REPORT No. : SZ22020053W04

TEST REPORT

APPLICANT	:	Reliance Communications LLC
PRODUCT NAME	:	Orbic AirSurf WIFI
MODEL NAME	:	RC141TLWF
BRAND NAME	:	Orbic
FCC ID	:	2ABGH-RC141TLWF
STANDARD(S)	:	47 CFR Part 15 Subpart E
RECEIPT DATE	:	2022-02-09
TEST DATE	:	2022-02-18 to 2022-03-21
ISSUE DATE	:	2022-04-21

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Change History		
Version	Date	Reason for change
1.0	2022-04-21	First edition

1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Reliance Communications LLC
Applicant Address:	91 Colin Drive, Unit 1, HOLBROOK, New York 11741, United States
Manufacturer:	Reliance Communications LLC
Manufacturer Address:	91 Colin Drive, Unit 1, HOLBROOK, New York 11741, United States

1.2. Equipment Under Test (EUT) Description

Product Name:	Orbic AirSurf WIFI	
Sample No.:	5#	
Hardware Version:	EM_TG819_C_200B_V1.0	
Software Version:	ORB141TLWF_v1.0.1_GEN_WHM	
Modulation Technology:	OFDM	
Modulation Mode:	802.11a, 802.11n (HT20), 802.11n (HT40) 802.11ac (VHT20), 802.11ac (VHT40), 802.11ac (VHT80) 802.11ax (HEW20), 802.11ax (HEW40),802.11ax (HEW80)	
Operating Frequency Range:	5180MHz-5240MHz; 5260MHz-5320MHz; 5500MHz-5720MHz; 5745MHz-5825MHz	
Channel Number:	Refer to 1.3	
Antenna Type:	PIFA Antenna	
Antenna Gain:	ANT 0: 1.34dBi; ANT 1: 0.98dBi	
Directional Gain:	4.35dBi$_{\text{Note 2}}$	
Accessory Information:	Battery	
	Brand Name:	N/A
	Model No.:	558663-3S1P
	Serial No.:	N/A
	Capacity:	4830mAh
	Rated Voltage:	11.40V
	Charge Limit:	13.05V
	Manufacturer:	Ganzhou NovelBattery Technology Co., Ltd

Accessory Information:	AC Adapter	
	Brand Name:	N/A
	Model No.:	A330-200325W-M3
	Serial No.:	N/A
	Rated Output:	5.0V⎓3.0A, 9.0V⎓3.0A, 12.0V⎓3.0A, 15.0V⎓3.0A, 20.0V⎓3.25A
	Rated Input:	100-240V~50/60Hz, 1.7A
	Manufacturer:	Dongguan Aohai Technology Co., Ltd.

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. 802.11a only supports diversity and can't transmit simultaneously.

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} + 10log(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 does not support U-NII 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

Mode	Bandwidth (MHz)	Modulation Technology	Modulation Type	Data Rate	RU Size
802.11a	20	OFDM	**DBPSK**	**1**/2/5.5/11Mbps	NA
			DQPSK		
			CCK		
802.11n	20/40 (HT20/40)	OFDM	**BPSK**	**MCS0**~MCS7	NA
			QPSK		
			16QAM		
			64QAM		
802.11ac	20/40/80 (VHT20/40/80)	OFDM	**BPSK**	**MSC0**~MCS9	NA
			QPSK		
			16QAM		
			64QAM		
			256QAM		
802.11ax	20/40/80 (HEW20/40/80)	OFDMA	**BPSK**	**MSC0**~MCS11	26/52/106/242/484/996
			QPSK		
			16QAM		
			64QAM		
			256QAM		
			1024QAM		

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	112	5560
	116	5580	**120**	**5600**
	124	5620	128	5640
	132	5660	136	5680
	140	5700	**144**	**5720**
40MHz	**102**	**5510**	110	5550
	118	5590	**126**	**5630**
	134	5670	**142**	**5710**
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	Feb. 18, 2022	Meng Shurui	PASS	No deviation
3	15.407(a)	Maximum Conducted Output Power	Mar. 10, 2022	Meng Shurui	PASS	No deviation
4	15.407(a) (e)	Emission Bandwidth	Mar. 04, 2022	Meng Shurui	PASS	No deviation
5	15.407(a)	Peak Power Spectral Density	Mar. 04, 2022	Meng Shurui	PASS	No deviation
6	15.407(g)	Frequency Stability	Mar. 04, 2022	Meng Shurui	PASS	No deviation
7	15.207	Conducted Emission	Mar. 08, 2022	Wu Zhaoling	PASS	No deviation
8	15.407(b)	Restricted Frequency Bands	Mar. 11&12, 2022	Su Zhan	PASS	No deviation
9	15.407(b)	Radiated Emission	Mar. 21, 2022	Lin Jiayong	PASS	No deviation

Note 1: The DFS test report was documented in a separate report (Report No.: SZ22020053W05).

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 12.0dB contains two parts that cable loss 2.0dB 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 I-PEX connector. Please refer to the EUT internal photos.

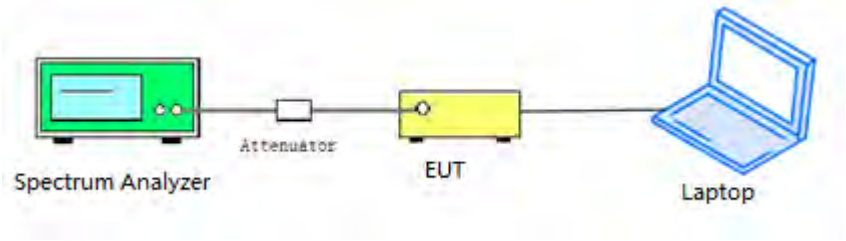
2.2. Duty Cycle of the Test Signal

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 ±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

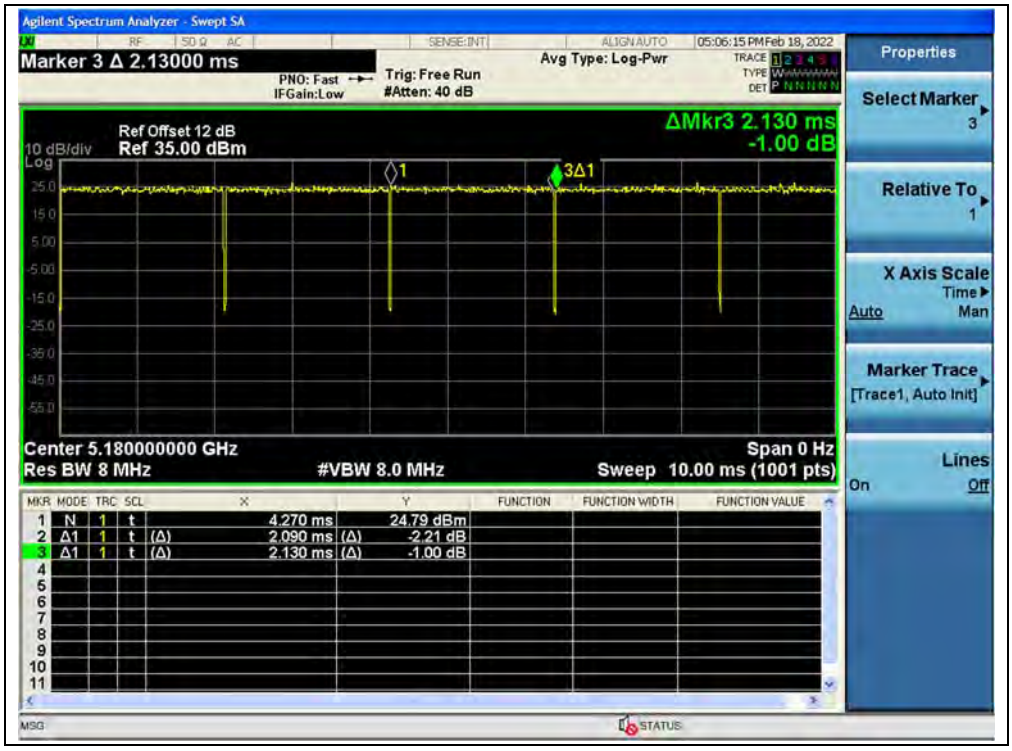
KDB 789033 Section B was used in order to prove compliance.

2.2.4. Test Result

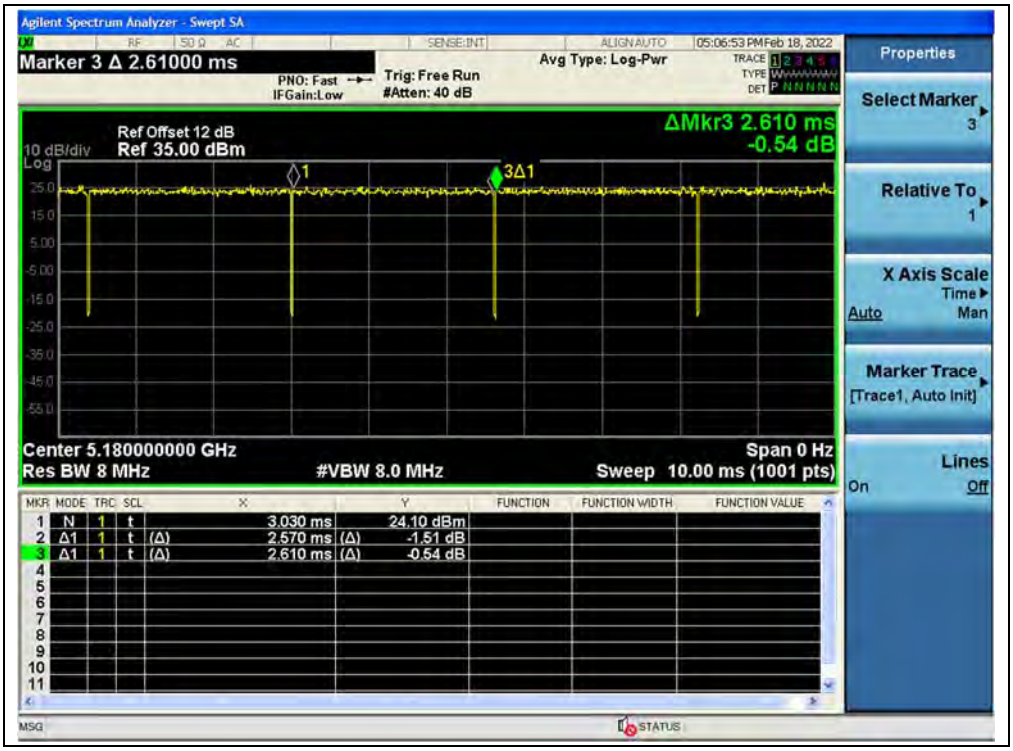
A.Test Verdict:

Test Mode	Duty Cycle (%) (D)	Duty Factor (10*log[1/D])
802.11a	98.12	0.08
802.11n(HT20)	98.47	0.07
802.11n(HT40)	98.48	0.07
802.11ac(VHT20)	98.46	0.07
802.11ac(VHT40)	98.09	0.08
802.11ac(VHT80)	98.47	0.07
802.11ax(HEW20)	98.90	0.05
802.11ax(HEW40)	98.90	0.05
802.11ax(HEW80)	97.98	0.09
802.11ax(RU26)	95.55	0.20
802.11ax(RU52)	95.55	0.20
802.11ax(RU106)	95.29	0.21

