

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT



Applicant: Axon Enterprise, Inc.
17800 N 85th St, Scottsdale, AZ 85255, United States

Product Name: Fleet Hub

Brand Name: Axon

Model No.: AX1033

Model Difference: N/A

Report Number: ER/2021/20085

FCC ID X4GS01405

FCC Rule Part: §15.407, Cat: U-NII

Issue Date: May 3, 2021

Date of Test: February 8, 2021 - April 6, 2021

Date of EUT Received: February 8, 2021

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:

Blue Yang / Asst. Manager

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Revision History

Report Number	Revision	Description	Issue Date	Revised By
ER/2021/20085	Rev.00	Original.	May 3, 2021	Susan Lin

Note:

- 1、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:	Fleet Hub
Brand Name:	Axon
Model No.:	AX1033
Model Difference:	N/A
Hardware Version:	X3
Firmware Version:	IG2.DVT.1.2
EUT Series No.:	X70322224
Power Supply:	12Vdc from Car battery

1.2 Modulation & Data Rate

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 – 173.4Mbps 802.11 ac_40MHz: 13.5 – 400Mbps 802.11 ac_80MHz: 29.3 – 866.7Mbps 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

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1.3 Antenna Designation

Antenna Type	Supplier	Antenna Part No.	Freq. (MHz)	Main Antenna Peak Gain (dBi)	Directional Gain of Beamforming (dBi)
PIFA	Airgain	AP-AXONF3-MMF-Q-MS-BL-15	5150~5250	0.5	3.50
			5250~5350	0.7	3.70
			5470~5725	N/A	N/A
			5725~5850	N/A	N/A
Dipole	Airgain	AP-AXONF3-GL-WWG-BL-3M	5150~5250	N/A	N/A
			5250~5350	N/A	N/A
			5470~5725	1.10	4.10
			5725~5850	1.30	4.10
Note: The N/A represents that the Antenna does not available in the specified frequency.					

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1.4 FCC

CDD

Wi-Fi 802.11	Frequency Range	Channels	Rated Power (Avg.) (dBm) (Worst case)	Modulation Technology
a	5150~5250	4	23.29	OFDM
	5250~5350	4	22.92	
	5470~5725	12	22.35	
	5725-5850	5	29.09	
n_HT/ ac_VHT 20M	5150~5250	4	HT: 23.15	OFDM
	5250~5350	4	HT: 23.11	
	5470~5725	12	HT: 22.70	
	5725-5850	5	HT: 28.95	
ax_HE 20M	5150~5250	4	23.50	OFDMA
	5250~5350	4	23.45	
	5470~5725	12	22.89	
	5725-5850	5	29.94	
n_HT/ ac_VHT 40M	5150~5250	2	HT: 23.28	OFDM
	5250~5350	2	HT: 23.52	
	5470~5725	5	HT: 23.47	
	5725-5850	2	HT: 28.09	
ax_HE 40M	5150~5250	2	23.40	OFDMA
	5250~5350	2	23.14	
	5470~5725	5	23.13	
	5725-5850	2	28.06	
ac_VHT 80M	5150~5250	1	22.71	OFDM
	5250~5350	1	21.05	
	5470~5725	2	23.32	
	5725-5850	1	23.55	
ax_HE 80M	5150~5250	1	22.10	OFDMA
	5250~5350	1	20.65	
	5470~5725	2	23.48	
	5725-5850	1	23.81	

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Beamforming

Wi-Fi 802.11	Frequency Range	Channels	Rated Power (Avg.) (dBm) (Worst case)	Modulation Technology
n_HT/ ac_VHT 20M	5150~5250	4	HT: 20.52	OFDM
	5250~5350	4	HT: 20.48	
	5470~5725	12	HT: 19.82	
	5725~5850	5	HT: 26.47	
ax_HE 20M	5150~5250	4	20.66	OFDMA
	5250~5350	4	20.66	
	5470~5725	12	19.93	
	5725~5850	5	27.53	
n_HT/ ac_VHT 40M	5150~5250	2	HT: 20.39	OFDM
	5250~5350	2	HT: 20.54	
	5470~5725	5	HT: 20.49	
	5725~5850	2	HT: 24.84	
ax_HE 40M	5150~5250	2	20.43	OFDMA
	5250~5350	2	20.28	
	5470~5725	5	20.20	
	5725~5850	2	24.84	
ac_VHT 80M	5150~5250	1	19.72	OFDM
	5250~5350	1	18.23	
	5470~5725	2	20.56	
	5725~5850	1	20.80	
ax_HE 80M	5150~5250	1	19.27	OFDMA
	5250~5350	1	17.94	
	5470~5725	2	20.53	
	5725~5850	1	20.74	

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1.5 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

1.6 Test Facility

Laboratory	Test Site Address	Test Site Name	FCC Designa- tion number	IC CAB identifier
SGS Taiwan Ltd. Central RF Lab. (TAF code 3702)	No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan.	SAC 1	TW0027	TW3702
		SAC 3		
		Conduction 1		
		Conducted 1		
		Conducted 2		
		Conducted 3		
		Conducted 4		
		Conducted 5		
		Conducted 6		
		No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333		
	SAC C			
	SAC D			
	SAC G			
	Conducted A			
	Conducted B			
	Conducted C			
	Conducted D			
	Conducted E			
	Conducted F			
	Conducted G			
Note: Test site name is remarked on the equipment list in each section of this report as an indica- tion where measurements occurred in specific test site and address.				

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1.7 Special Accessories

There are no special accessories used while test was conducted.

1.8 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.

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2.5 Configuration of Tested System

Fig. 2-1 Radiated Emission Configuration



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

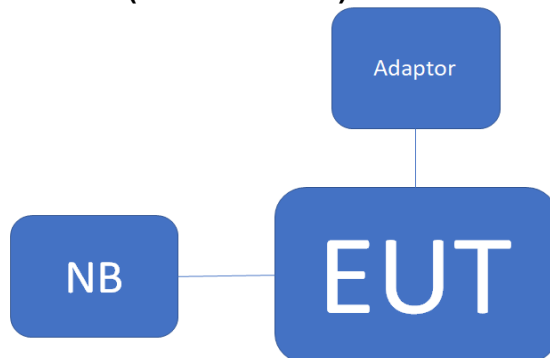


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	WLAN Test Software	N/A	N/A	N/A	N/A	N/A
2.	Notebook	Lenovo	L430	R9-XFG0X	N/A	N/A

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3 SUMMARY OF TEST RESULT

FCC Rules	Description Of Test	Result
§15.207	AC Power Line Conducted Emission	N/A
§15.407(e)	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
§15.203 §15.407(a)	Antenna Requirement	Compliant

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4 DESCRIPTION OF TEST MODES

4.1 Operating in U-NII Bands

Operated band in 5150 MHz ~5250 MHz:

20 M		40 M		80 M	
CH	Freq (MHz)	CH	Freq (MHz)	CH	Freq (MHz)
36	5180	38	5190	42	5210
40	5200	46	5230		
44	5220				
48	5240				

Operated band in 5250 MHz ~5350 MHz:

20 M		40 M		80 M	
CH	Freq (MHz)	CH	Freq (MHz)	CH	Freq (MHz)
52	5260	54	5270	58	5290
56	5280	62	5310		
60	5300				
64	5320				

Operated band in 5470 MHz ~5725 MHz:

20 M		40 M		80 M	
CH	Freq (MHz)	CH	Freq (MHz)	CH	Freq (MHz)
100	5500	102	5510	106	5530
104	5520	110	5550	122	5610
108	5540	118	5590	138	5690
112	5560	126	5630		
116	5580	134	5670		
120	5600	142	5710		
124	5620				
128	5640				
132	5660				
136	5680				
140	5700				
144	5720				

Operated band in 5745 MHz ~5850 MHz:

20 M		40 M		80 M	
CH	Freq (MHz)	CH	Freq (MHz)	CH	Freq (MHz)
149	5745	151	5755	155	5775
153	5765	159	5795		
157	5785				
161	5805				
165	5825				

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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
☒ 802.11 a	☒ Ch0	☒ Ch1	☐ Ch2	☐ Ch3	☒ 1TX	☒ 2TX
☒ 802.11 n	☒ Ch0	☒ Ch1	☐ Ch2	☐ Ch3	☒ SISO	☒ MIMO
☒ 802.11 ac	☒ Ch0	☒ Ch1	☐ Ch2	☐ Ch3	☒ SISO	☒ MIMO
☒ 802.11 ax	☒ Ch0	☒ Ch1	☐ Ch2	☐ Ch3	☒ SISO	☒ 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.

802.11ax	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:

CDD

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	2TX
	5260~5320	52 to 64	60			
	5500~5700	100 to 140	116			
	5745~5825	149 to 165	157			
802.11ax_HE80	5190~5230	42	42	OFDMA	MCS0	MIMO
	5270~5310	58	58			
	5530~5610	106 to 138	122			
	5775	155	155			

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	2TX
	5260~5320	52 to 64	52,60,64			
	5500~5700	100 to 140	100,116,140			
	5745~5825	149 to 165	149,157,165			
802.11n_HT20	5180~5240	36 to 48	36,44,48	OFDM	MCS8	MIMO
	5260~5320	52 to 64	52,60,64			
	5500~5700	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	OFDM	MCS8	MIMO
	5270~5310	54 to 62	54,62			
	5510~5670	102 to 142	102,110,134,142			
	5755~5795	151 to 159	151,159			
802.11ac_VHT80	5210	42	42	OFDM	MCS0	MIMO
	5290	58	58			
	5530~5610	106 to 138	106,122,138			
	5775	155	155			

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RADIATED EMISSION TEST (ABOVE 1 GHz)							
MODE	FRE- QUENCY BAND (MHz)	AVAILA- BLE CHANNEL	TESTED CHANNEL	MODULA- TION	RU CONFIGURA- TION	DATA RATE (Mbps)	AN- TENNA PORT
802.11ax_HE20	5180~5240	36 to 48	36,44,48	OFDMA	FULL RU 26/0,26/8 52/37,52/40 106/53,106/54	MCS0	MIMO
	5260~5320	52 to 64	52,60,64				
	5500~5700	100 to 144	100,116,140,144				
	5745~5825	149 to 165	149,157,165				
802.11ax_HE40	5190~5230	38 to 46	38,46	OFDMA	FULL RU 242/61,242/62	MCS0	MIMO
	5270~5310	54 to 62	54,62				
	5510~5670	102 to 142	102,110,134,142				
	5755~5795	151 to 159	151,159				
802.11ax_HE80	5210	42	42	OFDMA	FULL RU 484/65,484/66	MCS0	MIMO
	5290	58	58				
	5530~5610	106 to 138	106,122,138				
	5775	155	155				

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Beamforming

RADIATED EMISSION TEST (BELOW 1 GHz)						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11n_HT20	5180~5240	36 to 48	44	OFDM	MCS8	MIMO
	5260~5320	52 to 64	60			
	5500~5700	100 to 144	116			
	5745~5825	149 to 165	157			
802.11ax_HE80	5190~5230	42	42	OFDMA	MCS0	MIMO
	5270~5310	58	58			
	5530~5610	106 to 138	122			
	5775	155	155			

RADIATED EMISSION TEST (ABOVE 1 GHz)						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11n_HT20	5180~5240	36 to 48	36,44,48	OFDM	MCS8	MIMO
	5260~5320	52 to 64	52,60,64			
	5500~5700	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	OFDM	MCS8	MIMO
	5270~5310	54 to 62	54,62			
	5510~5670	102 to 142	102,110,134,142			
	5755~5795	151 to 159	151,159			
802.11ac_VHT80	5210	42	42	OFDM	MCS0	MIMO
	5290	58	58			
	5530~5610	106 to 138	106,122,138			
	5775	155	155			

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RADIATED EMISSION TEST (ABOVE 1 GHz)							
MODE	FRE- QUENCY BAND (MHz)	AVAILA- BLE CHANNEL	TESTED CHANNEL	MODULA- TION	RU CONFIGURA- TION	DATA RATE (Mbps)	AN- TENNA PORT
802.11ax_HE20	5180~5240	36 to 48	36,44,48	OFDMA	FULL RU 26/0,26/8 52/37,52/40 106/53,106/54	MCS0	MIMO
	5260~5320	52 to 64	52,60,64				
	5500~5700	100 to 144	100,116,140,144				
	5745~5825	149 to 165	149,157,165				
802.11ax_HE40	5190~5230	38 to 46	38,46	OFDMA	FULL RU 242/61,242/62	MCS0	MIMO
	5270~5310	54 to 62	54,62				
	5510~5670	102 to 142	102,110,134,142				
	5755~5795	151 to 159	151,159				
802.11ax_HE80	5210	42	42	OFDMA	FULL RU 484/65,484/66	MCS0	MIMO
	5290	58	58				
	5530~5610	106 to 138	106,122,138				
	5775	155	155				

Note:

The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for channel Low, Mid and High, the worst case H position was reported.

