



TEST REPORT

APPLICANT : Realme Chongqing Mobile
Telecommunications Corp., Ltd.

PRODUCT NAME : Mobile Phone

MODEL NAME : RMX3363

BRAND NAME : realme

FCC ID : 2AUYFRMX3363

STANDARD(S) : 47 CFR Part 15 Subpart E

RECEIPT DATE : 2021-05-19

TEST DATE : 2021-05-27 to 2021-07-22

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Change History		
Version	Date	Reason for change
1.0	2021-07-23	First edition



1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Realme Chongqing Mobile Telecommunications Corp., Ltd.
Applicant Address:	No.178 Yulong Avenue, Yufengshan, Yubei District, Chongqing, China
Manufacturer:	Realme Chongqing Mobile Telecommunications Corp., Ltd.
Manufacturer Address:	No.178 Yulong Avenue, Yufengshan, Yubei District, Chongqing, China

1.2. Equipment Under Test (EUT) Description

Product Name:	Mobile Phone
Sample No.:	54#
Hardware Version:	11
Software Version:	realme UI V2.0
Modulation Technology:	OFDM, OFDMA
Modulation Mode:	802.11a, 802.11n (HT20), 802.11n (HT40) 802.11ac (VHT20), 802.11ac (VHT40), 802.11ac (VHT80) , 802.11ac (VHT160) 802.11ax (HEW20), 802.11ax (HEW40), 802.11ax (HEW80) , 802.11ax (HEW160)
Operating Frequency Range:	5180MHz-5240MHz; 5260MHz-5320MHz; 5500MHz-5700MHz; 5745MHz-5825MHz
Channel Number:	Refer to 1.3
Antenna Type:	PIFA Antenna
Antenna Gain:	ANT 0: -3.5dBi; ANT 1: -5.0dBi
Directional Gain:	-0.49dBi _{Note 2}



Accessory Information:	Battery	
	Brand Name:	realme
	Model No.:	BLP809
	Serial No.:	(N/A, marked #1 by test site)
	Capacity:	Typical: 2150mAh, Rated: 2100mAh
	Rated Voltage:	7.74V
	Charge Limit:	8.90V
	Manufacturer:	SUNWODA Electronic Co., Ltd.
	AC Adapter 1	
	Brand Name:	realme
	Model No.:	VCA7JAUH
	Serial No.:	(N/A, marked #1 by test site)
	Rated Output:	5V \Rightarrow 2A; 10V \Rightarrow 5A
	Rated Input:	100-130V \sim 50/60Hz, 1.8A
	Rated Output:	5V \Rightarrow 2A; 10V \Rightarrow 6.5A
	Rated Input:	200-240V \sim 50/60Hz, 1.8A
	Manufacturer:	HUIZHOU GOLDEN LAKE INDUSTRIAL CO., LTD
	AC Adapter 2	
	Brand Name:	realme
	Model No.:	VCA7JDUH
	Serial No.:	(N/A, marked #1 by test site)
	Rated Output:	5V \Rightarrow 2A; 10V \Rightarrow 5A
	Rated Input:	100-130V \sim 50/60Hz, 1.8A
	Rated Output:	5V \Rightarrow 2A; 10V \Rightarrow 6.5A
	Rated Input:	200-240V \sim 50/60Hz, 1.8A
	Manufacturer:	HUIZHOU GOLDEN LAKE INDUSTRIAL CO., LTD
	AC Adapter 3	
	Brand Name:	realme
	Model No.:	VCA7HAUH
	Serial No.:	(N/A, marked #1 by test site)
	Rated Output:	5V \Rightarrow 2A; 10V \Rightarrow 5A
	Rated Input:	100-130V \sim 50/60Hz, 1.8A
	Rated Output:	5V \Rightarrow 2A; 10V \Rightarrow 6.5A
	Rated Input:	200-240V \sim 50/60Hz, 1.8A
	Manufacturer:	SHENZHEN HUNTKEY ELECTRIC CO., LTD.



Accessory Information:	USB Cable	
	Model No.:	DL129
	Earphone	
	Model No.:	MH156
	Length:	1.2m

Note 1: The EUT supports a MIMO function. Physically, the EUT provides two completed transmitters and two receivers for 802.11n, 802.11ac and 802.11ax modulation mode.

Modulation Mode:	TX Function
802.11n	2TX
802.11ac	2TX
802.11ax	2TX

Note 2: 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 3: For conducted test item 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 (ANT0) in this report.

Note 4: All radiation test items for 802.11n, 802.11ac and 802.11ax 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 5: WIFI hotspot only support U-NII-3 band.

Note 6: We use the dedicated software to control the EUT continuous transmission.

Note 7: 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)
OFDM (802.11a)	BPSK	6 / 9
	QPSK	12 / 18
	16QAM	24 / 36
	64QAM	48 / 54
OFDM (802.11n (HT20))	BPSK	6.5
	QPSK	13/19.5
	16QAM	26/39
	64QAM	52/58.5/65
OFDM (802.11n (HT40))	BPSK	13.5
	QPSK	27/40.5
	16QAM	54/81
	64QAM	108/121.5/135
OFDM (802.11ac (VHT20))	BPSK	6.5
	QPSK	13.0/19.5
	16QAM	26.0/39.0
	64QAM	52.0/58.5/65.0
	256QAM	78.0
OFDM (802.11ac (VHT40))	BPSK	13.5
	QPSK	27.0/40.5
	16QAM	54.0/81.0
	64QAM	108.0/121.5/135.0
	256QAM	162.0/180.0
OFDM (802.11ac (VHT80))	BPSK	29.3
	QPSK	58.5/87.8
	16QAM	117.0/175.5
	64QAM	234.0/263.3/292.5
	256QAM	351.0/390.0
OFDM (802.11ac (VHT160))	BPSK	58.5
	QPSK	117.0/175.5
	16QAM	234.0/351
	64QAM	468/585
	256QAM	702/780



Modulation Technology	Modulation Type	Data Rate (Mbps)
OFDMA (802.11ax(HEW20))	BPSK	8.6
	QPSK	17.2/25.8
	16QAM	34.4/51.6
	64QAM	68.8/77.4/86
	256QAM	103.2/114.7
	1024QAM	129/143.4
	4096QAM	154.8/172.1
OFDMA (802.11 ax(HEW40))	BPSK	17.2
	QPSK	34.4/51.6
	16QAM	68.8/103.2
	64QAM	137.6/154.9/172.1
	256QAM	206.5/229.4
	1024QAM	258.1/286.8
	4096QAM	309.7/344.2
OFDMA (802.11 ax(HEW80))	BPSK	36.0
	QPSK	72.1/108.1
	16QAM	144.1/216.2
	64QAM	288.2/324.3/360.3
	256QAM	432.4/480.4
	1024QAM	540.4/600.5
	4096QAM	648.5/720.6
OFDMA (802.11 ax(HEW160))	BPSK	68
	QPSK	136/204
	16QAM	272/408
	64QAM	544/681
	256QAM	817/907
	1024QAM	1021/1034
	4096QAM	1225/1241

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

(U-NII-1) 5180MHz-5240MHz				
Bandwidth	Channel	Frequency (MHz)	Channel	Frequency (MHz)
20MHz	36	5180	40	5200
	44	5220	48	5240
40MHz	38	5190	46	5230
80MHz	42	5210		
(U-NII-2A) 5260MHz-5320MHz				
Bandwidth	Channel	Frequency (MHz)	Channel	Frequency (MHz)
20MHz	52	5260	56	5280
	60	5300	64	5320
40MHz	54	5270	62	5310
80MHz	58	5290		
160MHz	50	5250		
(U-NII-2C) 5500MHz-5700MHz				
Bandwidth	Channel	Frequency (MHz)	Channel	Frequency (MHz)
20MHz	100	5500	105	5520
			112	5560
			120	5600
			128	5640
			136	5680
		140	5700	
40MHz	102	5510	110	5550
			126	5630
		134	5670	
80MHz	106	5530	122	5610
160MHz	114	5570		
(U-NII-3) 5745MHz-5825MHz				
Bandwidth	Channel	Frequency (MHz)	Channel	Frequency (MHz)
20MHz	149	5745	153	5765
	157	5785	161	5805
	165	5825		
40MHz	151	5775	159	5795
80MHz	155	5775		

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	Jun 08&15, 2021	Su Xiaoxian	PASS	No deviation
3	15.407(a)	Maximum Conducted Output Power	Jun 29, 2021 Jul 22, 2021	Liu Bo	PASS	No deviation
4	15.407(a)(e)	Emission Bandwidth	Jun 14, 2021 Jul 22, 2021	Su Xiaoxian	PASS	No deviation
5	15.407(a)	Peak Power Spectral Density	Jun 14, 2021 Jul 22, 2021	Su Xiaoxian	PASS	No deviation
6	15.407(g)	Frequency Stability	Jun 14, 2021	Su Xiaoxian	PASS	No deviation
7	15.207	Conducted Emission	Mar 27, 2021	Wu Runfeng	PASS	No deviation
8	15.407(b)	Restricted Frequency Bands	Jun 22, 2021 Jul 01, 2021	Huang Zhiye	PASS	No deviation
9	15.407(b)	Radiated Emission	Jun 18, 2021 Jul 22, 2021	Huang Zhiye	PASS	No deviation

Note 1: The DFS test report was documented in a separate report (Report No.: SZ21040341W05).

Note 2: The tests of Conducted Emission and Radiated Emission were performed according to the method of measurements prescribed in ANSI C63.102013.

Note 3: These RF tests were performed according to the method of measurements prescribed in KDB789033 D02 v02r01.



Note 4: The path loss during the RF test is calibrated to correct the results by the offset setting in the test equipments. The ref offset 11.5dB contains two parts that cable loss 1.5dB 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.

Note 6: When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% confidence intervals.

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. Test Result: Compliant

Inside of the EUT has a PIFA antenna coupled with the metal shrapnel. Please refer to the EUT internal photos.

2.2. Duty Cycle of the Test Signal

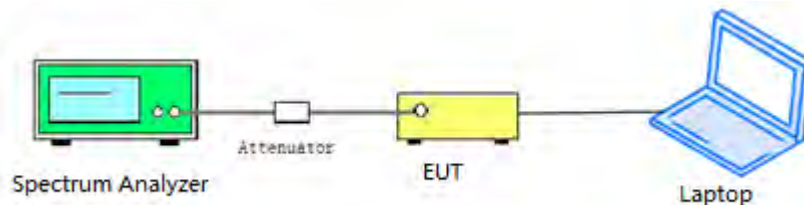
2.2.1. Requirement

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 sub clause, 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.

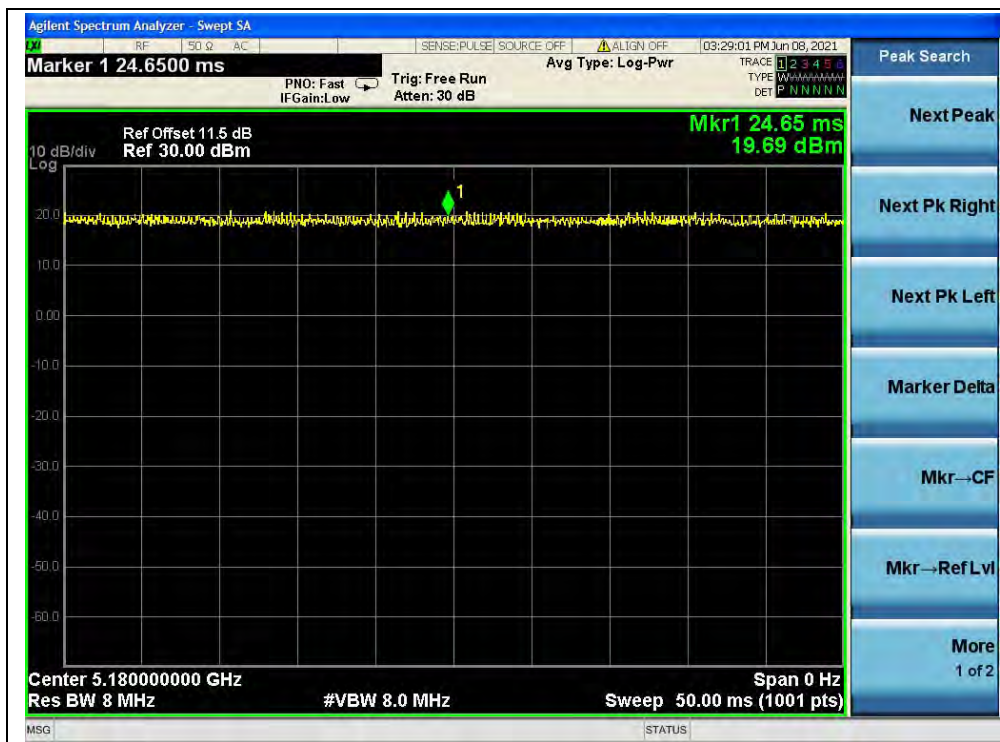


2.2.4. Test Result

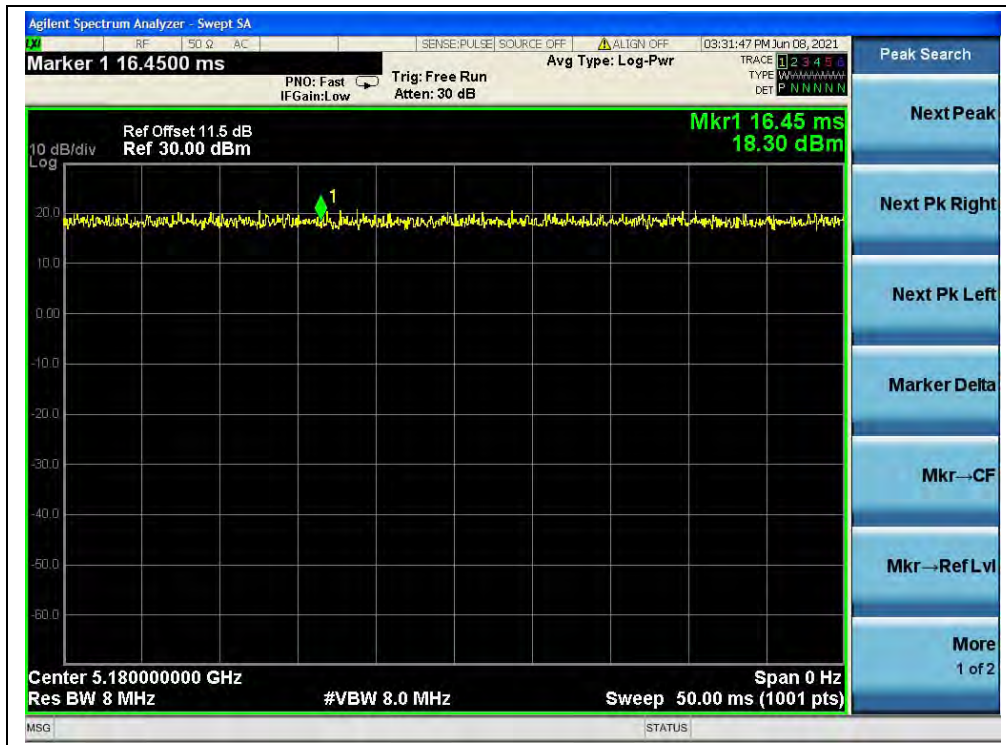
A. Test Verdict:

Test Mode	Duty Cycle (%) (D)	Duty Factor (10*log[1/D])
802.11a	100.00	0.00
802.11n(HT20)	100.00	0.00
802.11n(HT40)	100.00	0.00
802.11ac(VHT20)	100.00	0.00
802.11ac(VHT40)	100.00	0.00
802.11ac(VHT80)	100.00	0.00
802.11ac(VHT160)	100.00	0.00
802.11ax(HEW20)	100.00	0.00
802.11ax(HEW20) RU26	100.00	0.00
802.11ax(HEW20) RU52	100.00	0.00
802.11ax(HEW20) RU106	100.00	0.00
802.11ax(HEW40)	100.00	0.00
802.11ax(HEW80)	100.00	0.00
802.11ax(HEW160)	100.00	0.00

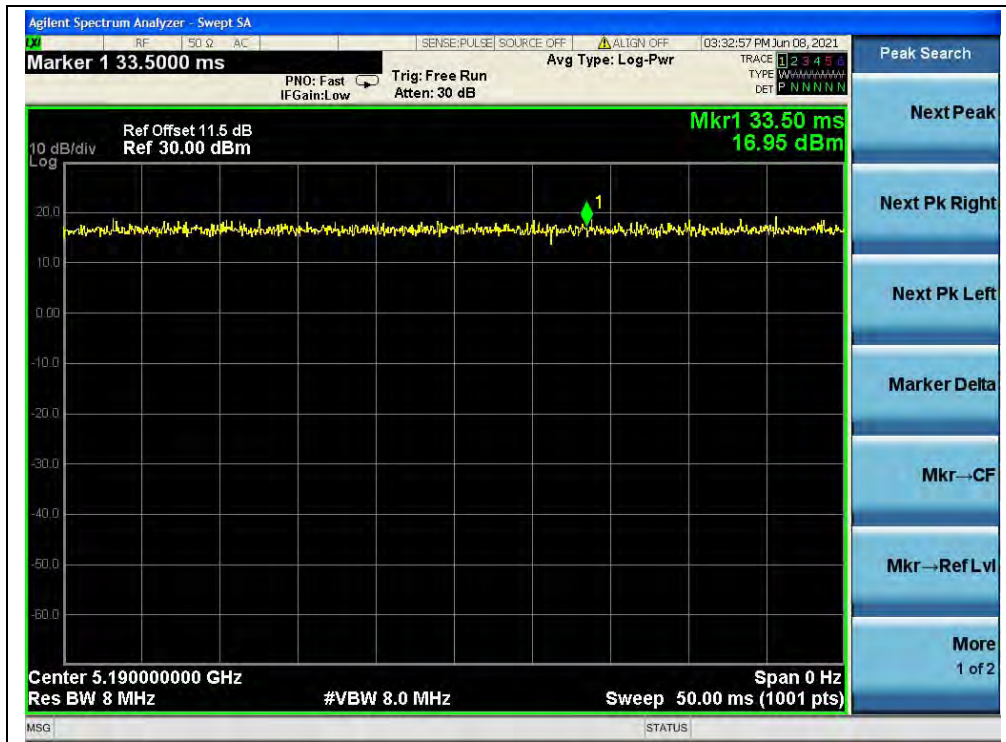
B. Test Plot:



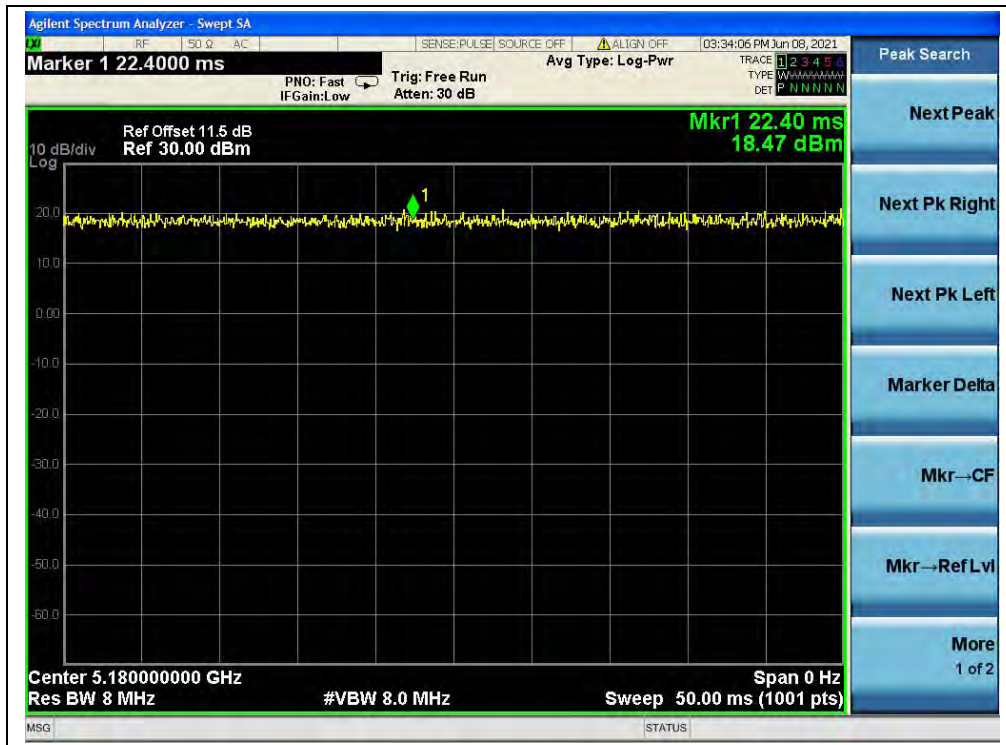
(Channel 36, 5180MHz, 802.11a)



