

## ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

**Applicant:** Microsoft Corporation  
One Microsoft Way Redmond, WA 98052-6399, U.S.A  
**Product Name:** Portable Computing Device  
**Brand Name:** Microsoft  
**Model No.:** 1979  
**Model Difference:** N/A  
**Report Number:** E2/2020/90087  
**FCC ID:** C3K1979  
**FCC Rule Part:** §15.407, Cat: U-NII  
**Issue Date:** Mar. 08, 2021  
**Date of Test:** Sep. 22, 2020 ~ Feb. 23, 2021  
**Date of EUT Received:** Sep. 22, 2020

**We hereby certify that:**

The above equipment was tested by SGS Taiwan Ltd. Central RF Lab. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10: 2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits.

The test results of this report relate only to the tested sample identified in this report.

**Approved By:**



**Jay Lin / Asst. Supervisor**



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## Revision History

Report Number	Revision	Description	Issue Date	Remark
E2/2020/90087	Rev.00	Original.	Mar. 08, 2021	Revised By: Violetta Tang

### Note:

#### 1、Disclaimer

Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.

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# 1 GENERAL INFORMATION

## 1.1 Product Description

Product Name:	Portable Computing Device	
Brand Name:	Microsoft	
Model No.:	1979	
Model Difference:	N/A	
HW Version (Product):	EV2	
SW Version (Product):	4.89.137	
HW Version (Radio):	N/A	
SW Version (Radio):	21.80.2.1	
Radio Test Tool & Version:	DRTU: 21.21080.0.0-10722	
Power Supply:	From Rechargeable Lithium-Ion Polymer Battery or from AC/DC Adapter	
Modulation type	64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 802.11ac only 1024QAM for OFDMA in 802.11ax only	
Transition Rate:	802.11 a: 6/9/12/18/24/36/48/54 Mbps 802.11 n_20MHz: 6.5 – 144.4Mbps 802.11 n_40MHz: 13.5 – 300.0Mbps	802.11 ac_20MHz: 6.5 – 173.3Mbps 802.11 ac_40MHz: 13.5 – 400.0Mbps 802.11 ac_80MHz: 29.3 – 866.7Mbps 802.11 ac_160MHz: 58.5 – 1733.4Mbps 802.11 ax_20MHz: 8.6 – 286.8 Mbps 802.11 ax_40MHz: 17.2 – 573.5 Mbps 802.11 ax_80MHz: 36.0 – 1201 Mbps 802.11 ax_160MHz: 68 – 2402 Mbps

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## 1.2 Antenna Designation

Antenna Type	Chain A / Chain B	Freq. (MHz)	Peak Antenna Gain (dBi)	Worst Antenna Gain
PIFA	Chain A	5150~5250	6.10	V
		5250~5350	5.90	V
		5470~5725	5.70	V
		5725~5850	5.90	V
	Chain B	5150~5250	4.80	
		5250~5350	4.50	
		5470~5725	3.10	
		5725~5850	2.80	
<b>Note:</b> Investigation has been done to determine the worst case scenario for the above antennas demonstrated with measurements in this report.				

Below directional gain is used in measurement due to the worst case scenario determined in section 4 of this report designate below antennas for transmissions.

Transmission Chain	Freq. (MHz)	Peak Antenna Gain (dBi)	Directional Gain in the worst case scenario (dBi)
Chain A	5150~5250	6.10	5.50
Chain B		4.80	
Chain A	5250~5350	5.90	5.26
Chain B		4.50	
Chain A	5470~5725	5.70	4.59
Chain B		3.10	
Chain A	5725~5850	5.90	4.62
Chain B		2.80	

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### 1.3 FCC worst power

Wi-Fi 802.11	Frequency Range	Channels	Avg. Power (dBm)	Modulation Technology
a	5180~5240	4	19.43 (Chain A)	OFDM
	5260~5320	4	19.91 (Chain B)	
	5500~5720	12	19.48 (Chain B)	
	5745~5825	5	20.05 (Chain B)	
n_HT20M ac_VHT20M	5180~5240	4	HT: 19.89 (Chain B)	OFDM
	5260~5320	4	HT: 19.89 (Chain B)	
	5500~5720	12	HT: 19.89 (Chain B)	
	5745~5825	5	HT: 21.97 (MIMO)	
ax_HE20M	5180~5240	4	20.13 (Chain B)	OFDMA
	5260~5320	4	19.92 (Chain B)	
	5500~5720	12	19.92 (Chain B)	
	5745~5825	5	22.59 (MIMO)	
n_HT40M ac_VHT40M	5190~5230	2	HT: 21.49 (MIMO)	OFDM
	5270~5310	2	HT: 21.73 (MIMO)	
	5510~5710	6	HT: 21.83 (MIMO)	
	5755~5795	2	HT: 21.97 (MIMO)	
ax_HE40M	5190~5230	2	21.68 (MIMO)	OFDMA
	5270~5310	2	21.69 (MIMO)	
	5510~5710	6	21.98 (MIMO)	
	5755~5795	2	21.83 (MIMO)	
ac_VHT80M	5210	1	20.48 (MIMO)	OFDM
	5290	1	19.60 (Chain B)	
	5530~5690	3	20.64 (MIMO)	
	5775	1	21.66 (MIMO)	
ax_HE80M	5210	1	20.74 (MIMO)	OFDMA
	5290	1	19.93 (MIMO)	
	5530~5690	3	21.96 (MIMO)	
	5775	1	21.72 (MIMO)	
ac_VHT160M	5250	1	17.81 (MIMO)	OFDM
	5570	1	16.43 (MIMO)	
ax_HE160M	5250	1	19.97 (MIMO)	OFDMA
	5570	1	19.46 (MIMO)	

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#### 1.4 Test Methodology of Applied Standards

FCC Part 15, Subpart E §15.407

FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10:2013

#### 1.5 Test Facility

SGS Taiwan Ltd. Central RF Lab (TAF code 3702)

No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333

FCC Designation number: TW0028

#### 1.6 Special Accessories

There are no special accessories used while test was conducted.

#### 1.7 Equipment Modifications

There was no modification incorporated into the EUT.

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## 2 SYSTEM TEST CONFIGURATION

### 2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

### 2.2 EUT Exercise

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

### 2.3 Test Procedure

#### 2.3.1 Conducted Emissions

The EUT is placed on a table which is 0.8 m above ground plane. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz. The CISPR Quasi-Peak and Average detector mode is employed. The two LISNs provide 50uH/50 ohm of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

#### 2.3.2 Conducted Test (RF)

The active antenna port of the unlicensed wireless device is connected to the spectrum analyzer with attenuator to protect the instrumentation. If a second antenna port is available, it is tested at one operating frequency, with other port(s) appropriately terminated, to verify it has similar output characteristics as the fully tested port.

#### 2.3.3 Radiated Emissions

The EUT is placed on a turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.

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## 2.4 Measurement Results Explanation Example

### 2.4.1 Radiated Emission Test Sites For Measurements From 9 kHz To 30 MHz

Radiated emission below 30MHz is measured in a 9m\*9m\*6m semi-anechoic chamber, the measurements correspond to those obtained at an open-field test site.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

### 2.4.2 For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

## 2.5 Configuration of Tested System

**Fig. 2-1 Conducted (Antenna Port)  
Emission Configuration**



**Fig. 2-3 Conducted (AC Power Line)  
Emission Configuration**



**Fig. 2-2 Radiated Emission Configuration**



**Table 2-1 Equipment Used in Tested System**

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	DRTU	Intel	21.21080.0.0-10722	N/A	N/A	N/A

Note: The EUT is tested with all external accessory ports populated.

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### 3 SUMMARY OF TEST RESULT

FCC Rules	Description Of Test	Result
§15.207	AC Power Line Conducted Emission	Compliant
§15.403(i) §15.407(e)	26 dB & 6dB Emission Bandwidth	Compliant
§15.407(a)	Maximum Conducted Output Power	Compliant
§15.407(a)	Power Spectral Density	Compliant
§15.205 §15.209 §15.407(b)	Undesirable Radiated Emissions	Compliant
§15.407(c)	Transmission in case of Absence of Information	Compliant
§15.407(g)	Frequency Stability	N/A
§15.203 §15.407(a)	Antenna Requirement	Compliant

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## 4 DESCRIPTION OF TEST MODES

### 4.1 802.11a/n/ac/ax operated in U-NII Bands

#### Operated band in 5150 MHz ~5250 MHz:

20 M	
CH	Freq (MHz)
36	5180
40	5200
44	5220
48	5240

40 M	
CH	Freq (MHz)
38	5190
46	5230

80 M	
CH	Freq (MHz)
42	5210

#### Operated band in 5250 MHz ~5350 MHz:

20 M	
CH	Freq (MHz)
52	5260
56	5280
60	5300
64	5320

40 M	
CH	Freq (MHz)
54	5270
62	5310

80 M	
CH	Freq (MHz)
58	5290

160 M	
CH	Freq (MHz)
50	5250

#### Operated band in 5470 MHz ~5725 MHz:

20 M	
CH	Freq (MHz)
100	5500
104	5520
108	5540
112	5560
116	5580
120	5600
124	5620
128	5640
132	5660
136	5680
140	5700
144	5720

40 M	
CH	Freq (MHz)
102	5510
110	5550
118	5590
126	5630
134	5670
142	5710

80 M	
CH	Freq (MHz)
106	5530
122	5610
138	5690

160 M	
CH	Freq (MHz)
114	5570

#### Operated band in 5745 MHz ~5850 MHz:

20 M	
CH	Freq (MHz)
149	5745
153	5765
157	5785
161	5805
165	5825

40 M	
CH	Freq (MHz)
151	5755
159	5795

80 M	
CH	Freq (MHz)
155	5775

EUT	Serial Number	Note
Portable Computing Device	3978103657 (Conducted)	
Portable Computing Device	025144503557 (Radiated)	

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## 4.2 The Worst Test Modes and Channel Details

1. The EUT has been tested under operating condition.
2. Test program used to control the EUT for staying in continuous transmitting mode is programmed.
3. Investigation has been done on all the possible configurations for searching the worst case. The given UE is pre-scanned among below modes.

Modulation	Transmission Chain		Single Transmission Spatial	Multiple Transmission Spatial
<input checked="" type="checkbox"/> 802.11 a	<input checked="" type="checkbox"/> ChA	<input checked="" type="checkbox"/> ChB	<input checked="" type="checkbox"/> 1TX	<input type="checkbox"/> 2TX
<input checked="" type="checkbox"/> 802.11 n	<input checked="" type="checkbox"/> ChA	<input checked="" type="checkbox"/> ChB	<input checked="" type="checkbox"/> SISO	<input checked="" type="checkbox"/> MIMO
<input checked="" type="checkbox"/> 802.11 ac	<input checked="" type="checkbox"/> ChA	<input checked="" type="checkbox"/> ChB	<input checked="" type="checkbox"/> SISO	<input checked="" type="checkbox"/> MIMO
<input checked="" type="checkbox"/> 802.11 ax	<input checked="" type="checkbox"/> ChA	<input checked="" type="checkbox"/> ChB	<input checked="" type="checkbox"/> SISO	<input checked="" type="checkbox"/> MIMO

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4. Observations have been done for 802.11 ax available RU configurations below and found that the lowest, highest and Full RU results higher emissions.

Only one RU can be enabled at any given time. ( 802.11 ax)

802.11ax	20MHz				802.11ax	40MHz			
RU type	26-tone RU		52-tone RU		RU type	26-tone RU		52-tone RU	
RU index and subcarrier range	RU0	[-121: -96]	RU37	[-121: -70]	RU index and subcarrier range	RU0	[-243: -218]	RU37	[-243: -192]
	RU1	[-95: -70]	RU38	[-68: -17]		RU1	[-217: -192]	RU38	[-189: -138]
	RU2	[-68: -43]	RU39	[17: 68]		RU2	[-189: -164]	RU39	[-109: -58]
	RU3	[-42: -17]	RU40	[70: 121]		RU3	[-163: -138]	RU40	[-55: -4]
	RU4	[-16: -4, 4: 16]	RU41	N/A		RU4	[-136: -111]	RU41	[4: 55]
	RU5	[17: 42]	RU42	N/A		RU5	[-109: -84]	RU42	[58: 109]
	RU6	[43: 68]	RU43	N/A		RU6	[-83: -58]	RU43	[138: 189]
	RU7	[70: 95]	RU44	N/A		RU7	[-55: -30]	RU44	[192: 243]
	RU8	[96: 121]	RU45	N/A		RU8	[-29: -4]	RU45	N/A
	RU9	N/A	RU46	N/A		RU9	[4: 29]	RU46	N/A
	RU10	N/A	RU47	N/A		RU10	[30: 55]	RU47	N/A
	RU11	N/A	RU48	N/A		RU11	[58: 83]	RU48	N/A
	RU12	N/A	RU49	N/A		RU12	[84: 109]	RU49	N/A
	RU13	N/A	RU50	N/A		RU13	[111: 136]	RU50	N/A
	RU14	N/A	RU51	N/A		RU14	[138: 163]	RU51	N/A
	RU15	N/A	RU52	N/A		RU15	[164: 189]	RU52	N/A
	RU16	N/A				RU16	[192: 217]		
	RU17	N/A	106-tone RU			RU17	[218: 243]	106-tone RU	
	RU18	N/A	RU53	[-122: -17]		RU18	N/A	RU53	[-243: -138]
	RU19	N/A	RU54	[17: 122]		RU19	N/A	RU54	[-109: -4]
	RU20	N/A	RU55	N/A		RU20	N/A	RU55	[4: 109]
	RU21	N/A	RU56	N/A		RU21	N/A	RU56	[138: 243]
	RU22	N/A	RU57	N/A		RU22	N/A	RU57	N/A
	RU23	N/A	RU58	N/A		RU23	N/A	RU58	N/A
	RU24	N/A	RU59	N/A		RU24	N/A	RU59	N/A
	RU25	N/A	RU60	N/A		RU25	N/A	RU60	N/A
	RU26	N/A				RU26	N/A		
	RU27	N/A	242-tone RU			RU27	N/A	242-tone RU	
	RU28	N/A	RU61	[-122: -2, 2: 122]		RU28	N/A	RU61	[-244: -3]
	RU29	N/A	RU62	N/A		RU29	N/A	RU62	[3: 244]
	RU30	N/A	RU63	N/A		RU30	N/A	RU63	N/A
	RU31	N/A	RU64	N/A		RU31	N/A	RU64	N/A
	RU32	N/A				RU32	N/A		
	RU33	N/A				RU33	N/A	484-tone RU	
	RU34	N/A				RU34	N/A	RU65	[-244: -3, 3: 244]
	RU35	N/A				RU35	N/A	RU66	N/A
	RU36	N/A				RU36	N/A		

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802.11ax	80MHz			
RU type	26-tone RU		52-tone RU	
RU index and subcarrier range	RU0	[-499: -474]	RU37	[-499: -448]
	RU1	[-473: -448]	RU38	[-445: -394]
	RU2	[-445: -420]	RU39	[-365: -314]
	RU3	[-419: -394]	RU40	[-311: -260]
	RU4	[-392: -367]	RU41	[-257: -206]
	RU5	[-365: -340]	RU42	[-203: -152]
	RU6	[-339: -314]	RU43	[-123: -72]
	RU7	[-311: -286]	RU44	[-69: -18]
	RU8	[-285: -260]	RU45	[18: 69]
	RU9	[-257: -232]	RU46	[72: 123]
	RU10	[-231: -206]	RU47	[152: 203]
	RU11	[-203: -178]	RU48	[206: 257]
	RU12	[-177: -152]	RU49	[260: 311]
	RU13	[-150: -125]	RU50	[314: 365]
	RU14	[-123: -98]	RU51	[394: 445]
	RU15	[-97: -72]	RU52	[448: 499]
	RU16	[-69: -44]	106-tone RU	
	RU17	[-43: -18]	RU53	[-499: -394]
	RU18	[-16: -4, 4: 16]	RU54	[-365: -260]
	RU19	[18: 43]	RU55	[-257: -152]
	RU20	[44: 69]	RU56	[-123: -18]
	RU21	[72: 97]	RU57	[18: 123]
	RU22	[98: 123]	RU58	[152: 257]
	RU23	[125: 150]	RU59	[260: 365]
	RU24	[152: 177]	RU60	[394: 499]
	RU25	[178: 203]	242-tone RU	
	RU26	[206: 231]	RU61	[-500: -259]
	RU27	[232: 257]	RU62	[-258: -17]
	RU28	[260: 285]	RU63	[17: 258]
	RU29	[286: 311]	RU64	[259: 500]
	RU30	[314: 339]	484-tone RU	
	RU31	[340: 365]	RU65	[-500: -17]
	RU32	[367: 392]	RU66	[17: 500]
	RU33	[394: 419]	996-tone RU	
	RU34	[420: 445]	RU67	[-500: -3, 3: 500]
	RU35	[448: 473]		
	RU36	[474: 499]		

5. Therefore, below summary is the modes of test configuration that yield the highest reading and generate the highest emission chosen to carry out the relevantly mandatory test items.

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#### 4.2.1 RADIATED EMISSION TEST:

RADIATED EMISSION TEST (BELOW 1 GHz)						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5180~5240	36 to 48	44	OFDM	6	ChA/ChB
	5260~5320	52 to 64	60			
	5500~5720	100 to 144	116			
	5745~5825	149 to 165	157			
802.11n_HT20	5180~5240	36 to 48	44		HT8	MIMO
	5260~5320	52 to 64	60			
	5500~5720	100 to 144	116			
	5745~5825	149 to 165	157			
802.11ac_VHT160	5250	50	50		VHT0	ChA/ChB/MIMO
	5570	114	114			

RADIATED EMISSION TEST (ABOVE 1 GHz)						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6	ChA/ChB
	5260~5320	52 to 64	52,56,64			
	5500~5720	100 to 144	100,116,140 144			
	5745~5825	149 to 165	149,157,165			
802.11n_HT20	5180~5240	36 to 48	36,44,48		HT0/HT8	ChA/ChB/MIMO
	5260~5320	52 to 64	52,56,64			
	5500~5720	100 to 144	100,116,140 144			
	5745~5825	149 to 165	149,157,165			
802.11n_HT40	5190~5230	38 to 46	38,46		HT0/HT8	ChA/ChB/MIMO
	5270~5310	54 to 62	54,62			
	5510~5710	102 to 142	102,110,134,142			
	5755~5795	151 to 159	151,159			
802.11ac_VHT80	5210	42	42		VHT0	ChA/ChB/MIMO
	5290	58	58			
	5530~5690	106 to 138	106,122,138			
	5775	155	155			
802.11ac_VHT160	5250	50	50		VHT0	ChA/ChB/MIMO
	5570	114	114			

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### RADIATED EMISSION TEST (ABOVE 1 GHz)

MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	RU CONFIGURATION	DATA RATE (Mbps)	ANTENNA PORT
802.11ax_HE20	5180~5240	36 to 48	36	OFDMA	full, 26/0 52/37, 106/53	MCS0	ChA/ChB/MIMO
			40,44,48		full		
	5260~5320	52 to 64	52,56,60		full		
			64		full, 26/8, 52/40 106/54		
			100		full, 26/0, 52/37 106/53		
			116		full		
	5500~5720	100 to 144	140		full, 26/8, 52/40 106/54		
			144		full		
			149		full, 26/0, 52/37 106/53		
			157,165		full		
802.11ax_HE40	5190~5230	38 to 46	38	OFDMA	full, 242/61	MCS0	ChA/ChB/MIMO
			46		full		
	5270~5310	54 to 62	54		full		
			62		full, 242/62		
	5510~5710	102 to 142	102		full, 242/61		
			110		full		
			134		full, 242/62		
			142		full		
	5755~5795	151 to 159	151		full, 242/61		
			159		full		
802.11ax_HE80	5210	42	42	OFDMA	full, 484/65	MCS0	ChA/ChB/MIMO
	5290	58	58		full, 484/66		
	5530~5690	106 to 138	106		full, 484/65		
			122		full		
			138		full		
	5775	155	155		full, 484/66		
802.11ax_HE160	5250	50	50		full, 996/67 996/s67	MCS0	ChA/ChB/MIMO
	5570	52 to 64	114		full, 996/67 996/s67		

**Note:** Observation has been done on all RU configurations, the Full RU configuration yields higher emissions and average output power, and hence the radiated emission results are demonstrated in full RU configuration in this report.

