



# TEST REPORT

**APPLICANT** : Jiangsu SEUIC Technology Co.,Ltd.  
**PRODUCT NAME** : Portable Data Collection Terminal  
**MODEL NAME** : CRUISE 1  
**BRAND NAME** : CRUISE/SEUIC  
**FCC ID** : 2AC68-CRUISE1S  
**STANDARD(S)** : 47 CFR Part 15 Subpart E  
**RECEIPT DATE** : 2019-12-05  
**TEST DATE** : 2019-12-26 to 2020-01-03  
**ISSUE DATE** : 2020-01-11

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<b>Change History</b>		
<b>Version</b>	<b>Date</b>	<b>Reason for change</b>
1.0	2020-01-11	First edition



# 1. Technical Information

Note: Provide by applicant.

## 1.1. Applicant and Manufacturer Information

<b>Applicant:</b>	Jiangsu SEUIC Technology Co.,Ltd.
<b>Applicant Address:</b>	NO.15 Xinghuo Road, Nanjing New & High Technology Industry Development Zone, 210061, Nanjing City, Jiangsu Province, China
<b>Manufacturer:</b>	Jiangsu SEUIC Technology Co.,Ltd.
<b>Manufacturer Address:</b>	NO.15 Xinghuo Road, Nanjing New & High Technology Industry Development Zone, 210061, Nanjing City, Jiangsu Province, China

## 1.2. Equipment Under Test (EUT) Description

<b>Product Name:</b>	Portable Data Collection Terminal	
<b>Serial No:</b>	(N/A, marked #1 by test site)	
<b>Hardware Version:</b>	SLB761X_MB_V1.00_PCB	
<b>Software Version:</b>	D700S_G_V0.3.0	
<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>	5.180 GHz- 5.240 GHz; 5.260 GHz -5.320 GHz ; 5.500 GHz -5.720 GHz ; 5.745GHz- 5.825GHz	
<b>Channel Number:</b>	Refer to 1.3	
<b>Antenna Type:</b>	PIFA Antenna	
<b>Antenna Gain:</b>	0.68dBi	
<b>Accessory Information:</b>	Battery	
	<b>Brand Name:</b>	N/A
	<b>Model No.:</b>	BT01700CRUISE
	<b>Serial No.:</b>	(N/A, marked #1 by test site)
	<b>Capacity:</b>	4500mAh
	<b>Rated Voltage:</b>	3.80V
	<b>Charge Limit:</b>	4.35V



<b>Accessory Information:</b>	AC Adapter	
	Brand Name:	N/A
	Model No.:	TPA-23A050200UU01
	Serial No.:	(N/A, marked #1 by test site)
	Rated Output:	5.00V $\Rightarrow$ 2.00A
	Rated Input:	100-240V $\sim$ 0.3A

**Note 1:** WIFI hotspot does not support U-NII band.

**Note 2:** For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

### 1.3. Modulation Type and Data Rate of EUT

Modulation technology	Modulation Type	Data Rate (Mbps) <small>Note1</small>
OFDM (802.11a)	BPSK	<b>6/9</b>
	QPSK	12/18
	16QAM	24/36
	64QAM	48/54
OFDM (802.11n)	BPSK	<b>6.5</b>
	QPSK	13/19.5
	16QAM	26/39
	64QAM	52/58.5/65
OFDM (802.11ac)	BPSK	<b>6.5</b>
	QPSK	13/19.5
	16QAM	26/39
	64QAM	52/58.5/65
	256QAM	78

**Note1:** The worst-case mode (black bold) in all data rates has been determined during the pre-scan, only the test data of the worst-case were recorded in this report.

## 1.4. The Channel Number and Frequency

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
			124	5620
			132	5660
			140	<b>144</b>
40MHz	<b>102</b>	<b>5510</b>	110	5550
			118	5590
			134	<b>142</b>
80MHz	<b>106</b>	<b>5530</b>	<b>122</b>	<b>5610</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.



## 1.5. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart E (U-NII 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	Method determination /Remark
1	15.203	Antenna Requirement	N/A	N/A	PASS	No deviation
2	ANSI C63.10	Duty Cycle of the test signal	Dec 26, 2019	Zhou Chuang	PASS	No deviation
3	15.407(a)	Maximum conducted output Power	Dec 26, 2019	Zhou Chuang	PASS	No deviation
4	15.407(a) (e)	Emission Bandwidth	Dec 26, 2019	Zhou Chuang	PASS	No deviation
5	15.407(a)	Peak Power spectral density	Dec 26, 2019	Zhou Chuang	PASS	No deviation
6	15.407(g)	Frequency Stability	Dec 26, 2019	Zhou Chuang	PASS	No deviation
7	15.207	Conducted Emission	Dec 26, 2019	Lin Jiayong	PASS	No deviation
8	15.407(b)	Restricted Frequency Bands	Jan 01, 2020	Peng Xuewei	PASS	No deviation
9	15.407(b)	Radiated Emission	Jan 03, 2020	Peng Xuewei	PASS	No deviation

**Note1:** The DFS test report was documented in a separate report (Report No.: SZ19120009W09).

**Note2:** The tests of Conducted Emission and Radiated Emission were performed according to the method of measurements prescribed in ANSI C63.10 2013.

**Note3:** These RF tests were performed according to the method of measurements prescribed in KDB789033 D02 v01r03.

**Note4:** The path loss during the RF test is calibrated to correct the results by the offset setting in the test equipments. The ref offset 12.5dB contains two parts that cable loss 2.5dB and





Attenuator 10dB.  
**Note 5:** Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.

## 1.6. 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 15E 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. 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

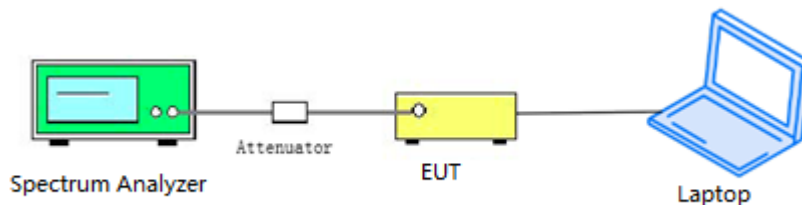
### 2.2.1. Requirement

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

#### Test Setup:



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

### 2.2.3. Test Procedure

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

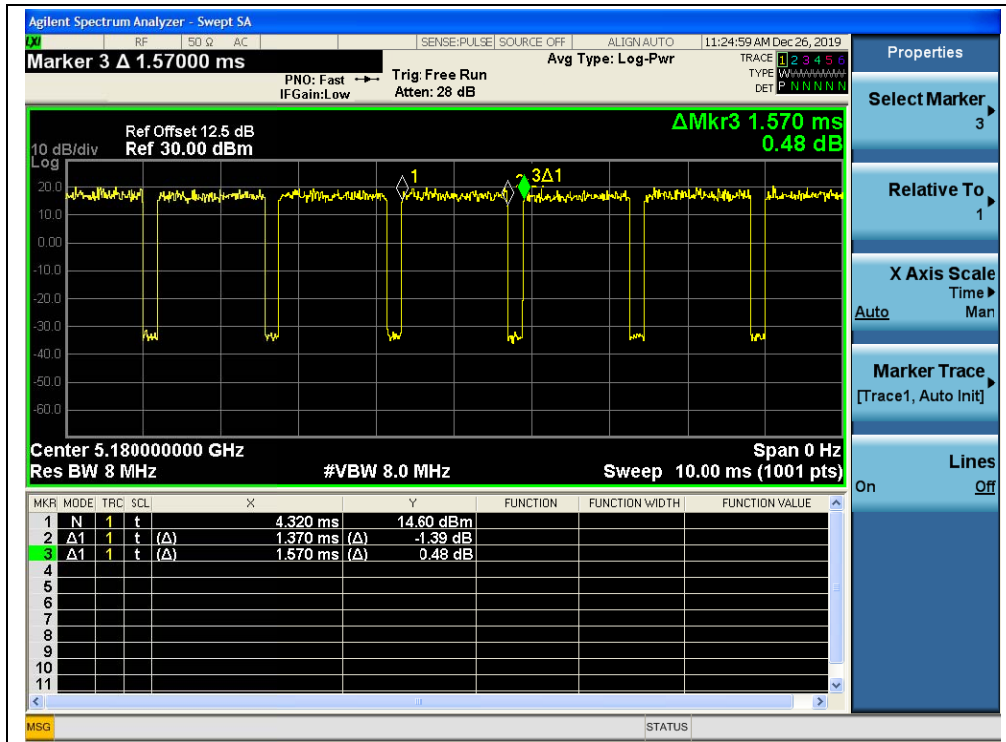


2.2.4. Test Result

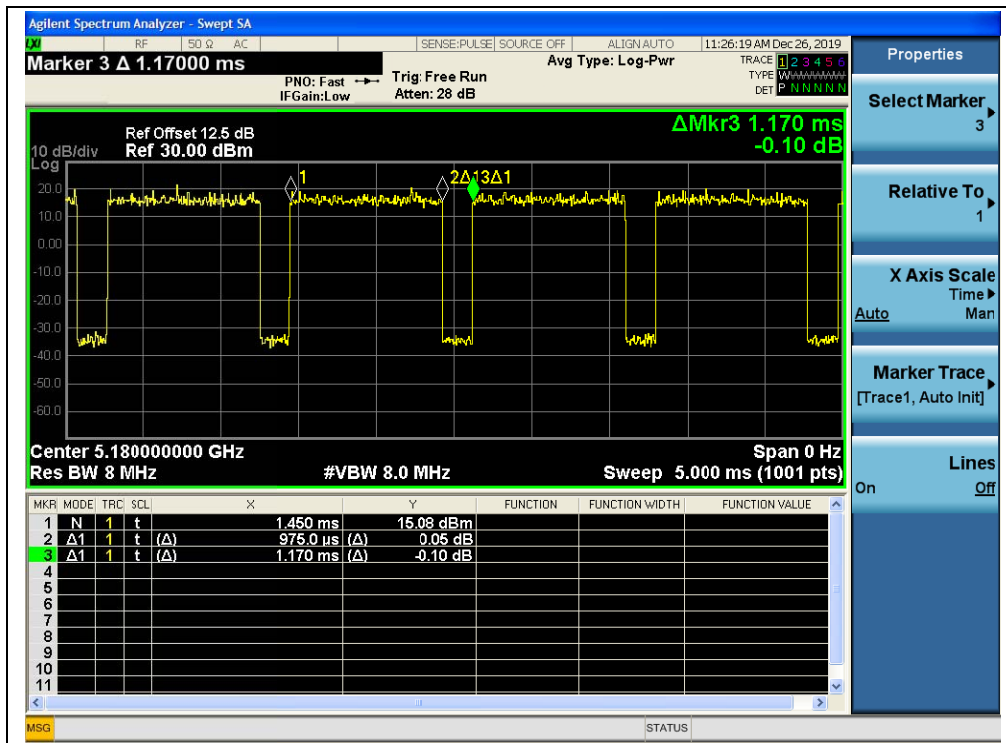
A. Test Verdict:

Test Mode	Duty Cycle (%) (D)	Duty Factor (10*log[1/D])
802.11a	87.26	0.59
802.11n(HT20)	83.33	0.79
802.11n(HT40)	70.74	1.50
802.11ac(VHT20)	82.98	0.81
802.11ac(VHT40)	71.00	1.49
802.11ac(VHT80)	55.36	2.57

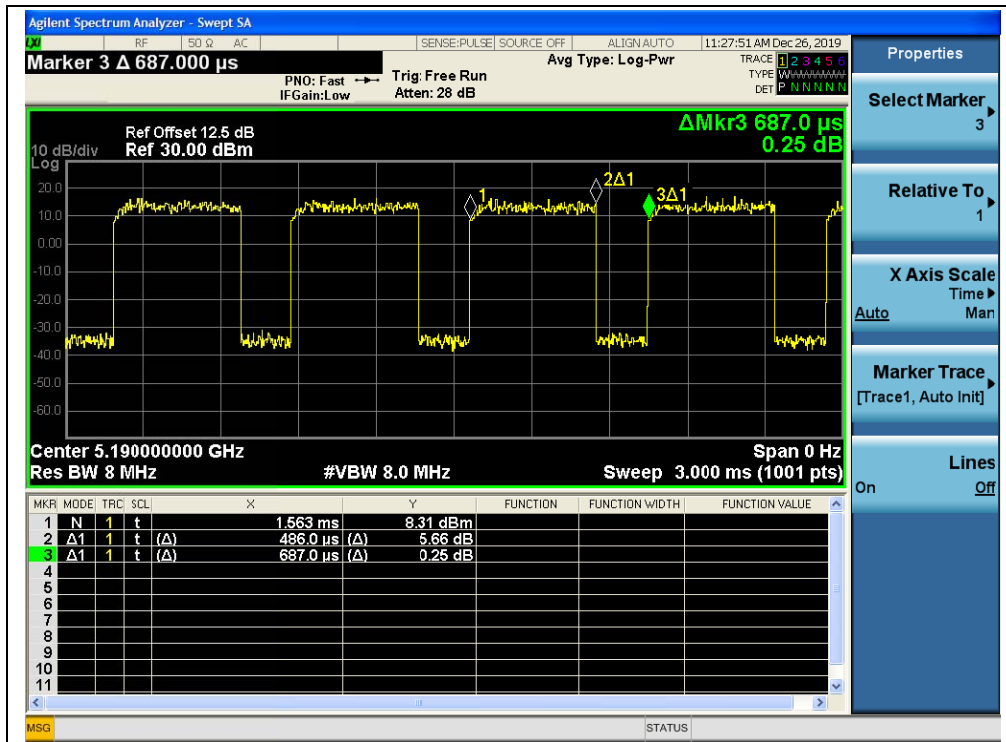
B. Test Plots



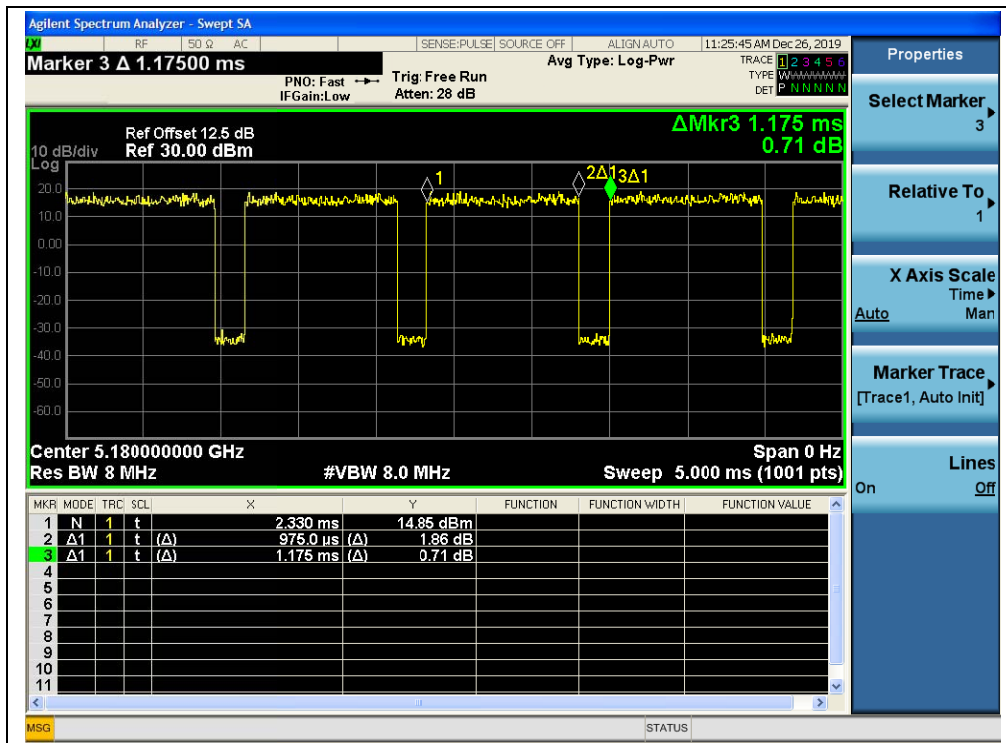
(CH36\_5180MHz\_802.11a)



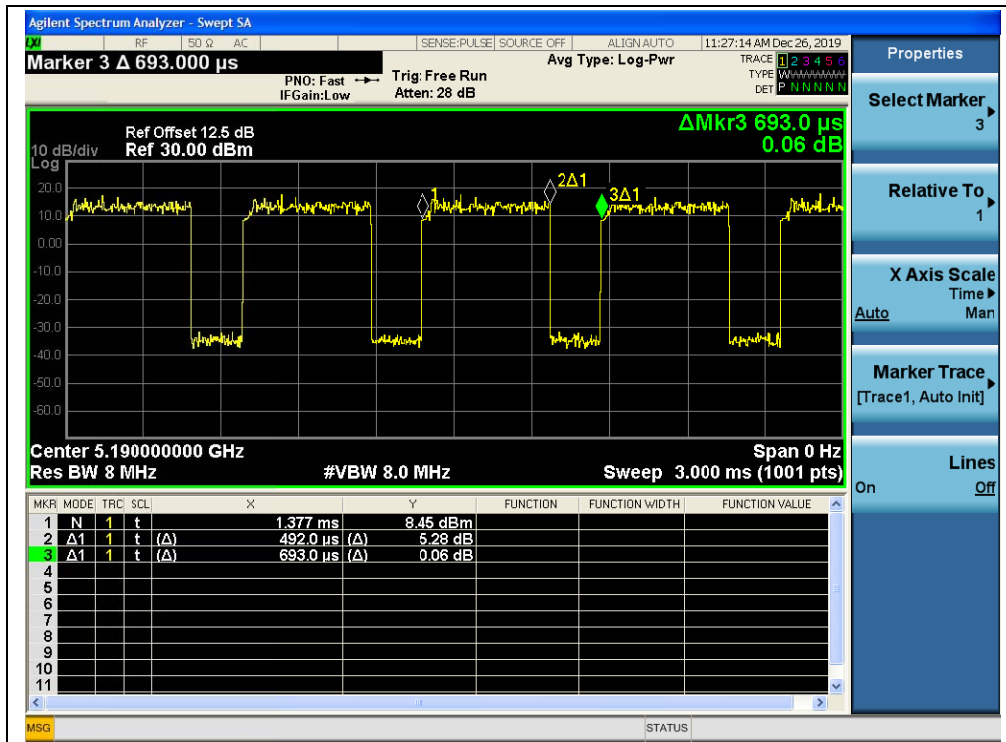
(CH36\_5180MHz\_802.11n(HT20))



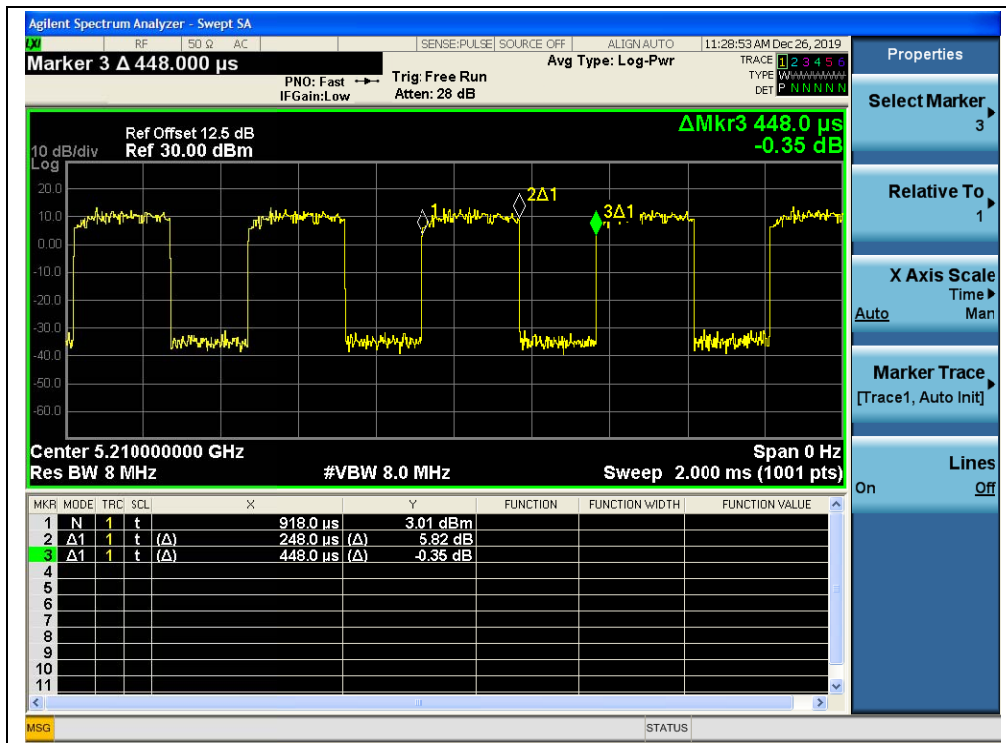
(CH38\_5190MHz\_802.11n(HT40))



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



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



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

## 2.3. Maximum Conducted Output Power

### 2.3.1. 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.

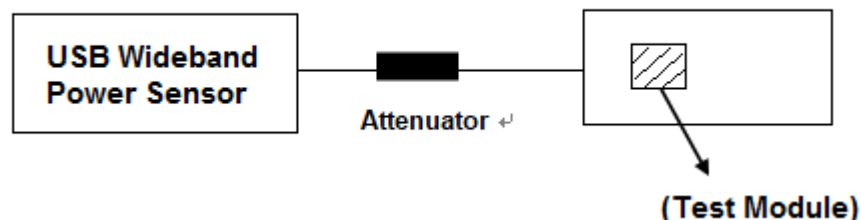
(4) According to KDB662911D01 Measure-and-sum technique, the conducted emission level (e.g., transmit power or power in specified bandwidth) is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically to determine the total emission level from the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

### 2.3.2. Test Description

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

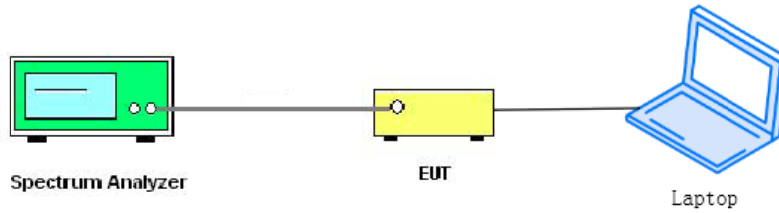
#### Test Setup:



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.