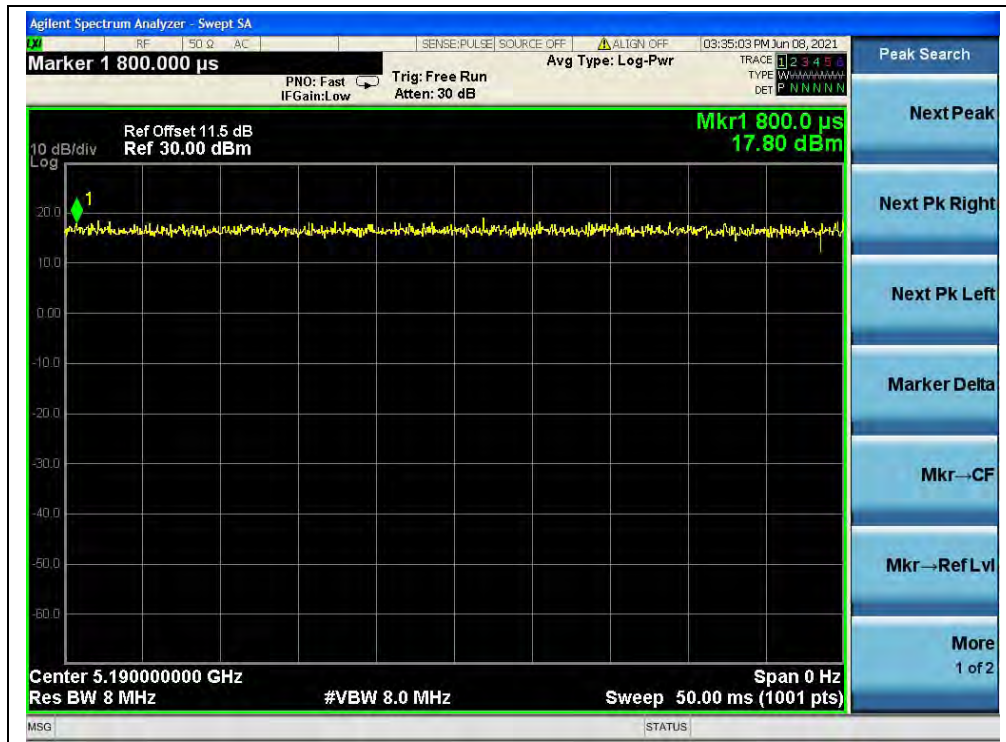
(Channel 36, 5180MHz, 802.11n (HT20))



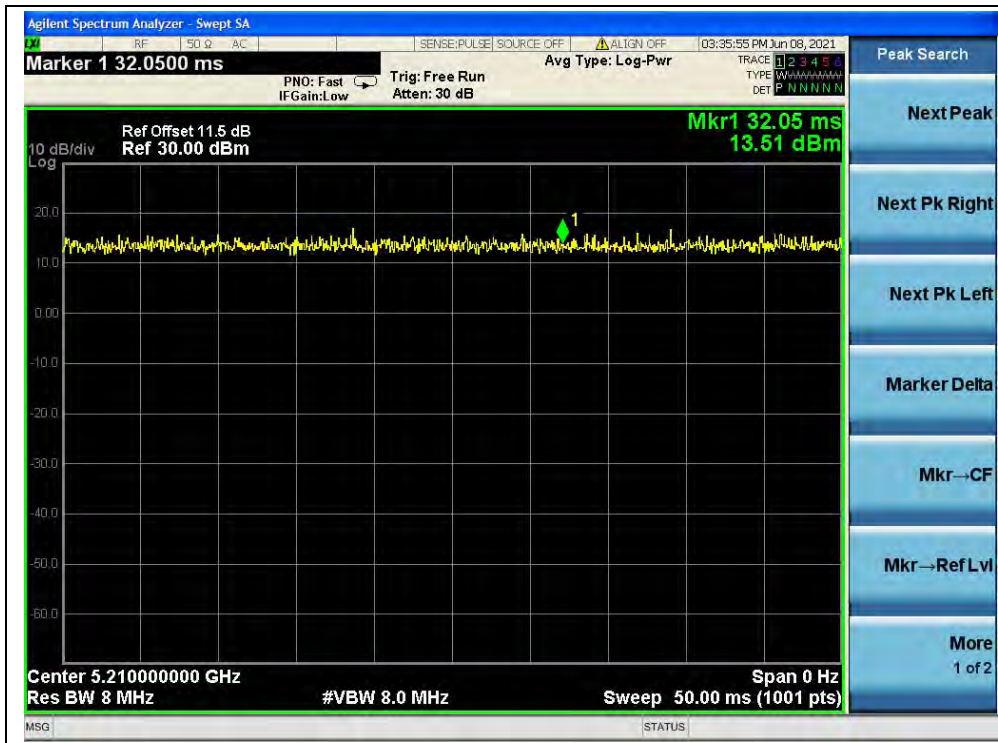
(Channel 38, 5190MHz, 802.11n (HT40))



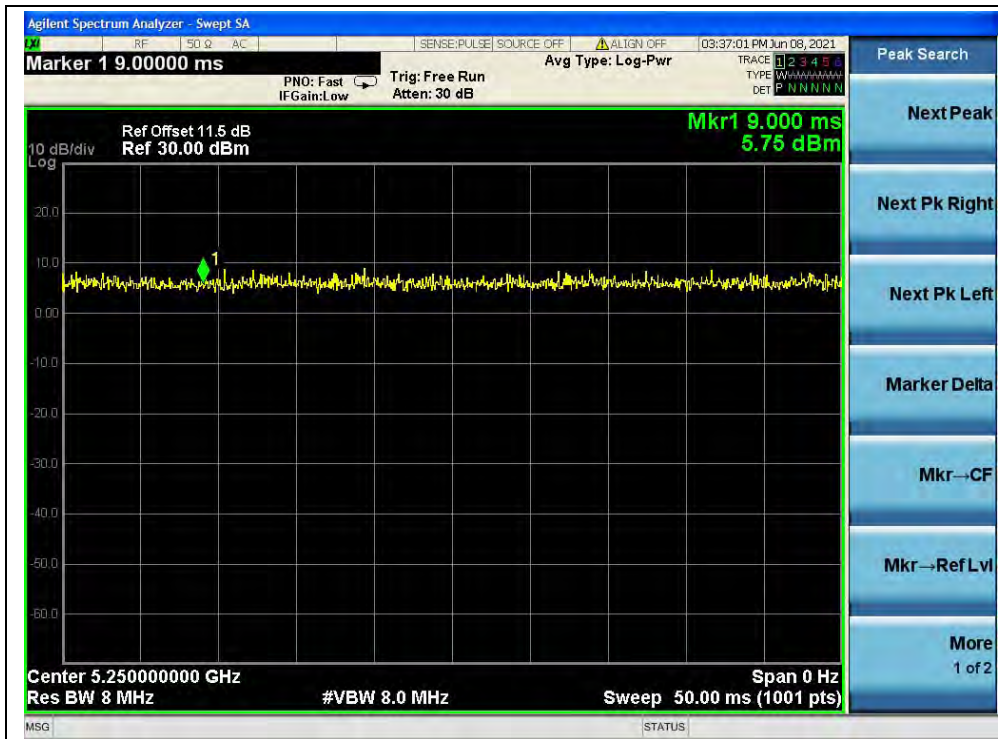
(Channel 36, 5180MHz, 802.11ac (VHT20))



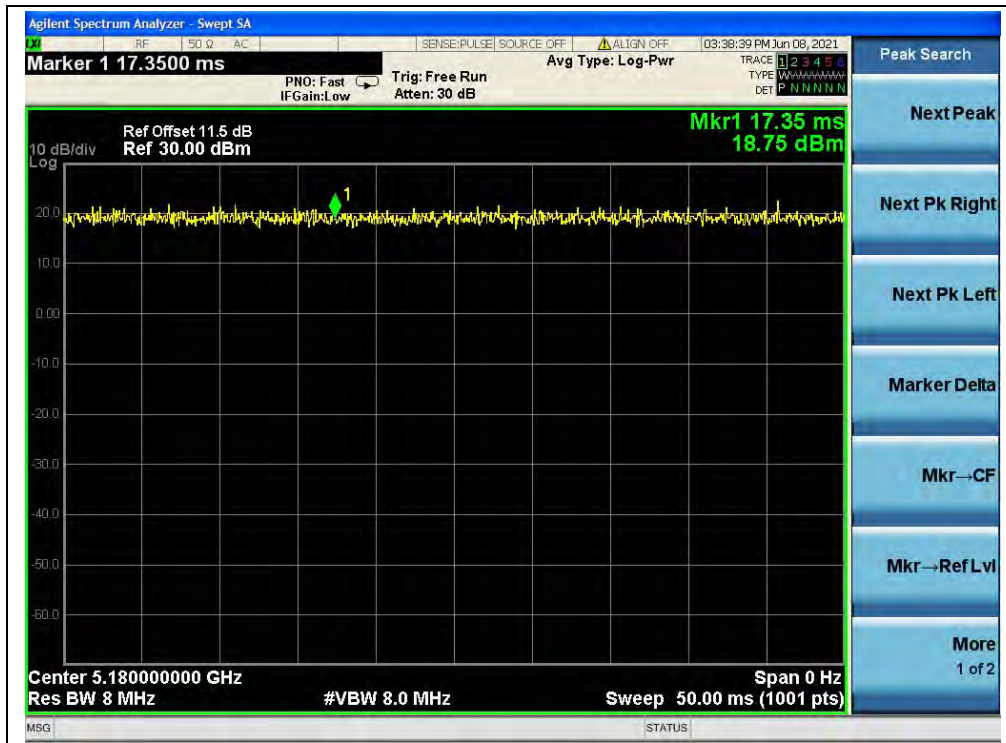
(Channel 38, 5190MHz, 802.11ac (VHT40))



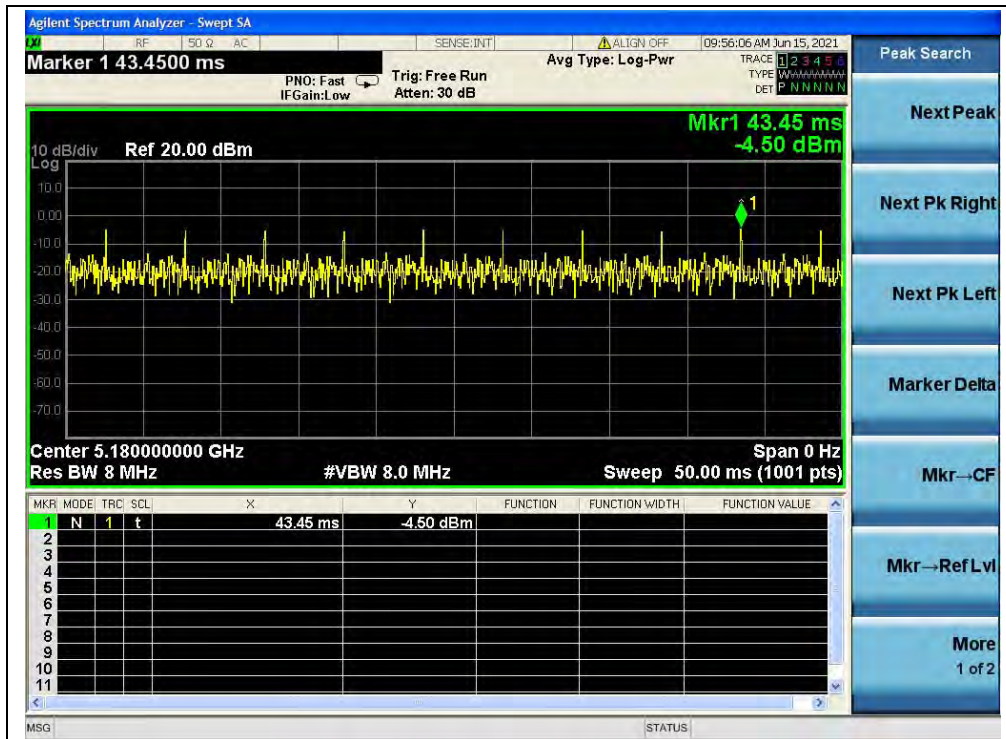
(Channel 42, 5210MHz, 802.11ac (VHT80))



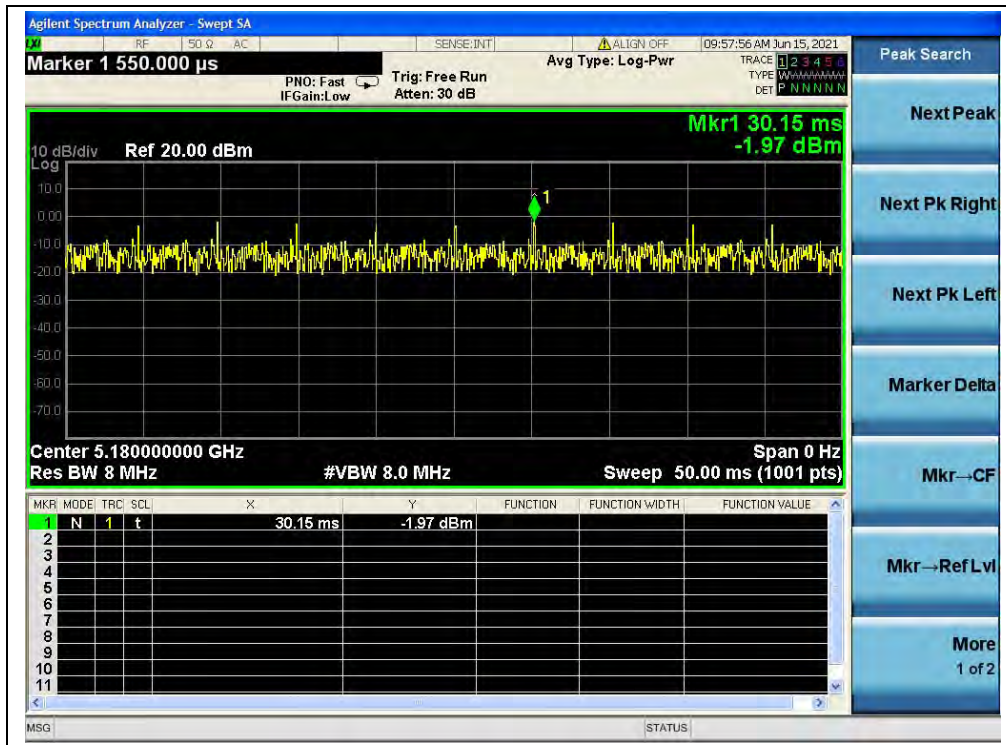
(Channel 42, 5210MHz, 802.11ac (VHT160))



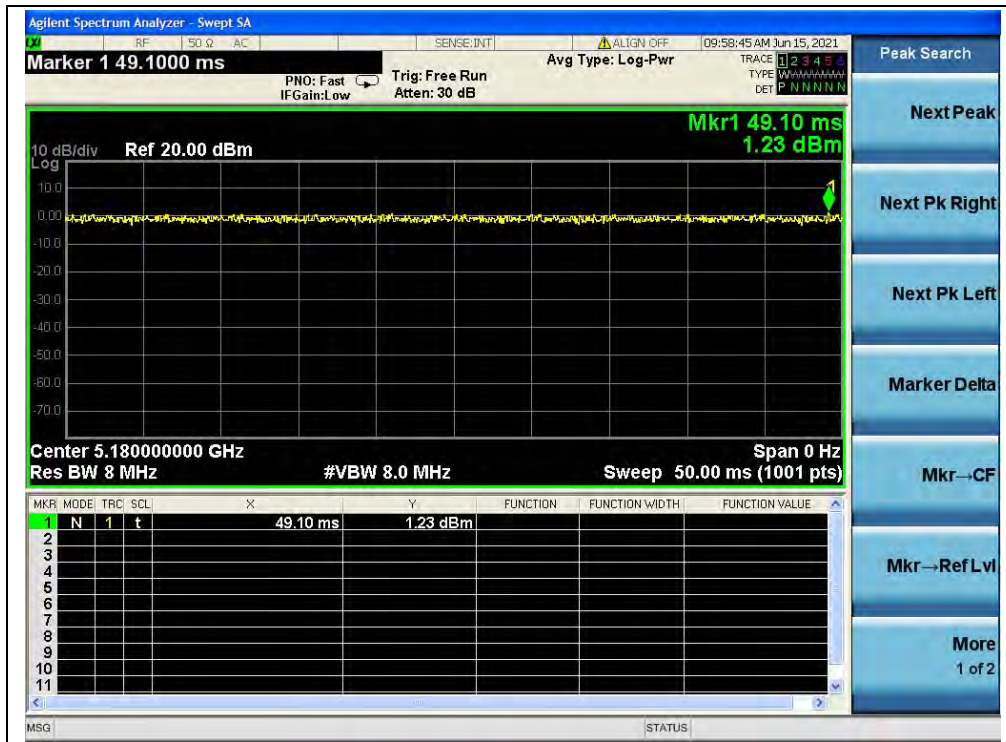
(CH36, 5180MHz, 802.11ax (HEW20))



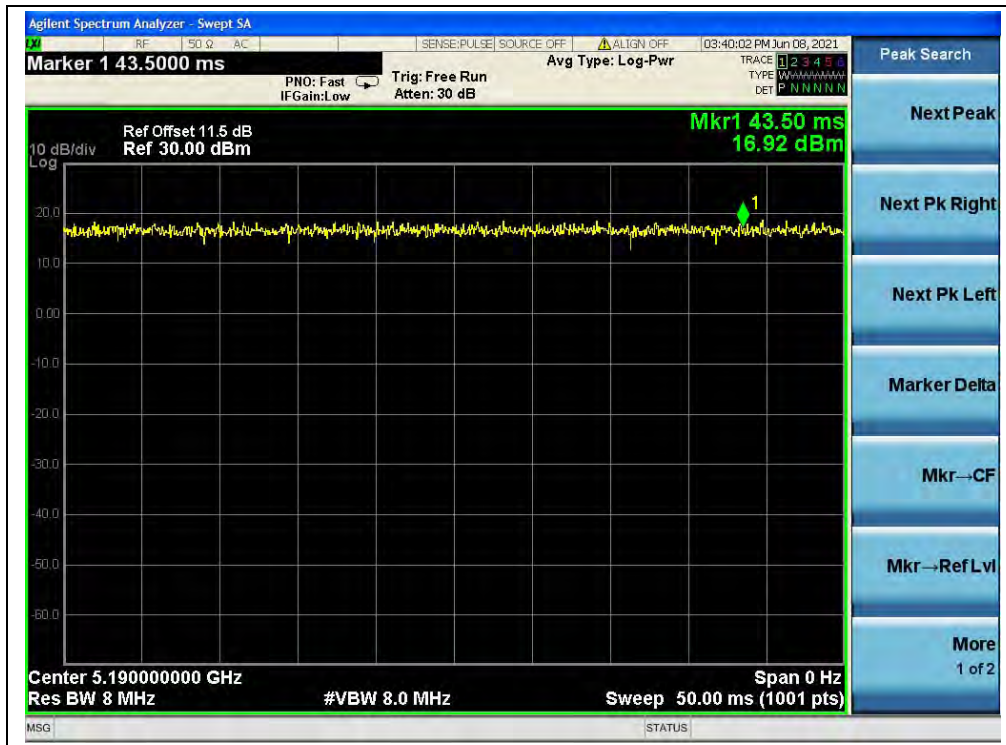
(CH36, 5180MHz, 802.11ax (HEW20) RU26)



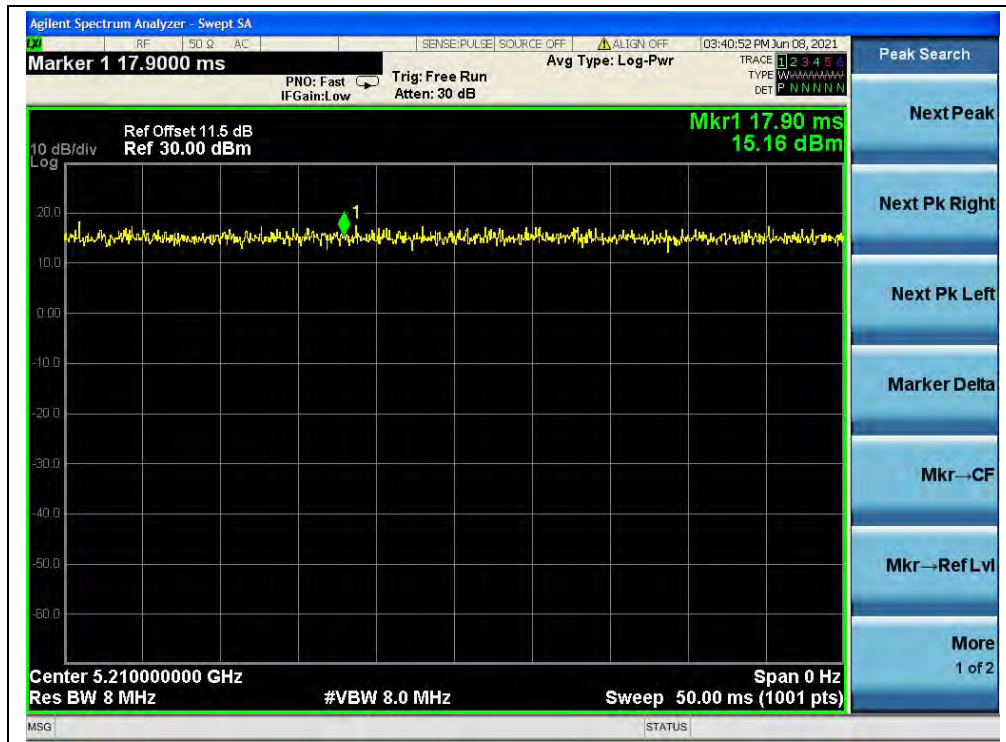
(CH36, 5180MHz, 802.11ax (HEW20) RU52)



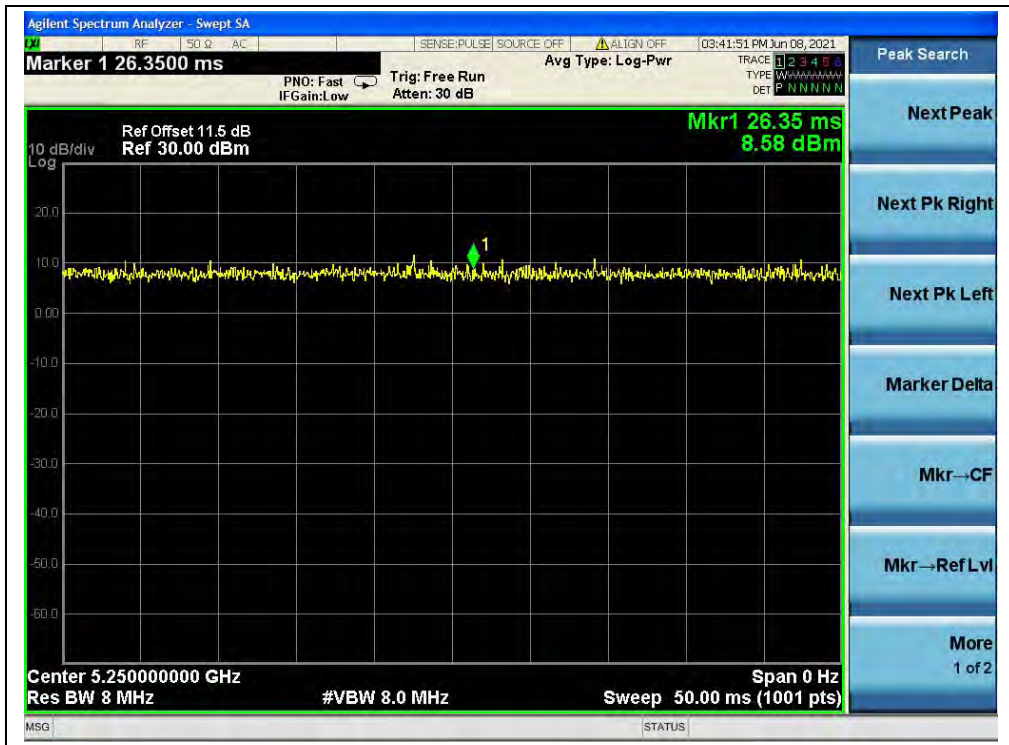
(CH36, 5180MHz, 802.11ax (HEW20) RU106)



(CH38, 5190MHz, 802.11ax (HEW40))



(CH42, 5210MHz, 802.11ax (HEW80))



(CH42, 5210MHz, 802.11ax (HEW160))

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 250mW provided the maximum antenna gain does not exceed 6dBi.

