



TEST REPORT

APPLICANT : Ricoh Company Ltd
PRODUCT NAME : RICOH Meeting 360 V1
MODEL NAME : E0A8-17
BRAND NAME : RICOH
FCC ID : BBP-WLANG01
STANDARD(S) : 47 CFR Part 15 Subpart E
RECEIPT DATE : 2021-09-01
TEST DATE : 2021-09-07 to 2021-09-30
ISSUE DATE : 2022-07-12

Edited by: Zeng Xiaoying
Zeng Xiaoying (Rapporteur)

Approved by: Shen Junsheng
Shen Junsheng (Supervisor)

NOTE: This document is issued by Shenzhen Morlab Communications Technology Co., Ltd., the test report shall not be reproduced except in full without prior written permission of the company. The test results apply only to the particular sample(s) tested and to the specific tests carried out which is available on request for validation and information confirmed at our website.





DIRECTORY

- 1. Technical Information 3**
- 1.1. Applicant and Manufacturer Information 3**
- 1.2. Equipment Under Test (EUT) Description 3**
- 1.3. Modulation Type and Data Rate of EUT 4**
- 1.4. The Channel Number and Frequency 5**
- 1.5. Test Standards and Results 6**
- 1.6. Environmental Conditions 7**
- 2. 47 CFR Part 15E Requirements 8**
- 2.1. Antenna Requirement 8**
- 2.2. Duty Cycle of the Test Signal 9**
- 2.3. Maximum Conducted Output Power 14**
- 2.4. Emission Bandwidth 19**
- 2.5. Peak Power Spectral Density 58**
- 2.6. Frequency Stability 99**
- 2.7. Conducted Emission 102**
- 2.8. Restricted Frequency Bands 106**
- 2.9. Radiated Emission 126**
- Annex A Test Uncertainty 157**
- Annex B Testing Laboratory Information 158**

Change History		
Version	Date	Reason for change
1.0	2022-07-12	First edition



1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Ricoh Company Ltd
Applicant Address:	2-7-1 Izumi, Ebina, Kanagawa 243-0460, Japan
Manufacturer:	Ricoh Company Ltd
Manufacturer Address:	2-7-1 Izumi, Ebina, Kanagawa 243-0460, Japan

1.2. Equipment Under Test (EUT) Description

Product Name:	RICOH Meeting 360 V1	
Sample No.:	1#	
Hardware Version:	V0.90	
Software Version:	V1.0	
Modulation Technology:	OFDM	
Modulation Mode:	802.11a, 802.11n (HT20), 802.11n (HT40) 802.11ac (VHT20), 802.11ac (VHT40), 802.11ac (VHT80),	
Operating Frequency Range:	5180MHz-5240MHz; 5260MHz-5320MHz; 5500MHz-5720MHz; 5745MHz-5825MHz	
Channel Number:	Refer to 1.3	
Antenna Type:	Dipole Antenna	
Antenna Gain:	2.9dBi	
Accessory Information:	AC Adapter	
	Brand Name:	N/A
	Model No.:	PA1030-2T2
	Serial No.:	N/A
	Rated Output:	12V \pm 3A
	Rated Input:	100-240V \sim 50/60Hz, 0.8A
	Manufacturer:	Powertron Electronics Corp.

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

Note 2: We use the dedicated software to control the EUT continuous transmission.

Note 3: 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) ^{Note1}
OFDM (802.11a)	BPSK	6/9
	QPSK	12/18
	16QAM	24/36
	64QAM	48/54
OFDM (802.11n)	BPSK	6.5
	QPSK	13/19.5
	16QAM	26/39
	64QAM	52/58.5/65
OFDM (802.11ac)	BPSK	6.5
	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

(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		
(U-NII-2C) 5500MHz-5720MHz				
Bandwidth	Channel	Frequency (MHz)	Channel	Frequency (MHz)
20MHz	100	5500	105	5520
			108	5540
			116	5580
			124	5620
			132	5660
			140	5700
40MHz	102	5510	110	5550
			118	5590
			134	5670
80MHz	106	5530	122	5610
	138	5690		
(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	Sep 08, 2021	Meng Shurui	PASS	No deviation
3	15.407(a)	Maximum Conducted Output Power	Sep 18, 2021	Meng Shurui	PASS	No deviation
4	15.407(a)(e)	Emission Bandwidth	Sep 09, 2021	Meng Shurui	PASS	No deviation
5	15.407(a)	Peak Power Spectral Density	Sep 09, 2021	Meng Shurui	PASS	No deviation
6	15.407(g)	Frequency Stability	Sep 10, 2021	Meng Shurui	PASS	No deviation
7	15.207	Conducted Emission	Sep 10, 2021	Su Zhan	PASS	No deviation
8	15.407(b)	Restricted Frequency Bands	Oct 09, 2021	Gao Jianrou	PASS	No deviation
9	15.407(b)	Radiated Emission	Sep 30, 2021	Gao Jianrou	PASS	No deviation

Note 1: The DFS test report was documented in a separate report (Report No.: SZ21090008W05).

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 12dB contains two parts that cable loss 2dB 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

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 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.

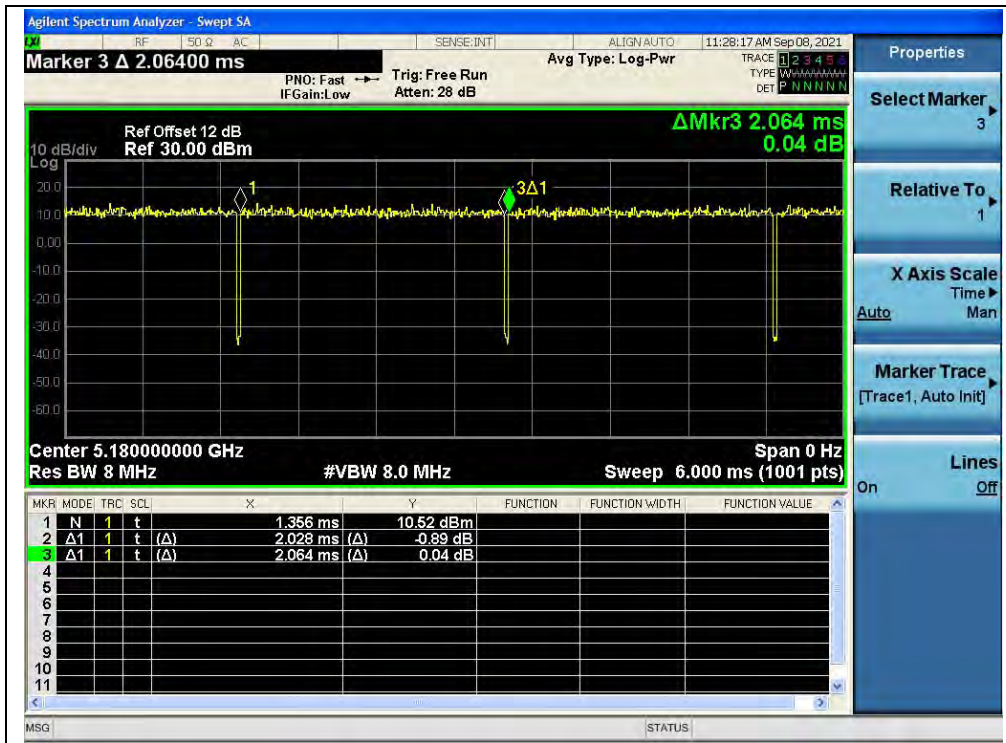


2.2.4. Test Result

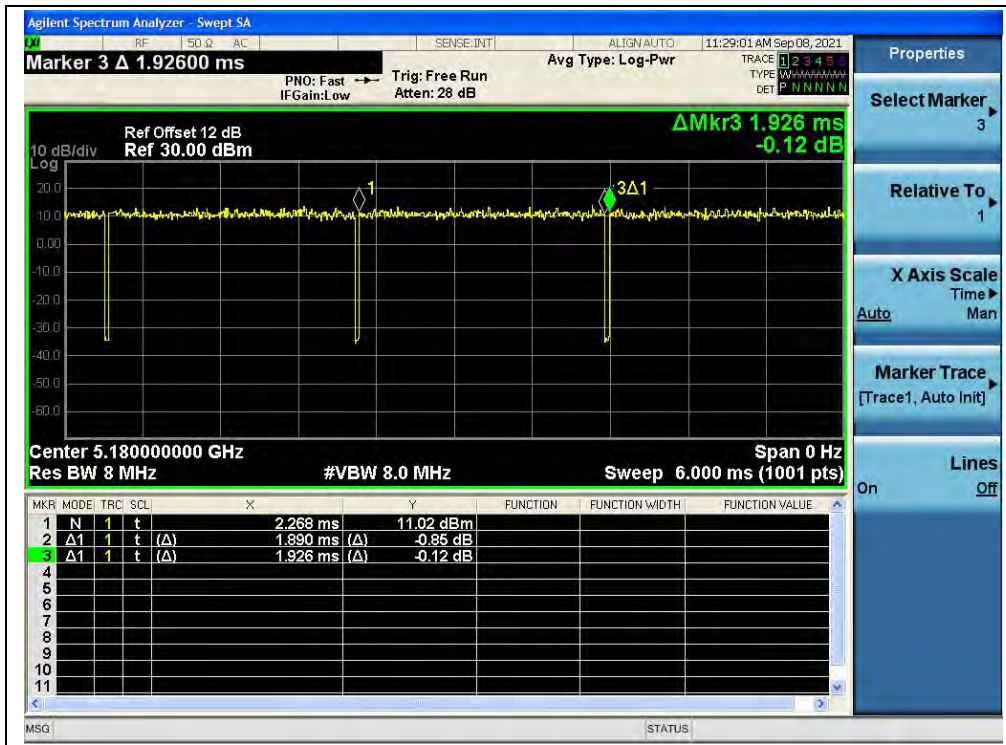
A. Test Verdict:

Test Mode	Duty Cycle (%) (D)	Duty Factor (10*log[1/D])
802.11a	98.54	0.06
802.11n (HT20)	97.93	0.09
802.11n (HT40)	96.88	0.14
802.11ac (VHT20)	97.42	0.11
802.11ac (VHT40)	96.91	0.14
802.11ac (VHT80)	93.88	0.27

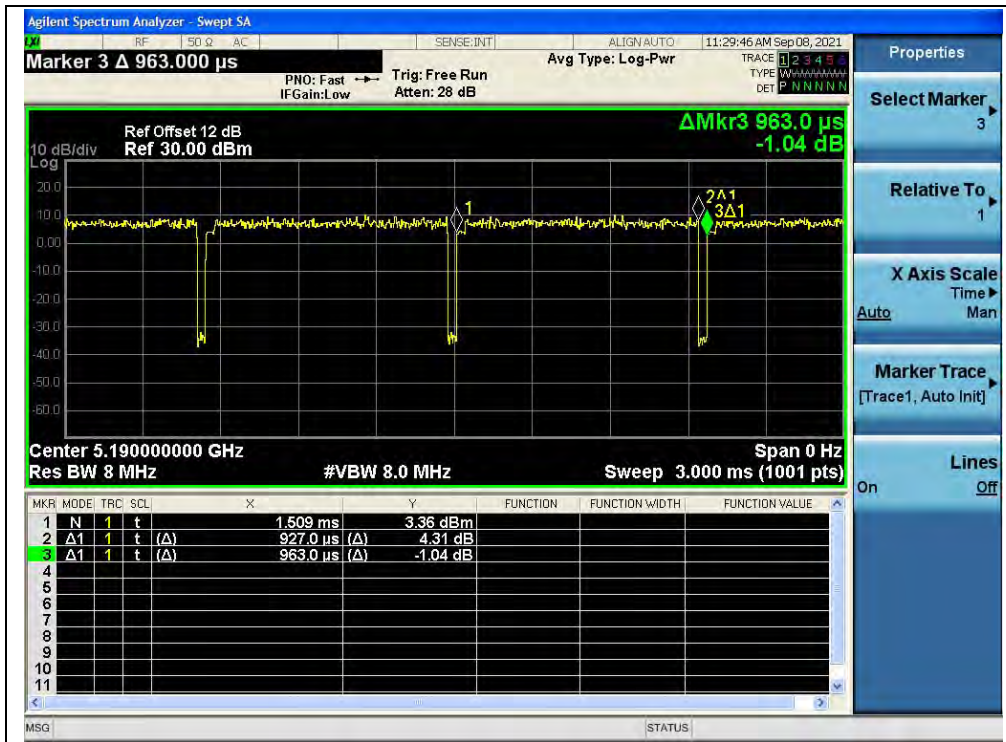
B. Test Plot:



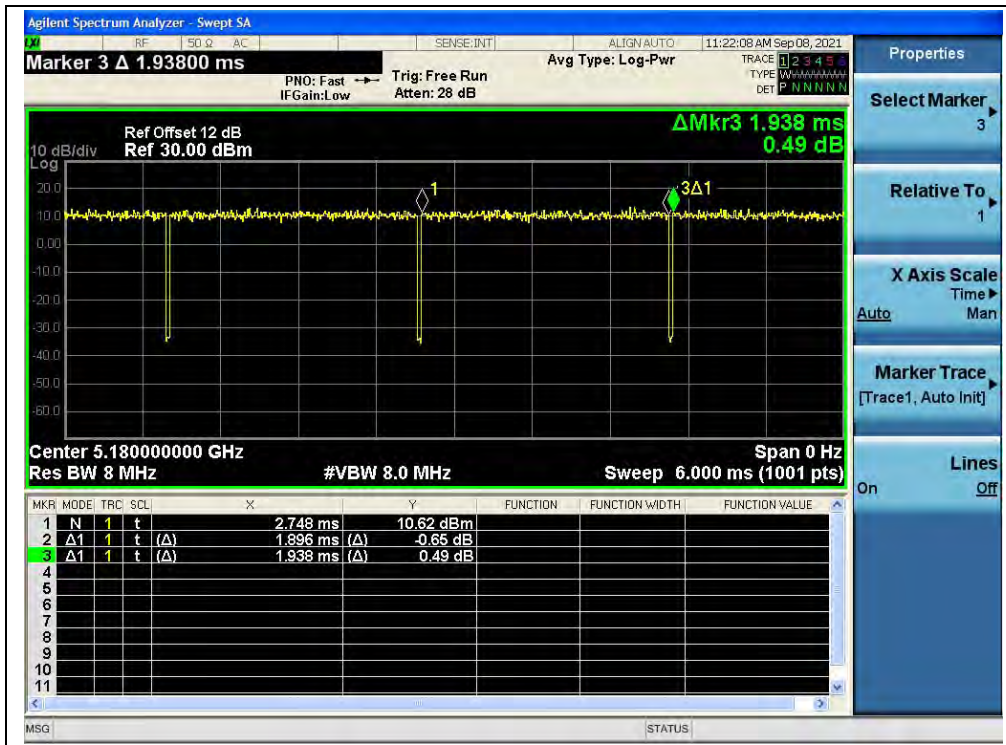
(Channel 36, 5180MHz, 802.11a)



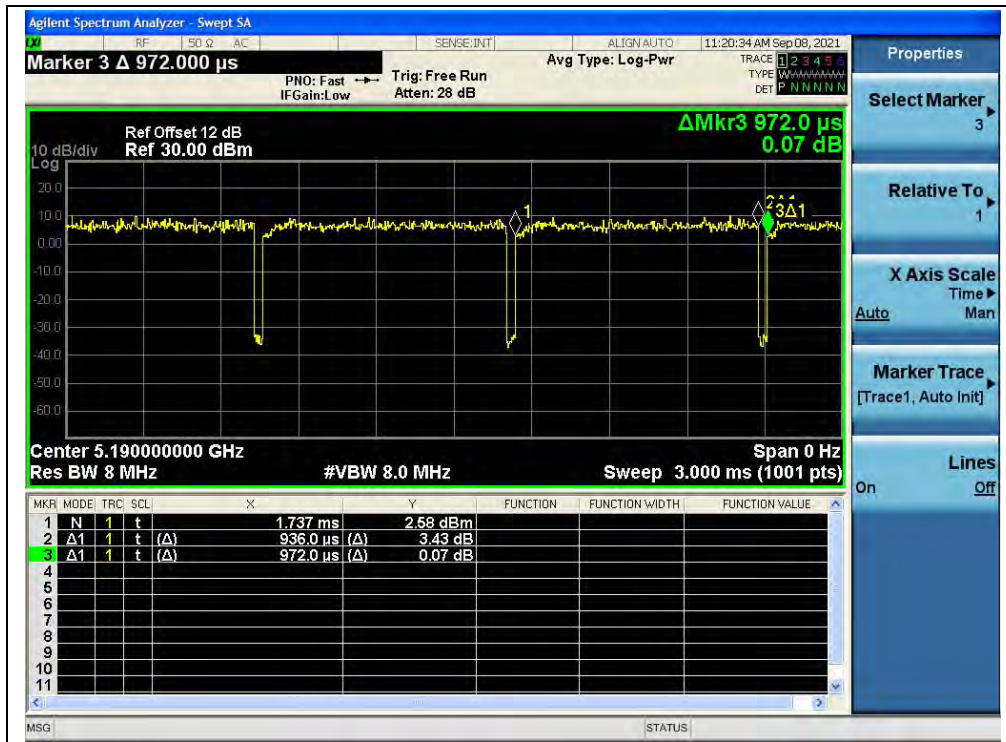
(Channel 36, 5180MHz, 802.11n (HT20))



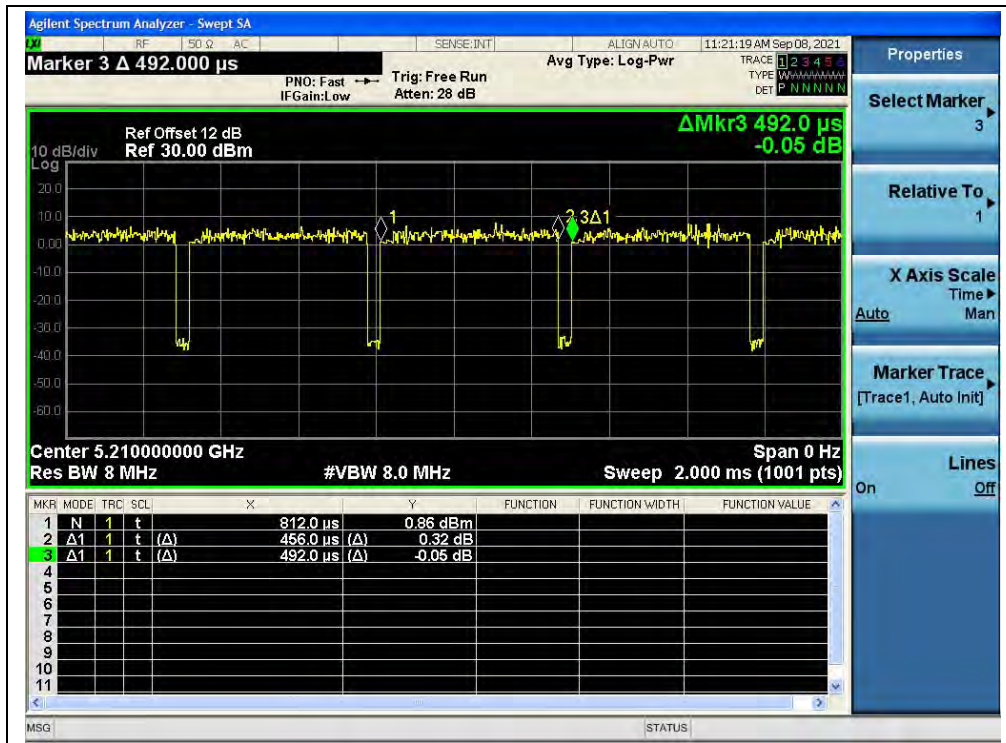
(Channel 38, 5190MHz, 802.11n (HT40))



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



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



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

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.

