RF TEST REPORT

Applicant	Xiaomi Communications Co., Ltd.
FCC ID	2AFZZFRA65G
Product	Mobile Phone
Brand	Redmi
Model	2502FRA65G
Report No.	R2410A1618-R7
Issue Date	December 25, 2024

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

Prepared by: Xu Ying   *Approved by: Xu Kai*

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TABLE OF CONTENT

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: September 23, 2023 ~ October 7, 2023
Date of Sample Received: September 20, 2023

Note: PASS: The EUT complies with the essential requirements in the standard.

       FAIL: The EUT does not comply with the essential requirements in the standard.

All indications of Pass/Fail in this report are opinions expressed by Eurofins TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.

2502FRA65G (Report No.: R2410A1618-R7) is a variant model of 23117RA68G (Report No.: R2309A0986-R7).
ID difference between 2502FRA65G and 23117RA68G: battery cover and Deco
The difference is derived from the ID set: Rear main camera bracket,
Motherboard bracket, flash shield, lens, Plastic & metal ring size changes.
Compared with the 23117RA68G, the 2502FRA65G adds a charging IC：SC6601A (Southchip)
Compared with N6, N6R adds NFC chip (THN31FGB1N), supplier: Beijing Tsingteng Microsystem Co., Ltd.

There is no additional test for variant in this report. Test values all duplicated from original report (Report No.: R2309A0986-R7).
The detailed product change description please refers to the *Difference Declaration Letter*.

1. Test Laboratory

1.1. Notes of the test report

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1.2. Test facility

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

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

A2LA (Certificate Number: 3857.01)

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

1.3. Testing Location

Company:	Eurofins TA Technology (Shanghai) Co., Ltd.
Address:	Building 3, No.145, Jintang Rd, Pudong Shanghai, P.R.China
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Website:	https://www.eurofins.com/electrical-and-electronics
E-mail:	Kain.Xu@cpt.eurofinscn.com

2. General Description of Equipment under Test

2.1. Applicant and Manufacturer Information

Applicant	Xiaomi Communications Co., Ltd.
Applicant address	#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085
Manufacturer	Xiaomi Communications Co., Ltd.
Manufacturer address	#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

2.2. General information

EUT Description				
Model	2502FRA65G			
IMEI	Original	Conducted	IMEI 1: 863357060096302 IMEI 2: 863357060096310	
		Radiated	Radiated Emission	IMEI 1: 863357060105648 IMEI 2: 863357060105655
			Conducted Emission	IMEI 1: 863357060104481 IMEI 2: 863357060106499
	Variant	IMEI 1: 866213070041589 IMEI 2: 866213070041597		
Hardware Version	135100N6R			
Software Version	Xiaomi Hyper OS1.0			
Antenna Type	PIFA Antenna			
Antenna Connector	A permanently attached antenna (meet with the standard FCC Part 15.203 requirement)			
Antenna Gain	U-NII-1	-1.06 dBi		
	U-NII-2A	-0.90 dBi		
	U-NII-2C	-1.66 dBi		
	U-NII-3	-1.35 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: OFDM 802.11n (HT20/HT40): OFDM 802.11ac (VHT20/VHT40/VHT80): OFDM			
Max. Output Power	17.80 dBm			
Testing temperature range	-30 ° C to 50° C			

Eurofins TA Technology (Shanghai) Co., Ltd.   **TA-MB-04-006R**   **Page 5 of 241**

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Operating temperature range	0 ° C to 40 ° C
Operating voltage range	3.6 V to 4.48 V
State DC voltage	3.89 V

Note:

1. The EUT is sent from the applicant to Eurofins TA and the information of the EUT is declared by the applicant.

2. This device support automatically discontinue transmission, while the device is not transmitting any information, the device can automatically discontinue transmission and become standby mode for power saving. The device can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

3. (a) Manufacturers implements security features in any digitally modulated devices capable of operating in any of the U-Nll 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-Nll device.

3. Applied Standards

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

Test standards:

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

ANSI C63.10-2013

Reference standard:

KDB 789033 D02 General UNII Test Procedures New Rules v02r01

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
			44	5220MHz
			48	5240MHz
		40 MHz	38	5190MHz
			46	5230MHz
		80 MHz	42	5210MHz
	U-NII-2A	20 MHz	52	5260MHz
			56	5280MHz
			60	5300MHz
			64	5320MHz
		40 MHz	54	5270MHz
			62	5310MHz
		80 MHz	58	5290MHz
	U-NII-2C	20 MHz	100	5500MHz
			104	5520MHz
			108	5540MHz
			112	5560MHz
			116	5580MHz
			120	5600MHz
			124	5620MHz
			128	5640MHz
			132	5660MHz
			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
			153	5765MHz
			157	5785MHz

			161	5805MHz
			165	5825MHz
		40 MHz	151	5755MHz
			159	5795MHz
		80 MHz	155	5775MHz
Does this device support TPC Function? ☐Yes ☒No				
Does this device support TDWR Band? ☒Yes ☐No				

5. Test Case Results

5.1. Occupied Bandwidth

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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
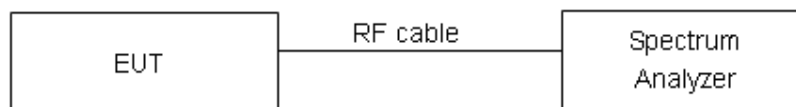
Limits
For U-NII-1/U-NII-2A/U-NII-2C
No specific occupied bandwidth requirements in Part 15.407.
For U-NII-3
Rule FCC Part §15.407(e)
Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Measurement Uncertainty

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

Test Results:

U-NII-1

Mode	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 26 dB bandwidth (MHz)	Conclusion
802.11a	5180	16.556	20.873	PASS
	5200	16.602	20.048	PASS
	5240	16.594	20.430	PASS
802.11n HT20	5180	17.641	20.755	PASS
	5200	17.637	21.805	PASS
	5240	17.650	22.094	PASS
802.11n HT40	5190	36.051	40.754	PASS
	5230	36.089	41.079	PASS
802.11ac VHT20	5180	17.602	20.180	PASS
	5200	17.647	20.475	PASS
	5240	17.642	20.144	PASS
802.11ac VHT40	5190	35.978	40.822	PASS
	5230	36.057	40.615	PASS
802.11ac VHT80	5210	75.357	81.206	PASS

U-NII-2A

Mode	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 26 dB bandwidth (MHz)	Conclusion
802.11a	5260	16.531	20.000	PASS
	5300	16.575	20.746	PASS
	5320	16.525	21.298	PASS
802.11n HT20	5260	17.616	21.514	PASS
	5300	17.634	21.745	PASS
	5320	17.623	20.823	PASS
802.11n HT40	5270	36.053	40.760	PASS
	5310	36.020	40.430	PASS
802.11ac VHT20	5260	17.598	20.279	PASS
	5300	17.640	20.260	PASS
	5320	17.622	20.124	PASS
802.11ac VHT40	5270	36.064	40.491	PASS
	5310	36.023	40.557	PASS
802.11ac VHT80	5290	75.313	80.686	PASS

U-NII-2C

Mode	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 26 dB bandwidth (MHz)	Conclusion
802.11a	5500	16.537	21.546	PASS
	5600	16.567	23.137	PASS
	5700	16.577	22.504	PASS
	5720	16.594	22.557	PASS
802.11n HT20	5500	17.631	21.335	PASS
	5600	17.672	23.345	PASS
	5700	17.648	23.056	PASS
	5720	17.652	22.482	PASS
802.11n HT40	5510	36.004	40.748	PASS
	5590	36.067	40.060	PASS
	5670	36.035	40.858	PASS
	5710	36.005	40.847	PASS
802.11ac VHT20	5500	17.604	20.156	PASS
	5600	17.629	20.183	PASS
	5700	17.587	20.204	PASS
	5720	17.665	20.412	PASS
802.11ac VHT40	5510	35.996	40.656	PASS
	5590	36.099	40.210	PASS
	5670	35.993	40.505	PASS
	5710	35.988	40.770	PASS
802.11ac VHT80	5610	75.373	81.100	PASS
	5690	75.387	80.848	PASS

U-NII-3

Mode	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 6 dB bandwidth (MHz)	Limit (kHz)	Conclusion
802.11a	5720	16.521	15.245	500	PASS
	5745	16.638	15.253	500	PASS
	5785	16.620	15.067	500	PASS
	5825	16.554	15.075	500	PASS
802.11n HT20	5720	17.649	13.843	500	PASS
	5745	17.646	13.190	500	PASS
	5785	17.668	12.378	500	PASS
	5825	17.646	13.821	500	PASS
802.11n HT40	5710	36.118	35.049	500	PASS
	5755	36.022	35.082	500	PASS
	5795	36.039	35.115	500	PASS
802.11ac VHT20	5720	17.633	13.864	500	PASS
	5745	17.612	13.842	500	PASS
	5785	17.642	13.796	500	PASS
	5825	17.653	14.025	500	PASS
802.11ac VHT40	5710	36.053	33.868	500	PASS
	5755	36.037	33.875	500	PASS
	5795	36.080	33.847	500	PASS
802.11ac VHT80	5690	75.366	75.070	500	PASS
	5775	75.315	75.114	500	PASS

99% bandwidth

U-NII-1

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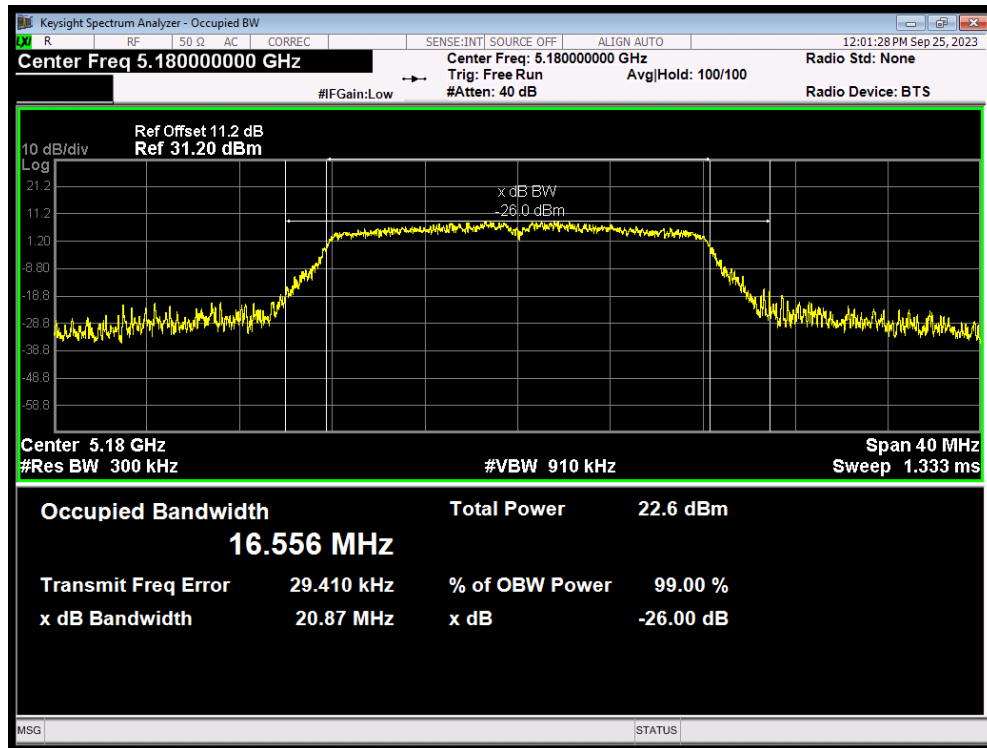
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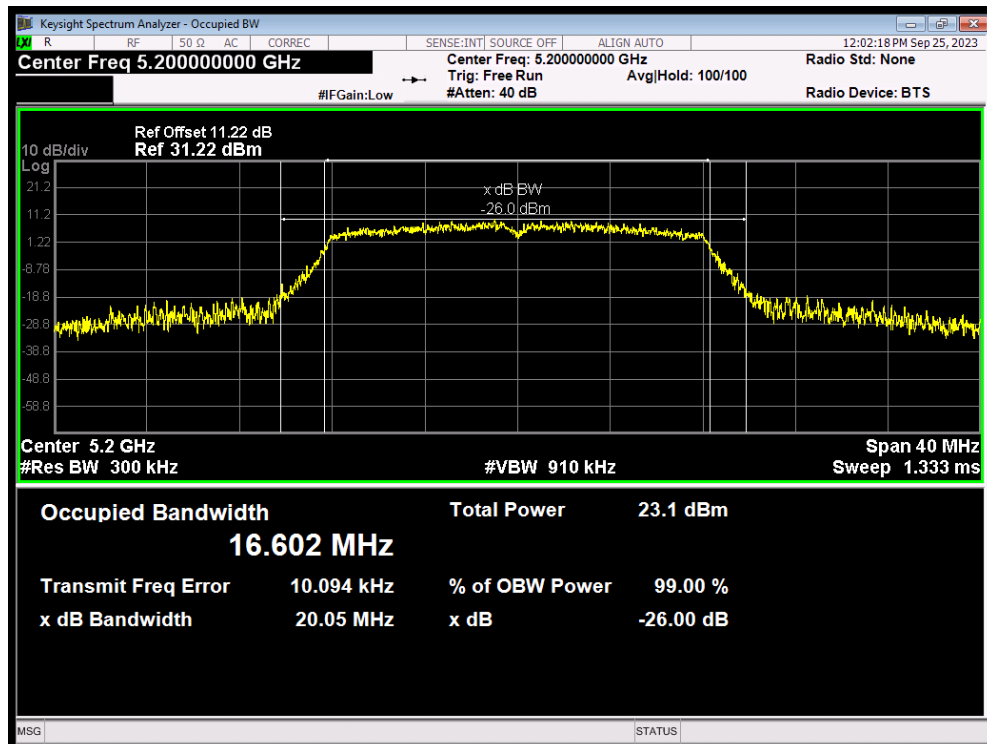
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OBW 802.11ac(VHT20) 5180MHz