(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 250mW 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 6dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

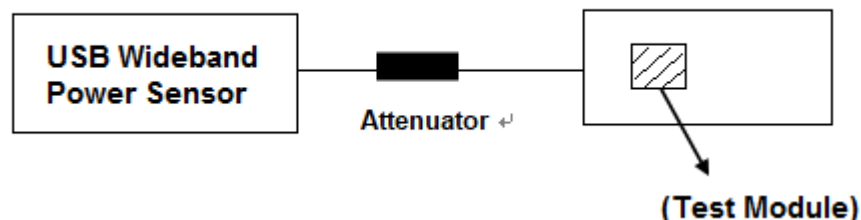
(4) According to KDB662911D01 Measure-and-sum technique, the conducted emission level (e.g., transmit power or power in specified bandwidth) is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically to determine the total emission level from the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

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

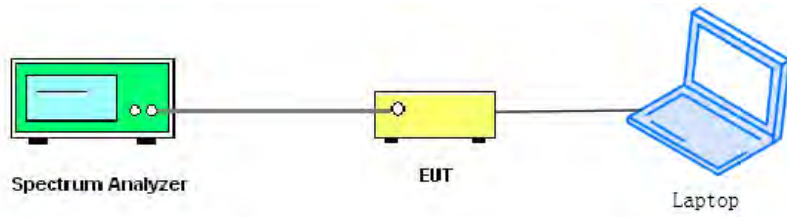
2.3.2. Test Description

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 50Ohm; 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)	10+10log(26dB BW)	Limits (dBm)
a	UNII-2a	5260	16.30	23.12	23.12
		5300	16.31	23.12	23.12
		5320	16.32	23.13	23.13
	UNII-2c	5500	16.25	23.11	23.11
		5600	16.37	23.14	23.14
		5700	16.35	23.14	23.14
n20	UNII-2a	5260	17.57	23.45	23.45
		5300	17.53	23.44	23.44
		5320	17.56	23.45	23.45
	UNII-2c	5500	17.58	23.45	23.45
		5600	17.59	23.45	23.45
		5700	17.59	23.45	23.45
ac20	UNII-2a	5260	17.54	23.44	23.44
		5300	17.51	23.43	23.43
		5320	17.55	23.44	23.44
	UNII-2c	5500	17.57	23.45	23.45
		5600	17.58	23.45	23.45
		5700	17.60	23.46	23.45
ax20	UNII-2a	5260	18.89	23.76	23.76
		5300	18.89	23.76	23.76
		5320	18.87	23.76	23.76
	UNII-2c	5500	18.92	23.77	23.77
		5600	18.98	23.78	23.78
		5700	18.99	23.79	23.78
ax_RU26	UNII-2a	5260	18.63	23.70	23.70
		5300	18.56	23.69	23.69
		5320	18.32	23.63	23.63
	UNII-2c	5500	18.50	23.67	23.67
		5600	18.40	23.65	23.65
		5700	18.54	23.68	23.66



2.3.4. Test Result

Maximum Average Conducted Output Power
802.11a Mode

Frequency (MHz)	Average Power							Limit		Verdict
	Measured		Duty Factor	Duty Factor Calculated						
	ANT0	ANT1		ANT0		ANT1				
	dBm	dBm		dBm	W	dBm	W	dBm	W	
5180	16.21	15.87	0.00	16.21	0.042	15.87	0.039	24	0.25	
5220	16.22	16.14		16.22	0.042	16.14	0.041			
5240	15.97	16.05		15.97	0.040	16.05	0.040			
5260	16.50	16.37		16.50	0.045	16.37	0.043	23.12	0.21	
5300	16.51	16.32		16.51	0.045	16.32	0.043	23.12	0.21	
5320	16.47	16.31		16.47	0.044	16.31	0.043	23.13	0.21	
5500	14.33	12.01		14.33	0.027	12.01	0.016	23.11	0.20	
5600	17.57	15.18		17.57	0.057	15.18	0.033	23.14	0.21	
5700	13.22	11.02		13.22	0.021	11.02	0.013	23.14	0.21	
5745	17.31	14.51		17.31	0.054	14.51	0.028	30	1	
5785	17.45	15.12		17.45	0.056	15.12	0.033			
5825	17.09	15.09		17.09	0.051	15.09	0.032			



802.11n (HT20) Mode

Frequency (MHz)	Average Power				Limit		Verdict		
	Measured		Duty Factor	Total Power with Duty Factor					
	ANT0	ANT1		dBm	W	dBm		W	
5180	15.53	15.16	0.00	18.39	0.069	24	0.25		
5220	15.94	15.31		18.63	0.073				
5240	15.38	15.44		18.45	0.070				
5260	15.35	15.56		18.45	0.070			23.45	0.22
5300	15.66	15.92		18.81	0.076			23.44	0.22
5320	15.41	16.02		18.75	0.075	23.45	0.22		
5500	17.22	14.41		19.03	0.080	23.45	0.22		
5600	17.15	14.36		18.98	0.079	23.45	0.22		
5700	16.52	13.66		18.33	0.068	23.45	0.22		
5745	16.64	13.88		18.51	0.071	30	1		
5785	16.59	14.31		18.63	0.073				
5825	16.42	14.70		18.63	0.073				

Note: Directional gain = -3.5dBi +10log(2) = -0.49dBi < 6dBi, so the power limit shall be 24dBm for 5.18-5.24 GHz band and 30dBm for 5.745-5.825 GHz band.

802.11n (HT40) Mode

Frequency (MHz)	Average Power				Limit		Verdict
	Measured		Duty Factor	Total Power with Duty Factor			
	ANT0	ANT1		dBm	W	dBm	
5190	11.42	11.29	0.00	14.31	0.027	24	0.25
5230	15.95	15.57		18.75	0.075		
5270	16.00	16.01		19.03	0.080		
5310	11.17	11.95		14.62	0.029		
5510	10.22	7.71		12.04	0.016		
5630	7.33	5.66		9.54	0.009	23.45	0.22
5670	16.87	14.28		18.75	0.075	30	1
5755	15.16	13.58		17.48	0.056		
5795	15.05	14.02		17.56	0.057		

Note: Directional gain = -3.5dBi +10log(2) = -0.49dBi < 6dBi, so the power limit shall be 24dBm for 5.18-5.24 GHz band and 30dBm for 5.745-5.825 GHz band.



802.11ac (VHT20) Mode

Frequency (MHz)	Average Power				Limit		Verdict
	Measured		Duty Factor	Total Power with Duty Factor			
	ANT0	ANT1		dBm	W	dBm	
5180	15.50	15.13	0.00	18.33	0.068	24	0.25
5220	15.61	15.30		18.45	0.070		
5240	15.37	15.45		18.45	0.070		
5260	15.44	15.57		18.51	0.071		
5300	15.34	15.91		18.63	0.073	23.43	0.22
5320	12.55	12.86		15.68	0.037	23.44	0.22
5500	17.20	14.42		19.03	0.080	23.45	0.22
5600	17.35	14.36		19.14	0.082	23.45	0.22
5700	16.91	13.54		18.57	0.072	23.45	0.22
5745	16.84	13.87		18.63	0.073	30	1
5785	16.35	14.31		18.45	0.070		
5825	16.38	14.67		18.63	0.073		

Note: Directional gain = -3.5dBi +10log(2) = -0.49dBi < 6dBi, so the power limit shall be 24dBm for 5.18-5.24 GHz band and 30dBm for 5.745-5.825 GHz band.

802.11ac (VHT40) Mode

Frequency (MHz)	Average Power				Limit		Verdict
	Measured		Duty Factor	Total Power with Duty Factor			
	ANT0	ANT1		dBm	W	dBm	
5190	15.91	15.73	0.00	18.81	0.076	24	0.25
5230	15.75	15.80		18.81	0.076		
5270	16.09	16.45		19.29	0.085		
5310	16.15	16.42		19.29	0.085		
5510	17.42	14.94		19.34	0.086	23.45	0.22
5630	17.45	14.63		19.29	0.085	23.44	0.22
5670	17.12	14.19		18.92	0.078	23.44	0.22
5755	16.05	14.36		18.33	0.068	30	1
5795	16.20	14.88		18.57	0.072		

Note: Directional gain = -3.5dBi +10log(2) = -0.49dBi < 6dBi, so the power limit shall be 24dBm for 5.18-5.24 GHz band and 30dBm for 5.745-5.825 GHz band.



802.11ac (VHT80) Mode

Frequency (MHz)	Average Power				Limit		Verdict	
	Measured		Duty Factor	Total Power with Duty Factor				
	ANT0	ANT1		dBm	W	dBm		W
	dBm	dBm						
5210	11.61	12.67	0.00	15.19	0.033	24	0.25	PASS
5290	10.78	11.34		14.15	0.026			
5530	11.22	9.88		13.62	0.023			
5610	16.51	14.91		18.81	0.076			
5775	16.10	14.74		18.51	0.071	30	1	

Note: Directional gain = $-3.5\text{dBi} + 10\log(2) = -0.49\text{dBi} < 6\text{dBi}$, so the power limit shall be 24dBm for 5.18-5.24 GHz band and 30dBm for 5.745-5.825 GHz band.

802.11ac (VHT160) Mode

Frequency (MHz)	Average Power				Limit		Verdict	
	Measured		Duty Factor	Total Power with Duty Factor				
	ANT0	ANT1		dBm	W	dBm		W
	dBm	dBm						
5250	9.12	10.26	0.00	12.79	0.019	24	0.25	PASS
5570	11.28	9.22		13.42	0.022			

Note: Directional gain = $-3.5\text{dBi} + 10\log(2) = -0.49\text{dBi} < 6\text{dBi}$, so the power limit shall be 24dBm for 5.18-5.24 GHz band and 30dBm for 5.745-5.825 GHz band.



802.11ax (HEW20) Mode

Frequency (MHz)	Average Power				Limit		Verdict
	Measured		Duty Factor	Total Power with Duty Factor			
	ANT0	ANT1		dBm	W	dBm	
	dBm	dBm					
5180	15.71	15.74	0.00	18.75	0.075	24	0.25
5220	15.56	15.89		18.75	0.075		
5240	15.59	16.05		18.81	0.076		
5260	15.70	16.15		18.92	0.078		
5300	15.69	16.43		19.08	0.081	23.76	0.24
5320	12.11	12.98		15.56	0.036	23.76	0.24
5500	12.45	10.84		14.77	0.030	23.77	0.24
5600	17.53	14.95		19.44	0.088	23.78	0.24
5700	12.11	10.25		14.31	0.027	23.78	0.24
5745	16.93	14.06		18.75	0.075	30	1
5785	16.92	14.53		18.92	0.078		
5825	16.64	14.93		18.86	0.077		

Note: Directional gain = $-3.5\text{dBi} + 10\log(2) = -0.49\text{dBi} < 6\text{dBi}$, so the power limit shall be 24dBm for 5.18-5.24 GHz band and 30dBm for 5.745-5.825 GHz band.



802.11ax (HEW20) RU26 Mode

Frequency (MHz)	Average Power				Limit		Verdict
	Measured		Duty Factor	Total Power with Duty Factor			
	ANT0	ANT1		dBm	W	dBm	
	dBm	dBm					
5180	4.20	3.52	0.00	6.99	0.005	24	0.25
5220	4.62	3.50		6.99	0.005		
5240	4.62	3.51		6.99	0.005		
5260	4.39	3.54		6.99	0.005		
5300	3.81	3.72		6.99	0.005	23.69	0.23
5320	3.63	4.07		6.99	0.005	23.63	0.23
5500	5.12	3.06		6.99	0.005	23.67	0.23
5600	5.75	2.75		7.78	0.006	23.65	0.23
5700	5.51	2.18		6.99	0.005	23.66	0.23
5745	5.61	2.19		6.99	0.005	30	1
5785	5.32	3.26		7.78	0.006		
5825	4.85	3.68		6.99	0.005		

Note: Directional gain = $-3.5\text{dBi} + 10\log(2) = -0.49\text{dBi} < 6\text{dBi}$, so the power limit shall be 24dBm for 5.18-5.24 GHz band and 30dBm for 5.745-5.825 GHz band.



802.11ax (HEW20) RU52 Mode

Frequency (MHz)	Average Power				Limit		Verdict	
	Measured		Duty Factor	Total Power with Duty Factor		dBm		W
	ANT0	ANT1		dBm	W			
	dBm	dBm						
5180	7.14	6.08	0.00	9.54	0.009	24	0.25	PASS
5220	7.49	6.17		10.00	0.010			
5240	7.47	6.10		10.00	0.010			
5260	7.31	6.06		9.54	0.009			
5300	6.64	6.48		9.54	0.009			
5320	6.50	6.77		9.54	0.009			
5500	9.21	6.03		10.79	0.012			
5600	9.12	5.51		10.79	0.012			
5700	8.60	4.59		10.00	0.010			
5745	8.74	5.39		10.41	0.011			
5785	8.19	6.28		10.41	0.011			
5825	7.79	6.68		10.41	0.011			

Note: Directional gain = $-3.5\text{dBi} + 10\log(2) = -0.49\text{dBi} < 6\text{dBi}$, so the power limit shall be 24dBm for 5.18-5.24 GHz band and 30dBm for 5.745-5.825 GHz band.



802.11ax (HEW20) RU106 Mode

Frequency (MHz)	Average Power				Limit		Verdict	
	Measured		Duty Factor	Total Power with Duty Factor		dBm		W
	ANT0	ANT1		dBm	W			
5180	10.20	9.26	0.00	12.79	0.019	24	0.25	PASS
5220	10.63	9.32		13.01	0.020			
5240	10.62	9.35		13.01	0.020			
5260	10.38	9.17		12.79	0.019			
5300	9.74	9.53		12.55	0.018			
5320	9.65	9.87		12.79	0.019			
5500	12.18	8.85		13.80	0.024			
5600	11.84	8.39		13.42	0.022			
5700	11.48	7.61		13.01	0.020			
5745	11.82	7.95		13.22	0.021	30	1	
5785	11.48	8.85		13.42	0.022			
5825	11.10	9.15		13.22	0.021			

Note: Directional gain = $-3.5\text{dBi} + 10\log(2) = -0.49\text{dBi} < 6\text{dBi}$, so the power limit shall be 24dBm for 5.18-5.24 GHz band and 30dBm for 5.745-5.825 GHz band.

802.11ax (HEW40) Mode

Frequency (MHz)	Average Power				Limit		Verdict	
	Measured		Duty Factor	Total Power with Duty Factor		dBm		W
	ANT0	ANT1		dBm	W			
5190	15.98	15.69	0.00	18.86	0.077	24	0.25	PASS
5230	15.83	15.77		18.81	0.076			
5270	15.89	15.80		18.86	0.077			
5310	15.97	15.99		18.98	0.079			
5510	17.01	14.82		19.08	0.081			
5630	17.40	14.57		19.24	0.084			
5670	17.27	14.00		18.92	0.078			
5755	16.94	14.43		18.86	0.077	30	1	
5795	16.92	14.90		19.03	0.080			

Note: Directional gain = $-3.5\text{dBi} + 10\log(2) = -0.49\text{dBi} < 6\text{dBi}$, so the power limit shall be 24dBm for 5.18-5.24 GHz band and 30dBm for 5.745-5.825 GHz band.



802.11ax (HEW80) Mode

Frequency (MHz)	Average Power				Limit		Verdict	
	Measured		Duty Factor	Total Power with Duty Factor				
	ANT0	ANT1		dBm	W	dBm		W
	dBm	dBm						
5210	14.52	15.84	0.00	18.26	0.067	24	0.25	PASS
5290	15.11	15.93		18.57	0.072			
5530	15.97	14.68		18.39	0.069			
5610	16.53	14.83		18.75	0.075			
5775	15.99	14.67		18.39	0.069	30	1	

Note: Directional gain = $-3.5\text{dBi} + 10\log(2) = -0.49\text{dBi} < 6\text{dBi}$, so the power limit shall be 24dBm for 5.18-5.24 GHz band and 30dBm for 5.745-5.825 GHz band.

802.11ax (HEW160) Mode

Frequency (MHz)	Average Power				Limit		Verdict	
	Measured		Duty Factor	Total Power with Duty Factor				
	ANT0	ANT1		dBm	W	dBm		W
	dBm	dBm						
5250	12.42	13.54	0.00	16.02	0.040	24	0.25	PASS
5570	14.54	12.40		16.63	0.046			

Note: Directional gain = $-3.5\text{dBi} + 10\log(2) = -0.49\text{dBi} < 6\text{dBi}$, so the power limit shall be 24dBm for 5.18-5.24 GHz band and 30dBm for 5.745-5.825 GHz band.

