

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT



Applicant: Quanta Computer Inc.
No. 188, Wenhua 2nd Road, Guishan District, Taoyuan City
33377, Taiwan

Product Name: Clover Flex

Brand Name: clover

Model No.: C403

HVIN: C403W

Model Difference: N/A

Report Number: ER/2021/50016

FCC ID HFS-C403W

IC: 1787B-C403W

Issue Date: July 9, 2021

Date of Test: June 11, 2021 ~ June 30, 2021

Date of EUT Received: May 21, 2021

Approved By


Blue Yang

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, ISED RSS-247.

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

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Revision History

Report Number	Revision	Description	Issue Date	Revised By
ER/2021/50016	00	Original	July 9, 2021	Yuri Tsai

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1 GENERAL INFORMATION

1.1 Product Description

Product Name:	Clover Flex
Brand Name:	clover
Model No.:	C403
HVIN:	C403W
Model Difference:	N/A
Hardware Version:	N/A
Firmware Version:	N/A
EUT Series No.:	C043UT11750016
Power Supply:	7.6V from Li-ion Polymer rechargeable battery or 12V from Adapter

1.2 Modulation & Data Rate

Modulation type:	64QAM, 16QAM, QPSK, BPSK for OFDM
	256QAM for OFDM in 802.11ac only
Transition Rate:	802.11 a: 6.5 - 54 Mbps
	802.11 n_20MHz: 6.5 - 72.2 Mbps
	802.11 n_40MHz: 13.5 - 150 Mbps
	802.11 ac_20MHz: 6.5 - 86.7 Mbps
	802.11 ac_40MHz: 13.5 - 200 Mbps
	802.11 ac_80MHz: 29.3 - 433.3 Mbps

1.3 Antenna Designation

Antenna Type	Supplier	Antenna Part No.	Freq. (MHz)	Peak Antenna Gain (dBi)	Worst Antenna Gain
PIFA	SAA	DQ60AYF0002	5150~5250	2.24	-
			5250~5350	2.30	-
			5475~5725	3.64	-
			5725~5850	3.97	-
Note: Antenna information is provided by the applicant.					

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1.4 FCC

WLAN 5 GHz

Wi-Fi	Frequency Range	Channels	Rated Power(Avg) (dBm) (Worst Case)	Modulation Technology
a n_HT ac_VHT 20M	5180~5240	4	17.49 dBm	OFDM
	5260~5320	4	17.25 dBm	OFDM
	5500~5720	12	17.34 dBm	OFDM
	5745-5825	5	17.47 dBm	OFDM
n_HT ac_VHT 40M	5190~5230	2	16.48 dBm	OFDM
	5270~5310	2	16.21 dBm	OFDM
	5510~5710	6	16.59 dBm	OFDM
	5755-5795	2	16.37 dBm	OFDM
ac_VHT 80M	5210	1	14.68 dBm	OFDM
	5290	1	10.63 dBm	OFDM
	5530~5690	3	15.27 dBm	OFDM
	5775	1	15.24 dBm	OFDM

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1.5 ISED

WLAN 5 GHz for ISED(Slave)

Wi-Fi	Frequency Range	Channels	EIRP/Avg	Rated Power(EIRP/Avg) (dBm) (Worst Case)		Modulation Technology
a n_HT ac_VHT 20M	5180~5240	4	EIRP	19.73	dBm	OFDM
	5260~5320	4	Avg	17.25	dBm	OFDM
	5500~5700	11	Avg	17.34	dBm	OFDM
	5720 (U-NII 2C)	1	Avg	15.68	dBm	OFDM
	5720 (U-NII 3)	1	Avg	11.93	dBm	OFDM
	5745-5825	5	Avg	17.47	dBm	OFDM
n_HT ac_VHT 40M	5190~5230	2	EIRP	18.72	dBm	OFDM
	5270~5310	2	Avg	16.21	dBm	OFDM
	5510~5670	5	Avg	16.59	dBm	OFDM
	5710 (U-NII 2C)	1	Avg	15.57	dBm	OFDM
	5710 (U-NII 3)	1	Avg	7.33	dBm	OFDM
	5755-5795	2	Avg	16.37	dBm	OFDM
ac_VHT 80M	5210	1	EIRP	16.92	dBm	OFDM
	5290	1	Avg	10.63	dBm	OFDM
	5530~5610	2	Avg	15.27	dBm	OFDM
	5690 (U-NII 2C)	1	Avg	14.82	dBm	OFDM
	5690 (U-NII 3)	1	Avg	4.11	dBm	OFDM
	5775	1	Avg	15.24	dBm	OFDM

Note: As per guidance in presentation 2018-04-10-03 IC Certification updates of April 2018 TCB workshop, Client (Slave mode) devices without active scanning function, but with the capability of operating in 5600-5650 MHz solely under the control of a certified master device meeting the requirement of RSS-247, are allowed in Canada.

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1.6 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

RSS-247 issue 2 Feb. 2017

RSS-Gen Issue 5, Amendment 2, February 2021

ANSI C63.10:2013

1.7 Test Facility

Laboratory	Test Site Address	Test Site Name	FCC Designation 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	Conduction A	TW0028	
		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 indication where measurements occurred in specific test site and address.				

1.8 Special Accessories

There are no special accessories used while test was conducted.

1.9 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

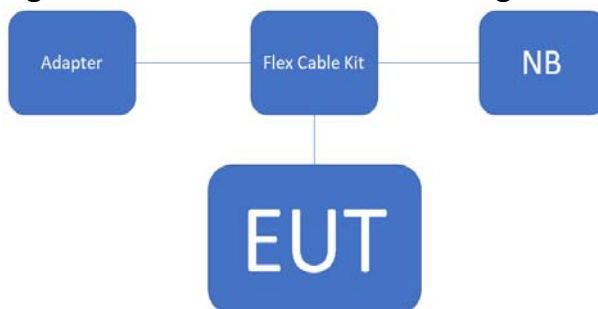


Fig. 2-2 Conducted (Antenna Port) Emission Configuration



Fig. 2-3 Conducted (AC powerline) Emission Configuration

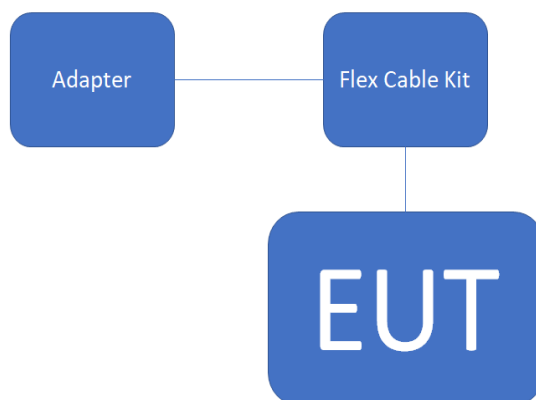


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.
1	WLAN Test Software	N/A	N/A	N/A
2	Notebook	Lenovo	T440P	PC-014TAK
3	Flex Cable Kit	Clover	N/A	H041UQ63940213

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3 SUMMARY OF TEST RESULT

FCC Rules	IC Rules	Description Of Test	Result
§15.207	RSS-Gen §8.8	AC Power Line Conducted Emission	Compliant
§15.407(e)	RSS-Gen §6.7 RSS-247 §6.2.4.1	Emission Bandwidth	Compliant
§15.407(a)	RSS-247 §6.2.1~ 4 (1)	Maximum Conducted Output Power	Compliant
§15.407(a)	RSS-247 §6.2.1~ 4 (1)	Power Spectral Density	Compliant
§15.205 §15.209 §15.407(b)	RSS-247 §6.2.1~ 4 (2)	Undesirable Radiated Emissions	Compliant
§15.407(c)	RSS-247 §6.4	Transmission in case of Absence of Information	Compliant
§15.203 §15.407(a)	N/A	Antenna Requirement	Compliant

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4 DESCRIPTION OF TEST MODES

4.1 Operating Frequencies

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 gevin 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

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

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4.2.1 RADIATED EMISSION TEST:

RADIATED EMISSION TEST (BELOW 1 GHz)						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5180~5240	36 to 48	44	OFDM	6	ch0
	5260~5320	52 to 64	60			
	5500~5720	100 to 144	116			
	5745~5825	149 to 165	157			

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	ch0
	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	MCS0	ch0
	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	MCS0	ch0
	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	ch0
	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 three orthogonal planes, E1 / E2 / H, are positioned to pre-scan the emission generating the highest one. The worst position is tested and recorded.

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4.2.2 ANTENNA PORT CONDUCTED MEASUREMENT:

CONDUCTED TEST						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6	ch0
	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	MCS0	ch0
	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	MCS0	ch0
	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	ch0
	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
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			
Polarization: Vertical	+/-	2.64 dB	9kHz~30MHz
	+/-	4.93 dB	30MHz - 1000MHz
	+/-	4.81 dB	1GHz - 18GHz
	+/-	4.52 dB	18GHz - 40GHz
Polarization: Horizontal	+/-	2.64 dB	9kHz~30MHz
	+/-	4.45 dB	30MHz - 1000MHz
	+/-	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.

Frequency range MHz	Limits (dBuV)	
	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

Radiated Emission Test Site: Conduction 1					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
LISN	SCHWARZB ECK	NSLK 8127	8127-465	04/09/2021	04/08/2022
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	ESCI 7	100759	07/13/2020	07/12/2021

6.3 EUT Setup

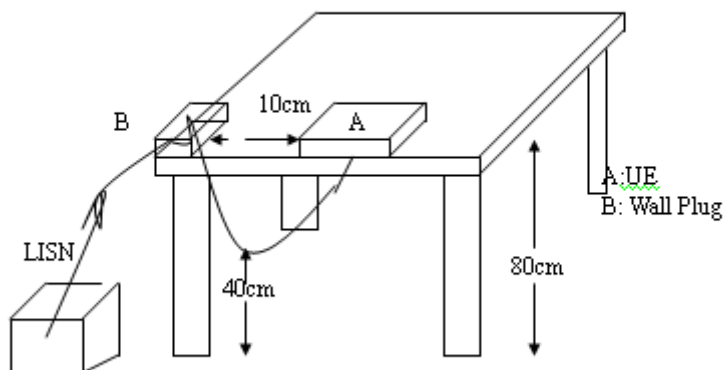
1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10:2013.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The LISN was connected with 120Vac/60Hz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

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6.4 Test SET-UP



6.5 Measurement Procedure

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

6.6 Measurement Result

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

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 :ER/2021/50016

Test Site :Conduction 6F

Test Mode :WLAN 5G

Test Date :2021-06-16

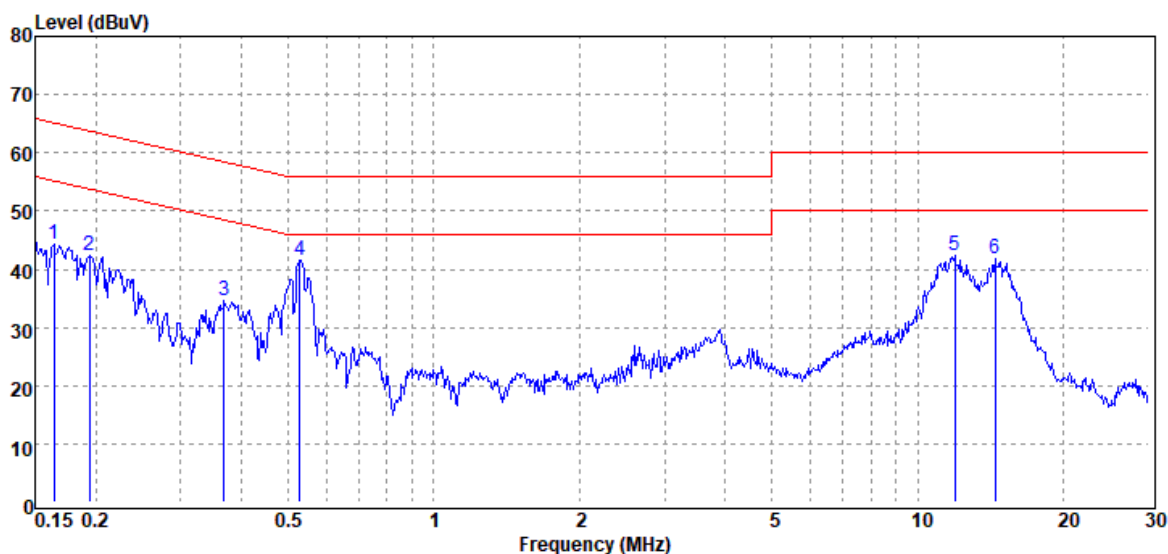
Power :AC 120V/60Hz

Temp./Humi. :25.3/58

Probe :L

Engineer :Neo Tsai

Note :



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV	Limit dBμV	Margin dB
0.16	Peak	44.36	0.04	44.40	65.25	-20.85
0.19	Peak	42.31	0.04	42.35	63.84	-21.49
0.37	Peak	34.43	0.09	34.52	58.52	-24.00
0.53	Peak	41.33	0.15	41.48	56.00	-14.52
11.93	Peak	41.34	0.92	42.26	60.00	-17.74
14.44	Peak	40.78	1.01	41.79	60.00	-18.21

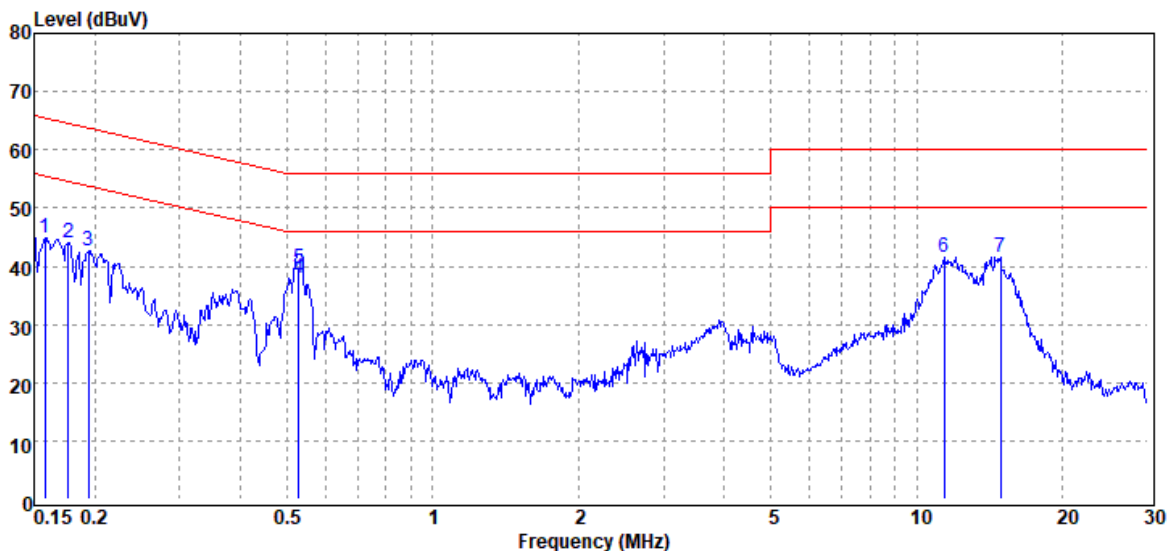
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Report Number :ER/2021/50016
 Test Mode :WLAN 5G
 Power :AC 120V/60Hz
 Probe :N
 Note: :

Test Site :Conduction 6F
 Test Date :2021-06-16
 Temp./Humi. :25.3/58
 Engineer :Neo Tsai



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV	Limit dBμV	Margin dB
0.16	Peak	44.79	0.11	44.90	65.56	-20.66
0.18	Peak	44.04	0.11	44.15	64.64	-20.49
0.19	Peak	42.50	0.11	42.61	63.84	-21.23
0.53	Average	37.70	0.21	37.91	46.00	-8.09
0.53	QP	39.30	0.21	39.51	56.00	-16.49
11.38	Peak	40.84	0.79	41.63	60.00	-18.37
14.91	Peak	40.67	0.97	41.64	60.00	-18.36

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7 DUTY CYCLE TEST SIGNAL

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle.

All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

7.1 Measurement Procedure:

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

Duty Cycle:

Mode	Duty Cycle (%) =Ton / (Ton+Toff)	Duty Factor (dB) =10*log (1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
802.11a	98.00	0.09	0.48	0.01
802.11n_20	98.00	0.09	0.52	0.01
802.11ac_20	98.00	0.09	0.52	0.01
802.11n_40	96.00	0.18	1.05	2.00
802.11ac_40	96.00	0.18	1.05	2.00
802.11ac_80	93.00	0.32	2.16	3.00

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7.2 DUTY CYCLE TEST SIGNAL MEASUREMENT RESULT

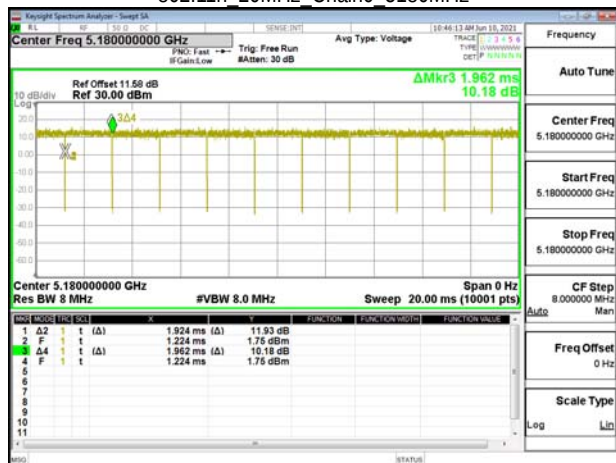
802.11a 20MHz Chain0 5180MHz



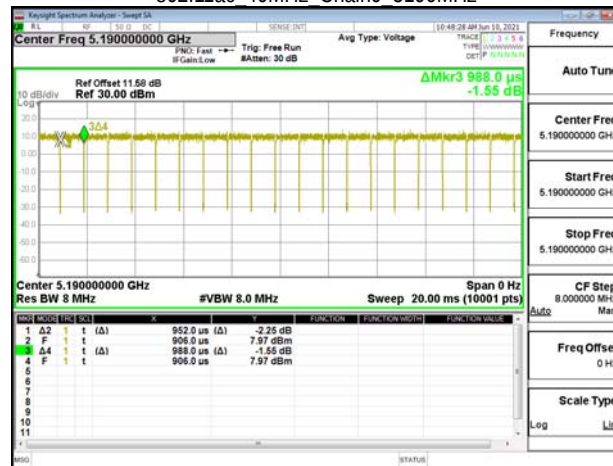
802.11ac 20MHz Chain0 5180MHz



802.11n 20MHz Chain0 5180MHz



802.11ac 40MHz Chain0 5190MHz



802.11n 40MHz Chain0 5190MHz



802.11ac 80MHz Chain0 5210MHz



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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 = large enough to capture all products of the modulation process,
Detector=Peak,
Sweep=auto
 - b. Mark the peak frequency and -6dB (upper and lower) frequency.
6. For 99% Bandwidth: Set the spectrum analyzer as
RBW=1%,
VBW = 3*RBW,
Span = large enough to capture all products of the modulation process,
Detector=Sample,
Sweep=auto.
7. Turn on the 99% bandwidth function, max reading.
8. Repeat above procedures until all frequency of interest measured was complete.

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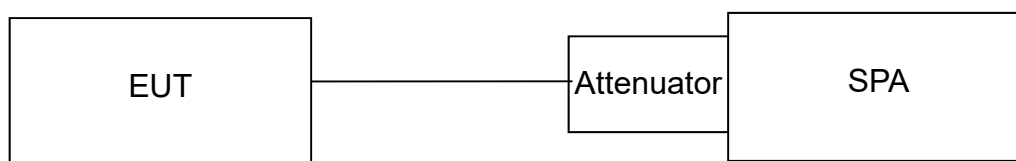
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8.3 Measurement Equipment Used

Conducted Emission Test Site: Conducted 4					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
PXA Spectrum Analyzer	Agilent	N9030A	MY53120760	04/27/2021	04/26/2022
Attenuator	Mini-Circuit	BW-S10W2+	4	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 Measurement Result

8.5.1 FCC 26dB Bandwidth

802.11a_Ch0

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	23.70	13.750
5220	23.45	13.700
5240	22.08	13.440
5260	23.49	13.710
5300	23.38	13.690
5320	21.94	13.410
5500	22.99	13.620
5580	22.70	13.560
5700	23.05	13.630
5720(U-NII 2C)	16.51	12.180
5720(U-NII 3)	6.51	8.130

802.11n_HT20_Ch0

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	22.97	13.610
5220	25.47	14.060
5240	25.09	14.000
5260	23.79	13.760
5300	23.25	13.660
5320	23.54	13.720
5500	23.27	13.670
5580	25.10	14.000
5700	23.30	13.670
5720(U-NII 2C)	17.28	12.380
5720(U-NII 3)	7.28	8.620

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802.11n_HT40_Ch0

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	40.87	16.110
5230	40.23	16.050
5270	41.12	16.140
5310	40.84	16.110
5510	40.65	16.090
5550	40.44	16.070
5670	41.09	16.140
5710(U-NII 2C)	35.29	15.480
5710(U-NII 3)	5.29	7.230

802.11ac_VHT80_Ch0

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5210	82.17	19.150
5290	82.79	19.180
5530	82.85	19.180
5610	82.73	19.180
5690(U-NII 2C)	76.50	18.840
5690(U-NII 3)	6.50	8.130

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

802.11a_Ch0

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	16.06	12.060
5785	15.48	11.900
5825	16.31	12.120

802.11n_HT20_Ch0

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	16.86	12.270
5785	16.32	12.130
5825	16.83	12.260

802.11n_HT40_Ch0

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5755	36.06	15.570
5795	36.10	15.580

802.11ac_VHT80_Ch0

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5775	72.84	18.620

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8.5.3 BW Verification for DFS Function

802.11a_Ch0

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5240	5248.33	< 5250
5745	5736.80	> 5725

802.11n_HT20_Ch0

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5240	5248.94	< 5250
5745	5736.18	> 5725

802.11n_HT40_Ch0

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5230	5248.14	< 5250
5755	5736.95	> 5725

802.11ac_VHT80_Ch0

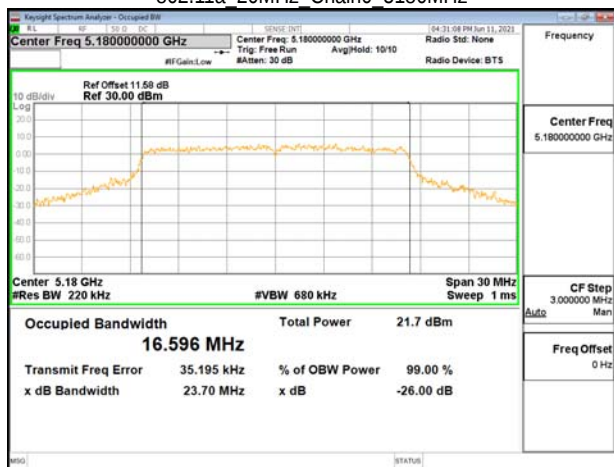
Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5210	5247.96	< 5250
5775	5737.24	> 5725

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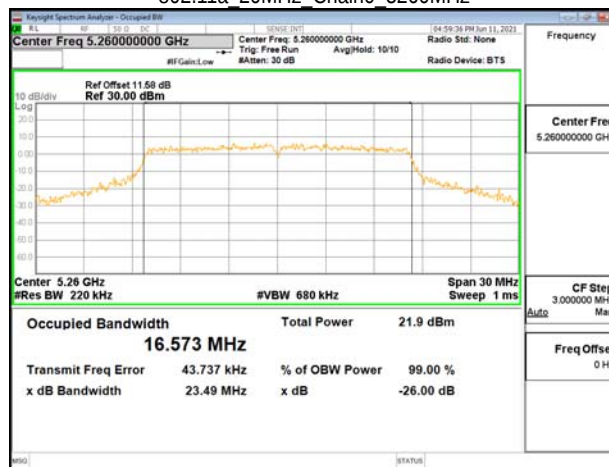
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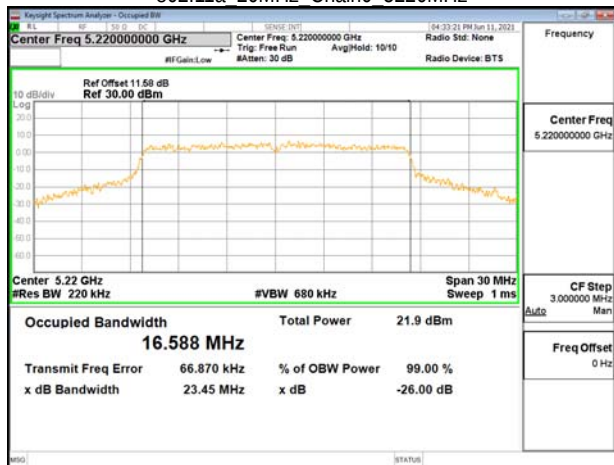
802.11a 20MHz Chain0 5180MHz



802.11a 20MHz Chain0 5260MHz



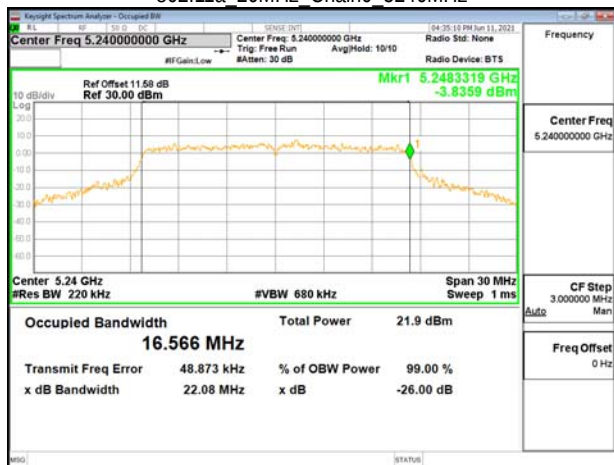
802.11a 20MHz Chain0 5220MHz



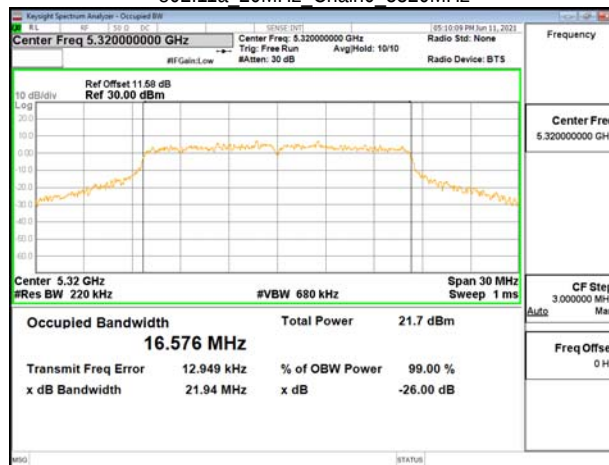
802.11a 20MHz Chain0 5300MHz



802.11a 20MHz Chain0 5240MHz



802.11a 20MHz Chain0 5320MHz

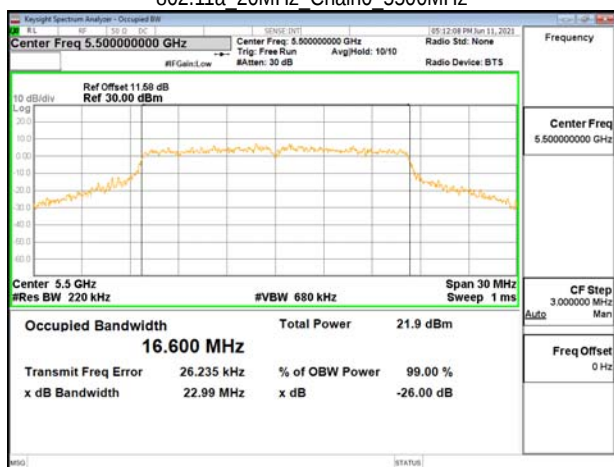


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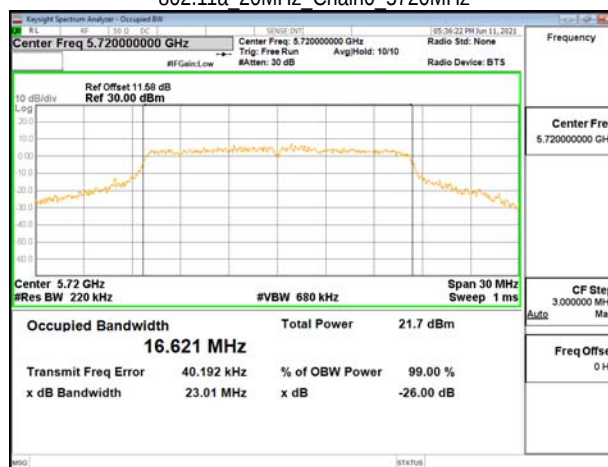
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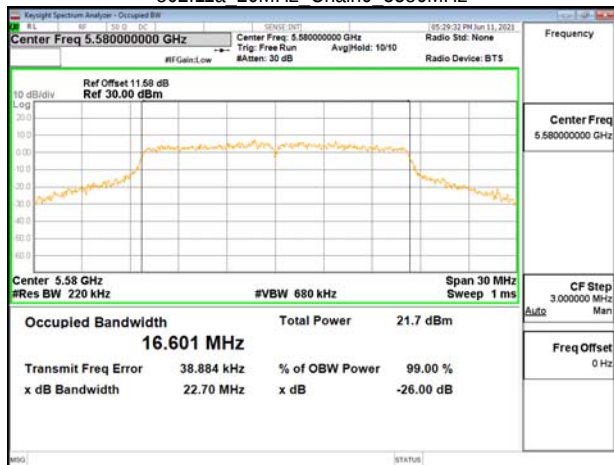
802.11a 20MHz Chain0 5500MHz