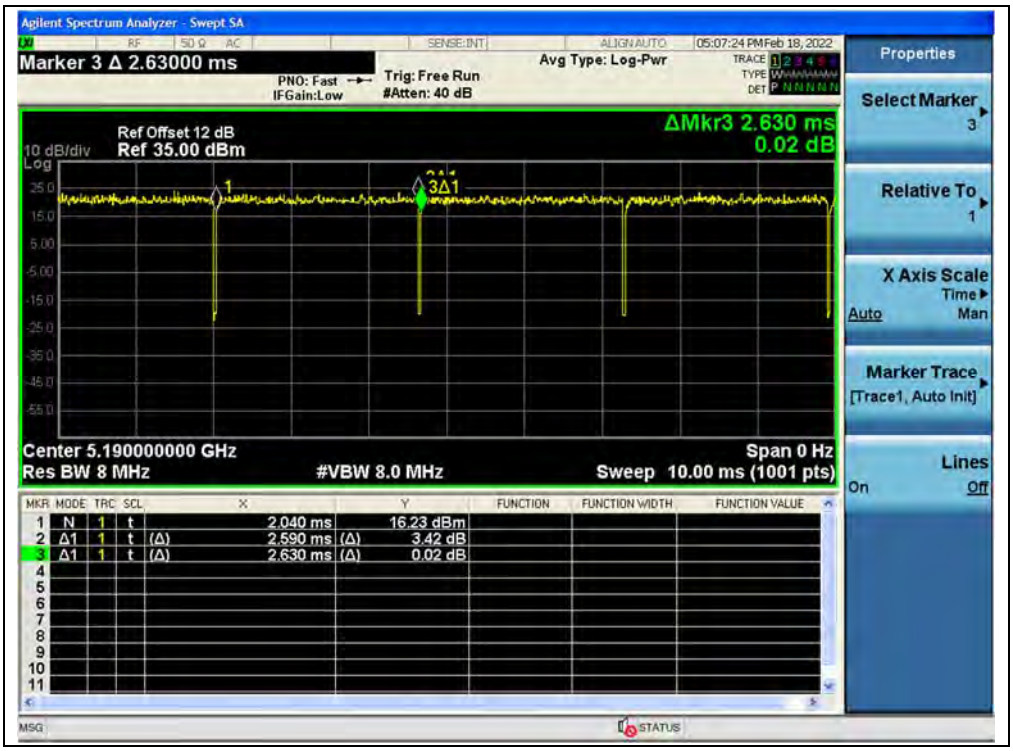
B.Test Plot:



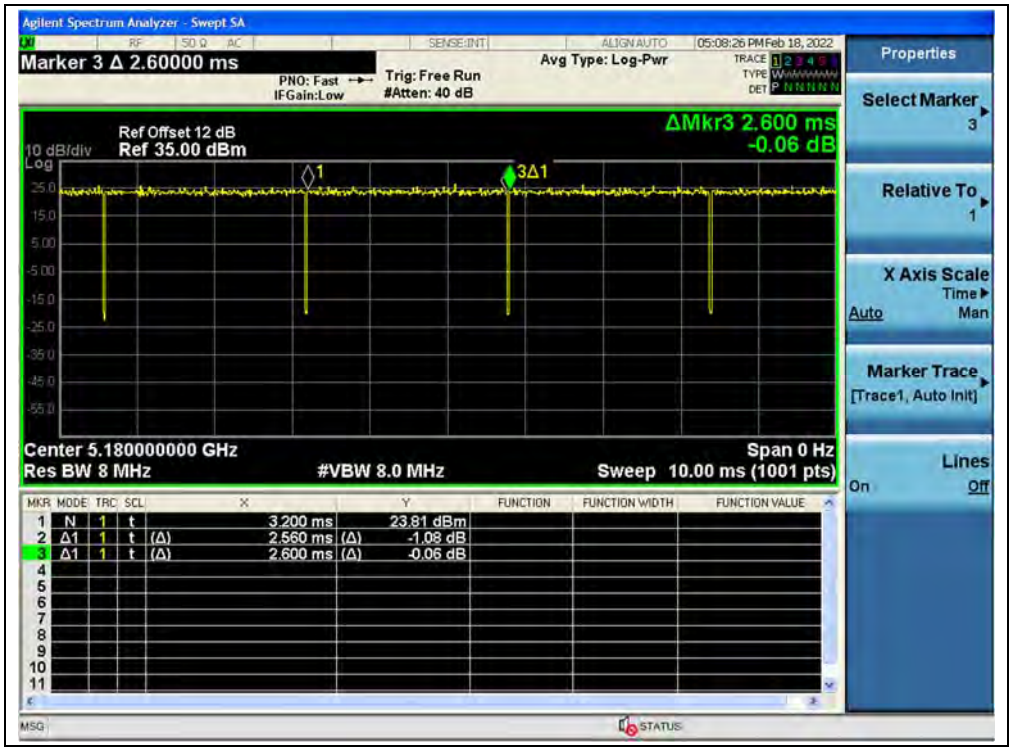
(Channel 36, 5180MHz, 802.11a)



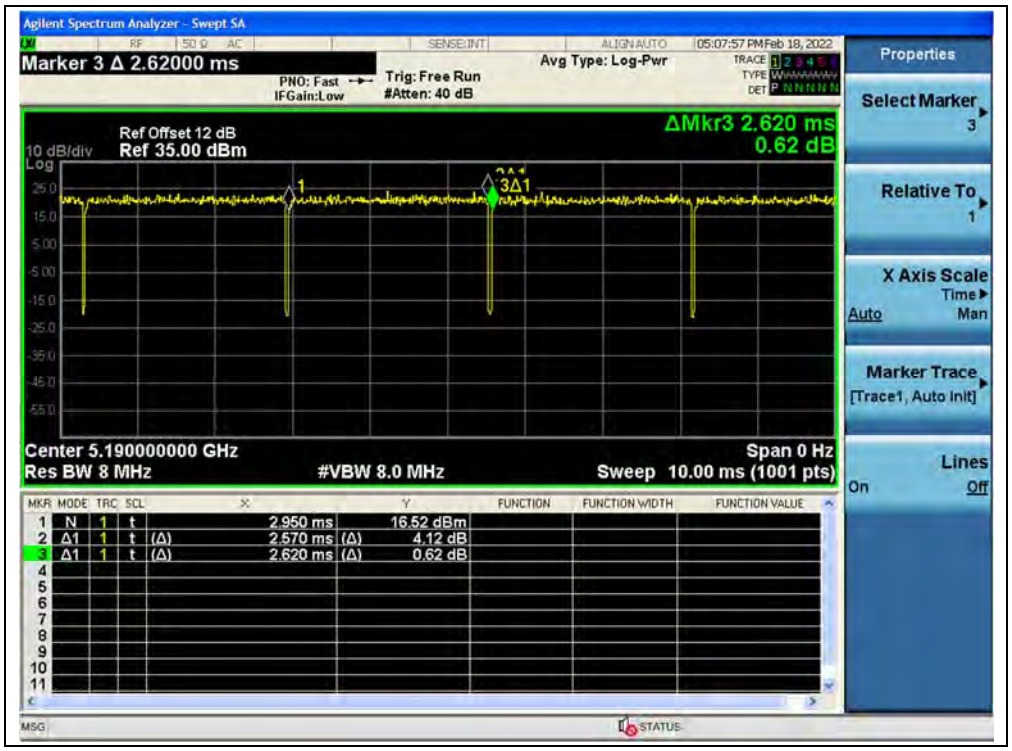
(Channel 36, 5180MHz, 802.11n (HT20))



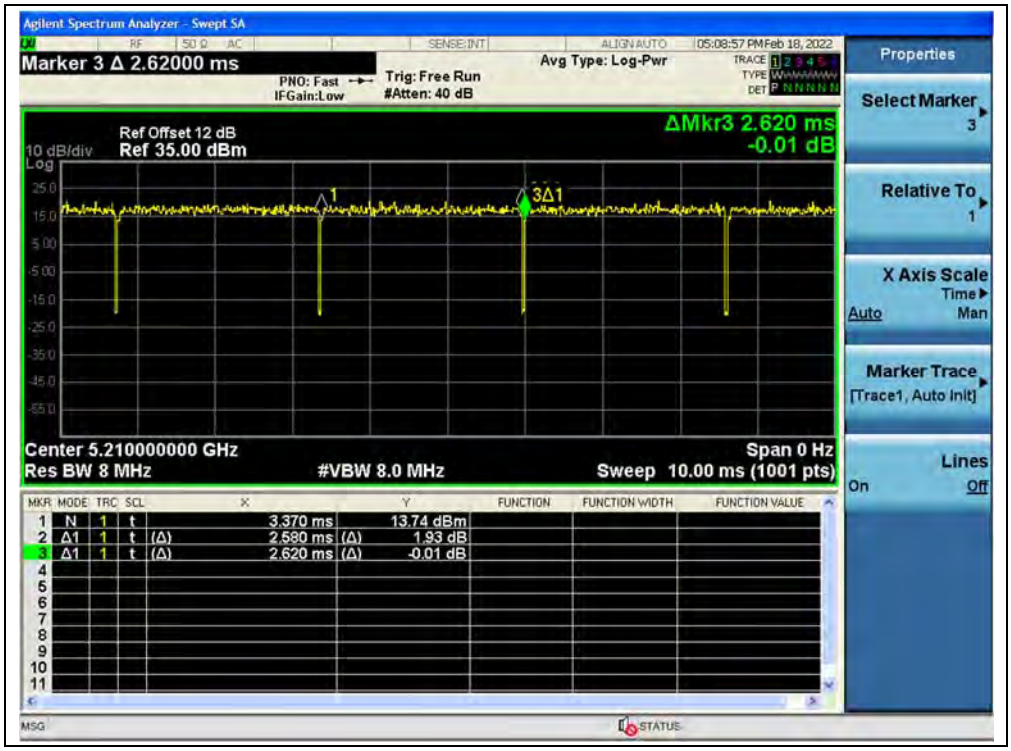
(Channel 38, 5190MHz, 802.11n (HT40))



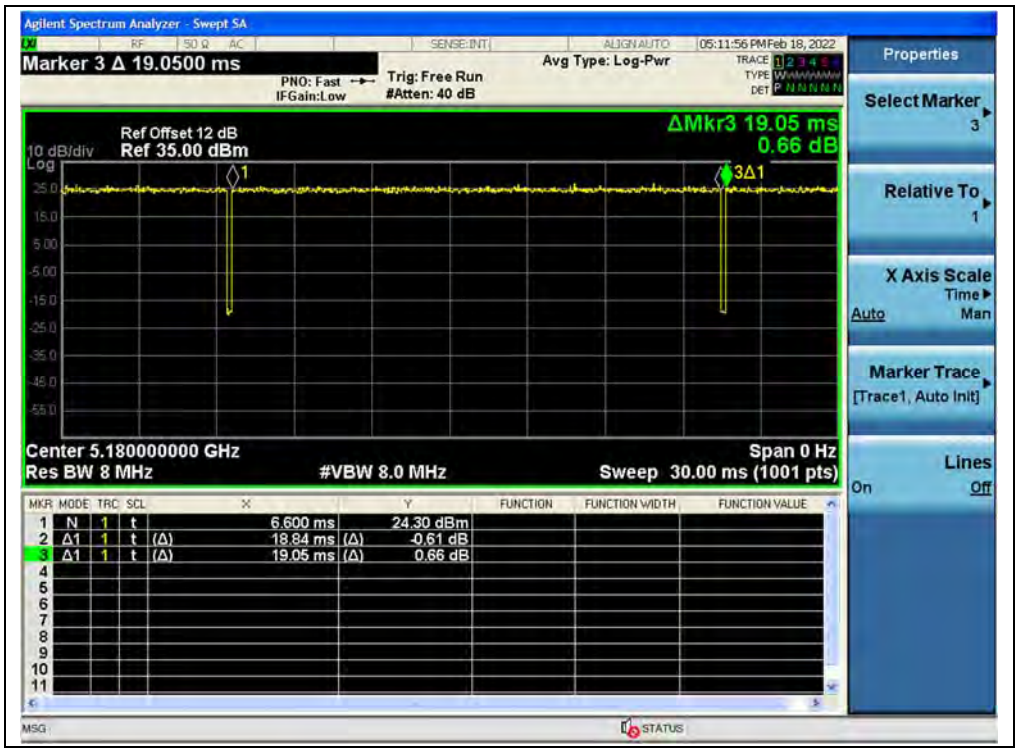
(Channel 36, 5180MHz, 802.11ac (VHT20))