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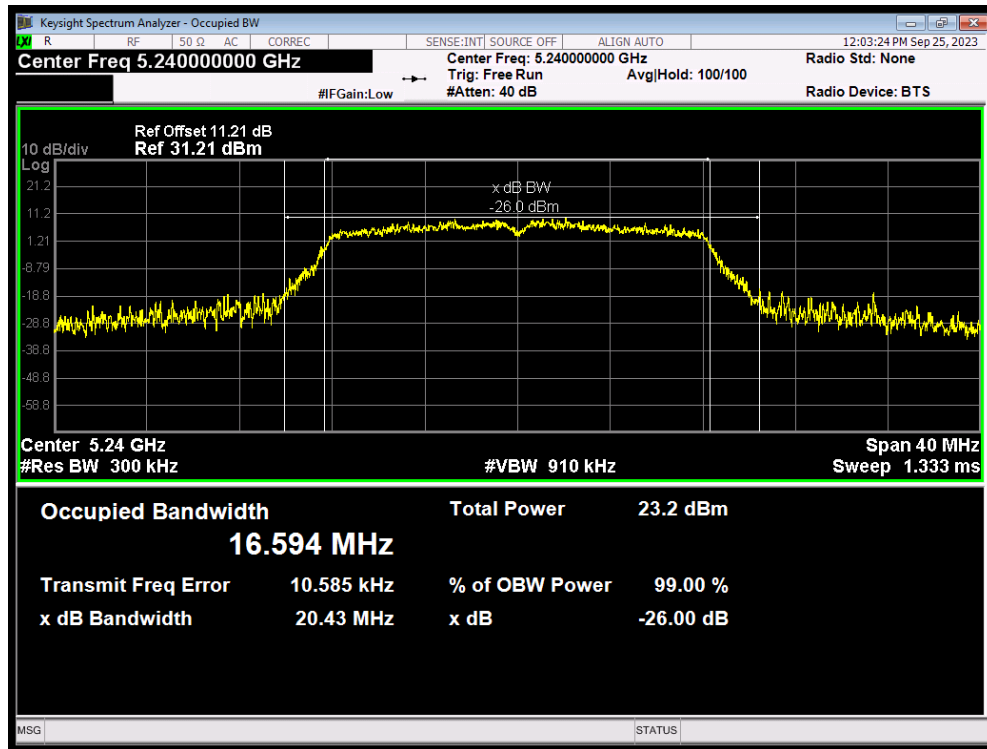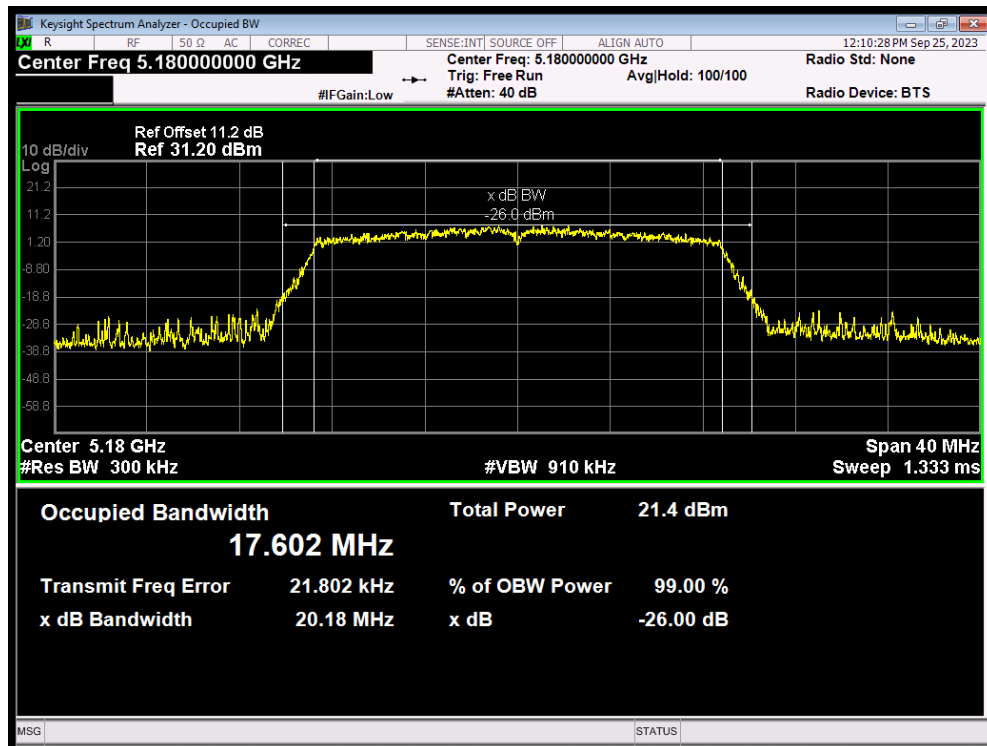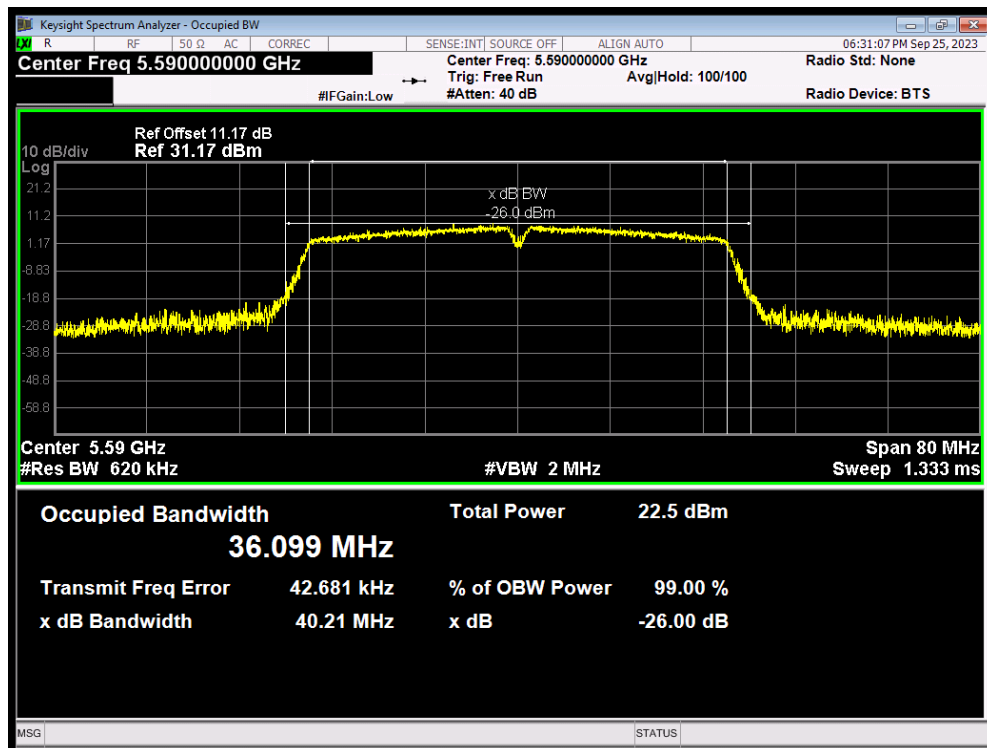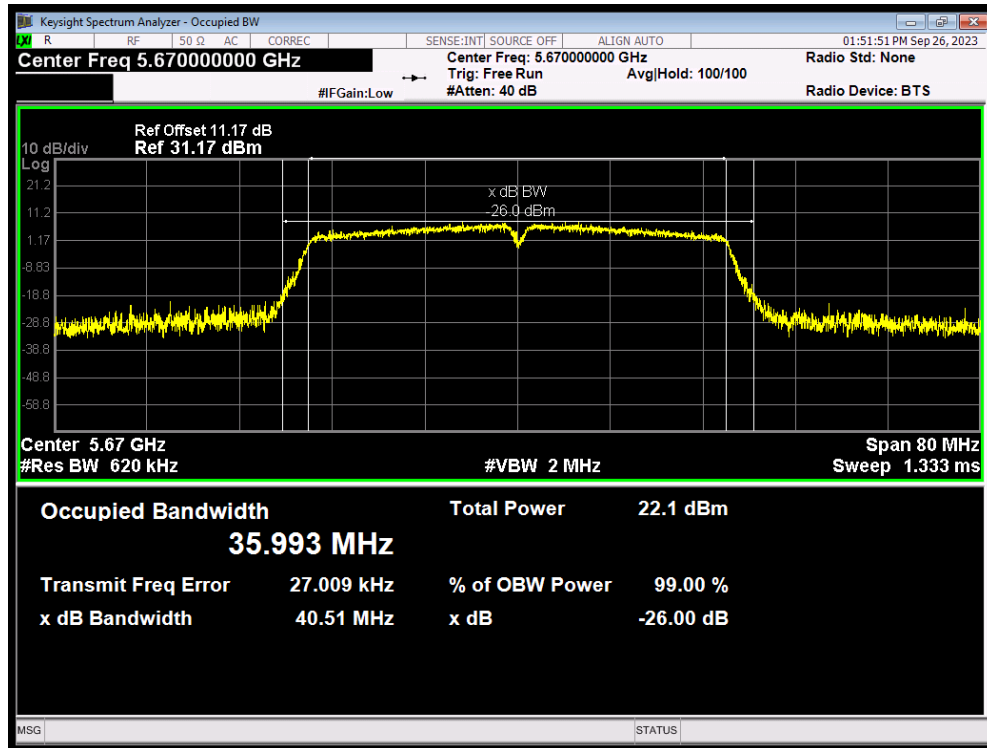
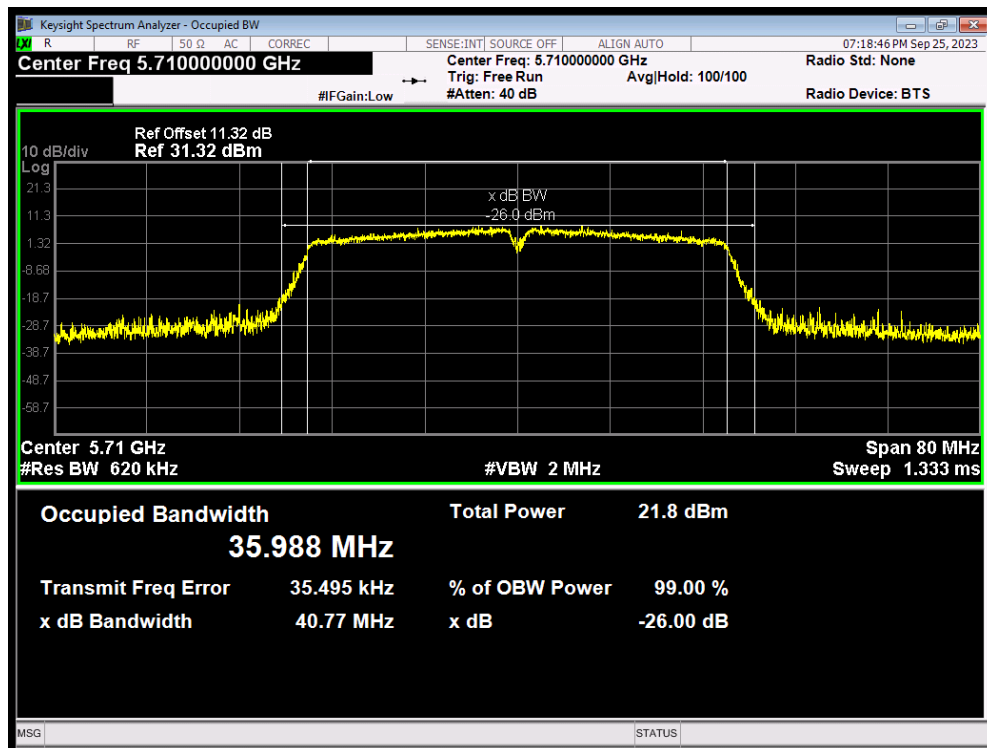OBW 802.11ac(VHT20) 5200MHz
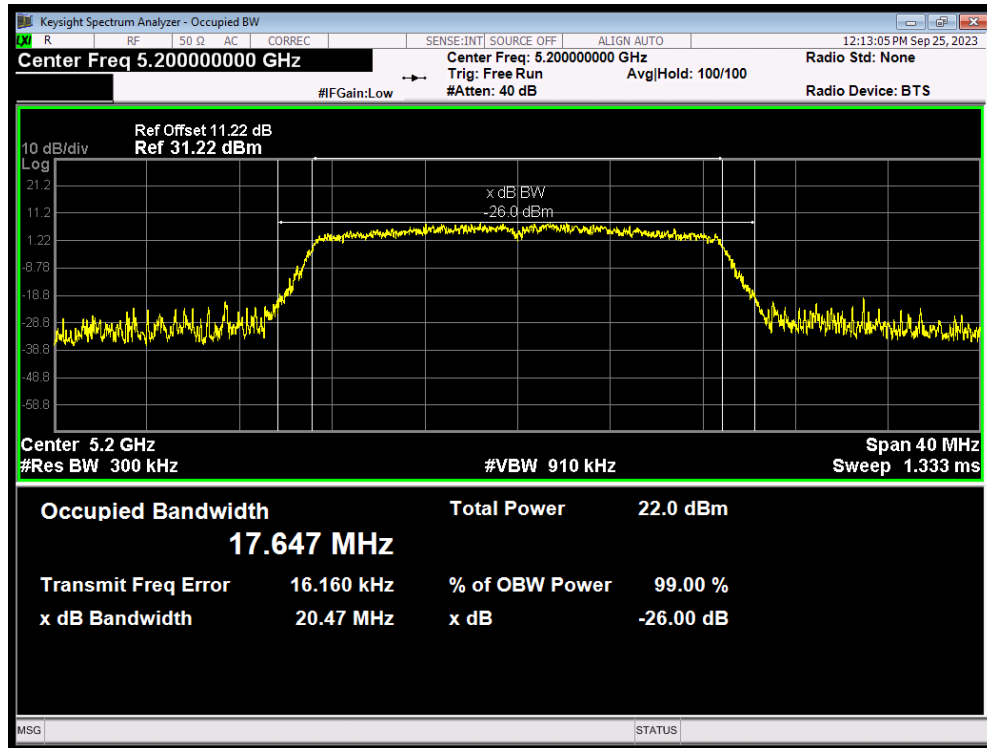
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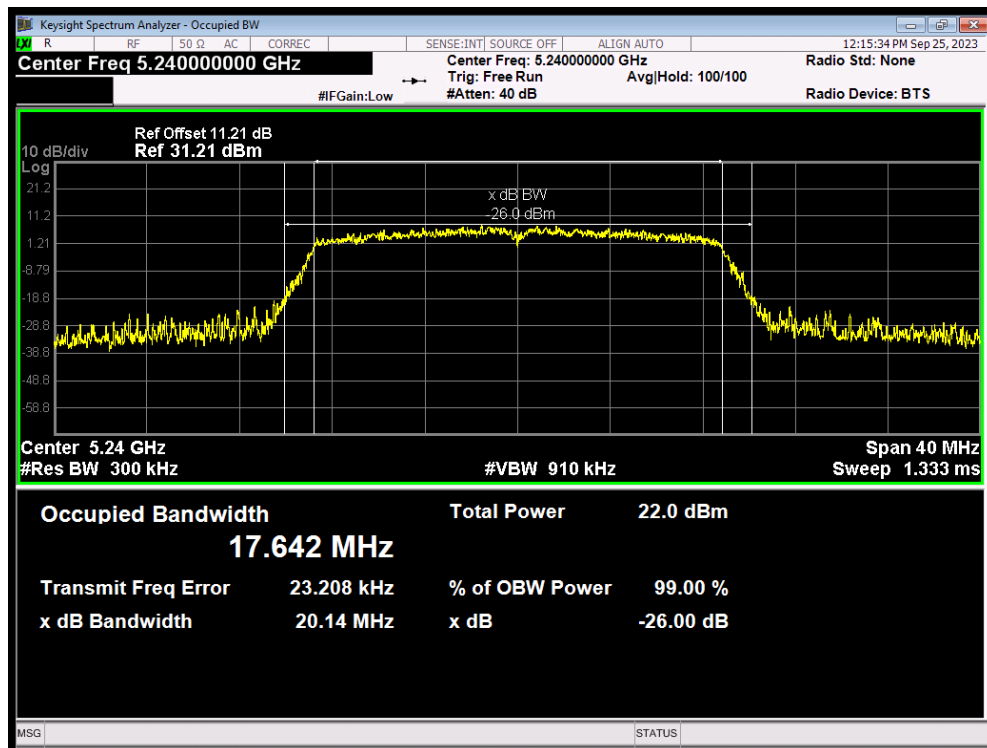
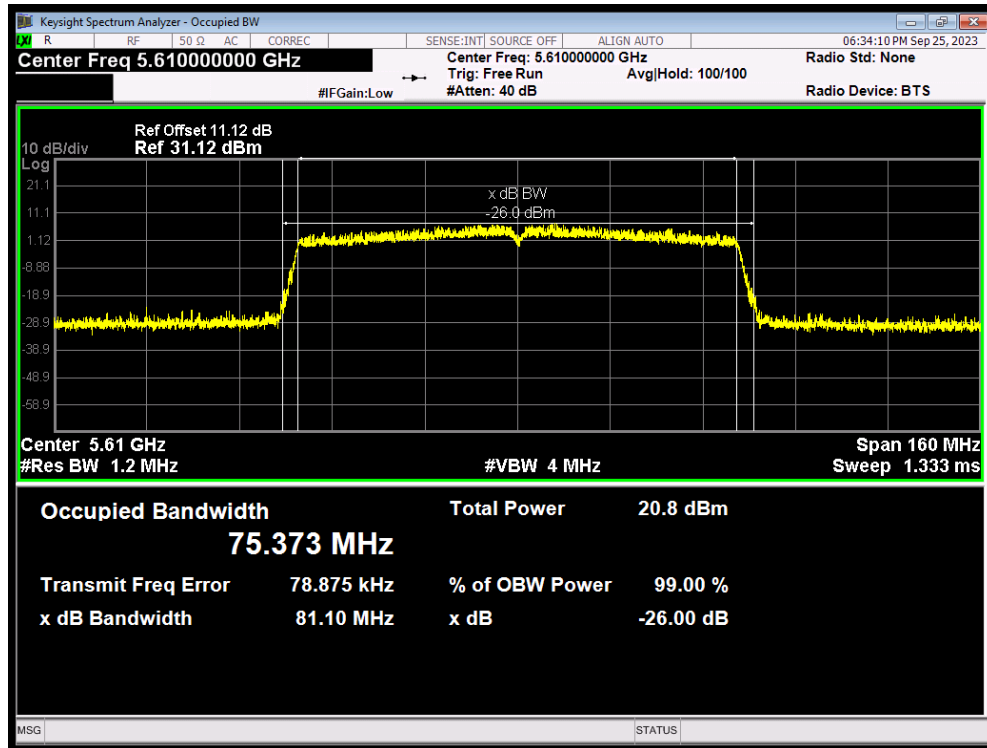OBW 802.11ac(VHT40) 5190MHz
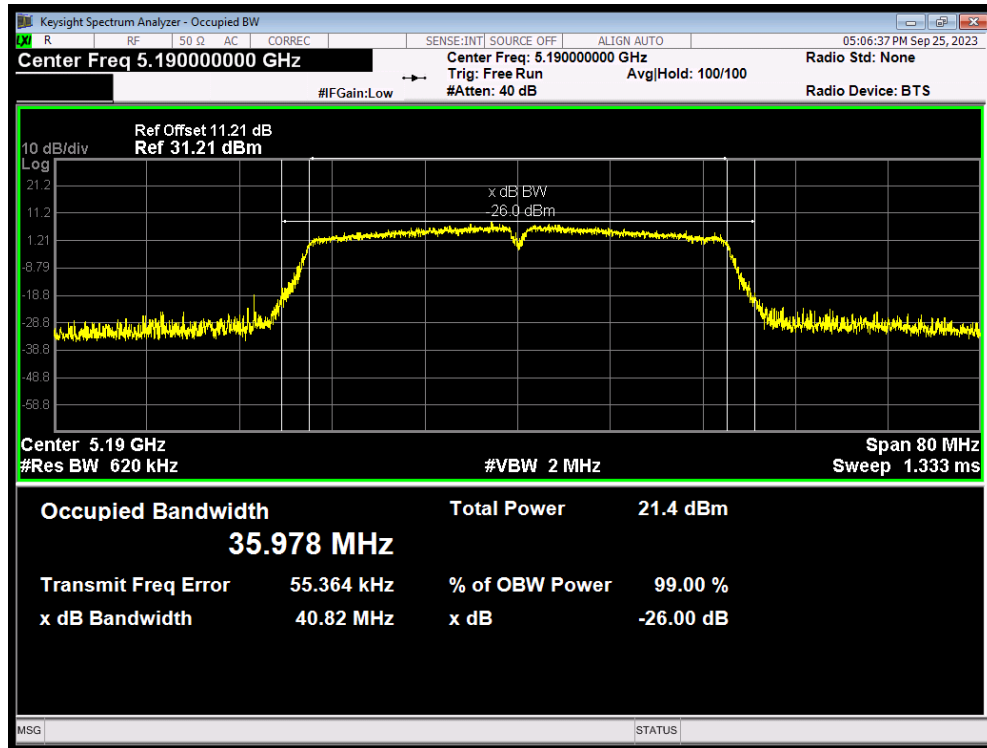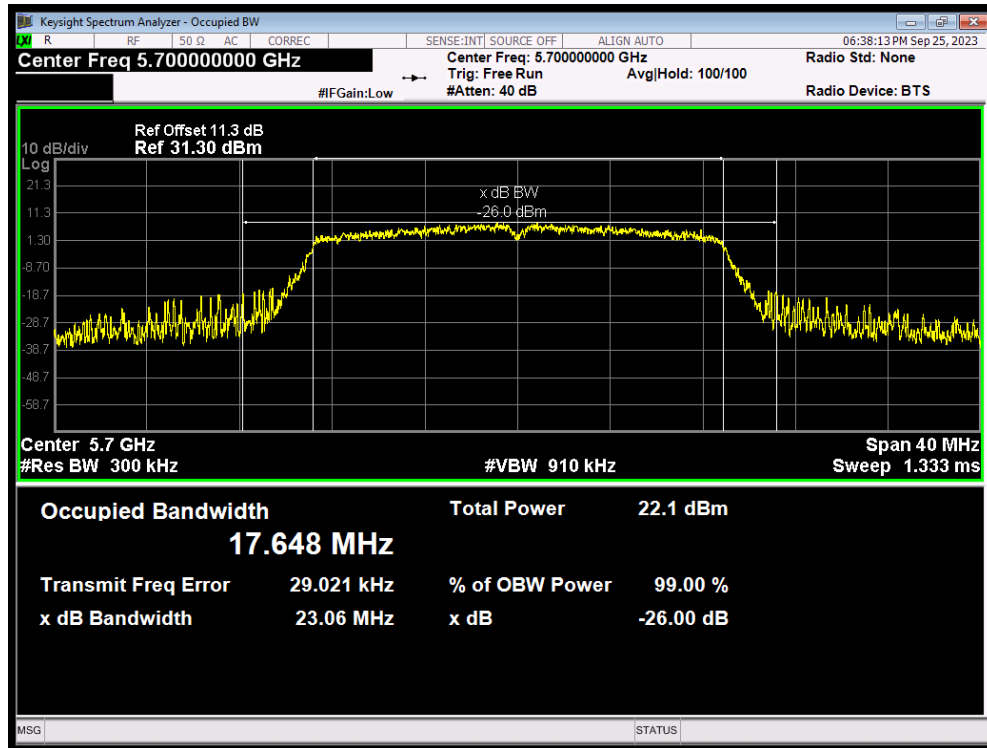

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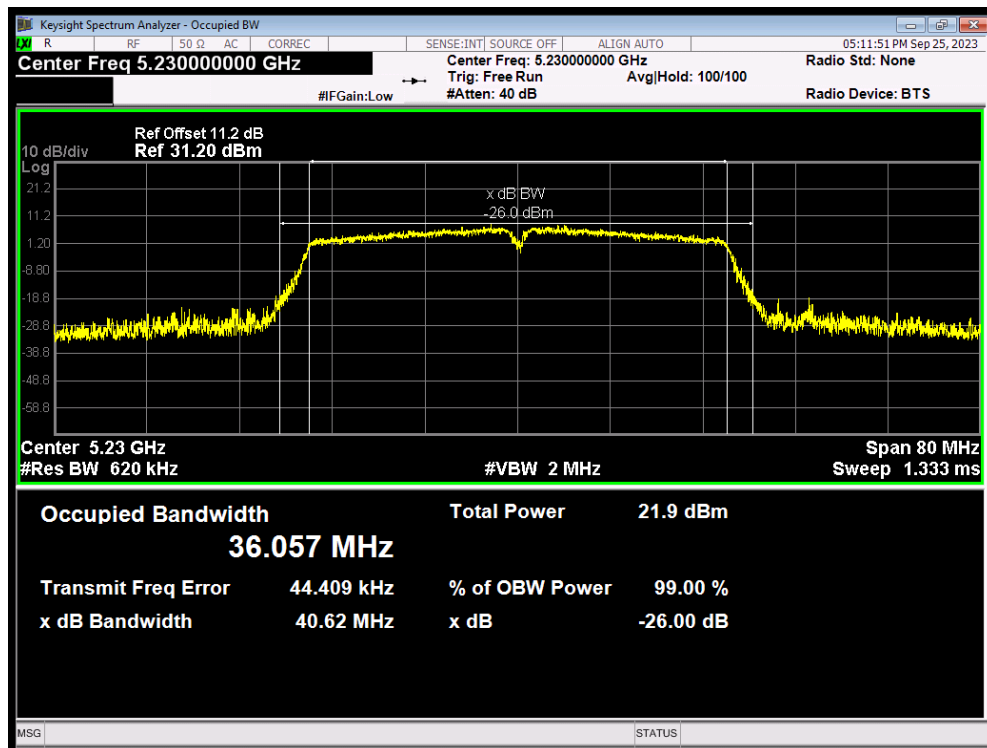
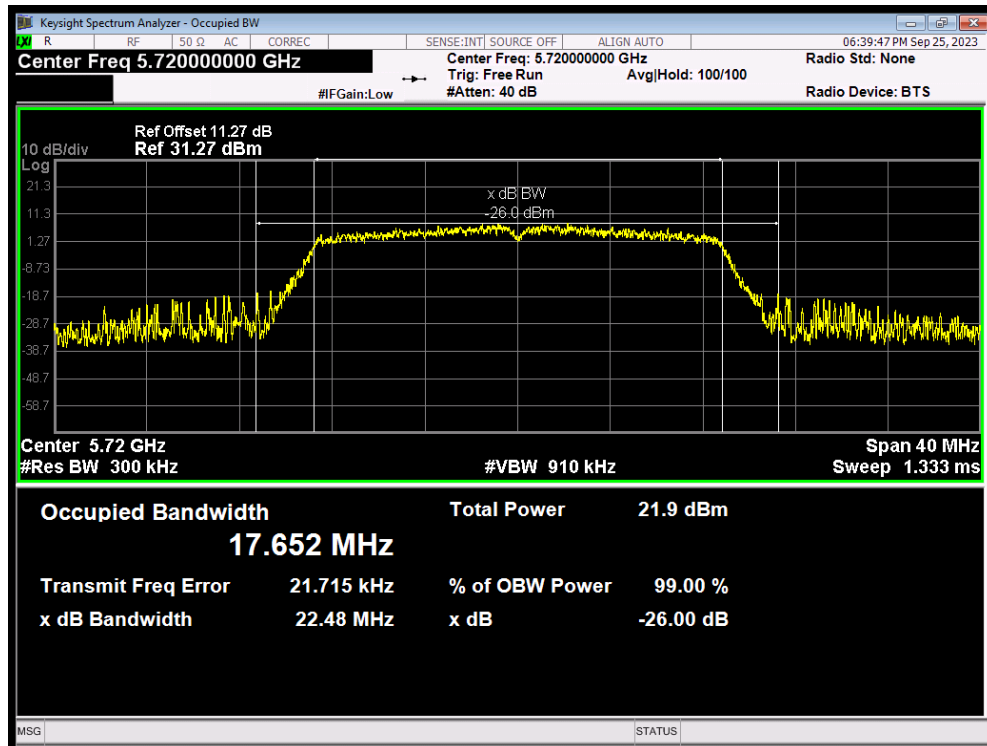OBW 802.11ac(VHT80) 5210MHz
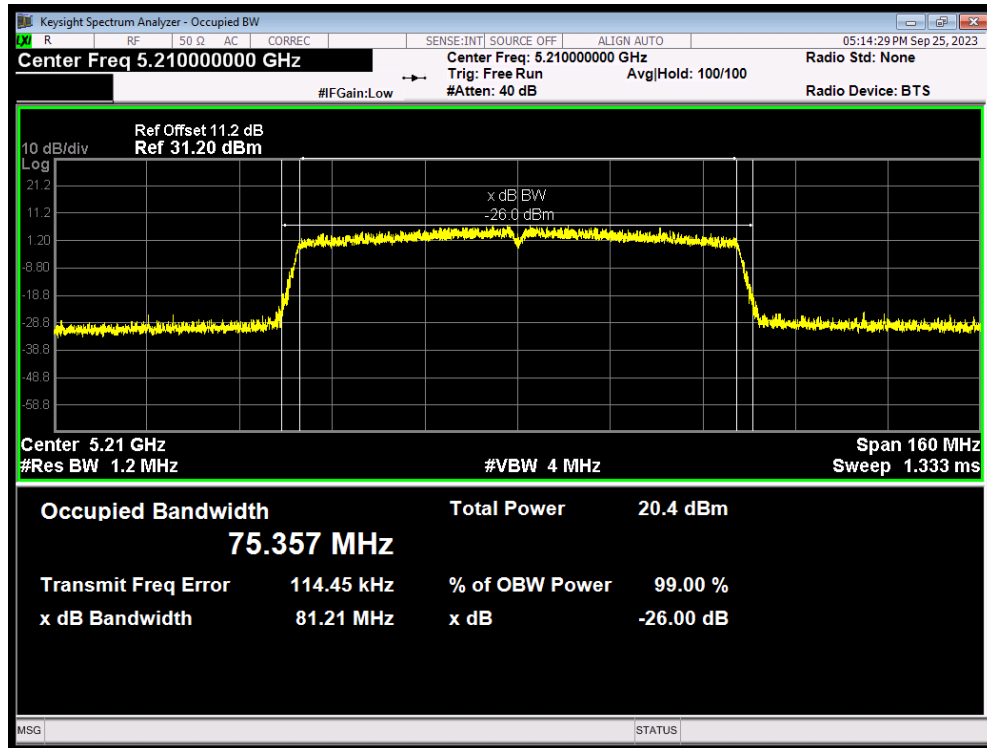
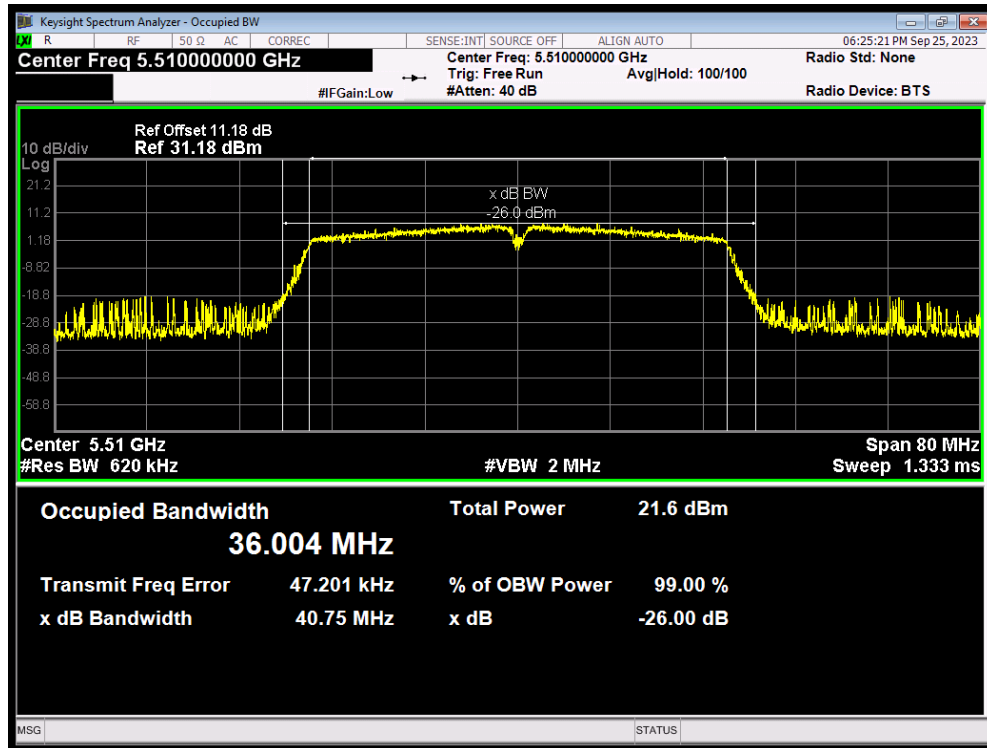OBW 802.11n(HT20) 5180MHz
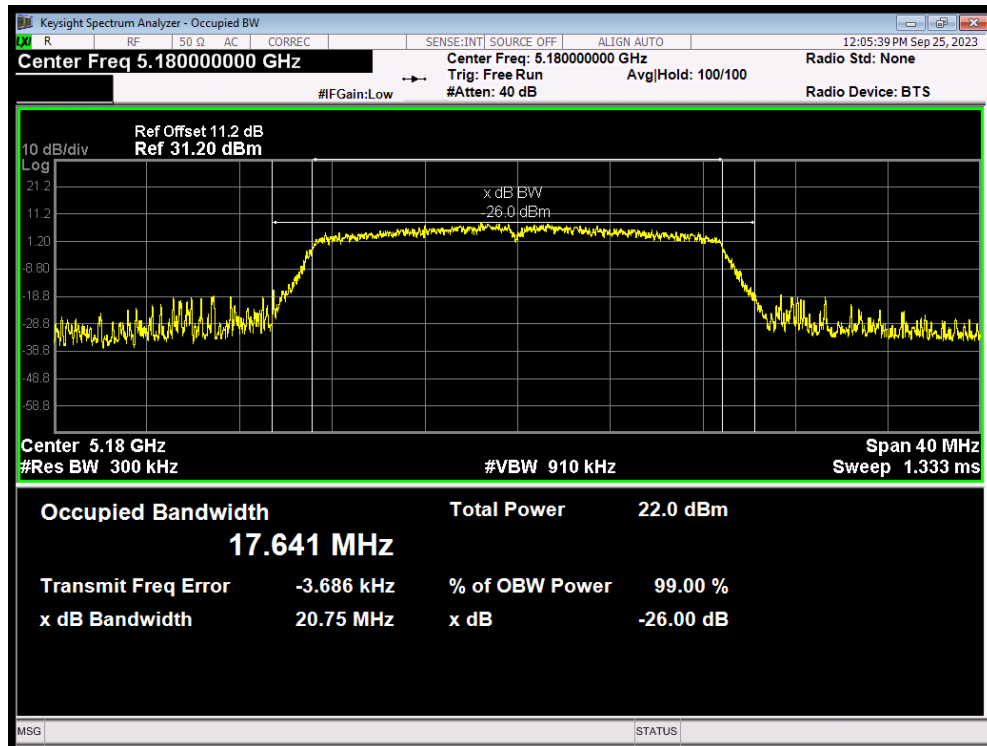
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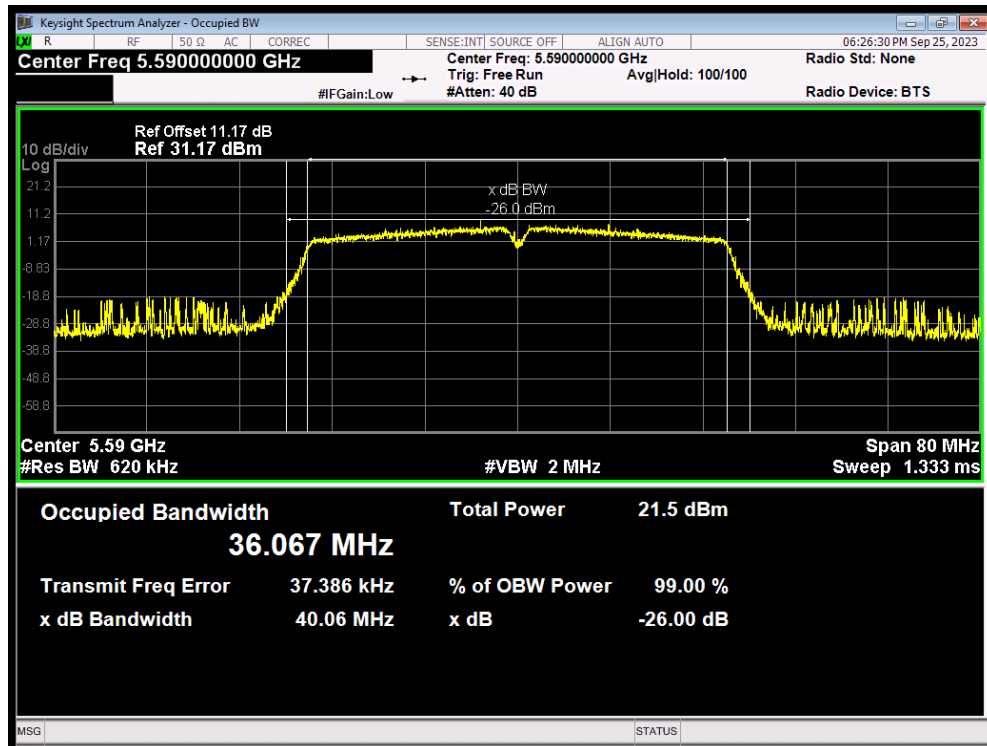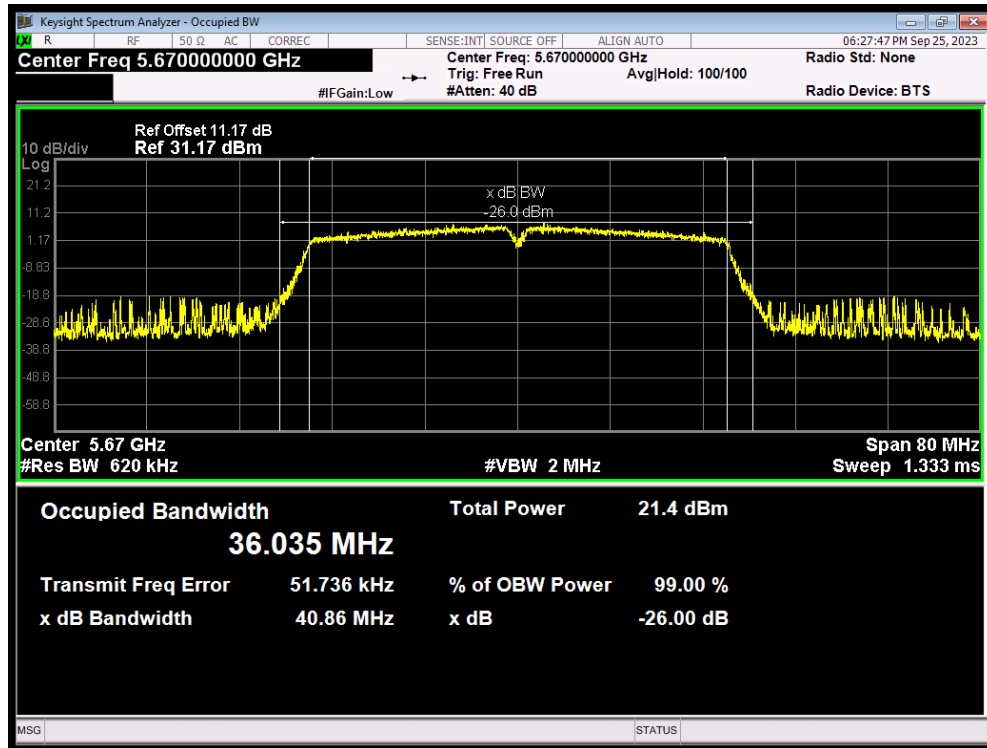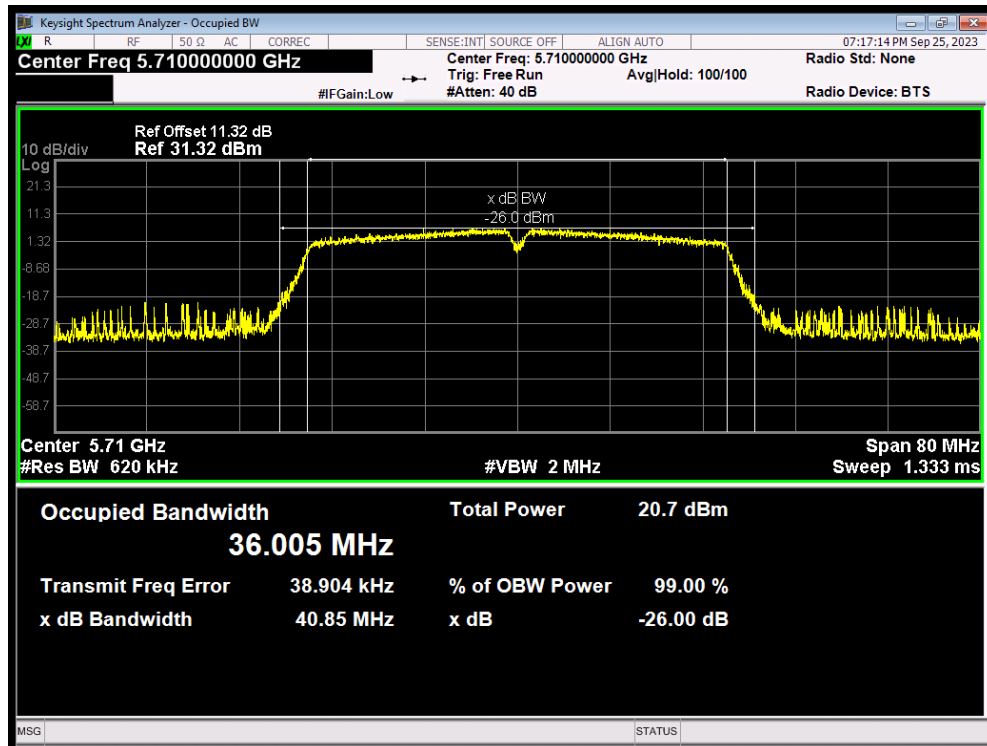