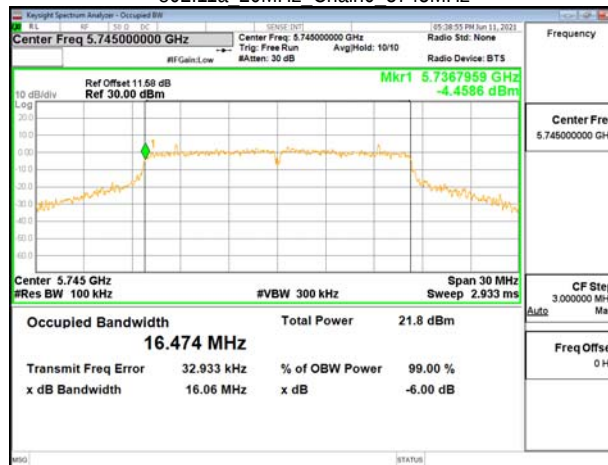
802.11a 20MHz Chain0 5720MHz



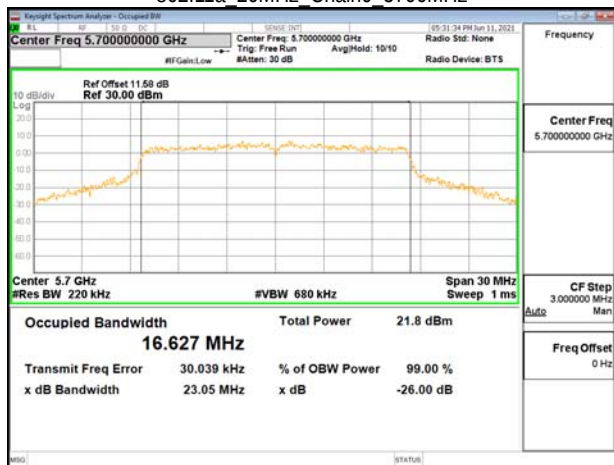
802.11a 20MHz Chain0 5580MHz



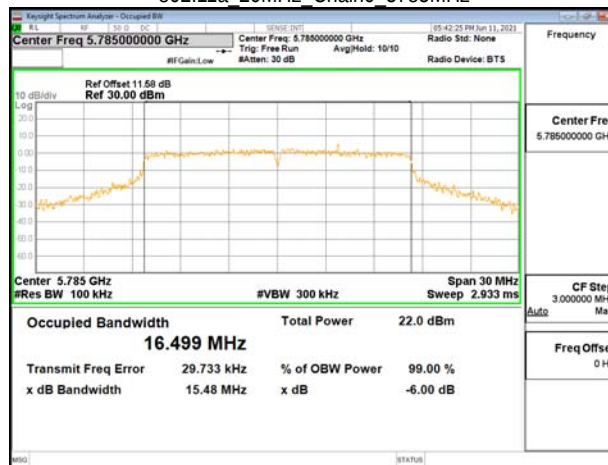
802.11a 20MHz Chain0 5745MHz



802.11a 20MHz Chain0 5700MHz



802.11a 20MHz Chain0 5785MHz

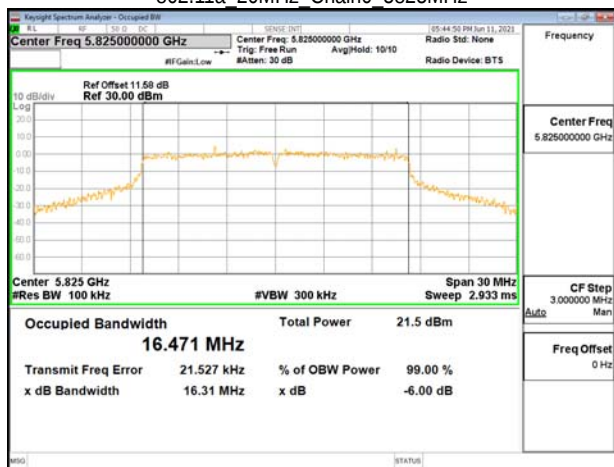


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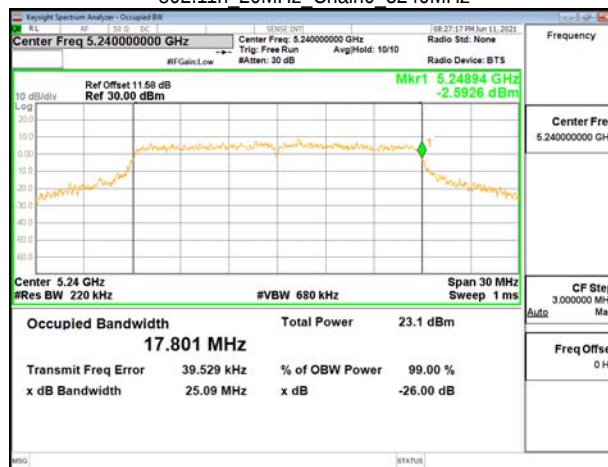
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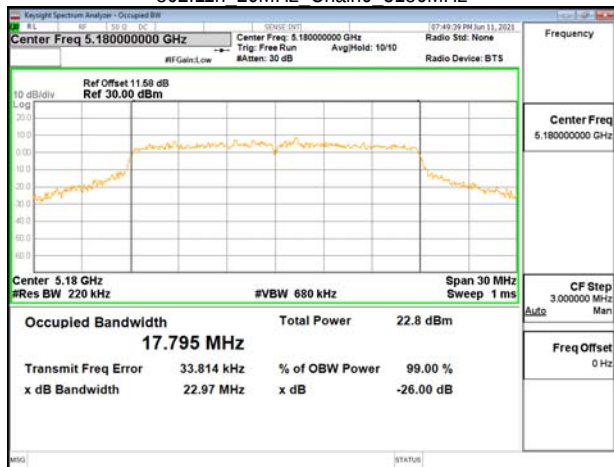
802.11a 20MHz Chain0 5825MHz



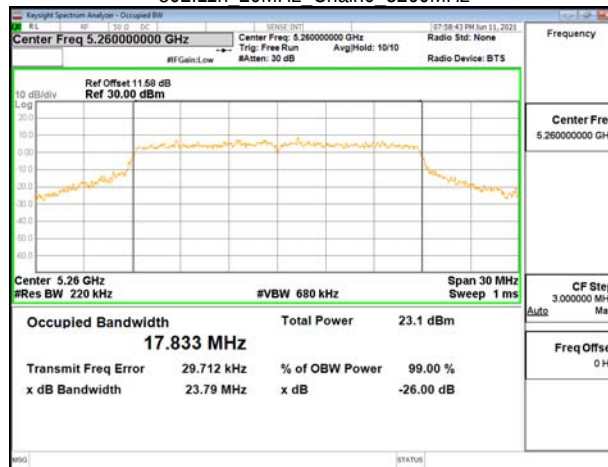
802.11n 20MHz Chain0 5240MHz



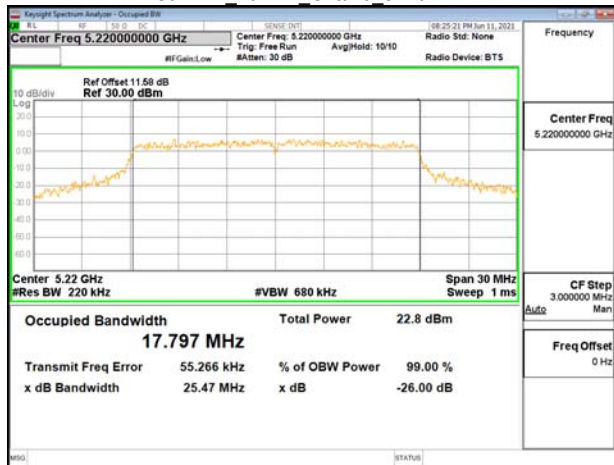
802.11n 20MHz Chain0 5180MHz



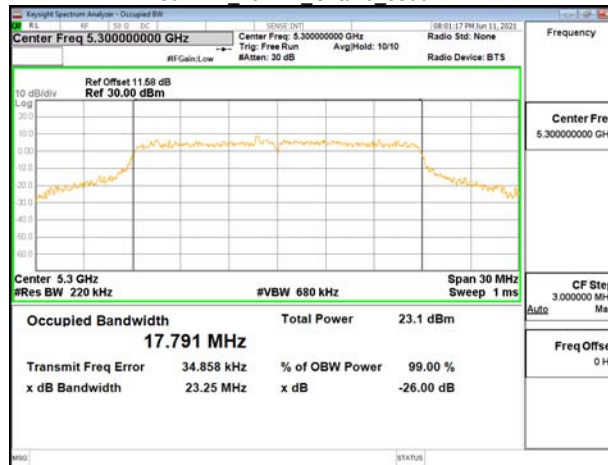
802.11n 20MHz Chain0 5260MHz



802.11n 20MHz Chain0 5220MHz



802.11n 20MHz Chain0 5300MHz

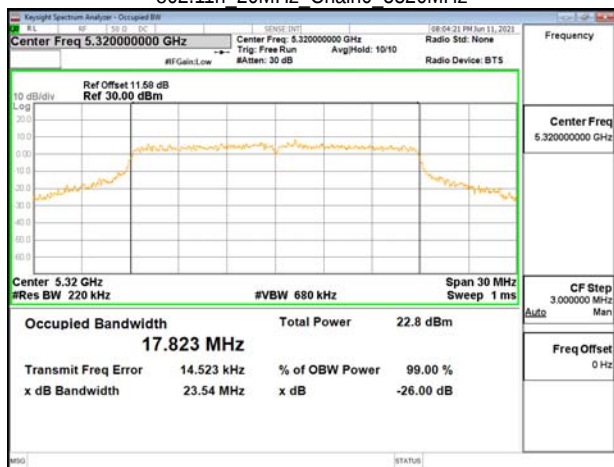


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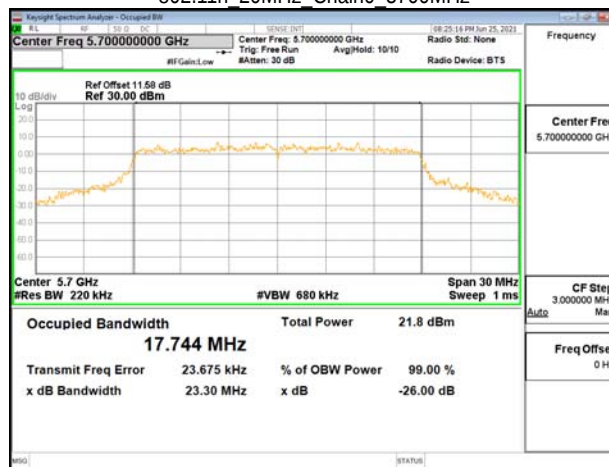
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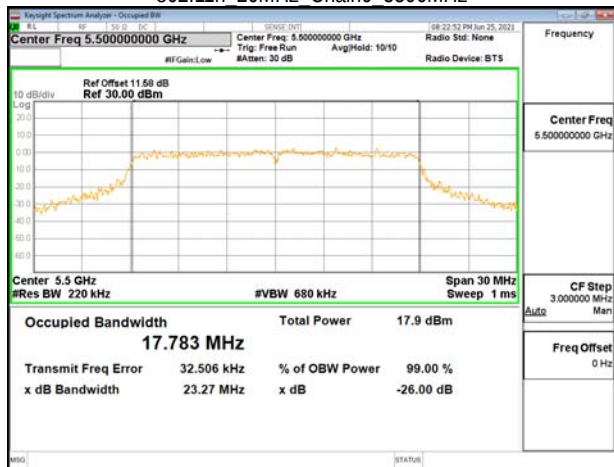
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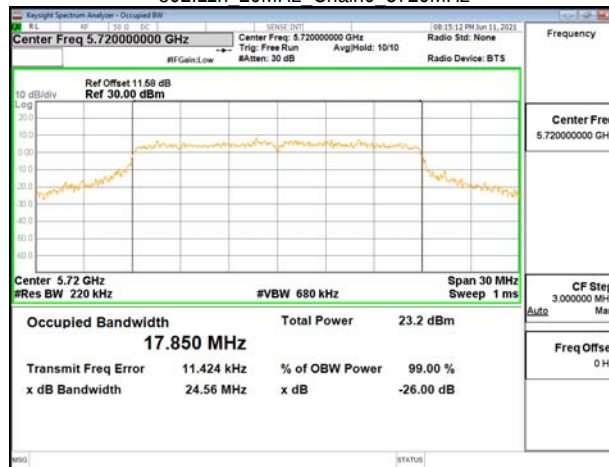
802.11n 20MHz Chain0 5700MHz



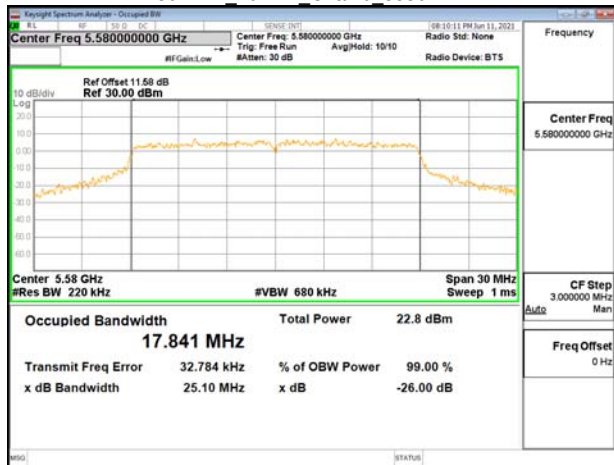
802.11n 20MHz Chain0 5500MHz



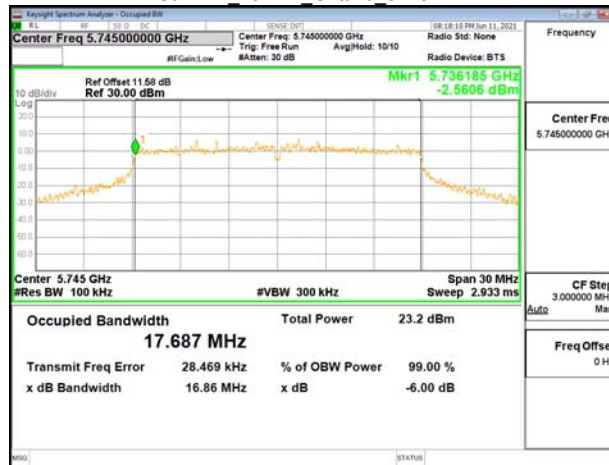
802.11n 20MHz Chain0 5720MHz



802.11n 20MHz Chain0 5580MHz



802.11n 20MHz Chain0 5745MHz

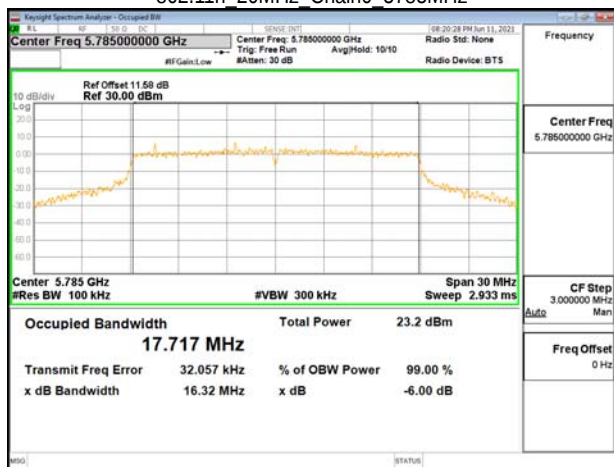


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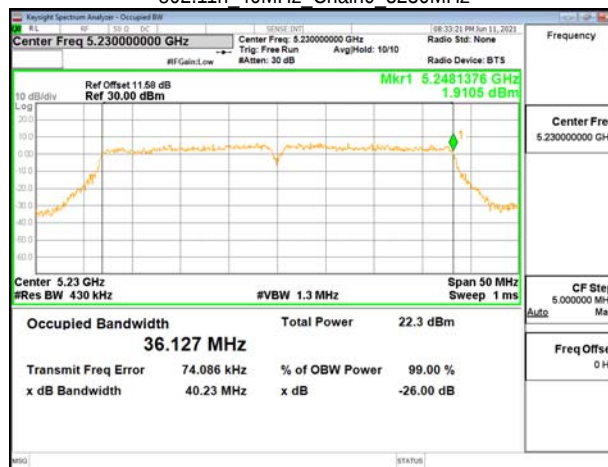
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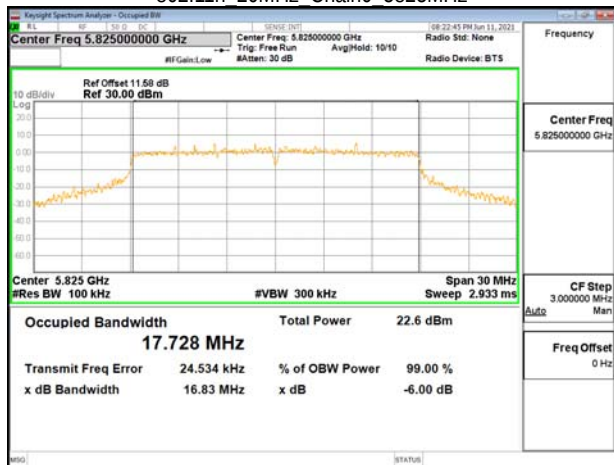
802.11n 20MHz Chain0 5785MHz



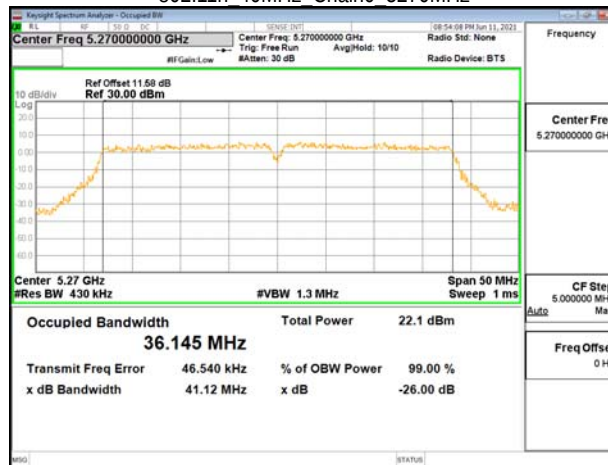
802.11n 40MHz Chain0 5230MHz



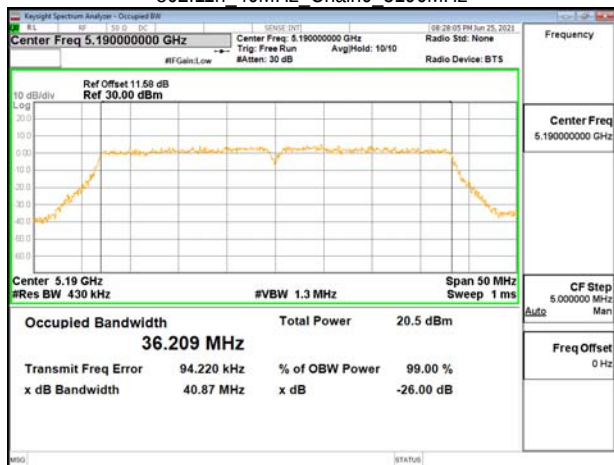
802.11n 20MHz Chain0 5825MHz



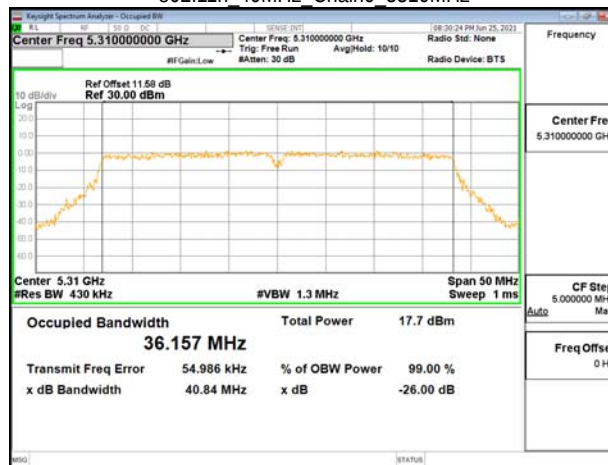
802.11n 40MHz Chain0 5270MHz



802.11n 40MHz Chain0 5190MHz



802.11n 40MHz Chain0 5310MHz

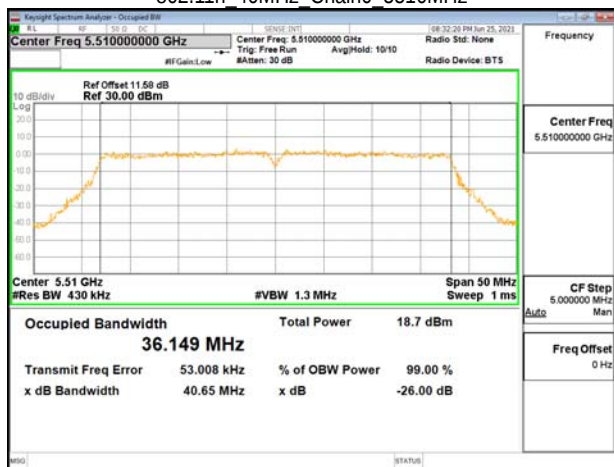


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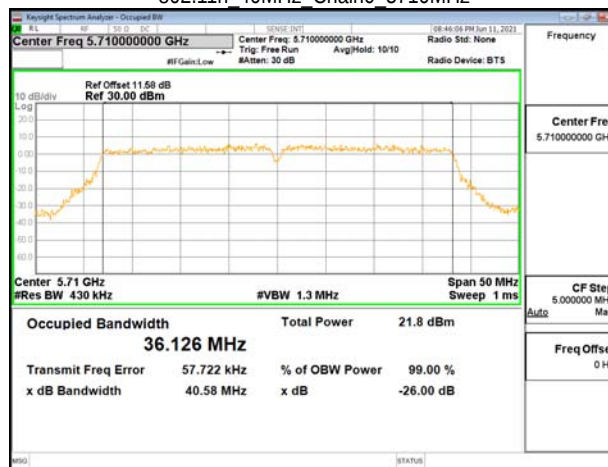
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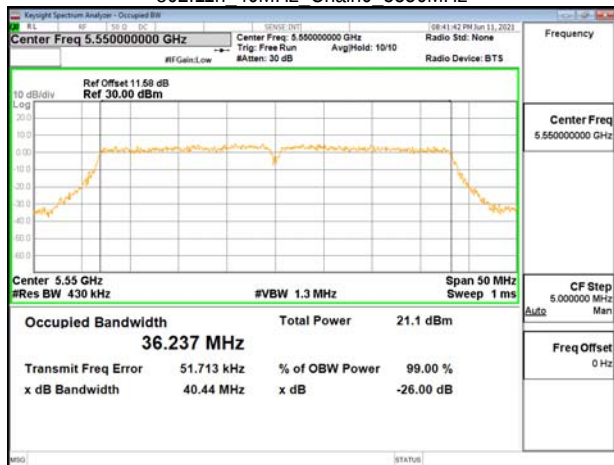
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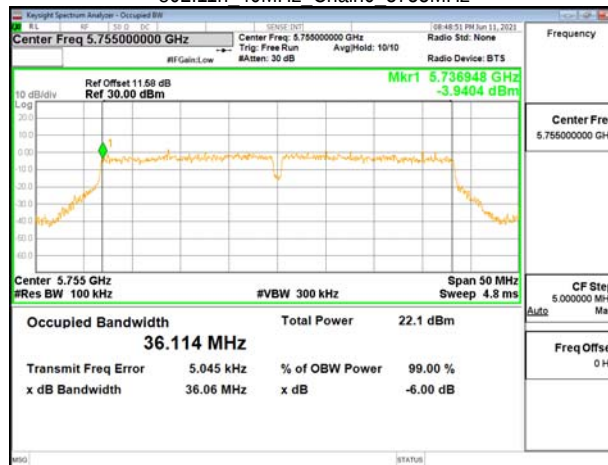
802.11n 40MHz Chain0 5710MHz



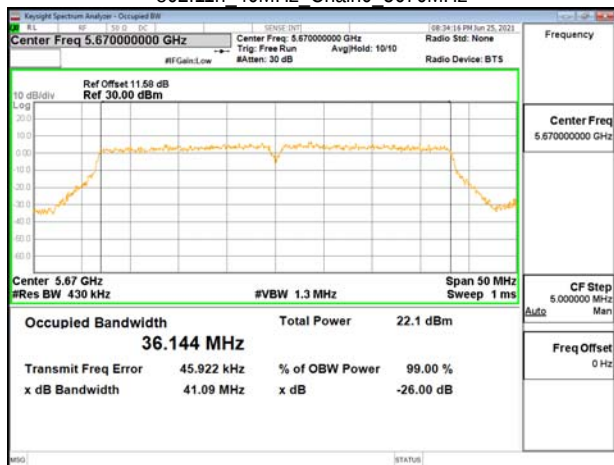
802.11n 40MHz Chain0 5550MHz



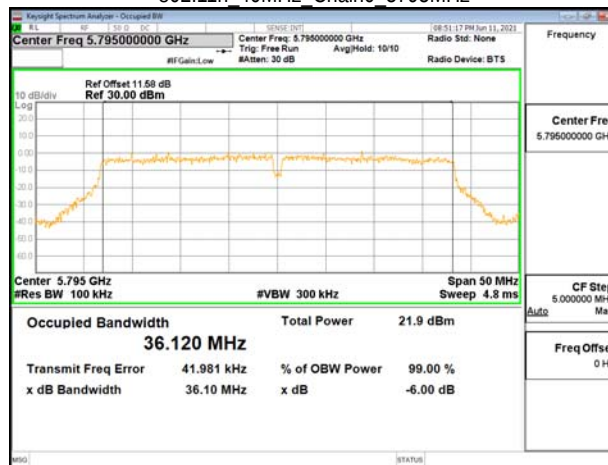
802.11n 40MHz Chain0 5755MHz



802.11n 40MHz Chain0 5670MHz



802.11n 40MHz Chain0 5795MHz

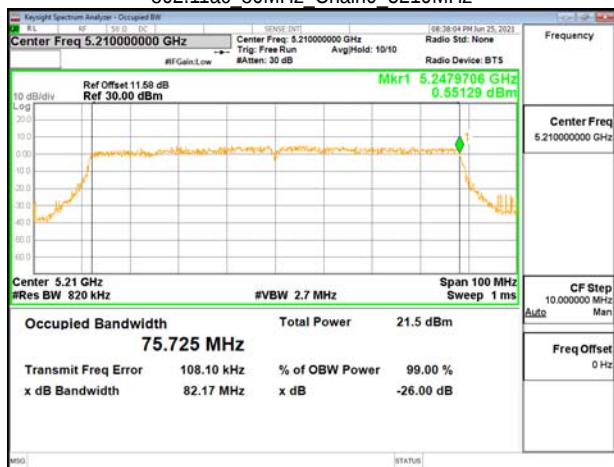


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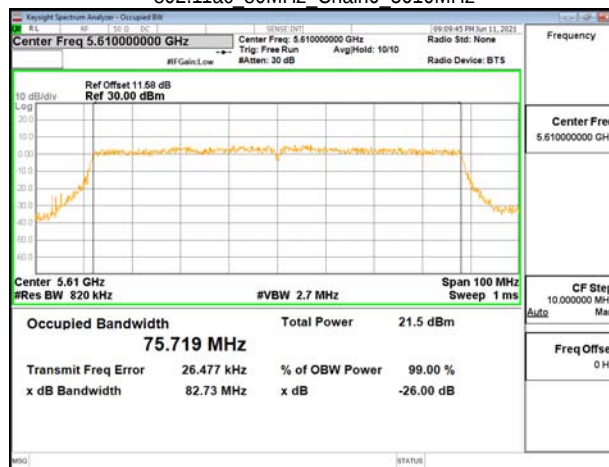
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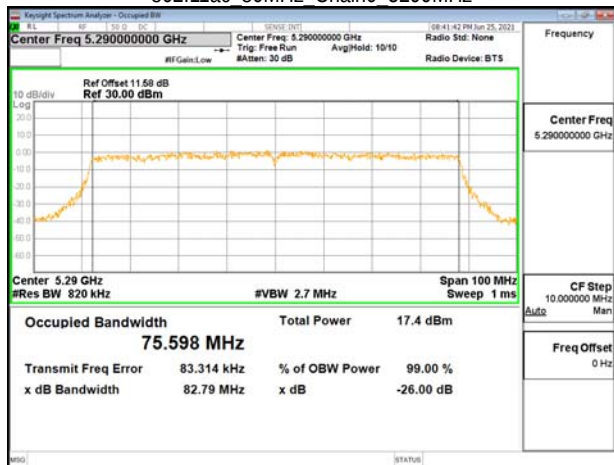
802.11ac 80MHz Chain0 5210MHz



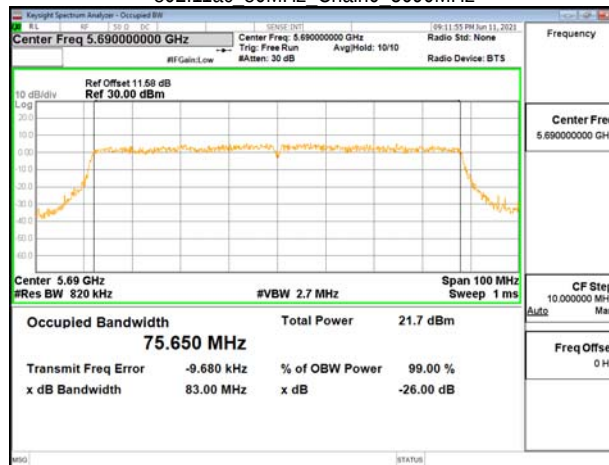
802.11ac 80MHz Chain0 5610MHz



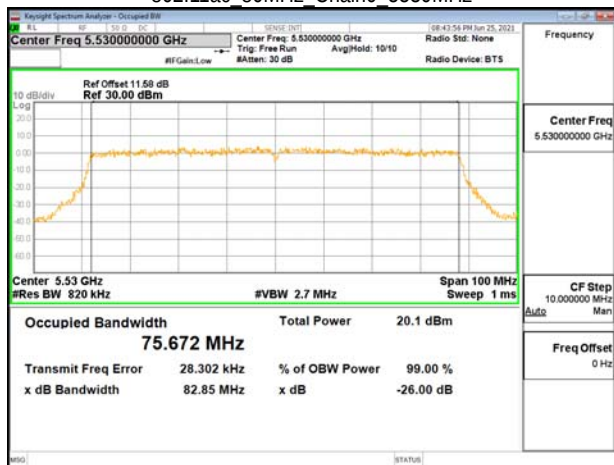
802.11ac 80MHz Chain0 5290MHz



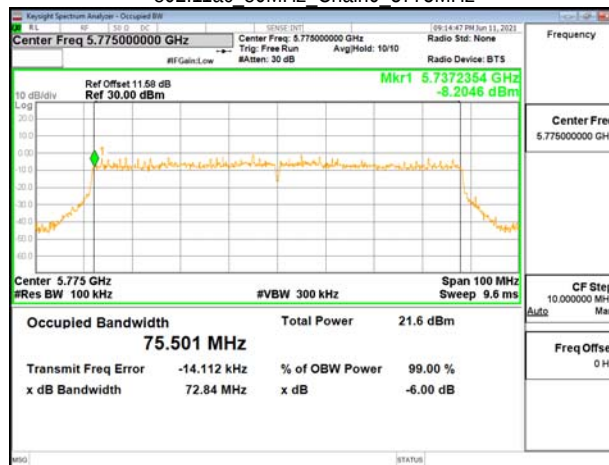
802.11ac 80MHz Chain0 5690MHz



802.11ac 80MHz Chain0 5530MHz



802.11ac 80MHz Chain0 5775MHz



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8.5.4 ISED 99% Bandwidth

802.11a_Ch0

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5180	16.548	12.190
5220	16.573	12.190
5240	16.575	12.190
5260	16.589	12.200
5300	16.537	12.180
5320	16.569	12.190
5500	16.550	12.190
5580	16.552	12.190
5700	16.558	12.190
5720(U-NII 2C)	13.274	11.230
5720(U-NII 3)	3.274	5.150

