



TEST REPORT

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Address of Applicant: 701, Building 8, Hengda Shishang Huigu, next to Fulong Road, Shanghenglang Community,Dalang Street, Longhua District, ShenZhen, China
Manufacturer/Factory: Shenzhen AZW Technology Co., Ltd.
Address of Manufacturer: 701, Building 8, Hengda Shishang Huigu, next to Fulong Road, Shanghenglang Community,Dalang Street, Longhua District, ShenZhen, China
Product Name: Mini Smart Computer
Model No.: SER,SER6,SER7,SER8,SER6 PRO,SER7 PRO,SER8 PRO
Trade Mark: N/A
FCC ID: 2A4J2-SER
Applicable standards: FCC CFR Title 47 Part 15 Subpart E Section 15.407
Date of Test: Feb.02, 2024- Feb.20, 2024
Date of report issued: Mar. 06, 2024
Test Result : PASS *

Remark:

* In the configuration tested, the EUT complied with the standards specified above.

The results shown in this test report refer only to the sample(s) tested , this test report cannot be reproduced, except in full without prior written permission of the company.

The report would be invalid without specific stamp of test institute and the signatures of compiler and approver

Prepared By

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1 Test Summary

Test Item	Section in CFR 47	Result	Test by
Antenna requirement	15.203	Pass	/
AC Power Line Conducted Emission	15.207	Pass	Carr Kang
Conducted Output Power	15.407 (a)(1)/(a)(3)	Pass	Yvan Fan
26dB Bandwidth and 99% Occupied Bandwidth	15.407 (a)(12)	Pass	Yvan Fan
6dB Bandwidth	15.407 (e)	Pass	Yvan Fan
Power Spectral Density	15.407(a)(1)/(a)(3)	Pass	Yvan Fan
Band Edge	15.407(b)(1)/(b)(4)	Pass	Yvan Fan
Spurious Emission	15.205/15.209 15.407(b)(1)/(b)(4)/(b)(8)	Pass	Qiao Li
Frequency Stability	15.407(g)	Pass	Yvan Fan

Remarks:

1. Pass: The EUT complies with the essential requirements in the standard.
2. Test according to ANSI C63.10:2013.

1.1 Measurement Uncertainty

Test Item	Measurement Uncertainty	Notes
Occupied Channel Bandwidth	±0.55%	(1)
RF output power, conducted	±0.99dB	(1)
Power Spectral Density, conducted	±0.61dB	(1)
Unwanted Emissions, conducted	±0.64dB	(1)
AC Power Line Conducted Emission	± 3.02dB	(1)
Radiated emissions 9K-30MHz	±3.98dB	(1)
Radiated emissions 30M- 1GHz	±4.30dB	(1)
Radiated emissions 1GHz-18GHz	±4.35dB	(1)
Radiated emissions 18GHz-40GHz	±4.59 dB	(1)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

2 General Information

2.1 General Description of EUT

Product Name:	Mini Smart Computer
Model No.:	SER,SER6,SER7,SER8,SER6 PRO,SER7 PRO,SER8 PRO
Difference of model(s)	All the model are the same circuit and RF module, except the model names and colors
Test Model:	SER
Hardware Version:	N/A
Software Version:	N/A
Sample(s) Status:	Engineer sample
Operation Frequency:	☒ 5180-5240MHz for 802.11a/n(HT20)/ac20; 5190-5230MHz for 802.11n(HT40)/ac40; 5210MHz for 802.11 ac80; ☒ 5745-5825 MHz for 802.11a/n(HT20)/ac20; 5755-5795 MHz for 802.11n(HT40)/ac40; 5775MHz for 802.11 ac80;
Channel numbers:	☒ 4 channels for 802.11a/n20/ac20 in the 5180-5240MHz band; 2 channels for 802.11 n40/ac40 in the 5190-5230MHz band ; 1 channels for 802.11 ac80 in the 5210MHz band ; ☒ 5 channels for 802.11a/n20/ac20 in the 5745-5825MHz band ; 2 channels for 802.11 n40/ac40 in the 5755-5795MHz band ; 1 channels for 802.11 ac80 in the 5775MHz band
Channel bandwidth:	802.11a/802.11n(HT20)/ 802.11ac(HT20): 20MHz 802.11n(HT40)/ 802.11ac(HT40) : 40MHz 802.11ac(HT80) : 80MHz
Data Rate	802.11a: 6,9,12,18,24,36,48,54Mbps; 802.11n(HT20/HT40):MCS0-MCS15; 802.11ac(VHT/20/40/80):NSS1, MCS0-MCS9
Modulation technology:	Orthogonal Frequency Division Multiplexing (OFDM) with BPSK/QPSK/16QAM/64QAM/256QAM
Antenna Type:	FPC antenna
Antenna gain:	2.79 dBi(Declare by applicant) Note: Antenna information is provided by applicant, Testing lab is not responsible for the accuracy of the information.
Battery	N/A
Adapter Model:	Model: HKA06519034-6K Input: 100-240V 50/60Hz 1.5A Output: DC 19V 3.42A

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180MHz	38	5190MHz	40	5200MHz	42	5210MHz
44	5220MHz	46	5230MHz	48	5240MHz	/	/
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
149	5745MHz	151	5755MHz	153	5765MHz	155	5775MHz
157	5785MHz	159	5795MHz	161	5805MHz	/	/
165	5825MHz	/					

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Test channel	Frequency (MHz)		
	802.11 a /n(HT20)/ac(HT20)	802.11 n(HT40)/ac(HT40)	802.11ac(HT80)
Lowest channel	5180	5190	5210
Middle channel	5200	X	
Highest channel	5240		

Test channel	Frequency (MHz)		
	802.11 a /n(HT20)/ac(HT20)	802.11 n(HT40)/ac(HT40)	802.11ac(HT80)
Lowest channel	5745	5755	5775
Middle channel	5785	X	
Highest channel	5825		

2.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode(or with a duty cycle $\geq 98\%$)
<i>Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.</i>	

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Pretest Mode	Description
Mode 1	802.11a / n 20 CH36/ CH40/ CH 48 802.11a /n 20 CH149/ CH157/ CH 165
Mode 2	802.11n 40 CH38/ CH 46 802.11n 40 CH 151 / CH 159
Mode 3	802.11 ac80 CH 42/CH 155
Mode 4	802.11a / n 20 CH36/ CH40/ CH 48 802.11a /n 20 CH149/ CH157/ CH 165
Mode 5	Link Mode

Conducted Emission	
Final Test Mode	Description
Mode 5	Link Mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	802.11a / n 20 CH36/ CH40/ CH 48 802.11a /n 20 CH149/ CH157/ CH 165
Mode 2	802.11n 40 CH38/ CH 46 802.11n 40 CH 151 / CH 159
Mode 3	802.11 ac80 CH 42/CH 155
Mode 4	802.11a / n 20 CH36/ CH40/ CH 48 802.11a /n 20 CH149/ CH157/ CH 165

Note:

(1) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported.

2.3 Description of Support Units

No.	Description	Manufacturer	Model	Serial Number
1	monitor	DELL	SE2416HC	/
2	mouse	DELL	/	/
3	keyboard	DELL	/	/

2.4 Deviation from Standards

None.

2.5 Abnormalities from Standard Conditions

None.

2.6 Test Facility

Test laboratory:	Shenzhen ETR Standard Technology Co., Ltd.
CNAS Registration Number:	L11864
A2LA Certificate Number:	6640.01
FCC Designation Number:	CN1326
FCC Test Firm Registration:	183064

2.7 Test Location

All tests were performed at:

Laboratory location:	No.103, No.10, Phase I, Zone 3, Xinxing Industrial Park, Xinhe, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Telephone:	+86 755 85259392

2.8 Additional Instructions

Test Software	DRTU.EXE
Power level setup	Default



3 Test Instruments list

Conducted Emission

Item	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	EMI Test Receiver	Rohde&schwarz	ESCI3	100605	2023.3.02	2024.3.01
2	Artificial power network	schwarabeck	NSLK8127	8127483	2023.3.02	2024.3.01
3	Artificial power network	ETS	3186/2NM	1132	2023.3.02	2024.3.01
4	10dB attenuator	HUBER+SUHNER	10dB	/	2023.3.02	2024.3.01
5	Cable 4	HUBER SUNNER	3M	/	2023.3.02	2024.3.01
6	Absorbing Clamp	schwarabeck	MDS21	D69250	2023.3.06	2024.3.05

Radiated Emission & RF Conducted test:

Item	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	EMI Test Receiver	Rohde&schwarz	ESCI7	101032	2023.3.02	2024.3.01
2	Broadband antenna	schwarabeck	VULB9168	1064	2022.3.11	2024.3.10
3	Horn antenna	schwarabeck	BBHA9120D	9120D-1145	2022.3.11	2024.3.10
4	Amplifier	EMtrace	RP01A	50117	2023.3.02	2024.3.01
5	Amplifier	Space-Dtronics	EWLAN0118G-P40	19113001	2023.3.02	2024.3.01
6	Spectrum analyzer	KEYSIGHT	N9020A	MY55370280	2023.3.02	2024.3.01
7	Power detector meter	MWRFTest	MW100-PSB	MW201020JYT	2023.10.18	2024.10.17
8	Signal generator	Agilent	N5182A	MY49060455	2023.10.18	2024.10.17
9	Spectrum analyzer	Rohde&schwarz	FSU40	1166.1660K43	2023.8.16	2024.8.15
10	Amplifier	SKET	LNPA_1840-50	SK2019040302	2023.8.16	2024.8.15
11	Horn antenna	schwarabeck	BBHA 9170	946	2022.3.11	2024.3.10
12	Loop antenna	schwarabeck	FMZB 1519 B	1519	2022.3.11	2024.3.10
13	Cable 6	HUBER SUNNER	0.5M	/	2023.3.02	2024.3.01
14	Cable7	HUBER SUNNER	2.0M	/	2023.3.02	2024.3.01
15	Cable8	HUBER SUNNER	6.0M	/	2023.3.02	2024.3.01
16	Filter	Xin bo	XBLBQ-GTA29	210410-3-2	2023.3.06	2024.3.05

Note: the calibration interval of the above test instruments is 12 or 24 months and the calibrations are traceable to international system unit (SI).

Software Name	Manufacturer	Model	Version
RF test software	MWRFTest	MTS 8310	V2.0.0.0
Conducted test software	EZ-EMC	Farad	Ver.EMC-CON 3A1.1
Radiated test software	EZ-EMC	Farad	Ver.FA-03A2 RE

4 Test results and Measurement Data

4.1 Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203
<i>15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</i>	
E.U.T Antenna:	
<i>The antennas are FPC Antenna, the best case gain of the antennas are 2.79dBi, reference to the appendix II for details</i>	

4.2 Conducted Emissions

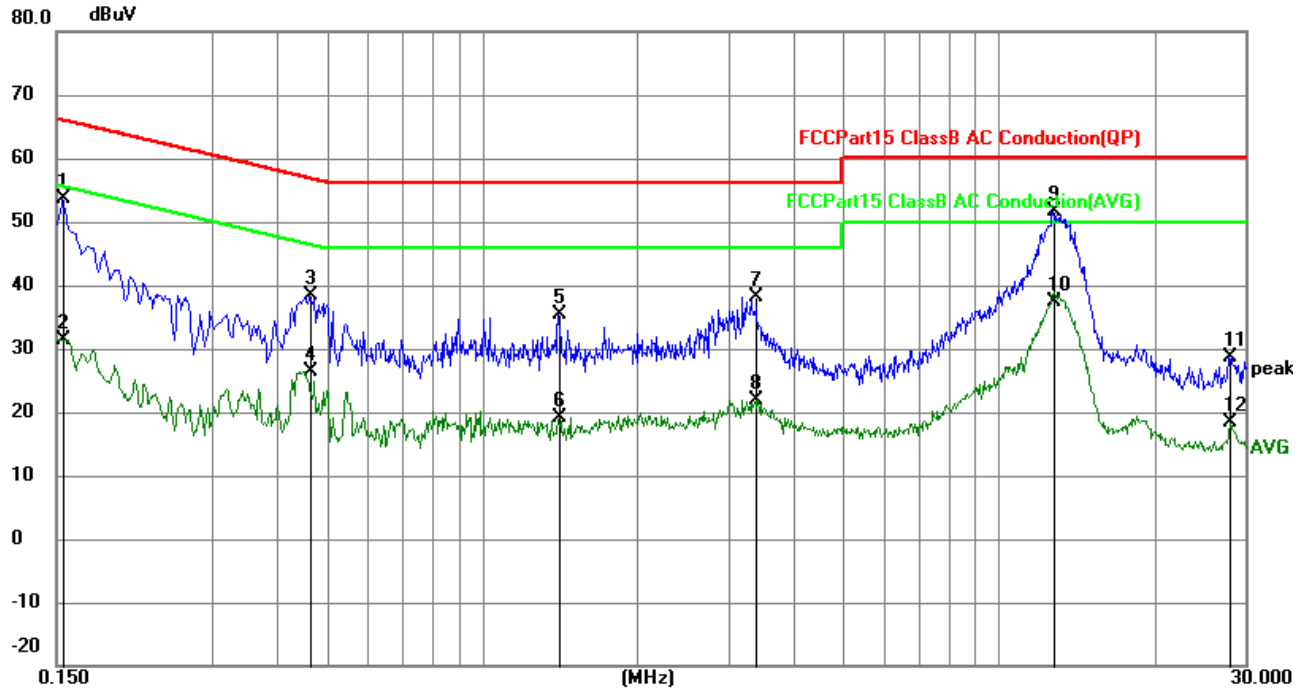
Test Requirement:	FCC Part15 C Section 15.207						
Test Method:	ANSI C63.10:2013						
Test Frequency Range:	150KHz to 30MHz						
Class / Severity:	Class B						
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto						
Limit:	Frequency range (MHz)		Limit (dBuV)				
			Quasi-peak		Average		
	0.15-0.5		66 to 56*		56 to 46*		
	0.5-5		56		46		
	5-30		60		50		
* Decreases with the logarithm of the frequency.							
Test setup:	Reference Plane Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m						
Test procedure:	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.						
Test Instruments:	Refer to section 3.0 for details						
Test mode:	Refer to section 2.2 for details						
Test environment:	Temp.:	24.2°C	Humid.:	63%	Press.:	1012mbar	
Test voltage:	AC 120V, 60Hz						
Test results:	Pass						

Remark:

1. Both high voltage and low voltage have been tested, and the report only shows the worst case data with AC 120V/60Hz.
2. All mode have been tested, the report only shows the worst mode (5785MHz) data.

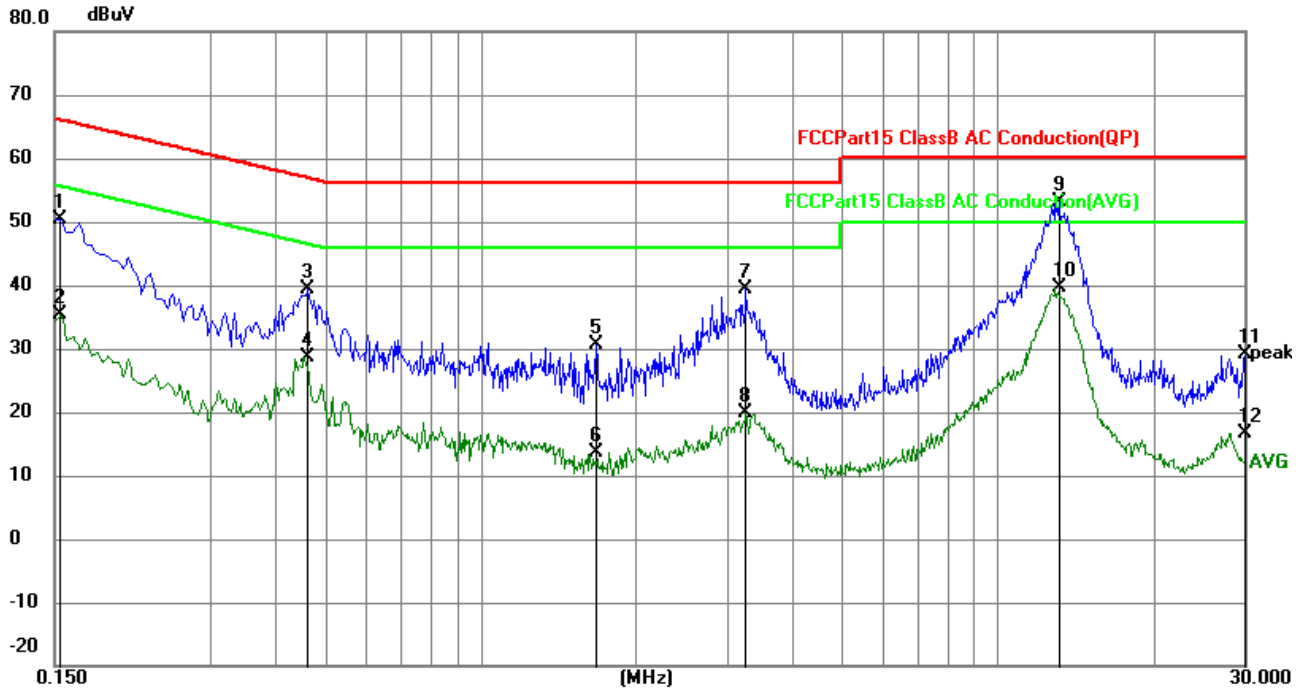
Measurement data

Line:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1544	43.75	9.80	53.55	65.76	-12.21	QP
2	0.1544	21.67	9.80	31.47	55.76	-24.29	AVG
3	0.4650	28.36	9.93	38.29	56.60	-18.31	QP
4	0.4650	16.37	9.93	26.30	46.60	-20.30	AVG
5	1.4053	25.35	9.91	35.26	56.00	-20.74	QP
6	1.4053	9.19	9.91	19.10	46.00	-26.90	AVG
7	3.3944	28.23	9.84	38.07	56.00	-17.93	QP
8	3.3944	12.16	9.84	22.00	46.00	-24.00	AVG
9	12.7725	41.80	9.79	51.59	60.00	-8.41	QP
10	12.7725	27.47	9.79	37.26	50.00	-12.74	AVG
11	27.9959	19.19	9.53	28.72	60.00	-31.28	QP
12	27.9959	8.76	9.53	18.29	50.00	-31.71	AVG

Neutral:

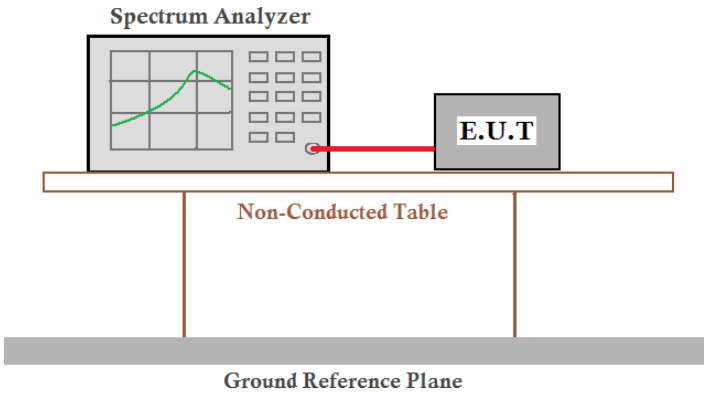


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1539	40.58	9.80	50.38	65.79	-15.41	QP
2	0.1539	25.61	9.80	35.41	55.79	-20.38	AVG
3	0.4636	29.50	9.93	39.43	56.63	-17.20	QP
4	0.4636	18.69	9.93	28.62	46.63	-18.01	AVG
5	1.6713	20.70	9.89	30.59	56.00	-25.41	QP
6	1.6713	3.74	9.89	13.63	46.00	-32.37	AVG
7	3.2581	29.55	9.84	39.39	56.00	-16.61	QP
8	3.2581	10.04	9.84	19.88	46.00	-26.12	AVG
9	13.1267	43.31	9.79	53.10	60.00	-6.90	QP
10	13.1267	29.79	9.79	39.58	50.00	-10.42	AVG
11	30.0000	19.60	9.49	29.09	60.00	-30.91	QP
12	30.0000	7.09	9.49	16.58	50.00	-33.42	AVG

