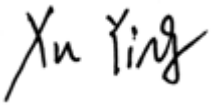
RF TEST REPORT

Applicant	COOSEA GROUP (HK) COMPANY LIMITED
FCC ID	2A28USL112
Product	Smart Phone
Model	SL112A; SL112C
Report No.	R2212A1312-R7
Issue Date	March 16, 2023

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 15E (2022)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.



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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 28, 2023 ~ March 3, 2023 Date of Sample Received: January 11, 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 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 **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)

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)

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

1.3. Testing Location

Company:	TA Technology (Shanghai) Co., Ltd.
Address:	Building 3, No.145, Jintang Rd, Pudong Shanghai, P.R.China
City:	Shanghai
Post code:	201201
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E-mail:	xukai@ta-shanghai.com

2. General Description of Equipment under Test

2.1. Applicant and Manufacturer Information

Applicant	COOSEA GROUP (HK) COMPANY LIMITED
Applicant address	UNIT 5-6 16/F MULTIFIELD PLAZA 3-7A PRAT AVENUE TSIMSHATSUI KL, HONG KONG, CHINA
Manufacturer	COOSEA GROUP (HK) COMPANY LIMITED
Manufacturer address	UNIT 5-6 16/F MULTIFIELD PLAZA 3-7A PRAT AVENUE TSIMSHATSUI KL, HONG KONG, CHINA

2.2. General information

EUT Description	
Model	SL112A; SL112C
IMEI	351384680003616
Hardware Version	1.0
Software Version	SL112A10010
Power Supply	Battery / AC adapter
Antenna Type	PIFA Antenna
Antenna Connector	A permanently attached antenna (meet with the standard FCC Part 15.203 requirement)
Antenna Gain	2.07 dBi
Operating Frequency Range(s)	U-NII-1: 5150MHz-5250MHz U-NII-2A:5250MHz -5350MHz U-NII-2C:5470MHz-5725MHz U-NII-3: 5725MHz -5850MHz
Modulation Type	802.11a/n (HT20/HT40) : OFDM 802.11ac (VHT20/VHT40/VHT80): OFDM
Max. Output Power	15.93 dBm
Testing temperature range	-20 ° C to 50° C
Operating temperature range	-10 ° C to 55 ° C
Operating voltage range	3.6 V to 4.4 V
State DC voltage	3.85 V
EUT Accessory	
Adapter	Manufacturer: ShenZhen BaiJunDa Electronic Co.，Ltd Model: UT-592A-5200ZY
Battery	Manufacturer: Huizhou Highpower Technology Co., Ltd Model: BL-A50CT
USB Cable	Manufacturer: Shenzhen Yihuaxing Electronics Co.Ltd.. Model: K342-002
Note: 1. The EUT is sent from the applicant to 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.

(b) Manufacturers take steps to ensure that DFS functionality cannot be disabled by the operator of the U-NII device.

4. The customer claims that SL112A and SL112C are only different in model, and the others are the same. This report only tests SL112A.

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 (2022) Unlicensed National Information Infrastructure Devices

ANSI C63.10-2013

Reference standard:

KDB 789033 D02 General UNII Test Procedures New Rules 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 stand-up position (Z 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
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT20	MCS0
802.11ac VHT40	MCS0
802.11ac VHT80	MCS0

Wireless Technology and Frequency Range

Wireless Technology		Bandwidth	Channel	Frequency
Wi-Fi	U-NII-1	20 MHz	36	5180MHz
			40	5200MHz
			48	5240MHz
		40 MHz	38	5190MHz
			46	5230MHz
		80 MHz	42	5210MHz
	U-NII-2A	20 MHz	52	5260MHz
			60	5300MHz
			64	5320MHz
		40 MHz	54	5270MHz
			62	5310MHz
		80 MHz	58	5290MHz
	U-NII-2C	20 MHz	100	5500MHz
			104	5520MHz
			116	5580MHz
			120	5600MHz
			124	5620MHz
			128	5640MHz
			136	5680MHz
			140	5700MHz
			144	5720MHz
		40 MHz	102	5510MHz
			110	5550MHz
			118	5590MHz
			126	5630MHz
			134	5670MHz
			142	5710MHz
		80 MHz	106	5530MHz
			122	5610MHz
			138	5690MHz
	U-NII-3	20 MHz	149	5745MHz
			157	5785MHz
			165	5825MHz
		40 MHz	151	5755MHz
			159	5795MHz
		80 MHz	155	5775MHz
Does this device support TPC Function? ☒Yes ☐No				
Does this device support TDWR Band? ☒Yes ☐No				

5. Test Case Results

5.1. Occupied Bandwidth

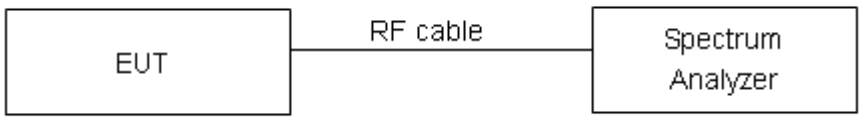
Ambient condition

Temperature	Relative humidity
20°C ~ 25°C	45% ~ 50%

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/U-NII-2A/U-NII-2C, 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

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	16.688	25.448	PASS
	5200	16.555	20.016	PASS
	5240	16.593	20.726	PASS
802.11n HT20	5180	17.743	25.714	PASS
	5200	17.641	21.385	PASS
	5240	17.627	20.197	PASS
802.11n HT40	5190	36.063	49.987	PASS
	5230	36.019	41.669	PASS
802.11ac VHT20	5180	17.701	21.415	PASS
	5200	17.601	20.357	PASS
	5240	17.595	20.299	PASS
802.11ac VHT40	5190	35.950	40.872	PASS
	5230	35.985	41.081	PASS
802.11ac VHT80	5210	75.289	81.122	PASS

U-NII-2A

Mode	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 26 dB bandwidth (MHz)	Conclusion
802.11a	5260	16.565	19.920	PASS
	5300	16.555	20.013	PASS
	5320	16.576	20.125	PASS
802.11n HT20	5260	17.628	21.428	PASS
	5300	17.628	22.222	PASS
	5320	17.630	22.971	PASS
802.11n HT40	5270	36.034	40.813	PASS
	5310	36.020	49.621	PASS
802.11ac VHT20	5260	17.596	20.318	PASS
	5300	17.616	20.286	PASS
	5320	17.613	20.267	PASS
802.11ac VHT40	5270	36.046	40.807	PASS
	5310	35.941	41.002	PASS
802.11ac VHT80	5290	75.332	81.154	PASS

U-NII-2C

Mode	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 26 dB bandwidth (MHz)	Conclusion
802.11a	5500	16.500	20.172	PASS
	5520	16.563	23.268	PASS
	5580	16.585	22.974	PASS
	5680	16.577	24.189	PASS
	5700	17.379	29.919	PASS
	5720	16.567	21.334	PASS
802.11n HT20	5500	17.643	20.388	PASS
	5520	17.646	22.548	PASS
	5580	17.628	20.767	PASS
	5680	17.615	22.101	PASS
	5700	18.117	30.000	PASS
	5720	17.631	23.936	PASS
802.11n HT40	5510	36.018	40.970	PASS
	5550	36.033	50.115	PASS
	5590	36.048	40.186	PASS
	5630	36.031	41.546	PASS
	5670	36.029	41.185	PASS
	5710	36.012	40.881	PASS
802.11ac VHT20	5500	17.628	20.502	PASS
	5580	17.628	20.329	PASS
	5700	17.622	20.285	PASS
	5720	17.616	20.178	PASS
802.11ac VHT40	5510	36.021	40.797	PASS
	5550	35.990	40.971	PASS
	5670	36.013	40.572	PASS
	5710	35.985	40.553	PASS
802.11ac VHT80	5530	75.320	80.882	PASS
	5610	75.196	80.720	PASS
	5690	75.366	80.771	PASS

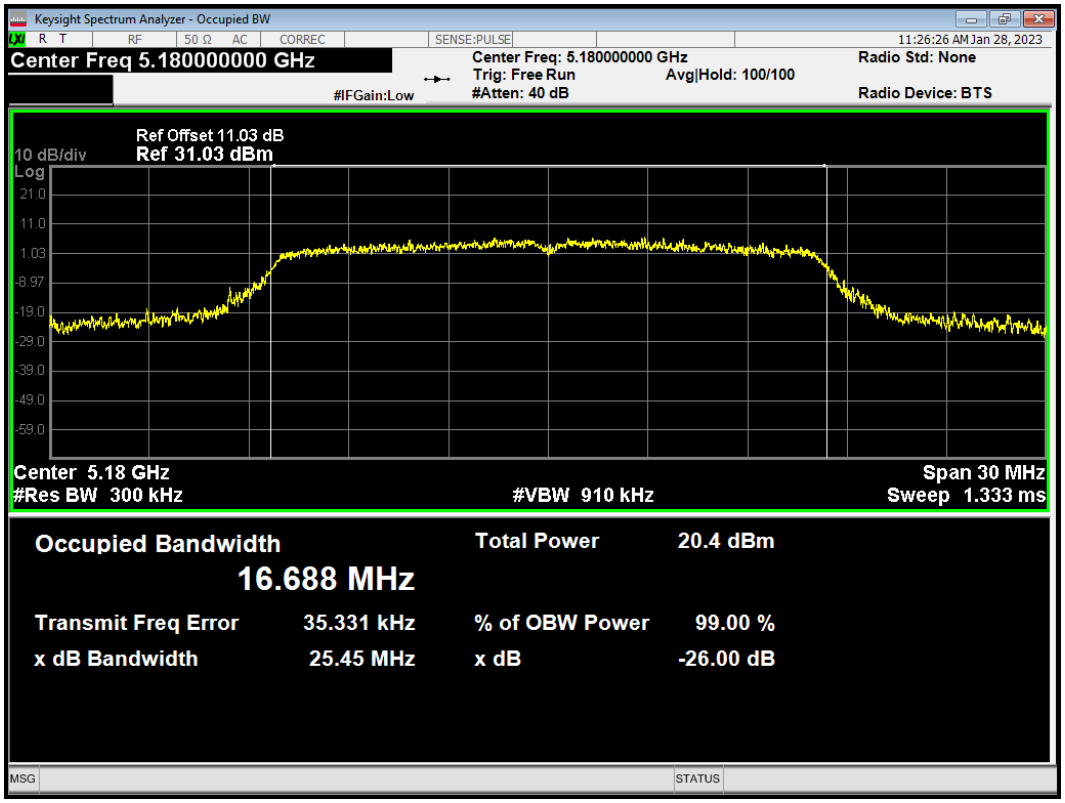
U-NII-3

Mode	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 6 dB bandwidth (MHz)	Limit (kHz)	Conclusion
802.11a	5720	--	15.443	500	PASS
	5745	16.546	14.390	500	PASS
	5785	16.539	15.030	500	PASS
	5825	16.556	15.086	500	PASS
802.11n HT20	5720	--	15.051	500	PASS
	5745	17.653	16.083	500	PASS
	5785	17.646	15.030	500	PASS
	5825	17.612	14.649	500	PASS
802.11n HT40	5710	--	35.057	500	PASS
	5755	36.045	35.063	500	PASS
	5795	36.068	35.053	500	PASS
802.11ac VHT20	5720	--	16.431	500	PASS
	5745	17.594	15.041	500	PASS
	5785	17.594	15.049	500	PASS
	5825	17.610	15.077	500	PASS
802.11ac VHT40	5710	--	35.007	500	PASS
	5755	36.065	35.099	500	PASS
	5795	36.052	35.096	500	PASS
802.11ac VHT80	5690	--	75.105	500	PASS
	5775	75.367	75.124	500	PASS

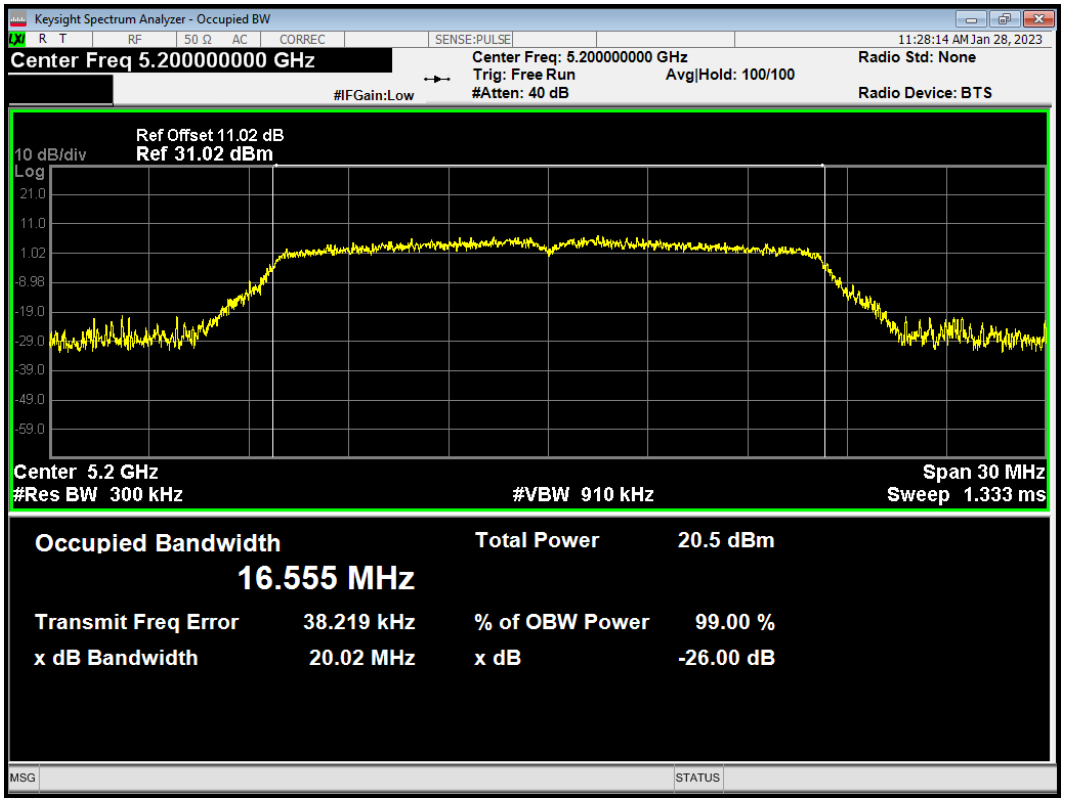
99% bandwidth

U-NII-1

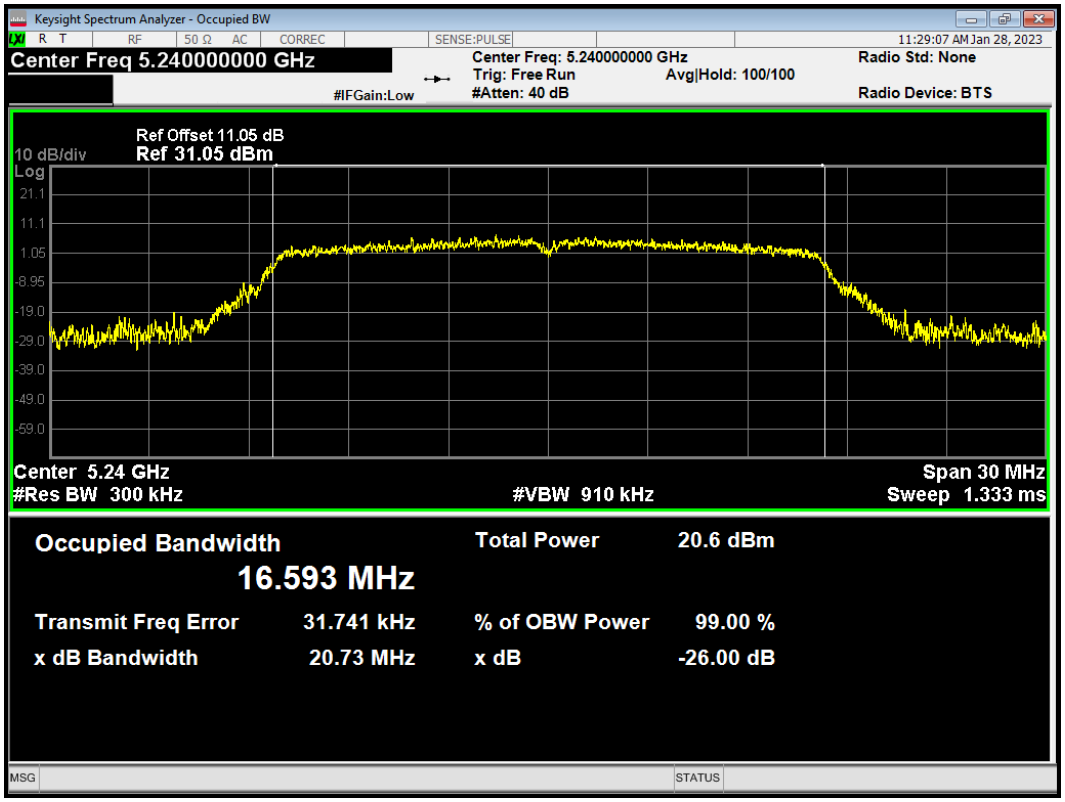
OBW 802.11a 5180MHz



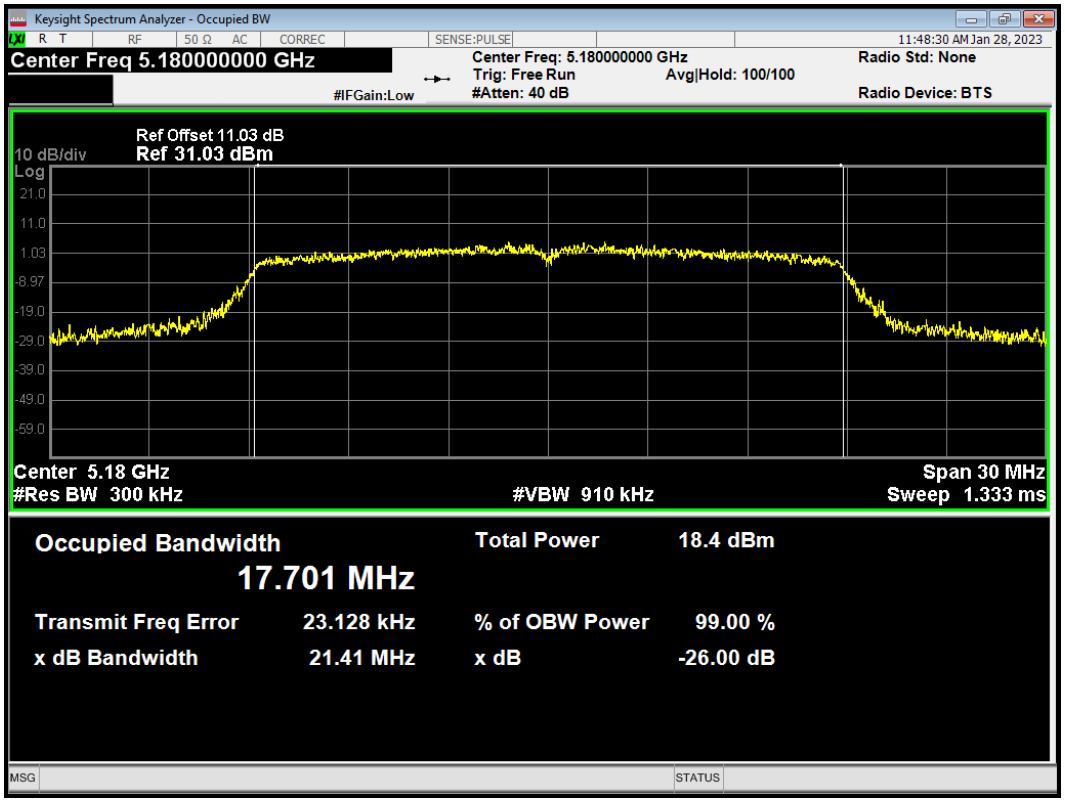
OBW 802.11a 5200MHz



OBW 802.11a 5240MHz



OBW 802.11ac(VHT20) 5180MHz



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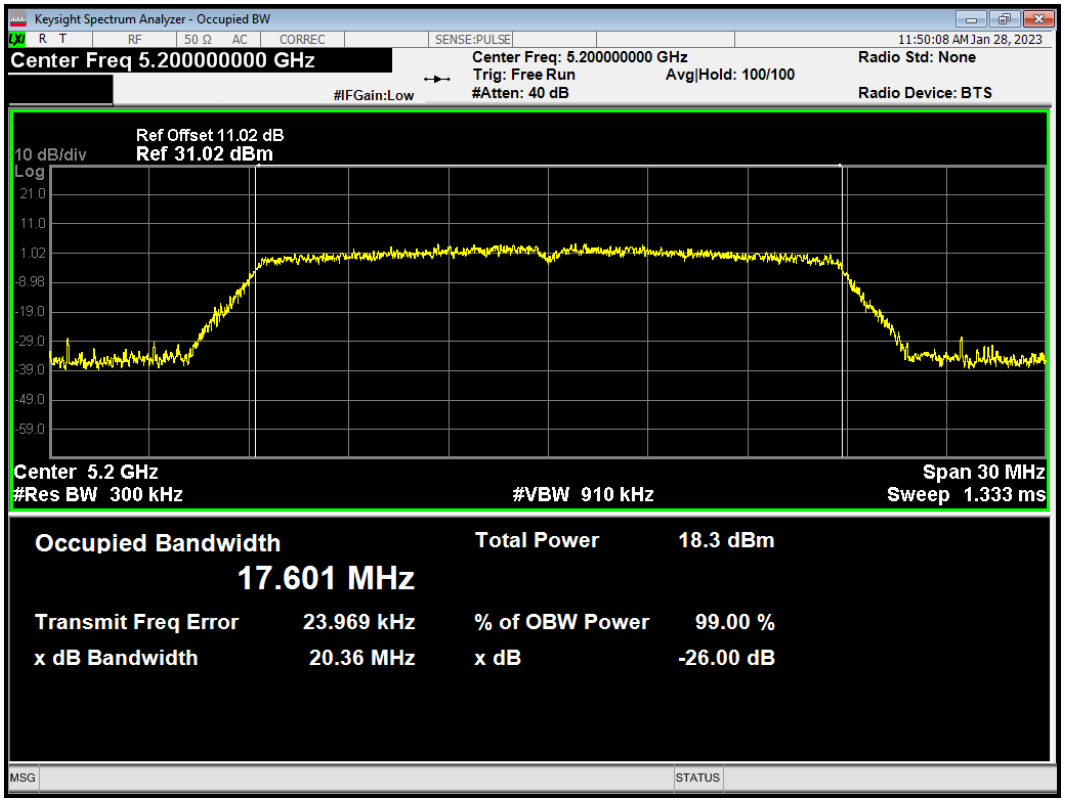

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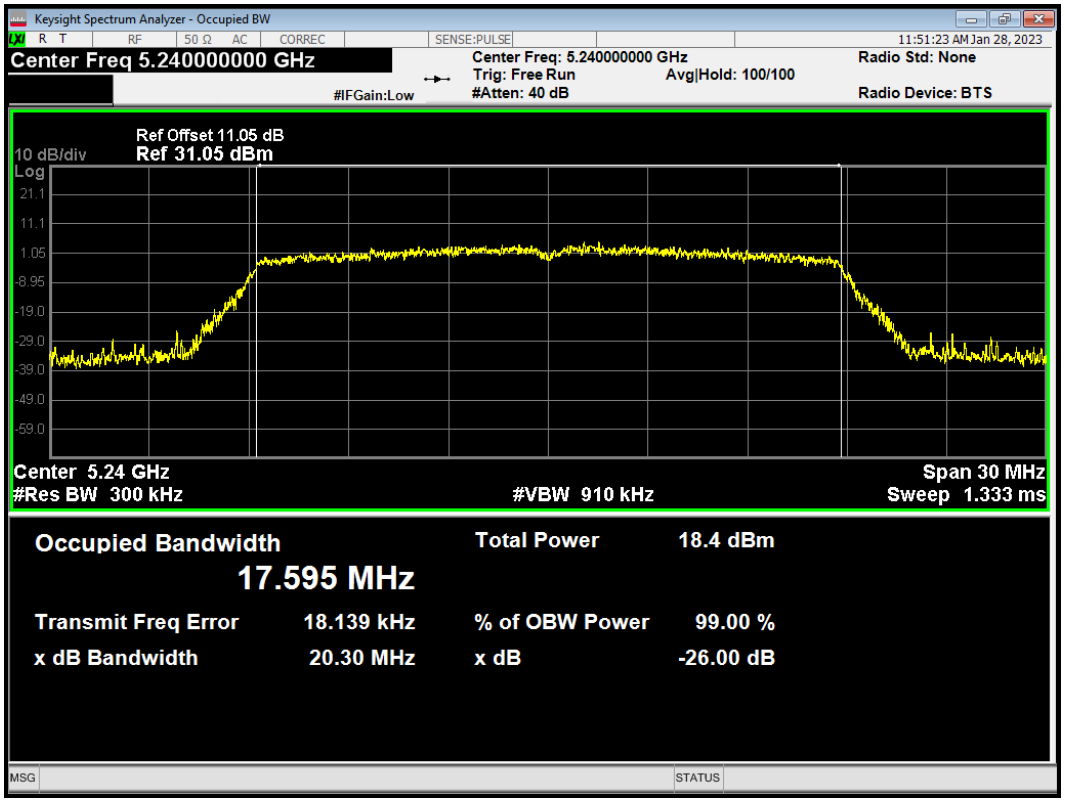
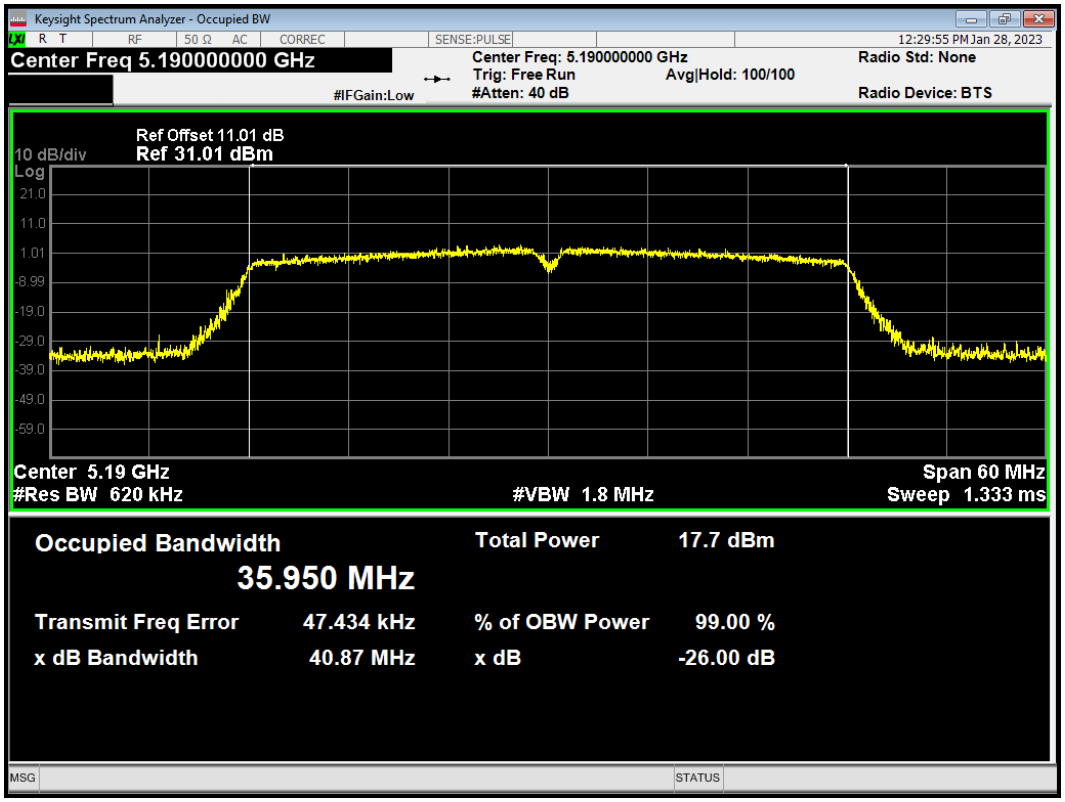
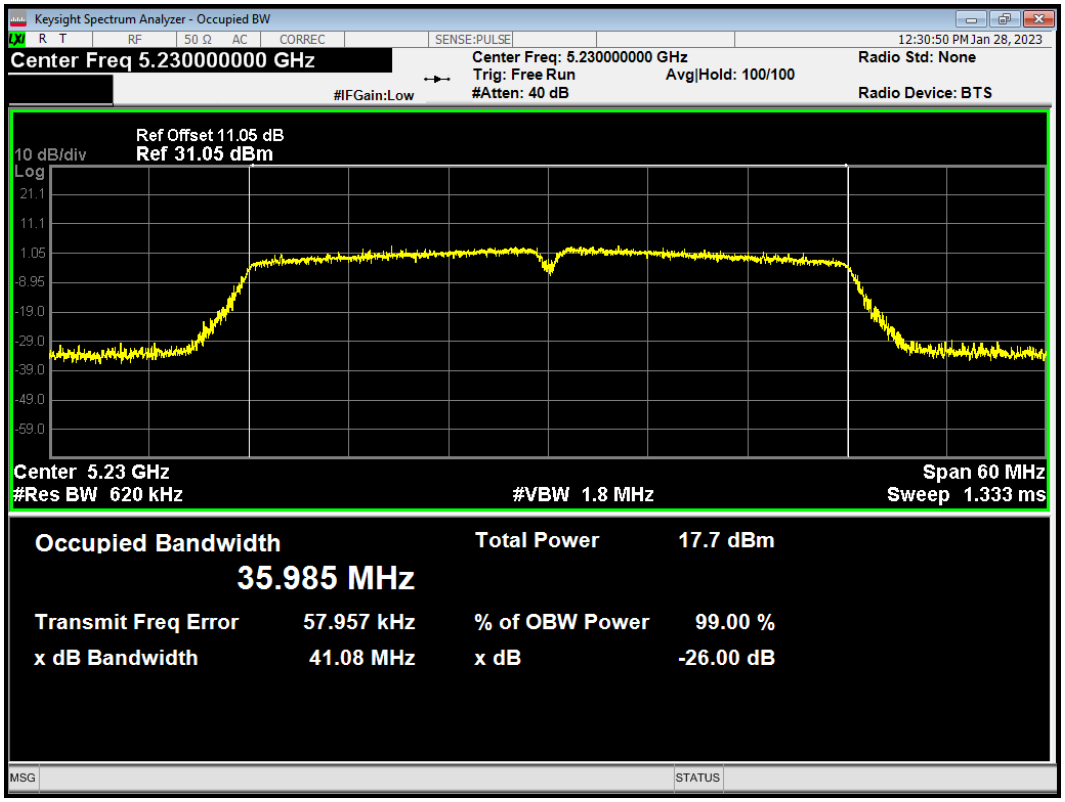


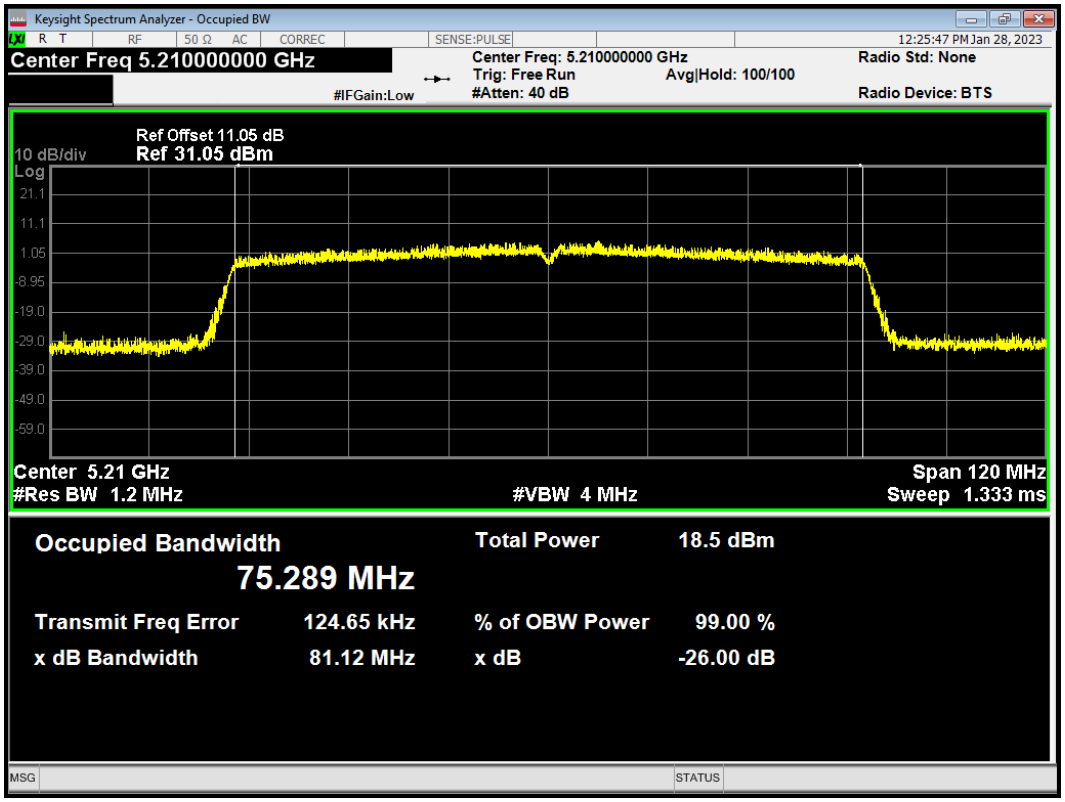
OBW 802.11ac(VHT40) 5190MHz



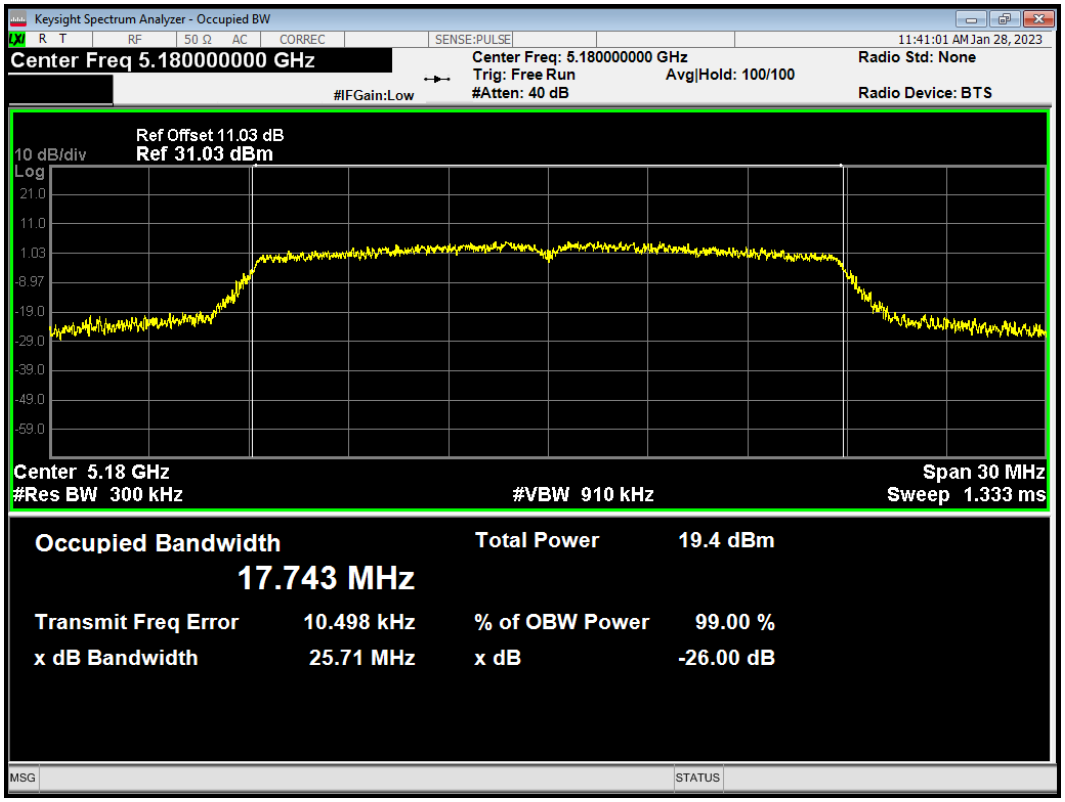
OBW 802.11ac(VHT40) 5230MHz



OBW 802.11ac(VHT80) 5210MHz



OBW 802.11n(HT20) 5180MHz



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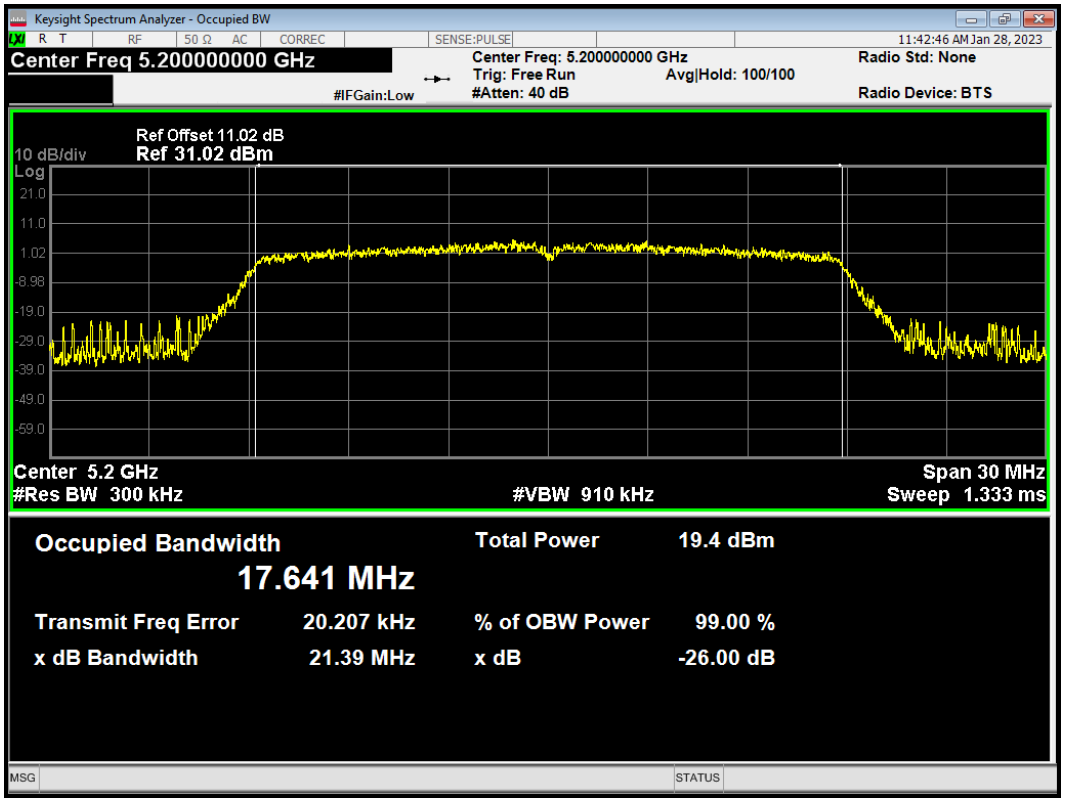
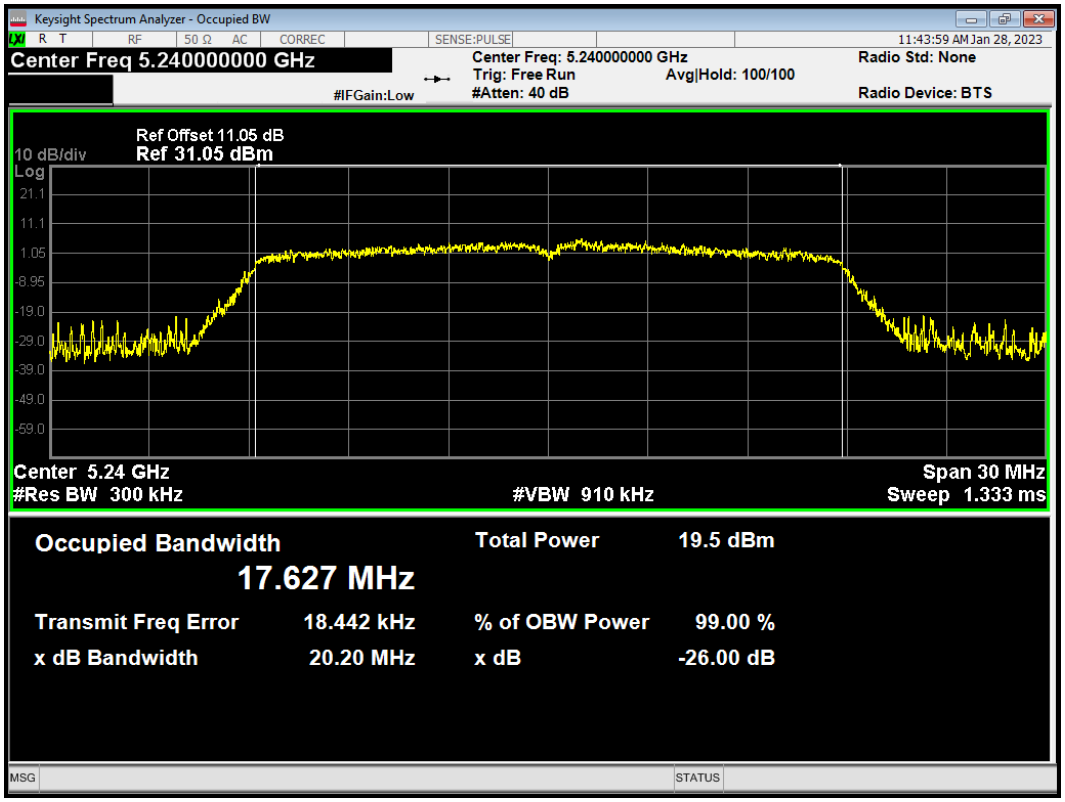
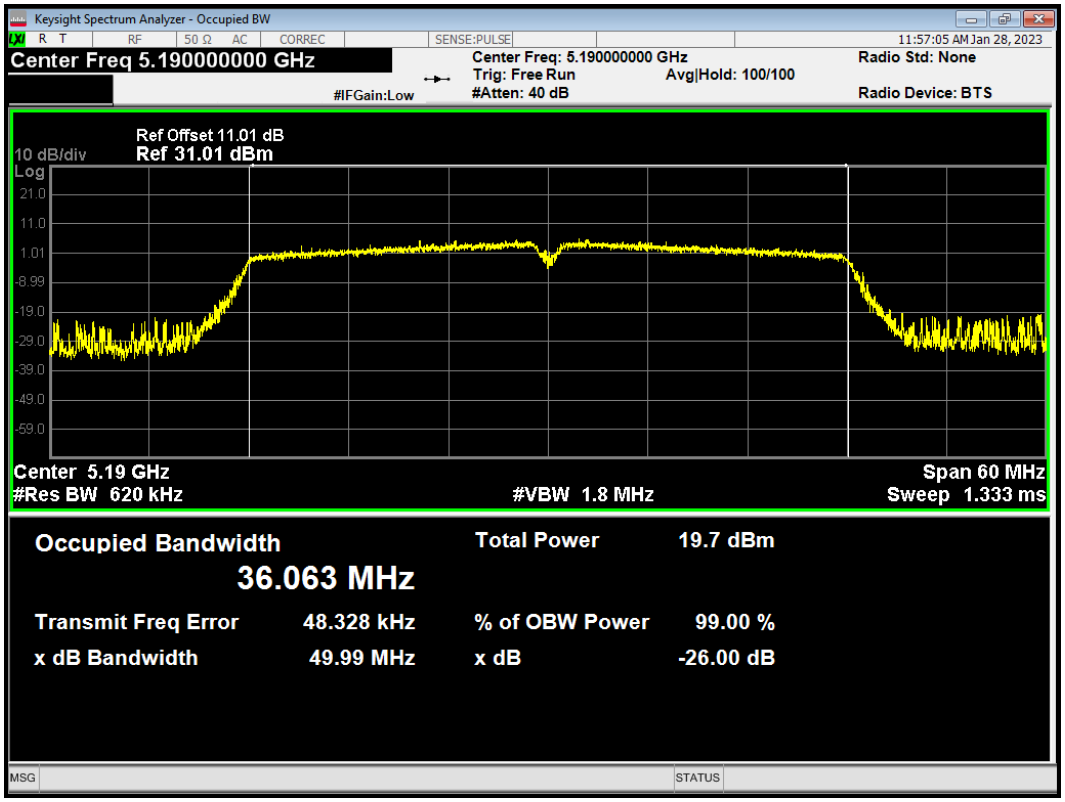


OBW 802.11n(HT20) 5240MHz



OBW 802.11n(HT40) 5190MHz



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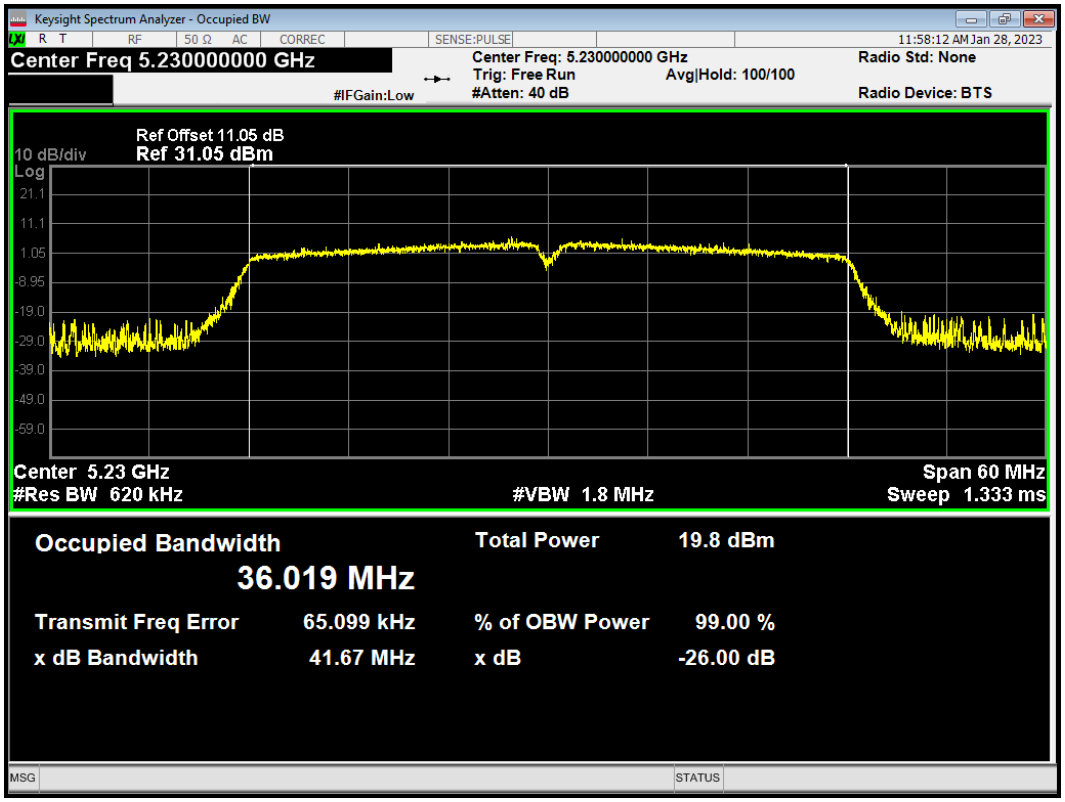
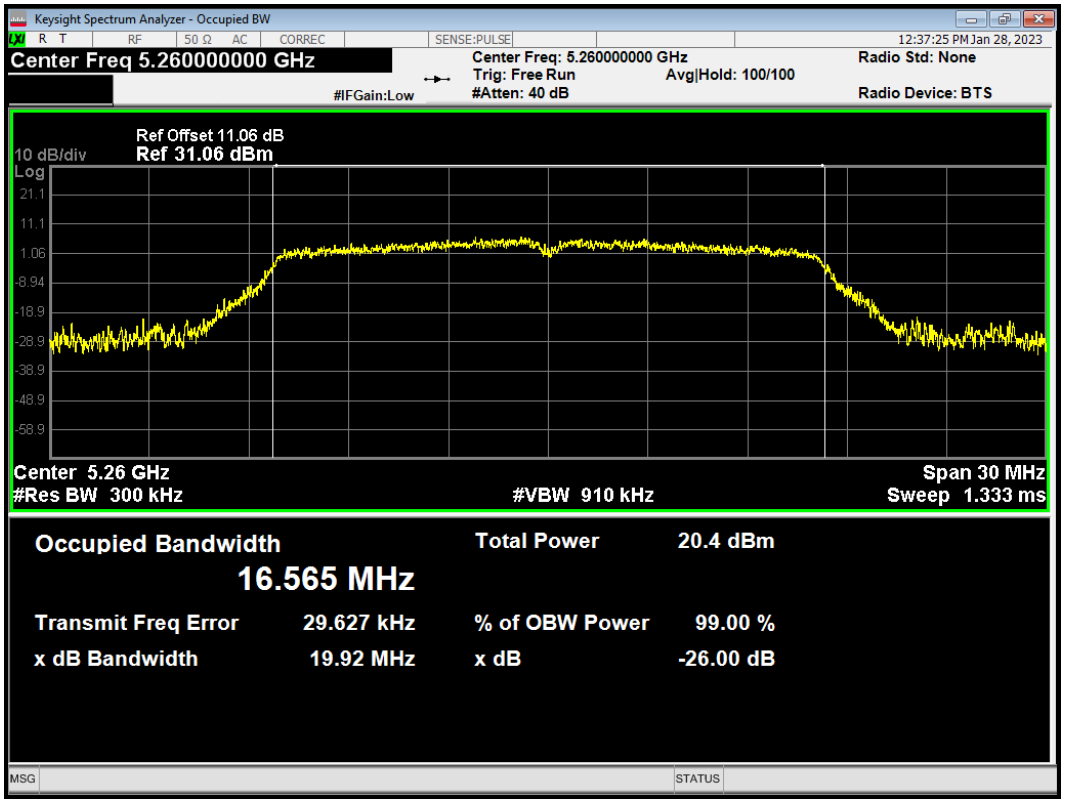
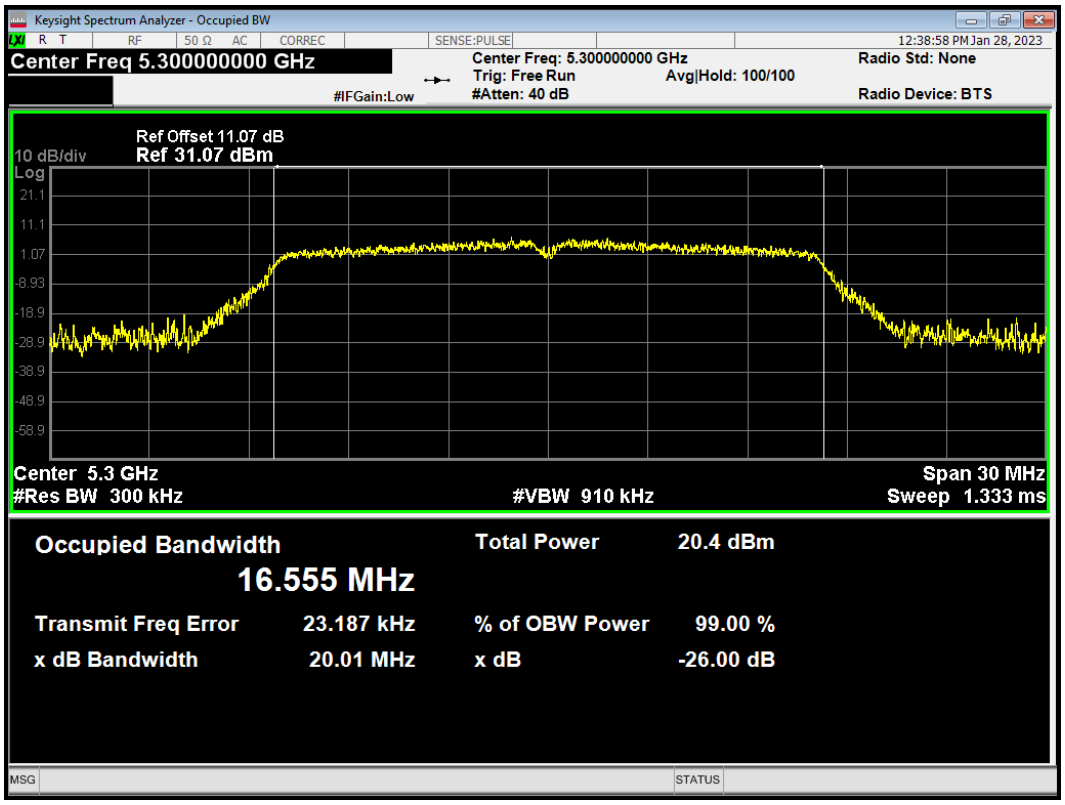


