

ELECTROMAGNETIC EMISSIONS **COMPLIANCE REPORT**



FCC Applicant: Product Name:	ASUSTeK COMPUTER INC. 1F.No.15.Lide Rd.Beitou Dist. Taipei City 112.taiwan ASUS Phone (Mobile Phone)
Brand Name:	ASUS
Model No.:	ASUS_1006D
Model Difference:	N/A
Report Number:	ER/2021/20015
FCC ID	MSQ1006D
Issue Date:	June 15, 2021
Date of Test:	January 26, 2021 - May 11, 2021
Date of EUT Received:	January 26, 2021

Approved By Men Lay Blue Yang / Asst. Manager

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 comply with FCC rule part §15.407.

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Revision History						
Report Number Revision Description Issue Date Revised By						
ER/2021/20015 Rev.00 Original. June 15,2021 Viola Su						

Note:

1 Disclaimer

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

2 Measurement results in the original test report ER/2021/20007 are partially leveraged in this test report with spot check to demonstrate compliance.

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GENERAL INFORMATION 1

1.1 **Product Description**

Product Name:	ASUS Phone	ASUS Phone (Mobile Phone)				
Brand Name:	ASUS					
Model No.:	ASUS_I006D					
Model Difference:	N/A					
Hardware Version:	V4	V4				
Firmware Version:	Android 11	Android 11				
EUT Series No.:	N/A	N/A				
		Rechargeable Li-polymer Battery / 15 / 20 Vdc from AC/DC Adapter				
Power Supply:	Battery	Model No: C11P2003 Brand: ASUS				
	Adapter	Model No: A299-200150U-US Brand: ASUS				

1.2 **Modulation & Data Rate**

	1024QAM, 64QAM, 16QAM, QPSK, BPSK for OFDMA in 802.11ax
	802.11 ax_20MHz: 8.6 - 286.8 Mbps
	802.11 ax_40MHz: 17.2 - 573.6 Mbps
	802.11 ax_80MHz: 36 - 1201 Mbps
	802.11 ax_160MHz: 68 - 2402 Mbps



1.3 **Antenna Designation**

Antenna Type	Freq. (MHz)	Peak Antenna Gain (dBi)		
	5925~6425	-0.32		
PIFA	6425~6525	-3.91		
PIFA	6525~6875	-4.00		
	6875~7125	-5.10		
	5925~6425	-2.01		
PIFA	6425~6525	-3.49		
	6525~6875	-3.90		
	6875~7125	-4.65		

Note: Investigation has been done to determine the worst case scenario for the above antennas demonstrated with measurements in this report.

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			Member of SGS Group



1.4 **Rated Power**

WLAN 6E

Wi-Fi	FrequencyRange	Channels	Rated Power(Avg) (dBm) (Worst Case)
	5955~6415	24	10.10 dBm
ax_HE 20MHz	6435~6515	5	10.27 dBm
	6535~6875	18	10.20 dBm
	6895~7115	12	10.12 dBm
	5965~6405	12	12.97 dBm
ax_HE 40MHz	6445~6525	3	11.02 dBm
	6565~6845	8	10.97 dBm
	6885~7085	6	10.12 dBm
	5985~6385	6	13.78 dBm
ax_HE 80MHz	6465	1	11.29 dBm
	6545~6865	5	10.87 dBm
	6945~7025	2	9.94 dBm
	6025~6345	3	13.82 dBm
ax_HE 160MHz	6505	1	9.26 dBm
	6665~6825	2	10.85 dBm
	6985	1	9.84 dBm

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1.5 **Test Methodology of Applied Standards**

FCC Part 15, Subpart E §15.407

FCC KDB 987594 D02 U-NII 6GHz EMC Measurement v01r01

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		
		SAC 1				
		SAC 3				
		Conduction 1				
	No.134, Wu Kung Road, New Taipei	Conducted 1				
	Industrial Park, Wuku District, New	Conducted 2	TW0027			
	Taipei City, Taiwan.	Conducted 3		TW3702		
		Conducted 4				
		Conducted 5				
SGS Taiwan Ltd.		Conducted 6				
Central RF Lab.	No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333	Conduction A				
(TAF code 3702)		SAC C				
		SAC D				
		SAC G				
		Conducted A				
		Conducted B	TW0028			
	ladydan Orty, Talwan 505	Conducted C				
		Conducted D				
		Conducted E				
		Conducted F				
Conducted G						
	ame is remarked on the equipmen measurements occurred in specif		•	s an indica-		

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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SYSTEM TEST CONFIGURATION 2

EUT Configuration 2.1

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 a 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 a 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 Conducted Setup &Radiated Setup



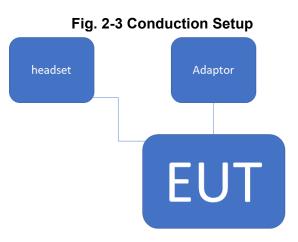


Table 2-1 Equipment Used in Tested System

ltem	Equipment	MRF/Brand	Model/Type No.	Series No.	Version
1.	QRCT4	N/A	N/A	N/A	4.0.00142.0
2.	Notebook	Lenovo	L480 PF-1S9NT5		N/A

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SUMMARY OF TEST RESULT 3

FCC Rules	Description Of Test	Result
§15.207	AC Power Line Conducted Emission	Compliant
§15.407(a)(10) 2.1049	Emission Bandwidth	Compliant
§15.407(a)(4~8)	Maximum Conducted Output Power	Compliant
§15.407(a)(4~8)	Power Spectral Density	Compliant
§15.407(b)(6)	In-band emission	Compliant
§15.205 §15.209 §15.407(b)(5),(b)(8), (b)(9)	Undesirable Radiated Emissions	Compliant
§15.407(d)(6)	contention-based protocol	Compliant
§15.407(a)(7)(8)	Dual Client Test Demonstration of Proper Power Adjustment based on Associated AP	NA Device only assocoates with indoor AP
§15.203 §15.407(a)(9)	Antenna Requirement	Compliant

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DESCRIPTION OF TEST MODES 4

Operation in U-NII Bands 4.1

	UNII-5 5925~6425 MHz							
	20MHz				4	0MHz		8
СН	Freq. (MHz)	СН	Freq. (MHz)		СН	Freq. (MHz)		СН
1	5955	49	6195		3	5965		7
5	5975	53	6215		11	6005		23
9	5995	57	6235	Ì	19	6045		39
13	6015	61	6255		27	6085		55
17	6035	65	6275	Ì	35	6125		71
21	6055	69	6295		43	6165		87
25	6075	73	6315		51	6205		
29	6095	77	6335		59	6245		
33	6115	81	6355		67	6285		
37	6135	85	6375	ĺ	75	6325		
41	6155	89	6395		83	6365		
45	6175	93	6415		91	6405		

