




# TEST REPORT

**APPLICANT** : Nubia Technology Co.,Ltd  
**PRODUCT NAME** : NX619J  
**MODEL NAME** : NX619J  
**BRAND NAME** : NUBIA  
**FCC ID** : 2AHJO-NX619J  
**STANDARD(S)** : 47 CFR Part 15 Subpart E  
**RECEIPT DATE** : 2018-11-22  
**TEST DATE** : 2018-12-24 to 2019-01-14  
**ISSUE DATE** : 2019-01-14

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<b>Change History</b>		
<b>Version</b>	<b>Date</b>	<b>Reason for change</b>
1.0	2019-01-14	First edition



# 1. Technical Information

Note: Provide by applicant.

## 1.1. Applicant and Manufacturer Information

<b>Applicant:</b>	Nubia Technology Co.,Ltd
<b>Applicant Address:</b>	10/F, Tower A, Hans Innovation Mansion, North Ring Rd., No.9018, High-Tech Park, Nanshan District, Shenzhen, China
<b>Manufacturer:</b>	Nubia Technology Co.,Ltd
<b>Manufacturer Address:</b>	10/F, Tower A, Hans Innovation Mansion, North Ring Rd., No.9018, High-Tech Park, Nanshan District, Shenzhen, China

## 1.2. Equipment Under Test (EUT) Description

<b>Product Name:</b>	NX619J	
<b>Serial No:</b>	(N/A, marked #1 by test site)	
<b>Hardware Version:</b>	NX619J_V1AMB	
<b>Software Version:</b>	NX619J_ENCommon_V1.07	
<b>Modulation Type:</b>	OFDM	
<b>Modulation Mode:</b>	802.11a, 802.11n(HT20), 802.11n(HT40) 802.11ac(VHT20), 802.11ac(VHT40), 802.11ac(VHT80)	
<b>Operating Frequency Range:</b>	5.180GHz- 5.240GHz; 5.260GHz- 5.320GHz; 5.500GHz- 5.720GHz ; 5.745GHz- 5.825GHz	
<b>Channel Number:</b>	Refer to 1.3	
<b>Antenna Type:</b>	PIFA Antenna	
<b>Antenna Gain:</b>	Ant 0: 1.60 dBi; Ant 1: 1.71 dBi	
<b>Directional Gain:</b>	4.72 dBi <small>Note 3</small>	
<b>Accessory Information:</b>	Battery	
	<b>Brand Name:</b>	ATL
	<b>Model No.:</b>	Li3937T44P6h886639
	<b>Serial No.:</b>	(N/A, marked #1 by test site)
	<b>Capacity:</b>	3800mAh
	<b>Rated Voltage:</b>	3.85V
	<b>Charge Limit:</b>	4.4V



<b>Accessory Information:</b>	AC Adapter 1	
	Brand Name:	CHENYANG
	Model No.:	CYNBY090200-A00
	Serial No.:	(N/A, marked #1 by test site)
	Rated Input:	100-240V ~ 50/60Hz 0.5A
	Rated Output:	5V=3.0A; 9V=2.0A; 12V=1.5A
	AC Adapter 2	
	Brand Name:	XINSPower
	Model No.:	Q183
	Serial No.:	(N/A, marked #1 by test site)
	Rated Input:	100-240V ~ 50/60Hz 0.5A
	Rated Output:	3.6~6V=3.0A; 6~9V=2.0A; 9~12V=1.5A

**Note 1:** WIFI hotspot only support U-NII-1 and U-NII-3 band.

**Note 2:** The EUT has two antennas and supports a MIMO function. Physically, the EUT provides two completed transmitters and two receivers for 802.11n and 802.11ac modulation mode.

Modulation Mode:	TX Function
802.11a	1TX
802.11n	2TX
802.11ac	2TX

**Note 3:** According to KDB 662911 D01, the directional gain =  $G_{ANT} + 10\log(N_{ANT})$  dBi, where  $G_{ANT}$  is the maximum antenna gain in dBi,  $N_{ANT}$  is the number of outputs.

**Note 4:** During test, the duty cycle of the EUT was setting to 100%.

**Note 5:** For conducted test item Maximum conducted output Power and Peak Power spectral density of each modulation mode, we recorded the test result of two antennas separately, for other conducted test items both of the two antennas were tested separately, we only recorded the worst test result(Ant 0) in this report.

**Note 6:** All radiation test items for 802.11n modulation mode operate at MIMO mode during the test. Other modulation mode operate at SISO mode, both of the two antennas were tested separately, we only recorded the worst test result(ANT0) in this report.

**Note 7:** For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

### 1.3. The channel number and frequency of EUT

Frequency Range: 5180MHz-5240MHz				
Bandwidth	Channel	Frequency (MHz)	Channel	Frequency (MHz)
20MHz	<b>36</b>	<b>5180</b>	40	5200
	<b>44</b>	<b>5220</b>	<b>48</b>	<b>5240</b>
40MHz	<b>38</b>	<b>5190</b>	<b>46</b>	<b>5230</b>
80MHz	<b>42</b>	<b>5210</b>		
Frequency Range: 5260MHz-5320MHz				
Bandwidth	Channel	Frequency (MHz)	Channel	Frequency (MHz)
20MHz	<b>52</b>	<b>5260</b>	56	5280
	<b>60</b>	<b>5300</b>	<b>64</b>	<b>5320</b>
40MHz	<b>54</b>	<b>5270</b>	<b>62</b>	<b>5310</b>
80MHz	<b>58</b>	<b>5290</b>		
Frequency Range: 5500MHz-5720MHz				
Bandwidth	Channel	Frequency (MHz)	Channel	Frequency (MHz)
20MHz	<b>100</b>	<b>5500</b>	105	5520
			108	5540
			116	5580
			<b>120</b>	<b>5600</b>
			124	5620
			132	5660
40MHz		140	5700	
	<b>102</b>	<b>5510</b>	110	5550
			118	5590
80MHz			<b>126</b>	<b>5630</b>
			134	5670
	<b>106</b>	<b>5530</b>	<b>142</b>	<b>5710</b>
	<b>138</b>	<b>5690</b>		
Frequency Range: 5745-5825MHz				
Bandwidth	Channel	Frequency (MHz)	Channel	Frequency (MHz)
20MHz	<b>149</b>	<b>5745</b>	153	5765
	<b>157</b>	<b>5785</b>	161	5805
	<b>165</b>	<b>5825</b>		
40MHz	<b>151</b>	<b>5775</b>	<b>159</b>	<b>5795</b>
80MHz	<b>155</b>	<b>5775</b>		

**Note 1:** The black bold channels were selected for test.



## 1.4. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart E (UNII band) for the EUT FCC ID Certification:

No	Identity	Document Title
1	47 CFR Part 15 (5-1-14 Edition)	Radio Frequency Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Test Date	Test Engineer	Result
1	15.203	Antenna Requirement	N/A	N/A	PASS
2	15.407(a) (e)	Emission Bandwidth	Jan 02, 2019	Zhou Zijiang	PASS
3	15.407(a)	Maximum conducted output Power	Jan 02, 2019	Zhou Zijiang	PASS
4	15.407(a)	Peak Power spectral density	Dec 25&27, 2018	Zhou Zijiang	PASS
5	15.407(g)	Frequency Stability	Jan 02, 2019	Zhou Zijiang	PASS
6	15.207	Conducted Emission	Nov 27, 2018	Wang Dalong	PASS
7	15.205,15.209 15.407(b)	Restricted Frequency Bands	Dec 31, 2018 Jan 12, 2019	Wang Dalong	PASS
8	15.407(b)	Radiated Emission	Dec 31, 2018 Jan 01, 2019	Wang Dalong	PASS

**Note1:** EUT is a Client Device Without Radar Detection, TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

**Note2:** The DFS test report was documented in a separate report (Report No.: SZ18110268W05).

**Note3:** The tests of Conducted Emission and Radiated Emission were performed according to the method of measurements prescribed in ANSI C63.10 (2013).

**Note4:** These RF tests were performed according to the method of measurements prescribed in KDB789033 D02 General UNII Test Procedures New Rules v02r01, KDB662911 D01 Multiple Transmitter Output v02r01.

## 1.5. Environmental Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 - 35
Relative Humidity (%):	30 -60
Atmospheric Pressure (kPa):	86-106



## 2.47 CFR Part 15C Requirements

### 2.1. Antenna requirement

#### 2.1.1. Applicable Standard

According to FCC 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.

#### 2.1.2. 2.1.2 Result: Compliant

The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.



## 2.2. Duty Cycle of the test signal

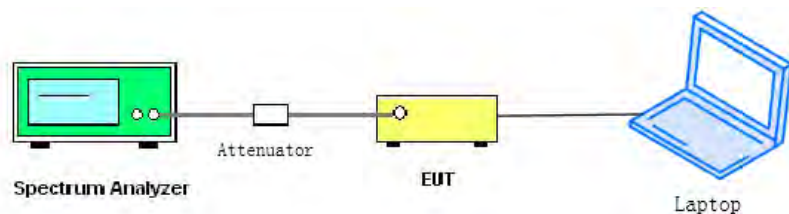
### 2.2.1. Requirement

Preferably, all measurements of maximum conducted (average) output power will be performed with the EUT transmitting continuously (i.e., with a duty cycle of greater than or equal to 98%). When continuous operation cannot be realized, then the use of sweep triggering/signal gating techniques can be used to ensure that measurements are made only during transmissions at the maximum power control level. Such sweep triggering/signal gating techniques will require knowledge of the minimum transmission duration (T) over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation. Sweep triggering/signal gating techniques can then be used if the measurement/sweep time of the analyzer can be set such that it does not exceed T at any time that data are being acquired (i.e., no transmitter OFF-time is to be considered).

When continuous transmission cannot be achieved and sweep triggering/signal gating cannot be implemented, alternative procedures are provided that can be used to measure the average power; however, they will require an additional measurement of the transmitter duty cycle (D). Within this subclause, the duty cycle refers to the fraction of time over which the transmitter is ON and is transmitting at its maximum power control level. The duty cycle is considered to be constant if variations are less than  $\pm 2\%$ ; otherwise, the duty cycle is considered to be nonconstant.

### 2.2.2. Test Description

#### A. Test Set:



The EUT is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50 $\Omega$ ; the path loss as the factor is calibrated to correct the reading.

#### B. Test Procedure

KDB 789033 Section B was used in order to prove compliance.

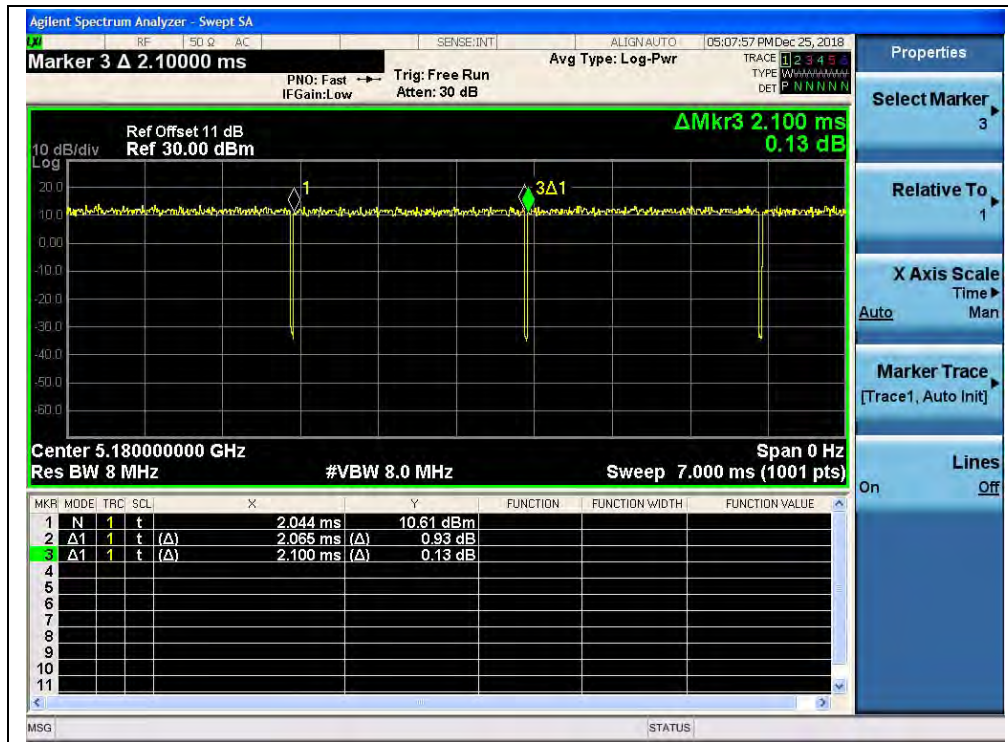


2.2.3. Test Result

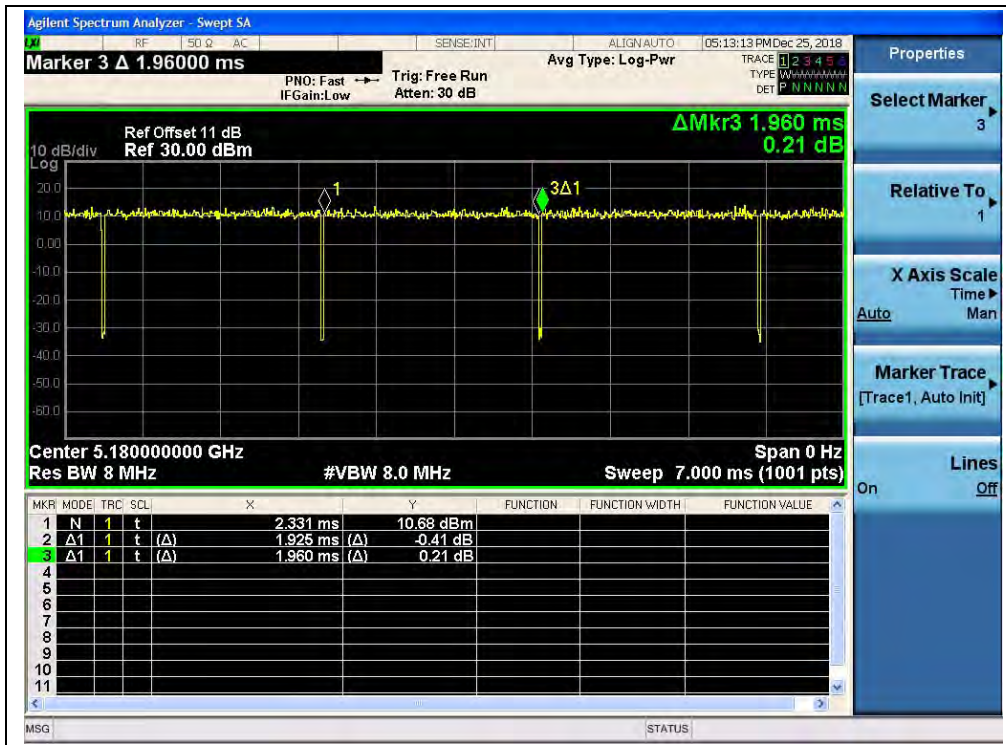
A. Test Verdict:

Test Mode	Duty Cycle (%) (D)		Duty Factor (10*log[1/D])	
	ANT0	ANT1	ANT0	ANT1
802.11a	98.33	98.10	0.07	0.08
802.11n(HT20)	98.21	97.96	0.08	0.09
802.11n(HT40)	96.50	96.11	0.15	0.17
802.11ac(VHT20)	96.34	96.34	0.16	0.16
802.11ac(VHT40)	93.28	93.28	0.30	0.30
802.11ac(VHT80)	87.67	87.67	0.57	0.57