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**Note:**

The field strength of radiation emission was measured for 802.11a/n/ac/ax WLAN Transmitter for above tested channel, the worst case NB position was reported.

**4.2.2 ANTENNA PORT CONDUCTED MEASUREMENT:**

CONDUCTED TEST						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6	ChA/ChB
	5260~5320	52 to 64	52,60,64			
	5500~5720	100 to 144	100,116,140,144			
	5745~5825	149 to 165	149,157,165			
802.11n_HT20	5180~5240	36 to 48	36,44,48		HT0/HT8	ChA/ChB/MIMO
	5260~5320	52 to 64	52,60,64			
	5500~5720	100 to 144	100,116,140,144			
	5745~5825	149 to 165	149,157,165			
802.11n_HT40	5190~5230	38 to 46	38,46		HT0/HT8	ChA/ChB/MIMO
	5270~5310	54 to 62	54,62			
	5510~5710	102 to 142	102,110,134,142			
	5755~5795	151 to 159	151,159			
802.11ac_VHT80	5210	42	42		VHT0	ChA/ChB/MIMO
	5290	58	58			
	5530~5690	106 to 138	106,122,138			
	5775	155	155			
802.11ac_VHT160	5250	50	50		VHT0	ChA/ChB/MIMO
	5570	114	114			

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CONDUCTED TEST							
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	RU CONFIGURATION	DATA RATE (Mbps)	ANTENNA PORT
802.11ax_HE20	5180~5240	36 to 48	36	OFDMA	full , 26/0 52/37, 106/53	MCS0	ChA/ChB/ MIMO
			40,48		full		
			52,60		full		
	5260~5320	52 to 64	64		full, 26/8, 52/40 106/54		
			100		full , 26/0 52/37, 106/53		
			116		full		
	5500~5720	100 to 144	140		full, 26/8, 52/40 106/54		
			144		full		
			149		full, 26/0, 52/37 106/53		
			157,165		full		
802.11ax_HE40	5190~5230	38 to 46	38	OFDMA	full , 242/61	MCS0	ChA/ChB/ MIMO
			46		full		
			54		full		
	5270~5310	54 to 62	62		full , 242/62		
			102		full, 242/61		
			110		full		
	5510~5710	102 to 142	134		full, 242/62		
			142		full		
			151		full, 242/61		
			159		full		
802.11ax_HE80	5210	42	42	OFDMA	full, 484/65	MCS0	ChA/ChB/ MIMO
	5290	58	58		full, 484/66		
	5530~5690	106 to 138	106		full, 484/65		
			122		full		
			138		full		
	5775	155	155		full, 484/66		
802.11ax_HE160	5250	50	50	OFDMA	full , 996/67 966/s67	MCS0	ChA/ChB/ MIMO
	5570	114	114		full , 996/67 966/s67		

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## 5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
26dB & 6dB Emission Bandwidth	+/- 123.36 Hz
The Maximum Output Power Measurement	+/- 0.96 dB
Peak Power Spectral Density Measurement	+/- 1.67 dB
Frequency Stability	+/- 123.36 Hz
Temperature	+/- 0.65 °C
Humidity	+/- 4.6 %
DC / AC Power Source	DC= +/- 0.13%, AC=+/- 0.2%

Radiated Spurious Emission Measurement Uncertainty	
<b>Polarization: Vertical</b>	9kHz~30MHz: +2.3dB
	30MHz - 180MHz: +/- 3.37dB
	180MHz -417MHz: +/- 3.19dB
	0.417GHz-1GHz: +/- 3.19dB
	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB
<b>Polarization: Horizontal</b>	9kHz~30MHz: +2.3dB
	30MHz - 167MHz: +/- 4.22dB
	167MHz -500MHz: +/- 3.44dB
	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

### Note:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The conformity assessment statement in this report is based solely on the test results, measurement uncertainty is excluded.

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## 6 CONDUCTED EMISSION TEST

### 6.1 Standard Applicable

Frequency range within 150 kHz to 30 MHz shall not exceed the Limit table as below.

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
<b>Note</b> 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

### 6.2 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
LISN	SCHWARZBECK Mess-Elektronik	NSLK8127	974	03/25/2020	03/24/2021
EMI Test Receiver	R&S	ESCI	101342	04/28/2020	04/27/2021

### 6.3 EUT Setup

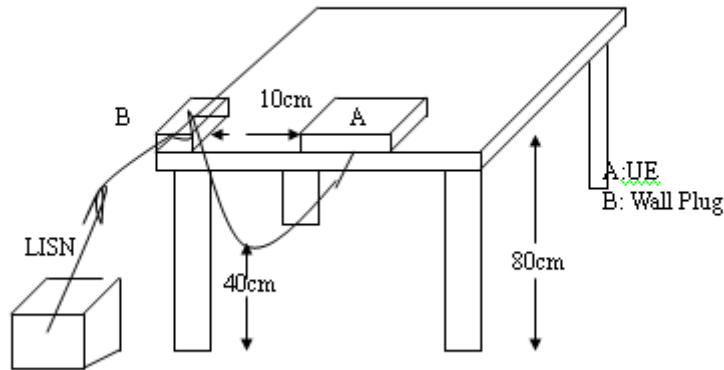
1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10:2013.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The LISN was connected with 120Vac/60Hz power source.

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## 6.4 Test SET-UP



## 6.5 Measurement Procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all phases of power being supplied by given UE are completed.

## 6.6 Measurement Result

Note: Refer to next page for measurement data and plots.

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## AC POWER LINE CONDUCTED EMISSION TEST DATA

## Adapter 1

Report Number :E2-2020-90087

Test Site :Conduction Room C

Test Mode :WLAN 5G

Test Date :2020-11-14

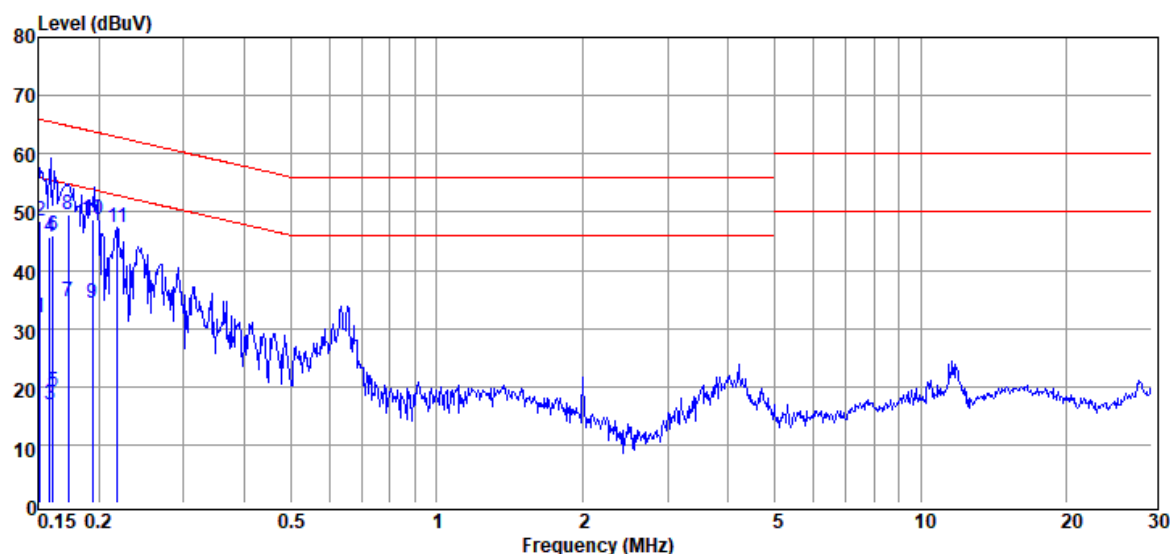
Power :120V/60Hz

Temp./Humi. :22.1/73

Probe :L1

Engineer :Ashton Chiu

Note: : Adapter 1



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV	Limit dBμV	Margin dB
0.15	Average	21.52	10.22	31.74	55.92	-24.18
0.15	QP	38.21	10.22	48.43	65.92	-17.49
0.16	Average	6.75	10.22	16.97	55.54	-38.57
0.16	QP	35.40	10.22	45.62	65.54	-19.92
0.16	Average	8.89	10.22	19.11	55.41	-36.30
0.16	QP	35.71	10.22	45.93	65.41	-19.48
0.17	Average	24.45	10.22	34.67	54.81	-20.14
0.17	QP	39.30	10.22	49.52	64.81	-15.29
0.19	Average	24.20	10.22	34.42	53.84	-19.42
0.19	QP	38.43	10.22	48.65	63.84	-15.19
0.22	Peak	37.18	10.22	47.40	62.88	-15.48

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Report Number :E2-2020-90087

Test Site :Conduction Room C

Test Mode :WLAN 5G

Test Date :2020-11-14

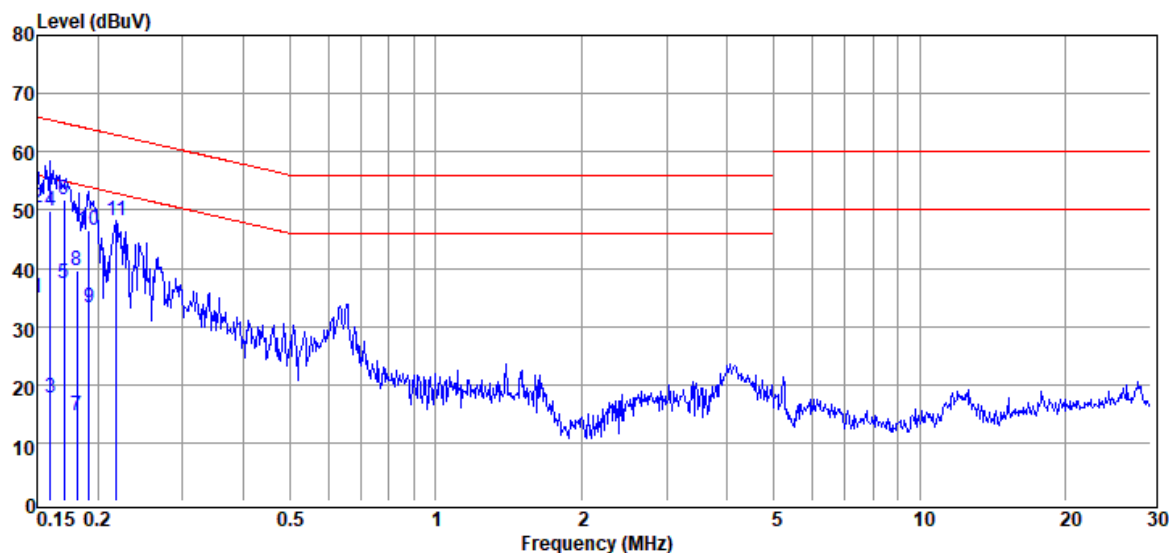
Power :120V/60Hz

Temp./Humi. :22.1/73

Probe :N

Engineer :Ashton Chiu

Note: : Adapter 1



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV	Limit dBμV	Margin dB
0.15	Average	24.79	10.21	35.00	55.99	-20.99
0.15	QP	40.03	10.21	50.24	65.99	-15.75
0.16	Average	7.52	10.21	17.73	55.48	-37.75
0.16	QP	39.73	10.21	49.94	65.48	-15.54
0.17	Average	27.27	10.21	37.48	54.94	-17.46
0.17	QP	41.50	10.21	51.71	64.94	-13.23
0.18	Average	4.53	10.21	14.74	54.42	-39.68
0.18	QP	29.51	10.21	39.72	64.42	-24.70
0.19	Average	22.93	10.21	33.14	53.95	-20.81
0.19	QP	36.19	10.21	46.40	63.95	-17.55
0.22	Peak	38.08	10.21	48.29	62.88	-14.59

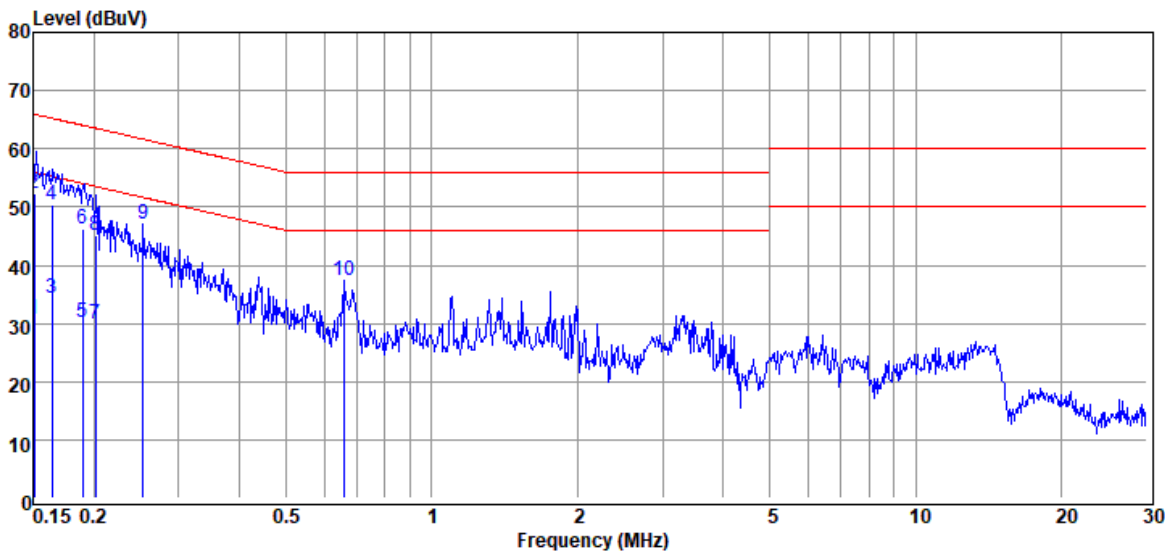
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## Adapter 2

Report Number	:E2-2020-90087	Test Site	:Conduction Room C
Test Mode	:WLAN 5G	Test Date	:2020-11-13
Power	:120V/60Hz	Temp./Humi.	:22.9/67
Probe	:L1	Engineer	:Ashton Chiu
Note:	: Adapter 2		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV	Limit dBμV	Margin dB
0.15	Average	20.60	10.22	30.82	55.94	-25.12
0.15	QP	41.96	10.22	52.18	65.94	-13.76
0.16	Average	24.09	10.22	34.31	55.25	-20.94
0.16	QP	40.04	10.22	50.26	65.25	-14.99
0.19	Average	20.01	10.22	30.23	54.06	-23.83
0.19	QP	36.01	10.22	46.23	64.06	-17.83
0.20	Average	19.59	10.22	29.81	53.54	-23.73
0.20	QP	34.82	10.22	45.04	63.54	-18.50
0.25	Peak	36.94	10.22	47.16	61.64	-14.48
0.66	Peak	26.99	10.31	37.30	56.00	-18.70

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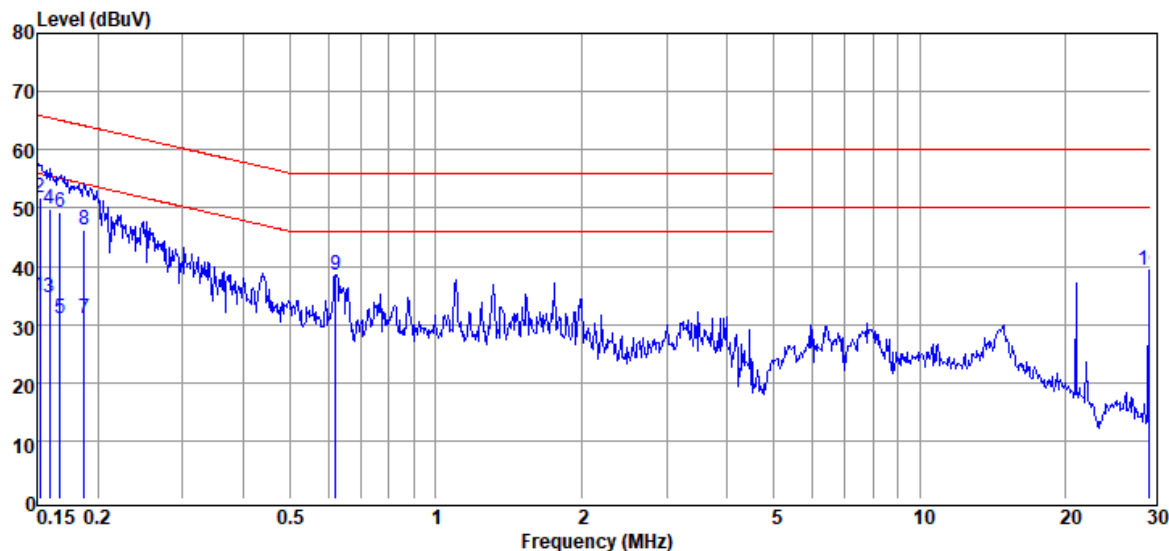
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Report Number :E2-2020-90087  
Test Mode :WLAN 5G  
Power :120V/60Hz  
Probe :N  
Note: : Adapter 2

Test Site :Conduction Room C  
Test Date :2020-11-13  
Temp./Humi. :22.9/67  
Engineer :Ashton Chiu



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV	Limit dBμV	Margin dB
0.15	Average	24.68	10.21	34.89	55.89	-21.00
0.15	QP	41.43	10.21	51.64	65.89	-14.25
0.16	Average	24.44	10.21	34.65	55.52	-20.87
0.16	QP	39.55	10.21	49.76	65.52	-15.76
0.17	Average	20.88	10.21	31.09	55.08	-23.99
0.17	QP	38.98	10.21	49.19	65.08	-15.89
0.19	Average	20.89	10.21	31.10	54.12	-23.02
0.19	QP	35.96	10.21	46.17	64.12	-17.95
0.62	Peak	28.32	10.28	38.60	56.00	-17.40
29.68	Peak	28.20	11.08	39.28	60.00	-20.72

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## 7 DUTY CYCLE TEST SIGNAL

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle. All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

### 7.1 Measurement Procedure:

1. Set span = Zero
2. RBW = 8MHz
3. VBW = 8MHz,
4. Detector = Peak

Duty Cycle:

Mode: Chain A

Mode	Duty Cycle (%) =Ton / (Ton+Toff)	Duty Factor (dB) =10*log ( 1/Duty Cycle )	1/T (kHz)	VBW setting (kHz)
802.11a	97.70	0.10	0.48	1.00
802.11n_20	99.83	0.01	0.03	0.01
802.11n_40	99.60	0.02	0.06	0.01
802.11ac_80	99.63	0.02	0.09	0.01
802.11ac_160	99.08	0.04	0.18	0.01
802.11ax_20	99.75	0.01	0.05	0.01
802.11ax_40	99.50	0.02	0.11	0.01
802.11ax_80	98.98	0.04	0.22	0.01
802.11ax_160	98.01	0.09	0.44	0.01