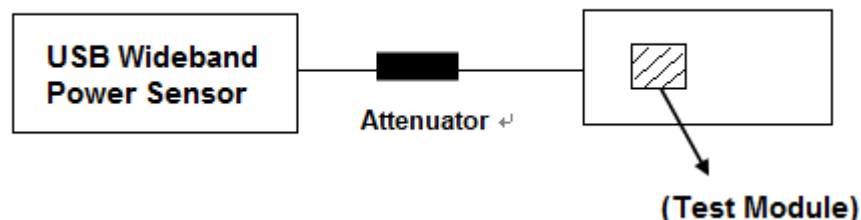
(4) According to KDB662911D01 Measure-and-sum technique, the conducted emission level (e.g., transmit power or power in specified bandwidth) is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically to determine the total emission level from the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

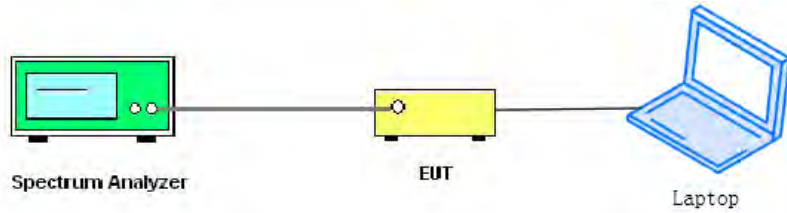
Section E) 3) of KDB 789033 defines a methodology using a USB Wideband Power Sensor.

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)	11+10log(26dB BW)	Limits (dBm)
a	UNII-2a	5260	22.28	24.48	24.00
		5300	22.56	24.53	24.00
		5320	22.37	24.50	24.00
	UNII-2c	5500	23.85	24.77	24.00
		5600	22.75	24.57	24.00
		5720	22.70	24.56	24.00
n20	UNII-2a	5260	23.28	24.67	24.00
		5300	22.36	24.49	24.00
		5320	24.21	24.84	24.00
	UNII-2c	5500	23.65	24.74	24.00
		5600	23.34	24.68	24.00
		5720	23.18	24.65	24.00
ac20	UNII-2a	5260	22.58	24.54	24.00
		5300	24.34	24.86	24.00
		5320	24.38	24.87	24.00
	UNII-2c	5500	23.61	24.73	24.00
		5600	24.34	24.86	24.00
		5720	24.69	24.93	24.00



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		dBm	W	
	dBm		dBm	W			
5180	14.97	0.06	15.03	0.032	24	0.25	PASS
5220	14.52		14.58	0.029			
5240	14.43		14.49	0.028			
5260	13.97		14.03	0.025			
5300	13.06		13.12	0.021			
5320	12.87		12.93	0.020			
5500	11.69		11.75	0.015			
5600	12.98		13.04	0.020			
5720	15.20		15.26	0.034			
5745	15.25		15.31	0.034	30	1	
5785	15.70		15.76	0.038			
5825	15.81		15.87	0.039			

802.11n (HT20) Mode

Frequency (MHz)	Average Power				Limit		Verdict
	Measured	Duty Factor	Duty factor Calculated		dBm	W	
	dBm		dBm	W			
5180	13.95	0.09	14.04	0.025	24	0.25	PASS
5220	13.65		13.74	0.024			
5240	13.38		13.47	0.022			
5260	12.92		13.01	0.020			
5300	12.03		12.12	0.016			
5320	11.75		11.84	0.015			
5500	10.70		10.79	0.012			
5600	11.93		12.02	0.016			
5720	14.25		14.34	0.027			
5745	14.11		14.20	0.026	30	1	
5785	14.65		14.74	0.030			
5825	14.86		14.95	0.031			



802.11n (HT40) Mode

Frequency (MHz)	Average Power				Limit		Verdict
	Measured	Duty Factor	Duty factor Calculated		dBm	W	
	dBm		dBm	W			
5190	12.64	0.14	12.78	0.019	24	0.25	PASS
5230	14.12		14.26	0.027			
5270	13.23		13.37	0.022			
5310	12.40		12.54	0.018			
5510	9.98		10.12	0.010			
5630	13.04		13.18	0.021			
5710	14.55		14.69	0.029			
5755	14.64		14.78	0.030	30	1	
5795	15.16		15.30	0.034			

802.11ac (VHT20) Mode

Frequency (MHz)	Average Power				Limit		Verdict
	Measured	Duty Factor	Duty factor Calculated		dBm	W	
	dBm		dBm	W			
5180	13.48	0.11	13.59	0.023	24	0.25	PASS
5220	13.08		13.19	0.021			
5240	12.82		12.93	0.020			
5260	12.32		12.43	0.017			
5300	11.41		11.52	0.014			
5320	11.23		11.34	0.014			
5500	10.14		10.25	0.011			
5600	11.29		11.40	0.014			
5720	13.52		13.63	0.023			
5745	13.44		13.55	0.023	30	1	
5785	13.94		14.05	0.025			
5825	14.17		14.28	0.027			



802.11ac (VHT40) Mode

Frequency (MHz)	Average Power				Limit		Verdict
	Measured	Duty Factor	Duty factor Calculated		dBm	W	
	dBm		dBm	W			
5190	13.61	0.14	13.75	0.024	24	0.25	PASS
5230	13.16		13.30	0.021			
5270	12.27		12.41	0.017			
5310	11.51		11.65	0.015			
5510	10.45		10.59	0.011			
5630	12.18		12.32	0.017			
5710	13.74		13.88	0.024			
5755	13.80		13.94	0.025	30	1	
5795	14.37		14.51	0.028			

802.11ac (VHT80) Mode

Frequency (MHz)	Average Power				Limit		Verdict
	Measured	Duty Factor	Duty factor Calculated		dBm	W	
	dBm		dBm	W			
5210	11.21	0.27	11.48	0.014	24	0.25	PASS
5290	10.02		10.29	0.011			
5530	9.54		9.81	0.010			
5610	11.38		11.65	0.015			
5690	13.06		13.33	0.022			
5775	13.58		13.85	0.024	30	1	

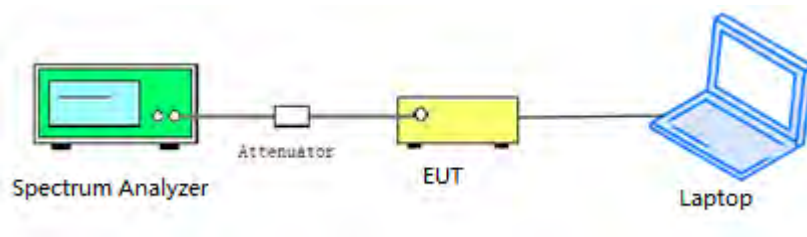
2.4. Emission Bandwidth

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 50Ohm; 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 theband5.715-5.85 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

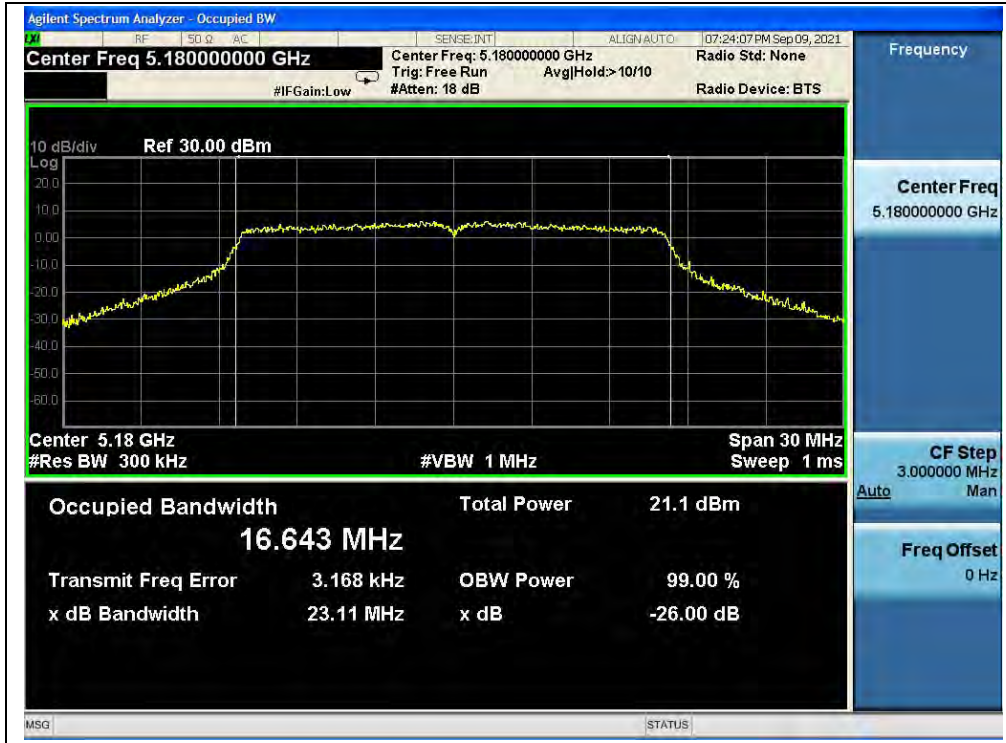
802.11a Mode

A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
36	5180	23.11
44	5220	22.28
48	5240	23.21
52	5260	22.28
60	5300	22.56
64	5320	22.37
100	5500	23.85
120	5600	22.75
144	5720	22.70
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)
144	5720	15.24
149	5745	14.81
157	5785	13.70
165	5825	16.28



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)



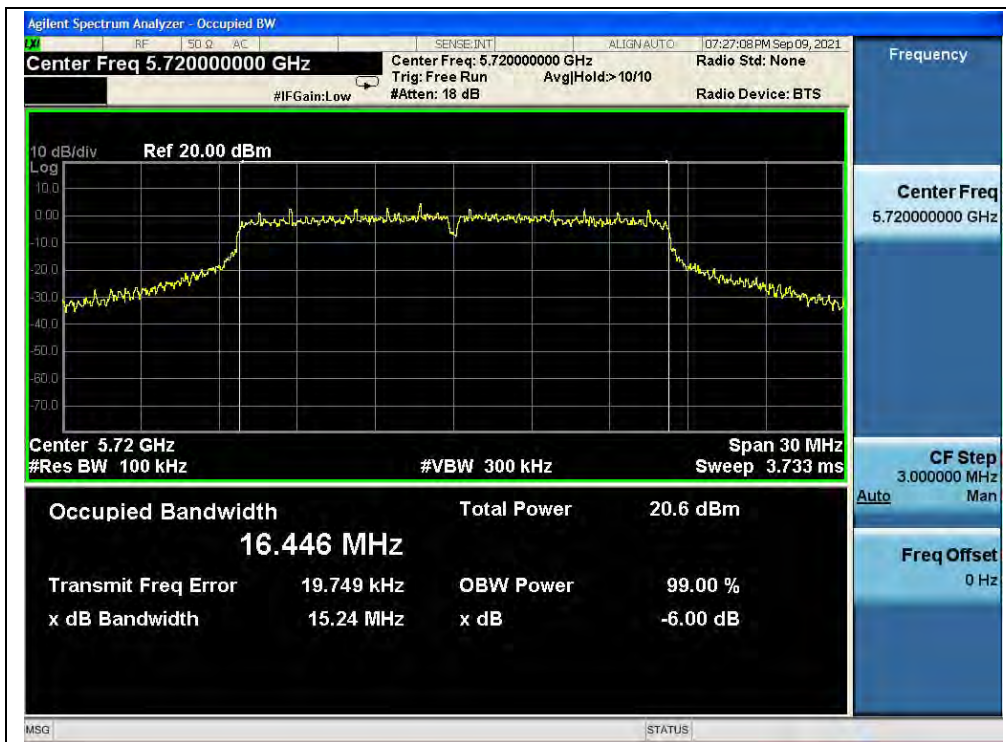
(Channel 100,5500MHz, 802.11a)



(Channel 120,5600 MHz, 802.11a)



(Channel 144, 5720MHz, 802.11a)



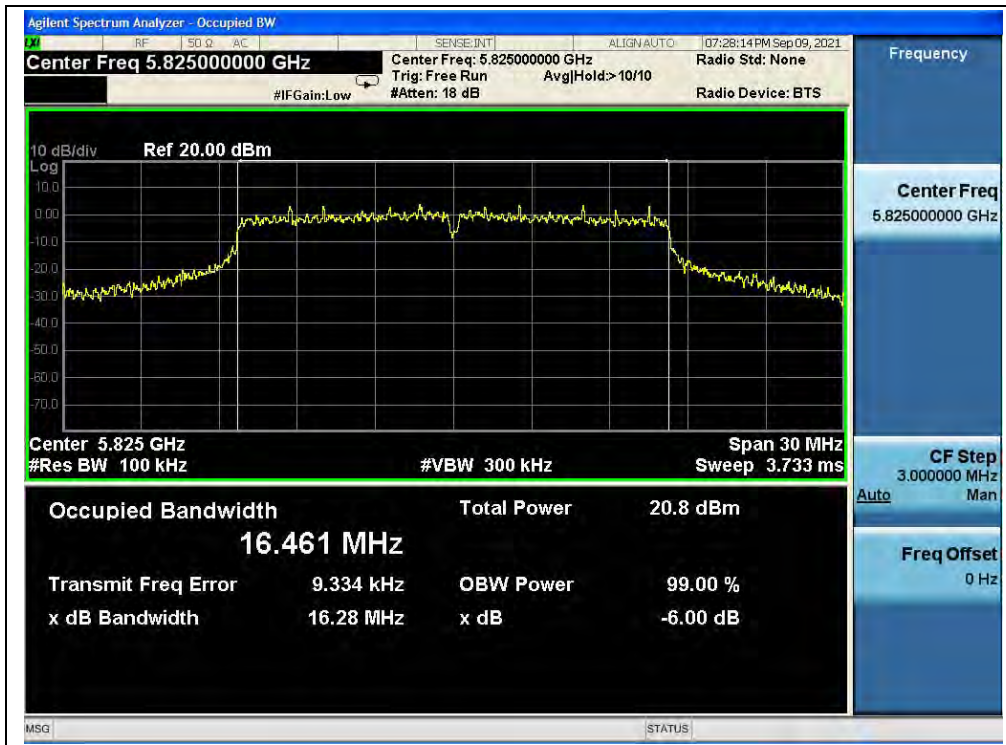
(Channel 144, 5720MHz, 802.11a)



(Channel 149, 5745MHz, 802.11a)



(Channel 157, 5785MHz, 802.11a)



(Channel 165, 5825MHz, 802.11a)

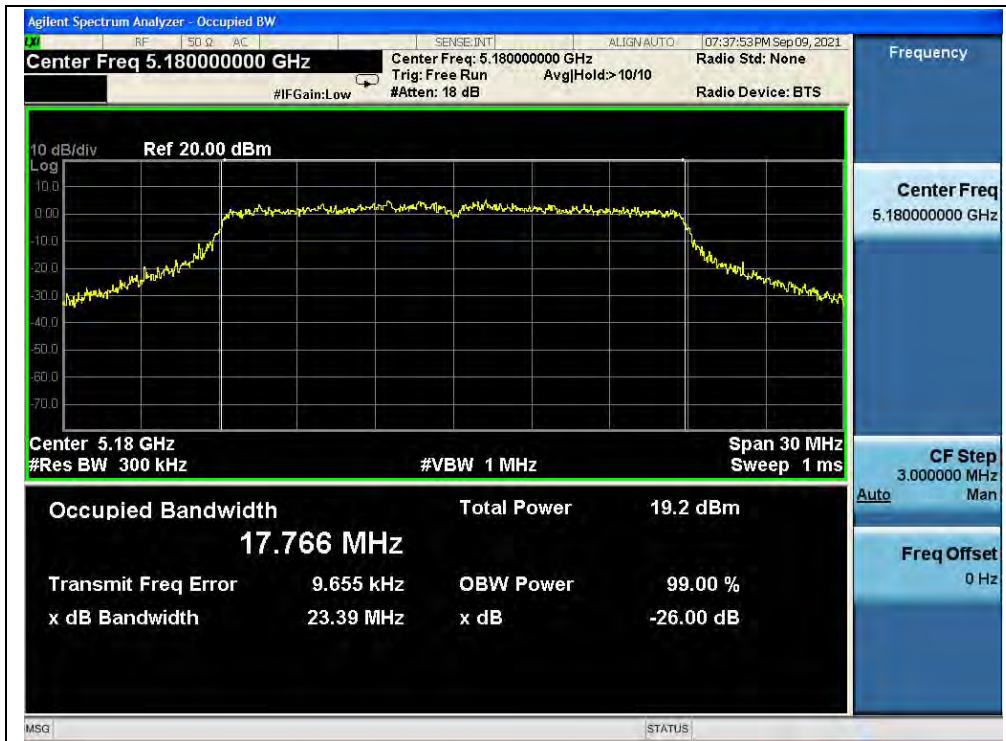


802.11n (HT20) Mode

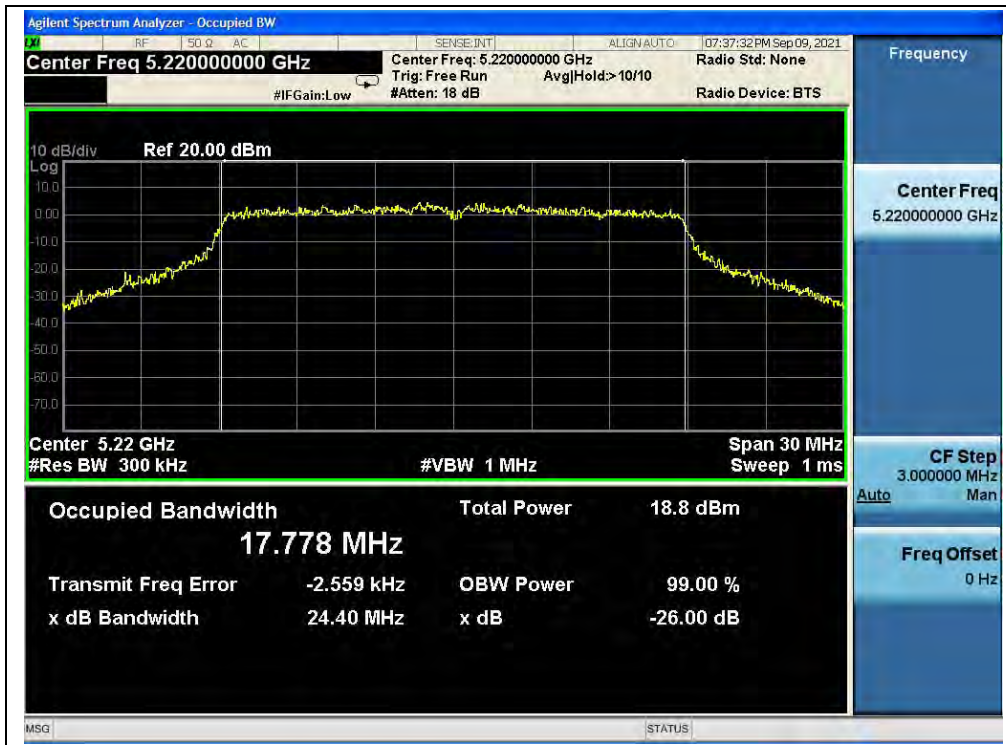
A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
36	5180	23.39
44	5220	24.40
48	5240	22.73
52	5260	23.28
60	5300	22.36
64	5320	24.21
100	5500	23.65
120	5600	23.34
144	5720	23.18
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)
144	5720	15.40
149	5745	17.14
157	5785	17.51
165	5825	16.52