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
 2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
 3. Level = Receiver Read level + Factor (Factor = LISN Factor + Cable Loss + Attenuator Factor)
- If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

4.3 Duty cycle

Test Method :	ANSI C63.10:2013	
Limit:	/	
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. The table is supported by two vertical legs and sits on a Ground Reference Plane.	
Test Instruments:	Refer to section 3.0 for details	
Test mode:	Refer to section 2.2 for details	
Test environment:	Temp.: 21.4°C	Humid.: 40%RH
Test voltage:	DC 19V	
Test results:	Pass	

Measurement Result

5180-5240MHz

Mode	Duty cycle (%)	Correction Factor (dB)
TX 802.11a Mode	98.05	0.09
TX 802.11n20 Mode	98.98	0.04
TX 802.11ac20 Mode	97.97	0.04
TX 802.11n40 Mode	98.98	0.09
TX 802.11a40 Mode	97.98	0.09
TX 802.11ac80 Mode	95.9	0.18

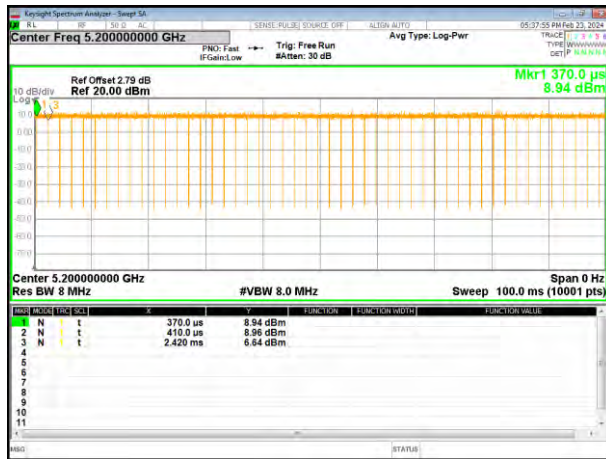
5745-5825 MHz

Mode	Duty cycle (%)	Correction Factor (dB)
TX 802.11a Mode	97.62	0.1
TX 802.11n20 Mode	98.98	0.04
TX 802.11ac20 Mode	98.98	0.09
TX 802.11n40 Mode	97.97	0.04
TX 802.11a40 Mode	98.96	0.05
TX 802.11ac80 Mode	98.92	0.05

Test plot

5180-5240MHz

(802.11a) plot on channel 40



(802.11 n20) plot on channel 40



Test plot

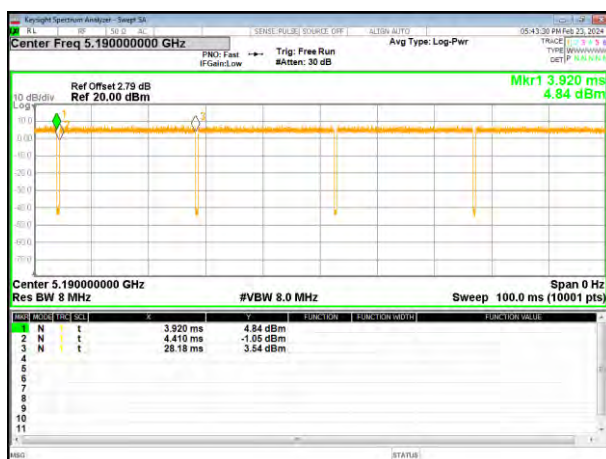
(802.11ac20) plot on channel 40



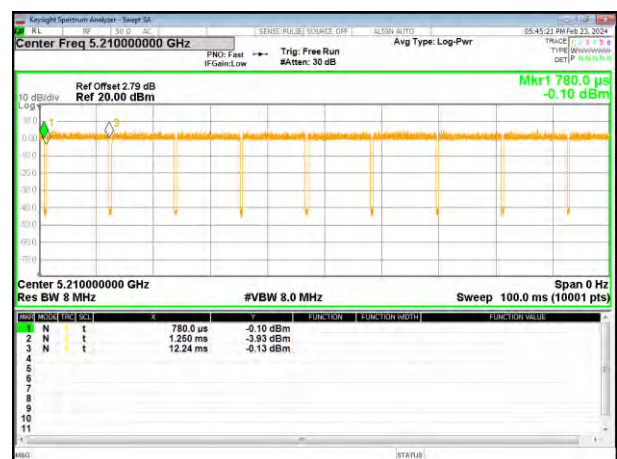
(802.11 n40) plot on channel 38



(802.11ac40) plot on channel 38

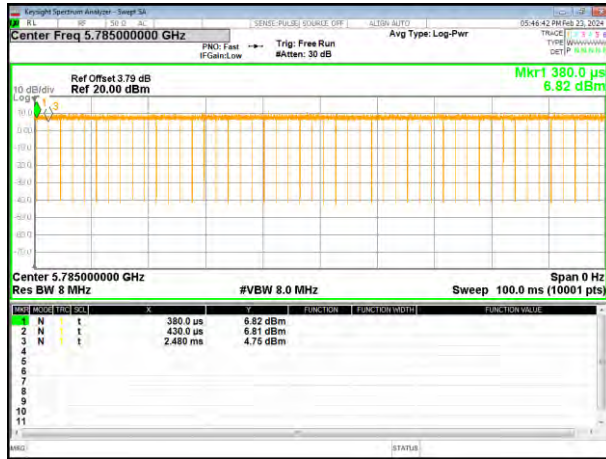


(802.11ac80) plot on channel 42



5745-5825 MHz

(802.11a) plot on channel 40



(802.11 n20) plot on channel 40



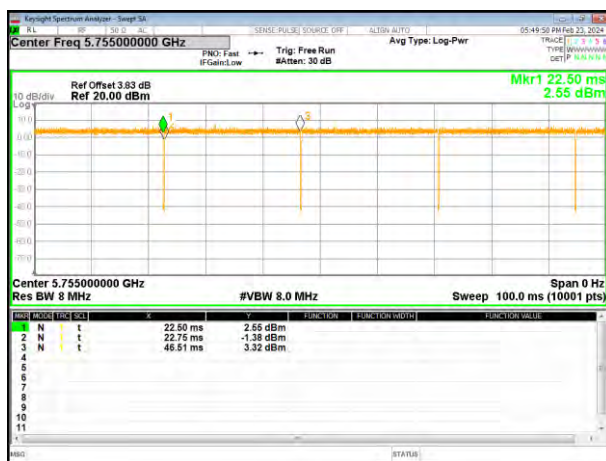
(802.11ac20) plot on channel 40



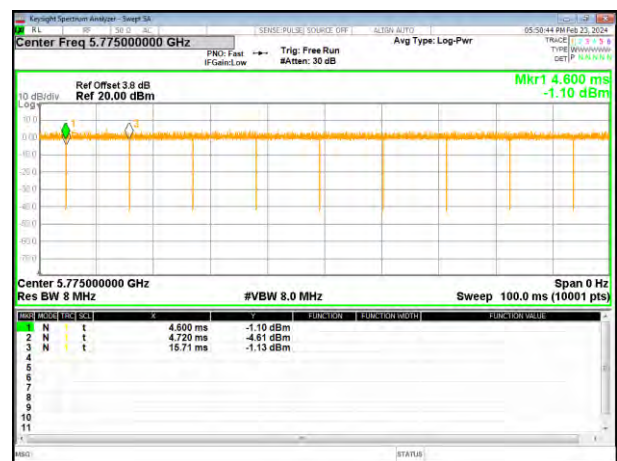
(802.11 n40) plot on channel 38



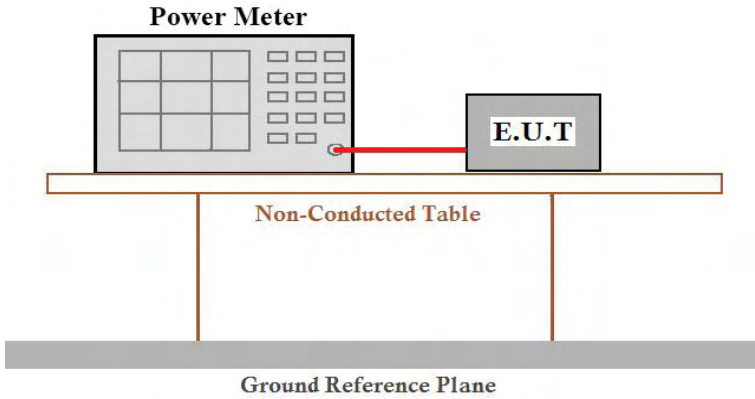
(802.11ac40) plot on channel 38



(802.11ac80) plot on channel 42



4.4 Conducted Output Power

Test Requirement:	FCC Part15 E Section 15.407 (a)(1)/(a)(3)	
Test Method:	ANSI C63.10:2013 and KDB 789033 D02 General U-NII Test Procedures New Rules v02r01	
Limit:	5150-5250MHz : 250mW 5725~5850MHz : 1W	
Test setup:	 The diagram illustrates the test setup. A 'Power Meter' is connected to an 'E.U.T' (Equipment Under Test) via a red cable. Both the Power Meter and the E.U.T are placed on a 'Non-Conducted Table'. This table is supported by two vertical legs and sits on a 'Ground Reference Plane'.	
Test Instruments:	Refer to section 3.0 for details	
Test mode:	Refer to section 2.2 for details	
Test environment:	Temp.: 21.4°C	Humid.: 40%RH
Test voltage:	DC 19V	
Test results:	Pass	

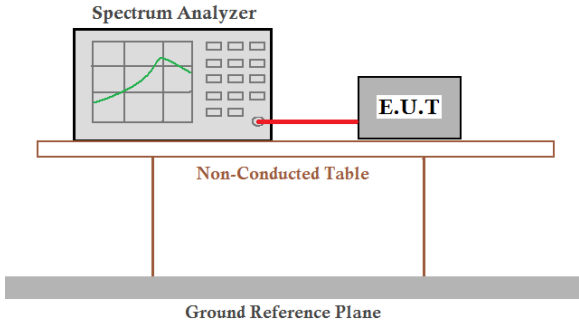
**Measurement Result****5180-5240MHz**

Test Channel	Frequency	Correction Factor	Maximum output power	Total Power	LIMIT	Result
	(MHz)	(dB)	(dBm)	(dBm)	dBm	
TX 802.11a Mode						
CH36	5180	0.09	8.93	9.02	23.98	Pass
CH40	5200	0.09	8.54	8.63	23.98	Pass
CH48	5240	0.09	7.82	7.91	23.98	Pass
TX 802.11 n20 Mode						
CH36	5180	0.04	6.78	6.82	23.98	Pass
CH40	5200	0.04	6.38	6.42	23.98	Pass
CH48	5240	0.04	5.75	5.79	23.98	Pass
TX 802.11 ac20 Mode						
CH36	5180	0.04	6.90	6.94	23.98	Pass
CH40	5200	0.04	7.03	7.07	23.98	Pass
CH48	5240	0.04	6.52	6.56	23.98	Pass
TX 802.11 n40 Mode						
CH38	5190	0.09	6.55	6.64	23.98	Pass
CH46	5230	0.09	5.84	5.93	23.98	Pass
TX 802.11 ac40 Mode						
CH38	5190	0.09	4.04	4.13	23.98	Pass
CH46	5230	0.09	4.78	4.87	23.98	Pass
TX 802.11 ac80 Mode						
CH42	5210	0.18	3.91	4.09	23.98	Pass

5745-5825 MHz

Test Channel	Frequency	Correction Factor	Maximum output power	Total Power	LIMIT	Result
	(MHz)	(dB)	(dBm)	(dBm)	dBm	
TX 802.11a Mode						
CH149	5745	0.01	8.85	8.86	30	Pass
CH157	5785	0.01	9.21	9.22	30	Pass
CH165	5825	0.01	9.70	9.71	30	Pass
TX 802.11 n20 Mode						
CH149	5745	0.04	9.04	9.08	30	Pass
CH157	5785	0.04	9.47	9.51	30	Pass
CH165	5825	0.04	9.38	9.42	30	Pass
TX 802.11 ac20 Mode						
CH149	5745	0.09	8.98	9.07	30	Pass
CH157	5785	0.09	9.78	9.87	30	Pass
CH165	5825	0.09	9.82	9.91	30	Pass
TX 802.11 n40 Mode						
CH151	5755	0.04	6.21	6.25	30	Pass
CH159	5795	0.04	6.68	6.72	30	Pass
TX 802.11 ac40 Mode						
CH151	5755	0.05	6.25	6.30	30	Pass
CH159	5795	0.05	6.76	6.81	30	Pass
TX 802.11 ac80 Mode						
CH155	5775	0.05	5.74	5.79	30	Pass

4.5 Bandwidth 99% Occupy Bandwidth

Test Requirement:	FCC Part15 E Section 15.407(a)(12)&15.407(e)	
Test Method:	ANSI C63.10:2013 and KDB 789033 D02 General U-NII Test Procedures New Rules v02r01	
Limit:	Measurements in the 5.725-5.85 GHz band, the minimum bandwidth 6 dB bandwidth of U-NII devices shall be at least 500KHz. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.	
Test setup:		
Test Instruments:	Refer to section 3.0 for details	
Test mode:	Refer to section 2.2 for details	
Test environment:	Temp.: 21.4°C	Humid.: 40%RH
Test voltage:	DC 19V	
Test results:	Pass	

Measurement Result

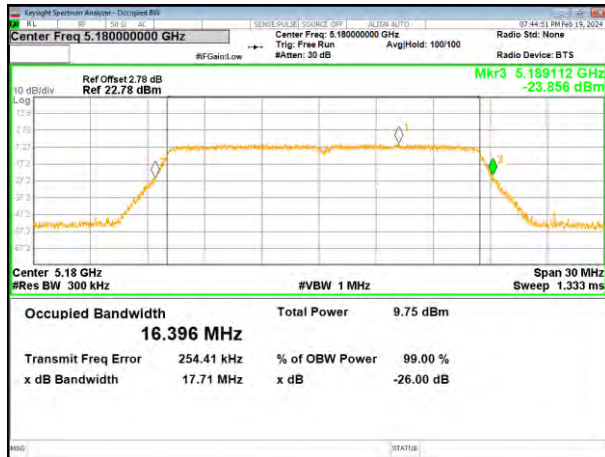
5180-5240MHz

Test CH	-26dB Channel Bandwidth (MHz)						Result
	802.11a	802.11n (HT20)	802.11ac (HT20)	802.11n (HT40)	802.11ac (HT40)	802.11ac (HT80)	
Lowest	17.71	18.80	19.53	40.21	40.01	--	Pass
Middle	17.80	18.83	19.35	--	--	79.06	
Highest	17.81	18.81	19.54	40.37	39.96	--	

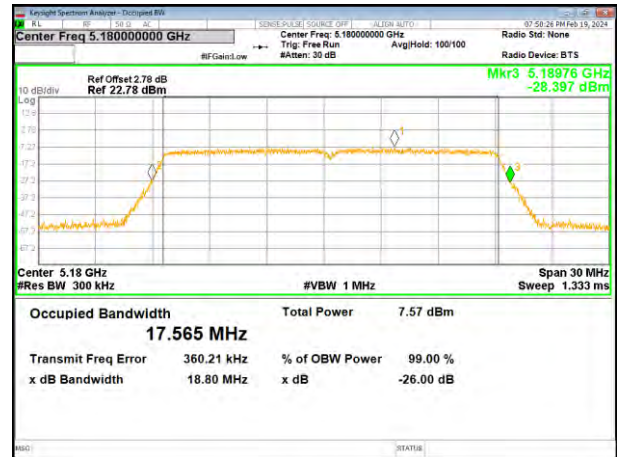
Test CH	99% Occupy Bandwidth (MHz)						Result
	802.11a	802.11n (HT20)	802.11ac (HT20)	802.11n (HT40)	802.11ac (HT40)	802.11ac (HT80)	
Lowest	16.355	17.534	17.524	36.065	36.012	--	Pass
Middle	16.344	17.543	17.534	--	--	74.466	
Highest	16.354	17.542	17.542	35.999	36.021	--	