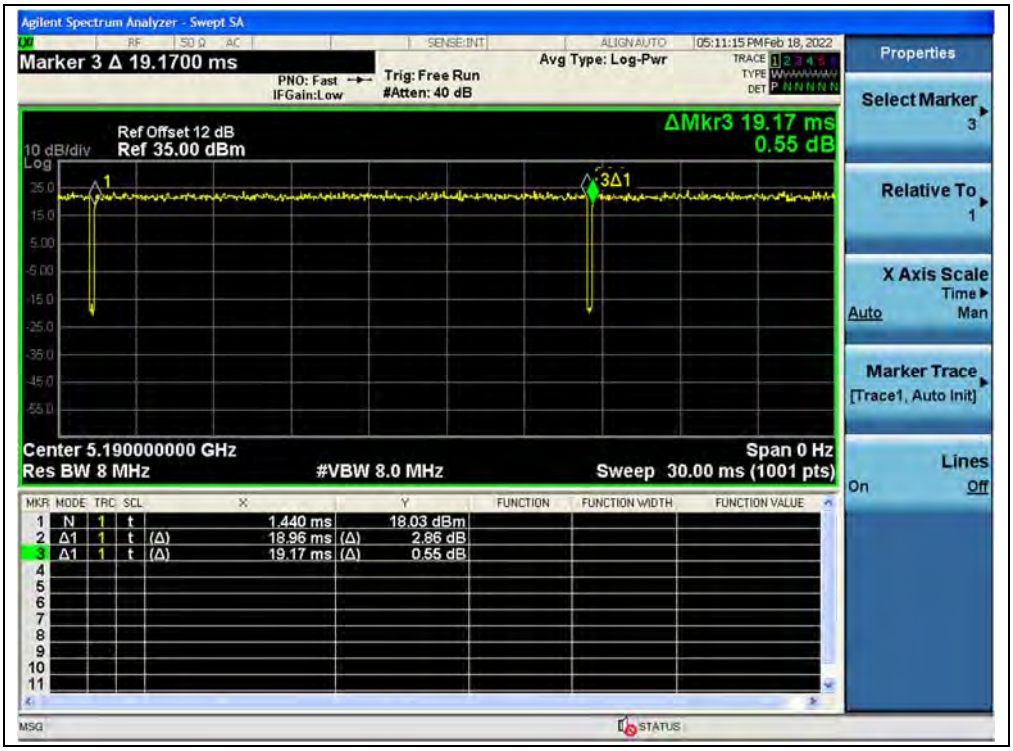
(Channel 38, 5190MHz, 802.11ac (VHT40))



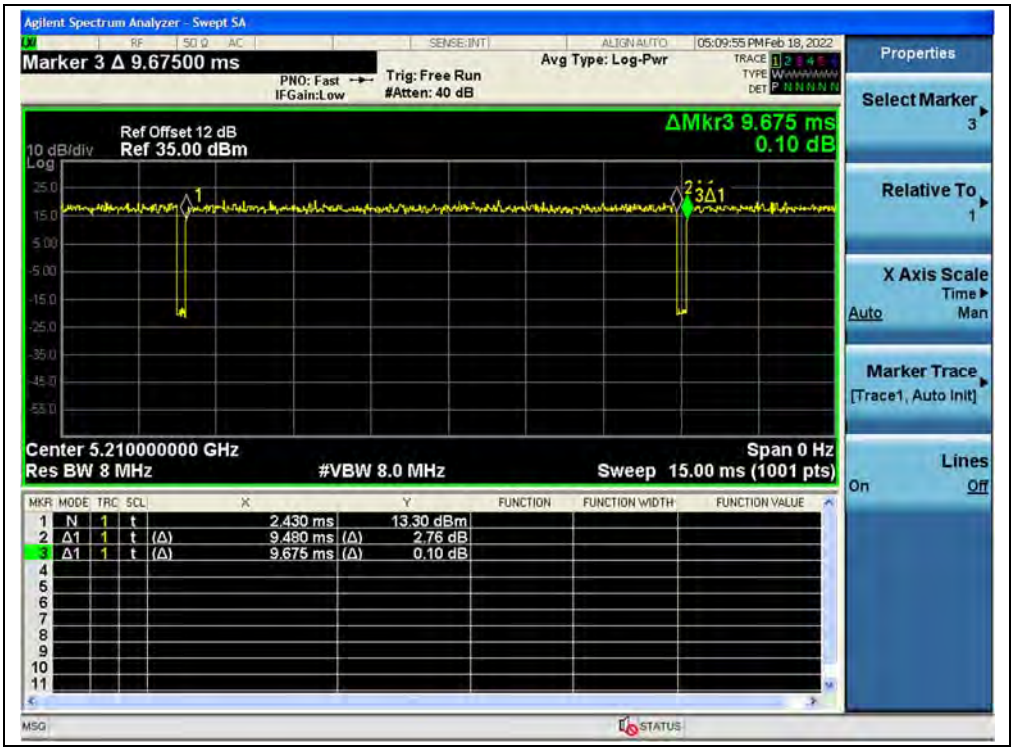
(Channel 42, 5210MHz, 802.11ac (VHT80))



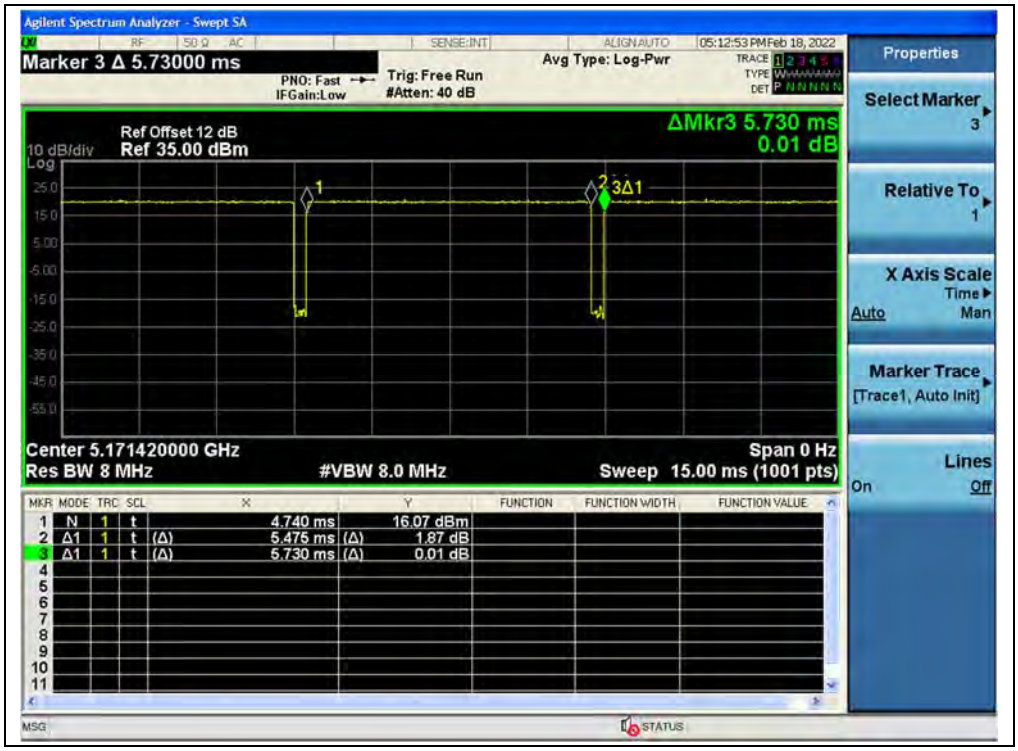
(CH36, 5180MHz, 802.11ax (HEW20))



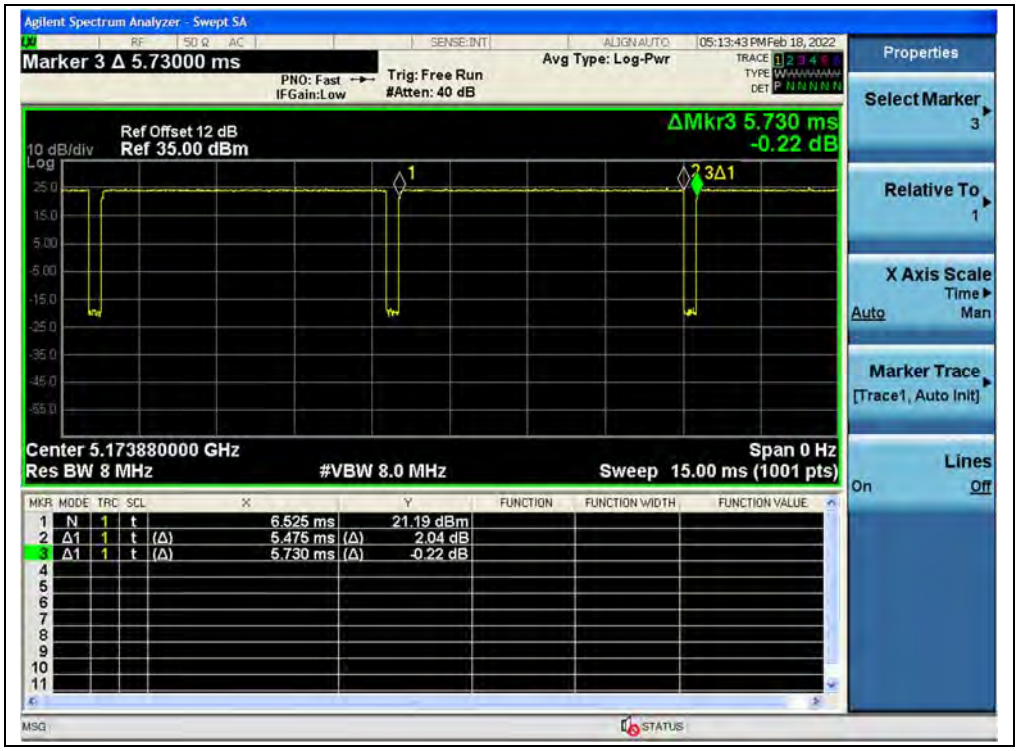
(CH38, 5190MHz, 802.11ax (HEW40))



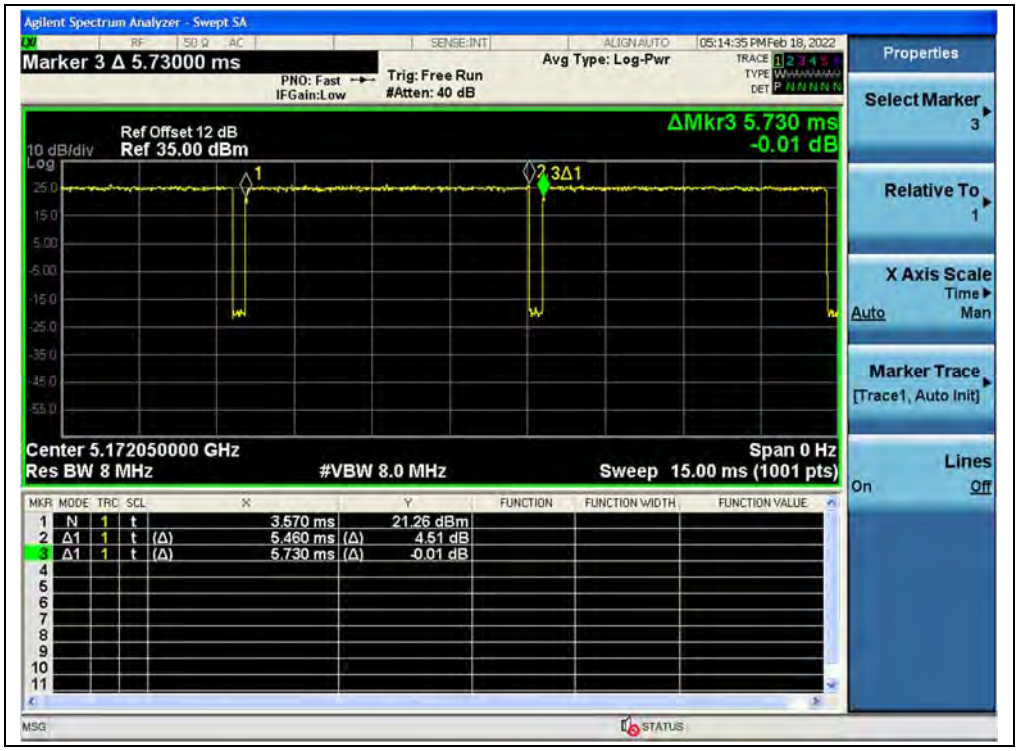
(CH42, 5210MHz, 802.11ax (HEW80))



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



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



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

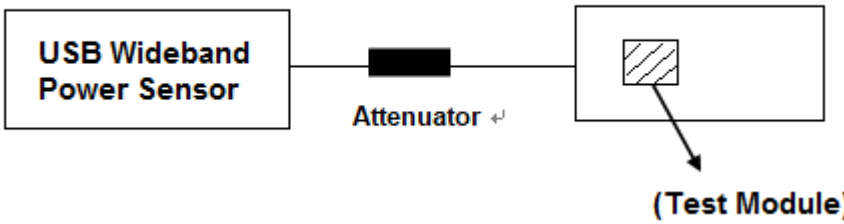
2.3. Maximum Conducted Output Power

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 11dBm + 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 KDB662911D01Measure-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} +10log(N_{ANT})dBi, where G_{ANT} is the antenna gain in dBi, N_{ANT} is the number of outputs.

