TEST REPORT

Applicant:	Shenzhen Youdisi E-Commerce Co., Ltd.
Address of Applicant:	Room 402, Building A, Jiewei Industrial Zone, Pingxin North Road 53, Pinghu Street, Longgang, Shenzhen, Guangdong, China
Manufacturer/Factory:	Shenzhen Youdisi E-Commerce Co., Ltd.
Address of Manufacturer	Room 402, Building A, Jiewei Industrial Zone, Pingxin North Road 53, Pinghu Street, Longgang, Shenzhen, Guangdong, China
Product Name:	Laptop
Model No.:	YEPBOOK,XBOOK-2,XBOOK-3,FLEXONE,A6,T1,YEPBOOK-2, YEPBOOK-3,YEPBOOK-4,XBOOK-4,A1
Trade Mark:	KUU
FCC ID:	2BCD7-YEPBOOK
IC:	31109-YEPBOOK
Applicable standards:	FCC CFR Title 47 Part 15 Subpart E Section 15.407
	RSS-Gen Issue 5,RSS-247 Issue 2
Date of Test:	Jul.17, 2023-Aug.24, 2023
Date of report issued:	Aug.24, 2023
Test Result :	PASS *

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

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

Prepared By

Shenzhen ETR Standard Technology Co., Ltd.

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Compiled by:	Reviewed by:	Approved by:
Project Engineer	Project Manager	Authorized Signature

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Report Revision History		
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1 Test Summary

Test Item	Section	Result	Test by
Antenna requirement	15.203 RSS-Gen §6.8	Pass	/
AC Power Line Conducted Emission	15.207 RSS-Gen §8.8	Pass	Carr Kang
Conducted Output Power	15.407 (a)(1)/(a)(3) RSS-247 §6.2.1.1&6.2.4.1	Pass	Yvan Fan
26dB Bandwidth and 99% Occupied Bandwidth	15.407 (a)(12) RSS-247 §6.2.1.1,RSS-GEN 6.7	Pass	Yvan Fan
6dB Bandwidth	15.407 (e) RSS-247 §6.2.4.1	Pass	Yvan Fan
Power Spectral Density	15.407(a)(1)/(a)(3) RSS-247 §6.2.1.1&6.2.4.1	Pass	Yvan Fan
Band Edge	15.407(b)(1)/(b)(4) RSS-247 §6.2.1&6.2.4.2	Pass	Yvan Fan
Spurious Emission	15.205/15.209 15.407(b)(1)/(b)(4)/(b)(8) RSS-247 §6.2.1.2&6.2.4.2	Pass	Qiao Li
Frequency Stability	15.407(g) RSS Gen§ 8.11	Pass	Yvan Fan

Remarks：

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

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:	Laptop
Model No.:	XBOOK-2,XBOOK-3,FLEXONE,A6,T1,YEPBOOK-2,YEPBOOK-3, YEPBOOK-4,XBOOK-4,A1
Difference of model(s)	YEPBOOK
Test Model:	All the model are the same circuit and RF module, except the model names.
Hardware Version:	V2.1
Software Version:	V2.1
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:	Integrated antenna
Antenna gain:	2.75 dBi (Note: Antenna information is provided by applicant, Testing lab is not responsible for the accuracy of the information.)
Battery	7.6V 5000mAh
Power supply:	DC 7.6V

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		
Highest channel	5240	5230	

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		
Highest channel	5825	5795	

2.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode EUT was test with ＞98% duty cycle at its maximum power control level.
Remark: For battery operated equipment, the EUT was performed using a new DC 7.6V battery.	

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	Power supply	Shen Zhen Shi Yingyuan Electronics Co.,Ltd	ICP36-120-3000	/

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
IC Company Number:	28440
CAB identifier:	CN0132

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
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	2022.11.09	2023.11.08
8	Signal generator	Agilent	N5182A	MY49060455	2022.11.09	2023.11.08
9	Spectrum analyzer	Rohde&schwarz	FSV40	102137	2023.3.02	2024.3.01
10	Amplifier	SKET	LNPA_1840-50	SK2019040302	2023.3.02	2024.3.01
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
17	Power meter	Rohde&Schwarz	NRP-Z11	1138.3004.02-117725-vh	2023.03.30	2024.03.29

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
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.* **RSS-Gen 6.8:** The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list. For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).	
E.U.T Antenna:	
The antennas are Integrated antenna, the best case gain of the antennas are 2.75 dBi, reference to the appendix II for details	

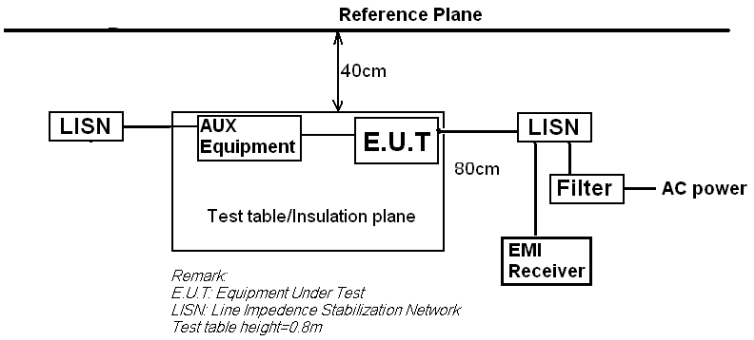
4.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207, RSS-Gen §8.8
Test Method:	ANSI C63.10:2013 and RSS-Gen
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:



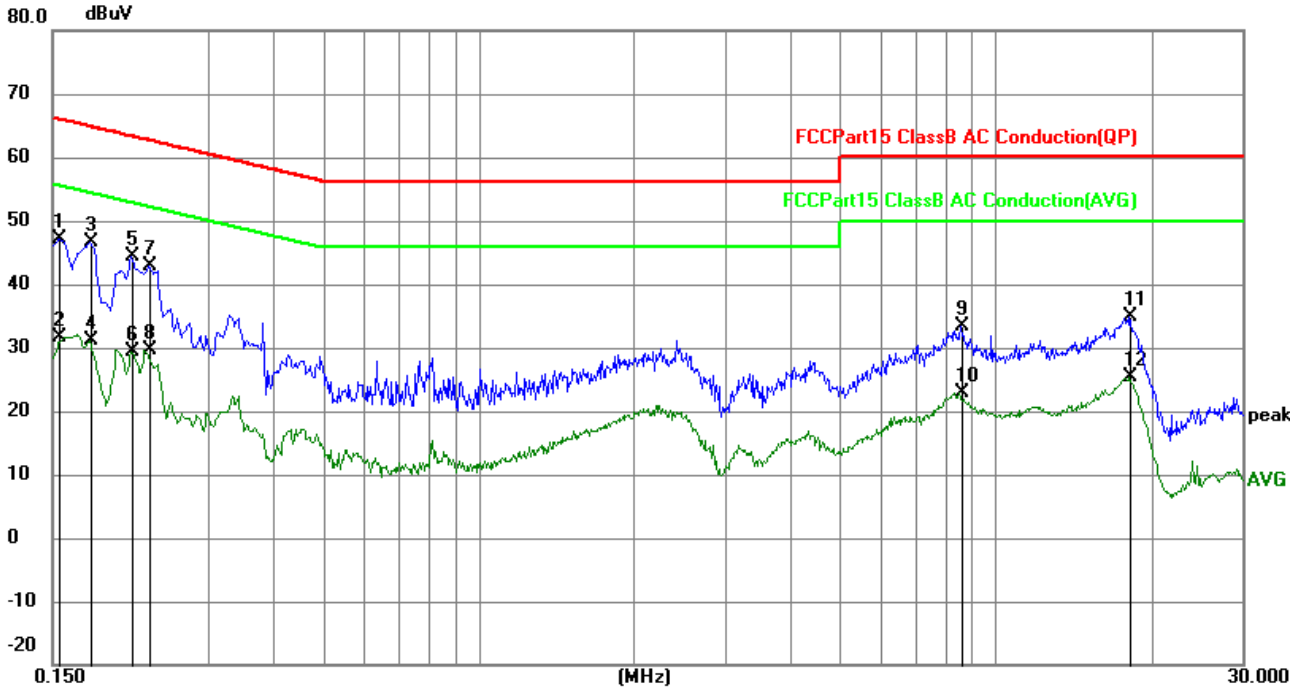
Test procedure:

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.:	26.2°C	Humid.:	41%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

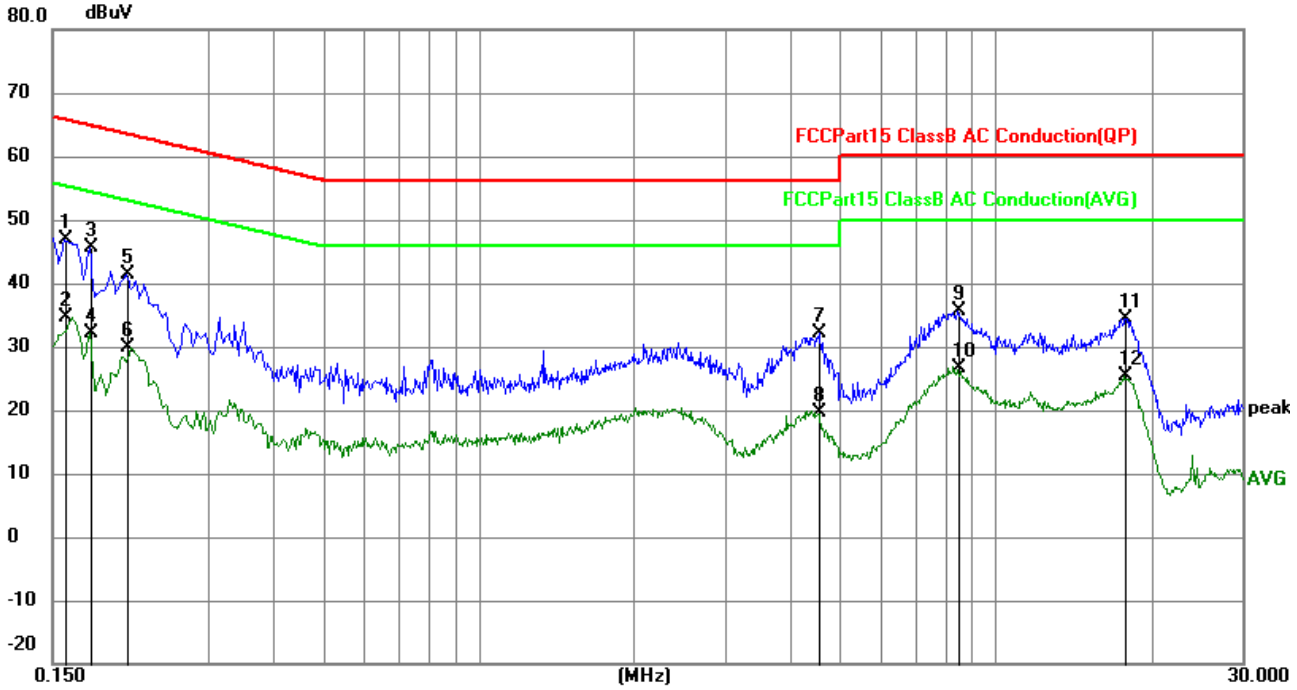
Remark:
1. Both high voltage and low voltage have been tested, and the report only shows the worst case data with AC 120V/60Hz.
2. All mode have been tested, the report only shows the worst mode (802.11 ac20 5180MHz) data.

Measurement data
Line:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1544	37.32	9.80	47.12	65.76	-18.64	QP
2	0.1544	21.93	9.80	31.73	55.76	-24.03	AVG
3	0.1768	36.73	9.81	46.54	64.63	-18.09	QP
4	0.1768	21.34	9.81	31.15	54.63	-23.48	AVG
5	0.2130	34.60	9.81	44.41	63.09	-18.68	QP
6	0.2130	19.65	9.81	29.46	53.09	-23.63	AVG
7	0.2310	33.01	9.82	42.83	62.41	-19.58	QP
8	0.2310	19.70	9.82	29.52	52.41	-22.89	AVG
9	8.5604	23.45	9.84	33.29	60.00	-26.71	QP
10	8.5604	13.15	9.84	22.99	50.00	-27.01	AVG
11	18.1365	25.07	9.70	34.77	60.00	-25.23	QP
12	18.1365	15.76	9.70	25.46	50.00	-24.54	AVG

Neutral:

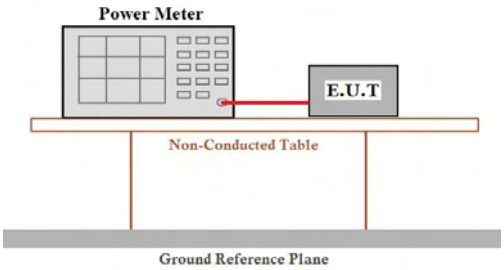


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1590	37.03	9.80	46.83	65.52	-18.69	QP
2	0.1590	24.84	9.80	34.64	55.52	-20.88	AVG
3	0.1770	35.86	9.81	45.67	64.63	-18.96	QP
4	0.1770	22.30	9.81	32.11	54.63	-22.52	AVG
5	0.2085	31.64	9.81	41.45	63.26	-21.81	QP
6	0.2085	20.08	9.81	29.89	53.26	-23.37	AVG
7	4.5510	22.27	9.84	32.11	56.00	-23.89	QP
8	4.5510	9.68	9.84	19.52	46.00	-26.48	AVG
9	8.4795	25.88	9.83	35.71	60.00	-24.29	QP
10	8.4795	16.92	9.83	26.75	50.00	-23.25	AVG
11	17.7900	24.78	9.70	34.48	60.00	-25.52	QP
12	17.7900	15.59	9.70	25.29	50.00	-24.71	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. Final Level =Receiver Read level + LISN Factor + Cable Loss
4. 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 Conducted Output Power &EIRP

Test Requirement:	FCC Part15 E Section 15.407 (a)(1)/(a)(3), RSS-247 §6.2.1.1&6.2.4.1	
Test Method:	ANSI C63.10:2013 and KDB 789033 D02 General U-NII Test Procedures New Rules v02r01, RSS Gen	
Limit:	5150-5250MHz : 250mW 5725~5850MHz : 1W 5150-5250MHz : e.i.r.p. shall not exceed 200 mW or 10 + 10 log10B, dBm, whichever power is less. 5725~5850MHz : conducted output power shall not exceed 1 W	
Test setup:		
Test Instruments:	Refer to section 3.0 for details	
Test mode:	Refer to section 2.2 for details	
Test environment:	Temp.: 24.6°C	Humid.: 52%RH
Test voltage:	DC 7.6V	
Test results:	Pass	
Remark:	Measurement using a gated RF average power meter.	

Measurement Result

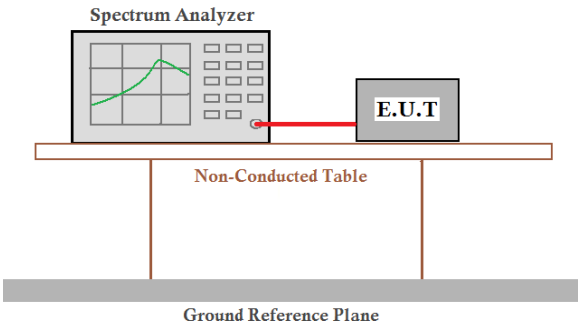
Test Channel	Frequency (MHz)	Maximum output power(AV) (dBm)	LIMIT dBm	Result
TX 802.11a Mode				
CH36	5180	8.73	23.98	Pass
CH40	5200	8.52	23.98	Pass
CH48	5240	8.11	23.98	Pass
TX 802.11 n20 Mode				
CH36	5180	8.64	23.98	Pass
CH40	5200	8.43	23.98	Pass
CH48	5240	8.04	23.98	Pass
TX 802.11 ac20 Mode				
CH36	5180	8.80	23.98	Pass
CH40	5200	8.43	23.98	Pass
CH48	5240	8.10	23.98	Pass
TX 802.11 n40 Mode				
CH38	5190	7.73	23.98	Pass
CH46	5230	7.38	23.98	Pass
TX 802.11 ac40 Mode				
CH38	5190	7.90	23.98	Pass
CH46	5230	7.44	23.98	Pass
TX 802.11 ac80 Mode				
CH42	5210	5.60	23.98	Pass

Test Channel	Frequency (MHz)	Maximum output power. (AV) (dBm)	LIMIT dBm	Result
TX 802.11a Mode				
CH149	5745	8.32	30	Pass
CH157	5785	8.44	30	Pass
CH165	5825	8.73	30	Pass
TX 802.11 n20 Mode				
CH149	5745	8.31	30	Pass
CH157	5785	8.37	30	Pass
CH165	5825	8.67	30	Pass
TX 802.11 ac20 Mode				
CH149	5745	8.37	30	Pass
CH157	5785	8.41	30	Pass
CH165	5825	8.61	30	Pass
TX 802.11 n40 Mode				
CH151	5755	7.67	30	Pass
CH159	5795	7.82	30	Pass
TX 802.11 ac40 Mode				
CH151	5755	7.69	30	Pass
CH159	5795	7.81	30	Pass
TX 802.11 ac80 Mode				
CH155	5775	6.81	30	Pass

EIRP

Test Channel	Frequency (MHz)	Maximum output power (dBm)	ANT gain dBi	E.I.R.P (dBm)	LIMIT dBm	Result
TX 802.11a Mode						
CH36	5180	8.73	2.75	11.48	22.2	Pass
CH40	5200	8.52	2.75	11.27	22.2	Pass
CH48	5240	8.11	2.75	10.86	22.2	Pass
TX 802.11 n20 Mode						
CH36	5180	8.64	2.75	11.39	22.5	Pass
CH40	5200	8.43	2.75	11.18	22.5	Pass
CH48	5240	8.04	2.75	10.79	22.5	Pass
TX 802.11 ac20 Mode						
CH36	5180	8.80	2.75	11.55	22.5	Pass
CH40	5200	8.43	2.75	11.18	22.5	Pass
CH48	5240	8.10	2.75	10.85	22.5	Pass
TX 802.11 n40 Mode						
CH38	5190	7.73	2.75	10.48	23	Pass
CH46	5230	7.38	2.75	10.13	23	Pass
TX 802.11 ac40 Mode						
CH38	5190	7.90	2.75	10.65	23	Pass
CH46	5230	7.44	2.75	10.19	23	Pass
TX 802.11 ac80 Mode						
CH42	5210	5.60	2.75	8.35	23	Pass

4.4 26dB Bandwidth 99% Occupied Bandwidth

Test Requirement:	FCC Part15 E Section 15.407(a)(12)&15.407(e) RSS-247 §6.2.1.1&6.2.4.1
Test Method:	ANSI C63.10:2013 and KDB 789033 D02 General U-NII Test Procedures New Rules v02r01, RSS Gen
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.: 24.6°C Humid.: 52%RH
Test voltage:	DC 7.6V
Test results:	Pass

Measurement Result

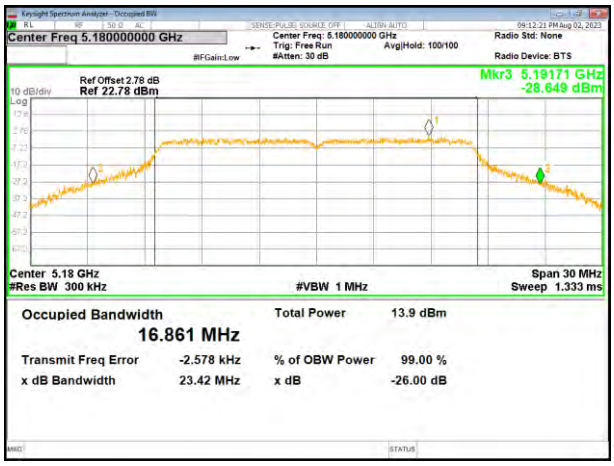
5180-5240MHz

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	23.42	24.16	23.80	43.37	44.58	--	Pass
Middle	23.63	24.63	24.42	--	--	82.15	
Highest	23.67	23.67	24.21	43.77	43.60	--	

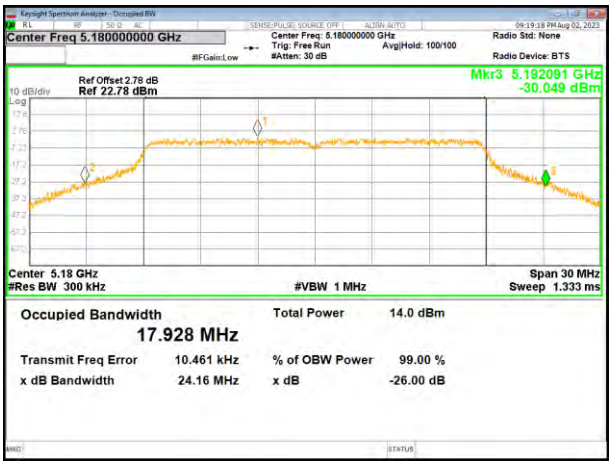
Test CH	99% Occupy Bandwidth (MHz)						Result
	802.11a	802.11n (HT20)	802.11ac (HT20)	802.11n (HT40)	802.11ac (HT40)	802.11ac (HT80)	
Lowest	16.688	17.802	17.839	36.354	36.380	--	Pass
Middle	16.725	17.826	17.851	--	--	74.973	
Highest	16.706	17.824	17.794	36.302	36.345	--	