802.11n_HT20_Ch0

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5180	17.772	12.500
5220	17.817	12.510
5240	17.760	12.490
5260	17.785	12.500
5300	17.772	12.500
5320	17.768	12.500
5500	17.739	12.490
5580	17.836	12.510
5700	17.783	12.500
5720(U-NII 2C)	13.901	11.430
5720(U-NII 3)	3.901	5.910

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802.11n _HT40_Ch0

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5190	36.166	15.580
5230	36.173	15.580
5270	36.120	15.580
5310	36.132	15.580
5510	36.175	15.580
5550	36.141	15.580
5670	36.164	15.580
5710(U-NII 2C)	33.069	15.190
5710(U-NII 3)	3.069	4.870

802.11ac _VHT80_Ch0

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5210	75.766	18.790
5290	75.667	18.790
5530	75.770	18.790
5610	75.590	18.780
5690(U-NII 2C)	72.796	18.620
5690(U-NII 3)	2.796	4.470

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8.5.5 6dB Bandwidth (5725 MHz~ 5850 MHz) measure with sample detector

802.11a_Ch0

Frequency (MHz)	99% BW (MHz)	6dB BW (MHz)
5745	16.532	15.980
5785	16.541	16.300
5825	16.552	11.580

802.11n_HT20_Ch0

Frequency (MHz)	99% BW (MHz)	6dB BW (MHz)
5745	17.761	17.010
5785	17.810	17.040
5825	17.780	17.340

802.11n_HT40_Ch0

Frequency (MHz)	99% BW (MHz)	6dB BW (MHz)
5755	36.127	36.210
5795	36.108	36.150

802.11ac_VHT80_Ch0

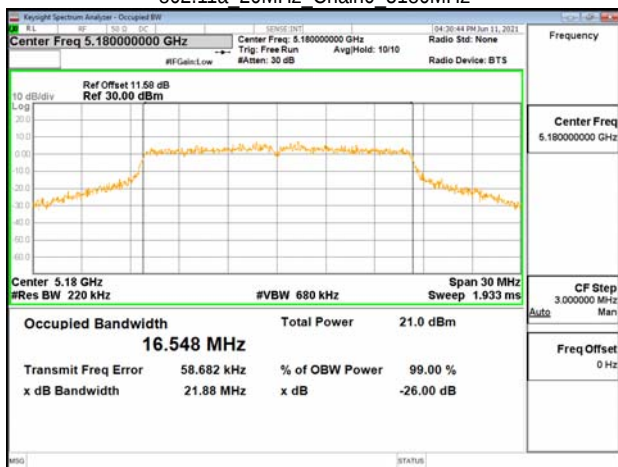
Frequency (MHz)	99% BW (MHz)	6dB BW (MHz)
5775	75.750	75.900

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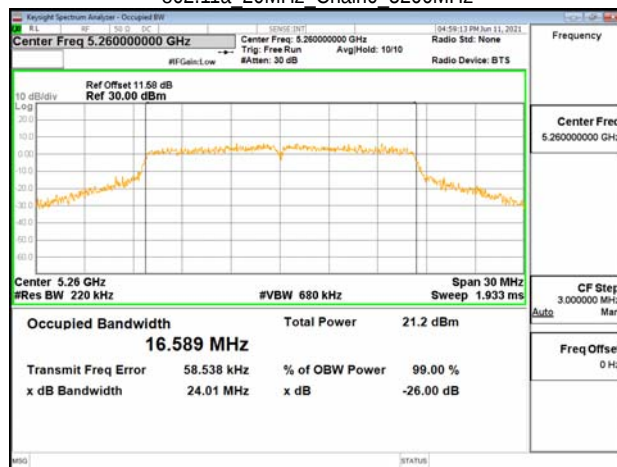
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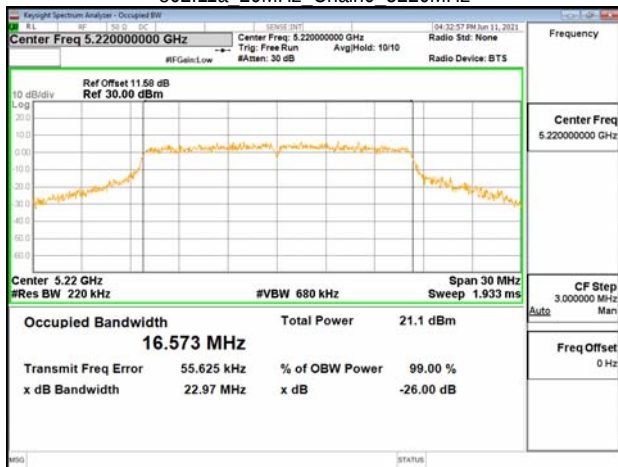
802.11a 20MHz Chain0 5180MHz



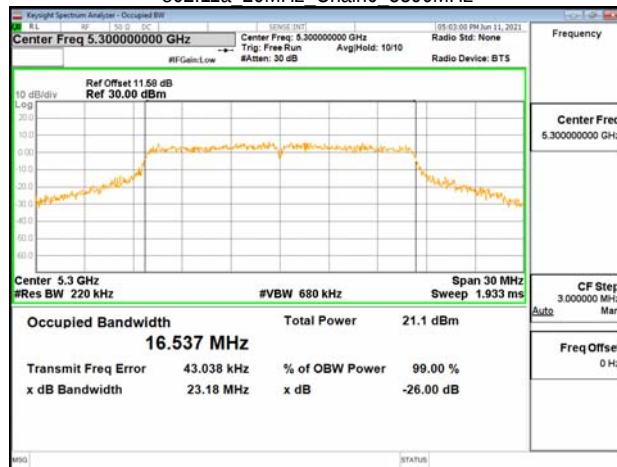
802.11a 20MHz Chain0 5260MHz



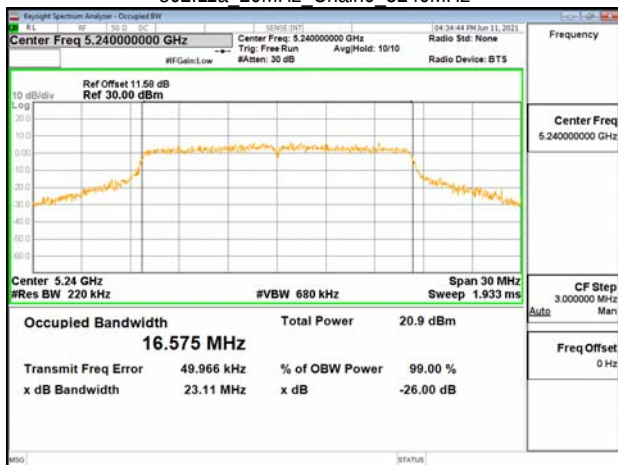
802.11a 20MHz Chain0 5220MHz



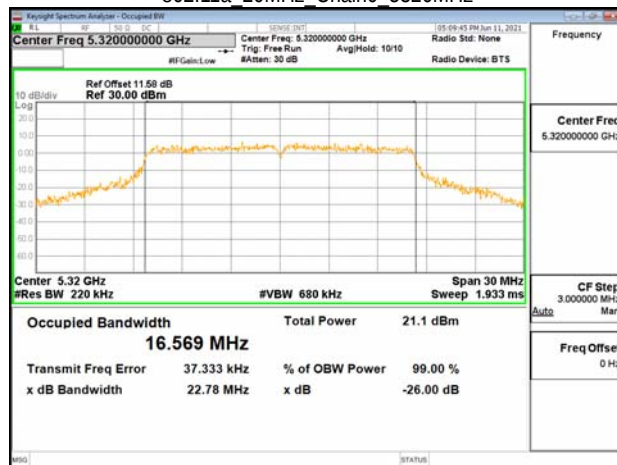
802.11a 20MHz Chain0 5300MHz



802.11a 20MHz Chain0 5240MHz



802.11a 20MHz Chain0 5320MHz



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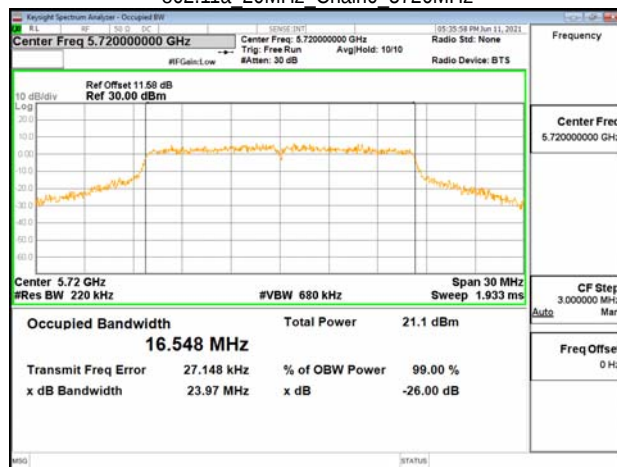
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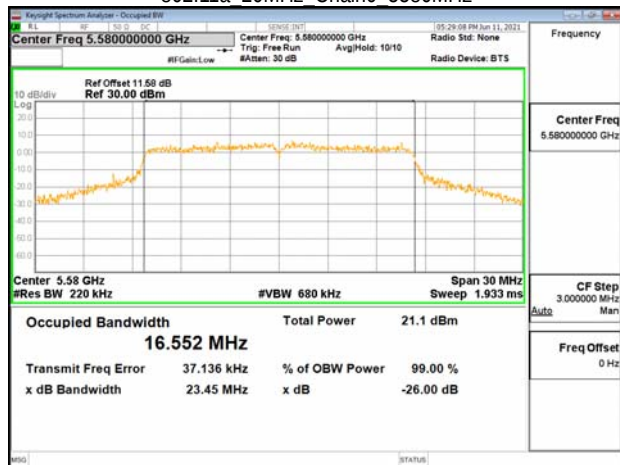
802.11a 20MHz Chain0 5500MHz



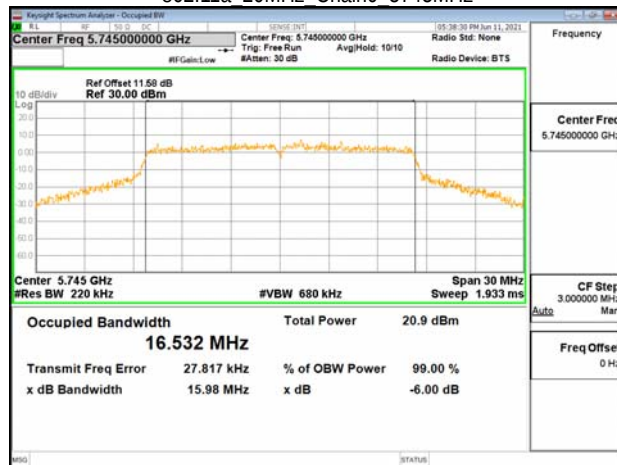
802.11a 20MHz Chain0 5720MHz



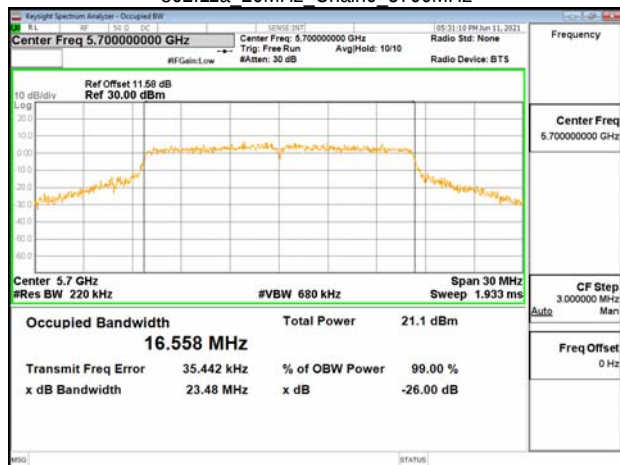
802.11a 20MHz Chain0 5580MHz



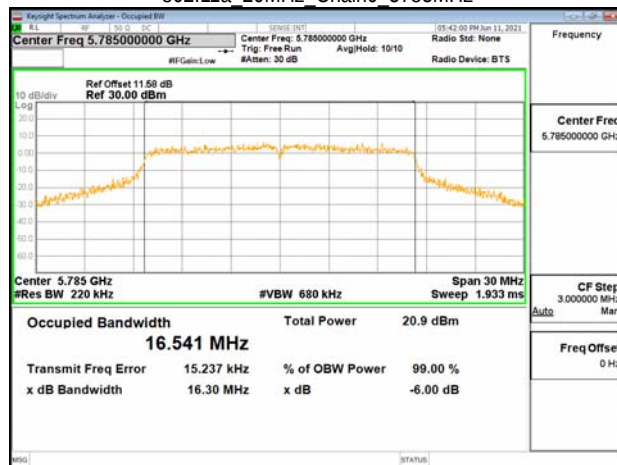
802.11a 20MHz Chain0 5745MHz



802.11a 20MHz Chain0 5700MHz



802.11a 20MHz Chain0 5785MHz

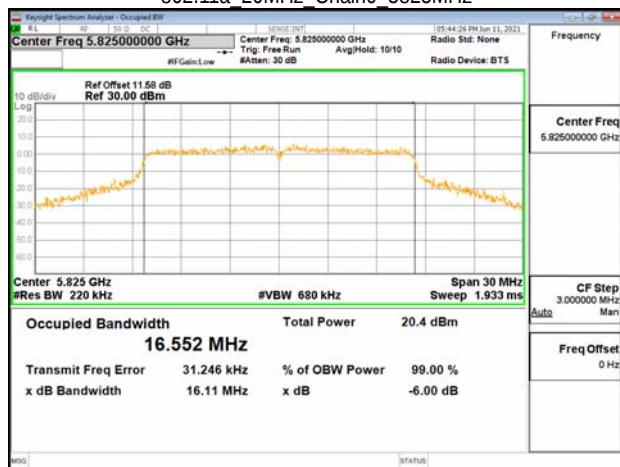


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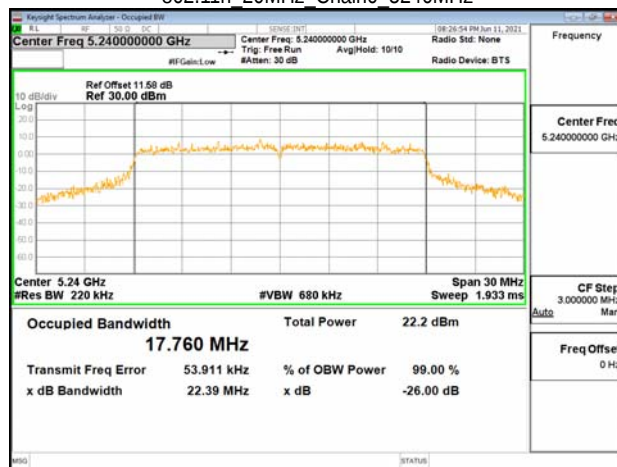
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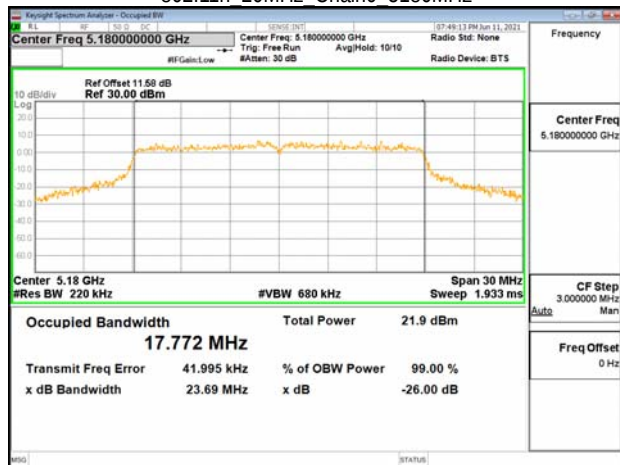
802.11a 20MHz Chain0 5825MHz



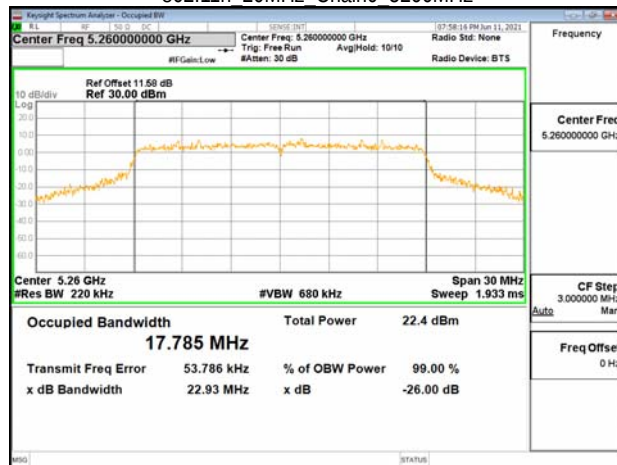
802.11n 20MHz Chain0 5240MHz



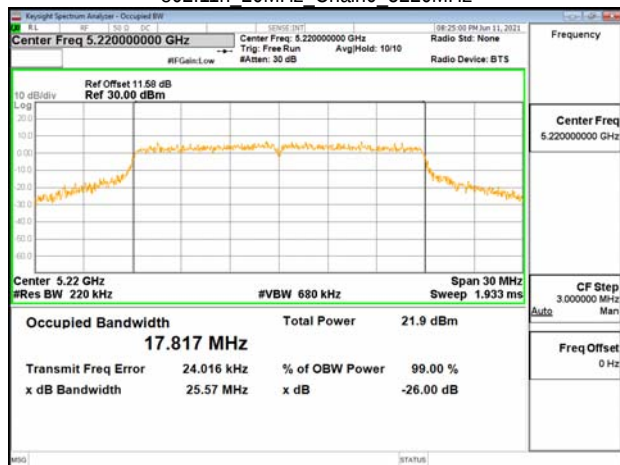
802.11n 20MHz Chain0 5180MHz



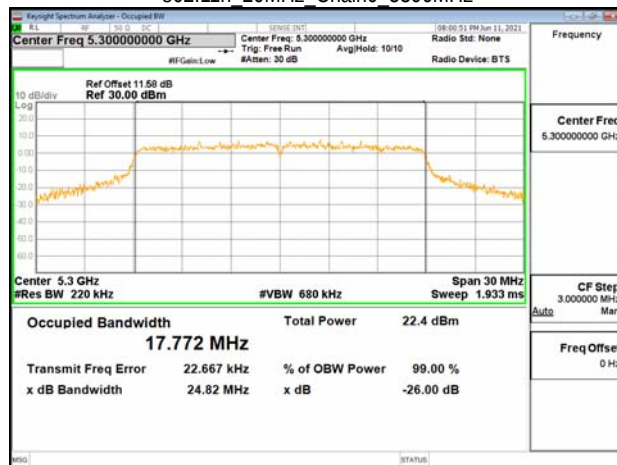
802.11n 20MHz Chain0 5260MHz



802.11n 20MHz Chain0 5220MHz



802.11n 20MHz Chain0 5300MHz

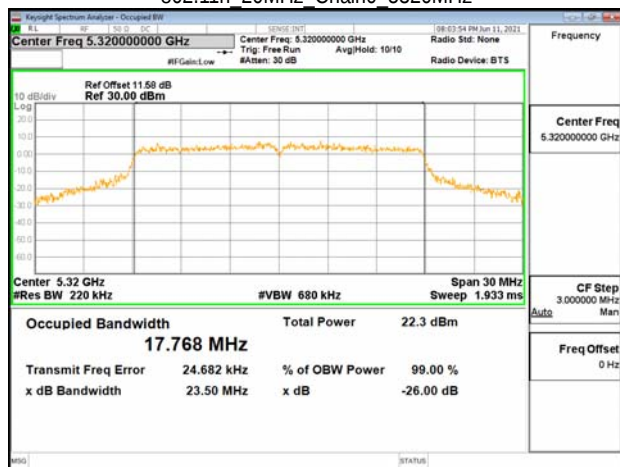


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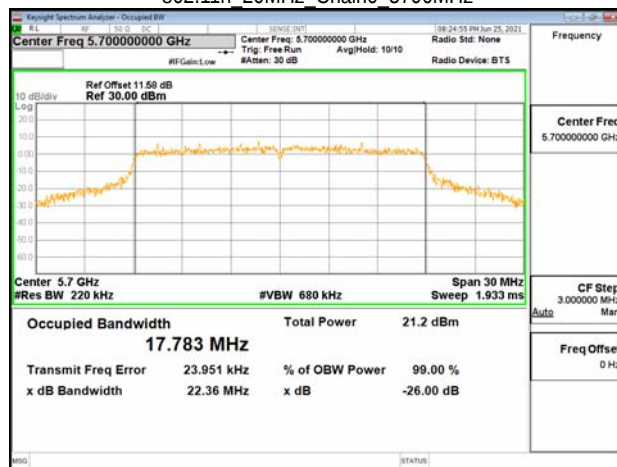
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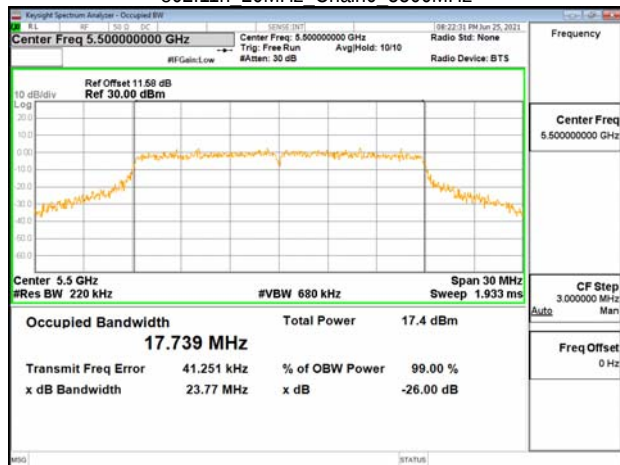
802.11n 20MHz Chain0 5320MHz



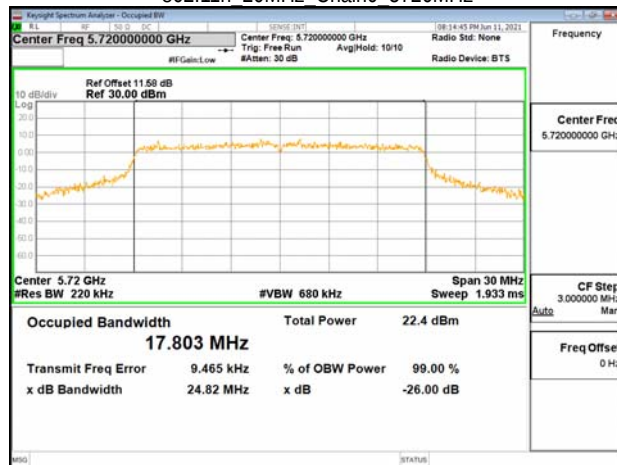
802.11n 20MHz Chain0 5700MHz



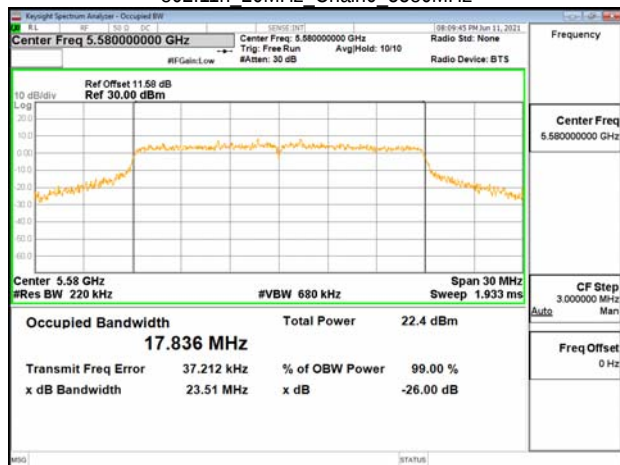
802.11n 20MHz Chain0 5500MHz



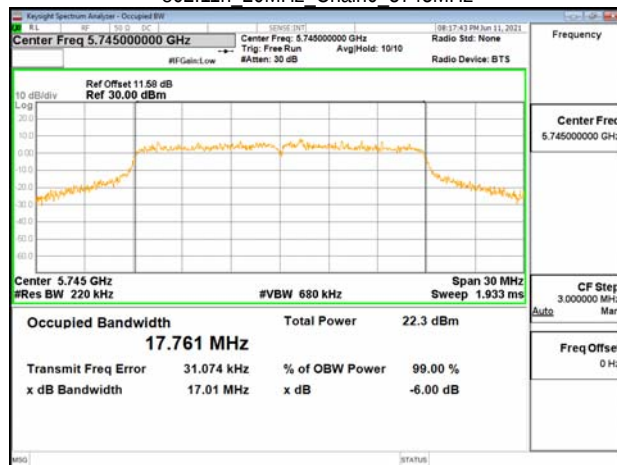
802.11n 20MHz Chain0 5720MHz



802.11n 20MHz Chain0 5580MHz



802.11n 20MHz Chain0 5745MHz



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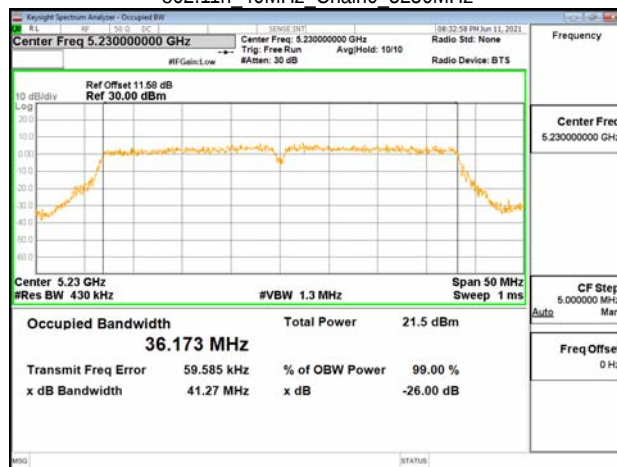
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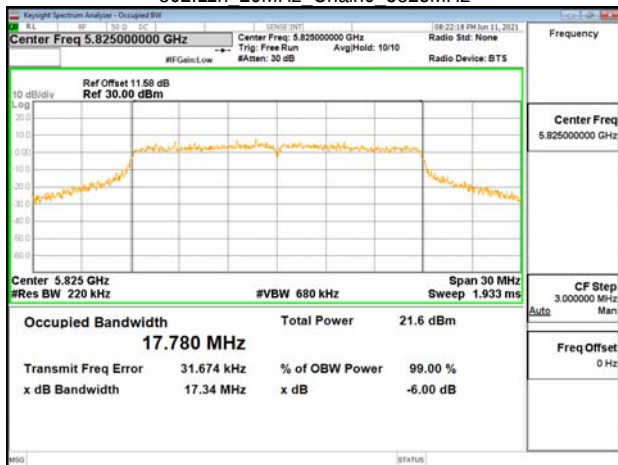
802.11n 20MHz Chain0 5785MHz



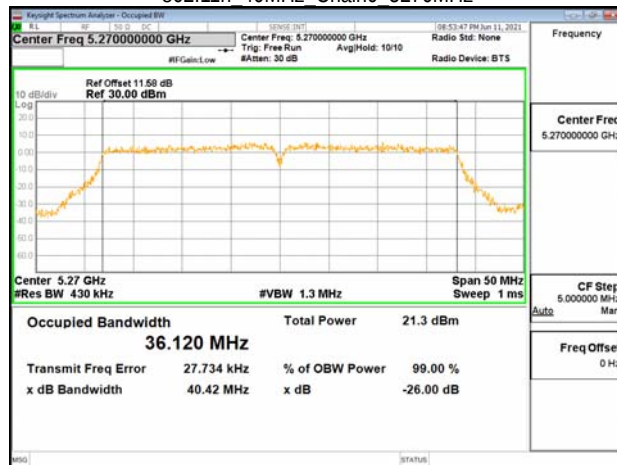
802.11n 40MHz Chain0 5230MHz



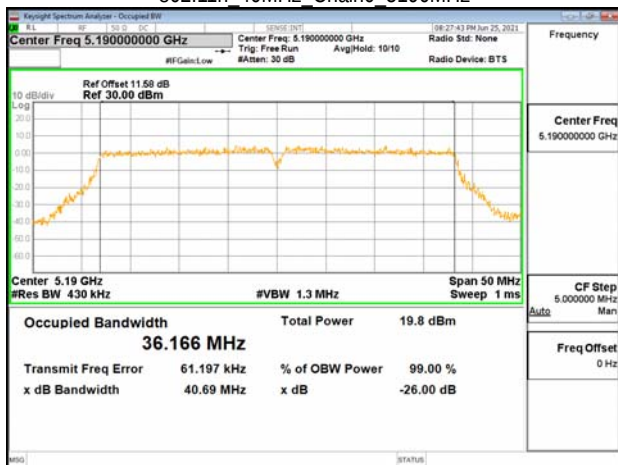
802.11n 20MHz Chain0 5825MHz



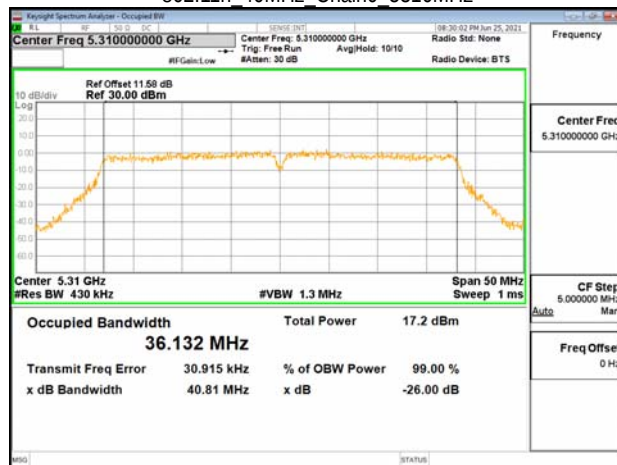
802.11n 40MHz Chain0 5270MHz



802.11n 40MHz Chain0 5190MHz



802.11n 40MHz Chain0 5310MHz

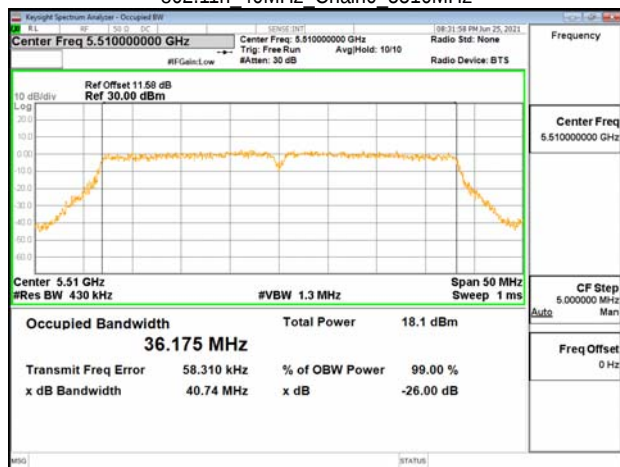


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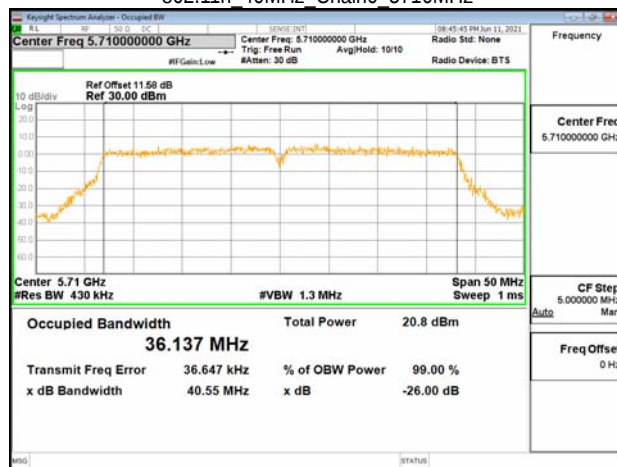
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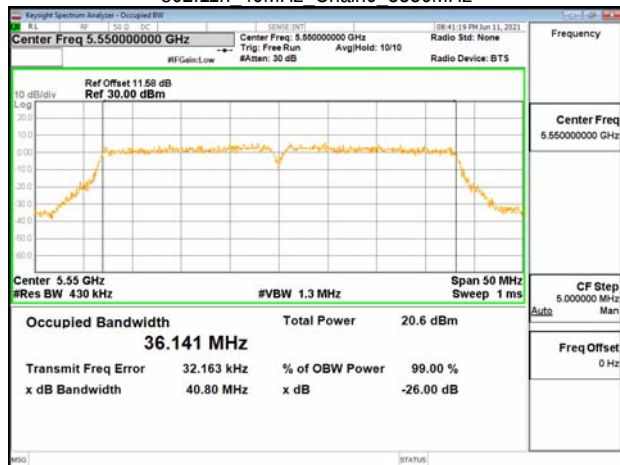
802.11n 40MHz Chain0 5510MHz



