RF TEST REPORT

Applicant	iRay Technology Co., Ltd.
FCC ID	2ACHK-01070840
Product	Wireless Digital Flat Panel Detector
Brand	iRayTechnology
Model	NDT1013LA
Report No.	R2311A1189-R2V1
Issue Date	June 7, 2024

Eurofins TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 15E (2023)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Zhu Chentao

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Approved by: Xu Kai

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TABLE OF CONTENT

Version	Revision Description	Issue Date
Rev.0	Initial issue of report.	May 30, 2024
Rev.1	Update information.	June 7, 2024
Note: This revised report (Report No.: R2311A1189-R2V1) supersedes and replaces the previously issued report (Report No.: R2311A1189-R2). Please discard or destroy the previously issued report and dispose of it accordingly.		

Summary of measurement results

Number	Test Case	Clause in FCC rules	Verdict
1	Average output power	15.407(a)	PASS
2	Occupied bandwidth	15.407(e)	PASS
3	Frequency stability	15.407(g)	PASS
4	Power spectral density	15.407(a)	PASS
5	Unwanted Emissions	15.407(b)	PASS
6	Conducted Emissions	15.207	PASS
Date of Testing: January 9, 2024 ~ April 29, 2024 Date of Sample Received: November 2, 2023			
Note: PASS: The EUT complies with the essential requirements in the standard. FAIL: The EUT does not comply with the essential requirements in the standard. All indications of Pass/Fail in this report are opinions expressed by Eurofins TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.			

1. Test Laboratory

1.1. Notes of the test report

This report shall not be reproduced in full or partial, without the written approval of **Eurofins TA Technology (Shanghai) Co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

1.2. Test facility

FCC (Designation number: CN1179, Test Firm Registration Number: 446626)

Eurofins TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA (Certificate Number: 3857.01)

Eurofins TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

1.3. Testing Location

Company:	Eurofins TA Technology (Shanghai) Co., Ltd.
Address:	Building 3, No.145, Jintang Rd, Pudong Shanghai, P.R.China
City:	Shanghai
Post code:	201201
Country:	P. R. China
Contact:	Xu Kai
Telephone:	+86-021-50791141/2/3
Fax:	+86-021-50791141/2/3-8000
Website:	https://www.eurofins.com/electrical-and-electronics
E-mail:	Kain.Xu@cpt.eurofinscn.com

2. General Description of Equipment under Test

2.1. Applicant and Manufacturer Information

Applicant	iRay Technology Co., Ltd.
Applicant address	RM 202, Building 7, No. 590, Ruiqing RD.,Pudong, Shanghai, China
Manufacturer	iRay Technology Co., Ltd.
Manufacturer address	RM 202, Building 7, No. 590, Ruiqing RD.,Pudong, Shanghai, China

2.2. General information

EUT Description			
Model	NDT1013LA		
Lab internal SN	R2311A1189/S01		
Hardware Version	ARM: Core: 2.5.5.xx Kernel: 1.0.45.xx FPGA: main: 2.10.8.xx MCU: 2.10.1.xx		
Software Version	4.4.6.xxxxx		
Power Supply	DC 11.55V from battery or DC 24V from Adapter.		
Antenna Type	Internal Antenna		
Antenna Connector	A permanently attached antenna (meet with the standard FCC Part 15.203 requirement)		
Antenna Gain	Band	Antenna 1 (dBi)	Antenna 2 (dBi)
	U-NII-1	2.78	1.42
	U-NII-3	-0.30	3.04
Directional Gain	Band	Power (dBi)	PSD (dBi)
	U-NII-1	2.78	5.79
	U-NII-3	3.04	6.05
Operating Frequency Range(s)	U-NII-1: 5150MHz-5250MHz U-NII-3: 5725MHz -5850MHz		
Modulation Type	802.11a: OFDM 802.11n (HT20/HT40): OFDM 802.11ac (VHT20/VHT40/VHT80): OFDM 802.11ax (HE20/ HE40/ HE80): OFDM		
Max. Output Power	24.26 dBm		
Testing temperature range	-30 ° C to 50° C		
Operating temperature range	10 ° C to 40 ° C		
Testing voltage range	Extreme Low 102 V; Normal 120 V;		

	Extreme High 138 V
State DC voltage	24 V
EUT Accessory	
Adapter	Manufacturer: Shenzhen Longxc Power Supply Co., LTD. Model: LXCP61-024300 Input: 100-240V 1.5A Output: 24V⎓ 3.0A
Battery	Manufacturer: iRay Technology Taicang Ltd. Model: BATTERY-KX DC 11.55V, 4700mAh
Control-box-SM	Model: 02061227
Auxiliary Test Equipment	
PC	Manufacturer: DELL Model: Latitude 3301(SN: DR6DJW2)

Note:
1. The EUT is sent from the applicant to Eurofins TA and the information of the EUT is declared by the applicant.
2. This device support automatically discontinue transmission, while the device is not transmitting any information, the device can automatically discontinue transmission and become standby mode for power saving. The device can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.
3. (a) Manufacturers implements security features in any digitally modulated devices capable of operating in any of the U-NII bands, so that third parties are not able to reprogram the device to operate outside the parameters for which the device was certified. The software prevents the user from operating the transmitter with operating frequencies, output power, modulation types or other radio frequency parameters outside those that were approved for the device. Manufacturers uses means including, but not limited to the use of a private network that allows only authenticated users to download software, electronic signatures in software or coding in hardware that is decoded by software to verify that new software can be legally loaded into a device to meet these requirements and must describe the methods in their application for equipment authorization.

3. Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

Test standards:

FCC CFR47 Part 15E (2023) Unlicensed National Information Infrastructure Devices

ANSI C63.10-2013

Reference standard:

KDB 789033 D02 General UNII Test Procedures New Rules v02r01

KDB 662911 D01 Multiple Transmitter Output v02r01

4. Test Configuration

Test Mode

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (Y axis) and the worst case was recorded.

In order to find the worst case condition, Pre-tests are needed at the presence of different data rate. Preliminary tests have been done on all the configuration for confirming worst case. Data rate below means worst-case rate of each test item.

Worst-case data rates are shown as following table.

Mode	Data Rate		
	Antenna 1	Antenna 2	MIMO
802.11a	6 Mbps	6 Mbps	/
802.11n HT20	MCS0	MCS0	MCS8
802.11n HT40	MCS0	MCS0	MCS8
802.11ac VHT20	MCS0	MCS0	MCS0
802.11ac VHT40	MCS0	MCS0	MCS0
802.11ac VHT80	MCS0	MCS0	MCS0
802.11ax HE20	MCS0	MCS0	MCS0
802.11ax HE40	MCS0	MCS0	MCS0
802.11ax HE80	MCS0	MCS0	MCS0

The worst case Antenna mode for each of the following tests for Wi-Fi:

Test Cases	Antenna 1	Antenna 2	MIMO
Average conducted output power	O	O	802.11n HT20/40 802.11ac VHT20/40/80 802.11ax HE20/40/80
Occupied bandwidth	--	802.11a	802.11n HT20/40 802.11ac VHT20/40/80 802.11ax HE20/40/80
Frequency stability	--	802.11a	--
Power Spectral Density	O	O	802.11n HT20/40 802.11ac VHT20/40/80 802.11ax HE20/40/80
Unwanted Emissions	--	802.11a	802.11n HT20/40 802.11ac VHT20/40/80 802.11ax HE20/40/80
Conducted Emissions	--	--	802.11ax HE40
Note：“O”: test all bands			

Wireless Technology and Frequency Range

Wireless Technology		Bandwidth	Channel	Frequency
Wi-Fi	U-NII-1	20 MHz	36	5180MHz
			40	5200MHz
			44	5220MHz
			48	5240MHz
		40 MHz	38	5190MHz
			46	5230MHz
		80 MHz	42	5210MHz
	U-NII-3	20 MHz	149	5745MHz
			153	5765MHz
			157	5785MHz
			161	5805MHz
			165	5825MHz
		40 MHz	151	5755MHz
			159	5795MHz
		80 MHz	155	5775MHz
Does this device support TPC Function? ☐Yes ☒No				

5. Test Case Results

5.1. Occupied Bandwidth

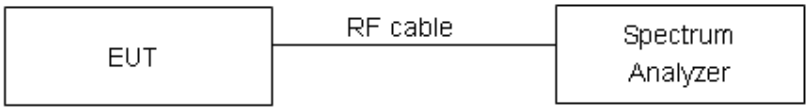
Ambient condition

Temperature	Relative humidity	Pressure
15°C ~ 35°C	20% ~ 80%	86 kPa ~ 106 kPa

Method of Measurement

The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable.
For U-NII-1, set RBW ≈1% OCB kHz, VBW ≥ 3 × RBW, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 26 dB relative to the maximum level measured in the fundamental emission.
For U-NII-3, Set RBW = 100 kHz, VBW ≥ 3 × RBW, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.
Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.
Use the 99 % power bandwidth function of the instrument

Test Setup



Limits

For U-NII-1
No specific occupied bandwidth requirements in Part 15.407.
For U-NII-3
Rule FCC Part §15.407(e)
Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 936 Hz.

Test Results:

U-NII-1

Mode	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 26 dB bandwidth (MHz)	Conclusion
802.11a	5180	16.727	19.565	PASS
	5200	16.692	19.573	PASS
	5240	16.719	19.584	PASS
802.11n HT20	5180	17.669	20.162	PASS
	5200	17.688	20.514	PASS
	5240	17.681	20.006	PASS
802.11n HT40	5190	36.180	41.157	PASS
	5230	36.136	40.703	PASS
802.11ac VHT20	5180	17.701	20.307	PASS
	5200	17.688	20.242	PASS
	5240	17.675	20.176	PASS
802.11ac VHT40	5190	36.168	40.326	PASS
	5230	36.179	40.517	PASS
802.11ac VHT80	5210	76.136	81.854	PASS
802.11ax HE20	5180	18.837	20.188	PASS
	5200	18.801	20.321	PASS
	5240	18.803	20.346	PASS
802.11ax HE40	5190	37.510	40.341	PASS
	5230	37.519	40.847	PASS
802.11ax HE80	5210	77.690	81.040	PASS

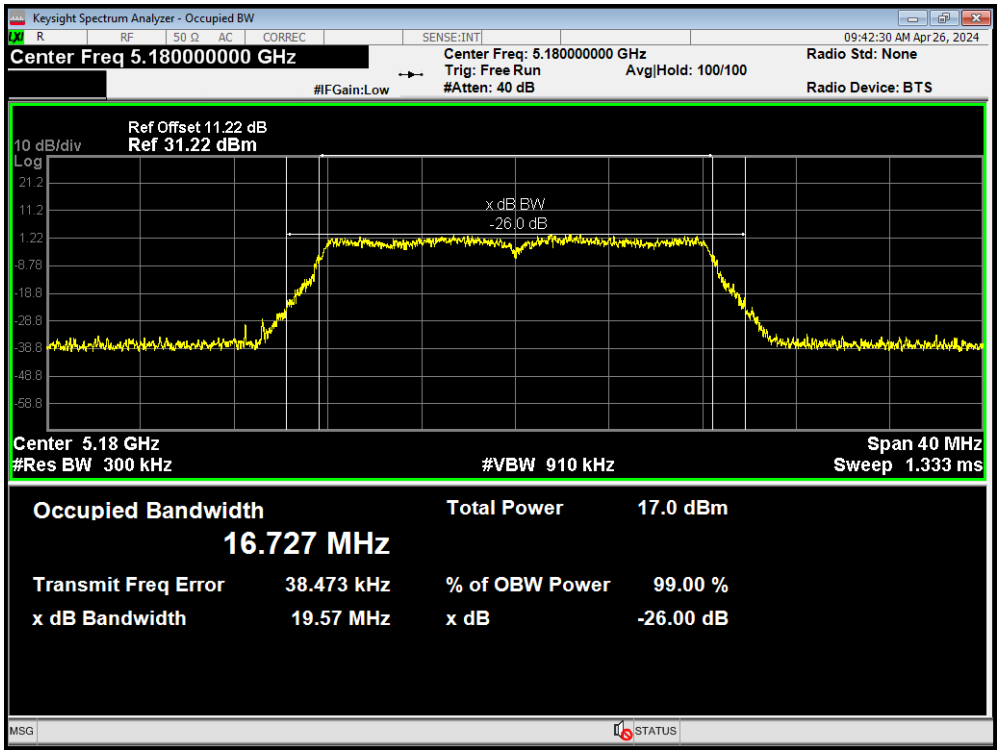
U-NII-3

Mode	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 6 dB bandwidth (MHz)	Limit (kHz)	Conclusion
802.11a	5745	16.865	16.399	500	PASS
	5785	16.800	16.342	500	PASS
	5825	16.749	16.394	500	PASS
802.11n HT20	5745	17.834	17.554	500	PASS
	5785	17.807	17.088	500	PASS
	5825	17.745	17.555	500	PASS
802.11n HT40	5755	36.234	35.328	500	PASS
	5795	36.198	35.032	500	PASS
802.11ac VHT20	5745	17.827	17.273	500	PASS
	5785	17.755	17.310	500	PASS
	5825	17.777	17.568	500	PASS
802.11ac VHT40	5755	36.252	35.667	500	PASS
	5795	36.254	35.505	500	PASS
802.11ac VHT80	5775	76.173	76.343	500	PASS
802.11ax HE20	5745	18.922	17.761	500	PASS
	5785	18.919	17.781	500	PASS
	5825	18.867	18.119	500	PASS
802.11ax HE40	5755	37.576	36.969	500	PASS
	5795	37.580	35.466	500	PASS
802.11ax HE80	5775	77.804	77.638	500	PASS

99% bandwidth

U-NII-1

OBW 802.11a 5180MHz



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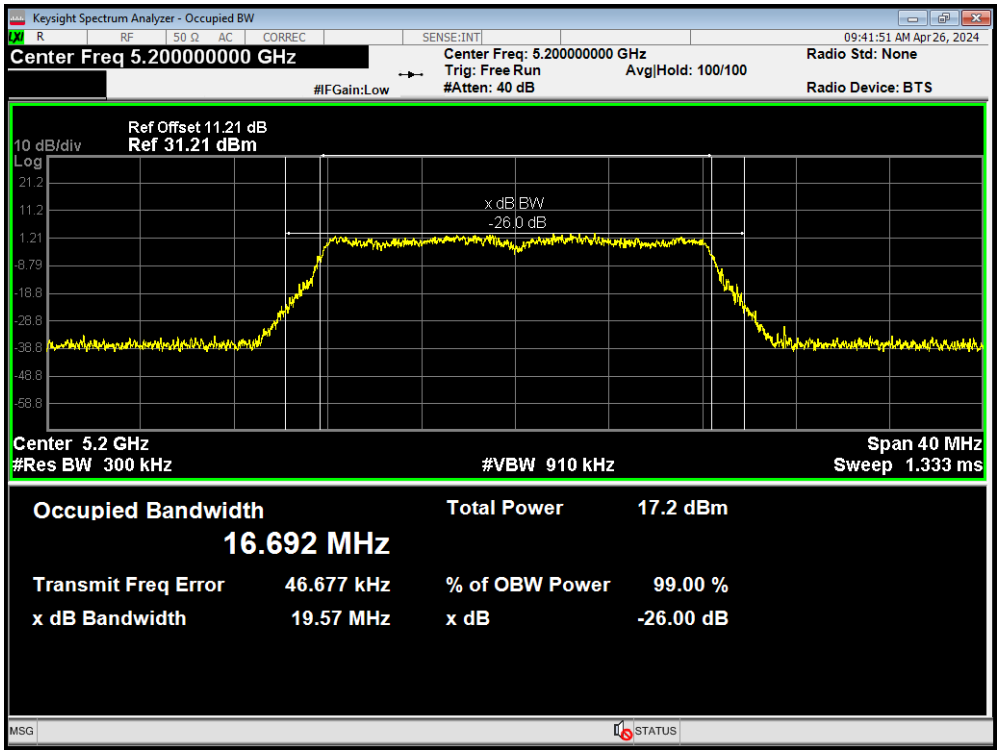

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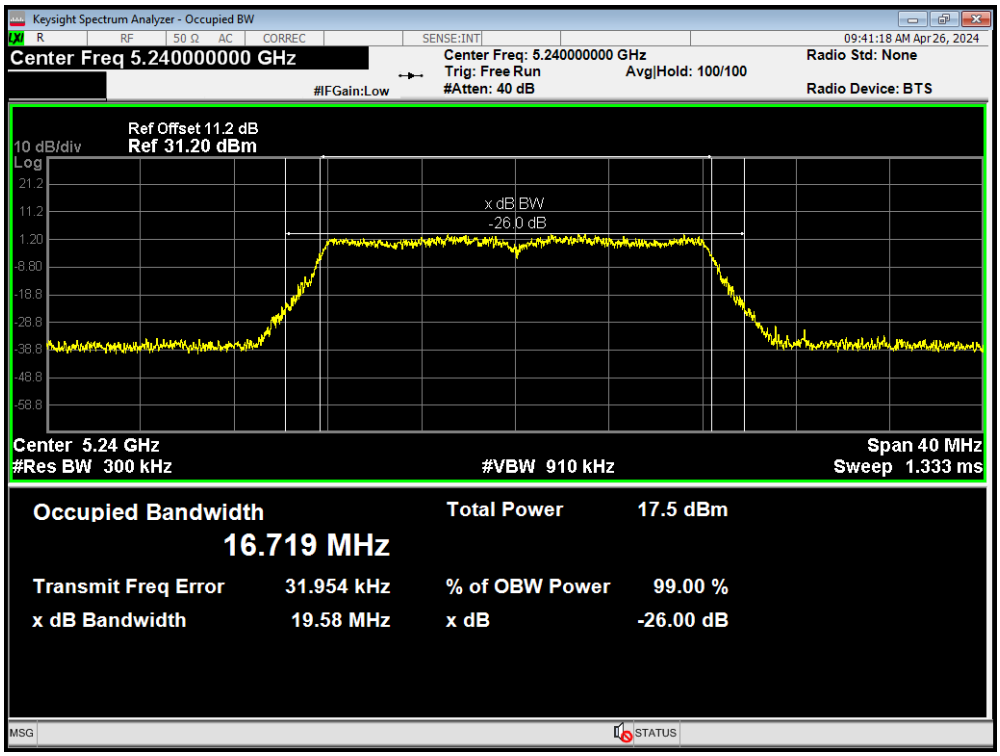

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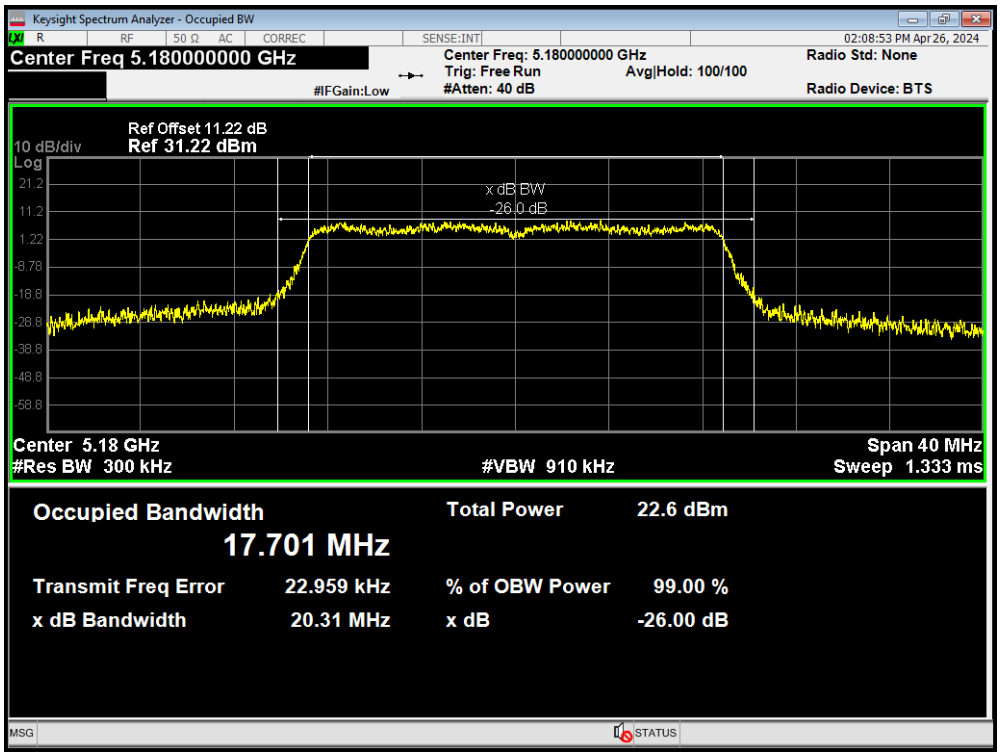

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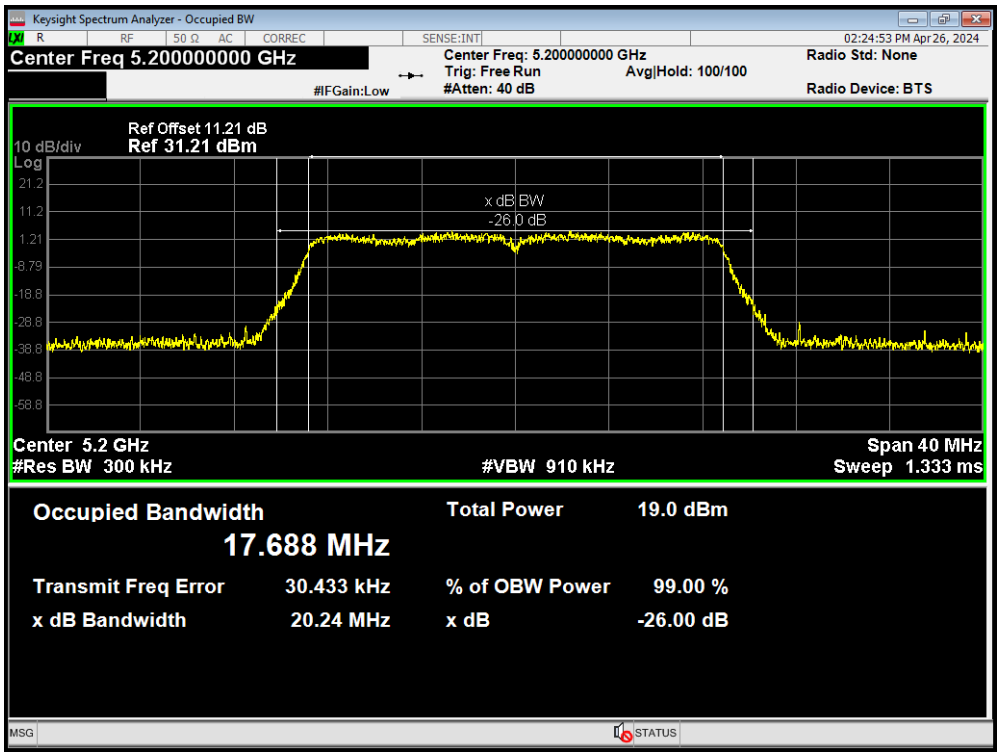

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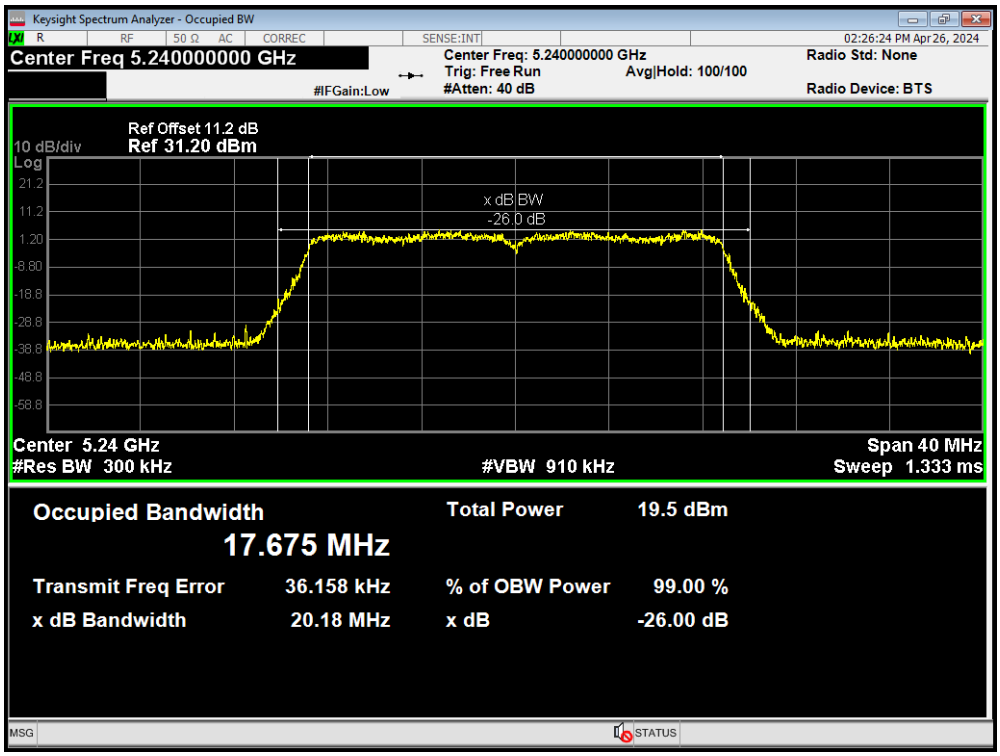

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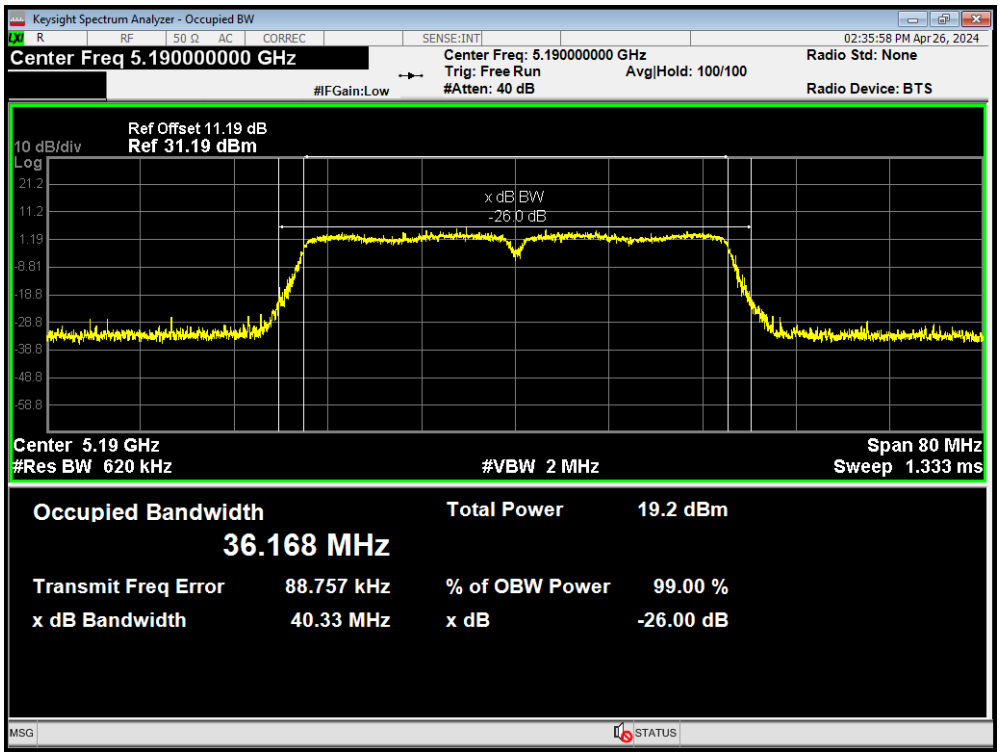

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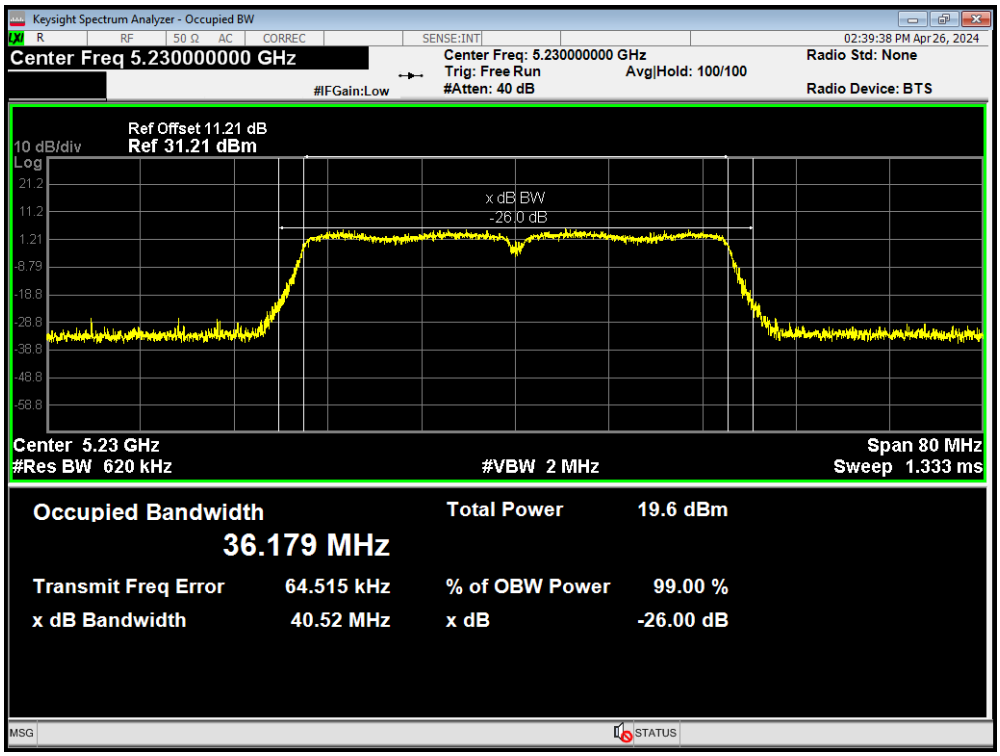

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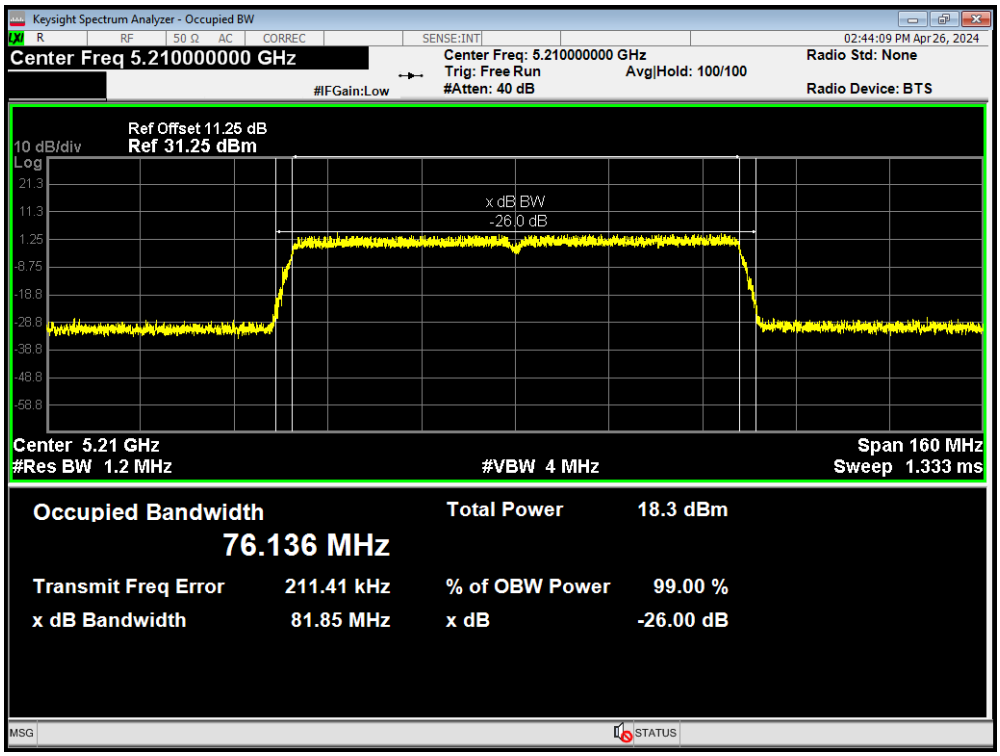

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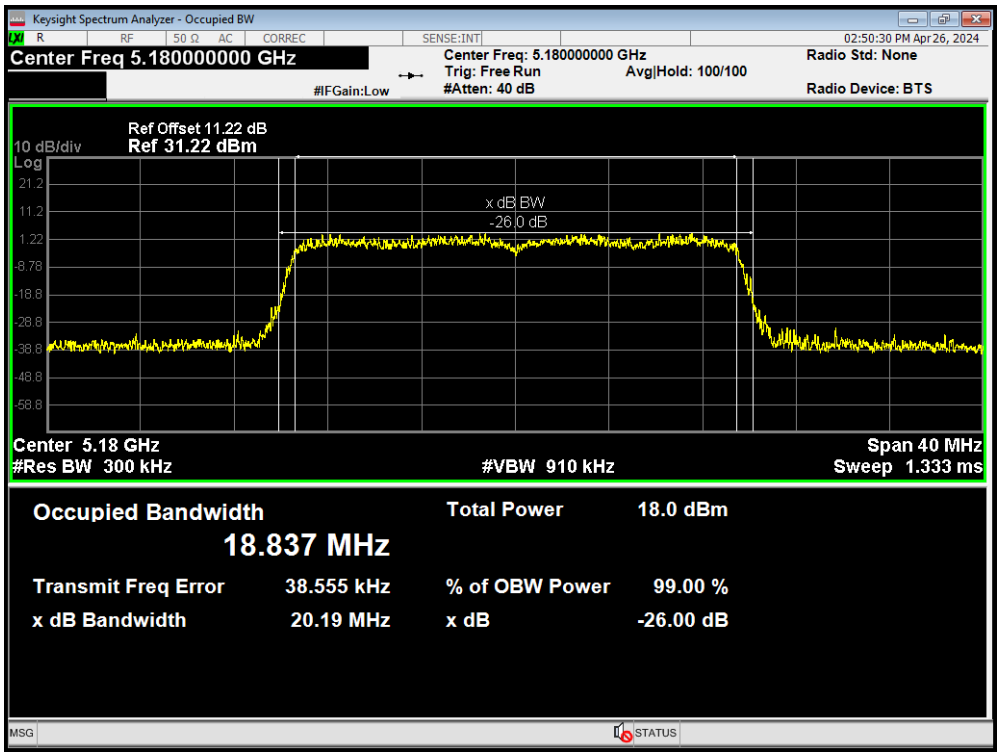