-26dB Channel Bandwidth Test plot

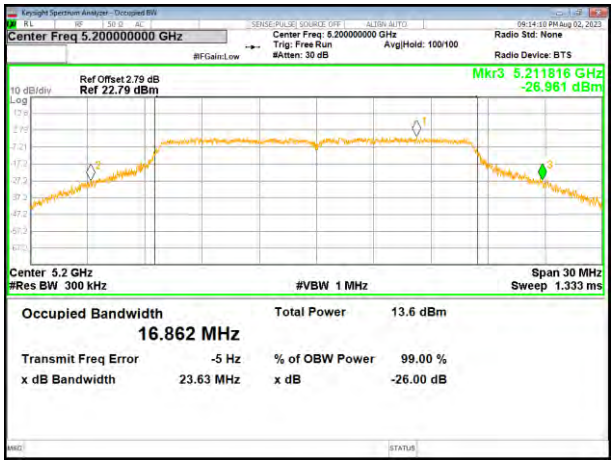
(802.11a) plot on channel 36



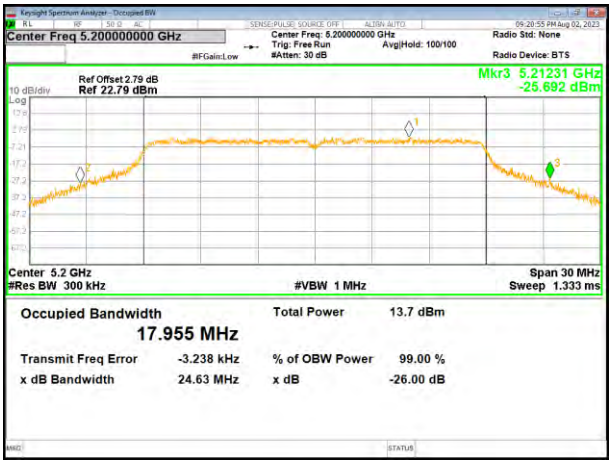
(802.11 n20) plot on channel 36



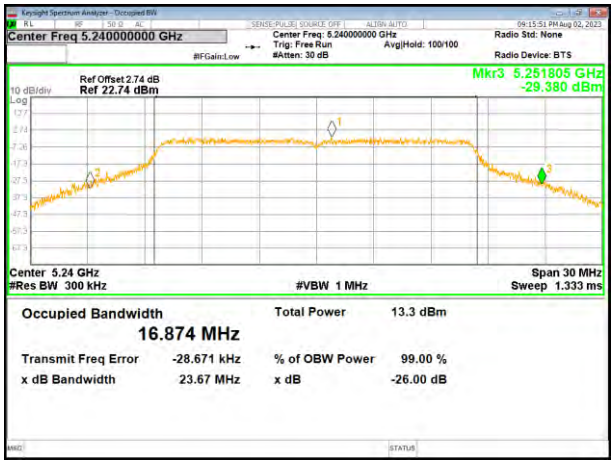
(802.11a) plot on channel 40



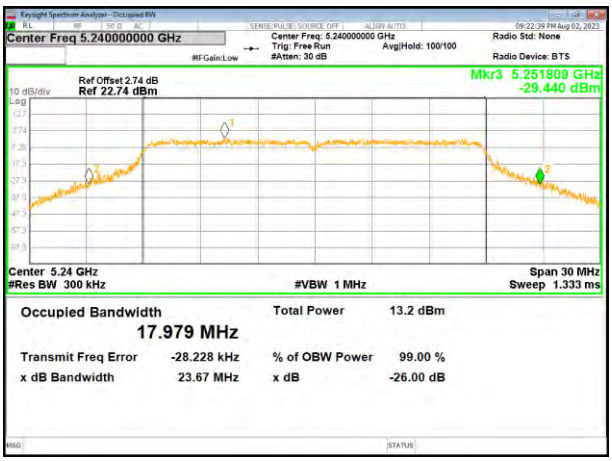
(802.11 n20) plot on channel 40



(802.11a) plot on channel 48



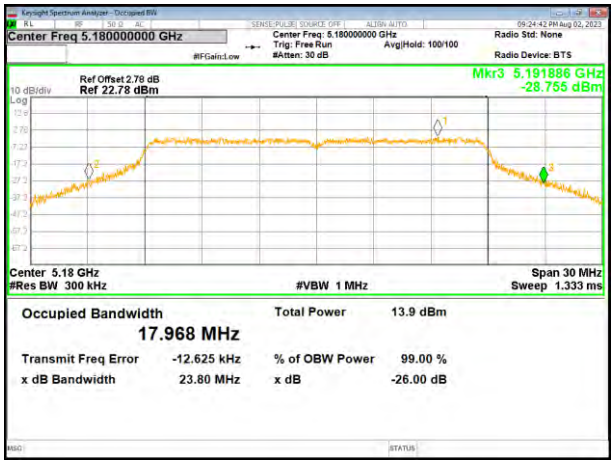
(802.11 n20) plot on channel 48



Test plot

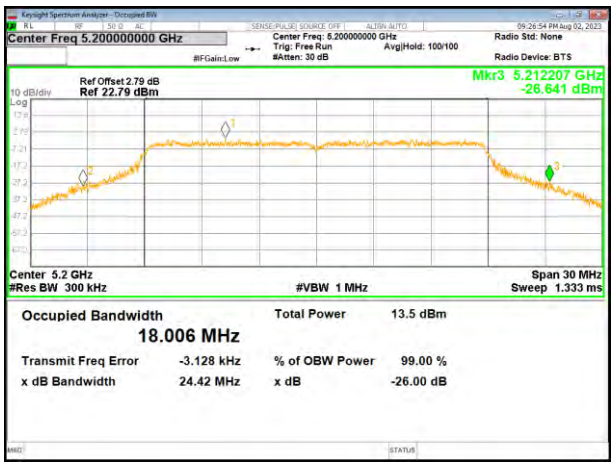
(802.11ac20) plot on channel 36

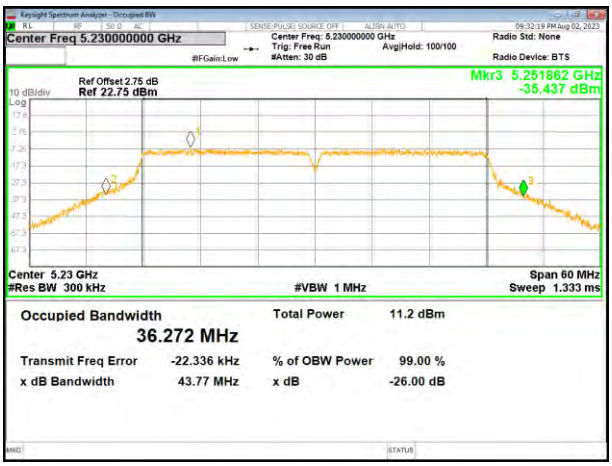
(802.11 n40) plot on channel 38



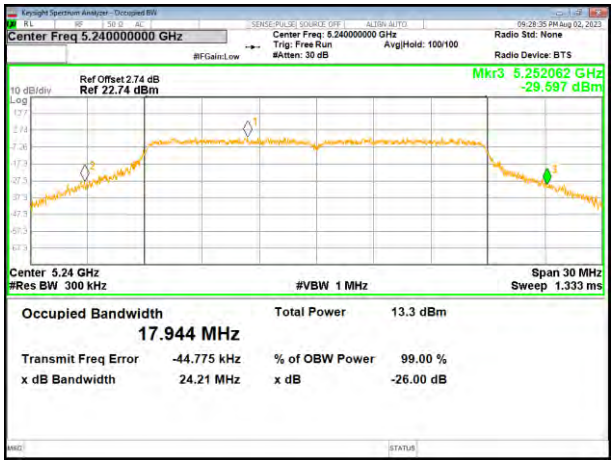
(802.11ac20) plot on channel 40

(802.11 n40) plot on channel 46





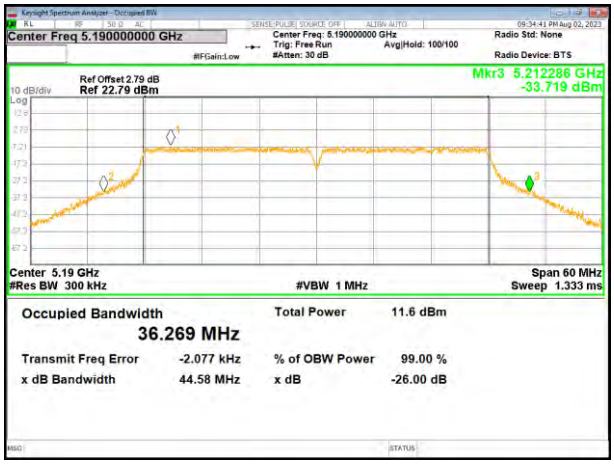
(802.11ac20) plot on channel 48

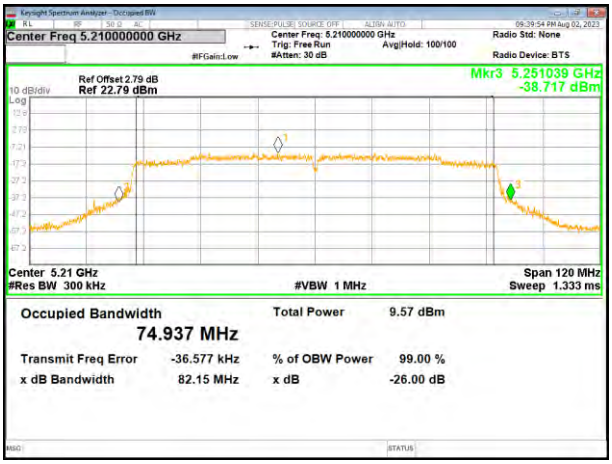


Test plot

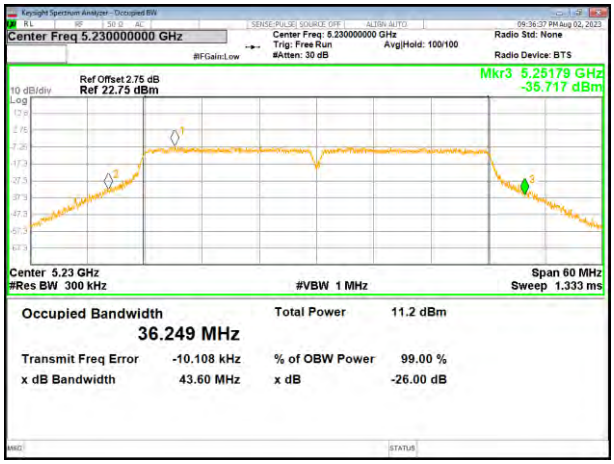
(802.11ac40) plot on channel 38

(802.11ac80) plot on channel 42





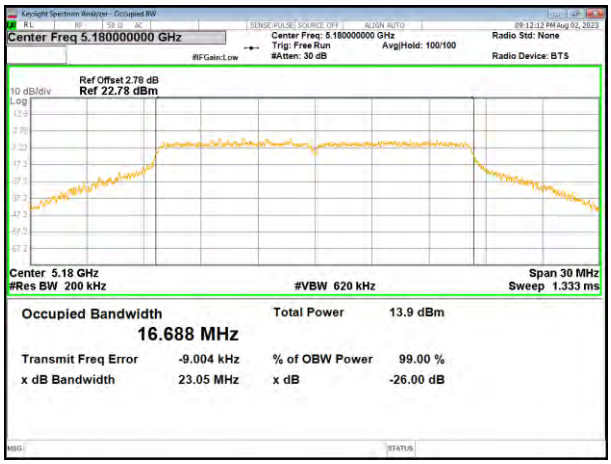
(802.11ac40) plot on channel 46



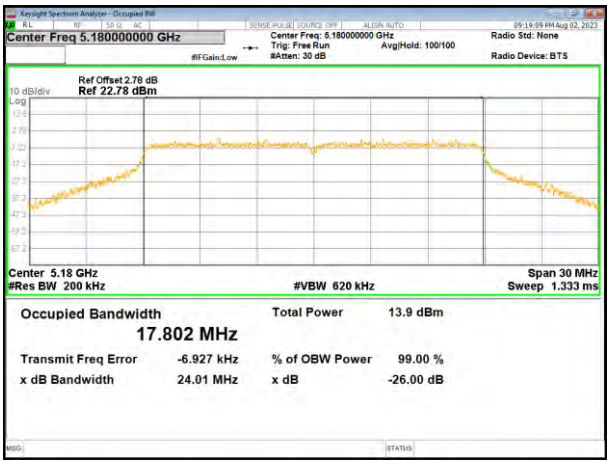
99% Occupy Bandwidth Test plot

(802.11a) plot on channel 36

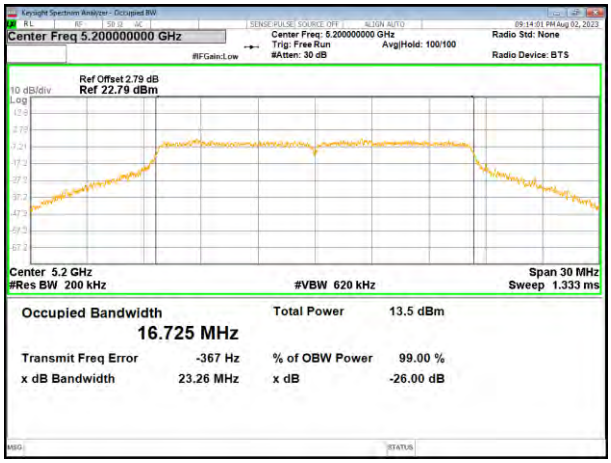
(802.11 n20) plot on channel 36



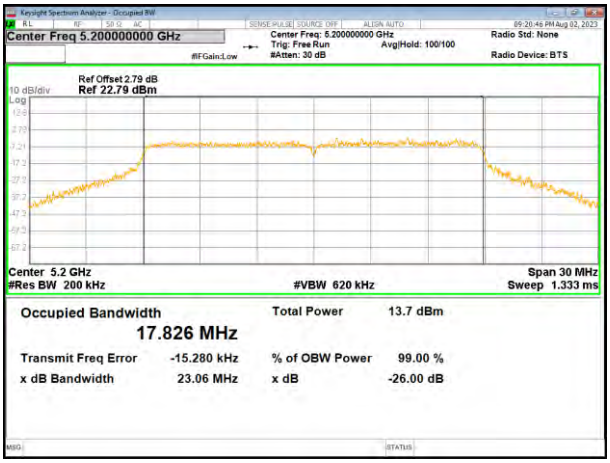
(802.11a) plot on channel 40



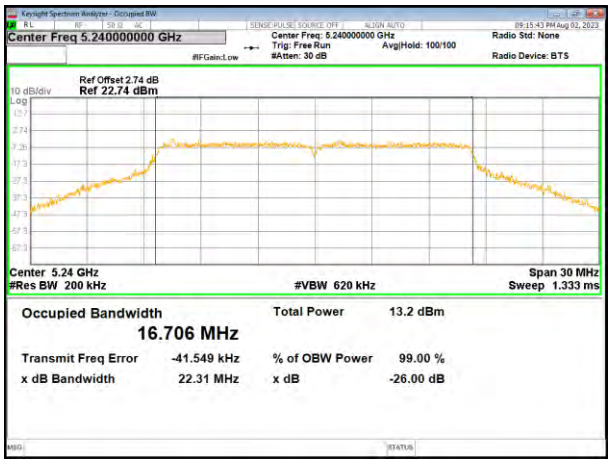
(802.11 n20) plot on channel 40

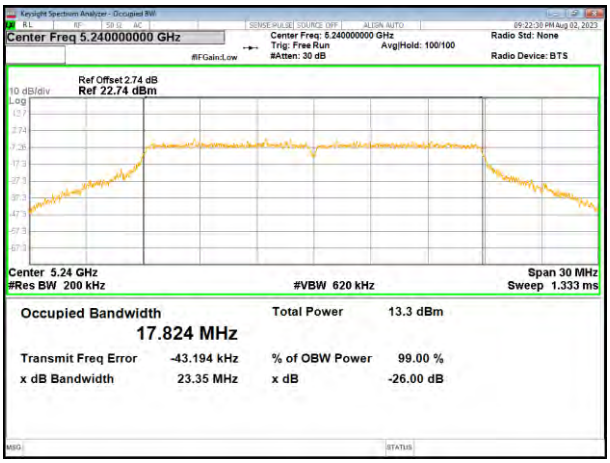


(802.11a) plot on channel 48



(802.11 n20) plot on channel 48

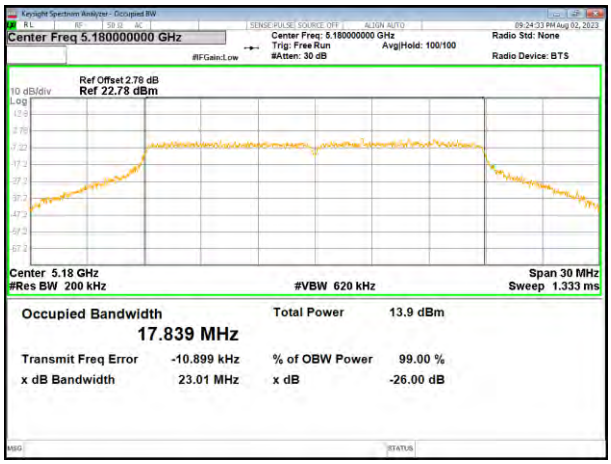




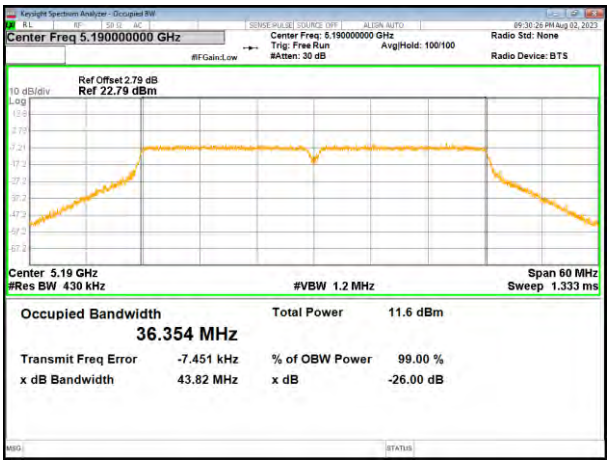
Test plot

(802.11ac20) plot on channel 36

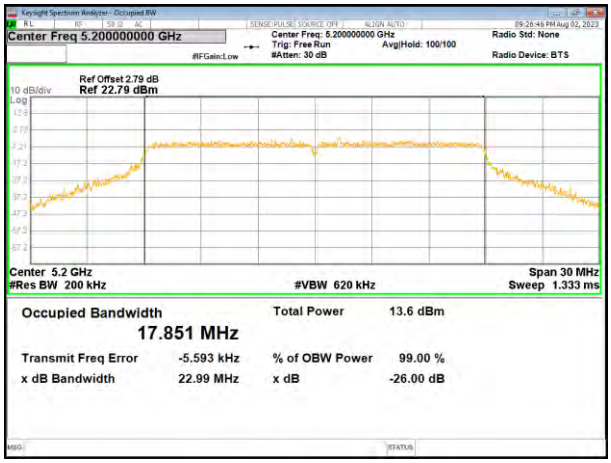
(802.11 n40) plot on channel 38



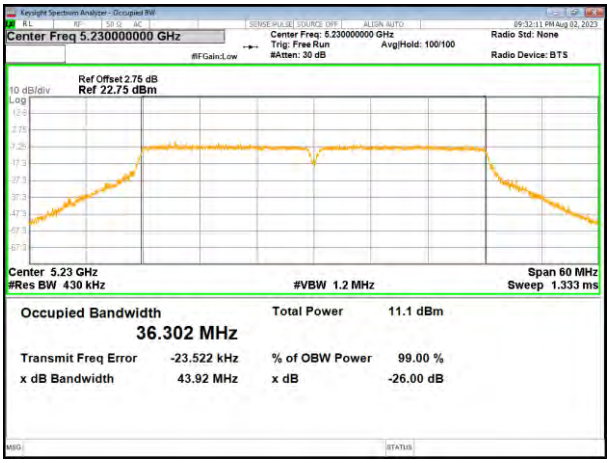
(802.11ac20) plot on channel 40

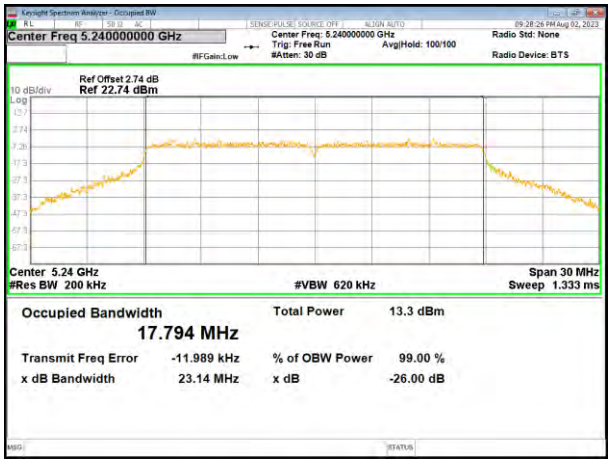


(802.11 n40) plot on channel 46



(802.11ac20) plot on channel 48



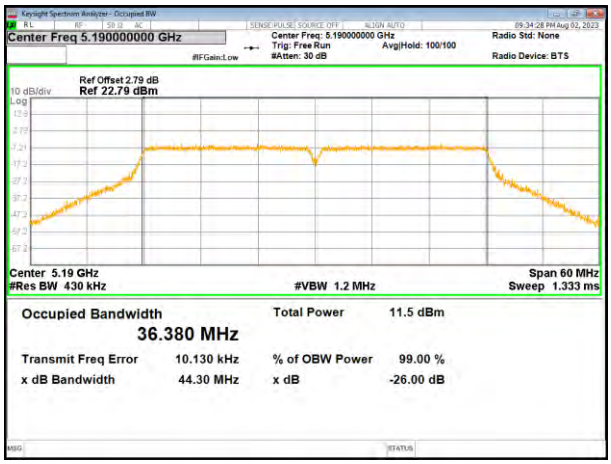


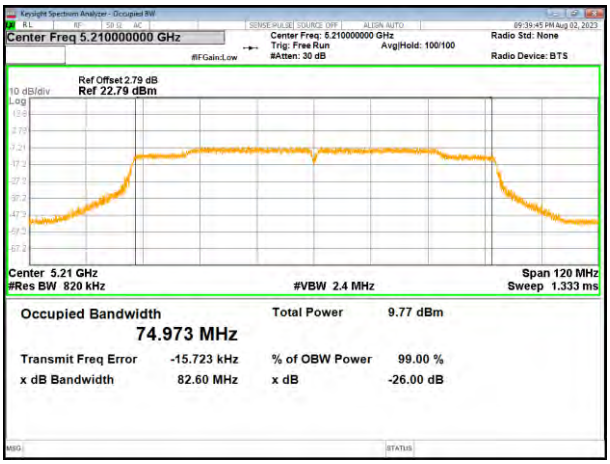
(802.11ac20) plot on channel 48

Test plot

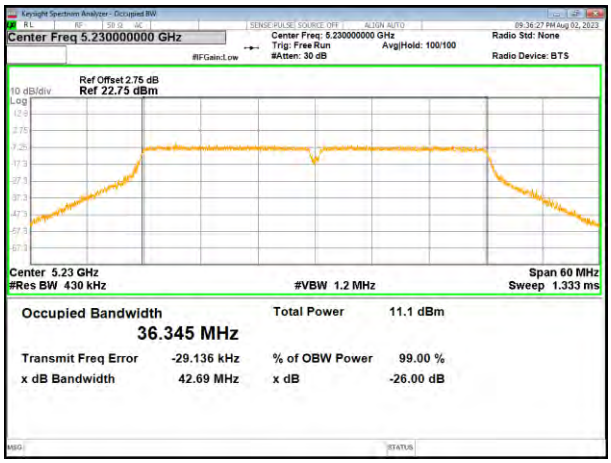
(802.11ac40) plot on channel 38

(802.11ac80) plot on channel 42





(802.11ac40) plot on channel 46



5745-5825MHz

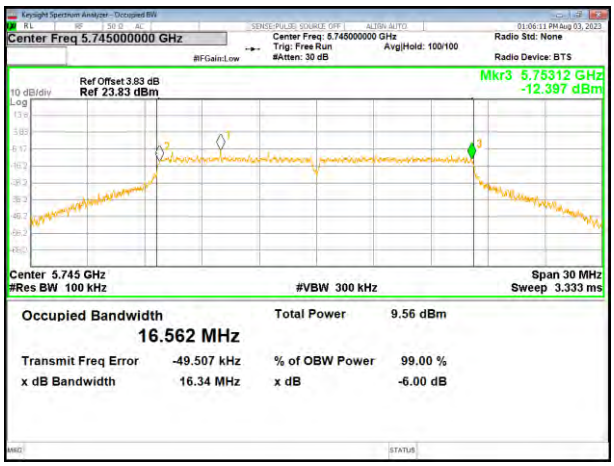
Test CH	-6dB Channel Bandwidth (MHz)						Limit (KHz)	Result
	802.11a	802.11n (HT20)	802.11ac (HT20)	802.11n (HT40)	802.11ac (HT40)	802.11ac (HT80)		
Lowest	16.34	17.56	17.56	36.31	36.28	--	>500	Pass
Middle	16.30	17.56	17.55	--	--	75.09		
Highest	16.32	17.29	17.58	36.31	36.30	--		

Test CH	99% Occupy Bandwidth (MHz)						Limit (KHz)	Result
	802.11a	802.11n (HT20)	802.11ac (HT20)	802.11n (HT40)	802.11ac (HT40)	802.11ac (HT80)		
Lowest	16.721	17.852	17.843	36.400	36.380	--	/	Pass
Middle	16.678	17.835	17.847	--	--	75.028		
Highest	16.672	17.823	17.813	36.341	36.351	--		