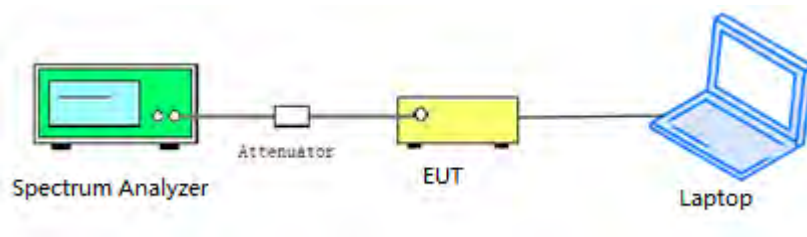
2.4. Emission Bandwidth

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 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 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

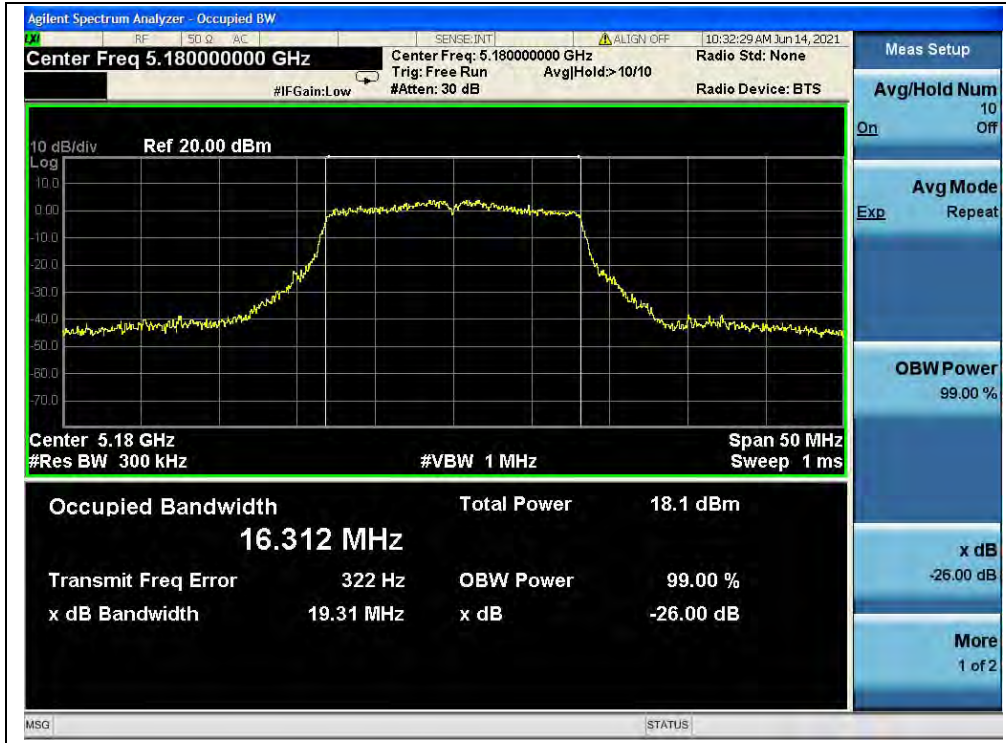
802.11a Mode

A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
36	5180	19.31
44	5220	18.53
48	5240	18.46
52	5260	18.25
60	5300	18.96
64	5320	18.78
100	5500	18.41
120	5600	19.38
140	5700	19.33
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)
149	5745	15.54
157	5785	15.33
165	5825	13.82



B.Test Plot:



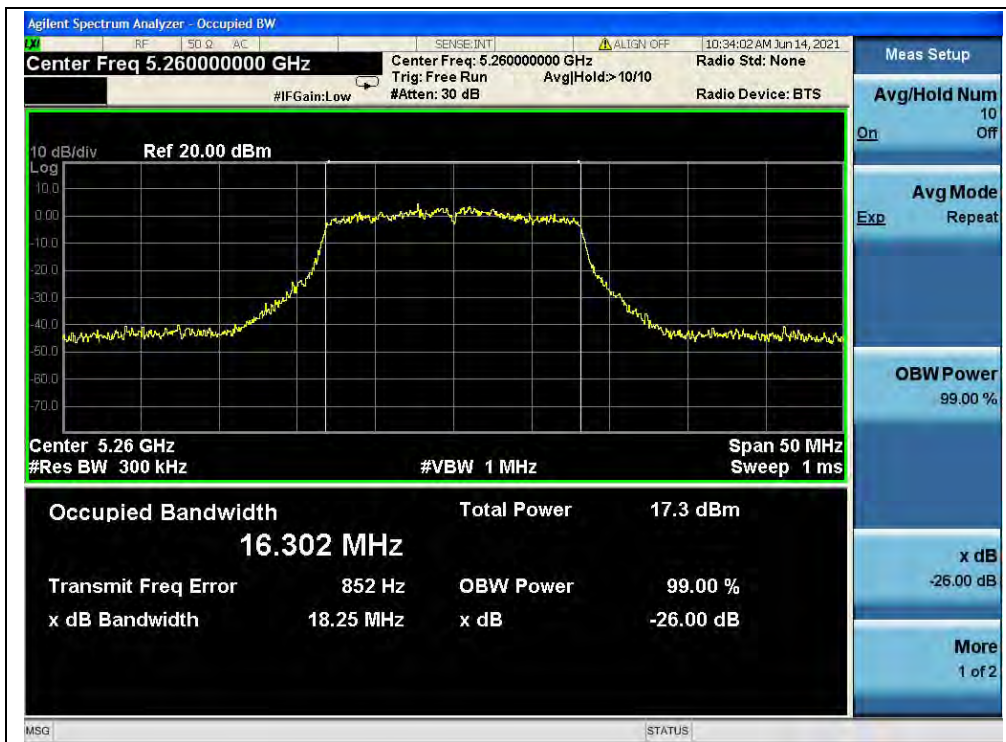
(Channel 36, 5180MHz, 802.11a)



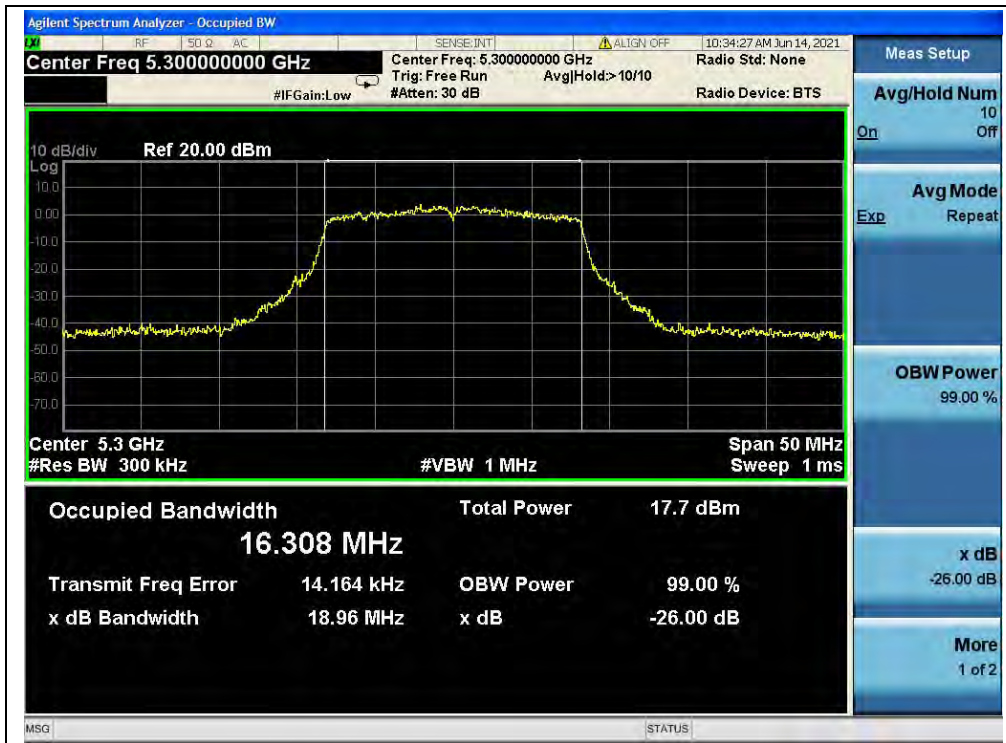
(Channel 44, 5220 MHz, 802.11a)



(Channel 48, 5240MHz, 802.11a)



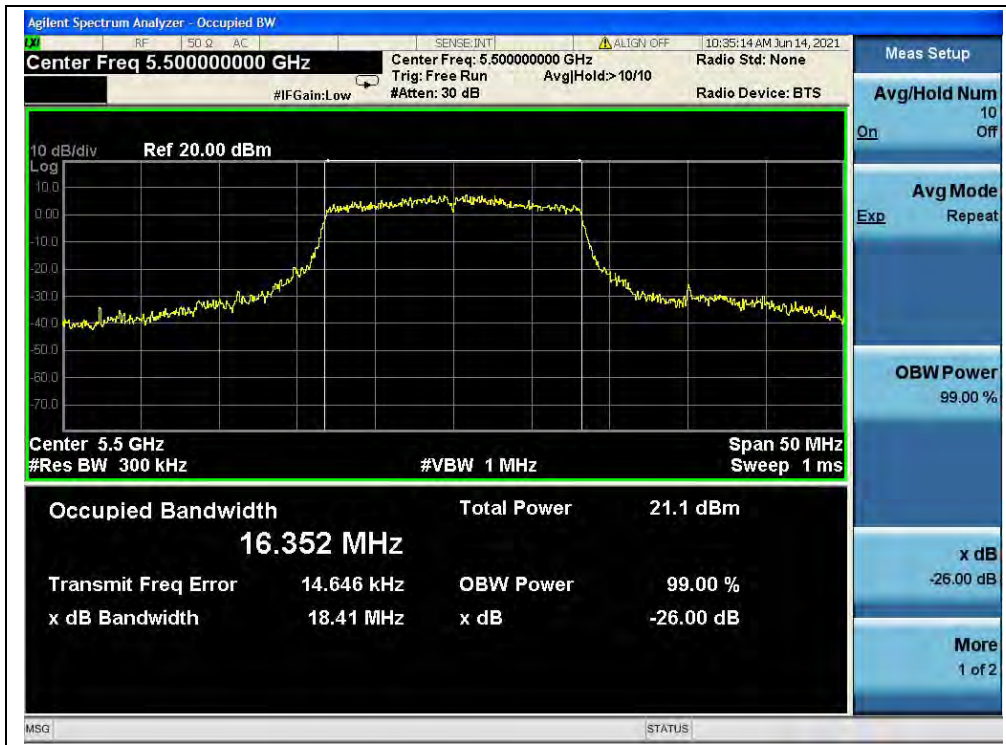
(Channel 52, 5260MHz, 802.11a)



(Channel 60, 5300 MHz, 802.11a)



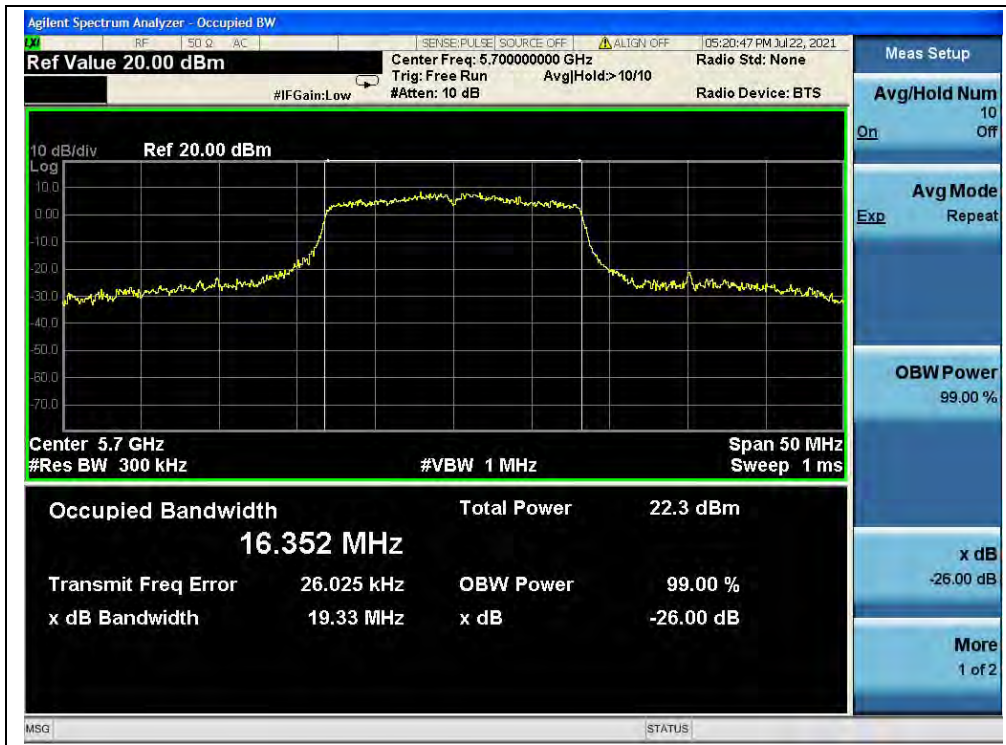
(Channel 64, 5320MHz, 802.11a)



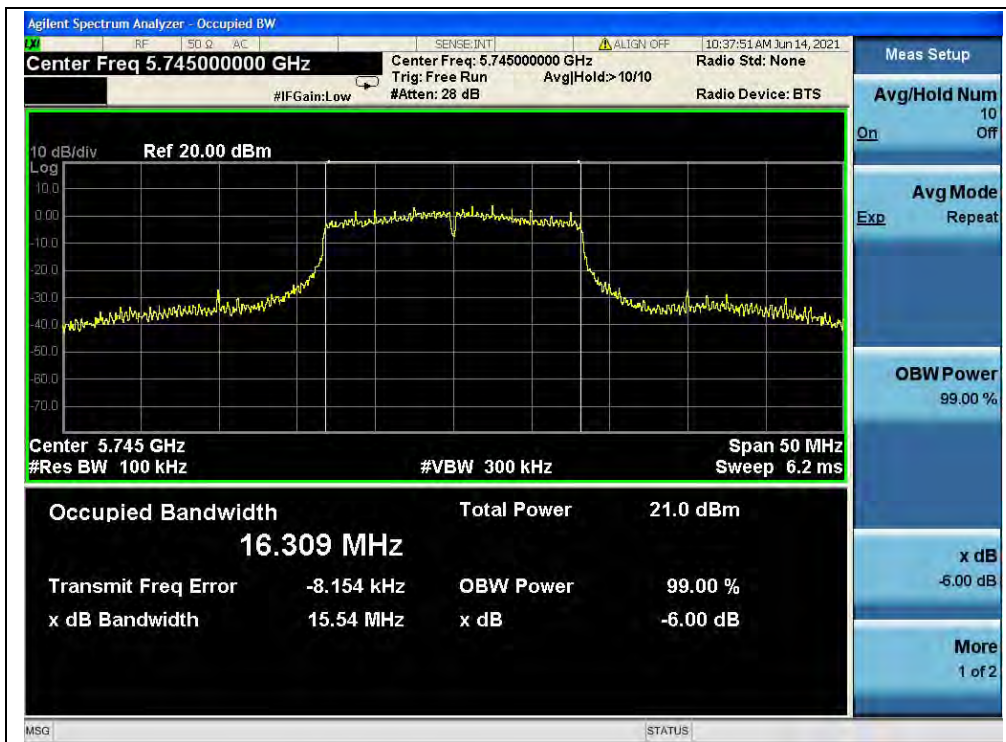
(Channel 100,5500MHz, 802.11a)



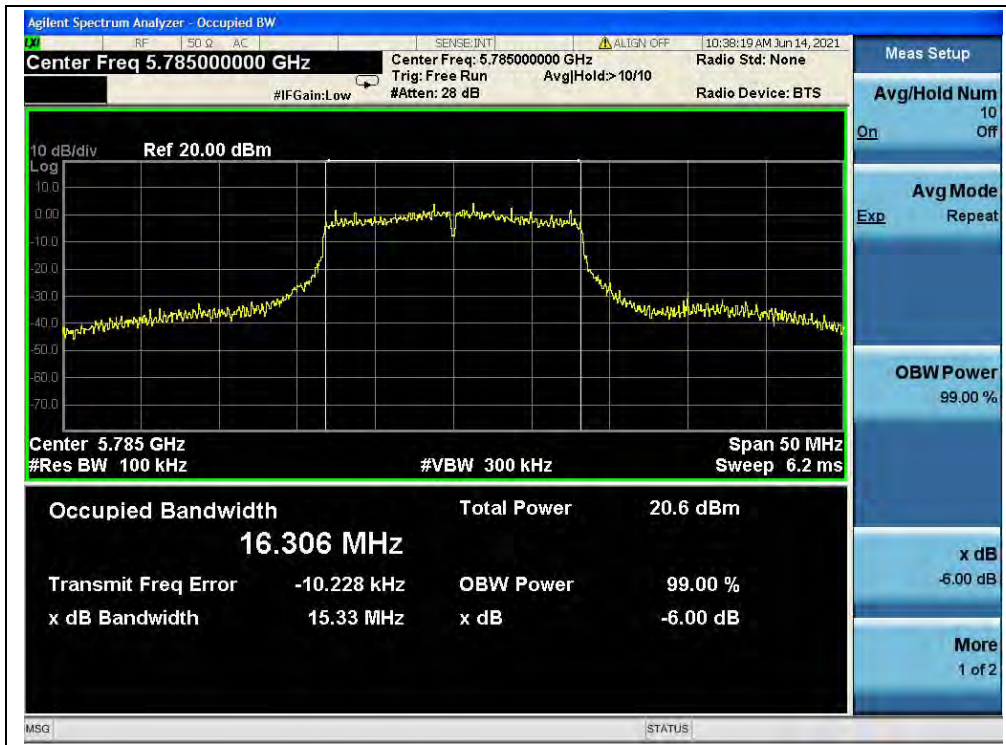
(Channel 120,5600 MHz, 802.11a)



(Channel 140, 5700MHz, 802.11a)



(Channel 149, 5745MHz, 802.11a)



(Channel 157,5785MHz, 802.11a)



(Channel 165, 5825MHz, 802.11a)

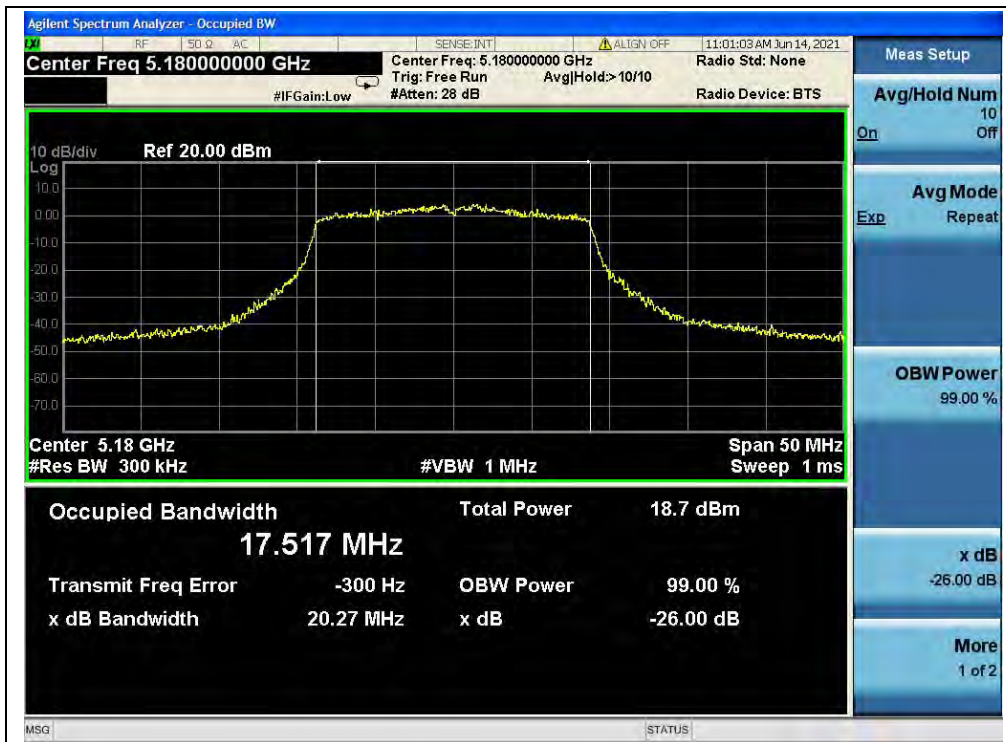


802.11n (HT20) Mode

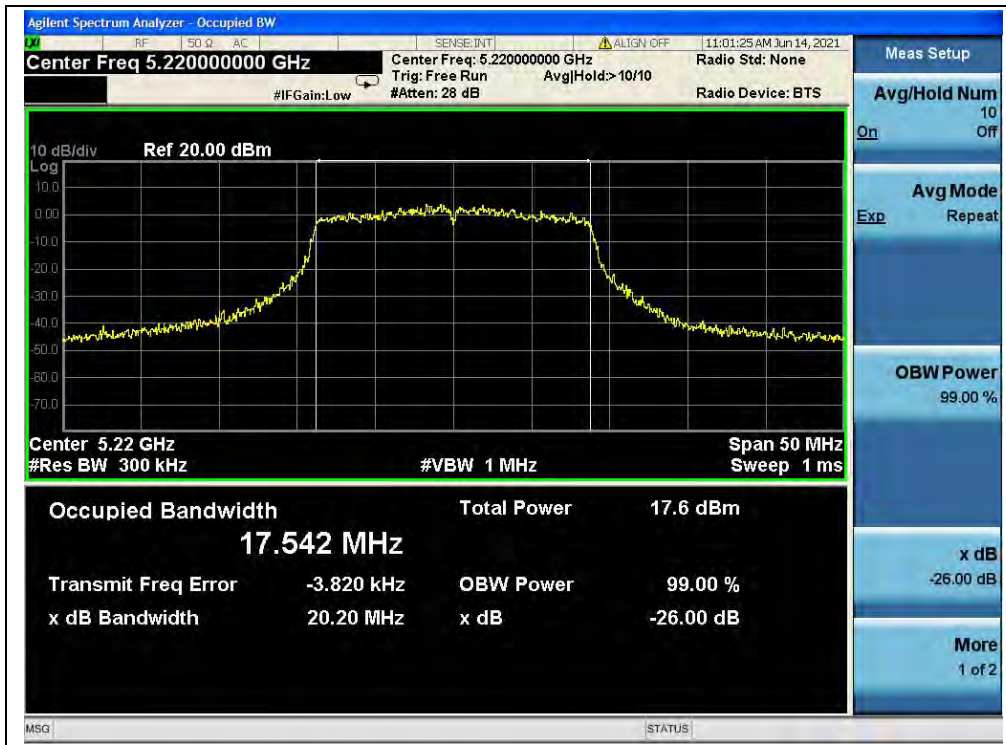
A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
36	5180	20.27
44	5220	20.20
48	5240	19.99
52	5260	19.91
60	5300	20.26
64	5320	20.40
100	5500	20.65
120	5600	20.39
140	5700	20.67
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)
149	5745	17.58
157	5785	17.51
165	5825	16.91

