

RF TEST REPORT

Applicant Nokia Shanghai Bell Co., Ltd.

FCC ID 2ADZRBEACON31

Product NOKIA WiFi Beacon 3.1

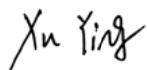
Brand NOKIA

Model Beacon 3.1

Report No. R2308A0899-R1

Issue Date October 19, 2023

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 15C (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	Maximum output power	15.247(b)(3)	PASS
2	99% Bandwidth and 6dB Bandwidth	15.247(a)(2) C63.10 6.9	PASS
3	Power spectral density	15.247(e)	PASS
4	Band Edge	15.247(d)	PASS
5	Spurious RF Conducted Emissions	15.247(d)	PASS
6	Unwanted Emissions	15.247(d), 15.205, 15.209	PASS
7	Conducted Emissions	15.207	PASS
Date of Testing: August 7, 2023 ~ September 26, 2023			
Date of Sample Received: August 7, 2023			
Note: 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 measurements.

A2LA (Certificate Number: 3857.01)

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform 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
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E-mail: xukai@ta-shanghai.com

2. General Description of Equipment Under Test

2.1. Applicant and Manufacturer Information

Applicant	Nokia Shanghai Bell Co., Ltd.
Applicant address	No.388, Ningqiao Rd, Pilot Free Trade Zone, Shanghai, 201206 P.R. China
Manufacturer	Nokia of America Corporation.
Manufacturer address	2301 Sugar Bush Road, Raleigh, North Carolina, 27612, United States of America

2.2. General Information

EUT Description			
Model	Beacon 3.1		
SN	Conducted	ALCLB299643A	
Lab internal SN	Radiated	R2308A0899/S01	
Hardware Version	PEM1		
Software Version	3TN00626		
Power Supply	AC adapter		
Antenna Type	Internal Antenna		
Antenna Connector	A permanently attached antenna (meet with the standard FCC Part 15.203 requirement)		
Direction Gain	AOT		
	Direction Gain	Power (dBi)	PSD (dBi)
	Antenna	MIMO/ with Beamforming	
	Antenna 1A + Antenna 2	3.00	4.00
	Antenna 1B+ Antenna 2	3.00	4.00
	DZZ		
	Direction Gain	Power (dBi)	PSD (dBi)
	Antenna	MIMO/ with Beamforming	
	Antenna 1A + Antenna 2	2.64	4.06
	Antenna 1B+ Antenna 2	2.64	4.06
Operating Frequency Range(s)	802.11b/g/n(HT20)/ax(HE20): 2412 ~ 2462 MHz 802.11n(HT40)/ax(HE40): 2422 ~ 2452 MHz		
Modulation Type	802.11b: DSSS 802.11g/n/ax: OFDM		
Max. Output Power	27.69 dBm		
EUT Accessory			
Adapter 1	Manufacturer: Ruide Model: RD1201500-C55-198MG Part Number: BW120150-UC6C-LL04		
Adapter 2	Manufacturer: FuHua		

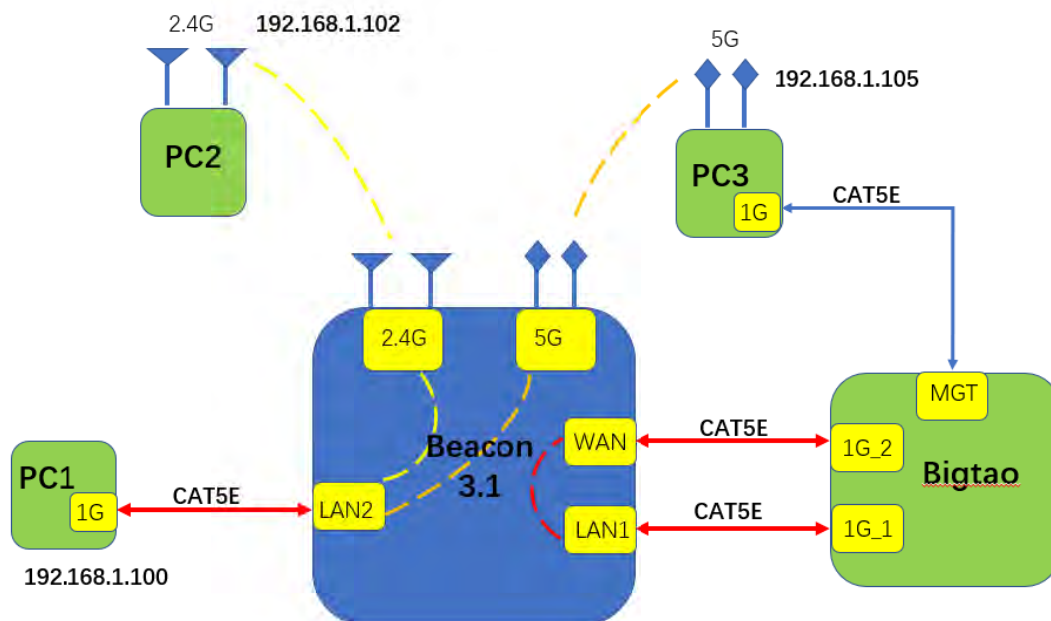
	Model: UES18LU-120150SPA Part Number: UE230418DGNA1RI
Antenna 1	Manufacturer: ANTENNA OF THINGS Model: AOT
Antenna 2	Manufacturer: Shenzhen be-comfortable Technology Co. Ltd. Model: DZZ
Note: 1. The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant.	

Hardware code information

Mnemonic	KIT Code	EMA Code	Part Description
Beacon 3.1	3TN00511****(* Can be any capital letter from A to Z)	3TN00512****(* Can be any capital letter from A to Z)	Beacon 3.1, 1G WAN, 2x1G LAN, WIFI6 2+2

Information of Configuration:

Beacon 3.1 is a WIFI router, has 1 WAN port, 2 LAN ports, it supports 2.4G&5G dual band 2*2 WIFI. The test environment in normal room condition as below.



Run 2.4G WIFI stream between PC1 and PC2 use iperf, the throughput should be higher than 50Mbps.

Run 5G WIFI stream between PC1 and PC3 use iperf, the throughput should be higher than 100Mbps.

Bigtao run stream between port 1G_1 and 1G_2, the throughput should be wire speed.

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 15C (2022) Radio Frequency Devices

ANSI C63.10-2013

Reference standard:

KDB 558074 D01 15.247 Meas Guidance v05r02

KDB 662911 D01 Multiple Transmitter Output v02r01

4. Test Configuration

Test Mode

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

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (Y axis) and the loop antenna is vertical, the others are vertical and horizontal. 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.

Test Mode	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS8
802.11n HT40	MCS8
802.11ax HE20	MCS0
802.11ax HE40	MCS0

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

Test Cases	CDD/ MIMO (Ant 1A + Ant 2)	CDD/ MIMO (Ant 1B + Ant 2)	Beamforming (Ant 1A + Ant 2)	Beamforming (Ant 1B + Ant 2)
Maximum output power	O	O	O	O
6dB Bandwidth	--	O	--	--
Band Edge	--	O	--	--
Power Spectral Density	O	O	O	O
Spurious RF Conducted Emissions	--	O	--	--
Unwanted Emissions	--	O	--	--
Conducted Emission	--	O	--	--
Note: "O": test all bands				

5. Test Case Results

5.1. Maximum output power

Ambient Condition

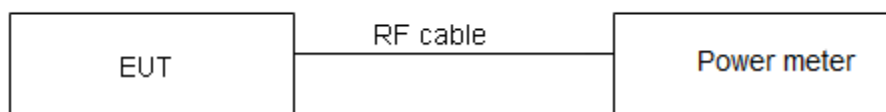
Temperature	Relative humidity
20°C ~ 25°C	45% ~ 50%

Methods of Measurement

During the process of the testing, The EUT was connected to Power meter with a known loss. The EUT is max power transmission with proper modulation.

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

Test Setup



Limits

Rule Part 15.247 (b) (3) specifies that " For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz: 1 Watt."

Average Output Power	$\leq 1W$ (30dBm)
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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

Test Mode	Duty cycle	Duty cycle correction Factor (dB)
802.11b	0.988	0.00
802.11g	0.930	0.31
802.11n HT20	0.926	0.34
802.11n HT40	0.861	0.65
802.11ax HE20	0.839	0.76
802.11ax HE40	0.742	1.29
Note: when Duty cycle ≥ 0.98 , Duty cycle correction Factor not required.		

AOT

MIMO

Antenna 1A + Antenna 2

Test Mode	Carrier frequency (MHz) / Channel	MIMO Antenna 1A		MIMO Antenna 2		Total Power (dBm)	Limit (dBm)	Conclusion
		Average Power Measured (dBm)	Average Power with duty factor (dBm)	Average Power Measured (dBm)	Average Power with duty factor (dBm)			
802.11b	2412/CH 1	22.67	22.67	23.15	23.15	25.93	30	PASS
	2417/CH 2	22.60	22.60	23.28	23.28	25.97	30	PASS
	2422/CH 3	22.95	22.95	23.69	23.69	26.35	30	PASS
	2437/CH 6	23.89	23.89	23.48	23.48	26.70	30	PASS
	2447/CH 8	24.61	24.61	23.50	23.50	27.10	30	PASS
	2452/CH 9	23.92	23.92	24.39	24.39	27.18	30	PASS
	2457/CH 10	23.42	23.42	23.88	23.88	26.67	30	PASS
	2462/CH 11	22.80	22.80	23.24	23.24	26.03	30	PASS
802.11g	2412/CH 1	19.44	19.75	19.79	20.10	22.94	30	PASS
	2417/CH 2	20.44	20.75	20.80	21.11	23.95	30	PASS
	2422/CH 3	21.37	21.68	21.91	22.22	24.97	30	PASS
	2427/CH 4	22.31	22.62	22.97	23.28	25.97	30	PASS
	2432/CH 5	23.53	23.84	23.81	24.12	26.99	30	PASS
	2437/CH 6	23.74	24.05	23.54	23.85	26.96	30	PASS
	2442/CH 7	22.58	22.89	23.08	23.39	26.16	30	PASS
	2447/CH 8	22.07	22.38	22.57	22.88	25.65	30	PASS
	2452/CH 9	21.08	21.39	21.56	21.87	24.64	30	PASS
	2457/CH 10	20.01	20.32	20.40	20.71	23.53	30	PASS
	2462/CH 11	18.92	19.23	19.46	19.77	22.52	30	PASS
802.11n HT20	2412/CH 1	18.65	18.99	19.22	19.56	22.29	30	PASS
	2417/CH 2	20.17	20.51	20.78	21.12	23.84	30	PASS
	2422/CH 3	21.15	21.49	21.79	22.13	24.84	30	PASS
	2427/CH 4	21.67	22.01	22.37	22.71	25.39	30	PASS

	2432/CH 5	22.61	22.95	23.35	23.69	26.35	30	PASS
	2437/CH 6	22.74	23.08	23.52	23.86	26.50	30	PASS
	2442/CH 7	22.34	22.68	23.02	23.36	26.04	30	PASS
	2447/CH 8	21.44	21.78	22.01	22.35	25.08	30	PASS
	2452/CH 9	20.77	21.11	21.55	21.89	24.53	30	PASS
	2457/CH 10	19.78	20.12	20.46	20.80	23.48	30	PASS
	2462/CH 11	18.25	18.59	18.90	19.24	21.94	30	PASS
802.11n HT40	2422/CH 3	16.49	17.14	17.11	17.76	20.47	30	PASS
	2427/CH 4	17.56	18.21	18.18	18.83	21.54	30	PASS
	2432/CH 5	18.62	19.27	19.25	19.90	22.60	30	PASS
	2437/CH 6	19.38	20.03	19.92	20.57	23.31	30	PASS
	2442/CH 7	17.83	18.48	18.30	18.95	21.73	30	PASS
	2447/CH 8	17.77	18.42	18.21	18.86	21.65	30	PASS
	2452/CH 9	16.17	16.82	16.79	17.44	20.15	30	PASS
802.11ax HE20	2412/CH 1	18.69	19.45	18.98	19.74	22.61	30	PASS
	2417/CH 2	19.69	20.45	20.18	20.94	23.71	30	PASS
	2422/CH 3	20.66	21.42	21.21	21.97	24.71	30	PASS
	2427/CH 4	21.65	22.41	22.29	23.05	25.75	30	PASS
	2432/CH 5	22.56	23.32	23.23	23.99	26.67	30	PASS
	2437/CH 6	22.37	23.13	22.92	23.68	26.43	30	PASS
	2442/CH 7	21.90	22.66	22.52	23.28	25.99	30	PASS
	2447/CH 8	21.91	22.67	22.50	23.26	25.98	30	PASS
	2452/CH 9	20.91	21.67	21.38	22.14	24.92	30	PASS
	2457/CH 10	20.35	21.11	20.83	21.59	24.37	30	PASS
	2462/CH 11	18.20	18.96	18.70	19.46	22.22	30	PASS
802.11ax HE40	2422/CH 3	16.33	17.62	16.93	18.22	20.94	30	PASS
	2427/CH 4	16.84	18.13	17.48	18.77	21.47	30	PASS
	2432/CH 5	17.89	19.18	18.55	19.84	22.54	30	PASS
	2437/CH 6	18.76	20.05	19.19	20.48	23.28	30	PASS
	2442/CH 7	17.67	18.96	18.21	19.50	22.25	30	PASS
	2447/CH 8	16.65	17.94	17.12	18.41	21.19	30	PASS
	2452/CH 9	15.56	16.85	16.09	17.38	20.14	30	PASS

Note: 1.Average Power with duty factor = Average Power Measured +Duty cycle correction factor

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

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

3. The manufacturer declared that the directional gain = 3dBi<6dBi. So the power limit is 30dBm.

MIMO
Antenna 1B+ Antenna 2

Test Mode	Carrier frequency (MHz) / Channel	MIMO Antenna 1B		MIMO Antenna 2		Total Power (dBm)	Limit (dBm)	Conclusion
		Average Power Measured (dBm)	Average Power with duty factor (dBm)	Average Power Measured (dBm)	Average Power with duty factor (dBm)			
802.11b	2412/CH 1	23.69	23.69	23.19	23.19	26.46	30	PASS
	2417/CH 2	23.59	23.59	23.19	23.19	26.41	30	PASS
	2422/CH 3	22.54	22.54	23.69	23.69	26.16	30	PASS
	2437/CH 6	23.65	23.65	23.80	23.80	26.74	30	PASS
	2447/CH 8	24.23	24.23	23.75	23.75	27.01	30	PASS
	2452/CH 9	24.87	24.87	24.48	24.48	27.69	30	PASS
	2457/CH 10	24.35	24.35	23.87	23.87	27.13	30	PASS
	2462/CH 11	23.82	23.82	23.29	23.29	26.57	30	PASS
802.11g	2412/CH 1	20.33	20.64	19.78	20.09	23.39	30	PASS
	2417/CH 2	21.25	21.56	20.84	21.15	24.37	30	PASS
	2422/CH 3	22.31	22.62	22.00	22.31	25.48	30	PASS
	2427/CH 4	23.28	23.59	23.00	23.31	26.46	30	PASS
	2432/CH 5	23.35	23.66	23.96	24.27	26.99	30	PASS
	2437/CH 6	23.57	23.88	23.59	23.90	26.90	30	PASS
	2442/CH 7	23.51	23.82	23.03	23.34	26.60	30	PASS
	2447/CH 8	23.00	23.31	22.57	22.88	26.11	30	PASS
	2452/CH 9	21.95	22.26	21.57	21.88	25.08	30	PASS
	2457/CH 10	20.89	21.20	20.47	20.78	24.00	30	PASS
	2462/CH 11	19.82	20.13	19.41	19.72	22.94	30	PASS
802.11n HT20	2412/CH 1	19.63	19.97	19.19	19.53	22.77	30	PASS
	2417/CH 2	21.10	21.44	20.74	21.08	24.27	30	PASS
	2422/CH 3	22.14	22.48	21.87	22.21	25.35	30	PASS
	2427/CH 4	22.60	22.94	22.47	22.81	25.89	30	PASS
	2432/CH 5	23.50	23.84	23.45	23.79	26.82	30	PASS
	2437/CH 6	23.64	23.98	23.55	23.89	26.94	30	PASS
	2442/CH 7	23.30	23.64	23.03	23.37	26.52	30	PASS
	2447/CH 8	22.35	22.69	22.07	22.41	25.56	30	PASS
	2452/CH 9	21.70	22.04	21.56	21.90	24.98	30	PASS
	2457/CH 10	20.77	21.11	20.49	20.83	23.99	30	PASS
	2462/CH 11	19.15	19.49	18.98	19.32	22.42	30	PASS
802.11n HT40	2422/CH 3	17.56	18.21	17.16	17.81	21.02	30	PASS
	2427/CH 4	18.54	19.19	18.21	18.86	22.04	30	PASS
	2432/CH 5	19.60	20.25	19.28	19.93	23.10	30	PASS
	2437/CH 6	20.35	21.00	19.84	20.49	23.76	30	PASS
	2442/CH 7	18.78	19.43	18.36	19.01	22.24	30	PASS
	2447/CH 8	18.85	19.50	18.27	18.92	22.23	30	PASS

	2452/CH 9	17.16	17.81	16.70	17.35	20.59	30	PASS
802.11ax HE20	2412/CH 1	19.57	20.33	19.10	19.86	23.11	30	PASS
	2417/CH 2	20.62	21.38	20.14	20.90	24.15	30	PASS
	2422/CH 3	21.58	22.34	21.29	22.05	25.21	30	PASS
	2427/CH 4	22.62	23.38	22.32	23.08	26.24	30	PASS
	2432/CH 5	23.48	24.24	23.27	24.03	27.15	30	PASS
	2437/CH 6	23.29	24.05	22.92	23.68	26.88	30	PASS
	2442/CH 7	22.85	23.61	22.50	23.26	26.45	30	PASS
	2447/CH 8	22.93	23.69	22.43	23.19	26.46	30	PASS
	2452/CH 9	21.77	22.53	21.37	22.13	25.34	30	PASS
	2457/CH 10	21.25	22.01	20.79	21.55	24.79	30	PASS
	2462/CH 11	19.19	19.95	18.75	19.51	22.74	30	PASS
802.11ax HE40	2422/CH 3	17.28	18.57	16.95	18.24	21.42	30	PASS
	2427/CH 4	17.91	19.20	17.53	18.82	22.03	30	PASS
	2432/CH 5	18.92	20.21	18.61	19.90	23.07	30	PASS
	2437/CH 6	19.74	21.03	19.31	20.60	23.83	30	PASS
	2442/CH 7	18.71	20.00	18.24	19.53	22.78	30	PASS
	2447/CH 8	17.68	18.97	17.24	18.53	21.76	30	PASS
	2452/CH 9	16.50	17.79	16.10	17.39	20.60	30	PASS

Note: 1.Average Power with duty factor = Average Power Measured +Duty cycle correction factor

