Report No.: ET-23101245E03

TEST REPORT

Applicant:	Huike Shilian (Shenzhen) Electronics Co., Ltd
Address of Applicant:	3th Floor, Building 6, Huike Industrial Park, Shilong Shequ, Shiyan, Baoan, Shenzhen
Manufacturer/Factory:	Huike Shilian (Shenzhen) Electronics Co., Ltd
Address of Manufacturer	3th Floor, Building 6, Huike Industrial Park, Shilong Shequ, Shiyan, Baoan, Shenzhen
Product Name:	Smart Office Book
Model No.:	RT-EB-103C
Trade Mark:	N/A
FCC ID:	2BDE2-RTEB103C
Date of Test:	Oct.25, 2023-Nov.07, 2023
Date of report issued:	Nov.08, 2023
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

Shenzhen ETR Standard Technology Co., Ltd.

Address: No.103, No.10, Phase I, Zone 3, Xinxing Industrial Park, Xinhe, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

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

Report Revision History		
Report No.	Description	Issue Date
ET-23101245E03	Original	Nov.08, 2023

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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 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:	Smart Office Book
Model No.:	RT-EB-103C
Difference of model(s)	N/A
Test Model:	RT-EB-103C
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:	FPCB antenna
Antenna gain:	2.76 dBi(Declare by applicant) Note: Antenna information is provided by applicant, Testing lab is not responsible for the accuracy of the information.
Battery:	DC 3.7V / 4000mAh
Adapter information:	N/A
Power supply:	DC 3.7V from battery

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

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.

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	Adapter	Xiao mi	5V/2A	N/A

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

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	System Engineering Mode
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
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& RSS-Gen

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:

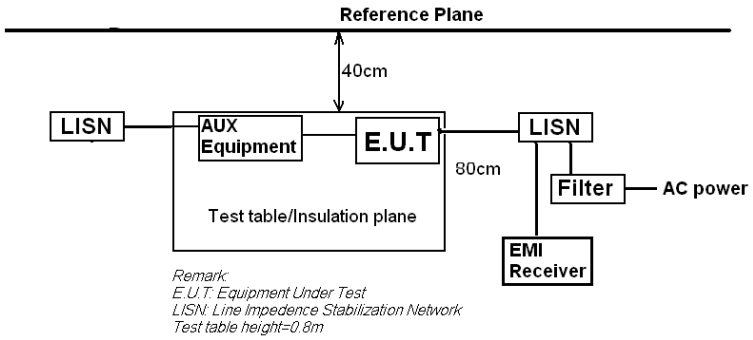
The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report 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 FPCB Antenna, the best case gain of the antennas are 2.76 dBi, reference to the appendix II for details

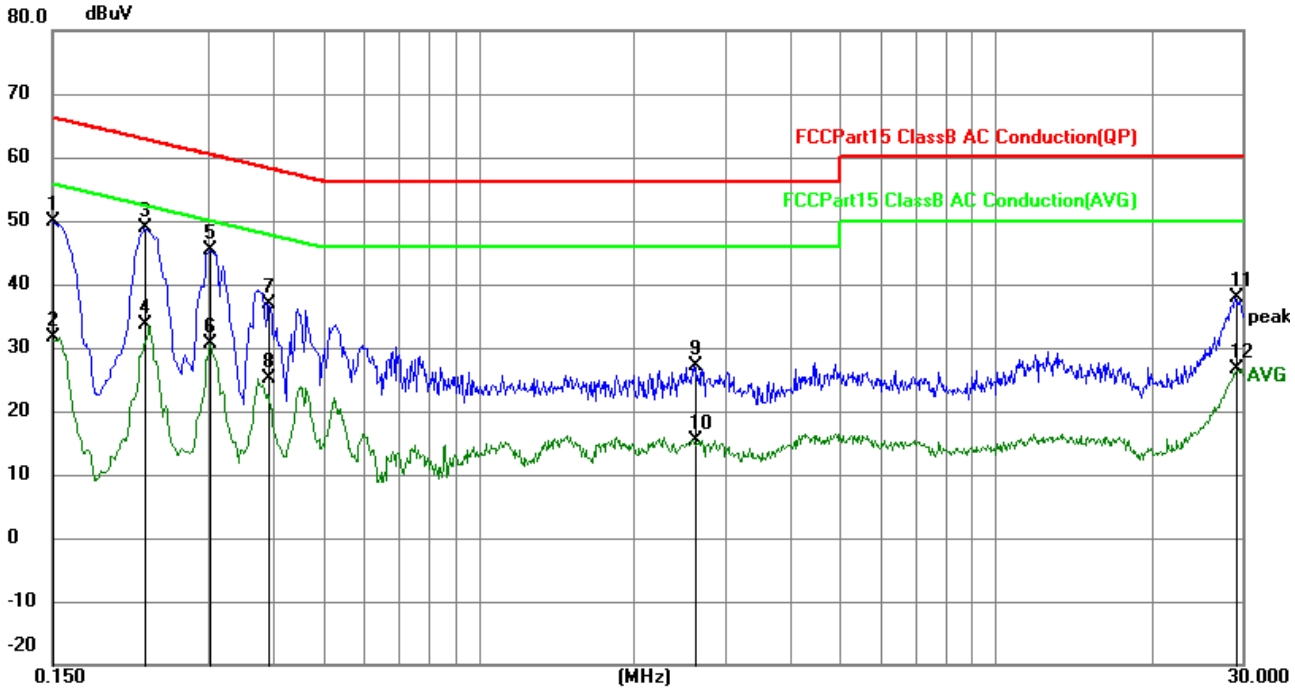
4.2 Conducted Emissions

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:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence 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.: 25.2°C / Humid.: 48% / Press.: 101.2kPar
Test voltage:	AC 120V
Test results:	Pass

1. Both high voltage and low voltage have been tested, and the report only shows the worst case data with AC 120V/60Hz.

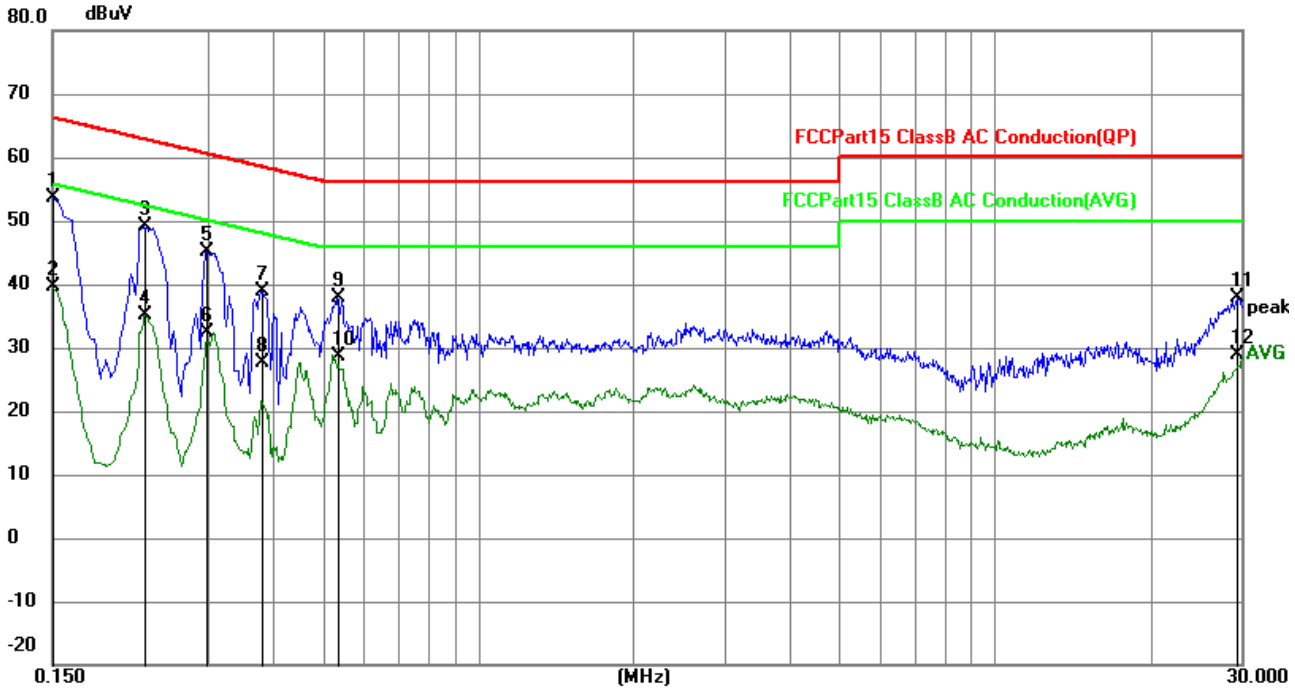
2. All mode have been tested, the report only shows the worst mode (802.11 a 5240MHz) data.

Measurement data
Line:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1500	40.15	9.80	49.95	66.00	-16.05	QP
2	0.1500	21.71	9.80	31.51	56.00	-24.49	AVG
3	0.2265	39.03	9.82	48.85	62.58	-13.73	QP
4	0.2265	23.79	9.82	33.61	52.58	-18.97	AVG
5	0.3029	35.63	9.86	45.49	60.16	-14.67	QP
6	0.3029	20.77	9.86	30.63	50.16	-19.53	AVG
7	0.3930	27.07	9.89	36.96	58.00	-21.04	QP
8	0.3930	15.12	9.89	25.01	48.00	-22.99	AVG
9	2.6160	17.18	9.85	27.03	56.00	-28.97	QP
10	2.6160	5.55	9.85	15.40	46.00	-30.60	AVG
11	29.1433	28.28	9.51	37.79	60.00	-22.21	QP
12	29.1433	17.03	9.51	26.54	50.00	-23.46	AVG

Neutral:

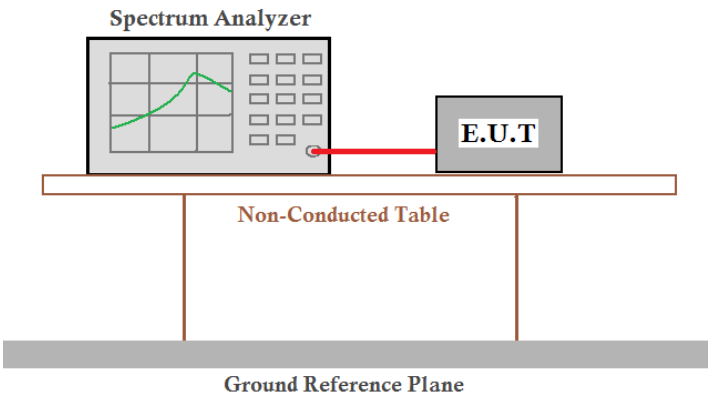


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1500	43.88	9.80	53.68	66.00	-12.32	QP
2	0.1500	29.81	9.80	39.61	56.00	-16.39	AVG
3	0.2265	39.35	9.82	49.17	62.58	-13.41	QP
4	0.2265	25.33	9.82	35.15	52.58	-17.43	AVG
5	0.2983	35.37	9.84	45.21	60.29	-15.08	QP
6	0.2983	22.45	9.84	32.29	50.29	-18.00	AVG
7	0.3795	29.01	9.89	38.90	58.29	-19.39	QP
8	0.3795	17.69	9.89	27.58	48.29	-20.71	AVG
9	0.5322	27.82	9.94	37.76	56.00	-18.24	QP
10	0.5322	18.80	9.94	28.74	46.00	-17.26	AVG
11	29.4495	28.36	9.50	37.86	60.00	-22.14	QP
12	29.4495	19.40	9.50	28.90	50.00	-21.10	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 Duty cycle

Test Method :	ANSI C63.10:2013	
Limit:	/	
Test setup:		
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.: 51%RH
Test voltage:	DC 3.7V	
Test results:	Pass	

Measurement Result

5180-5240MHz

Mode	Test Channel	Frequency (MHz)	Duty cycle (%)	Correction Factor (dB)
TX 802.11a Mode	CH36	5180	100	0.00
	CH40	5200	100	0.00
	CH48	5240	100	0.00
TX 802.11n20 Mode	CH36	5180	100	0.00
	CH40	5200	100	0.00
	CH48	5240	100	0.00
TX 802.11ac20 Mode	CH36	5180	100	0.00
	CH40	5200	100	0.00
	CH48	5240	100	0.00
TX 802.11n40 Mode	CH38	5190	100	0.00
	CH46	5230	100	0.00
TX 802.11a40 Mode	CH38	5190	100	0.00
	CH46	5230	100	0.00
TX 802.11ac80 Mode	CH42	5210	100	0.00

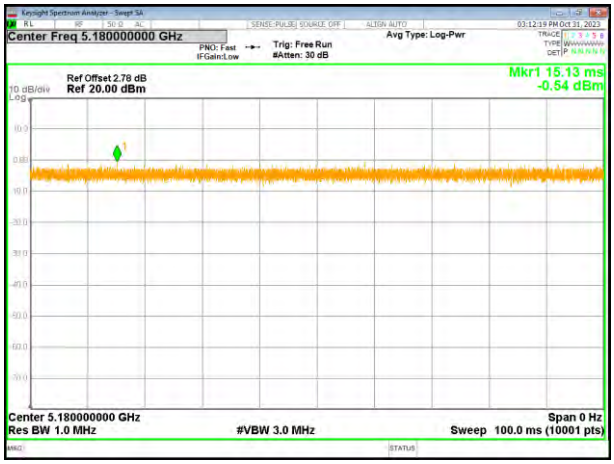
5745-5825 MHz

Mode	Test Channel	Frequency (MHz)	Duty cycle (%)	Correction Factor (dB)
TX 802.11a Mode	CH149	5745	100	0.00
	CH157	5785	100	0.00
	CH165	5825	100	0.00
TX 802.11n20 Mode	CH149	5745	100	0.00
	CH157	5785	100	0.00
	CH165	5825	100	0.00
TX 802.11ac20 Mode	CH149	5745	100	0.00
	CH157	5785	100	0.00
	CH165	5825	100	0.00
TX 802.11n40 Mode	CH151	5755	100	0.00
	CH159	5795	100	0.00
TX 802.11a40 Mode	CH151	5755	100	0.00
	CH159	5795	100	0.00
TX 802.11ac80 Mode	CH155	5775	100	0.00

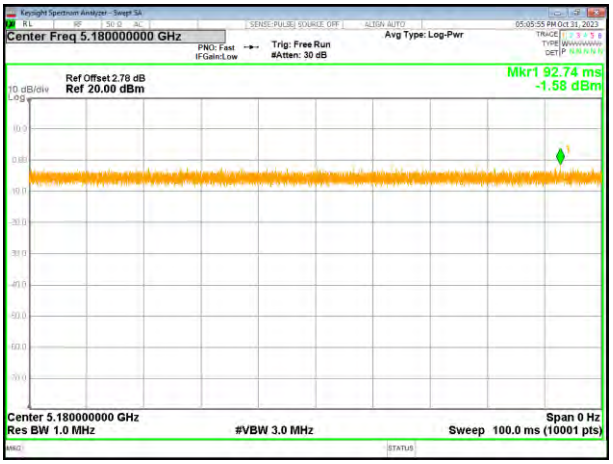
Test plot as follows:

5180-5240MHz

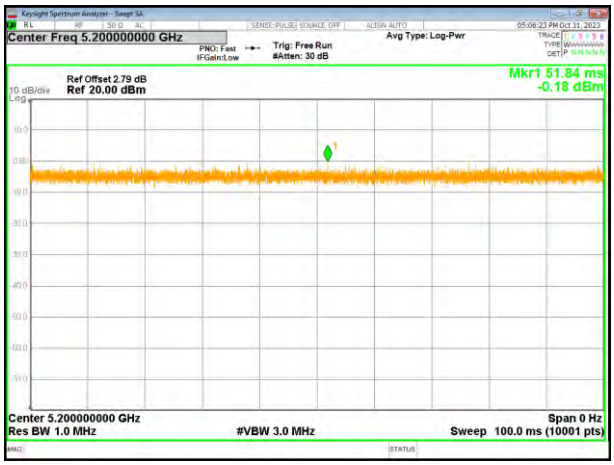
(802.11a) plot on channel 36



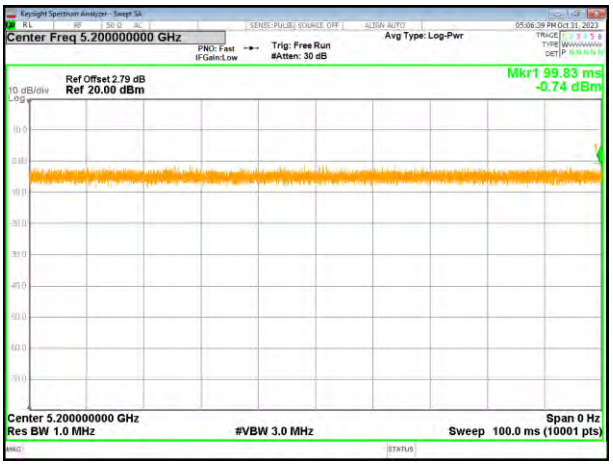
(802.11 n20) plot on channel 36



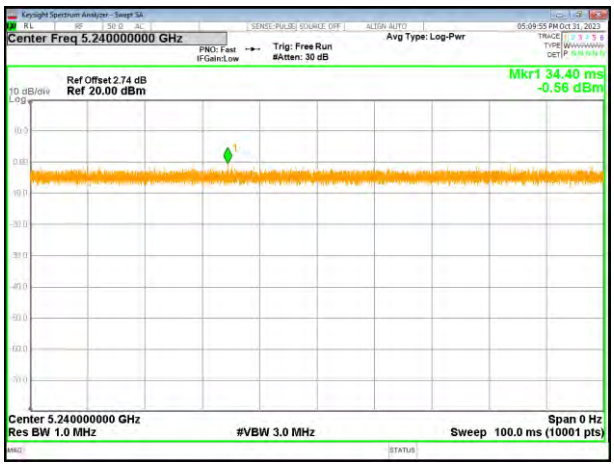
(802.11a) plot on channel 40



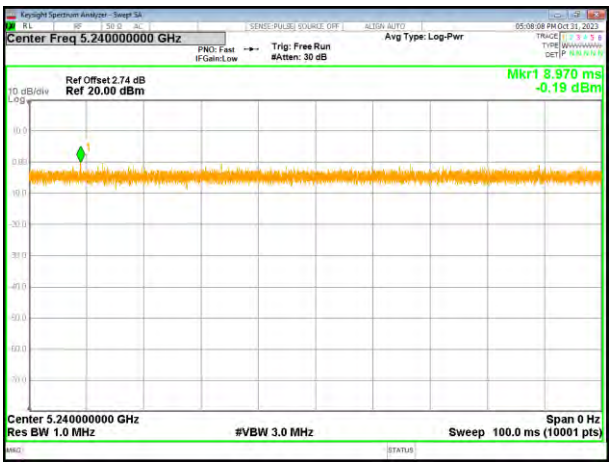
(802.11 n20) plot on channel 40



(802.11a) plot on channel 48

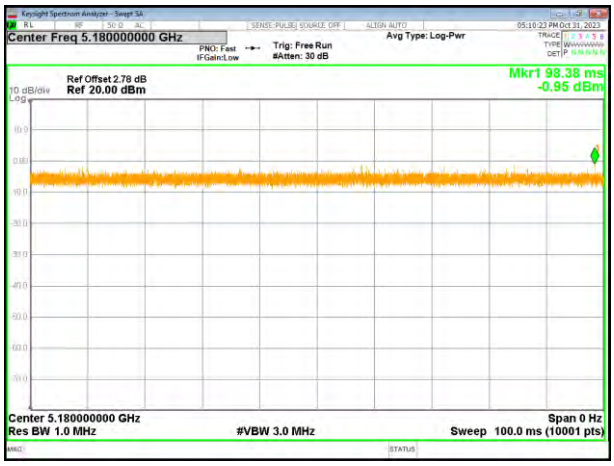


(802.11 n20) plot on channel 48

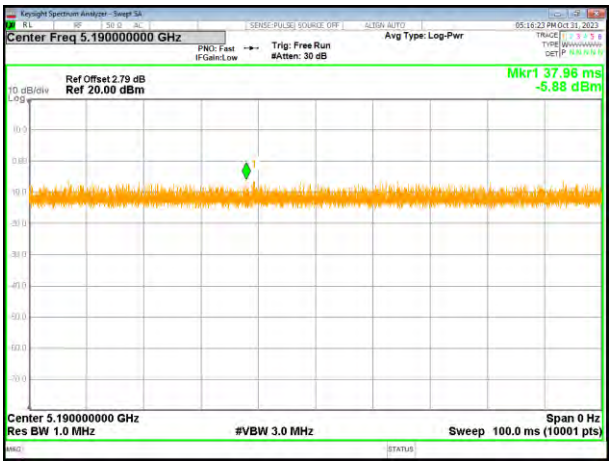


Test plot

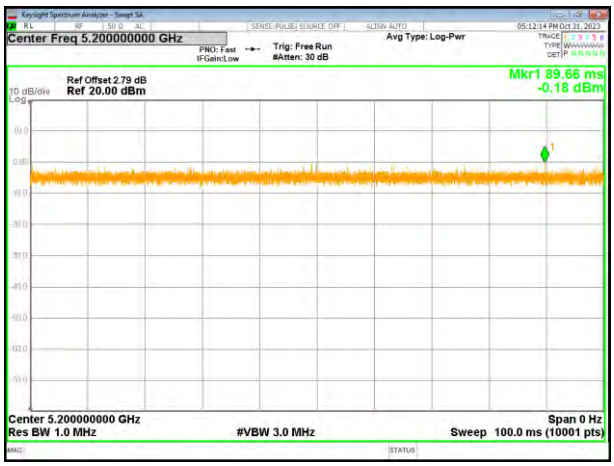
(802.11ac20) plot on channel 36



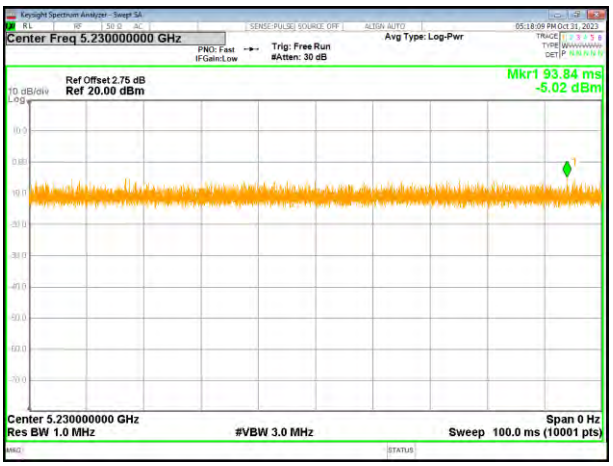
(802.11 n40) plot on channel 38



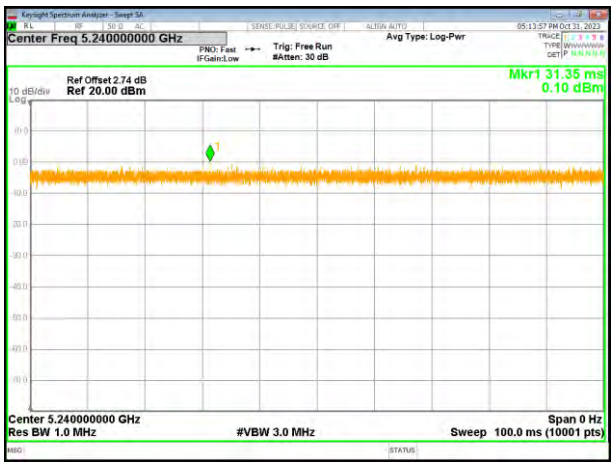
(802.11ac20) plot on channel 40



(802.11 n40) plot on channel 46

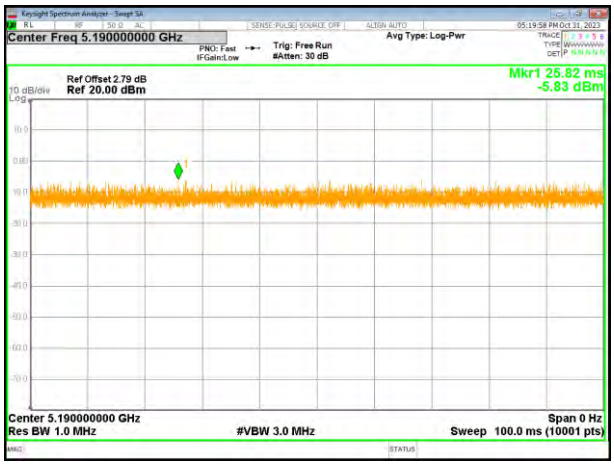


(802.11ac20) plot on channel 48

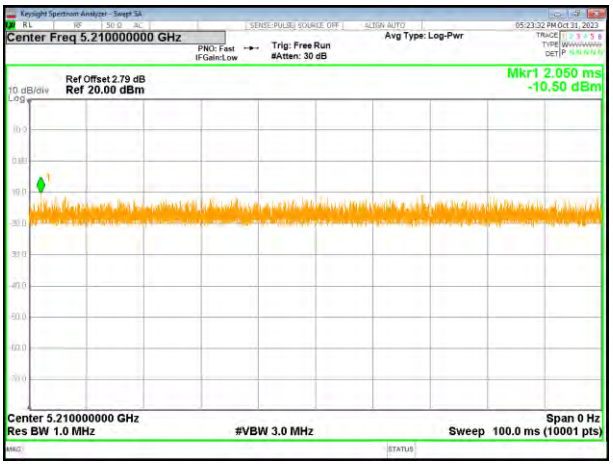


Test plot

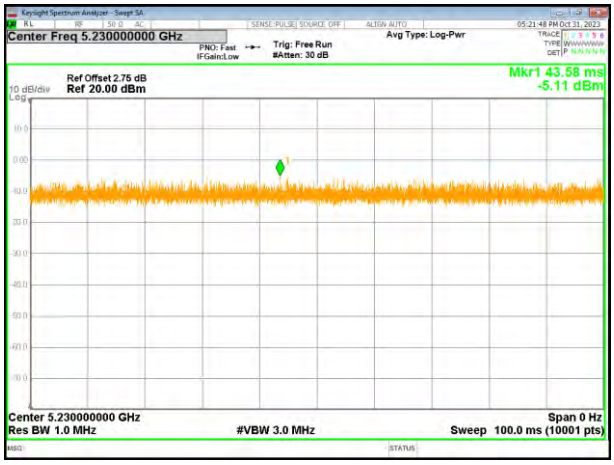
(802.11ac40) plot on channel 38



(802.11ac80) plot on channel 42

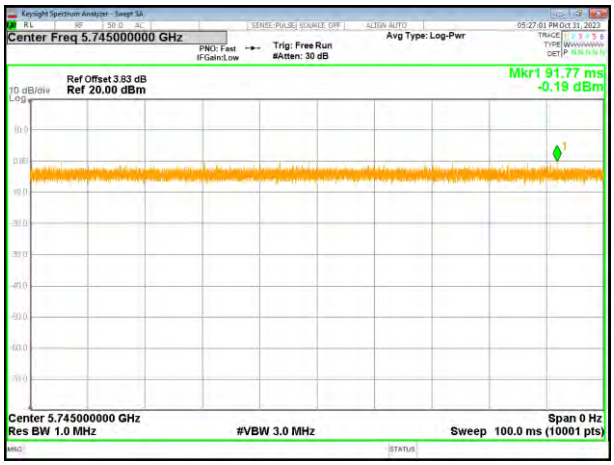


(802.11ac40) plot on channel 46

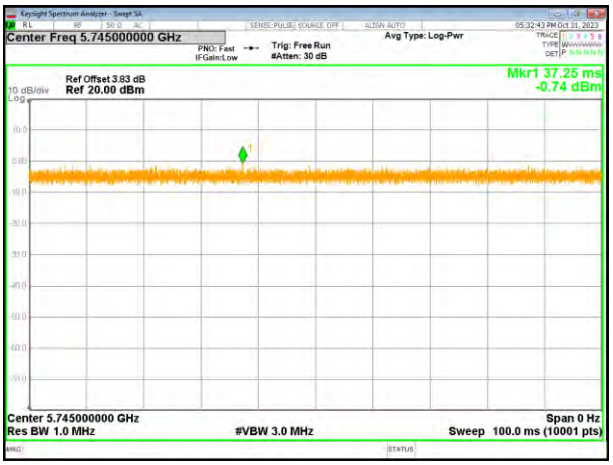


5745-5825 MHz

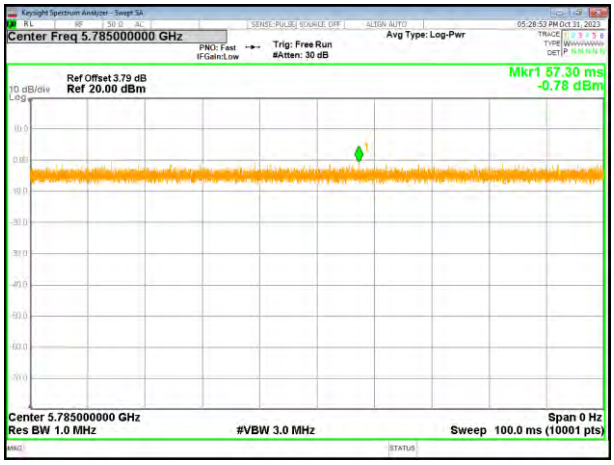
(802.11a) plot on channel 149



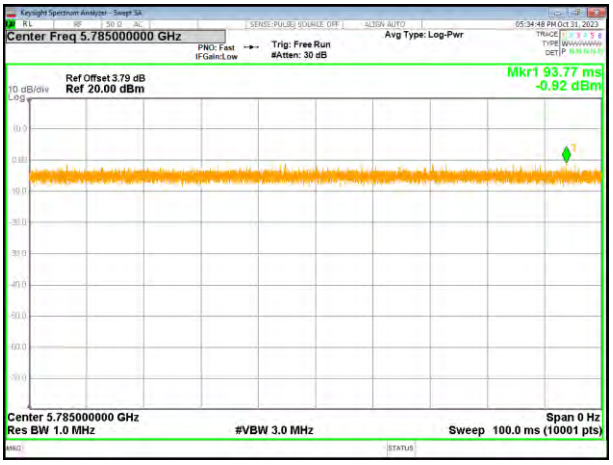
(802.11 n20) plot on channel 149



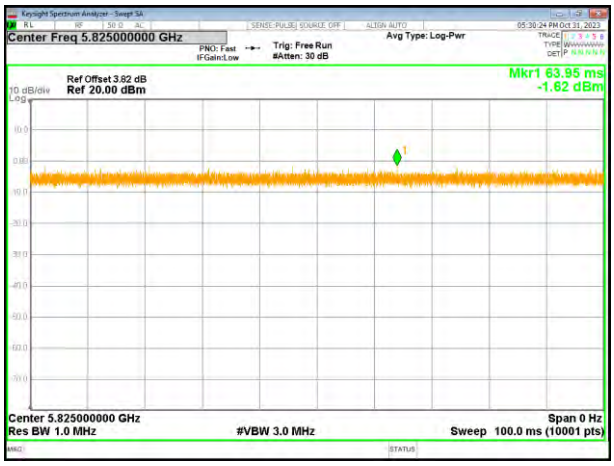
(802.11a) plot on channel 157



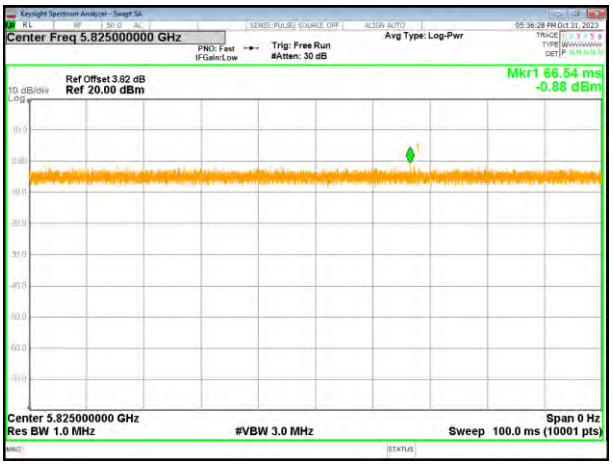
(802.11 n20) plot on channel 157



(802.11a) plot on channel 165

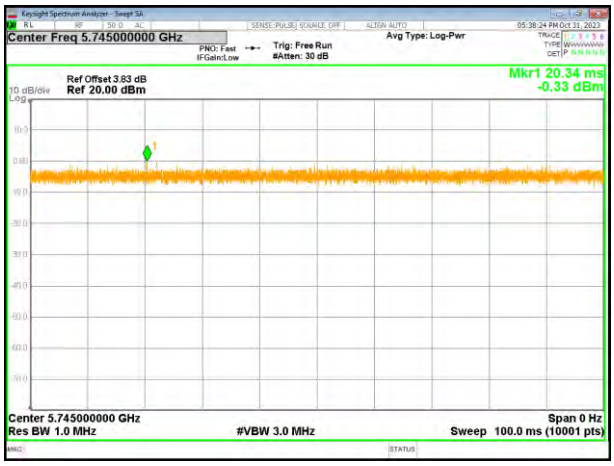


(802.11 n20) plot on channel 165

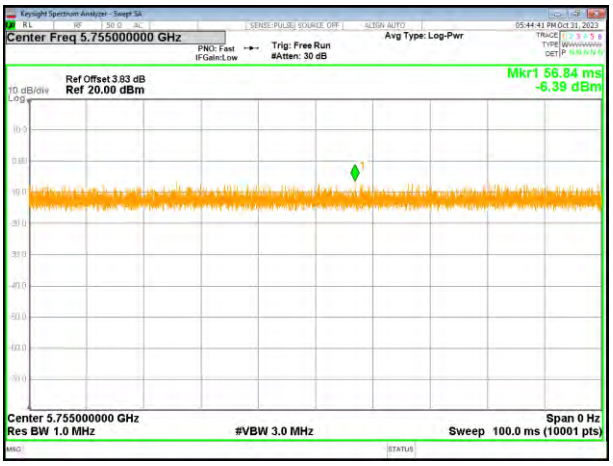


Test plot

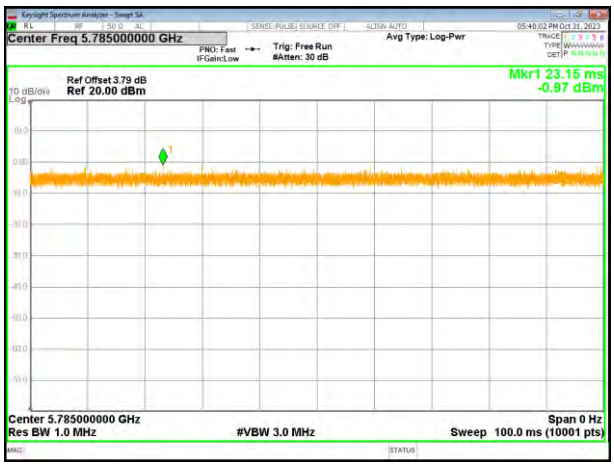
(802.11ac20) plot on channel 149



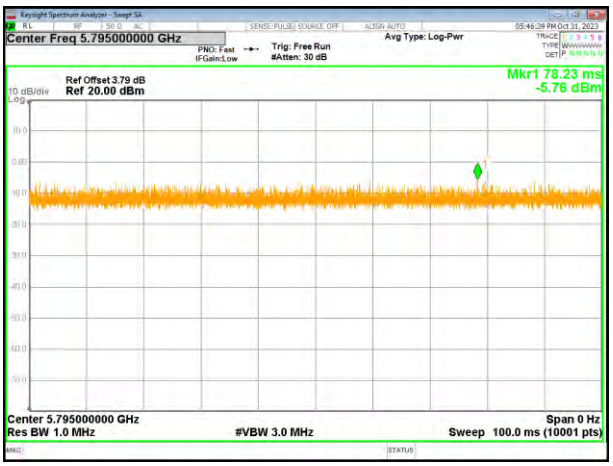
(802.11 n40) plot on channel 151



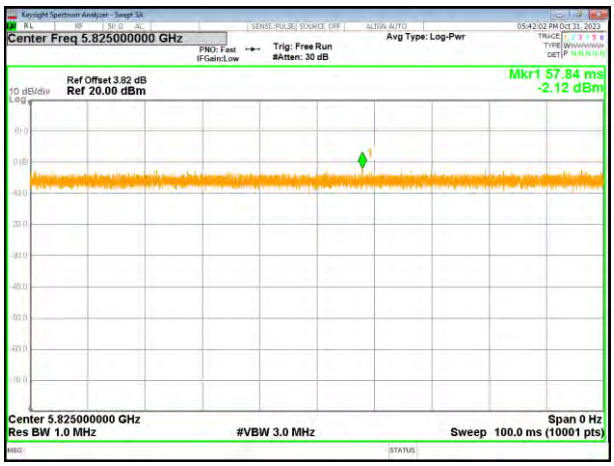
(802.11ac20) plot on channel 157



(802.11 n40) plot on channel 159

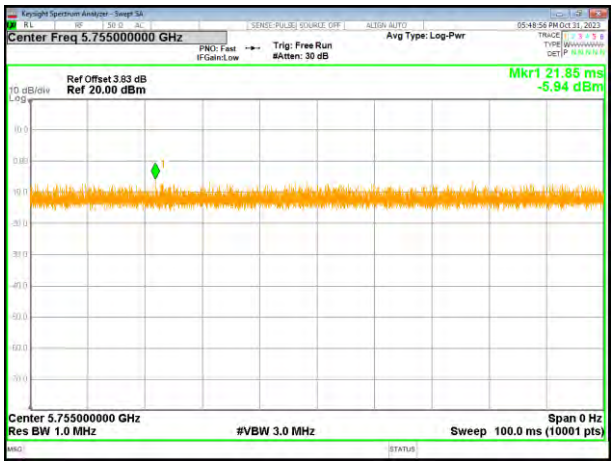


(802.11ac20) plot on channel 165

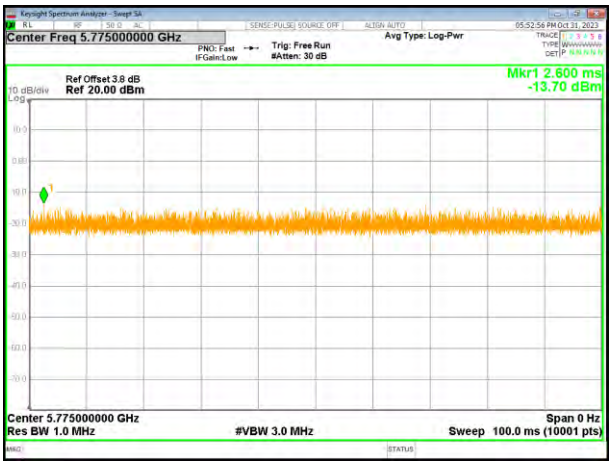


Test plot

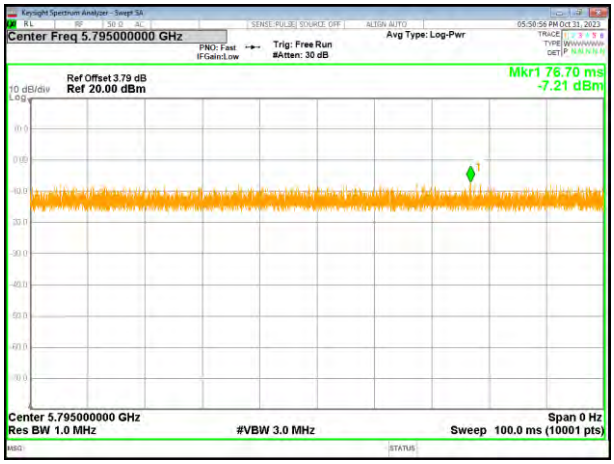
(802.11ac40) plot on channel 151



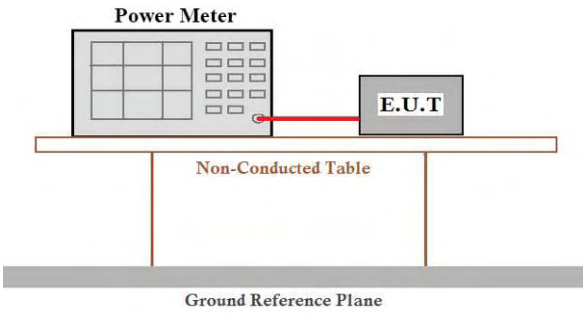
(802.11ac80) plot on channel 155



(802.11ac40) plot on channel 159



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:		
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.: 51%RH
Test voltage:	DC 3.7V	
Test results:	Pass	

Measurement Result

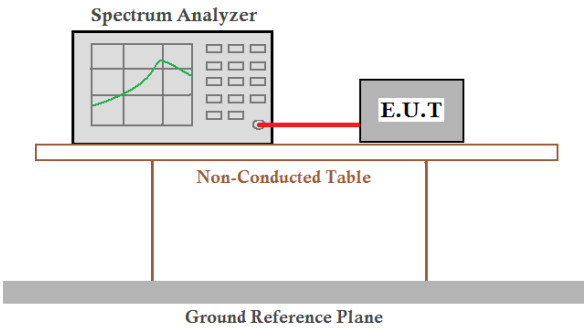
5180-5240MHz

Test Channel	Frequency	Correction Factor	Maximum output power	Total Power	LIMIT	Result
	(MHz)	(dB)	(dBm)	(dBm)	dBm	
TX 802.11a Mode						
CH36	5180	0.00	6.23	6.23	23.98	Pass
CH40	5200	0.00	6.56	6.56	23.98	Pass
CH48	5240	0.00	6.69	6.69	23.98	Pass
TX 802.11 n20 Mode						
CH36	5180	0.00	5.81	5.81	23.98	Pass
CH40	5200	0.00	6.00	6.00	23.98	Pass
CH48	5240	0.00	6.20	6.20	23.98	Pass
TX 802.11 ac20 Mode						
CH36	5180	0.00	5.65	5.65	23.98	Pass
CH40	5200	0.00	6.29	6.29	23.98	Pass
CH48	5240	0.00	5.33	5.33	23.98	Pass
TX 802.11 n40 Mode						
CH38	5190	0.00	6.10	6.10	23.98	Pass
CH46	5230	0.00	6.29	6.29	23.98	Pass
TX 802.11 ac40 Mode						
CH38	5190	0.00	5.57	5.57	23.98	Pass
CH46	5230	0.00	6.30	6.30	23.98	Pass
TX 802.11 ac80 Mode						
CH42	5210	0.00	3.07	3.07	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	0.00	6.33	6.33	30	Pass
CH157	5785	0.00	5.79	5.79	30	Pass
CH165	5825	0.00	4.85	4.85	30	Pass
TX 802.11 n20 Mode						
CH149	5745	0.00	6.00	6.00	30	Pass
CH157	5785	0.00	5.62	5.62	30	Pass
CH165	5825	0.00	5.71	5.71	30	Pass
TX 802.11 ac20 Mode						
CH149	5745	0.00	4.92	4.92	30	Pass
CH157	5785	0.00	5.26	5.26	30	Pass
CH165	5825	0.00	5.97	5.97	30	Pass
TX 802.11 n40 Mode						
CH151	5755	0.00	5.38	5.38	30	Pass
CH159	5795	0.00	4.75	4.75	30	Pass
TX 802.11 ac40 Mode						
CH151	5755	0.00	5.13	5.13	30	Pass
CH159	5795	0.00	4.05	4.05	30	Pass
TX 802.11 ac80 Mode						
CH155	5775	0.00	2.31	2.31	30	Pass