OBW 802.11n(HT20) 5240MHz

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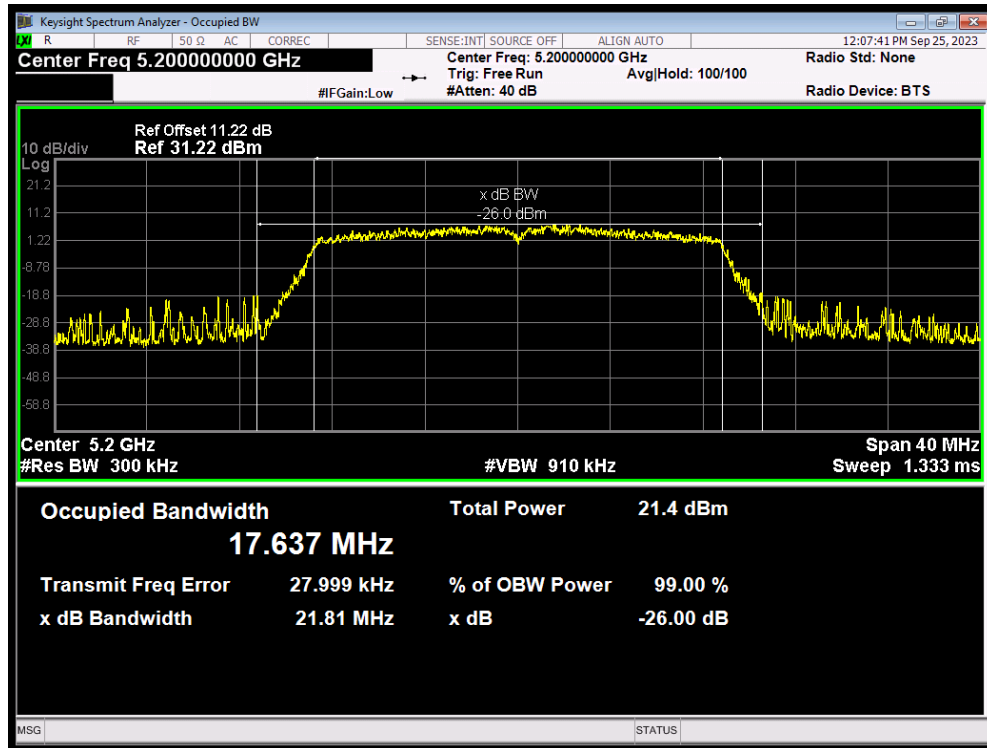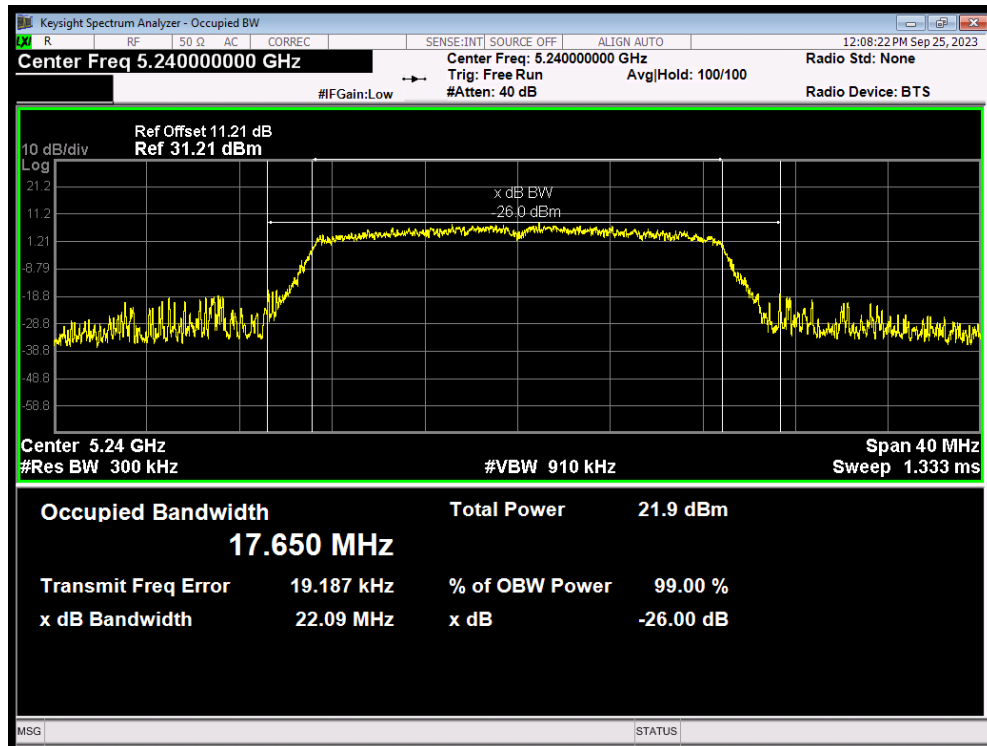
OBW 802.11n(HT40) 5190MHz

OBW 802.11n(HT40) 5230MHz

Eurofins TA Technology (Shanghai) Co., Ltd.   **TA-MB-04-006R**   **Page 22 of 241**

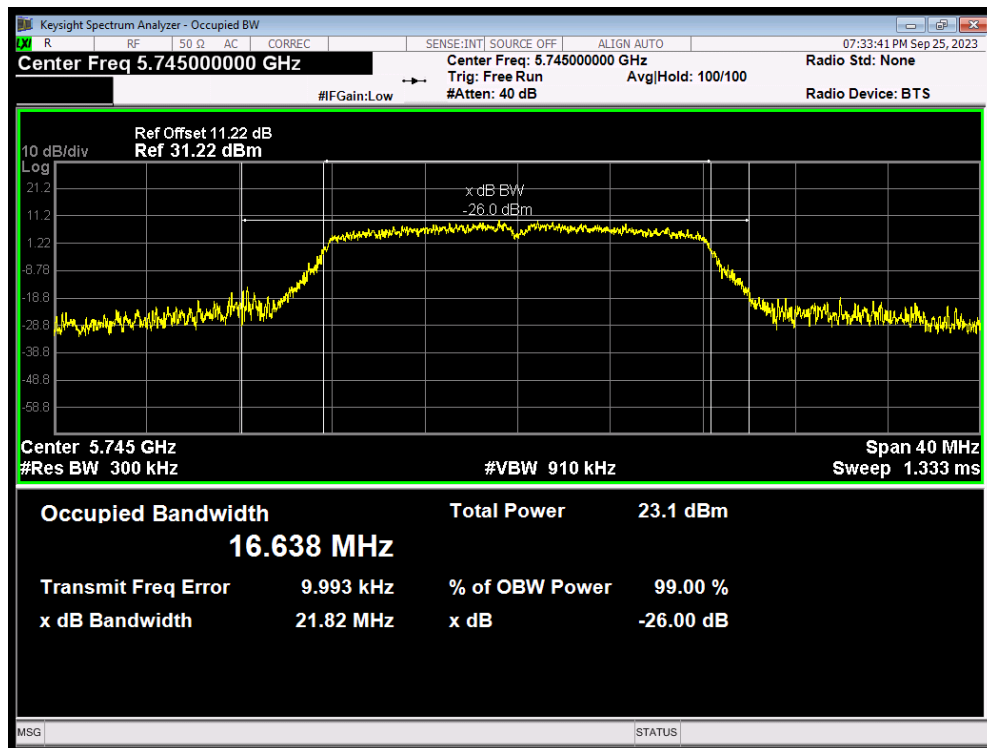*This report shall not be reproduced except in full, without the written approval of Eurofins TA Technology (Shanghai) Co., Ltd.*
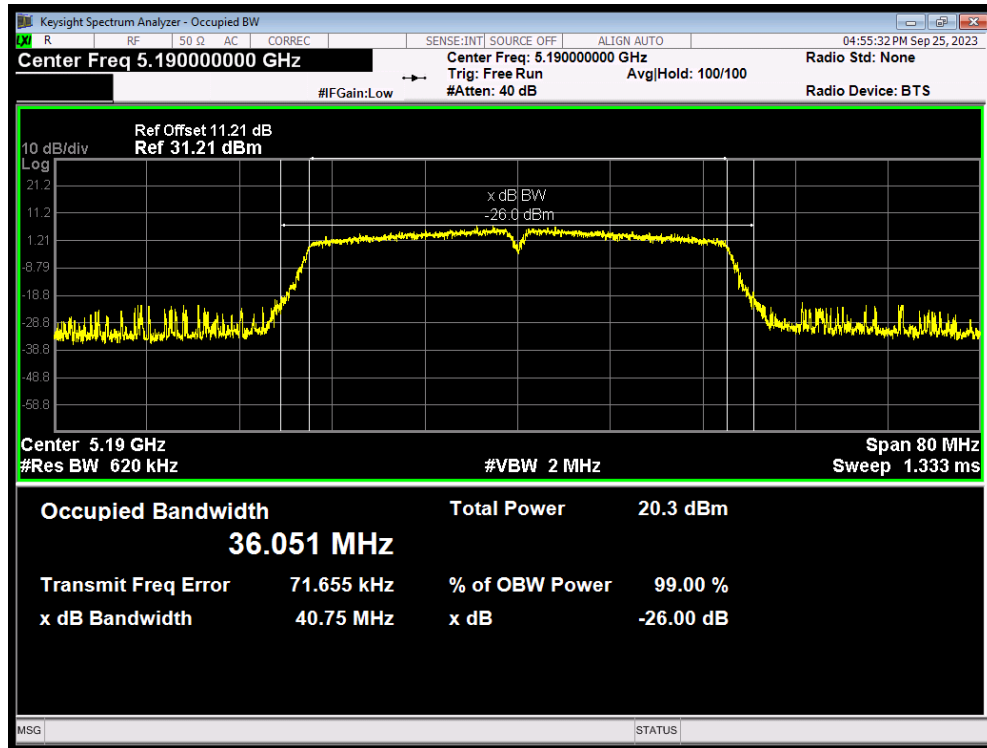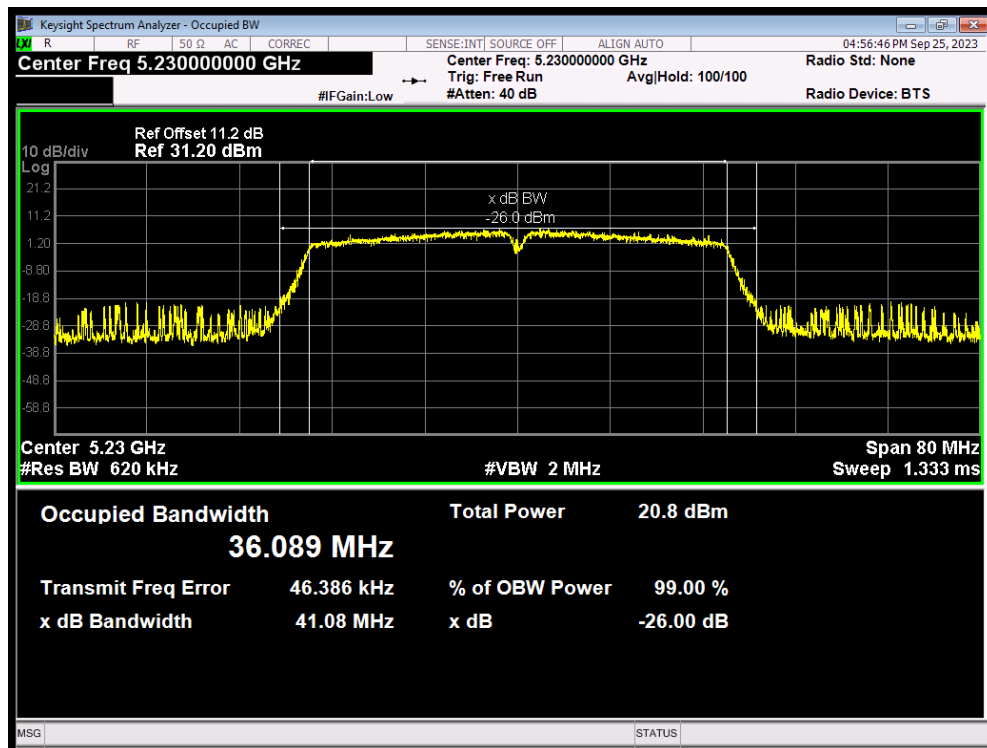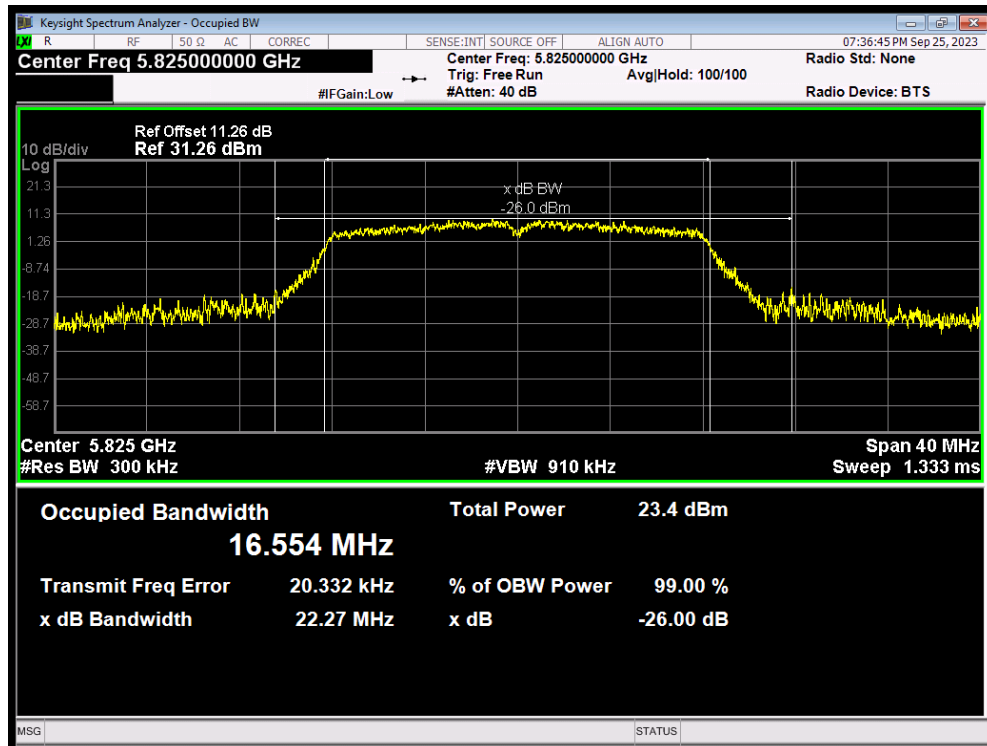
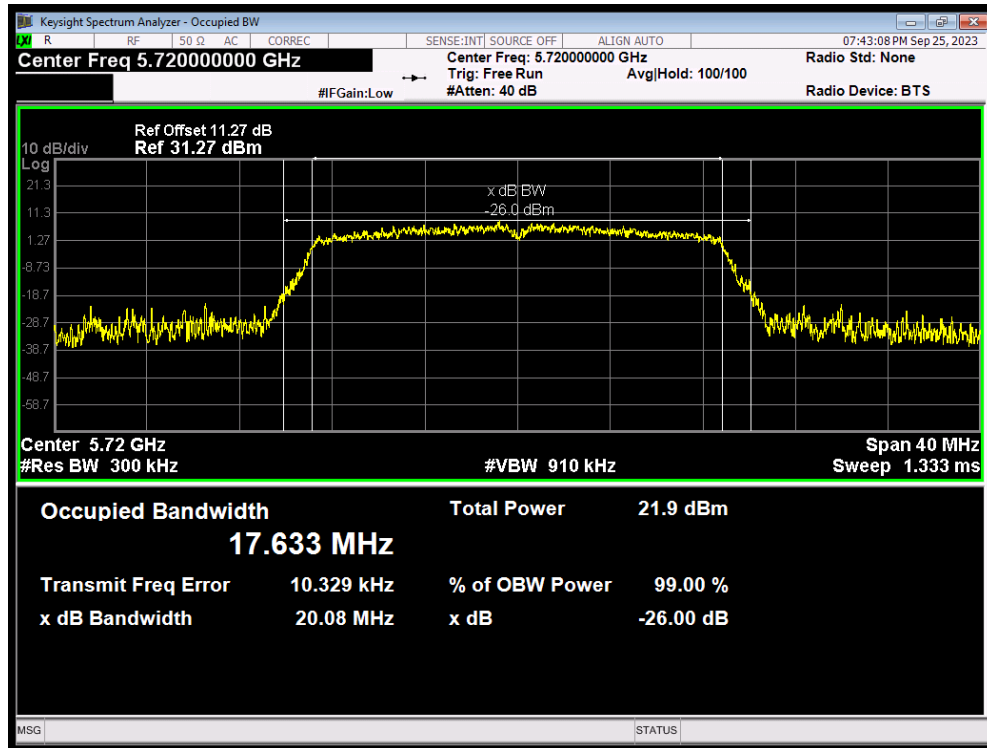**U-NII-2A**