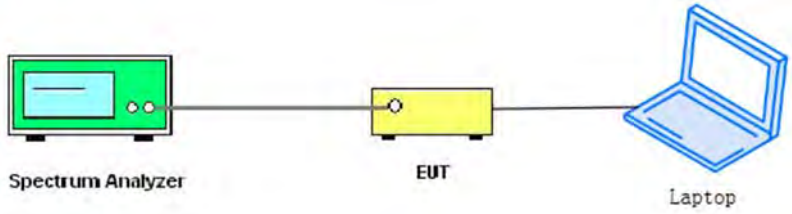
2.3.2. Test Description

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	22.64	24.55	24.00
		5300	22.63	24.55	24.00
		5320	22.87	24.59	24.00
	UNII-2c	5500	23.24	24.66	24.00
		5600	22.89	24.60	24.00
		5720	22.85	24.59	24.00
n20	UNII-2a	5260	24.24	24.85	24.00
		5300	22.81	24.58	24.00
		5320	22.89	24.60	24.00
	UNII-2c	5500	23.53	24.72	24.00
		5600	22.79	24.58	24.00
		5720	24.38	24.87	24.00
ac20	UNII-2a	5260	23.39	24.69	24.00
		5300	22.85	24.59	24.00
		5320	23.19	24.65	24.00
	UNII-2c	5500	22.70	24.56	24.00
		5600	23.20	24.65	24.00
		5720	23.67	24.74	24.00
ax20	UNII-2a	5260	22.59	24.54	24.00
		5300	22.40	24.50	24.00
		5320	21.92	24.41	24.00
	UNII-2c	5500	22.84	24.59	24.00
		5600	23.66	24.74	24.00
		5720	22.58	24.54	24.00
ax_RU26	UNII-2a	5260	20.36	24.09	24.00
		5300	20.08	24.03	24.00
		5320	20.14	24.04	24.00
	UNII-2c	5500	20.25	24.06	24.00
		5600	20.32	24.08	24.00
		5720	20.35	24.09	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						
	ANT0	ANT1		ANT0		ANT1				
	dBm	dBm		dBm	W	dBm	W	dBm	W	
5180	16.22	16.11	0.08	16.30	0.043	16.19	0.042	24	0.25	PASS
5220	16.34	15.83		16.42	0.044	15.91	0.039			PASS
5240	16.52	16.02		16.60	0.046	16.10	0.041			
5260	16.73	16.38		16.81	0.048	16.46	0.044			
5300	16.63	16.12		16.71	0.047	16.20	0.042			
5320	16.48	16.01		16.56	0.045	16.09	0.041			
5500	16.70	16.14		16.78	0.048	16.22	0.042			
5600	16.15	15.52		16.23	0.042	15.60	0.036			
5720	16.18	15.72		16.26	0.042	15.80	0.038			
5745	16.07	15.71		16.15	0.041	15.79	0.038	30	1	
5785	16.38	15.79		16.46	0.044	15.87	0.039			
5825	16.00	15.69		16.08	0.041	15.77	0.038			

802.11n (HT20) Mode

Frequency (MHz)	Average Power		Duty Factor	Total Power with Duty Factor		Limit		Verdict
	Measured							
	ANT0	ANT1						
	dBm	dBm		dBm	W	dBm	W	
5180	17.15	16.98	0.07	20.13	0.103	24	0.25	PASS
5220	17.24	16.67		20.04	0.101			
5240	17.46	16.83		20.25	0.106			
5260	17.70	17.24		20.57	0.114			
5300	17.53	17.14		20.41	0.110			
5320	17.37	16.96		20.25	0.106			
5500	17.29	17.01		20.25	0.106			
5600	16.82	16.47		19.73	0.094			
5720	17.05	16.75		20.00	0.100			
5745	17.22	16.71		20.04	0.101	30	1	
5785	17.21	16.72		20.04	0.101			
5825	17.35	16.74		20.13	0.103			
Note: Directional gain = 1.34dBi +10log(2) = 4.35dBi＜6dBi, so the power limit shall be 24dBm for 5.18-5.24 GHz, 5.260-5.320GHz, 5.500-5.720GHz band and 30dBm for 5.745-5.825 GHz band.								

802.11n (HT40) Mode

Frequency (MHz)	Average Power		Duty Factor	Total Power with Duty Factor		Limit		Verdict
	Measured							
	ANT0	ANT1						
	dBm	dBm		dBm	W	dBm	W	
5190	16.91	16.63	0.07	19.87	0.097	24	0.25	PASS
5230	17.03	16.58		19.91	0.098			
5270	17.05	16.85		20.04	0.101			
5310	17.09	16.71		20.00	0.100			
5510	17.33	17.10		20.29	0.107			
5630	16.90	16.85		19.96	0.099			
5710	16.58	16.53		19.64	0.092			
5755	17.06	16.52		19.87	0.097	30	1	
5795	16.84	16.49		19.73	0.094			
Note: Directional gain = 1.34dBi +10log(2) = 4.35dBi＜6dBi, so the power limit shall be 24dBm for 5.18-5.24 GHz, 5.260-5.320GHz, 5.500-5.720GHz band and 30dBm for 5.745-5.825 GHz band.								

802.11ac (VHT20) Mode

Frequency (MHz)	Average Power		Duty Factor	Total Power with Duty Factor		Limit		Verdict
	Measured							
	ANT0	ANT1						
	dBm	dBm		dBm	W	dBm	W	
5180	16.63	16.34	0.07	19.59	0.091	24	0.25	PASS
5220	16.73	16.04		19.49	0.089			
5240	16.79	16.27		19.64	0.092			
5260	17.16	16.58		19.96	0.099			
5300	17.07	16.51		19.87	0.097			
5320	16.88	16.47		19.78	0.095			
5500	17.21	16.59		20.00	0.100			
5600	16.57	16.49		19.59	0.091			
5720	16.61	16.21		19.49	0.089			
5745	16.62	16.32		19.54	0.090	30	1	
5785	16.78	16.09		19.54	0.090			
5825	16.46	16.23		19.44	0.088			
Note: Directional gain = 1.34dBi +10log(2) = 4.35dBi＜6dBi, so the power limit shall be 24dBm for 5.18-5.24 GHz, 5.260-5.320GHz, 5.500-5.720GHz band and 30dBm for 5.745-5.825 GHz band.								

802.11ac (VHT40) Mode

Frequency (MHz)	Average Power		Duty Factor	Total Power with Duty Factor		Limit		Verdict
	Measured							
	ANT0	ANT1						
	dBm	dBm		dBm	W	dBm	W	
5190	16.82	16.64	0.08	19.82	0.096	24	0.25	PASS
5230	17.10	16.75		20.00	0.100			
5270	17.12	16.86		20.09	0.102			
5310	17.09	16.79		20.04	0.101			
5510	17.21	16.83		20.13	0.103			
5630	16.60	16.11		19.44	0.088			
5710	16.85	16.55		19.78	0.095			
5755	16.91	16.46		19.78	0.095	30	1	
5795	16.84	16.62		19.82	0.096			
Note: Directional gain = 1.34dBi +10log(2) = 4.35dBi＜6dBi, so the power limit shall be 24dBm for 5.18-5.24 GHz, 5.260-5.320GHz, 5.500-5.720GHz 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	dBm		dBm	W	dBm	W	
5210	16.40	16.11	0.07	19.34	0.086	24	0.25	PASS
5290	16.42	16.08		19.34	0.086			
5530	16.92	16.35		19.73	0.094			
5610	16.63	16.17		19.49	0.089			
5690	16.32	15.98		19.24	0.084			
5775	15.78	15.31		18.63	0.073	30	1	
Note: Directional gain = 1.34dBi +10log(2) = 4.35dBi＜6dBi, so the power limit shall be 24dBm for 5.18-5.24 GHz, 5.260-5.320GHz, 5.500-5.720GHz 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	dBm		dBm	W	dBm	W	
5180	16.34	16.21	0.05	19.34	0.086	24	0.25	PASS
5220	16.43	15.89		19.24	0.084			
5240	16.45	16.02		19.29	0.085			
5260	16.64	16.37		19.59	0.091			
5300	16.71	16.28		19.54	0.090			
5320	16.82	16.18		19.59	0.091			
5500	16.95	16.47		19.78	0.095			
5600	16.32	15.75		19.08	0.081			
5720	16.38	16.09		19.29	0.085			
5745	16.43	16.15		19.34	0.086	30	1	
5785	16.55	16.01		19.34	0.086			
5825	16.51	15.96		19.29	0.085			
Note: Directional gain = 1.34dBi +10log(2) = 4.35dBi＜6dBi, so the power limit shall be 24dBm for 5.18-5.24 GHz, 5.260-5.320GHz, 5.500-5.720GHz 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	dBm		dBm	W	dBm	W	
5180	8.23	8.07	0.05	11.14	0.013	24	0.25	PASS
5220	8.56	8.00		11.46	0.014			
5240	8.81	8.04		11.46	0.014			
5260	9.04	8.47		11.76	0.015			
5300	8.87	8.30		11.76	0.015			
5320	8.81	8.35		11.76	0.015			
5500	9.28	8.12		11.76	0.015			
5600	8.62	7.94		11.46	0.014			
5720	8.52	7.98		11.46	0.014			
5745	8.49	8.16		11.46	0.014	30	1	
5785	8.74	8.03		11.46	0.014			
5825	8.69	7.99		11.46	0.014			
Note: Directional gain = 1.34dBi +10log(2) = 4.35dBi＜6dBi, so the power limit shall be 24dBm for 5.18-5.24 GHz, 5.260-5.320GHz, 5.500-5.720GHz 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				
	ANT0	ANT1						
	dBm	dBm		dBm	W	dBm	W	
5180	8.39	8.22	0.05	11.46	0.014	24	0.25	PASS
5220	8.61	7.87		11.46	0.014			
5240	8.89	8.06		11.46	0.014			
5260	9.12	8.54		11.76	0.015			
5300	8.94	8.43		11.76	0.015			
5320	8.86	8.20		11.46	0.014			
5500	9.19	8.61		12.04	0.016			
5600	8.63	8.58		11.76	0.015			
5720	8.59	8.42		11.46	0.014			
5745	8.72	8.23		11.46	0.014	30	1	
5785	8.64	8.09		11.46	0.014			
5825	8.46	8.17		11.46	0.014			
Note: Directional gain = 1.34dBi +10log(2) = 4.35dBi＜6dBi, so the power limit shall be 24dBm for 5.18-5.24 GHz, 5.260-5.320GHz, 5.500-5.720GHz 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				
	ANT0	ANT1						
	dBm	dBm		dBm	W	dBm	W	
5180	8.23	8.28	0.05	11.46	0.014	24	0.25	PASS
5220	8.51	7.99		11.46	0.014			
5240	8.74	8.11		11.46	0.014			
5260	8.42	8.61		11.46	0.014			
5300	8.87	8.63		11.76	0.015			
5320	8.93	8.68		11.76	0.015			
5500	9.30	8.72		12.04	0.016			
5600	8.67	7.98		11.46	0.014			
5720	8.58	8.24		11.46	0.014			
5745	8.75	8.29		11.46	0.014	30	1	
5785	8.62	8.12		11.46	0.014			
5825	8.50	8.13		11.46	0.014			
Note: Directional gain = 1.34dBi +10log(2) = 4.35dBi＜6dBi, so the power limit shall be 24dBm for 5.18-5.24 GHz, 5.260-5.320GHz, 5.500-5.720GHz 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				
	ANT0	ANT1						
	dBm	dBm		dBm	W	dBm	W	
5190	15.08	14.81	0.05	17.99	0.063	24	0.25	PASS
5230	15.14	14.52		17.92	0.062			
5270	15.01	14.69		17.92	0.062			
5310	14.79	14.29		17.63	0.058			
5510	15.26	14.70		18.06	0.064			
5630	14.96	14.64		17.85	0.061			
5710	14.74	14.26		17.56	0.057			
5755	14.07	13.61		16.90	0.049	30	1	
5795	14.54	13.93		17.32	0.054			
Note: Directional gain = 1.34dBi +10log(2) = 4.35dBi＜6dBi, so the power limit shall be 24dBm for 5.18-5.24 GHz, 5.260-5.320GHz, 5.500-5.720GHz band and 30dBm for 5.745-5.825 GHz band.								