B. Test Plot:



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



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



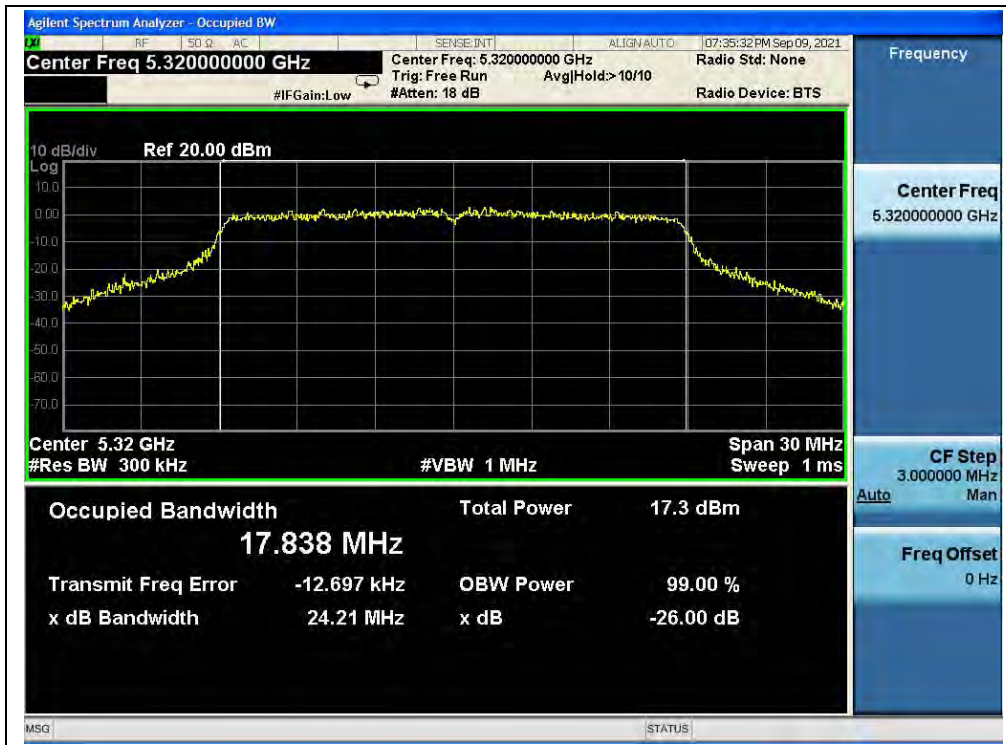
(Channel 48, 5240MHz, 802.11n (HT20))



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



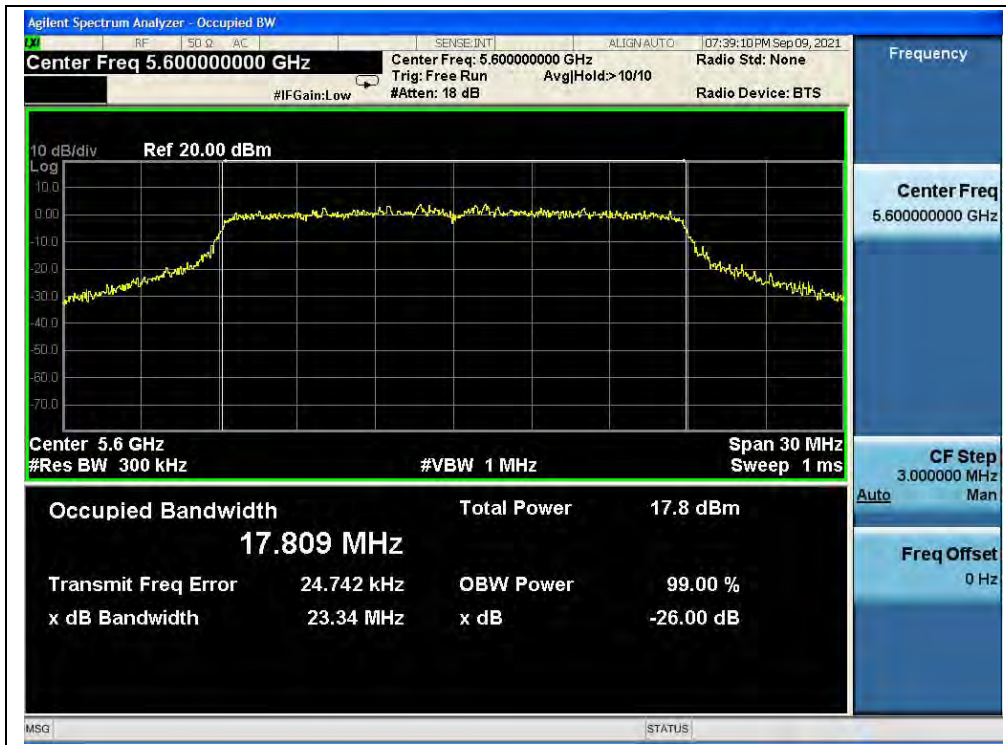
(Channel 60, 5300MHz, 802.11n (HT20))



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



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



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



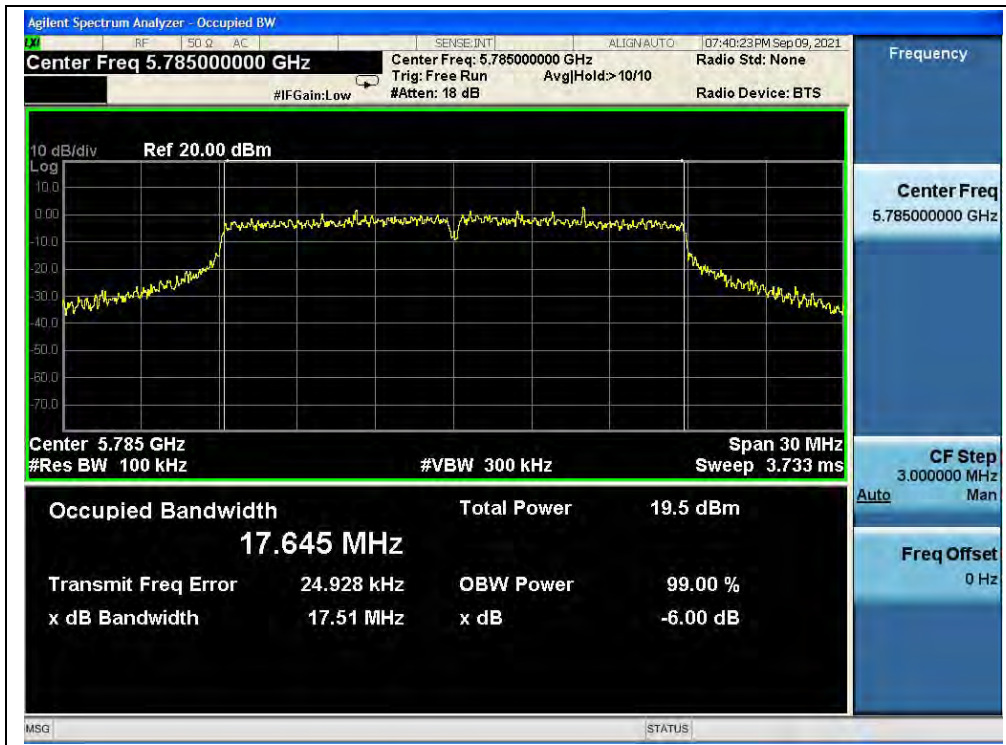
(Channel 144, 5720MHz, 802.11n (HT20))



(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

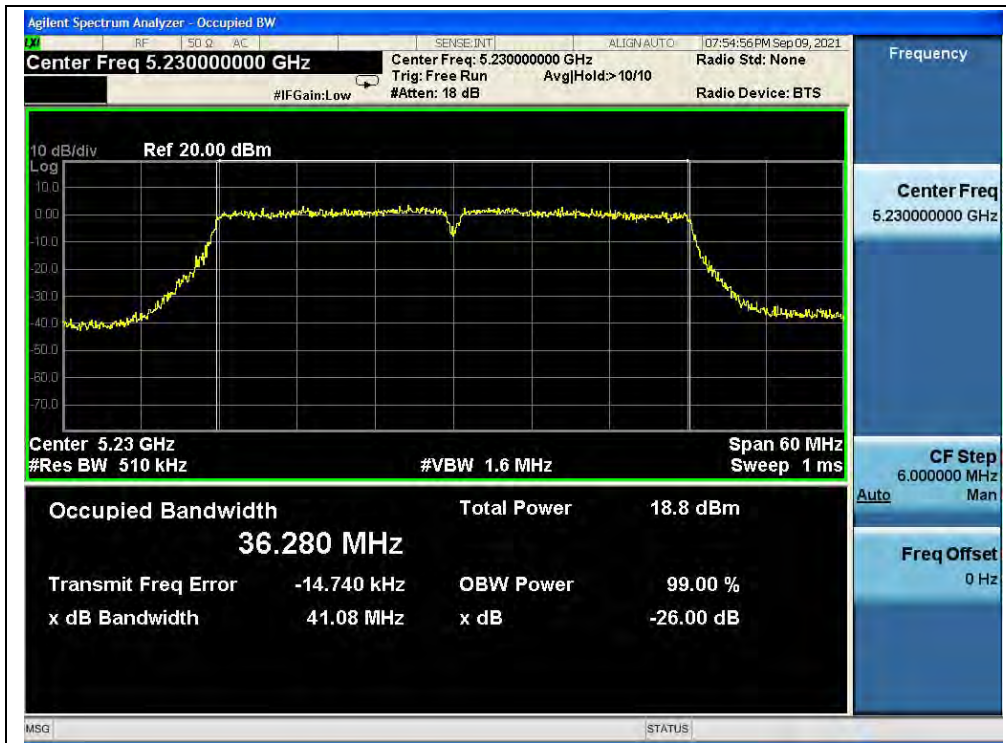
A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
38	5190	40.91
46	5230	41.08
54	5270	41.28
62	5310	41.08
102	5510	40.73
126	5630	40.77
142	5710	40.66
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)
142	5710	36.28
151	5755	36.34
159	5795	36.34

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))



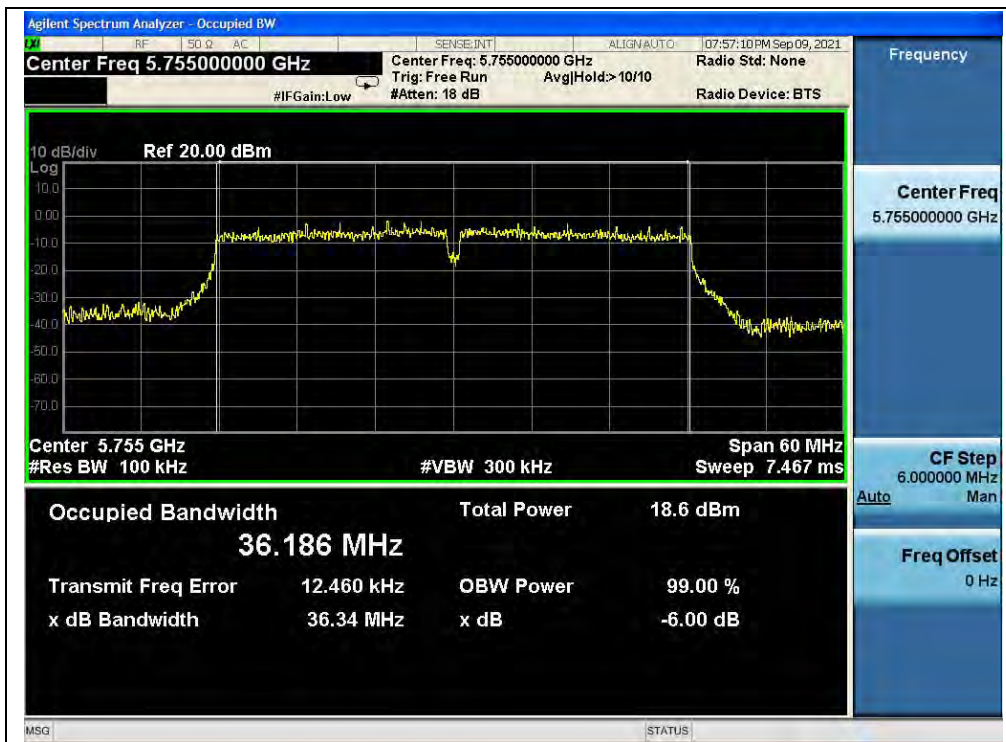
(Channel 126, 5630MHz, 802.11n (HT40))



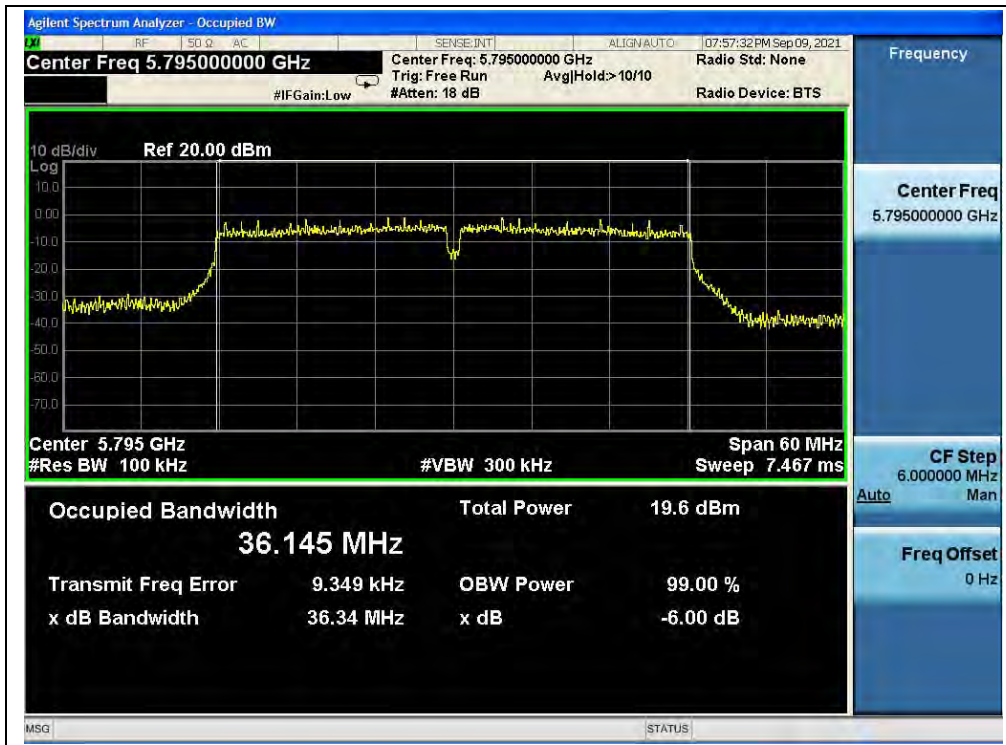
(Channel 142, 5710MHz, 802.11n (HT40))



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



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



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

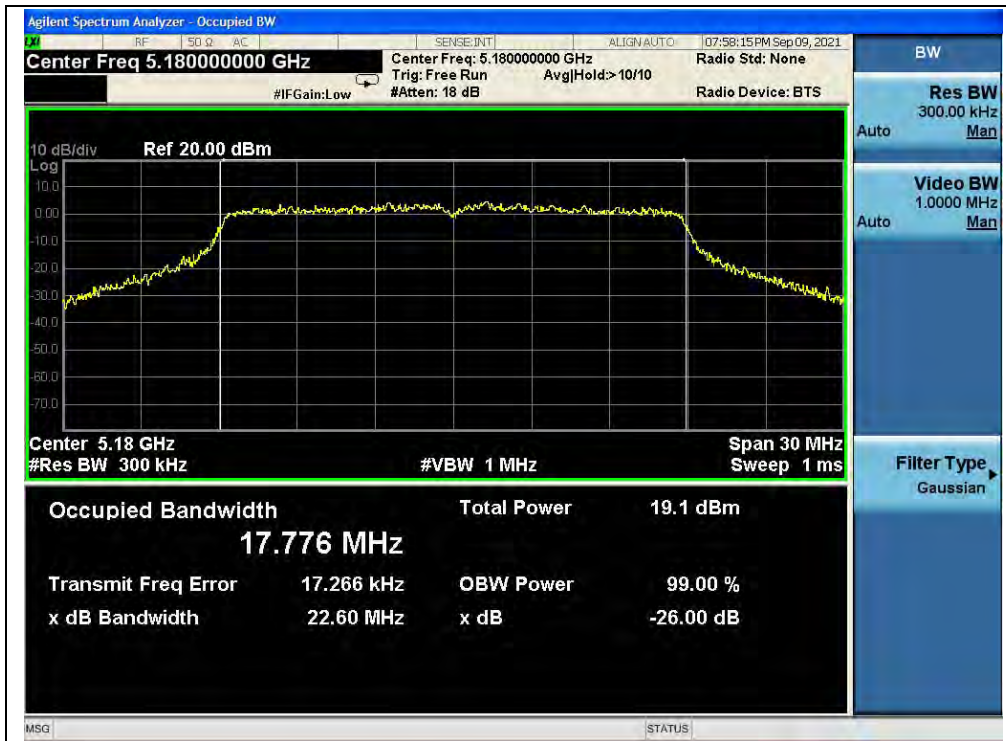


802.11ac (VHT20) Mode

A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
36	5180	22.60
44	5220	22.30
48	5240	22.81
52	5260	22.58
60	5300	24.34
64	5320	24.38
100	5500	23.61
120	5600	24.34
144	5720	24.69
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)
144	5720	15.91
149	5745	13.86
157	5785	15.88
165	5825	13.81

