



TEST REPORT

Applicant: Shenzhen ImagineVision Technology Limited
Address of Applicant: 1A, Block F5, TCL International E City, 1001 Zhong Shan Park Road, Nan Shan, Shenzhen, China
Manufacturer/Factory: Shenzhen ImagineVision Technology Limited
Address of Manufacturer: 1A, Block F5, TCL International E City, 1001 Zhong Shan Park Road, Nan Shan, Shenzhen, China
Product Name: Z CAM E2Ls 4K Cinema Camera
Model No.: E1508,E1509
Trade Mark: Z CAM
FCC ID: 2AENN-E1508
Applicable standards: FCC CFR Title 47 Part 15 Subpart E Section 15.407
Date of Test: Aug.28, 2023-Dec.05, 2023
Date of report issued: Jan.30, 2024
Test Result : PASS *

Remark:

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

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

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

Prepared By

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Authorized Signature



Report Revision History

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1 Test Summary

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

Remarks:

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

1.1 Measurement Uncertainty

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

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

2 General Information

2.1 General Description of EUT

Product Name:	Z CAM E2Ls 4K Cinema Camera
Model No.:	E1508,E1509
Difference of model(s)	All the model are the same circuit and RF module, except the model names and colors
Test Model:	E1508
Hardware Version:	N/A
Software Version:	N/A
Sample(s) Status:	Engineer sample
Operation Frequency:	<input checked="" type="checkbox"/> 5180-5240MHz for 802.11a/n(HT20)/ac20; 5190-5230MHz for 802.11n(HT40)/ac40; 5210MHz for 802.11 ac80; <input checked="" type="checkbox"/> 5745-5825 MHz for 802.11a/n(HT20)/ac20; 5755-5795 MHz for 802.11n(HT40)/ac40; 5775MHz for 802.11 ac80;
Channel numbers:	<input checked="" type="checkbox"/> 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 ; <input checked="" type="checkbox"/> 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:	External Antenna
Antenna gain:	1.83 dBi(Note: Antenna information is provided by applicant, Testing lab is not responsible for the accuracy of the information.)
Battery	N/A
Power supply:	DC 12V from Adapter
Adapter information:	N/A

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	5230	5240
Highest channel	5240	5230	5210

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	5795	5805
Highest channel	5825	5795	5775

2.2 Test mode

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

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	Replacement	EA107311J-120	/
2	microphone	ImagineVision	YX-02	/
3	headset	ImagineVision	Q9	/
4	LED display	DELL	SE2416HC	/
5	SD Card	Sandisk	64GB	/
6	battery	PISEN	TS-DV001-LP-E6N	/

2.4 Deviation from Standards

None.

2.5 Abnormalities from Standard Conditions

None.

2.6 Test Facility

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

2.7 Test Location

All tests were performed at:

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

2.8 Additional Instructions

Test Software	SecureCRT.EXE
Power level setup	Default

3 Test Instruments list

Conducted Emission

Item	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	EMI Test Receiver	Rohde&schwarz	ESC13	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	ESC17	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-Dtronic	EWLAN0118G-P40	19113001	2023.3.02	2024.3.01
6	Spectrum analyzer	KEYSIGHT	N9020A	MY55370280	2023.3.02	2024.3.01
7	Power detector meter	MWRFTest	MW100-PSB	MW201020JYT	2023.10.18	2024.10.17
8	Signal generator	Agilent	N5182A	MY49060455	2023.10.18	2024.10.17
9	Spectrum analyzer	Rohde&schwarz	FSU40	1166.1660K43	2023.8.16	2024.8.15
10	Amplifier	SKET	LNPA_1840-50	SK2019040302	2023.8.16	2024.8.15
11	Horn antenna	schwarabeck	BBHA 9170	946	2022.3.11	2024.3.10
12	Loop antenna	schwarabeck	FMZB 1519 B	1519	2022.3.11	2024.3.10
13	Cable 6	HUBER SUNNER	0.5M	/	2023.3.02	2024.3.01
14	Cable7	HUBER SUNNER	2.0M	/	2023.3.02	2024.3.01
15	Cable8	HUBER SUNNER	6.0M	/	2023.3.02	2024.3.01
16	Filter	Xin bo	XBLBQ-GTA29	210410-3-2	2023.3.06	2024.3.05

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

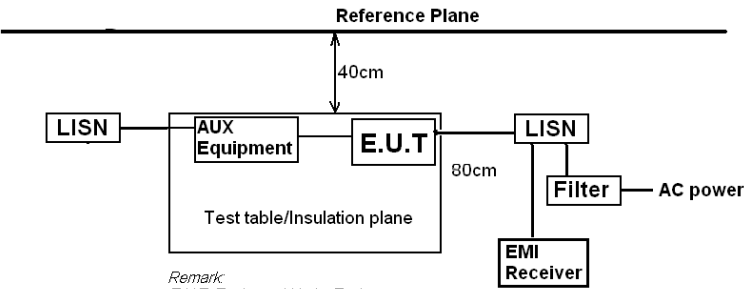
Software Name	Manufacturer	Model	Version
RF test software	MWRFTest	MTS 8310	V2.0.0.0
Conducted test software	EZ-EMC	Farad	Ver.EMC-CON 3A1.1
Radiated test software	EZ-EMC	Farad	Ver.FA-03A2 RE

4 Test results and Measurement Data

4.1 Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203
<i>15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</i>	
E.U.T Antenna:	
<i>The antennas are External Antenna, the best case gain of the antennas are 1.83 dBi, reference to the appendix II for details</i>	

4.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207					
Test Method:	ANSI C63.10:2013					
Test Frequency Range:	150KHz to 30MHz					
Class / Severity:	Class B					
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto					
Limit:	Frequency range (MHz)	Limit (dBuV)				
		Quasi-peak		Average		
	0.15-0.5	66 to 56*		56 to 46*		
	0.5-5	56		46		
	5-30	60		50		
* Decreases with the logarithm of the frequency.						
Test setup:	 <p><i>Remark</i> E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>					
Test procedure:	<ol style="list-style-type: none"> 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.:	50%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

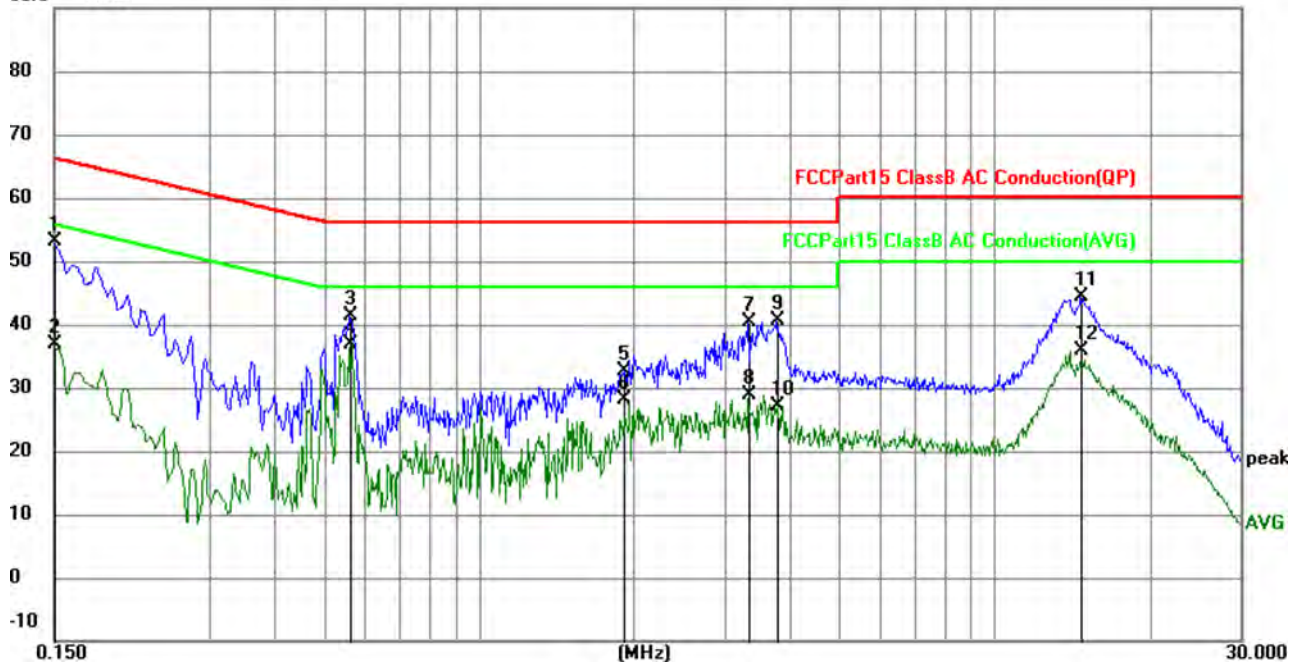
Remark:

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 (802.11a 5825MHz) data.

Measurement data

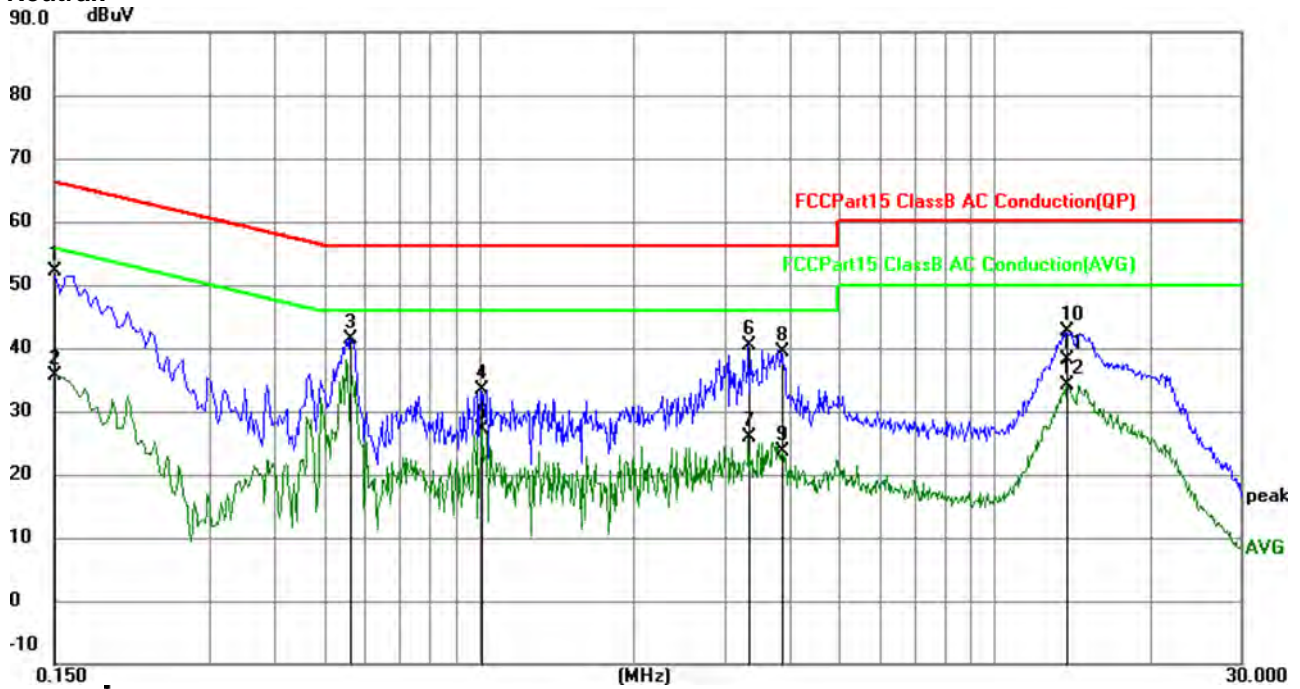
Line:

90.0 dBuV



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1500	43.40	9.80	53.20	66.00	-12.80	QP
2	0.1500	26.99	9.80	36.79	56.00	-19.21	AVG
3	0.5637	31.37	9.94	41.31	56.00	-14.69	QP
4	0.5637	26.91	9.94	36.85	46.00	-9.15	AVG
5	1.9092	22.78	9.86	32.64	56.00	-23.36	QP
6	1.9092	18.36	9.86	28.22	46.00	-17.78	AVG
7	3.3315	30.54	9.84	40.38	56.00	-15.62	QP
8	3.3315	18.94	9.84	28.78	46.00	-17.22	AVG
9	3.7905	30.71	9.84	40.55	56.00	-15.45	QP
10	3.7905	17.39	9.84	27.23	46.00	-18.77	AVG
11	14.7028	34.62	9.76	44.38	60.00	-15.62	QP
12	14.7028	26.15	9.76	35.91	50.00	-14.09	AVG

Neutral:

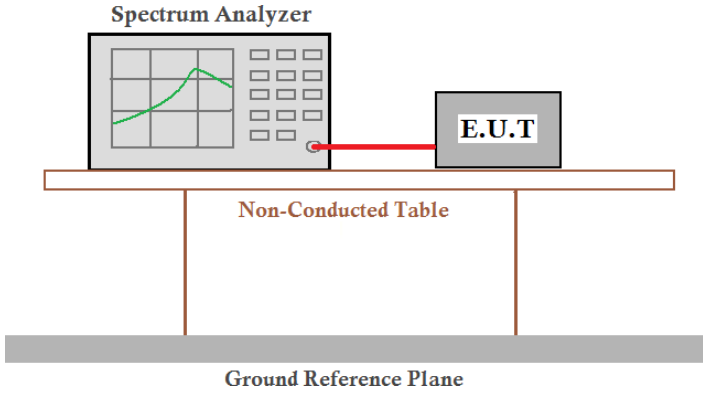


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1500	42.21	9.80	52.01	66.00	-13.99	QP
2	0.1500	25.75	9.80	35.55	56.00	-20.45	AVG
3	0.5637	31.46	9.94	41.40	56.00	-14.60	QP
4	1.0094	23.52	9.96	33.48	56.00	-22.52	QP
5	1.0094	17.15	9.96	27.11	46.00	-18.89	AVG
6	3.3315	30.44	9.84	40.28	56.00	-15.72	QP
7	3.3315	16.02	9.84	25.86	46.00	-20.14	AVG
8	3.8715	29.49	9.84	39.33	56.00	-16.67	QP
9	3.8715	13.80	9.84	23.64	46.00	-22.36	AVG
10	13.8390	32.77	9.77	42.54	60.00	-17.46	QP
11	13.8390	28.38	9.77	38.15	50.00	-11.85	AVG
12	13.8390	24.26	9.77	34.03	50.00	-15.97	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:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>	
Test Instruments:	Refer to section 3.0 for details	
Test mode:	Refer to section 2.2 for details	
Test environment:	Temp.: 25. 4°C	Humid.: 50%RH
Test voltage:	DC 12V	
Test results:	Pass	

Measurement Result

5180-5240MHz

Mode	Test Channel	Frequency (MHz)	Duty cycle (%)	Correction Factor (dB)
TX 802.11a Mode	CH36	5180	85.39	0.69
	CH40	5200	85.13	0.70
	CH48	5240	85.34	0.69
TX 802.11n20 Mode	CH36	5180	85.34	0.69
	CH40	5200	85.37	0.69
	CH48	5240	85.16	0.70
TX 802.11ac20 Mode	CH36	5180	85.28	0.69
	CH40	5200	85.30	0.69
	CH48	5240	85.30	0.69
TX 802.11n40 Mode	CH38	5190	85.34	0.69
	CH46	5230	85.41	0.68
TX 802.11a40 Mode	CH38	5190	85.41	0.68
	CH46	5230	85.44	0.68
TX 802.11ac80 Mode	CH42	5210	86.01	0.65

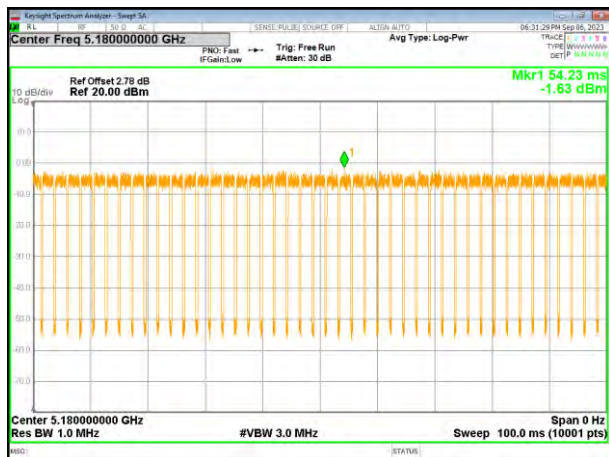
5745-5825 MHz

Mode	Test Channel	Frequency (MHz)	Duty cycle (%)	Correction Factor (dB)
TX 802.11a Mode	CH149	5745	84.96	0.71
	CH157	5785	84.97	0.71
	CH165	5825	85.33	0.69
TX 802.11n20 Mode	CH149	5745	85.35	0.69
	CH157	5785	85.08	0.70
	CH165	5825	85.32	0.69
TX 802.11ac20 Mode	CH149	5745	85.30	0.69
	CH157	5785	85.31	0.69
	CH165	5825	85.26	0.69
TX 802.11n40 Mode	CH151	5755	85.43	0.68
	CH159	5795	85.46	0.68
TX 802.11a40 Mode	CH151	5755	85.42	0.68
	CH159	5795	85.28	0.69
TX 802.11ac80 Mode	CH155	5775	85.92	0.66