802.11ax (HEW80) Mode

Frequency (MHz)	Average Power		Duty Factor	Total Power with Duty Factor		Limit		Verdict
	Measured							
	ANT0	ANT1						
	dBm	dBm		dBm	W	dBm	W	
5210	14.06	13.47	0.09	16.90	0.049	24	0.25	PASS
5290	14.01	13.55		16.90	0.049			
5530	14.38	13.66		17.16	0.052			
5610	14.16	13.57		16.99	0.050			
5690	13.82	13.31		16.63	0.046			
5775	13.22	12.61		16.02	0.040	30	1	
Note: Directional gain = 1.34dBi +10log(2) = 4.35dBi＜6dBi, so the power limit shall be 24dBm for 5.18-5.24 GHz, 5.260-5.320GHz, 5.500-5.720GHz band and 30dBm for 5.745-5.825 GHz band.								

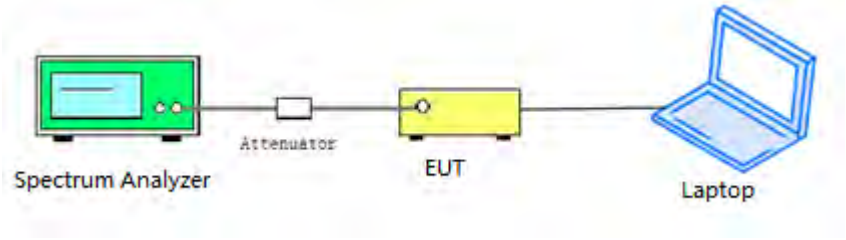
2.4. Emission Bandwidth

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 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) ≥ 3 × 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

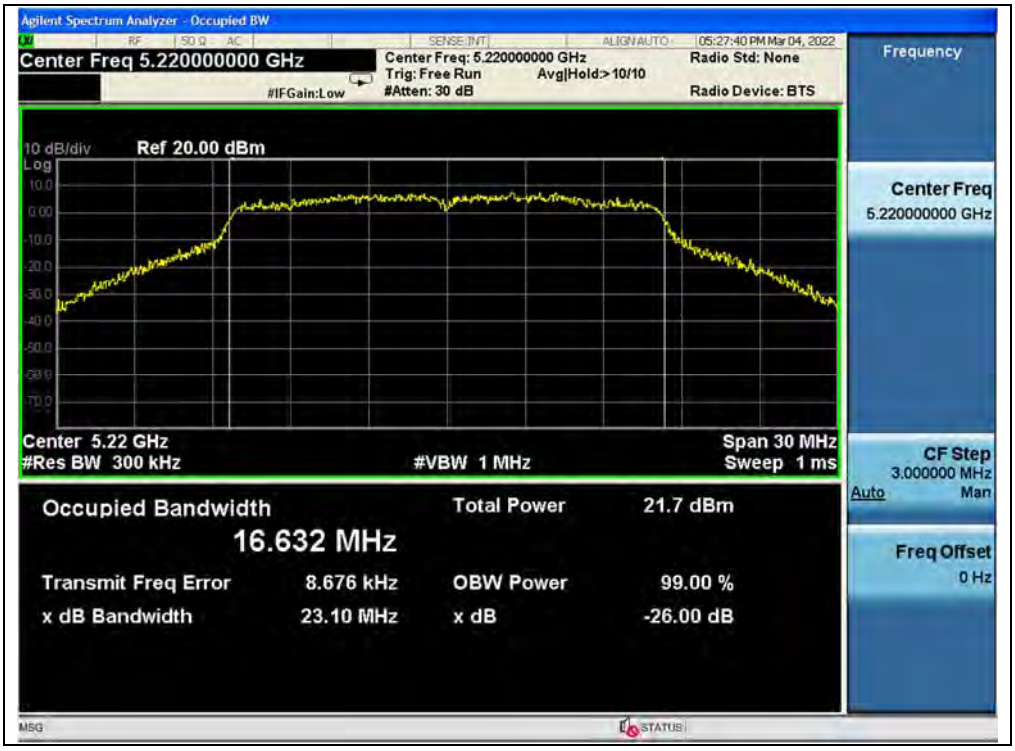
802.11a Mode

A.Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
36	5180	22.67
44	5220	23.10
48	5240	23.30
52	5260	22.64
60	5300	22.63
64	5320	22.87
100	5500	23.24
120	5600	22.89
144	5720	22.85
Channel	**Frequency (MHz)**	**6 dB Bandwidth (MHz)**
144	5720	16.27
149	5745	13.88
157	5785	15.08
165	5825	12.66

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)

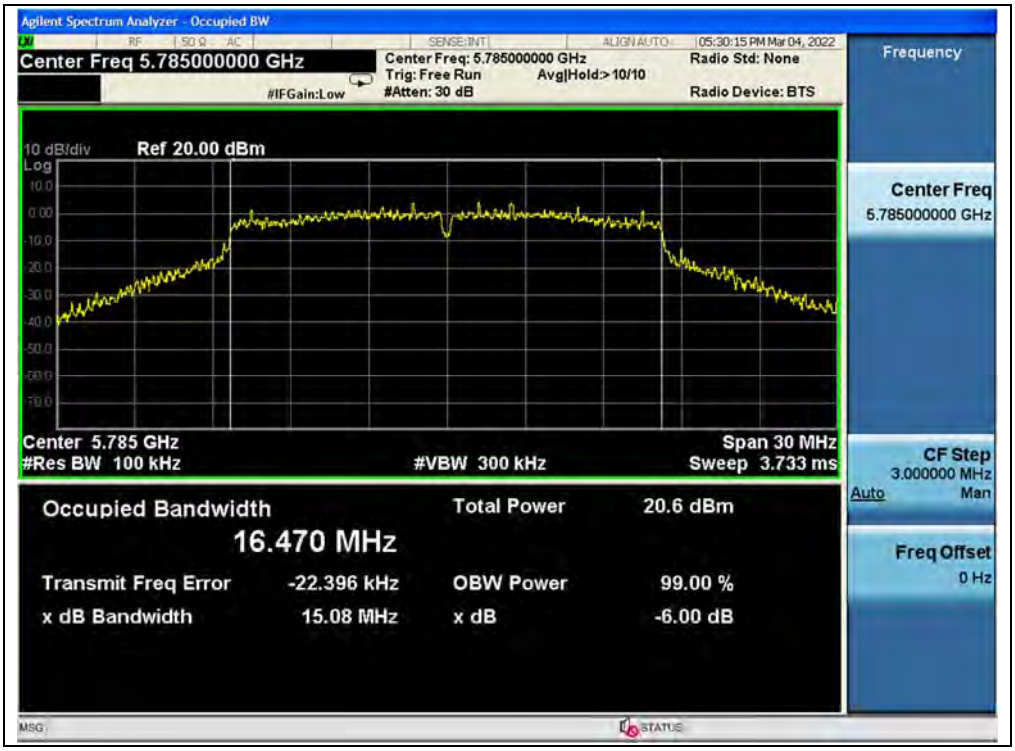
(Channel 100,5500MHz, 802.11a)

(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	22.80
44	5220	23.44
48	5240	23.44
52	5260	24.24
60	5300	22.81
64	5320	22.89
100	5500	23.53
120	5600	22.79
144	5720	24.38
Channel	**Frequency (MHz)**	**6 dB Bandwidth (MHz)**
144	5720	17.56
149	5745	16.01
157	5785	17.55
165	5825	16.27

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	43.23
46	5230	42.69
54	5270	41.59
62	5310	43.22
102	5510	42.76
126	5630	42.95
142	5710	41.95
Channel	**Frequency (MHz)**	**6 dB Bandwidth (MHz)**
142	5710	36.34
151	5755	34.14
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 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	22.71
44	5220	23.19
48	5240	23.51
52	5260	23.39
60	5300	22.85
64	5320	23.19
100	5500	22.70
120	5600	23.20
144	5720	23.67
Channel	**Frequency (MHz)**	**6 dB Bandwidth (MHz)**
144	5720	17.61
149	5745	17.13
157	5785	17.13
165	5825	17.62

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))

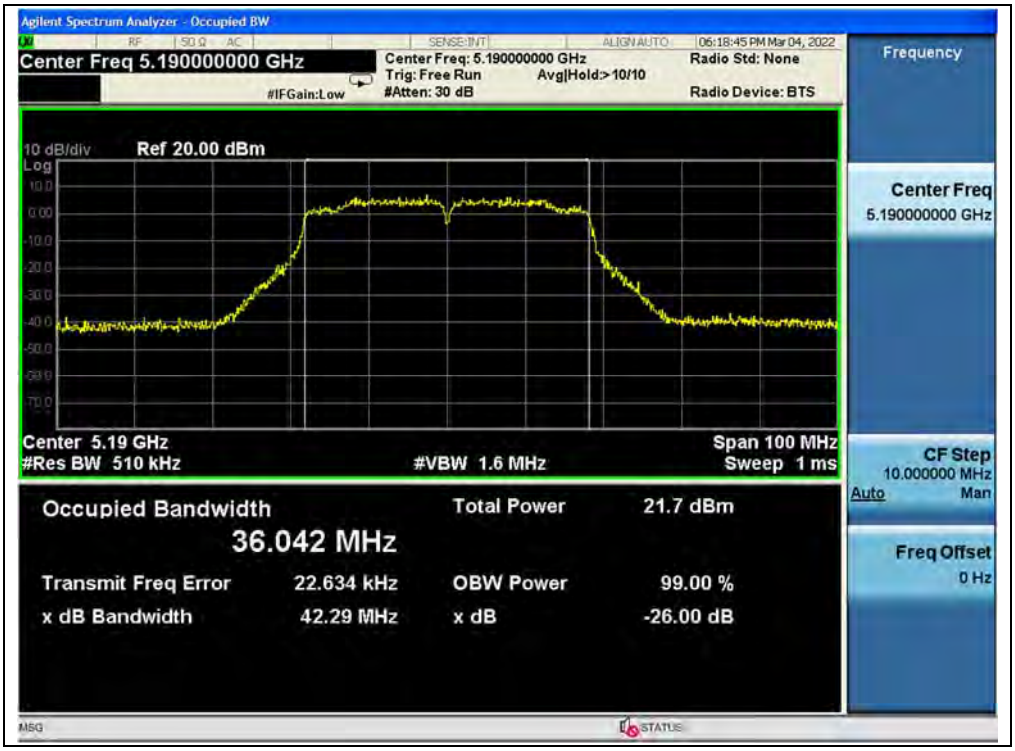
(Channel 165, 5825MHz, 802.11 ac (VHT20))

802.11ac (VHT40) Mode

A.Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
38	5190	42.29
46	5230	42.46
54	5270	43.19
62	5310	42.95
102	5510	43.12
126	5630	42.55
142	5710	42.17
Channel	**Frequency (MHz)**	**6 dB Bandwidth (MHz)**
142	5710	31.61
151	5755	29.83
159	5795	35.12

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))