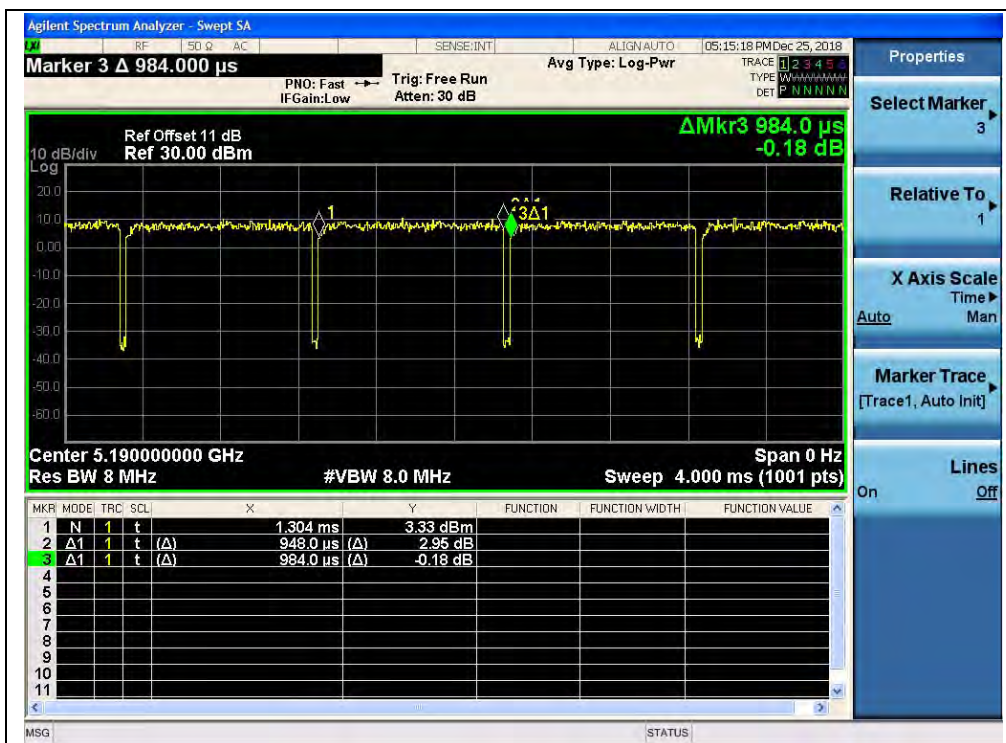
B. Test Plots



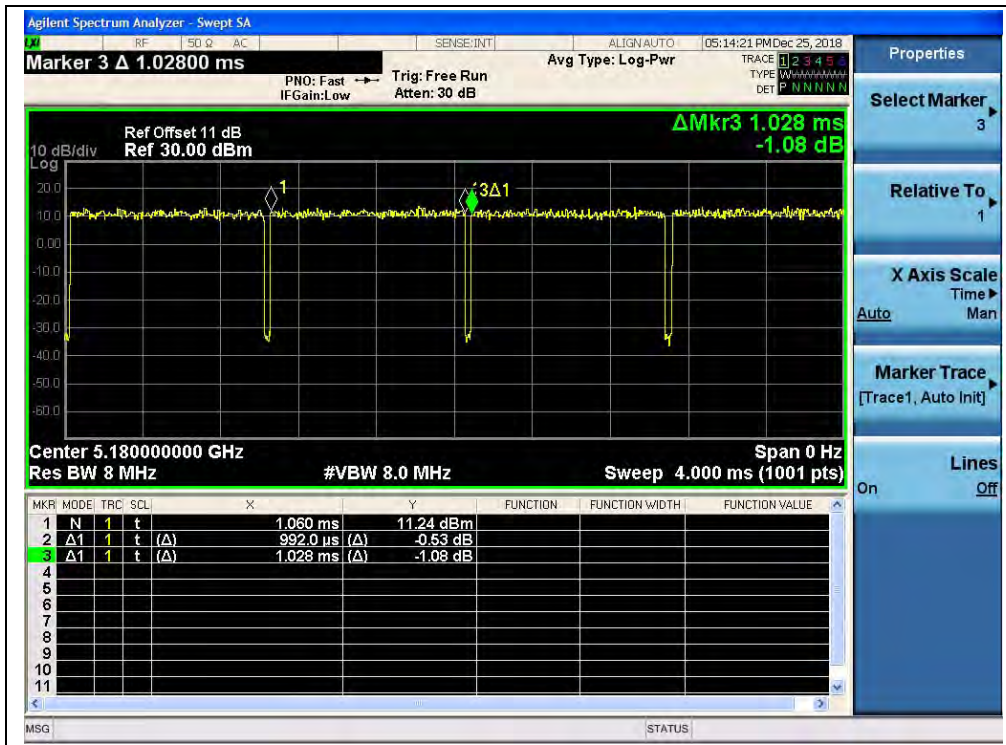
(CH36\_5180MHz\_802.11a, ANT0)



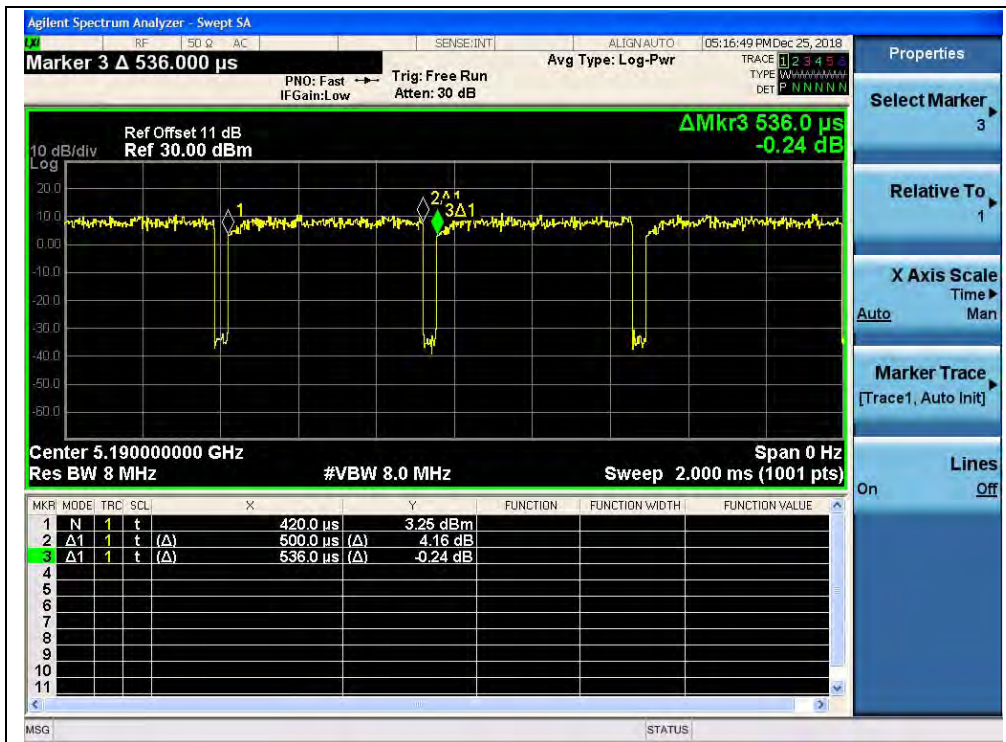
(CH36\_5180MHz\_802.11n(HT20), ANT0)



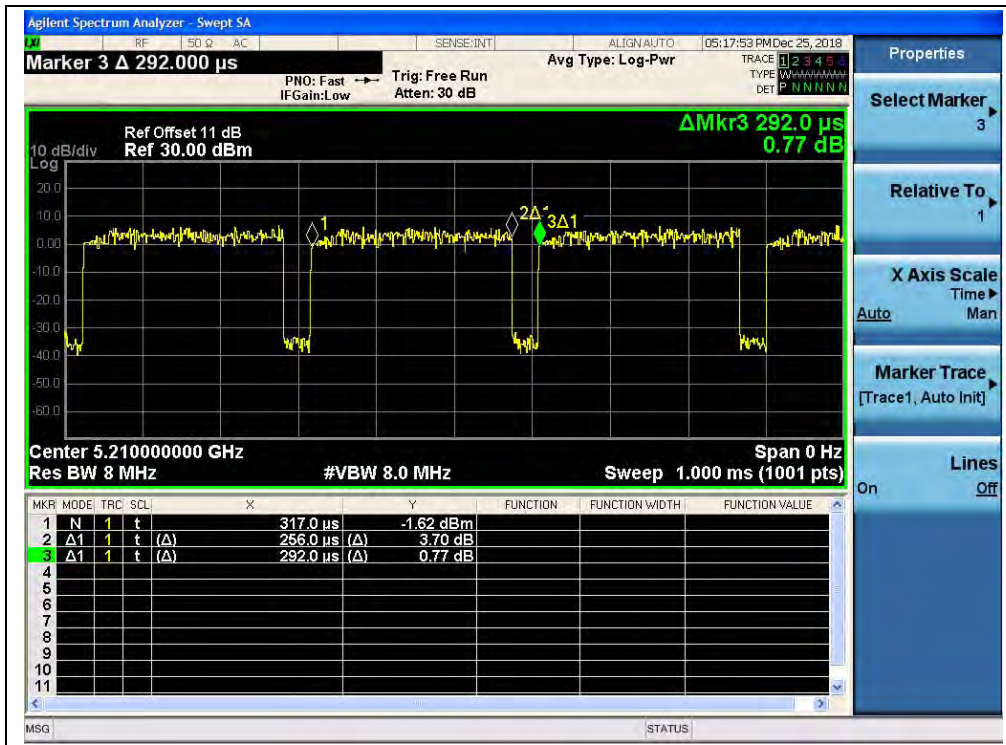
(CH38\_5190MHz\_802.11n(HT40), ANT0)



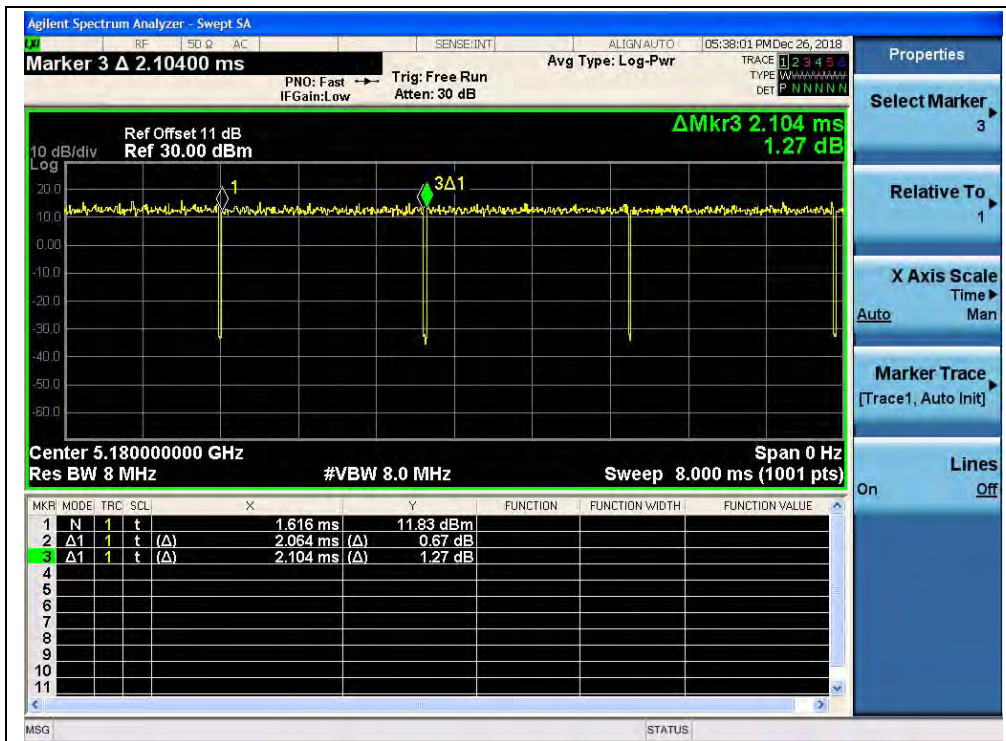
(CH36\_5180MHz\_802.11ac(VHT20), ANT0)



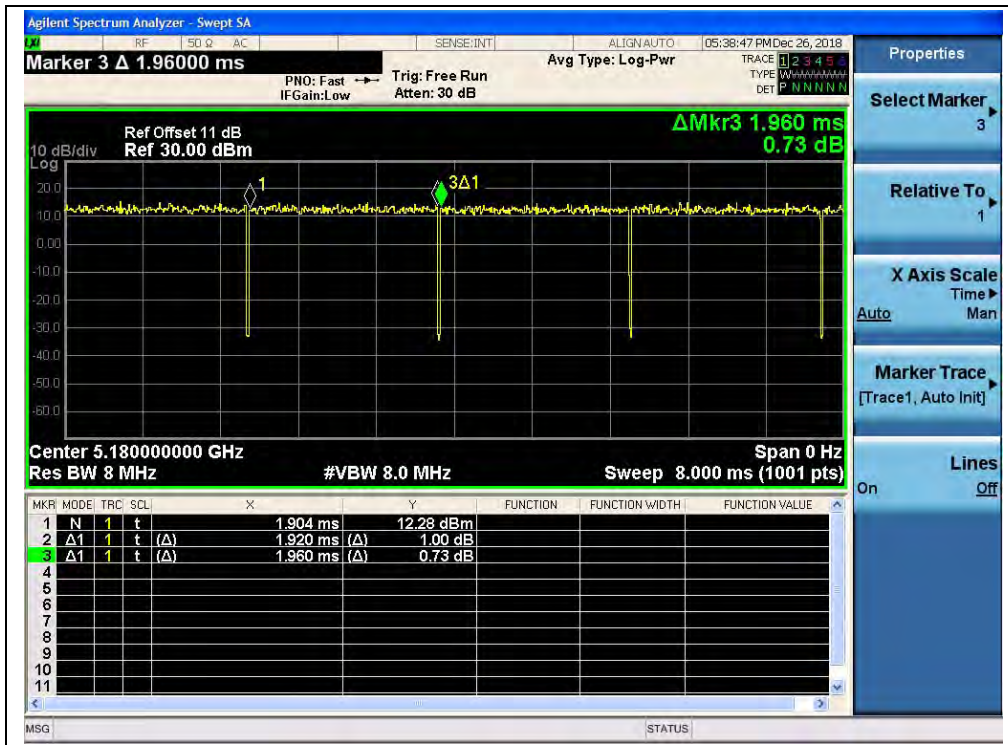
(CH38\_5190MHz\_802.11 ac(VHT40), ANT0)