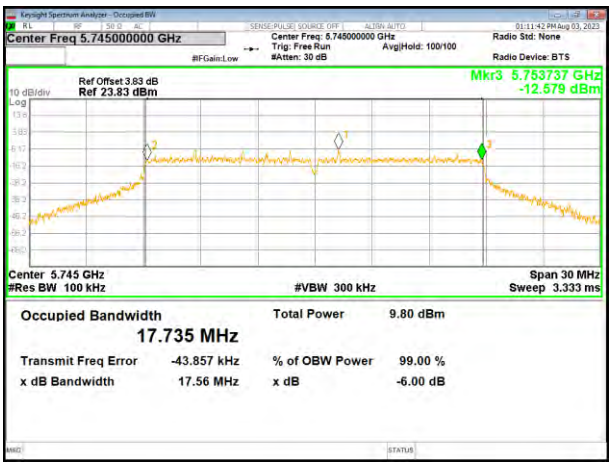
Remark: “---“is not applicable

-6dB Channel Bandwidth Test plot

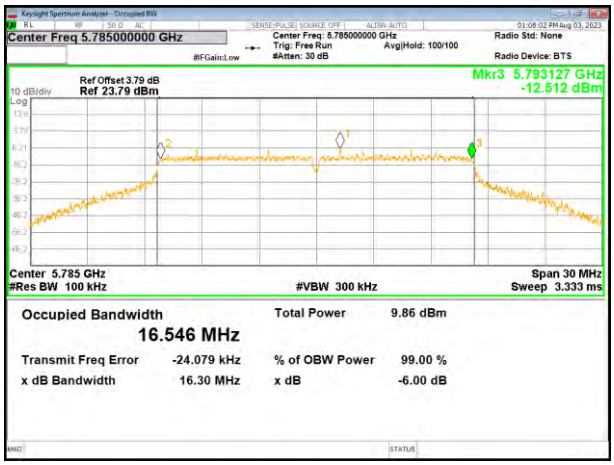
(802.11a) plot on channel 149



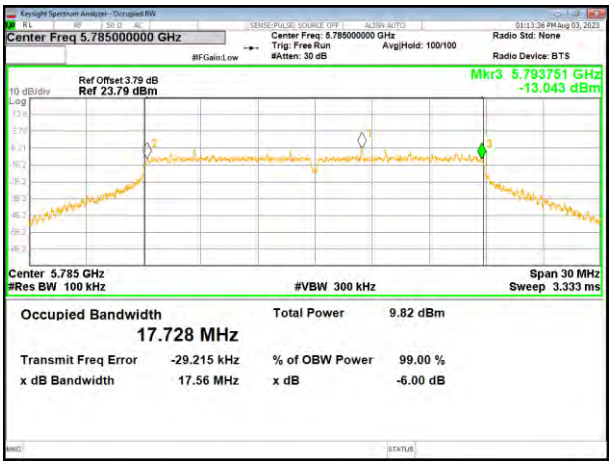
(802.11 n20) plot on channel 149



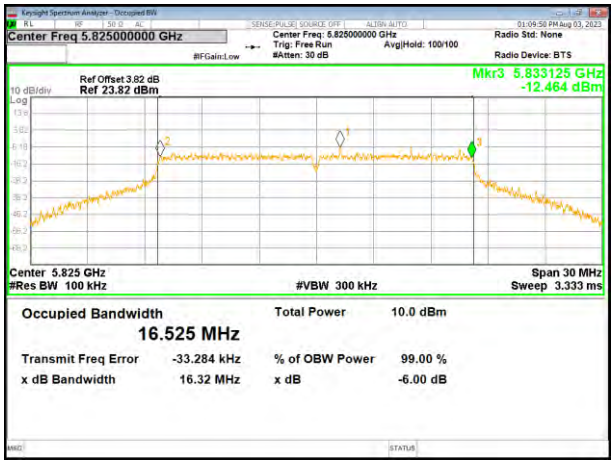
(802.11a) plot on channel 157



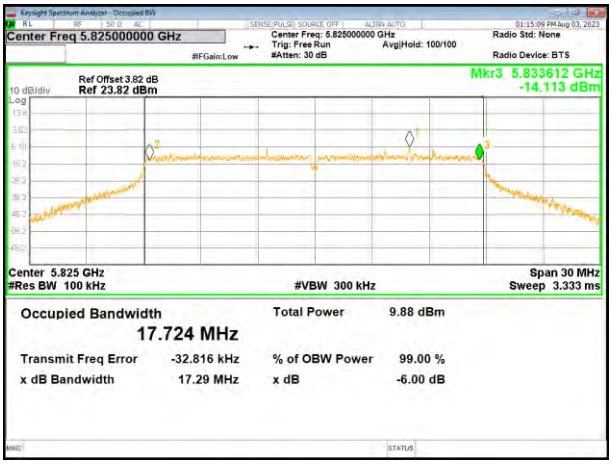
(802.11 n20) plot on channel 157



(802.11a) plot on channel 165

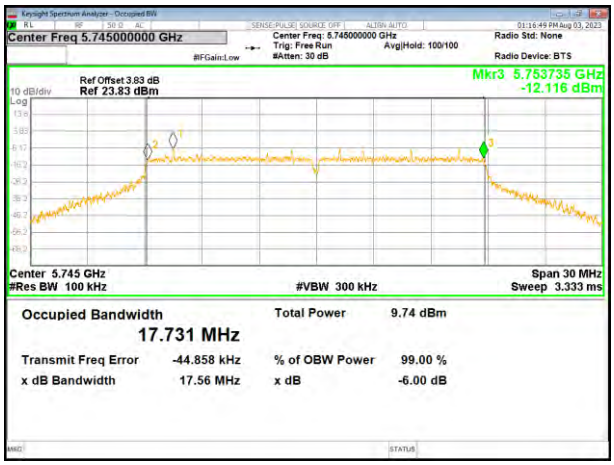


(802.11 n20) plot on channel 165

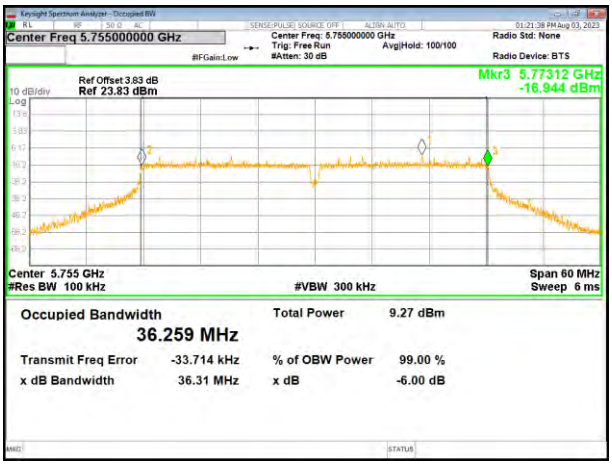


Test plot

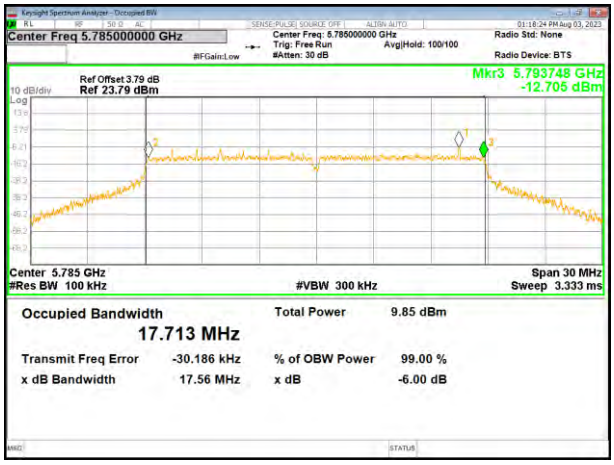
(802.11ac20) plot on channel 149



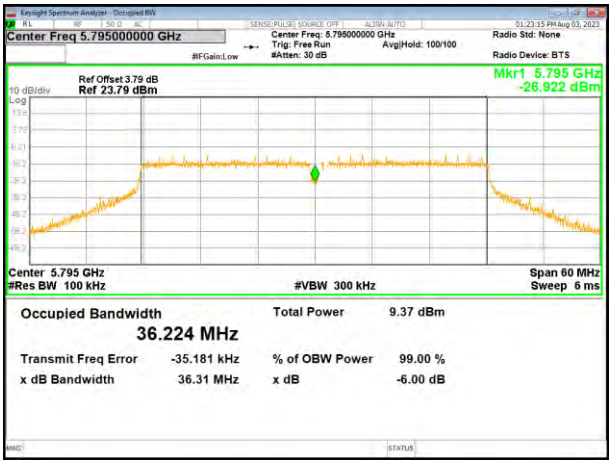
(802.11 n40) plot on channel 151



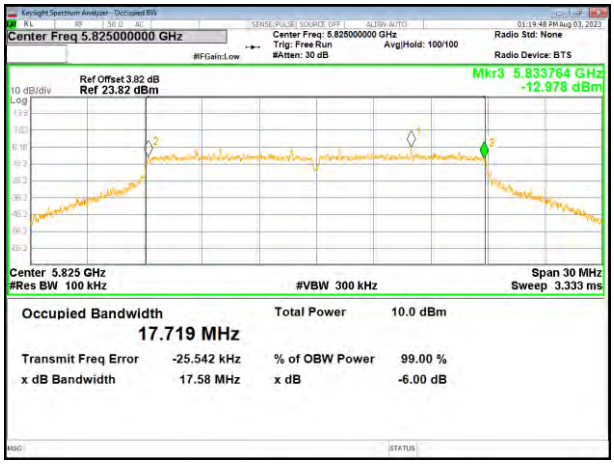
(802.11ac20) plot on channel 157



(802.11 n40) plot on channel 159

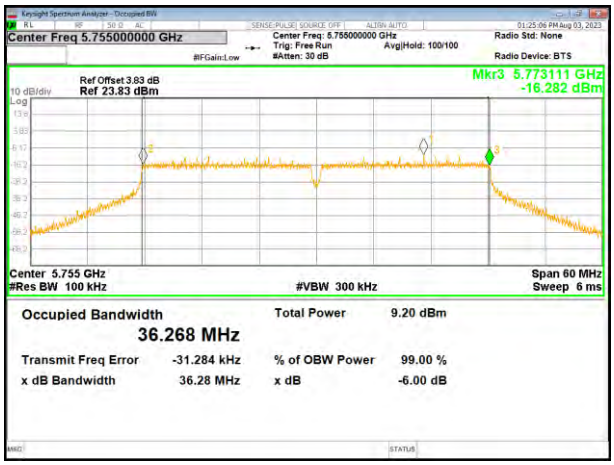


(802.11ac20) plot on channel 165

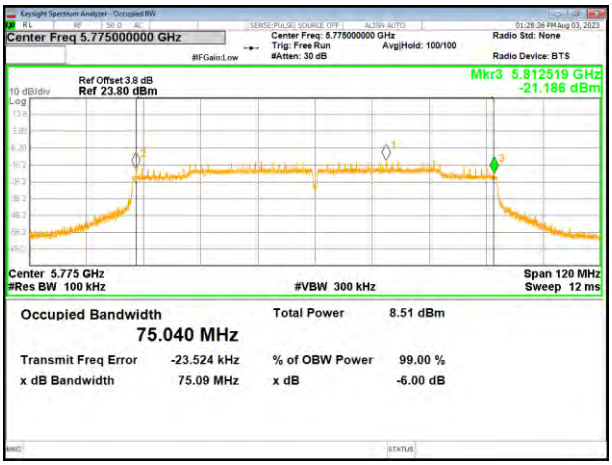


Test plot

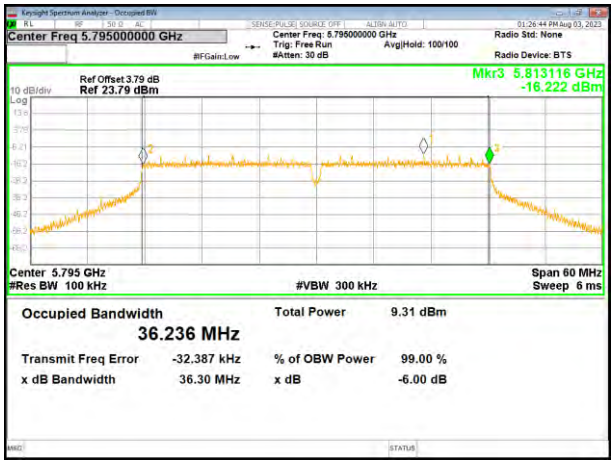
(802.11 ac40) plot on channel 151



(802.11 ac80) plot on channel 155

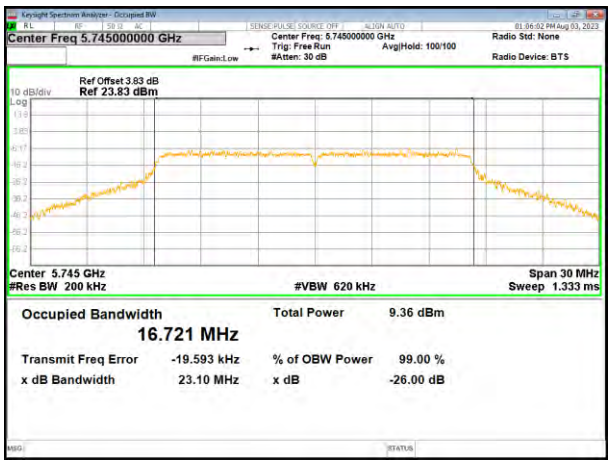


(802.11 ac40) plot on channel 159

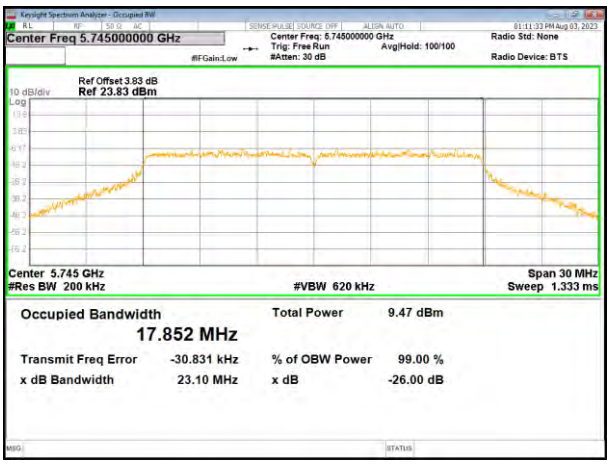


99% Occupy Bandwidth Test plot

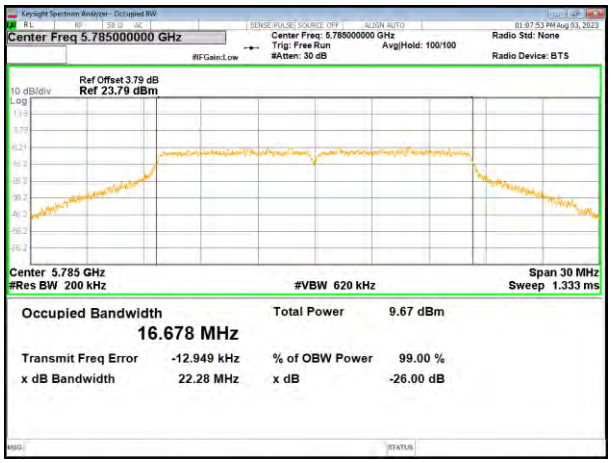
(802.11a) plot on channel 149



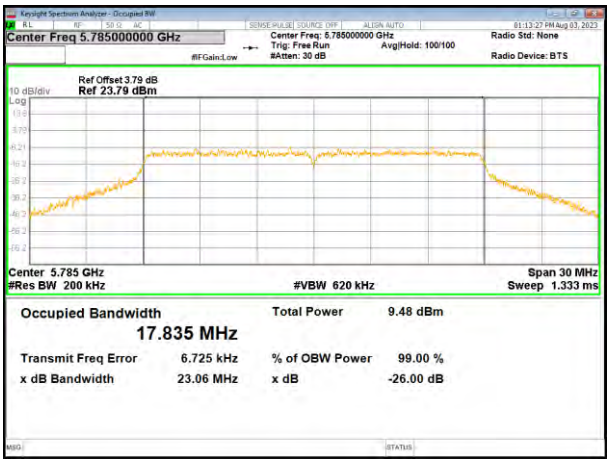
(802.11 n20) plot on channel 149



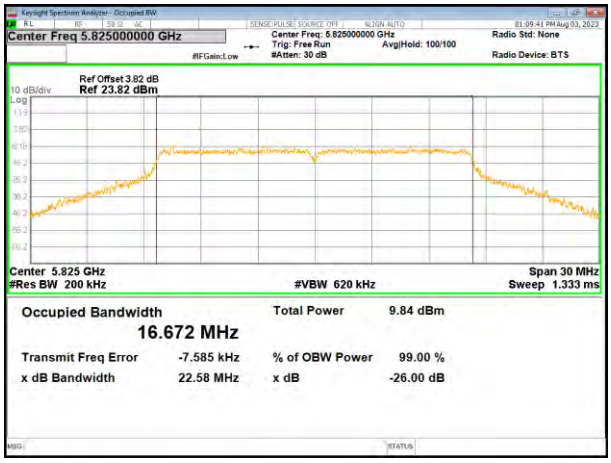
(802.11a) plot on channel 157



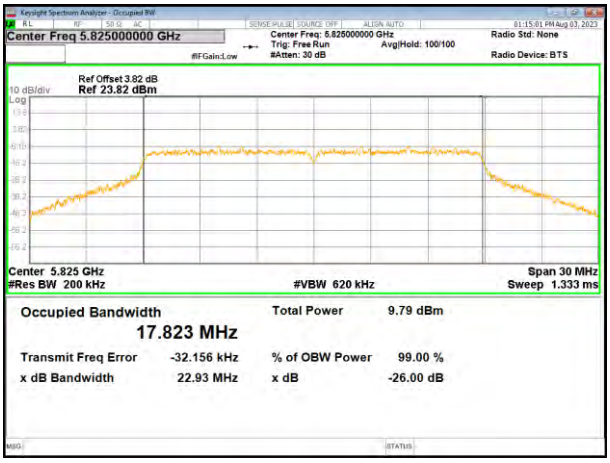
(802.11 n20) plot on channel 157



(802.11a) plot on channel 165

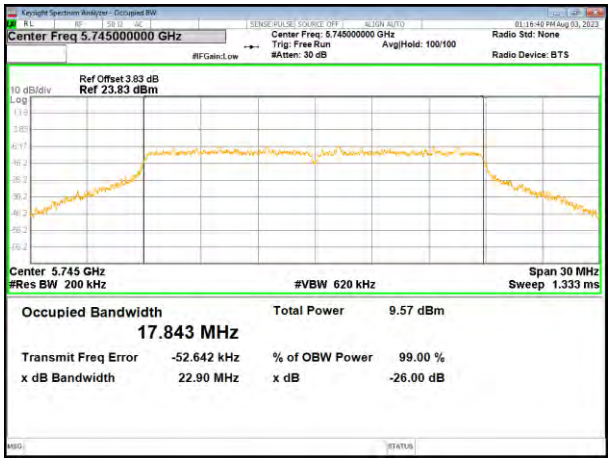


(802.11 n20) plot on channel 165

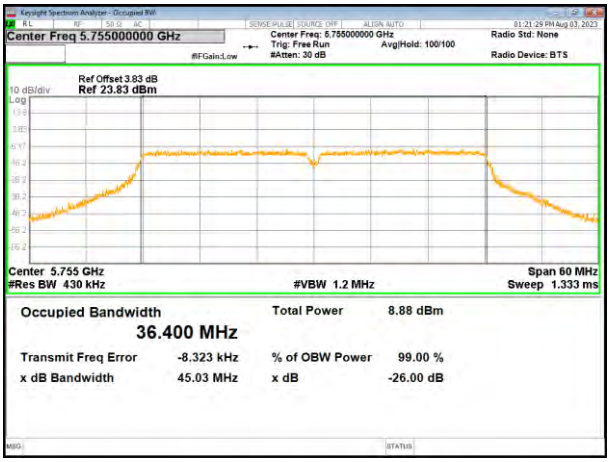


Test plot

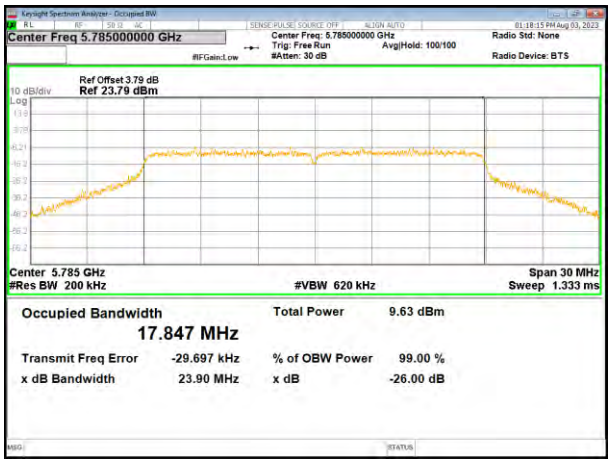
(802.11ac20) plot on channel 149



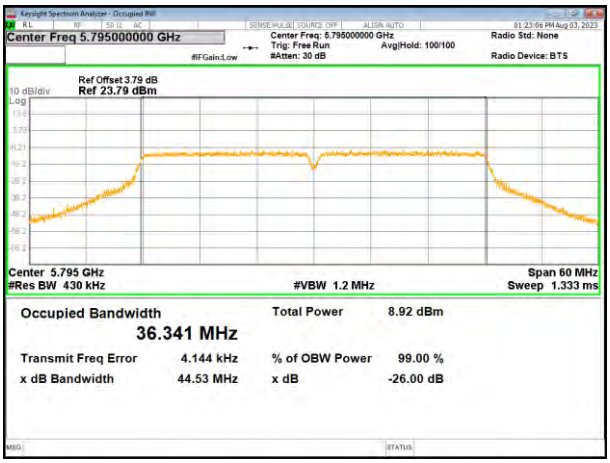
(802.11 n40) plot on channel 151



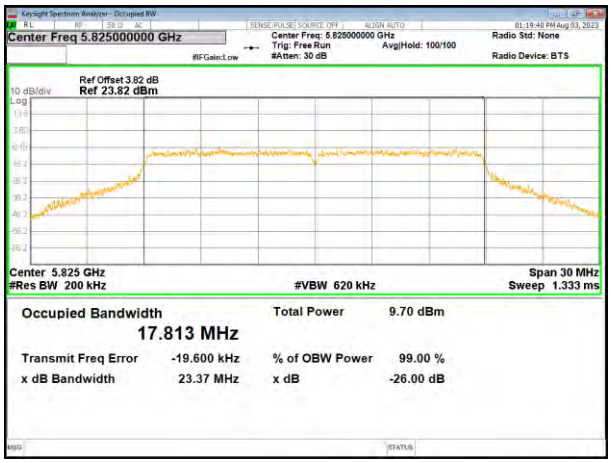
(802.11ac20) plot on channel 157



(802.11 n40) plot on channel 159

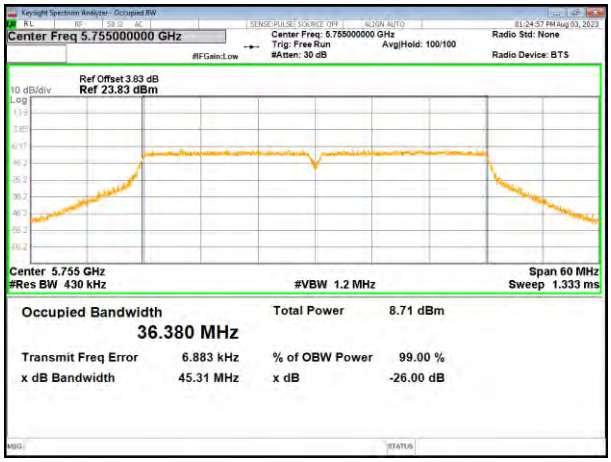


(802.11ac20) plot on channel 165

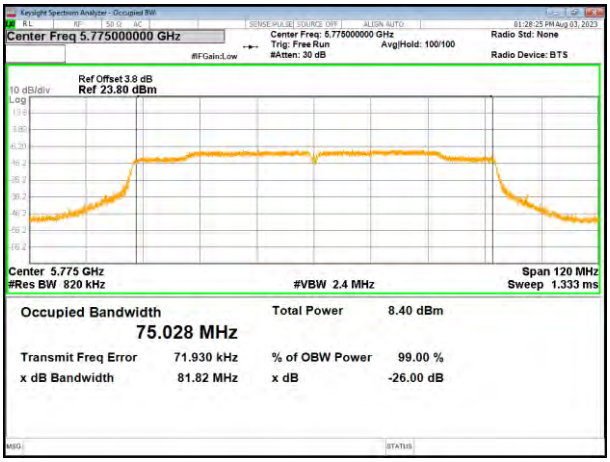


Test plot

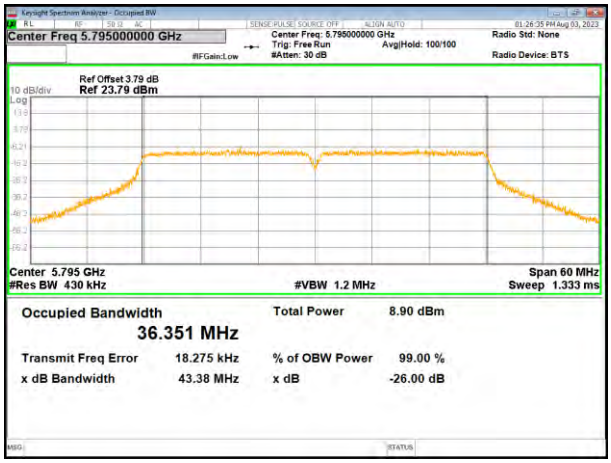
(802.11 ac40) plot on channel 151



(802.11 ac80) plot on channel 155



(802.11 ac40) plot on channel 159

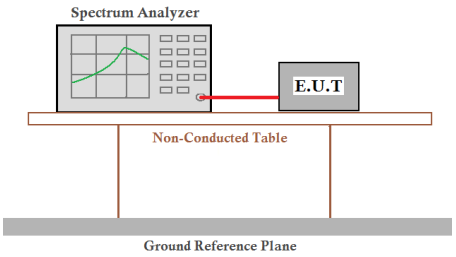


4.5 Power Spectral Density

Test Requirement:	FCC Part15 E Section 15.407(a)(1)/ (a)(3), RSS-247 §6.2.1.1&6.2.4.1
Test Method:	ANSI C63.10:2013 and KDB 789033 D02 General U-NII Test Procedures New Rules v02r01, RSS-Gen
Limit:	

Frequency band (MHz)	Limit
5150-5250	≤17dBm/1MHz for master device
	≤11dBm/1MHz for client device e.i.r.p. spectral density≤10dBm/1MHz
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.: 24.6°C	Humid.: 52%RH
Test voltage:	DC 7.6V	
Test results:	Pass	

Measurement Result

Duty cycle

Mode	Frequency	Duty cycle	Duty Fator
802.11 a	5180 MHz	100	0
	5200 MHz	100	0
	5240 MHz	100	0
802.11 n20	5180 MHz	100	0
	5200 MHz	100	0
	5240 MHz	100	0
802.11 ac20	5180 MHz	100	0
	5200 MHz	100	0
	5240 MHz	100	0
802.11 n40	5190 MHz	100	0
	5230 MHz	100	0
802.11 ac40	5190 MHz	100	0
	5230 MHz	100	0
802.11 ac80	5210 MHz	100	0

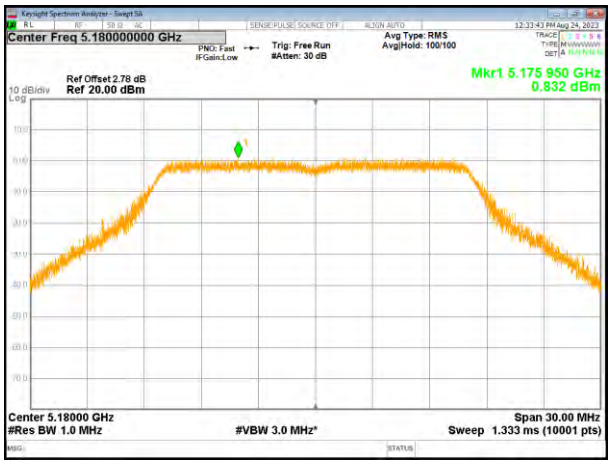
5180-5240MHz

Mode	Frequency	Measured Power Density (dBm/MHz)	Duty Fator	Power Density (dBm/MHz)	Limit (dBm/MHz)
802.11 a	5180 MHz	0.832	0	0.832	11
	5200 MHz	0.926	0	0.926	11
	5240 MHz	0.434	0	0.434	11
802.11 n20	5180 MHz	0.888	0	0.888	11
	5200 MHz	0.120	0	0.120	11
	5240 MHz	0.164	0	0.164	11
802.11 ac20	5180 MHz	0.778	0	0.778	11
	5200 MHz	0.781	0	0.781	11
	5240 MHz	0.180	0	0.180	11
802.11 n40	5190 MHz	-2.706	0	-2.706	11
	5230 MHz	-3.028	0	-3.028	11
802.11 ac40	5190 MHz	-2.272	0	-2.272	11
	5230 MHz	-3.178	0	-3.178	11
802.11 ac80	5210 MHz	-7.281	0	-7.281	11

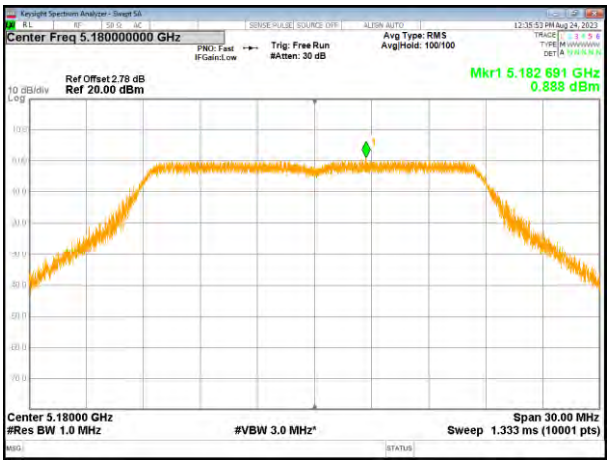
Mode	Frequency	Power Density (dBm/MHz)	ANT Gain(dBi)	e.i.r.p. spectral density	Limit (dBm/MHz)
802.11 a	5180 MHz	0.832	2.75	3.582	10
	5200 MHz	0.926	2.75	3.676	10
	5240 MHz	0.434	2.75	3.184	10
802.11 n20	5180 MHz	0.888	2.75	3.638	10
	5200 MHz	0.120	2.75	2.870	10
	5240 MHz	0.164	2.75	2.914	10
802.11 ac20	5180 MHz	0.778	2.75	3.528	10
	5200 MHz	0.781	2.75	3.531	10
	5240 MHz	0.180	2.75	2.930	10
802.11 n40	5190 MHz	-2.706	2.75	0.044	10
	5230 MHz	-3.028	2.75	-0.278	10
802.11ac40	5190 MHz	-2.272	2.75	0.478	10
	5230 MHz	-3.178	2.75	-0.428	10
802.11 ac80	5210 MHz	-7.281	2.75	-4.531	10