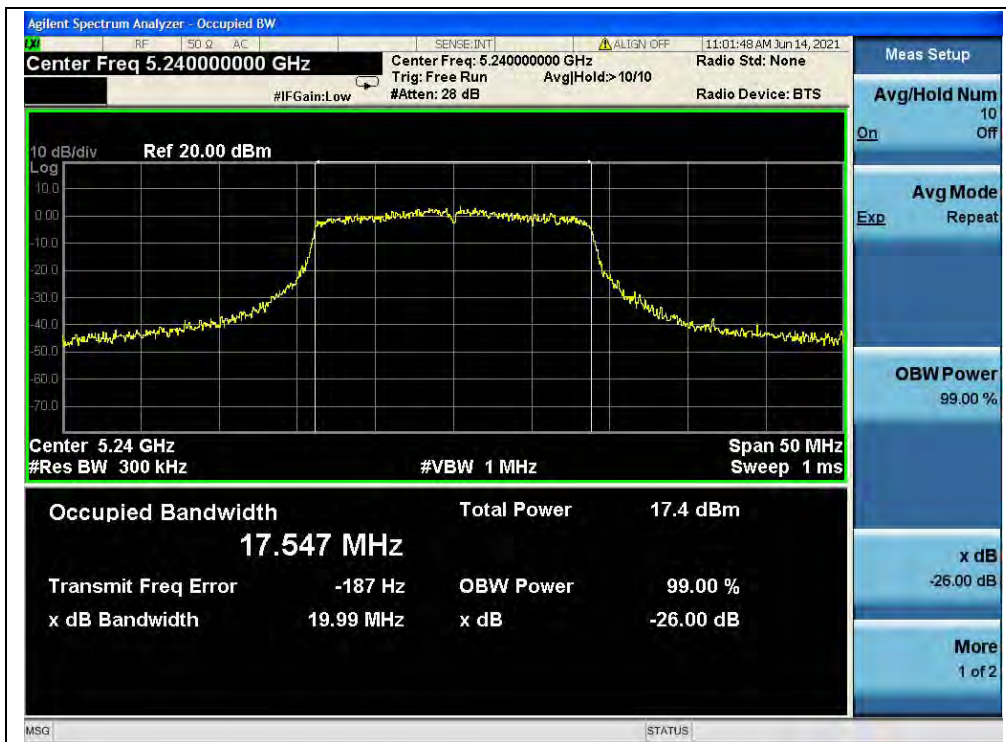
B. Test Plot:



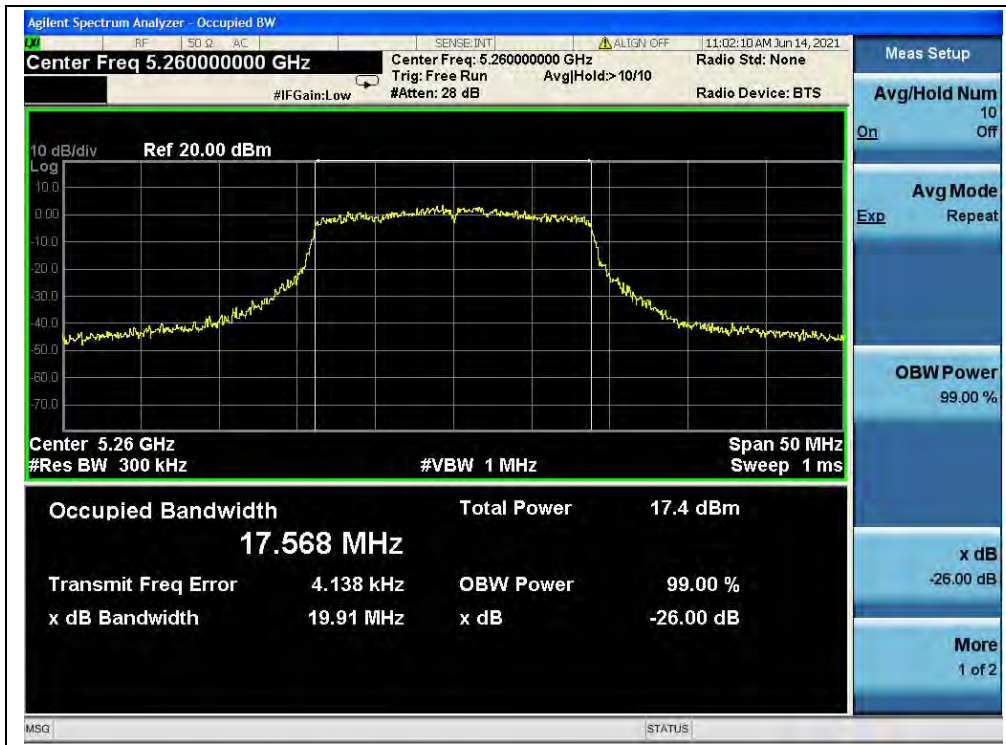
(Channel 36, 5180MHz, 802.11n (HT20))



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



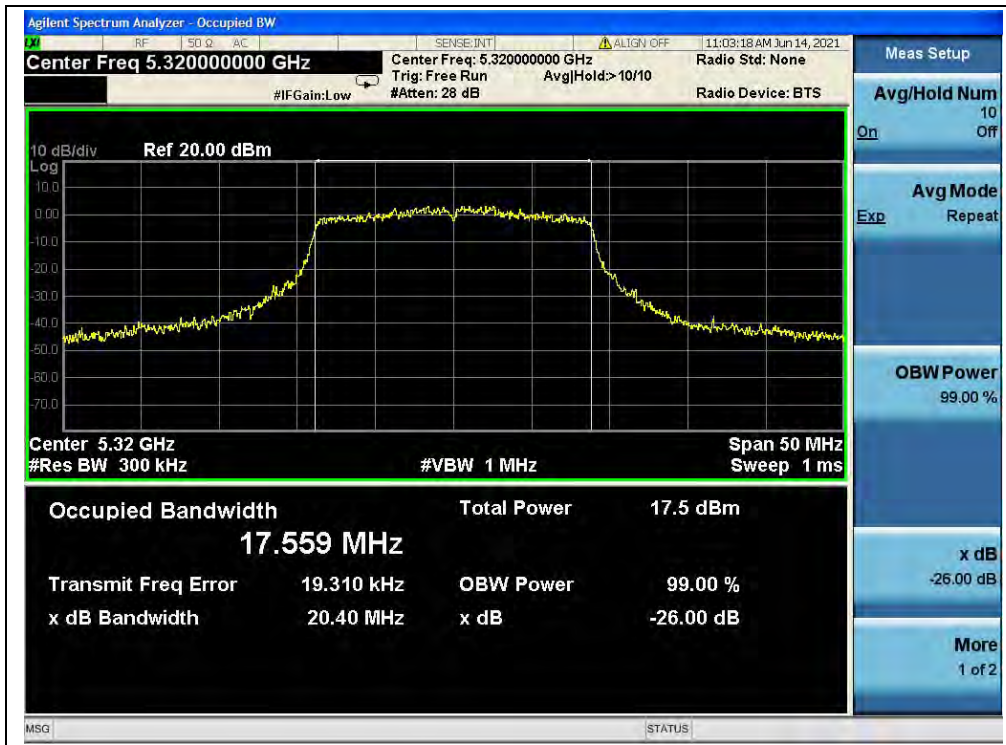
(Channel 48, 5240MHz, 802.11n (HT20))



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



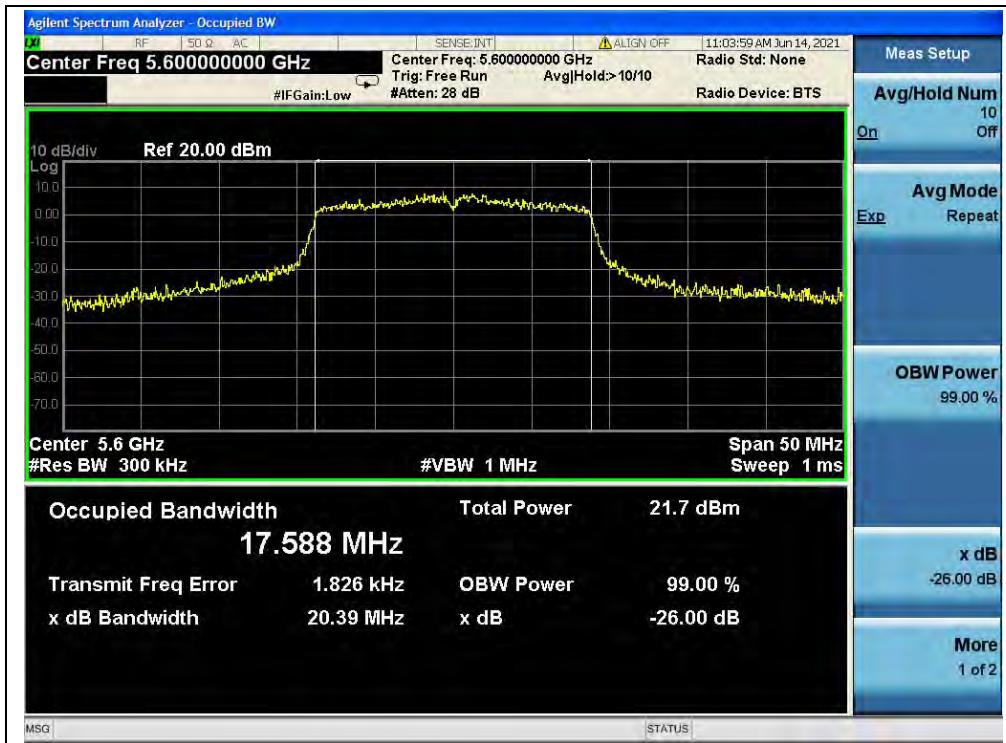
(Channel 60, 5300MHz, 802.11n (HT20))



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



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



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



(Channel 140, 5700MHz, 802.11n (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	39.62
46	5230	39.83
54	5270	40.08
62	5310	39.40
102	5510	40.52
126	5630	55.24
134	5670	40.46
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)
151	5755	35.64
159	5795	36.35

B. Test Plot:



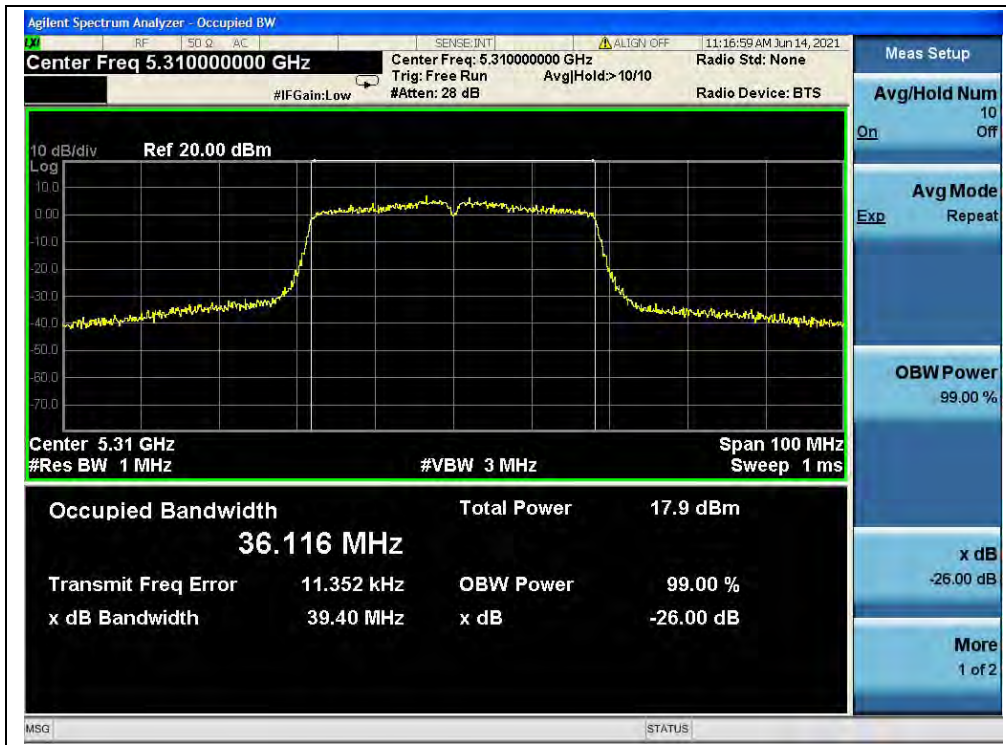
(Channel 38, 5190MHz, 802.11n (HT40))



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



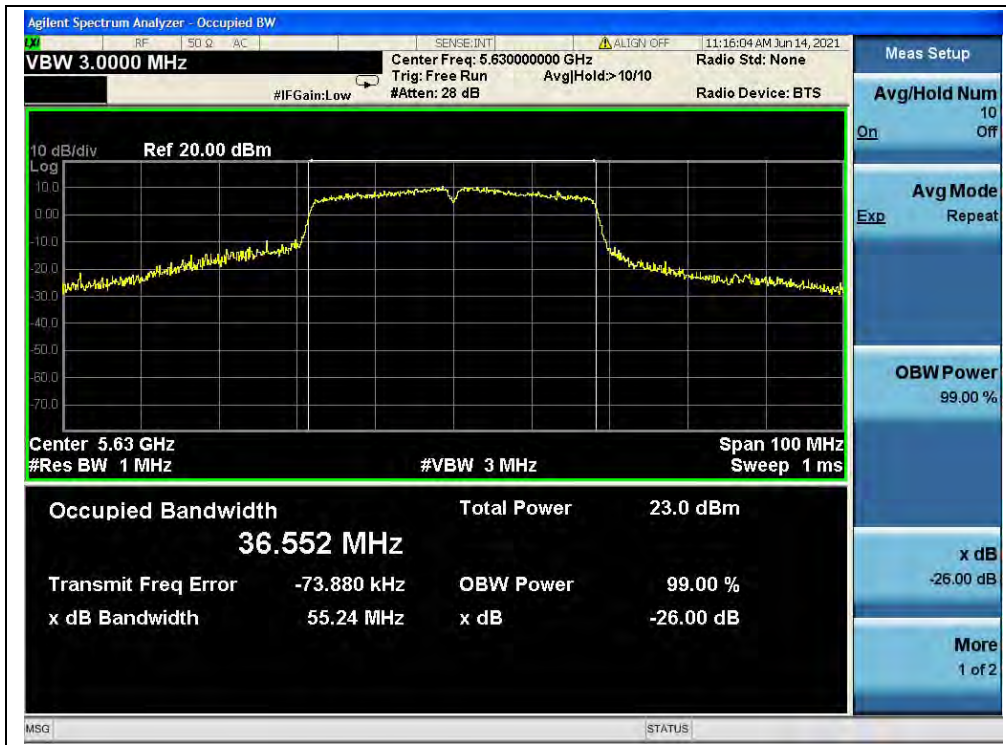
(Channel 54, 5270MHz, 802.11n (HT40))



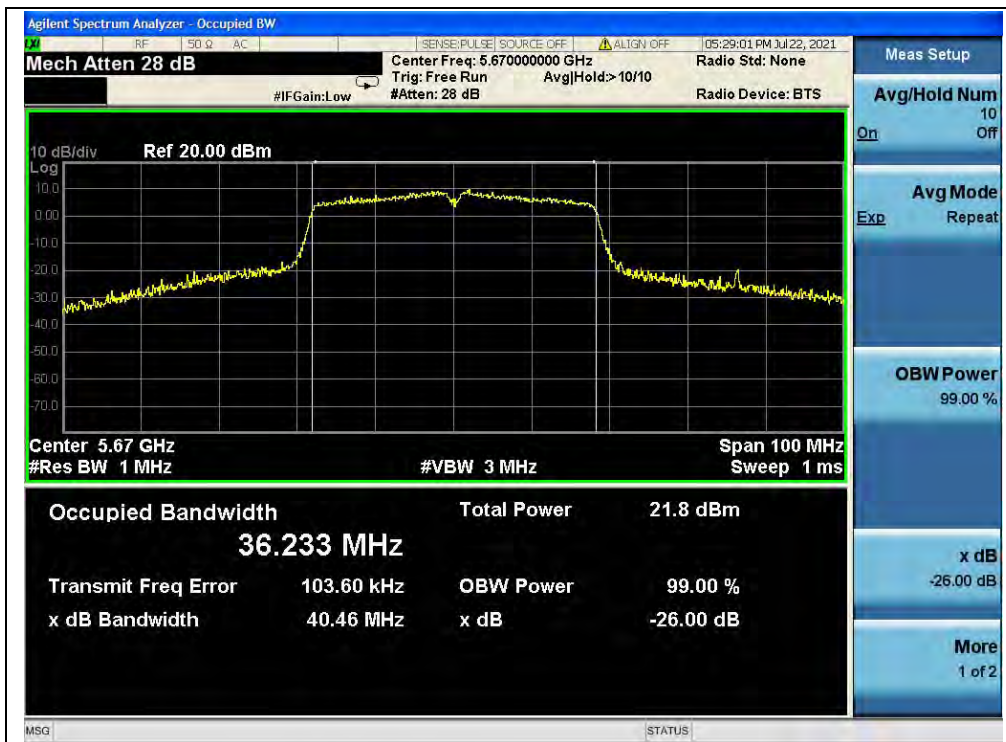
(Channel 62, 5310MHz, 802.11n (HT40))



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



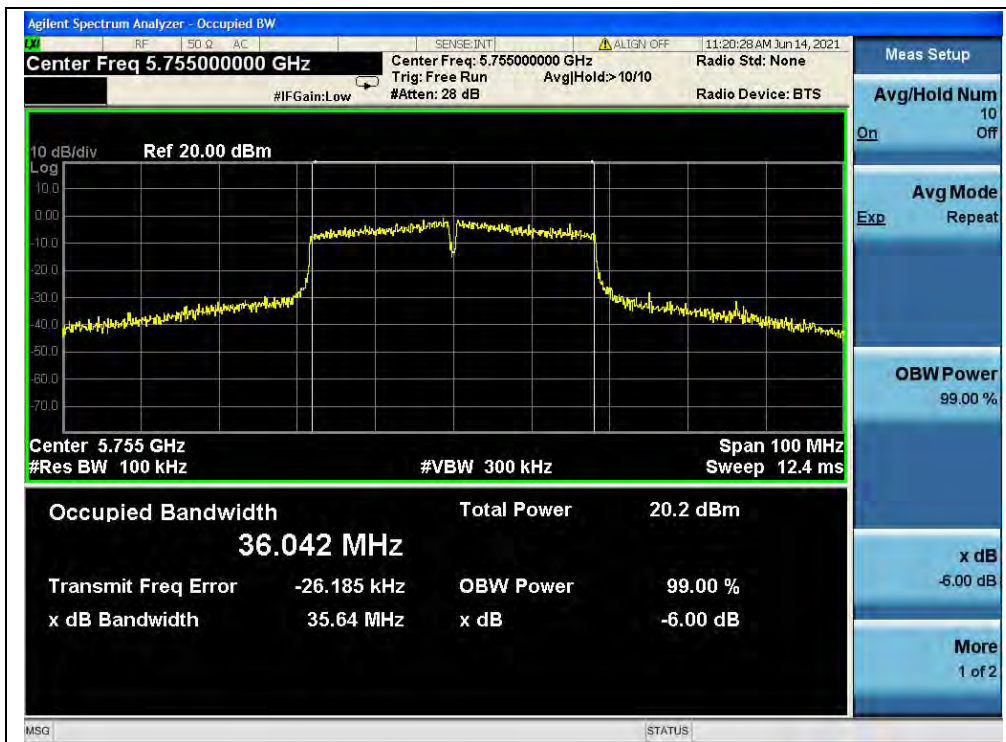
(Channel 126, 5630MHz, 802.11n (HT40))



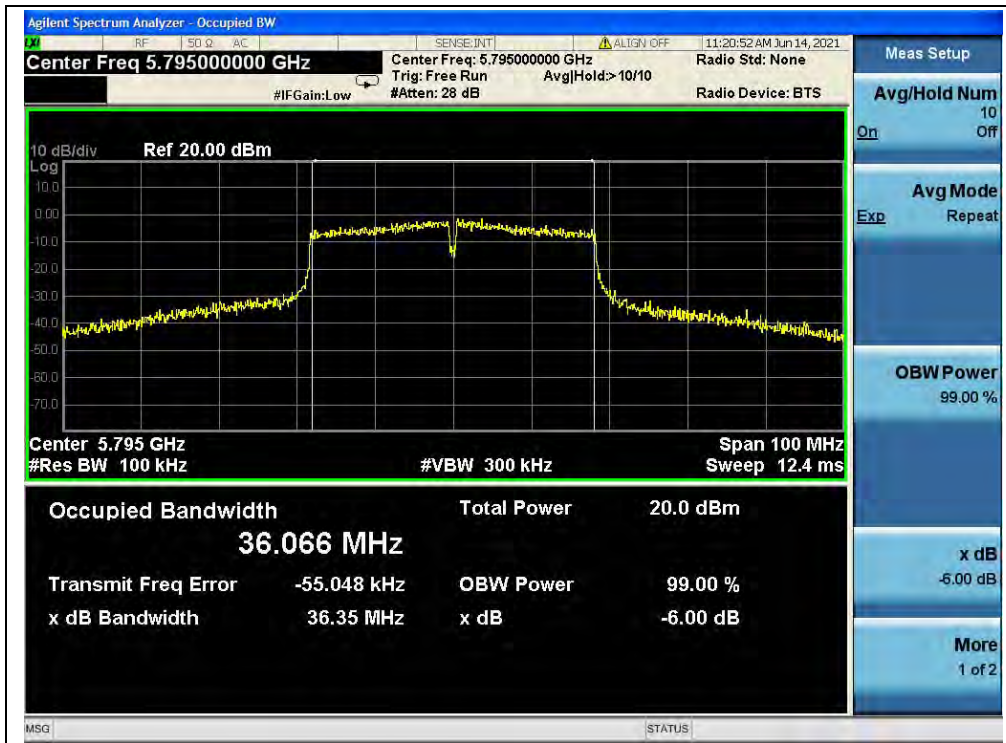
(Channel 134, 5670MHz, 802.11n (HT40))