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

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

3. The manufacturer declared that the directional gain = 3dBi<6dBi. So the power limit is 30dBm.

Beamforming

Antenna 1A + Antenna 2

Test Mode	Carrier frequency (MHz) / Channel	Beamforming Antenna 1A		Beamforming Antenna 2		Total Power (dBm)	Limit (dBm)	Conclusion
		Average Power Measured (dBm)	Average Power with duty factor (dBm)	Average Power Measured (dBm)	Average Power with duty factor (dBm)			
802.11b	2412/CH 1	22.41	22.41	22.86	22.86	25.65	30	PASS
	2417/CH 2	22.34	22.34	22.89	22.89	25.63	30	PASS
	2422/CH 3	22.90	22.90	23.52	23.52	26.23	30	PASS
	2437/CH 6	23.68	23.68	23.53	23.53	26.62	30	PASS
	2447/CH 8	24.40	24.40	23.34	23.34	26.91	30	PASS
	2452/CH 9	23.63	23.63	24.12	24.12	26.89	30	PASS
	2457/CH 10	23.07	23.07	23.58	23.58	26.34	30	PASS
	2462/CH 11	22.46	22.46	22.96	22.96	25.73	30	PASS
802.11g	2412/CH 1	19.16	19.47	19.43	19.74	22.62	30	PASS
	2417/CH 2	20.14	20.45	20.55	20.86	23.67	30	PASS
	2422/CH 3	21.10	21.41	21.57	21.88	24.66	30	PASS
	2427/CH 4	22.08	22.39	22.77	23.08	25.76	30	PASS
	2432/CH 5	23.32	23.63	23.64	23.95	26.81	30	PASS
	2437/CH 6	23.41	23.72	23.39	23.70	26.72	30	PASS
	2442/CH 7	22.37	22.68	22.85	23.16	25.93	30	PASS
	2447/CH 8	21.87	22.18	22.38	22.69	25.45	30	PASS
	2452/CH 9	20.82	21.13	21.28	21.59	24.38	30	PASS
	2457/CH 10	19.80	20.11	20.23	20.54	23.34	30	PASS
	2462/CH 11	18.64	18.95	19.13	19.44	22.21	30	PASS
802.11n HT20	2412/CH 1	18.49	18.83	18.94	19.28	22.07	30	PASS
	2417/CH 2	19.91	20.25	20.59	20.93	23.61	30	PASS
	2422/CH 3	20.91	21.25	21.62	21.96	24.63	30	PASS
	2427/CH 4	21.34	21.68	22.18	22.52	25.13	30	PASS
	2432/CH 5	22.28	22.62	23.17	23.51	26.10	30	PASS
	2437/CH 6	22.51	22.85	23.24	23.58	26.24	30	PASS
	2442/CH 7	22.12	22.46	22.76	23.10	25.80	30	PASS
	2447/CH 8	21.17	21.51	21.81	22.15	24.85	30	PASS
	2452/CH 9	20.53	20.87	21.14	21.48	24.20	30	PASS
	2457/CH 10	19.46	19.80	20.21	20.55	23.20	30	PASS
	2462/CH 11	17.94	18.28	18.73	19.07	21.70	30	PASS
802.11n HT40	2422/CH 3	16.32	16.97	16.89	17.54	20.28	30	PASS
	2427/CH 4	17.42	18.07	17.99	18.64	21.37	30	PASS
	2432/CH 5	18.30	18.95	18.98	19.63	22.31	30	PASS
	2437/CH 6	19.20	19.85	19.62	20.27	23.08	30	PASS
	2442/CH 7	17.65	18.30	18.10	18.75	21.54	30	PASS
	2447/CH 8	17.63	18.28	17.98	18.63	21.47	30	PASS

	2452/CH 9	16.02	16.67	16.55	17.20	19.95	30	PASS
802.11ax HE20	2412/CH 1	18.40	19.16	18.79	19.55	22.37	30	PASS
	2417/CH 2	19.48	20.24	19.92	20.68	23.48	30	PASS
	2422/CH 3	20.46	21.22	21.02	21.78	24.52	30	PASS
	2427/CH 4	21.49	22.25	22.05	22.81	25.55	30	PASS
	2432/CH 5	22.34	23.10	23.04	23.80	26.48	30	PASS
	2437/CH 6	22.17	22.93	22.74	23.50	26.23	30	PASS
	2442/CH 7	21.71	22.47	22.28	23.04	25.77	30	PASS
	2447/CH 8	21.67	22.43	22.21	22.97	25.72	30	PASS
	2452/CH 9	20.59	21.35	21.17	21.93	24.66	30	PASS
	2457/CH 10	20.03	20.79	20.57	21.33	24.08	30	PASS
	2462/CH 11	17.91	18.67	18.54	19.30	22.01	30	PASS
802.11ax HE40	2422/CH 3	16.11	17.40	16.66	17.95	20.69	30	PASS
	2427/CH 4	16.77	18.06	17.28	18.57	21.33	30	PASS
	2432/CH 5	17.69	18.98	18.38	19.67	22.35	30	PASS
	2437/CH 6	18.57	19.86	18.97	20.26	23.08	30	PASS
	2442/CH 7	17.47	18.76	17.93	19.22	22.01	30	PASS
	2447/CH 8	16.50	17.79	16.84	18.13	20.97	30	PASS
	2452/CH 9	15.32	16.61	15.83	17.12	19.88	30	PASS

Note: 1.Average Power with duty factor = Average Power Measured +Duty cycle correction factor

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

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

3. The manufacturer declared that the directional gain = 3dBi<6dBi. So the power limit is 30dBm.

Beamforming

Antenna 1B + Antenna 2

Test Mode	Carrier frequency (MHz) / Channel	Beamforming Antenna 1B		Beamforming Antenna 2		Total Power (dBm)	Limit (dBm)	Conclusion
		Average Power Measured (dBm)	Average Power with duty factor (dBm)	Average Power Measured (dBm)	Average Power with duty factor (dBm)			
802.11b	2412/CH 1	23.49	23.49	22.94	22.94	26.23	30	PASS
	2417/CH 2	23.47	23.47	23.05	23.05	26.28	30	PASS
	2422/CH 3	22.48	22.48	23.53	23.53	26.05	30	PASS
	2437/CH 6	23.50	23.50	23.61	23.61	26.56	30	PASS
	2447/CH 8	23.89	23.89	23.27	23.27	26.60	30	PASS
	2452/CH 9	24.66	24.66	24.18	24.18	27.44	30	PASS
	2457/CH 10	24.09	24.09	23.55	23.55	26.84	30	PASS
	2462/CH 11	23.53	23.53	23.00	23.00	26.29	30	PASS
802.11g	2412/CH 1	20.15	20.46	19.56	19.87	23.19	30	PASS
	2417/CH 2	21.08	21.39	20.59	20.90	24.16	30	PASS
	2422/CH 3	22.16	22.47	21.69	22.00	25.25	30	PASS
	2427/CH 4	23.04	23.35	22.68	22.99	26.18	30	PASS
	2432/CH 5	23.14	23.45	23.54	23.85	26.66	30	PASS
	2437/CH 6	23.21	23.52	23.28	23.59	26.56	30	PASS
	2442/CH 7	23.28	23.59	22.81	23.12	26.37	30	PASS
	2447/CH 8	22.72	23.03	22.34	22.65	25.86	30	PASS
	2452/CH 9	21.68	21.99	21.25	21.56	24.79	30	PASS
	2457/CH 10	20.77	21.08	20.18	20.49	23.81	30	PASS
	2462/CH 11	19.63	19.94	19.23	19.54	22.76	30	PASS
802.11n HT20	2412/CH 1	19.29	19.63	19.01	19.35	22.50	30	PASS
	2417/CH 2	20.85	21.19	20.63	20.97	24.09	30	PASS
	2422/CH 3	21.82	22.16	21.62	21.96	25.07	30	PASS
	2427/CH 4	22.30	22.64	22.17	22.51	25.58	30	PASS
	2432/CH 5	23.19	23.53	23.19	23.53	26.54	30	PASS
	2437/CH 6	23.44	23.78	23.28	23.62	26.71	30	PASS
	2442/CH 7	23.01	23.35	22.81	23.15	26.26	30	PASS
	2447/CH 8	22.04	22.38	21.84	22.18	25.29	30	PASS
	2452/CH 9	21.49	21.83	21.23	21.57	24.71	30	PASS
	2457/CH 10	20.48	20.82	20.15	20.49	23.67	30	PASS
	2462/CH 11	18.88	19.22	18.60	18.94	22.09	30	PASS
802.11n HT40	2422/CH 3	17.24	17.89	16.89	17.54	20.73	30	PASS
	2427/CH 4	18.29	18.94	18.03	18.68	21.82	30	PASS
	2432/CH 5	19.32	19.97	18.98	19.63	22.81	30	PASS
	2437/CH 6	20.15	20.80	19.71	20.36	23.59	30	PASS
	2442/CH 7	18.60	19.25	18.06	18.71	22.00	30	PASS
	2447/CH 8	18.65	19.30	18.09	18.74	22.04	30	PASS

	2452/CH 9	17.02	17.67	16.54	17.19	20.45	30	PASS
802.11ax HE20	2412/CH 1	19.29	20.05	18.77	19.53	22.81	30	PASS
	2417/CH 2	20.33	21.09	19.88	20.64	23.88	30	PASS
	2422/CH 3	21.37	22.13	20.97	21.73	24.94	30	PASS
	2427/CH 4	22.36	23.12	22.10	22.86	26.00	30	PASS
	2432/CH 5	23.28	24.04	23.04	23.80	26.93	30	PASS
	2437/CH 6	23.07	23.83	22.71	23.47	26.67	30	PASS
	2442/CH 7	22.61	23.37	22.28	23.04	26.22	30	PASS
	2447/CH 8	22.59	23.35	22.21	22.97	26.17	30	PASS
	2452/CH 9	21.59	22.35	21.18	21.94	25.16	30	PASS
	2457/CH 10	20.99	21.75	20.59	21.35	24.56	30	PASS
	2462/CH 11	18.96	19.72	18.55	19.31	22.53	30	PASS
802.11ax HE40	2422/CH 3	16.98	18.27	16.71	18.00	21.15	30	PASS
	2427/CH 4	17.61	18.90	17.25	18.54	21.73	30	PASS
	2432/CH 5	18.71	20.00	18.30	19.59	22.81	30	PASS
	2437/CH 6	19.44	20.73	18.96	20.25	23.51	30	PASS
	2442/CH 7	18.49	19.78	17.92	19.21	22.51	30	PASS
	2447/CH 8	17.42	18.71	16.87	18.16	21.45	30	PASS
	2452/CH 9	16.26	17.55	15.80	17.09	20.34	30	PASS

Note: 1.Average Power with duty factor = Average Power Measured +Duty cycle correction factor

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

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

3. The manufacturer declared that the directional gain = 3dBi<6dBi. So the power limit is 30dBm.

DZZ
MIMO
Antenna 1A + Antenna 2

Test Mode	Carrier frequency (MHz) / Channel	MIMO Antenna 1A		MIMO Antenna 2		Total Power (dBm)	Limit (dBm)	Conclusion
		Average Power Measured (dBm)	Average Power with duty factor (dBm)	Average Power Measured (dBm)	Average Power with duty factor (dBm)			
802.11b	2412/CH 1	22.84	22.84	23.89	23.89	26.41	30	PASS
	2437/CH 6	23.75	23.75	23.67	23.67	26.72	30	PASS
	2462/CH 11	25.02	25.02	23.43	23.43	27.31	30	PASS
802.11g	2412/CH 1	20.35	20.66	20.63	20.94	23.81	30	PASS
	2417/CH 2	20.77	21.08	21.13	21.44	24.28	30	PASS
	2422/CH 3	21.79	22.10	22.24	22.55	25.34	30	PASS
	2427/CH 4	23.10	23.41	23.59	23.90	26.67	30	PASS
	2437/CH 6	23.20	23.51	23.89	24.20	26.88	30	PASS
	2442/CH 7	22.50	22.81	22.94	23.25	26.04	30	PASS
	2447/CH 8	21.49	21.80	22.00	22.31	25.07	30	PASS
	2452/CH 9	20.94	21.25	21.47	21.78	24.53	30	PASS
	2457/CH 10	20.46	20.77	20.90	21.21	24.01	30	PASS
	2462/CH 11	19.32	19.63	19.82	20.13	22.90	30	PASS
802.11n HT20	2412/CH 1	19.59	19.93	20.11	20.45	23.21	30	PASS
	2417/CH 2	20.54	20.88	21.24	21.58	24.25	30	PASS
	2422/CH 3	21.63	21.97	22.28	22.62	25.31	30	PASS
	2427/CH 4	22.85	23.19	23.58	23.92	26.58	30	PASS
	2437/CH 6	23.49	23.83	23.25	23.59	26.72	30	PASS
	2442/CH 7	23.66	24.00	23.37	23.71	26.87	30	PASS
	2447/CH 8	21.76	22.10	22.42	22.76	25.45	30	PASS
	2452/CH 9	20.71	21.05	21.41	21.75	24.42	30	PASS
	2457/CH 10	19.70	20.04	20.33	20.67	23.37	30	PASS
	2462/CH 11	19.14	19.48	19.81	20.15	22.83	30	PASS
802.11n HT40	2422/CH 3	16.60	17.25	17.06	17.71	20.49	30	PASS
	2427/CH 4	17.57	18.22	18.17	18.82	21.54	30	PASS
	2432/CH 5	19.62	20.27	20.21	20.86	23.59	30	PASS
	2437/CH 6	20.37	21.02	20.83	21.48	24.27	30	PASS
	2442/CH 7	19.85	20.50	20.23	20.88	23.70	30	PASS
	2447/CH 8	19.36	20.01	19.72	20.37	23.20	30	PASS
	2452/CH 9	18.68	19.33	19.22	19.87	22.62	30	PASS
802.11ax HE20	2412/CH 1	19.15	19.91	19.51	20.27	23.10	30	PASS
	2417/CH 2	20.15	20.91	20.65	21.41	24.18	30	PASS
	2422/CH 3	21.08	21.84	21.65	22.41	25.14	30	PASS
	2427/CH 4	22.03	22.79	22.74	23.50	26.16	30	PASS
	2432/CH 5	22.96	23.72	23.21	23.97	26.86	30	PASS

	2437/CH 6	23.06	23.82	22.94	23.70	26.77	30	PASS
	2442/CH 7	23.25	24.01	22.70	23.46	26.75	30	PASS
	2447/CH 8	21.81	22.57	22.29	23.05	25.83	30	PASS
	2452/CH 9	20.71	21.47	21.21	21.97	24.74	30	PASS
	2457/CH 10	19.74	20.50	20.27	21.03	23.78	30	PASS
	2462/CH 11	18.69	19.45	19.11	19.87	22.68	30	PASS
802.11ax HE40	2422/CH 3	15.89	17.18	16.40	17.69	20.45	30	PASS
	2427/CH 4	16.89	18.18	17.41	18.70	21.46	30	PASS
	2432/CH 5	18.94	20.23	19.47	20.76	23.51	30	PASS
	2437/CH 6	19.67	20.96	20.21	21.50	24.25	30	PASS
	2442/CH 7	19.19	20.48	19.51	20.80	23.65	30	PASS
	2447/CH 8	19.14	20.43	19.53	20.82	23.64	30	PASS
	2452/CH 9	17.59	18.88	18.05	19.34	22.12	30	PASS

Note: 1.Average Power with duty factor = Average Power Measured +Duty cycle correction factor

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

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

3. The manufacturer declared that the directional gain = 2.64dBi<6dBi. So the power limit is 30dBm.

MIMO
Antenna 1B+ Antenna 2

Test Mode	Carrier frequency (MHz) / Channel	MIMO Antenna 1B		MIMO Antenna 2		Total Power (dBm)	Limit (dBm)	Conclusion
		Average Power Measured (dBm)	Average Power with duty factor (dBm)	Average Power Measured (dBm)	Average Power with duty factor (dBm)			
802.11b	2412/CH 1	22.09	22.09	23.83	23.83	26.06	30	PASS
	2437/CH 6	23.65	23.65	23.66	23.66	26.66	30	PASS
	2462/CH 11	24.88	24.88	23.53	23.53	27.27	30	PASS
802.11g	2412/CH 1	21.17	21.48	20.59	20.90	24.21	30	PASS
	2417/CH 2	21.71	22.02	21.21	21.52	24.79	30	PASS
	2422/CH 3	22.70	23.01	22.26	22.57	25.80	30	PASS
	2427/CH 4	23.14	23.45	22.98	23.29	26.38	30	PASS
	2437/CH 6	23.32	23.63	23.25	23.56	26.60	30	PASS
	2442/CH 7	23.39	23.70	23.03	23.34	26.54	30	PASS
	2447/CH 8	22.48	22.79	21.99	22.30	25.57	30	PASS
	2452/CH 9	21.83	22.14	21.45	21.76	24.96	30	PASS
	2457/CH 10	21.30	21.61	20.89	21.20	24.42	30	PASS
	2462/CH 11	20.21	20.52	19.86	20.17	23.36	30	PASS
802.11n HT20	2412/CH 1	20.49	20.83	20.09	20.43	23.64	30	PASS
	2417/CH 2	21.49	21.83	21.18	21.52	24.69	30	PASS
	2422/CH 3	22.54	22.88	22.30	22.64	25.77	30	PASS
	2427/CH 4	22.89	23.23	23.69	24.03	26.66	30	PASS
	2437/CH 6	23.36	23.70	23.40	23.74	26.73	30	PASS
	2442/CH 7	23.34	23.68	23.22	23.56	26.63	30	PASS
	2447/CH 8	22.66	23.00	22.44	22.78	25.90	30	PASS
	2452/CH 9	21.57	21.91	21.36	21.70	24.82	30	PASS
	2457/CH 10	20.57	20.91	20.29	20.63	23.78	30	PASS
	2462/CH 11	20.07	20.41	19.83	20.17	23.30	30	PASS
802.11n HT40	2422/CH 3	17.43	18.08	17.07	17.72	20.91	30	PASS
	2427/CH 4	18.49	19.14	18.14	18.79	21.98	30	PASS
	2432/CH 5	20.51	21.16	20.21	20.86	24.02	30	PASS
	2437/CH 6	21.29	21.94	20.76	21.41	24.70	30	PASS
	2442/CH 7	20.75	21.40	20.26	20.91	24.17	30	PASS
	2447/CH 8	20.29	20.94	19.68	20.33	23.66	30	PASS
	2452/CH 9	19.57	20.22	19.15	19.80	23.02	30	PASS
	2457/CH 10	18.83	19.48	18.41	19.06	22.28	30	PASS
802.11ax HE20	2412/CH 1	19.94	20.70	19.39	20.15	23.44	30	PASS
	2417/CH 2	20.90	21.66	20.45	21.21	24.45	30	PASS
	2422/CH 3	22.16	22.92	21.73	22.49	25.72	30	PASS
	2427/CH 4	23.11	23.87	22.82	23.58	26.74	30	PASS
	2432/CH 5	22.75	23.51	23.14	23.90	26.72	30	PASS
	2437/CH 6	22.70	23.46	22.77	23.53	26.51	30	PASS

	2442/CH 7	23.16	23.92	23.01	23.77	26.86	30	PASS
	2447/CH 8	22.78	23.54	22.41	23.17	26.37	30	PASS
	2452/CH 9	21.76	22.52	21.33	22.09	25.32	30	PASS
	2457/CH 10	20.68	21.44	20.24	21.00	24.24	30	PASS
	2462/CH 11	19.69	20.45	19.20	19.96	23.22	30	PASS
802.11ax HE40	2422/CH 3	16.77	18.06	16.43	17.72	20.91	30	PASS
	2427/CH 4	17.85	19.14	17.52	18.81	21.99	30	PASS
	2432/CH 5	19.93	21.22	19.53	20.82	24.03	30	PASS
	2437/CH 6	20.65	21.94	20.24	21.53	24.75	30	PASS
	2442/CH 7	20.16	21.45	19.57	20.86	24.17	30	PASS
	2447/CH 8	20.17	21.46	19.55	20.84	24.17	30	PASS
	2452/CH 9	18.53	19.82	18.06	19.35	22.60	30	PASS