4.5 26dB Bandwidth 99% Occupied 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.: 26.2°C	Humid.: 51%RH
Test voltage:	DC 3.7V	
Test results:	Pass	

Measurement Data

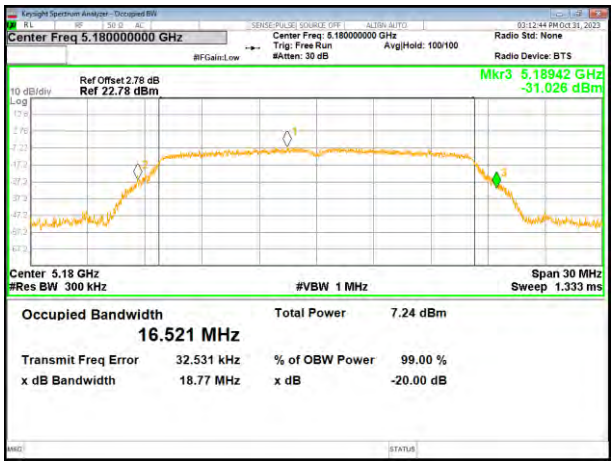
5180-5240MHz

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	18.77	19.38	20.18	39.86	39.59	--	Pass
Middle	18.48	19.32	20.11	--	--	78.87	
Highest	19.25	19.50	20.24	40.27	39.76	--	

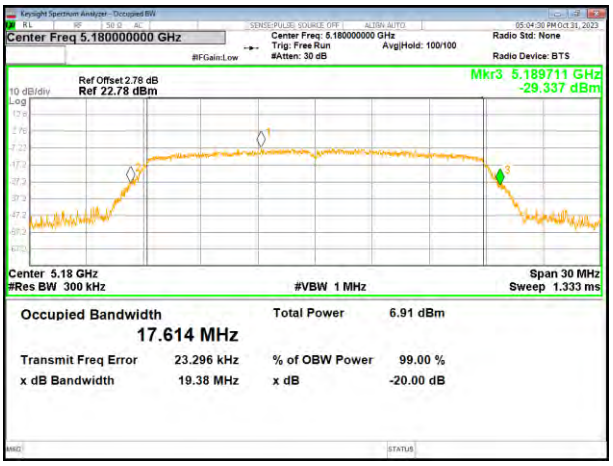
Test CH	99% Occupy Bandwidth (MHz)						Result
	802.11a	802.11n (HT20)	802.11ac (HT20)	802.11n (HT40)	802.11ac (HT40)	802.11ac (HT80)	
Lowest	16.401	17.526	17.543	35.959	35.946	--	Pass
Middle	16.368	17.573	17.548	--	--	75.178	
Highest	16.393	17.545	17.553	35.919	35.905	--	