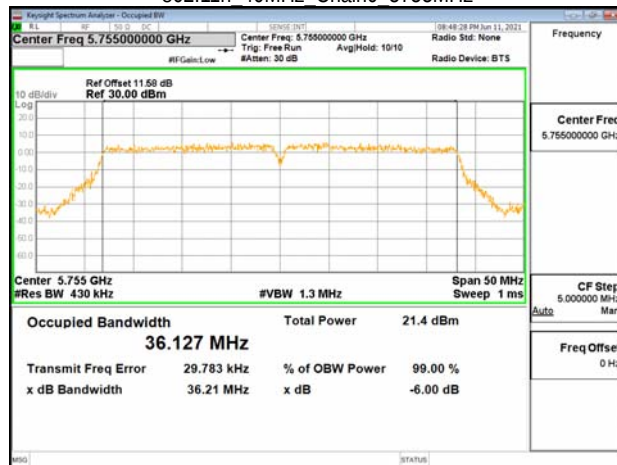
802.11n 40MHz Chain0 5710MHz



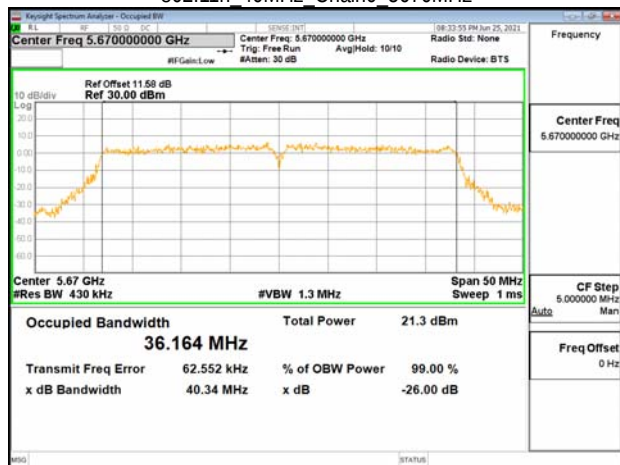
802.11n 40MHz Chain0 5550MHz



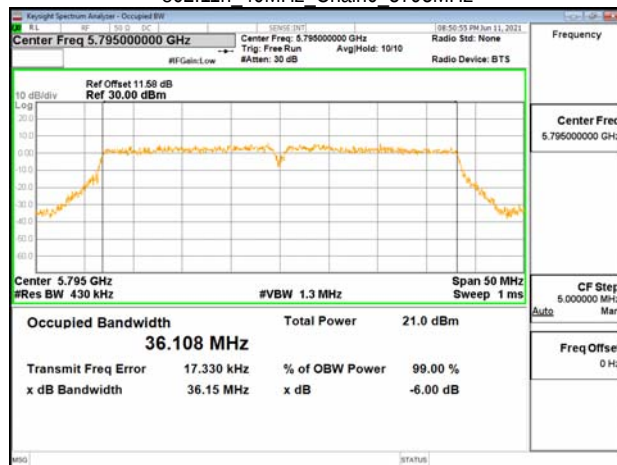
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802.11n 40MHz Chain0 5670MHz



802.11n 40MHz Chain0 5795MHz

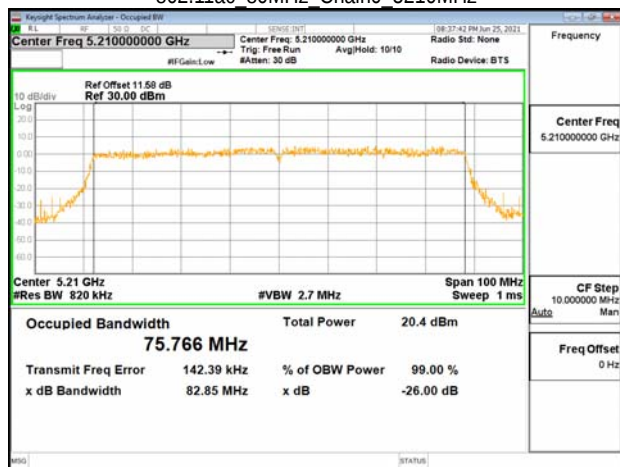


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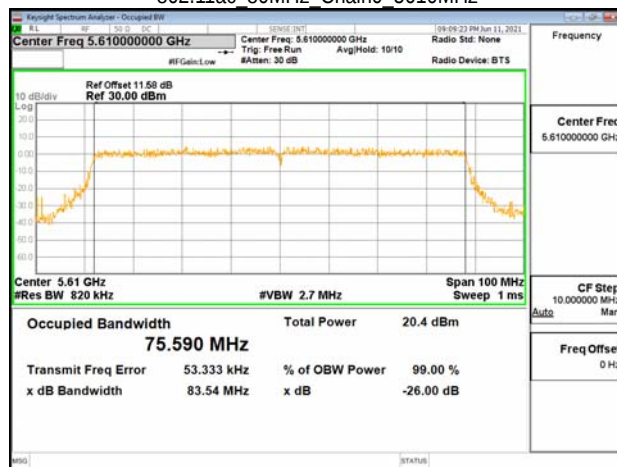
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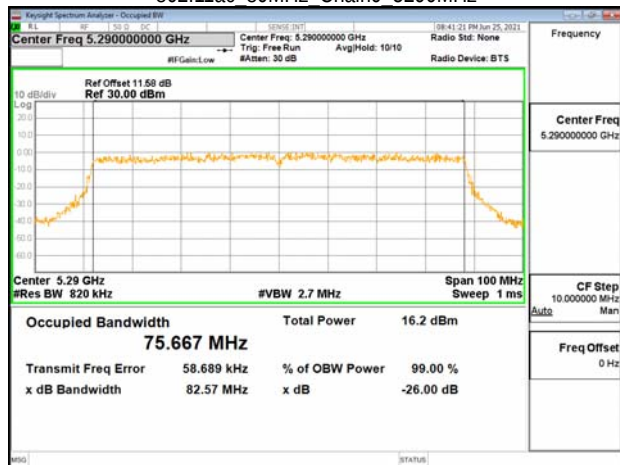
802.11ac 80MHz Chain0 5210MHz



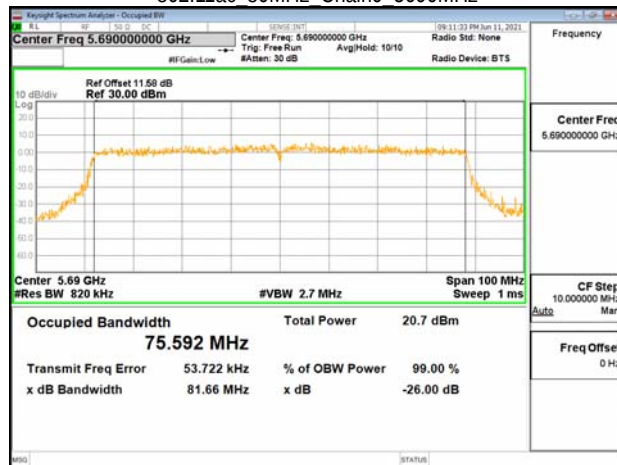
802.11ac 80MHz Chain0 5610MHz



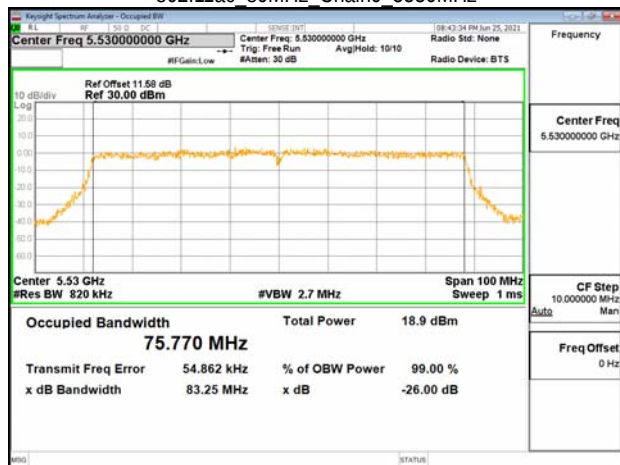
802.11ac 80MHz Chain0 5290MHz



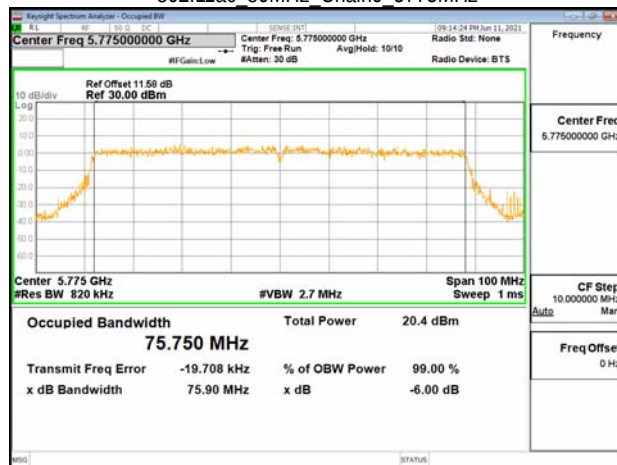
802.11ac 80MHz Chain0 5690MHz



802.11ac 80MHz Chain0 5530MHz



802.11ac 80MHz Chain0 5775MHz



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9 MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

9.1 Standard Applicable

FCC

Band	EUT CATEGORY		LIMIT			
			Conducted Output Power	EIRP	TPC	Antenna Directional Gain Requirements
U-NII-1	☐	Fixed point-to-point	1 Watt(30dBm)	Not required	Not required	23dBi
	☐	Out door AP	1 Watt(30dBm)	Elevation angle above 30 degrees 125mW (21dBm)	Not required	6dBi
	☒	Other	250mW(23.98dBm)	Not required	Not required	6dBi
U-NII-2A	☒	Other	250mW(23.98dBm) or 11dBm+10 log B	Not required	When EIRP >500mW	6dBi
U-NII-2C	☒	Other	250mW(23.98dBm) or 11dBm+10 log B	Not required	At least 6dB below EIRP 1W (30dBm)	6dBi
U-NII-3	☒	Other	1 Watt(30dBm)	Not required	Not required	6dBi
	☐	Fixed point-to-point	1 Watt(30dBm)	Not required	Not required	Not required

If transmitting antennas of directional gain greater than the antenna requirements column, the Maximum transmit power shall be reduced by the amount in dB that the direction-al gain of the antenna.

ISED

FREQUENCY BAND (MHz)	Limits of RSS-247 6.2.1~6.2.4			
	EIRP	Conducted Output Power	TPC	
5150~5250	200 mW or 10 + 10 log ₁₀ B dBm	N/A	☐	Vehicle use, at least 3dB below 30mW EIRP
5250~5350	1.0 W or 17 + 10 log ₁₀ B dBm	250 mW or 11 + 10 log ₁₀ B	☐	Vehicle use, at least 3dB below 30mW EIRP or
			☐	EIRP >500mW, at least 6dB below 1W EIRP
5470-5600 and 5650-5725	1.0 W or 17 + 10 log ₁₀ B dBm	250 mW or 11 + 10 log ₁₀ B	☐	EIRP >500mW, at least 6dB below 1W EIRP
5725~5850	N/A	1 W	N/A	

For equipment operating in the band **5725-5850** MHz, If transmitting antennas of directional gain greater than 6 dBi are used, the Maximum transmit power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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The antenna gain is not greater than 6 dBi. Therefore, reduction of power is not required.

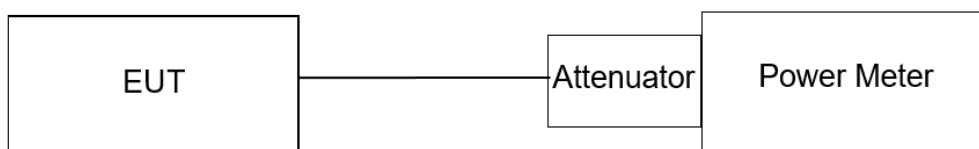
9.2 Measurement Procedure

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 power meter
4. Power Meter is used as the auxiliary test equipment to conduct the output power measurement.
5. Record the max. reading and add $10 \log(1/\text{duty cycle})$.
6. Repeat above procedures until all frequency (low, middle, and high channel) measured were complete.

9.3 Measurement Equipment Used

Conducted Emission Test Site: Conducted 4					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
PXA Spectrum Analyzer	Agilent	N9030A	MY53120760	04/27/2021	04/26/2022
Power Meter	Anritsu	ML2496A	1804001	03/02/2021	03/01/2022
Power Sensor	Anritsu	MA2411B	1726104	03/02/2021	03/01/2022
Power Sensor	Anritsu	MA2411B	1726107	03/02/2021	03/01/2022
Attenuator	Mini-Circuit	BW-S10W2+	4	12/16/2020	12/15/2021
DC Block	Mini-Circuits	BLK-18-S+	1	12/16/2020	12/15/2021

9.4 Test Set-up



9.5 Measurement Result

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power limits are the lesser of 250 mW (23.98dBm) or 11 dBm + 10 log B and EIRP limits are the lesser of 1.0W (30dBm) or 17 + 10 log B .

1. Where B is the 26 dB emission bandwidth in megahertz for FCC compliance.
2. And B is the 99% for ISSED compliance.

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9.5.2 Conducted output power (FCC)

802.11a_Ch0

CH	Frequency (MHz)	Data Rate	Power set	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	6	16.5	16.34	43.030	23.98	PASS
44	5220	6	17	16.48	44.440	23.98	PASS
48	5240	6	16.5	16.24	42.051	23.98	PASS
52	5260	6	16.5	16.33	42.931	23.98	PASS
60	5300	6	16.5	16.29	42.538	23.98	PASS
64	5320	6	16.5	16.33	42.931	23.98	PASS
100	5500	6	16.5	16.33	42.931	23.98	PASS
116	5580	6	16.5	16.47	44.338	23.98	PASS
140	5700	6	16.5	16.49	44.542	23.98	PASS
144	5720(U-NII 2C)	6	16.5	15.03	31.88	23.18	PASS
144	5720 (U-NII 3)	6	16.5	10.99	12.56	30	PASS
149	5745	6	16.5	16.46	44.236	30	PASS
157	5785	6	16.5	16.49	44.542	30	PASS
165	5825	6	16.5	16.45	44.134	30	PASS

802.11n_HT20_Ch0

CH	Frequency (MHz)	Data Rate	Power set	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	MCS0	17.5	17.25	53.061	23.98	PASS
44	5220	MCS0	18	17.47	55.818	23.98	PASS
48	5240	MCS0	18	17.49	56.076	23.98	PASS
52	5260	MCS0	17.5	17.14	51.734	23.98	PASS
60	5300	MCS0	17.5	17.15	51.853	23.98	PASS
64	5320	MCS0	17.5	17.25	53.061	23.98	PASS
100	5500	MCS0	13	12.65	18.398	23.98	PASS
116	5580	MCS0	17.5	17.34	54.172	23.98	PASS
140	5700	MCS0	16.5	16.47	44.338	23.98	PASS
144	5720(U-NII 2C)	MCS0	17.5	15.68	36.99	23.98	PASS
144	5720 (U-NII 3)	MCS0	17.5	11.93	15.58	30	PASS
149	5745	MCS0	17.5	17.18	52.212	30	PASS
157	5785	MCS0	17.5	17.47	55.818	30	PASS
165	5825	MCS0	17.5	17.11	51.378	30	PASS

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802.11n_HT40_Ch0

CH	Frequency (MHz)	Data Rate	Power set	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
38	5190	MCS0	14.5	14.86	30.601	23.98	PASS
46	5230	MCS0	16.5	16.48	44.435	23.98	PASS
54	5270	MCS0	16	16.21	41.757	23.98	PASS
62	5310	MCS0	12	12.16	16.433	23.98	PASS
102	5510	MCS0	13	13.30	21.366	23.98	PASS
110	5550	MCS0	15.5	16.23	41.950	23.98	PASS
134	5670	MCS0	16	16.59	45.575	23.98	PASS
142	5710(U-NII 2C)	MCS0	15.5	15.57	36.06	23.98	PASS
142	5710 (U-NII 3)	MCS0	15.5	7.33	5.41	30	PASS
151	5755	MCS0	16	16.33	42.927	30	PASS
159	5795	MCS0	16	16.37	43.324	30	PASS

802.11ac_VHT80_Ch0

CH	Frequency (MHz)	Data Rate	Power set	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
42	5210	MCS0	15	14.68	29.344	23.98	PASS
58	5290	MCS0	11	10.63	11.548	23.98	PASS
106	5530	MCS0	13.5	13.76	23.742	23.98	PASS
122	5610	MCS0	15	15.27	33.614	23.98	PASS
138	5690(U-NII 2C)	MCS0	15	14.82	30.35	23.98	PASS
138	5690 (U-NII 3)	MCS0	15	4.11	2.58	30	PASS
155	5775	MCS0	15	15.24	33.382	30	PASS

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9.5.4 ISED EIRP

J2.11a_Ch0

CH	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	16.34	2.24	18.58	72.073	22.19	PASS
44	5220	16.48	2.24	18.72	74.434	22.19	PASS
48	5240	16.24	2.24	18.48	70.433	22.19	PASS
52	5260	16.33	2.30	18.63	72.908	22.2	PASS
60	5300	16.29	2.30	18.59	72.239	22.18	PASS
64	5320	16.33	2.30	18.63	72.908	22.19	PASS
100	5500	16.33	3.64	19.97	99.260	22.19	PASS
116	5580	16.47	3.64	20.11	102.512	22.19	PASS
140	5700	16.49	3.64	20.13	102.985	22.19	PASS

1n_HT20_Ch0

CH	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	17.25	2.24	19.49	88.874	22.5	PASS
44	5220	17.47	2.24	19.71	93.492	22.51	PASS
48	5240	17.49	2.24	19.73	93.923	22.49	PASS
52	5260	17.14	2.30	19.44	87.857	22.5	PASS
60	5300	17.15	2.30	19.45	88.059	22.5	PASS
64	5320	17.25	2.30	19.55	90.110	22.5	PASS
100	5500	12.65	3.64	16.29	42.538	22.49	PASS
116	5580	17.34	3.64	20.98	125.249	22.51	PASS
140	5700	16.47	3.64	20.11	102.512	22.5	PASS

1n_HT40_Ch0

CH	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	REQUIRED LIMIT (dBm)	RESULT
38	5190	14.86	2.24	17.10	51.254	23.01	PASS
46	5230	16.48	2.24	18.72	74.427	23.01	PASS
54	5270	16.21	2.30	18.51	70.913	25.58	PASS
62	5310	12.16	2.30	14.46	27.908	25.58	PASS
102	5510	13.30	3.64	16.94	49.400	25.58	PASS
110	5550	16.23	3.64	19.87	96.990	25.58	PASS
134	5670	16.59	3.64	20.23	105.373	25.58	PASS

ac_VHT80_Ch0

CH	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	REQUIRED LIMIT (dBm)	RESULT
42	5210	14.68	2.24	16.92	49.149	23.01	PASS
58	5290	10.63	2.30	12.93	19.612	28.79	PASS
106	5530	13.76	3.64	17.40	54.893	28.79	PASS

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9.5.5 Conducted output power (ISED)

12.11a_Ch0

CH	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
52	5260	16.33	42.931	23.20	PASS
60	5300	16.29	42.538	23.18	PASS
64	5320	16.33	42.931	23.19	PASS
100	5500	16.33	42.931	23.19	PASS
116	5580	16.47	44.338	23.19	PASS
140	5700	16.49	44.542	23.19	PASS
144	5720(U-NII 2C)	15.03	31.877	22.23	PASS
144	5720 (U-NII 3)	10.99	12.563	30	PASS
149	5745	16.46	44.236	30	PASS
157	5785	16.49	44.542	30	PASS
165	5825	16.45	44.134	30	PASS

1n_HT20_Ch0

CH	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
52	5260	17.14	51.734	23.5	PASS
60	5300	17.15	51.853	23.5	PASS
64	5320	17.25	53.061	23.5	PASS
100	5500	12.65	18.398	23.49	PASS
116	5580	17.34	54.172	23.51	PASS
140	5700	16.47	44.338	23.5	PASS
144	5720(U-NII 2C)	15.68	36.990	22.43	PASS
144	5720 (U-NII 3)	11.93	15.584	30	PASS
149	5745	17.18	52.212	30	PASS
157	5785	17.47	55.818	30	PASS
165	5825	17.11	51.378	30	PASS

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1n_HT40_Ch0

CH	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
54	5270	16.21	41.757	23.98	PASS
62	5310	12.16	16.433	23.98	PASS
102	5510	13.30	21.366	23.98	PASS
110	5550	16.23	41.950	23.98	PASS
134	5670	16.59	45.575	23.98	PASS
142	5710(U-NII 2C)	15.57	36.064	23.98	PASS
142	5710 (U-NII 3)	7.33	5.406	30	PASS
151	5755	16.33	42.927	30	PASS
159	5795	16.37	43.324	30	PASS

ac_VHT80_Ch0

CH	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
58	5290	10.63	11.548	23.98	PASS
106	5530	13.76	23.742	23.98	PASS
122	5610	15.27	33.614	23.98	PASS
138	5690(U-NII 2C)	14.82	30.346	23.98	PASS
138	5690 (U-NII 3)	4.11	2.578	30	PASS
155	5775	15.24	33.382	30	PASS

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10 MAXIMUM POWER SPECTRAL DENSITY

10.1 Standard Applicable

FCC

OPERZTION Band	EUT CATEGORY		LIMIT
U-NII-1	☐	Access Point (Master device)	17dBm/ MHz
	☐	Fixed point-to-point Access Ponit	
	☒	Mobile and portable client device	11dBm/ MHz
U-NII-2A	☒		11dBm/ MHz
U-NII-2C	☒		11dBm/ MHz
U-NII-3	☒		30dBm/ 500kHz

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

ISED

OPERZTION FREQUENCY BAND	LIMIT
5150~5250 MHz	EIRP spectral density 10 dBm / MHz
5250~5350 MHz	11dBm / MHz
5470-5600 MHz and 5650-5725 MHz	11dBm / MHz
5725~5850 MHz	30dBm / 500 kHz

For equipment operating in the band **5725-5850** MHz, If transmitting antennas of directional gain greater than 6 dBi are used, the Maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The antenna gain is not greater than 6 dBi. Therefore, reduction of power is not required.

10.2 Measurement Procedure

- Place the EUT on the table and set it in transmitting mode.
- The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
- Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to Spectrum.
- For U-NII1, U-NII-2A, U-NII-2C Band:**
Set RBW=1MHz, VBW=3MHz, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)
For U-NII-3 Band:

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Set RBW=300kHz, VBW=1MHz, where span is enough to capture the entire bandwidth, Sweep time = Auto, detector = RMS or sample, traces 100 sweeps of video averaging.

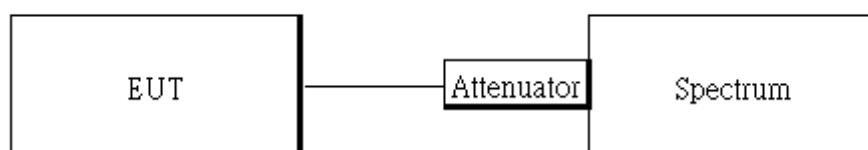
In addition, measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10 \log(500 \text{ kHz/RBW})$ to the measured result.

5. Use the cursor on spectrum to peak search the highest level of trace
6. Record the max. reading and add $10 \log(1/\text{duty cycle})$.
7. Repeat above procedures until all default test channel (low, middle, and high) was complete.

10.3 Measurement Equipment Used

Conducted Emission Test Site: Conducted 4					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
PXA Spectrum Analyzer	Agilent	N9030A	MY53120760	04/27/2021	04/26/2022
Attenuator	Mini-Circuit	BW-S10W2+	4	12/16/2020	12/15/2021
DC Block	Mini-Circuits	BLK-18-S+	1	12/16/2020	12/15/2021

10.4 Test Set-up



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10.5 Measurement Result

10.5.1 Power spectral density

POWER DENSITY 802.11a MODE						
Frequency (MHz)	ch0 meas PSD (dBm/MHz)	Duty Factor (dB)	Maxmum Corr'd PSD(dBm/MHz)		Limit	Margin (dB)
5180	6.09	0.00	6.09		11.00 dBm/MHz	-4.91
5220	6.50	0.00	6.50		11.00 dBm/MHz	-4.50
5240	6.41	0.00	6.41		11.00 dBm/MHz	-4.59
5260	6.47	0.00	6.47		11.00 dBm/MHz	-4.53
5300	6.24	0.00	6.24		11.00 dBm/MHz	-4.76
5320	6.20	0.00	6.20		11.00 dBm/MHz	-4.80
5500	6.09	0.00	6.09		11.00 dBm/MHz	-4.91
5580	5.96	0.00	5.96		11.00 dBm/MHz	-5.04
5700	6.60	0.00	6.60		11.00 dBm/MHz	-4.40
5720 (U-NII 2C)	6.49	0.00	6.49		11.00 dBm/MHz	-4.51
Frequency (MHz)	ch0 meas PSD (dBm/300kHz)	Duty Factor (dB)	10log (500kHz/RBW) Factor(dB)	Maxmum Corr'd PSD (dBm/500kHz)	Limit	Margin (dB)
5720 (U-NII 3)	-0.22	0.00	2.22	2.00	30.00 dBm/500kHz	-28.00
5745	1.64	0.00	2.22	3.86	30.00 dBm/500kHz	-26.14
5785	1.53	0.00	2.22	3.75	30.00 dBm/500kHz	-26.25
5825	0.52	0.00	2.22	2.74	30.00 dBm/500kHz	-27.26

POWER DENSITY 802.11n HT20 MODE						
Frequency (MHz)	ch0 meas PSD (dBm/MHz)	Duty Factor (dB)	Maxmum Corr'd PSD(dBm/MHz)		Limit	Margin (dB)
5180	6.52	0.00	6.52		11.00 dBm/MHz	-4.48
5220	6.87	0.00	6.87		11.00 dBm/MHz	-4.13
5240	7.05	0.00	7.05		11.00 dBm/MHz	-3.95
5260	6.82	0.00	6.82		11.00 dBm/MHz	-4.18
5300	6.97	0.00	6.97		11.00 dBm/MHz	-4.03
5320	6.70	0.00	6.70		11.00 dBm/MHz	-4.30
5500	2.73	0.00	1.14		11.00 dBm/MHz	-9.86
5580	6.16	0.00	6.16		11.00 dBm/MHz	-4.84
5700	6.55	0.00	2.91		11.00 dBm/MHz	-8.09
5720 (U-NII 2C)	6.99	0.00	6.99		11.00 dBm/MHz	-4.01
Frequency (MHz)	ch0 meas PSD (dBm/300kHz)	Duty Factor (dB)	10log (500kHz/RBW) Factor(dB)	Maxmum Corr'd PSD(dBm/500kHz)	Limit	Margin (dB)
5720 (U-NII 3)	0.84	0.00	2.22	3.06	30.00 dBm/500kHz	-26.94
5745	2.02	0.00	2.22	4.24	30.00 dBm/500kHz	-25.76
5785	2.23	0.00	2.22	4.45	30.00 dBm/500kHz	-25.55
5825	0.96	0.00	2.22	3.18	30.00 dBm/500kHz	-26.82

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POWER DENSITY 802.11n HT40 MODE						
Frequency (MHz)	ch0 meas PSD (dBm/MHz)	Duty Factor (dB)	Maxmum Corr'd PSD(dBm/MHz)		Limit	Margin (dB)
5190	1.68	0.18	1.81		11.00 dBm/MHz	-9.19
5230	3.89	0.18	4.07		11.00 dBm/MHz	-6.93
5270	3.38	0.18	3.56		11.00 dBm/MHz	-7.44
5310	-0.50	0.18	-0.99		11.00 dBm/MHz	-11.99
5510	0.02	0.18	-2.19		11.00 dBm/MHz	-13.19
5550	3.07	0.18	3.25		11.00 dBm/MHz	-7.75
5670	3.12	0.18	-0.34		11.00 dBm/MHz	-11.34
5710 (U-NII 2C)	3.22	0.18	3.40		11.00 dBm/MHz	-7.60
Frequency (MHz)	ch0 meas PSD (dBm/300kHz)	Duty Factor (dB)	10log (500kHz/RBW) Factor(dB)	Maxmum Corr'd PSD(dBm/500kHz)	Limit	Margin (dB)
5710 (U-NII 3)	-3.72	0.18	2.22	-1.32	30.00 dBm/500kHz	-31.32
5755	-1.71	0.18	2.22	0.69	30.00 dBm/500kHz	-29.31
5795	-1.90	0.18	2.22	0.50	30.00 dBm/500kHz	-29.50