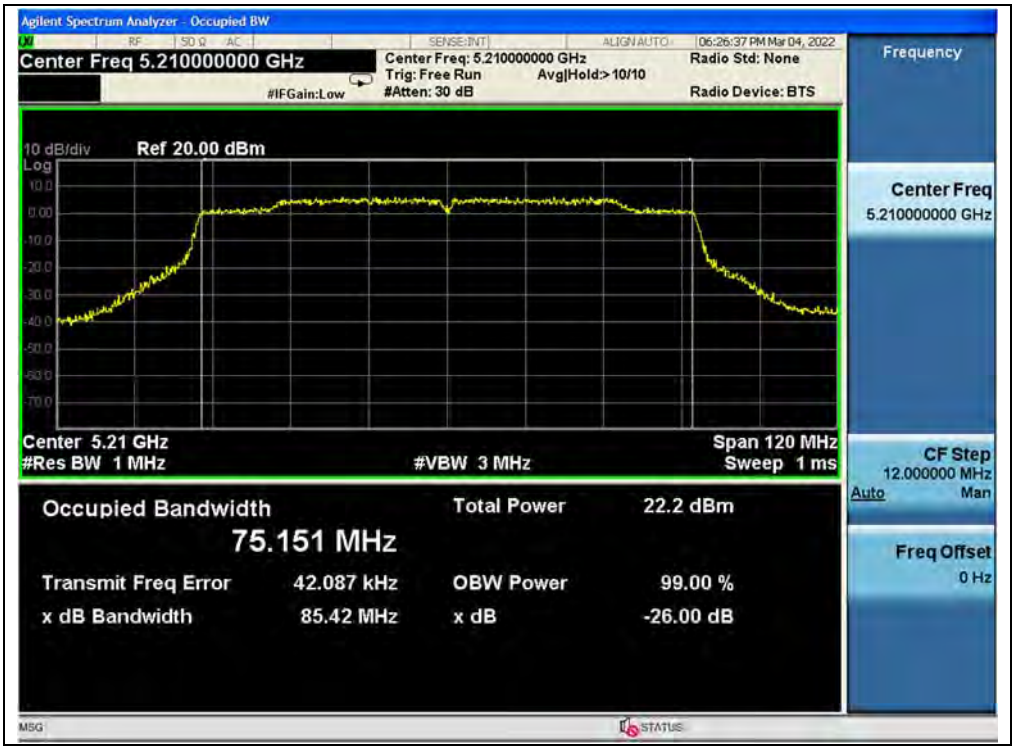
(Channel 159, 5795MHz, 802.11ac (VHT40))

802.11ac (VHT80) Mode

A.Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
42	5210	85.42
58	5290	85.03
106	5530	85.50
122	5610	83.78
138	5690	85.12
Channel	**Frequency (MHz)**	**6 dB Bandwidth (MHz)**
138	5690	72.27
155	5775	66.34

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))

802.11ax (HEW20) Mode

A.Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
36	5180	22.67
44	5220	22.32
48	5240	22.55
52	5260	22.59
60	5300	22.40
64	5320	21.92
100	5500	22.84
120	5600	23.66
144	5720	22.58
Channel	**Frequency (MHz)**	**6 dB Bandwidth (MHz)**
144	5720	18.65
149	5745	18.80
157	5785	18.76
165	5825	18.83

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))

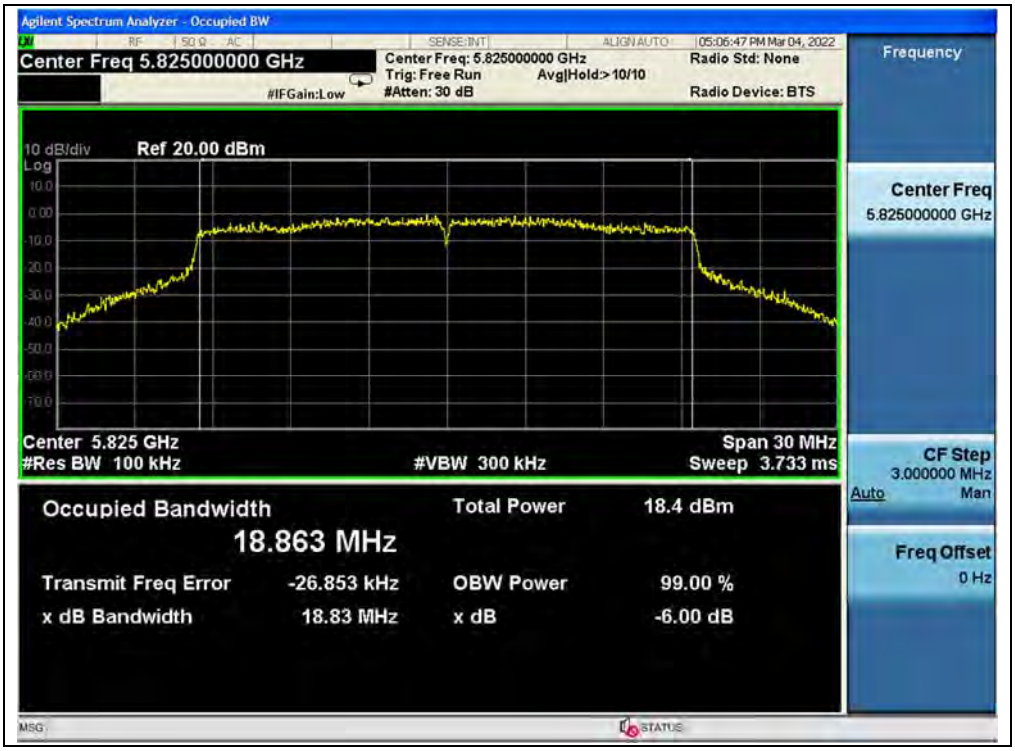
(Channel 120, 5600MHz, 802.11ax (HEW20))

(Channel 144, 5720MHz, 802.11ax (HEW20))

(Channel 144, 5720MHz, 802.11ax (HEW20))

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

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



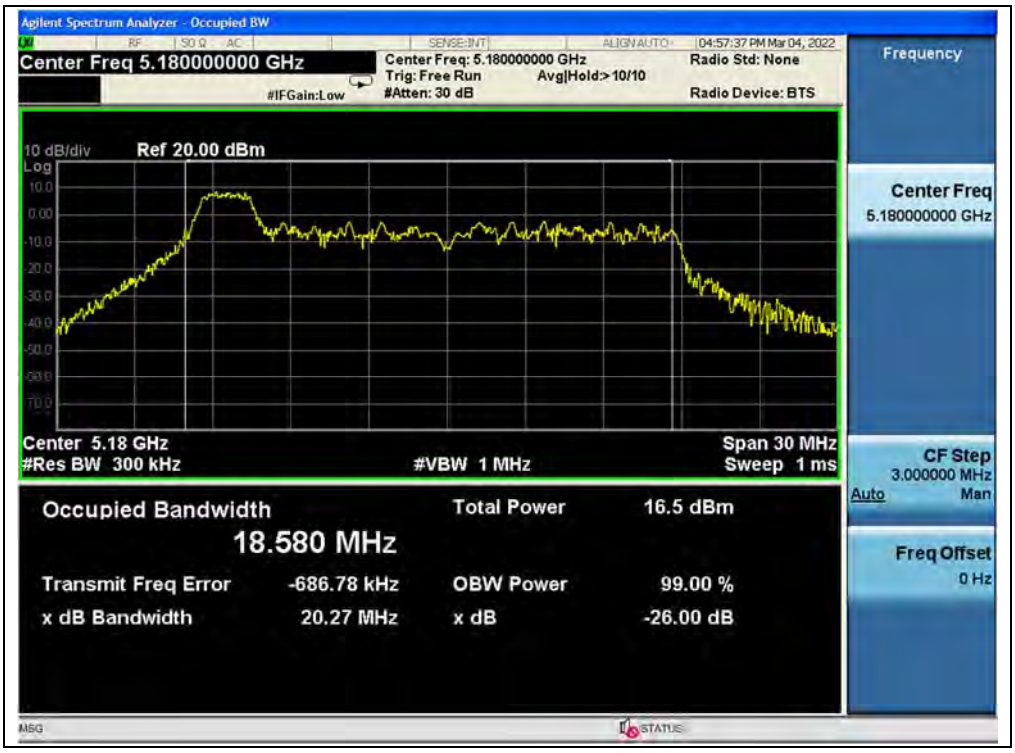
(Channel 165, 5825MHz, 802.11ax (HEW20))

802.11ax (HEW20)(RU26) Mode

A.Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
36	5180	20.27
44	5220	20.19
48	5240	20.34
52	5260	20.36
60	5300	20.08
64	5320	20.14
100	5500	20.25
120	5600	20.32
144	5720	20.35
Channel	**Frequency (MHz)**	**6 dB Bandwidth (MHz)**
144	5720	2.02
149	5745	2.03
157	5785	2.03
165	5825	2.03

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))

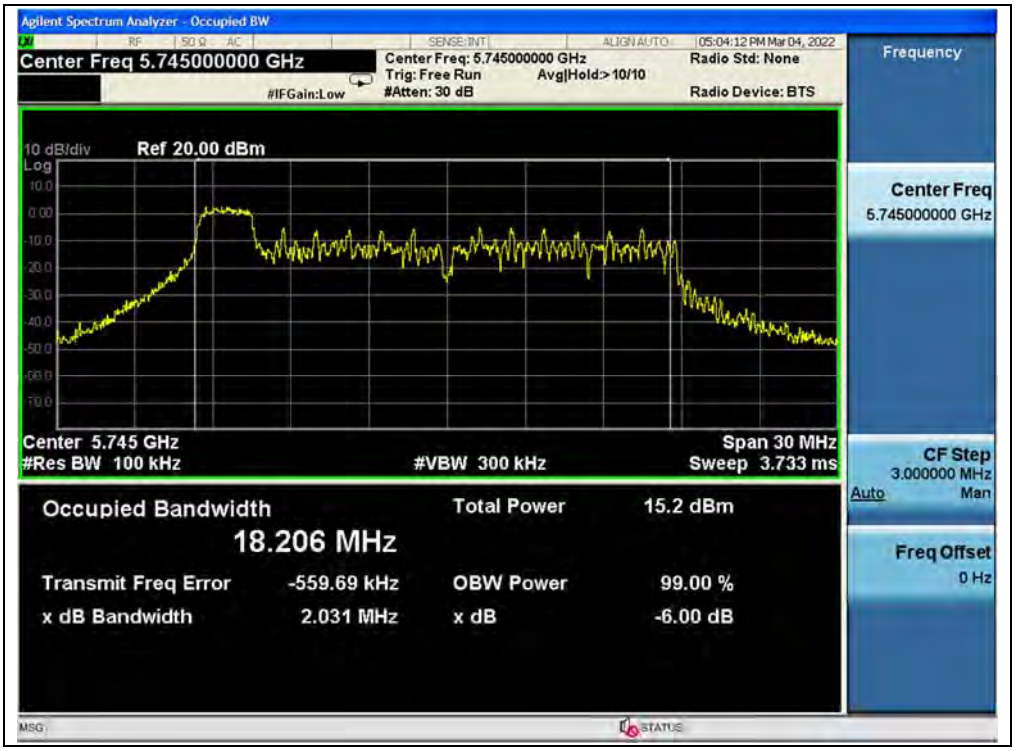
(Channel 64, 5320MHz, 802.11ax (HEW20)(RU26))

(Channel 100, 5500MHz, 802.11ax (HEW20)(RU26))

(Channel 120, 5600MHz, 802.11ax (HEW20)(RU26))

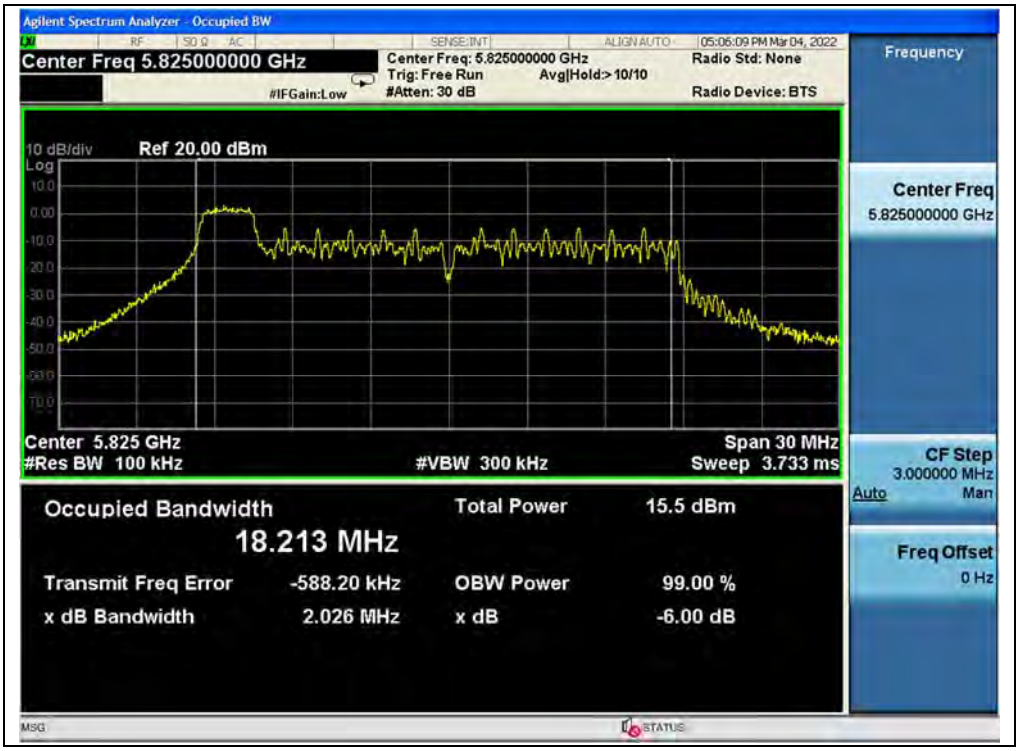
(Channel 144, 5720MHz, 802.11ax (HEW20)(RU26))