(802.11a) PSD plot on channel 36

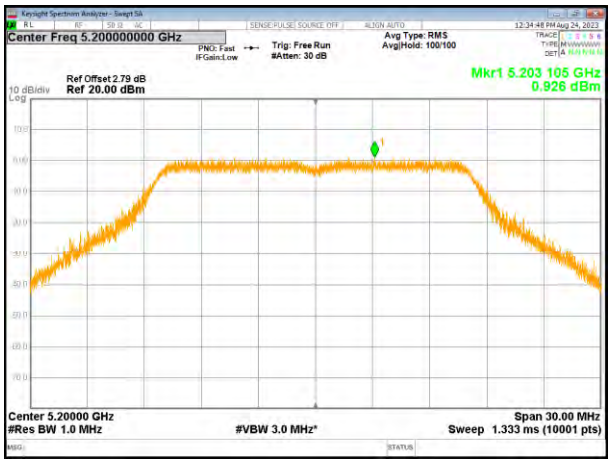
(802.11n20) PSD plot on channel 36



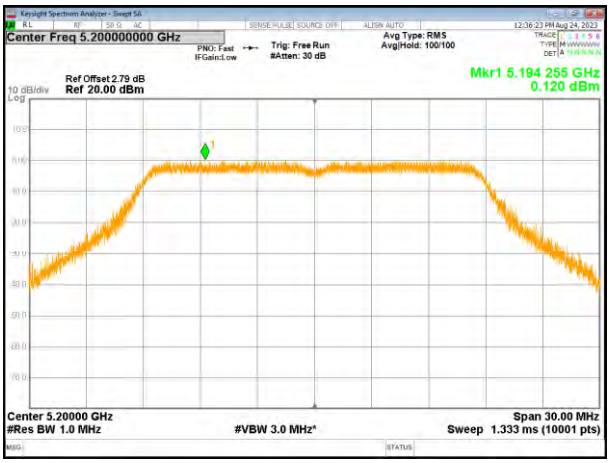
(802.11a) PSD plot on channel 40



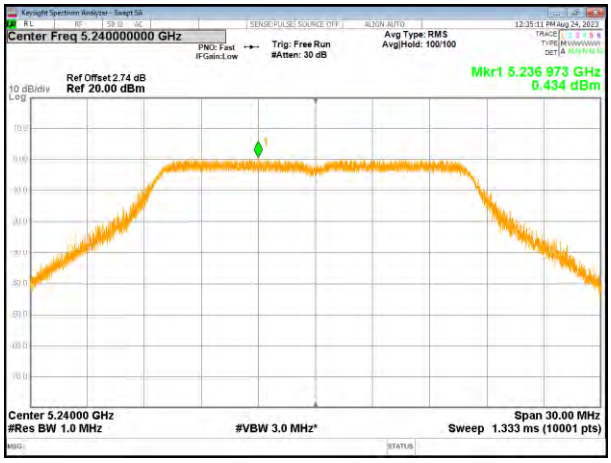
(802.11n20) PSD plot on channel 40



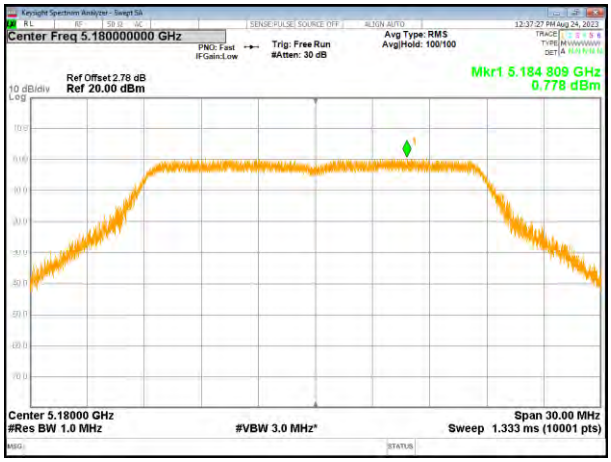
(802.11a) PSD plot on channel 48



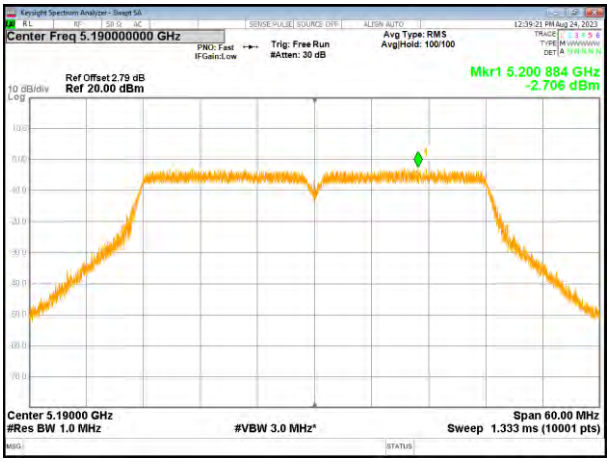
(802.11n20) PSD plot on channel 48



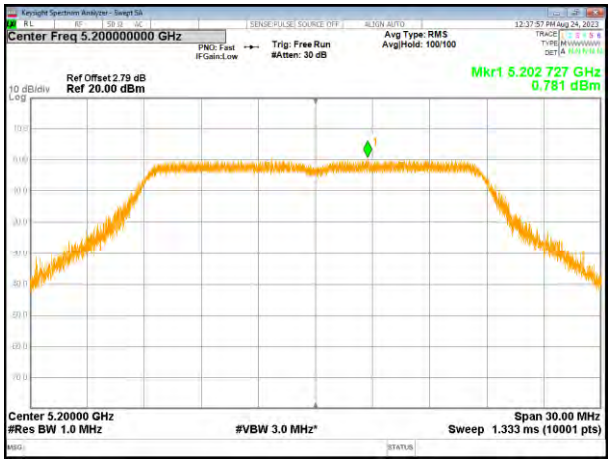
(802.11ac20) PSD plot on channel 36



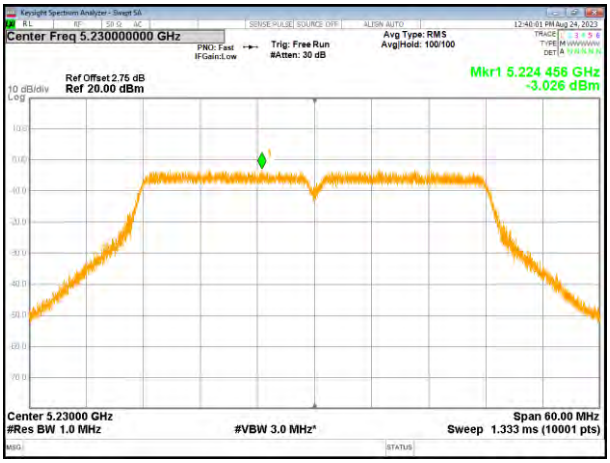
(802.11n40) PSD plot on channel 38



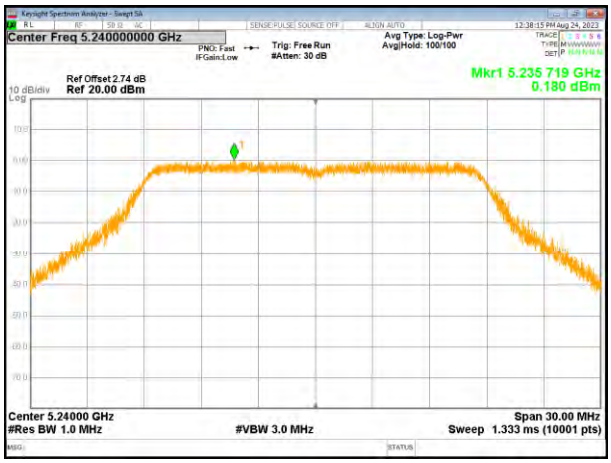
(802.11ac20) PSD plot on channel 40



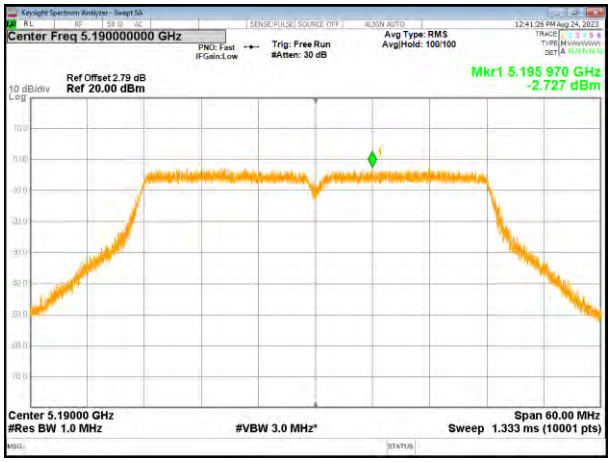
(802.11n40) PSD plot on channel 46



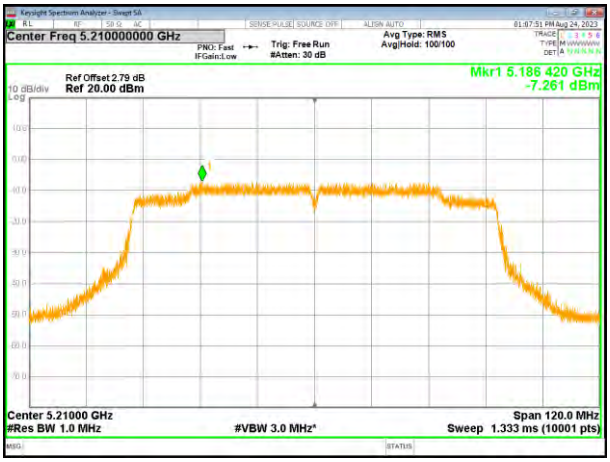
(802.11ac20) PSD plot on channel 48



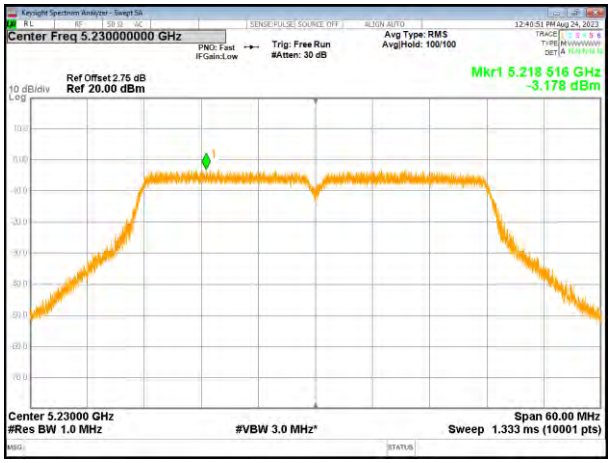
(802.11ac40) PSD plot on channel 38



(802.11ac80) PSD plot on channel 42



(802.11ac40) PSD plot on channel 46

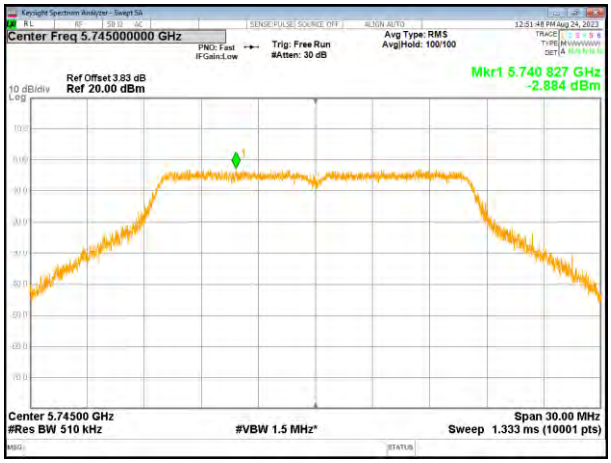


Mode	Frequency	Duty cycle	Duty factor
802.11 a	5745 MHz	100%	0
	5785 MHz	100%	0
	5825 MHz	100%	0
802.11 n20	5745 MHz	100%	0
	5785 MHz	100%	0
	5825 MHz	100%	0
802.11 ac20	5745 MHz	100%	0
	5785 MHz	100%	0
	5825 MHz	100%	0
802.11 n40	5755 MHz	100%	0
	5795 MHz	100%	0
802.11 ac40	5755 MHz	100%	0
	5795 MHz	100%	0
802.11 AC80	5775 MHz	100%	0

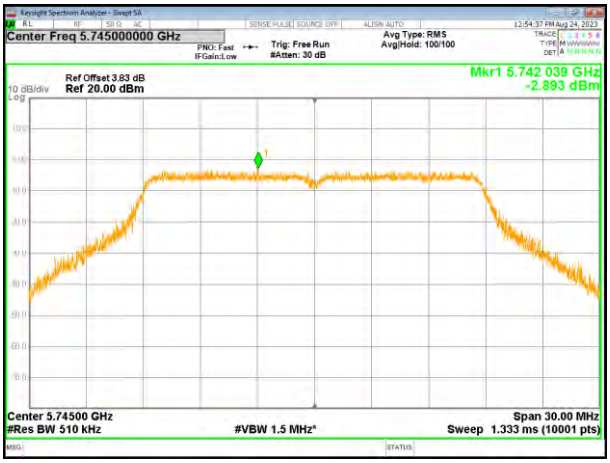
Mode	Frequency	Measured Power Density (dBm/510KHz)	Duty factor	Power Density (dBm/510KHz)	Power Density (dBm/500KHz)	Limit (dBm/MHz)
802.11 a	5745 MHz	-2.884	0	-2.884	-2.970	30
	5785 MHz	-2.813	0	-2.813	-2.899	30
	5825 MHz	-1.008	0	-1.008	-1.094	30
802.11 n20	5745 MHz	-2.893	0	-2.893	-2.979	30
	5785 MHz	-2.986	0	-2.986	-3.072	30
	5825 MHz	-1.944	0	-1.944	-2.03	30
802.11 ac20	5745 MHz	-2.942	0	-2.942	-3.028	30
	5785 MHz	-1.916	0	-1.916	-2.002	30
	5825 MHz	-2.652	0	-2.652	-2.738	30
802.11 n40	5755 MHz	-6.728	0	-6.728	-6.814	30
	5795 MHz	-6.018	0	-6.018	-6.104	30
802.11 ac40	5755 MHz	-6.390	0	-6.390	-6.476	30
	5795 MHz	-6.023	0	-6.023	-6.109	30
802.11 AC80	5775 MHz	-10.130	0	-10.130	-10.216	30

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

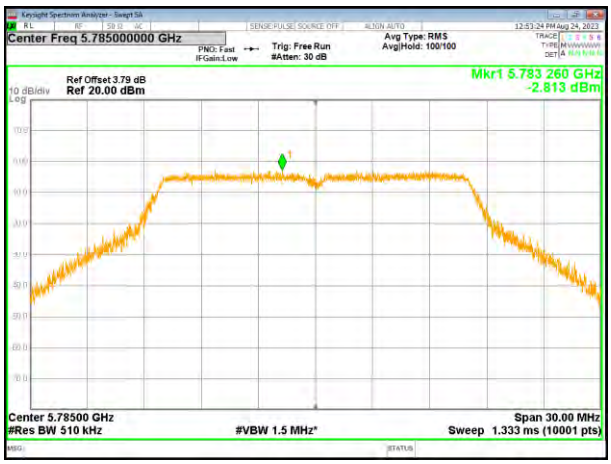
(802.11a) PSD plot on channel 149



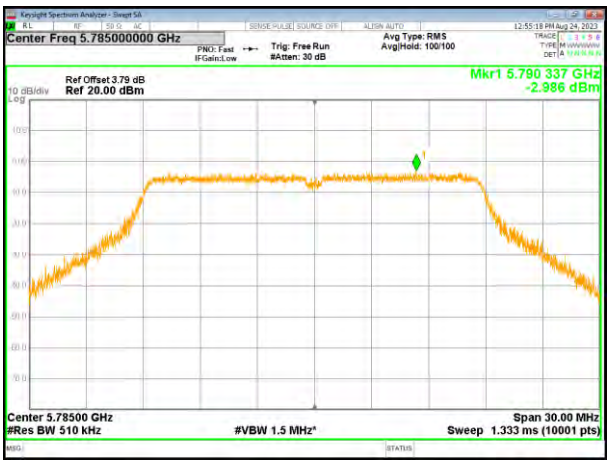
(802.11n20) PSD plot on channel 149



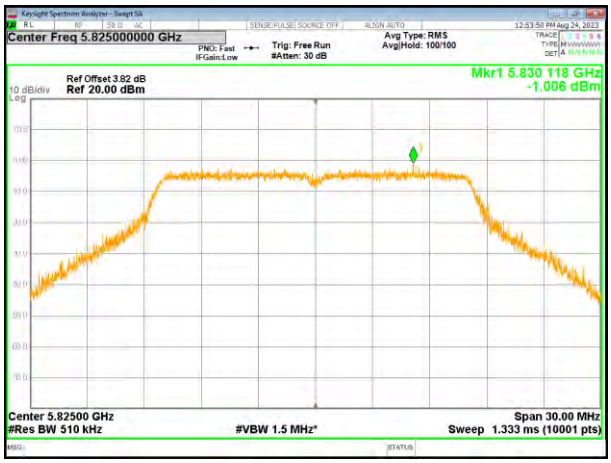
(802.11a) PSD plot on channel 157



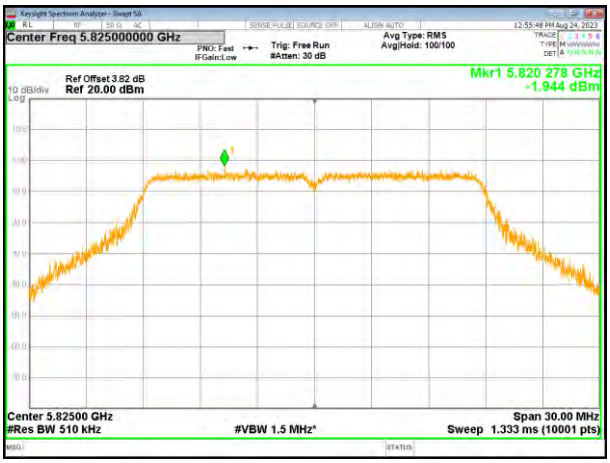
(802.11n20) PSD plot on channel 157



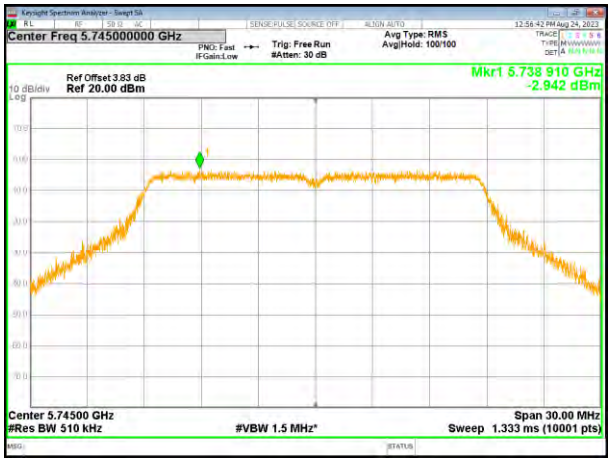
(802.11a) PSD plot on channel 165



(802.11n20) PSD plot on channel 165

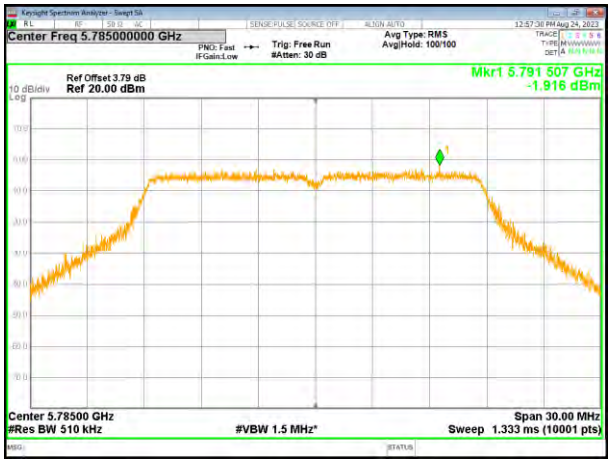


(802.11ac20) PSD plot on channel 149

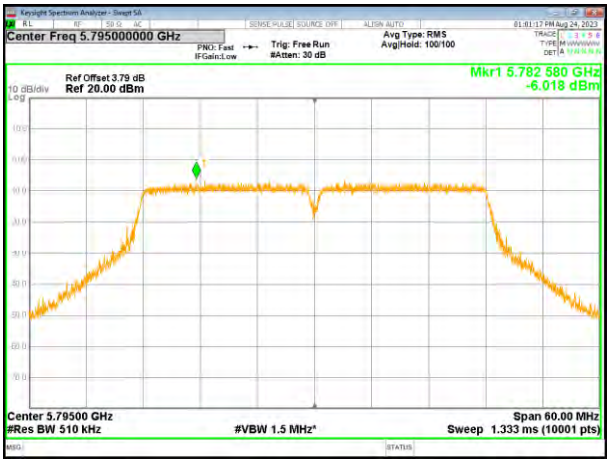


(802.11n40) PSD plot on channel 151

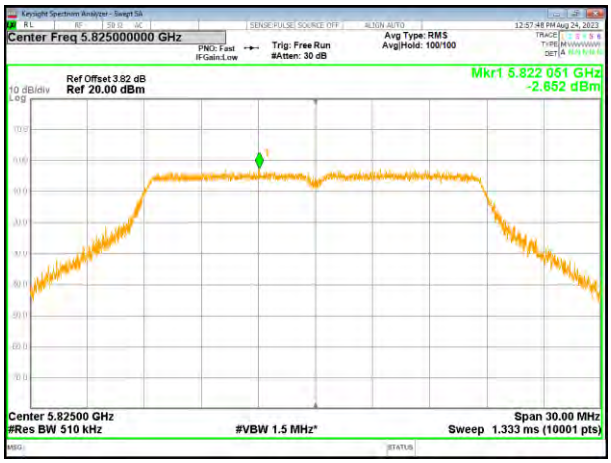
(802.11ac20) PSD plot on channel 157



(802.11n40) PSD plot on channel 159

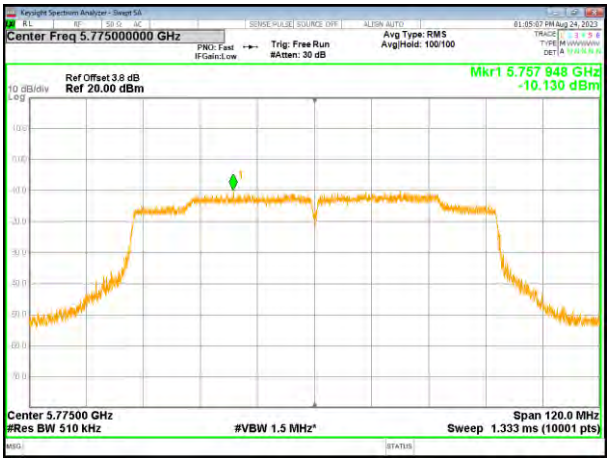


(802.11ac20) PSD plot on channel 165

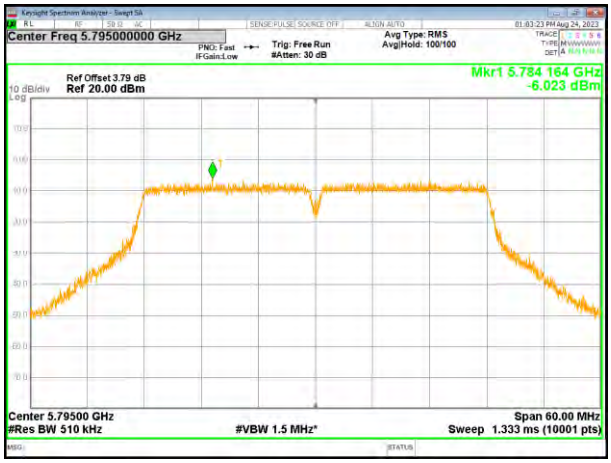


(802.11ac40) PSD plot on channel 151

(802.11ac80) PSD plot on channel 155

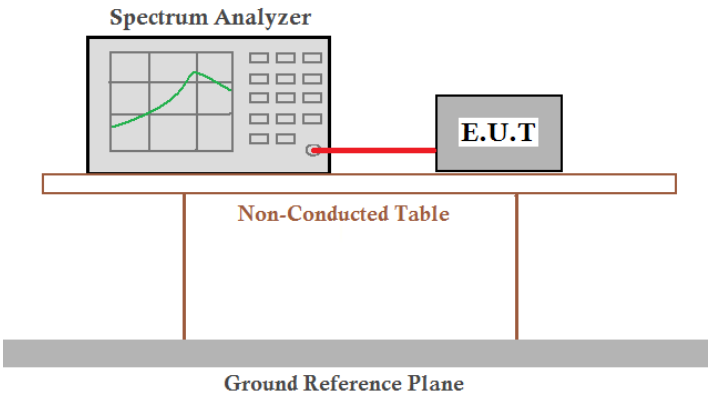


(802.11ac40) PSD plot on channel 159



4.6 Band edge

4.6.1 Conducted test Method

Test Requirement:	FCC Part15 C Section 15.209 and 15.205, RSS-247 §6.2.1.2&6.2.4.2	
Test Method:	ANSI C63.10: 2013, RSS-Gen	
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:		
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.: 24.6°C	Humid.: 52%RH
Test voltage:	DC 7.6V	
Test results:	Pass	

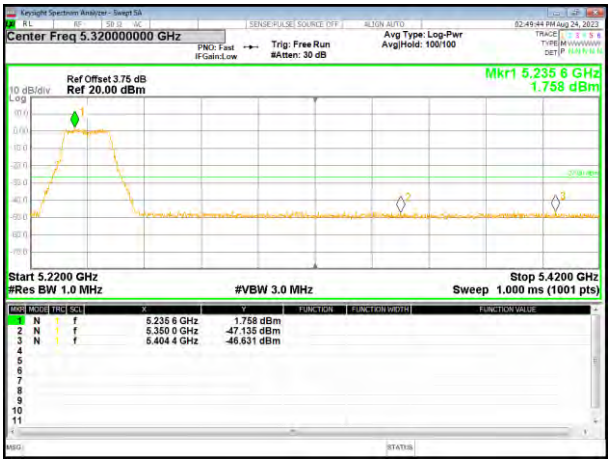
Remark: Antenna gain data included in Offset.