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))



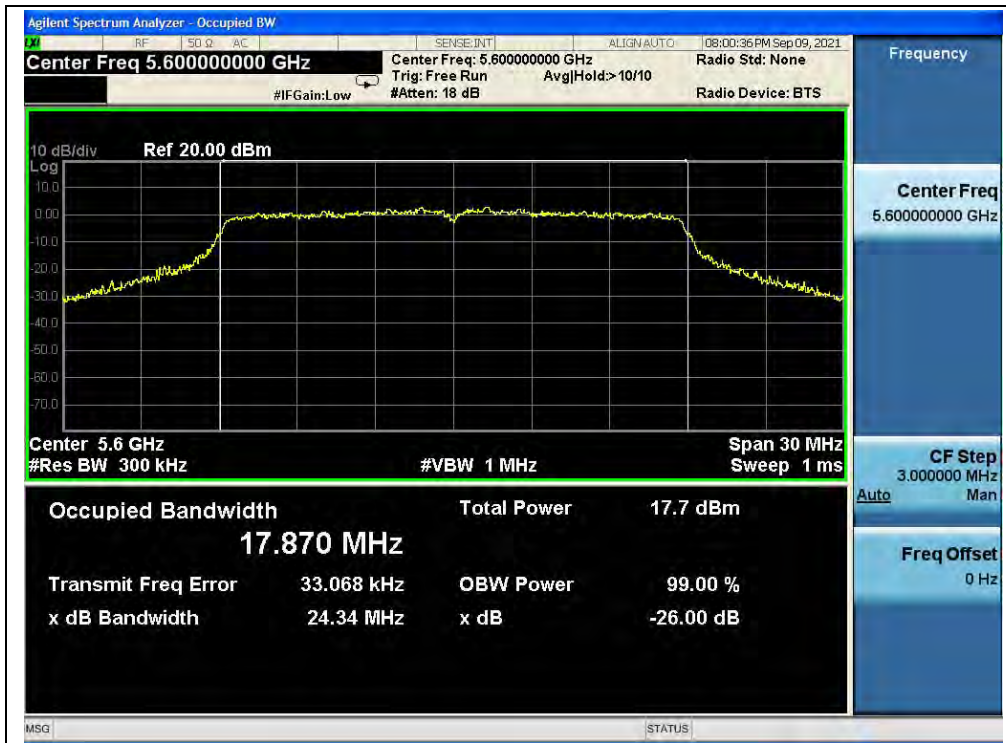
(Channel 60, 5300MHz, 802.11ac (VHT20))



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



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



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



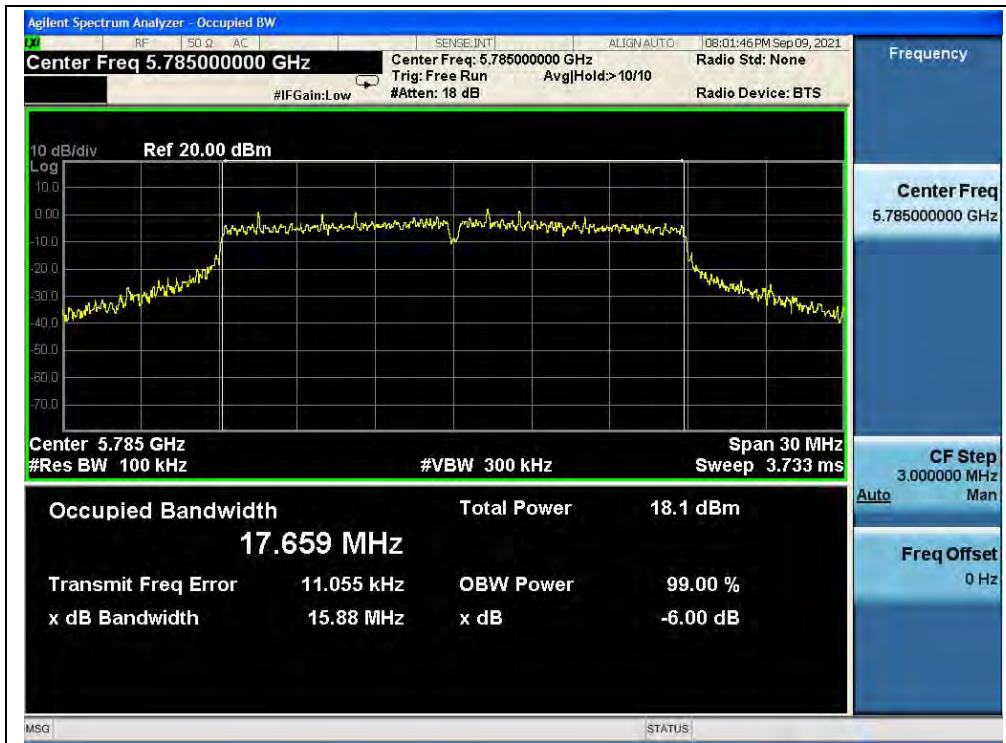
(Channel 144, 5720MHz, 802.11ac (VHT20))



(Channel 144, 5720MHz, 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

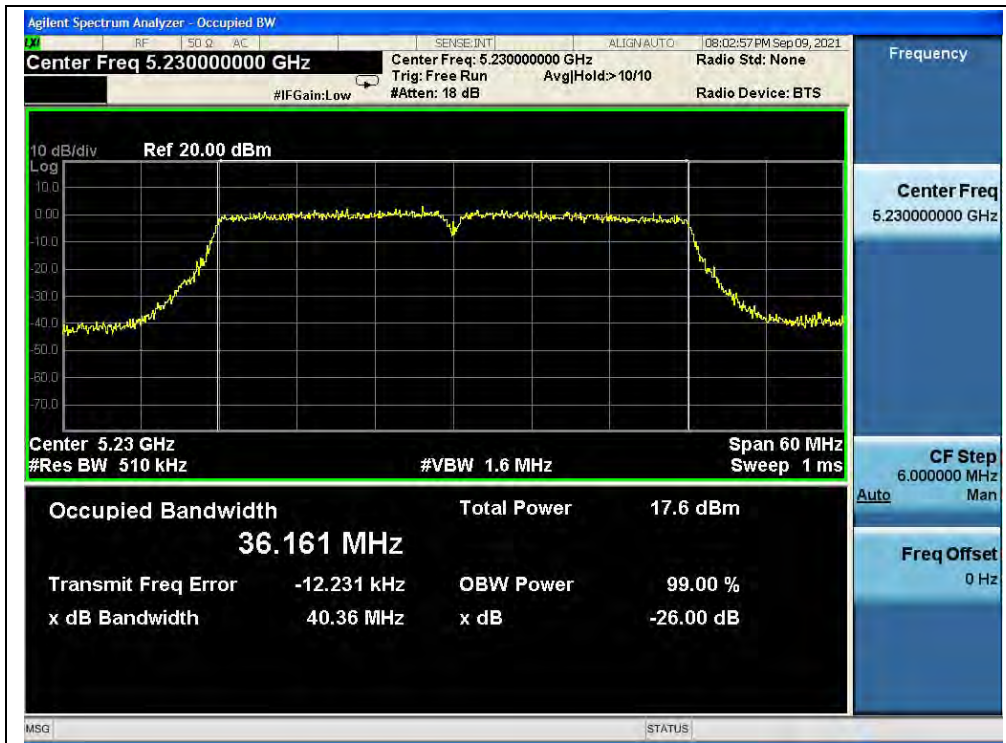
A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
38	5190	41.04
46	5230	40.36
54	5270	41.12
62	5310	40.81
102	5510	40.53
126	5630	41.09
142	5710	40.75
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)
142	5710	36.28
151	5755	35.94
159	5795	36.27

B. Test Plot:



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



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



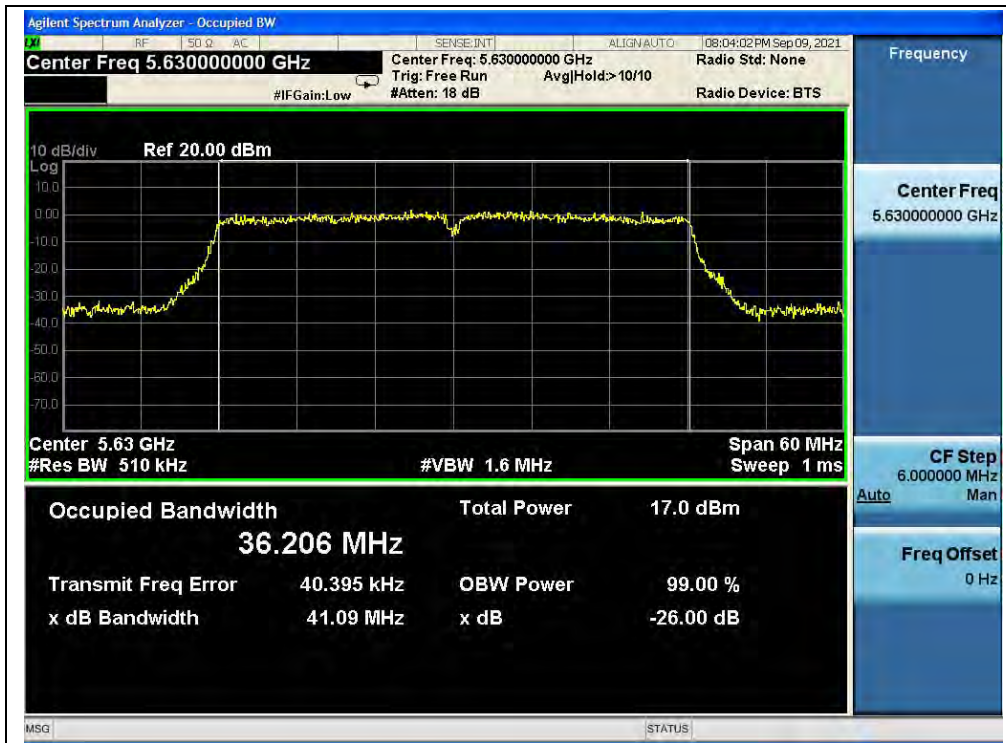
(Channel 54, 5270MHz, 802.11ac (VHT40))



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



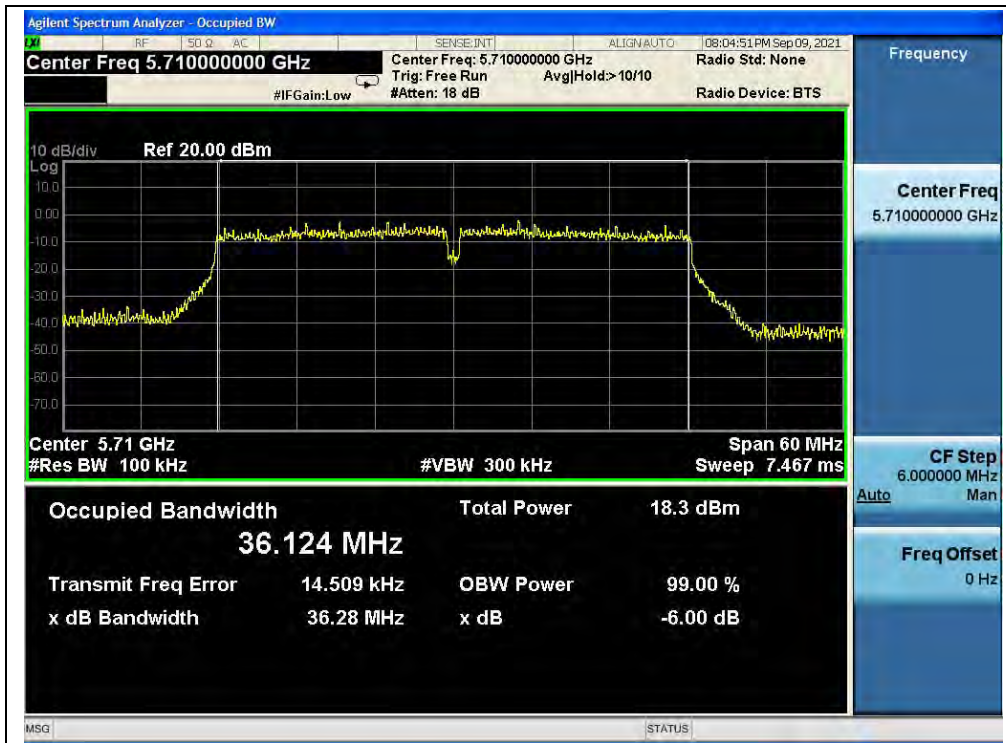
(Channel 102, 5510MHz, 802.11ac (VHT40))



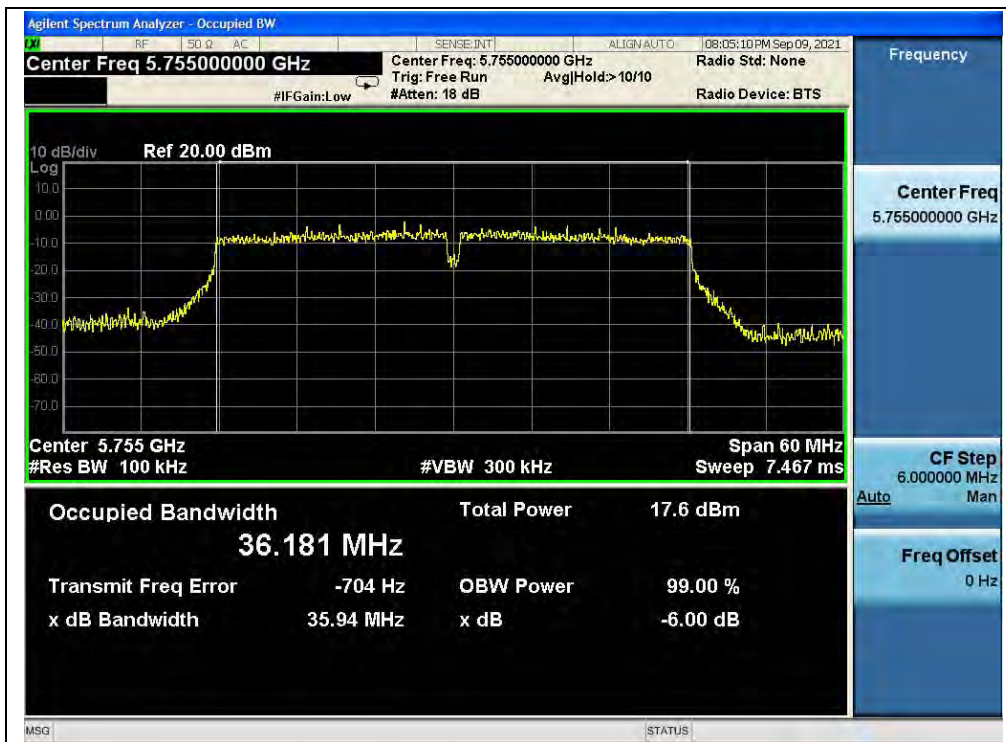
(Channel 126, 5630MHz, 802.11ac (VHT40))



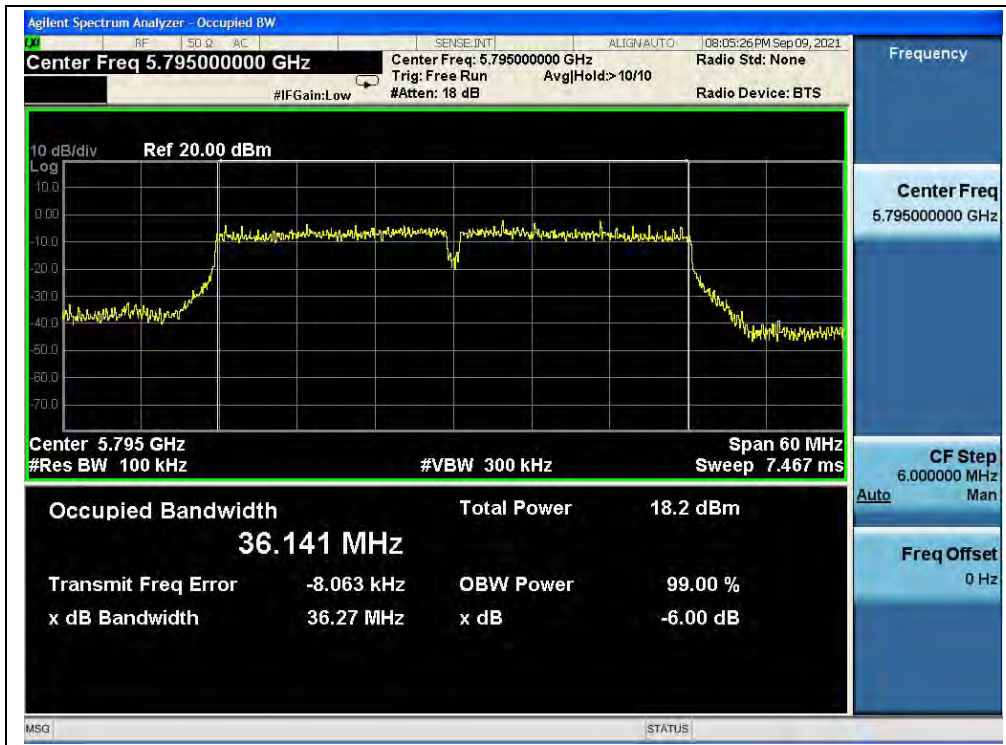
(Channel 142, 5710MHz, 802.11ac (VHT40))



