

# TEST REPORT

**FCC ID: 2AWNK-X100**

**Product: Tablet PC**

**Model No.: X100**

**Additional Model No.: N/A**

**Trade Mark: Voger**

**Report No.: TCT201020E056**

**Issued Date: Nov. 27, 2020**

Issued for:

**Shenzhen Apeman Innovations Technology Co., Ltd.  
1808, Heng Lu E Times Building, No. 159, North Pingji Road, Hehua  
Community, Pinghu Street, Longgang District, Shenzhen, Guangdong, China**

Issued By:

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**Appendix A: Test Result of Conducted Test**

**Appendix B: Photographs of Test Setup**

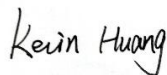
**Appendix C: Photographs of EUT**

**1. Test Certification**

<b>Product:</b>	Tablet PC
<b>Model No.:</b>	X100
<b>Additional Model No.:</b>	N/A
<b>Trade Mark:</b>	Voger
<b>Applicant:</b>	Shenzhen Apeman Innovations Technology Co., Ltd.
<b>Address:</b>	1808, Heng Lu E Times Building, No. 159, North Pingji Road, Hehua Community, Pinghu Street, Longgang District, Shenzhen, Guangdong, China
<b>Manufacturer:</b>	Shenzhen Apeman Innovations Technology Co., Ltd.
<b>Address:</b>	1808, Heng Lu E Times Building, No. 159, North Pingji Road, Hehua Community, Pinghu Street, Longgang District, Shenzhen, Guangdong, China
<b>Date of Test:</b>	Oct. 21, 2020 – Nov. 27, 2020
<b>Applicable Standards:</b>	FCC CFR Title 47 Part 15 Subpart E Section 15.407: 2016 KDB662911 D01 Multiple Transmitter Output v02r01 KDB789033 D02 General U-NII Test Procedures New Rules v02r01

The above equipment has been tested by Shenzhen Tongce Testing Lab. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tested By:



Kevin Huang

Date:

Nov. 27, 2020

Reviewed By:



Beryl Zhao

Date:

Nov. 27, 2020

Approved By:



Tomsin

Date:

Nov. 27, 2020

## 2. Test Result Summary

Requirement	CFR 47 Section	Result
Antenna requirement	§15.203	PASS
AC Power Line Conducted Emission	§15.207	PASS
Maximum Conducted Output Power	§15.407(a)	PASS
26dB Emission Bandwidth & 99% Occupied Bandwidth	§15.407(a)	PASS
Power Spectral Density	§15.407(a)	PASS
Restricted Bands around fundamental frequency	§15.407(a)	PASS
Radiated Emission	§15.407(a)	PASS
Frequency Stability	§15.407(g)	PASS

**Note:**

1. PASS: Test item meets the requirement.
2. Fail: Test item does not meet the requirement.
3. N/A: Test case does not apply to the test object.
4. The test result judgment is decided by the limit of test standard.

### 3. EUT Description

<b>Product:</b>	Tablet PC
<b>Model No.:</b>	X100
<b>Additional Model No.:</b>	N/A
<b>Trade Mark:</b>	<b>Voger</b>
<b>Operation Frequency:</b>	Band 1: 5150 MHz -5250 MHz
<b>Channel Bandwidth:</b>	802.11a: 20MHz 802.11n: 20MHz, 40MHz 802.11ac: 20MHz, 40MHz, 80MHz
<b>Modulation Technology:</b>	Orthogonal Frequency Division Multiplexing(OFDM)
<b>Modulation Type</b>	256QAM, 64QAM, 16QAM, BPSK, QPSK
<b>Antenna Type:</b>	Internal Antenna
<b>Antenna Gain:</b>	1.37dBi
<b>Power Supply:</b>	Rechargeable Li-ion Battery DC 3.8V
<b>AC adapter:</b>	Adapter Information: Model: JML-0500200NZ-LW Input: AC 100-240V, 50/60Hz, 0.5A Output: DC 5.0V, 2A

**Note:** The antenna gain listed in this report is provided by applicant, and the test laboratory is not responsible for this parameter.

**Test Frequency each of channel**

**Band 1**

20MHz		40MHz		80MHz	
Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180	38	5190	42	5210
40	5200	46	5230		
48	5240				

**Note:**

*In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:*

## 4. General Information

### 4.1. Test environment and mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	56 % RH
Atmospheric Pressure:	1010 mbar
Test Mode:	
Engineering mode:	Keep the EUT in continuous transmitting by select channel and modulations(The value of duty cycle is 100%)
<p>The sample was placed 0.8m/1.5m for blow/above 1GHz above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y &amp; Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.</p>	

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

**Per-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.**

Mode	Data rate
802.11a	6 Mbps
802.11n(HT20)	6.5 Mbps
802.11n(HT40)	13.5 Mbps
802.11ac(VHT20)	6.5 Mbps
802.11ac(VHT40)	13.5 Mbps
802.11ac(VHT80)	29.3 Mbps

#### Final Test Mode:

Operation mode:	Keep the EUT in continuous transmitting with modulation
-----------------	---

## 4.2. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Equipment	Model No.	Serial No.	FCC ID	Trade Name
/	/	/	/	/

**Note:**

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.
3. For conducted measurements (Output Power, Emission Bandwidth, Power Spectral Density, Spurious Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.



## 5. Facilities and Accreditations

### 5.1. Facilities

The test facility is recognized, certified, or accredited by the following organizations:

- FCC - Registration No.: 645098

Shenzhen Tongce Testing Lab

The 3m Semi-anechoic chamber has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

- IC - Registration No.: 10668A-1

The 3m Semi-anechoic chamber of SHENZHEN TONGCE TESTING LAB has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

### 5.2. Location

Shenzhen Tongce Testing Lab.

Address: 1B/F., Building 1, Yibaolai Industrial Park, Qiaotou, Fuyong, Baoan District, Shenzhen, Guangdong, China

TEL: +86-755-27673339

### 5.3. Measurement Uncertainty

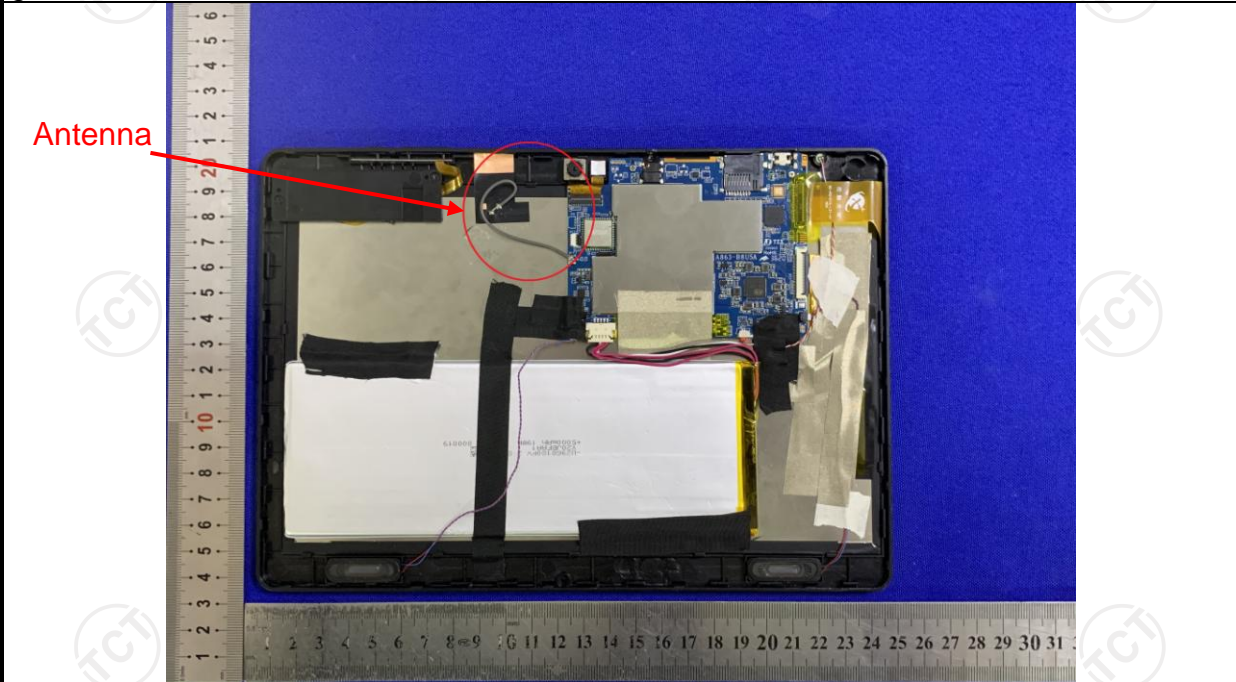
The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission	$\pm 2.56\text{dB}$
2	RF power, conducted	$\pm 0.12\text{dB}$
3	Spurious emissions, conducted	$\pm 0.11\text{dB}$
4	All emissions, radiated(<1G)	$\pm 3.92\text{dB}$
5	All emissions, radiated(>1G)	$\pm 4.28\text{dB}$
6	Temperature	$\pm 0.1^\circ\text{C}$
7	Humidity	$\pm 1.0\%$

## 6. Test Results and Measurement Data

### 6.1. Antenna requirement

<b>Standard requirement:</b>	FCC Part15 C Section 15.203 /247(c)
15.203 requirement: 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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.	
<b>E.U.T Antenna:</b>	
The WIFI antenna is internal antenna which permanently attached, and the best case gain of the antenna is 1.37dBi.	



## 6.2. Conducted Emission

### 6.2.1. Test Specification

<b>Test Requirement:</b>	FCC Part15 C Section 15.207														
<b>Test Method:</b>	ANSI C63.10:2013														
<b>Frequency Range:</b>	150 kHz to 30 MHz														
<b>Receiver setup:</b>	RBW=9 kHz, VBW=30 kHz, Sweep time=auto														
<b>Limits:</b>	<table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table>	Frequency range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
Frequency range (MHz)	Limit (dBuV)														
	Quasi-peak	Average													
0.15-0.5	66 to 56*	56 to 46*													
0.5-5	56	46													
5-30	60	50													
<b>Test Setup:</b>	<p><i>Remark</i> E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>														
<b>Test Mode:</b>	Tx Mode														
<b>Test Procedure:</b>	<ol style="list-style-type: none"> <li>The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.</li> <li>The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).</li> <li>Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.</li> </ol>														
<b>Test Result:</b>	PASS														

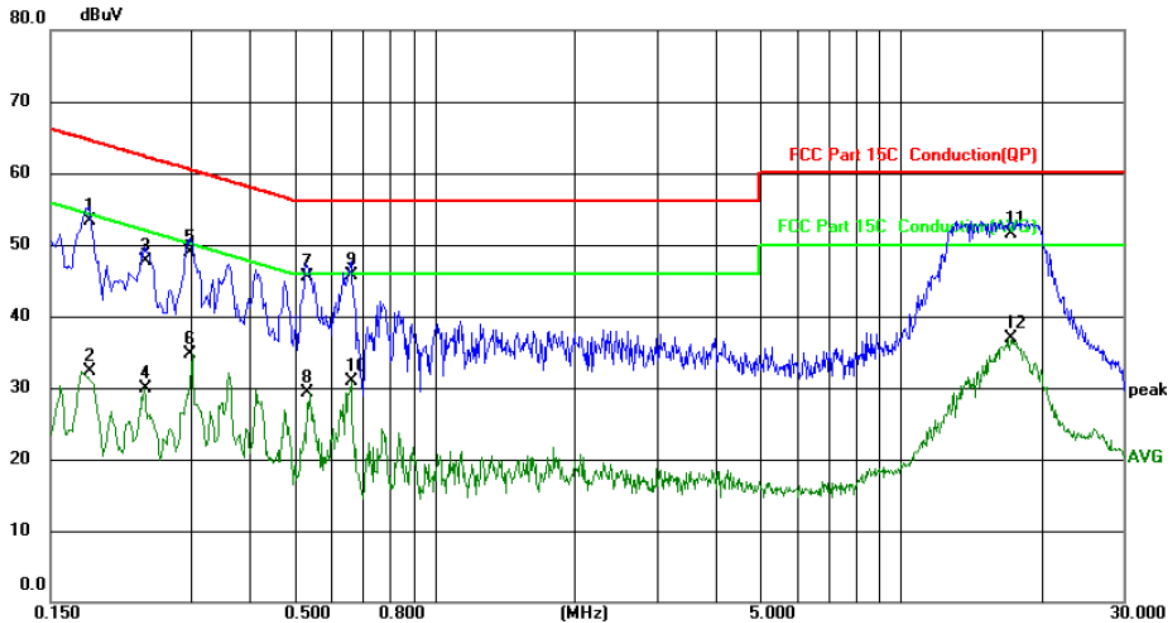
**6.2.2. Test Instruments**

Conducted Emission Shielding Room Test Site (843)				
Equipment	Manufacturer	Model	Serial Number	Calibration Due
Test Receiver	R&S	ESCI3	100898	Jul. 27, 2021
LISN-2	Schwarzbeck	NSLK 8126	8126453	Sep. 11, 2021
Line-5	TCT	CE-05	N/A	Sep. 02, 2021
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

6.2.3. Test data

Please refer to following diagram for individual  
Conducted Emission on Line Terminal of the power line (150 kHz to 30MHz)

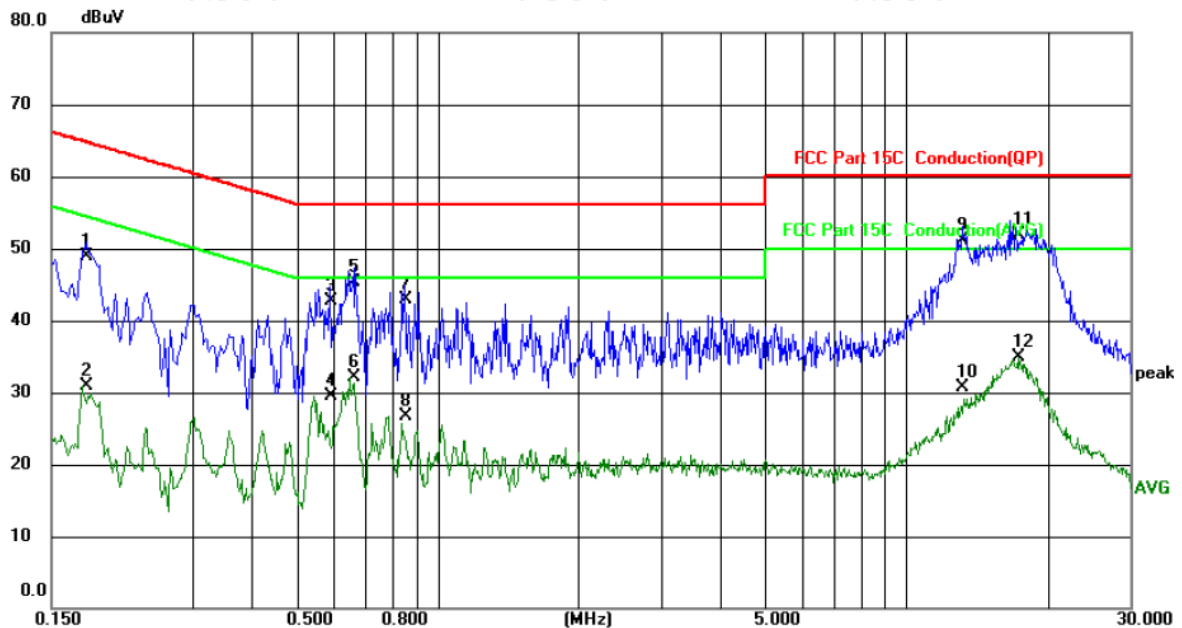


Site	Phase: <b>L1</b>		Temperature: 25 (C)						
Limit: FCC Part 15C Conduction(QP)	Power: AC 120V/60Hz		Humidity: 55 %RH						
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.1819	43.22	10.07	53.29	64.40	-11.11	QP	
2		0.1819	22.26	10.07	32.33	54.40	-22.07	AVG	
3		0.2379	37.60	10.08	47.68	62.17	-14.49	QP	
4		0.2379	19.89	10.08	29.97	52.17	-22.20	AVG	
5		0.2983	38.84	10.09	48.93	60.29	-11.36	QP	
6		0.2983	24.54	10.09	34.63	50.29	-15.66	AVG	
7		0.5299	35.45	10.10	45.55	56.00	-10.45	QP	
8		0.5299	19.28	10.10	29.38	46.00	-16.62	AVG	
9		0.6620	35.53	10.11	45.64	56.00	-10.36	QP	
10		0.6620	20.81	10.11	30.92	46.00	-15.08	AVG	
11	*	17.1700	40.48	10.96	51.44	60.00	-8.56	QP	
12		17.1700	26.04	10.96	37.00	50.00	-13.00	AVG	

**Note:**

- Freq. = Emission frequency in MHz
- Reading level (dBuV) = Receiver reading
- Corr. Factor (dB) = LISN factor + Cable loss
- Measurement (dBuV) = Reading level (dBuV) + Corr. Factor (dB)
- Limit (dBuV) = Limit stated in standard
- Margin (dB) = Measurement (dBuV) – Limits (dBuV)
- Q.P. =Quasi-Peak
- AVG =average
- \* is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz.

## Conducted Emission on Neutral Terminal of the power line (150 kHz to 30MHz)



Site	Phase: N	Temperature: 25 (C)
Limit: FCC Part 15C Conduction(QP)	Power: AC 120V/60Hz	Humidity: 55 %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.1779	38.89	10.07	48.96	64.58	-15.62	QP	
2		0.1779	20.92	10.07	30.99	54.58	-23.59	AVG	
3		0.5899	32.62	10.11	42.73	56.00	-13.27	QP	
4		0.5899	19.49	10.11	29.60	46.00	-16.40	AVG	
5		0.6620	35.16	10.11	45.27	56.00	-10.73	QP	
6		0.6620	22.02	10.11	32.13	46.00	-13.87	AVG	
7		0.8500	32.82	10.13	42.95	56.00	-13.05	QP	
8		0.8500	16.48	10.13	26.61	46.00	-19.39	AVG	
9		13.1417	40.48	10.65	51.13	60.00	-8.87	QP	
10		13.1417	20.10	10.65	30.75	50.00	-19.25	AVG	
11	*	17.3414	40.88	10.97	51.85	60.00	-8.15	QP	
12		17.3414	23.94	10.97	34.91	50.00	-15.09	AVG	

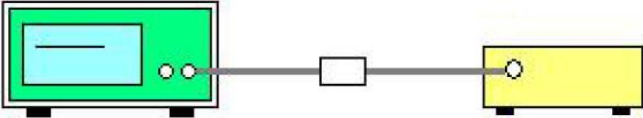
**Note:**

- Freq. = Emission frequency in MHz
- Reading level (dBuV) = Receiver reading
- Corr. Factor (dB) = LISN factor + Cable loss
- Measurement (dBuV) = Reading level (dBuV) + Corr. Factor (dB)
- Limit (dBuV) = Limit stated in standard
- Margin (dB) = Measurement (dBuV) – Limits (dBuV)
- Q.P. =Quasi-Peak
- AVG =average
- \* is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz.



### 6.3. Maximum Conducted Output Power

#### 6.3.1. Test Specification

<b>Test Requirement:</b>	FCC Part15 E Section 15.407(a)& Part 2 J Section 2.1046										
<b>Test Method:</b>	KDB662911 D01 Multiple Transmitter Output v02r01 KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section E										
<b>Limit:</b>	<table border="1"> <thead> <tr> <th>Frequency Band (MHz)</th> <th>Limit</th> </tr> </thead> <tbody> <tr> <td>5180 - 5240</td> <td>24dBm(250mW) for client device</td> </tr> <tr> <td>5260 - 5320</td> <td>24dBm(250mW) or 11 dBm + 10 log B, B is the 26 dB emission bandwidth in megahertz</td> </tr> <tr> <td>5470 - 5725</td> <td>24dBm(250mW) or 11 dBm + 10 log B, B is the 26 dB emission bandwidth in megahertz</td> </tr> <tr> <td>5745 - 5825</td> <td>30dBm(1W)</td> </tr> </tbody> </table>	Frequency Band (MHz)	Limit	5180 - 5240	24dBm(250mW) for client device	5260 - 5320	24dBm(250mW) or 11 dBm + 10 log B, B is the 26 dB emission bandwidth in megahertz	5470 - 5725	24dBm(250mW) or 11 dBm + 10 log B, B is the 26 dB emission bandwidth in megahertz	5745 - 5825	30dBm(1W)
Frequency Band (MHz)	Limit										
5180 - 5240	24dBm(250mW) for client device										
5260 - 5320	24dBm(250mW) or 11 dBm + 10 log B, B is the 26 dB emission bandwidth in megahertz										
5470 - 5725	24dBm(250mW) or 11 dBm + 10 log B, B is the 26 dB emission bandwidth in megahertz										
5745 - 5825	30dBm(1W)										
<b>Test Setup:</b>	 <p style="text-align: center;"> <span style="margin-right: 100px;"><b>Power meter</b></span> <span><b>EUT</b></span> </p>										
<b>Test Mode:</b>	Transmitting mode with modulation										
<b>Test Procedure:</b>	<ol style="list-style-type: none"> <li>1. The testing follows the Measurement Procedure of KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section E, 3, a</li> <li>2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.</li> <li>3. Set to the maximum power setting and enable the EUT transmit continuously.</li> <li>5. Measure the conducted output power and record the results in the test report.</li> </ol>										
<b>Test Result:</b>	PASS										
<b>Remark:</b>	<p>Conducted output power= measurement power +10log(1/x) X is duty cycle=1, so 10log(1/1)=0</p> <p>Conducted output power= measurement power</p>										

**6.3.2. Test Instruments**


Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9020A	MY49100619	Sep. 11, 2021
Power Meter	Agilent	E4418B	GB43312526	Sep. 21, 2021
Power Sensor	Agilent	E9301A	MY41497725	Sep. 21, 2021
RF Cable (9KHz-40GHz)	TCT	RE-high-02	N/A	Sep. 02, 2021
Antenna Connector	TCT	RFC-03	N/A	Sep. 02, 2021

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



## 6.4. 26dB Bandwidth and 99% Occupied Bandwidth

### 6.4.1. Test Specification

<b>Test Requirement:</b>	47 CFR Part 15C Section 15.407 (a)& Part 2 J Section 2.1049
<b>Test Method:</b>	KDB662911 D01 Multiple Transmitter Output v02r01 KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section D
<b>Limit:</b>	No restriction limits
<b>Test Setup:</b>	 <p style="text-align: center;">Spectrum Analyzer                      EUT</p>
<b>Test Mode:</b>	Transmitting mode with modulation
<b>Test Procedure:</b>	<ol style="list-style-type: none"> <li>1. KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section D</li> <li>2. Set to the maximum power setting and enable the EUT transmit continuously.</li> <li>3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement.</li> <li>4. Measure and record the results in the test report.</li> </ol>
<b>Test Result:</b>	PASS

### 6.4.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9020A	MY49100619	Sep. 11, 2021
RF Cable (9KHz-26.5GHz)	TCT	RE-high-02	N/A	Sep. 02, 2021
Antenna Connector	TCT	RFC-03	N/A	Sep. 02, 2021

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



## 6.6. Band edge

### 6.6.1. Test Specification

<b>Test Requirement:</b>	FCC CFR47 Part 15E Section 15.407																				
<b>Test Method:</b>	ANSI C63.10 2013																				
<b>Limit:</b>	In un-restricted band: For Band 1&2A&2C: -27dBm/MHz For Band 3:																				
	<table border="1"> <thead> <tr> <th>Frequency (MHz)</th> <th>Limit (dBm/MHz)</th> <th>Frequency (MHz)</th> <th>Limit (dBm/MHz)</th> </tr> </thead> <tbody> <tr> <td>&lt; 5650</td> <td>-27</td> <td>5850~5855</td> <td>27~15.6</td> </tr> <tr> <td>5650~5700</td> <td>-27~10</td> <td>5855~5875</td> <td>15.6~10</td> </tr> <tr> <td>5700~5720</td> <td>10~15.6</td> <td>5875~5925</td> <td>10~-27</td> </tr> <tr> <td>5720~5725</td> <td>15.6~27</td> <td>&gt; 5925</td> <td>-27</td> </tr> </tbody> </table>	Frequency (MHz)	Limit (dBm/MHz)	Frequency (MHz)	Limit (dBm/MHz)	< 5650	-27	5850~5855	27~15.6	5650~5700	-27~10	5855~5875	15.6~10	5700~5720	10~15.6	5875~5925	10~-27	5720~5725	15.6~27	> 5925	-27
	Frequency (MHz)	Limit (dBm/MHz)	Frequency (MHz)	Limit (dBm/MHz)																	
	< 5650	-27	5850~5855	27~15.6																	
	5650~5700	-27~10	5855~5875	15.6~10																	
5700~5720	10~15.6	5875~5925	10~-27																		
5720~5725	15.6~27	> 5925	-27																		
$E[dB\mu V/m] = EIRP[dBm] + 95.2 @3m$																					
In restricted band:																					
	<table border="1"> <thead> <tr> <th>Detector</th> <th>Limit@3m</th> </tr> </thead> <tbody> <tr> <td>Peak</td> <td>74dB<math>\mu</math>V/m</td> </tr> <tr> <td>AVG</td> <td>54dB<math>\mu</math>V/m</td> </tr> </tbody> </table>	Detector	Limit@3m	Peak	74dB $\mu$ V/m	AVG	54dB $\mu$ V/m														
Detector	Limit@3m																				
Peak	74dB $\mu$ V/m																				
AVG	54dB $\mu$ V/m																				
<b>Test Setup:</b>																					
<b>Test Mode:</b>	Transmitting mode with modulation																				
<b>Test Procedure:</b>	<ol style="list-style-type: none"> <li>1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li> <li>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.</li> <li>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold</li> </ol>																				