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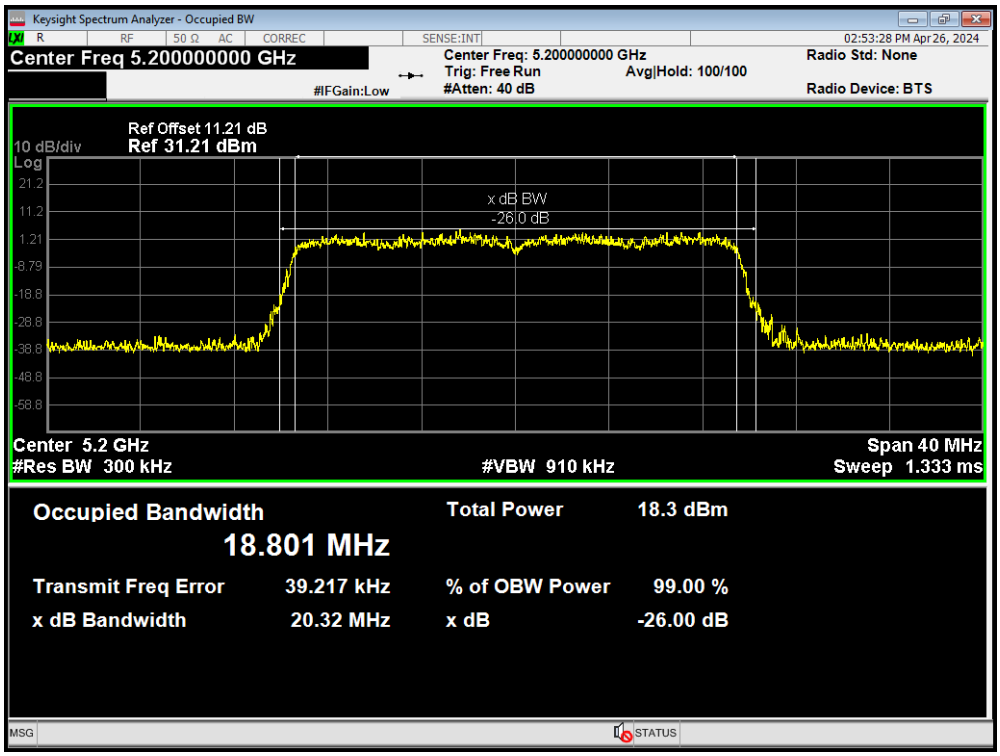

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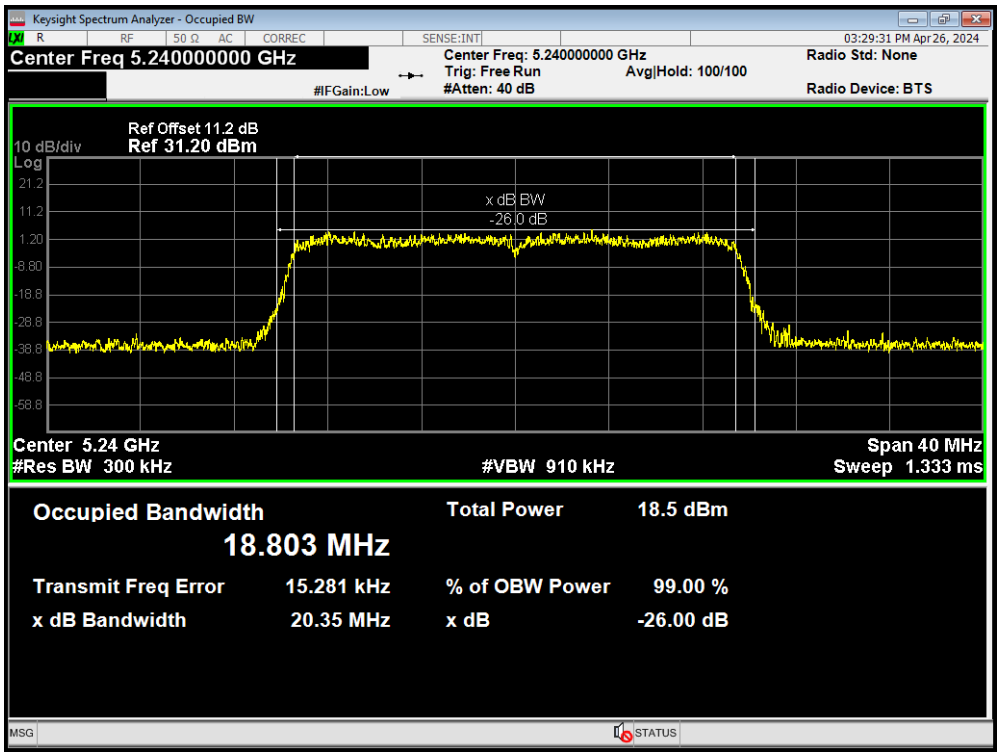

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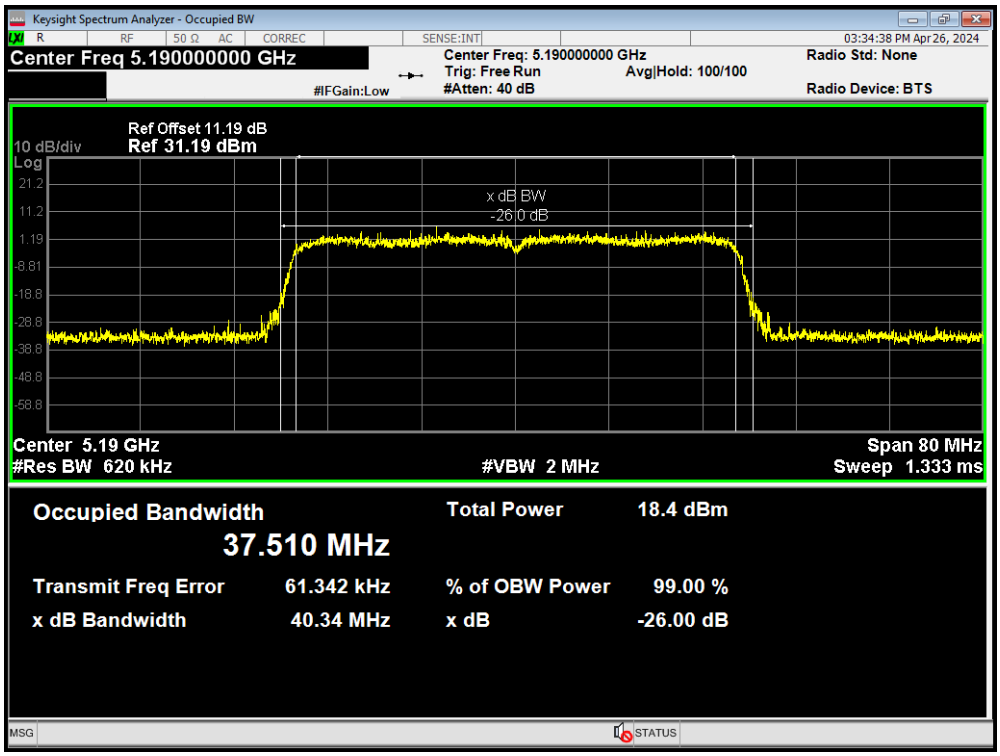

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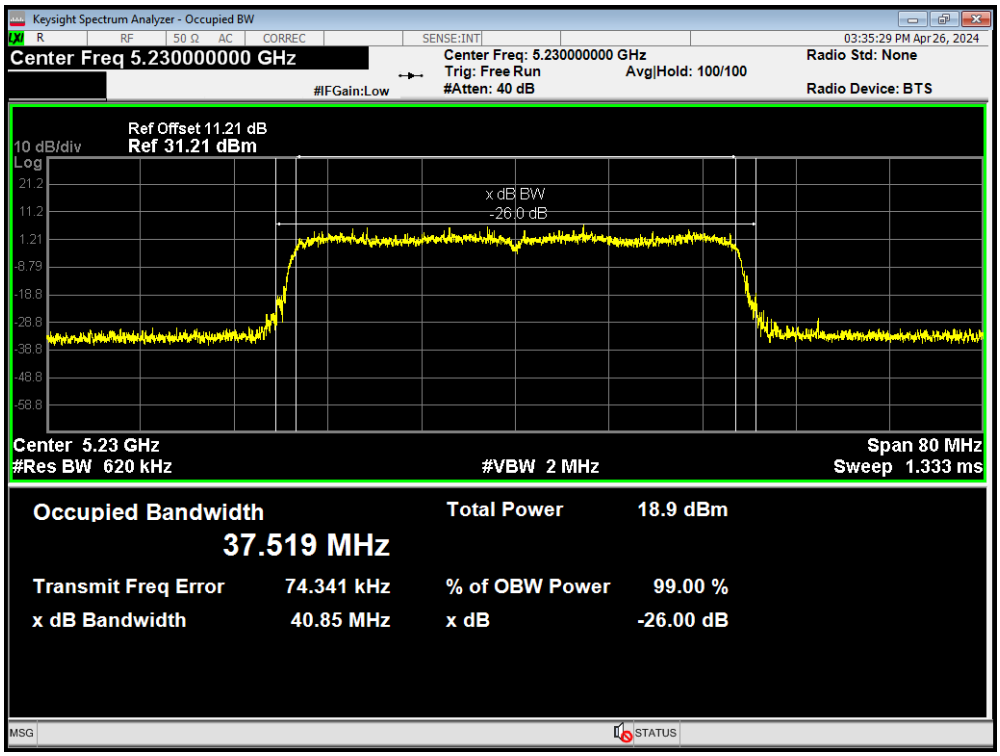

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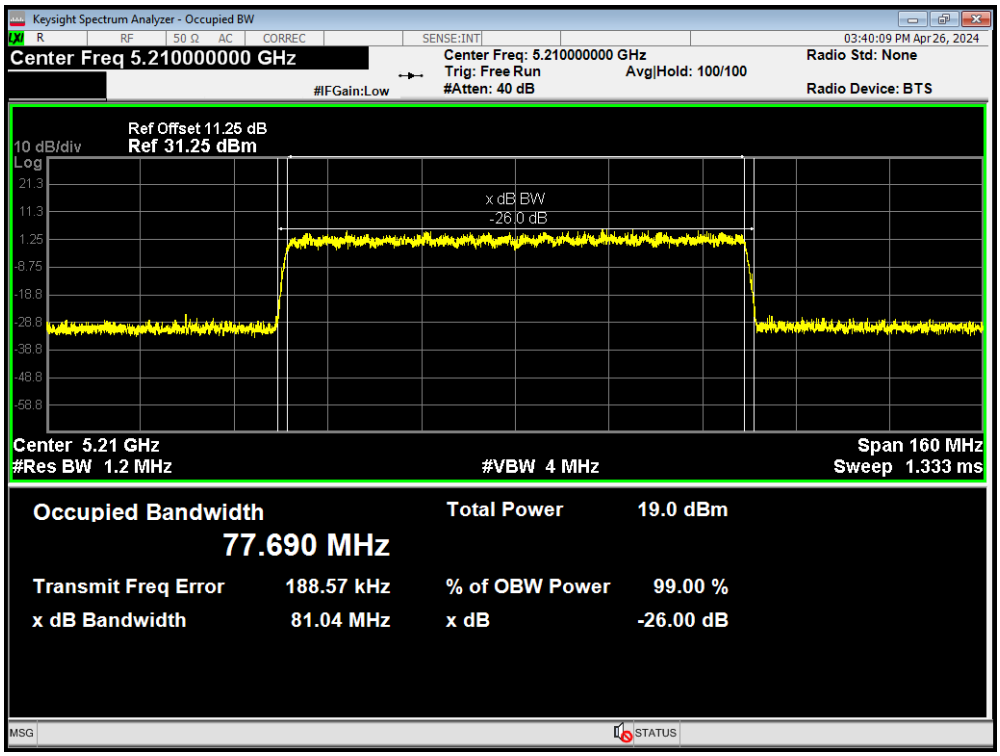

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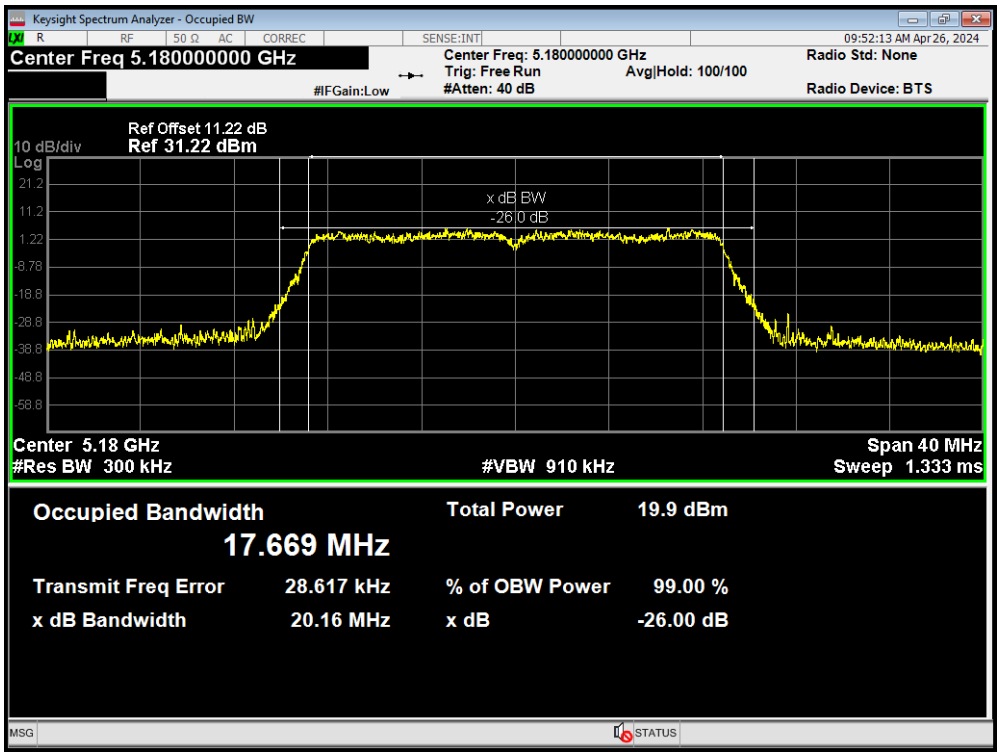

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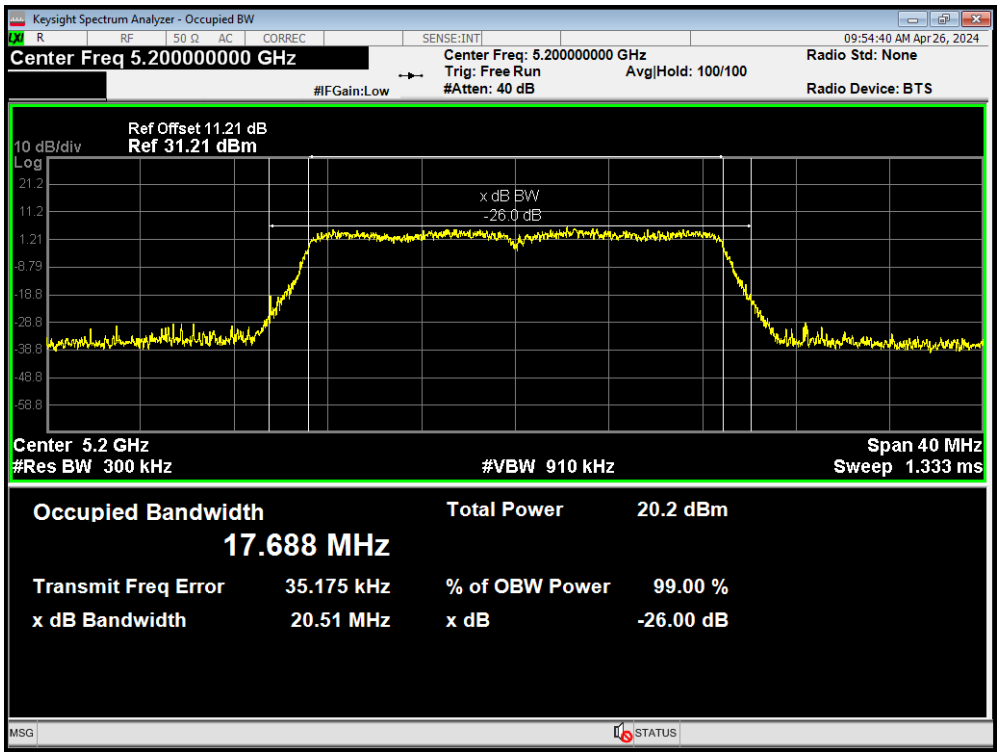

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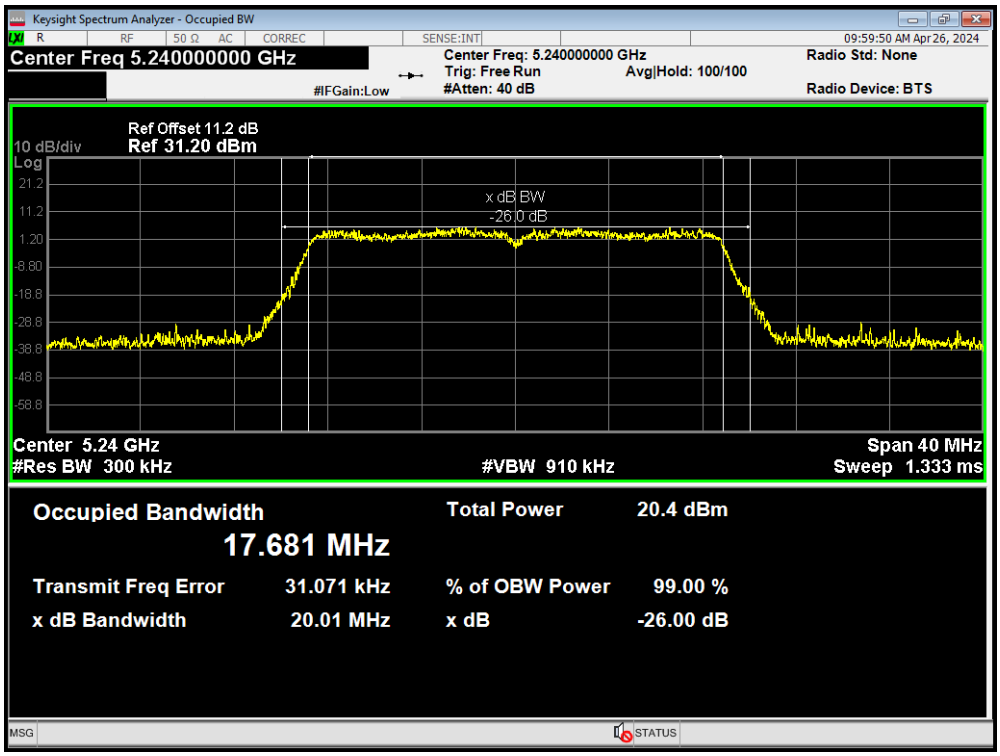

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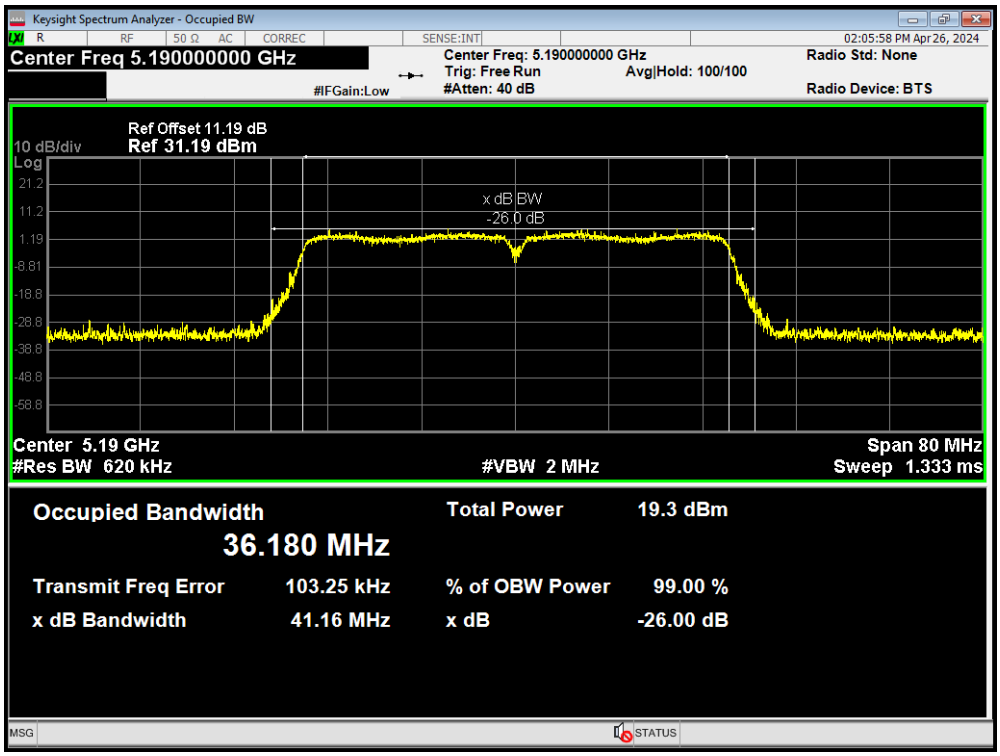

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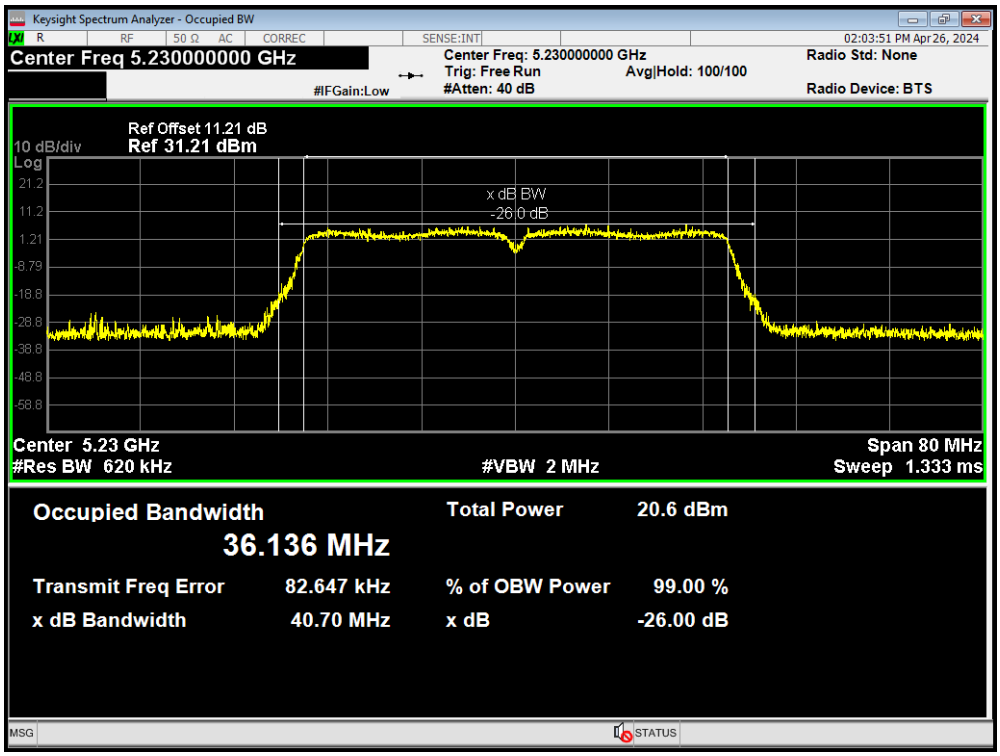
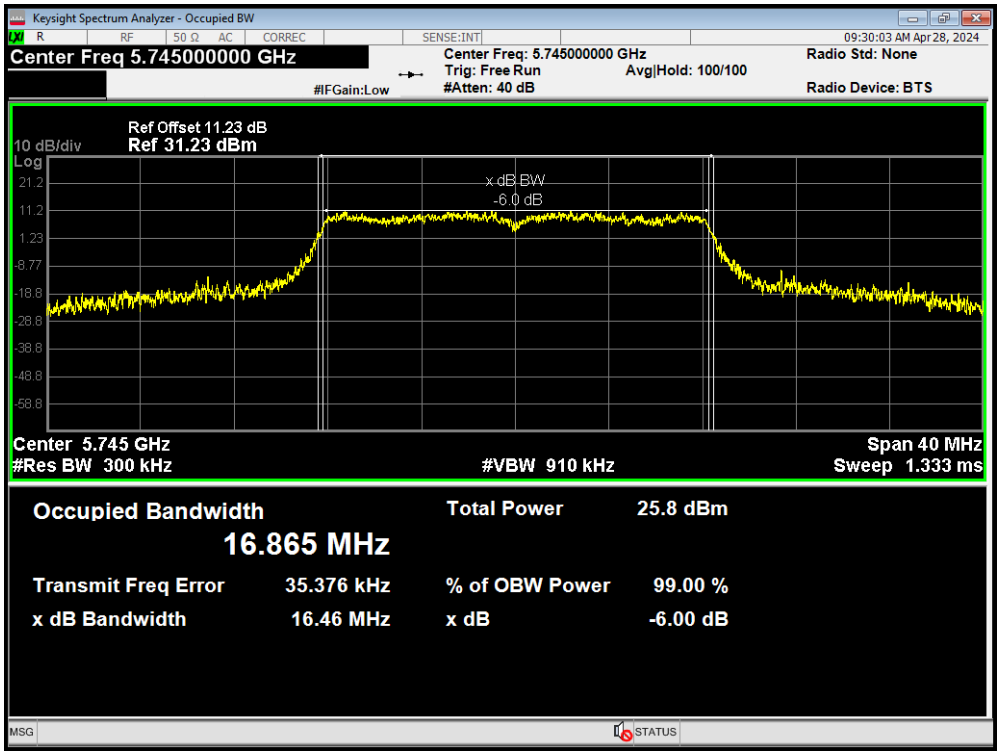


U-NII-3

OBW 802.11a 5745MHz



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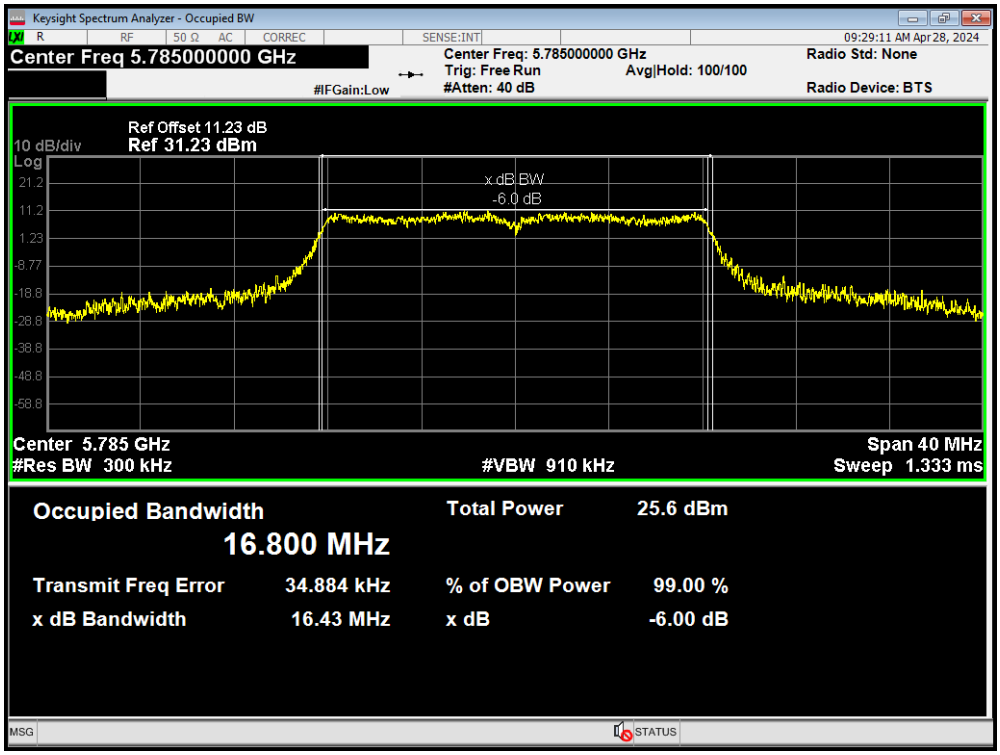

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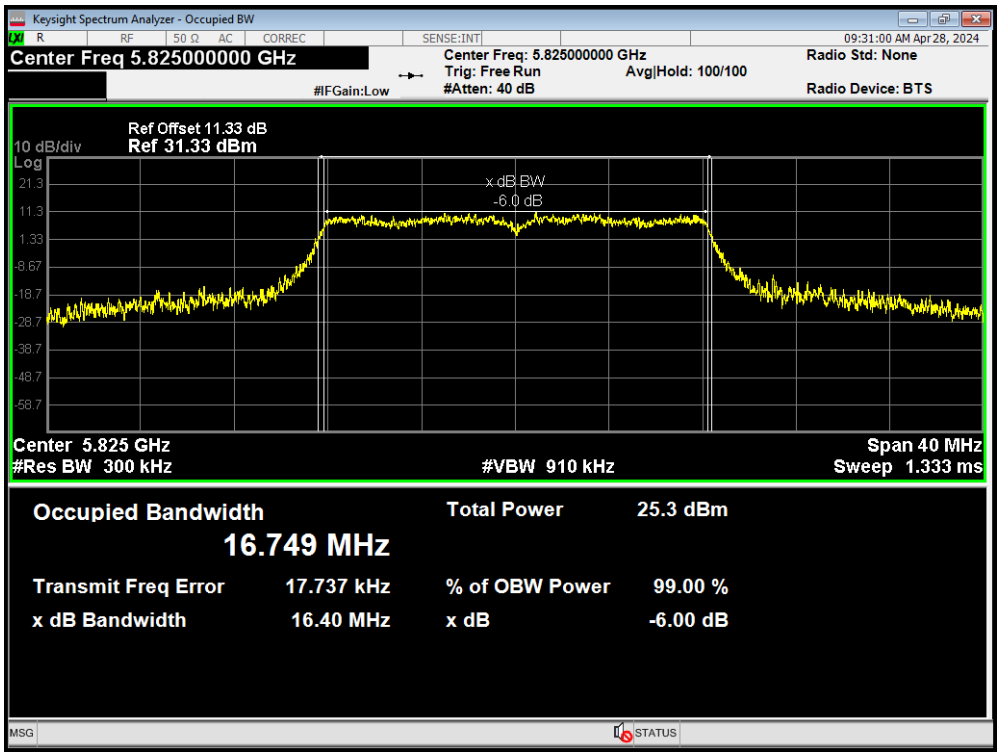

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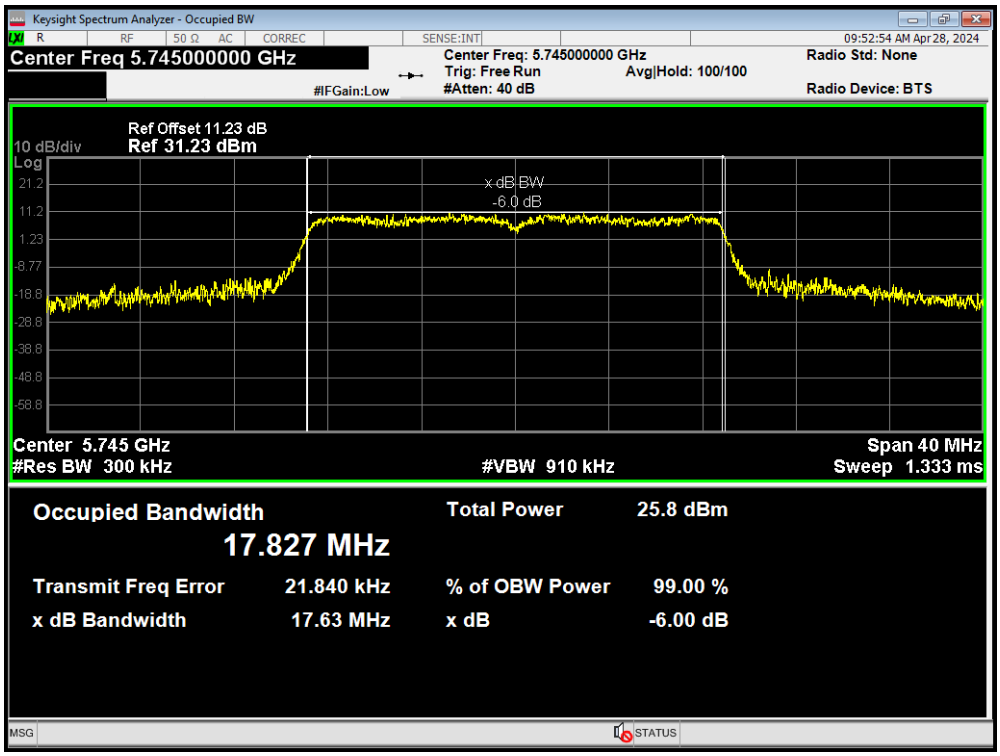