U-NII-2A

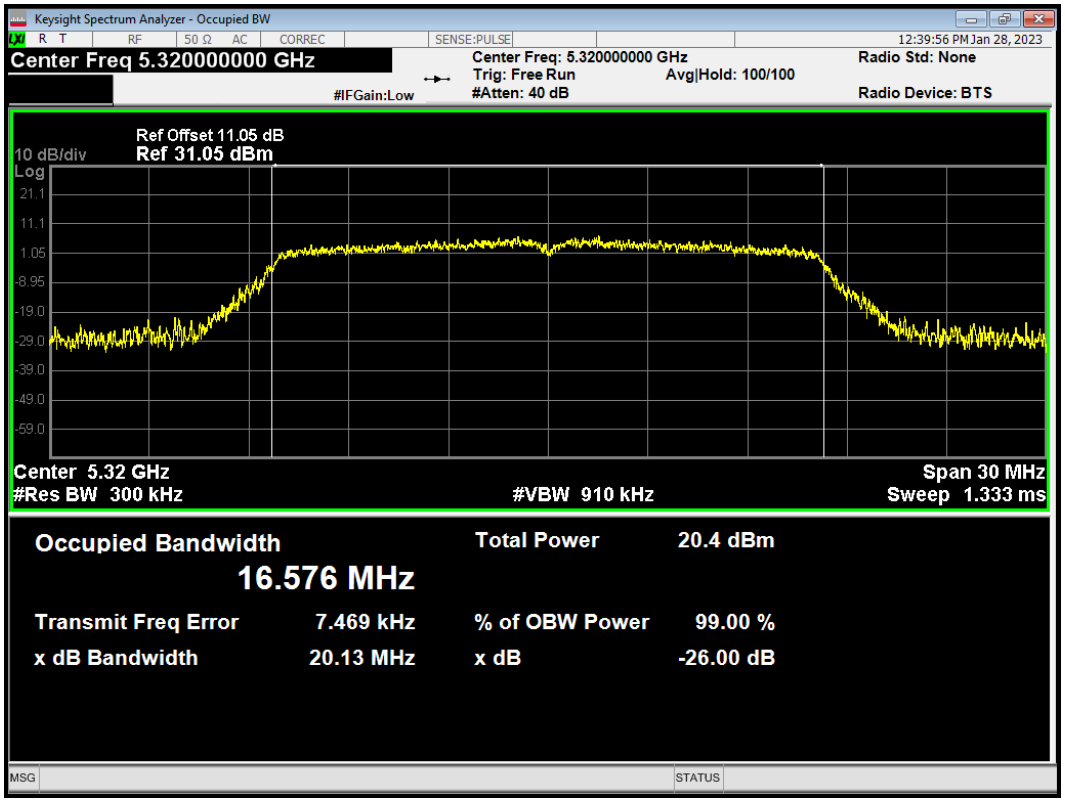
OBW 802.11a 5260MHz



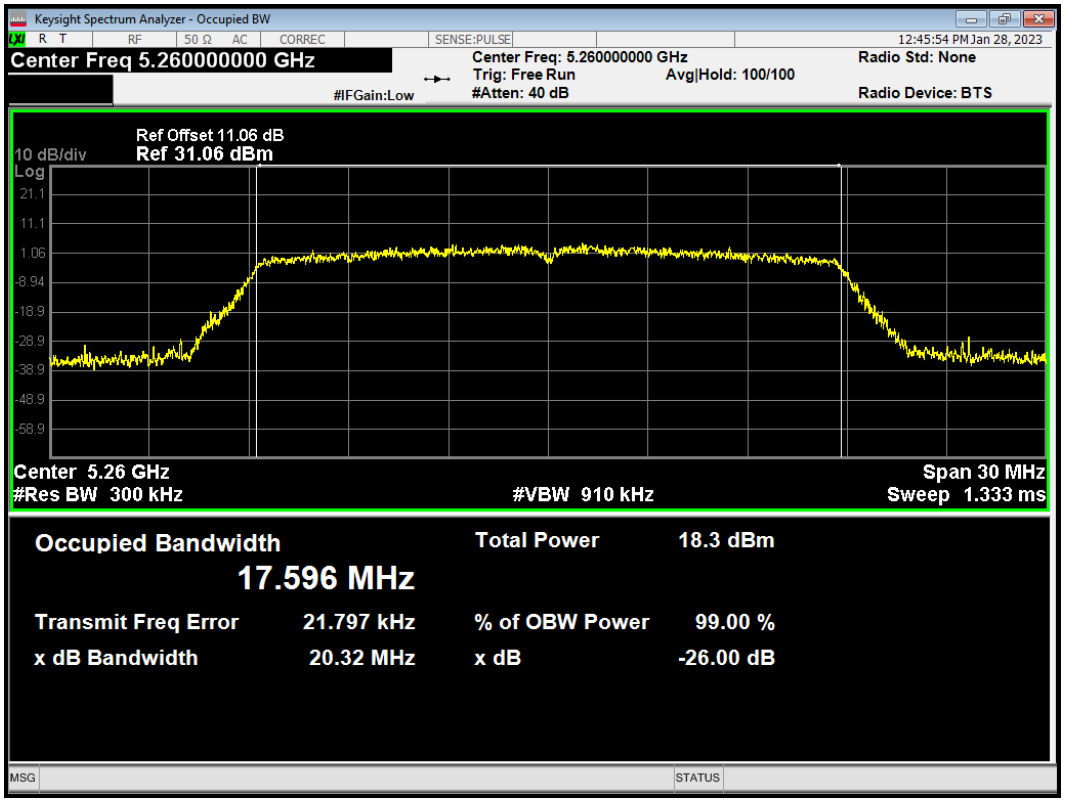
OBW 802.11a 5300MHz



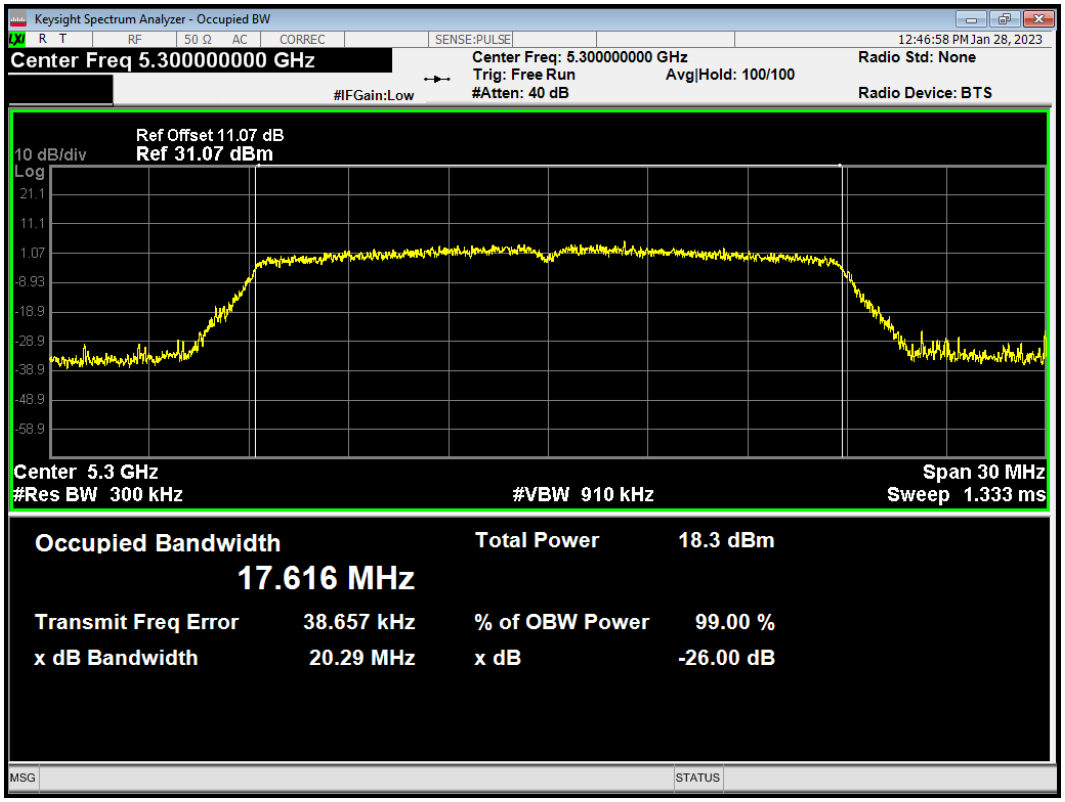
OBW 802.11a 5320MHz



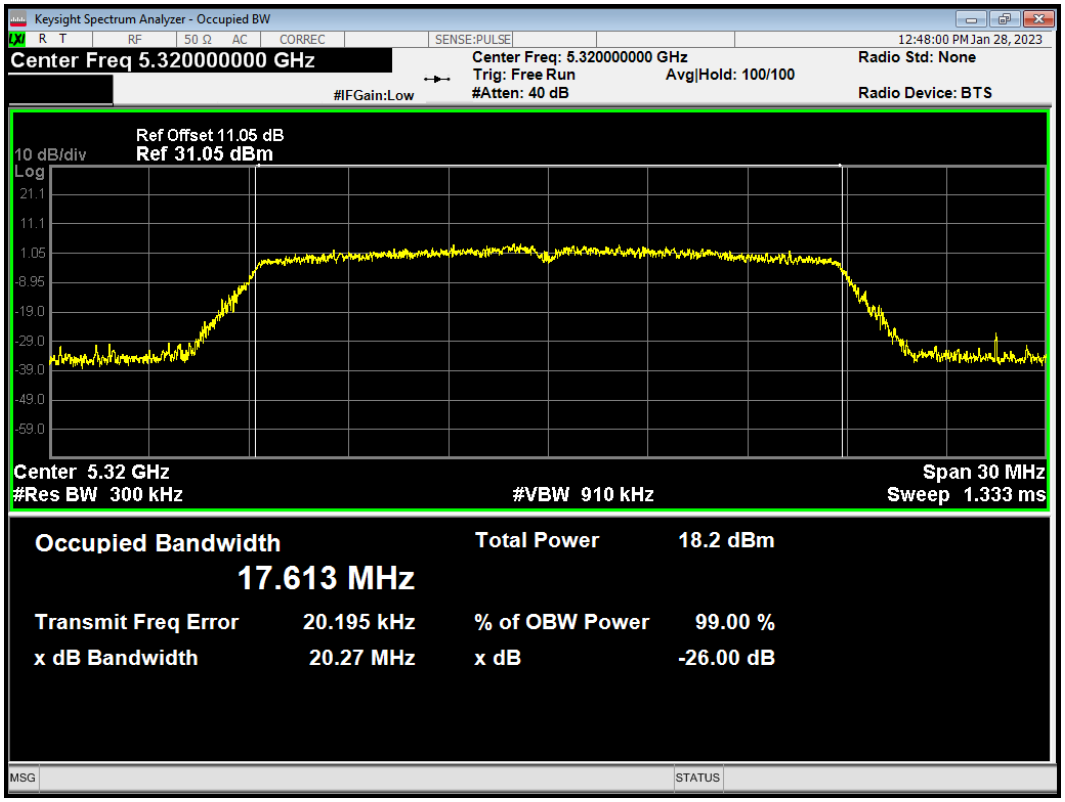
OBW 802.11ac(VHT20) 5260MHz



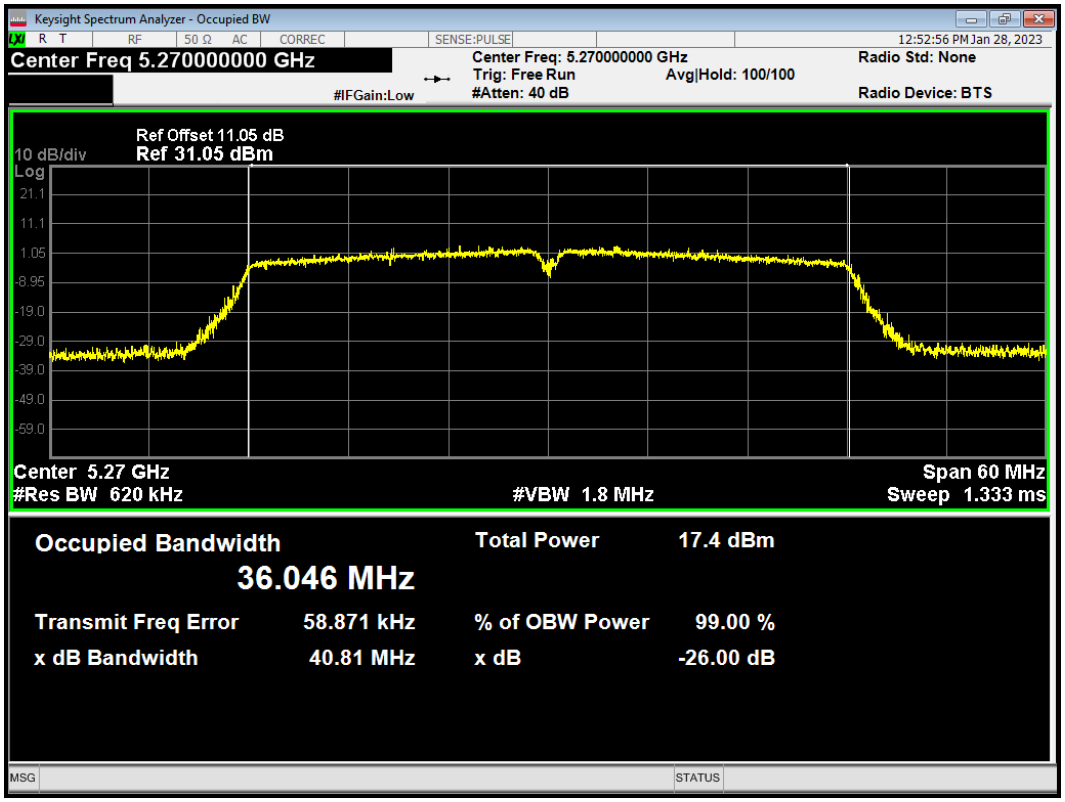
OBW 802.11ac(VHT20) 5300MHz



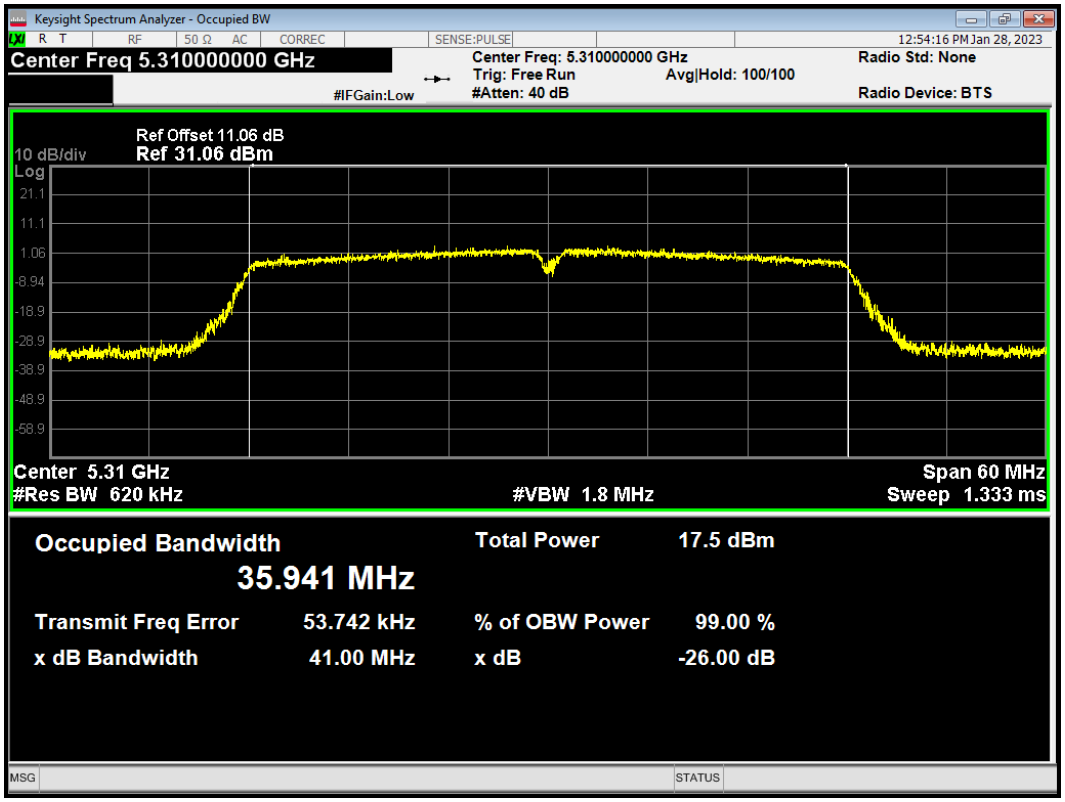
OBW 802.11ac(VHT20) 5320MHz



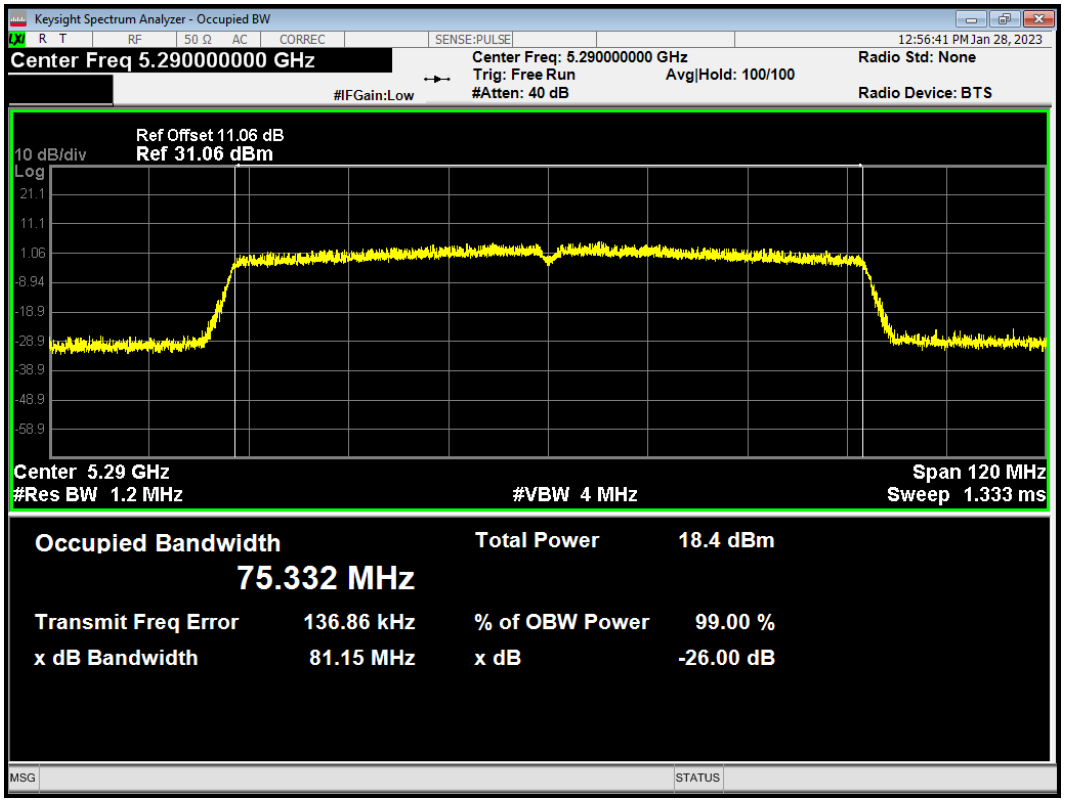
OBW 802.11ac(VHT40) 5270MHz



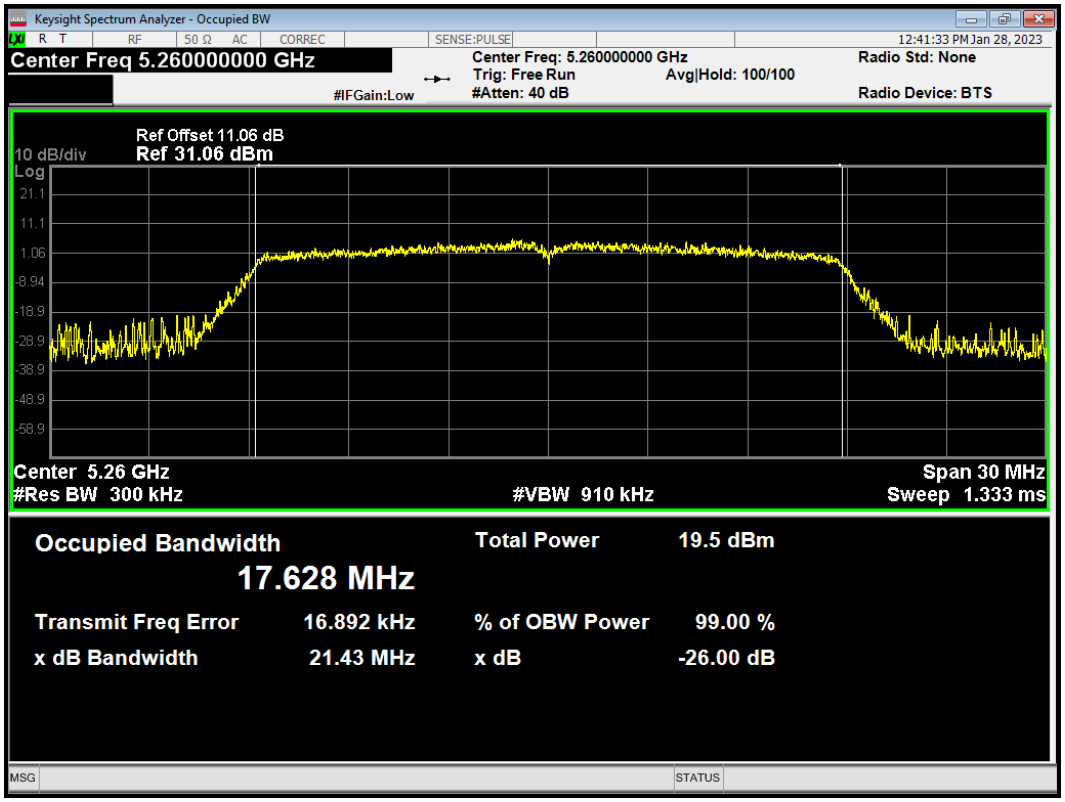
OBW 802.11ac(VHT40) 5310MHz



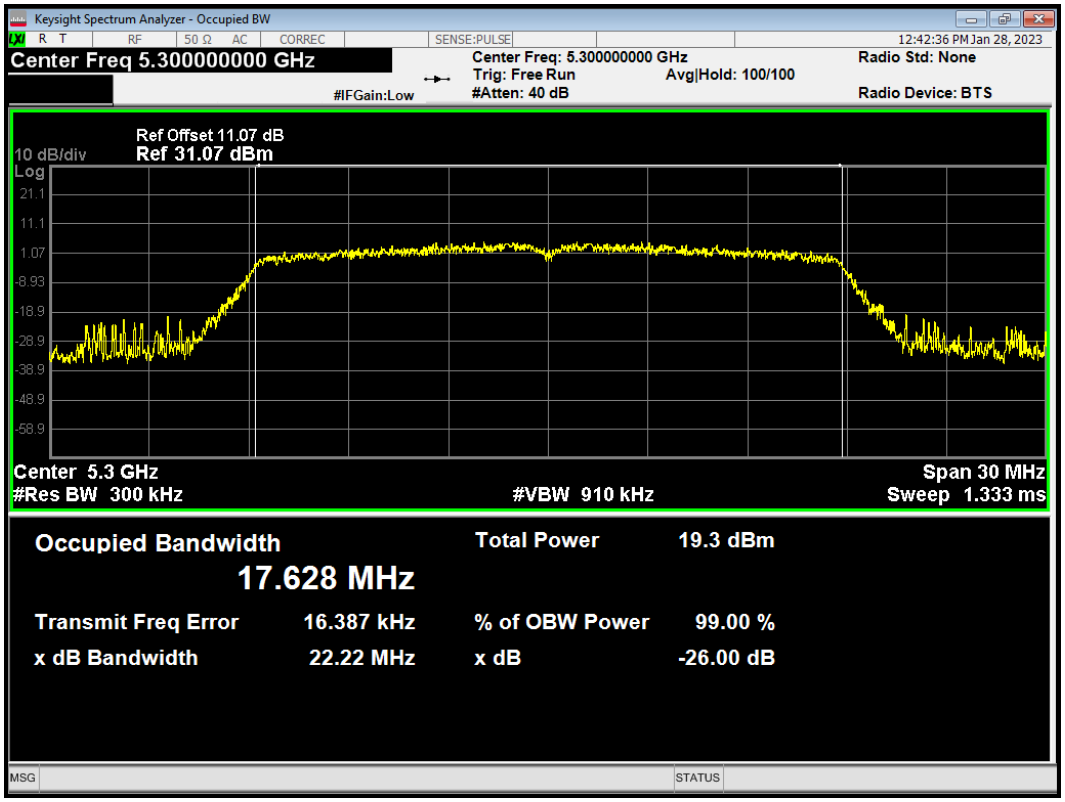
OBW 802.11ac(VHT80) 5290MHz



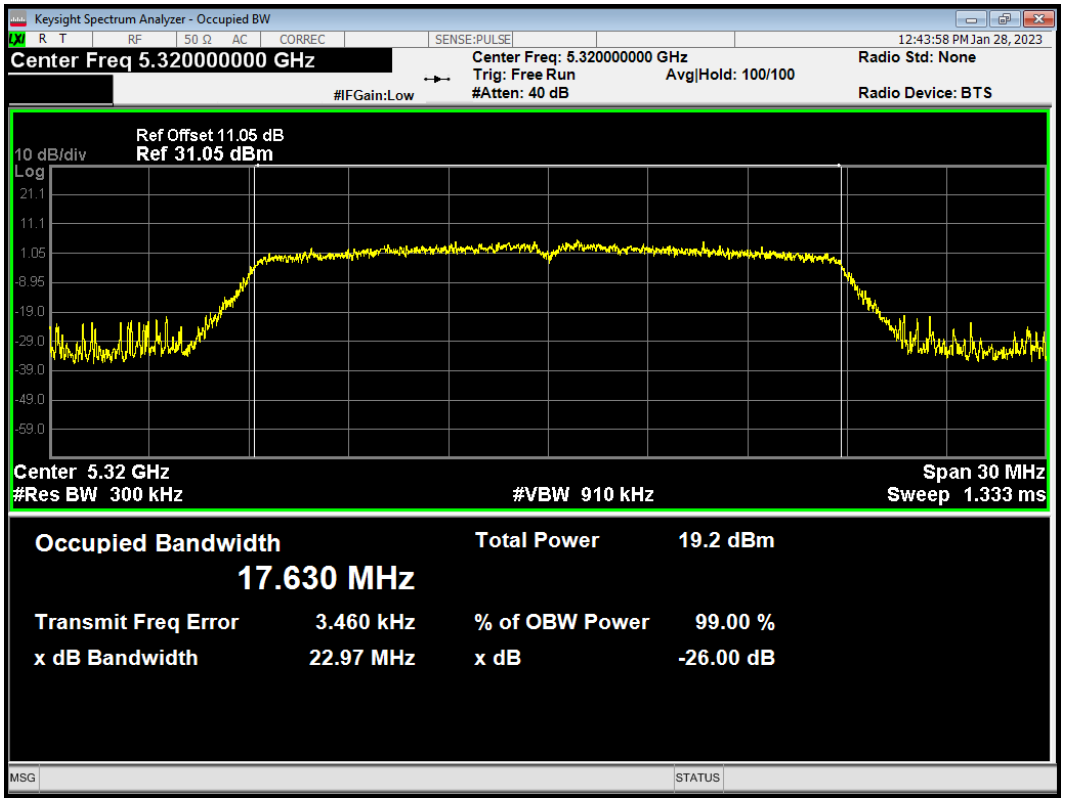
OBW 802.11n(HT20) 5260MHz



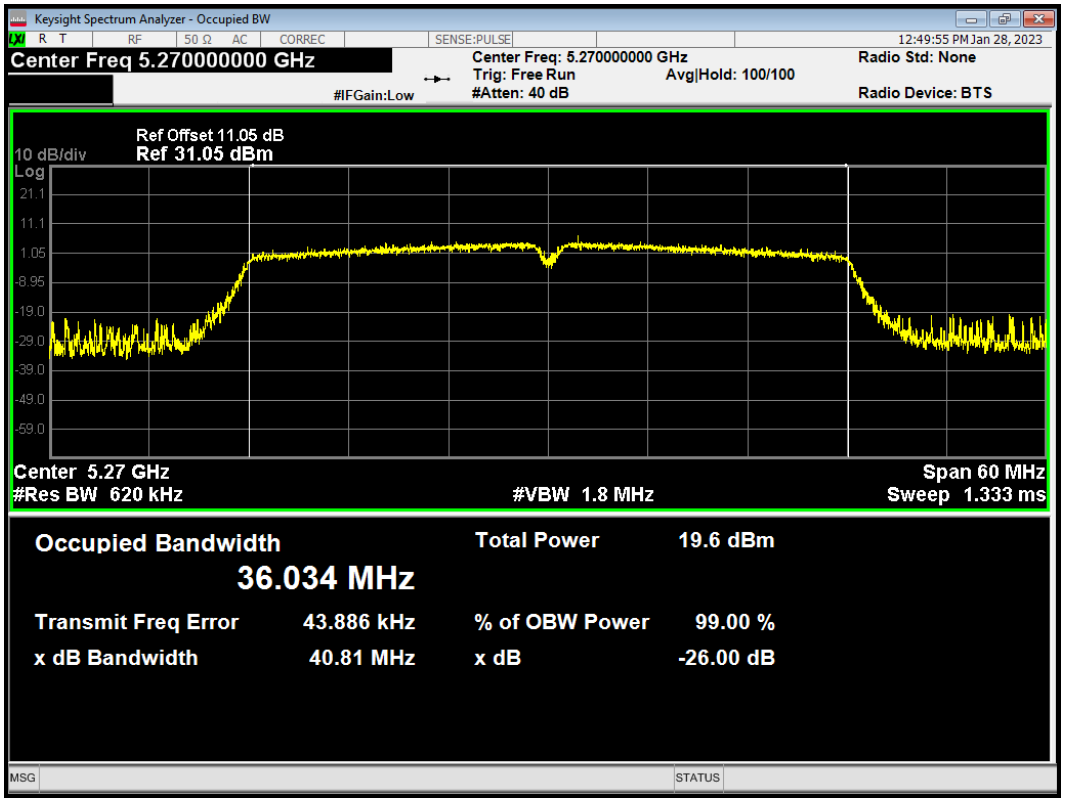
OBW 802.11n(HT20) 5300MHz



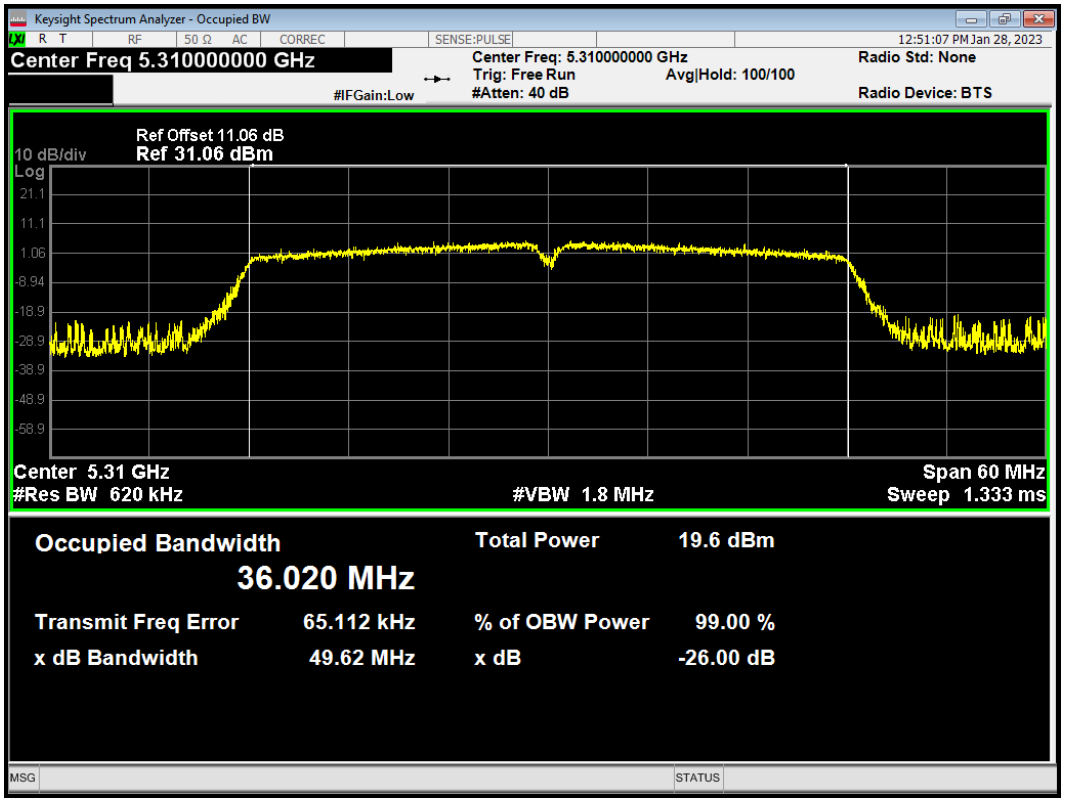
OBW 802.11n(HT20) 5320MHz



OBW 802.11n(HT40) 5270MHz

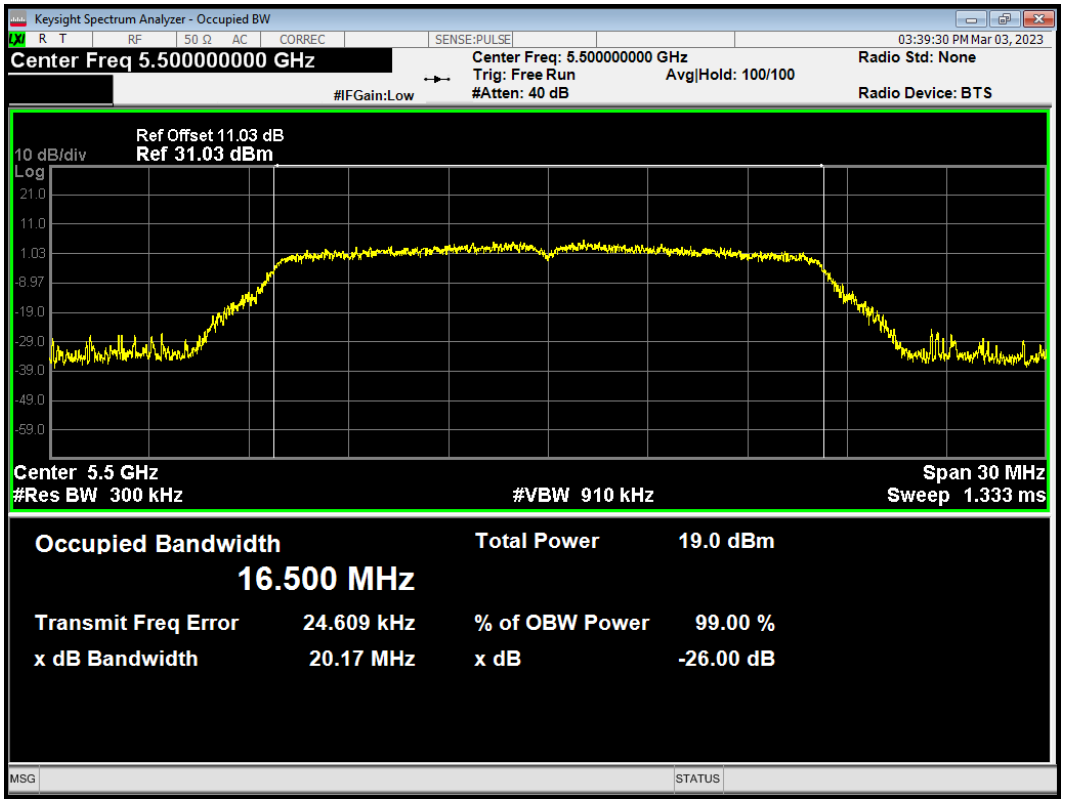


OBW 802.11n(HT40) 5310MHz

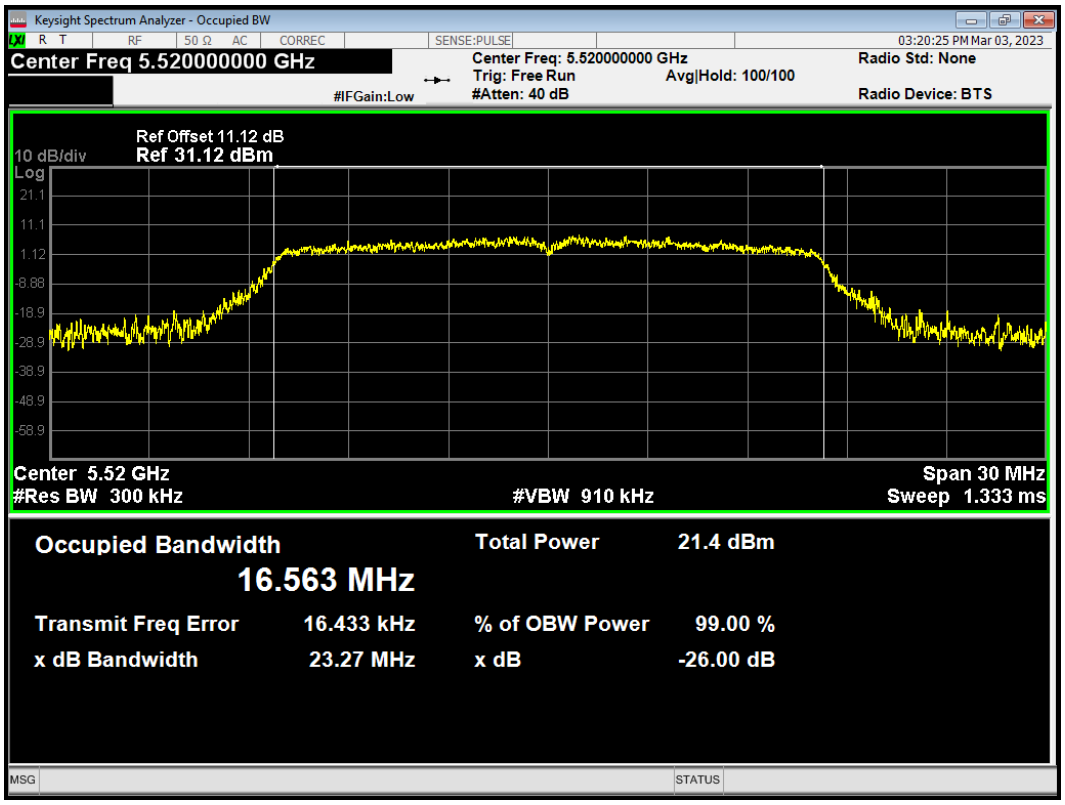


U-NII-2C

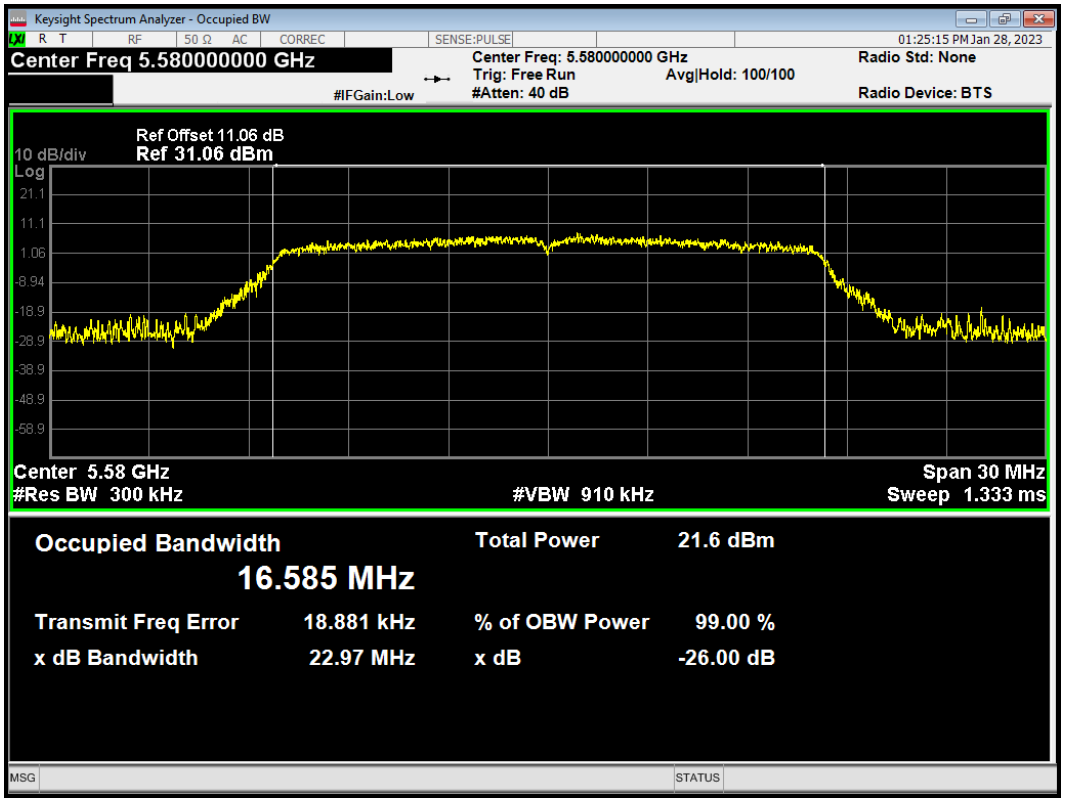
OBW 802.11a 5500MHz



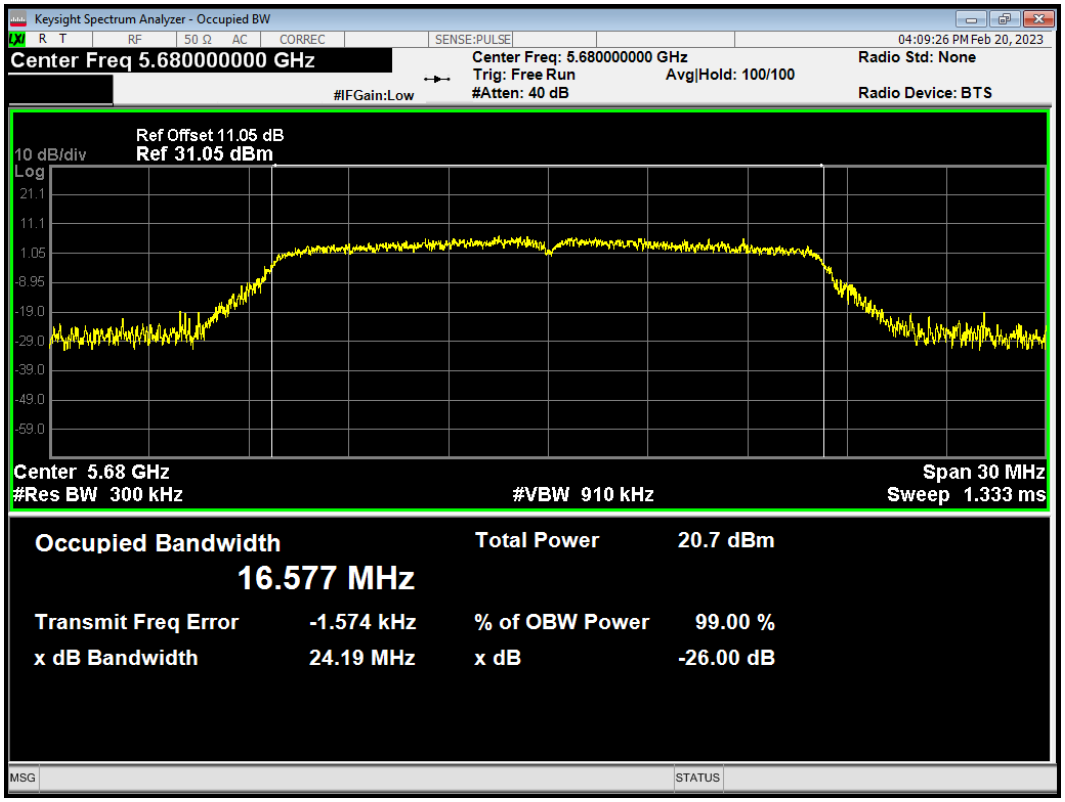
OBW 802.11a 5520MHz



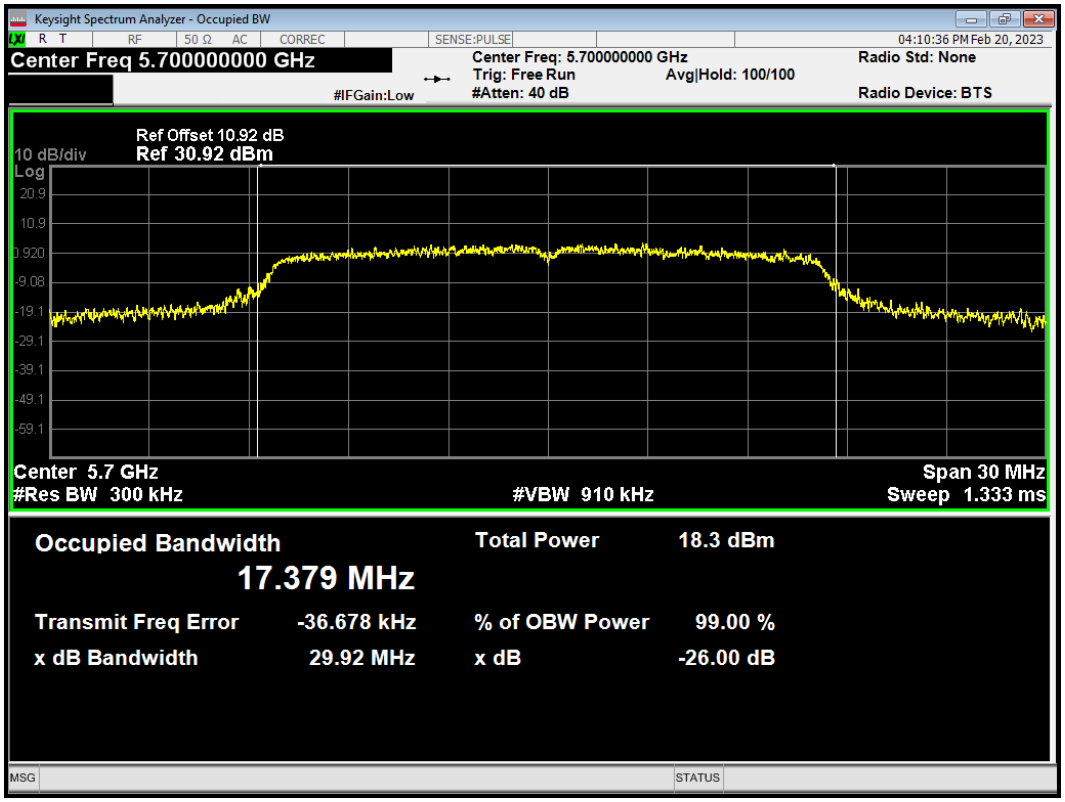
OBW 802.11a 5580MHz



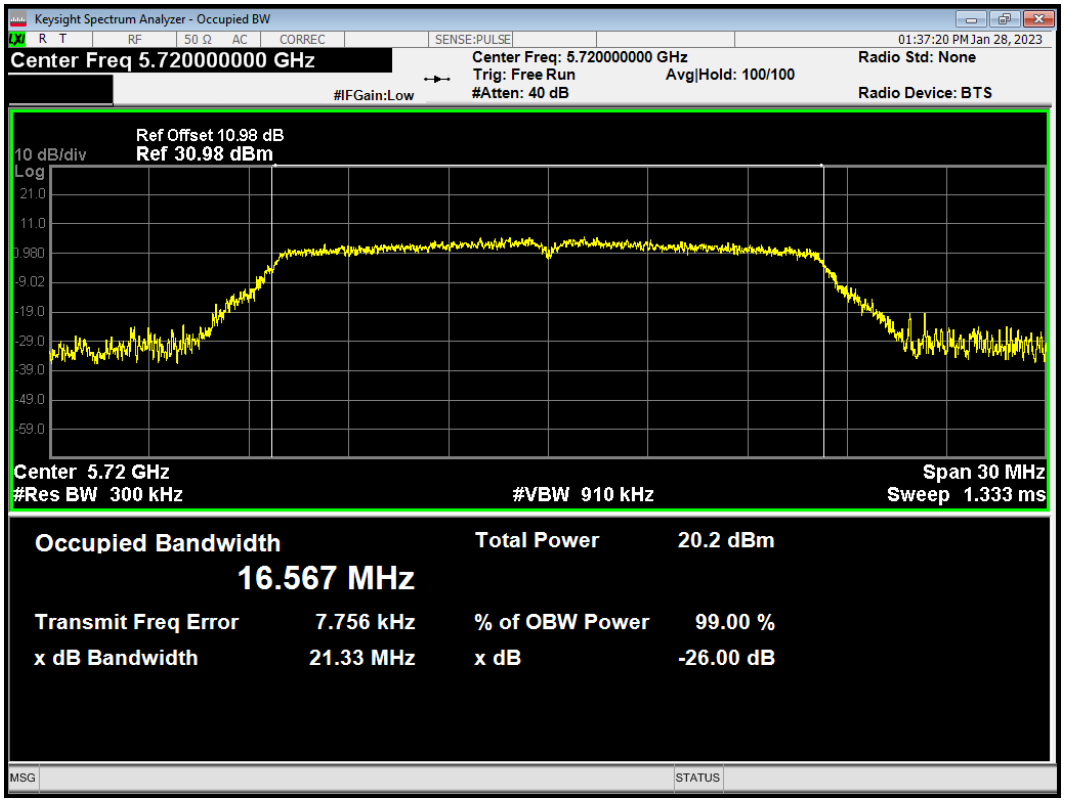
OBW 802.11a 5680MHz



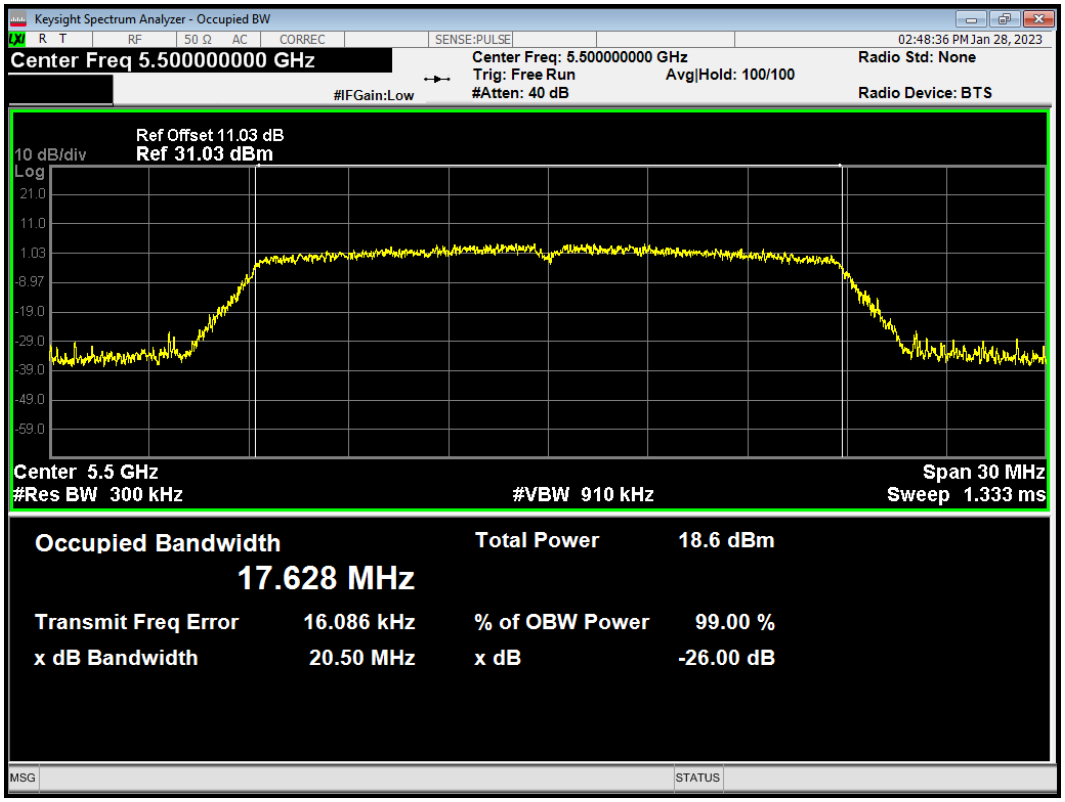
OBW 802.11a 5700MHz



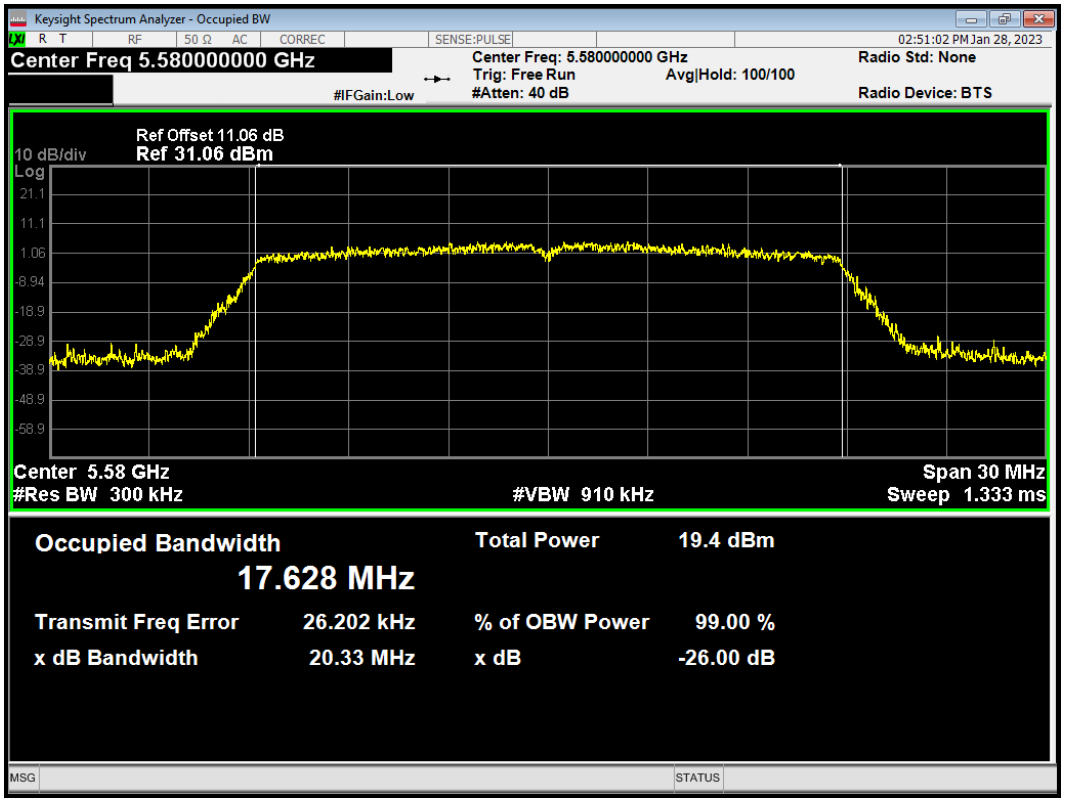
OBW 802.11a 5720MHz



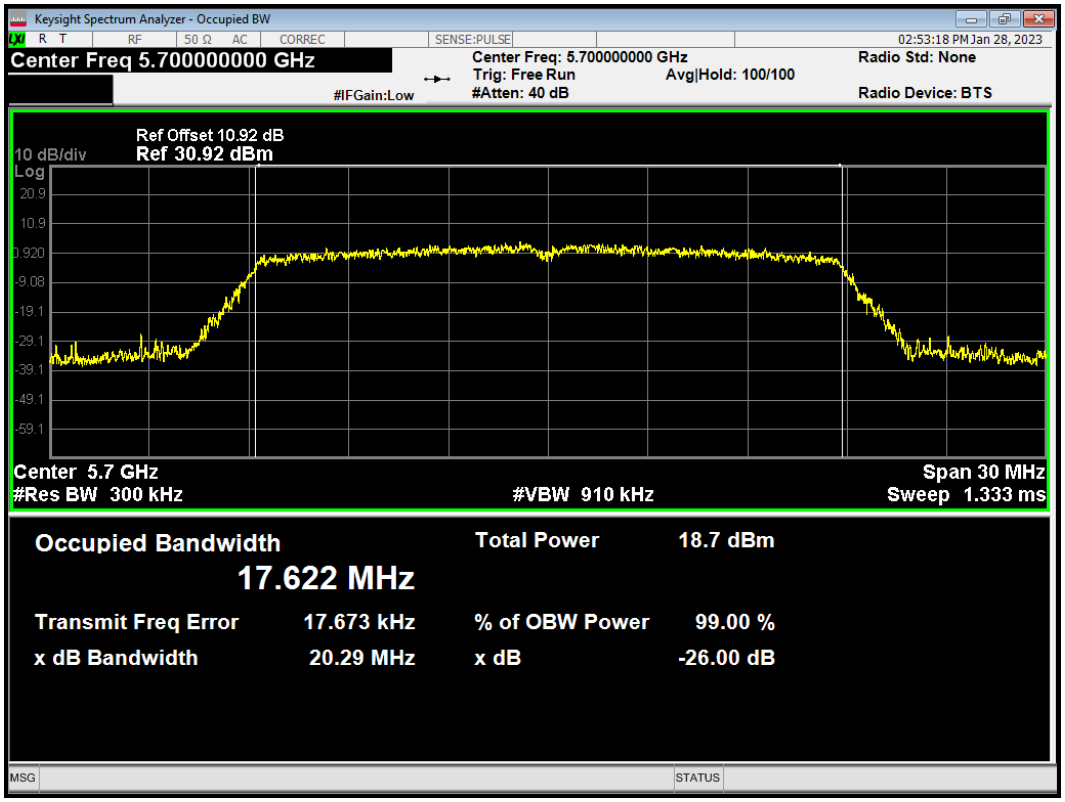
OBW 802.11ac(VHT20) 5500MHz



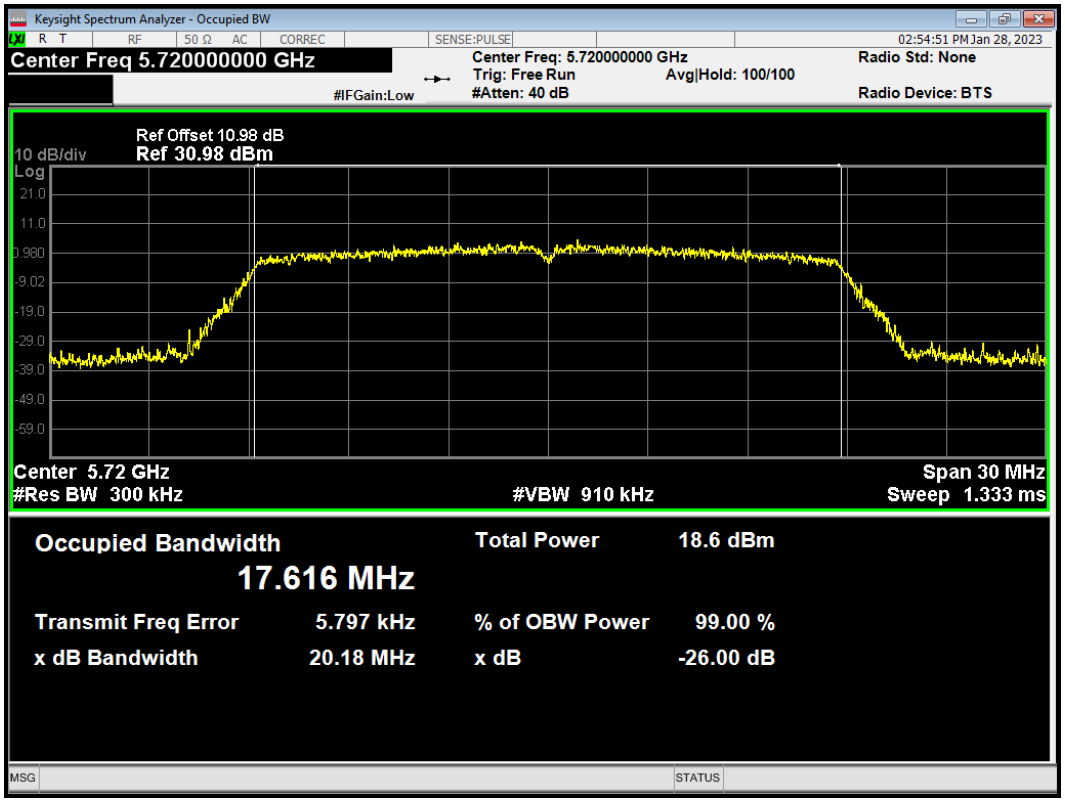
OBW 802.11ac(VHT20) 5580MHz



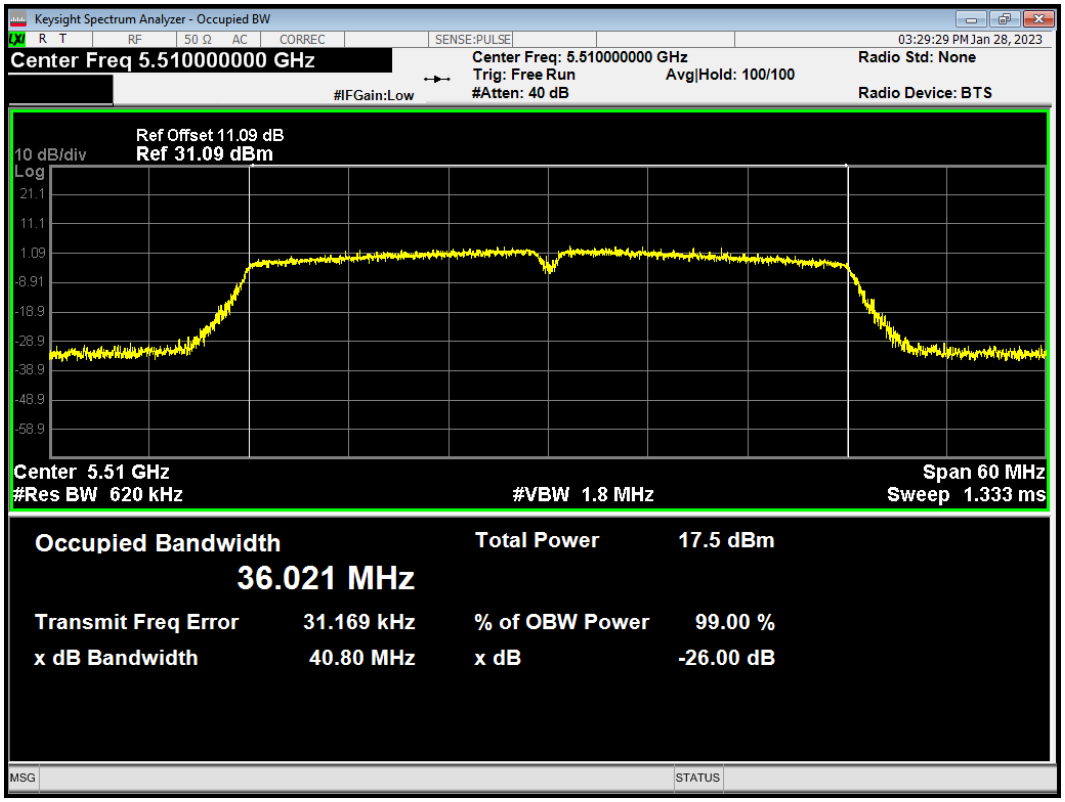
OBW 802.11ac(VHT20) 5700MHz



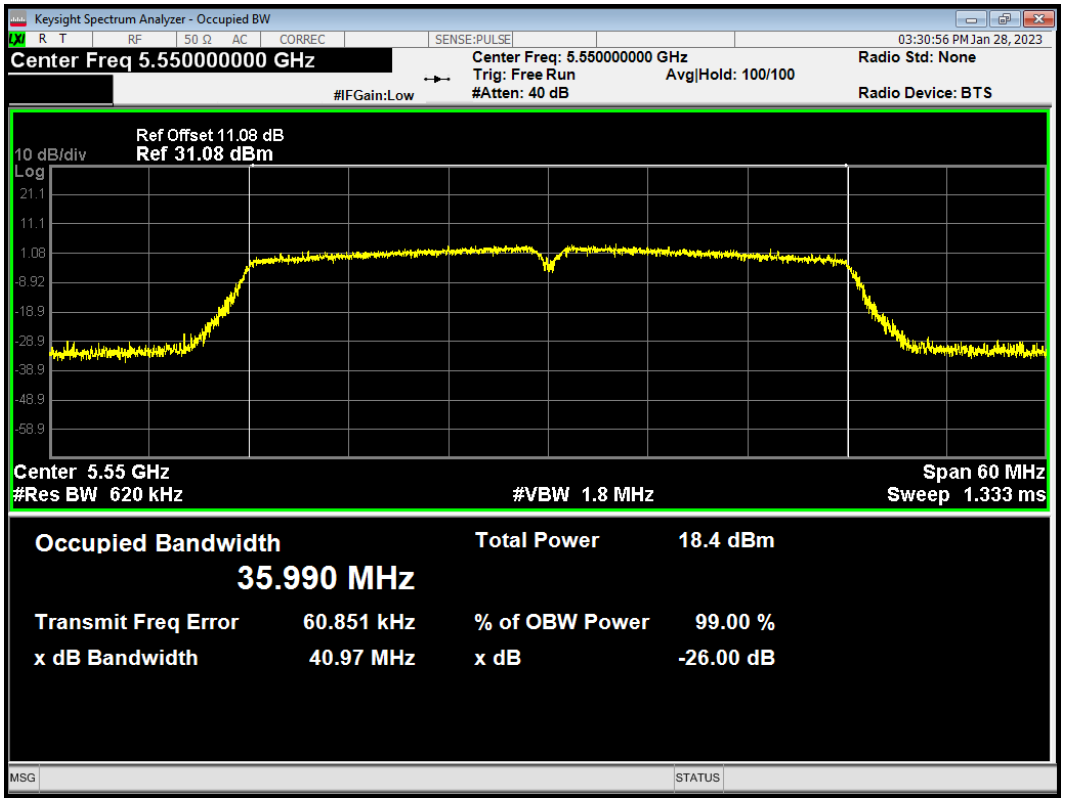
OBW 802.11ac(VHT20) 5720MHz



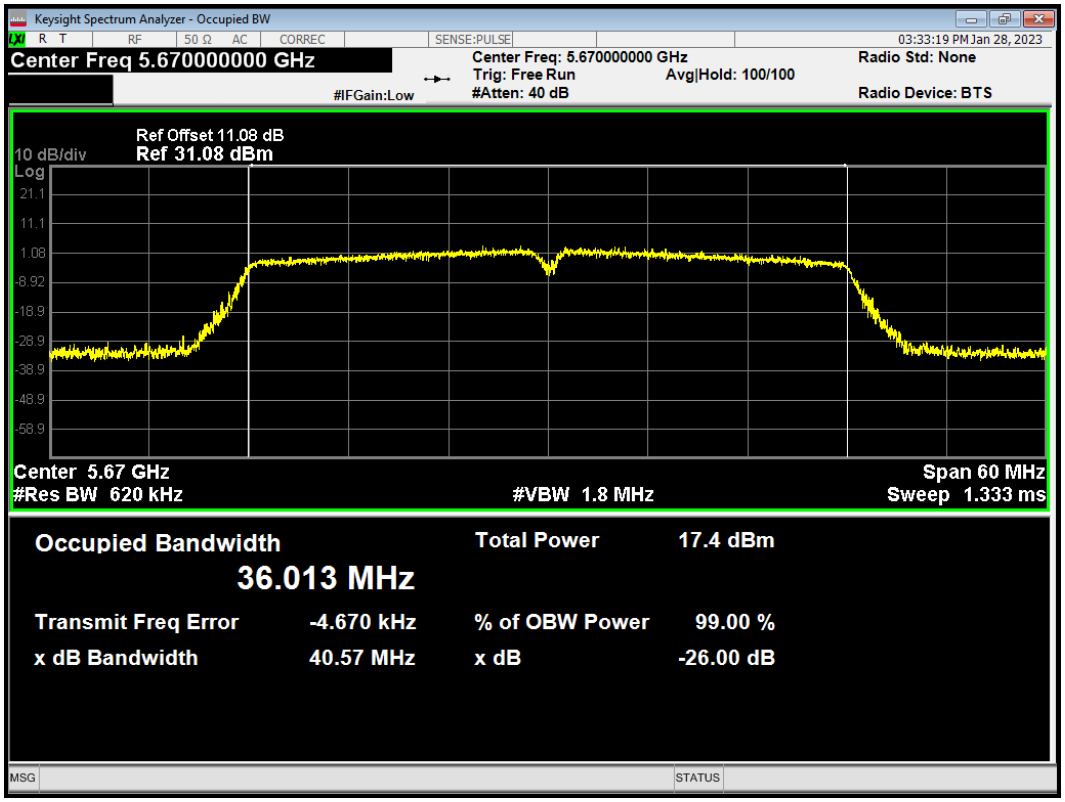
OBW 802.11ac(VHT40) 5510MHz



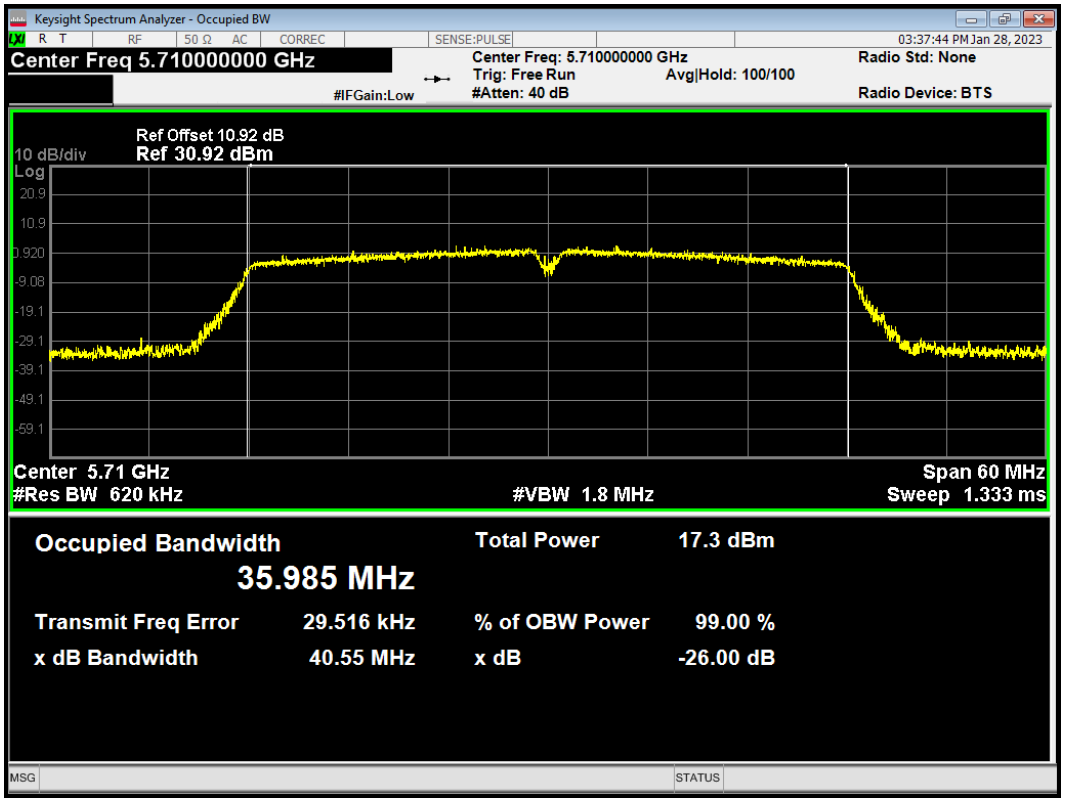
OBW 802.11ac(VHT40) 5550MHz



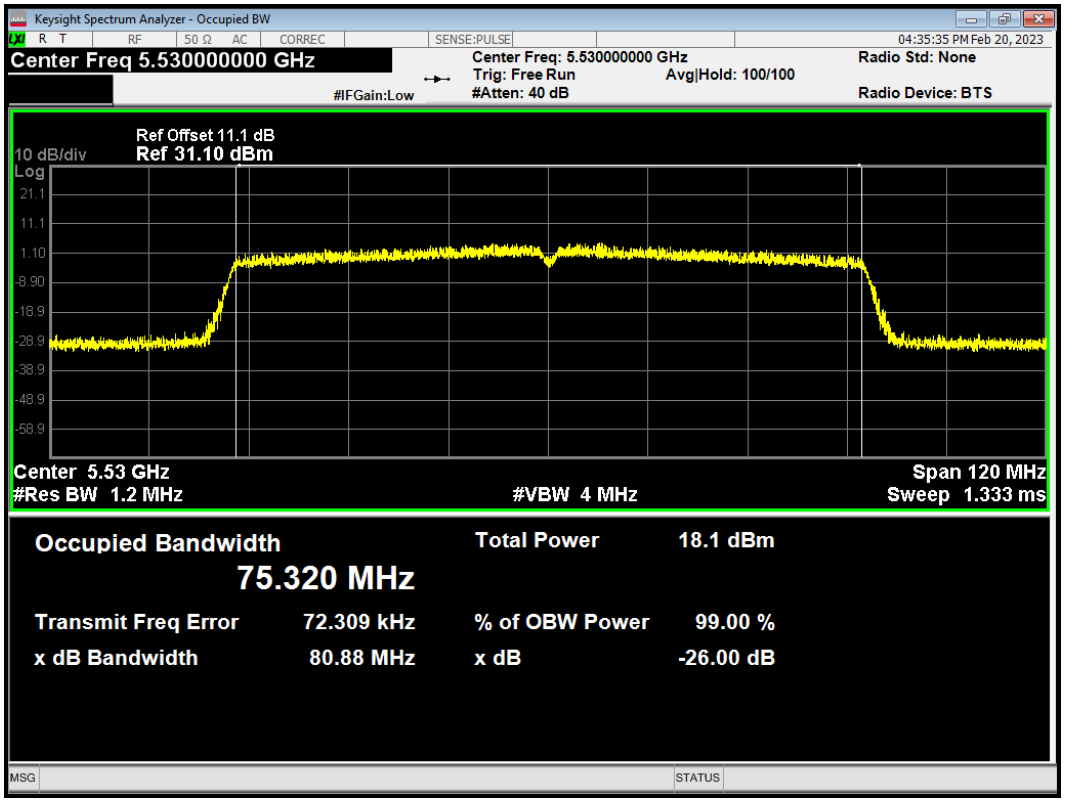
OBW 802.11ac(VHT40) 5670MHz



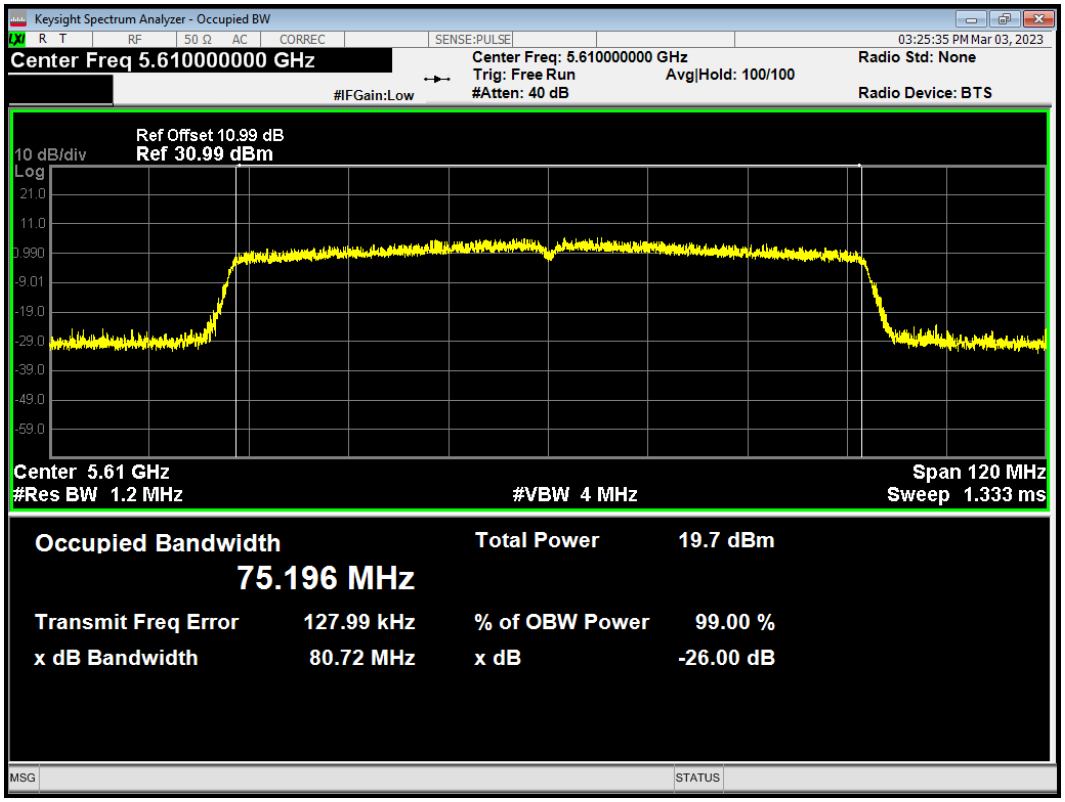
OBW 802.11ac(VHT40) 5710MHz



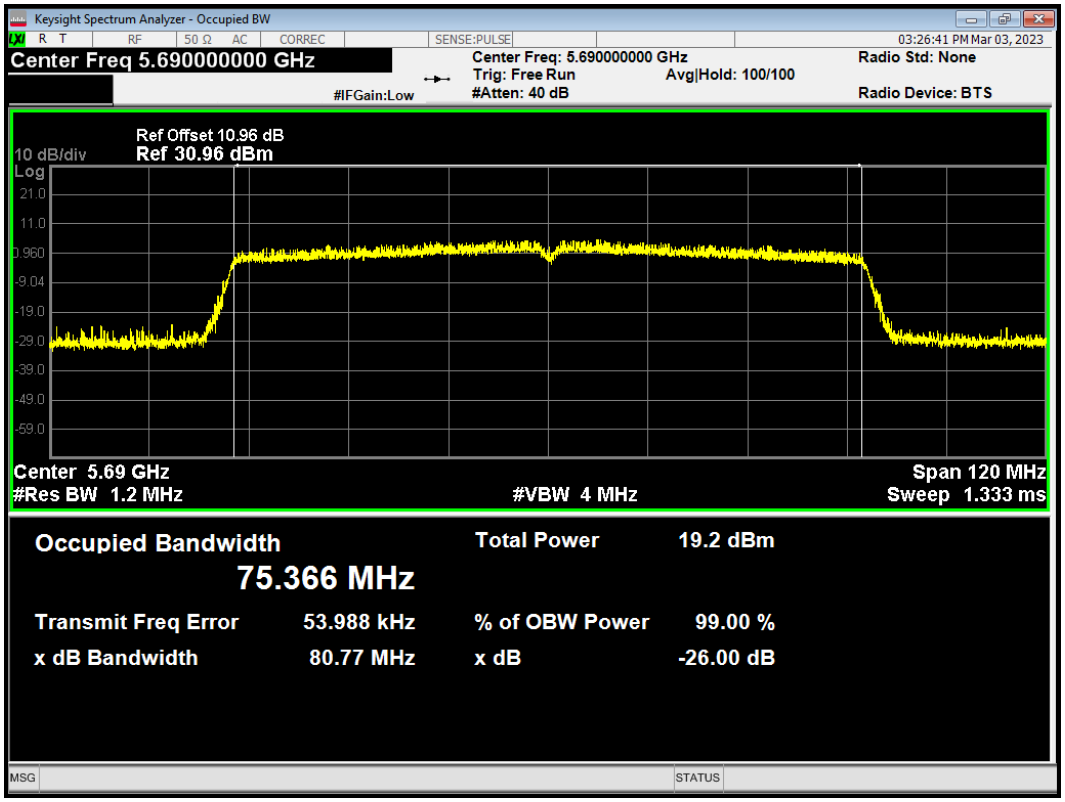
OBW 802.11ac(VHT80) 5530MHz



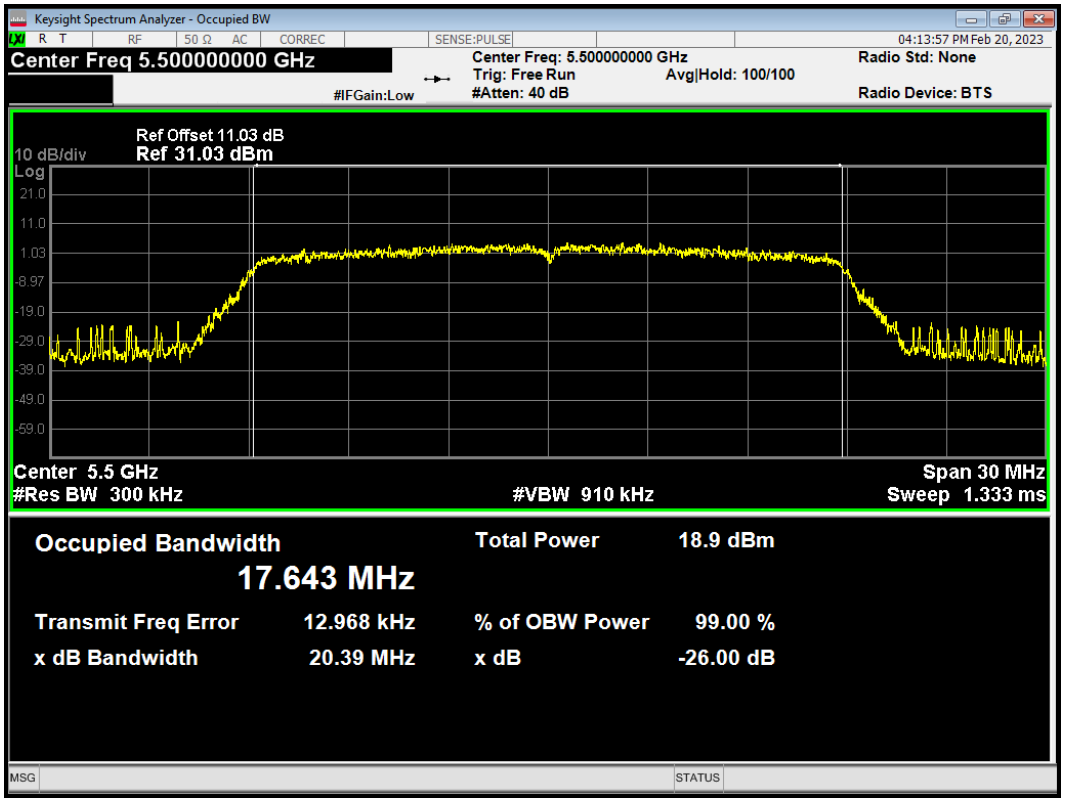
OBW 802.11ac(VHT80) 5610MHz



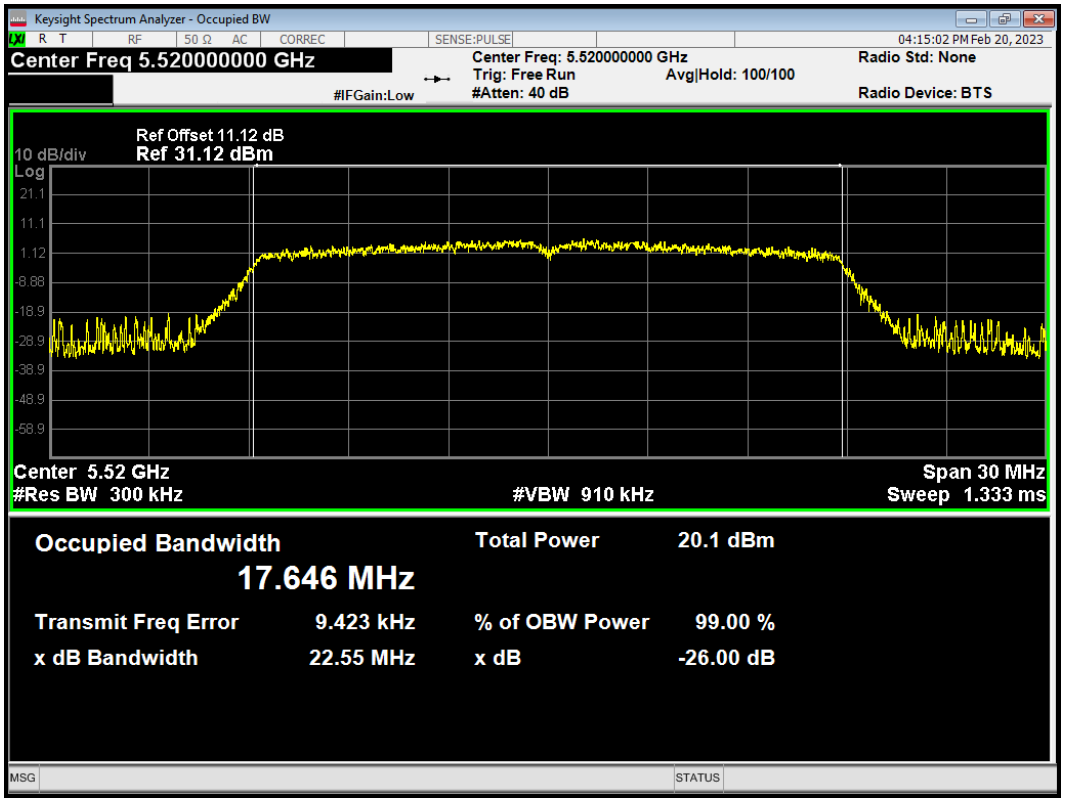
OBW 802.11ac(VHT80) 5690MHz



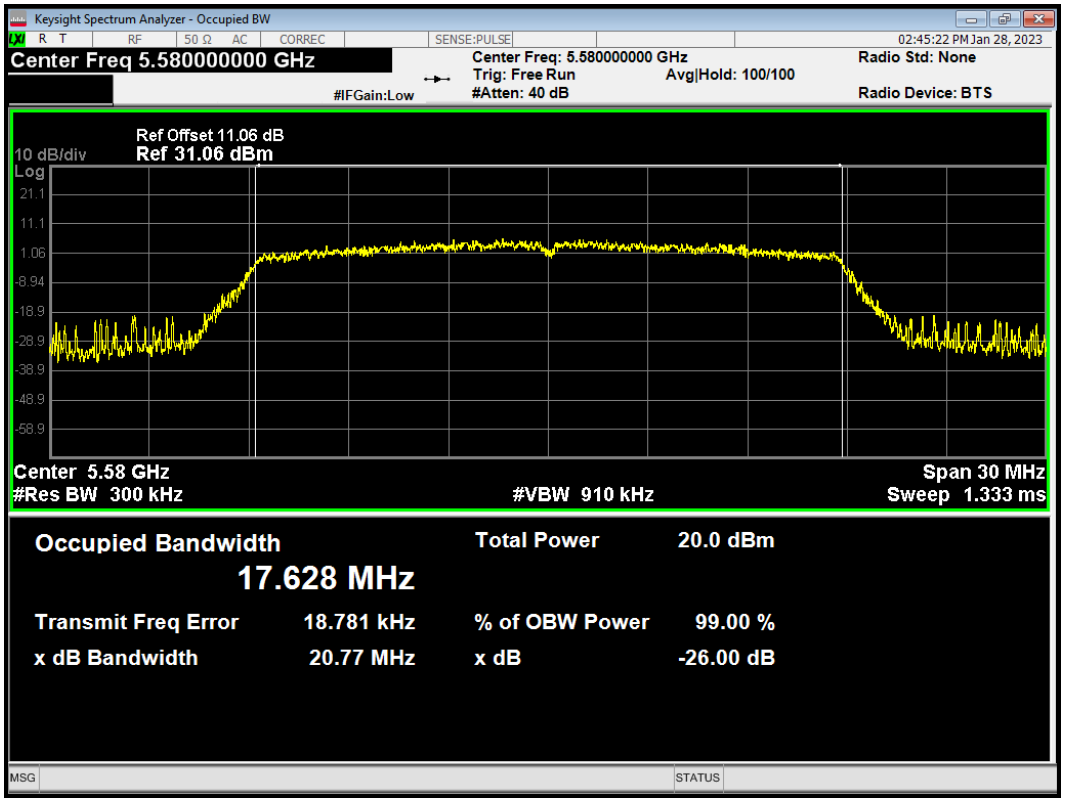
OBW 802.11n(HT20) 5500MHz



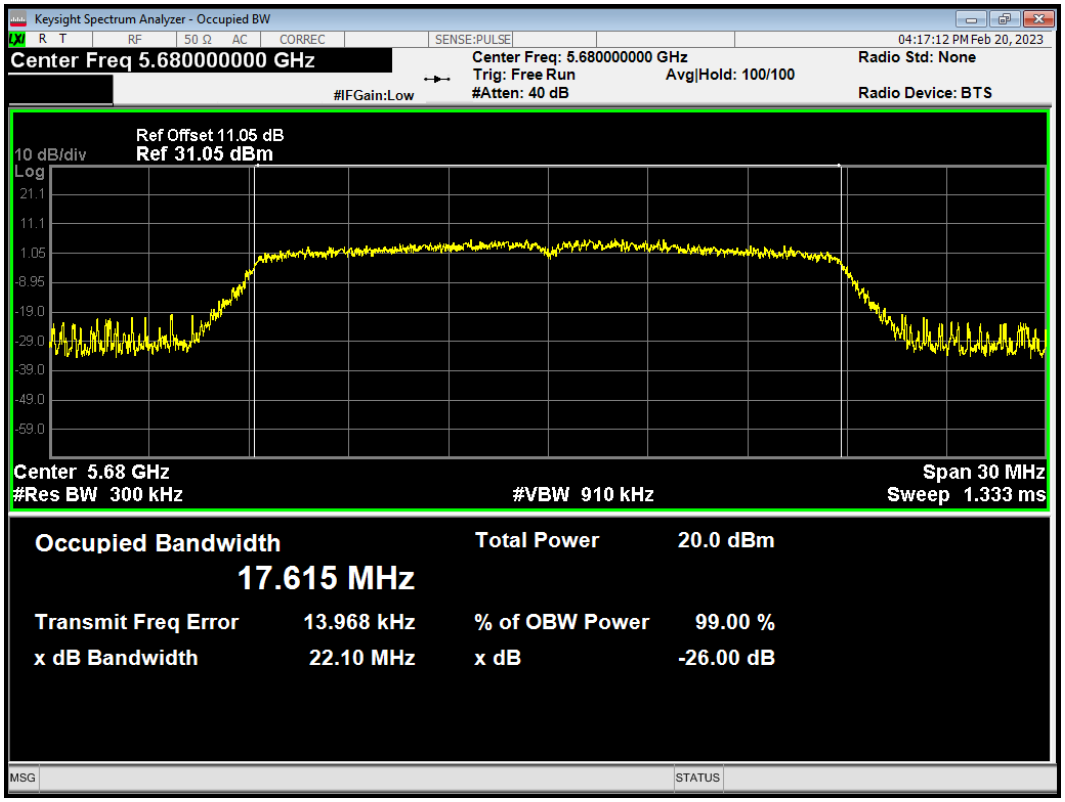
OBW 802.11n(HT20) 5520MHz



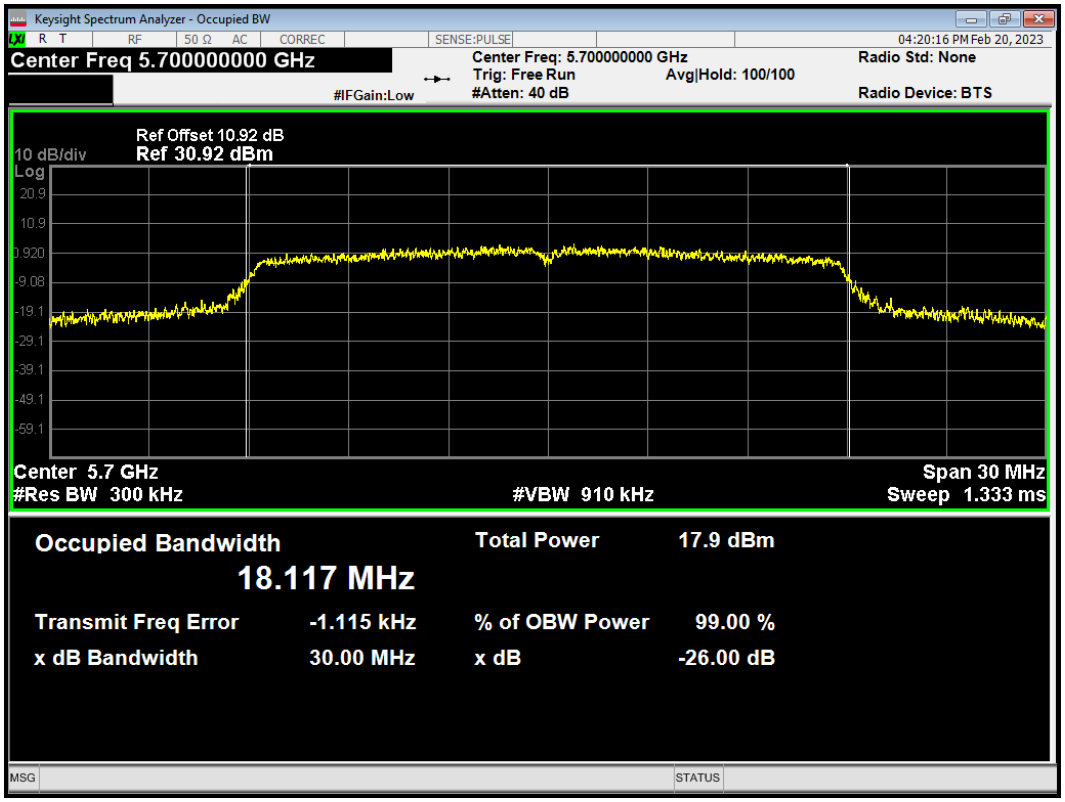
OBW 802.11n(HT20) 5580MHz



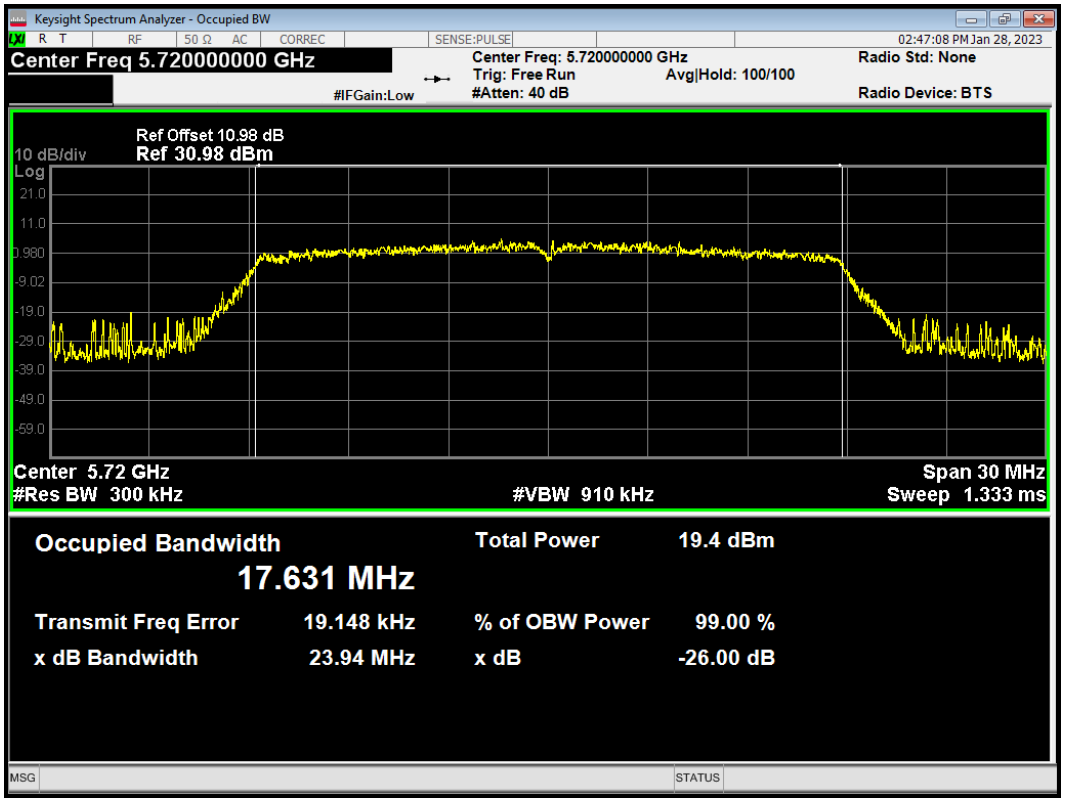
OBW 802.11n(HT20) 5680MHz



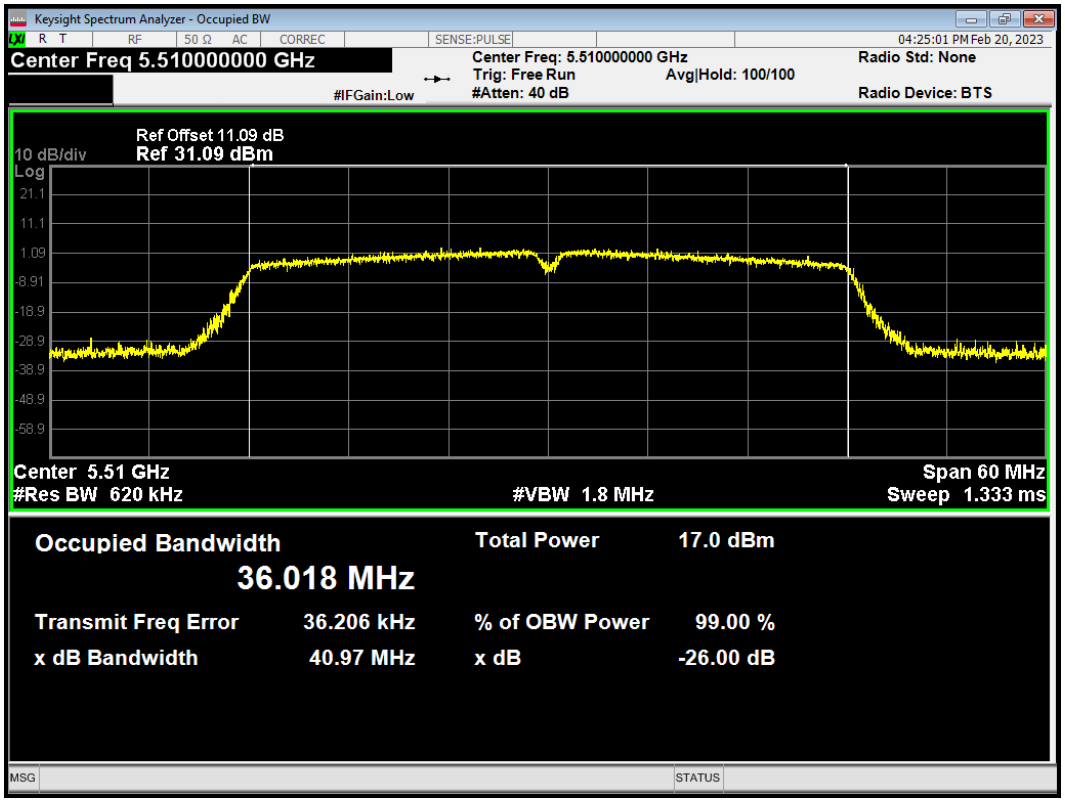
OBW 802.11n(HT20) 5700MHz



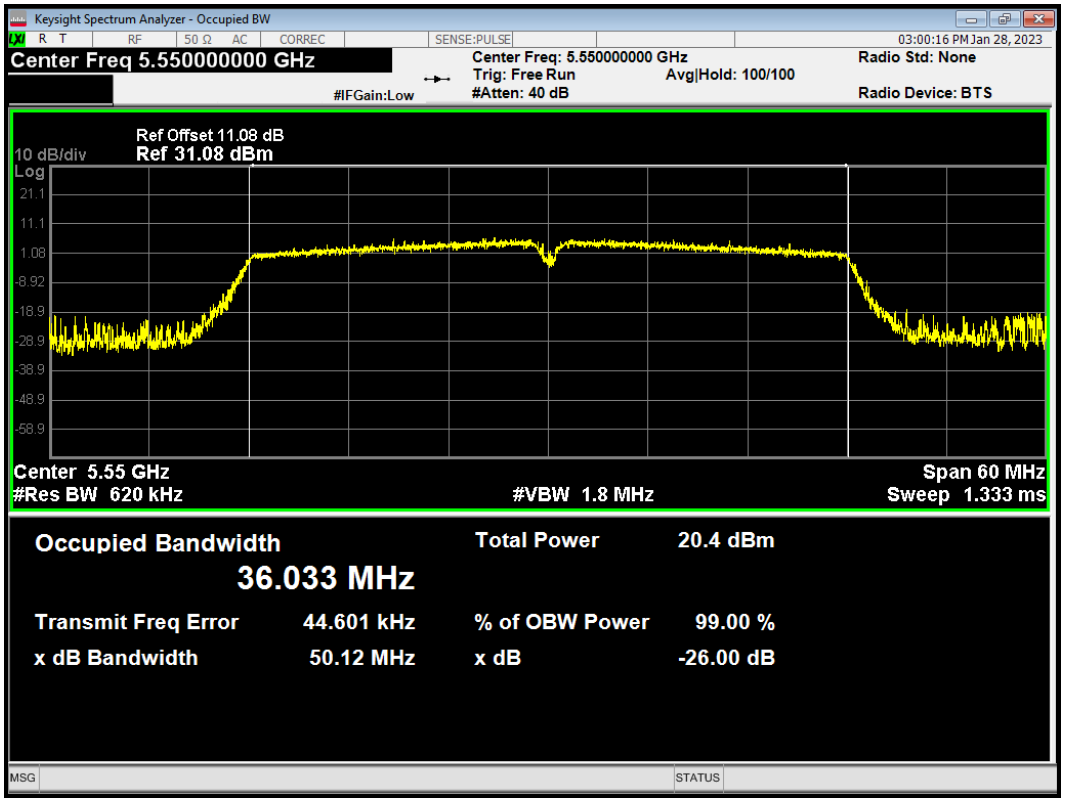
OBW 802.11n(HT20) 5720MHz



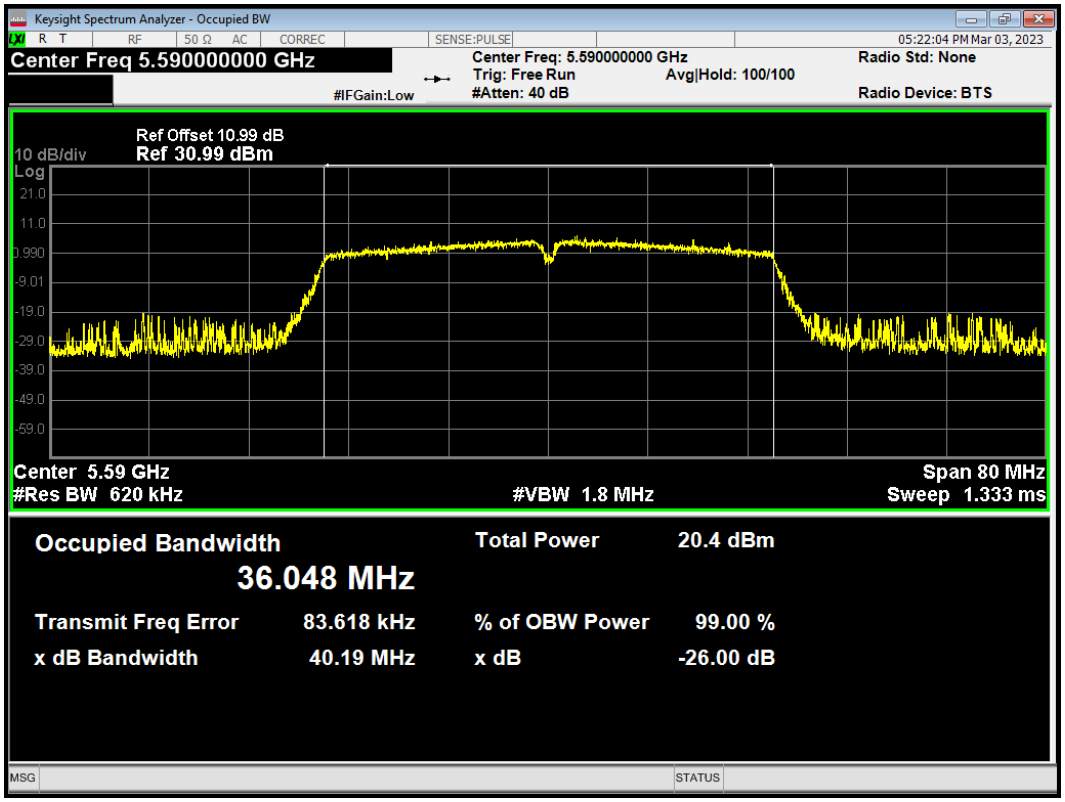
OBW 802.11n(HT40) 5510MHz



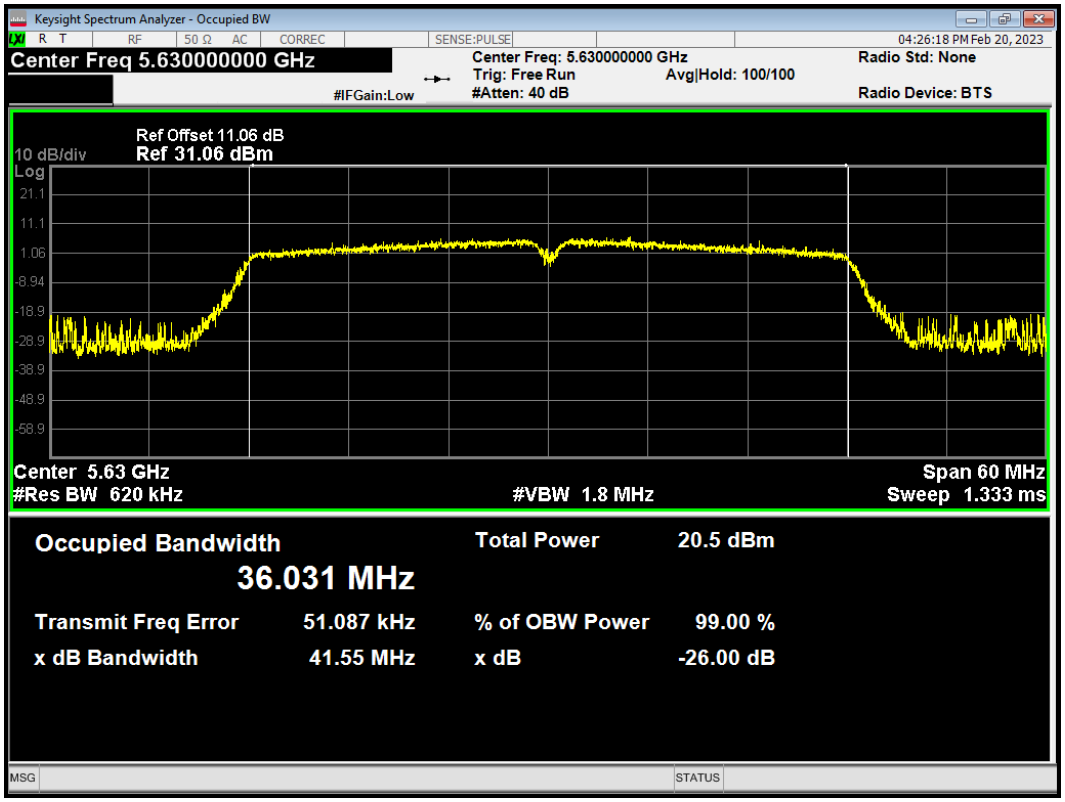
OBW 802.11n(HT40) 5550MHz



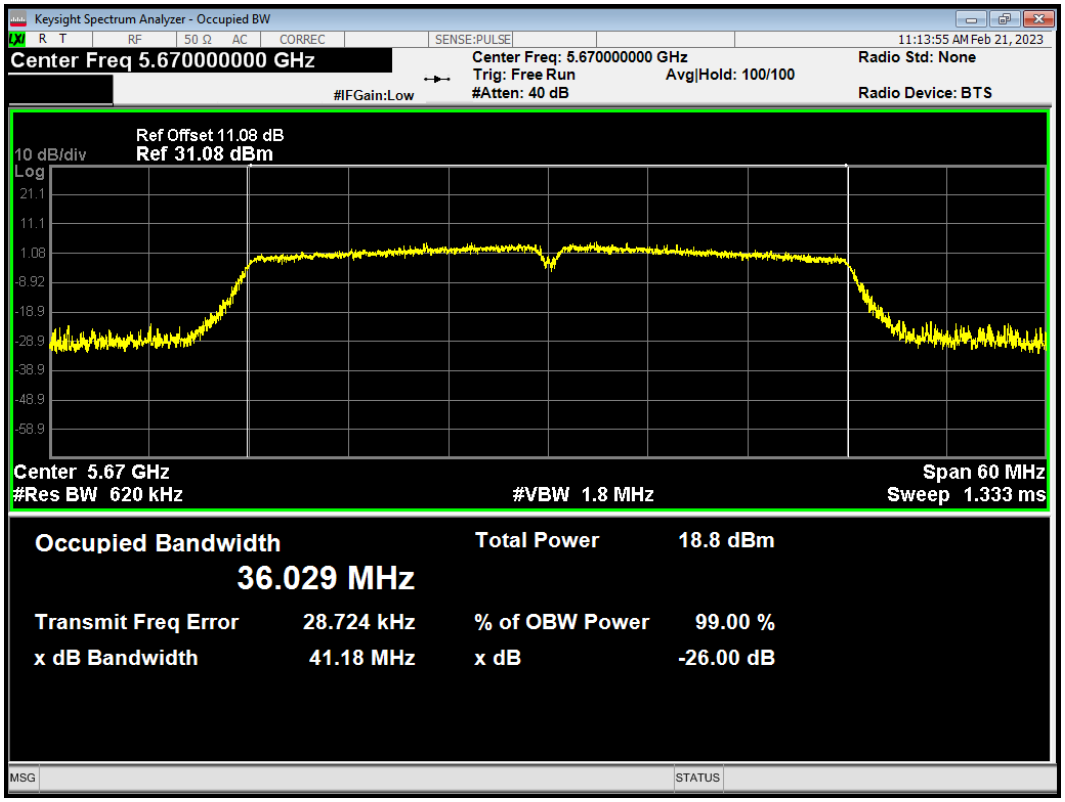
OBW 802.11n(HT40) 5590MHz



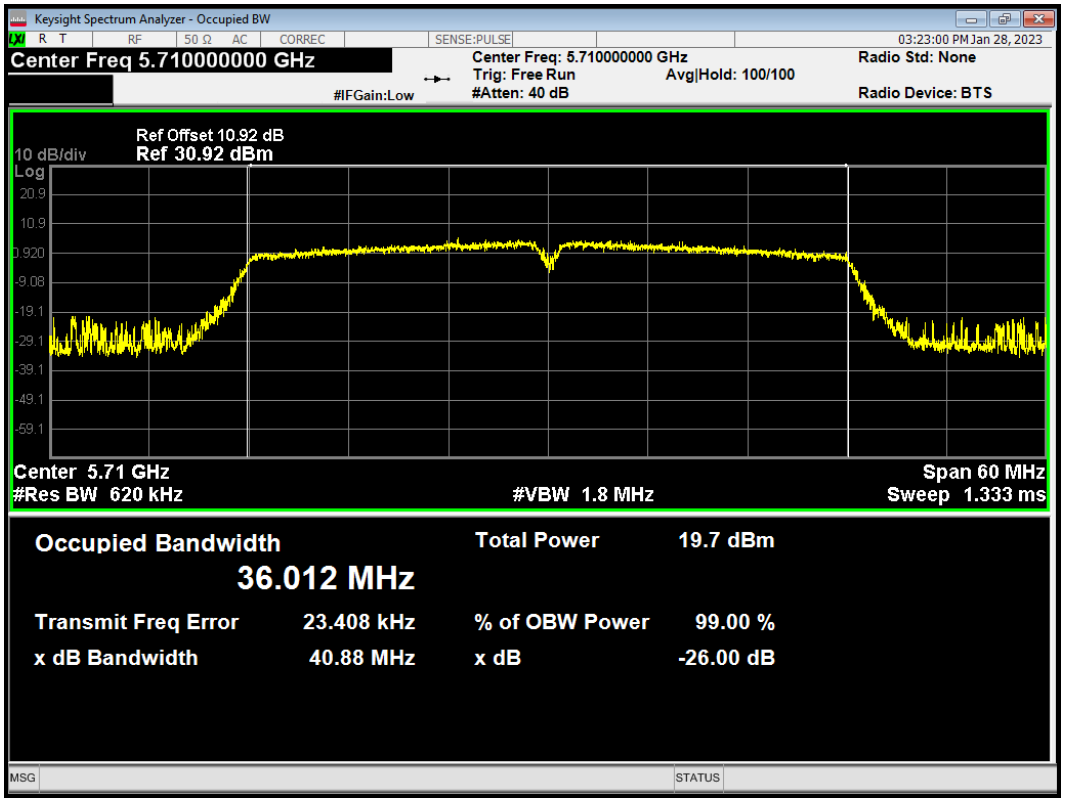
OBW 802.11n(HT40) 5630MHz



OBW 802.11n(HT40) 5670MHz

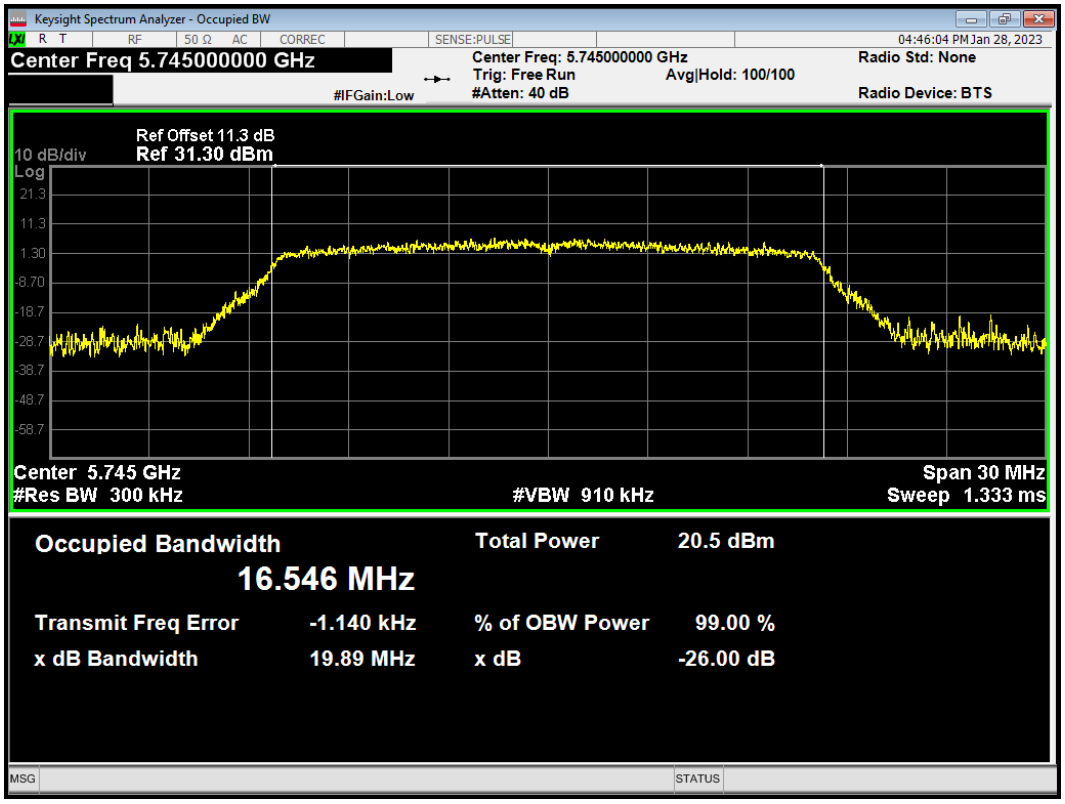


OBW 802.11n(HT40) 5710MHz

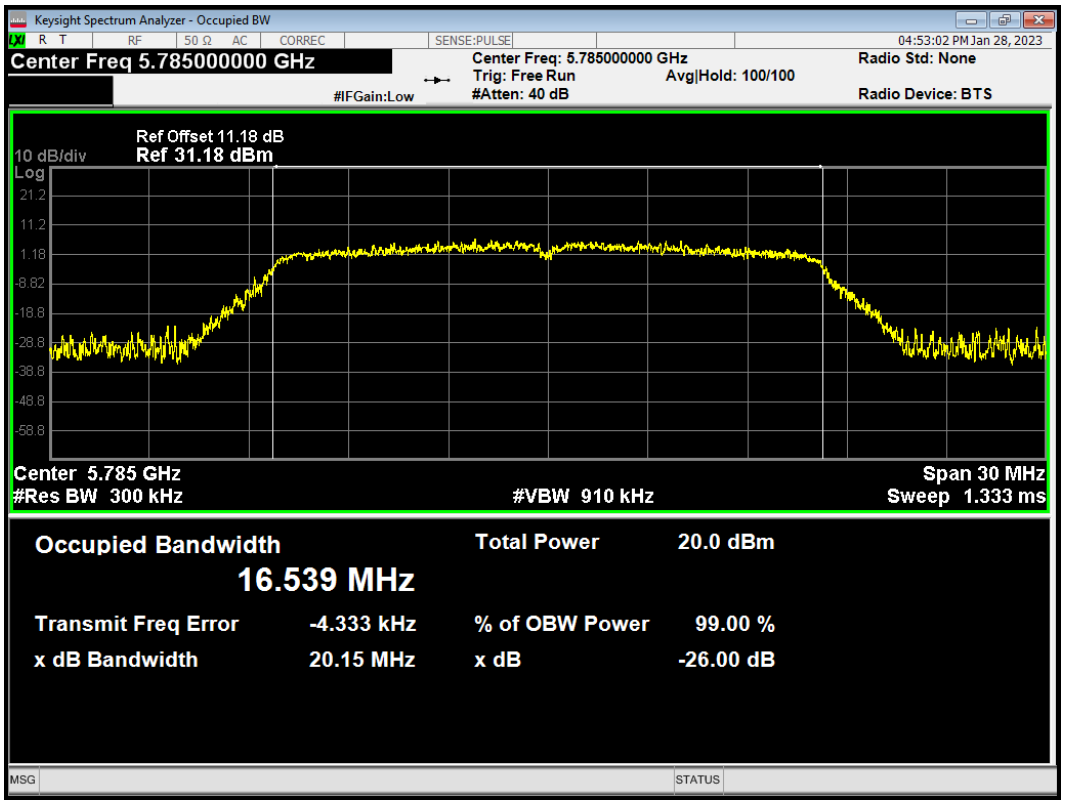


U-NII-3

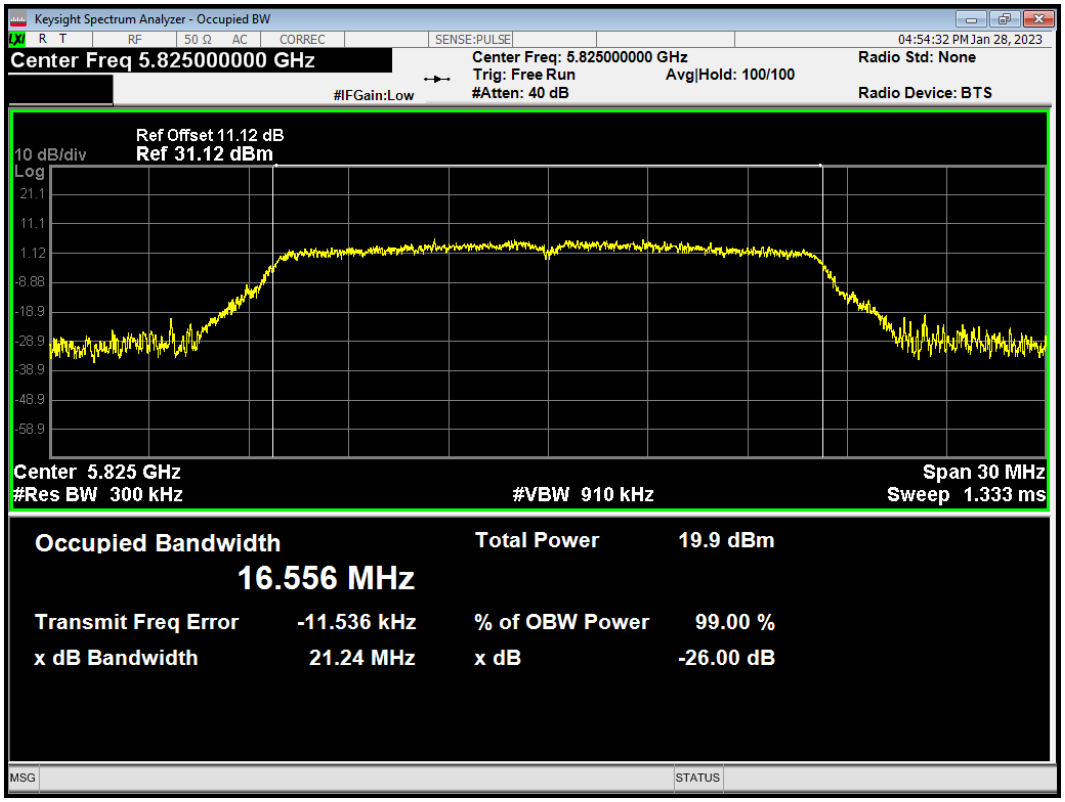
OBW 802.11a 5745MHz



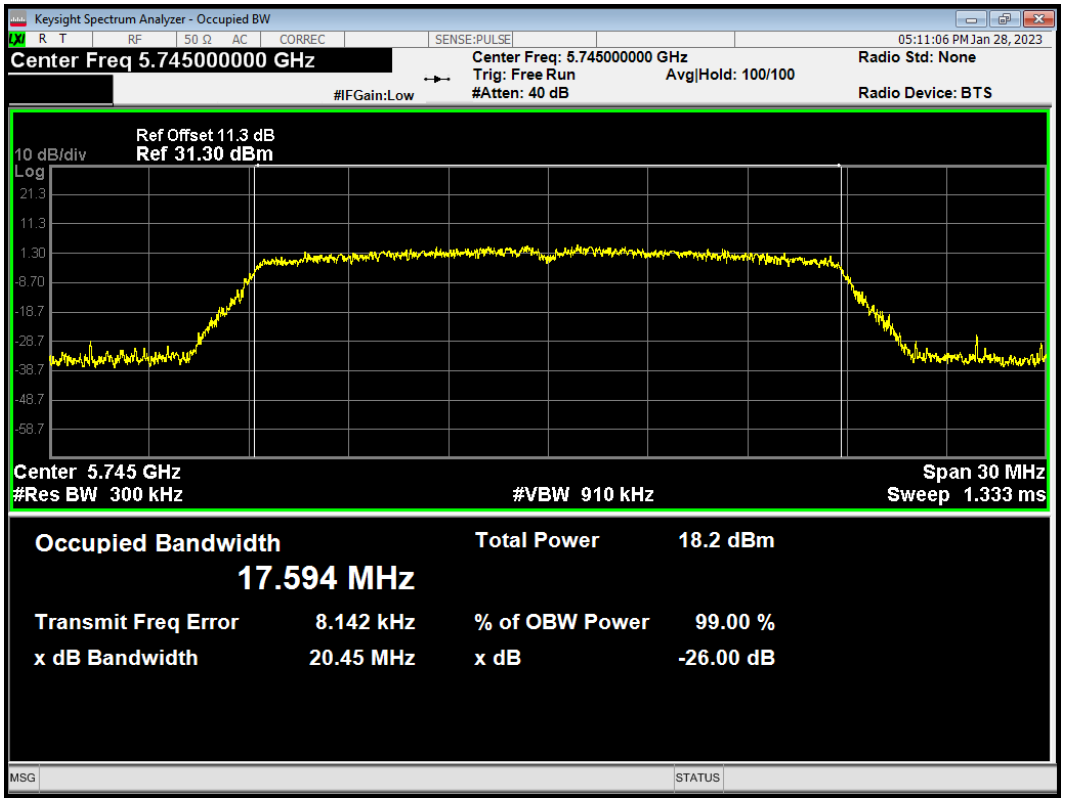
OBW 802.11a 5785MHz



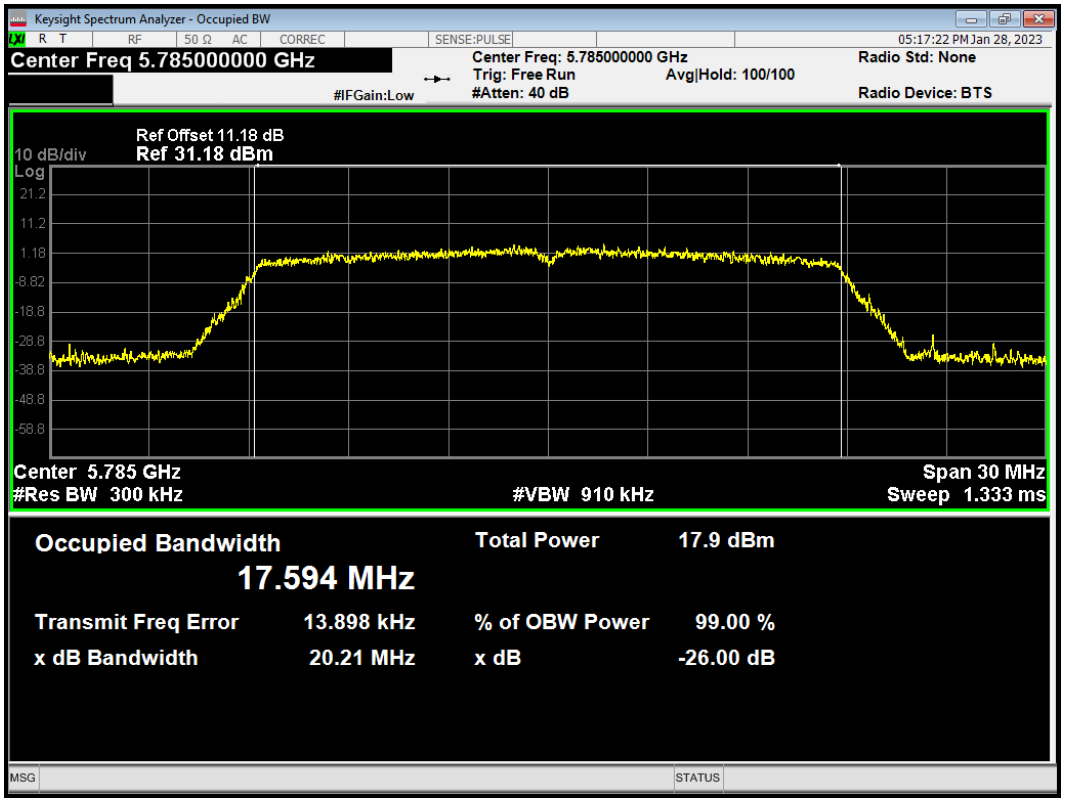
OBW 802.11a 5825MHz



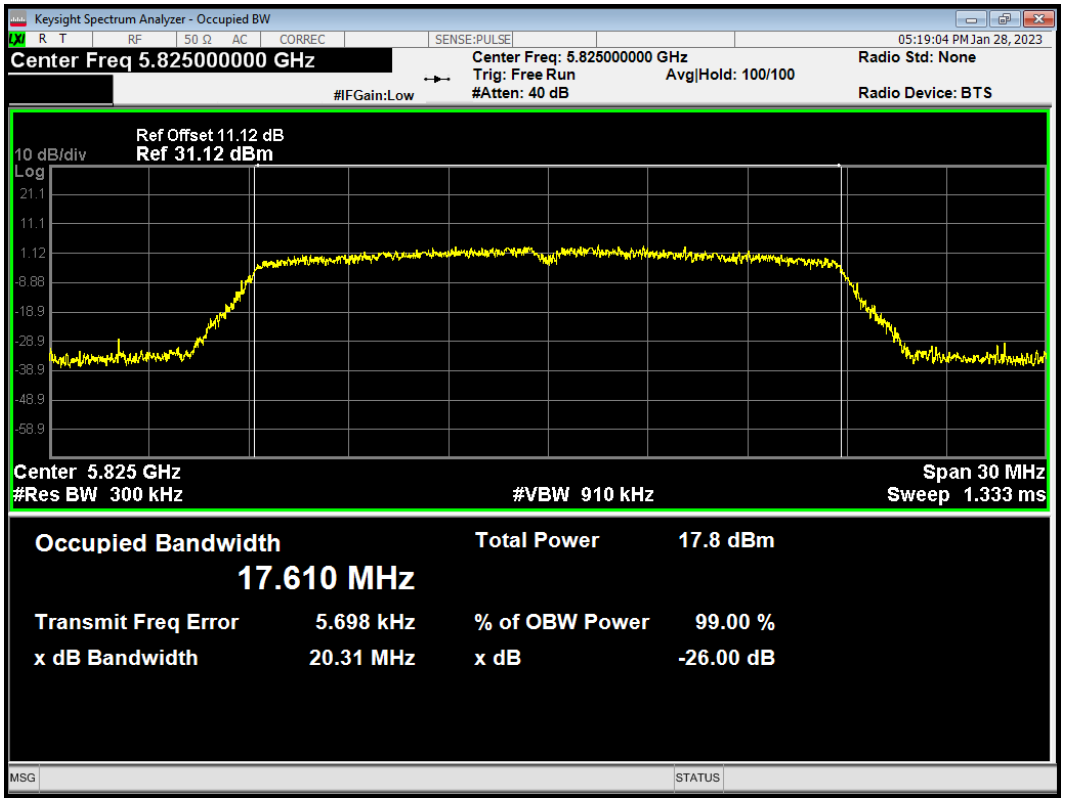
OBW 802.11ac(VHT20) 5745MHz



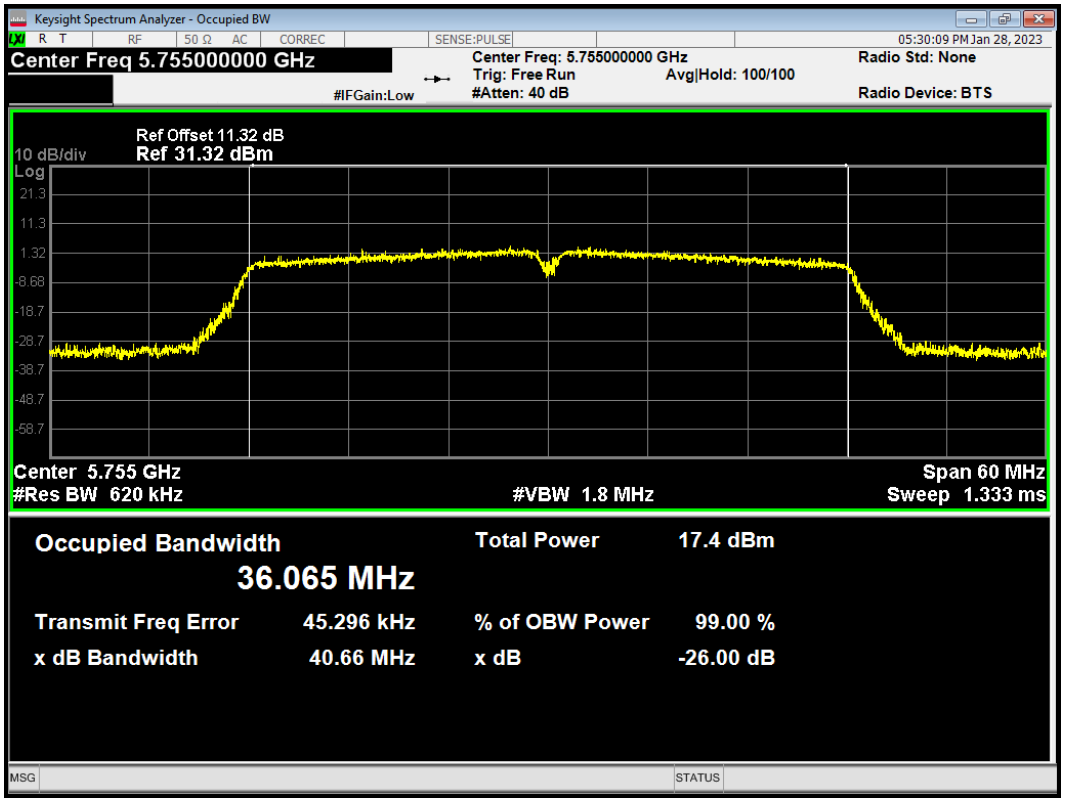
OBW 802.11ac(VHT20) 5785MHz



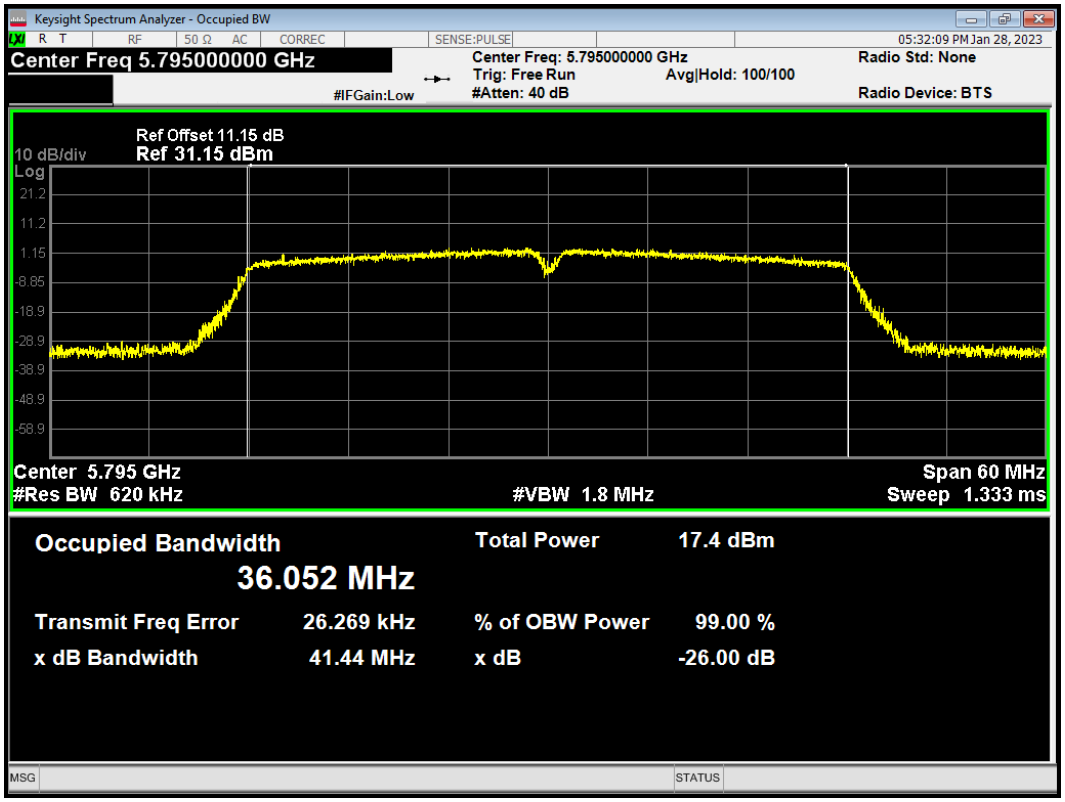
OBW 802.11ac(VHT20) 5825MHz



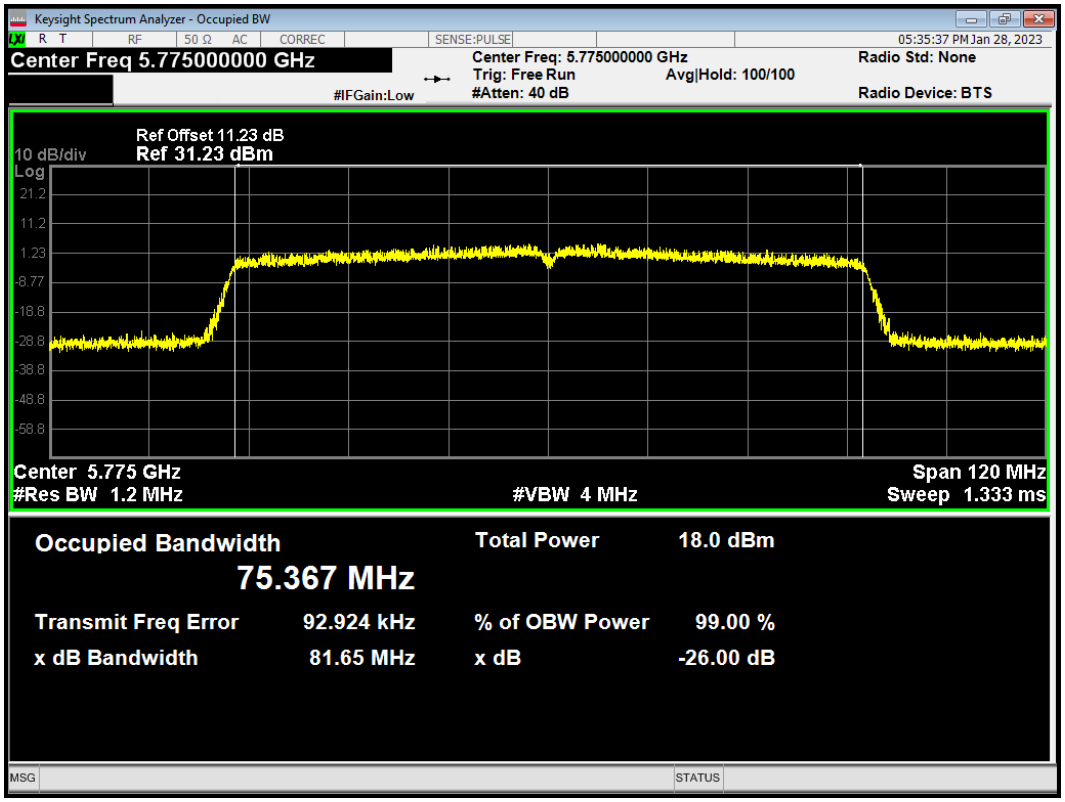
OBW 802.11ac(VHT40) 5755MHz



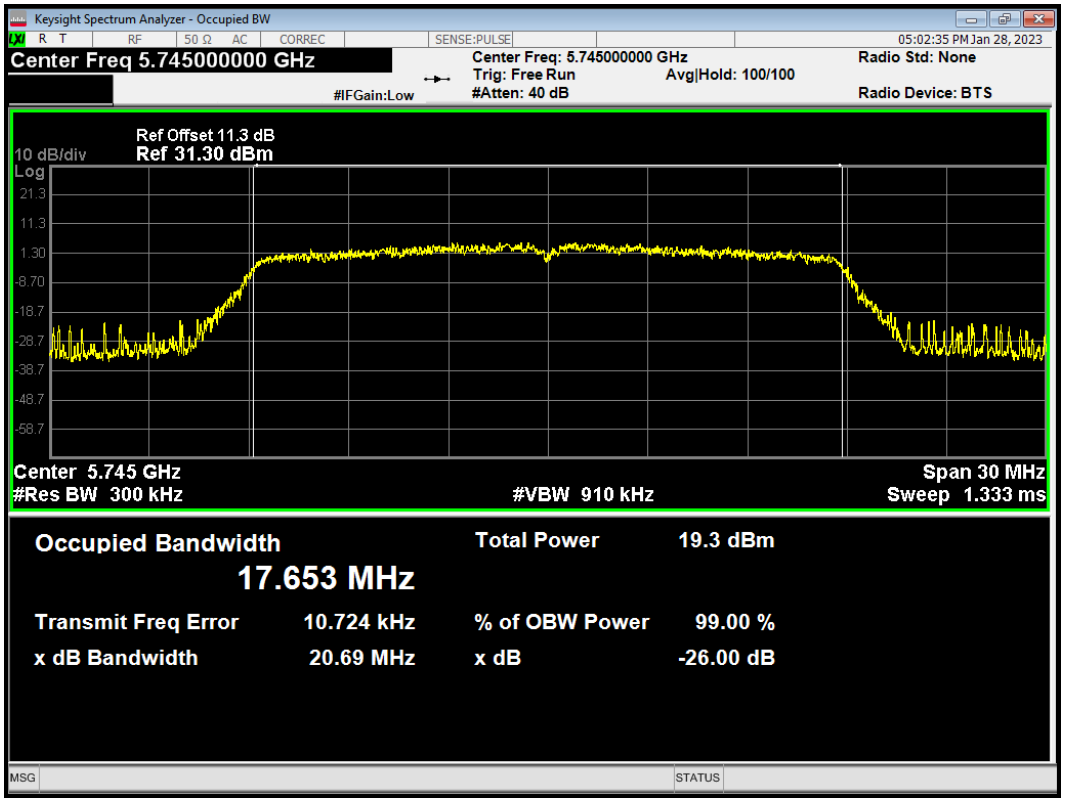
OBW 802.11ac(VHT40) 5795MHz



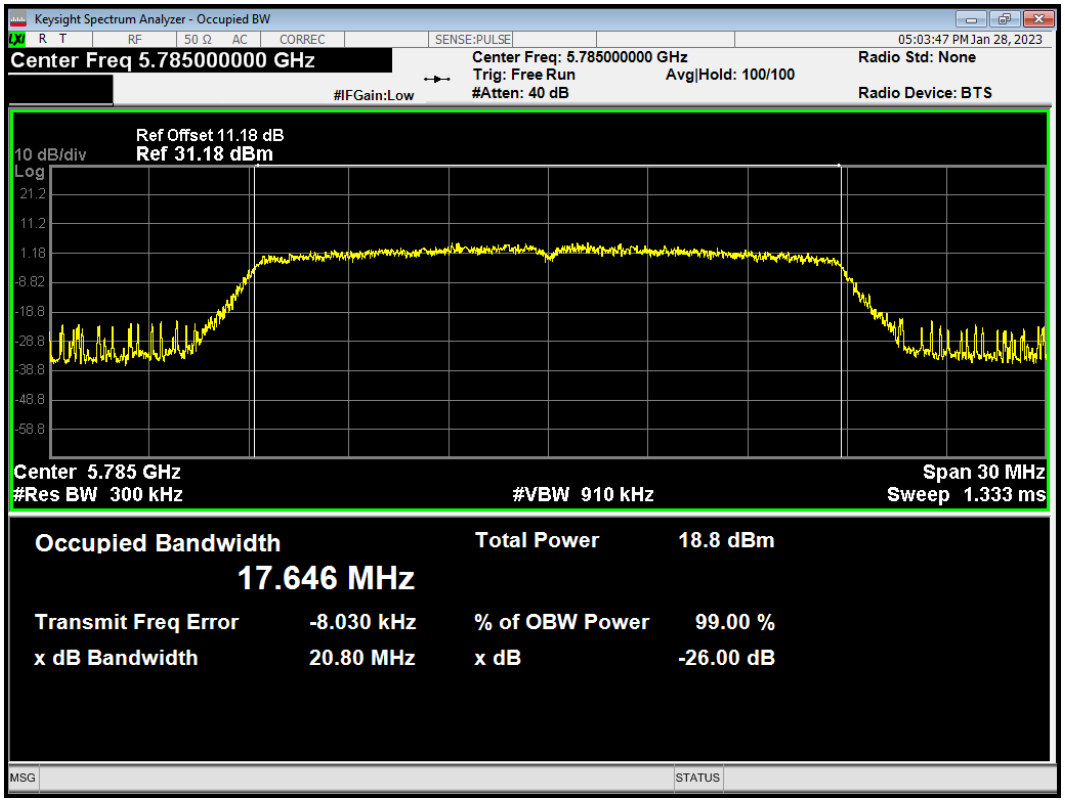
OBW 802.11ac(VHT80) 5775MHz



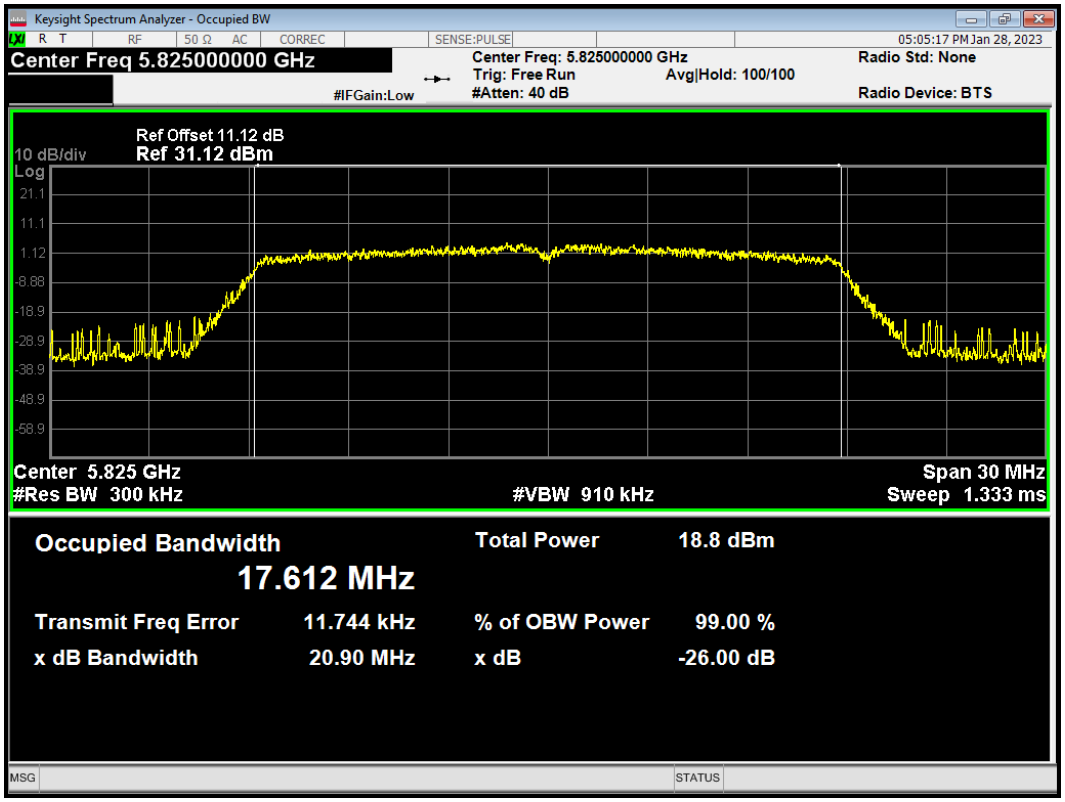
OBW 802.11n(HT20) 5745MHz



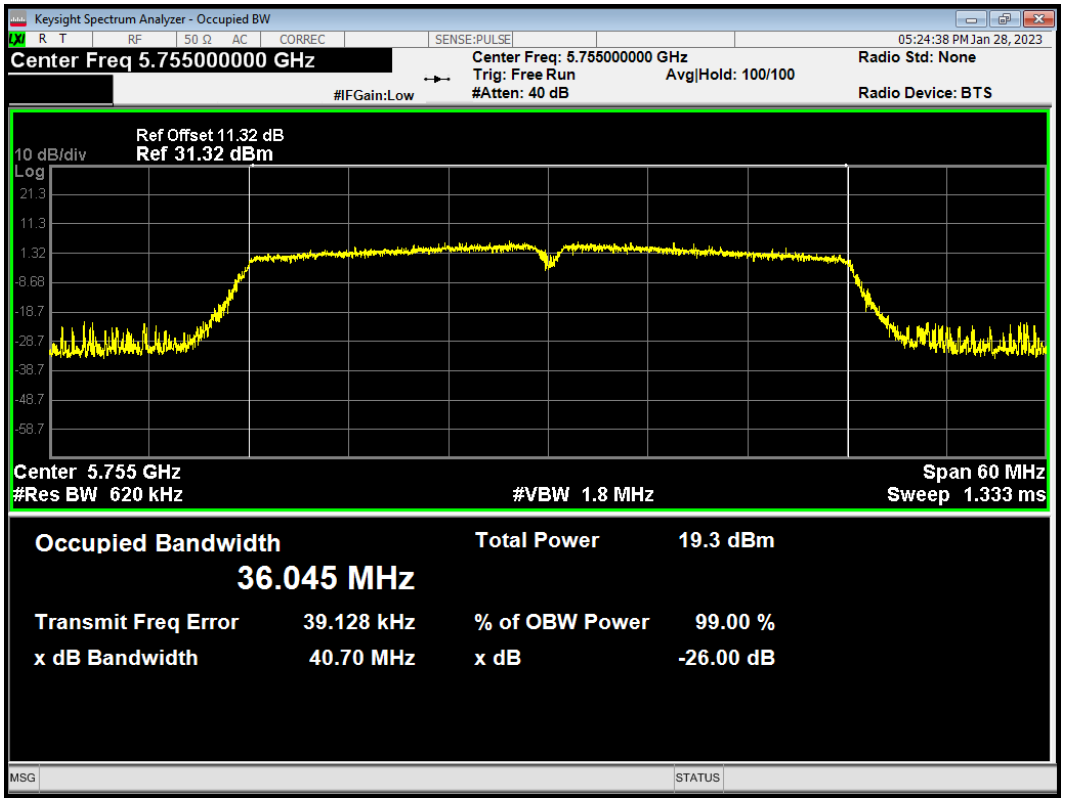
OBW 802.11n(HT20) 5785MHz



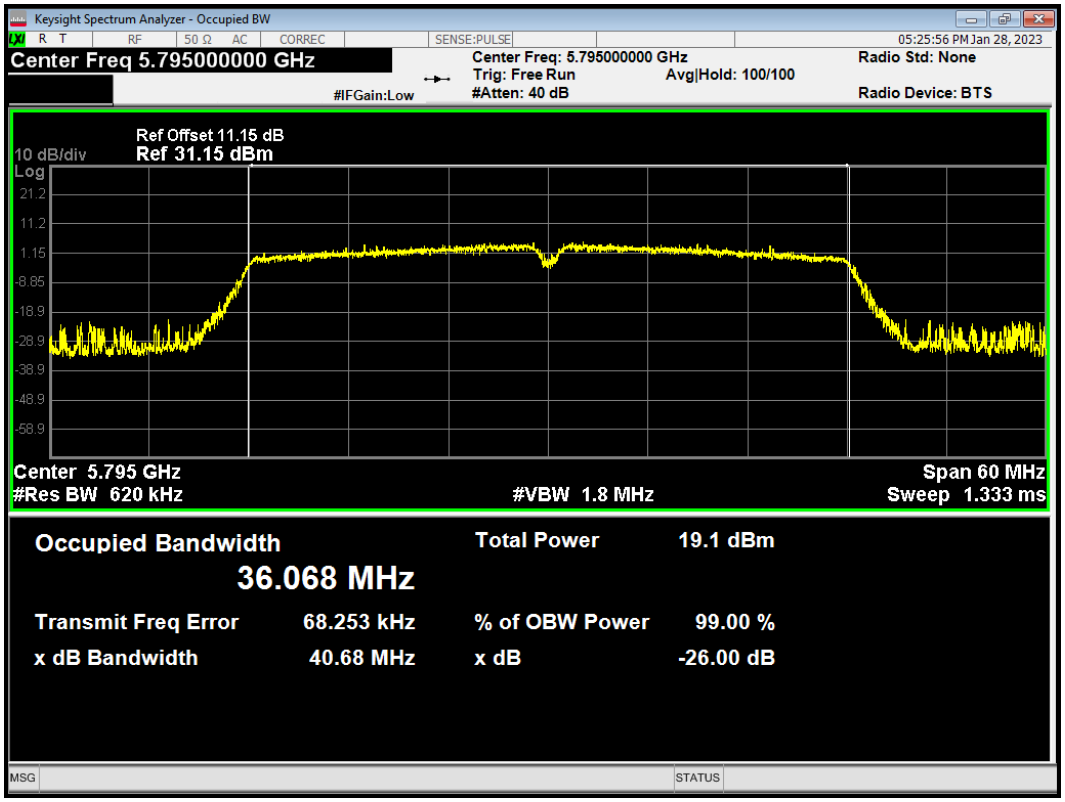
OBW 802.11n(HT20) 5825MHz



OBW 802.11n(HT40) 5755MHz



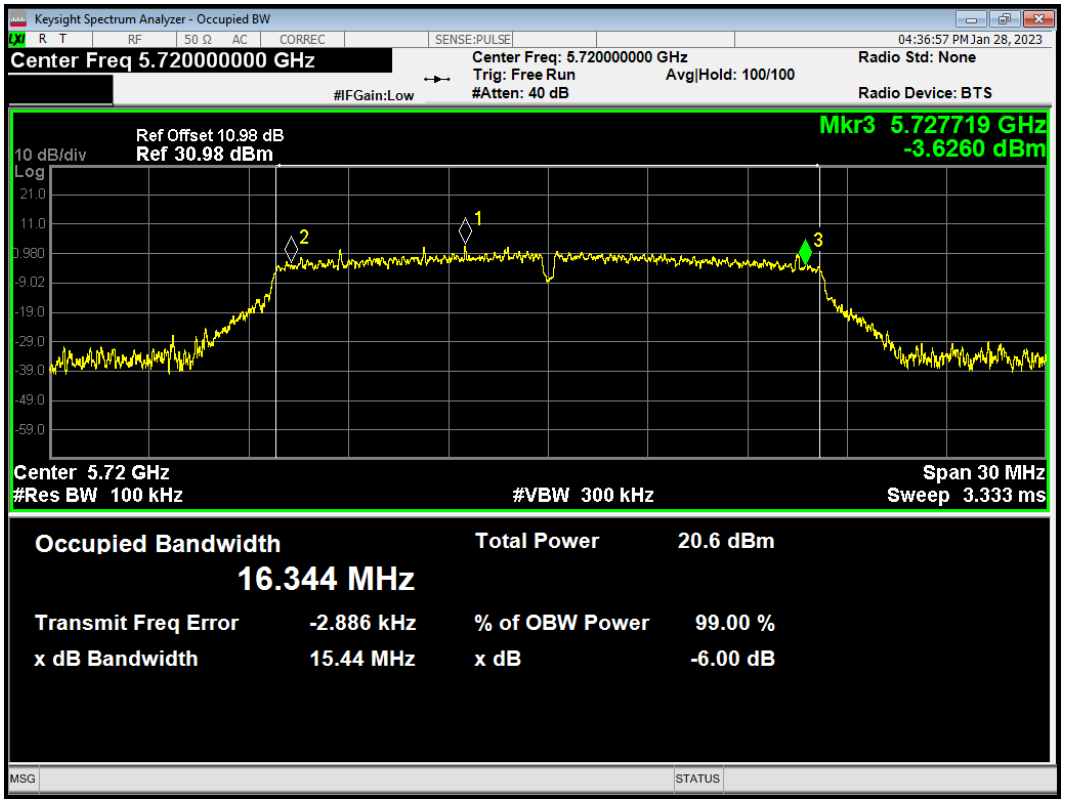
OBW 802.11n(HT40) 5795MHz



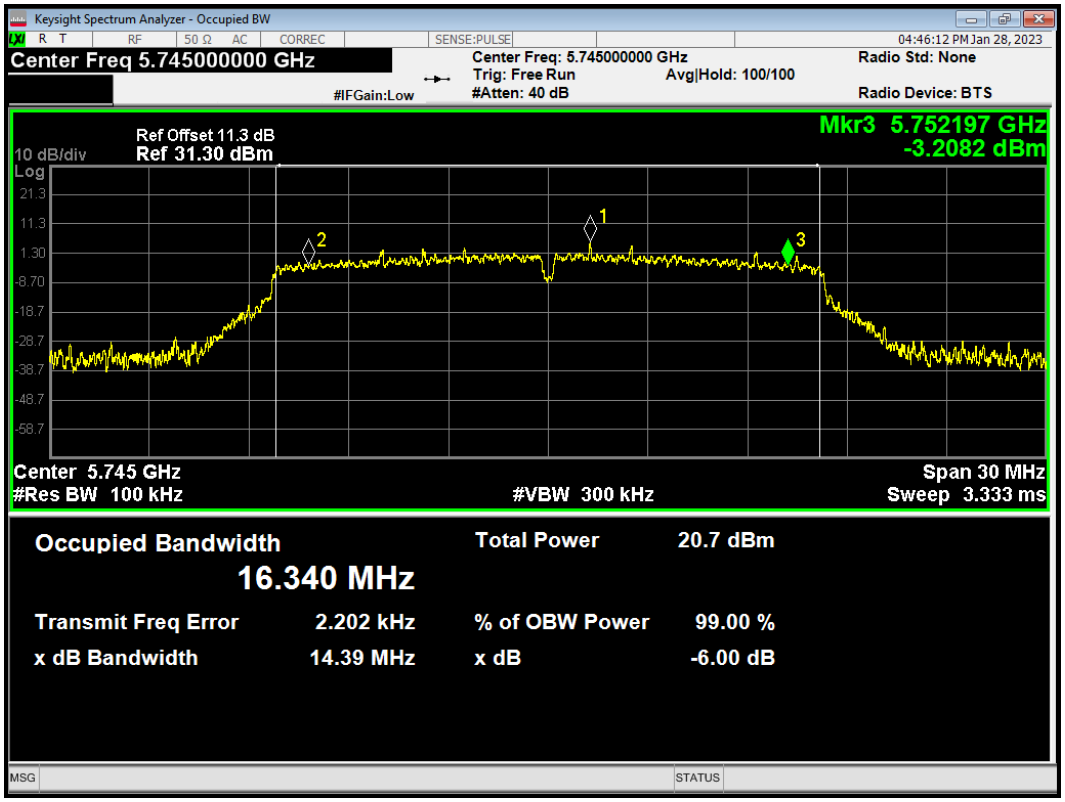
Minimum 6 dB bandwidth

U-NII-3

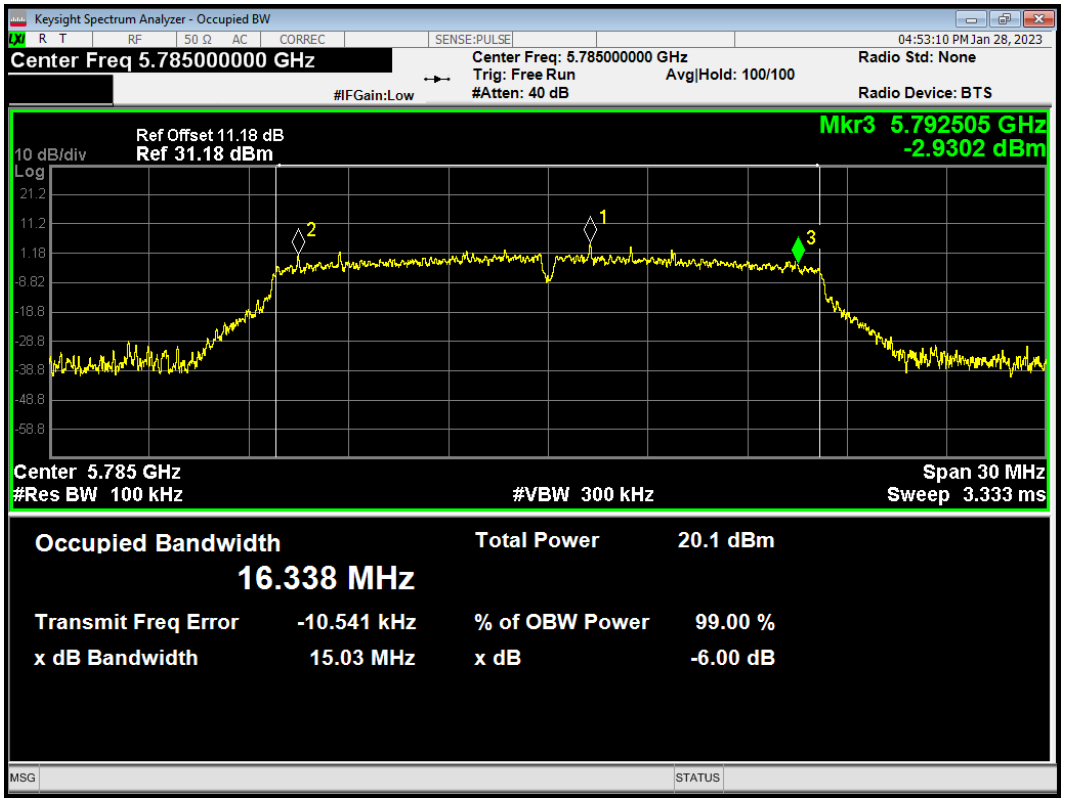
-6dB Bandwidth 802.11a 5720MHz



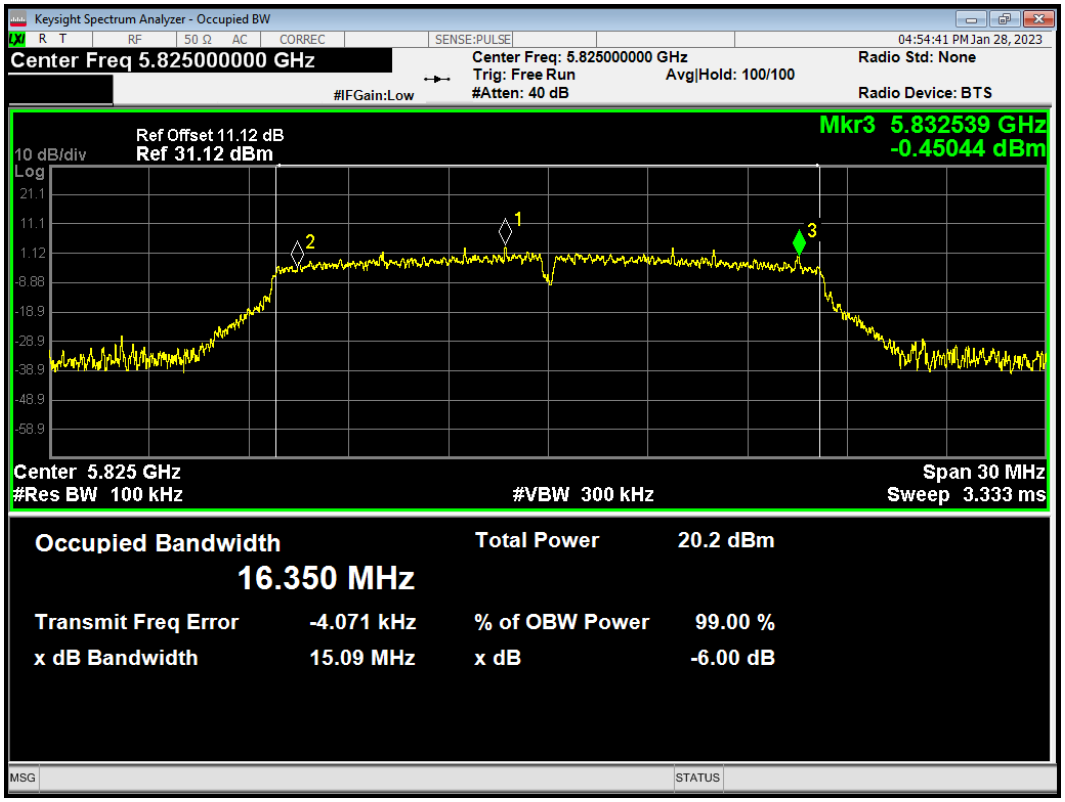
-6dB Bandwidth 802.11a 5745MHz



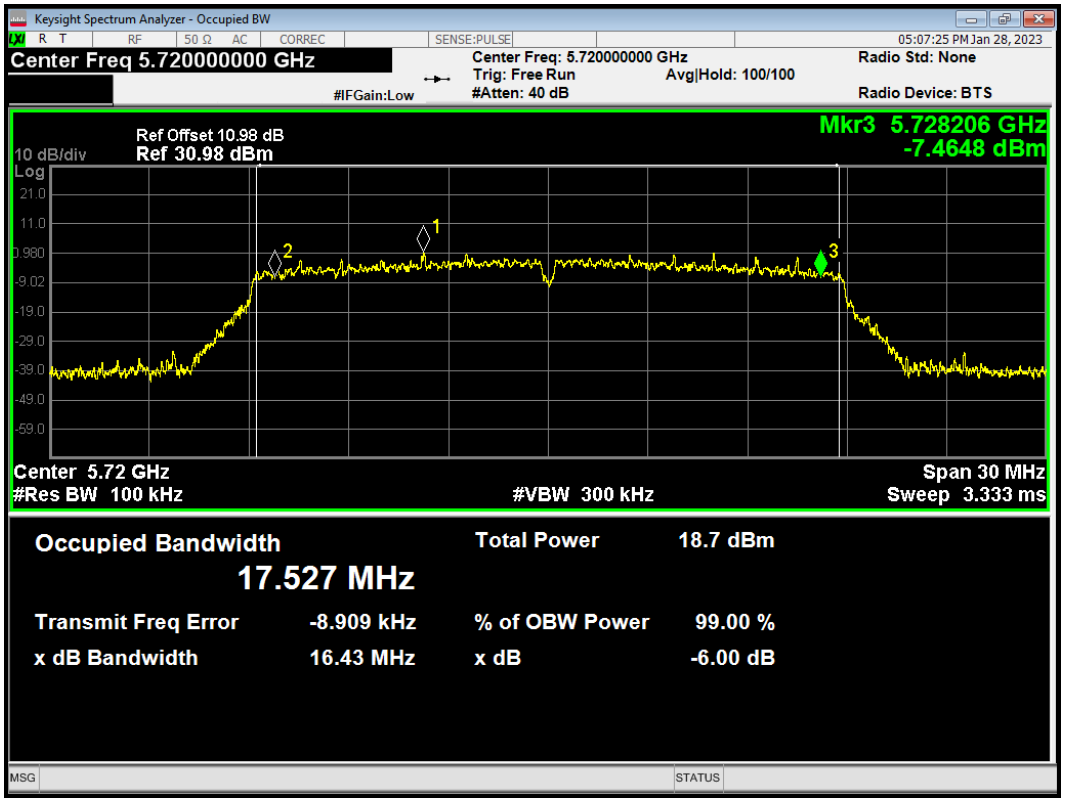
-6dB Bandwidth 802.11a 5785MHz



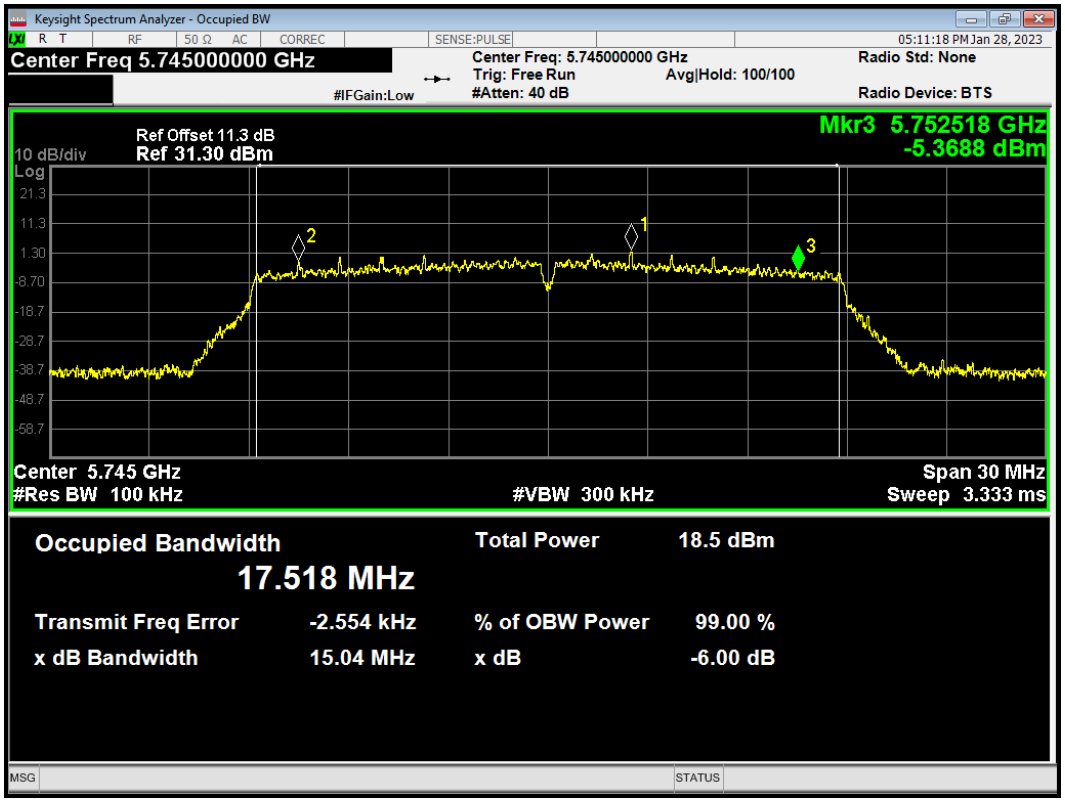
-6dB Bandwidth 802.11a 5825MHz



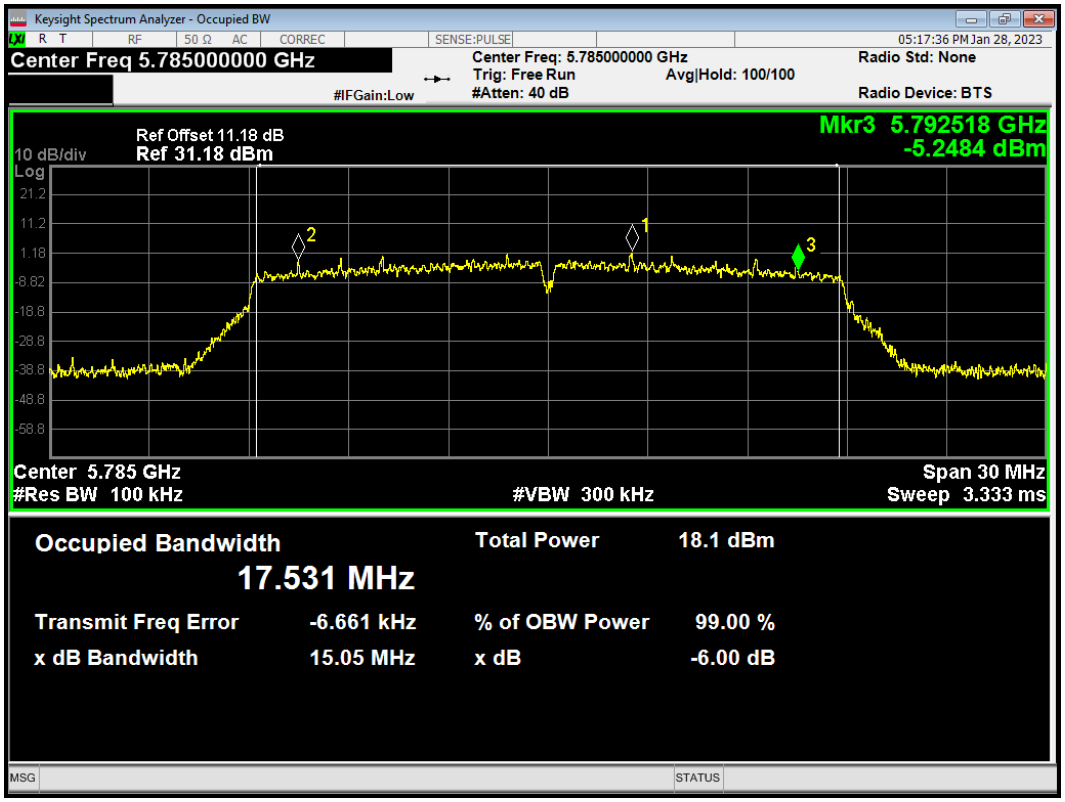
-6dB Bandwidth 802.11ac(VHT20) 5720MHz



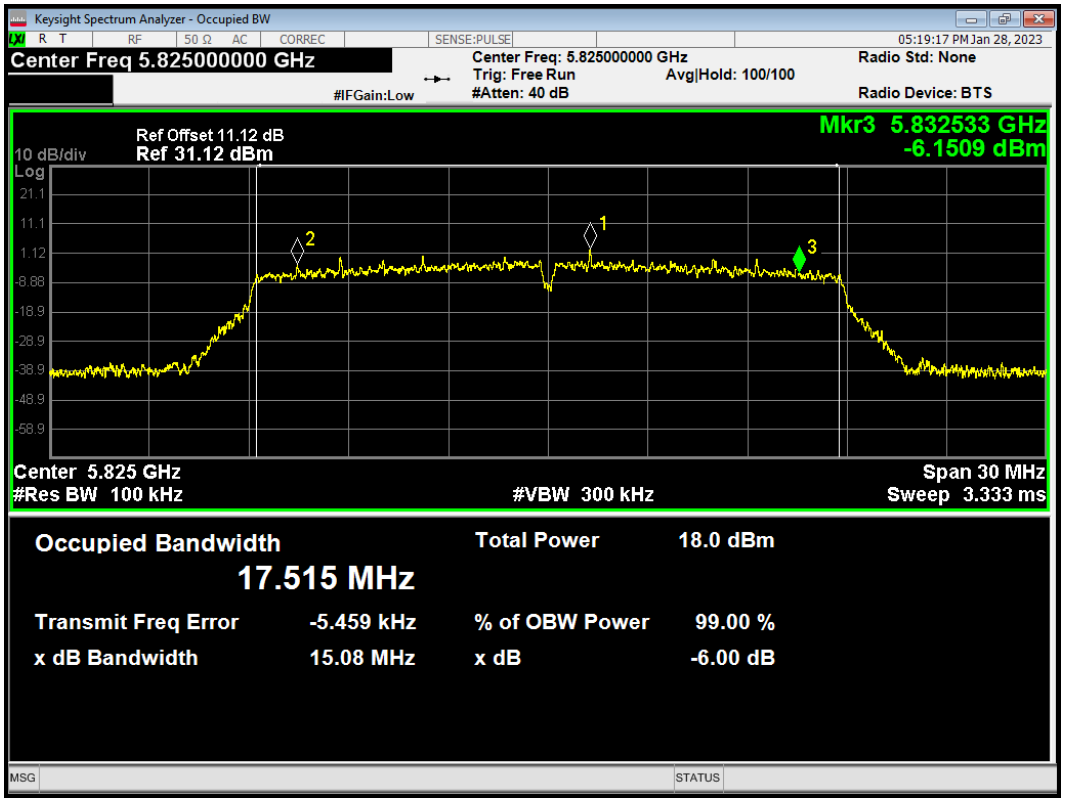
-6dB Bandwidth 802.11ac(VHT20) 5745MHz



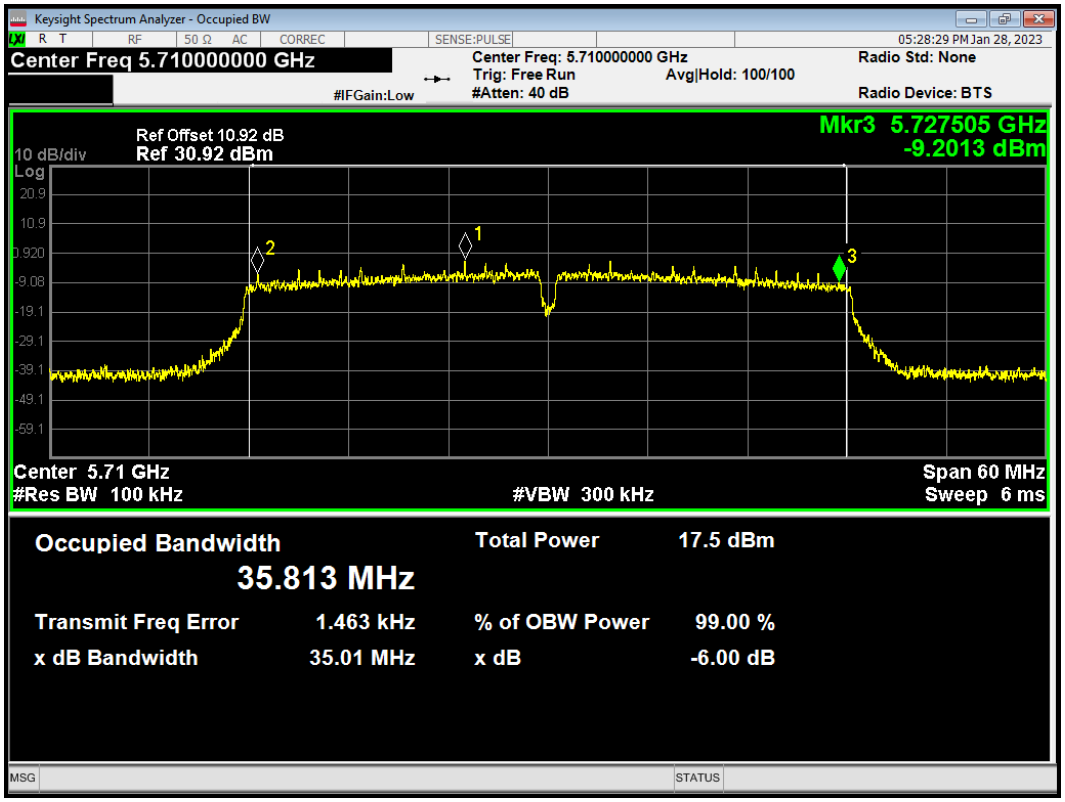
-6dB Bandwidth 802.11ac(VHT20) 5785MHz



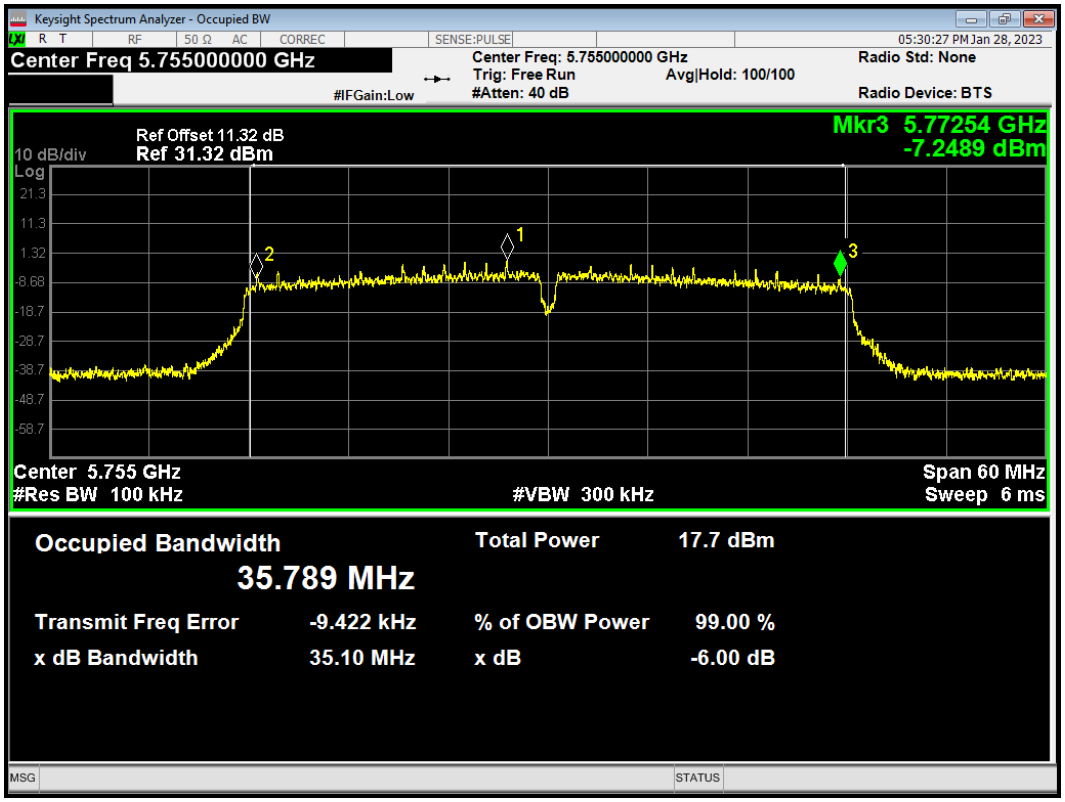
-6dB Bandwidth 802.11ac(VHT20) 5825MHz



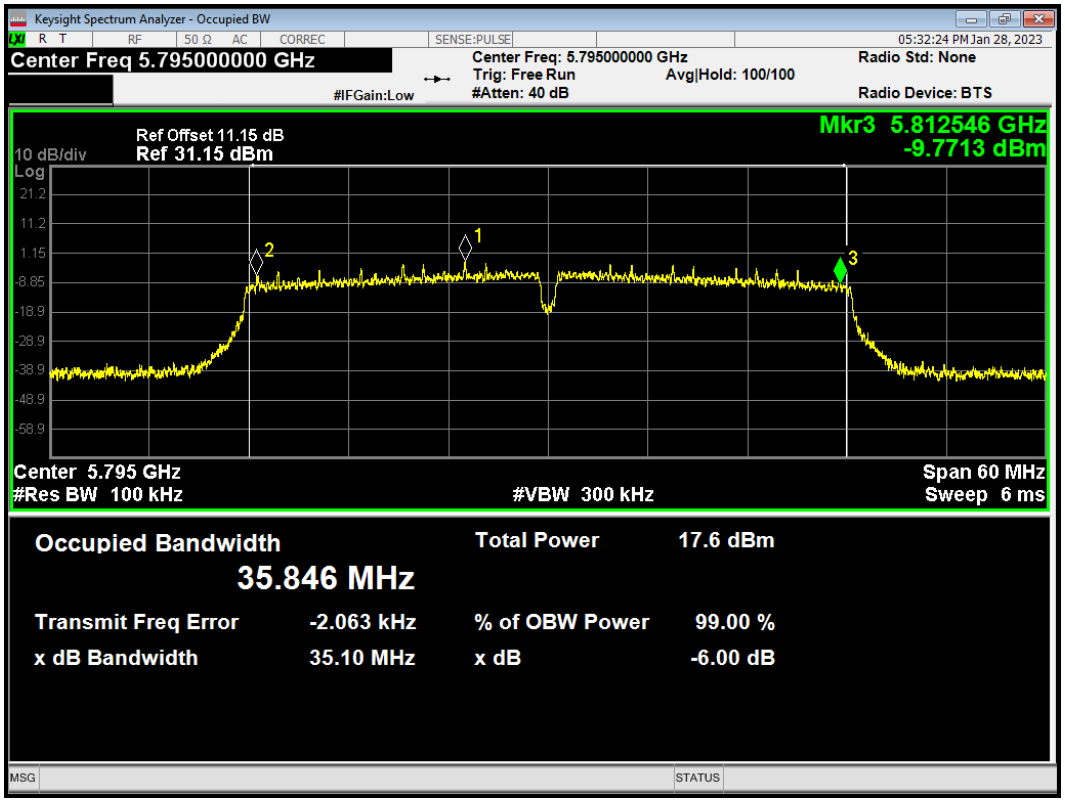