Test plot -26dB Channel Bandwidth

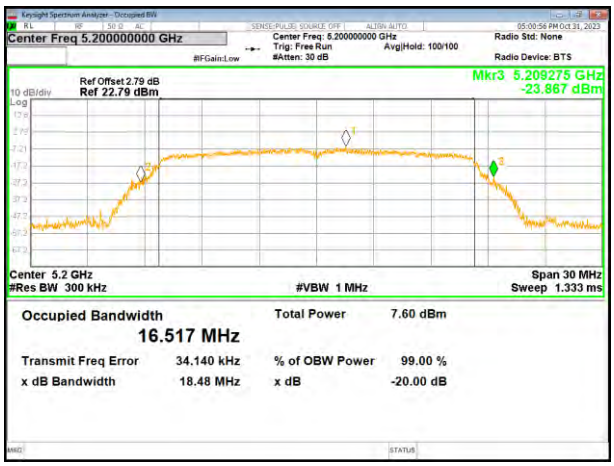
(802.11a) plot on channel 36



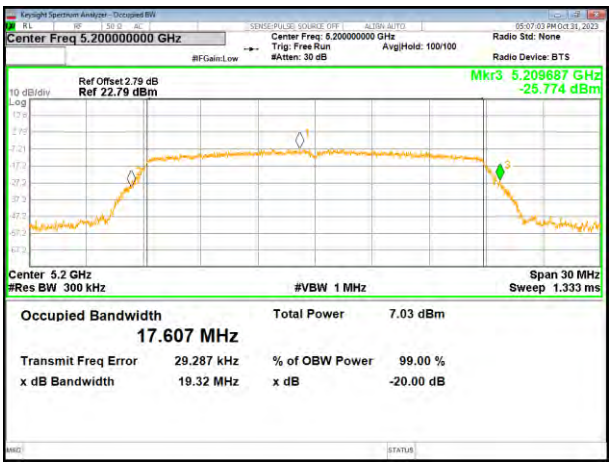
(802.11 n20) plot on channel 36



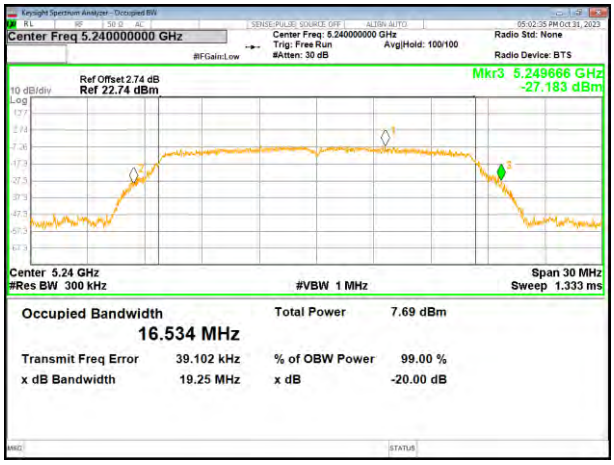
(802.11a) plot on channel 40



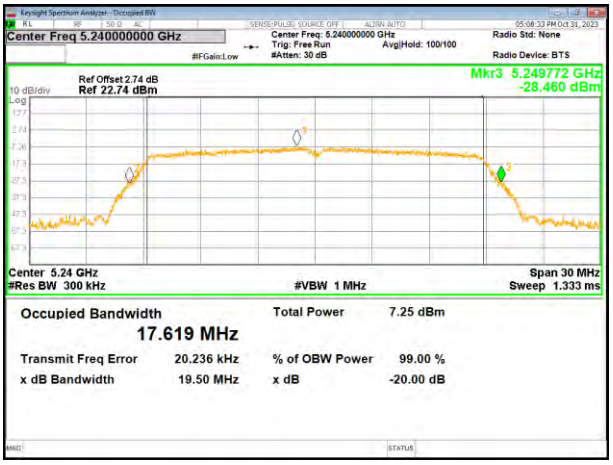
(802.11 n20) plot on channel 40



(802.11a) plot on channel 48

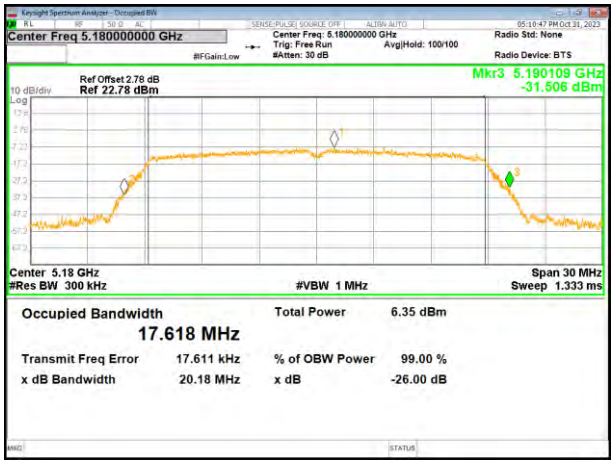


(802.11 n20) plot on channel 48

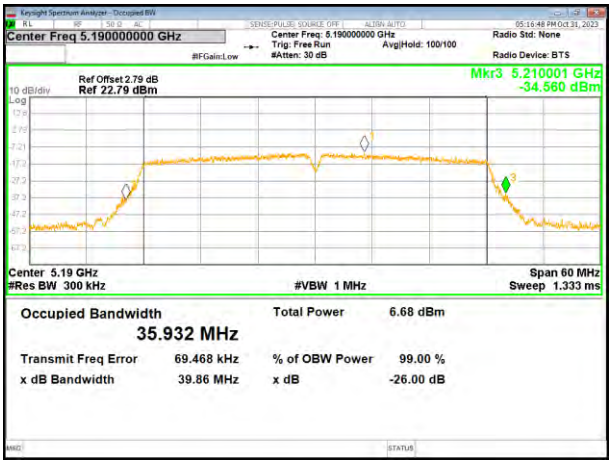


Test plot

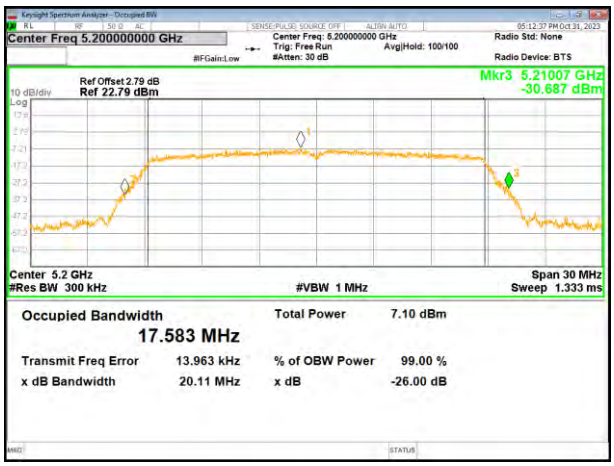
(802.11ac20) plot on channel 36



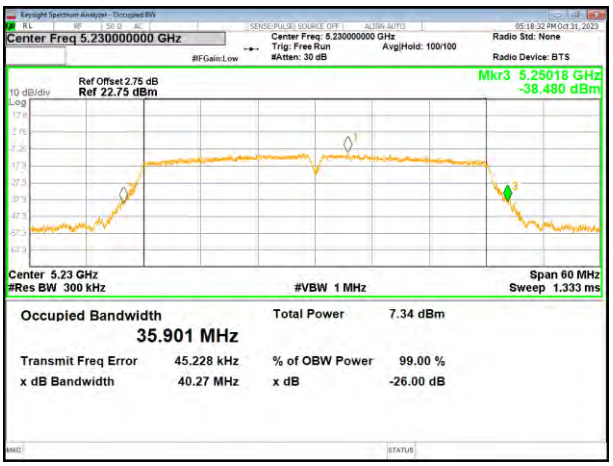
(802.11 n40) plot on channel 38



(802.11ac20) plot on channel 40



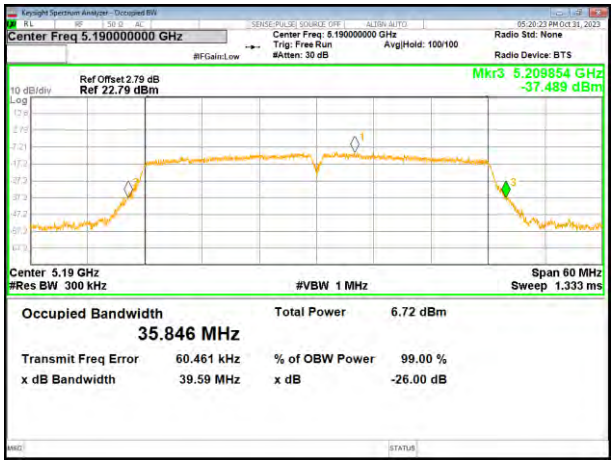
(802.11 n40) plot on channel 46



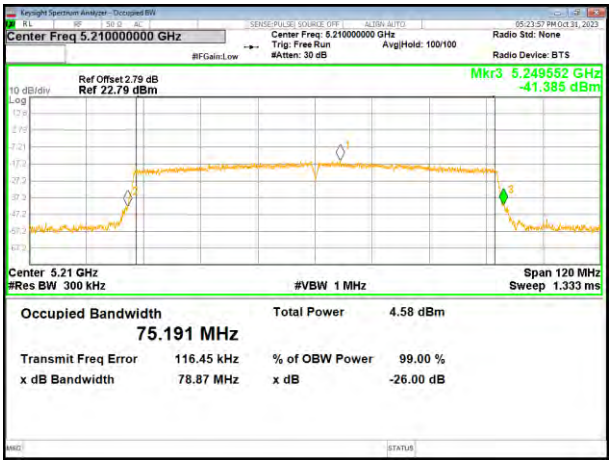
(802.11ac20) plot on channel 48

Test plot

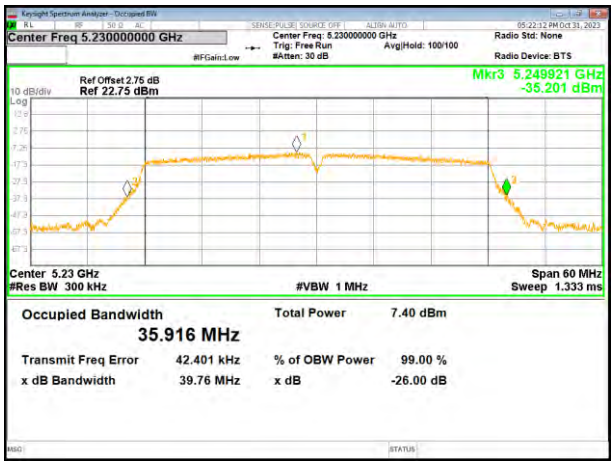
(802.11ac40) plot on channel 38



(802.11ac80) plot on channel 42

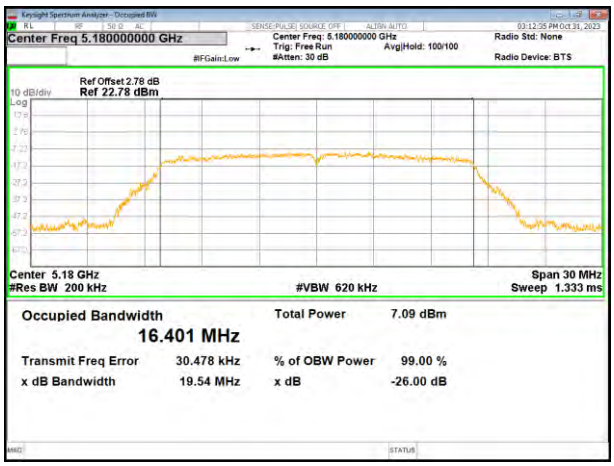


(802.11ac40) plot on channel 46

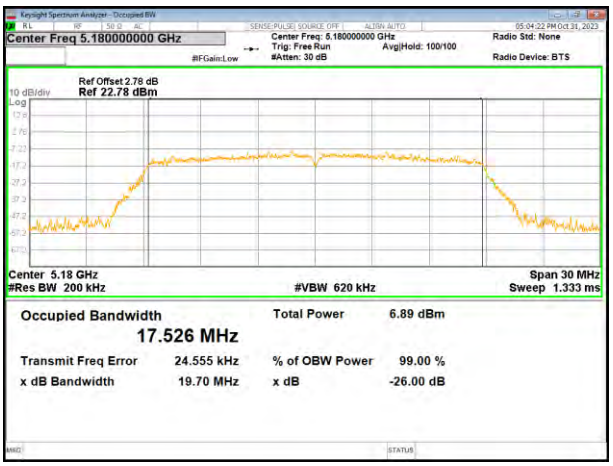


Test plot 99% Occupy Bandwidth

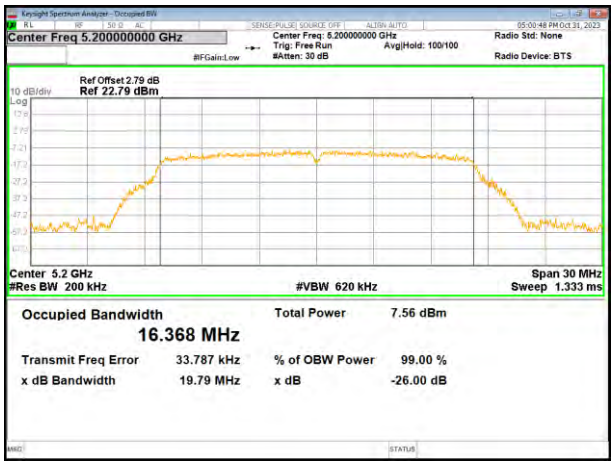
(802.11a) plot on channel 36



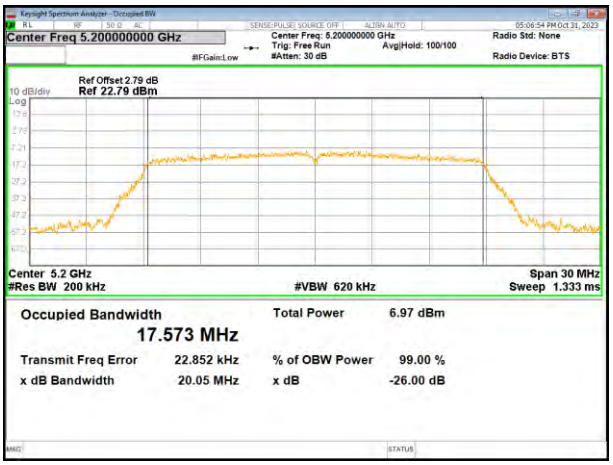
(802.11 n20) plot on channel 36



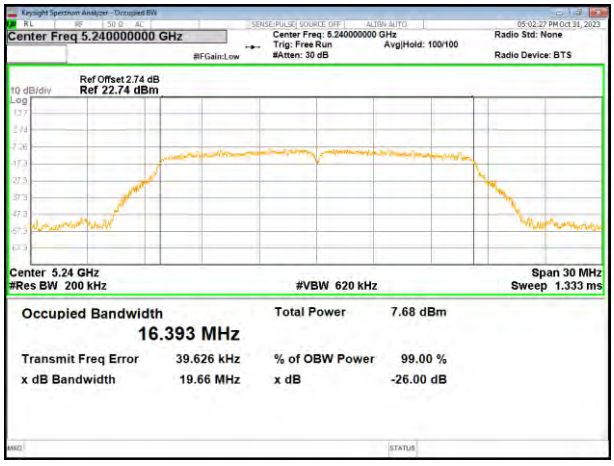
(802.11a) plot on channel 40



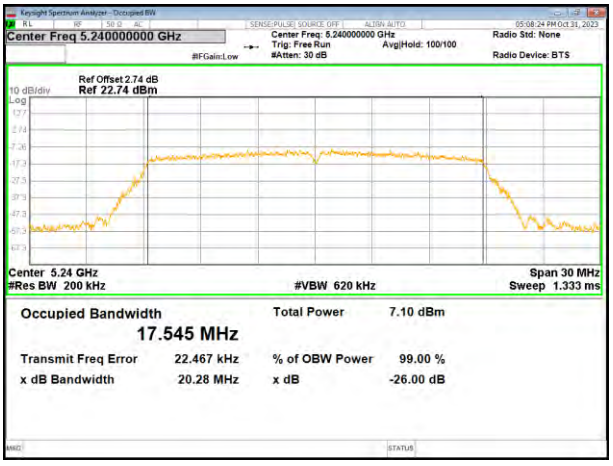
(802.11 n20) plot on channel 40



(802.11a) plot on channel 48

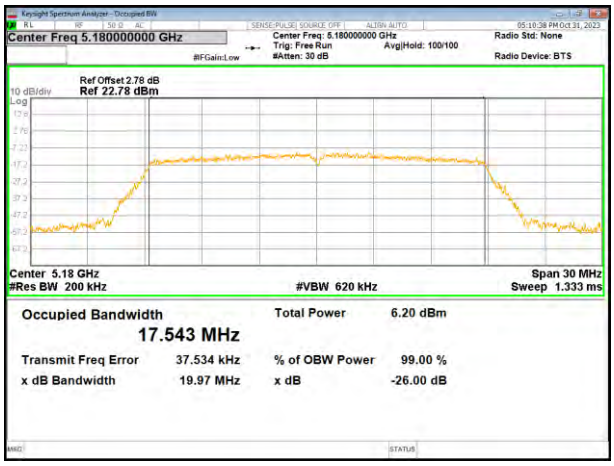


(802.11 n20) plot on channel 48

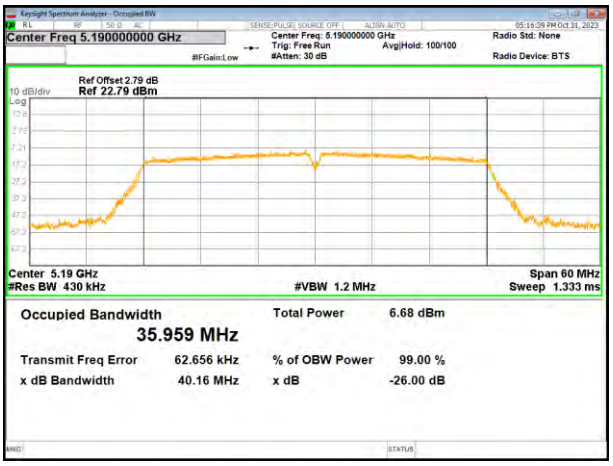


Test plot

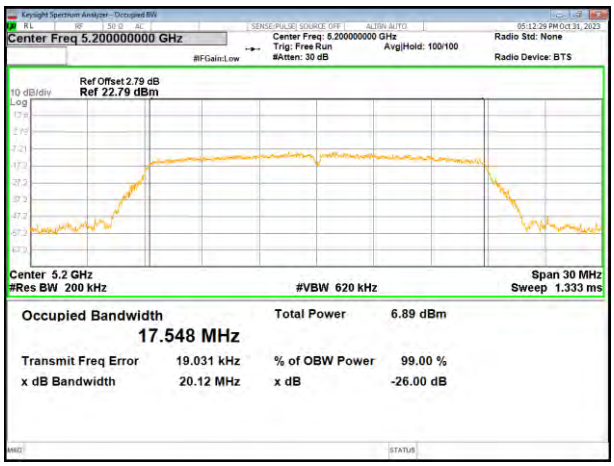
(802.11ac20) plot on channel 36



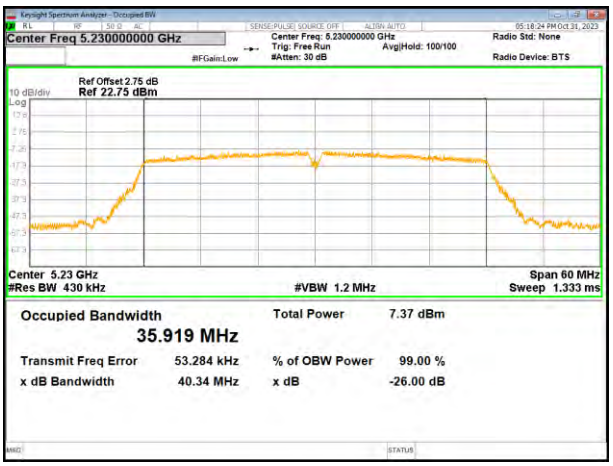
(802.11 n40) plot on channel 38



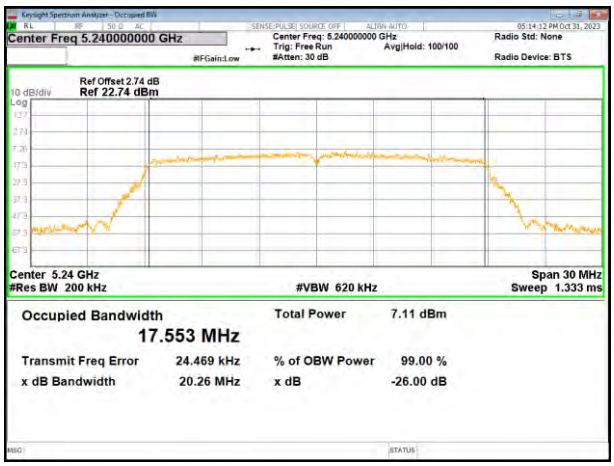
(802.11ac20) plot on channel 40



(802.11 n40) plot on channel 46

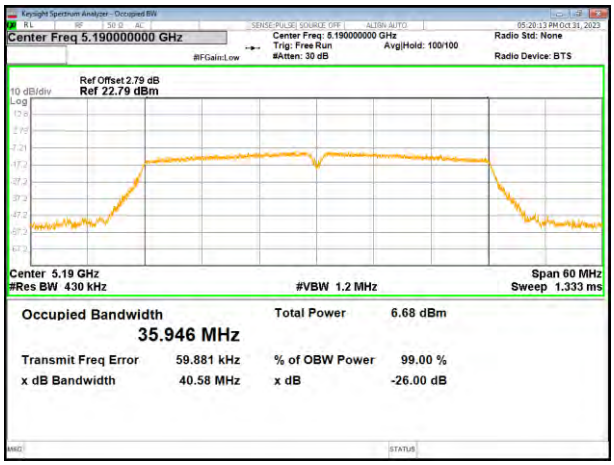


(802.11ac20) plot on channel 48

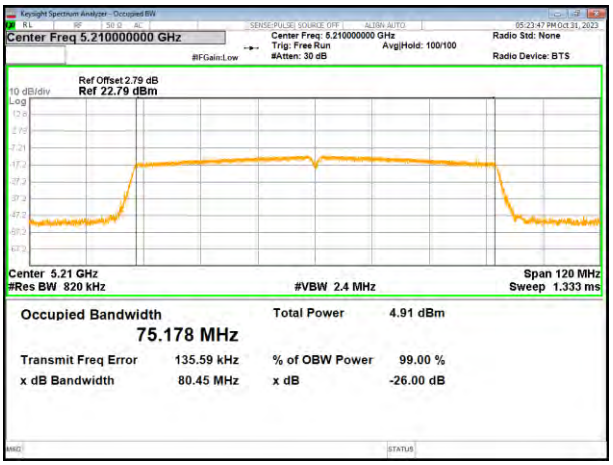


Test plot

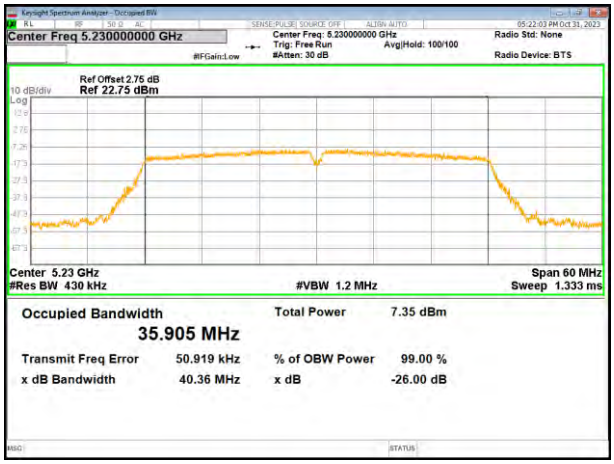
(802.11ac40) plot on channel 38



(802.11ac80) plot on channel 42



(802.11ac40) plot on channel 46



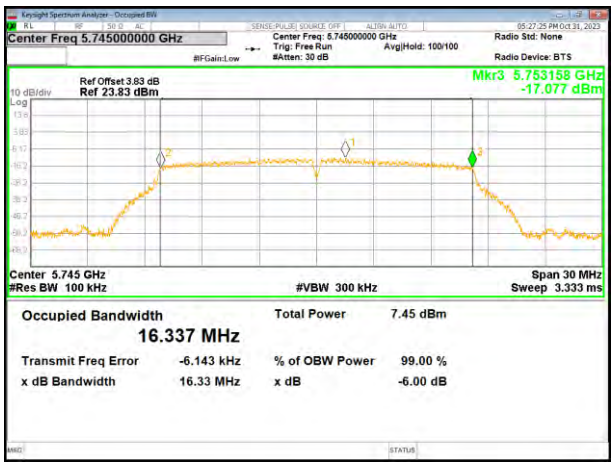
5745-5825MHz

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	16.33	17.59	17.58	35.92	36.04	--	>500	Pass
Middle	16.34	17.54	17.56	--	--	74.23		
Highest	16.32	17.58	17.58	35.07	35.64	--		

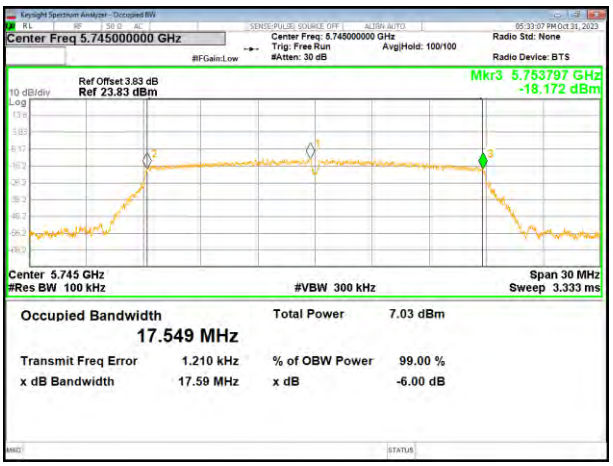
Remark: “---“is not applicable

Test plot -6dB Channel Bandwidth

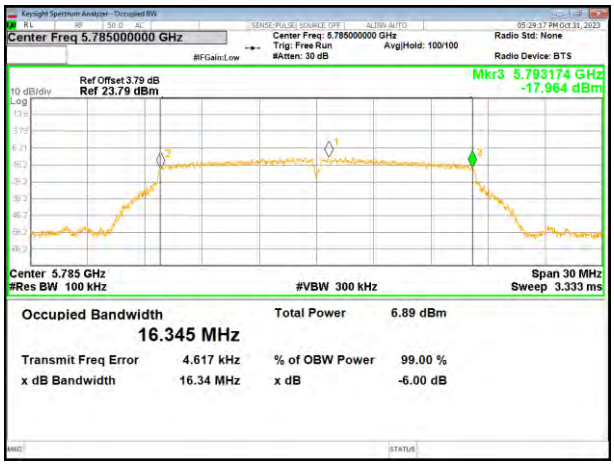
(802.11a) plot on channel 149



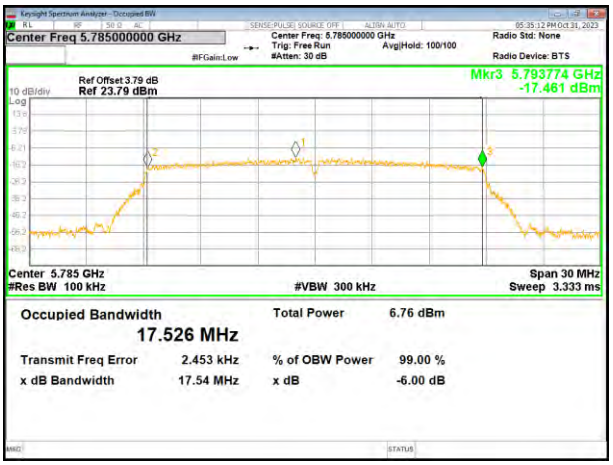
(802.11 n20) plot on channel 149



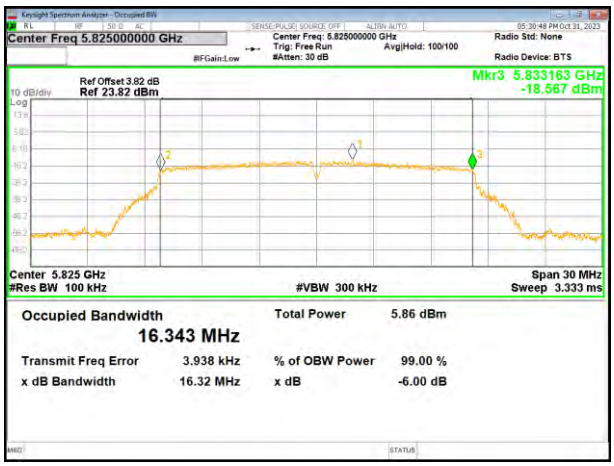
(802.11a) plot on channel 157



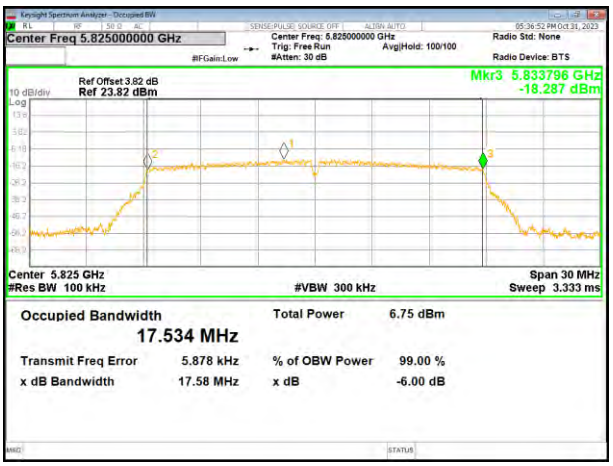
(802.11 n20) plot on channel 157



(802.11a) plot on channel 165



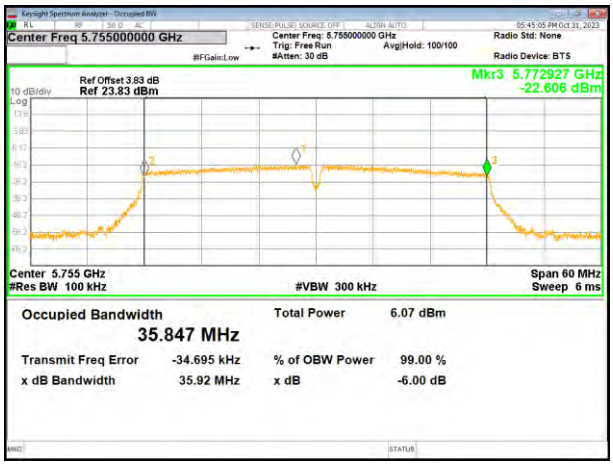
(802.11 n20) plot on channel 165



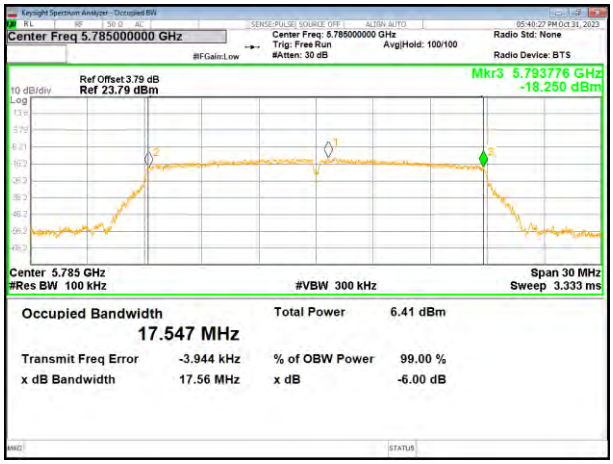
Test plot

(802.11ac20) plot on channel 149

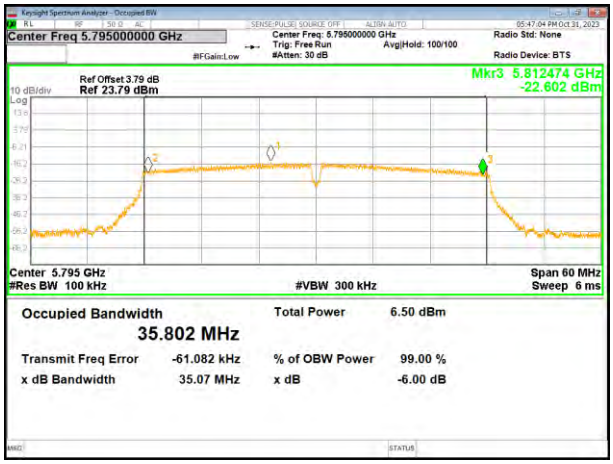
(802.11 n40) plot on channel 151



(802.11ac20) plot on channel 157



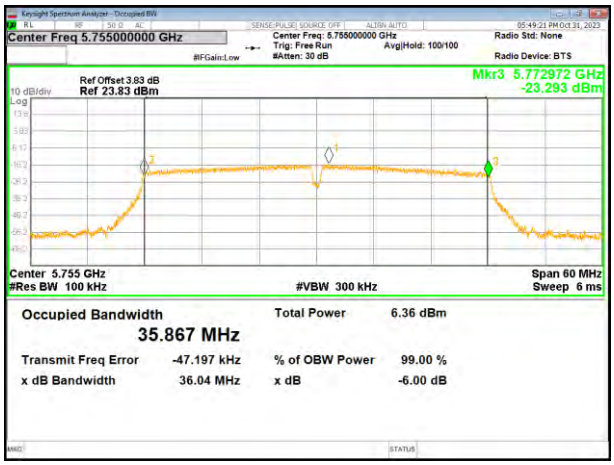
(802.11 n40) plot on channel 159



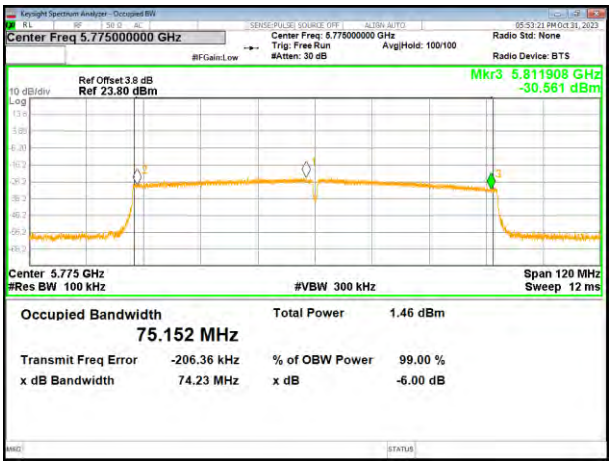
(802.11ac20) plot on channel 165

Test plot

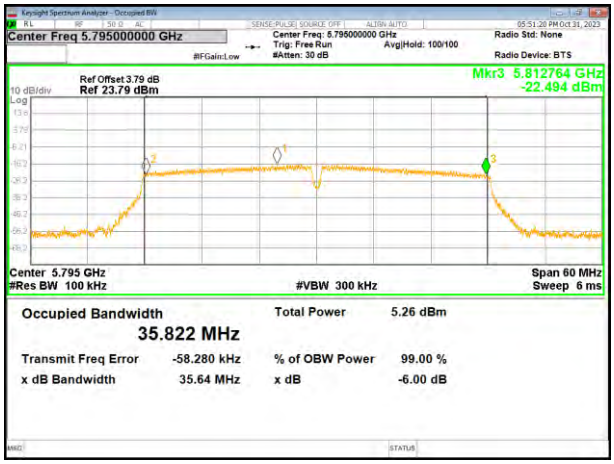
(802.11 ac40) plot on channel 151



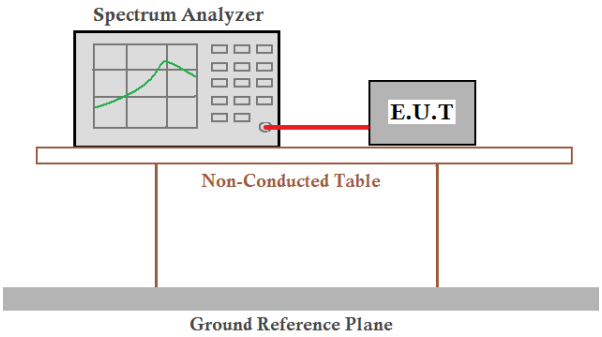
(802.11 ac80) plot on channel 155



(802.11 ac40) plot on channel 159



4.6 Power Spectral Density

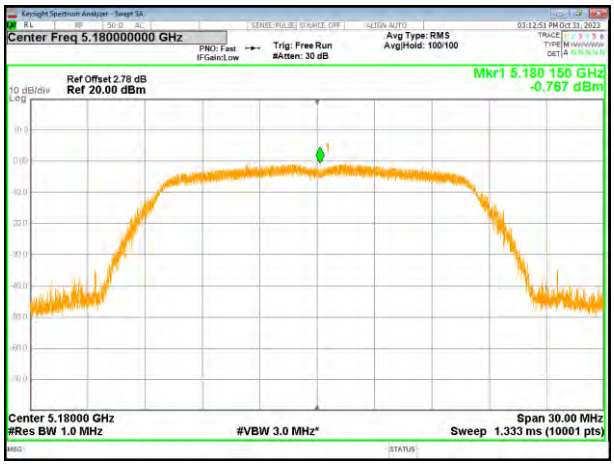
Test Requirement:	FCC Part15 E Section 15.407(a)(1)/ (a)(3)
Test Method:	ANSI C63.10:2013 and KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Limit:	Frequency band (MHz) / Limit 5150-5250 / ≤17dBm/1MHz for master device 5150-5250 / ≤11dBm/1MHz for client device 5250-5350 / ≤11dBm/1MHz for 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.: 26.2°C / Humid.: 51%RH
Test voltage:	DC 3.7V
Test results:	Pass