Test plot -26dB Channel Bandwidth

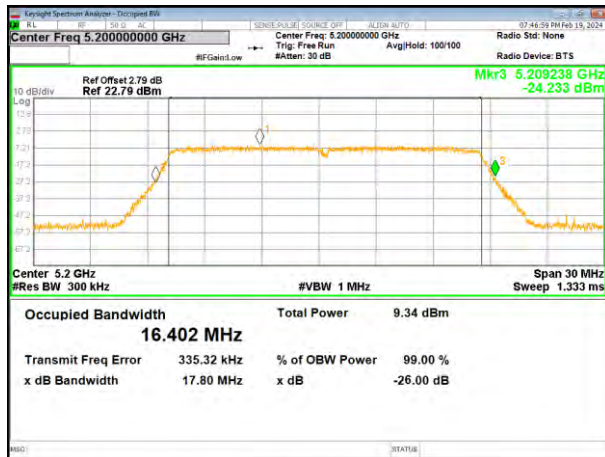
(802.11a) plot on channel 36



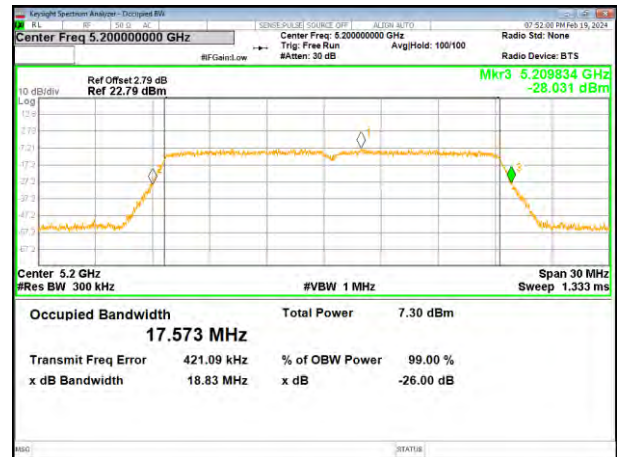
(802.11 n20) plot on channel 36



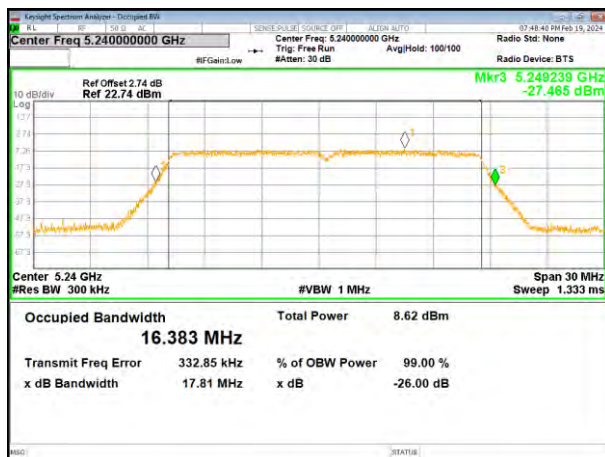
(802.11a) plot on channel 40



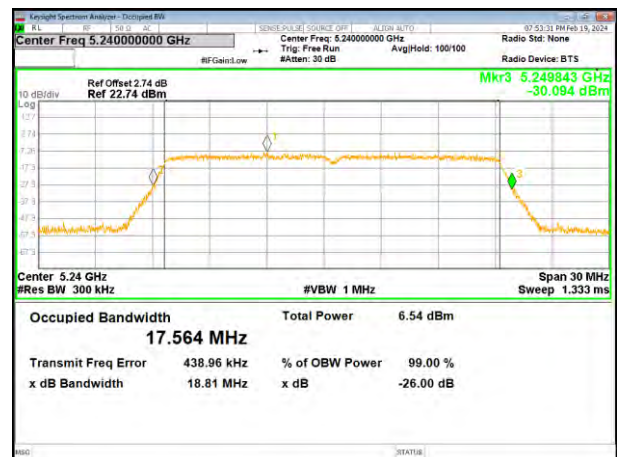
(802.11 n20) plot on channel 40



(802.11a) plot on channel 48

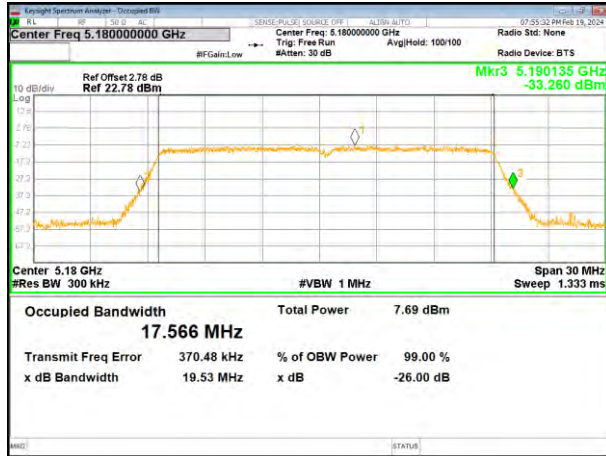


(802.11 n20) plot on channel 48

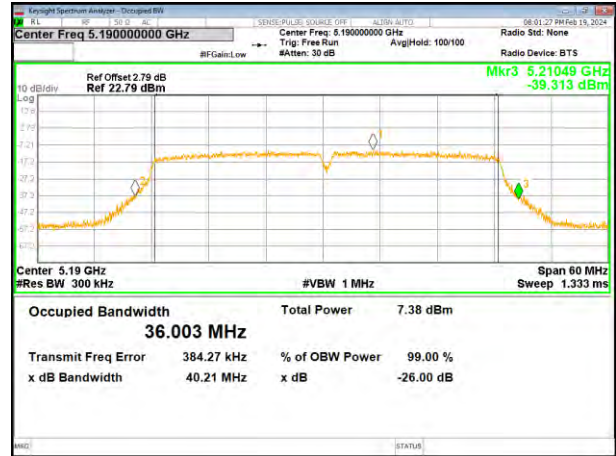


Test plot

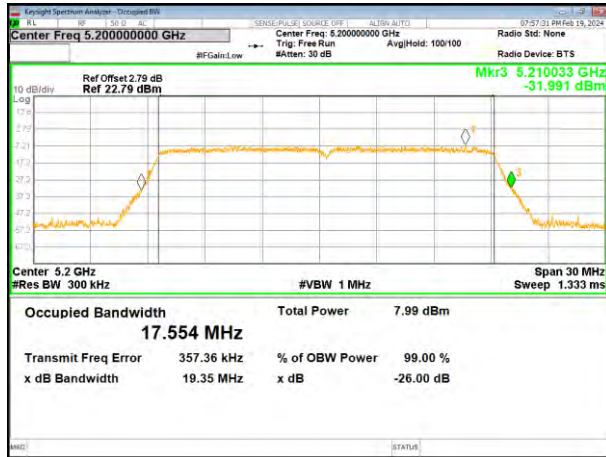
(802.11ac20) plot on channel 36



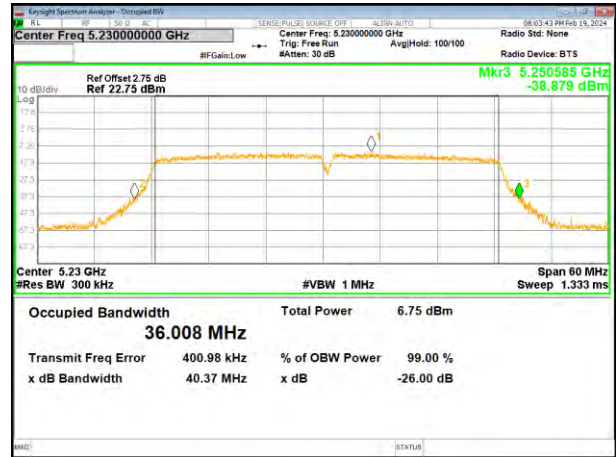
(802.11 n40) plot on channel 38



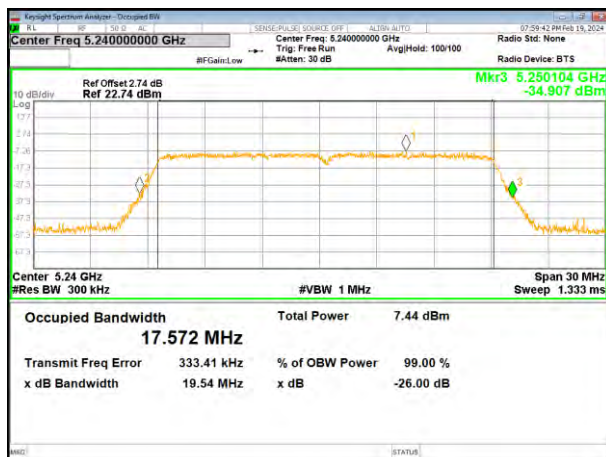
(802.11ac20) plot on channel 40



(802.11 n40) plot on channel 46

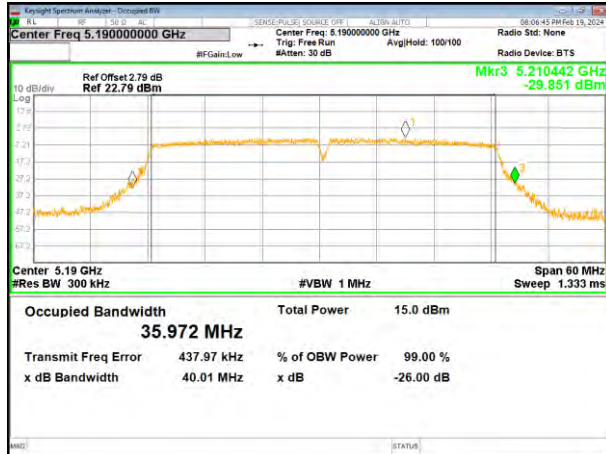


(802.11ac20) plot on channel 48

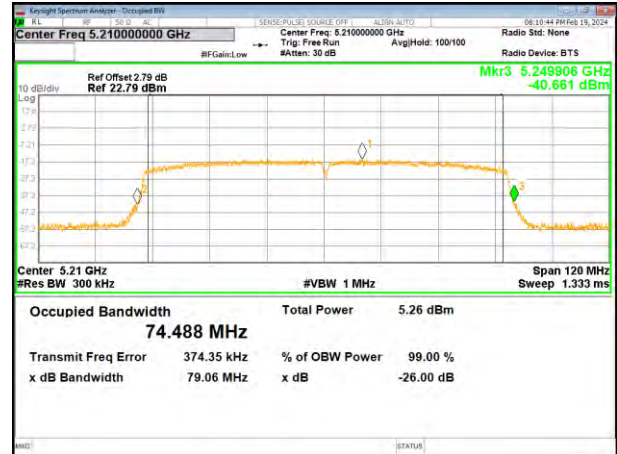


Test plot

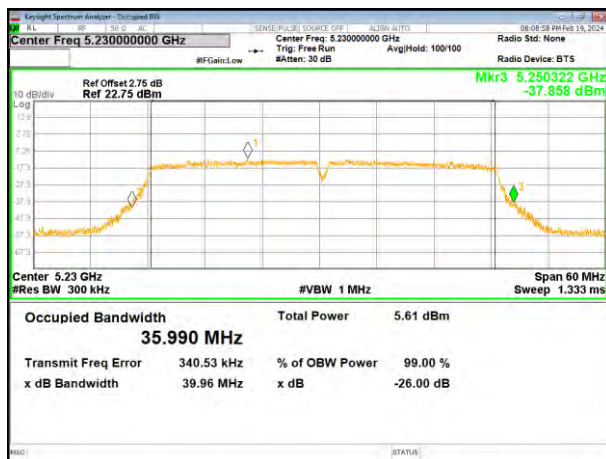
(802.11ac40) plot on channel 38



(802.11ac80) plot on channel 42

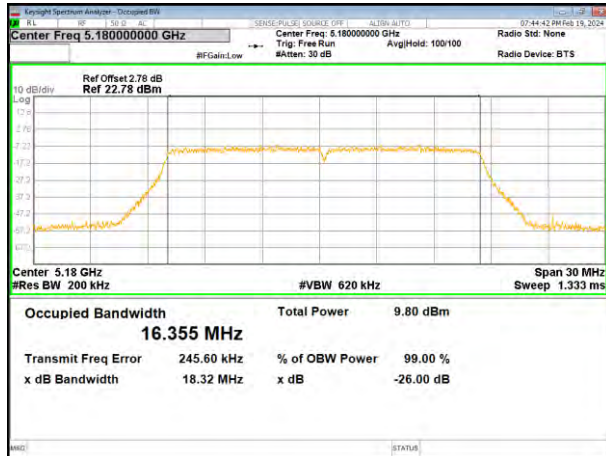


(802.11ac40) plot on channel 46

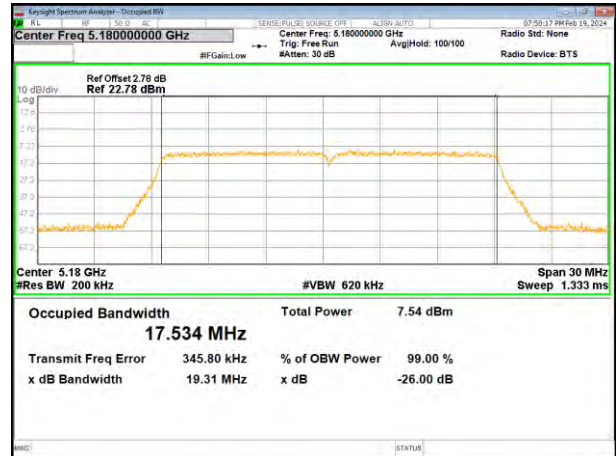


Test plot 99% Occupy Bandwidth

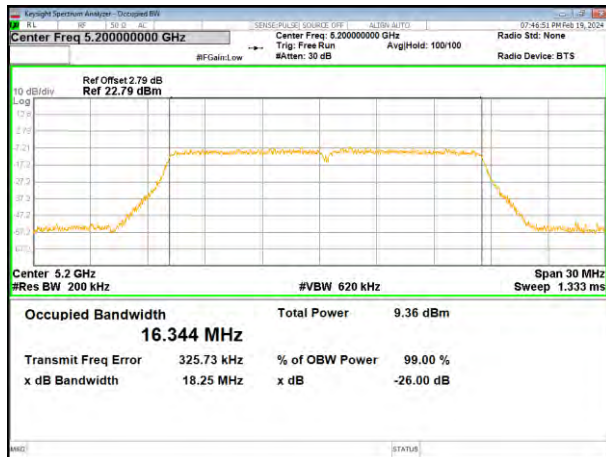
(802.11a) plot on channel 36



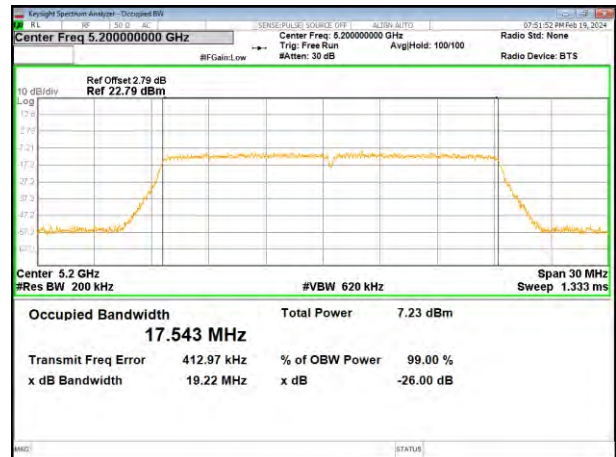
(802.11 n20) plot on channel 36



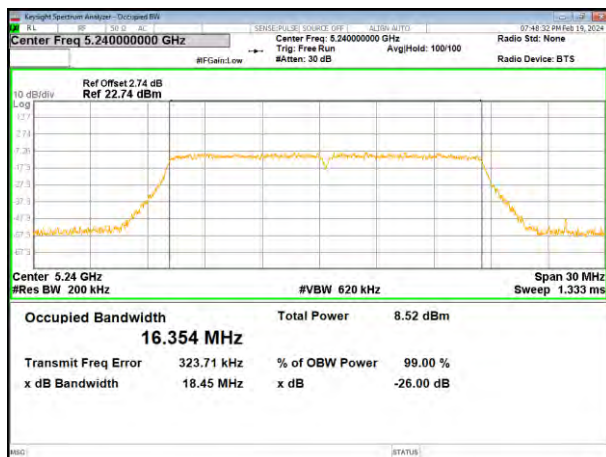
(802.11a) plot on channel 40



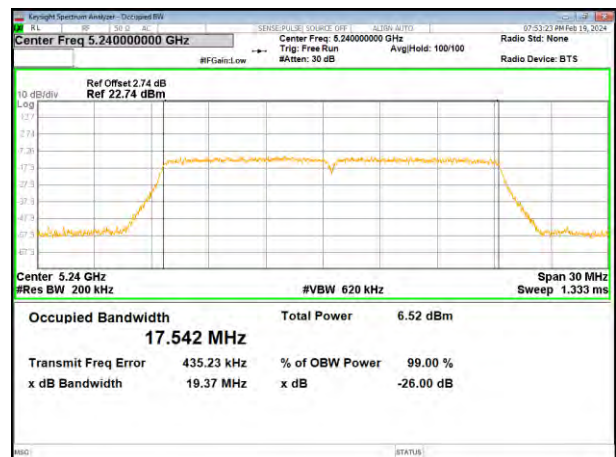
(802.11 n20) plot on channel 40



(802.11a) plot on channel 48

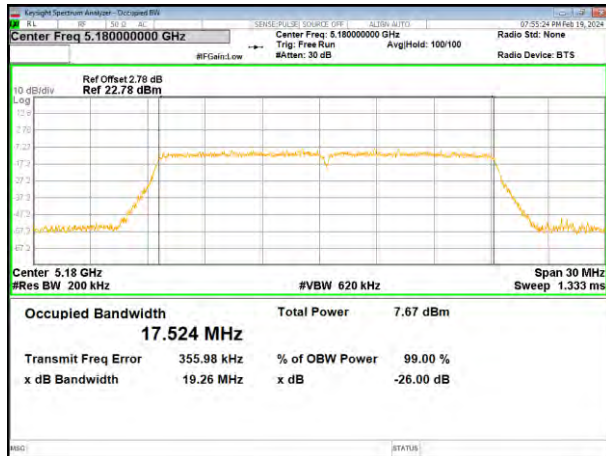


(802.11 n20) plot on channel 48

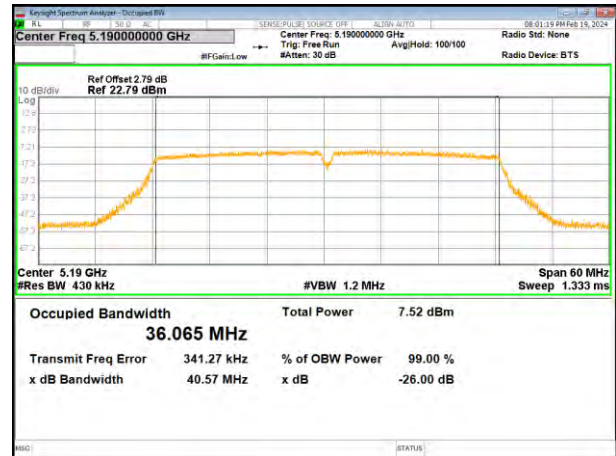


Test plot

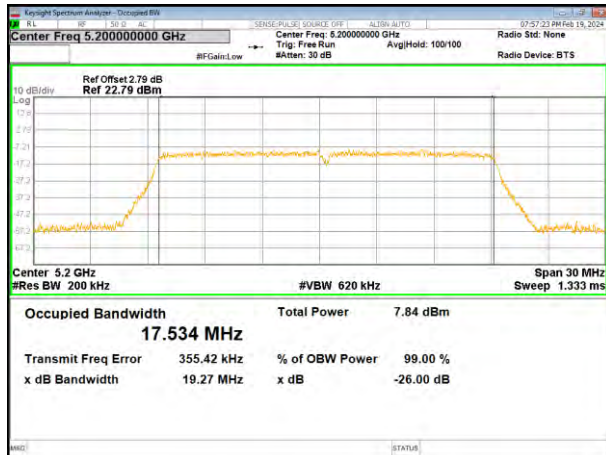
(802.11ac20) plot on channel 36



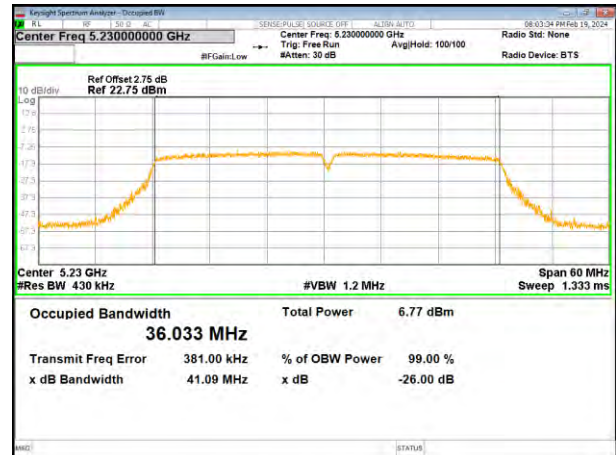
(802.11 n40) plot on channel 38



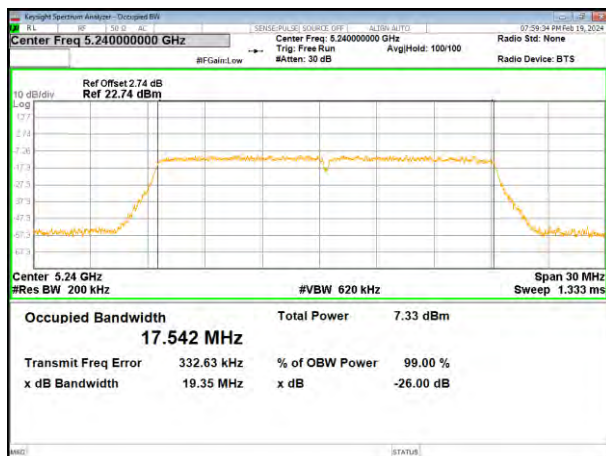
(802.11ac20) plot on channel 40



(802.11 n40) plot on channel 46

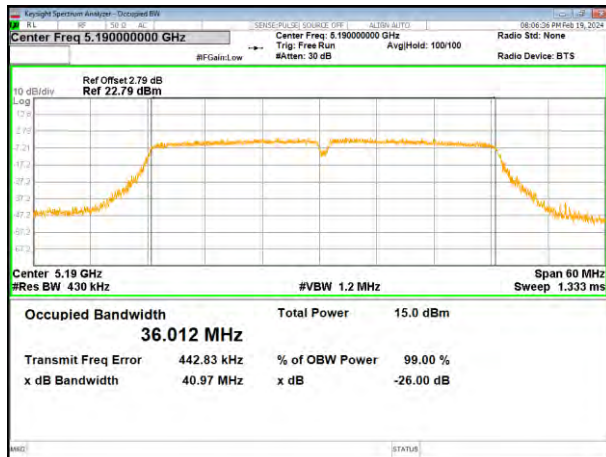


(802.11ac20) plot on channel 48

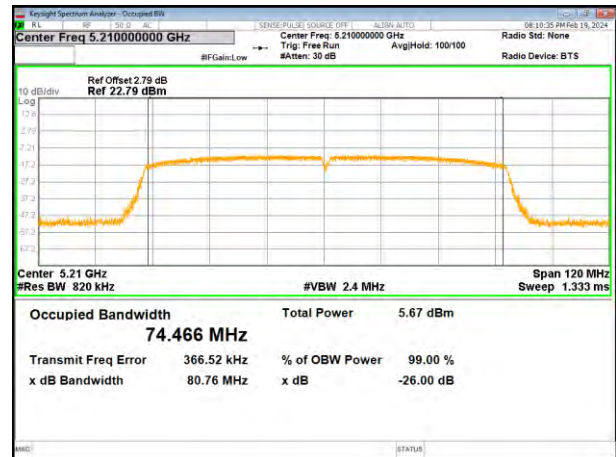


Test plot

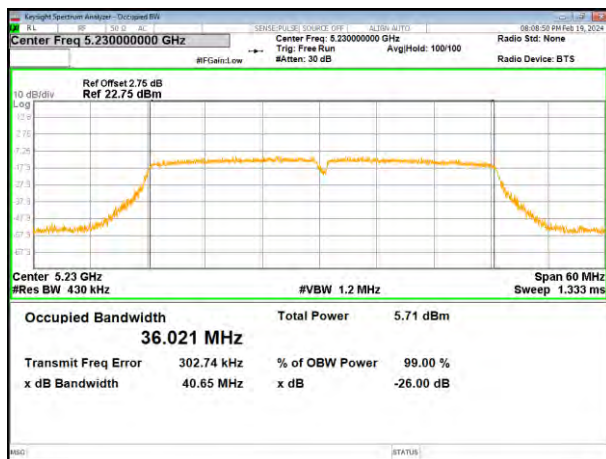
(802.11ac40) plot on channel 38



(802.11ac80) plot on channel 42



(802.11ac40) plot on channel 46





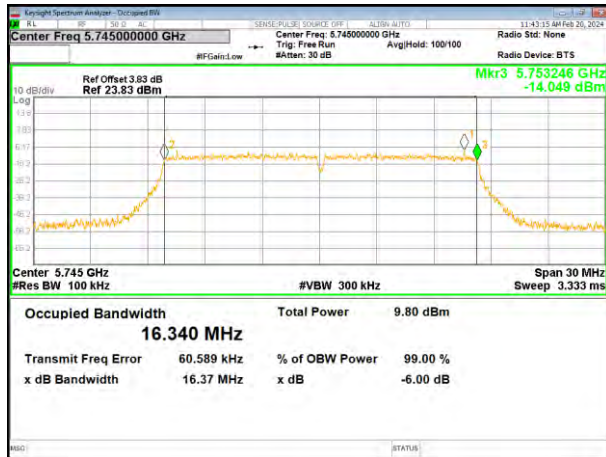
5745-5825MHz

Test CH	-6dB Channel Bandwidth (MHz)						Limit (KHz)	Result
	802.11a	802.11n (HT20)	802.11ac (HT20)	802.11n (HT40)	802.11ac (HT40)	802.11ac (HT80)		
Lowest	16.37	17.60	17.58	34.40	35.37	--	>500	Pass
Middle	16.32	17.66	17.63	--	--	54.86		
Highest	16.41	17.56	17.56	33.15	36.04	--		

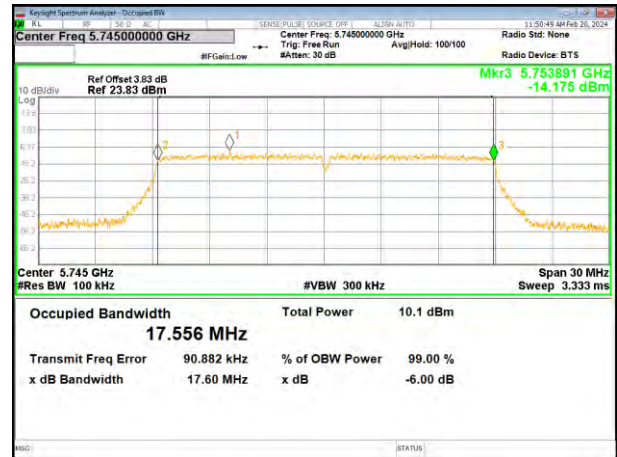
Remark: "---"is not applicable

Test plot

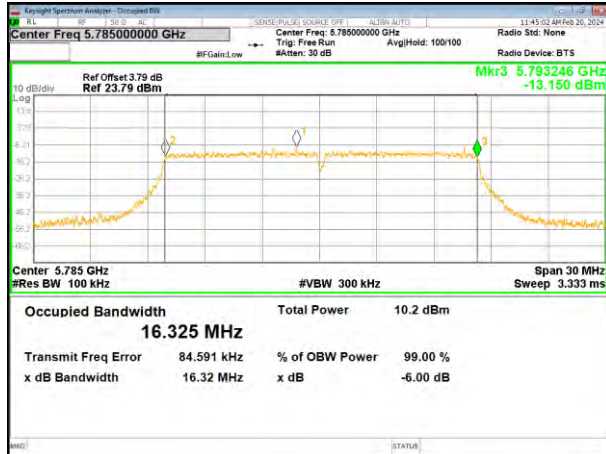
(802.11a) plot on channel 149



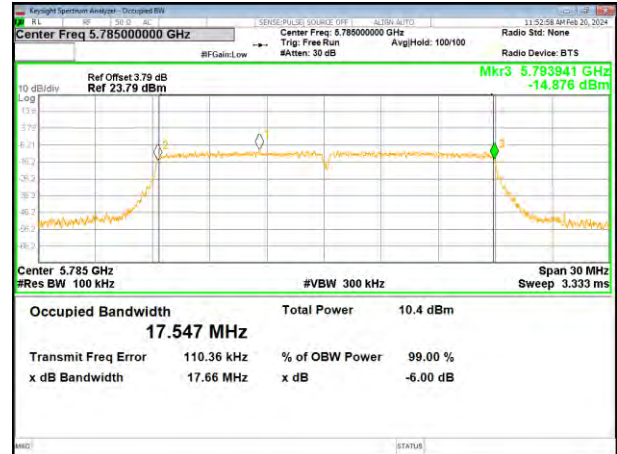
(802.11 n20) plot on channel 149



(802.11a) plot on channel 157



(802.11 n20) plot on channel 157



(802.11a) plot on channel 165



(802.11 n20) plot on channel 165



Test plot

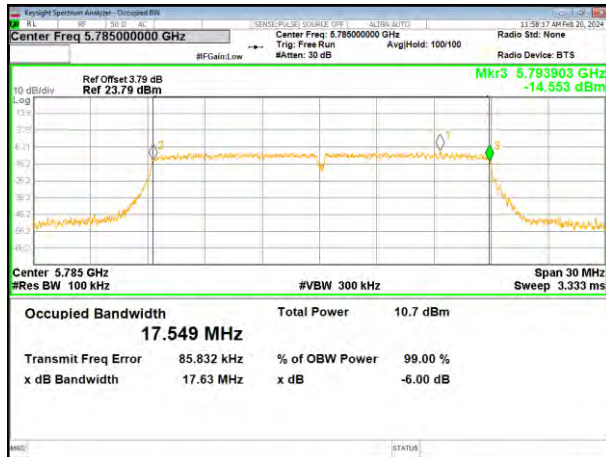
(802.11ac20) plot on channel 149



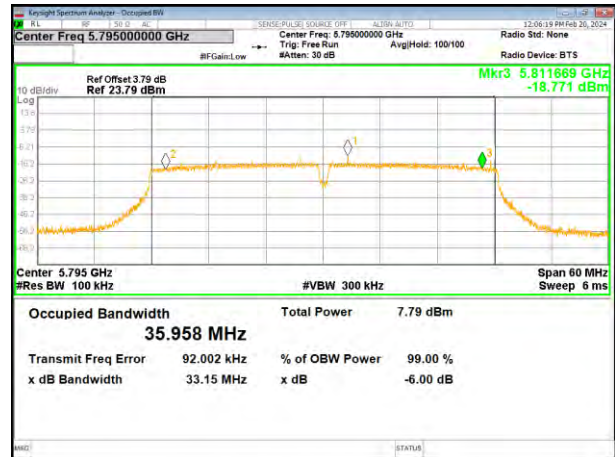
(802.11 n40) plot on channel 151



(802.11ac20) plot on channel 157



(802.11 n40) plot on channel 159



(802.11ac20) plot on channel 165