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



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



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

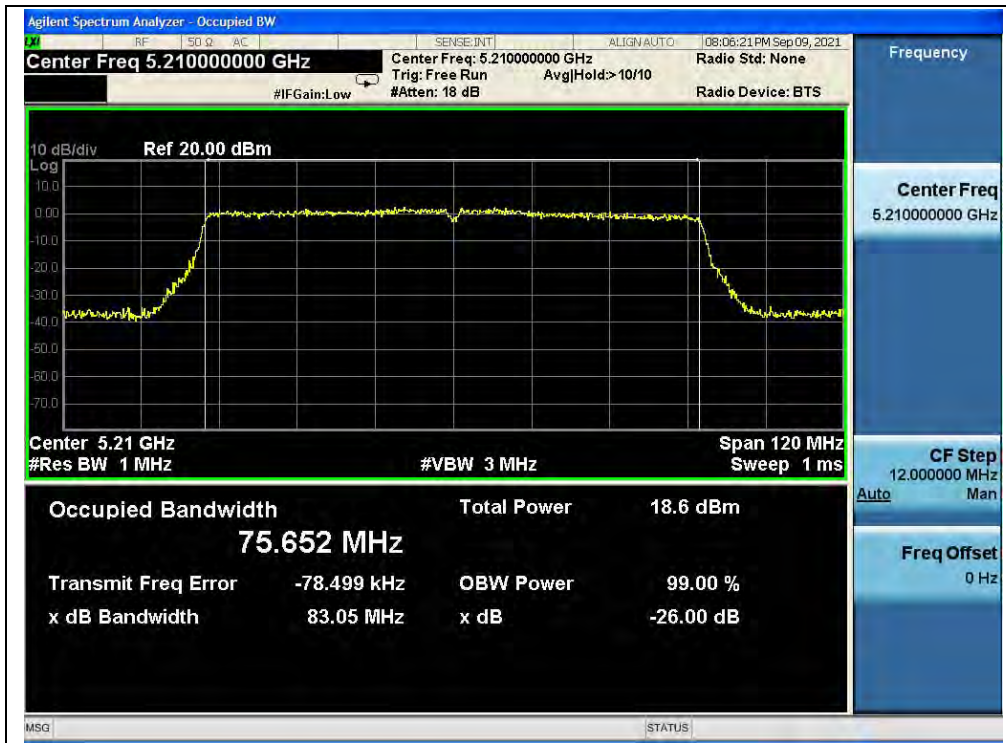


802.11ac (VHT80) Mode

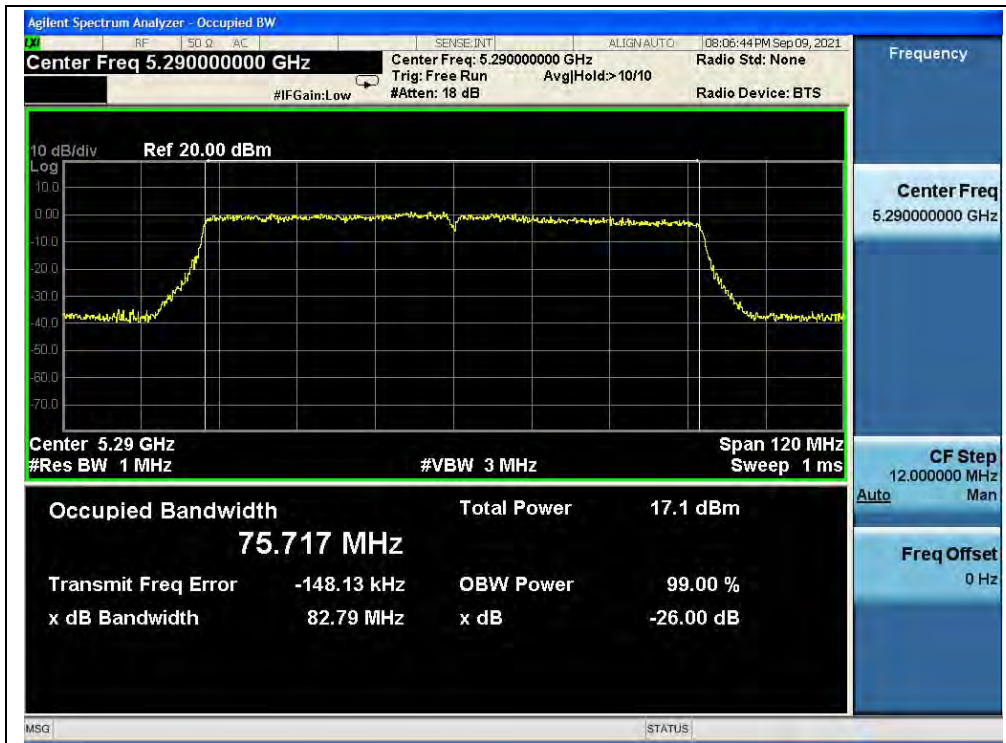
A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
42	5210	83.05
58	5290	82.79
106	5530	81.76
122	5610	82.68
138	5690	82.25
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)
138	5690	74.69
155	5775	75.45

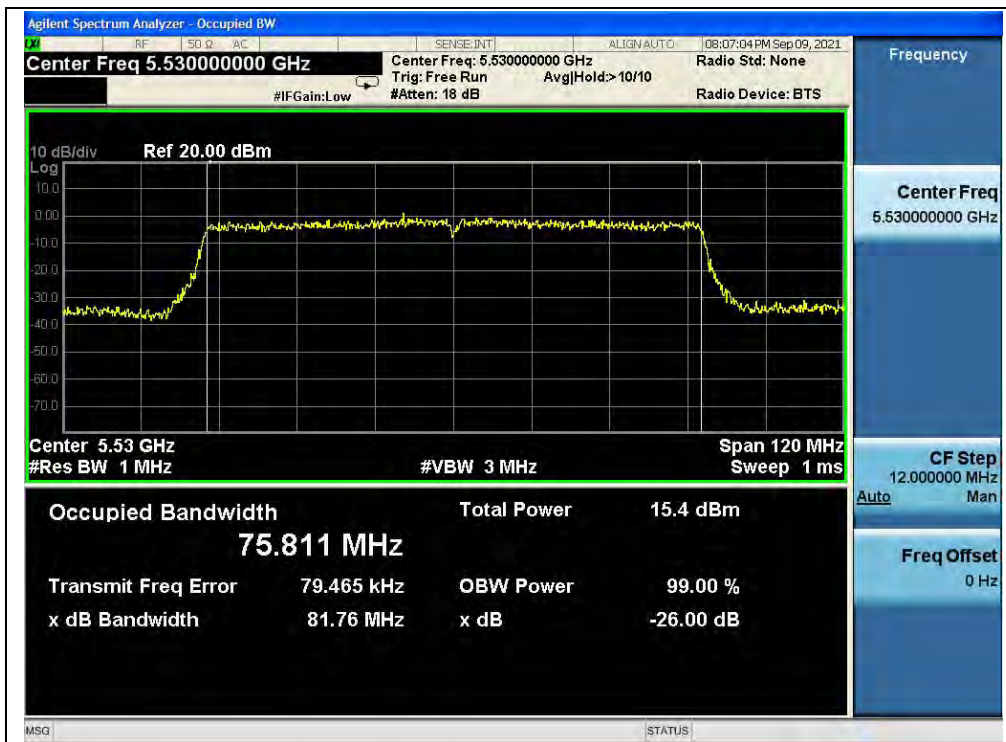
B. Test Plot:



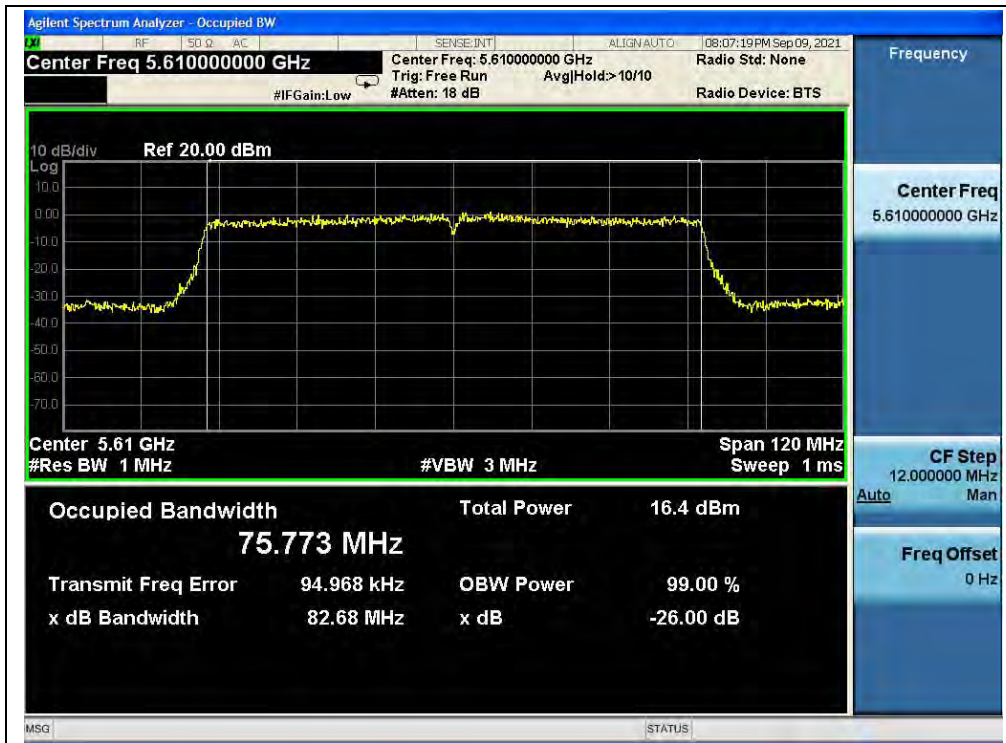
(Channel 42, 5210MHz, 802.11ac (VHT80))



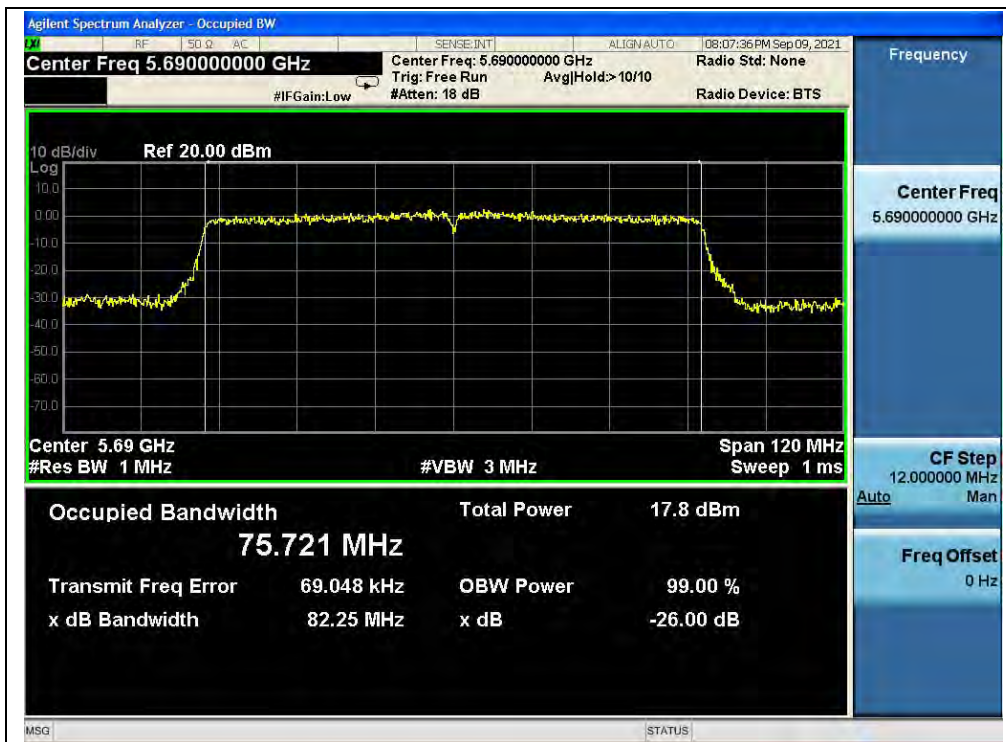
(Channel 58, 5290MHz, 802.11ac (VHT80))



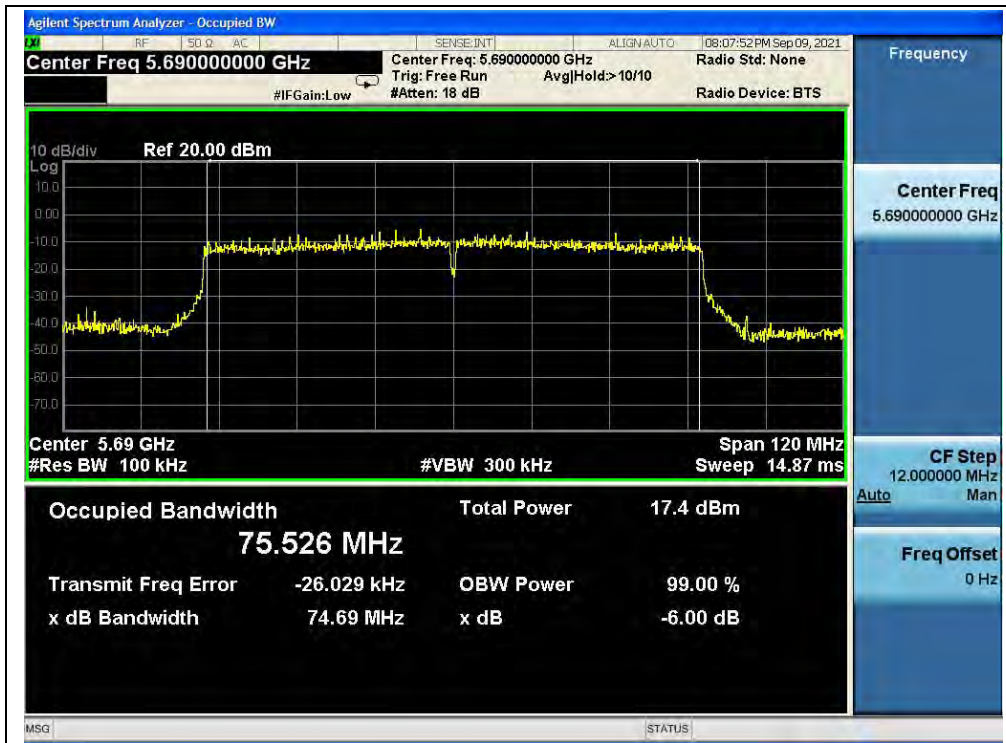
(Channel 106, 5530MHz, 802.11ac (VHT80))



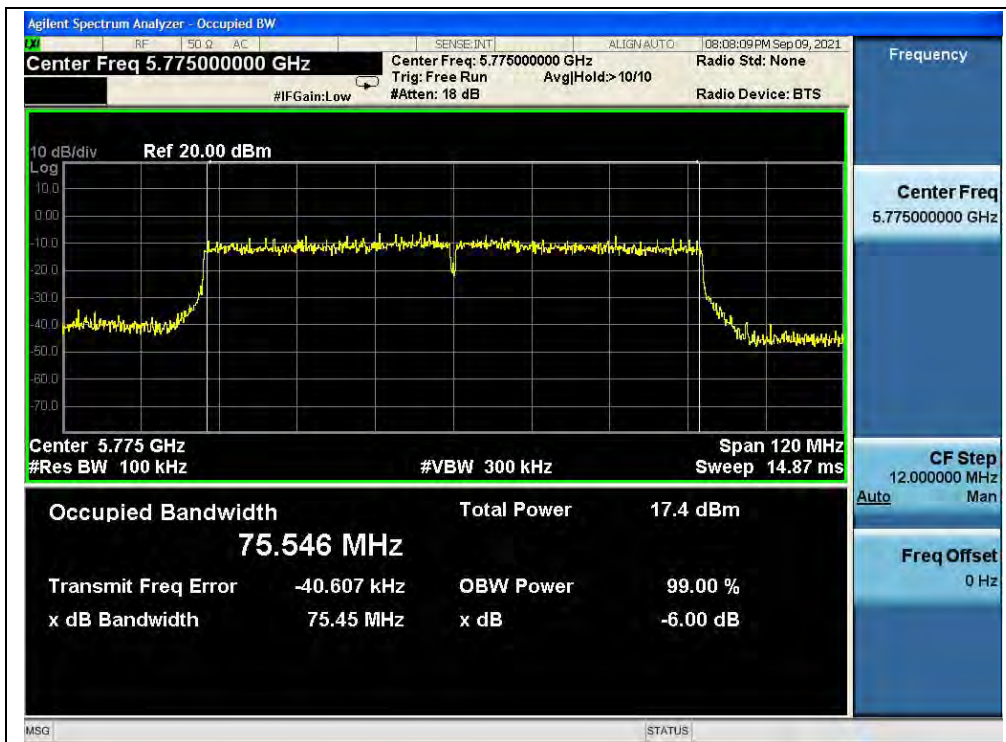
(Channel 122, 5610MHz, 802.11ac (VHT80))



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



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



(Channel 155, 5775MHz, 802.11ac (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 11dBm 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 11dBm in any 1 megahertz band.

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

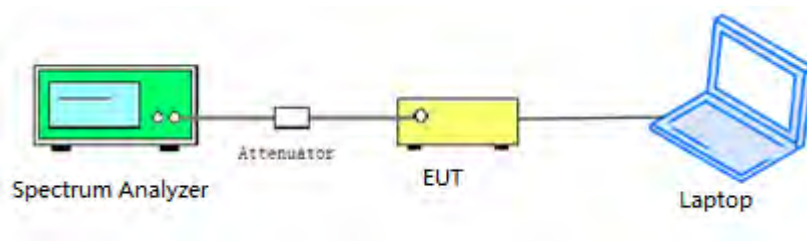
If transmitting antennas of directional gain greater than 6dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

(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 = $G_{ANT} + 10\log(N_{ANT})$ 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 50Ohm; 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-3 was used in order to prove compliance

- 1) Set span to encompass the entire 26-dB emission bandwidth
- 2) Set RBW = 1MHz. Set VBW ≥ 3MHz
- 3) Number of points in sweep ≥ 2 Span / RBW. Sweep time = auto
- 4) Detector = Average
- 5) Trace mode=Max hold
- 6) Record the max value

2.5.4. Test Result

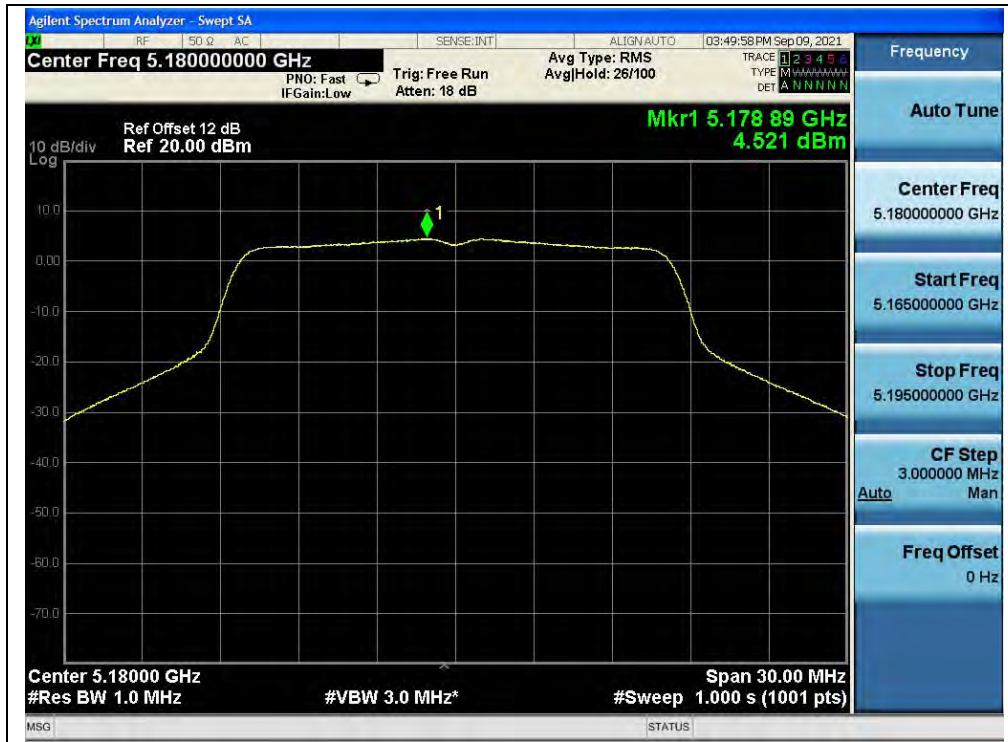
802.11a Mode

A. Test Verdict:

Channel	Frequency (MHz)	Measured PPSD (dBm/MHz)	Duty Factor	Corrected PPSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
36	5180	4.52	0.06	4.58	11	PASS
44	5220	4.24		4.30		
48	5240	3.93		3.99		
52	5260	3.42		3.48		
60	5300	2.43		2.49		
64	5320	2.27		2.33		
100	5500	1.06		1.12		
120	5600	2.33		2.39		
144	5720	4.60		4.66		
Channel	Frequency (MHz)	Measured PPSD (dBm/500KHz)	Duty Factor	Corrected PPSD (dBm/500KHz)	Limit (dBm/500KHz)	Verdict
144	5720	1.87	0.06	1.93	30	PASS
149	5745	1.71		1.77		
157	5785	2.16		2.22		
165	5825	2.35		2.41		