Note: 1.Average Power with duty factor = Average Power Measured +Duty cycle correction factor

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

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

3. The manufacturer declared that the directional gain = 2.64dBi<6dBi. So the power limit is 30dBm.

Beamforming

Antenna 1A + Antenna 2

Test Mode	Carrier frequency (MHz) / Channel	Beamforming Antenna 1A		Beamforming Antenna 2		Total Power (dBm)	Limit (dBm)	Conclusion
		Average Power Measured (dBm)	Average Power with duty factor (dBm)	Average Power Measured (dBm)	Average Power with duty factor (dBm)			
802.11b	2412/CH 1	22.28	22.28	23.53	23.53	25.96	30	PASS
	2437/CH 6	23.68	23.68	23.42	23.42	26.56	30	PASS
	2462/CH 11	24.93	24.93	23.35	23.35	27.22	30	PASS
802.11g	2412/CH 1	20.09	20.40	20.41	20.72	23.57	30	PASS
	2417/CH 2	20.60	20.91	21.02	21.33	24.14	30	PASS
	2422/CH 3	21.50	21.81	22.04	22.35	25.10	30	PASS
	2427/CH 4	22.89	23.20	23.38	23.69	26.46	30	PASS
	2437/CH 6	23.09	23.40	23.73	24.04	26.74	30	PASS
	2442/CH 7	22.21	22.52	22.71	23.02	25.79	30	PASS
	2447/CH 8	21.25	21.56	21.72	22.03	24.81	30	PASS
	2452/CH 9	20.68	20.99	21.19	21.50	24.26	30	PASS
	2457/CH 10	20.19	20.50	20.69	21.00	23.77	30	PASS
	2462/CH 11	19.02	19.33	19.61	19.92	22.65	30	PASS
802.11n HT20	2412/CH 1	19.45	19.79	19.77	20.11	22.96	30	PASS
	2417/CH 2	20.39	20.73	20.78	21.12	23.94	30	PASS
	2422/CH 3	21.33	21.67	21.90	22.24	24.98	30	PASS
	2427/CH 4	22.88	23.22	23.44	23.78	26.52	30	PASS
	2437/CH 6	23.14	23.48	23.02	23.36	26.43	30	PASS
	2442/CH 7	23.47	23.81	23.07	23.41	26.62	30	PASS
	2447/CH 8	21.56	21.90	21.99	22.33	25.13	30	PASS
	2452/CH 9	20.56	20.90	21.03	21.37	24.15	30	PASS
	2457/CH 10	19.55	19.89	20.01	20.35	23.13	30	PASS
	2462/CH 11	18.99	19.33	19.39	19.73	22.55	30	PASS
802.11n HT40	2422/CH 3	16.30	16.95	16.85	17.50	20.24	30	PASS
	2427/CH 4	17.24	17.89	17.80	18.45	21.19	30	PASS
	2432/CH 5	19.47	20.12	20.05	20.70	23.43	30	PASS
	2437/CH 6	20.08	20.73	20.64	21.29	24.03	30	PASS
	2442/CH 7	19.56	20.21	19.93	20.58	23.41	30	PASS
	2447/CH 8	19.11	19.76	19.44	20.09	22.94	30	PASS
	2452/CH 9	18.57	19.22	19.02	19.67	22.46	30	PASS
	2457/CH 10	18.02	18.67	18.77	19.42	22.27	30	PASS
802.11ax HE20	2412/CH 1	19.01	19.77	19.37	20.13	22.97	30	PASS
	2417/CH 2	19.98	20.74	20.45	21.21	23.99	30	PASS
	2422/CH 3	21.03	21.79	21.50	22.26	25.04	30	PASS
	2427/CH 4	22.01	22.77	22.63	23.39	26.10	30	PASS
	2432/CH 5	22.86	23.62	23.14	23.90	26.77	30	PASS
	2437/CH 6	22.89	23.65	22.86	23.62	26.64	30	PASS

	2442/CH 7	23.09	23.85	22.47	23.23	26.56	30	PASS
	2447/CH 8	21.76	22.52	22.20	22.96	25.75	30	PASS
	2452/CH 9	20.62	21.38	21.17	21.93	24.67	30	PASS
	2457/CH 10	19.59	20.35	20.09	20.85	23.62	30	PASS
	2462/CH 11	18.54	19.30	19.04	19.80	22.57	30	PASS
802.11ax HE40	2422/CH 3	15.71	17.00	16.23	17.52	20.28	30	PASS
	2427/CH 4	16.64	17.93	17.27	18.56	21.27	30	PASS
	2432/CH 5	18.64	19.93	19.19	20.48	23.22	30	PASS
	2437/CH 6	19.37	20.66	19.95	21.24	23.97	30	PASS
	2442/CH 7	18.98	20.27	19.48	20.77	23.54	30	PASS
	2447/CH 8	19.02	20.31	19.36	20.65	23.49	30	PASS
	2452/CH 9	17.38	18.67	17.83	19.12	21.91	30	PASS

Note: 1.Average Power with duty factor = Average Power Measured +Duty cycle correction factor

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

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

3. The manufacturer declared that the directional gain = 2.64dBi<6dBi. So the power limit is 30dBm.

Beamforming

Antenna 1B + Antenna 2

Test Mode	Carrier frequency (MHz) / Channel	Beamforming Antenna 1B		Beamforming Antenna 2		Total Power (dBm)	Limit (dBm)	Conclusion
		Average Power Measured (dBm)	Average Power with duty factor (dBm)	Average Power Measured (dBm)	Average Power with duty factor (dBm)			
802.11b	2412/CH 1	21.78	21.78	23.51	23.51	25.74	30	PASS
	2437/CH 6	23.15	23.15	23.31	23.31	26.24	30	PASS
	2462/CH 11	24.73	24.73	23.32	23.32	27.09	30	PASS
802.11g	2412/CH 1	21.08	21.39	20.53	20.84	24.13	30	PASS
	2417/CH 2	21.62	21.93	21.15	21.46	24.71	30	PASS
	2422/CH 3	22.55	22.86	22.16	22.47	25.68	30	PASS
	2427/CH 4	22.97	23.28	23.59	23.90	26.61	30	PASS
	2437/CH 6	24.09	24.40	23.85	24.16	27.29	30	PASS
	2442/CH 7	23.29	23.60	22.83	23.14	26.39	30	PASS
	2447/CH 8	22.28	22.59	21.86	22.17	25.40	30	PASS
	2452/CH 9	21.70	22.01	21.33	21.64	24.84	30	PASS
	2457/CH 10	21.24	21.55	20.82	21.13	24.36	30	PASS
	2462/CH 11	20.15	20.46	19.67	19.98	23.23	30	PASS
802.11n HT20	2412/CH 1	20.47	20.81	19.83	20.17	23.51	30	PASS
	2417/CH 2	21.43	21.77	20.91	21.25	24.53	30	PASS
	2422/CH 3	22.37	22.71	22.03	22.37	25.55	30	PASS
	2427/CH 4	22.45	22.79	23.23	23.57	26.21	30	PASS
	2437/CH 6	23.00	23.34	23.05	23.39	26.38	30	PASS
	2442/CH 7	23.19	23.53	22.92	23.26	26.41	30	PASS
	2447/CH 8	22.56	22.90	22.00	22.34	25.64	30	PASS
	2452/CH 9	21.54	21.88	21.17	21.51	24.71	30	PASS
	2457/CH 10	20.53	20.87	20.06	20.40	23.65	30	PASS
	2462/CH 11	20.03	20.37	19.56	19.90	23.15	30	PASS
802.11n HT40	2422/CH 3	17.36	18.01	16.91	17.56	20.80	30	PASS
	2427/CH 4	18.35	19.00	17.99	18.64	21.83	30	PASS
	2432/CH 5	20.38	21.03	20.03	20.68	23.87	30	PASS
	2437/CH 6	21.11	21.76	20.66	21.31	24.55	30	PASS
	2442/CH 7	20.63	21.28	20.10	20.75	24.03	30	PASS
	2447/CH 8	20.12	20.77	19.54	20.19	23.50	30	PASS
	2452/CH 9	19.46	20.11	19.01	19.66	22.90	30	PASS
	2457/CH 10	18.81	19.46	18.46	19.11	22.39	30	PASS
802.11ax HE20	2412/CH 1	19.94	20.70	19.37	20.13	23.43	30	PASS
	2417/CH 2	20.86	21.62	20.52	21.28	24.46	30	PASS
	2422/CH 3	22.00	22.76	21.53	22.29	25.54	30	PASS
	2427/CH 4	22.84	23.60	22.55	23.31	26.46	30	PASS
	2432/CH 5	22.63	23.39	23.05	23.81	26.61	30	PASS
	2437/CH 6	22.51	23.27	22.68	23.44	26.36	30	PASS

	2442/CH 7	22.95	23.71	22.88	23.64	26.69	30	PASS
	2447/CH 8	22.65	23.41	22.23	22.99	26.21	30	PASS
	2452/CH 9	21.49	22.25	21.16	21.92	25.10	30	PASS
	2457/CH 10	20.49	21.25	20.07	20.83	24.06	30	PASS
	2462/CH 11	19.50	20.26	19.07	19.83	23.06	30	PASS
802.11ax HE40	2422/CH 3	16.65	17.94	16.24	17.53	20.75	30	PASS
	2427/CH 4	17.63	18.92	17.36	18.65	21.80	30	PASS
	2432/CH 5	19.74	21.03	19.34	20.63	23.85	30	PASS
	2437/CH 6	20.44	21.73	20.04	21.33	24.54	30	PASS
	2442/CH 7	19.87	21.16	19.40	20.69	23.94	30	PASS
	2447/CH 8	19.88	21.17	19.34	20.63	23.92	30	PASS
	2452/CH 9	18.36	19.65	17.83	19.12	22.40	30	PASS

Note: 1.Average Power with duty factor = Average Power Measured +Duty cycle correction factor

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

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

3. The manufacturer declared that the directional gain = 2.64dBi<6dBi. So the power limit is 30dBm.

5.2. 99% Bandwidth and 6dB Bandwidth

Ambient Condition

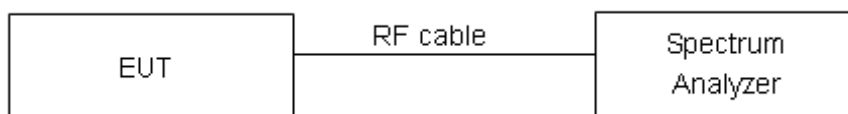
Temperature	Relative humidity
20°C ~ 25°C	45% ~ 50%

Method of Measurement

The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable. RBW is set to 100 kHz; VBW is set to 300 kHz on spectrum analyzer.
Dector=Peak, Trace mode=max hold.

The EUT was connected to the spectrum analyzer through a known loss cable. The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value.

Test Setup



Limits

Rule Part 15.247 (a) (2) specifies that “Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.”

minimum 6 dB bandwidth	≥ 500 kHz
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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.

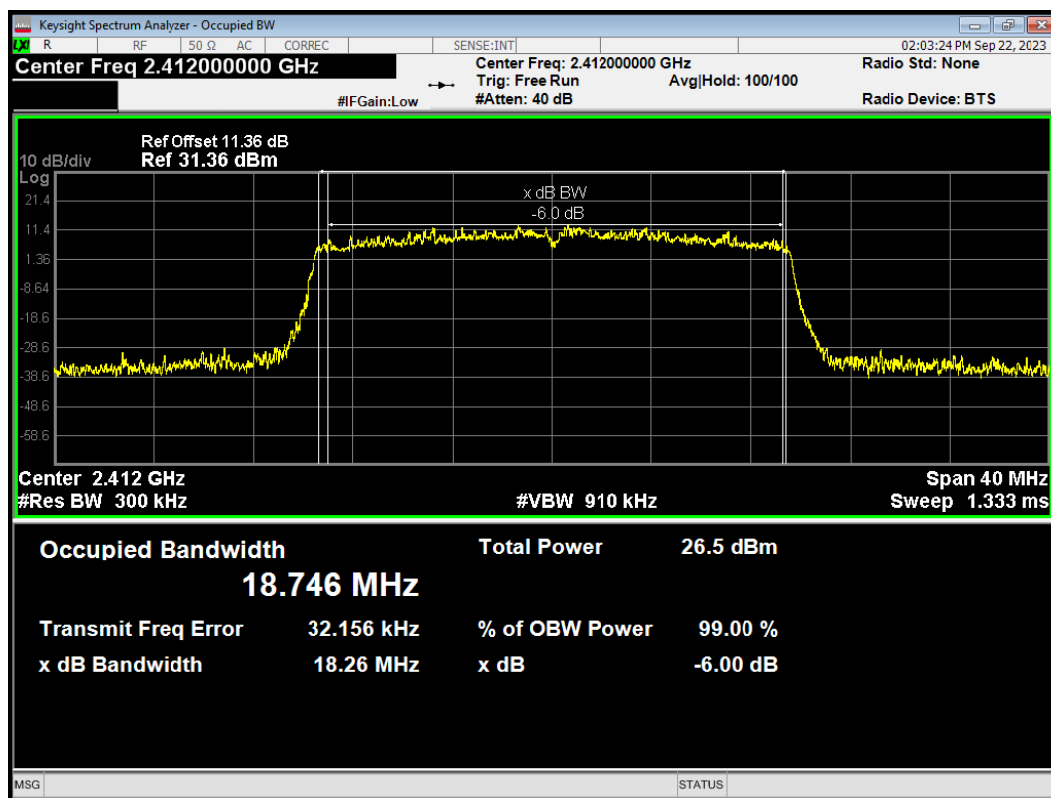
Test Results:

Test Mode	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 6 dB bandwidth (MHz)	Limit (kHz)	Conclusion
802.11b	2412	13.962	10.065	500	PASS
	2417	13.968	10.090	500	PASS
	2422	13.986	10.063	500	PASS
	2437	13.985	10.092	500	PASS
	2447	13.987	10.079	500	PASS
	2452	14.032	10.065	500	PASS
	2457	13.987	10.086	500	PASS
	2462	13.969	10.071	500	PASS
802.11g	2412	16.254	15.073	500	PASS
	2417	16.240	15.663	500	PASS
	2422	16.258	15.646	500	PASS
	2427	16.326	15.110	500	PASS
	2432	16.426	15.053	500	PASS
	2437	16.410	15.272	500	PASS
	2442	16.349	15.113	500	PASS
	2447	16.314	15.028	500	PASS
	2452	16.267	15.005	500	PASS
	2457	16.256	15.090	500	PASS
	2462	16.235	15.106	500	PASS
802.11n HT20	2412	17.359	15.094	500	PASS
	2417	17.384	15.610	500	PASS
	2422	17.435	15.645	500	PASS
	2427	17.437	15.089	500	PASS
	2432	17.531	15.123	500	PASS
	2437	17.558	15.023	500	PASS
	2442	17.502	15.131	500	PASS
	2447	17.451	15.061	500	PASS
	2452	17.380	15.090	500	PASS
	2457	17.384	15.068	500	PASS
	2462	17.384	15.075	500	PASS
802.11n HT40	2422	35.735	35.098	500	PASS
	2427	35.739	35.079	500	PASS
	2432	35.768	35.078	500	PASS
	2437	35.726	35.101	500	PASS
	2442	35.722	35.087	500	PASS
	2447	35.728	35.102	500	PASS
	2452	35.746	33.753	500	PASS
802.11ax	2412	18.746	15.069	500	PASS

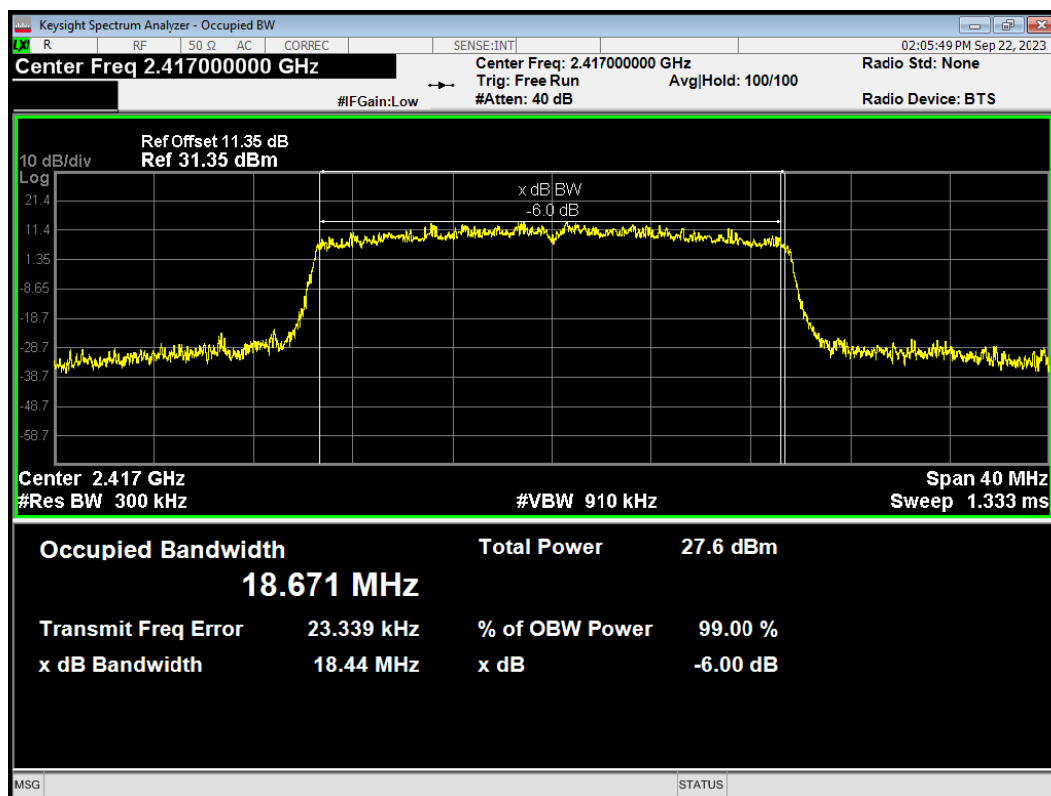
HE20	2417	18.671	15.072	500	PASS
	2422	18.725	15.098	500	PASS
	2427	18.754	15.055	500	PASS
	2432	18.796	15.114	500	PASS
	2437	18.811	15.014	500	PASS
	2442	18.761	15.074	500	PASS
	2447	18.762	15.095	500	PASS
	2452	18.705	15.023	500	PASS
	2457	18.735	15.110	500	PASS
	2462	18.697	15.125	500	PASS
802.11ax HE40	2422	37.363	35.057	500	PASS
	2427	37.489	35.108	500	PASS
	2432	37.426	35.078	500	PASS
	2437	37.444	35.098	500	PASS
	2442	37.426	35.110	500	PASS
	2447	37.495	35.096	500	PASS
	2452	37.385	35.088	500	PASS