POWER DENSITY 802.11ac VHT80 MODE						
Frequency (MHz)	ch0 meas PSD (dBm/MHz)	Duty Factor (dB)	Maxmum Corr'd PSD(dBm/MHz)		Limit	Margin (dB)
5210	-1.47	0.32	-1.67		11.00 dBm/MHz	-12.67
5290	-5.45	0.32	-4.99		11.00 dBm/MHz	-15.99
5530	-2.71	0.32	-4.48		11.00 dBm/MHz	-15.48
5610	-1.35	0.32	-1.03		11.00 dBm/MHz	-12.03
5690 (U-NII 2C)	-1.01	0.32	-0.69		11.00 dBm/MHz	-11.69
Frequency (MHz)	ch0 meas PSD (dBm/300kHz)	Duty Factor (dB)	10log (500kHz/RBW) Factor(dB)	Maxmum Corr'd PSD(dBm/500kHz)	Limit	Margin (dB)
5690 (U-NII 3)	-7.73	0.32	2.22	-5.19	30.00 dBm/500kHz	-35.19
5775	-6.32	0.32	2.22	-3.78	30.00 dBm/500kHz	-33.78

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10.5.2 EIRP spectral density

EIRP spectral density 802.11a MODE					
Freq. (MHz)	PSD (dBm)	Ant. Gain (dBi)	EIRP PSD (dBm)	Limit (dBm)	Margin (dB)
5180	6.09	2.24	8.33	10	-1.67
5220	6.50	2.24	8.74	10	-1.26
5240	6.41	2.24	8.65	10	-1.35

EIRP spectral density 802.11n HT20 MODE					
Freq. (MHz)	PSD (dBm)	Ant. Gain (dBi)	EIRP SD (dBm)	Limit (dBm)	Margin (dB)
5180	6.52	2.24	8.76	10	-1.24
5220	6.87	2.24	9.11	10	-0.89
5240	7.05	2.24	9.29	10	-0.71

EIRP spectral density 802.11n HT40 MODE					
Freq. (MHz)	PSD (dBm)	Ant. Gain (dBi)	EIRP SD (dBm)	Limit (dBm)	Margin (dB)
5190	1.81	2.24	4.05	10	-5.95
5230	4.07	2.24	6.31	10	-3.69

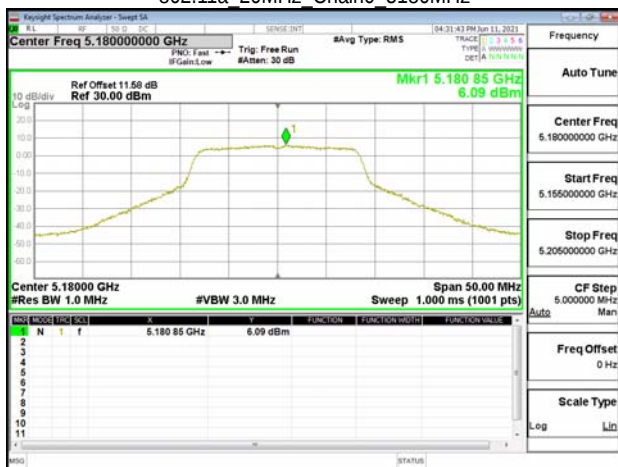
EIRP spectral density 802.11ac VHT80 MODE					
Freq. (MHz)	PSD (dBm)	Ant. Gain (dBi)	EIRP SD (dBm)	Limit (dBm)	Margin (dB)
5210	-1.67	2.24	0.57	10	-9.43

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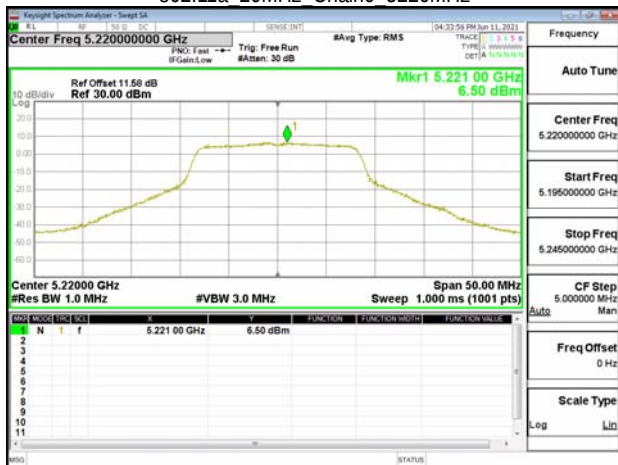
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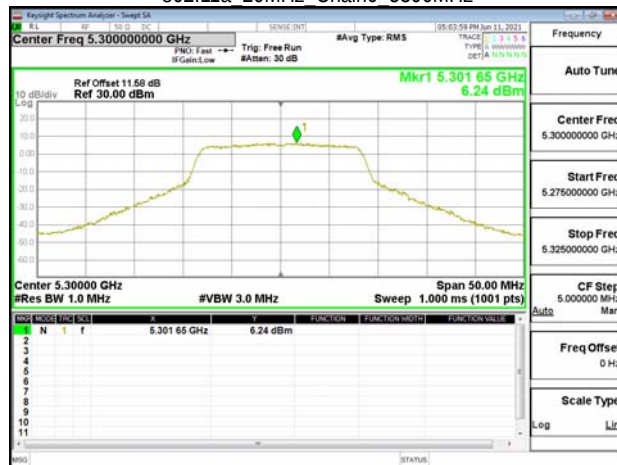
802.11a 20MHz Chain0 5260MHz



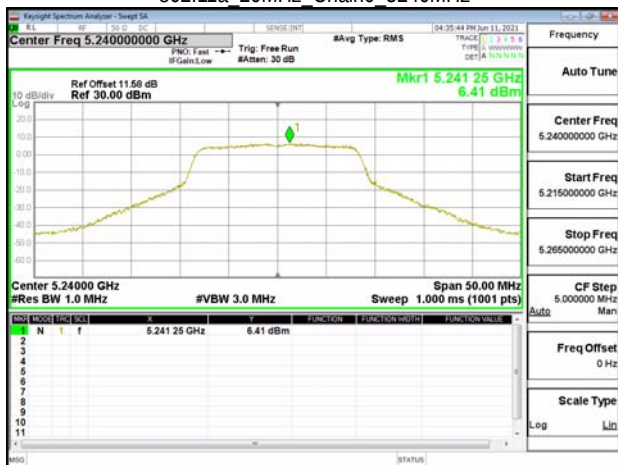
802.11a 20MHz Chain0 5220MHz



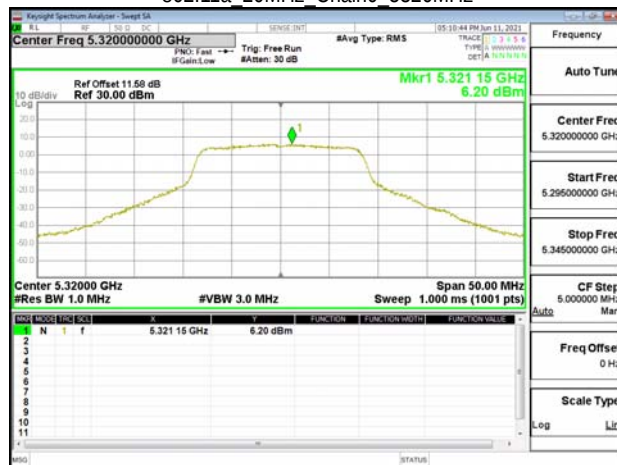
802.11a 20MHz Chain0 5300MHz



802.11a 20MHz Chain0 5240MHz



802.11a 20MHz Chain0 5320MHz



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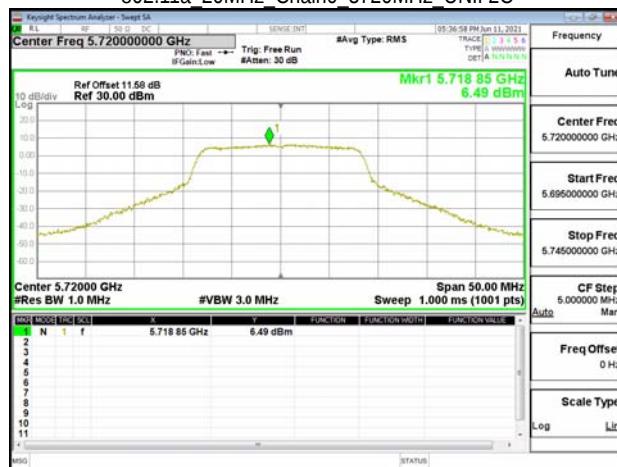
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802.11a 20MHz Chain0 5500MHz



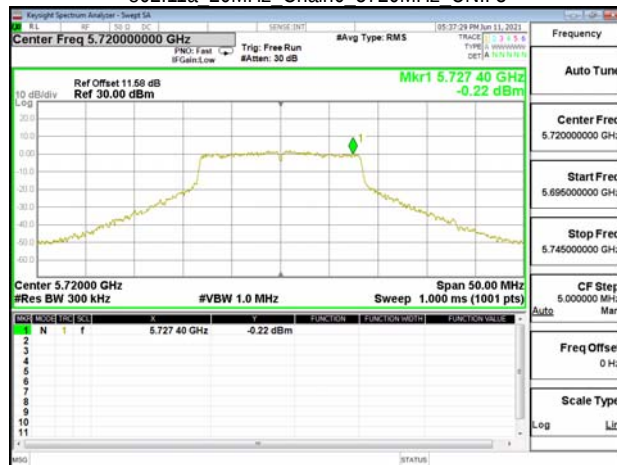
802.11a 20MHz Chain0 5720MHz UNII 2C



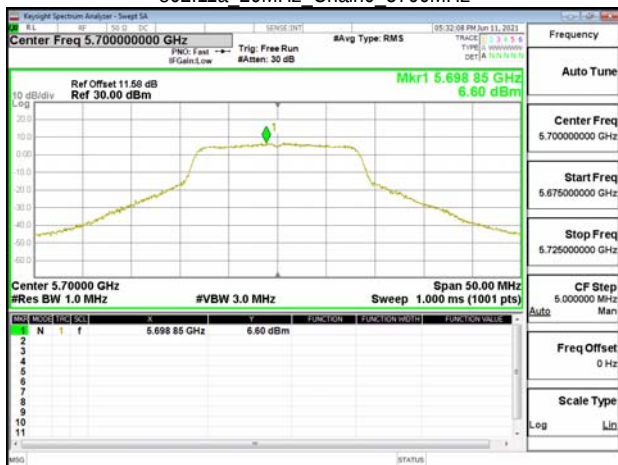
802.11a 20MHz Chain0 5580MHz



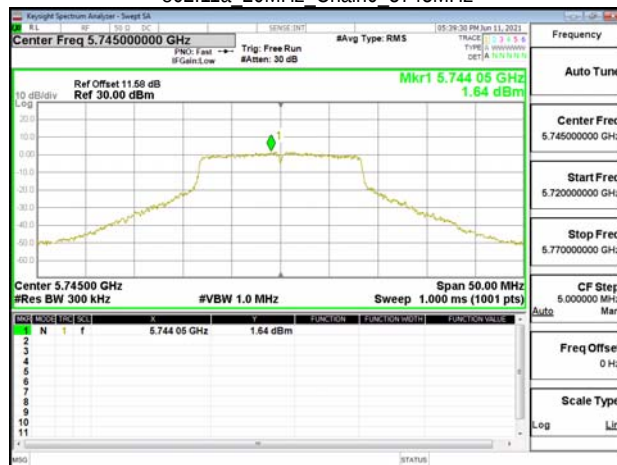
802.11a 20MHz Chain0 5720MHz UNII 3



802.11a 20MHz Chain0 5700MHz



802.11a 20MHz Chain0 5745MHz

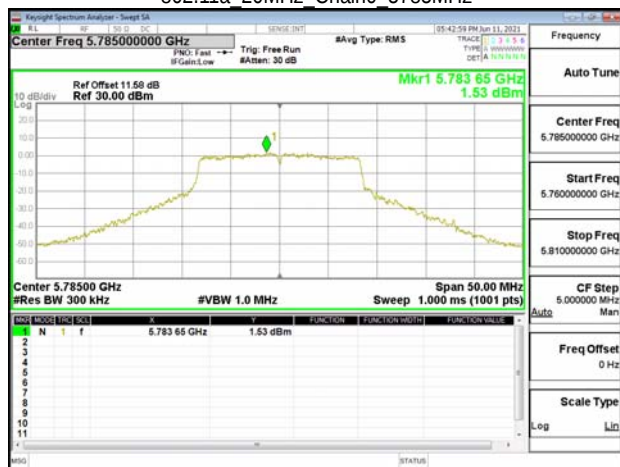


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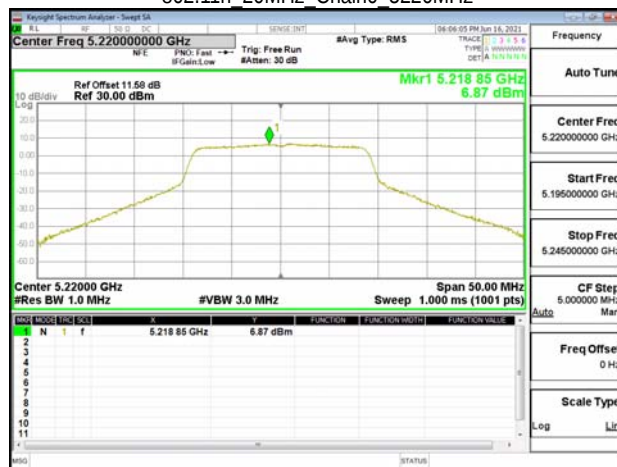
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802.11a 20MHz Chain0 5785MHz



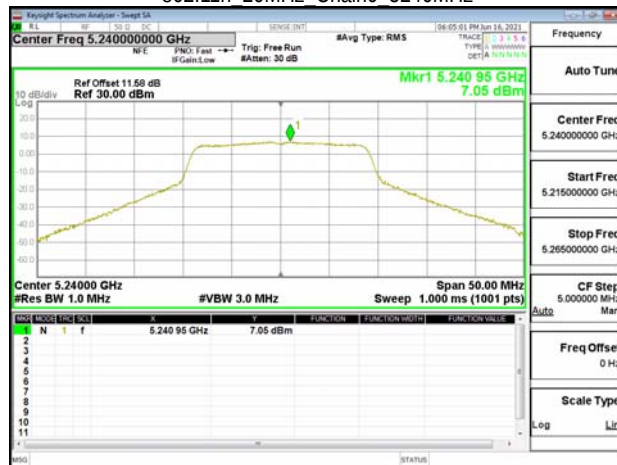
802.11n 20MHz Chain0 5220MHz



802.11a 20MHz Chain0 5825MHz



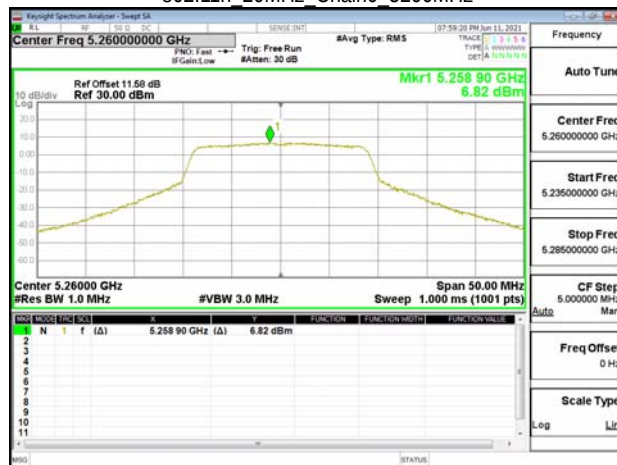
802.11n 20MHz Chain0 5240MHz



802.11n 20MHz Chain0 5180MHz



802.11n 20MHz Chain0 5260MHz



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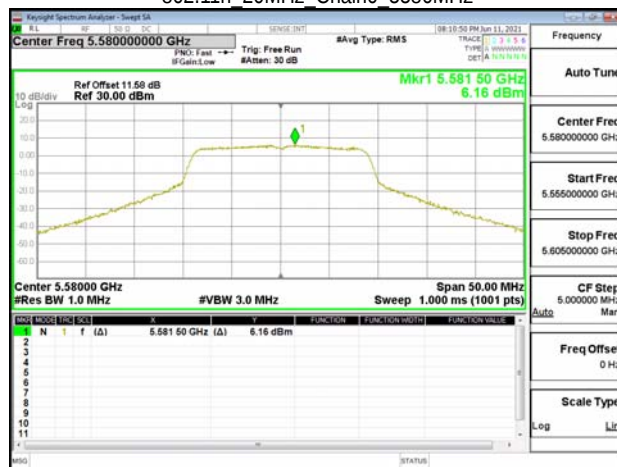
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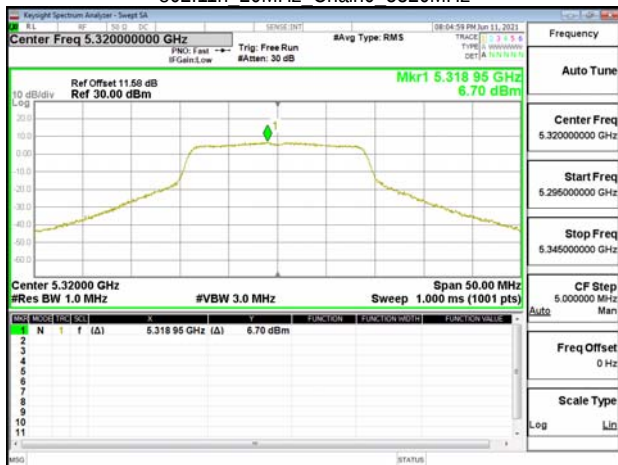
802.11n 20MHz Chain0 5300MHz



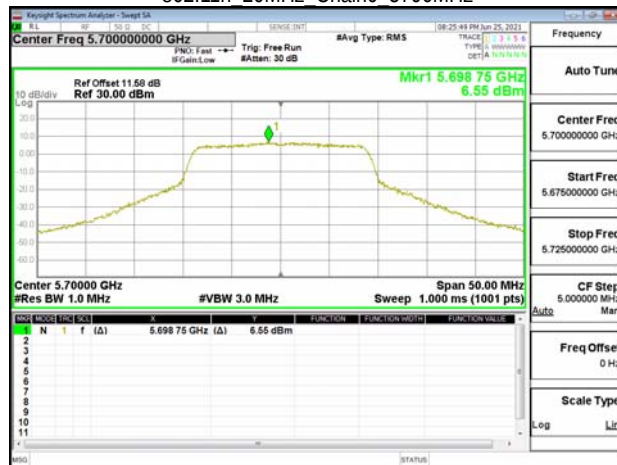
802.11n 20MHz Chain0 5580MHz



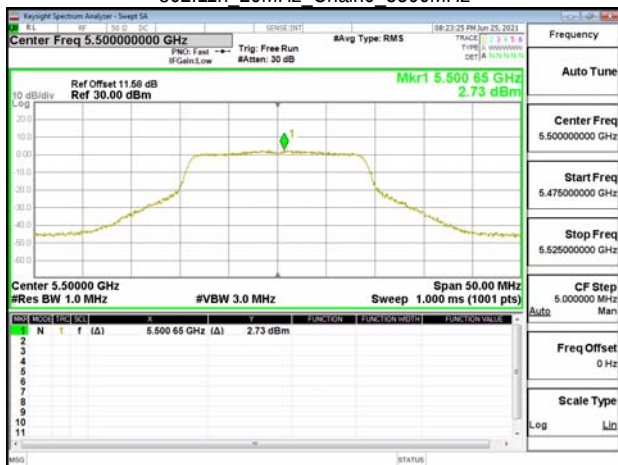
802.11n 20MHz Chain0 5320MHz



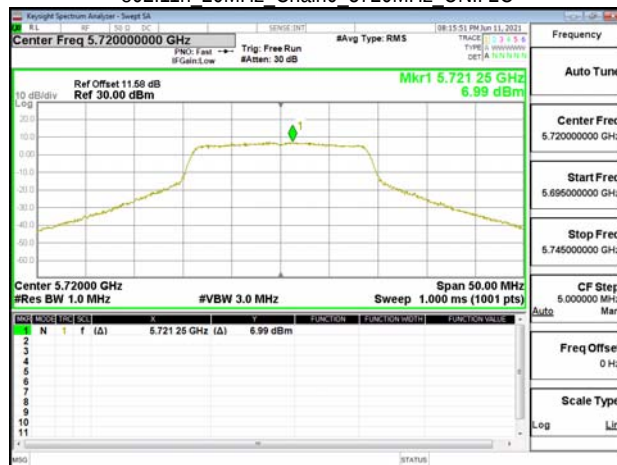
802.11n 20MHz Chain0 5700MHz



802.11n 20MHz Chain0 5500MHz



802.11n 20MHz Chain0 5720MHz UNII 2C

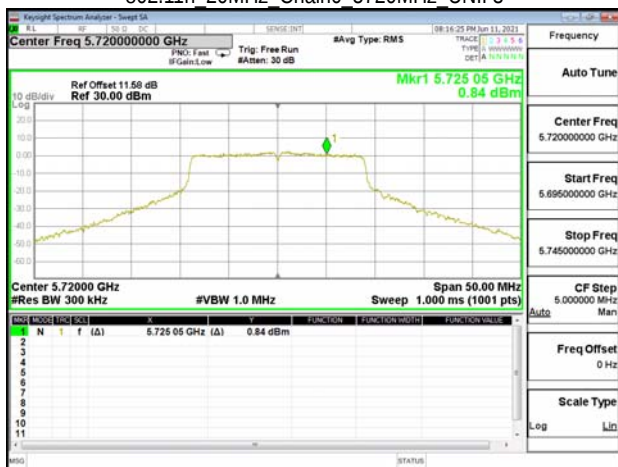


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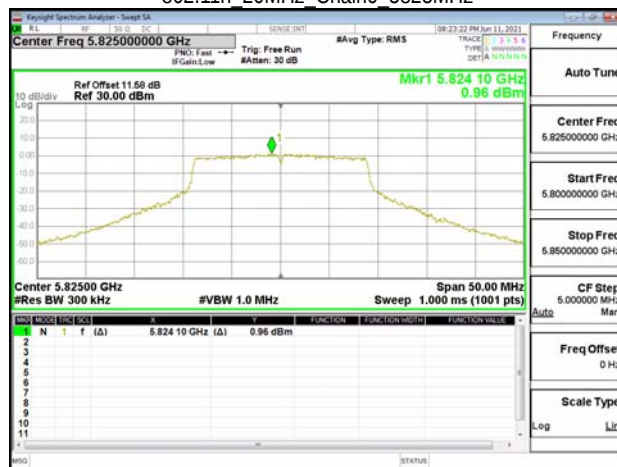
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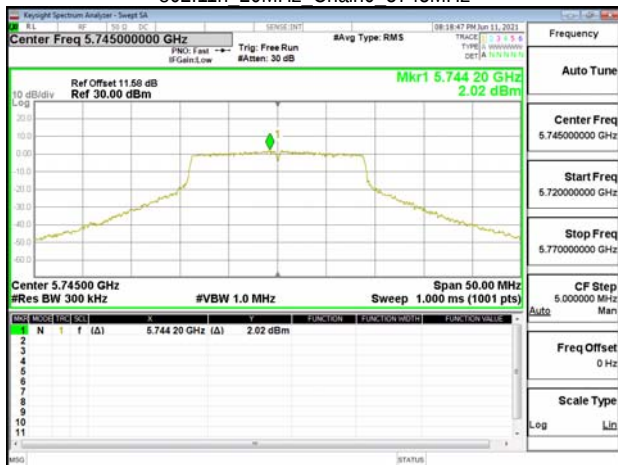
802.11n 20MHz Chain0 5720MHz UNII 3



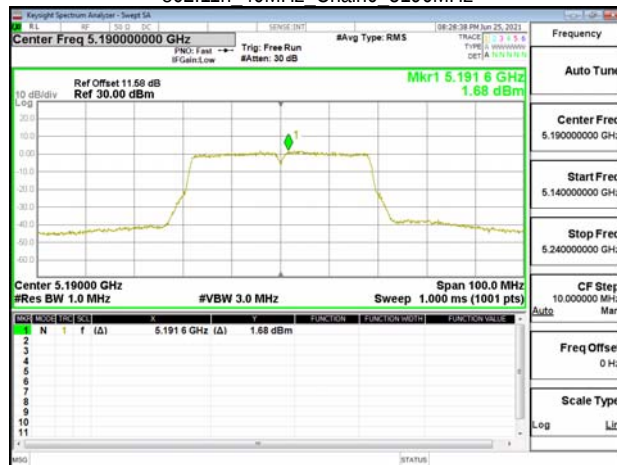
802.11n 20MHz Chain0 5825MHz



802.11n 20MHz Chain0 5745MHz



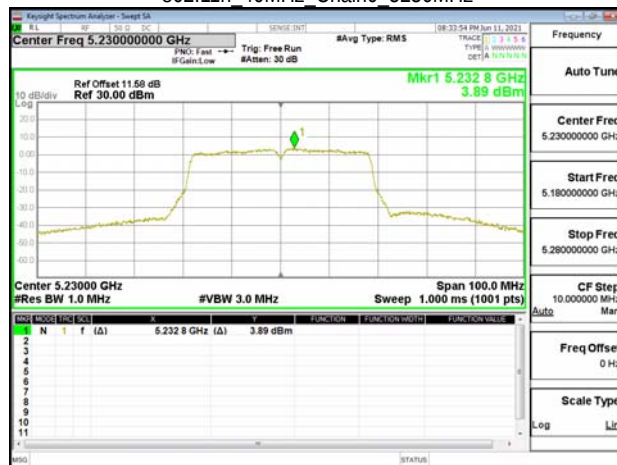
802.11n 40MHz Chain0 5190MHz



802.11n 20MHz Chain0 5785MHz



802.11n 40MHz Chain0 5230MHz



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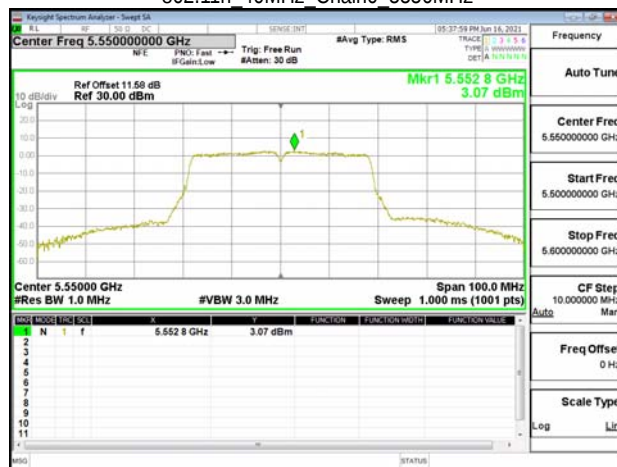
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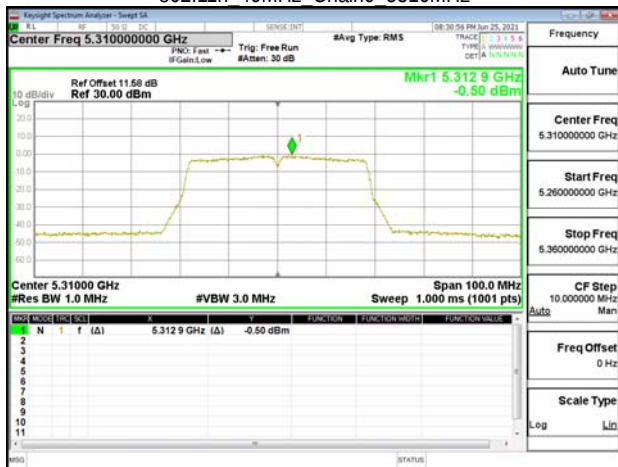
802.11n 40MHz Chain0 5270MHz



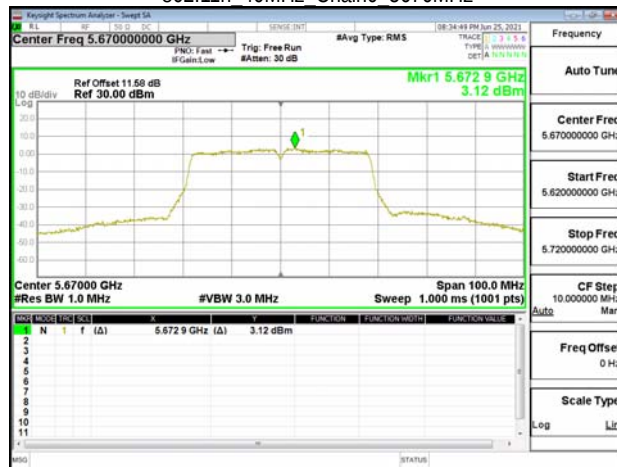
802.11n 40MHz Chain0 5550MHz



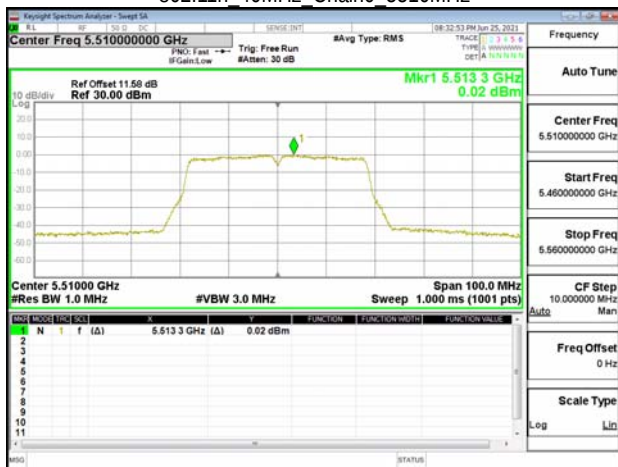
802.11n 40MHz Chain0 5310MHz



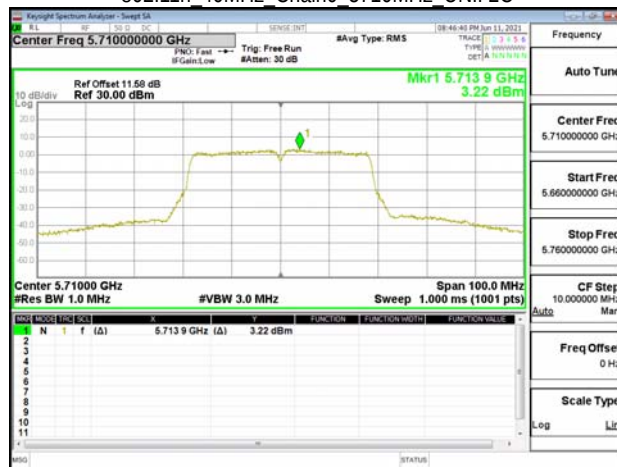
802.11n 40MHz Chain0 5670MHz



802.11n 40MHz Chain0 5510MHz



802.11n 40MHz Chain0 5710MHz UNII 2C

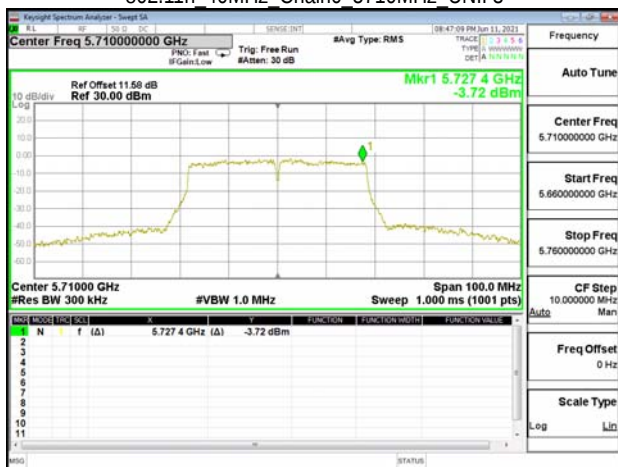


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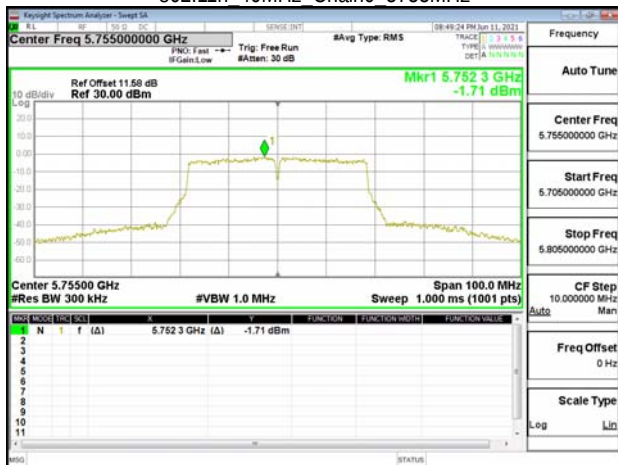
802.11n 40MHz Chain0 5710MHz UNII 3