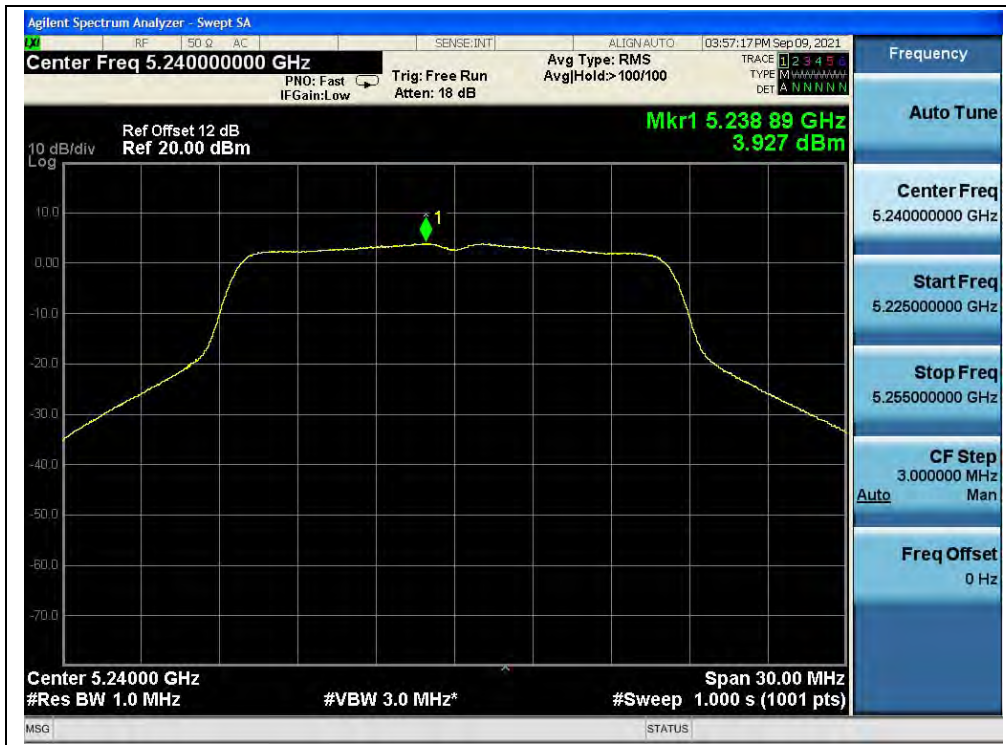
B. Test Plot:



(Channel 36, 5180MHz, 802.11a)



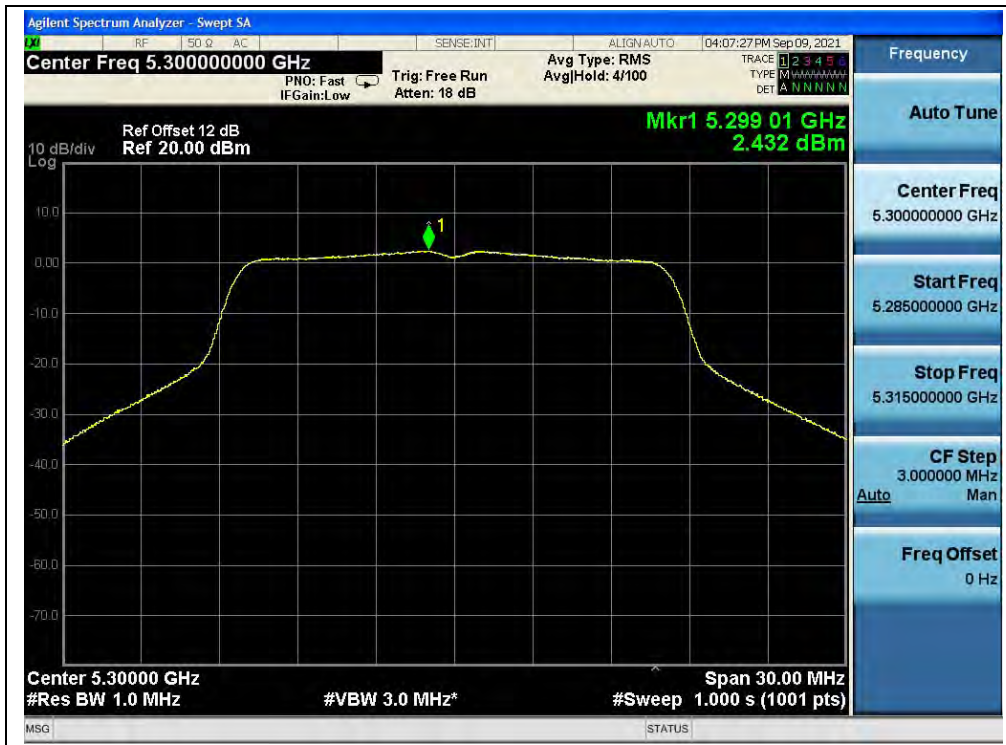
(Channel 44, 5220MHz, 802.11a)



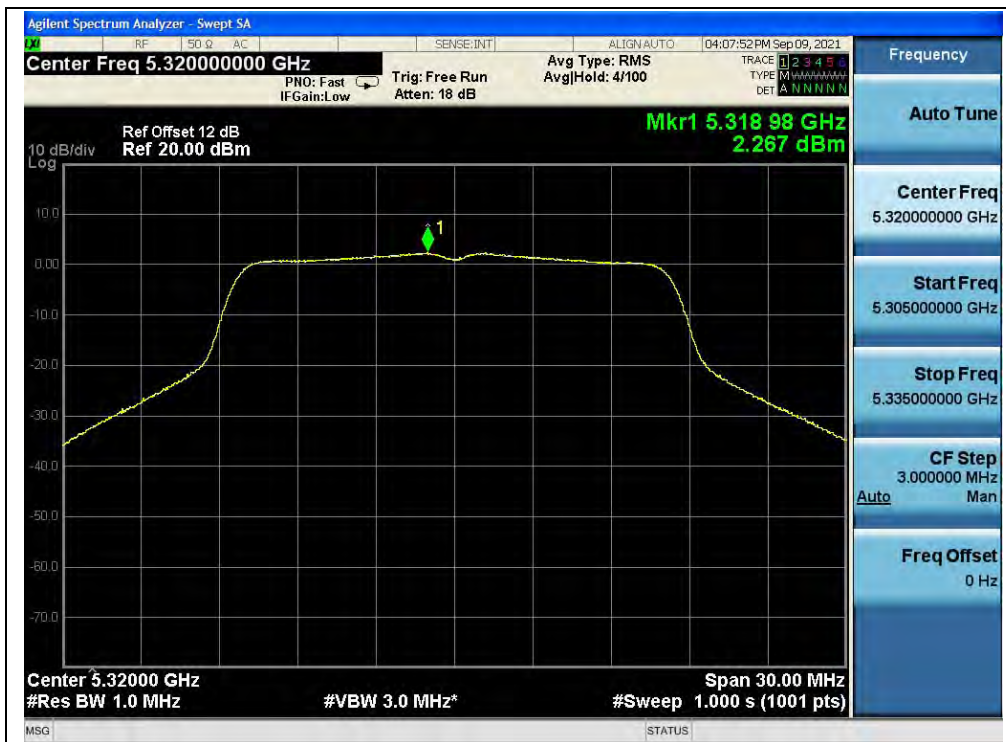
(Channel 48, 5240MHz, 802.11a)



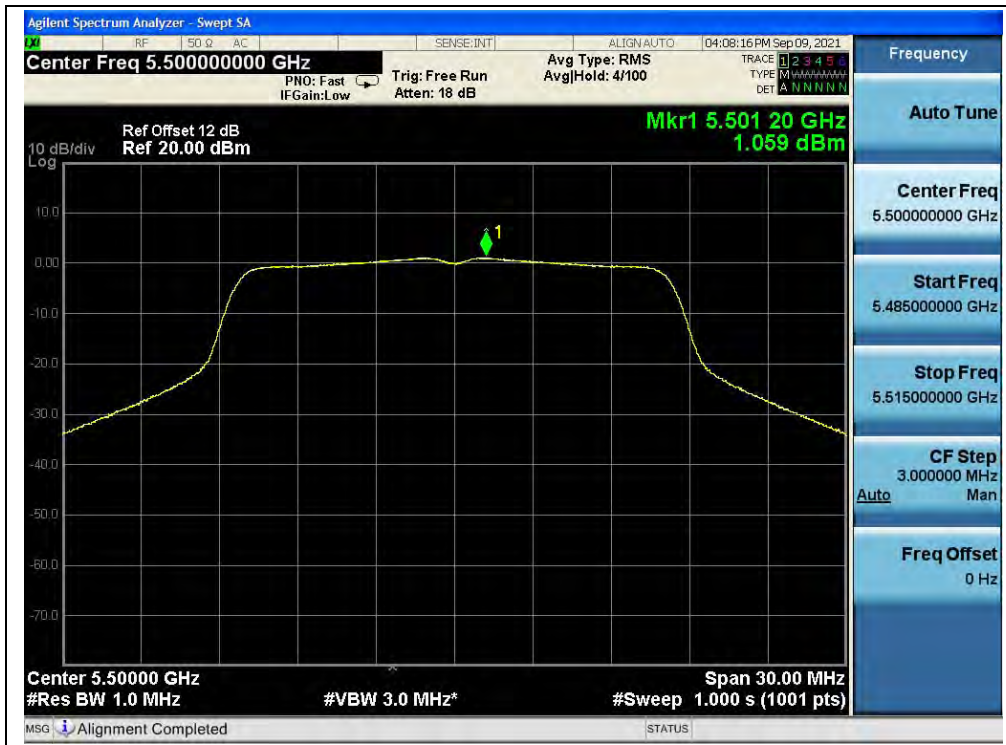
(Channel 52, 5260MHz, 802.11a)



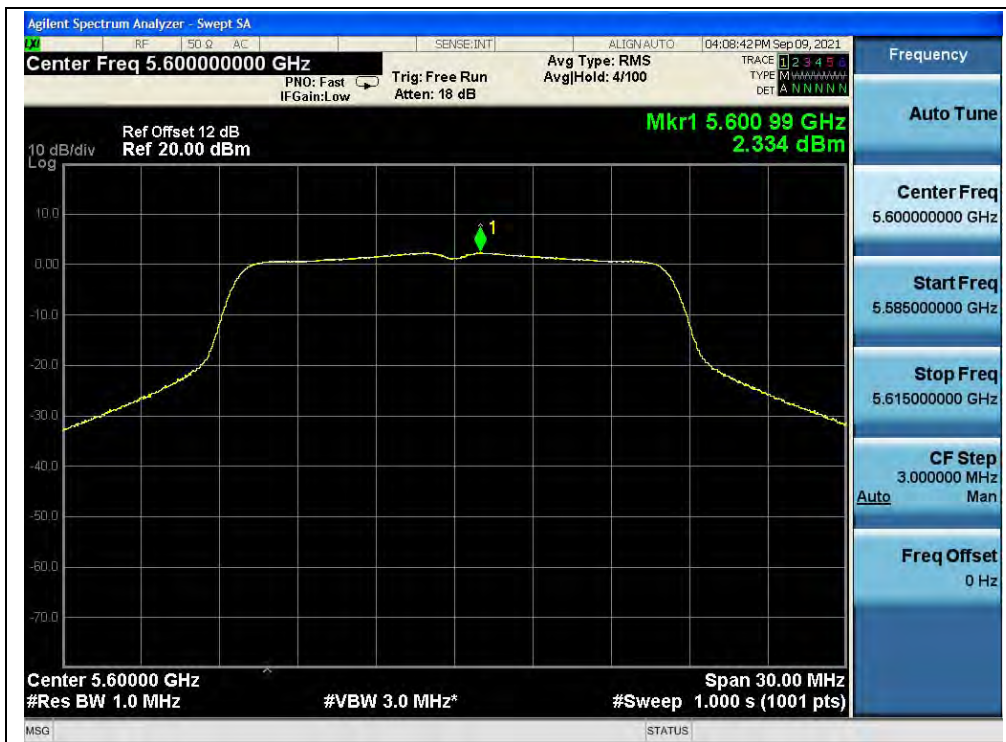
(Channel 60, 5300MHz, 802.11a)



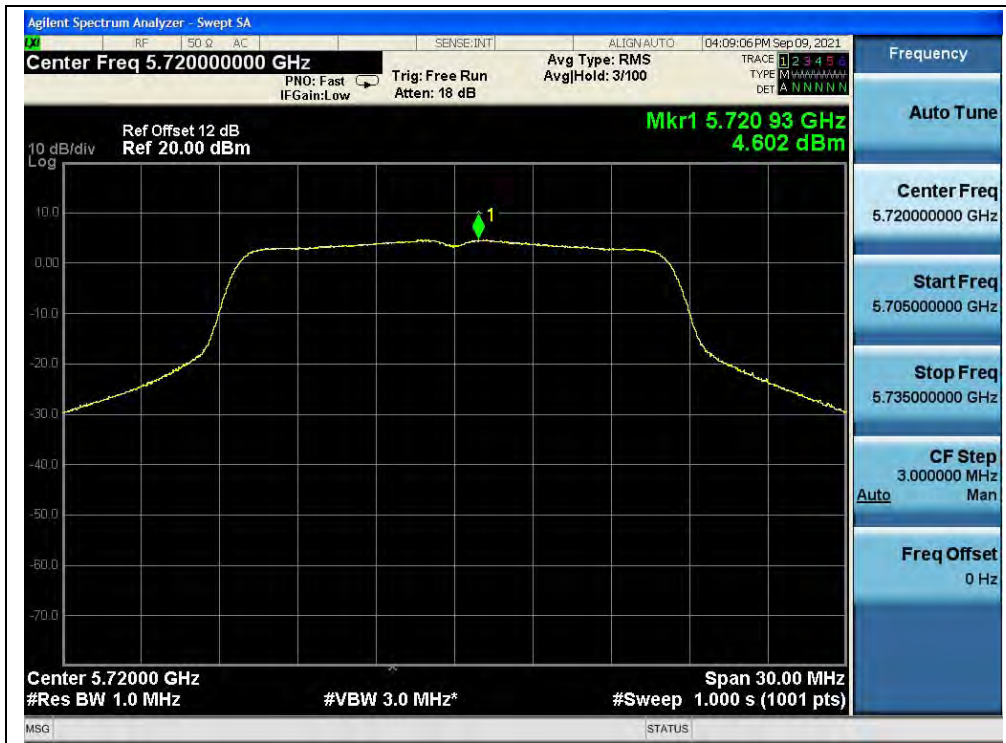
(Channel 64, 5320MHz, 802.11a)



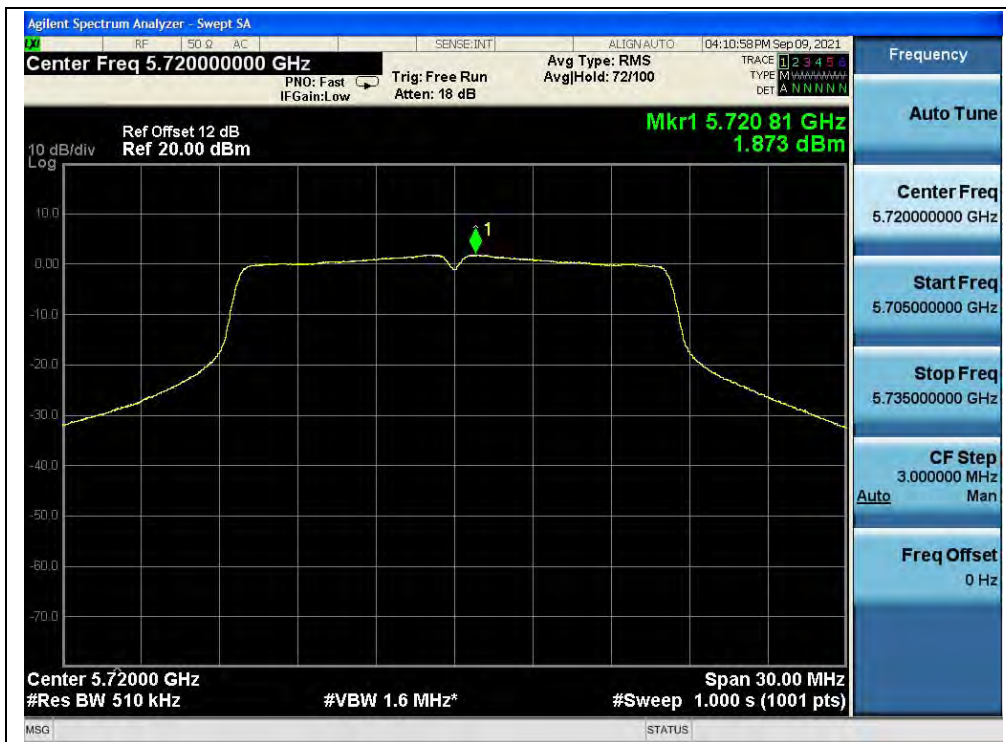
(Channel 100, 5500MHz, 802.11a)