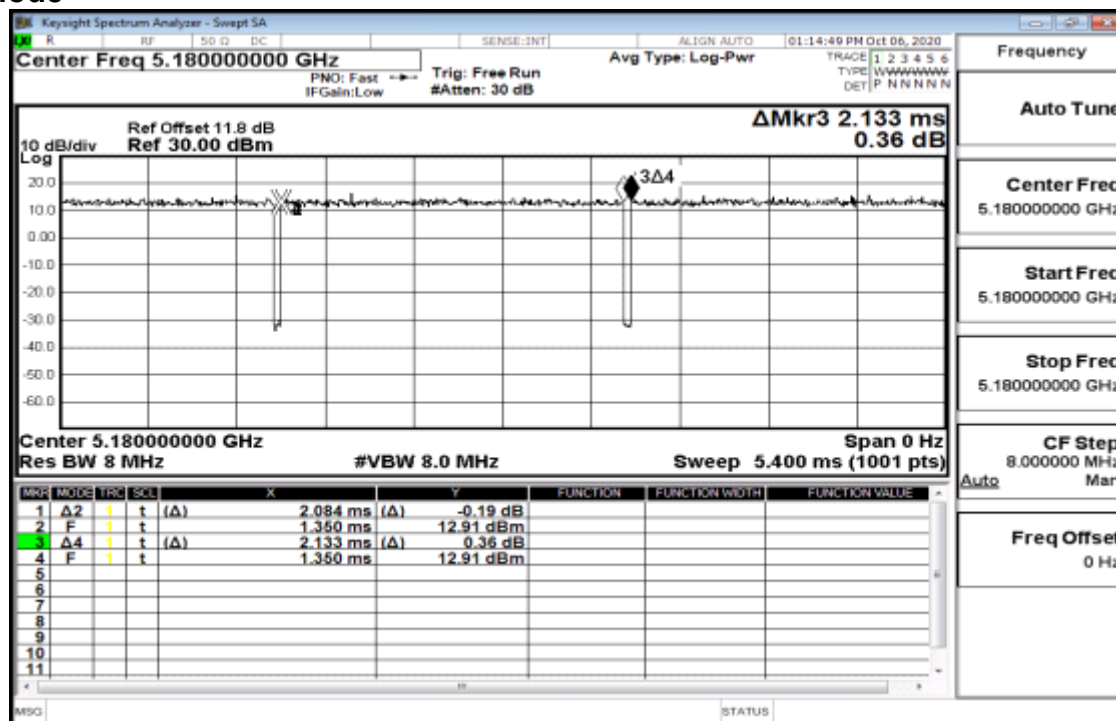
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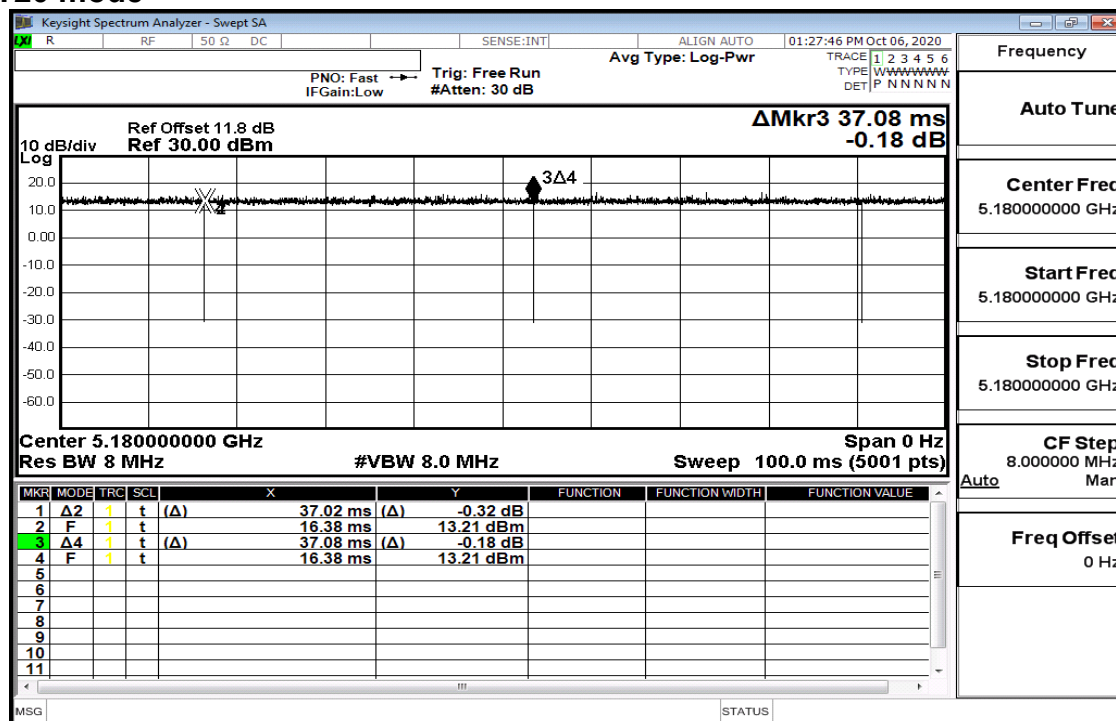
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## 7.2 DUTY CYCLE TEST SIGNAL MEASUREMENT RESULT

## 802.11 a mode



## 802.11n HT20 mode

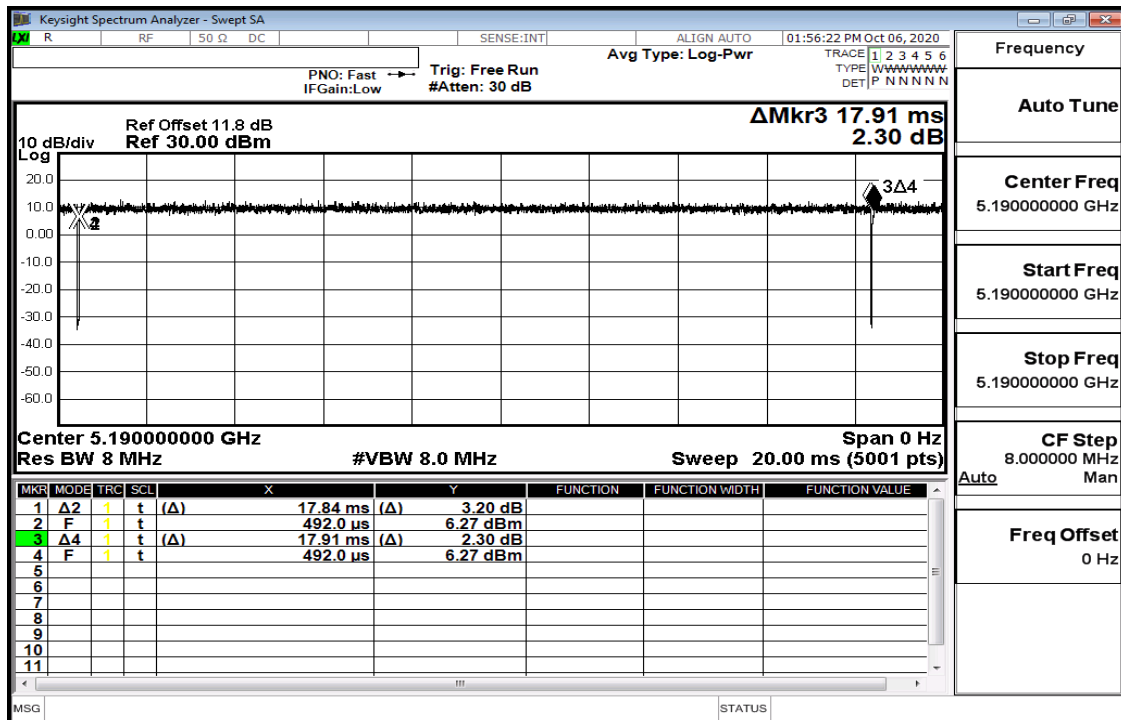


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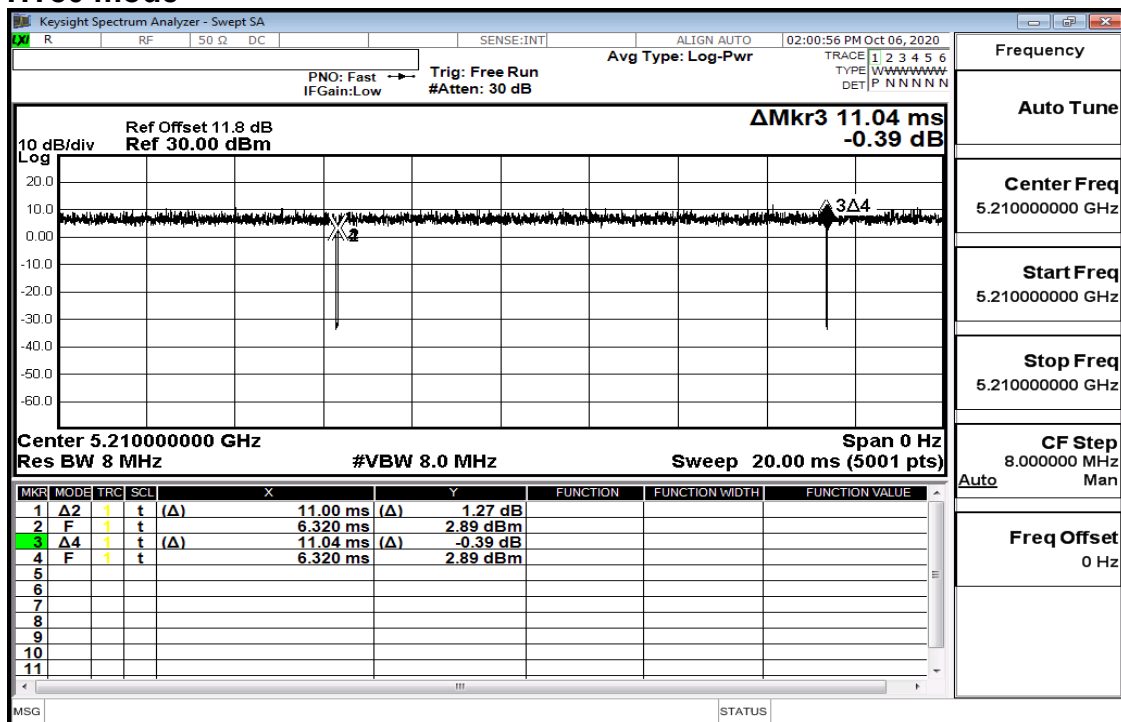
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## 802.11n HT40 mode



## 802.11ac VHT80 mode

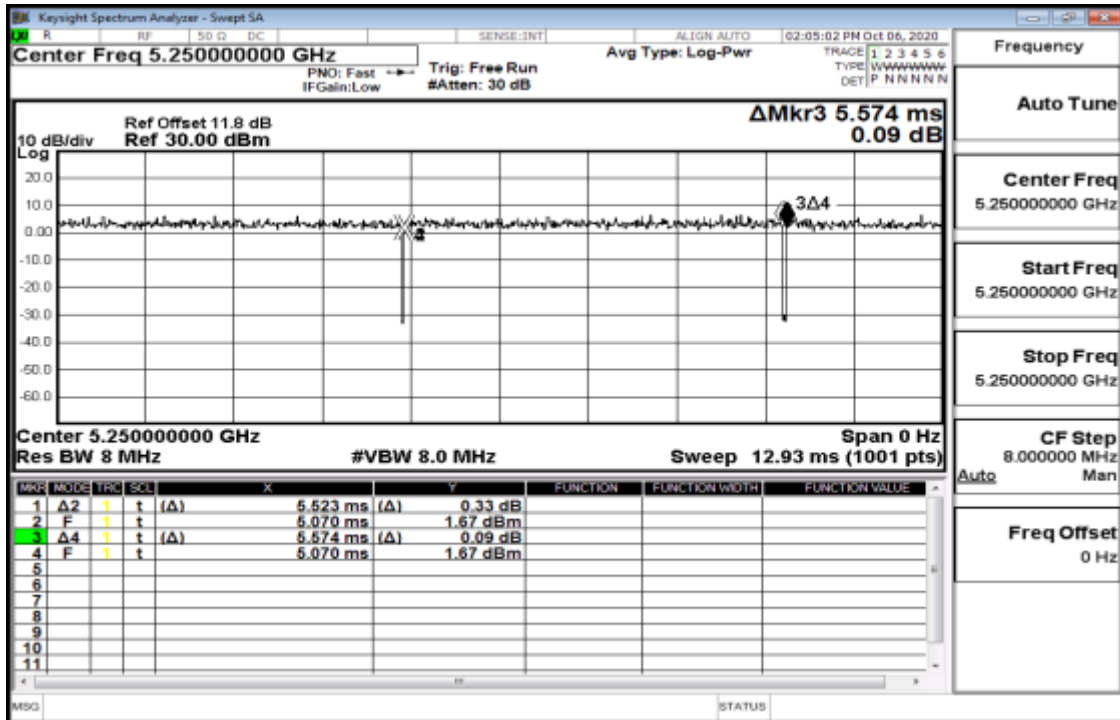


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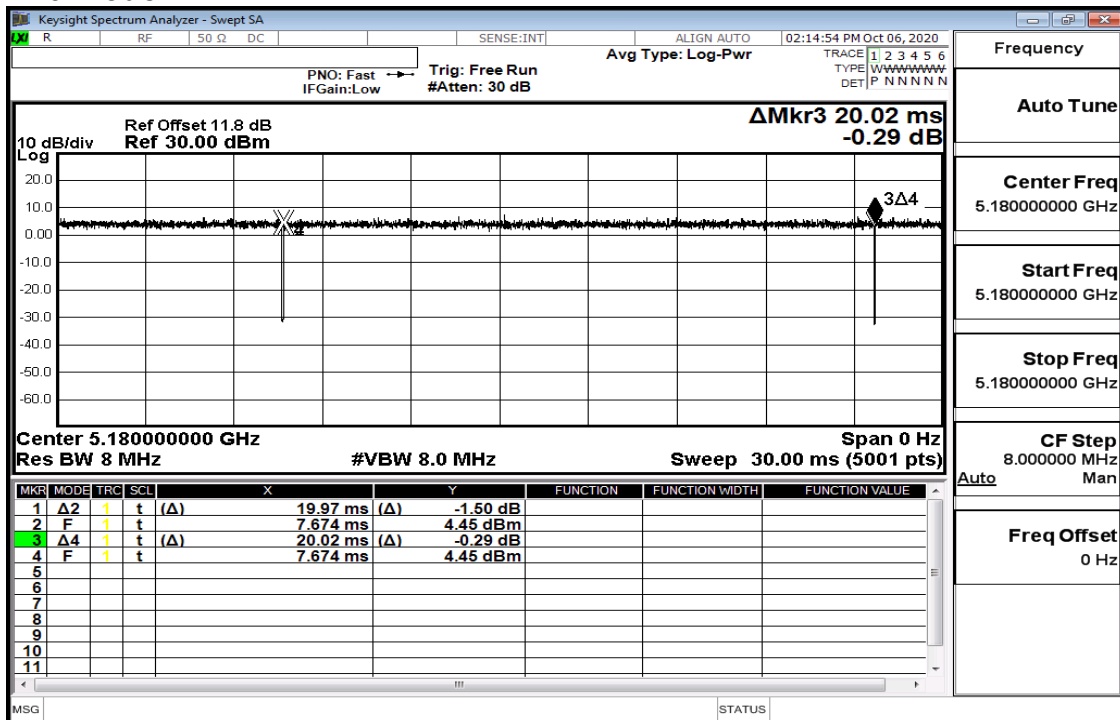
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## 802.11ac VHT160 mode



## 802.11ax HE20 mode

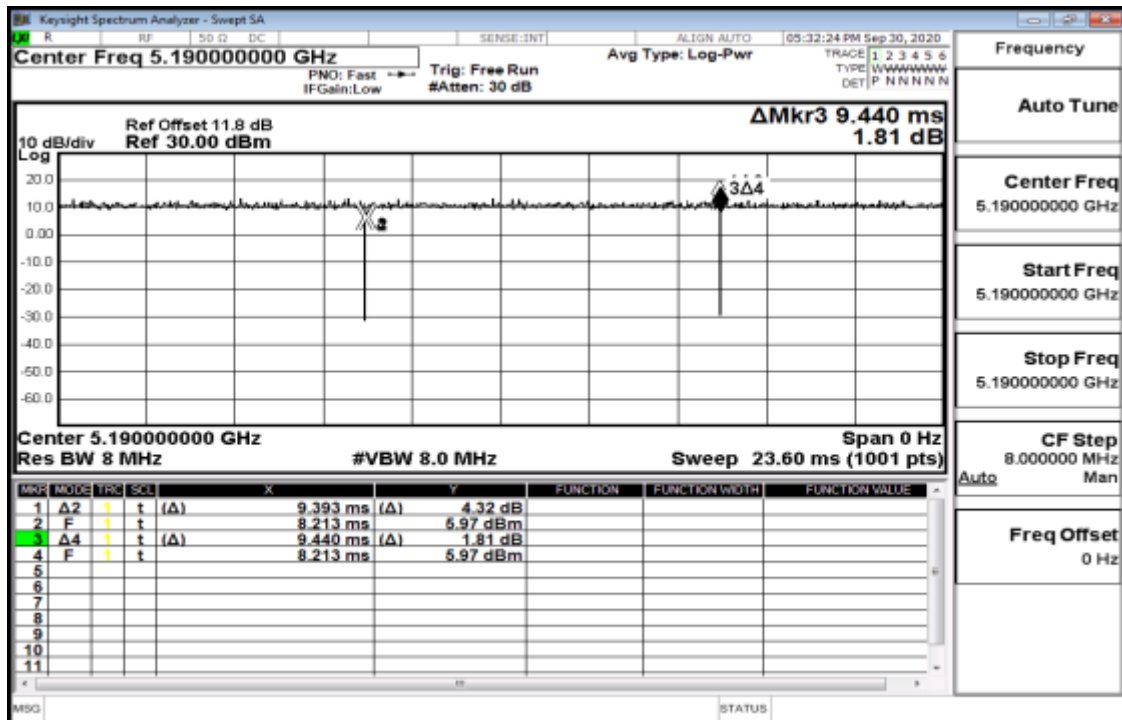


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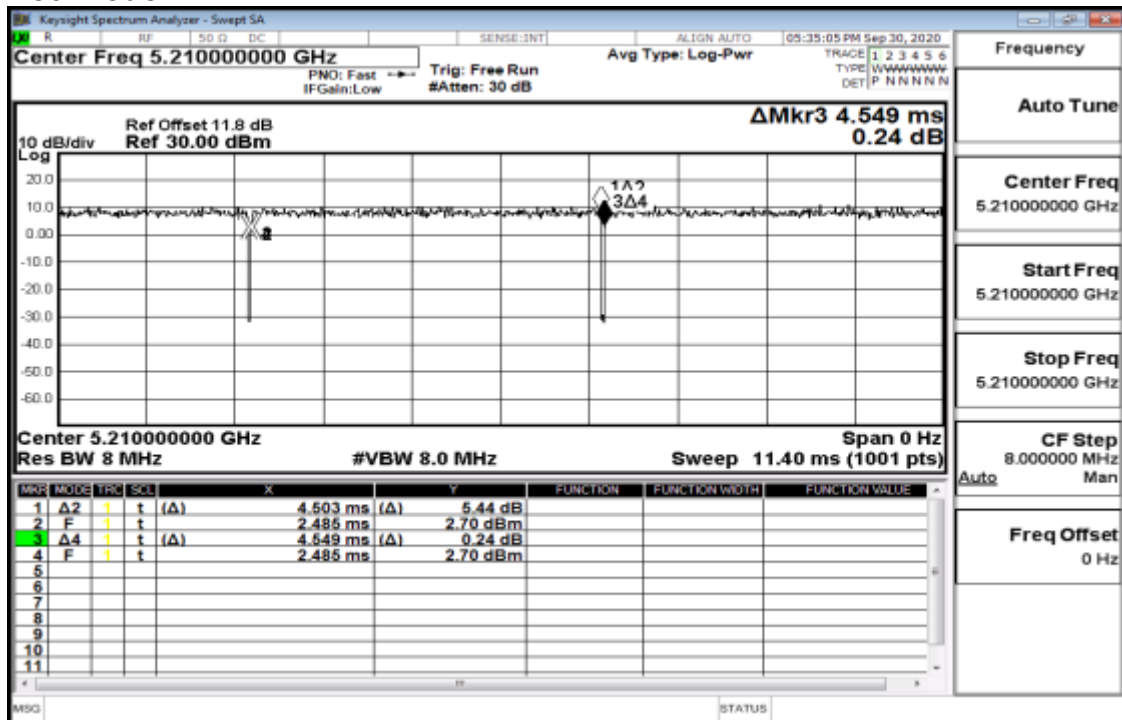
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## 802.11ax HE40 mode



## 802.11ax HE80 mode

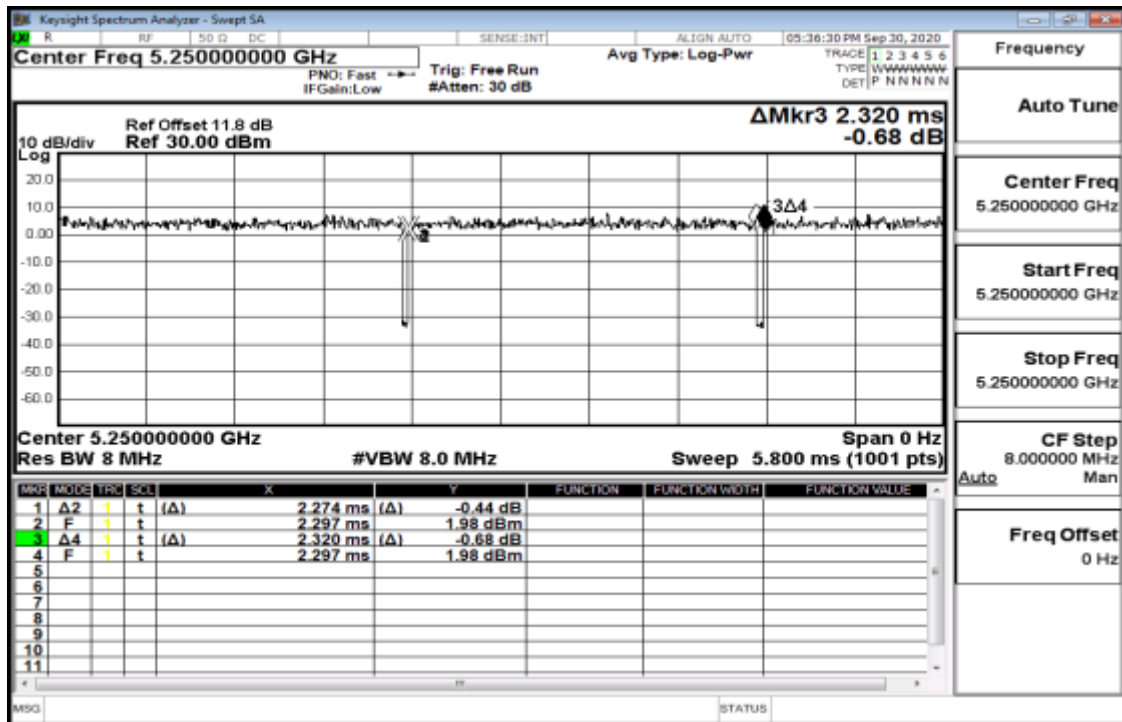


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## 802.11ax HE160 mode



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## 8 26DB & 6DB EMISSION BANDWIDTH MEASUREMENT

### 8.1 Standard Applicable

There is no limit bandwidth for U-NII-1, U-NII-2-A and U-NII-2-C.

