TEST REPORT

of

FCC PART 15 SUBPART E

Product:	**IPQ4019 SOM module**
Brand:	**EMBUX**
Main Model:	**SOM4019**
Series Model:	**N/A**
Model Difference:	**N/A**
FCC ID:	**2AVW3-SOM4019**
FCC Rule Part:	**§15.407, Cat:NII**
Applicant:	**EMBUX Technology Co. Ltd.**
Address	**13F, No. 920, Chung-Cheng Rd. Zhonghe Dist., New Taipei City 23586 Taiwan**

Test Performed by:

International Standards Laboratory Corp. LT Lab.
TEL: +886-3-263-8888 FAX: +886-3-263-8899
No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist., Tao Yuan City 325, Taiwan

Report No.: **ISL-23LR0098FE**
Issue Date : **September 01, 2023**

VERIFICATION OF COMPLIANCE

Applicant:	EMBUX Technology Co. Ltd.
Equipment Under Test:	IPQ4019 SOM module
Brand:	EMBUX
Main Model:	SOM4019
Series Model:	N/A
Model Difference:	N/A
FCC ID:	2AVW3-SOM4019
Date of Test:	August 2, 2023 ~ August 31, 2023
Date of EUT Received:	August 2, 2023

We hereby certify that:

All the tests in this report have been performed and recorded in accordance with the standards described above and performed by an independent electromagnetic compatibility consultant, International Standards Laboratory Corp.

The test results contained in this report accurately represent the measurements of the characteristics and the energy generated by sample equipment under test at the time of the test. The sample equipment tested as described in this report is in compliance with the limits of above standards.

Test By:	Kevin Yao	***Date:***	September 01, 2023
	Kevin Yao / Senior Engineer		
Prepared By:	Gigi yeh	***Date:***	September 01, 2023
	Gigi Yeh / Senior Engineer		
Approved By:		***Date:***	September 01, 2023
	Jerry Liu / Manager		

Version

Version No.	Date	Description
00	September 01, 2023	Initial creation of document

Uncertainty of Measurement

ISO/IEC 17025 requires that an estimate of measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)).

Parameter	Uncertainty (k=2)
Conducted Emission (AC power line)	±0.852 dB
Spurious emissions, radiated	±3.46 dB
RF power, conducted	±1.386 dB
Power Density	±1.432 dB
RF Frequency	±0.00298%
Time	±0.01%
DC Voltage	±0.808%

Table of Contents

1. General Information

1.1. Product Description

General Information		
Product Name:	IPQ4019 SOM module	
Brand Name:	EMBUX	
Model Name:	SOM4019	
Model Difference:	N/A	
Temperature Range	-40°C to +75°C	
Power Supply:	12Vdc For Adapter	Model: ATS018T-W120U; Supplier: I.T.E
WiFi Information		
WLAN Modular	IPQ4019	
Frequency Range:	WLAN 5GHz Band U-NII-1 5180MHz~5240MHz U-NII-3 5745MHz~5825MHz	
Max Output Power:	5180MHz ~ 5240MHz : 16.97dBm(AV) 5745MHz ~ 5825MHz : 28.23dBm(AV)	
Channel number:	WLAN 5GHz Band 802.11a U-NII-1 : 4 802.11n(HT20) U-NII-1 : 4 802.11n(HT40) U-NII-1 : 2 802.11ac(VHT20) U-NII-1 : 4 802.11ac(VHT40) U-NII-1 : 2 802.11ac(VHT80) U-NII-1 : 1 802.11a U-NII-3 : 5 802.11n(HT20) U-NII-3 : 5 802.11n(HT40) U-NII-3 : 2 802.11ac(VHT20) U-NII-3 : 5 802.11ac(VHT40) U-NII-3 : 2 802.11ac(VHT80) U-NII-3 : 1	
Product HW Version:	Ver. A	
Product SW Version:	N/A	
Product FW Version:	Ver 1.0.9	
Test SW Version:	V5.0.0-00188	
Worst Case:	WLAN 5G : 802.11a	

	Antenna Type	Brand	Model	Peak Gain	Frequency Range	Connector Type
1	Dipole Antenna	ARISTOTLE	RFA-25-T42-U-M70	2.6dBi 5dBi	2400-2500 MHz 5150-5875 MHz	SMA

According to KDB 662911 D01 MU-MIMO signals could be considered completely uncorrelated for purposes of directional gain computation in case.

Directional gain = G_{ANT}

The EUT is compliance with IEEE 802.11 a/b/g/n/ac Standard.
This report applies for Wifi frequency band 5150 MHz– 5250 MHz, 5725 MHz– 5850 MHz

Remark: The above DUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.2. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: 2AVW3-SOM4019** filing to comply with Section 15.407 of the FCC Part 15, Subpart E Rules.

1.3. Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.10: 2013. Radiated testing was performed at an antenna to EUT distance 3 meters.

KDB Document: 789033 D02 General U-NII Test Procedures New Rules v02r01

FCC 14-30 Revision UNII

594280 D02 U-NII Device Security v01r03

1.4. Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of International Standards Laboratory Corp. <LT Lab.> No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist., Tao Yuan City 325, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.10: 2013. FCC Registration Number is: 487532; Designation Number is: TW0997.

1.5. Special Accessories

Not available for this EUT intended for grant.

1.6. Equipment Modifications

Not available for this EUT intended for grant.

2. System Test Configuration

2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2. EUT Exercise

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

2.3. Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 6 of ANSI C63.10: 2013. Con-ducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR 16-1-1 Quasi-Peak and Average detector mode.

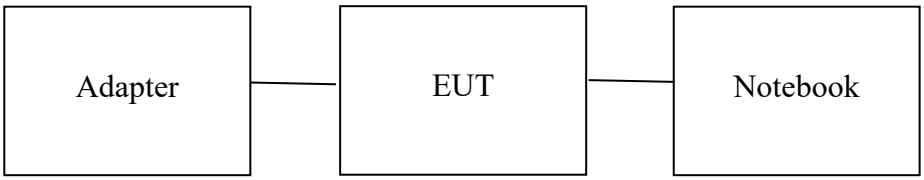
2.3.2 Radiated Emissions

The EUT is a placed on a turntable which is 0.8 m/1.5m (Frequency above 1GHz) above the ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. The EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. To find out the maximum emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna according to the requirements in Section 6, 11 and 12 of ANSI C63.10: 2013.

2.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System

Radiated Emission



1. Table 1-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1	Notebook	HP	Probook	N/A	150cm	100cm
2	Adapter	I.T.E	ATS018T-W120U	N/A	N/A	100cm

Note: All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.

Grounding: Grounding was in accordance with the manufacturer's requirements and conditions for the intended use.

2.5. Duty Cycle

If duty cycle of test signal is ≥ 98 %, duty factor is not required.

If duty cycle of test signal is < 98 %, duty factor shall be considered.

The output power = measured power + duty factor.

Mode	ON time (ms)	Total time (ms)	Duty Cycle	Duty Factor	1/Ton (kHz)	VBW for average detector (kHz)
a	1.680	1.770	94.915%	0.23	0.595	1
HT20	1.672	1.770	94.468%	0.25	0.598	1
HT40	0.795	0.910	87.363%	0.59	1.258	2
VHT20	1.680	1.770	94.915%	0.23	0.595	1
VHT40	0.790	0.910	86.813%	0.61	1.266	2
VHT80	0.367	0.448	81.921%	0.87	2.722	3

3. Summary of Test Results

FCC Rules	Description Of Test	Result
§15.207	AC Power Line Conducted Emission	Compliant
§15.407(a)(2)	Output Power/ EIRP/ Spectral Density Measurement	Compliant
§15.407(a)	26dB Emission Bandwidth	Compliant
§15.407(e)	6dB Emission Bandwidth	Compliant
§15.407(b)	Undesirable Emission – Radiated Measurement	Compliant
§15.407(c)	Transmission in case of Absence of Information	Compliant
§15.407(a)	Antenna Requirement	Compliant
§15.407(d)	TPC and DFS Measurement	Compliant
§15.407(i)	Device Security	Compliant

4. Description of Test Modes

The EUT has been tested under operating condition.
Test program used to control the EUT for staying in continuous transmitting mode is programmed.

5150MHz-5250MHz:
802.11a mode: Channel low (5180MHz), mid (5200MHz) and high (5240MHz) with 6Mbps lowest data rate are chosen for pre-test testing of radiated emissions.
802.11 n HT20: Channel low (5180MHz), mid (5200MHz) and high (5240MHz) with 6.5Mbps lowest data rate are chosen for pre-test testing of radiated emissions.
802.11 n HT40: Channel low (5190MHz) and high (5230MHz) with 13.5Mbps lowest data rate are chosen for pre-test testing of radiated emissions.
802.11 ac VHT20: Channel low (5180MHz), mid (5200MHz) and high (5240MHz) with 6.5Mbps lowest data rate are chosen for pre-test testing of radiated emissions.
802.11 ac VHT40: Channel low (5190MHz) and high (5230MHz) with 13.5Mbps lowest data rate are chosen for pre-test testing of radiated emissions.
802.11 ac VHT80: Channel low (5210MHz) with 13.5Mbps lowest data rate is chosen for pre-test testing of radiated emissions.

5725MHz-5850MHz:
802.11a mode: Channel low (5745MHz), mid (5785MHz) and high (5825MHz) with 6Mbps lowest data rate are chosen for pre-test testing of radiated emissions.
802.11 n HT20: Channel low (5745MHz), mid (5785MHz) and high (5825MHz) with 6.5Mbps lowest data rate are chosen for pre-test testing of radiated emissions.
802.11 n HT40: Channel low (5755MHz) and high (5795MHz) with 13.5Mbps lowest data rate are chosen for pre-test testing of radiated emissions.
802.11 ac VHT20: Channel low (5745MHz), mid (5785MHz) and high (5825MHz) with 6.5Mbps lowest data rate are chosen for pre-test testing of radiated emissions.
802.11 ac VHT40: Channel low (5755MHz) and high (5795MHz) with 13.5Mbps lowest data rate are chosen for pre-test testing of radiated emissions.
802.11 ac VHT80: Channel (5775MHz) with 13.5Mbps lowest data rate is chosen for pre-test testing of radiated emissions.

5. Conduced Emission Test

5.1. Standard Applicable

According to §15.207, frequency range within 150kHz to 30MHz shall not exceed the Limit table as below.

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Note 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

5.2. Measurement Equipment Used:

Location	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Conduction 02	EMI Receiver 19	R&S	ESR3	102460	05/08/2023	05/08/2024
Conduction 02	Conduction 02-1 Cable	WOKEN	CFD 300-NL	Conduction 02 -1	10/11/2022	10/11/2023
Conduction 02	LISN 26	R&S	ENV216	102378	12/08/2022	12/08/2023
Conduction 02	LISN 15	R&S	ENV216	101335	12/08/2022	12/08/2023
Conduction 02	ISN T8 CAT6A_02	SCHWARZ-BECK	NTFM 8158	NTFM 8158-00370	07/07/2023	07/07/2024
Conduction 02	ISN T4 08	TESEQ	ISN T400A	49913	08/31/2022	08/31/2023
Conduction 02	ISN T8 08	Teseq GmbH	ISN T800	36155	10/03/2022	10/03/2023
Conduction 02	CDN ISN ST08A_1	Teseq GmbH	CDN ISN ST08A	43352	10/04/2022	10/04/2023
Conduction 02	Capacitive Voltage Probe 01	SCHAFFNER	CVP 2200A	18711	02/22/2023	02/22/2024
Conduction 02	Current Probe	SCHAFFNER	SMZ 11	18030	02/22/2023	02/22/2024

5.3. EUT Setup:

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10: 2013
2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
3. The LISN was connected with 120Vac/60Hz power source.

5.4. Measurement Procedure:

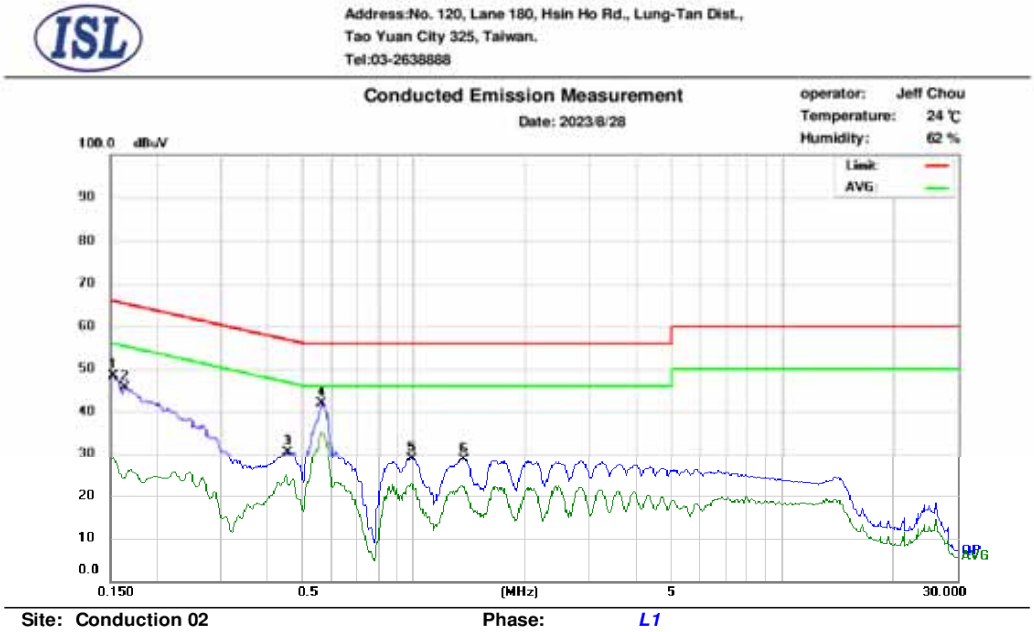
1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.
4. Both 120V & 240V have been verified, and 120V/60Hz was defined as the worst-case and record in the report.

5.5. Measurement Result:

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

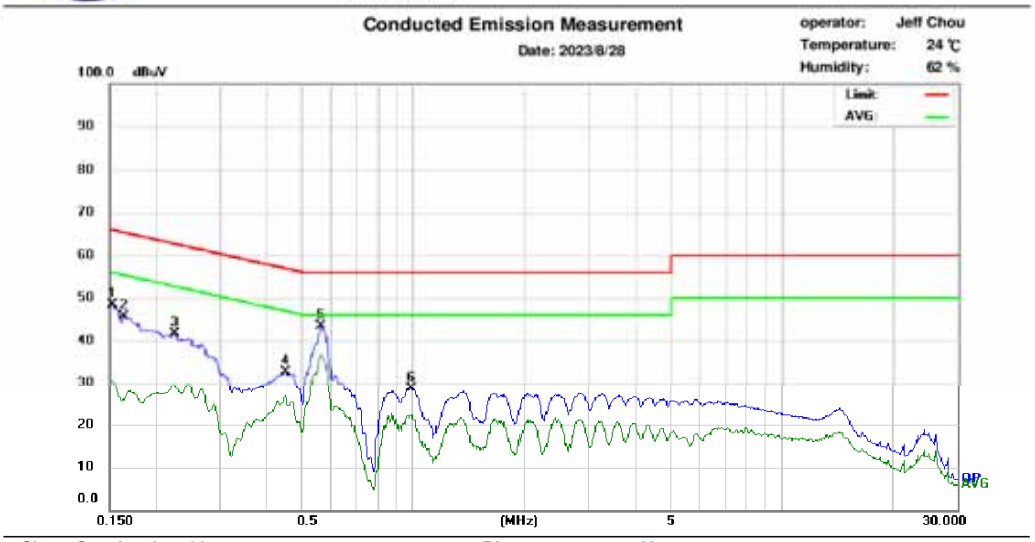
Note: Refer to next page for measurement data and plots.

AC POWER LINE CONDUCTED EMISSION TEST DATA



No.	Frequency (MHz)	QP_R (dBuV)	AVG_R (dBuV)	Correct Factor (dB)	QP Emission (dBuV)	QP Limit (dBuV)	QP Margin (dB)	AVG Emission (dBuV)	AVG Limit (dBuV)	AVG Margin (dB)
1	0.152	38.84	19.56	9.64	48.48	65.88	-17.40	29.20	55.88	-26.68
2	0.164	35.89	14.58	9.64	45.53	65.28	-19.75	24.22	55.28	-31.06
3	0.452	20.72	14.77	9.65	30.37	56.85	-26.48	24.42	46.85	-22.43
4*	0.562	32.29	25.44	9.65	41.94	56.00	-14.06	35.09	46.00	-10.91
5	0.987	19.19	13.10	9.68	28.87	56.00	-27.13	22.78	46.00	-23.22
6	1.372	18.98	12.37	9.69	28.67	56.00	-27.33	22.06	46.00	-23.94

Address:No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist.,
Tao Yuan City 325, Taiwan.
Tel:03-2638888



Site: Conduction 02 Phase: N

No.	Frequency (MHz)	QP_R (dBuV)	AVG_R (dBuV)	Correct Factor (dB)	QP Emission (dBuV)	QP Limit (dBuV)	QP Margin (dB)	AVG Emission (dBuV)	AVG Limit (dBuV)	AVG Margin (dB)
1	0.152	38.81	20.98	9.63	48.44	65.88	-17.44	30.61	55.88	-25.27
2	0.164	35.91	16.20	9.63	45.54	65.28	-19.74	25.83	55.28	-29.45
3	0.224	31.90	19.86	9.64	41.54	62.66	-21.12	29.50	52.66	-23.16
4	0.449	22.90	17.16	9.65	32.55	56.89	-24.34	26.81	46.89	-20.08
5*	0.562	33.74	26.89	9.65	43.39	56.00	-12.61	36.54	46.00	-9.46
6	0.987	18.86	12.80	9.68	28.54	56.00	-27.46	22.48	46.00	-23.52

6. OUTPUT POWER / EIRP /SPECTRAL DENSITY MEASUREMENT

6.1. Standard Applicable

According to §15.407(a) Power limits:

(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. 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 mobile and portable 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.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz. 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 dBiare 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. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. 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.

6.2. Measurement Procedure

For Output Power

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter
3. Record the max. reading.
4. Repeat above procedures until all frequency measured were complete.

For Power Spectral Density

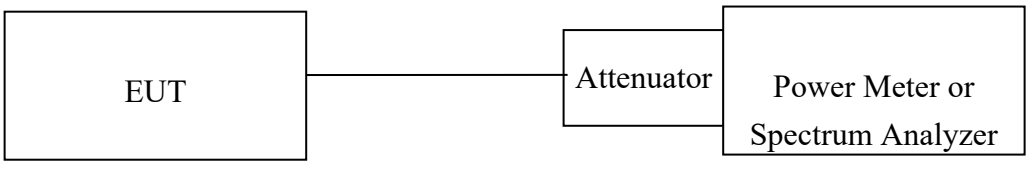
1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to Spectrum.
3. Set RBW=1MHz,VBW=3MHz, Span=50MHz (Base Mode), Sweep time = Auto, traces 100 sweeps of video averaging for 5150-5725MHz;
4. Set RBW=500kHz,VBW=1.5MHz, Span=60MHz (Base Mode), Sweep time = Auto, traces 100 sweeps of video averaging for 5725-5850MHz;
5. Record the max. reading.
6. Repeat above procedures until all frequency measured were complete.

Refer to KDB 789033 D02 General UNII Test Procedures New Rules v02r01

6.3. Measurement Equipment Used:

Location Conducted	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Conducted	Power Meter	Anritsu	ML2495A	1116010	09/29/2022	09/29/2023
Conducted	Power Sensor	Anritsu	MA2411B	34NKF50	09/29/2022	09/29/2023
Conducted	Power Sensor	DARE	RPR3006W	13I00030SNO33	01/06/2023	01/06/2024
Conducted	Power Sensor	DARE	RPR3006W	13I00030SNO34	01/06/2023	01/06/2024
Conducted	Power Sensor	DARE	RPR3006W	14I00889SNO35	06/21/2023	06/21/2024
Conducted	Power Sensor	DARE	RPR3006W	14I00889SNO36	06/21/2023	06/21/2024
Conducted	Temperature Chamber	KSON	THS-B4H100	2287	05/17/2023	05/17/2024
Conducted	DC Power supply	ABM	8185D	N/A	01/04/2023	01/04/2024
Conducted	AC Power supply	EXTECH	CFC105W	NA	N/A	N/A
Conducted	Spectrum analyzer	Keysight	N9010A	MY56070257	09/28/2022	09/28/2023
Conducted	Test Software	DARE	Radiation Ver:2013.1.23	NA	NA	NA
Conducted	Test Software	R&S	CMUGO Ver:2.0.0	N/A	N/A	N/A
Conducted	Universal Radio Comm. Tester	R&S	CMU200	111968	11/19/2022	11/19/2023
Conducted	Wideband Radio Comm. Tester	R&S	CMW500	1201.002K50108793-JG	10/31/2022	10/31/2023
Conducted	BT Simulator	Agilent	N4010A	MY48100200	NA	NA
Conducted	Signal Generator	Agilent	E4438C	MY49071550	12/28/2022	12/28/2023
Conducted	Signal Generator	Keysight	N5182B	MY53052399	12/28/2022	12/28/2023
Conducted	Spectrum analyzer	Keysight	N9010A	MY56070257	09/28/2022	09/28/2023
Conducted (TS8997)	Wideband Radio Comm. Tester	R&S	CMW500	168811	09/22/2022	09/22/2023
Conducted (TS8997)	UP/DOWN converter	R&S	CMW-Z800A	100566	12/22/2022	12/22/2023
Conducted (TS8997)	Signal Generator	R&S	SMB100A	183701	01/18/2023	01/18/2024
Conducted (TS8997)	Vector Signal Generator	R&S	SMM100A	101908	11/23/2022	11/23/2023
Conducted (TS8997)	Signal analyzer 40GHz	R&S	FSV40	101884	09/22/2022	09/22/2023
Conducted (TS8997)	OSP150 extension unit CAM-BUS	R&S	OSP150	101107	09/21/2022	09/21/2023
Conducted (TS8997)	Test Software	R&S	EMC32 Ver: 11.60.00	NA	NA	NA

6.4. Measurement Equipment Used:



6.5. Measurement Result

According to §15.407(a)

(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.