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



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



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



802.11ac (VHT20) Mode

A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
36	5180	20.11
44	5220	20.49
48	5240	20.38
52	5260	20.41
60	5300	20.22
64	5320	20.11
100	5500	20.17
120	5600	20.54
140	5700	21.32
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)
149	5745	17.58
157	5785	17.62
165	5825	16.90

B. Test Plot:



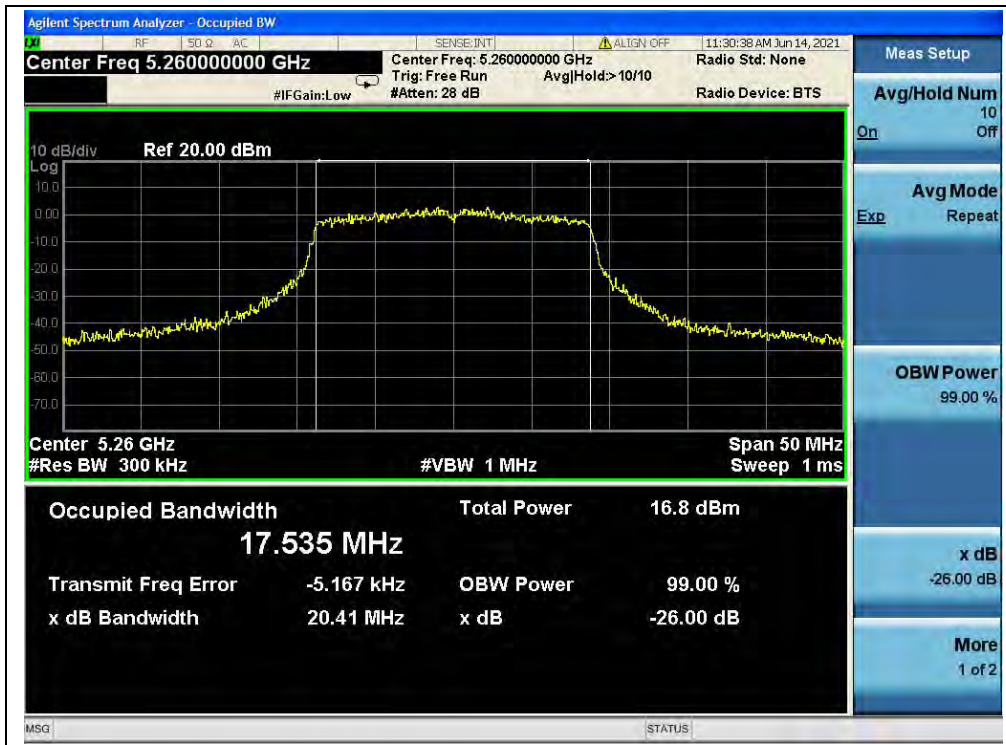
(Channel 36, 5180MHz, 802.11ac (VHT20))



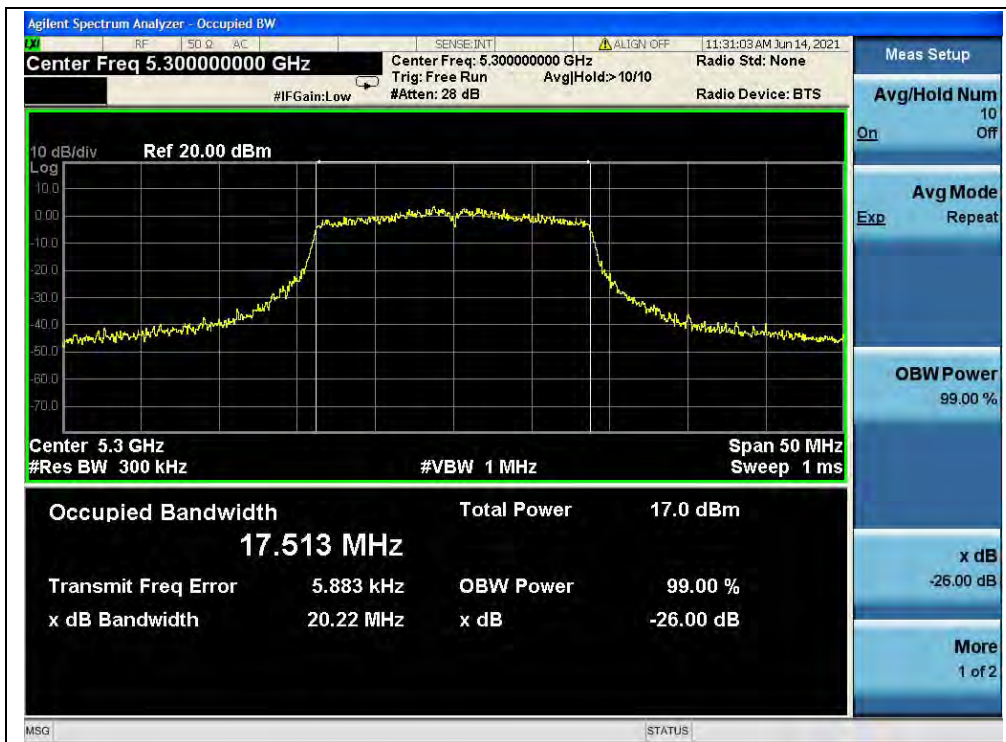
(Channel 44, 5220MHz, 802.11ac (VHT20))



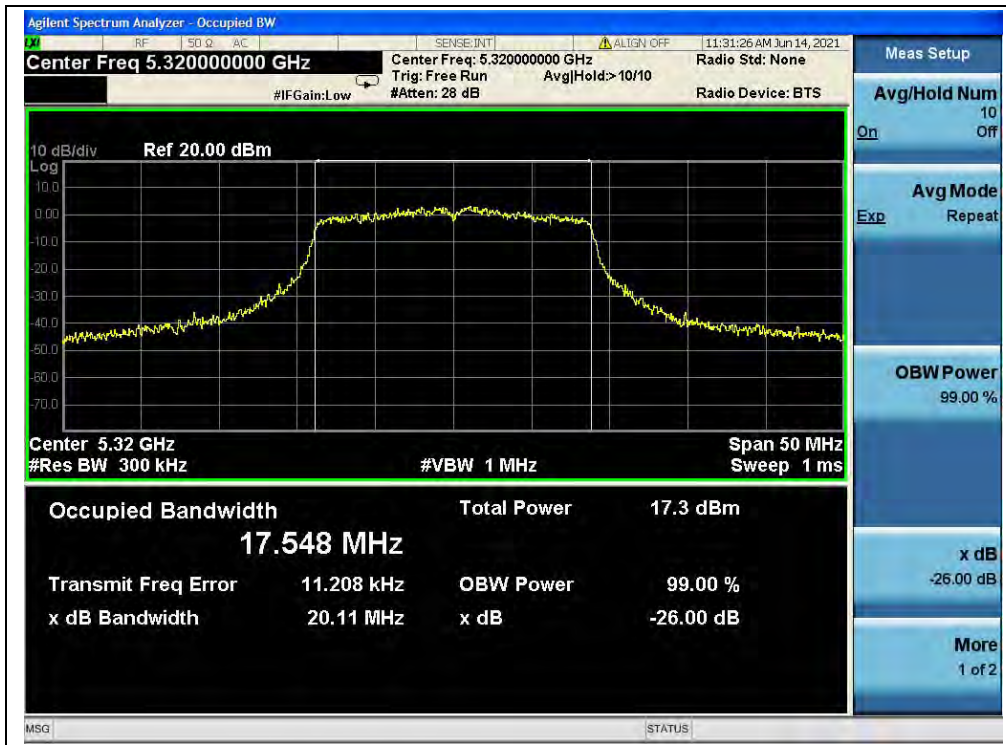
(Channel 48, 5240MHz, 802.11ac (VHT20))



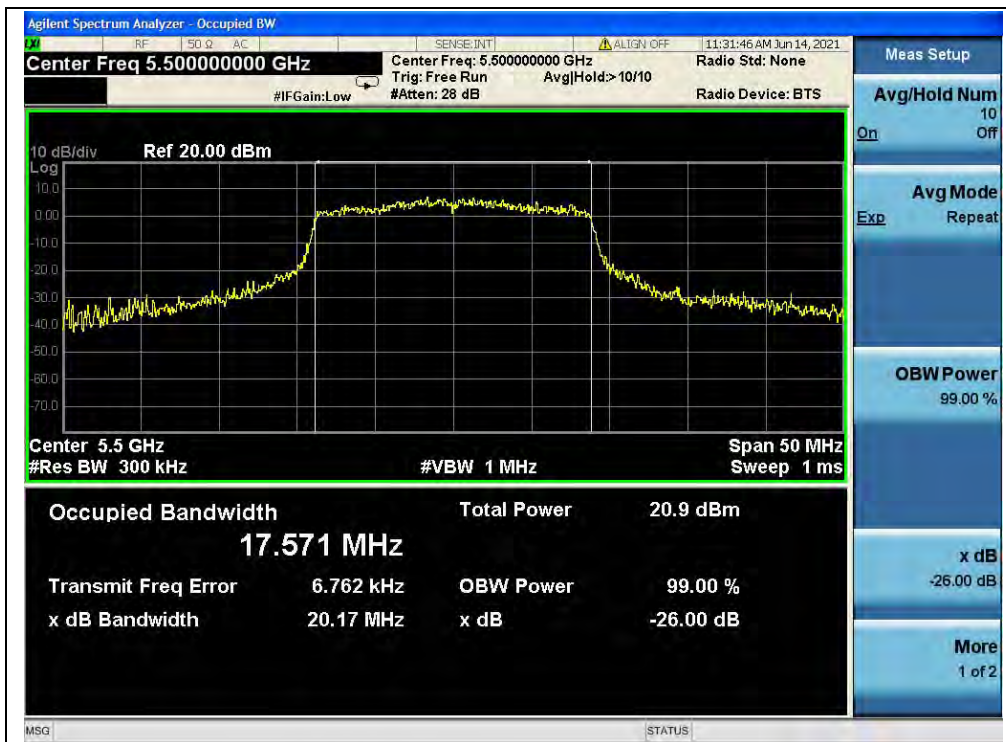
(Channel 52, 5260MHz, 802.11ac (VHT20))



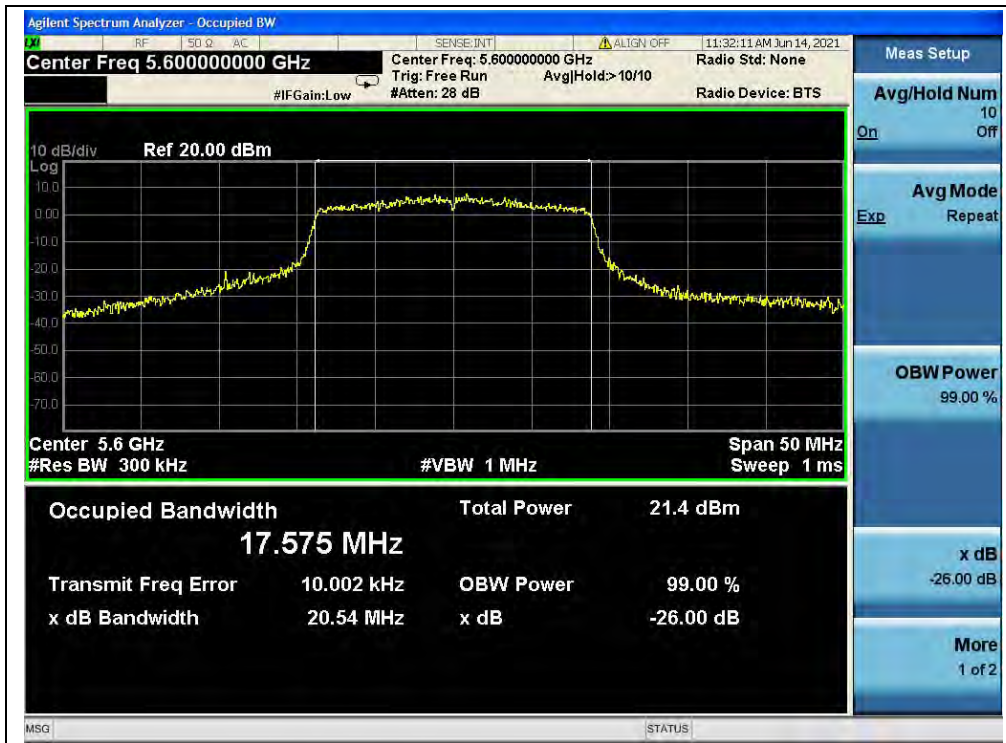
(Channel 60, 5300MHz, 802.11ac (VHT20))



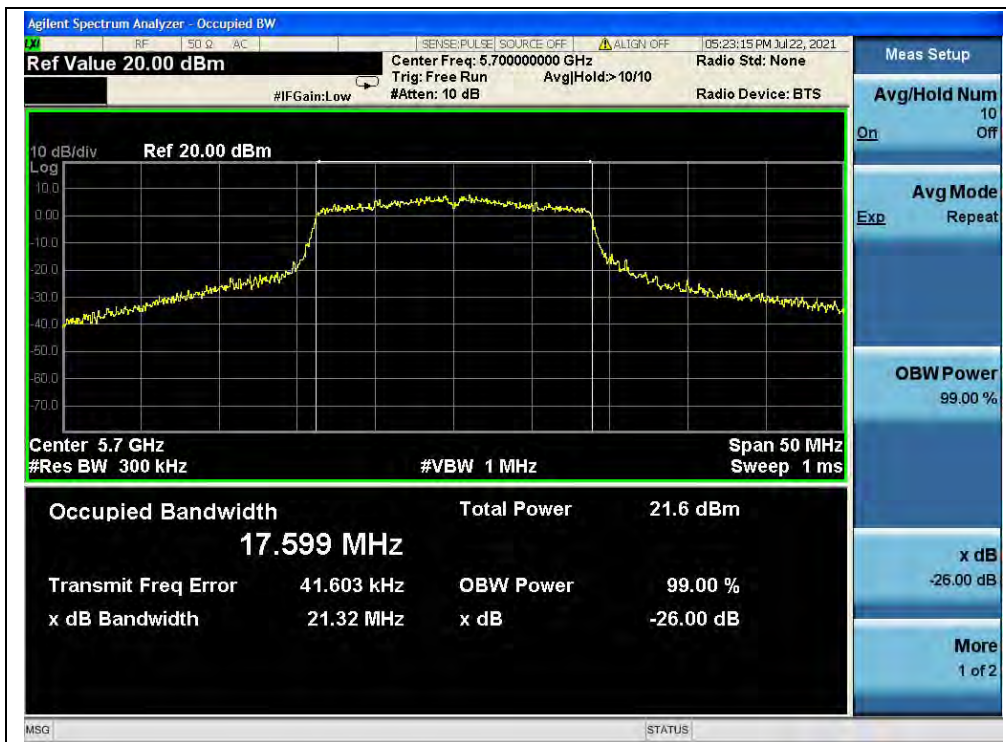
(Channel 64, 5320MHz, 802.11ac (VHT20))



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



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



(Channel 140, 5700MHz, 802.11ac (VHT20))



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



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



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

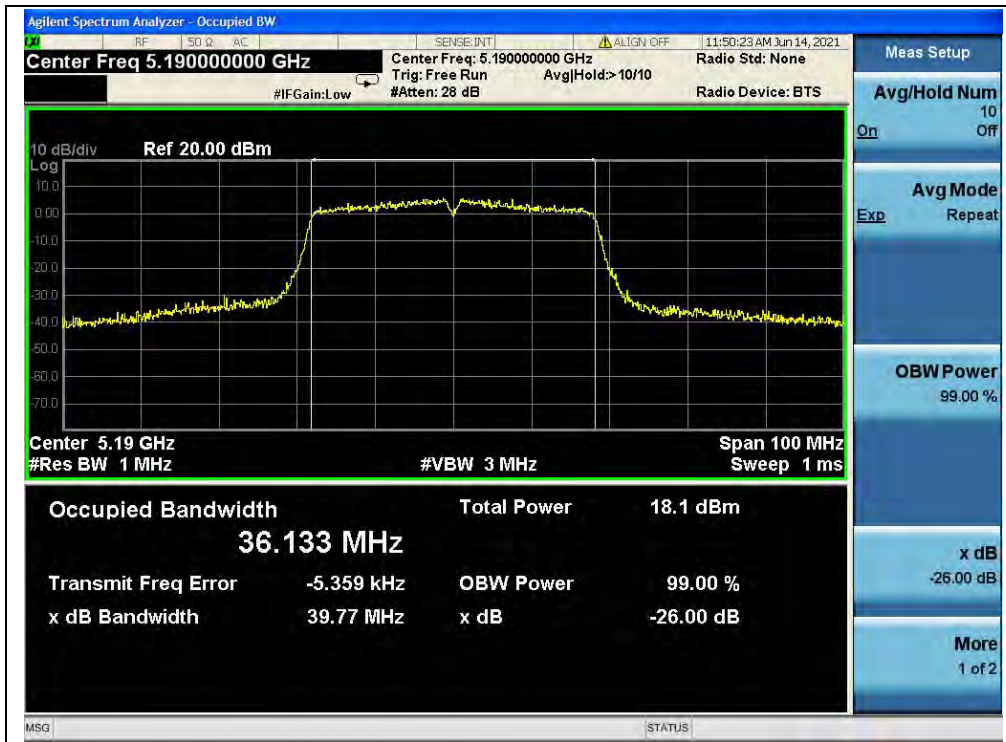


802.11ac (VHT40) Mode

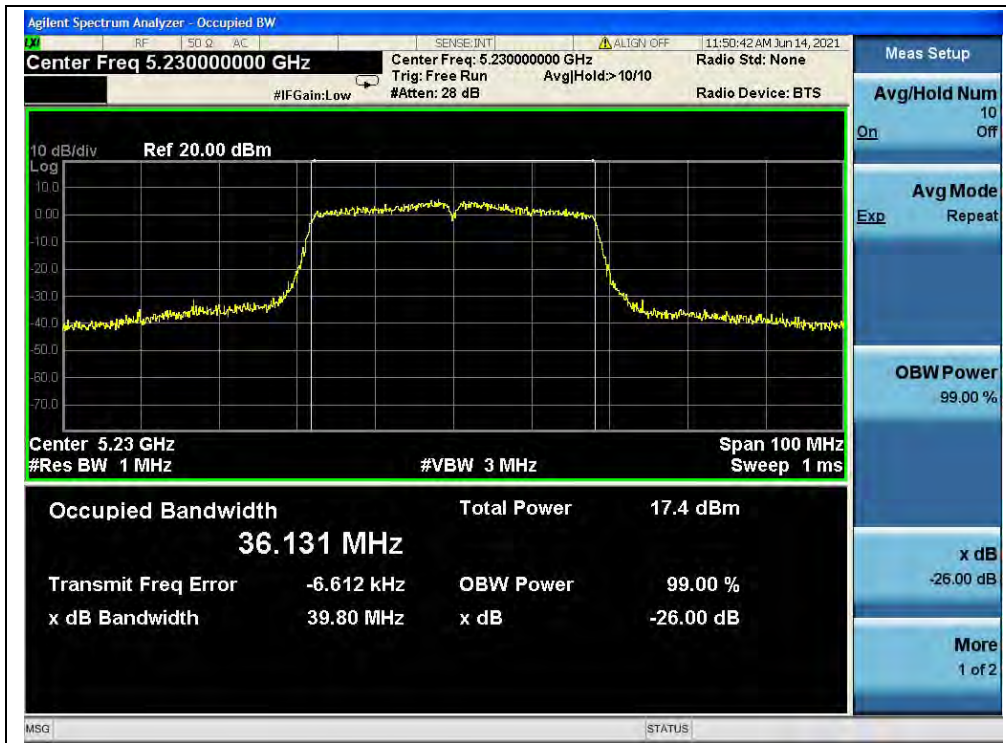
A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
38	5190	39.77
46	5230	39.80
54	5270	40.53
62	5310	39.71
102	5510	39.95
126	5630	53.11
134	5670	41.55
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)
151	5755	33.50
159	5795	33.21