The minimum of 6dB Bandwidth measurement is 0.5 MHz for U-NII-3.

### 8.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the Antenna port to the spectrum analyzer.
  - 3.a. 26dB Band width Measurement: Set the spectrum analyzer as 1% of emission BW  
Sweep=auto,  
Detector = Peak,  
Trace Mode = Max Hold,  
Manually readjust RBW until the RBW/EBW ratio is 1% based on EBW as observed on the result of pre-sequence measurement.
  - 3.b. Mark the peak frequency and -26dB (upper and lower) frequency.
4. Repeat the procedures as list above until all test default channels (low, middle, and high) are completed.
5. Minimum Emission Bandwidth for the band 5.725-5.850GHz.
  - a. Set the spectrum analyzer as  
RBW = 100 kHz,  
VBW = 3\*RBW,  
Span = 30M/50MHz,  
Detector=Peak,  
Sweep=auto
  - b. Mark the peak frequency and -6dB (upper and lower) frequency.
6. Repeat above procedures until all frequency of interest measured was complete.

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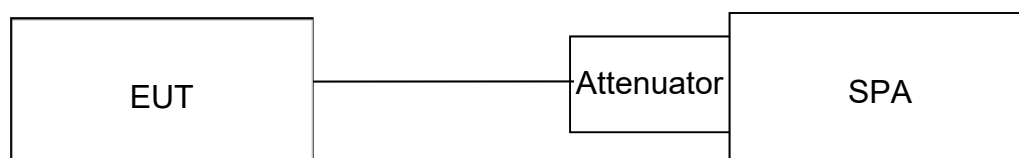
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## 8.3 Measurement Equipment Used

SGS Conducted Room					
EQUIPMENT TYPE	MFR/BRAND	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY57120290	02/20/2020	02/19/2021
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	07/08/2020	07/07/2021
Attenuator	Marvelous	MVE2213-10	RF09	11/20/2019	11/19/2020
Attenuator	Marvelous	MVE2213-10	RF09	11/19/2020	11/18/2021
DC Block	PASTER-NACK	PE8210	RF151	11/20/2019	11/19/2020
DC Block	PASTER-NACK	PE8210	RF151	11/19/2020	11/18/2021
IPEX-4 Cable	Woken	00100A1H646027	N/A	N/A	N/A

## 8.4 Test Set-up



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## 8.5 Measurement Result

### 8.5.1 FCC 26dB Bandwidth

Mode: Chain A

802.11a\_Chain A

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	22.33	13.490
5220	22.98	13.610
5240	22.23	13.470
5260	21.66	13.360
5300	22.15	13.450
5320	22.02	13.430
5500	22.53	13.530
5580	21.74	13.370
5700	21.77	13.380
5720(U-NII 2C)	15.76	11.970
5720(U-NII 3)	5.76	7.600

802.11n\_HT20\_Chain A

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	22.32	13.490
5220	22.37	13.500
5240	22.96	13.610
5260	23.12	13.640
5300	22.60	13.540
5320	22.51	13.520
5500	22.55	13.530
5580	23.24	13.660
5700	22.56	13.530
5720(U-NII 2C)	16.49	12.170
5720(U-NII 3)	6.49	8.120

802.11n\_HT40\_Chain A

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	41.64	16.200
5230	49.12	16.910
5270	49.01	16.900
5310	41.93	16.230
5510	42.13	16.250
5550	49.92	16.980
5670	41.76	16.210
5710(U-NII 2C)	35.84	15.540
5710(U-NII 3)	5.84	7.660

802.11ac\_VHT80\_Chain A

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5210	82.52	19.170
5290	86.02	19.350
5530	83.20	19.200
5610	82.97	19.190
5690(U-NII 2C)	75.79	18.800
5690(U-NII 3)	5.79	7.630

802.11ac\_VHT160\_Chain A

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5250	163.20	22.130
5570	162.50	22.110

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## 802.11ax\_20\_Chain A

Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)
5180	full	22.11	13.450
5220	full	21.98	13.420
5240	full	23.74	13.750
5260	full	22.34	13.490
5300	full	22.49	13.520
5320	full	22.96	13.610
5500	full	22.89	13.600
5580	full	22.01	13.430
5700	full	22.37	13.500
5720(U-NII 2C)	full	15.95	12.030
5720(U-NII 3)	full	5.95	7.750

## 802.11ax\_40\_Chain A

Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)
5190	full	40.30	16.050
5230	full	47.03	16.720
5270	full	44.62	16.500
5310	full	41.60	16.190
5510	full	42.52	16.290
5550	full	49.24	16.920
5670	full	41.92	16.220
5710(U-NII 2C)	full	35.27	15.470
5710(U-NII 3)	full	5.27	7.220

## 802.11ax\_80\_Chain A

Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)
5210	full	82.20	19.150
5290	full	81.69	19.120
5530	full	82.01	19.140
5610	full	81.19	19.100
5690(U-NII 2C)	full	75.43	18.780
5690(U-NII 3)	full	5.43	7.350

## 802.11ax\_160\_Chain A

Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)
5250	full	164.20	22.150
5570	full	163.30	22.130

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Mode: Chain B

802.11a\_Chain B

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	21.96	13.420
5220	22.77	13.570
5240	22.66	13.550
5260	22.21	13.470
5300	23.18	13.650
5320	22.58	13.540
5500	23.78	13.760
5580	23.45	13.700
5700	22.63	13.550
5720(U-NII 2C)	15.93	12.020
5720(U-NII 3)	5.93	7.730

802.11n\_HT20\_Chain B

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	22.78	13.580
5220	23.64	13.740
5240	22.56	13.530
5260	23.36	13.680
5300	23.57	13.720
5320	22.79	13.580
5500	23.13	13.640
5580	24.13	13.830
5700	23.27	13.670
5720(U-NII 2C)	16.38	12.140
5720(U-NII 3)	6.38	8.040

802.11n\_HT40\_Chain B

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	42.76	16.310
5230	42.38	16.270
5270	43.13	16.350
5310	42.49	16.280
5510	42.54	16.290
5550	42.12	16.240
5670	43.28	16.360
5710(U-NII 2C)	36.42	15.610
5710(U-NII 3)	6.42	8.080

802.11ac\_VHT80\_Chain B

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5210	84.14	19.250
5290	83.20	19.200
5530	83.93	19.240
5610	84.32	19.260
5690(U-NII 2C)	76.52	18.840
5690(U-NII 3)	6.52	8.150

802.11ac\_VHT160\_Chain B

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5250	162.10	22.100
5570	162.20	22.100

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## 802.11ax\_20\_Chain B

Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)
5180	full	20.86	13.190
5220	full	21.81	13.390
5240	full	21.86	13.400
5260	full	22.48	13.520
5300	full	23.05	13.630
5320	full	22.06	13.440
5500	full	21.95	13.410
5580	full	22.75	13.570
5700	full	22.34	13.490
5720(U-NII 2C)	full	16.00	12.040
5720(U-NII 3)	full	6.00	7.780

## 802.11ax\_40\_Chain B

Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)
5190	full	40.74	16.100
5230	full	42.07	16.240
5270	full	42.33	16.270
5310	full	40.97	16.120
5510	full	41.40	16.170
5550	full	48.62	16.870
5670	full	41.39	16.170
5710(U-NII 2C)	full	35.59	15.510
5710(U-NII 3)	full	5.59	7.470

## 802.11ax\_80\_Chain B

Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)
5210	full	81.55	19.110
5290	full	82.23	19.150
5530	full	81.58	19.120
5610	full	82.13	19.150
5690(U-NII 2C)	full	76.18	18.820
5690(U-NII 3)	full	6.18	7.910

## 802.11ax\_160\_Chain B

Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)
5250	full	162.70	22.110
5570	full	164.50	22.160

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Mode: MIMO

802.11n\_HT20\_Chain A

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	22.38	13.500
5220	22.65	13.550
5240	22.87	13.590
5260	23.37	13.690
5300	23.17	13.650
5320	23.58	13.730
5500	23.07	13.630
5580	23.67	13.740
5700	22.53	13.530
5720(U-NII 2C)	16.56	12.190
5720(U-NII 3)	6.56	8.170

802.11n\_HT20\_Chain B

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	23.81	13.770
5220	23.42	13.700
5240	25.60	14.080
5260	21.96	13.420
5300	23.30	13.670
5320	22.33	13.490
5500	23.02	13.620
5580	23.08	13.630
5700	22.58	13.540
5720(U-NII 2C)	16.19	12.090
5720(U-NII 3)	6.19	7.920

802.11n\_HT40\_Chain A

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	42.05	16.240
5230	42.28	16.260
5270	41.94	16.230
5310	42.90	16.320
5510	41.78	16.210
5550	<b>42.77</b>	16.310
5670	41.73	16.200
5710(U-NII 2C)	35.36	15.490
5710(U-NII 3)	5.36	7.290

802.11n\_HT40\_Chain B

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	41.59	16.190
5230	41.72	16.200
5270	41.39	16.170
5310	41.72	16.200
5510	41.85	16.220
5550	<b>40.99</b>	16.130
5670	41.63	16.190
5710(U-NII 2C)	35.56	15.510
5710(U-NII 3)	5.56	7.450

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802.11ac\_VHT80\_Chain A

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5210	82.63	19.170
5290	83.90	19.240
5530	86.44	19.370
5610	84.40	19.260
5690(U-NII 2C)	76.05	18.810
5690(U-NII 3)	6.05	7.810

802.11ac\_VHT80\_Chain B

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5210	83.59	19.220
5290	82.92	19.190
5530	83.27	19.200
5610	83.26	19.200
5690(U-NII 2C)	76.46	18.830
5690(U-NII 3)	6.46	8.100

802.11ac\_VHT160\_Chain A

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5250	162.40	22.110
5570	162.30	22.100

802.11ac\_VHT160\_Chain B

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5250	163.30	22.130
5570	162.40	22.110

802.11ax\_20\_Chain A

Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)
5180	full	24.18	13.830
5220	full	23.72	13.750
5240	full	25.29	14.030
5260	full	24.48	13.890
5300	full	24.08	13.820
5320	full	23.79	13.760
5500	full	24.59	13.910
5580	full	24.22	13.840
5700	full	23.92	13.790
5720(U-NII 2C)	full	17.59	12.450
5720(U-NII 3)	full	7.59	8.800

802.11ax\_20\_Chain B

Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)
5180	full	24.20	13.840
5220	full	25.23	14.020
5240	full	24.02	13.810
5260	full	23.98	13.800
5300	full	24.17	13.830
5320	full	24.21	13.840
5500	full	23.92	13.790
5580	full	24.33	13.860
5700	full	24.35	13.860
5720(U-NII 2C)	full	17.40	12.410
5720(U-NII 3)	full	7.40	8.690

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802.11ax \_40\_Chain A

Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)
5190	full	44.92	16.520
5230	full	40.24	16.050
5270	full	41.35	16.160
5310	full	44.16	16.450
5510	full	41.77	16.210
5550	full	<b>42.63</b>	16.300
5670	full	41.66	16.200
5710(U-NII 2C)	full	36.88	15.670
5710(U-NII 3)	full	6.88	8.380

802.11ax \_40\_Chain B

Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)
5190	full	44.53	16.490
5230	full	42.33	16.270
5270	full	42.65	16.300
5310	full	45.81	16.610
5510	full	41.87	16.220
5550	full	<b>40.39</b>	16.060
5670	full	41.90	16.220
5710(U-NII 2C)	full	37.01	15.680
5710(U-NII 3)	full	7.01	8.450

802.11ax \_80\_Chain A

Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)
5210	full	84.92	19.290
5290	full	82.84	19.180
5530	full	86.74	19.380
5610	full	84.37	19.260
5690(U-NII 2C)	full	77.37	18.890
5690(U-NII 3)	full	7.37	8.670

802.11ax \_80\_Chain B

Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)
5210	full	84.98	19.290
5290	full	85.15	19.300
5530	full	86.13	19.350
5610	full	84.45	19.270
5690(U-NII 2C)	full	78.18	18.930
5690(U-NII 3)	full	8.18	9.130

802.11ax \_160\_Chain A

Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)
5250	full	163.40	22.130
5570	full	162.90	22.120

802.11ax \_160\_Chain B

Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)
5250	full	163.90	22.150
5570	full	162.40	22.110

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## 8.5.2 6dB Bandwidth (5725 MHz~ 5850 MHz) measure with Peak detector for FCC

Mode: Chain A

802.11a\_Chain A

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	14.02	11.470
5785	11.25	10.510
5825	15.46	11.890

802.11n\_HT20\_Chain A

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	17.62	12.460
5785	17.61	12.460
5825	17.59	12.450

802.11n\_HT40\_Chain A

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5755	29.27	14.660
5795	36.38	15.610

802.11ac\_VHT80\_Chain A

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5775	65.04	18.130

802.11ax\_20\_Chain A

Freq. (MHz)	RU config	6dB BW (MHz)	10 Log (B) (dB)
5745	full	18.04	12.560
	26/0	2.070	3.160
5785	full	18.13	12.580
	26/0	2.039	3.090
5825	full	18.64	12.700
	26/0	2.024	3.060

802.11ax\_40\_Chain A

Freq. (MHz)	RU config	6dB BW (MHz)	10 Log (B) (dB)
5755	full	30.87	14.900
5795	full	33.64	15.270

802.11ax\_80\_Chain A

Freq. (MHz)	RU config	6dB BW (MHz)	10 Log (B) (dB)
5775	full	73.76	18.680

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Mode: Chain B

802.11a\_Chain B

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	15.02	11.770
5785	16.38	12.140
5825	11.32	10.540

802.11n\_HT20\_Chain B

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	17.56	12.450
5785	17.66	12.470
5825	17.64	12.460

802.11n\_HT40\_Chain B

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5755	36.34	15.600
5795	36.33	15.600

802.11ac\_VHT80\_Chain B

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5775	66.39	18.220

802.11ax\_20\_Chain B

Freq. (MHz)	RU config	6dB BW (MHz)	10 Log (B) (dB)
5745	full	18.70	12.720
	26/0	1.999	3.010
5785	full	18.75	12.730
	26/0	1.980	2.970
5825	full	18.21	12.600
	26/0	2.011	3.030

802.11ax\_40\_Chain B

Freq. (MHz)	RU config	6dB BW (MHz)	10 Log (B) (dB)
5755	full	37.49	15.740
5795	full	32.42	15.110

802.11ax\_80\_Chain B

Freq. (MHz)	RU config	6dB BW (MHz)	10 Log (B) (dB)
5775	full	70.38	18.470

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Mode: MIMO

802.11n\_HT20\_Chain A

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	10.24	10.100
5785	17.00	12.300
5825	17.62	12.460

802.11n\_HT20\_Chain B

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	15.28	11.840
5785	17.60	12.460
5825	17.61	12.460

802.11n\_HT40\_Chain A

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5755	27.26	14.360
5795	36.30	15.600

802.11n\_HT40\_Chain B

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5755	36.32	15.600
5795	36.37	15.610

802.11ac\_VHT80\_Chain A

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5775	57.54	17.600

802.11ac\_VHT80\_Chain B

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5775	73.52	18.660

802.11ax\_20\_Chain A

Freq. (MHz)	RU config	6dB BW (MHz)	10 Log (B) (dB)
5745	full	15.16	11.810
	26/0	2.055	3.130
5785	full	18.18	12.600
	26/0	2.075	3.170
5825	full	13.64	11.350
	26/0	2.062	3.140

802.11ax\_20\_Chain B

Freq. (MHz)	RU config	6dB BW (MHz)	10 Log (B) (dB)
5745	full	18.05	12.560
	26/0	2.078	3.180
5785	full	18.60	12.700
	26/0	2.071	3.160
5825	full	15.08	11.780
	26/0	2.058	3.130

802.11ax\_40\_Chain A

Freq. (MHz)	RU config	6dB BW (MHz)	10 Log (B) (dB)
5755	full	37.04	15.690
5795	full	34.87	15.420

802.11ax\_40\_Chain B

Freq. (MHz)	RU config	6dB BW (MHz)	10 Log (B) (dB)
5755	full	36.11	15.580
5795	full	28.95	14.620

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802.11ax \_80\_Chain A

Freq. (MHz)	RU config	6dB BW (MHz)	10 Log (B) (dB)
5775	full	70.07	18.460

802.11ax \_80\_Chain B

Freq. (MHz)	RU config	6dB BW (MHz)	10 Log (B) (dB)
5775	full	66.38	18.220

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### 8.5.3 BW Verification for DFS Function

Mode: Chain A

802.11a\_Chain A

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5240	5248.29	< 5250
5745	5736.63	> 5725

802.11n\_HT20\_Chain A

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5240	5248.83	< 5250
5745	5736.06	> 5725

802.11n\_HT40\_Chain A

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5230	5248.03	< 5250
5755	5736.90	> 5725

802.11ac\_VHT80\_Chain A

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5210	5247.50	< 5250
5775	5737.37	> 5725

802.11ax\_20\_Chain A

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5240	5249.39	< 5250
5745	5735.51	> 5725

802.11ax\_40\_Chain A

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5230	5248.74	< 5250
5755	5736.13	> 5725

802.11ax\_VHT80\_Chain A

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5210	5248.33	< 5250
5775	5736.80	> 5725

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Mode: Chain B

802.11a\_Chain B

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5240	5248.26	< 5250
5745	5736.74	> 5725

802.11n\_HT20\_Chain B

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5240	5248.85	< 5250
5745	5736.14	> 5725

802.11n\_HT40\_Chain B

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5230	5247.99	< 5250
5755	5736.97	> 5725

802.11ac\_VHT80\_Chain B

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5210	5247.49	< 5250
5775	5737.56	> 5725

802.11ax\_20\_Chain B

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5240	5249.43	< 5250
5745	5735.56	> 5725

802.11ax\_40\_Chain B

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5230	5248.77	< 5250
5755	5736.23	> 5725

802.11ax\_VHT80\_Chain B

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5210	5248.25	< 5250
5775	5736.80	> 5725

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Mode: MIMO

802.11n\_HT20\_Chain A

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5240	5248.84	< 5250
5745	5736.17	> 5725

802.11n\_HT20\_Chain B

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5240	5248.91	< 5250
5745	5736.19	> 5725

802.11n\_HT40\_Chain A

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5230	5247.97	< 5250
5755	5737.02	> 5725

802.11n\_HT40\_Chain B

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5230	5248.43	< 5250
5755	5737.01	> 5725

802.11ac\_VHT80\_Chain A

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5210	5247.51	< 5250
5775	5737.49	> 5725

802.11ac\_VHT80\_Chain B

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5210	5247.47	< 5250
5775	5737.51	> 5725

802.11ax\_20\_Chain A

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5240	5249.48	< 5250
5745	5735.49	> 5725

802.11ax\_20\_Chain B

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5240	5249.43	< 5250
5745	5735.51	> 5725

802.11ax\_40\_Chain A

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5230	5248.68	< 5250
5755	5736.24	> 5725

802.11ax\_40\_Chain B

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5230	5248.76	< 5250
5755	5736.23	> 5725

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802.11ax\_VHT80\_Chain A

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5210	5248.20	< 5250
5775	5736.80	> 5725

802.11ax\_VHT80\_Chain B

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5210	5248.38	< 5250
5775	5736.74	> 5725

Please see next page for test plots.