-6dB Bandwidth 802.11ac(VHT40) 5710MHz



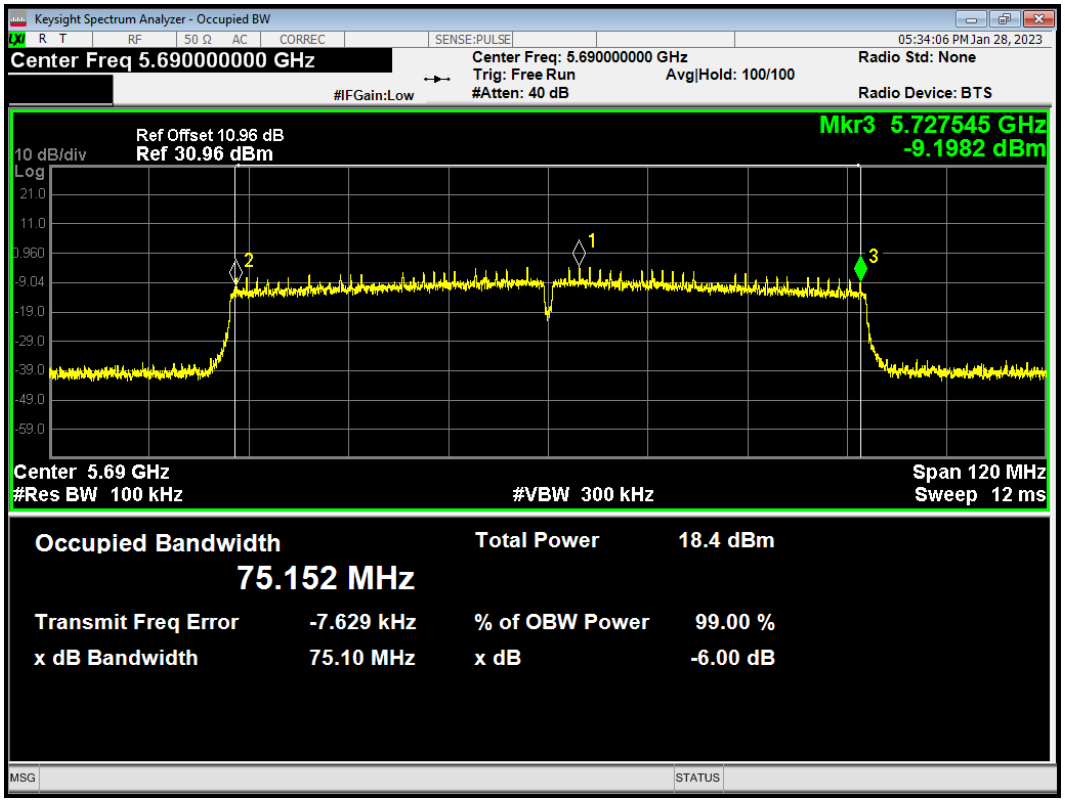
-6dB Bandwidth 802.11ac(VHT40) 5755MHz



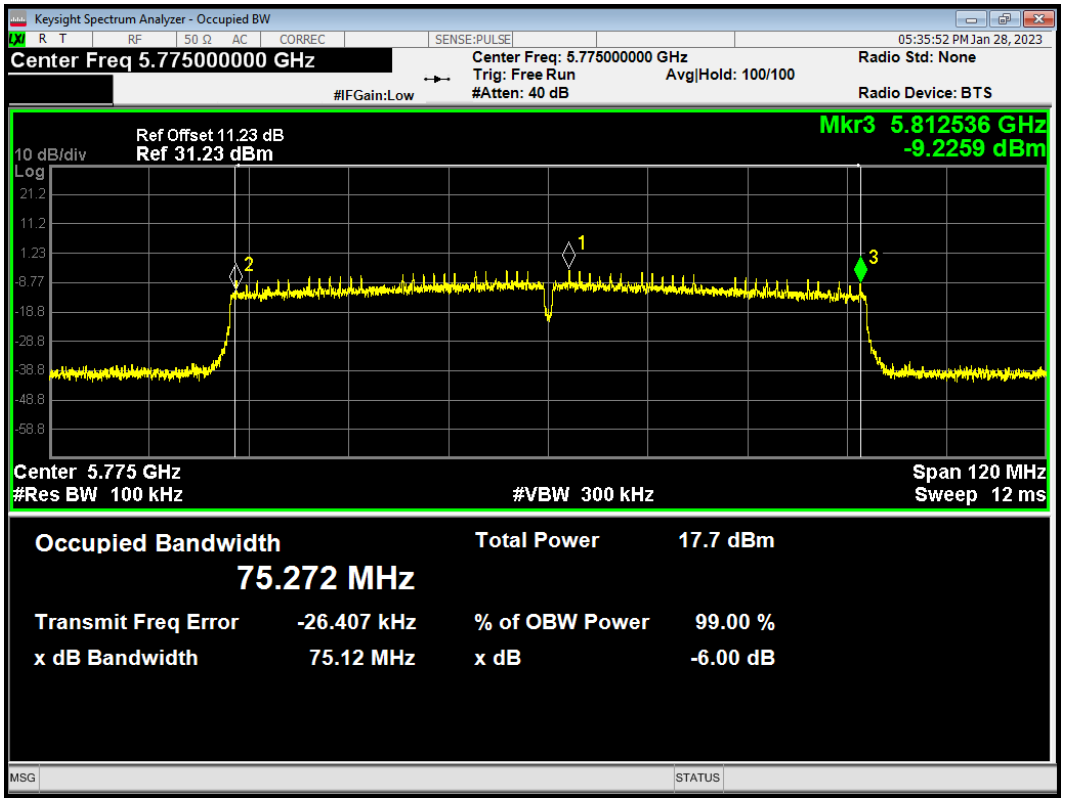
-6dB Bandwidth 802.11ac(VHT40) 5795MHz



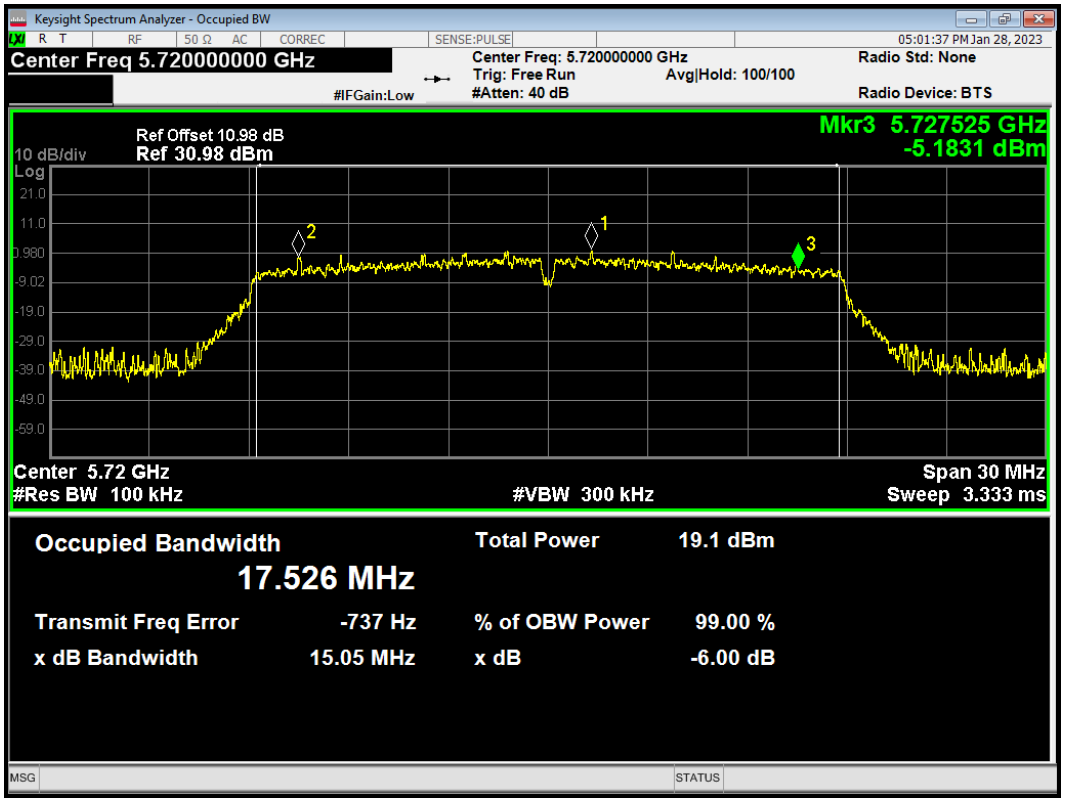
-6dB Bandwidth 802.11ac(VHT80) 5690MHz



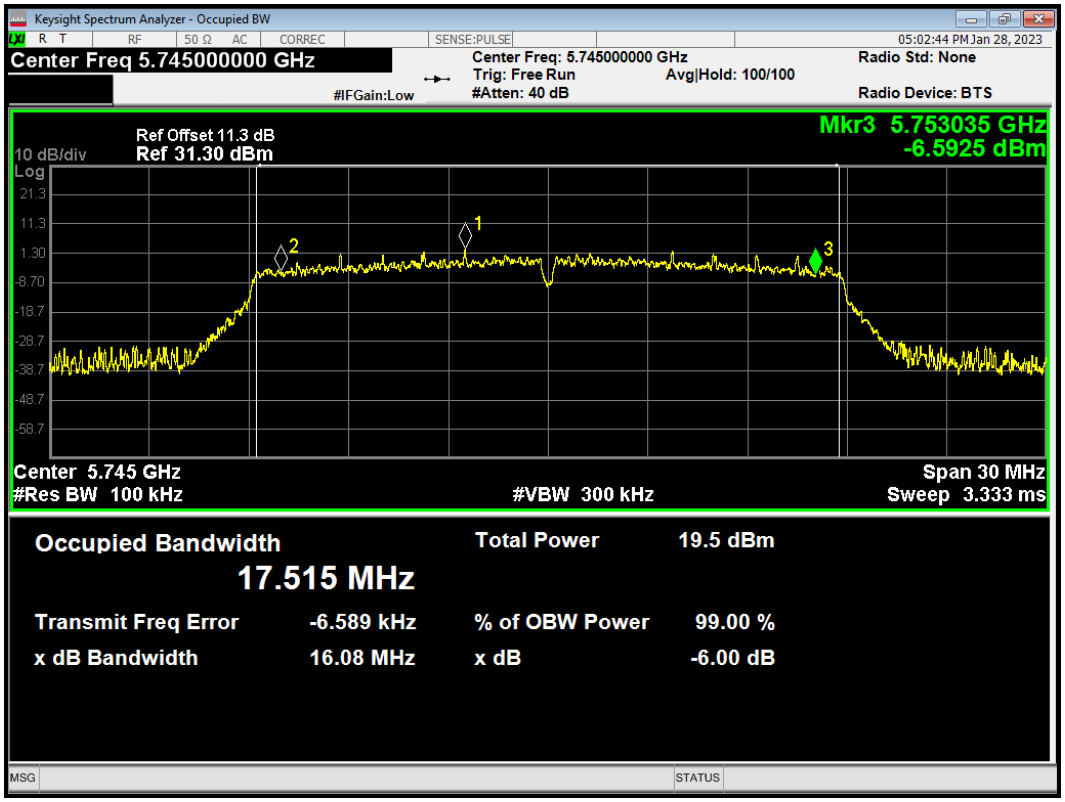
-6dB Bandwidth 802.11ac(VHT80) 5775MHz



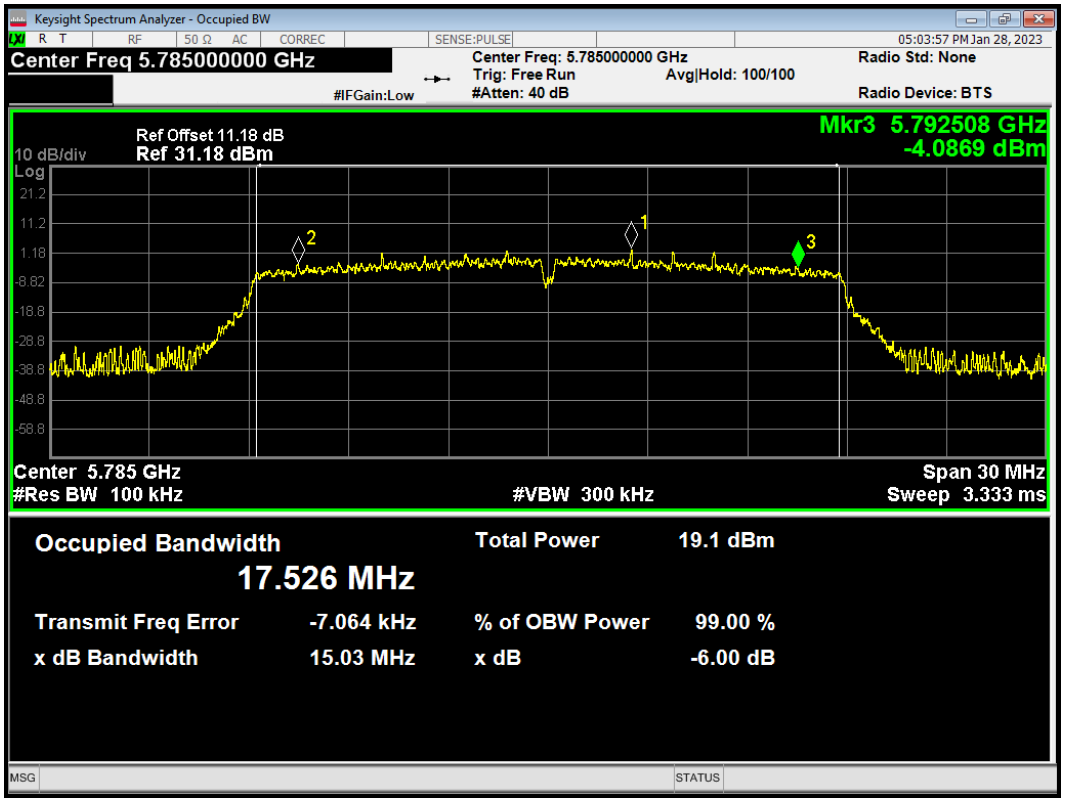
-6dB Bandwidth 802.11n(HT20) 5720MHz



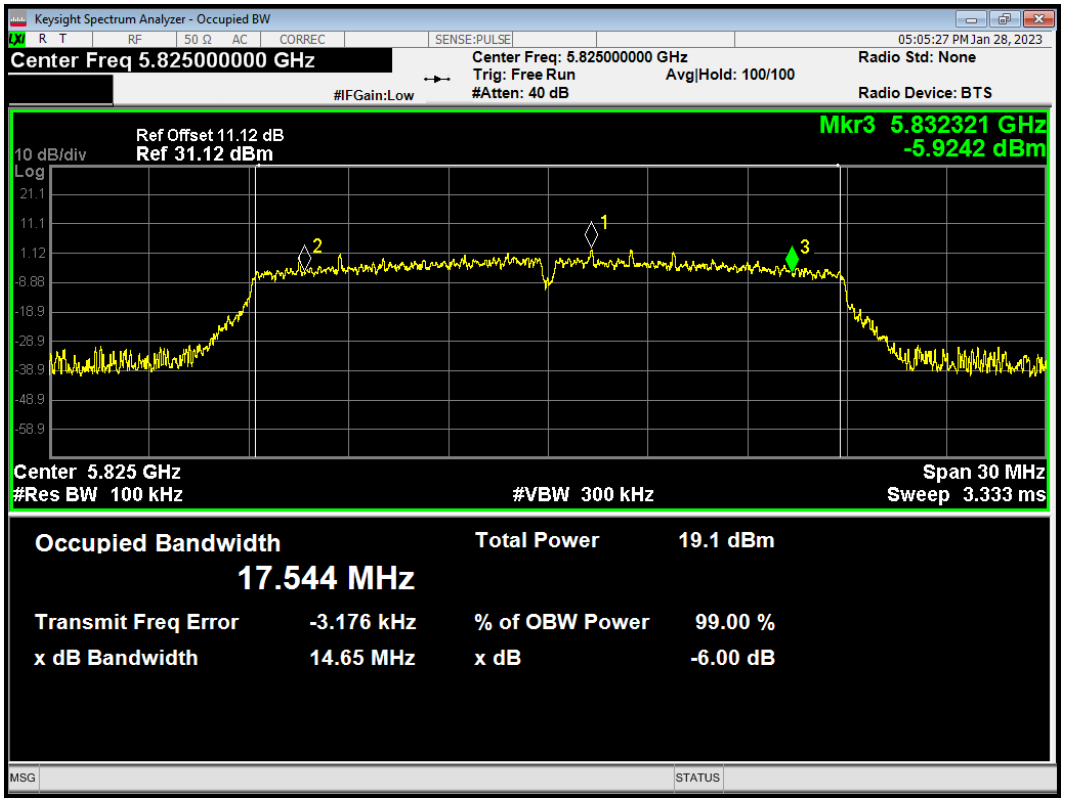
-6dB Bandwidth 802.11n(HT20) 5745MHz



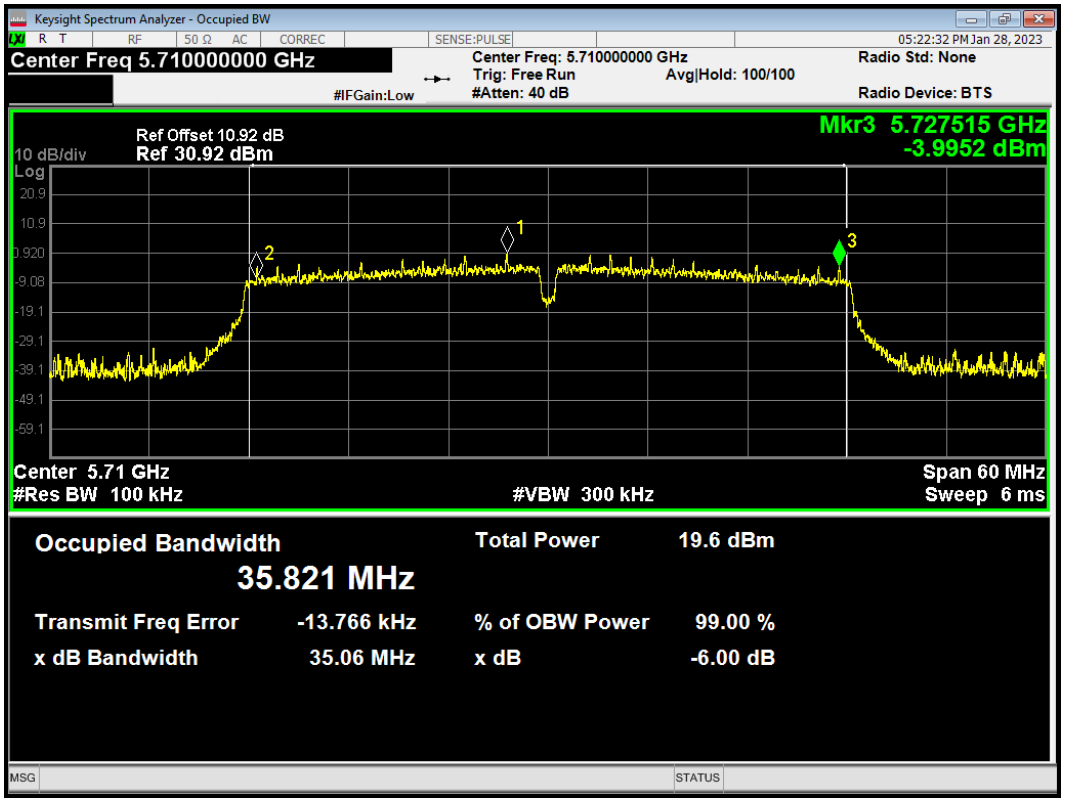
-6dB Bandwidth 802.11n(HT20) 5785MHz



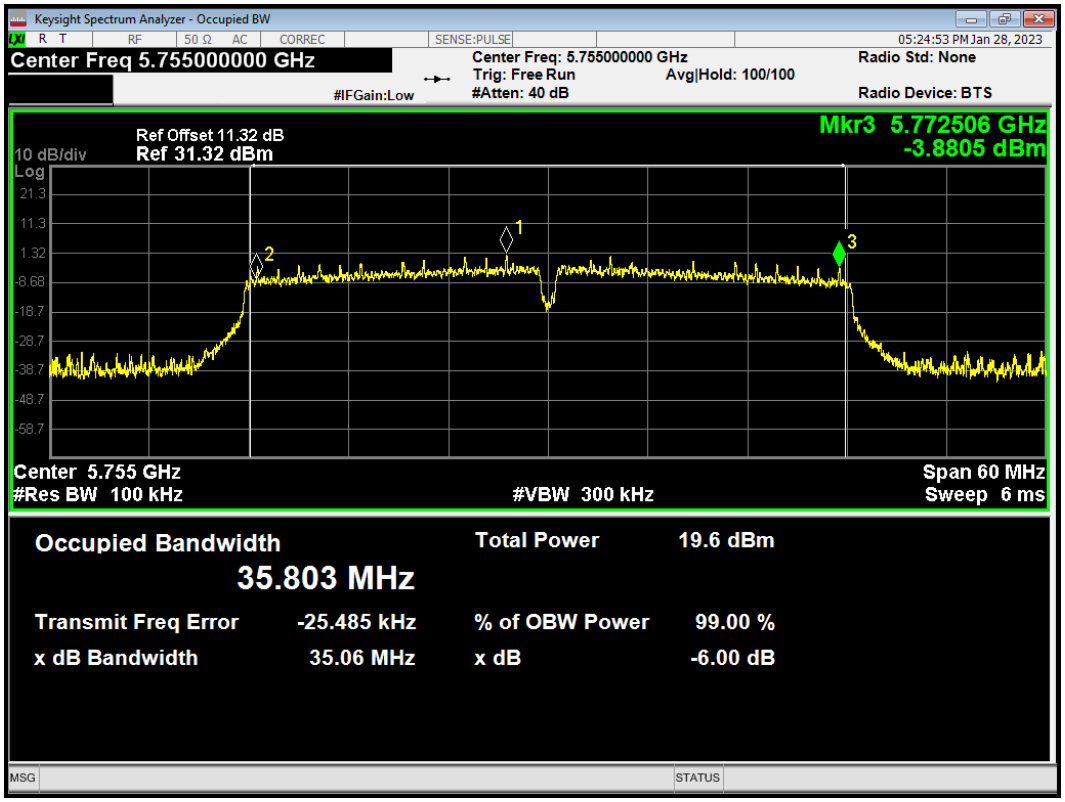
-6dB Bandwidth 802.11n(HT20) 5825MHz



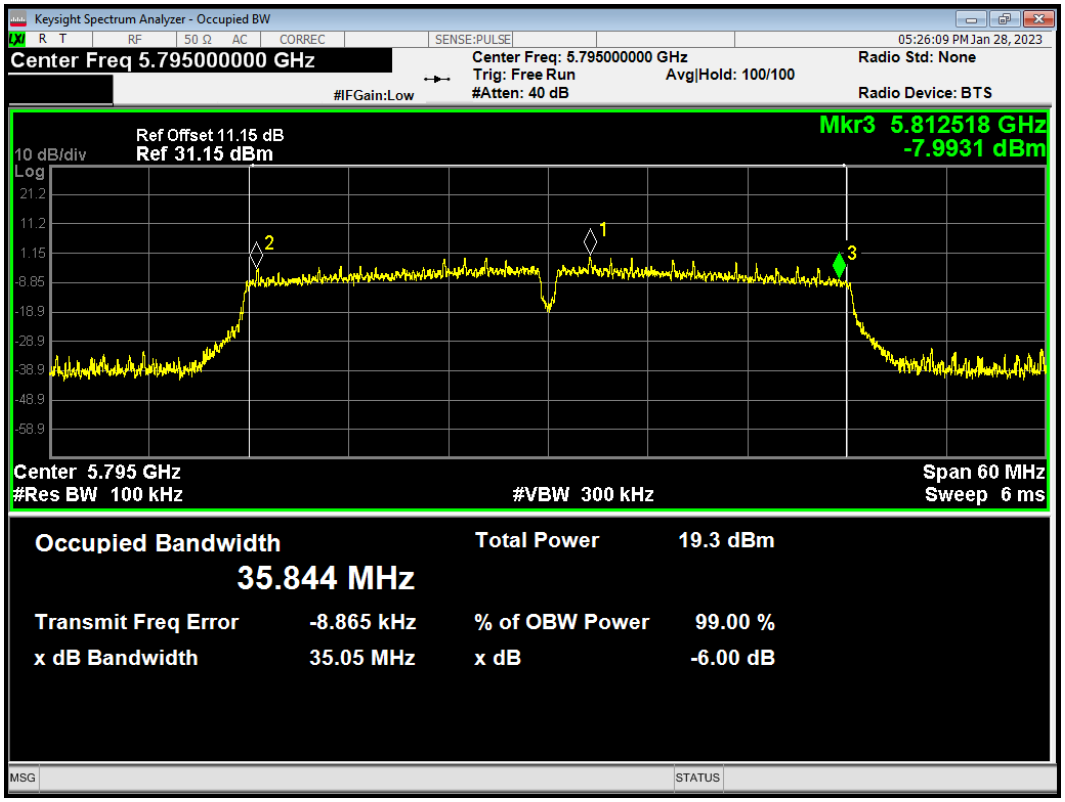
-6dB Bandwidth 802.11n(HT40) 5710MHz



-6dB Bandwidth 802.11n(HT40) 5755MHz



-6dB Bandwidth 802.11n(HT40) 5795MHz



5.2. Average Power Output

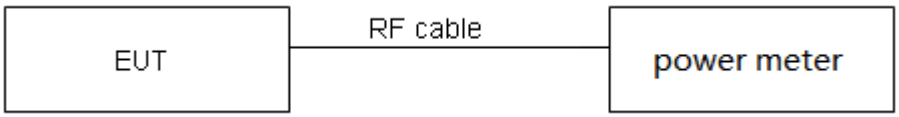
Ambient condition

Temperature	Relative humidity
20°C ~ 25°C	45% ~ 50%

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

Test Setup



Limits

Rule FCC Part 15.407(a)(1)(2)(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.

(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 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	0.97	0.13
802.11n HT20	0.97	0.14
802.11n HT40	0.94	0.28
802.11ac VHT20	0.97	0.14
802.11ac VHT40	0.94	0.28
802.11ac VHT80	0.88	0.55
Note: when Duty cycle≥0.98, Duty cycle correction Factor not required.		

Power Index								
Channel	802.11a	802.11n HT20	802.11ac VHT20	Channel	802.11n HT40	802.11ac VHT40	Channel	802.11ac VHT80
CH36	17	16	15	CH38	16	14.5	CH42	14.5
CH40	17	16	15	CH46	16	14.5	/	/
CH48	17	16	15	/	/	/	/	/
CH52	17	16	15	CH54	16	14.5	CH58	14.5
CH60	17	16	15	CH62	16	14.5	/	/
CH64	17	16	15	/	/	/	/	/
CH100	15	15	15	CH102	13	14.5	CH106	13.5
CH104	17	16	/	CH110	16	14.5	/	/
CH116	17	16	15	CH118	16	/	/	/
CH136	17	16	/	CH126	16	/	CH122	14.5
CH140	14	14	15	CH134	15	14.5	CH138	14.5
CH144	17	16	15	CH142	16	14.5	/	/
CH149	17	16	15	CH151	16	14.5	CH155	14.5
CH157	17	16	15	CH159	16	14.5	/	/
CH165	17	16	15	/	/	/	/	/

Test Mode		Channel/Frequency (MHz)	B=26 dB bandwidth (MHz)	Limit 11 dBm + 10 log B (dBm)	Final Limit (dBm)
U-NII-2A	802.11a	52/5260	20.57	24.13>24	24.00
		60/5300	20.01	24.01>24	24.00
		64/5320	20.13	24.04>24	24.00
	802.11n HT20	52/5260	21.43	24.31>24	24.00
		60/5300	22.22	24.47>24	24.00
		64/5320	22.97	24.61>24	24.00
	802.11n HT40	54/5270	40.81	27.11>24	24.00
		62/5310	49.62	27.96>24	24.00
	802.11ac VHT20	52/5260	20.32	24.08>24	24.00
		60/5300	20.29	24.07>24	24.00
		64/5320	20.27	24.07>24	24.00
	802.11ac VHT40	54/5270	40.81	27.11>24	24.00
		62/5310	41.00	27.13>24	24.00
	802.11ac VHT80	58/5290	81.15	30.09>24	24.00
U-NII-2C	802.11a	100/5500	20.17	24.05>24	24.00
		104/5520	23.79	24.76>24	24.00
		116/5580	22.97	24.61>24	24.00
		136/5680	24.19	24.84>24	24.00
		140/5700	29.92	25.76>24	24.00
		144/5720	21.33	24.29>24	24.00
	802.11n HT20	100/5500	20.39	24.09>24	24.00
		104/5520	22.55	24.53>24	24.00
		116/5580	20.77	24.17>24	24.00
		136/5680	22.10	24.44>24	24.00
		140/5700	30.00	25.77>24	24.00
		144/5720	23.94	24.79>24	24.00
	802.11n HT40	102/5510	40.97	27.12>24	24.00
		110/5550	50.12	28.00>24	24.00
		118/5590	40.19	27.04>24	24.00
		126/5630	41.55	27.19>24	24.00
		134/5670	41.19	27.15>24	24.00
		142/5710	40.88	27.12>24	24.00
	802.11ac VHT20	100/5500	20.50	24.12>24	24.00
		116/5580	20.33	24.08>24	24.00
		140/5700	20.29	24.07>24	24.00
		144/5720	20.18	24.05>24	24.00

	802.11ac VHT40	102/5510	40.80	27.11>24	24.00
		110/5550	40.97	27.12>24	24.00
		134/5670	40.57	27.08>24	24.00
		142/5710	40.55	27.08>24	24.00
	802.11ac VHT80	106/5530	80.88	30.08>24	24.00
		122/5610	80.72	30.07>24	24.00
		138/5690	80.77	30.07>24	24.00
Note: 250mW=24dBm					

Note: Average Power with duty factor = Average Power Measured +Duty cycle correction factor

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	14.74	14.87	24.00	PASS
	40/5200	14.69	14.82	24.00	PASS
	48/5240	14.79	14.92	24.00	PASS
802.11n HT20	36/5180	13.66	13.80	24.00	PASS
	40/5200	13.62	13.76	24.00	PASS
	48/5240	13.80	13.94	24.00	PASS
802.11n HT40	38/5190	13.55	13.83	24.00	PASS
	46/5230	13.60	13.88	24.00	PASS
802.11ac VHT20	36/5180	12.76	12.90	24.00	PASS
	40/5200	12.71	12.85	24.00	PASS
	48/5240	12.64	12.78	24.00	PASS
802.11ac VHT40	38/5190	11.95	12.23	24.00	PASS
	46/5230	11.98	12.26	24.00	PASS
802.11ac VHT80	42/5210	11.53	12.08	24.00	PASS
Note: Average Power with duty factor = Average Power Measured +Duty cycle correction factor					

U-NII-2A

Test Mode	Channel/ Frequency (MHz)	Average Power Measured (dBm)	Average Power with duty factor (dBm)	Limit (dBm)	Conclusion
802.11a	52/5260	14.76	14.89	24.00	PASS
	60/5300	14.73	14.86	24.00	PASS
	64/5320	14.60	14.73	24.00	PASS