Measurement Result

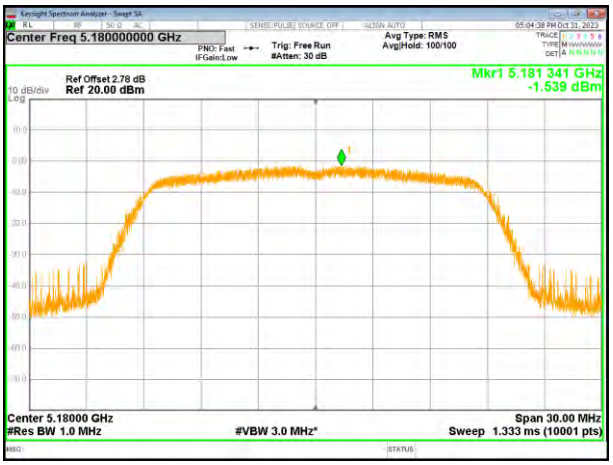
5180-5240MHz

Mode	Frequency	Measured Power Density (dBm/MHz)	Correction Factor (dB)	Total Measured Power Density (dBm/MHz)	Limit (dBm/MHz)
802.11 a	5180 MHz	-0.767	0.00	-0.767	11
	5200 MHz	-0.583	0.00	-0.583	11
	5240 MHz	-0.129	0.00	-0.129	11
802.11 n20	5180 MHz	-1.539	0.00	-1.539	11
	5200 MHz	-0.952	0.00	-0.952	11
	5240 MHz	-0.843	0.00	-0.843	11
802.11 ac20	5180 MHz	-3.993	0.00	-3.993	11
	5200 MHz	-3.462	0.00	-3.462	11
	5240 MHz	-2.073	0.00	-2.073	11
802.11 n40	5190 MHz	-0.628	0.00	-0.628	11
	5230 MHz	-0.893	0.00	-0.893	11
802.11 ac40	5190 MHz	-4.465	0.00	-4.465	11
	5230 MHz	-3.70	0.00	-3.70	11
802.11 ac80	5210 MHz	-9.563	0.00	-9.563	11

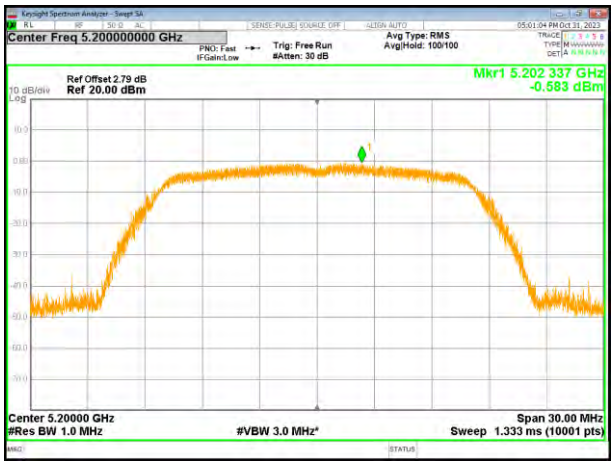
(802.11a) PSD plot on channel 36



(802.11n20) PSD plot on channel 36



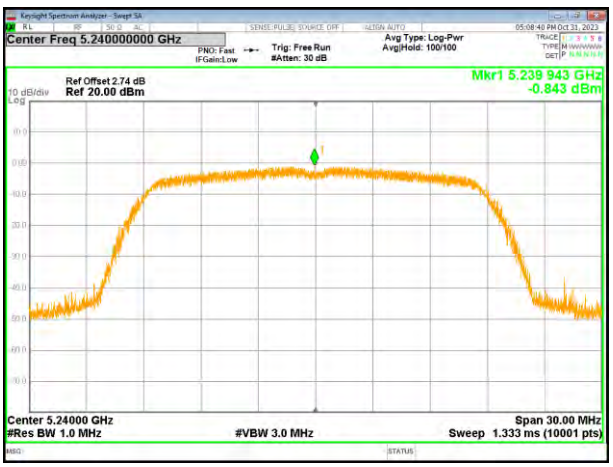
(802.11a) PSD plot on channel 40



(802.11n20) PSD plot on channel 40

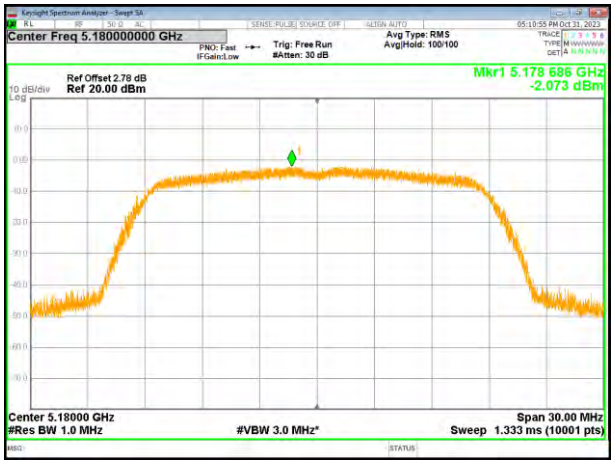
(802.11a) PSD plot on channel 48

(802.11n20) PSD plot on channel 48



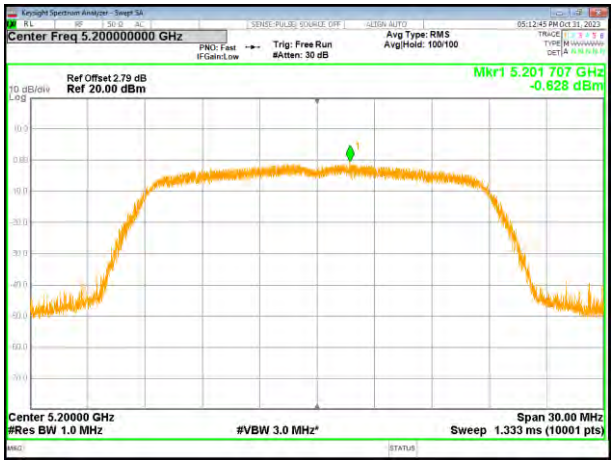
(802.11ac20) PSD plot on channel 36

(802.11n40) PSD plot on channel 38

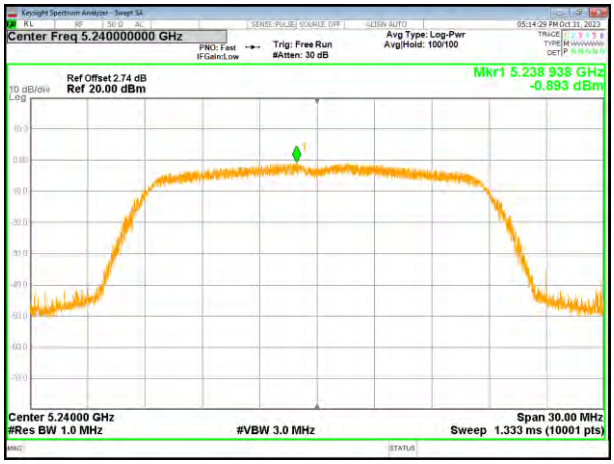


(802.11ac20) PSD plot on channel 40

(802.11n40) PSD plot on channel 46

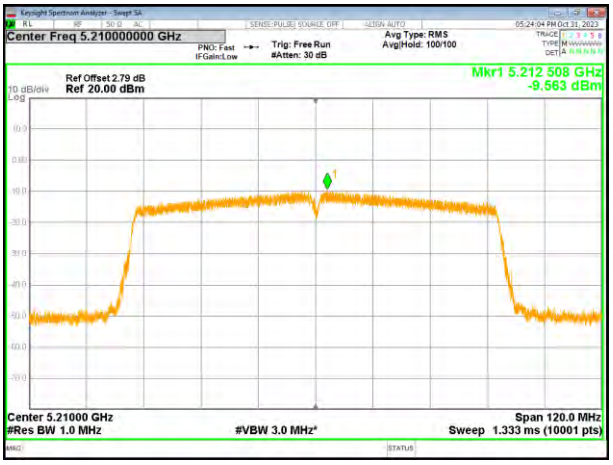


(802.11ac20) PSD plot on channel 48

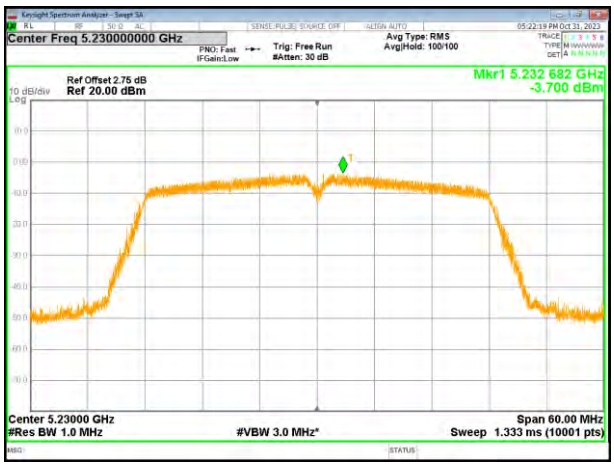


(802.11ac40) PSD plot on channel 38

(802.11ac80) PSD plot on channel 42



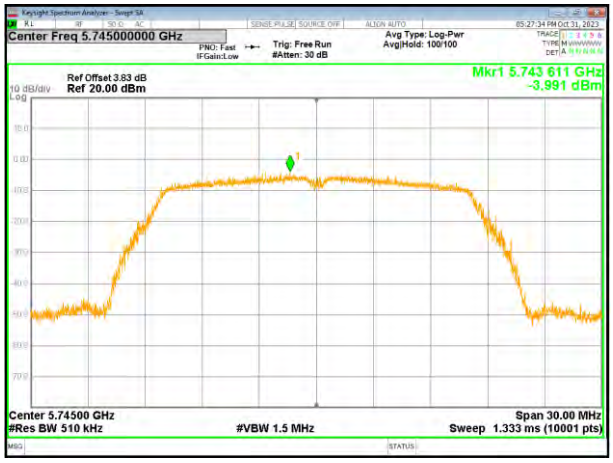
(802.11ac40) PSD plot on channel 46



Mode	Frequency	Measured Power Density (dBm/510KHz)	Measured Power Density (dBm/500KHz)	Correction Factor (dB)	Total Measured Power Density (dBm/500KHz)	Limit (dBm/MHz)
802.11 a	5745 MHz	-3.991	-4.077	0.00	-4.077	30
	5785 MHz	-4.649	-4.735	0.00	-4.735	30
	5825 MHz	-5.549	-5.635	0.00	-5.635	30
802.11 n20	5745 MHz	-3.796	-3.882	0.00	-3.882	30
	5785 MHz	-5.245	-5.331	0.00	-5.331	30
	5825 MHz	-4.175	-4.261	0.00	-4.261	30
802.11 ac20	5745 MHz	-7.806	-7.892	0.00	-7.892	30
	5785 MHz	-7.986	-8.072	0.00	-8.072	30
	5825 MHz	-4.683	-4.769	0.00	-4.769	30
802.11 n40	5755 MHz	-4.946	-5.032	0.00	-5.032	30
	5795 MHz	-5.802	-5.888	0.00	-5.888	30
802.11 ac40	5755 MHz	-8.122	-8.208	0.00	-8.208	30
	5795 MHz	-9.553	-9.639	0.00	-9.639	30
802.11 ac80	5775 MHz	-11.991	-12.077	0.00	-12.077	30

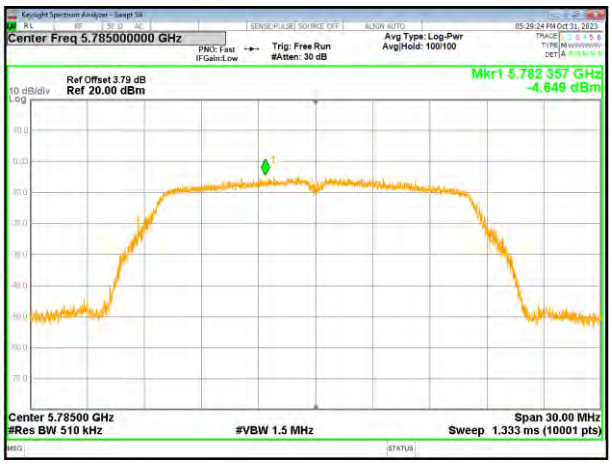
Note: If the measurement is X dBm/510kHz, thus X dBm/510kHz = $(10^{X/10})$*(500 / 510) dBm/500kHz

(802.11a) PSD plot on channel 149

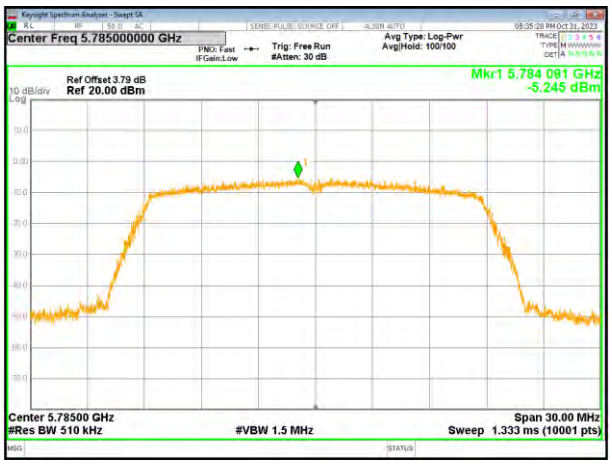


(802.11n20) PSD plot on channel 149

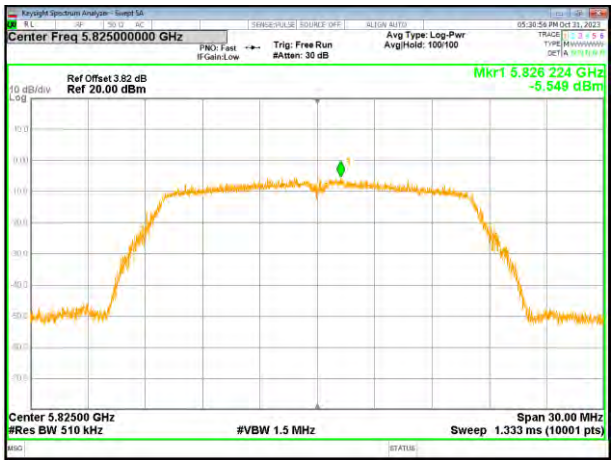
(802.11a) PSD plot on channel 157



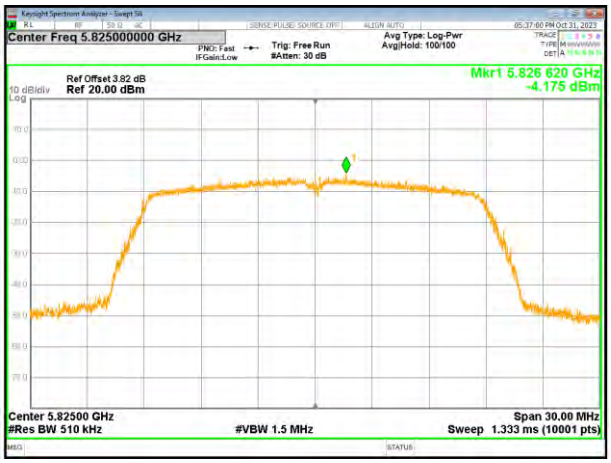
(802.11n20) PSD plot on channel 157



(802.11a) PSD plot on channel 165

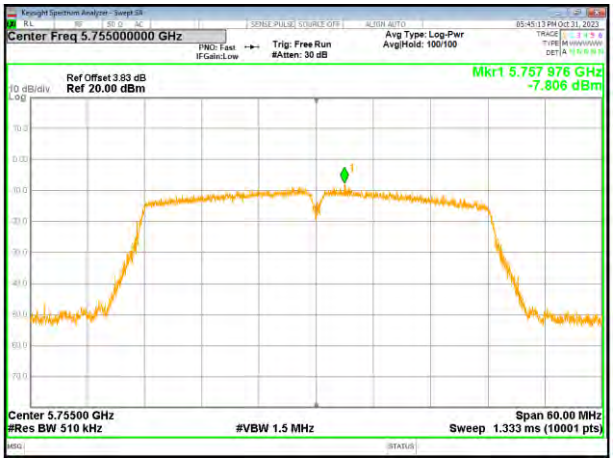


(802.11n20) PSD plot on channel 165



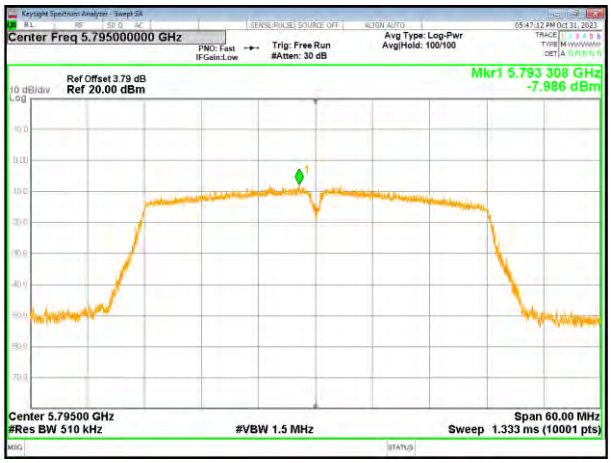
(802.11ac20) PSD plot on channel 149

(802.11n40) PSD plot on channel 151

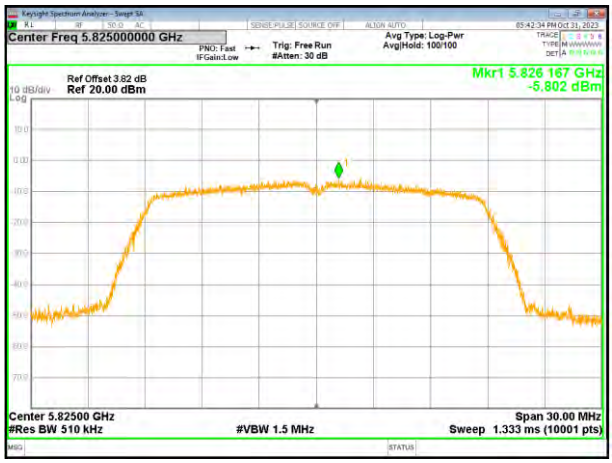


(802.11ac20) PSD plot on channel 157

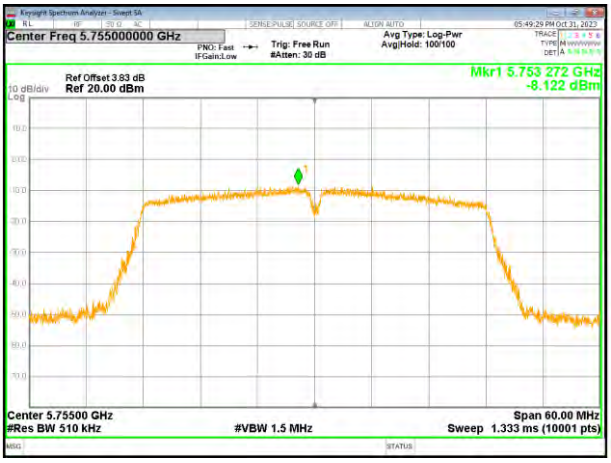
(802.11n40) PSD plot on channel 159



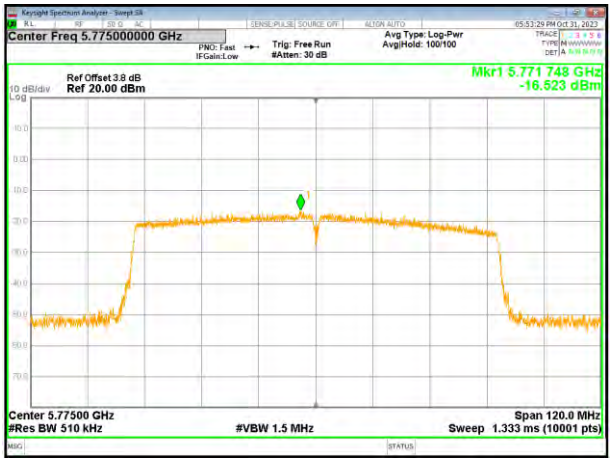
(802.11ac20) PSD plot on channel 165



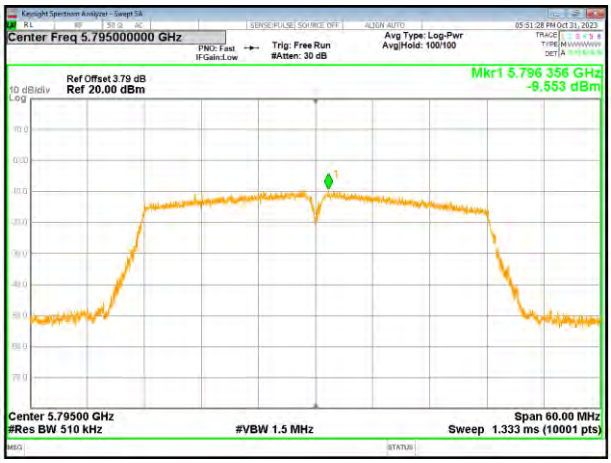
(802.11ac40) PSD plot on channel 151



(802.11ac80) PSD plot on channel 155

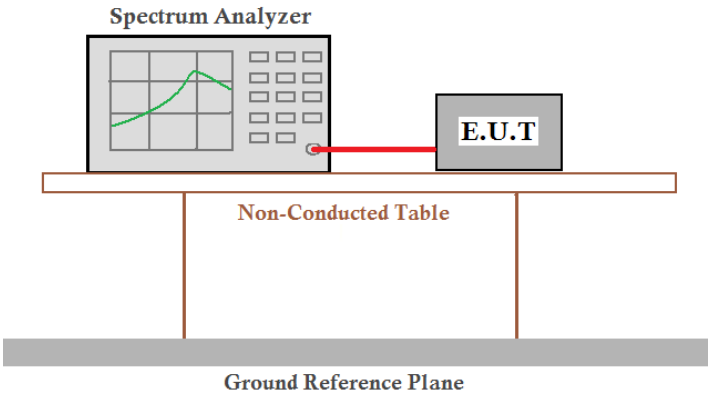


(802.11ac40) PSD plot on channel 159



4.7 Band edge

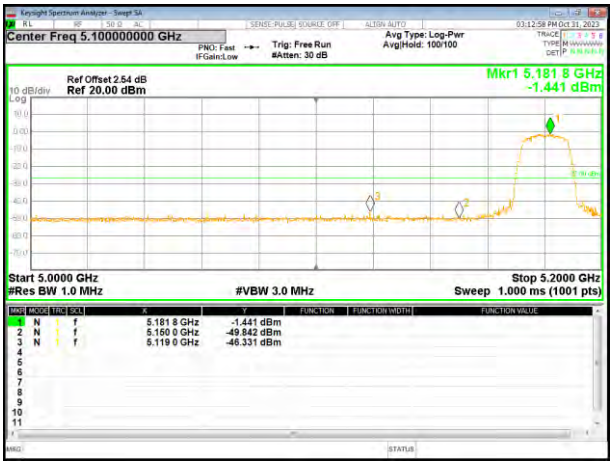
4.7.1 Conducted test Method

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:		
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.: 26.2°C	Humid.: 51%RH
Test voltage:	DC 3.7V	
Test results:	Pass	

Remark: Antenna gain data included in Offset.