99%bandwidth

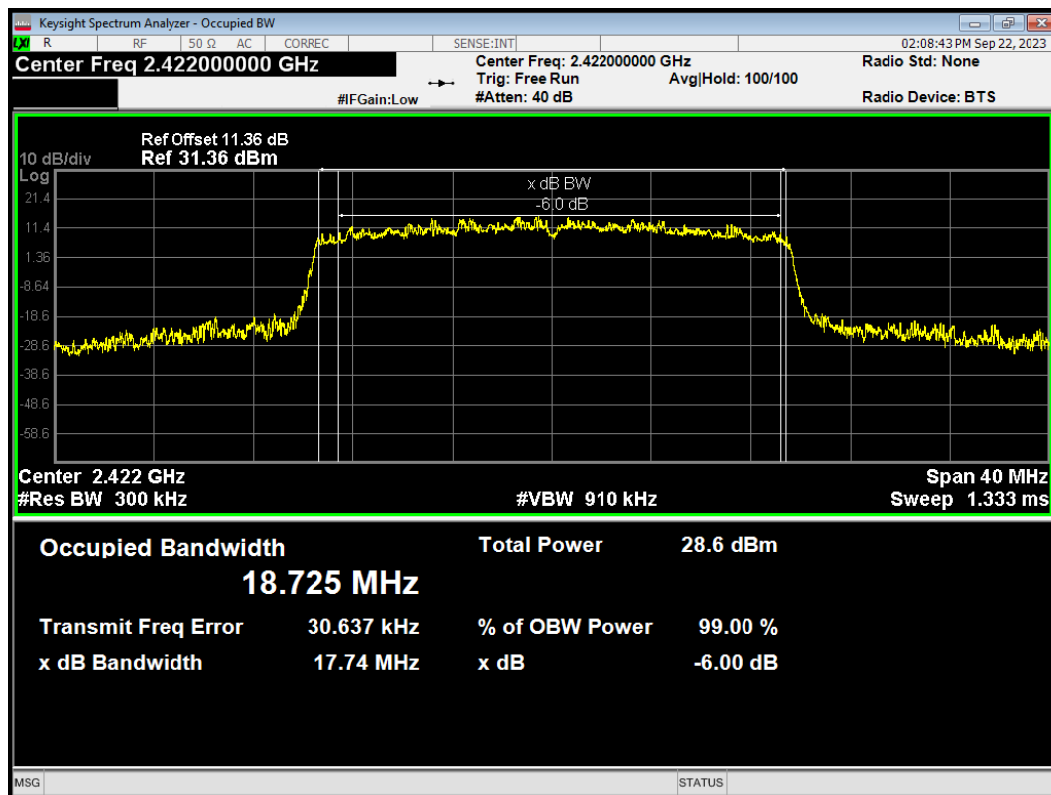
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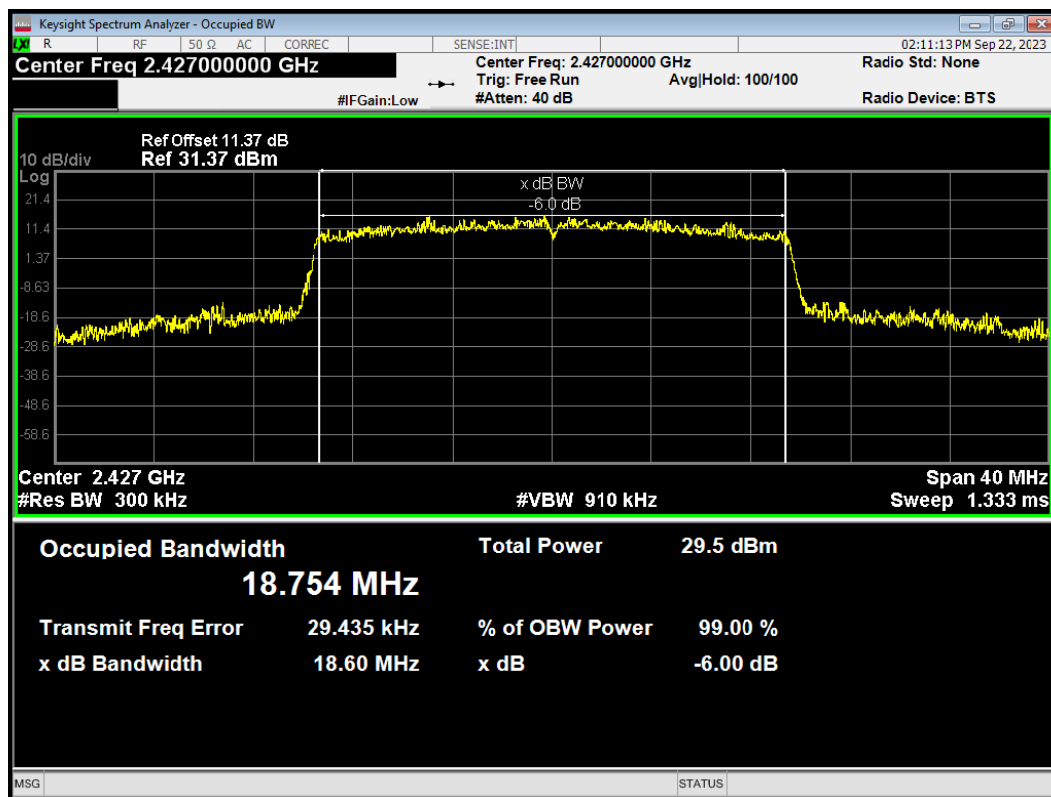
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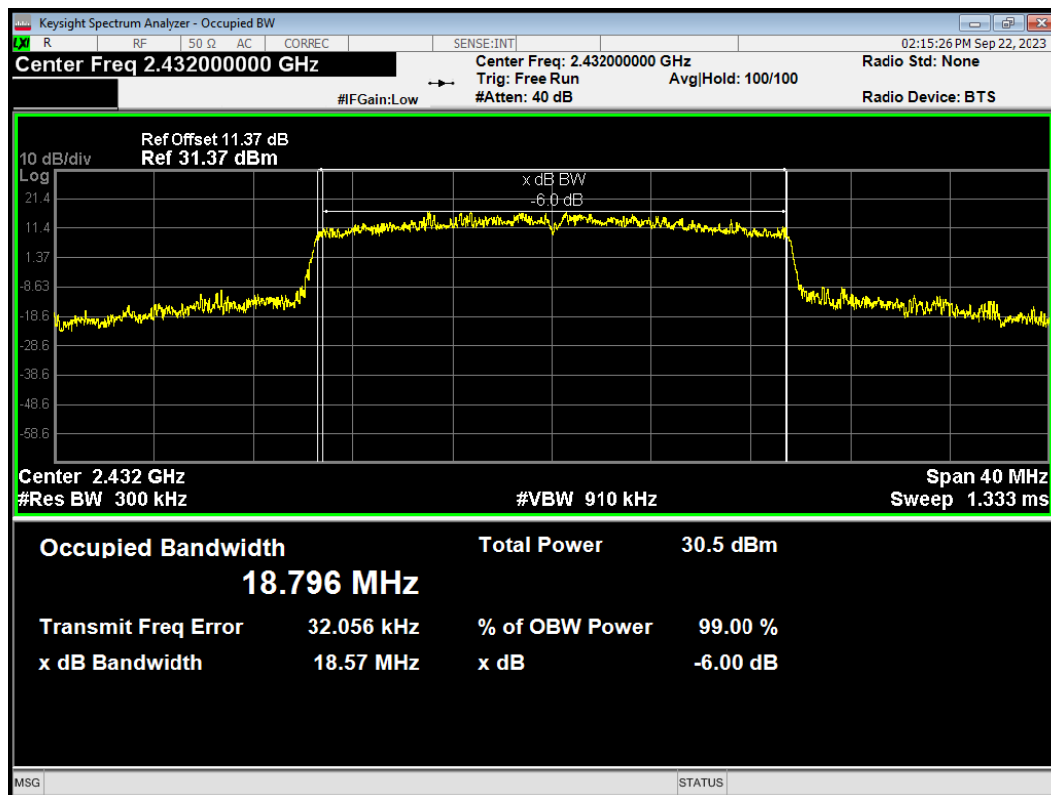
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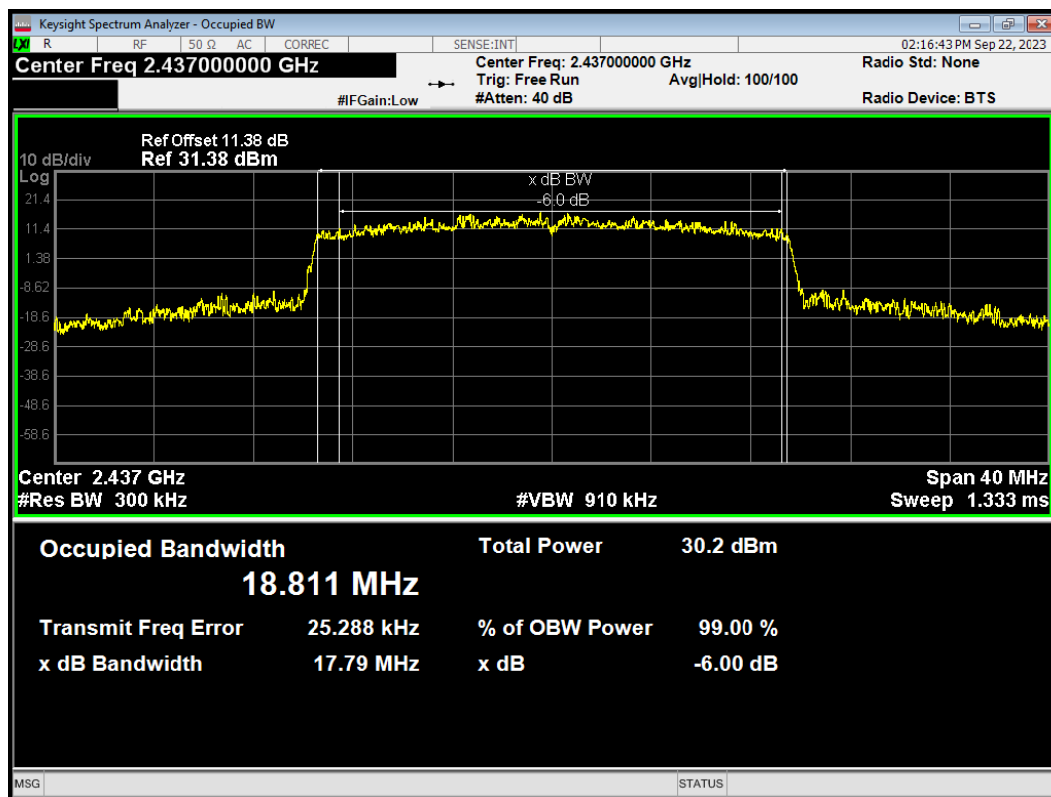
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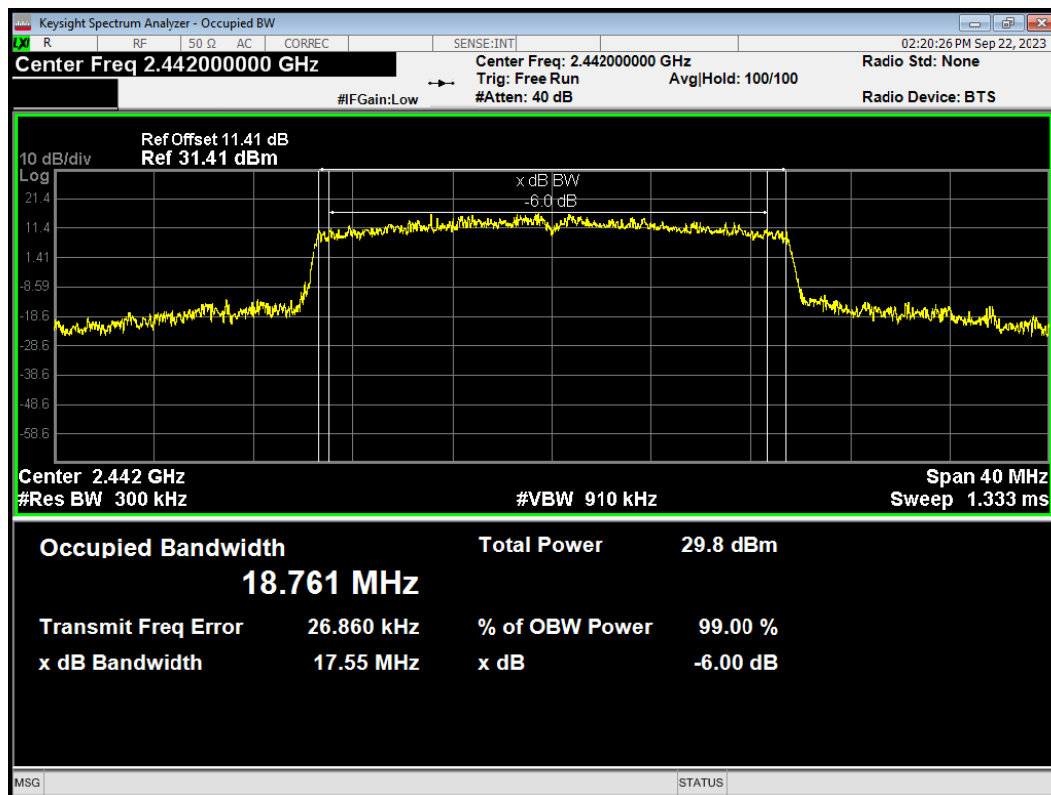
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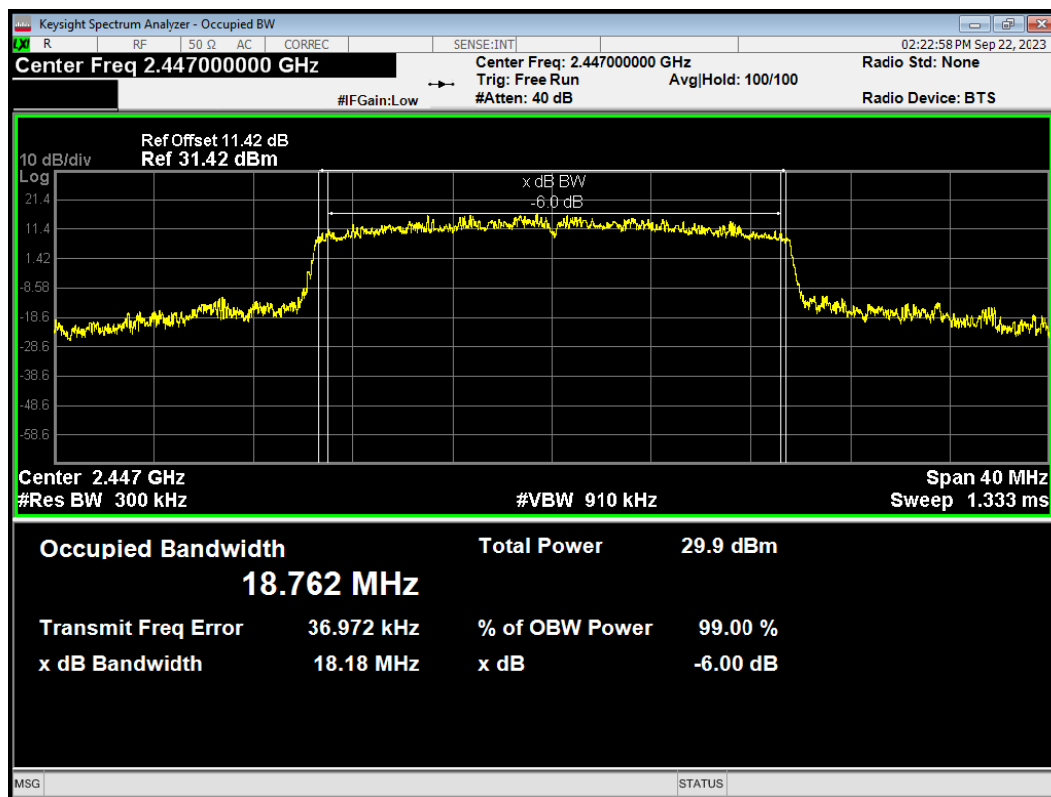
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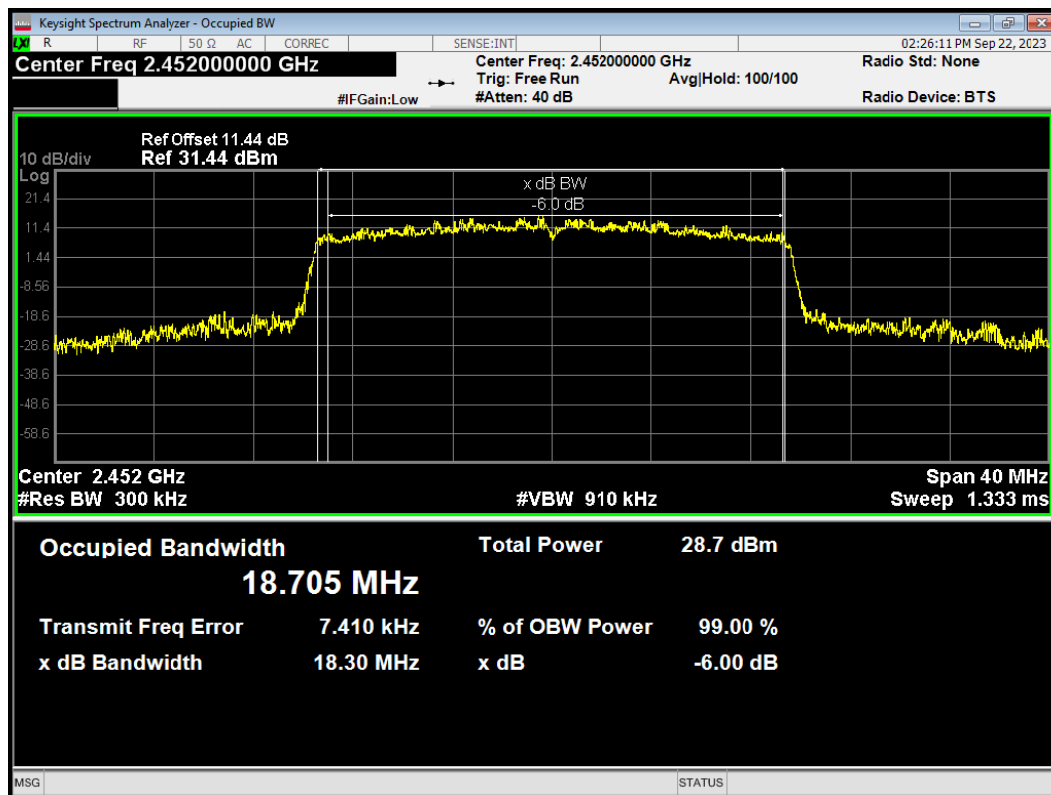
OBW 802.11ax(HE20) 2442MHz