802.11n HT20	52/5260	13.75	13.89	24.00	PASS
	60/5300	13.51	13.65	24.00	PASS
	64/5320	13.47	13.61	24.00	PASS
802.11n HT40	54/5270	13.52	13.80	24.00	PASS
	62/5310	13.40	13.68	24.00	PASS
802.11ac VHT20	52/5260	12.52	12.66	24.00	PASS
	60/5300	12.54	12.68	24.00	PASS
	64/5320	12.48	12.62	24.00	PASS
802.11ac VHT40	54/5270	11.63	11.91	24.00	PASS
	62/5310	11.74	12.02	24.00	PASS

802.11ac VHT80	58/5290	11.50	12.05	24.00	PASS
Note: Average Power with duty factor = Average Power Measured +Duty cycle correction factor					

U-NII-2C

Test Mode	Channel/ Frequency (MHz)	Average Power Measured (dBm)	Average Power with duty factor (dBm)	Limit (dBm)	Conclusion
802.11a	100/5500	13.51	13.64	24.00	PASS
	104/5520	15.64	15.77	24.00	PASS
	116/5580	15.80	15.93	24.00	PASS
	136/5680	14.95	15.08	24.00	PASS
	140/5700	12.72	12.85	24.00	PASS
	144/5720	14.32	14.45	24.00	PASS
802.11n HT20	100/5500	13.10	13.24	24.00	PASS
	104/5520	14.33	14.47	24.00	PASS
	116/5580	14.25	14.39	24.00	PASS
	136/5680	14.24	14.38	24.00	PASS
	140/5700	12.05	12.19	24.00	PASS
	144/5720	12.87	13.01	24.00	PASS
802.11n HT40	102/5510	10.87	11.15	24.00	PASS
	110/5550	14.23	14.51	24.00	PASS
	118/5590	14.09	14.37	24.00	PASS
	126/5630	14.39	14.67	24.00	PASS
	134/5670	12.90	13.18	24.00	PASS
	142/5710	13.33	13.61	24.00	PASS
802.11ac VHT20	100/5500	12.98	13.12	24.00	PASS
	116/5580	13.63	13.77	24.00	PASS
	140/5700	12.96	13.10	24.00	PASS
	144/5720	12.12	12.26	24.00	PASS
802.11ac VHT40	102/5510	12.03	12.31	24.00	PASS
	110/5550	12.28	12.56	24.00	PASS
	134/5670	11.94	12.22	24.00	PASS
	142/5710	11.58	11.86	24.00	PASS
802.11ac VHT80	106/5530	11.01	11.56	24.00	PASS
	122/5610	12.56	13.11	24.00	PASS
	138/5690	12.03	12.58	24.00	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	144/5720	6.74	6.87	30.00	PASS
	149/5745	14.76	14.89	30.00	PASS
	157/5785	14.24	14.37	30.00	PASS
	165/5825	14.13	14.26	30.00	PASS
802.11n HT20	144/5720	5.57	5.71	30.00	PASS
	149/5745	13.58	13.72	30.00	PASS
	157/5785	13.14	13.28	30.00	PASS
	165/5825	13.08	13.22	30.00	PASS
802.11n HT40	142/5710	0.97	1.25	30.00	PASS
	151/5755	13.17	13.45	30.00	PASS
	159/5795	12.93	13.21	30.00	PASS
802.11ac VHT20	144/5720	5.10	5.24	30.00	PASS
	149/5745	12.48	12.62	30.00	PASS
	157/5785	12.16	12.30	30.00	PASS
	165/5825	12.05	12.19	30.00	PASS
802.11ac VHT40	142/5710	-0.31	-0.03	30.00	PASS
	151/5755	11.95	12.23	30.00	PASS
	159/5795	11.55	11.83	30.00	PASS
802.11ac VHT80	138/5690	-3.77	-3.22	30.00	PASS
	155/5775	11.57	12.12	30.00	PASS
Note: Average Power with duty factor = Average Power Measured +Duty cycle correction factor					

5.3. Frequency Stability

Ambient condition

Temperature	Relative humidity
20°C ~ 25°C	45% ~ 50%

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
3.85	-10	5200.002107	5199.998391	5199.992706	5199.991083
3.85	0	5200.001230	5199.997422	5199.983733	5199.990076
3.85	10	5199.995405	5199.995857	5199.978059	5199.981444
3.85	20	5199.993219	5199.990724	5199.977841	5199.972549
3.85	25	5199.995609	5199.987412	5199.969456	5199.972249
3.85	30	5199.998201	5199.978254	5199.961900	5199.971848
3.85	40	5199.990641	5199.977959	5199.961599	5199.967143
3.85	50	5199.992427	5199.974699	5199.961106	5199.964226
3.60	25	5200.002185	5199.973555	5199.958049	5199.954939
4.40	25	5200.004202	5199.970782	5199.948269	5199.954577
Max. ΔMHz		-0.009359	-0.029218	-0.051731	-0.045423
PPM		-1.799808	-5.618846	-9.948269	-8.735192

Voltage (V)	Temperature (°C)	U-NII-2A Test Results			
		5300MHz			
		1min	2min	5min	10min
3.85	-10	5299.994461	5299.986434	5299.983140	5299.980299
3.85	0	5299.989885	5299.982999	5299.982924	5299.974472
3.85	10	5299.989912	5299.977834	5299.977192	5299.971314
3.85	20	5299.987693	5299.972401	5299.974475	5299.962227
3.85	25	5299.987797	5299.967841	5299.968009	5299.959309
3.85	30	5299.984594	5299.963596	5299.961378	5299.955655
3.85	40	5299.994186	5299.960801	5299.959587	5299.949495
3.85	50	5299.988474	5299.960202	5299.953376	5299.939724
3.60	25	5299.988099	5299.954810	5299.950235	5299.930982
4.40	25	5299.997547	5299.952563	5299.950213	5299.925112
Max. ΔMHz		-0.015406	-0.047437	-0.049787	-0.074888
PPM		-2.906792	-8.950377	-9.393774	-14.129811

Voltage (V)	Temperature (°C)	U-NII-2C Test Results			
		5580MHz			
		1min	2min	5min	10min
3.85	-10	5579.992886	5579.984424	5579.983655	5579.979532
3.85	0	5579.995484	5579.975494	5579.983299	5579.970038
3.85	10	5579.991059	5579.967998	5579.979363	5579.968837
3.85	20	5579.989855	5579.967242	5579.976200	5579.964702
3.85	25	5579.995632	5579.963505	5579.968405	5579.963764
3.85	30	5579.995409	5579.958541	5579.963864	5579.957343
3.85	40	5580.004558	5579.956646	5579.959377	5579.953624
3.85	50	5580.005784	5579.947051	5579.951251	5579.950886
3.60	25	5579.997812	5579.941521	5579.944477	5579.948940