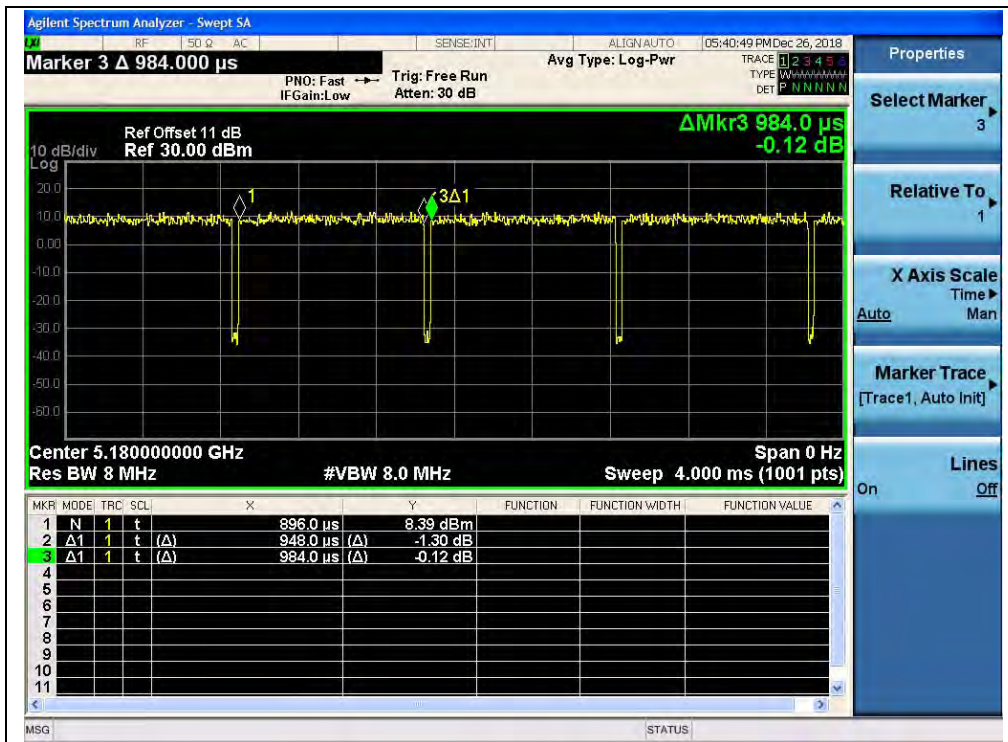
(CH42\_5210MHz\_802.11 ac(VHT80), ANT0)



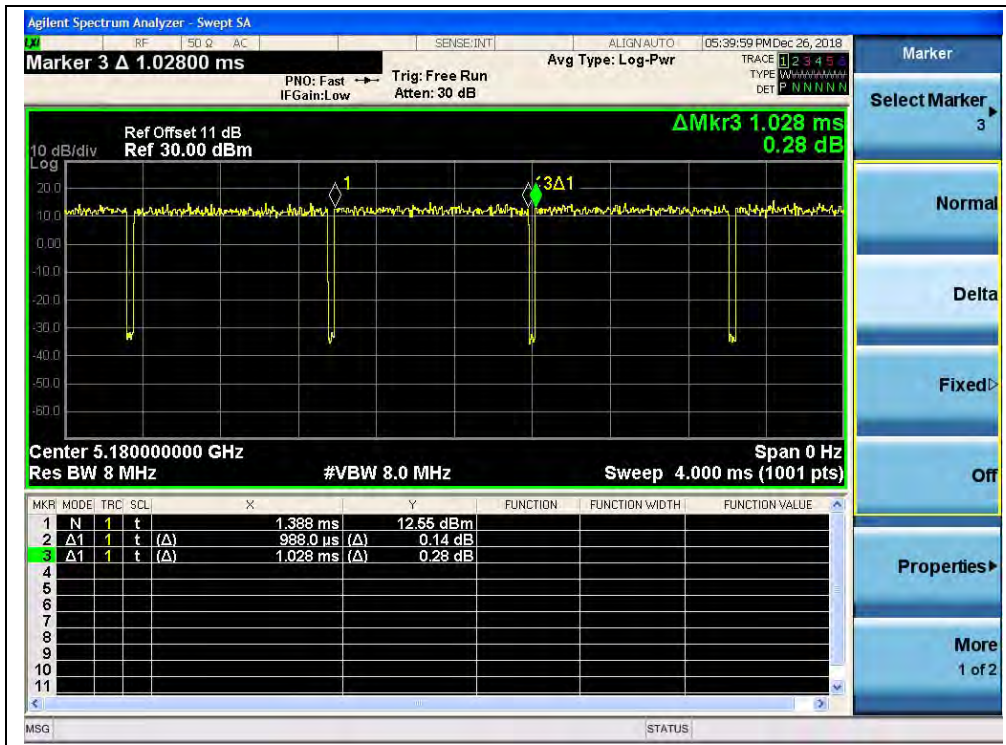
(CH36\_5180MHz\_802.11a, ANT1)



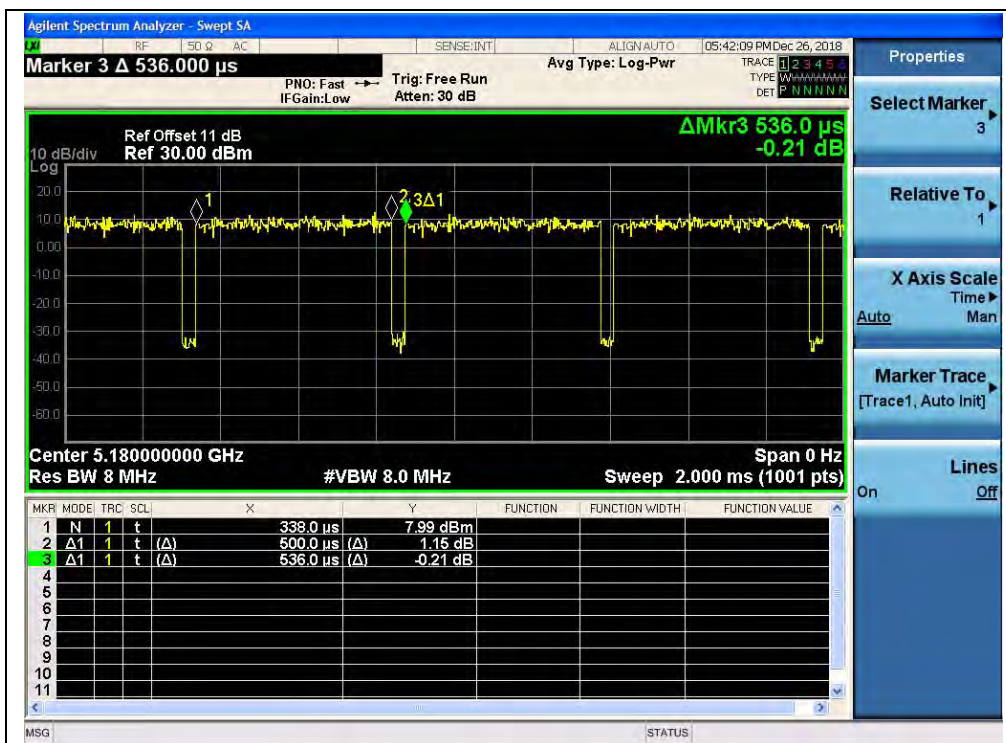
(CH36\_5180MHz\_802.11n(HT20), ANT1)



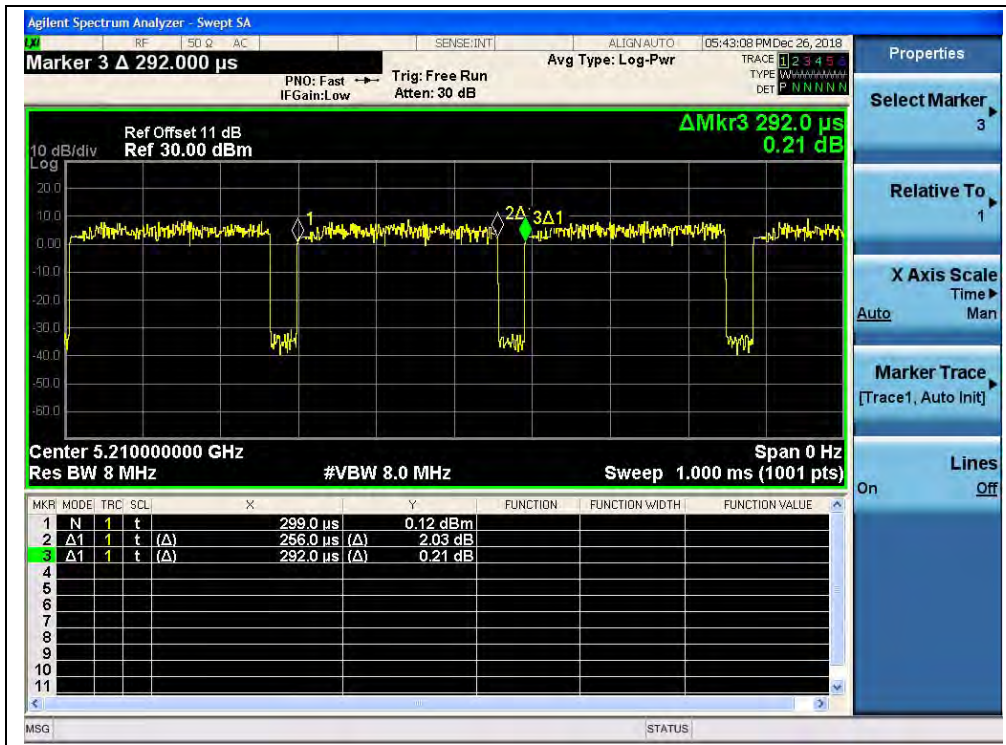
(CH38\_5190MHz\_802.11n(HT40), ANT1)



(CH36\_5180MHz\_802.11ac(VHT20), ANT1)



(CH38\_5190MHz\_802.11 ac(VHT40), ANT1)



(CH42\_5210MHz\_802.11 ac(VHT80), ANT1)



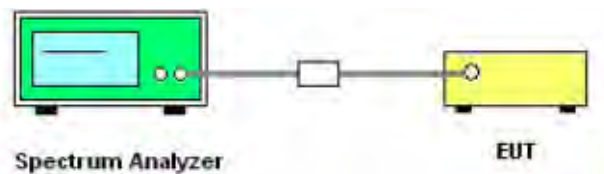
## 2.3. Emission Bandwidth

### 2.3.1. Requirement

For purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Determination of the emissions bandwidth is based on the use of measurement instrumentation employing a peak detector function with an instrument resolution bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement. Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

### 2.3.2. Test Description

#### A. Test Set:



The EUT is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50 Ohm; the path loss as the factor is calibrated to correct the reading.

#### B. Test Procedure

1. KDB 789033 Section C) 1) Emission Bandwidth was used in order to prove compliance
  - 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 peak 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%.
2. KDB 789033 Section C) 2) minimum emission bandwidth for the band 5.725-5.85GHz was used in order to prove compliance.  
Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:
  - a) Set RBW = 100 kHz.
  - b) Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
  - c) Detector = Peak.



- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

**2.3.3. Test Result**

**802.11a Test mode**

**A. Test Verdict:**

Channel	Frequency (MHz)	ANTO 26 dB Bandwidth (MHz)
36	5180	21.49
44	5220	21.30
48	5240	21.29 <sub>Note</sub>
52	5260	22.64
60	5300	21.86
64	5320	23.52
100	5500	22.52
120	5600	23.87
144	5720	21.26
Channel	Frequency (MHz)	ANTO 6dB Bandwidth (MHz)
144	5720	16.32
149	5745	16.01
157	5785	16.38
165	5825	15.41

**Note:** The high frequency of the -26dB is 5251.31MHz which is in the DFS frequency range, so DFS testing is required. Please refer to DFS report (Report No.: SZ18110268W05).



B. Test Plots



(Channel 36, 5180MHz, 802.11a, ANT0)



(Channel 44, 5220 MHz, 802.11a, ANT0)



(Channel 48, 5240MHz, 802.11a, ANT0)



(Channel 48, 5240MHz, fh of -26dB, 802.11a,)



(Channel 52, 5260MHz, 802.11a, ANT0)



(Channel 60, 5300 MHz, 802.11a, ANT0)



(Channel 64, 5320MHz, 802.11a, ANT0)



(Channel 100, 5500MHz, 802.11a, ANT0)



(Channel 120, 5600 MHz, 802.11a, ANT0)



(Channel 144, 5720MHz, 802.11a, ANT0)



(Channel 144, 5720MHz, 802.11a,)

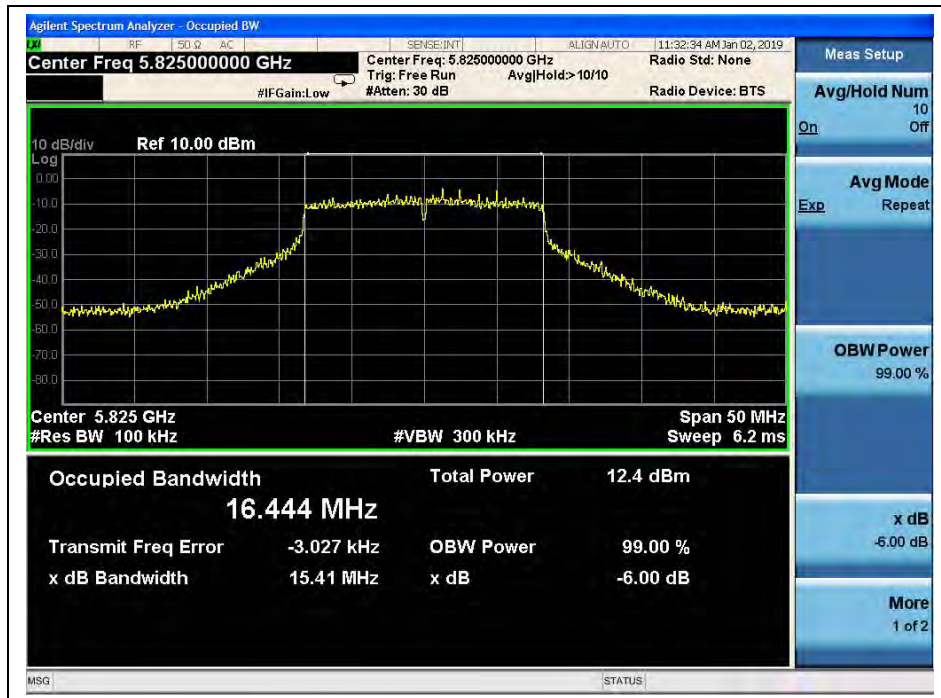


(Channel 149, 5745MHz, 802.11a, ANT0)





(Channel 157, 5785MHz, 802.11a, ANT0)



(Channel 165, 5825MHz, 802.11a, ANT0)

**802.11n (HT20) Test mode****A. Test Verdict:**

Channel	Frequency (MHz)	ANTO 26 dB Bandwidth (MHz)
36	5180	23.07
44	5220	22.35
48	5240	21.93 <sup>Note</sup>
52	5260	22.72
60	5300	21.84
64	5320	22.93
100	5500	21.47
120	5600	22.74
144	5720	23.12

Channel	Frequency (MHz)	ANTO 6dB Bandwidth (MHz)
144	5720	17.30
149	5745	13.81
157	5785	16.54
165	5825	16.78

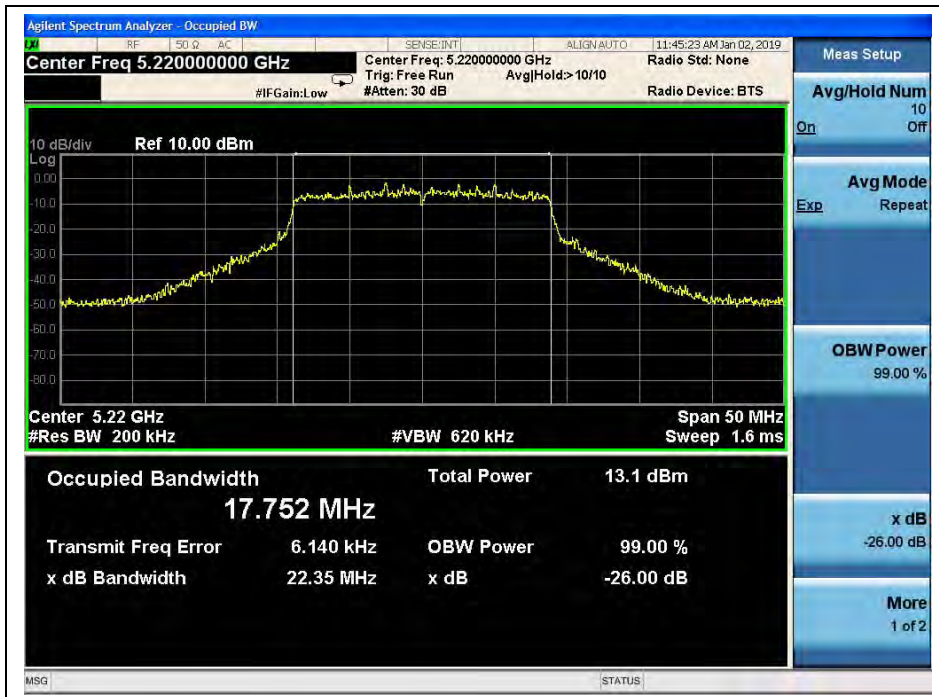
**Note:** The high frequency of the -26dB is 5251.88MHz which is in the DFS frequency range, so DFS testing is required. Please refer to DFS report (Report No.: SZ18110268W05).