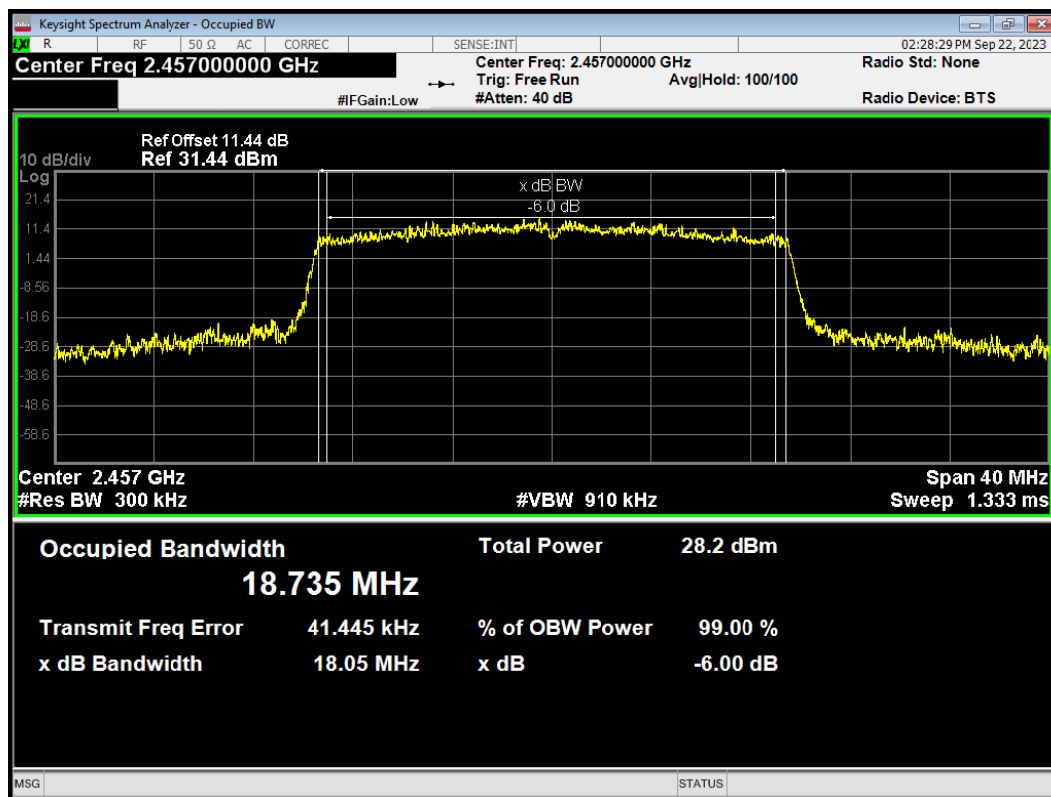
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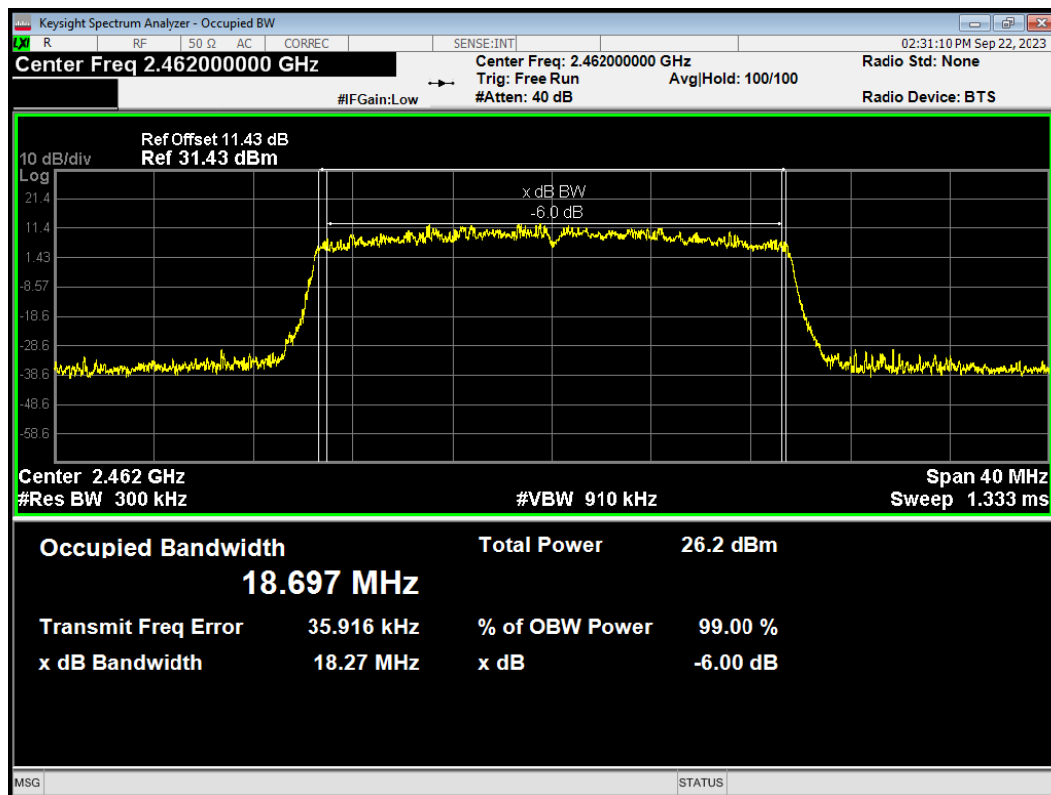
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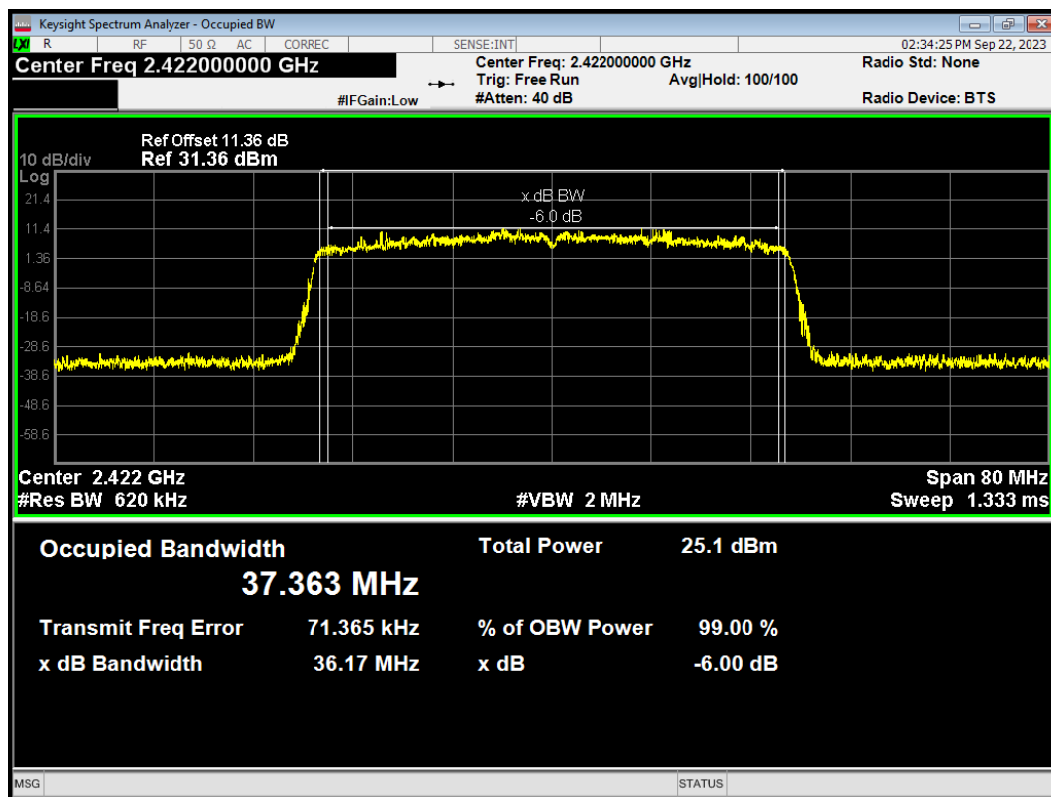
OBW 802.11ax(HE20) 2457MHz