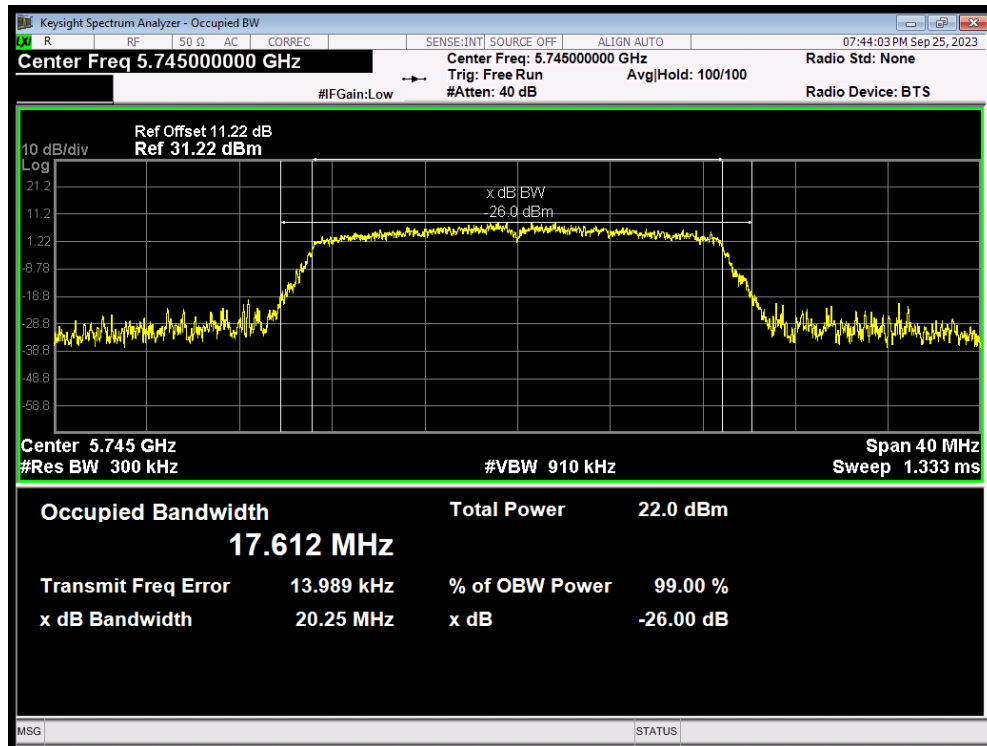OBW 802.11a 5260MHz
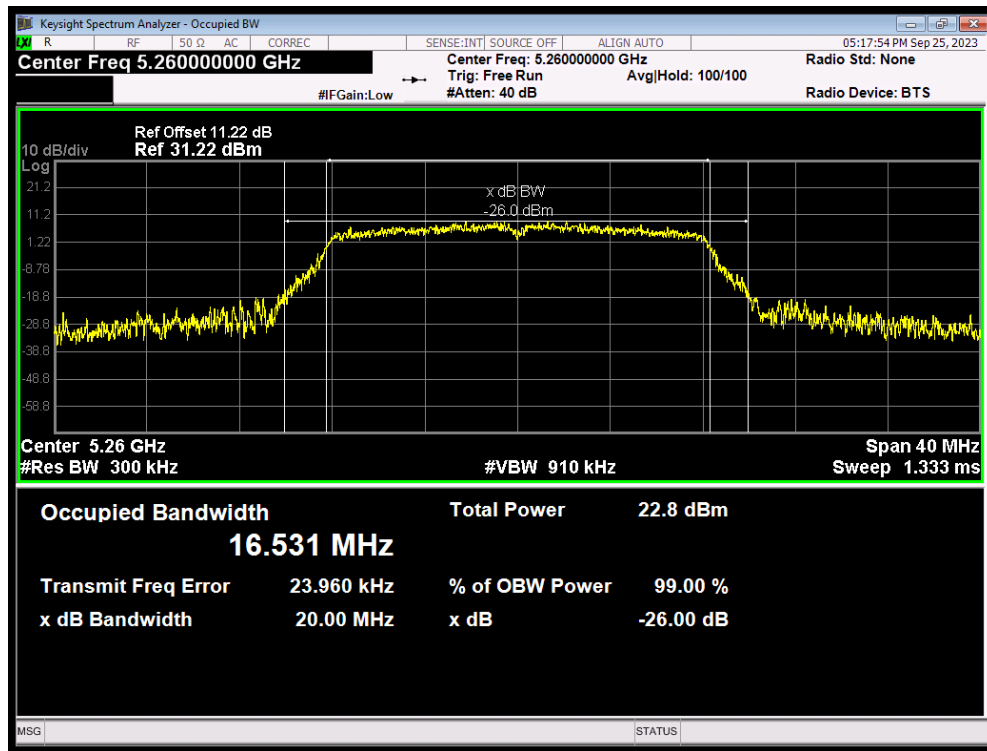
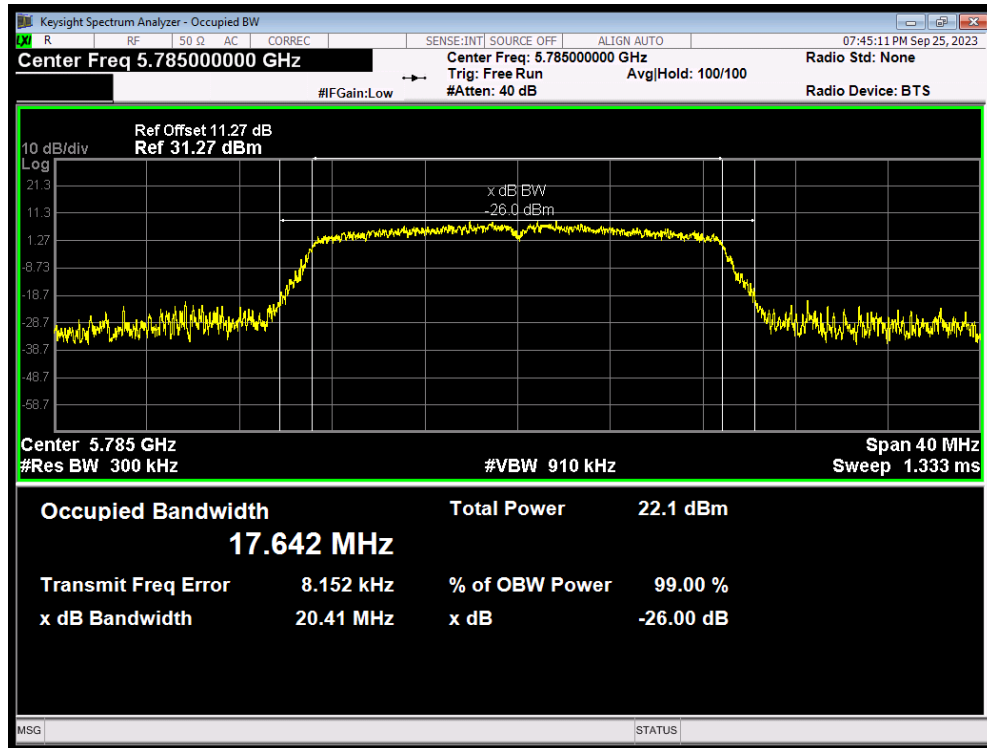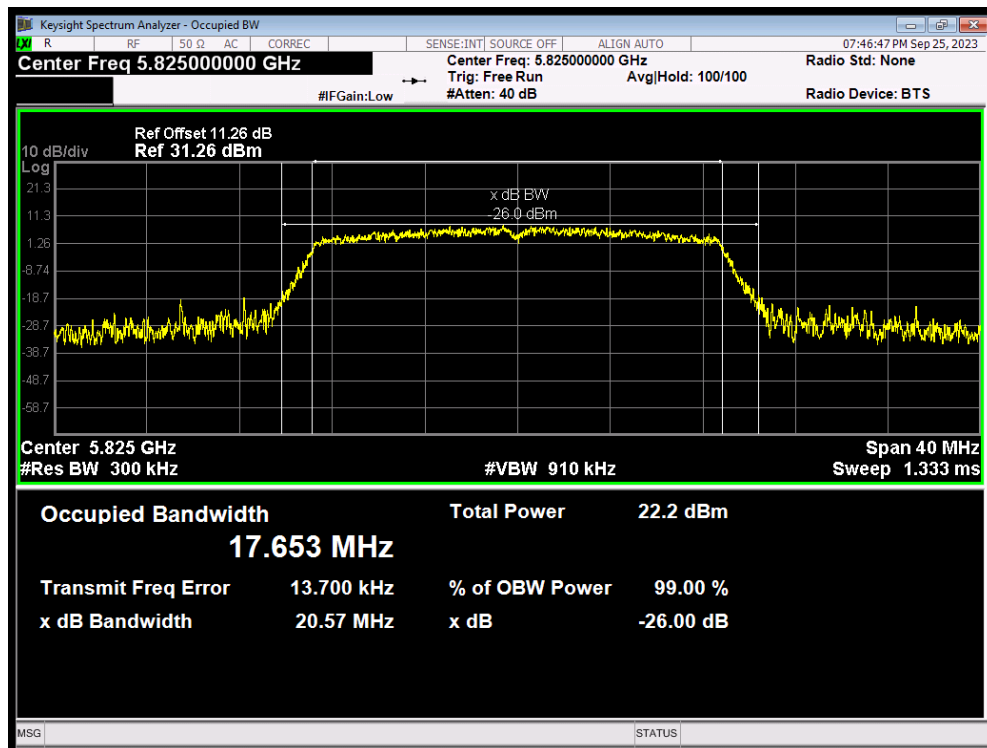OBW 802.11a 5300MHz
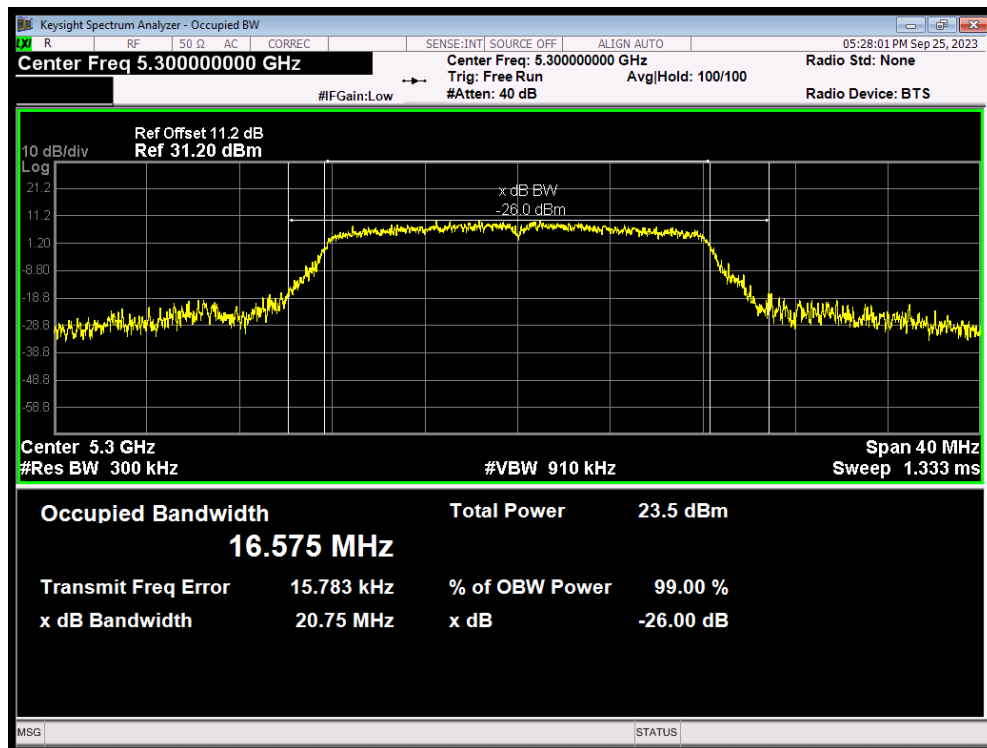
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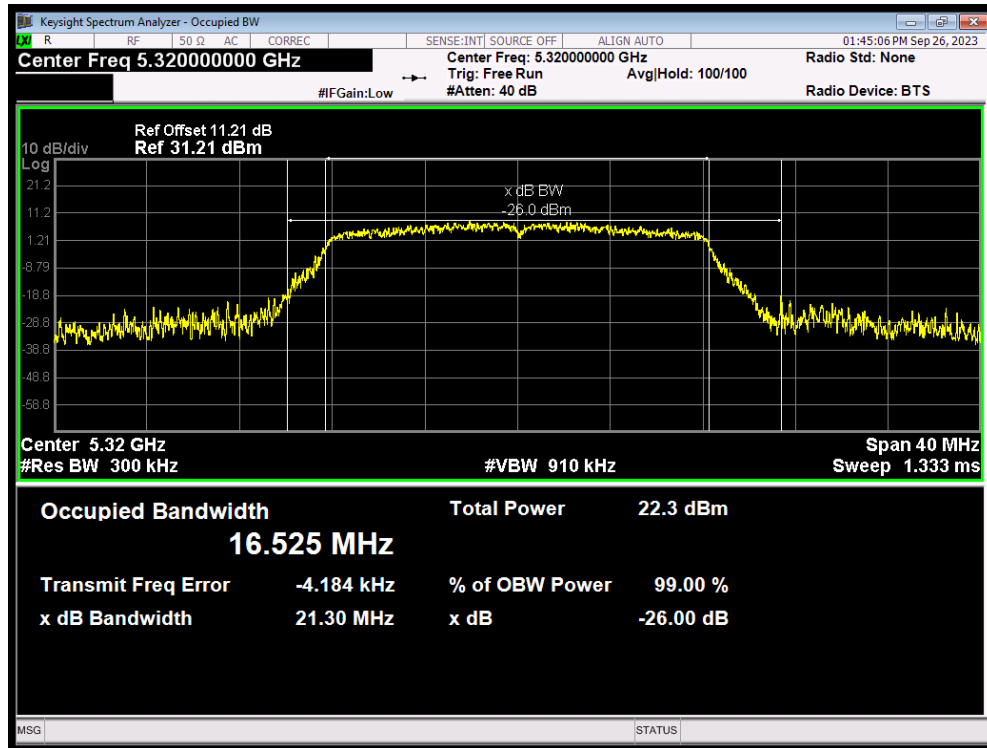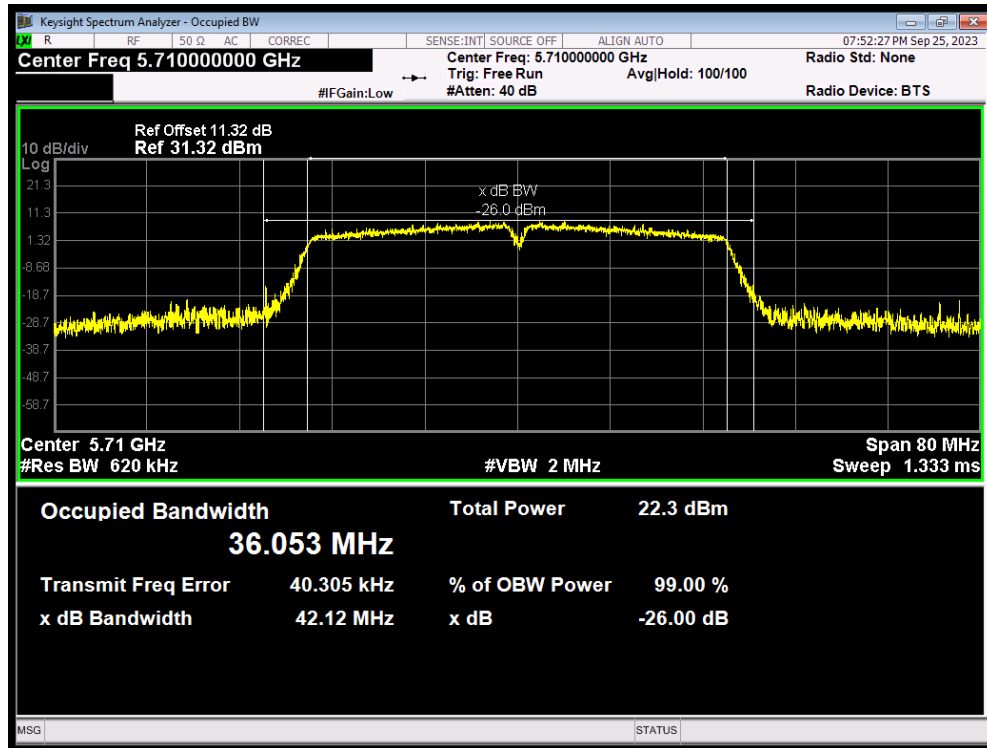

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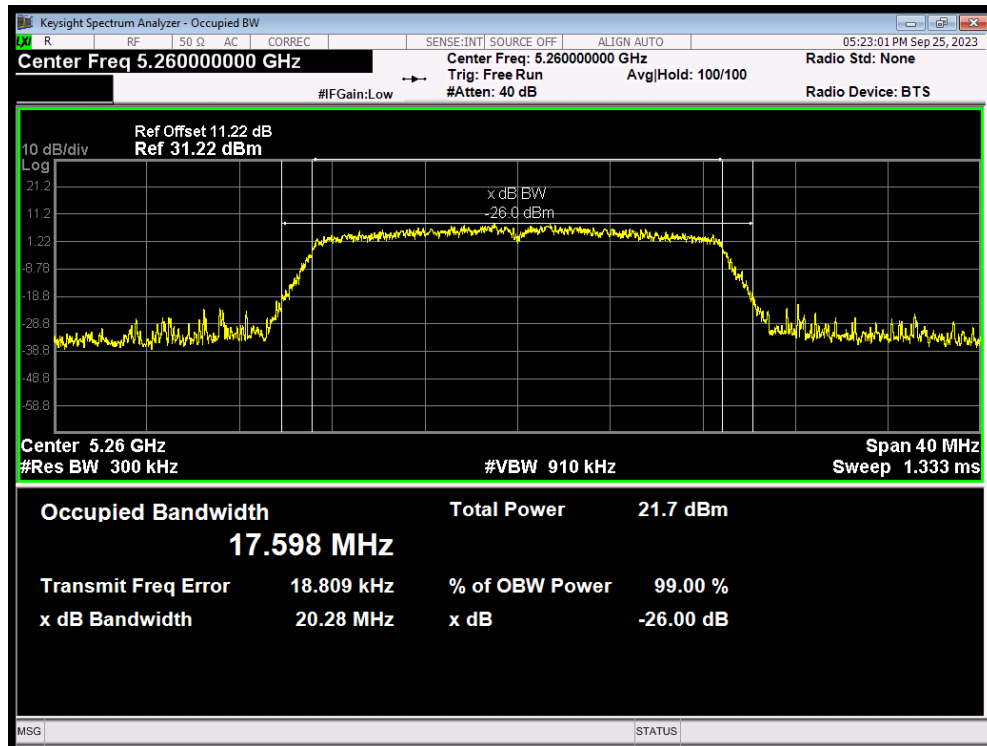
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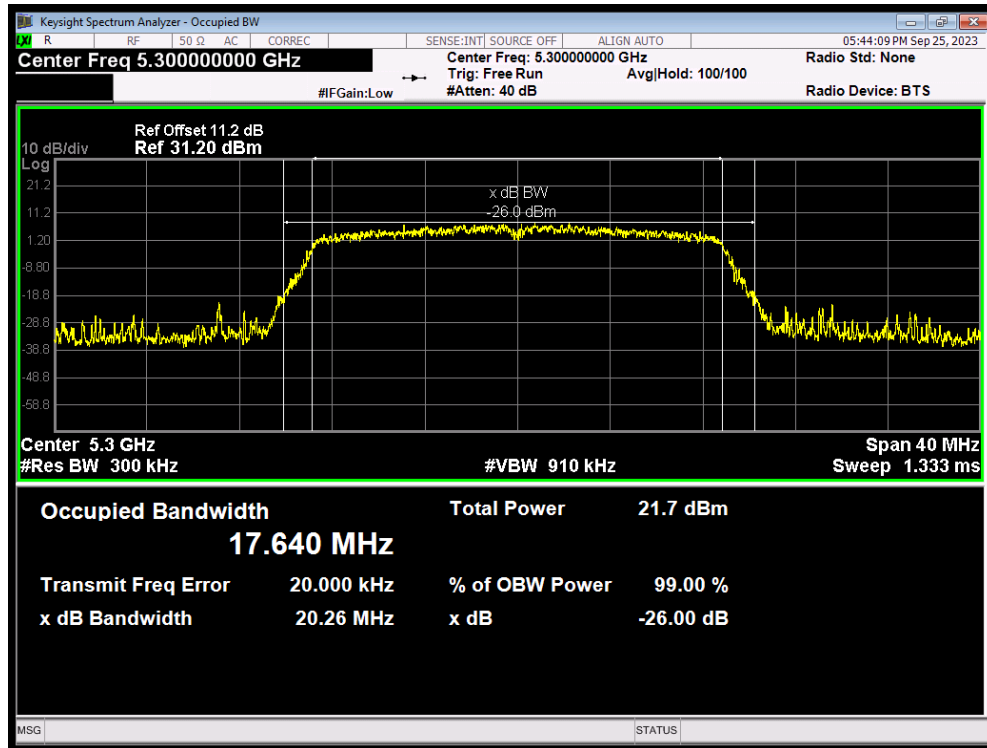
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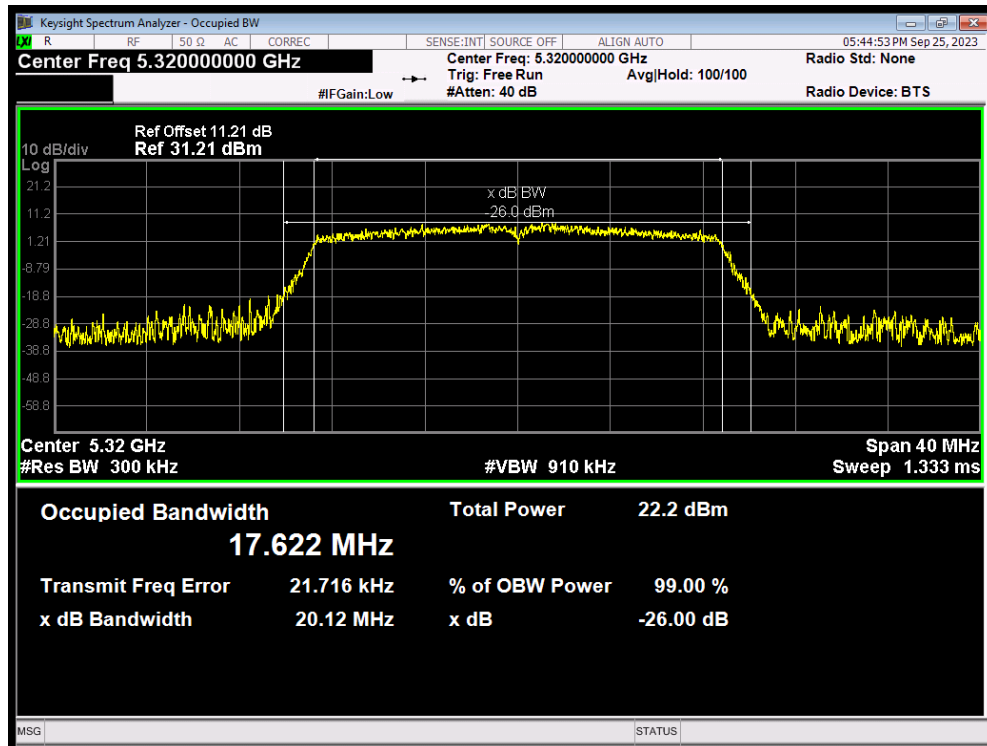
OBW 802.11ac(VHT40) 5270MHz
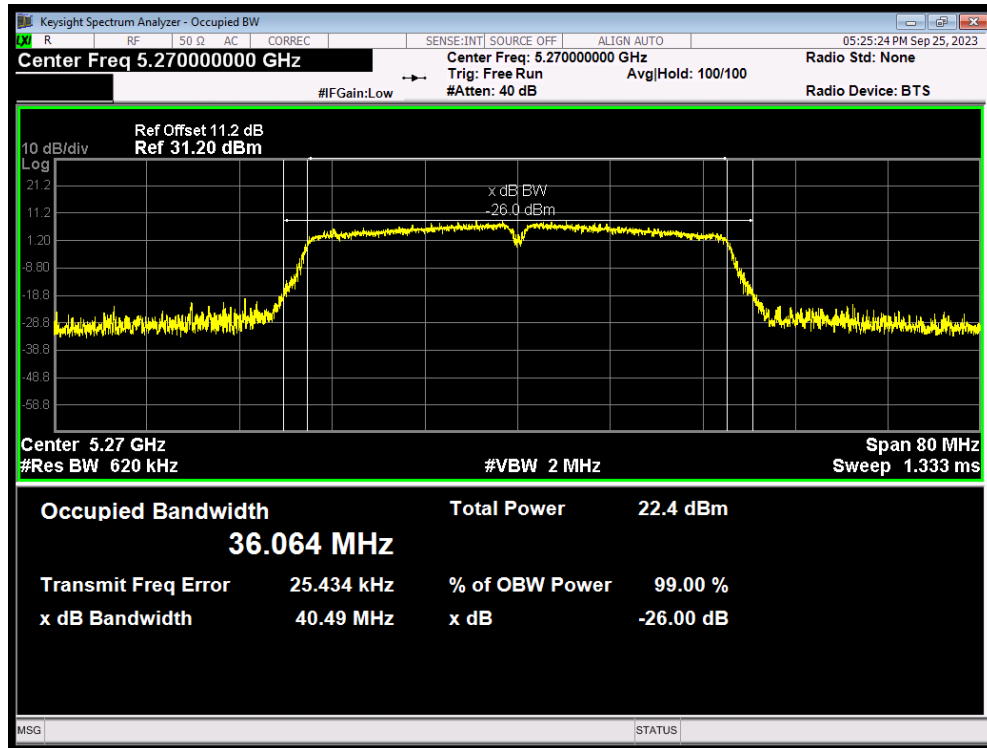
OBW 802.11ac(VHT40) 5310MHz
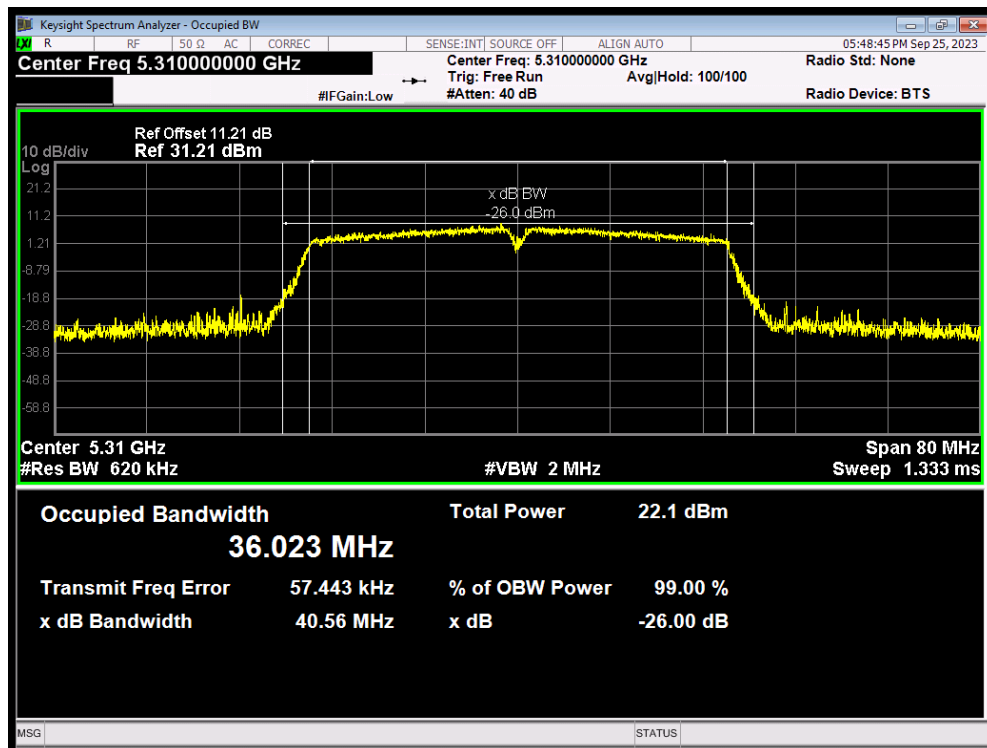
OBW 802.11ac(VHT80) 5290MHz