Band	Mode	Freq. (MHz)	Output Power (dBm)		Duty Factor (dB)	Total Output Power (dBm)	Output Power Limit (dBm)	Total Output Power (W)	Output Power Limit (W)
			Chain 0	Chain 1					
UNII-1	11a	5180	13.760	13.710	0.23	16.97	23.98	0.05	0.25
		5200	13.730	13.240	0.23	16.73	23.98	0.05	0.25
		5240	13.690	13.720	0.23	16.94	23.98	0.05	0.25
	HT20	5180	13.530	12.150	0.25	16.15	23.98	0.04	0.25
		5200	13.970	12.970	0.25	16.76	23.98	0.05	0.25
		5240	13.030	12.830	0.25	16.19	23.98	0.04	0.25
	HT40	5190	13.240	11.890	0.59	16.21	23.98	0.04	0.25
		5230	13.140	12.250	0.59	16.31	23.98	0.04	0.25
	VHT20	5180	13.590	12.640	0.23	16.38	23.98	0.04	0.25
		5200	13.930	13.050	0.23	16.75	23.98	0.05	0.25
		5240	13.420	12.650	0.23	16.29	23.98	0.04	0.25
	VHT40	5190	13.340	12.120	0.61	16.40	23.98	0.04	0.25
		5230	13.210	12.630	0.61	16.55	23.98	0.05	0.25
	VHT80	5210	12.450	11.950	0.87	16.08	23.98	0.04	0.25

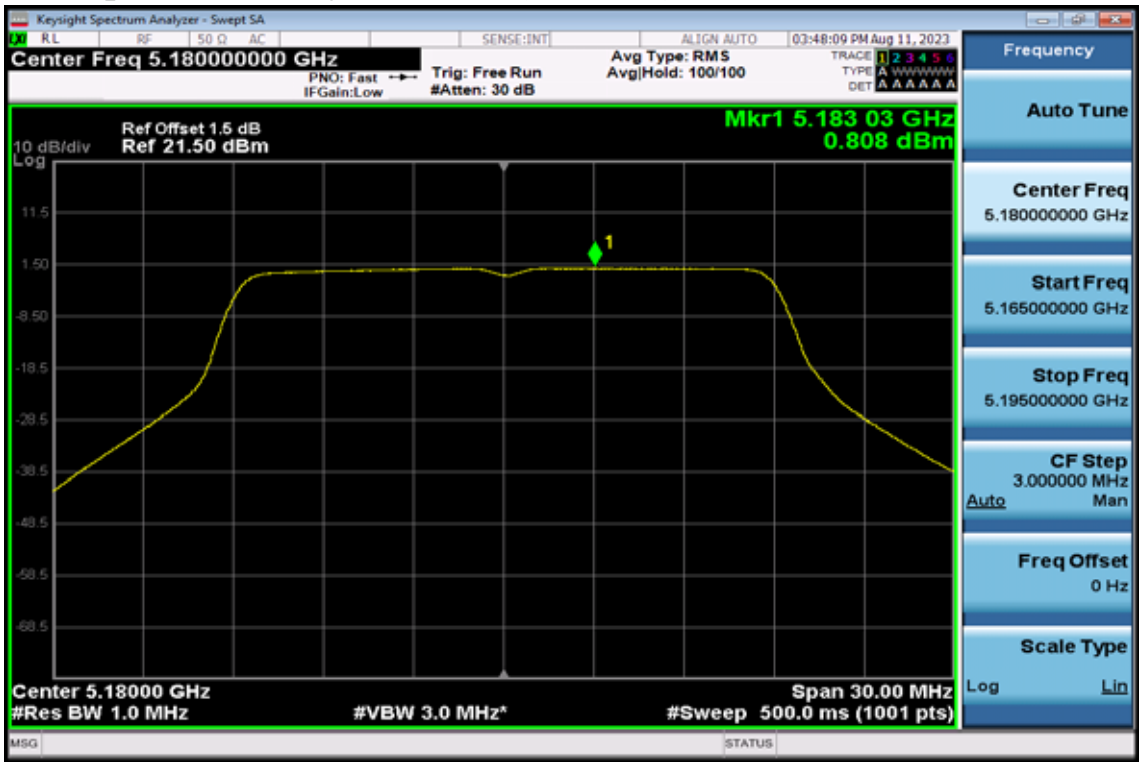
Band	Mode	Freq. (MHz)	Output Power (dBm)		Duty Factor (dB)	Total Output Power (dBm)	Output Power Limit (dBm)	Total Output Power (W)	Output Power Limit (W)
			Chain 0	Chain 1					
UNII-3	11a	5745	24.840	23.170	0.23	27.32	30.00	0.54	1.00
		5785	24.350	23.890	0.23	27.36	30.00	0.54	1.00
		5825	24.210	23.610	0.23	27.16	30.00	0.52	1.00
	HT20	5745	24.490	23.450	0.25	27.26	30.00	0.53	1.00
		5785	24.170	23.310	0.25	27.02	30.00	0.50	1.00
		5825	23.750	23.260	0.25	26.77	30.00	0.48	1.00
	HT40	5755	24.960	24.280	0.59	28.23	30.00	0.67	1.00
		5795	24.060	23.440	0.59	27.36	30.00	0.54	1.00
	VHT20	5745	24.450	23.110	0.23	27.07	30.00	0.51	1.00
		5785	23.820	23.050	0.23	26.69	30.00	0.47	1.00
		5825	24.530	23.160	0.23	27.14	30.00	0.52	1.00
	VHT40	5755	24.980	23.350	0.61	27.87	30.00	0.61	1.00
		5795	24.220	23.760	0.61	27.62	30.00	0.58	1.00
	VHT80	5775	20.210	19.560	0.87	23.77	30.00	0.24	1.00

Power Spectral Density Measurement:

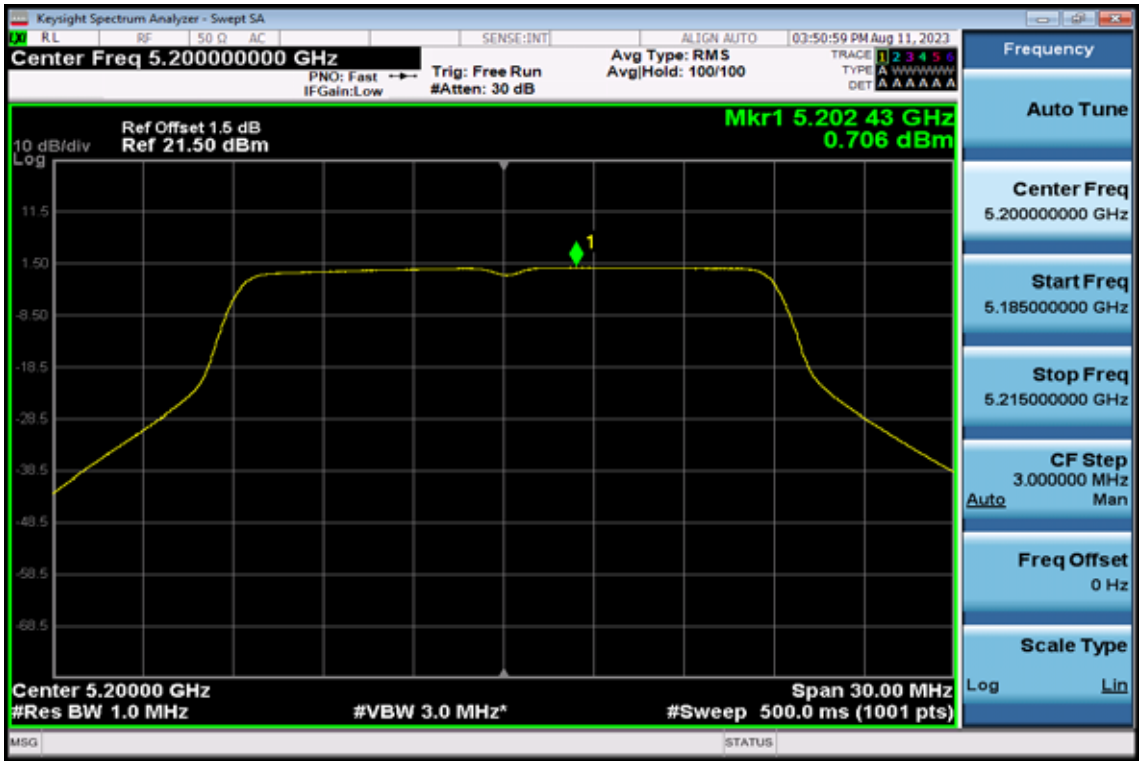
Band	Mode	Frequency (MHz)	PSD (dBm/MHz)				Duty Factor (dB)	Total PSD (dBm/MHz)	PSD Limit (dBm/MHz)
			Chain 0	Chain 1	Chain 2	Chain 3			
UNII-1	11a	5180	0.808	0.139			0.23	3.72	11.00
		5200	0.706	0.423			0.23	3.80	11.00
		5240	0.654	0.854			0.23	3.99	11.00
	HT20	5180	-0.150	-0.788			0.25	2.80	11.00
		5200	0.711	0.408			0.25	3.82	11.00
		5240	-0.290	-0.021			0.25	3.10	11.00
	HT40	5190	-3.046	-4.059			0.59	0.07	11.00
		5230	-3.273	-3.687			0.59	0.12	11.00
	VHT20	5180	-0.094	-0.862			0.23	2.78	11.00
		5200	0.700	0.291			0.23	3.74	11.00
		5240	-0.262	-0.082			0.23	3.07	11.00
	VHT40	5190	-3.064	-3.966			0.61	0.13	11.00
		5230	-3.311	-3.618			0.61	0.16	11.00
	VHT80	5210	-8.231	-8.570			0.87	-4.52	11.00

Band	Mode	Frequency (MHz)	PSD (dBm/500kHz)				Duty Factor (dB)	Total PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)
			Chain 0	Chain 1	Chain 2	Chain 3			
UNII-3	11a	5745	3.706	7.029			0.23	8.91	30
		5785	3.040	7.007			0.23	8.70	30
		5825	3.240	6.995			0.23	8.75	30
	HT20	5745	3.359	7.024			0.25	8.82	30
		5785	3.126	6.999			0.25	8.74	30
		5825	3.270	6.954			0.25	8.75	30
	HT40	5755	0.805	4.295			0.59	6.49	30
		5795	0.365	4.414			0.59	6.44	30
	VHT20	5745	3.331	6.931			0.23	8.73	30
		5785	3.162	6.721			0.23	8.53	30
		5825	3.228	5.065			0.23	7.48	30
	VHT40	5755	0.890	4.391			0.61	6.61	30
		5795	0.488	4.392			0.61	6.49	30
	VHT80	5775	-6.077	-2.565			0.87	-0.10	30

Band UNII-1, Ant 1
802.11a
Power Spectral Density Data Plot (CH Low)



Power Spectral Density Data Plot (CH Mid)

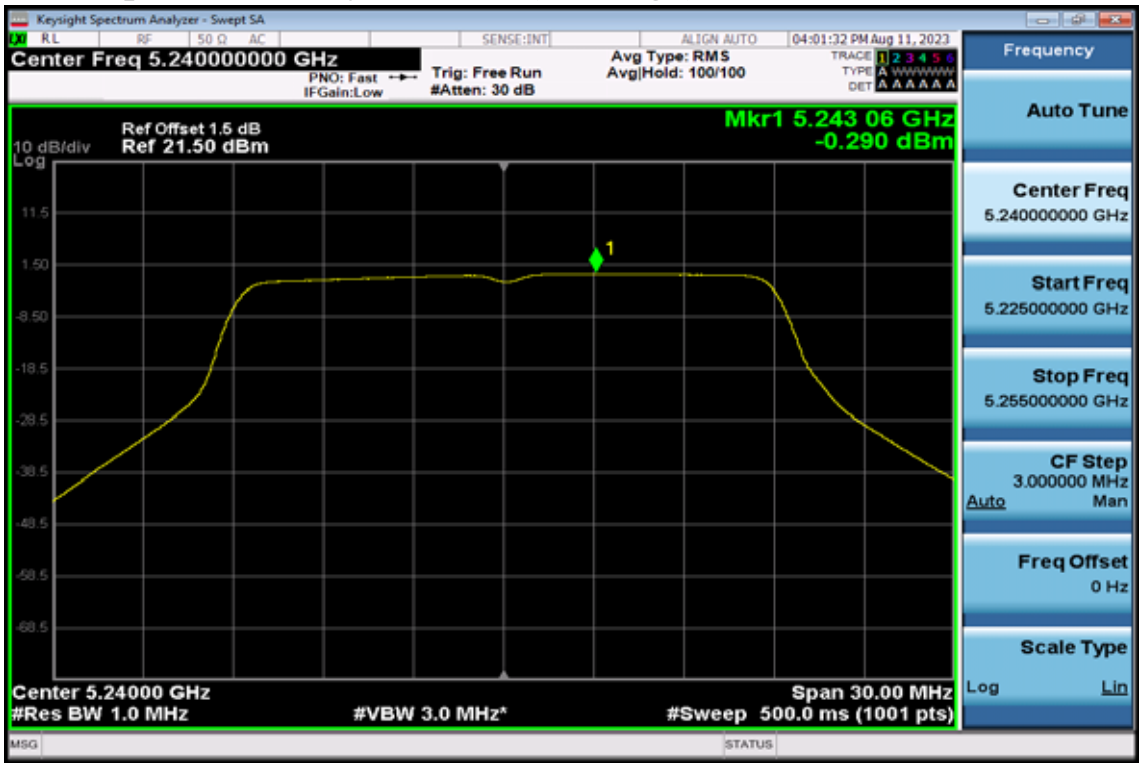


Power Spectral Density Data Plot (CH High)

802.11n HT20,
Power Spectral Density Test Plot (CH-Low)

Power Spectral Density Test Plot (CH-Mid)

Power Spectral Density Test Plot (CH-High)

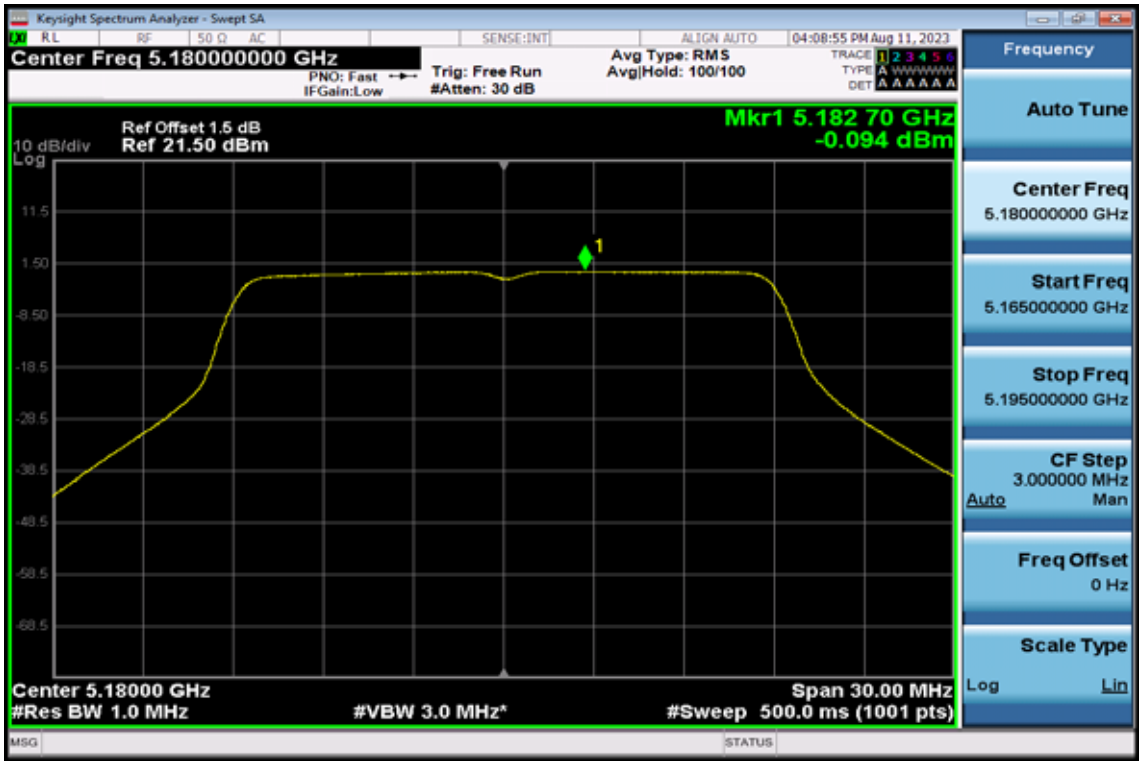


802.11n HT40

Power Spectral Density Test Plot (CH-Low)

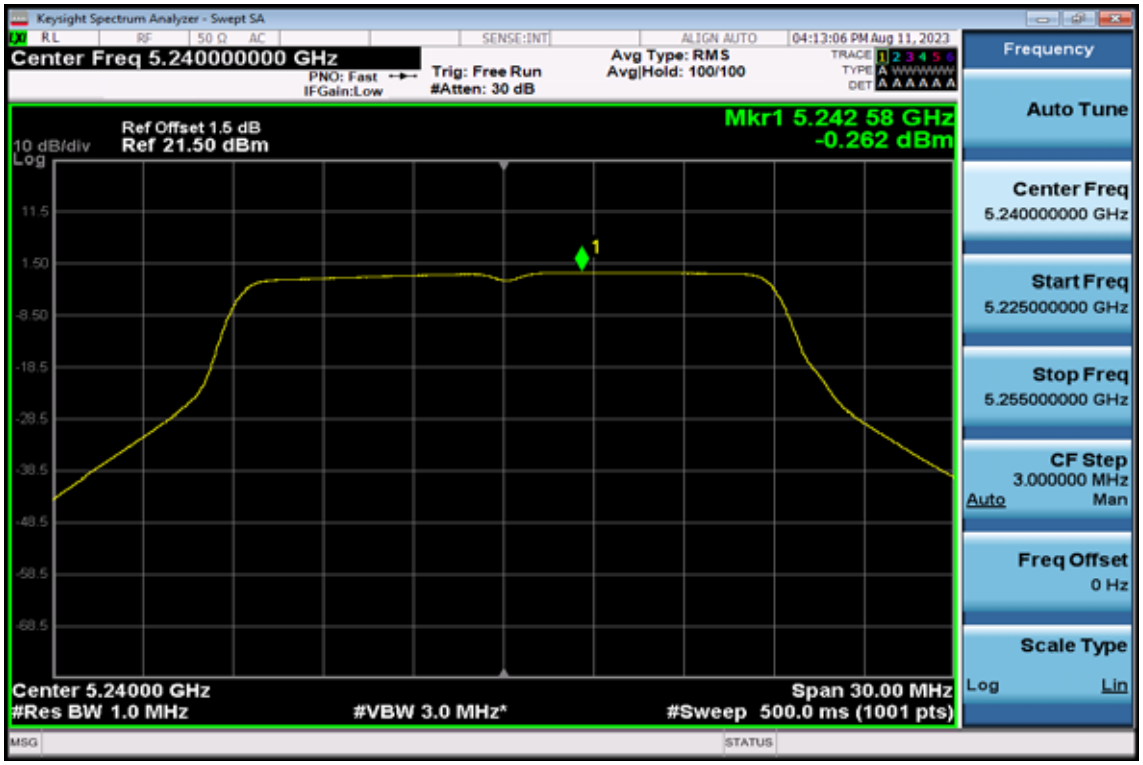
Power Spectral Density Test Plot (CH-High)

802.11ac VHT20,
Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)

Power Spectral Density Test Plot (CH-High)



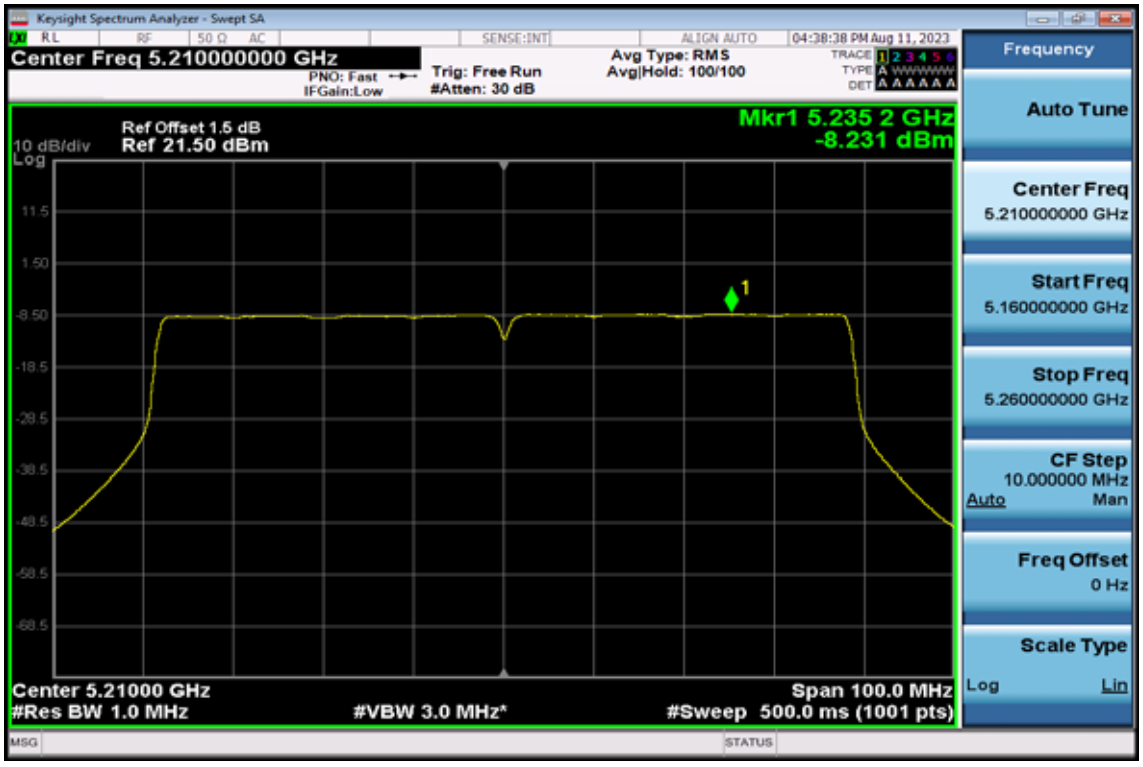
802.11ac VHT40

Power Spectral Density Test Plot (CH-Low)

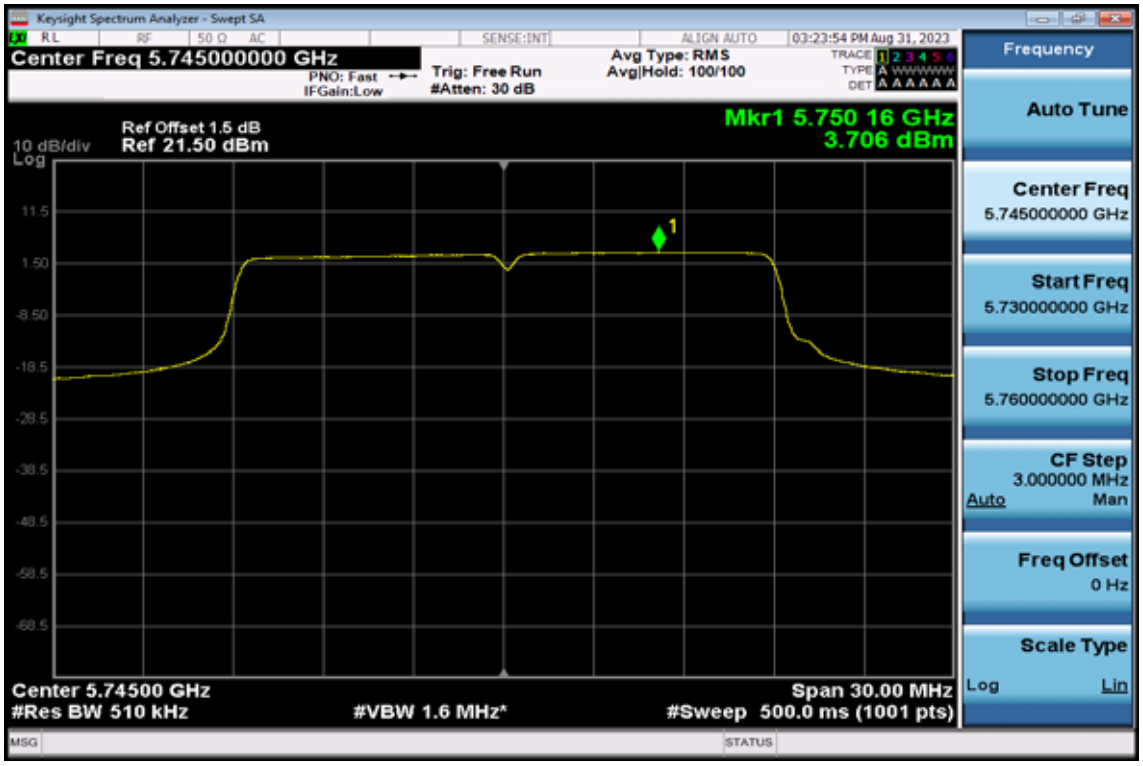
Power Spectral Density Test Plot (CH-High)