**For ac (VHT80) mode power**



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

**2.3.3. 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.

Mode	Band	Channel (MHz)	26dB BW (MHz)	11+10log(26dB BW)	Limits (dBm)
a	UNII-2a	5260	21.67	24.36	24.00
		5300	21.83	24.39	24.00
		5320	21.36	24.30	24.00
	UNII-2c	5500	21.72	24.37	24.00
		5600	22.06	24.44	24.00
		5720	21.5	24.32	24.00
n20	UNII-2a	5260	21.83	24.39	24.00
		5300	21.73	24.37	24.00
		5320	22.25	24.47	24.00
	UNII-2c	5500	22.02	24.43	24.00
		5600	22.09	24.44	24.00
		5720	22.3	24.48	24.00
ac20	UNII-2a	5260	22.04	24.43	24.00
		5300	21.88	24.40	24.00
		5320	22.3	24.48	24.00
	UNII-2c	5500	21.89	24.40	24.00
		5600	21.97	24.42	24.00
		5720	22.14	24.45	24.00



2.3.4. Test Result

Maximum Average Conducted Output Power

802.11a Test mode

Frequency (MHz)	Average Power (dBm)				Limit (dBm)		Verdict
	Measured dBm	Duty Factor	Duty factor Calculated		dBm	W	
			dBm	W			
5180	13.21	0.59	13.80	0.024	24	0.25	PASS
5220	13.04		13.63	0.023			
5240	13.14		13.73	0.024			
5260	13.72		14.31	0.027			
5300	13.81		<b>14.40</b>	<b>0.028</b>			
5320	13.79		14.38	0.027			
5500	12.56		13.15	0.021			
5600	12.61		13.20	0.021			
5720	12.75		13.34	0.022			
5745	12.83		13.42	0.022			
5785	12.89		13.48	0.022			
5825	12.91		13.50	0.022			

802.11 n (HT20) Test mode

Frequency (MHz)	Average Power (dBm)				Limit (dBm)		Verdict
	Measured dBm	Duty Factor	Duty factor Calculated		dBm	W	
			dBm	W			
5180	11.09	0.79	11.88	0.015	24	0.25	PASS
5220	11.34		12.13	0.016			
5240	11.61		12.40	0.017			
5260	11.87		<b>12.66</b>	<b>0.018</b>			
5300	11.79		12.58	0.018			
5320	11.64		12.43	0.017			
5500	10.65		11.44	0.014			
5600	10.71		11.50	0.014			
5720	10.75		11.54	0.014			
5745	10.85		11.64	0.015			
5785	10.91		11.70	0.015			
5825	10.79		11.58	0.014			



**802.11 n (HT40) Test mode**

Frequency (MHz)	Average Power (dBm)				Limit (dBm)		Verdict
	Measured	Duty Factor	Duty factor Calculated		dBm	W	
	dBm		dBm	W			
5190	10.88	1.50	12.38	0.017	24	0.25	PASS
5230	10.91		12.41	0.017			
5270	11.26		12.76	0.019			
5310	11.74		<b>13.24</b>	<b>0.021</b>			
5510	10.15		11.65	0.015			
5630	10.64		12.14	0.016			
5710	10.71		12.21	0.017			
5755	10.43		11.93	0.016	30	1	
5795	10.65		12.15	0.016			

**802.11 ac (VHT20) Test mode**

Frequency (MHz)	Average Power (dBm)				Limit (dBm)		Verdict
	Measured	Duty Factor	Duty factor Calculated		dBm	W	
	dBm		dBm	W			
5180	9.05	0.81	9.86	0.010	24	0.25	PASS
5220	9.41		10.22	0.011			
5240	9.35		10.16	0.010			
5260	9.62		10.43	0.011			
5300	9.87		10.68	0.012			
5320	9.89		<b>10.70</b>	<b>0.012</b>			
5500	8.61		9.42	0.009			
5600	8.82		9.63	0.009			
5720	8.76		9.57	0.009			
5745	8.55		9.36	0.009	30	1	
5785	8.62		9.43	0.009			
5825	8.49		9.30	0.009			



**802.11 ac (VHT40) Test mode**

Frequency (MHz)	Average Power (dBm)				Limit (dBm)		Verdict
	Measured	Duty Factor	Duty factor Calculated		dBm	W	
	dBm		dBm	W			
5190	9.07	1.49	10.56	0.011	24	0.25	PASS
5230	9.43		10.92	0.012			
5270	9.65		11.14	0.013			
5310	9.86		<b>11.35</b>	<b>0.014</b>			
5510	8.50		9.99	0.010			
5630	8.67		10.16	0.010			
5710	8.71		10.20	0.010			
5755	8.45		9.94	0.010	30	1	
5795	8.51		10.00	0.010			

**802.11 ac (VHT80) Test mode**

Frequency (MHz)	Average Power (dBm)				Limit (dBm)		Verdict
	Measured	Duty Factor	Duty factor Calculated		dBm	W	
	dBm		dBm	W			
5210	8.69	2.57	10.33	0.011	24	0.25	PASS
5290	9.05		<b>11.03</b>	<b>0.013</b>			
5530	8.39		9.67	0.009			
5690	7.86		10.13	0.010			
5775	8.22		10.00	0.010	30	1	

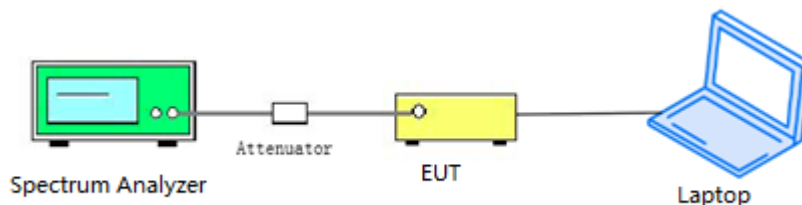
## 2.4. Emission Bandwidth

### 2.4.1. 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.

### 2.4.2. Test Description

#### Test Setup:



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.

### 2.4.3. 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.

**2.4.4. Test Result**

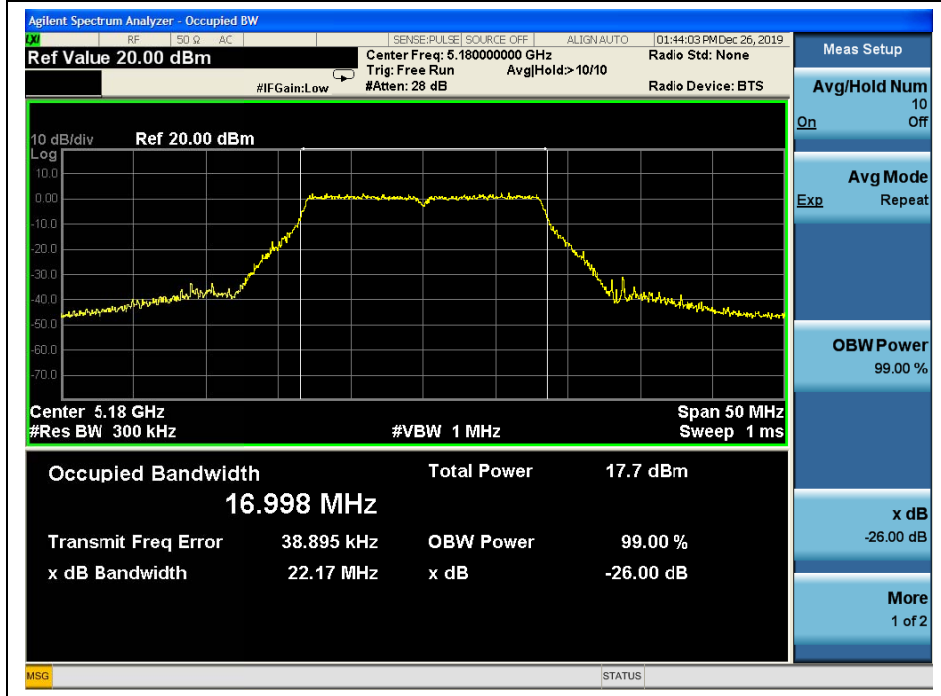
**802.11a Test mode**

**A. Test Verdict:**

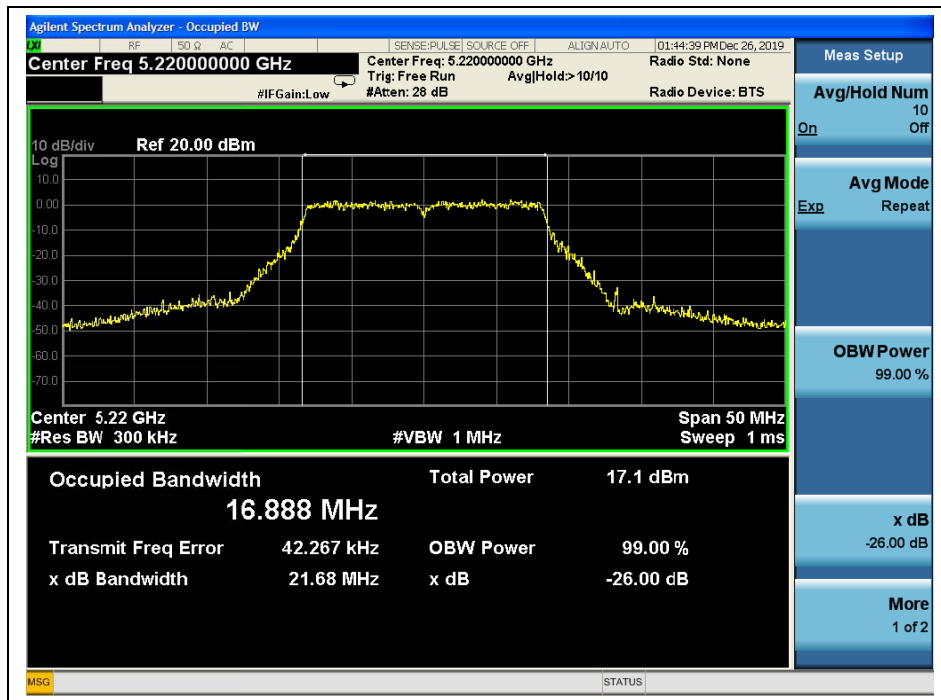
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
36	5180	22.17
44	5220	21.68
48	5240	21.73
52	5260	21.67
60	5300	21.83
64	5320	21.36
100	5500	21.72
120	5600	22.06
144	5720	21.50
Channel	Frequency (MHz)	6dB Bandwidth (MHz)
144	5720	16.38
149	5745	16.39
157	5785	16.41
165	5825	16.38



**B. Test Plots**



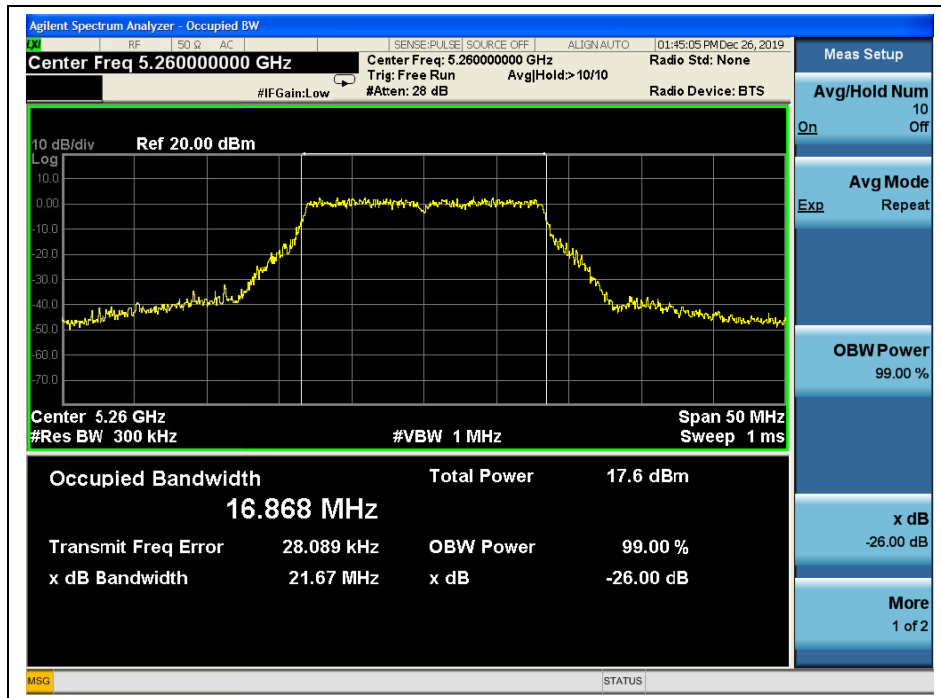
(Channel 36, 5180MHz, 802.11a,)



(Channel 44, 5220 MHz, 802.11a,)

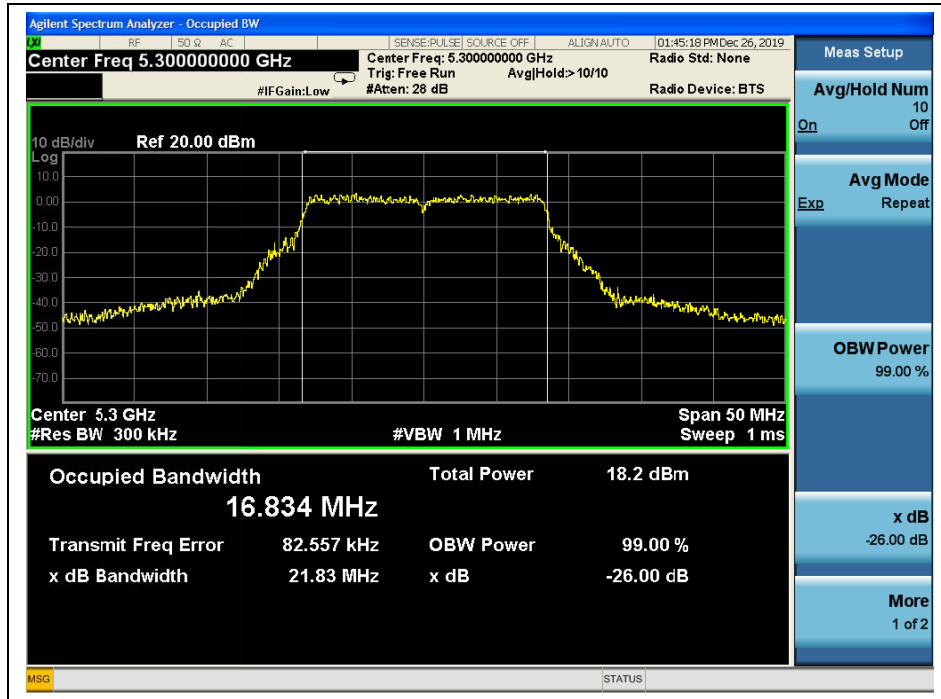


(Channel 48, 5240MHz, 802.11a,)

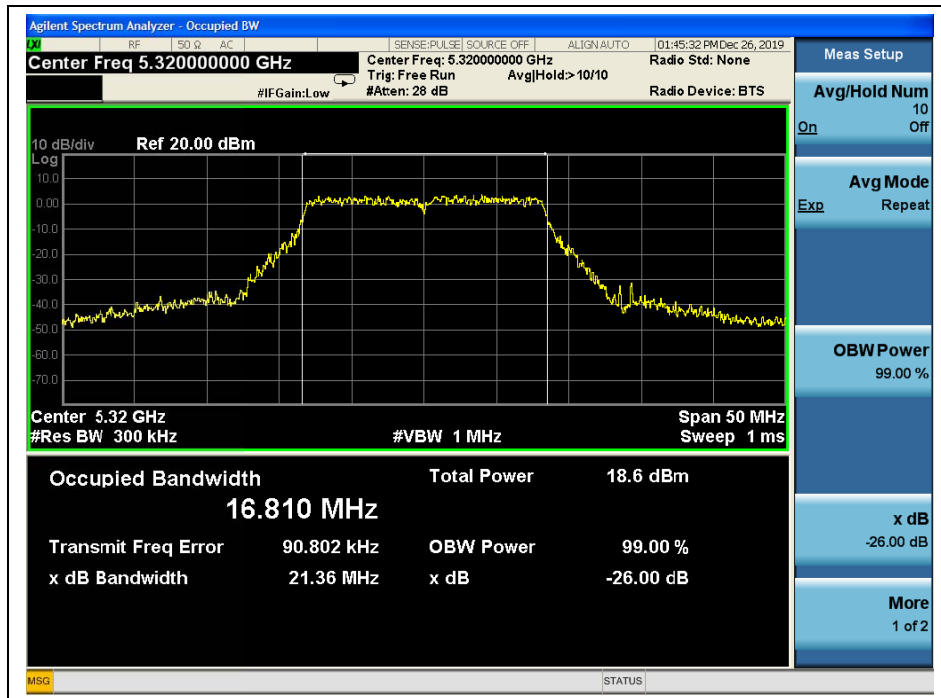


(Channel 52, 5260MHz, 802.11a,)

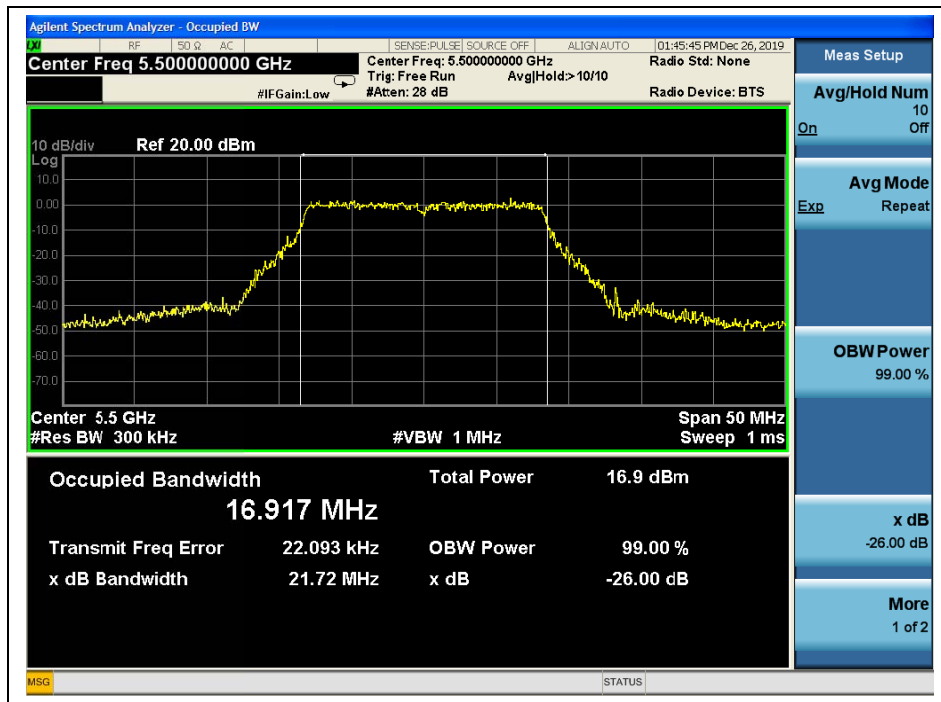




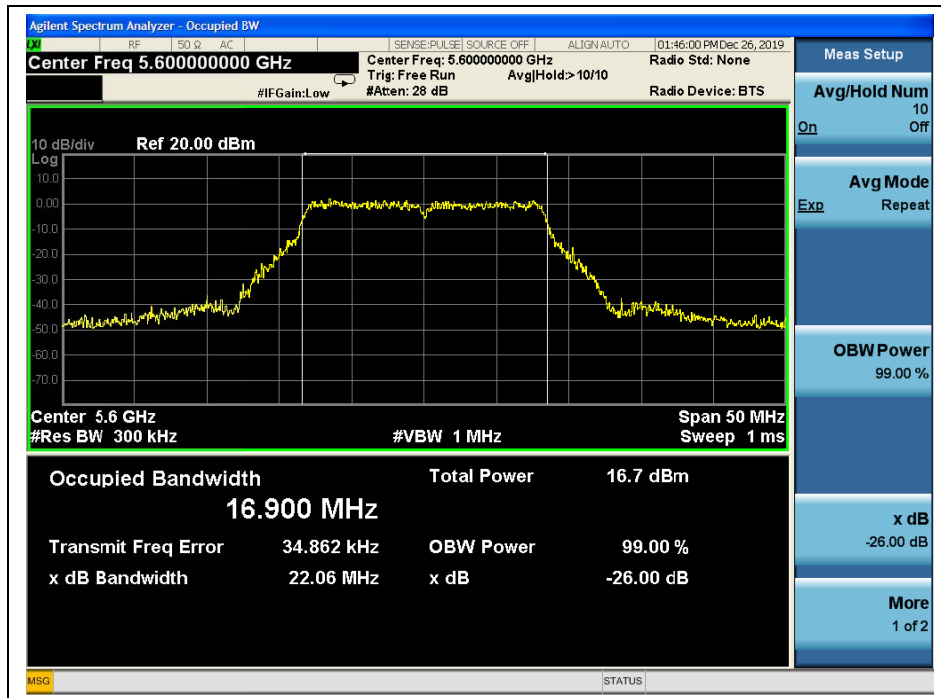
(Channel 60, 5300 MHz, 802.11a,)