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4.2.2 ANTENNA PORT CONDUCTED MEASUREMENT:

CDD

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	2TX
	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	OFDM	MCS8	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	OFDM	MCS8	MIMO
	5270~5310	54 to 62	54,62			
	5510~5670	102 to 142	102,110,134,142			
	5755~5795	151 to 159	151,159			
802.11ac_VHT80	5210	42	42	OFDM	MCS0	MIMO
	5290	58	58			
	5530~5610	106 to 138	106,122,138			
	5775	155	155			

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	36,44,48	OFDMA	FULL RU 26/0,26/8 52/37,52/40 106/53,106/54	MCS0	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				
802.11ax_HE40	5190~5230	38 to 46	38,46	OFDMA	FULL RU 242/61,242/62	MCS0	MIMO
	5270~5310	54 to 62	54,62				
	5510~5670	102 to 142	102,110,134,142				
	5755~5795	151 to 159	151,159				
802.11ax_HE80	5210	42	42	OFDMA	FULL RU 484/65,484/66	MCS0	MIMO
	5290	58	58				
	5530~5610	106 to 138	106,122,138				
	5775	155	155				

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Beamforming

CONDUCTED TEST						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11n_HT20	5180~5240	36 to 48	36,44,48	OFDM	MCS8	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	OFDM	MCS8	MIMO
	5270~5310	54 to 62	54,62			
	5510~5670	102 to 142	102,110,134,142			
	5755~5795	151 to 159	151,159			
802.11ac_VHT80	5210	42	42	OFDM	MCS0	MIMO
	5290	58	58			
	5530~5610	106 to 138	106,122,138			
	5775	155	155			

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	36,44,48	OFDMA	FULL RU 26/0,26/8 52/37,52/40 106/53,106/54	MCS0	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				
802.11ax_HE40	5190~5230	38 to 46	38,46	OFDMA	FULL RU 242/61,242/62	MCS0	MIMO
	5270~5310	54 to 62	54,62				
	5510~5670	102 to 142	102,110,134,142				
	5755~5795	151 to 159	151,159				
802.11ax_HE80	5210	42	42	OFDMA	FULL RU 484/65,484/66	MCS0	MIMO
	5290	58	58				
	5530~5610	106 to 138	106,122,138				
	5775	155	155				

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5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.34 dB
26dB & 6dB Emission Bandwidth	+/- 1.54 Hz
The Maximum Output Power Measurement	+/- 1 dB
Peak Power Spectral Density Measurement	+/- 1.54 dB
Frequency Stability	+/- 1.54 Hz
Temperature	+/- 0.4 °C
Humidity	+/- 3.5 %
DC / AC Power Source	DC= +/- 1%, AC=+/- 1%

Radiated Spurious Emission Measurement Uncertainty			
Polarization: Vertical	+/- 2.64 dB	9kHz~30MHz: +/-2.3dB	
	+/- 4.93 dB	30MHz - 1000MHz: +/- 3.37dB	
	+/- 4.81 dB	1GHz - 18GHz: +/- 4.04dB	
	+/- 4.52 dB	18GHz - 40GHz: +/- 4.04dB	
Polarization: Horizontal	+/- 2.64 dB	9kHz~30MHz: +/-2.3dB	
	+/- 4.45 dB	30MHz - 1000MHz: +/- 4.22dB	
	+/- 4.81 dB	1GHz - 18GHz: +/- 4.08dB	
	+/- 4.52 dB	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(μV)	
	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
Note 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.		

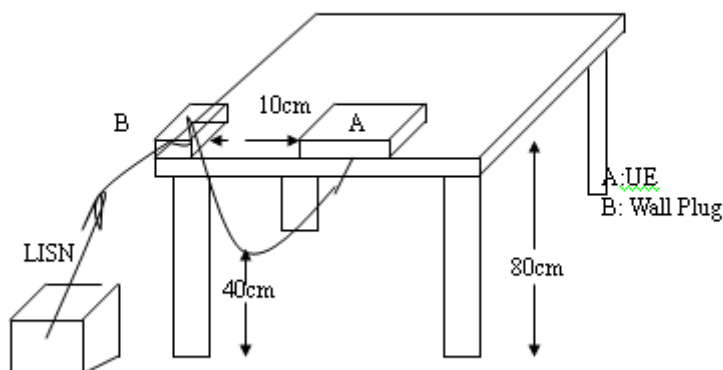
6.2 Measurement Equipment Used

N/A

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.

6.4 Test SET-UP



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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

N/A; Powered from Car battery.

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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:

Beamforming Mode

Mode	Duty Cycle (%) =Ton / (Ton+Toff)	Duty Factor (dB) =10*log (1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
802.11n_20	93.00	0.32	0.19	1.00
802.11ac_20	95.00	0.22	0.19	1.00
802.11n_40	93.00	0.32	0.19	1.00
802.11ac_40	95.00	0.22	0.19	1.00
802.11ac_80	91.00	0.41	0.19	1.00
802.11ax_20	95.00	0.22	0.19	1.00
802.11ax_40	95.00	0.22	0.19	1.00
802.11ax_80	95.00	0.22	0.19	1.00

✓ Duty Cycle Factor: $10 * \log(1/0.93) = 0.32$

✓ Duty Cycle Factor: $10 * \log(1/0.95) = 0.22$

✓ Duty Cycle Factor: $10 * \log(1/0.93) = 0.32$

✓ Duty Cycle Factor: $10 * \log(1/0.95) = 0.22$

✓ Duty Cycle Factor: $10 * \log(1/0.91) = 0.41$

✓ Duty Cycle Factor: $10 * \log(1/0.95) = 0.22$

✓ Duty Cycle Factor: $10 * \log(1/0.95) = 0.22$

✓ Duty Cycle Factor: $10 * \log(1/0.95) = 0.22$

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CDD Mode

Mode	Duty Cycle (%) =Ton / (Ton+Toff)	Duty Factor (dB) =10*log (1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
802.11a	93.25	0.30	0.65	1.00
802.11n_20	94.93	0.23	0.19	1.00
802.11ac_20	94.62	0.24	0.19	1.00
802.11n_40	93.09	0.31	0.19	1.00
802.11ac_40	91.66	0.38	0.19	1.00
802.11ac_80	93.26	0.30	0.19	1.00
802.11ax_20	95.57	0.20	0.19	1.00
802.11ax_40	94.81	0.23	0.19	1.00
802.11ax_80	94.98	0.22	0.19	1.00

Duty Cycle Factor: $10 * \log(1/0.9325) = 0.3$
 Duty Cycle Factor: $10 * \log(1/0.9493) = 0.23$
 Duty Cycle Factor: $10 * \log(1/0.9462) = 0.24$
 Duty Cycle Factor: $10 * \log(1/0.9309) = 0.31$
 Duty Cycle Factor: $10 * \log(1/0.9166) = 0.38$
 Duty Cycle Factor: $10 * \log(1/0.9326) = 0.3$
 Duty Cycle Factor: $10 * \log(1/0.9557) = 0.2$
 Duty Cycle Factor: $10 * \log(1/0.9481) = 0.23$
 Duty Cycle Factor: $10 * \log(1/0.9498) = 0.22$

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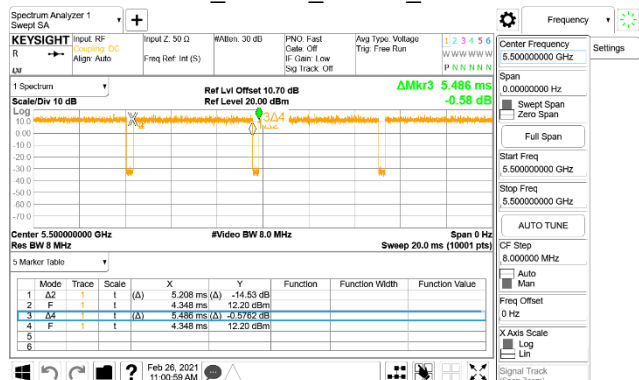
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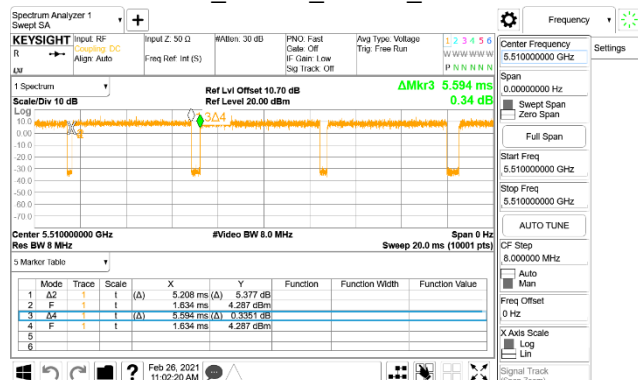
7.2 DUTY CYCLE TEST SIGNAL MEASUREMENT RESULT

Beamforming Mode

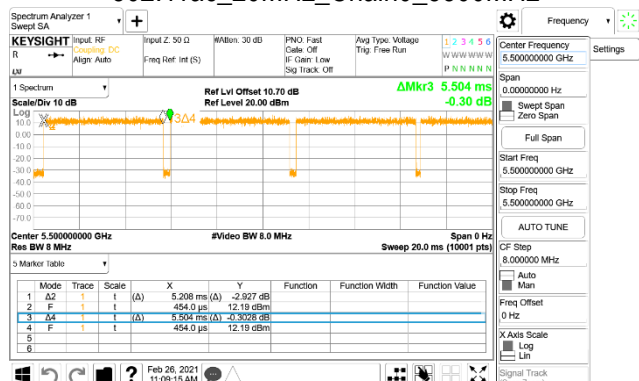
802.11n_20MHz_Chain0_5500MHz



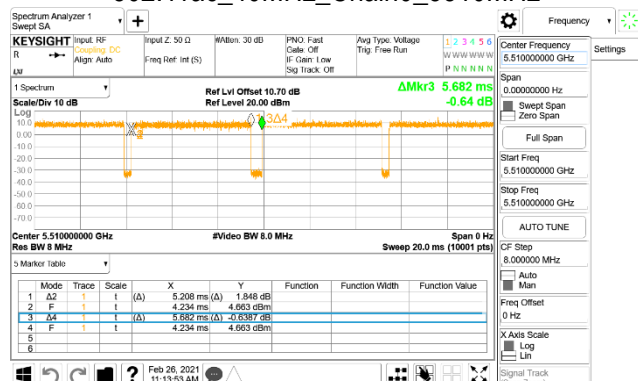
802.11n_40MHz_Chain0_5510MHz



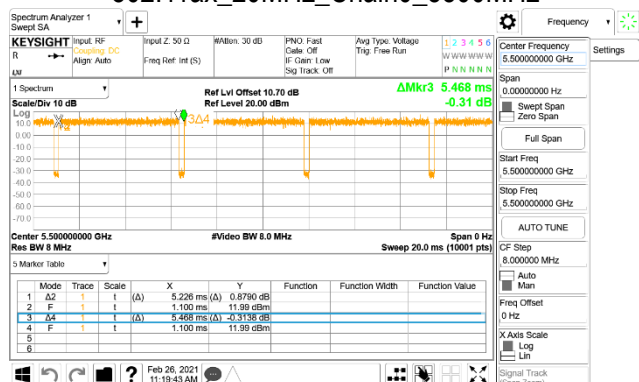
802.11ac_20MHz_Chain0_5500MHz



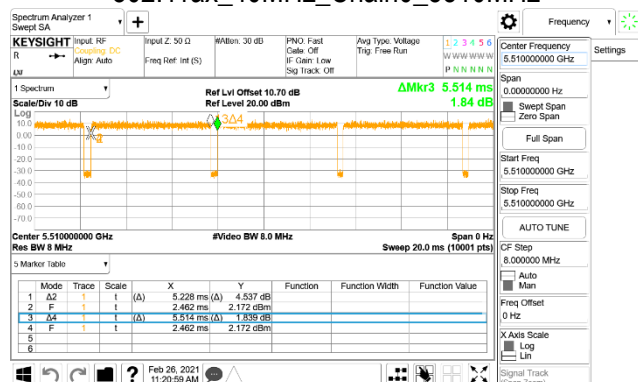
802.11ac_40MHz_Chain0_5510MHz



802.11ax_20MHz_Chain0_5500MHz



802.11ax_40MHz_Chain0_5510MHz

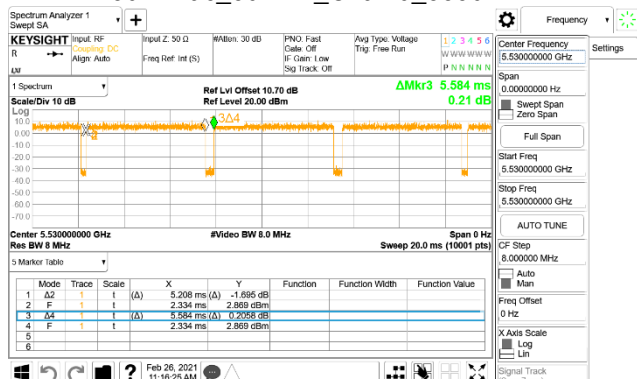


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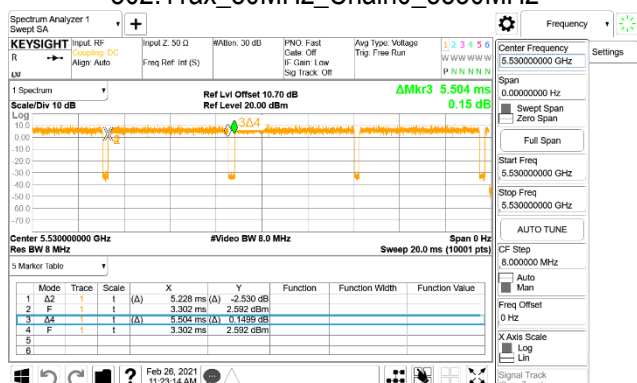
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802.11ac_80MHz_Chain0_5530MHz