802.11 ac VHT80

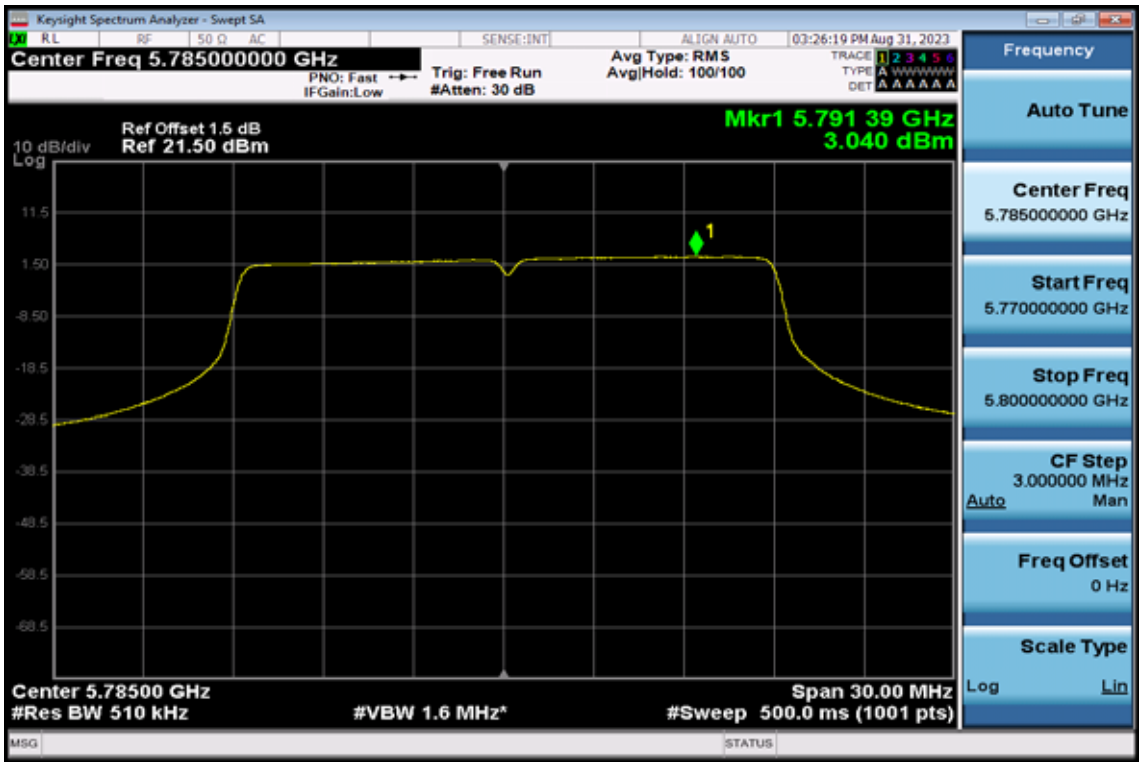
Power Spectral Density Test Plot (CH-Low)



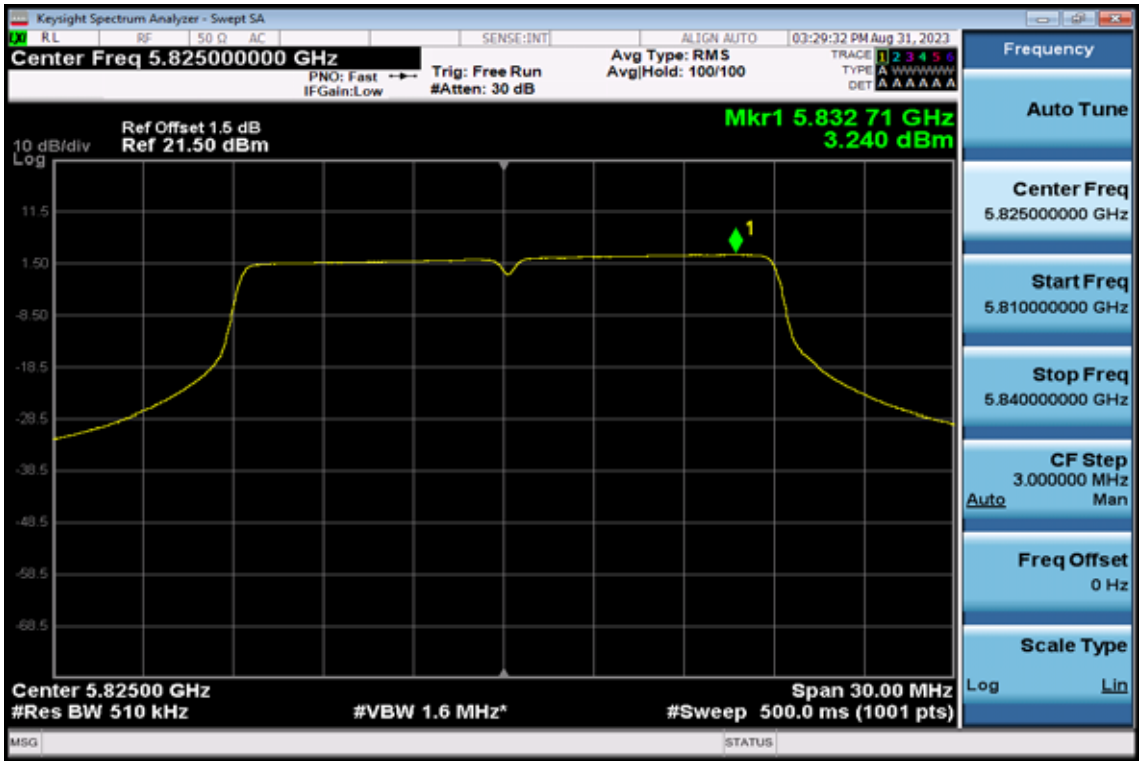
Band UNII-3, Ant 1
802.11a
Power Spectral Density Data Plot (CH Low)



Power Spectral Density Data Plot (CH Mid)

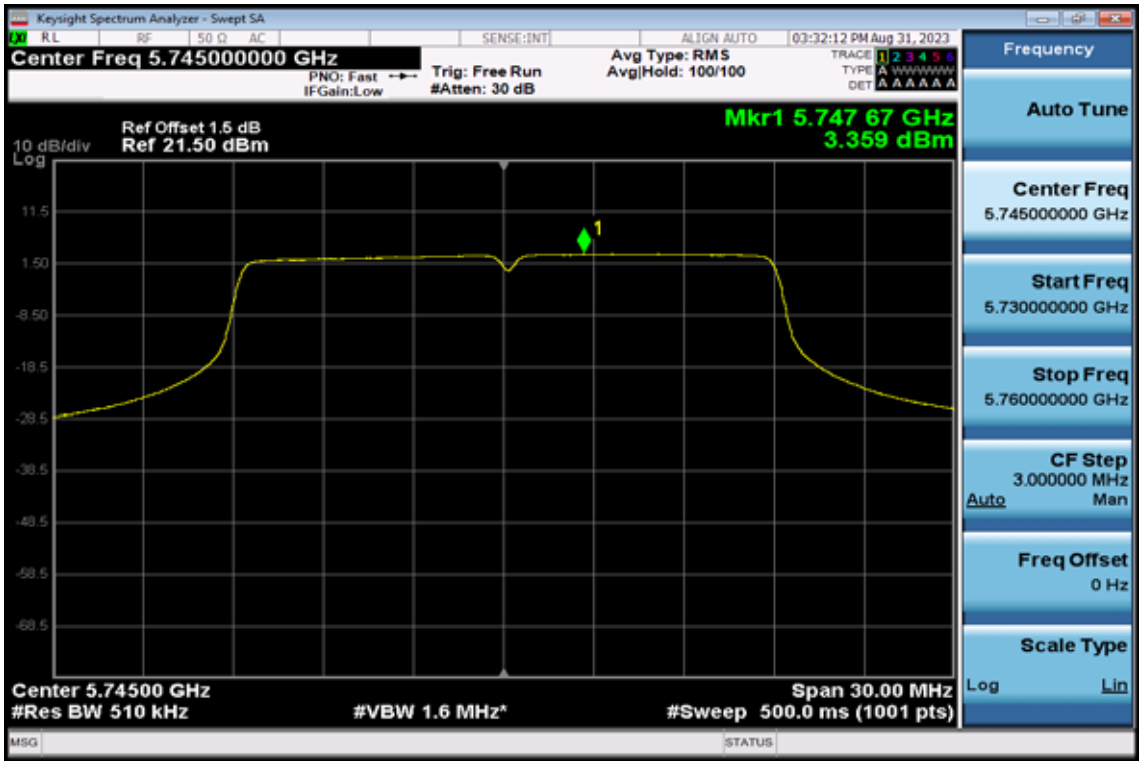


Power Spectral Density Data Plot (CH High)

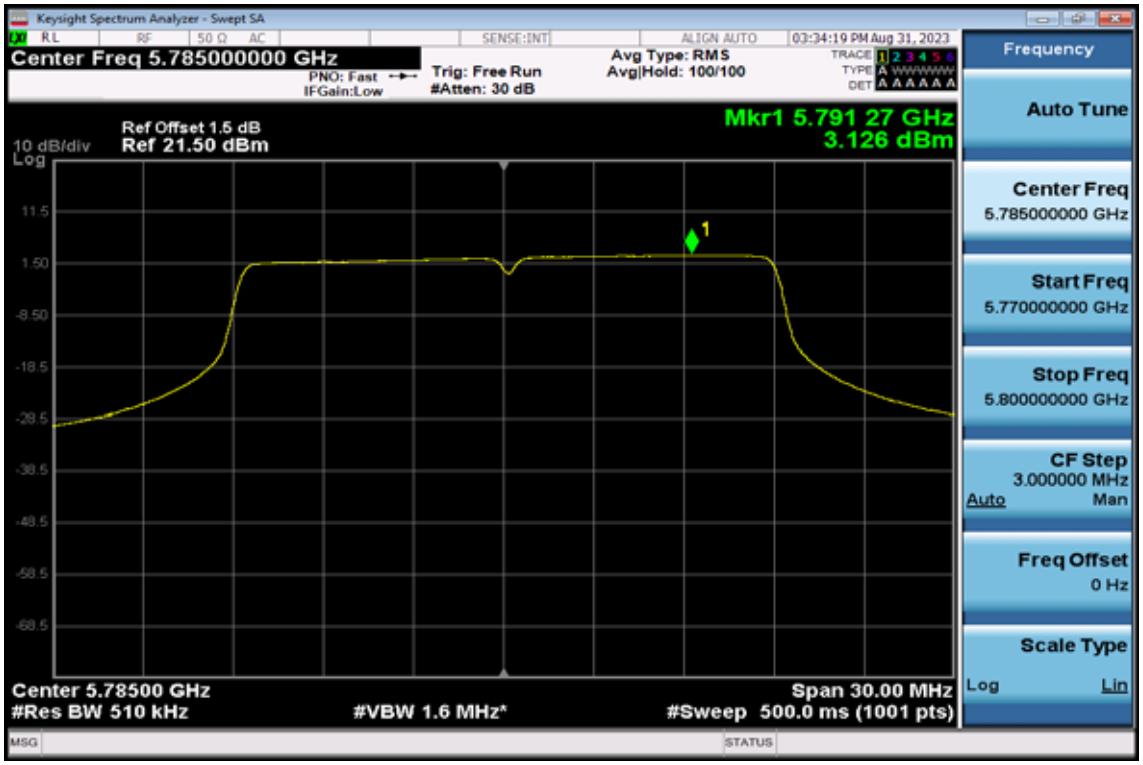


802.11n HT20

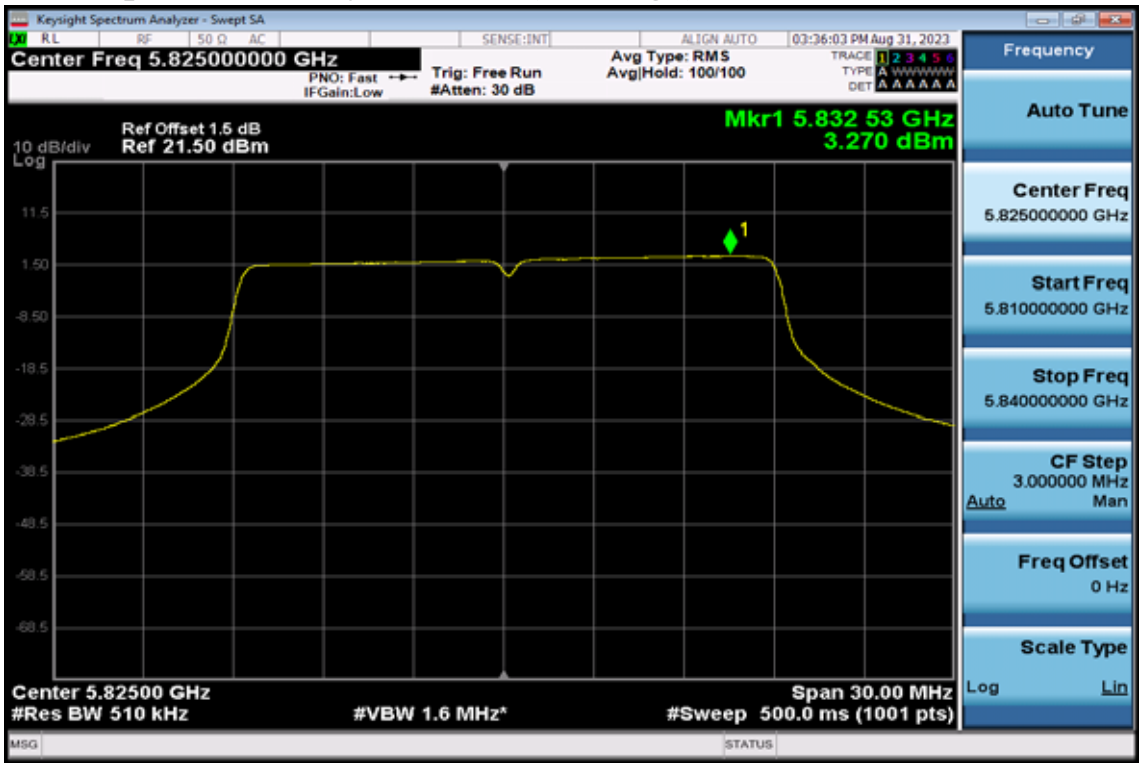
Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)

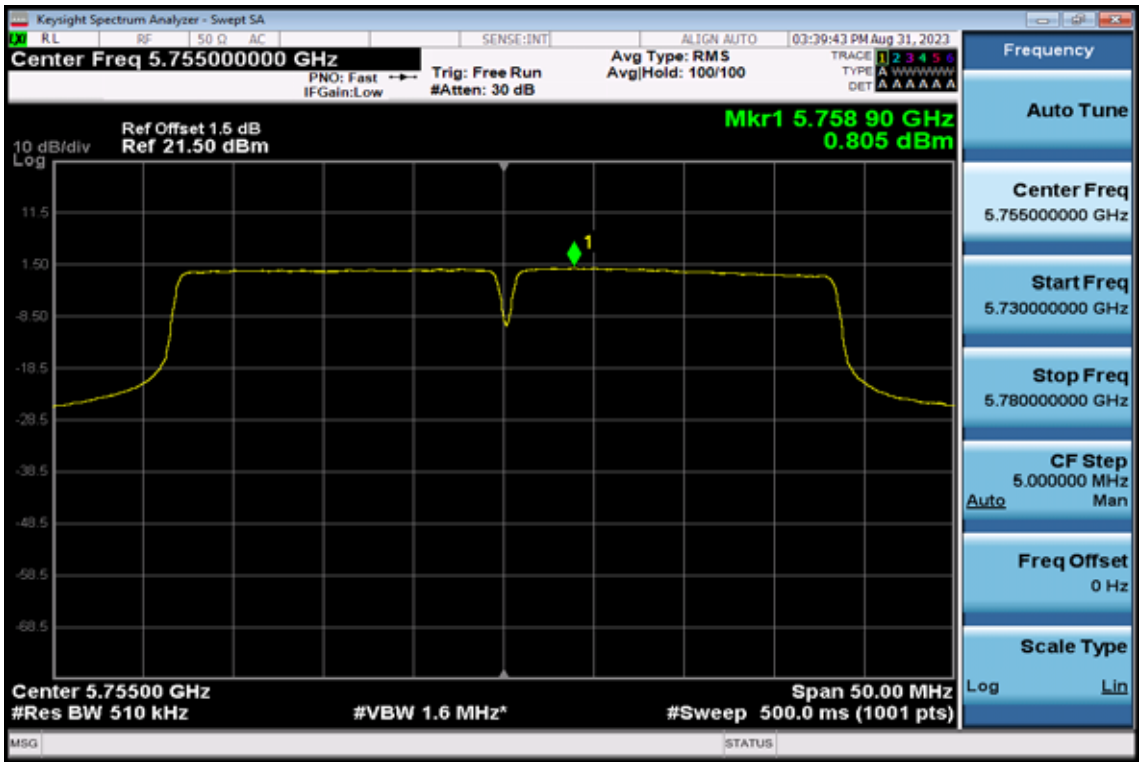


Power Spectral Density Test Plot (CH-High)

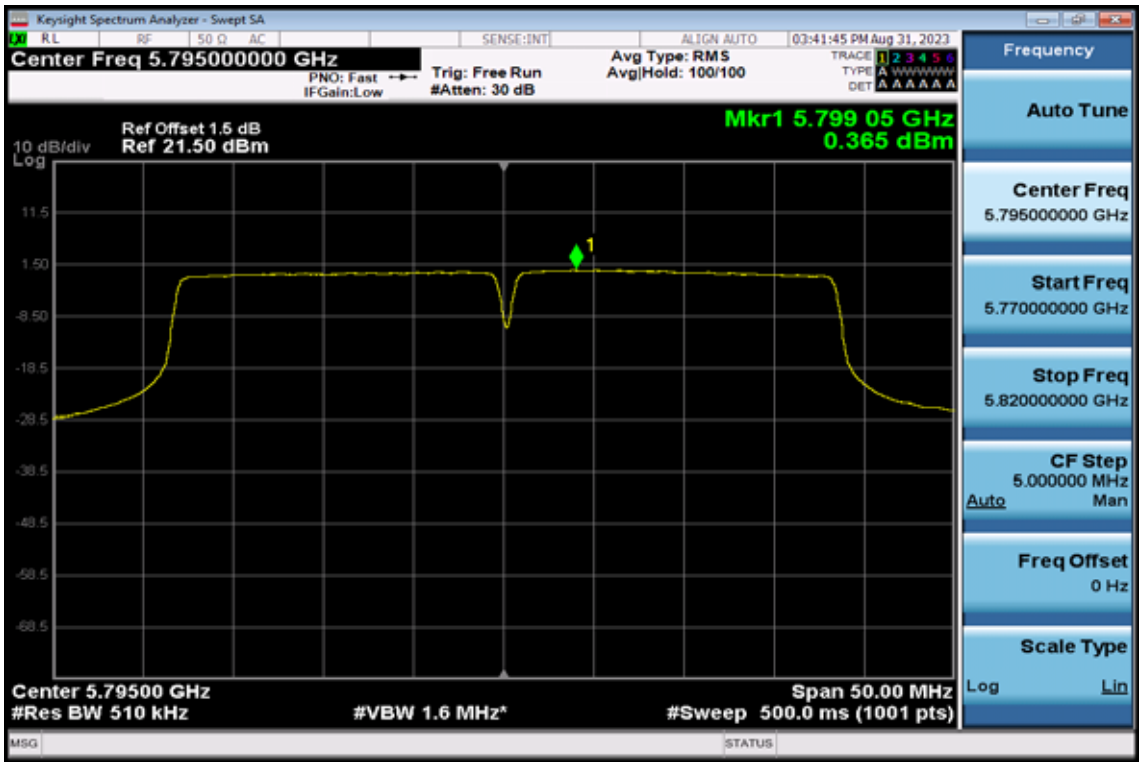


802.11n HT40

Power Spectral Density Test Plot (CH-Low)

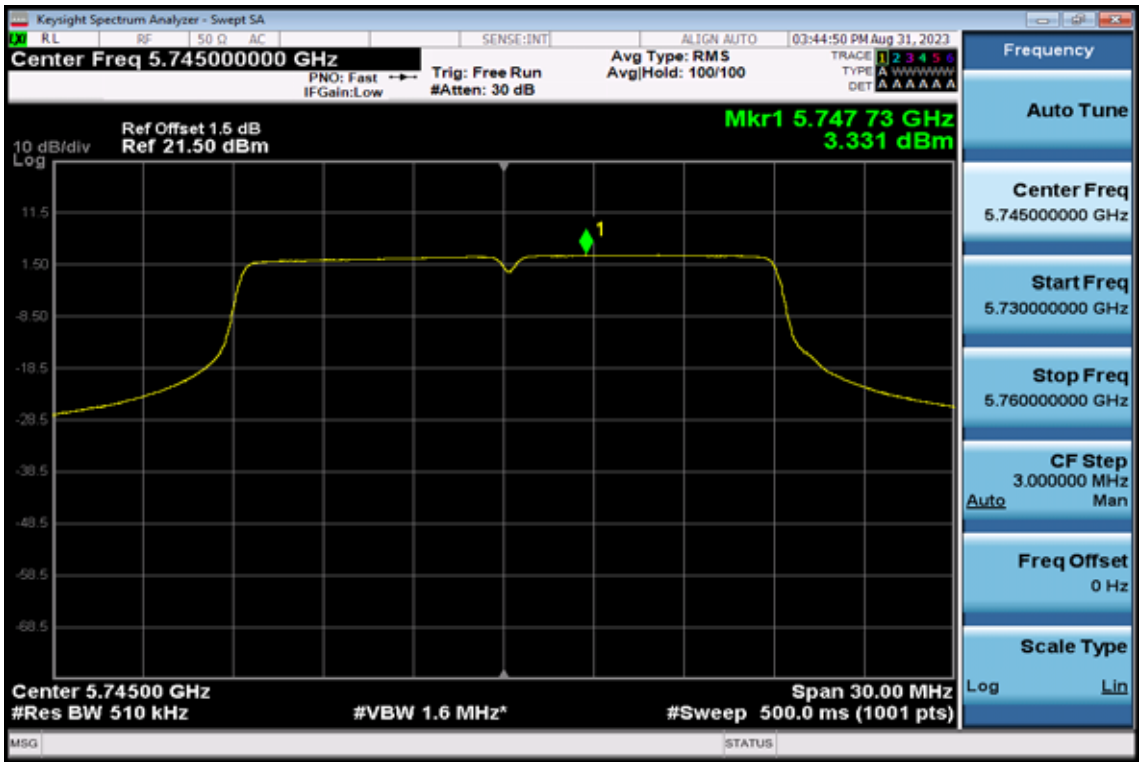


Power Spectral Density Test Plot (CH-High)