5.180~5.240 GHz

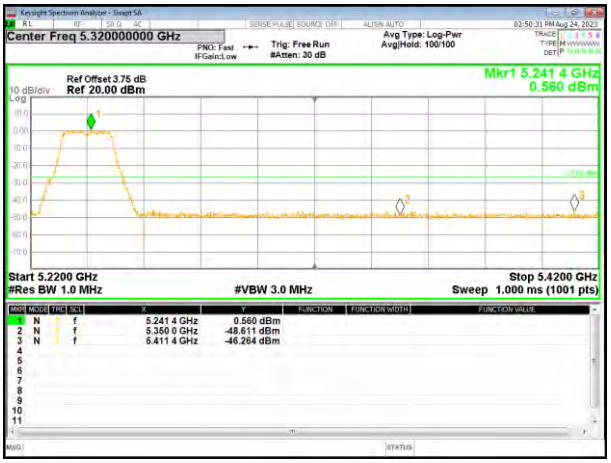
(802.11a) Band Edge, Left Side

(802.11n20) Band Edge, Left Side

(802.11a) Band Edge, Right Side



(802.11n20) Band Edge, Right Side



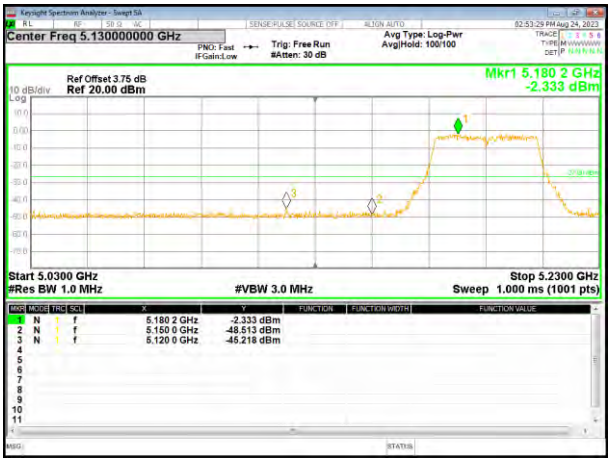
(802.11ac20) Band Edge, Left Side

(802.11n40) Band Edge, Left Side

(802.11ac20) Band Edge, Right Side

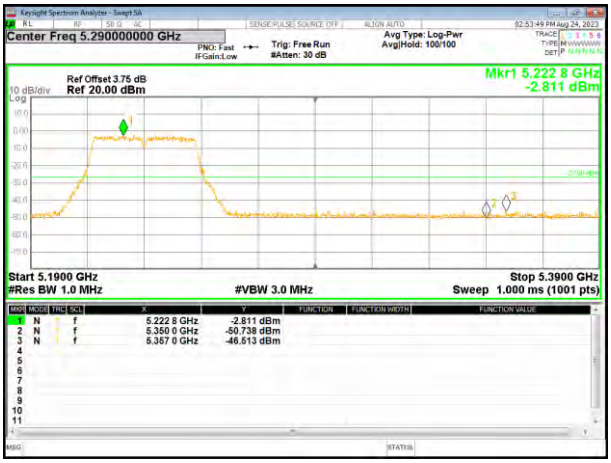
(802.11n40) Band Edge, Right Side

(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

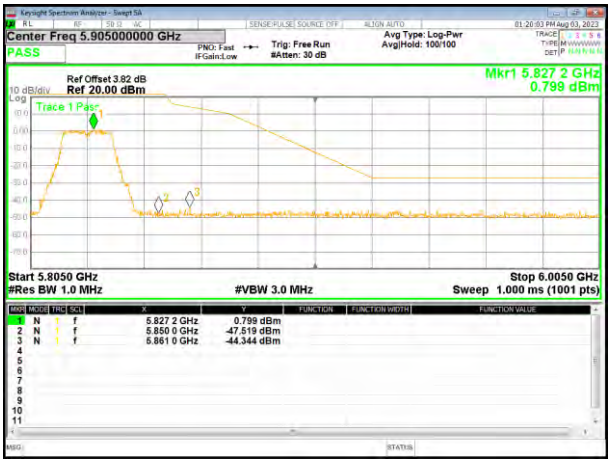
(802.11a) Band Edge, Right Side

(802.11n20) Band Edge, Right Side

(802.11ac20) Band Edge, Left Side

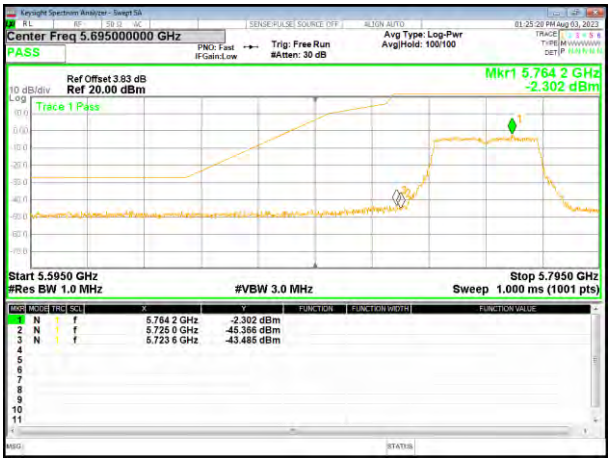
(802.11n40) Band Edge, Left Side

(802.11ac20) Band Edge, Right Side

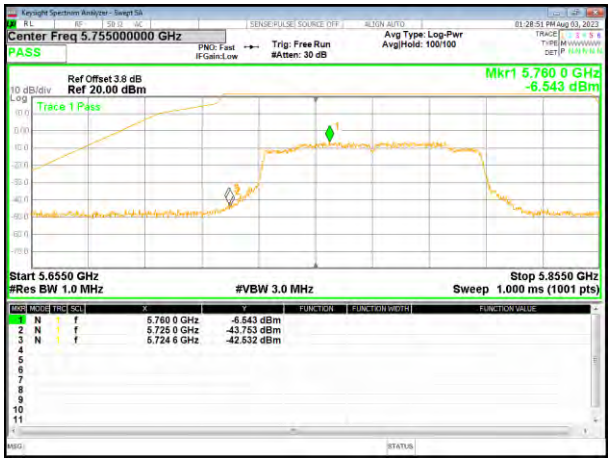


(802.11n40) Band Edge, Right Side

(802.11ac40) Band Edge, Left Side



(802.11ac80) Band Edge



(802.11ac40) Band Edge, Right Side

4.7 Spurious Emission

4.7.1 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209, Part 15E Section 15.407(b)(4) RSS-247 §6.2.1.2&6.2.4.2
Test Method:	ANSI C63.10:2013 , RSS-Gen
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

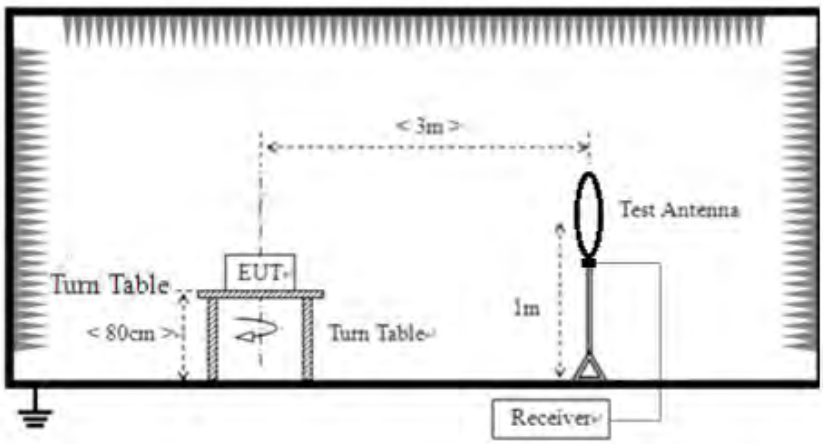
Limit:

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	

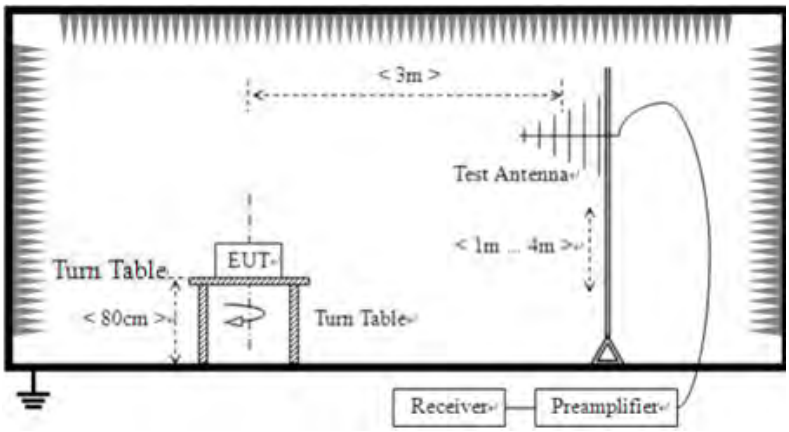
Frequency	Limit (dBm/MHz)	Remark
Above 1GHz	-27.0	Peak Value

Test setup:

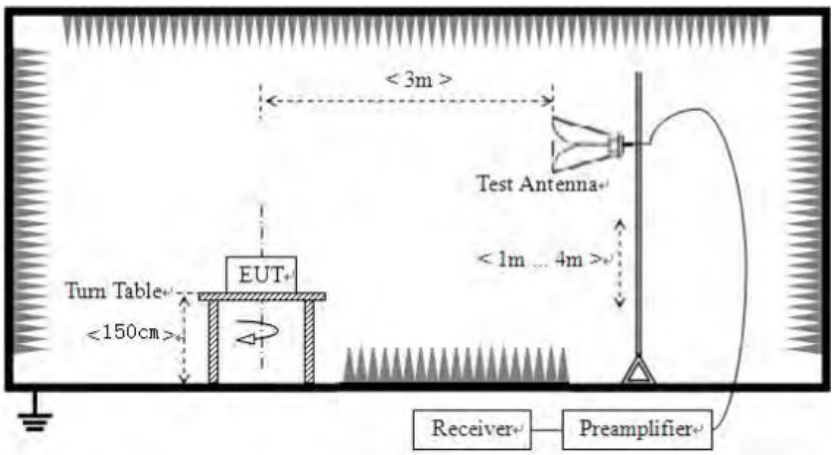
For radiated emissions from 9kHz to 30MHz



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

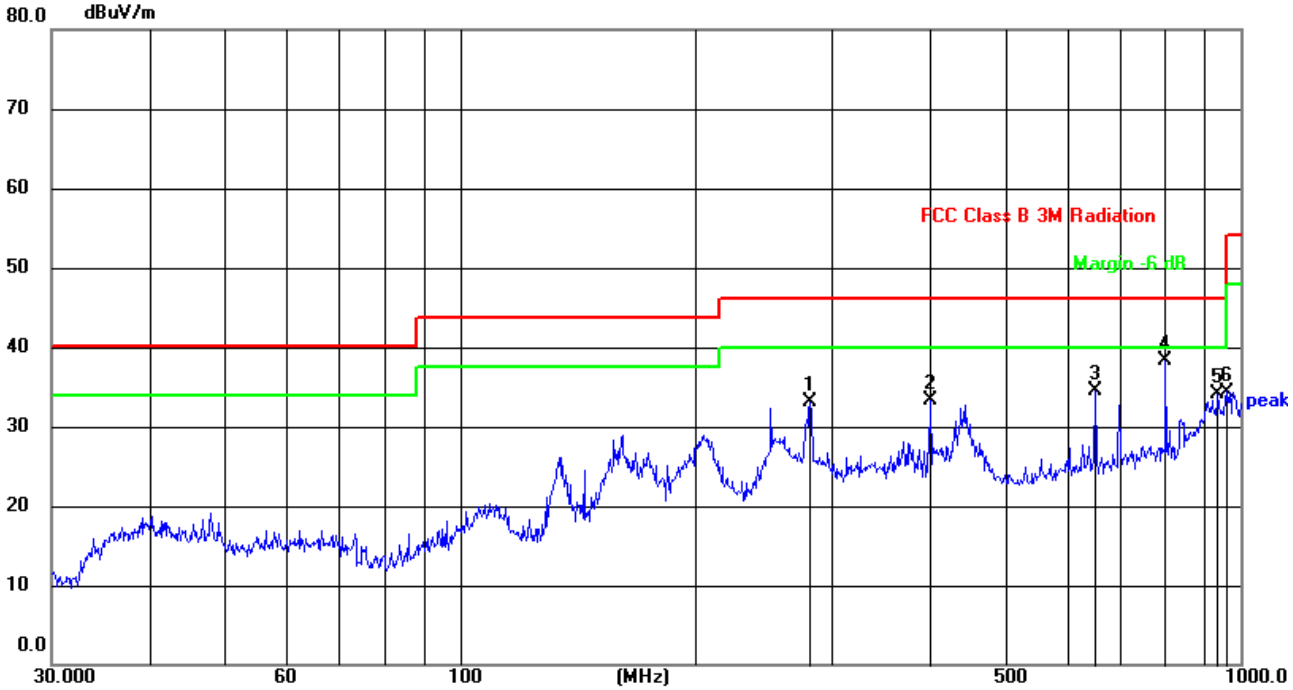
The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.

Below 1GHz

Remark: The test data shows only the worst case 802.11ac20 mode.

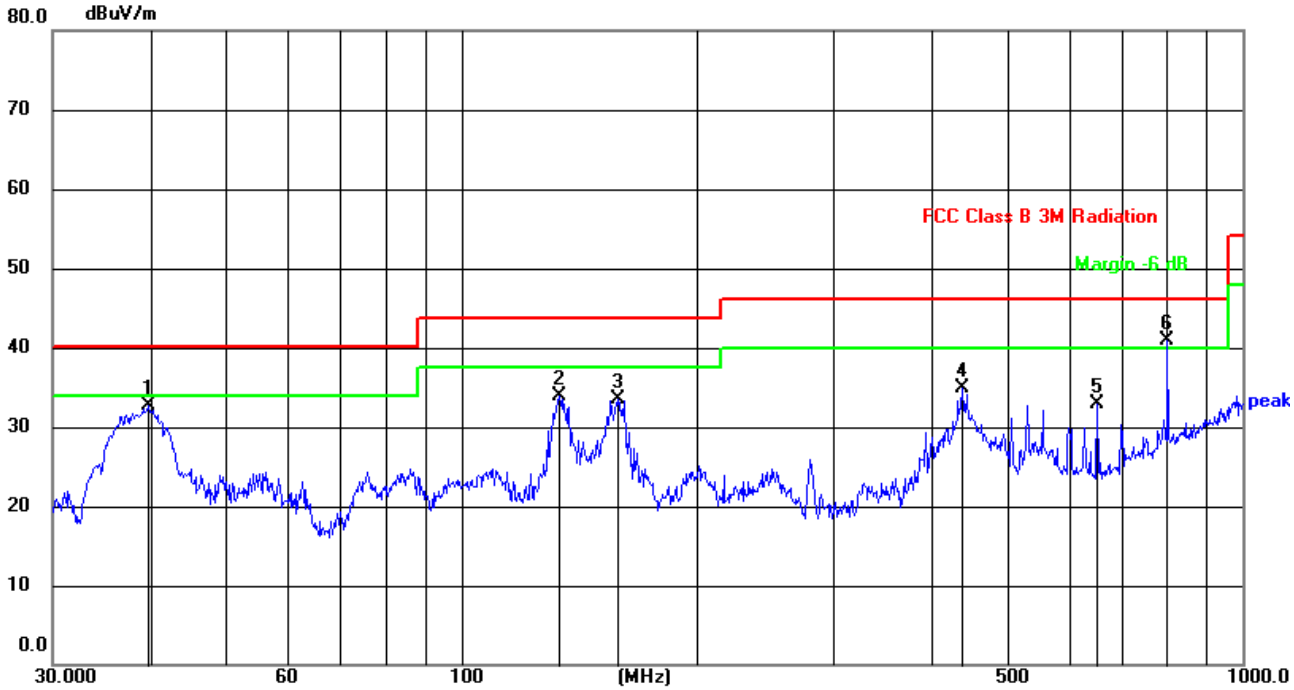
Temperature:	24.6℃	Relative Humidity:	52%
Pressure:	1010 hPa	Test Voltage :	DC 7.6V From adapter
Test Mode :	5.2G TX- 802.11ac20		

Horizontal:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	281.0074	54.38	-21.29	33.09	46.00	-12.91	QP
2	400.4318	50.51	-17.28	33.23	46.00	-12.77	QP
3	651.9415	44.90	-10.32	34.58	46.00	-11.42	QP
4	801.7862	44.87	-6.49	38.38	46.00	-7.62	QP
5	935.5461	38.47	-4.29	34.18	46.00	-11.82	QP
6	958.7943	38.13	-3.73	34.40	46.00	-11.60	QP

Vertical:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	39.8541	53.63	-20.97	32.66	40.00	-7.34	QP
2	133.6184	56.18	-22.21	33.97	43.50	-9.53	QP
3	158.6673	54.03	-20.56	33.47	43.50	-10.03	QP
4	437.1200	50.81	-15.92	34.89	46.00	-11.11	QP
5	651.9415	43.32	-10.32	33.00	46.00	-13.00	QP
6	801.7862	47.30	-6.49	40.81	46.00	-5.19	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 802.11ac20 mode

Above 1GHz:

Remark: The test data shows only the worst case 802.11ac20 mode.

Temperature:	24.6℃	Relative Humidity:	52%
Pressure:	1010 hPa	Test Voltage :	DC 7.6V From adapter
Test Mode :	5.2G TX- 802.11ac20		

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Low Channel:5180MHz									
V	5150.00	55.70	45.70	5.37	32.60	47.97	68.20	-20.23	PK
V	5150.00	49.56	45.70	5.37	32.60	41.83	54.00	-12.17	AV
V	10360.00	51.29	46.20	8.27	38.50	51.86	68.20	-16.34	PK
V	10360.00	41.89	46.20	8.27	38.50	42.46	54.00	-11.54	AV
V	15540.00	48.57	46.30	10.35	38.70	51.32	74.00	-22.68	PK
V	15540.00	39.12	46.30	10.35	38.70	41.87	54.00	-12.13	AV
V	20720.00	57.14	57.40	11.93	37.80	49.47	68.20	-18.73	PK
V	20720.00	47.69	57.40	11.93	37.80	40.02	54.00	-13.98	AV
V	25900.00	54.92	56.50	13.45	39.70	51.57	68.20	-16.63	PK
V	25900.00	45.09	56.50	13.45	39.70	41.74	54.00	-12.26	AV
H	5150.00	54.74	45.70	5.37	32.60	47.01	68.20	-21.19	PK
H	5150.00	48.48	45.70	5.37	32.60	40.75	54.00	-13.25	AV
H	10360.00	51.21	46.20	8.27	38.50	51.78	68.20	-16.42	PK
H	10360.00	40.60	46.20	8.27	38.50	41.17	54.00	-12.83	AV
H	15540.00	47.64	46.30	10.35	38.70	50.39	74.00	-23.61	PK
H	15540.00	36.82	46.30	10.35	38.70	39.57	54.00	-14.43	AV
H	20720.00	59.23	57.40	11.93	37.80	51.56	68.20	-16.64	PK
H	20720.00	48.54	57.40	11.93	37.80	40.87	54.00	-13.13	AV
H	25900.00	55.88	56.50	13.45	39.70	52.53	68.20	-15.67	PK
H	25900.00	45.12	56.50	13.45	39.70	41.77	54.00	-12.23	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Middle Channel:5200MHz									
V	10400.00	50.39	46.20	8.27	38.50	50.96	68.20	-17.24	PK
V	10400.00	41.67	46.20	8.27	38.50	42.24	54.00	-11.76	AV
V	15600.00	48.87	46.30	10.35	38.40	51.32	74.00	-22.68	PK
V	15600.00	40.55	46.30	10.35	38.40	43.00	54.00	-11.00	AV
V	20800.00	58.27	57.40	11.93	37.80	50.60	68.20	-17.60	PK
V	20800.00	49.13	57.40	11.93	37.80	41.46	54.00	-12.54	AV
V	26000.00	53.69	56.50	13.45	39.80	50.44	68.20	-17.76	PK
V	26000.00	46.26	56.50	13.45	39.80	43.01	54.00	-10.99	AV
H	10400.00	50.97	46.20	8.27	38.50	51.54	68.20	-16.66	PK
H	10400.00	41.91	46.20	8.27	38.50	42.48	54.00	-11.52	AV
H	15600.00	48.85	46.30	10.35	38.40	51.30	74.00	-22.70	PK
H	15600.00	40.55	46.30	10.35	38.40	43.00	54.00	-11.00	AV
H	20800.00	57.28	57.40	11.93	37.80	49.61	68.20	-18.59	PK
H	20800.00	47.15	57.40	11.93	37.80	39.48	54.00	-14.52	AV
H	26000.00	53.42	56.50	13.45	39.80	50.17	68.20	-18.03	PK
H	26000.00	45.51	56.50	13.45	39.80	42.26	54.00	-11.74	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
High Channel:5240MHz									
V	5350.00	54.08	45.70	5.37	33.10	46.85	68.20	-21.35	PK
V	5350.00	47.49	45.70	5.37	33.10	40.26	54.00	-13.74	AV
V	10480.00	47.38	46.20	8.27	38.60	48.05	68.20	-20.15	PK
V	10480.00	37.96	46.20	8.27	38.60	38.63	54.00	-15.37	AV
V	15720.00	45.09	46.30	10.35	38.40	47.54	74.00	-26.46	PK
V	15720.00	35.81	46.30	10.35	38.40	38.26	54.00	-15.74	AV
V	20960.00	54.63	57.40	11.93	37.50	46.66	68.20	-21.54	PK
V	20960.00	46.54	57.40	11.93	37.50	38.57	54.00	-15.43	AV
V	26200.00	50.84	56.50	13.45	40.10	47.89	68.20	-20.31	PK
V	26200.00	41.95	56.50	13.45	40.10	39.00	54.00	-15.00	AV
H	5350.00	54.56	45.70	5.37	33.10	47.33	68.20	-20.87	PK
H	5350.00	49.64	45.70	5.37	33.10	42.41	54.00	-11.59	AV
H	10480.00	47.61	46.20	8.27	38.60	48.28	68.20	-19.92	PK
H	10480.00	37.96	46.20	8.27	38.60	38.63	54.00	-15.37	AV
H	15720.00	45.41	46.30	10.35	38.40	47.86	74.00	-26.14	PK
H	15720.00	35.91	46.30	10.35	38.40	38.36	54.00	-15.64	AV
H	20960.00	54.80	57.40	11.93	37.50	46.83	68.20	-21.37	PK
H	20960.00	46.44	57.40	11.93	37.50	38.47	54.00	-15.53	AV
H	26200.00	50.56	56.50	13.45	40.10	47.61	68.20	-20.59	PK
H	26200.00	41.36	56.50	13.45	40.10	38.41	54.00	-15.59	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:	24.6℃	Relative Humidity:	52%
Pressure:	1010 hPa	Test Voltage :	DC 7.6V From adapter
Test Mode :	5.8G TX- 802.11ac20		