802.11ax_80MHz_Chain0_5530MHz



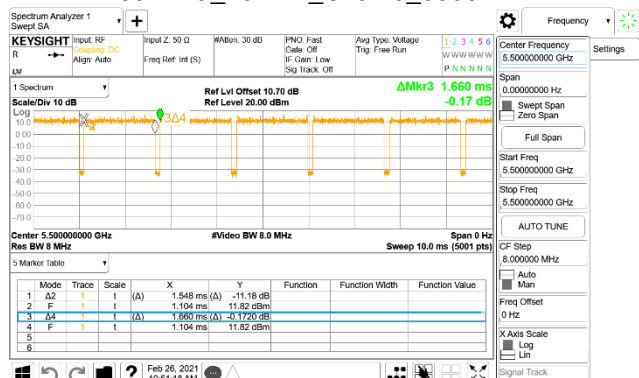
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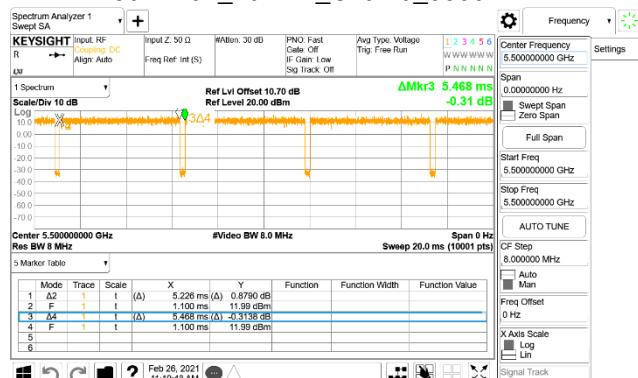
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CDD Mode

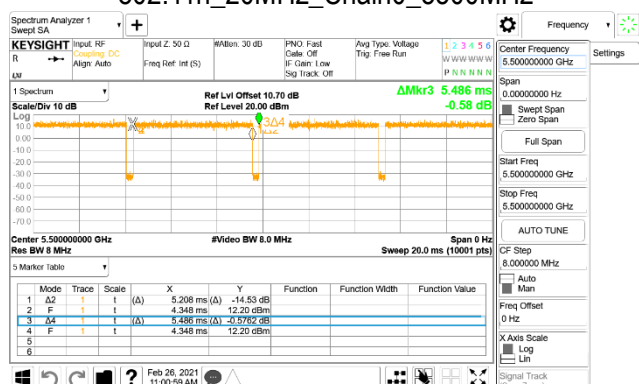
802.11a_20MHz_Chain0_5500MHz



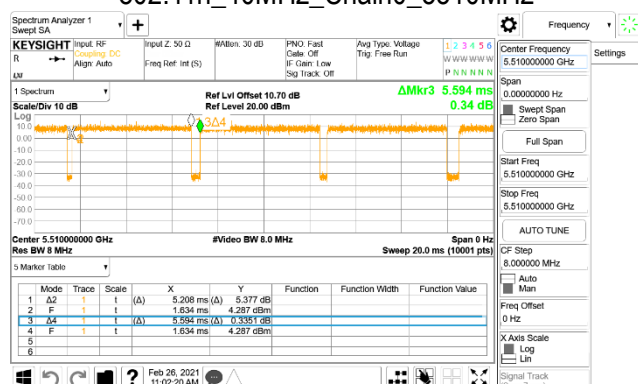
802.11ax_20MHz_Chain0_5500MHz



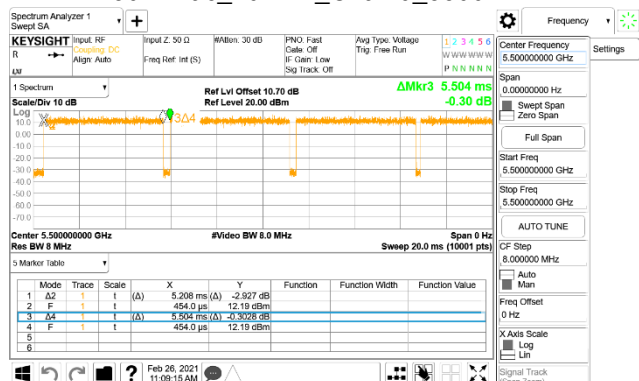
802.11n_20MHz_Chain0_5500MHz



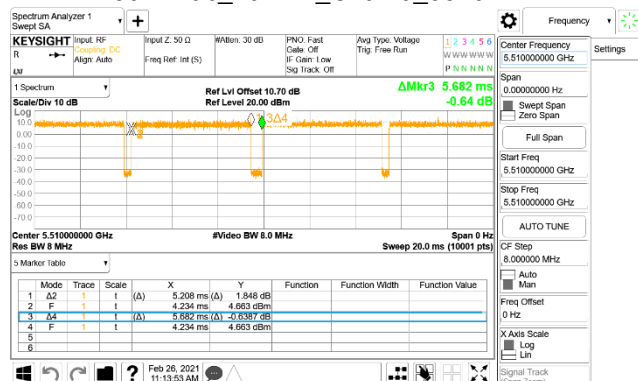
802.11n_40MHz_Chain0_5510MHz



802.11ac_20MHz_Chain0_5500MHz



802.11ac_40MHz_Chain0_5510MHz

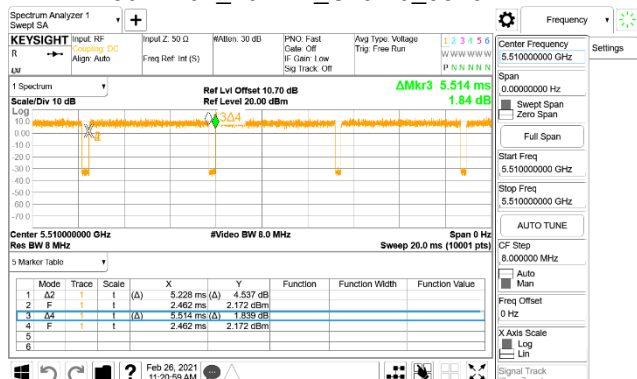


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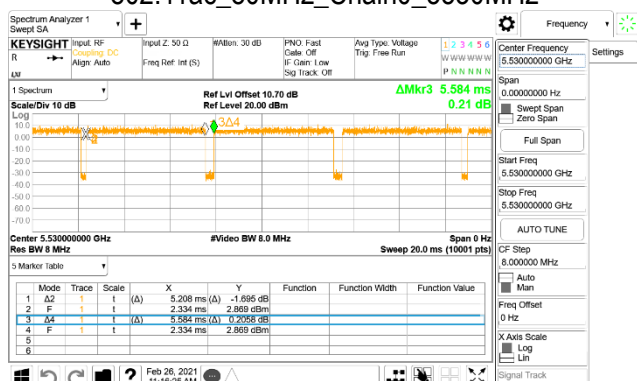
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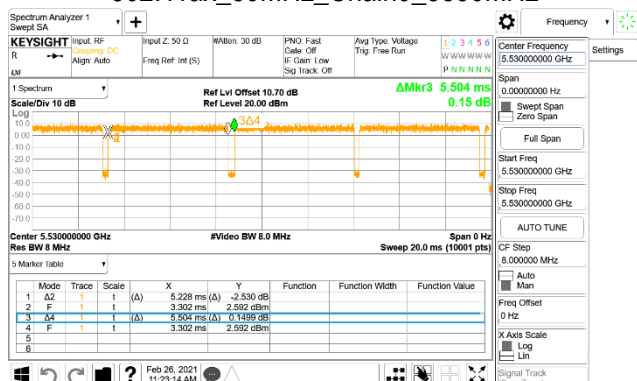
802.11ax_40MHz_Chain0_5510MHz



802.11ac_80MHz_Chain0_5530MHz



802.11ax_80MHz_Chain0_5530MHz



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8 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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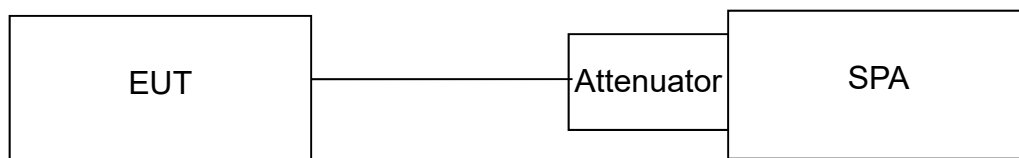
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8.3 Measurement Equipment Used

Conducted Emission Test Site: Conducted 2					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EXA Spectrum Analyzer	KEYSIGHT	N9010B	MY60240503	12/11/2020	12/10/2021
Attenuator	Mini-Circuit	BW-S10W2+	2	12/16/2020	12/15/2021
DC Block	Mini-Circuits	BLK-18-S+	1	12/16/2020	12/15/2021

8.4 Test Set-up



8.5 Beamforming Mode Measurement Result

8.5.1 FCC 26dB Bandwidth

802.11n_HT20_Ch0

802.11n_HT20_Ch1

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)	Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	20.14	13.040	5180	19.89	12.990
5220	20.26	13.070	5220	20.12	13.040
5240	19.95	13.000	5240	19.82	12.970
5260	20.11	13.030	5260	19.79	12.960
5300	20.13	13.040	5300	20.23	13.060
5320	20.00	13.010	5320	19.92	12.990
5500	20.45	13.110	5500	19.66	12.940
5580	19.88	12.980	5580	19.61	12.920
5700	20.32	13.080	5700	19.83	12.970
5720(U-NII 2C)	15.02	11.770	5720(U-NII 2C)	14.94	11.740
5720(U-NII 3)	5.02	7.010	5720(U-NII 3)	4.94	6.930

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802.11ax_20_Ch0

Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)
5180	full	20.66	13.150
5220	full	20.99	13.220
5240	full	20.94	13.210
5260	full	21.25	13.270
5300	full	20.92	13.210
5320	full	21.02	13.230
5500	full	20.67	13.150
5580	full	20.82	13.180
5700	full	21.28	13.280
5720(U-NII 2C)	full	15.65	11.950
5720(U-NII 3)	full	5.65	7.520

802.11ax_20_Ch1

Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)
5180	full	20.50	13.120
5220	full	21.14	13.250
5240	full	20.64	13.150
5260	full	20.55	13.130
5300	full	20.87	13.200
5320	full	21.21	13.270
5500	full	20.72	13.160
5580	full	20.70	13.160
5700	full	20.97	13.220
5720(U-NII 2C)	full	15.27	11.840
5720(U-NII 3)	full	5.27	7.220

802.11n_HT40_Ch0

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	39.82	16.000
5230	39.42	15.960
5270	39.90	16.010
5310	40.12	16.030
5510	39.79	16.000
5550	39.52	15.970
5670	39.88	16.010
5710(U-NII 2C)	35.17	15.460
5710(U-NII 3)	5.17	7.130

802.11n_HT40_Ch1

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	39.20	15.930
5230	39.00	15.910
5270	39.07	15.920
5310	38.98	15.910
5510	39.01	15.910
5550	39.23	15.940
5670	39.30	15.940
5710(U-NII 2C)	34.68	15.400
5710(U-NII 3)	4.68	6.700