Test plot

5180-5240MHz

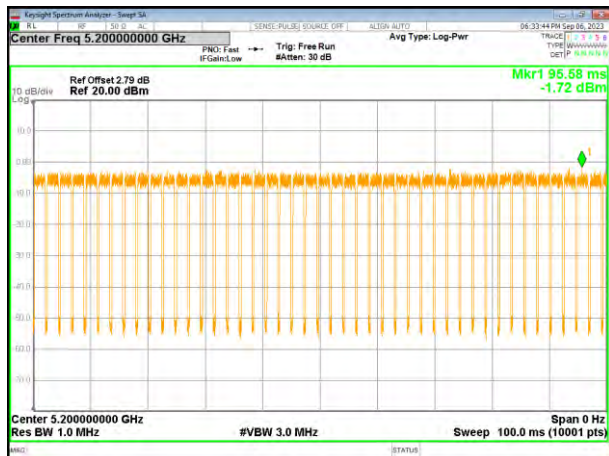
(802.11a) plot on channel 36



(802.11 n20) plot on channel 36



(802.11a) plot on channel 40



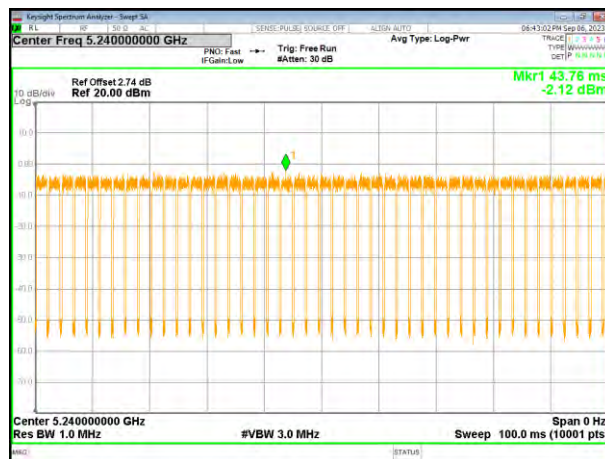
(802.11 n20) plot on channel 40



(802.11a) plot on channel 48

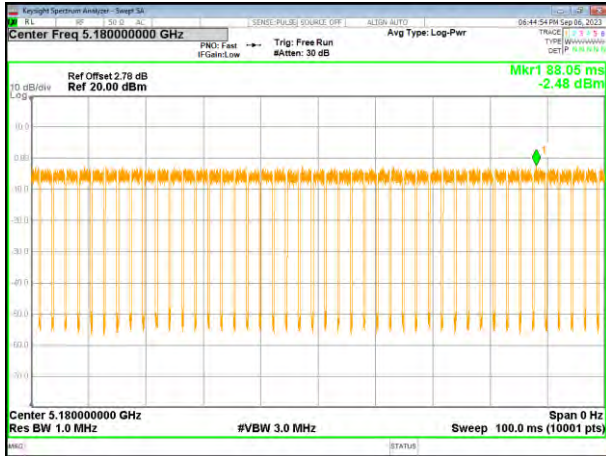


(802.11 n20) plot on channel 48

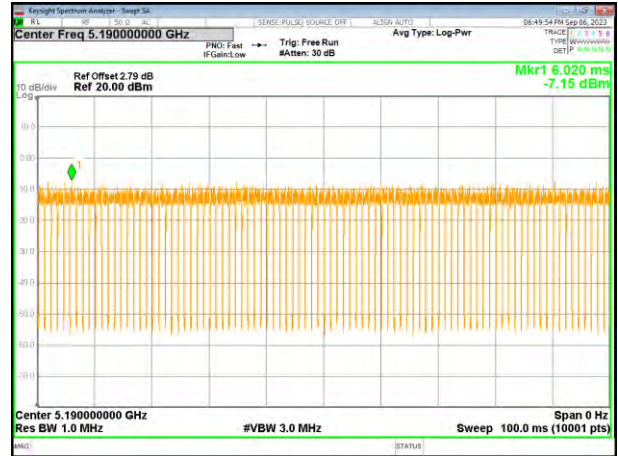


Test plot

(802.11ac20) plot on channel 36



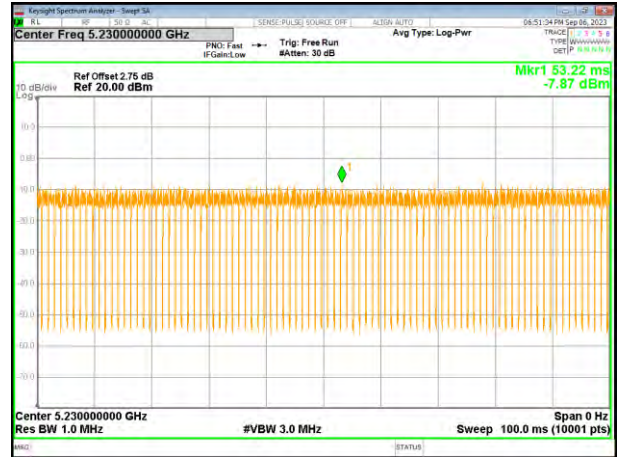
(802.11 n40) plot on channel 38



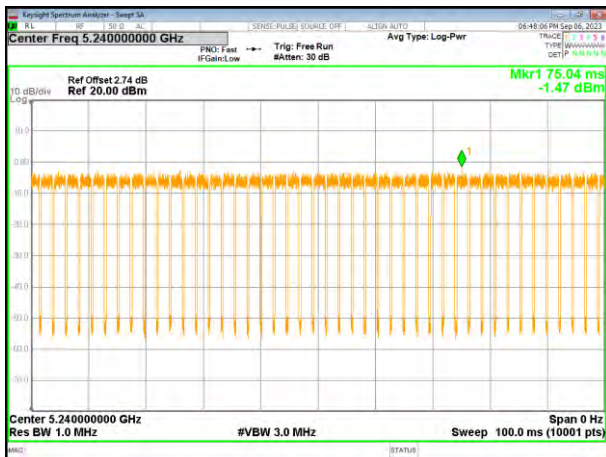
(802.11ac20) plot on channel 40



(802.11 n40) plot on channel 46



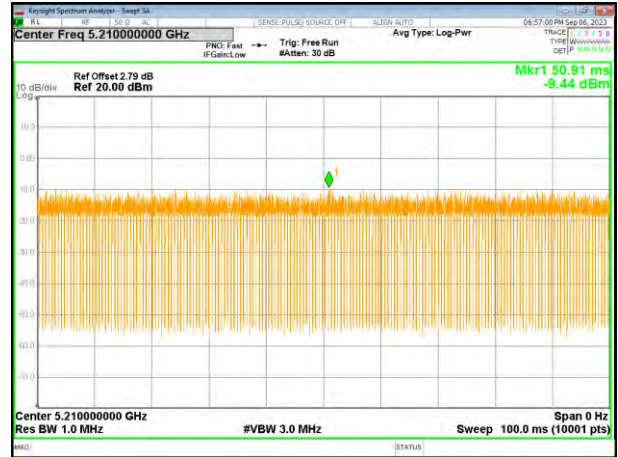
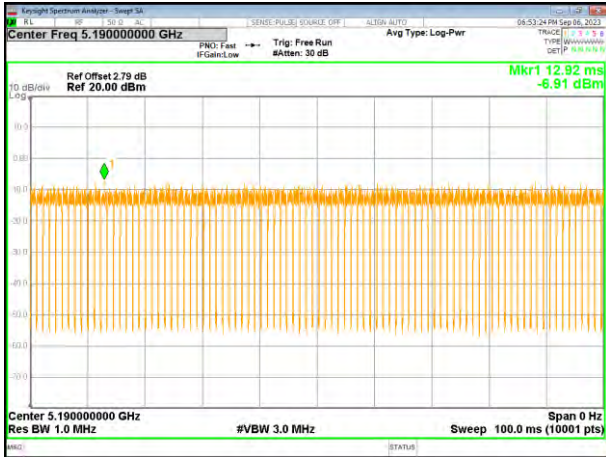
(802.11ac20) plot on channel 48