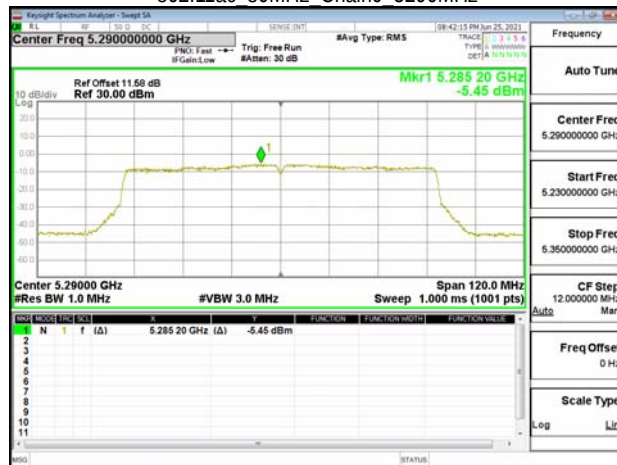
802.11ac 80MHz Chain0 5210MHz



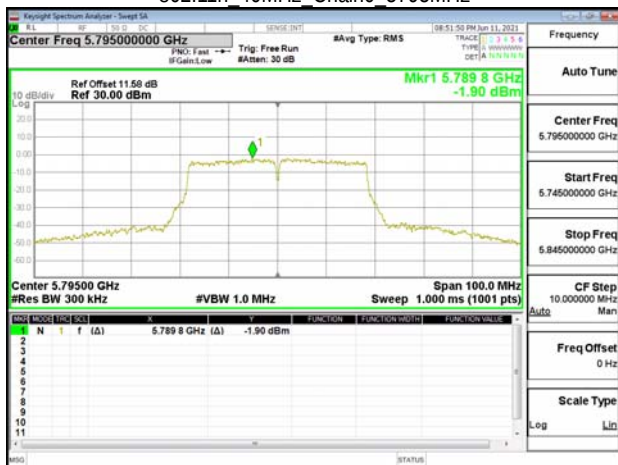
802.11n 40MHz Chain0 5755MHz



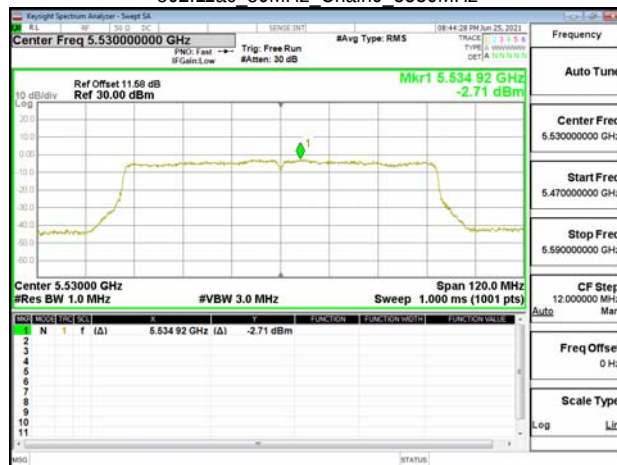
802.11ac 80MHz Chain0 5290MHz



802.11n 40MHz Chain0 5795MHz



802.11ac 80MHz Chain0 5530MHz

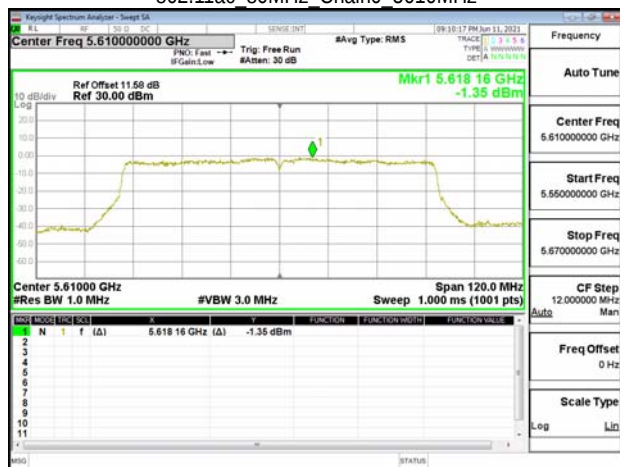


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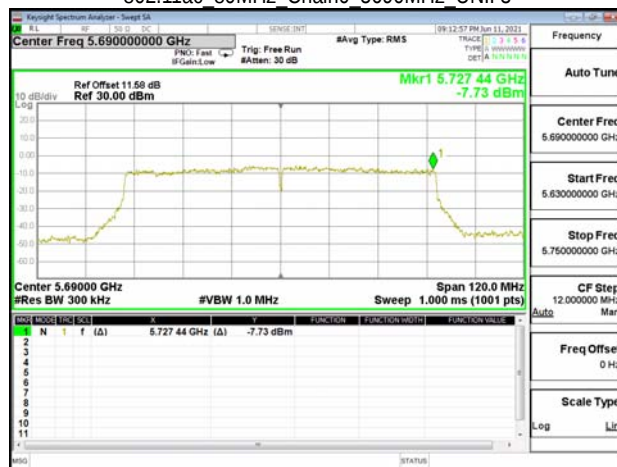
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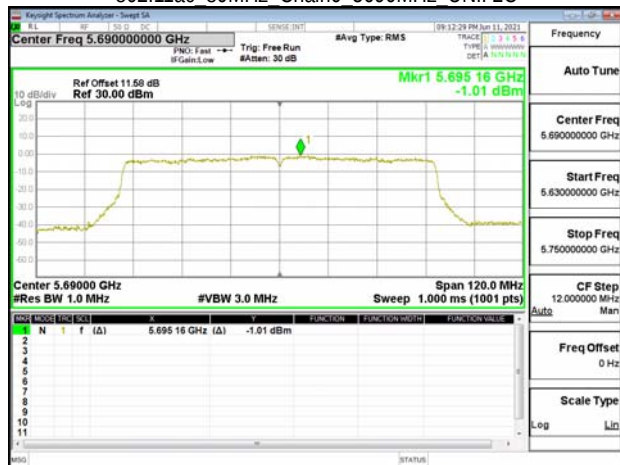
802.11ac 80MHz Chain0 5610MHz



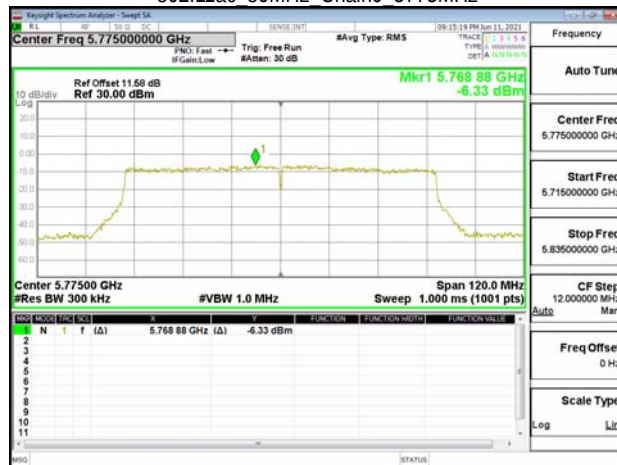
802.11ac 80MHz Chain0 5690MHz UNII 3



802.11ac 80MHz Chain0 5690MHz UNII 2C



802.11ac 80MHz Chain0 5775MHz



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11 UNDESIRABLE RADIATED EMISSION MEASUREMENT

11.1 Standard Applicable

11.1.1 Band Edge

The maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

1. For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
2. For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

APPLICABLE TO	EIRP LIMIT	FIELD STRENGTH AT 3m
15.407(b)(1) RSS-247 §6.2.1.2	PK: -27 (dBm/MHz)	PK: 68.2 (dBμV/m)
15.407(b)(2) RSS-247 §6.2.2.2		
15.407(b)(3) RSS-247 §6.2.3.2		
15.407(b)(4)(i) RSS-247 §6.2.4.2	PK:-27 (dBm/MHz) *1 PK:10 (dBm/MHz) *2 PK:15.6 (dBm/MHz) *3 PK:27 (dBm/MHz) *4	PK: 68.2 (dBμV/m) *1 PK:105.2 (dBμV/m) *2 PK: 110.8(dBμV/m) *3 PK:122.2 (dBμV/m) *4
*1 beyond 75 MHz or more above of the bandedge. *2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above. *3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above. *4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.		

$EIRP = (E \cdot d)^2 / 30$, where E is the field in V/m, d is the measurement distance (3m), $EIRP$ is the equivalent isotropically radiated power in Watts.

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11.1.2 Spurious Emission

Unwanted spurious emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table:

Frequency (MHz)	Field strength (microvolts/meter)	Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dB μ V/m) = 20 log Emission level (μ V/m)

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11.2 Measurement Equipment Used

Radiated Emission Test Site: SAC 1					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Horn Antenna	SCHWARZB ECK	BBHA9170	184	12/11/2020	12/10/2021
Site Cal	SGS	SAC I chamber	N/A	01/01/2021	12/31/2021
Horn Antenna	SCHWARZB ECK	BBHA9120 D	D803	12/17/2020	12/16/2021
Bi-log Antenna	TESEO	CBL 6112D	35242 & AT-N0555	01/13/2021	01/12/2022
Loop Antenna	ETS.LINDG REN	6502	148045	10/19/2020	10/18/2021
Spectrum Analyzer	Agilent	E4446A	MY51100003	10/29/2020	10/28/2021
Test Software	audix	e3	Ver. 6.11-20180413	01/01/2021	12/31/2021
EMI Test Receiver	R&S	ESCI 7	100759	07/13/2020	07/12/2021
Pre-Amplifier	EMC Instruments	EMC1840 45B	980135	12/16/2020	12/15/2021
Pre-Amplifier	HP	8449B	3008A01973	12/16/2020	12/15/2021
Pre-Amplifier	HP	8447D	2944A09469	12/16/2020	12/15/2021
Bandreject Filter 5150-5350	Micro-Tronics	BRM5070 3	1	12/16/2020	12/15/2021
Bandreject Filter 5470-5725	Micro-Tronics	BRM5070 4	1	12/16/2020	12/15/2021
Bandreject Filter 5725-5875	Micro-Tronics	BRM5070 5	1	12/16/2020	12/15/2021
7GHz High Pass Filter	WI	WHKX10-6090-80SS	3	04/20/2021	12/15/2021
Coaxial Cable	Huber Suhner	succoflex 102	MY2622/2	12/16/2020	12/15/2021
Coaxial Cable	Huber Suhner	succoflex 104A	800086/4a	12/16/2020	12/15/2021
Coaxial Cable	Huber Suhner	EMC 104-SM-SM-2000	160123	12/16/2020	12/15/2021
Coaxial Cable	Huber Suhner	SUCOFLE X 106	76096/6	12/16/2020	12/15/2021
Coaxial Cable	Huber Suhner	SUCOFLE X 102	MY2630/2	12/16/2020	12/15/2021
Coaxial Cable	Huber Suhner	SUCOFLE X 102	MY22962/2	12/16/2020	12/15/2021

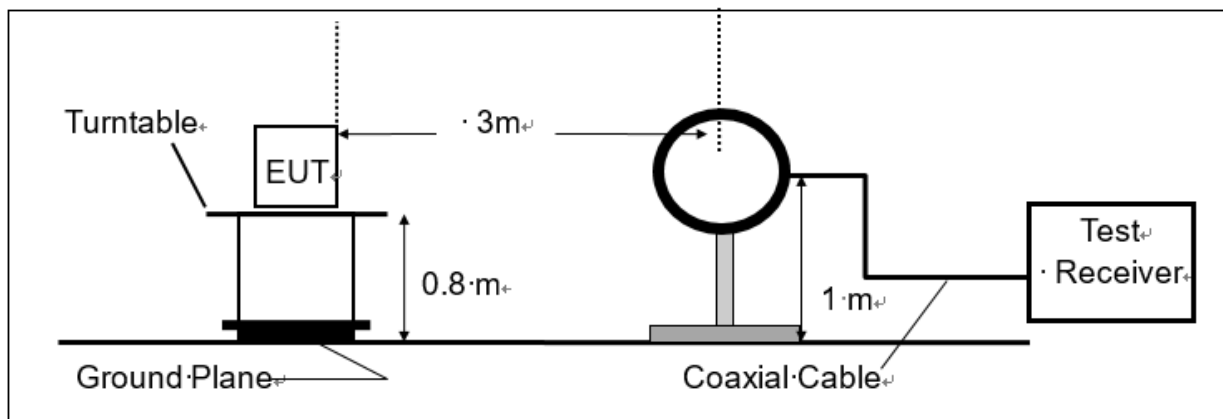
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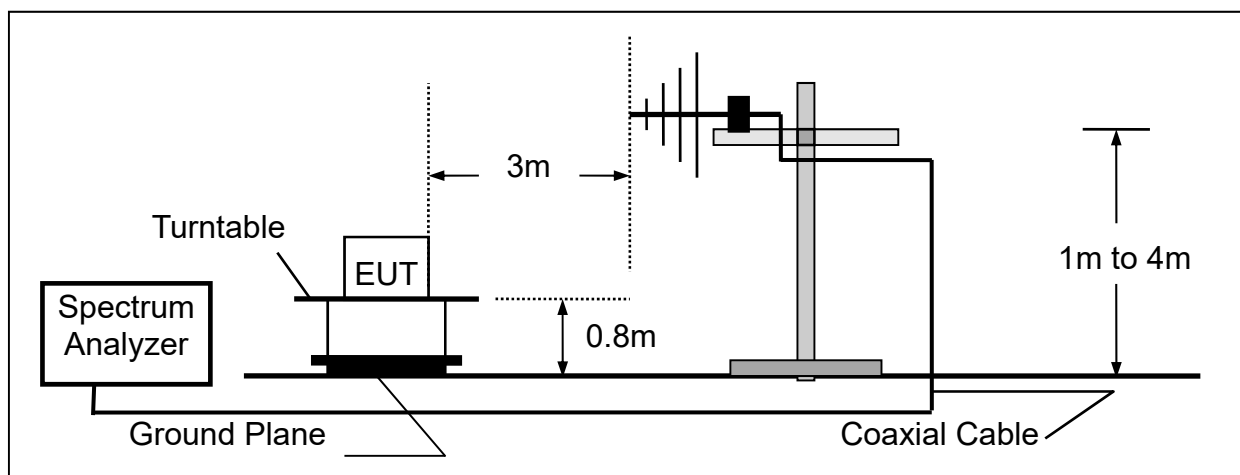
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11.3 Test SET-UP

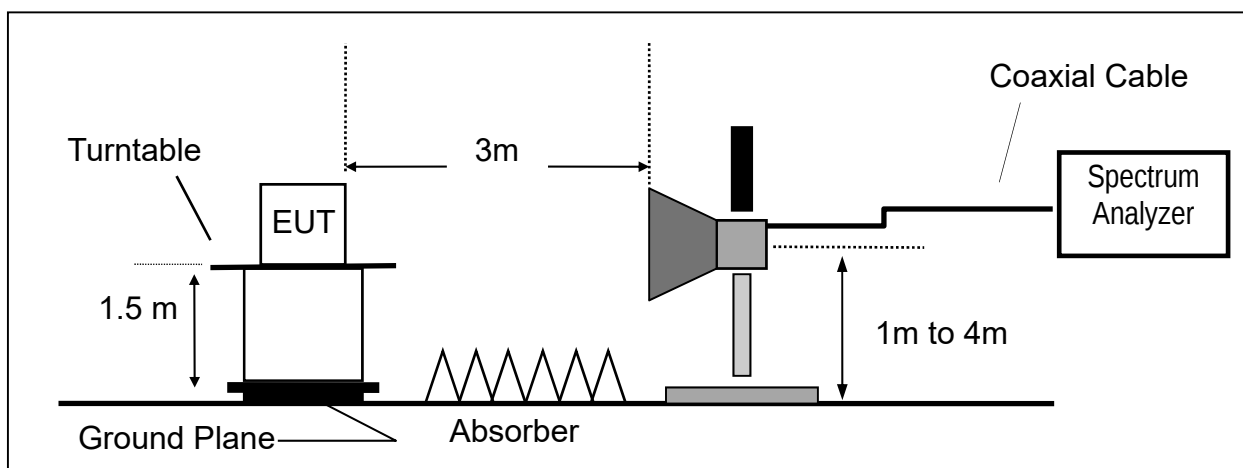
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz.



(B) Radiated Emission Test Set-Up, Frequency From 30MHz to 1000MHz



(C) Radiated Emission Test Set-Up, Frequency Above 1GHz



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11.4 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
3. The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 1.5m for frequency> 1GHz above ground plane.
4. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
5. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
6. Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) and Quasi-peak (QP) at frequency below 1 GHz.
7. At frequency above 1 GHz, Set the spectrum analyzer:
 - A. RBW=1 MHz, VBW=3 MHz for **Peak** Detector.
 - B. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW $\geq 1/T$ (Duty cycle < 98%) for **Average** Detector.
8. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
9. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
10. Repeat above procedures until all frequency measured were complete.

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11.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where *FS* = Field Strength

CL = Cable Attenuation Factor (Cable Loss)

RA = Reading Amplitude

AG = Amplifier Gain

AF = Antenna Factor

The limit of the emission level is expressed in dBuV/m, which converts $20 \cdot \log(uV/m)$

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

11.6 Test Results of Radiated Spurious Emissions from 9 kHz to 30 MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) & RSS-GEN §6.13.2 was not reported.

Pre-scanned was done at frequency 5.47 GHz and 5.85 GHz for bandedge measurement of straddle channels 138, 142 and 144 which was 20dB lower than the limit per 15.31(o) & RSS-GEN §6.13.2 was not reported.

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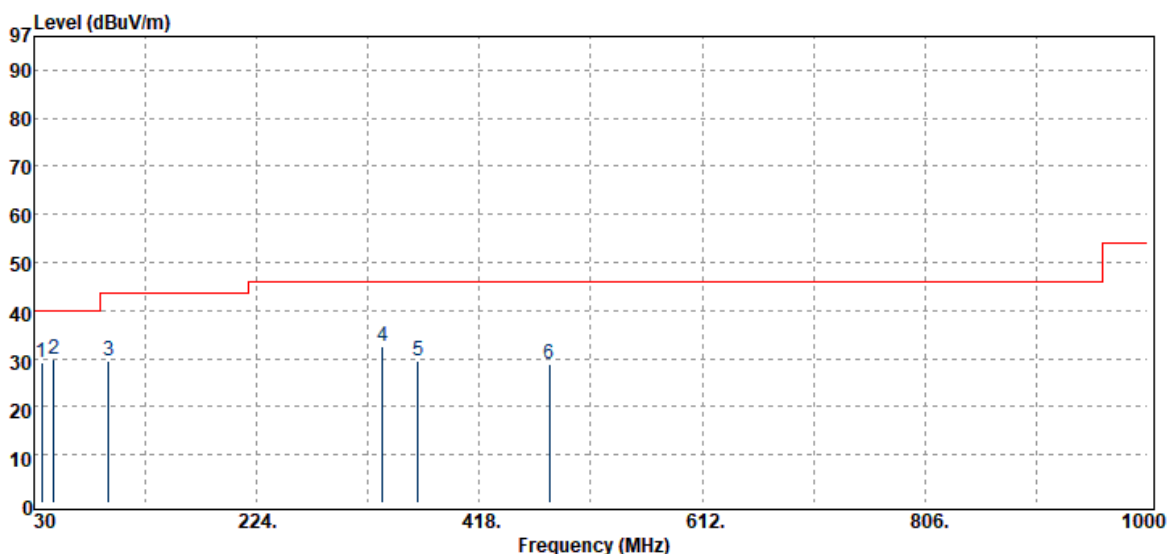
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11.7 Radiated Spurious Emission Measurement Result

11.7.1 Below 1GHz Worst-Case Data:

Report Number	:ER/2021/50016	Test Site	:SAC I Chamber
Operation Mode	:802.11a	Test Date	:2021-06-30
Test Frequency	:5220 MHz	Temp./Humi.	:26.8/62
Test Mode	:Tx CH Mid	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plane	Engineer	:Neo Tsai



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
36.79	Peak	37.71	-8.40	29.31	40.00	-10.69
47.46	Peak	44.16	-14.37	29.79	40.00	-10.21
94.99	Peak	43.96	-14.30	29.66	43.50	-13.84
333.61	Peak	41.12	-8.54	32.58	46.00	-13.42
364.65	Peak	37.51	-8.02	29.49	46.00	-16.51
479.11	Peak	34.81	-5.96	28.85	46.00	-17.15

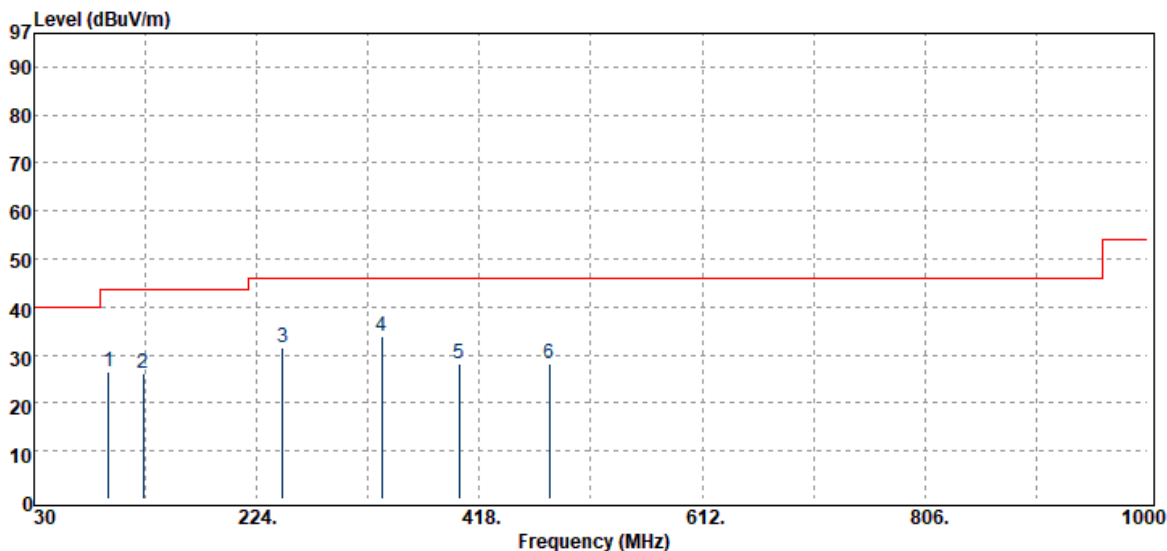
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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5220 MHz
 Test Mode :Tx CH Mid
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-30
 Temp./Humi. :26.8/62
 Antenna Pol. :HORIZONTAL
 Engineer :Neo Tsai



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
94.99	Peak	40.80	-14.30	26.50	43.50	-17.00
125.06	Peak	38.04	-11.73	26.31	43.50	-17.19
246.31	Peak	41.93	-10.52	31.41	46.00	-14.59
332.64	Peak	42.53	-8.56	33.97	46.00	-12.03
400.54	Peak	35.17	-6.89	28.28	46.00	-17.72
479.11	Peak	34.02	-5.96	28.06	46.00	-17.94

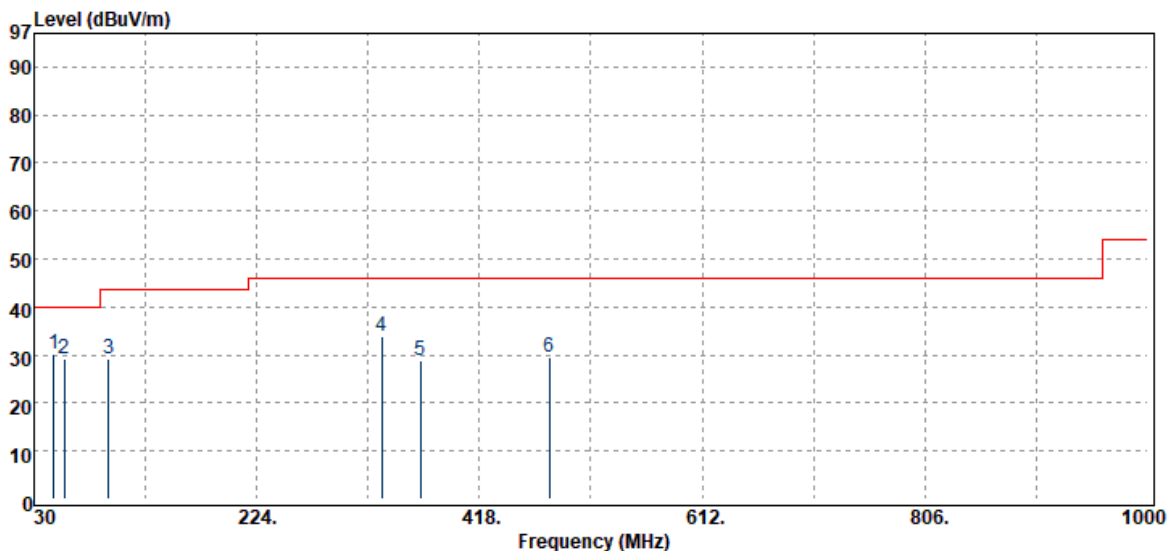
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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5300 MHz
 Test Mode :Tx CH Mid
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-30
 Temp./Humi. :26.8/62
 Antenna Pol. :VERTICAL
 Engineer :Neo Tsai



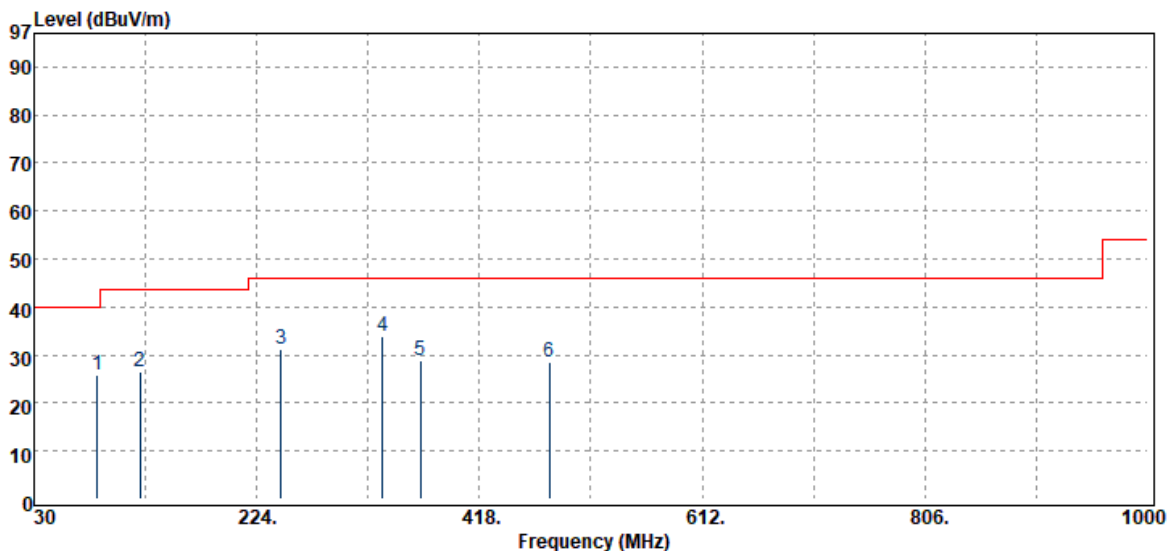
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
47.46	Peak	44.46	-14.37	30.09	40.00	-9.91
56.19	Peak	46.66	-17.62	29.04	40.00	-10.96
94.99	Peak	43.42	-14.30	29.12	43.50	-14.38
332.64	Peak	42.51	-8.56	33.95	46.00	-12.05
366.59	Peak	37.04	-8.04	29.00	46.00	-17.00
479.11	Peak	35.36	-5.96	29.40	46.00	-16.60

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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5300 MHz
 Test Mode :Tx CH Mid
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-30
 Temp./Humi. :26.8/62
 Antenna Pol. :HORIZONTAL
 Engineer :Neo Tsai



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
85.29	Peak	41.84	-16.07	25.77	40.00	-14.23
122.15	Peak	38.31	-11.69	26.62	43.50	-16.88
245.34	Peak	41.87	-10.64	31.23	46.00	-14.77
333.61	Peak	42.37	-8.54	33.83	46.00	-12.17
366.59	Peak	36.80	-8.04	28.76	46.00	-17.24
479.11	Peak	34.49	-5.96	28.53	46.00	-17.47