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802.11ax _40_Ch0

Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)
5190	full	40.41	16.060
5230	full	40.41	16.060
5270	full	40.51	16.080
5310	full	40.32	16.060
5510	full	39.84	16.000
5550	full	40.24	16.050
5670	full	40.31	16.050
5710(U-NII 2C)	full	35.19	15.460
5710(U-NII 3)	full	5.19	7.150

802.11ax _40_Ch1

Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)
5190	full	40.22	16.040
5230	full	40.59	16.080
5270	full	40.19	16.040
5310	full	40.29	16.050
5510	full	40.39	16.060
5550	full	40.30	16.050
5670	full	40.58	16.080
5710(U-NII 2C)	full	35.03	15.450
5710(U-NII 3)	full	5.03	7.020

802.11ac _VHT80_Ch0

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5210	80.85	19.080
5290	81.91	19.130
5530	81.52	19.110
5610	80.90	19.080
5690(U-NII 2C)	75.48	18.780
5690(U-NII 3)	5.48	7.390

802.11ac _VHT80_Ch1

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5210	81.38	19.110
5290	80.70	19.070
5530	79.79	19.020
5610	80.92	19.080
5690(U-NII 2C)	75.32	18.770
5690(U-NII 3)	5.32	7.260

802.11ax _80_Ch0

Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)
5210	full	81.63	19.120
5290	full	81.13	19.090
5530	full	80.89	19.080
5610	full	81.01	19.090
5690(U-NII 2C)	full	75.32	18.770
5690(U-NII 3)	full	5.32	7.260

802.11ax _80_Ch1

Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)
5210	full	81.56	19.110
5290	full	81.64	19.120
5530	full	81.22	19.100
5610	full	80.98	19.080
5690(U-NII 2C)	full	75.81	18.800
5690(U-NII 3)	full	5.81	7.650

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

802.11n_HT20_Ch0

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)	Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	17.62	12.460	5745	17.55	12.440
5785	17.62	12.460	5785	17.20	12.360
5825	16.93	12.290	5825	17.58	12.450

802.11n_HT20_Ch1

802.11ax_20_Ch0

Freq. (MHz)	RU config	6dB BW (MHz)	10 Log (B) (dB)	Freq. (MHz)	RU config	6dB BW (MHz)	10 Log (B) (dB)
5745	full	15.09	11.790	5745	full	17.34	12.390
5785	full	19.01	12.790	5785	full	17.42	12.410
5825	full	17.00	12.300	5825	full	19.08	12.810

802.11ax_20_Ch1

802.11n_HT40_Ch0

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)	Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5755	32.82	15.160	5755	35.12	15.460
5795	36.31	15.600	5795	36.38	15.610

802.11n_HT40_Ch1

802.11ax_40_Ch0

Freq. (MHz)	RU config	6dB BW (MHz)	10 Log (B) (dB)	Freq. (MHz)	RU config	6dB BW (MHz)	10 Log (B) (dB)
5755	full	37.07	15.690	5755	full	37.48	15.740
5795	full	36.73	15.650	5795	full	37.69	15.760

802.11ax_40_Ch1

802.11ac_VHT80_Ch0

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)	Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5775	74.16	18.700	5775	70.78	18.500

802.11ac_VHT80_Ch1

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802.11ax _80_Ch0

Freq. (MHz)	RU config	6dB BW (MHz)	10 Log (B) (dB)
5775	full	75.76	18.790

802.11ax _80_Ch1

Freq. (MHz)	RU config	6dB BW (MHz)	10 Log (B) (dB)
5775	full	75.56	18.780

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8.5.3 BW Verification for DFS Function

802.11n_HT20_Ch0

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5240	5248.78	< 5250
5745	5736.18	> 5725

802.11n_HT20_Ch1

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5240	5248.78	< 5250
5745	5736.19	> 5725

802.11ax_20_Ch0

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5240	5249.45	< 5250
5745	5735.48	> 5725

802.11ax_20_Ch1

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5240	5249.47	< 5250
5745	5735.50	> 5725

802.11n_HT40_Ch0

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5230	5247.99	< 5250
5755	5736.95	> 5725

802.11n_HT40_Ch1

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5230	5247.97	< 5250
5755	5736.91	> 5725

802.11ax_40_Ch0

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5230	5248.87	< 5250
5755	5736.21	> 5725

802.11ax_40_Ch1

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5230	5248.82	< 5250
5755	5736.09	> 5725

802.11ac_VHT80_Ch0

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5210	5247.69	< 5250
5775	5737.20	> 5725

802.11ac_VHT80_Ch1

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5210	5247.65	< 5250
5775	5737.28	> 5725

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802.11ax_VHT80_Ch0

802.11ax_VHT80_Ch1

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)	Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5210	5248.51	< 5250	5210	5248.45	< 5250
5775	5736.58	> 5725	5775	5736.38	> 5725

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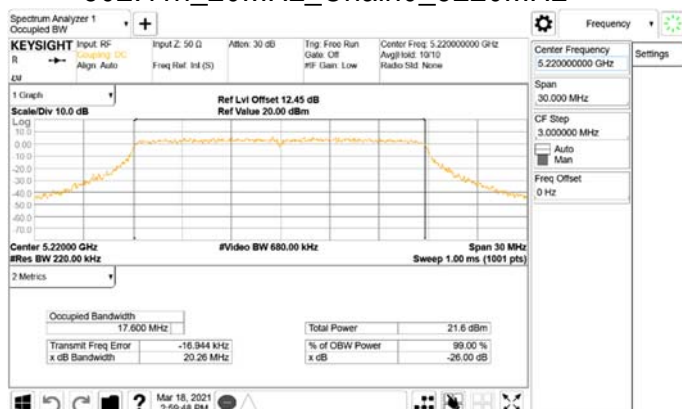
802.11n_20MHz_Chain0_5180MHz



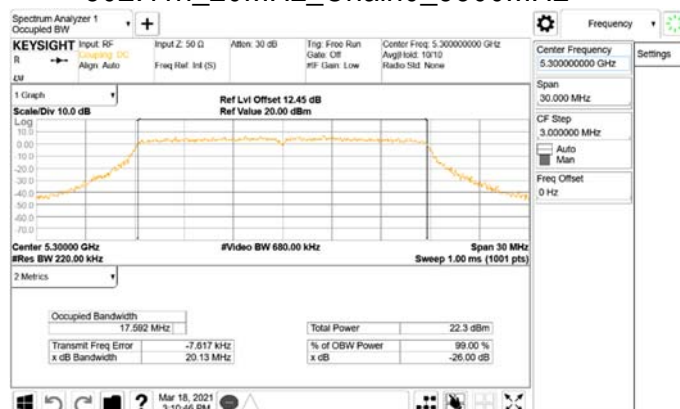
802.11n_20MHz_Chain0_5260MHz



802.11n_20MHz_Chain0_5220MHz



802.11n_20MHz_Chain0_5300MHz



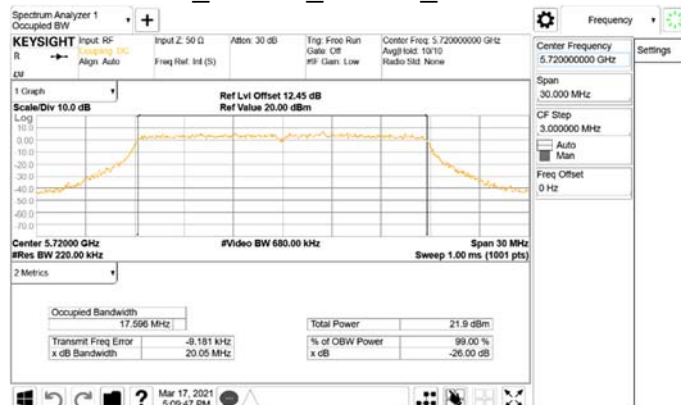
802.11n_20MHz_Chain0_5240MHz



802.11n_20MHz_Chain0_5500MHz



802.11n_20MHz_Chain0_5720MHz



802.11n_20MHz_Chain0_5580MHz



802.11n_20MHz_Chain0_5745MHz



802.11n_20MHz_Chain0_5825MHz



802.11n_20MHz_Chain1_5240MHz



802.11n_20MHz_Chain1_5180MHz



802.11n_20MHz_Chain1_5260MHz



802.11n_20MHz_Chain1_5220MHz



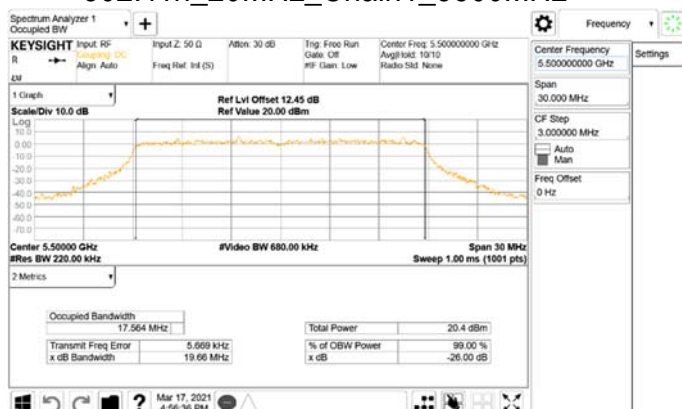
802.11n_20MHz_Chain1_5320MHz



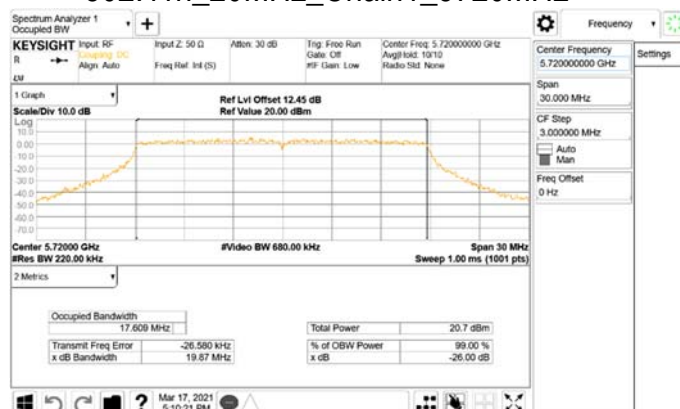
802.11n_20MHz_Chain1_5700MHz



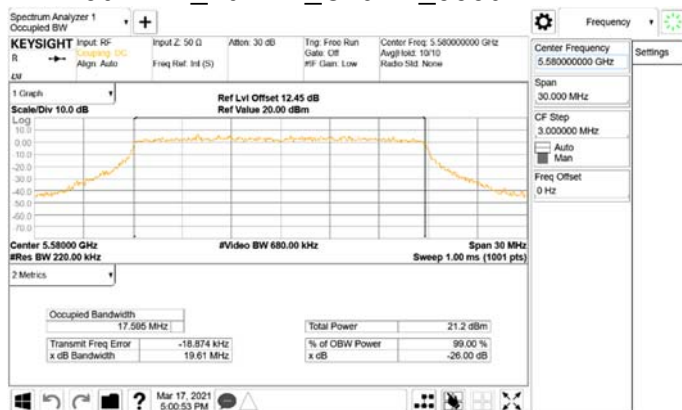
802.11n_20MHz_Chain1_5500MHz



802.11n_20MHz_Chain1_5720MHz



802.11n_20MHz_Chain1_5580MHz



802.11n_20MHz_Chain1_5745MHz



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802.11n_20MHz_Chain1_5785MHz



802.11n_40MHz_Chain0_5230MHz



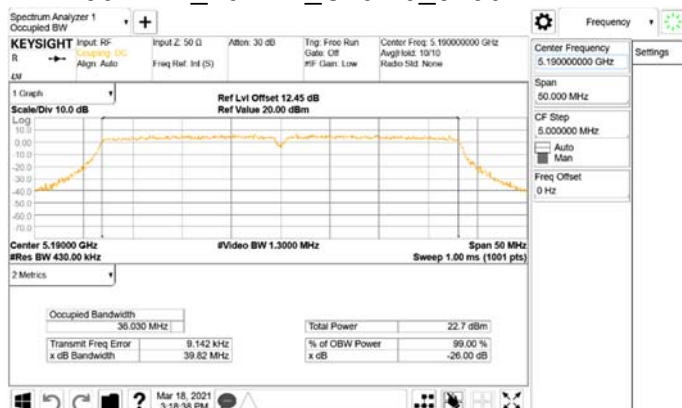
802.11n_20MHz_Chain1_5825MHz



802.11n_40MHz_Chain0_5270MHz



802.11n_40MHz_Chain0_5190MHz



802.11n_40MHz_Chain0_5310MHz



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802.11n_40MHz_Chain0_5510MHz