**Note:** For the test plots, Detector: PEAK, Trace: MAX Hold

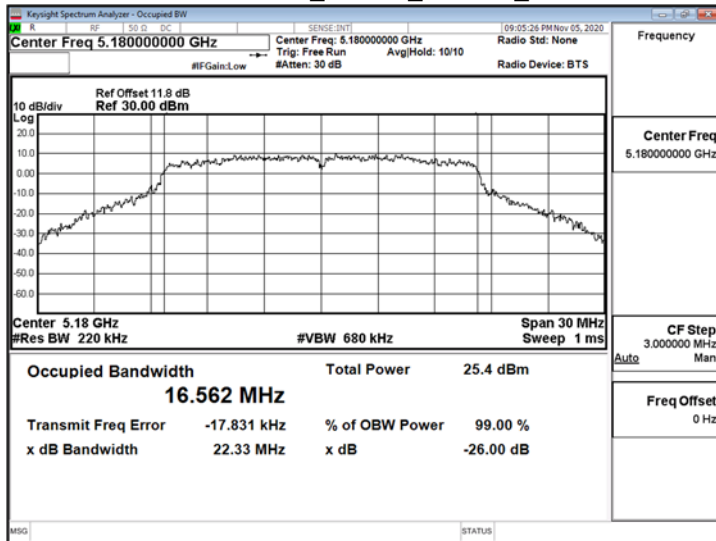
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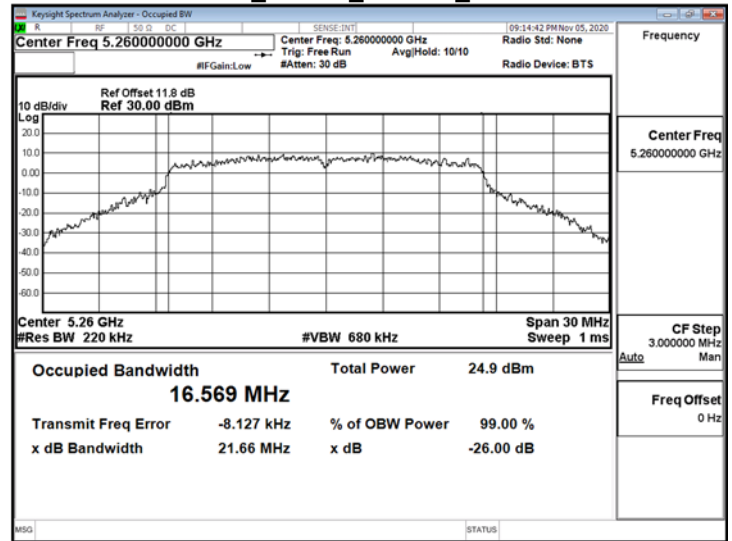
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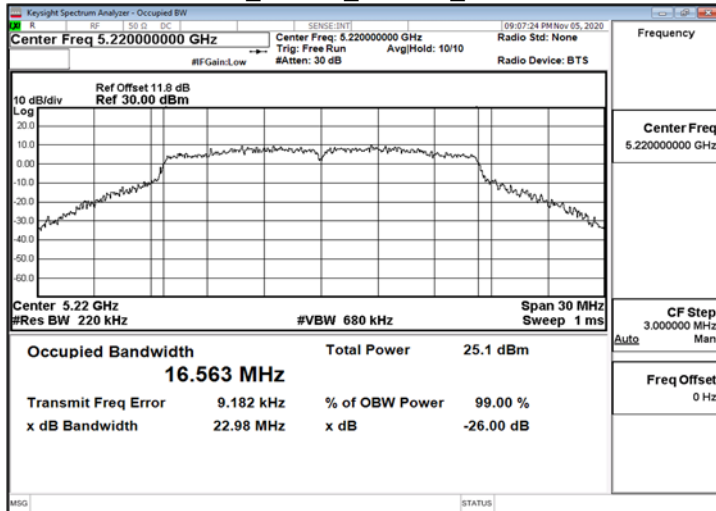
## Chain A 802.11a\_20MHz\_ChainA\_5180MHz



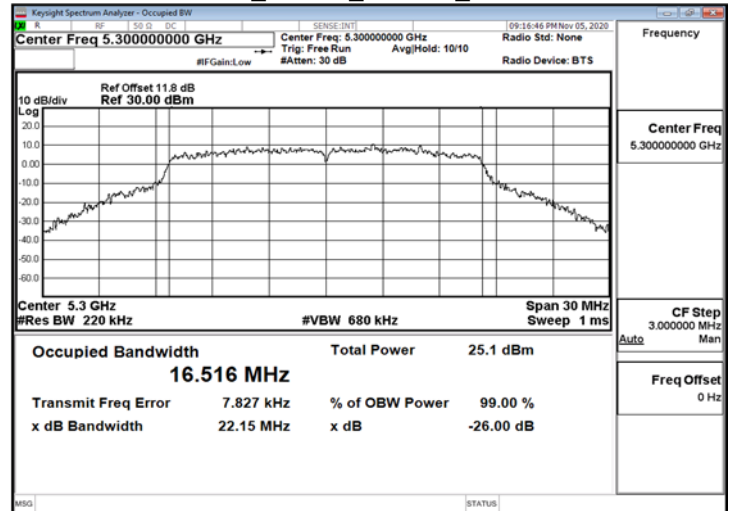
## 802.11a\_20MHz\_ChainA\_5260MHz



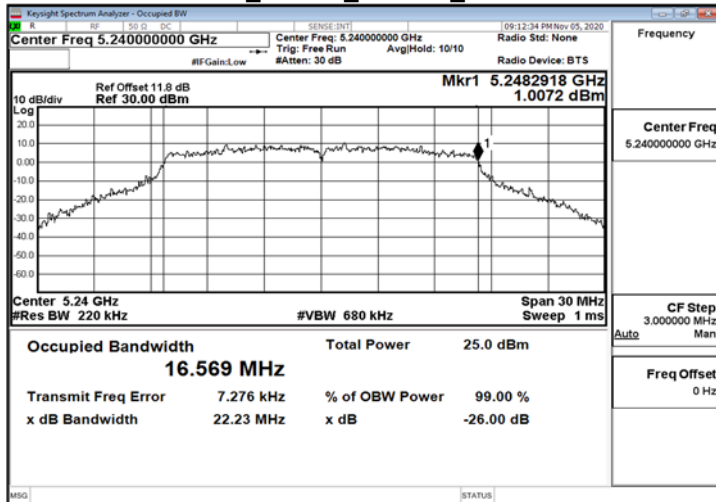
## 802.11a\_20MHz\_ChainA\_5220MHz



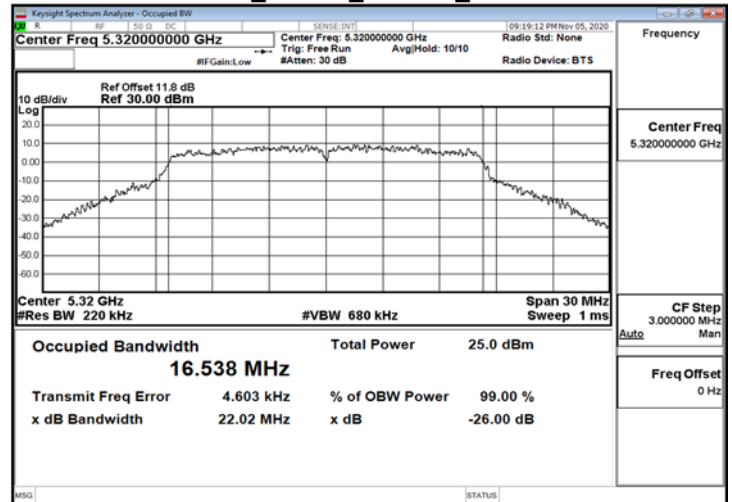
## 802.11a\_20MHz\_ChainA\_5300MHz



## 802.11a\_20MHz\_ChainA\_5240MHz



## 802.11a\_20MHz\_ChainA\_5320MHz

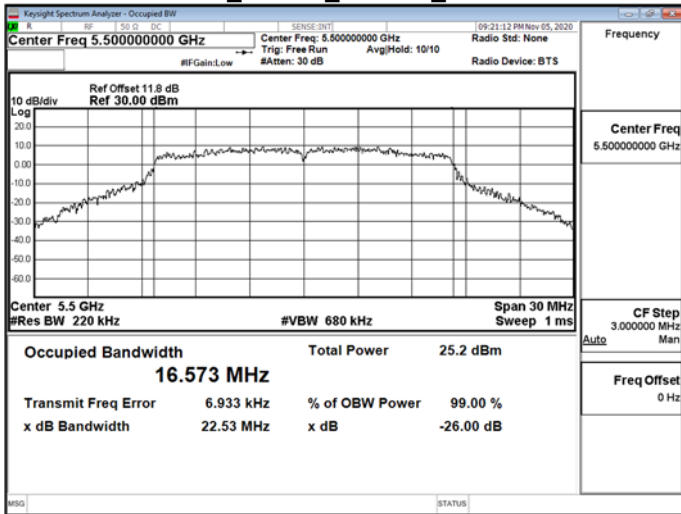


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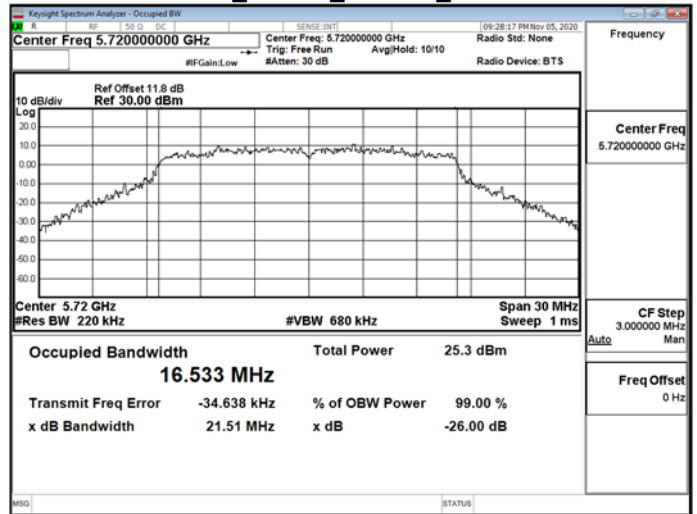
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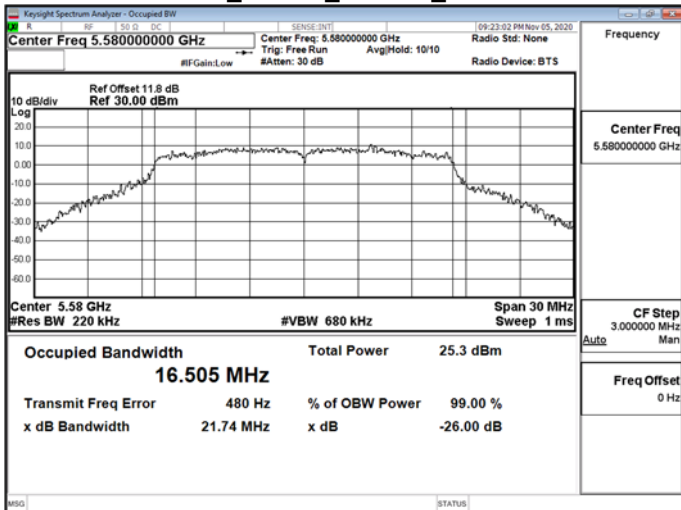
802.11a\_20MHz\_ChainA\_5500MHz



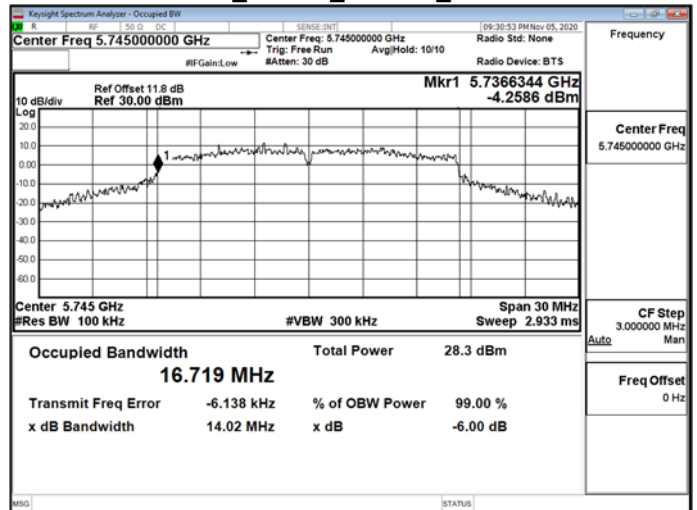
802.11a\_20MHz\_ChainA\_5720MHz



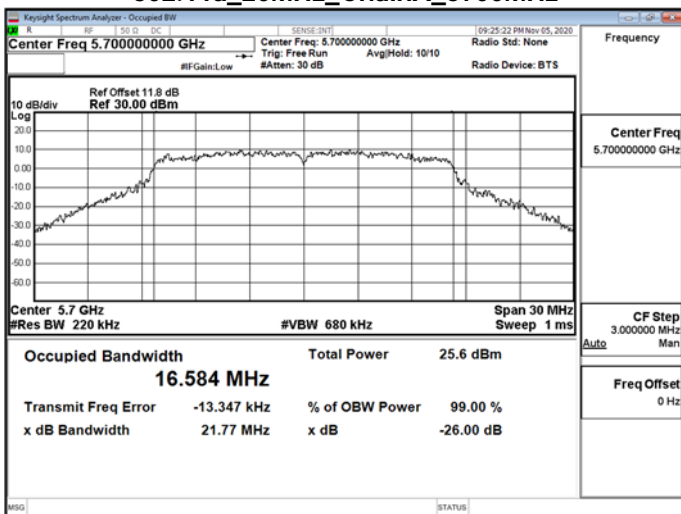
802.11a\_20MHz\_ChainA\_5580MHz



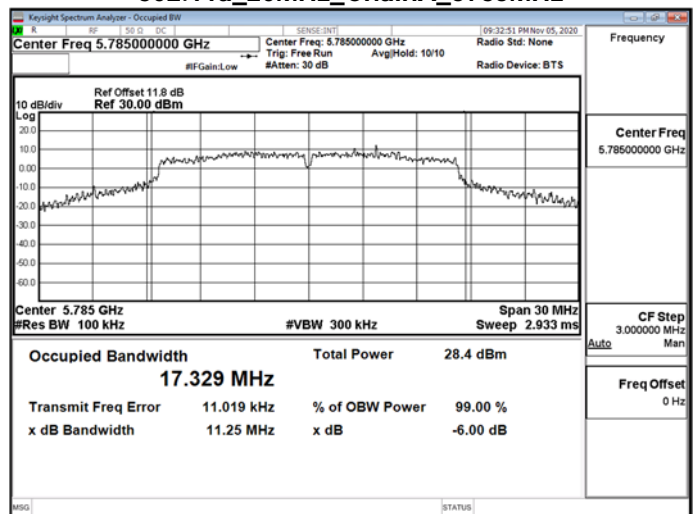
802.11a\_20MHz\_ChainA\_5745MHz



802.11a\_20MHz\_ChainA\_5700MHz



802.11a\_20MHz\_ChainA\_5785MHz

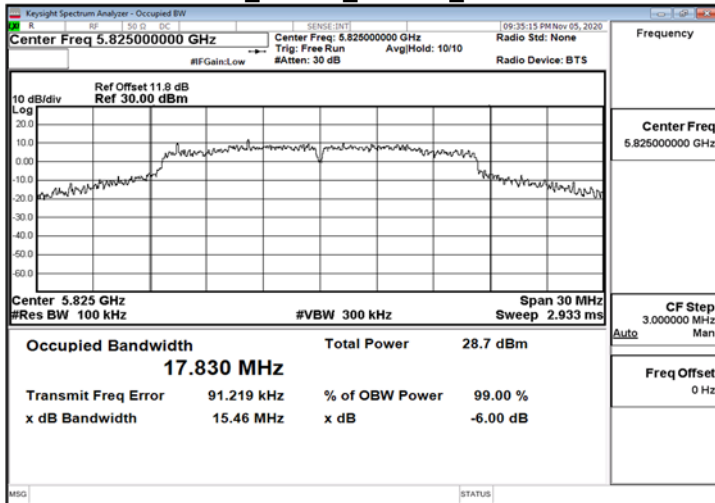


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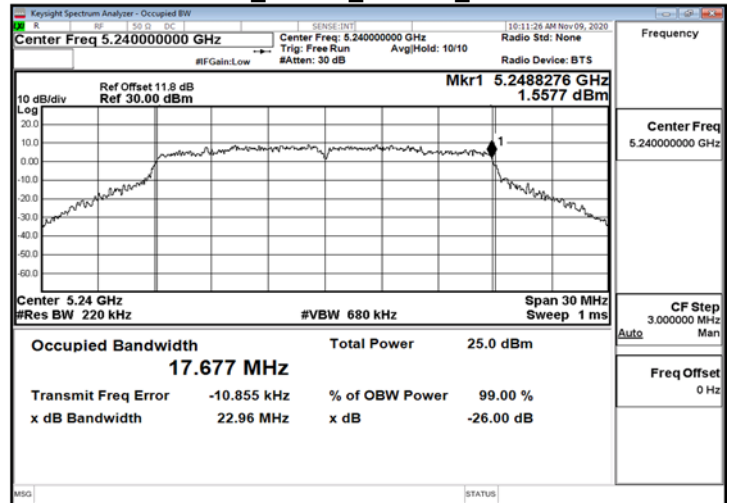
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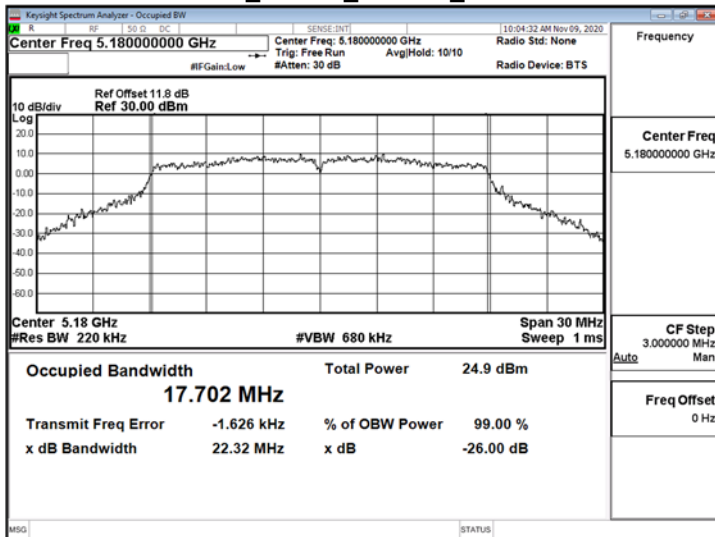
802.11a\_20MHz\_ChainA\_5825MHz