	<p>Mode.</p> <p>6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasipeak or average method as specified and then reported in a data sheet.</p>
<b>Test Result:</b>	PASS

**6.6.2. Test Instruments**

Radiated Emission Test Site (966)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Test Receiver	ROHDE&SCHW ARZ	ESIB7	100197	Jul. 27, 2021
Spectrum Analyzer	ROHDE&SCHW ARZ	FSQ40	200061	Sep. 11, 2021
Spectrum Analyzer	Agilent	N9020A	MY49100619	Sep. 11, 2021
Pre-amplifier	EM Electronics Corporation CO.,LTD	EM30265	07032613	Sep. 02, 2021
Pre-amplifier	HP	8447D	2727A05017	Sep. 02, 2021
Loop antenna	ZHINAN	ZN30900A	12024	Sep. 05, 2022
Broadband Antenna	Schwarzbeck	VULB9163	340	Sep. 04, 2022
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Sep. 04, 2022
Horn Antenna	A-INFO	LB-180400-KF	J211020657	Sep. 02, 2021
Line-4	TCT	RE-high-04	N/A	Sep. 02, 2021
Line-8	TCT	RE-01	N/A	Jul. 27, 2021
Antenna Mast	Keleto	CC-A-4M	N/A	N/A
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

**6.6.3. Test Data**

802.11 a	CH	Freq. (MHz)	Read_level (dBuV/m)	Factor (dB)	Peak (dBuV/m)	Limit (dBuV/m) (Peak)	Limit (dBuV/m) (Avg)	Over	Ant. Pol. H/V
Band 1	Lowest	5150	42.62	5.82	48.44	74	54	-5.56	H
		5150	37.89	5.82	43.71	74	54	-10.29	V
	Highest	5250	42.10	6.52	48.62	74	54	-5.38	H
		5250	38.92	6.52	45.44	74	54	-8.56	V
Remark: Factor(dB)=Ant. Factor+Cable Loss-Amp. Factor									

802.11 nHT20	CH	Freq. (MHz)	Read_level (dBuV/m)	Factor (dB)	Peak (dBuV/m)	Limit (dBuV/m) (Peak)	Limit (dBuV/m) (Avg)	Over	Ant. Pol. H/V
Band 1	Lowest	5150	41.41	6.96	48.37	74	54	-5.63	H
		5150	40.87	6.96	47.83	74	54	-6.17	V
	Highest	5250	36.05	8.21	44.26	74	54	-9.74	H
		5250	38.72	8.21	46.93	74	54	-7.07	V
Remark: Factor(dB)=Ant. Factor+Cable Loss-Amp. Factor									

802.11 nHT40	CH	Freq. (MHz)	Read_level (dBuV/m)	Factor (dB)	Peak (dBuV/m)	Limit (dBuV/m) (Peak)	Limit (dBuV/m) (Avg)	Over	Ant. Pol. H/V
Band 1	Lowest	5150	43.44	5.82	49.26	74	54	-4.74	H
		5150	38.55	5.82	44.37	74	54	-9.63	V
	Highest	5250	41.93	6.52	48.45	74	54	-5.55	H
		5250	39.32	6.52	45.84	74	54	-8.16	V
Remark: Factor(dB)=Ant. Factor+Cable Loss-Amp. Factor									

802.11 ac HT20	CH	Freq. (MHz)	Read_level (dBuV/m)	Factor (dB)	Peak (dBuV/m)	Limit (dBuV/m) (Peak)	Limit (dBuV/m) (Avg)	Over	Ant. Pol. H/V
Band 1	Lowest	5150	37.20	6.96	44.16	74	54	-9.84	H
		5150	41.17	6.96	48.13	74	54	-5.87	V
	Highest	5250	40.99	8.21	49.20	74	54	-4.80	H
		5250	38.47	8.21	46.68	74	54	-7.32	V
Remark: Factor(dB)=Ant. Factor+Cable Loss-Amp. Factor									

802.11 ac HT40	CH	Freq. (MHz)	Read_level (dBuV/m)	Factor (dB)	Peak (dBuV/m)	Limit (dBuV/m) (Peak)	Limit (dBuV/m) (Avg)	Over	Ant. Pol. H/V
Band 1	Lowest	5150	43.22	5.82	49.04	74	54	-4.96	H
		5150	38.16	5.82	43.98	74	54	-10.02	V
	Highest	5250	42.31	6.52	48.83	74	54	-5.17	H
		5250	39.08	6.52	45.60	74	54	-8.40	V
Remark: Factor(dB)=Ant. Factor+Cable Loss-Amp. Factor									

802.11 ac HT80	CH	Freq. (MHz)	Read_level (dBuV/m)	Factor (dB)	Peak (dBuV/m)	Limit (dBuV/m) (Peak)	Limit (dBuV/m) (Avg)	Over	Ant. Pol. H/V
Band 1	Lowest	5150	39.95	6.96	46.91	74	54	-7.09	H
		5150	41.47	6.96	48.43	74	54	-5.57	V
	Highest	5250	36.24	8.21	44.45	74	54	-9.55	H
		5250	38.92	8.21	47.13	74	54	-6.87	V
Remark: Factor(dB)=Ant. Factor+Cable Loss-Amp. Factor									

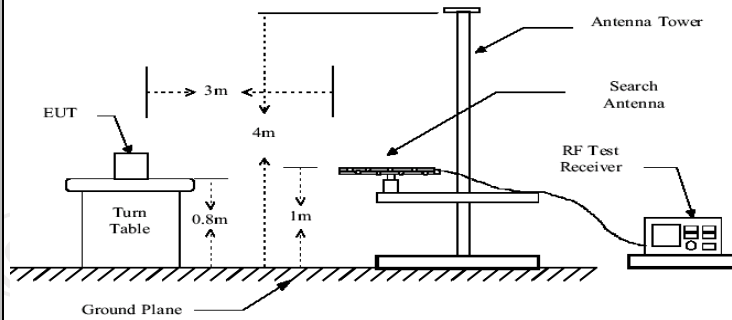


## 6.7. Unwanted Emission

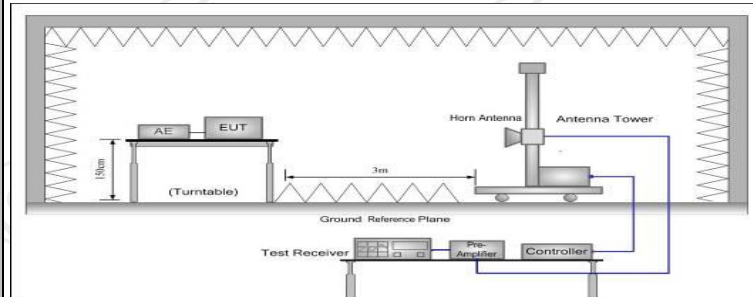
### 6.7.1. Test Specification

<b>Test Requirement:</b>	FCC CFR47 Part 15 Section 15.407 & 15.209 & 15.205				
<b>Test Method:</b>	KDB 789033 D02 v02r01				
<b>Frequency Range:</b>	9kHz to 40GHz				
<b>Measurement Distance:</b>	3 m				
<b>Antenna Polarization:</b>	Horizontal & Vertical				
<b>Operation mode:</b>	Transmitting mode with modulation				
<b>Receiver Setup:</b>	Frequency	Detector	RBW	VBW	Remark
	9kHz- 150kHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value
	150kHz- 30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		Peak	1MHz	10Hz	Average Value
<b>Limit:</b>	Unwanted spurious emissions fallen in restricted bands per FCC Part15.205 shall comply with the general field strength limits set forth in § 15.209 as below table,				
	Frequency	Field Strength (microvolts/meter)	Measurement Distance (meters)		
	0.009-0.490	2400/F(KHz)	300		
	0.490-1.705	24000/F(KHz)	30		
	1.705-30	30	30		
	30-88	100	3		
	88-216	150	3		
	216-960	200	3		
	Above 960	500	3		
	Frequency	Limit (dBuV/m @3m)	Detector		
Above 1G	74.0	Peak			
	54.0	Average			
<b>Test setup:</b>	For radiated emissions below 30MHz				
	<p>The diagram illustrates the test setup for radiated emissions below 30MHz. It shows an Equipment Under Test (EUT) placed on a turn table. A distance of 3m is maintained between the EUT and the antenna. The antenna is positioned above a ground plane. The receiver chain consists of a pre-amplifier, a receiver, and a computer connected to the receiver.</p>				
	30MHz to 1GHz				





Above 1GHz



**Test Procedure:**

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

**Test results:**

PASS

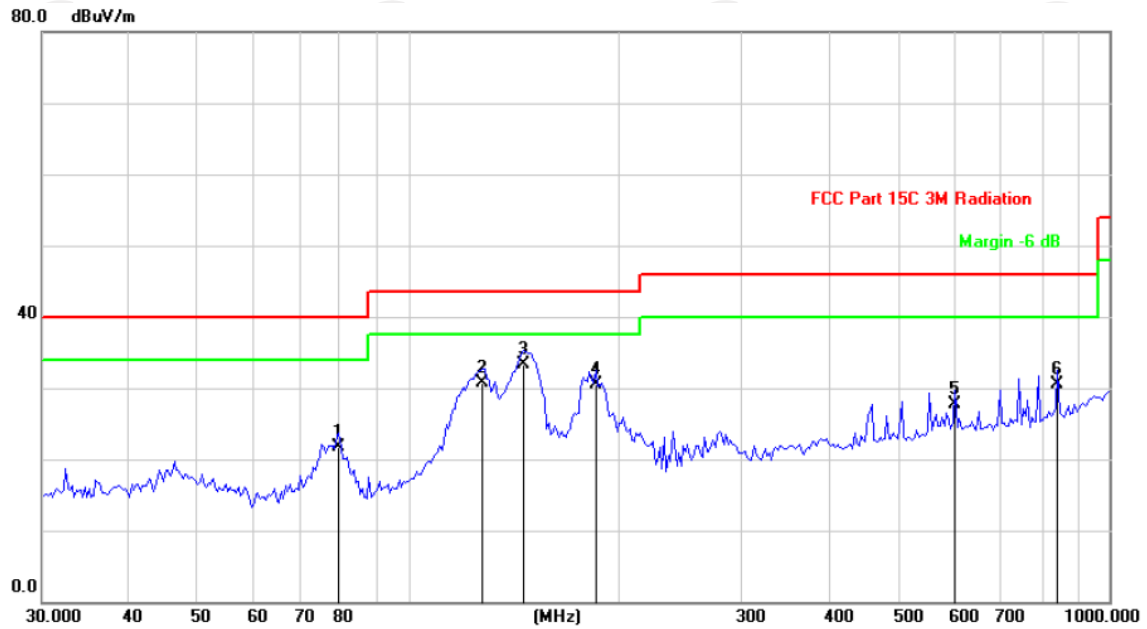
**6.7.2. Test Instruments**

Radiated Emission Test Site (966)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Test Receiver	ROHDE&SCHWARZ	ESIB7	100197	Jul. 27, 2021
Spectrum Analyzer	ROHDE&SCHWARZ	FSQ40	200061	Sep. 11, 2021
Pre-amplifier	EM Electronics Corporation CO.,LTD	EM30265	07032613	Sep. 02, 2021
Pre-amplifier	HP	8447D	2727A05017	Sep. 02, 2021
Loop antenna	ZHINAN	ZN30900A	12024	Sep. 05, 2022
Broadband Antenna	Schwarzbeck	VULB9163	340	Sep. 04, 2022
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Sep. 04, 2022
Horn Antenna	A-INFO	LB-180400-KF	J211020657	Sep. 04, 2022
Antenna Mast	Keleto	RE-AM	N/A	N/A
Line-4	TCT	RE-high-04	N/A	Sep. 02, 2021
Line-8	TCT	RE-01	N/A	Jul. 27, 2021
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A

**6.7.3. Test Data**

Please refer to following diagram for individual  
Below 1GHz

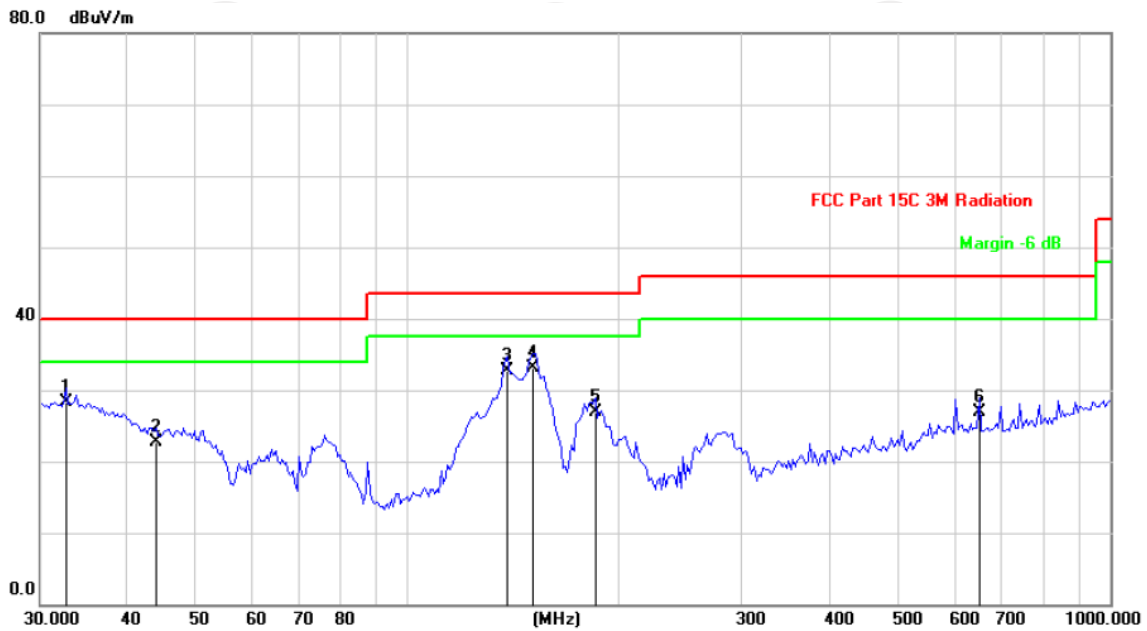
Horizontal:



Site: Polarization: *Horizontal* Temperature: 25  
Limit: FCC Part 15C 3M Radiation Power: AC 120V/60Hz Humidity: 55 %

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		79.6764	37.70	-15.90	21.80	40.00	-18.20	QP
2		127.5865	47.10	-16.42	30.68	43.50	-12.82	QP
3	*	145.8109	49.13	-15.73	33.40	43.50	-10.10	QP
4		185.1622	44.60	-14.07	30.53	43.50	-12.97	QP
5		602.9287	32.98	-5.32	27.66	46.00	-18.34	QP
6		844.8028	33.54	-3.02	30.52	46.00	-15.48	QP

Vertical:



Site: Polarization: **Vertical** Temperature: 25  
 Limit: FCC Part 15C 3M Radiation Power: AC 120V/60Hz Humidity: 55 %

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		32.6394	42.95	-14.63	28.32	40.00	-11.68	QP
2		43.8451	35.13	-12.40	22.73	40.00	-17.27	QP
3		138.8120	48.63	-15.98	32.65	43.50	-10.85	QP
4	*	151.0252	48.67	-15.62	33.05	43.50	-10.45	QP
5		185.1622	40.98	-14.07	26.91	43.50	-16.59	QP
6		651.3831	31.90	-5.04	26.86	46.00	-19.14	QP

- Note:**
- The low frequency, which started from 9KHz~30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported
  - Measurements were conducted in all three channels (high, middle, low) and all modulation (802.11a, 802.11n(HT20), 802.11n(HT40), 802.11n(HT20), 802.11ac(VHT20), 802.11ac(VHT40), 802.11ac(VHT80), and the worst case Mode (Lowest channel and 802.11n(HT20)) was submitted only.
  - Measurement (dBuV) = Reading level + Correction Factor, correction Factor= Antenna Factor + Cable loss - Pre-amplifier.

Modulation Type: Band 1

11a CH36: 5180MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
10360	H	40.04	---	8.02	48.06	---	74	54	-5.94
15540	H	40.83	---	9.87	50.70	---	74	54	-3.30
---	H	---	---	---	---	---	---	---	---
10360	V	39.44	---	8.02	47.46	---	74	54	-6.54
15540	V	40.62	---	9.87	50.49	---	74	54	-3.51
---	V	---	---	---	---	---	---	---	---

11a CH40: 5200MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
10400	H	41.50	---	7.97	49.47	---	74	54	-4.53
15600	H	39.92	---	9.83	49.75	---	74	54	-4.25
---	H	---	---	---	---	---	---	---	---
10400	V	41.76	---	7.97	49.73	---	74	54	-4.27
15600	V	40.08	---	9.83	49.91	---	74	54	-4.09
---	V	---	---	---	---	---	---	---	---

11a CH48: 5240MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
10480	H	40.68	---	7.97	48.65	---	74	54	-5.35
15720	H	40.53	---	9.83	50.36	---	74	54	-3.64
---	H	---	---	---	---	---	---	---	---
10480	V	41.04	---	7.97	49.01	---	74	54	-4.99
15720	V	38.89	---	9.83	48.72	---	74	54	-5.28
---	V	---	---	---	---	---	---	---	---

11n(HT20) CH36: 5180MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
10360	H	41.56	---	8.02	49.58	---	74	54	-4.42
15540	H	40.29	---	9.87	50.16	---	74	54	-3.84
---	H	---	---	---	---	---	---	---	---
10360	V	41.46	---	8.02	49.48	---	74	54	-4.52
15540	V	39.02	---	9.87	48.89	---	74	54	-5.11
---	V	---	---	---	---	---	---	---	---

11n(HT20) CH40: 5200MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
10400	H	40.02	---	7.97	47.99	---	74	54	-6.01
15600	H	40.99	---	9.83	50.82	---	74	54	-3.18
---	H	---	---	---	---	---	---	---	---
10400	V	42.87	---	7.97	50.84	---	74	54	-3.16
15600	V	40.13	---	9.83	49.96	---	74	54	-4.04
---	V	---	---	---	---	---	---	---	---

11n(HT20) CH48: 5240MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
10480	H	40.36	---	7.97	48.33	---	74	54	-5.67
15720	H	39.18	---	9.83	49.01	---	74	54	-4.99
---	H	---	---	---	---	---	---	---	---
10480	V	40.89	---	7.97	48.86	---	74	54	-5.14
15720	V	40.41	---	9.83	50.24	---	74	54	-3.76
---	V	---	---	---	---	---	---	---	---

11n(HT40)CH38: 5190MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
10380	H	42.17	---	7.75	49.92	---	74	54	-4.08
15570	H	39.56	---	9.87	49.43	---	74	54	-4.57
---	H	---	---	---	---	---	---	---	---
10380	V	41.49	---	7.75	49.24	---	74	54	-4.76
15570	V	40.27	---	9.87	50.14	---	74	54	-3.86
---	V	---	---	---	---	---	---	---	---

11n(HT40)CH46: 5230MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
10460	H	42.09	---	7.97	50.06	---	74	54	-3.94
15690	H	39.86	---	9.83	49.69	---	74	54	-4.31
---	H	---	---	---	---	---	---	---	---
10460	V	42.34	---	7.97	50.31	---	74	54	-3.69
15690	V	40.55	---	9.83	50.38	---	74	54	-3.62
---	V	---	---	---	---	---	---	---	---

11ac(VHT20) CH36: 5180MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
10360	H	41.57	---	8.02	49.59	---	74	54	-4.41
15540	H	40.01	---	9.87	49.88	---	74	54	-4.12
---	H	---	---	---	---	---	---	---	---
10360	V	39.85	---	8.02	47.87	---	74	54	-6.13
15540	V	40.19	---	9.87	50.06	---	74	54	-3.94
---	V	---	---	---	---	---	---	---	---

11ac(VHT20) CH40: 5200MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
10400	H	42.62	---	7.97	50.59	---	74	54	-3.41
15600	H	40.40	---	9.83	50.23	---	74	54	-3.77
---	H	---	---	---	---	---	---	---	---
10400	V	40.89	---	7.97	48.86	---	74	54	-5.14
15600	V	40.36	---	9.83	50.19	---	74	54	-3.81
---	V	---	---	---	---	---	---	---	---

11ac(VHT20) CH48: 5240MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
10480	H	38.30	---	7.97	46.27	---	74	54	-7.73
15720	H	39.89	---	9.83	49.72	---	74	54	-4.28
---	H	---	---	---	---	---	---	---	---
10480	V	40.61	---	7.97	48.58	---	74	54	-5.42
15720	V	40.25	---	9.83	50.08	---	74	54	-3.92
---	V	---	---	---	---	---	---	---	---

11ac(VHT40) CH38: 5190MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
10380	H	43.01	---	7.75	50.76	---	74	54	-3.24
15570	H	40.69	---	9.87	50.56	---	74	54	-3.44
---	H	---	---	---	---	---	---	---	---
10380	V	40.76	---	7.75	48.51	---	74	54	-5.49
15570	V	40.53	---	9.87	50.40	---	74	54	-3.60
---	V	---	---	---	---	---	---	---	---

11ac(VHT40) CH46: 5230MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
10460	H	41.32	---	7.97	49.29	---	74	54	-4.71
15690	H	40.60	---	9.83	50.43	---	74	54	-3.57
---	H	---	---	---	---	---	---	---	---
10460	V	41.81	---	7.97	49.78	---	74	54	-4.22
15690	V	40.36	---	9.83	50.19	---	74	54	-3.81
---	V	---	---	---	---	---	---	---	---

11ac(VHT80) CH42:5210

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
10420	H	42.13	---	7.96	50.09	---	74	54	-3.91
15630	H	40.55	---	9.84	50.39	---	74	54	-3.61
---	H	---	---	---	---	---	---	---	---
10420	V	41.90	---	7.96	49.86	---	74	54	-4.14
15630	V	40.37	---	9.84	50.21	---	74	54	-3.79
---	V	---	---	---	---	---	---	---	---

**Note:**

1. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier
2. Margin (dB) = Emission Level (Peak) (dBμV/m)-Average limit (dBμV/m)
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency. The highest test frequency is 40GHz.
5. Data of measurement shown "---" in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.



## 6.8. Frequency Stability Measurement

### 6.8.1. Test Specification

<b>Test Requirement:</b>	FCC Part15 Section 15.407(g) &Part2 J Section 2.1055
<b>Test Method:</b>	ANSI C63.10: 2013
<b>Limit:</b>	The frequency tolerance shall be maintained within the band of operation frequency over a temperature variation of 0 degrees to 45 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.
<b>Test Setup:</b>	<pre> graph LR     SA[Spectrum Analyzer] --- EUT[EUT]     subgraph TC [Temperature Chamber]         EUT     end     P[AC/DC Power supply] --- EUT     </pre>
<b>Test Procedure:</b>	The EUT was placed inside the environmental test chamber and powered by nominal AC/DC voltage. b. Turn the EUT on and couple its output to a spectrum analyzer. c. Turn the EUT off and set the chamber to the highest temperature specified. d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature. f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.
<b>Test Result:</b>	PASS
<b>Remark:</b>	Pre-scan was performed at all models(11a,11n,11ac), the worst case (11ac) was found and test data was shown in this report.