802.11n_40MHz_Chain0_5710MHz



802.11n_40MHz_Chain0_5550MHz



802.11n_40MHz_Chain0_5755MHz



802.11n_40MHz_Chain0_5670MHz



802.11n_40MHz_Chain0_5795MHz



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802.11n_40MHz_Chain1_5190MHz



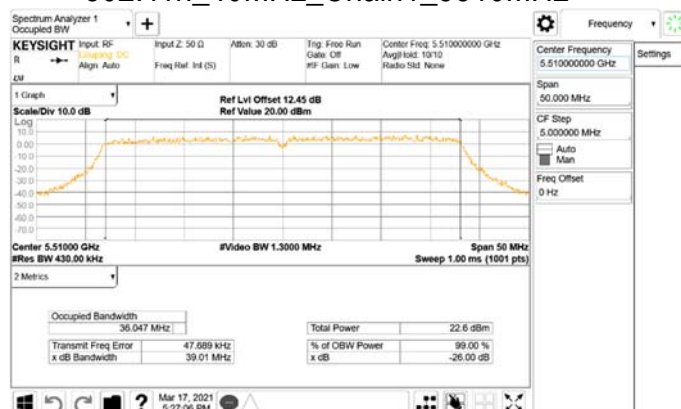
802.11n_40MHz_Chain1_5310MHz



802.11n_40MHz_Chain1_5230MHz



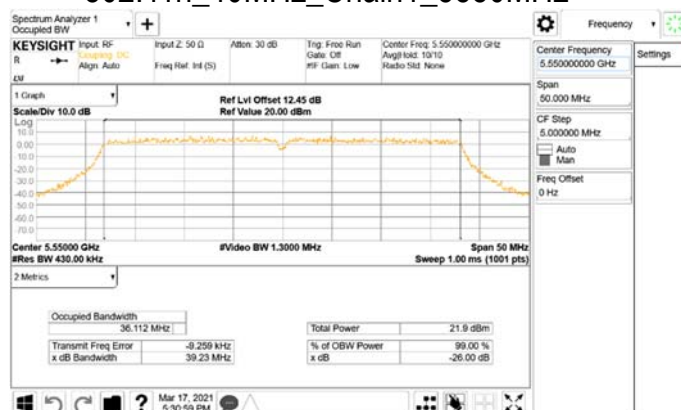
802.11n_40MHz_Chain1_5510MHz



802.11n_40MHz_Chain1_5270MHz



802.11n_40MHz_Chain1_5550MHz



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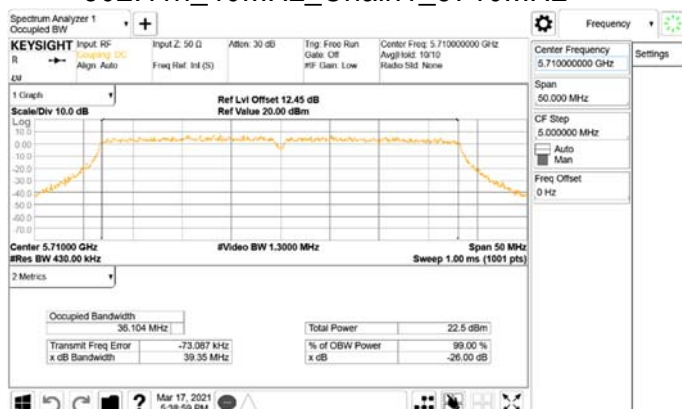
802.11n_40MHz_Chain1_5670MHz



802.11n_40MHz_Chain1_5795MHz



802.11n_40MHz_Chain1_5710MHz



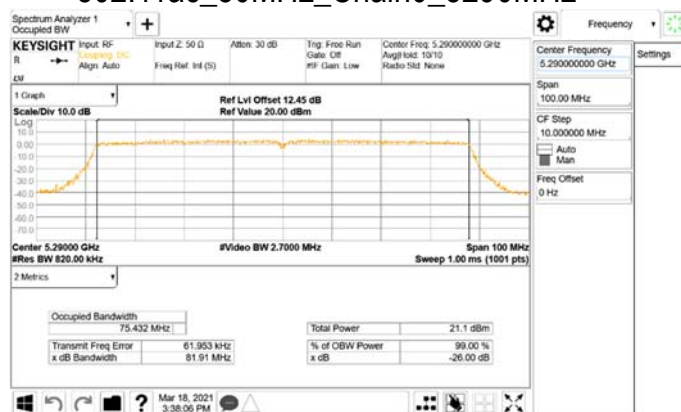
802.11ac_80MHz_Chain0_5210MHz



802.11n_40MHz_Chain1_5755MHz



802.11ac_80MHz_Chain0_5290MHz



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802.11ac_80MHz_Chain0_5530MHz



802.11ac_80MHz_Chain0_5775MHz



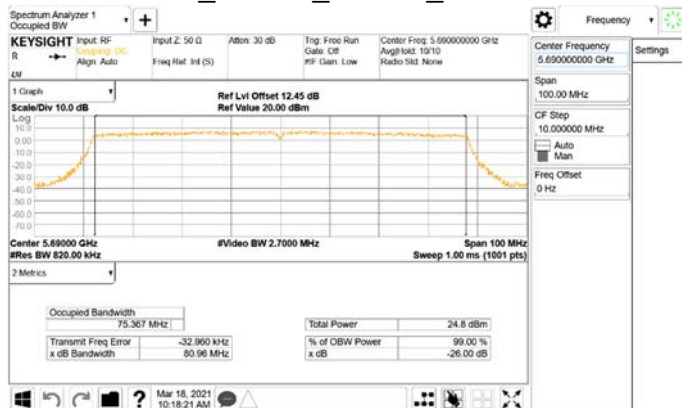
802.11ac_80MHz_Chain0_5610MHz



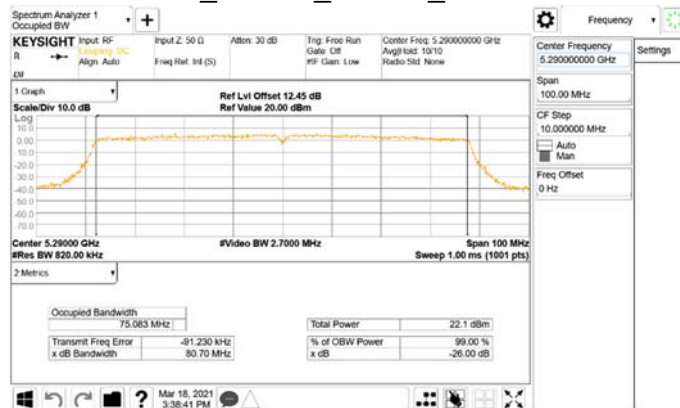
802.11ac_80MHz_Chain1_5210MHz



802.11ac_80MHz_Chain0_5690MHz



802.11ac_80MHz_Chain1_5290MHz



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802.11ac_80MHz_Chain1_5530MHz



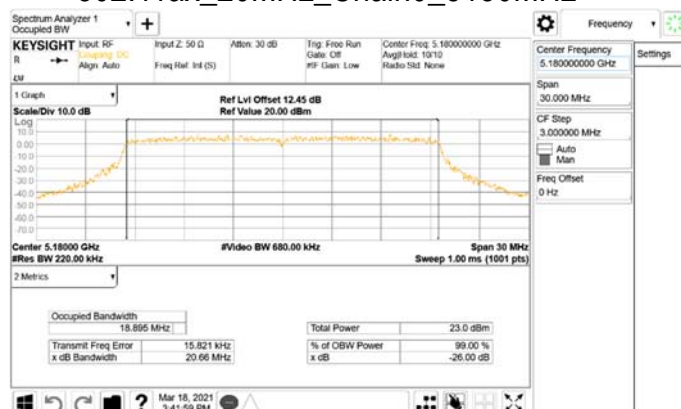
802.11ac_80MHz_Chain1_5775MHz



802.11ac_80MHz_Chain1_5610MHz



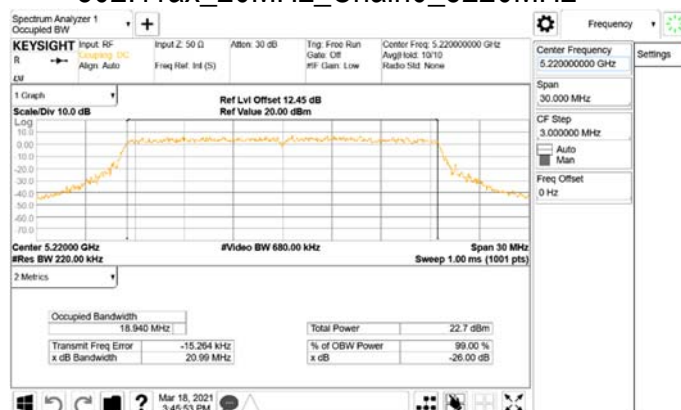
802.11ax_20MHz_Chain0_5180MHz



802.11ac_80MHz_Chain1_5690MHz



802.11ax_20MHz_Chain0_5220MHz



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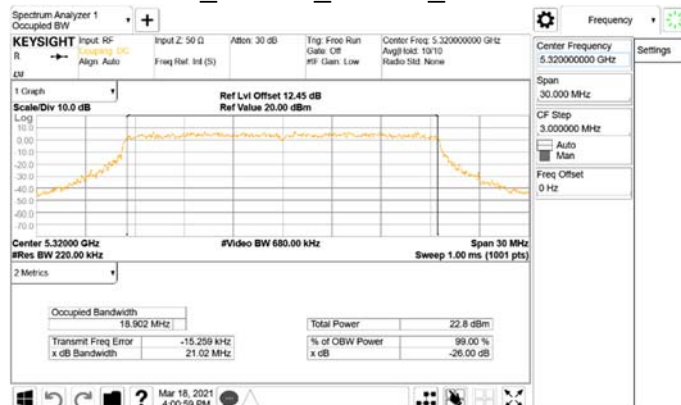
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802.11ax_20MHz_Chain0_5240MHz



802.11ax_20MHz_Chain0_5320MHz



802.11ax_20MHz_Chain0_5260MHz



802.11ax_20MHz_Chain0_5500MHz



802.11ax_20MHz_Chain0_5300MHz



802.11ax_20MHz_Chain0_5580MHz



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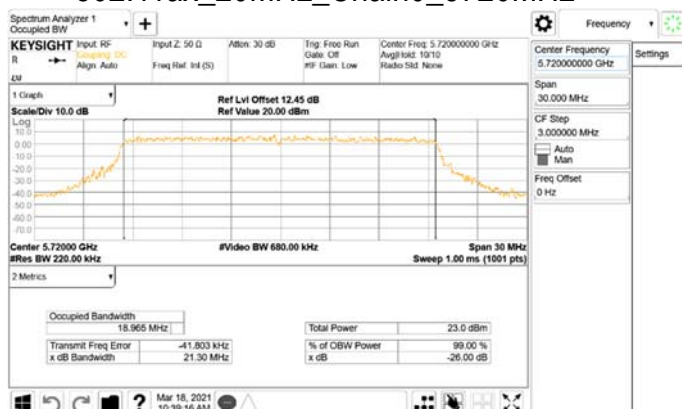
802.11ax_20MHz_Chain0_5700MHz



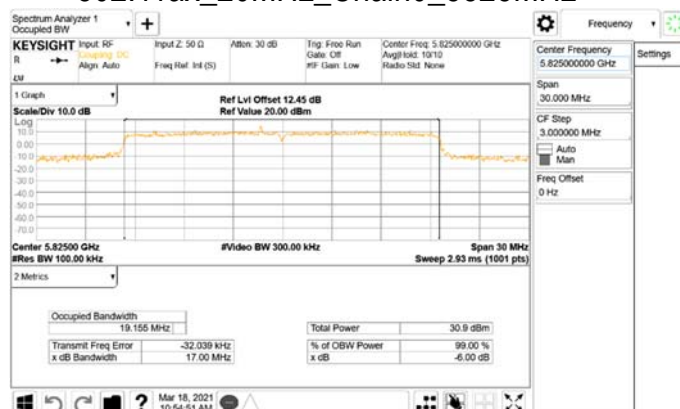
802.11ax_20MHz_Chain0_5785MHz



802.11ax_20MHz_Chain0_5720MHz



802.11ax_20MHz_Chain0_5825MHz



802.11ax_20MHz_Chain0_5745MHz



802.11ax_20MHz_Chain1_5180MHz



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802.11ax_20MHz_Chain1_5220MHz