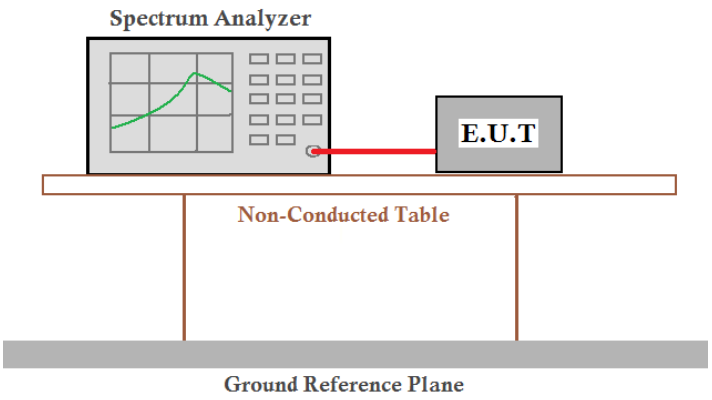
Polar (H/V)	Frequency (MHz)	Meter Readi g (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenn Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Typ
Low Channel:5745MHz									
V	11490.00	46.77	46.10	8.77	39.10	48.54	74.00	-25.46	PK
V	11490.00	39.32	46.10	8.77	39.10	41.09	54.00	-12.91	AV
V	17235.00	44.55	47.60	11.10	38.70	46.75	68.20	-21.45	PK
V	17235.00	37.89	47.60	11.10	38.70	40.09	54.00	-13.91	AV
V	22980.00	52.51	56.90	12.73	37.70	46.04	74.00	-27.96	PK
V	22980.00	45.22	56.90	12.73	37.70	38.75	54.00	-15.25	AV
V	28725.00	49.61	55.60	14.25	40.30	48.56	68.20	-19.64	PK
V	28725.00	41.85	55.60	14.25	40.30	40.80	54.00	-13.20	AV
H	11490.00	47.20	46.10	8.77	39.10	48.97	74.00	-25.03	PK
H	11490.00	39.17	46.10	8.77	39.10	40.94	54.00	-13.06	AV
H	17235.00	45.48	47.60	11.10	38.70	47.68	68.20	-20.52	PK
H	17235.00	38.27	47.60	11.10	38.70	40.47	54.00	-13.53	AV
H	22980.00	54.54	56.90	12.73	37.70	48.07	74.00	-25.93	PK
H	22980.00	45.01	56.90	12.73	37.70	38.54	54.00	-15.46	AV
H	28725.00	51.40	55.60	14.25	40.30	50.35	68.20	-17.85	PK
H	28725.00	42.42	55.60	14.25	40.30	41.37	54.00	-12.63	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Middle Channel:5785MHz									
V	11570.00	46.60	46.10	8.77	39.10	48.37	74.00	-25.63	PK
V	11570.00	39.16	46.10	8.77	39.10	40.93	54.00	-13.07	AV
V	17355.00	44.38	47.60	11.10	38.70	46.58	68.20	-21.62	PK
V	17355.00	37.71	47.60	11.10	38.70	39.91	54.00	-14.09	AV
V	23140.00	52.35	56.90	12.73	37.70	45.88	74.00	-28.12	PK
V	23140.00	45.04	56.90	12.73	37.70	38.57	54.00	-15.43	AV
V	28925.00	49.43	55.60	14.25	40.30	48.38	68.20	-19.82	PK
V	28925.00	41.68	55.60	14.25	40.30	40.63	54.00	-13.38	AV
H	11570.00	47.02	46.10	8.77	39.10	48.79	74.00	-25.21	PK
H	11570.00	38.98	46.10	8.77	39.10	40.75	54.00	-13.25	AV
H	17355.00	45.31	47.60	11.10	38.70	47.51	68.20	-20.69	PK
H	17355.00	38.09	47.60	11.10	38.70	40.29	54.00	-13.71	AV
H	23140.00	54.37	56.90	12.73	37.70	47.90	74.00	-26.10	PK
H	23140.00	44.84	56.90	12.73	37.70	38.37	54.00	-15.63	AV
H	28925.00	51.23	55.60	14.25	40.30	50.18	68.20	-18.02	PK
H	28925.00	42.25	55.60	14.25	40.30	41.20	54.00	-12.81	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
High Channel:5825MHz									
V	11650.00	47.59	46.10	8.77	39.10	49.36	74.00	-24.64	PK
V	11650.00	39.31	46.10	8.77	39.10	41.08	54.00	-12.92	AV
V	17475.00	45.65	47.90	11.23	38.90	47.88	68.20	-20.32	PK
V	17475.00	38.64	47.90	11.23	38.90	40.87	54.00	-13.13	AV
V	23300.00	54.47	57.10	12.73	37.80	47.90	68.20	-20.30	PK
V	23300.00	45.89	57.10	12.73	37.80	39.32	54.00	-14.68	AV
V	29125.00	51.49	55.80	14.25	40.50	50.44	68.20	-17.76	PK
V	29125.00	43.39	55.80	14.25	40.50	42.34	54.00	-11.67	AV
H	11650.00	49.42	46.10	8.77	39.10	51.19	74.00	-22.81	PK
H	11650.00	41.50	46.10	8.77	39.10	43.27	54.00	-10.73	AV
H	17475.00	46.76	47.90	11.23	38.90	48.99	68.20	-19.21	PK
H	17475.00	39.81	47.90	11.23	38.90	42.04	54.00	-11.96	AV
H	23300.00	55.75	57.10	12.73	37.80	49.18	68.20	-19.02	PK
H	23300.00	47.22	57.10	12.73	37.80	40.65	54.00	-13.35	AV
H	29125.00	52.45	55.80	14.25	40.50	51.40	68.20	-16.80	PK
H	29125.00	44.06	55.80	14.25	40.50	43.01	54.00	-10.99	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.

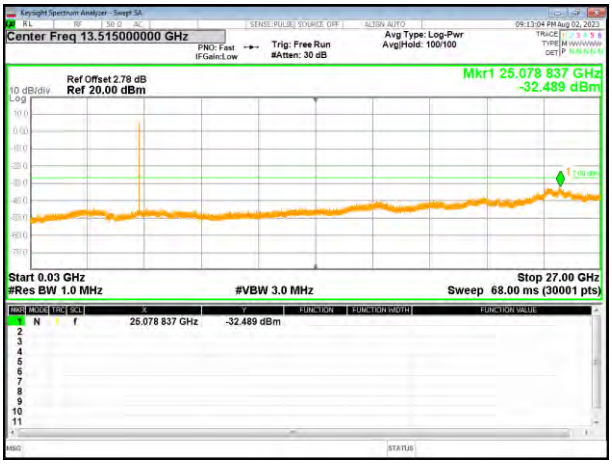
4.7.2 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.209, Part 15E Section 15.407(b)(4) RSS-247 §6.2.1.2&6.2.4.2	
Test Method:	ANSI C63.10:2013 , RSS-Gen	
Limit:	-27dBm/MHz	
Test setup:		
Test Instruments:	Refer to section 3.0 for details	
Test mode:	Refer to section 2.2 for details	
Test environment:	Temp.: 24.6°C	Humid.: 52%RH
Test voltage:	DC 7.6V	
Test results:	Pass	