5.180~5.240 GHz

(802.11a) Band Edge, Left Side



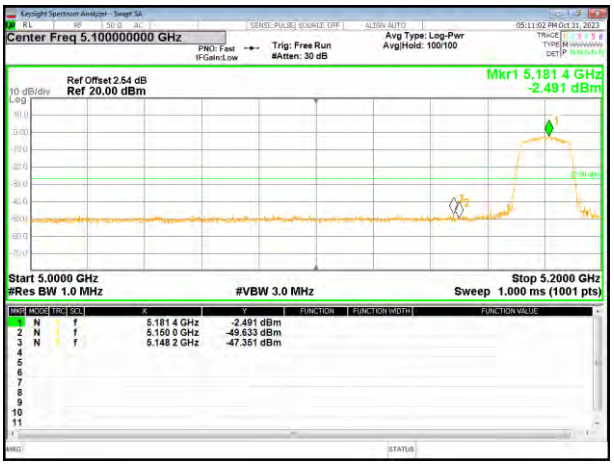
(802.11n20) Band Edge, Left Side

(802.11a) Band Edge, Right Side

(802.11n20) Band Edge, Right Side

5.180~5.240 GHz

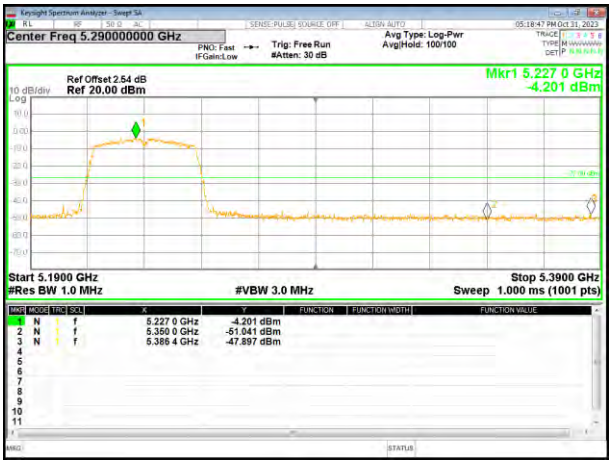
(802.11ac20) Band Edge, Left Side



(802.11n40) Band Edge, Left Side

(802.11ac20) Band Edge, Right Side

(802.11n40) Band Edge, Right Side

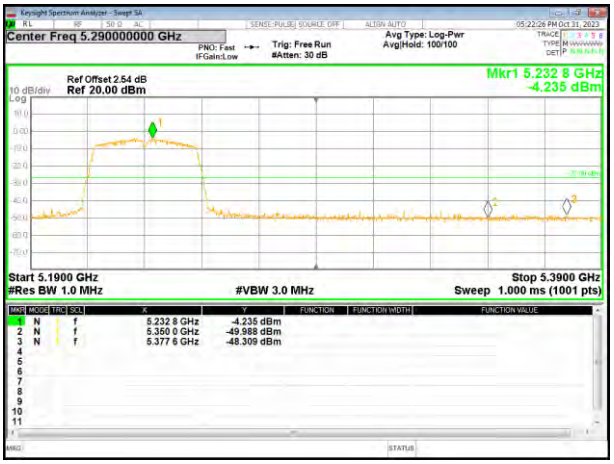


5.180~5.240 GHz

(802.11ac40) Band Edge, Left Side

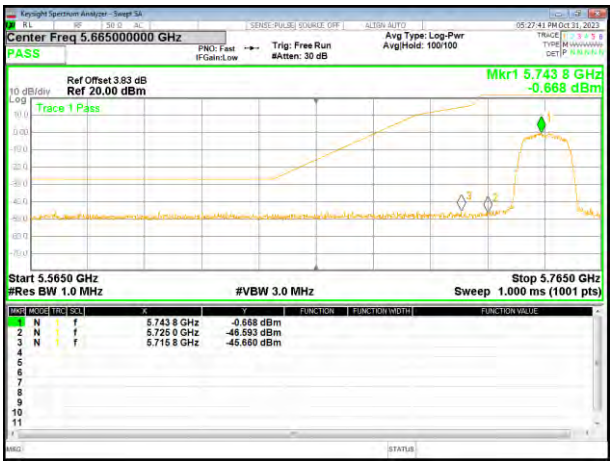
(802.11ac80) Band Edge

(802.11ac40) Band Edge, Right Side

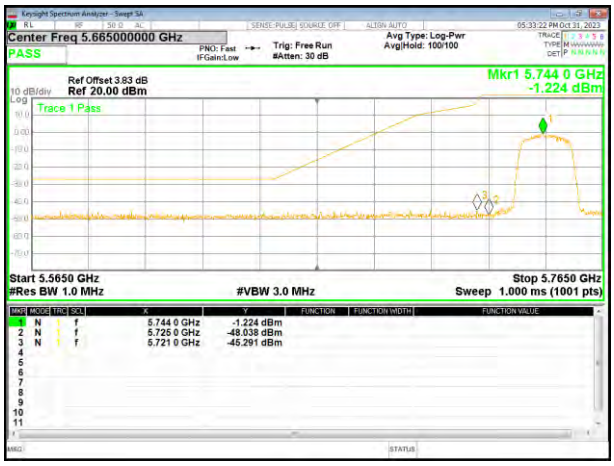


5.745~5.825 GHz

(802.11a) Band Edge, Left Side

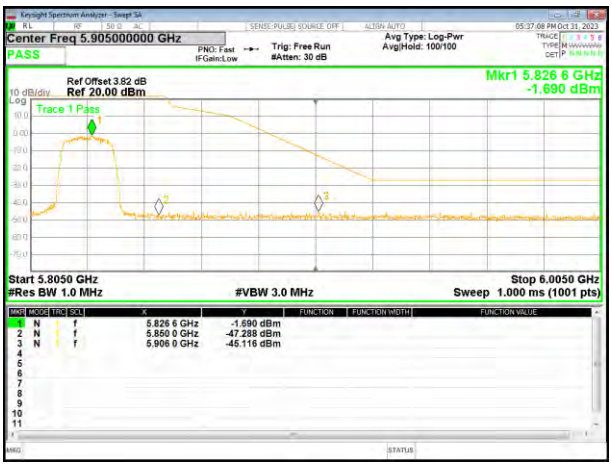


(802.11n20) Band Edge, Left Side



(802.11a) Band Edge, Right Side

(802.11n20) Band Edge, Right Side



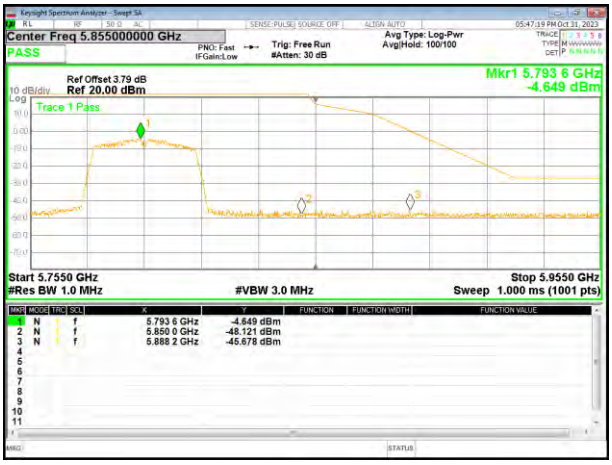
5.745~5.825 GHz

(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

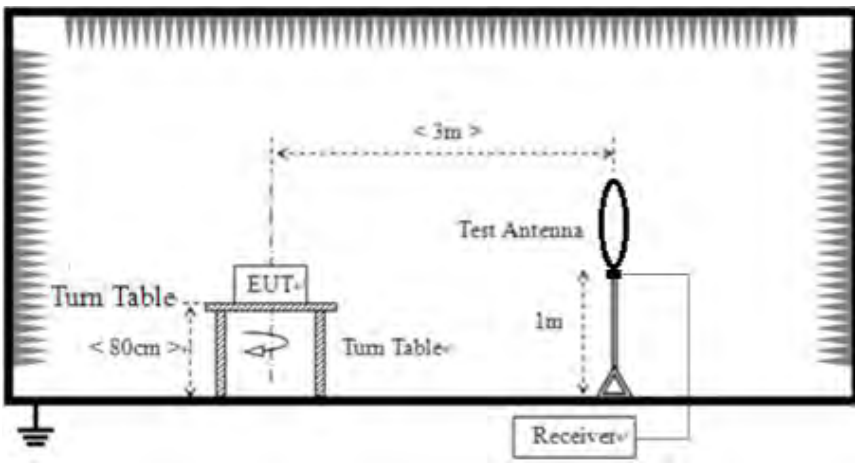
Limit:

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	

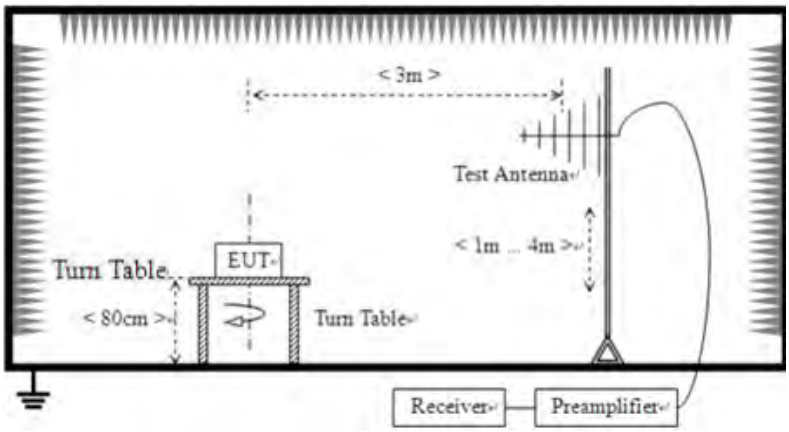
Frequency	Limit (dBm/MHz)	Remark
Above 1GHz	-27.0	Peak Value

Test setup:

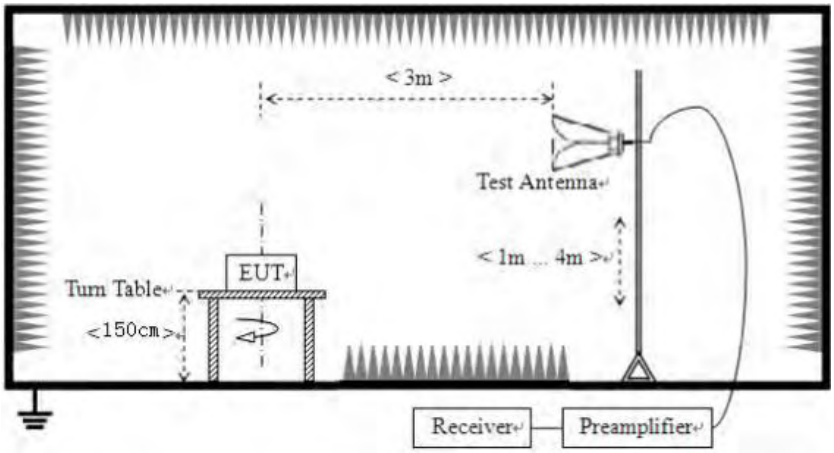
For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30MHz to1GHz



For radiated emissions above 1GHz



Test Procedure:	FCC Part15 C Section 15.209, Part 15E Section 15.407(b)(4) RSS-247 §6.2.1.2&6.2.4.2					
Test Instruments:	ANSI C63.10:2013 , RSS-Gen					
Test mode:	Refer to section 2.2 for details					
Test environment:	Temp.:	26.2 °C	Humid.:	51%	Press.:	101.2kPar
Test voltage:	DC 3.7V					
Test results:	Pass					

Remarks:

1. *All mode was tested, only show the worst case 802.11ac mode test data.*
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:

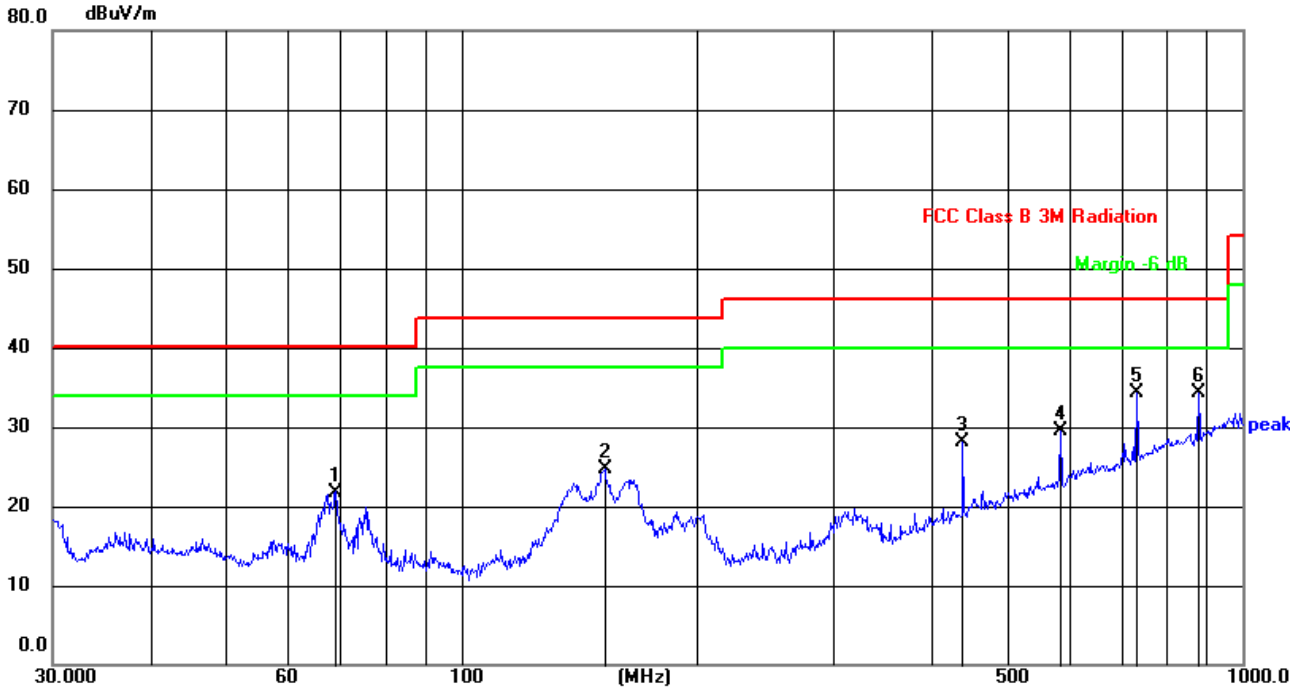
9 kHz ~ 30 MHz

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

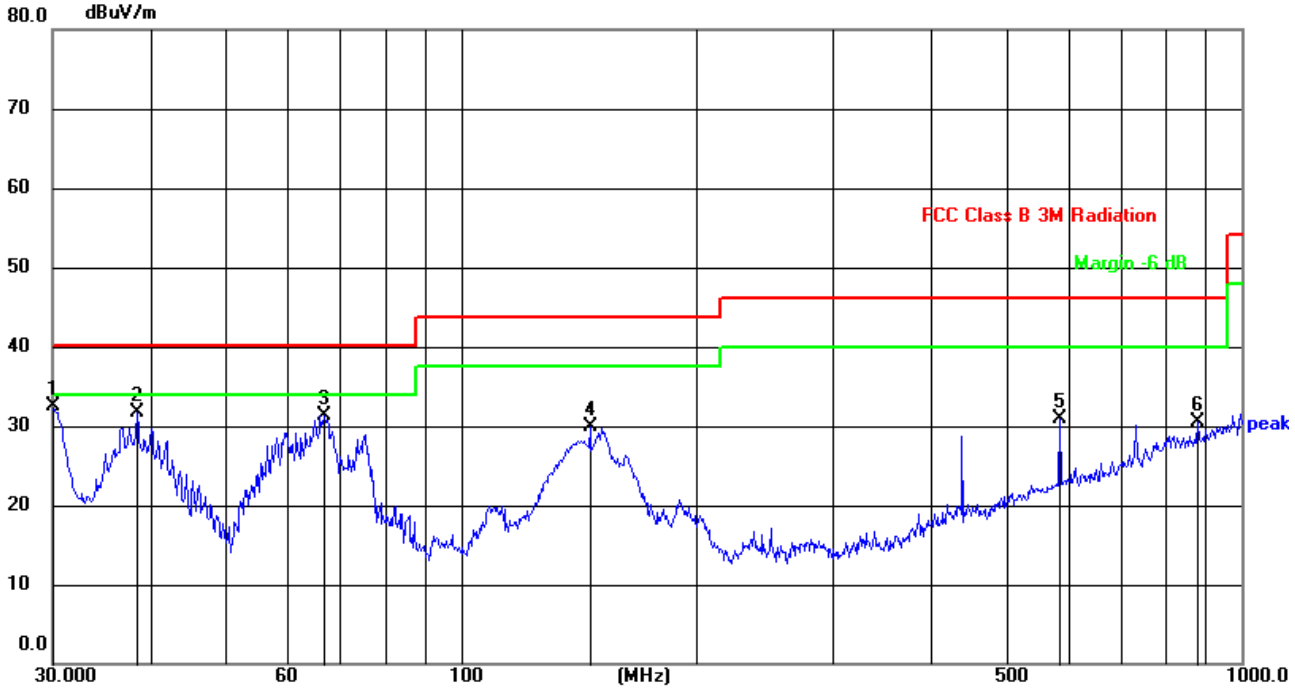
Temperature:	26.2℃	Relative Humidity:	51%
Pressure:	101.2kPar	Test Voltage :	DC 3.7V
Test Mode :	5.2G TX- 802.11a(5240MHz)		

Horizontal:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	69.1140	45.81	-24.01	21.80	40.00	-18.20	QP
2	152.6639	45.21	-20.52	24.69	43.50	-18.81	QP
3	438.6553	44.01	-15.88	28.13	46.00	-17.87	QP
4	584.7894	41.54	-12.09	29.45	46.00	-16.55	QP
5	731.9202	42.86	-8.47	34.39	46.00	-11.61	QP
6	878.3214	40.13	-5.81	34.32	46.00	-11.68	QP

Vertical:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	30.0000	55.36	-22.77	32.59	40.00	-7.41	QP
2	38.4808	52.80	-21.18	31.62	40.00	-8.38	QP
3	66.7325	55.02	-23.63	31.39	40.00	-8.61	QP
4	146.3734	50.86	-20.91	29.95	43.50	-13.55	QP
5	584.7894	42.92	-12.09	30.83	46.00	-15.17	QP
6	878.3214	36.34	-5.81	30.53	46.00	-15.47	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 802.11a mode

Above 1GHz:

Temperature:	26.2℃	Relative Humidity:	51%
Pressure:	101.2kPar	Test Voltage :	DC 3.7V
Test Mode :	5.2G TX- 802.11a		

Polar (H/V)	Frequency	Meter Reading	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	MHz	dBuV	dB	dB	dB	dBuV/m	dBuV/m	dB	
Low Channel:5180MHz									
V	10360.00	49.51	46.20	8.27	38.50	50.08	68.20	-18.12	PK
V	10360.00	39.75	46.20	8.27	38.50	40.32	54.00	-13.68	AV
V	15540.00	46.68	46.30	10.35	38.70	49.43	74.00	-24.57	PK
V	15540.00	36.87	46.30	10.35	38.70	39.62	54.00	-14.38	AV
V	20720.00	55.57	57.40	11.93	37.80	47.90	68.20	-20.30	PK
V	20720.00	45.77	57.40	11.93	37.80	38.10	54.00	-15.90	AV
V	25900.00	53.27	56.50	13.45	39.70	49.92	68.20	-18.28	PK
V	25900.00	43.08	56.50	13.45	39.70	39.73	54.00	-14.27	AV
H	10360.00	49.43	46.20	8.27	38.50	50.00	68.20	-18.20	PK
H	10360.00	38.41	46.20	8.27	38.50	38.98	54.00	-15.02	AV
H	15540.00	45.72	46.30	10.35	38.70	48.47	74.00	-25.53	PK
H	15540.00	34.49	46.30	10.35	38.70	37.24	54.00	-16.76	AV
H	20720.00	57.74	57.40	11.93	37.80	50.07	68.20	-18.13	PK
H	20720.00	46.65	57.40	11.93	37.80	38.98	54.00	-15.02	AV
H	25900.00	54.27	56.50	13.45	39.70	50.92	68.20	-17.28	PK
H	25900.00	43.11	56.50	13.45	39.70	39.76	54.00	-14.24	AV