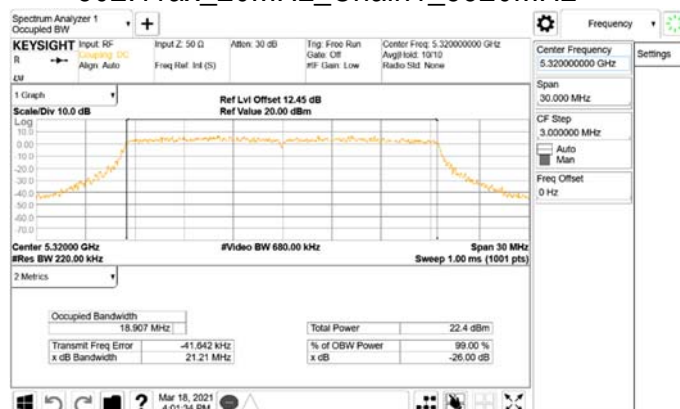
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802.11ax_20MHz_Chain1_5240MHz



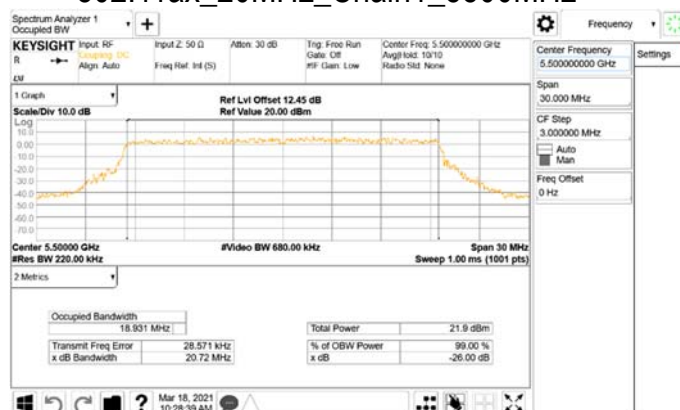
802.11ax_20MHz_Chain1_5320MHz



802.11ax_20MHz_Chain1_5260MHz



802.11ax_20MHz_Chain1_5500MHz



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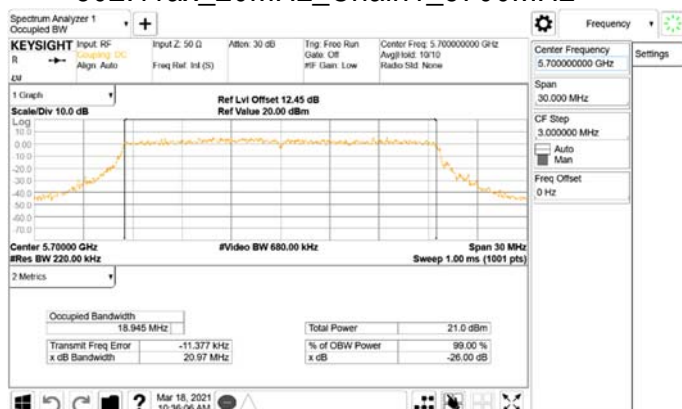
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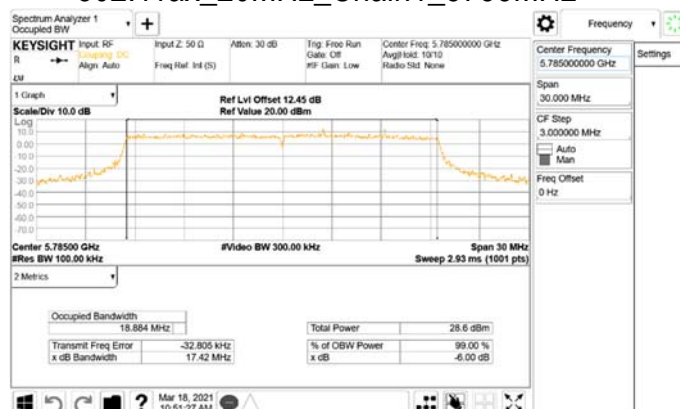
802.11ax_20MHz_Chain1_5745MHz



802.11ax_20MHz_Chain1_5700MHz



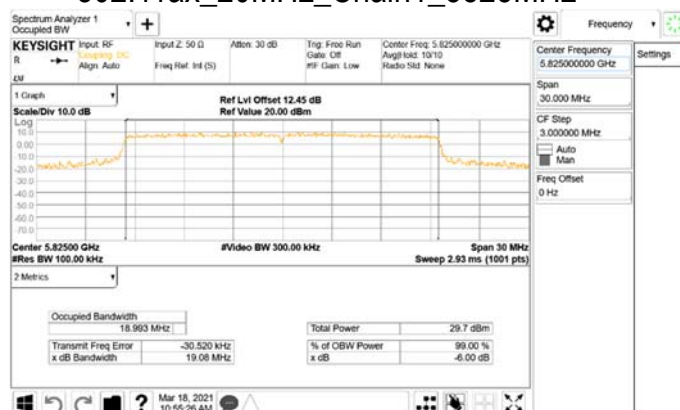
802.11ax_20MHz_Chain1_5785MHz



802.11ax_20MHz_Chain1_5720MHz



802.11ax_20MHz_Chain1_5825MHz



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802.11ax_40MHz_Chain0_5190MHz



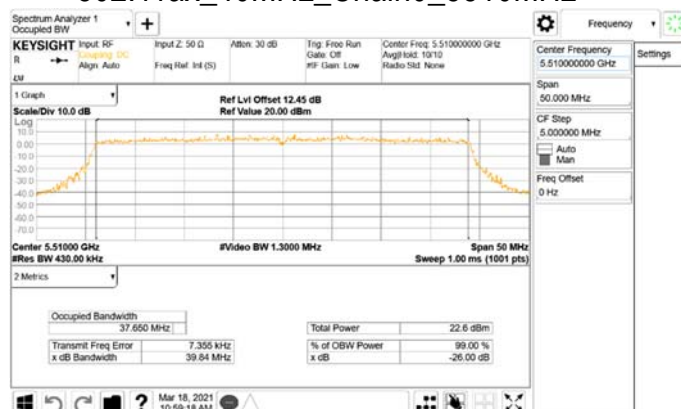
802.11ax_40MHz_Chain0_5310MHz



802.11ax_40MHz_Chain0_5230MHz



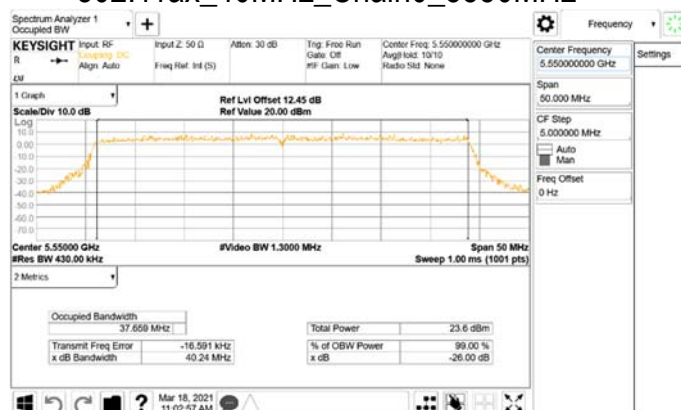
802.11ax_40MHz_Chain0_5510MHz



802.11ax_40MHz_Chain0_5270MHz



802.11ax_40MHz_Chain0_5550MHz



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802.11ax_40MHz_Chain0_5670MHz



802.11ax_40MHz_Chain0_5795MHz



802.11ax_40MHz_Chain0_5710MHz



802.11ax_40MHz_Chain1_5190MHz



802.11ax_40MHz_Chain0_5755MHz



802.11ax_40MHz_Chain1_5230MHz

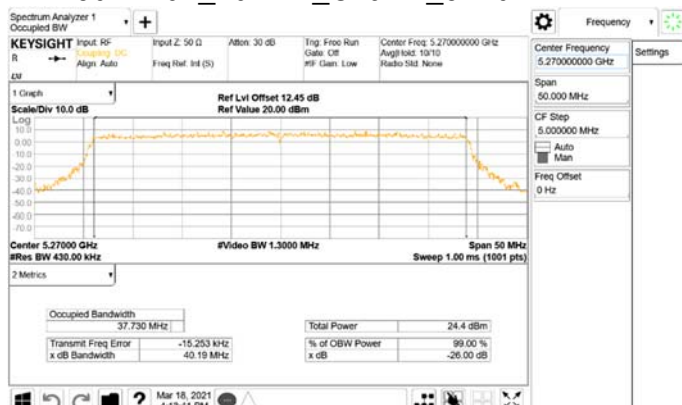


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802.11ax_40MHz_Chain1_5270MHz



802.11ax_40MHz_Chain1_5550MHz



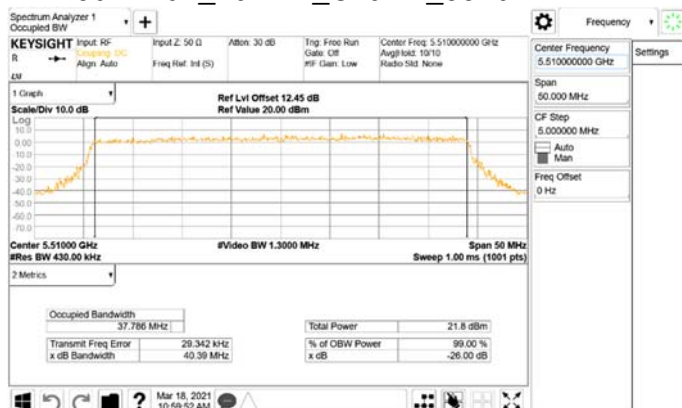
802.11ax_40MHz_Chain1_5310MHz



802.11ax_40MHz_Chain1_5670MHz



802.11ax_40MHz_Chain1_5510MHz



802.11ax_40MHz_Chain1_5710MHz



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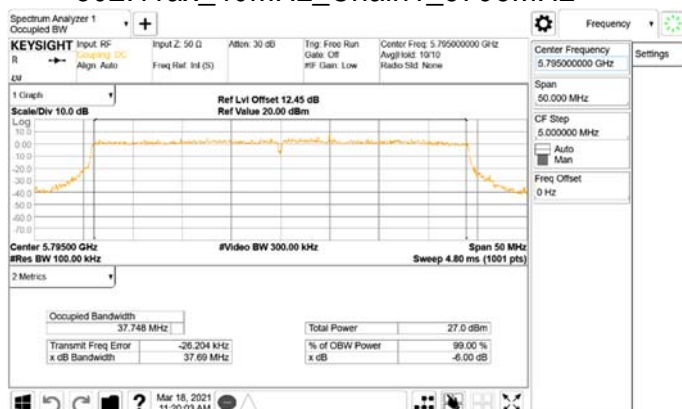
802.11ax_40MHz_Chain1_5755MHz



802.11ax_80MHz_Chain0_5290MHz



802.11ax_40MHz_Chain1_5795MHz



802.11ax_80MHz_Chain0_5530MHz



802.11ax_80MHz_Chain0_5210MHz



802.11ax_80MHz_Chain0_5610MHz

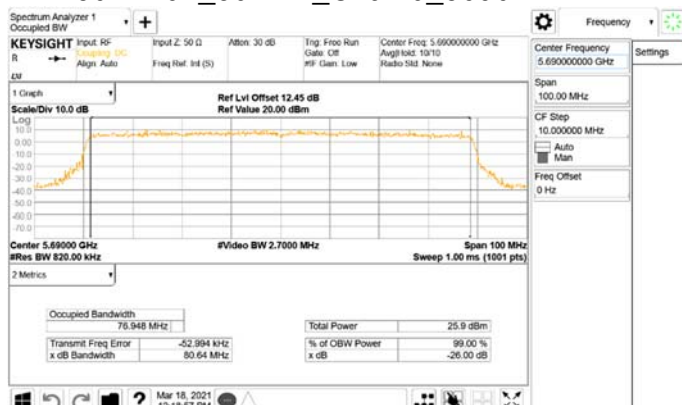


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802.11ax_80MHz_Chain0_5690MHz



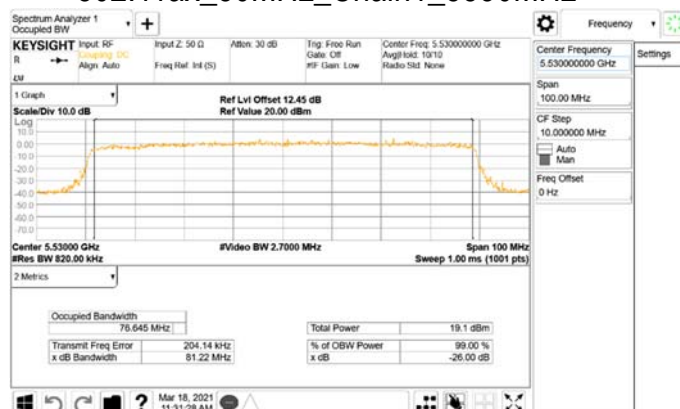
802.11ax_80MHz_Chain1_5290MHz



802.11ax_80MHz_Chain0_5775MHz



802.11ax_80MHz_Chain1_5530MHz



802.11ax_80MHz_Chain1_5210MHz



802.11ax_80MHz_Chain1_5610MHz



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802.11ax_80MHz_Chain1_5690MHz