(Channel 64, 5320MHz, 802.11a,)



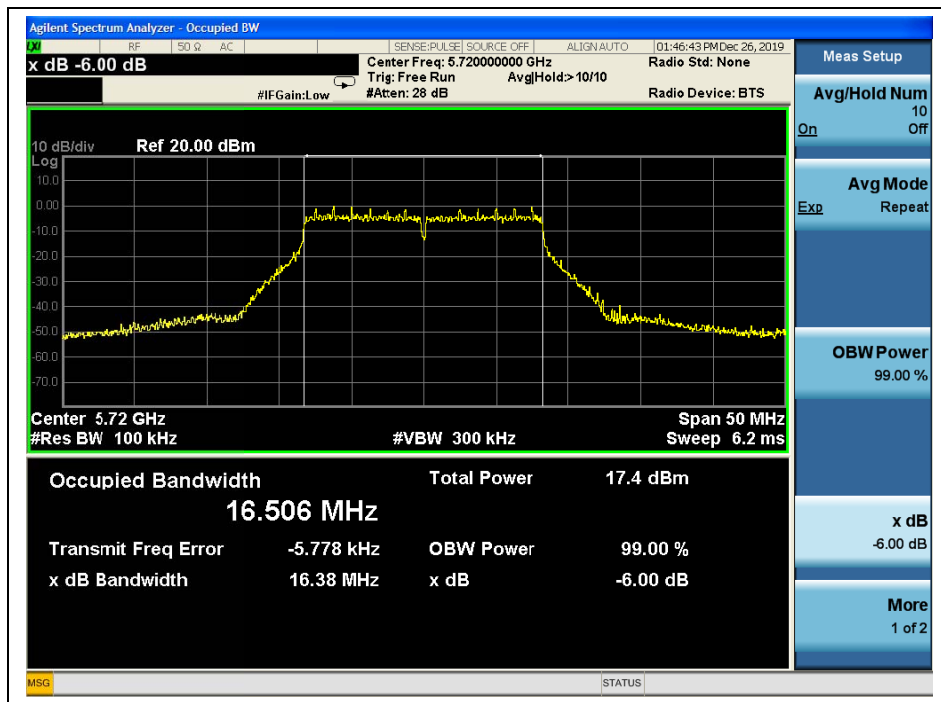
(Channel 100, 5500MHz, 802.11a,)



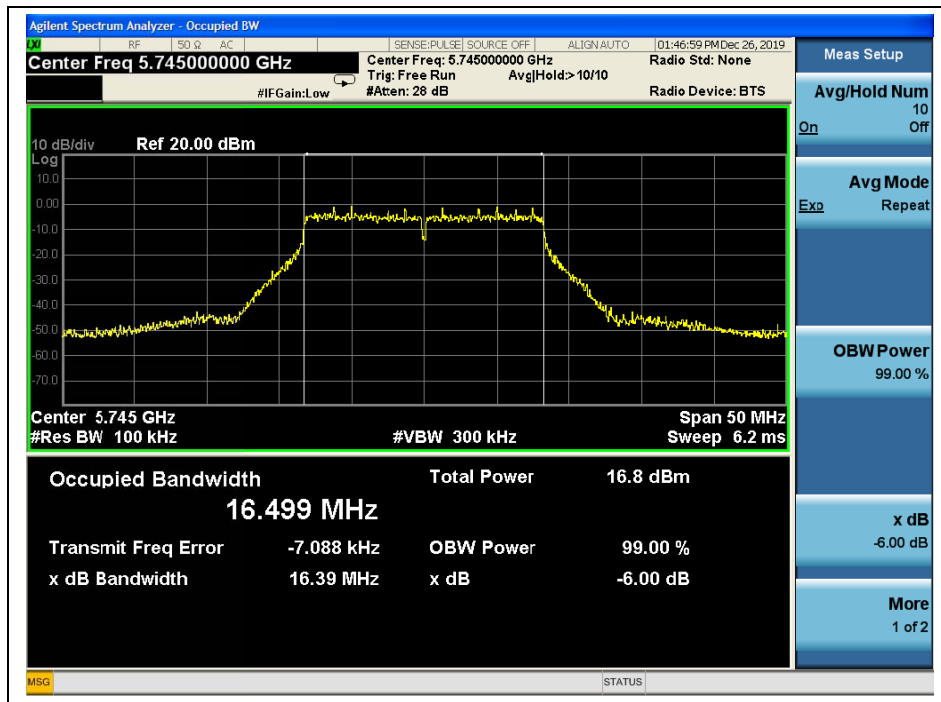
(Channel 120, 5600 MHz, 802.11a,)



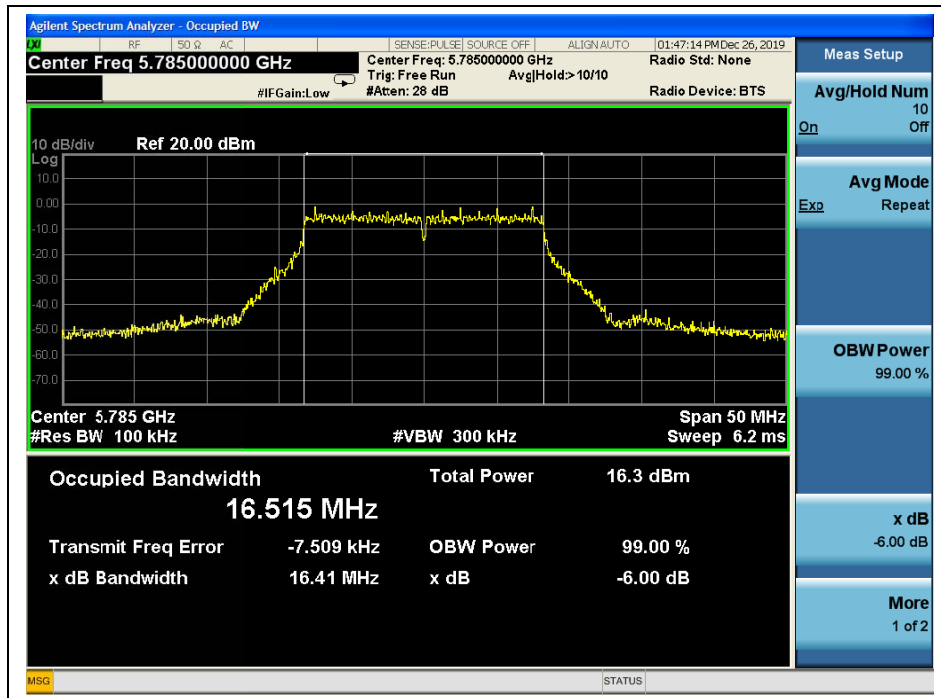
(Channel 144, 5720MHz, 802.11a,)



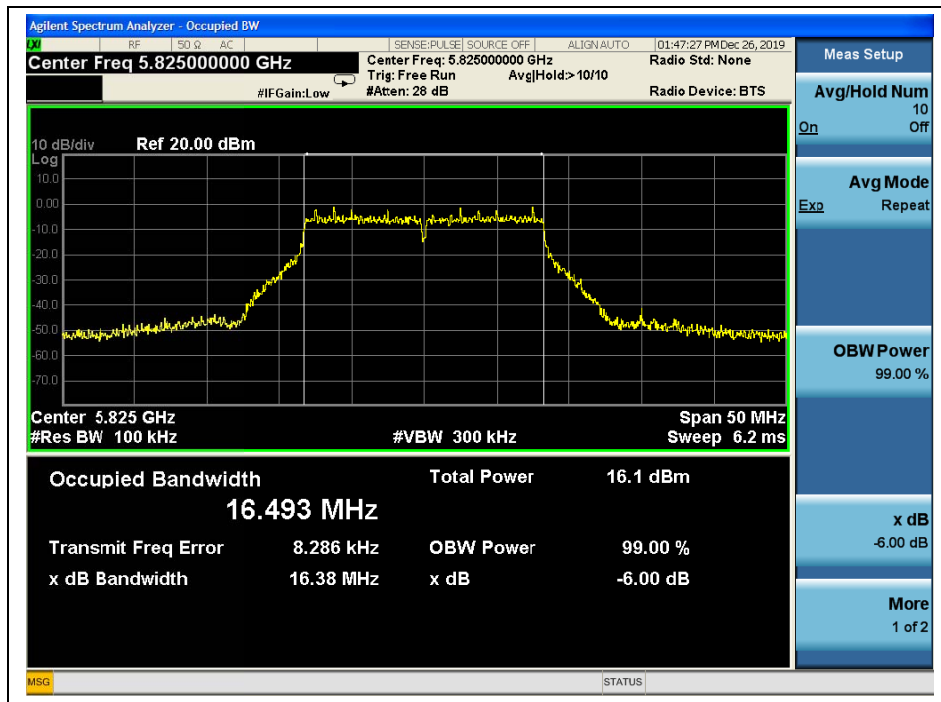
(Channel 144, 5720MHz, 802.11a,)



(Channel 149, 5745MHz, 802.11a)



(Channel 157, 5785MHz, 802.11a)



(Channel 165, 5825MHz, 802.11a)



**802.11n (HT20) Test mode**

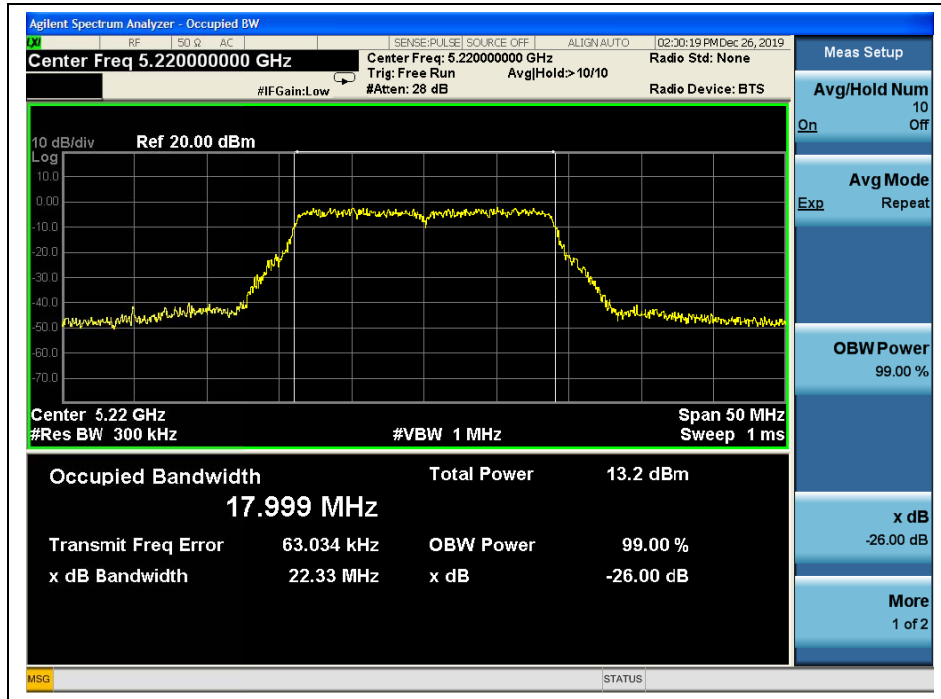
**A. Test Verdict:**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
36	5180	22.50
44	5220	22.33
48	5240	22.35
52	5260	21.83
60	5300	21.73
64	5320	22.25
100	5500	22.02
120	5600	22.09
144	5720	22.30
Channel	Frequency (MHz)	6dB Bandwidth (MHz)
144	5720	17.60
149	5745	17.62
157	5785	17.64
165	5825	17.63

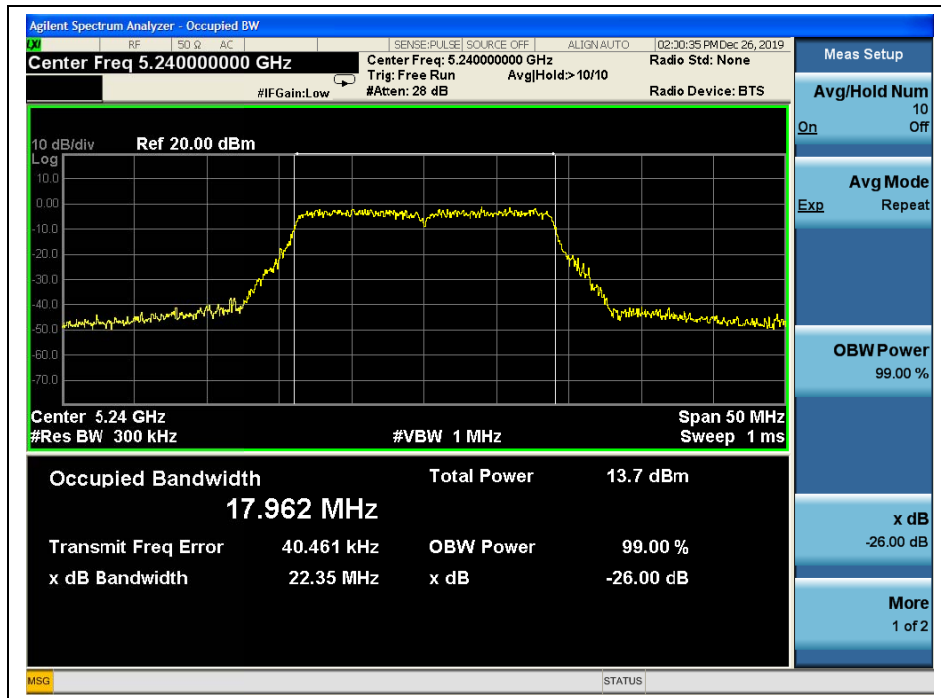
**B. Test Plots**



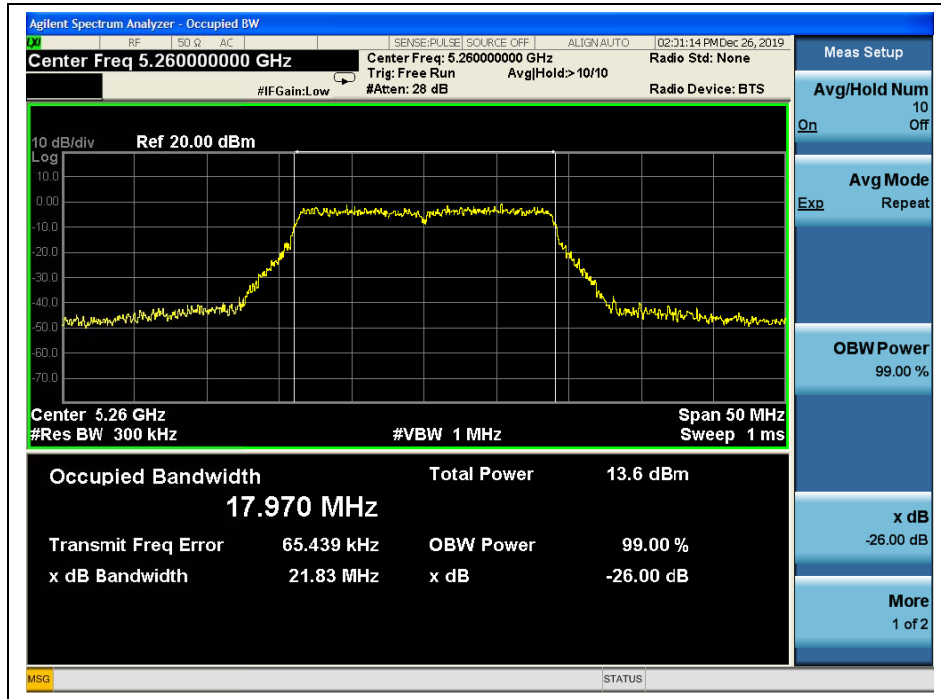
(Channel 36, 5180MHz, 802.11 n (HT20))



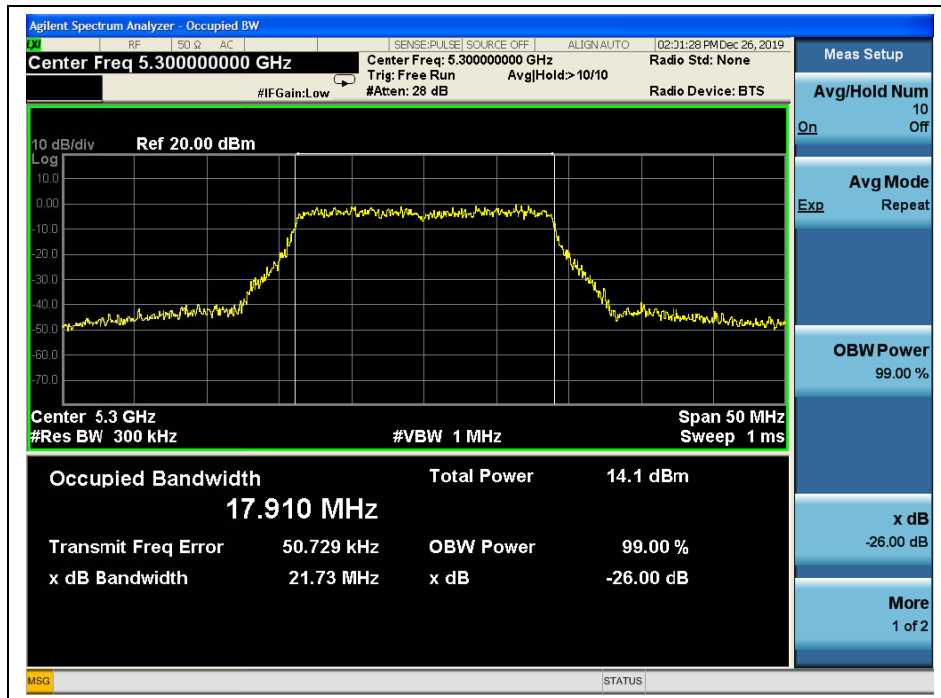
(Channel 44, 5220 MHz, 802.11 n (HT20))



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

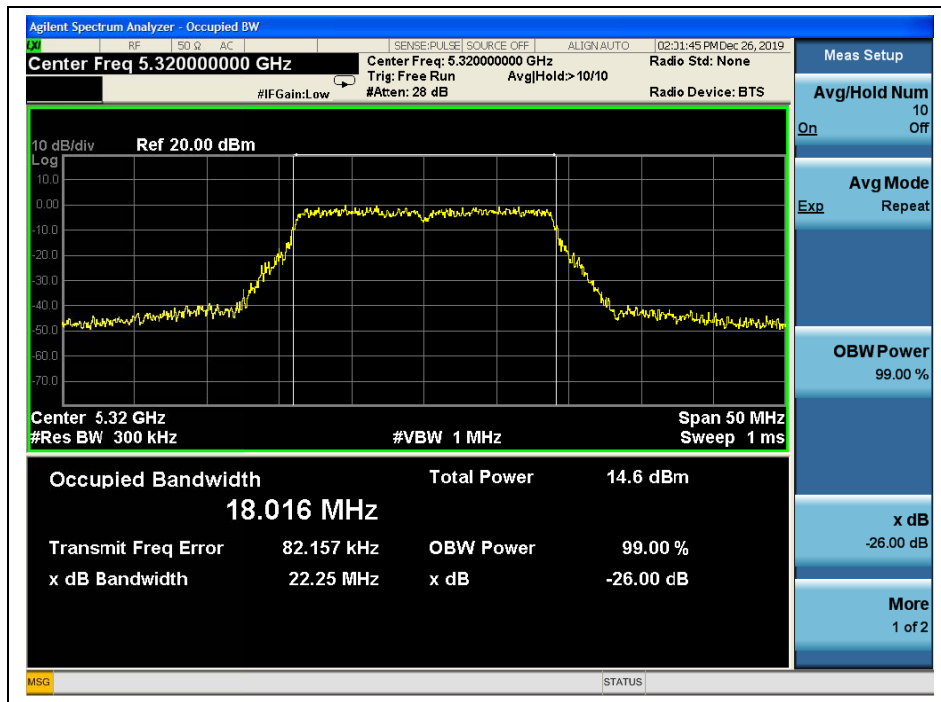


(Channel 52, 5260MHz, 802.11 n (HT20))