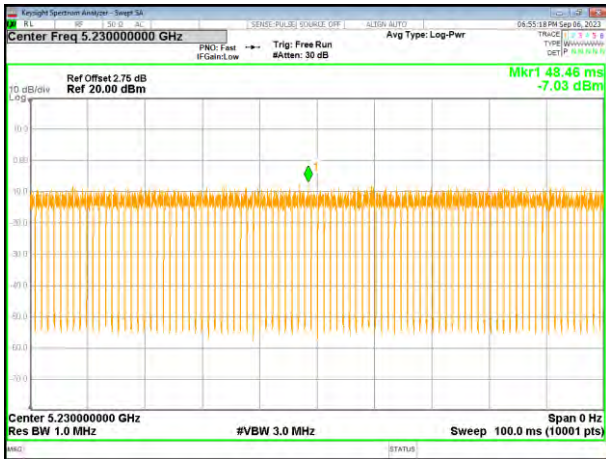
Test plot

(802.11ac40) plot on channel 38

(802.11ac80) plot on channel 42

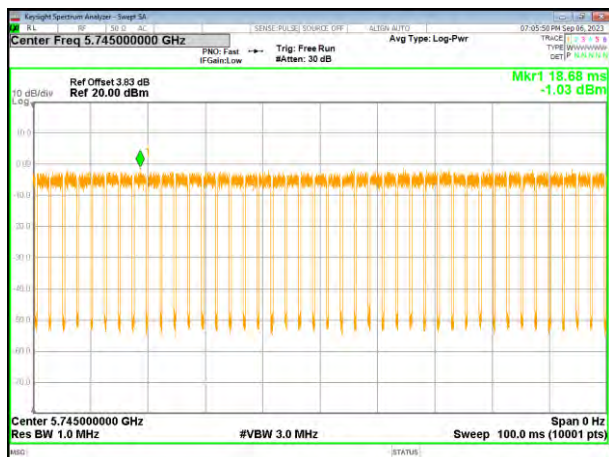


(802.11ac40) plot on channel 46

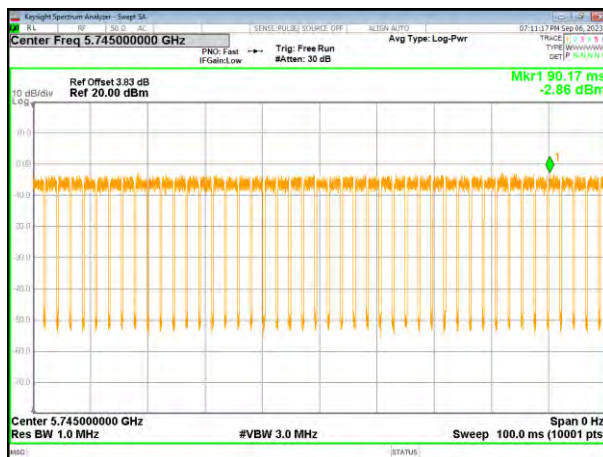


5745-5825 MHz

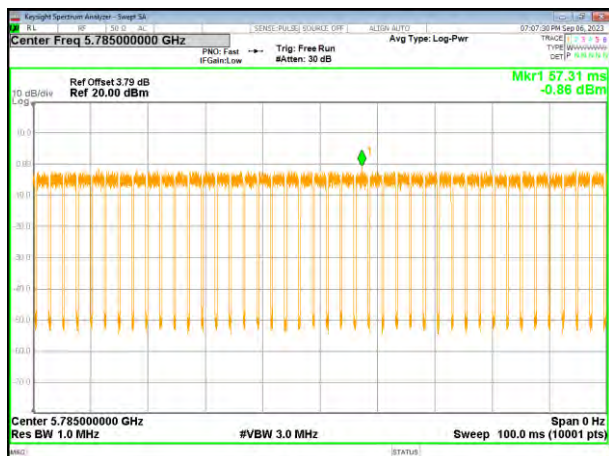
(802.11a) plot on channel 36



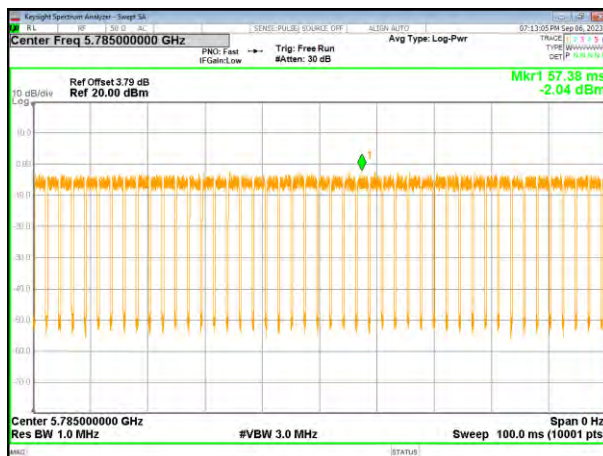
(802.11 n20) plot on channel 36



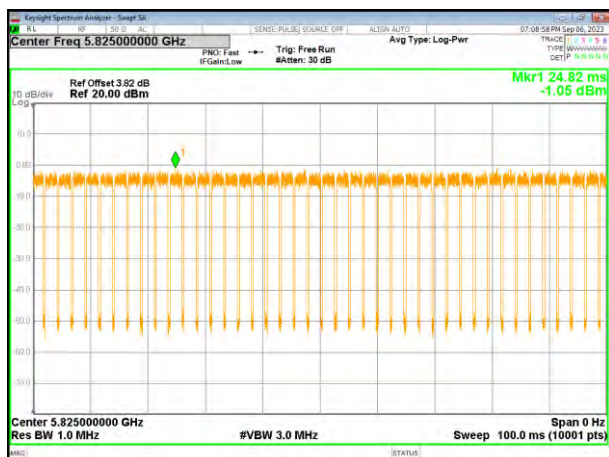
(802.11a) plot on channel 40



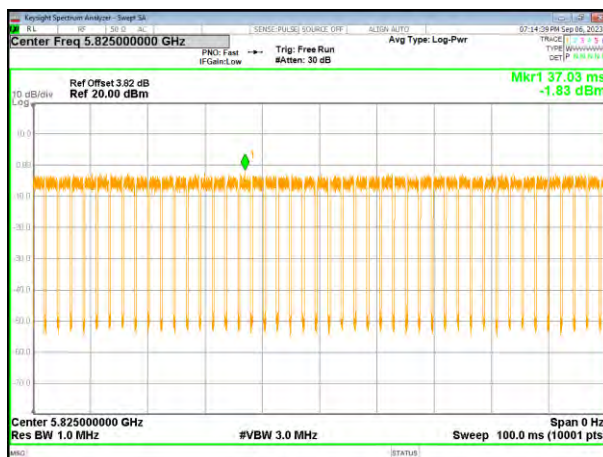
(802.11 n20) plot on channel 40



(802.11a) plot on channel 48

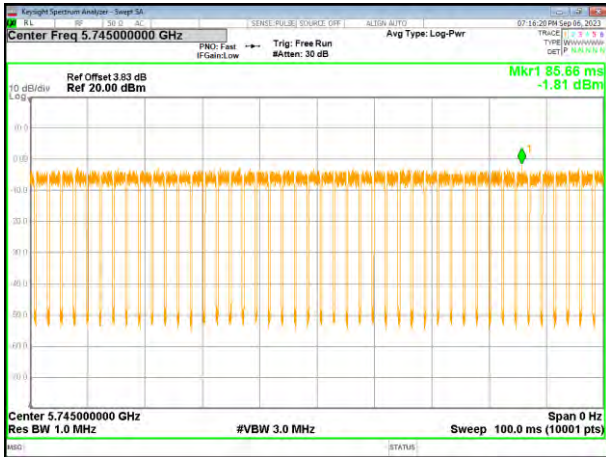


(802.11 n20) plot on channel 48

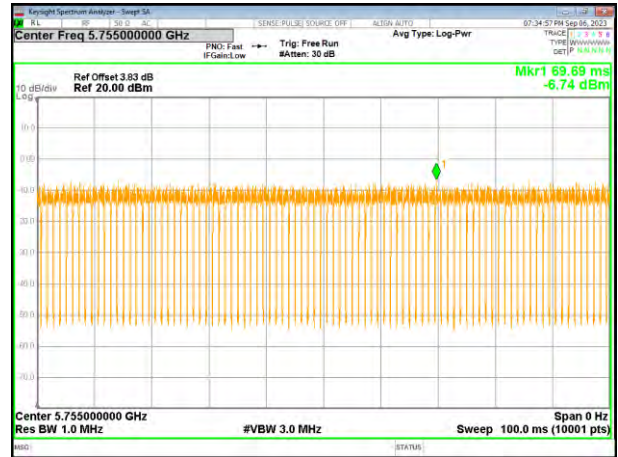


Test plot

(802.11ac20) plot on channel 36



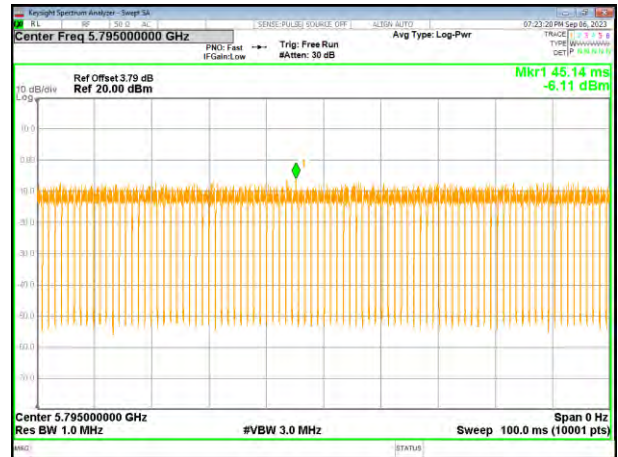
(802.11 n40) plot on channel 38



(802.11ac20) plot on channel 40



(802.11 n40) plot on channel 46

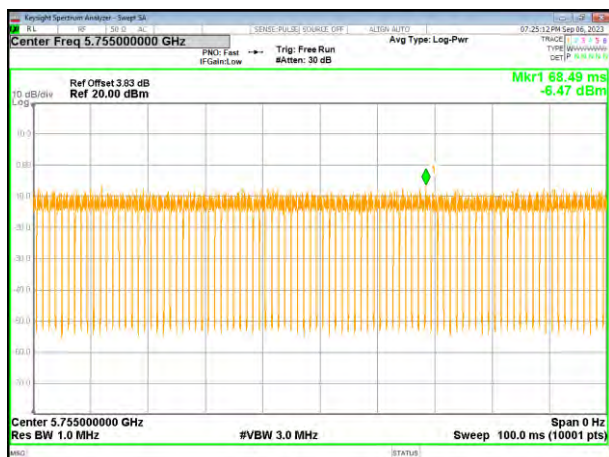


(802.11ac20) plot on channel 48

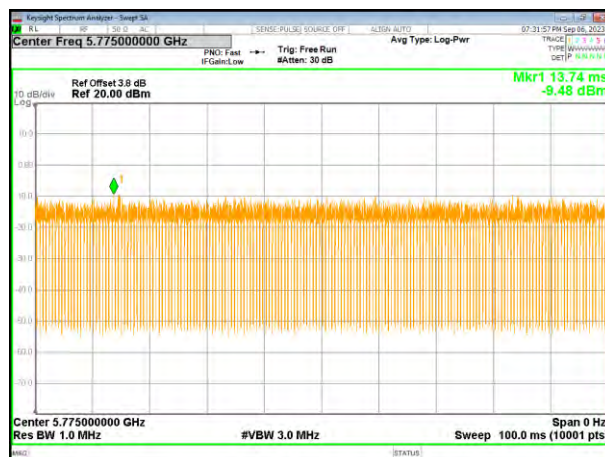


Test plot

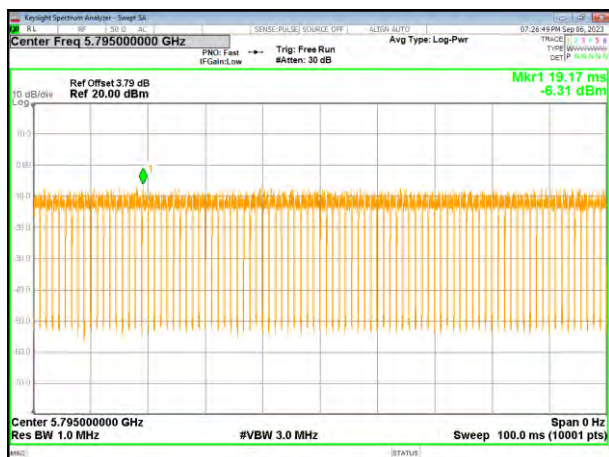
(802.11ac40) plot on channel 38



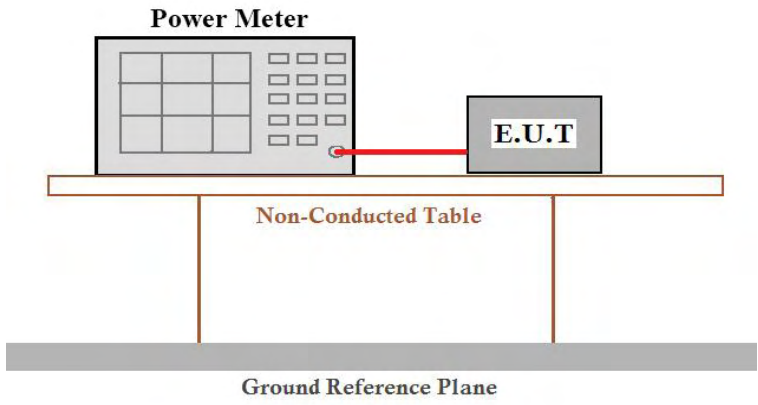
(802.11ac80) plot on channel 42



(802.11ac40) plot on channel 46



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.: 24.4°C	Humid.: 50%RH
Test voltage:	DC 12V	
Test results:	Pass	

Measurement Result

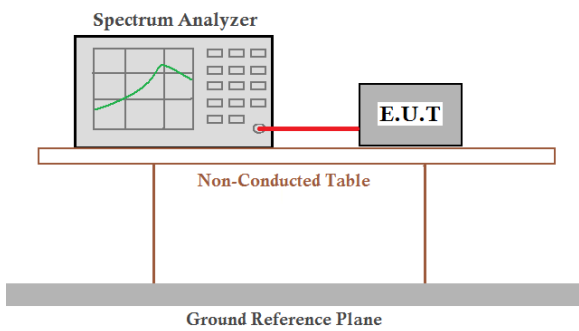
5180-5240MHz

Test Mode	Frequency	Correction Factor	Maximum output power	Total Power	Limit	Result
	(MHz)	(dB)	(dBm)	(dBm)	dBm	
802.11a	5180	0.69	7.05	7.74	23.98	Pass
	5200	0.70	6.94	7.64	23.98	Pass
	5240	0.69	6.55	7.24	23.98	Pass
802.11 n20	5180	0.69	7.03	7.72	23.98	Pass
	5200	0.69	6.63	7.32	23.98	Pass
	5240	0.70	6.39	7.09	23.98	Pass
802.11 ac20	5180	0.69	6.47	7.16	23.98	Pass
	5200	0.69	6.21	6.90	23.98	Pass
	5240	0.69	6.89	7.58	23.98	Pass
802.11 n40	5190	0.69	6.76	7.45	23.98	Pass
	5230	0.68	6.38	7.06	23.98	Pass
802.11 ac40	5190	0.68	6.50	7.18	23.98	Pass
	5230	0.68	6.09	6.77	23.98	Pass
802.11 ac80	5210	0.65	5.58	6.23	23.98	Pass

5745-5825 MHz

Test Channel	Frequency	Correction Factor	Maximum output power	Total Power	Limit	Result
	(MHz)	(dB)	(dBm)	(dBm)	dBm	
802.11a	5745	0.71	7.01	7.72	30	Pass
	5785	0.71	7.01	7.72	30	Pass
	5825	0.69	7.00	7.69	30	Pass
802.11 n20	5745	0.69	6.31	7.00	30	Pass
	5785	0.70	6.42	7.12	30	Pass
	5825	0.69	6.65	7.34	30	Pass
802.11 ac20	5745	0.69	6.85	7.54	30	Pass
	5785	0.69	6.93	7.62	30	Pass
	5825	0.69	6.30	6.99	30	Pass
802.11 n40	5755	0.68	6.30	6.98	30	Pass
	5795	0.68	6.65	7.33	30	Pass
802.11 ac40	5755	0.68	6.60	7.28	30	Pass
	5795	0.69	6.89	7.58	30	Pass
802.11 ac80	5775	0.66	5.73	6.39	30	Pass

4.5 Bandwidth 99% Occupy Bandwidth

Test Requirement:	FCC Part15 E Section 15.407(a)(12)&15.407(e)	
Test Method:	ANSI C63.10:2013 and KDB 789033 D02 General U-NII Test Procedures New Rules v02r01	
Limit:	Measurements in the 5.725-5.85 GHz band, the minimum bandwidth 6 dB bandwidth of U-NII devices shall be at least 500KHz. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.	
Test setup:		
Test Instruments:	Refer to section 3.0 for details	
Test mode:	Refer to section 2.2 for details	
Test environment:	Temp.: 24.4°C	Humid.: 50%RH
Test voltage:	DC 12V	
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	20.54	20.74	24.19	44.29	44.33	--	Pass
Middle	20.54	20.83	24.11	--	--	81.29	
Highest	19.75	20.46	23.82	43.25	43.86	--	

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	17.821	17.827	17.839	36.389	36.359	--	Pass
Middle	17.822	17.821	17.861	--	--	75.042	
Highest	16.674	17.825	17.829	36.336	36.333	--	