IHZ				
80MHz			16	60MHz
СН	Freq. (MHz)		СН	Freq. (MHz)
7	5985		15	6025
23	6065		47	6185
39	6145		79	6345
55	6225			

6305

6385

		UN	III-6 64	2	5~652	25 MHz		
20MHz		40MHz			8	0MHz	16	60MHz
СН	Freq. (MHz)	СН	Freq. (MHz)		СН	Freq. (MHz)	СН	Freq. (MHz)
97	6435	99	6445		103	6465	111	6505
101	6455	107	6485					
105	6475	115	6525	Ī				
109	6495			-				
113	6515							

	UNII-7 6525~6875 MHz								UNII-8 6875~7125 MHz													
	201	ИНz			40)MHz		80	80MHz		lz 160MHz		20	OMHz		40)MHz		80)MHz	16	0MHz
СН	Freq. (MHz)	СН	Freq. (MHz)		СН	Freq. (MHz)		СН	Freq. (MHz)		СН	Freq. (MHz)	СН	Freq. (MHz)		СН	Freq. (MHz)		СН	Freq. (MHz)	СН	Freq. (MHz)
117	6535	153	6715		123	6565		119	6545		143	6665	189	6895		187	6885		199	6945	207	6985
121	6555	157	6735		131	6605		135	6625		175	6825	193	6915		195	6925		215	7025		
125	6575	161	6755		139	6645		151	6705				197	6935		203	6965					
129	6595	165	6775		147	6685		167	6785				201	6955		211	7005					
133	6615	169	6795		155	6725		183	6865				205	6975		219	7045					
137	6635	173	6815		163	6765				-			209	6995		227	7085					
141	6655	177	6835		171	6805							213	7015								
145	6675	181	6855		179	6845							217	7035								
149	6695	185	6875				-						221	7055								
													225	7075								

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7095

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4.2 The Worst Test Modes and Channel Details

- The EUT has been tested under operating condition. 1.
- 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.

Modulation	Transmi	ssion Chain	Single Transmission Spatial	Multiple Transmission Spatial
🗆 802.11 a	🗆 Ch0 🗆 Ch	1 🗆 Ch2 🗆 Ch3	🗆 1TX	□ 2TX
🗆 802.11 n	🗆 Ch0 🗆 Ch	1 🗆 Ch2 🗆 Ch3		
□ 802.11 ac	🗆 Ch0 🗆 Ch	1 🗆 Ch2 🗆 Ch3		
🛛 802.11 ax	🛛 Ch0 🖂 Ch	1 🗆 Ch2 🗆 Ch3	🛛 SISO	⊠ MIMO

The gevin UE is pre-scanned among below modes.

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4. Observations have been done for 802.11 ax available RU configurations below and found that the lowest, heighest and Full RU results higher emissions. Only one RU can be enabled at any given time

802.11ax			MHz	l at any give		802.11ax			40MHz	
RU type	26	26-tone RU 52-tone RU				RU type	26-	tone RU		52-tone RU
	RU0	[-121: -96]	RU37	[-121: -70]			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]		
RU index and	RU17	N/A	10	06-tone RU		RU index and	RU17	[218: 243]	1	06-tone RU
subcarrier	RU18	N/A	RU53	[-122: -17]		subcarrier range	RU18	N/A	RU53	[-243: -138]
range	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		42-tone RU			RU27	N/A		42-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		84-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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8 02.11ax		80	MHz	
RU type	20	6-tone RU	Ę	52-tone RU
	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]	1	06-tone RU
RU index and	RU17	[-43: -18]	RU53	[-499: -394]
subcarrier	RU18	[-16: -4, 4: 16]	RU54	[-365: -260]
range	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]	2	42-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]	4	84-tone RU
	RU31	[340: 365]	RU65	[-500: -17]
	RU32	[367: 392]	RU66	[17: 500]
	RU33	[394: 419]	9	96-tone RU
	RU34	[420: 445]	RU67	[-500: -3, 3: 500]
	RU35	[448: 473]		
	RU36	[474: 499]		

5. The EUT support OFDM and OFDMA modulation, 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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			Member of SGS Group



RADIATED EMISSION TEST: 4.2.1

	RADIATED EMISSION TEST (BELOW 1 GHz)											
MODE	FREQUENCY	AVAILABLE	TESTED	MODULATION	DATARATE	ANTENNA						
WIODE	BAND (MHz)	CHANNEL	CHANNEL	MODULATION	(Mbps)	PORT						
	6025~6345	15 to 79	47									
802.11ax HE160	6505	111	111	OFDMA	MCS0	Mimo						
002.118X_FE100	6665~6825	143 to 175	143		WOOD	WIIIIO						
	6985	207	207									

	RADIATED EMISSION TEST (ABOVE 1 GHz)											
MODE	FREQUENCY	AVAILABLE	TESTED	MODULATION	RU	DATARATE	ANTENNA					
WODE	BAND (MHz)	CHANNEL	CHANNEL	MODULATION	CONFIGURATI	(Mbps)	PORT					
	5955~6415	1 to 93	1,45,93		FULL RU							
802.11ax_HE20	6435~6515	97 to 113	97,105,113	OFDMA	26/0,26/8	MCS0	Mimo					
002.1187_11220	6535~6875	117 to 185	117,149,181,185		52/37,52/40		WIIIIO					
	6895~7115	189 to 233	189,209,233		106/53,106/54							
	5965~6405	3 to 91	3,43,91									
802.11ax HE40	6445~6525	99 to 115	99,107,115	OFDMA	FULL RU 242/61,242/62	MCS0	Mimo					
002.118x_11E40	6565~6845	123 to 179	123,147,179	OFDIMA		MC30	WIIIIO					
	6885~7085	187 to 227	187,195,211,227									
	5985~6385	7 to 87	7,39,87									
802.11ax_HE80	6465	103	103	OFDMA	FULL RU	MCS0	Mimo					
002.1187_11200	6545~6865	119 to 183	103		484/65,484/66	10000	WIIIIO					
	6945~7025	199 to 215	199,215									
	6025~6345	15 to 79	15,47,79									
802.11ax HE160	6505	111	111	OFDMA	FULL RU	MCS0	Mimo					
002.1107_112100	6665~6825	143 to 175	143,175		484/65,484/66	WICOU	WIIIIO					
	6985	207	207									

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 E1 position was reported.