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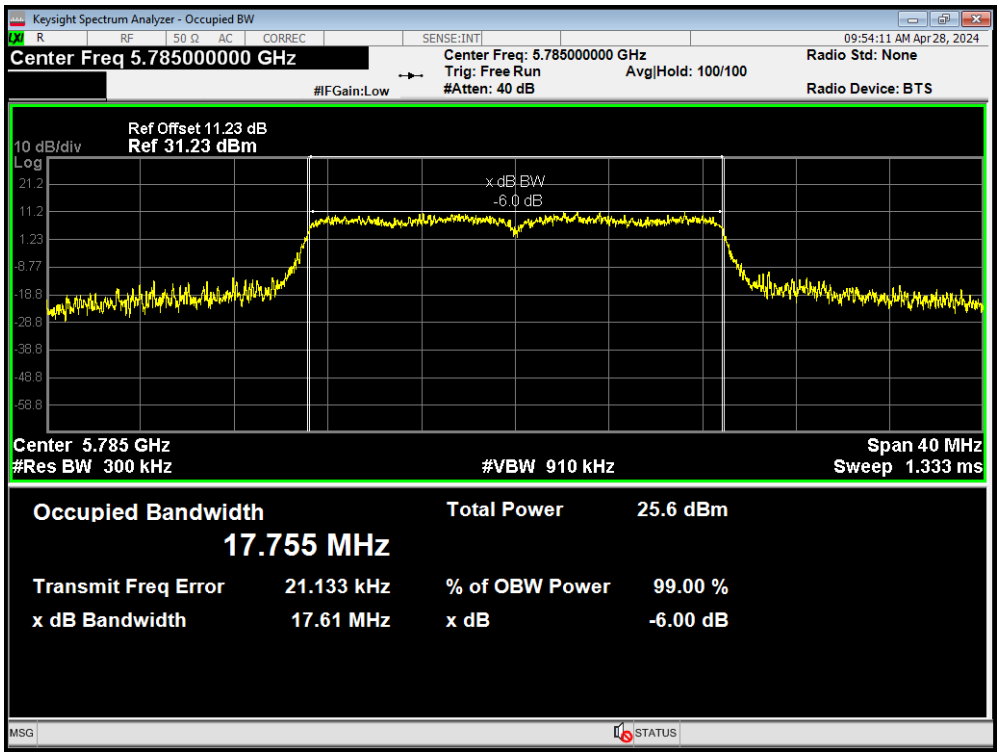

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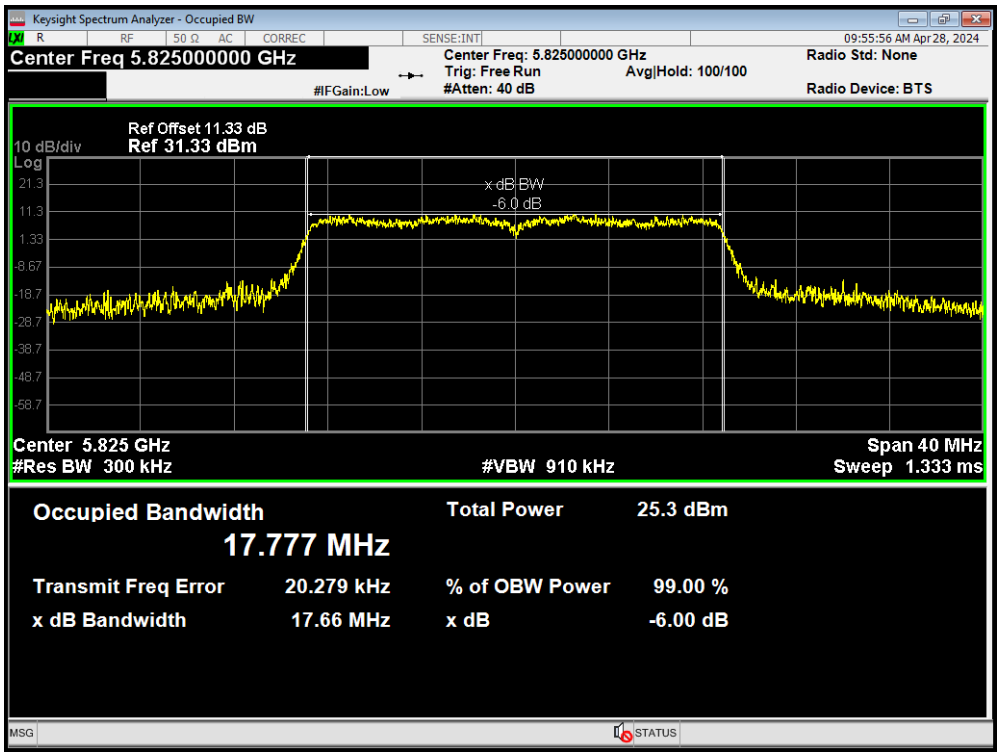

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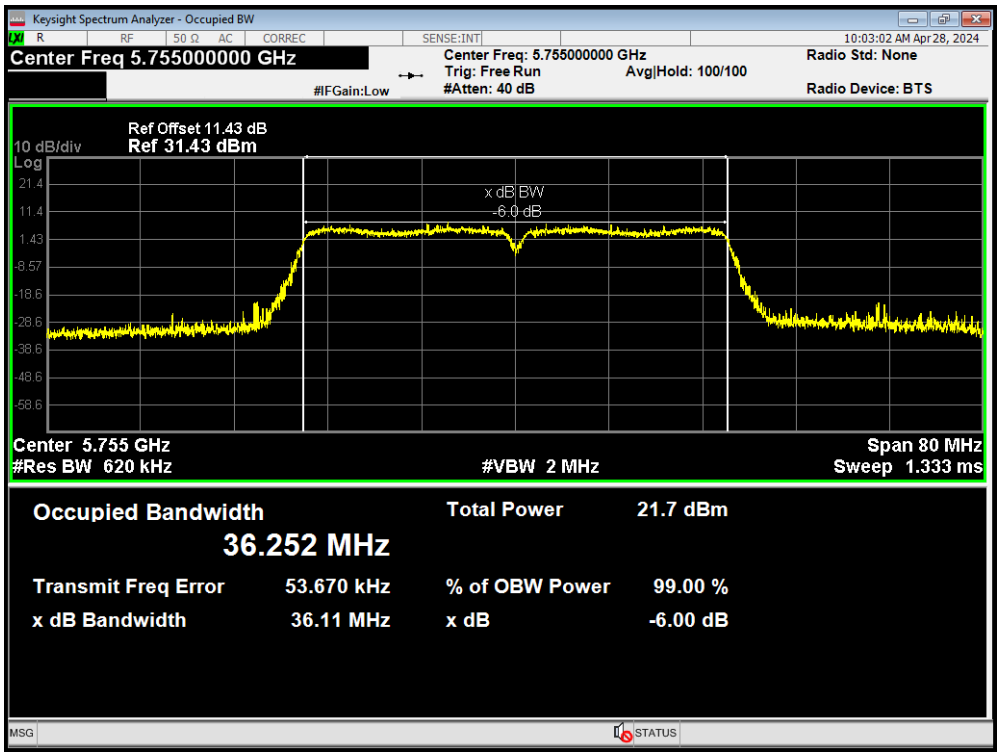
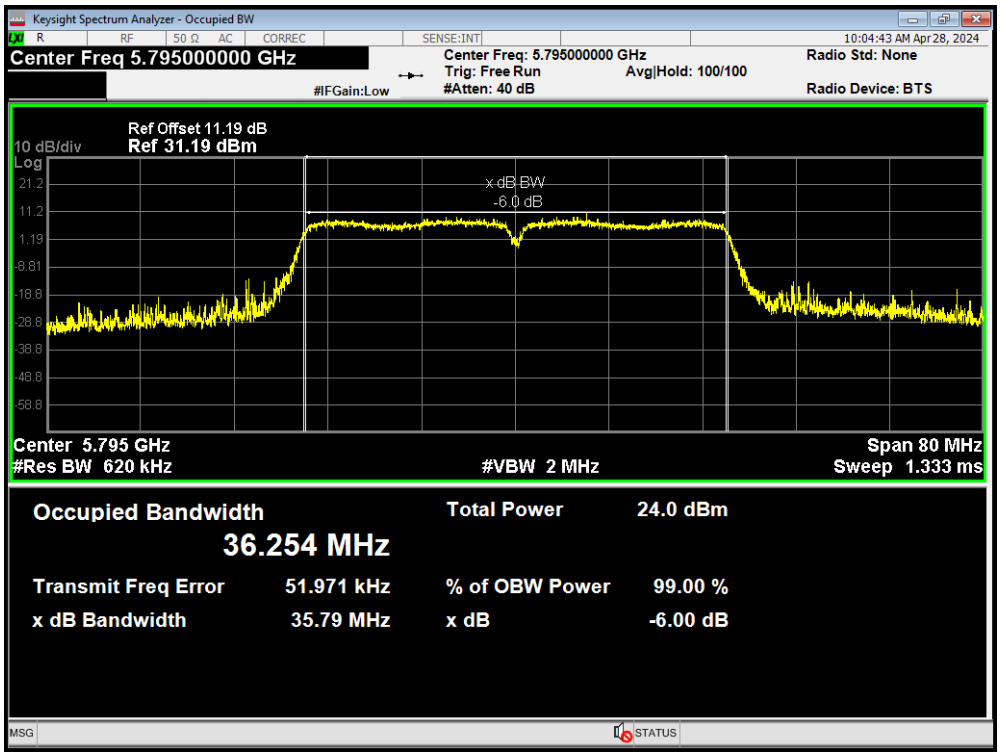
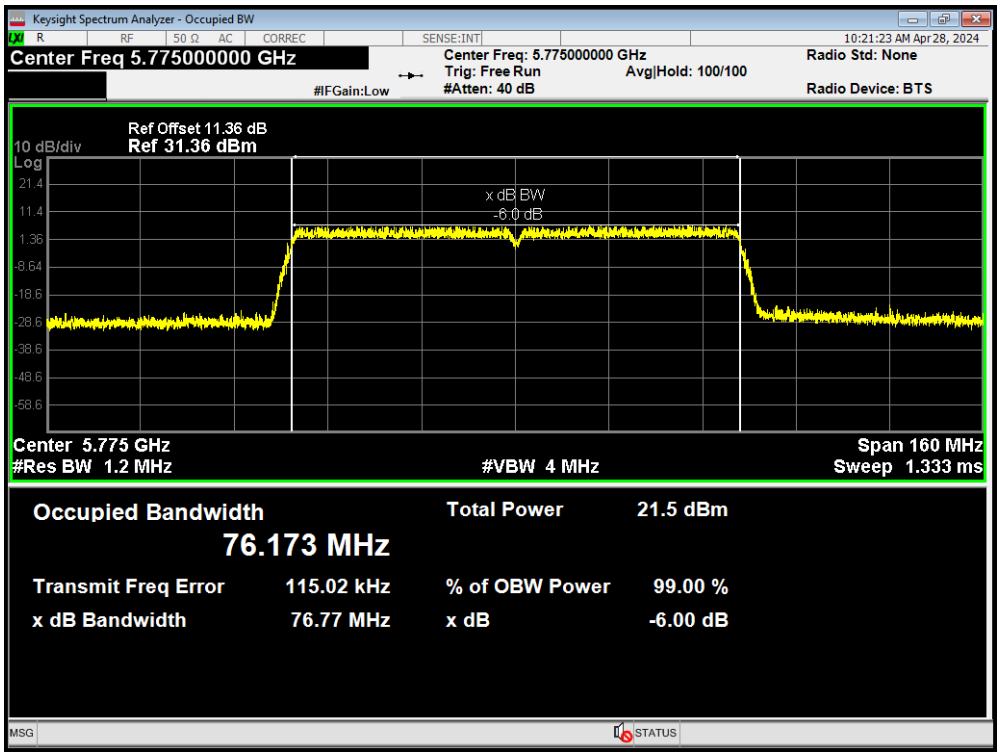


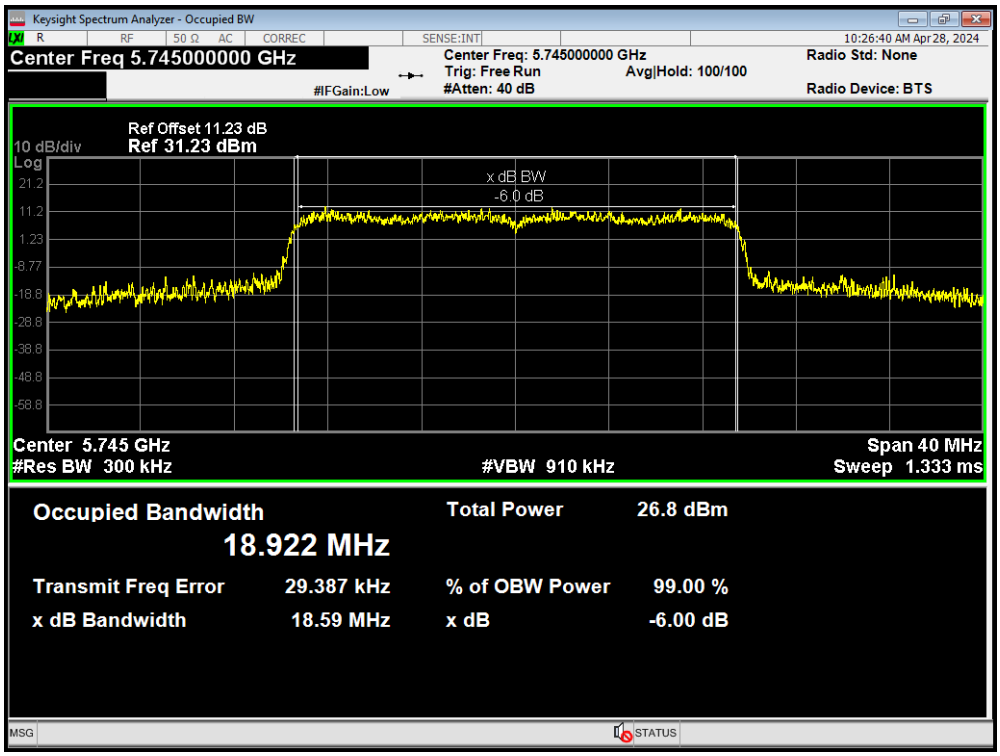
OBW 802.11ac(VHT40) 5795MHz



OBW 802.11ac(VHT80) 5775MHz



OBW 802.11ax(HE20) 5745MHz



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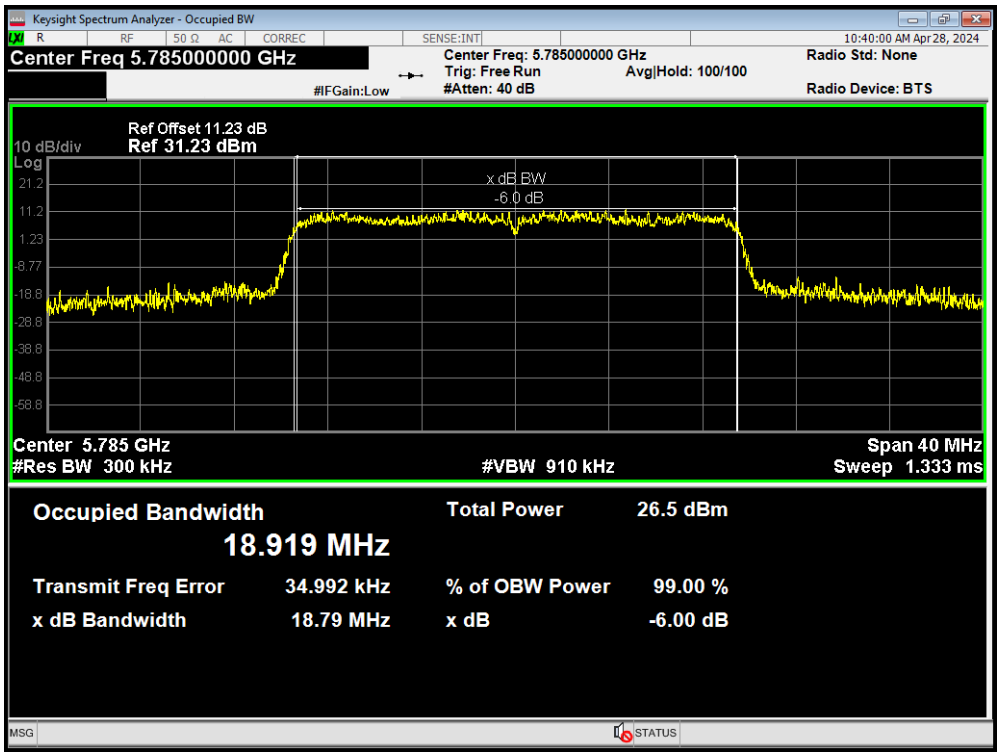
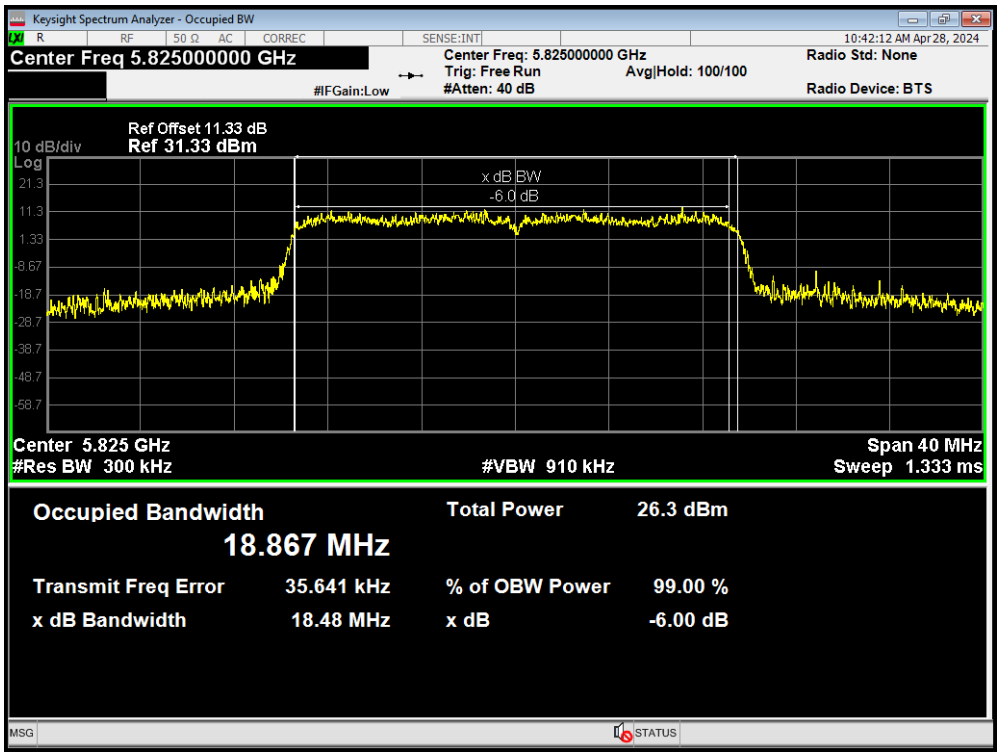
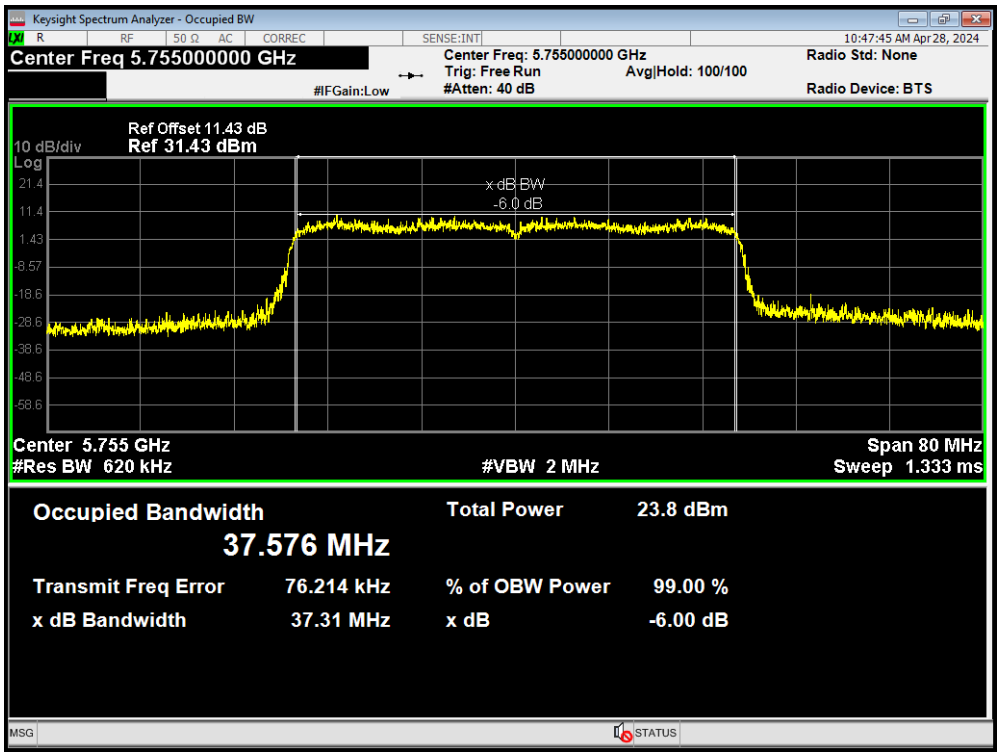