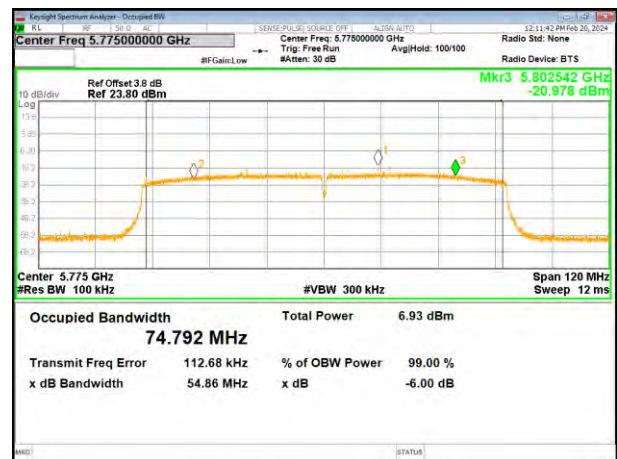


Test plot

(802.11 ac40) plot on channel 151



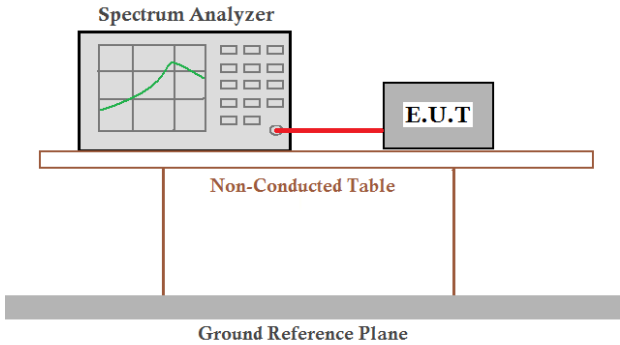
(802.11 ac80) plot on channel 155



(802.11 ac40) plot on channel 159



4.6 Power Spectral Density

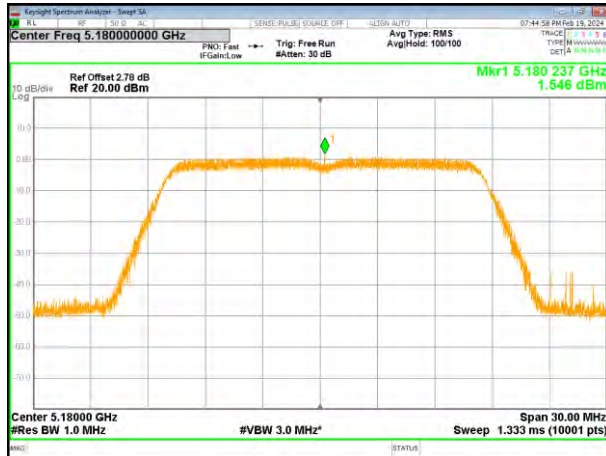
Test Requirement:	FCC Part15 E Section 15.407(a)(1)/ (a)(3)	
Test Method:	ANSI C63.10:2013 and KDB 789033 D02 General U-NII Test Procedures New Rules v02r01	
Limit:	Frequency band (MHz)	Limit
	5150-5250	≤17dBm/1MHz for master device
		≤11dBm/1MHz for client device
	5250-5350	≤11dBm/1MHz for client device
	5470-5725	≤11dBm/1MHz for client device
	5725-5850	≤30dBm/500kHz
Test setup:		
Test Instruments:	Refer to section 3.0 for details	
Test mode:	Refer to section 2.2 for details	
Test environment:	Temp.: 21.4°C	Humid.: 40%RH
Test voltage:	DC 19V	
Test results:	Pass	

Measurement Result

5180-5240MHz

Mode	Frequency	Measured Power Density (dBm/MHz)	Correction Factor (dB)	Total Measured Power Density (dBm/MHz)	Limit (dBm/MHz)
802.11 a	5180 MHz	1.546	0.090	1.636	11
	5200 MHz	0.705	0.090	0.795	11
	5240 MHz	0.333	0.090	0.423	11
802.11 n20	5180 MHz	-1.471	0.040	-1.431	11
	5200 MHz	-2.032	0.040	-1.992	11
	5240 MHz	-2.120	0.040	-2.080	11
802.11 ac20	5180 MHz	-1.355	0.040	-1.315	11
	5200 MHz	-1.220	0.040	-1.180	11
	5240 MHz	-1.848	0.040	-1.808	11
802.11 n40	5190 MHz	-4.148	0.090	-4.058	11
	5230 MHz	-4.530	0.090	-4.440	11
802.11 ac40	5190 MHz	3.151	0.090	3.241	11
	5230 MHz	-5.959	0.090	-5.869	11
802.11 ac80	5210 MHz	-9.986	0.180	-9.806	11

(802.11a) PSD plot on channel 36



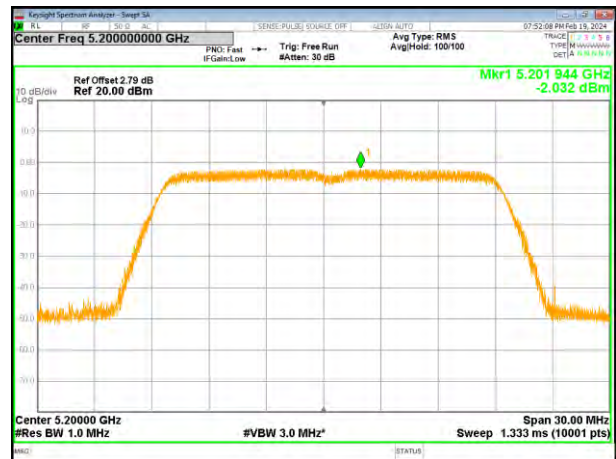
(802.11n20) PSD plot on channel 36



(802.11a) PSD plot on channel 40



(802.11n20) PSD plot on channel 40



(802.11a) PSD plot on channel 48



(802.11n20) PSD plot on channel 48



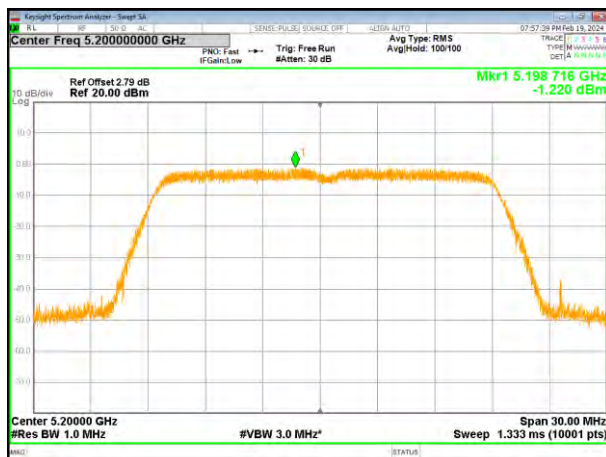
(802.11ac20) PSD plot on channel 36



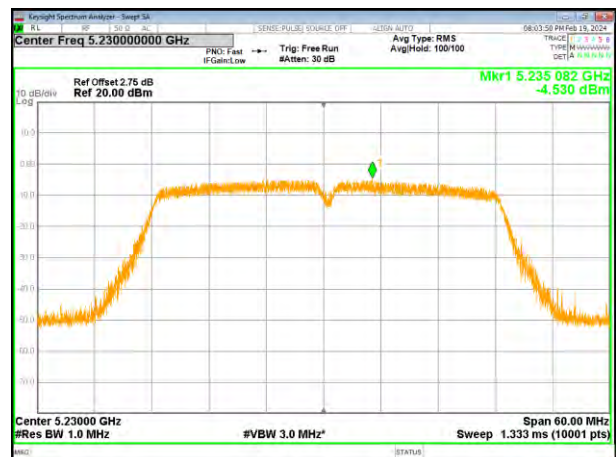
(802.11n40) PSD plot on channel 38



(802.11ac20) PSD plot on channel 40



(802.11n40) PSD plot on channel 46



(802.11ac20) PSD plot on channel 48



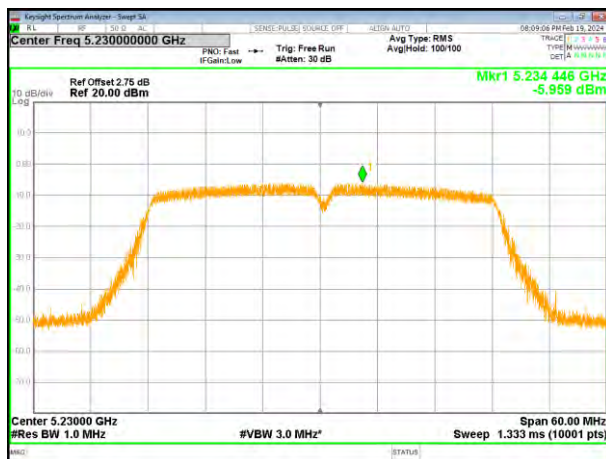
(802.11ac40) PSD plot on channel 38



(802.11ac80) PSD plot on channel 42



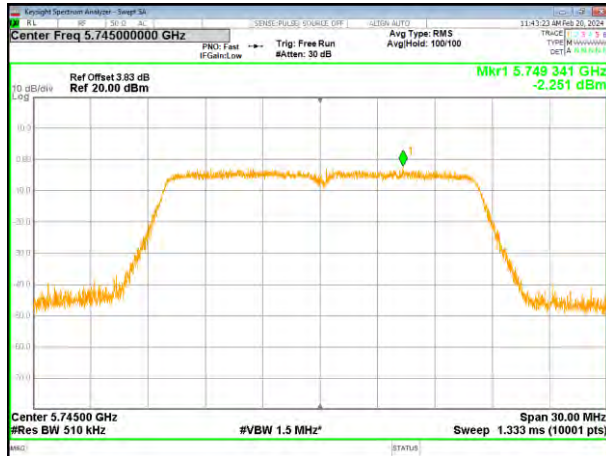
(802.11ac40) PSD plot on channel 46



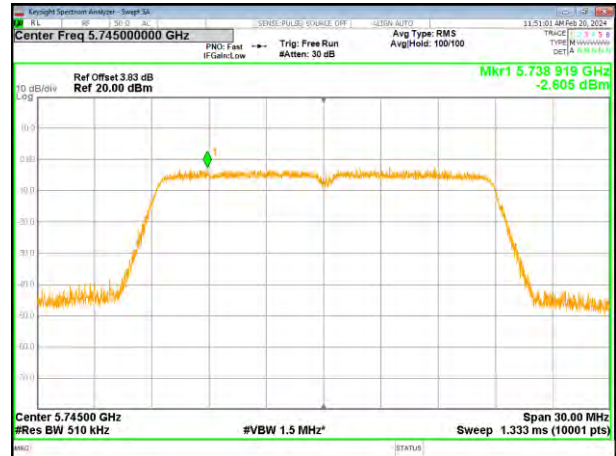
Mode	Frequency	Measured Power Density (dBm/510KHz)	Measured Power Density(dBm/500K Hz)	Correction Factor (dB)	Total Measured Power Density (dBm/500KHz)	Limit (dBm/MHz)
802.11 a	5745 MHz	-2.251	-2.337	0.010	-2.327	30
	5785 MHz	-2.070	-2.156	0.010	-2.146	30
	5825 MHz	-1.056	-1.142	0.010	-1.132	30
802.11 n20	5745 MHz	-2.605	-2.691	0.040	-2.651	30
	5785 MHz	-1.069	-1.155	0.040	-1.115	30
	5825 MHz	-2.504	-2.590	0.040	-2.550	30
802.11ac20	5745 MHz	-2.371	-2.457	0.090	-2.367	30
	5785 MHz	-2.039	-2.125	0.090	-2.035	30
	5825 MHz	-1.676	-1.762	0.090	-1.672	30
802.11 n40	5755 MHz	-8.180	-8.266	0.040	-8.226	30
	5795 MHz	-7.512	-7.598	0.040	-7.558	30
802.11ac40	5755 MHz	-8.399	-8.485	0.050	-8.435	30
	5795 MHz	-8.014	-8.100	0.050	-8.050	30
802.11ac80	5775 MHz	-11.830	-11.916	0.050	-11.866	30