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4.2.2 ANTENNA PORT CONDUCTED MEASUREMENT:

CONDUCTED TEST											
MODE	FREQUENCY	AVAILABLE	TESTED	MODULATION	RU	DATARATE	ANTENNA				
WODE	BAND (MHz)	CHANNEL	CHANNEL	MODULATION	CONFIGURATI	(Mbps)	PORT				
	5955~6415	1 to 93	1,45,93		FULL RU						
802.11ax_HE20	6435~6515	97 to 113	97,105,113	OFDMA	26/0,26/8	MCS0	Mimo				
002.11dx_11220	6535~6875	117 to 185	117,149,181,185		52/37,52/40	WICCO	WIIIIO				
	6895~7115	189 to 233	189,209,233	1	106/53,106/54						
	5965~6405	3 to 91	3,43,91								
802.11ax_HE40	6445~6525	99 to 115	99,107,115	OFDMA	FULL RU 242/61,242/62	MCS0	Mimo				
002.118X_HE40	6565~6845	123 to 179	123,147,179				WIIIIO				
	6885~7085	187 to 227	187,195,211,227	Ī							
	5985~6385	7 to 87	7,39,87								
802.11ax_HE80	6465	103	103	OFDMA	FULL RU	MCS0	Mimo				
002.1187_11200	6545~6865	119 to 183	103		484/65,484/66	WOOD	WIIIIO				
	6945~7025	199 to 215	199,215	1							
	6025~6345	15 to 79	15,47,79								
902 11 ov UE160	6505	111	111	OFDMA	FULL RU	MCS0	Mimo				
802.11ax_HE160	6665~6825	143 to 175	143,175		484/65,484/66	10000	WIIIIO				
	6985	207	207								



MEASUREMENT UNCERTAINTY 5

Test Items	L	Incertair	nty
AC Power Line Conducted Emission	+/-	2.34	dB
26dB & 6dB Emission Bandwidth	+/-	1.53	Hz
The Maximum Output Power Measurement	+/-	1	dB
Peak Power Spectral Density Measurement	+/-	1.53	dB
Frequency Stability	+/-	1.53	Hz
Temperature	+/-	0.4	°C
Humidity	+/-	3.5	%
DC / AC Power Source	+/-	1	%

Radiated Spurious Emission Measurement Uncertainty					
	+/-	2.64	dB	9kHz~30MHz	
Polarization: Vertical	+/-	4.93	dB	30MHz - 1000MHz	
	+/-	4.81	dB	1GHz - 18GHz	
	+/-	4.52	dB	18GHz - 40GHz	
	+/-	2.64	dB	9kHz~30MHz	
Polarization: Horizontal	+/-	4.45	dB	30MHz - 1000MHz	
Polarization. Horizontai	+/-	4.81	dB	1GHz - 18GHz	
	+/-	4.52	dB	18GHz - 40GHz	

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.

	Limits				
Frequency range	dB(uV)				
MHz	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				
Mata					

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

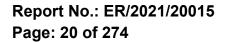
Radiated Emission Test Site: Conduction 1						
EQUIPMENT TYPE	MFR/BRAND	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.	
LISN	SCHWARZBECK	NSLK 8127	8127-465	04/09/2020	04/08/2021	
Coaxial Cables	N/A	Coaxial Cable	161207	12/07/2020	12/06/2021	
Test Software	audix	e3	Ver. 6.11- 20180413	01/01/2021	12/31/2021	
EMI Test Receiver	R&S	ESCI7	100759	07/13/2020	07/12/2021	

6.3 EUT Setup

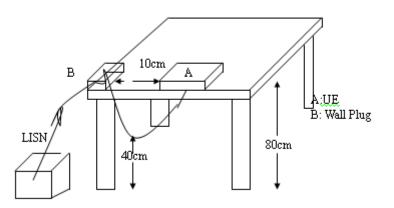
- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10:2013.
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
- 3. The LISN was connected with 120Vac/60Hz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

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6.5 Measurement Procedure

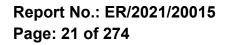
- 1. The EUT was placed on a table which is 0.8m above ground plane.
- 2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 3. Repeat above procedures until all phases of power being supplied by given UE are completed.

6.6 Measurement Result

Note: Refer to next page for measurement data and plots. Note2: The * reveals the worst-case results that closet to the limit.

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AC POWER LINE CONDUCTED EMISSION TEST DATA

Report Number Test Mode Power Probe Note:	:ER-2021- :WLAN 5G :AC 120V/ :L :	3		Test Site Test Date Temp./Humi. Engineer	:Conduction :2021-02-20 :22.5/47 :Neo Tsai	6F
80 Level (dBuV)						
00						
70						
60						
50						
50						
40 1 2	3			4		
30 1000000	whom A		. has not fil	all it was not and	(m	
20	NW W	March mon March March	hanne when the	v	my	
20						
10						
0.15 0.2	0.5	1	2	5 10	20 30	
0.15 0.2	0.5		z ency (MHz)	5 10	20 30	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
N 41 1-	Mode	Reading Level	٩D	FS	م (ب م ال	٩D
MHz	PK/QP/AV	dBµV	dB	dBµV	dBµV	dB
0.16	Peak	35.23	0.04	35.27	65.38	-30.11
0.10	Peak	35.06	0.04	35.10	63.23	-28.13
0.44	Peak	35.77	0.13	35.90	56.98	-21.08
5.11	Peak	32.79	0.55	33.34	60.00	-26.66
6.32	Peak	31.75	0.64	32.39	60.00	-27.61
10.07	Peak	31.49	0.83	32.32	60.00	-27.68

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Report Number Test Mode Power Probe Note:	:ER-2021- :WLAN 5G :AC 120V/ :N :	ì		Test Site Test Date Temp./Humi. Engineer	:Conduction :2021-02-20 :22.5/47 :Neo Tsai	6F
80 Level (dBuV)						
70						
60		1 1 1 1 1 1 1 1 1 1 				
50						
40	••••••			2 45		
30 million many	WMW MULL		wyhannes the state	Mar Barrow	Market and a second sec	
20	· ···································	Munduniungugh				
10					14/1/2000	
0.15 0.2	0.5	1 Erogu	2 ency (MHz)	5 10	20 30	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV	dBµV	dB
			dD		αυμν	<u>ub</u>
0.44	Peak	32.12	0.19	32.31	56.98	-24.67
4.75	Peak	32.76	0.46	33.22	56.00	-22.78
6.32	Peak	29.57	0.55	30.12	60.00	-29.88
9.16	Peak	31.36	0.67	32.03	60.00	-27.97
9.76	Peak	32.78	0.69	33.47	60.00	-26.53

30.46

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0.90

31.36

60.00

-28.64

SGS Taiwan Ltd.

