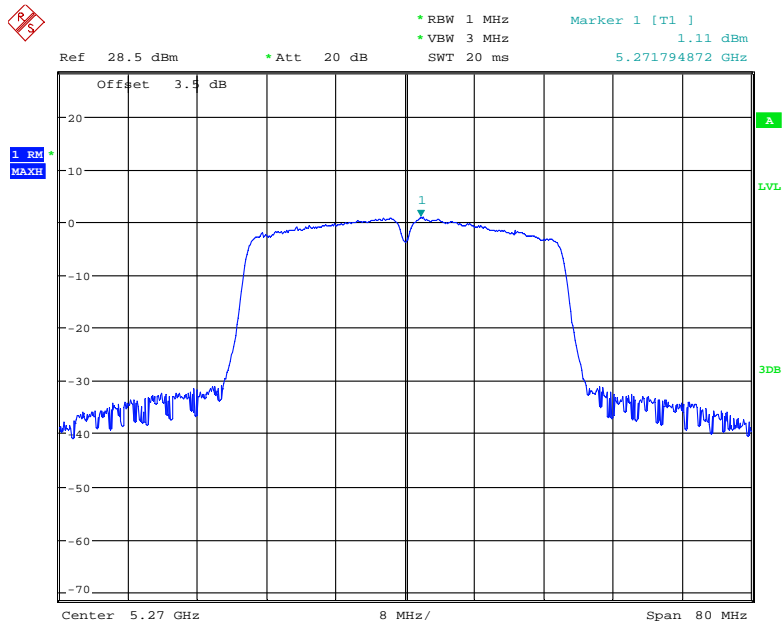
Date: 9.DEC.2019 21:30:51

### 802.11ac20 mode, Power Spectral Density, 5320 MHz



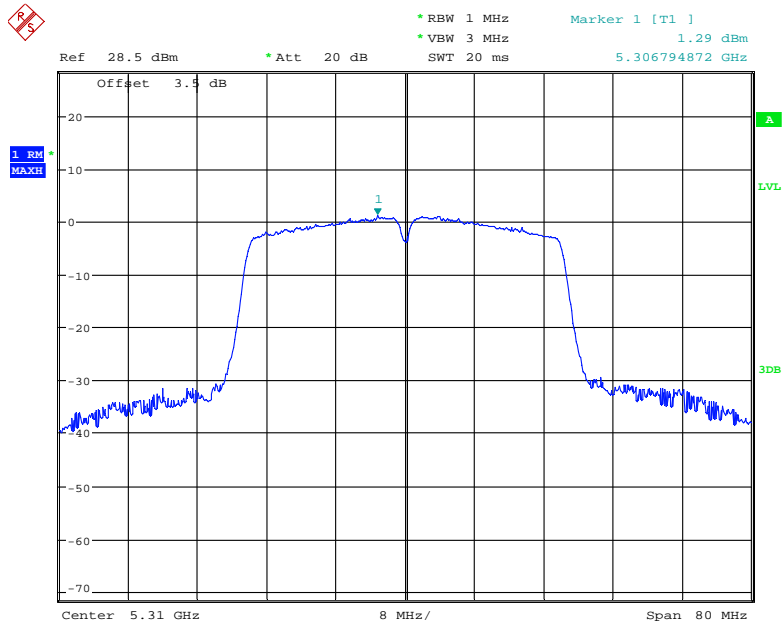
Date: 9.DEC.2019 21:29:28

### 802.11ac40 mode, Power Spectral Density, 5270 MHz



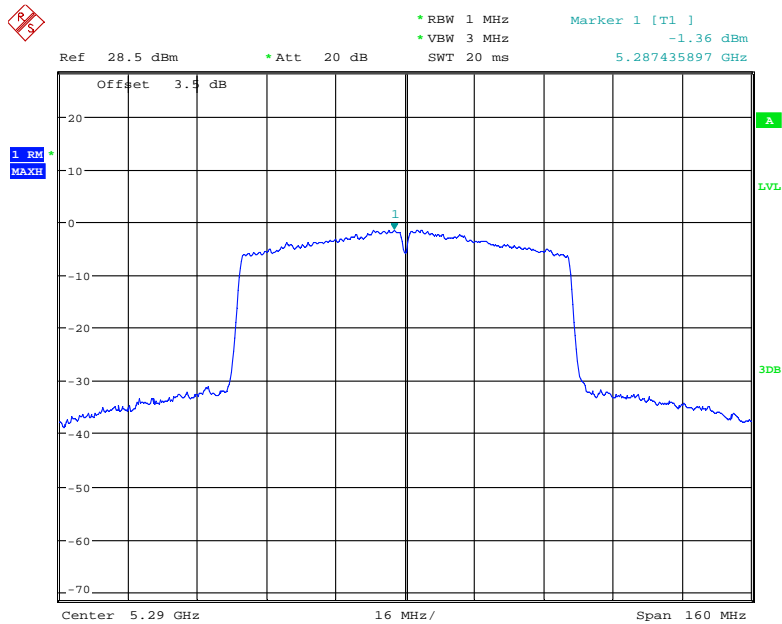
Date: 9.DEC.2019 23:00:57

### 802.11ac40 mode, Power Spectral Density, 5310 MHz



Date: 9.DEC.2019 22:59:48

### 802.11ac80 mode, Power Spectral Density, 5290 MHz



Date: 26.DEC.2019 18:57:36

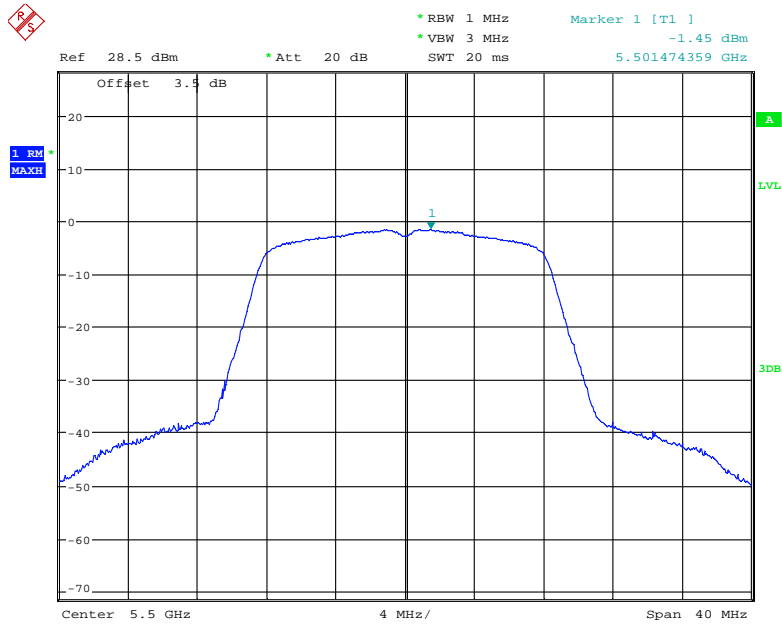
**5470 MHz – 5725 MHz:**

Frequency (MHz)	Antenna Port	Power Spectral Density (dBm/MHz)	Total Power Spectral (dBm/MHz)	Limit (dBm/MHz)
802.11a				
5500	0	-1.45	5.95	7.5
	1	-0.10		
	2	0.18		
	3	0.78		
5580	0	0.36	7.01	
	1	0.42		
	2	1.34		
	3	1.67		
5700	0	-1.29	4.96	
	1	-1.49		
	2	-0.04		
	3	-1.61		
802.11n20				
5500	0	0.43	7.18	7.5
	1	1.12		
	2	1.36		
	3	1.64		
5580	0	0.63	6.87	
	1	-0.09		
	2	1.24		
	3	1.47		
5700	0	0.79	6.78	
	1	0.47		
	2	1.56		
	3	0.09		
802.11n40				
5510	0	-3.68	3.50	7.5
	1	-2.77		
	2	-2.20		
	3	-1.67		
5550	0	-0.07	6.58	
	1	-0.09		
	2	0.81		
	3	1.41		
5670	0	0.78	6.85	
	1	-0.06		
	2	1.69		
	3	0.74		

Frequency (MHz)	Antenna Port	Power Spectral Density (dBm/MHz)	Total Power Spectral (dBm/MHz)	Limit (dBm/MHz)
802.11ac20				
5500	0	0.93	7.48	7.5
	1	1.36		
	2	1.51		
	3	1.98		
5580	0	0.93	7.28	
	1	0.44		
	2	1.63		
	3	1.9		
5700	0	1.49	7.33	
	1	0.82		
	2	2.11		
	3	0.64		
802.11ac40				
5510	0	-3.73	3.50	
	1	-2.76		
	2	-2.10		
	3	-1.75		
5550	0	0.48	7.27	
	1	0.57		
	2	1.32		
	3	2.37		
5670	0	1.51	7.46	
	1	0.75		
	2	2.15		
	3	1.21		
802.11ac80				
5530	0	-6.59	0.50	
	1	-5.90		
	2	-5.36		
	3	-4.51		
5610	0	-1.93	4.71	
	1	-2.15		
	2	-0.66		
	3	-0.71		

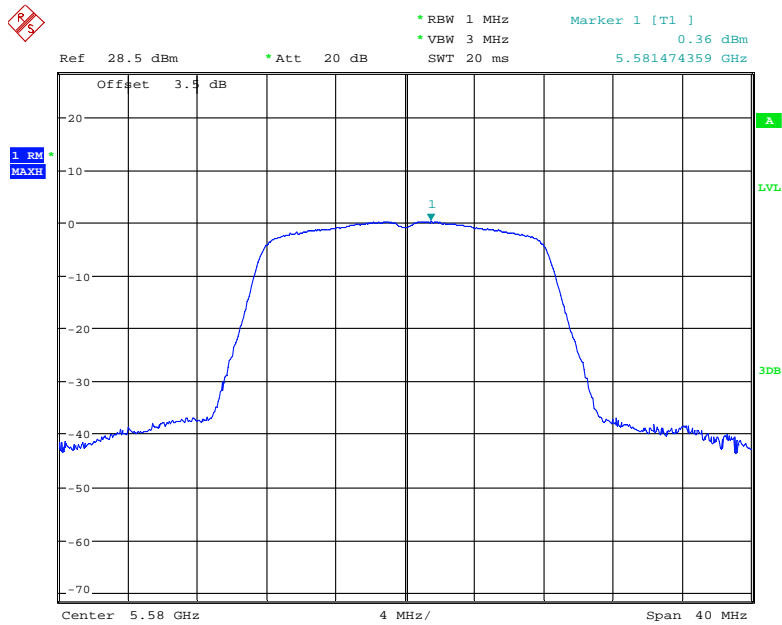
Antenna 0:

802.11a mode, Power Spectral Density, 5500 MHz



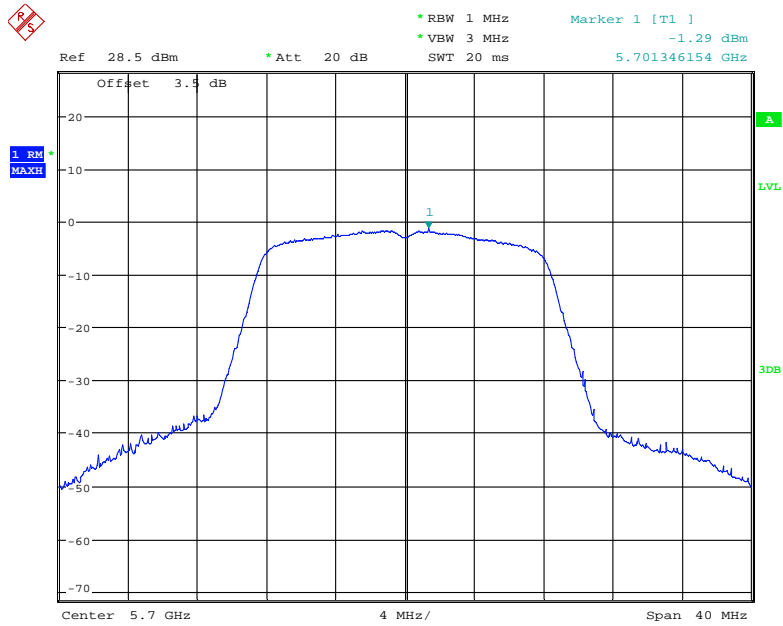
Date: 26.DEC.2019 19:47:33

802.11a mode, Power Spectral Density, 5580 MHz



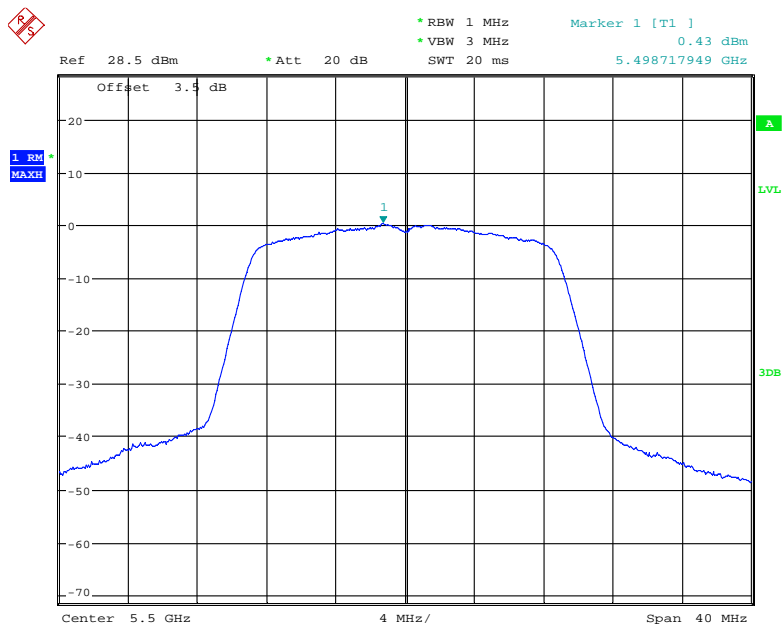
Date: 10.DEC.2019 22:17:39

### 802.11a mode, Power Spectral Density, 5700 MHz



Date: 26.DEC.2019 19:47:07

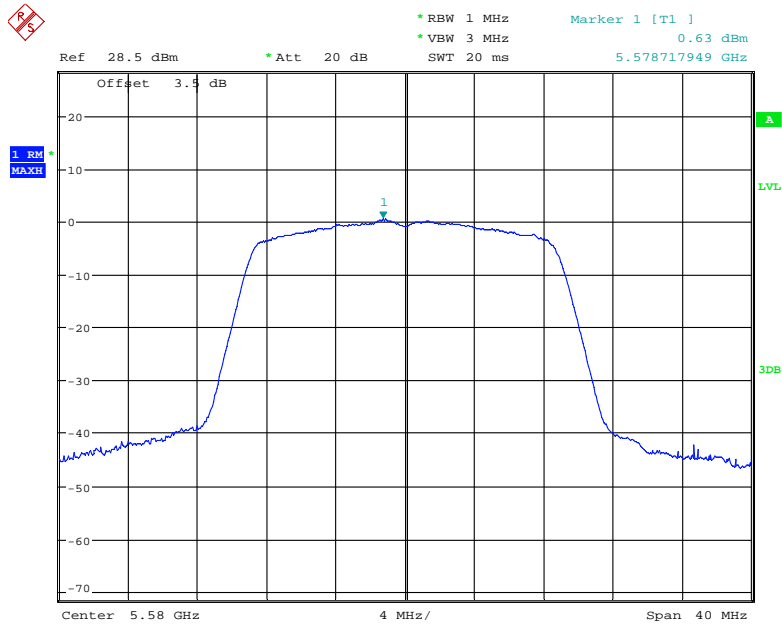
### 802.11n20 mode, Power Spectral Density, 5500 MHz