(Channel 144, 5720MHz, 802.11ax (HEW20)(RU26))



(Channel 149, 5745MHz, 802.11ax (HEW20)(RU26))

(Channel 157, 5785MHz, 802.11ax (HEW20)(RU26))



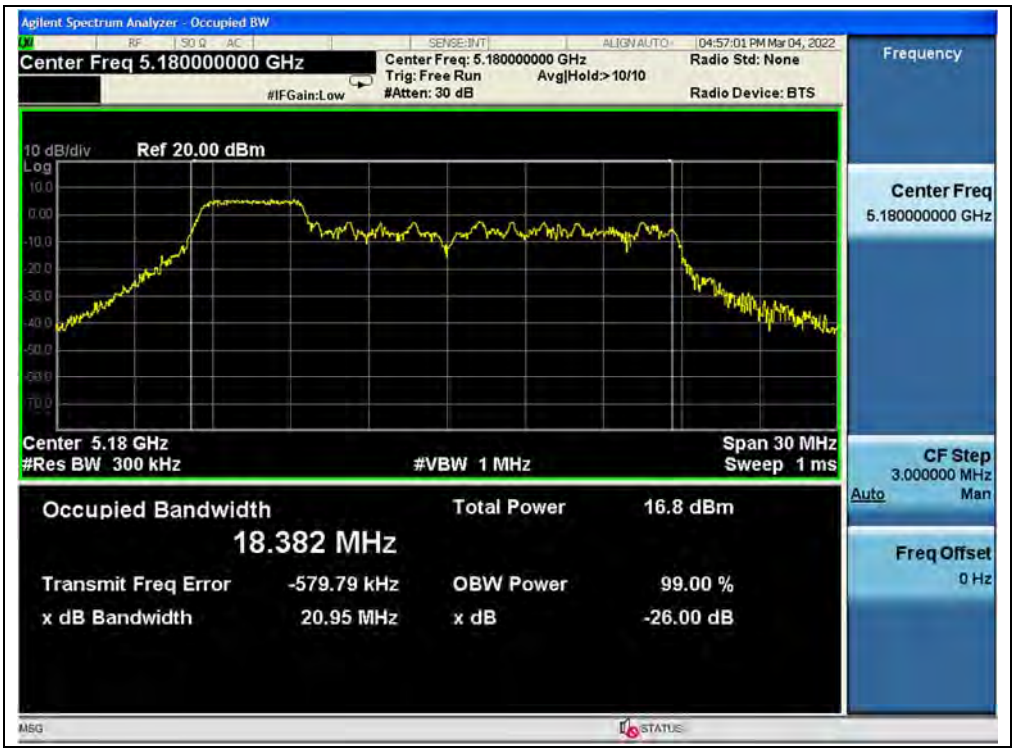
(Channel 165, 5825MHz, 802.11ax (HEW20)(RU26))

802.11ax (HEW20)(RU52) Mode

A.Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
36	5180	20.95
44	5220	20.58
48	5240	20.54
52	5260	20.42
60	5300	20.72
64	5320	20.39
100	5500	20.58
120	5600	20.70
144	5720	20.48
Channel	**Frequency (MHz)**	**6 dB Bandwidth (MHz)**
144	5720	16.97
149	5745	17.03
157	5785	17.01
165	5825	17.03

B.Test Plot:



(Channel 36, 5180MHz, 802.11ax (HEW20)(RU52))

(Channel 44, 5220MHz, 802.11ax (HEW20)(RU52))

(Channel 48, 5240MHz, 802.11ax (HEW20)(RU52))

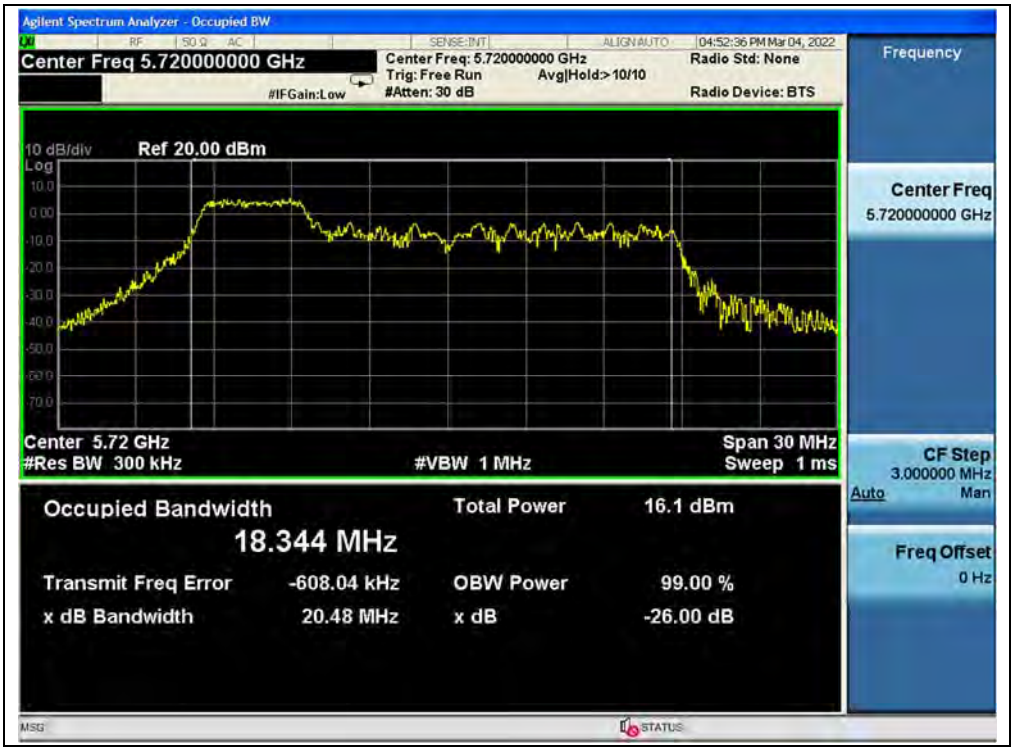
(Channel 52, 5260MHz, 802.11ax (HEW20)(RU52))

(Channel 60, 5300MHz, 802.11ax (HEW20)(RU52))

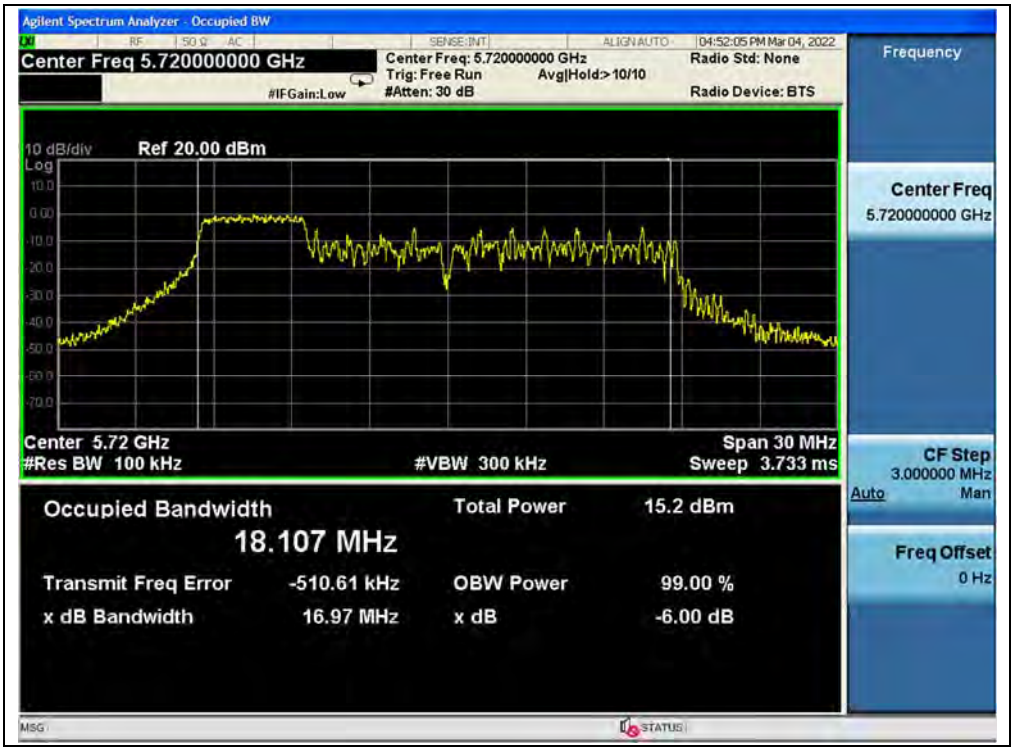
(Channel 64, 5320MHz, 802.11ax (HEW20)(RU52))

(Channel 100, 5500MHz, 802.11ax (HEW20)(RU52))

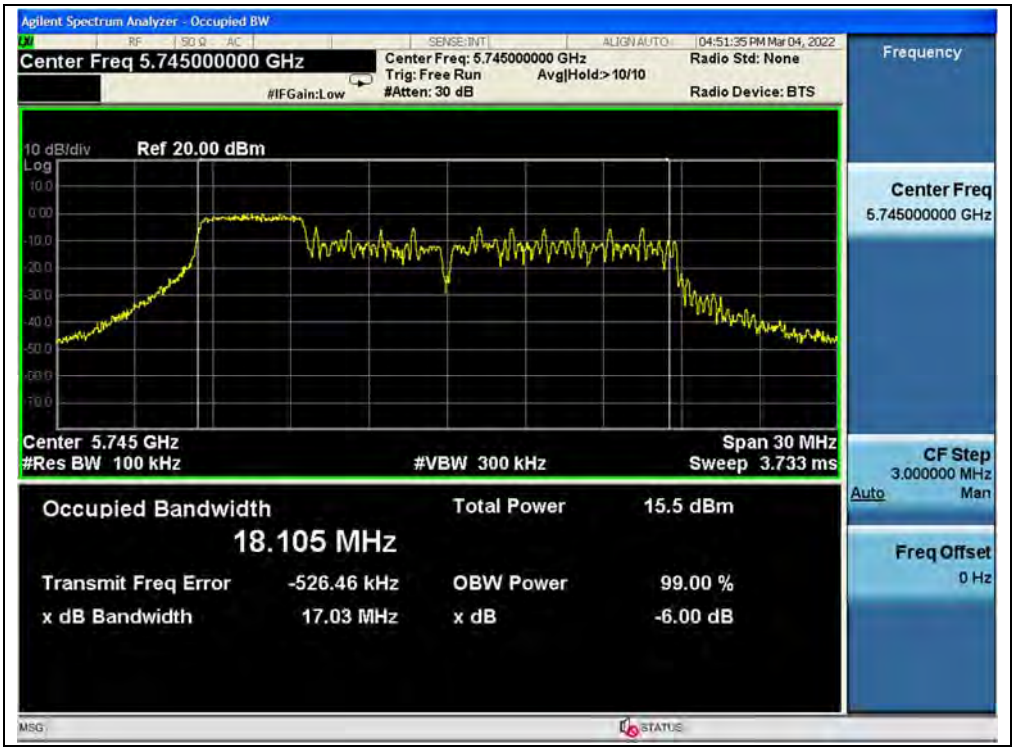
(Channel 120, 5600MHz, 802.11ax (HEW20)(RU52))



(Channel 144, 5720MHz, 802.11ax (HEW20)(RU52))