Test plot -26dB Channel Bandwidth

(802.11a) plot on channel 36



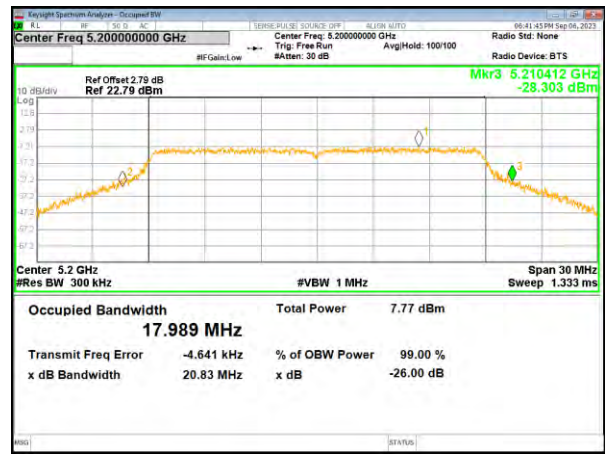
(802.11 n20) plot on channel 36



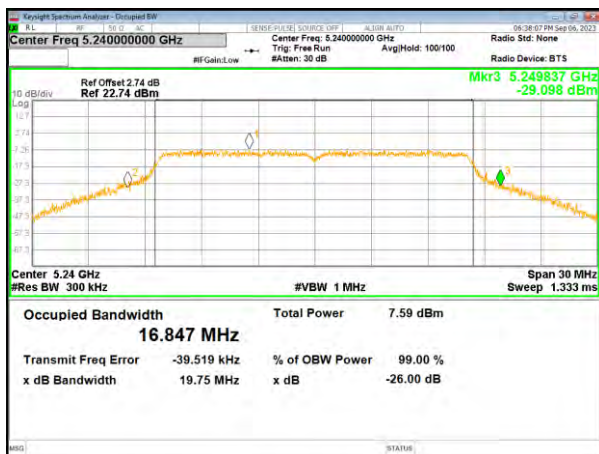
(802.11a) plot on channel 40



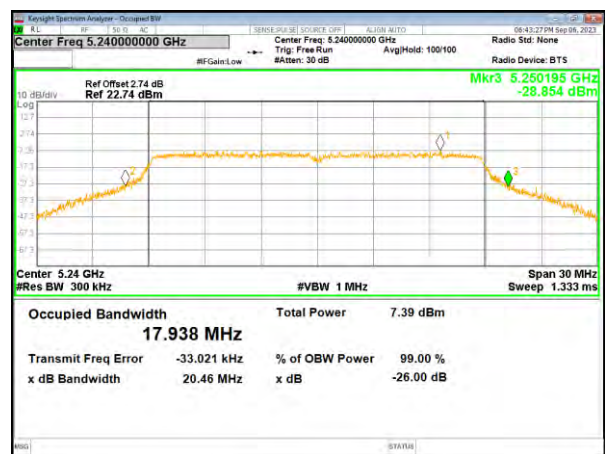
(802.11 n20) plot on channel 40



(802.11a) plot on channel 48

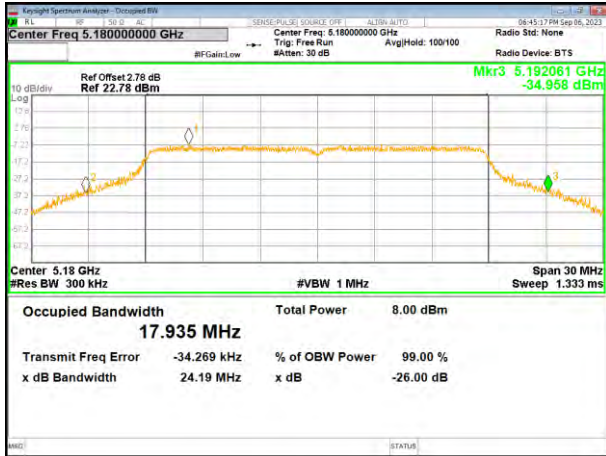


(802.11 n20) plot on channel 48

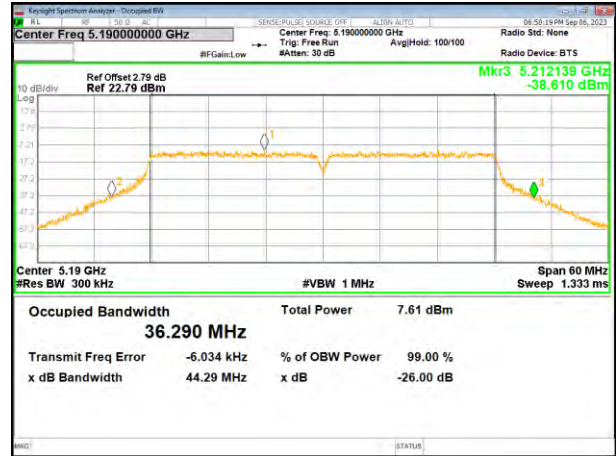


Test plot

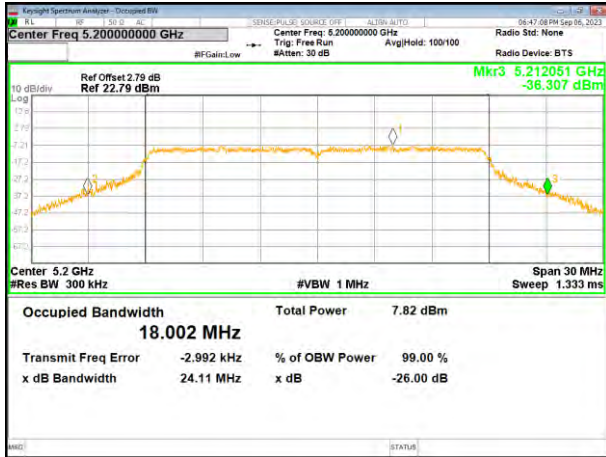
(802.11ac20) plot on channel 36



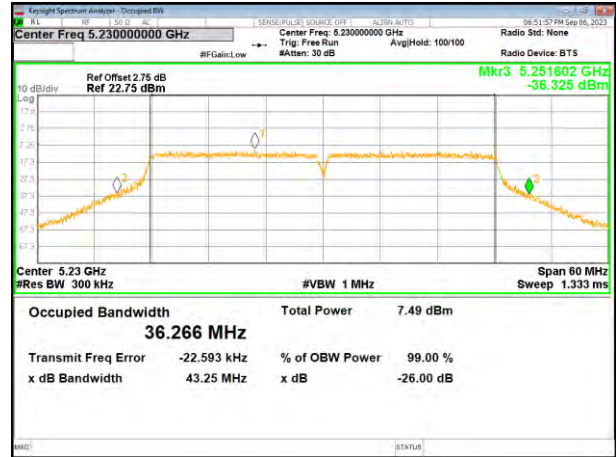
(802.11 n40) plot on channel 38



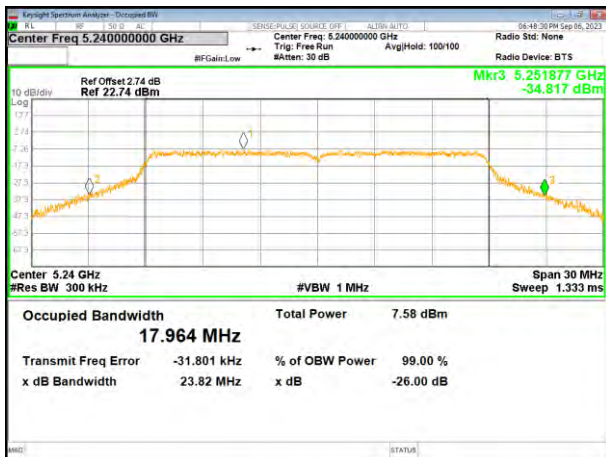
(802.11ac20) plot on channel 40



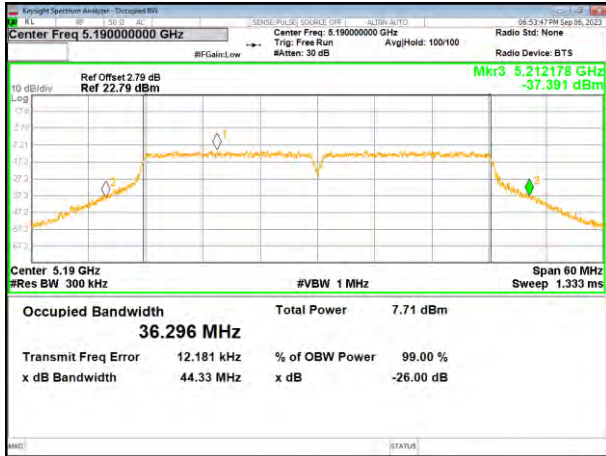
(802.11 n40) plot on channel 46



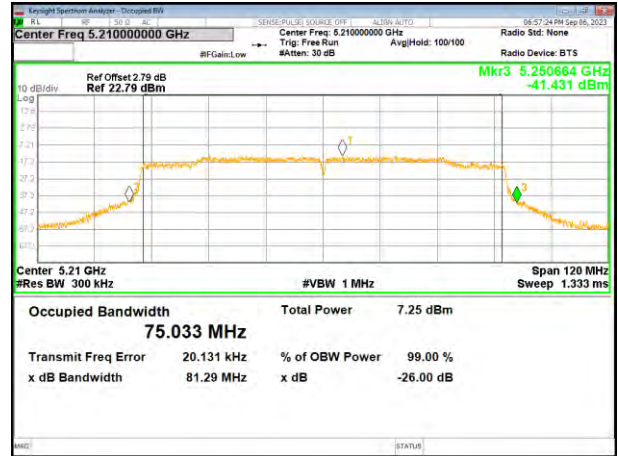
(802.11ac20) plot on channel 48



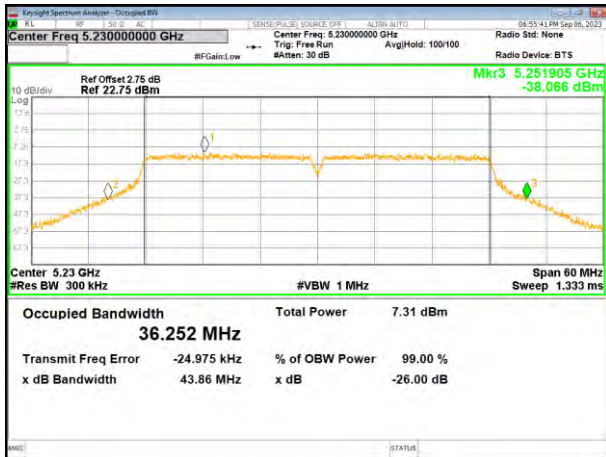
(802.11ac40) plot on channel 38



(802.11ac80) plot on channel 42

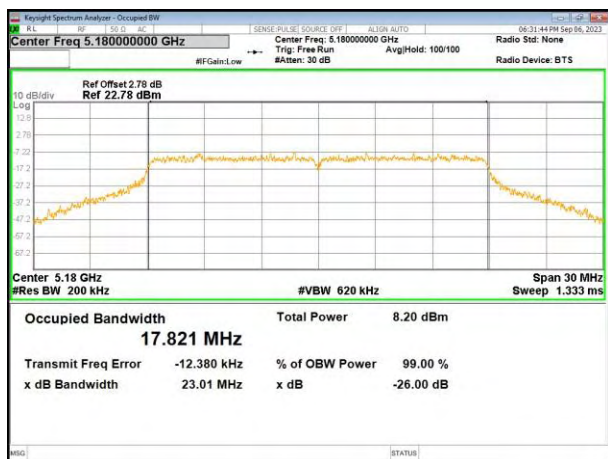


(802.11ac40) plot on channel 46

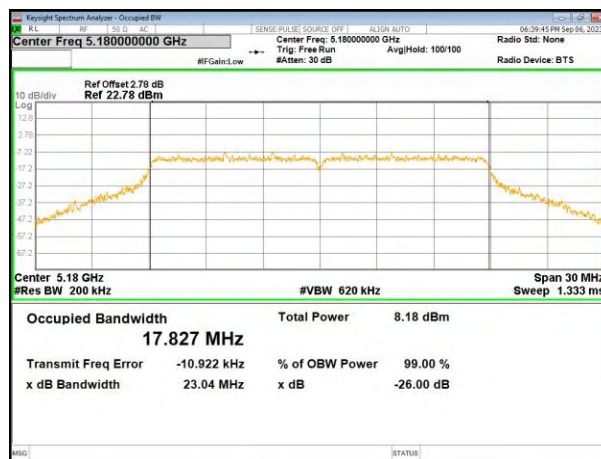


Test plot 99% Occupancy Bandwidth

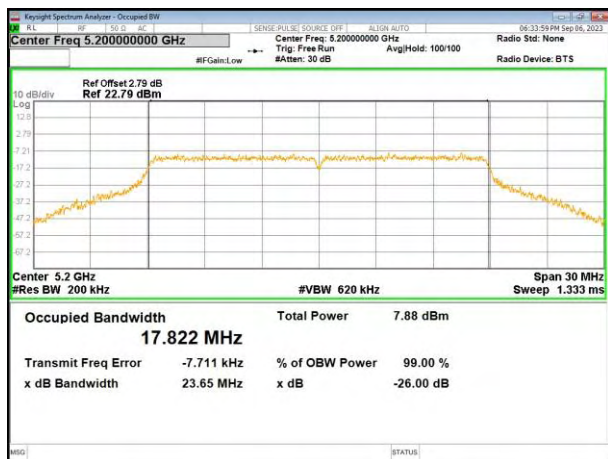