B. Test Plots



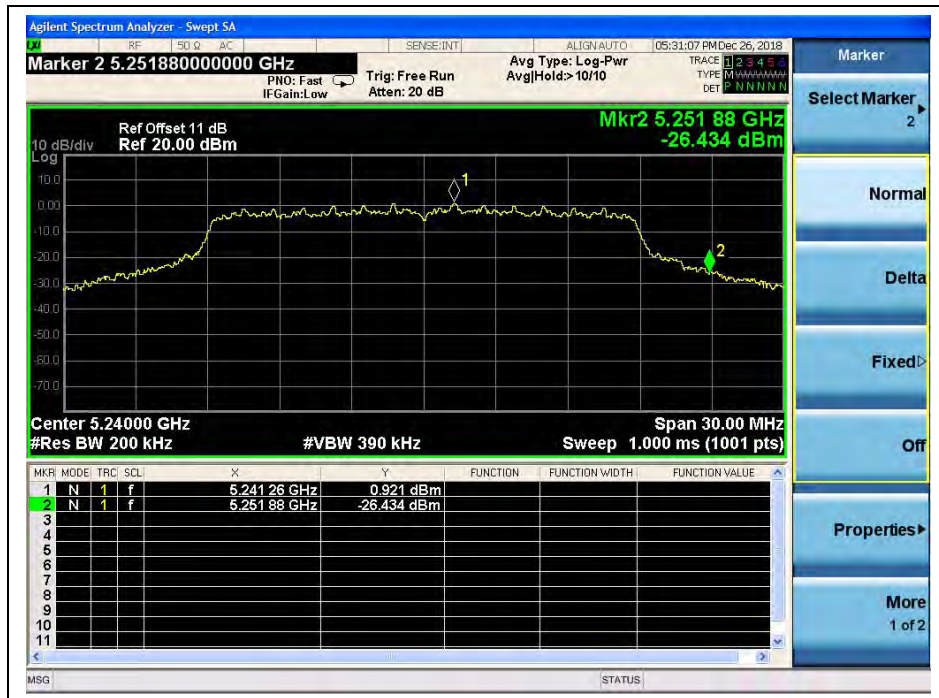
(Channel 36, 5180MHz, 802.11n (HT20), ANT0)



(Channel 44, 5220 MHz, 802.11n (HT20), ANT0)



(Channel 48, 5240MHz, 802.11 n (HT20), ANT0)



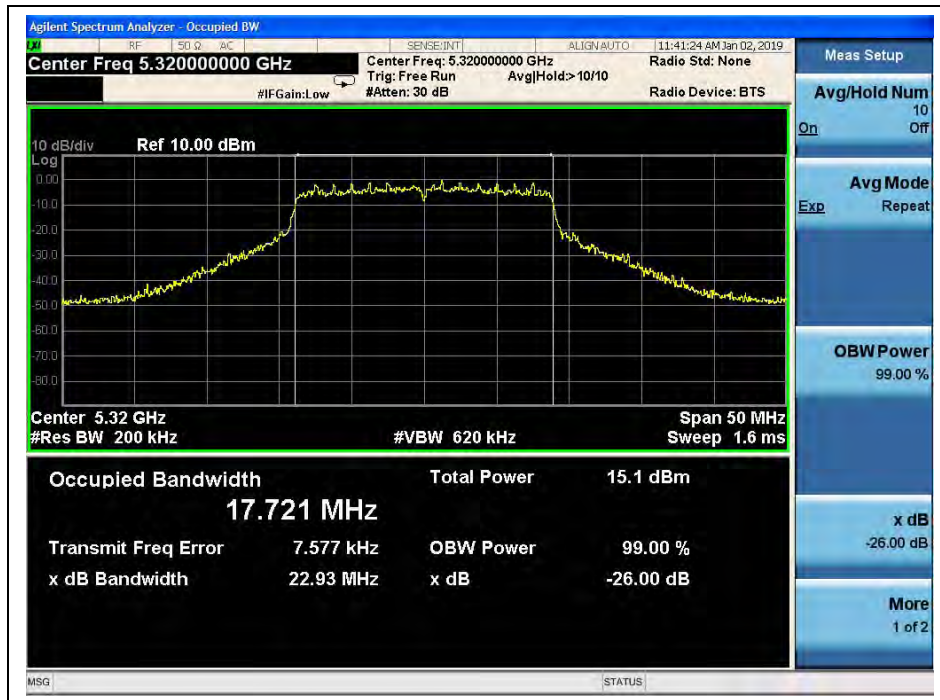
(Channel 48, 5240MHz, fh of -26dB, 802.11 n (HT20))



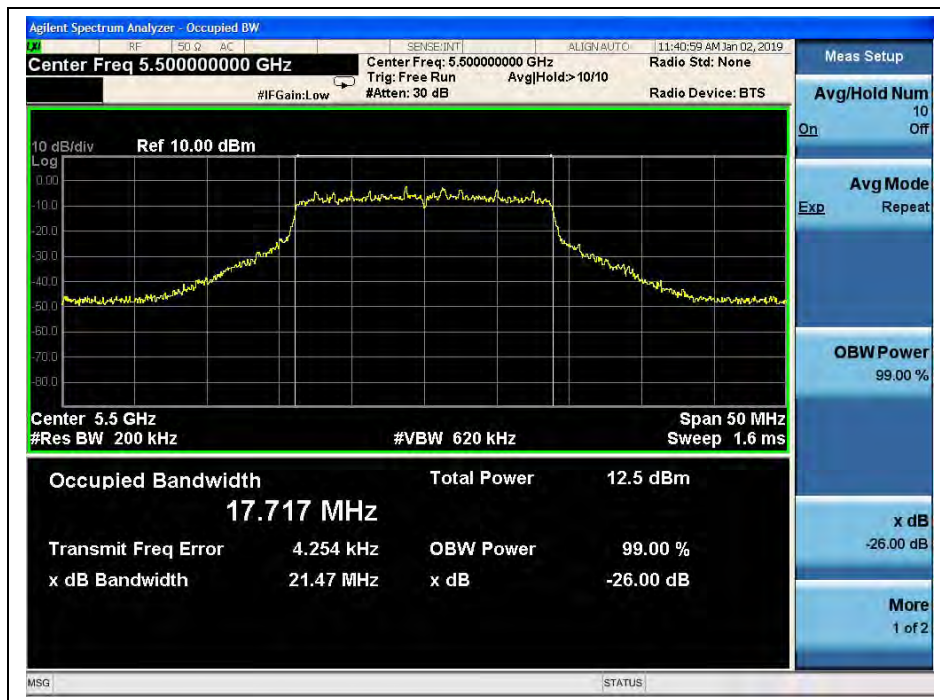
(Channel 52, 5260MHz, 802.11n (HT20), ANT0)



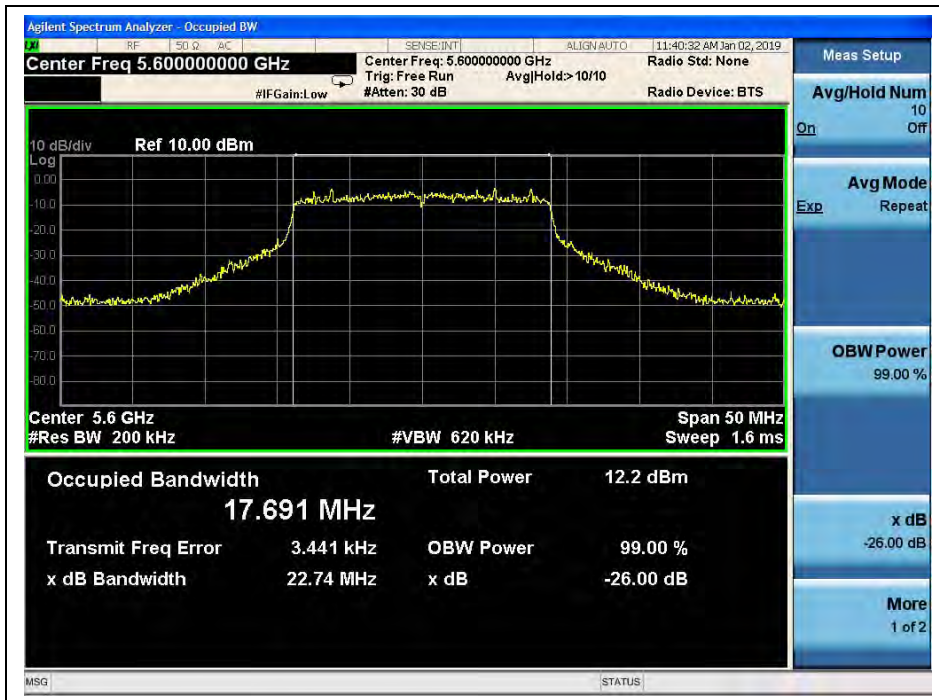
(Channel 60, 5300 MHz, 802.11n (HT20), ANT0)



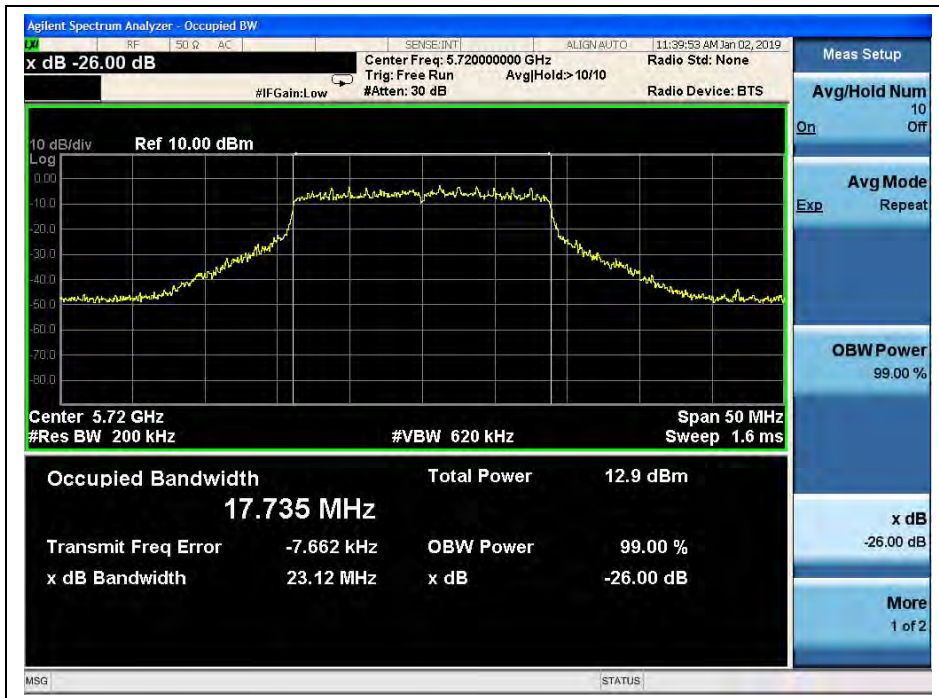
(Channel 64, 5320MHz, 802.11 n (HT20), ANT0)



(Channel 100, 5500MHz, 802.11n (HT20), ANT0)



(Channel 120, 5600 MHz, 802.11n (HT20), ANT0)



(Channel 144, 5720MHz, 802.11 n (HT20), ANT0)



(Channel 144, 5720MHz, 802.11 n (HT20), ANT0)



(Channel 149, 5745MHz, 802.11 n (HT20), ANT0)





(Channel 157, 5785MHz, 802.11 n (HT20), ANT0)



(Channel 165, 5825MHz, 802.11 n (HT20), ANT0)



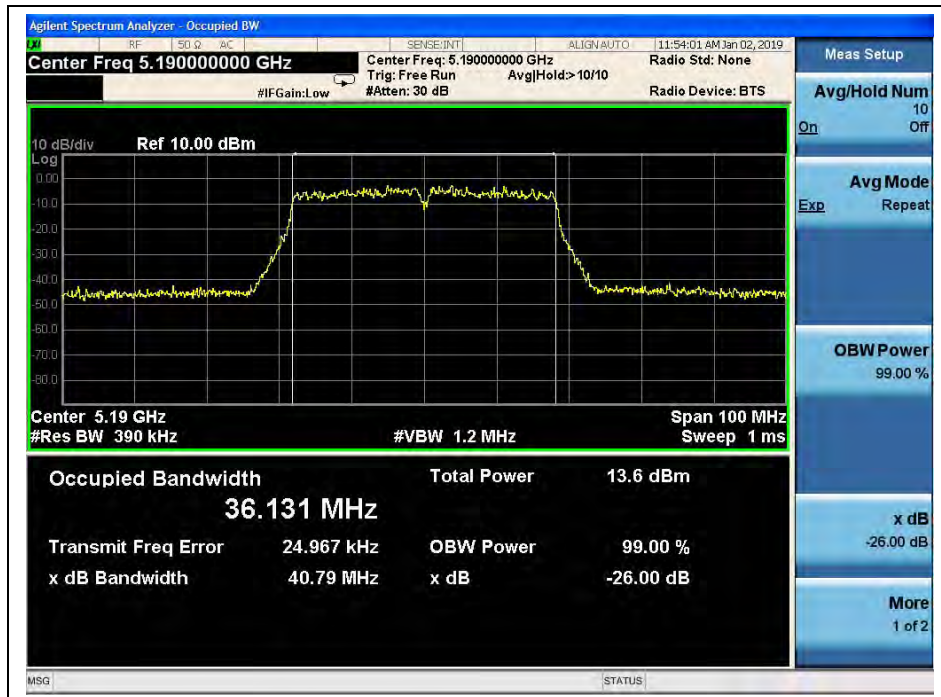
802.11n (HT40) Test mode

A. Test Verdict:

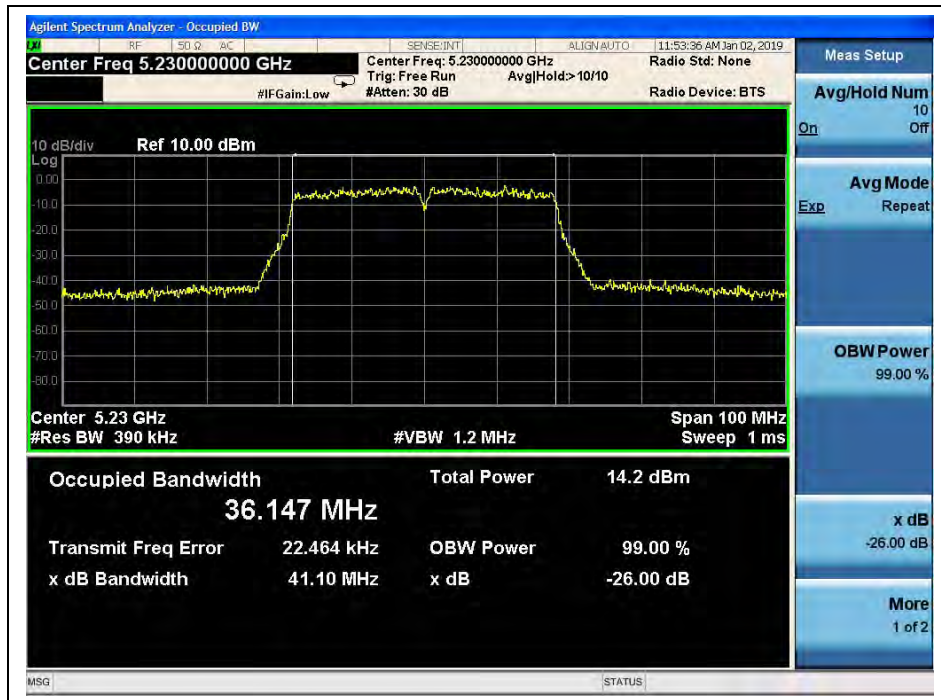
Channel	Frequency (MHz)	ANT 0 26 dB Bandwidth (MHz)
38	5190	40.79
46	5230	41.10 <sub>Note</sub>
54	5270	41.00
62	5310	40.65
102	5510	41.08
126	5630	40.57
142	5710	40.88
Channel	Frequency (MHz)	ANT0 6dB Bandwidth (MHz)
142	5710	36.29
151	5755	35.70
159	5795	35.71

**Note:** The high frequency of the -26dB is 5250.64MHz which is in the DFS frequency range, so DFS testing is required. Please refer to DFS report (Report No.: SZ18110268W05).