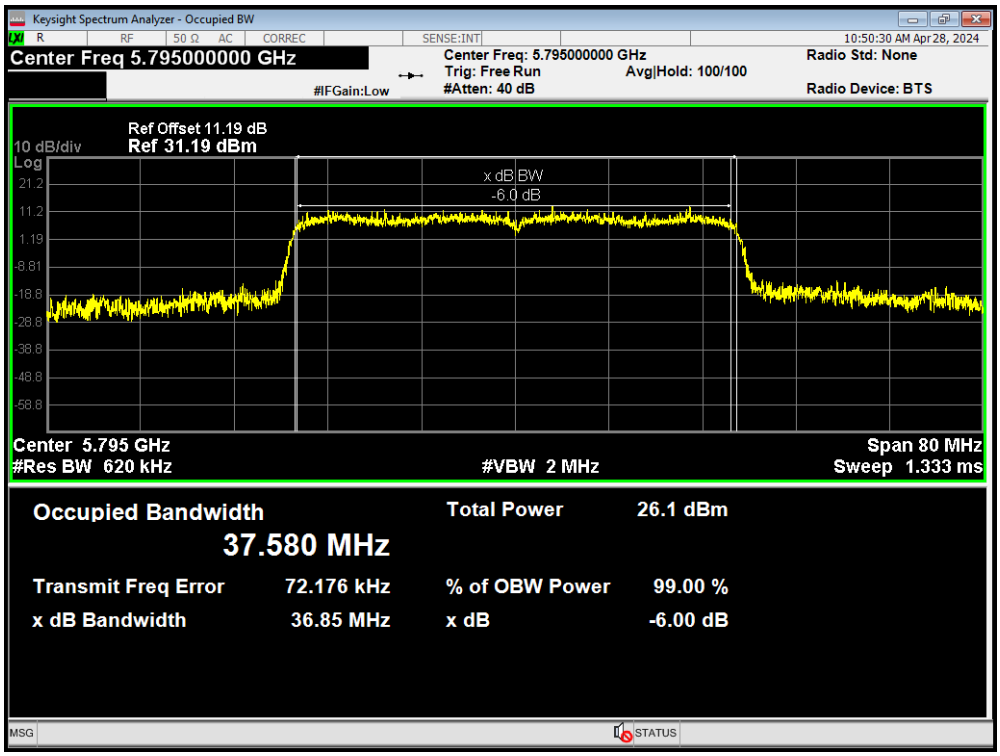
OBW 802.11ax(HE20) 5825MHz



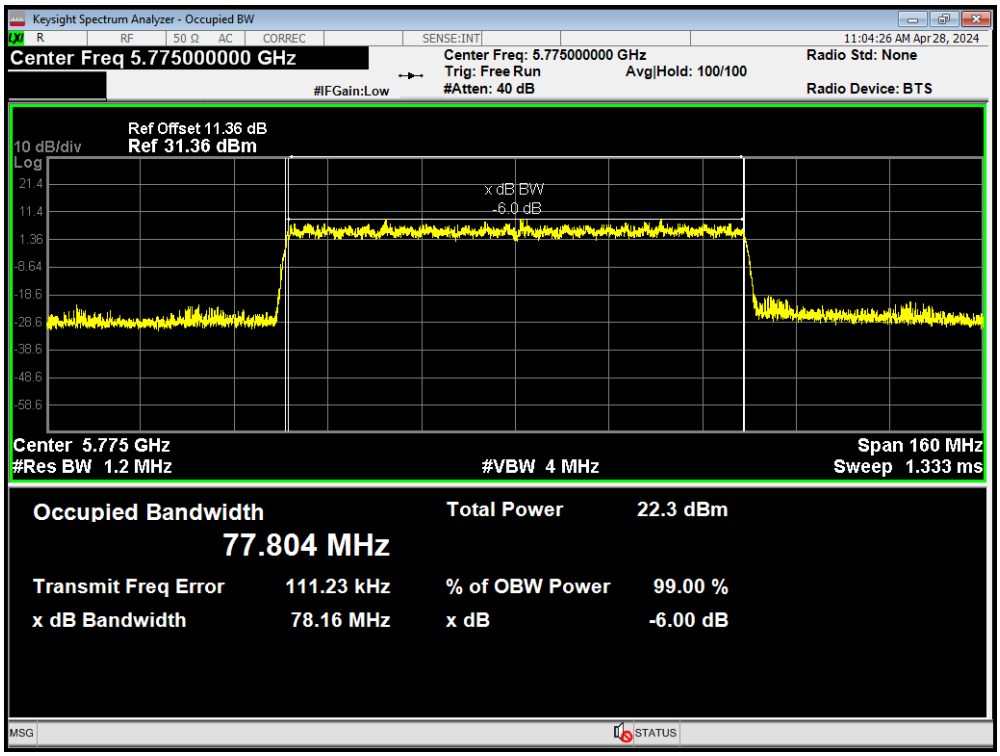
OBW 802.11ax(HE40) 5755MHz



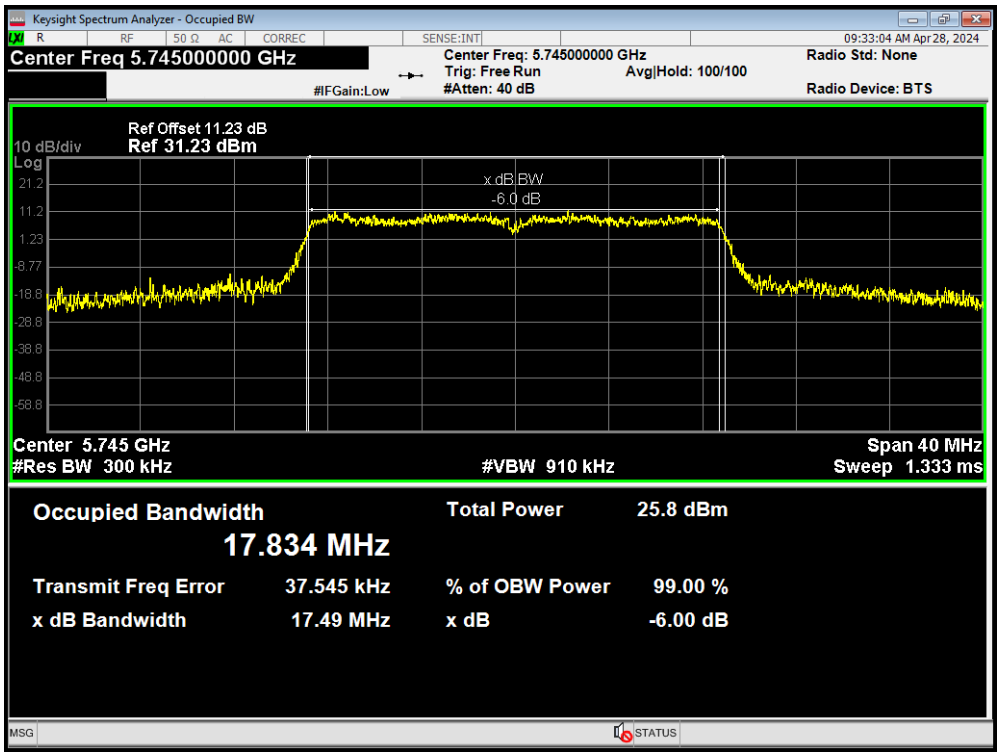
OBW 802.11ax(HE40) 5795MHz



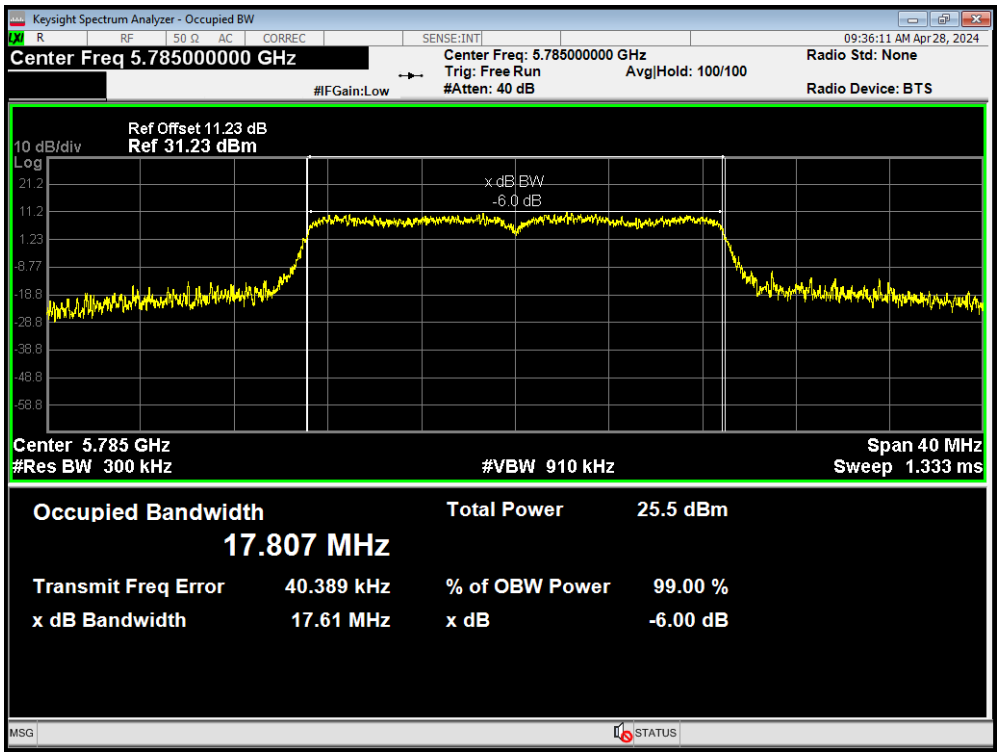
OBW 802.11ax(HE80) 5775MHz



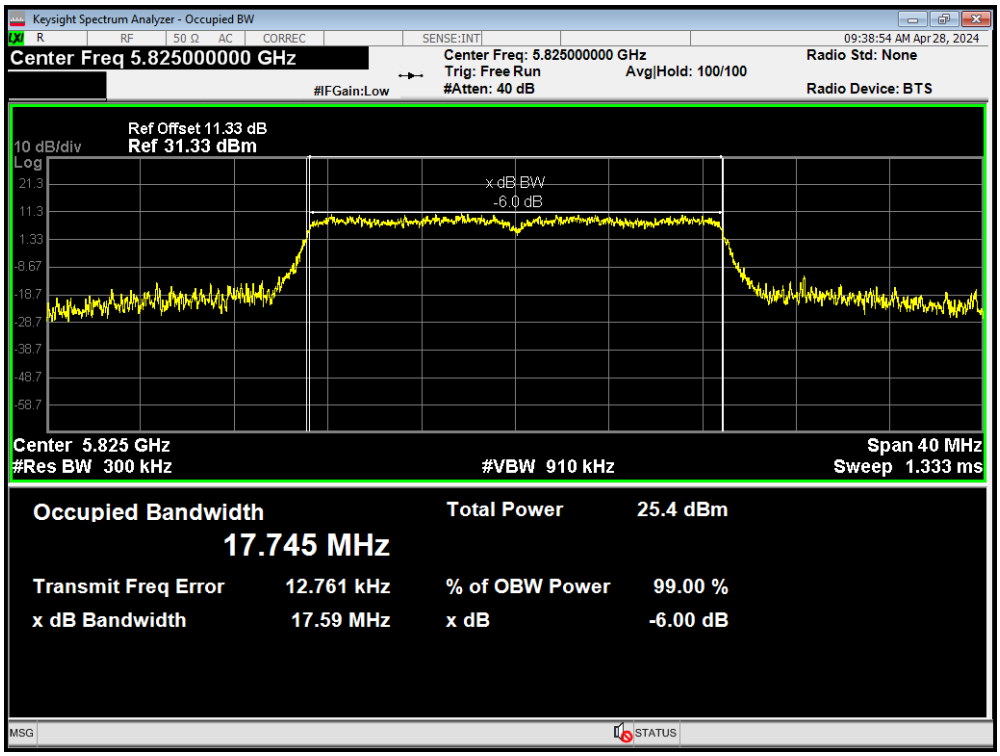
OBW 802.11n(HT20) 5745MHz



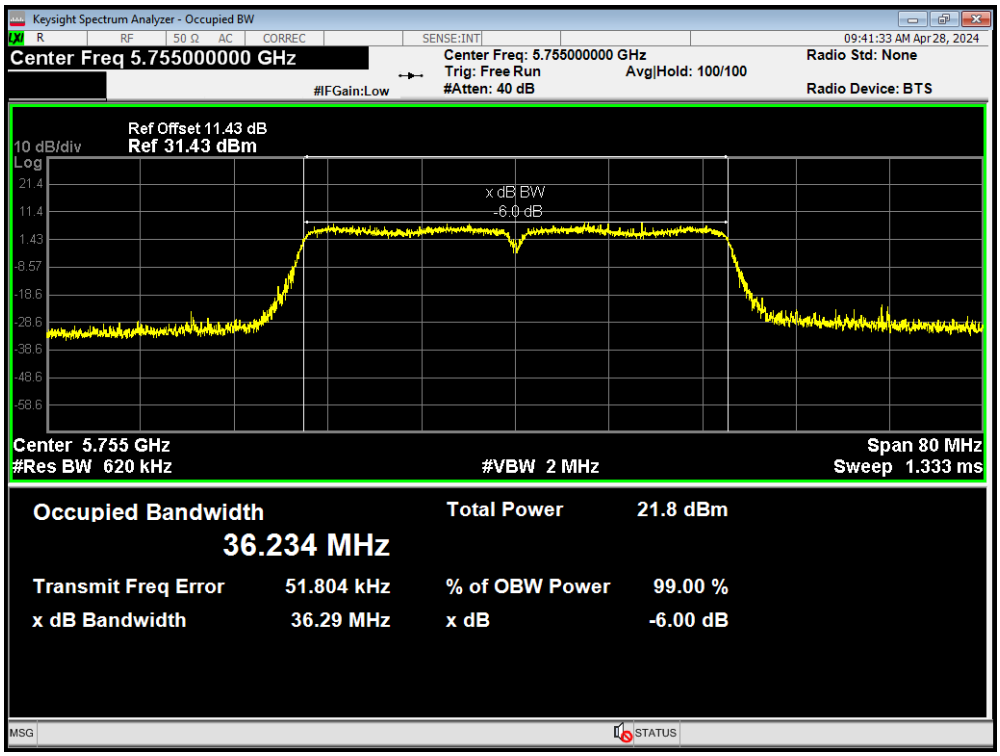
OBW 802.11n(HT20) 5785MHz



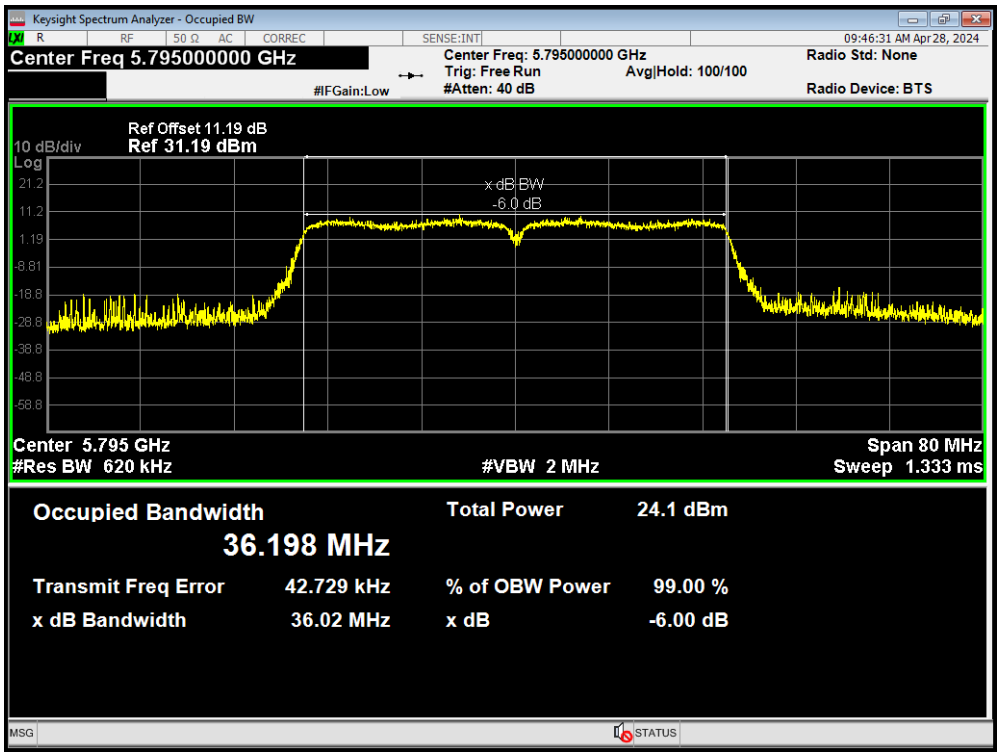
OBW 802.11n(HT20) 5825MHz



OBW 802.11n(HT40) 5755MHz



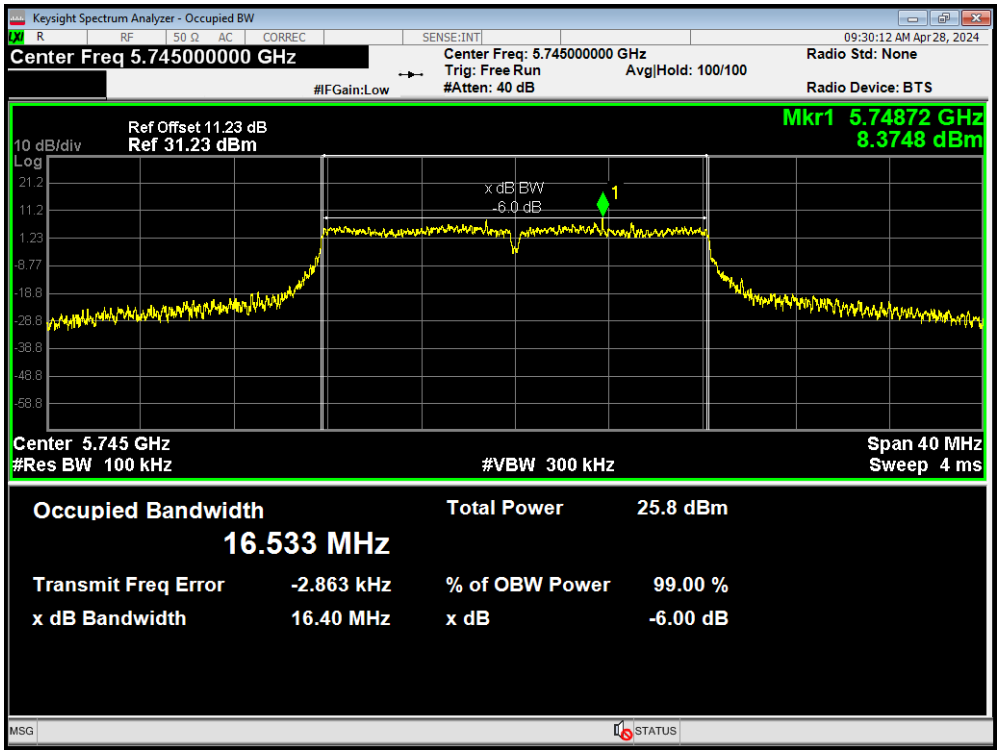
OBW 802.11n(HT40) 5795MHz



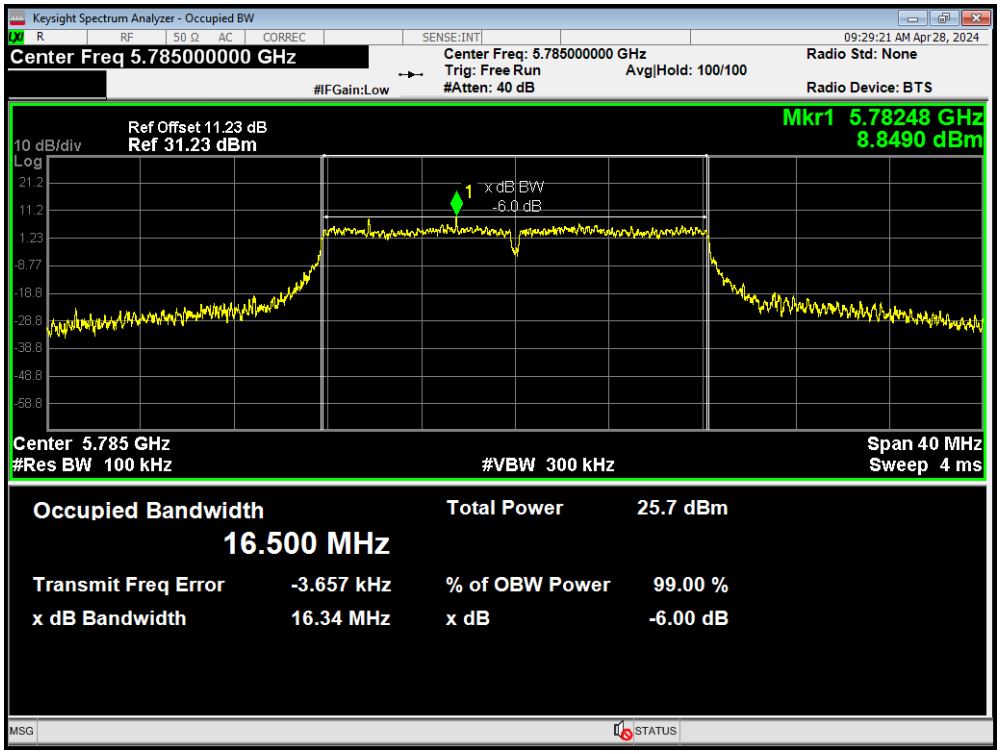
Minimum 6 dB bandwidth

U-NII-3

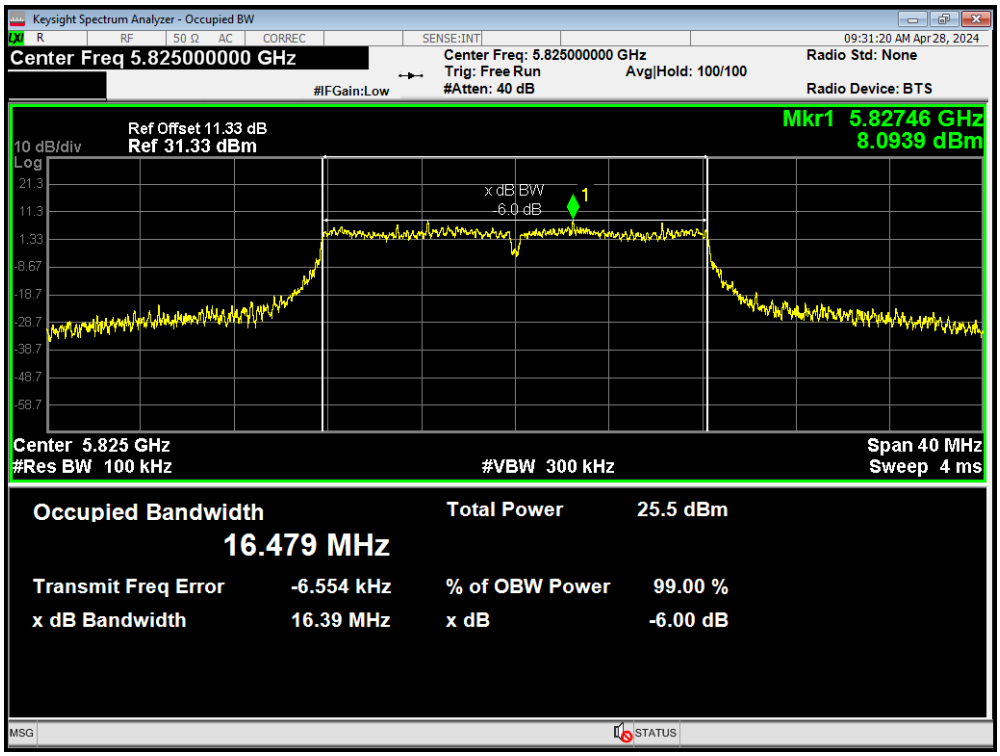
-6dB Bandwidth 802.11a 5745MHz



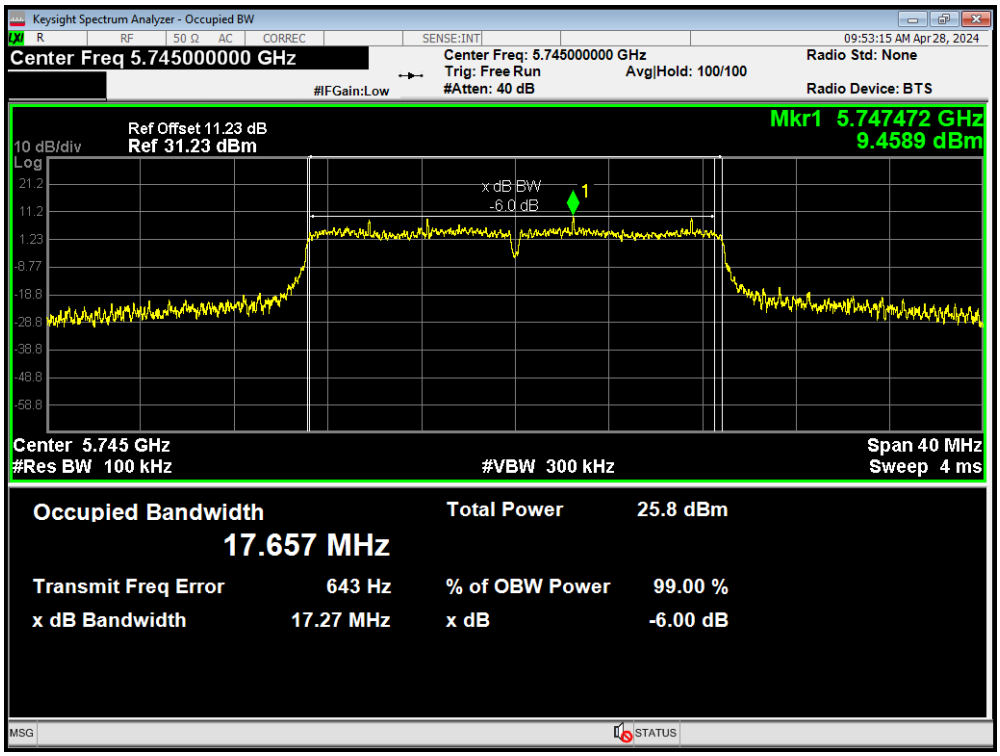
-6dB Bandwidth 802.11a 5785MHz



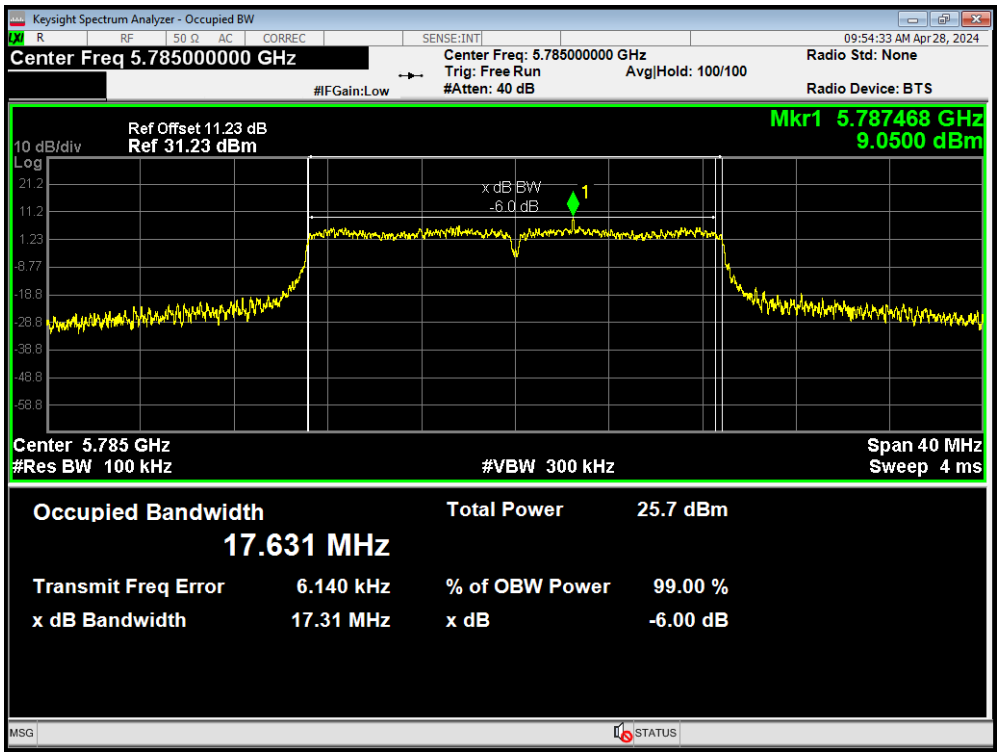
-6dB Bandwidth 802.11a 5825MHz



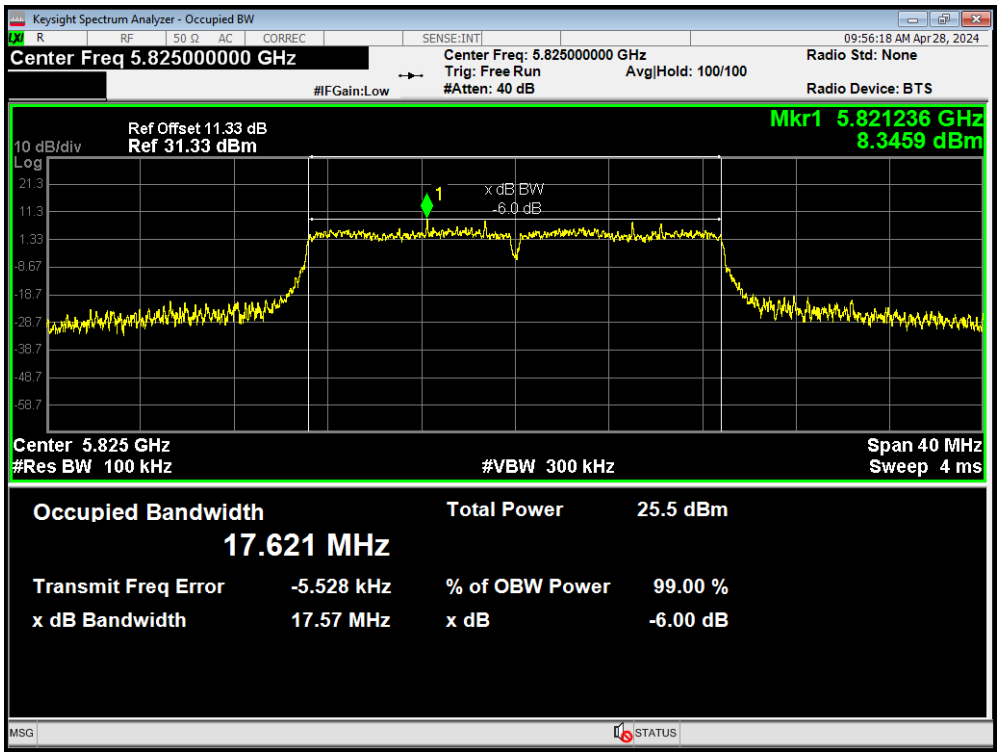
-6dB Bandwidth 802.11ac(VHT20) 5745MHz



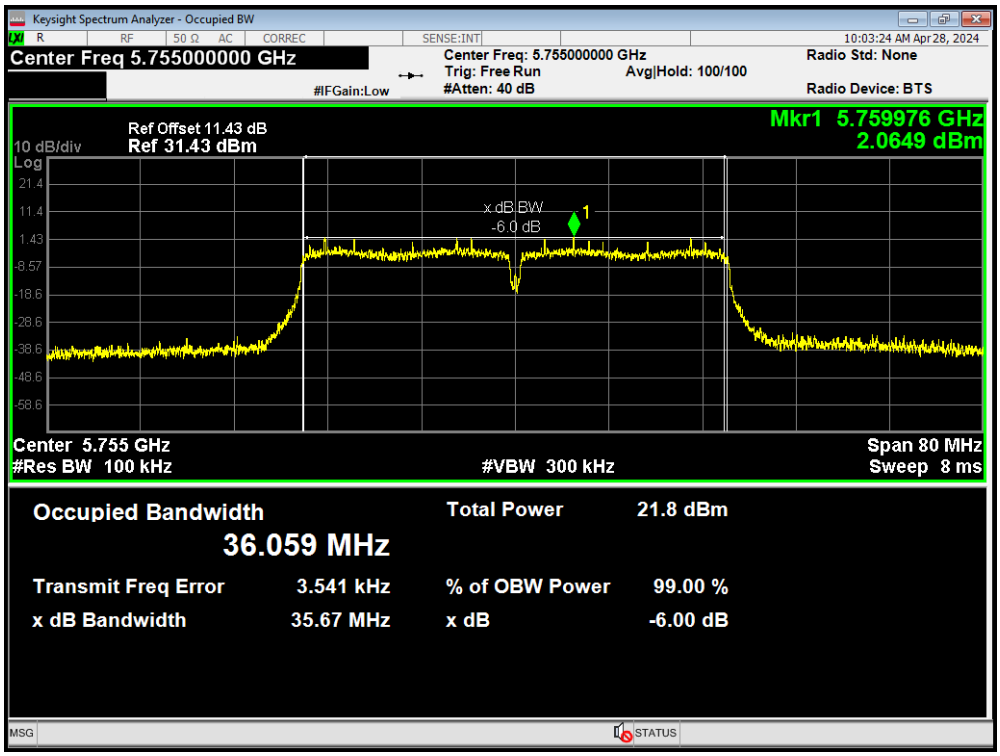
-6dB Bandwidth 802.11ac(VHT20) 5785MHz



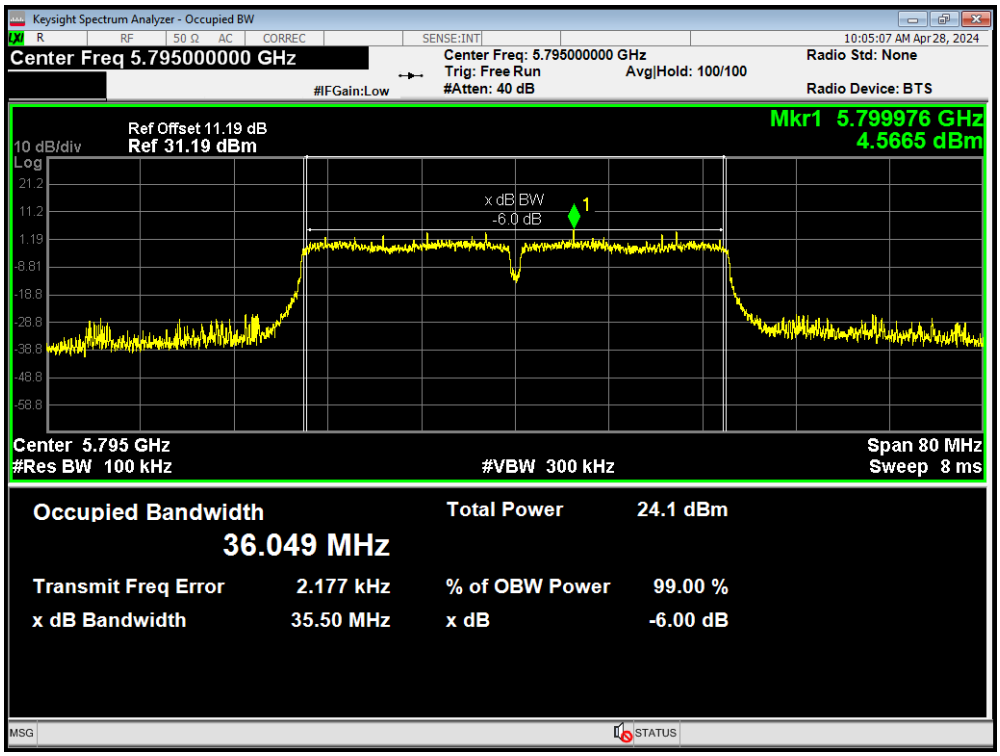
-6dB Bandwidth 802.11ac(VHT20) 5825MHz



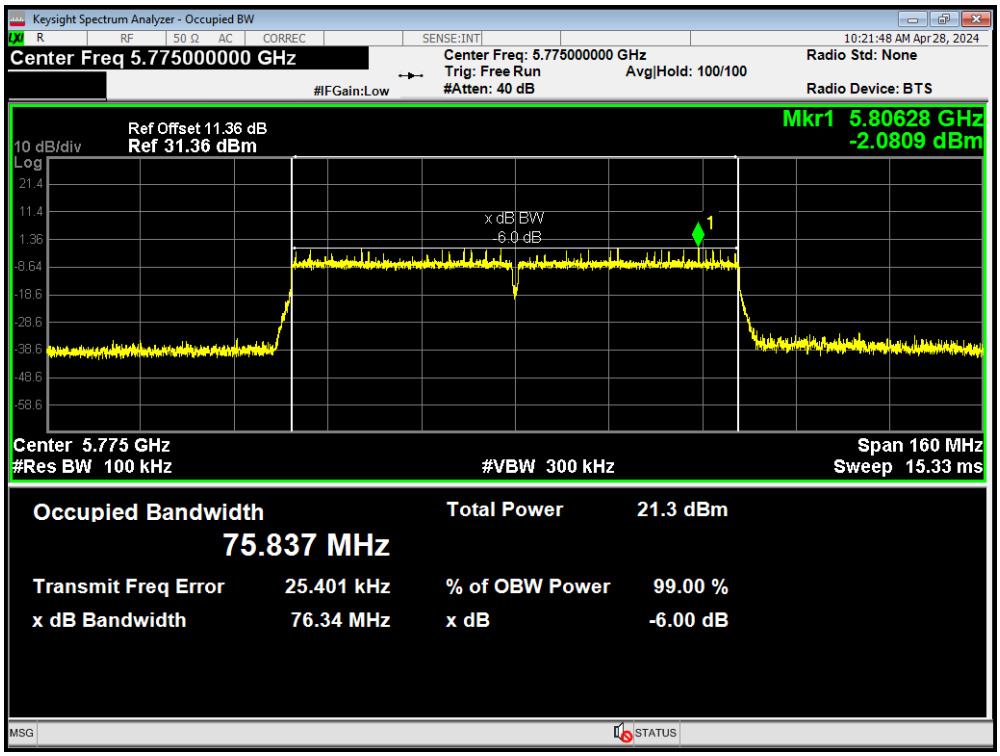
-6dB Bandwidth 802.11ac(VHT40) 5755MHz



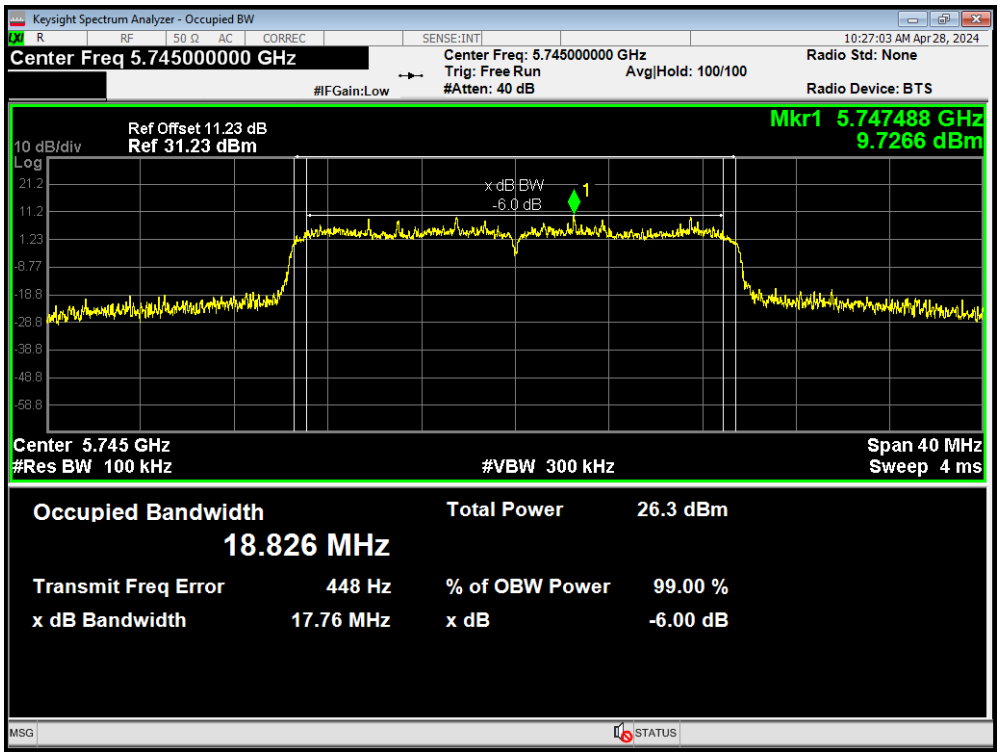
-6dB Bandwidth 802.11ac(VHT40) 5795MHz



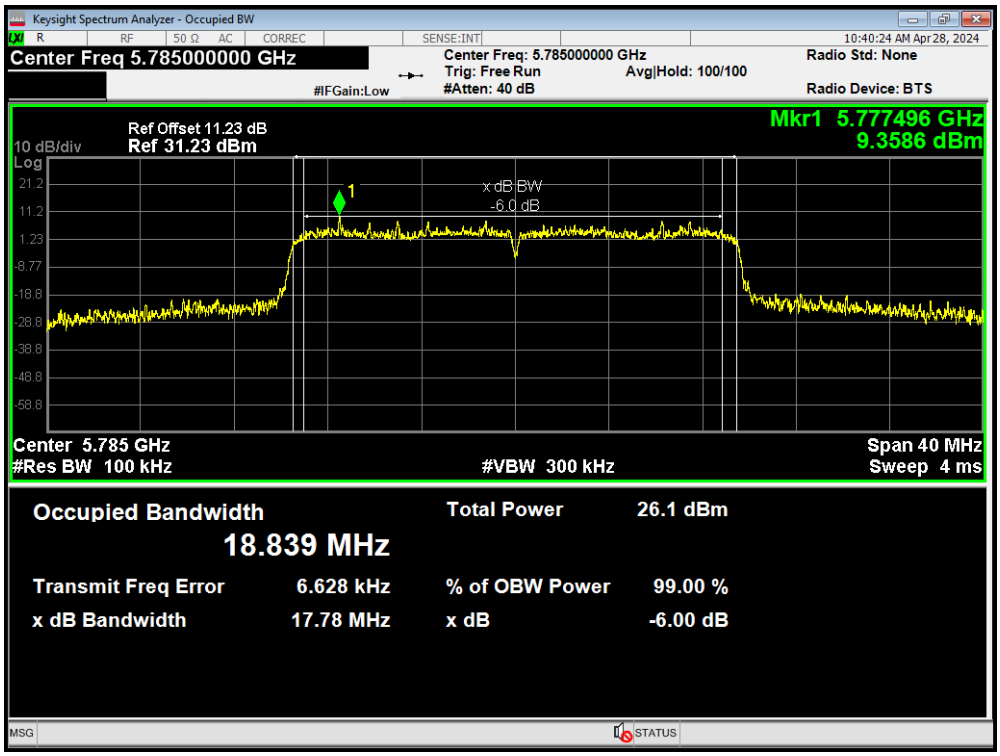
-6dB Bandwidth 802.11ac(VHT80) 5775MHz



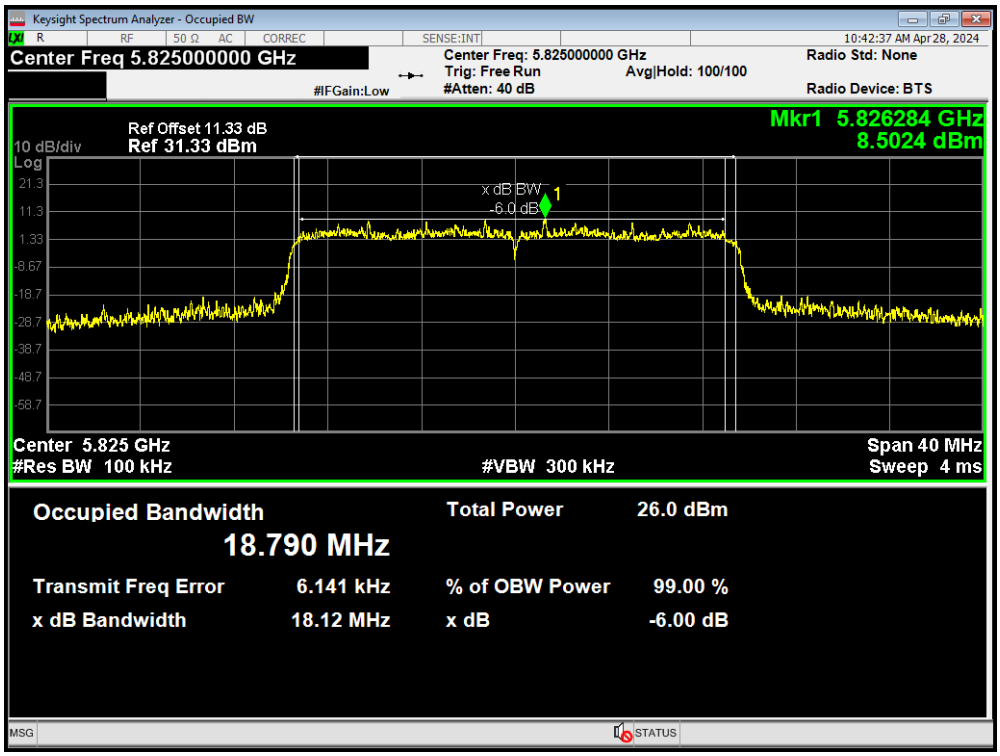
-6dB Bandwidth 802.11ax(HE20) 5745MHz



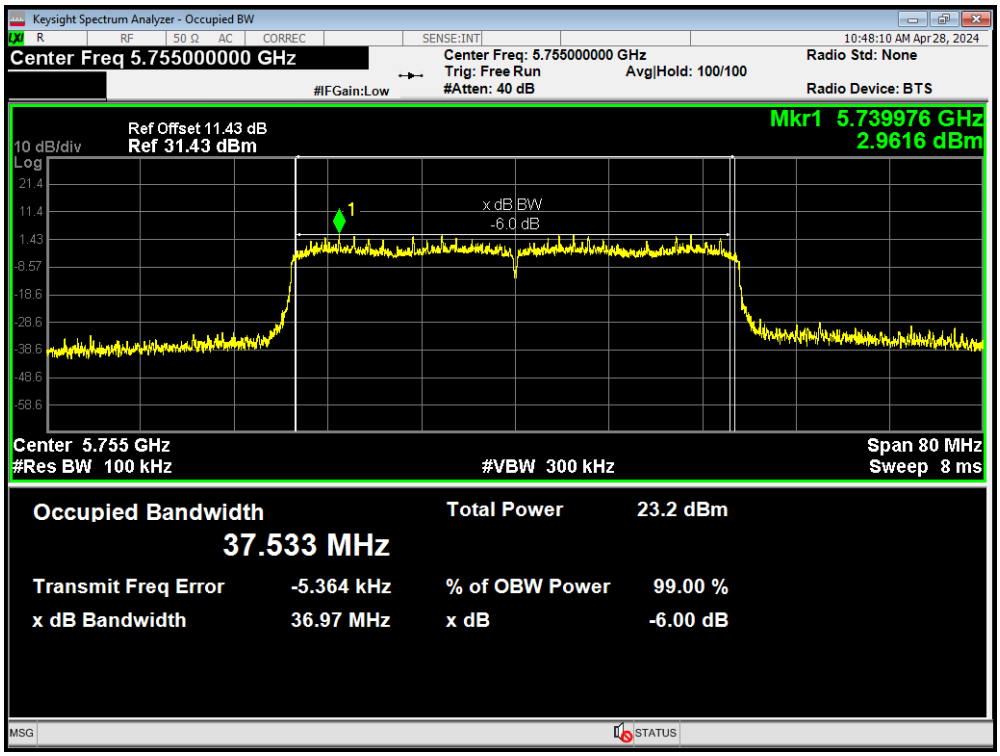
-6dB Bandwidth 802.11ax(HE20) 5785MHz



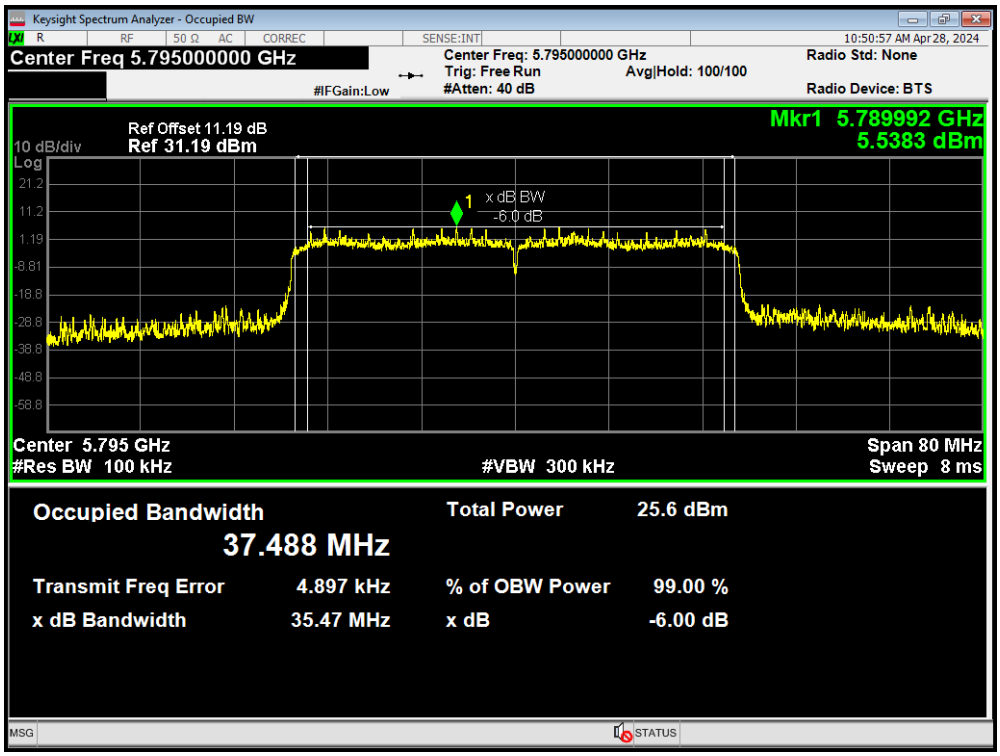
-6dB Bandwidth 802.11ax(HE20) 5825MHz



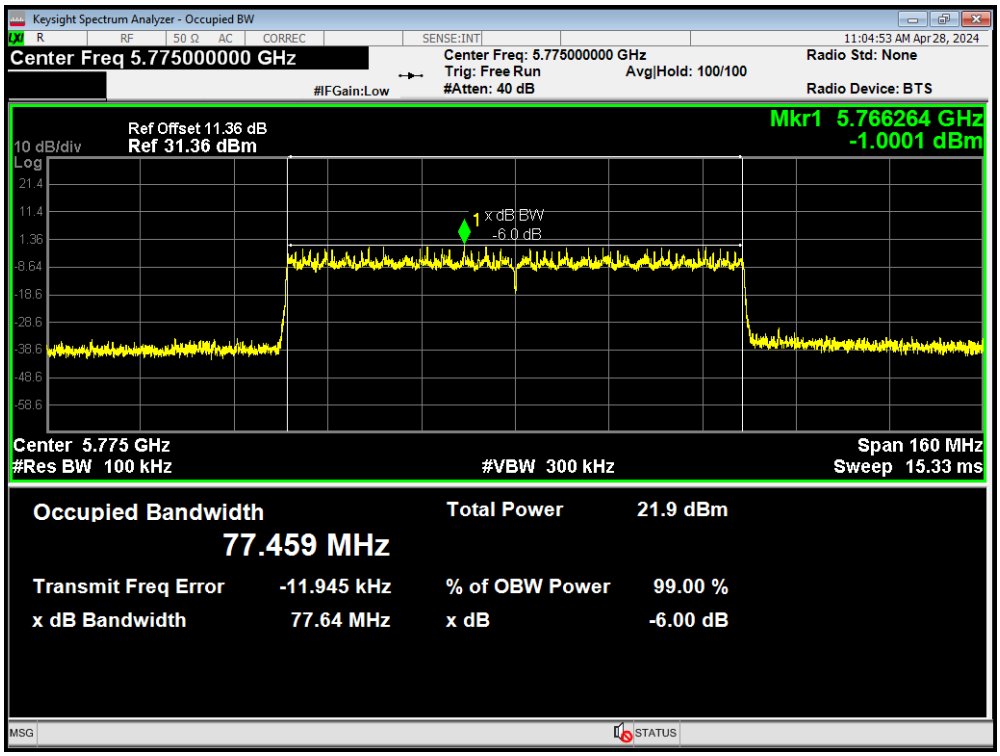
-6dB Bandwidth 802.11ax(HE40) 5755MHz



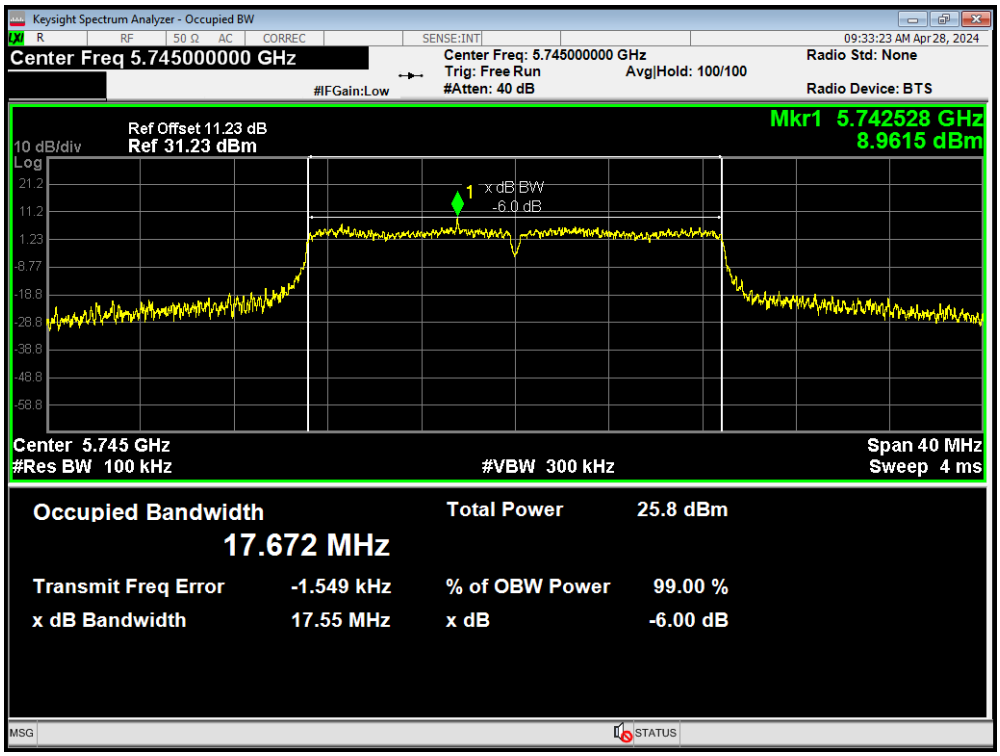
-6dB Bandwidth 802.11ax(HE40) 5795MHz



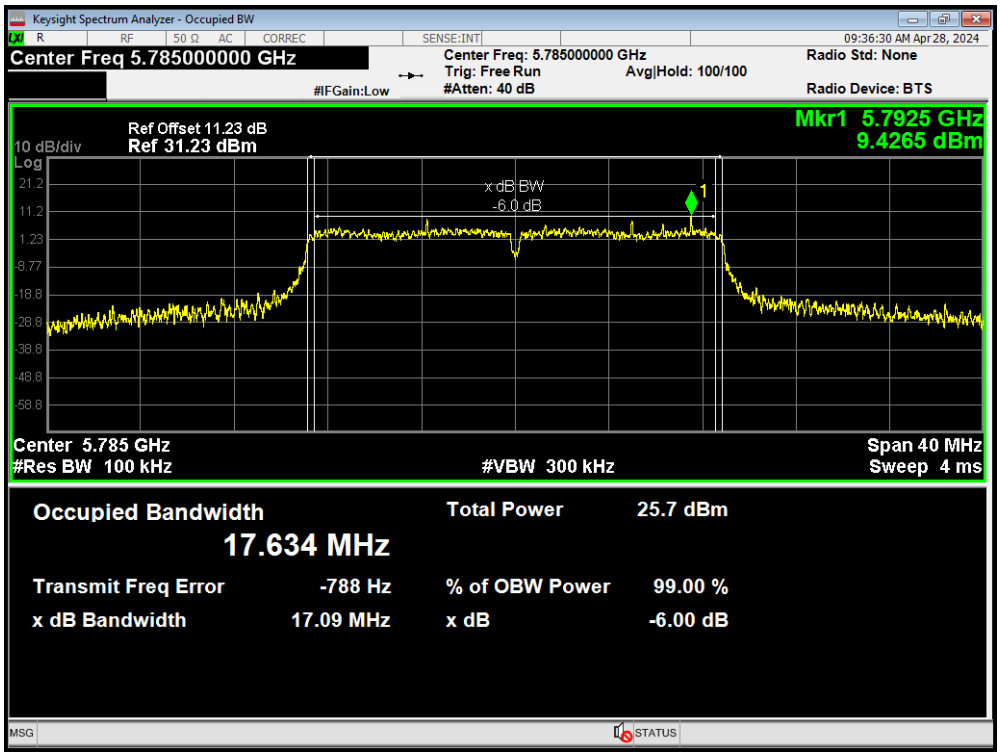
-6dB Bandwidth 802.11ax(HE80) 5775MHz



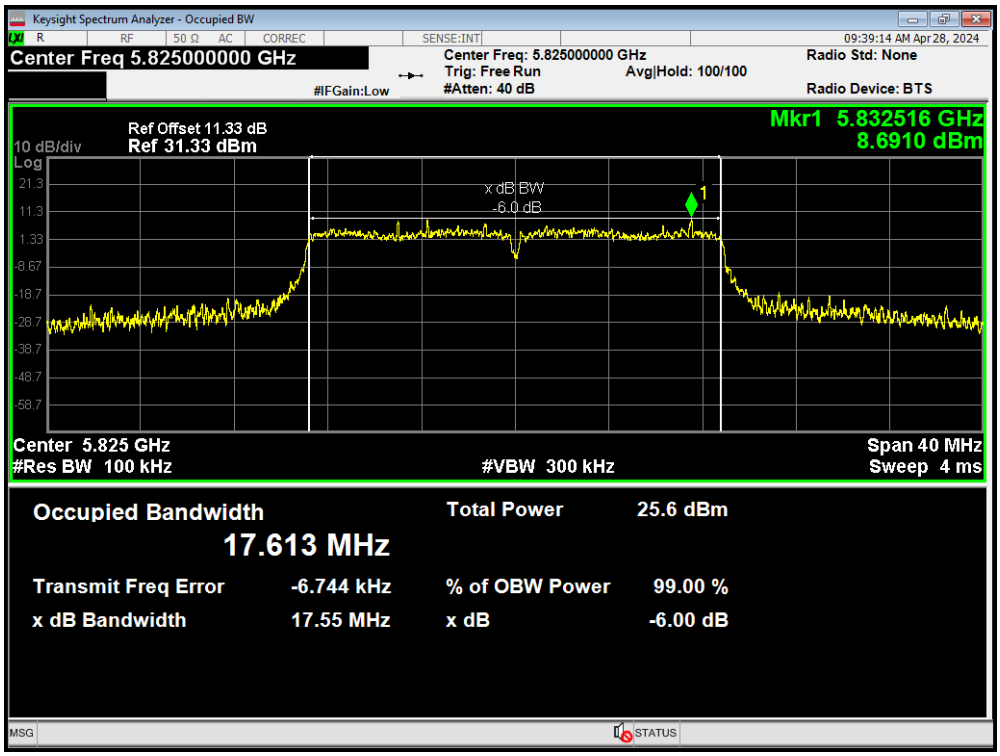
-6dB Bandwidth 802.11n(HT20) 5745MHz



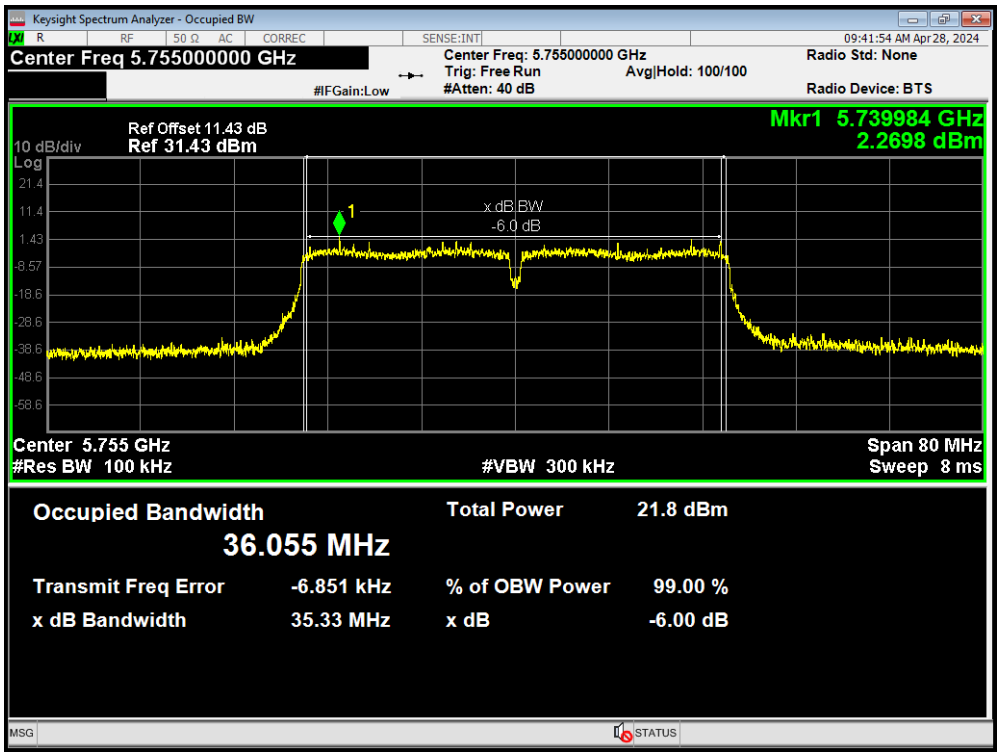
-6dB Bandwidth 802.11n(HT20) 5785MHz



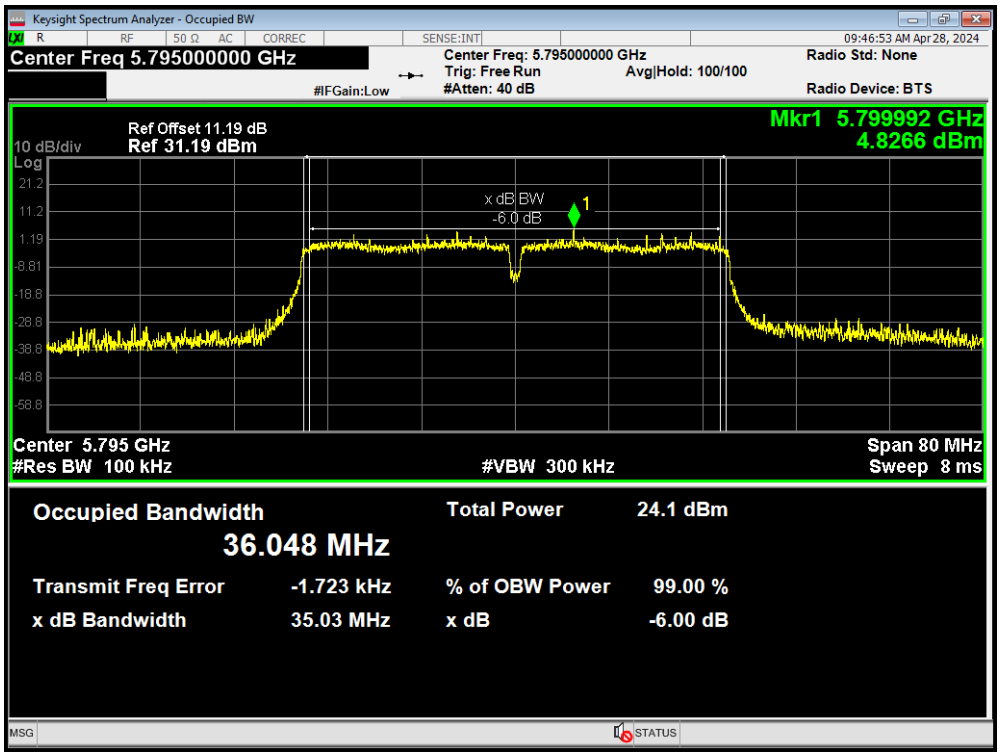
-6dB Bandwidth 802.11n(HT20) 5825MHz



-6dB Bandwidth 802.11n(HT40) 5755MHz



-6dB Bandwidth 802.11n(HT40) 5795MHz



5.2. Average Power Output

Ambient condition

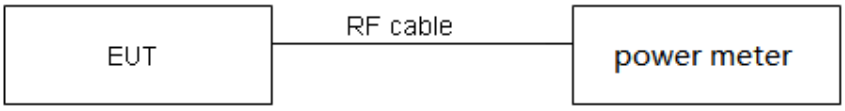
Temperature	Relative humidity	Pressure
15°C ~ 35°C	20% ~ 80%	86 kPa ~ 106 kPa

Methods of Measurement

During the process of the testing, The EUT was connected to the average power meter through an external attenuator and a known loss cable. The EUT is max power transmission with proper modulation. We use Maximum average Conducted Output Power Level Method in KDB789033 for this test

The conducted Power is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically.

Test Setup



Limits

Rule FCC Part 15.407(a)(1) / FCC Part 15.407(a) (3)
(1) For the band 5.15-5.25 GHz.
(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).
(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23

dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.
(iv) For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 0.44 dB.

Test Results

Mode	Duty cycle	Duty cycle correction Factor (dB)
802.11a	0.969	0.14
802.11n HT20	0.978	0.10
802.11n HT40	0.959	0.18
802.11ac VHT20	0.980	0.09
802.11ac VHT40	0.959	0.18
802.11ac VHT80	0.917	0.38
802.11ax HE20	0.913	0.40
802.11ax HE40	0.846	0.72
802.11ax HE80	0.745	1.28
Note: when Duty cycle⩾0.98, Duty cycle correction Factor not required.		

SISO Antenna Power Index											
Channel	802.11a	802.11n HT20	802.11ac VHT20	802.11ax HE20	Channel	802.11n HT40	802.11ac VHT40	802.11ax HE40	Channel	802.11ac VHT80	802.11ax HE80
CH36	19	17	17	17	CH38	15	15	15	CH42	13	14
CH40	19	17	17	17	CH46	19	19	20	/	/	
CH48	19	17	17	17	/	/	/		/	/	
CH149	29	21	21	21	CH151	15	15	16	CH155	14	14
CH157	29	21	21	21	CH159	18	18	19	/	/	
CH165	29	21	21	21	/	/	/		/	/	

MIMO Antenna Power Index										
Channel	802.11n HT20	802.11ac VHT20	802.11ax HE20	Channel	802.11n HT40	802.11ac VHT40	802.11ax HE40	Channel	802.11ac VHT80	802.11ax HE80
CH36	17	17	17	CH38	15	15	15	CH42	13	14
CH40	17	17	17	CH46	19	19	20	/	/	
CH48	17	17	17	/	/	/		/	/	
CH149	21	21	21	CH151	15	15	16	CH155	14	14
CH157	21	21	21	CH159	18	18	19	/	/	
CH165	21	21	21	/	/	/		/	/	

SISO Antenna 1

U-NII-1

Test Mode	Channel/ Frequency (MHz)	Average Power Measured (dBm)	Average Power with duty factor (dBm)	Limit (dBm)	Conclusion
802.11a	36/5180	19.49	19.63	24	PASS
	40/5200	19.76	19.90	24	PASS
	48/5240	19.82	19.96	24	PASS
802.11n HT20	36/5180	17.99	18.09	24	PASS
	40/5200	18.11	18.21	24	PASS
	48/5240	18.32	18.42	24	PASS
802.11n HT40	38/5190	16.31	16.49	24	PASS
	46/5230	19.84	20.02	24	PASS
802.11ac VHT20	36/5180	18.05	18.14	24	PASS
	40/5200	18.22	18.31	24	PASS
	48/5240	18.32	18.41	24	PASS
802.11ac VHT40	38/5190	16.24	16.42	24	PASS
	46/5230	19.89	20.07	24	PASS
802.11ac VHT80	42/5210	14.54	14.92	24	PASS
802.11ax HE20	36/5180	18.06	18.46	24	PASS
	40/5200	18.21	18.61	24	PASS
	48/5240	18.26	18.66	24	PASS
802.11ax HE40	38/5190	16.10	16.82	24	PASS
	46/5230	20.32	21.04	24	PASS
802.11ax HE80	42/5210	14.93	16.21	24	PASS
Note: Average Power with duty factor = Average Power Measured +Duty cycle correction factor					

U-NII-3

Test Mode	Channel/ Frequency (MHz)	Average Power Measured (dBm)	Average Power with duty factor (dBm)	Limit (dBm)	Conclusion
802.11a	149/5745	20.02	20.16	30	PASS
	157/5785	19.90	20.04	30	PASS
	165/5825	19.68	19.82	30	PASS
802.11n HT20	149/5745	20.08	20.18	30	PASS
	157/5785	19.89	19.99	30	PASS
	165/5825	19.71	19.81	30	PASS
802.11n HT40	151/5755	15.82	16.00	30	PASS
	159/5795	18.04	18.22	30	PASS
802.11ac VHT20	149/5745	20.08	20.17	30	PASS
	157/5785	19.90	19.99	30	PASS
	165/5825	19.66	19.75	30	PASS
802.11ac VHT40	151/5755	15.71	15.89	30	PASS
	159/5795	18.05	18.23	30	PASS
802.11ac VHT80	155/5775	14.61	14.99	30	PASS
802.11ax HE20	149/5745	19.95	20.35	30	PASS
	157/5785	19.77	20.17	30	PASS
	165/5825	19.57	19.97	30	PASS
802.11ax HE40	151/5755	16.44	17.16	30	PASS
	159/5795	18.72	19.44	30	PASS
802.11ax HE80	155/5775	14.18	15.46	30	PASS
Note: Average Power with duty factor = Average Power Measured +Duty cycle correction factor					