OBW 802.11n(HT20) 5260MHz

Eurofins TA Technology (Shanghai) Co., Ltd.　　　　**TA-MB-04-006R**　　　　**Page 27 of 241**

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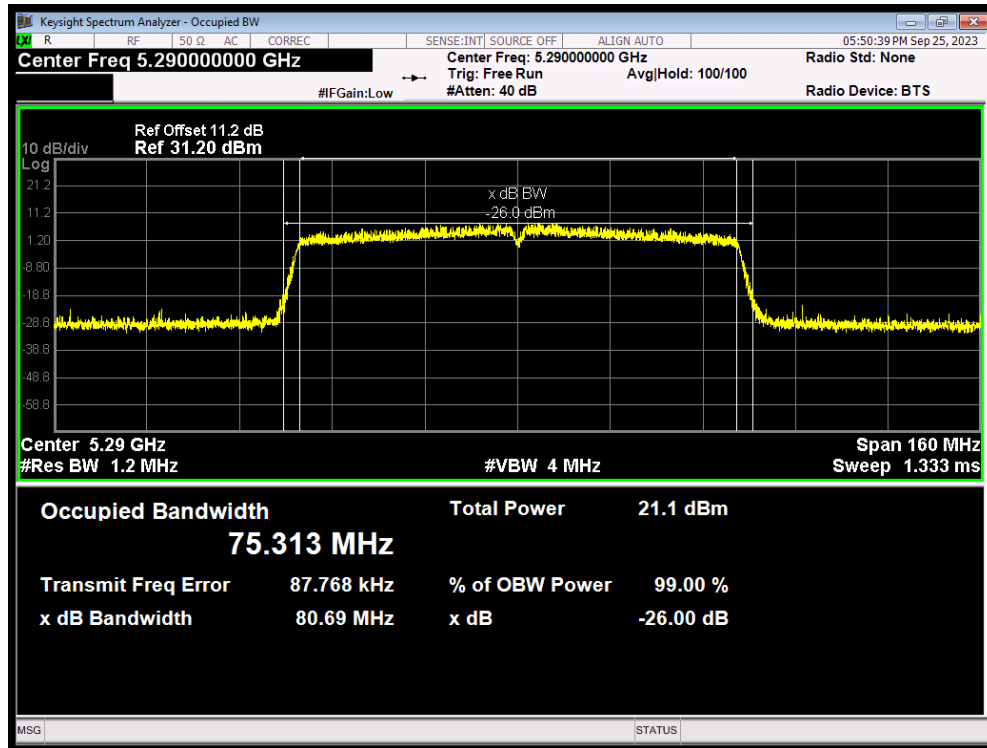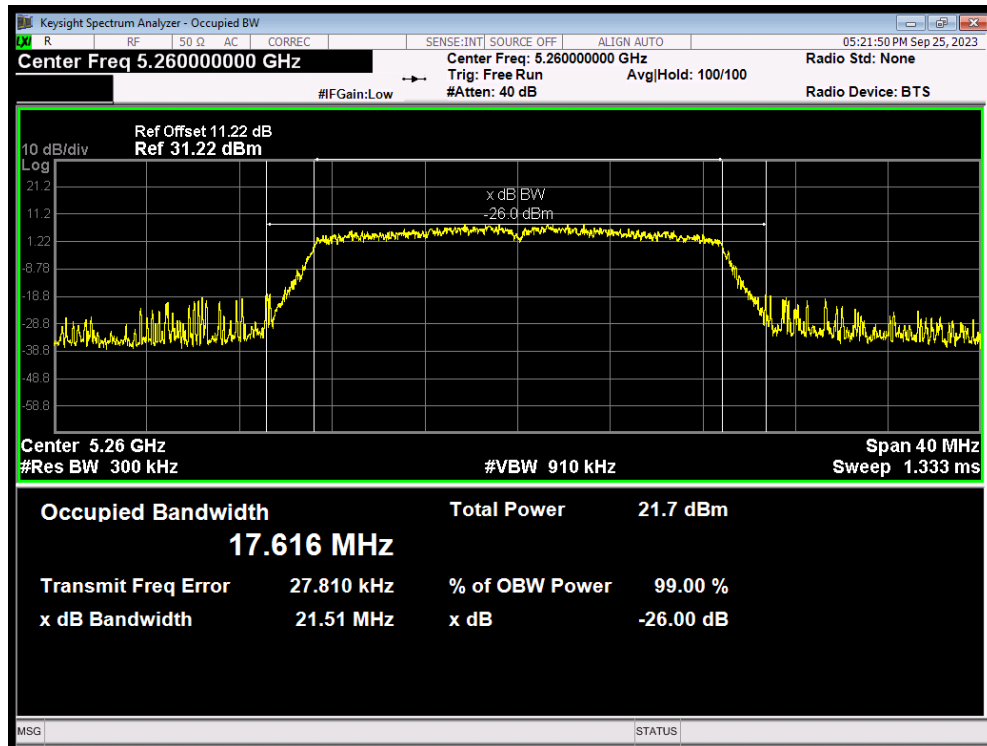
OBW 802.11n(HT20) 5300MHz
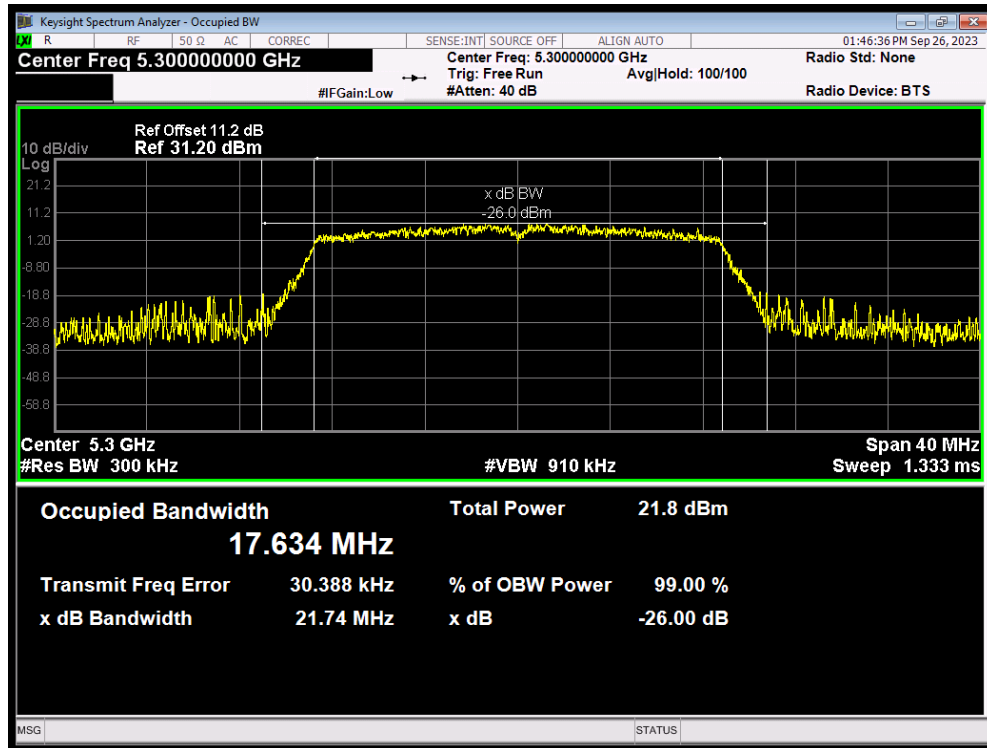
OBW 802.11n(HT20) 5320MHz
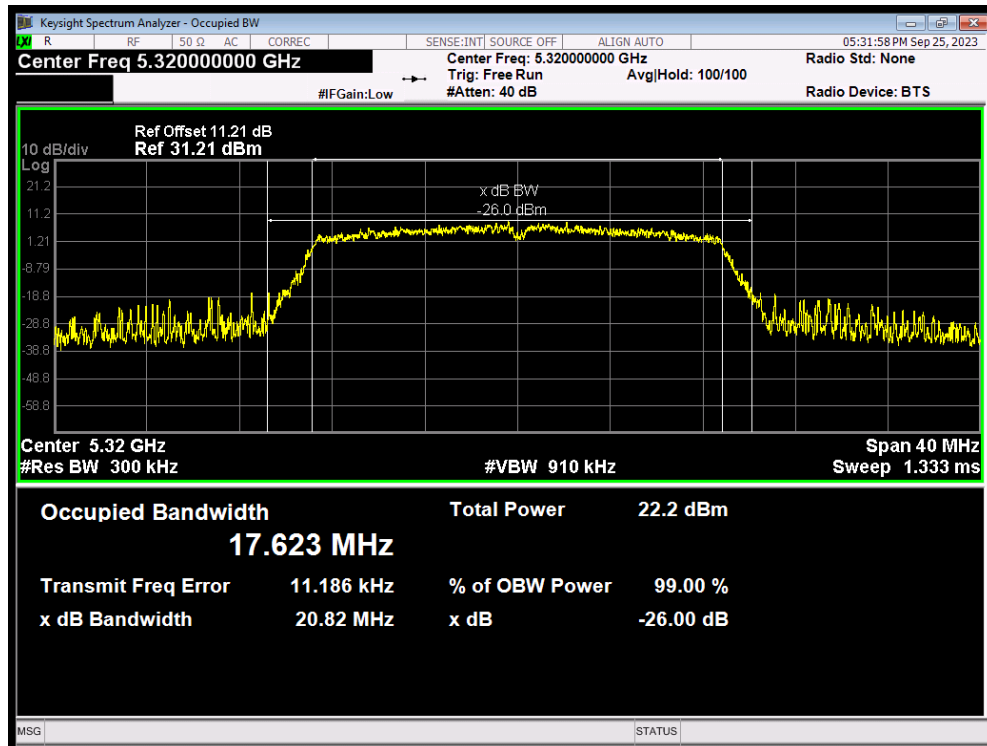
OBW 802.11n(HT40) 5270MHz
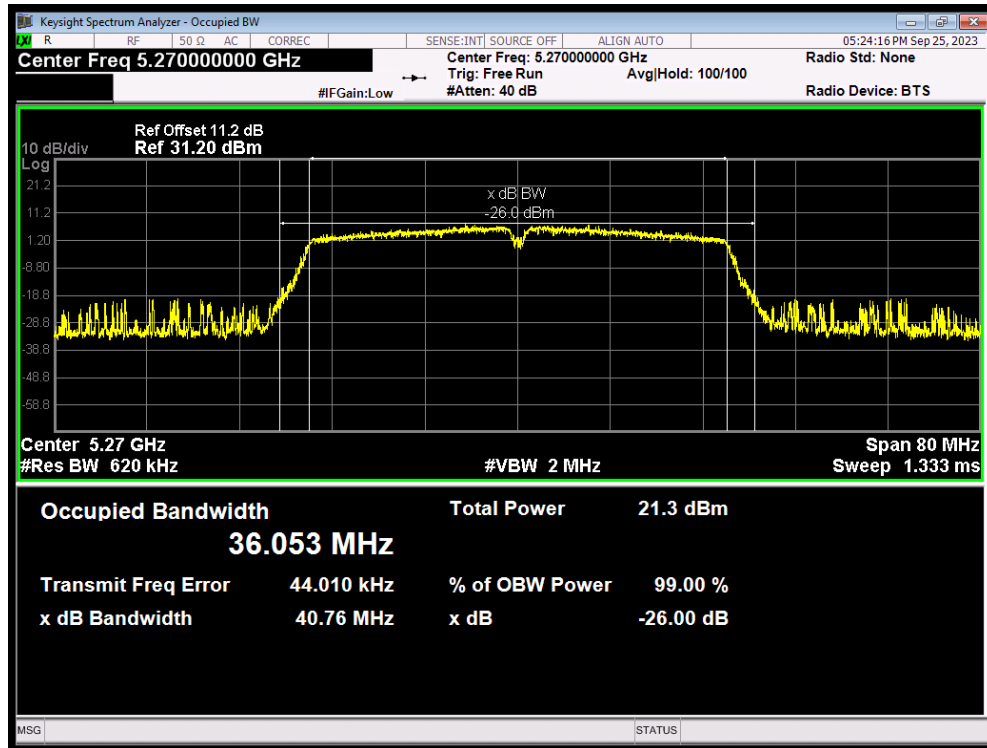
OBW 802.11n(HT40) 5310MHz
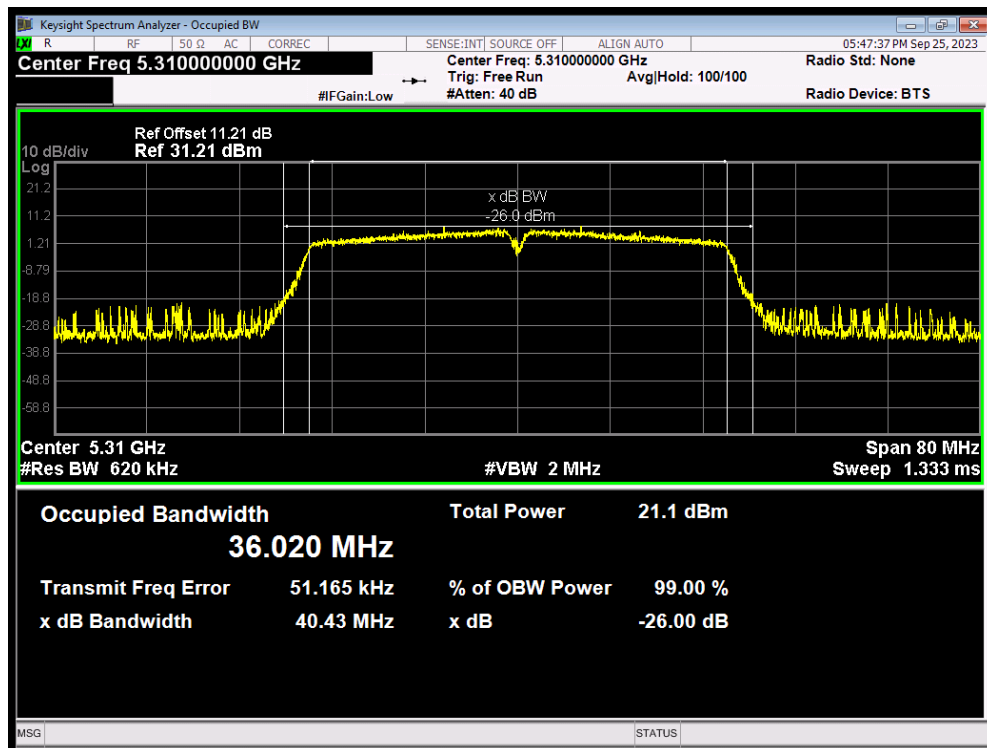
U-NII-2C