Date: 10.DEC.2019 22:20:53

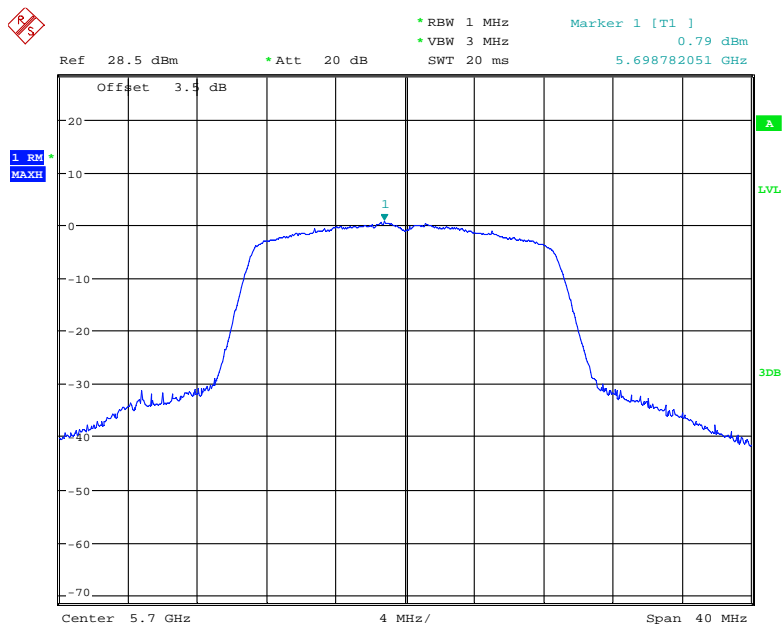


### 802.11n20 mode, Power Spectral Density, 5580 MHz



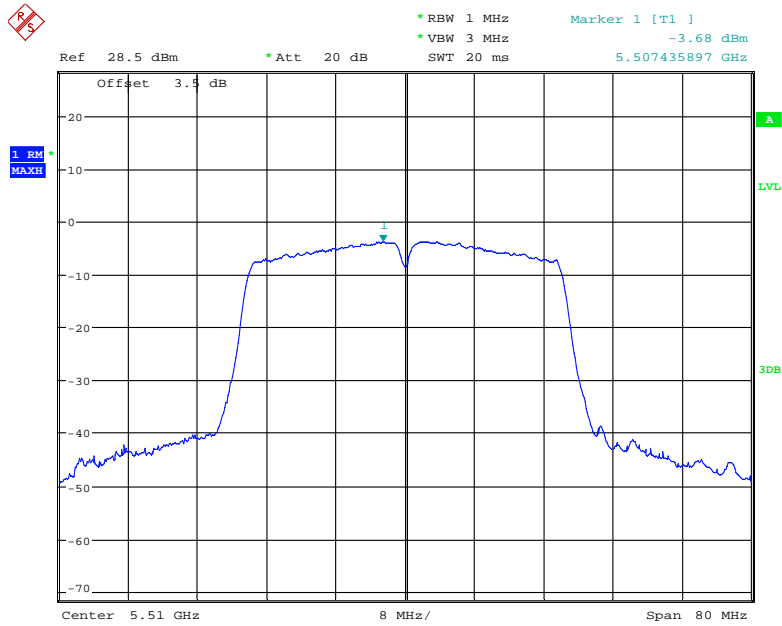
Date: 10.DEC.2019 22:18:22

### 802.11n20 mode, Power Spectral Density, 5700 MHz



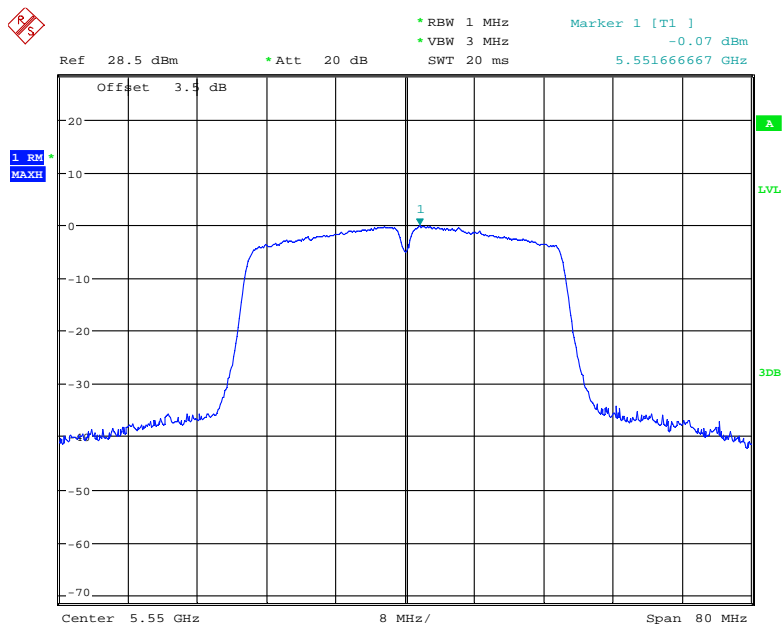
Date: 10.DEC.2019 22:16:53

### 802.11n40 mode, Power Spectral Density, 5510 MHz



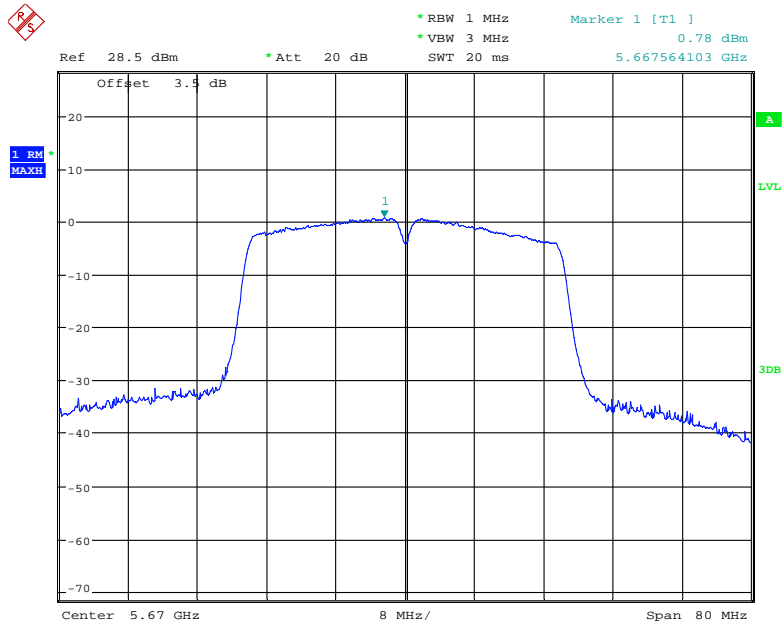
Date: 26.DEC.2019 19:34:09

### 802.11n40 mode, Power Spectral Density, 5550 MHz



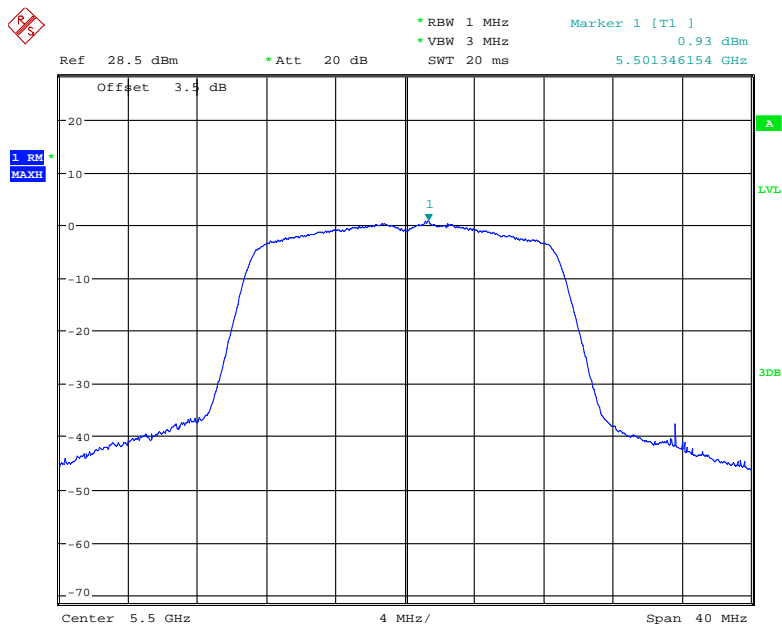
Date: 10.DEC.2019 21:45:59

### 802.11n40 mode, Power Spectral Density, 5670 MHz



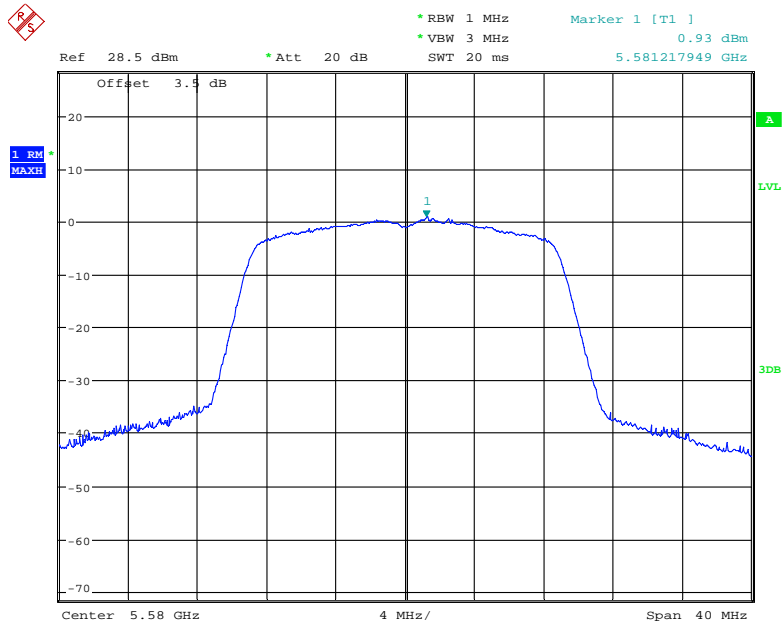
Date: 10.DEC.2019 21:46:29

### 802.11ac20 mode, Power Spectral Density, 5500 MHz



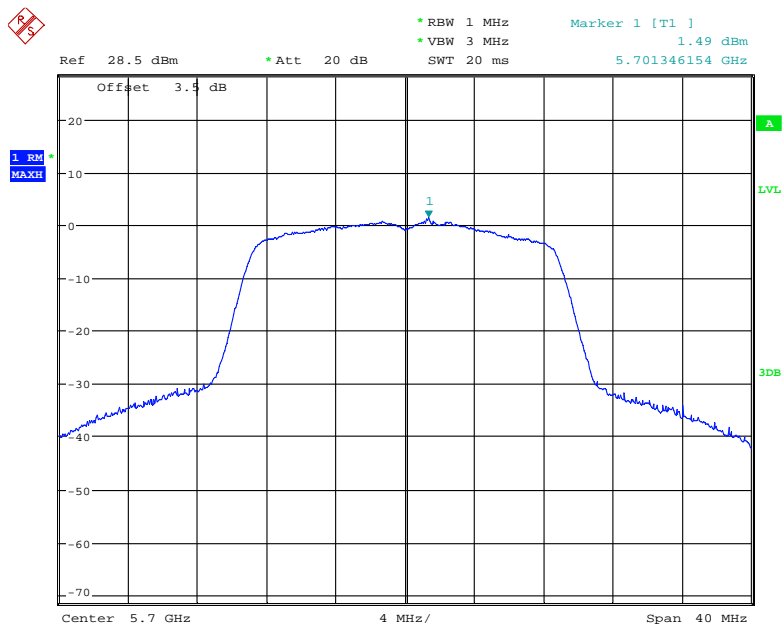
Date: 10.DEC.2019 22:20:18

### 802.11ac20 mode, Power Spectral Density, 5580 MHz



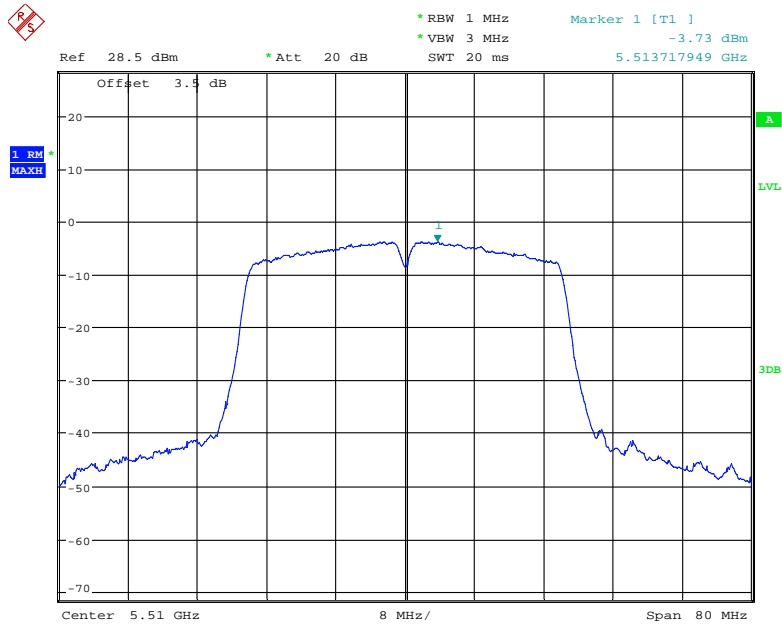
Date: 10.DEC.2019 22:18:41