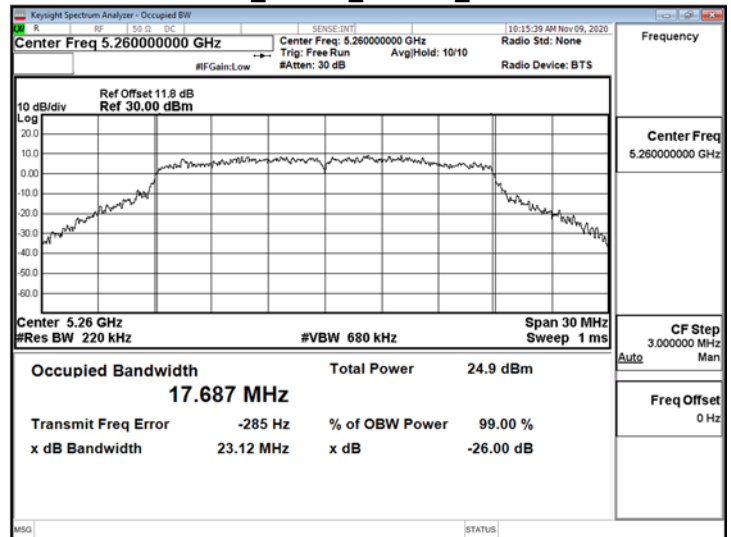
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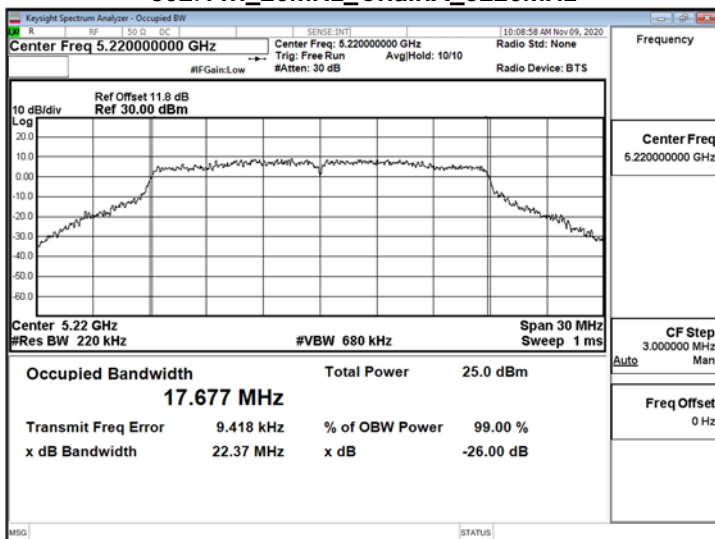
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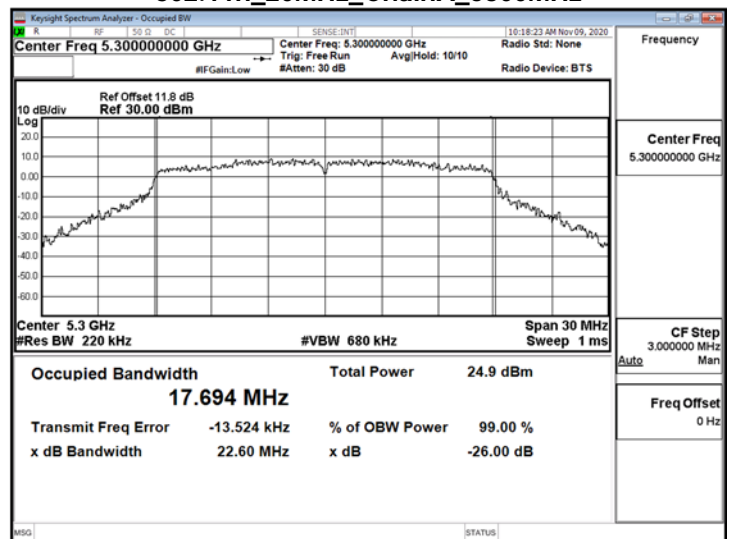
802.11n\_20MHz\_ChainA\_5260MHz



802.11n\_20MHz\_ChainA\_5220MHz



802.11n\_20MHz\_ChainA\_5300MHz



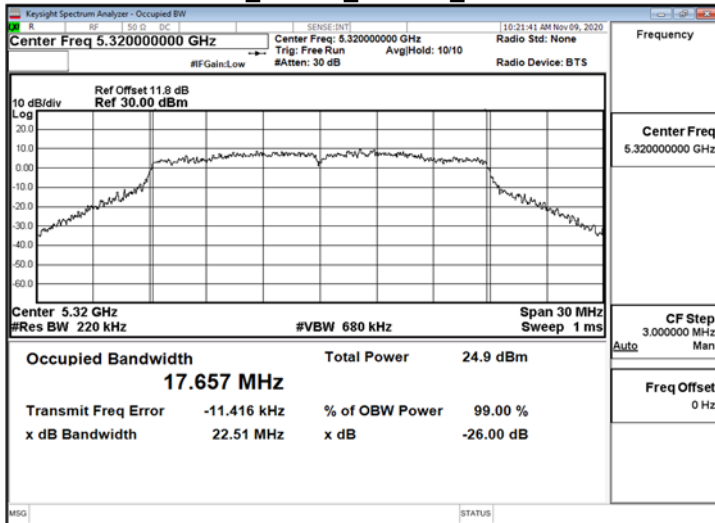
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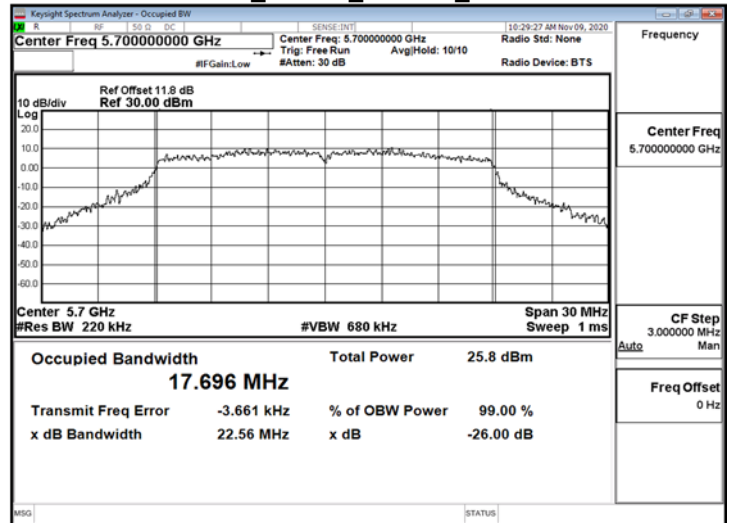
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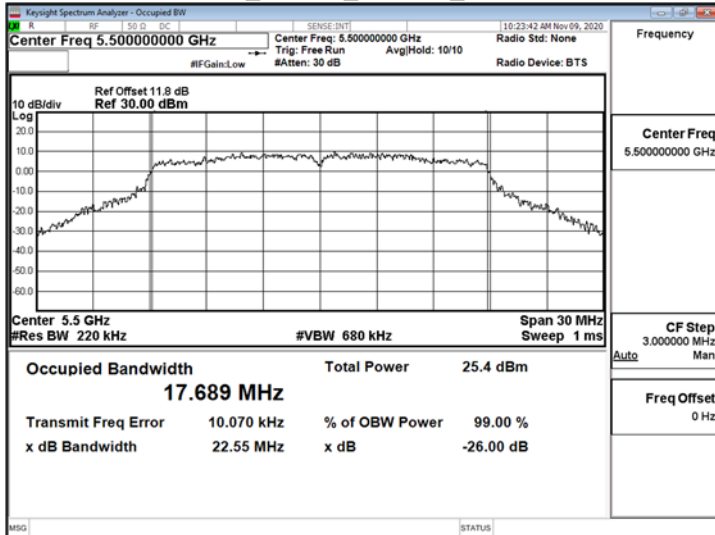
802.11n\_20MHz\_ChainA\_5320MHz



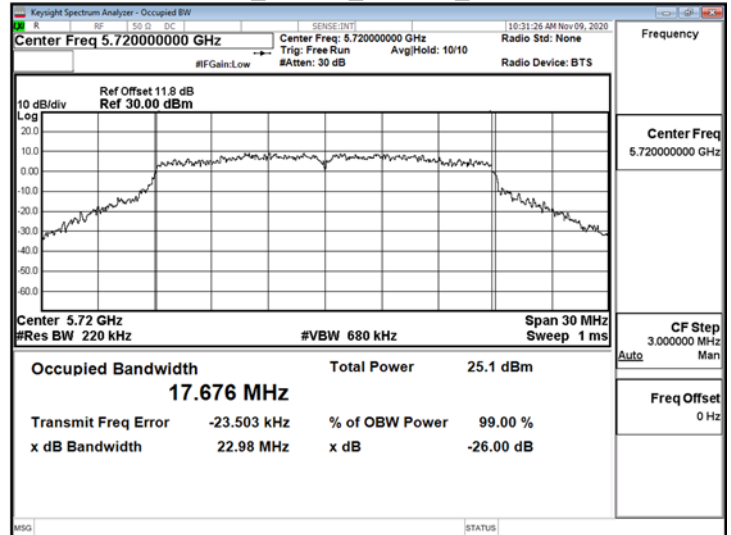
802.11n\_20MHz\_ChainA\_5700MHz



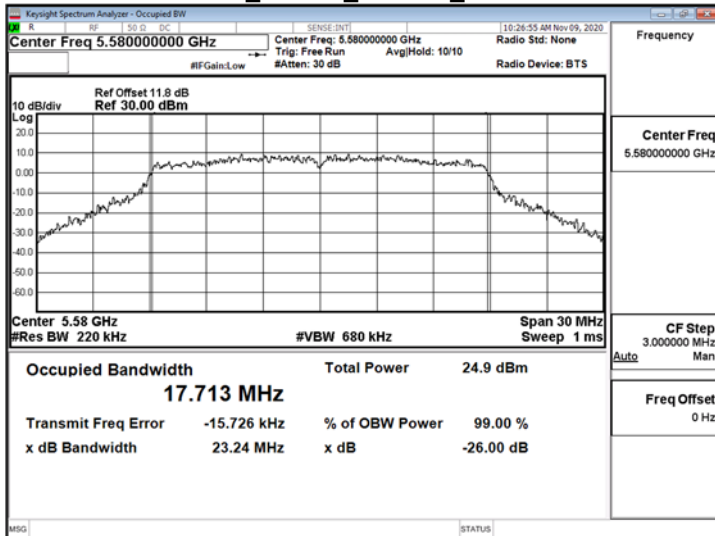
802.11n\_20MHz\_ChainA\_5500MHz



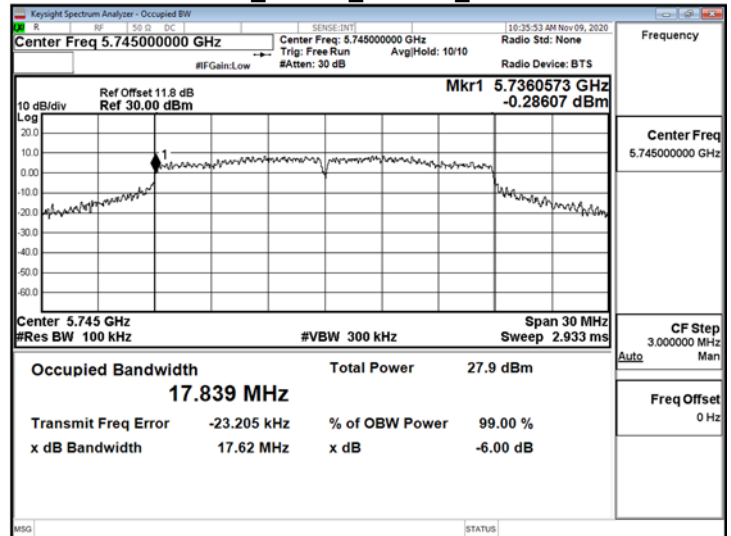
802.11n\_20MHz\_ChainA\_5720MHz



802.11n\_20MHz\_ChainA\_5580MHz



802.11n\_20MHz\_ChainA\_5745MHz

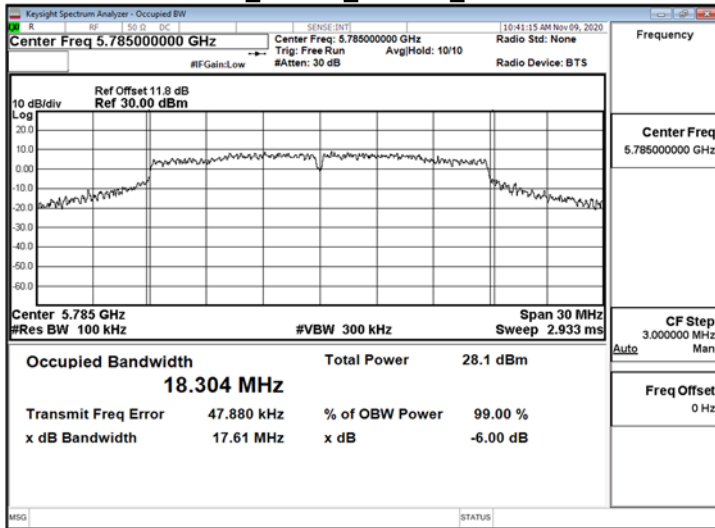


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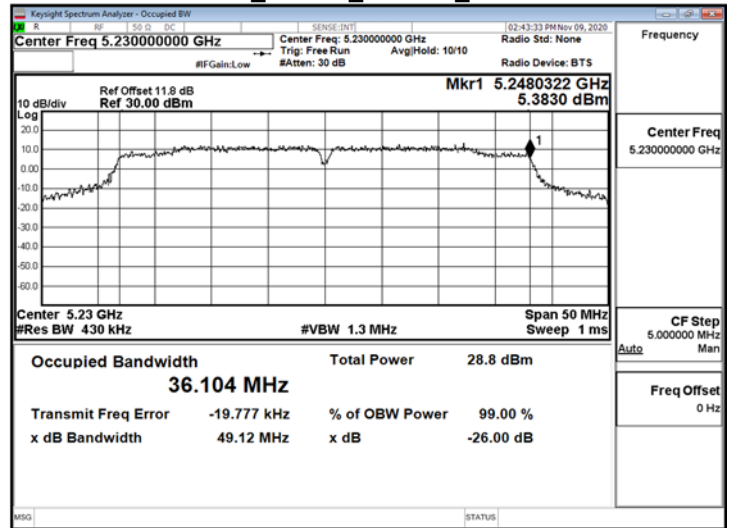
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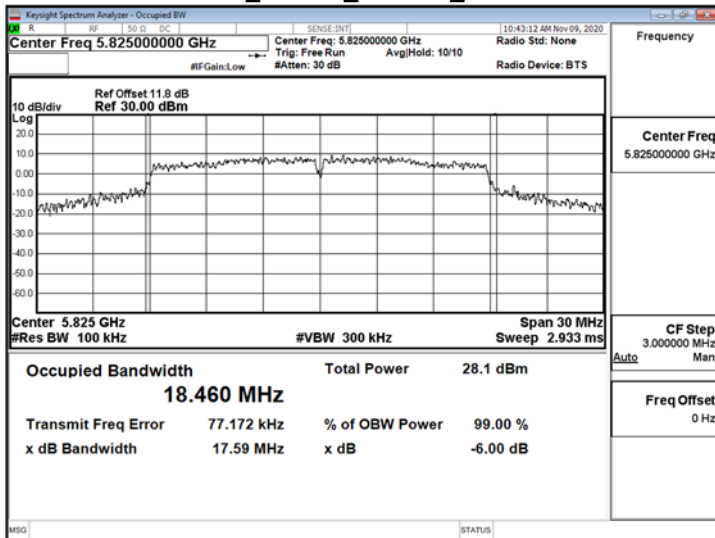
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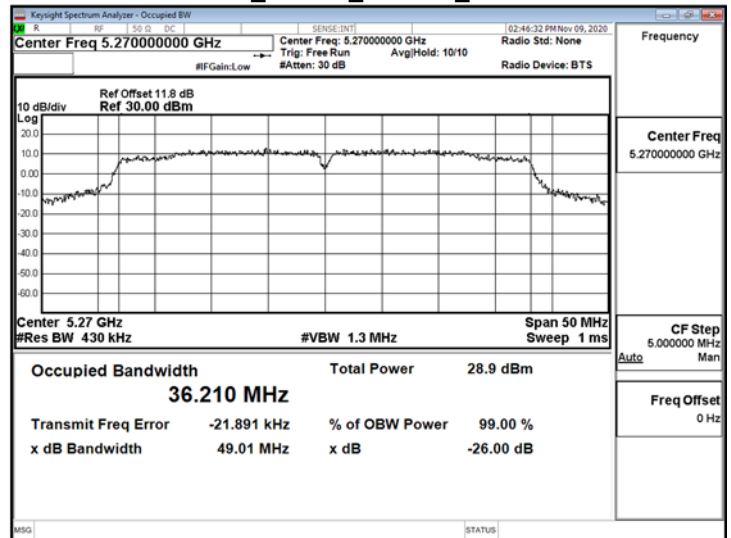
802.11n\_40MHz\_ChainA\_5230MHz