4.40	25	5580.000763	5579.934457	5579.942487	5579.945934
Max. ΔMHz		-0.010145	-0.065543	-0.057513	-0.054066
PPM		-1.818100	-11.746057	-10.306989	-9.689247

Voltage (V)	Temperature (°C)	U-NII-3 Test Results			
		5785MHz			
		1min	2min	5min	10min
3.85	-10	5785.001145	5784.992960	5784.984697	5784.982268
3.85	0	5784.992944	5784.988443	5784.978539	5784.972797
3.85	10	5784.991020	5784.986498	5784.969063	5784.964081
3.85	20	5785.000380	5784.976805	5784.960808	5784.954432
3.85	25	5784.995268	5784.972216	5784.951263	5784.949015
3.85	30	5784.999640	5784.971741	5784.944002	5784.944277
3.85	40	5785.008901	5784.969914	5784.940884	5784.943013
3.85	50	5785.006451	5784.966325	5784.940422	5784.933530
3.60	25	5785.015203	5784.958647	5784.937222	5784.927746
4.40	25	5785.006058	5784.958421	5784.928947	5784.921307
Max. ΔMHz		-0.008980	-0.041579	-0.071053	-0.078693
PPM		-1.552290	-7.187381	-12.282282	-13.602939

5.4. Power Spectral Density

Ambient condition

Temperature	Relative humidity
20°C ~ 25°C	45% ~ 50%

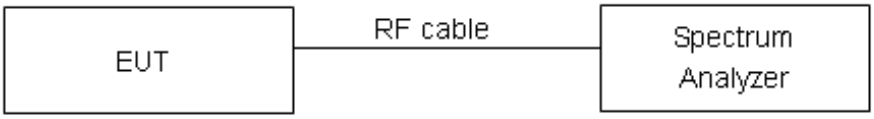
Method of Measurement

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, 5.250-5.350GHz, 5.470-5.725GHz.
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)/ Part 15.407(a)(2) / 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 5.25-5.35 GHz and 5.47-5.725 GHz bands, 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/MHz	Limits
5150-5250	11dBm/MHz
5.25-5.35 GHz and 5.47-5.725 GHz	11dBm/MHz
5725-5850	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:

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

U-NII-1

Mode	Channel Number	Read Value (dBm /MHz)	Power Spectral Density (dBm /MHz)	Limit (dBm /MHz)	Conclusion
802.11a	36	5.27	5.40	11	PASS
	40	5.09	5.22	11	PASS
	48	5.26	5.39	11	PASS
802.11n HT20	36	3.87	4.01	11	PASS
	40	3.78	3.92	11	PASS
	48	4.25	4.39	11	PASS
802.11n HT40	38	0.74	1.02	11	PASS
	46	0.88	1.16	11	PASS
802.11ac VHT20	36	3.21	3.35	11	PASS
	40	2.95	3.09	11	PASS
	48	2.76	2.90	11	PASS
802.11ac VHT40	38	-0.77	-0.49	11	PASS
	46	-0.89	-0.61	11	PASS
802.11ac VHT80	42	-3.98	-3.43	11	PASS

U-NII-2A

Mode	Channel Number	Read Value (dBm /MHz)	Power Spectral Density (dBm /MHz)	Limit (dBm /MHz)	Conclusion
802.11a	52	5.43	5.56	11	PASS
	60	5.08	5.21	11	PASS
	64	5.21	5.34	11	PASS
802.11n HT20	52	4.32	4.46	11	PASS
	60	3.71	3.85	11	PASS
	64	3.61	3.75	11	PASS
802.11n HT40	54	0.82	1.10	11	PASS
	62	0.66	0.94	11	PASS
802.11ac VHT20	52	3.10	3.24	11	PASS
	60	2.93	3.07	11	PASS
	64	2.87	3.01	11	PASS
802.11ac VHT40	54	-1.10	-0.82	11	PASS

	62	-0.84	-0.56	11	PASS
802.11ac VHT80	58	-4.22	-3.67	11	PASS

U-NII-2C

Mode	Channel Number	Read Value (dBm /MHz)	Power Spectral Density (dBm /MHz)	Limit (dBm /MHz)	Conclusion
802.11a	100	4.04	4.17	11	PASS
	104	6.01	6.14	11	PASS
	116	6.24	6.37	11	PASS
	136	5.49	5.62	11	PASS
	140	3.08	3.21	11	PASS
	144	5.05	5.18	11	PASS
802.11n HT20	100	3.58	3.72	11	PASS
	104	4.70	4.84	11	PASS
	116	4.30	4.44	11	PASS
	136	4.30	4.44	11	PASS
	140	2.24	2.38	11	PASS
	144	3.80	3.94	11	PASS
802.11n HT40	102	-1.81	-1.53	11	PASS
	110	1.41	1.69	11	PASS
	118	1.41	1.69	11	PASS
	126	1.66	1.94	11	PASS
	134	0.51	0.79	11	PASS
	142	0.93	1.21	11	PASS
802.11ac VHT20	100	3.28	3.42	11	PASS
	116	3.97	4.11	11	PASS
	140	3.41	3.55	11	PASS
	144	3.09	3.23	11	PASS
802.11ac VHT40	102	-0.63	-0.35	11	PASS
	110	-0.21	0.07	11	PASS
	134	-0.56	-0.28	11	PASS
	142	-0.80	-0.52	11	PASS
802.11ac VHT80	106	-4.42	-3.87	11	PASS
	122	-3.21	-2.66	11	PASS

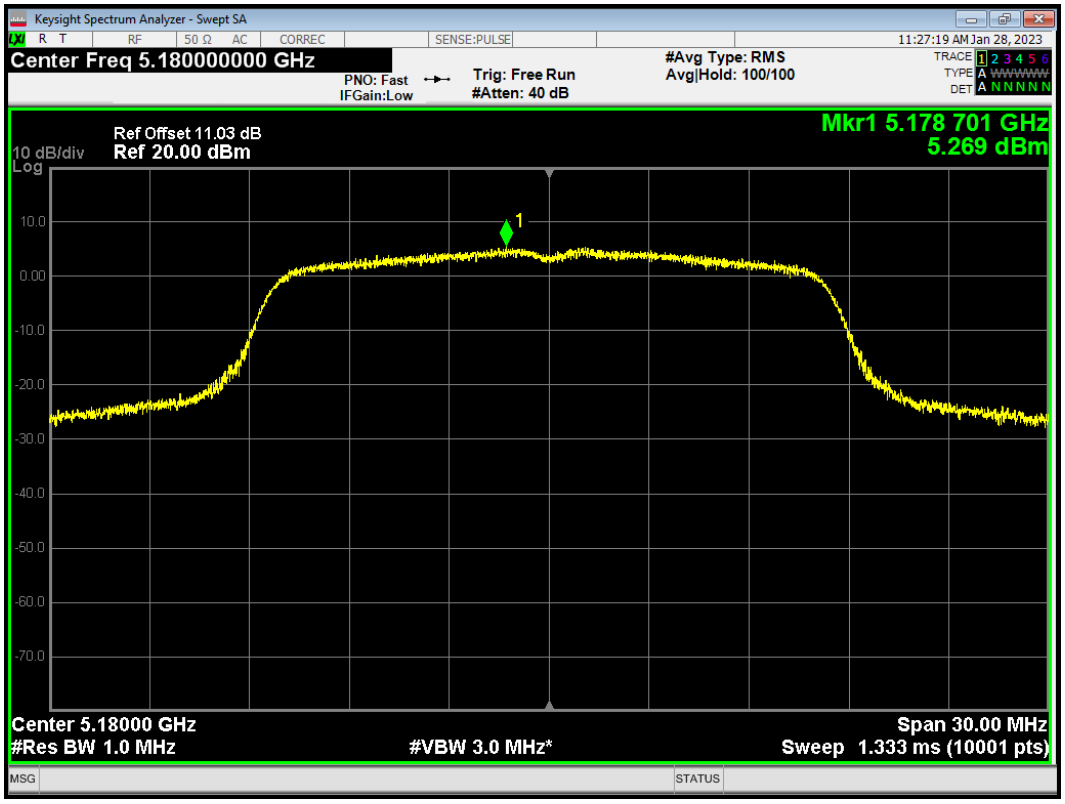
	13	-3.69	-3.14	11	PASS

U-NII-3

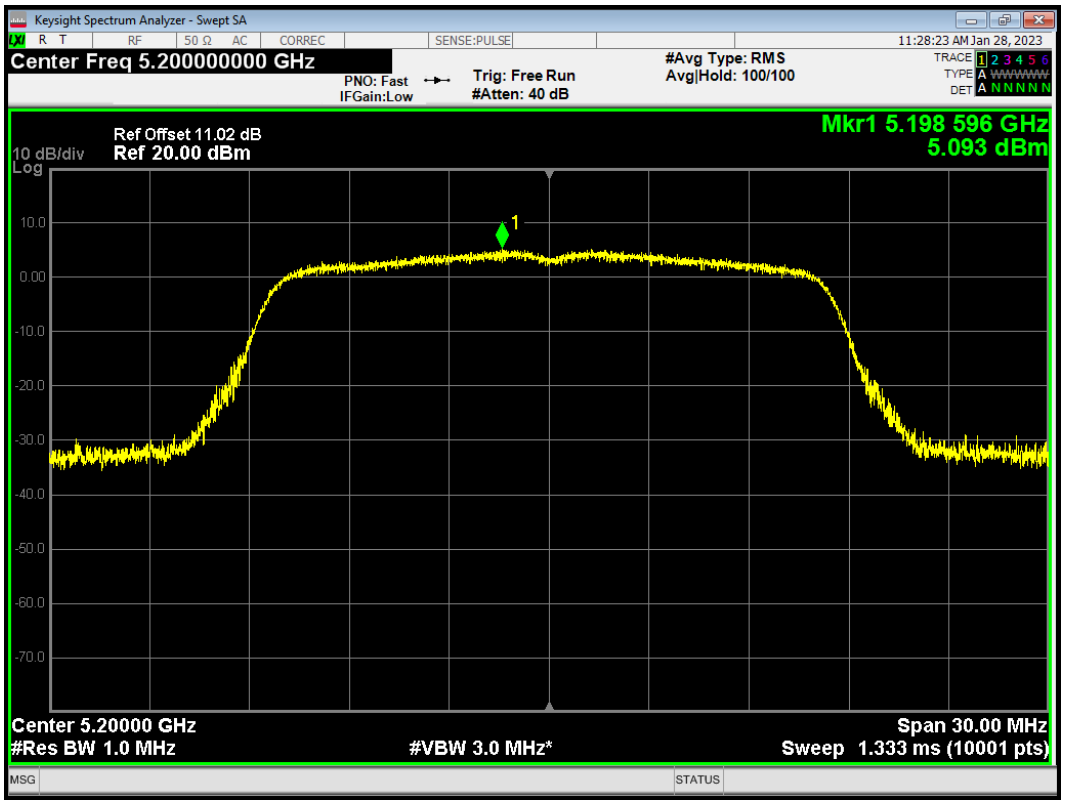
Mode	Channel Number	Read Value (dBm/470kHz)	Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)	Conclusion
802.11a	144	0.03	0.43	30	PASS
	149	1.83	2.23	30	PASS
	157	1.41	1.81	30	PASS
	165	1.52	1.92	30	PASS
802.11n HT20	144	-1.26	-0.85	30	PASS
	149	0.54	0.95	30	PASS
	157	0.13	0.54	30	PASS
	165	-0.19	0.22	30	PASS
802.11n HT40	142	-5.93	-5.38	30	PASS
	151	-3.10	-2.55	30	PASS
	159	-3.11	-2.56	30	PASS
802.11ac VHT20	144	-2.24	-1.83	30	PASS
	149	-0.58	-0.17	30	PASS
	157	-0.95	-0.54	30	PASS
	165	-0.54	-0.13	30	PASS
802.11ac VHT40	142	-7.48	-6.93	30	PASS
	151	-4.04	-3.49	30	PASS
	159	-4.20	-3.65	30	PASS
802.11ac VHT80	138	-11.15	-10.33	30	PASS
	155	-7.69	-6.87	30	PASS
Note: PSD=Read Value+Duty cycle correction factor +10*log(500/470) correction factor					

U-NII-1

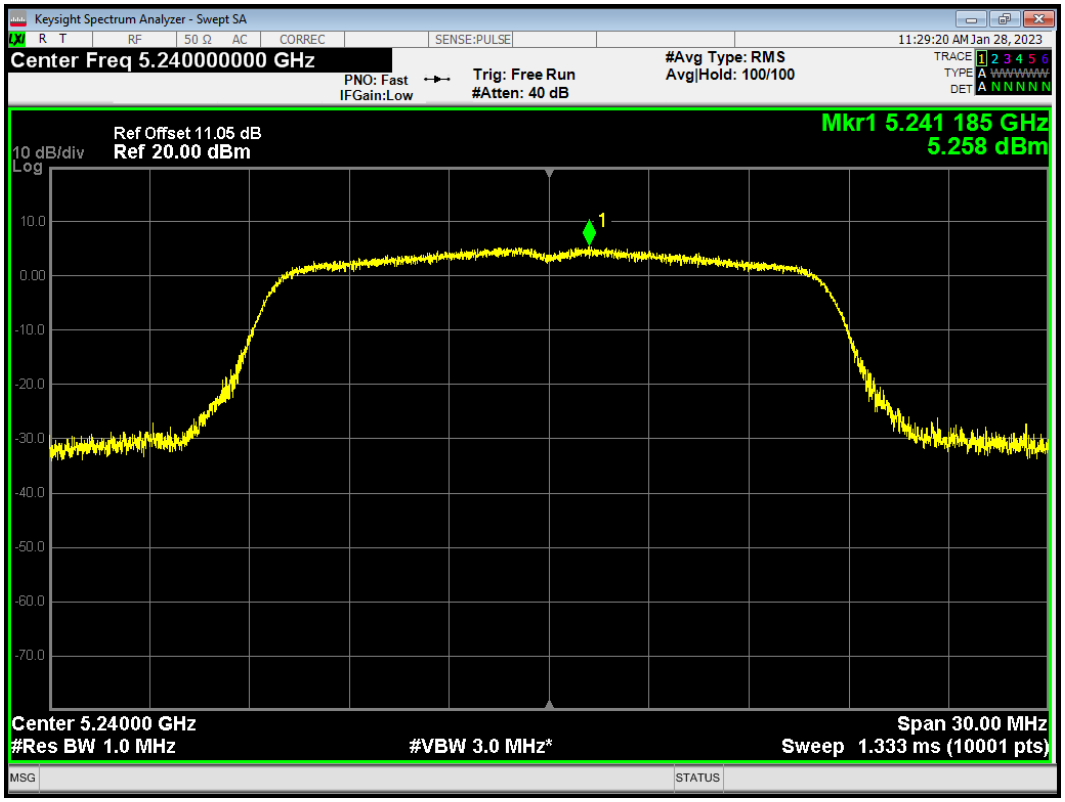
PSD 802.11a 5180MHz



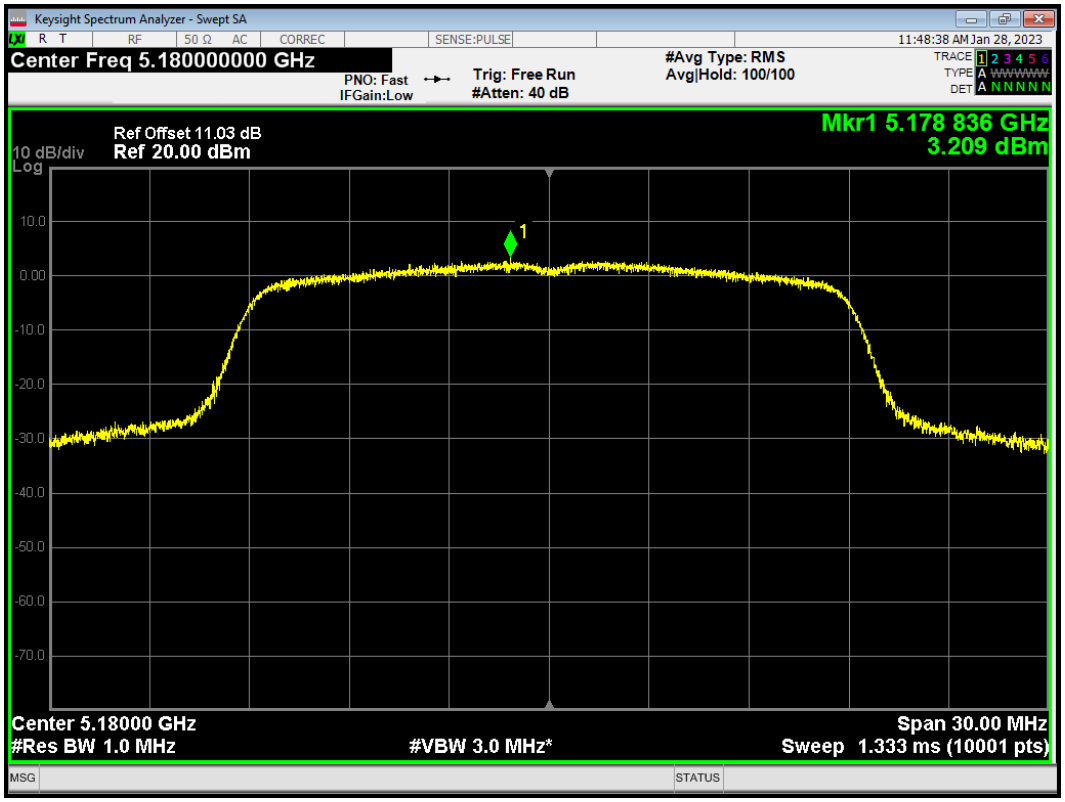
PSD 802.11a 5200MHz



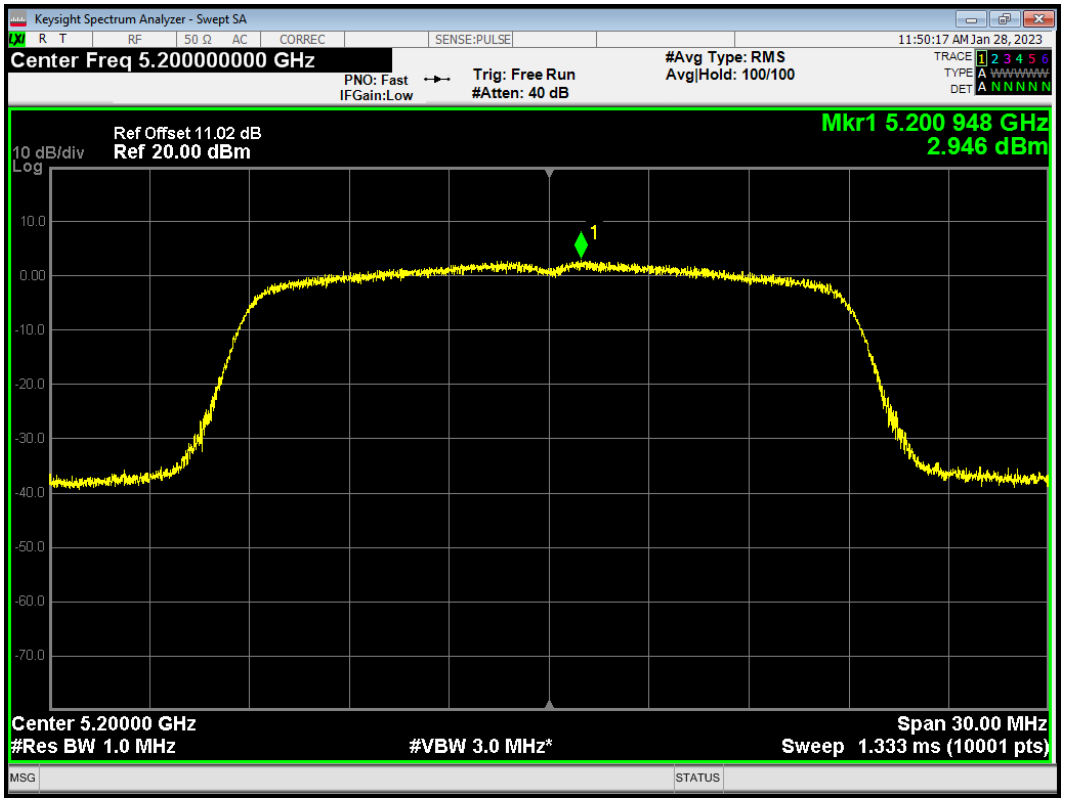
PSD 802.11a 5240MHz



PSD 802.11ac(VHT20) 5180MHz



PSD 802.11ac(VHT20) 5200MHz



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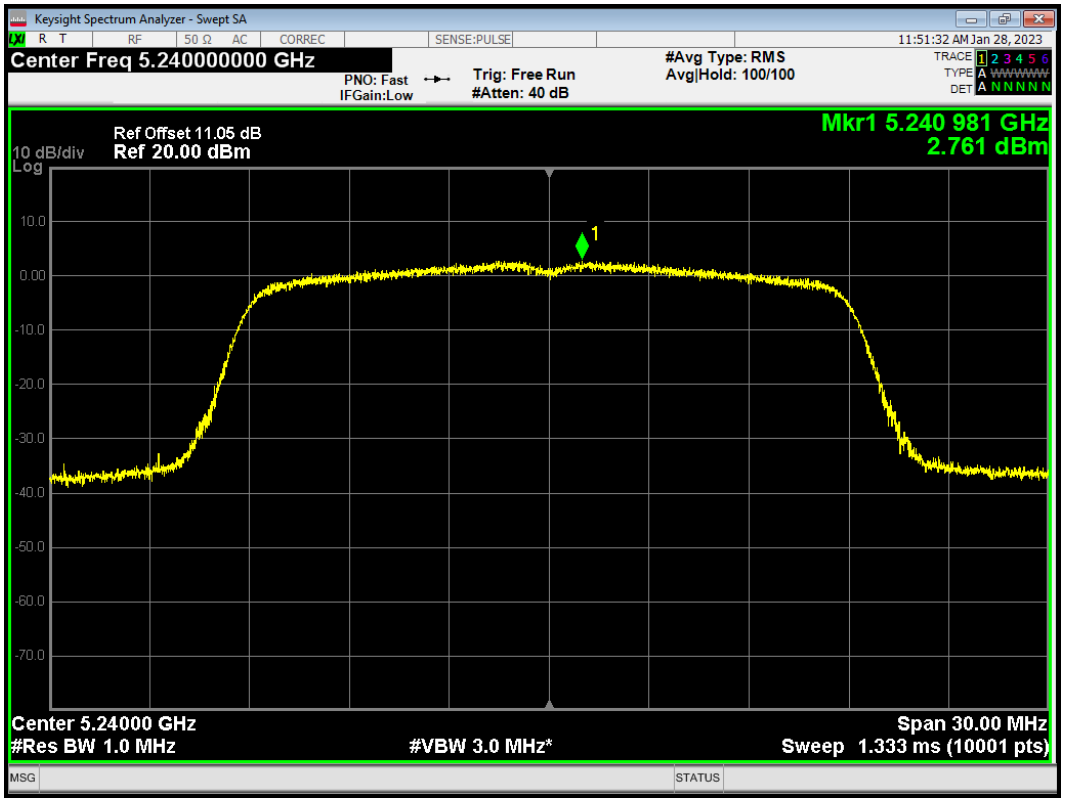
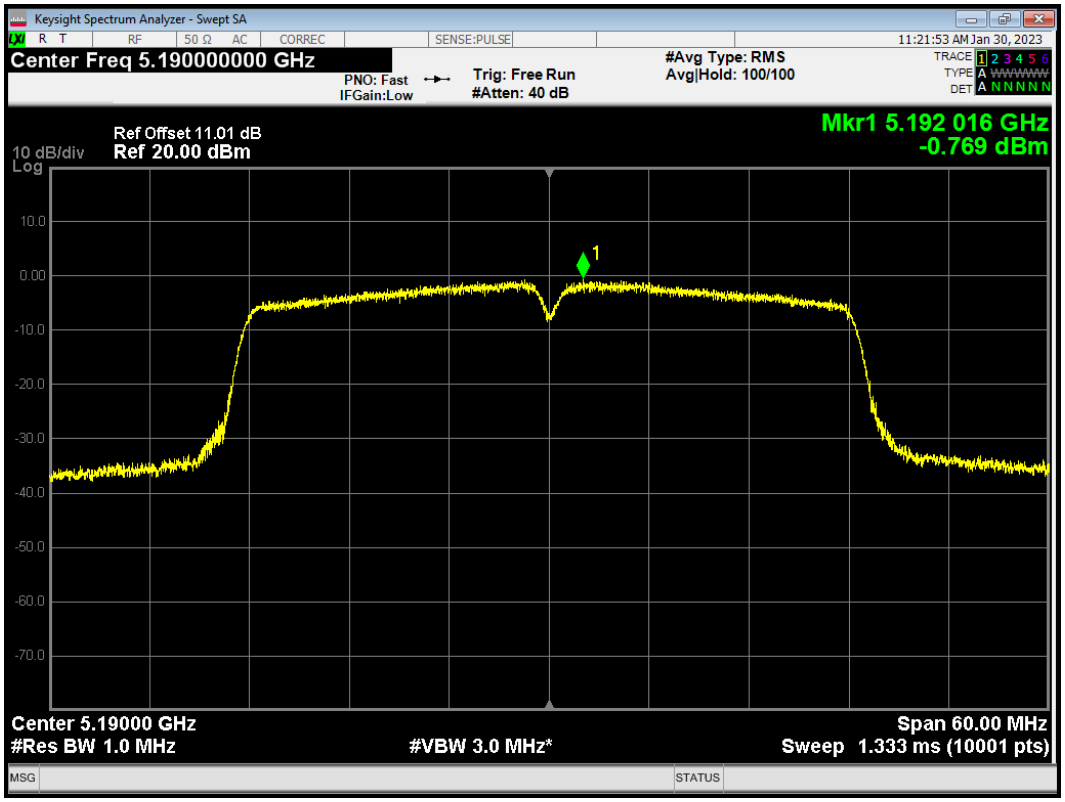
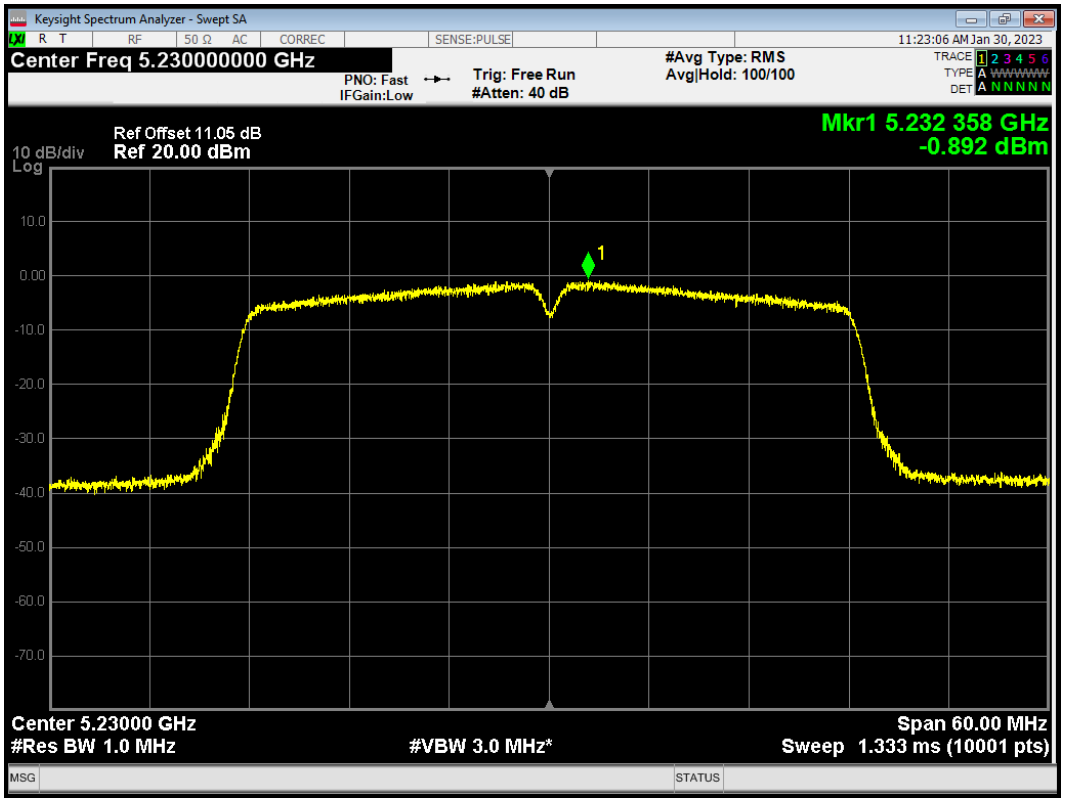