B. Test Plots



(Channel 38, 5190MHz, 802.11n (HT40), ANT0)



(Channel 46, 5230 MHz, 802.11n (HT40), ANT0)



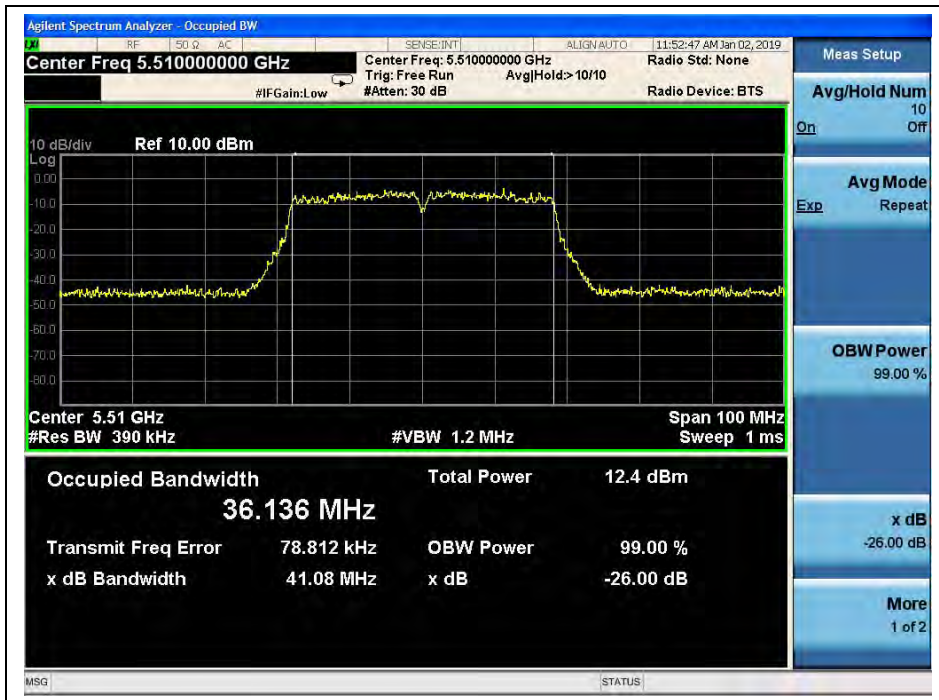
(Channel 46, 5230 MHz, fh of -26dB, 802.11n (HT40))



(Channel 54, 5270MHz, 802.11n (HT40), ANT0)



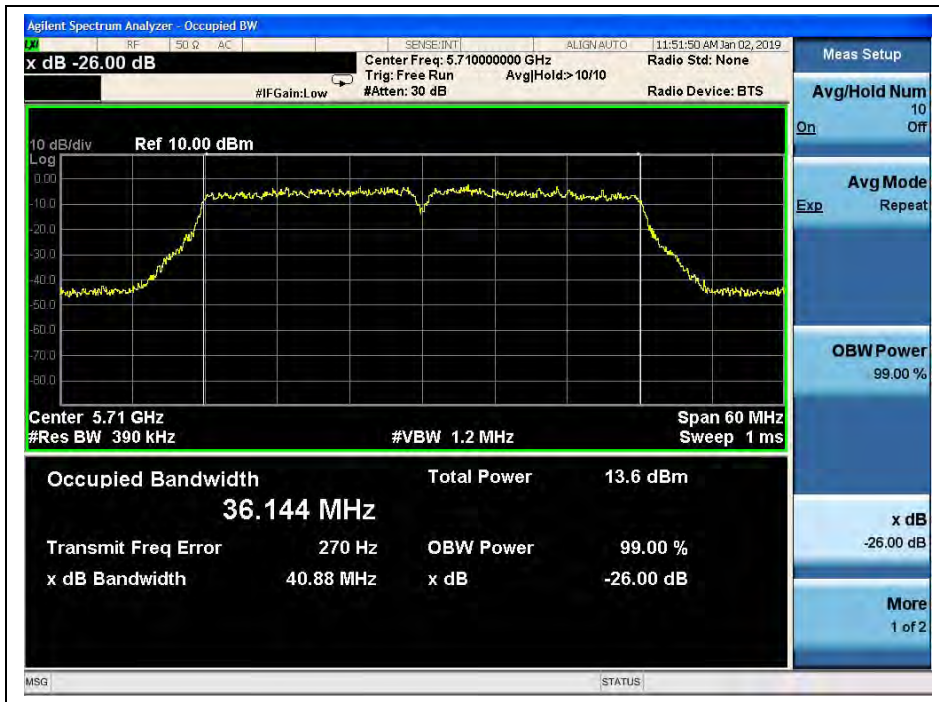
(Channel 62, 5310 MHz, 802.11n (HT40), ANT0)



(Channel 102, 5510 MHz, 802.11n (HT40), ANT0)



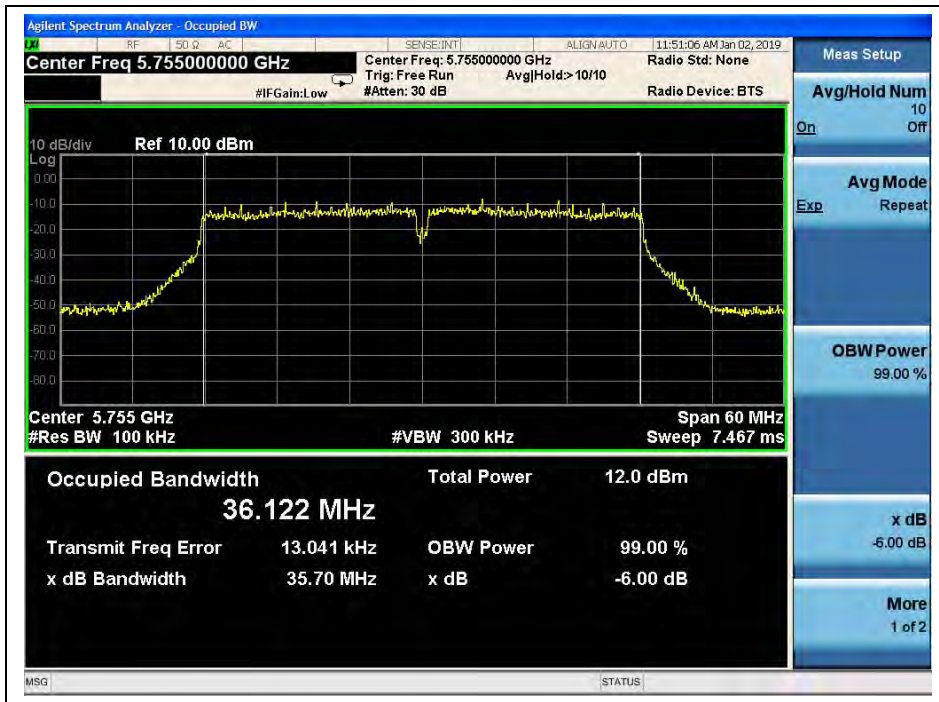
(Channel 126, 5630MHz, 802.11n (HT40), ANT0)



(Channel 142, 5710MHz, 802.11n (HT40), ANT0)



(Channel 142, 5710MHz, 802.11n (HT40), ANT0)



(Channel 151, 5755 MHz, 802.11n (HT40), ANT0)



(Channel 159, 5795MHz, 802.11n (HT40), ANT0)

**802.11ac (VHT20) Test mode****A. Test Verdict:**

Channel	Frequency (MHz)	ANTO 26 dB Bandwidth (MHz)
36	5180	21.94
44	5220	21.93
48	5240	23.49 <sub>Note</sub>
52	5260	23.09
60	5300	22.92
64	5320	22.54
100	5500	22.11
120	5600	23.22
144	5720	21.98
Channel	Frequency (MHz)	ANTO 6dB Bandwidth (MHz)
144	5720	17.22
149	5745	16.28
157	5785	17.21
165	5825	16.53

**Note:** The high frequency of the -26dB is 5251.97MHz which is in the DFS frequency range, so DFS testing is required. Please refer to DFS report (Report No.: SZ18110268W05).





B. Test Plots



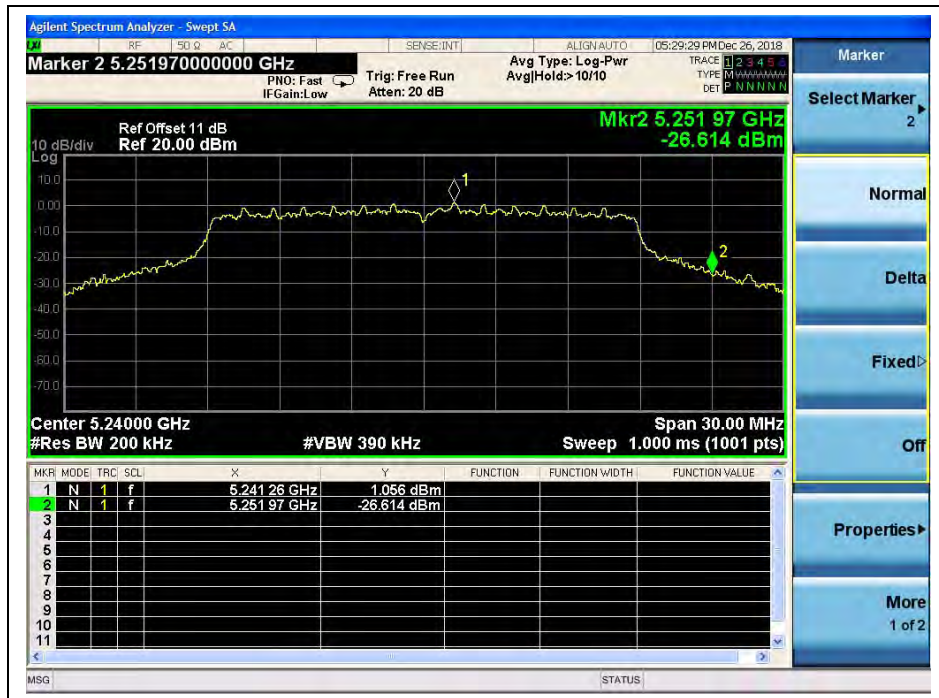
(Channel 36, 5180MHz, 802.11ac (VHT20), ANT0)



(Channel 44, 5220 MHz, 802.11 ac (VHT20), ANT0)



(Channel 48, 5240MHz, 802.11 ac (VHT20), ANT0)



(Channel 48, 5240MHz, fh of -26dB, 802.11 ac (VHT20))



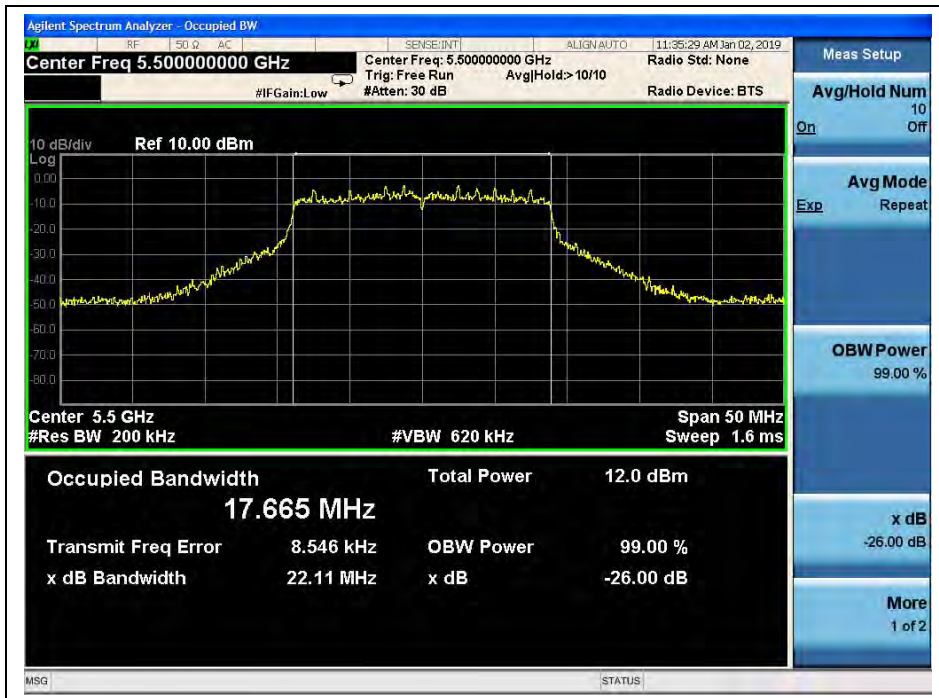
(Channel 52, 5260MHz, 802.11 ac (VHT20), ANT0)



(Channel 60, 5300 MHz, 802.11 ac (VHT20), ANT0)



(Channel 64, 5320MHz, 802.11 ac (VHT20), ANT0)



(Channel 100, 5500MHz, 802.11 ac (VHT20), ANT0)



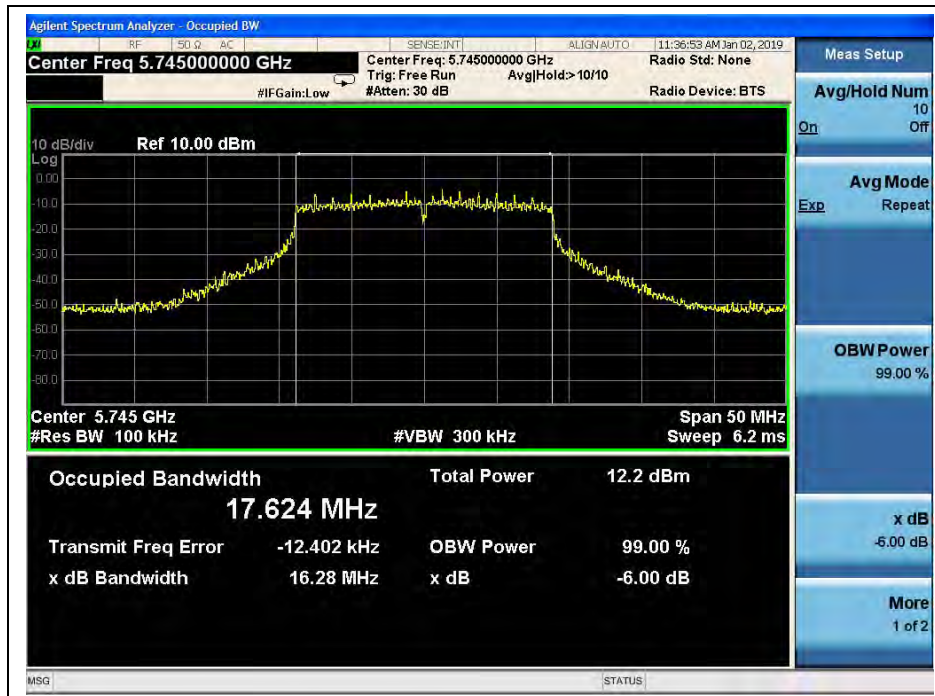
(Channel 120, 5600 MHz, 802.11 ac (VHT20), ANT0)