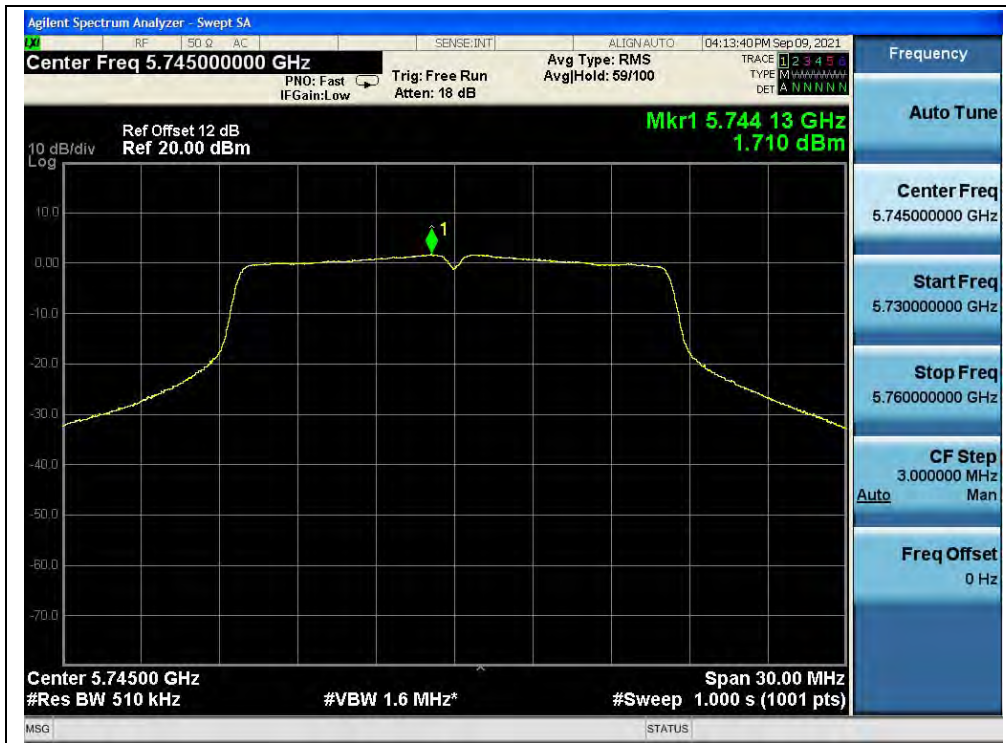
(Channel 120, 5600MHz, 802.11a)



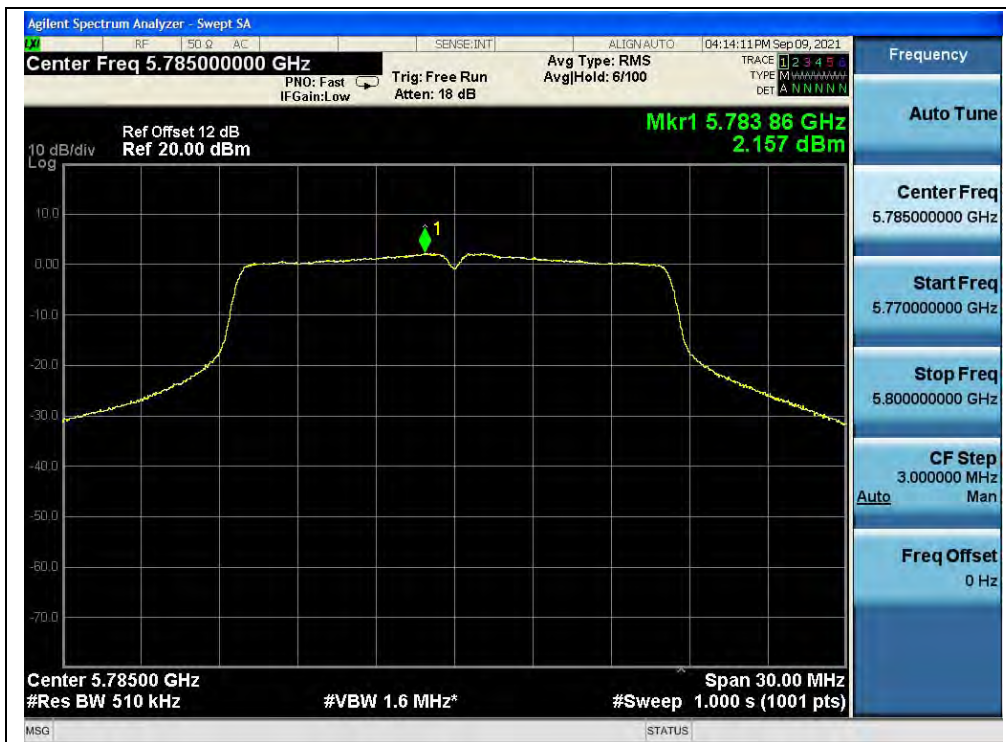
(Channel 144, 5720MHz, 802.11a)



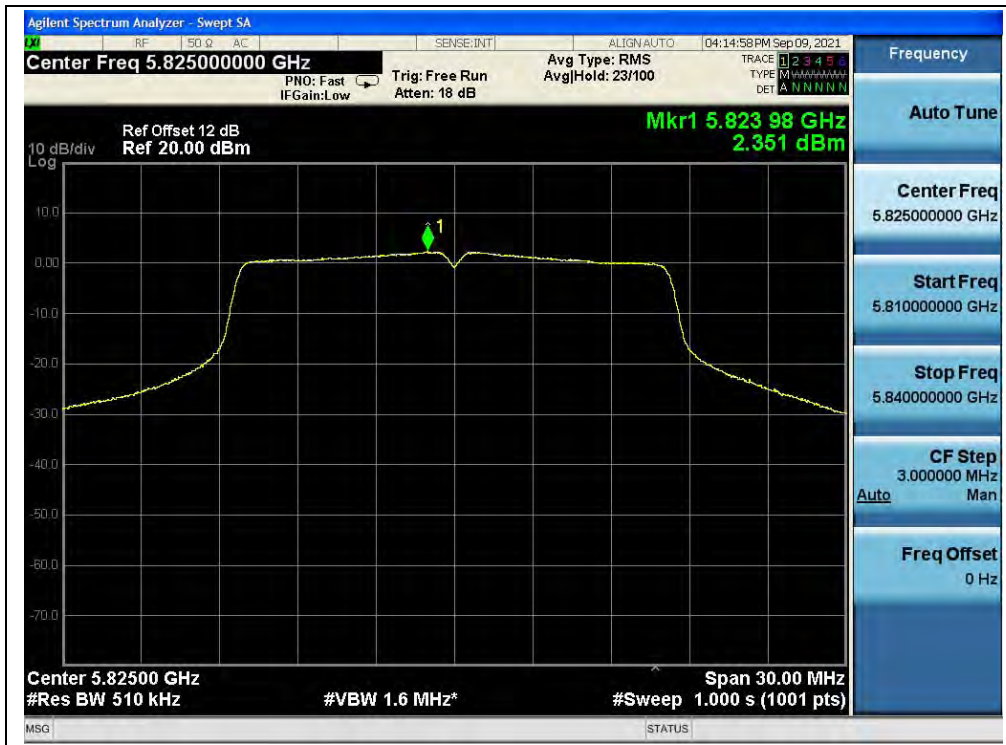
(Channel 144, 5720MHz, 802.11a)



(Channel 149, 5745MHz, 802.11a)



(Channel 157, 5785MHz, 802.11a)



(Channel 165, 5825MHz, 802.11a)

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

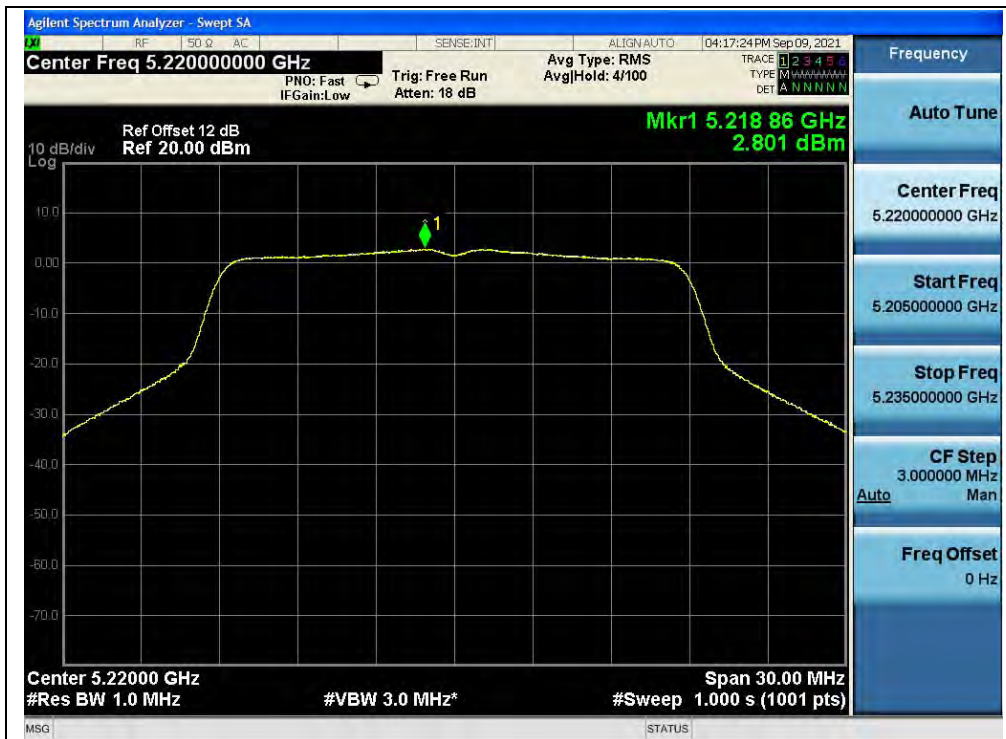
Channel	Frequency (MHz)	Measured PPSD (dBm/MHz)	Duty Factor	Corrected PPSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
36	5180	3.09	0.09	3.18	11	PASS
44	5220	2.80		2.89		
48	5240	2.71		2.80		
52	5260	2.13		2.22		
60	5300	1.31		1.40		
64	5320	1.52		1.61		
100	5500	0.25		0.34		
120	5600	1.48		1.57		
144	5720	3.57		3.66		
Channel	Frequency (MHz)	Measured PPSD (dBm/500KHz)	Duty Factor	Corrected (dBm/500KHz)	Limit (dBm/500KHz)	Verdict
144	5720	0.93	0.09	1.02	30	PASS
149	5745	0.60		0.69		
157	5785	1.14		1.23		
165	5825	1.25		1.34		



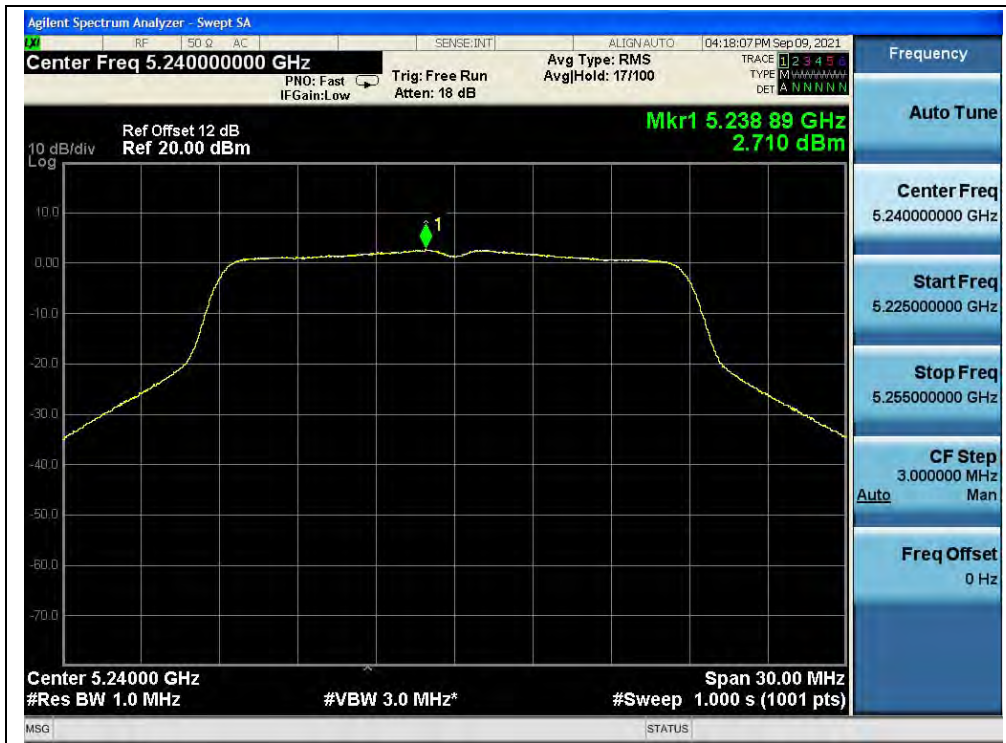
B. Test Plot:



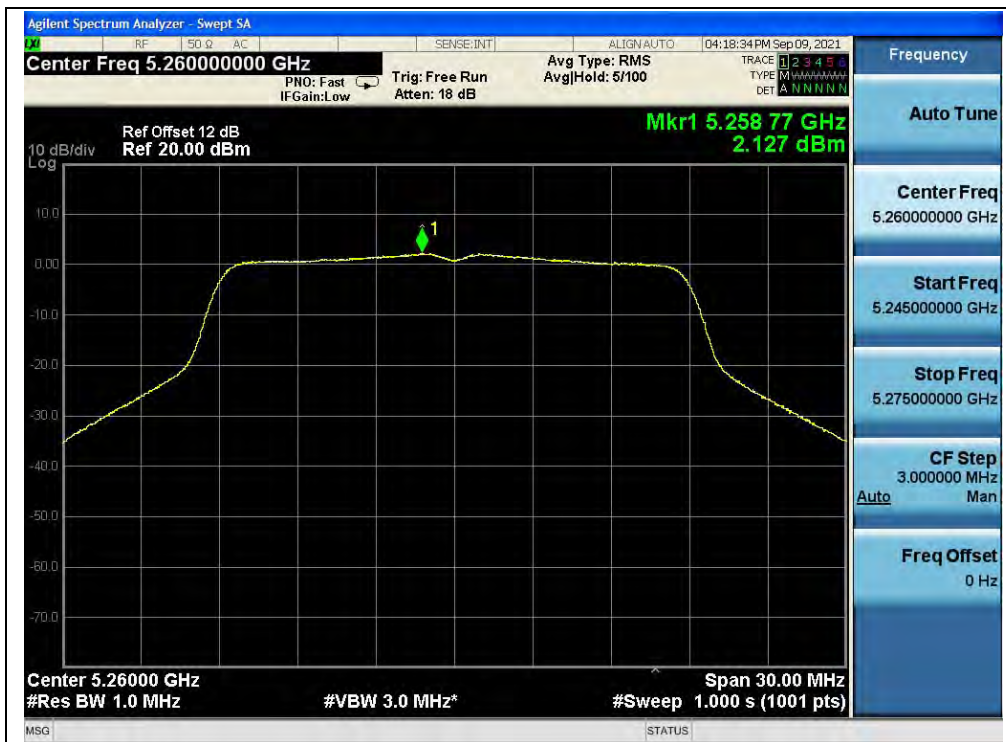
(Channel 36, 5180MHz, 802.11n (HT20))



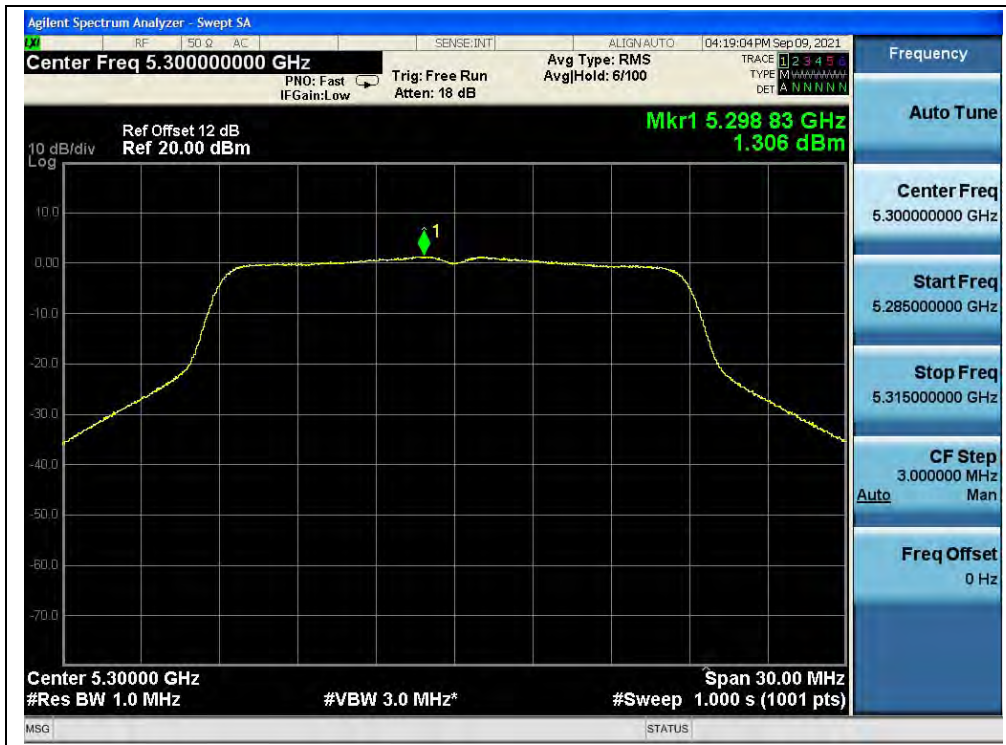
(Channel 44, 5220MHz, 802.11n (HT20))



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



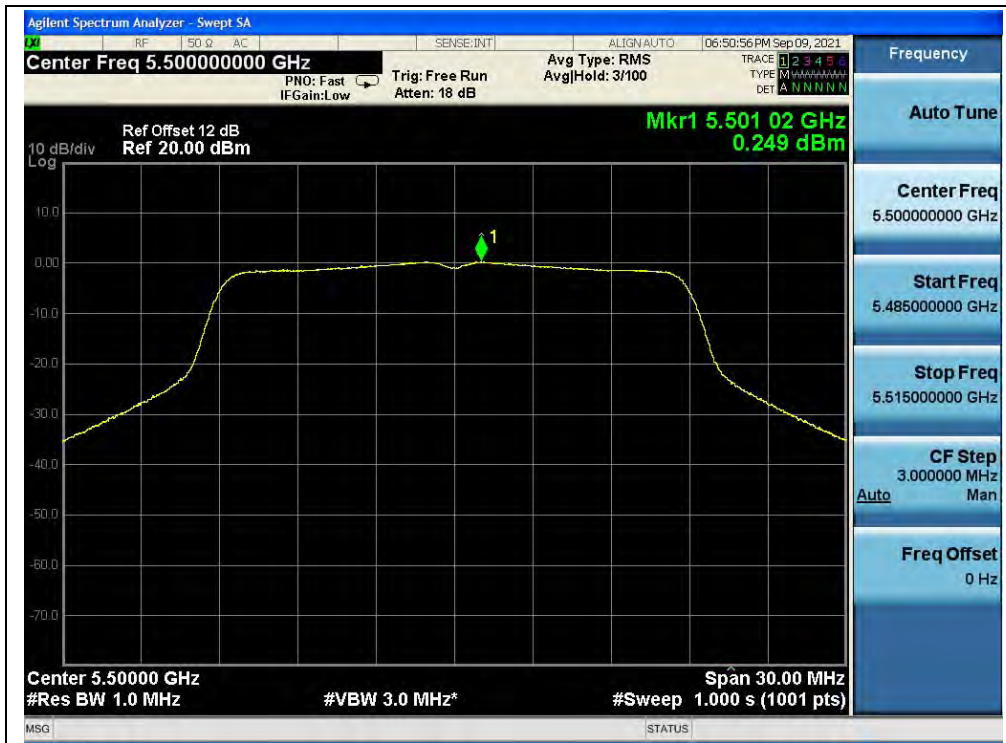
(Channel 52, 5260MHz, 802.11n (HT20))