SISO Antenna 2

U-NII-1

Test Mode	Channel/ Frequency (MHz)	Average Power Measured (dBm)	Average Power with duty factor (dBm)	Limit (dBm)	Conclusion
802.11a	36/5180	20.79	20.93	24	PASS
	40/5200	20.85	20.99	24	PASS
	48/5240	20.86	21.00	24	PASS
802.11n HT20	36/5180	18.71	18.81	24	PASS
	40/5200	19.05	19.15	24	PASS
	48/5240	19.00	19.10	24	PASS
802.11n HT40	38/5190	16.71	16.89	24	PASS
	46/5230	20.80	20.98	24	PASS
802.11ac VHT20	36/5180	18.77	18.86	24	PASS
	40/5200	18.50	18.59	24	PASS
	48/5240	18.92	19.01	24	PASS
802.11ac VHT40	38/5190	16.64	16.82	24	PASS
	46/5230	20.79	20.97	24	PASS
802.11ac VHT80	42/5210	14.29	14.67	24	PASS
802.11ax HE20	36/5180	18.32	18.72	24	PASS
	40/5200	18.48	18.88	24	PASS
	48/5240	18.47	18.87	24	PASS
802.11ax HE40	38/5190	16.63	17.35	24	PASS
	46/5230	20.81	21.53	24	PASS
802.11ax HE80	42/5210	14.77	16.05	24	PASS
Note: Average Power with duty factor = Average Power Measured +Duty cycle correction factor					

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Test Mode	Channel/ Frequency (MHz)	Average Power Measured (dBm)	Average Power with duty factor (dBm)	Limit (dBm)	Conclusion
802.11a	149/5745	21.58	21.72	30	PASS
	157/5785	21.76	21.90	30	PASS
	165/5825	21.60	21.74	30	PASS
802.11n HT20	149/5745	21.65	21.75	30	PASS
	157/5785	21.70	21.80	30	PASS
	165/5825	21.70	21.80	30	PASS
802.11n HT40	151/5755	16.84	17.02	30	PASS
	159/5795	19.68	19.86	30	PASS
802.11ac VHT20	149/5745	21.58	21.67	30	PASS
	157/5785	21.67	21.76	30	PASS
	165/5825	21.66	21.75	30	PASS
802.11ac VHT40	151/5755	16.76	16.94	30	PASS
	159/5795	19.63	19.81	30	PASS
802.11ac VHT80	155/5775	15.71	16.09	30	PASS
802.11ax HE20	149/5745	21.52	21.92	30	PASS
	157/5785	21.68	22.08	30	PASS
	165/5825	21.63	22.03	30	PASS
802.11ax HE40	151/5755	17.78	18.50	30	PASS
	159/5795	20.23	20.95	30	PASS
802.11ax HE80	155/5775	15.28	16.56	30	PASS
Note: Average Power with duty factor = Average Power Measured +Duty cycle correction factor					

MIMO

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Test Mode	Channel/ Frequency (MHz)	MIMO Antenna 1		MIMO Antenna 2		Total Power (dBm)	Limit (dBm)	Conclusion
		Average Power Measured (dBm)	Average Power with duty factor (dBm)	Average Power Measured (dBm)	Average Power with duty factor (dBm)			
802.11n HT20	36/5180	17.60	17.70	17.28	17.38	20.55	24.00	PASS
	44/5220	17.72	17.82	17.61	17.71	20.78	24.00	PASS
	48/5240	17.64	17.74	17.76	17.86	20.81	24.00	PASS
802.11n HT40	38/5190	15.94	16.12	15.56	15.74	18.94	24.00	PASS
	46/5230	19.41	19.59	19.63	19.81	22.71	24.00	PASS
802.11ac VHT20	36/5180	17.67	17.76	17.48	17.57	20.68	24.00	PASS
	44/5220	17.77	17.86	17.62	17.71	20.80	24.00	PASS
	48/5240	17.80	17.89	17.86	17.95	20.93	24.00	PASS
802.11ac VHT40	38/5190	15.94	16.12	15.59	15.77	18.96	24.00	PASS
	46/5230	19.51	19.69	19.66	19.84	22.77	24.00	PASS
802.11ac VHT80	42/5210	14.19	14.57	13.32	13.70	17.17	24.00	PASS
802.11ax HE20	36/5180	17.42	17.82	17.40	17.80	20.82	24.00	PASS
	44/5220	17.86	18.26	17.75	18.15	21.22	24.00	PASS
	48/5240	17.98	18.38	17.98	18.38	21.39	24.00	PASS
802.11ax HE40	38/5190	15.84	16.56	15.46	16.18	19.38	24.00	PASS
	46/5230	19.93	20.65	20.27	20.99	23.83	24.00	PASS
802.11ax HE80	42/5210	14.61	15.89	13.69	14.97	18.46	24.00	PASS

Note: 1. For Total Power, according to KDB 662911 D01 Multiple Transmitter Output v02r01 1),

The Total Power $=10\log(10^{(\text{Power antenna1 in dBm}/10)}+10^{(\text{Power antenna2 in dBm}/10)})$.

2. According to KDB 662911 D01 Multiple Transmitter Output v02r01 F)2)f)(ii): If antenna gains are not equal, the user may use either of the following methods to calculate directional gain, provided that each transmit antenna is driven by only one spatial stream: Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain.

Directional gain = $G_{ANT\ MAX}$ + Array Gain,

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};

Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less, for 20-MHz channel widths with $N_{ANT} \geq 5$.

So directional gain = $G_{ANT\ MAX}$ + Array Gain =2.78+0=2.78 dBi<6dBi. So the power limit is 24dBm.

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Test Mode	Channel/ Frequency (MHz)	MIMO Antenna 1		MIMO Antenna 2		Total Power (dBm)	Limit (dBm)	Conclusion
		Average Power Measured (dBm)	Average Power with duty factor (dBm)	Average Power Measured (dBm)	Average Power with duty factor (dBm)			
802.11n HT20	149/5745	19.85	19.95	21.86	21.96	24.08	30.00	PASS
	157/5785	19.52	19.62	21.94	22.04	24.01	30.00	PASS
	165/5825	19.38	19.48	21.86	21.96	23.90	30.00	PASS
802.11n HT40	151/5755	15.46	15.64	16.64	16.82	19.28	30.00	PASS
	159/5795	17.75	17.93	19.77	19.95	22.07	30.00	PASS
802.11ac VHT20	149/5745	19.72	19.81	21.74	21.83	23.95	30.00	PASS
	157/5785	19.48	19.57	21.93	22.02	23.98	30.00	PASS
	165/5825	19.15	19.24	21.73	21.82	23.73	30.00	PASS
802.11ac VHT40	151/5755	15.66	15.84	16.75	16.93	19.43	30.00	PASS
	159/5795	17.69	17.87	19.74	19.92	22.02	30.00	PASS
802.11ac VHT80	155/5775	14.48	14.86	15.59	15.97	18.46	30.00	PASS
802.11ax HE20	149/5745	19.71	20.11	21.75	22.15	24.26	30.00	PASS
	157/5785	19.37	19.77	21.82	22.22	24.18	30.00	PASS
	165/5825	19.16	19.56	21.73	22.13	24.04	30.00	PASS
802.11ax HE40	151/5755	16.20	16.92	17.86	18.58	20.84	30.00	PASS
	159/5795	18.37	19.09	20.53	21.25	23.31	30.00	PASS
802.11ax HE80	155/5775	14.08	15.36	15.15	16.43	18.94	30.00	PASS

Note: 1. For Total Power, according to KDB 662911 D01 Multiple Transmitter Output v02r01 1),

The Total Power $=10\log(10^{(\text{Power antenna 1 in dBm}/10)}+10^{(\text{Power antenna 2 in dBm}/10)})$.

2. According to KDB 662911 D01 Multiple Transmitter Output v02r01 F)2)f)(ii): If antenna gains are not equal, the user may use either of the following methods to calculate directional gain, provided that each transmit antenna is driven by only one spatial stream: Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain.

Directional gain = $G_{ANT\ MAX}$ + Array Gain,

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};

Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less, for 20-MHz channel widths with $N_{ANT} \geq 5$.

So directional gain = $G_{ANT\ MAX}$ + Array Gain =3.04+0=3.04 dBi<6dBi. So the power limit is 30dBm.