Test plots as follows:

Test mode:		802.11ac(VHT20)	Frequency(MHz):	5180
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	3.8V	5180.0091	9100	PASS
35		5180.0064	6400	PASS
25		5179.9876	-12400	PASS
15		5179.9988	-1200	PASS
5		5180.0034	3400	PASS
0		5180.0041	4100	PASS
20		3.7	5179.9832	-16800
	3.8	5180.0035	3500	PASS
	4.35	5179.9829	-17100	PASS

Test mode:		802.11ac(VHT20)	Frequency(MHz):	5200
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	3.8V	5200.0095	9500	PASS
35		5200.0081	8100	PASS
25		5200.0074	7400	PASS
15		5200.0043	4300	PASS
5		5199.9985	-1500	PASS
0		5199.9873	-12700	PASS
20		3.7	5199.9952	-4800
	3.8	5200.0021	2100	PASS
	4.35	5200.0050	5000	PASS

Test mode:		802.11ac(VHT20)	Frequency(MHz):	5240
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	3.8V	5240.0047	4700	PASS
35		5240.0033	3300	PASS
25		5240.0025	2500	PASS
15		5239.9991	-900	PASS
5		5239.9989	-1100	PASS
0		5239.9972	-2800	PASS
20		3.7	5240.0034	3400
	3.8	5240.0016	1600	PASS
	4.35	5239.9980	-2000	PASS

Test mode:		802.11ac(VHT20)	Frequency(MHz):	5260
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	3.8V	5260.0087	8700	PASS
35		5260.0054	5400	PASS
25		5259.9889	-11100	PASS
15		5259.9981	-1900	PASS
5		5260.0034	3400	PASS
0		5260.0047	4700	PASS
20		3.7	5259.9832	-16800
	3.8	5260.0038	3800	PASS
	4.35	5259.9825	-17500	PASS

Test mode:		802.11ac(VHT20)	Frequency(MHz):	5300
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	3.8V	5300.0085	8500	PASS
35		5300.0091	9100	PASS
25		5300.0077	7700	PASS
15		5300.0043	4300	PASS
5		5299.9982	-1800	PASS
0		5299.9876	-12400	PASS
20		3.7	5299.9959	-4100
	3.8	5300.0024	2400	PASS
	4.35	5300.0056	5600	PASS

Test mode:		802.11ac(VHT20)	Frequency(MHz):	5320
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	3.8V	5320.0051	5100	PASS
35		5320.0068	6800	PASS
25		5320.0034	3400	PASS
15		5319.9996	-400	PASS
5		5319.9985	-1500	PASS
0		5319.9973	-2700	PASS
20		3.7	5320.0032	3200
	3.8	5320.0016	1600	PASS
	4.35	5319.9989	-1100	PASS

Test mode:		802.11ac(VHT20)	Frequency(MHz):	5500
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	3.8V	5500.0014	1400	PASS
35		5500.0018	1800	PASS
25		5499.9956	-4400	PASS
15		5499.9951	-4900	PASS
5		5500.0037	3700	PASS
0		5500.0042	4200	PASS
20	3.7	5500.0073	7300	PASS
	3.8	5500.0079	7900	PASS
	4.35	5500.0025	2500	PASS

Test mode:		802.11ac(VHT20)	Frequency(MHz):	5600
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	3.8V	5600.0081	8100	PASS
35		5600.0034	3400	PASS
25		5600.0027	2700	PASS
15		5599.9856	-14400	PASS
5		5600.0022	2200	PASS
0		5599.9984	-1600	PASS
20	3.7	5600.0051	5100	PASS
	3.8	5600.0028	2800	PASS
	4.35	5599.9973	-2700	PASS

Test mode:		802.11ac(VHT20)	Frequency(MHz):	5720
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	3.8V	5719.9819	-18100	PASS
35		5720.0082	8200	PASS
25		5719.9954	-4600	PASS
15		5719.9986	-1400	PASS
5		5720.0015	1500	PASS
0		5720.0047	4700	PASS
20	3.7	5720.0043	4300	PASS
	3.8	5719.9981	-1900	PASS
	4.35	5720.0028	2800	PASS

Test mode:		802.11ac(VHT40)	Frequency(MHz):	5190
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	3.8V	5190.0125	12500	PASS
35		5190.0119	11900	PASS
25		5190.0103	10300	PASS
15		5190.0034	3400	PASS
5		5190.0065	6500	PASS
0		5190.0072	7200	PASS
20	3.7	5189.9917	-8300	PASS
	3.8	5189.9978	-2200	PASS
	4.35	5190.0041	4100	PASS

Test mode:		802.11ac(VHT40)	Frequency(MHz):	5230
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	3.8V	5230.0124	12400	PASS
35		5230.0120	12000	PASS
25		5230.0099	9900	PASS
15		5229.9981	-1900	PASS
5		5229.9983	-1700	PASS
0		5230.0054	5400	PASS
20	3.7	5230.0046	4600	PASS
	3.8	5230.0023	2300	PASS
	4.35	5229.9975	-2500	PASS

Test mode:		802.11ac(VHT40)	Frequency(MHz):	5270
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	3.8V	5270.0121	12100	PASS
35		5270.0116	11600	PASS
25		5269.9984	-1600	PASS
15		5269.9990	-1000	PASS
5		5270.0068	6800	PASS
0		5270.0072	7200	PASS
20	3.7	5269.9923	-7700	PASS
	3.8	5269.9977	-2300	PASS
	4.35	5270.0045	4500	PASS

Test mode:		802.11ac(VHT40)	Frequency(MHz):	5310
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	3.8V	5310.0136	13600	PASS
35		5310.0124	12400	PASS
25		5310.0091	9100	PASS
15		5309.9985	-1500	PASS
5		5309.9984	-1600	PASS
0		5310.0059	5900	PASS
20	3.7	5310.0047	4700	PASS
	3.8	5310.0022	2200	PASS
	4.35	5309.9977	-2300	PASS

Test mode:		802.11ac(VHT40)	Frequency(MHz):	5510
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	3.8V	5509.9974	-2600	PASS
35		5510.0120	12000	PASS
25		5510.0116	11600	PASS
15		5509.9887	-11300	PASS
5		5510.0033	3300	PASS
0		5510.0075	7500	PASS
20	3.7	5510.0048	4800	PASS
	3.8	5509.9935	-6500	PASS
	4.35	5510.0066	6600	PASS

Test mode:		802.11ac(VHT40)	Frequency(MHz):	5590
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	3.8V	5589.9808	-19200	PASS
35		5589.9847	-15300	PASS
25		5590.0041	4100	PASS
15		5590.0036	3600	PASS
5		5590.0023	2300	PASS
0		5590.0067	6700	PASS
20	3.7	5590.0055	5500	PASS
	3.8	5589.9982	-1800	PASS
	4.35	5590.0085	8500	PASS

Test mode:		802.11ac(VHT40)	Frequency(MHz):	5710
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	3.8V	5709.9806	-19400	PASS
35		5709.9847	-15300	PASS
25		5710.0045	4500	PASS
15		5710.0032	3200	PASS
5		5710.0028	2800	PASS
0		5710.0064	6400	PASS
20	3.7	5710.0057	5700	PASS
	3.8	5709.9989	-1100	PASS
	4.35	5710.0081	8100	PASS

Test mode:		802.11ac(VHT80)	Frequency(MHz):	5210
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	3.8V	5209.9805	-19500	PASS
35		5209.9841	-15900	PASS
25		5210.0044	4400	PASS
15		5210.0037	3700	PASS
5		5210.0022	2200	PASS
0		5210.0063	6300	PASS
20	3.7	5210.0051	5100	PASS
	3.8	5209.9987	-1300	PASS
	4.35	5210.0082	8200	PASS

Test mode:		802.11ac(VHT80)	Frequency(MHz):	5290
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	3.8V	5290.0045	4500	PASS
35		5289.9971	-2900	PASS
25		5290.0040	4000	PASS
15		5290.0037	3700	PASS
5		5290.0026	2600	PASS
0		5290.0065	6500	PASS
20	3.7	5290.0058	5800	PASS
	3.8	5289.9982	-1800	PASS
	4.35	5290.0089	8900	PASS

Test mode:		802.11ac(VHT80)	Frequency(MHz):	5530	
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result	
45	3.8V	5530.0071	7100	PASS	
35		5530.0034	3400	PASS	
25		5530.0048	4800	PASS	
15		5529.9965	-3500	PASS	
5		5530.0027	2700	PASS	
0		5529.9982	-1800	PASS	
20	3.7	5530.0056	5600	PASS	
	3.8	5529.9989	-1100	PASS	
	4.35	5530.0083	8300	PASS	

Test mode:		802.11ac(VHT80)	Frequency(MHz):	5690	
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result	
45	3.8V	5689.9962	-3800	PASS	
35		5690.0031	3100	PASS	
25		5689.9946	-5400	PASS	
15		5690.0038	3800	PASS	
5		5690.0052	5200	PASS	
0		5689.9978	-2200	PASS	
20	3.7	5690.0073	7300	PASS	
	3.8	5689.9965	-3500	PASS	
	4.35	5690.0091	9100	PASS	



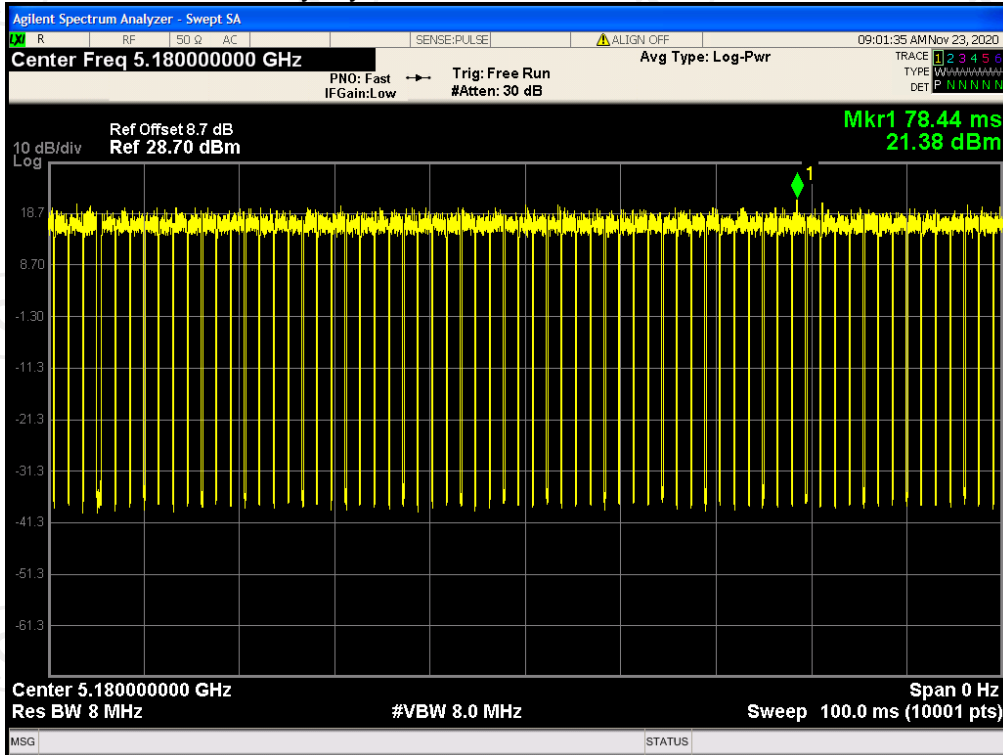
**Appendix A: Test Result of Conducted Test**

Band 1:

**Duty Cycle**

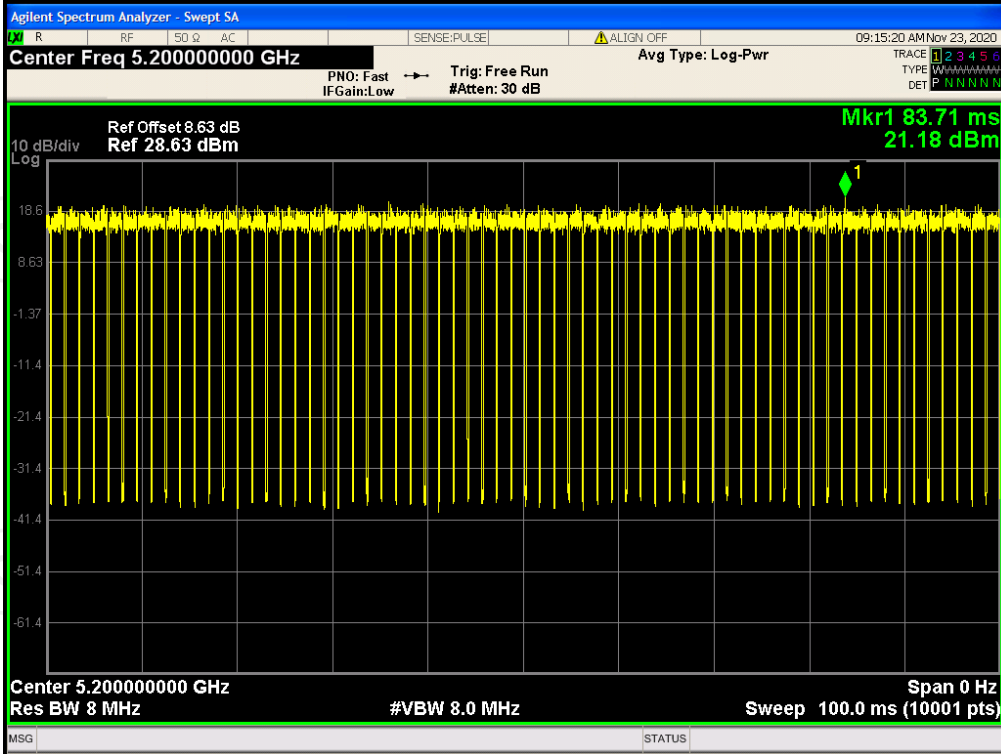
Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)
802.11a	5180	100	0
802.11a	5200	100	0
802.11a	5240	100	0
802.11ac20	5180	100	0
802.11ac20	5200	100	0
802.11ac20	5240	100	0
802.11ac40	5190	100	0
802.11ac40	5230	100	0
802.11ac80	5210	100	0
802.11n(HT20)	5180	100	0
802.11n(HT20)	5200	100	0
802.11n(HT20)	5240	100	0
802.11n(HT40)	5190	100	0
802.11n(HT40)	5230	100	0