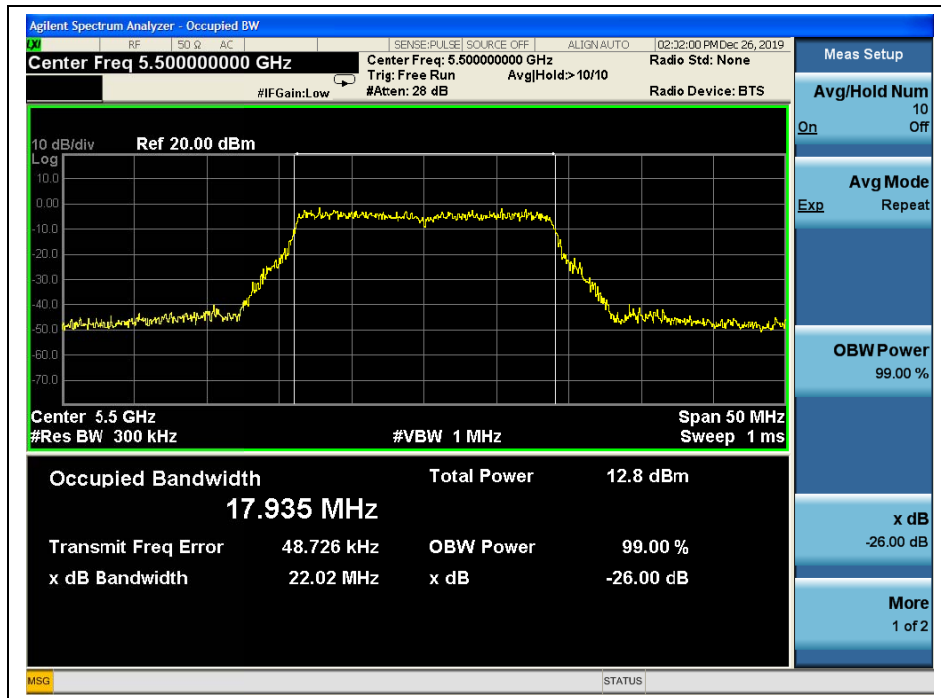


(Channel 60, 5300 MHz, 802.11 n (HT20))

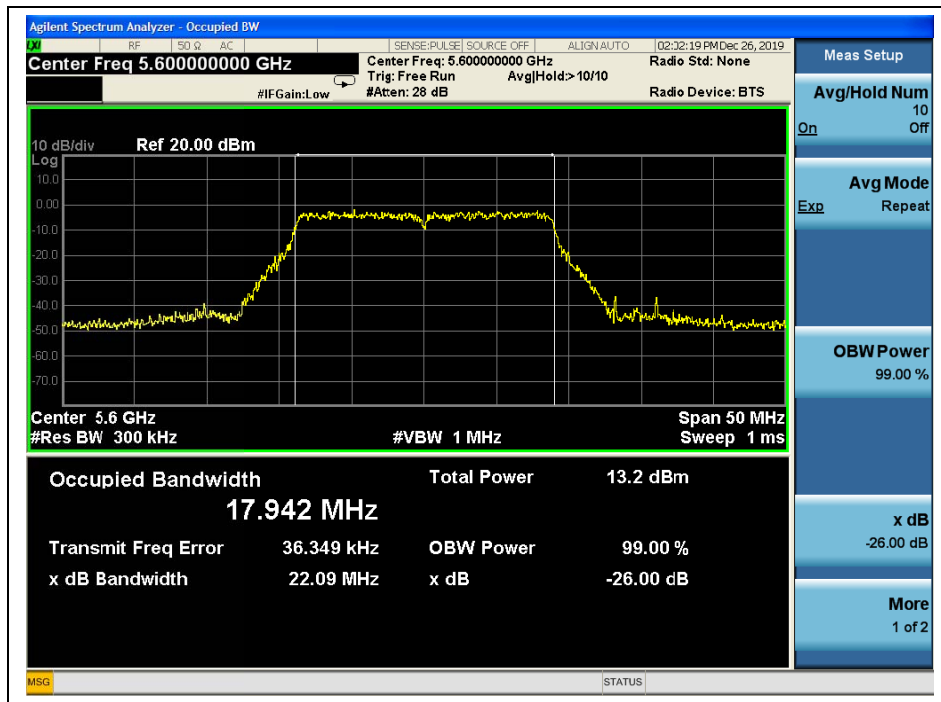




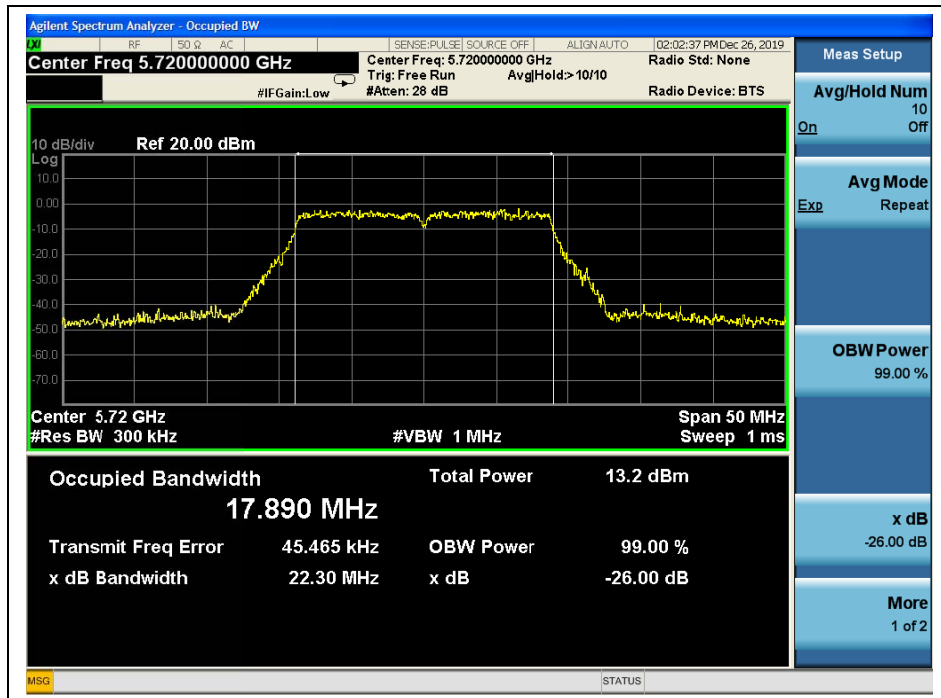
(Channel 64, 5320MHz, 802.11 n (HT20))



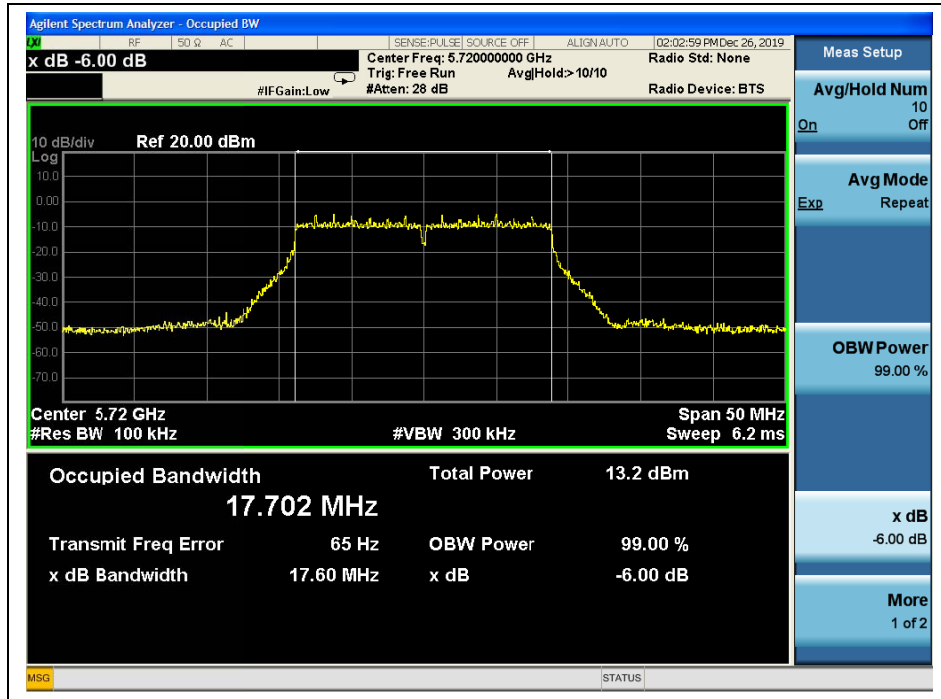
(Channel 100, 5500MHz, 802.11 n (HT20))



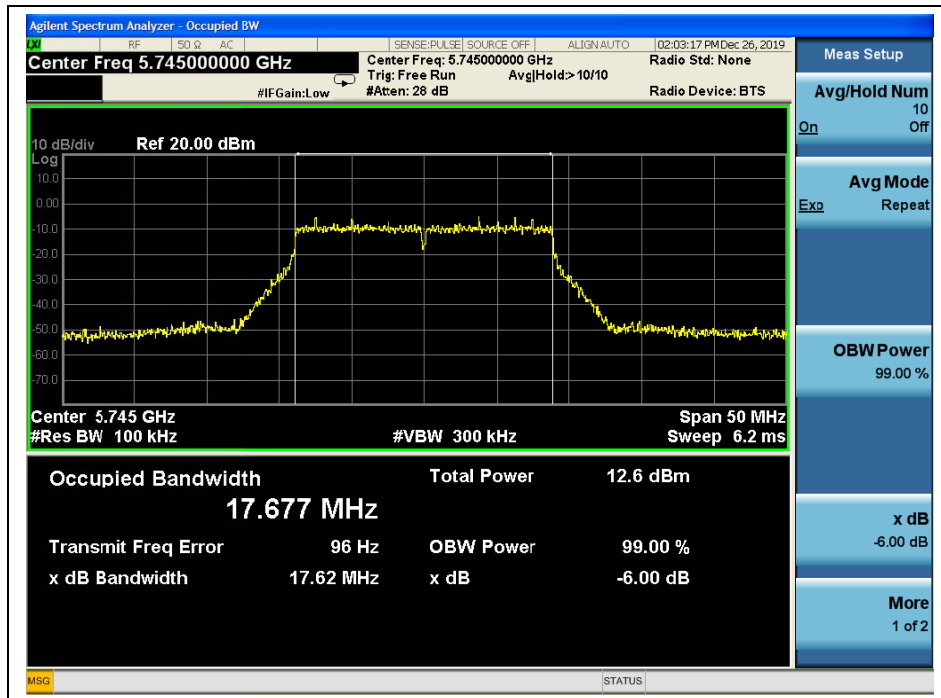
(Channel 120, 5600 MHz, 802.11 n (HT20))



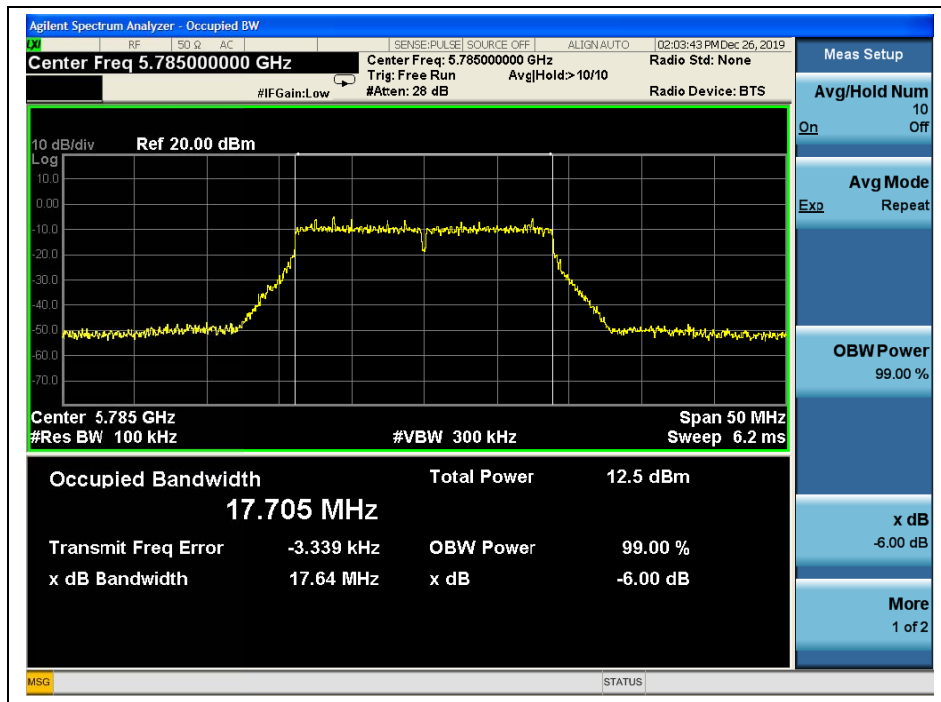
(Channel 144, 5720MHz, 802.11 n (HT20))



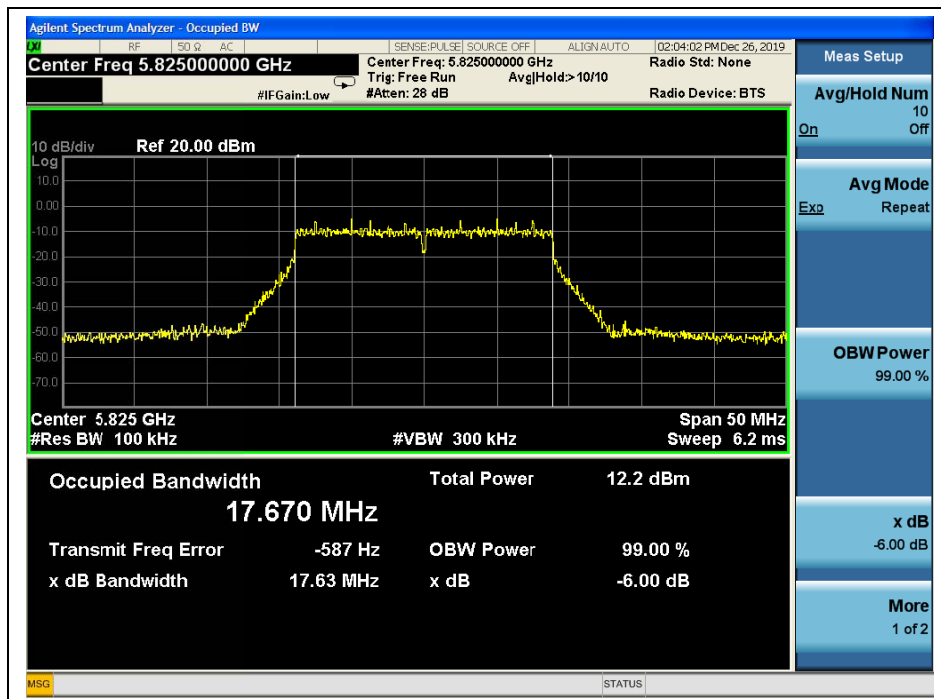
(Channel 144, 5720MHz, 802.11 n (HT20))



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



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



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

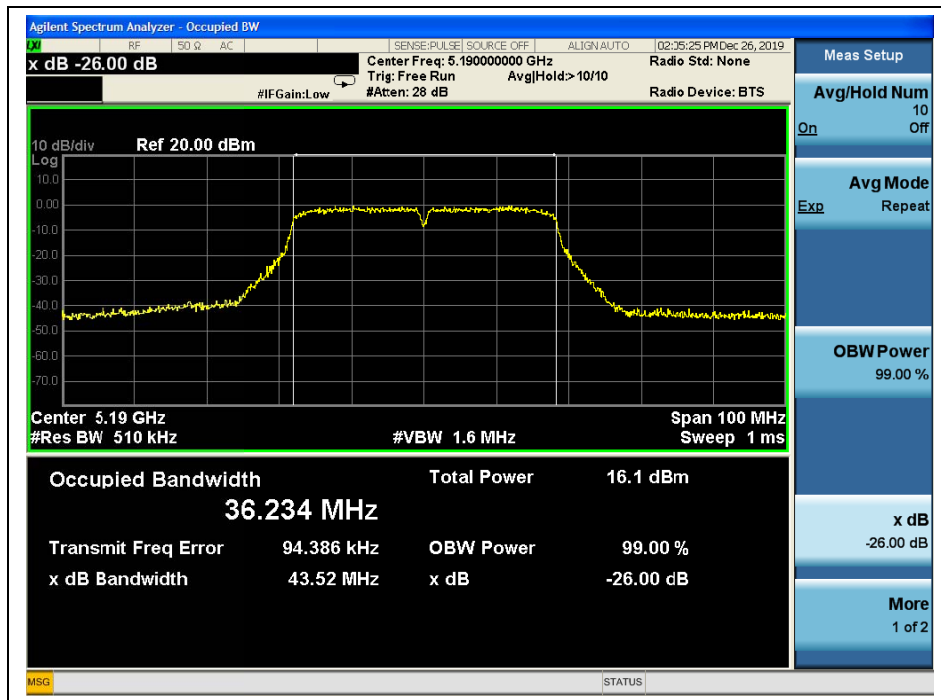


802.11n (HT40) Test mode

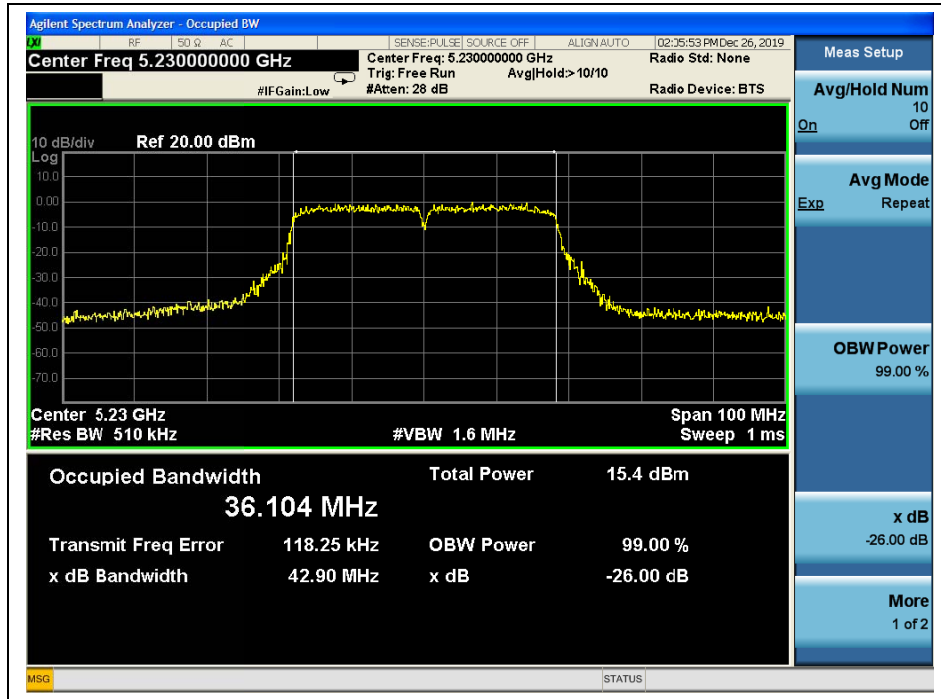
A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
38	5190	43.52
46	5230	42.90
54	5270	42.66
62	5310	42.17
102	5510	41.58
126	5630	43.04
142	5710	43.68
Channel	Frequency (MHz)	6dB Bandwidth (MHz)
142	5710	36.03
151	5755	34.99
159	5795	36.33

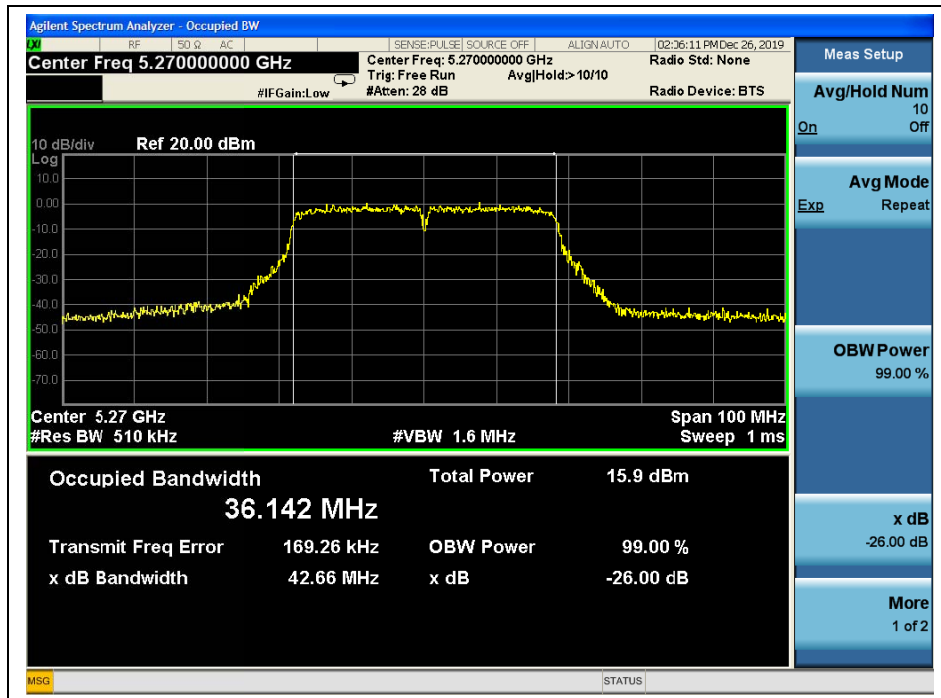
B. Test Plots



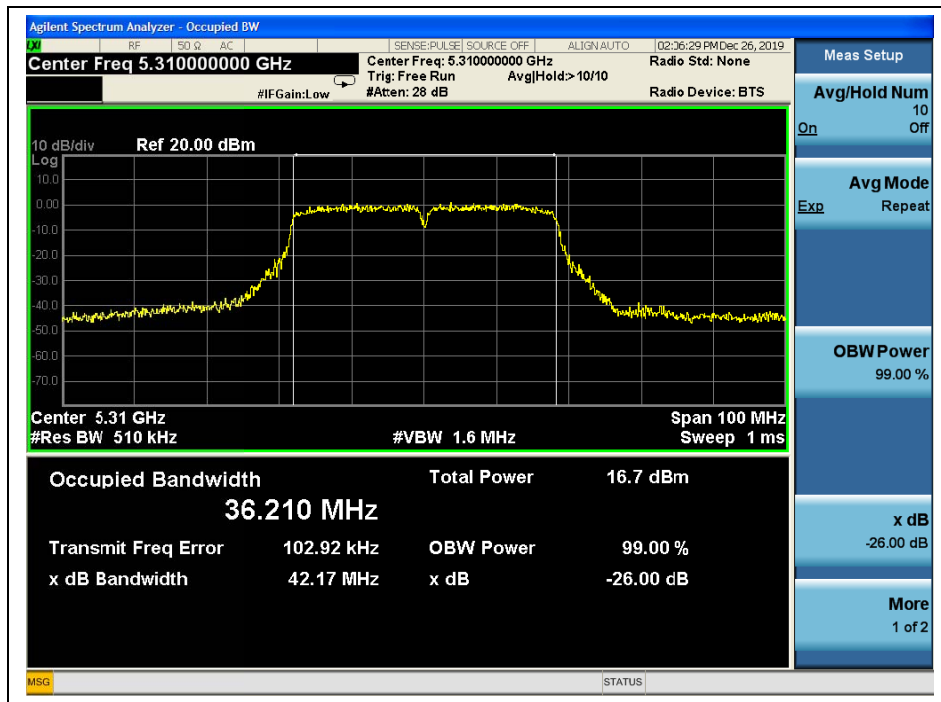
(Channel 38, 5190MHz, 802.11n (HT40))