(Channel 144, 5720MHz, 802.11 ac (VHT20), ANT0)



(Channel 144, 5720MHz, 802.11 ac (VHT20), ANT0)



(Channel 149, 5745MHz, 802.11 ac (VHT20), ANT0)



(Channel 157, 5785MHz, 802.11 ac (VHT20), ANT0)



(Channel 165, 5825MHz, 802.11 ac (VHT20), ANT0)



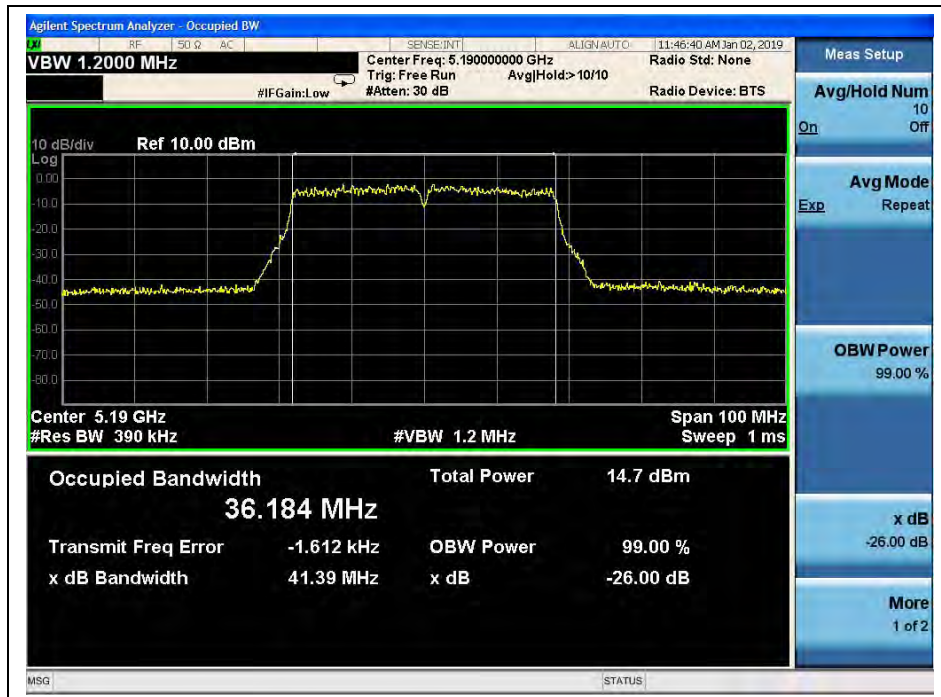
802.11ac (VHT40) Test mode

A. Test Verdict:

Channel	Frequency (MHz)	ANT 0 26 dB Bandwidth (MHz)
38	5190	41.39
46	5230	41.23 <small>Note</small>
54	5270	41.01
62	5310	40.31
102	5510	40.07
126	5630	40.23
142	5710	41.00
Channel	Frequency (MHz)	ANT0 6dB Bandwidth (MHz)
142	5710	36.31
151	5755	36.29
159	5795	35.70

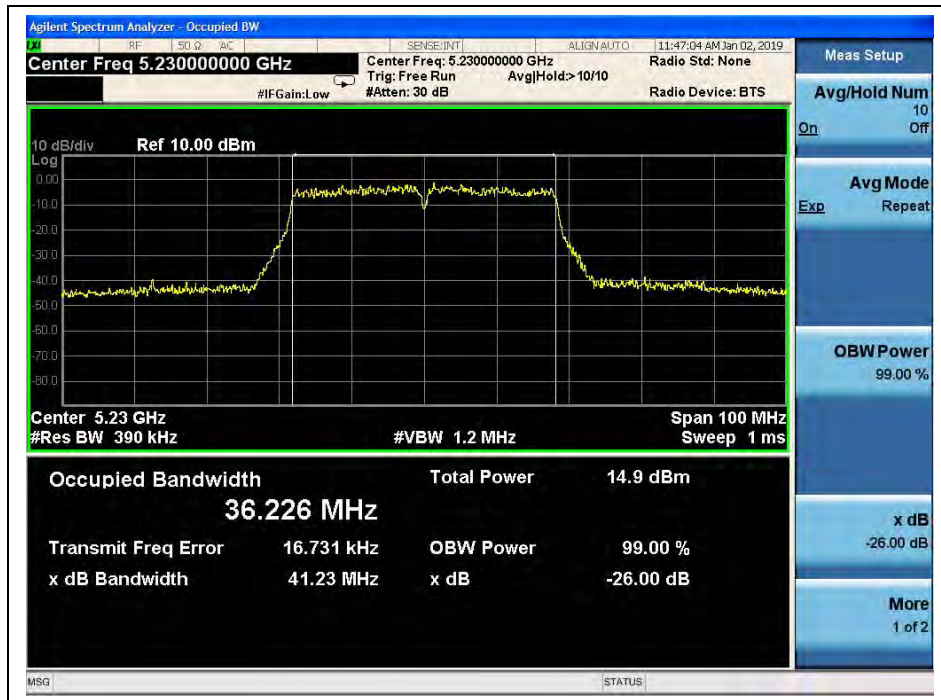
**Note:** The high frequency of the -26dB is 5250.76MHz which is in the DFS frequency range, so DFS testing is required. Please refer to DFS report (Report No.: SZ18110268W05).

B. Test Plots



(Channel 38, 5190MHz, 802.11 ac (VHT40), ANT0)

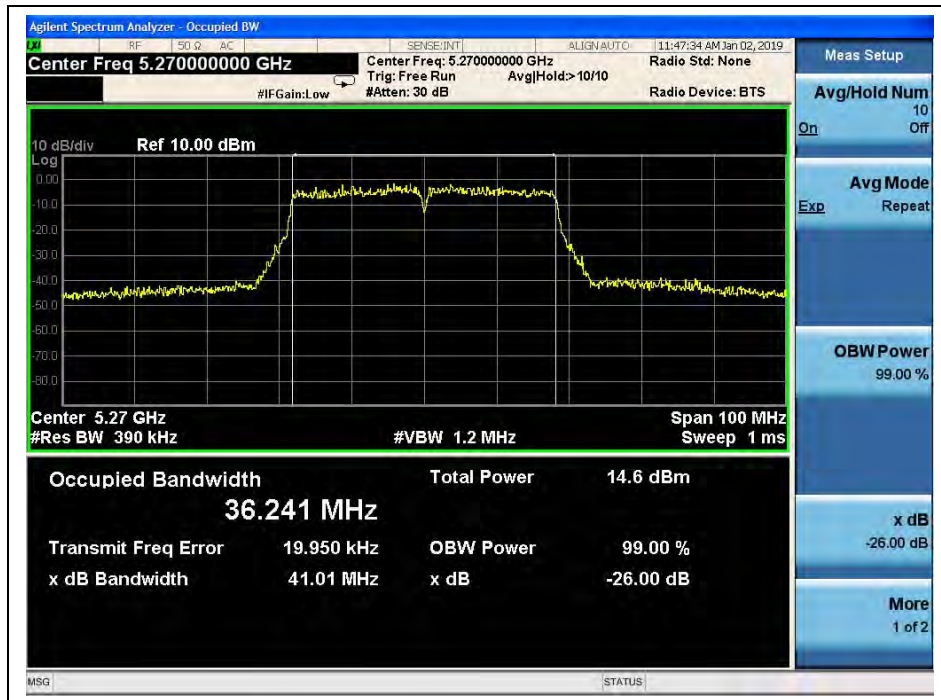




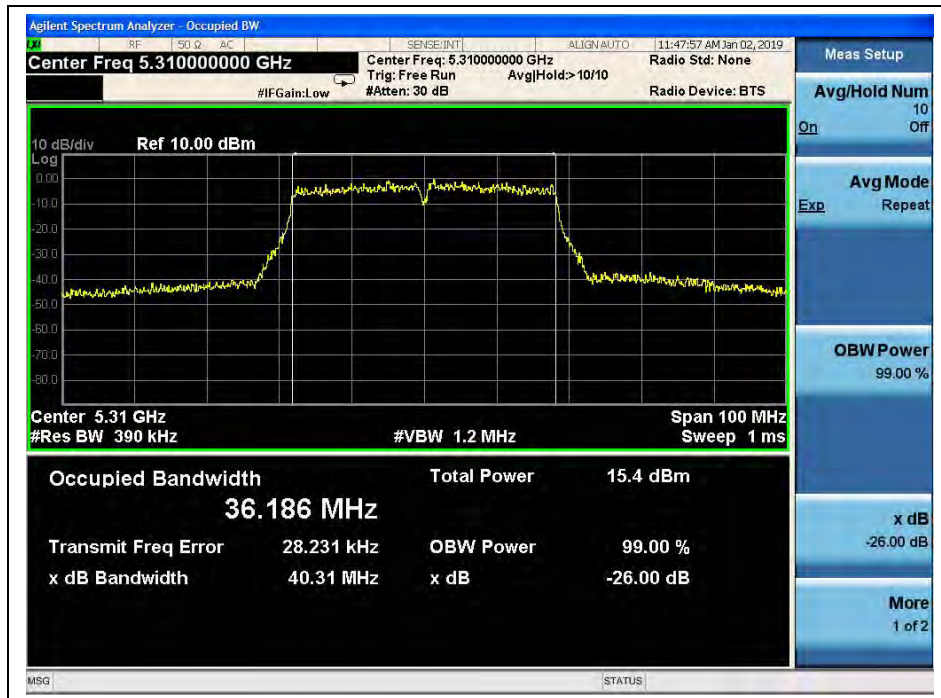
(Channel 46, 5230 MHz, 802.11 ac (VHT40), ANT0)



(Channel 46, 5230 MHz, fh of -26dB, 802.11 ac (VHT40))



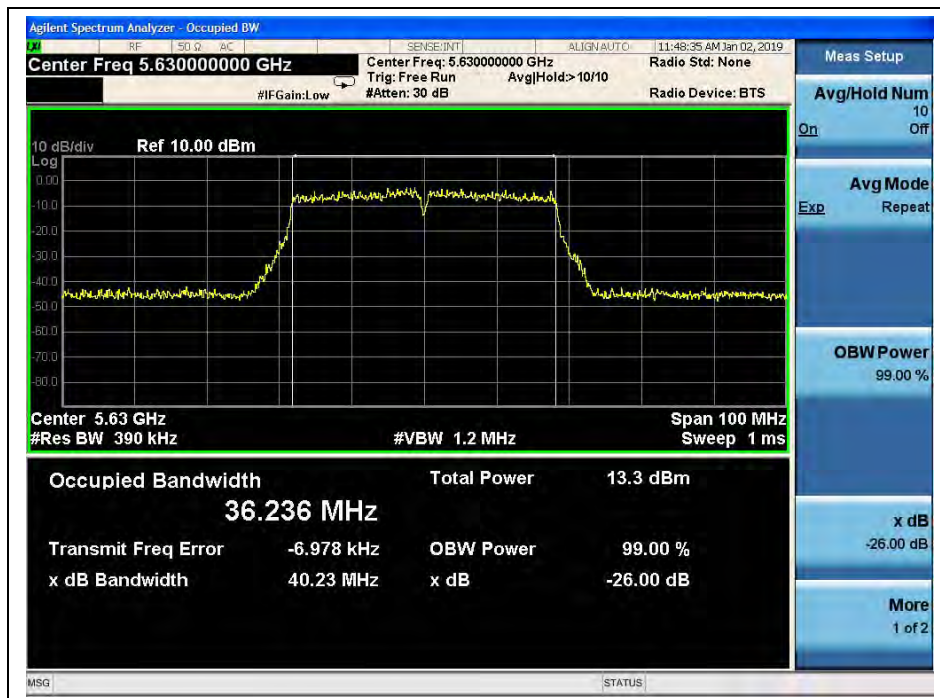
(Channel 54, 5270MHz, 802.11 ac (VHT40), ANT0)



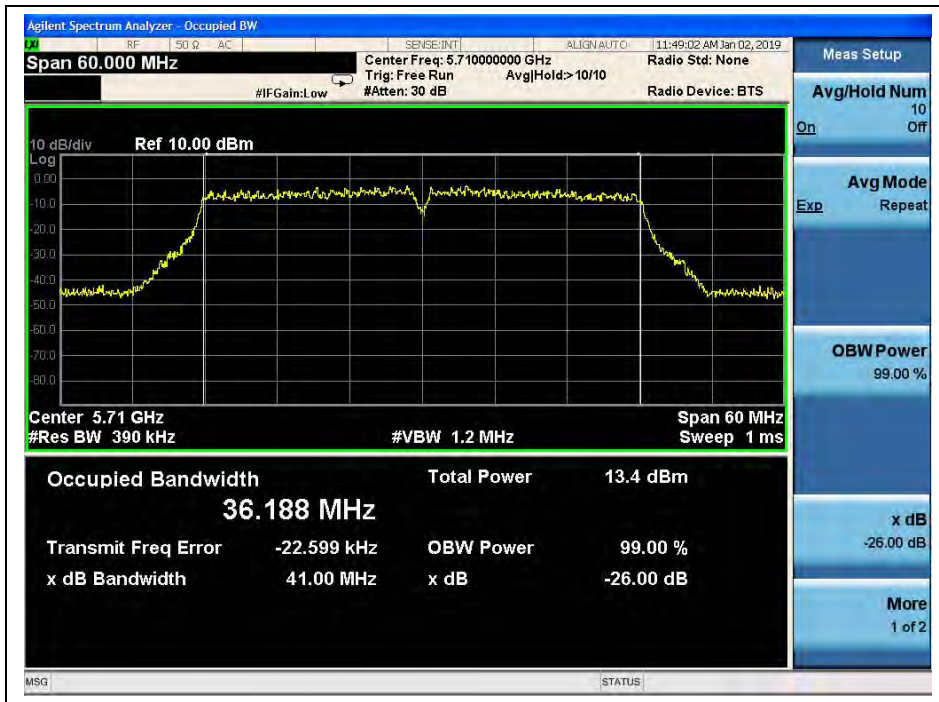
(Channel 62, 5310 MHz, 802.11 ac (VHT40), ANT0)



(Channel 102, 5510 MHz, 802.11 ac (VHT40), ANT0)



(Channel 126, 5630MHz, 802.11 ac (VHT40), ANT0)



(Channel 142, 5710MHz, 802.11 ac (VHT40), ANT0)



(Channel 142, 5710MHz, 802.11 ac (VHT40), ANT0)



(Channel 151, 5755 MHz, 802.11 ac (VHT40), ANT0)



(Channel 159, 5795MHz, 802.11ac (VHT40), ANT0)