Note: If the measurement is X dBm/510kHz, thus $X \text{ dBm/510kHz} = (10^{X/10}) * (500 / 510) \text{ dBm/500kHz}$

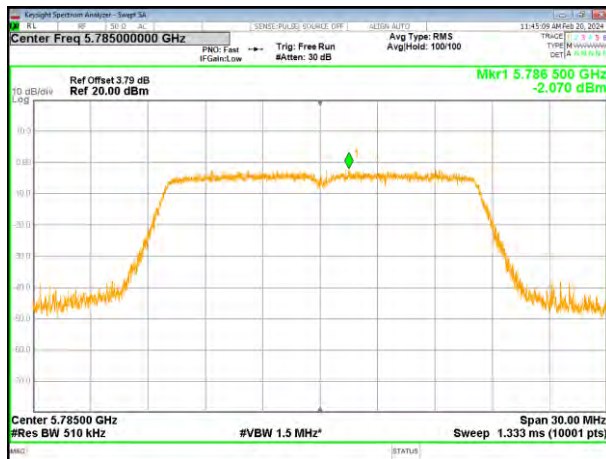
(802.11a) PSD plot on channel 149



(802.11n20) PSD plot on channel 149



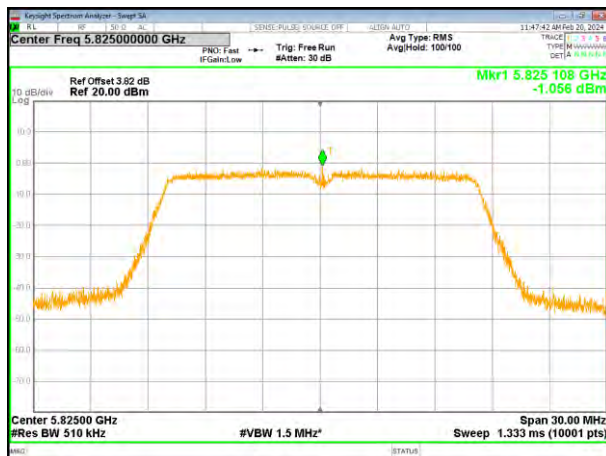
(802.11a) PSD plot on channel 157



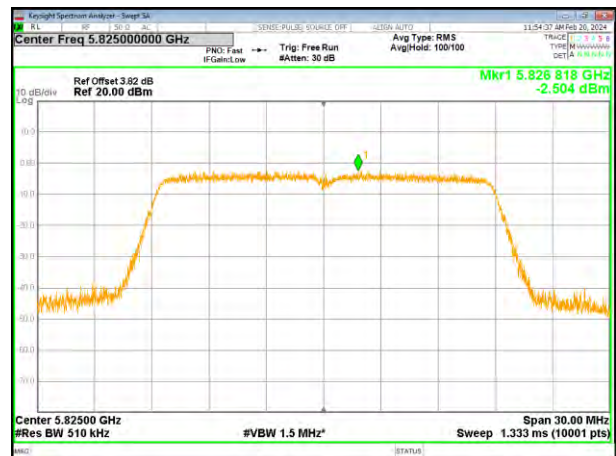
(802.11n20) PSD plot on channel 157



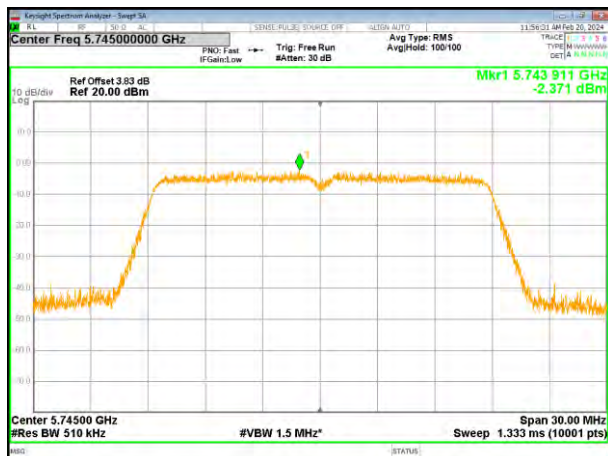
(802.11a) PSD plot on channel 165



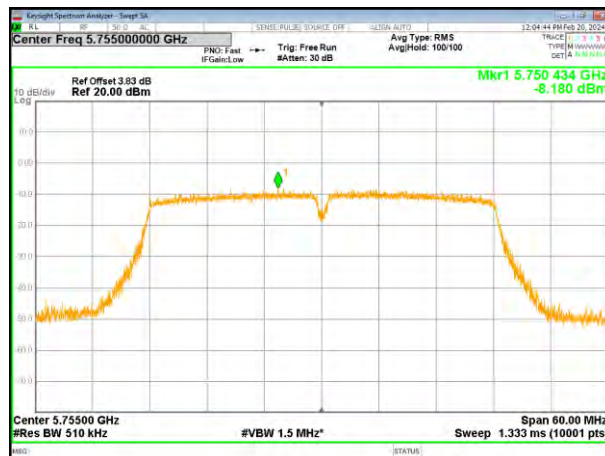
(802.11n20) PSD plot on channel 165



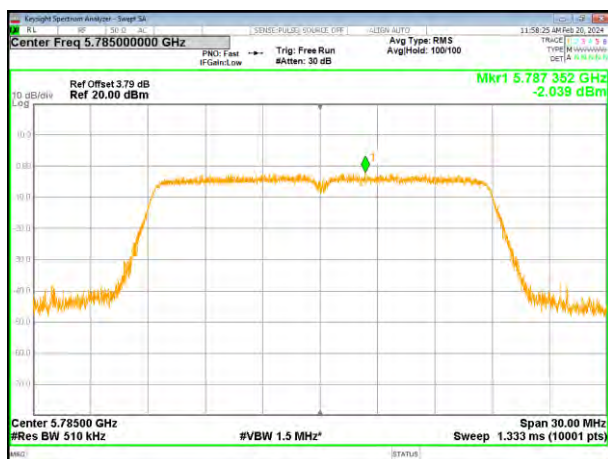
(802.11ac20) PSD plot on channel 149



(802.11n40) PSD plot on channel 151



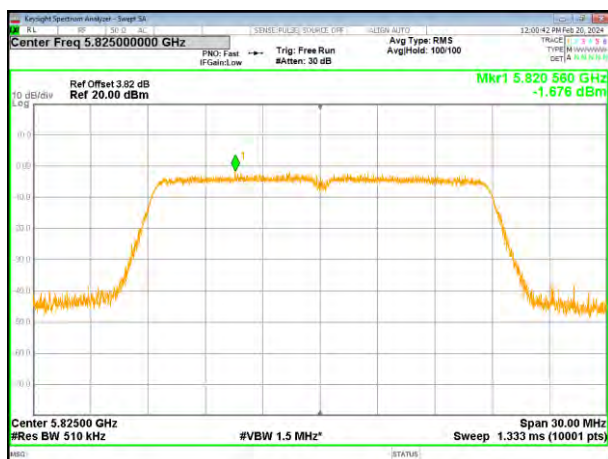
(802.11ac20) PSD plot on channel 157



(802.11n40) PSD plot on channel 159



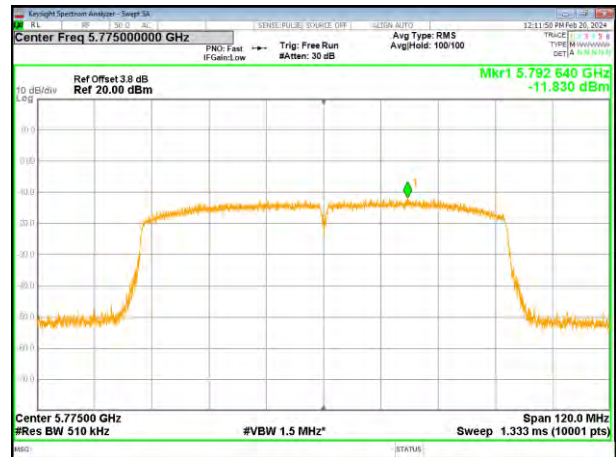
(802.11ac20) PSD plot on channel 165



(802.11ac40) PSD plot on channel 151



(802.11ac80) PSD plot on channel 155

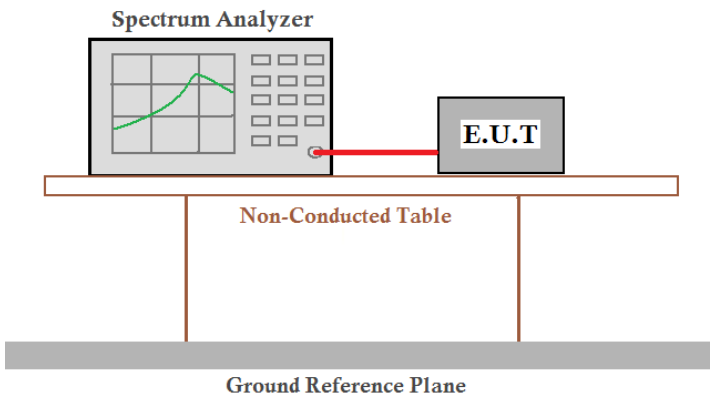


(802.11ac40) PSD plot on channel 159



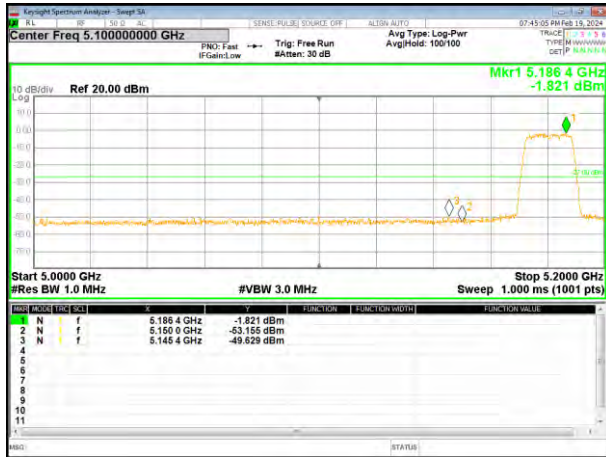
4.7 Band edge

4.7.1 Conducted test Method

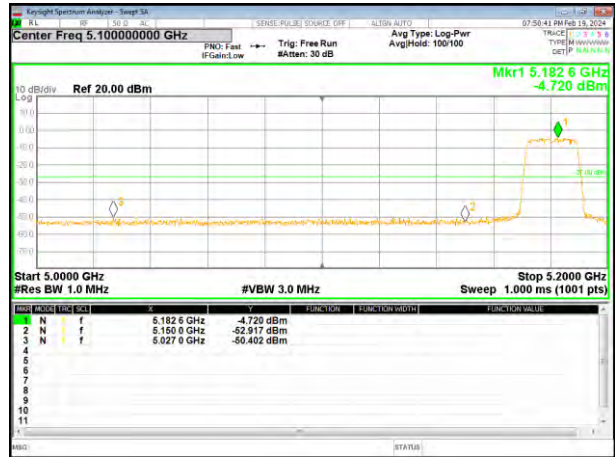
Test Requirement:	FCC Part15 C Section 15.209 and 15.205	
Test Method:	ANSI C63.10: 2013	
Limit:	All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below 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.	
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table. The table is supported by two vertical legs and sits on a Ground Reference Plane, which is represented by a thick grey bar at the bottom.	
Test Procedure:	1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator. 2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range. 3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span. 4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency. 5. Repeat above procedures until all measured frequencies were complete..	
Test Instruments:	Refer to section 3.0 for details	
Test mode:	Refer to section 2.2 for details	
Test environment:	Temp.: 21.4°C	Humid.: 40%RH
Test voltage:	DC 19V	
Test results:	Pass	