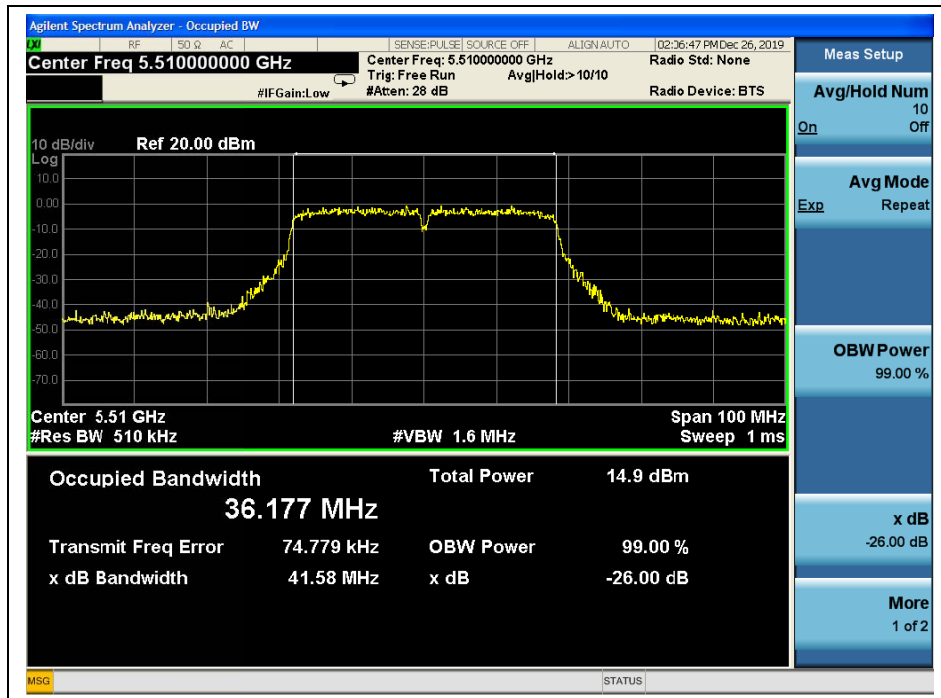
(Channel 46, 5230 MHz, 802.11n (HT40))



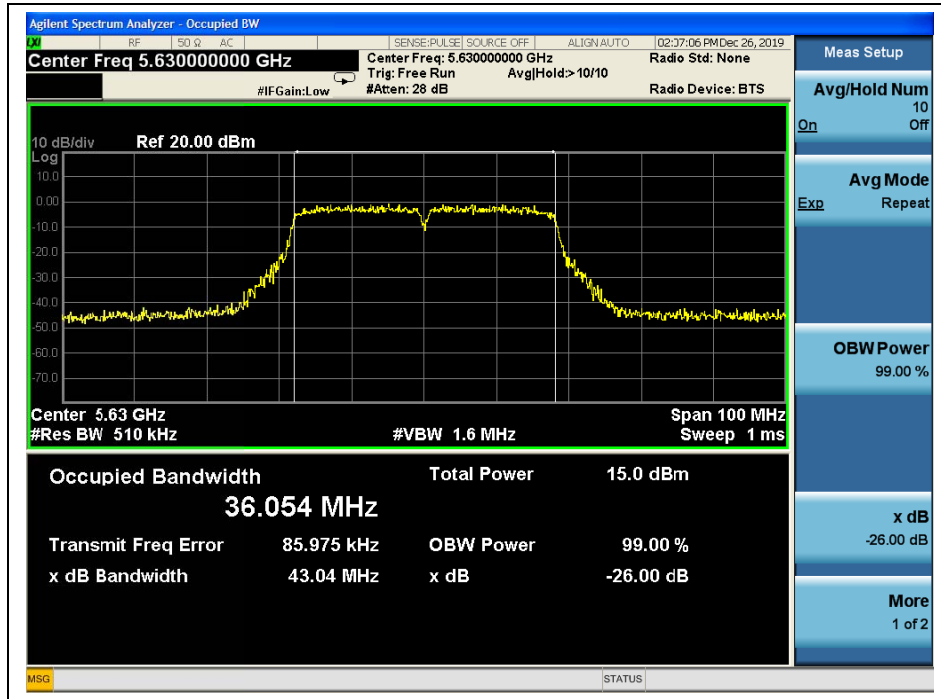
(Channel 54, 5270MHz, 802.11n (HT40))



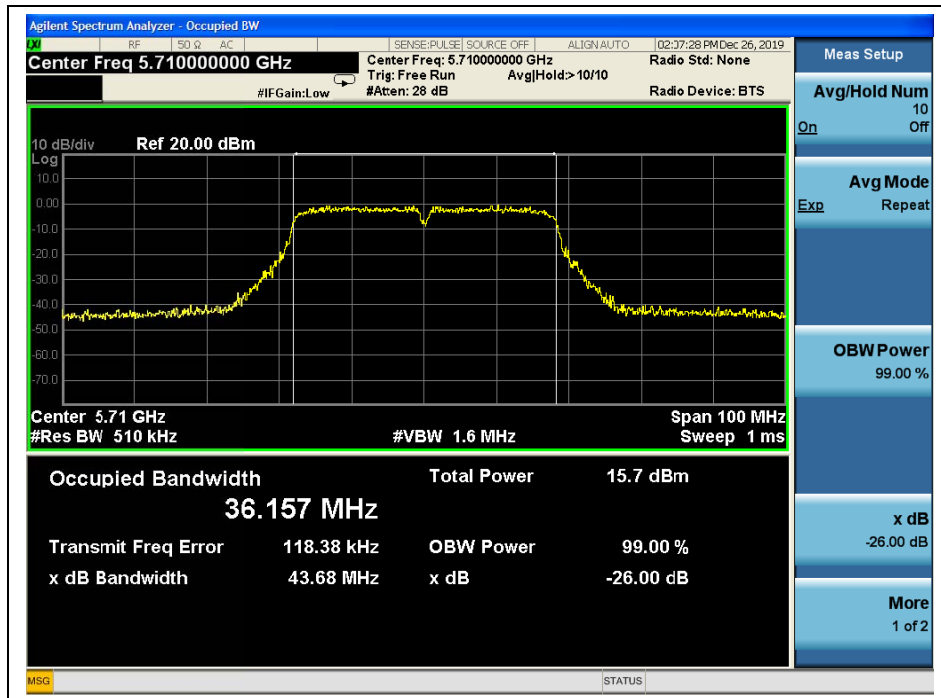
(Channel 62, 5310 MHz, 802.11n (HT40))



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

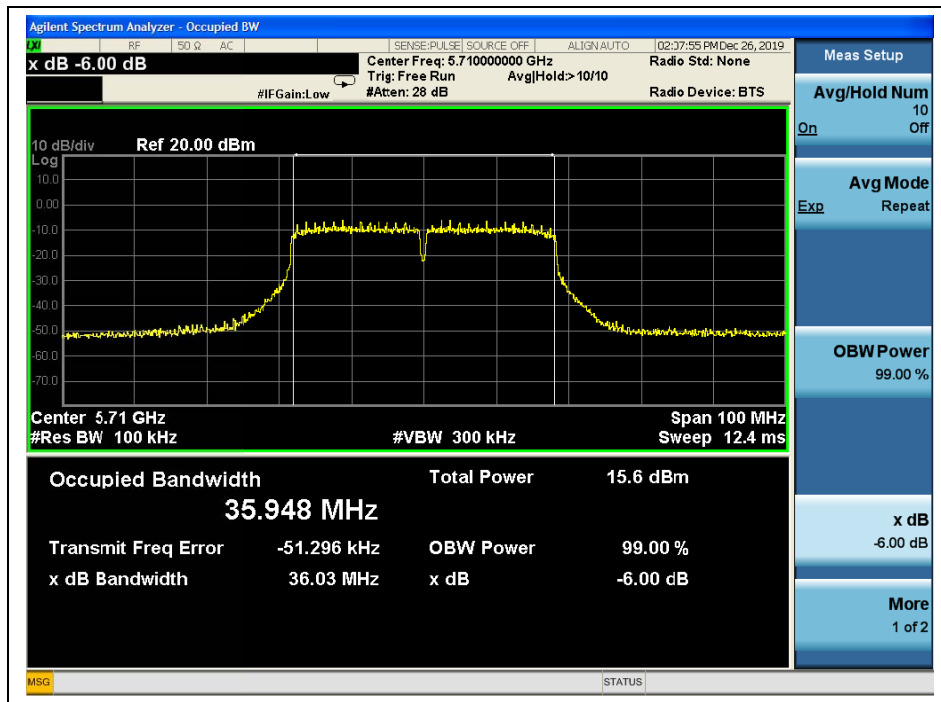


(Channel 126, 5630 MHz, 802.11n (HT40))

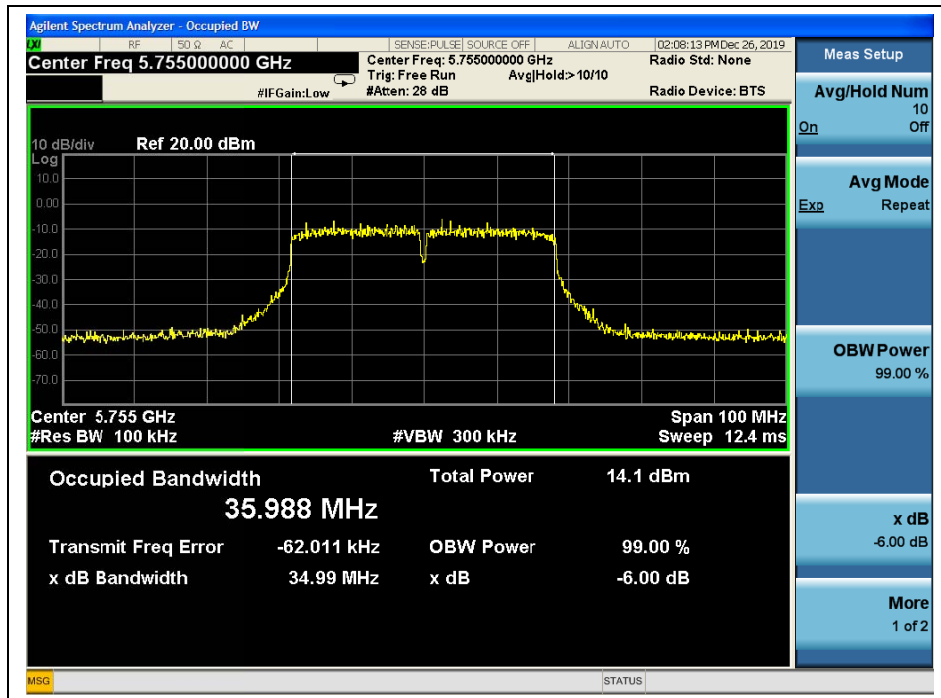


(Channel 142, 5710MHz, 802.11n (HT40))

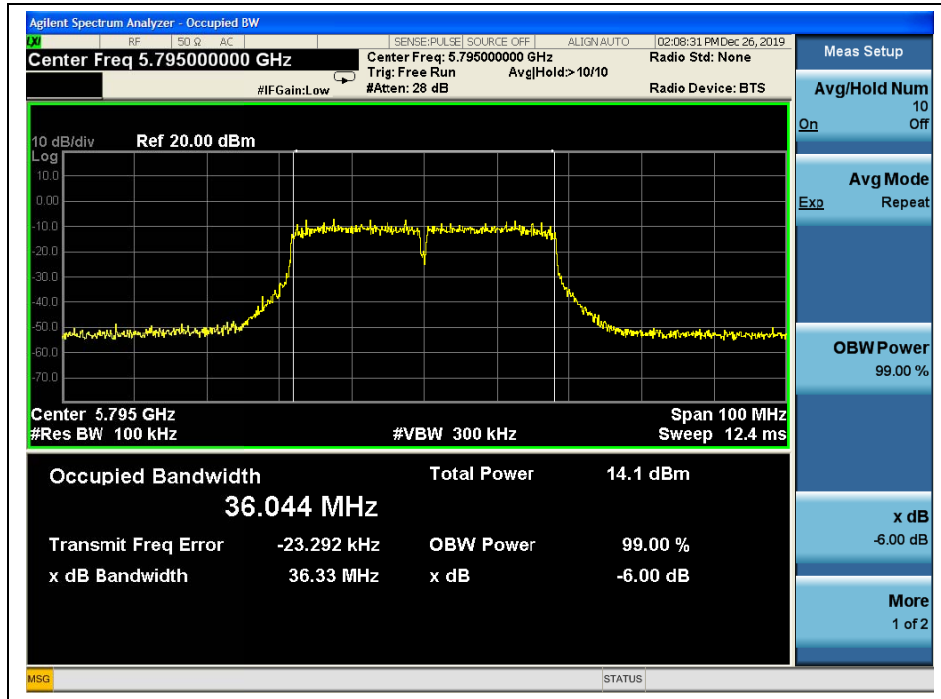




(Channel 142, 5710MHz, 802.11n (HT40))



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



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

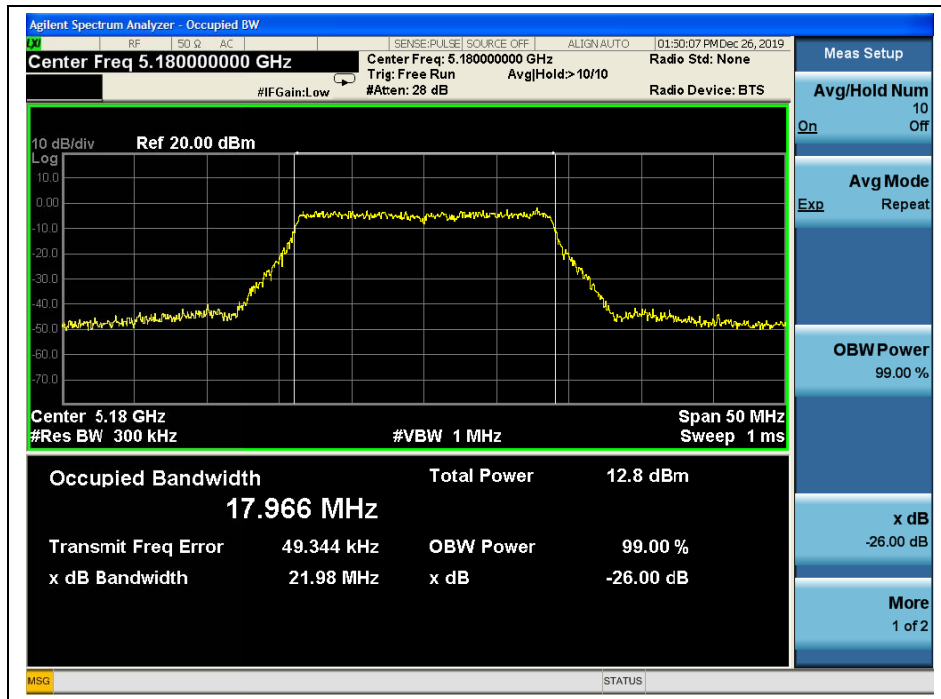


**802.11ac (VHT20) Test mode**

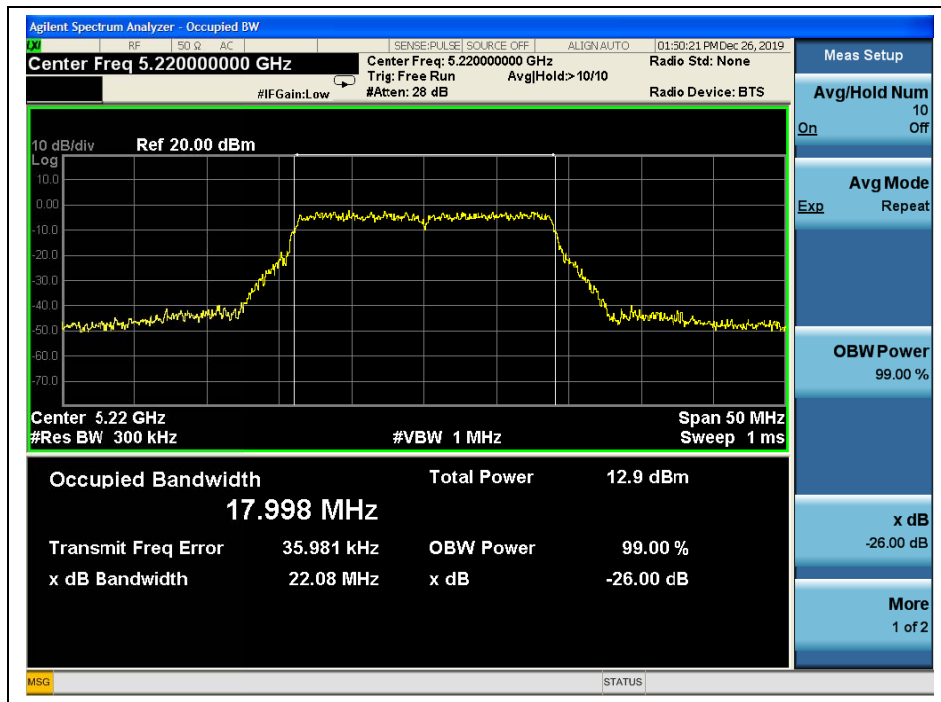
**A. Test Verdict:**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
36	5180	21.98
44	5220	22.08
48	5240	21.86
52	5260	22.04
60	5300	21.88
64	5320	22.30
100	5500	21.89
120	5600	21.97
144	5720	22.14
Channel	Frequency (MHz)	6dB Bandwidth (MHz)
144	5720	17.62
149	5745	17.63
157	5785	17.59
165	5825	17.63