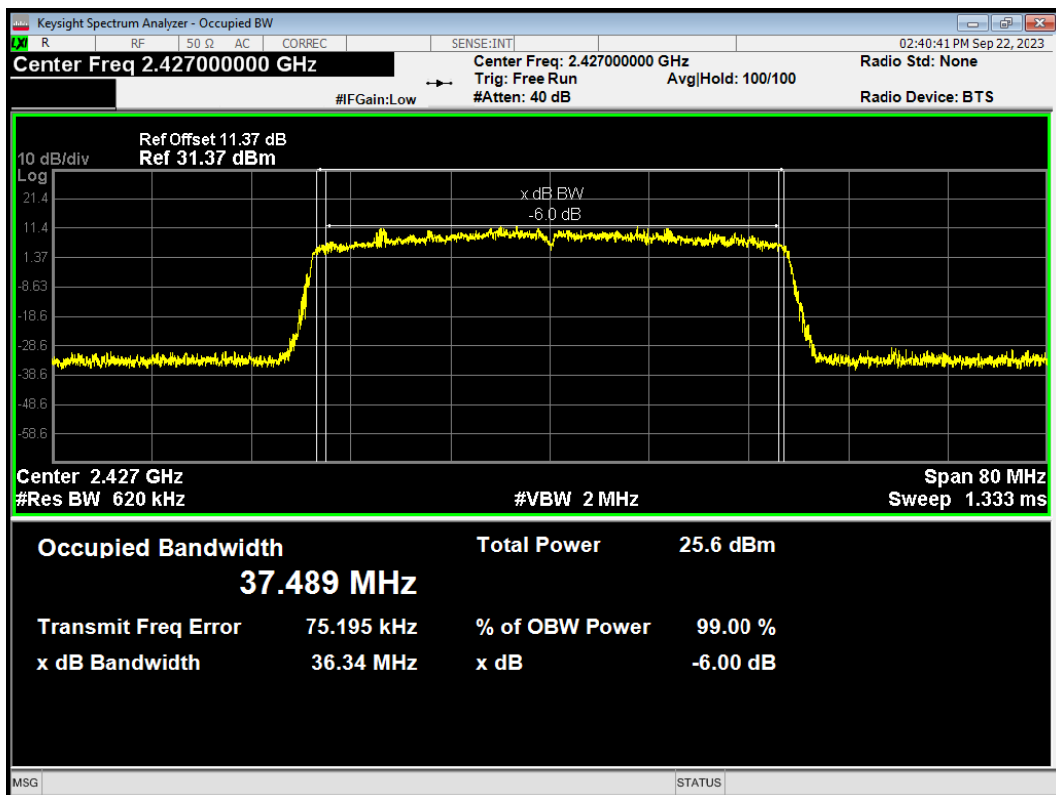
OBW 802.11ax(HE20) 2462MHz



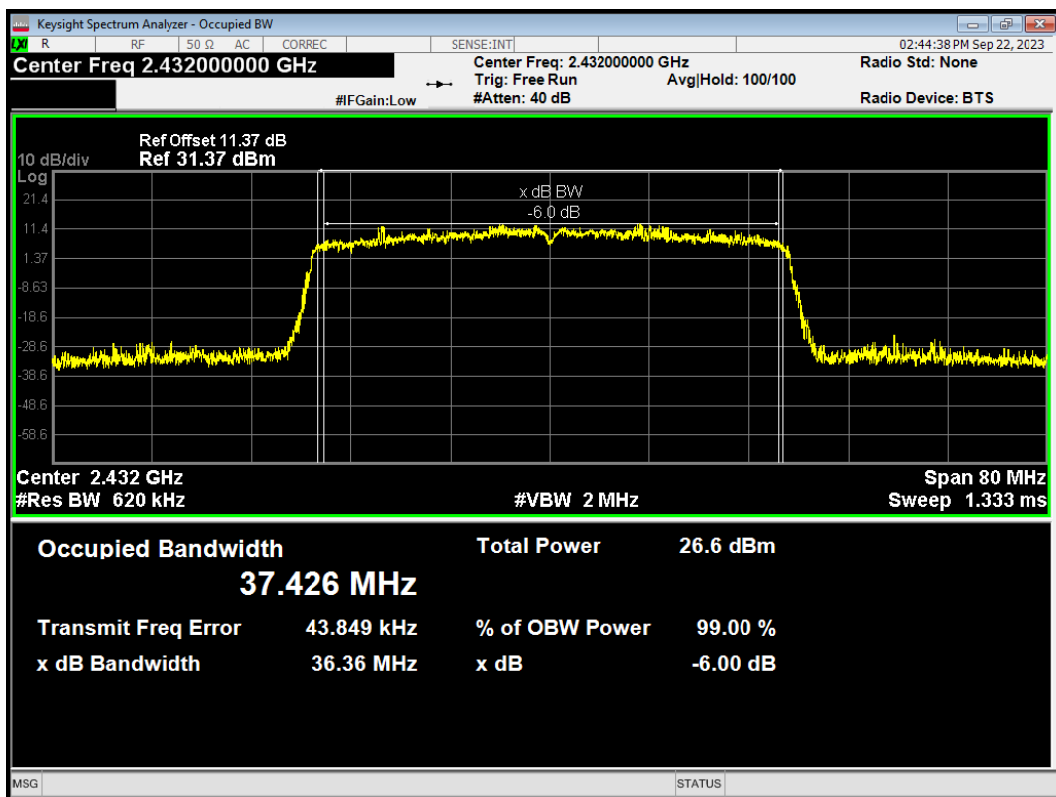
OBW 802.11ax(HE40) 2422MHz



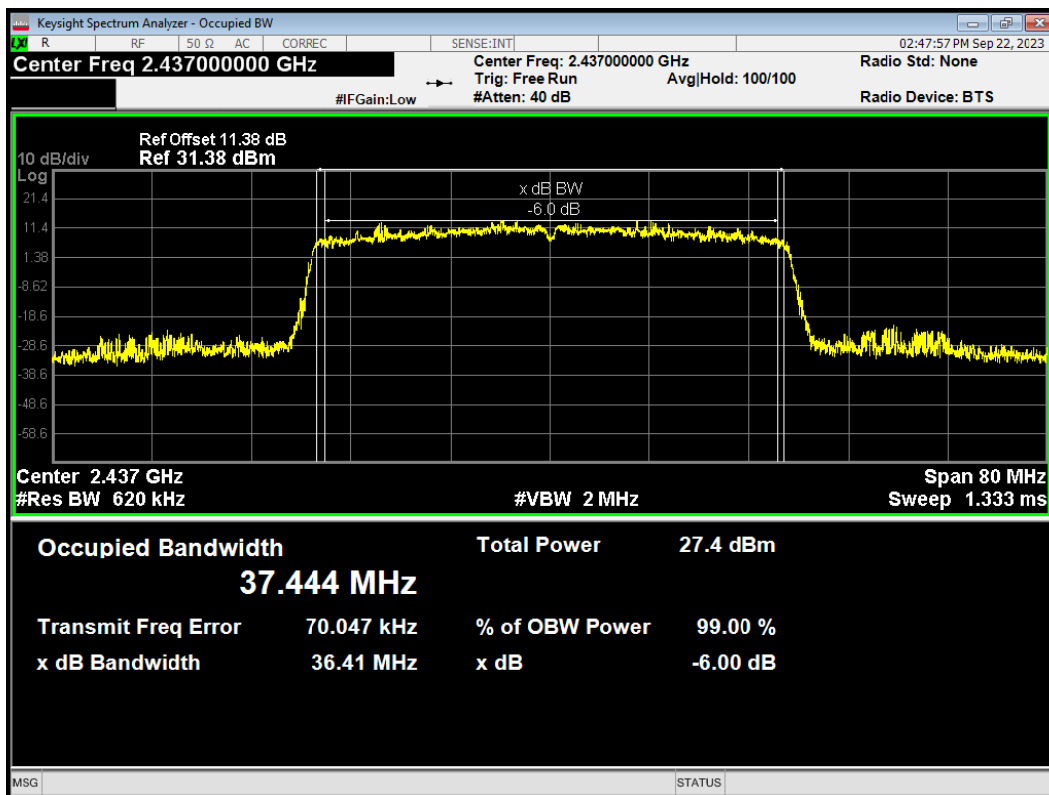
OBW 802.11ax(HE40) 2427MHz



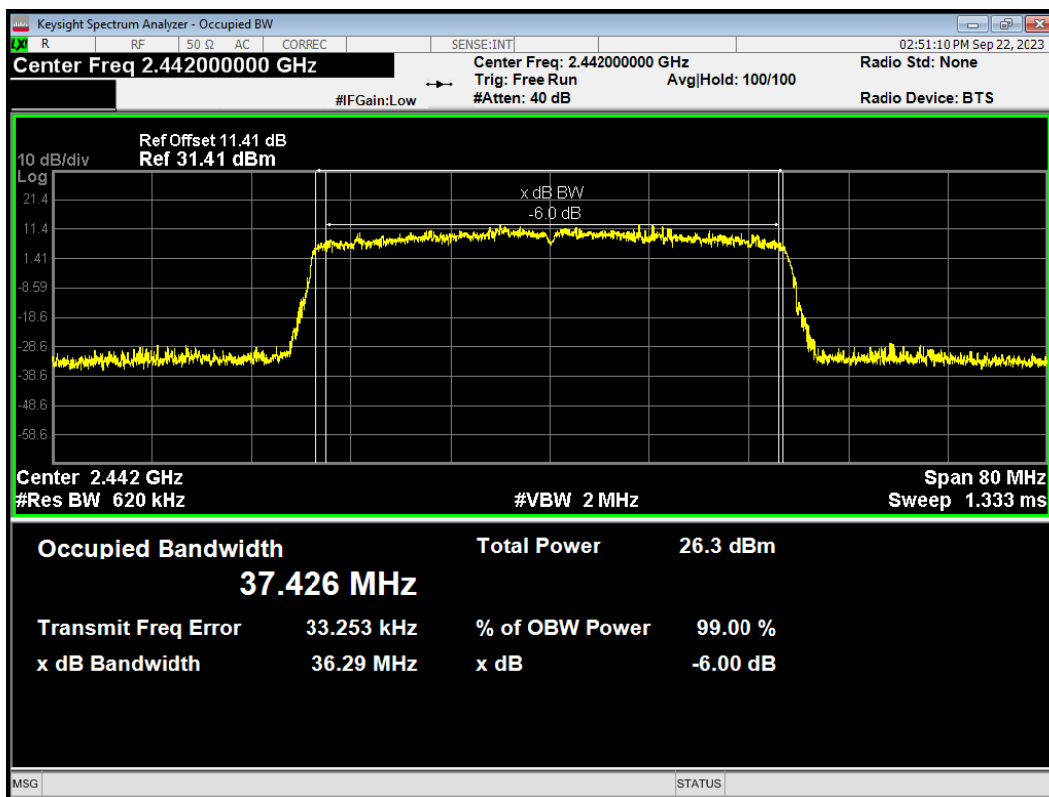
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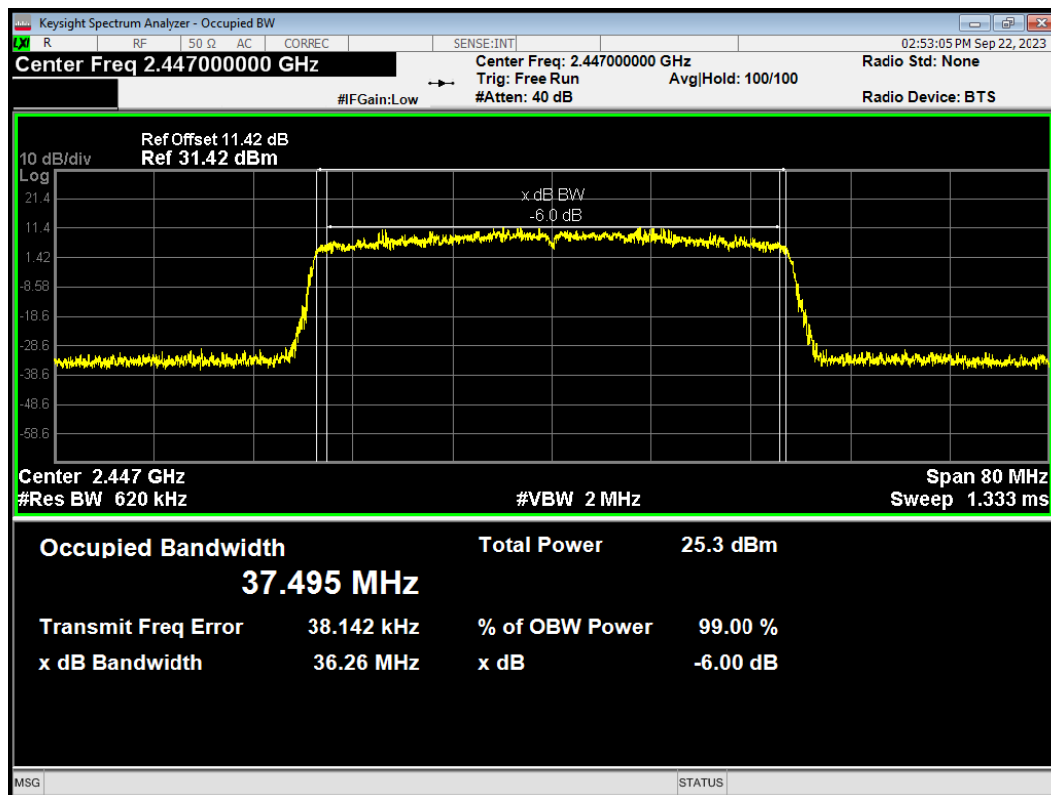
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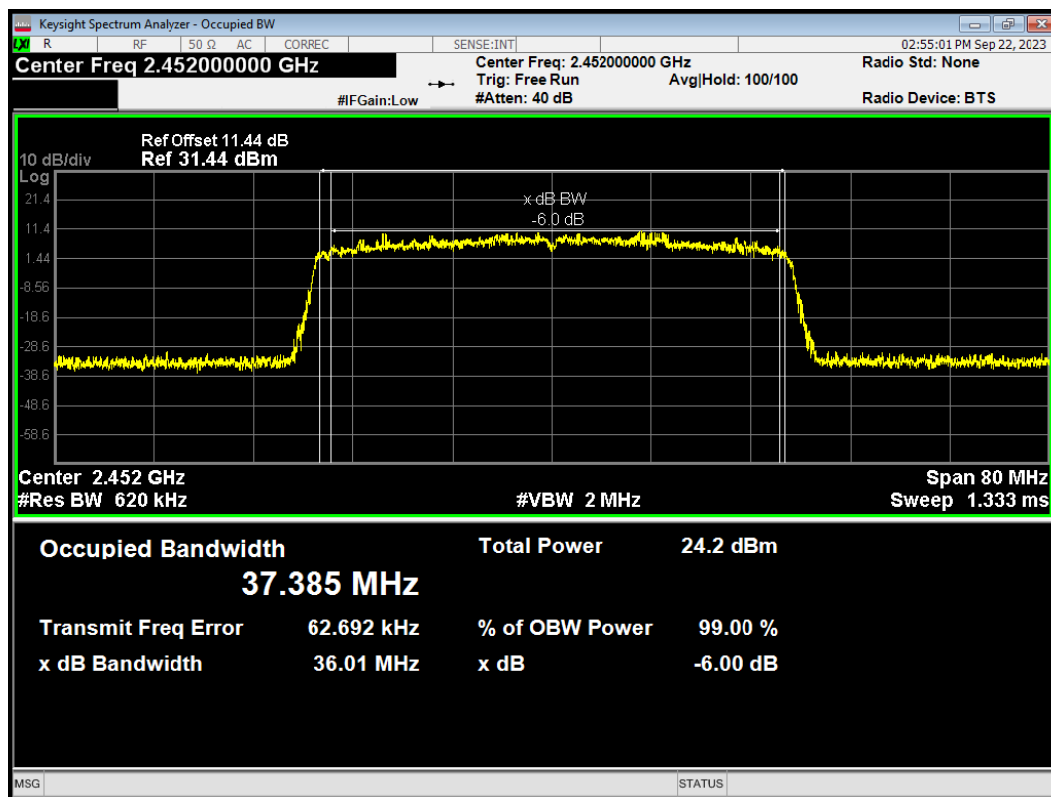
OBW 802.11ax(HE40) 2442MHz



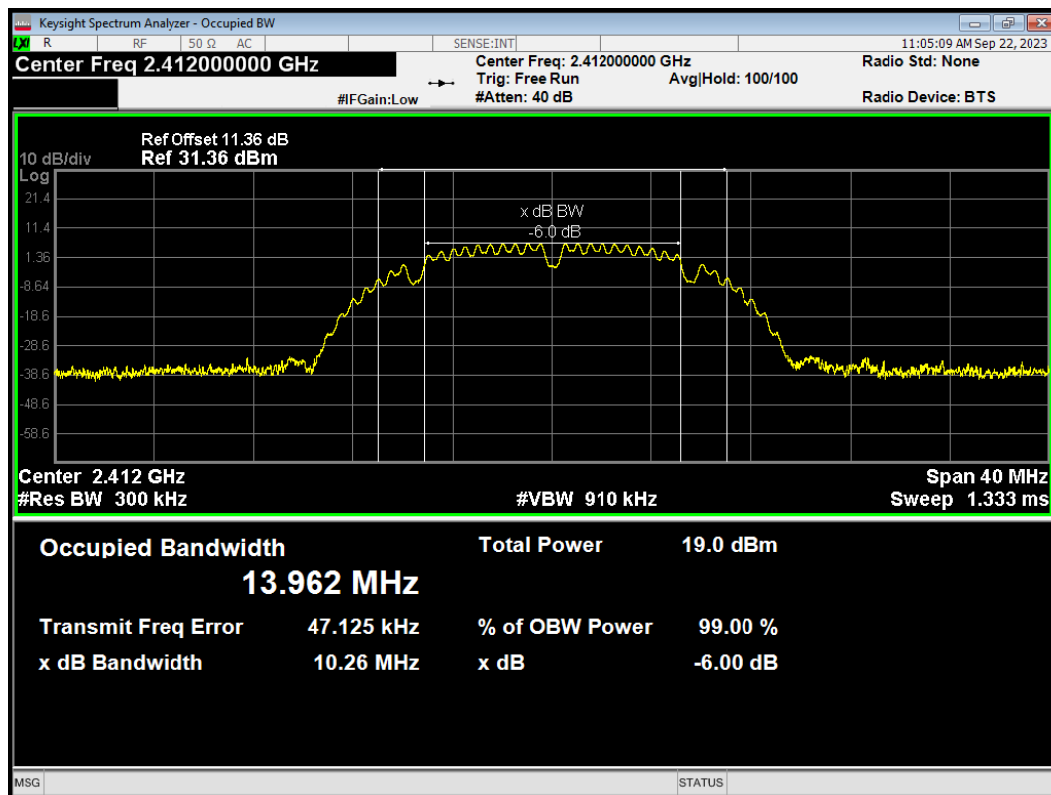
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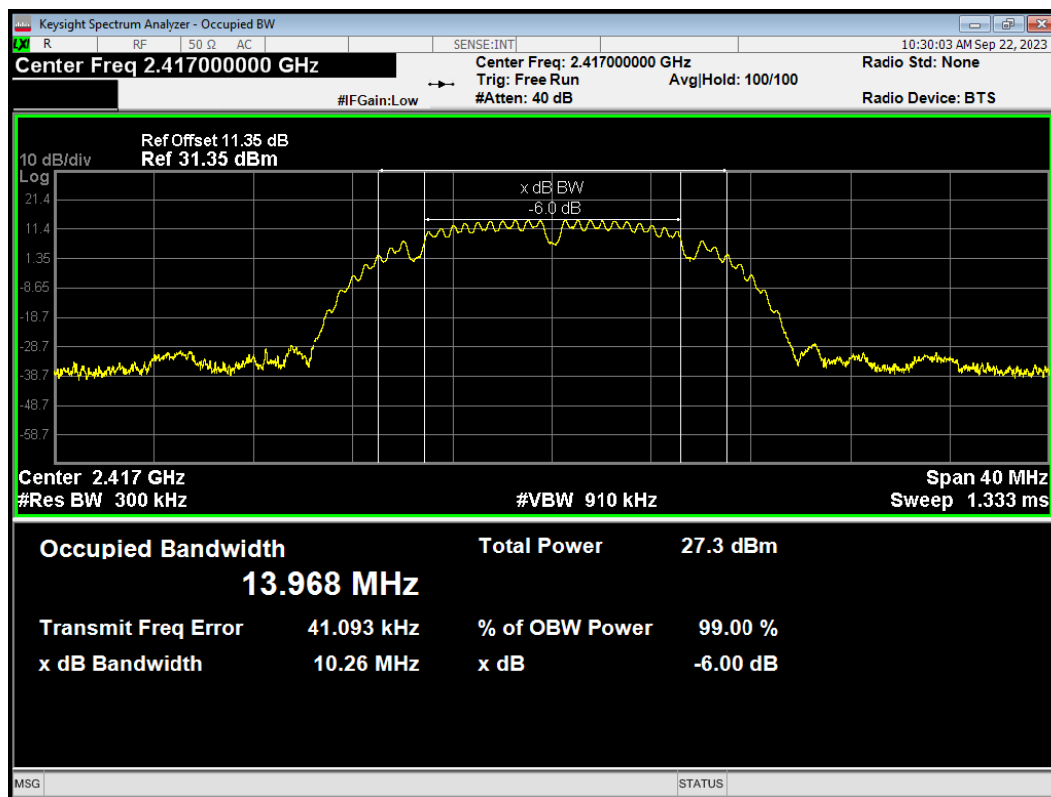
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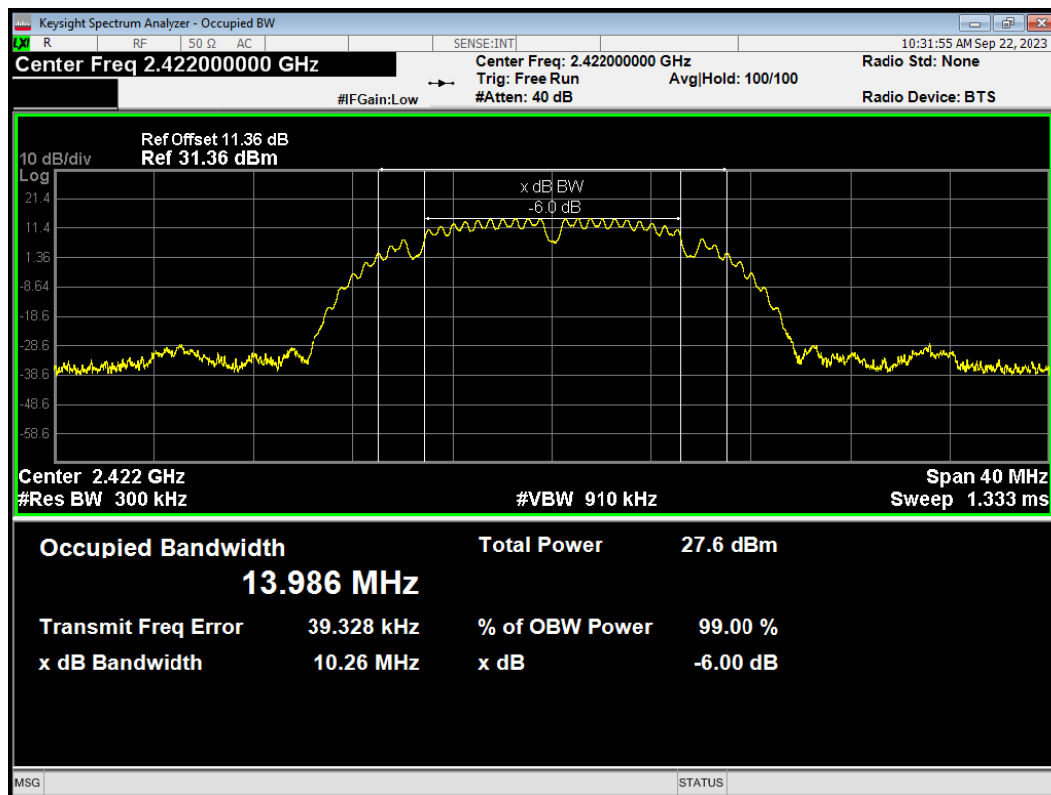
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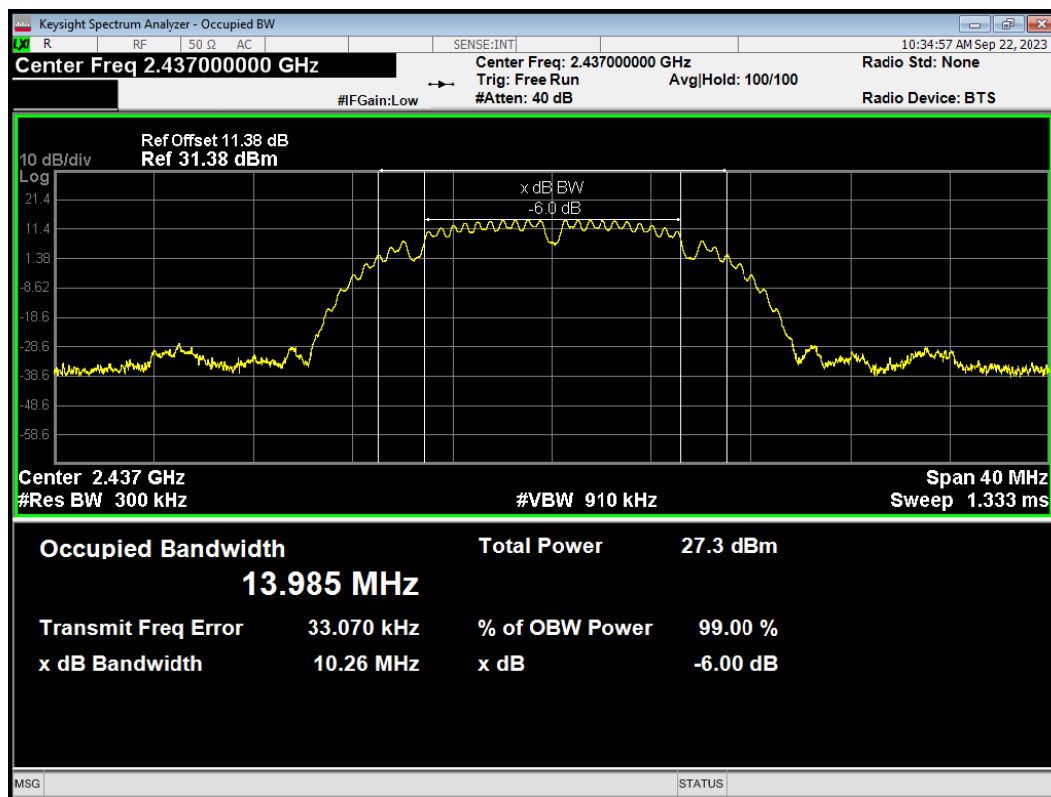
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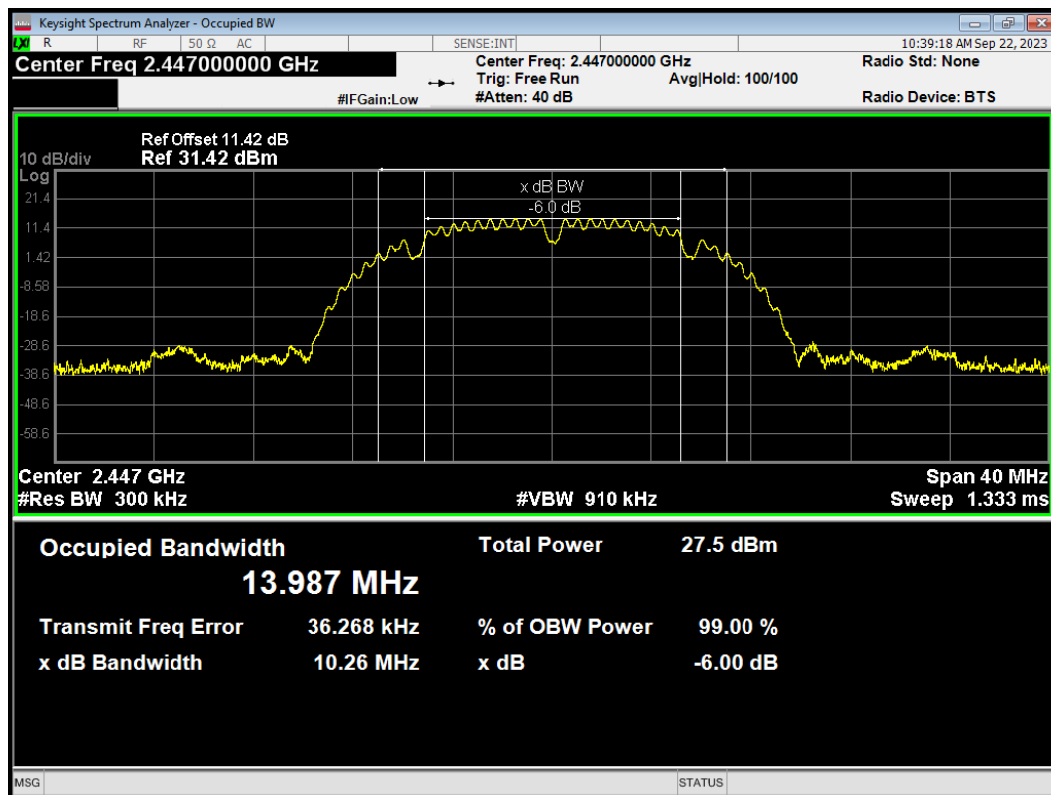
OBW 802.11b 2422MHz