802.11ax_80MHz_Chain1_5775MHz



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8.6 CDD Mode Measurement Result

8.6.1 FCC 26dB Bandwidth

802.11a_Ch0			802.11a_Ch1		
Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)	Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	19.13	12.820	5180	19.07	12.800
5220	18.91	12.770	5220	18.88	12.760
5240	19.37	12.870	5240	19.09	12.810
5260	18.92	12.770	5260	18.79	12.740
5300	19.10	12.810	5300	19.11	12.810
5320	18.86	12.760	5320	18.77	12.730
5500	18.92	12.770	5500	18.69	12.720
5580	18.97	12.780	5580	18.93	12.770
5700	19.20	12.830	5700	18.85	12.750
5720(U-NII 2C)	14.47	11.600	5720(U-NII 2C)	14.48	11.610
5720(U-NII 3)	4.47	6.500	5720(U-NII 3)	4.48	6.510

802.11n_HT20_Ch0			802.11n_HT20_Ch1		
Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)	Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	20.79	13.180	5180	19.65	12.930
5220	19.90	12.990	5220	19.73	12.950
5240	20.40	13.100	5240	20.00	13.010
5260	20.09	13.030	5260	19.81	12.970
5300	19.94	13.000	5300	19.94	13.000
5320	20.22	13.060	5320	20.02	13.010
5500	19.86	12.980	5500	19.94	13.000
5580	20.18	13.050	5580	20.23	13.060
5700	20.26	13.070	5700	19.91	12.990
5720(U-NII 2C)	15.19	11.820	5720(U-NII 2C)	14.92	11.740
5720(U-NII 3)	5.19	7.160	5720(U-NII 3)	4.92	6.920

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802.11ax_20_Ch0				802.11ax_20_Ch1			
Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)	Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)
5180	full	20.66	13.150	5180	full	20.78	13.180
5220	full	21.12	13.250	5220	full	20.61	13.140
5240	full	20.91	13.200	5240	full	21.19	13.260
5260	full	20.67	13.150	5260	full	20.70	13.160
5300	full	20.57	13.130	5300	full	20.77	13.170
5320	full	20.51	13.120	5320	full	21.15	13.250
5500	full	20.65	13.150	5500	full	20.83	13.190
5580	full	21.04	13.230	5580	full	20.63	13.140
5700	full	20.85	13.190	5700	full	20.80	13.180
5720(U-NII 2C)	full	15.40	11.870	5720(U-NII 2C)	full	15.37	11.870
5720(U-NII 3)	full	5.40	7.320	5720(U-NII 3)	full	5.37	7.300

802.11n_HT40_Ch0			802.11n_HT40_Ch1		
Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)	Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	40.24	16.050	5190	39.16	15.930
5230	39.53	15.970	5230	39.29	15.940
5270	39.73	15.990	5270	39.39	15.950
5310	39.75	15.990	5310	39.44	15.960
5510	39.78	16.000	5510	39.28	15.940
5550	39.87	16.010	5550	39.36	15.950
5670	40.33	16.060	5670	39.41	15.960
5710(U-NII 2C)	34.78	15.410	5710(U-NII 2C)	34.60	15.390
5710(U-NII 3)	4.78	6.800	5710(U-NII 3)	4.60	6.620

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802.11ax _40_Ch0				802.11ax _40_Ch1			
Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)	Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)
5190	full	40.10	16.030	5190	full	40.68	16.090
5230	full	41.23	16.150	5230	full	40.80	16.110
5270	full	40.37	16.060	5270	full	40.47	16.070
5310	full	40.26	16.050	5310	full	39.69	15.990
5510	full	40.43	16.070	5510	full	40.40	16.060
5550	full	40.37	16.060	5550	full	40.21	16.040
5670	full	39.94	16.010	5670	full	40.65	16.090
5710(U-NII 2C)	full	35.15	15.460	5710(U-NII 2C)	full	35.24	15.470
5710(U-NII 3)	full	5.15	7.120	5710(U-NII 3)	full	5.24	7.200

802.11ac _VHT80_Ch0			802.11ac _VHT80_Ch1		
Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)	Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5210	81.38	19.110	5210	81.38	19.110
5290	81.46	19.110	5290	80.92	19.080
5530	81.00	19.080	5530	80.23	19.040
5610	80.95	19.080	5610	80.58	19.060
5690(U-NII 2C)	75.56	18.780	5690(U-NII 2C)	75.31	18.770
5690(U-NII 3)	5.56	7.450	5690(U-NII 3)	5.31	7.250

802.11ax _80_Ch0				802.11ax _80_Ch1			
Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)	Freq. (MHz)	RU config	26dB BW (MHz)	10 Log (B) (dB)
5210	full	81.77	19.130	5210	full	80.66	19.070
5290	full	81.01	19.090	5290	full	80.58	19.060
5530	full	81.78	19.130	5530	full	80.98	19.080
5610	full	81.14	19.090	5610	full	81.14	19.090
5690(U-NII 2C)	full	75.73	18.790	5690(U-NII 2C)	full	75.85	18.800
5690(U-NII 3)	full	5.73	7.580	5690(U-NII 3)	full	5.85	7.670

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8.6.2 6dB Bandwidth (5725 MHz~ 5850 MHz) measure with Peak detector for FCC

802.11a_Ch0			802.11a_Ch1		
Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)	Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	16.16	12.080	5745	16.34	12.130
5785	16.32	12.130	5785	15.68	11.950
5825	15.78	11.980	5825	16.31	12.120

802.11n_HT20_Ch0			802.11n_HT20_Ch1		
Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)	Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	17.69	12.480	5745	17.63	12.460
5785	17.57	12.450	5785	15.72	11.960
5825	17.58	12.450	5825	17.56	12.450

802.11ax_20_Ch0				802.11ax_20_Ch1			
Freq. (MHz)	RU config	6dB BW (MHz)	10 Log (B) (dB)	Freq. (MHz)	RU config	6dB BW (MHz)	10 Log (B) (dB)
5745	full	14.99	11.760	5745	full	16.74	12.240
5785	full	17.89	12.530	5785	full	17.17	12.350
5825	full	18.97	12.780	5825	full	19.08	12.810

802.11n_HT40_Ch0			802.11n_HT40_Ch1		
Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)	Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5755	36.42	15.610	5755	36.42	15.610
5795	35.72	15.530	5795	35.58	15.510

802.11ax_40_Ch0				802.11ax_40_Ch1			
Freq. (MHz)	RU config	6dB BW (MHz)	10 Log (B) (dB)	Freq. (MHz)	RU config	6dB BW (MHz)	10 Log (B) (dB)
5755	full	37.80	15.770	5755	full	37.84	15.780
5795	full	37.74	15.770	5795	full	37.39	15.730

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802.11ac _VHT80_Ch0			802.11ac _VHT80_Ch1		
Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)	Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5775	72.04	18.580	5775	68.98	18.390

802.11ax _80_Ch0				802.11ax _80_Ch1			
Freq. (MHz)	RU config	6dB BW (MHz)	10 Log (B) (dB)	Freq. (MHz)	RU config	6dB BW (MHz)	10 Log (B) (dB)
5775	full	76.35	18.830	5775	full	72.30	18.590

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8.6.3 BW Verification for DFS Function

802.11a_Ch0			802.11a_Ch1		
Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)	Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5240	5248.16	< 5250	5240	5248.17	< 5250
5745	5734.80	> 5725	5745	5736.71	> 5725

802.11n_HT20_Ch0			802.11n_HT20_Ch1		
Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)	Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5240	5248.79	< 5250	5240	5248.79	< 5250
5745	5735.21	> 5725	5745	5736.11	> 5725

802.11ax_20_Ch0			802.11ax_20_Ch1		
Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)	Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5240	5249.45	< 5250	5240	5249.46	< 5250
5745	5733.90	> 5725	5745	5733.38	> 5725

802.11n_HT40_Ch0			802.11n_HT40_Ch1		
Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)	Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5230	5248.00	< 5250	5230	5248.02	< 5250
5755	5736.90	> 5725	5755	5736.90	> 5725

802.11ax_40_Ch0			802.11ax_40_Ch1		
Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)	Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5230	5248.84	< 5250	5230	5248.88	< 5250
5755	5736.84	> 5725	5755	5736.14	> 5725

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802.11ac _VHT80_Ch0			802.11ac _VHT80_Ch1		
Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)	Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5210	5247.73	< 5250	5210	5247.59	< 5250
5775	5737.23	> 5725	5775	5737.28	> 5725

802.11ax _VHT80_Ch0			802.11ax _VHT80_Ch1		
Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)	Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5210	5248.50	< 5250	5210	5248.49	< 5250
5775	5736.59	> 5725	5775	5736.39	> 5725

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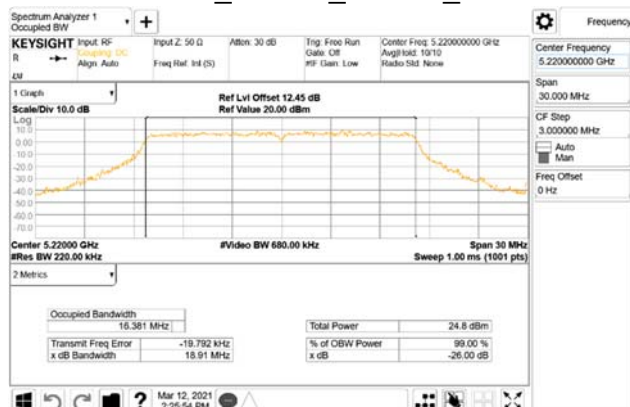
802.11a_20MHz_Chain0_5180MHz



802.11a_20MHz_Chain0_5260MHz



802.11a_20MHz_Chain0_5220MHz



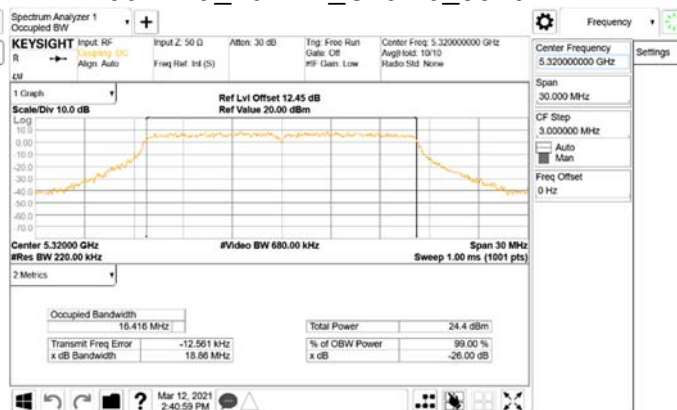
802.11a_20MHz_Chain0_5300MHz



802.11a_20MHz_Chain0_5240MHz



802.11a_20MHz_Chain0_5320MHz



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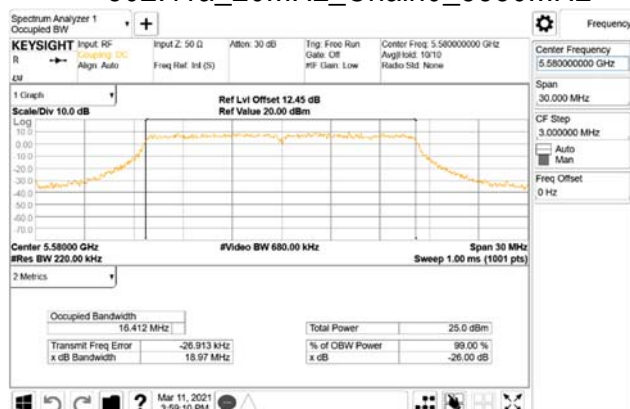
802.11a_20MHz_Chain0_5500MHz