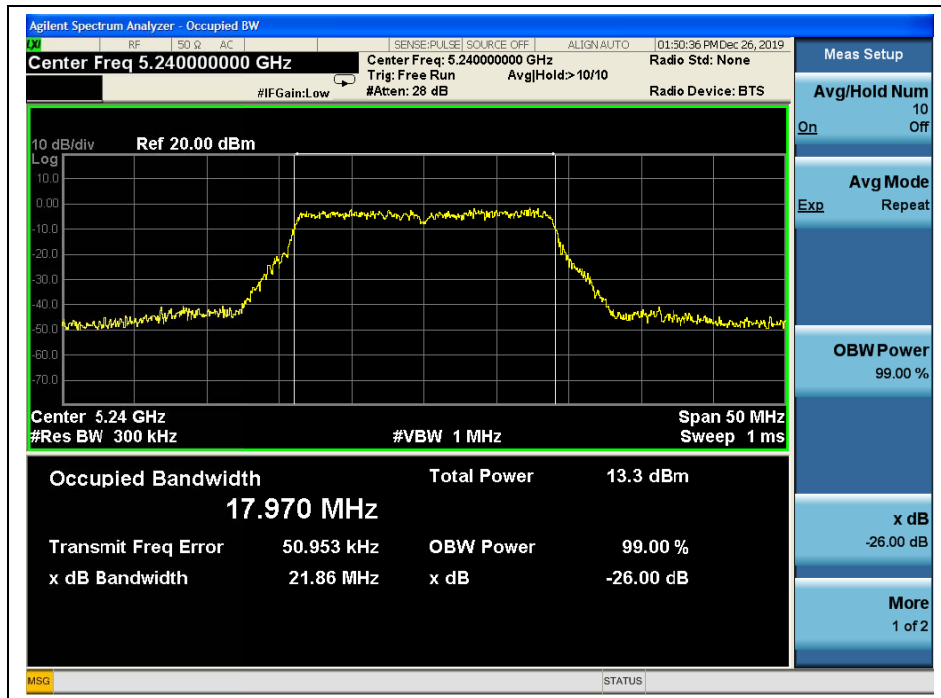
**B. Test Plots**



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



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



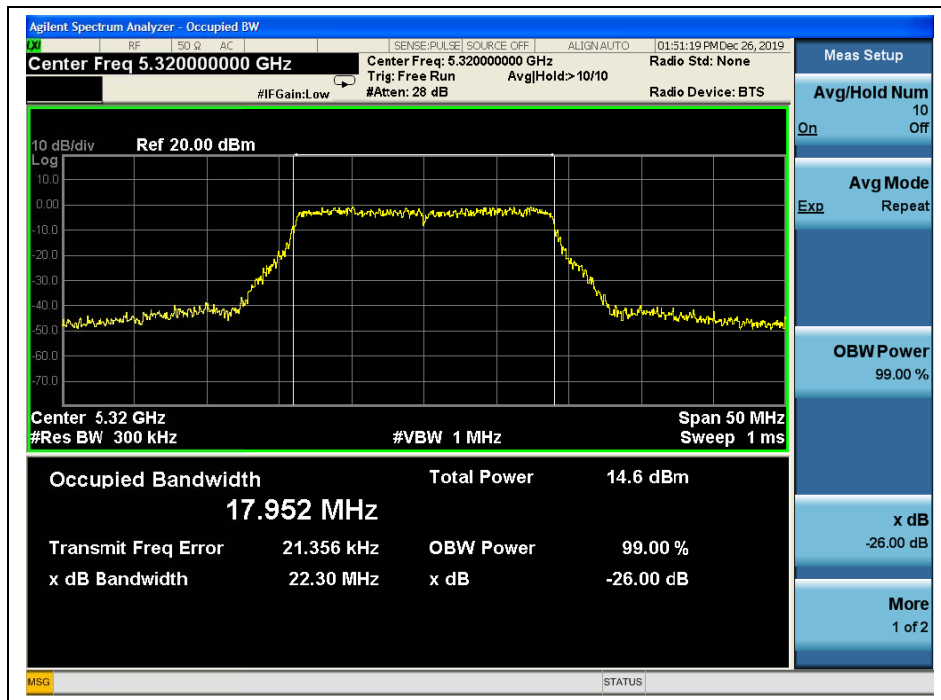
(Channel 48, 5240MHz, 802.11 ac (VHT20))



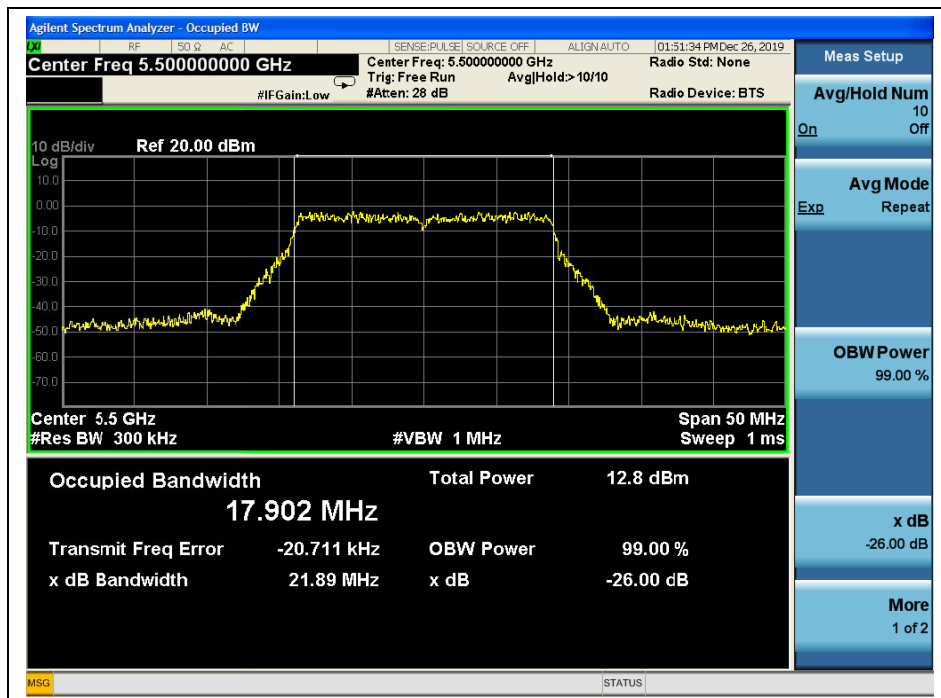
(Channel 52, 5260MHz, 802.11 ac (VHT20))



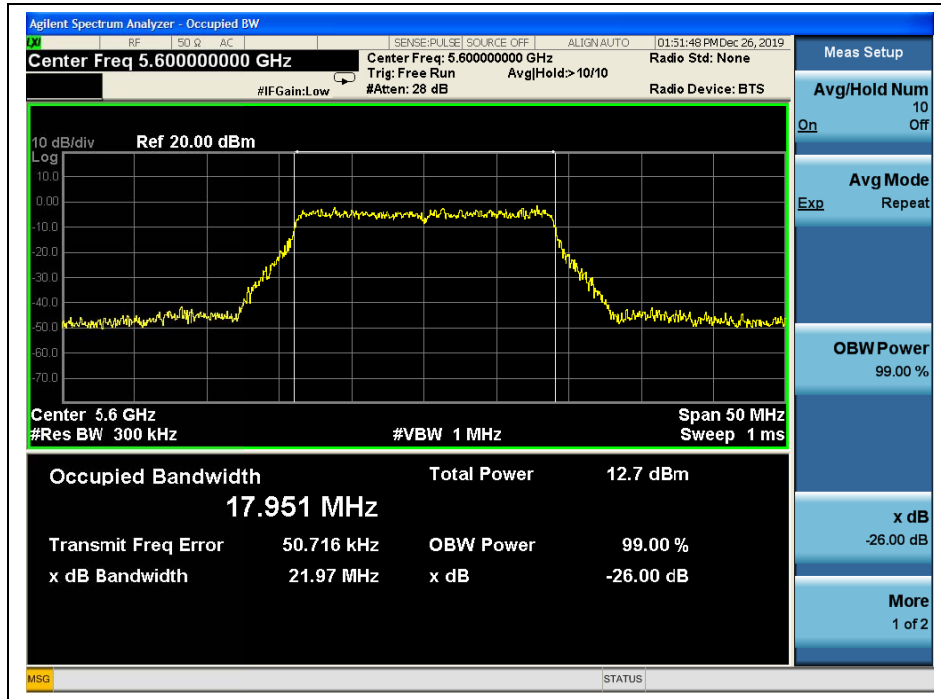
(Channel 60, 5300 MHz, 802.11 ac (VHT20))



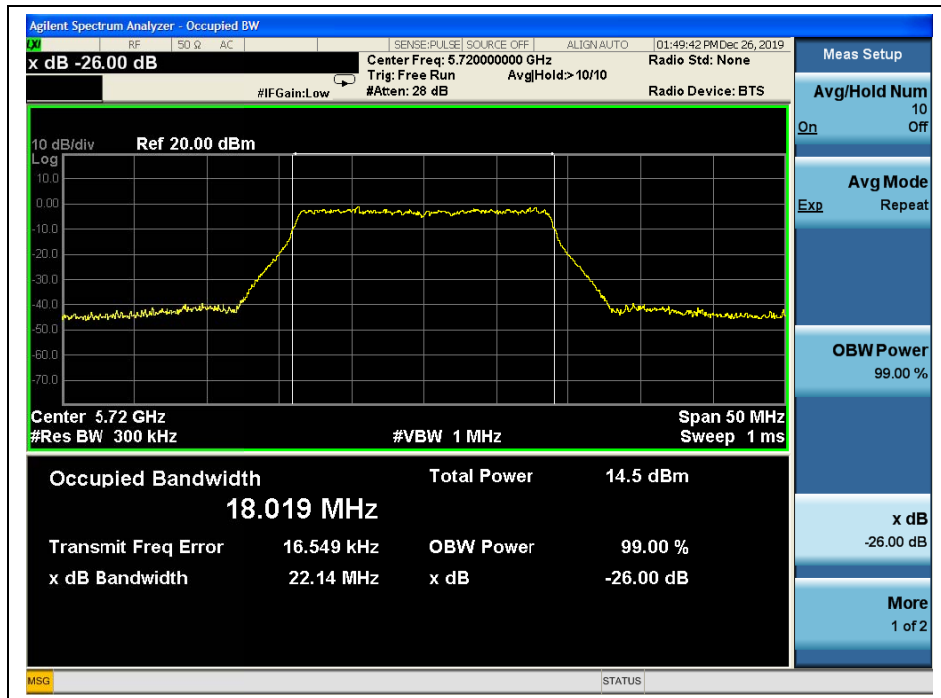
(Channel 64, 5320MHz, 802.11 ac (VHT20))



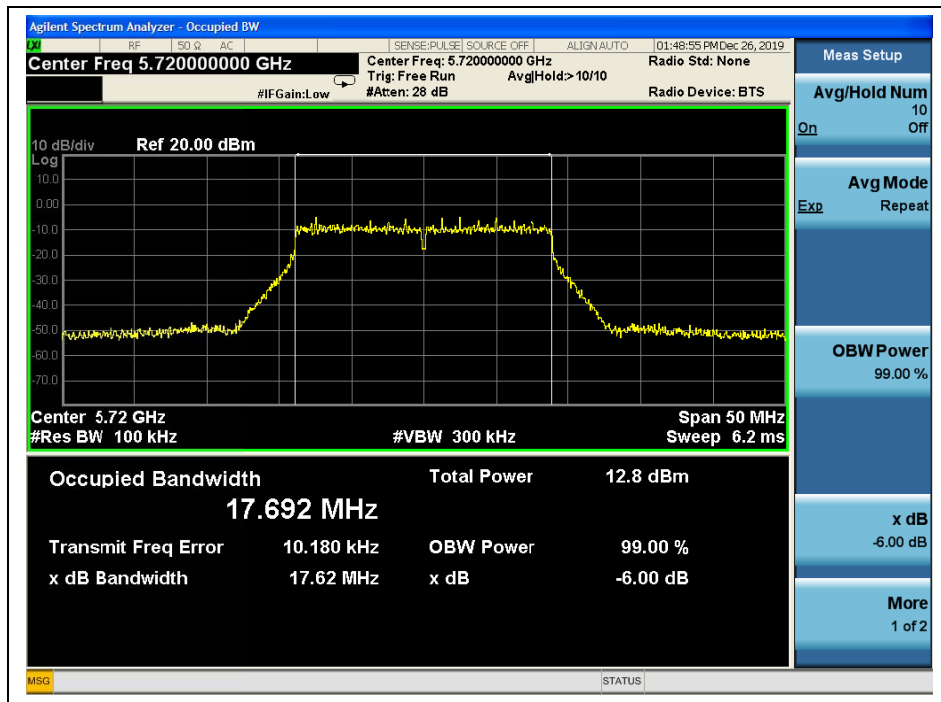
(Channel 100, 5500MHz, 802.11 ac (VHT20))



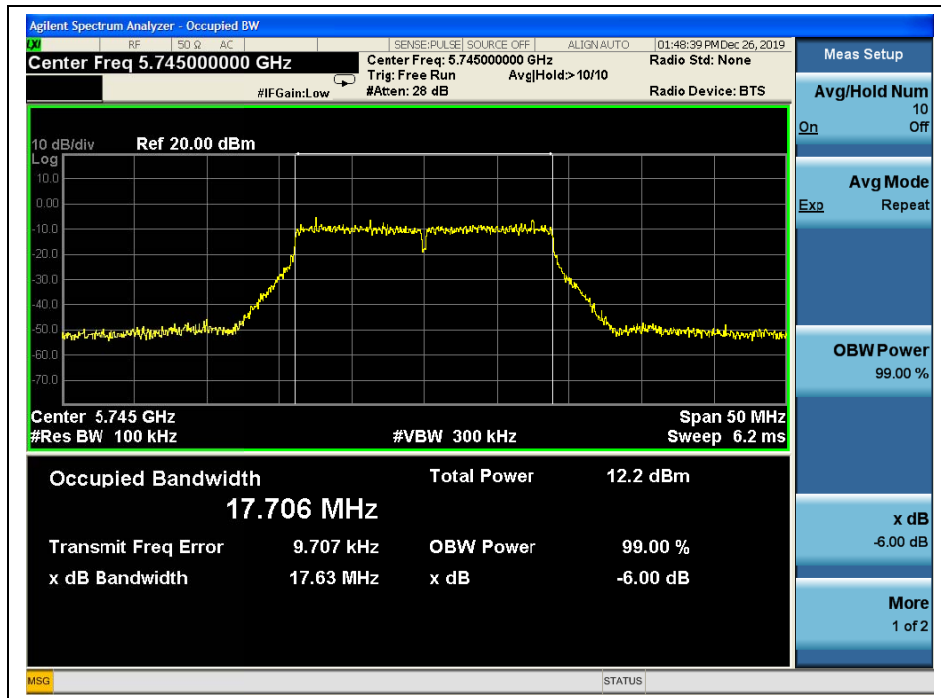
(Channel 120, 5600 MHz, 802.11 ac (VHT20))



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

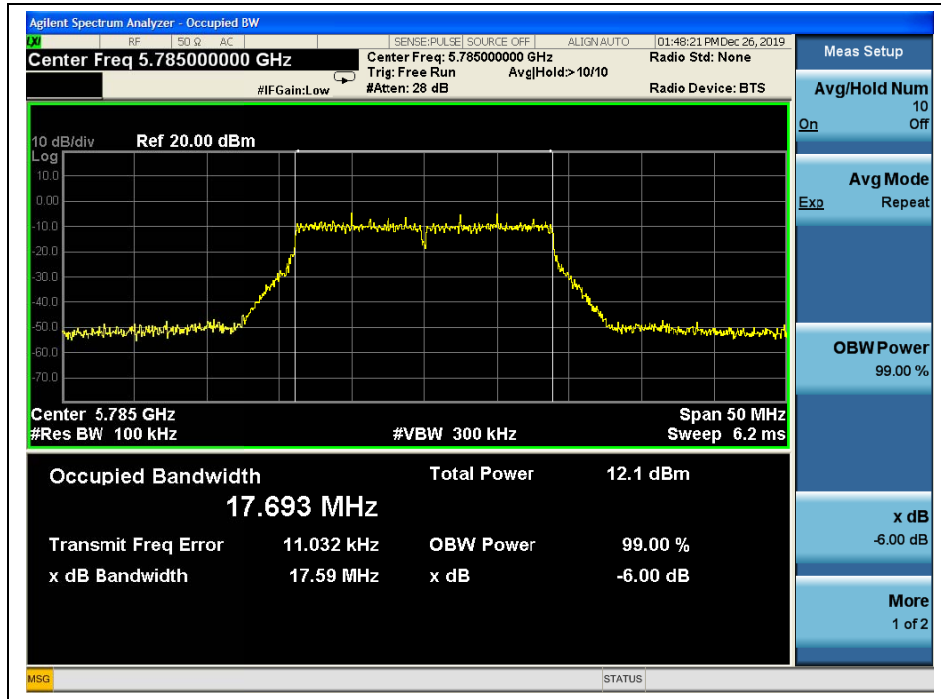


(Channel 144, 5720MHz, 802.11 ac (VHT20))

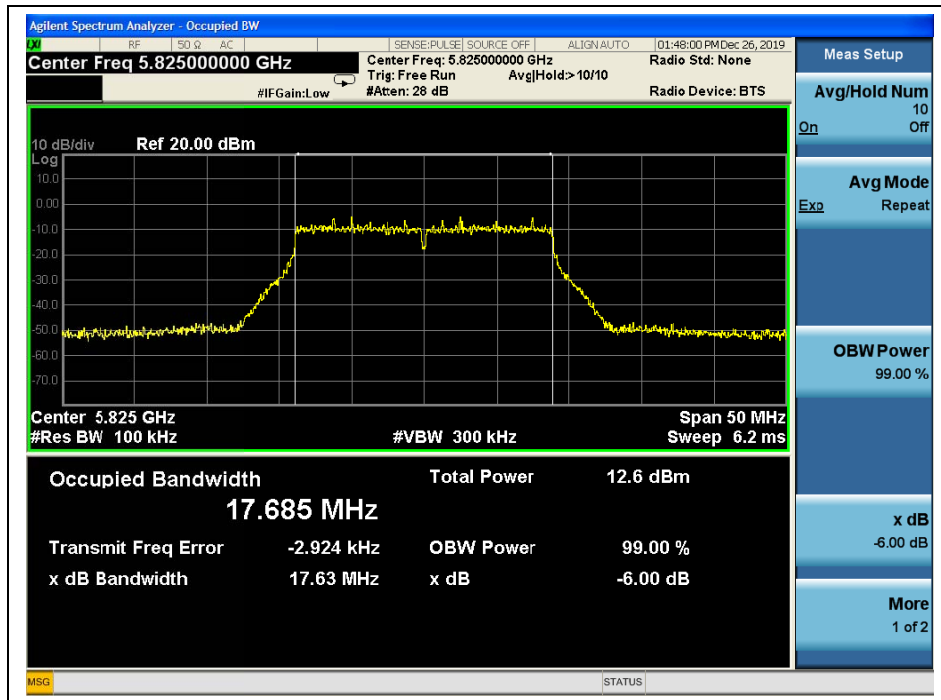


(Channel 149, 5745MHz, 802.11 ac (VHT20))





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



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

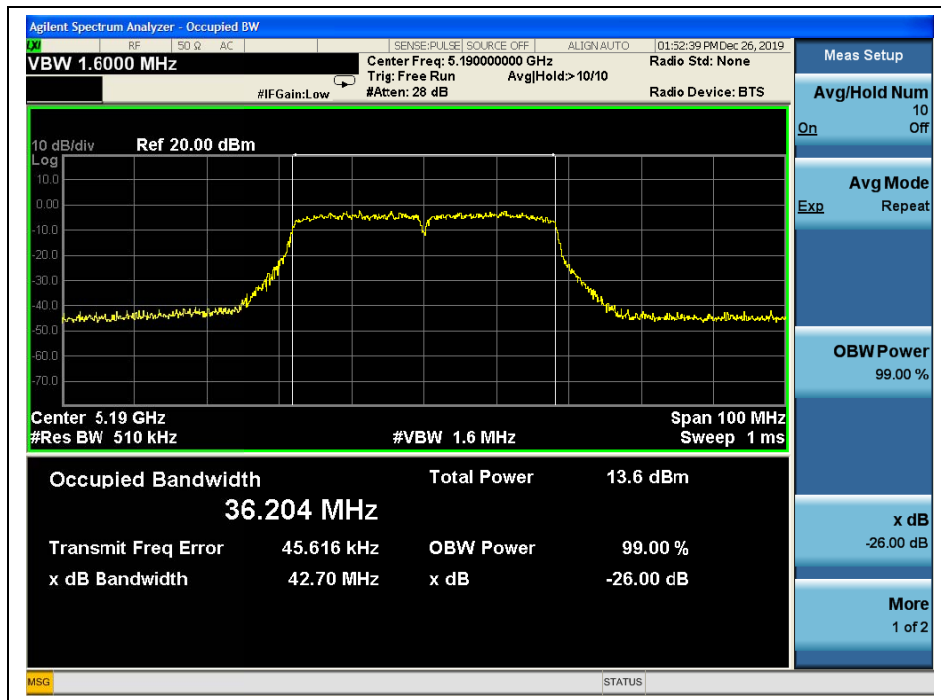


802.11ac (VHT40) Test mode

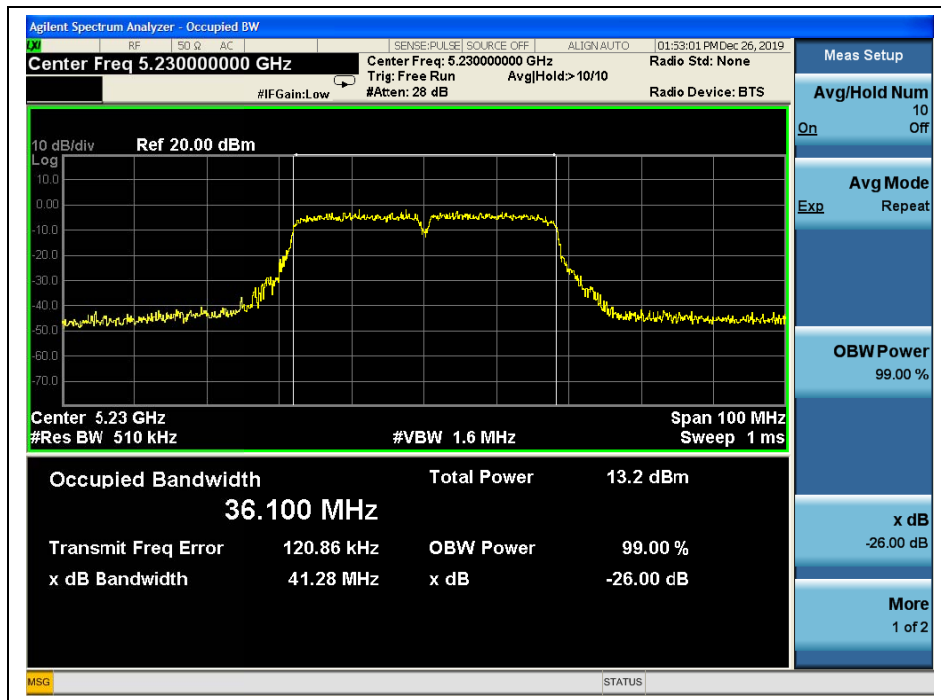
A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
38	5190	42.70
46	5230	41.28
54	5270	41.90
62	5310	42.74
102	5510	42.36
126	5630	41.69
142	5710	41.77
Channel	Frequency (MHz)	6dB Bandwidth (MHz)
142	5710	35.39
151	5755	35.12
159	5795	35.94