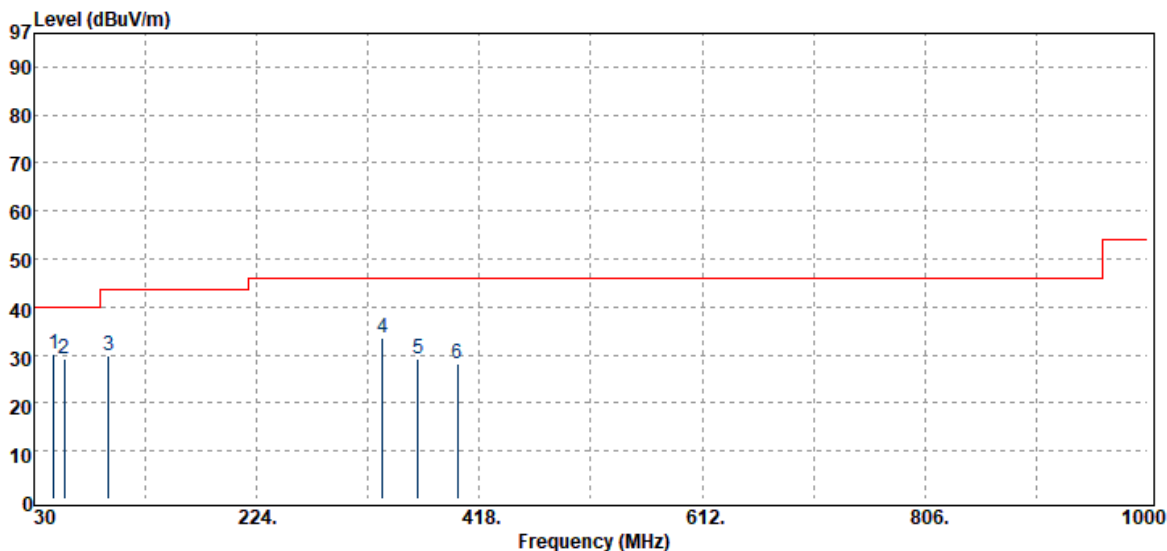
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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5580 MHz
 Test Mode :Tx CH Mid
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-30
 Temp./Humi. :26.8/62
 Antenna Pol. :VERTICAL
 Engineer :Neo Tsai



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
47.46	Peak	44.47	-14.37	30.10	40.00	-9.90
56.19	Peak	46.91	-17.62	29.29	40.00	-10.71
94.99	Peak	44.23	-14.30	29.93	43.50	-13.57
333.61	Peak	42.18	-8.54	33.64	46.00	-12.36
364.65	Peak	37.23	-8.02	29.21	46.00	-16.79
398.60	Peak	35.17	-7.01	28.16	46.00	-17.84

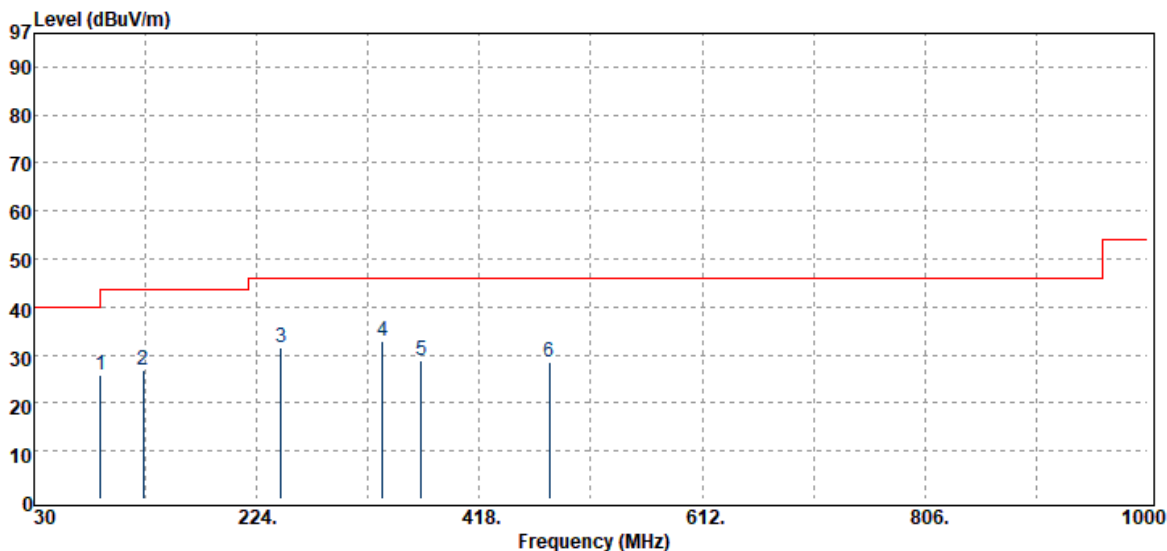
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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5580 MHz
 Test Mode :Tx CH Mid
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-30
 Temp./Humi. :26.8/62
 Antenna Pol. :HORIZONTAL
 Engineer :Neo Tsai



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
88.20	Peak	41.59	-15.61	25.98	43.50	-17.52
125.06	Peak	38.59	-11.73	26.86	43.50	-16.64
245.34	Peak	42.30	-10.64	31.66	46.00	-14.34
333.61	Peak	41.58	-8.54	33.04	46.00	-12.96
367.56	Peak	36.98	-8.05	28.93	46.00	-17.07
479.11	Peak	34.47	-5.96	28.51	46.00	-17.49

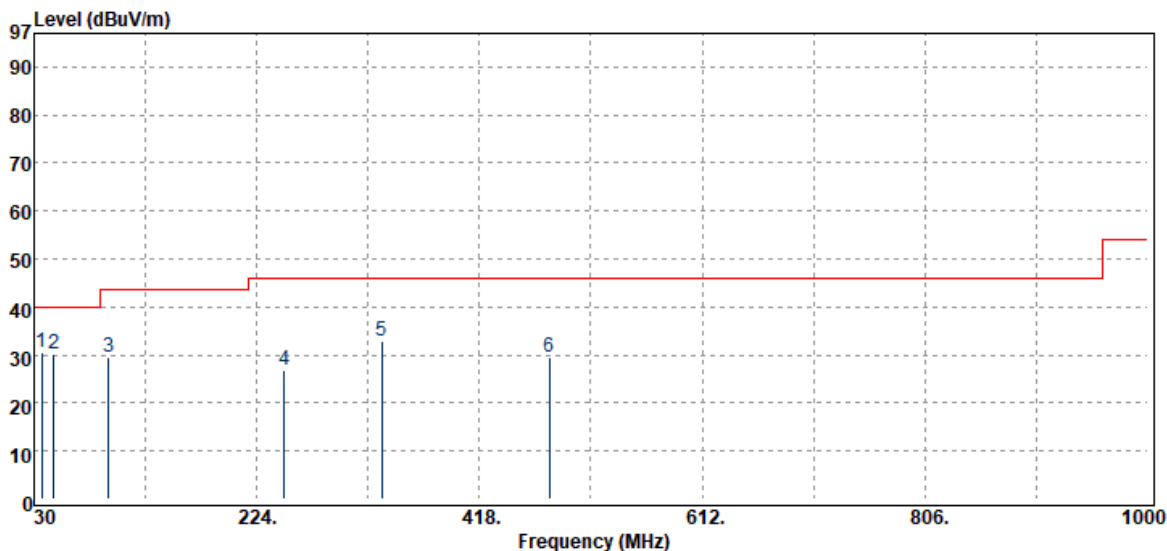
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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5785 MHz
 Test Mode :Tx CH Mid
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-30
 Temp./Humi. :26.8/62
 Antenna Pol. :VERTICAL
 Engineer :Neo Tsai



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
36.79	Peak	38.86	-8.40	30.46	40.00	-9.54
47.46	Peak	44.54	-14.37	30.17	40.00	-9.83
94.99	Peak	43.85	-14.30	29.55	43.50	-13.95
248.25	Peak	36.97	-10.26	26.71	46.00	-19.29
332.64	Peak	41.56	-8.56	33.00	46.00	-13.00
479.11	Peak	35.53	-5.96	29.57	46.00	-16.43

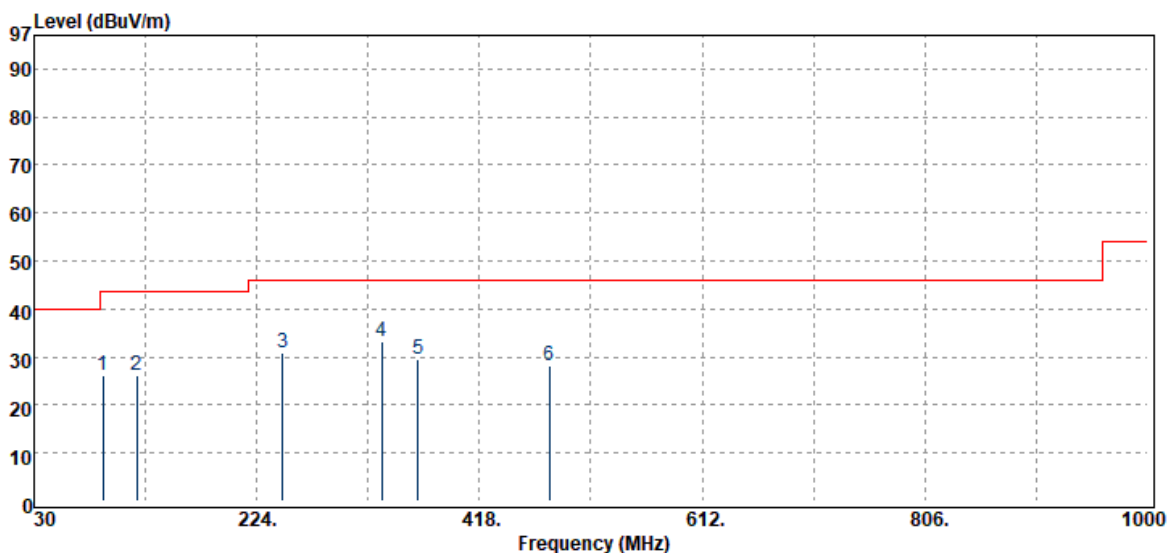
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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5785 MHz
 Test Mode :Tx CH Mid
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-30
 Temp./Humi. :26.8/62
 Antenna Pol. :HORIZONTAL
 Engineer :Neo Tsai



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
90.14	Peak	41.35	-15.16	26.19	43.50	-17.31
119.24	Peak	37.94	-11.69	26.25	43.50	-17.25
246.31	Peak	41.34	-10.52	30.82	46.00	-15.18
332.64	Peak	41.80	-8.56	33.24	46.00	-12.76
364.65	Peak	37.45	-8.02	29.43	46.00	-16.57
479.11	Peak	34.24	-5.96	28.28	46.00	-17.72

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11.7.2 Above 1GHz Worst-Case Data:

Report Number :ER/2021/50016

Operation Mode :802.11a

Test Frequency :5180 MHz

Test Mode :Tx CH Low

EUT Pol :E2 Plane

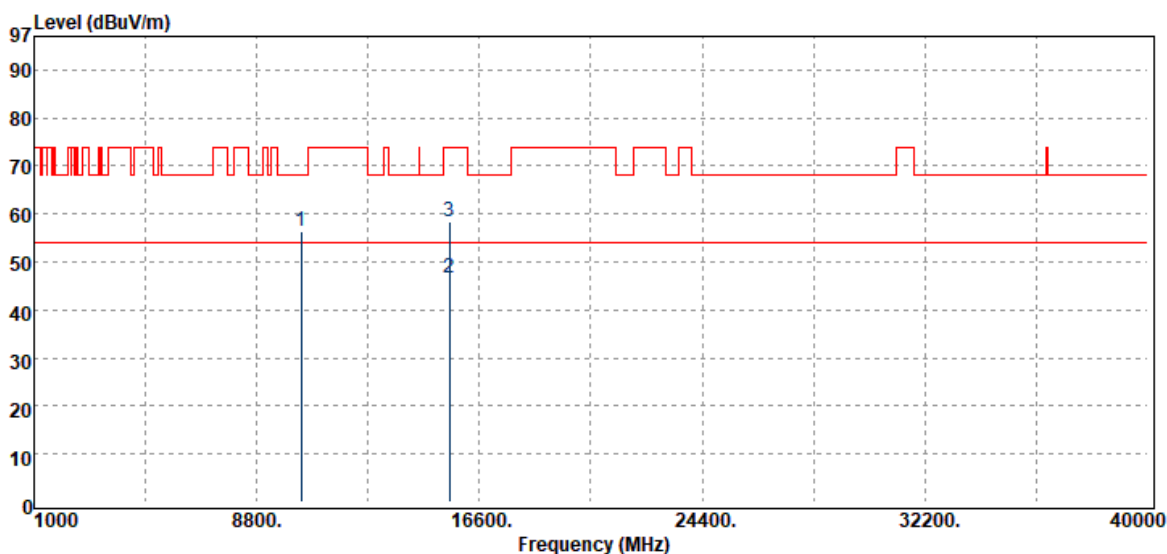
Test Site :SAC I Chamber

Test Date :2021-06-19

Temp./Humi. :25.7/65

Antenna Pol. :VERTICAL

Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10360.00	Peak	37.52	19.01	56.53	68.20	-11.67
15540.00	Average	24.83	21.80	46.63	54.00	-7.37
15540.00	Peak	36.44	21.80	58.24	74.00	-15.76

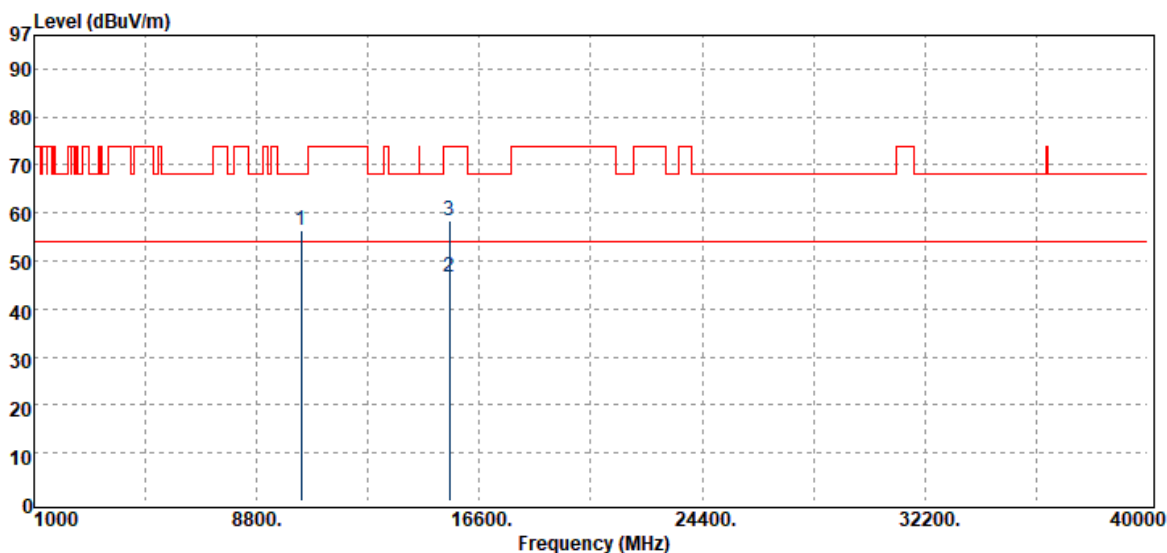
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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5180 MHz
 Test Mode :Tx CH Low
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-19
 Temp./Humi. :25.7/65
 Antenna Pol. :HORIZONTAL
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10360.00	Peak	37.48	19.01	56.49	68.20	-11.71
15540.00	Average	24.89	21.80	46.69	54.00	-7.31
15540.00	Peak	36.58	21.80	58.38	74.00	-15.62

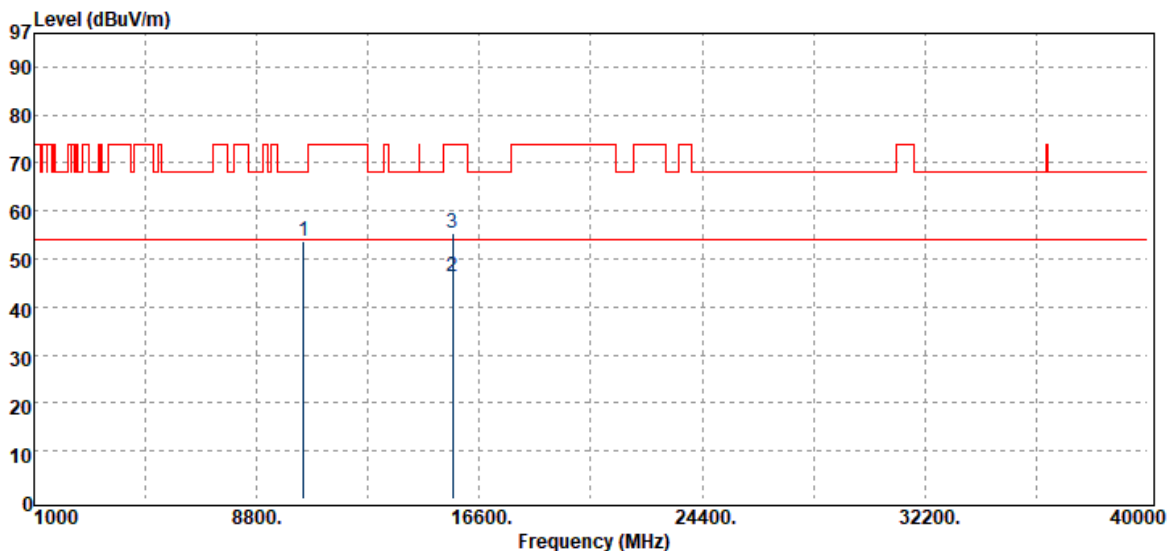
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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5220 MHz
 Test Mode :Tx CH Mid
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-19
 Temp./Humi. :25.7/65
 Antenna Pol. :VERTICAL
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
10440.00	Peak	34.78	18.81	53.59	68.20	-14.61
15660.00	Average	25.31	21.03	46.34	54.00	-7.66
15660.00	Peak	34.51	21.03	55.54	74.00	-18.46

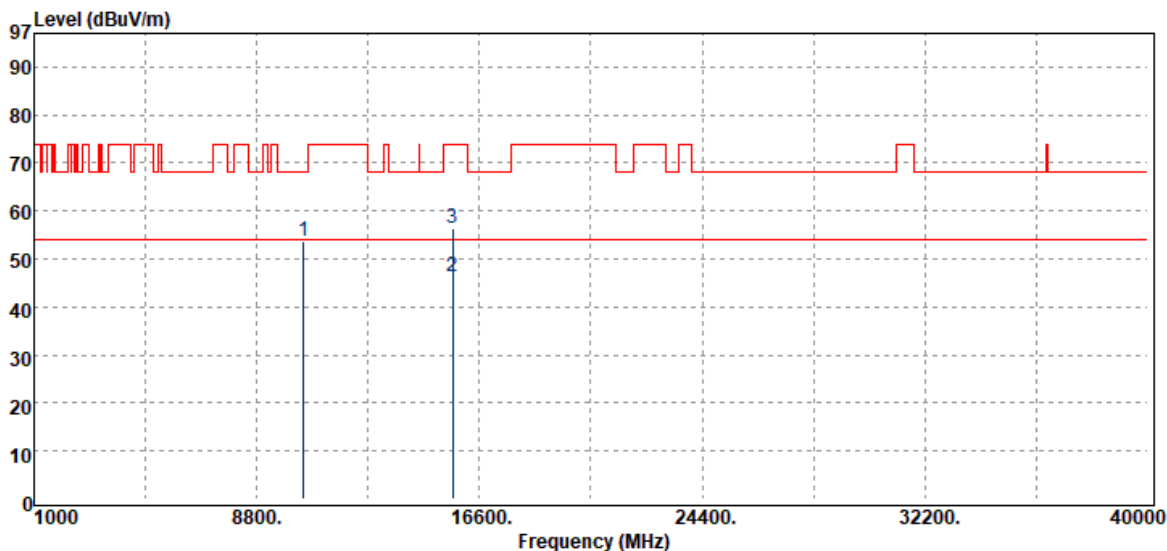
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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5220 MHz
 Test Mode :Tx CH Mid
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-19
 Temp./Humi. :25.7/65
 Antenna Pol. :HORIZONTAL
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10440.00	Peak	35.04	18.81	53.85	68.20	-14.35
15660.00	Average	25.39	21.03	46.42	54.00	-7.58
15660.00	Peak	35.22	21.03	56.25	74.00	-17.75

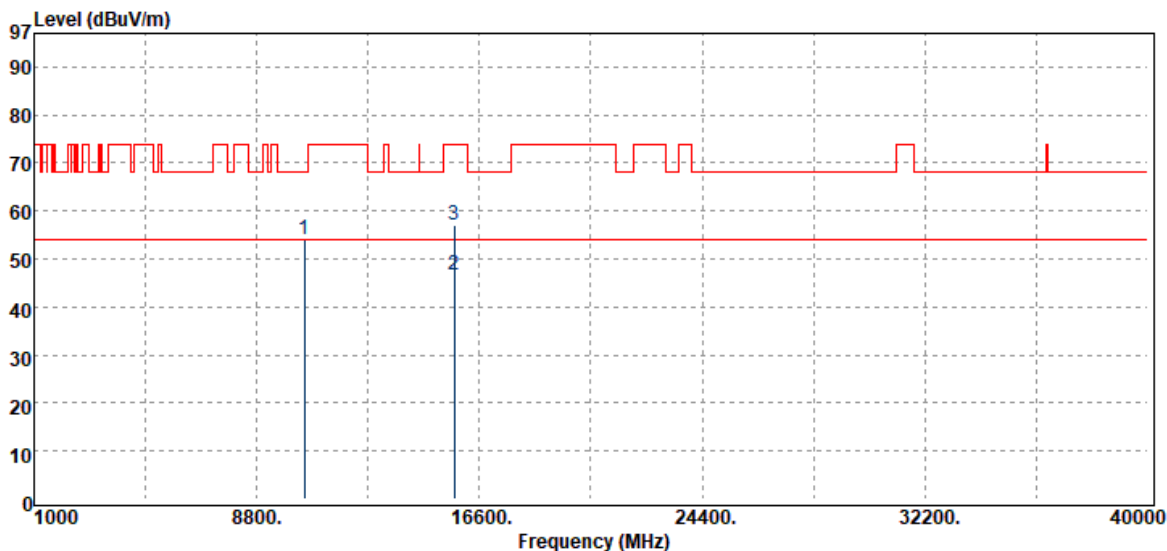
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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5240 MHz
 Test Mode :Tx CH High
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-19
 Temp./Humi. :25.7/65
 Antenna Pol. :VERTICAL
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10480.00	Peak	34.46	19.74	54.20	68.20	-14.00
15720.00	Average	25.47	21.25	46.72	54.00	-7.28
15720.00	Peak	35.68	21.25	56.93	74.00	-17.07

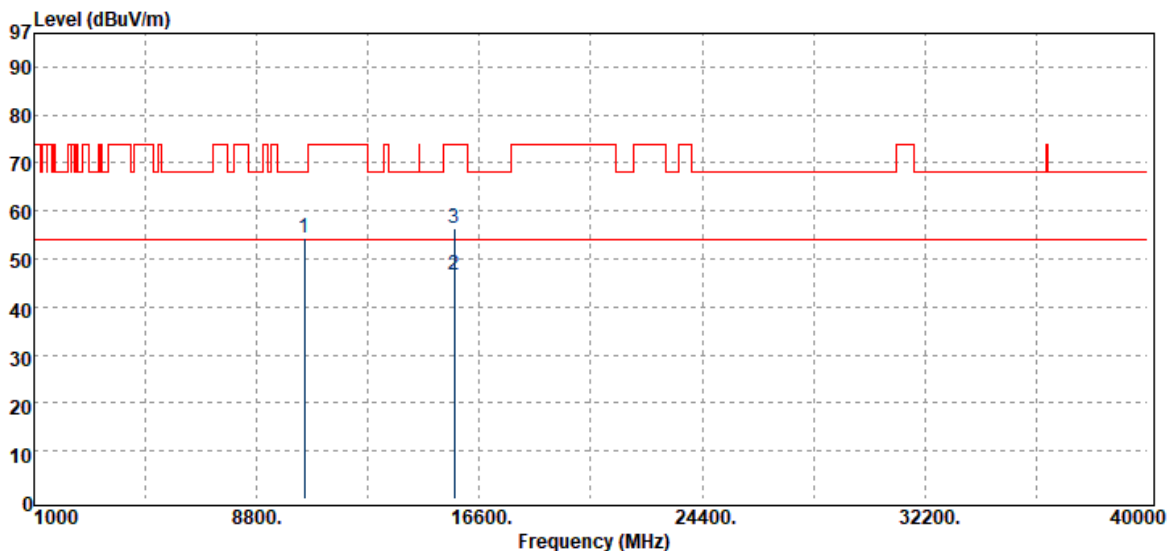
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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5240 MHz
 Test Mode :Tx CH High
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-19
 Temp./Humi. :25.7/65
 Antenna Pol. :HORIZONTAL
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10480.00	Peak	34.64	19.74	54.38	68.20	-13.82
15720.00	Average	25.44	21.25	46.69	54.00	-7.31
15720.00	Peak	35.14	21.25	56.39	74.00	-17.61

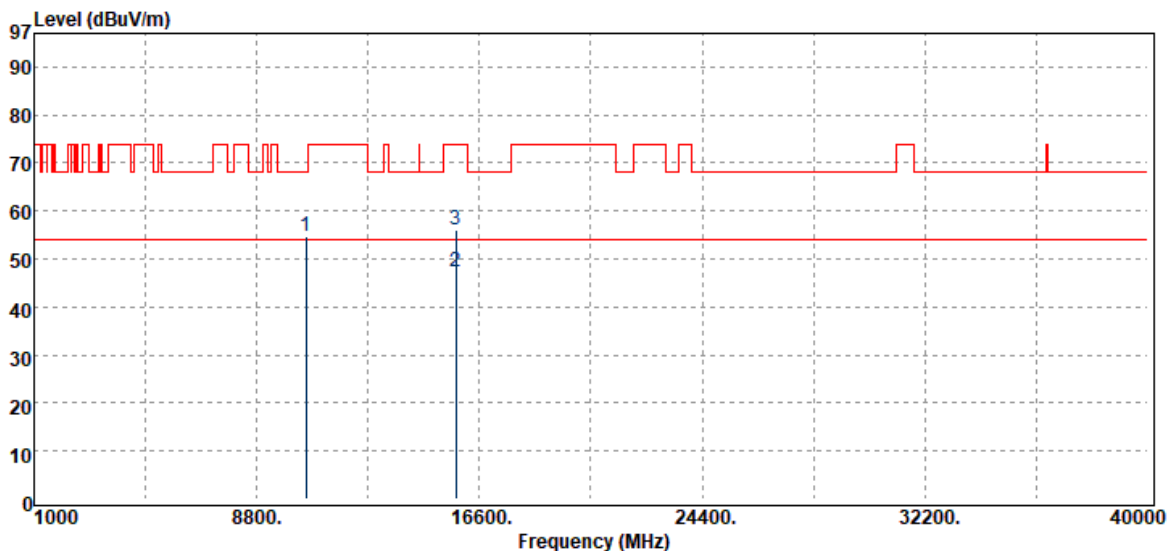
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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5260 MHz
 Test Mode :Tx CH Low
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-19
 Temp./Humi. :25.7/65
 Antenna Pol. :VERTICAL
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10520.00	Peak	34.46	20.14	54.60	68.20	-13.60
15780.00	Average	25.62	21.61	47.23	54.00	-6.77
15780.00	Peak	34.42	21.61	56.03	74.00	-17.97

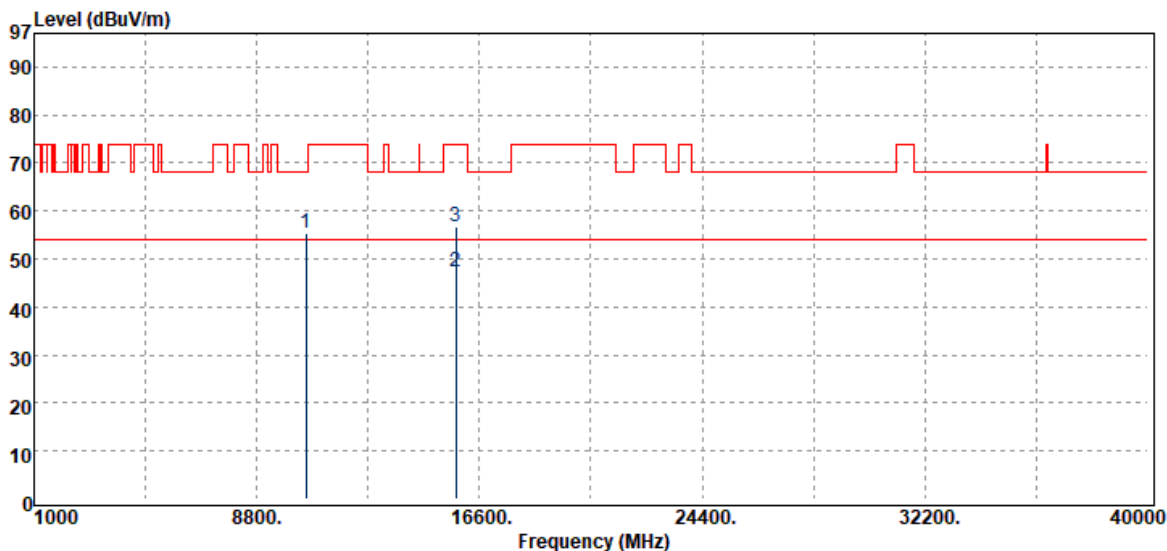
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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5260 MHz
 Test Mode :Tx CH Low
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-19
 Temp./Humi. :25.7/65
 Antenna Pol. :HORIZONTAL
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10520.00	Peak	35.09	20.14	55.23	68.20	-12.97
15780.00	Average	25.60	21.61	47.21	54.00	-6.79
15780.00	Peak	35.09	21.61	56.70	74.00	-17.30