(802.11a) plot on channel 36



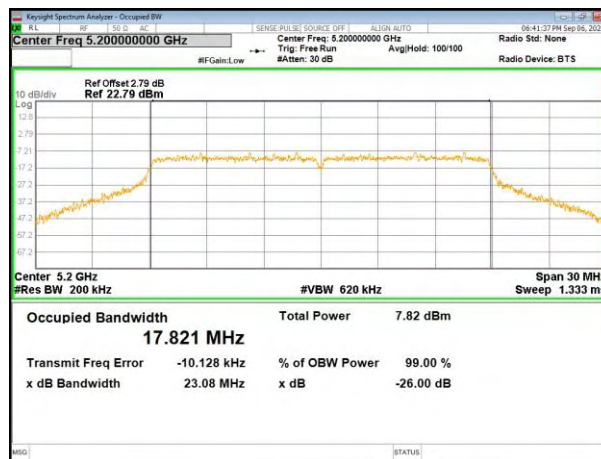
(802.11 n20) plot on channel 36



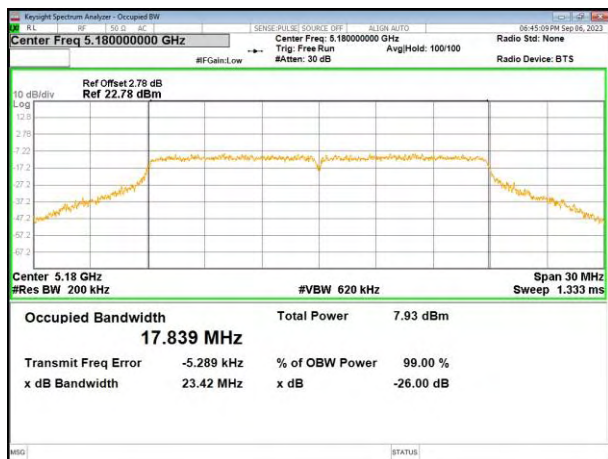
(802.11a) plot on channel 40



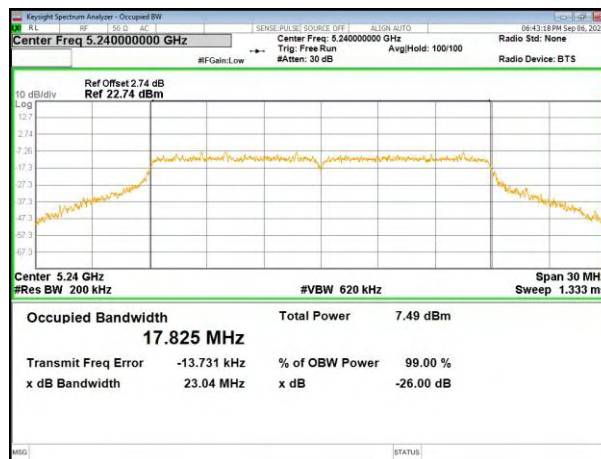
(802.11 n20) plot on channel 40



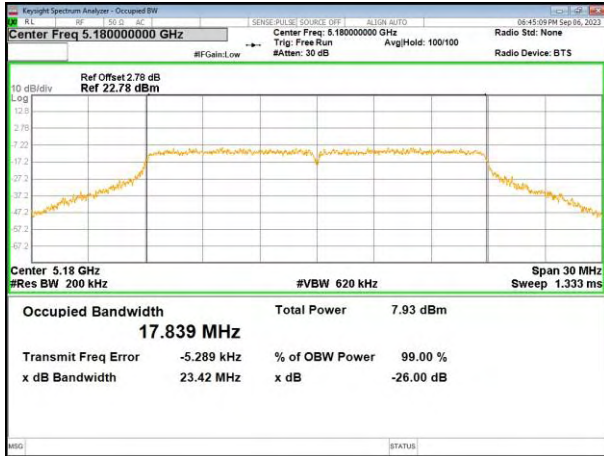
(802.11a) plot on channel 48



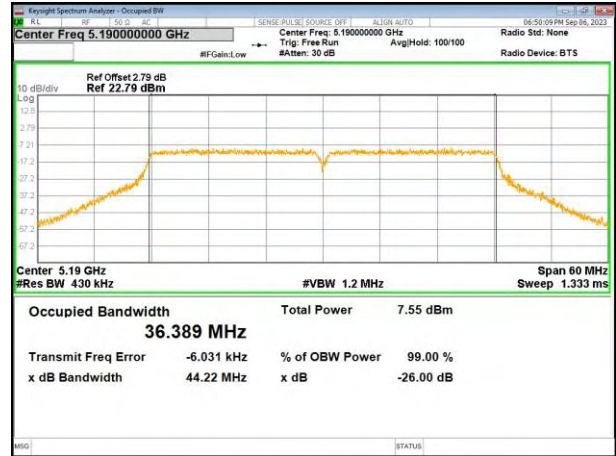
(802.11 n20) plot on channel 48



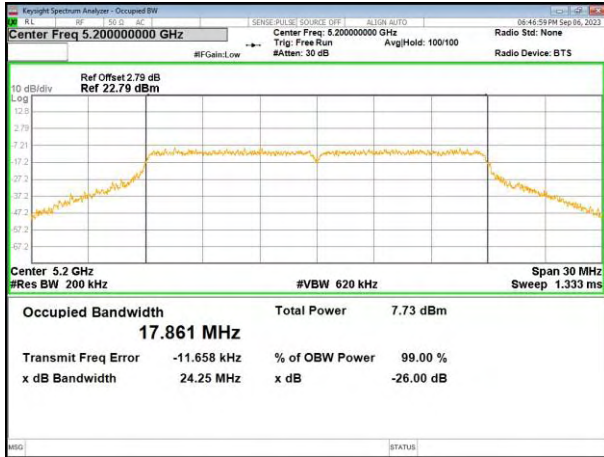
(802.11ac20) plot on channel 36



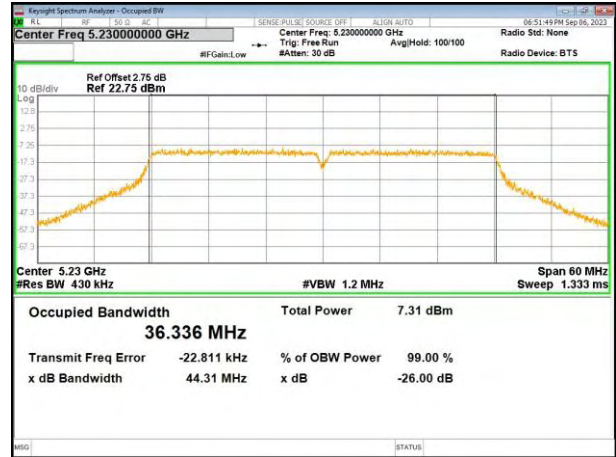
(802.11 n40) plot on channel 38



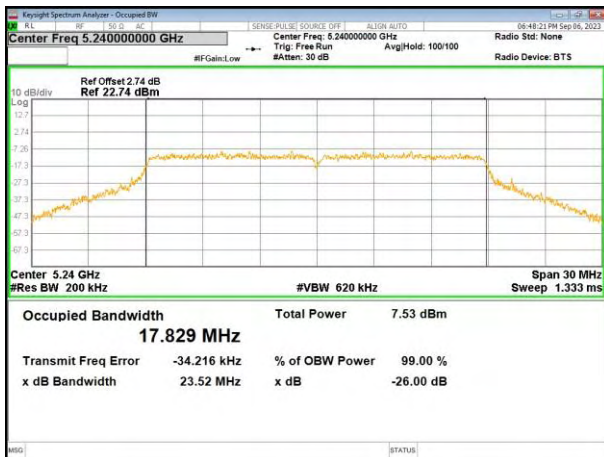
(802.11ac20) plot on channel 40



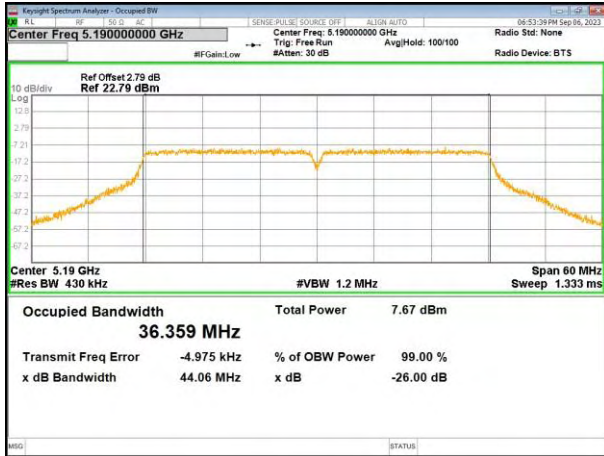
(802.11 n40) plot on channel 46



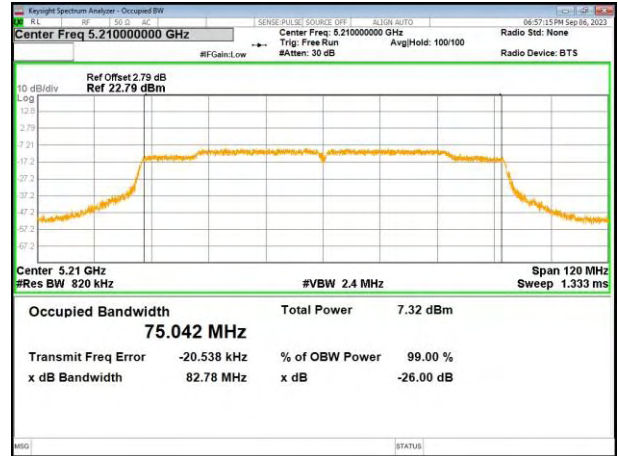
(802.11ac20) plot on channel 48



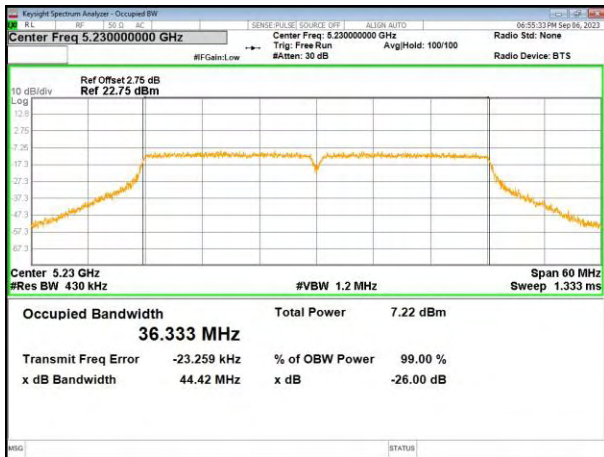
(802.11ac40) plot on channel 38



(802.11ac80) plot on channel 42



(802.11ac40) plot on channel 46



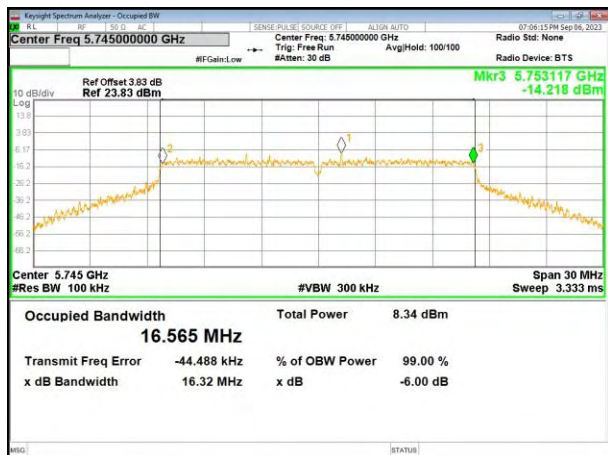
5745-5825MHz

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	16.32	17.57	17.55	36.03	36.04	--	>500	Pass
Middle	16.33	17.57	17.54	--	--	75.07		
Highest	16.32	17.56	17.27	36.30	36.31	--		