13.55

Peak

```
No.134,Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan/新北市五股區新北產業園區五工路 134 號
```



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

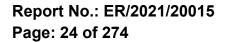
Duty Cycle:

Duty Cycle

Mode	Duty Cycle (%) =Ton / (Ton+Toff)	Duty Factor (dB) =10*log (1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
802.11ax_20	100.00	0.00	0.00	0.01
802.11ax_40	100.00	0.00	0.00	0.01
802.11ax_80	100.00	0.00	0.00	0.01
802.11ax_160	100.00	0.00	0.00	0.01

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7.2 DUTY CYCLE TEST SIGNAL MEASUREMENT RESULT

Duty Cycle 802.11ax 20MHz Chain0 5955MHz ¢ F · + KEYSIGHT Input RF Input 7: 50 0 30 dB PNO: Fast Gate: Off IF Gain: Lo Sig Track: Center Freque Freq Ref: Int (S) LU0 Span ΔMkr3 5.462 n 1 Spectrum Scale/Div 10 dE Ref LvI Offset 11.90 dB Ref Level 30.00 dBm 0.00000000 -0.44 dE Swept Spa Full Sp Start Freq 5.955000000 Stop Freq 5.955000000 AUTO TU Center 5.95500 000 GHz #Video BW 8.0 MHz Span 0 Hz Sweep 20.0 ms (10001 pts) CF Step Res BW 8 MHz 8.000000 MI 5 Marker Tab Auto Man Function Function Width Function Value Mode Trace Scale
 Y

 5.444 ms (Δ)
 -1.148 dB

 2.156 ms
 13.63 dBm

 5.462 ms (Δ)
 -0.4395 dB

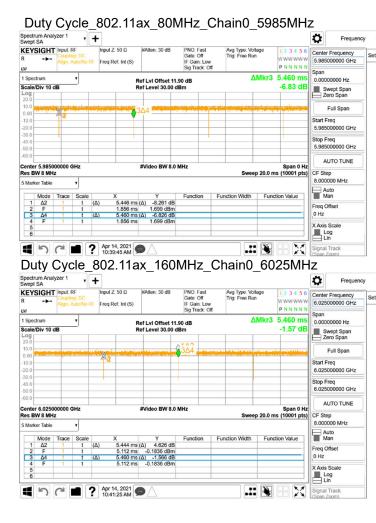
 2.156 ms
 13.63 dBm
 (Δ) Δ2 F Δ4 Freq Offset 3 (Δ) 0 Hz X Axis Scale Log 4 つ つ ■ ? Apr 14, 2021 ● 10:35:30 AM X .II 🔖 Signal Track Duty Cycle 802.11ax 40MHz Chain0 5965MHz ¢ Spectrum Analyzer 1 Swept SA · + KEYSIGHT Input: RF iput Z: 50 Ω Avg Type: Vol Trig: Free Run PNO: Fast Gate: Off Center Freque -Gatu IF Gain: Freq Ref: Int (S) PNNNN LXI Span 0.000000000 ΔMkr3 5.462 m Ref LvI Offset 11.90 dB Ref Level 30.00 dBm Scale/Div 10 de 0.62 dE Swept Sp Zero Spa Full Sc Start Freq 5.965000000 Stop Freq 5.965000000
 Span 0 Hz
 CF Step

 Sweep 20.0 ms (10001 pts)
 CF Step
 Center 5.96500 Res BW 8 MHz GH₂ #Video BW 8.0 MH 5 Markor T Auto Man $\begin{array}{c|c} Mode & Trace & Scale \\ \hline \Delta 2 & 1 & t & (\Delta) \\ \hline F & 1 & t \end{array}$ Function Width Function Value Function
 λ
 I

 5.446 ms (Δ)
 -5.099 dB

 3.946 ms
 4.674 dBm
 Freq Offset 0 Hz 5.462 ms (Δ) 0.6166 dB 3.946 ms 4.674 dBm 3 <u>Δ4</u> (Δ) X Axis Scale Log 4 つ C ■ ? Apr 14, 2021 10:38:37 AM X Signal Track .# 🖏

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8 EMISSION BANDWIDTH

8.1 Standard Applicable

The maximum transmitter channel bandwidth for U-NII devices in the 5.925-7.125 GHz band is 320 megahertz.

8.1 GHz band is 320 megahertz.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. For 99% Bandwidth: Set the spectrum analyzer as RBW=1%, VBW = 3*RBW, Span = 30M/50MHz, Detector=Sample, Sweep=auto.
- 6. Turn on the 99% bandwidth function, max reading.
- 7. Repeat above procedures until all frequency of interest measured was complete.

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8.2 **Measurement Equipment Used**

Conducted Emission Test Site: Conducted 2						
EQUIPMENT TYPE MFR/BRAND MODEL SERIAL LAST CAL. CAL DUE.						
EXA Spectrum Analyzer	KEYSIGHT	N9010B	MY59071571	06/27/2020	06/26/2021	
DC Block	Mini-Circuits	BLK-18-S+	1	12/16/2020	12/15/2021	

8.3 **Test Set-up**

EUT	Attenuator	SPA
-----	------------	-----

8.4 **Measurement Result**

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			Member of SGS Group



8.4.1 FCC 26dB Bandwidth

802.11ax_20_Ch0

СН	Frequency (MHz)	99% BW (MHz)	26dB BW (MHz)
1	5955	18.916	20.81
45	6175	18.923	21.23
93	6415	18.950	20.96
97	6435	18.902	21.08
105	6475	18.941	20.65
113	6515	18.932	21.06
117	6535	18.957	20.90
149	6695	18.897	20.96
181	6855	18.907	20.67
185	6875(U-NII 7)	9.430	10.54
185	6875(U-NII 8)	9.430	10.54
189	6895	18.852	20.82
209	6995	18.892	20.90
233	7115	18.927	20.83

802.11ax_20_Ch1

СН	Frequency (MHz)	99% BW (MHz)	26dB BW (MHz)
1	5955	18.928	20.86
45	6175	18.939	20.93
93	6415	18.941	20.96
97	6435	18.968	20.96
105	6475	18.936	21.18
113	6515	18.880	20.82
117	6535	18.918	20.90
149	6695	18.902	20.86
181	6855	18.942	20.49
185	6875(U-NII 7)	9.475	10.40
185	6875(U-NII 8)	9.475	10.40
189	6895	18.960	21.08
209	6995	18.922	20.61
233	7115	18.966	20.99



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802.11ax _40_Ch0

СН	Frequency (MHz)	99% BW (MHz)	26dB BW (MHz)
3	5965	37.715	40.72
43	6165	37.747	40.39
91	6405	37.704	39.90
99	6445	37.733	39.85
107	6485	37.680	40.17
115	6525(U-NII 6)	18.862	20.16
115	6525(U-NII 7)	18.862	20.16
123	6565	37.651	40.08
147	6685	37.686	40.11
179	6845	37.696	39.93
187	6885(U-NII 7)	8.885	10.03
187	6885(U-NII 8)	28.885	30.03
195	6925	37.700	40.09
211	7005	37.703	39.72
227	7085	37.743	40.12