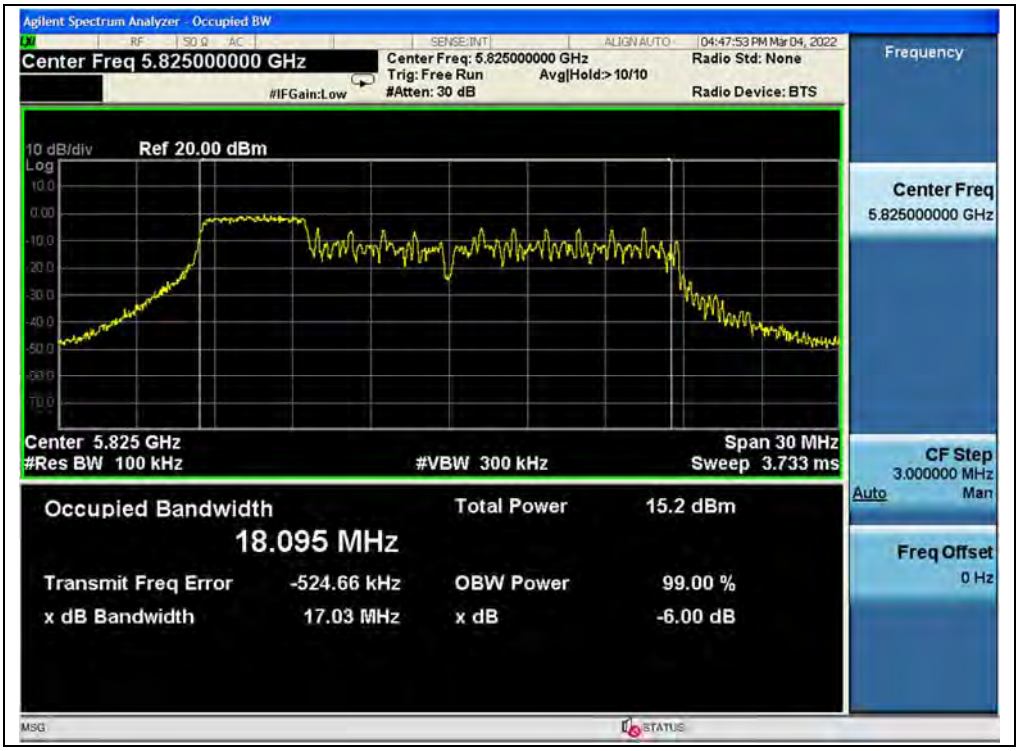


(Channel 144, 5720MHz, 802.11ax (HEW20)(RU52))



(Channel 149, 5745MHz, 802.11ax (HEW20)(RU52))

(Channel 157, 5785MHz, 802.11ax (HEW20)(RU52))



(Channel 165, 5825MHz, 802.11ax (HEW20)(RU52))

802.11ax (HEW20)(RU106) Mode

A.Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
36	5180	21.56
44	5220	21.03
48	5240	20.78
52	5260	20.90
60	5300	21.14
64	5320	20.89
100	5500	21.28
120	5600	21.04
144	5720	20.80
Channel	**Frequency (MHz)**	**6 dB Bandwidth (MHz)**
144	5720	17.14
149	5745	17.12
157	5785	17.17
165	5825	17.12

B.Test Plot:

(Channel 36, 5180MHz, 802.11ax (HEW20)(RU106))

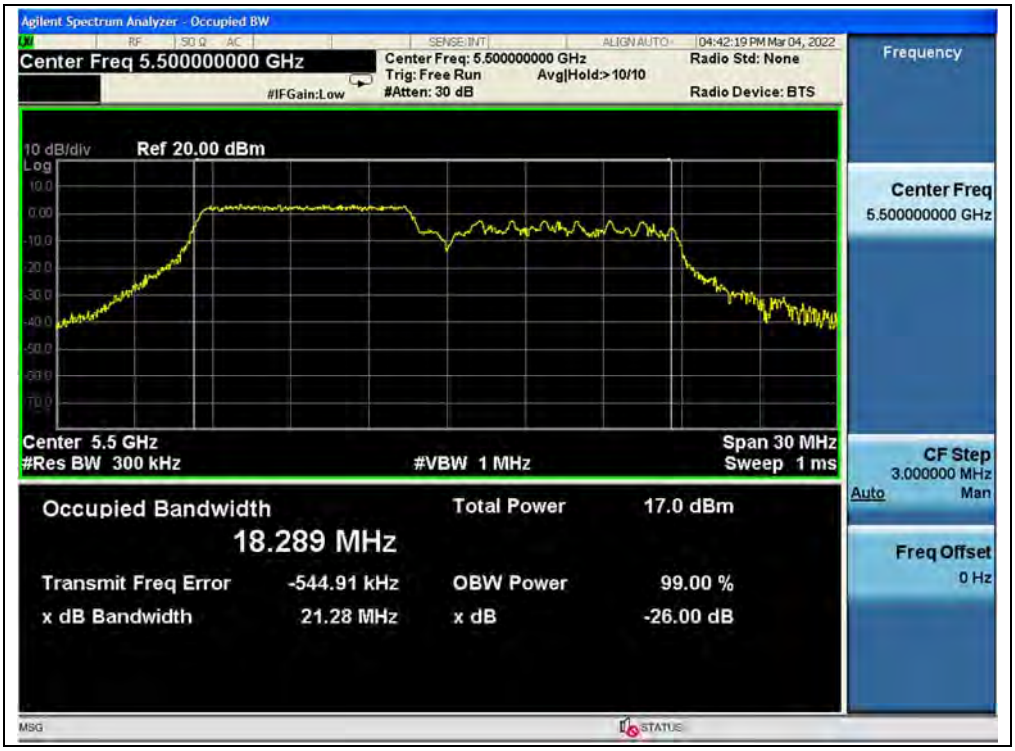
(Channel 44, 5220MHz, 802.11ax (HEW20)(RU106))

(Channel 48, 5240MHz, 802.11ax (HEW20)(RU106))

(Channel 52, 5260MHz, 802.11ax (HEW20)(RU106))

(Channel 60, 5300MHz, 802.11ax (HEW20)(RU106))

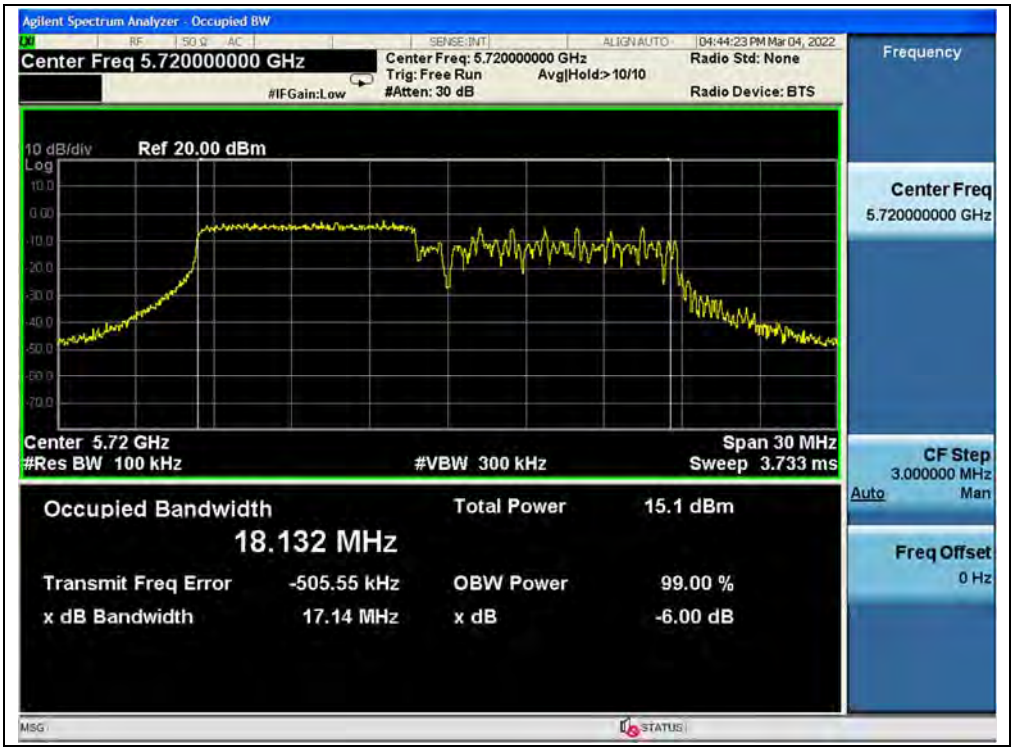
(Channel 64, 5320MHz, 802.11ax (HEW20)(RU106))



(Channel 100, 5500MHz, 802.11ax (HEW20)(RU106))

(Channel 120, 5600MHz, 802.11ax (HEW20)(RU106))

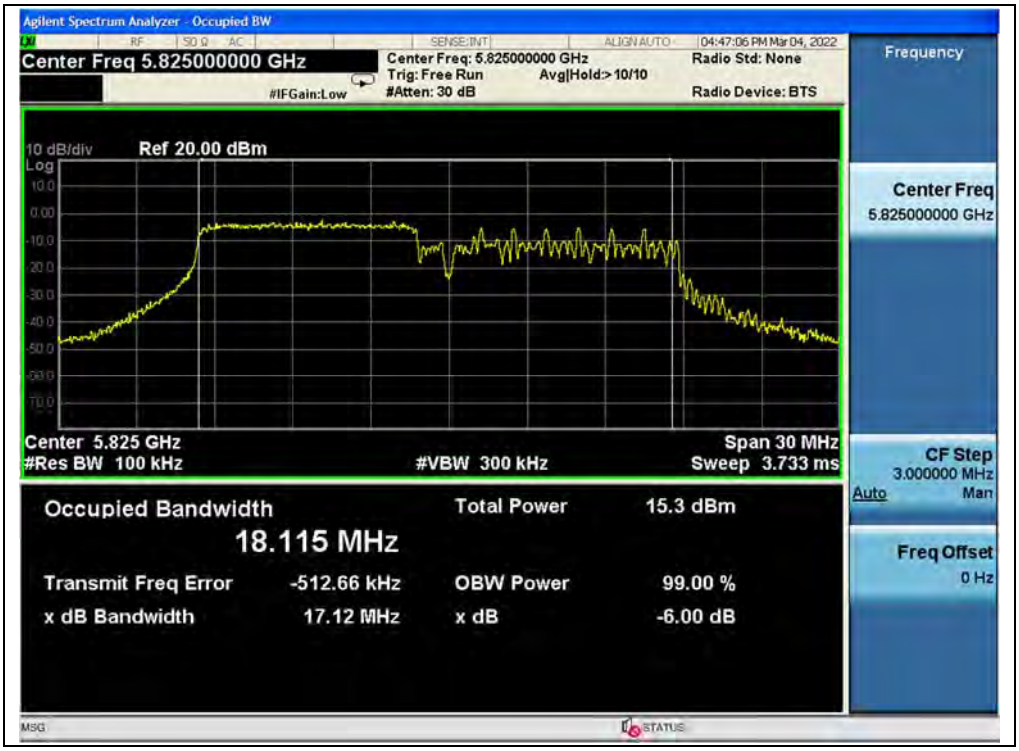
(Channel 144, 5720MHz, 802.11ax (HEW20)(RU106))



(Channel 144, 5720MHz, 802.11ax (HEW20)(RU106))

(Channel 149, 5745MHz, 802.11ax (HEW20)(RU106))

(Channel 157, 5785MHz, 802.11ax (HEW20)(RU106))



(Channel 165, 5825MHz, 802.11ax (HEW20)(RU106))

802.11ax (HEW40) Mode

A.Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
38	5190	41.75
46	5230	41.29
54	5270	42.07
62	5310	42.33
102	5510	42.46
118	5590	41.62
142	5710	42.92
Channel	**Frequency (MHz)**	**6 dB Bandwidth (MHz)**
142	5710	28.53
151	5755	33.90
159	5795	33.81

B.Test Plot:

(Channel 38, 5190MHz, 802.11ax (HEW40))

(Channel 46, 5230MHz, 802.11ax (HEW40))

(Channel 54, 5270MHz, 802.11ax (HEW40))

(Channel 62, 5310MHz, 802.11ax (HEW40))

(Channel 102, 5510MHz, 802.11ax (HEW40))