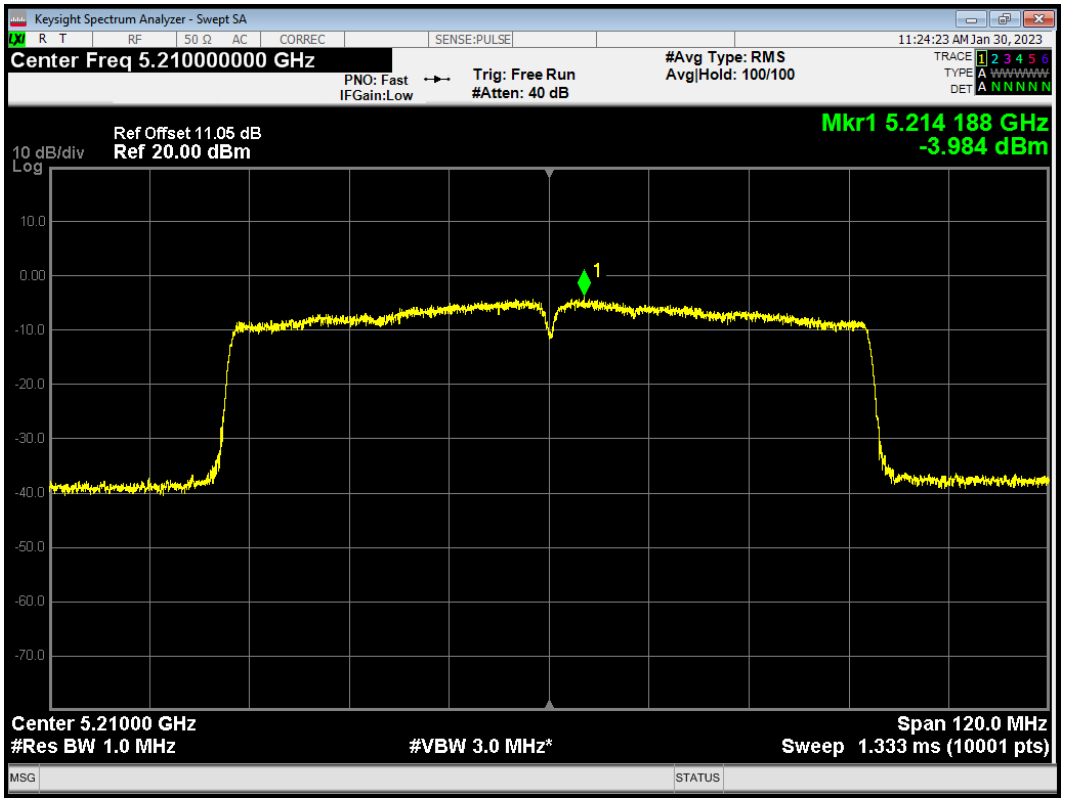
PSD 802.11ac(VHT40) 5190MHz



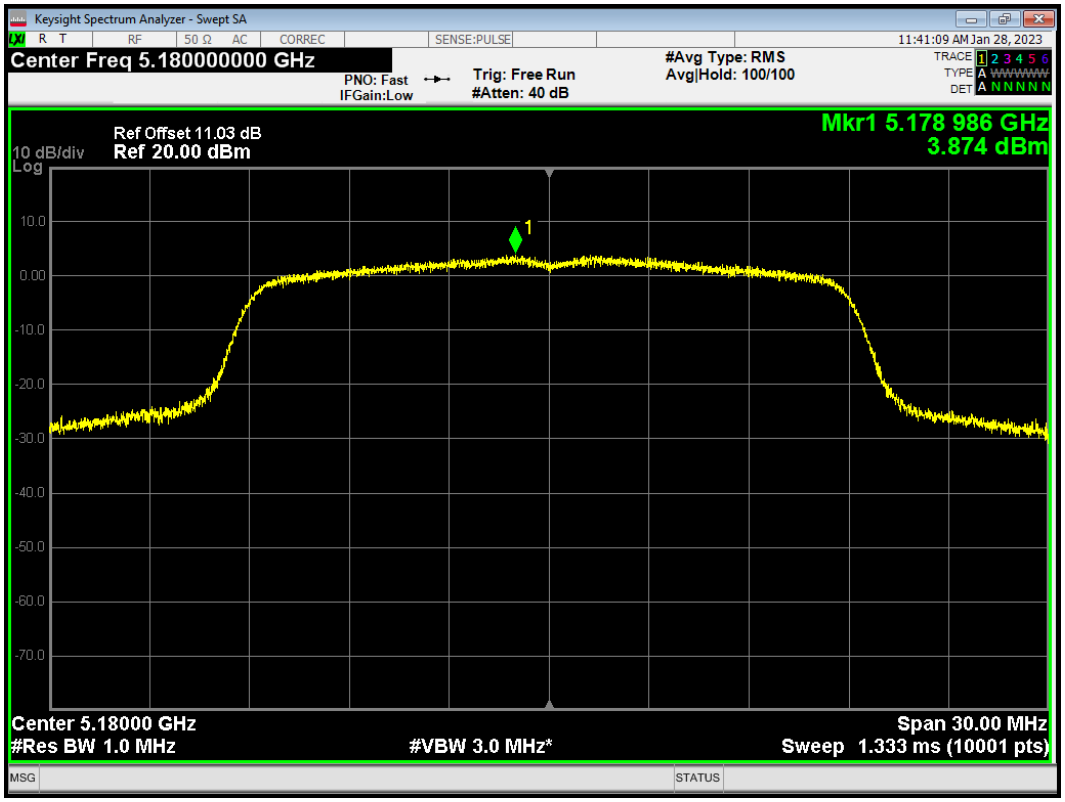
PSD 802.11ac(VHT40) 5230MHz



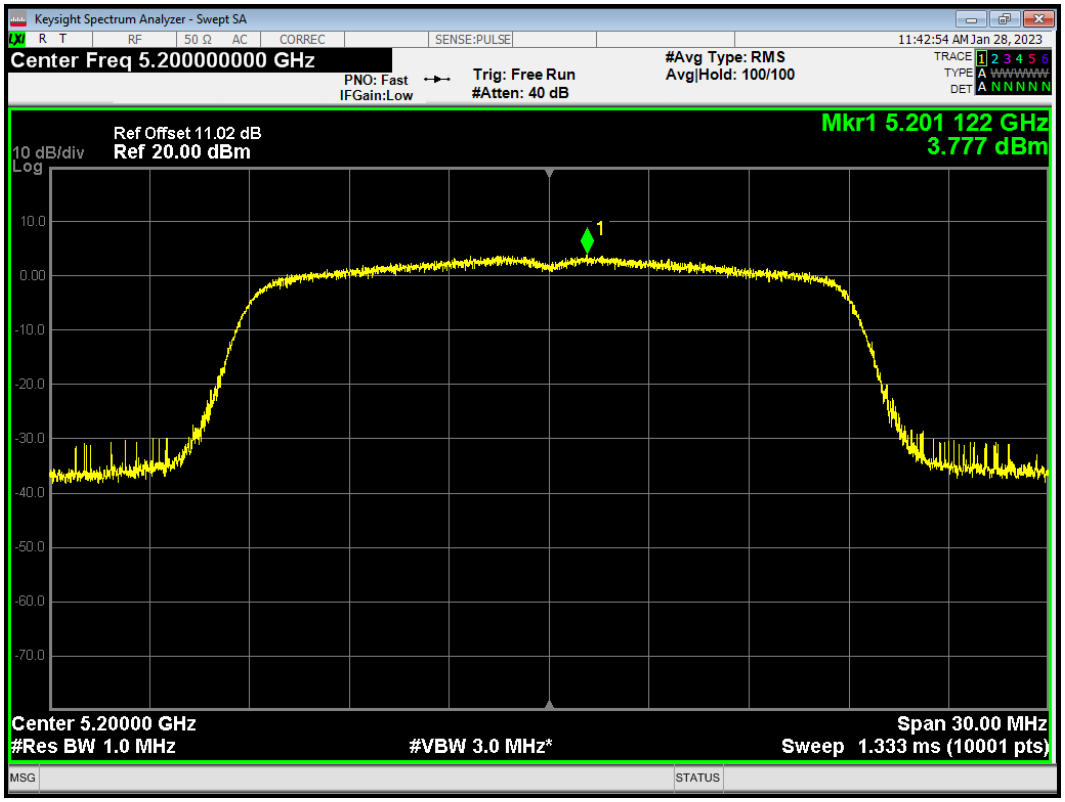
PSD 802.11ac(VHT80) 5210MHz



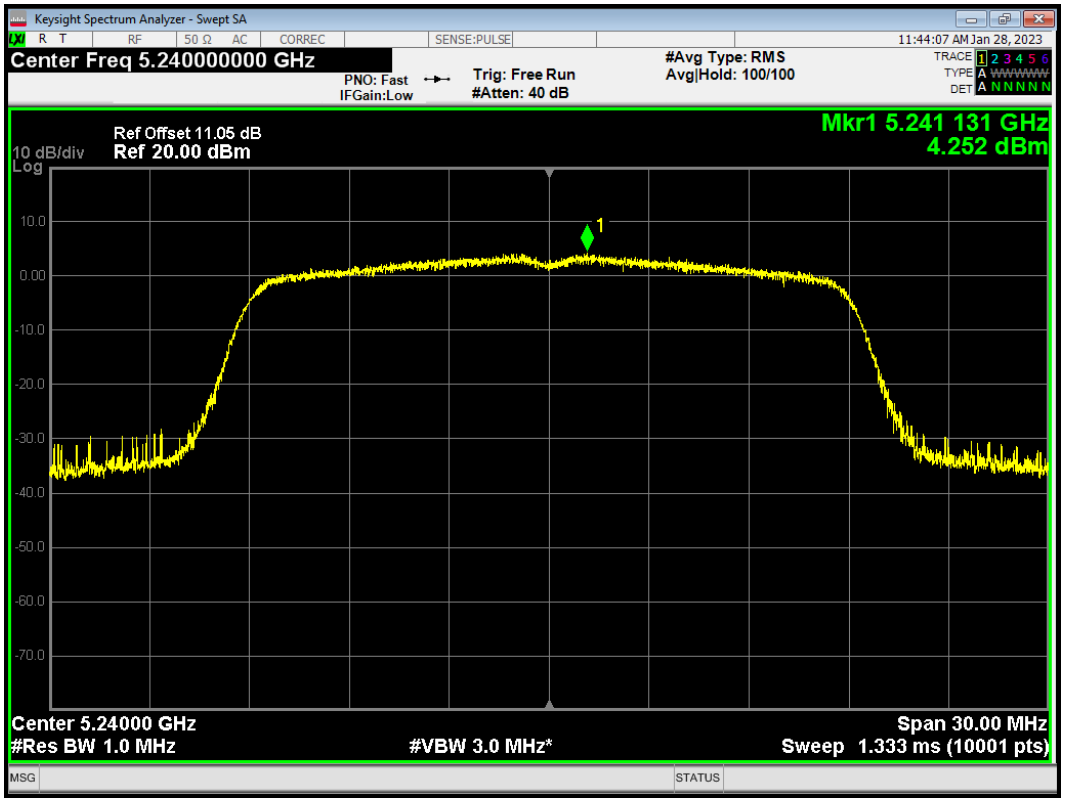
PSD 802.11n(HT20) 5180MHz



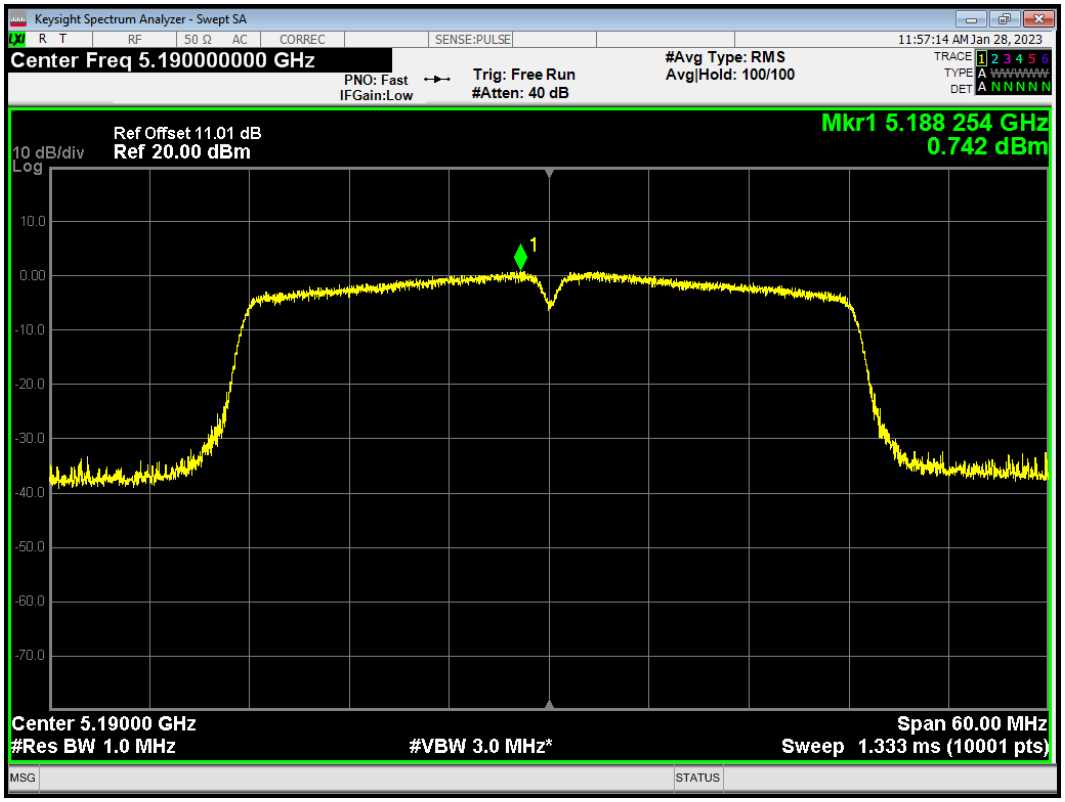
PSD 802.11n(HT20) 5200MHz



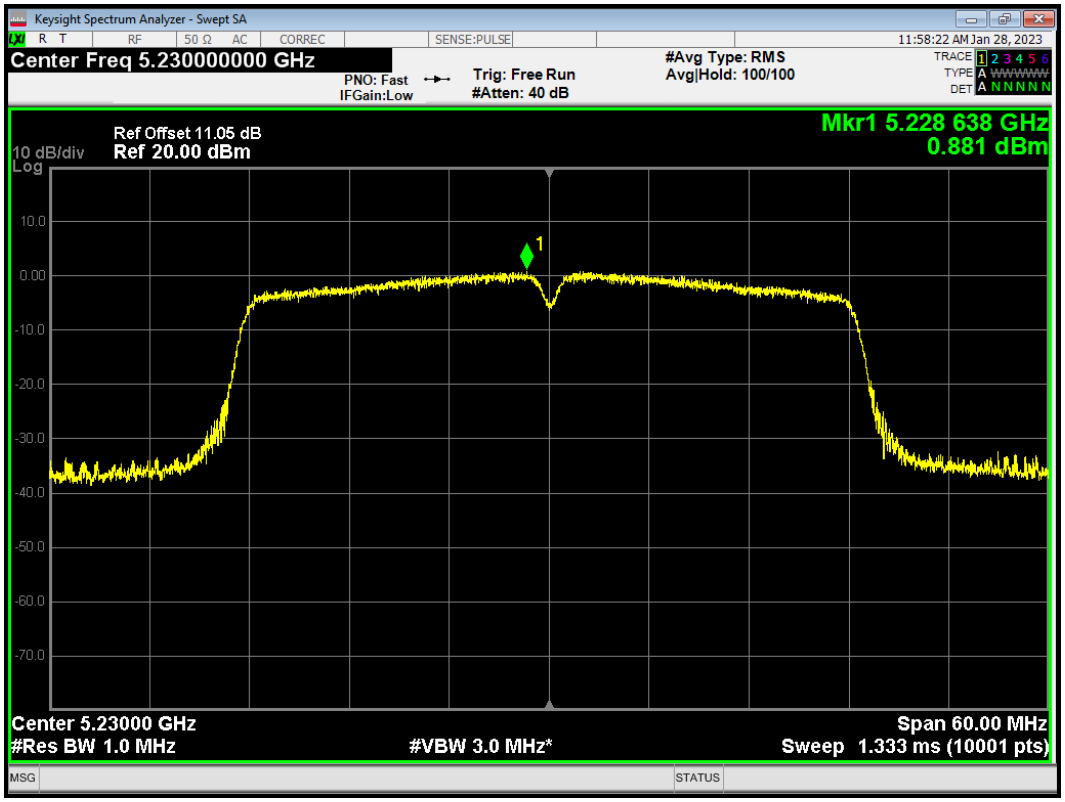
PSD 802.11n(HT20) 5240MHz



PSD 802.11n(HT40) 5190MHz

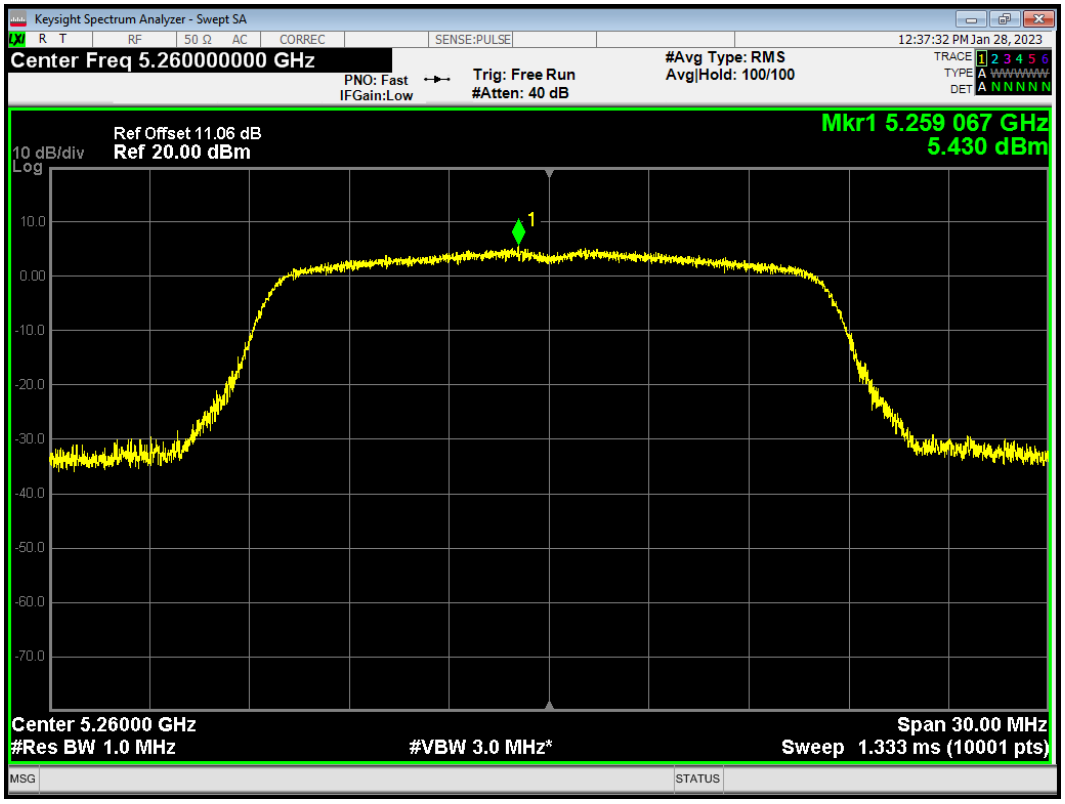


PSD 802.11n(HT40) 5230MHz

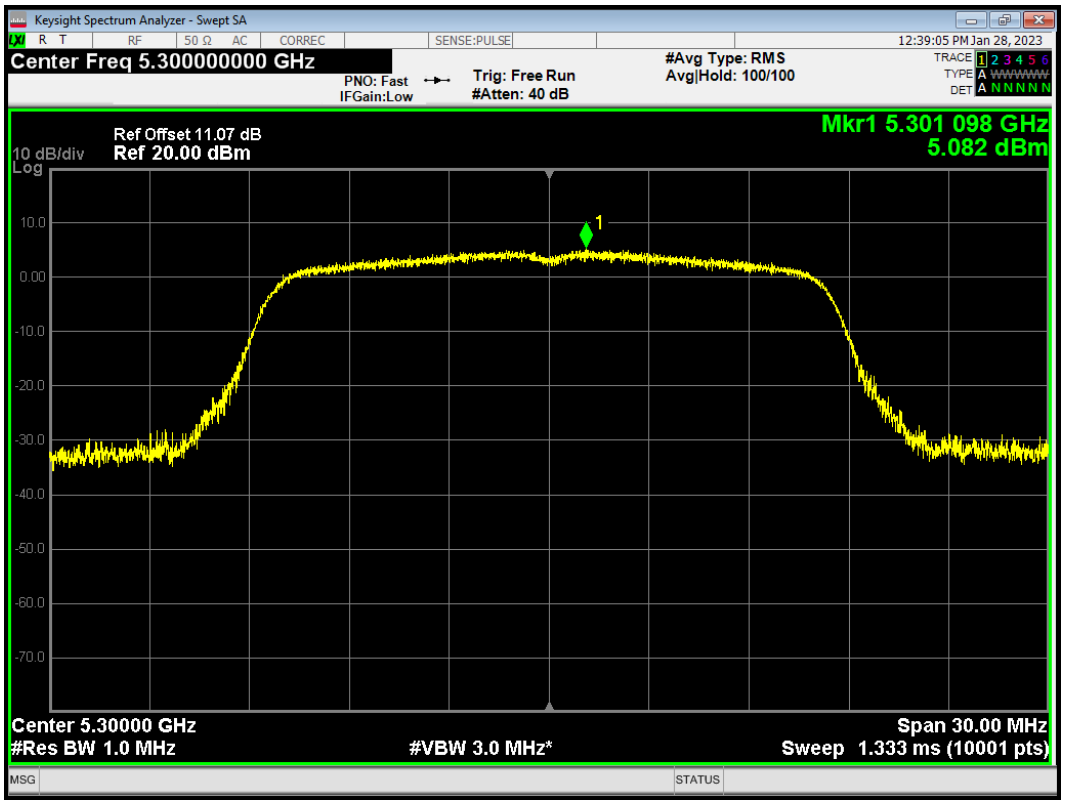


U-NII-2A

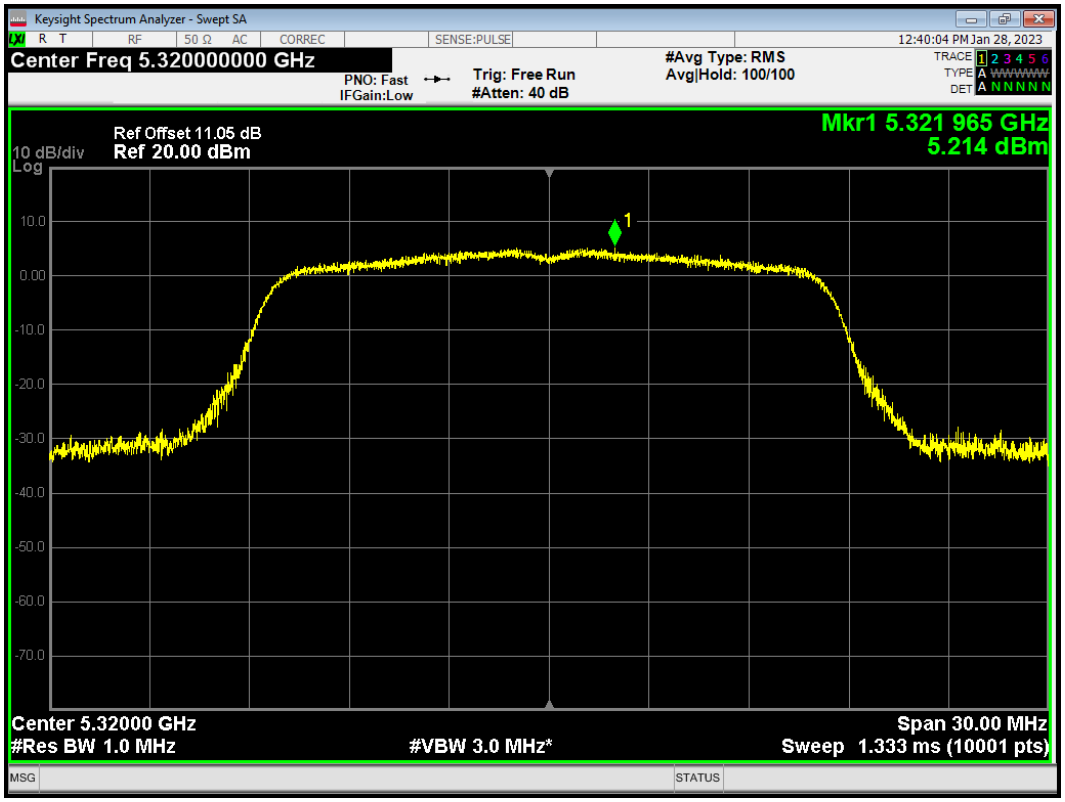
PSD 802.11a 5260MHz



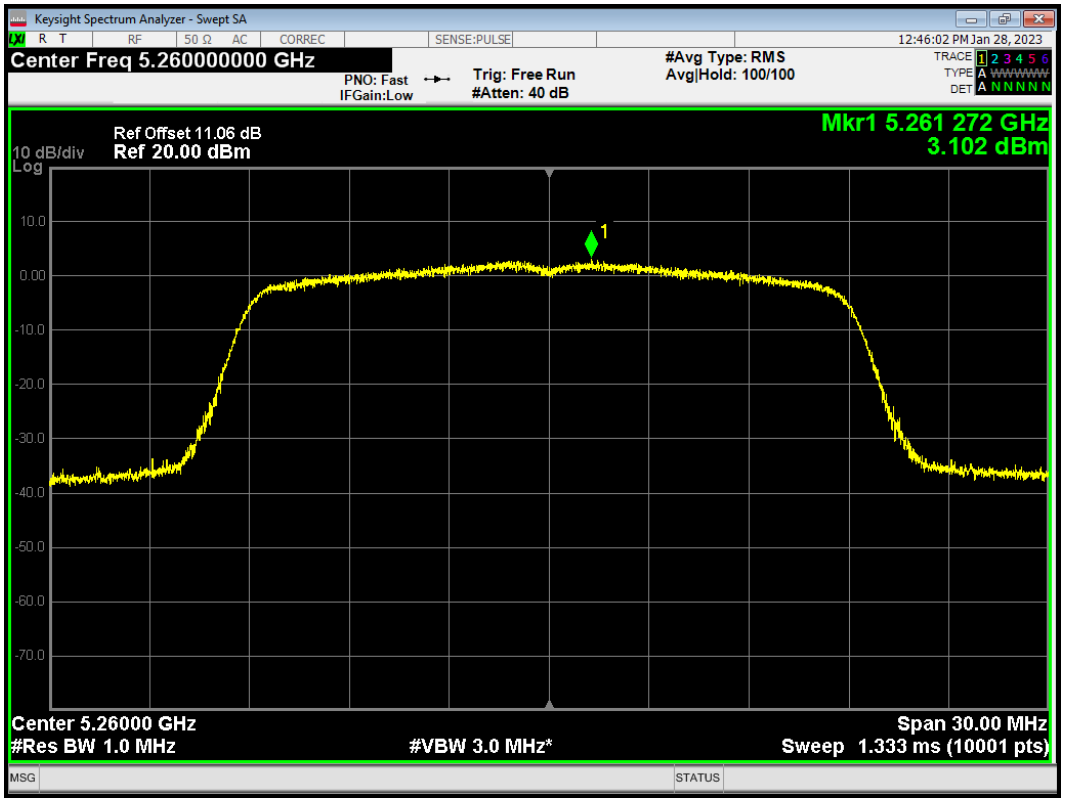
PSD 802.11a 5300MHz



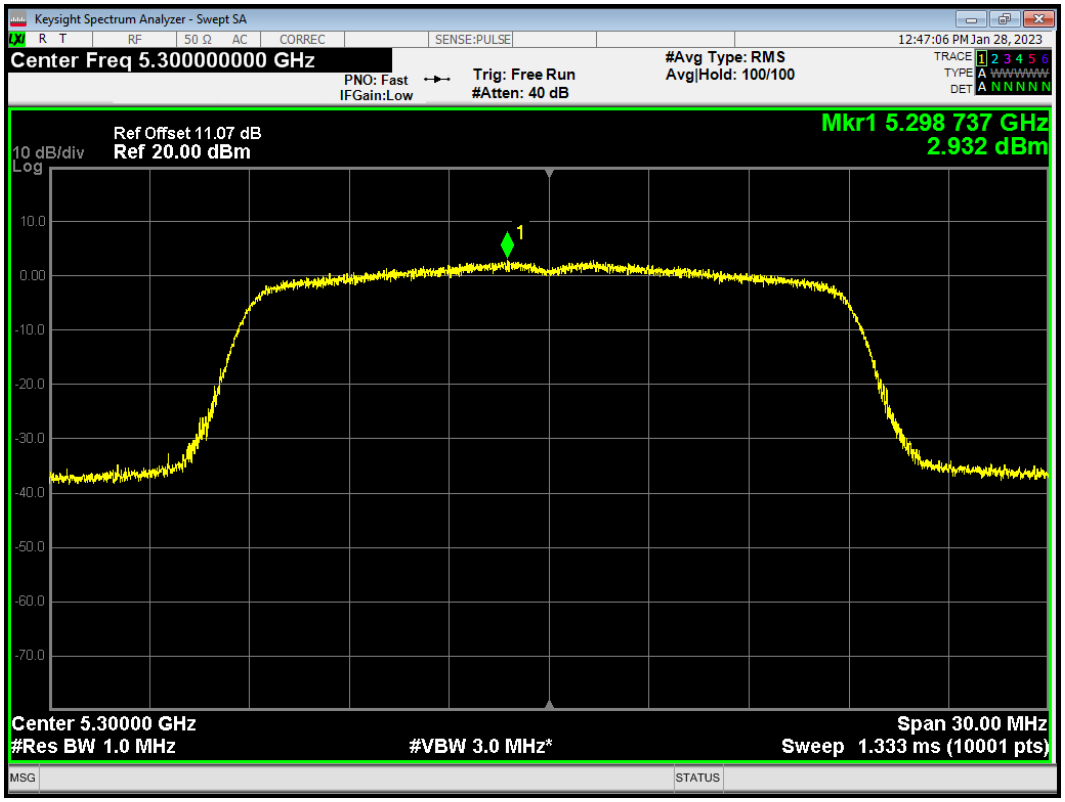
PSD 802.11a 5320MHz



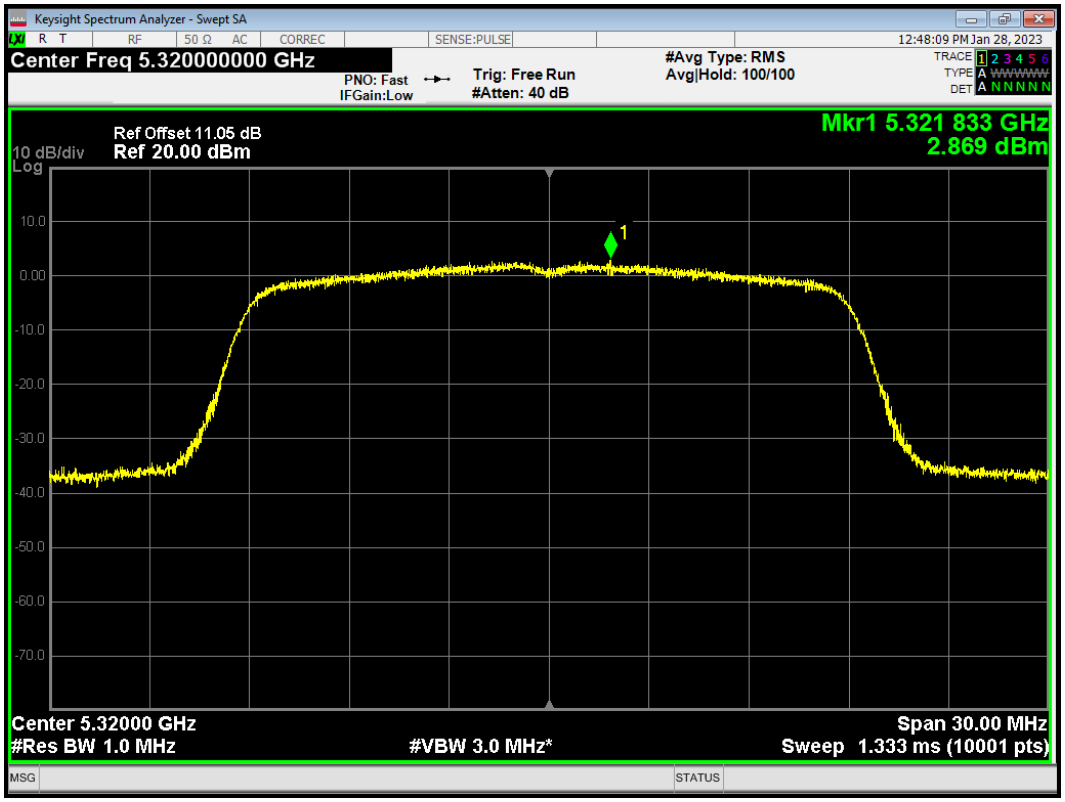
PSD 802.11ac(VHT20) 5260MHz



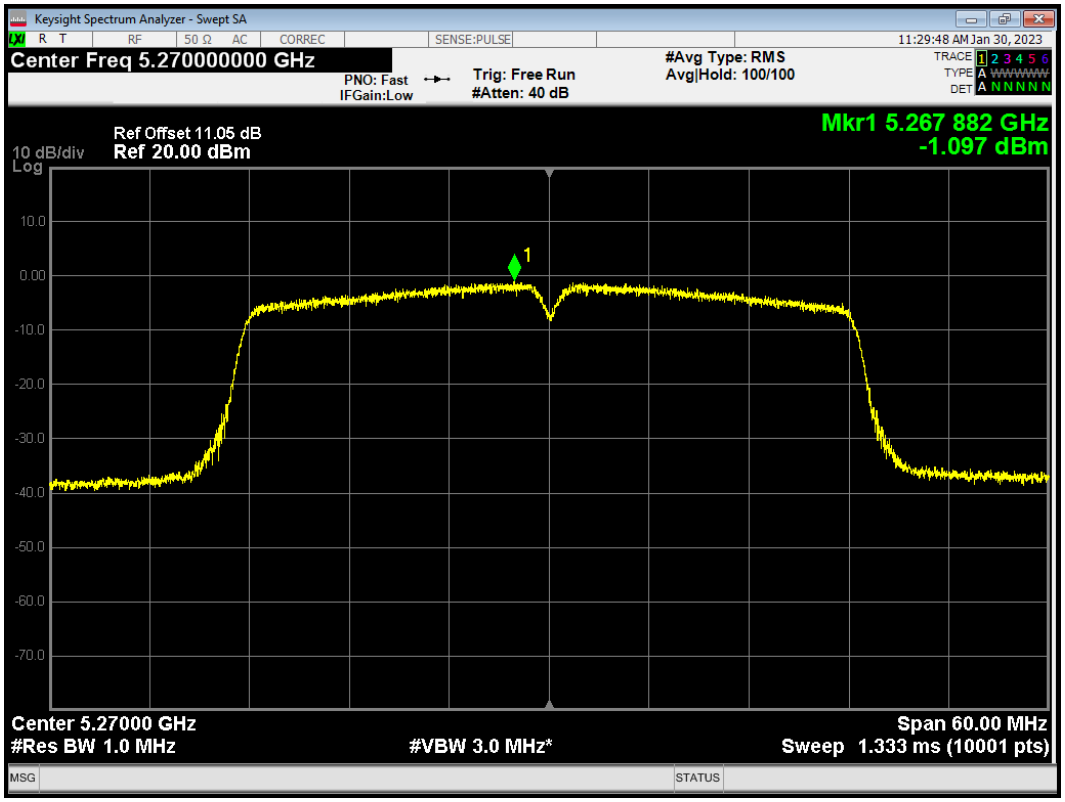
PSD 802.11ac(VHT20) 5300MHz



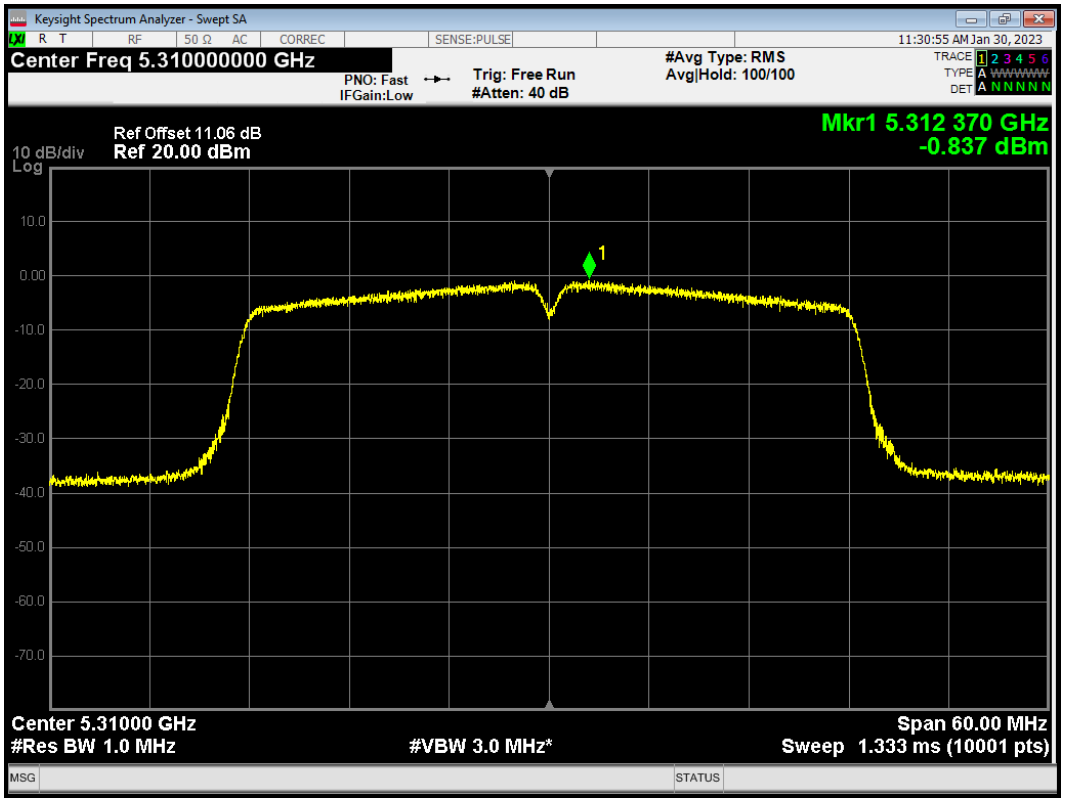
PSD 802.11ac(VHT20) 5320MHz



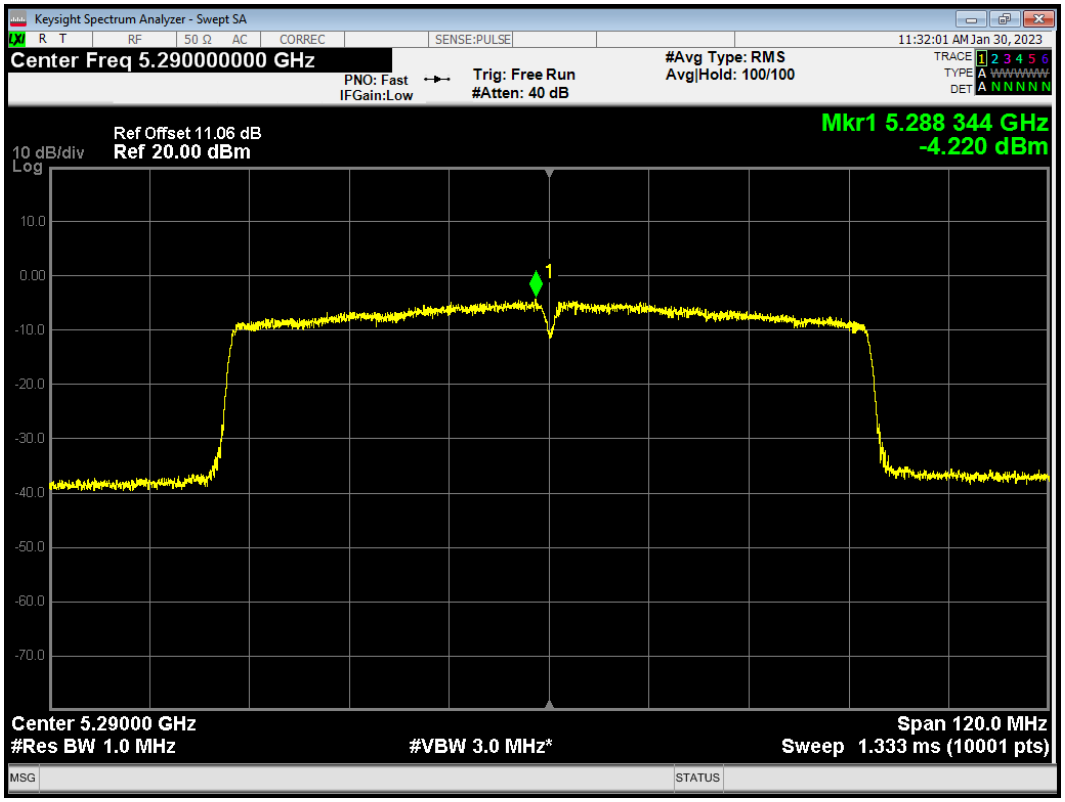
PSD 802.11ac(VHT40) 5270MHz



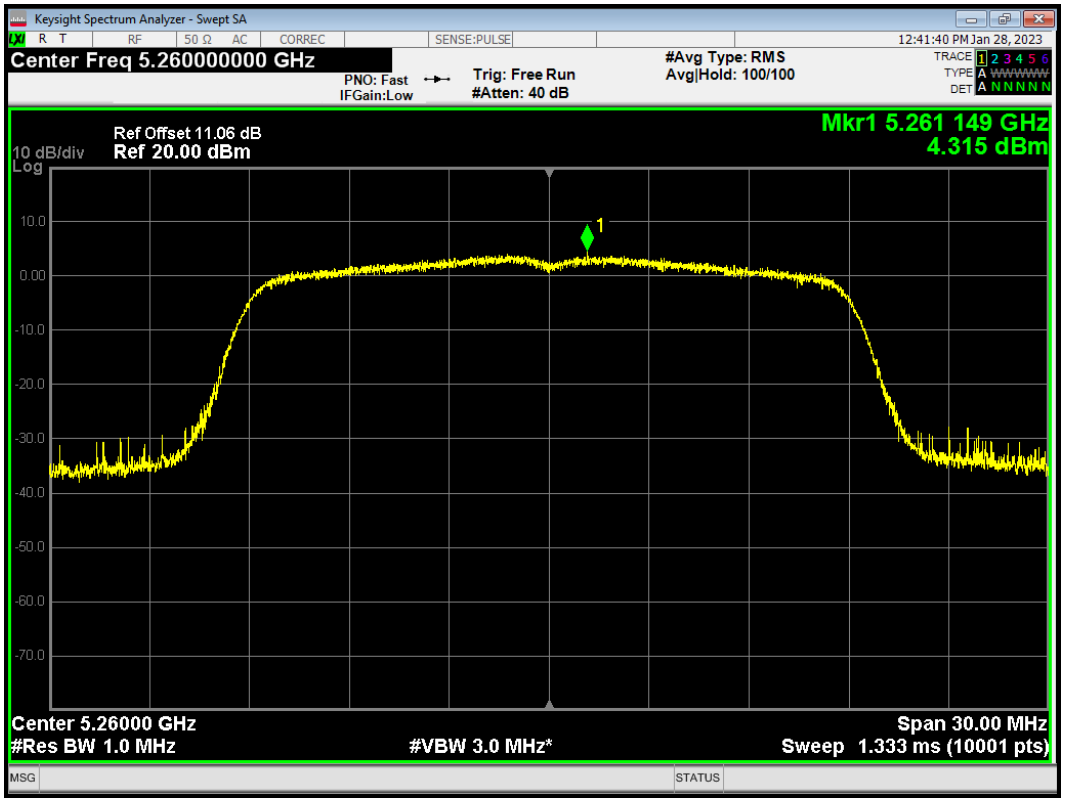
PSD 802.11ac(VHT40) 5310MHz



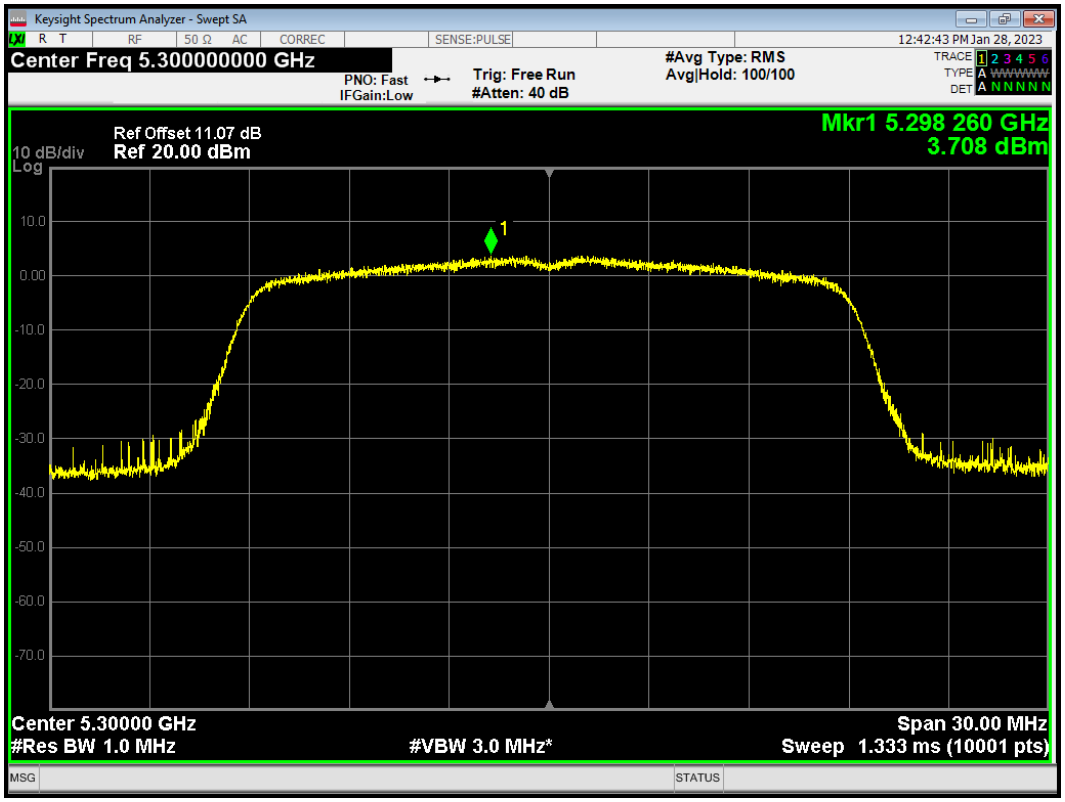
PSD 802.11ac(VHT80) 5290MHz



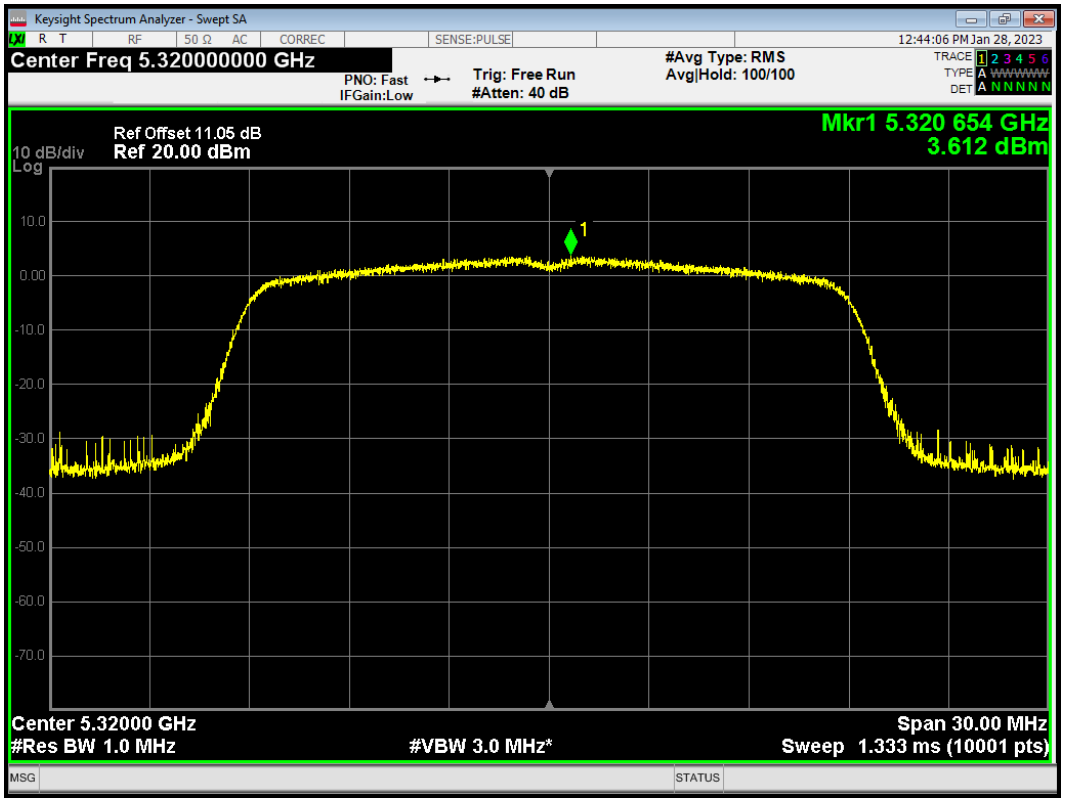
PSD 802.11n(HT20) 5260MHz



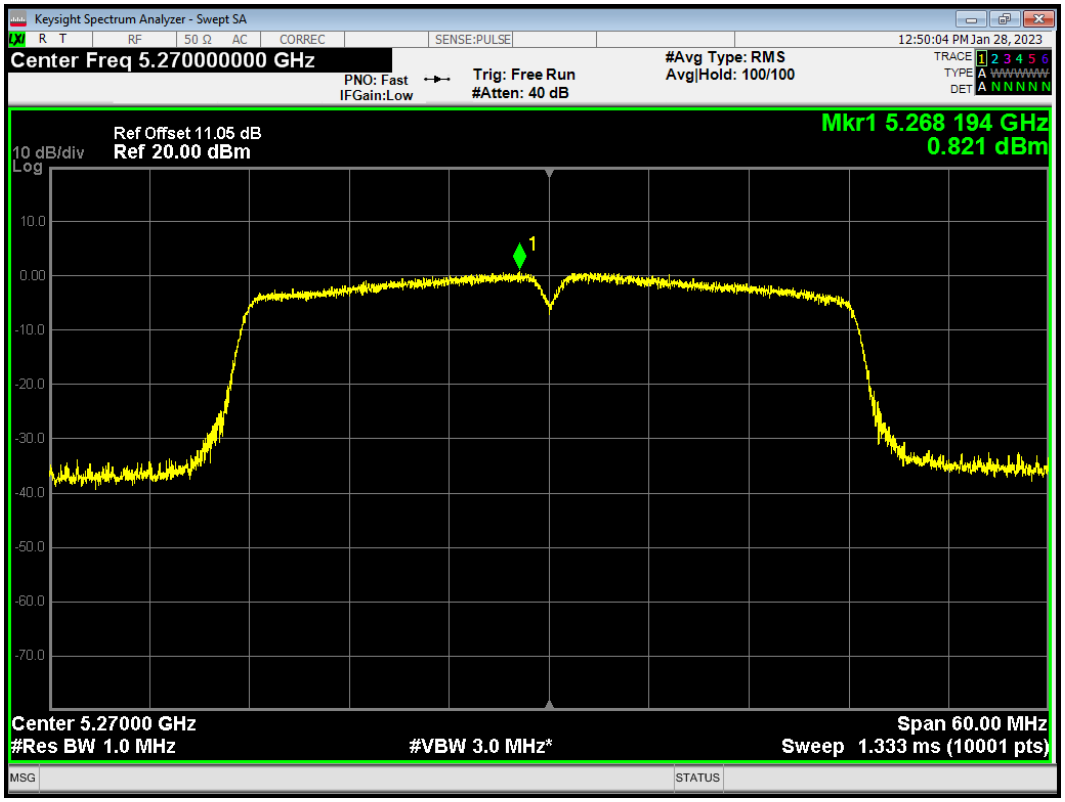
PSD 802.11n(HT20) 5300MHz



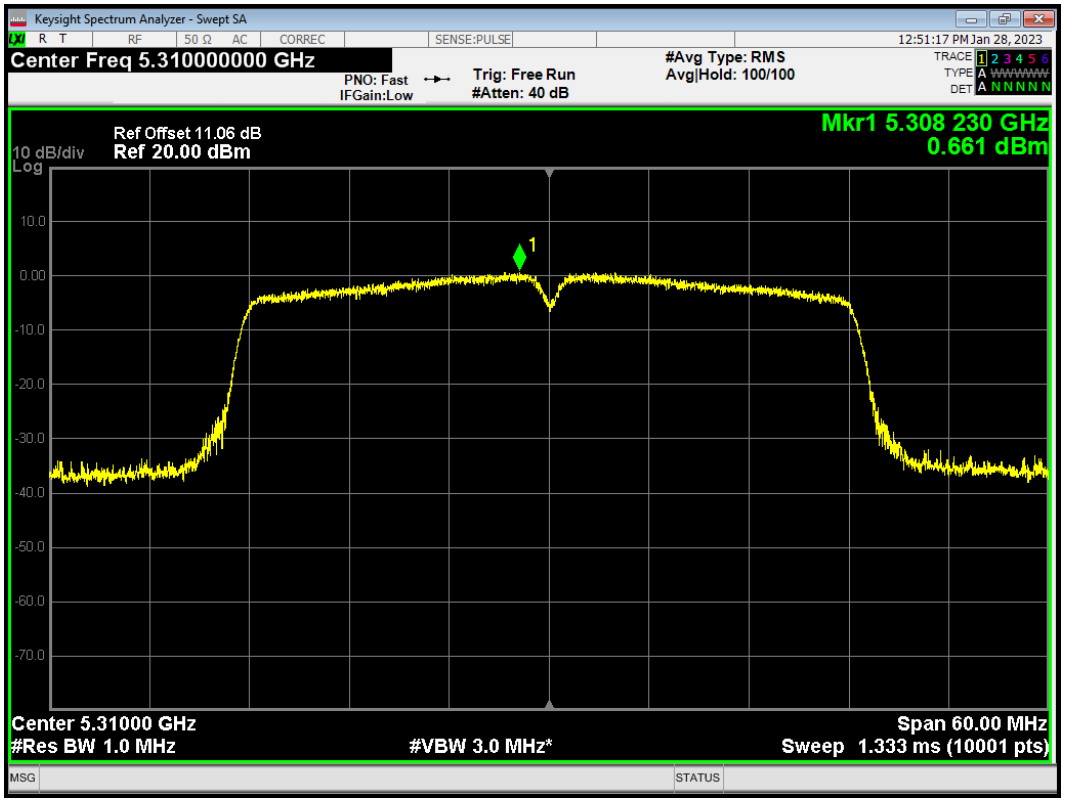
PSD 802.11n(HT20) 5320MHz



PSD 802.11n(HT40) 5270MHz

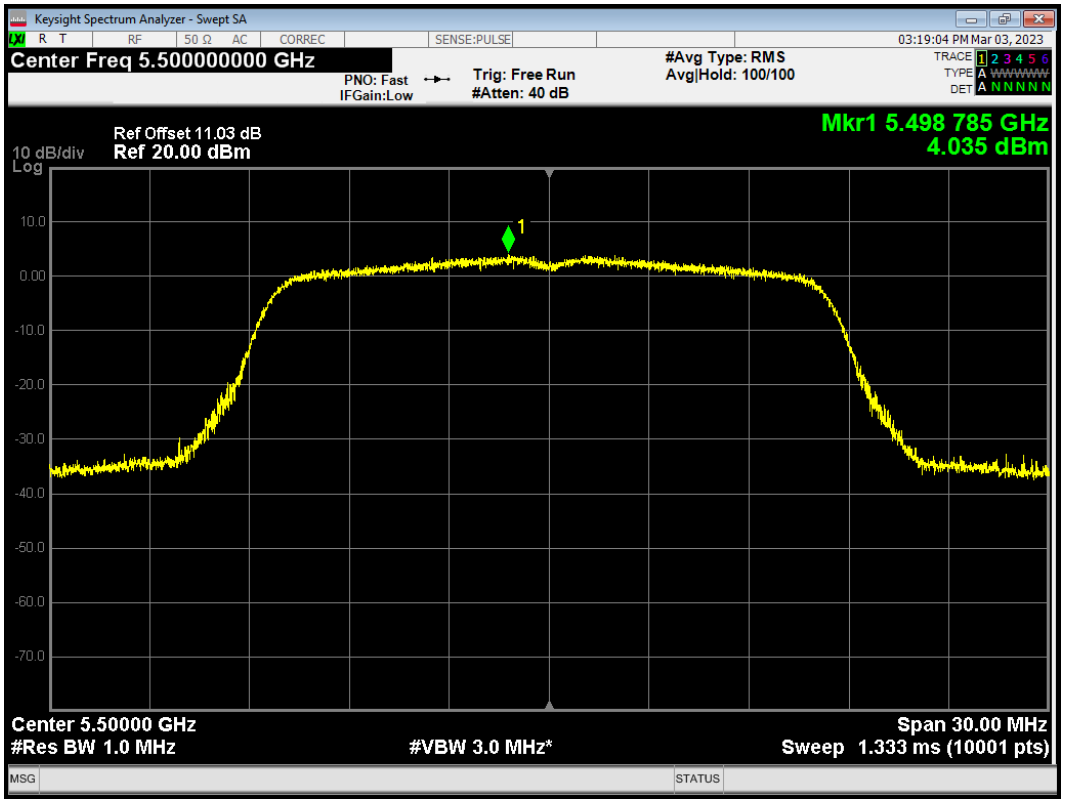


PSD 802.11n (HT40) 5310MHz

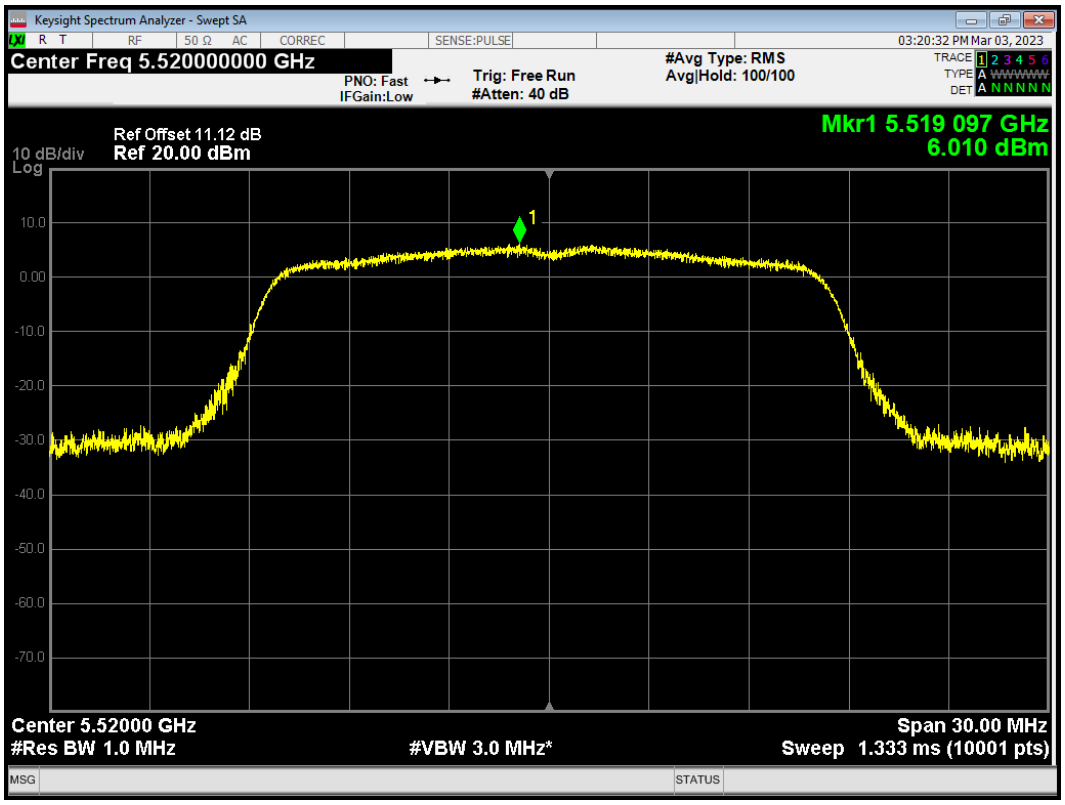


U-NII-2C

PSD 802.11a 5500MHz



PSD 802.11a 5520MHz



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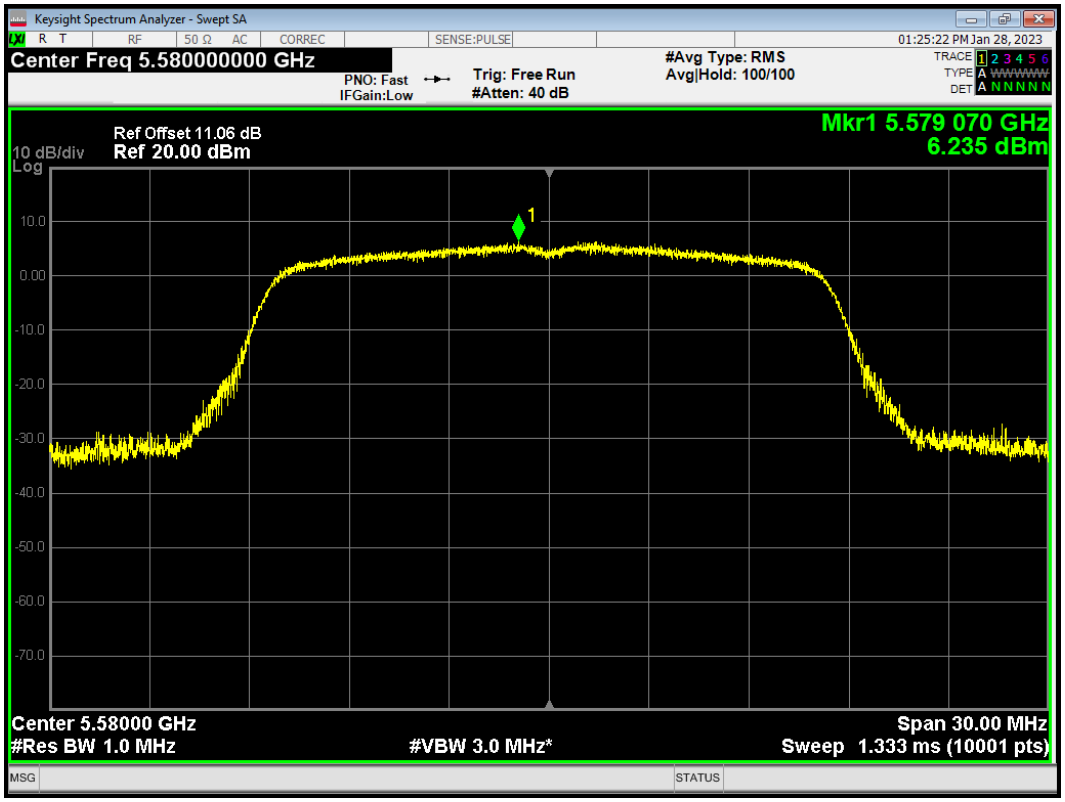

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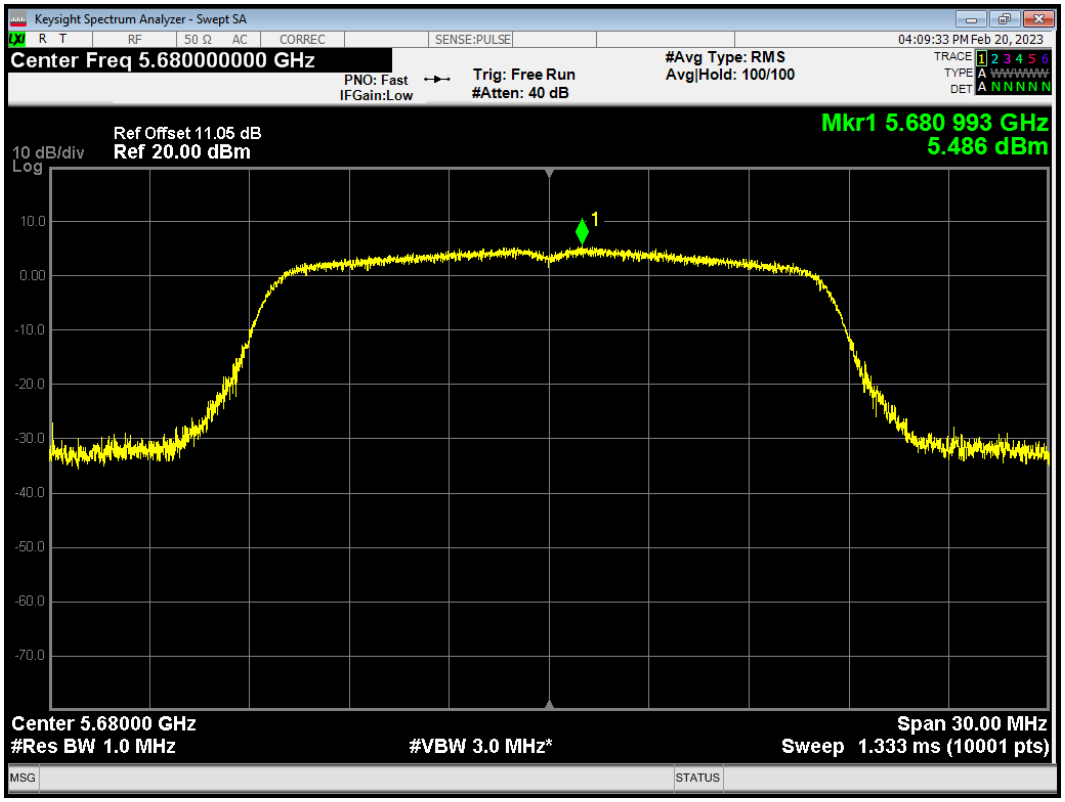

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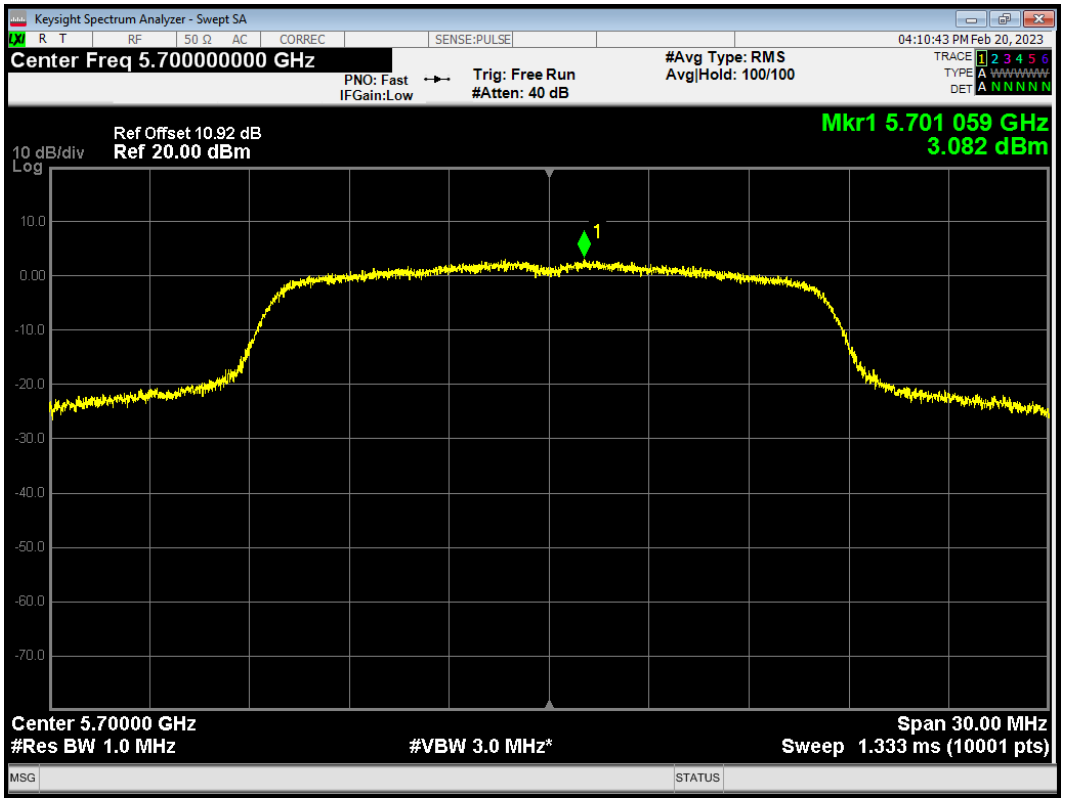

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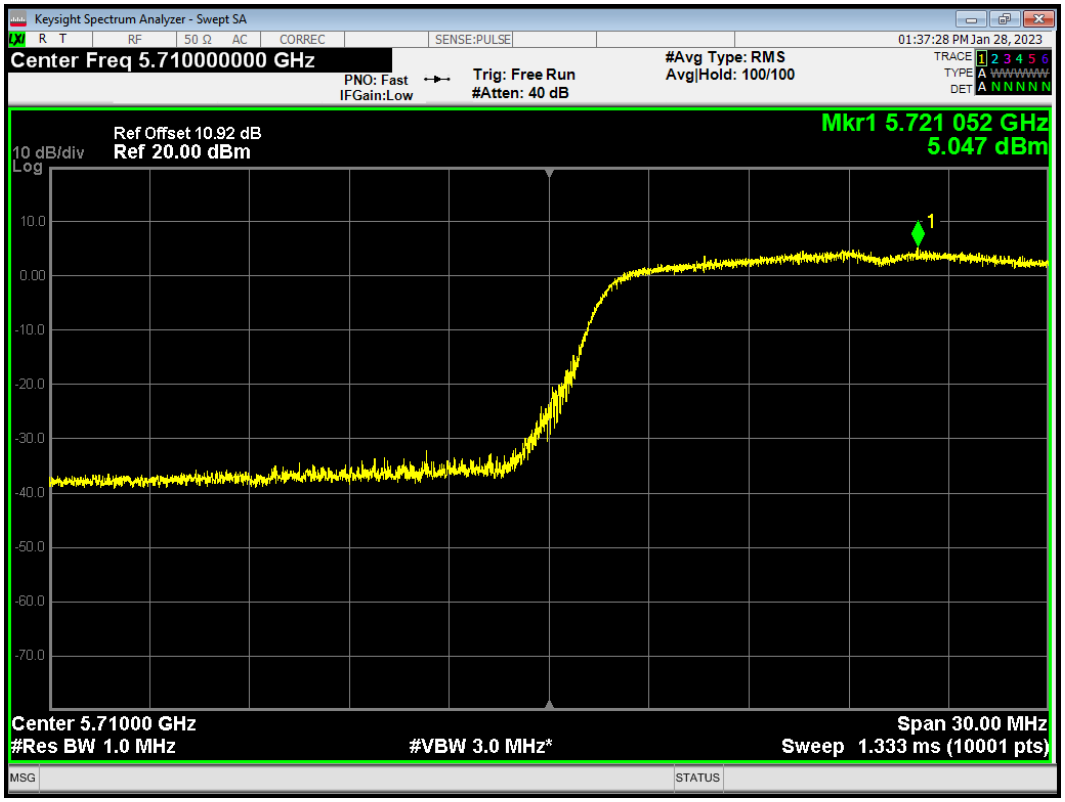