### 802.11ac20 mode, Power Spectral Density, 5700 MHz



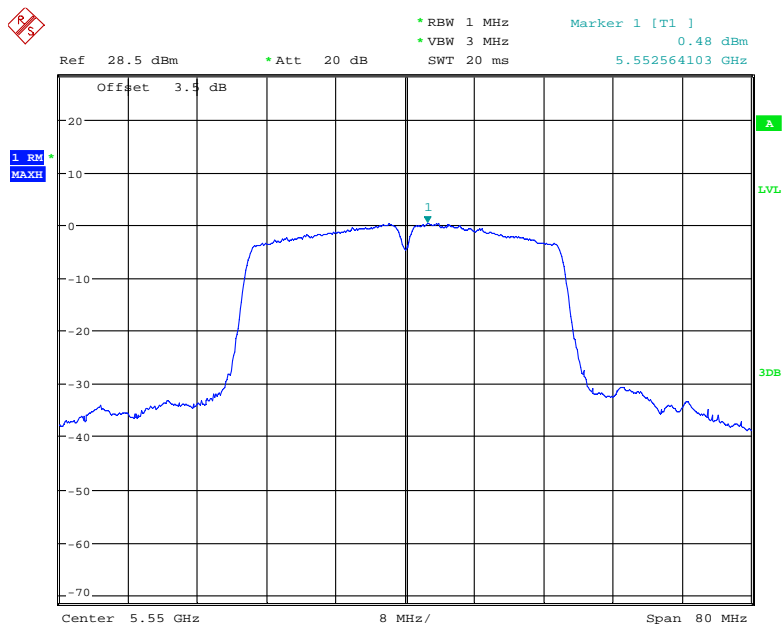
Date: 10.DEC.2019 22:16:30

### 802.11ac40 mode, Power Spectral Density, 5510 MHz



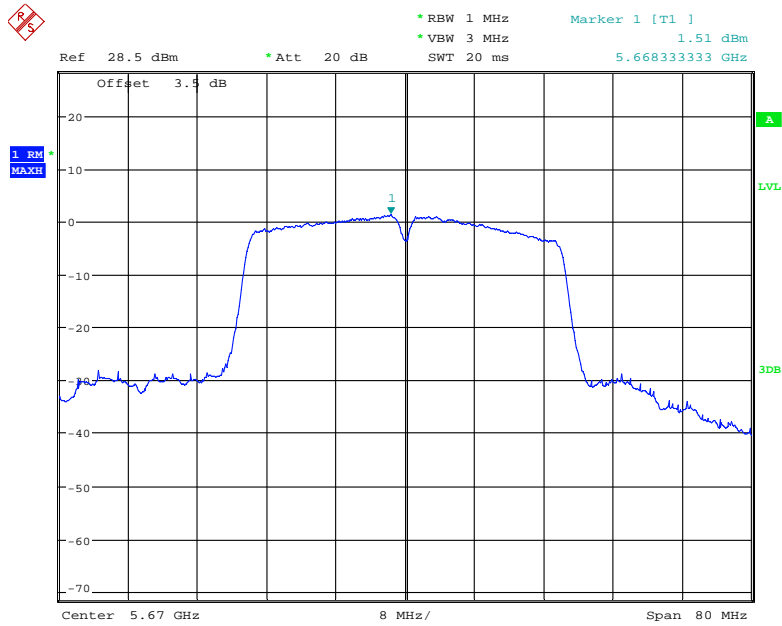
Date: 26.DEC.2019 19:34:56

### 802.11ac40 mode, Power Spectral Density, 5550 MHz



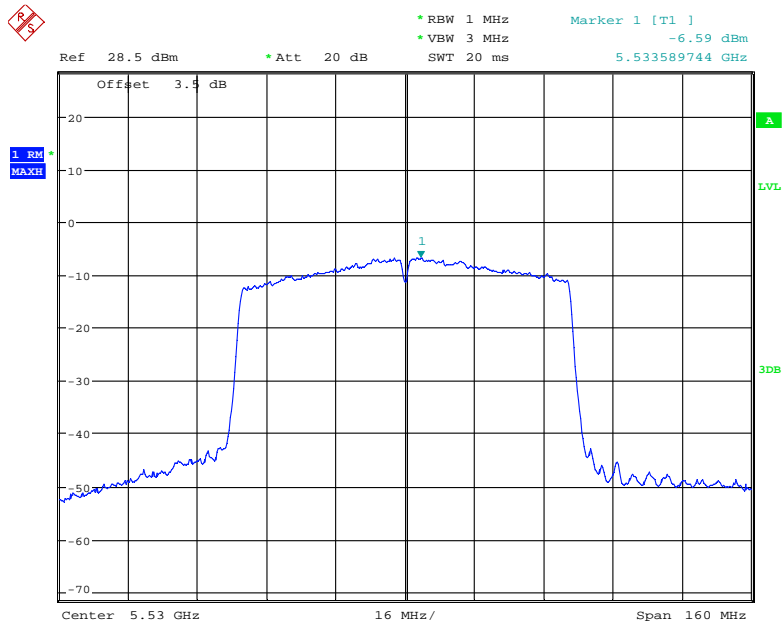
Date: 10.DEC.2019 21:45:35

### 802.11ac40 mode, Power Spectral Density, 5670 MHz



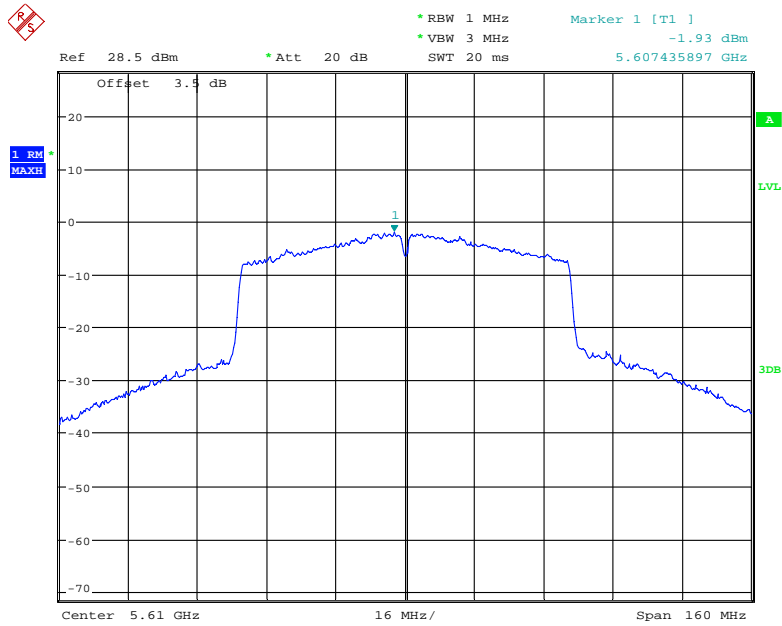
Date: 10.DEC.2019 21:46:48

### 802.11ac80 mode, Power Spectral Density, 5530 MHz



Date: 26.DEC.2019 19:30:52

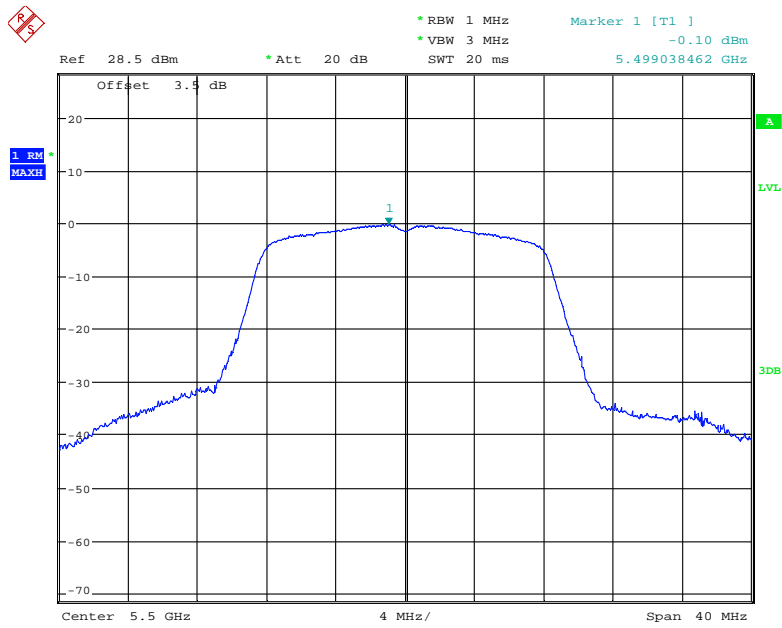
### 802.11ac80 mode, Power Spectral Density, 5610 MHz



Date: 26.DEC.2019 19:30:14

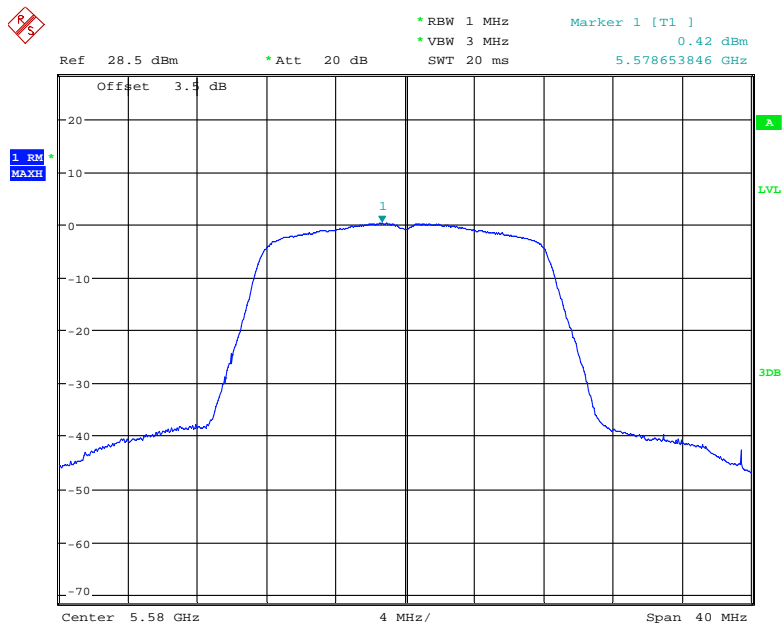
Antenna 1:

802.11a mode, Power Spectral Density, 5500 MHz



Date: 26.DEC.2019 19:46:17

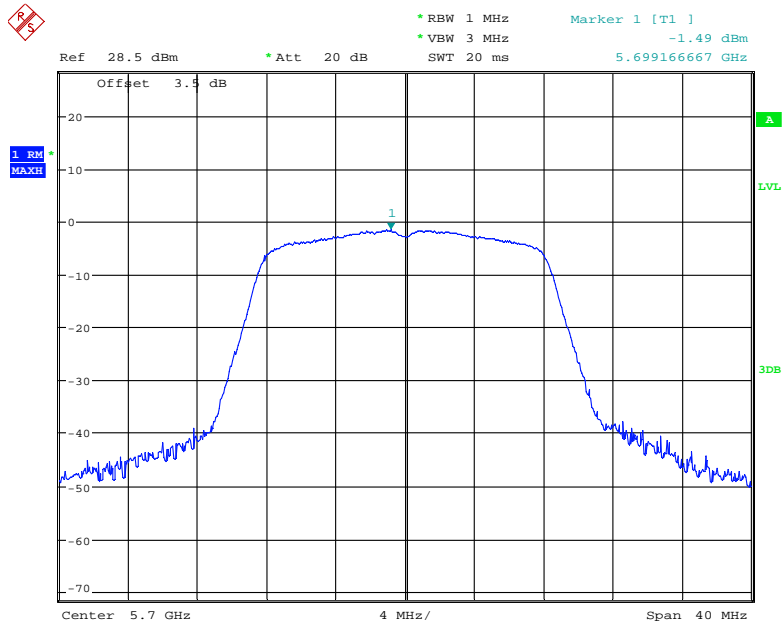
802.11a mode, Power Spectral Density, 5580 MHz