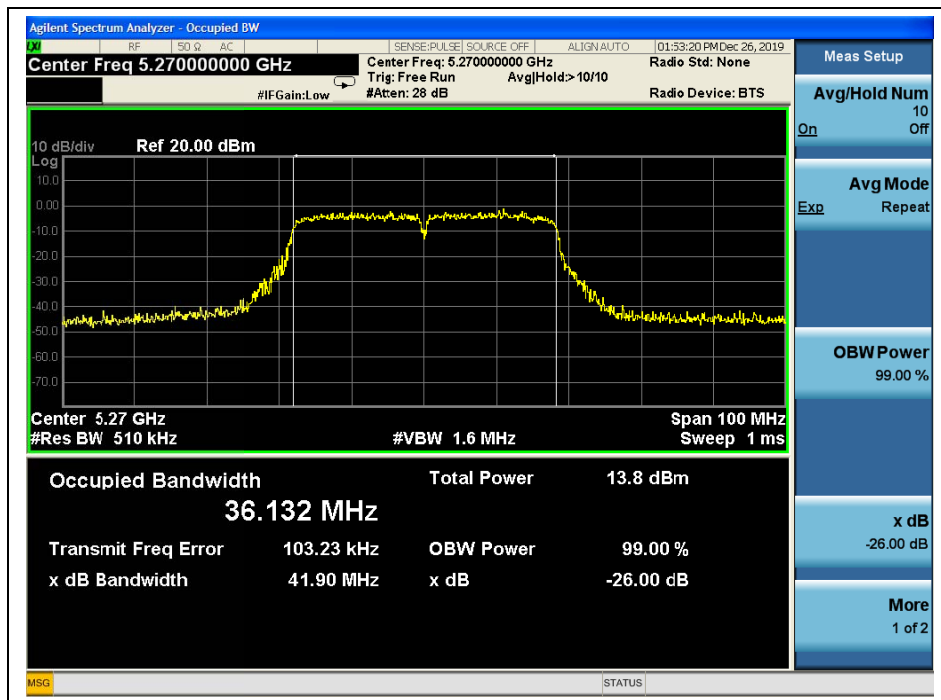
B. Test Plots



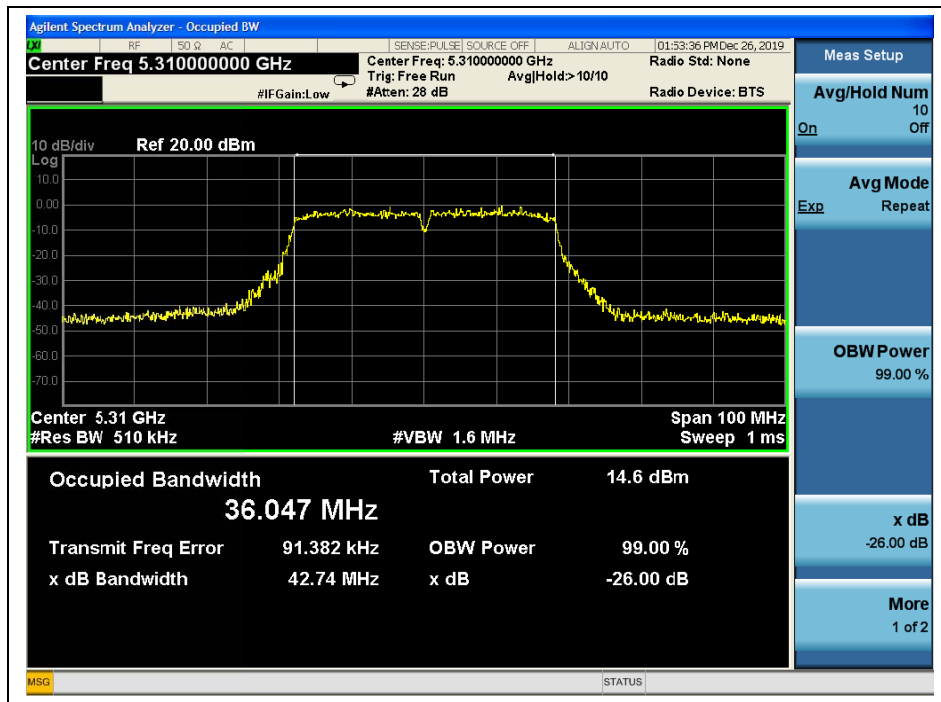
(Channel 38, 5190MHz, 802.11 ac (VHT40))



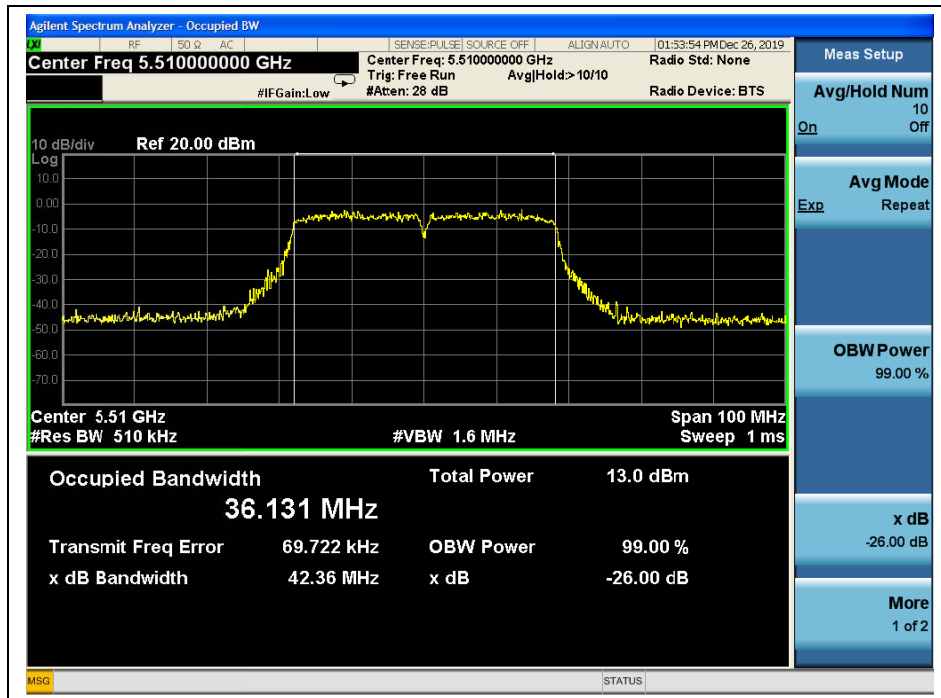
(Channel 46, 5230 MHz, 802.11 ac (VHT40))



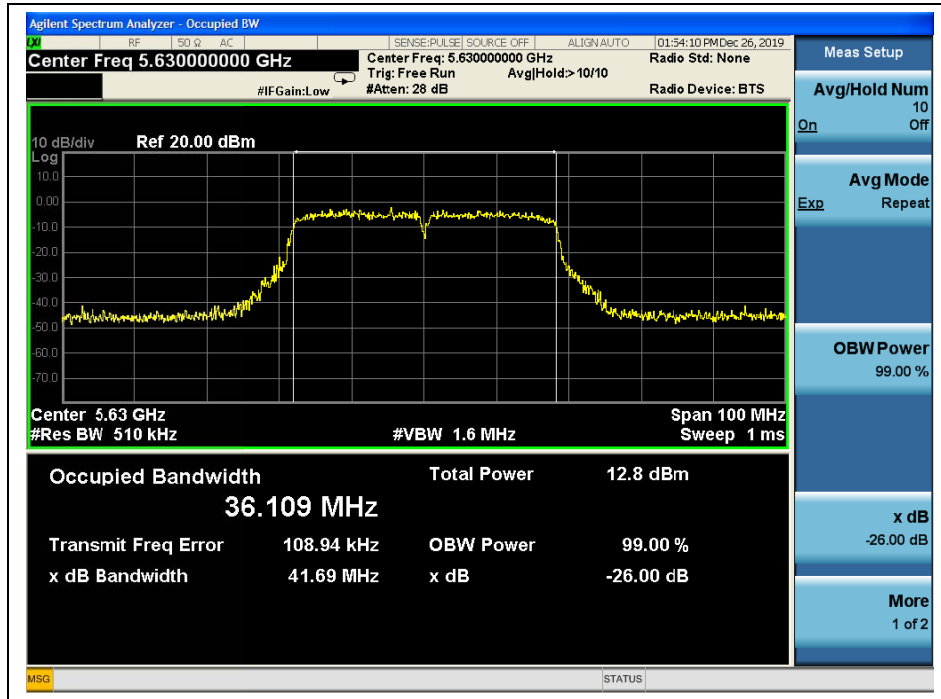
(Channel 54, 5270MHz, 802.11 ac (VHT40))



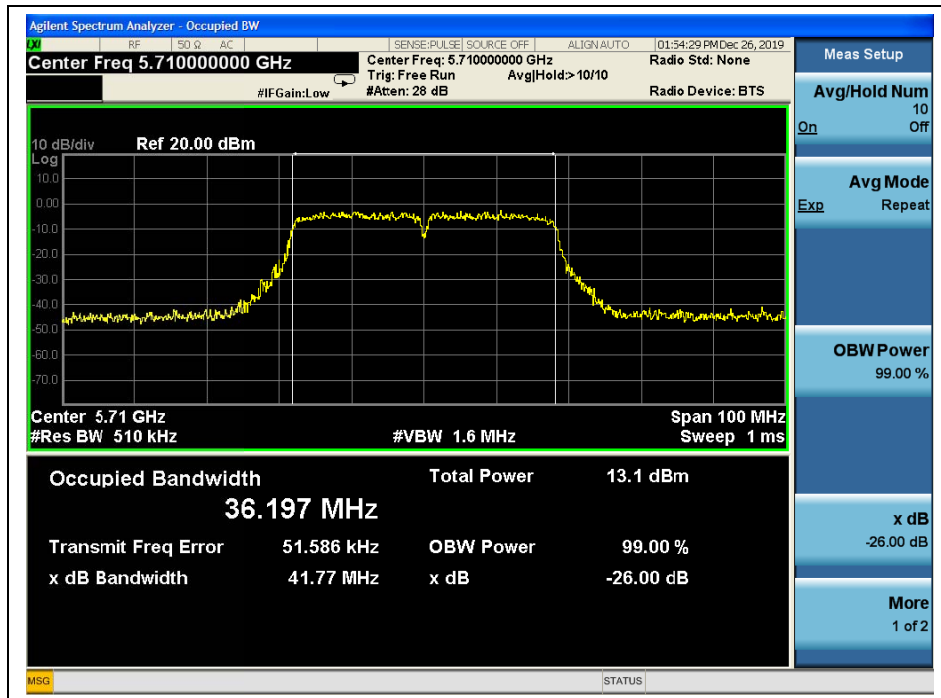
(Channel 62, 5310 MHz, 802.11 ac (VHT40))



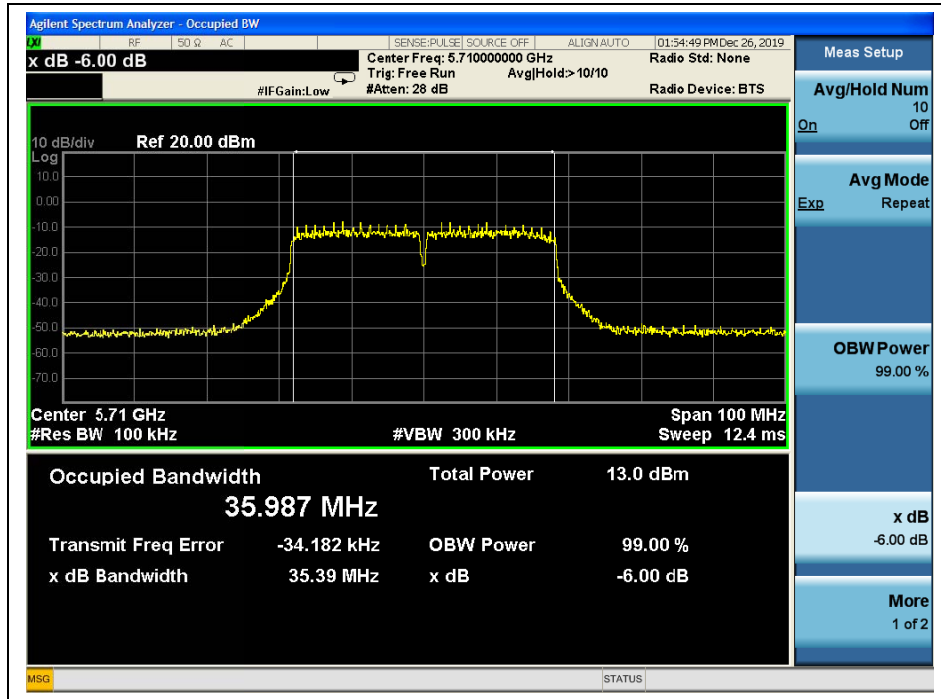
(Channel 102, 5510MHz, 802.11 ac (VHT40))



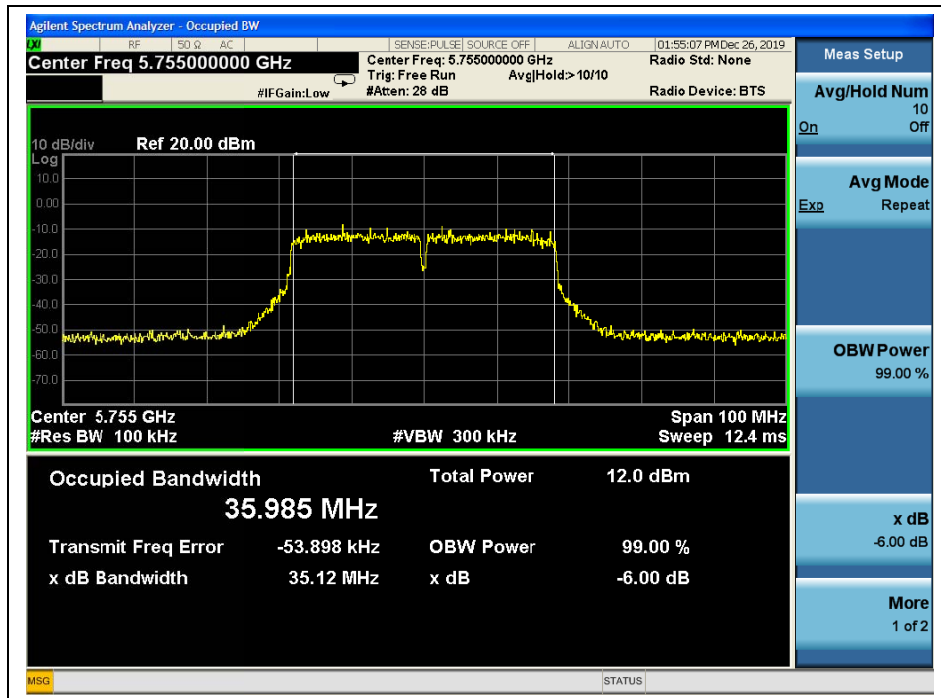
(Channel 126, 5630 MHz, 802.11 ac (VHT40))



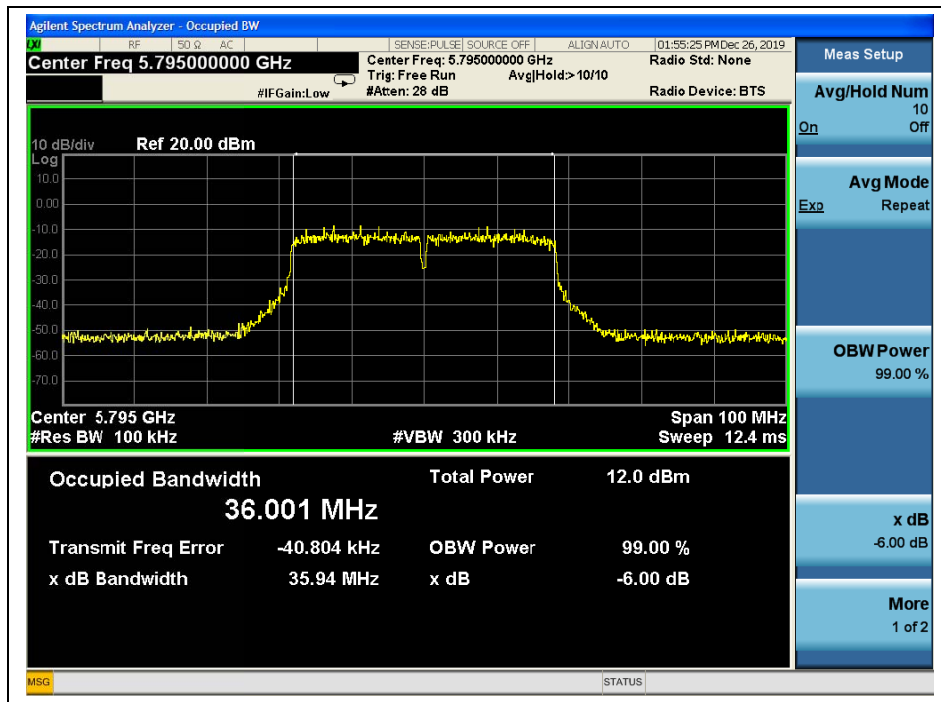
(Channel 142, 5710MHz, 802.11 ac (VHT40))



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



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



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



802.11ac (VHT80) Test mode

A. Test Verdict:

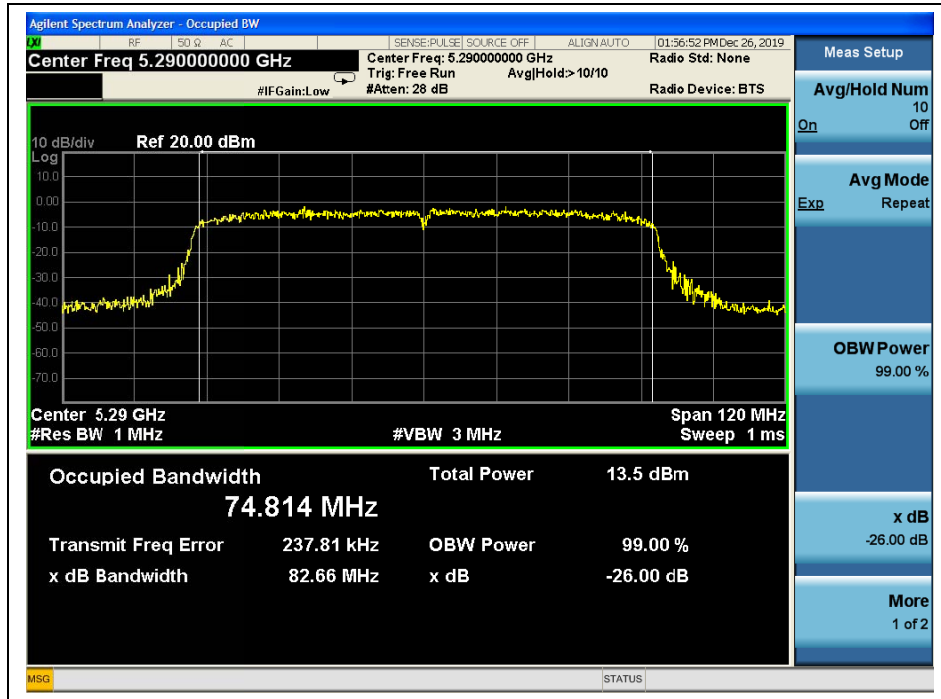
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
42	5210	83.62
58	5290	82.66
106	5530	81.89
122	5610	81.91
138	5690	82.83
Channel	Frequency (MHz)	6dB Bandwidth (MHz)
138	5690	75.07
155	5775	75.02

B. Test Plots

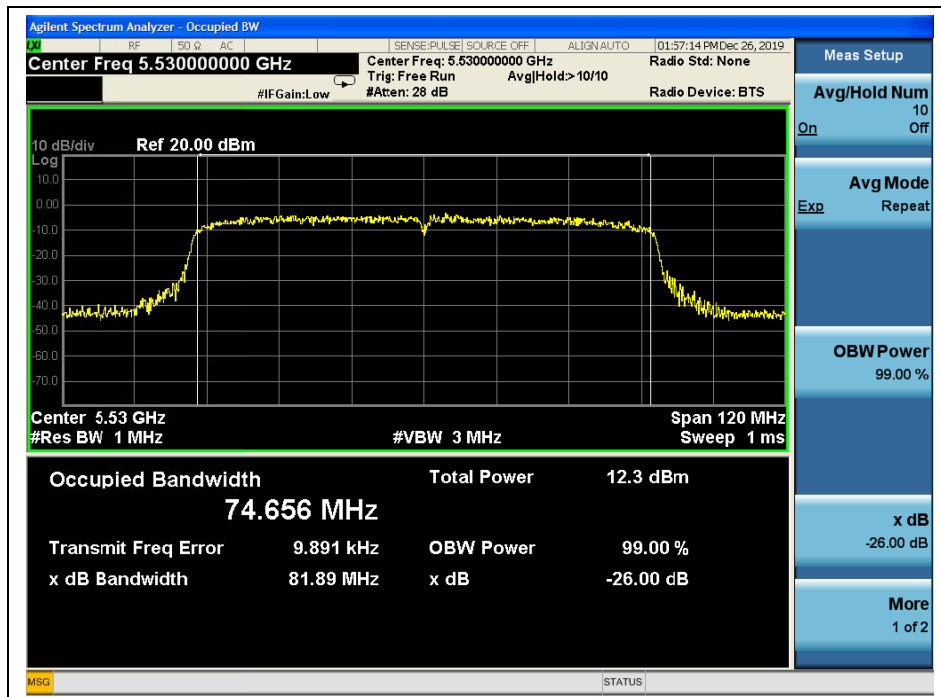


(Channel 42, 5210MHz, 802.11 ac (VHT80))