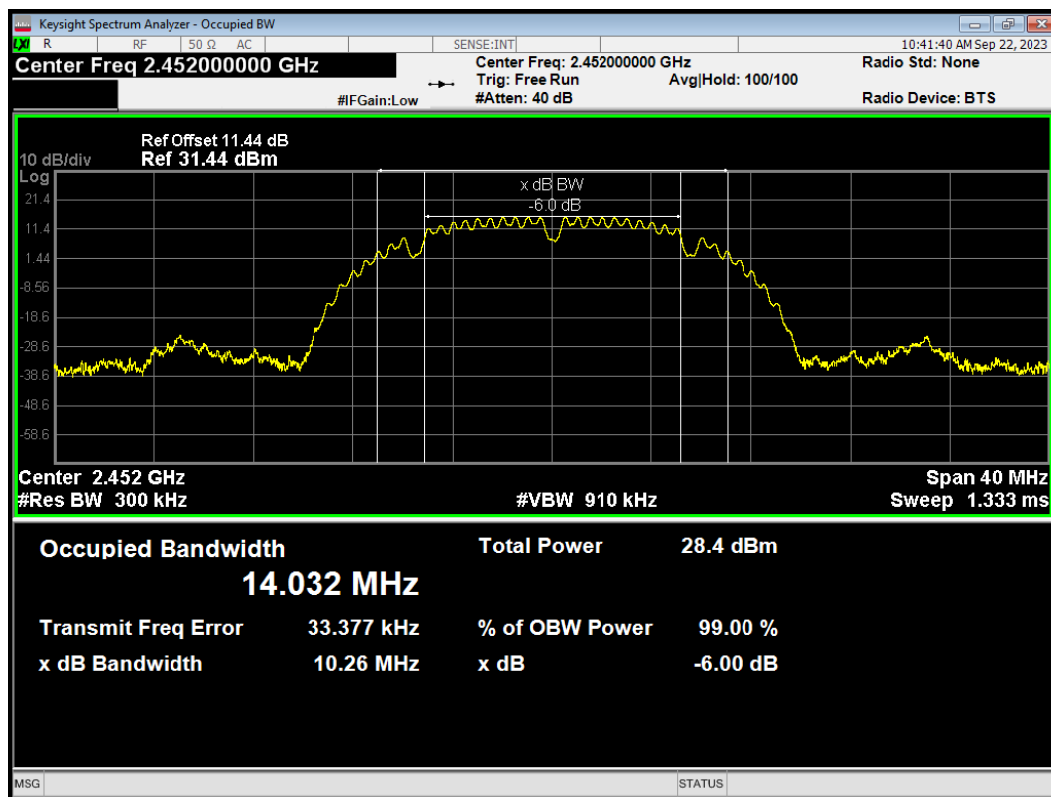
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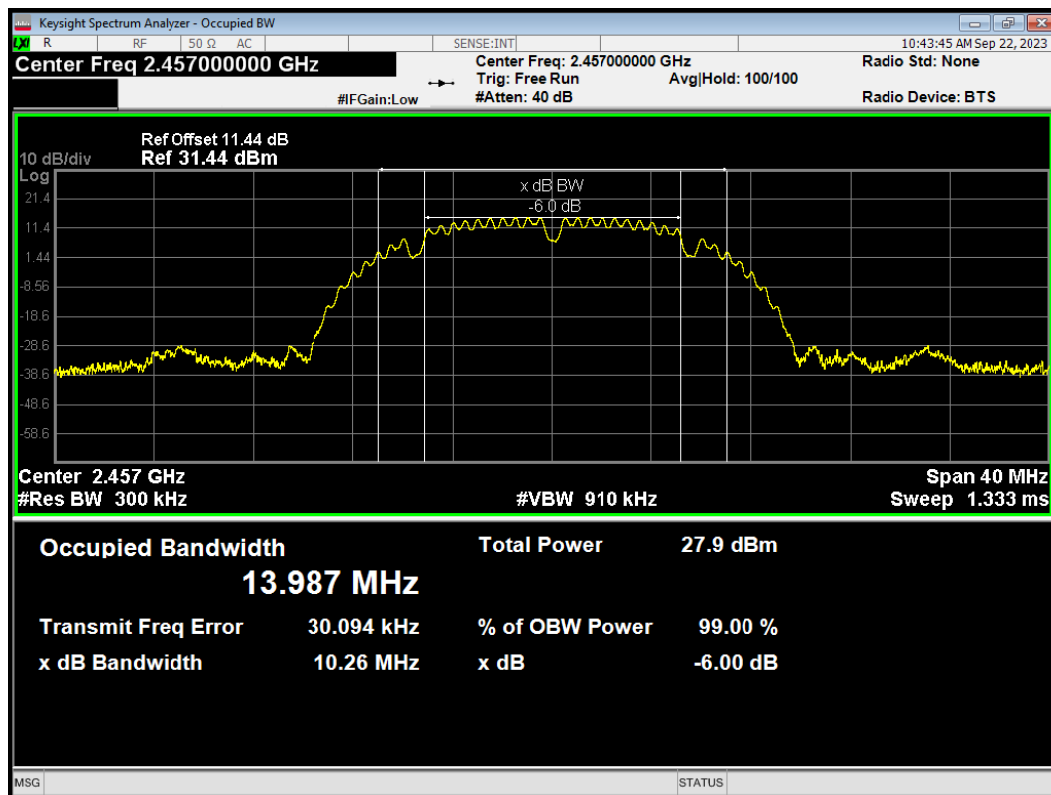
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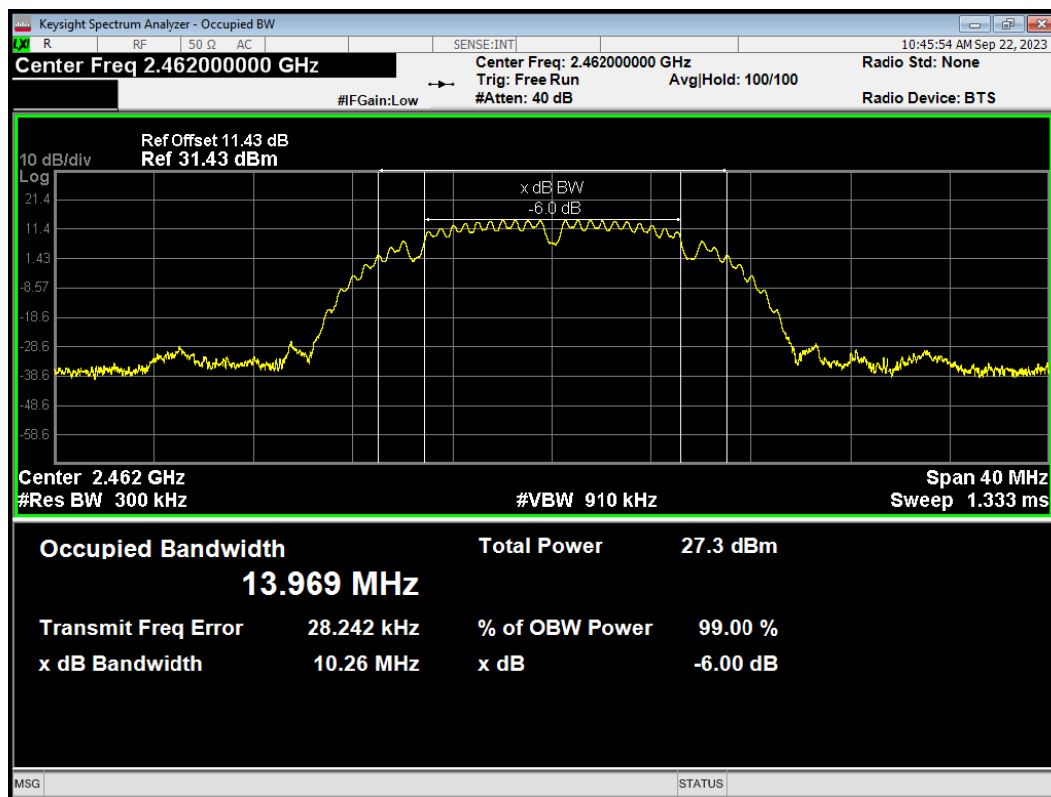
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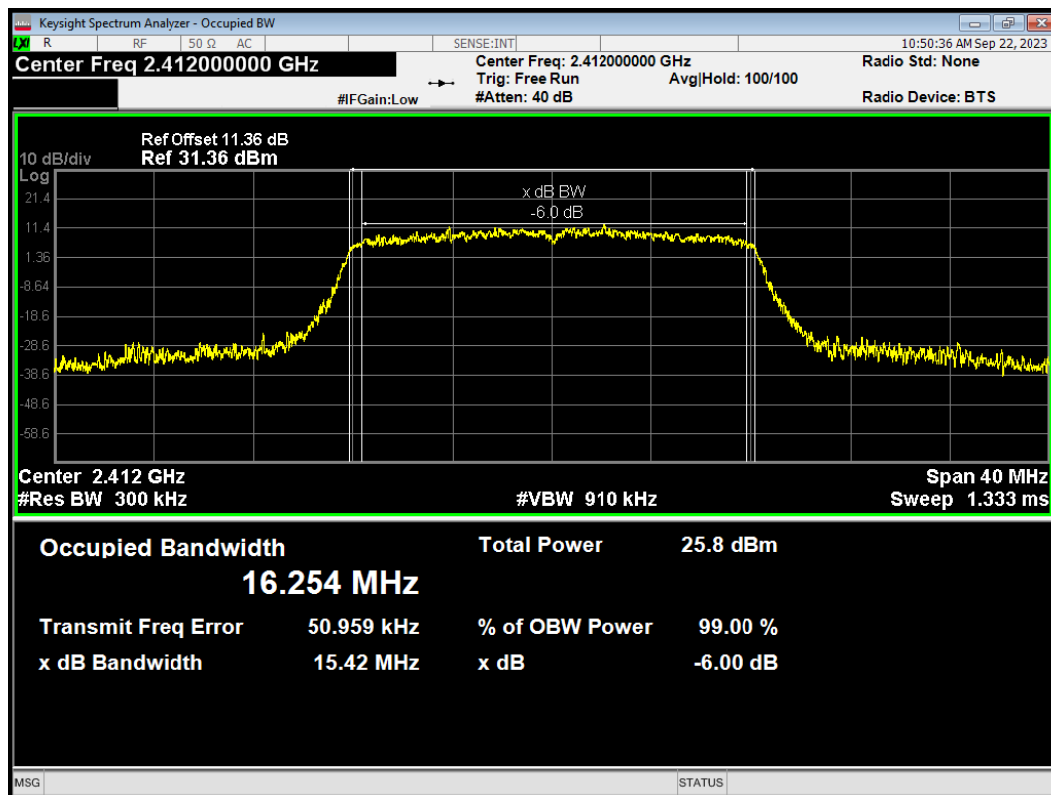
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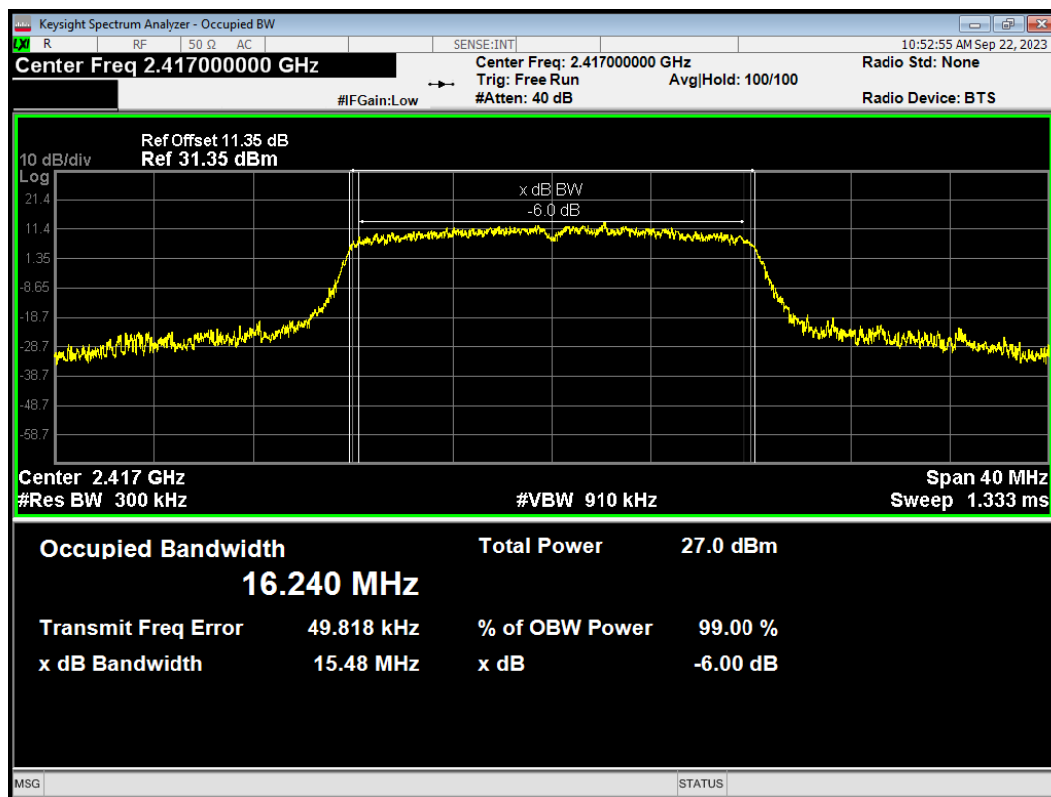
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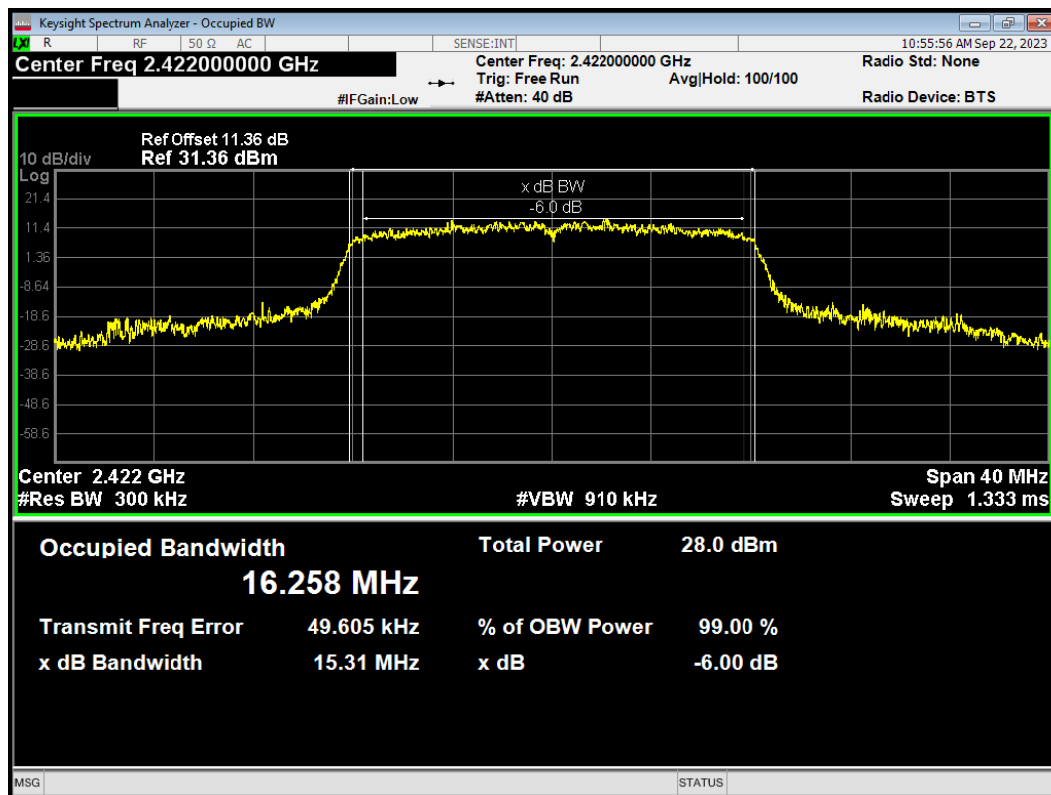
OBW 802.11g 2412MHz