OBW 802.11a 5500MHz
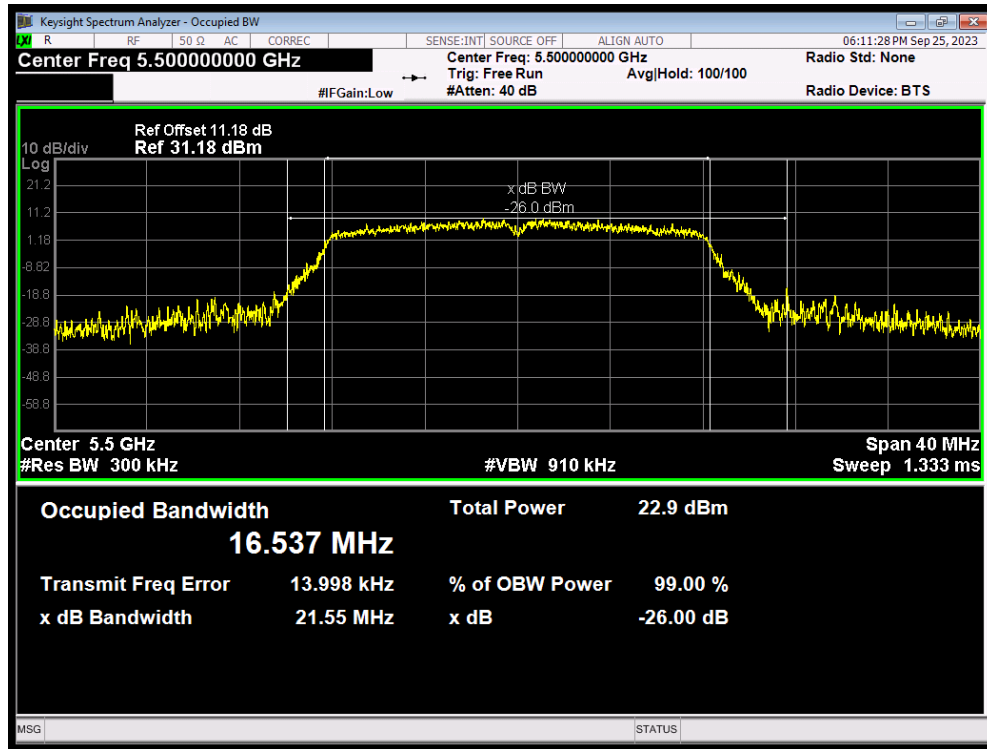
OBW 802.11a 5600MHz
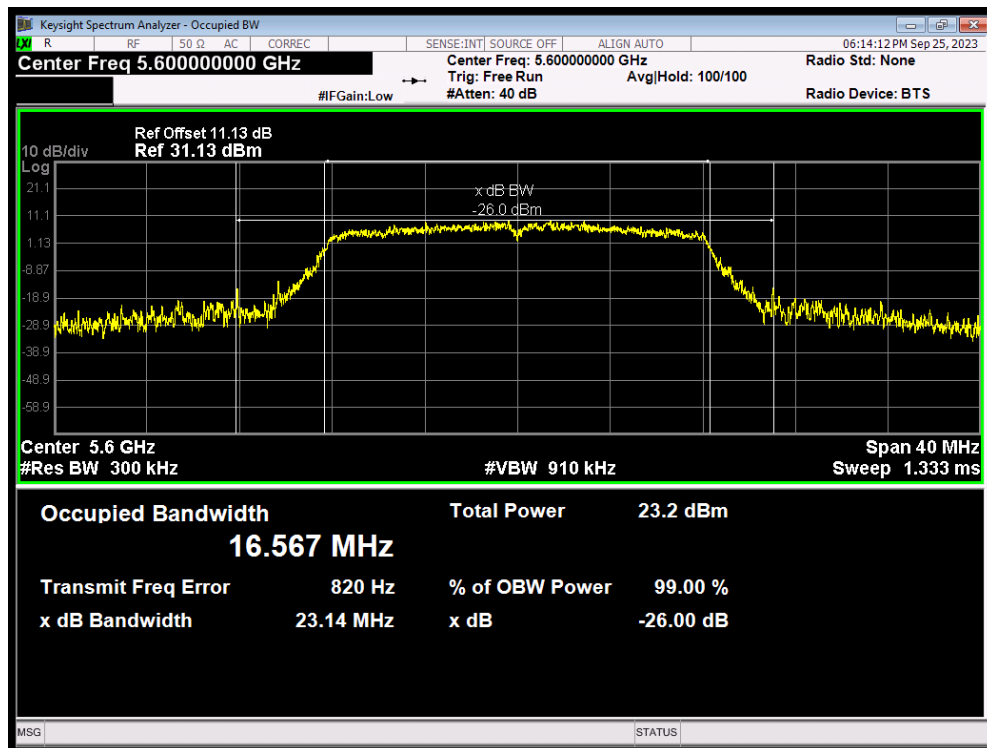
OBW 802.11a 5700MHz
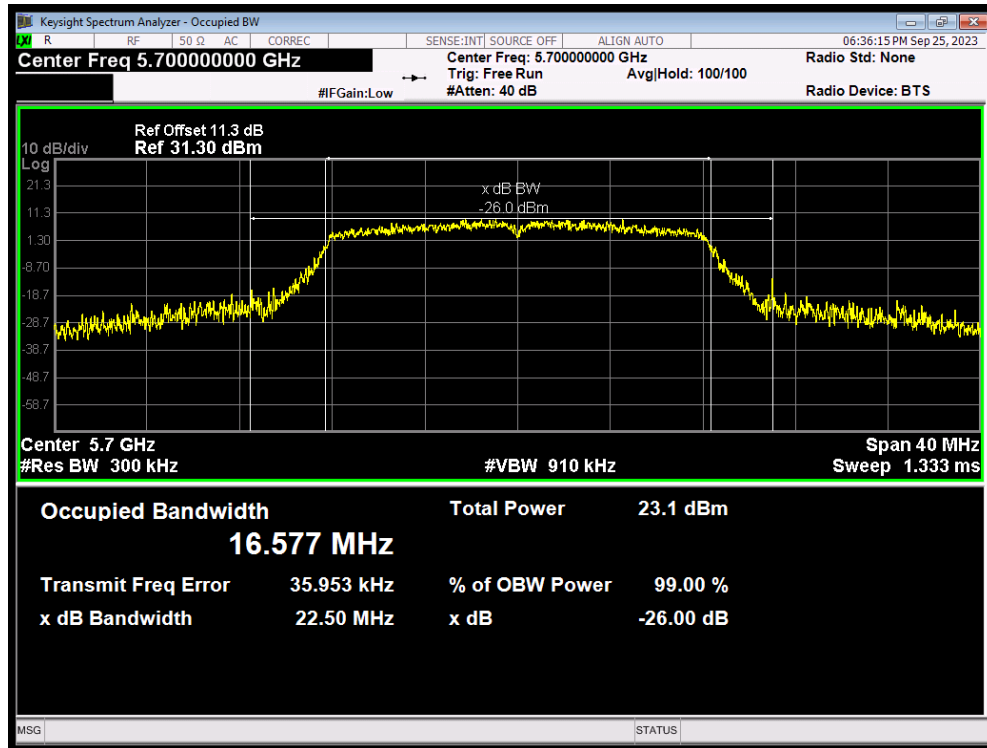
OBW 802.11a 5720MHz
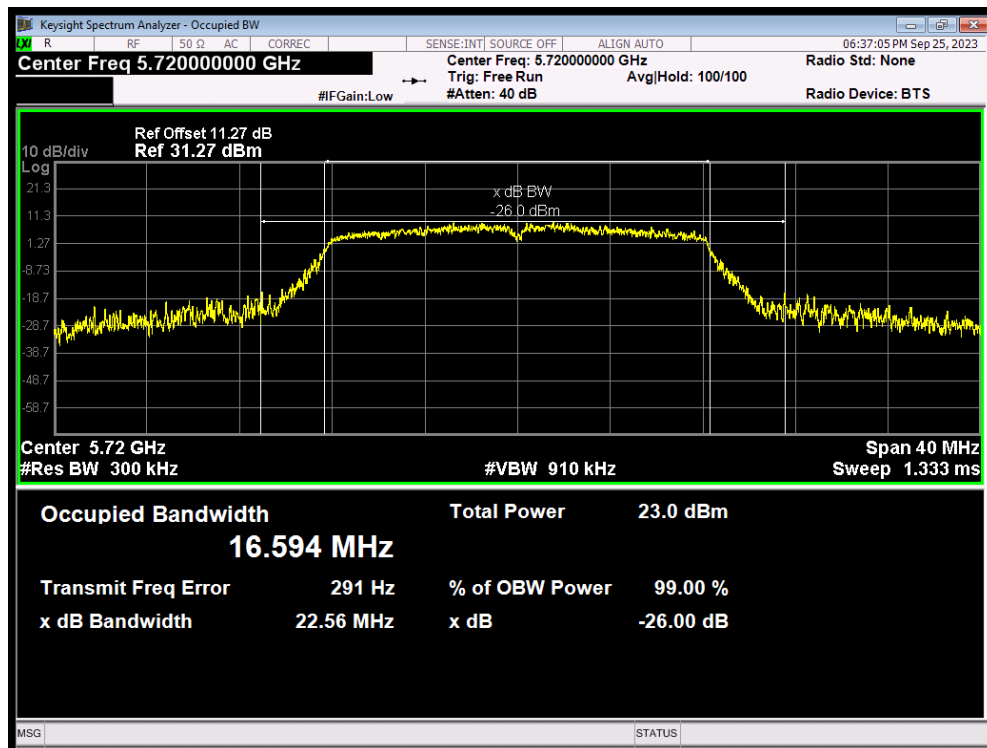
OBW 802.11ac(VHT20) 5500MHz
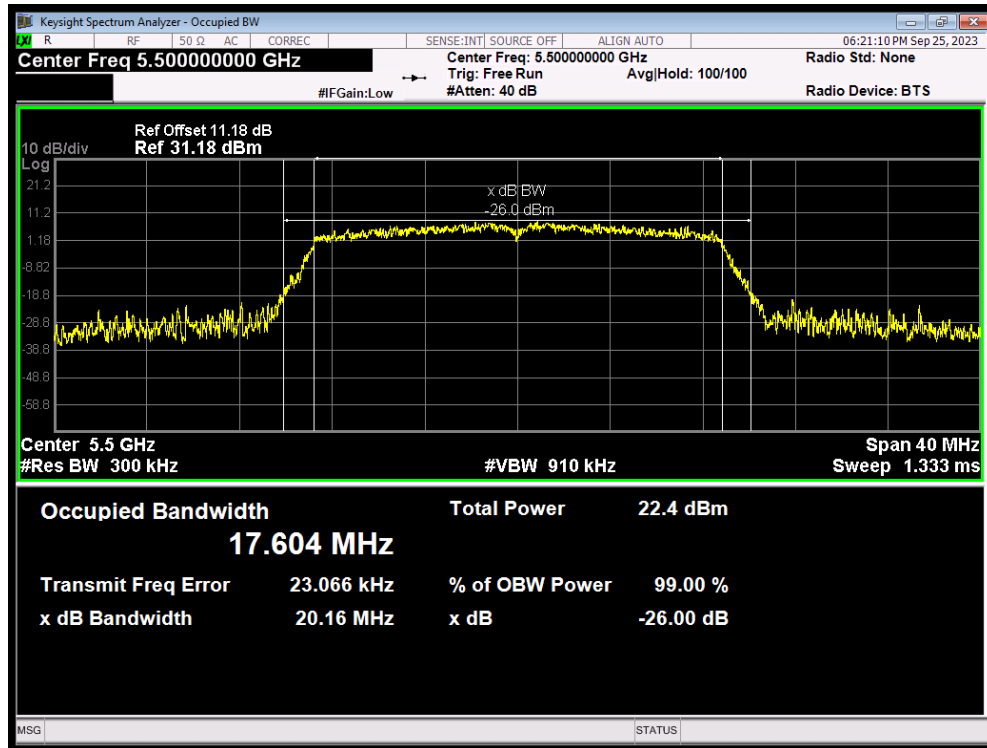
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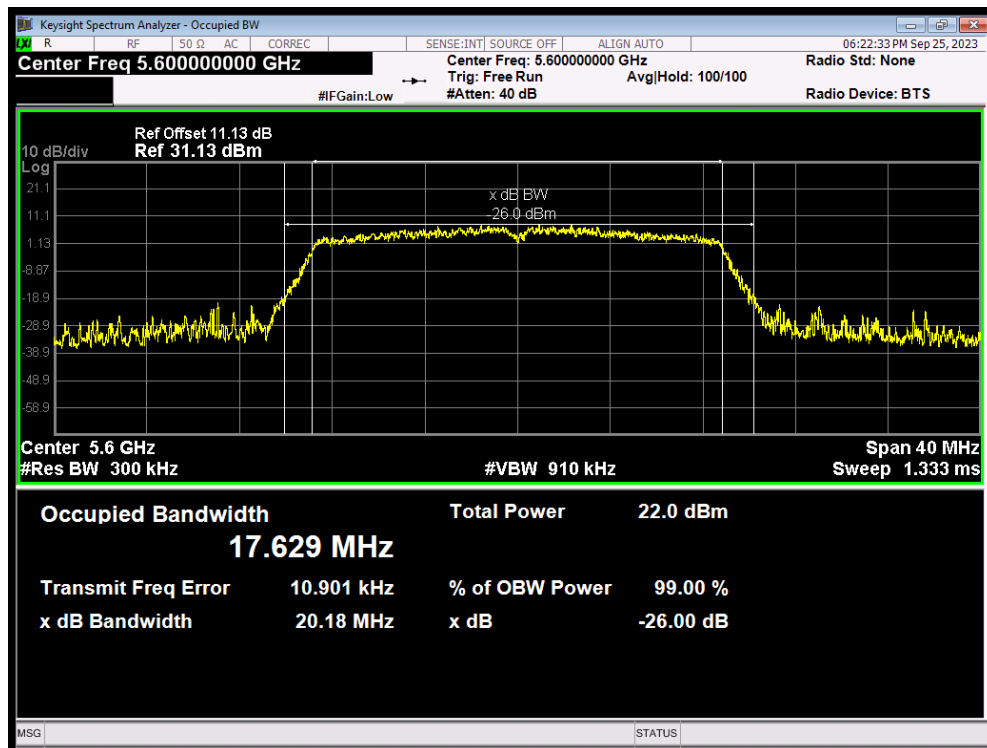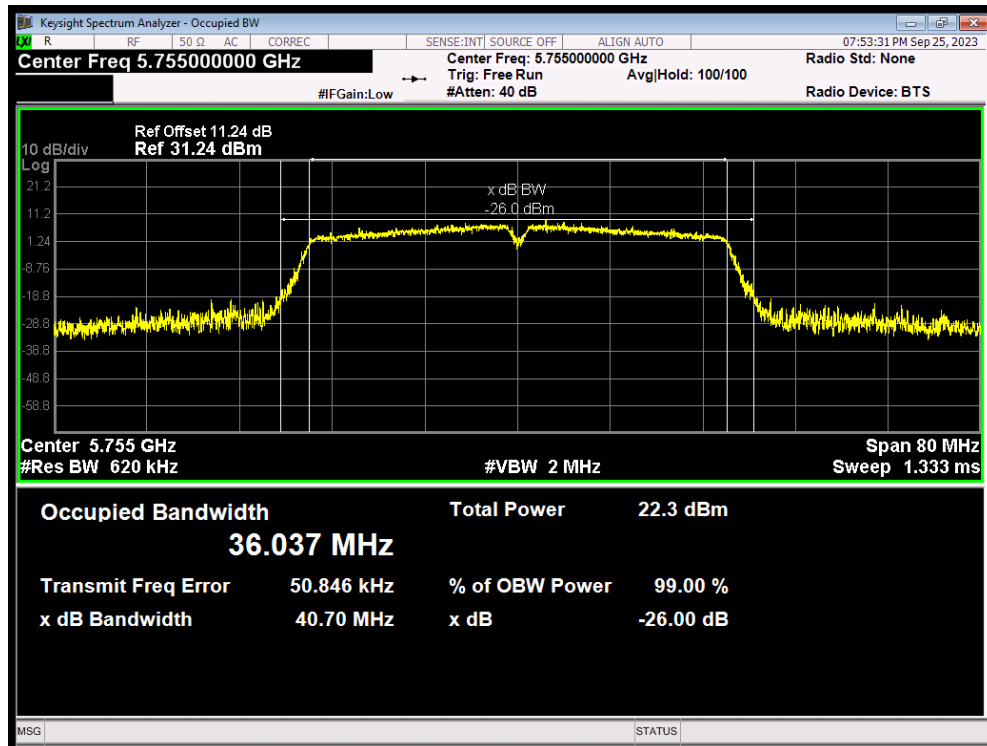
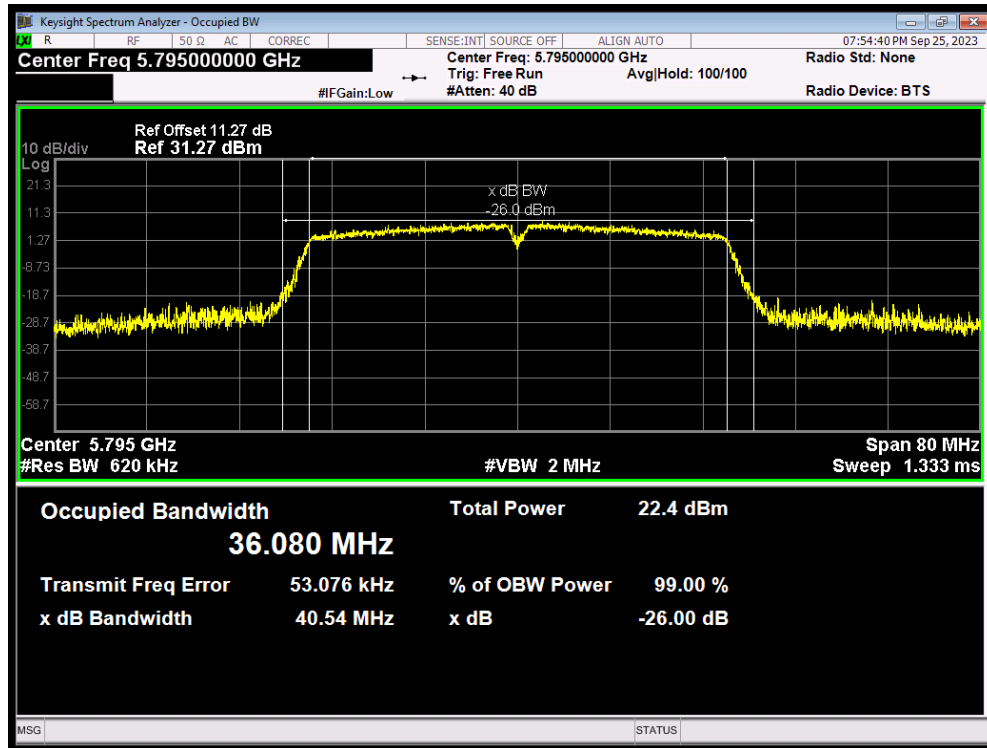OBW 802.11ac(VHT20) 5700MHz
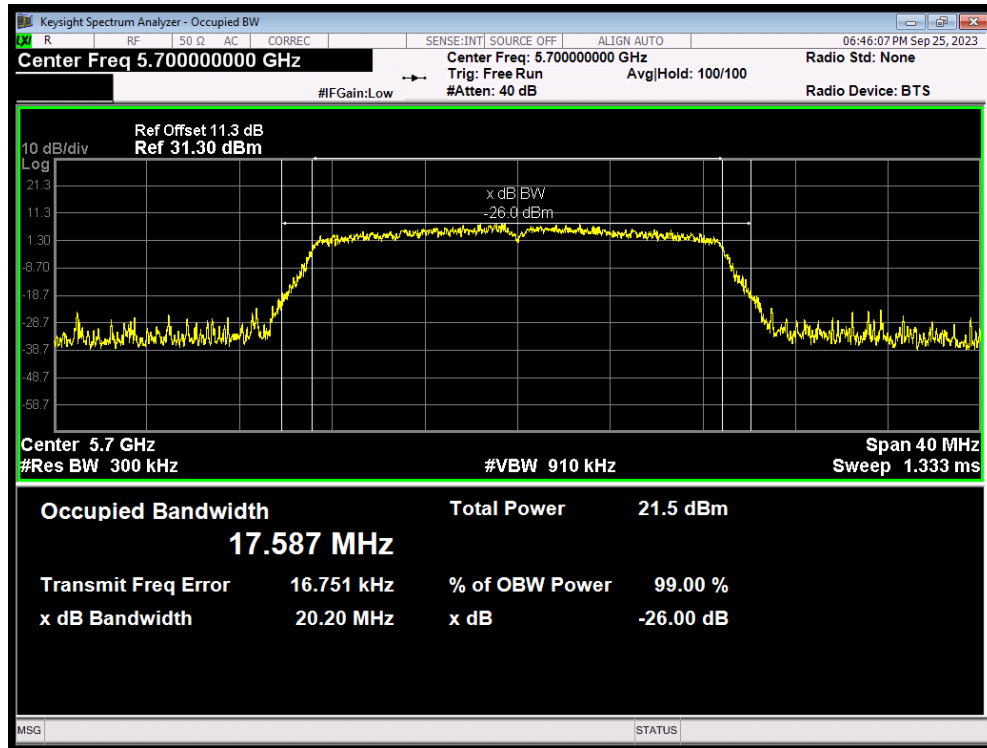
OBW 802.11ac(VHT20) 5720MHz
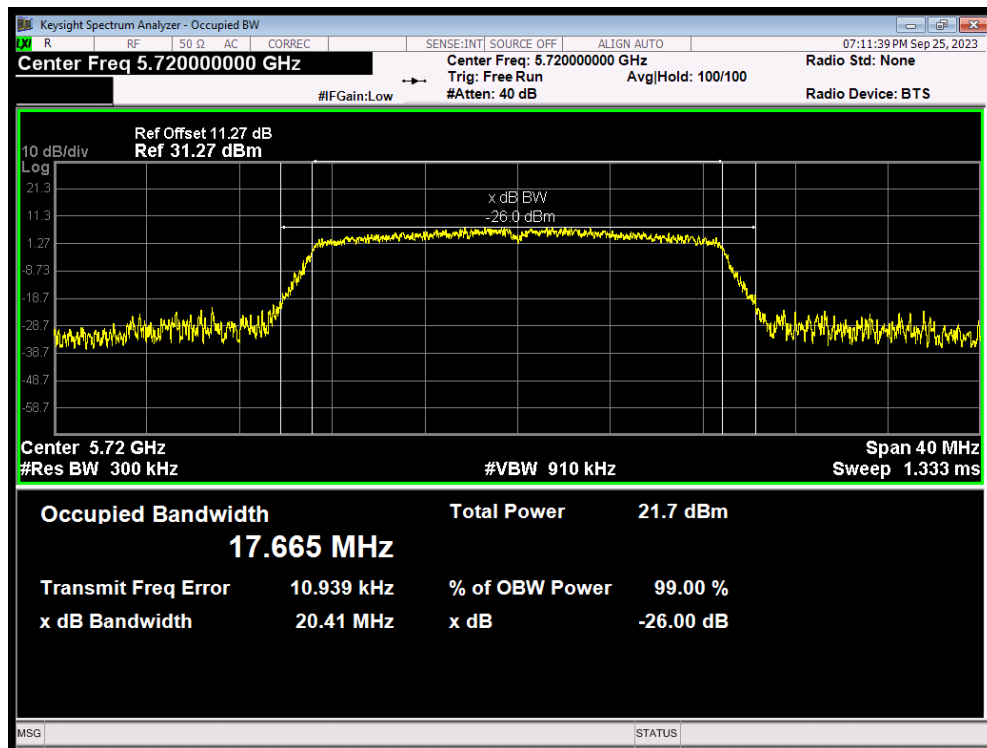
OBW 802.11ac(VHT40) 5510MHz
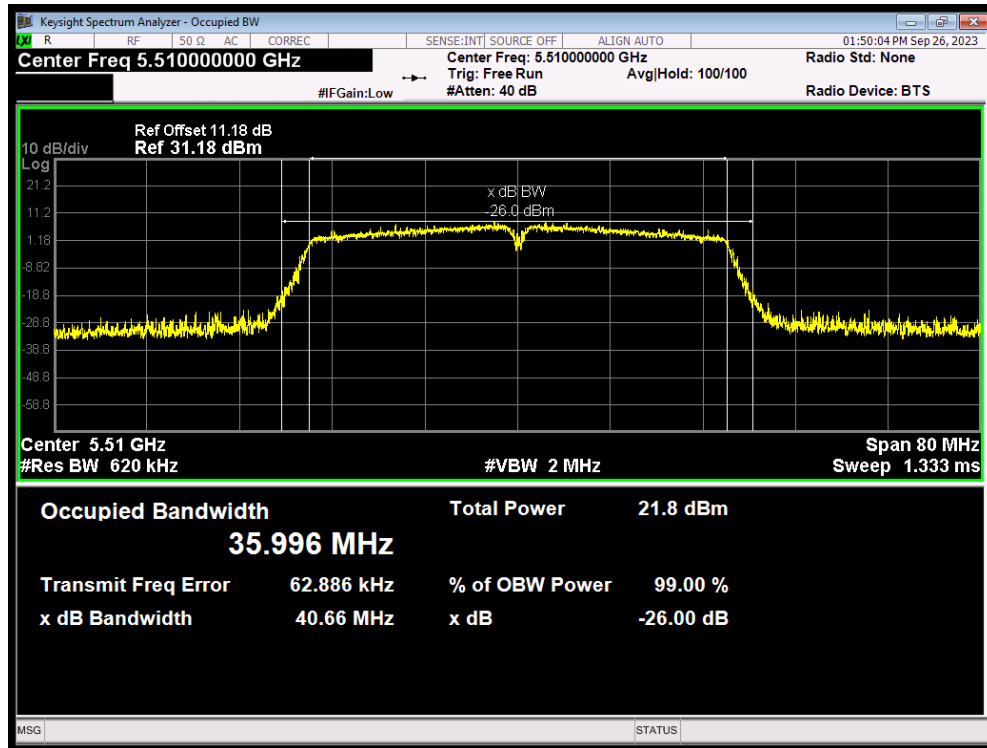
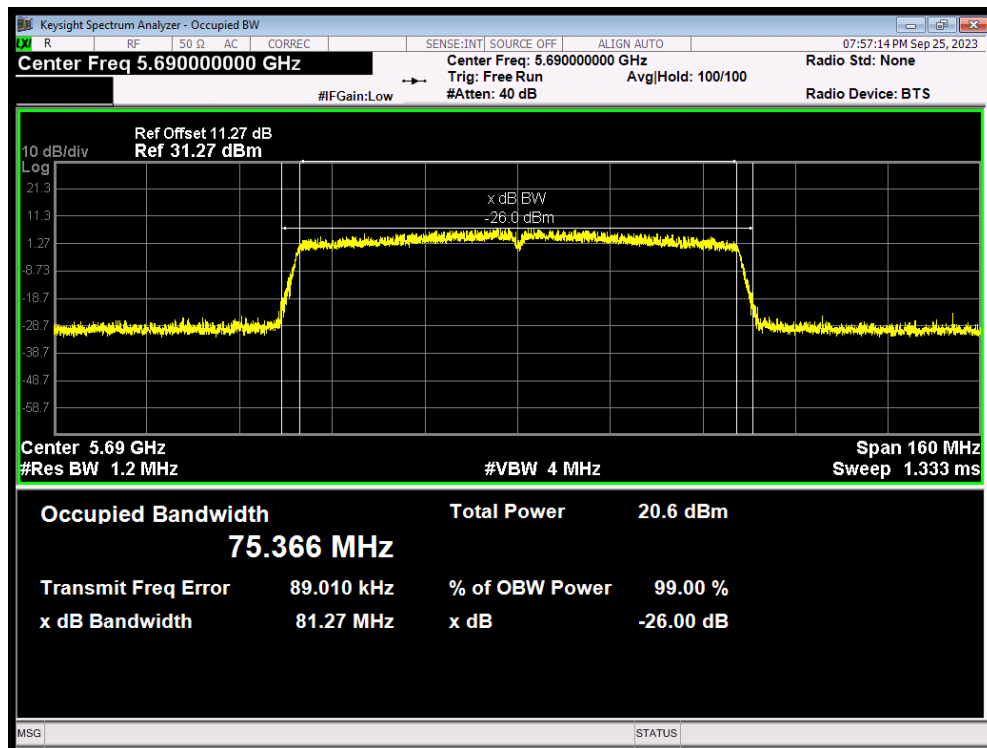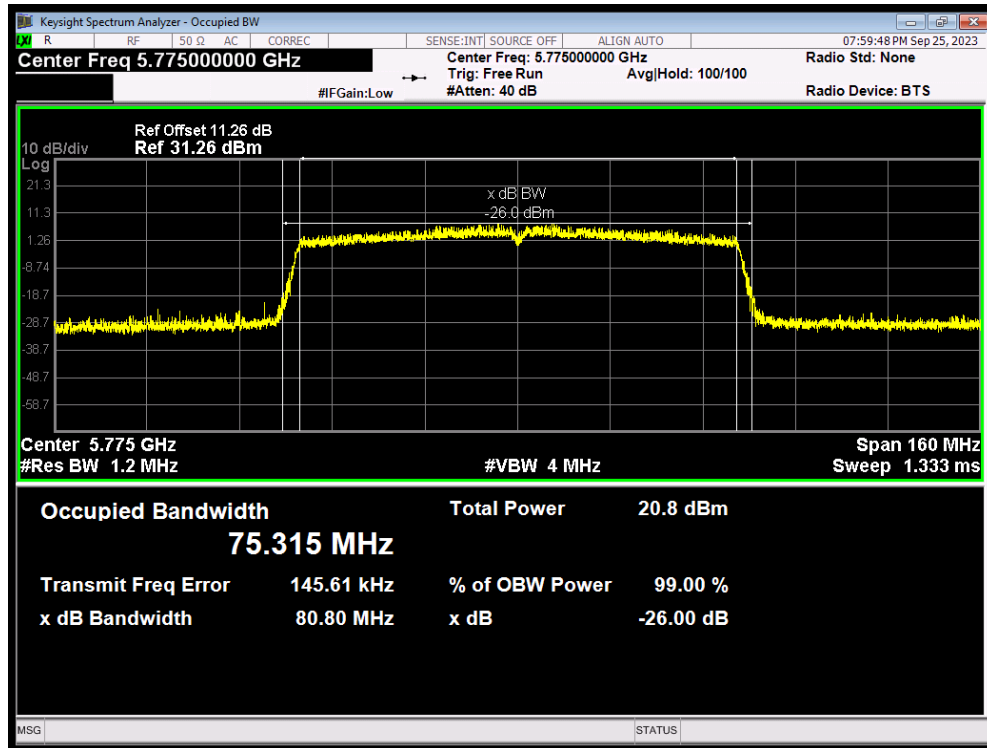OBW 802.11ac(VHT40) 5590MHz
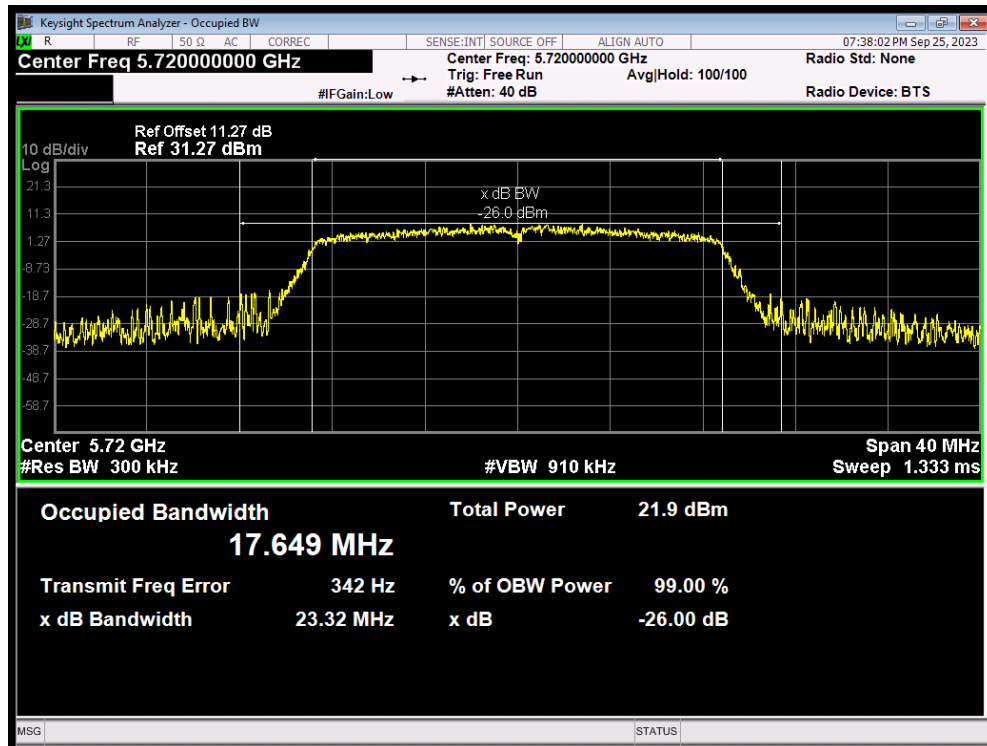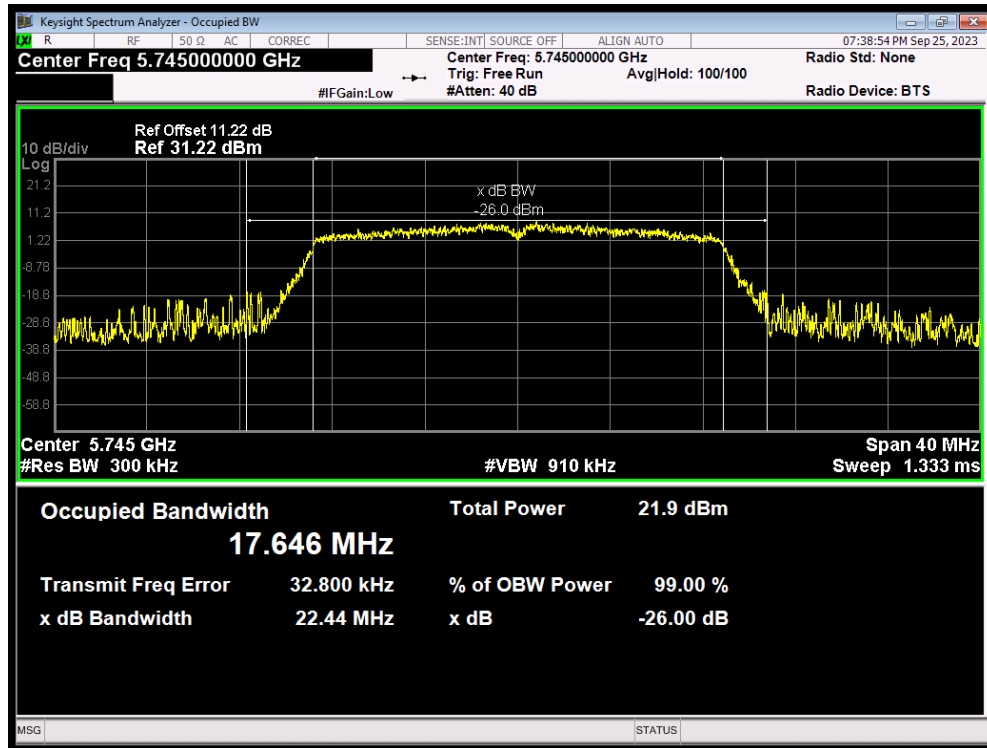
OBW 802.11ac(VHT40) 5670MHz