Date: 10.DEC.2019 22:14:50

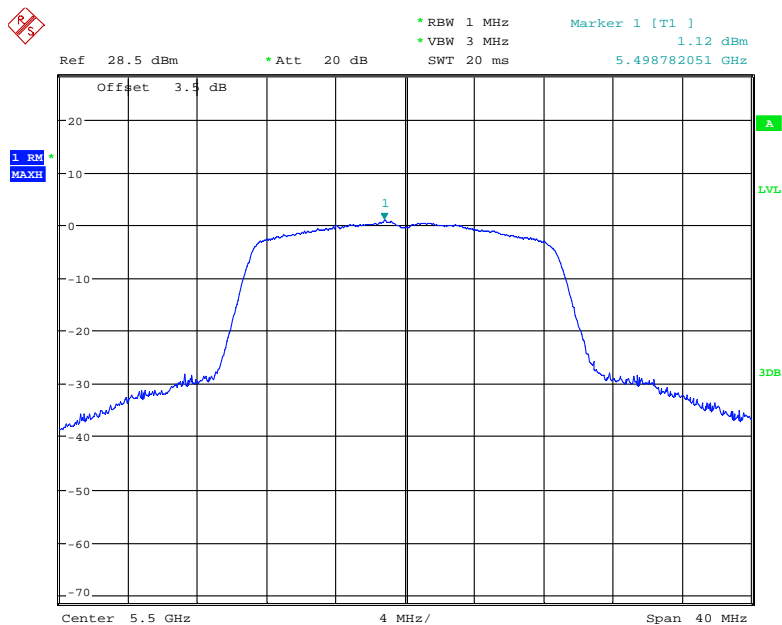


### 802.11a mode, Power Spectral Density, 5700 MHz



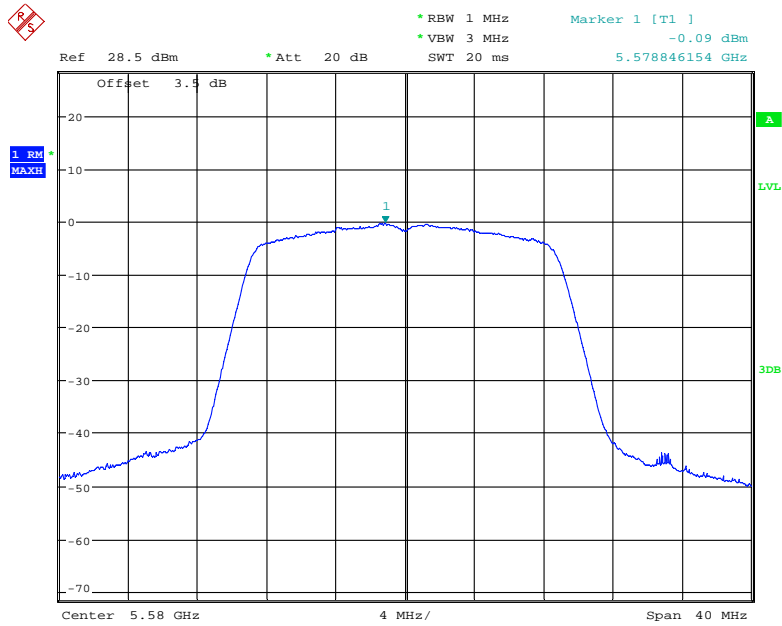
Date: 26.DEC.2019 19:46:43

### 802.11n20 mode, Power Spectral Density, 5500 MHz



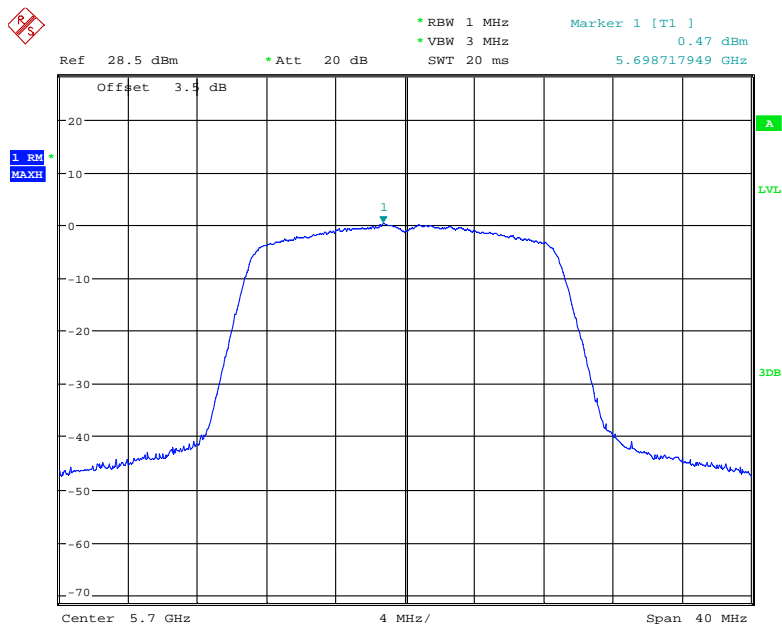
Date: 10.DEC.2019 22:12:44

### 802.11n20 mode, Power Spectral Density, 5580 MHz



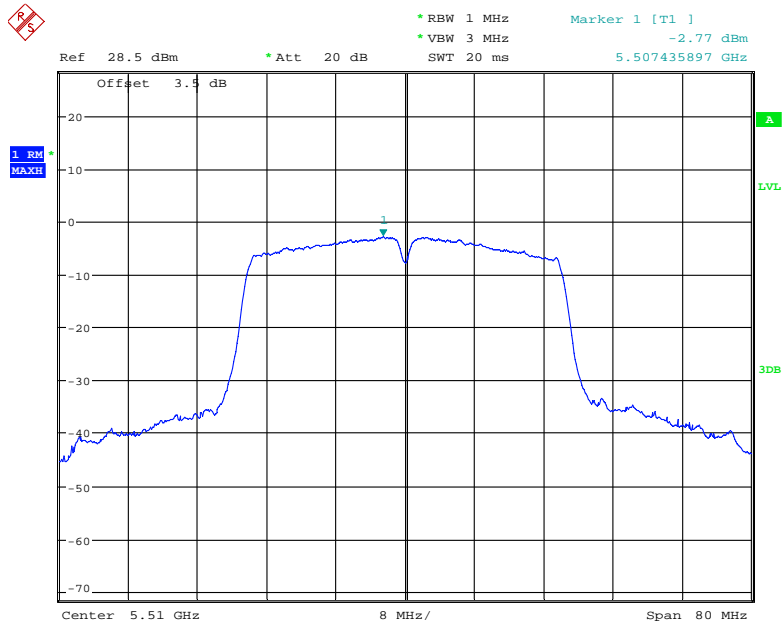
Date: 10.DEC.2019 22:14:21

### 802.11n20 mode, Power Spectral Density, 5700 MHz



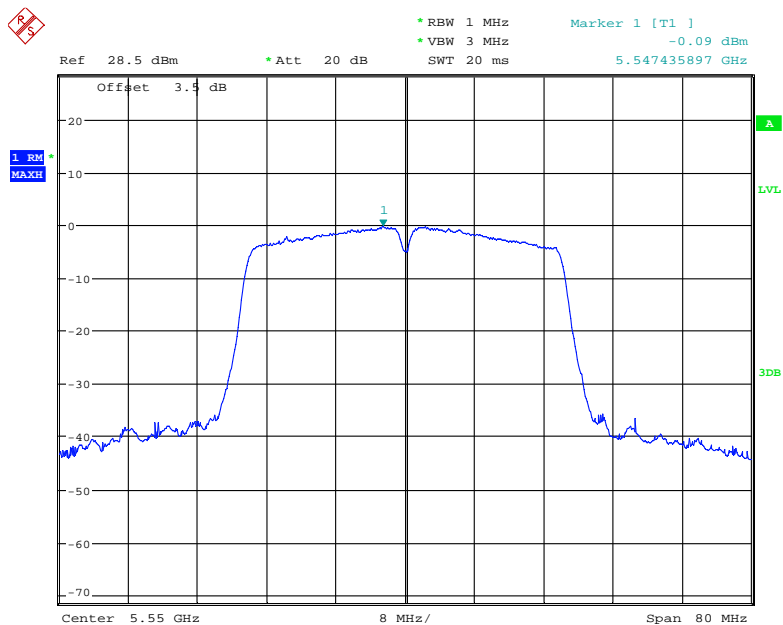
Date: 10.DEC.2019 22:15:39

### 802.11n40 mode, Power Spectral Density, 5510 MHz



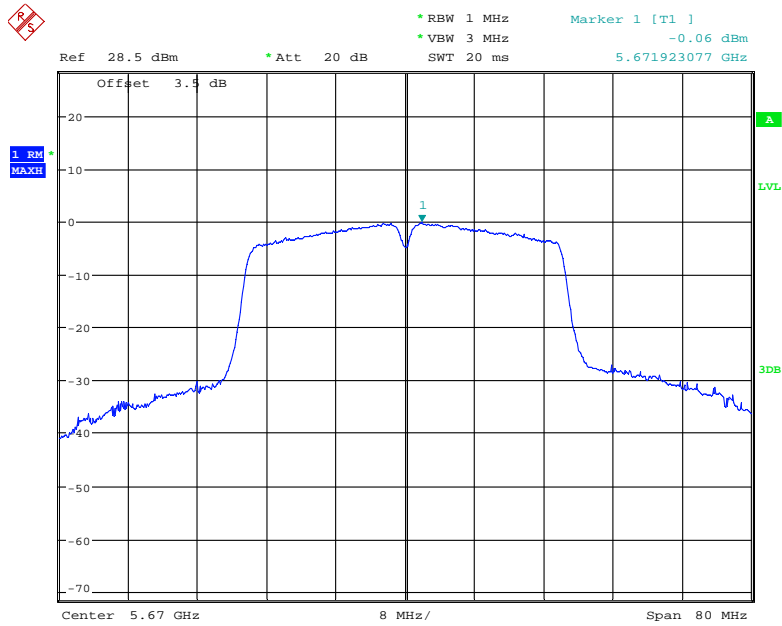
Date: 26.DEC.2019 19:37:25

### 802.11n40 mode, Power Spectral Density, 5550 MHz



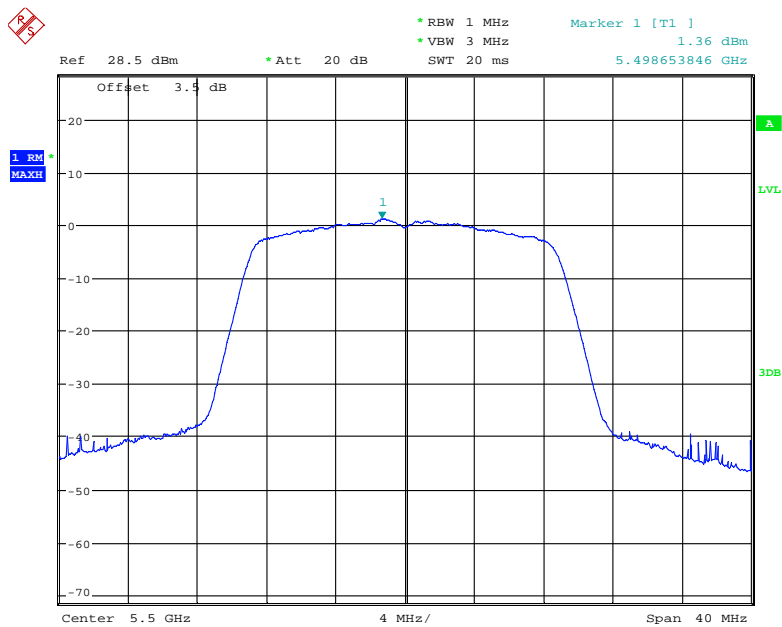
Date: 10.DEC.2019 21:42:03

### 802.11n40 mode, Power Spectral Density, 5670 MHz



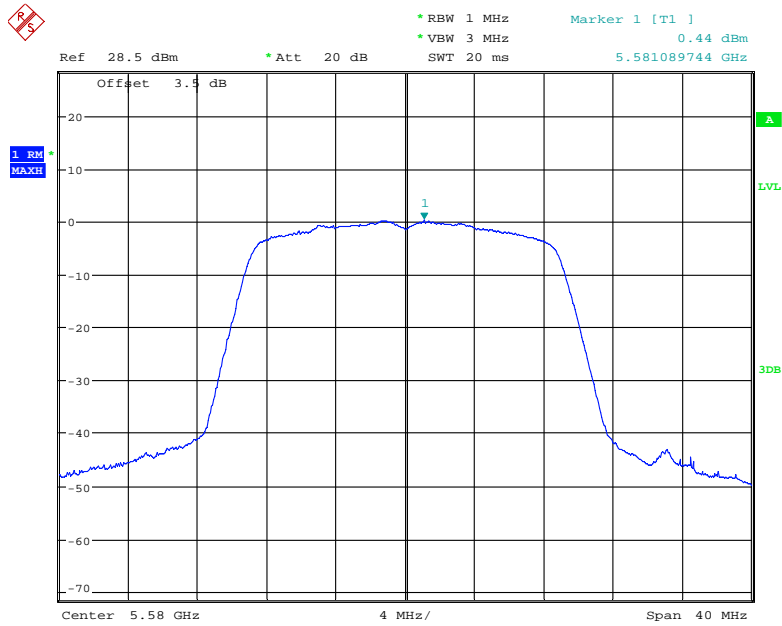
Date: 10.DEC.2019 21:41:43