5.3. Frequency Stability

Ambient condition

Temperature	Relative humidity	Pressure
15°C ~ 35°C	20% ~ 80%	86 kPa ~ 106 kPa

Method of Measurement

1. Frequency stability with respect to ambient temperature

a) Supply the EUT with a nominal ac voltage or install a new or fully charged battery in the EUT. If possible, a dummy load shall be connected to the EUT because an antenna near the metallic walls of an environmental test chamber could affect the output frequency of the EUT. If the EUT is equipped with a permanently attached, adjustable-length antenna, then the EUT shall be placed in the center of the chamber with the antenna adjusted to the shortest length possible. Turn ON the EUT and tune it to one of the number of frequencies shown in 5.6.

b) Couple the unlicensed wireless device output to the measuring instrument by connecting an antenna to the measuring instrument with a suitable length of coaxial cable and placing the measuring antenna near the EUT (e.g., 15 cm away), or by connecting a dummy load to the measuring instrument, through an attenuator if necessary.

c) Adjust the location of the measurement antenna and the controls on the measurement instrument to obtain a suitable signal level (i.e., a level that will not overload the measurement instrument but is strong enough to allow measurement of the operating or fundamental frequency of the EUT).

d) Turn the EUT OFF and place it inside the environmental temperature chamber. For devices that have oscillator heaters, energize only the heater circuit.

e) Set the temperature control on the chamber to the highest specified in the regulatory requirements for the type of device and allow the oscillator heater and the chamber temperature to stabilize.

f) While maintaining a constant temperature inside the environmental chamber, turn the EUT ON and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized. Four measurements in total are made.

g) Measure the frequency at each of frequencies specified in 5.6.

h) Switch OFF the EUT but do not switch OFF the oscillator heater.

i) Lower the chamber temperature by not more that 10°C, and allow the temperature inside the chamber to stabilize.

j) Repeat step f) through step i) down to the lowest specified temperature.

2. Frequency stability when varying supply voltage

Unless otherwise specified, these tests shall be made at ambient room temperature (+15°C to +25 °C). An antenna shall be connected to the antenna output terminals of the EUT if possible. If the EUT is equipped with or uses an adjustable-length antenna, then it shall be fully extended.

a) Supply the EUT with nominal voltage or install a new or fully charged battery in the EUT. Turn ON the EUT and couple its output to a frequency counter or other frequency-measuring instrument.

b) Tune the EUT to one of the number of frequencies required in 5.6. Adjust the location of the measurement antenna and the controls on the measurement instrument to obtain a suitable signal level (i.e., a level that will not overload the measurement instrument but is strong enough to allow measurement of the operating or fundamental frequency of the EUT).
c) Measure the frequency at each of the frequencies specified in 5.6.
d) Repeat the above procedure at 85% and 115% of the nominal supply voltage.

Limit

Manufacturers 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 in the users manual.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 936Hz

Test Results

Voltage (V)	Temperature (°C)	U-NII-1 Test Results			
		5200MHz			
		1min	2min	5min	10min
120	-30	5200.007914	5200.004121	5200.003063	5199.995583
120	-20	5199.998033	5199.997399	5200.000939	5199.992019
120	-10	5199.994506	5199.994105	5199.994066	5199.987872
120	0	5199.994400	5199.995020	5199.998022	5199.991141
120	10	5199.993772	5199.990818	5199.997060	5199.985412
120	20	5199.988309	5199.984387	5199.993476	5199.983092
120	30	5199.980364	5199.976137	5199.984001	5199.977085
120	40	5199.974238	5199.966973	5199.974336	5199.968506
120	50	5199.966234	5199.960531	5199.965933	5199.967421
102	20	5199.965916	5199.959308	5199.963934	5199.964954
138	20	5199.960622	5199.955727	5199.957894	5199.962290
Max. ΔMHz		-0.039378	-0.044273	-0.042106	-0.037710
PPM		-7.572692	-8.514038	-8.097308	-7.251923

Voltage (V)	Temperature (°C)	U-NII-3 Test Results			
		5785MHz			
		1min	2min	5min	10min
120	-30	5785.003134	5785.001085	5785.000565	5784.991202
120	-20	5784.996213	5784.999887	5784.995212	5784.989520
120	-10	5784.989792	5784.998927	5784.986585	5784.985153
120	0	5784.993840	5784.994380	5784.991383	5784.987901
120	10	5784.985202	5784.993505	5784.988571	5784.987647
120	20	5784.978149	5784.988964	5784.985252	5784.980101
120	30	5784.971561	5784.984140	5784.975682	5784.973554
120	40	5784.965469	5784.981086	5784.969438	5784.964301
120	50	5784.965403	5784.973383	5784.967417	5784.959856
102	20	5784.956658	5784.972974	5784.960268	5784.951457
138	20	5784.948640	5784.971587	5784.957760	5784.947328
Max. ΔMHz		-0.051360	-0.028413	-0.042240	-0.052672
PPM		-8.878133	-4.911495	-7.301642	-9.104927

5.4. Power Spectral Density

Ambient condition

Temperature	Relative humidity	Pressure
15°C ~ 35°C	20% ~ 80%	86 kPa ~ 106 kPa

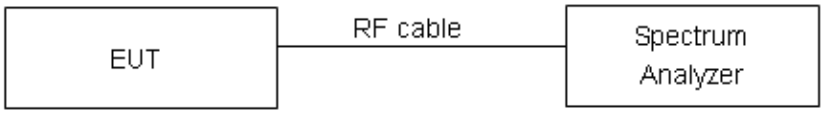
Method of Measurement

The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable.

Set RBW = 1MHz, VBW =3MHz for the band 5.150-5.250GHz.
Set RBW = 470kHz, VBW =1.5MHz for the band 5.725-5.850GHz

The conducted PSD is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically.

Test setup



Limits

Rule FCC Part 15.407(a)(1)/ FCC Part 15.407(a)(3)
For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500kHz band. If transmittingantennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Frequency Bands/GHz	Limits
5.15-5.25	11dBm/MHz
5.725-5.85	30dBm/500kHz

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 0.75dB.

Test Results:

SISO Antenna 1

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Mode	Channel/ Frequency (MHz)	Read Value (dBm /MHz)	Power Spectral Density (dBm /MHz)	Limit (dBm /MHz)	Conclusion
802.11a	36/5180	9.24	9.38	11	PASS
	40/5200	9.43	9.57	11	PASS
	48/5240	9.40	9.54	11	PASS
802.11n HT20	36/5180	7.52	7.62	11	PASS
	40/5200	7.62	7.72	11	PASS
	48/5240	8.11	8.21	11	PASS
802.11n HT40	38/5190	2.94	3.12	11	PASS
	46/5230	6.78	6.96	11	PASS
802.11ac VHT20	36/5180	7.59	7.68	11	PASS
	40/5200	7.61	7.70	11	PASS
	48/5240	7.72	7.81	11	PASS
802.11ac VHT40	38/5190	2.86	3.04	11	PASS
	46/5230	6.12	6.30	11	PASS
802.11ac VHT80	42/5210	-2.34	-1.96	11	PASS
802.11ax HE20	36/5180	7.23	7.63	11	PASS
	40/5200	7.70	8.10	11	PASS
	48/5240	7.45	7.85	11	PASS
802.11ax HE40	38/5190	2.60	3.32	11	PASS
	46/5230	6.92	7.64	11	PASS
802.11ax HE80	42/5210	-1.33	-0.05	11	PASS
Note: Power Spectral Density =Read Value+Duty cycle correction factor					

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Mode	Channel /Frequency (MHz)	Read Value (dBm/470kHz)	Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)	Conclusion
802.11a	149/5745	6.57	6.98	30	PASS
	157/5785	6.58	6.99	30	PASS
	165/5825	6.19	6.60	30	PASS
802.11n HT20	149/5745	6.13	6.50	30	PASS
	157/5785	5.87	6.24	30	PASS
	165/5825	6.00	6.37	30	PASS
802.11n HT40	151/5755	-1.17	-0.72	30	PASS
	159/5795	1.20	1.65	30	PASS
802.11ac VHT20	149/5745	6.05	6.41	30	PASS
	157/5785	5.92	6.28	30	PASS
	165/5825	5.71	6.07	30	PASS
802.11ac VHT40	151/5755	-1.11	-0.66	30	PASS
	159/5795	1.35	1.80	30	PASS
802.11ac VHT80	155/5775	-6.11	-5.46	30	PASS
802.11ax HE20	149/5745	6.10	6.77	30	PASS
	157/5785	5.82	6.49	30	PASS
	165/5825	5.64	6.31	30	PASS
802.11ax HE40	151/5755	-0.34	0.65	30	PASS
	159/5795	1.79	2.78	30	PASS
802.11ax HE80	155/5775	-5.42	-3.87	30	PASS
Note: PSD=Read Value+Duty cycle correction factor +10*log(500/470)					

SISO Antenna 2

U-NII-1

Mode	Channel/ Frequency (MHz)	Read Value (dBm /MHz)	Power Spectral Density (dBm /MHz)	Limit (dBm /MHz)	Conclusion
802.11a	36/5180	10.47	10.61	11	PASS
	40/5200	10.62	10.76	11	PASS
	48/5240	10.54	10.68	11	PASS
802.11n HT20	36/5180	8.24	8.34	11	PASS
	40/5200	8.39	8.49	11	PASS
	48/5240	8.33	8.43	11	PASS
802.11n HT40	38/5190	3.46	3.64	11	PASS
	46/5230	7.31	7.49	11	PASS
802.11ac VHT20	36/5180	8.38	8.47	11	PASS
	40/5200	8.12	8.21	11	PASS
	48/5240	8.42	8.51	11	PASS
802.11ac VHT40	38/5190	3.14	3.32	11	PASS
	46/5230	7.32	7.50	11	PASS
802.11ac VHT80	42/5210	-2.91	-2.53	11	PASS
802.11ax HE20	36/5180	7.94	8.34	11	PASS
	40/5200	7.91	8.31	11	PASS
	48/5240	8.14	8.54	11	PASS
802.11ax HE40	38/5190	3.22	3.94	11	PASS
	46/5230	7.46	8.18	11	PASS
802.11ax HE80	42/5210	-1.30	-0.02	11	PASS
Note: Power Spectral Density =Read Value+Duty cycle correction factor					

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Mode	Channel /Frequency (MHz)	Read Value (dBm/470kHz)	Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)	Conclusion
802.11a	149/5745	7.74	8.15	30	PASS
	157/5785	8.15	8.56	30	PASS
	165/5825	7.89	8.30	30	PASS
802.11n HT20	149/5745	7.65	8.02	30	PASS
	157/5785	7.69	8.06	30	PASS
	165/5825	7.85	8.22	30	PASS
802.11n HT40	151/5755	0.17	0.62	30	PASS
	159/5795	2.60	3.05	30	PASS
802.11ac VHT20	149/5745	7.50	7.86	30	PASS
	157/5785	7.88	8.24	30	PASS
	165/5825	7.83	8.19	30	PASS
802.11ac VHT40	151/5755	-0.06	0.39	30	PASS
	159/5795	2.69	3.14	30	PASS
802.11ac VHT80	155/5775	-4.49	-3.84	30	PASS
802.11ax HE20	149/5745	7.65	8.32	30	PASS
	157/5785	7.70	8.37	30	PASS
	165/5825	7.62	8.29	30	PASS
802.11ax HE40	151/5755	1.17	2.16	30	PASS
	159/5795	3.73	4.72	30	PASS
802.11ax HE80	155/5775	-4.53	-2.98	30	PASS
Note: PSD=Read Value+Duty cycle correction factor +10*log(500/470)					

MIMO

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Mode	Channel/ Frequency (MHz)	Power Spectral Density					Limit (dBm /MHz)	Conclusion
		Antenna 1		Antenna 2		Total PSD (dBm/MHz)		
		Read Value (dBm/MHz)	PSD (dBm/MHz)	Read Value (dBm/MHz)	PSD (dBm/MHz)			
802.11n HT20	36/5180	6.85	6.95	6.53	6.63	9.80	11.00	PASS
	40/5200	7.24	7.34	7.22	7.32	10.34	11.00	PASS
	48/5240	7.64	7.74	7.70	7.80	10.78	11.00	PASS
802.11n HT40	38/5190	2.49	2.67	2.10	2.28	5.49	11.00	PASS
	46/5230	5.68	5.86	6.07	6.25	9.07	11.00	PASS
802.11ac VHT20	36/5180	7.07	7.16	7.02	7.11	10.15	11.00	PASS
	40/5200	7.31	7.40	7.36	7.45	10.44	11.00	PASS
	48/5240	7.39	7.48	7.69	7.78	10.64	11.00	PASS
802.11ac VHT40	38/5190	2.55	2.73	2.07	2.25	5.51	11.00	PASS
	46/5230	5.77	5.95	5.96	6.14	9.06	11.00	PASS
802.11ac VHT80	42/5210	-2.66	-2.28	-3.46	-3.08	0.35	11.00	PASS
802.11ax HE20	36/5180	7.30	7.70	7.01	7.41	10.57	11.00	PASS
	40/5200	7.28	7.68	7.18	7.58	10.64	11.00	PASS
	48/5240	7.14	7.54	7.44	7.84	10.70	11.00	PASS
802.11ax HE40	38/5190	2.26	2.98	1.95	2.67	5.84	11.00	PASS
	46/5230	6.46	7.18	6.69	7.41	10.31	11.00	PASS
802.11ax HE80	42/5210	-1.61	-0.33	-2.61	-1.33	2.21	11.00	PASS

Note: 1. Power Spectral Density =Read Value+Duty cycle correction factor

2. For Total PSD, according to KDB 662911 D01 Multiple Transmitter Output v02r01 2)a),

the power spectral density=$10\log(10^{(\text{PSD antenna 1 in dBm/10})}+10^{(\text{PSD antenna 2 in dBm/10})})$

3. According to KDB 662911 D01 Multiple Transmitter Output v02r01 F)2)f)(ii): If antenna gains are not equal, the user may use either of the following methods to calculate directional gain, provided that each transmit antenna is driven by only one spatial stream: Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain.

Directional gain = $G_{ANT\ MAX}$ + Array Gain, For PSD measurements on all devices, Array Gain=10log(Nant/Nss)dB,

so directional gain=$G_{ANT\ MAX}$ + Array Gain=2.78+10log(2/1)=5.79<6 dBi.

So the PSD limit is 11 dBm.

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Mode	Channel/ Frequency (MHz)	Power Spectral Density					Limit (dBm/ 500kHz)	Conclusion
		Antenna 1		Antenna 2		Total Power (dBm/ 500kHz)		
		Read Value (dBm/ 470kHz)	PSD (dBm/ 500kHz)	Read Value (dBm/ 470kHz)	PSD (dBm/ 500kHz)			
802.11n HT20	149/5745	5.67	6.04	7.96	8.33	10.34	29.95	PASS
	157/5785	5.35	5.72	7.96	8.33	10.23	29.95	PASS
	165/5825	5.32	5.69	8.02	8.39	10.26	29.95	PASS
802.11n HT40	151/5755	-1.56	-1.11	-0.33	0.12	2.56	29.95	PASS
	159/5795	0.75	1.20	2.76	3.21	5.33	29.95	PASS
802.11ac VHT20	149/5745	5.71	6.07	7.76	8.12	10.23	29.95	PASS
	157/5785	5.75	6.11	8.06	8.42	10.43	29.95	PASS
	165/5825	5.14	5.50	7.86	8.22	10.08	29.95	PASS
802.11ac VHT40	151/5755	-1.37	-0.92	0.09	0.54	2.88	29.95	PASS
	159/5795	0.52	0.97	2.57	3.02	5.13	29.95	PASS
802.11ac VHT80	155/5775	-6.28	-5.63	-5.12	-4.47	-2.00	29.95	PASS
802.11ax HE20	149/5745	5.70	6.37	7.63	8.30	10.45	29.95	PASS
	157/5785	5.60	6.27	7.96	8.63	10.62	29.95	PASS
	165/5825	5.19	5.86	8.09	8.76	10.56	29.95	PASS
802.11ax HE40	151/5755	-0.56	0.43	1.20	2.19	4.41	29.95	PASS
	159/5795	1.24	2.23	3.71	4.70	6.65	29.95	PASS
802.11ax HE80	155/5775	-5.54	-3.99	-4.60	-3.05	-0.48	29.95	PASS

Note: 1. Power Spectral Density =Read Value+Duty cycle correction factor +10*log(500/470).

2. For Total PSD, according to KDB 662911 D01 Multiple Transmitter Output v02r01 2)a),

the power spectral density=$10\log(10^{(\text{PSD antenna 1 in dBm/10})}+10^{(\text{PSD antenna 2 in dBm/10})})$

3. According to KDB 662911 D01 Multiple Transmitter Output v02r01 F)2)f)(ii): If antenna gains are not equal, the user may use either of the following methods to calculate directional gain, provided that each transmit antenna is driven by only one spatial stream: Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain.

Directional gain = $G_{ANT\ MAX}$ + Array Gain, For PSD measurements on all devices, Array Gain=10log(Nant/Nss)dB,

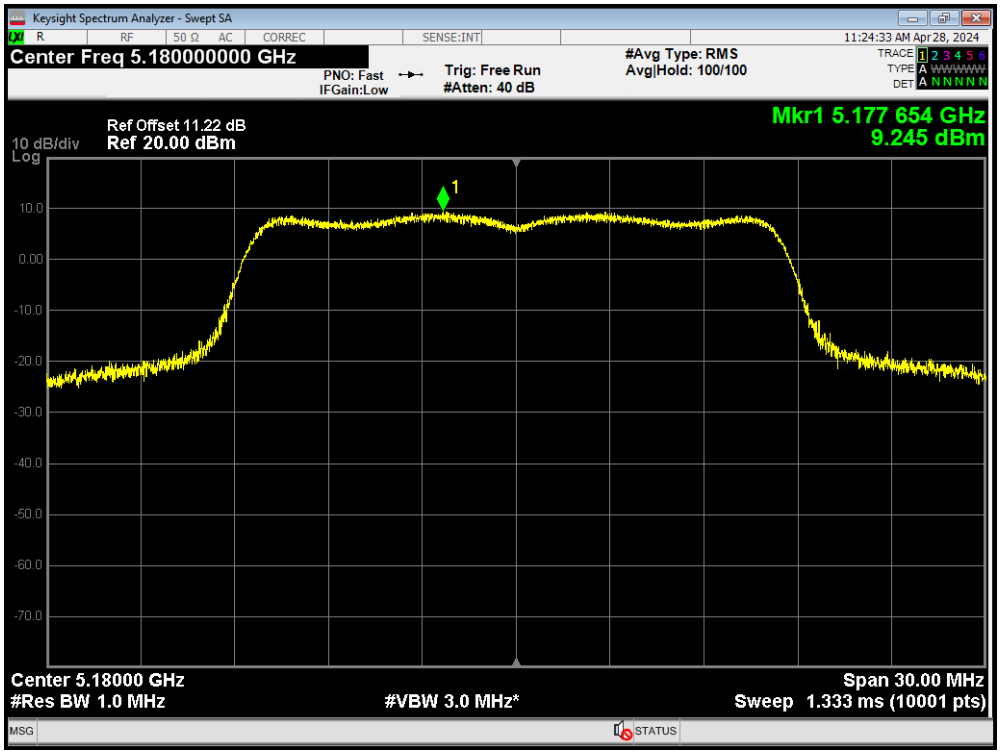
so directional gain=$G_{ANT\ MAX}$ +Array Gain=3.04+10log(2/1)=6.05>6 dBi.

So the PSD limit is 30-(directional gain-6 dBi) =30-(6.05-6) =29.95dBm.