5.180~5.240 GHz

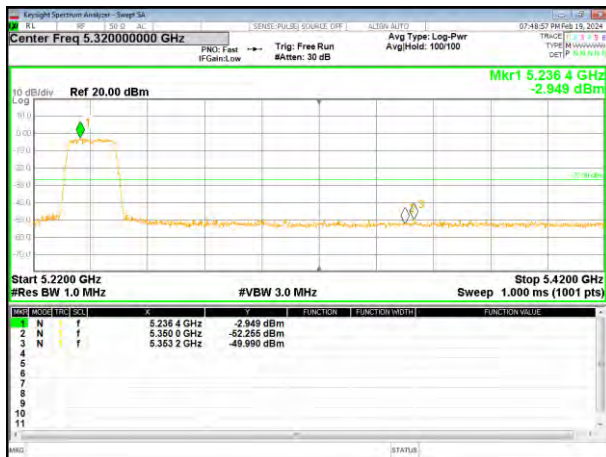
(802.11a) Band Edge, Left Side



(802.11n20) Band Edge, Left Side



(802.11a) Band Edge, Right Side

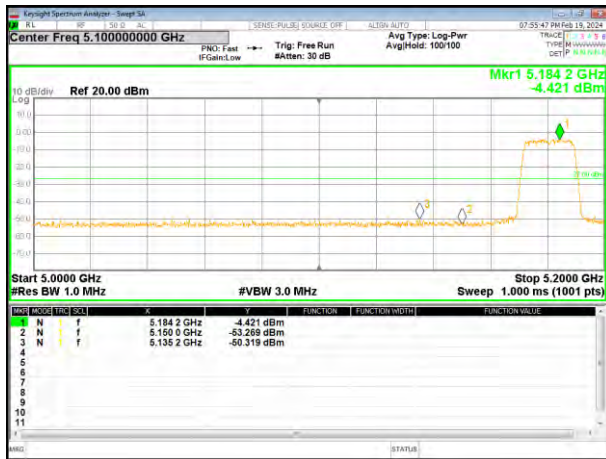


(802.11n20) Band Edge, Right Side

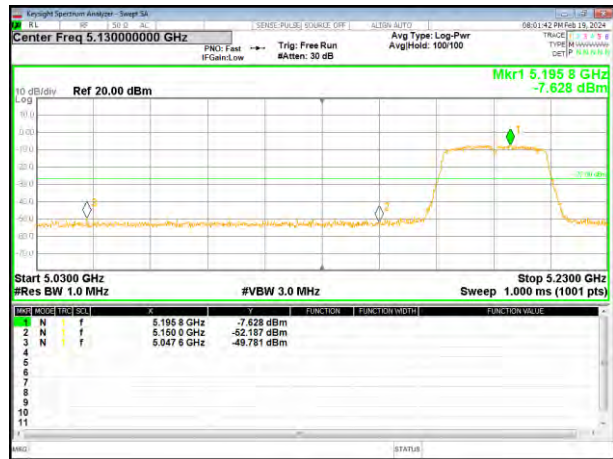


5.180~5.240 GHz

(802.11ac20) Band Edge, Left Side



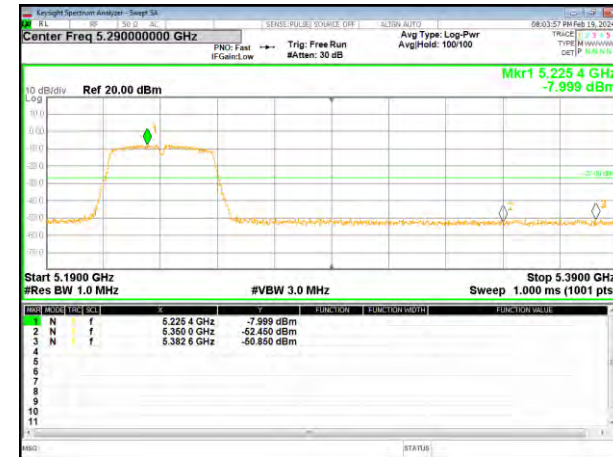
(802.11n40) Band Edge, Left Side



(802.11ac20) Band Edge, Right Side

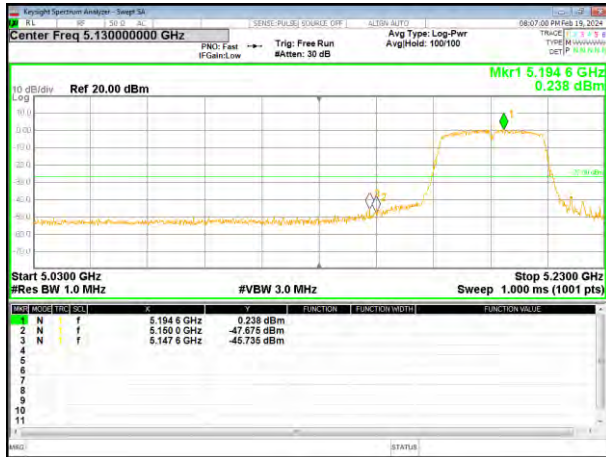


(802.11n40) Band Edge, Right Side



5.180~5.240 GHz

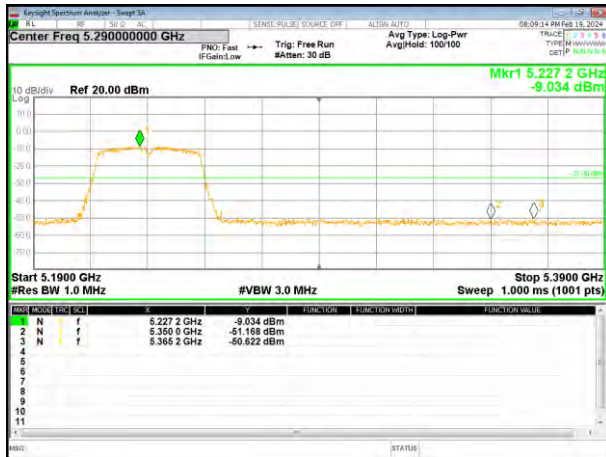
(802.11ac40) Band Edge, Left Side



(802.11ac80) Band Edge

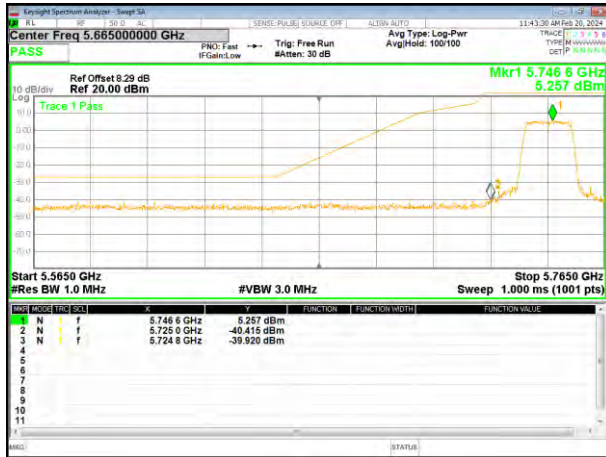


(802.11ac40) Band Edge, Right Side

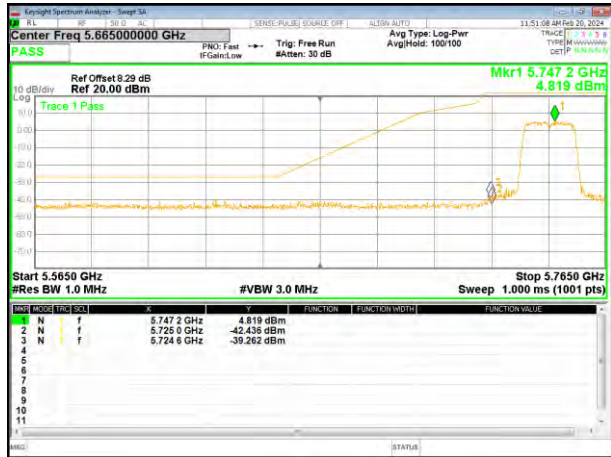


5.745~5.825 GHz

(802.11a) Band Edge, Left Side



(802.11n20) Band Edge, Left Side



(802.11a) Band Edge, Right Side



(802.11n20) Band Edge, Right Side



5.745~5.825 GHz

(802.11ac20) Band Edge, Left Side



(802.11n40) Band Edge, Left Side



(802.11ac20) Band Edge, Right Side



(802.11n40) Band Edge, Right Side



5.745~5.825 GHz

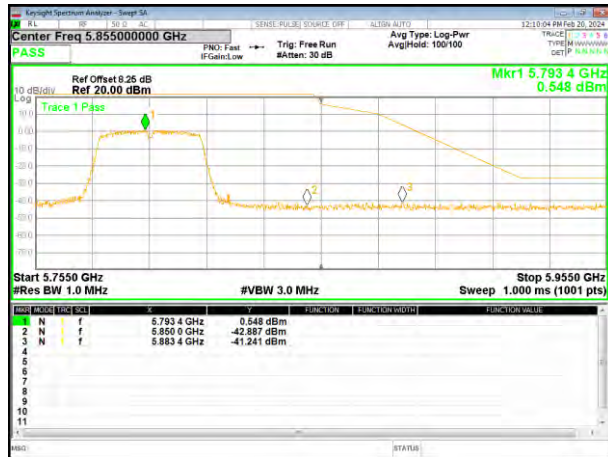
(802.11ac40) Band Edge, Left Side



(802.11ac80) Band Edge

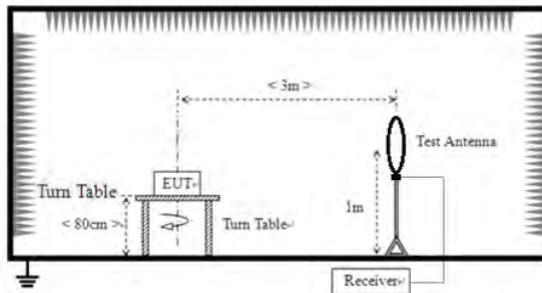
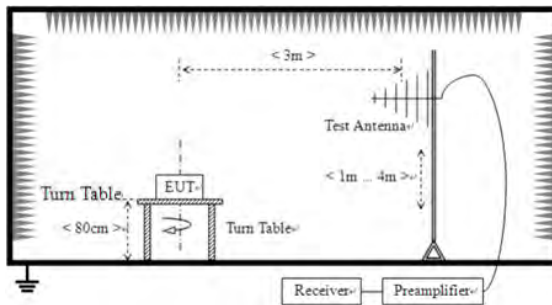


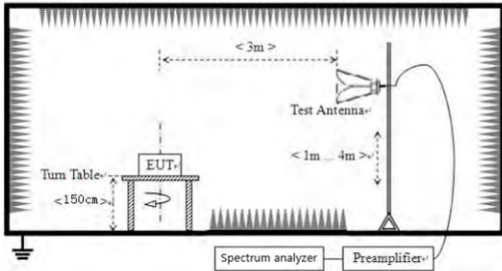
(802.11ac40) Band Edge, Right Side



4.8 Spurious Emission

4.8.1 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209, Part 15E Section 15.407(b)(4)				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	9kHz to 40GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	9kHz-150KHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value
	150kHz-30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		AV	1MHz	3MHz	Average Value
Limit:	Frequency		Limit (uV/m)	Value	Measurement Distance
	0.009MHz-0.490MHz		2400/F(KHz)	QP	300m
	0.490MHz-1.705MHz		24000/F(KHz)	QP	300m
	1.705MHz-30MHz		30	QP	30m
	30MHz-88MHz		100	QP	3m
	88MHz-216MHz		150	QP	
	216MHz-960MHz		200	QP	
	960MHz-1GHz		500	QP	
	Frequency		Limit (dBm/MHz)	Remark	
	Above 1GHz		-27.0	Peak Value	
Test setup:	For radiated emissions from 9kHz to 30MHz				
					
Test setup:	For radiated emissions from 30MHz to1GHz				
					

	For radiated emissions above 1GHz 
Test Procedure:	1. The EUT was placed on the top of a rotating table (0.8m for below 1GHz and 1.5 meters for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.
Test Instruments:	Refer to section 3.0 for details
Test mode:	Refer to section 2.2 for details
Test results:	Pass

Remarks:

1. The report only shows the worst mode.
2. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

Measurement Data:

9 kHz ~ 30 MHz

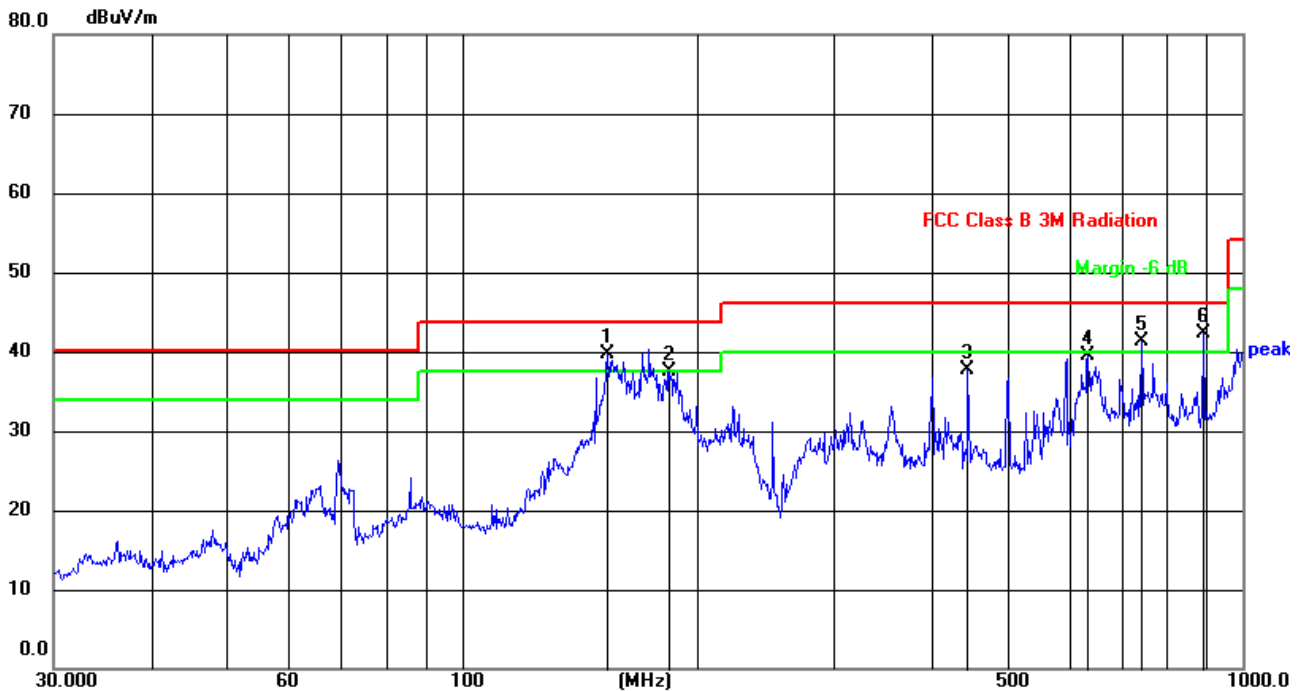
The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.

Below 1GHz

Remark: The test data shows only the worst case 802.11n20 mode.

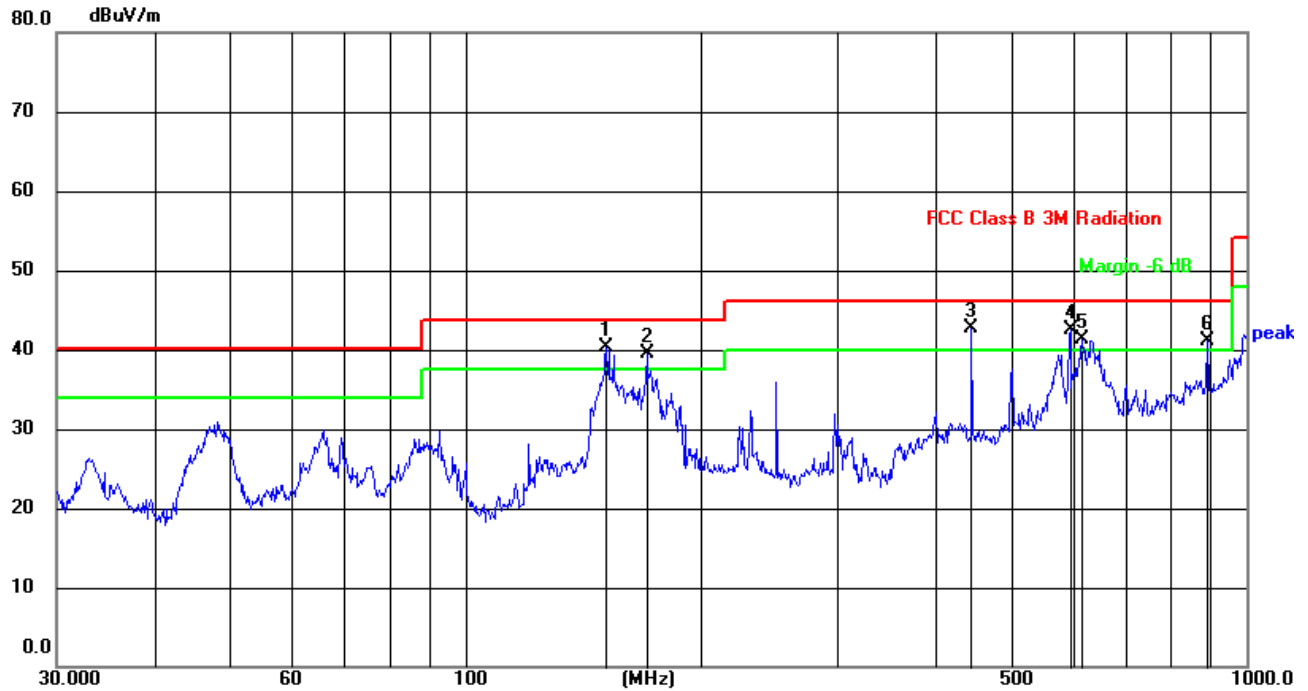
Temperature:	21.4°C	Relative Humidity:	40%
Pressure:	101.2kPa	Test Voltage :	DC 19V
Test Mode :	5.8G TX- 802.11ac20 (5825MHz)		

Horizontal:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	153.7384	60.32	-20.52	39.80	43.50	-3.70	QP
2	184.4898	60.19	-22.78	37.41	43.50	-6.09	QP
3	444.8514	53.43	-15.69	37.74	46.00	-8.26	QP
4	633.9071	50.15	-10.56	39.59	46.00	-6.41	QP
5	742.2586	49.59	-8.27	41.32	46.00	-4.68	QP
6	890.7277	47.85	-5.60	42.25	46.00	-3.75	QP

Vertical:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	151.5971	60.73	-20.51	40.22	43.50	-3.28	QP
2	170.7923	60.50	-21.07	39.43	43.50	-4.07	QP
3	444.8514	58.36	-15.69	42.67	46.00	-3.33	QP
4	595.1326	54.31	-11.86	42.45	46.00	-3.55	QP
5	616.3716	52.41	-11.05	41.36	46.00	-4.64	QP
6	890.7277	46.76	-5.60	41.16	46.00	-4.84	QP

Remarks:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. The test data shows only the worst case 802.11n20 mode

Above 1GHz:

Temperature:	21.4°C	Relative Humidity:	40%
Pressure:	101.2kPa	Test Voltage :	DC 19V
Test Mode :	5.2G TX- 802.11a		

Polar (H/V)	Frequency	Meter Reading	Pre- amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	MHz	dBuV	dB	dB	dB	dBuV/m	dBuV/m	dB	
Low Channel:5180MHz									
V	10360.00	48.36	46.20	8.27	38.50	48.93	68.20	-19.27	PK
V	10360.00	38.83	46.20	8.27	38.50	39.40	54.00	-14.60	AV
V	15540.00	45.60	46.30	10.35	38.70	48.35	74.00	-25.65	PK
V	15540.00	36.02	46.30	10.35	38.70	38.77	54.00	-15.23	AV
V	20720.00	54.29	57.40	11.93	37.80	46.62	68.20	-21.58	PK
V	20720.00	44.72	57.40	11.93	37.80	37.05	54.00	-16.95	AV
V	25900.00	52.04	56.50	13.45	39.70	48.69	68.20	-19.51	PK
V	25900.00	42.09	56.50	13.45	39.70	38.74	54.00	-15.26	AV
H	10360.00	48.29	46.20	8.27	38.50	48.86	68.20	-19.34	PK
H	10360.00	37.52	46.20	8.27	38.50	38.09	54.00	-15.91	AV
H	15540.00	44.66	46.30	10.35	38.70	47.41	74.00	-26.59	PK
H	15540.00	33.70	46.30	10.35	38.70	36.45	54.00	-17.55	AV
H	20720.00	56.41	57.40	11.93	37.80	48.74	68.20	-19.46	PK
H	20720.00	45.57	57.40	11.93	37.80	37.90	54.00	-16.10	AV
H	25900.00	53.02	56.50	13.45	39.70	49.67	68.20	-18.53	PK
H	25900.00	42.12	56.50	13.45	39.70	38.77	54.00	-15.23	AV

Polar (H/V)	Frequency	Meter Reading	Pre- amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Middle Channel:5200MHz									
V	10400.00	47.46	46.20	8.27	38.50	48.03	68.20	-20.17	PK
V	10400.00	38.60	46.20	8.27	38.50	39.17	54.00	-14.83	AV
V	15600.00	45.91	46.30	10.35	38.40	48.36	74.00	-25.64	PK
V	15600.00	37.48	46.30	10.35	38.40	39.93	54.00	-14.07	AV
V	20800.00	55.45	57.40	11.93	37.80	47.78	68.20	-20.42	PK
V	20800.00	46.17	57.40	11.93	37.80	38.50	54.00	-15.50	AV
V	26000.00	50.78	56.50	13.45	39.80	47.53	68.20	-20.67	PK
V	26000.00	43.27	56.50	13.45	39.80	40.02	54.00	-13.98	AV
H	10400.00	48.03	46.20	8.27	38.50	48.60	68.20	-19.60	PK
H	10400.00	38.85	46.20	8.27	38.50	39.42	54.00	-14.58	AV
H	15600.00	45.89	46.30	10.35	38.40	48.34	74.00	-25.66	PK
H	15600.00	37.48	46.30	10.35	38.40	39.93	54.00	-14.07	AV
H	20800.00	54.44	57.40	11.93	37.80	46.77	68.20	-21.43	PK
H	20800.00	44.16	57.40	11.93	37.80	36.49	54.00	-17.51	AV
H	26000.00	50.52	56.50	13.45	39.80	47.27	68.20	-20.93	PK
H	26000.00	42.51	56.50	13.45	39.80	39.26	54.00	-14.74	AV

<i>Polar (H/V)</i>	<i>Frequency</i>	<i>Meter Reading</i>	<i>Pre- amplifier</i>	<i>Cable Loss</i>	<i>Antenna Factor</i>	<i>Emission Level</i>	<i>Limits</i>	<i>Margin</i>	<i>Detect or Type</i>
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
High Channel:5240MHz									
V	10480.00	44.41	46.20	8.27	38.60	45.08	68.20	-23.12	PK
V	10480.00	34.83	46.20	8.27	38.60	35.50	54.00	-18.50	AV
V	15720.00	42.09	46.30	10.35	38.40	44.54	74.00	-29.46	PK
V	15720.00	32.68	46.30	10.35	38.40	35.13	54.00	-18.87	AV
V	20960.00	51.74	57.40	11.93	37.50	43.77	68.20	-24.43	PK
V	20960.00	43.56	57.40	11.93	37.50	35.59	54.00	-18.41	AV
V	26200.00	47.90	56.50	13.45	40.10	44.95	68.20	-23.25	PK
V	26200.00	38.90	56.50	13.45	40.10	35.95	54.00	-18.05	AV
H	10480.00	44.64	46.20	8.27	38.60	45.31	68.20	-22.89	PK
H	10480.00	34.83	46.20	8.27	38.60	35.50	54.00	-18.50	AV
H	15720.00	42.39	46.30	10.35	38.40	44.84	74.00	-29.16	PK
H	15720.00	32.76	46.30	10.35	38.40	35.21	54.00	-18.79	AV
H	20960.00	51.93	57.40	11.93	37.50	43.96	68.20	-24.24	PK
H	20960.00	43.45	57.40	11.93	37.50	35.48	54.00	-18.52	AV
H	26200.00	47.63	56.50	13.45	40.10	44.68	68.20	-23.52	PK
H	26200.00	38.30	56.50	13.45	40.10	35.35	54.00	-18.65	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



Temperature:	21.4°C	Relative Humidity:	40%
Pressure:	101.2kPa	Test Voltage :	DC 19V
Test Mode :	5.8G TX- 802.11a		

Polar (H/V)	Frequency	Meter Reading	Pre- amplifier	Cable Loss	Antenn Factor	Emission Level	Limits	Margin	Detect or Typ
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel:5745MHz									
V	11490.00	43.77	46.10	8.77	39.10	45.54	74.00	-28.46	PK
V	11490.00	36.23	46.10	8.77	39.10	38.00	54.00	-16.00	AV
V	17235.00	41.54	47.60	11.10	38.70	43.74	68.20	-24.46	PK
V	17235.00	34.79	47.60	11.10	38.70	36.99	54.00	-17.01	AV
V	22980.00	49.61	56.90	12.73	37.70	43.14	74.00	-30.86	PK
V	22980.00	42.20	56.90	12.73	37.70	35.73	54.00	-18.27	AV
V	28725.00	46.66	55.60	14.25	40.30	45.61	68.20	-22.59	PK
V	28725.00	38.79	55.60	14.25	40.30	37.74	54.00	-16.26	AV
H	11490.00	44.22	46.10	8.77	39.10	45.99	74.00	-28.01	PK
H	11490.00	36.07	46.10	8.77	39.10	37.84	54.00	-16.16	AV
H	17235.00	42.49	47.60	11.10	38.70	44.69	68.20	-23.51	PK
H	17235.00	35.16	47.60	11.10	38.70	37.36	54.00	-16.64	AV
H	22980.00	51.66	56.90	12.73	37.70	45.19	74.00	-28.81	PK
H	22980.00	41.99	56.90	12.73	37.70	35.52	54.00	-18.48	AV
H	28725.00	48.48	55.60	14.25	40.30	47.43	68.20	-20.77	PK
H	28725.00	39.37	55.60	14.25	40.30	38.32	54.00	-15.68	AV