Duty Cycle NVNT 802.11a 5180MHz

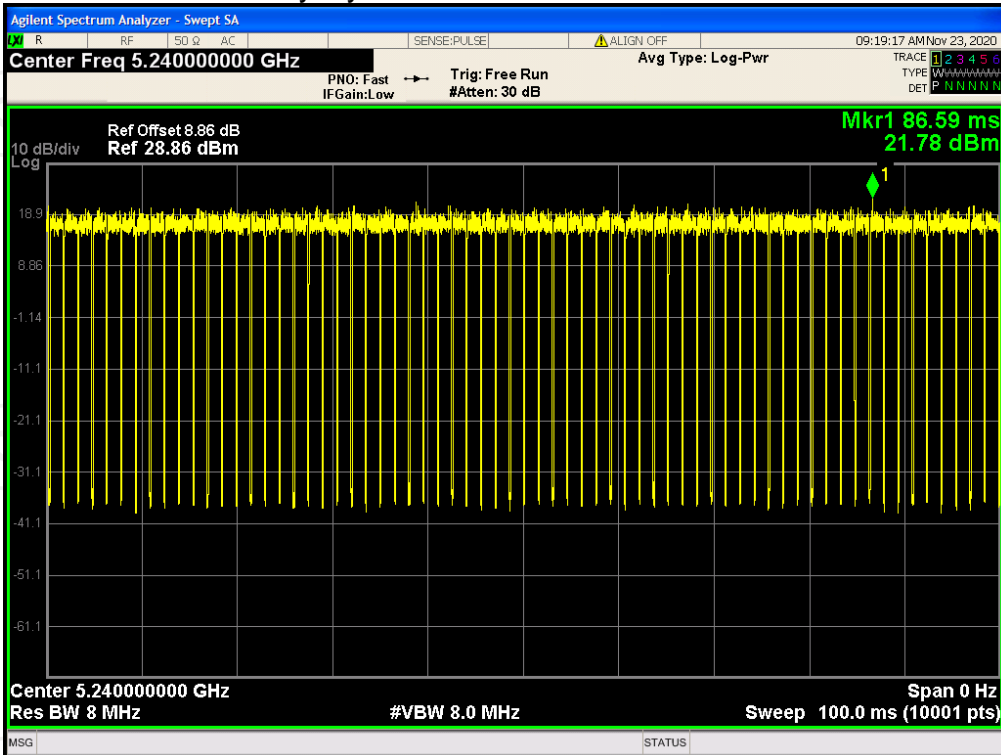




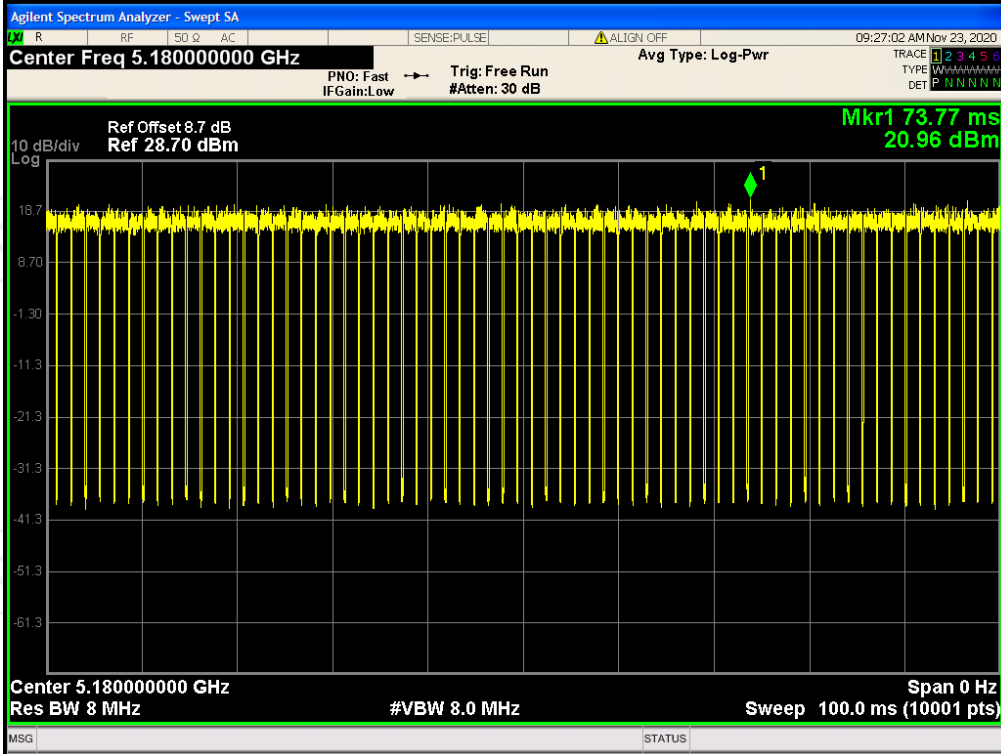
Duty Cycle NVNT 802.11a 5200MHz



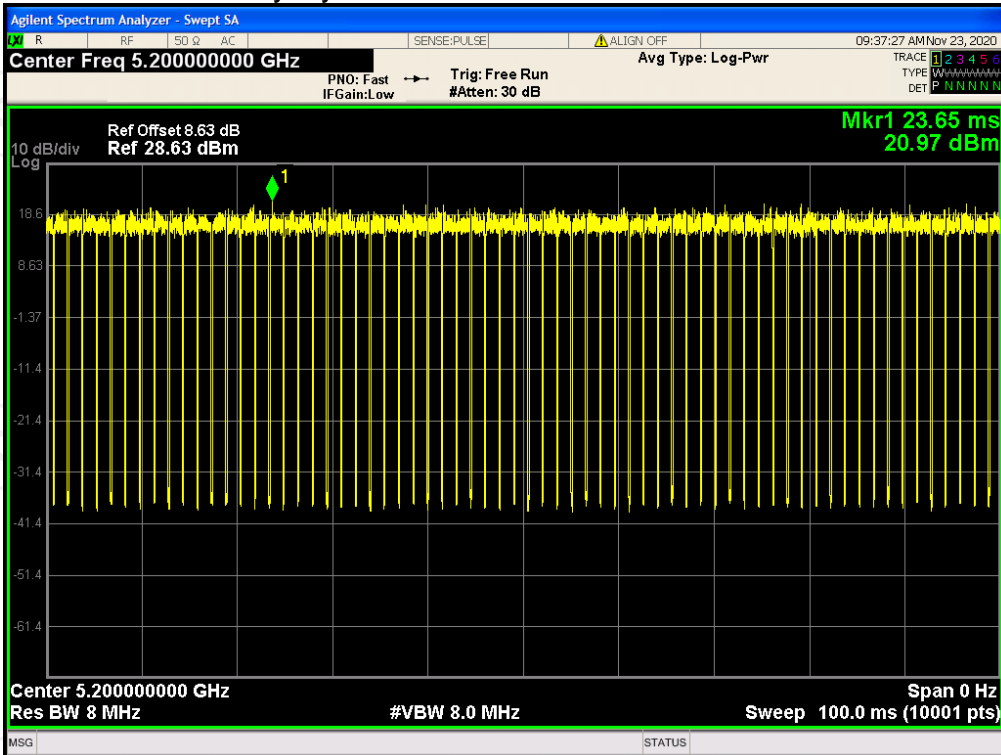
Duty Cycle NVNT 802.11a 5240MHz



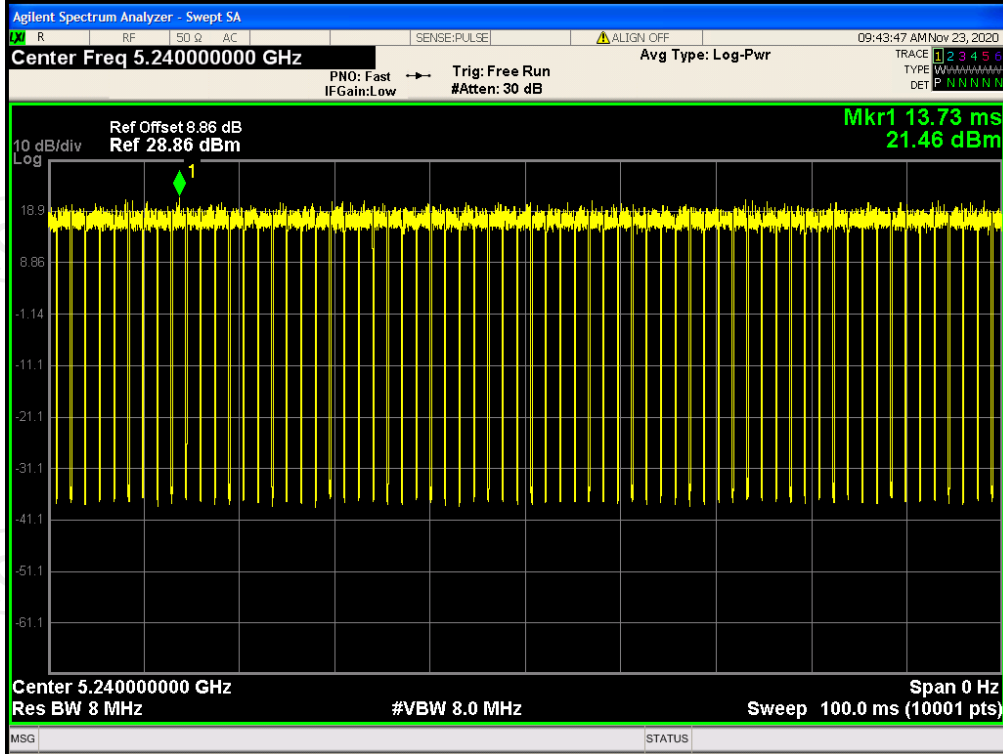
Duty Cycle NVNT 802.11ac20 5180MHz



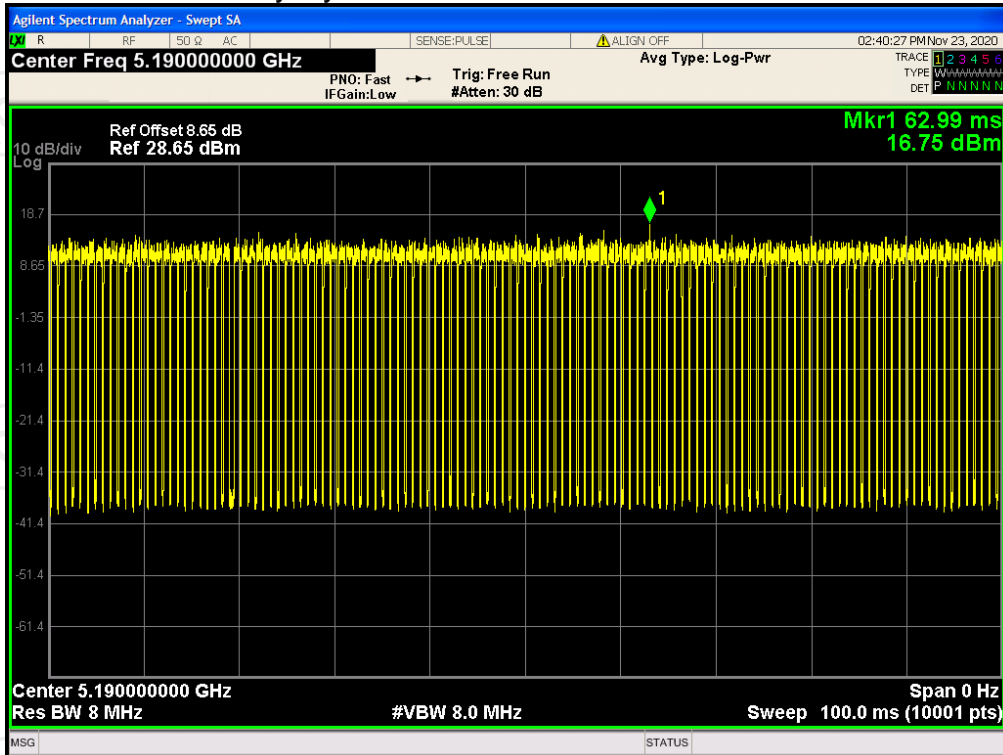
Duty Cycle NVNT 802.11ac20 5200MHz



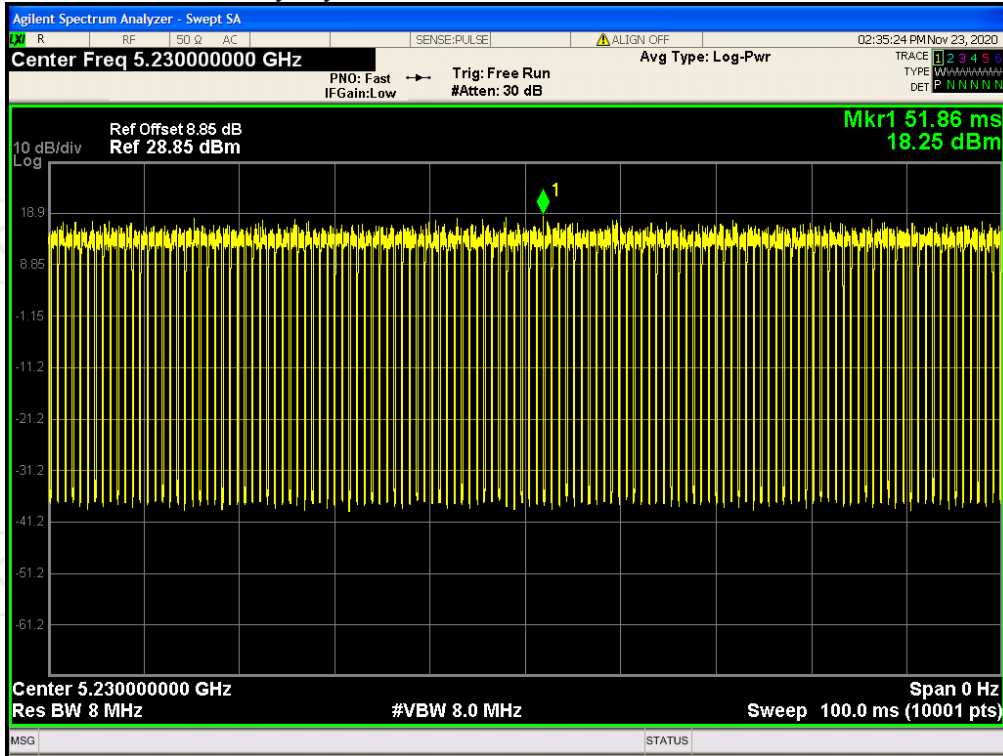
## Duty Cycle NVNT 802.11ac20 5240MHz



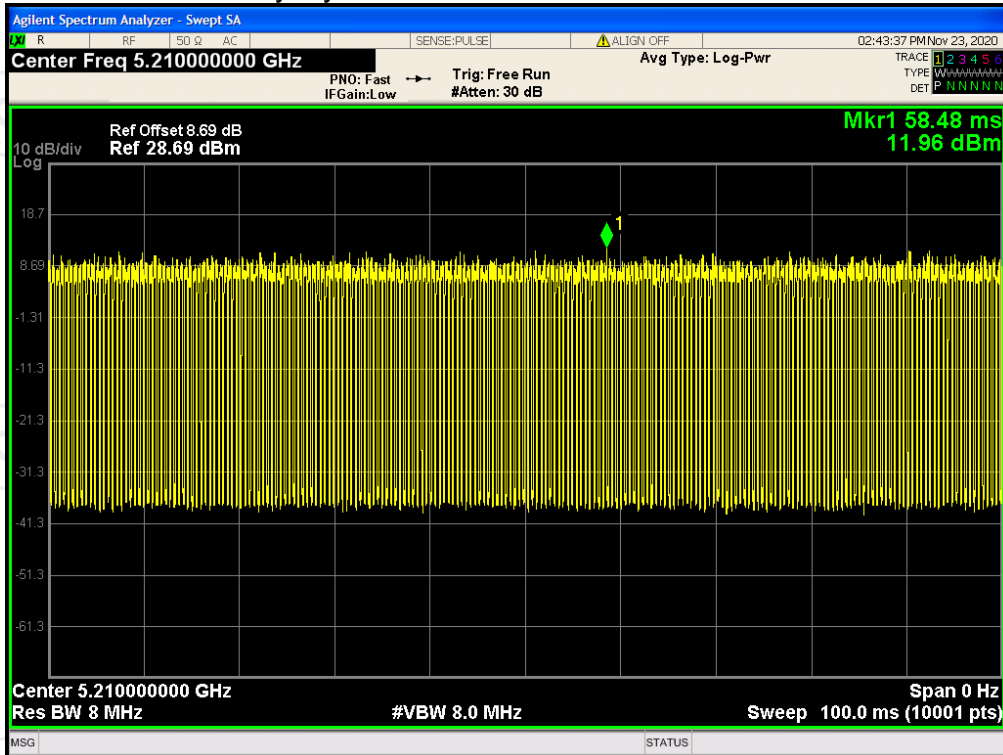
## Duty Cycle NVNT 802.11ac40 5190MHz



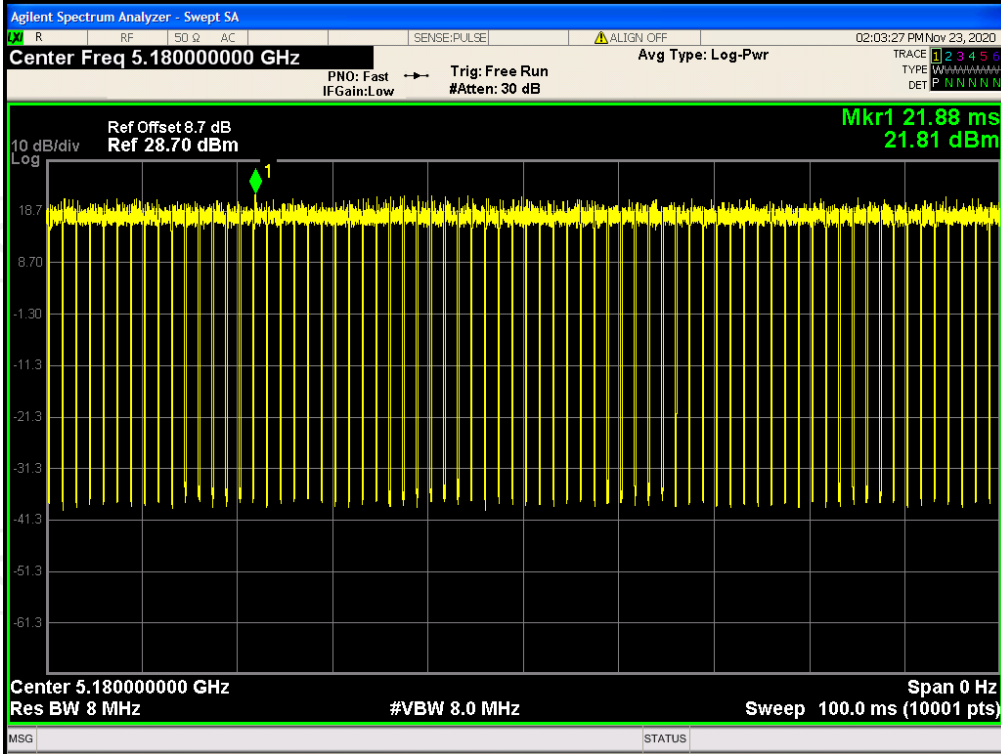
## Duty Cycle NVNT 802.11ac40 5230MHz



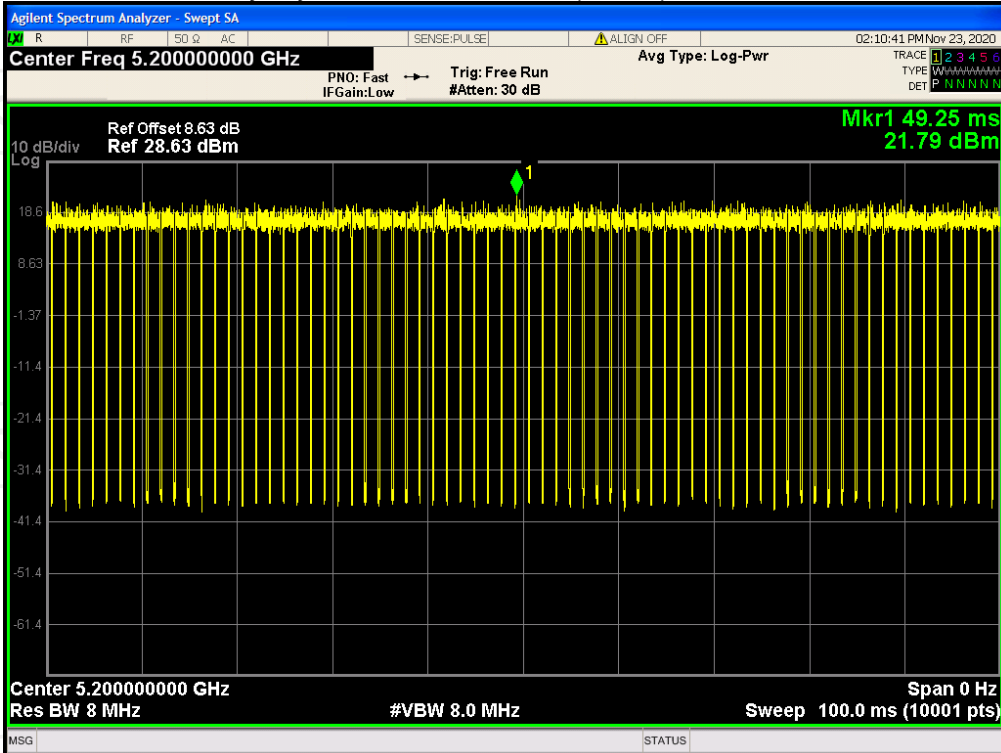
## Duty Cycle NVNT 802.11ac80 5210MHz



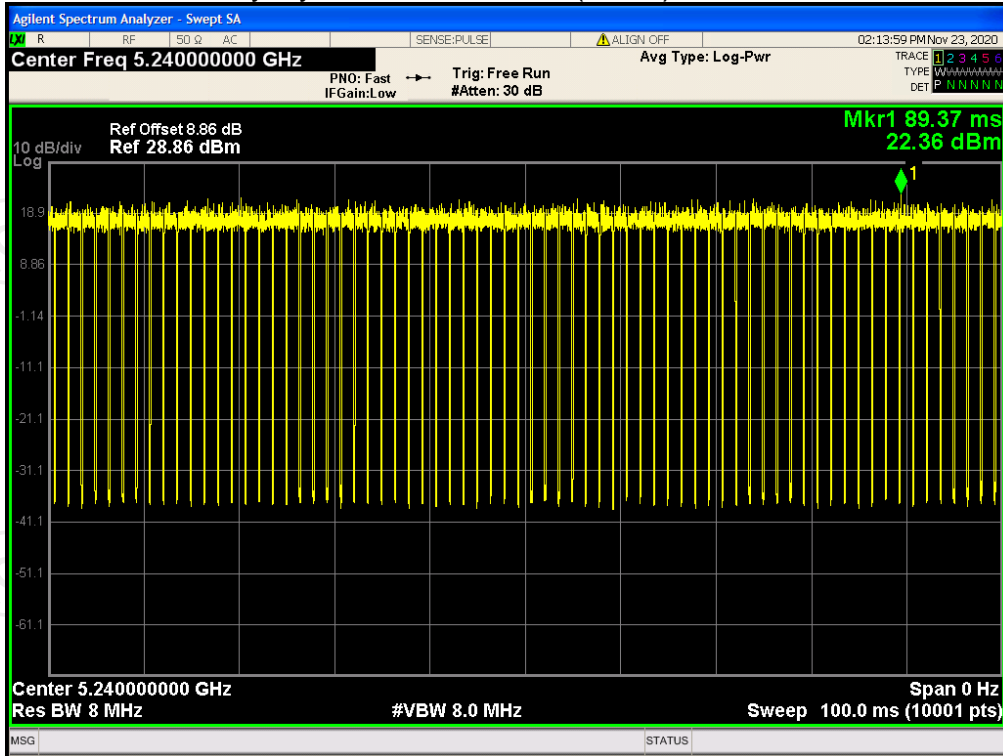
## Duty Cycle NVNT 802.11n(HT20) 5180MHz



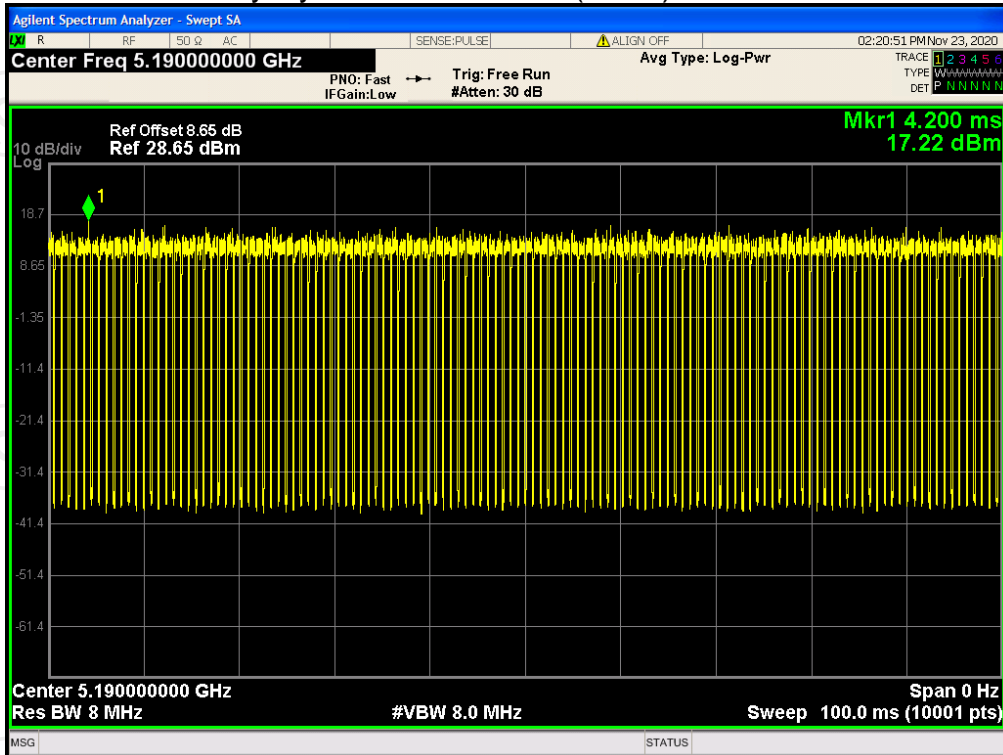
## Duty Cycle NVNT 802.11n(HT20) 5200MHz



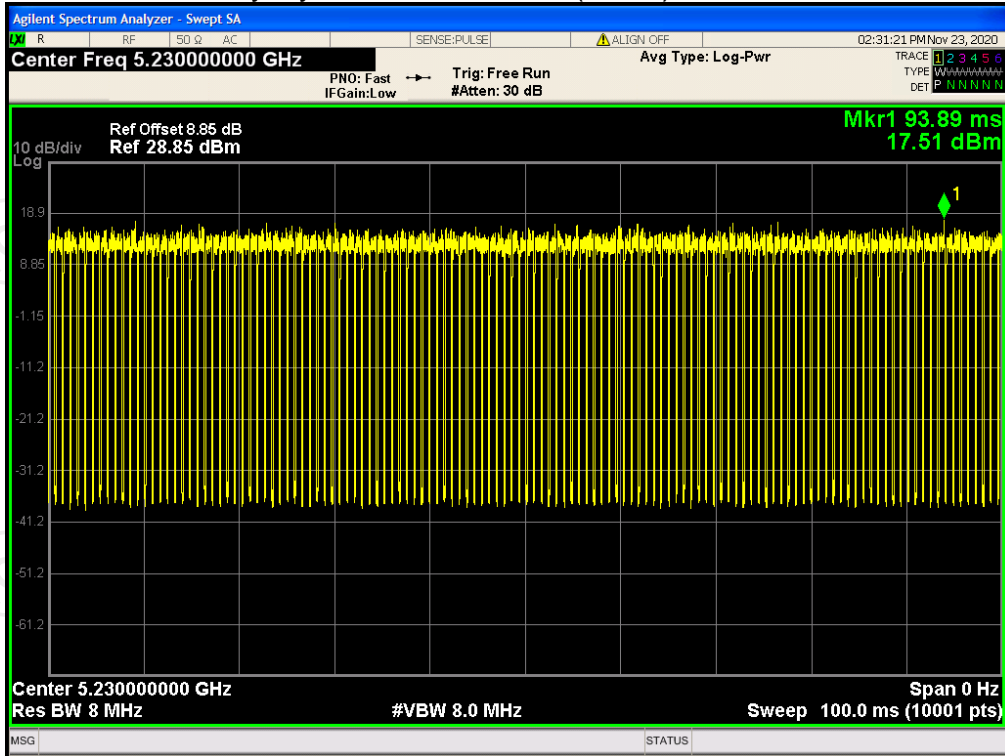