OBW 802.11ac(VHT40) 5710MHz

OBW 802.11ac(VHT80) 5610MHz

OBW 802.11ac(VHT80) 5690MHz
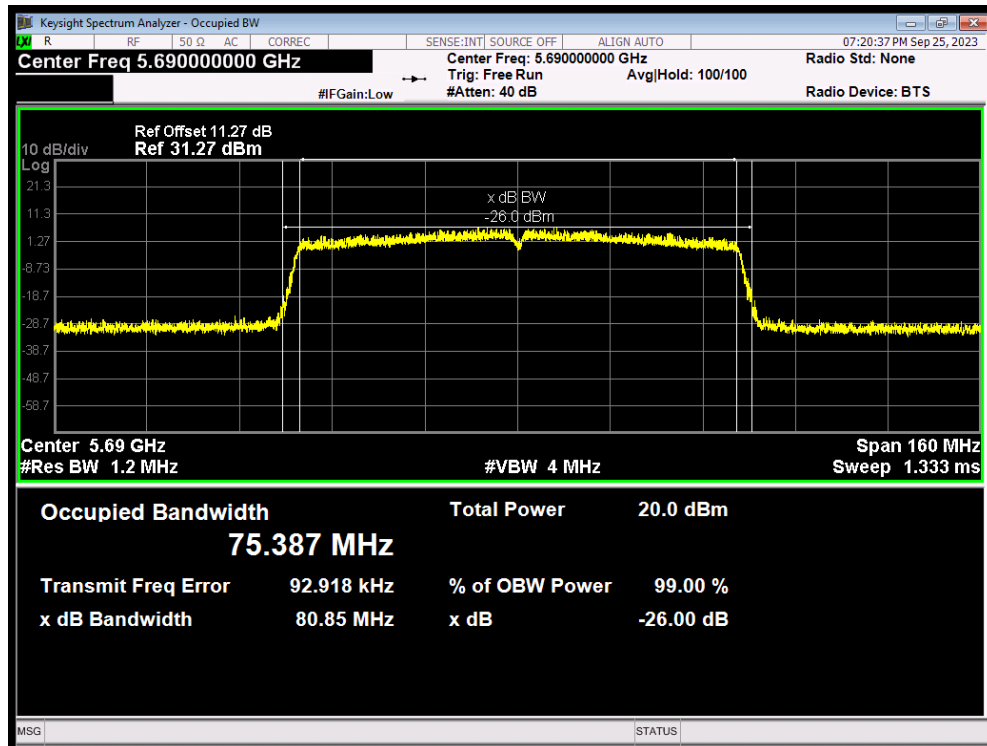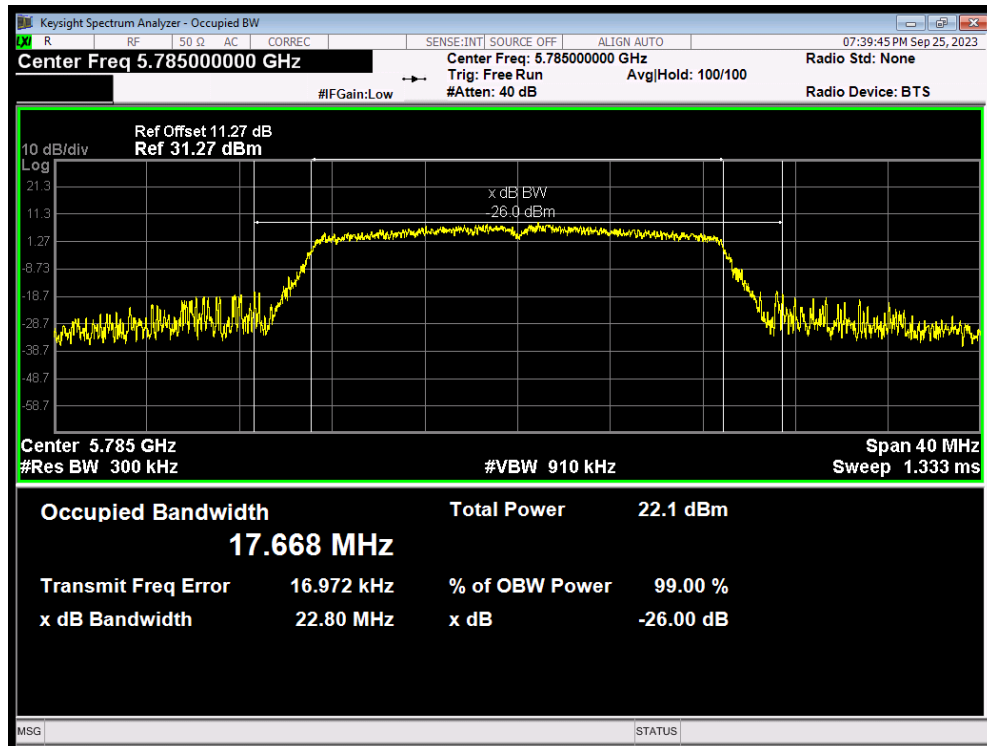
OBW 802.11n(HT20) 5500MHz
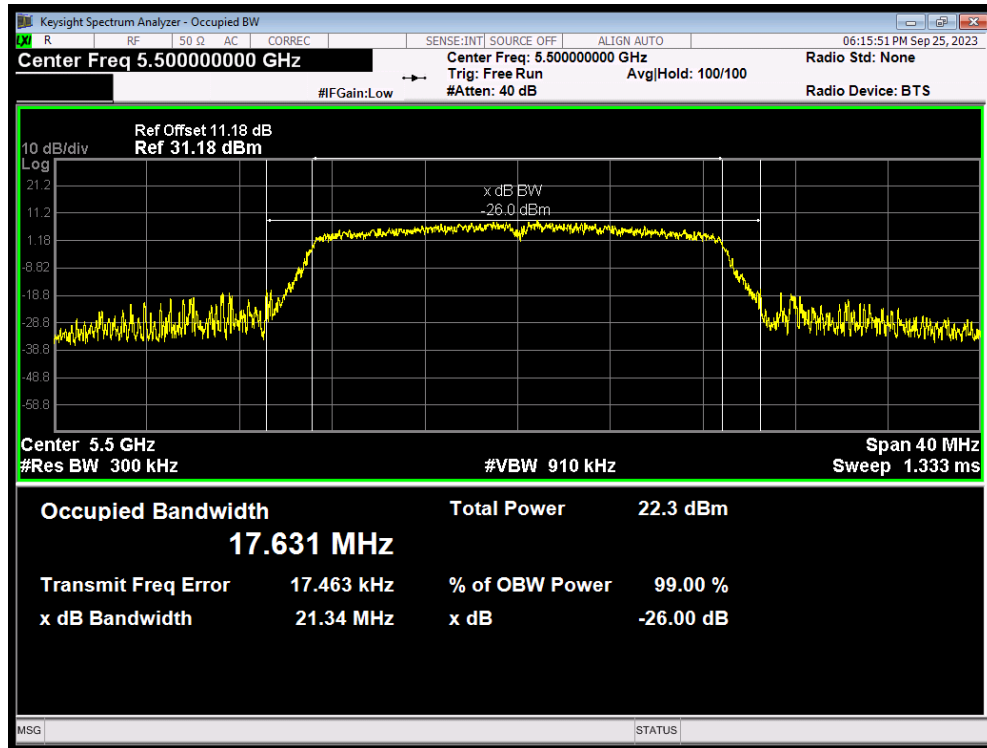
OBW 802.11n(HT20) 5600MHz
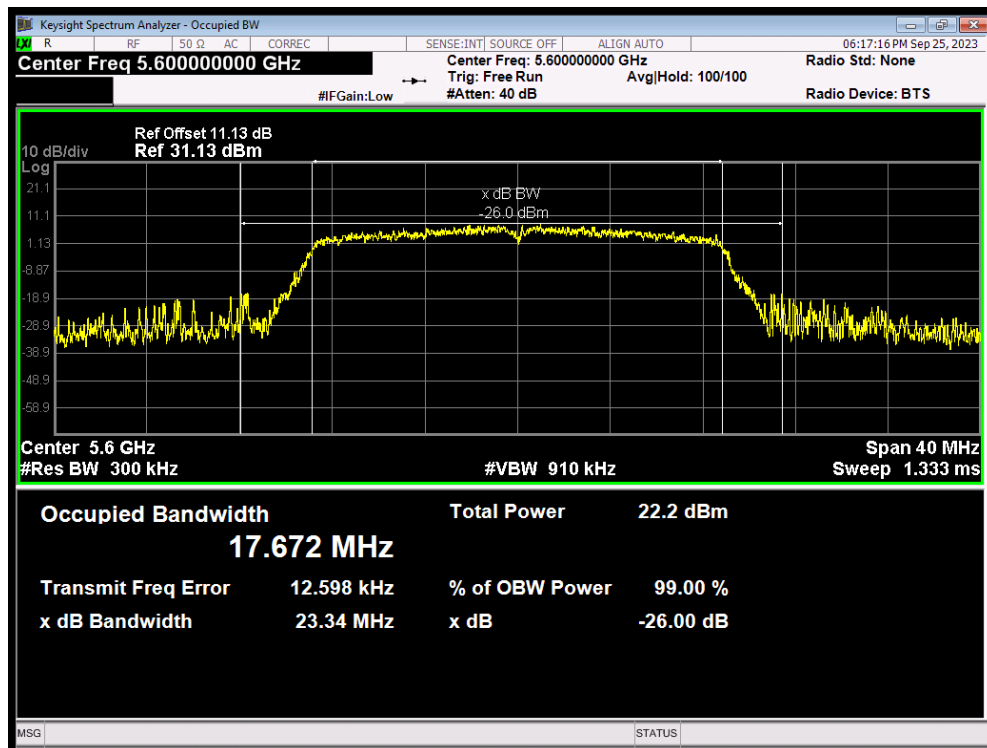
OBW 802.11n(HT20) 5700MHz

OBW 802.11n(HT20) 5720MHz

OBW 802.11n(HT40) 5510MHz

OBW 802.11n(HT40) 5590MHz

OBW 802.11n(HT40) 5670MHz

OBW 802.11n(HT40) 5710MHz

U-NII-3

OBW 802.11a 5720MHz

OBW 802.11a 5745MHz

Eurofins TA Technology (Shanghai) Co., Ltd.   **TA-MB-04-006R**   **Page 41 of 241**

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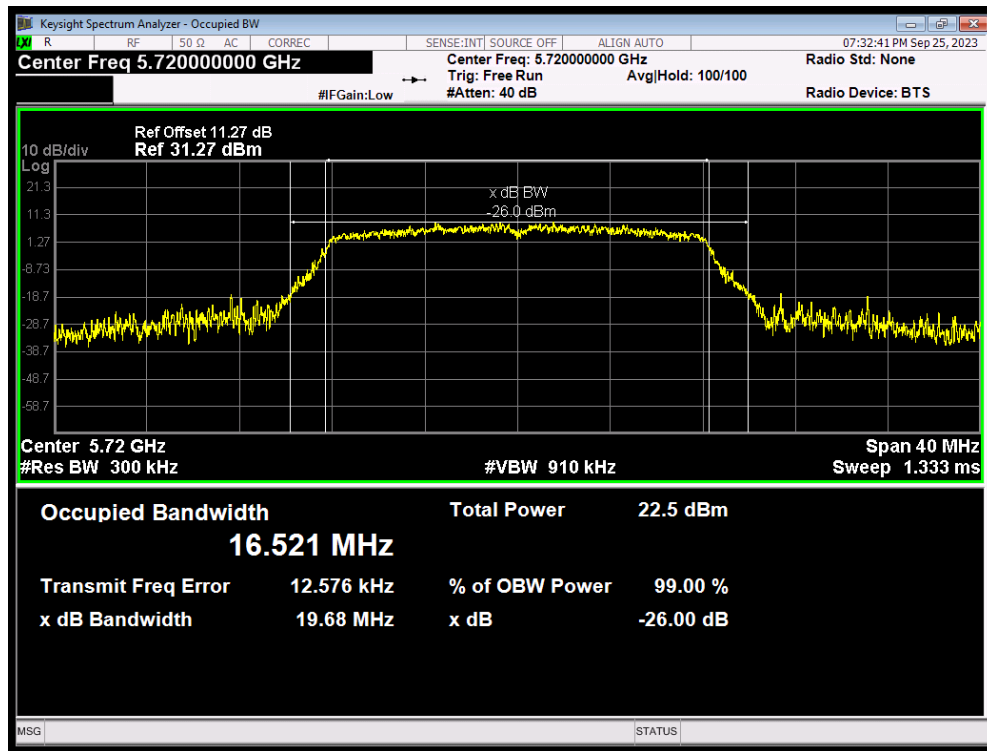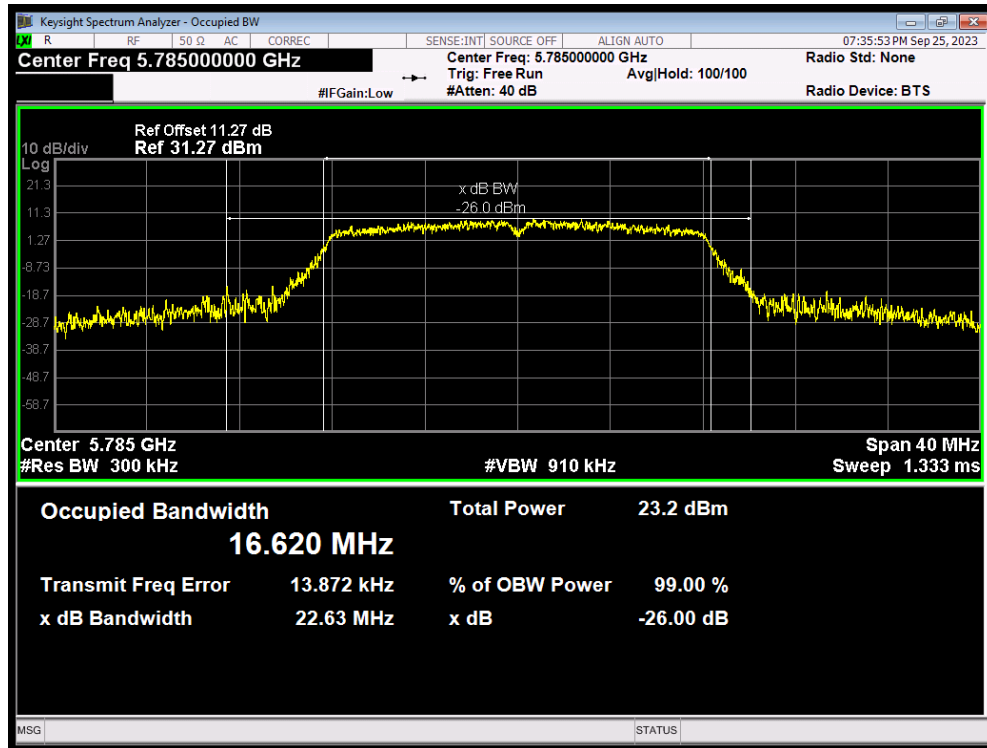
OBW 802.11a 5785MHz

OBW 802.11a 5825MHz

OBW 802.11ac(VHT20) 5720MHz

OBW 802.11ac(VHT20) 5745MHz

OBW 802.11ac(VHT20) 5785MHz

OBW 802.11ac(VHT20) 5825MHz

OBW 802.11ac(VHT40) 5710MHz

OBW 802.11ac(VHT40) 5755MHz

OBW 802.11ac(VHT40) 5795MHz

OBW 802.11ac(VHT80) 5690MHz

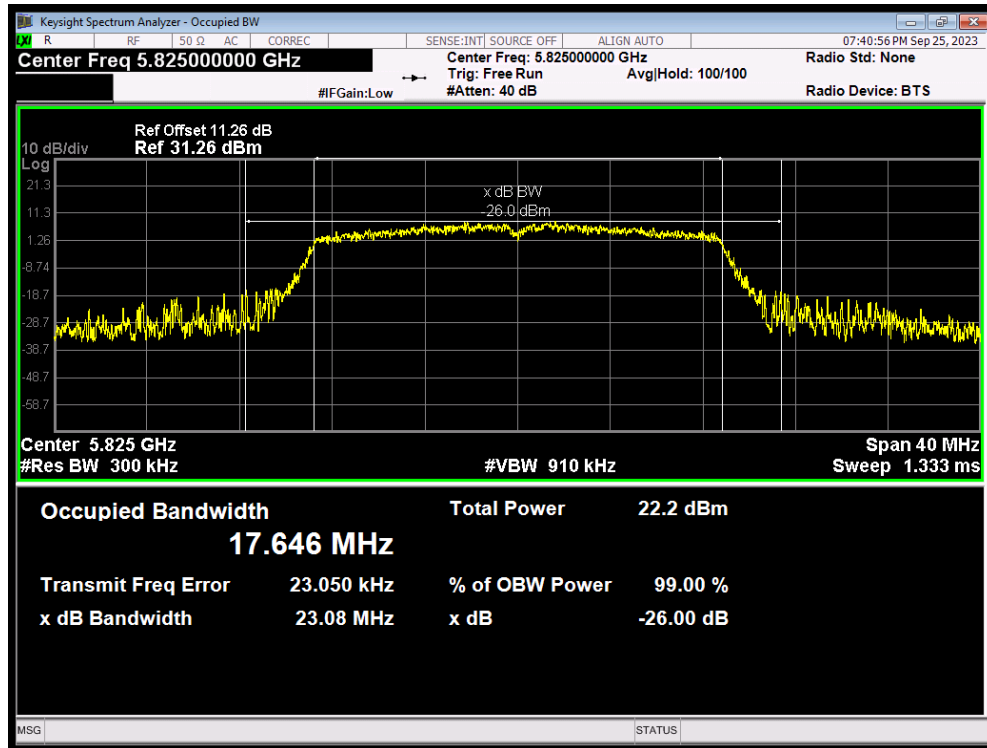OBW 802.11ac(VHT80) 5775MHz

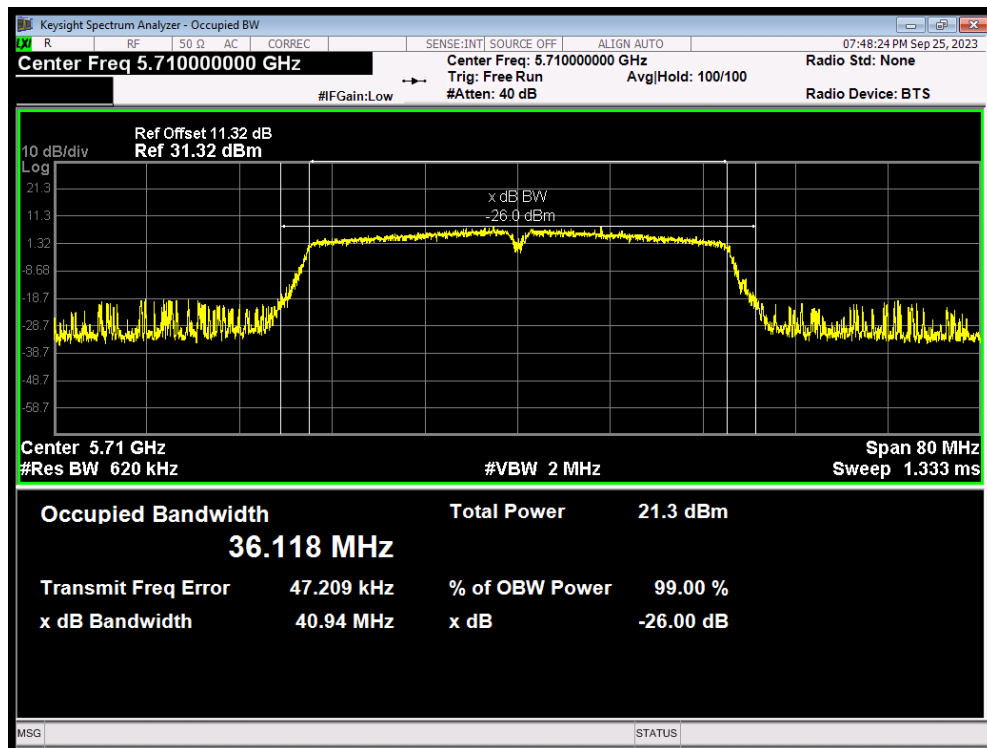OBW 802.11n(HT20) 5720MHz

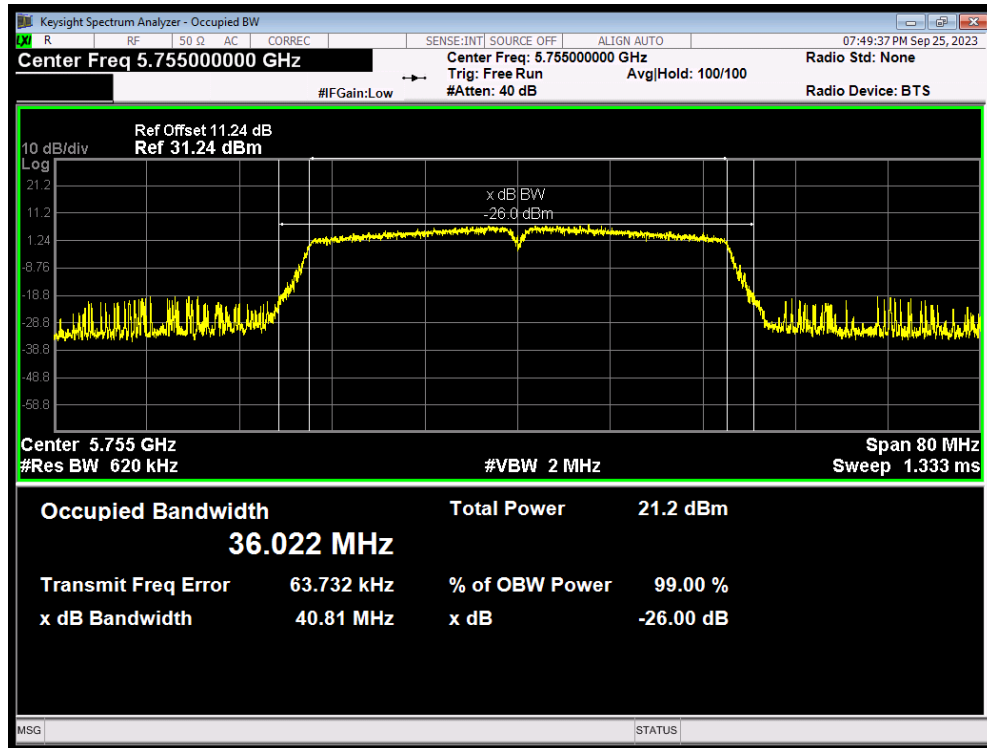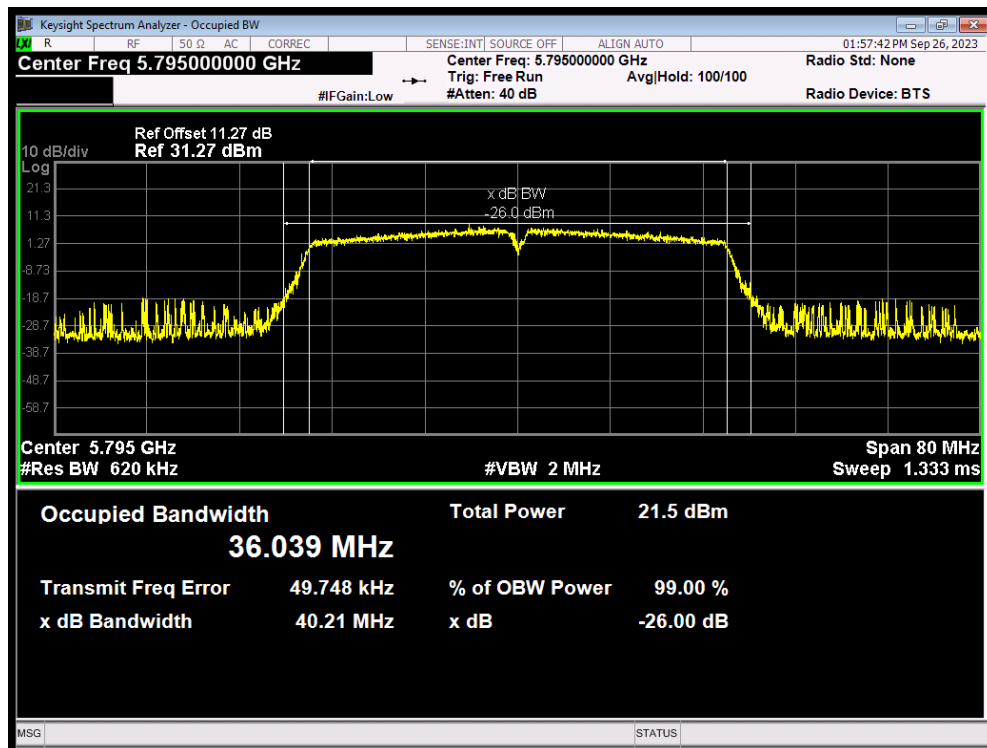## OBW 802.11n(HT20) 5745MHz