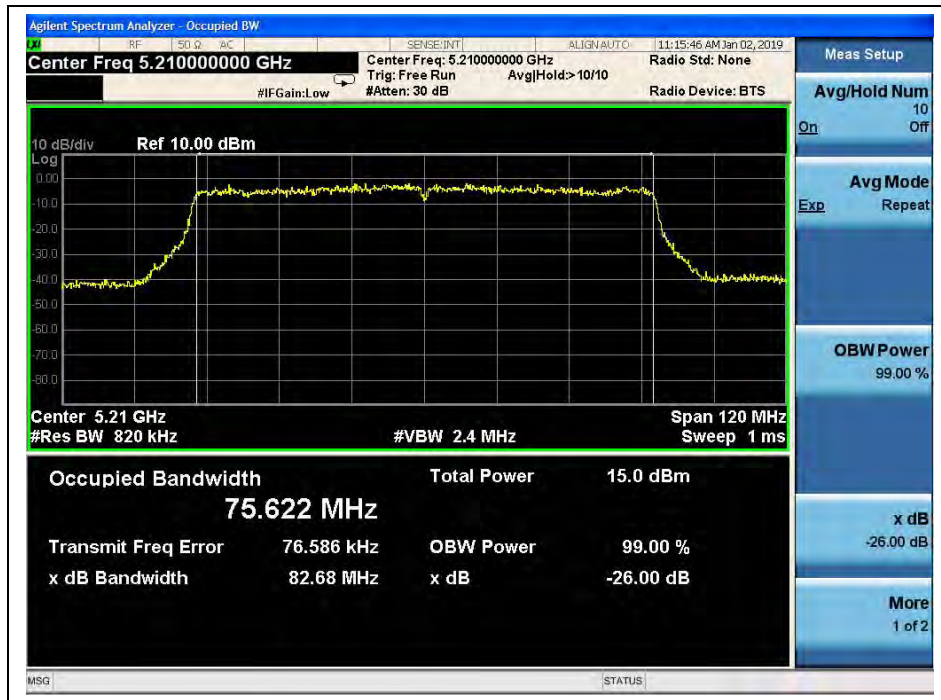
802.11ac (VHT80) Test mode

A. Test Verdict:

Channel	Frequency (MHz)	ANT 0 26 dB Bandwidth (MHz)
42	5210	82.68 <small>Note</small>
58	5290	82.87
106	5530	81.83
122	5610	82.33
138	5690	83.21
Channel	Frequency (MHz)	ANT0 6dB Bandwidth (MHz)
138	5690	83.14
155	5775	75.70

**Note:** The high frequency of the -26dB is 5251.76MHz which is in the DFS frequency range, so DFS testing is required. Please refer to DFS report (Report No.: SZ18110268W05).

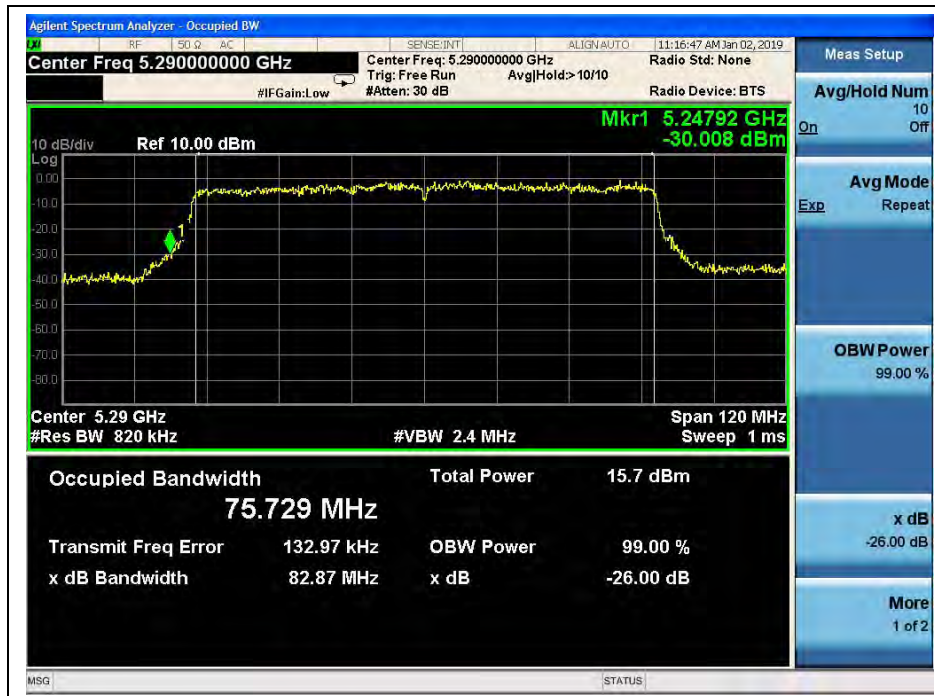
B. Test Plots



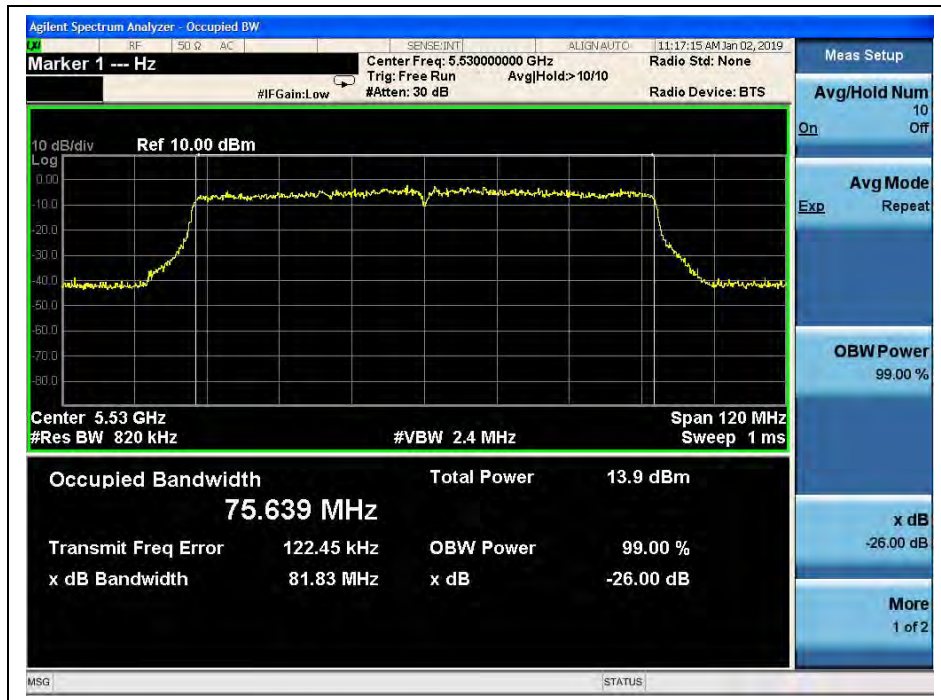
(Channel 42, 5210MHz, 802.11 ac (VHT80), ANT0)



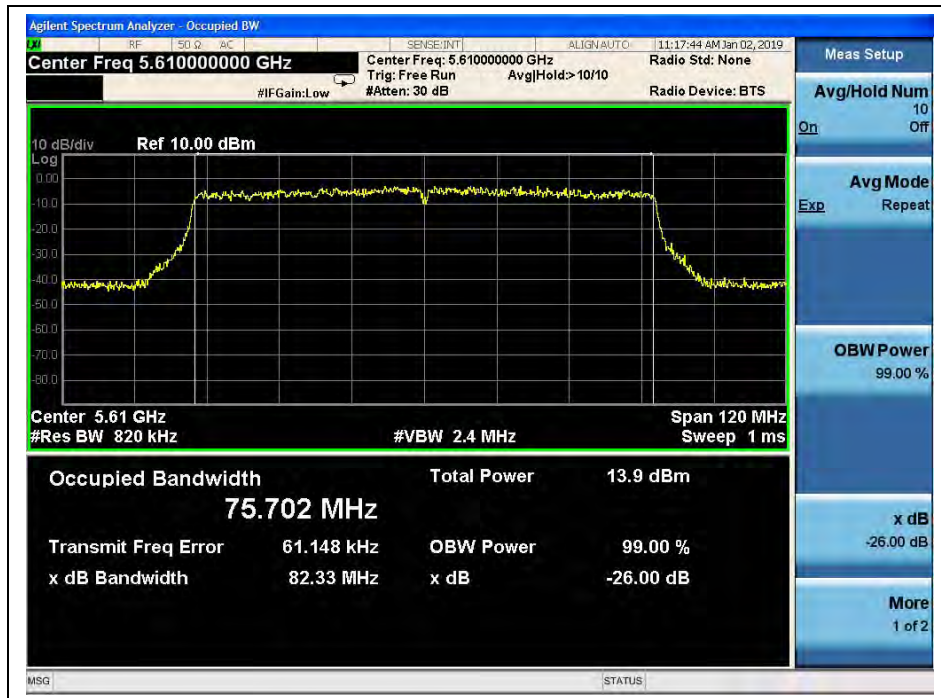
(Channel 42, 5210 MHz, fh of -26dB, 802. ac (VHT80), ANT0)



(Channel 58, 5290 MHz, 802.11 ac (VHT80), ANT0)

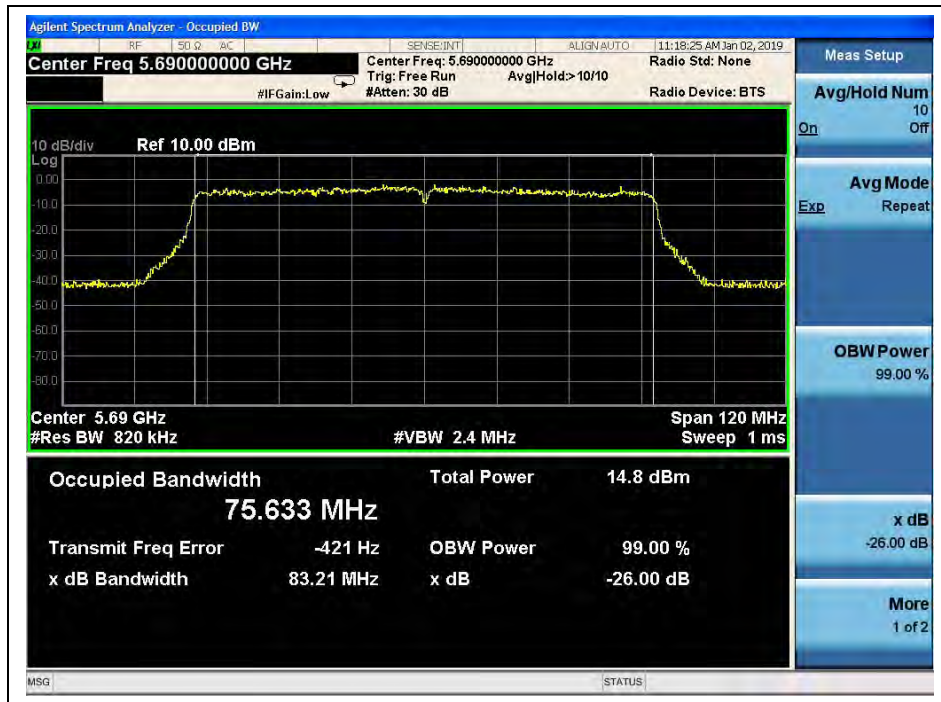


(Channel 106, 5530MHz, 802.11 ac (VHT80))

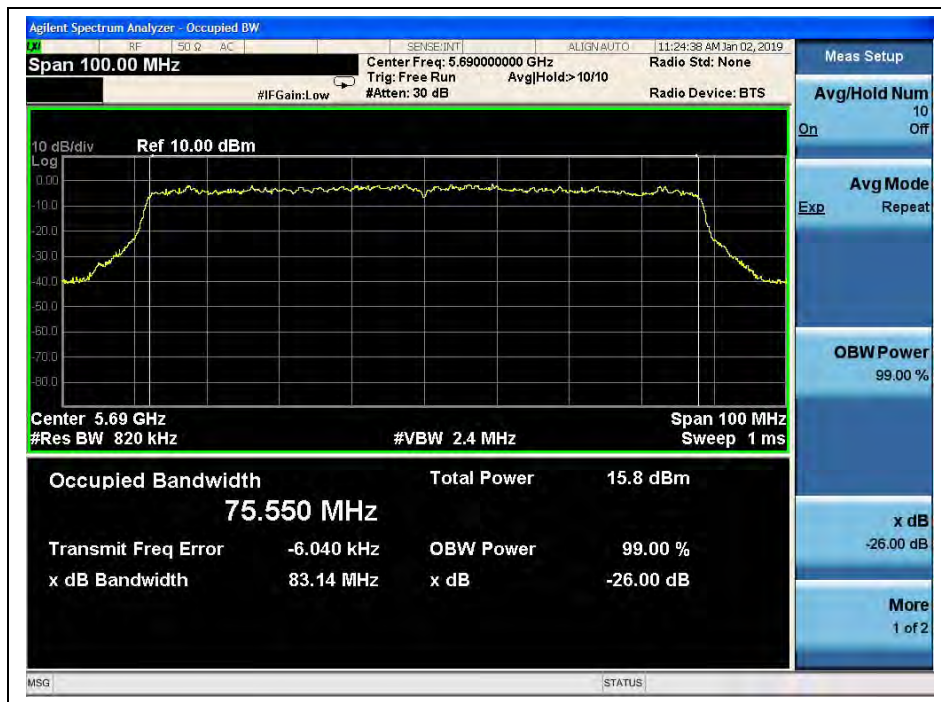


(Channel 122, 5610 MHz, 802.11 ac (VHT80), ANT0)

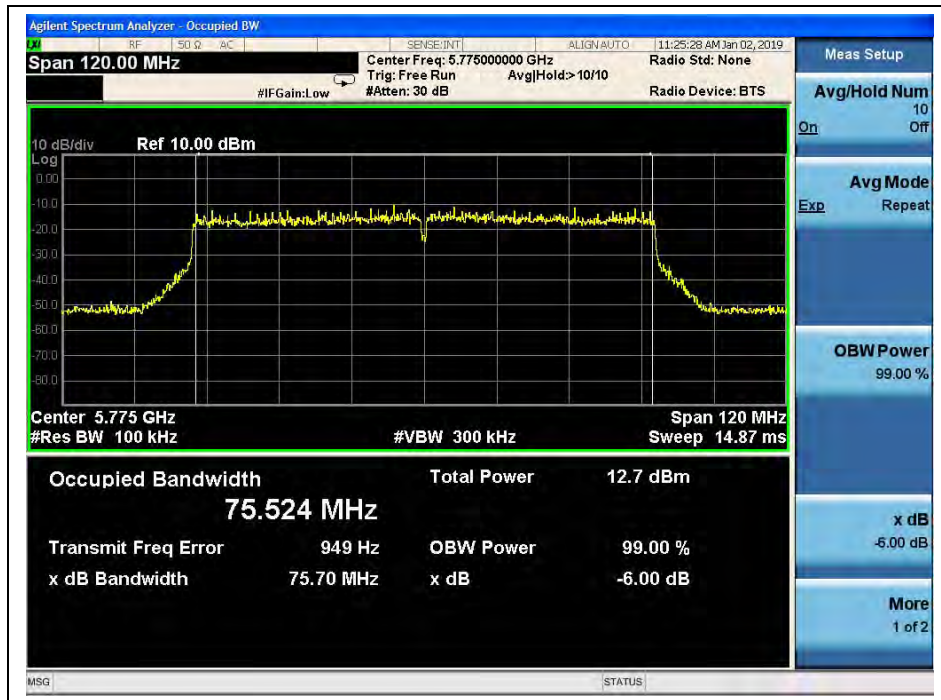




(Channel 138, 5690MHz, 802.11 ac (VHT80), ANT0)



(Channel 138, 5690MHz, 802.11 ac (VHT80), ANT0)



(Channel 155, 5775 MHz, 802.11 ac (VHT80), ANT0)

## 2.4. Maximum conducted output power

### 2.4.1. Requirement

(1) For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in megahertz.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(4) According to KDB662911D01 Measure-and-sum technique, the conducted emission level (e.g., transmit power or power in specified bandwidth) is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically to determine the total emission level from the device. Summing is performed in units that are directly proportional to power.