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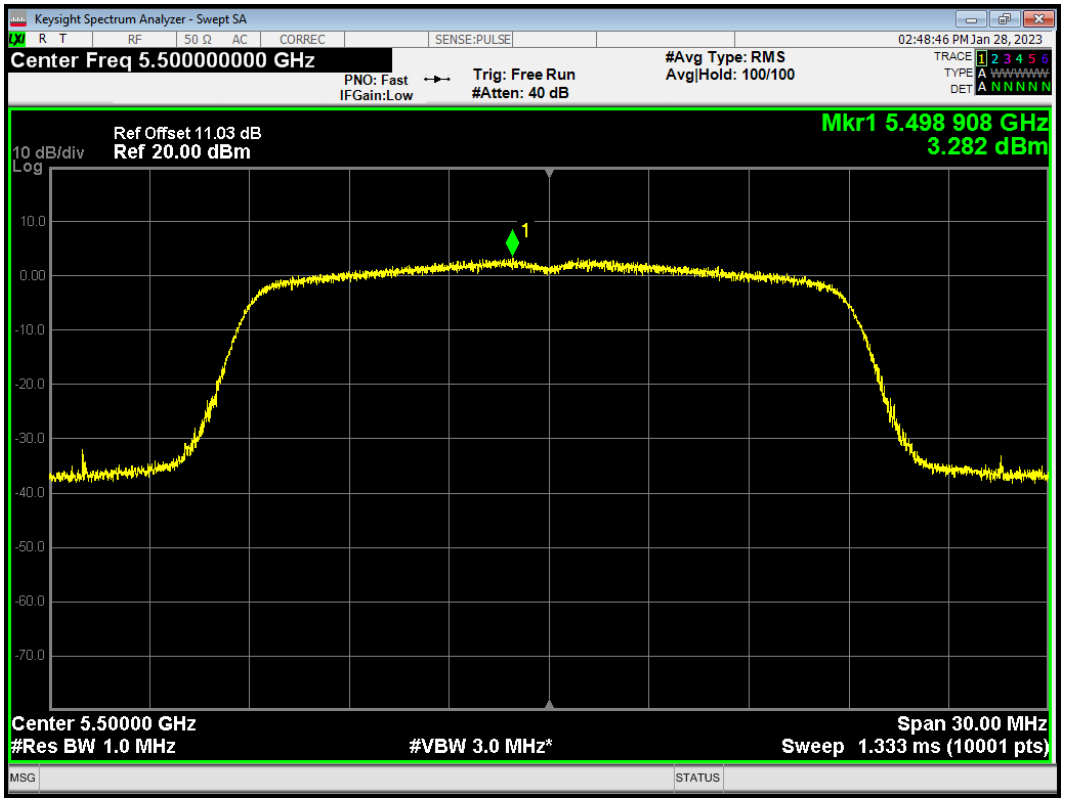

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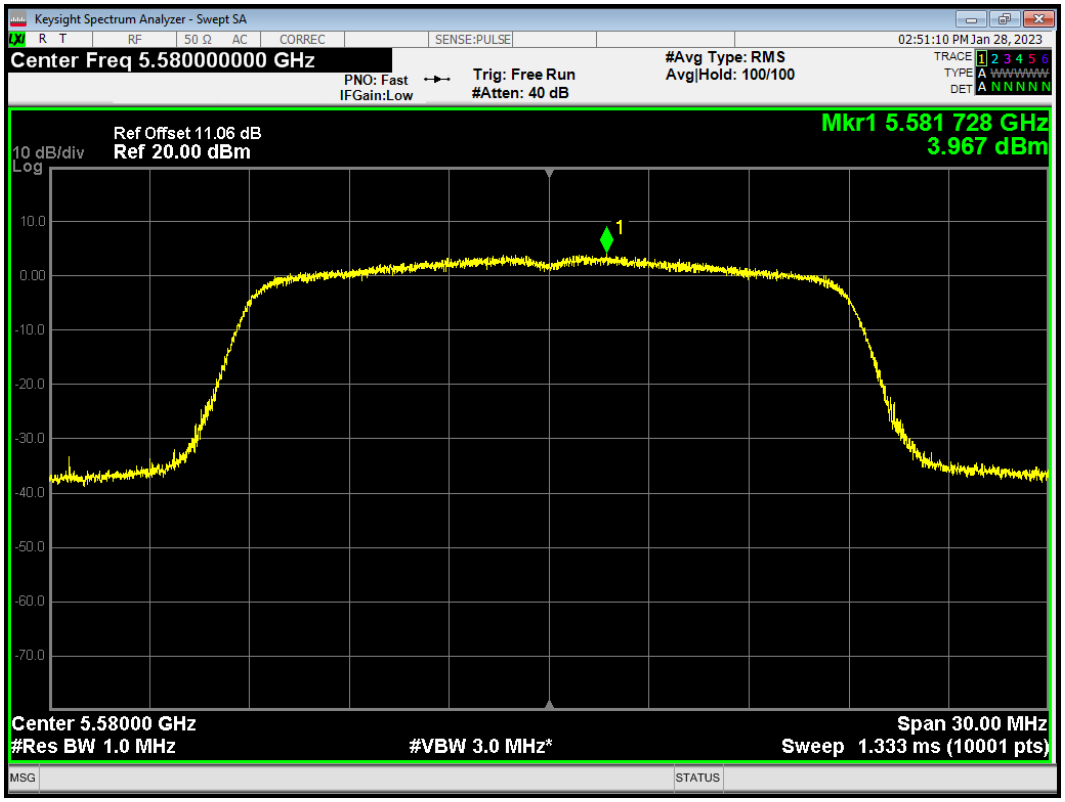

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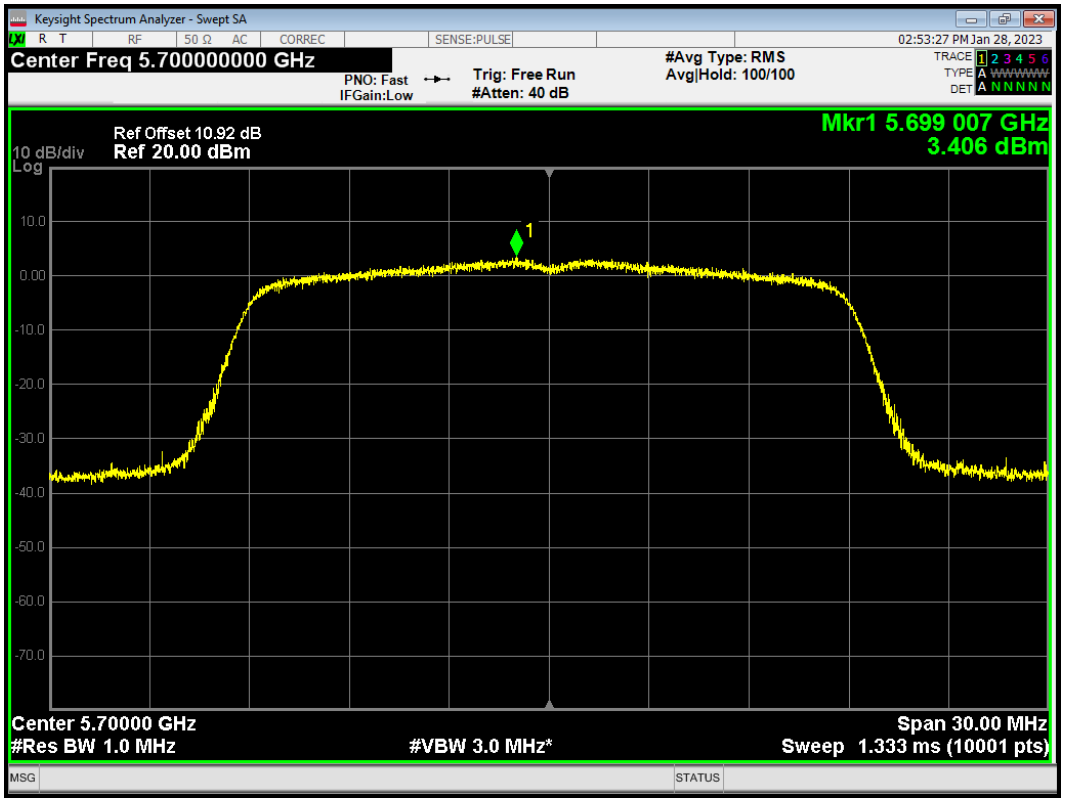

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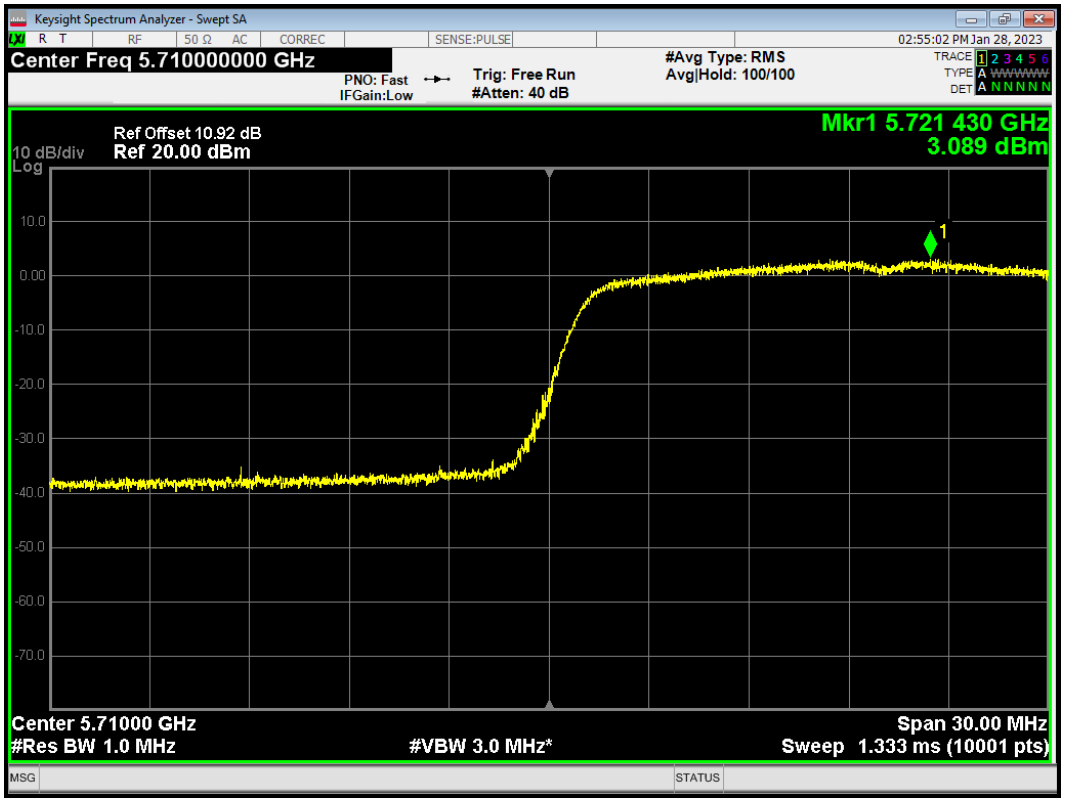

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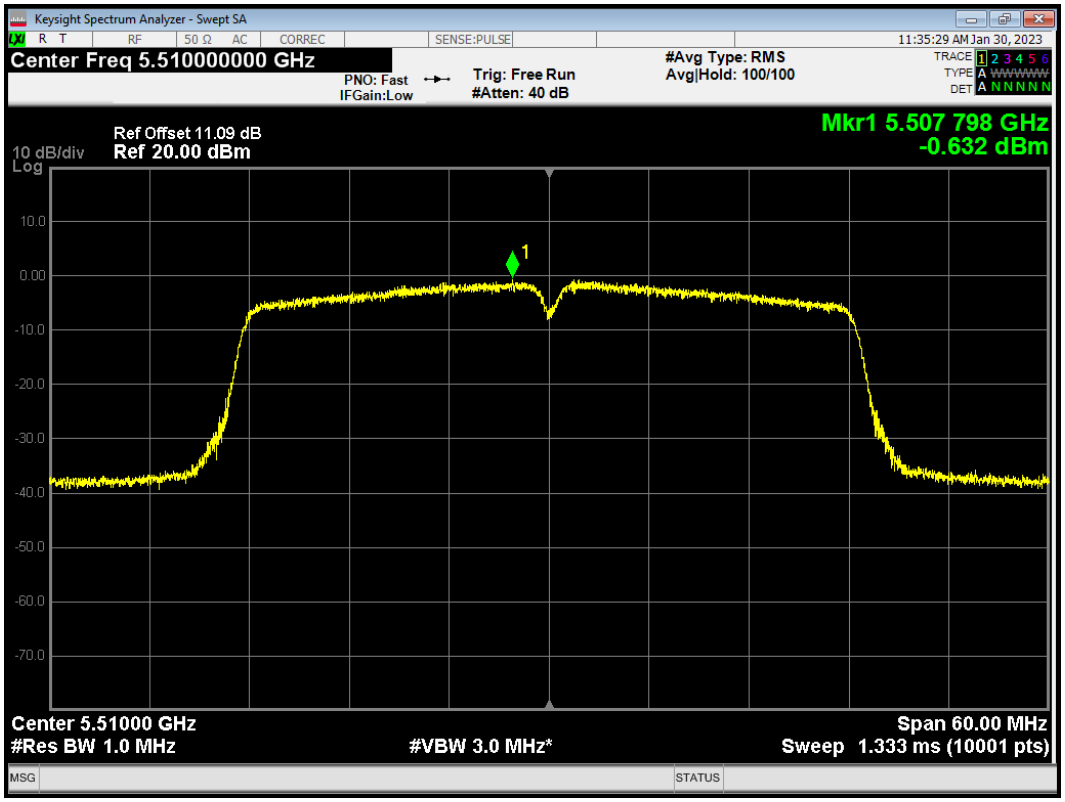

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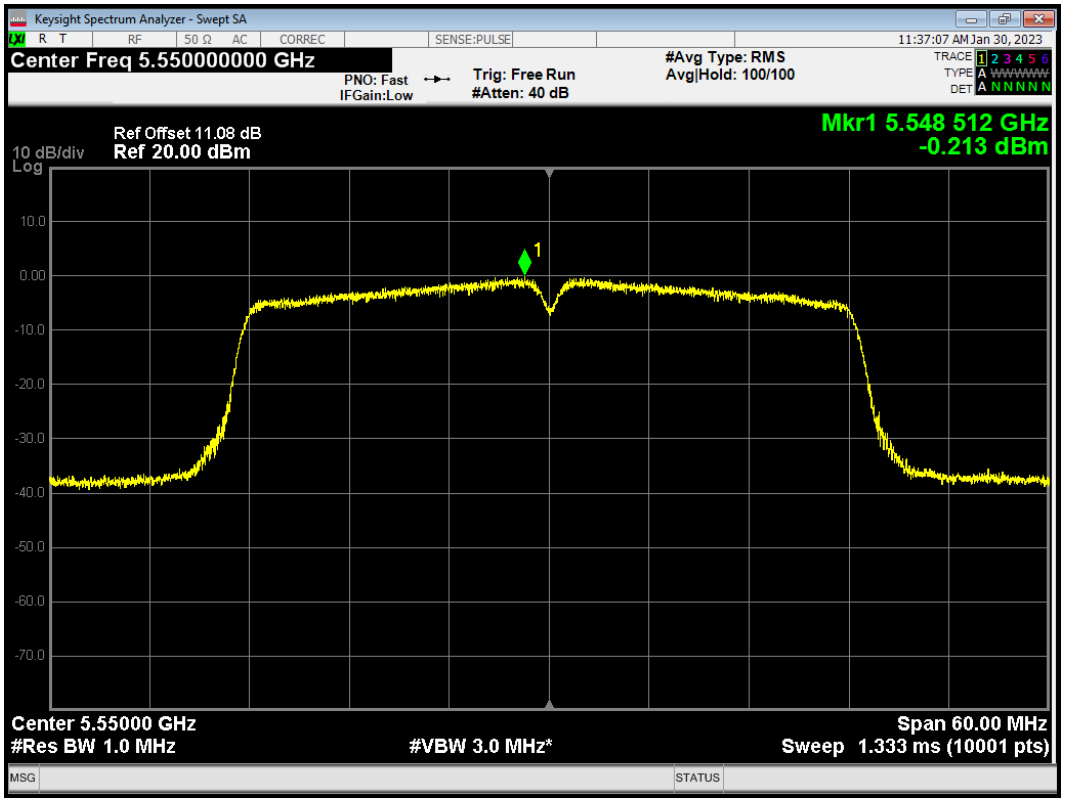

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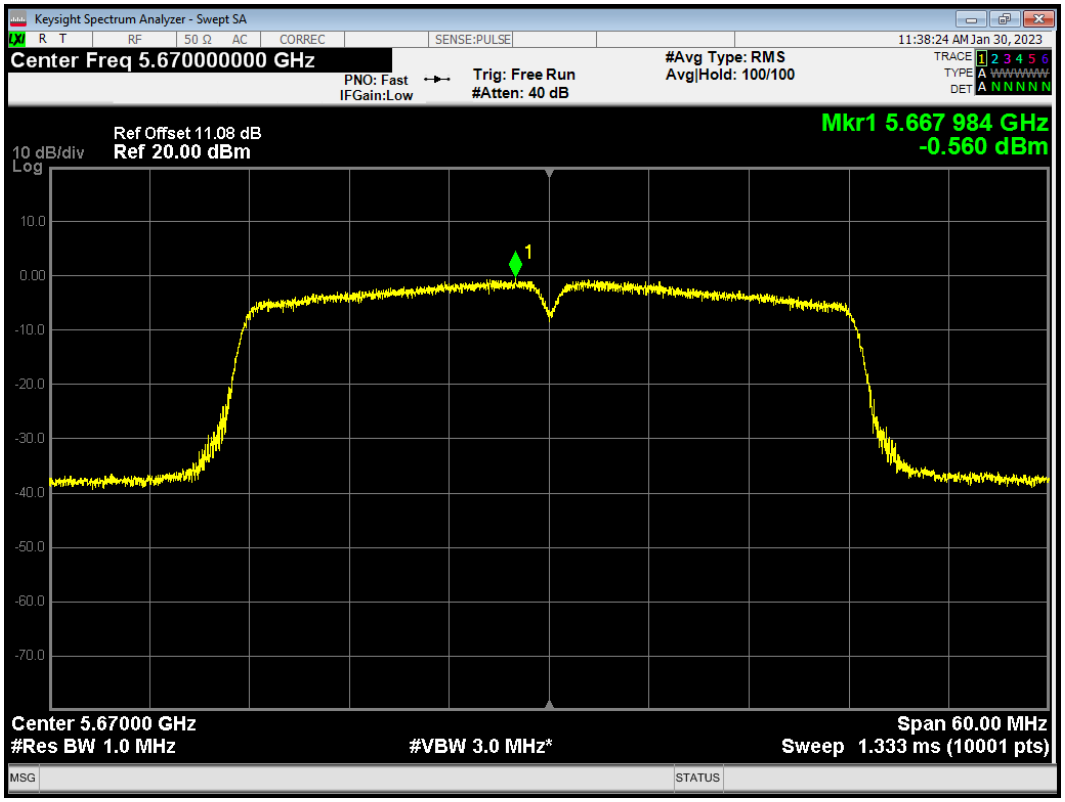

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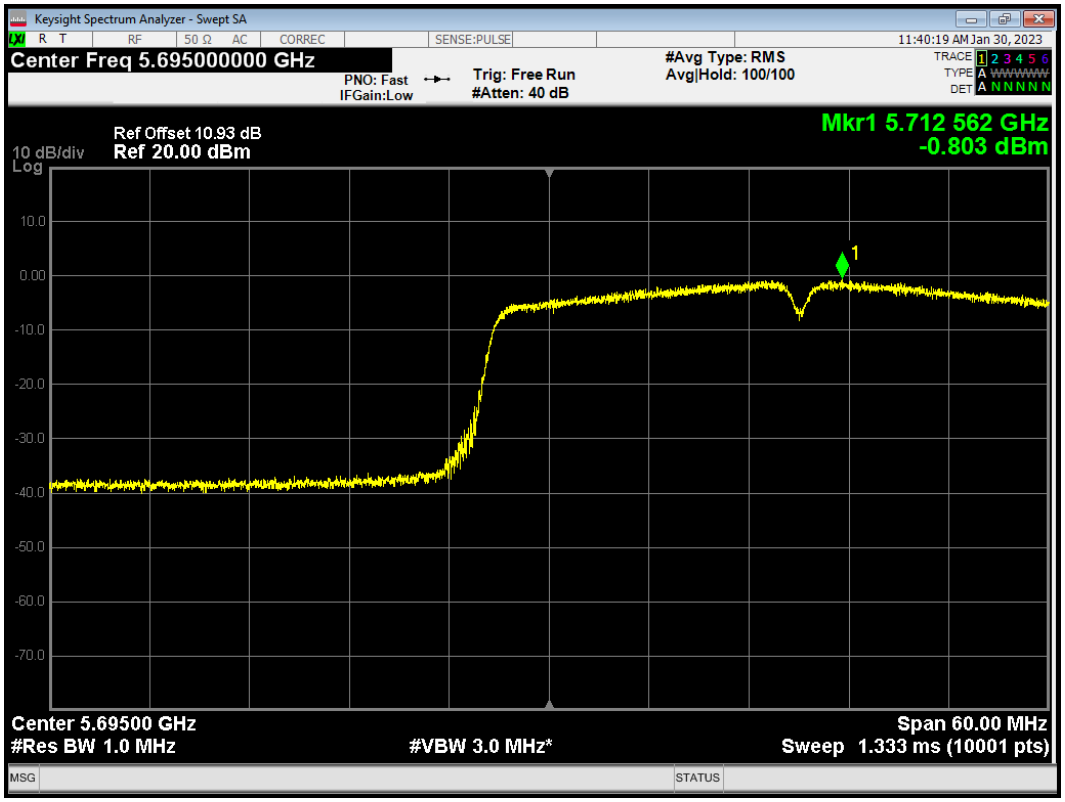

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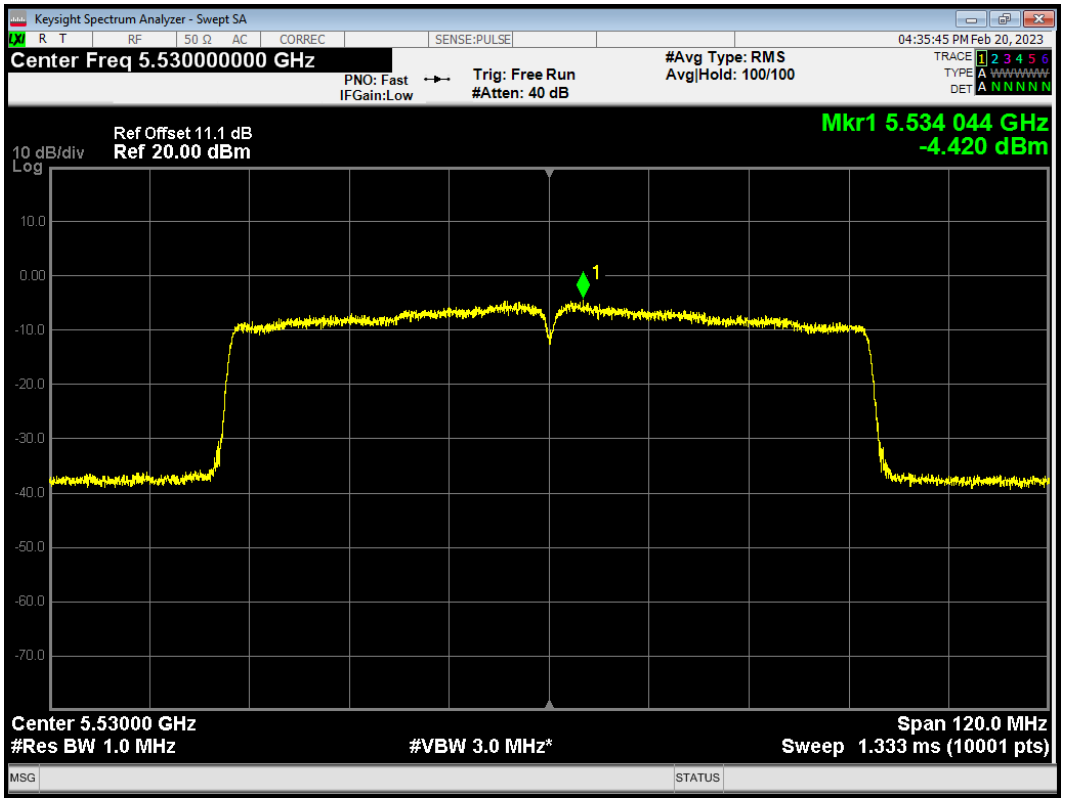

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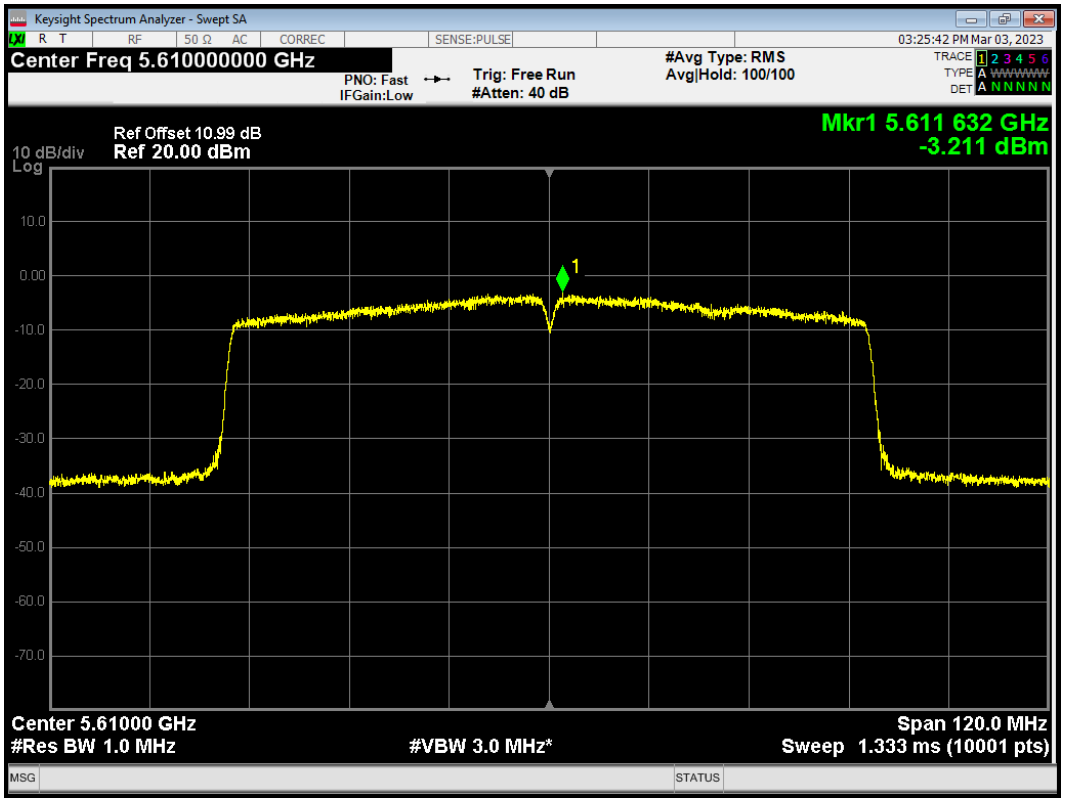

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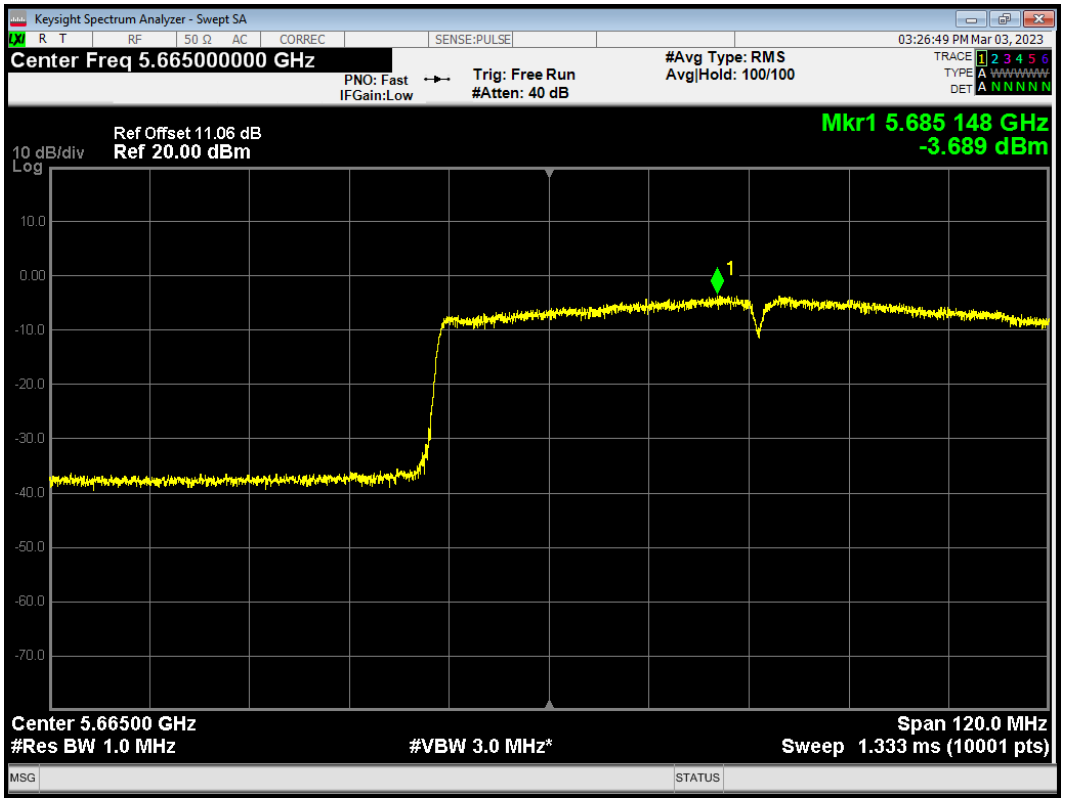

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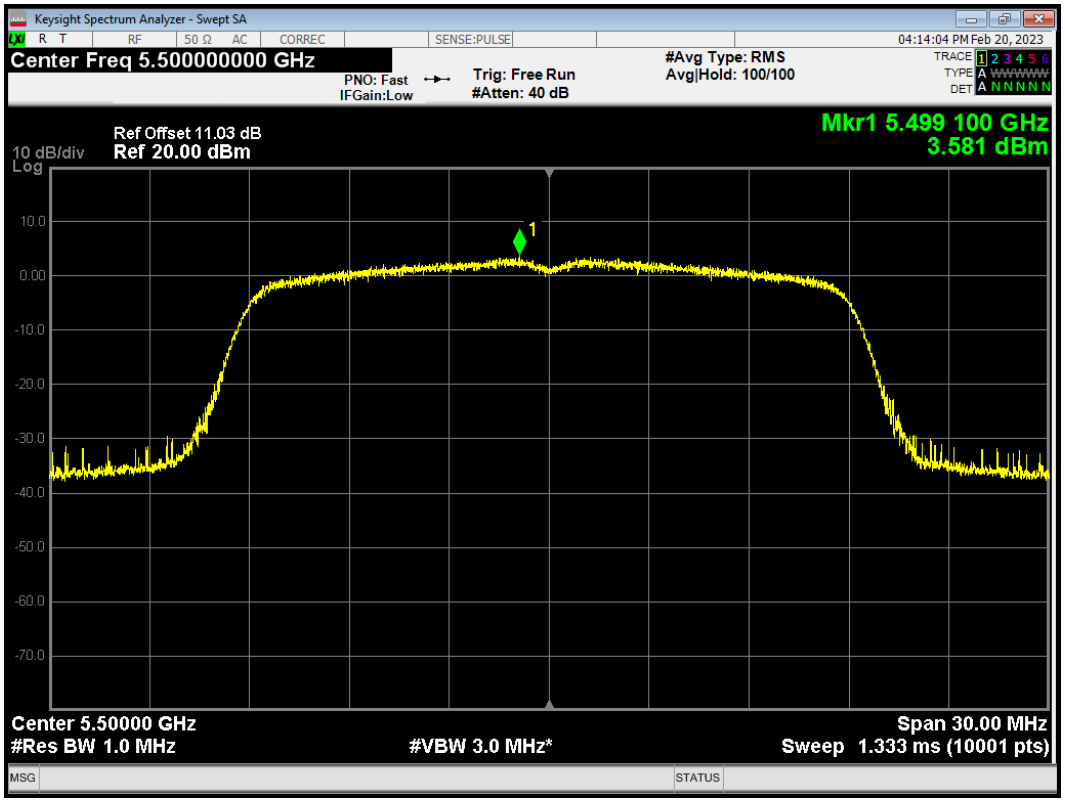

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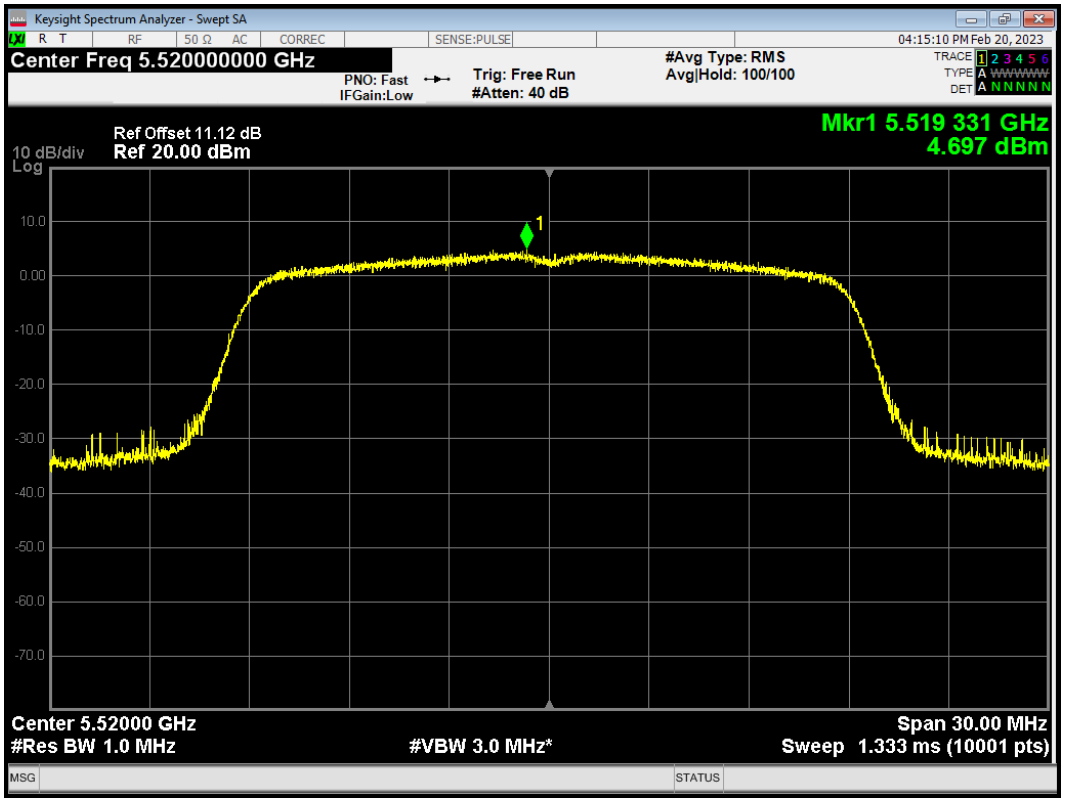

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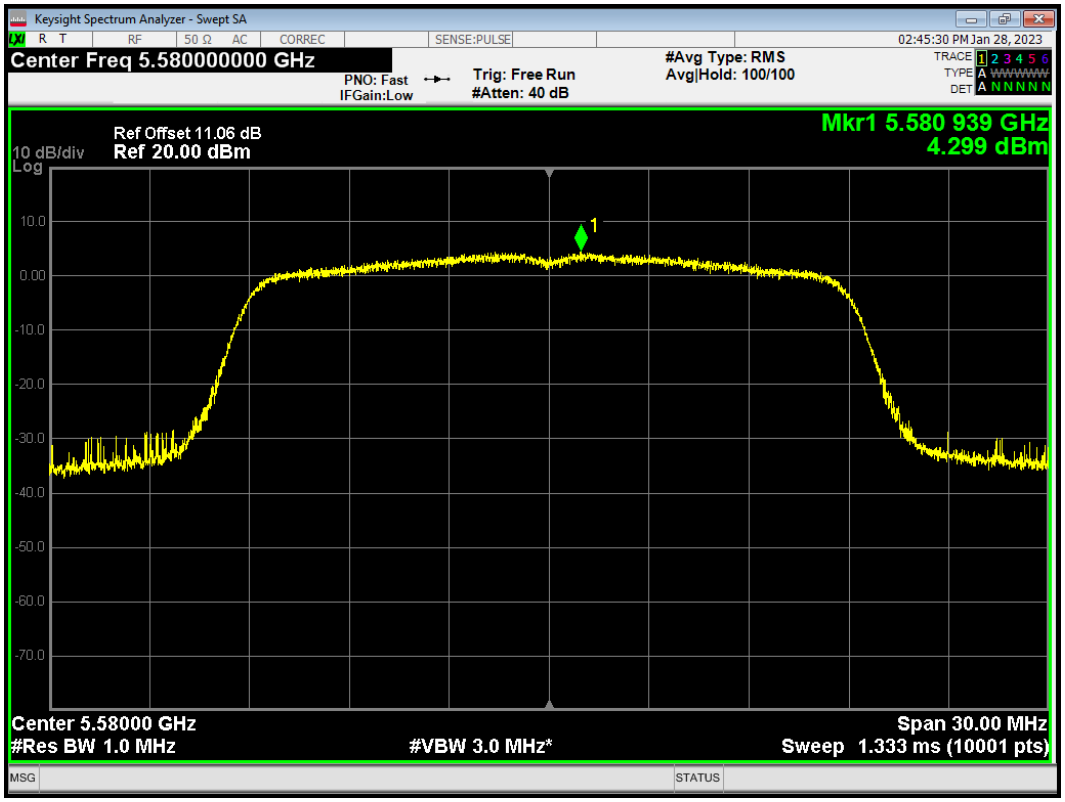

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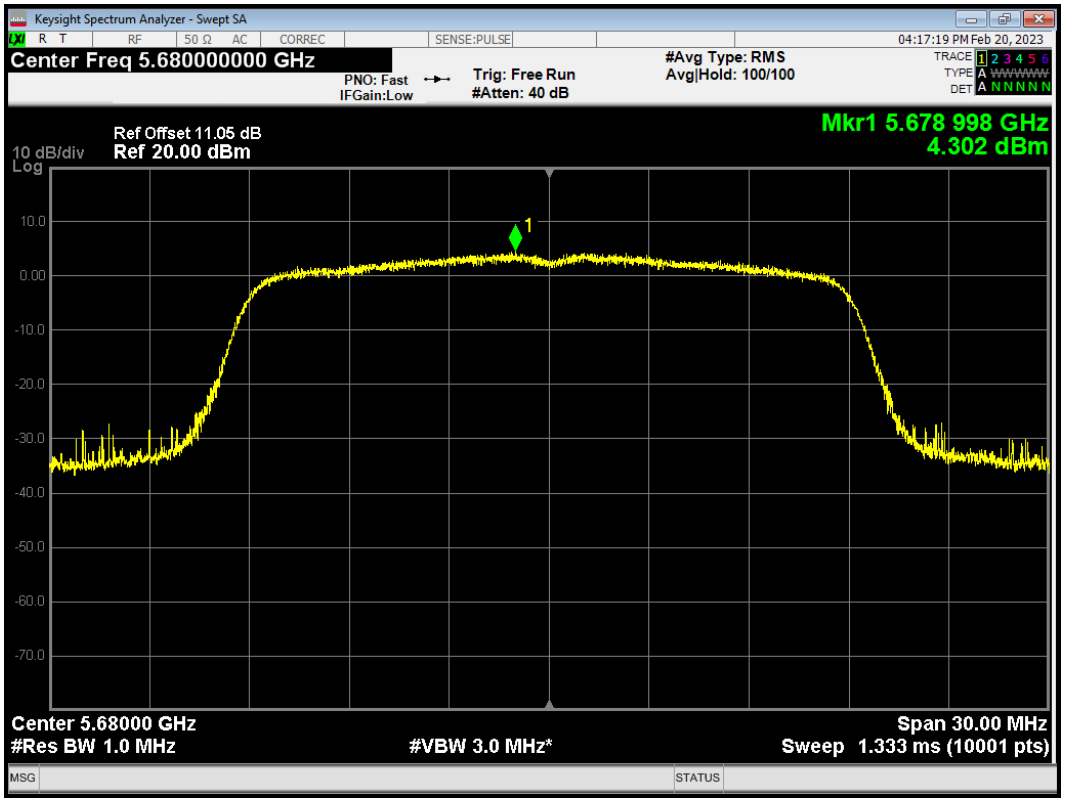

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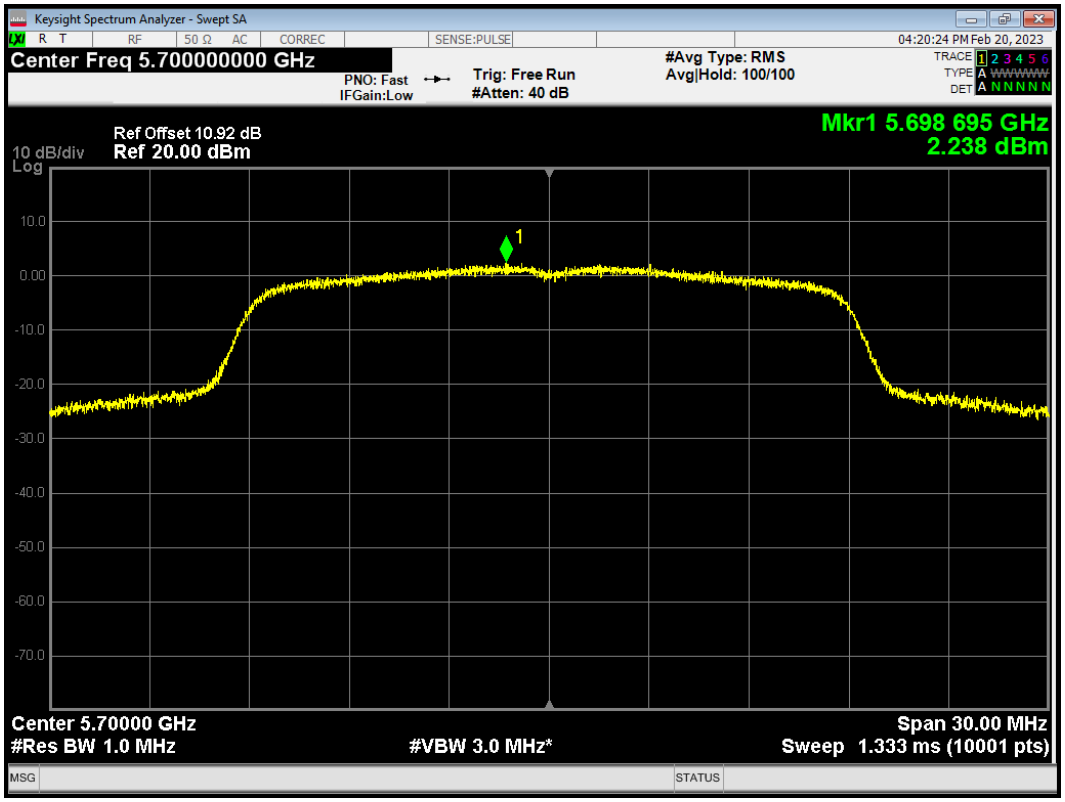

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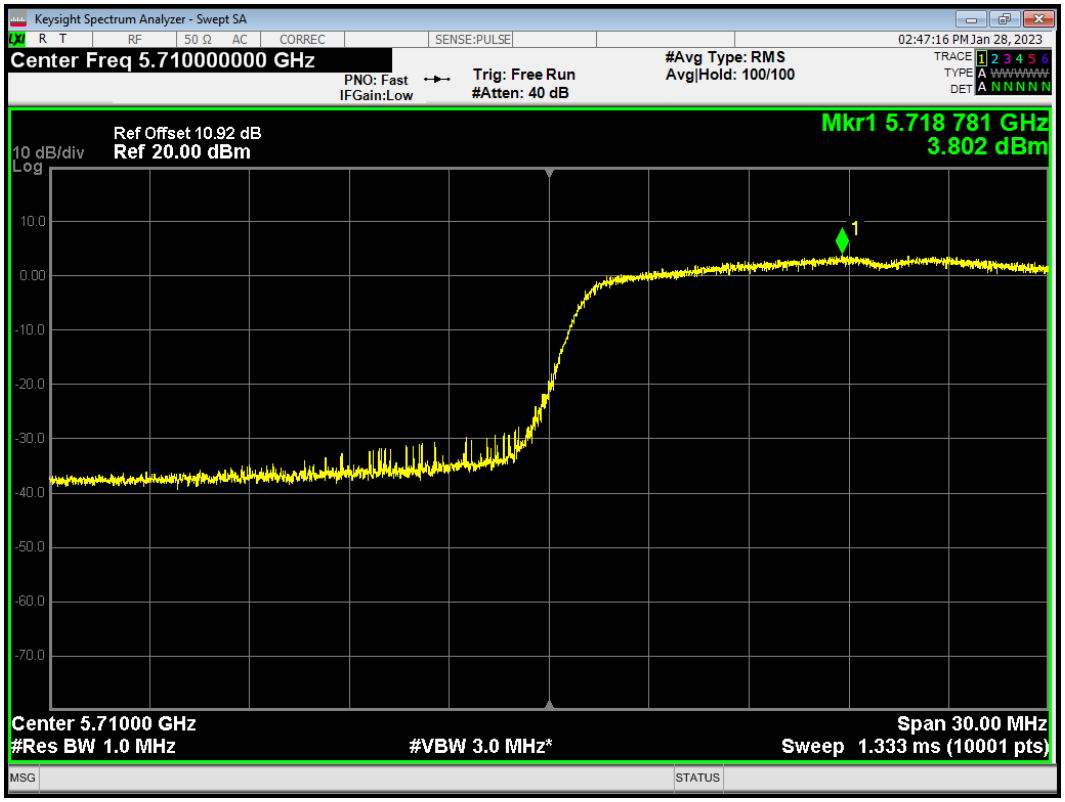

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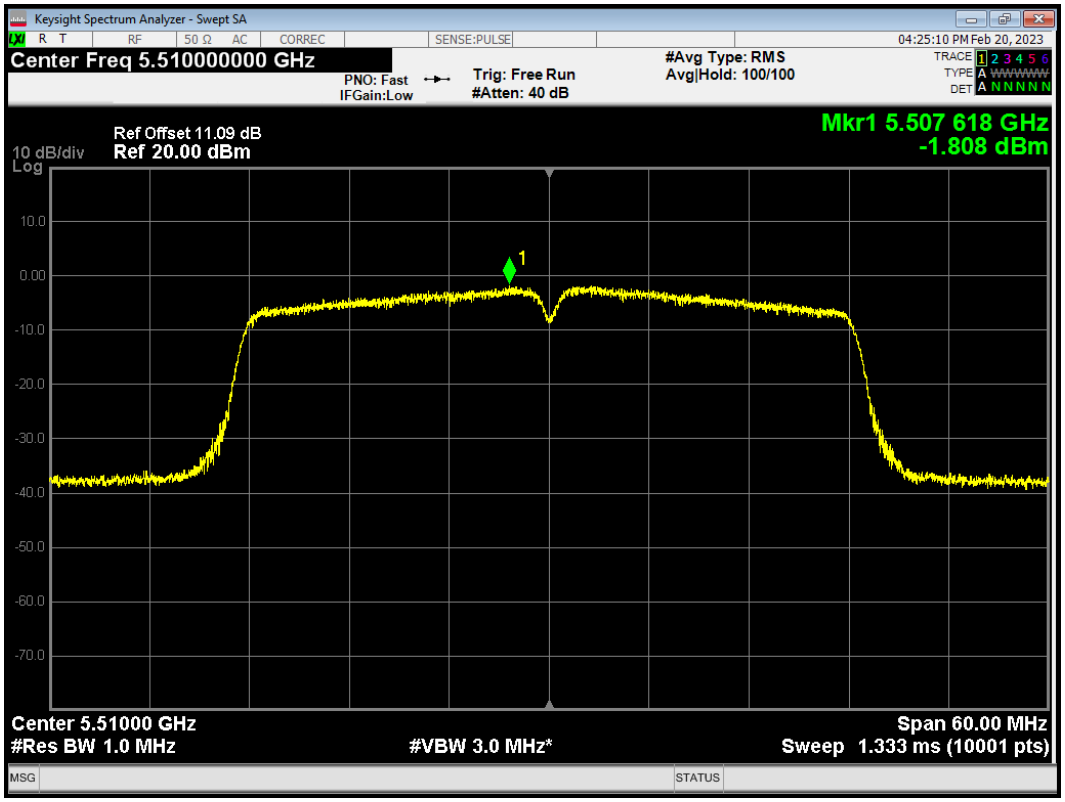

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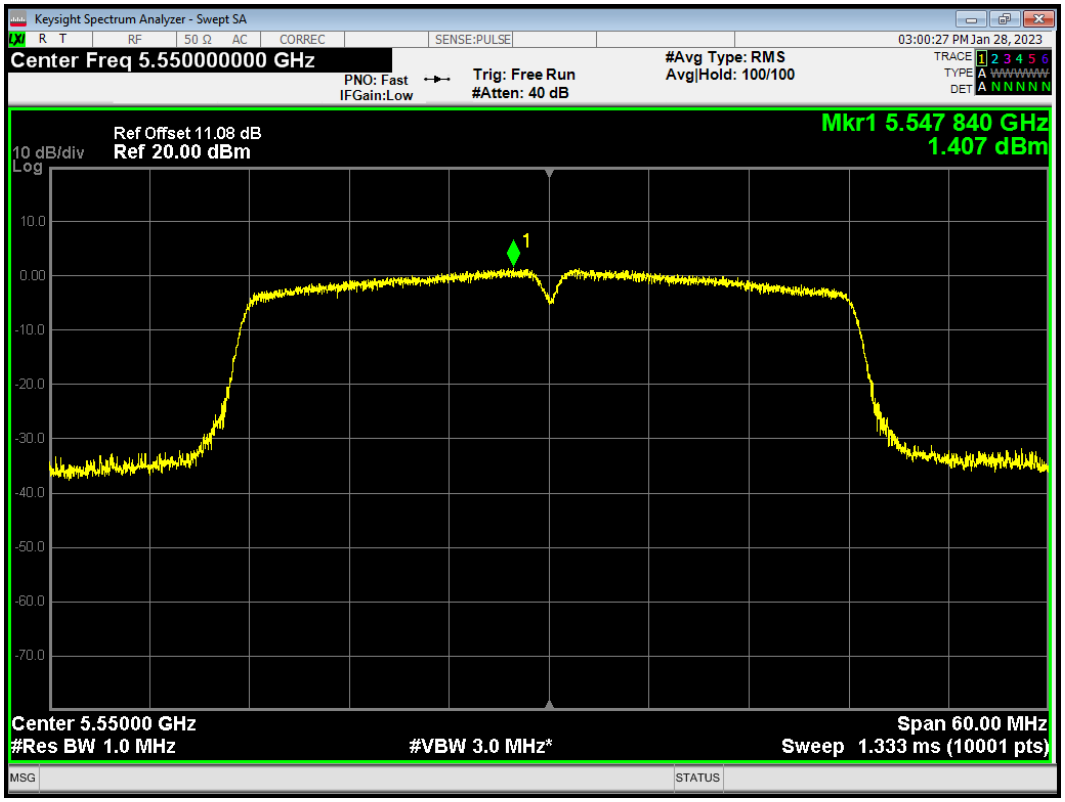

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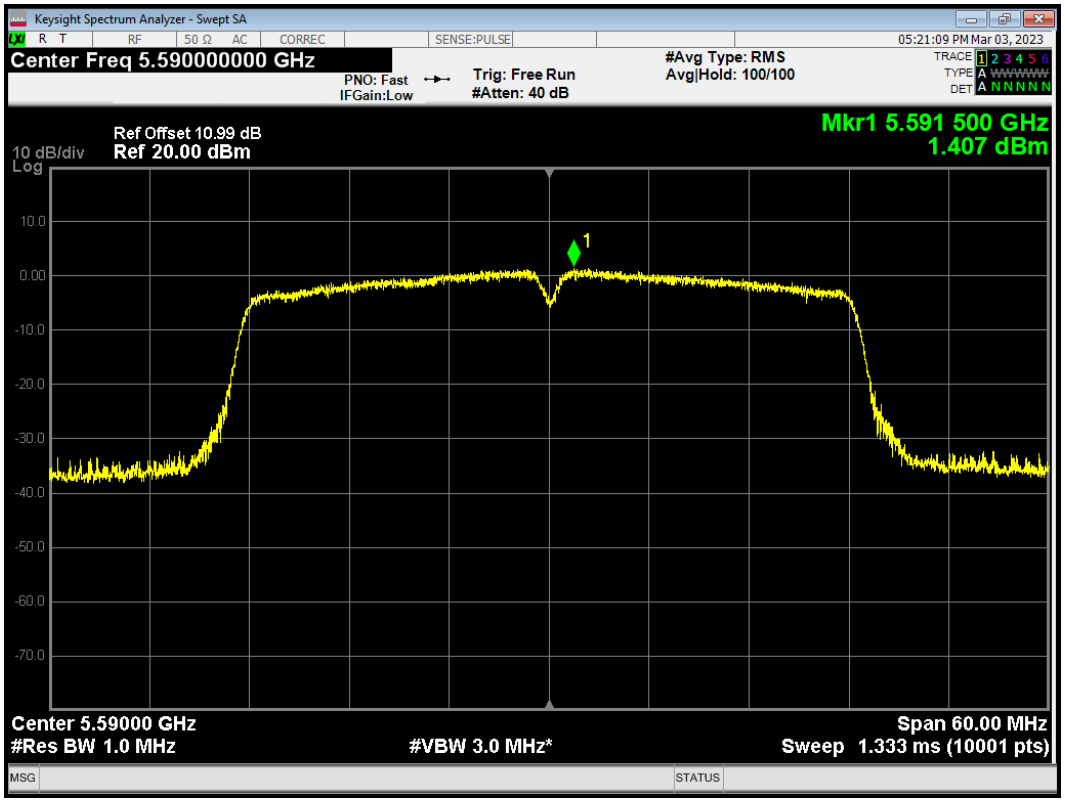

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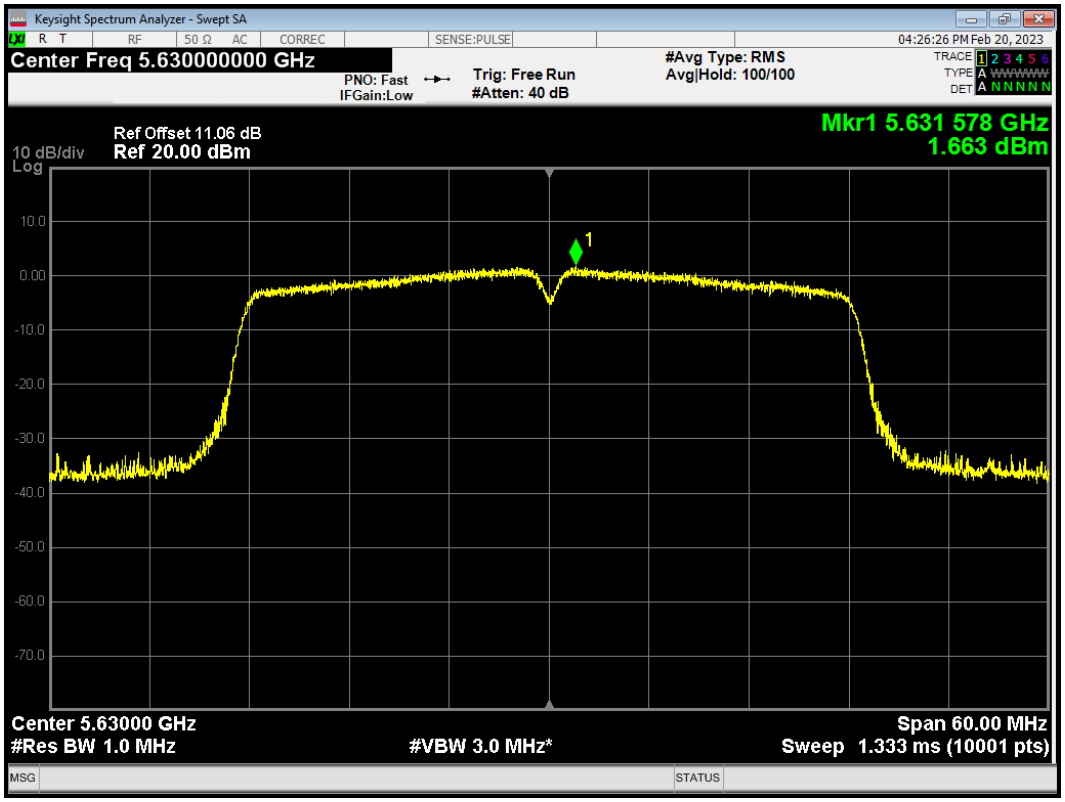

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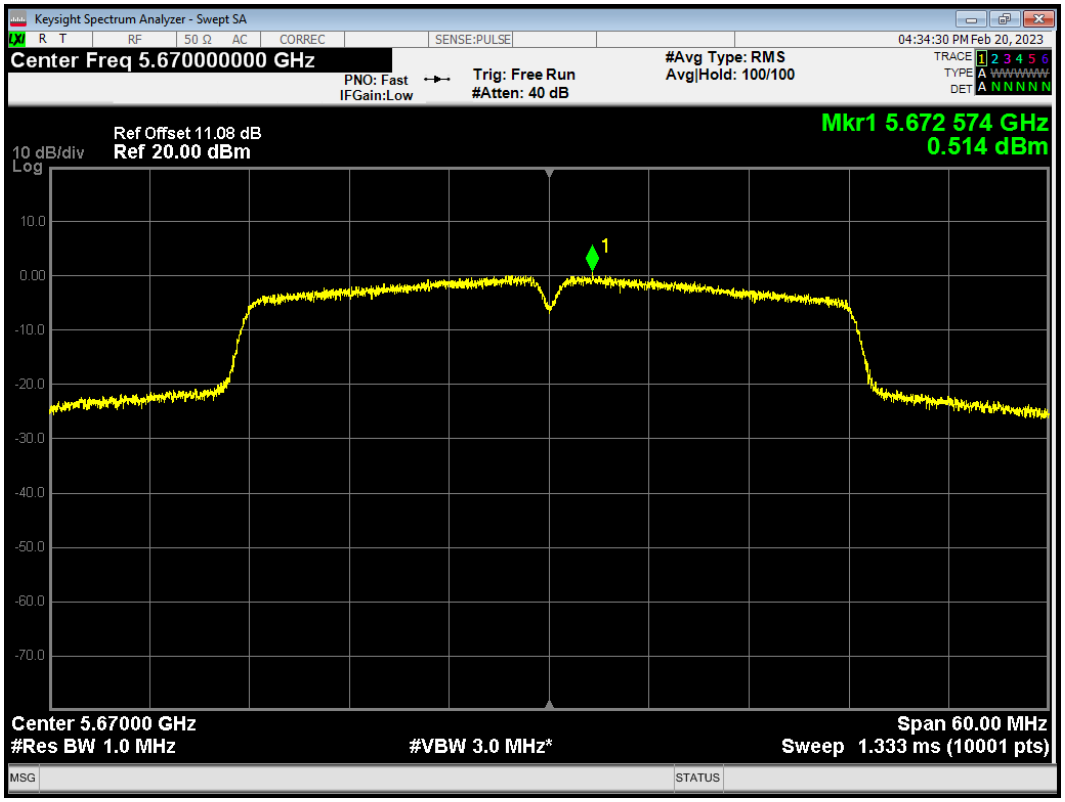

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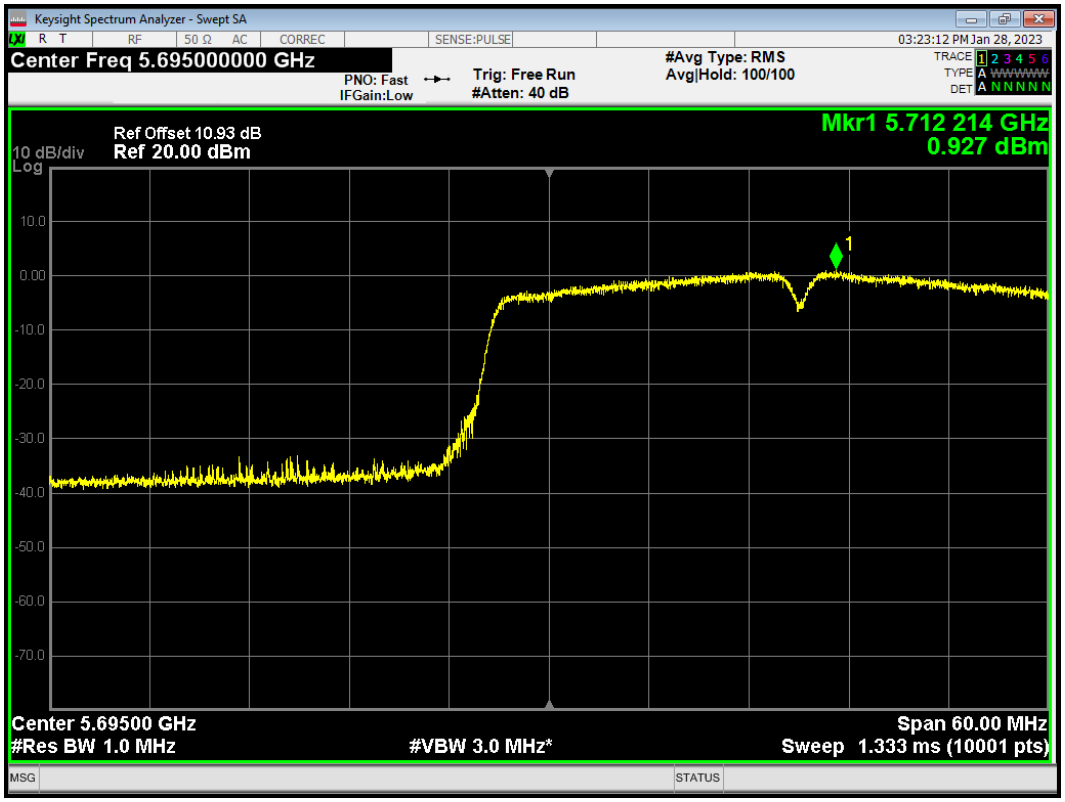
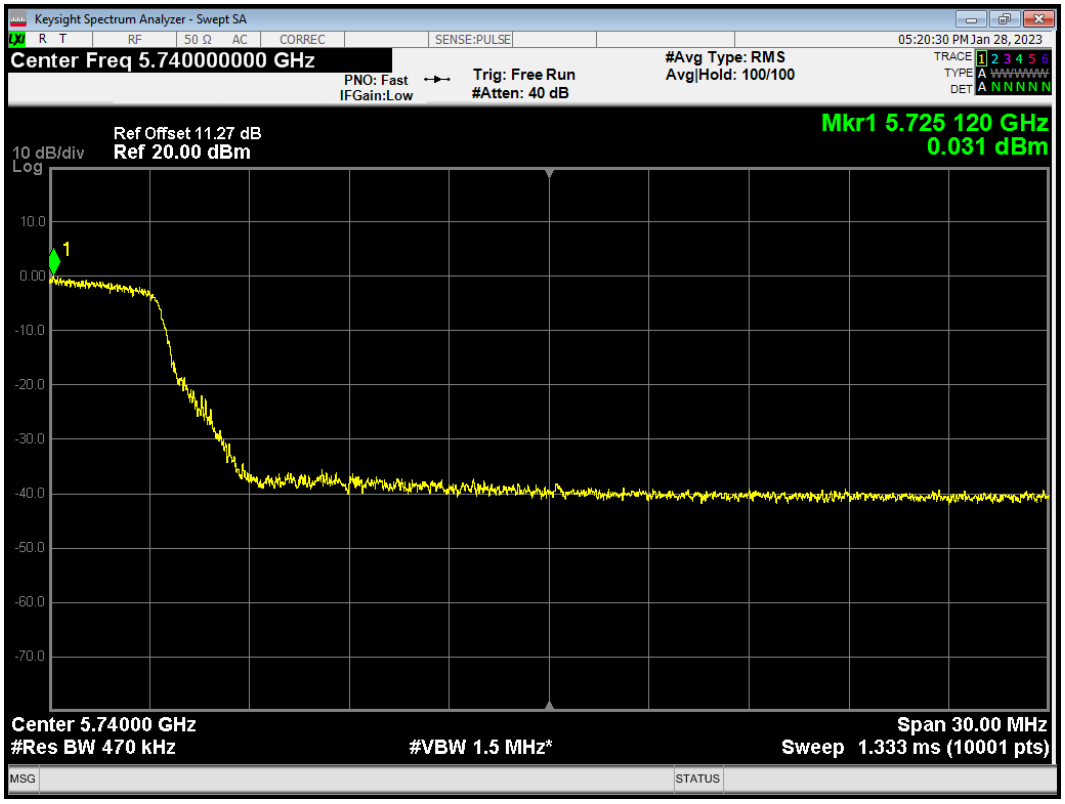