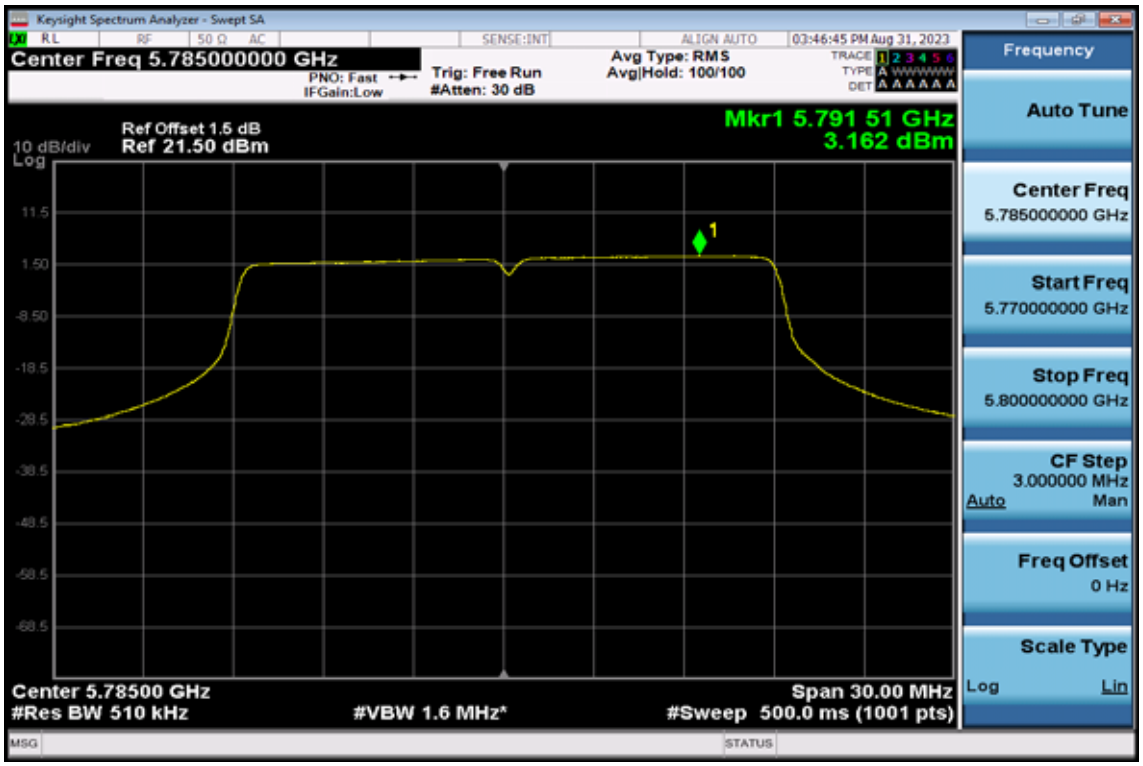


802.11ac VHT20

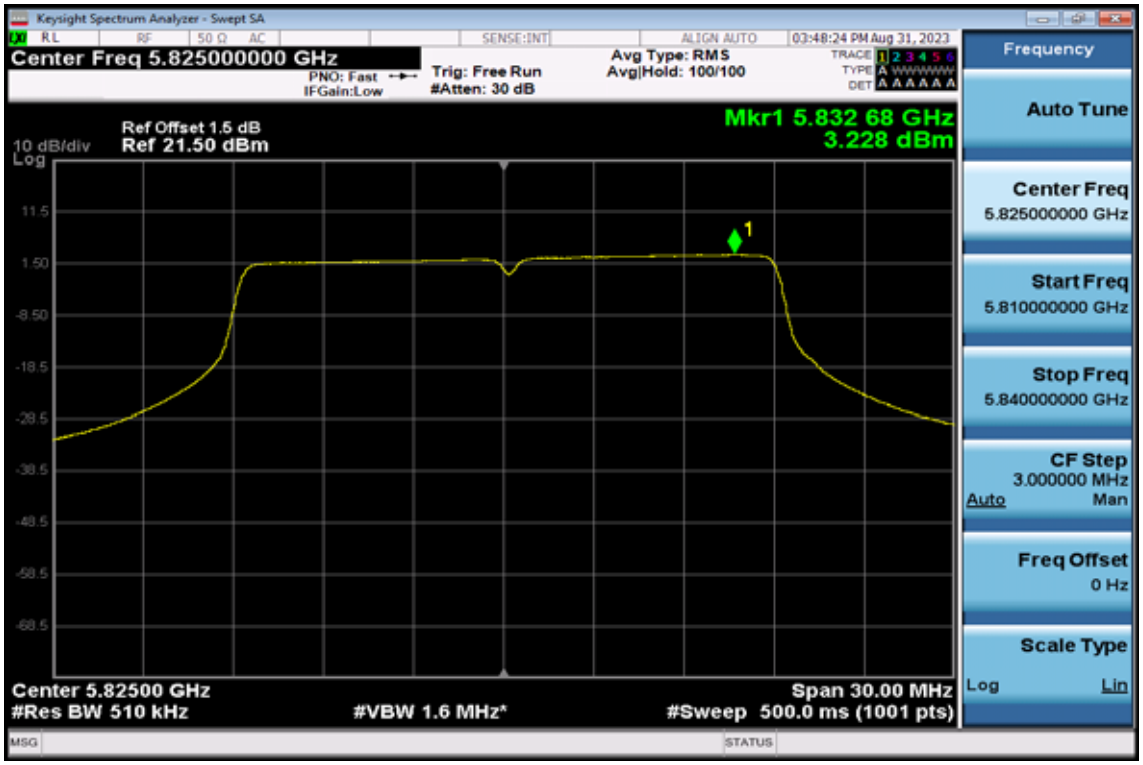
Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)

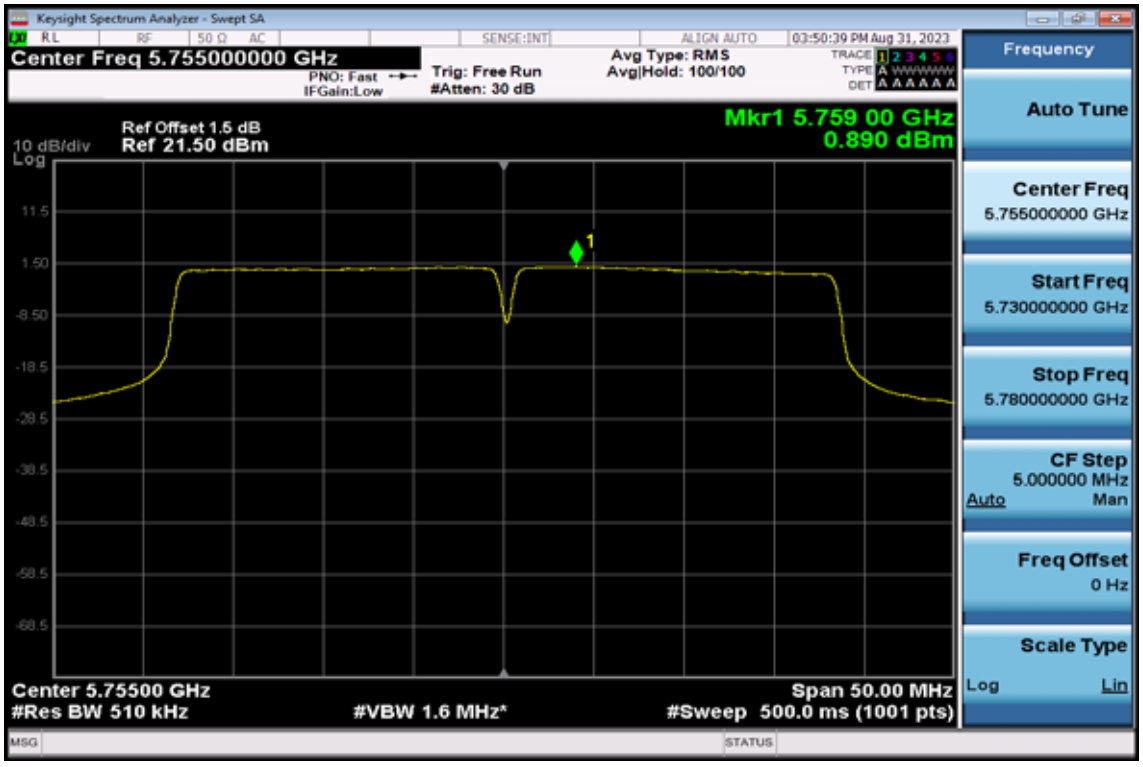


Power Spectral Density Test Plot (CH-High)

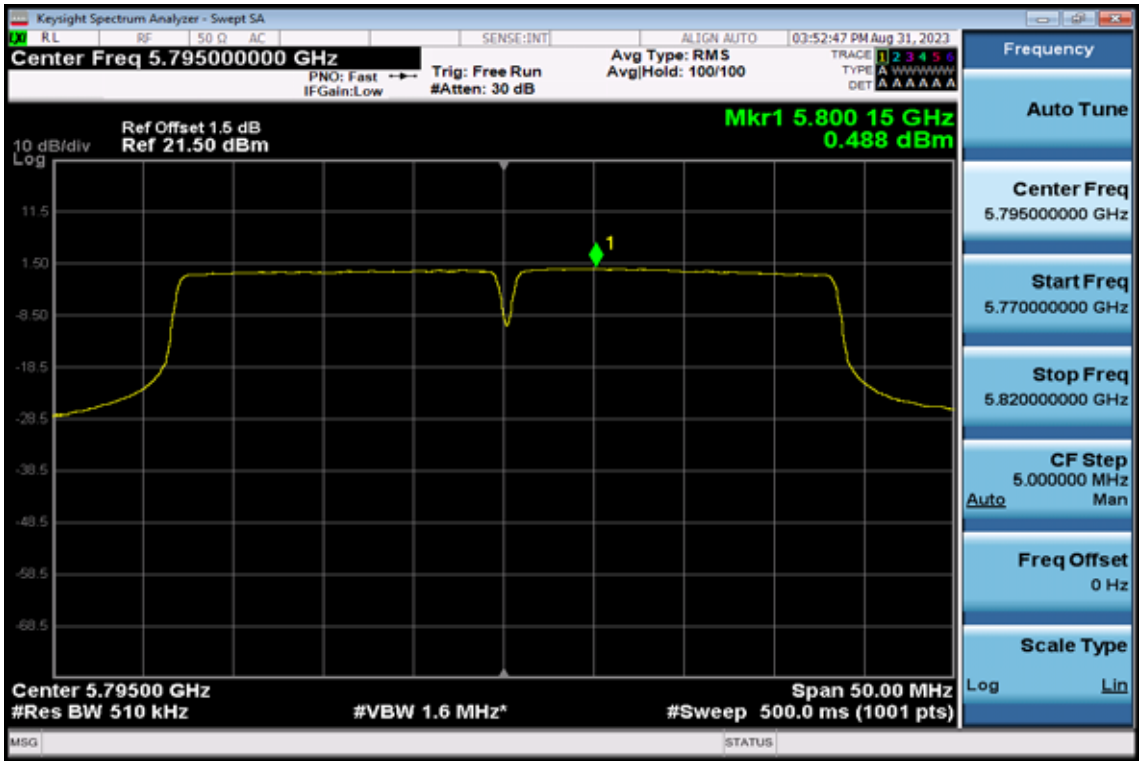


802.11ac VHT40

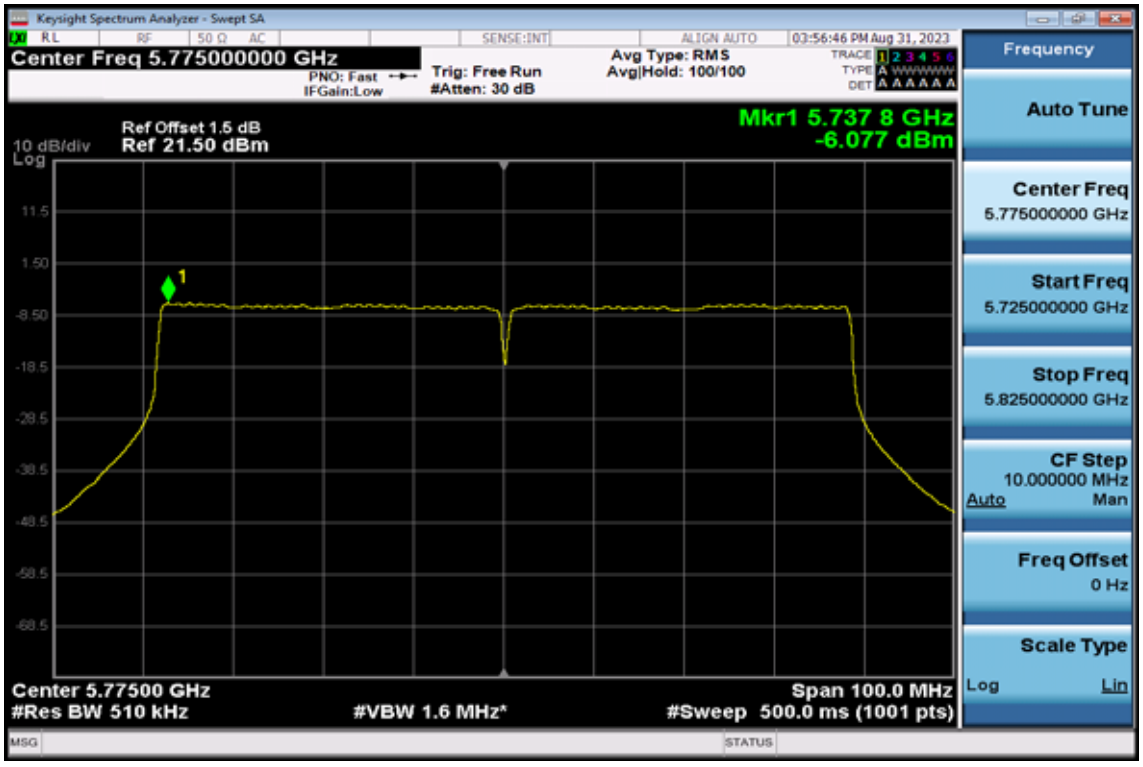
Power Spectral Density Test Plot (CH-Low)



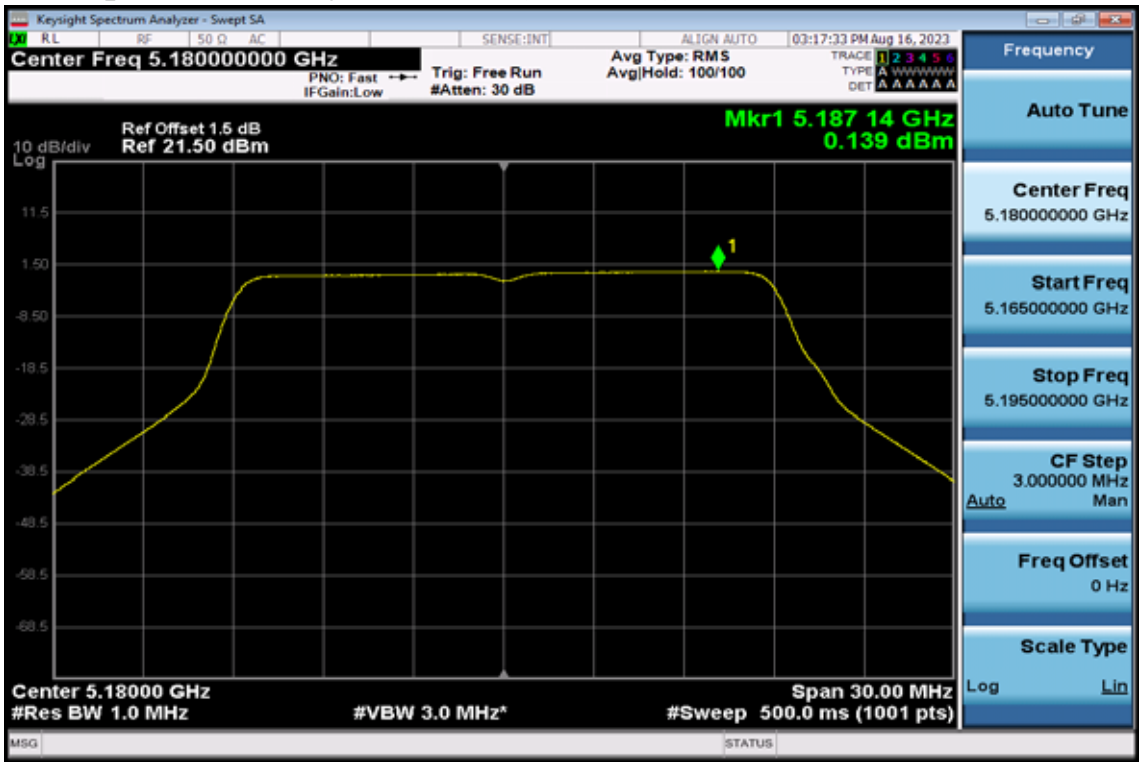
Power Spectral Density Test Plot (CH-High)



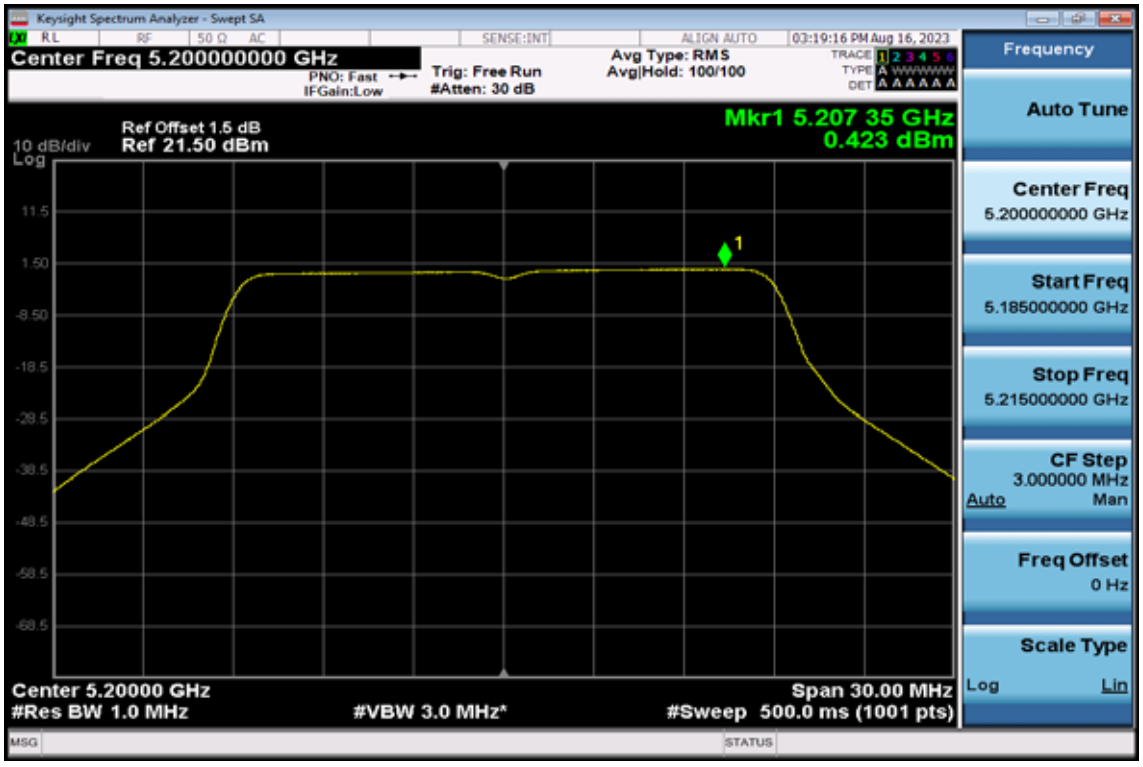
802.11 ac VHT80,
Power Spectral Density Test Plot



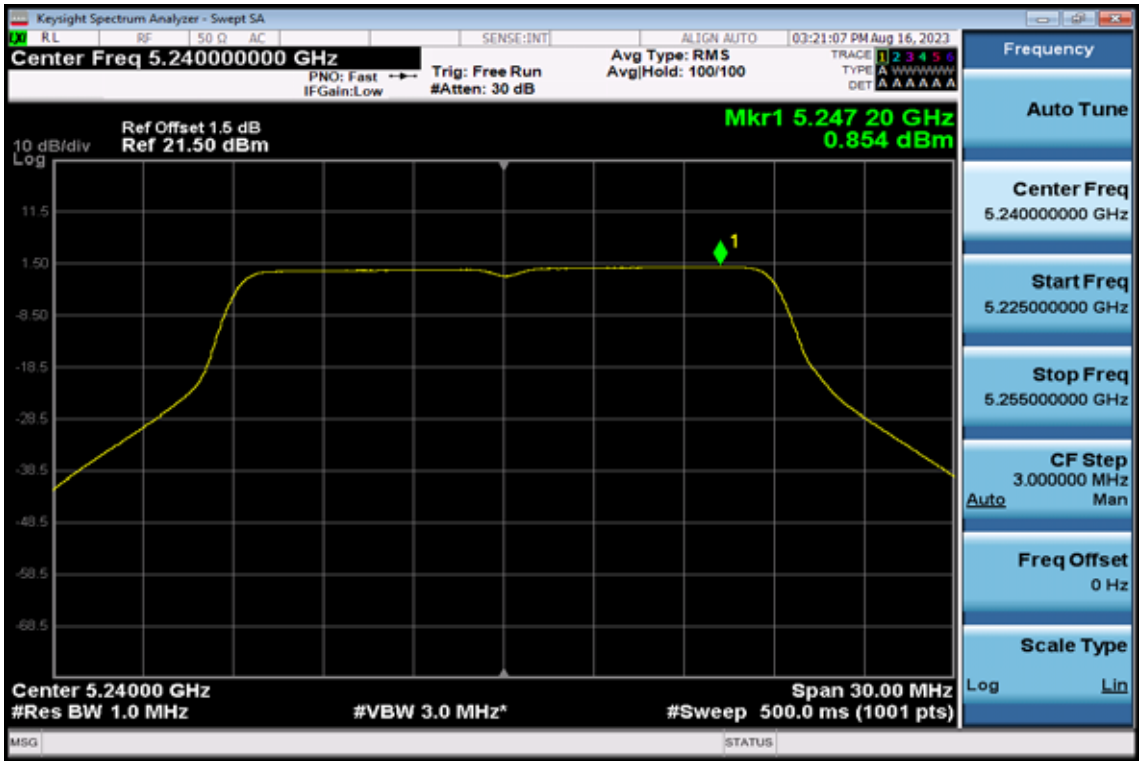
Band UNII-1, Ant 2
802.11a
Power Spectral Density Data Plot (CH Low)



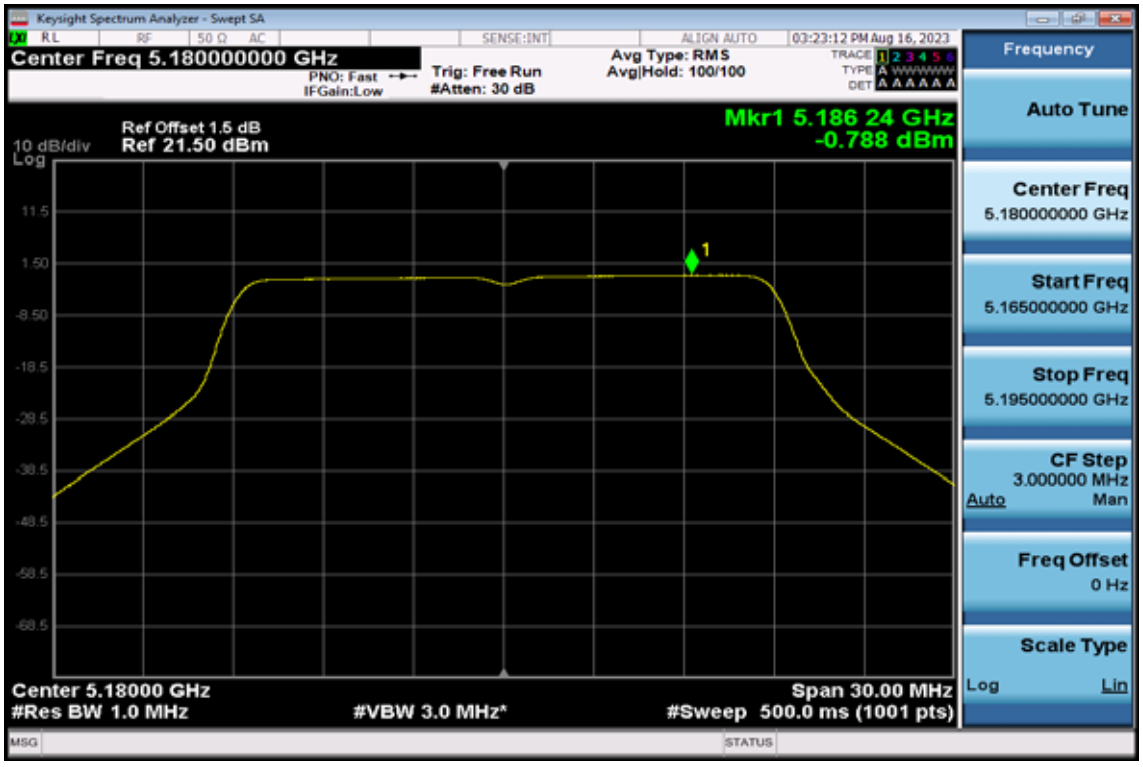
Power Spectral Density Data Plot (CH Mid)