## Duty Cycle NVNT 802.11n(HT20) 5240MHz



## Duty Cycle NVNT 802.11n(HT40) 5190MHz



## Duty Cycle NVNT 802.11n(HT40) 5230MHz

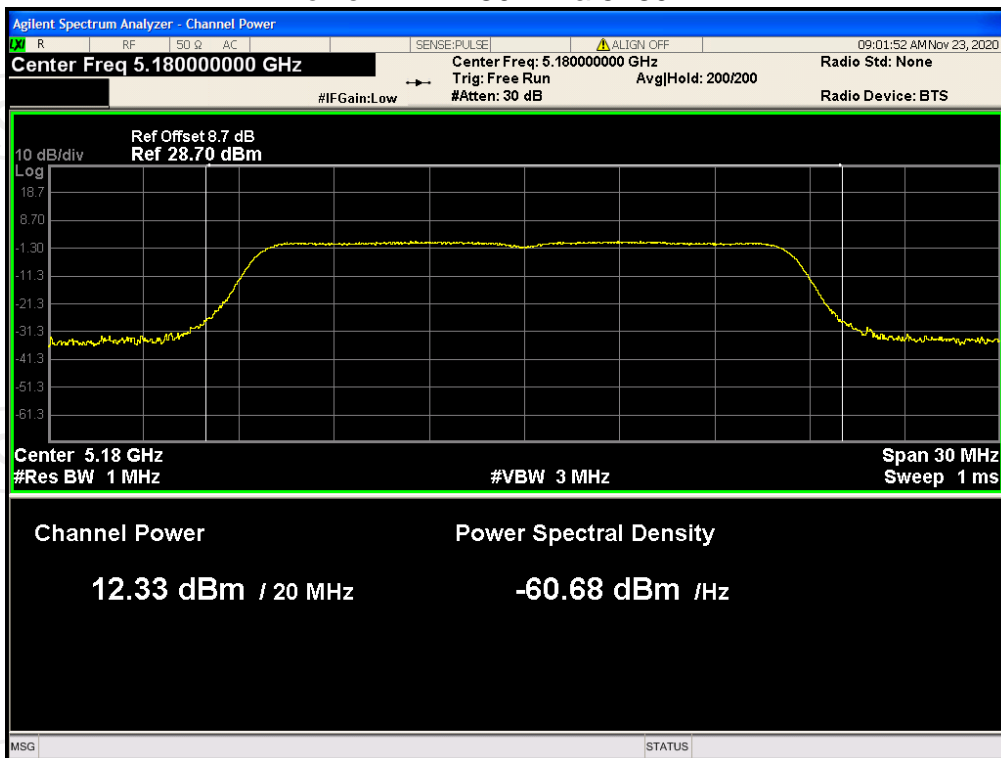




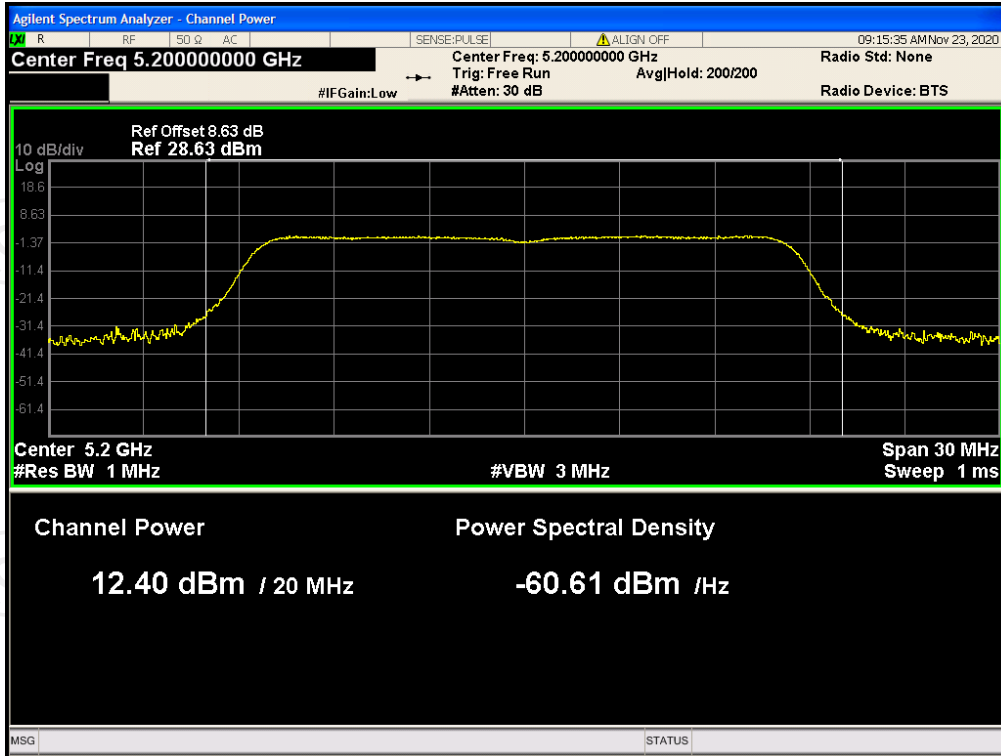
**Maximum Conducted Output Power**

Mode	Frequency (MHz)	Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	Verdict
802.11a	5180	12.334	0	12.334	24	Pass
802.11a	5200	12.403	0	12.403	24	Pass
802.11a	5240	12.864	0	12.864	24	Pass
802.11ac20	5180	12.445	0	12.445	24	Pass
802.11ac20	5200	12.485	0	12.485	24	Pass
802.11ac20	5240	13.002	0	13.002	24	Pass
802.11ac40	5190	12.479	0	12.479	24	Pass
802.11ac40	5230	12.937	0	12.937	24	Pass
802.11ac80	5210	11.325	0	11.325	24	Pass
802.11n(HT20)	5180	13.723	0	13.723	24	Pass
802.11n(HT20)	5200	12.988	0	12.988	24	Pass
802.11n(HT20)	5240	13.417	0	13.417	24	Pass
802.11n(HT40)	5190	12.339	0	12.339	24	Pass
802.11n(HT40)	5230	12.936	0	12.936	24	Pass