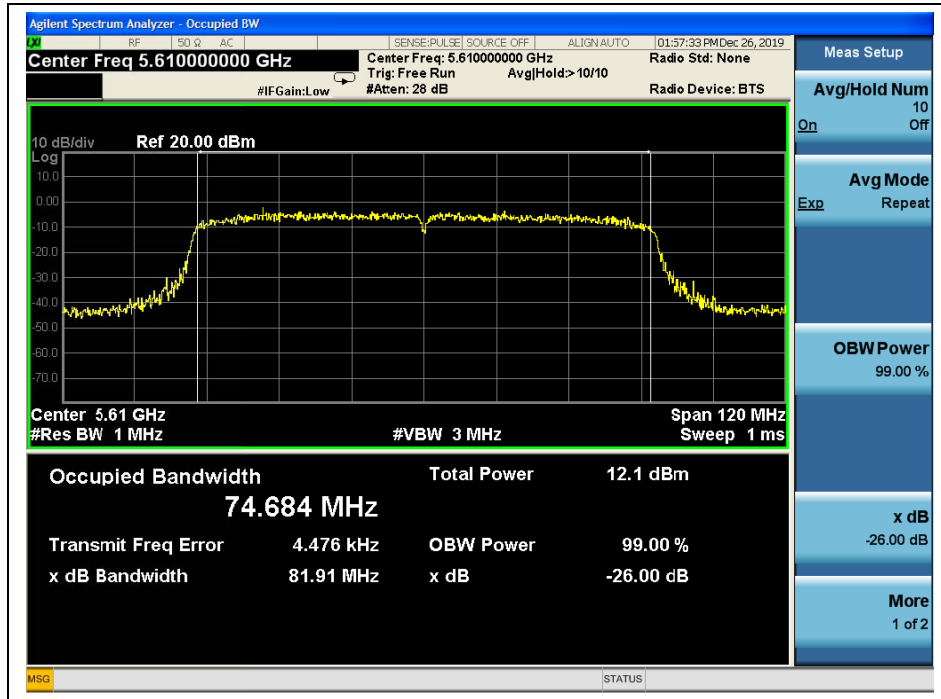




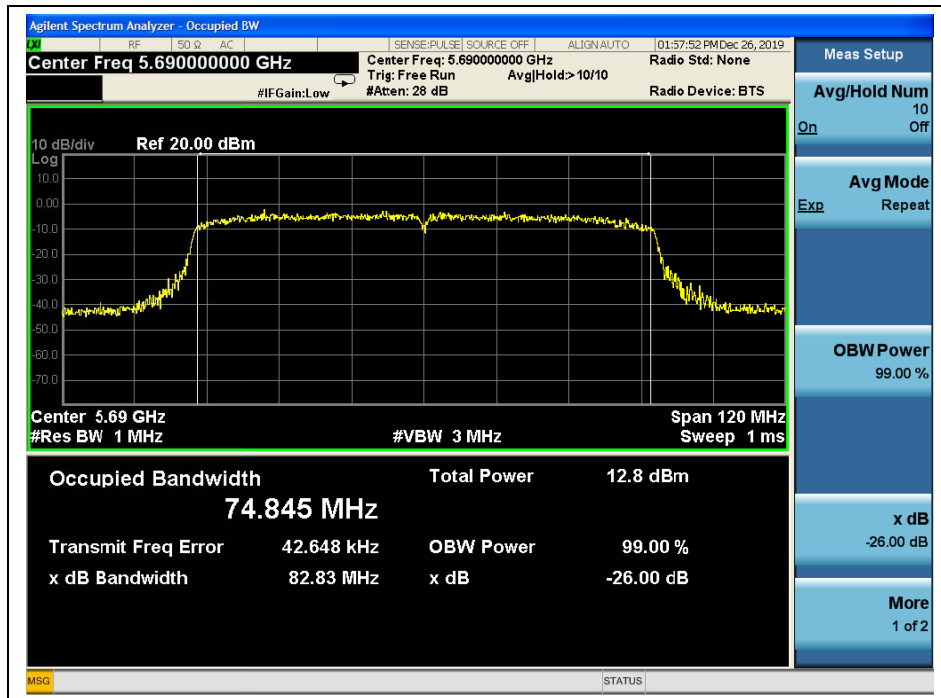
(Channel 58, 5290 MHz, 802.11 ac (VHT80))



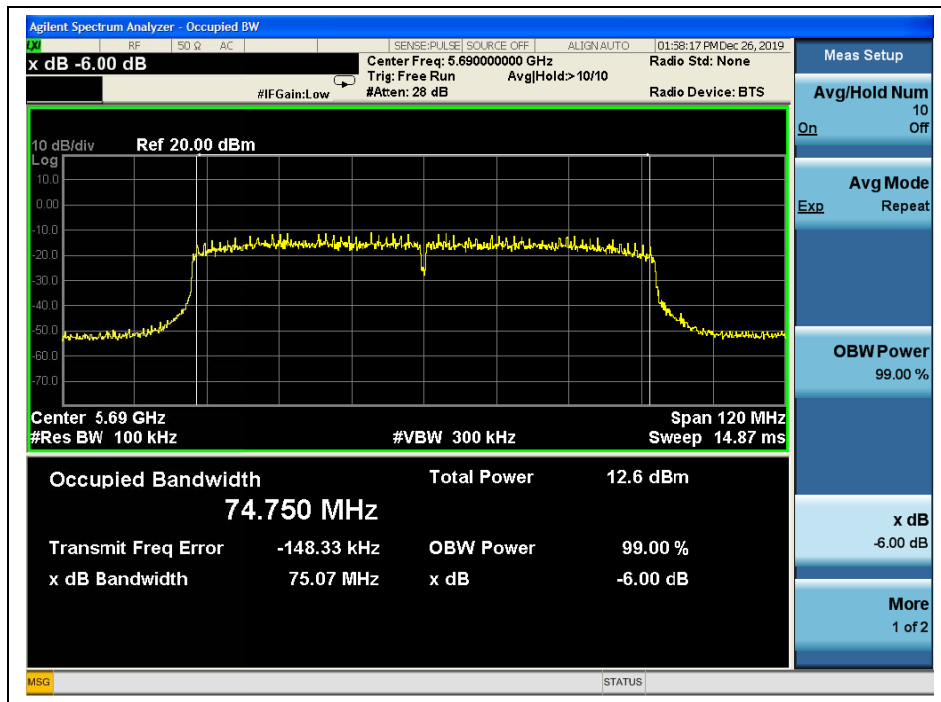
(Channel 106, 5530MHz, 802.11 ac (VHT80))



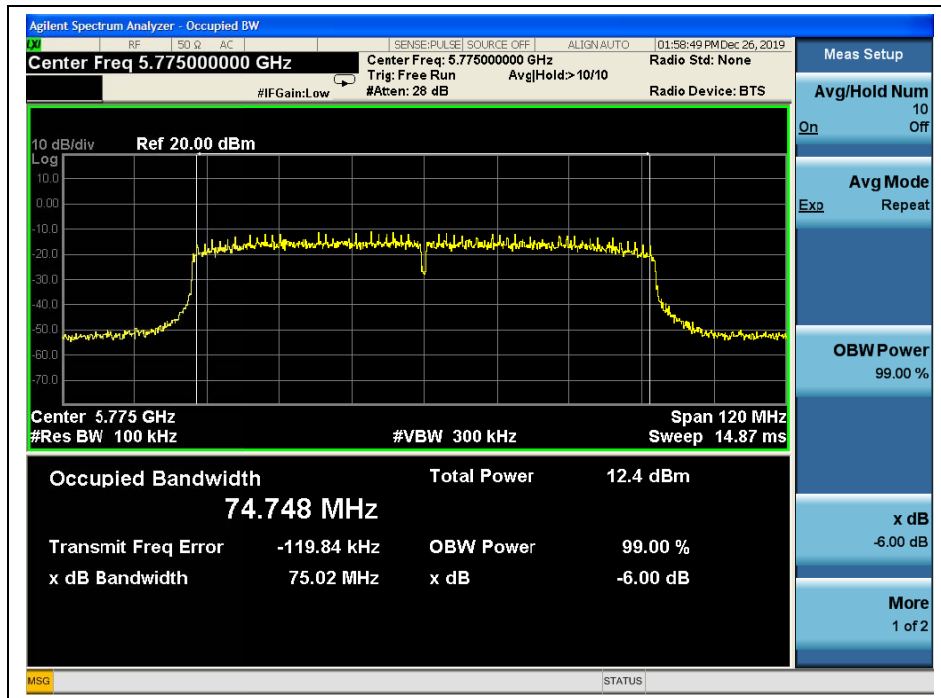
(Channel 122, 5610 MHz, 802.11 ac (VHT80))



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



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



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

## 2.5. Peak Power spectral density

### 2.5.1. Requirement

(1) For client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

(3) For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500KHz band.

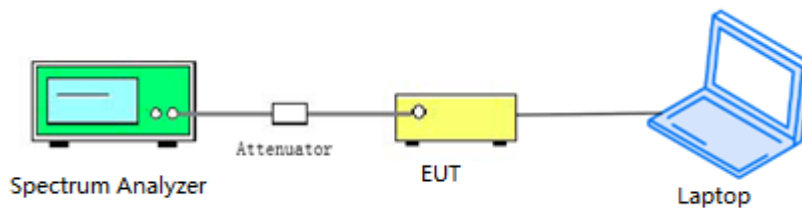
If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(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 =  $G_{ANT} + 10\log(N_{ANT})$  dBi, where  $G_{ANT}$  is the antenna gain in dBi,  $N_{ANT}$  is the number of outputs.

### 2.5.2. Test Description

#### Test Setup:



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.

### 2.5.3. Test Procedure

KDB 789033 Section F) Maximum Power Spectral Density (PSD) Method SA-1 was used in order to prove compliance

- 1) Set span to encompass the entire 26-dB emission bandwidth
- 2) Set RBW = 1 MHz. Set VBW  $\geq$  3 MHz.



- 3) Number of points in sweep  $\geq 2$  Span / RBW. Sweep time = auto.
- 4) Detector = Peak
- 5) Trace mode=Max hold
- 6) Record the max value

**2.5.4. Test Result**

**802.11a Test mode**

**A. Test Verdict:**

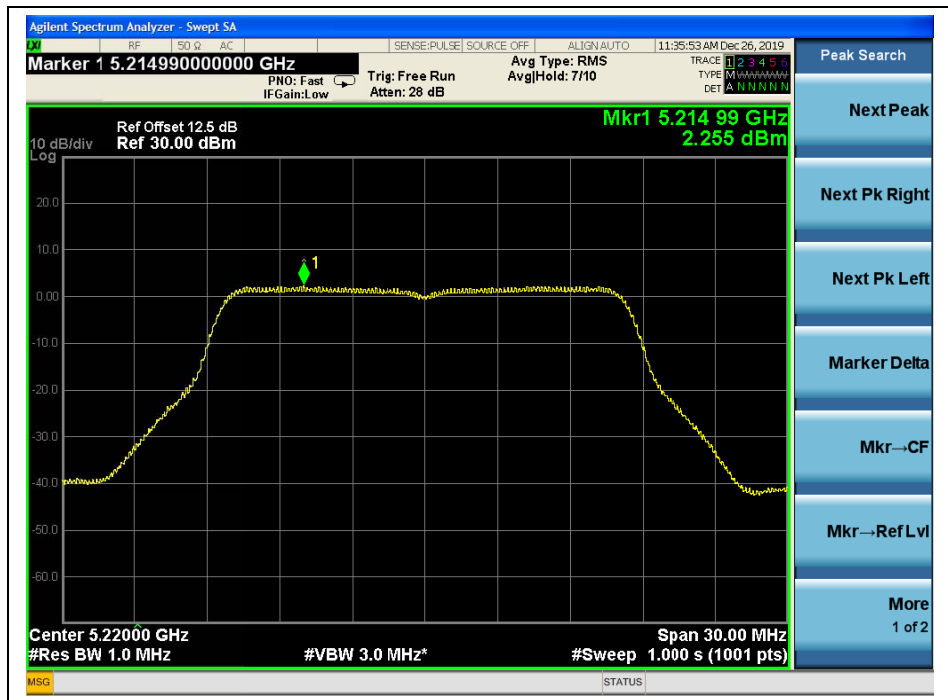
Channel	Frequency (MHz)	Measured PPSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
36	5180	1.83	11	PASS
44	5220	2.26		
48	5240	2.36		
52	5260	2.43		
60	5300	3.03		
64	5320	3.41		
100	5500	1.29		
120	5600	0.90		
144	5720	1.44		
Channel	Frequency (MHz)	Measured PPSD (dBm/500KHz)		
144	5720	-1.55	30	PASS
149	5745	-1.59		
157	5785	-2.15		
165	5825	-2.54		



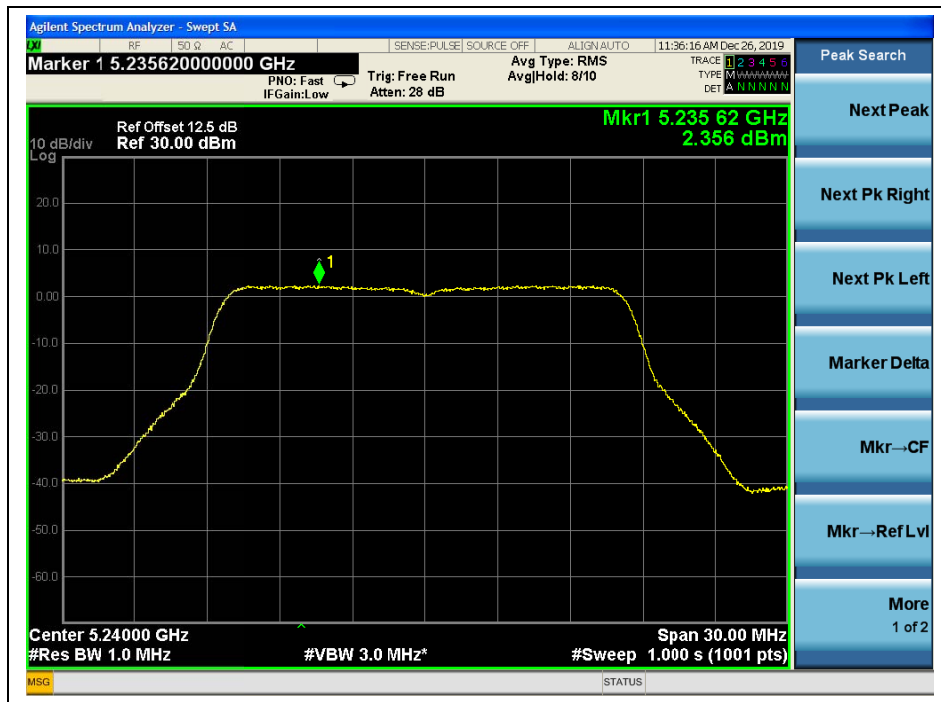
B. Test Plots



(Channel 36, 5180MHz, 802.11a)



(Channel 44, 5220 MHz, 802.11a)



(Channel 48, 5240MHz, 802.11a)



(Channel 52, 5260MHz, 802.11a)



(Channel 60, 5300 MHz, 802.11a)



(Channel 64, 5320MHz, 802.11a)





(Channel 100, 5500MHz, 802.11a)



(Channel 120, 5600 MHz, 802.11a)



(Channel 144, 5720MHz, 802.11a)



(Channel 144, 5720MHz, 802.11a)



(Channel 149, 5745MHz, 802.11a)



(Channel 157, 5785MHz, 802.11a)



(Channel 165, 5825MHz, 802.11a)



**802.11n (HT20) Test mode**

**A. Test Verdict:**

Channel	Frequency (MHz)	Measured PPSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
36	5180	-0.60	11	PASS
44	5220	-0.29		
48	5240	-0.05		
52	5260	-0.07		
60	5300	0.60		
64	5320	0.80		
100	5500	-1.45		
116	5600	-1.67		
144	5720	-1.16		
Channel	Frequency (MHz)	Measured PPSD (dBm/500KHz)	Limit (dBm/500KHz)	Verdict
144	5720	-4.14	30	PASS
149	5745	-4.47		
157	5785	-4.81		
165	5825	-4.88		

**B. Test Plots**



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



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



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



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



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



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

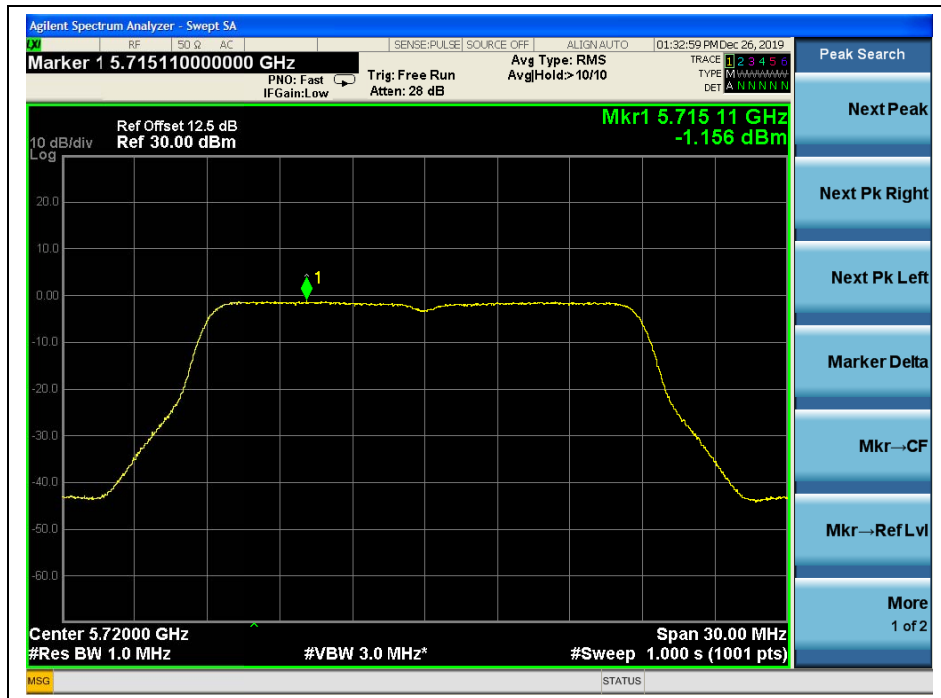


(Channel 100, 5500MHz, 802.11 n (HT20))





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



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



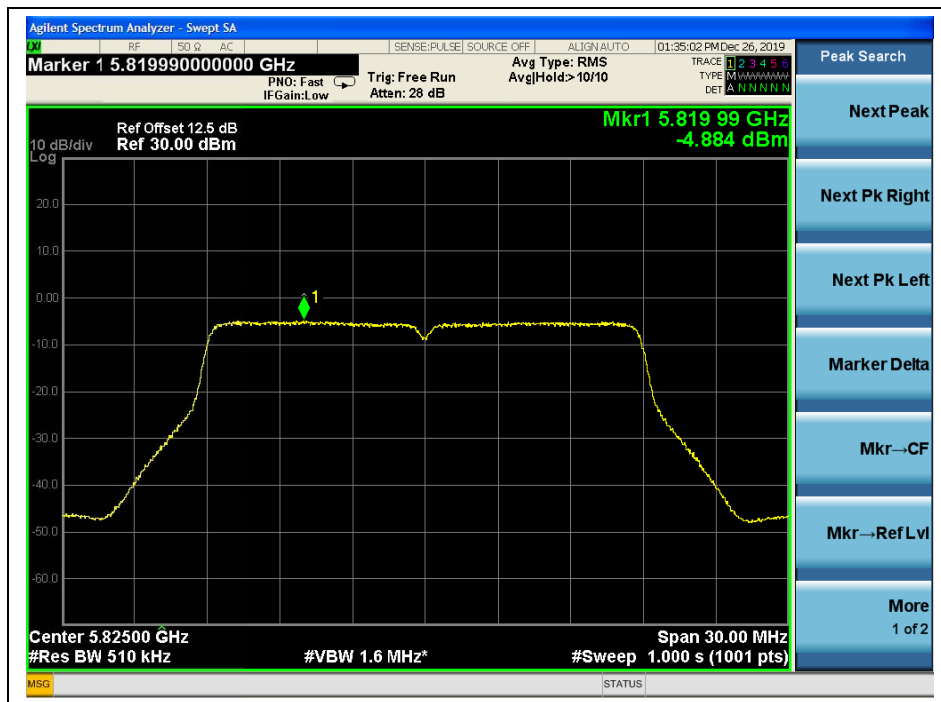
(Channel 144, 5720MHz, 802.11 n (HT20))



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



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



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