Polar (H/V)	Frequency	Meter Reading	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Middle Channel:5200MHz									
V	10400.00	48.58	46.20	8.27	38.50	49.15	68.20	-19.05	PK
V	10400.00	39.51	46.20	8.27	38.50	40.08	54.00	-13.92	AV
V	15600.00	46.99	46.30	10.35	38.40	49.44	74.00	-24.56	PK
V	15600.00	38.36	46.30	10.35	38.40	40.81	54.00	-13.19	AV
V	20800.00	56.76	57.40	11.93	37.80	49.09	68.20	-19.11	PK
V	20800.00	47.26	57.40	11.93	37.80	39.59	54.00	-14.41	AV
V	26000.00	51.99	56.50	13.45	39.80	48.74	68.20	-19.46	PK
V	26000.00	44.29	56.50	13.45	39.80	41.04	54.00	-12.96	AV
H	10400.00	49.17	46.20	8.27	38.50	49.74	68.20	-18.46	PK
H	10400.00	39.77	46.20	8.27	38.50	40.34	54.00	-13.66	AV
H	15600.00	46.97	46.30	10.35	38.40	49.42	74.00	-24.58	PK
H	15600.00	38.36	46.30	10.35	38.40	40.81	54.00	-13.19	AV
H	20800.00	55.73	57.40	11.93	37.80	48.06	68.20	-20.14	PK
H	20800.00	45.21	57.40	11.93	37.80	37.54	54.00	-16.46	AV
H	26000.00	51.72	56.50	13.45	39.80	48.47	68.20	-19.73	PK
H	26000.00	43.51	56.50	13.45	39.80	40.26	54.00	-13.74	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	10480.00	45.46	46.20	8.27	38.60	46.13	68.20	-22.07	PK
V	10480.00	35.66	46.20	8.27	38.60	36.33	54.00	-17.67	AV
V	15720.00	43.08	46.30	10.35	38.40	45.53	74.00	-28.47	PK
V	15720.00	33.45	46.30	10.35	38.40	35.90	54.00	-18.10	AV
V	20960.00	52.97	57.40	11.93	37.50	45.00	68.20	-23.20	PK
V	20960.00	44.58	57.40	11.93	37.50	36.61	54.00	-17.39	AV
V	26200.00	49.04	56.50	13.45	40.10	46.09	68.20	-22.11	PK
V	26200.00	39.82	56.50	13.45	40.10	36.87	54.00	-17.13	AV
H	10480.00	45.70	46.20	8.27	38.60	46.37	68.20	-21.83	PK
H	10480.00	35.66	46.20	8.27	38.60	36.33	54.00	-17.67	AV
H	15720.00	43.40	46.30	10.35	38.40	45.85	74.00	-28.15	PK
H	15720.00	33.54	46.30	10.35	38.40	35.99	54.00	-18.01	AV
H	20960.00	53.16	57.40	11.93	37.50	45.19	68.20	-23.01	PK
H	20960.00	44.48	57.40	11.93	37.50	36.51	54.00	-17.49	AV
H	26200.00	48.75	56.50	13.45	40.10	45.80	68.20	-22.40	PK
H	26200.00	39.21	56.50	13.45	40.10	36.26	54.00	-17.74	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. The worst mode is 802.11a, only the worst data is recorded.

Temperature：	26.2℃	Relative Humidity：	51%
Pressure：	101.2kPar	Test Voltage ：	DC24V
Test Mode ：	5.8G TX- 802.11a		

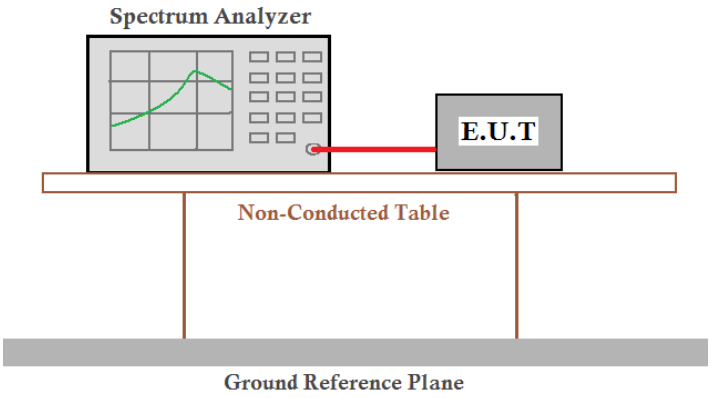
Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenn Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Typ
Low Channel:5745MHz									
V	11490.00	44.80	46.10	8.77	39.10	46.57	74.00	-27.43	PK
V	11490.00	37.08	46.10	8.77	39.10	38.85	54.00	-15.15	AV
V	17235.00	42.52	47.60	11.10	38.70	44.72	68.20	-23.48	PK
V	17235.00	35.61	47.60	11.10	38.70	37.81	54.00	-16.19	AV
V	22980.00	50.78	56.90	12.73	37.70	44.31	74.00	-29.69	PK
V	22980.00	43.20	56.90	12.73	37.70	36.73	54.00	-17.27	AV
V	28725.00	47.76	55.60	14.25	40.30	46.71	68.20	-21.49	PK
V	28725.00	39.71	55.60	14.25	40.30	38.66	54.00	-15.34	AV
H	11490.00	45.26	46.10	8.77	39.10	47.03	74.00	-26.97	PK
H	11490.00	36.92	46.10	8.77	39.10	38.69	54.00	-15.31	AV
H	17235.00	43.49	47.60	11.10	38.70	45.69	68.20	-22.51	PK
H	17235.00	36.00	47.60	11.10	38.70	38.20	54.00	-15.80	AV
H	22980.00	52.88	56.90	12.73	37.70	46.41	74.00	-27.59	PK
H	22980.00	42.98	56.90	12.73	37.70	36.51	54.00	-17.49	AV
H	28725.00	49.62	55.60	14.25	40.30	48.57	68.20	-19.63	PK
H	28725.00	40.30	55.60	14.25	40.30	39.25	54.00	-14.75	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	44.63	46.10	8.77	39.10	46.40	74.00	-27.60	PK
V	11570.00	36.91	46.10	8.77	39.10	38.68	54.00	-15.32	AV
V	17355.00	42.34	47.60	11.10	38.70	44.54	68.20	-23.66	PK
V	17355.00	35.41	47.60	11.10	38.70	37.61	54.00	-16.39	AV
V	23140.00	50.61	56.90	12.73	37.70	44.14	74.00	-29.86	PK
V	23140.00	43.02	56.90	12.73	37.70	36.55	54.00	-17.45	AV
V	28925.00	47.58	55.60	14.25	40.30	46.53	68.20	-21.67	PK
V	28925.00	39.52	55.60	14.25	40.30	38.47	54.00	-15.53	AV
H	11570.00	45.08	46.10	8.77	39.10	46.85	74.00	-27.15	PK
H	11570.00	36.73	46.10	8.77	39.10	38.50	54.00	-15.50	AV
H	17355.00	43.31	47.60	11.10	38.70	45.51	68.20	-22.69	PK
H	17355.00	35.82	47.60	11.10	38.70	38.02	54.00	-15.98	AV
H	23140.00	52.69	56.90	12.73	37.70	46.22	74.00	-27.78	PK
H	23140.00	42.81	56.90	12.73	37.70	36.34	54.00	-17.66	AV
H	28925.00	49.45	55.60	14.25	40.30	48.40	68.20	-19.80	PK
H	28925.00	40.12	55.60	14.25	40.30	39.07	54.00	-14.93	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	45.67	46.10	8.77	39.10	47.44	74.00	-26.56	PK
V	11650.00	37.08	46.10	8.77	39.10	38.85	54.00	-15.15	AV
V	17475.00	43.65	47.90	11.23	38.90	45.88	68.20	-22.32	PK
V	17475.00	36.39	47.90	11.23	38.90	38.62	54.00	-15.38	AV
V	23300.00	52.81	57.10	12.73	37.80	46.24	68.20	-21.96	PK
V	23300.00	43.90	57.10	12.73	37.80	37.33	54.00	-16.67	AV
V	29125.00	49.71	55.80	14.25	40.50	48.66	68.20	-19.54	PK
V	29125.00	41.31	55.80	14.25	40.50	40.26	54.00	-13.74	AV
H	11650.00	47.56	46.10	8.77	39.10	49.33	74.00	-24.67	PK
H	11650.00	39.34	46.10	8.77	39.10	41.11	54.00	-12.89	AV
H	17475.00	44.79	47.90	11.23	38.90	47.02	68.20	-21.18	PK
H	17475.00	37.60	47.90	11.23	38.90	39.83	54.00	-14.17	AV
H	23300.00	54.13	57.10	12.73	37.80	47.56	68.20	-20.64	PK
H	23300.00	45.28	57.10	12.73	37.80	38.71	54.00	-15.29	AV
H	29125.00	50.71	55.80	14.25	40.50	49.66	68.20	-18.54	PK
H	29125.00	42.00	55.80	14.25	40.50	40.95	54.00	-13.05	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. The worst mode is 802.11a, only the worst data is recorded.

4.8.2 Conducted Emission Method

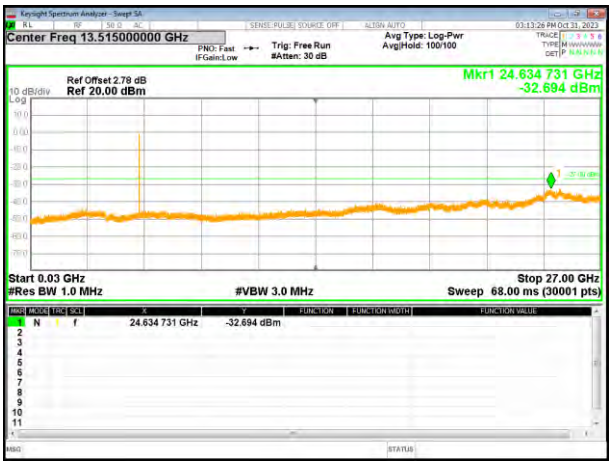
Test Requirement:	FCC Part15 C Section 15.209, Part 15E Section 15.407(b)(4)	
Test Method:	ANSI C63.10:2013	
Limit:	-27dBm/MHz	
Test setup:		
Test Instruments:	Refer to section 3.0 for details	
Test mode:	Refer to section 2.2 for details	
Test environment:	Temp.: 26.2°C	Humid.: 51%RH
Test voltage:	DC 3.7V	
Test results:	Pass	

Remark: Antenna gain data included in Offset.