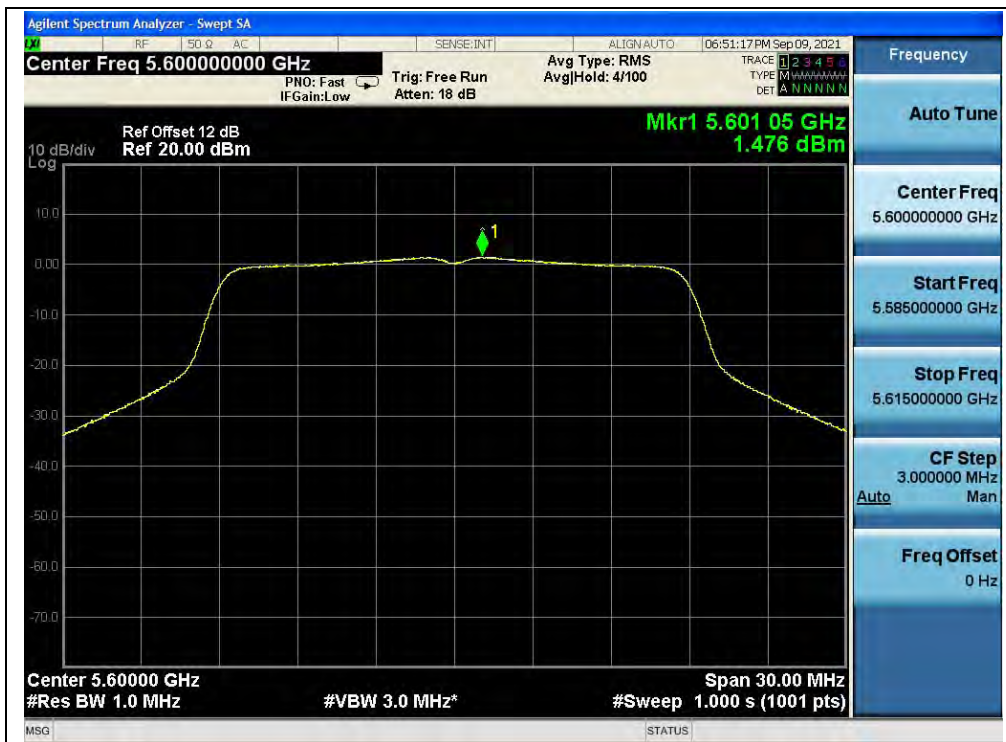
(Channel 60, 5300MHz, 802.11n (HT20))



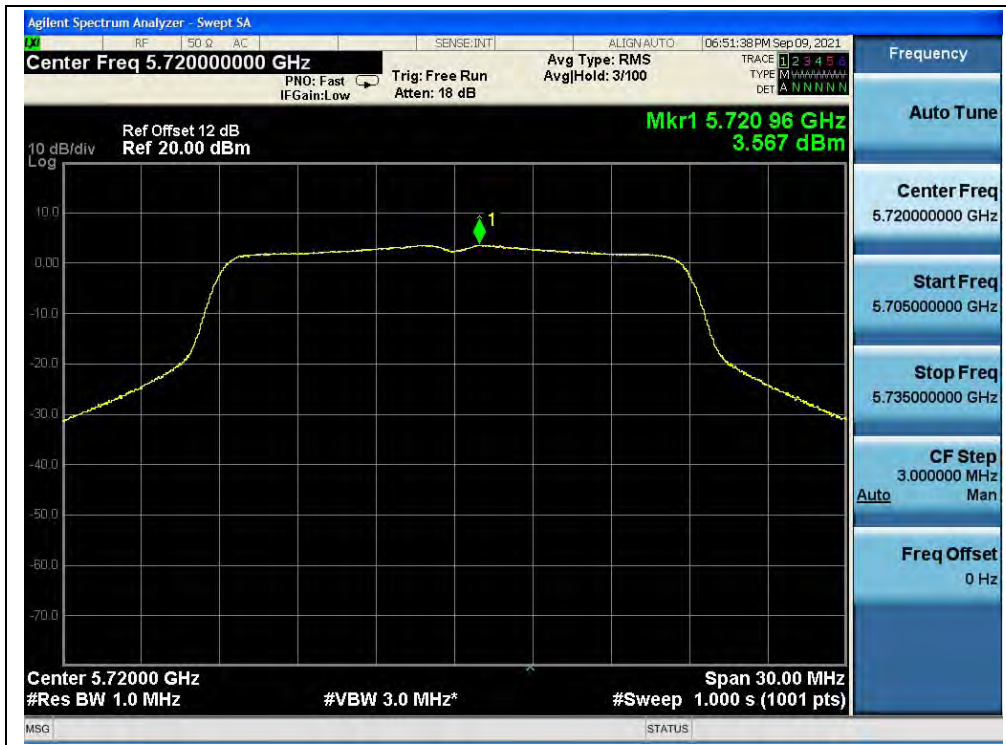
(Channel 64, 5320MHz, 802.11n (HT20))



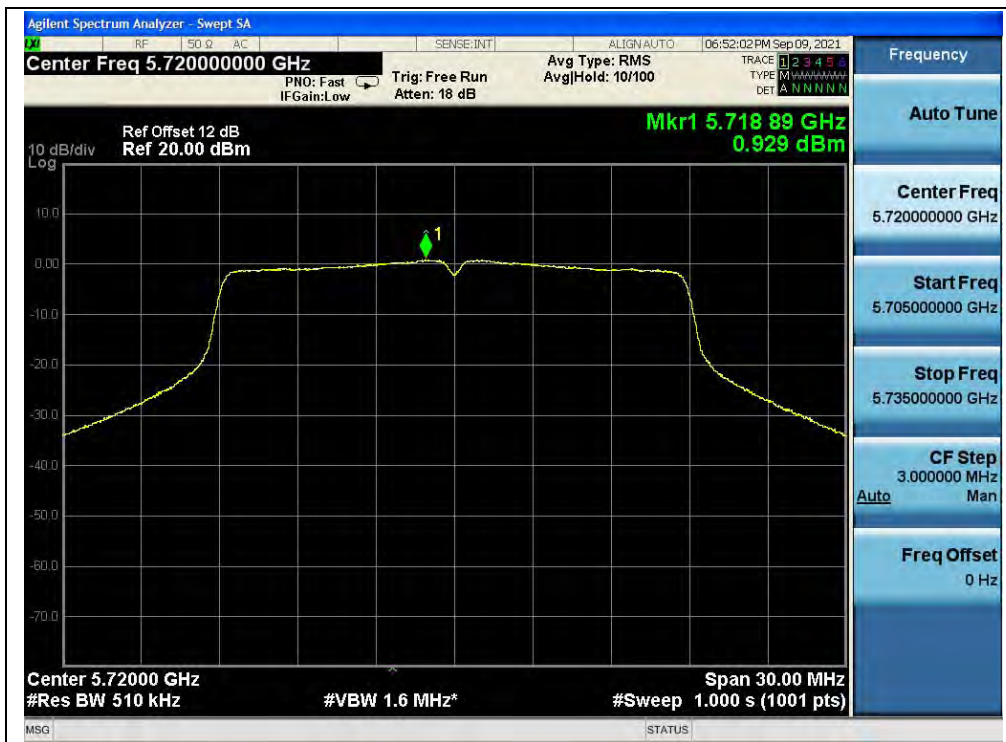
(Channel 100, 5500MHz, 802.11n (HT20))



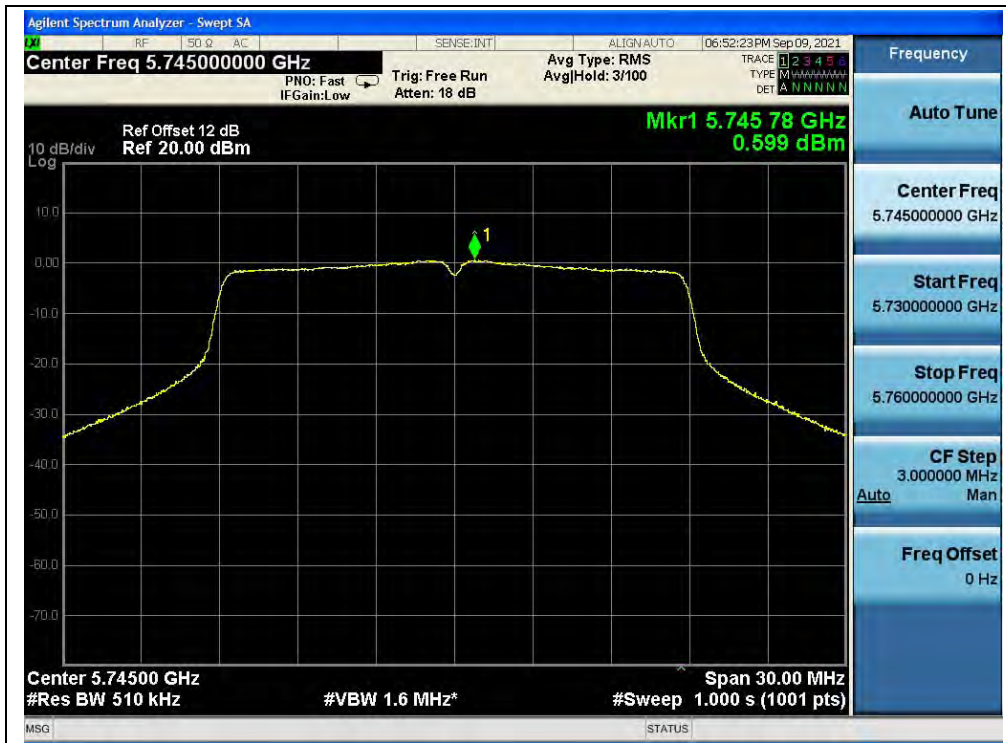
(Channel 120, 5600MHz, 802.11n (HT20))



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



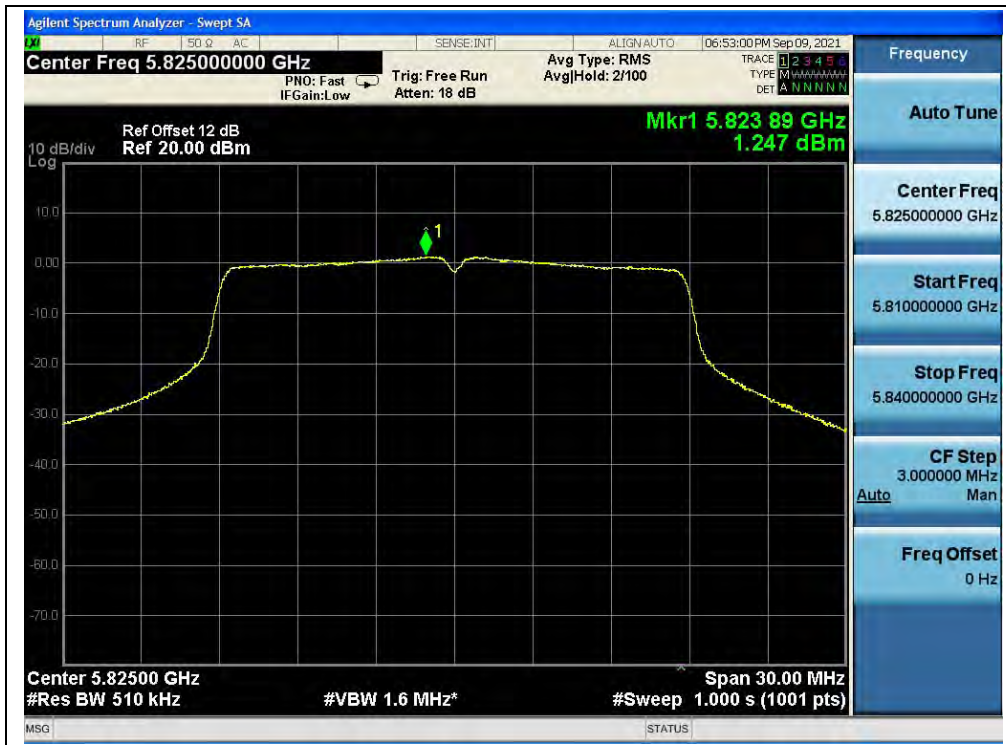
(Channel 144, 5720MHz, 802.11n (HT20))



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



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



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

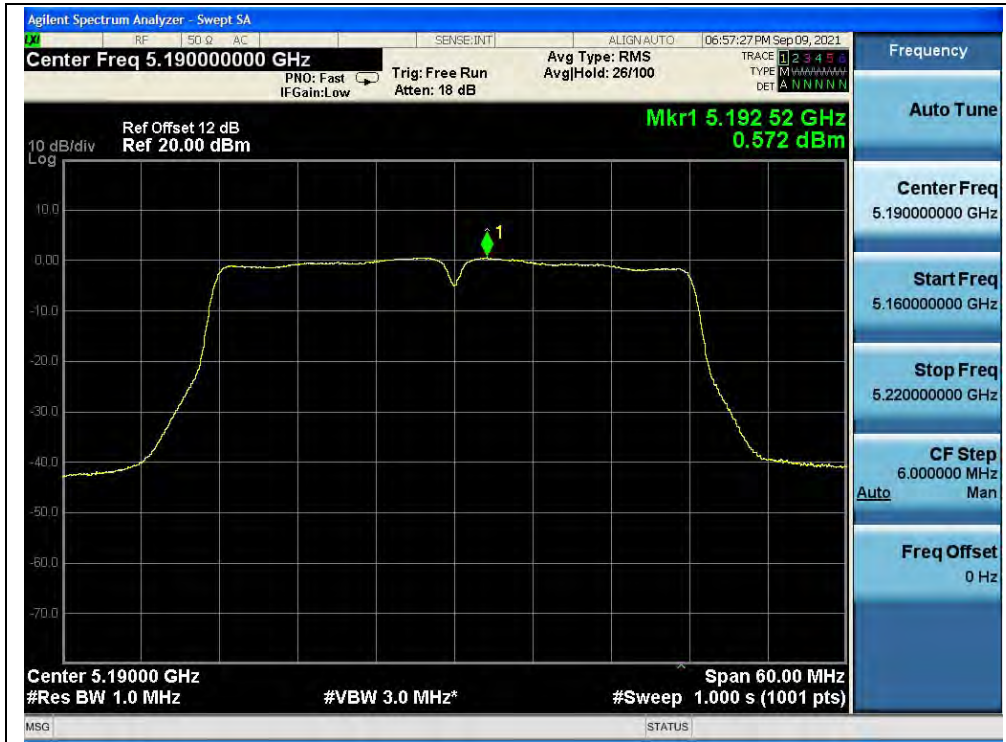


802.11n (HT40) Mode

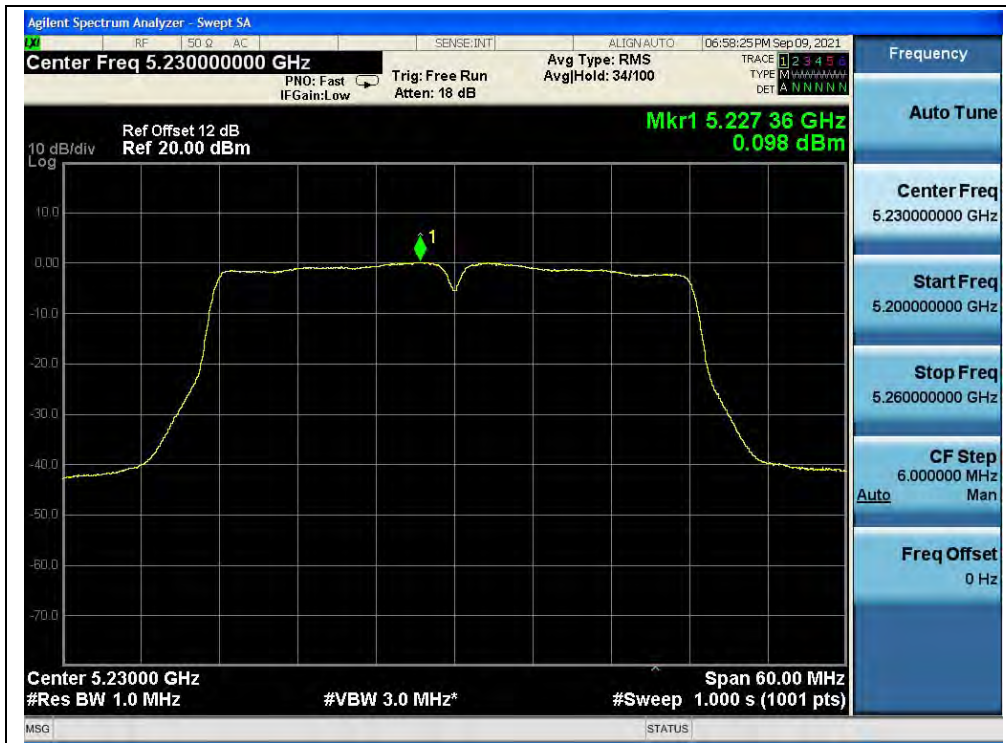
A. Test Verdict:

Channel	Frequency (MHz)	Measured PPSD (dBm/MHz)	Duty Factor	Corrected PPSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
38	5190	0.57	0.14	0.71	11	PASS
46	5230	0.10		0.24		
54	5270	-0.40		-0.26		
62	5310	-1.56		-1.42		
102	5510	-2.64		-2.50		
126	5630	-0.83		-0.69		
142	5710	0.73		0.87		
Channel	Frequency (MHz)	Measured PPSD (dBm/500KHz)	Duty Factor	Corrected (dBm/500KHz)	Limit (dBm/500KHz)	Verdict
142	5710	-2.20	0.14	-2.06	30	PASS
151	5755	-2.29		-2.15		
159	5795	-1.58		-1.44		

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, 5630 MHz, 802.11n (HT40))



(Channel 142, 5710MHz, 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)	Measured PPSD (dBm/MHz)	Duty Factor	Corrected PPSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
36	5180	2.75	0.11	2.86	11	PASS
44	5220	2.39		2.50		
48	5240	2.12		2.23		
52	5260	1.63		1.74		
60	5300	0.63		0.74		
64	5320	0.43		0.54		
100	5500	-0.79		-0.68		
120	5600	0.48		0.59		
144	5720	2.69		2.80		
Channel	Frequency (MHz)	Measured PPSD (dBm/500KHz)	Duty Factor	Corrected (dBm/500KHz)	Limit (dBm/500KHz)	Verdict
144	5720	-0.10	0.11	0.01	30	PASS
149	5745	-0.21		-0.10		
157	5785	0.28		0.39		
165	5825	0.32		0.43		