OBW 802.11n(HT20) 5785MHz

OBW 802.11n(HT20) 5825MHz

OBW 802.11n(HT40) 5710MHz

Eurofins TA Technology (Shanghai) Co., Ltd.   **TA-MB-04-006R**   **Page 49 of 241**

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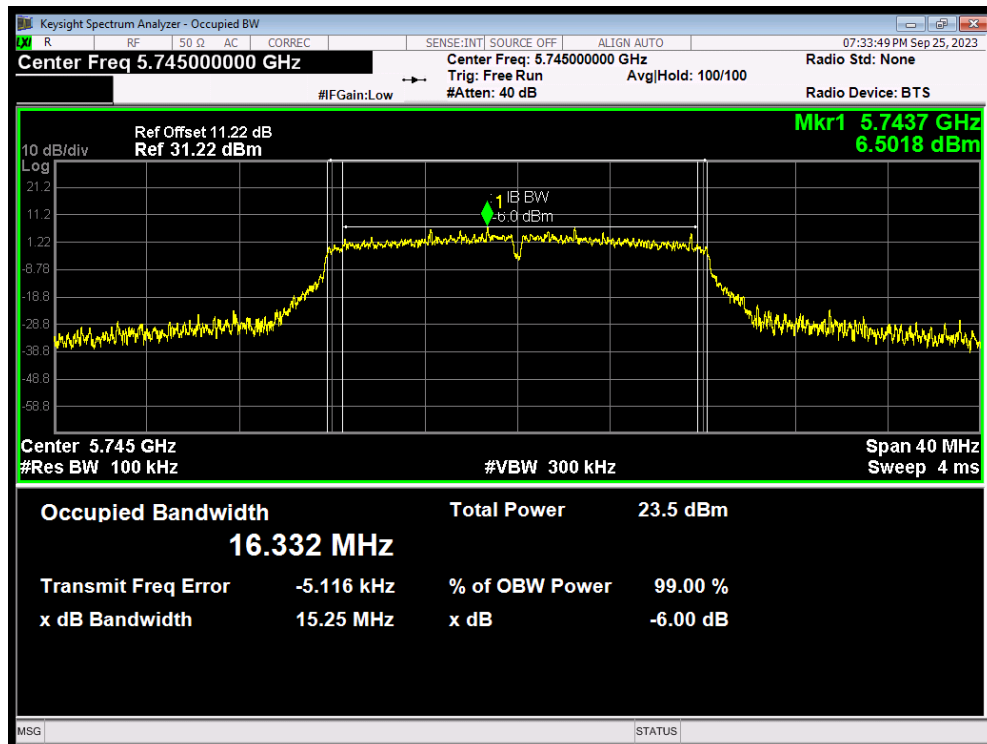OBW 802.11n(HT40) 5755MHz

OBW 802.11n(HT40) 5795MHz

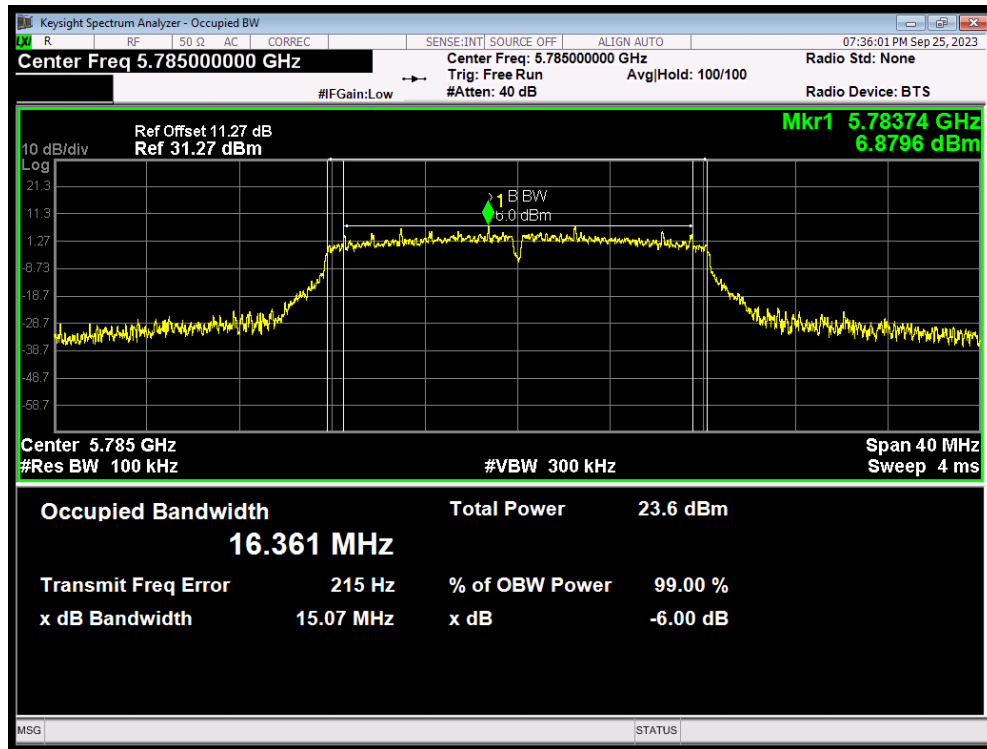## Minimum 6 dB bandwidth
U-NII-3
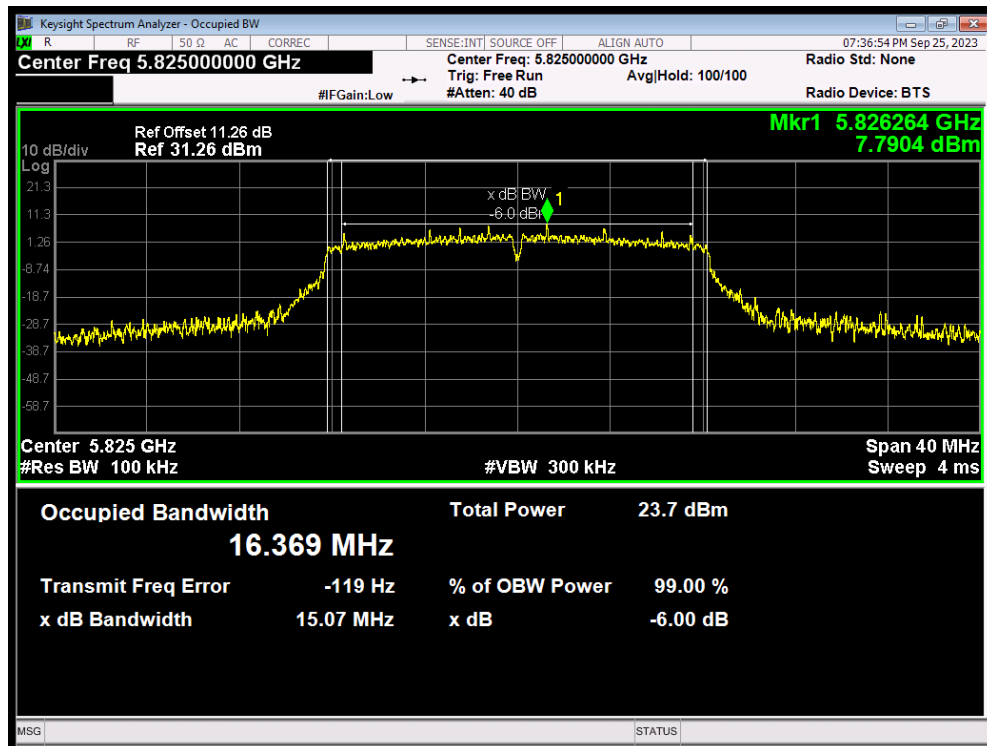
-6dB Bandwidth 802.11a 5720MHz
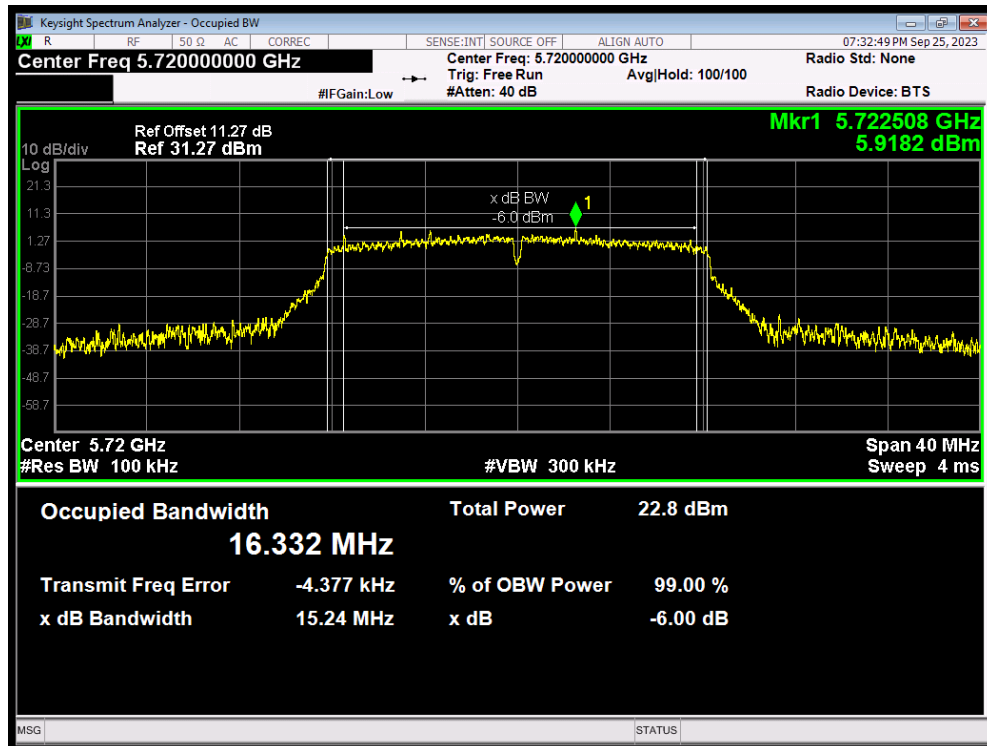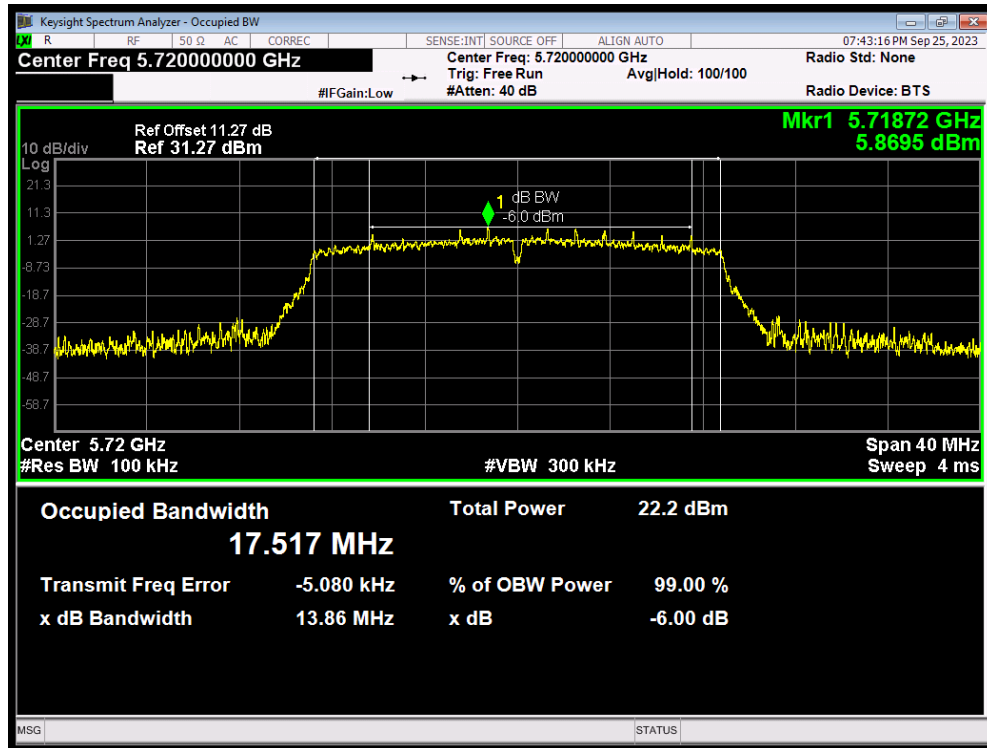

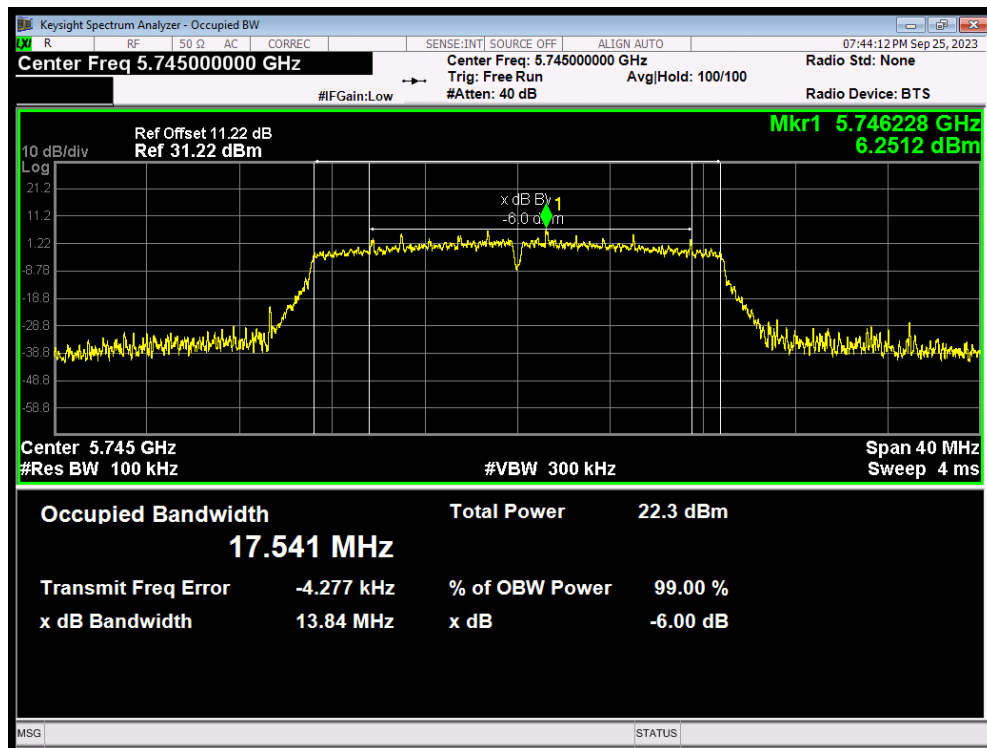-6dB Bandwidth 802.11a 5745MHz

-6dB Bandwidth 802.11a 5785MHz
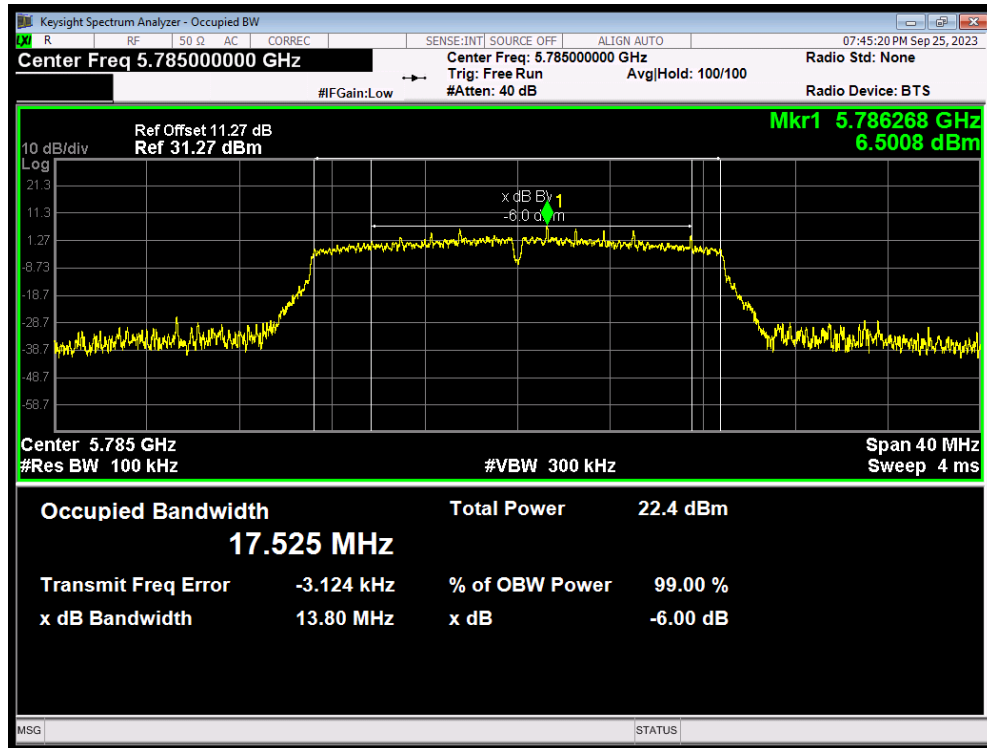

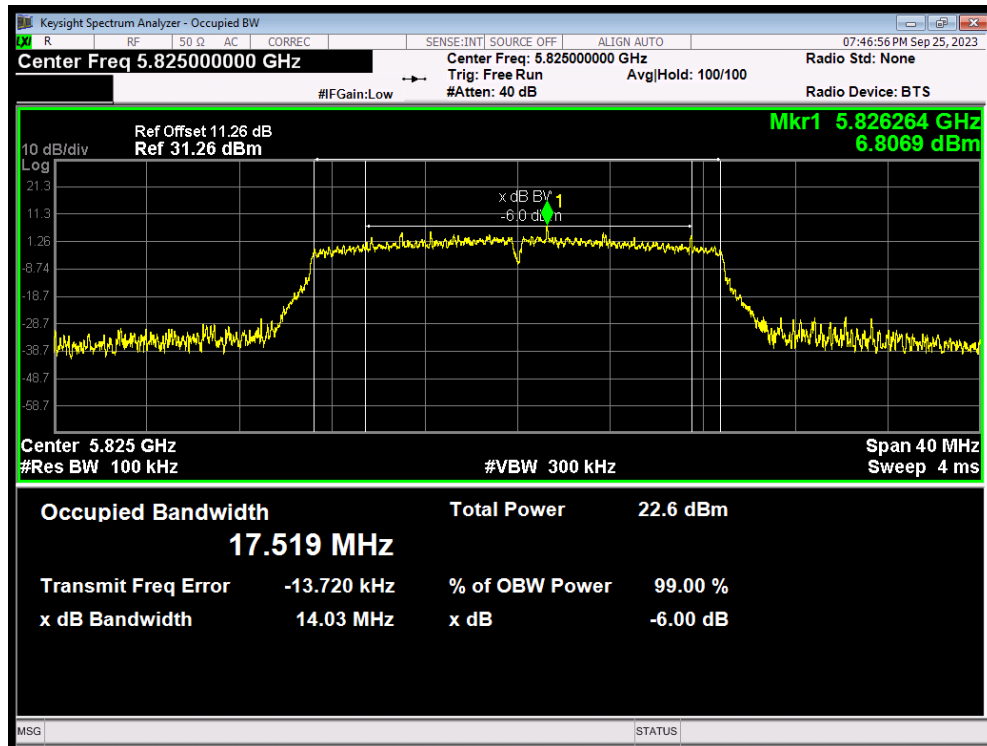-6dB Bandwidth 802.11a 5825MHz

-6dB Bandwidth 802.11ac(VHT20) 5720MHz

-6dB Bandwidth 802.11ac(VHT20) 5745MHz

Eurofins TA Technology (Shanghai) Co., Ltd.   TA-MB-04-006R   Page 53 of 241

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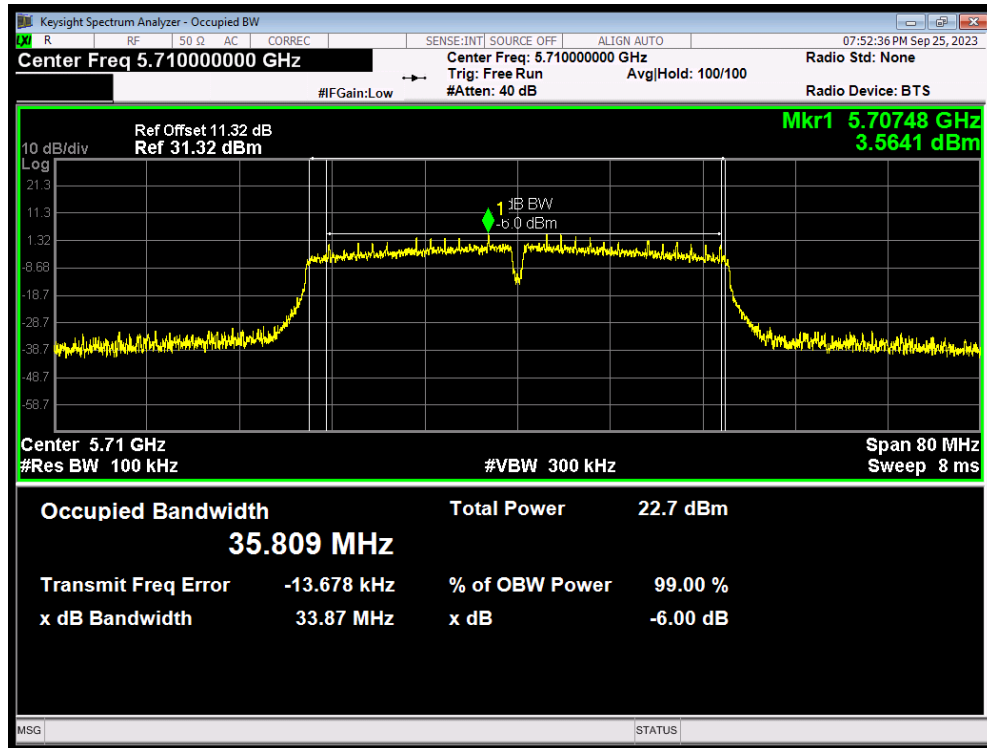
-6dB Bandwidth 802.11ac(VHT20) 5785MHz

-6dB Bandwidth 802.11ac(VHT20) 5825MHz

-6dB Bandwidth 802.11ac(VHT40) 5710MHz

-6dB Bandwidth 802.11ac(VHT40) 5755MHz