B. Test Plot:



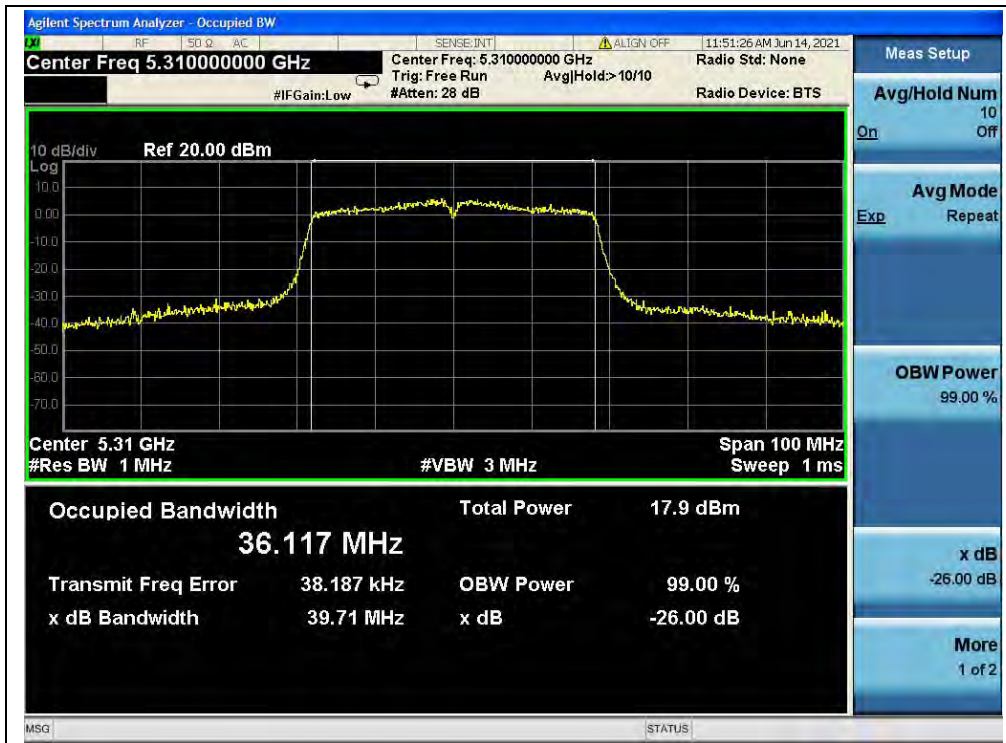
(Channel 38, 5190MHz, 802.11ac (VHT40))



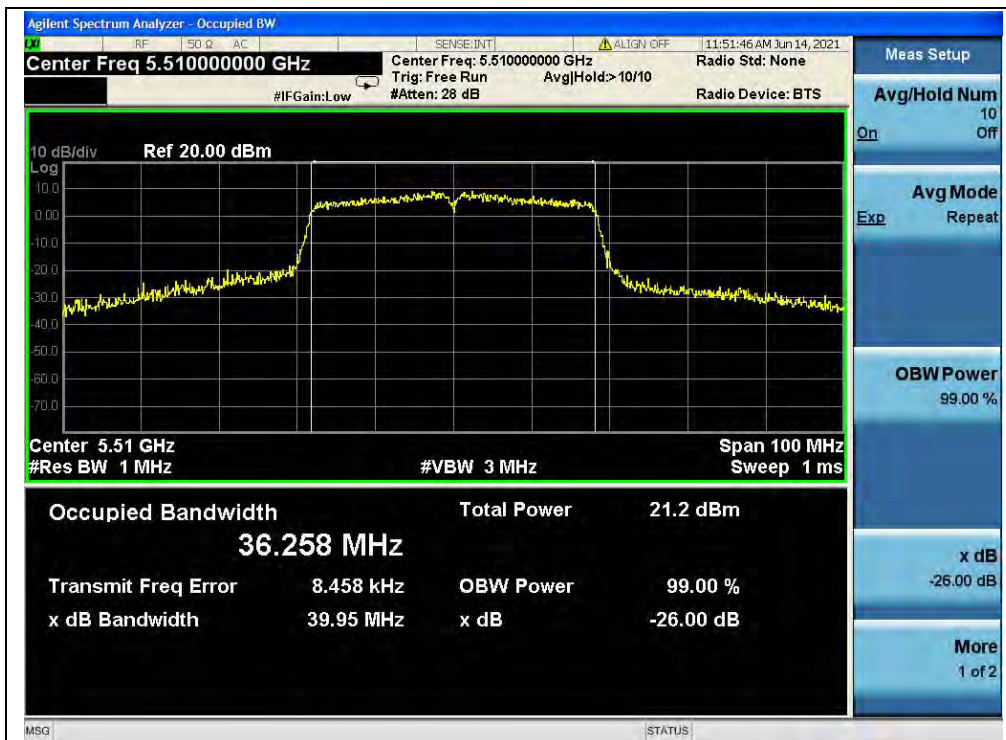
(Channel 46, 5230MHz, 802.11ac (VHT40))



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



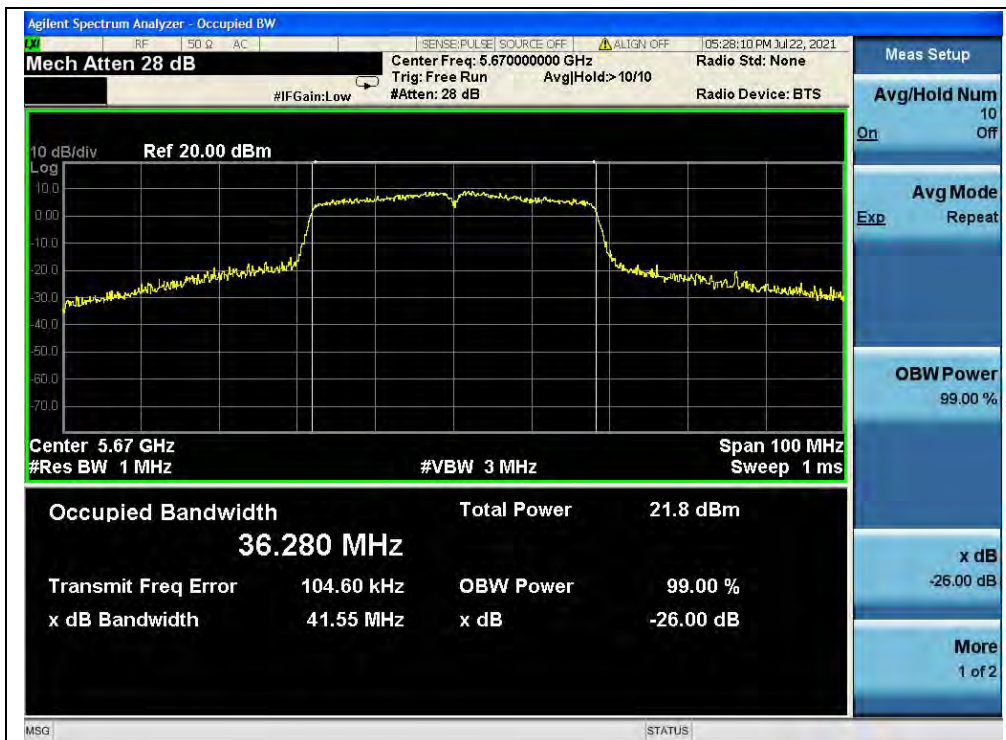
(Channel 62, 5310MHz, 802.11ac (VHT40))



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



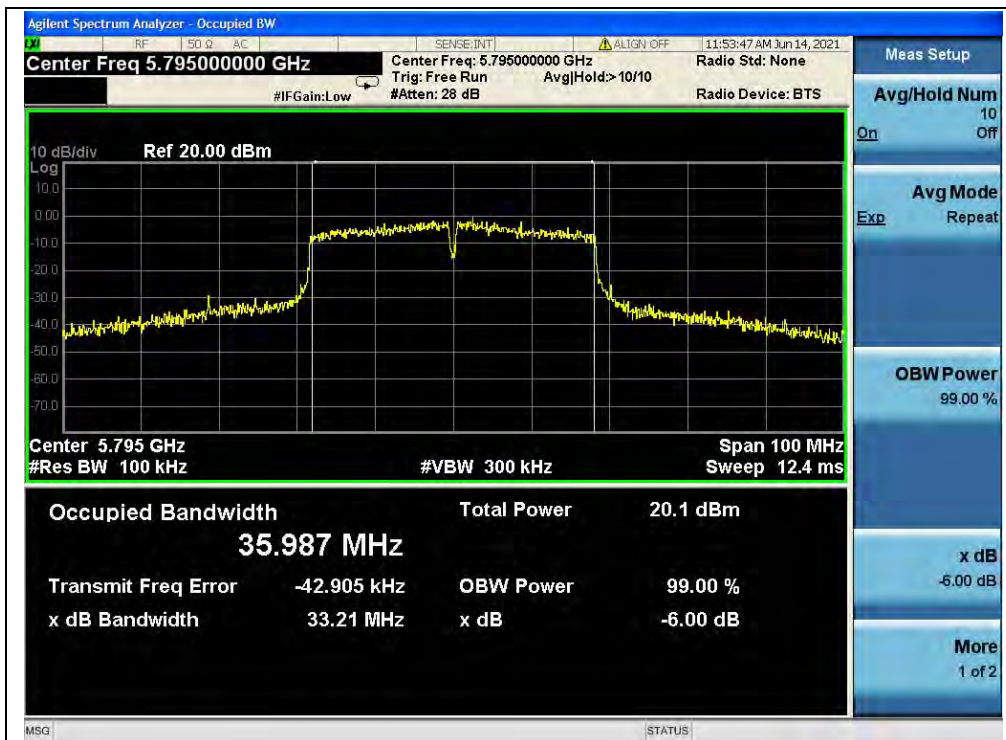
(Channel 126, 5630MHz, 802.11ac (VHT40))



(Channel 134, 5670MHz, 802.11ac (VHT40))



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



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

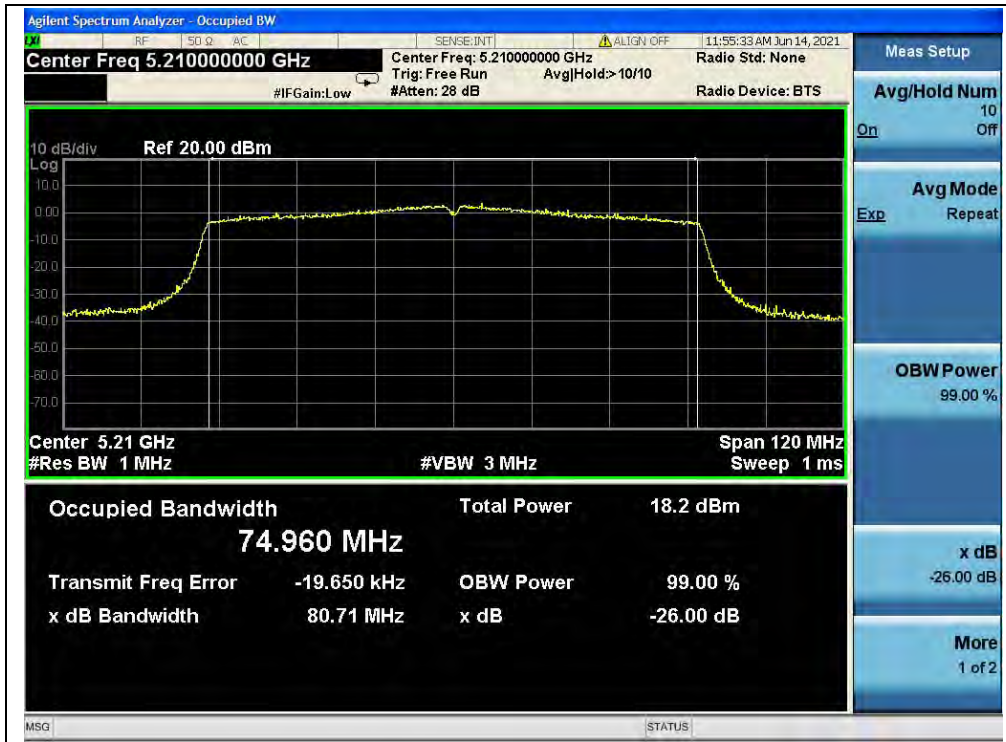


802.11ac (VHT80) Mode

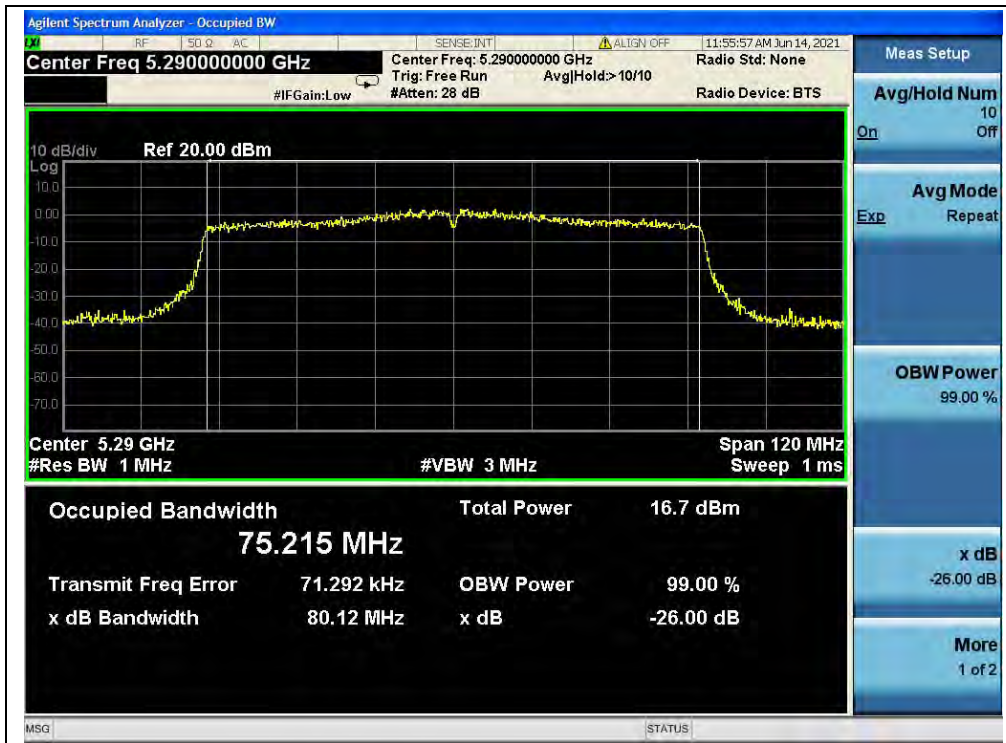
A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
42	5210	80.71
58	5290	80.12
106	5530	80.57
122	5610	83.31
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)
155	5775	54.43

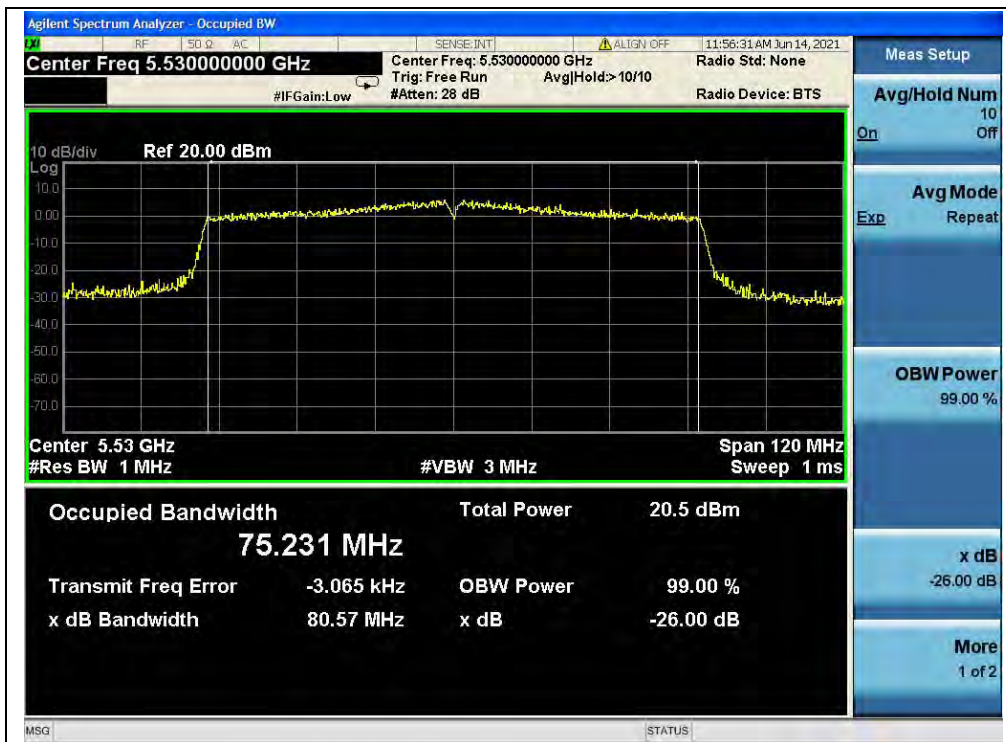
B. Test Plot:



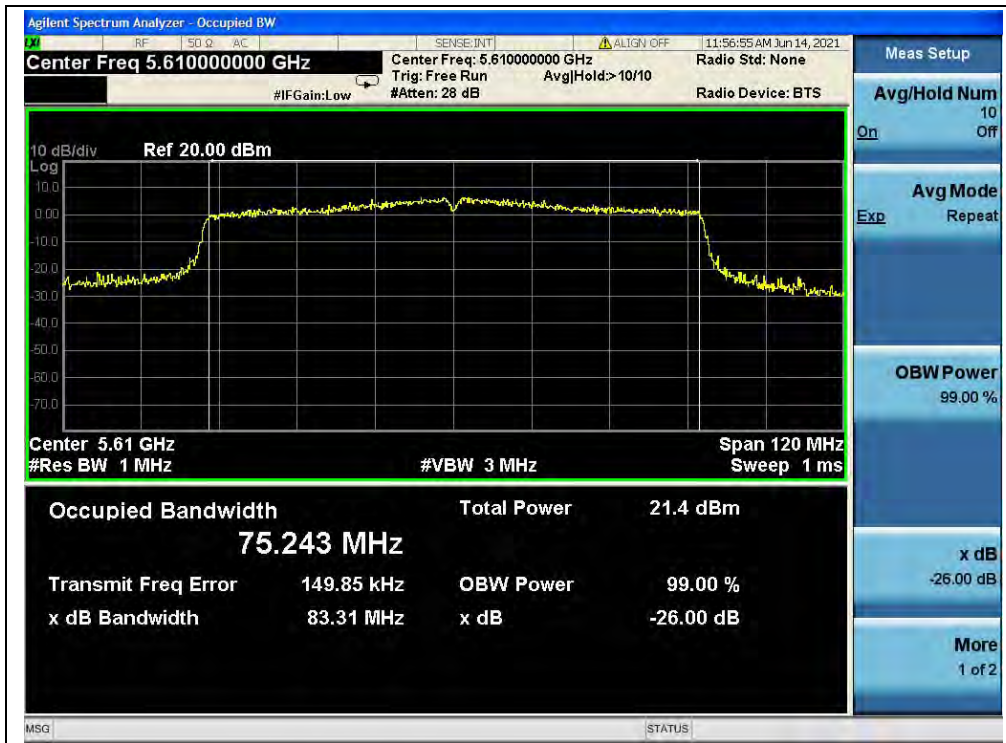
(Channel 42, 5210MHz, 802.11ac (VHT80))



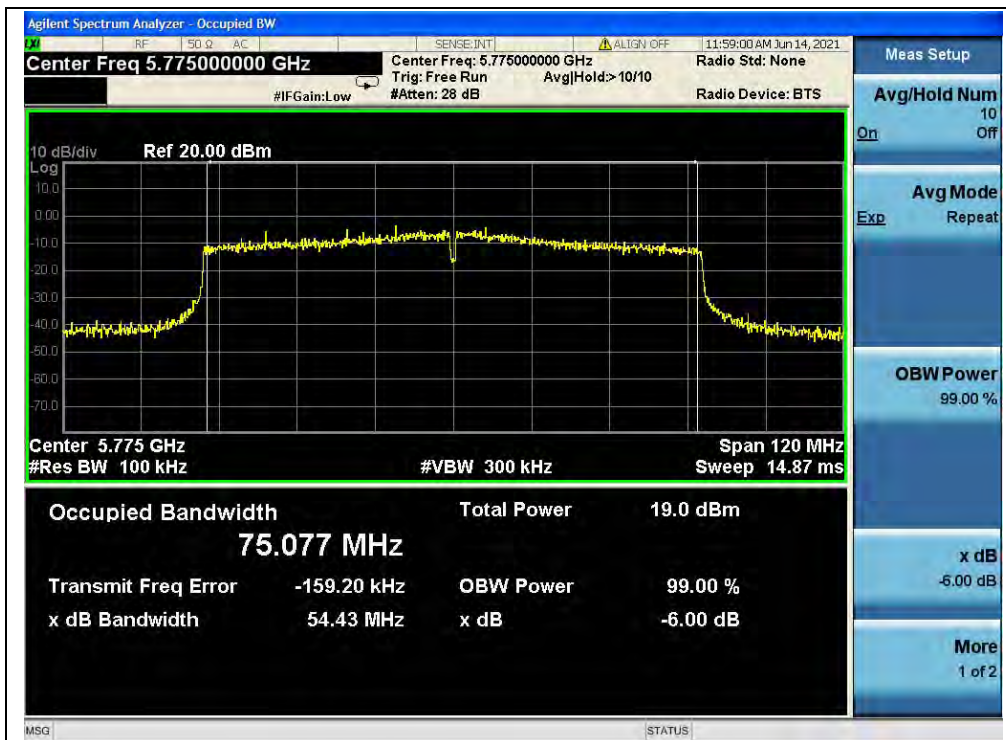
(Channel 58, 5290MHz, 802.11ac (VHT80))