Remark: "---" is not applicable

Test plot

(802.11a) plot on channel 149



(802.11 n20) plot on channel 149



(802.11a) plot on channel 157



(802.11 n20) plot on channel 157



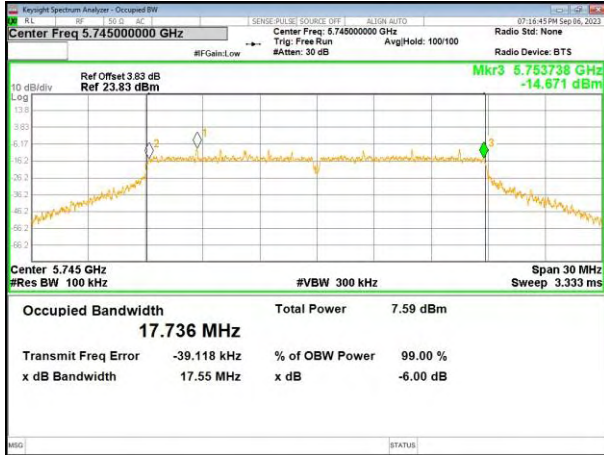
(802.11a) plot on channel 165



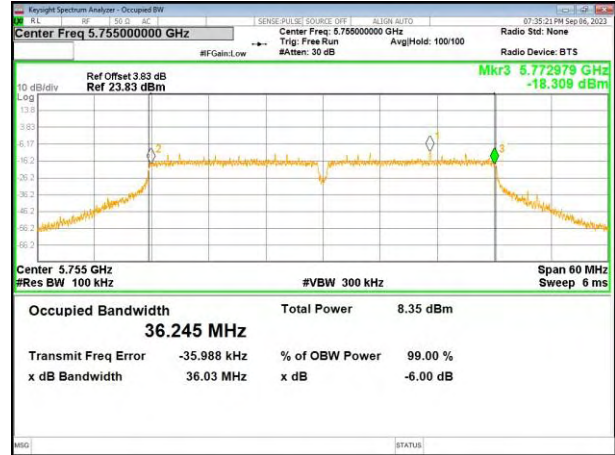
(802.11 n20) plot on channel 165



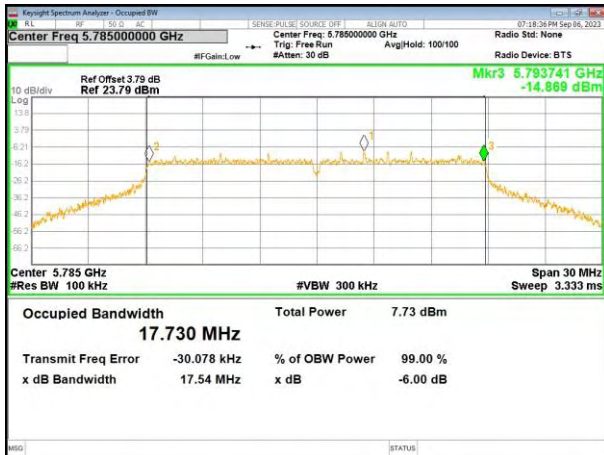
(802.11ac20) plot on channel 149



(802.11 n40) plot on channel 151



(802.11ac20) plot on channel 157



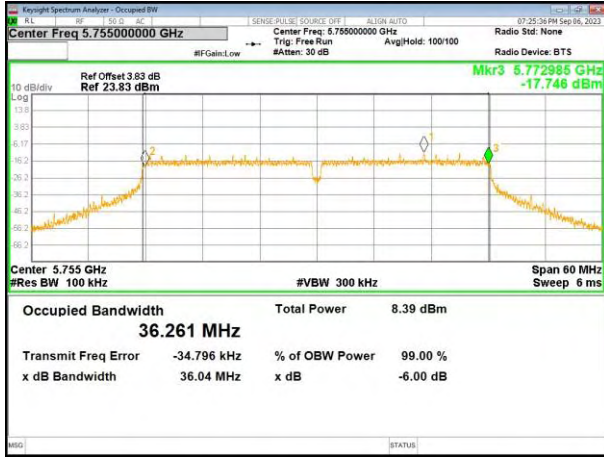
(802.11 n40) plot on channel 159



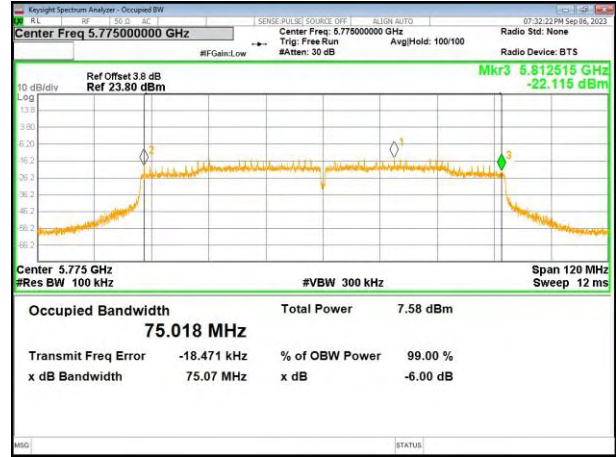
(802.11ac20) plot on channel 165



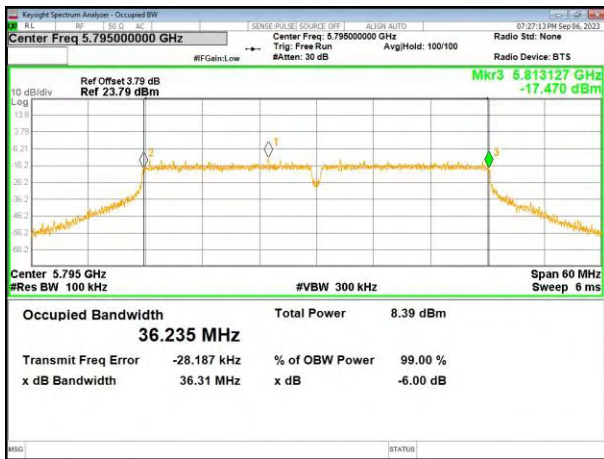
(802.11 ac40) plot on channel 151



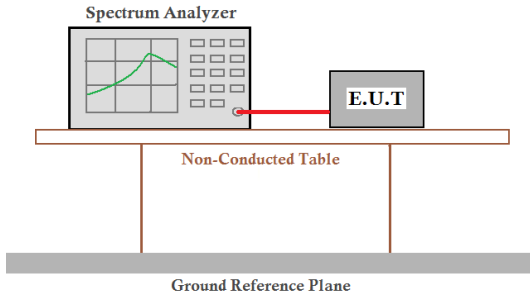
(802.11 ac80) plot on channel 155



(802.11 ac40) plot on channel 159



4.6 Power Spectral Density

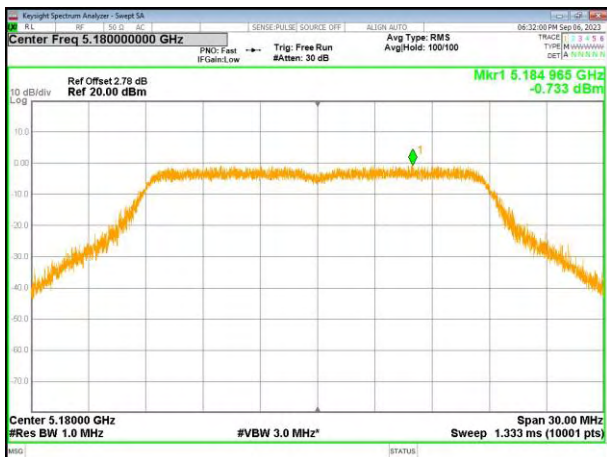
Test Requirement:	FCC Part15 E Section 15.407(a)(1)/ (a)(3)	
Test Method:	ANSI C63.10:2013 and KDB 789033 D02 General U-NII Test Procedures New Rules v02r01	
Limit:	Frequency band (MHz)	Limit
	5150-5250	≤17dBm/1MHz for master device
		≤11dBm/1MHz for client device
	5250-5350	≤11dBm/1MHz for client device
	5470-5725	≤11dBm/1MHz for client device
5725-5850	≤30dBm/500kHz	
Test setup:		
Test Instruments:	Refer to section 3.0 for details	
Test mode:	Refer to section 2.2 for details	
Test environment:	Temp.: 24.4°C	Humid.: 50%RH
Test voltage:	DC 12V	
Test results:	Pass	

Measurement Result

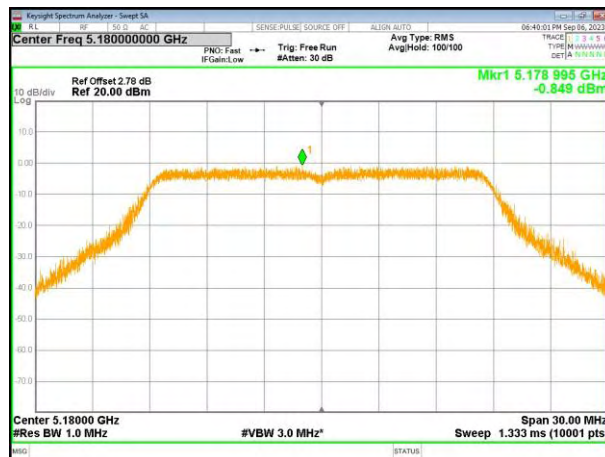
5180-5240MHz

Mode	Frequency	Measured Power Density (dBm/MHz)	Correction Factor (dB)	Total Power Density (dBm/MHz)	Limit (dBm/MHz)
802.11 a	5180 MHz	-0.733	0.69	-0.043	11
	5200 MHz	-0.546	0.70	0.154	11
	5240 MHz	-0.343	0.69	0.347	11
802.11 n20	5180 MHz	-0.849	0.69	-0.159	11
	5200 MHz	-1.169	0.69	-0.479	11
	5240 MHz	-1.379	0.70	-0.679	11
802.11 ac20	5180 MHz	-1.040	0.69	-0.350	11
	5200 MHz	-1.100	0.69	-0.410	11
	5240 MHz	-1.393	0.69	-0.703	11
802.11 n40	5190 MHz	-4.051	0.69	-3.361	11
	5230 MHz	-4.531	0.68	-3.851	11
802.11 ac40	5190 MHz	-4.306	0.68	-3.626	11
	5230 MHz	-4.282	0.68	-3.602	11
802.11 ac80	5210 MHz	-7.797	0.65	-7.147	11