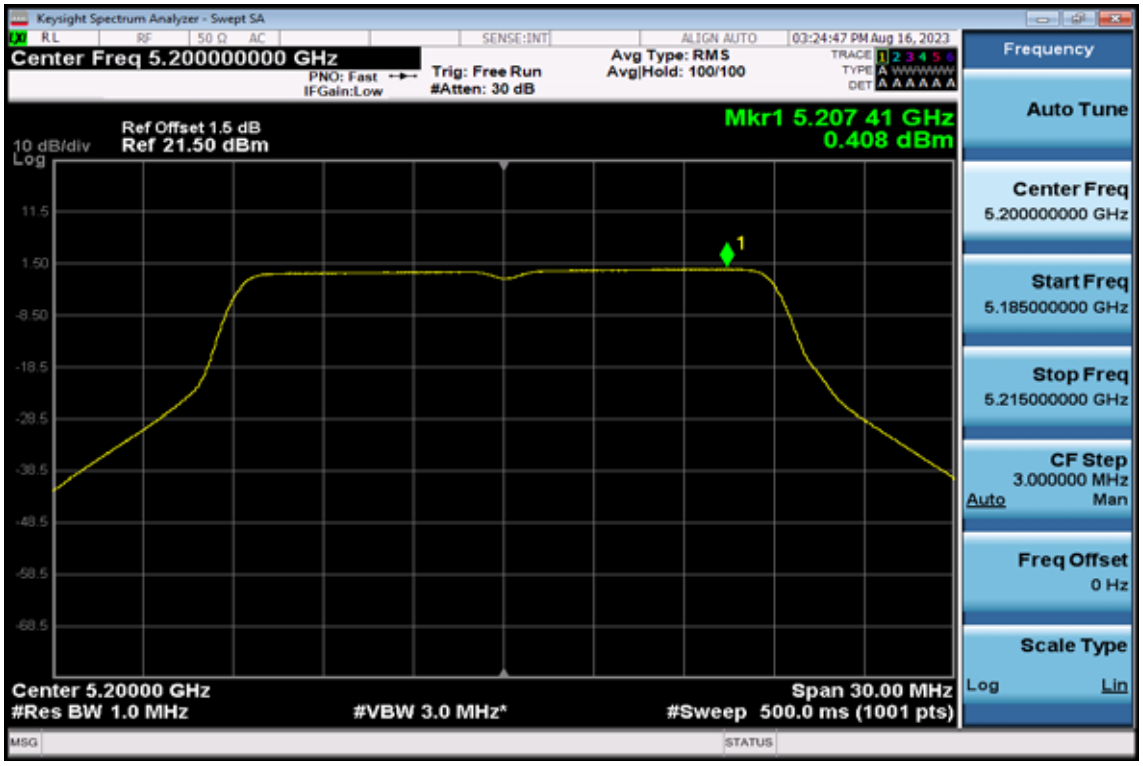
Power Spectral Density Data Plot (CH High)



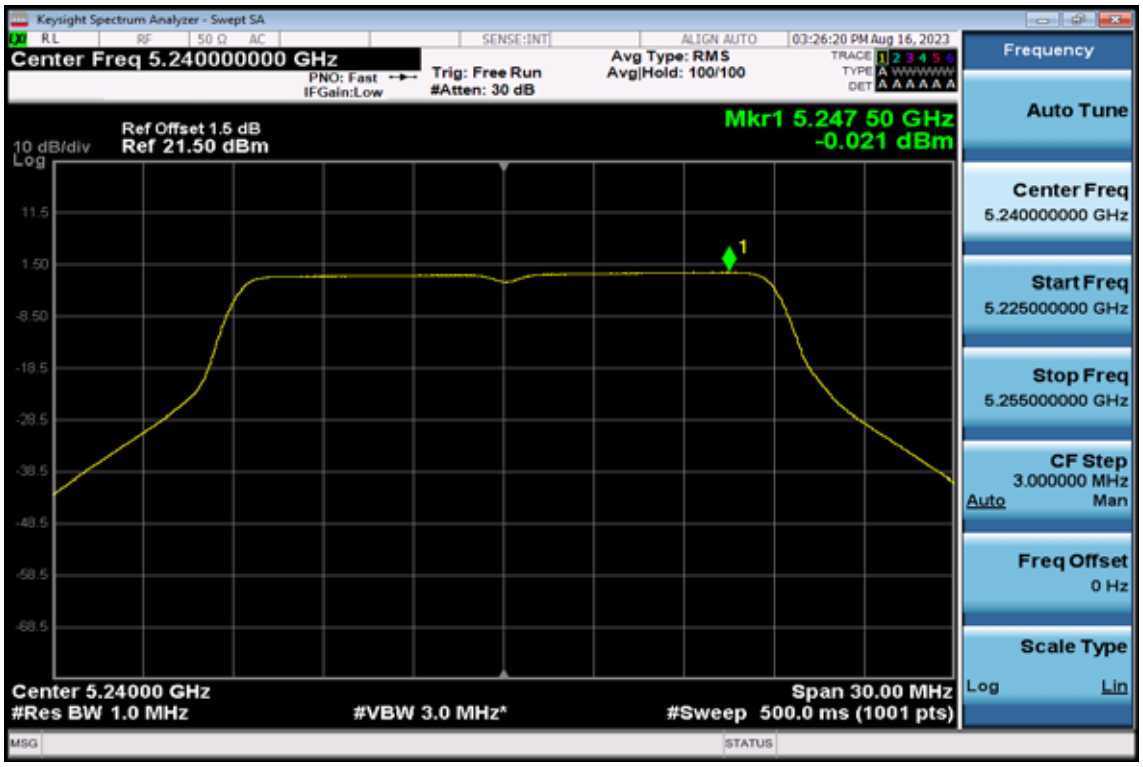
802.11n HT20,
Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)

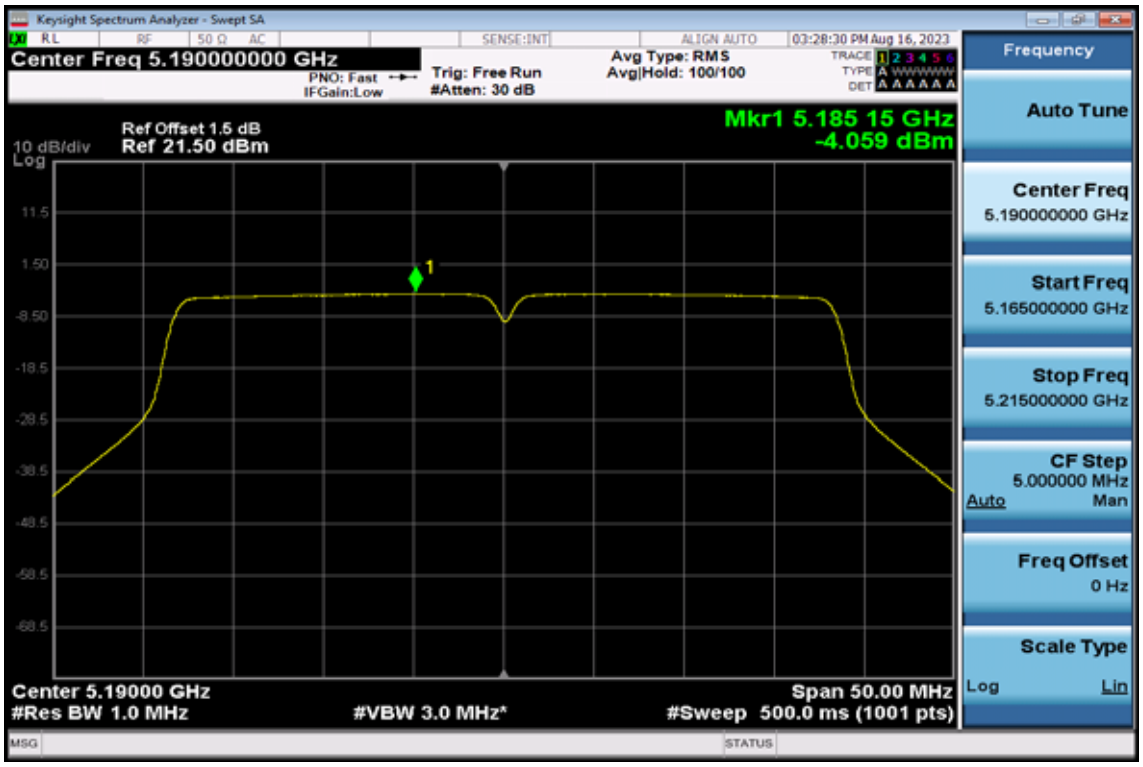


Power Spectral Density Test Plot (CH-High)



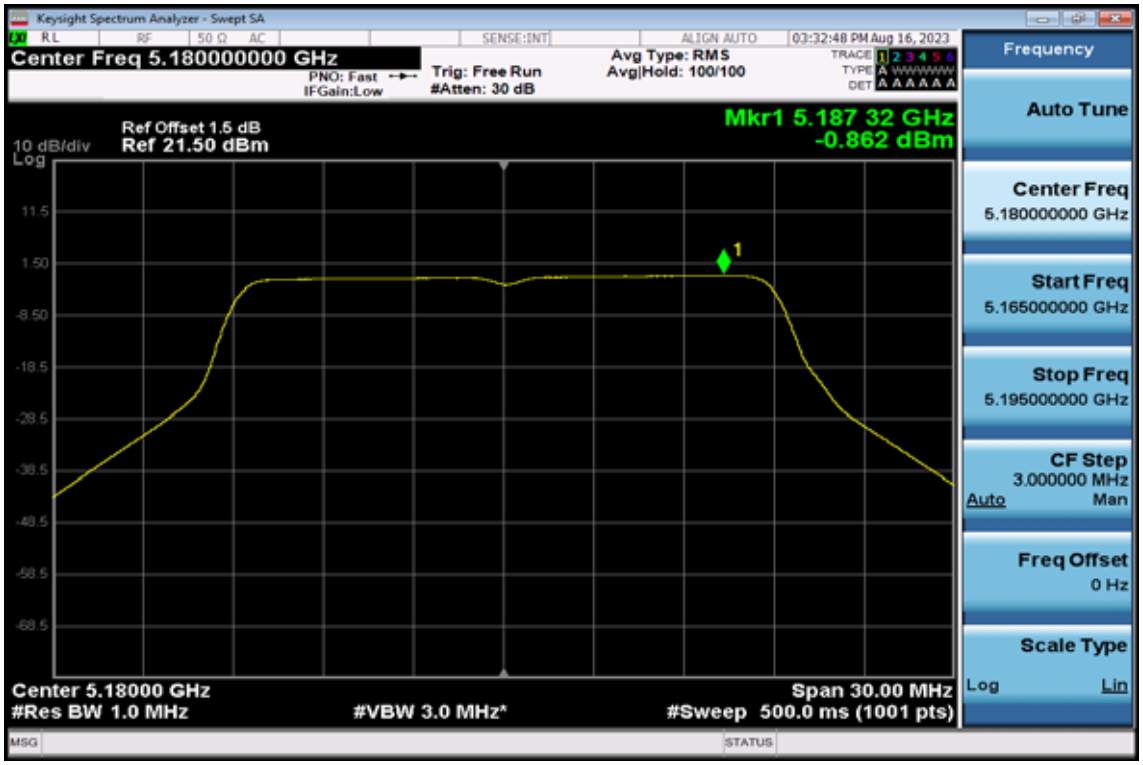
802.11n HT40

Power Spectral Density Test Plot (CH-Low)

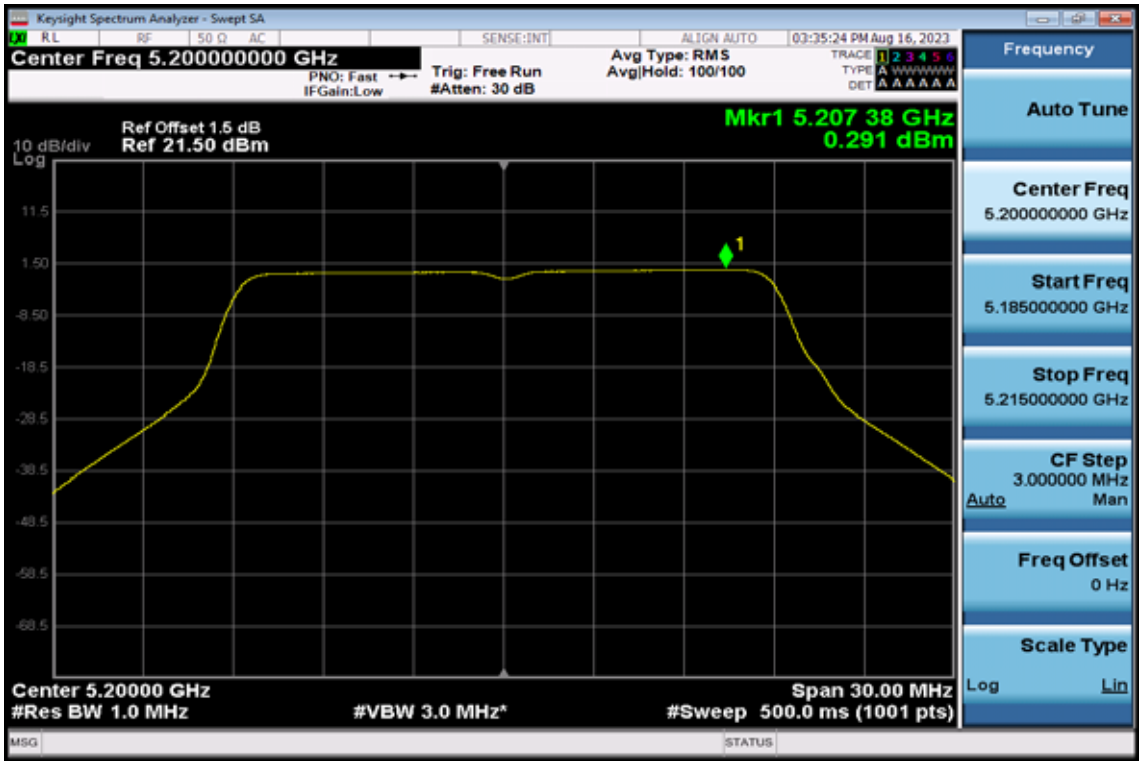


Power Spectral Density Test Plot (CH-High)

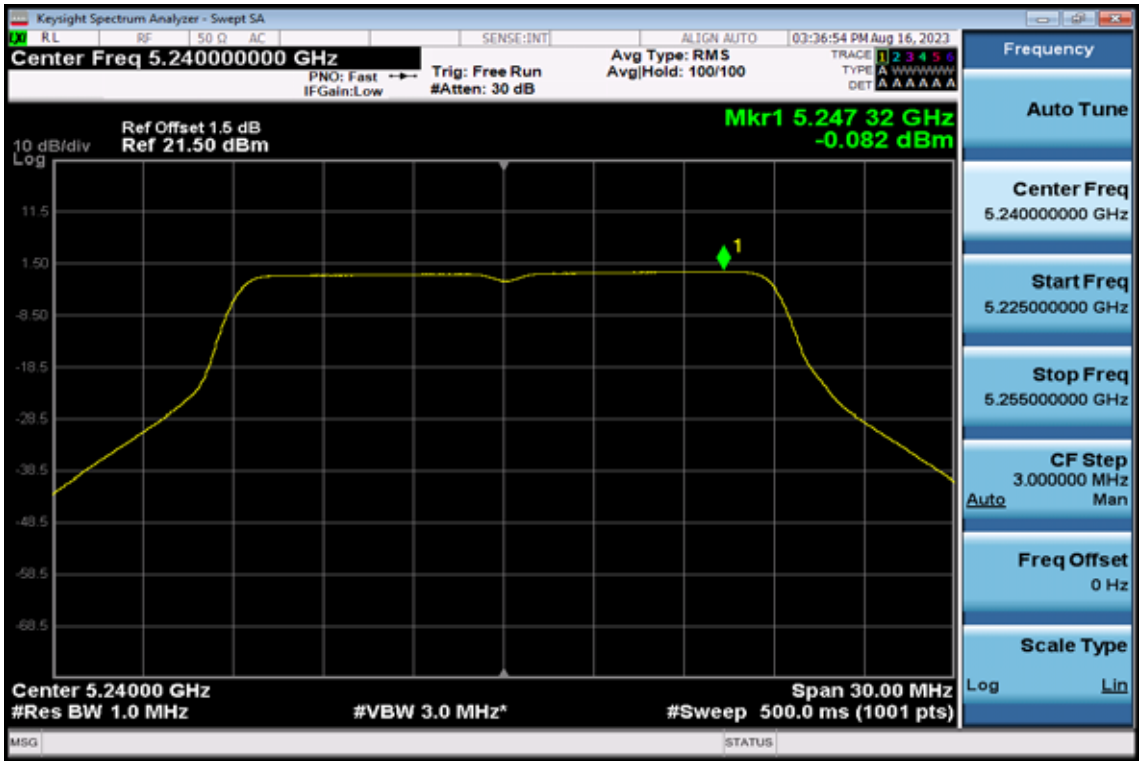
802.11ac VHT20,
Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)



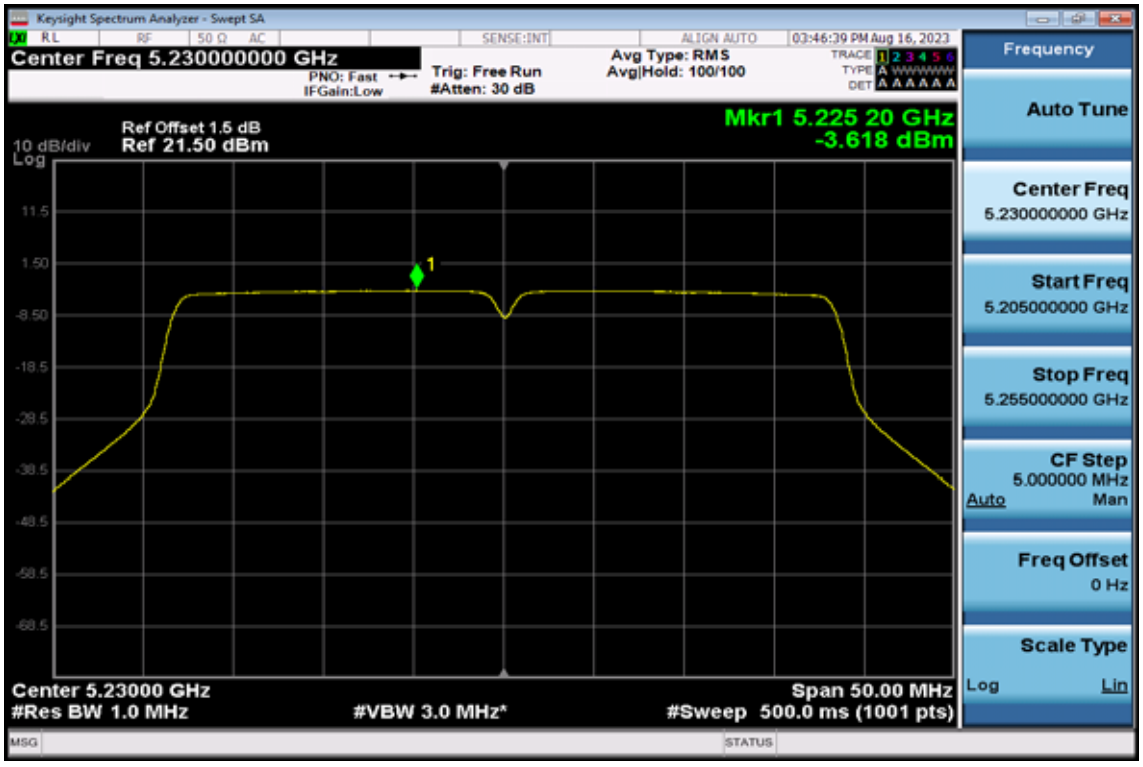
Power Spectral Density Test Plot (CH-High)



802.11ac VHT40

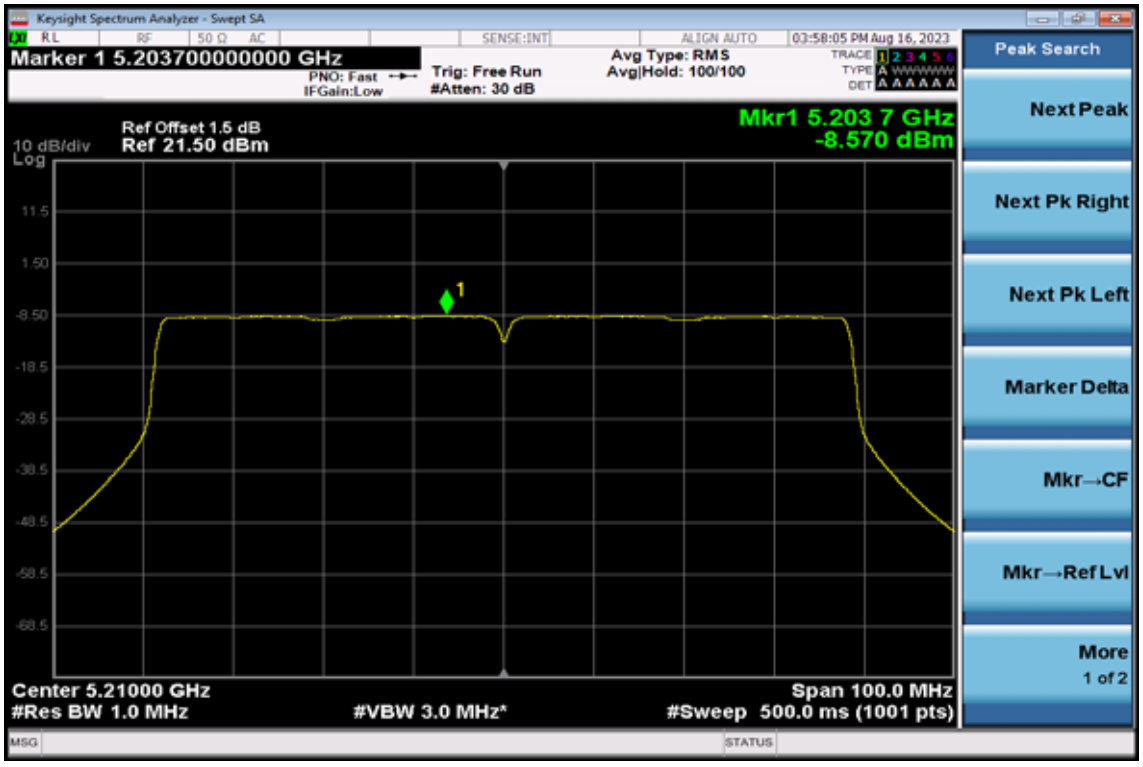
Power Spectral Density Test Plot (CH-Low)

Power Spectral Density Test Plot (CH-High)