802.11ax _40_Ch1

СН	Frequency (MHz)	99% BW (MHz)	26dB BW (MHz)
3	5965	37.761	39.99
43	6165	37.839	40.50
91	6405	37.863	40.22
99	6445	37.779	40.08
107	6485	37.840	39.88
115	6525(U-NII 6)	18.929	20.05
115	6525(U-NII 7)	18.929	20.05
123	6565	37.730	40.47
147	6685	37.774	40.08
179	6845	37.704	40.10
187	6885(U-NII 7)	8.881	10.02
187	6885(U-NII 8)	28.881	30.02
195	6925	37.764	40.50
211	7005	37.667	40.26
227	7085	37.715	40.05

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802.11ax _80_Ch0

СН	Frequency (MHz)	99% BW (MHz)	26dB BW (MHz)
7	5985	76.999	81.92
39	6145	77.242	81.57
87	6385	77.068	81.54
103	6465	76.960	81.23
119	6545(U-NII 6)	18.685	26.24
119	6545(U-NII 7)	58.685	66.24
135	6625	77.239	81.50
151	6705	77.120	81.79
167	6785	77.106	81.22
183	6865(U-NII 7)	48.556	50.69
183	6865(U-NII 8)	28.556	30.69
199	6945	77.062	82.03
215	7025	77.146	81.21

802.11ax _80_Ch1

СН	Frequency (MHz)	99% BW (MHz)	26dB BW (MHz)
7	5985	77.20	80.85
39	6145	77.12	81.84
87	6385	77.41	82.13
103	6465	77.16	81.55
119	6545(U-NII 6)	18.65	21.78
119	6545(U-NII 7)	58.65	61.78
135	6625	77.53	81.16
151	6705	77.33	81.16
167	6785	77.01	80.89
183	6865(U-NII 7)	48.63	60.27
183	6865(U-NII 8)	28.63	40.27
199	6945	77.24	81.59
215	7025	76.92	81.38

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802.11ax _160_Ch0

СН	Frequency (MHz)	99% BW (MHz)	26dB BW (MHz)
15	6025	156.335	165.7
47	6185	156.165	164.0
79	6345	155.971	164.6
111	6505(U-NII 6)	98.331	131.3
111	6505(U-NII 7)	58.331	91.3
143	6665	156.397	200.3
175	6825(U-NII 7)	128.191	132.2
175	6825(U-NII 8)	28.191	32.2
207	6985	156.067	165.6

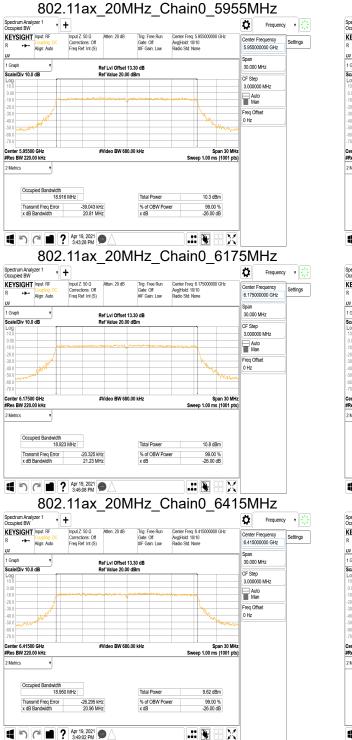
802.11ax _160_Ch1

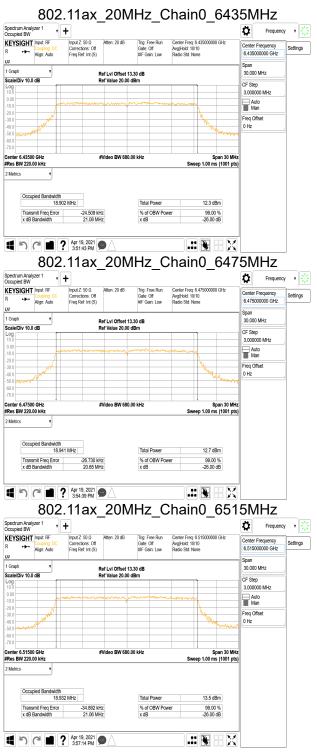
СН	Frequency (MHz)	99% BW (MHz)	26dB BW (MHz)
15	6025	156.15	164.4
47	6185	156.60	165.0
79	6345	156.04	164.6
111	6505(U-NII 6)	98.52	136.3
111	6505(U-NII 7)	58.52	96.3
143	6665	156.88	236.3
175	6825(U-NII 7)	128.18	151.3
175	6825(U-NII 8)	28.18	51.3
207	6985	155.75	165.4

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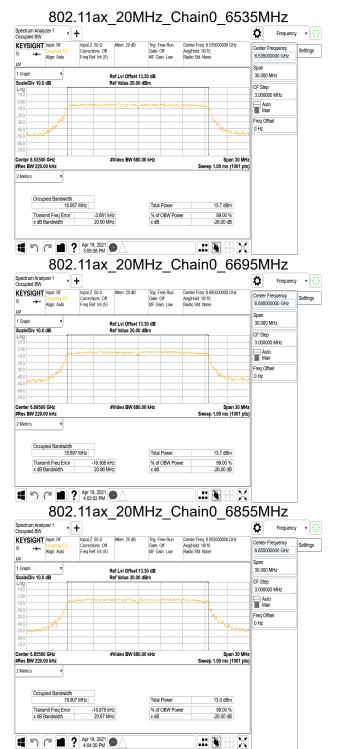