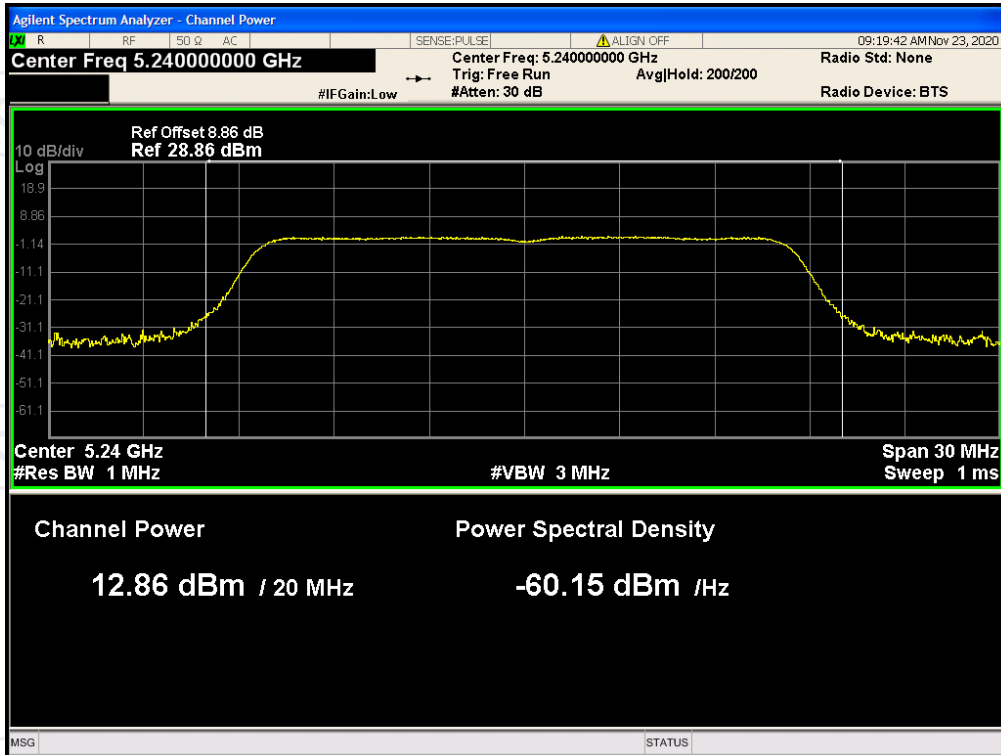
Power NVNT 802.11a 5180MHz



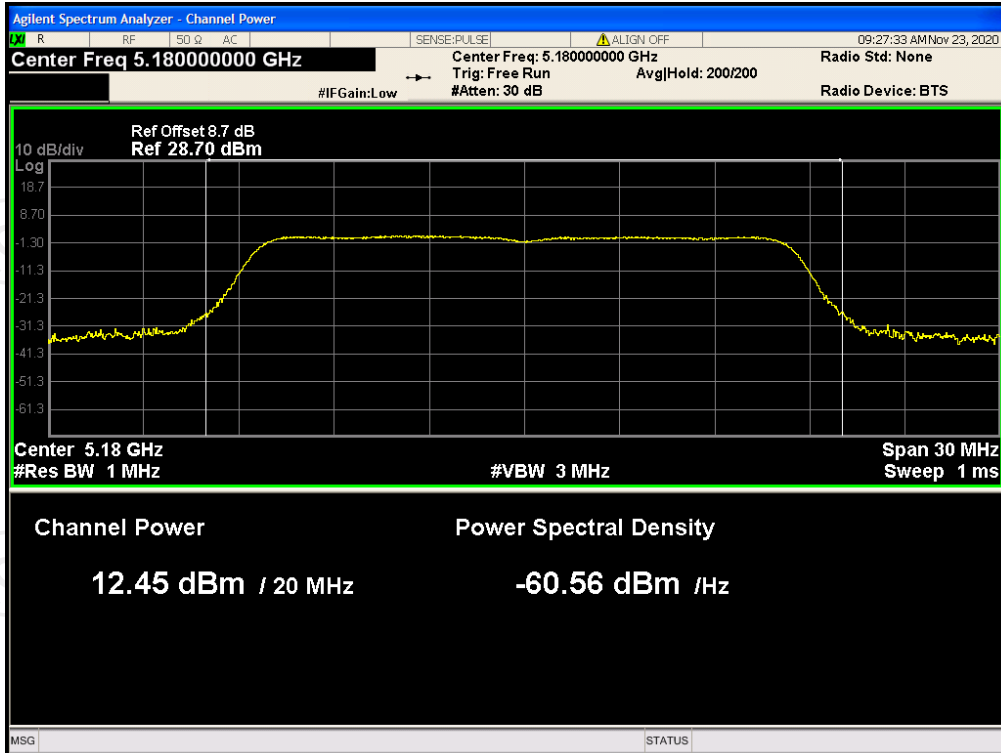
Power NVNT 802.11a 5200MHz



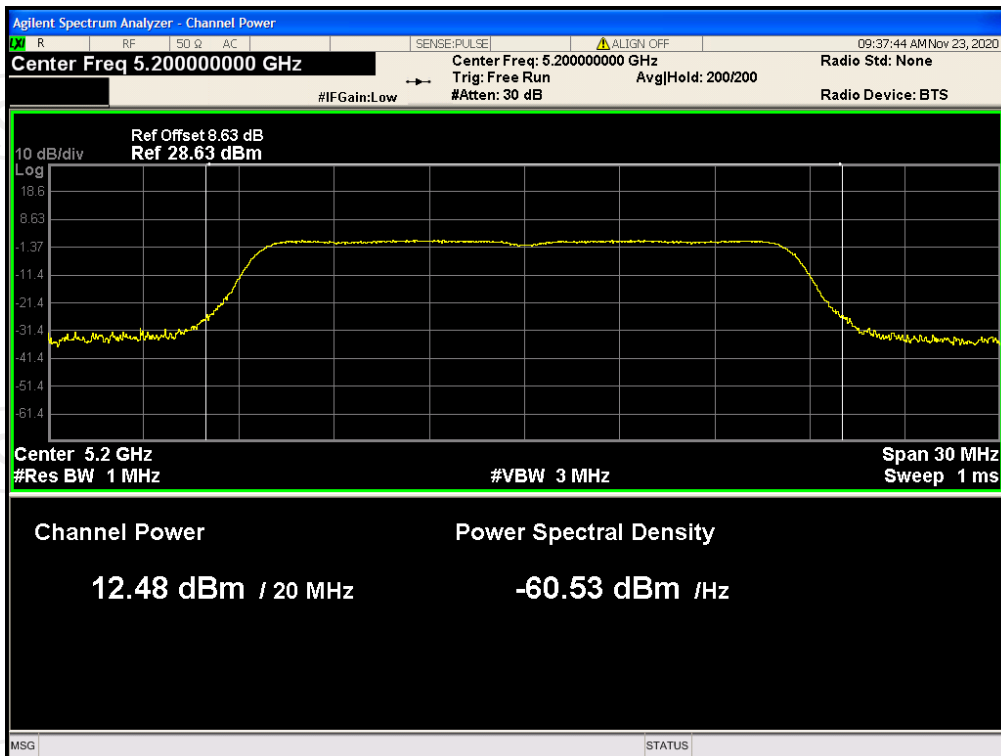
Power NVNT 802.11a 5240MHz



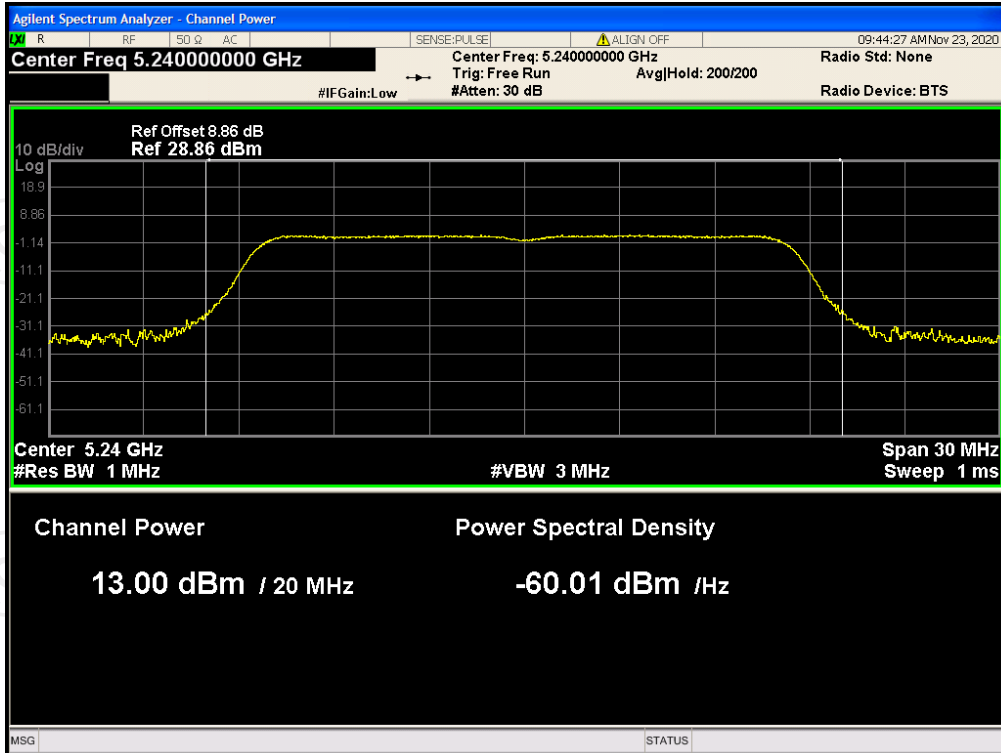
Power NVNT 802.11ac20 5180MHz



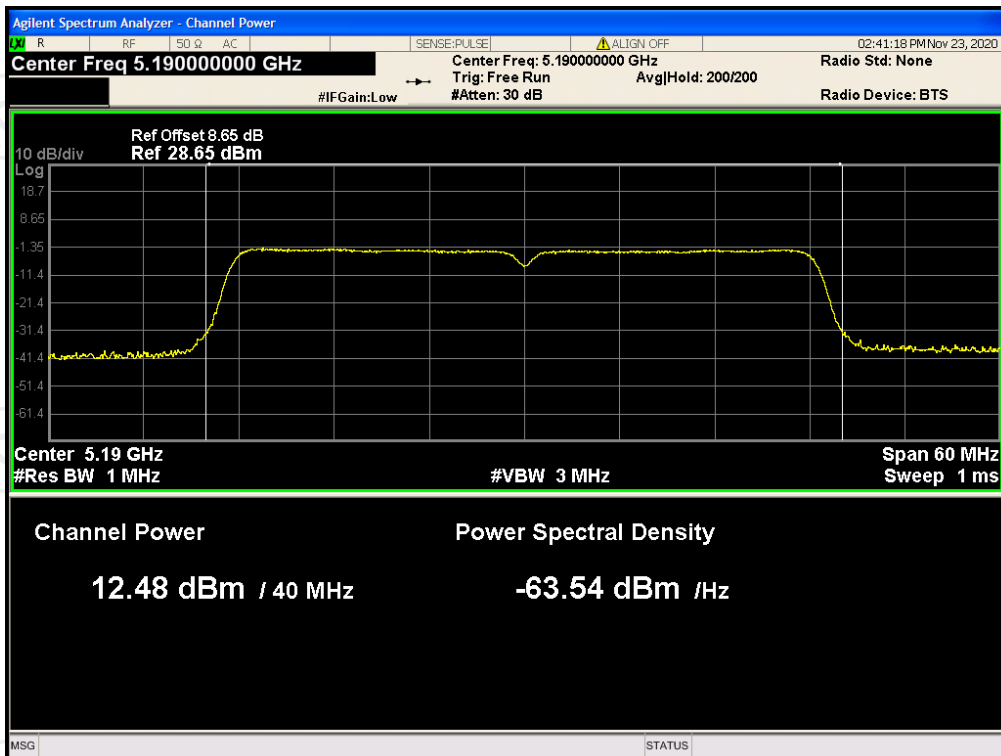
Power NVNT 802.11ac20 5200MHz



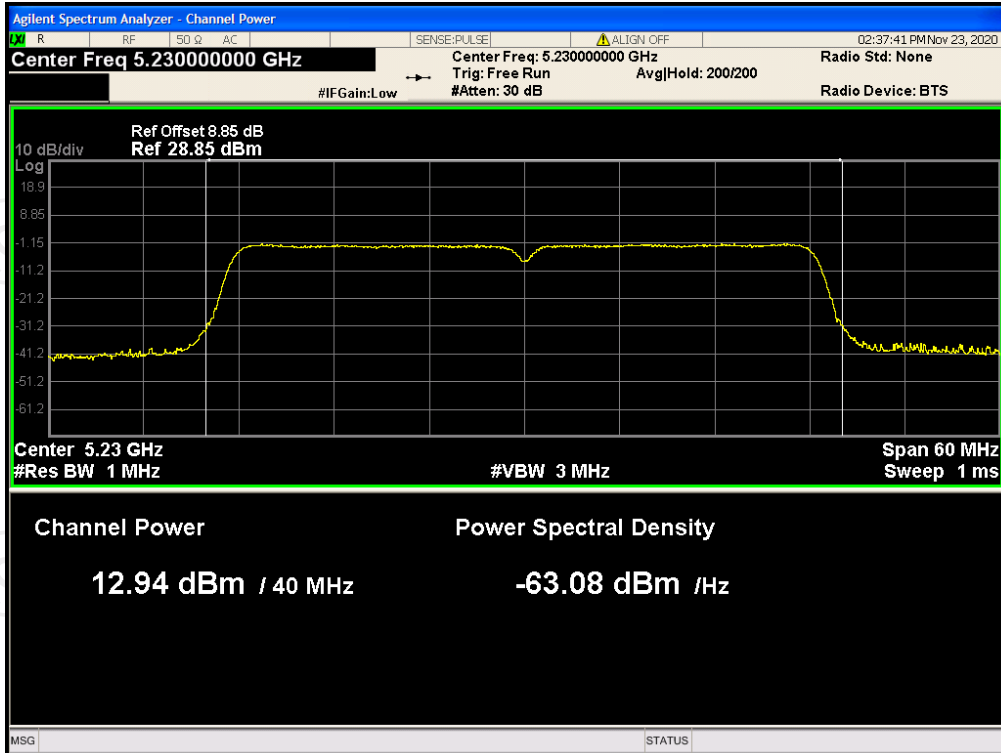
Power NVNT 802.11ac20 5240MHz



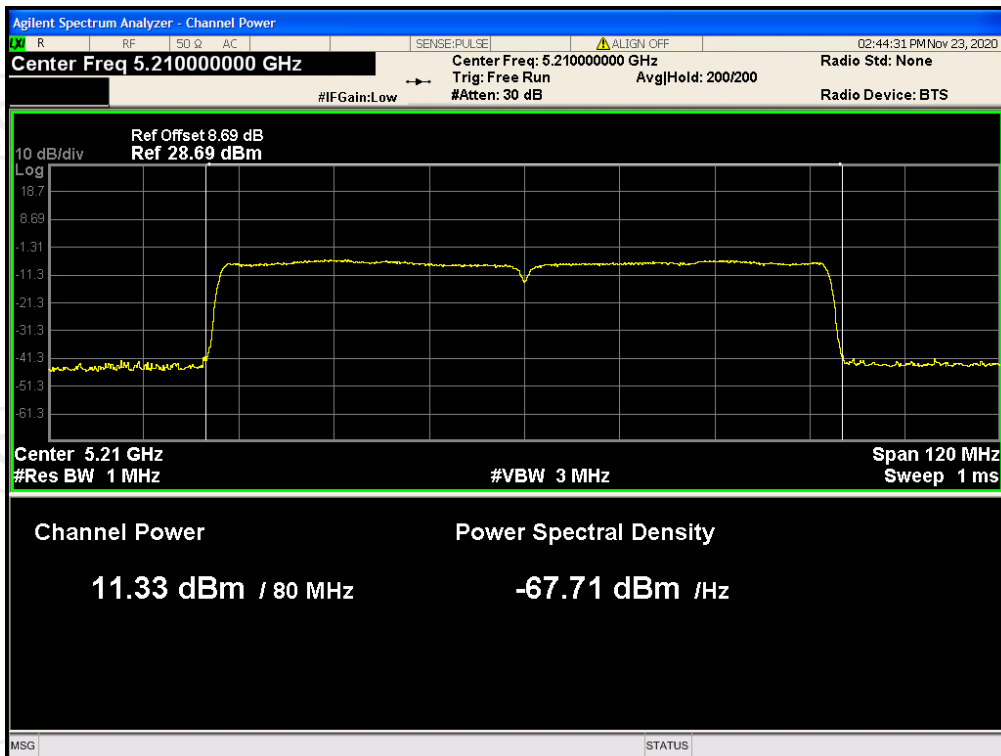
Power NVNT 802.11ac40 5190MHz



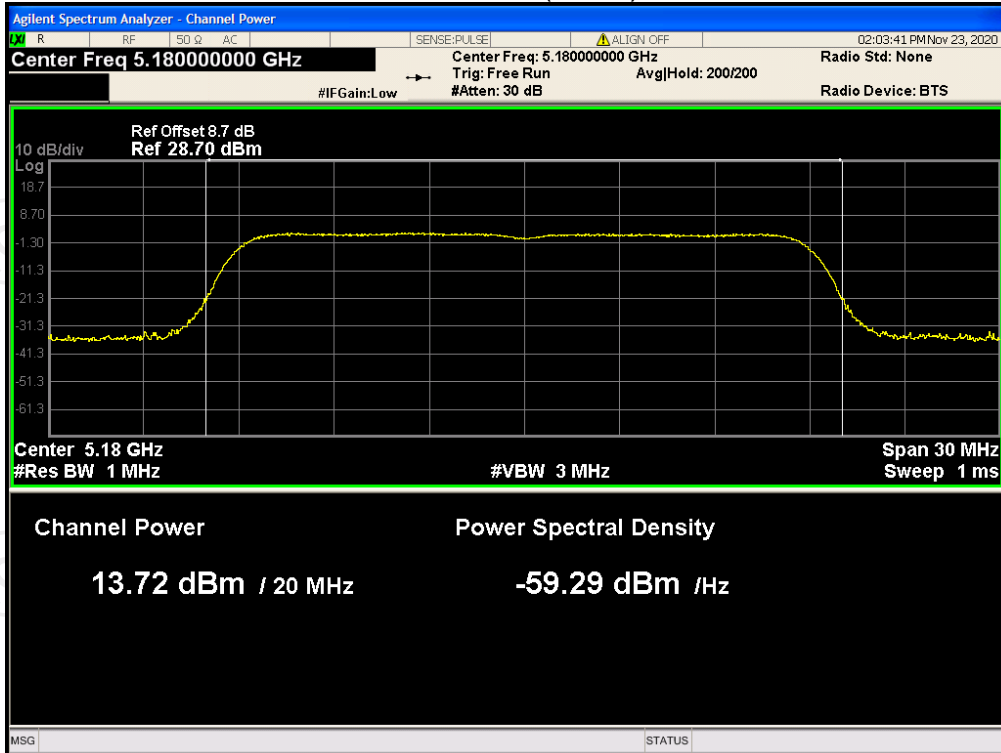
Power NVNT 802.11ac40 5230MHz



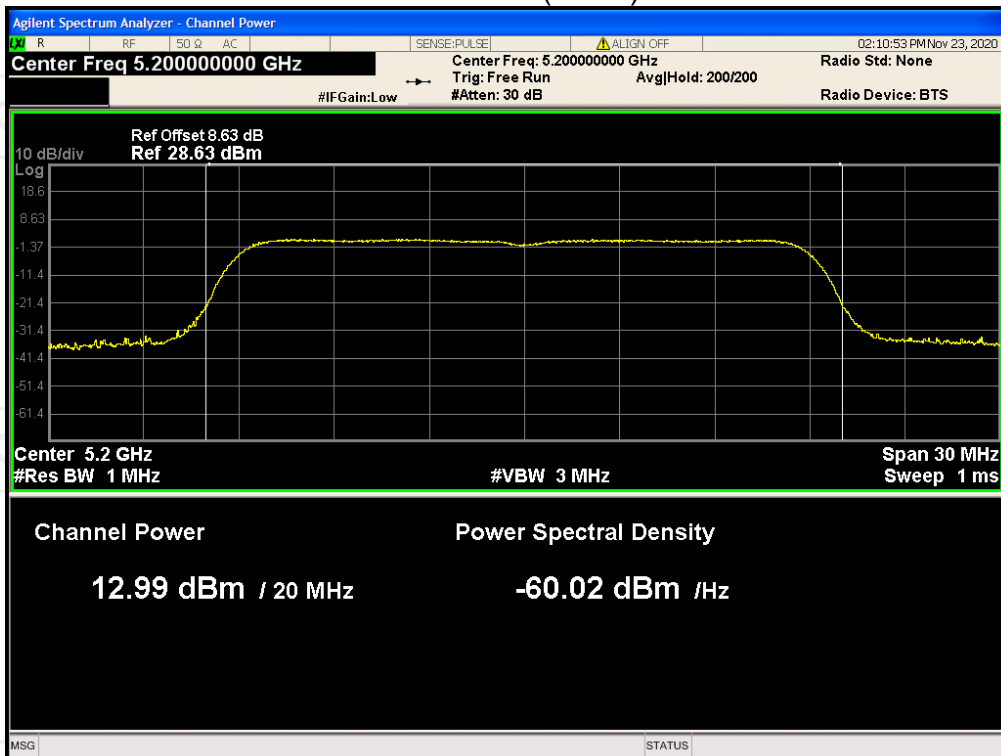
Power NVNT 802.11ac80 5210MHz



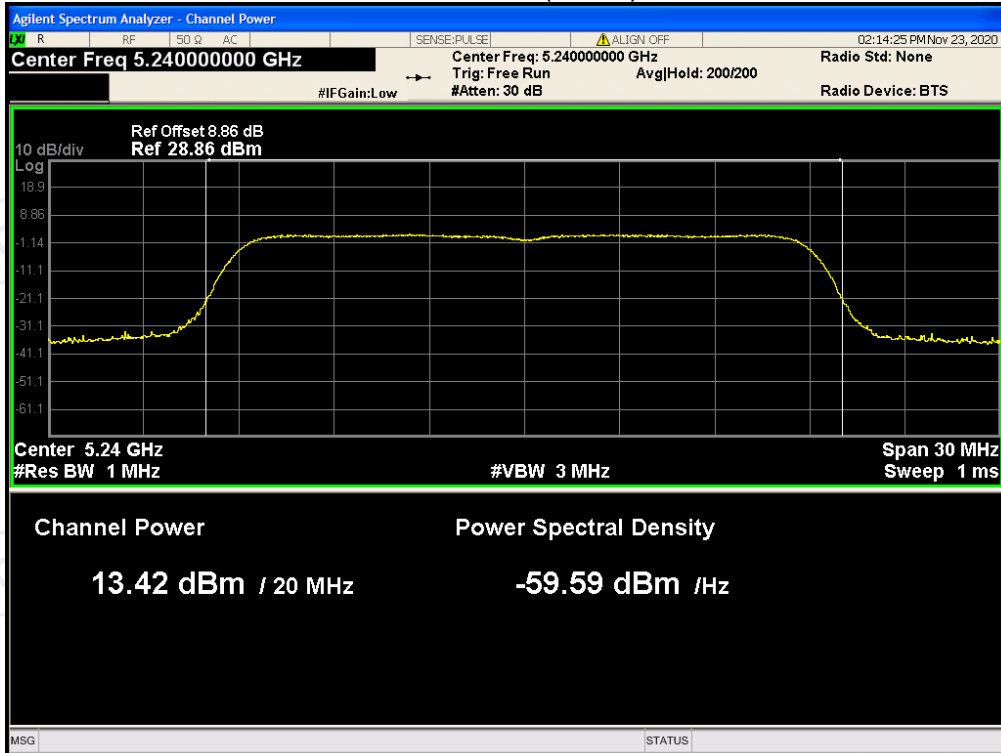
## Power NVNT 802.11n(HT20) 5180MHz



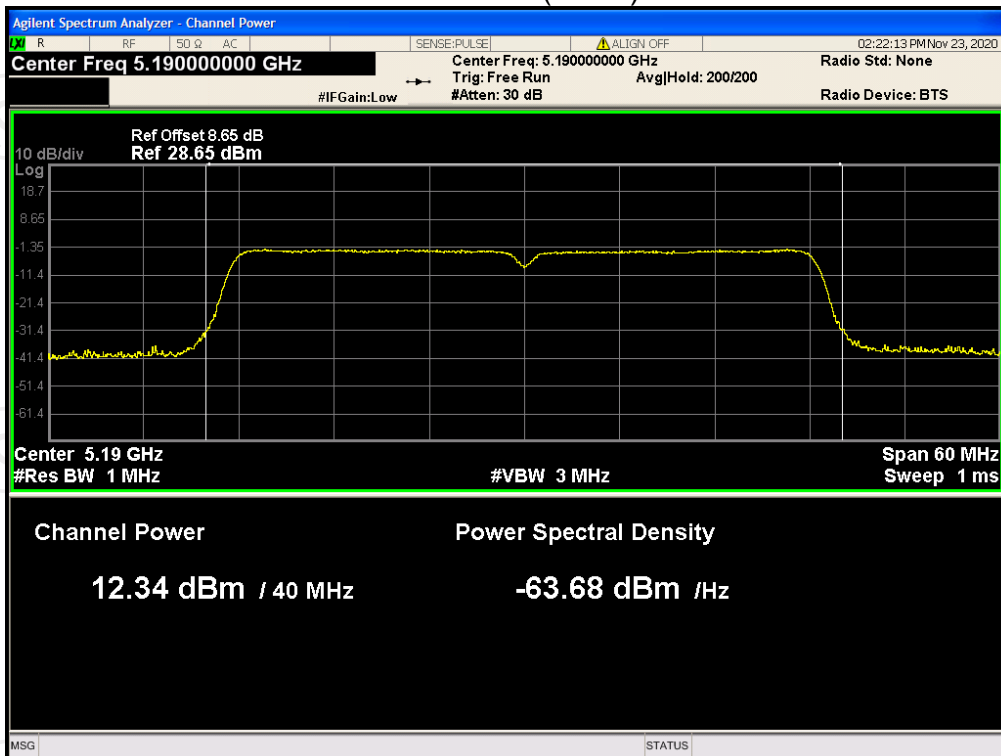
## Power NVNT 802.11n(HT20) 5200MHz



## Power NVNT 802.11n(HT20) 5240MHz

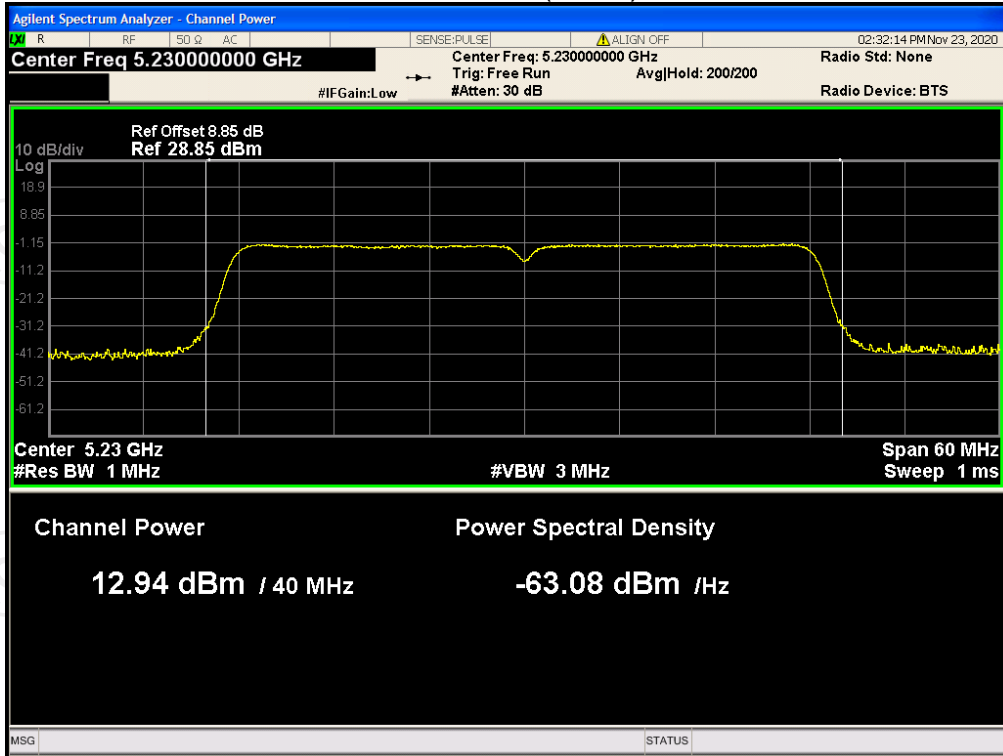


## Power NVNT 802.11n(HT40) 5190MHz





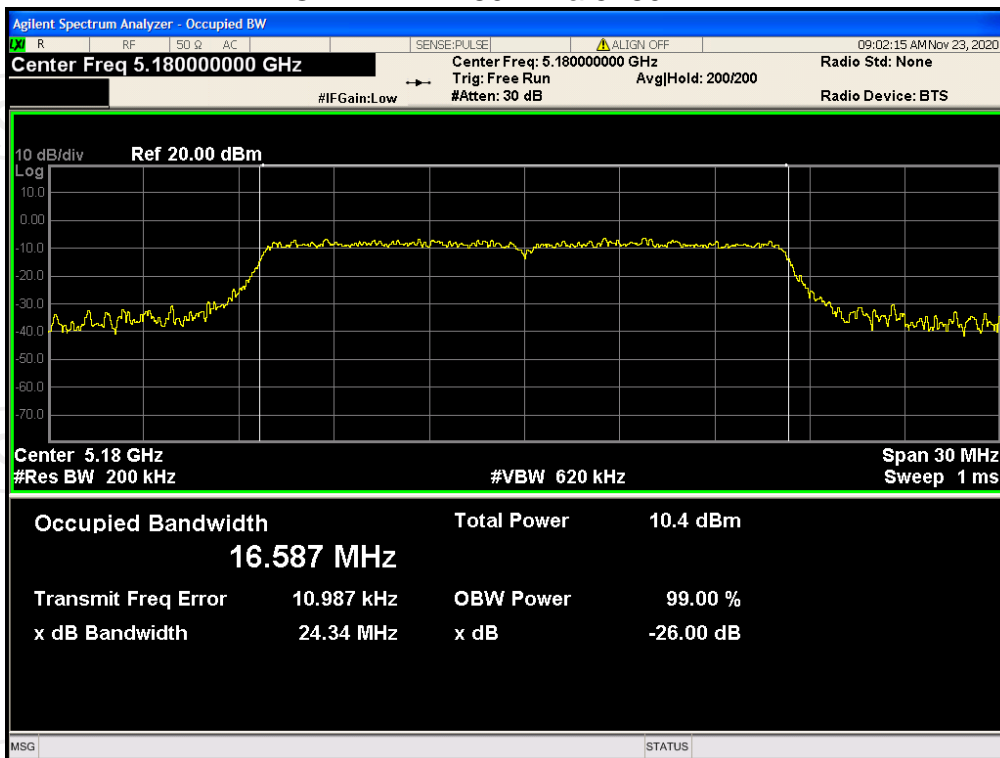
Power NVNT 802.11n(HT40) 5230MHz



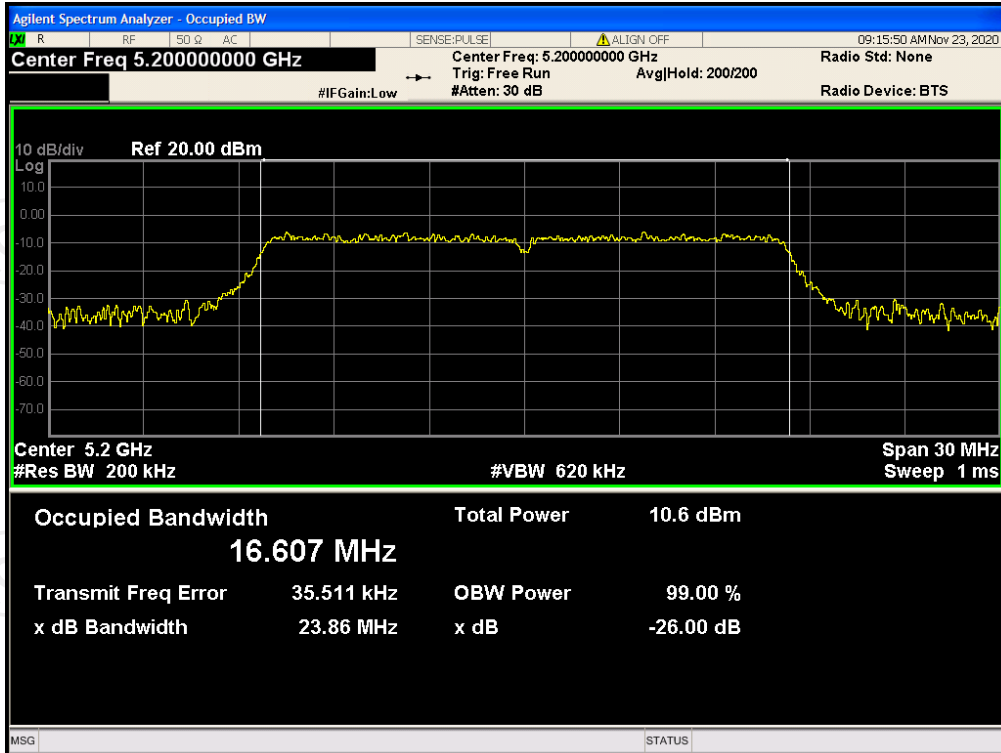
### Occupied Channel Bandwidth

Mode	Frequency (MHz)	99% OBW (MHz)	-26 dB Bandwidth (MHz)	Limit -26 dB Bandwidth (MHz)	Verdict
802.11a	5180	16.5866	24.3405	0	Pass
802.11a	5200	16.6066	23.8566	0	Pass
802.11a	5240	16.5976	23.8477	0	Pass
802.11ac20	5180	16.6069	25.0913	0	Pass
802.11ac20	5200	16.6104	24.3563	0	Pass
802.11ac20	5240	16.6178	23.0182	0	Pass
802.11ac40	5190	36.2373	49.0677	0	Pass
802.11ac40	5230	36.1681	44.713	0	Pass
802.11ac80	5210	75.5673	100.7199	0	Pass
802.11n(HT20)	5180	17.5822	19.9039	0	Pass
802.11n(HT20)	5200	17.592	22.5607	0	Pass
802.11n(HT20)	5240	17.5688	19.8944	0	Pass
802.11n(HT40)	5190	36.2305	43.502	0	Pass
802.11n(HT40)	5230	36.1966	45.2075	0	Pass