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



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



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

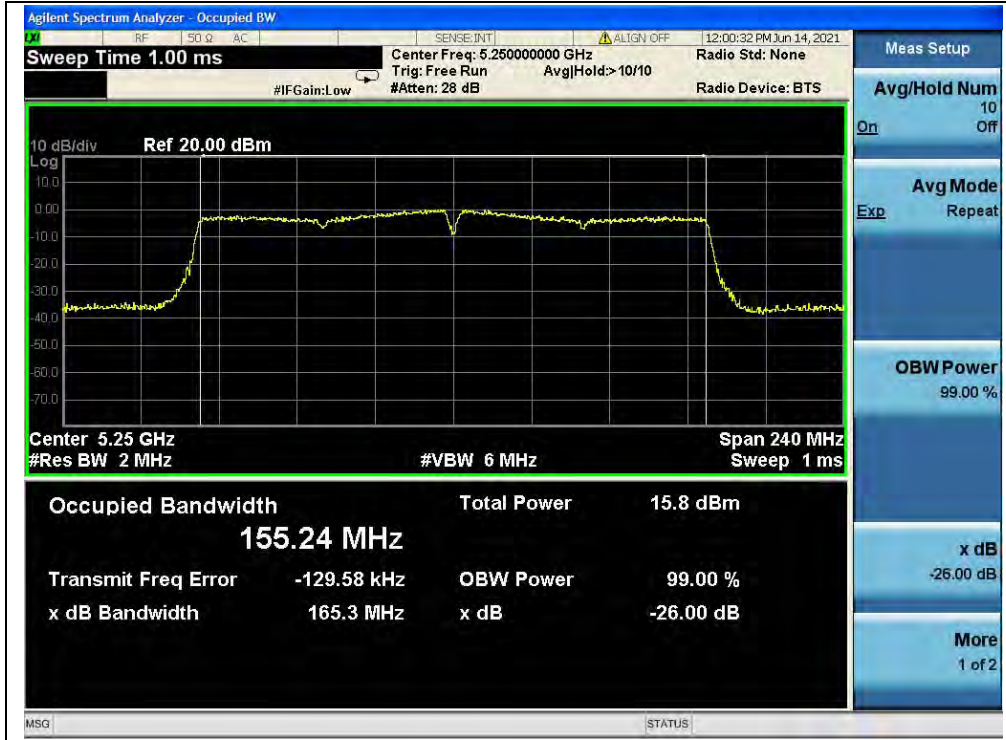


802.11ac (VHT160) Mode

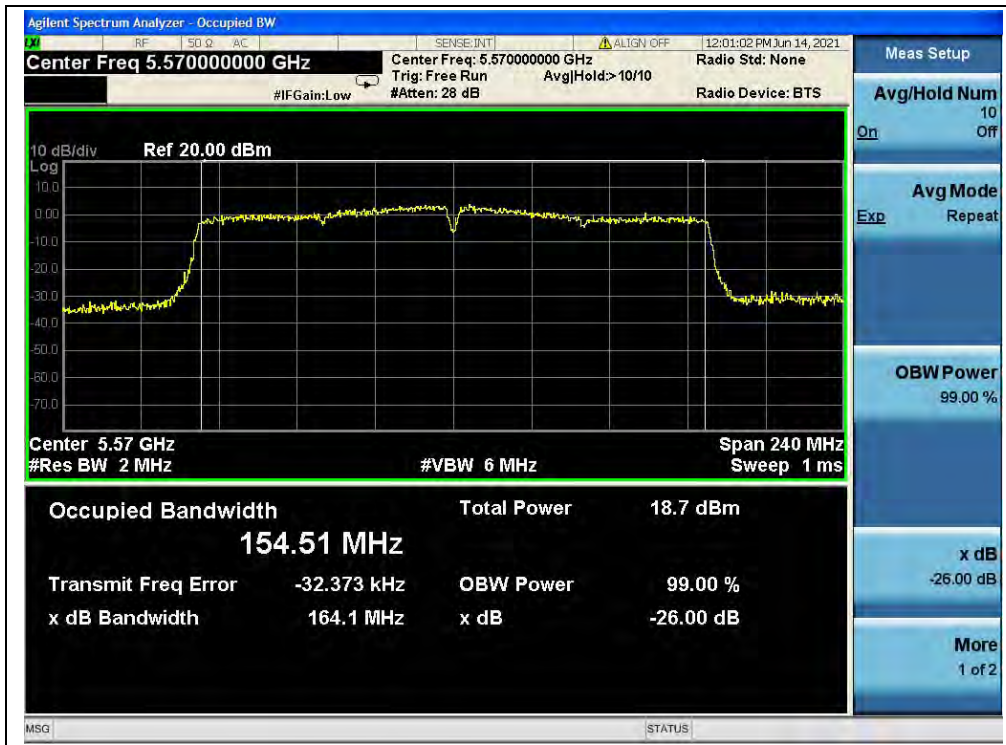
A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
50	5250	165.30
114	5570	164.10

B. Test Plot:



(Channel 50, 5250MHz, 802.11ac (VHT160))



(Channel 114, 5570MHz, 802.11ac (VHT160))



802.11ax (HEW20) Mode

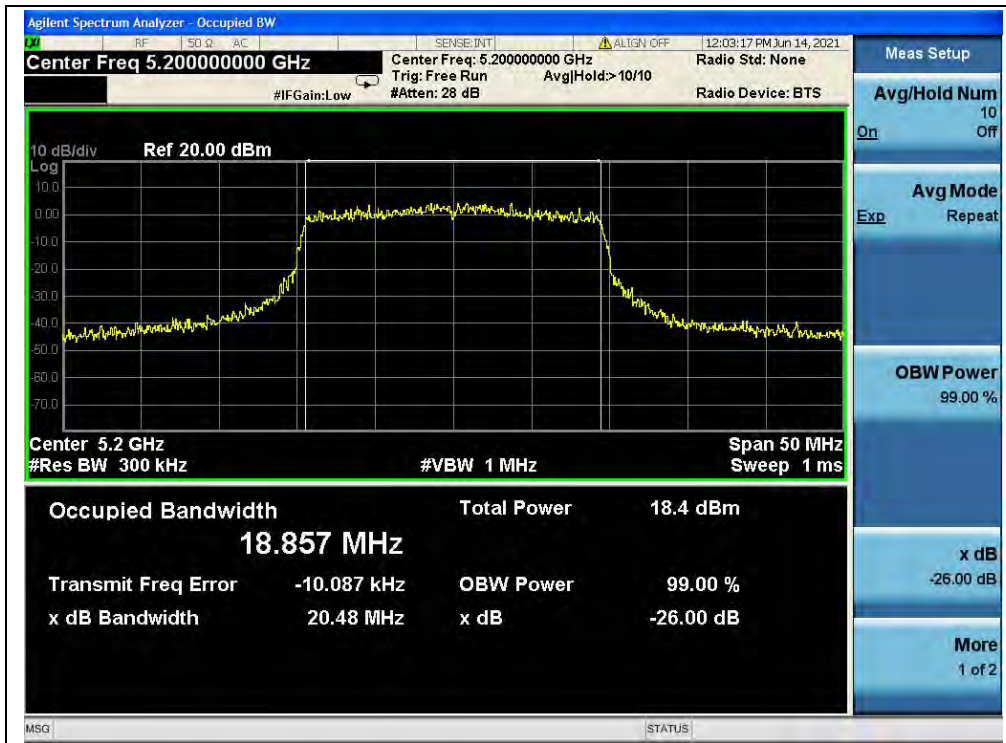
A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
36	5180	20.59
44	5220	20.48
48	5240	20.63
52	5260	21.03
60	5300	20.46
64	5320	20.76
100	5500	21.25
120	5600	25.20
140	5700	23.61
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)
149	5745	14.93
157	5785	15.35
165	5825	18.47

B. Test Plot:



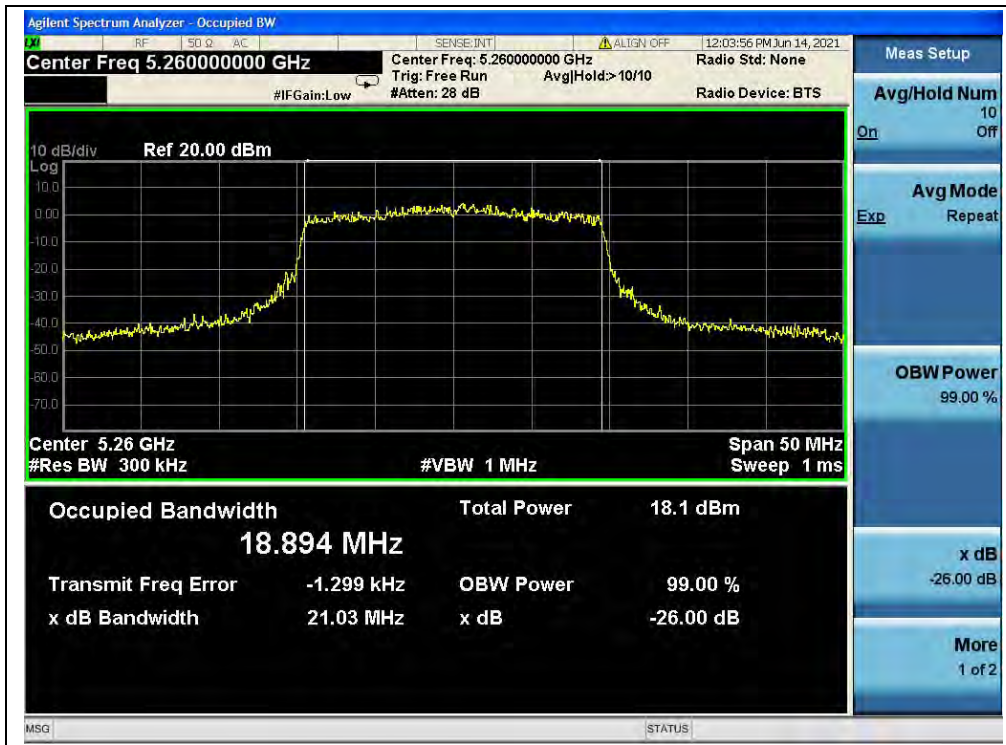
(Channel 36, 5180MHz, 802.11ax (HEW20))



(Channel 44, 5220MHz, 802.11ax (HEW20))



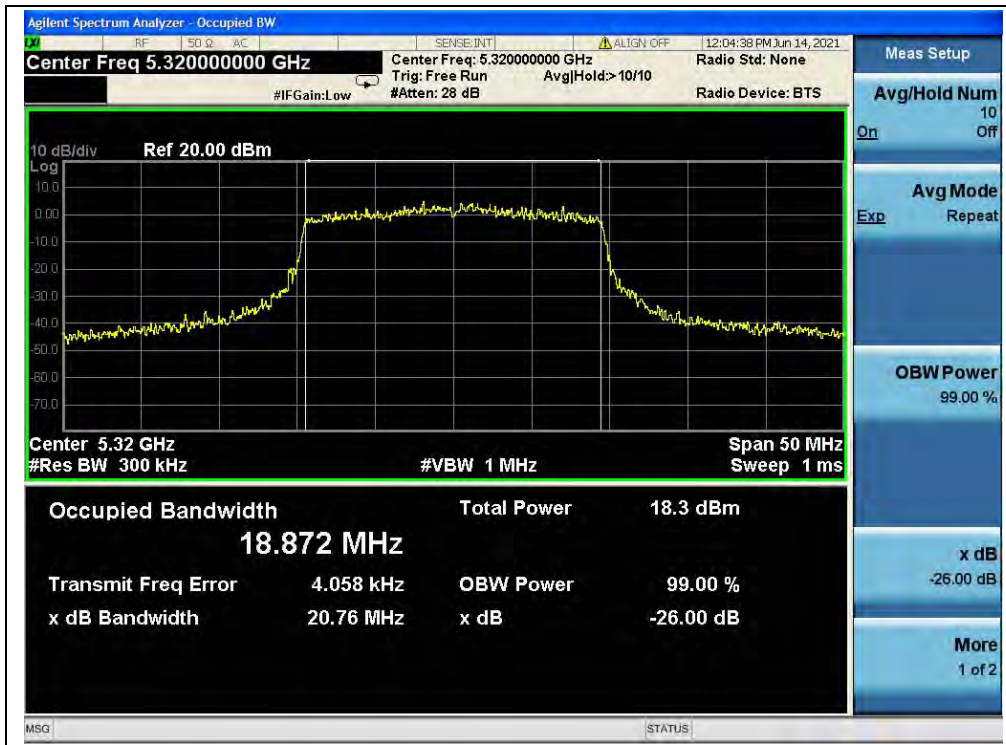
(Channel 48, 5240MHz, 802.11ax (HEW20))



(Channel 52, 5260MHz, 802.11ax (HEW20))



(Channel 60, 5300MHz, 802.11ax (HEW20))



(Channel 64, 5320MHz, 802.11ax (HEW20))



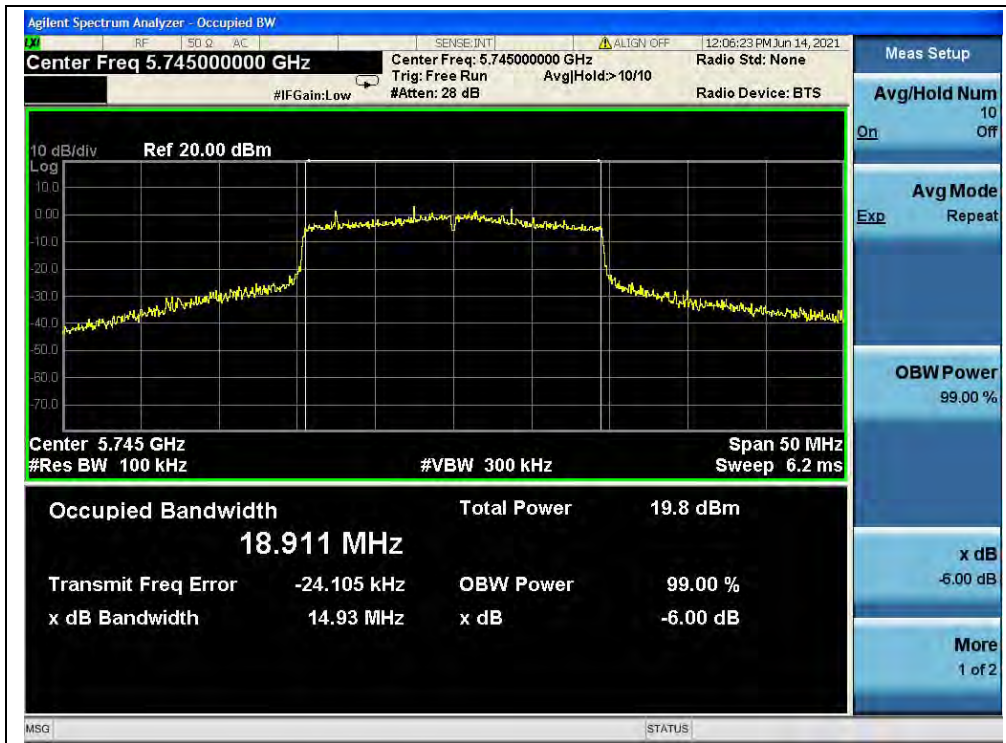
(Channel 100, 5500MHz, 802.11ax (HEW20))



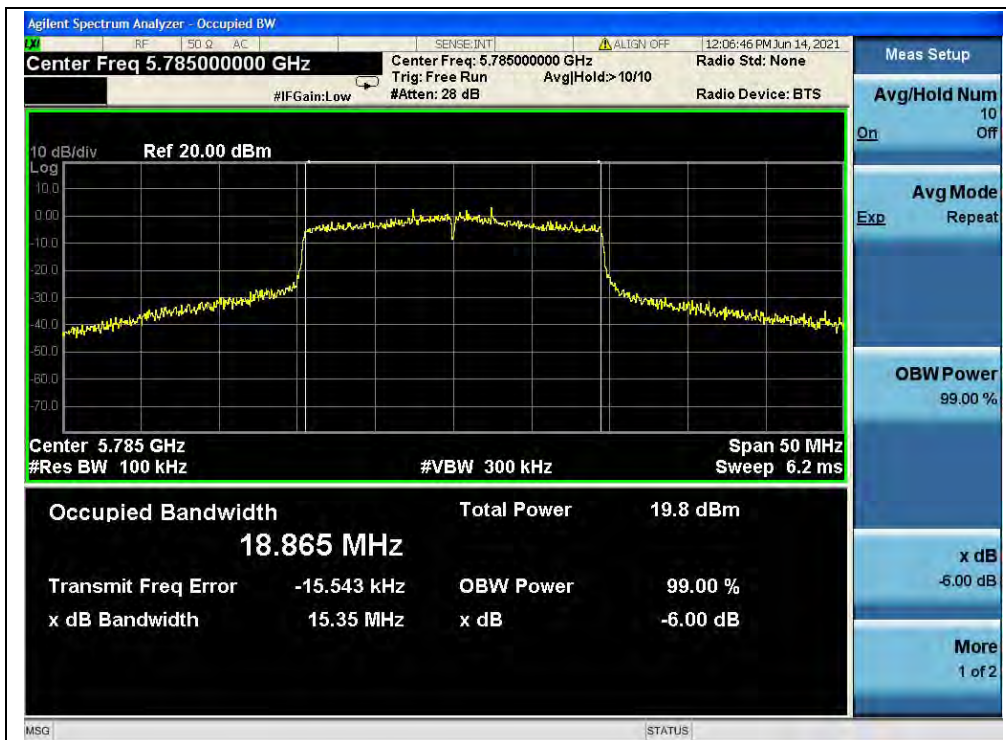
(Channel 120, 5600MHz, 802.11ax (HEW20))



(Channel 140, 5700MHz, 802.11ax (HEW20))



(Channel 149, 5745MHz, 802.11ax (HEW20))



(Channel 157, 5785MHz, 802.11ax (HEW20))



(Channel 165, 5825MHz, 802.11ax (HEW20))



802.11ax (HEW20) RU26 Mode

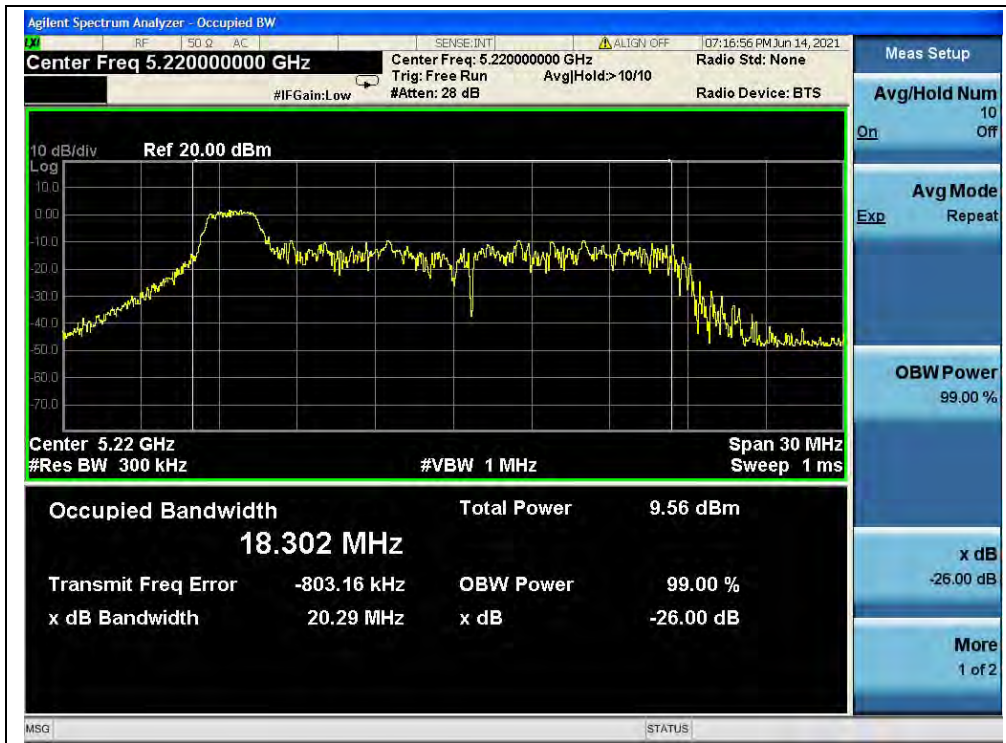
A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
36	5180	20.69
44	5220	20.29
48	5240	20.37
52	5260	20.58
60	5300	20.67
64	5320	20.19
100	5500	20.59
120	5600	20.42
140	5700	20.61
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)
149	5745	2.05
157	5785	2.08
165	5825	2.05

B. Test Plot:



(Channel 36, 5180MHz, 802.11ax (HEW20) RU26)



(Channel 44, 5220MHz, 802.11ax (HEW20) RU26)



(Channel 48, 5240MHz, 802.11ax (HEW20) RU26)



(Channel 52, 5260MHz, 802.11ax (HEW20) RU26)



(Channel 60, 5300MHz, 802.11ax (HEW20) RU26)