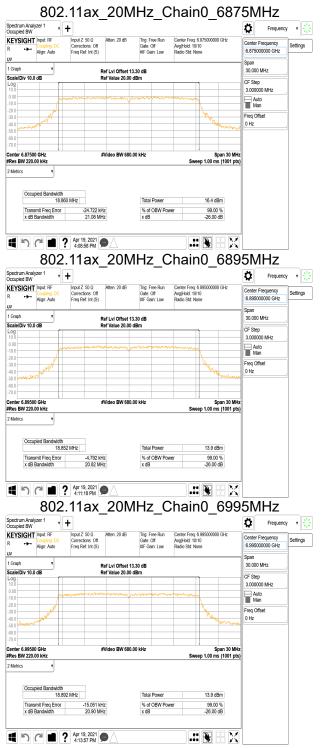
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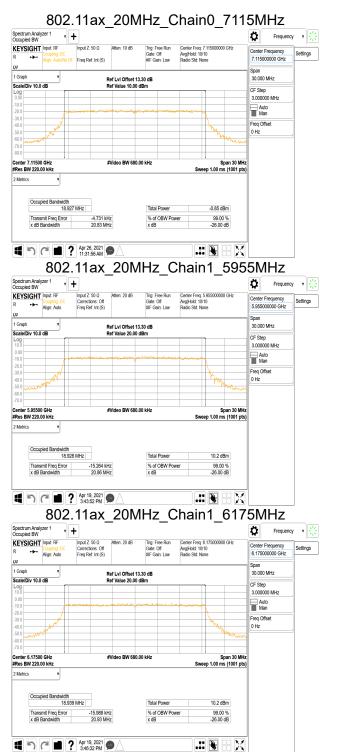
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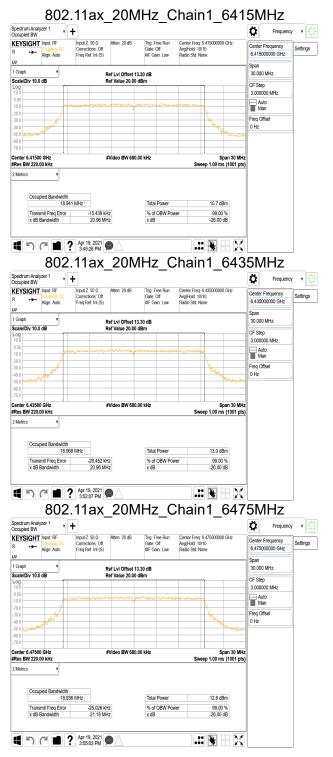
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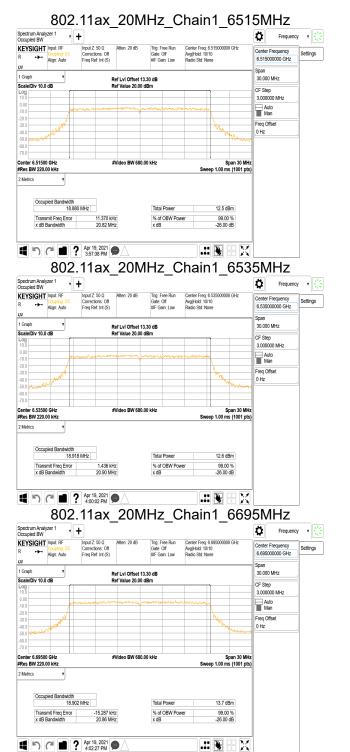
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802.11ax 20MHz Chain1 6855MHz Spectrum Analyzer 1 + 🗘 Frequency 🕇 🔆 Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) KEYSIGHT Input: RF Trig: Free Run Gate: Off Atten: 20 dB Center Frequency 6.855000000 GHz Settings ++-Align: Auto Da Span 30.000 MHz Ref Lvi Offset 13.30 dB Ref Value 20.00 dBm Scale/Div 10.0 dB CF Step 3.000000 MHz Auto Man Freq Offse 0 Hz Center 6.85500 GHz #Video BW 680.00 kHz n 30 MH Span 30 MH Sweep 1.00 ms (1001 pt #Res BW 220.00 kH 2 Metrics Occupied Bandwidth 18.942 MHz Total Power 13.2 dBm Transmit Freq Error x dB Bandwidth -23.715 kHz 20.49 MHz % of OBW Power x dB 99.00 % -26.00 dB 4:04:55 PM # 💘 🕂 🗶 802.11ax 20MHz Chain1 6875MHz Ö Frequency T · + Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) Trig: Free Run Center Freq: 6.875000000 GHz Gate: Off Avg[Hold: 10/10 #IF Gain: Low Radio Std: None KEYSIGHT Input: RF Atten: 20 dB Center Frequency 6.875000000 GHz Settings Align: Auto ĽØ Span 30.000 MHz 1 Graph Scale/Div 10.0 dB Ref Lvi Offset 13.30 dB CF Step 3.000000 MHz Auto Man Freq Offse 0 Hz Center 6.87500 GHz #Res BW 220.00 kHz #Video BW 680 00 kHz Span 30 MHz Sweep 1.00 ms (1001 pts) 2 Metrics Occupied Bandwidth 18.950 MHz Total Power 17.1 dBm % of OBW Power x dB Transmit Freq Error x dB Bandwidth -16.560 kHz 20.80 MHz 99.00 % -26.00 dB 4:09:22 PM .# 💽 🗄 🗶 802.11ax_20MHz_Chain1_6895MHz Spectrum Analyzer 1 Ö Frequency T KEYSIGHT Input: RF Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) Trig: Free Run Center Freq: 6.895000000 GHz Gate: Off Avg[Hold: 10/10 #IF Gain: Low Radio Std: None Atten: 20 dB Coupling: DC Align: Auto Center Frequency 6.895000000 GHz Settings Ļя Span 30.000 MHz 1 Graph Ref Lvi Offset 13.30 dB Ref Value 20.00 dBm Scale/Div 10.0 dB CF Step 3.000000 MHz Auto Man Freq Offse 0 Hz er 6 89500 GH #Video BW 680 00 kHz an 30 MH #Res BW 220.00 kHz Sweep 1.00 ms (1001 pts 2 Metrics Occupied Bandwidth 18.960 MHz Total Power 14.7 dBm Transmit Freq Error x dB Bandwidth -14.103 kHz 21.08 MHz % of OBW Power x dB 99.00 % -26.00 dB 4 つ ペ 目 ? Apr 19, 2021 ● .# 🖹 🗄 🗶