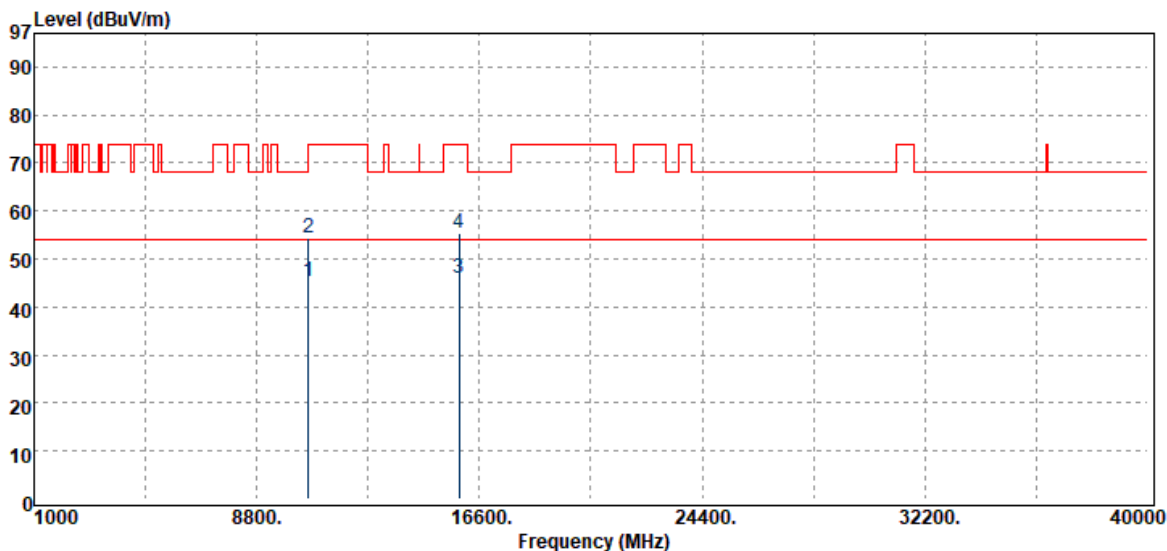
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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5300 MHz
 Test Mode :Tx CH Mid
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-19
 Temp./Humi. :25.7/65
 Antenna Pol. :VERTICAL
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10600.00	Average	25.65	19.56	45.21	54.00	-8.79
10600.00	Peak	34.98	19.56	54.54	74.00	-19.46
15900.00	Average	25.44	20.38	45.82	54.00	-8.18
15900.00	Peak	34.95	20.38	55.33	74.00	-18.67

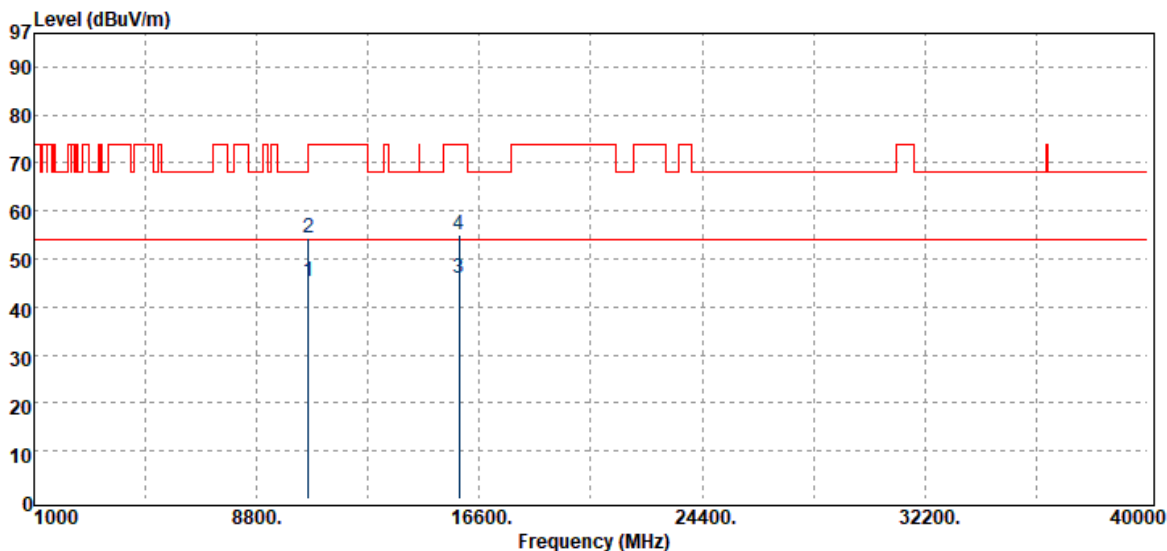
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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5300 MHz
 Test Mode :Tx CH Mid
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-19
 Temp./Humi. :25.7/65
 Antenna Pol. :HORIZONTAL
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10600.00	Average	25.63	19.56	45.19	54.00	-8.81
10600.00	Peak	34.67	19.56	54.23	74.00	-19.77
15900.00	Average	25.46	20.38	45.84	54.00	-8.16
15900.00	Peak	34.81	20.38	55.19	74.00	-18.81

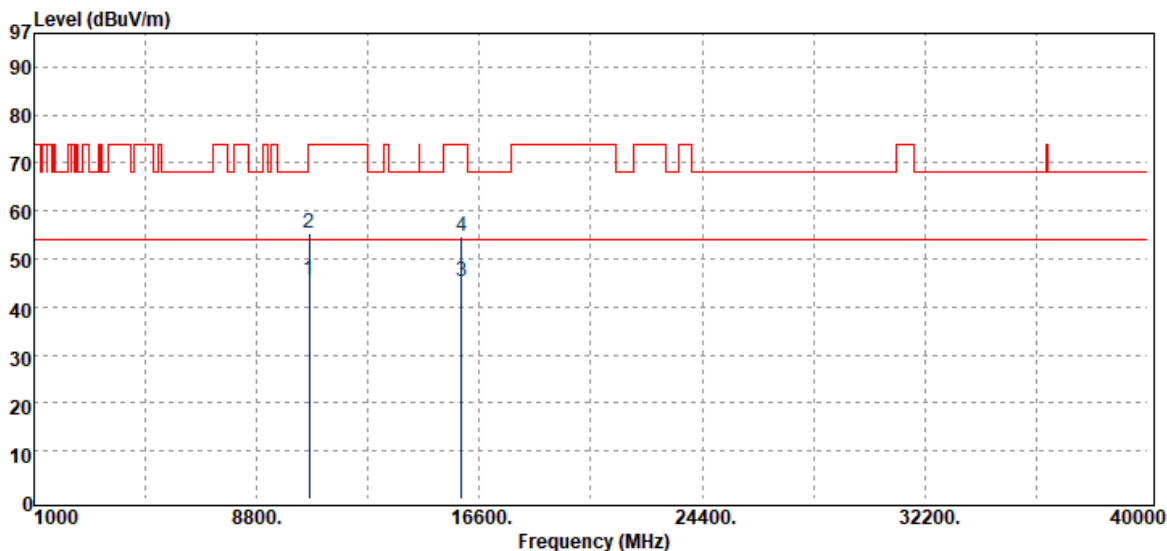
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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5320 MHz
 Test Mode :Tx CH High
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-19
 Temp./Humi. :25.7/65
 Antenna Pol. :VERTICAL
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10640.00	Average	25.91	19.71	45.62	54.00	-8.38
10640.00	Peak	35.67	19.71	55.38	74.00	-18.62
15960.00	Average	25.57	19.73	45.30	54.00	-8.70
15960.00	Peak	35.09	19.73	54.82	74.00	-19.18

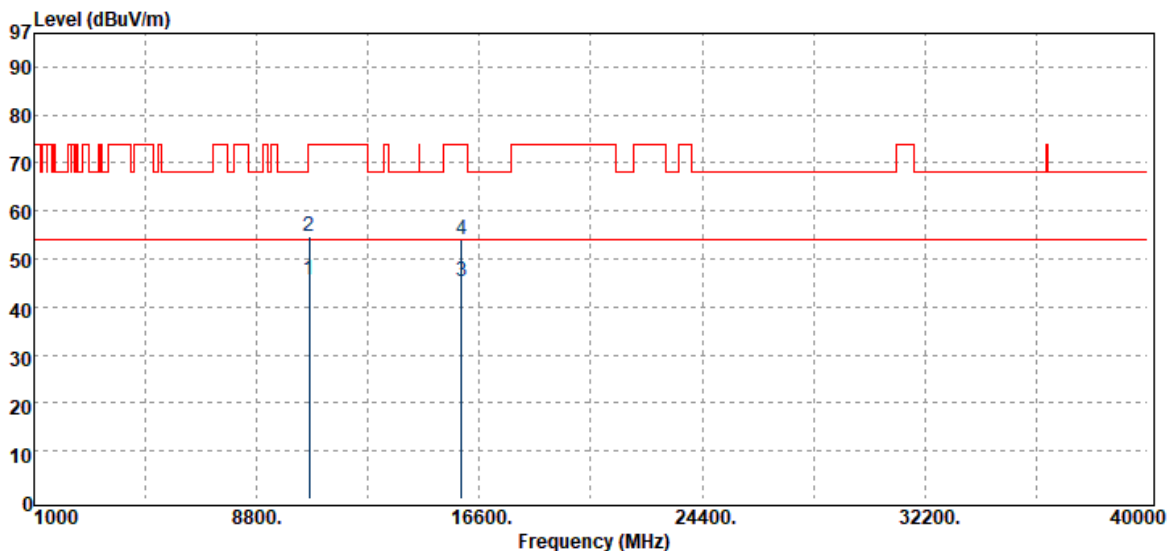
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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5320 MHz
 Test Mode :Tx CH High
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-19
 Temp./Humi. :25.7/65
 Antenna Pol. :HORIZONTAL
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10640.00	Average	25.85	19.71	45.56	54.00	-8.44
10640.00	Peak	35.14	19.71	54.85	74.00	-19.15
15960.00	Average	25.43	19.73	45.16	54.00	-8.84
15960.00	Peak	34.20	19.73	53.93	74.00	-20.07

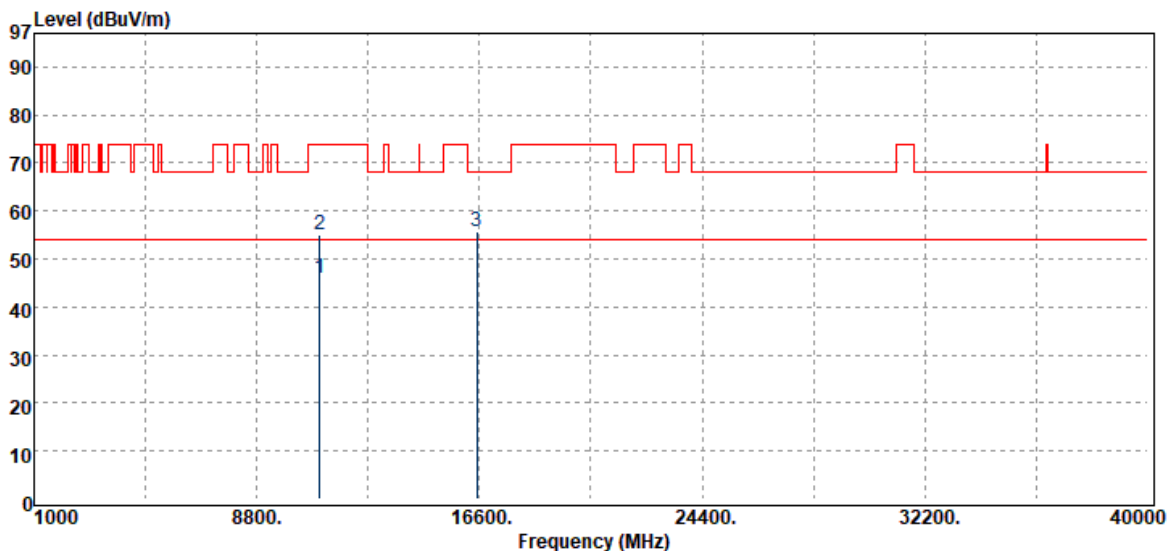
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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5500 MHz
 Test Mode :Tx CH Low
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-19
 Temp./Humi. :25.7/65
 Antenna Pol. :VERTICAL
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11000.00	Average	25.39	20.58	45.97	54.00	-8.03
11000.00	Peak	34.50	20.58	55.08	74.00	-18.92
16500.00	Peak	33.61	21.95	55.56	68.20	-12.64

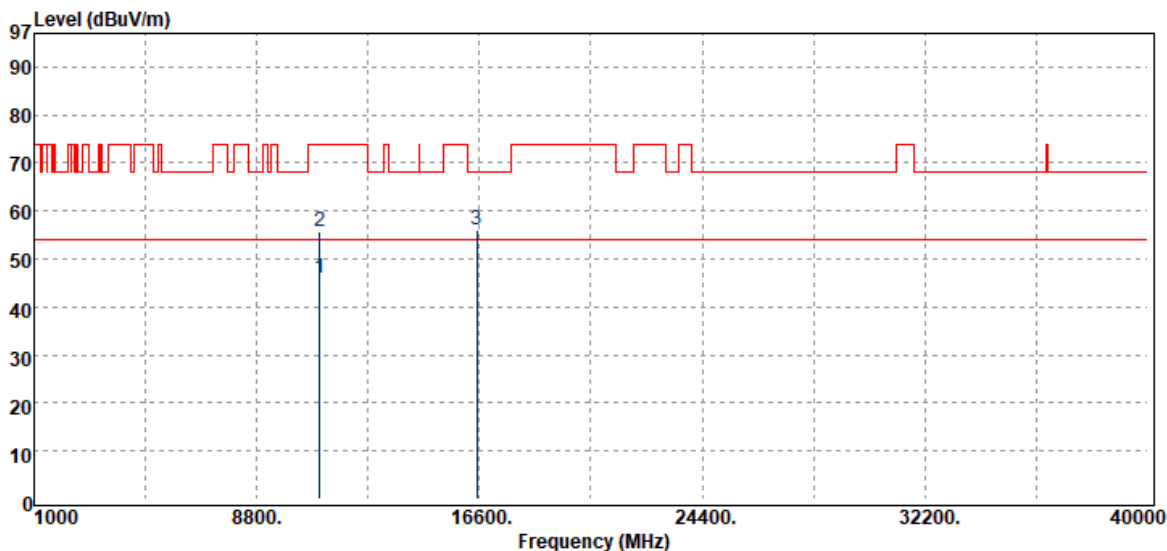
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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5500 MHz
 Test Mode :Tx CH Low
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-19
 Temp./Humi. :25.7/65
 Antenna Pol. :HORIZONTAL
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11000.00	Average	25.36	20.58	45.94	54.00	-8.06
11000.00	Peak	35.01	20.58	55.59	74.00	-18.41
16500.00	Peak	34.18	21.95	56.13	68.20	-12.07

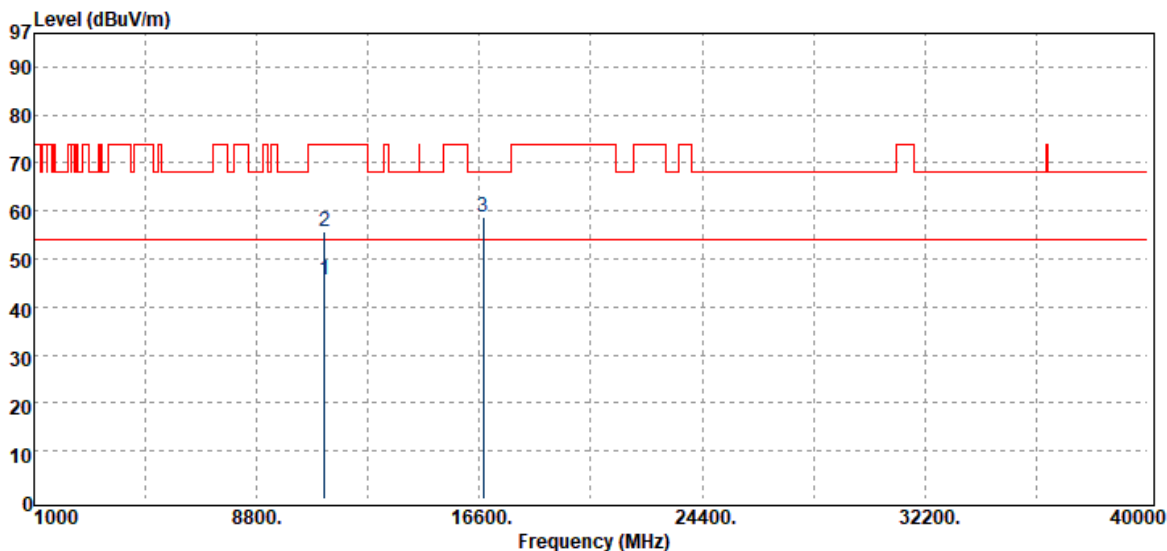
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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5580 MHz
 Test Mode :Tx CH Mid
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-19
 Temp./Humi. :25.7/65
 Antenna Pol. :VERTICAL
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11160.00	Average	25.07	20.61	45.68	54.00	-8.32
11160.00	Peak	35.00	20.61	55.61	74.00	-18.39
16740.00	Peak	34.33	24.44	58.77	68.20	-9.43

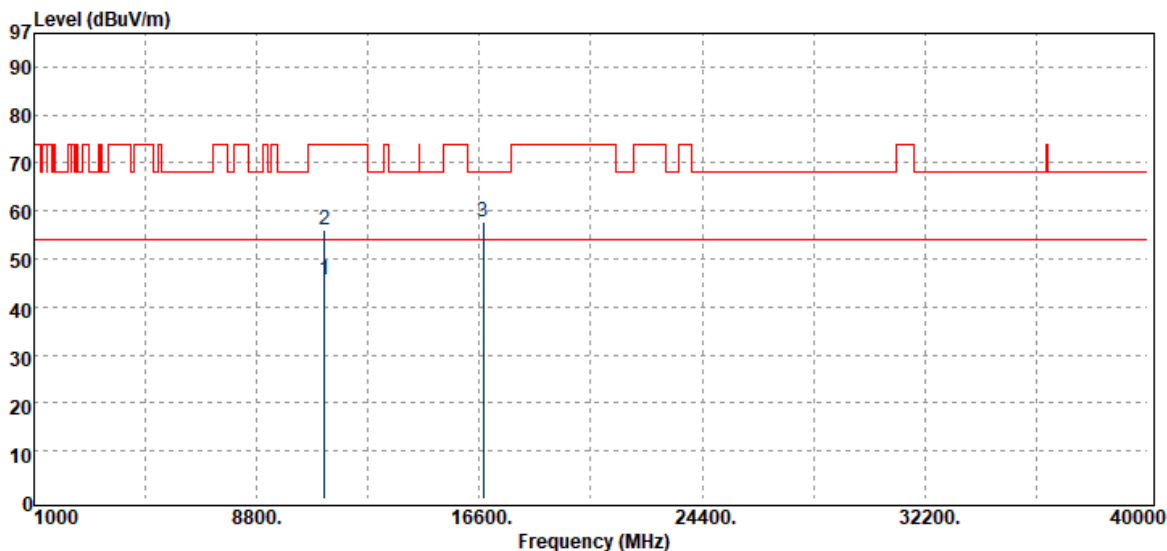
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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5580 MHz
 Test Mode :Tx CH Mid
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-19
 Temp./Humi. :25.7/65
 Antenna Pol. :HORIZONTAL
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11160.00	Average	25.18	20.61	45.79	54.00	-8.21
11160.00	Peak	35.34	20.61	55.95	74.00	-18.05
16740.00	Peak	33.33	24.44	57.77	68.20	-10.43

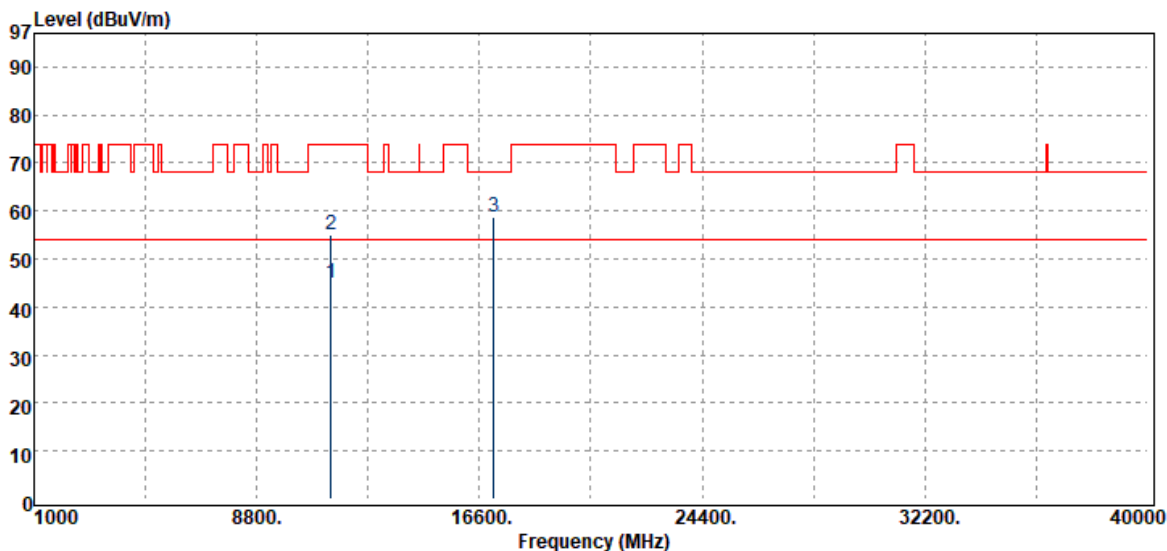
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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5700 MHz
 Test Mode :Tx CH High
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-19
 Temp./Humi. :25.7/65
 Antenna Pol. :VERTICAL
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11400.00	Average	24.82	20.23	45.05	54.00	-8.95
11400.00	Peak	34.73	20.23	54.96	74.00	-19.04
17100.00	Peak	33.65	25.15	58.80	68.20	-9.40

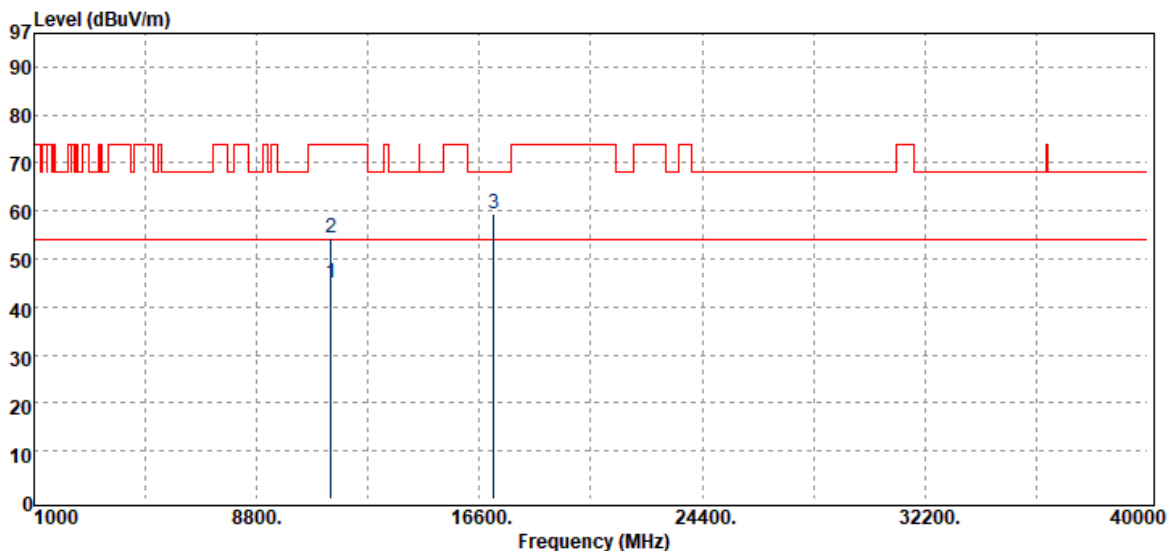
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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5700 MHz
 Test Mode :Tx CH High
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-19
 Temp./Humi. :25.7/65
 Antenna Pol. :HORIZONTAL
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11400.00	Average	24.73	20.23	44.96	54.00	-9.04
11400.00	Peak	34.27	20.23	54.50	74.00	-19.50
17100.00	Peak	34.15	25.15	59.30	68.20	-8.90

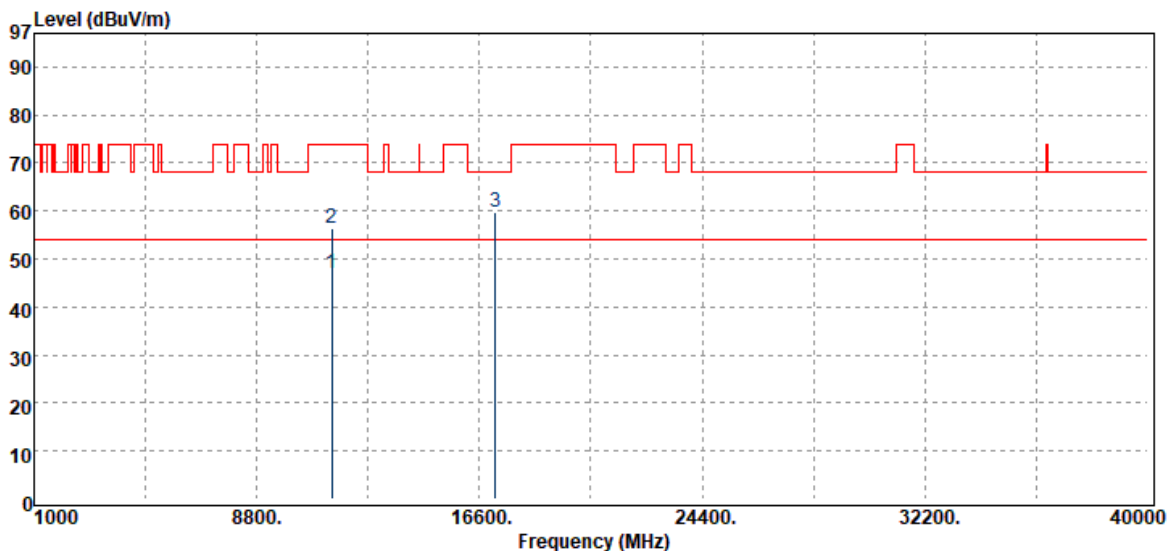
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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5720 MHz
 Test Mode :Tx CH Mid
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-19
 Temp./Humi. :25.7/65
 Antenna Pol. :VERTICAL
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11440.00	Average	25.13	21.89	47.02	54.00	-6.98
11440.00	Peak	34.43	21.89	56.32	74.00	-17.68
17160.00	Peak	34.33	25.47	59.80	68.20	-8.40

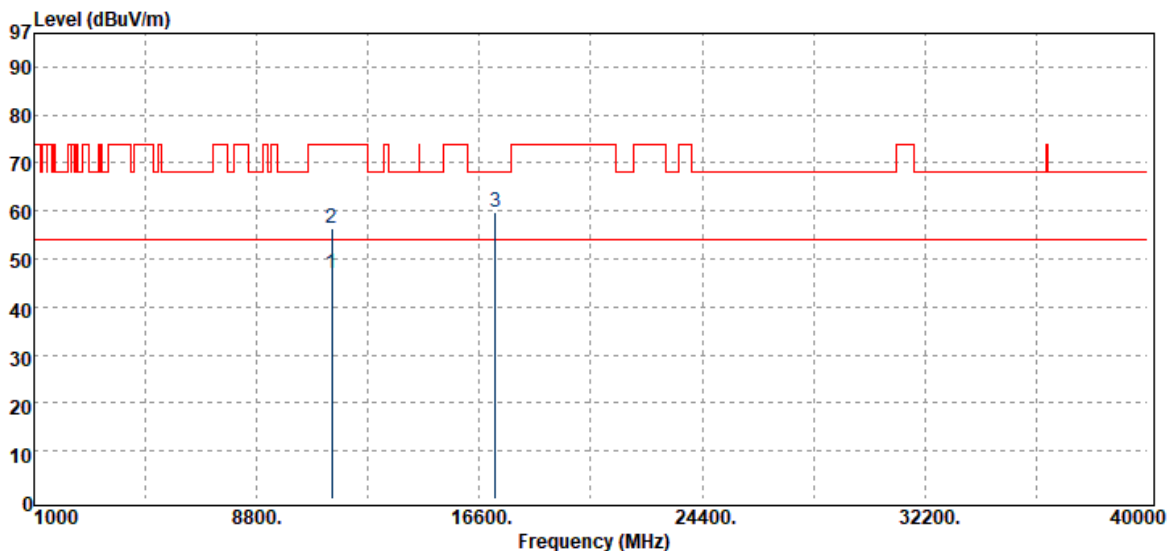
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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5720 MHz
 Test Mode :Tx CH Mid
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-19
 Temp./Humi. :25.7/65
 Antenna Pol. :HORIZONTAL
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11440.00	Average	25.03	21.89	46.92	54.00	-7.08
11440.00	Peak	34.41	21.89	56.30	74.00	-17.70
17160.00	Peak	34.26	25.47	59.73	68.20	-8.47

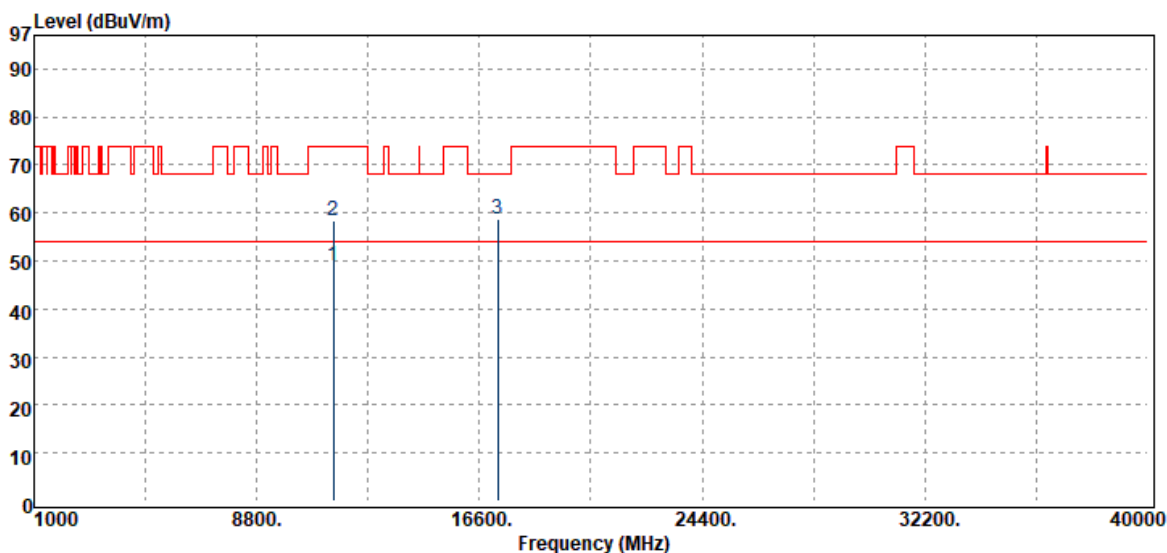
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Report Number :ER/2021/50016
 Operation Mode :802.11a
 Test Frequency :5745 MHz
 Test Mode :Tx CH Low
 EUT Pol :E2 Plane

Test Site :SAC I Chamber
 Test Date :2021-06-19
 Temp./Humi. :25.7/65
 Antenna Pol. :VERTICAL
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11490.00	Average	25.08	24.05	49.13	54.00	-4.87
11490.00	Peak	34.26	24.05	58.31	74.00	-15.69
17235.00	Peak	33.79	24.88	58.67	68.20	-9.53

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