### 802.11ac20 mode, Power Spectral Density, 5500 MHz



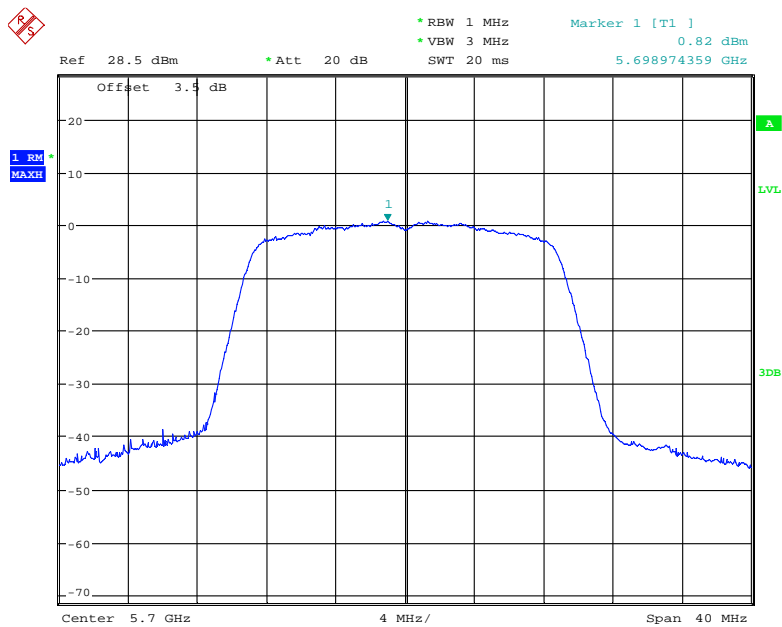
Date: 10.DEC.2019 22:10:45

### 802.11ac20 mode, Power Spectral Density, 5580 MHz



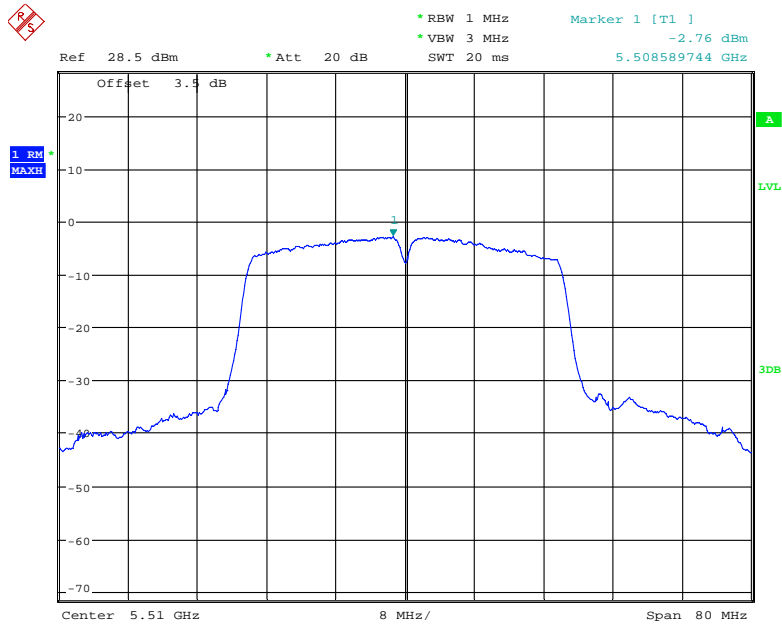
Date: 10.DEC.2019 22:13:52

### 802.11ac20 mode, Power Spectral Density, 5700 MHz



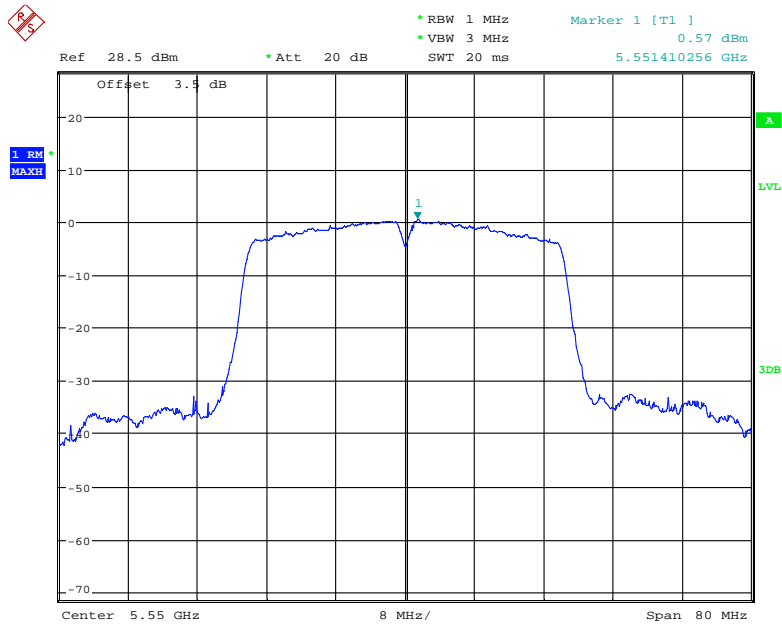
Date: 10.DEC.2019 22:15:58

### 802.11ac40 mode, Power Spectral Density, 5510 MHz



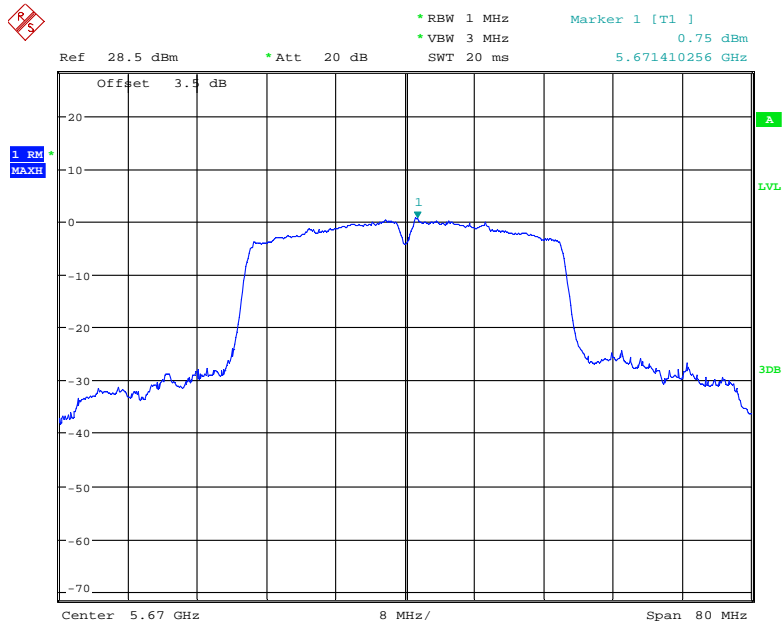
Date: 26.DEC.2019 19:36:41

### 802.11ac40 mode, Power Spectral Density, 5550 MHz



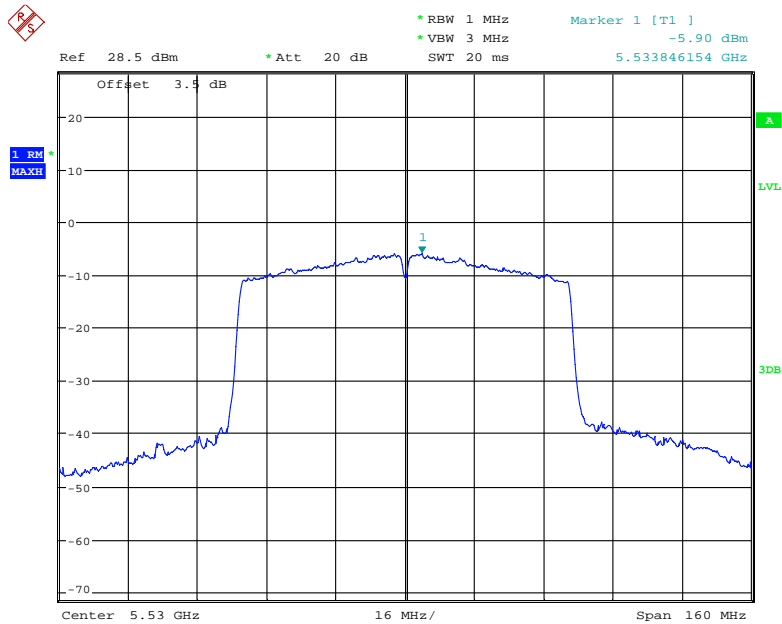
Date: 10.DEC.2019 21:42:22

### 802.11ac40 mode, Power Spectral Density, 5670 MHz



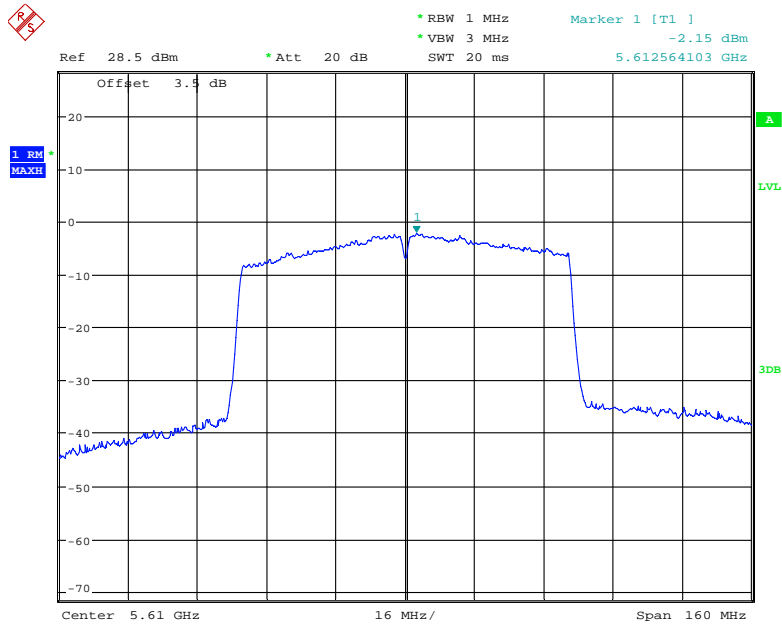
Date: 10.DEC.2019 21:41:26

### 802.11ac80 mode, Power Spectral Density, 5530 MHz



Date: 26.DEC.2019 19:29:03

### 802.11ac80 mode, Power Spectral Density, 5610 MHz

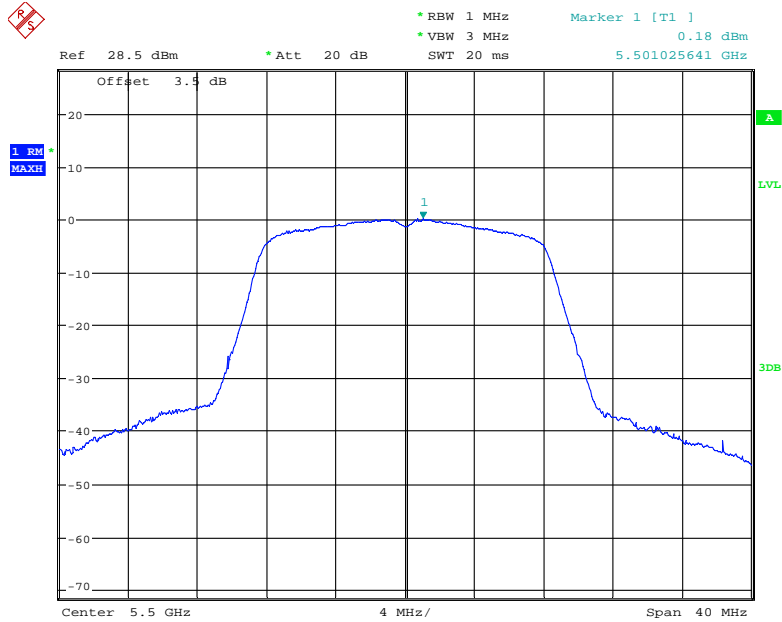


Date: 26.DEC.2019 19:29:37



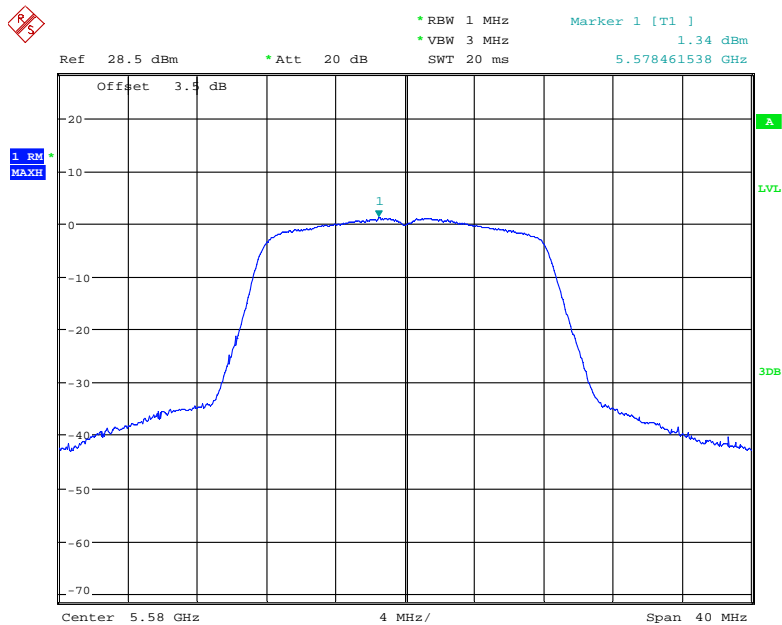
Antenna 2:

802.11a mode, Power Spectral Density, 5500 MHz



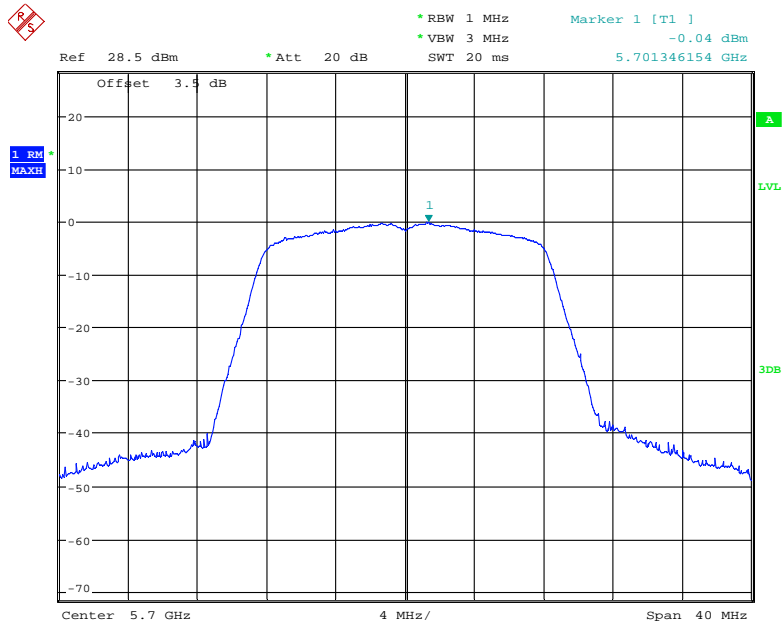
Date: 26.DEC.2019 19:45:08

802.11a mode, Power Spectral Density, 5580 MHz



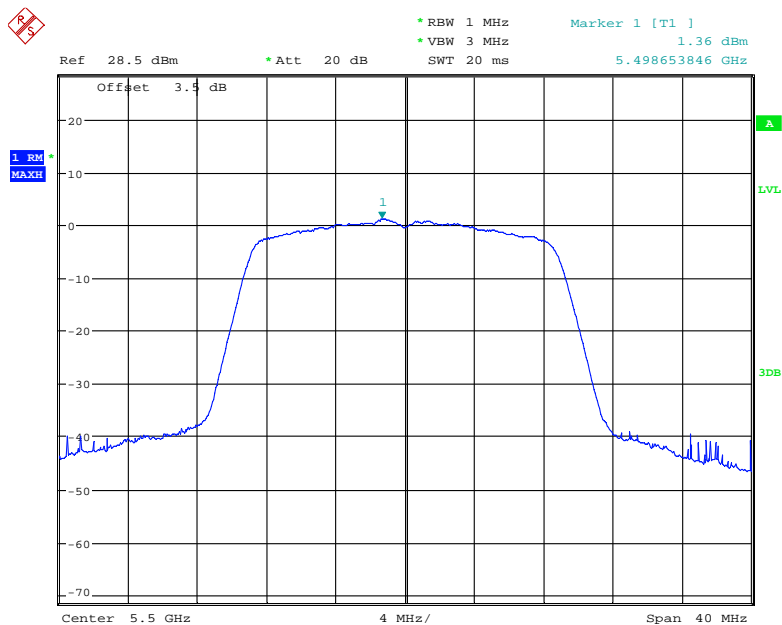
Date: 10.DEC.2019 22:08:02

### 802.11a mode, Power Spectral Density, 5700 MHz



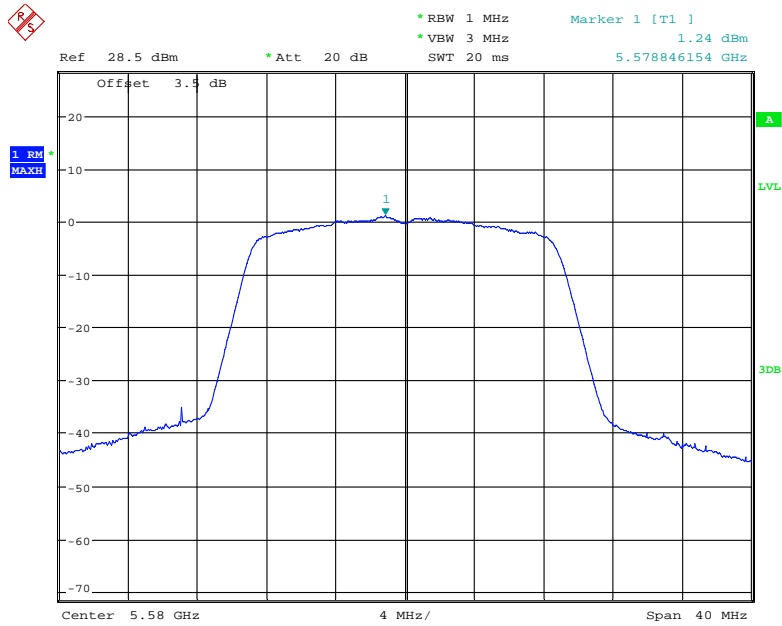
Date: 26.DEC.2019 19:44:42

### 802.11n20 mode, Power Spectral Density, 5500 MHz



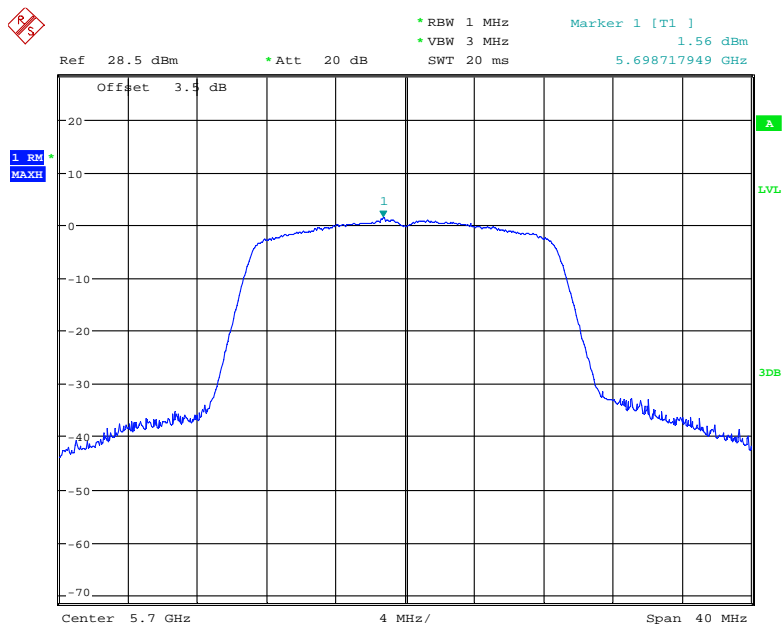
Date: 10.DEC.2019 22:10:45

### 802.11n20 mode, Power Spectral Density, 5580 MHz



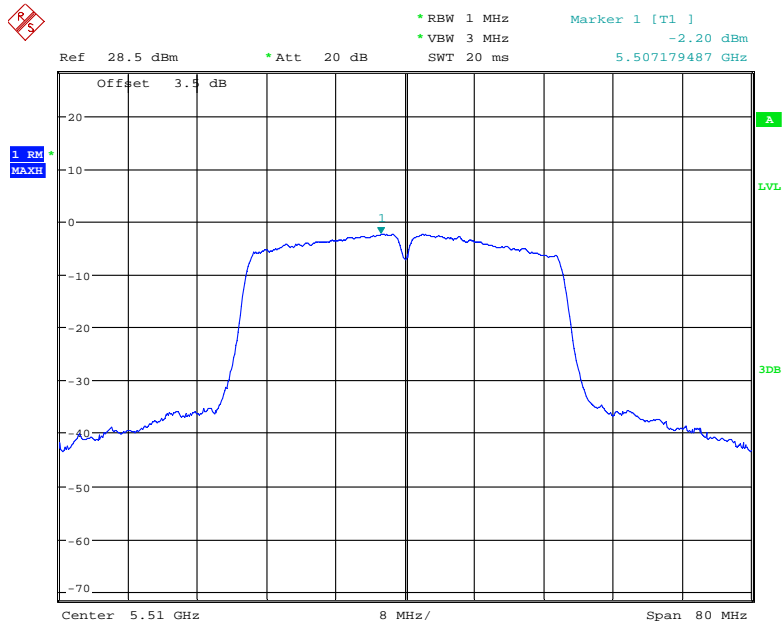
Date: 10.DEC.2019 22:08:38

### 802.11n20 mode, Power Spectral Density, 5700 MHz



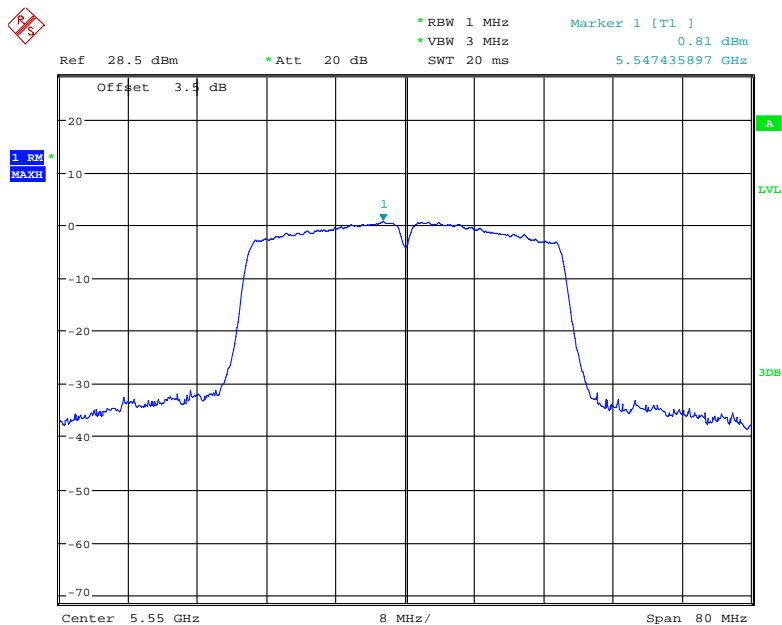
Date: 10.DEC.2019 22:07:15

### 802.11n40 mode, Power Spectral Density, 5510 MHz



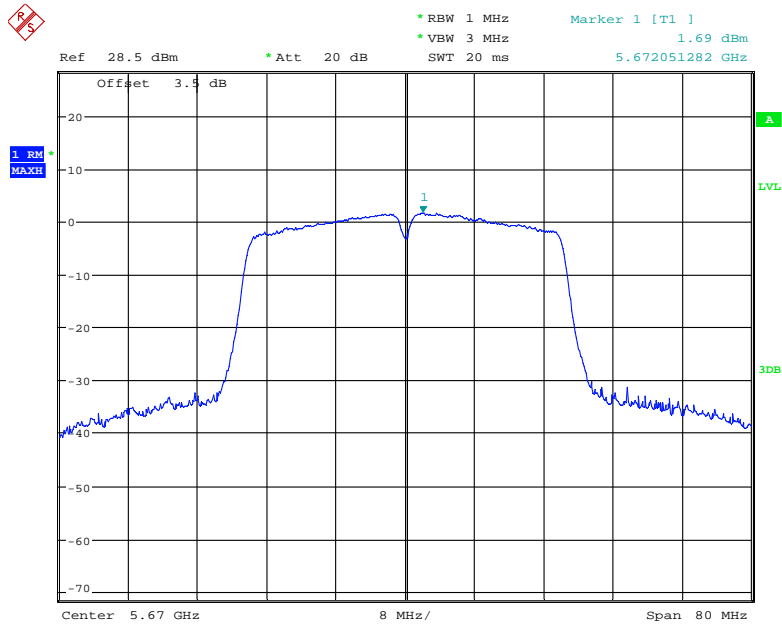
Date: 26.DEC.2019 19:38:59

### 802.11n40 mode, Power Spectral Density, 5550 MHz



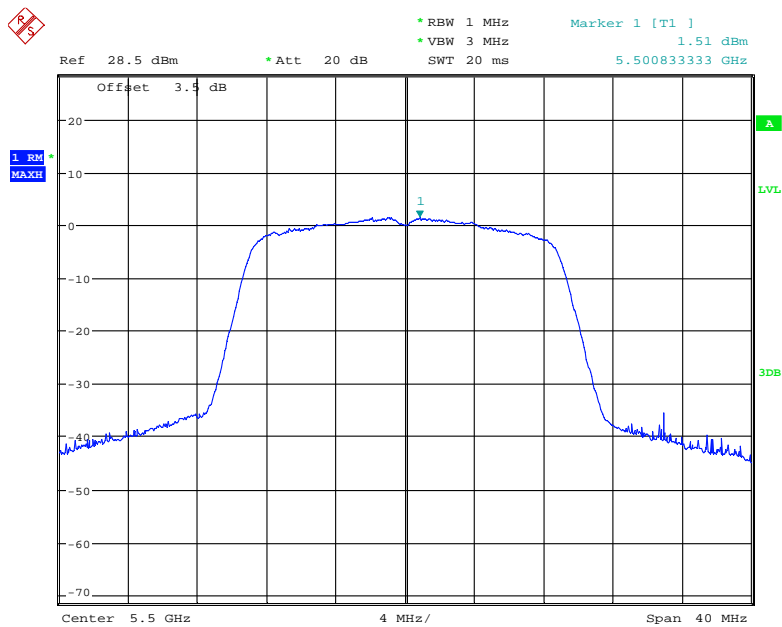
Date: 10.DEC.2019 21:33:30

### 802.11n40 mode, Power Spectral Density, 5670 MHz



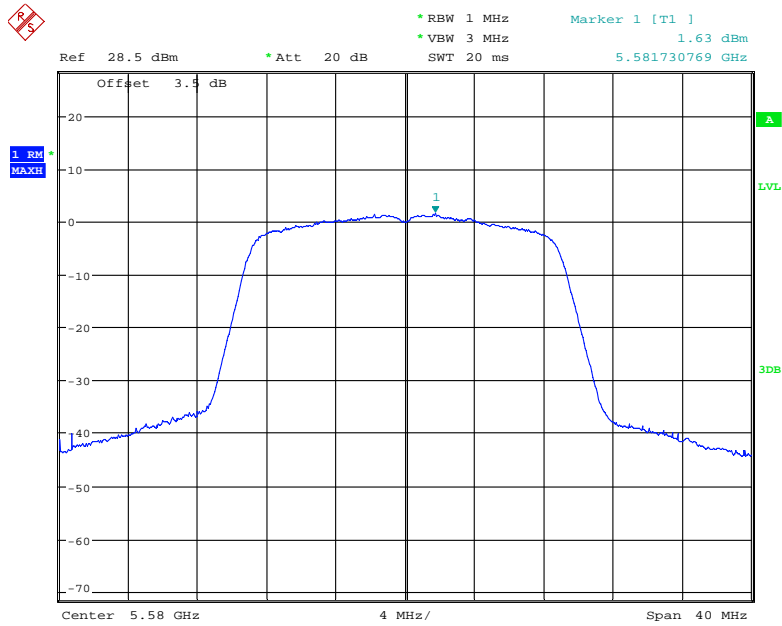