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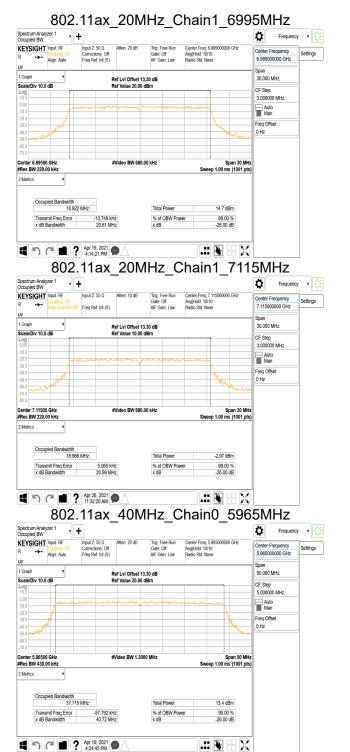
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802.11ax 40MHz Chain0 6165MHz Spectrum Analyzer 1 + 🗘 Frequency 🕇 🔆 Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) Trig: Free Run Gate: Off Avg|Hold: 10/10 #IF Gain: Low Radio Std: None KEYSIGHT Input: RF Atten: 20 dB Center Frequency 6.165000000 GHz Settings ++-Align: Auto Da Span 50.000 MHz Ref LvI Offset 13.30 dB Ref Value 20.00 dBm Scale/Div 10.0 dE CF Step 5.000000 MHz Auto Man Freq Offse 0 Hz nter 6.16500 (#Video BW 1.3000 MHz 50 MI Sweep 1.00 ms (1001 pt Res BW 430.00 kHz 2 Metrics Occupied Bandwidth 37.747 MHz Total Power 13.4 dBm Transmit Freq Error x dB Bandwidth 12.819 kHz 40.39 MHz % of OBW Power x dB 99.00 % -26.00 dB 427:13 PM # 💘 🕂 🗶 802.11ax 40MHz Chain0 6405MHz Ö Frequency v · + Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) Trig: Free Run Center Freq: 6.40500000 GHz Gate: Off Avg[Hold: 10/10 #IF Gain: Low Radio Std: None KEYSIGHT Input: RF Atten: 20 dB Center Frequency 6.40500000 GHz Settings Align: Auto ĽØ Span 50.000 MHz 1 Graph Scale/Div 10.0 dE Ref Lvi Offset 13.30 dB CF Step 5.000000 MHz Auto Man Freq Offse 0 Hz #Video BW 1 3000 MHz or 6 40500 G en 50 M #Res BW 430.00 kHz Sweep 1.00 ms (1001 pts 2 Metrics Occupied Bandwidth 37.704 MHz Total Power 13.8 dBm % of OBW Power x dB Transmit Freq Error x dB Bandwidth -24.558 kHz 39.90 MHz 99.00 % -26.00 dB 429:59 PM .# 💽 🗄 🗶 802.11ax_40MHz_Chain0_6445MHz Spectrum Analyzer 1 Ö Frequency • KEYSIGHT Input: RF Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) Trig: Free Run Center Freq: 6.445000000 GHz Gate: Off Avg[Hold: 10/10 #IF Gain: Low Radio Std: None Atten: 20 dB Coupling: DC Align: Auto Center Frequency 6.445000000 GHz Settings Ļя Span 50.000 MHz 1 Graph Ref LvI Offset 13.30 dB Ref Value 20.00 dBm Scale/Div 10.0 dE CF Step 5.000000 MHz Auto Man Freq Offse 0 Hz #Video BW 1 3000 MHz r 6 44500 (#Res BW 430.00 kHz Sweep 1.00 ms (1001 pts 2 Metrics Occupied Bandwidth 37.733 MHz Total Power 16.6 dBm Transmit Freq Error x dB Bandwidth % of OBW Power x dB -23.280 kHz 39.85 MHz 99.00 % -26.00 dB 4 ら で ■ ? Apr 19, 2021 ● .# 🖹 🗄 🗶

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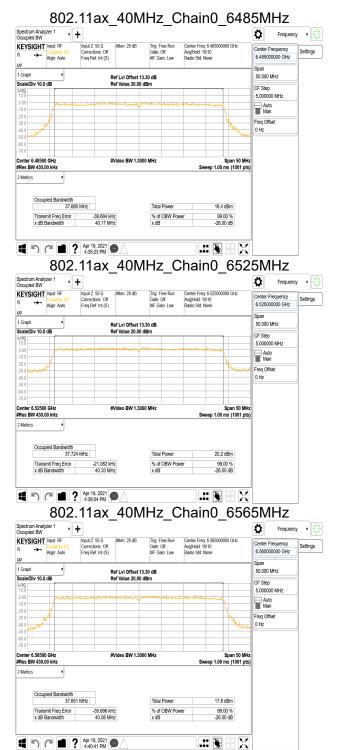
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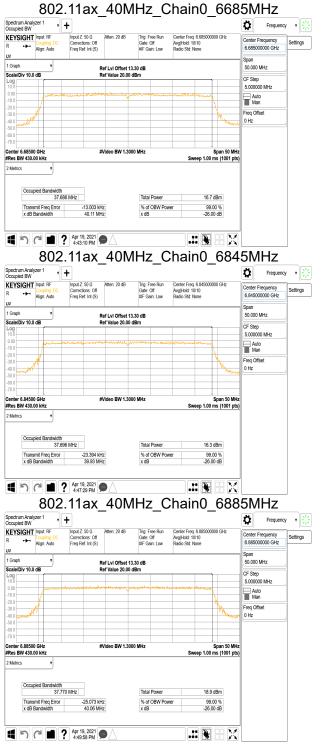
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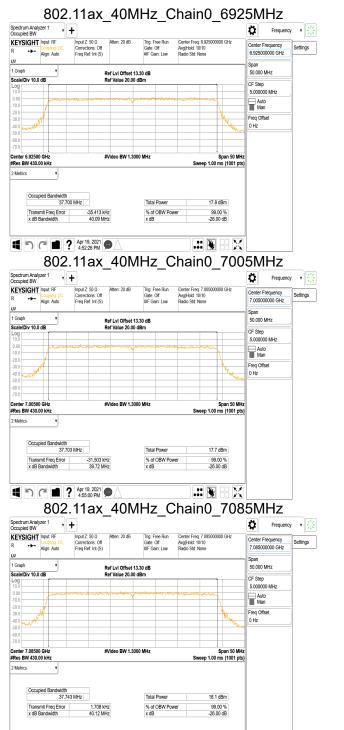
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802.11ax 40MHz Chain1 5965MHz Spectrum Analyzer 1 + 🗘 Frequency 🕇 🔆 Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) KEYSIGHT Input: RF Trig: Free Run Gate: Off Atten: 20 dB Center Frequency 5.965000000 GHz Settings + Align: Auto Da Span 50.000 MHz Ref LvI Offset 13.30 dB Ref Value 20.00 dBm Scale/Div 10.0 dE CF Step 5.000000 MHz Auto Man Freq Offse 0 Hz nter 5.96500 (#Video BW 1.3000 MHz 50 MI Sweep 1.00 ms (1001 pt #Res BW 430.00 kHz 2 Metrics Occupied Bandwidth 37.761 MHz Total Power 13.8 dBm Transmit Freq Error x dB Bandwidth -42.944 kHz 39.99 MHz % of OBW Power x dB 99.00 % -26.00 dB 425:10 PM # 💘 🕂 🗶 802.11ax_40MHz Chain1 6165MHz Ö Frequency T · + Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) Trig: Free Run Center Freq: 6.16500000 GHz Gate: Off Avg[Hold: 10/10 #IF Gain: Low Radio Std: None KEYSIGHT Input: RF Atten: 20 dB Center Frequency 6.165000000 GHz Settings ••• Align: Auto ĽØ Span 50.000 MHz 1 Graph Scale/Div 10.0 dE Ref Lvi Offset 13.30 dB CF Step 5.000000 MHz Auto Man Freq Offse 0 Hz #Video BW 1 3000 MHz or 6 16500 G #Res BW 430.00 kHz Sweep 1.00 ms (1001 pts 2 Metrics Occupied Bandwidth 37.839 MHz Total Power 13.7 dBm % of OBW Power x dB Transmit Freq Error x dB Bandwidth -7.806 kHz 40.50 MHz 99.00 % -26.00 dB 4 つ (* 目 ? Apr 19, 2021 ● 4:27:37 PM .# 💽 🗄 🗶 802.11ax 40MHz Chain1 6405MHz Spectrum Analyzer 1 Ö Frequency T KEYSIGHT Input: RF Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) Trig: Free Run Center Freq: 6.40500000 GHz Gate: Off Avg[Hold: 10/10 #IF Gain: Low Radio Std: None Atten: 20 dB Coupling: DC Align: Auto Center Frequency 6.405000000 GHz Settings Ļя Span 50.000 MHz 1 Grapt Ref Lvi Offset 13.30 dB Ref Value 20.00 dBm Scale/Div 10.0 dE CF Step 5.000000 MHz Auto Man Freq Offse 0 Hz #Video BW 1 3000 MHz r 6 40500 (#Res BW 430.00 kHz Sweep 1.00 ms (1001 pts 2 Metrics Occupied Bandwidth 37.863 MHz Total Power 14.7 dBm Transmit Freq Error x dB Bandwidth % of OBW Power x dB 5.578 kHz 40.22 MHz 99.00 % -26.00 dB 4 つ ペ 目 ? Apr 19, 2021 ● .# 🖹 🗄 🗶