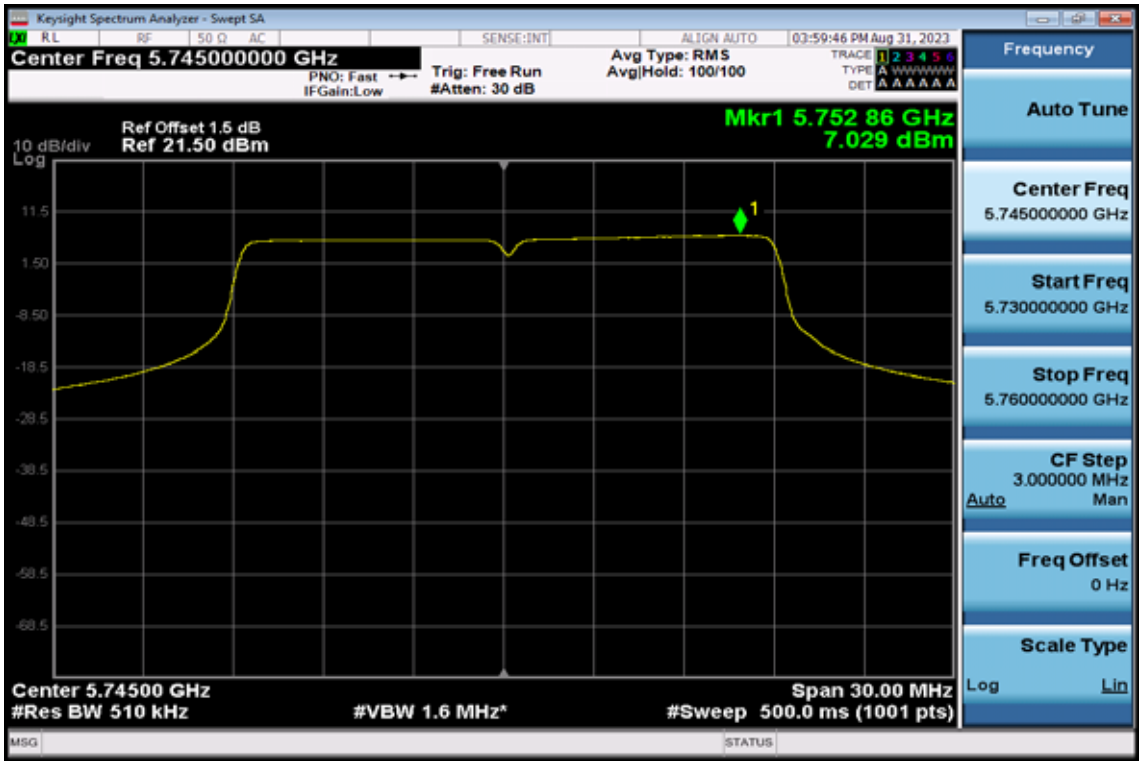


802.11 ac VHT80

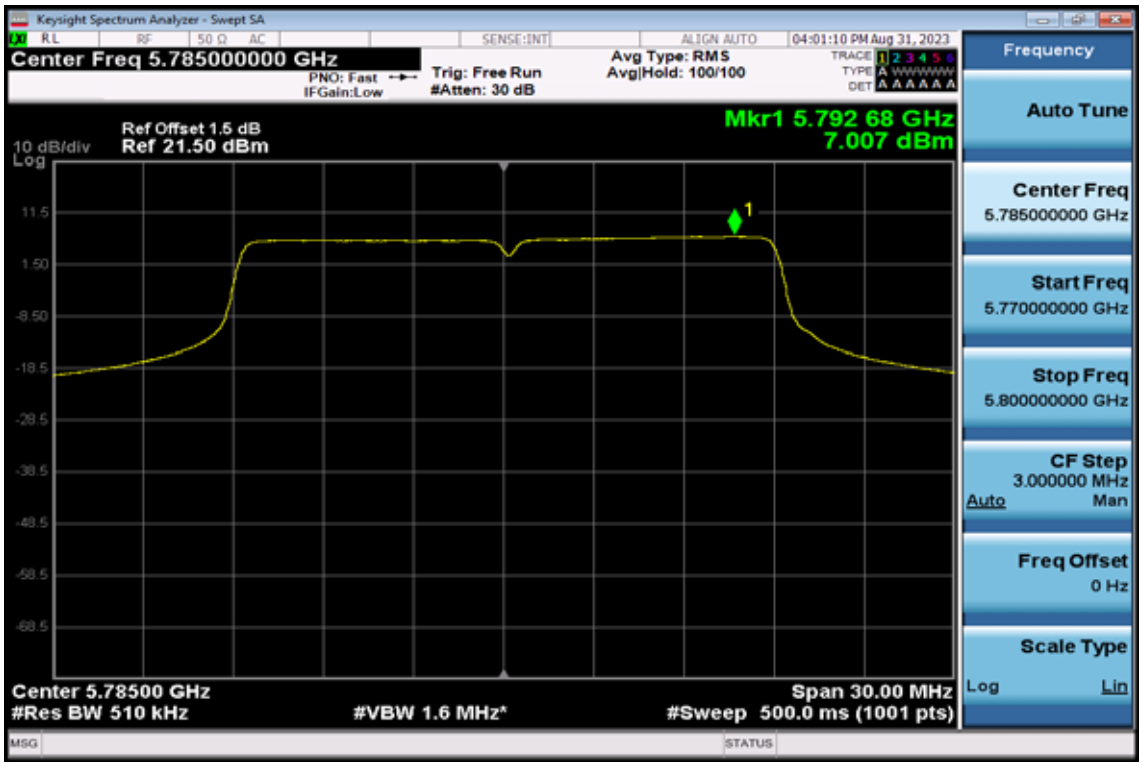
Power Spectral Density Test Plot (CH-Low)



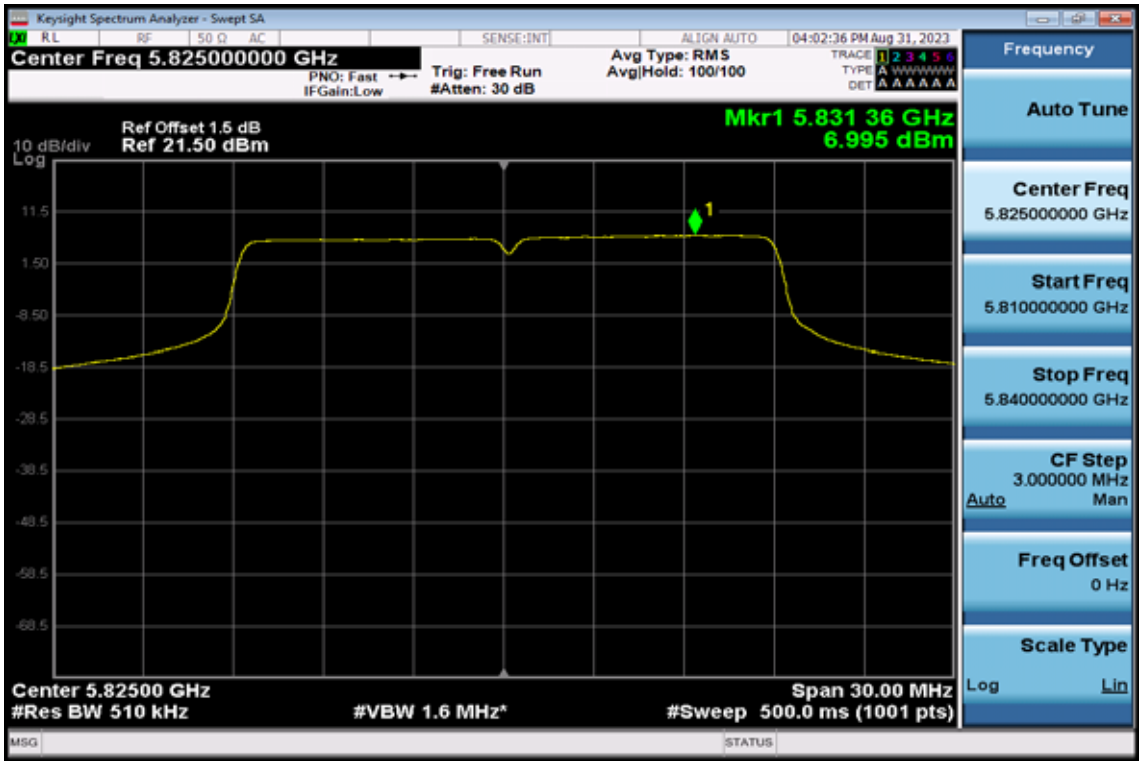
Band UNII-3, Ant 2
802.11a
Power Spectral Density Data Plot (CH Low)



Power Spectral Density Data Plot (CH Mid)

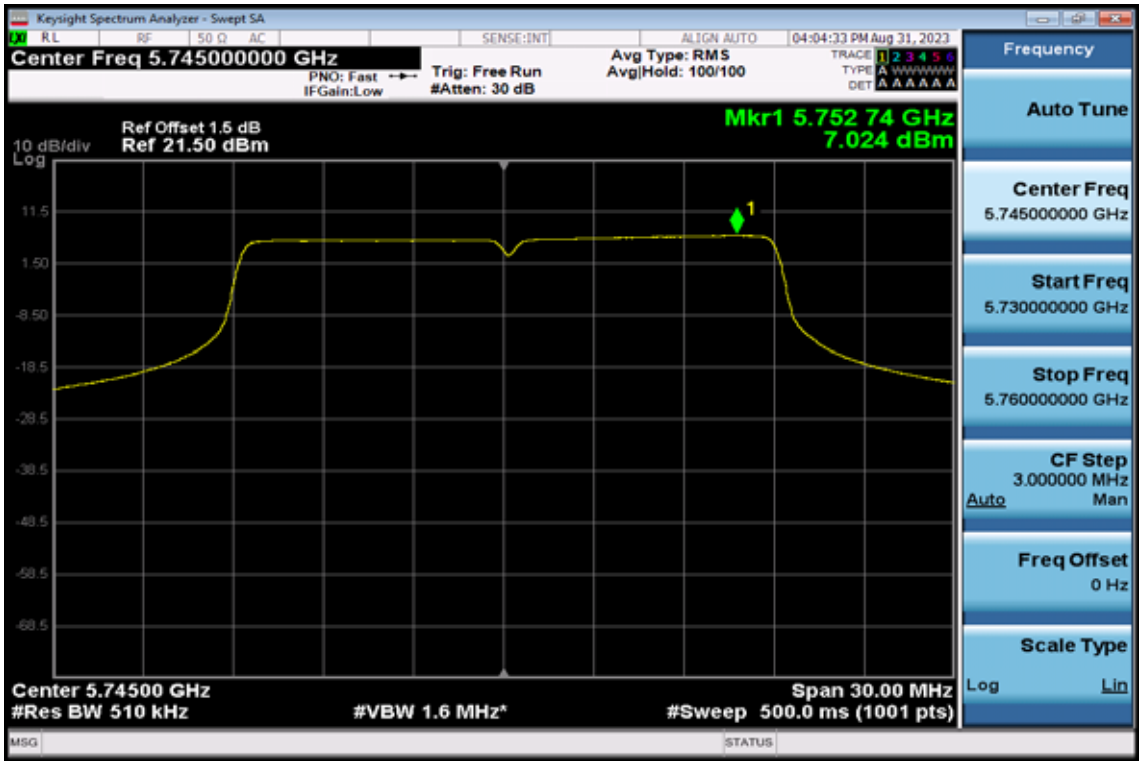


Power Spectral Density Data Plot (CH High)

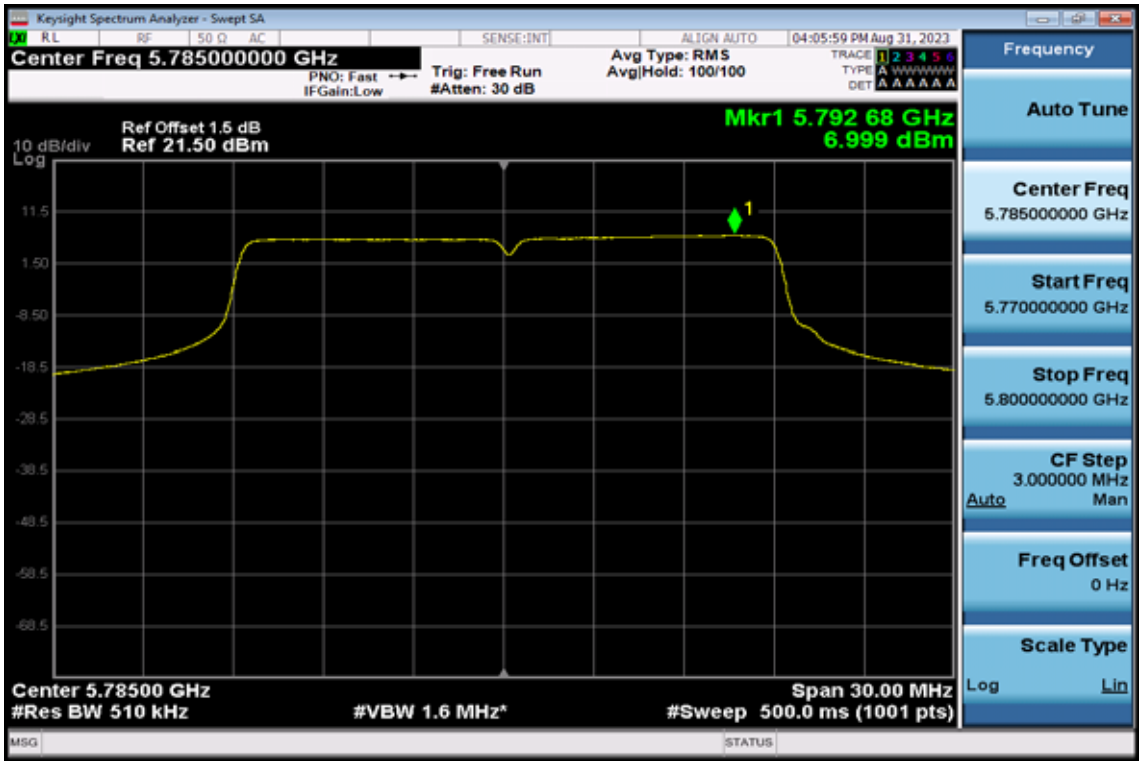


802.11n HT20

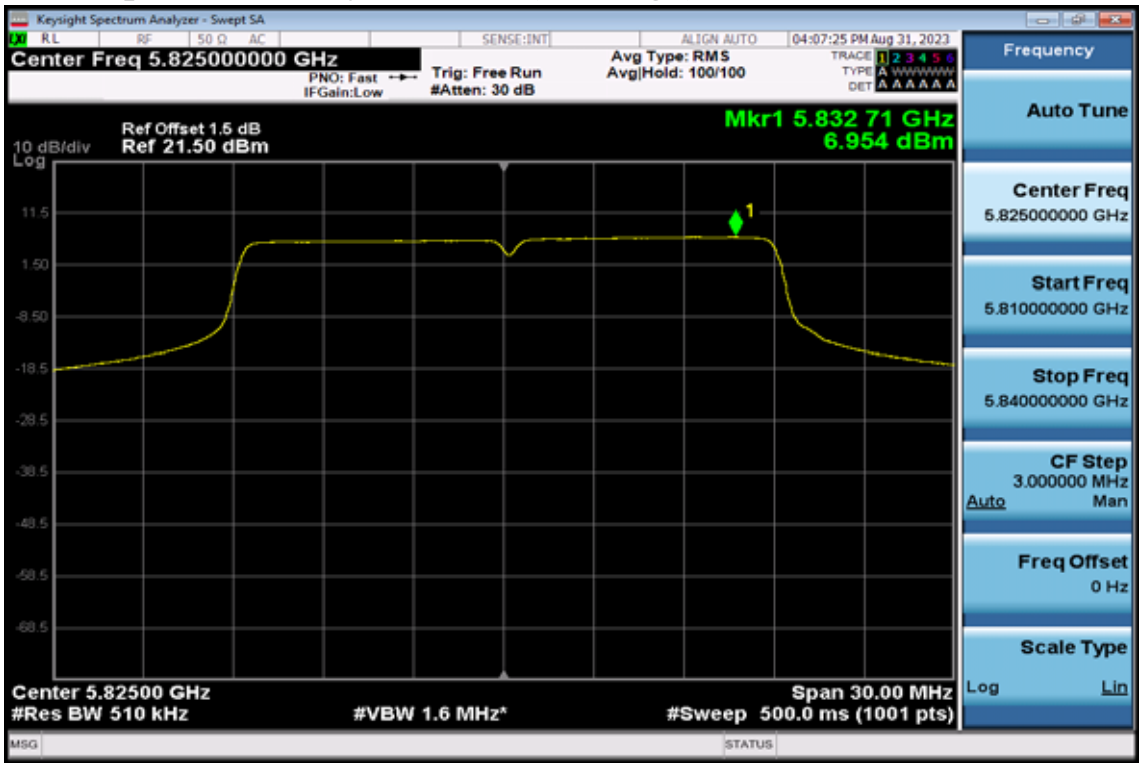
Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)

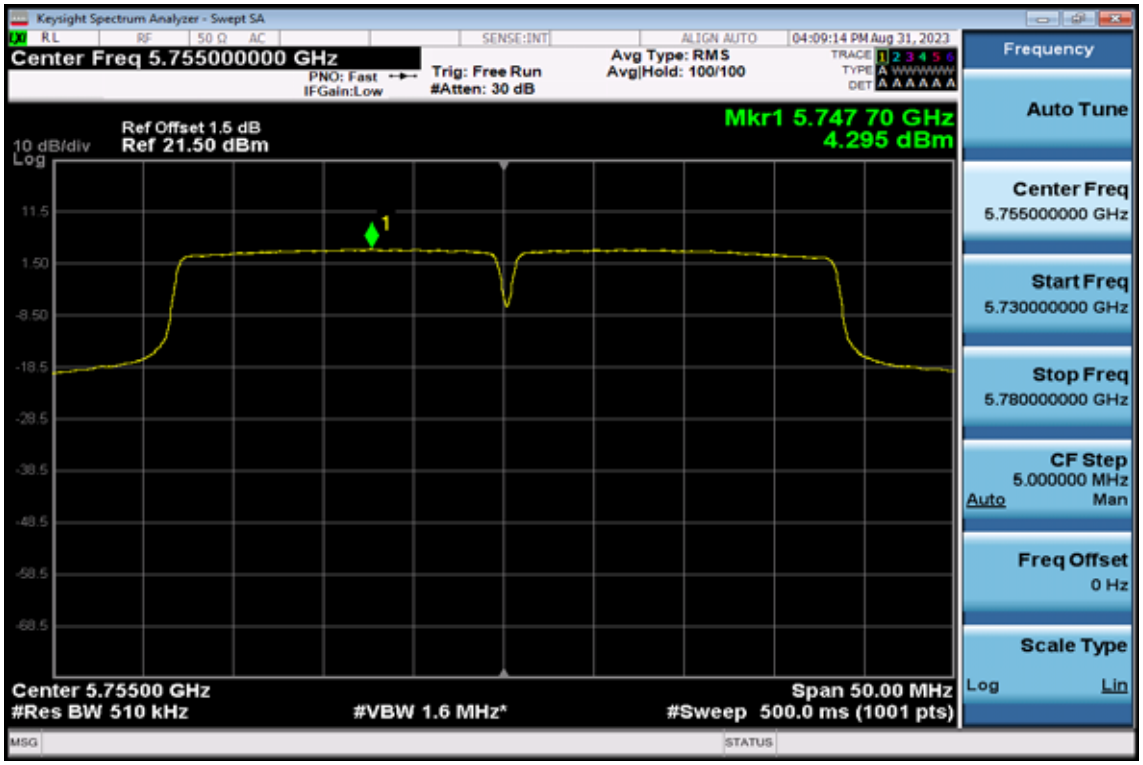


Power Spectral Density Test Plot (CH-High)

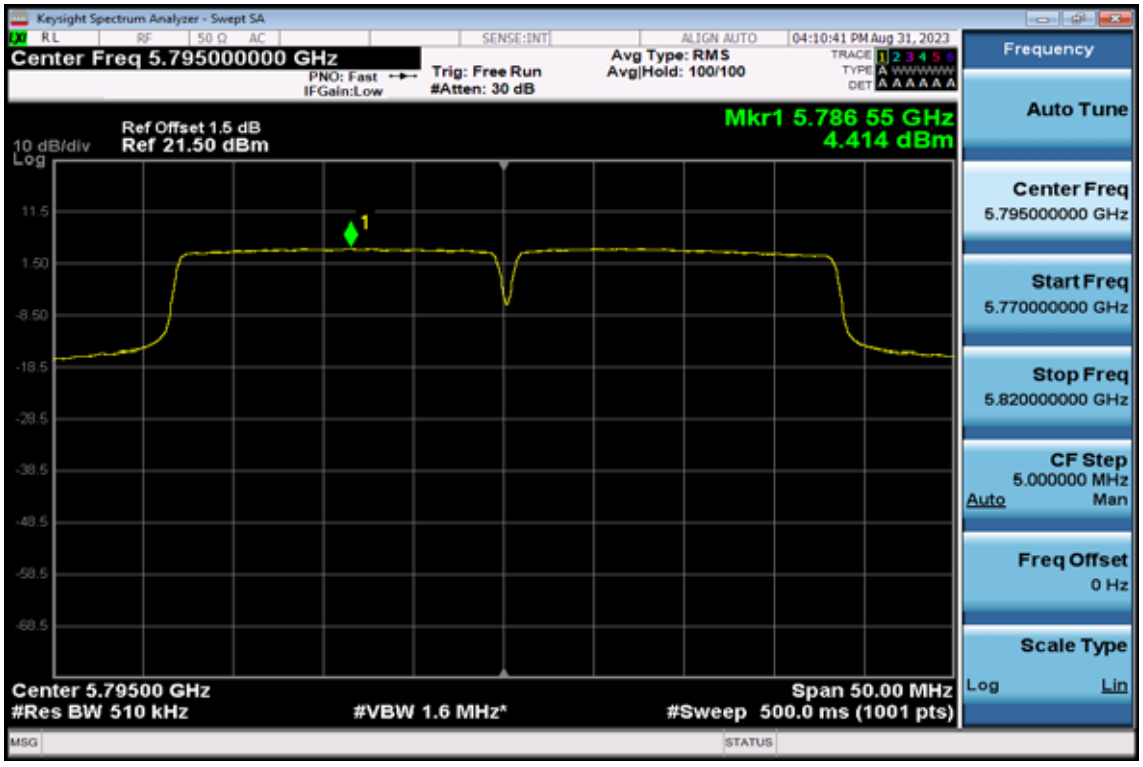


802.11n HT40

Power Spectral Density Test Plot (CH-Low)

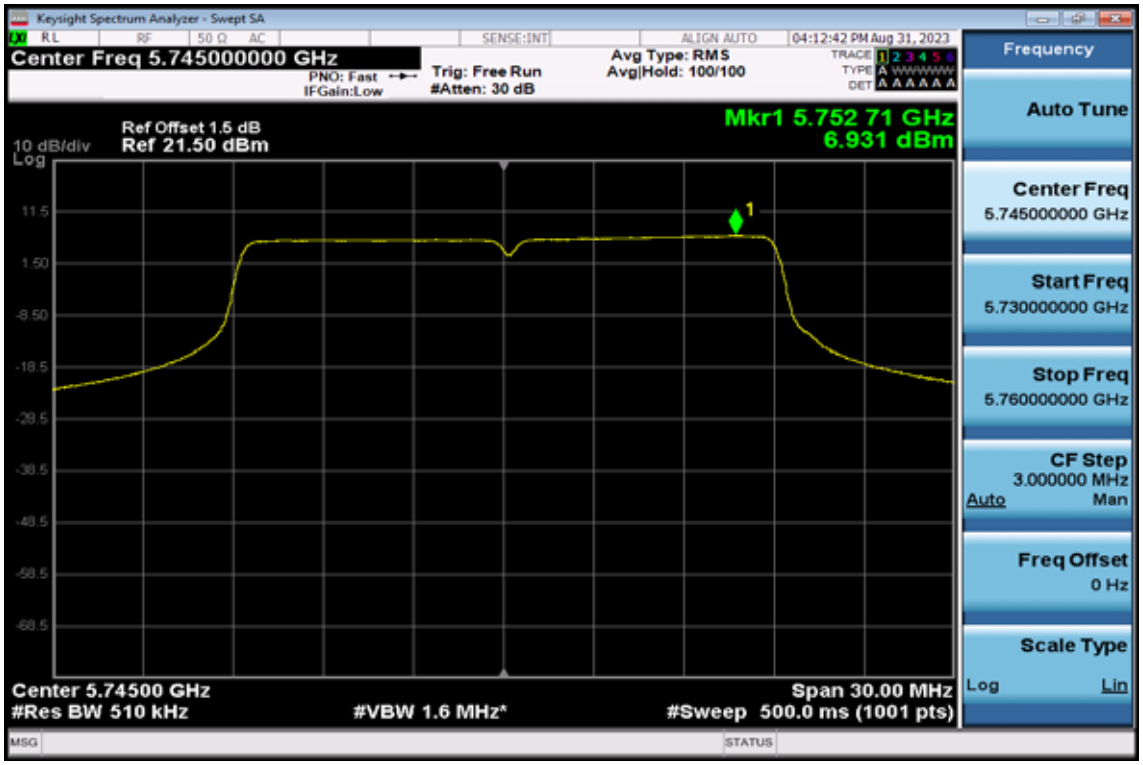


Power Spectral Density Test Plot (CH-High)