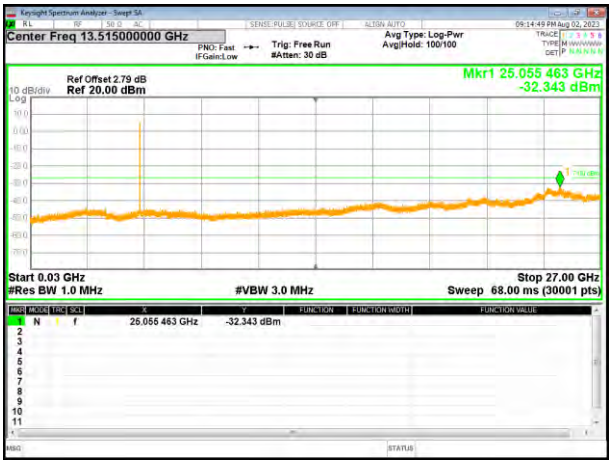
5180-5240MHz

Test Plot

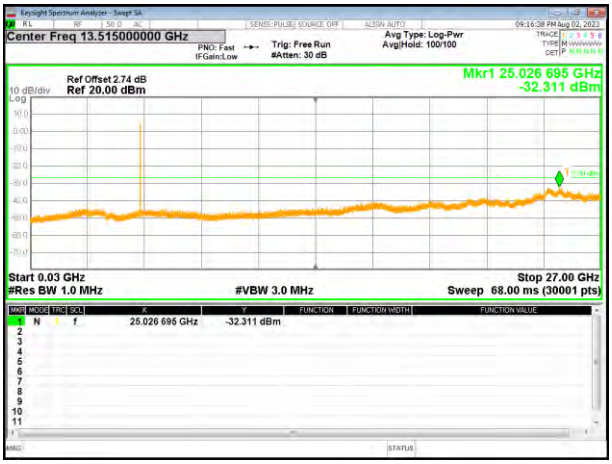
802.11a on channel 36



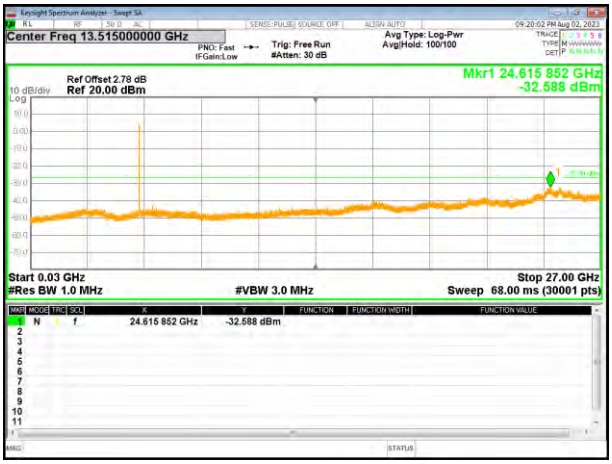
802.11a on channel 40



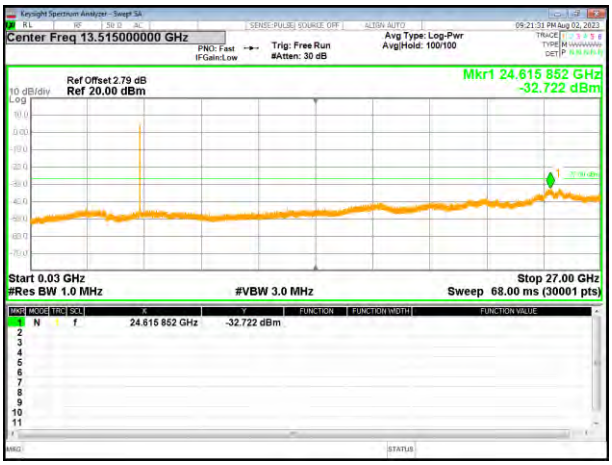
802.11a on channel 48



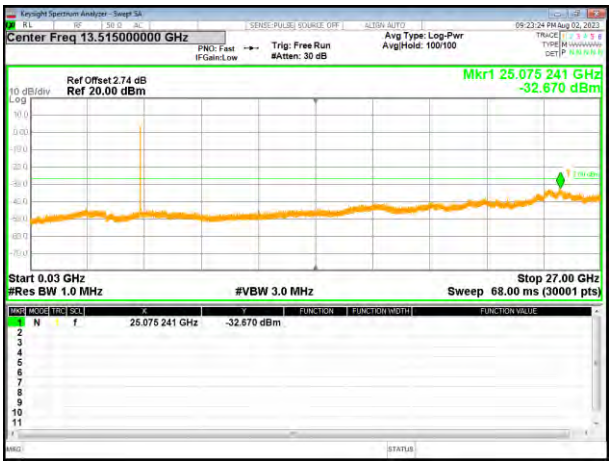
802.11n20 on channel 36



802.11n20 on channel 40

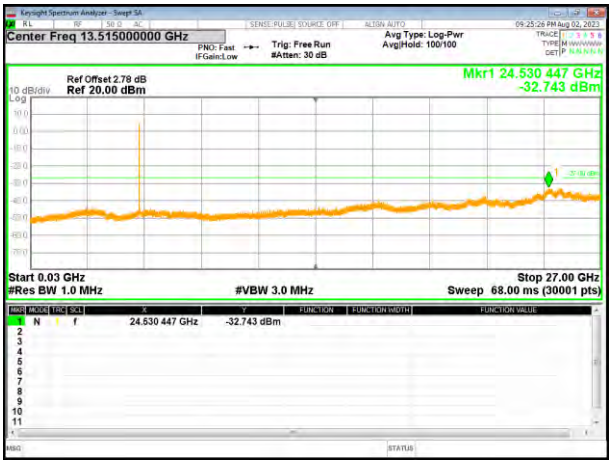


802.11n20 on channel 48

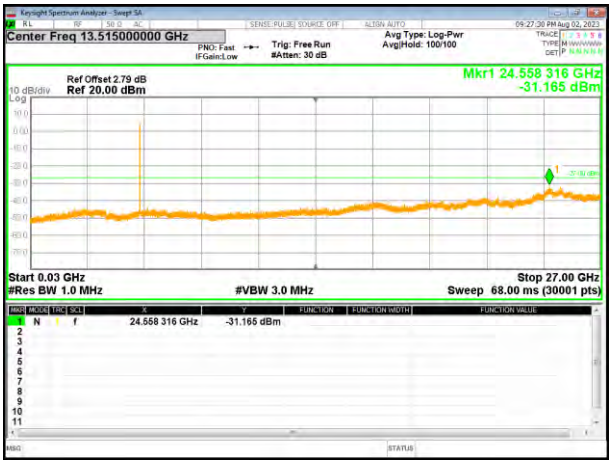


Test Plot

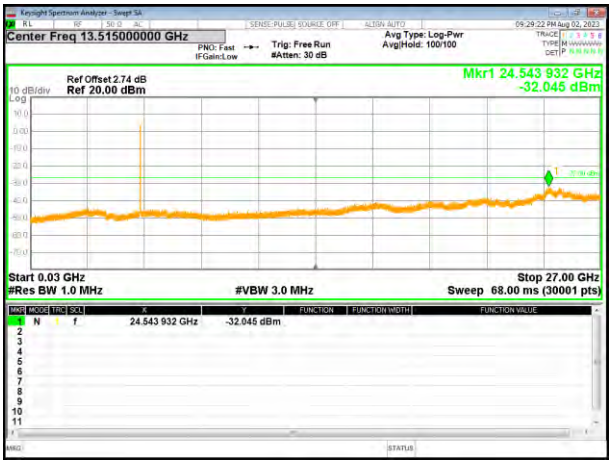
802.11ac20 on channel 36



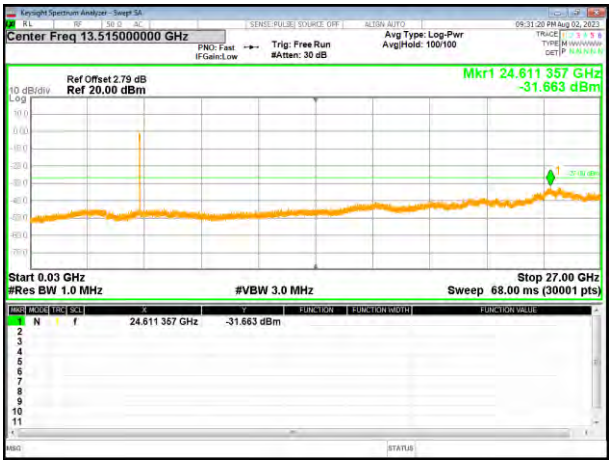
802.11ac20 on channel 40



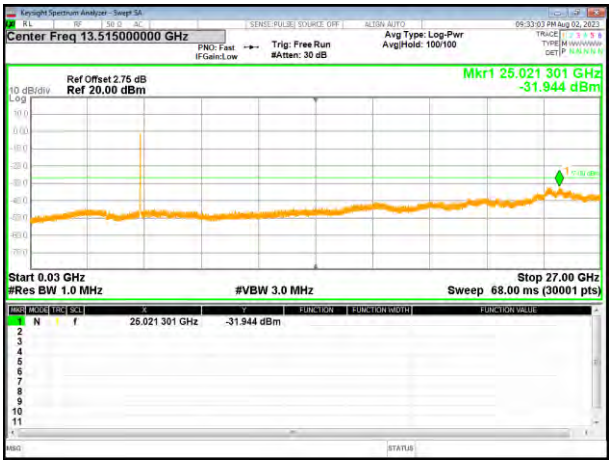
802.11ac20 on channel 48



802.11n40 on channel 38

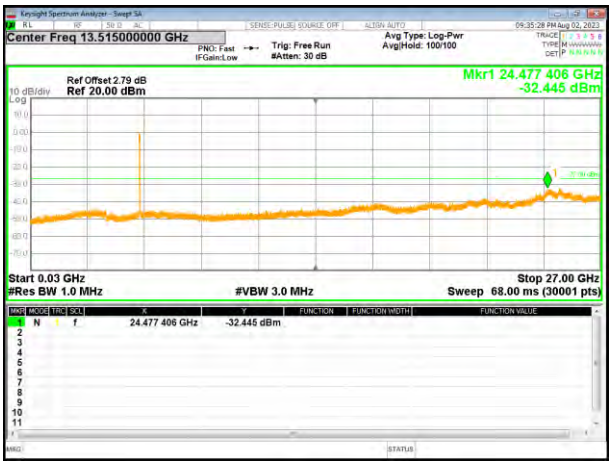


802.11n40 on channel 46

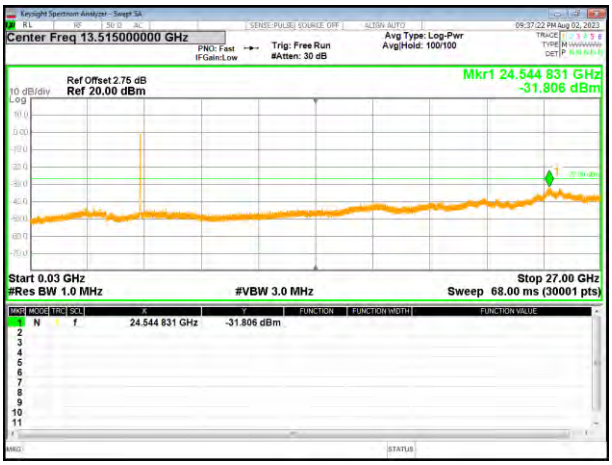


Test Plot

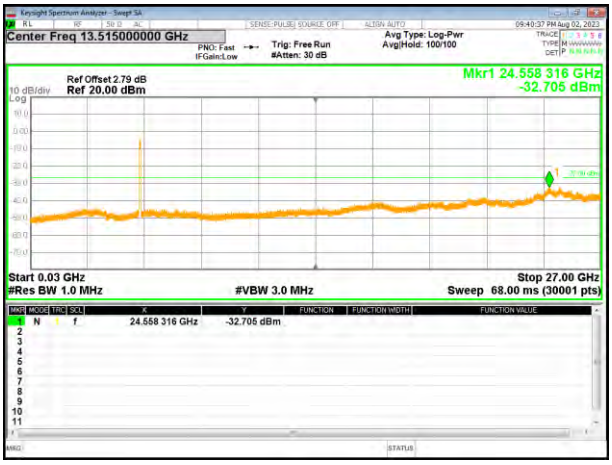
802.11ac40 on channel 38



802.11ac40 on channel 46



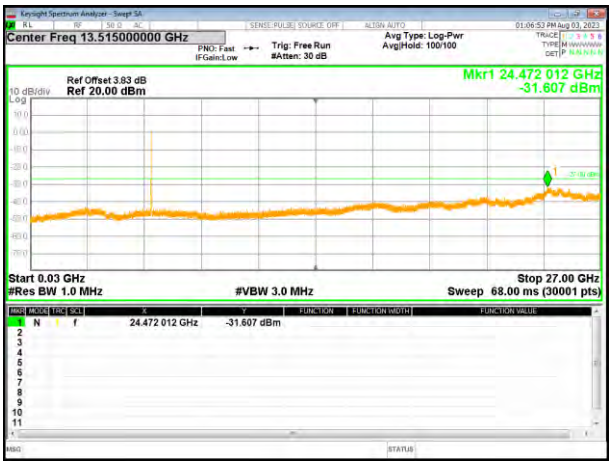
802.11ac80 on channel 42



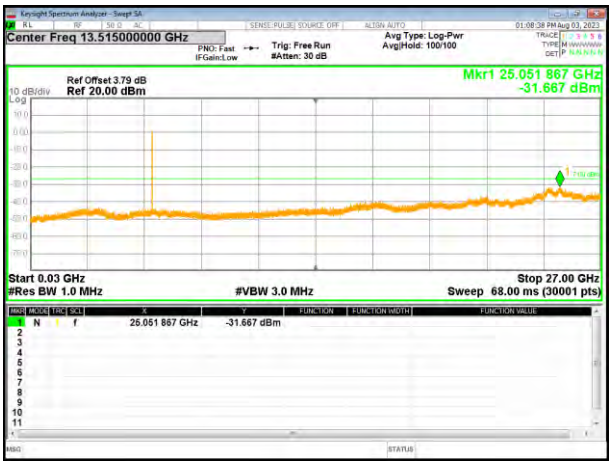
5745-5825MHz

Test Plot

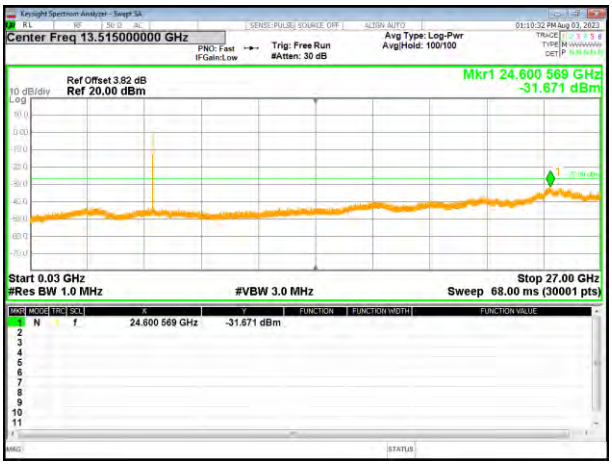
802.11a on channel 149



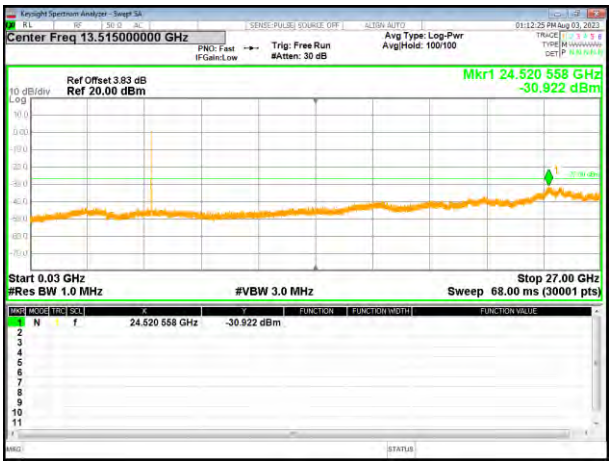
802.11a on channel 157



802.11a on channel 165



802.11n20 on channel 149

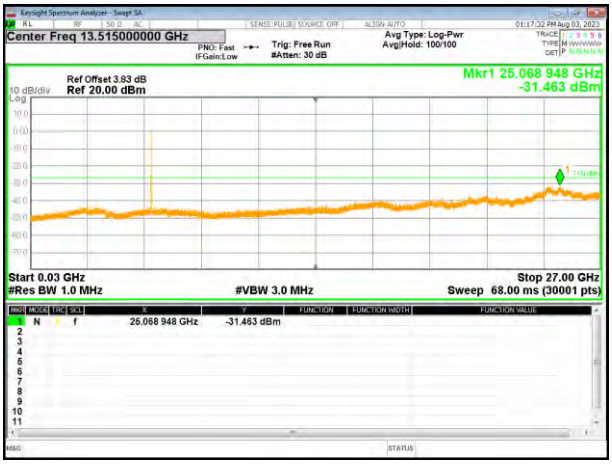


802.11n20 on channel 157

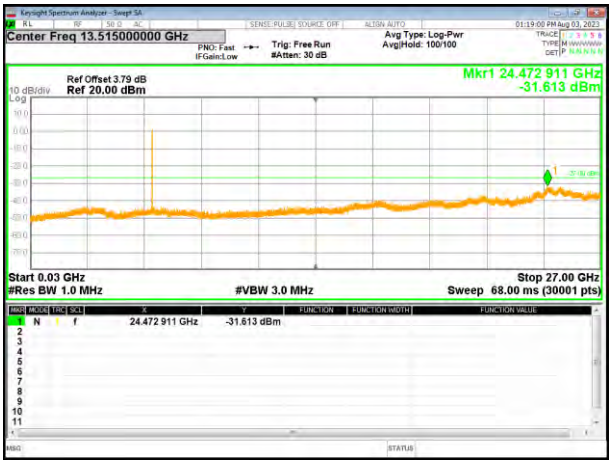
802.11n20 on channel 165

Test Plot

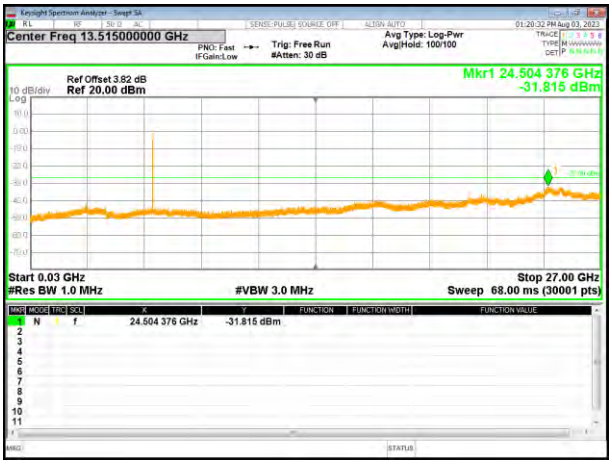
802.11ac20 on channel 149



802.11ac20 on channel 157



802.11ac20 on channel 165

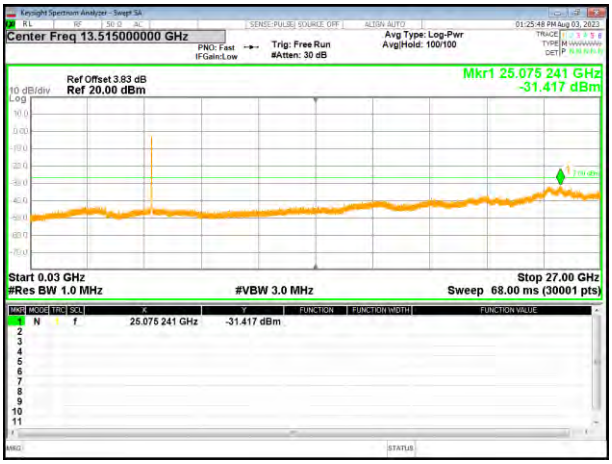


802.11n40 on channel 151

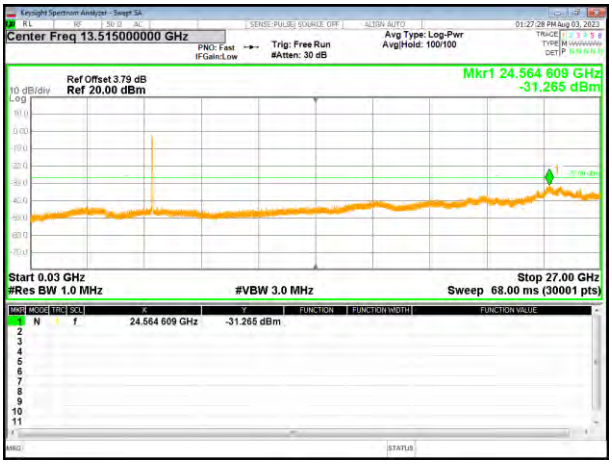
802.11n40 on channel 159

Test Plot

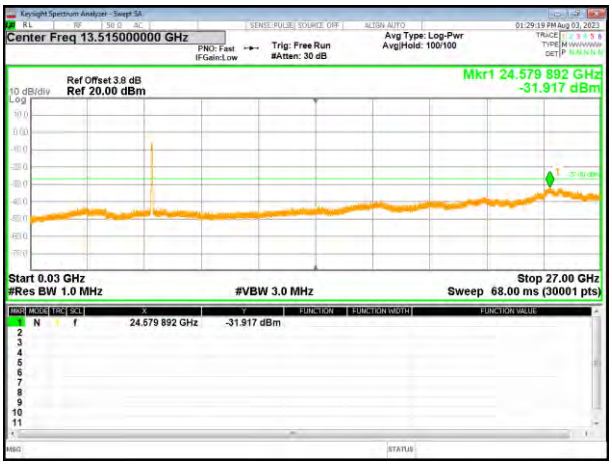
802.11ac40 on channel 151



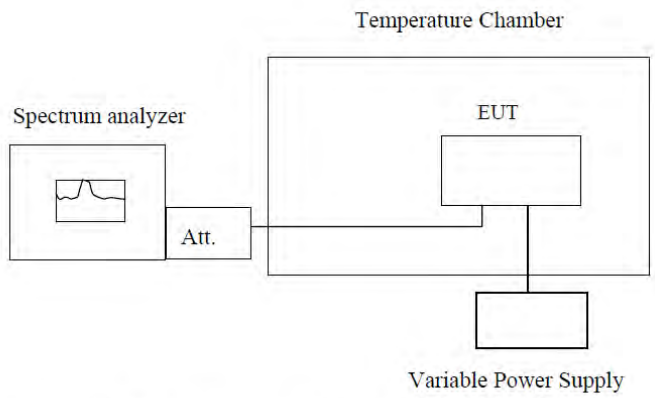
802.11ac40 on channel 159



802.11ac80 on channel 155



4.8 Frequency stability

Test Requirement:	FCC Part15 C Section 15.407(g), RSS Gen§ 8.11
Test Method:	ANSI C63.10:2013, FCC Part 2.1055, RSS Gen
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 7.6V					
Temp. (°C)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
-30	5180	5180.061	5179.525	5179.840	5179.603
	5190	5190.057	5199.398	5199.715	5189.614
	5200	5200.052	5199.423	5199.740	5199.604
	5210	5210.058	5209.400	5209.718	5209.605
	5220	5220.053	5219.415	5219.732	5219.612
	5230	5230.050	5229.407	5229.724	5229.629
	5240	5240.023	5239.414	5239.732	5239.614
-20	5180	5180.052	5179.401	5179.725	5179.624
	5190	5190.043	5189.391	5189.724	5189.620
	5200	5200.051	5199.398	5199.718	5199.614
	5210	5210.043	5209.389	5209.708	5209.620
	5220	5220.064	5219.410	5219.717	5219.615
	5230	5230.041	5229.387	5299.712	5229.612
	5240	5240.059	5239.404	5239.718	5239.585
-10	5180	5180.061	5179.410	5179.704	5179.603
	5190	5190.057	5189.405	5189.715	5189.614
	5200	5200.052	5199.399	5199.706	5199.604
	5210	5210.058	5209.404	5209.707	5209.605
	5220	5220.053	5219.399	5219.713	5219.612
	5230	5230.050	5229.396	5229.730	5229.629
	5240	5240.023	5239.368	5239.702	5239.601
0	5180	5179.838	5179.389	5179.716	5179.614
	5190	5200.010	5189.399	5189.707	5189.615
	5200	5200.008	5199.389	5199.715	5199.605
	5210	5210.063	5209.389	5209.707	5299.610
	5220	5220.052	5219.396	5219.727	5219.605
	5230	5230.038	5229.413	5229.704	5229.625
	5240	5240.055	5239.384	5239.722	5239.603
10	5180	5180.040	5179.401	5179.725	5179.615
	5190	5190.051	5189.391	5189.721	5189.606
	5200	5200.042	5199.398	5199.716	5199.613
	5210	5210.043	5209.389	5209.722	5209.605

	5220	5220.050	5219.410	5219.716	5219.626
	5230	5230.067	5229.387	5229.713	5229.603
	5240	5240.052	5239.404	5239.686	5239.621
20	5180	5180.061	5179.400	5179.716	5179.576
	5190	5190.057	5189.400	5189.707	5189.606
	5200	5200.052	5199.390	5199.715	5199.630
	5210	5210.058	5299.390	5209.707	5209.614
	5220	5220.053	5219.389	5219.727	5219.605
	5230	5230.050	5229.409	5229.704	5229.632
	5240	5240.023	5239.386	5239.722	5239.620
30	5180	5180.040	5179.401	5179.716	5179.624
	5190	5190.051	5189.391	5189.707	5179.624
	5200	5200.042	5199.398	5199.715	5189.620
	5210	5210.043	5209.389	5209.707	5199.614
	5220	5220.050	5219.410	5219.727	5209.620
	5230	5230.067	5229.387	5229.704	5219.615
	5240	5240.039	5239.404	5239.722	5229.612
40	5180	5180.052	5179.400	5179.502	5179.603
	5190	5190.043	5189.400	5199.674	5189.614
	5200	5200.051	5199.390	5199.672	5199.604
	5210	5210.043	5299.390	5209.727	5209.605
	5220	5220.064	5219.389	5219.715	5219.612
	5230	5230.041	5229.409	5229.701	5229.629
	5240	5240.059	5239.386	5239.718	5239.601
50	5180	5180.052	5179.401	5179.716	5179.576
	5190	5190.043	5189.391	5189.707	5189.606
	5200	5200.051	5199.398	5199.715	5199.630