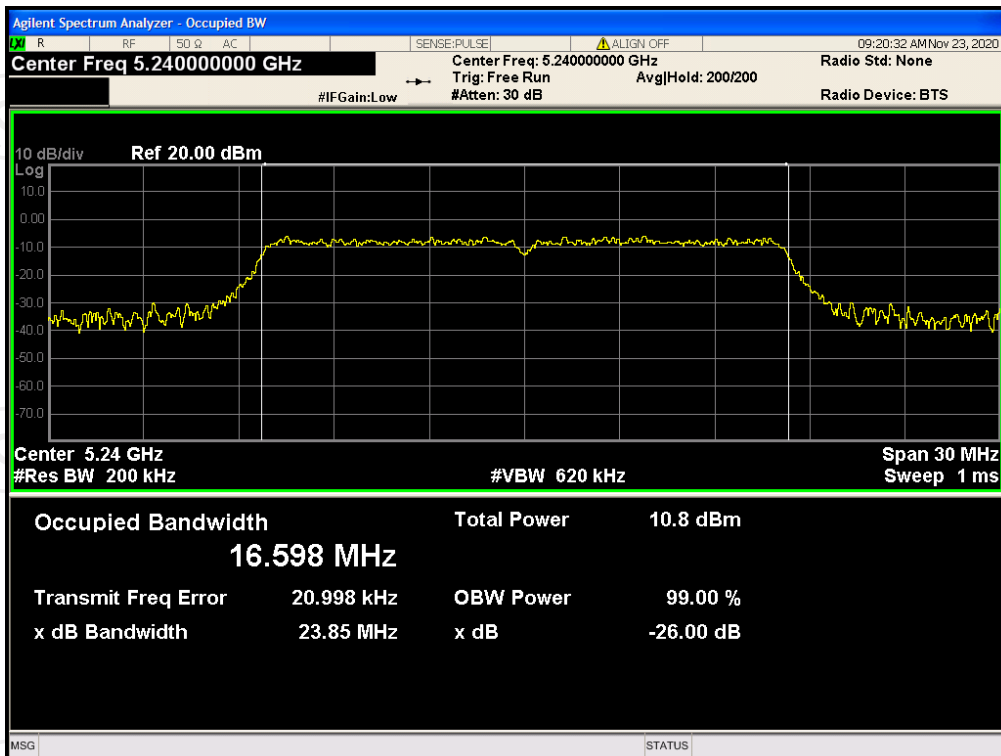
OBW NVNT 802.11a 5180MHz



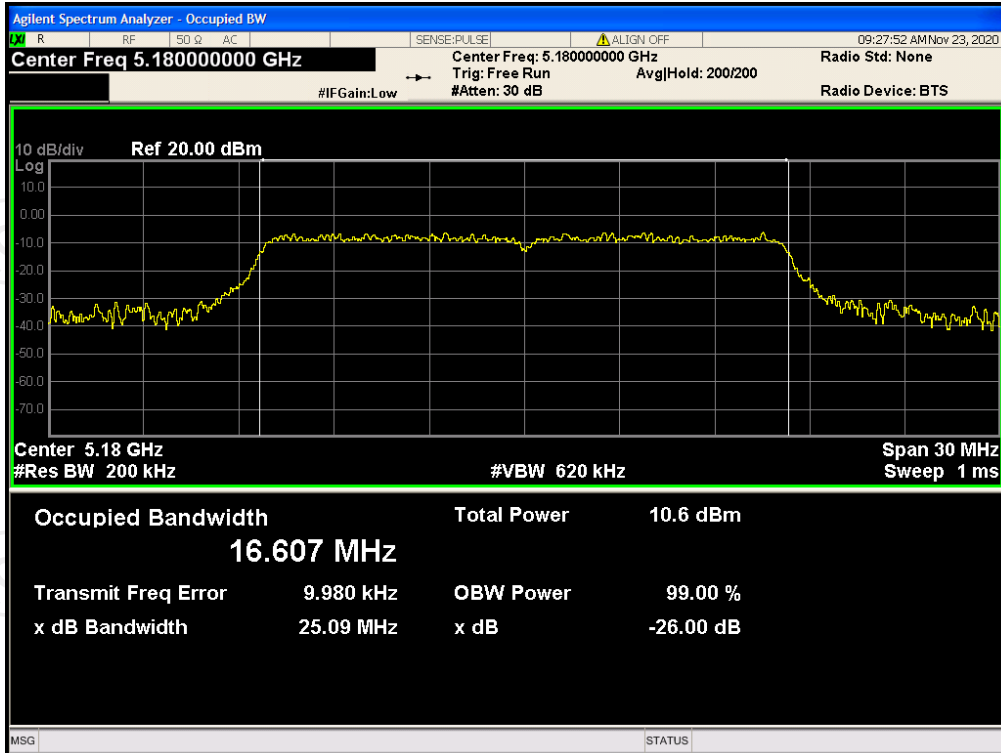
## OBW NVNT 802.11a 5200MHz



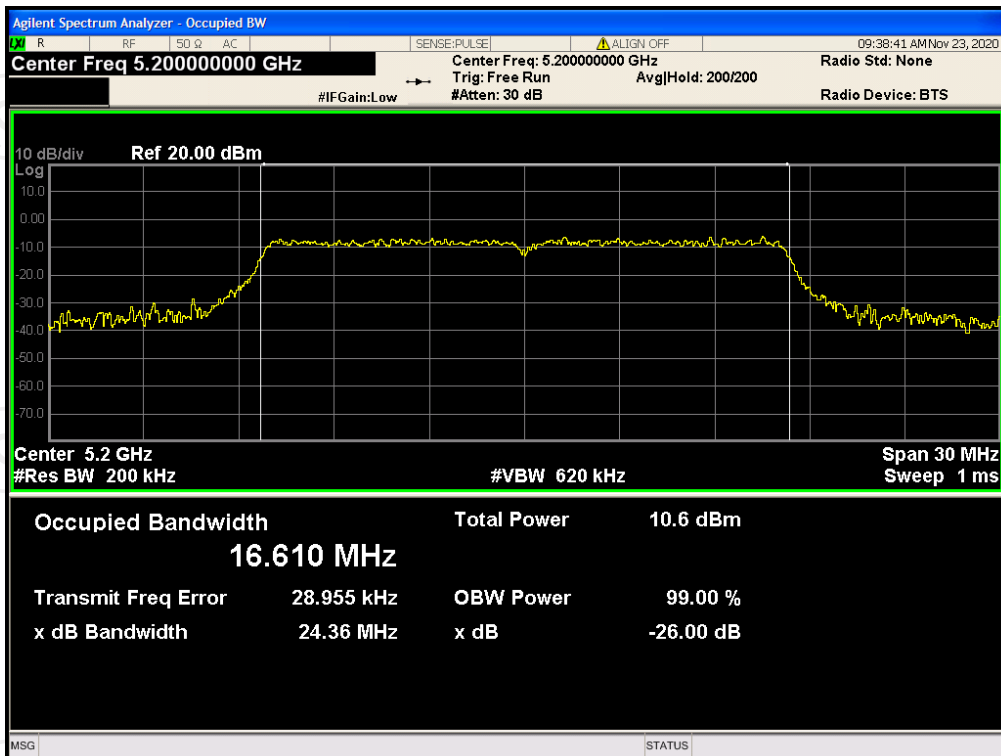
## OBW NVNT 802.11a 5240MHz



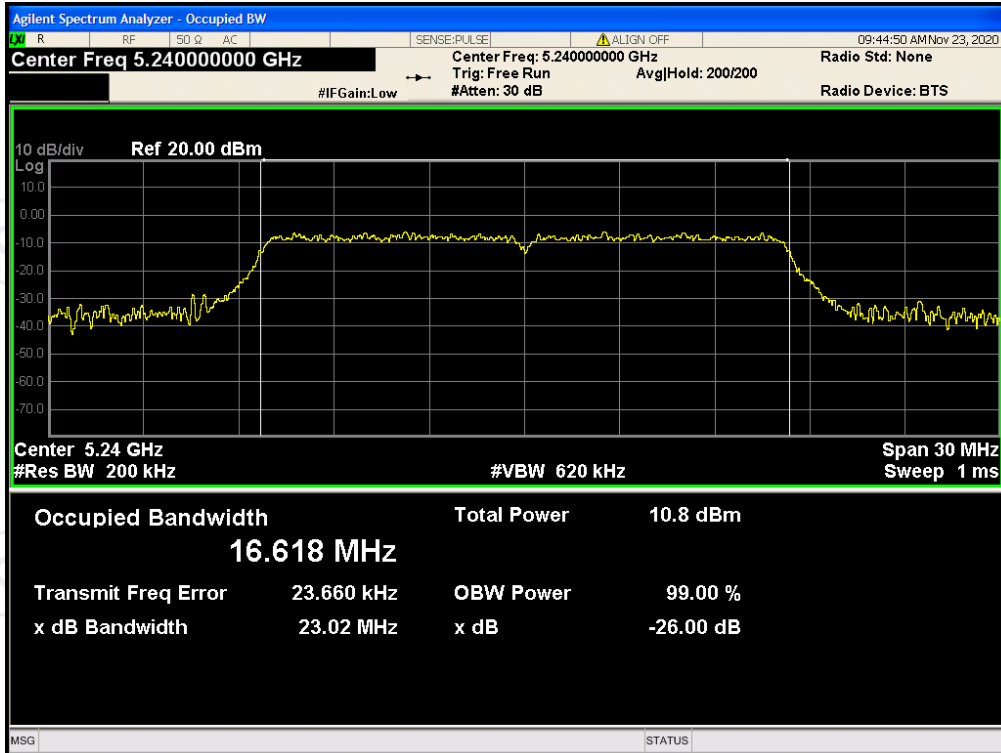
## OBW NVNT 802.11ac20 5180MHz



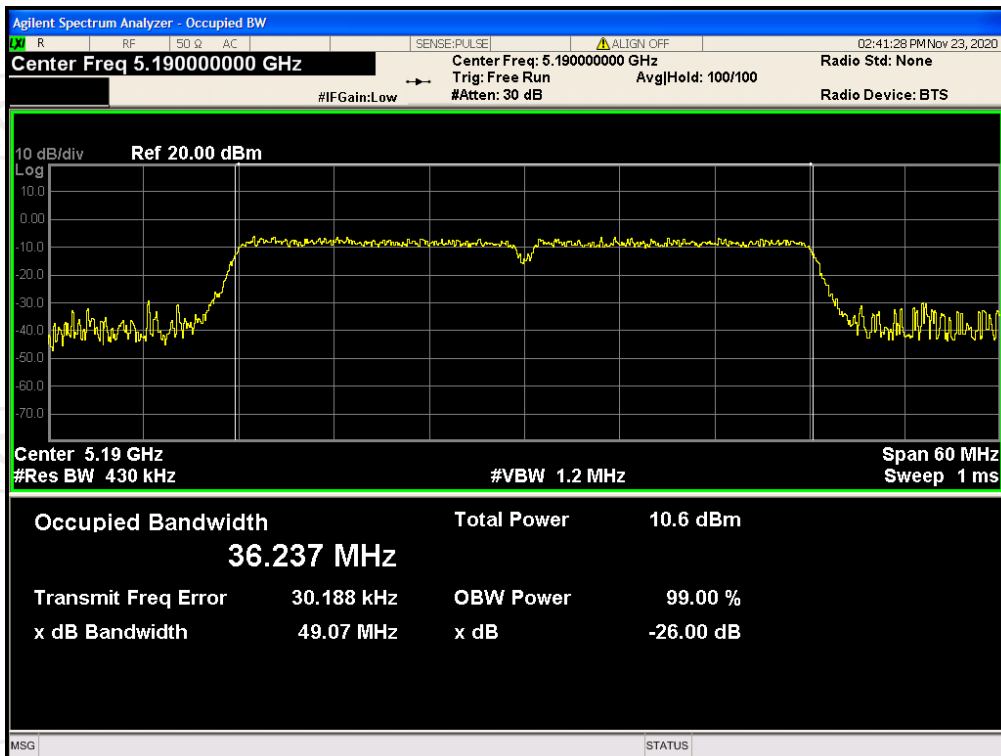
## OBW NVNT 802.11ac20 5200MHz



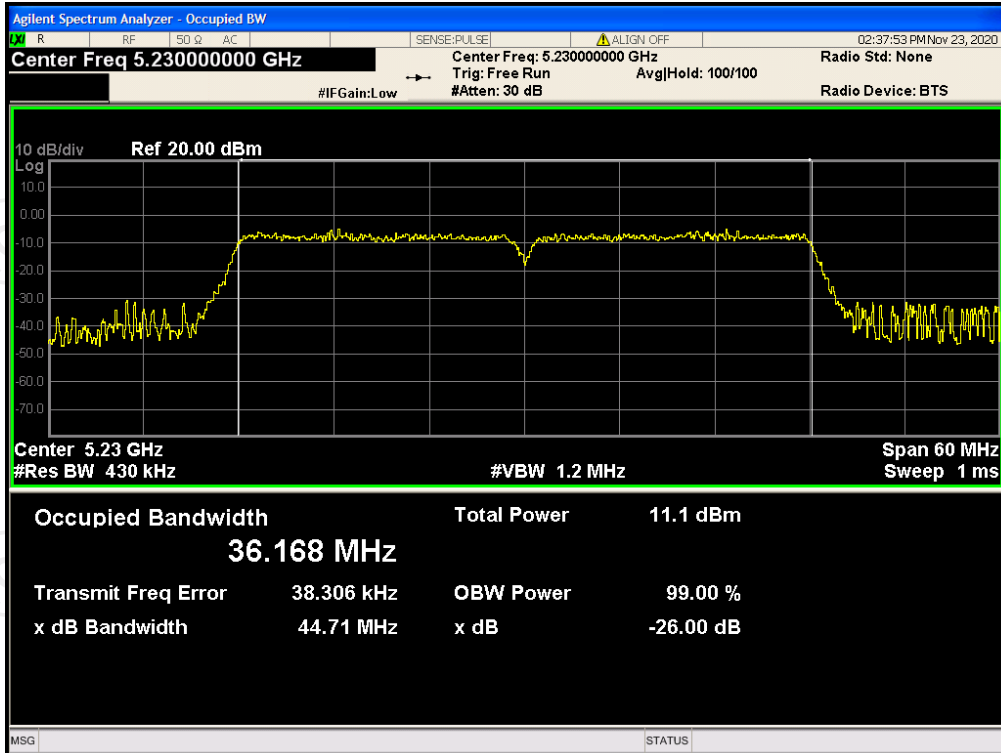
## OBW NVNT 802.11ac20 5240MHz



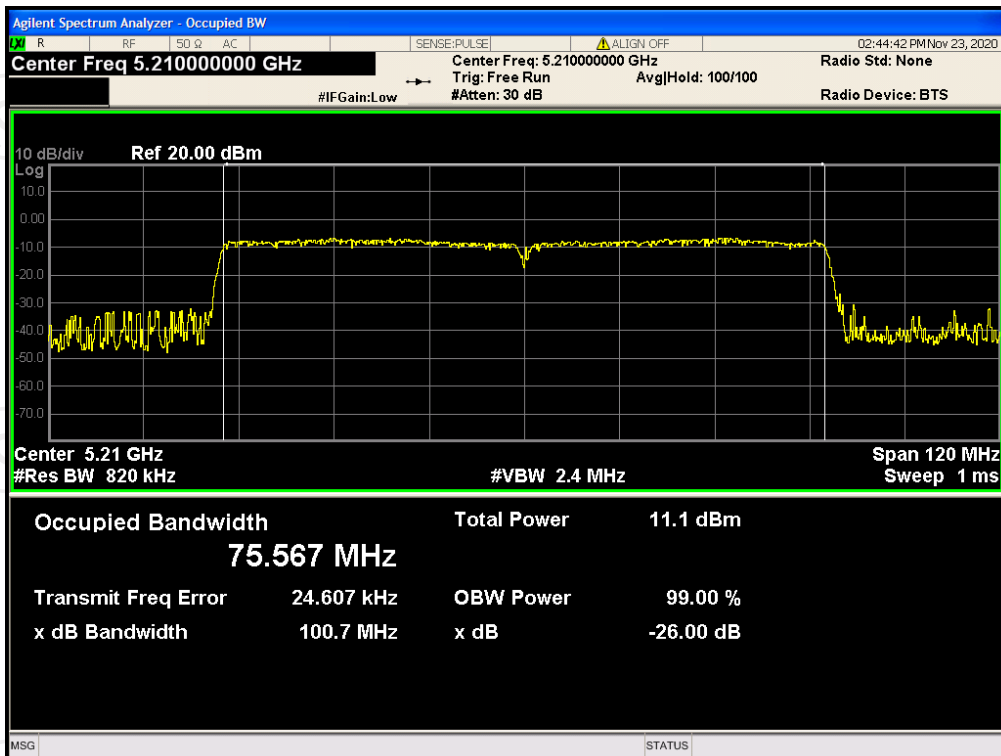
## OBW NVNT 802.11ac40 5190MHz



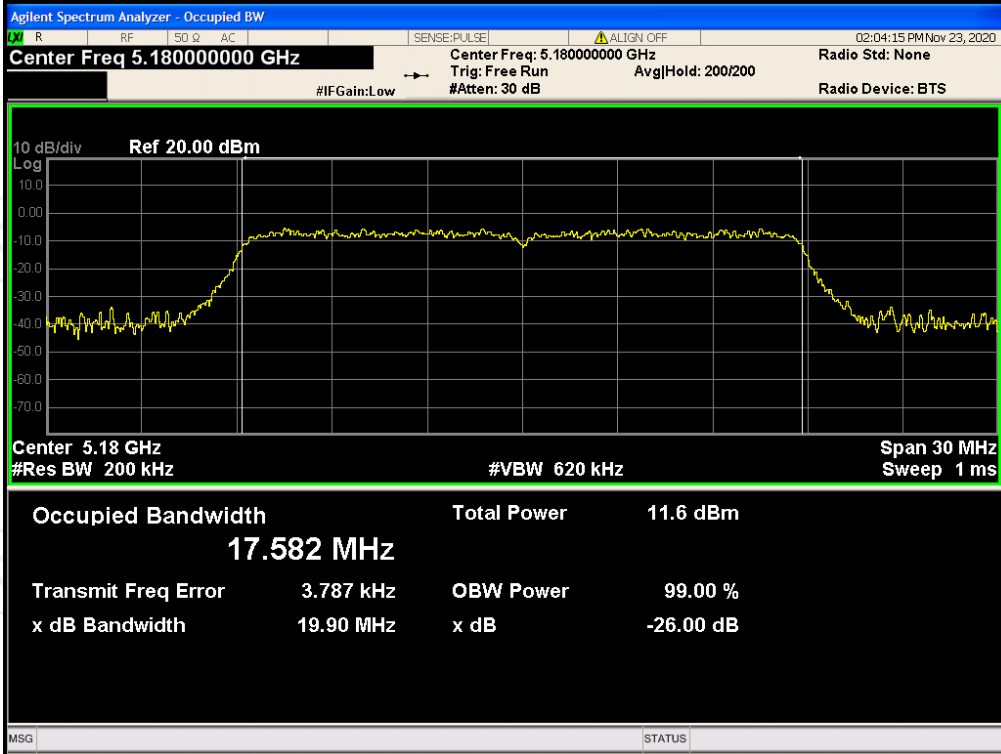
## OBW NVNT 802.11ac40 5230MHz



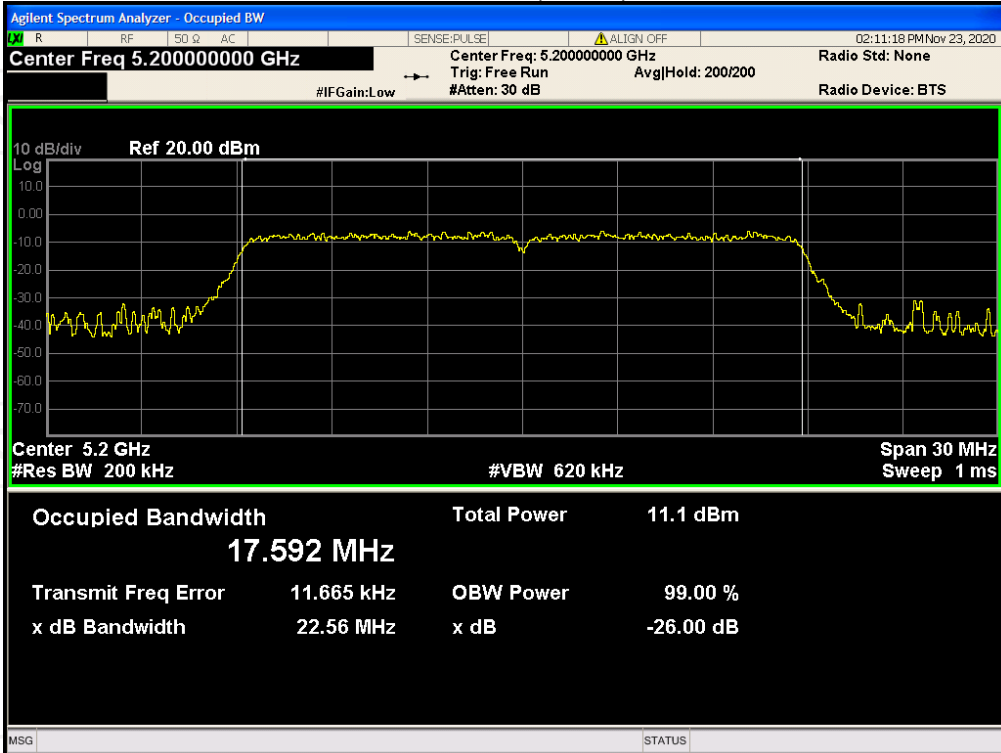
## OBW NVNT 802.11ac80 5210MHz



OBW NVNT 802.11n(HT20) 5180MHz

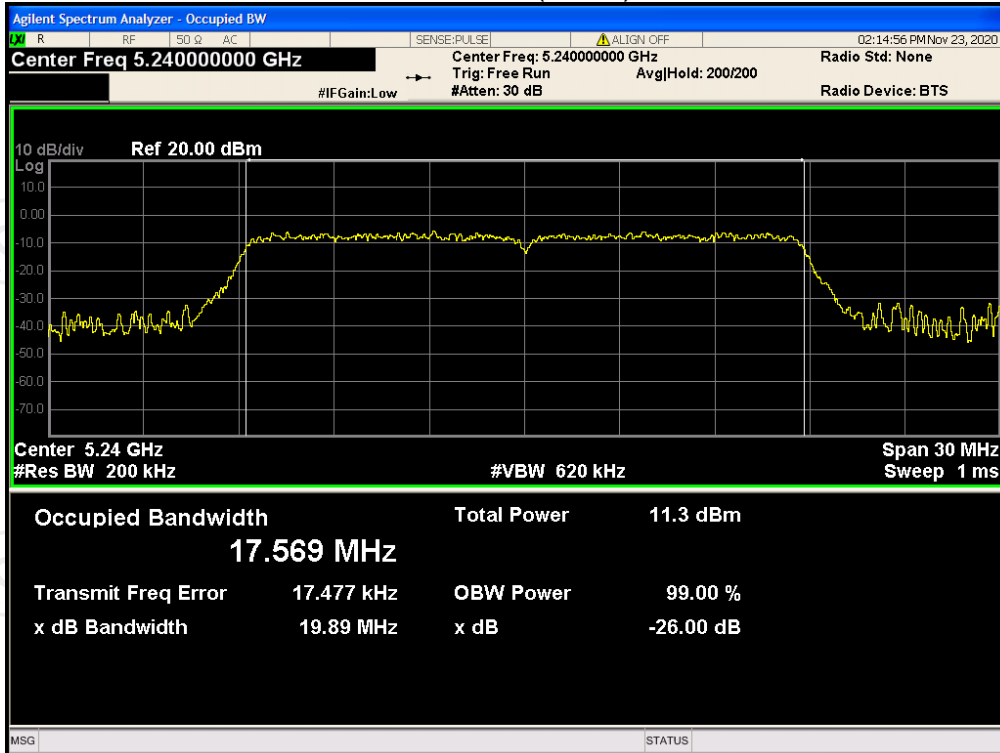


OBW NVNT 802.11n(HT20) 5200MHz

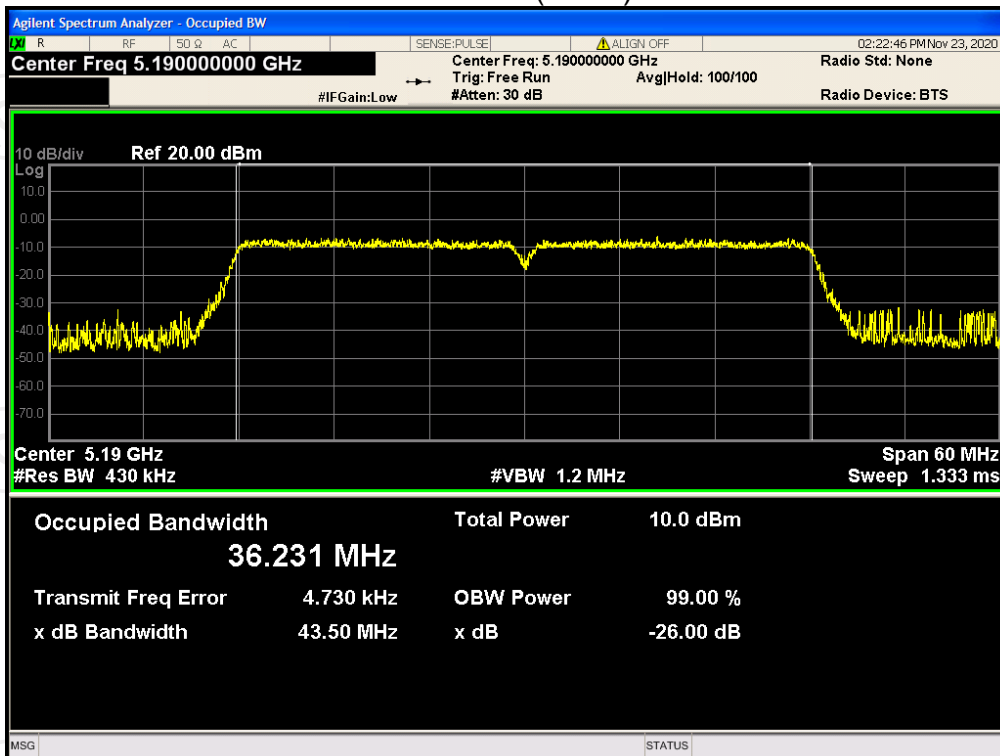




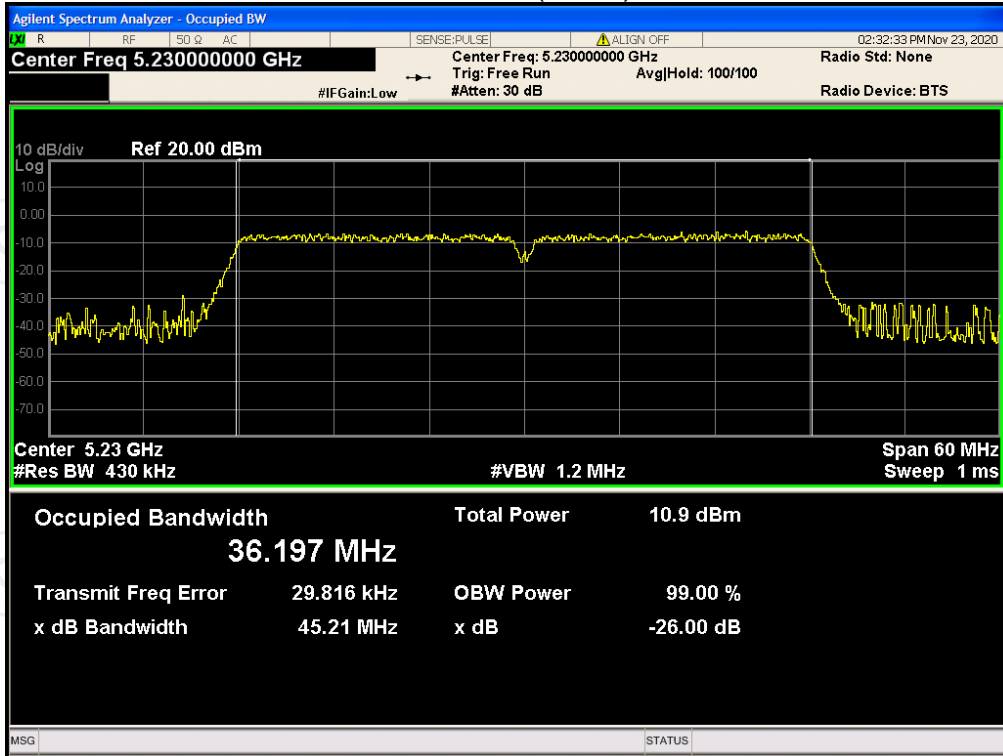
## OBW NVNT 802.11n(HT20) 5240MHz



## OBW NVNT 802.11n(HT40) 5190MHz



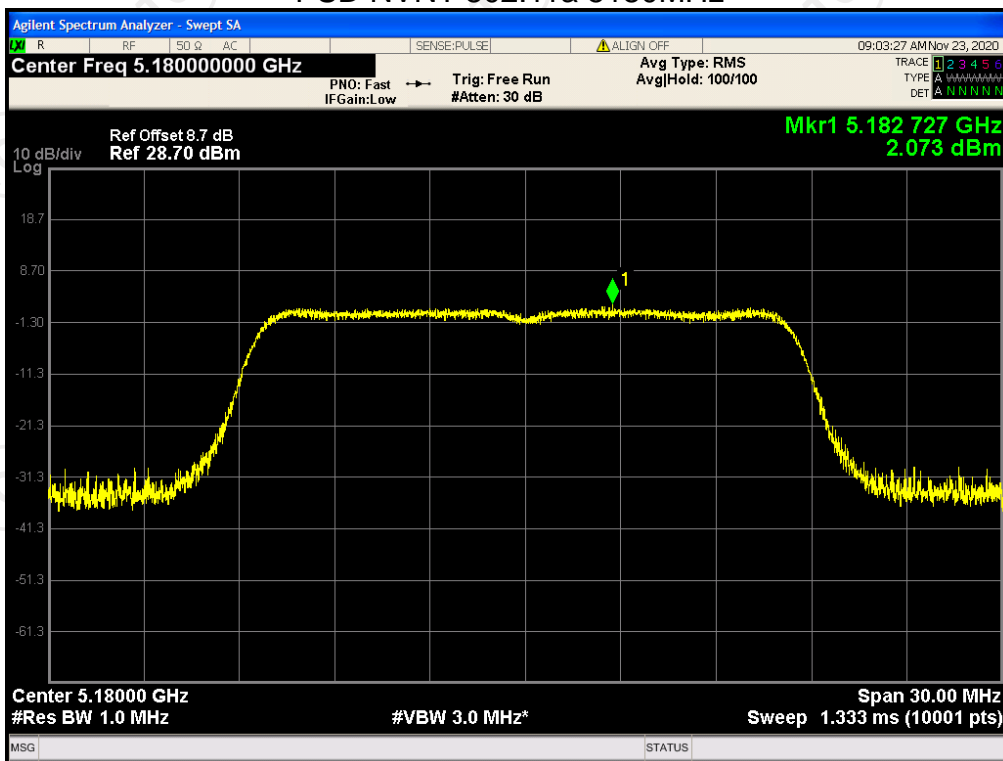
OBW NVNT 802.11n(HT40) 5230MHz



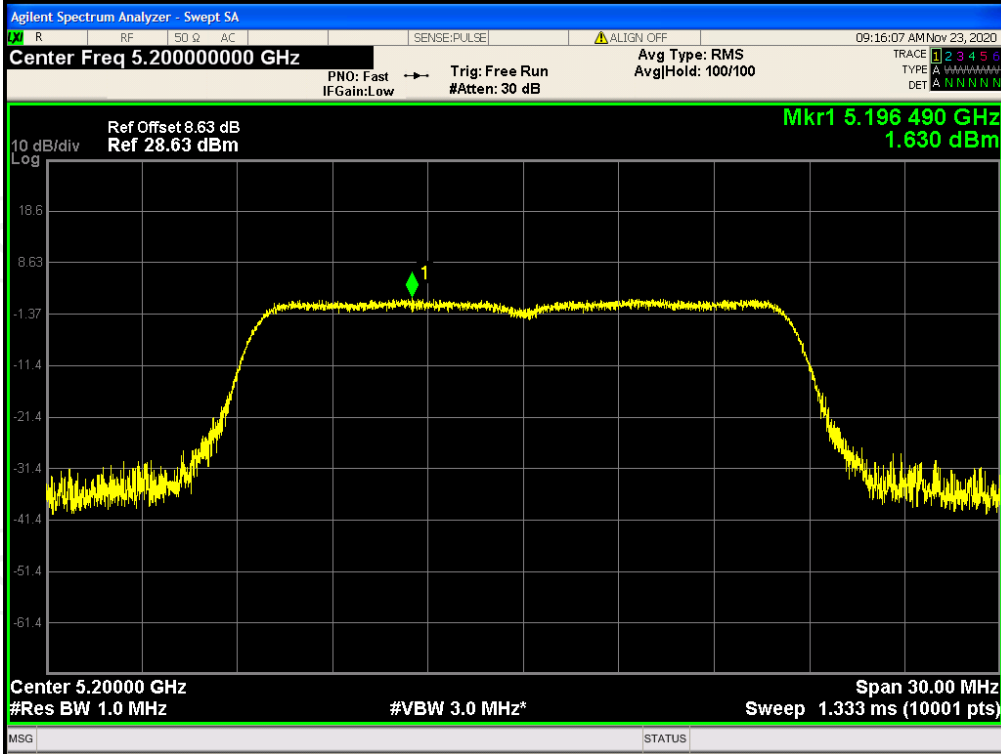
**Maximum Power Spectral Density Level**

Mode	Frequency (MHz)	Max PSD (dBm)	Correction Factor (dB)	Result (dBm)	Limit (dBm)	Verdict
802.11a	5180	2.073	0	2.073	11	Pass
802.11a	5200	1.630	0	1.630	11	Pass
802.11a	5240	2.594	0	2.594	11	Pass
802.11ac20	5180	1.848	0	1.848	11	Pass
802.11ac20	5200	1.997	0	1.997	11	Pass
802.11ac20	5240	2.361	0	2.361	11	Pass
802.11ac40	5190	-1.199	0	-1.199	11	Pass
802.11ac40	5230	-0.835	0	-0.835	11	Pass
802.11ac80	5210	-5.137	0	-5.137	11	Pass
802.11n(HT20)	5180	1.925	0	1.925	11	Pass
802.11n(HT20)	5200	1.520	0	1.520	11	Pass
802.11n(HT20)	5240	2.057	0	2.057	11	Pass
802.11n(HT40)	5190	-1.846	0	-1.846	11	Pass
802.11n(HT40)	5230	-1.396	0	-1.396	11	Pass