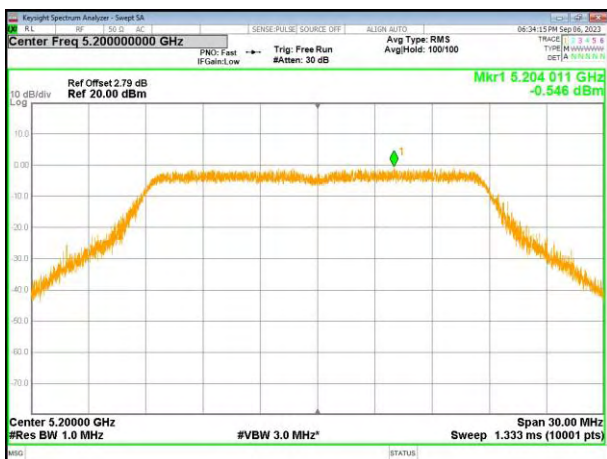
(802.11a) PSD plot on channel 36



(802.11n20) PSD plot on channel 36



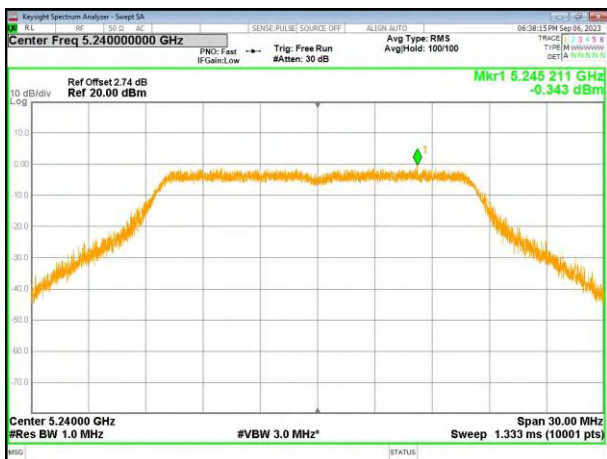
(802.11a) PSD plot on channel 40



(802.11n20) PSD plot on channel 40



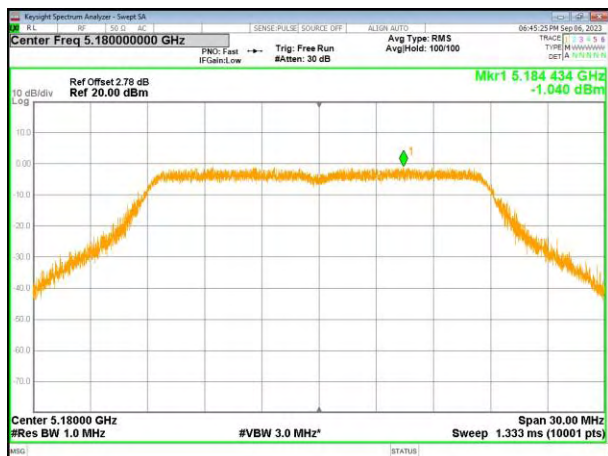
(802.11a) PSD plot on channel 48



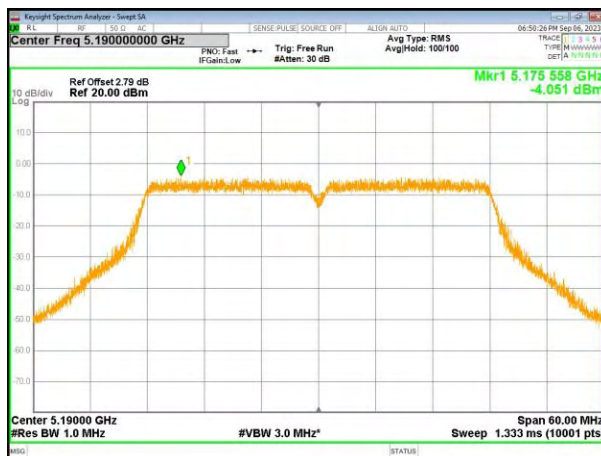
(802.11n20) PSD plot on channel 48



(802.11ac20) PSD plot on channel 36



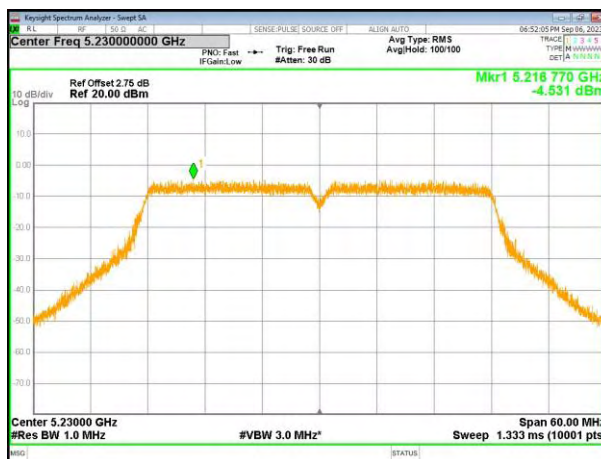
(802.11n40) PSD plot on channel 38



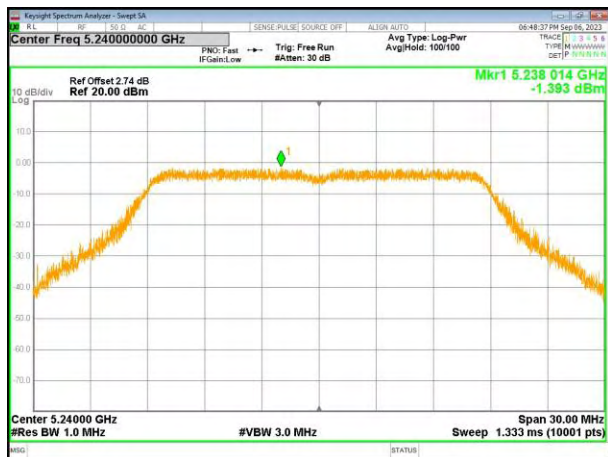
(802.11ac20) PSD plot on channel 40



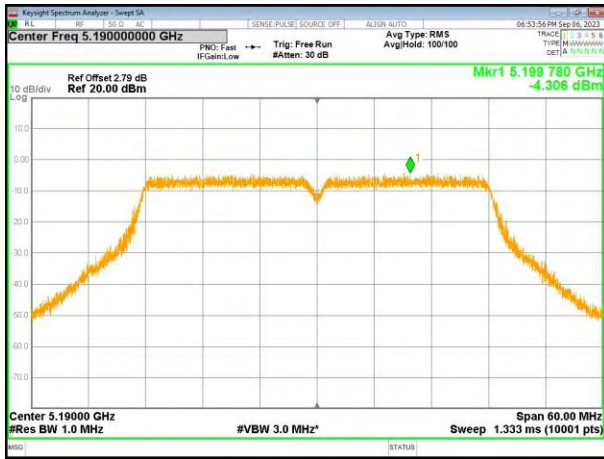
(802.11n40) PSD plot on channel 46



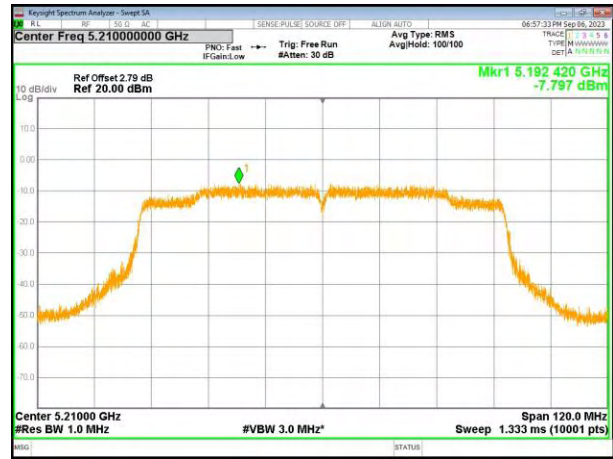
(802.11ac20) PSD plot on channel 48



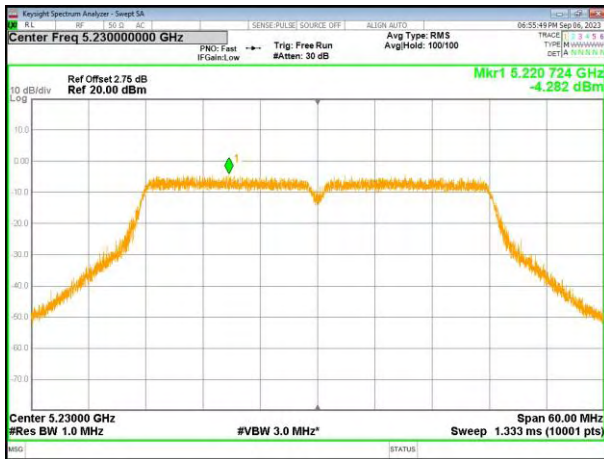
(802.11ac40) PSD plot on channel 38



(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 Power Density (dBm/500KHz)	Limit (dBm/MHz)
802.11 a	5745 MHz	-4.346	-4.432	0.71	-3.722	30
	5785 MHz	-3.913	-3.999	0.71	-3.289	30
	5825 MHz	-3.049	-3.135	0.69	-2.445	30
802.11 n20	5745 MHz	-4.736	-4.822	0.69	-4.132	30
	5785 MHz	-4.957	-5.043	0.70	-4.343	30
	5825 MHz	-4.960	-5.046	0.69	-4.356	30
802.11ac20	5745 MHz	-4.539	-4.625	0.69	-3.935	30
	5785 MHz	-5.272	-5.358	0.69	-4.668	30
	5825 MHz	-4.361	-4.447	0.69	-3.757	30
802.11 n40	5755 MHz	-7.616	-7.702	0.68	-7.022	30
	5795 MHz	-7.552	-7.638	0.68	-6.958	30
802.11ac40	5755 MHz	-7.416	-7.502	0.68	-6.822	30
	5795 MHz	-7.469	-7.555	0.69	-6.865	30
802.11ac80	5775 MHz	-10.542	-10.628	0.66	-9.968	30

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

(802.11a) PSD plot on channel 149



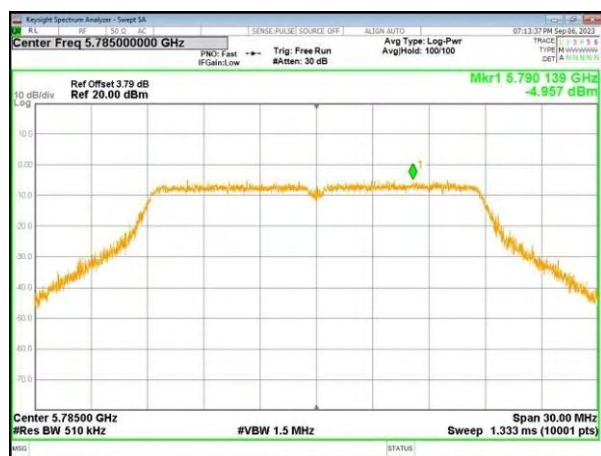
(802.11n20) PSD plot on channel 149



(802.11a) PSD plot on channel 157



(802.11n20) PSD plot on channel 157



(802.11a) PSD plot on channel 165



(802.11n20) PSD plot on channel 165