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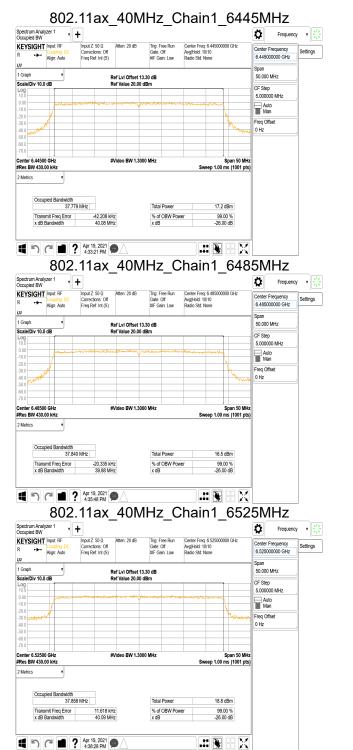
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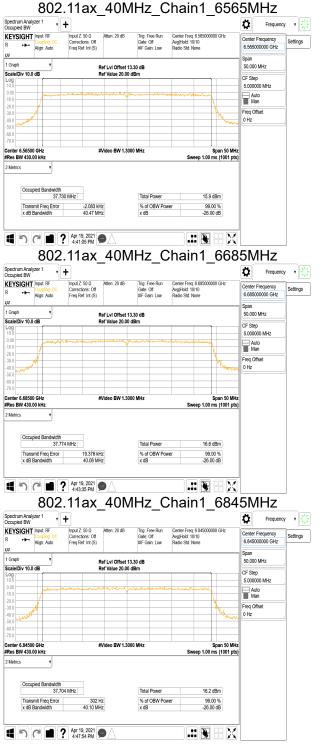
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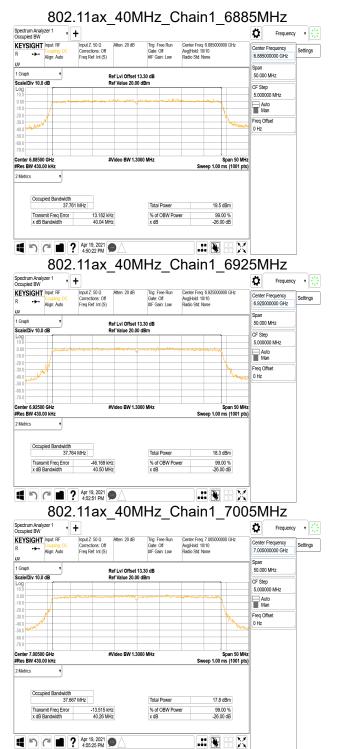
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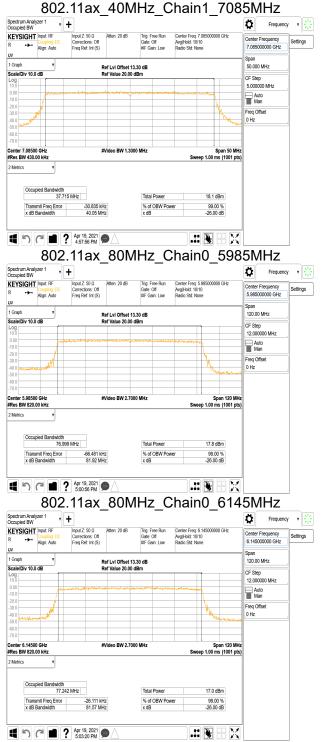
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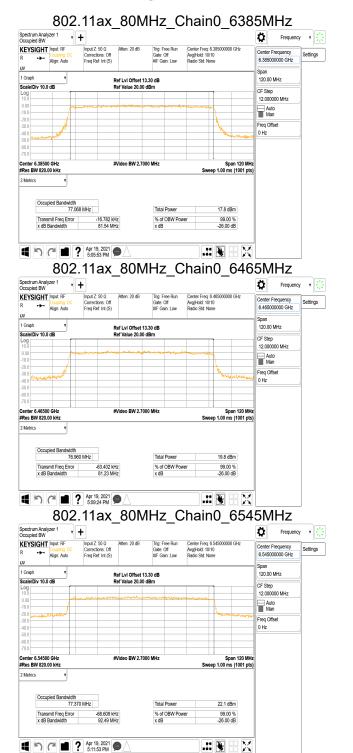
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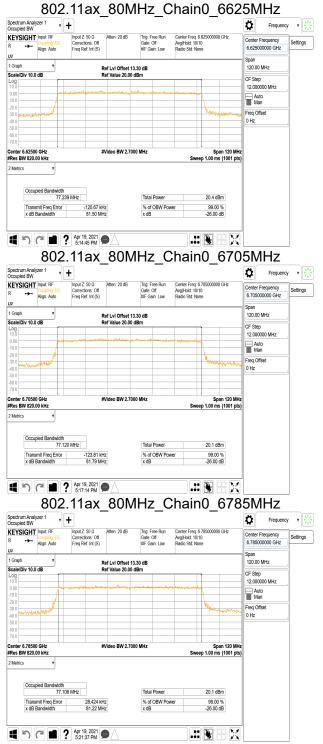
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