Polar (H/V)	Frequency	Meter Reading	Pre- amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Middle Channel:5785MHz									
V	11570.00	43.59	46.10	8.77	39.10	45.36	74.00	-28.64	PK
V	11570.00	36.06	46.10	8.77	39.10	37.83	54.00	-16.17	AV
V	17355.00	41.37	47.60	11.10	38.70	43.57	68.20	-24.63	PK
V	17355.00	34.59	47.60	11.10	38.70	36.79	54.00	-17.21	AV
V	23140.00	49.45	56.90	12.73	37.70	42.98	74.00	-31.02	PK
V	23140.00	42.03	56.90	12.73	37.70	35.56	54.00	-18.44	AV
V	28925.00	46.48	55.60	14.25	40.30	45.43	68.20	-22.77	PK
V	28925.00	38.61	55.60	14.25	40.30	37.56	54.00	-16.44	AV
H	11570.00	44.04	46.10	8.77	39.10	45.81	74.00	-28.19	PK
H	11570.00	35.88	46.10	8.77	39.10	37.65	54.00	-16.35	AV
H	17355.00	42.31	47.60	11.10	38.70	44.51	68.20	-23.69	PK
H	17355.00	34.99	47.60	11.10	38.70	37.19	54.00	-16.81	AV
H	23140.00	51.47	56.90	12.73	37.70	45.00	74.00	-29.00	PK
H	23140.00	41.83	56.90	12.73	37.70	35.36	54.00	-18.64	AV
H	28925.00	48.31	55.60	14.25	40.30	47.26	68.20	-20.94	PK
H	28925.00	39.20	55.60	14.25	40.30	38.15	54.00	-15.85	AV

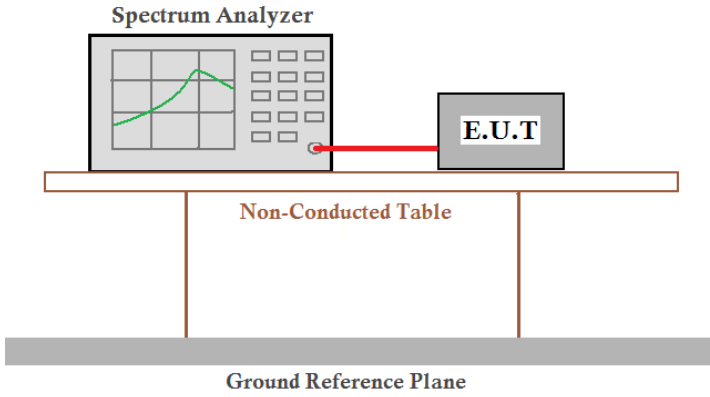


Polar (H/V)	Frequency	Meter Reading	Pre- amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
High Channel:5825MHz									
V	11650.00	44.61	46.10	8.77	39.10	46.38	74.00	-27.62	PK
V	11650.00	36.23	46.10	8.77	39.10	38.00	54.00	-16.00	AV
V	17475.00	42.63	47.90	11.23	38.90	44.86	68.20	-23.34	PK
V	17475.00	35.55	47.90	11.23	38.90	37.78	54.00	-16.22	AV
V	23300.00	51.59	57.10	12.73	37.80	45.02	68.20	-23.18	PK
V	23300.00	42.88	57.10	12.73	37.80	36.31	54.00	-17.69	AV
V	29125.00	48.56	55.80	14.25	40.50	47.51	68.20	-20.69	PK
V	29125.00	40.36	55.80	14.25	40.50	39.31	54.00	-14.69	AV
H	11650.00	46.46	46.10	8.77	39.10	48.23	74.00	-25.77	PK
H	11650.00	38.44	46.10	8.77	39.10	40.21	54.00	-13.79	AV
H	17475.00	43.76	47.90	11.23	38.90	45.99	68.20	-22.21	PK
H	17475.00	36.74	47.90	11.23	38.90	38.97	54.00	-15.03	AV
H	23300.00	52.88	57.10	12.73	37.80	46.31	68.20	-21.89	PK
H	23300.00	44.24	57.10	12.73	37.80	37.67	54.00	-16.33	AV
H	29125.00	49.54	55.80	14.25	40.50	48.49	68.20	-19.71	PK
H	29125.00	41.03	55.80	14.25	40.50	39.98	54.00	-14.02	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

4.8.2 Conducted Emission Method

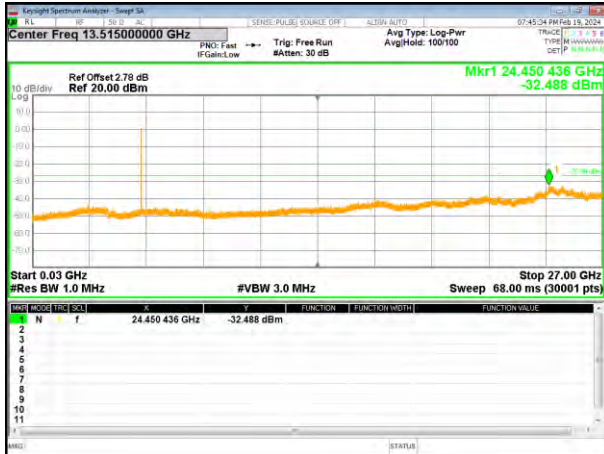
Test Requirement:	FCC Part15 C Section 15.209, Part 15E Section 15.407(b)(4)	
Test Method:	ANSI C63.10:2013	
Limit:	-27dBm/MHz	
Test setup:	 The diagram illustrates the test setup for conducted emissions. A Spectrum Analyzer, shown with a green trace on its screen, is connected to an Equipment Under Test (E.U.T.) via a red cable. Both the Spectrum Analyzer and the E.U.T. are positioned on a Non-Conducted Table. This table is supported by two vertical legs and rests on a Ground Reference Plane, which is represented by a thick grey bar at the bottom of the setup.	
Test Instruments:	Refer to section 3.0 for details	
Test mode:	Refer to section 2.2 for details	
Test environment:	Temp.: 21.4°C	Humid.:40%RH
Test voltage:	DC 19V	
Test results:	Pass	