Date: 10.DEC.2019 21:30:48

### 802.11ac20 mode, Power Spectral Density, 5500 MHz



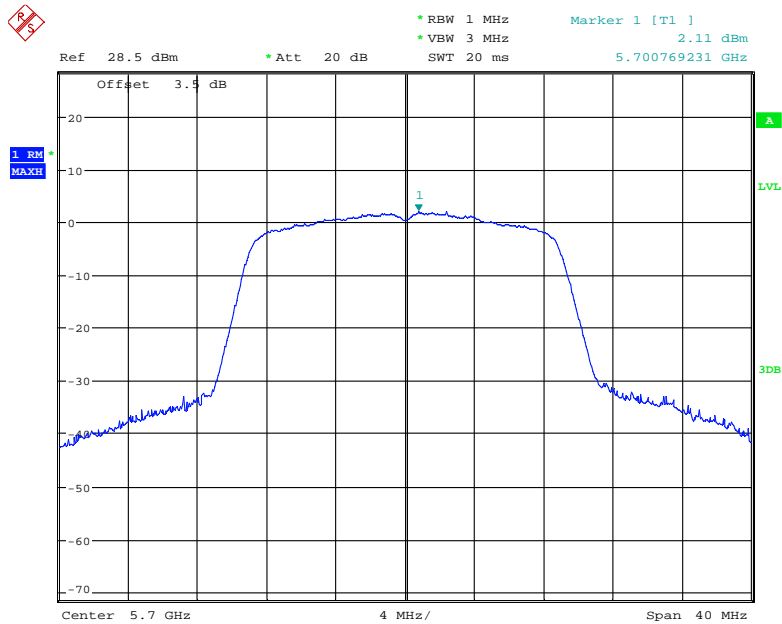
Date: 10.DEC.2019 22:09:43

### 802.11ac20 mode, Power Spectral Density, 5580 MHz



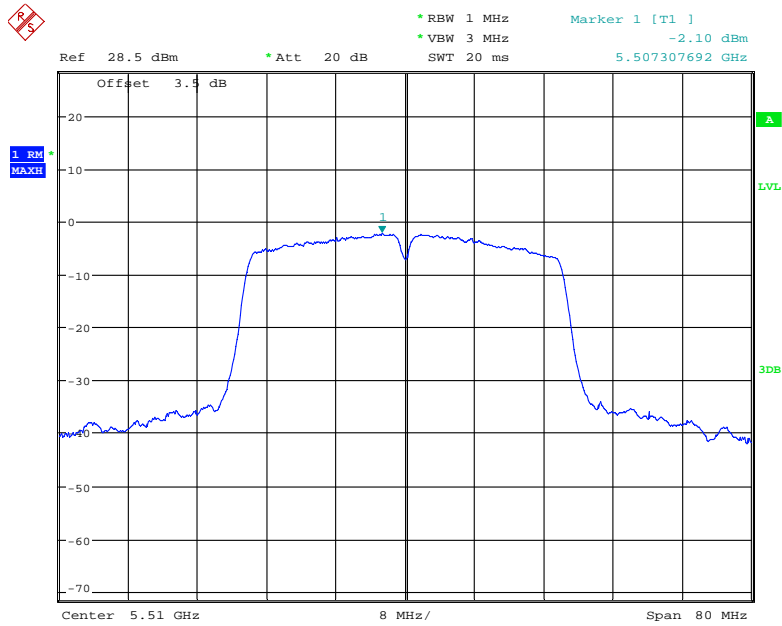
Date: 10.DEC.2019 22:09:06

### 802.11ac20 mode, Power Spectral Density, 5700 MHz



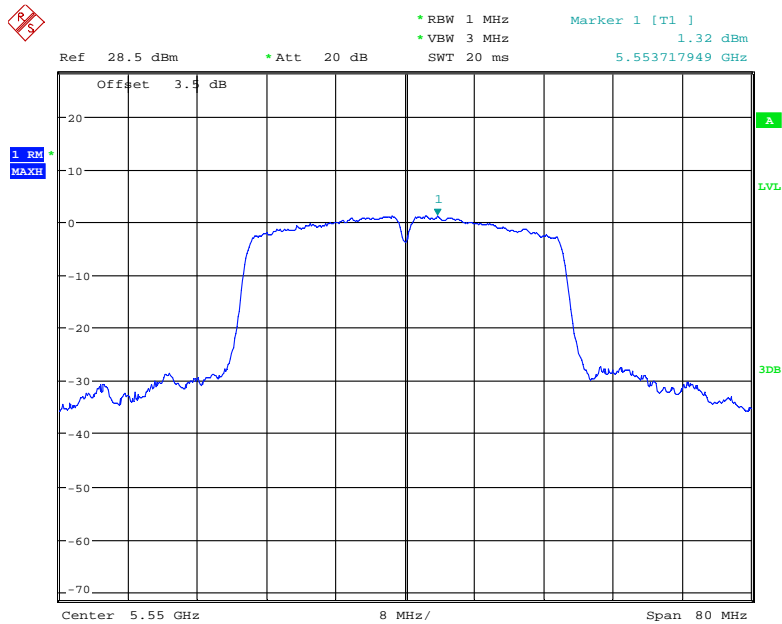
Date: 10.DEC.2019 22:06:57

### 802.11ac40 mode, Power Spectral Density, 5510 MHz



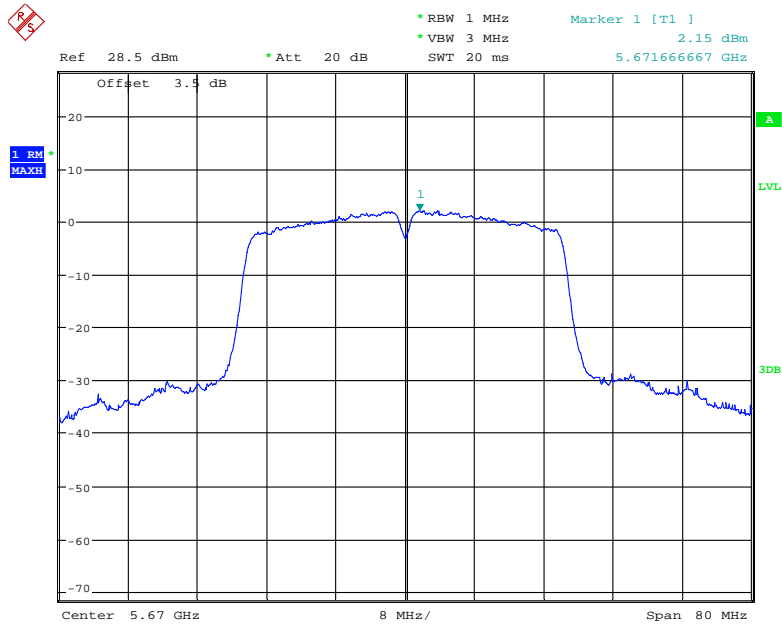
Date: 26.DEC.2019 19:39:31

### 802.11ac40 mode, Power Spectral Density, 5550 MHz



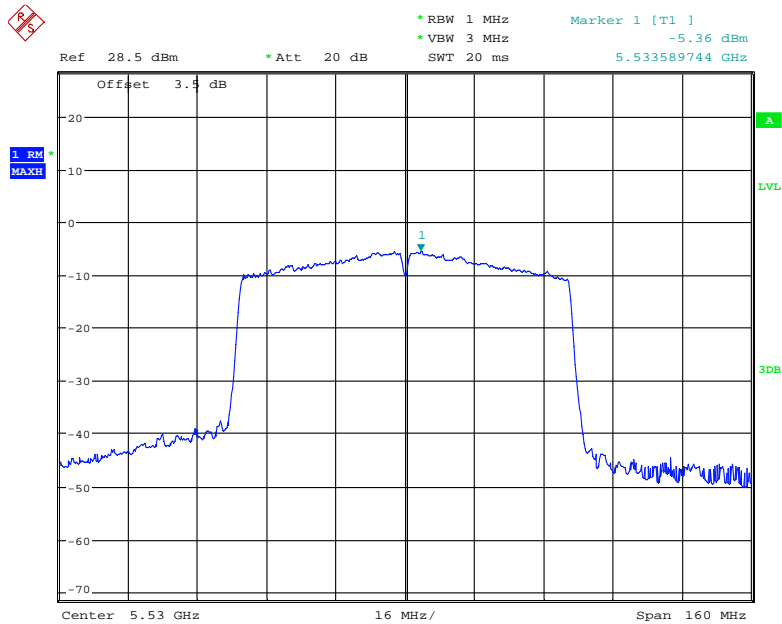
Date: 10.DEC.2019 21:34:00

### 802.11ac40 mode, Power Spectral Density, 5670 MHz



Date: 10.DEC.2019 21:31:49

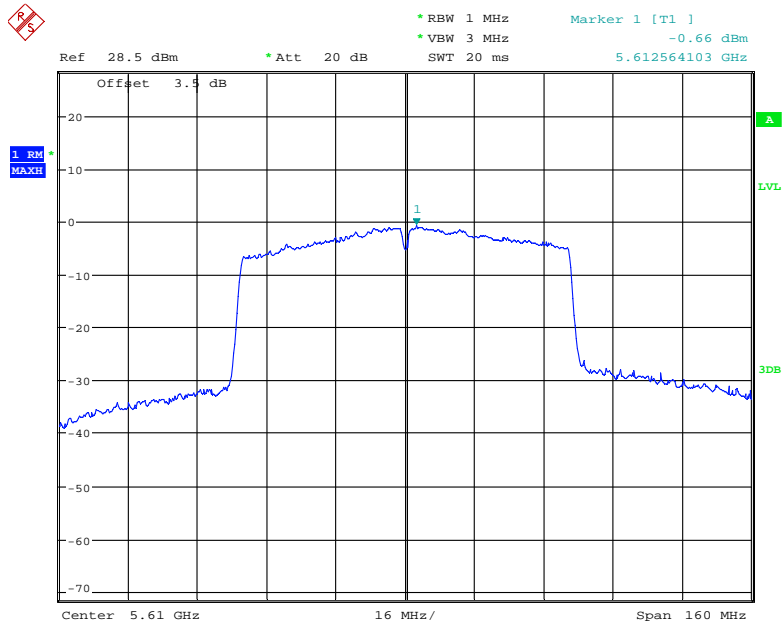
### 802.11ac80 mode, Power Spectral Density, 5530 MHz



Date: 26.DEC.2019 19:28:21



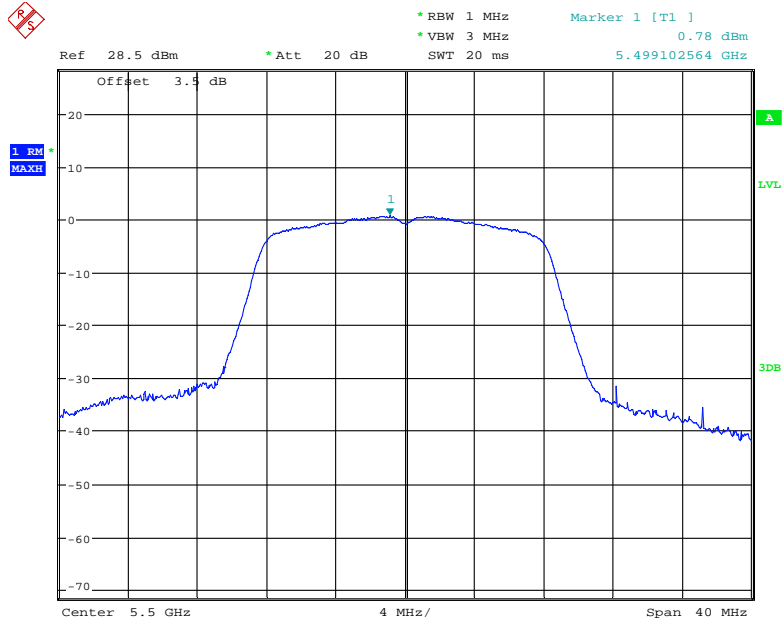
### 802.11ac80 mode, Power Spectral Density, 5610 MHz



Date: 26.DEC.2019 19:27:36

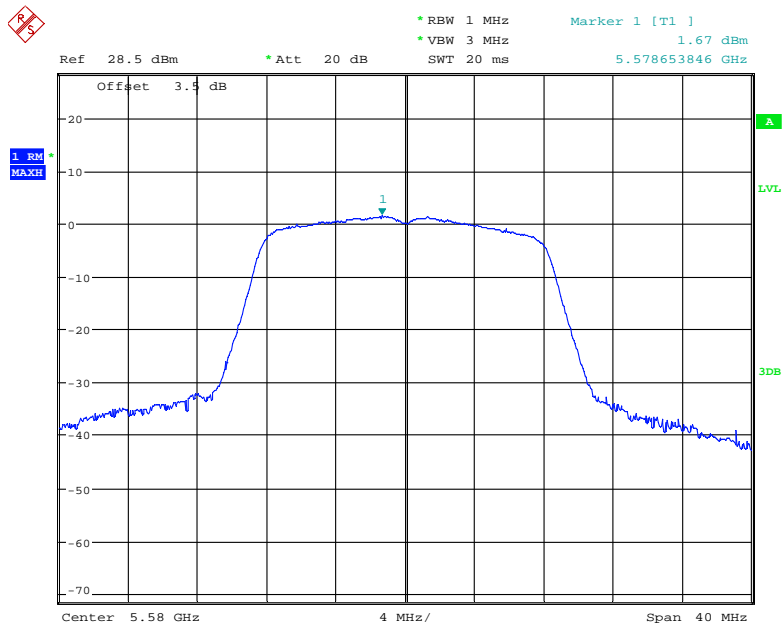
Antenna 3:

802.11a mode, Power Spectral Density, 5500 MHz



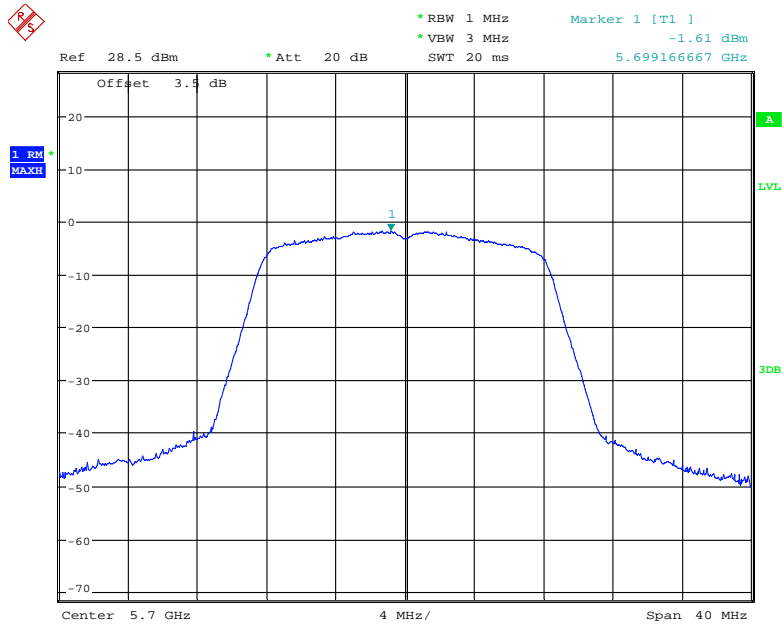
Date: 26.DEC.2019 19:42:13

802.11a mode, Power Spectral Density, 5580 MHz



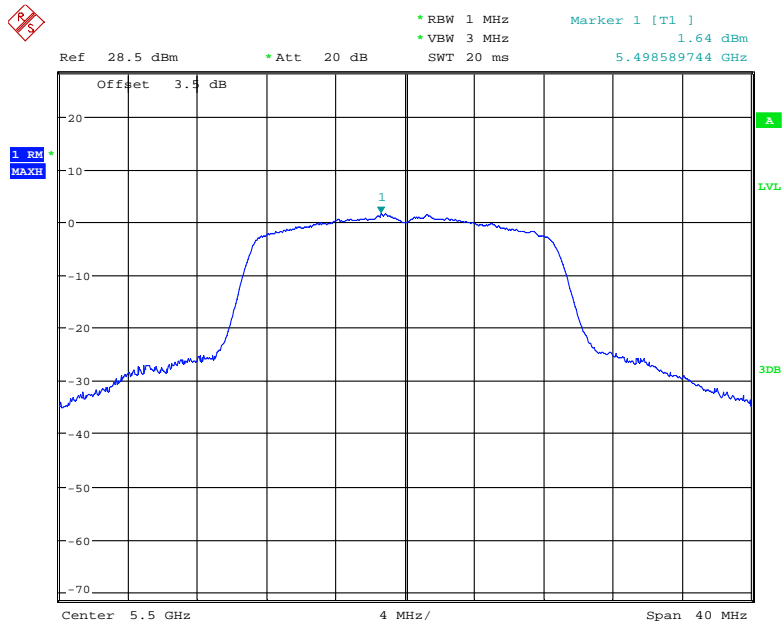
Date: 10.DEC.2019 22:01:38

### 802.11a mode, Power Spectral Density, 5700 MHz



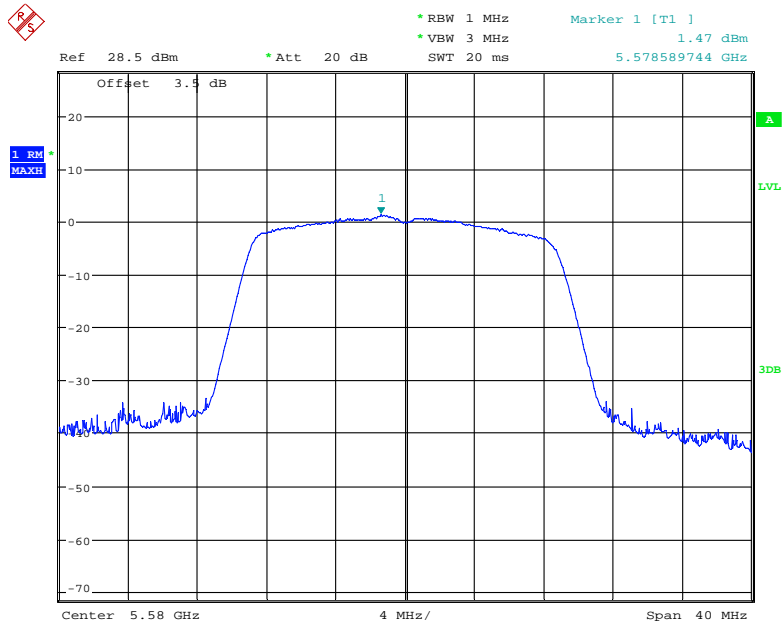
Date: 26.DEC.2019 19:43:46

### 802.11n20 mode, Power Spectral Density, 5500 MHz



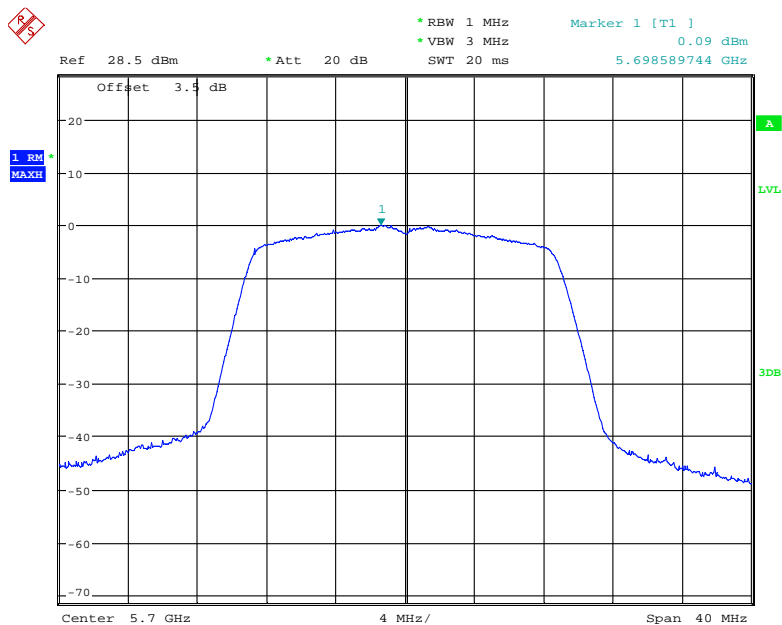
Date: 10.DEC.2019 21:58:15

### 802.11n20 mode, Power Spectral Density, 5580 MHz



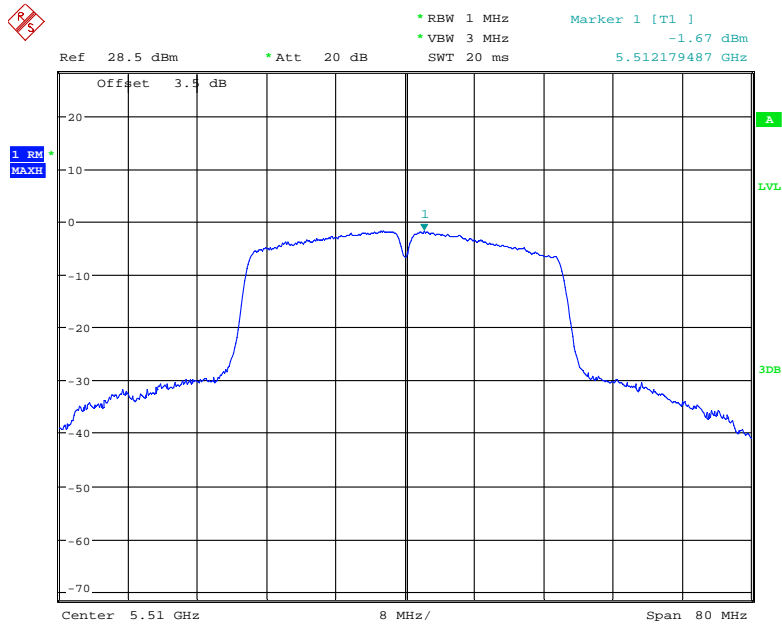
Date: 10.DEC.2019 22:00:54

### 802.11n20 mode, Power Spectral Density, 5700 MHz



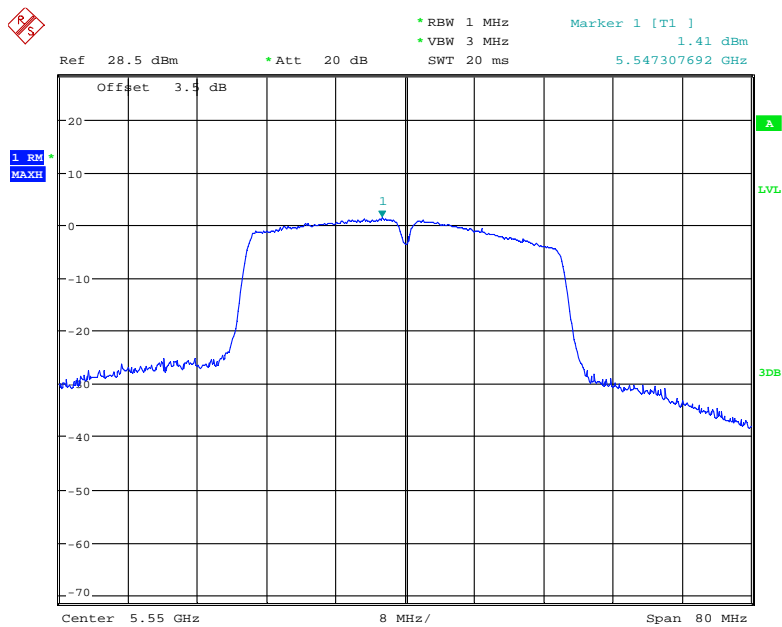
Date: 10.DEC.2019 22:05:15

### 802.11n40 mode, Power Spectral Density, 5510 MHz



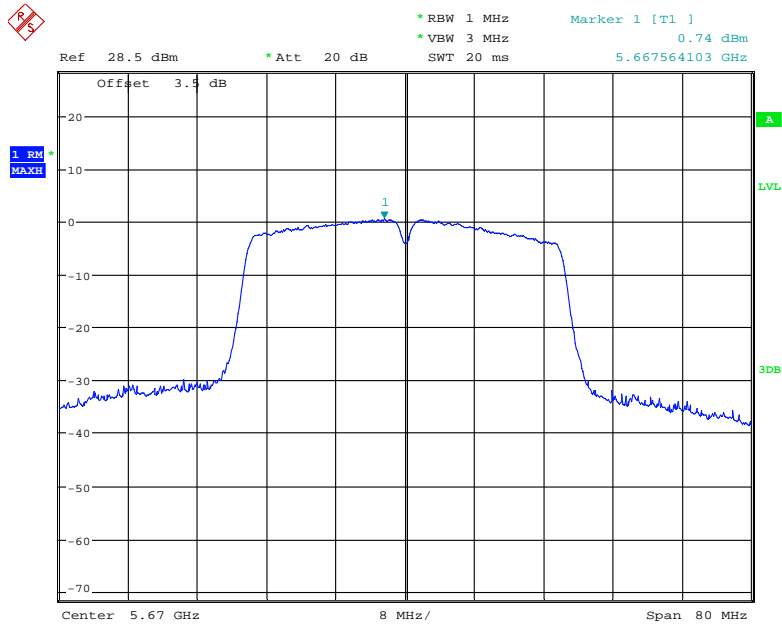
Date: 26.DEC.2019 19:40:37

### 802.11n40 mode, Power Spectral Density, 5550 MHz



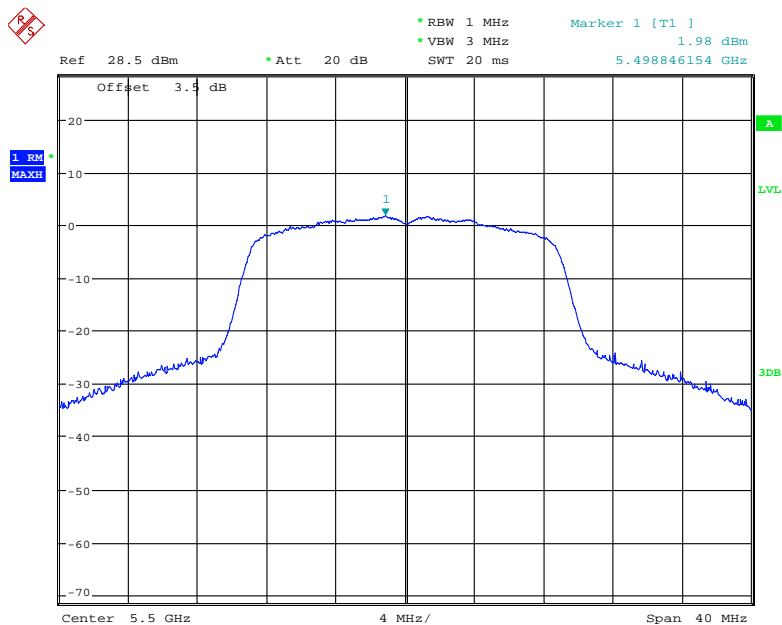
Date: 10.DEC.2019 21:39:59

### 802.11n40 mode, Power Spectral Density, 5670 MHz



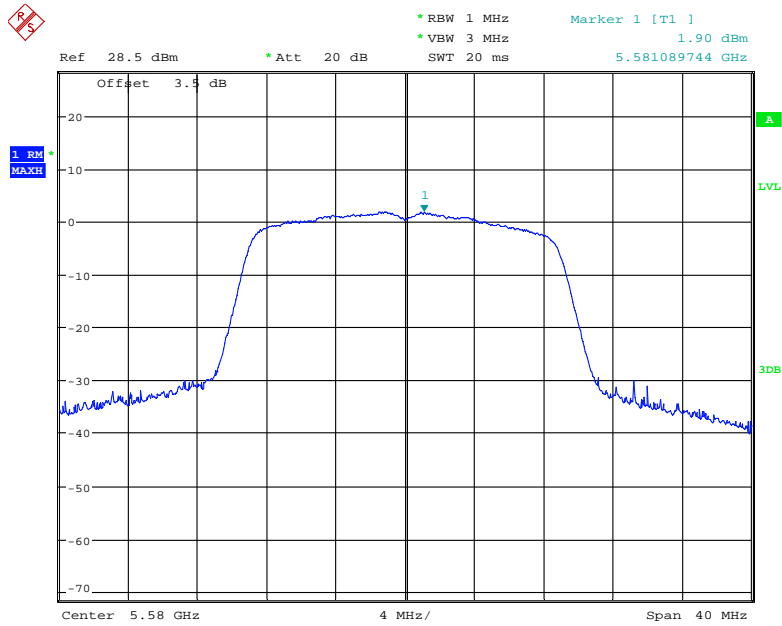
Date: 10.DEC.2019 21:40:20

### 802.11ac20 mode, Power Spectral Density, 5500 MHz



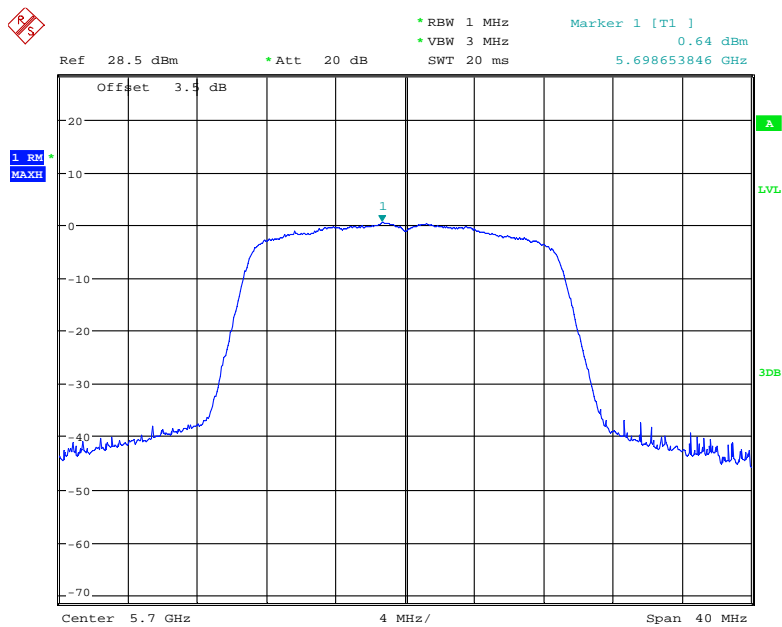
Date: 10.DEC.2019 21:58:37

### 802.11ac20 mode, Power Spectral Density, 5580 MHz



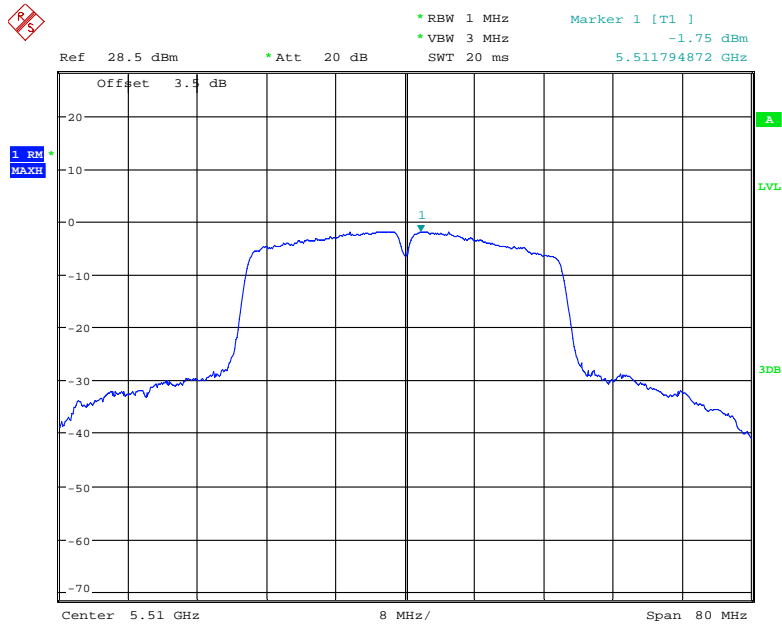
Date: 10.DEC.2019 22:00:26

### 802.11ac20 mode, Power Spectral Density, 5700 MHz



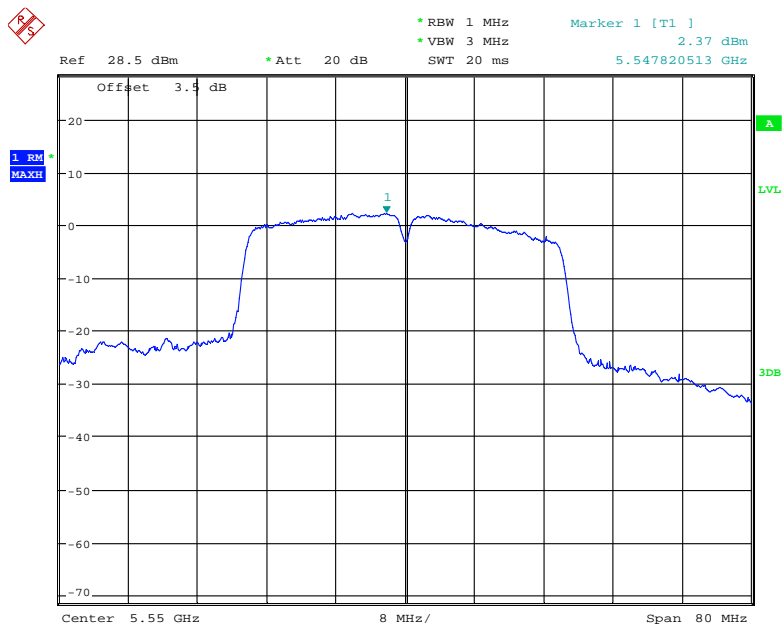
Date: 10.DEC.2019 22:05:45

### 802.11ac40 mode, Power Spectral Density, 5510 MHz



Date: 26.DEC.2019 19:40:13

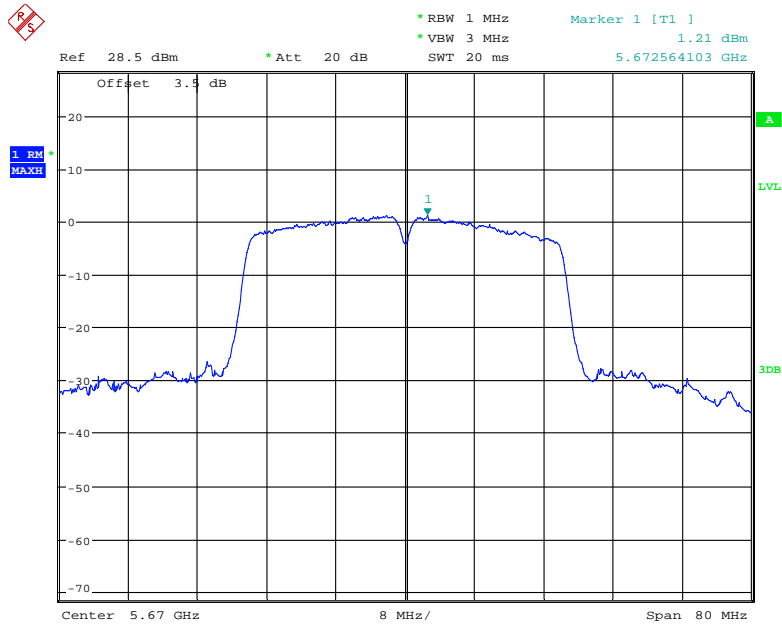
### 802.11ac40 mode, Power Spectral Density, 5550 MHz



Date: 10.DEC.2019 21:39:28



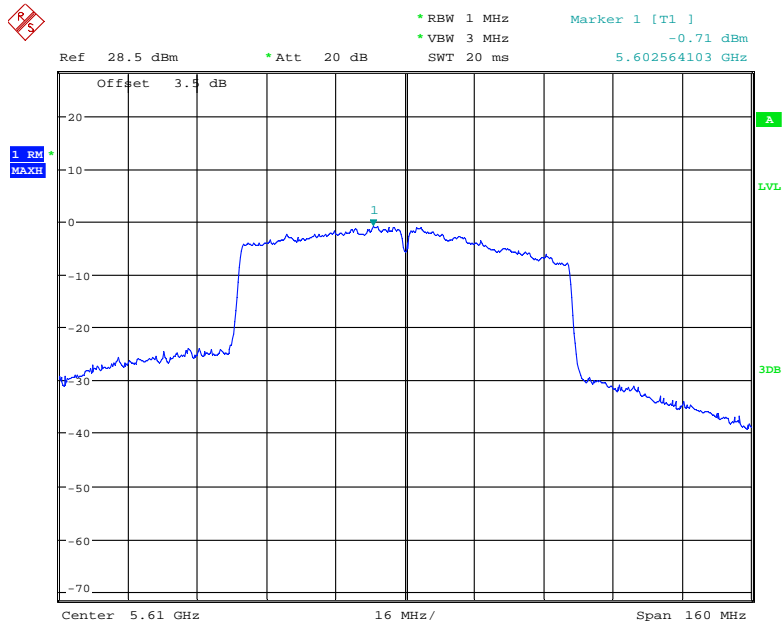
### 802.11ac40 mode, Power Spectral Density, 5670 MHz



### 802.11ac80 mode, Power Spectral Density, 5530 MHz



### 802.11ac80 mode, Power Spectral Density, 5610 MHz



Date: 26.DEC.2019 19:26:54

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