	5210	5210.043	5209.389	5209.707	5209.614
	5220	5220.064	5219.410	5219.727	5219.605
	5230	5230.041	5229.387	5229.704	5229.632
	5240	5240.059	5239.404	5239.722	5239.620

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)
6.46	5180	5180.061	5179.525	5179.716	5179.739
	5190	5190.057	5199.398	5189.707	5199.613
	5200	5200.052	5199.423	5199.715	5199.638
	5210	5210.058	5209.400	5209.707	5209.616
	5220	5220.053	5219.415	5219.727	5219.631
	5230	5230.050	5229.407	5229.704	5229.623
	5240	5240.023	5239.414	5239.722	5239.631
7.60	5180	5180.052	5179.419	5179.715	5179.624
	5190	5190.043	5179.525	5189.716	5189.623
	5200	5200.051	5199.398	5199.707	5199.616
	5210	5210.043	5209.422	5299.711	5209.606
	5220	5220.064	5219.400	5219.706	5219.616
	5230	5230.041	5229.414	5229.726	5299.611
	5240	5240.059	5239.406	5239.704	5239.617
8.74	5180	5180.061	5179.410	5179.704	5179.603
	5190	5190.057	5189.405	5189.715	5189.614
	5200	5200.052	5199.399	5199.706	5199.604
	5210	5210.058	5209.404	5209.707	5209.605
	5220	5220.053	5219.399	5219.713	5219.612
	5230	5230.050	5229.396	5229.730	5229.629
	5240	5240.023	5239.368	5239.702	5239.601

Frequency stability versus Temp.					
Power Supply: DC 7.6V					
Temp. (°C)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
-30	5745	5745.038	5744.343	5744.682	5744.585
	5755	5755.046	5754.348	5754.689	5754.573
	5775	5775.061	5774.339	5774.704	5774.584
	5785	5785.037	5784.330	5784.679	5784.590
	5795	5795.033	5794.336	5794.675	5794.608
	5825	5825.036	5824.262	5824.677	5824.599
-20	5745	5745.027	5744.354	5744.676	5744.596
	5755	5755.044	5754.354	5754.701	5754.609
	5775	5775.041	5774.356	5774.680	5774.594
	5785	5785.044	5784.347	5784.688	5784.580
	5795	5795.055	5794.337	5794.686	5794.574
	5825	5825.036	5824.343	5824.695	5824.607
-10	5745	5745.038	5744.344	5744.692	5744.216
	5755	5755.065	5754.349	5754.694	5754.598
	5775	5775.059	5774.365	5774.695	5774.599
	5785	5785.043	5784.340	5784.686	5784.601
	5795	5795.032	5794.335	5794.677	5794.584
	5825	5824.967	5824.335	5824.685	5824.579
0	5745	5745.032	5744.333	5744.692	5742.621
	5755	5755.058	5754.347	5754.694	5754.611
	5775	5775.038	5774.345	5774.695	5774.607
	5785	5785.046	5784.347	5784.686	5784.590
	5795	5795.044	5794.357	5794.677	5794.579
	5825	5825.053	5824.335	5824.685	5824.513
10	5745	5745.032	5744.343	5744.681	5744.586
	5755	5755.058	5754.358	5754.688	5754.592
	5775	5775.038	5774.358	5774.678	5774.609
	5785	5785.046	5784.339	5784.669	5784.584
	5795	5795.044	5794.355	5794.676	5794.580
	5825	5825.053	5824.350	5824.604	5824.582
20	5745	5745.048	5744.368	5744.692	5744.585
	5755	5755.063	5754.338	5754.706	5754.603
	5775	5775.046	5774.360	5774.689	5774.583
	5785	5785.033	5784.359	5784.675	5784.609
	5795	5795.027	5794.349	5794.669	5794.601
	5825	5825.060	5824.361	5824.702	5824.609
30	5745	5745.038	5744.354	5744.681	5744.610
	5755	5755.046	5754.354	5754.698	5754.581
	5775	5775.061	5774.356	5774.697	5774.604
	5785	5785.037	5784.347	5784.678	5784.603
	5795	5795.033	5794.337	5794.695	5794.594
	5825	5825.036	5824.343	5824.692	5824.608
40	5745	5745.048	5744.338	5744.692	5742.621
	5755	5755.063	5754.361	5754.694	5754.611
	5775	5775.046	5774.341	5774.695	5774.607

	5785	5785.033	5784.349	5784.686	5784.590
	5795	5795.027	5794.346	5794.677	5794.579
	5825	5825.060	5824.353	5824.685	5824.513
50	5745	5745.048	5744.368	5744.692	5744.585
	5755	5755.063	5754.338	5754.706	5754.603
	5775	5775.046	5774.360	5774.689	5774.583
	5785	5785.033	5784.359	5784.675	5784.609
	5795	5795.027	5794.349	5794.669	5794.601
	5825	5825.060	5824.361	5824.702	5824.609

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)
6.46	5745	5745.027	5744.343	5744.681	5744.580
	5755	5755.044	5754.348	5754.698	5754.604
	5775	5775.041	5774.339	5774.697	5774.585
	5785	5785.044	5784.330	5784.678	5784.593
	5795	5795.055	5794.336	5794.695	5794.591
	5825	5825.036	5824.262	5824.692	5824.600
7.60	5745	5745.027	5744.354	5744.676	5744.596
	5755	5755.044	5754.354	5754.701	5754.609
	5775	5775.041	5774.356	5774.680	5774.594
	5785	5785.044	5784.347	5784.688	5784.580
	5795	5795.055	5794.337	5794.686	5794.574
	5825	5825.036	5824.343	5824.695	5824.607
8.74	5745	5745.048	5744.368	5744.692	5744.585
	5755	5755.063	5754.338	5754.706	5754.603
	5775	5775.046	5774.360	5774.689	5774.583
	5785	5785.033	5784.359	5784.675	5784.609
	5795	5795.027	5794.349	5794.669	5794.601
	5825	5825.060	5824.361	5824.702	5824.609

5 Test Setup Photo

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

6 EUT Constructional Details

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

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