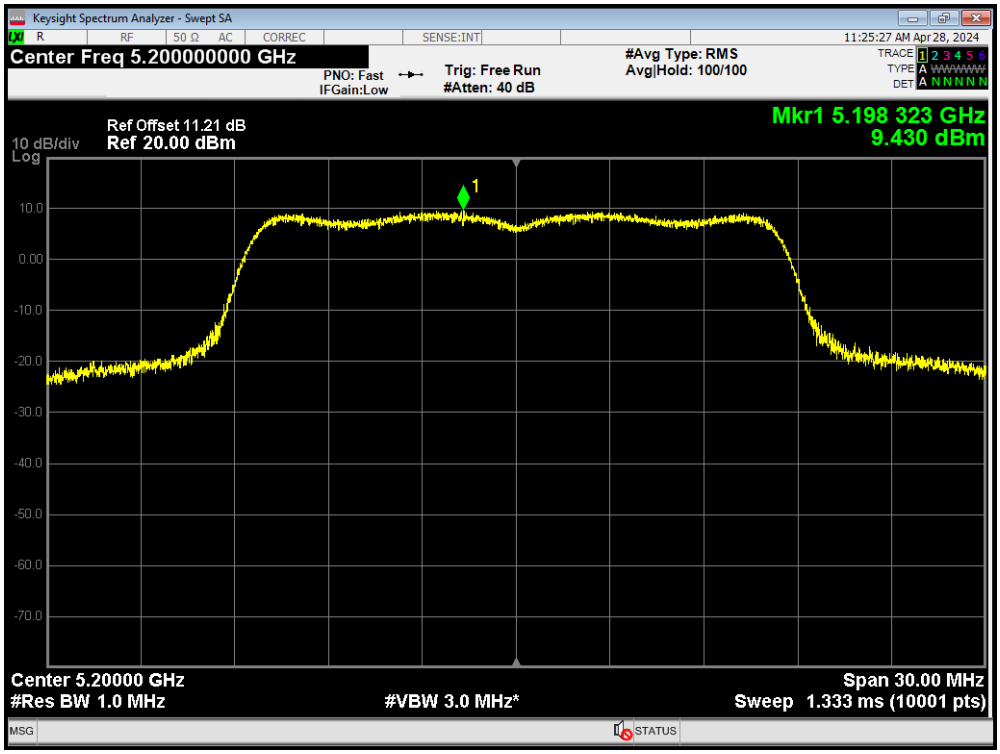
SISO Antenna 1

U-NII-1

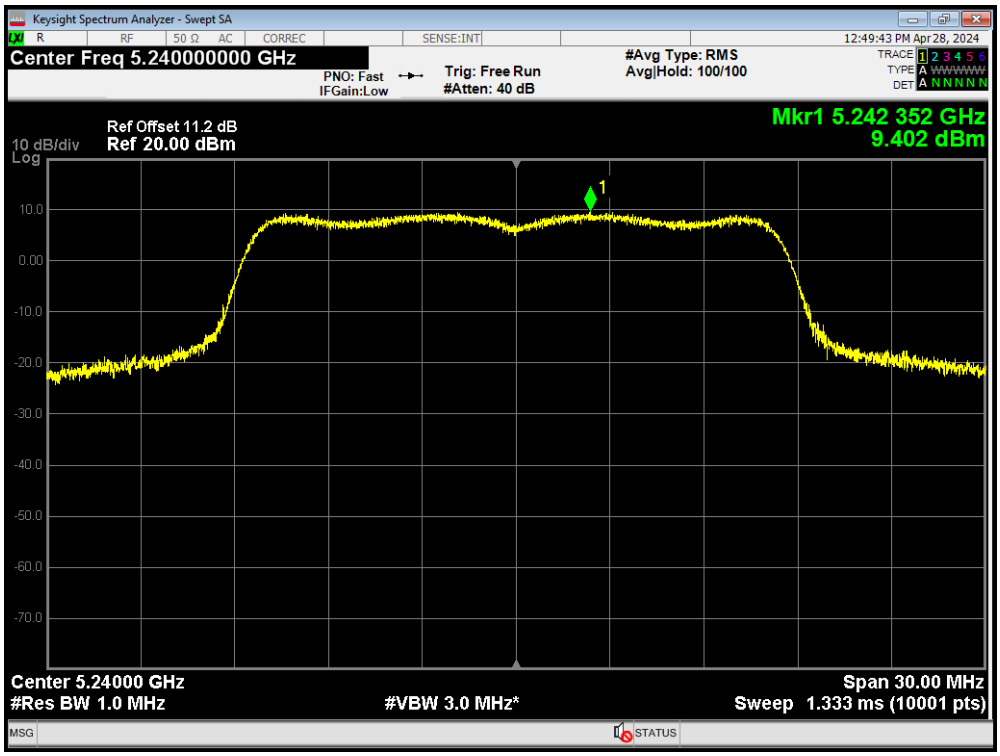
PSD 802.11a 5180MHz



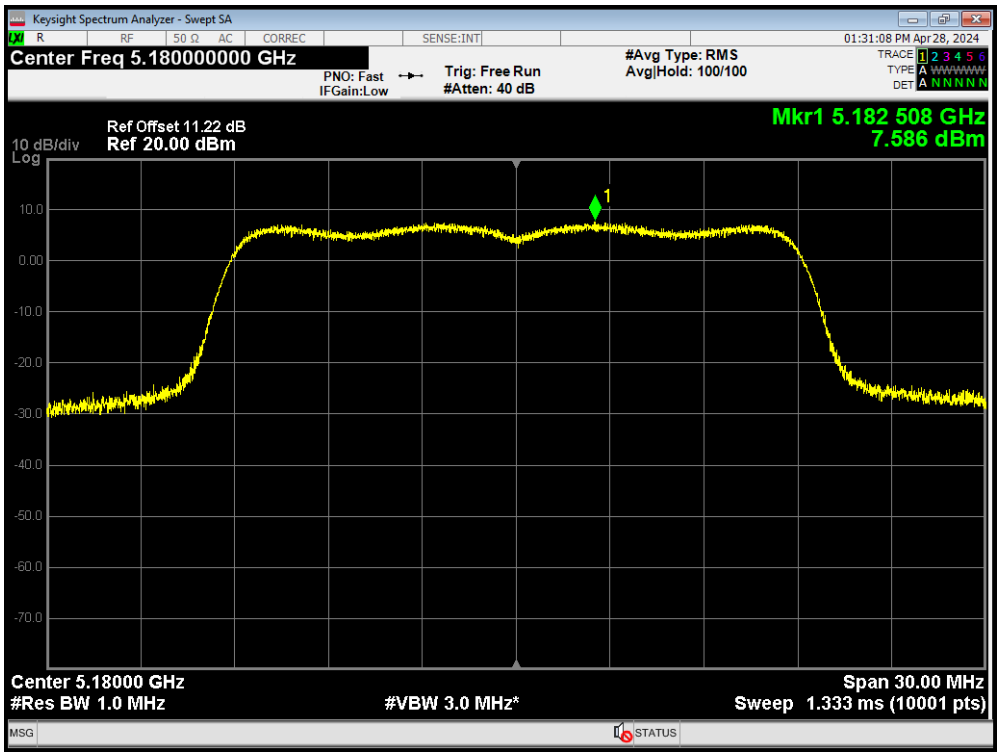
PSD 802.11a 5200MHz



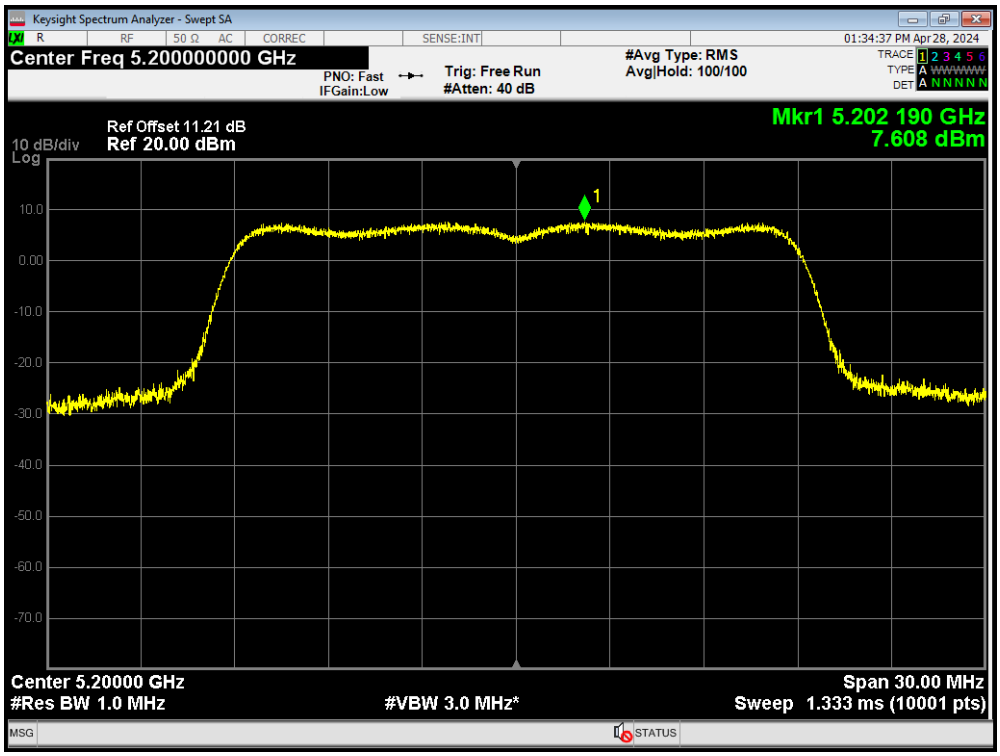
PSD 802.11a 5240MHz



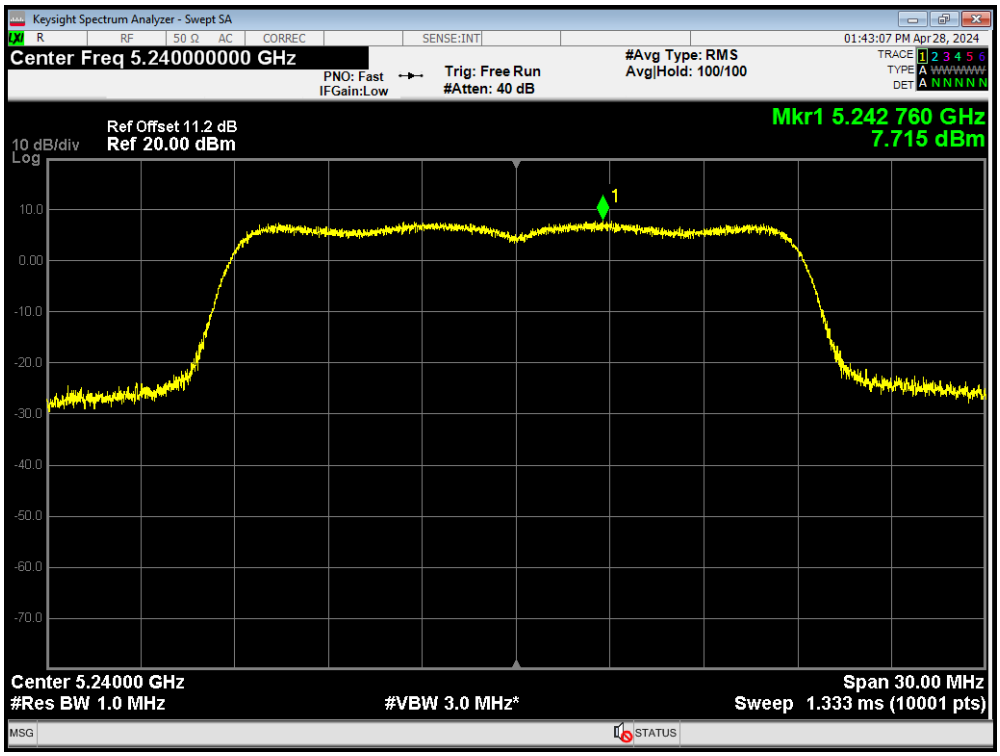
PSD 802.11ac(VHT20) 5180MHz



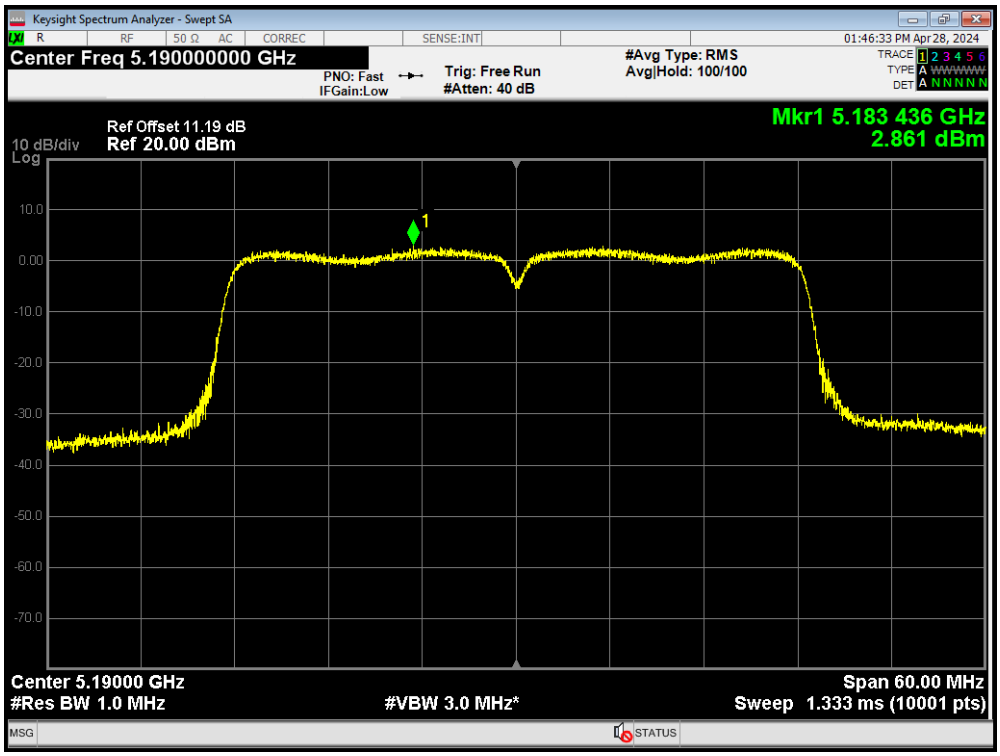
PSD 802.11ac(VHT20) 5200MHz



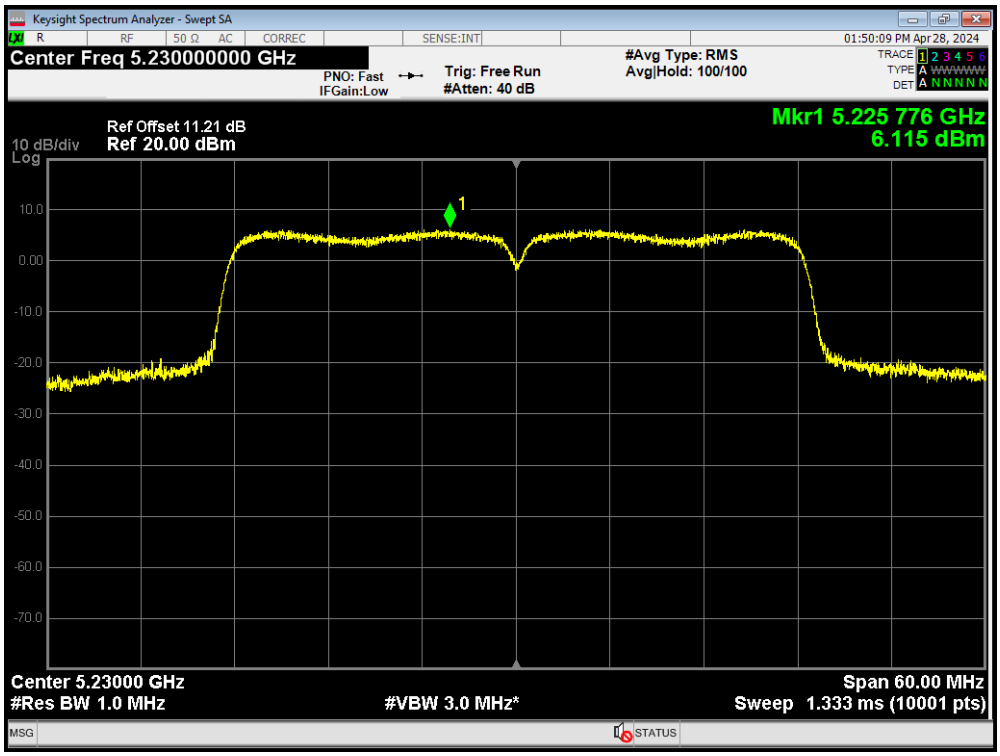
PSD 802.11ac(VHT20) 5240MHz



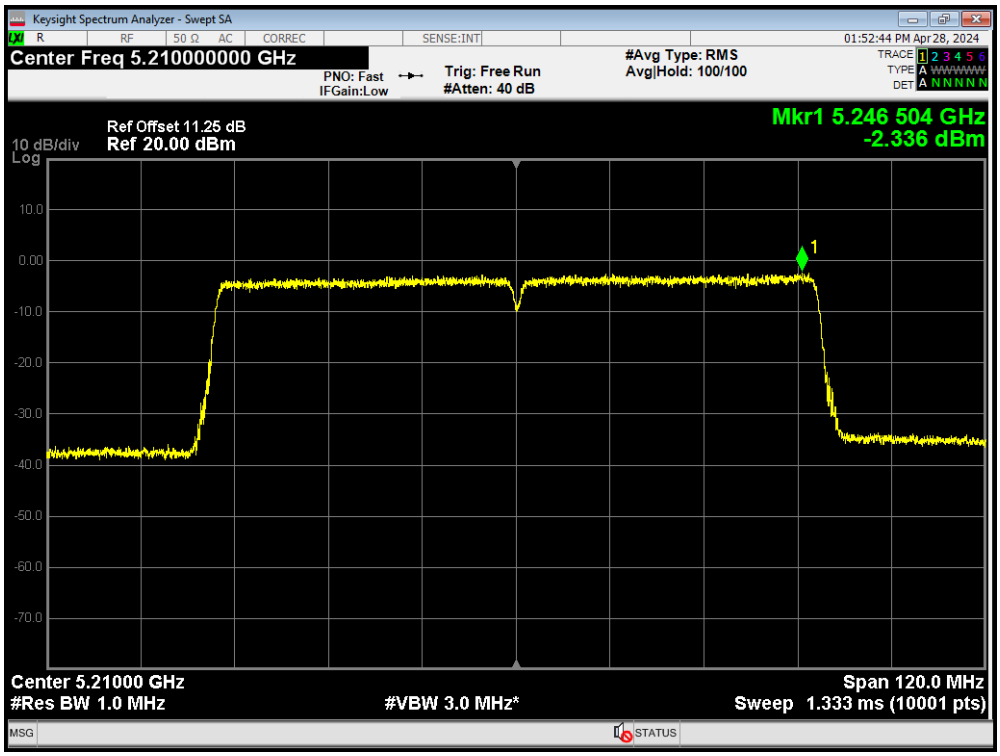
PSD 802.11ac(VHT40) 5190MHz



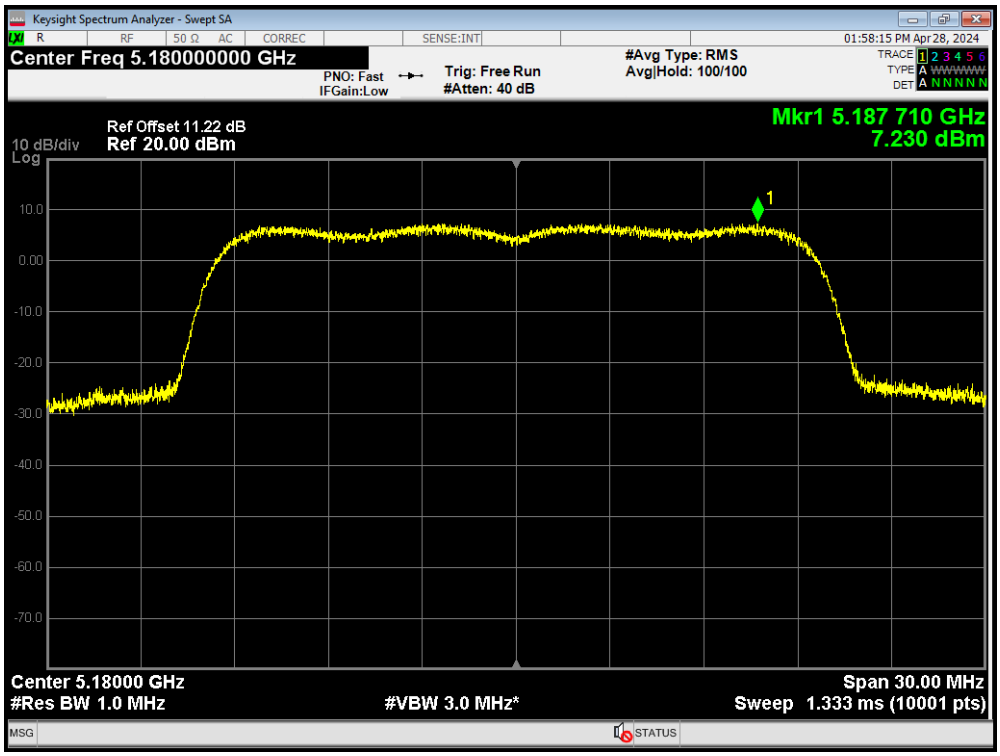
PSD 802.11ac(VHT40) 5230MHz



PSD 802.11ac(VHT80) 5210MHz



PSD 802.11ax(HE20) 5180MHz



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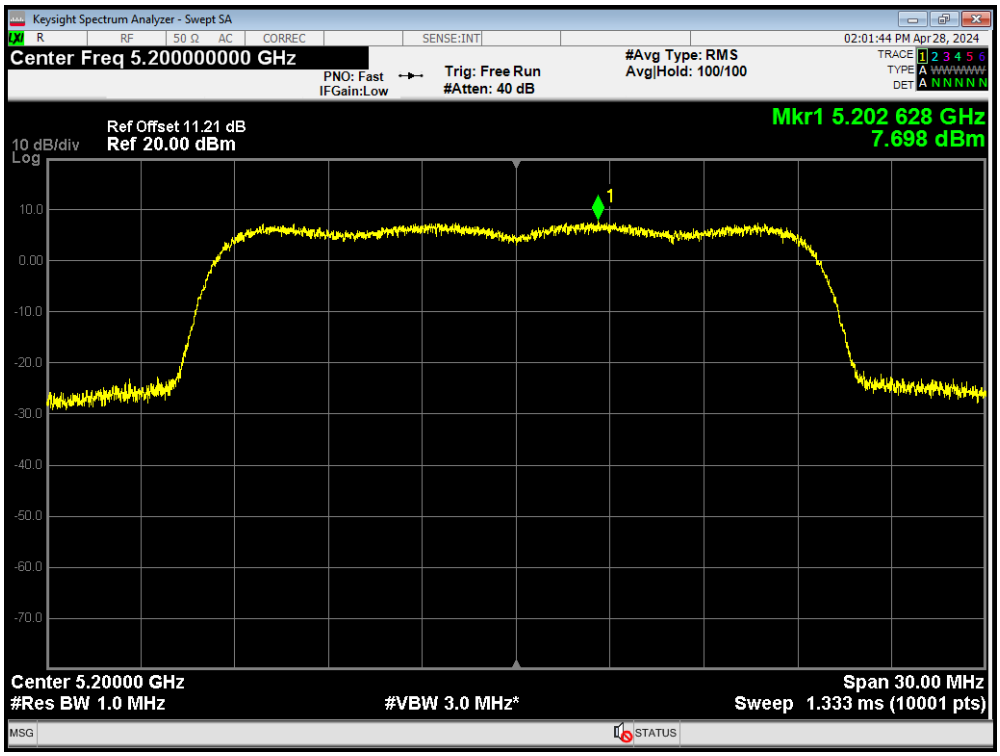
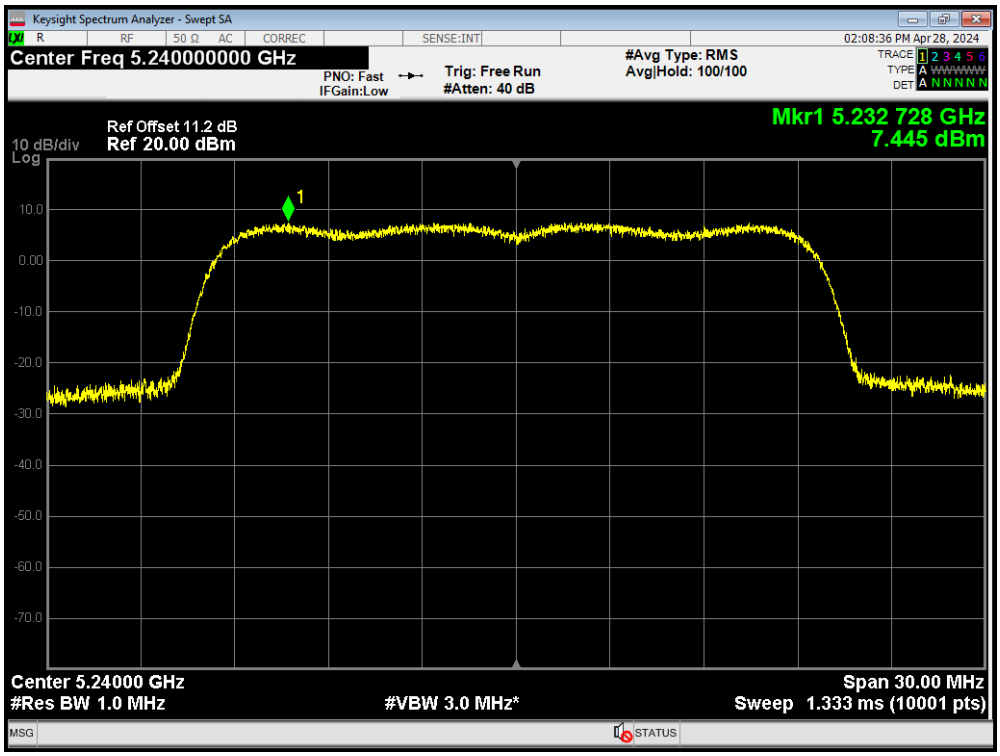
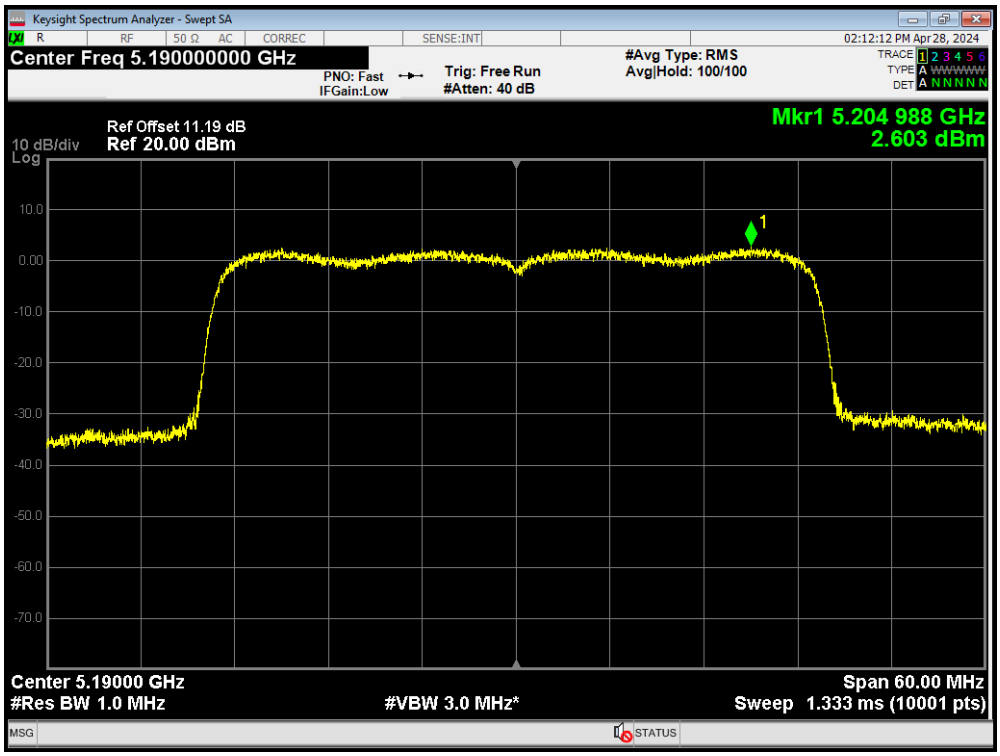