(5) According to KDB 662911 D01, the directional gain =  $G_{\text{ANT}} + 10 \log(N_{\text{ANT}})$  dBi, where  $G_{\text{ANT}}$  is the antenna gain in dBi,  $N_{\text{ANT}}$  is the number of outputs.

### 2.4.2. Test Description

Section E) 3) of KDB 789033 defines a methodology using a USB Wideband Power Sensor.

#### A. Test Setup:



The EUT (Equipment under the test) which is coupled to the USB Wideband Power Sensor; the RF load attached to the EUT antenna terminal is 50 Ohm; the path loss as the factor is calibrated to correct the reading, all test result in USB Wideband Power Sensor.



**2.4.3. Limits**

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz.

ANT0					
Mode	Band	Channel (MHz)	26dB BW (MHz)	11+10log(26dB BW)	Limits (dBm)
a	UNII-2a	5260	22.64	24.55	24.00
		5300	21.86	24.40	24.00
		5320	23.52	24.71	24.00
	UNII-2c	5500	22.52	24.53	24.00
		5600	23.87	24.78	24.00
		5720	21.26	24.28	24.00
n20	UNII-2a	5260	22.72	24.56	24.00
		5300	21.84	24.39	24.00
		5320	22.93	24.60	24.00
	UNII-2c	5500	21.47	24.32	24.00
		5600	22.74	24.57	24.00
		5720	23.12	24.64	24.00
ac20	UNII-2a	5260	23.09	24.63	24.00
		5300	22.92	24.60	24.00
		5320	22.54	24.53	24.00
	UNII-2c	5500	22.11	24.45	24.00
		5600	23.22	24.66	24.00
		5720	21.98	24.42	24.00



ANT1					
Mode	Band	Channel (MHz)	26dB BW (MHz)	11+10log(26dB BW)	Limits (dBm)
a	UNII-2a	5260	22.12	24.45	24.00
		5300	21.58	24.34	24.00
		5320	22.09	24.44	24.00
	UNII-2c	5500	21.12	24.25	24.00
		5600	23.58	24.73	24.00
		5720	22.03	24.43	24.00
n20	UNII-2a	5260	22.34	24.49	24.00
		5300	21.62	24.35	24.00
		5320	21.92	24.41	24.00
	UNII-2c	5500	21.89	24.40	24.00
		5600	22.31	24.48	24.00
		5720	22.08	24.44	24.00
ac20	UNII-2a	5260	21.73	24.37	24.00
		5300	21.43	24.31	24.00
		5320	21.23	24.27	24.00
	UNII-2c	5500	21.5	24.32	24.00
		5600	21.33	24.29	24.00
		5720	21.73	24.37	24.00



2.4.4. Test Result

802.11a Test mode

Channel	Frequency (MHz)	ANT0 Measured Peak Power (dBm)	ANT1 Measured Peak Power (dBm)	Limit (dBm)	Verdict
36	5180	12.66	10.67	24	PASS
44	5220	13.10	11.02		
48	5240	13.31	11.12		
52	5260	13.21	11.21		
60	5300	16.21	14.21		
64	5320	16.18	14.32		
100	5500	11.12	9.78		
120	5600	12.21	10.12		
142	5720	13.21	10.13		
149	5745	12.66	10.65	30	
157	5785	12.51	10.66		
165	5825	12.71	10.74		

Channel	Frequency (MHz)	ANT0 Measured Average Power (dBm)	ANT1 Measured Average Power (dBm)	Limit (dBm)	Verdict
36	5180	10.76	6.56	24	PASS
44	5220	11.10	6.53		
48	5240	11.21	6.65		
52	5260	11.12	6.89		
60	5300	14.21	11.21		
64	5320	14.29	10.94		
100	5500	9.87	5.54		
120	5600	8.77	6.31		
144	5720	10.11	5.42		
149	5745	10.56	6.06	30	
157	5785	10.61	6.51		
165	5825	10.72	6.71		

**802.11n (HT20) Test mode**

Channel	Frequency (MHz)	ANT0 Measured Peak Power (dBm)	ANT1 Measured Peak Power (dBm)	Limit (dBm)	Verdict
36	5180	12.81	10.78	24	PASS
44	5220	13.21	11.18		
48	5240	13.33	11.28		
52	5260	13.21	11.08		
60	5300	16.55	14.56		
64	5320	14.91	13.95		
100	5500	12.12	10.05		
120	5600	12.45	10.11		
144	5720	11.58	10.18		
149	5745	12.55	10.58		
157	5785	12.61	10.61	30	
165	5825	13.01	10.62		

Channel	Frequency (MHz)	ANT0 Measured Average Power (dBm)	ANT1 Measured Average Power (dBm)	Limit (dBm)	Verdict
36	5180	10.81	5.38	24	PASS
44	5220	11.22	6.41		
48	5240	11.33	6.71		
52	5260	11.18	6.99		
60	5300	14.54	10.93		
64	5320	13.91	10.71		
100	5500	10.01	5.91		
120	5600	7.64	5.78		
144	5720	10.21	6.23		
149	5745	10.64	6.14		
157	5785	10.66	6.51	30	
165	5825	10.67	6.78		



**Total Peak Power (ANT0+ANT1)**

Channel	Frequency (MHz)	Total Peak Power (dBm))	Total Peak Power (W)	Limit <sub>Note</sub> (dBm)	Verdict
36	5180	14.92	0.031	24	PASS
44	5220	15.32	0.034		
48	5240	15.44	0.035		
52	5260	15.28	0.034		
60	5300	18.68	0.074		
64	5320	17.47	0.056		
100	5500	14.22	0.026		
120	5600	14.45	0.028		
144	5720	13.95	0.025		
149	5745	14.69	0.029		
157	5785	14.73	0.030		
165	5825	14.99	0.032		

**Note:** Directional gain =  $1.71\text{dBi} + 10\log(2) = 4.72\text{dBi} < 6\text{dBi}$ , so the power limit shall be 24dBm for 5.18-5.24 GHz band, 5.26-5.32 GHz band, 5.50-5.70 GHz band and 30dBm for 5.745-5.825 GHz band.

Channel	Frequency (MHz)	Total Average Power (dBm))	Total Average Power (W)	Limit <sub>Note</sub> (dBm)	Verdict
36	5180	11.90	0.015	24	PASS
44	5220	12.46	0.018		
48	5240	12.62	0.018		
52	5260	12.58	0.018		
60	5300	16.11	0.041		
64	5320	15.61	0.036		
100	5500	11.44	0.014		
120	5600	9.82	0.010		
144	5720	11.67	0.015		
149	5745	11.96	0.016		
157	5785	12.07	0.016		
165	5825	12.16	0.016		

**Note:** Directional gain =  $1.71\text{dBi} + 10\log(2) = 4.72\text{dBi} < 6\text{dBi}$ , so the power limit shall be 24dBm for 5.18-5.24 GHz band, 5.26-5.32 GHz band, 5.50-5.70 GHz band and 30dBm for 5.745-5.825 GHz band.



**802.11n (HT40) Test mode**

Channel	Frequency (MHz)	ANT0 Measured Peak Power (dBm)	ANT1 Measured Peak Power (dBm)	Limit (dBm)	Verdict
38	5190	13.64	12.61	24	PASS
46	5230	14.31	12.95		
54	5270	15.12	14.81		
62	5310	17.71	17.11		
102	5510	12.22	11.31		
126	5630	12.21	10.85		
142	5710	13.15	11.96		
151	5755	13.03	12.32	30	
159	5795	13.21	12.21		

Channel	Frequency (MHz)	ANT0 Measured Average Power (dBm)	ANT1 Measured Average Power (dBm)	Limit (dBm)	Verdict
38	5190	12.53	5.93	24	PASS
46	5230	13.26	6.87		
54	5270	14.82	7.51		
62	5310	17.17	11.21		
102	5510	11.51	6.24		
126	5630	10.46	8.85		
142	5710	12.69	6.79		
151	5755	12.23	6.94	30	
159	5795	12.12	6.76		



**Total Peak Power (ANT0+ANT1)**

Channel	Frequency (MHz)	Total Peak Power (dBm)	Total Peak Power (W)	Limit <sub>Note</sub> (dBm)	Verdict
38	5190	16.17	0.041	24	PASS
46	5230	16.69	0.047		
54	5270	17.98	0.063		
62	5310	20.43	0.110		
102	5510	14.80	0.030		
126	5630	14.59	0.029		
142	5710	15.61	0.036		
151	5755	15.70	0.037	30	
159	5795	15.75	0.038		

**Note:** Directional gain =  $1.71\text{dBi} + 10\log(2) = 4.72\text{dBi} < 6\text{dBi}$ , so the power limit shall be 24dBm for 5.18-5.24 GHz band, 5.26-5.32 GHz band, 5.50-5.70 GHz band and 30dBm for 5.745-5.825 GHz band.

Channel	Frequency (MHz)	Total Average Power (dBm)	Total Average Power (W)	Limit <sub>Note</sub> (dBm)	Verdict
38	5190	13.39	0.022	24	PASS
46	5230	14.16	0.026		
54	5270	15.56	0.036		
62	5310	18.15	0.065		
102	5510	12.64	0.018		
126	5630	12.74	0.019		
142	5710	13.68	0.023		
151	5755	13.36	0.022	30	
159	5795	13.23	0.021		

**Note:** Directional gain =  $1.71\text{dBi} + 10\log(2) = 4.72\text{dBi} < 6\text{dBi}$ , so the power limit shall be 24dBm for 5.18-5.24 GHz band, 5.26-5.32 GHz band, 5.50-5.70 GHz band and 30dBm for 5.745-5.825 GHz band.

**802.11ac (VHT20) Test mode**

Channel	Frequency (MHz)	ANT0 Measured Peak Power (dBm)	ANT1 Measured Peak Power (dBm)	Limit (dBm)	Verdict
36	5180	12.58	10.78	24	PASS
44	5220	13.12	11.22		
48	5240	13.02	11.31		
52	5260	13.11	11.19		
60	5300	16.15	14.11		
64	5320	16.22	14.88		
100	5500	11.23	9.92		
120	5600	12.11	10.21		
144	5720	12.01	10.11		
149	5745	12.03	10.55	30	
157	5785	11.58	10.72		
165	5825	11.67	10.74		

Channel	Frequency (MHz)	ANT0 Measured Average Power (dBm)	ANT1 Measured Average Power (dBm)	Limit (dBm)	Verdict
36	5180	10.77	5.43	24	PASS
44	5220	11.15	6.31		
48	5240	11.28	6.65		
52	5260	11.14	7.01		
60	5300	14.05	11.01		
64	5320	14.82	10.71		
100	5500	9.94	5.99		
120	5600	7.47	6.12		
144	5720	10.14	6.29		
149	5745	10.66	6.11	30	
157	5785	10.71	6.55		
165	5825	10.75	6.85		



**Total Peak Power (ANT0+ANT1)**

Channel	Frequency (MHz)	Total Peak Power (dBm))	Total Peak Power (W)	Limit <sub>Note</sub> (dBm)	Verdict
36	5180	14.78	0.030	24	PASS
44	5220	15.28	0.034		
48	5240	15.26	0.034		
52	5260	15.27	0.034		
60	5300	18.26	0.067		
64	5320	18.61	0.073		
100	5500	13.63	0.023		
120	5600	14.27	0.027		
144	5720	14.17	0.026		
149	5745	14.36	0.027		
157	5785	14.18	0.026		
165	5825	14.24	0.027		

**Note:** Directional gain = 1.71dBi +10log(2) = 4.72dBi<6dBi, so the power limit shall be 24dBm for 5.18-5.24 GHz band, 5.26-5.32 GHz band, 5.50-5.70 GHz band and 30dBm for 5.745-5.825 GHz band.

Channel	Frequency (MHz)	Total Average Power (dBm))	Total Average Power (W)	Limit <sub>Note</sub> (dBm)	Verdict
36	5180	11.88	0.015	24	PASS
44	5220	12.38	0.017		
48	5240	12.57	0.018		
52	5260	12.56	0.018		
60	5300	15.80	0.038		
64	5320	16.24	0.042		
100	5500	11.41	0.014		
120	5600	9.86	0.010		
144	5720	11.64	0.015		
149	5745	11.97	0.016		
157	5785	12.12	0.016		
165	5825	12.23	0.017		

**Note:** Directional gain = 1.71dBi +10log(2) = 4.72dBi<6dBi, so the power limit shall be 24dBm for 5.18-5.24 GHz band, 5.26-5.32 GHz band, 5.50-5.70 GHz band and 30dBm for 5.745-5.825 GHz band.

**802.11ac (VHT40) Test mode**

Channel	Frequency (MHz)	ANT0 Measured Peak Power (dBm)	ANT1 Measured Peak Power (dBm)	Limit (dBm)	Verdict
38	5190	13.05	12.51	24	PASS
46	5230	13.06	12.23		
54	5270	15.11	14.77		
62	5310	17.05	17.01		
102	5510	13.02	11.51		
126	5630	11.67	10.35		
142	5710	13.45	12.73		
151	5755	13.44	12.25	30	
159	5795	13.01	12.34		

Channel	Frequency (MHz)	ANT0 Measured Average Power (dBm)	ANT1 Measured Average Power (dBm)	Limit (dBm)	Verdict
38	5190	12.55	5.82	24	PASS
46	5230	12.18	6.84		
54	5270	14.75	7.46		
62	5310	16.98	11.18		
102	5510	11.55	5.13		
126	5630	7.78	6.35		
142	5710	12.74	6.88		
151	5755	12.31	7.04	30	
159	5795	12.25	6.55		



**Total Peak Power (ANT0+ANT1)**

Channel	Frequency (MHz)	Total Peak Power (dBm)	Total Peak Power (W)	Limit <sub>Note</sub> (dBm)	Verdict
38	5190	15.80	0.038	24	PASS
46	5230	15.68	0.037		
54	5270	17.95	0.062		
62	5310	20.04	0.101		
102	5510	15.34	0.034		
126	5630	14.07	0.026		
142	5710	16.12	0.041		
151	5755	15.90	0.039	30	
159	5795	15.70	0.037		

**Note:** Directional gain =  $1.71\text{dBi} + 10\log(2) = 4.72\text{dBi} < 6\text{dBi}$ , so the power limit shall be 24dBm for 5.18-5.24 GHz band, 5.26-5.32 GHz band, 5.50-5.70 GHz band and 30dBm for 5.745-5.825 GHz band.

Channel	Frequency (MHz)	Total Average Power (dBm)	Total Average Power (W)	Limit <sub>Note</sub> (dBm)	Verdict
38	5190	13.39	0.022	24	PASS
46	5230	13.29	0.021		
54	5270	15.49	0.035		
62	5310	17.99	0.063		
102	5510	12.44	0.018		
126	5630	10.13	0.010		
142	5710	13.74	0.024		
151	5755	13.44	0.022	30	
159	5795	13.29	0.021		

**Note:** Directional gain =  $1.71\text{dBi} + 10\log(2) = 4.72\text{dBi} < 6\text{dBi}$ , so the power limit shall be 24dBm for 5.18-5.24 GHz band, 5.26-5.32 GHz band, 5.50-5.70 GHz band and 30dBm for 5.745-5.825 GHz band.