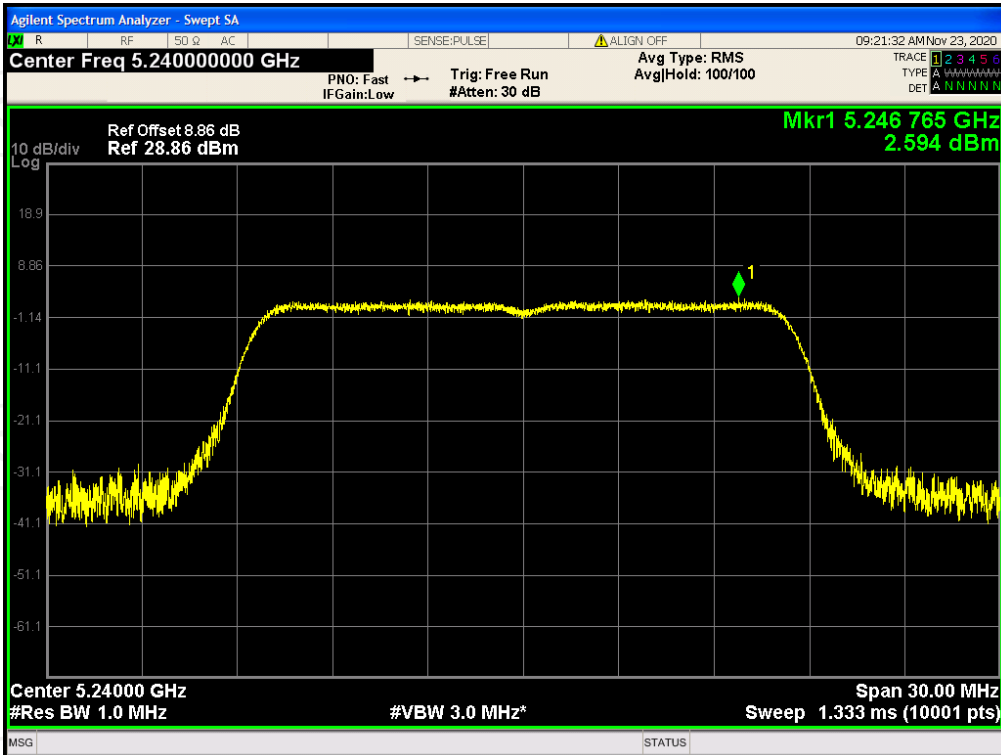
PSD NVNT 802.11a 5180MHz



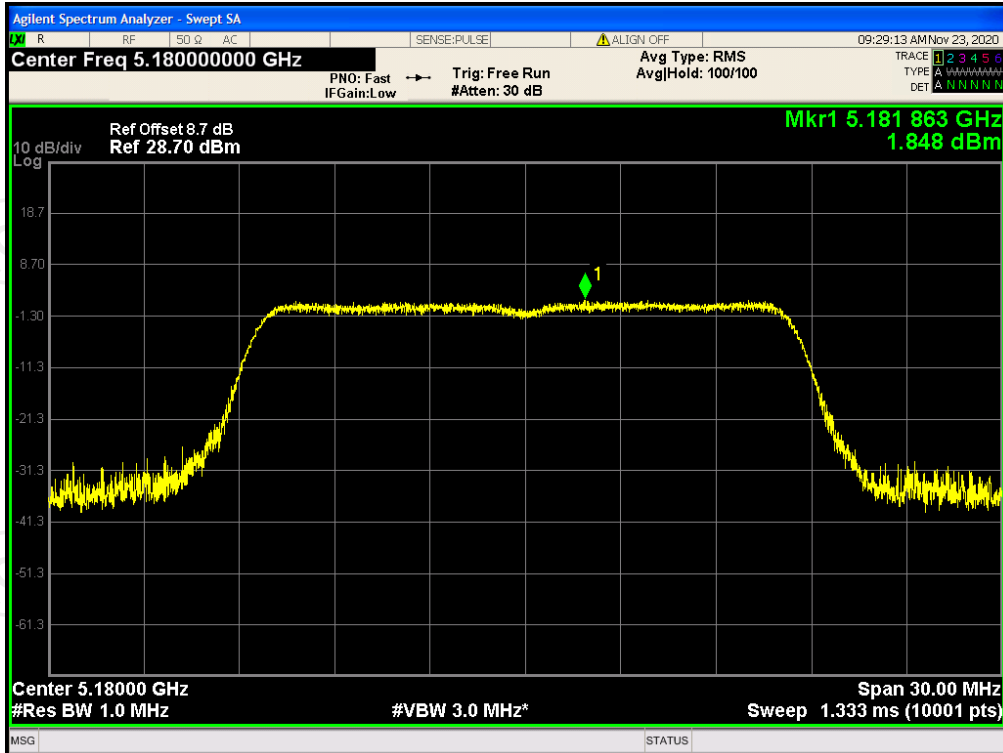
## PSD NVNT 802.11a 5200MHz



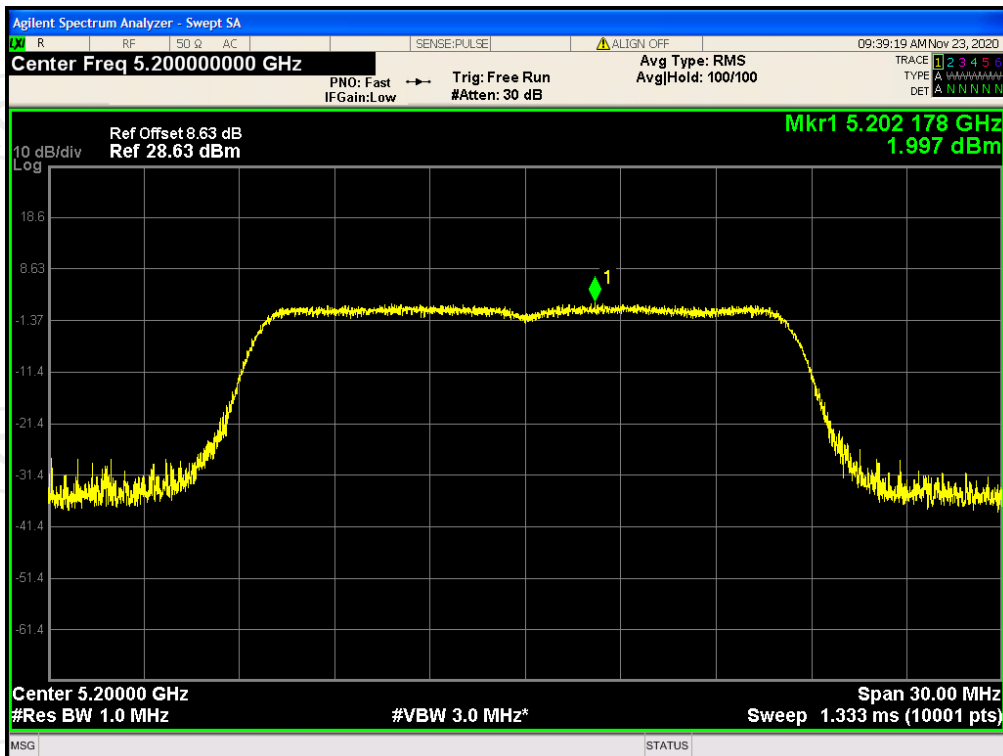
## PSD NVNT 802.11a 5240MHz



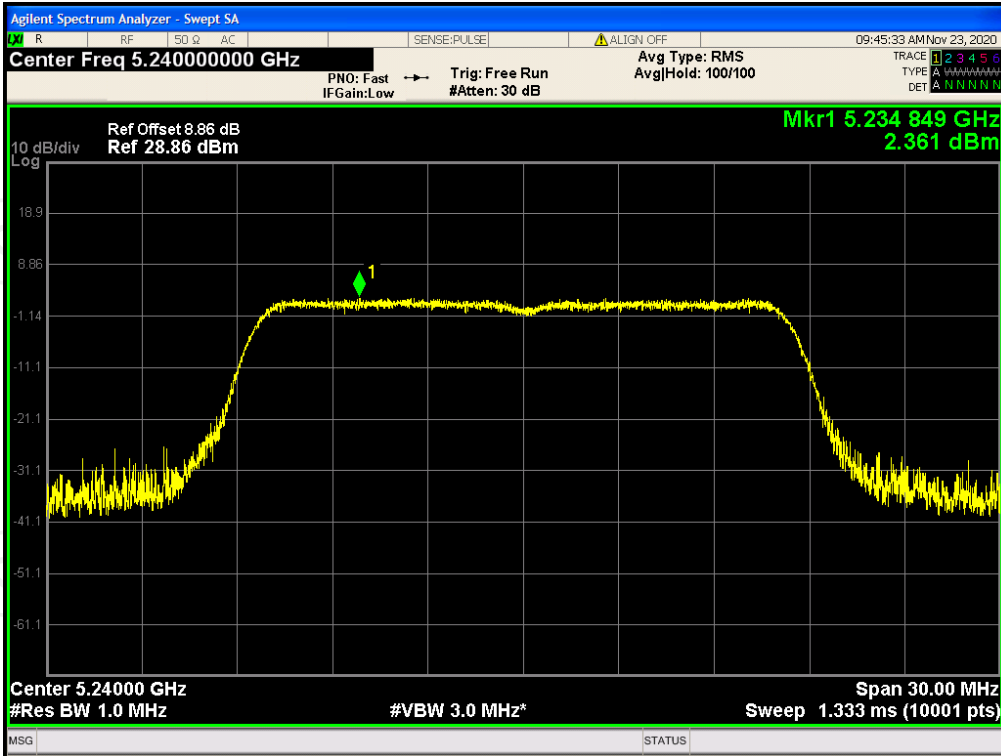
## PSD NVNT 802.11ac20 5180MHz



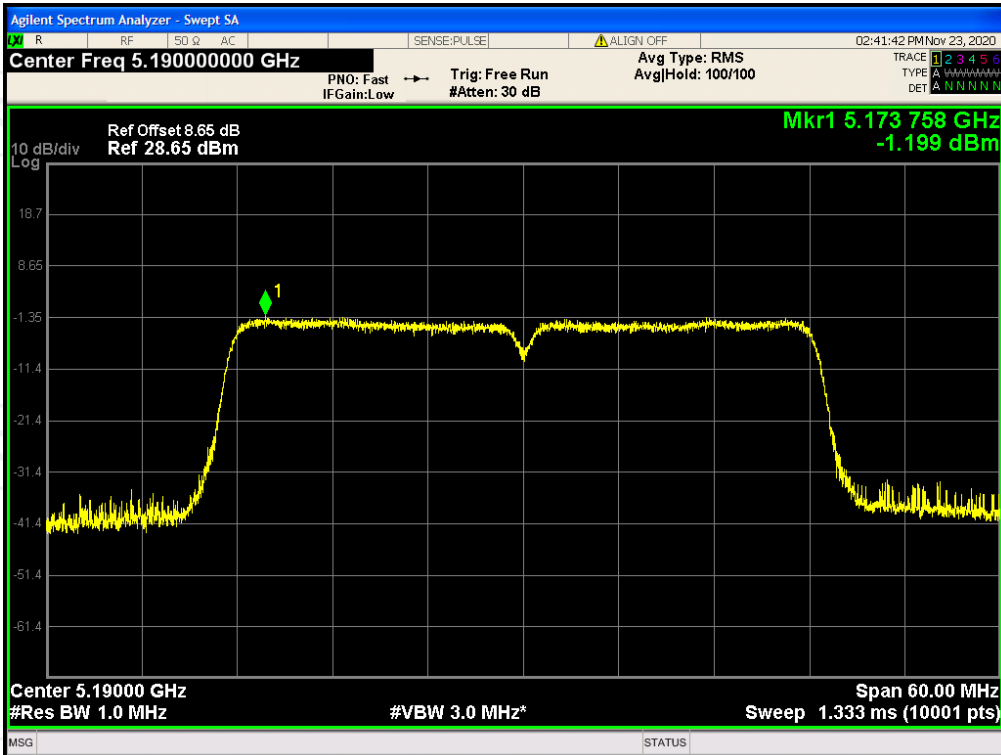
## PSD NVNT 802.11ac20 5200MHz



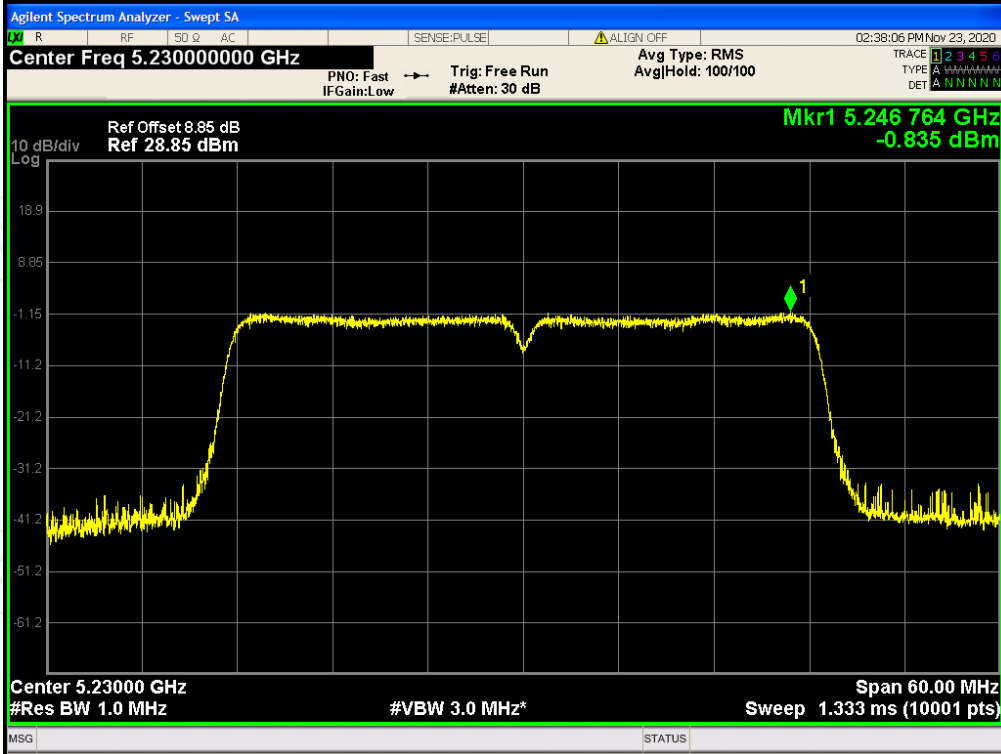
## PSD NVNT 802.11ac20 5240MHz



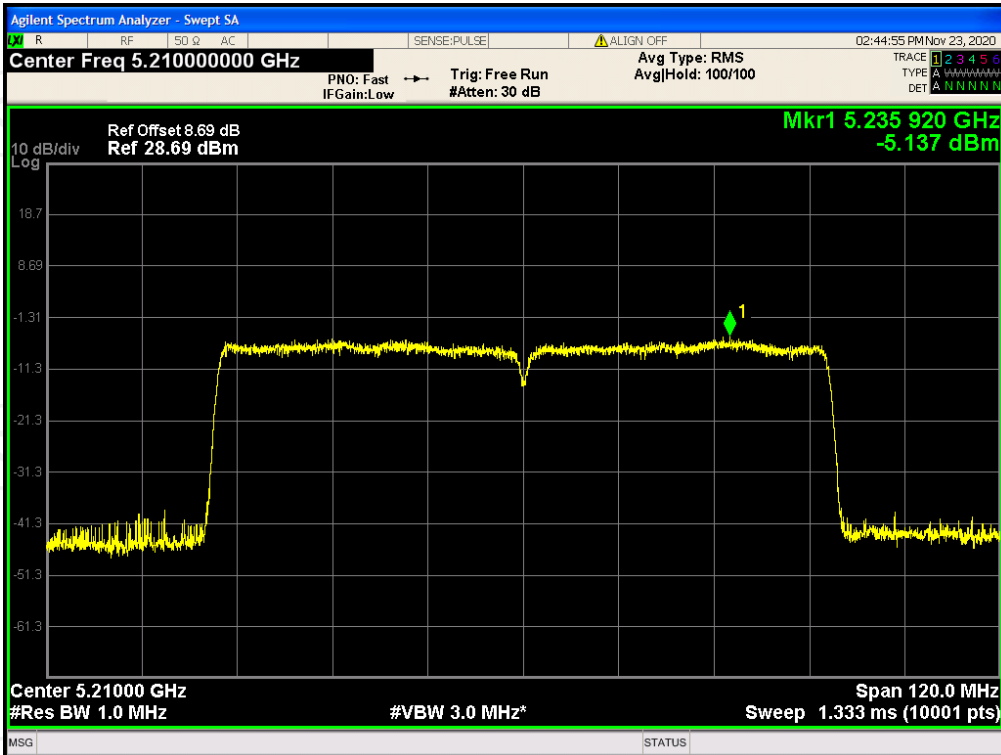
## PSD NVNT 802.11ac40 5190MHz



PSD NVNT 802.11ac40 5230MHz

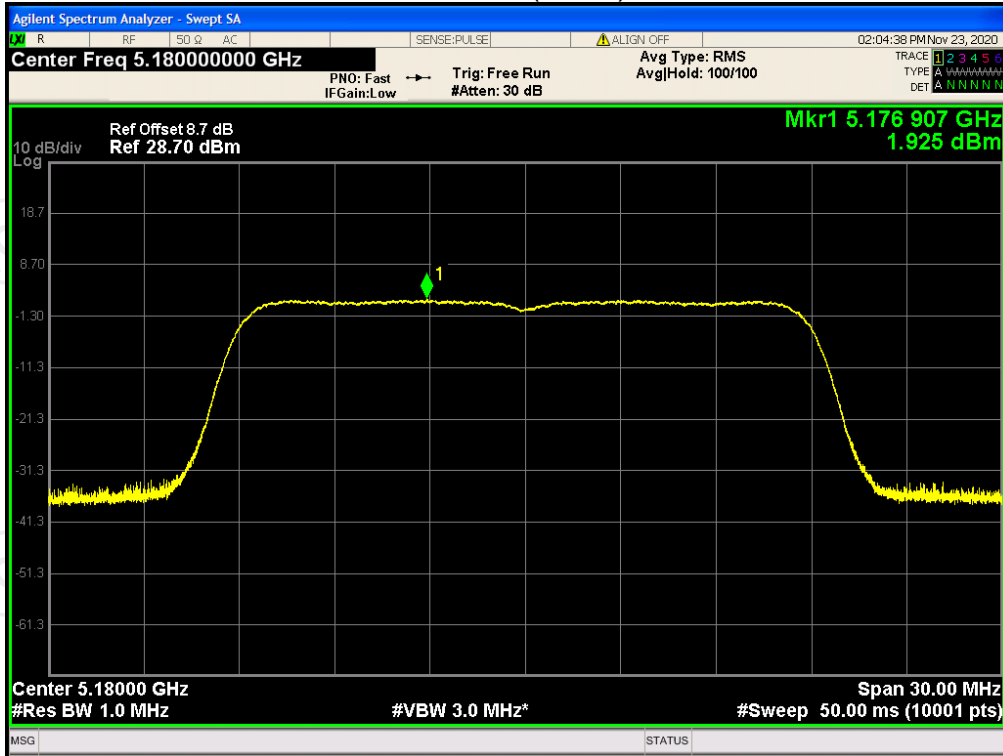


PSD NVNT 802.11ac80 5210MHz

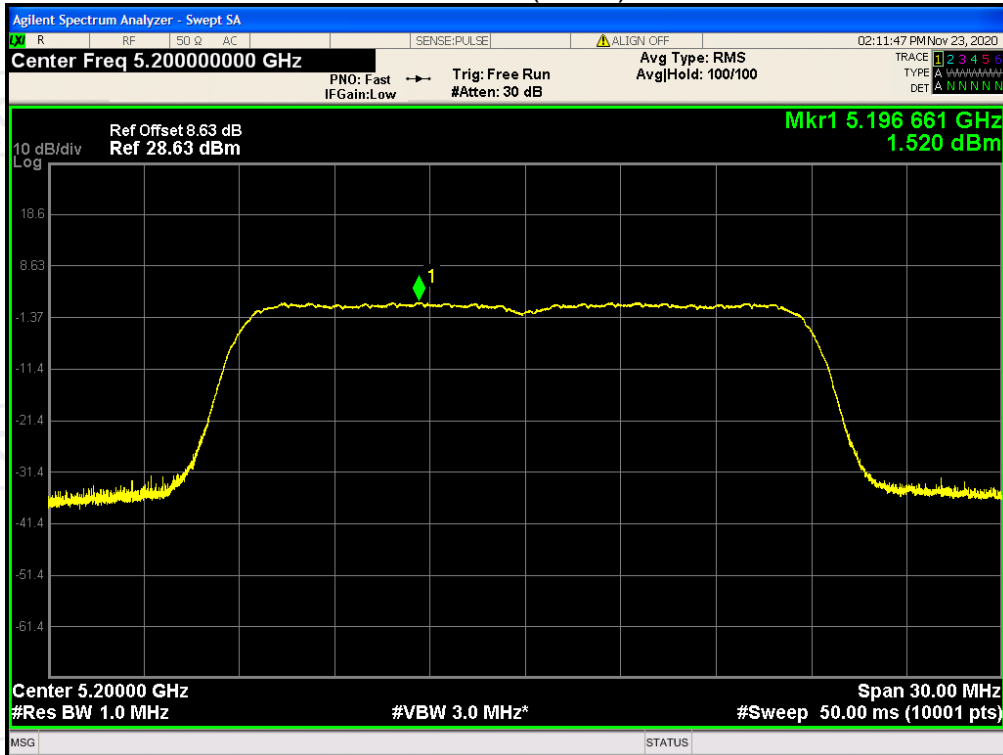




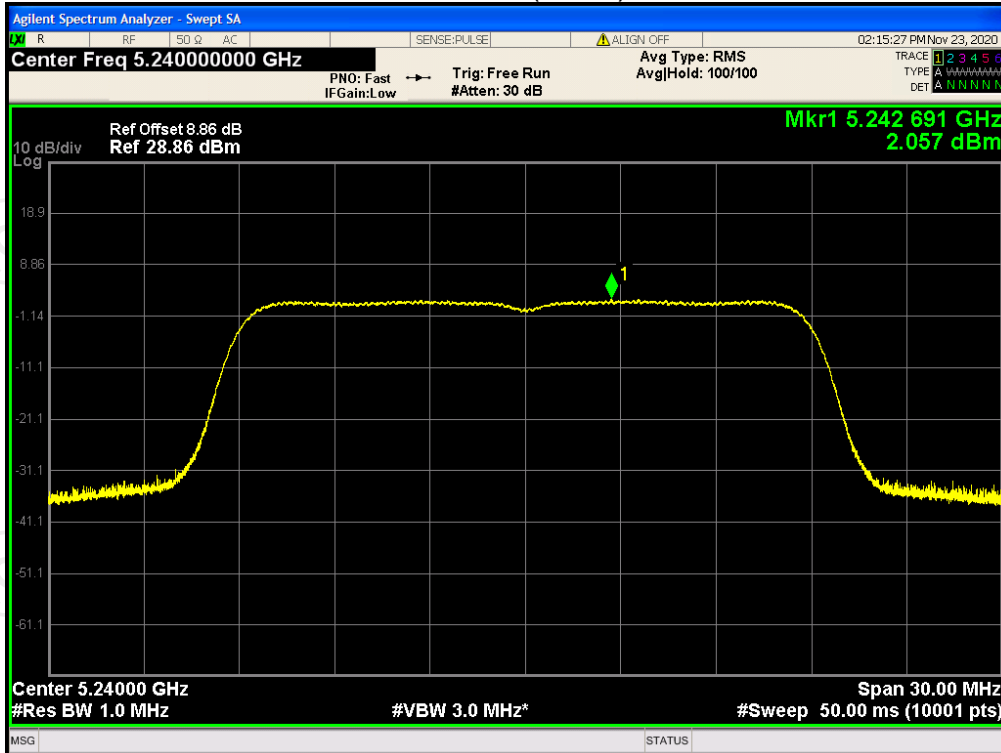
## PSD NVNT 802.11n(HT20) 5180MHz



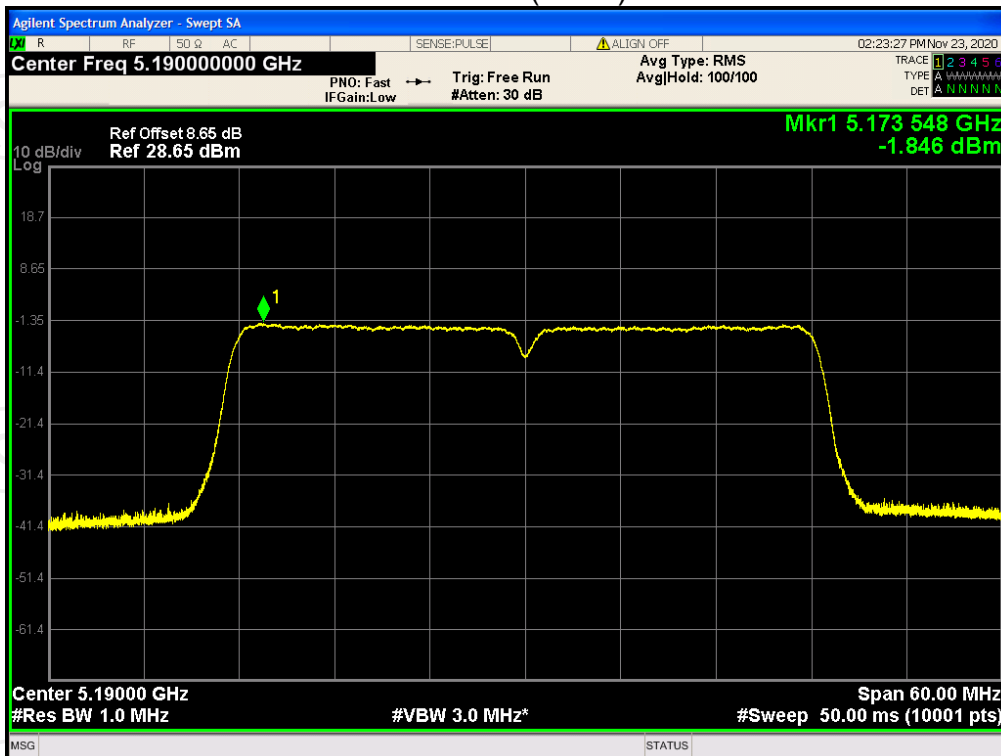
## PSD NVNT 802.11n(HT20) 5200MHz



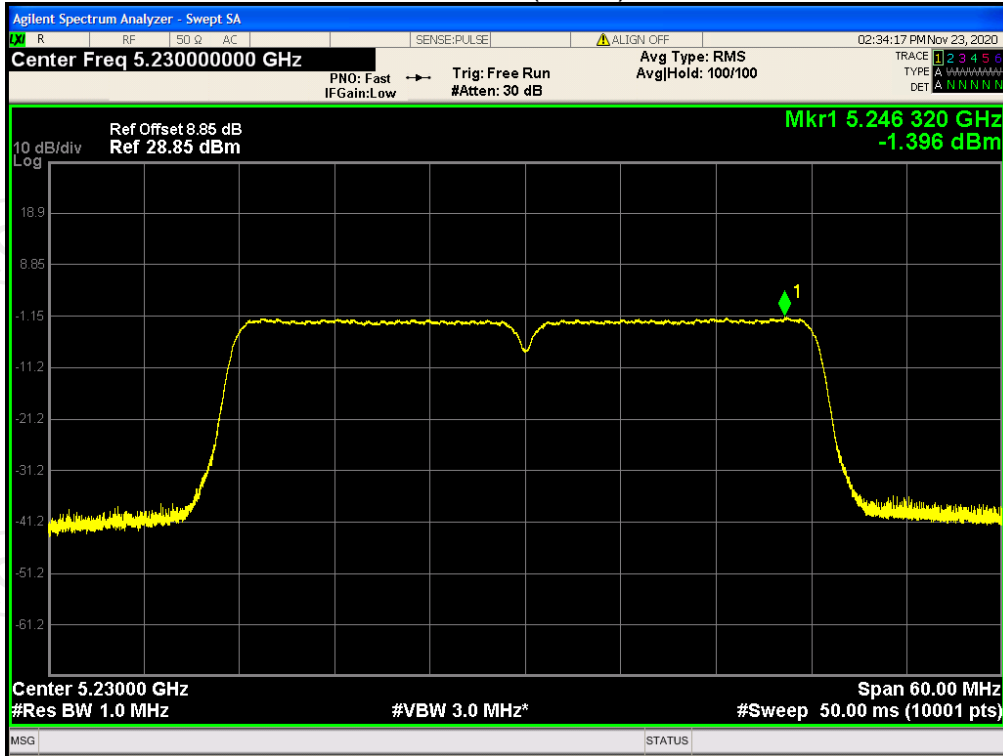
## PSD NVNT 802.11n(HT20) 5240MHz



## PSD NVNT 802.11n(HT40) 5190MHz



## PSD NVNT 802.11n(HT40) 5230MHz



## Appendix B: Photographs of Test Setup

Refer to the test report No. TCT201020E025

## Appendix C: Photographs of EUT

Refer to the test report No. TCT201020E025

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