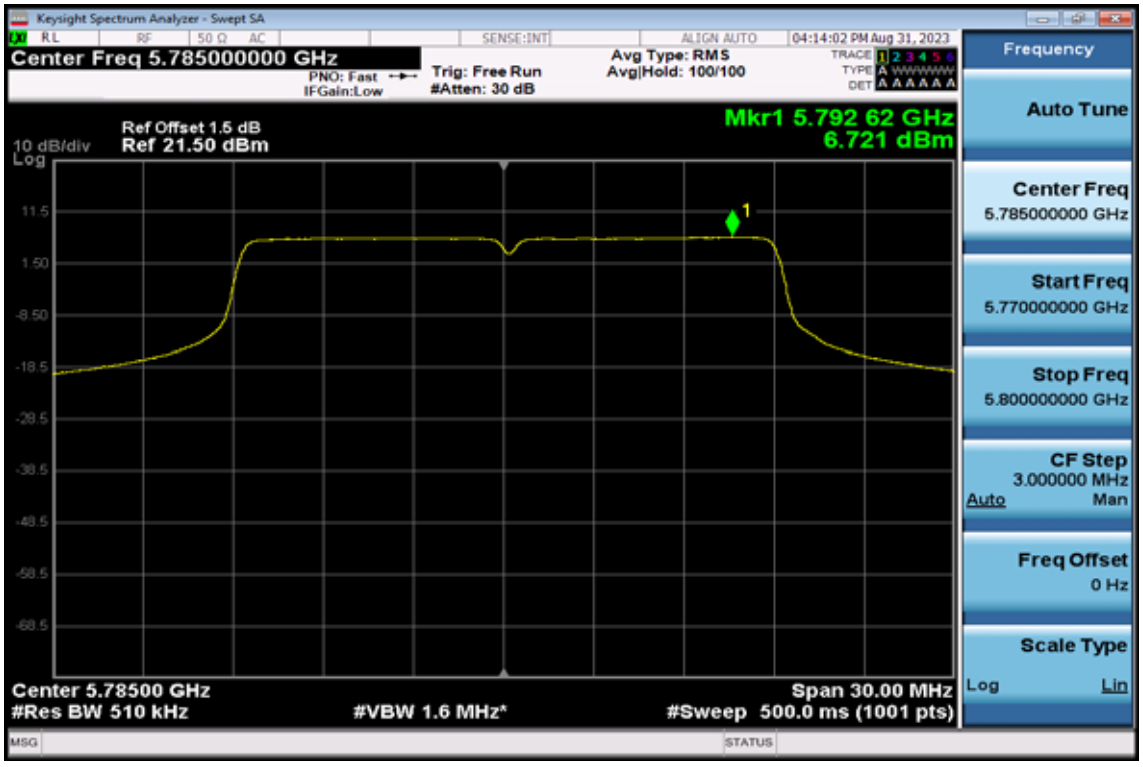


802.11ac VHT20

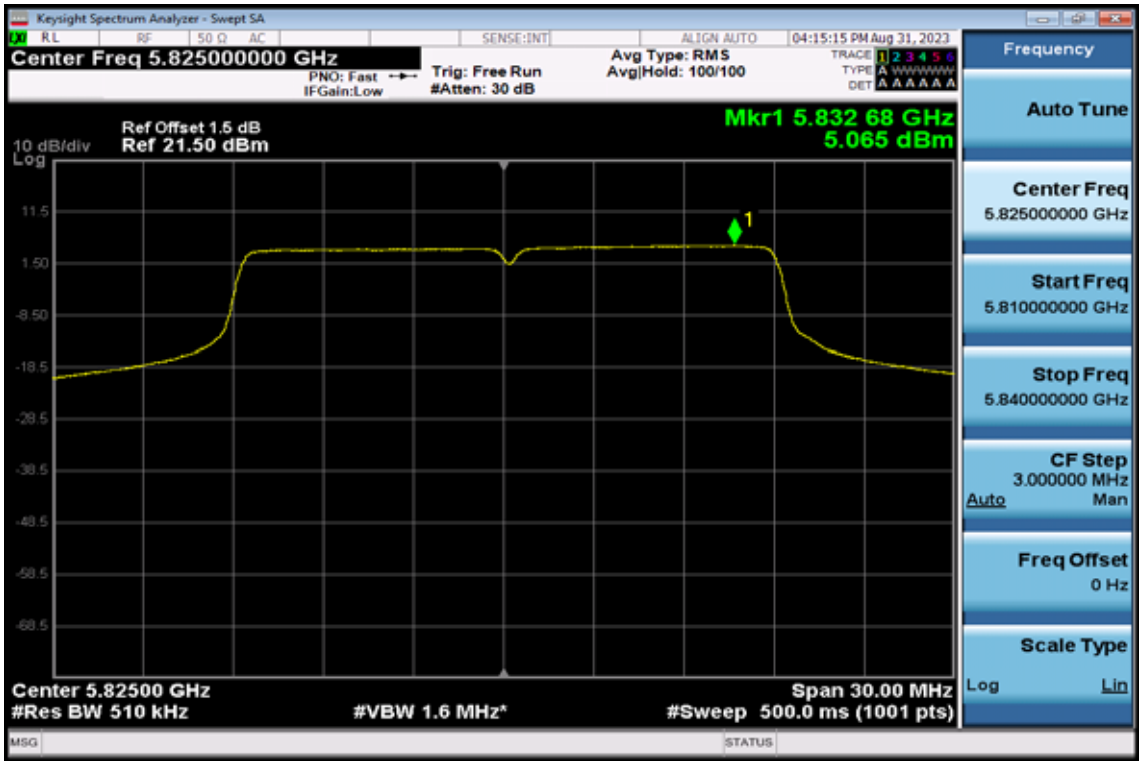
Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)

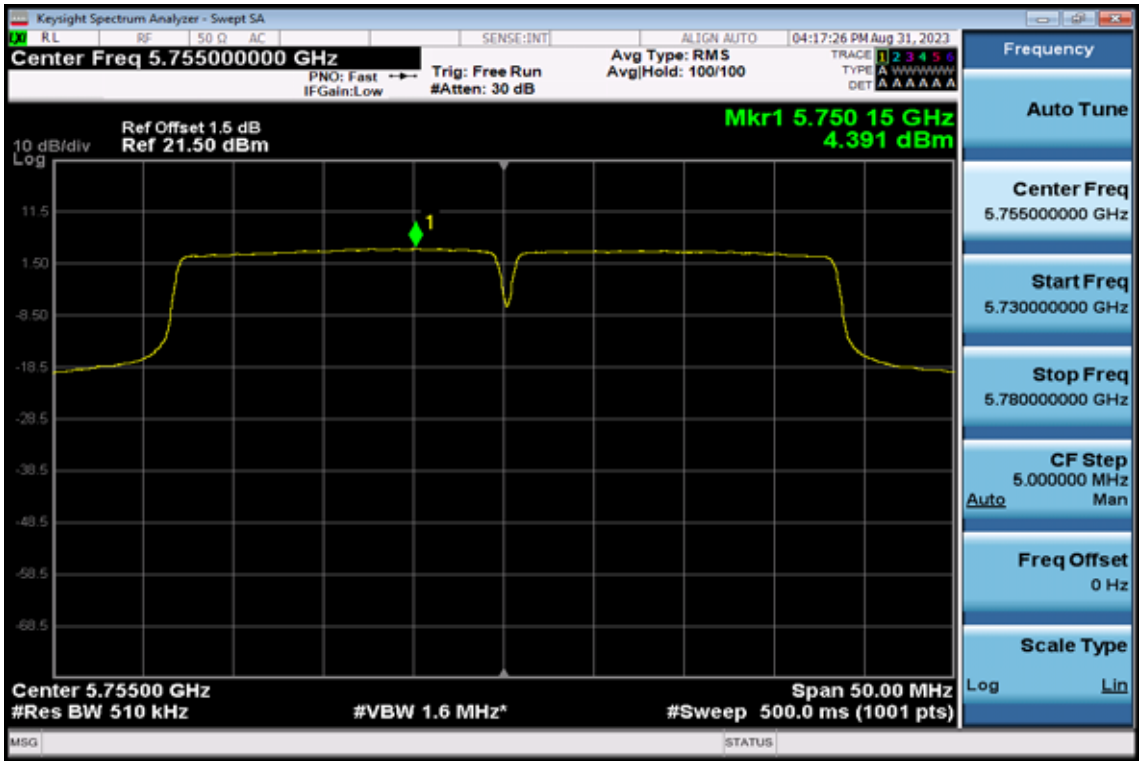


Power Spectral Density Test Plot (CH-High)

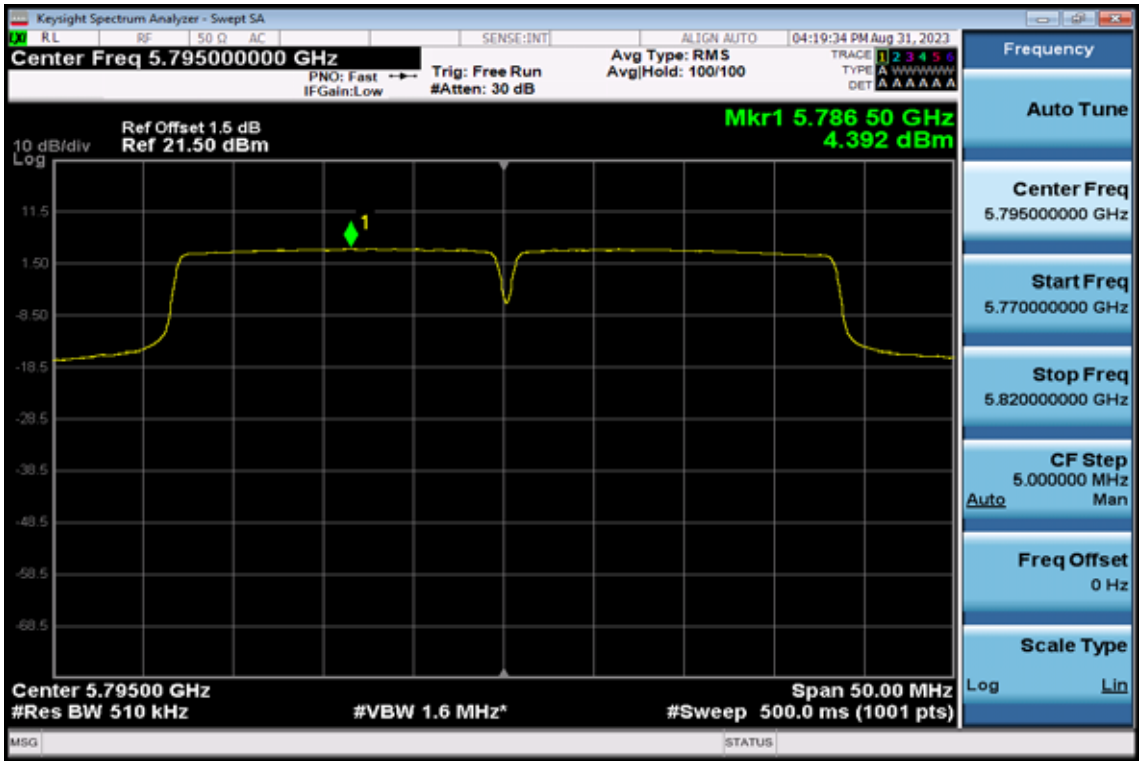


802.11ac VHT40

Power Spectral Density Test Plot (CH-Low)

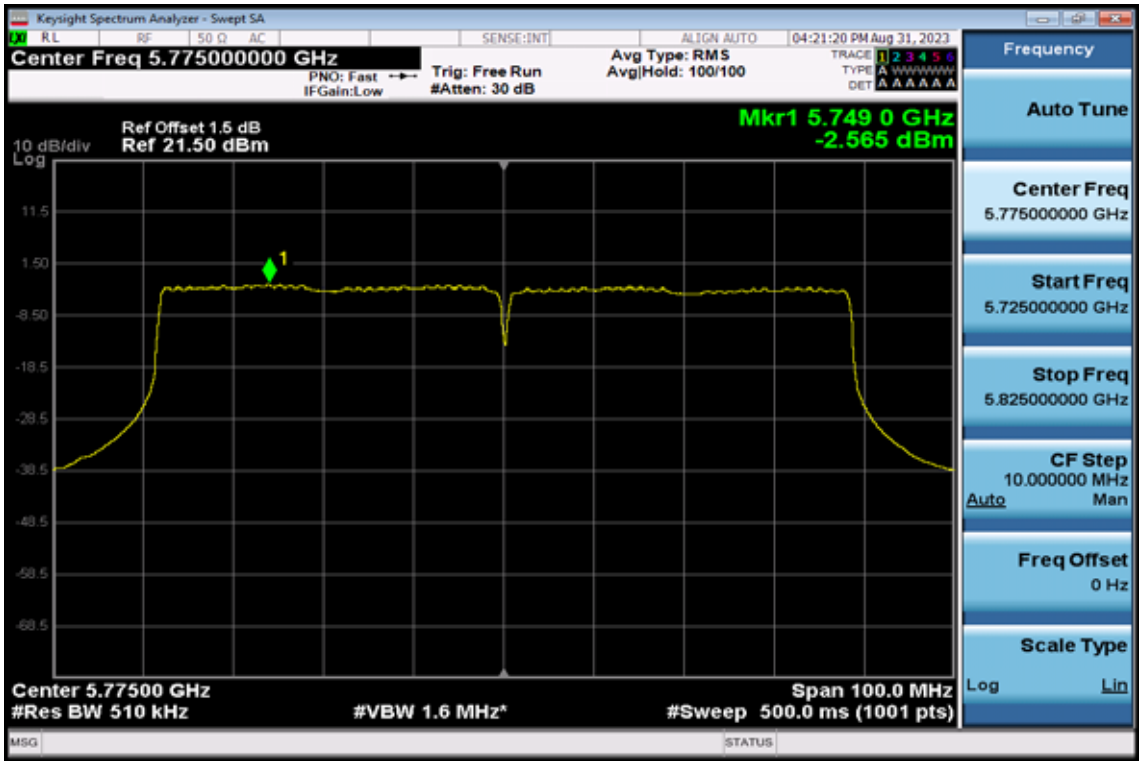


Power Spectral Density Test Plot (CH-High)



802.11 ac VHT80

Power Spectral Density Test Plot (CH-Low)



7. 26dB /99% Emission Bandwidth Measurement

7.1. Standard Applicable

According to §15.407(a) foe band 1,2,3. No Limit required.

7.2. Measurement Procedure

2. Place the EUT on the table and set it in transmitting mode.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. Set the spectrum analyzer as RBW=300kHz, VBW =1MHz, Span= 50MHz, Sweep=auto
5. Mark the peak frequency and –26dB (upper and lower) frequency.
6. Repeat above procedures until all frequency measured were complete.

Refer to section D of KDB Document: KDB 789033 D02 General UNII Test Procedures New Rules v01r03

7.3. Measurement Equipment Used:

Refer to section 6.3 for details.

7.4. Test Set-up:

Refer to section 6.4 for details.

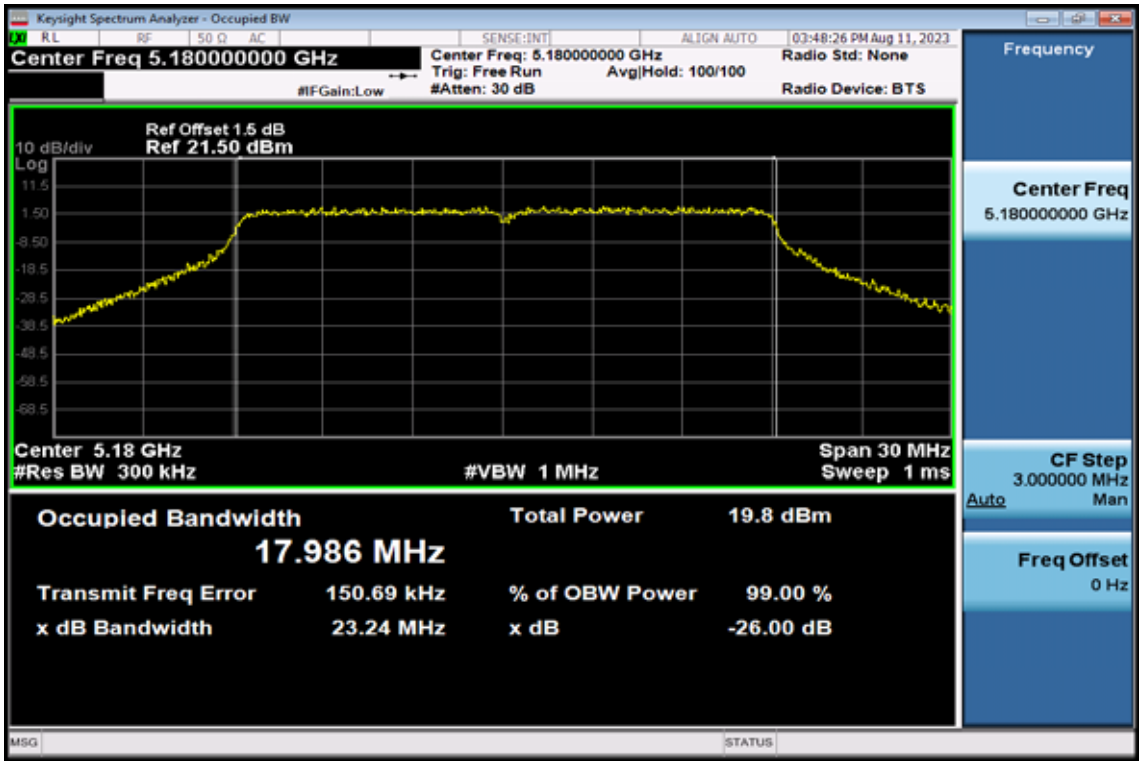
7.5. Measurement Result

Band	Mode	Frequency (MHz)	26dB Bandwidth (MHz)	99% OBW (MHz)
UNII-1	11a	5180	23.24	17.986
		5200	22.66	17.975
		5240	23.12	17.967
	HT20	5180	22.99	18.016
		5200	22.90	17.951
		5240	22.99	18.005
	HT40	5190	43.93	36.559
		5230	44.20	36.548
	VHT20	5180	23.11	17.972
		5200	22.86	17.986
		5240	23.21	17.995
	VHT40	5190	44.50	36.589
		5230	43.86	36.495
	VHT80	5210	88.85	76.281