U-NII-3

PSD 802.11a 5740MHz



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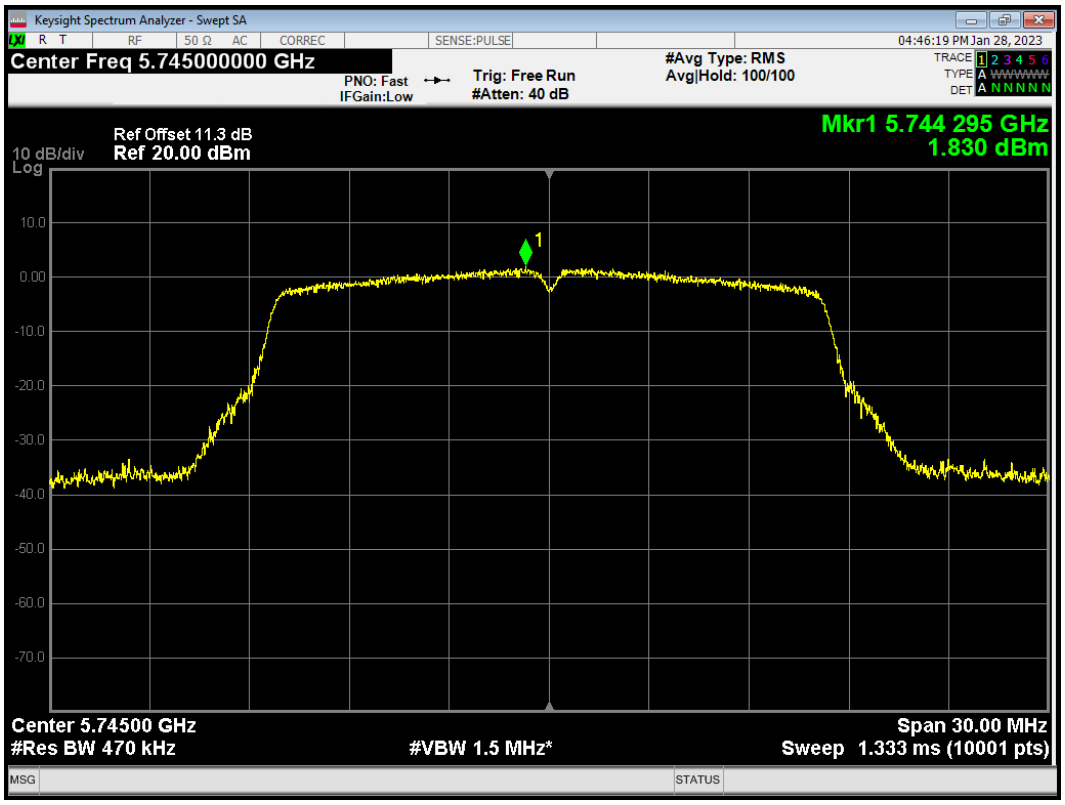

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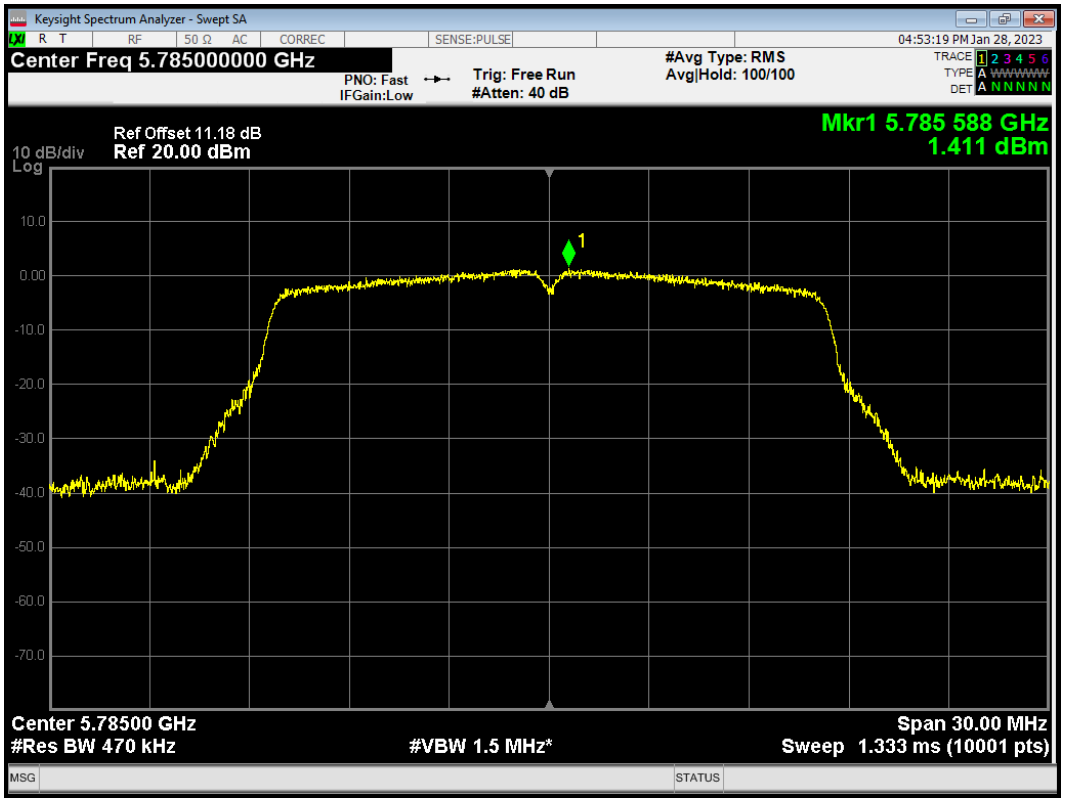
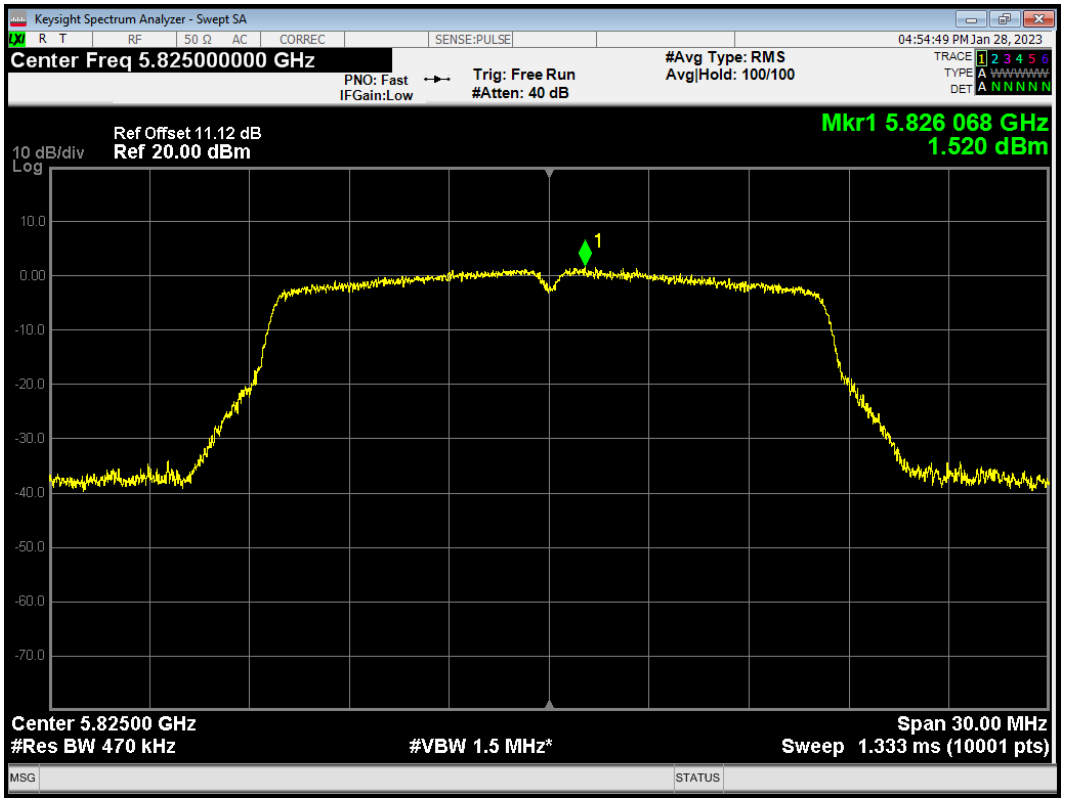


PSD 802.11a 5825MHz



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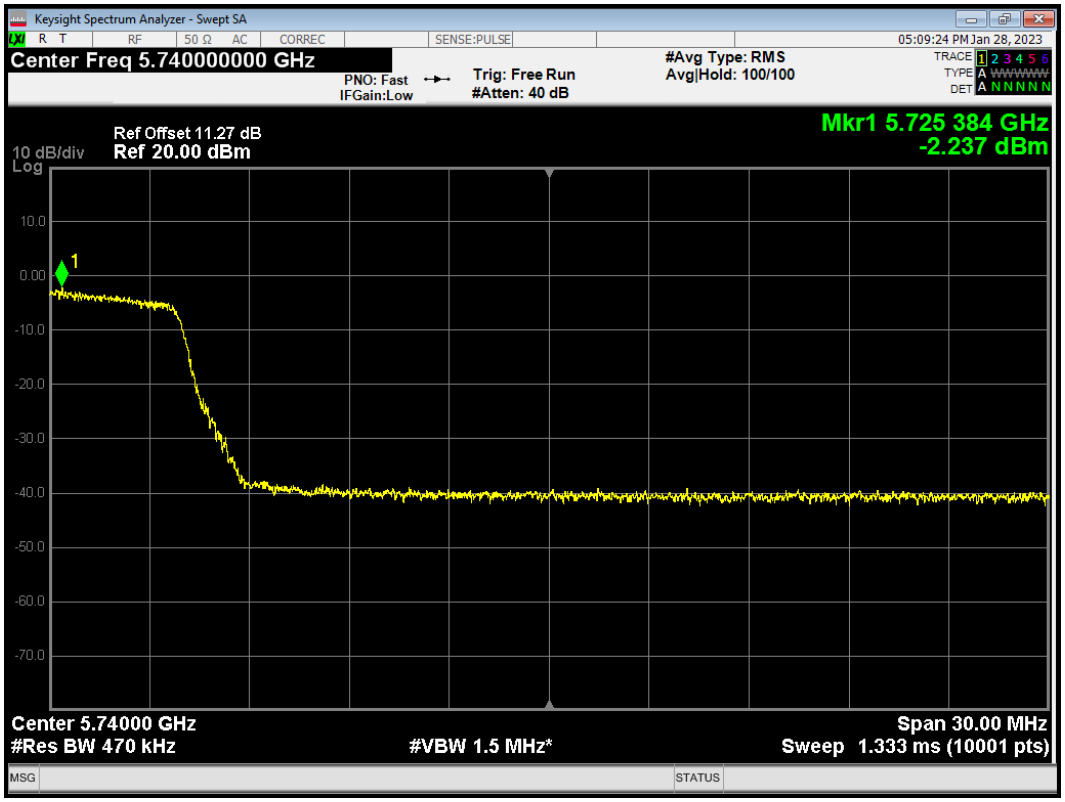

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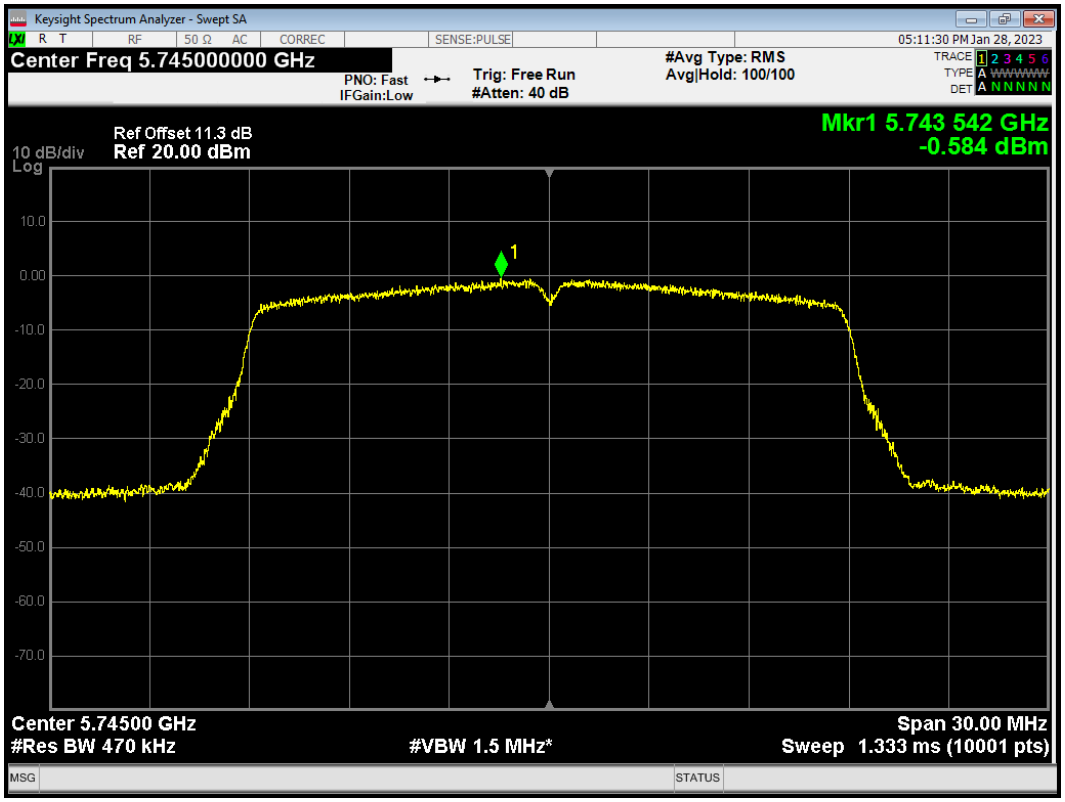

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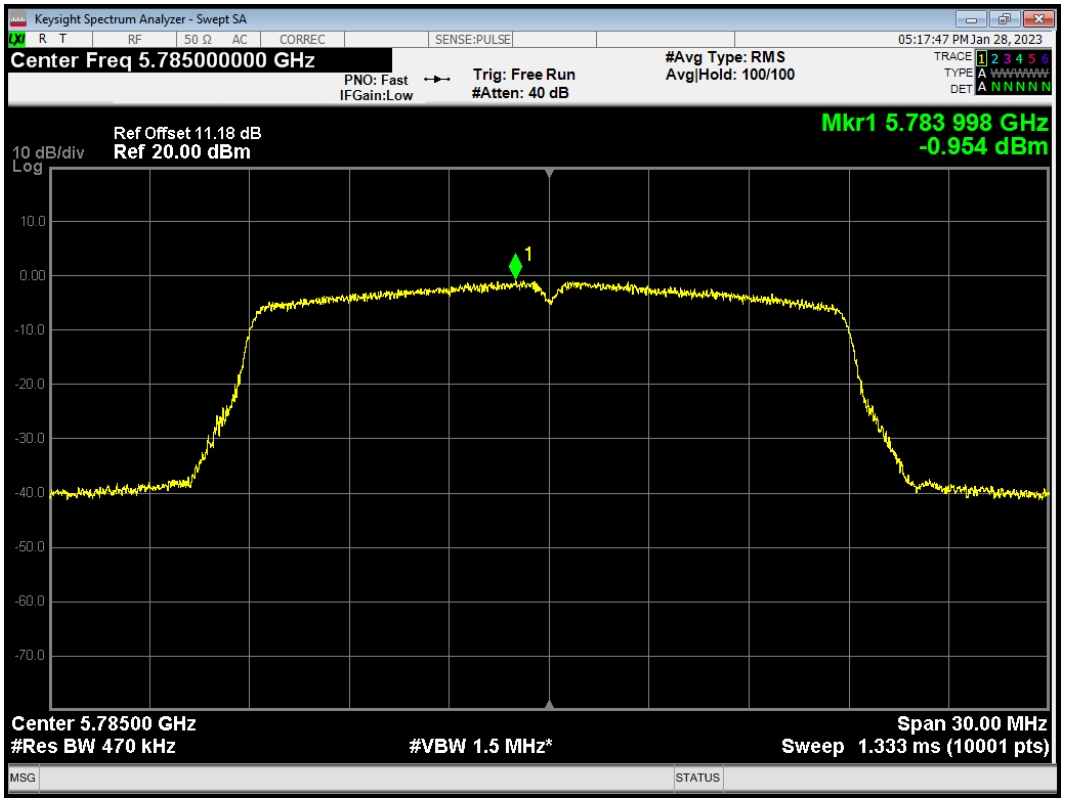

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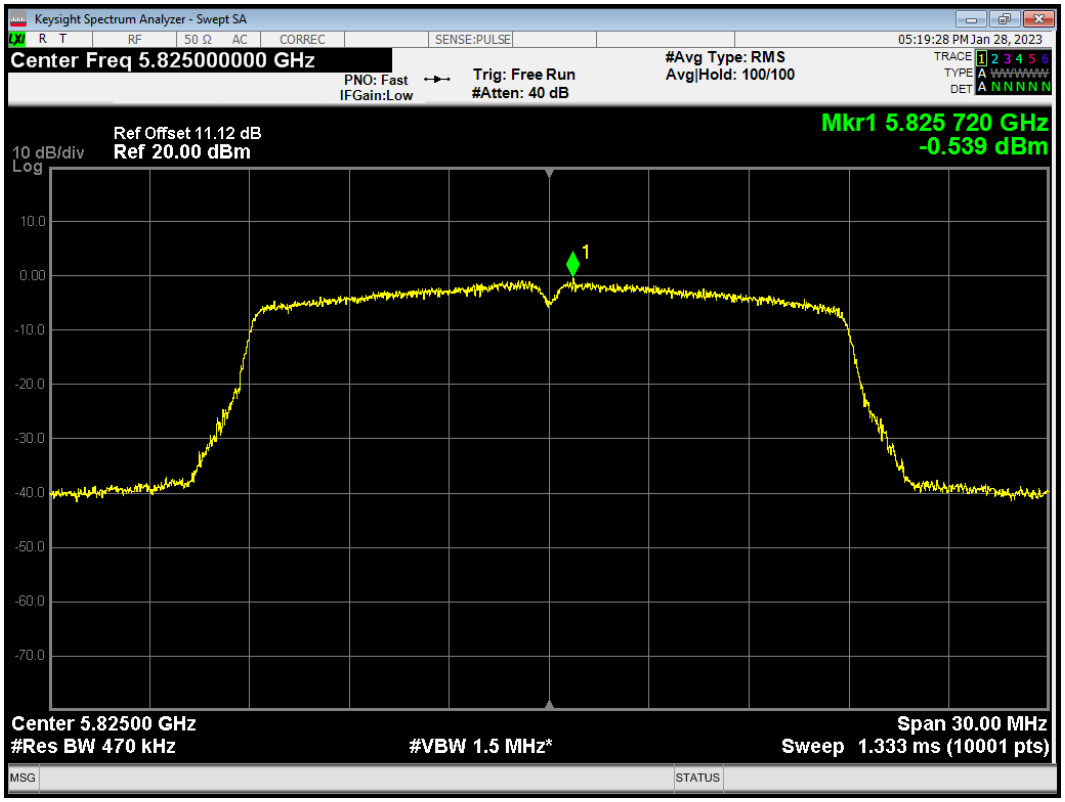

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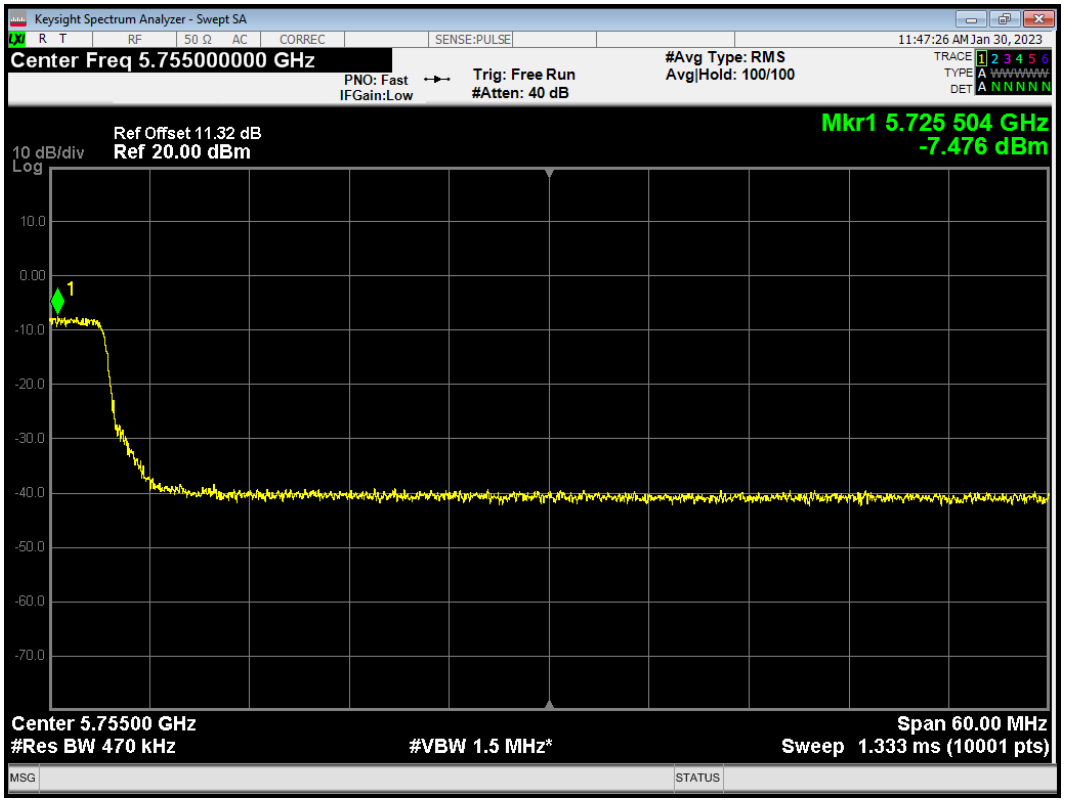

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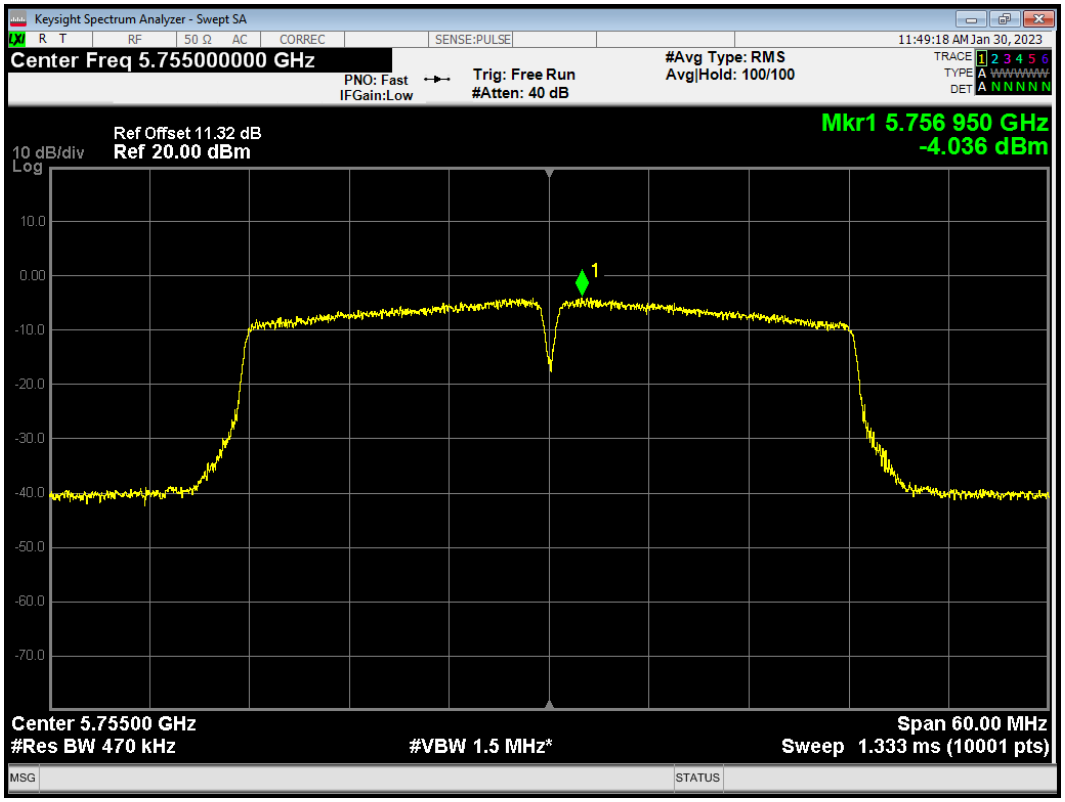

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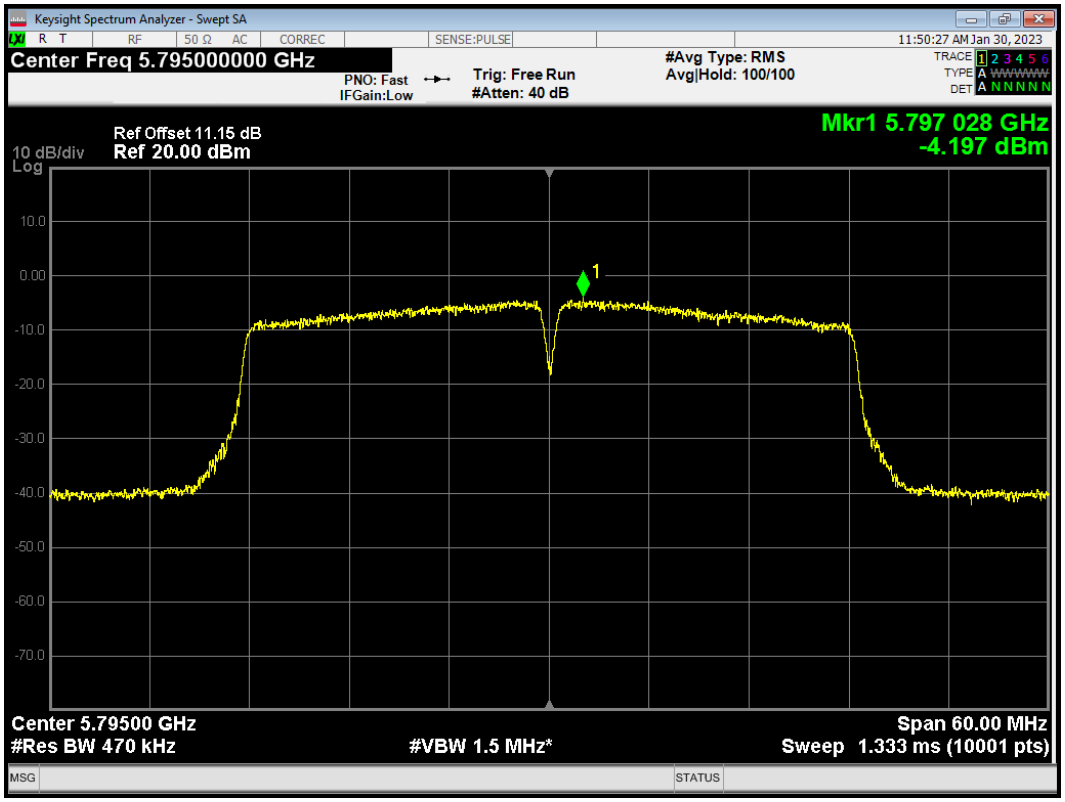

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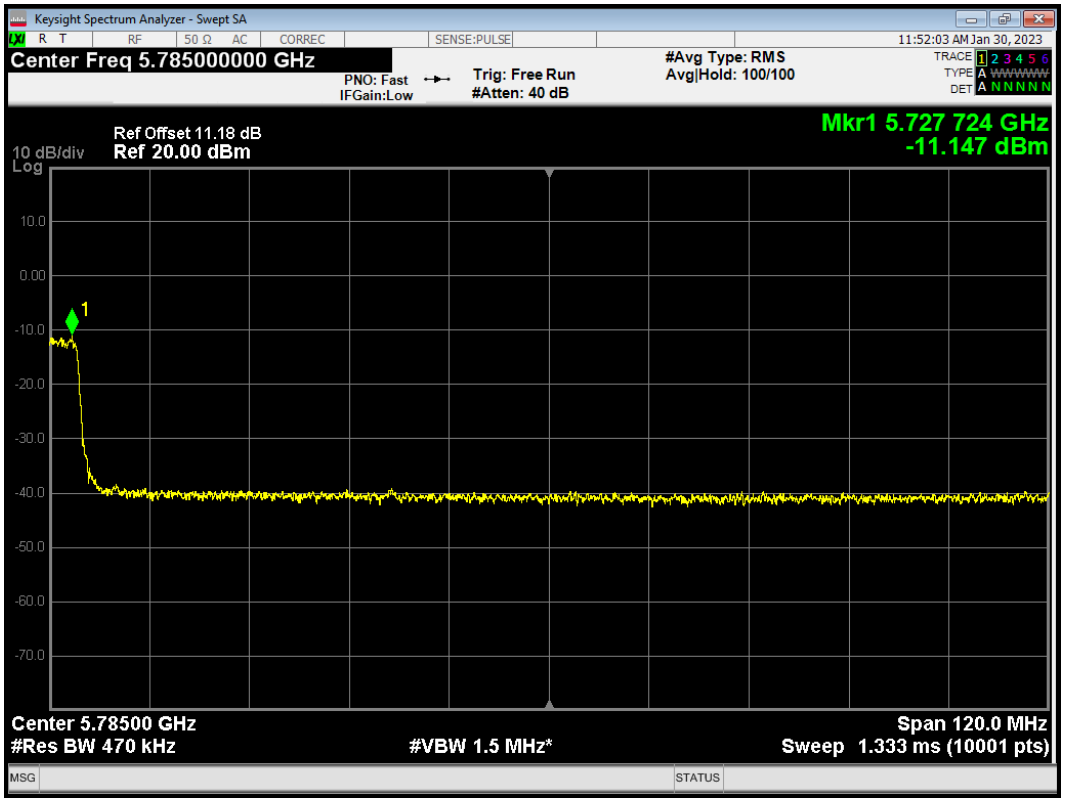

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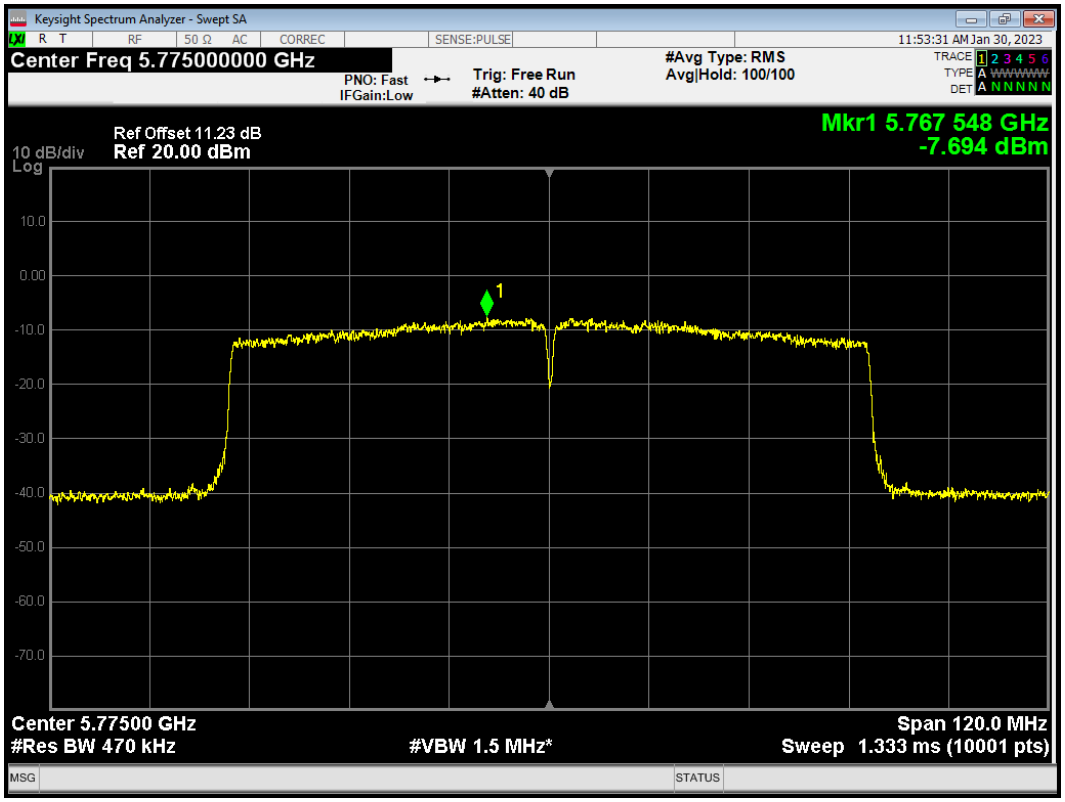

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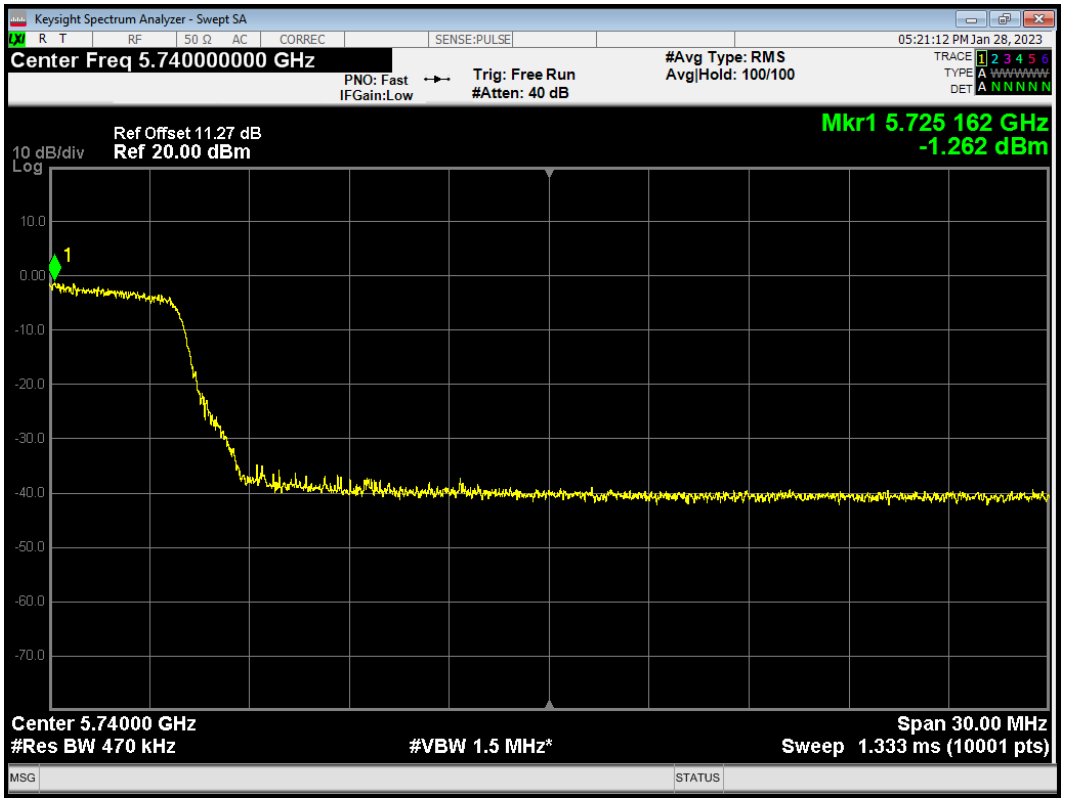

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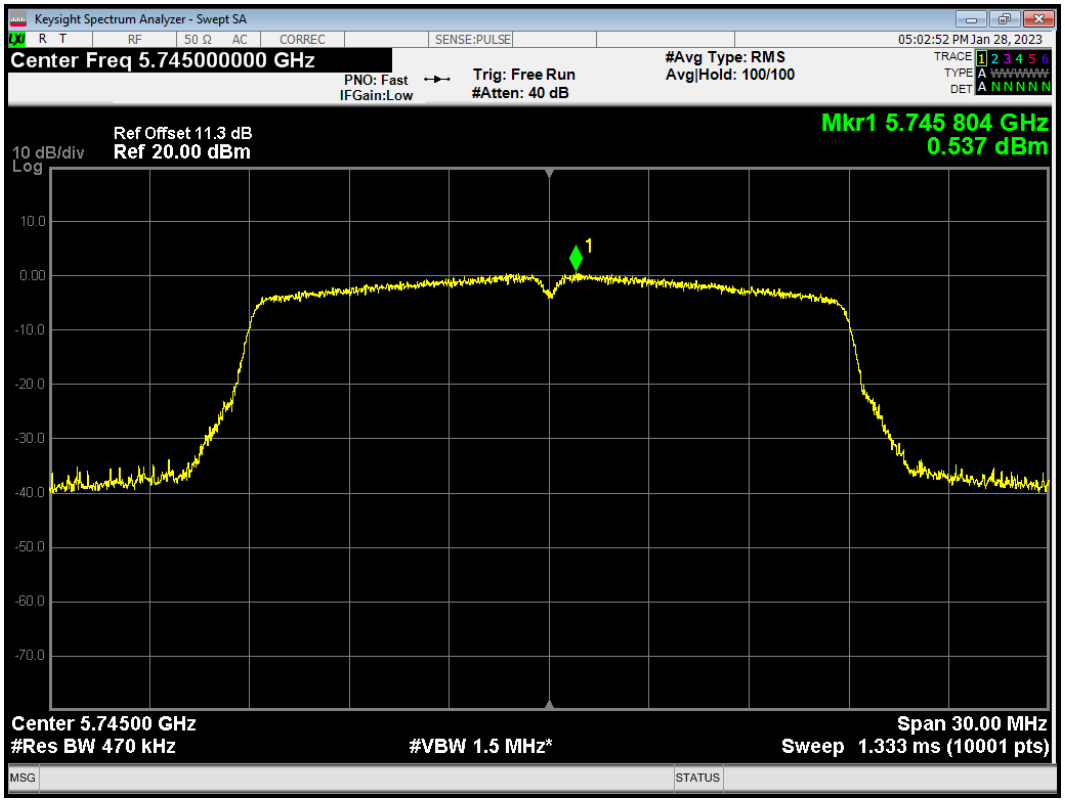

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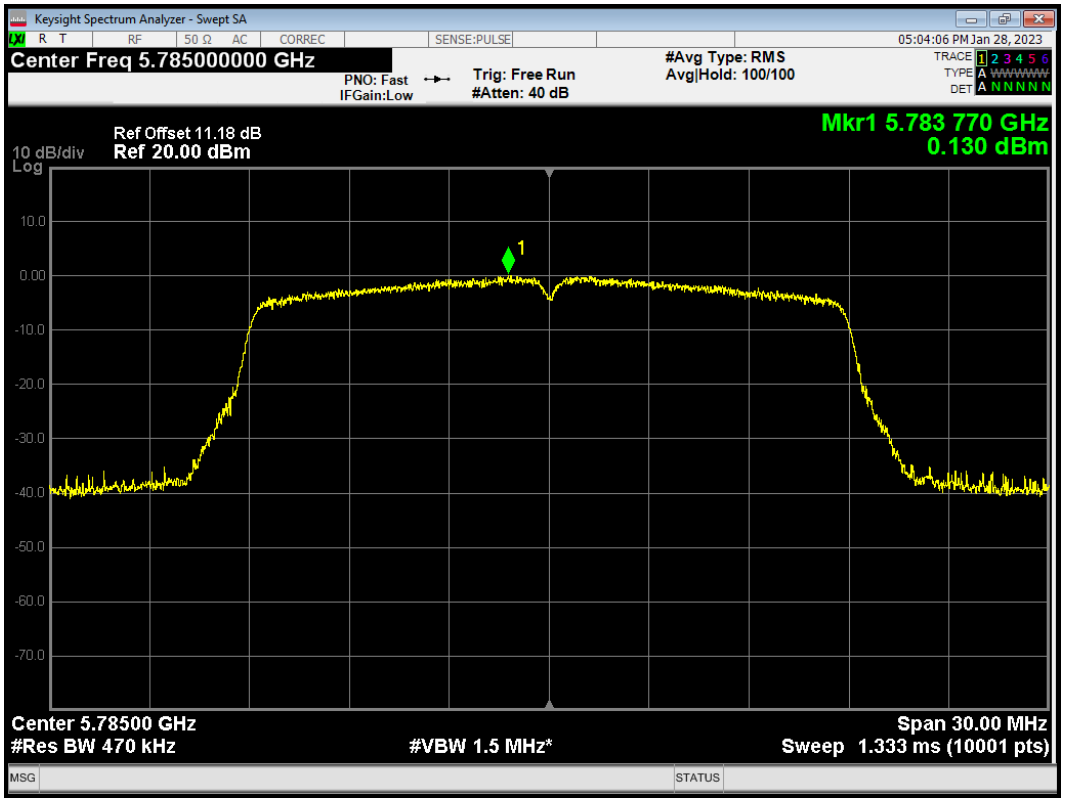

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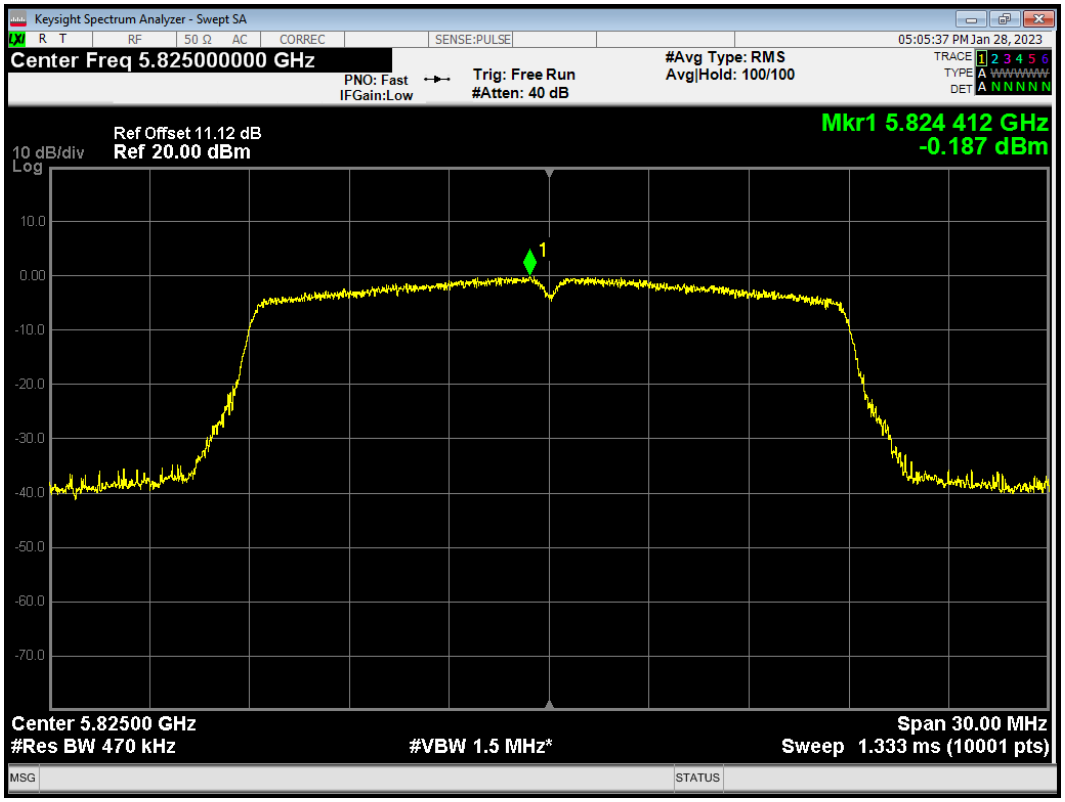

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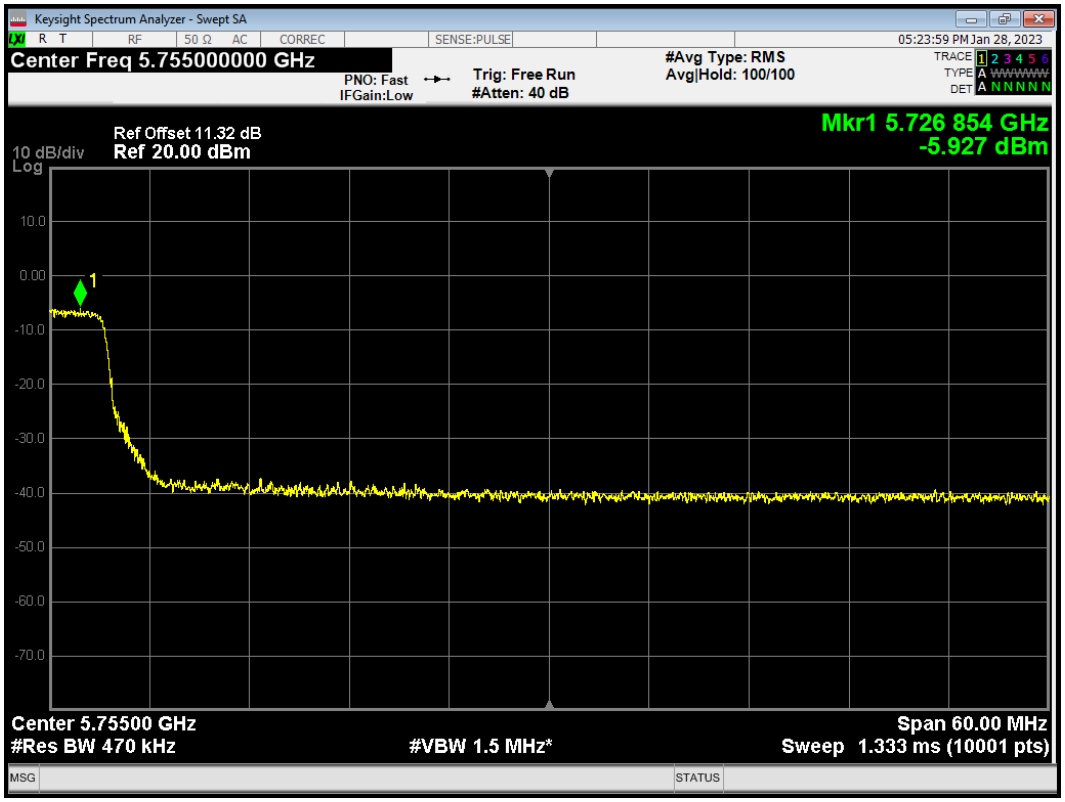

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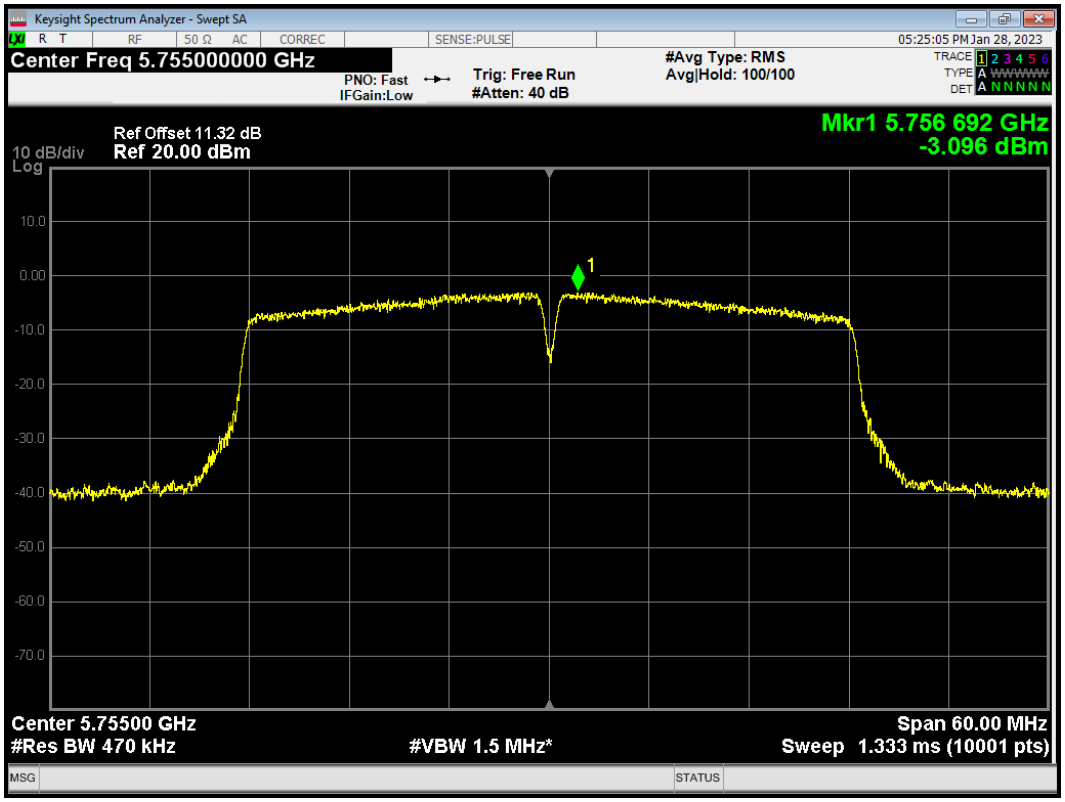

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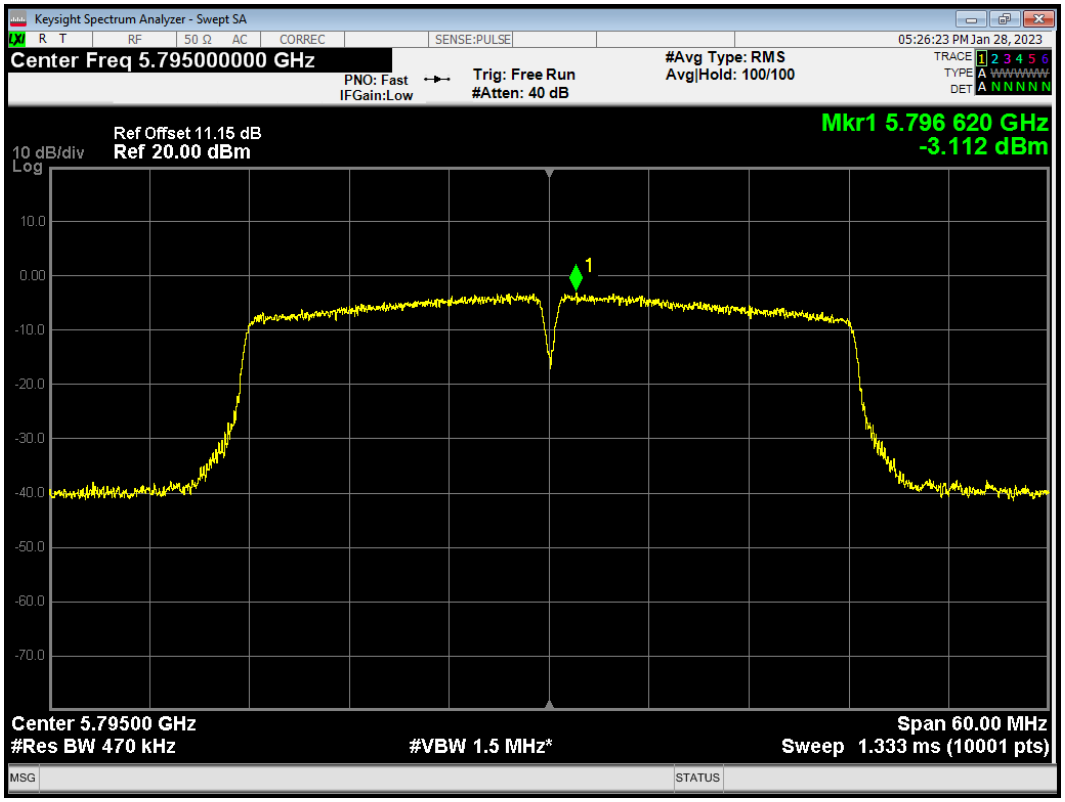


5.5. Unwanted Emission

Ambient condition

Temperature	Relative humidity
20°C ~ 25°C	45% ~ 50%

Method of Measurement

The test set-up was made in accordance to the general provisions of ANSI C63.10. The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna. The radiated emissions measurements were made in a typical installation configuration.
Sweep the whole frequency band range from 9kHz to the 10th harmonic of the carrier, and the emissions less than 20 dB below the permissible value are reported.

During the test, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turntable shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna. The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing.
Set the spectrum analyzer in the following:
9kHz~150 kHz
RBW=200Hz, VBW=1kHz/ Sweep=AUTO
150 kHz~30MHz
RBW=9KHz, VBW=30KHz,/ Sweep=AUTO
Below 1GHz
RBW=100kHz / VBW=300kHz / Sweep=AUTO
a) Peak emission levels are measured by setting the instrument as follows:
Above 1GHz
PEAK: RBW=1MHz VBW=3MHz/ Sweep=AUTO
b) Average emission levels are measured by setting the instrument as follows:
Above 1GHz
AVERAGE: RBW=1MHz / VBW=3MHz / Sweep=AUTO
c) Detector: The measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
d) Averaging type = power (i.e., rms) (As an alternative, the detector and averaging type may be set for linear voltage averaging. Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.)
e) Sweep time = auto.
f) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, then the number of traces shall be increased by a factor of 1 / D, where D is the duty cycle. For example, with 50% duty cycle, at least 200 traces shall be averaged. (If a specific

emission is demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 100 traces shall be averaged.)

g) If tests are performed with the EUT transmitting at a duty cycle less than 98%, then a correction factor shall be added to the measurement results prior to comparing with the emission limit, to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:

1) If power averaging (rms) mode was used in the preceding step e), then the correction factor is [10 log (1 / D)], where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 3 dB shall be added to the measured emission levels.

2) If linear voltage averaging mode was used in the preceding step e), then the correction factor is [20 log (1 / D)], where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 6 dB shall be added to the measured emission levels.

3) If a specific emission is demonstrated to be continuous (100% duty cycle) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

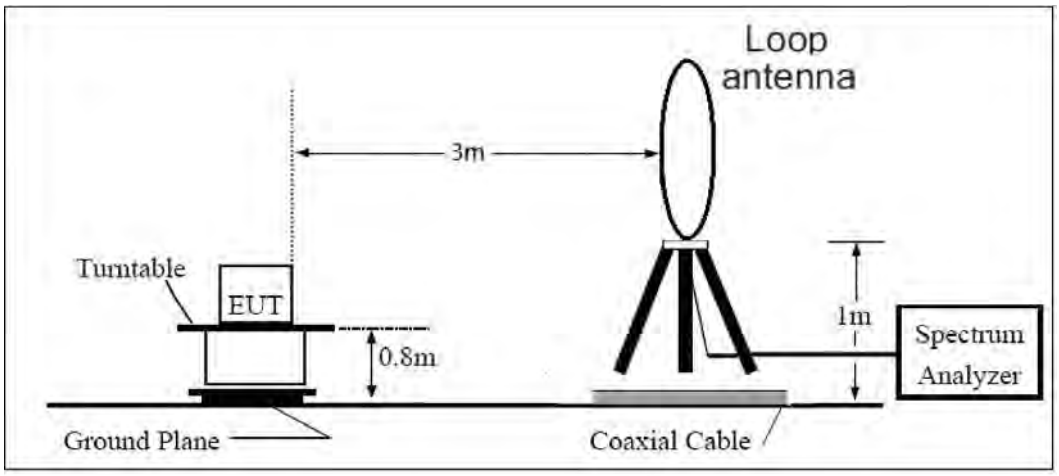
Reduce the video bandwidth until no significant variations in the displayed signal are observed in subsequent traces, provided the video bandwidth is no less than 1 Hz. For regulatory requirements that specify averaging only over the transmit duration (e.g., digital transmission system [DTS] and Unlicensed National Information Infrastructure [U-NII]), the video bandwidth shall be greater than [1 / (minimum transmitter on time)] and no less than 1 Hz.

The field strength of spurious 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 stand-up position (Z axis) and the loop antenna is vertical, others antenna are vertical and horizontal.

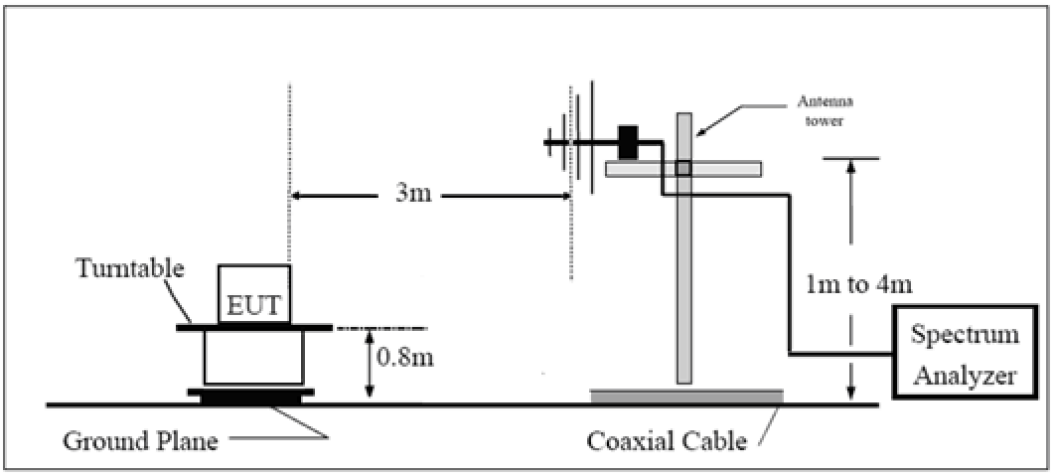
The test is in transmitting mode.

Test setup

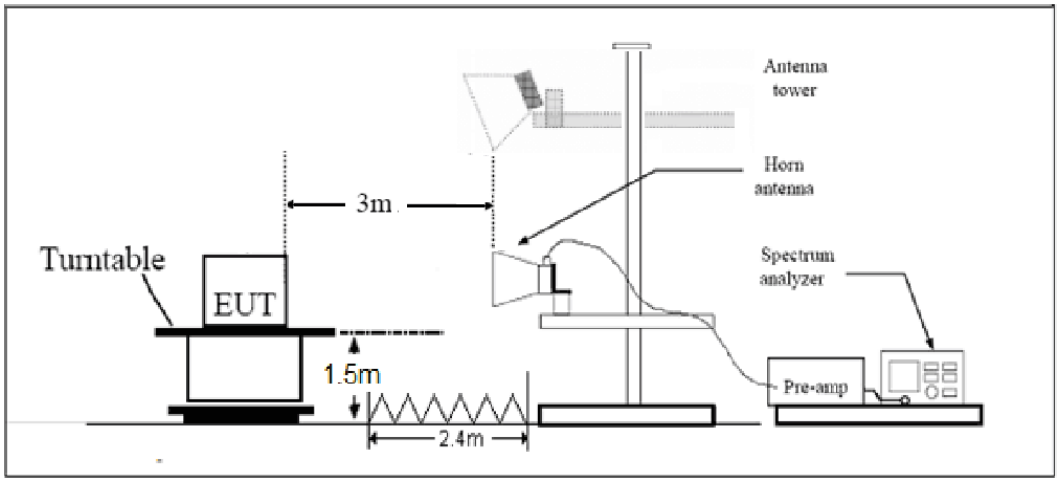
9KHz~ 30MHz



30MHz~ 1GHz



Above 1GHz



Note: Area side:2.4mX3.6m

Limits

(1) For transmitters operating in the 5725-5850 MHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

(2) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz(68.2dBμV/m).

(3) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz(68.2dBμV/m).

(4) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz(68.2dBμV/m).

Note: the following formula is used to convert the EIRP to field strength

§1、E[dBμV/m] = EIRP[dBm] - 20 log(d[meters]) + 104.77, where E = field strength and

d = distance at which field strength limit is specified in the rules;

§2、E[dBμV/m] = EIRP[dBm] + 95.2, for d = 3 meters

(5) Unwanted spurious emissions fallen in restricted bands per FCC Part15.205 shall comply with the general field strength limits set forth in § 15.209 as below table.

Frequency of emission (MHz)	Field strength(μV/m)	Field strength(dBμV/m)
0.009–0.490	2400/F(kHz)	/
0.490–1.705	24000/F(kHz)	/
1.705–30.0	30	/
30-88	100	40
88-216	150	43.5
216-960	200	46
Above960	500	54