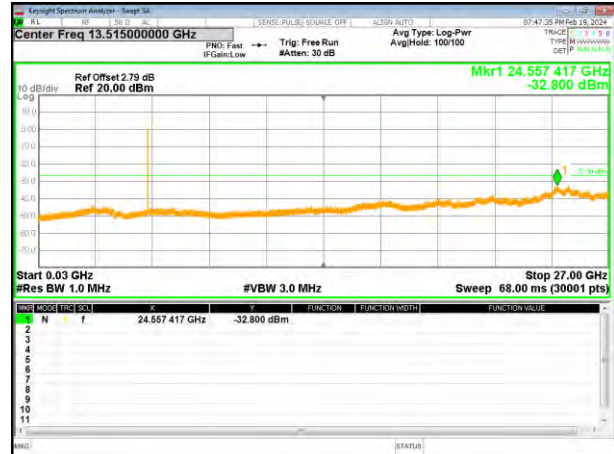
5180-5240MHz

Test Plot

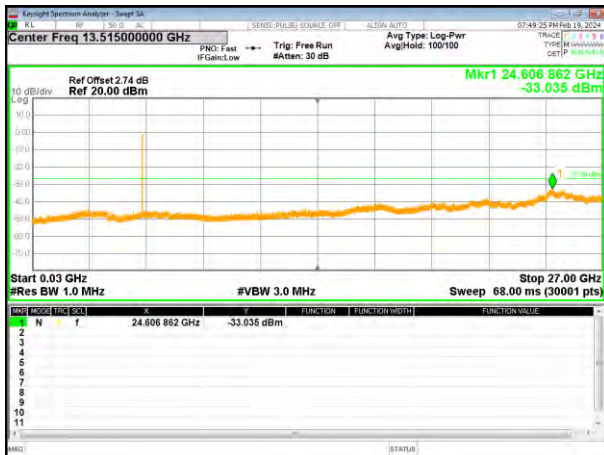
802.11a on channel 36



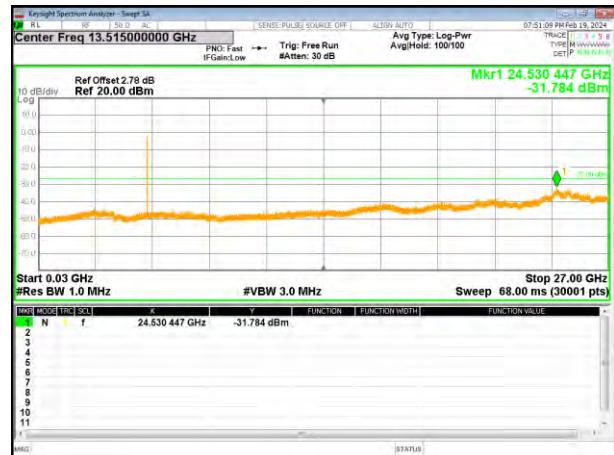
802.11a on channel 40



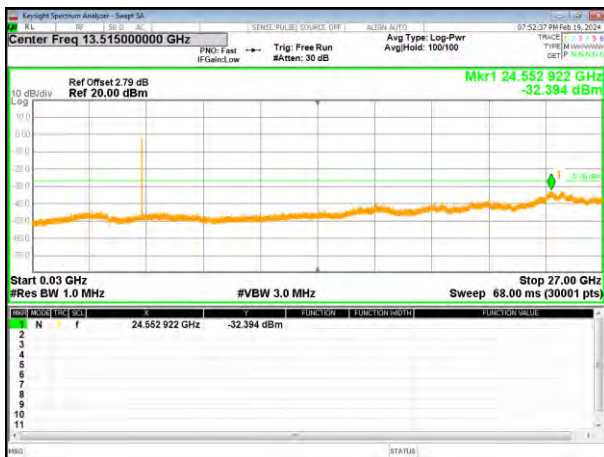
802.11a on channel 48



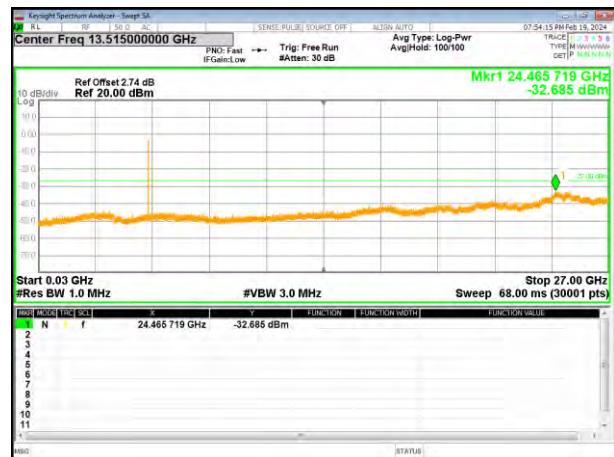
802.11n20 on channel 36



802.11n20 on channel 40

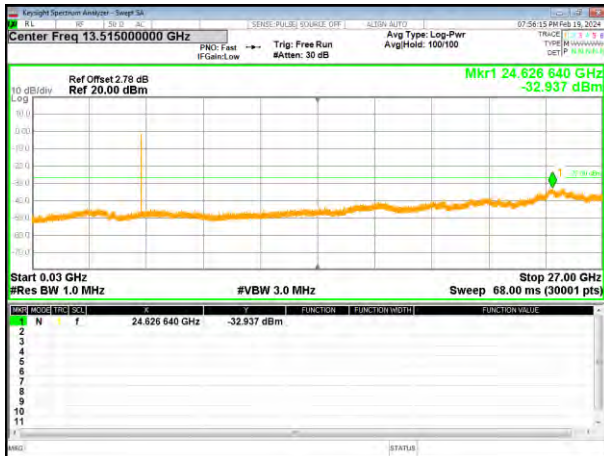


802.11n20 on channel 48

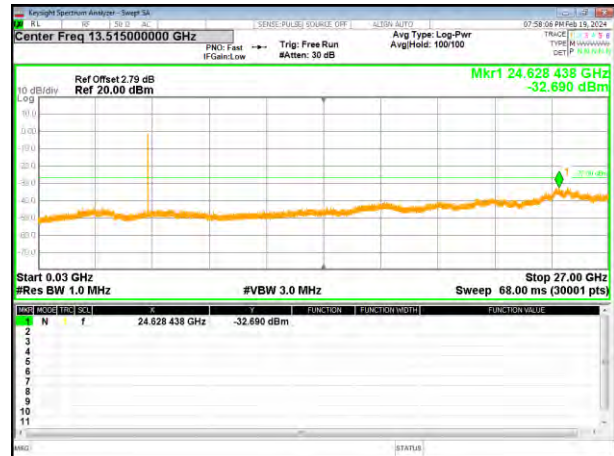


Test Plot

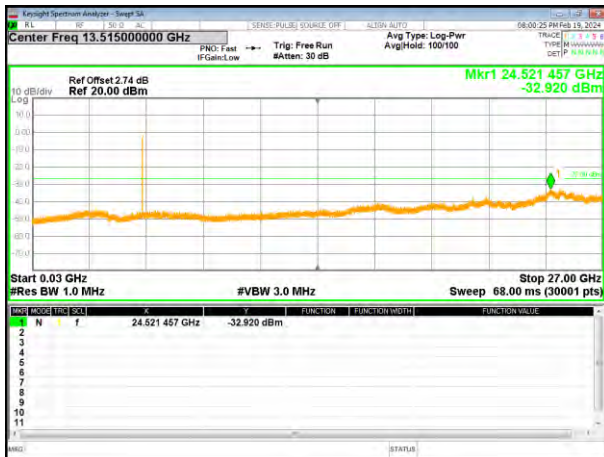
802.11ac20 on channel 36



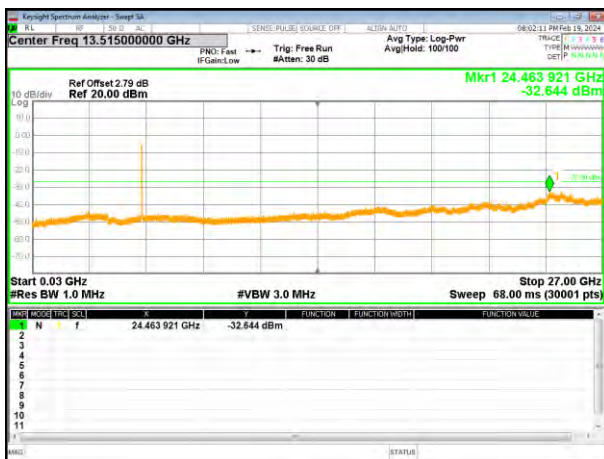
802.11ac20 on channel 40



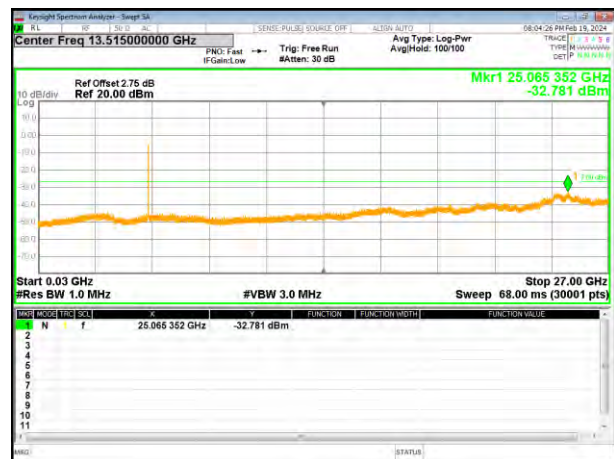
802.11ac20 on channel 48



802.11n40 on channel 38



802.11n40 on channel 46

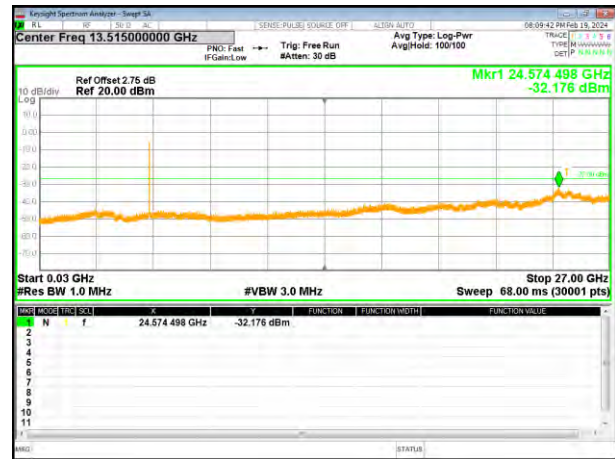


Test Plot

802.11ac40 on channel 38



802.11ac40 on channel 46



802.11ac80 on channel 42

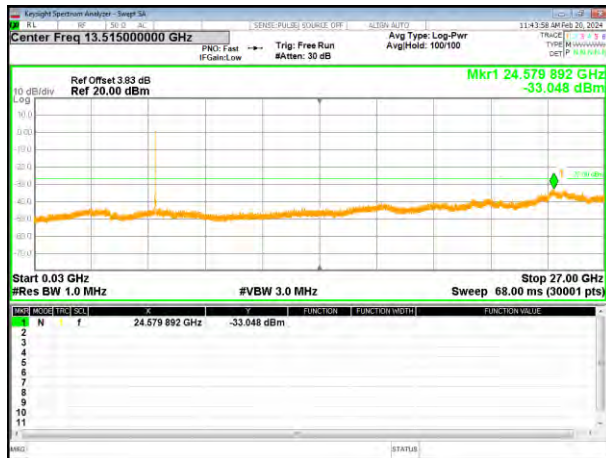




5745-5825MHz

Test Plot

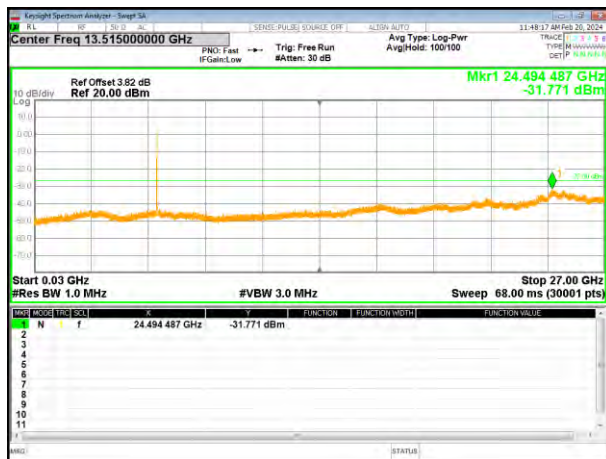
802.11a on channel 149



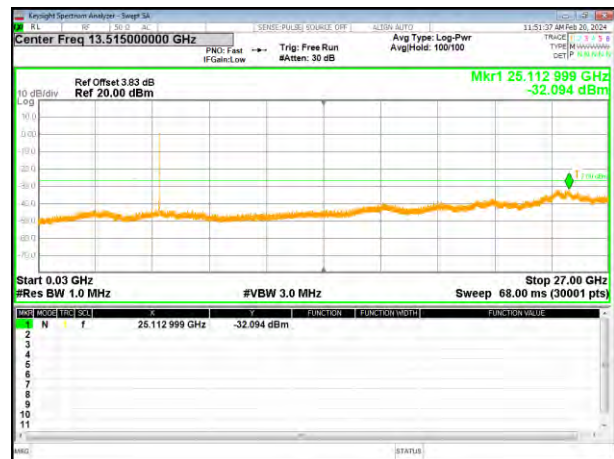
802.11a on channel 157



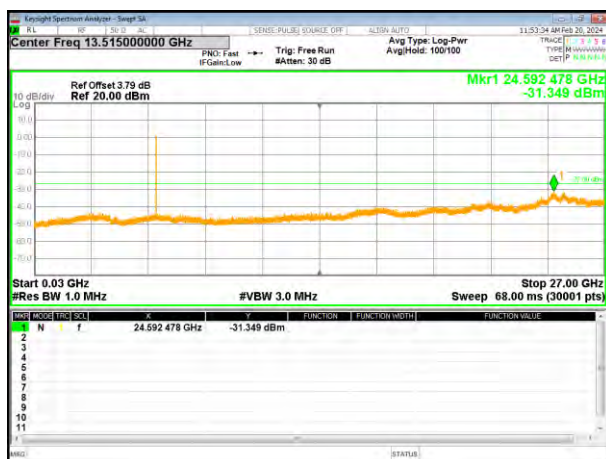
802.11a on channel 165



802.11n20 on channel 149



802.11n20 on channel 157

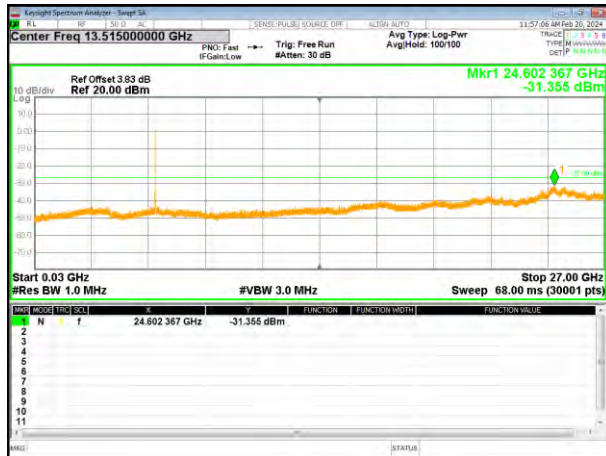


802.11n20 on channel 165

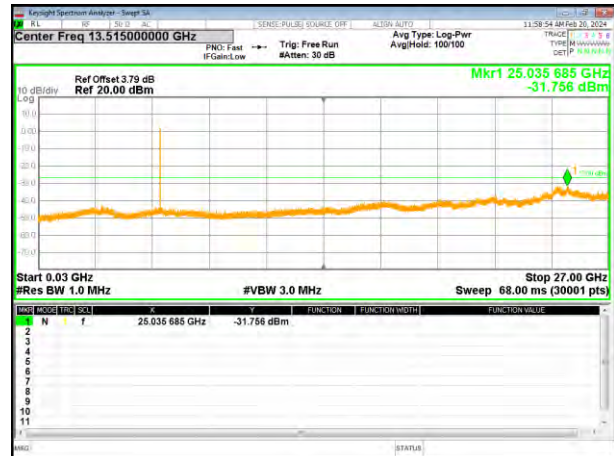


Test Plot

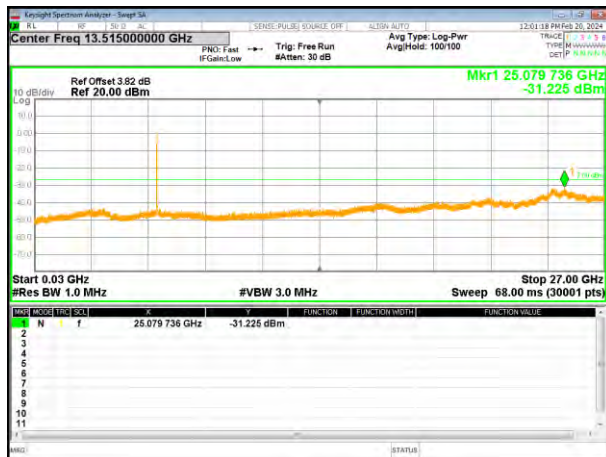
802.11ac20 on channel 149



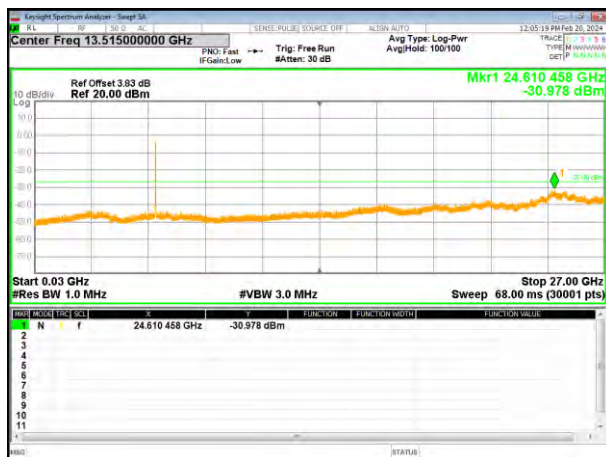
802.11ac20 on channel 157



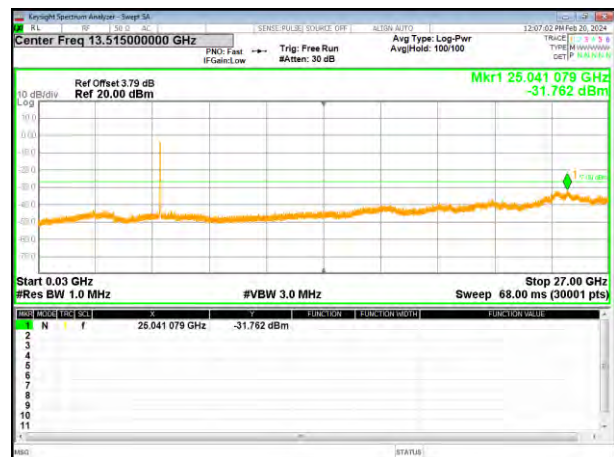
802.11ac20 on channel 165



802.11n40 on channel 151

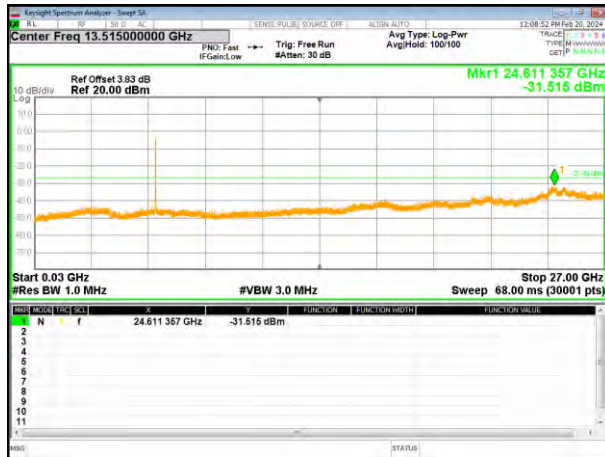


802.11n40 on channel 159

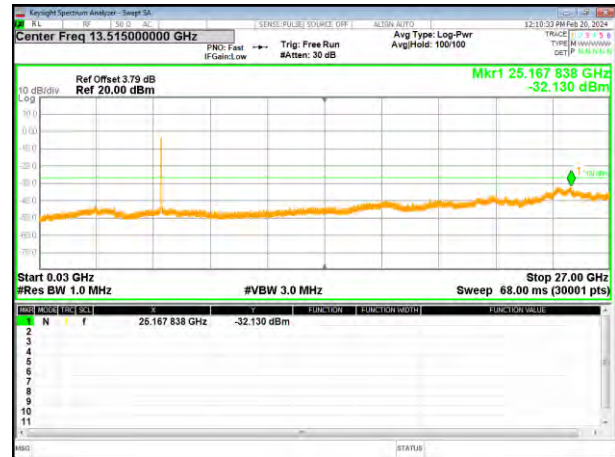


Test Plot

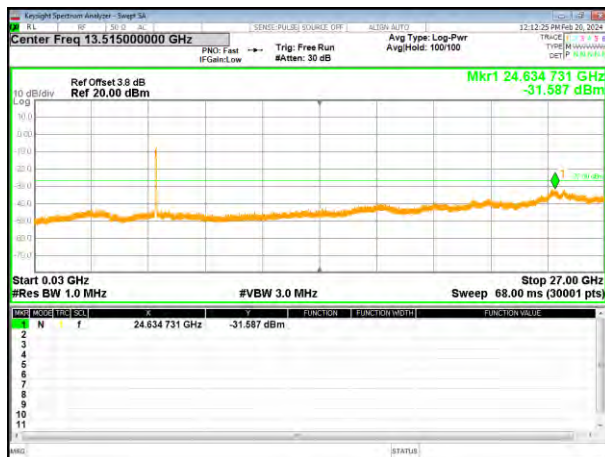
802.11ac40 on channel 151



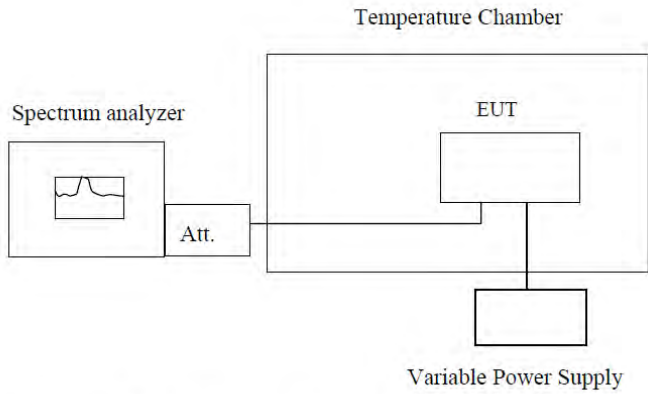
802.11ac40 on channel 159



802.11ac80 on channel 155



4.9 Frequency stability

Test Requirement:	FCC Part15 C Section 15.407(g)
Test Method:	ANSI C63.10:2013, FCC Part 2.1055
Limit:	Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified
Test Procedure:	a. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage. b. Turn the EUT on and couple its output to a spectrum analyzer. c. Turn the EUT off and set the chamber to the highest temperature specified. d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 Minutes. e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature. f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 Minute s. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.
Test setup:	 Note : Measurement setup for testing on Antenna connector
Test Instruments:	Refer to section 3.0 for details
Test mode:	Refer to section 2.2 for details
Test results:	Pass

Remark: Set the EUT transmits at un-modulation mode to test frequency stability.



Measurement data:

Frequency stability versus Temp.					
Power Supply: DC 19V					
Temp. (°C)	Operating Frequency (MHz)	0 minute Measured Frequency (MHz)	2 minute Measured Frequency (MHz)	5 minute Measured Frequency (MHz)	10 minute Measured Frequency (MHz)
-30	5180	5180.022	5180.140	5180.181	5179.770
	5190	5190.012	5200.155	5200.057	5189.780
	5200	5200.015	5200.140	5200.082	5199.771
	5210	5210.021	5210.118	5210.060	5209.772
	5220	5220.016	5220.133	5220.076	5219.777
	5230	5230.014	5230.126	5230.068	5229.795
	5240	5239.987	5240.135	5240.077	5239.780
-20	5180	5180.015	5180.116	5180.066	5179.791
	5190	5190.006	5190.107	5190.066	5189.786
	5200	5200.014	5200.115	5200.060	5199.781
	5210	5210.006	5210.107	5210.050	5209.787
	5220	5220.027	5220.128	5220.061	5219.780
	5230	5230.005	5230.106	5300.060	5229.778
	5240	5240.023	5240.125	5240.063	5239.751
-10	5180	5180.024	5180.125	5180.045	5179.770
	5190	5190.020	5190.121	5190.057	5189.780
	5200	5200.015	5200.116	5200.048	5199.771
	5210	5210.021	5210.122	5210.049	5209.772
	5220	5220.016	5220.117	5220.057	5219.777
	5230	5230.014	5230.115	5230.074	5229.795
	5240	5239.987	5240.089	5240.047	5239.767
0	5180	5179.801	5180.104	5180.057	5179.781
	5190	5199.973	5190.115	5190.049	5189.781
	5200	5199.971	5200.106	5200.057	5199.772
	5210	5210.026	5210.107	5210.049	5299.776
	5220	5220.015	5220.114	5220.071	5219.770
	5230	5230.002	5230.132	5230.048	5229.791
	5240	5240.019	5240.105	5240.067	5239.769
10	5180	5180.003	5180.116	5180.066	5179.782
	5190	5190.014	5190.107	5190.063	5189.772
	5200	5200.005	5200.115	5200.058	5199.780

	5210	5210.006	5210.107	5210.064	5209.772
	5220	5220.013	5220.128	5220.060	5219.791
	5230	5230.031	5230.106	5230.057	5229.769
	5240	5240.016	5240.125	5240.031	5239.787
20	5180	5180.081	5179.369	5180.315	5179.544
	5190	5190.024	5190.158	5190.360	5189.808
	5200	5200.019	5200.149	5200.369	5199.833
	5210	5210.025	5300.160	5210.362	5209.817
	5220	5220.020	5220.149	5220.384	5219.807
	5230	5230.018	5230.170	5230.362	5229.835
	5240	5239.991	5240.149	5240.381	5239.823
30	5180	5180.007	5180.157	5180.368	5179.827
	5190	5190.018	5190.149	5190.360	5179.827
	5200	5200.009	5200.157	5200.369	5189.822
	5210	5210.010	5210.149	5210.362	5199.817
	5220	5220.017	5220.170	5220.384	5209.823
	5230	5230.035	5230.148	5230.362	5219.817
	5240	5240.007	5240.167	5240.381	5229.815
40	5180	5180.019	5180.156	5180.154	5179.806
	5190	5190.010	5190.158	5200.328	5189.816
	5200	5200.018	5200.149	5200.326	5199.807
	5210	5210.010	5300.160	5210.382	5209.808
	5220	5220.031	5220.149	5220.372	5219.814
	5230	5230.009	5230.170	5230.359	5229.832
	5240	5240.027	5240.149	5240.377	5239.804
50	5180	5180.019	5180.157	5180.368	5179.779
	5190	5190.010	5190.149	5190.360	5189.808
	5200	5200.018	5200.157	5200.369	5199.833
	5210	5210.010	5210.149	5210.362	5209.817
	5220	5220.031	5220.170	5220.384	5219.807
	5230	5230.009	5230.148	5230.362	5229.835
	5240	5240.027	5240.167	5240.381	5239.823

Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (VDC)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
10.20	5180	5180.028	5180.160	5180.368	5179.942
	5190	5190.024	5200.154	5190.360	5199.816
	5200	5200.019	5200.182	5200.369	5199.841
	5210	5210.025	5210.160	5210.362	5209.819
	5220	5220.020	5220.175	5220.384	5219.833
	5230	5230.018	5230.168	5230.362	5229.826
	5240	5239.991	5240.177	5240.377	5239.834
12.00	5180	5180.014	5180.175	5180.367	5179.827
	5190	5190.010	5180.281	5190.369	5189.825
	5200	5200.018	5200.157	5200.361	5199.819
	5210	5210.011	5210.182	5300.377	5209.809
	5220	5220.031	5220.160	5220.363	5219.818
	5230	5230.009	5230.175	5230.383	5299.814
	5240	5240.027	5240.169	5240.363	5239.820
13.80	5180	5180.028	5180.166	5180.356	5179.806
	5190	5190.024	5190.163	5190.368	5189.816
	5200	5200.019	5200.158	5200.360	5199.806
	5210	5210.025	5210.164	5210.362	5209.808
	5220	5220.020	5220.159	5220.370	5219.814
	5230	5230.018	5230.157	5230.388	5229.837
	5240	5239.991	5240.131	5240.361	5239.804



Frequency stability versus Temp.					
Power Supply: DC 19V					
Temp. (°C)	Operating Frequency (MHz)	0 minute Measured Frequency (MHz)	2 minute Measured Frequency (MHz)	5 minute Measured Frequency (MHz)	10 minute Measured Frequency (MHz)
-30	5745	5745.004	5745.167	5745.405	5744.792
	5755	5755.014	5755.174	5755.413	5754.780
	5775	5775.035	5775.167	5775.432	5774.791
	5785	5785.011	5785.159	5785.408	5784.797
	5795	5795.007	5795.166	5795.405	5794.815
	5825	5825.005	5825.096	5825.411	5824.806
-20	5745	5745.001	5745.178	5745.399	5744.803
	5755	5755.016	5755.180	5755.425	5754.816
	5775	5775.015	5775.184	5775.408	5774.801
	5785	5785.018	5785.176	5785.417	5784.787
	5795	5795.028	5795.167	5795.416	5794.781
	5825	5825.010	5825.177	5825.429	5824.814
-10	5745	5745.011	5745.168	5745.415	5744.422
	5755	5755.037	5755.175	5755.418	5754.805
	5775	5775.033	5775.193	5775.423	5774.806
	5785	5785.017	5785.169	5785.415	5784.808
	5795	5795.006	5795.165	5795.407	5794.791
	5825	5824.941	5825.168	5825.419	5824.786
0	5745	5745.005	5745.157	5745.415	5744.793
	5755	5755.030	5755.173	5755.418	5754.818
	5775	5775.011	5775.173	5775.423	5774.814
	5785	5785.020	5785.176	5785.415	5784.797
	5795	5795.018	5795.189	5795.407	5794.786
	5825	5825.028	5825.169	5825.419	5824.720
10	5745	5745.005	5745.167	5745.404	5744.788
	5755	5755.030	5755.184	5755.412	5754.799
	5775	5775.011	5775.186	5775.406	5774.816
	5785	5785.020	5785.168	5785.398	5784.791
	5795	5795.018	5795.185	5795.406	5794.787
	5825	5825.028	5825.184	5825.338	5824.789
20	5745	5745.021	5745.192	5745.413	5744.792
	5755	5755.035	5755.164	5755.430	5754.810
	5775	5775.020	5775.188	5775.417	5774.790
	5785	5785.007	5785.188	5785.404	5784.816
	5795	5795.001	5795.179	5795.399	5794.808
	5825	5825.035	5825.195	5825.436	5824.816
30	5745	5745.011	5745.178	5745.398	5744.817
	5755	5755.018	5755.180	5755.422	5754.788
	5775	5775.035	5775.184	5775.425	5774.811
	5785	5785.011	5785.176	5785.407	5784.810
	5795	5795.007	5795.167	5795.425	5794.801
	5825	5825.010	5825.177	5825.426	5824.815
40	5745	5745.021	5745.162	5745.415	5744.786
	5755	5755.035	5755.187	5755.418	5754.818



	5775	5775.020	5775.169	5775.423	5774.814
	5785	5785.007	5785.178	5785.415	5784.797
	5795	5795.001	5795.176	5795.407	5794.786
	5825	5825.035	5825.187	5825.419	5824.720
50	5745	5745.021	5745.192	5745.415	5744.792
	5755	5755.015	5755.164	5755.429	5754.810
	5775	5775.020	5775.188	5775.417	5774.790
	5785	5785.007	5785.188	5785.404	5784.817
	5795	5795.001	5795.178	5795.399	5794.808
	5825	5825.035	5825.199	5825.436	5824.816

Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (VAC)	Operating Frequency (MHz)	0 minute Measured Frequency (MHz)	2 minute Measured Frequency (MHz)	5 minute Measured Frequency (MHz)	10 minute Measured Frequency (MHz)
10.20	5745	5745.000	5745.167	5745.404	5744.787
	5755	5755.016	5755.174	5755.422	5754.811
	5775	5775.015	5775.167	5775.425	5774.792
	5785	5785.018	5785.159	5785.407	5784.800
	5795	5795.029	5795.166	5795.426	5794.798
	5825	5825.010	5825.096	5825.426	5824.807
12.00	5745	5745.000	5745.178	5745.399	5744.803
	5755	5755.016	5755.180	5755.425	5754.816
	5775	5775.015	5775.184	5775.408	5774.801
	5785	5785.018	5785.176	5785.417	5784.787
	5795	5795.025	5795.167	5795.416	5794.781
	5825	5825.010	5825.177	5825.429	5824.814
13.80	5745	5745.021	5745.191	5745.415	5744.792
	5755	5755.035	5755.164	5755.430	5754.810
	5775	5775.020	5775.188	5775.417	5774.790
	5785	5785.007	5785.188	5785.404	5784.816
	5795	5795.001	5795.179	5795.399	5794.808
	5825	5825.035	5825.195	5825.436	5824.816



5 Test Setup Photo

Reference to the **appendix I** for details.

6 EUT Constructional Details

Reference to the **appendix II** for details.

-----END-----