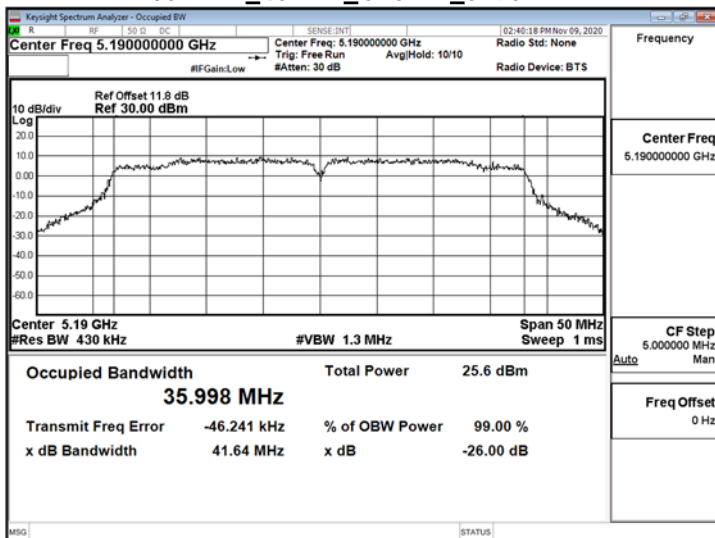
802.11n\_20MHz\_ChainA\_5825MHz



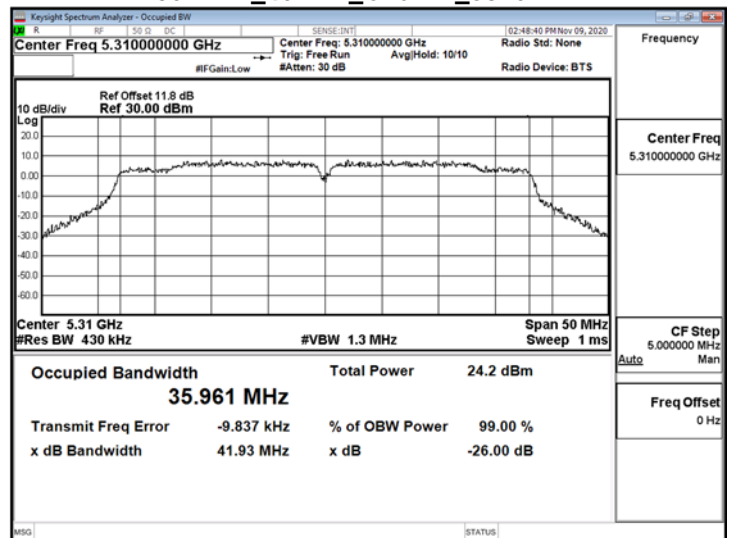
802.11n\_40MHz\_ChainA\_5270MHz



802.11n\_40MHz\_ChainA\_5190MHz



802.11n\_40MHz\_ChainA\_5310MHz

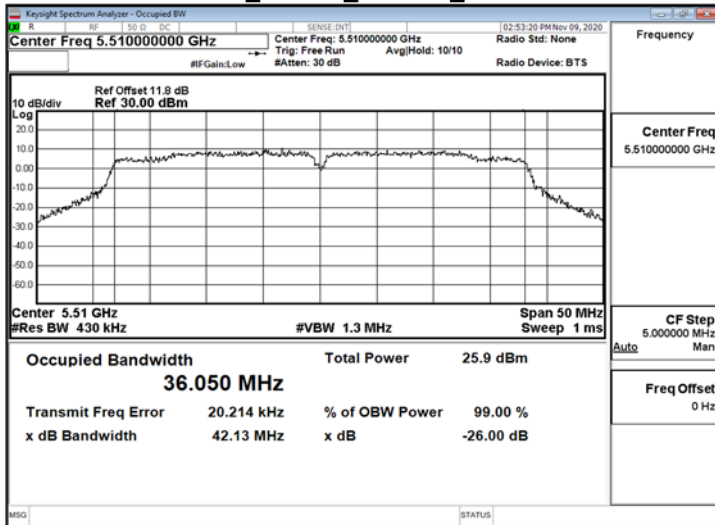


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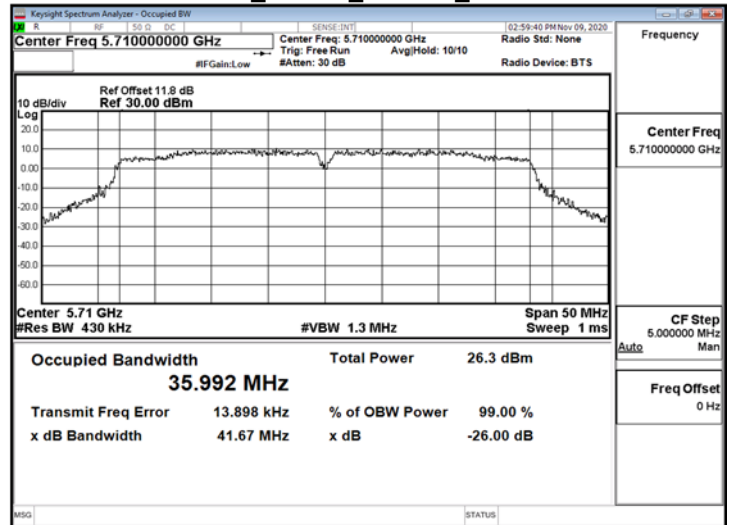
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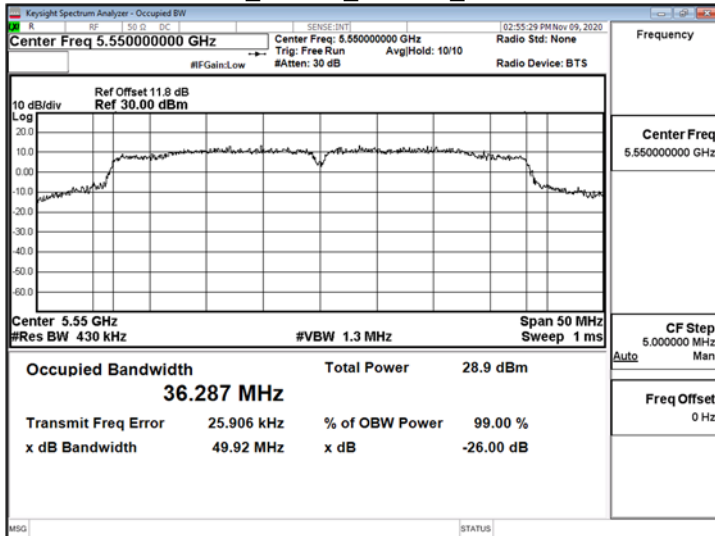
802.11n\_40MHz\_ChainA\_5510MHz



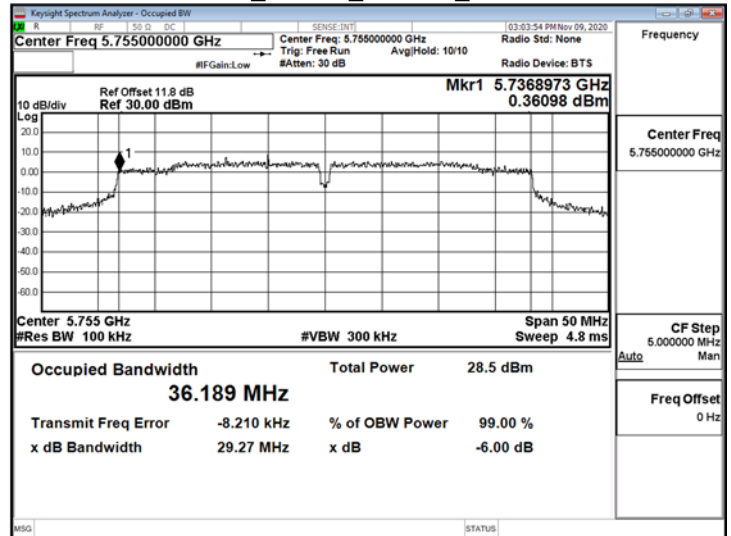
802.11n\_40MHz\_ChainA\_5710MHz



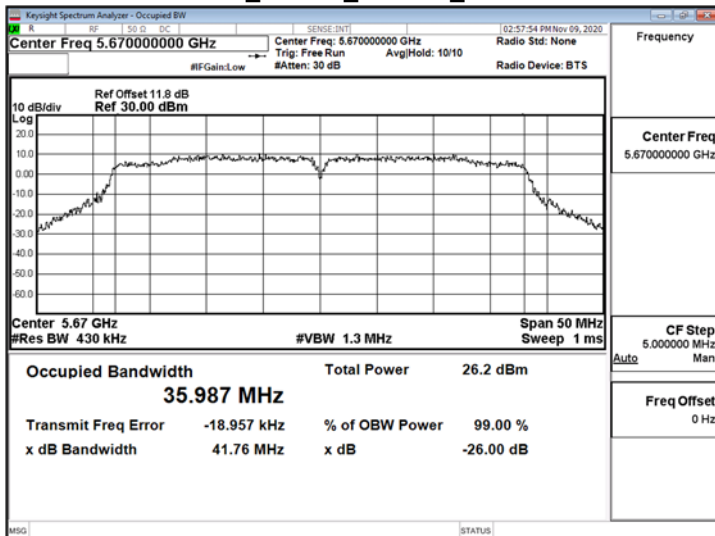
802.11n\_40MHz\_ChainA\_5550MHz



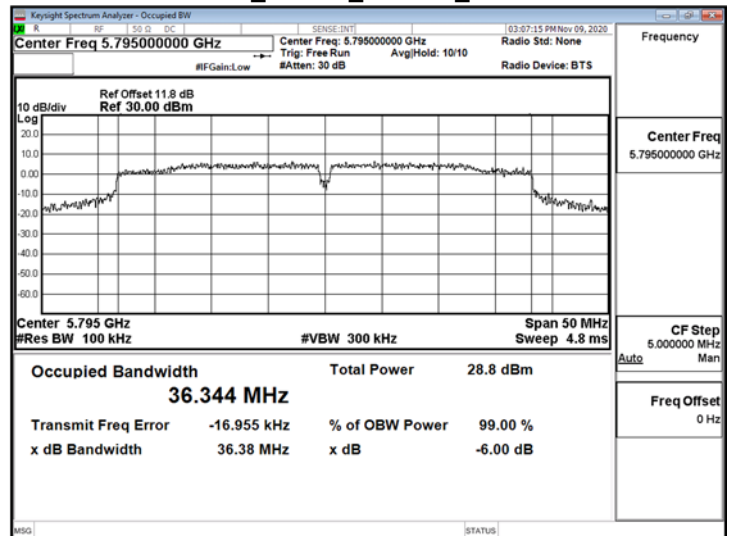
802.11n\_40MHz\_ChainA\_5755MHz



802.11n\_40MHz\_ChainA\_5670MHz



802.11n\_40MHz\_ChainA\_5795MHz



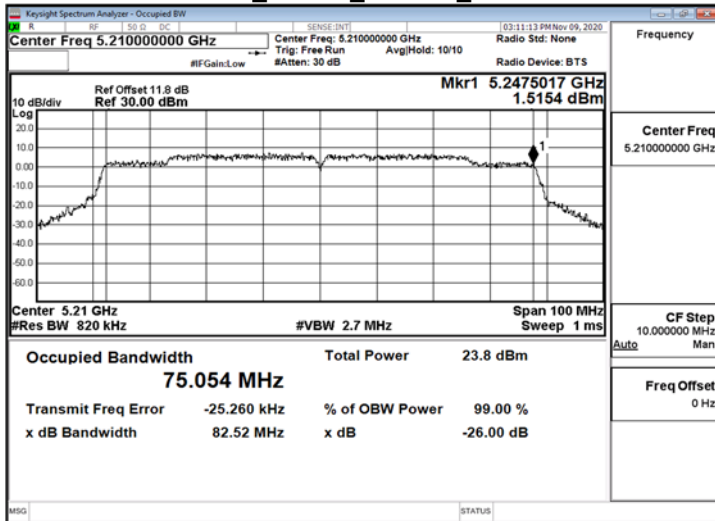
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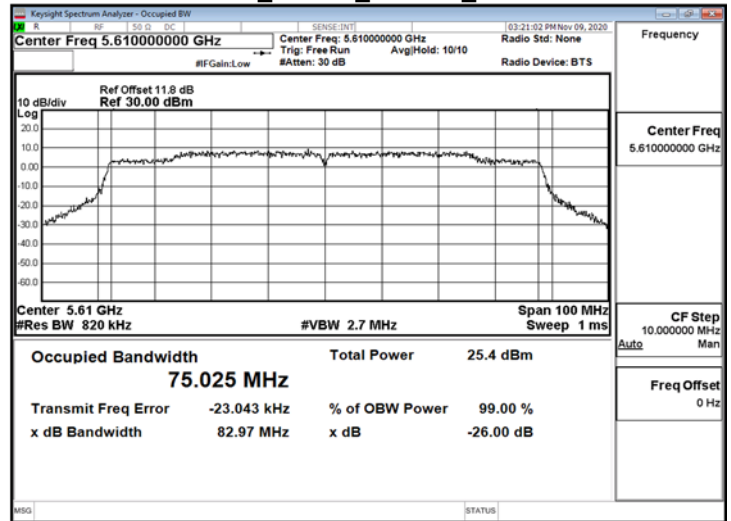
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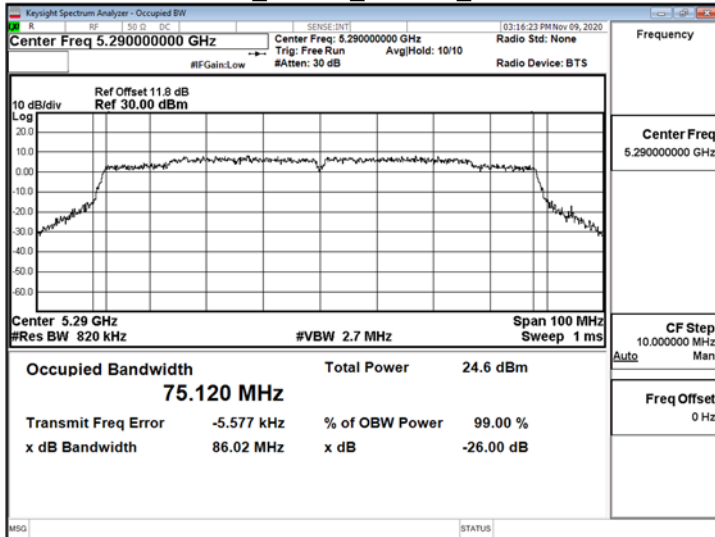
802.11ac\_80MHz\_ChainA\_5210MHz



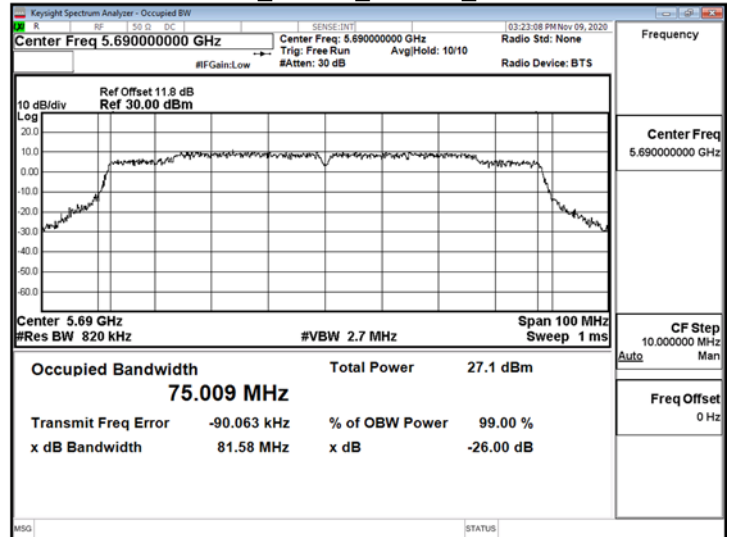
802.11ac\_80MHz\_ChainA\_5610MHz



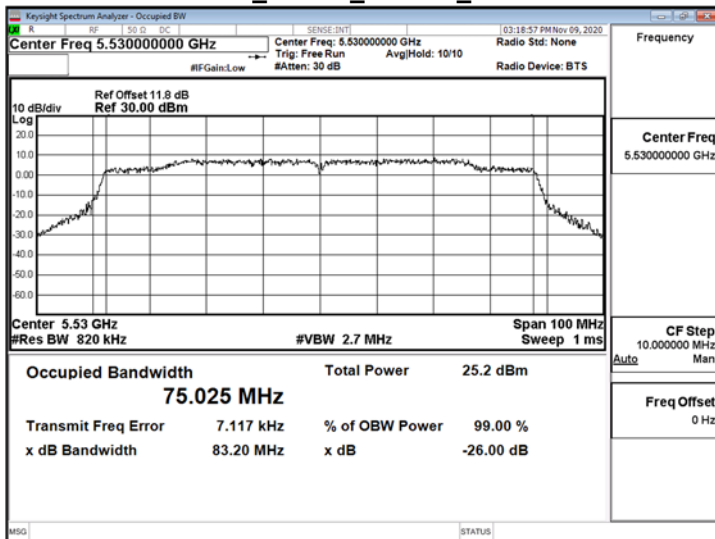
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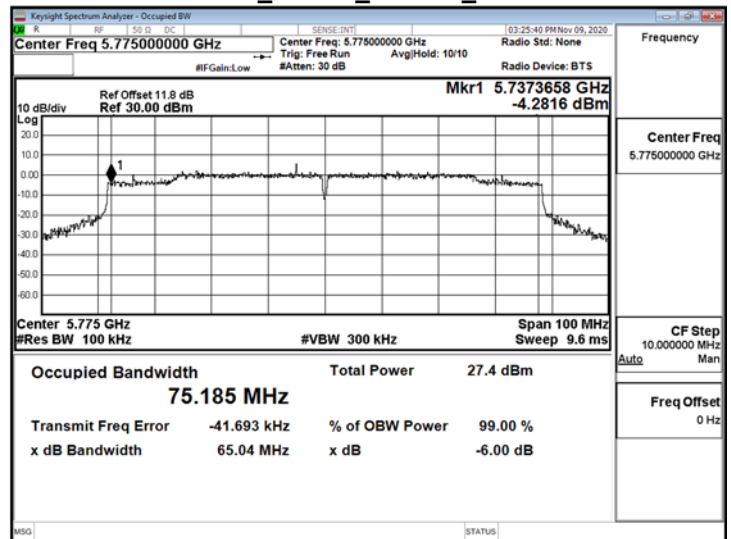
802.11ac\_80MHz\_ChainA\_5690MHz



802.11ac\_80MHz\_ChainA\_5530MHz



802.11ac\_80MHz\_ChainA\_5775MHz

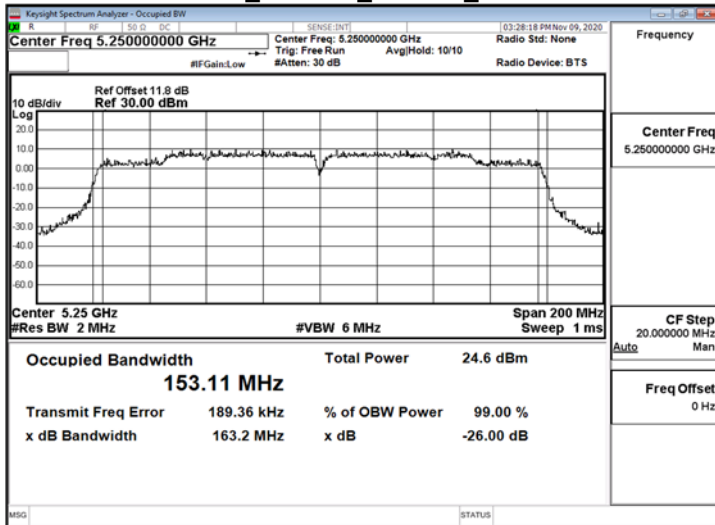


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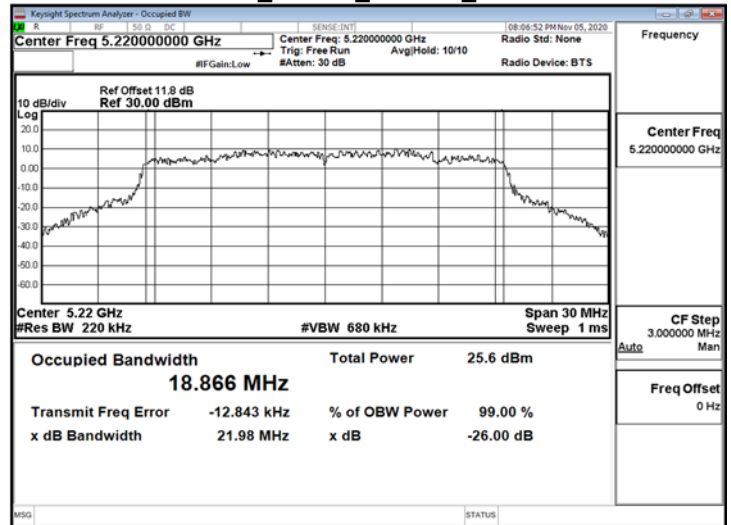
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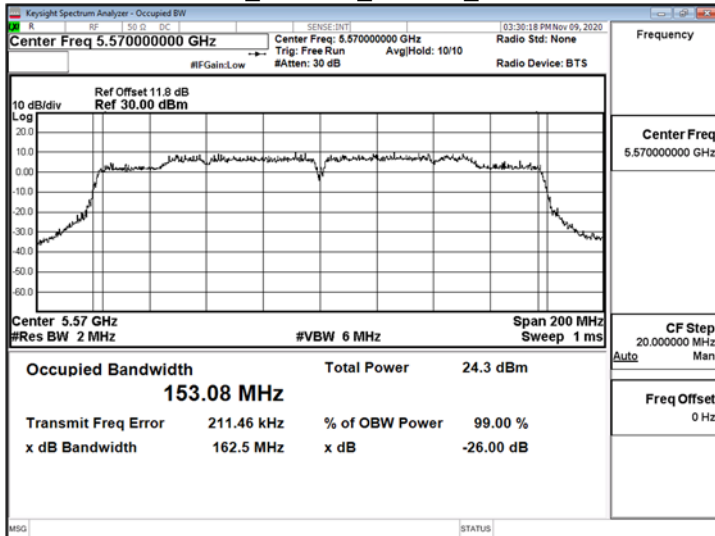
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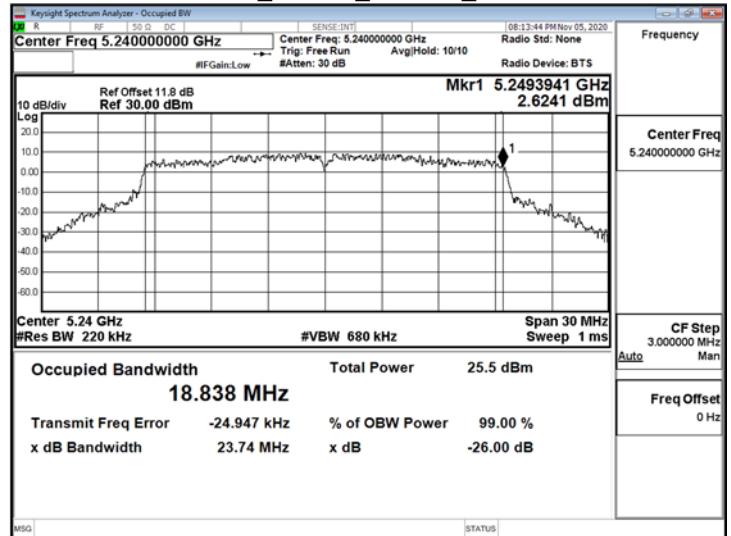
802.11ax\_20MHz\_ChainA\_5220MHz