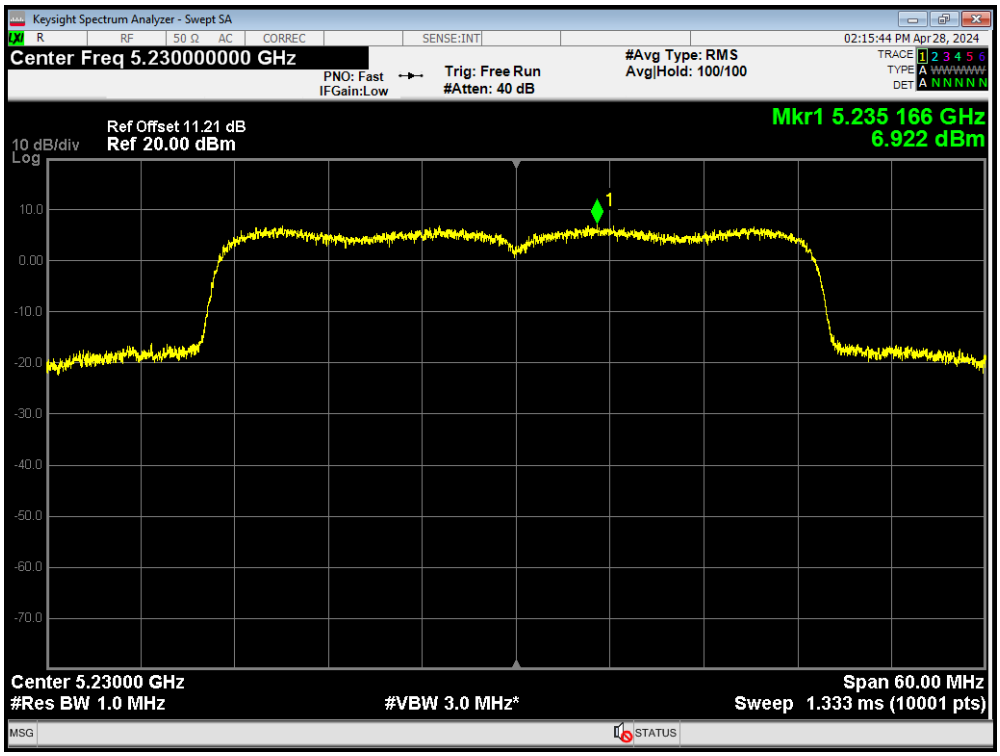
PSD 802.11ax(HE20) 5240MHz



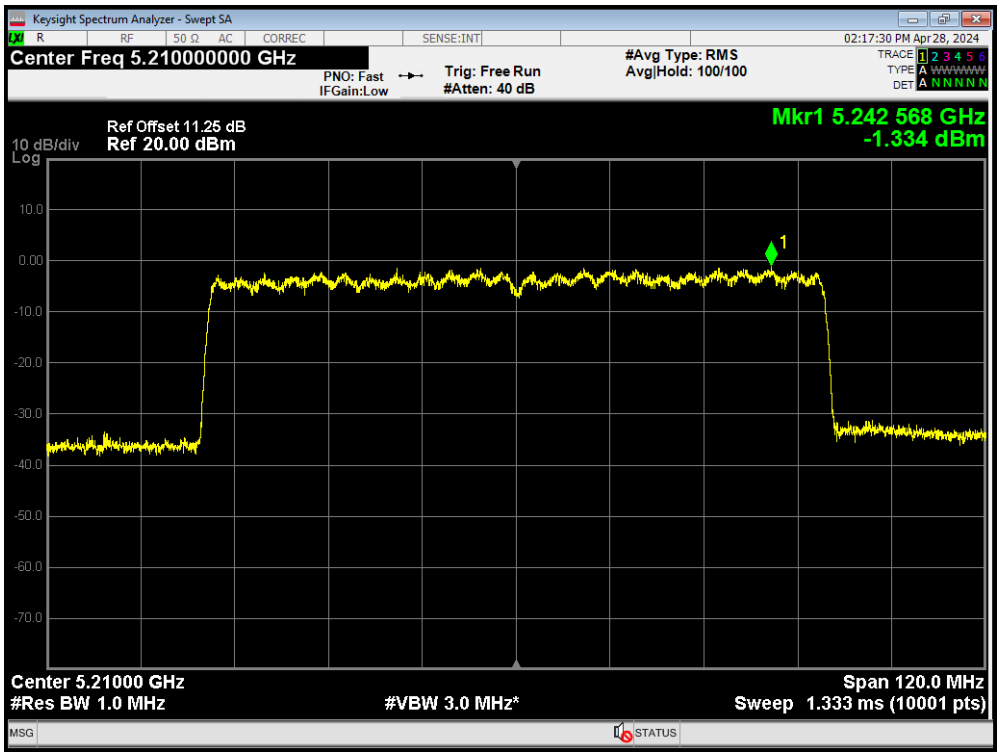
PSD 802.11ax(HE40) 5190MHz



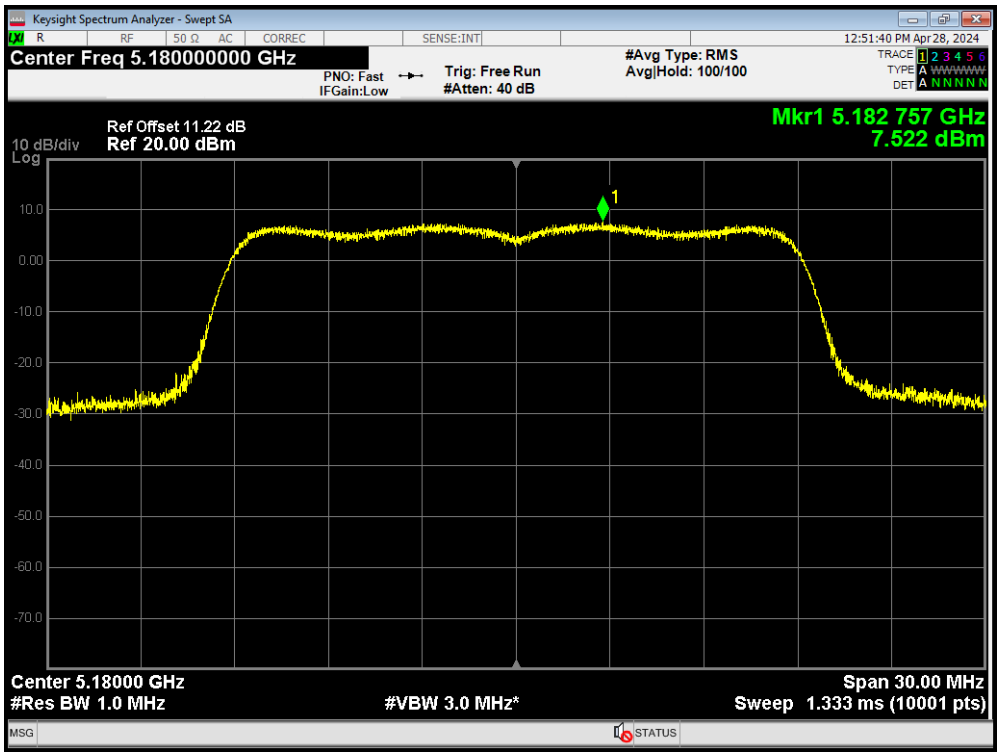
PSD 802.11ax(HE40) 5230MHz



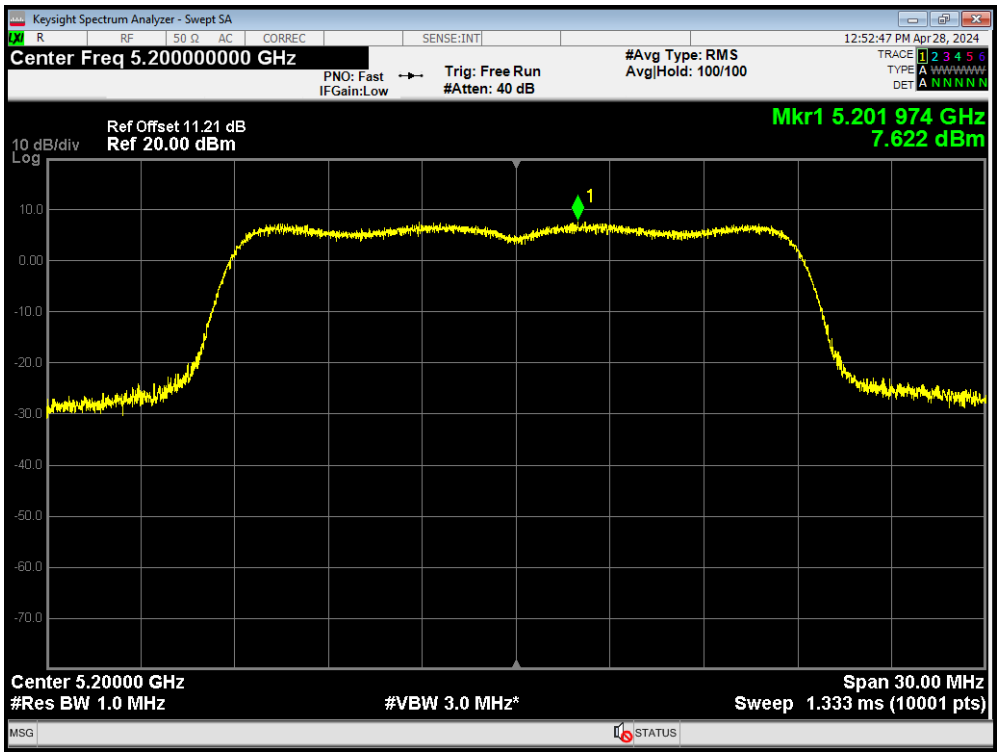
PSD 802.11ax(HE80) 5210MHz



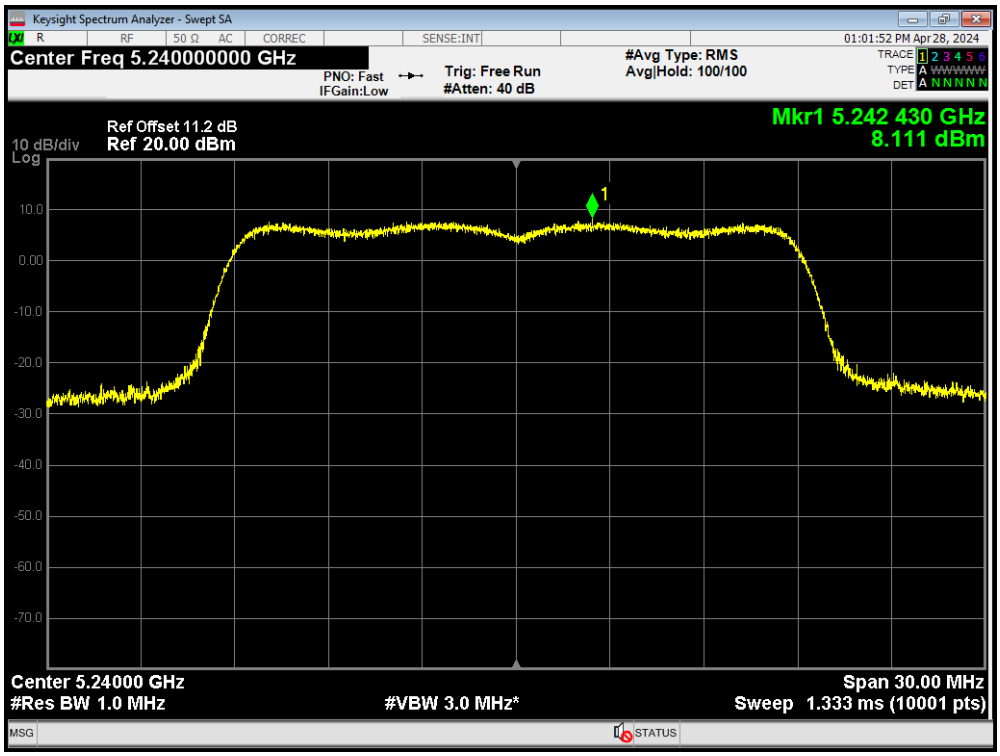
PSD 802.11n(HT20) 5180MHz



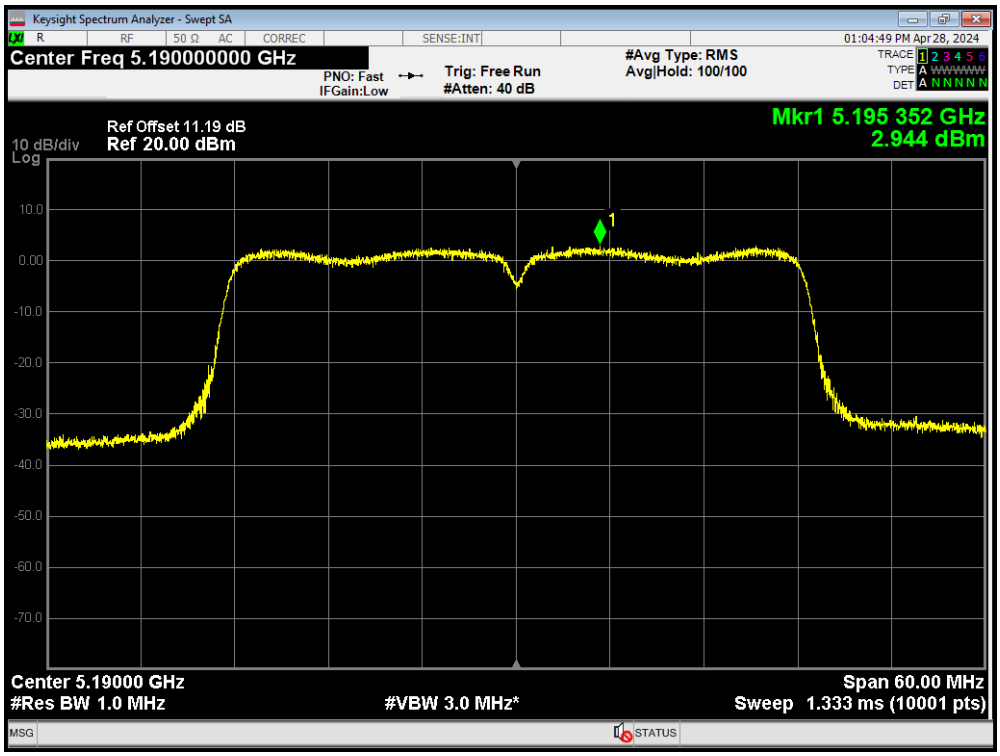
PSD 802.11n(HT20) 5200MHz



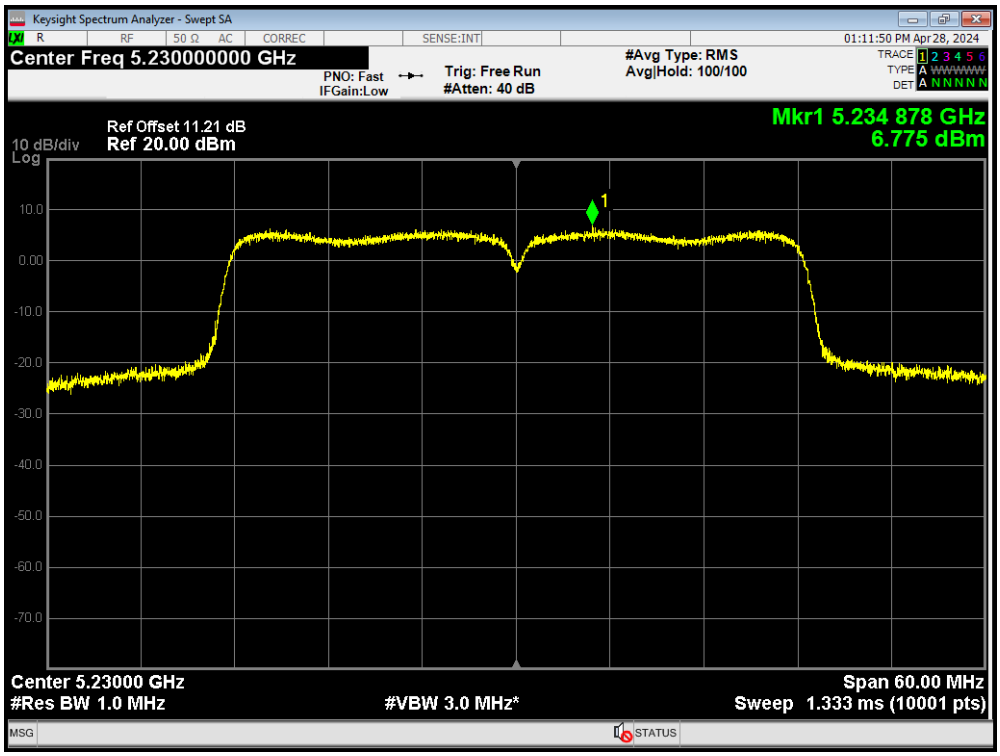
PSD 802.11n(HT20) 5240MHz



PSD 802.11n(HT40) 5190MHz

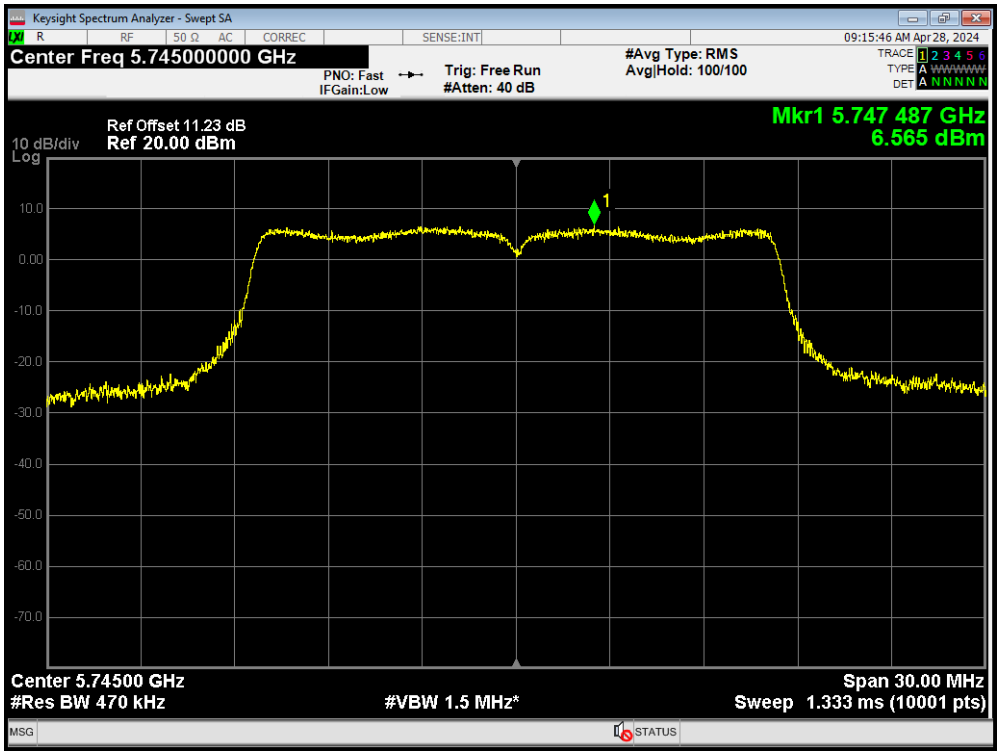


PSD 802.11n(HT40) 5230MHz

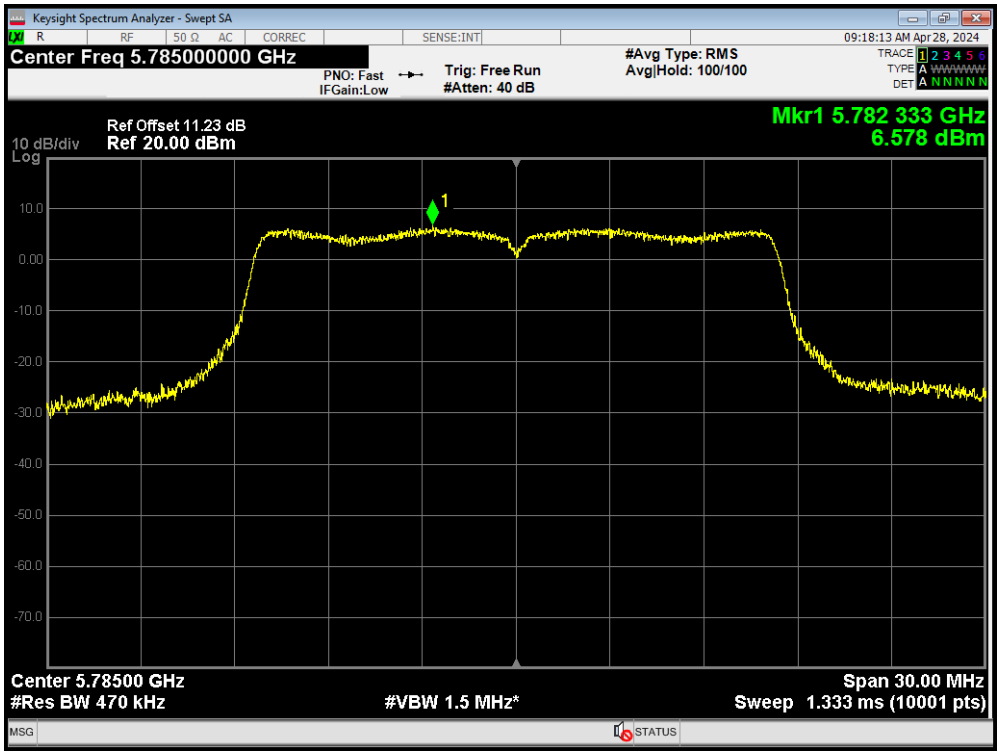


U-NII-3

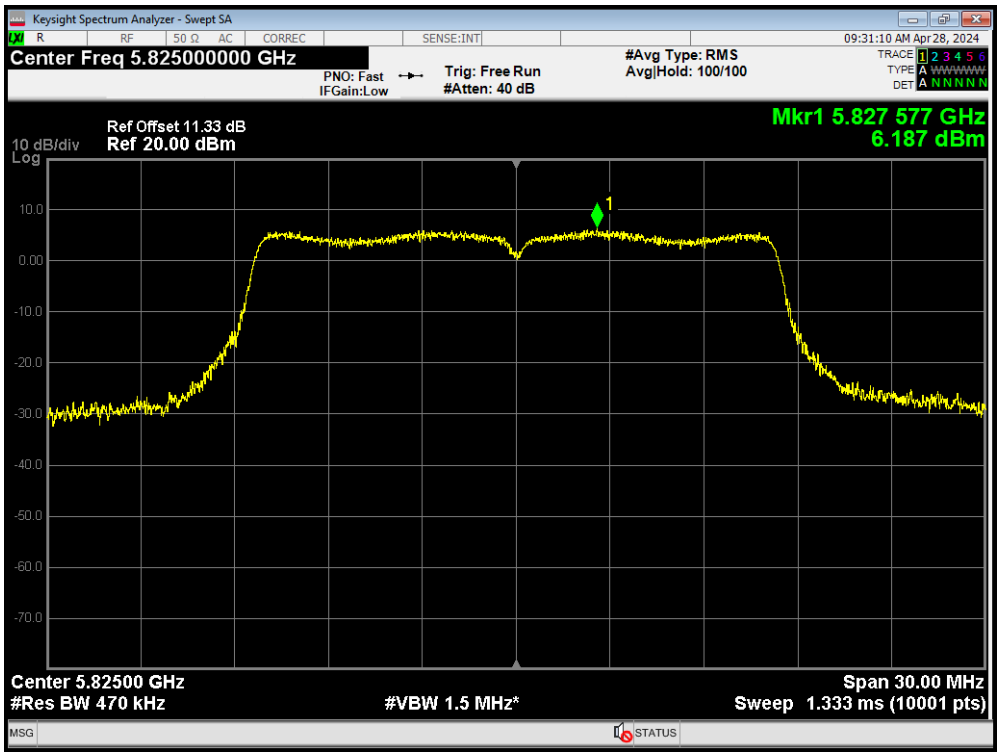
PSD 802.11a 5745MHz



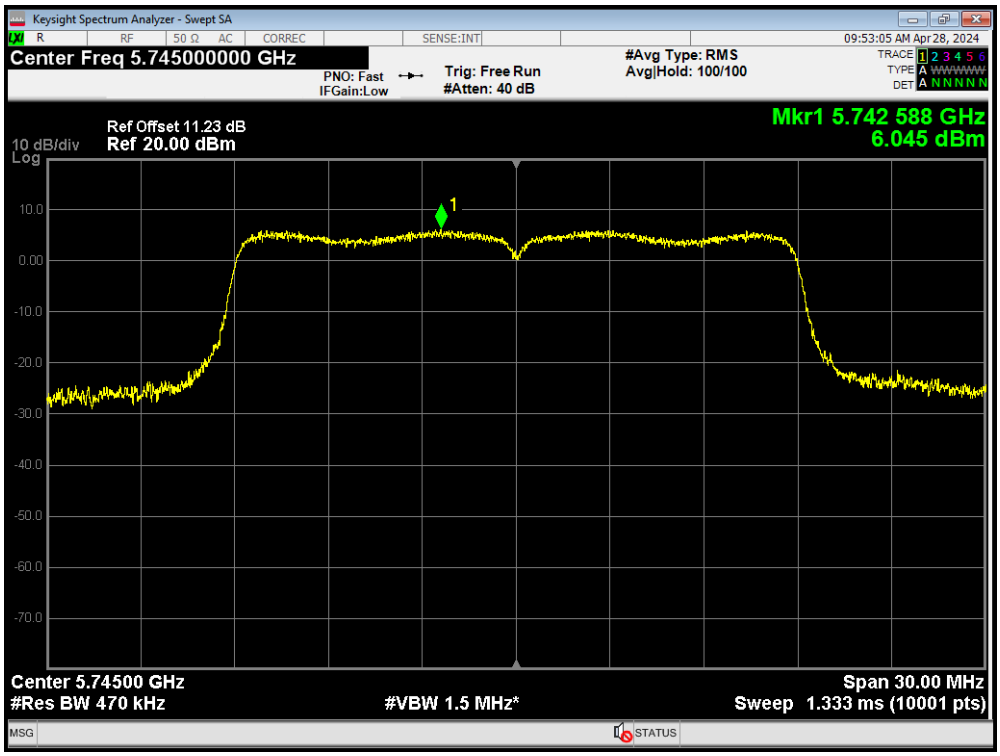
PSD 802.11a 5785MHz



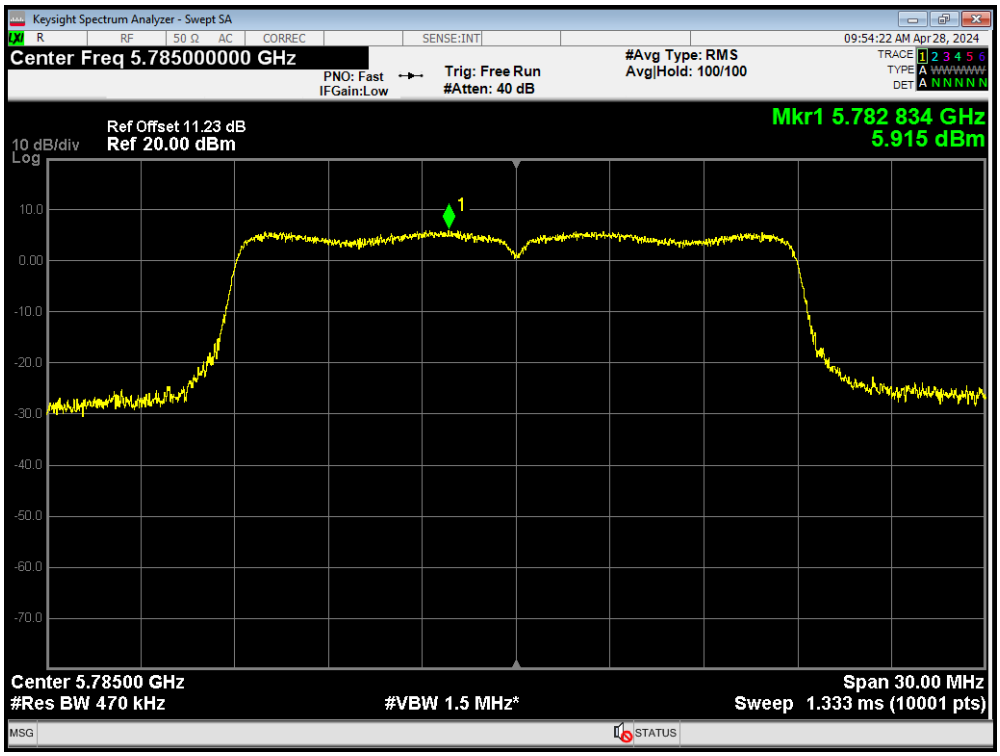
PSD 802.11a 5825MHz



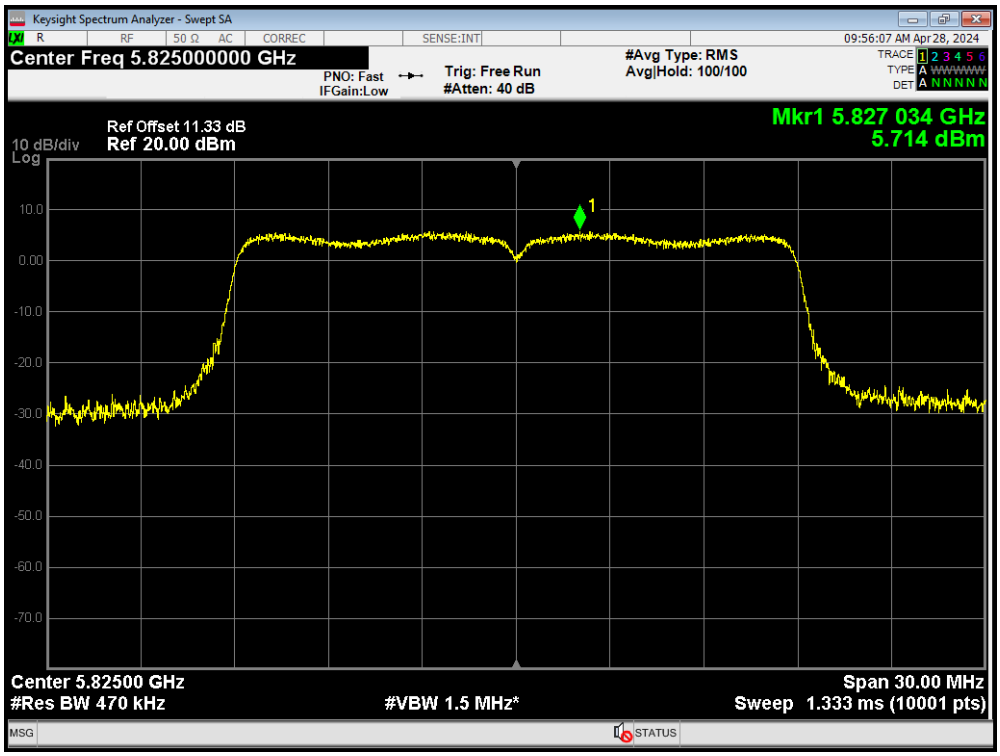
PSD 802.11ac(VHT20) 5745MHz



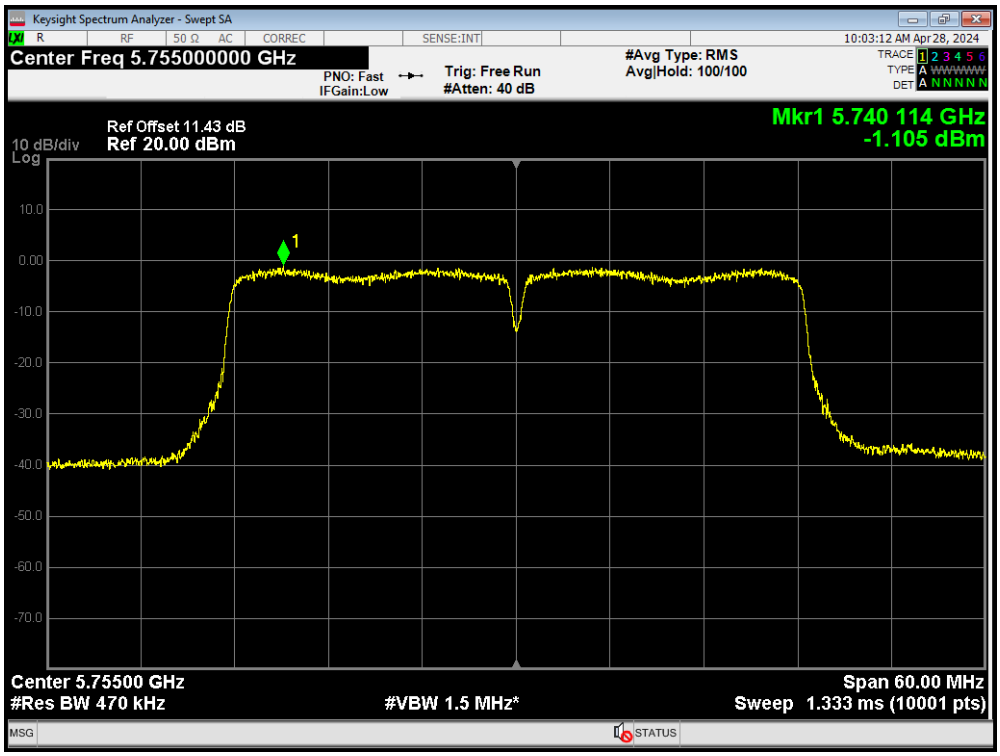
PSD 802.11ac(VHT20) 5785MHz



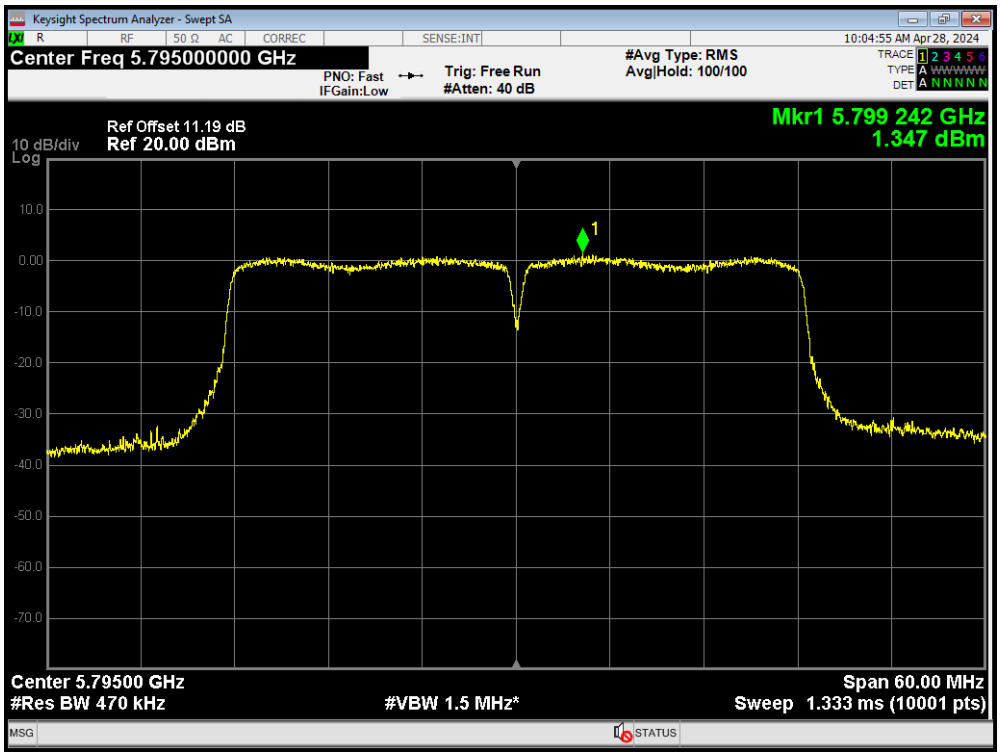
PSD 802.11ac(VHT20) 5825MHz



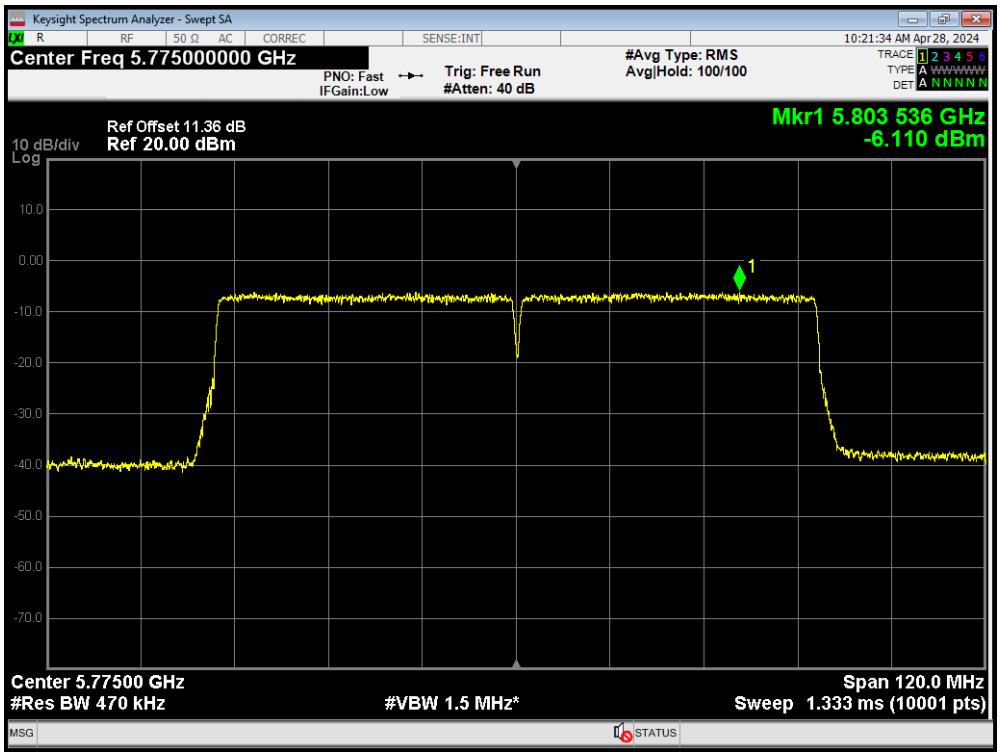
PSD 802.11ac(VHT40) 5755MHz



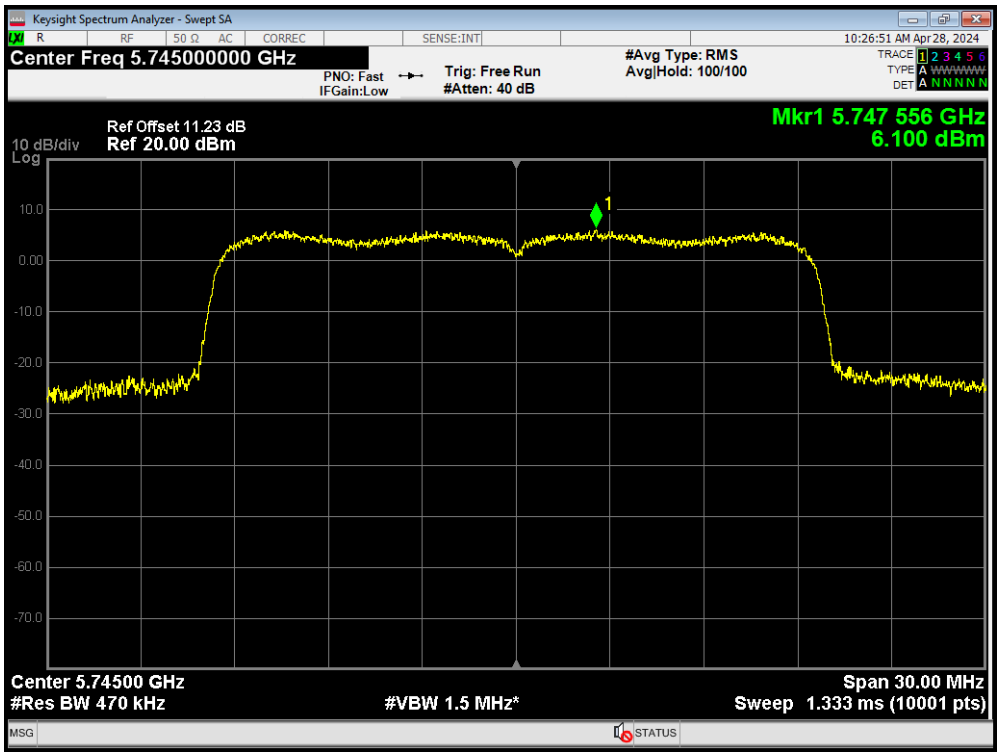
PSD 802.11ac(VHT40) 5795MHz



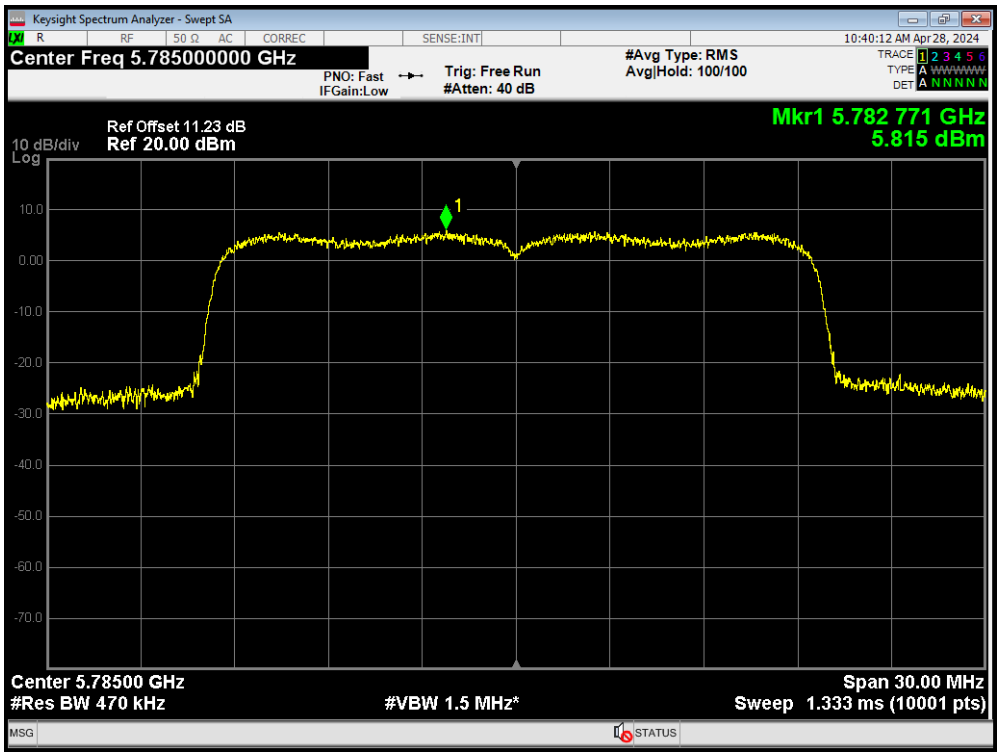
PSD 802.11ac(VHT80) 5775MHz



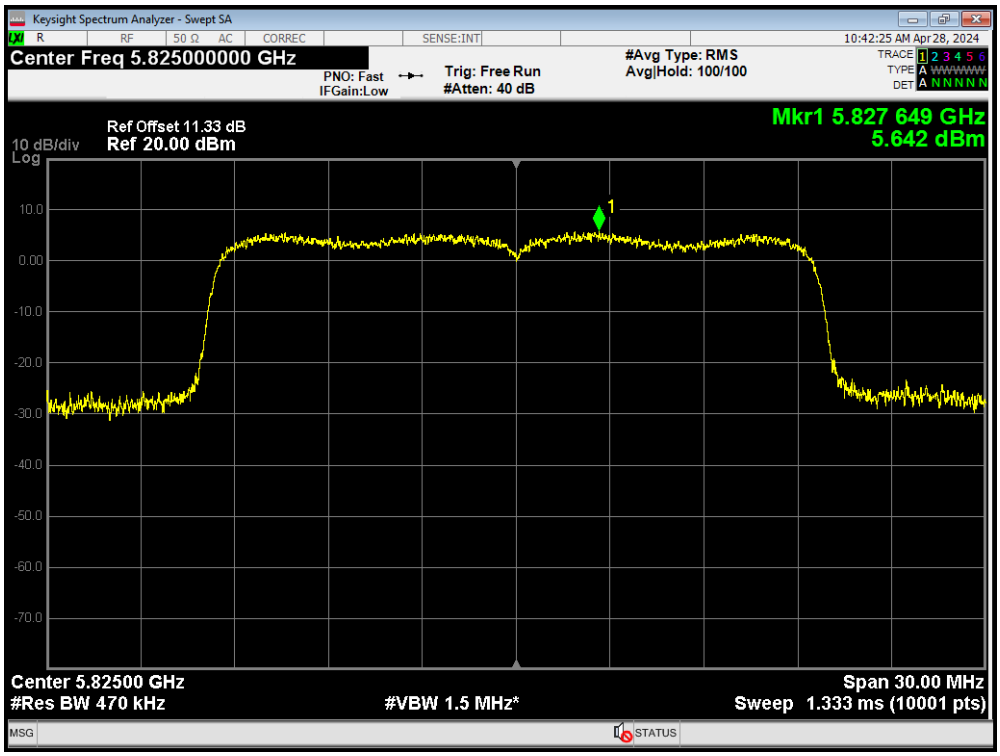
PSD 802.11ax(HE20) 5745MHz



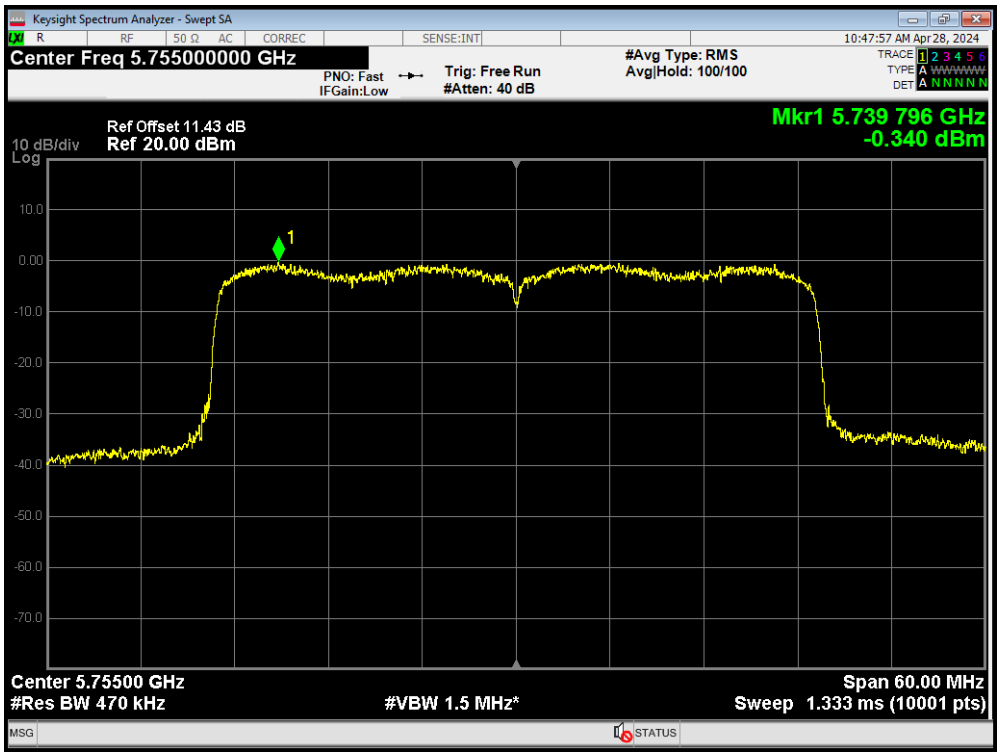
PSD 802.11ax(HE20) 5785MHz



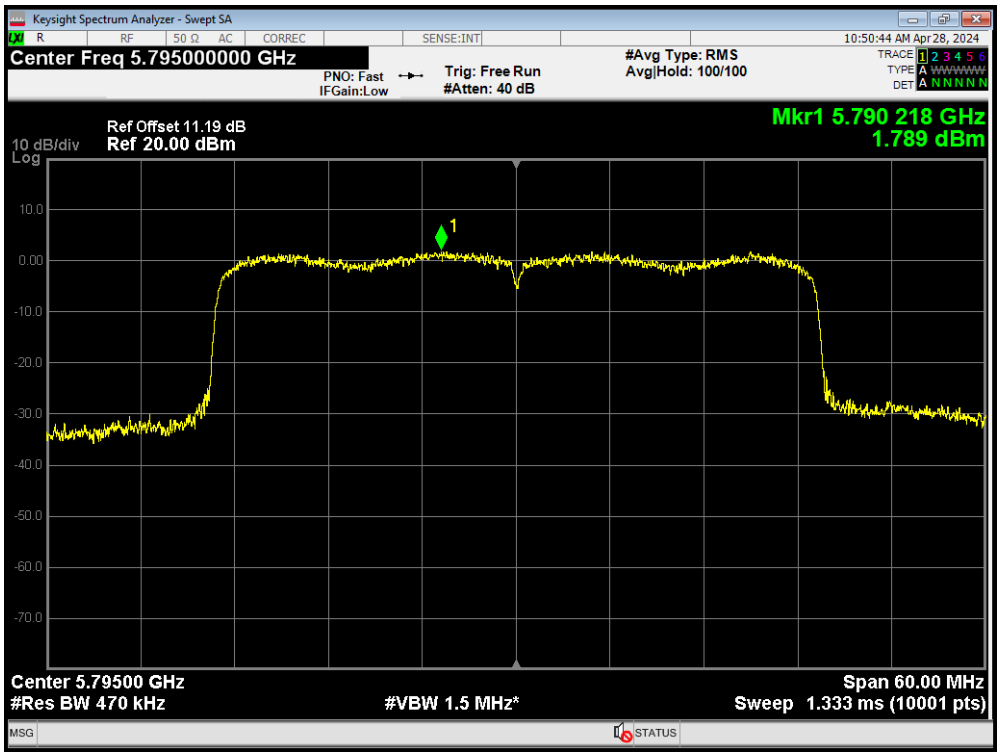
PSD 802.11ax(HE20) 5825MHz



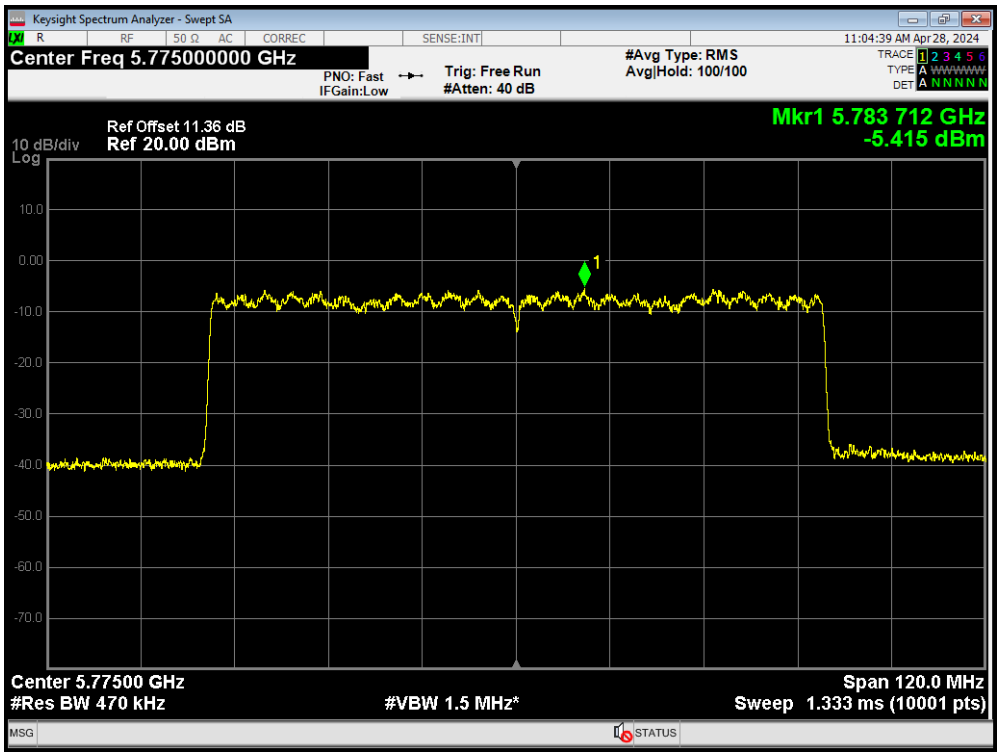
PSD 802.11ax(HE40) 5755MHz



PSD 802.11ax(HE40) 5795MHz



PSD 802.11ax(HE80) 5775MHz



PSD 802.11n(HT20) 5745MHz