802.11a_20MHz_Chain0_5720MHz



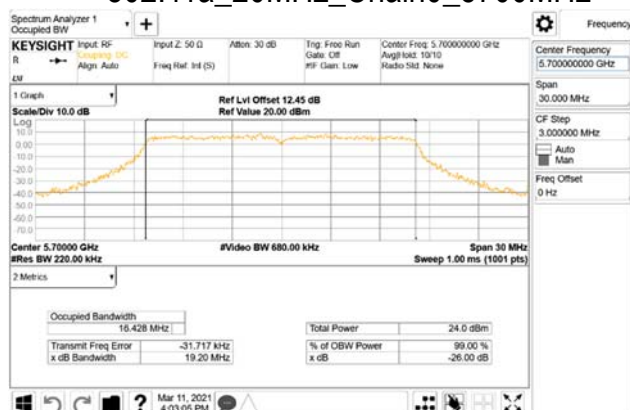
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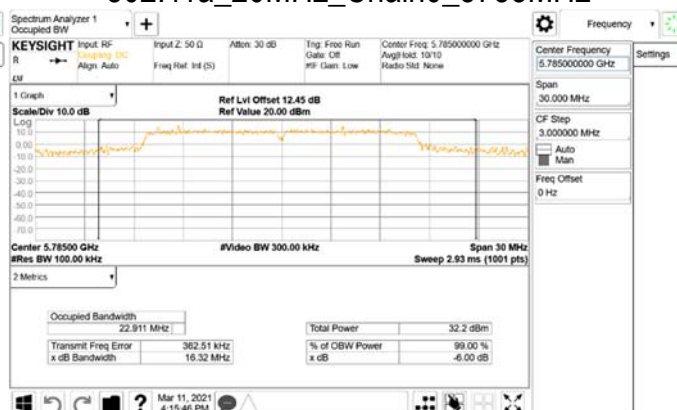
802.11a_20MHz_Chain0_5745MHz



802.11a_20MHz_Chain0_5700MHz



802.11a_20MHz_Chain0_5785MHz

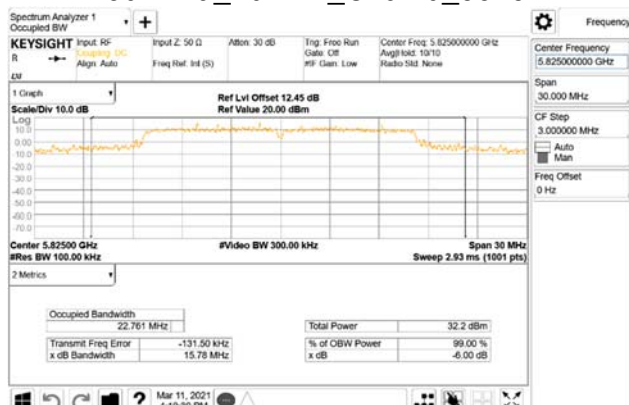


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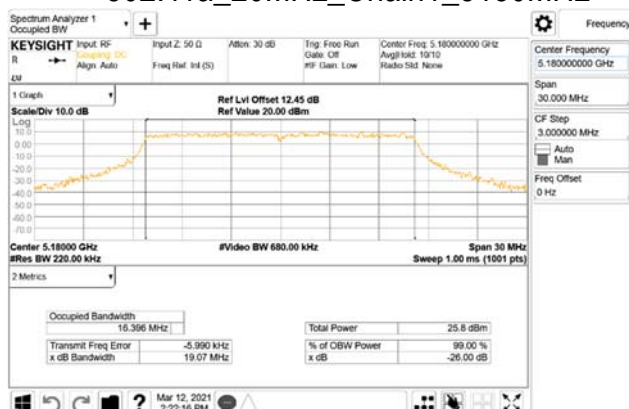
802.11a_20MHz_Chain0_5825MHz



802.11a_20MHz_Chain1_5240MHz



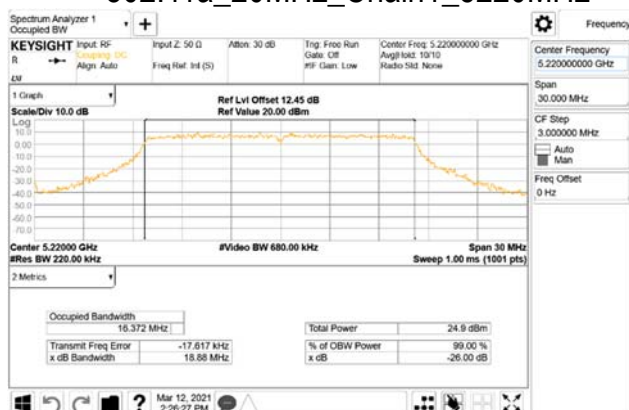
802.11a_20MHz_Chain1_5180MHz



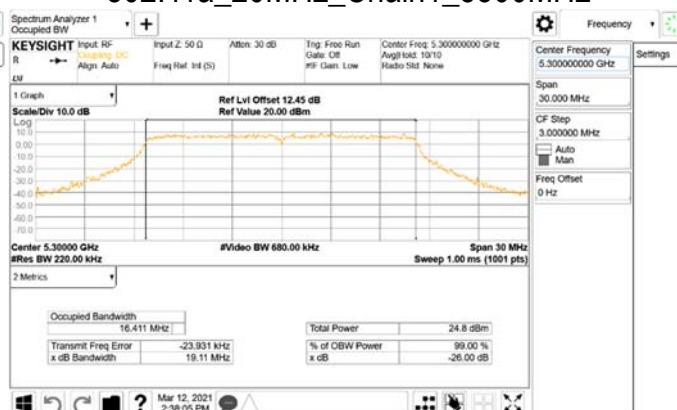
802.11a_20MHz_Chain1_5260MHz



802.11a_20MHz_Chain1_5220MHz



802.11a_20MHz_Chain1_5300MHz

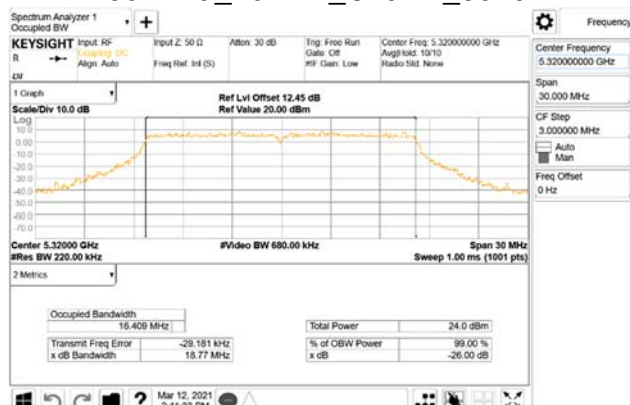


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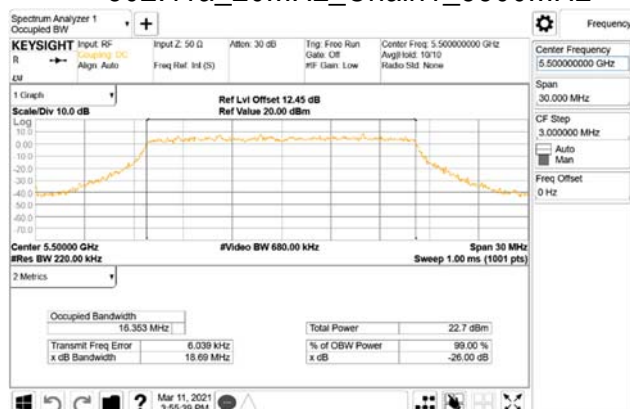
802.11a_20MHz_Chain1_5320MHz



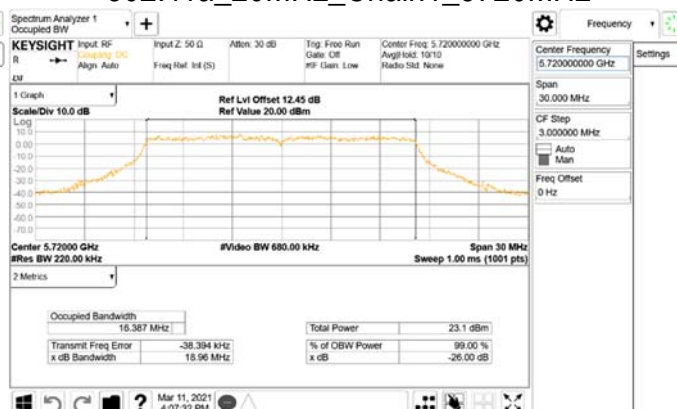
802.11a_20MHz_Chain1_5700MHz



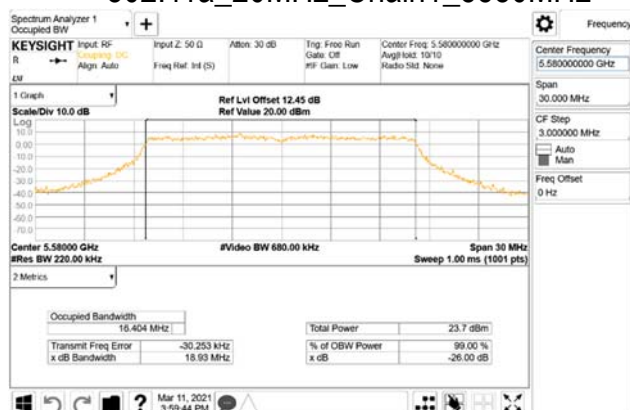
802.11a_20MHz_Chain1_5500MHz



802.11a_20MHz_Chain1_5720MHz



802.11a_20MHz_Chain1_5580MHz



802.11a_20MHz_Chain1_5745MHz

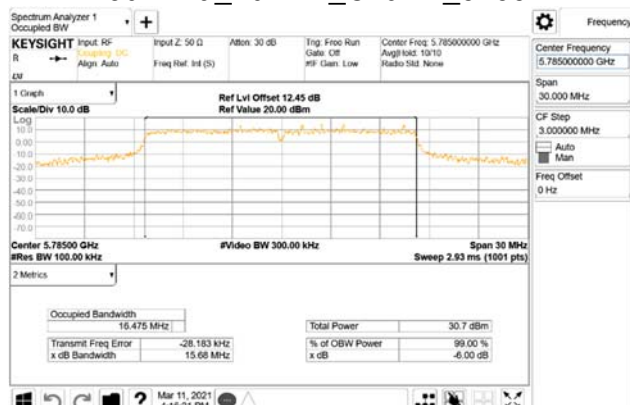


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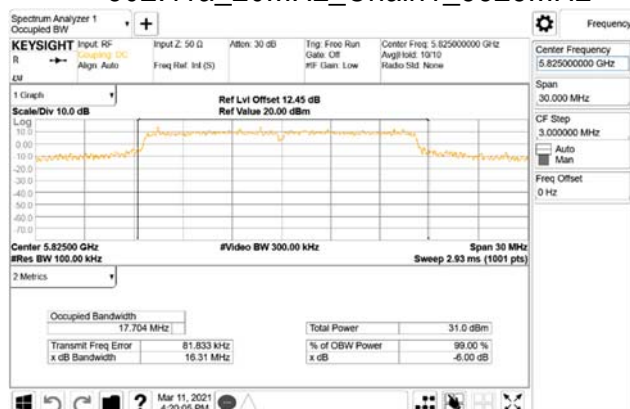
802.11a_20MHz_Chain1_5785MHz



802.11n_20MHz_Chain0_5220MHz



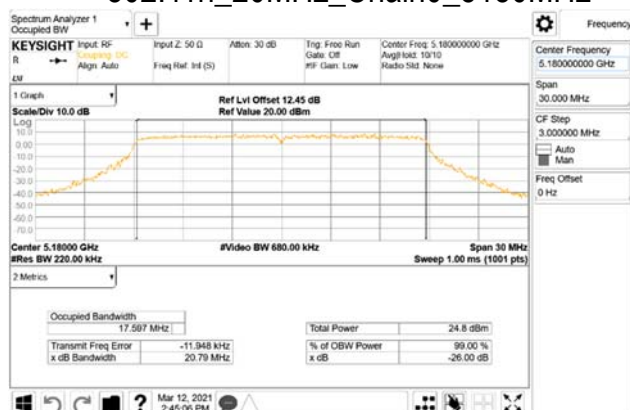
802.11a_20MHz_Chain1_5825MHz



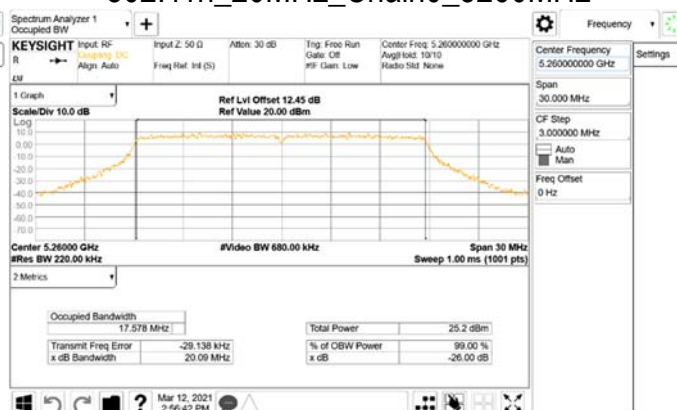
802.11n_20MHz_Chain0_5240MHz



802.11n_20MHz_Chain0_5180MHz



802.11n_20MHz_Chain0_5260MHz



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