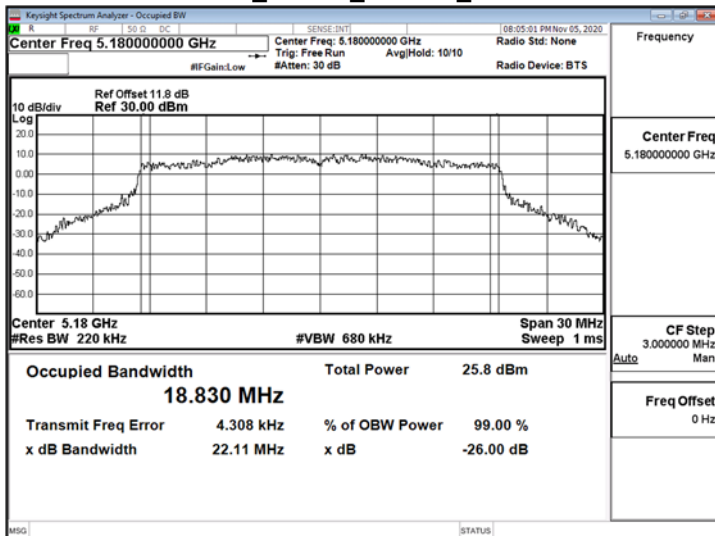
802.11ac\_160MHz\_ChainA\_5570MHz



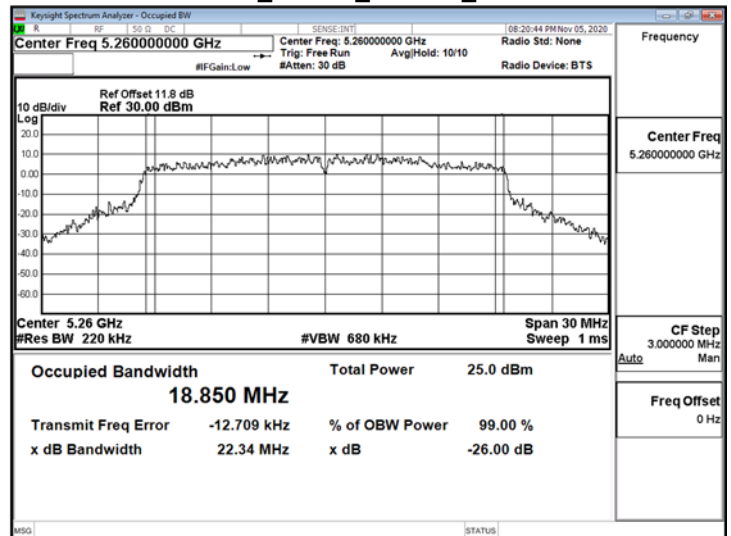
802.11ax\_20MHz\_ChainA\_5240MHz



802.11ax\_20MHz\_ChainA\_5180MHz



802.11ax\_20MHz\_ChainA\_5260MHz



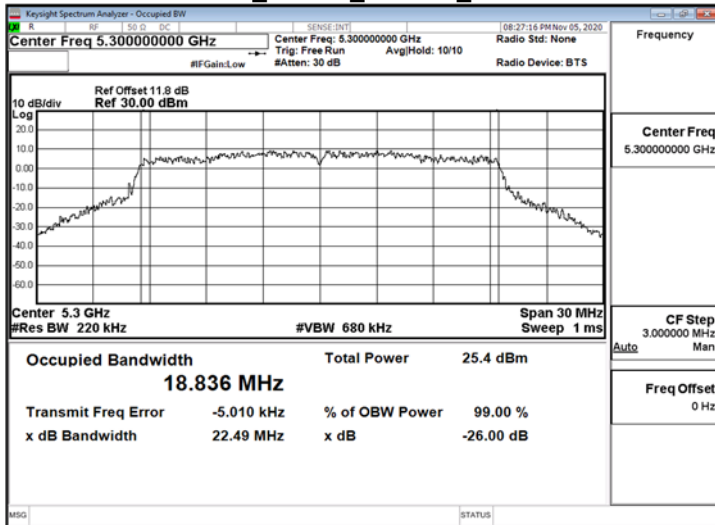
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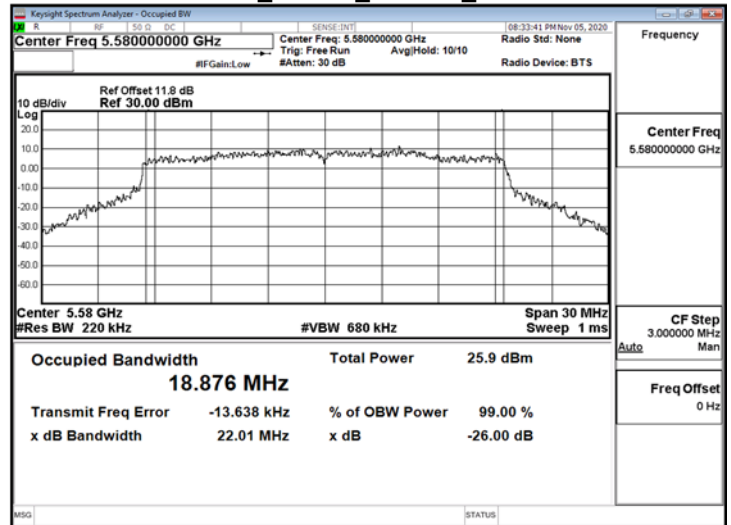
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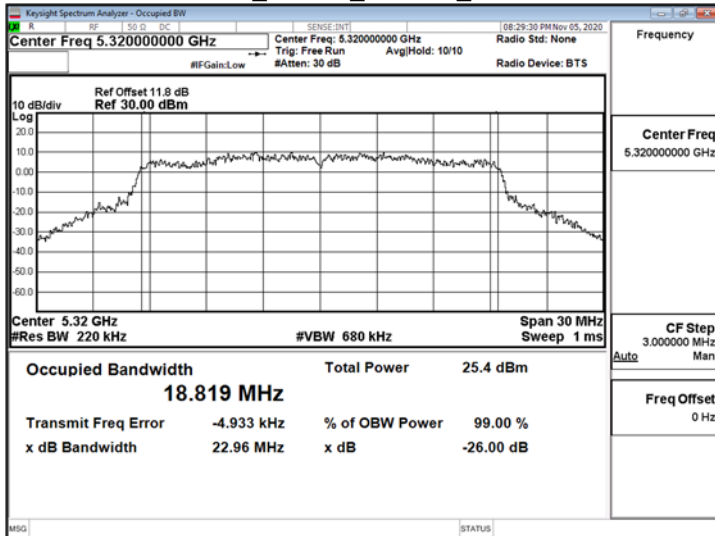
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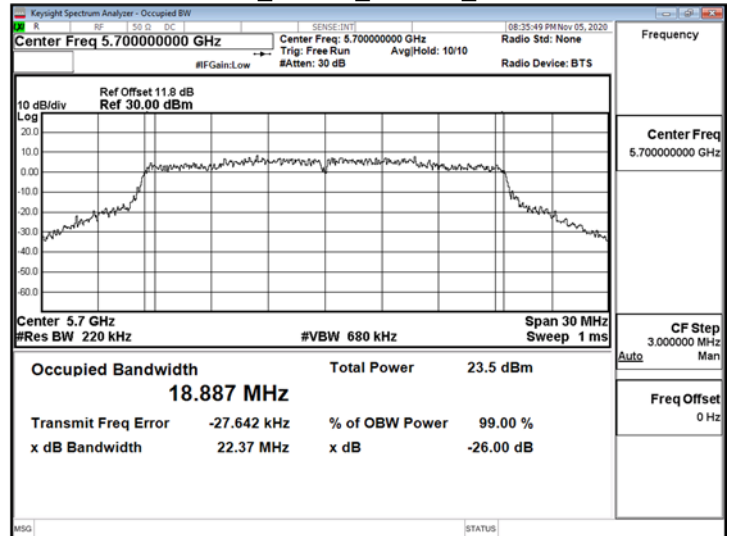
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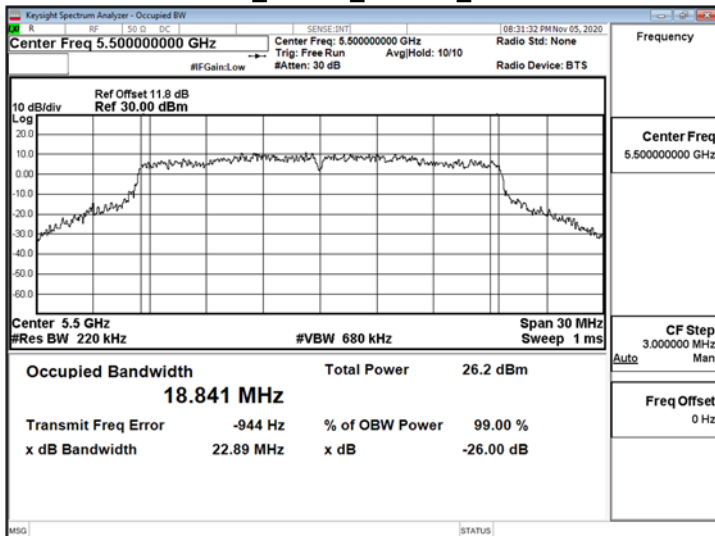
802.11ax\_20MHz\_ChainA\_5320MHz



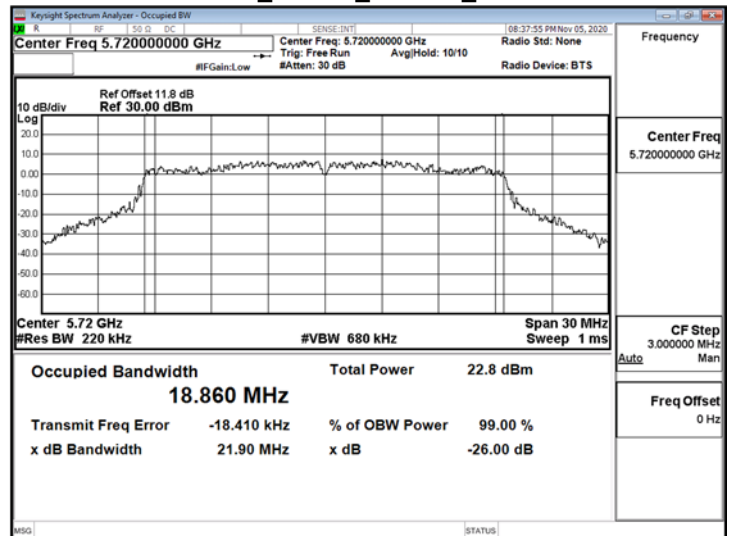
802.11ax\_20MHz\_ChainA\_5700MHz



802.11ax\_20MHz\_ChainA\_5500MHz



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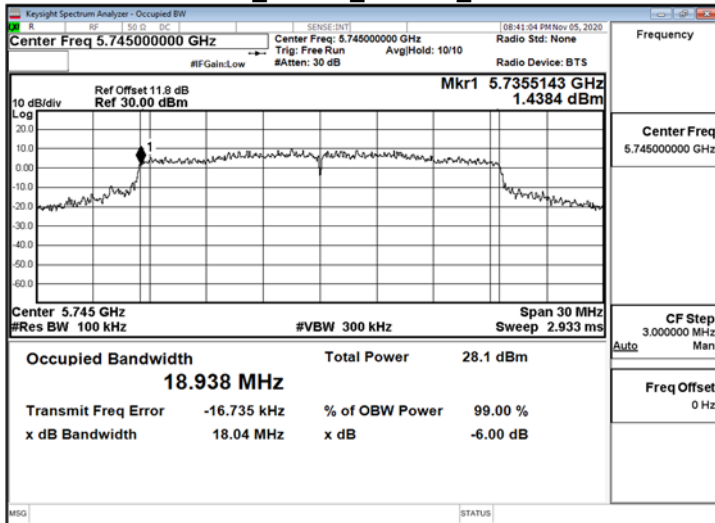


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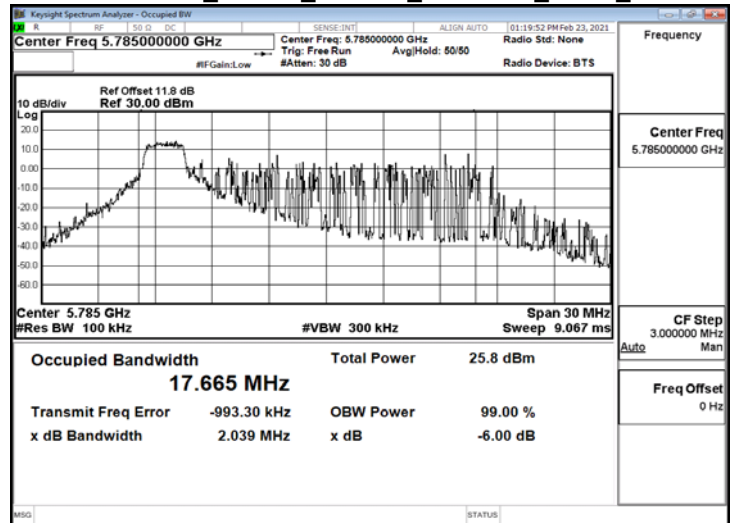
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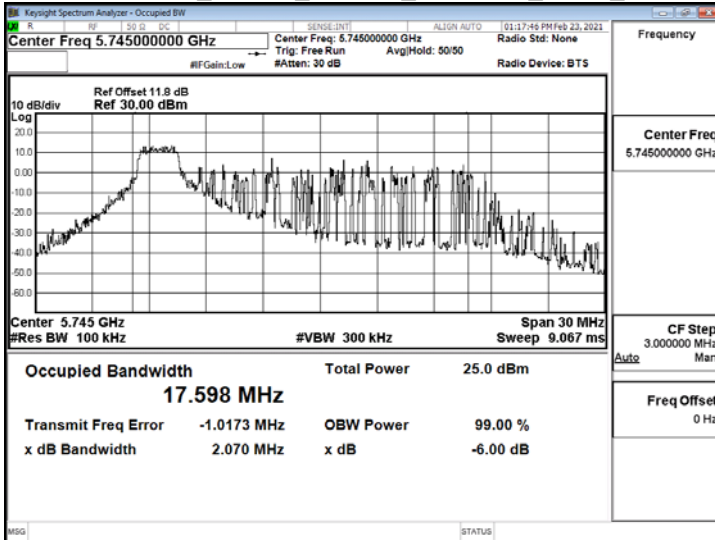
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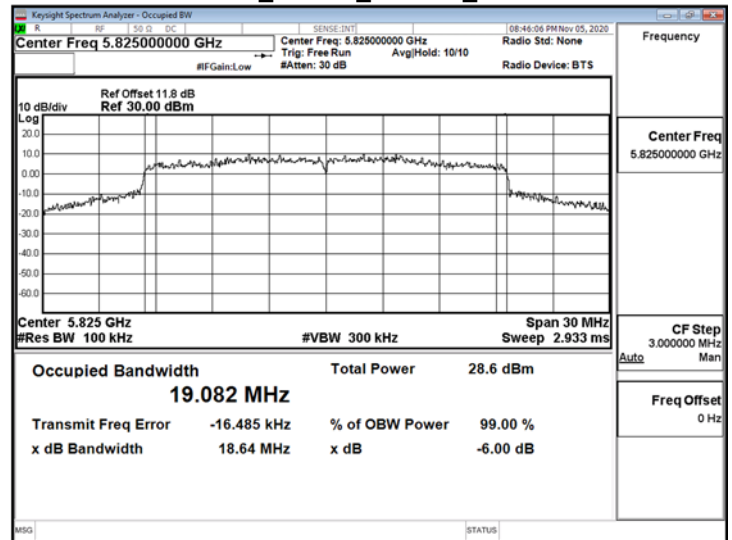
802.11ax\_20MHz\_ChainA\_5785MHz\_RU26\_0



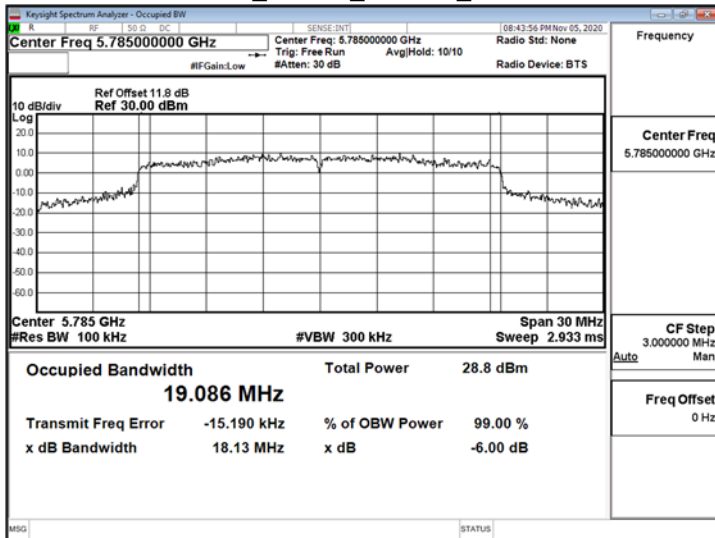
802.11ax\_20MHz\_ChainA\_5745MHz\_RU26\_0



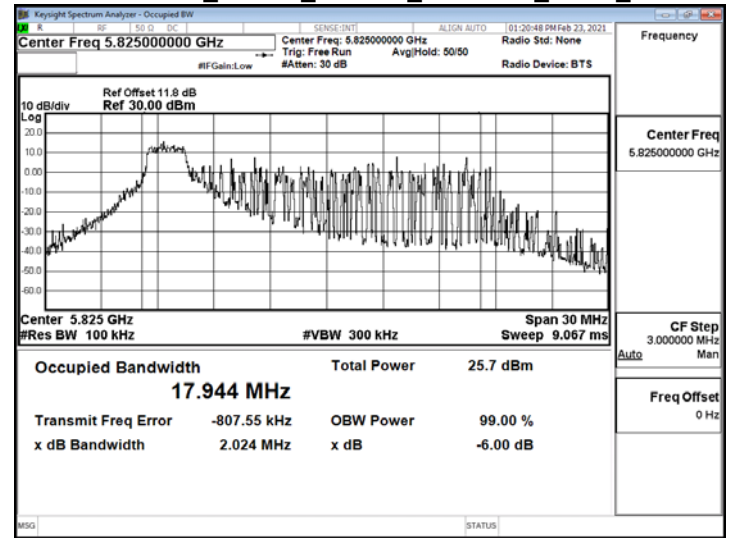
802.11ax\_20MHz\_ChainA\_5825MHz



802.11ax\_20MHz\_ChainA\_5785MHz



802.11ax\_20MHz\_ChainA\_5825MHz\_RU26\_0



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