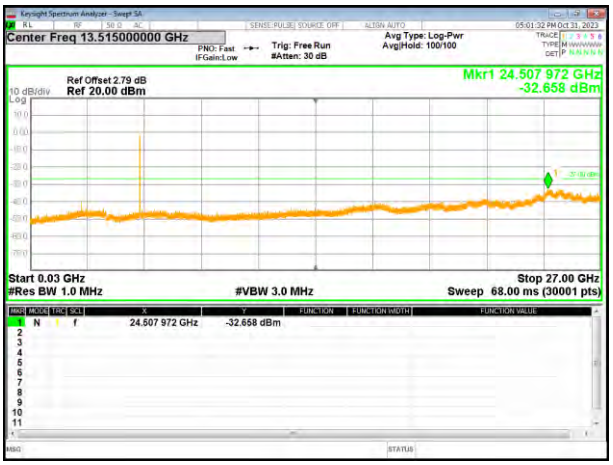
5180-5240MHz

Test Plot

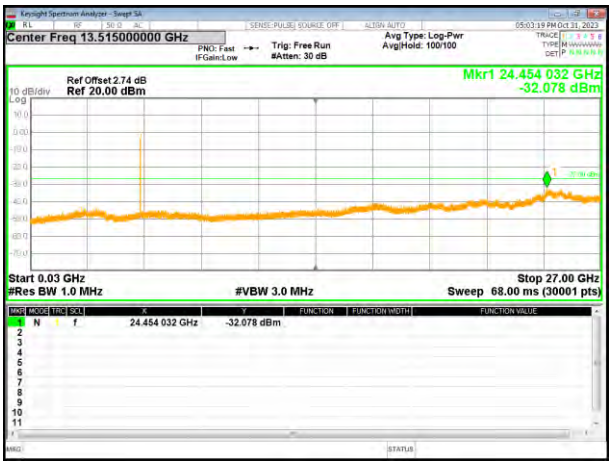
802.11a on channel 36



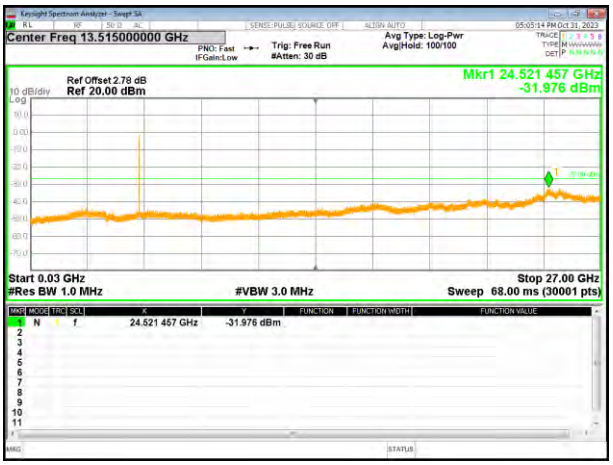
802.11a on channel 40



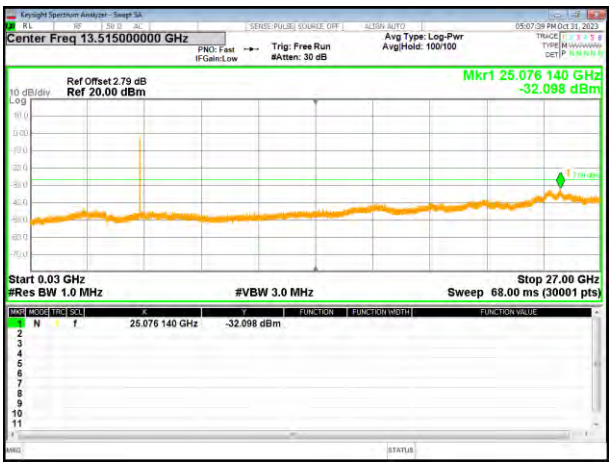
802.11a on channel 48



802.11n20 on channel 36



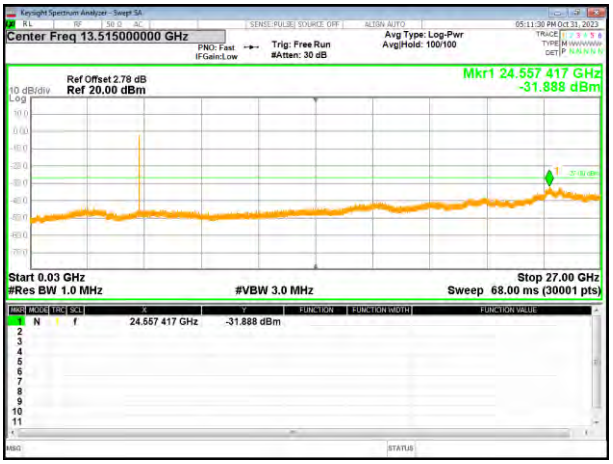
802.11n20 on channel 40



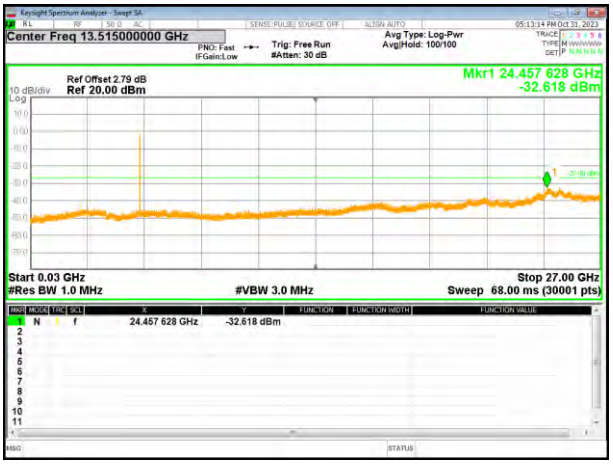
802.11n20 on channel 48

Test Plot

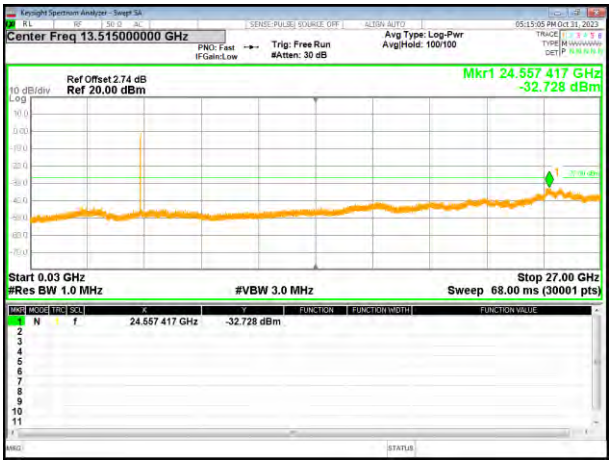
802.11ac20 on channel 36



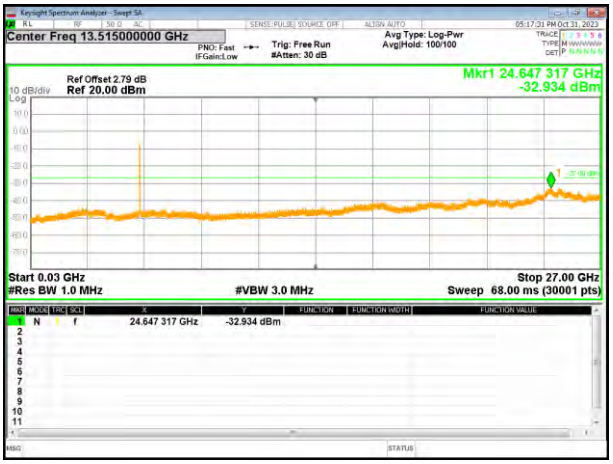
802.11ac20 on channel 40



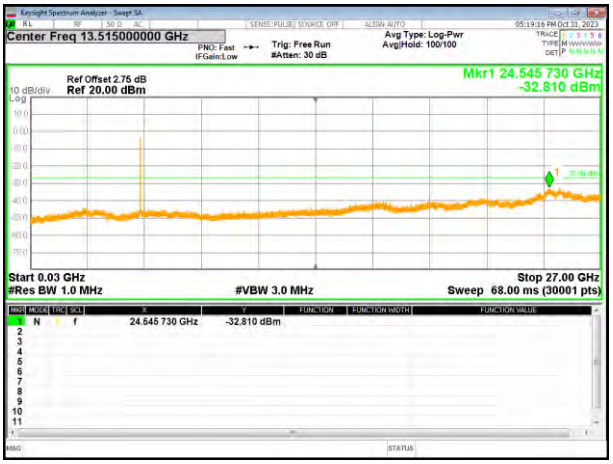
802.11ac20 on channel 48



802.11n40 on channel 38

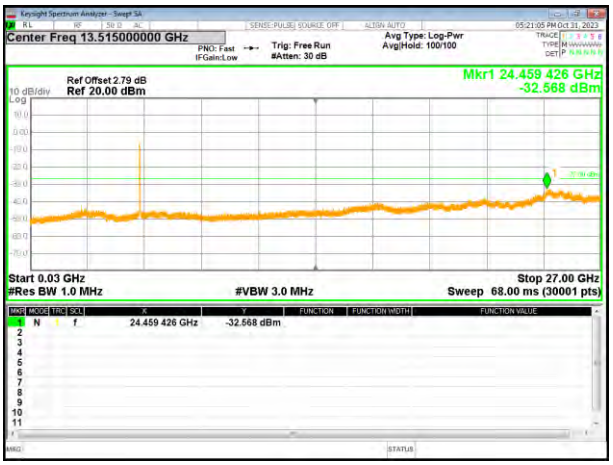


802.11n40 on channel 46

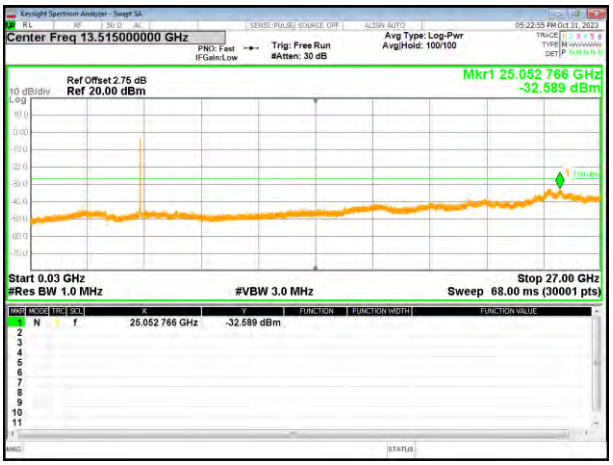


Test Plot

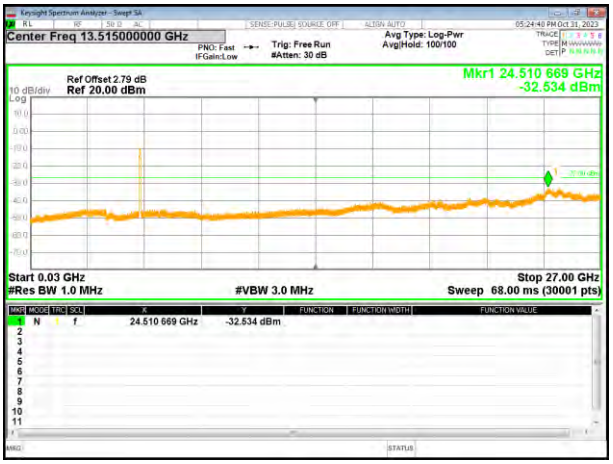
802.11ac40 on channel 38



802.11ac40 on channel 46



802.11ac80 on channel 42



5745-5825MHz

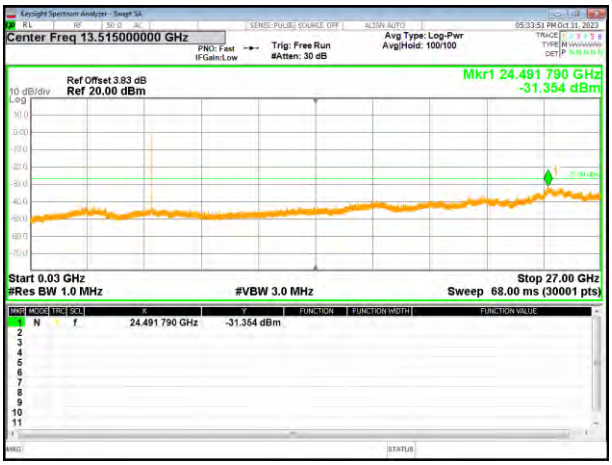
Test Plot

802.11a on channel 149

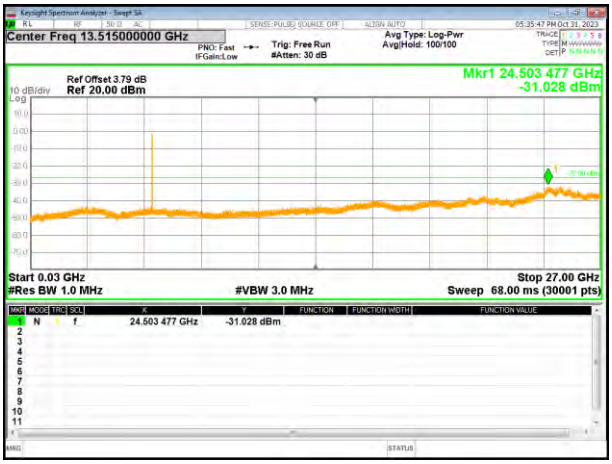
802.11a on channel 157

802.11a on channel 165

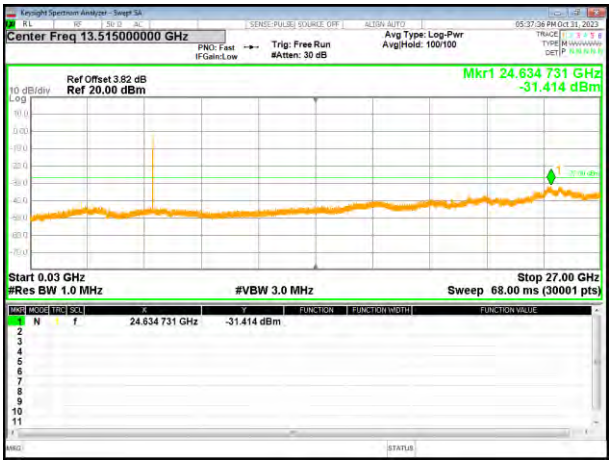
802.11n20 on channel 149



802.11n20 on channel 157

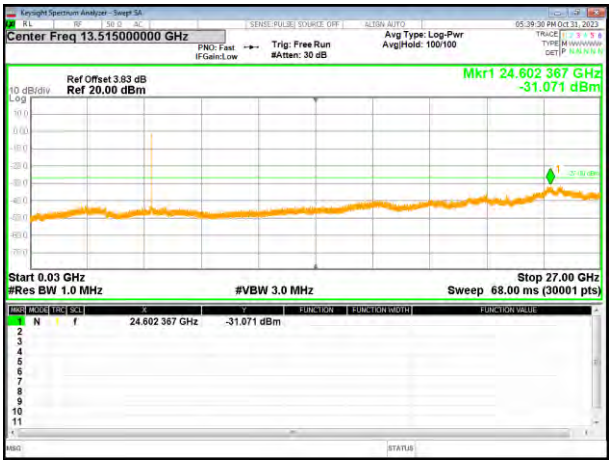


802.11n20 on channel 165

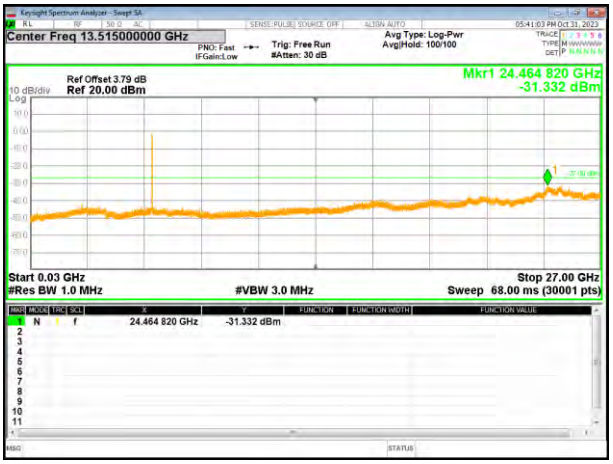


Test Plot

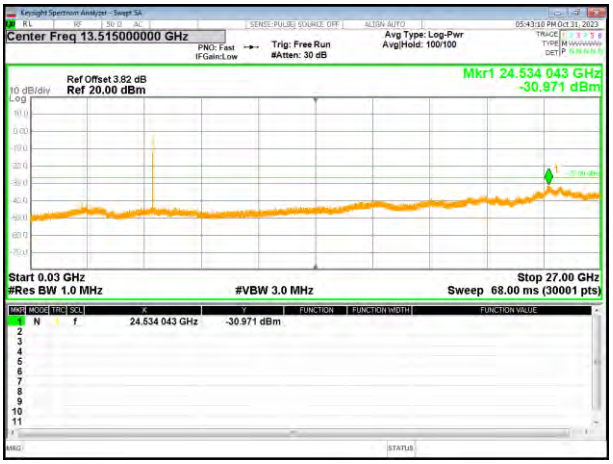
802.11ac20 on channel 149



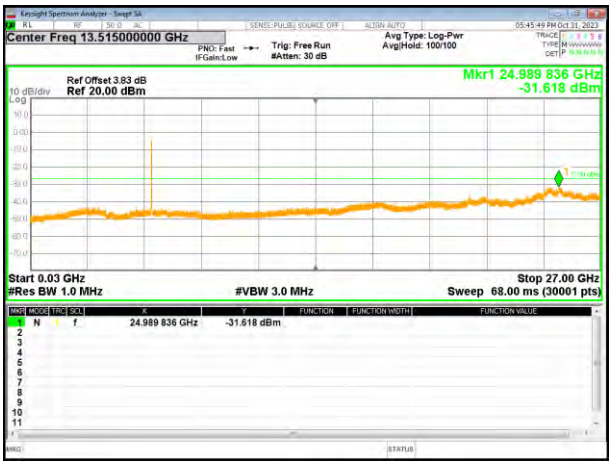
802.11ac20 on channel 157



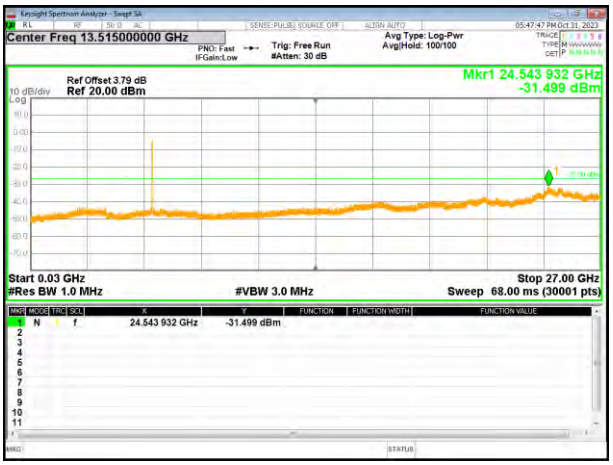
802.11ac20 on channel 165



802.11n40 on channel 151

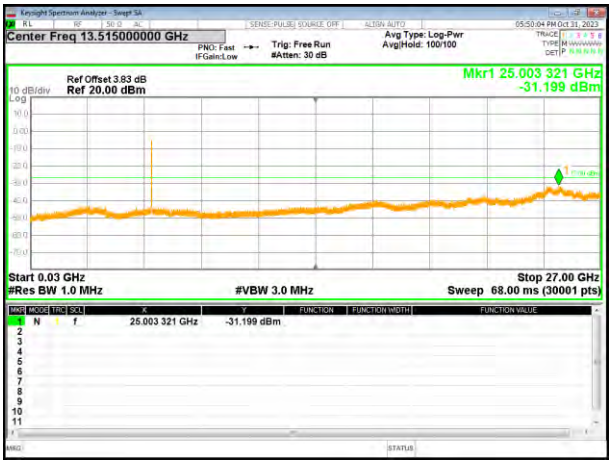


802.11n40 on channel 159



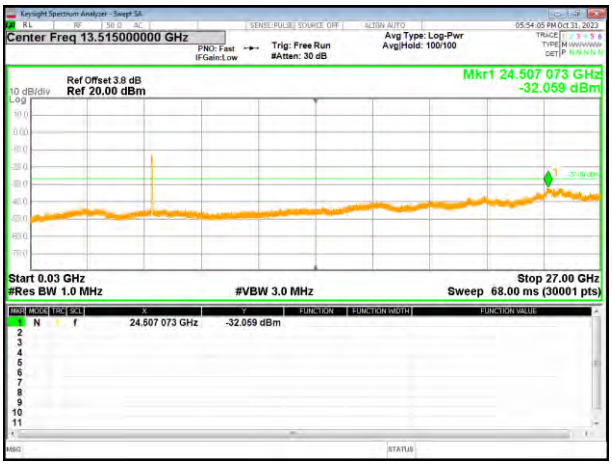
Test Plot

802.11ac40 on channel 151

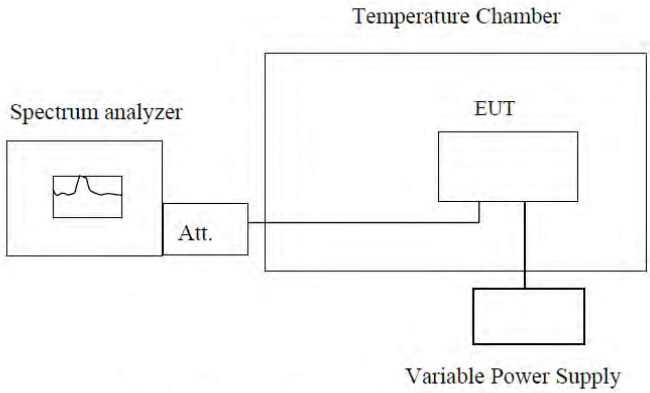


802.11ac40 on channel 159

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 3.7V					
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	5179.955	5180.198	5179.685	5179.778
	5190	5189.945	5200.213	5199.559	5189.788
	5200	5199.948	5200.198	5199.584	5199.779
	5210	5209.954	5210.176	5209.561	5209.780
	5220	5219.949	5220.192	5219.576	5219.785
	5230	5229.947	5230.185	5229.567	5229.803
	5240	5239.920	5240.194	5239.575	5239.788
-20	5180	5179.948	5180.174	5179.570	5179.799
	5190	5189.939	5190.165	5189.569	5189.794
	5200	5199.947	5200.173	5199.562	5199.789
	5210	5209.939	5210.165	5209.551	5209.795
	5220	5219.960	5220.187	5219.561	5219.788
	5230	5229.938	5230.165	5299.552	5229.786
	5240	5239.956	5240.184	5239.561	5239.759
-10	5180	5179.957	5180.183	5179.549	5179.778
	5190	5189.953	5190.179	5189.560	5189.788
	5200	5199.948	5200.174	5199.550	5199.779
	5210	5209.954	5210.180	5209.550	5209.780
	5220	5219.949	5220.176	5219.557	5219.785
	5230	5229.947	5230.174	5229.573	5229.803
	5240	5239.920	5240.148	5239.545	5239.775
0	5180	5179.734	5180.162	5179.561	5179.789
	5190	5199.906	5190.173	5189.552	5189.789
	5200	5199.904	5200.164	5199.559	5199.780
	5210	5209.959	5210.165	5209.550	5299.784
	5220	5219.948	5220.173	5219.571	5219.778
	5230	5229.935	5230.191	5229.547	5229.799
	5240	5239.952	5240.164	5239.565	5239.777
10	5180	5179.936	5180.174	5179.570	5179.790
	5190	5189.947	5190.165	5189.566	5189.780
	5200	5199.938	5200.173	5199.560	5199.788
	5210	5209.939	5210.165	5209.565	5209.780
	5220	5219.946	5220.187	5219.560	5219.799
	5230	5229.964	5230.165	5229.556	5229.777
	5240	5239.949	5240.184	5239.529	5239.795
20	5180	5179.961	5180.214	5179.872	5179.787
	5190	5189.957	5190.216	5189.863	5189.816

	5200	5199.952	5200.207	5199.871	5199.841
	5210	5209.958	5300.219	5209.863	5209.825
	5220	5219.953	5220.208	5219.884	5219.815
	5230	5229.951	5230.229	5229.861	5229.843
	5240	5239.924	5240.208	5239.879	5239.831
30	5180	5179.940	5180.215	5179.872	5179.835
	5190	5189.951	5190.207	5189.863	5179.835
	5200	5199.942	5200.215	5199.871	5189.830
	5210	5209.943	5210.207	5209.863	5199.825
	5220	5219.950	5220.229	5219.884	5209.831
	5230	5229.968	5230.207	5229.861	5219.825
	5240	5239.940	5240.226	5239.879	5229.823
40	5180	5179.952	5180.214	5179.658	5179.814
	5190	5189.943	5190.216	5199.830	5189.824
	5200	5199.951	5200.207	5199.828	5199.815
	5210	5209.943	5300.219	5209.883	5209.816
	5220	5219.964	5220.208	5219.872	5219.822
	5230	5229.942	5230.229	5229.858	5229.840
	5240	5239.960	5240.208	5239.875	5239.812
50	5180	5179.952	5180.215	5179.872	5179.787
	5190	5189.943	5190.207	5189.863	5189.816
	5200	5199.951	5200.215	5199.871	5199.841
	5210	5209.943	5210.207	5209.863	5209.825
	5220	5219.964	5220.229	5219.884	5219.815
	5230	5229.942	5230.207	5229.861	5229.843
	5240	5239.960	5240.226	5239.879	5239.831

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)
3.145	5180	5179.961	5180.218	5179.872	5179.950
	5190	5189.957	5200.212	5189.863	5199.824
	5200	5199.952	5200.240	5199.871	5199.849
	5210	5209.958	5210.218	5209.863	5209.827
	5220	5219.953	5220.234	5219.884	5219.841
	5230	5229.951	5230.227	5229.861	5229.834
	5240	5239.924	5240.236	5239.875	5239.842
3.70	5180	5179.947	5180.233	5179.871	5179.835
	5190	5189.943	5180.339	5189.872	5189.833
	5200	5199.951	5200.215	5199.863	5199.827
	5210	5209.944	5210.240	5299.869	5209.817
	5220	5219.964	5220.219	5219.863	5219.826
	5230	5229.942	5230.234	5229.882	5299.822
	5240	5239.960	5240.228	5239.861	5239.828
4.225	5180	5179.961	5180.224	5179.860	5179.814
	5190	5189.957	5190.221	5189.871	5189.824
	5200	5199.952	5200.216	5199.862	5199.814
	5210	5209.958	5210.222	5209.863	5209.816
	5220	5219.953	5220.218	5219.870	5219.822
	5230	5229.951	5230.216	5229.887	5229.845
	5240	5239.924	5240.190	5239.859	5239.812

Frequency stability versus Temp.					
Power Supply: DC 3.7V					
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	5744.937	5745.229	5744.853	5744.800
	5755	5754.947	5755.236	5754.860	5754.788
	5775	5774.968	5775.229	5774.877	5774.799
	5785	5784.944	5785.221	5784.852	5784.805
	5795	5794.940	5795.229	5794.848	5794.823
	5825	5824.938	5825.159	5824.851	5824.814
-20	5745	5744.934	5745.240	5744.847	5744.811
	5755	5754.949	5755.242	5754.872	5754.824
	5775	5774.948	5775.246	5774.853	5774.809
	5785	5784.951	5785.238	5784.861	5784.795
	5795	5794.961	5795.230	5794.859	5794.789
	5825	5824.943	5825.240	5824.869	5824.822
-10	5745	5744.944	5745.230	5744.863	5744.430
	5755	5754.970	5755.237	5754.865	5754.813
	5775	5774.966	5775.255	5774.868	5774.814
	5785	5784.950	5785.231	5784.859	5784.816
	5795	5794.939	5795.228	5794.850	5794.799
	5825	5824.874	5825.231	5824.859	5824.794
0	5745	5744.938	5745.219	5744.863	5744.801
	5755	5754.963	5755.235	5754.865	5754.826
	5775	5774.944	5775.235	5774.868	5774.822
	5785	5784.953	5785.238	5784.859	5784.805
	5795	5794.951	5795.252	5794.850	5794.794
	5825	5824.961	5825.232	5824.859	5824.728
10	5745	5744.938	5745.229	5744.852	5744.796
	5755	5754.963	5755.246	5754.859	5754.807
	5775	5774.944	5775.248	5774.851	5774.824
	5785	5784.953	5785.230	5784.842	5784.799
	5795	5794.951	5795.248	5794.849	5794.795
	5825	5824.961	5825.247	5824.778	5824.797
20	5745	5744.954	5745.254	5744.861	5744.800
	5755	5754.968	5755.226	5754.877	5754.818
	5775	5774.953	5775.250	5774.862	5774.798
	5785	5784.940	5785.250	5784.848	5784.824
	5795	5794.934	5795.242	5794.842	5794.816
	5825	5824.968	5825.258	5824.876	5824.824
30	5745	5744.944	5745.240	5744.846	5744.825
	5755	5754.951	5755.242	5754.869	5754.796
	5775	5774.968	5775.246	5774.870	5774.819
	5785	5784.944	5785.238	5784.851	5784.818
	5795	5794.940	5795.230	5794.868	5794.809
	5825	5824.943	5825.240	5824.866	5824.823
40	5745	5744.954	5745.224	5744.863	5744.794
	5755	5754.968	5755.249	5754.865	5754.826
	5775	5774.953	5775.231	5774.868	5774.822

	5785	5784.940	5785.240	5784.859	5784.805
	5795	5794.934	5795.239	5794.850	5794.794
	5825	5824.968	5825.250	5824.859	5824.728
50	5745	5744.954	5745.254	5744.863	5744.800
	5755	5754.948	5755.226	5754.876	5754.818
	5775	5774.953	5775.250	5774.862	5774.798
	5785	5784.940	5785.250	5784.848	5784.825
	5795	5794.934	5795.241	5794.842	5794.816
	5825	5824.968	5825.262	5824.876	5824.824

Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (VDC)	Operating Frequency (MHz)	0 minute Measured Frequency (MHz)	2 minute Measured Frequency (MHz)	5 minute Measured Frequency (MHz)	10 minute Measured Frequency (MHz)
3.145	5745	5744.933	5745.229	5744.852	5744.795
	5755	5754.949	5755.236	5754.869	5754.819
	5775	5774.948	5775.229	5774.870	5774.800
	5785	5784.951	5785.221	5784.851	5784.808
	5795	5794.962	5795.229	5794.869	5794.806
	5825	5824.943	5825.159	5824.866	5824.815
3.70	5745	5744.933	5745.240	5744.847	5744.811
	5755	5754.949	5755.242	5754.872	5754.824
	5775	5774.948	5775.246	5774.853	5774.809
	5785	5784.951	5785.238	5784.861	5784.795
	5795	5794.958	5795.230	5794.859	5794.789
	5825	5824.943	5825.240	5824.869	5824.822
4.225	5745	5744.954	5745.253	5744.863	5744.800
	5755	5754.968	5755.226	5754.877	5754.818
	5775	5774.953	5775.250	5774.862	5774.798
	5785	5784.940	5785.250	5784.848	5784.824
	5795	5794.934	5795.242	5794.842	5794.816
	5825	5824.968	5825.258	5824.876	5824.824

5 Test Setup Photo

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

6 EUT Constructional Details

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

------END------