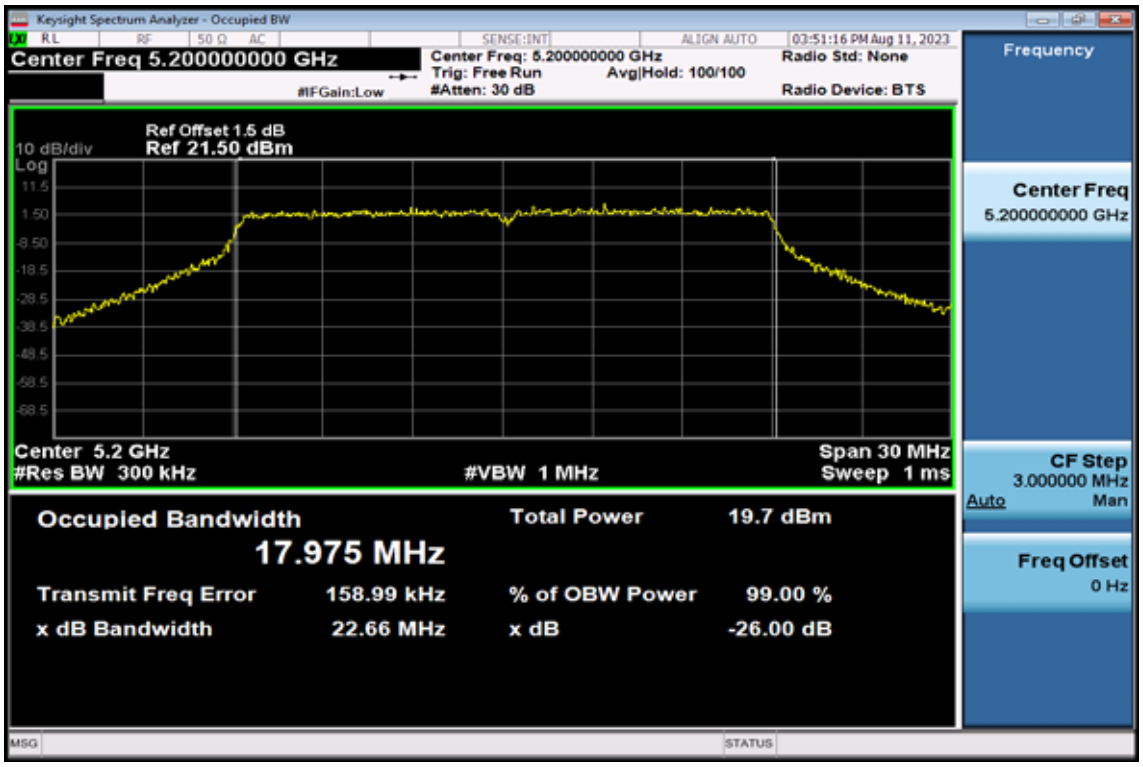
Band UNII-1

802.11a

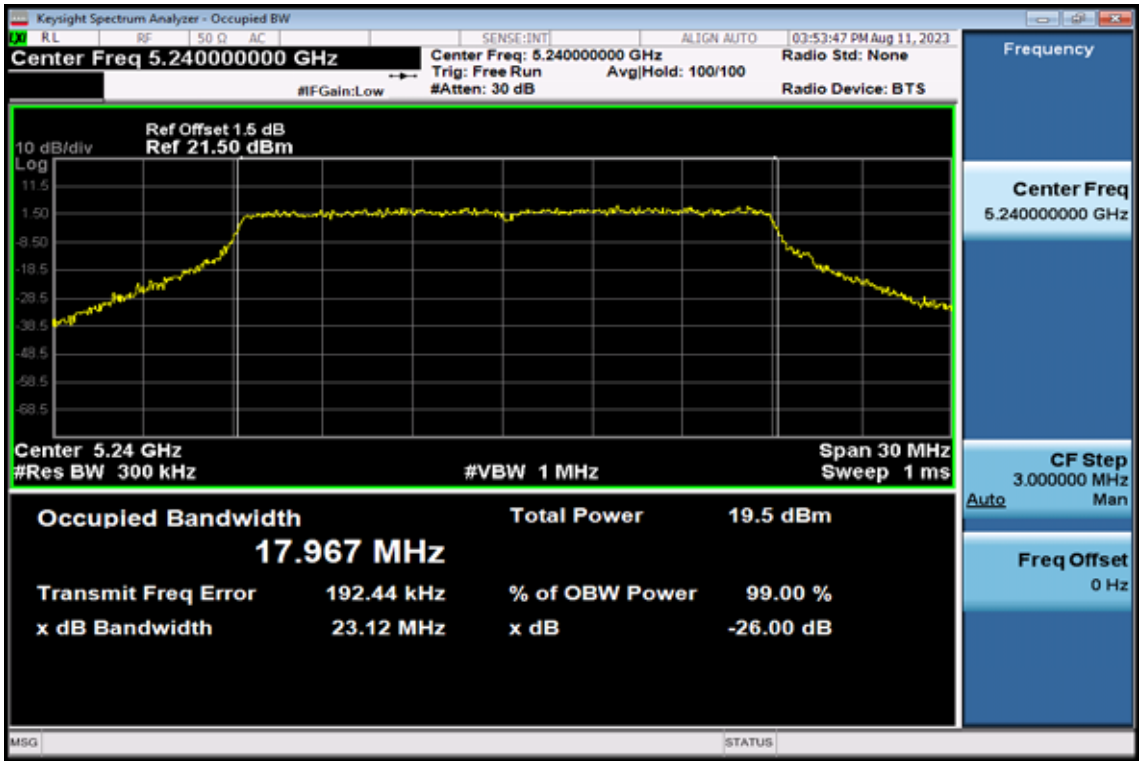
26dB / 99% Band Width Test Data CH-Low



26dB / 99% Band Width Test Data CH-Mid

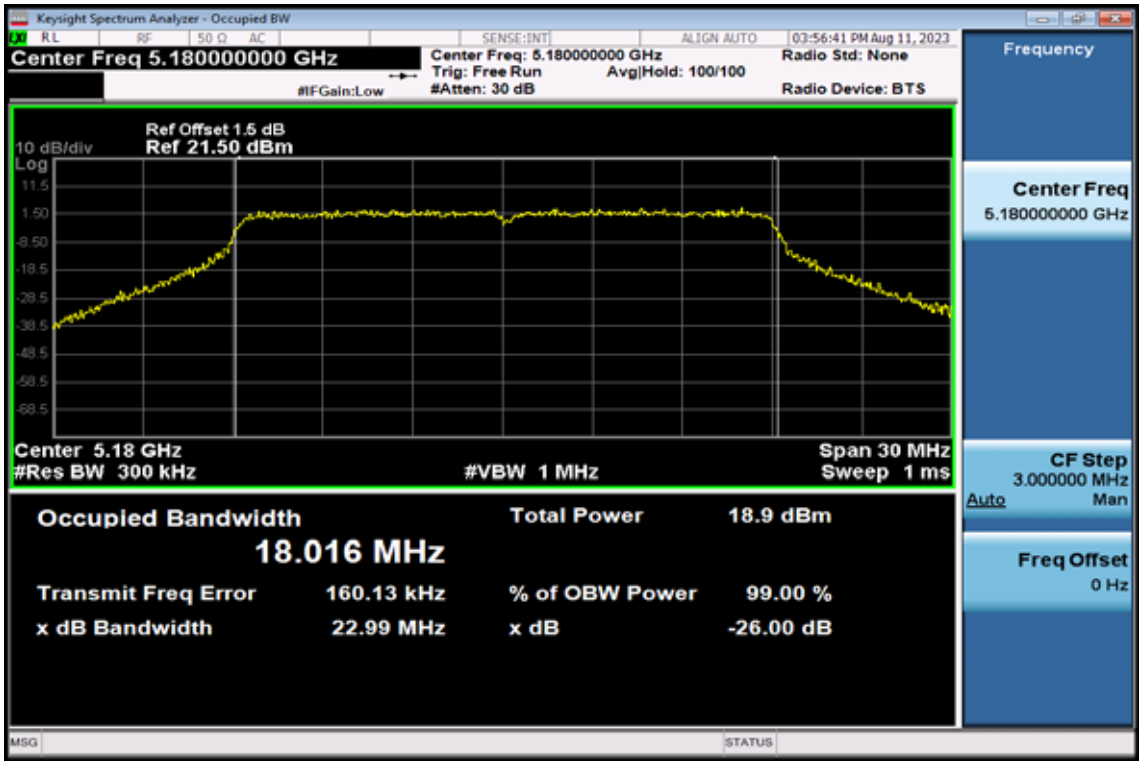


26dB / 99% Band Width Test Data CH-High

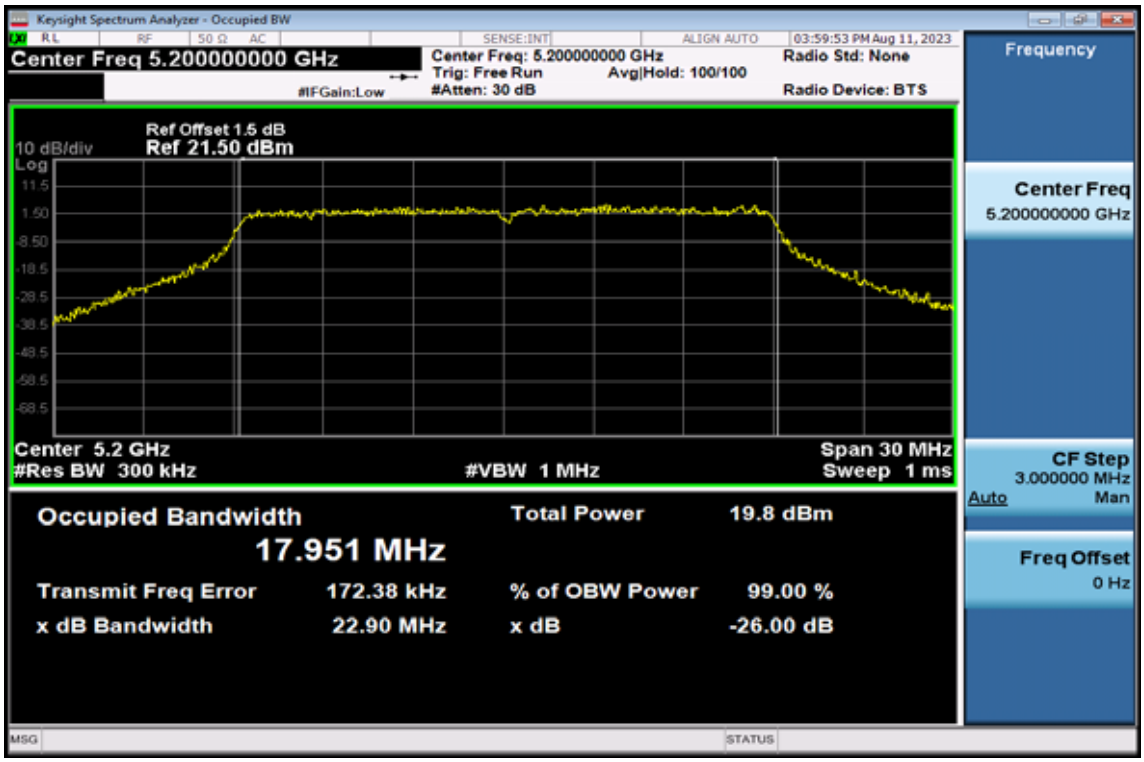


802.11n HT20

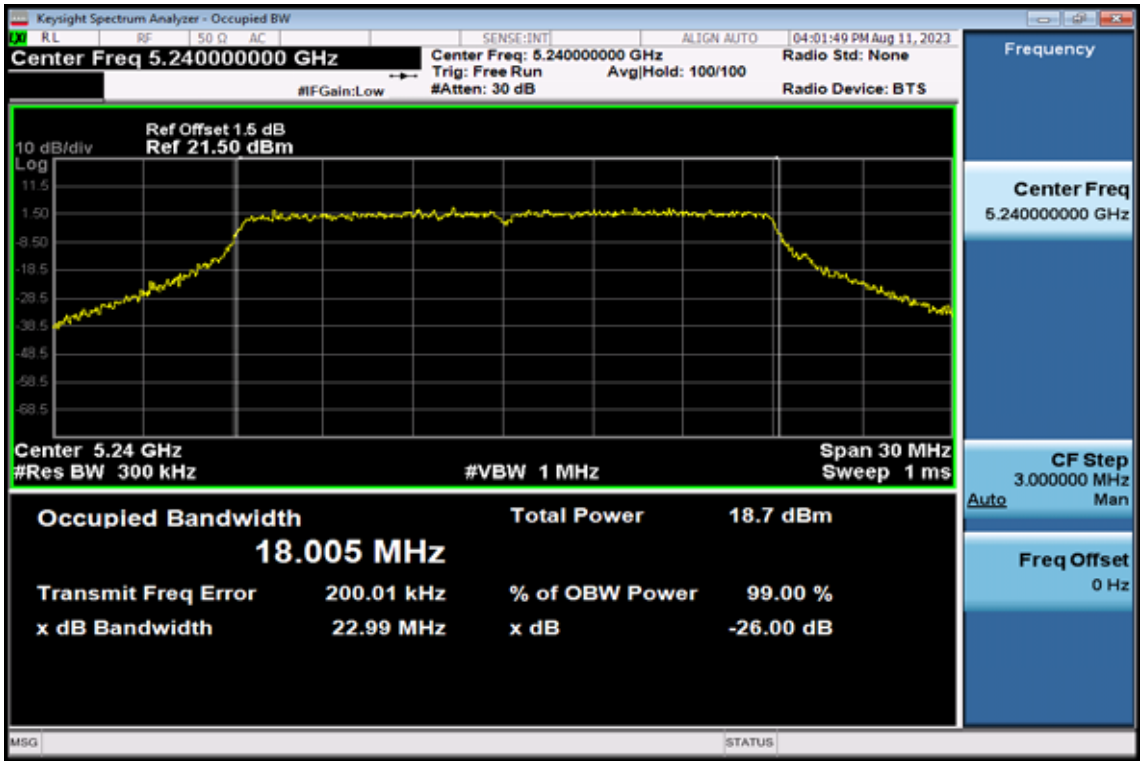
26dB / 99% Band Width Test Data CH-Low



26dB / 99% Band Width Test Data CH-Mid

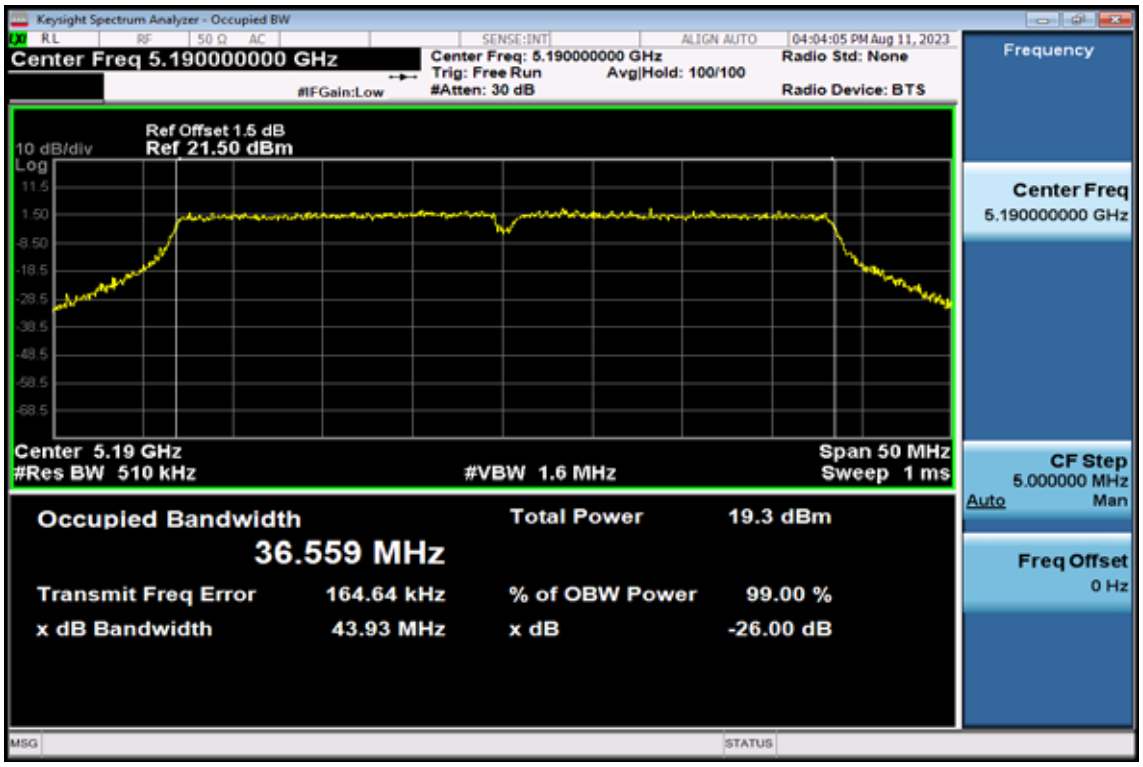


26dB / 99% Band Width Test Data CH-High

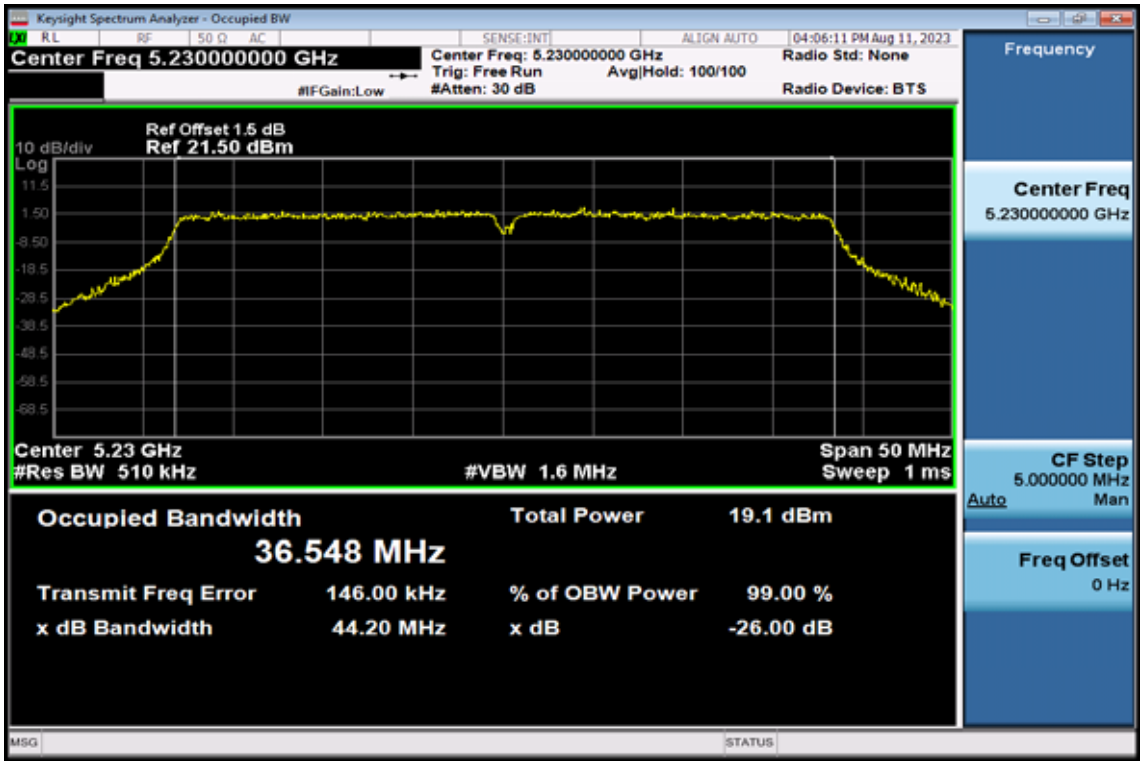


802.11n HT40

26dB / 99% Band Width Test Data CH-Low

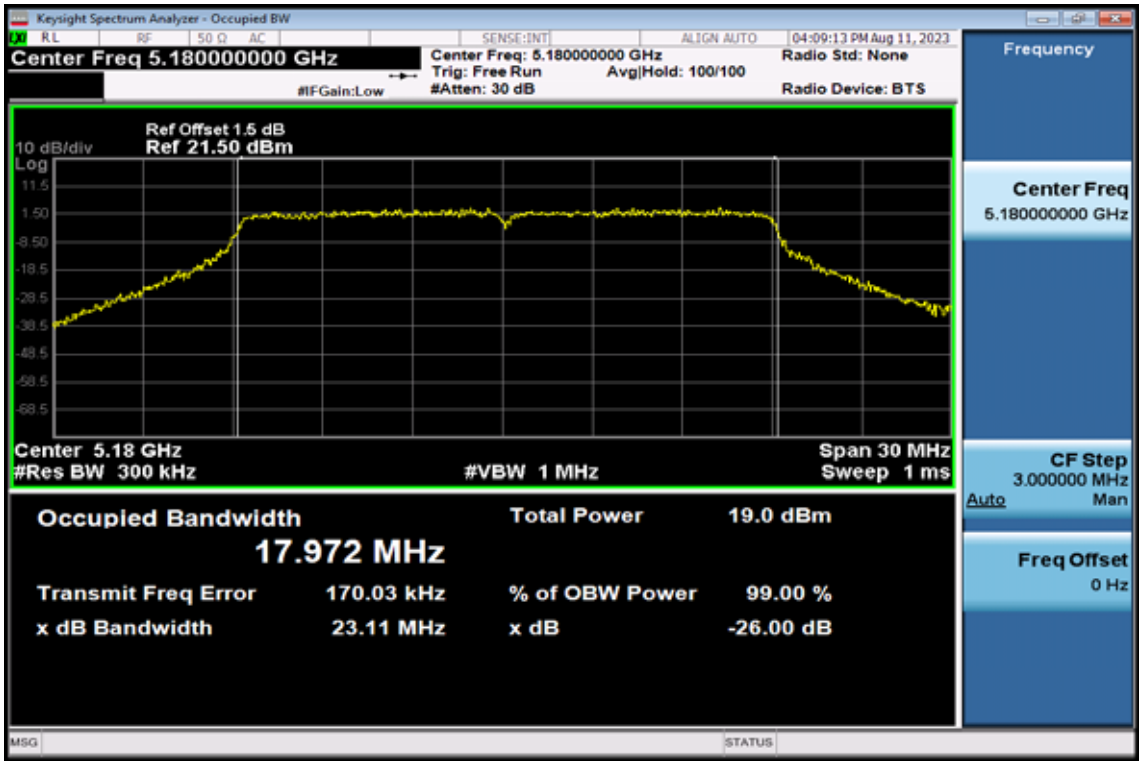


26dB / 99%Band Width Test Data CH-High



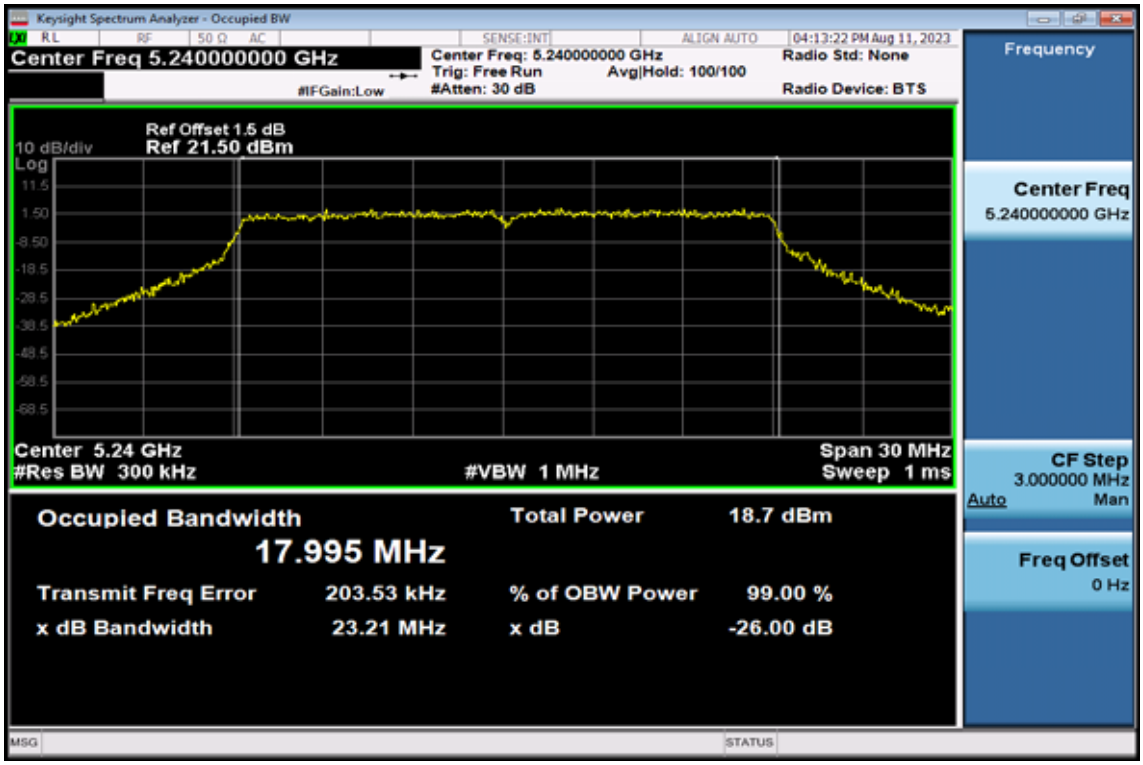
802.11ac VHT20

26dB / 99% Band Width Test Data CH-Low



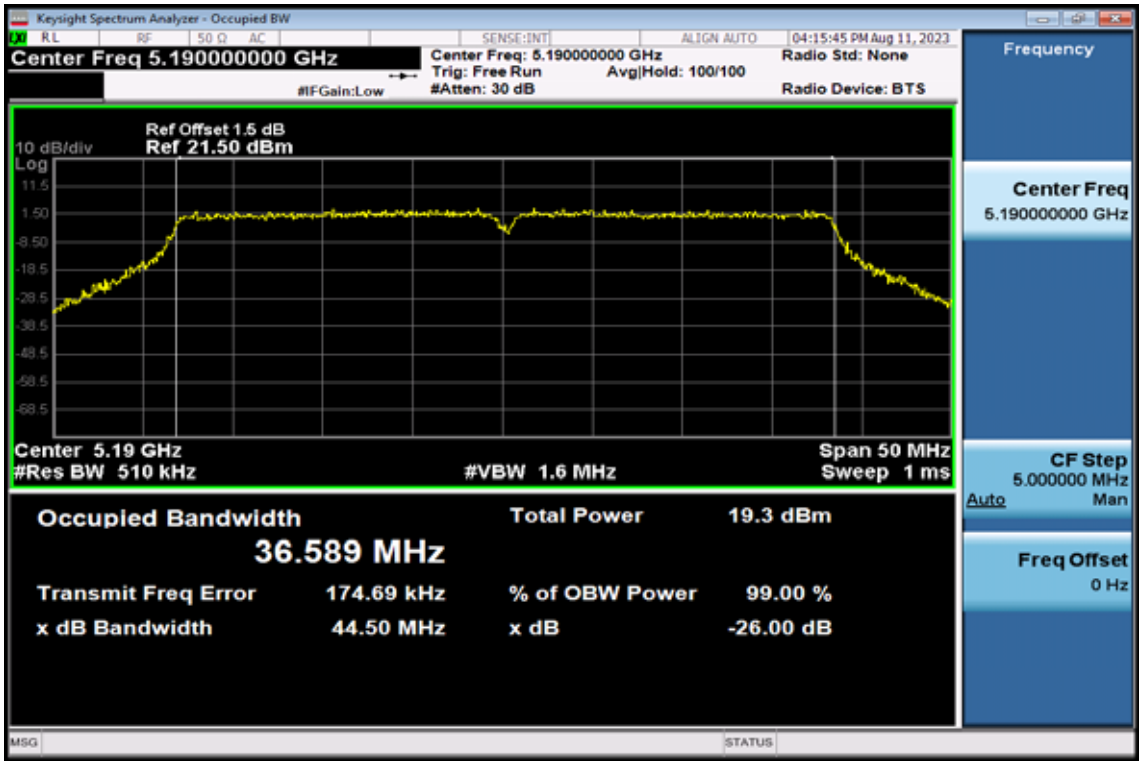
26dB / 99% Band Width Test Data CH-Mid

26dB / 99% Band Width Test Data CH-High



802.11ac VHT40

26dB / 99% Band Width Test Data CH-Low



26dB / 99%Band Width Test Data CH-High