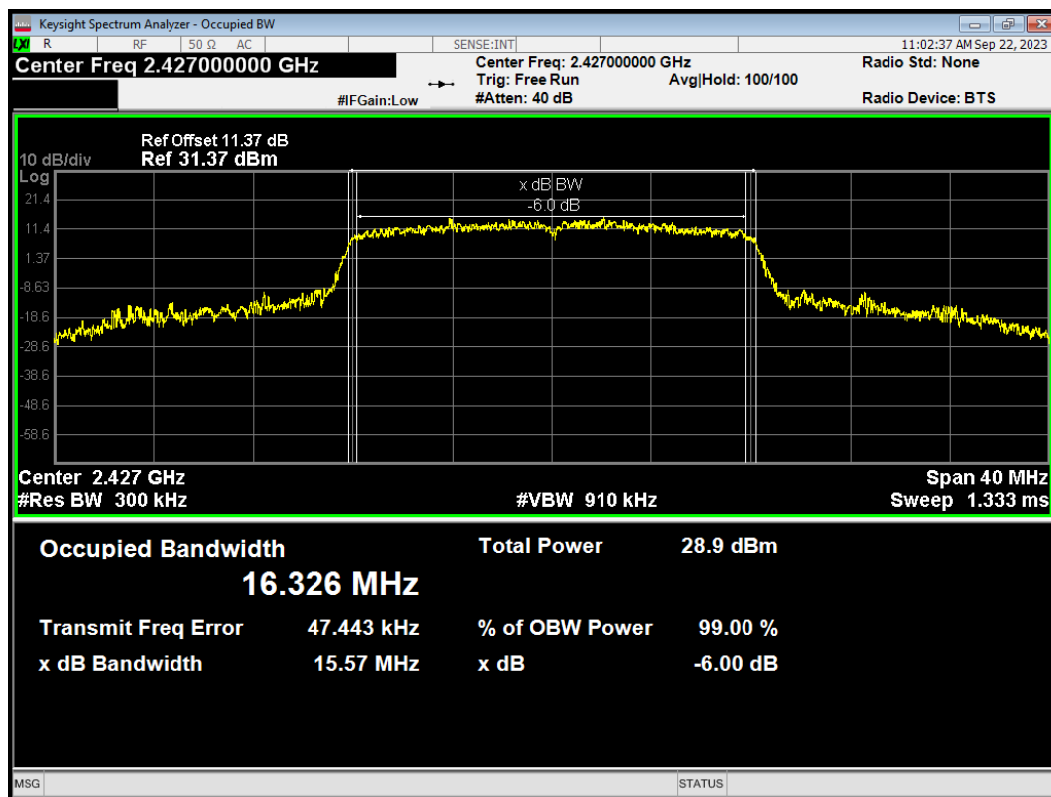
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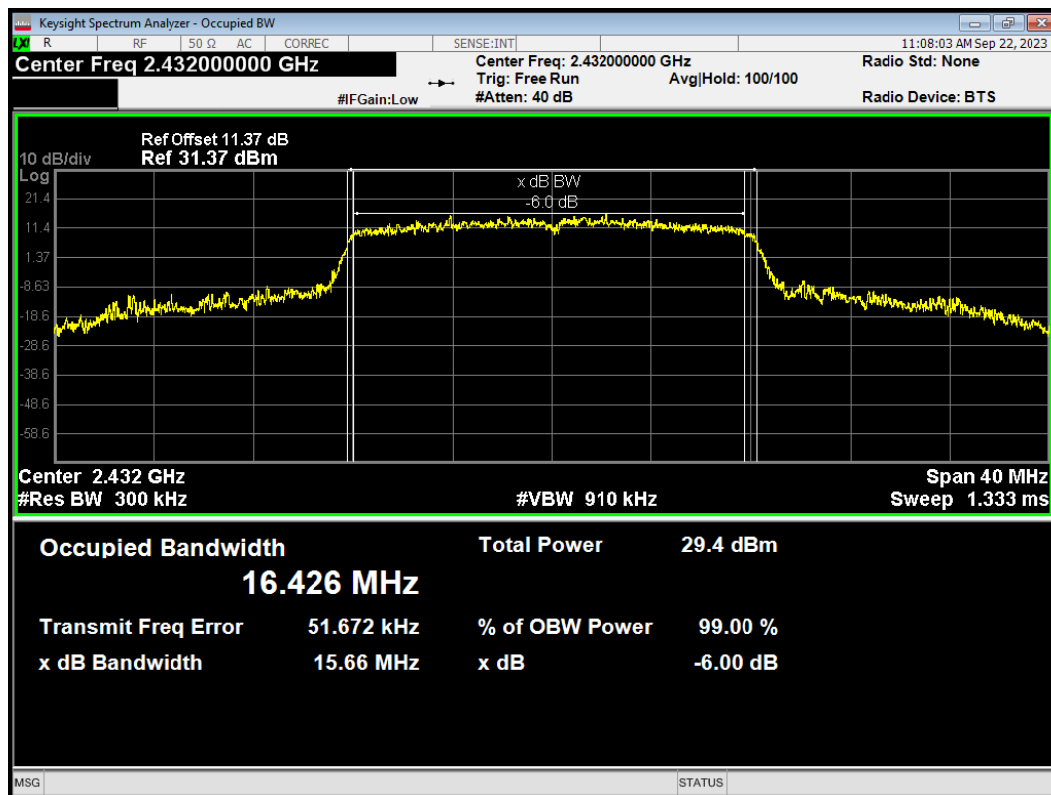
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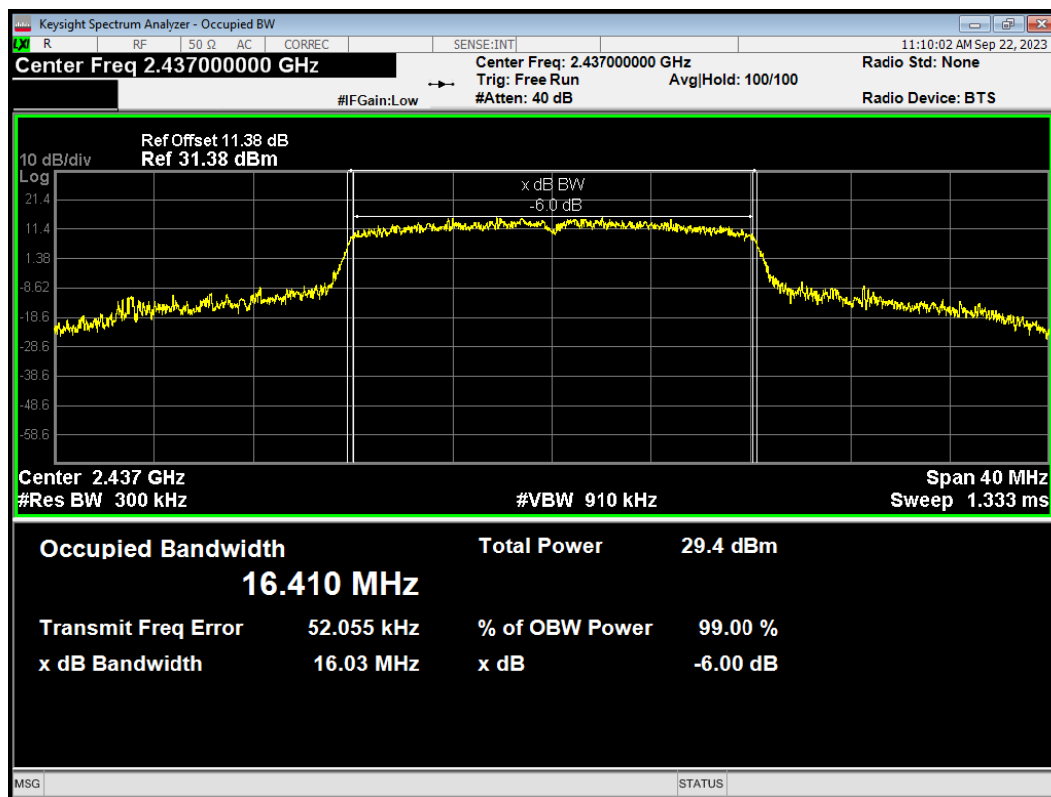
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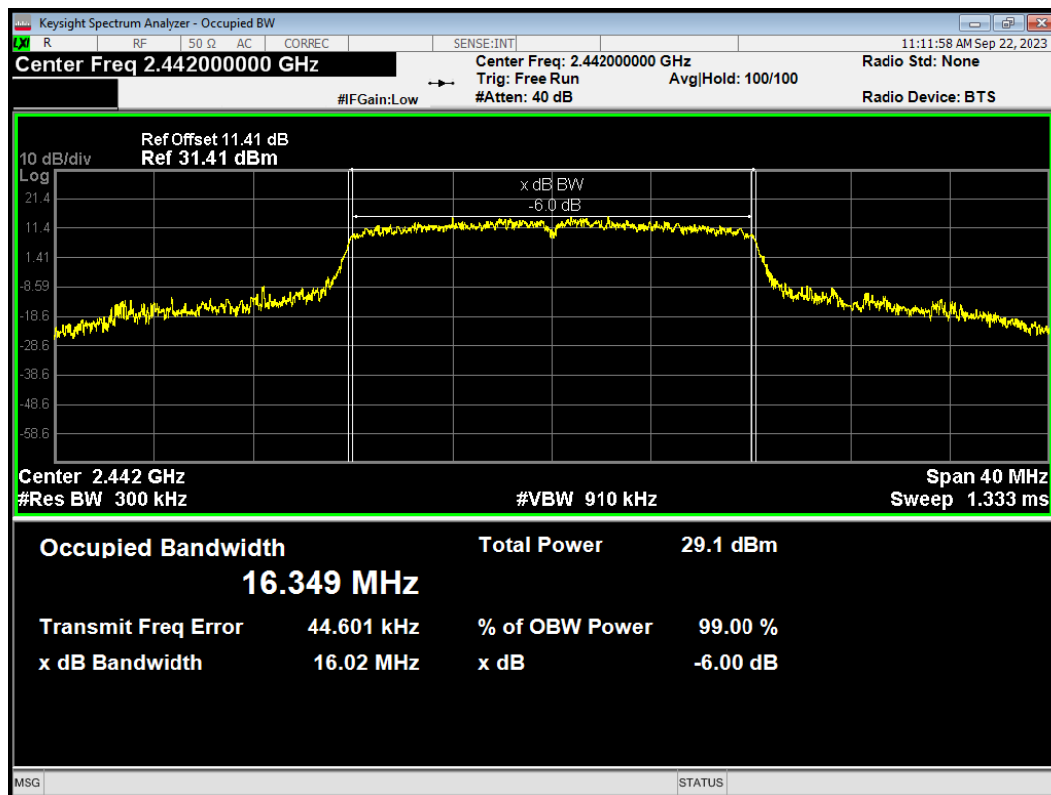
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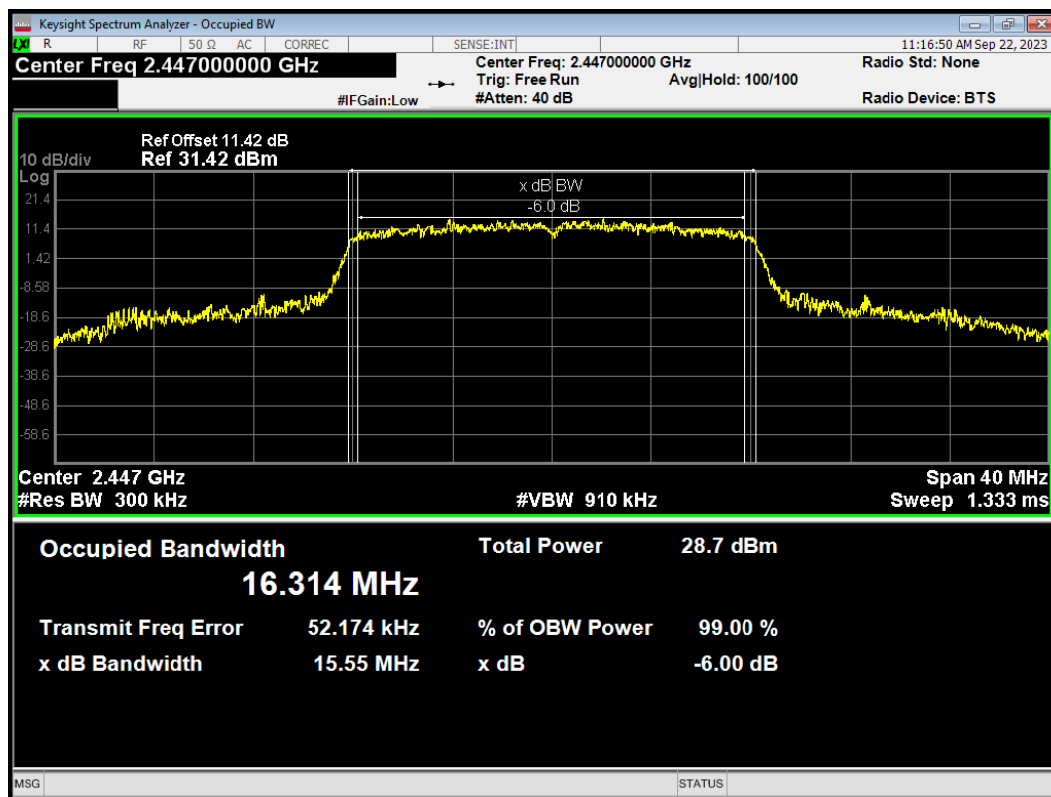
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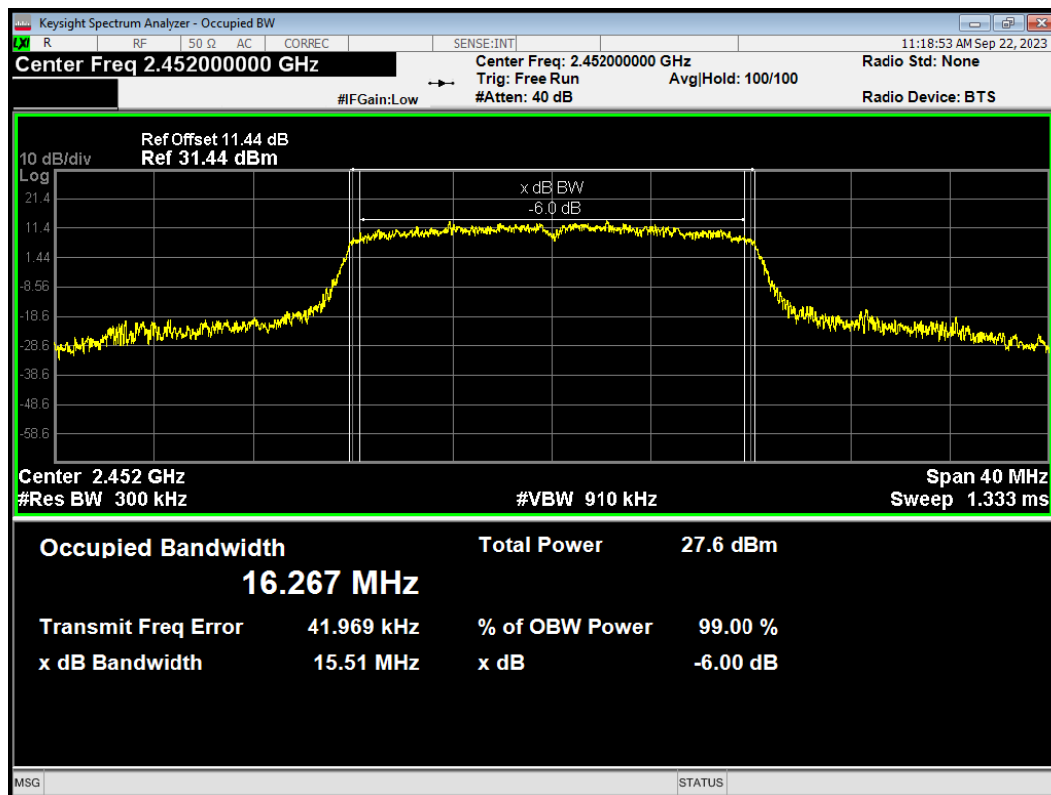
OBW 802.11g 2442MHz



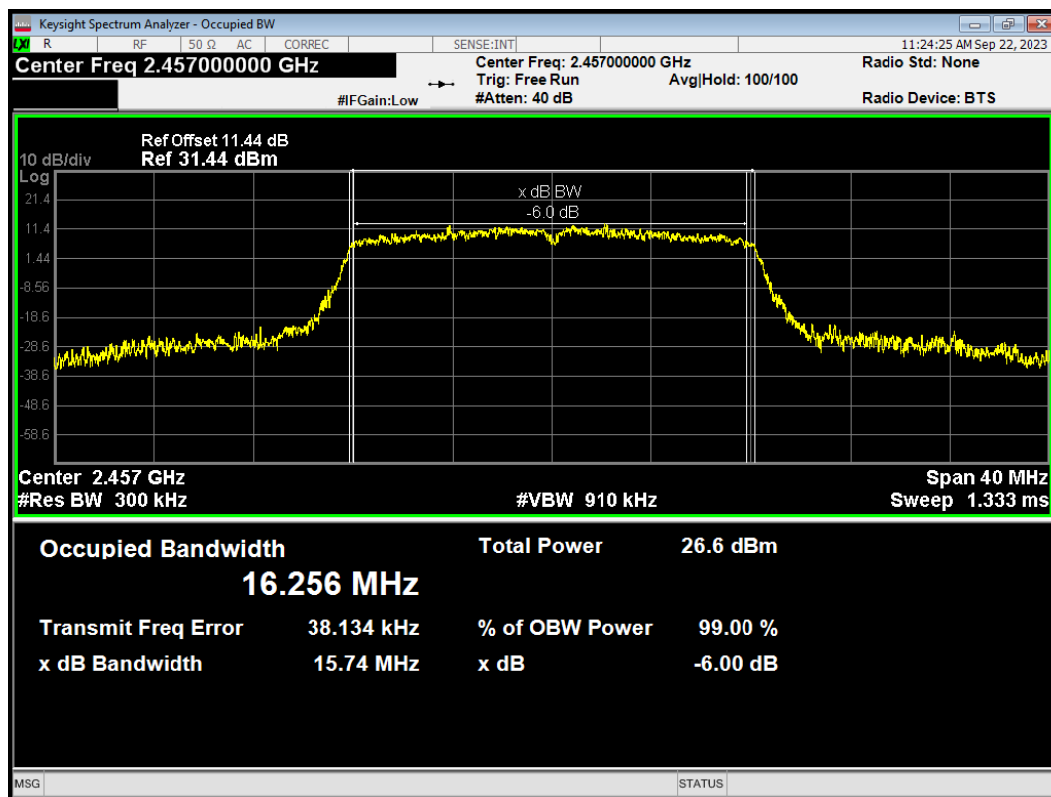
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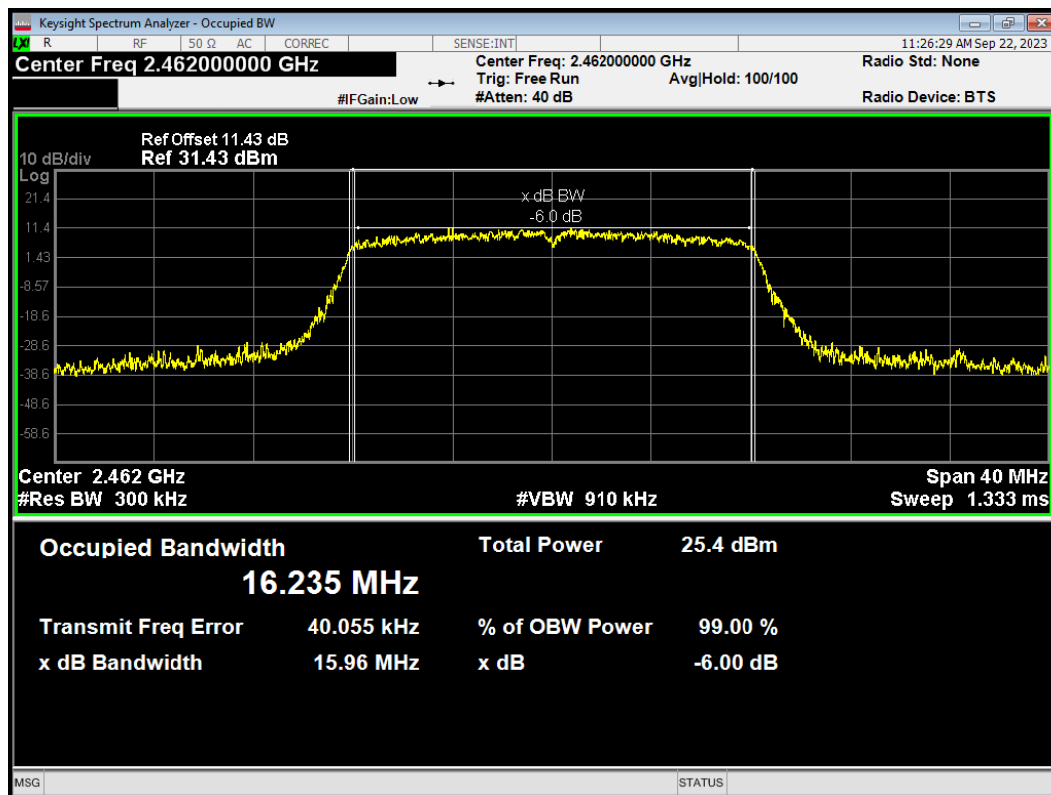
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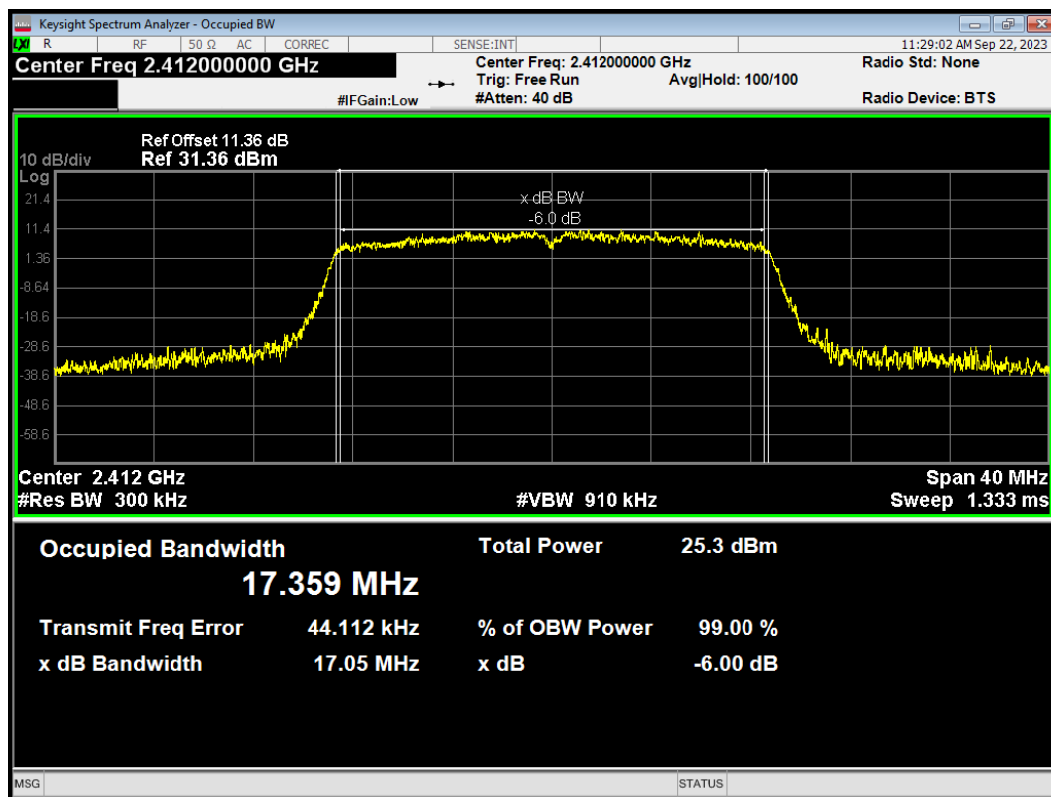
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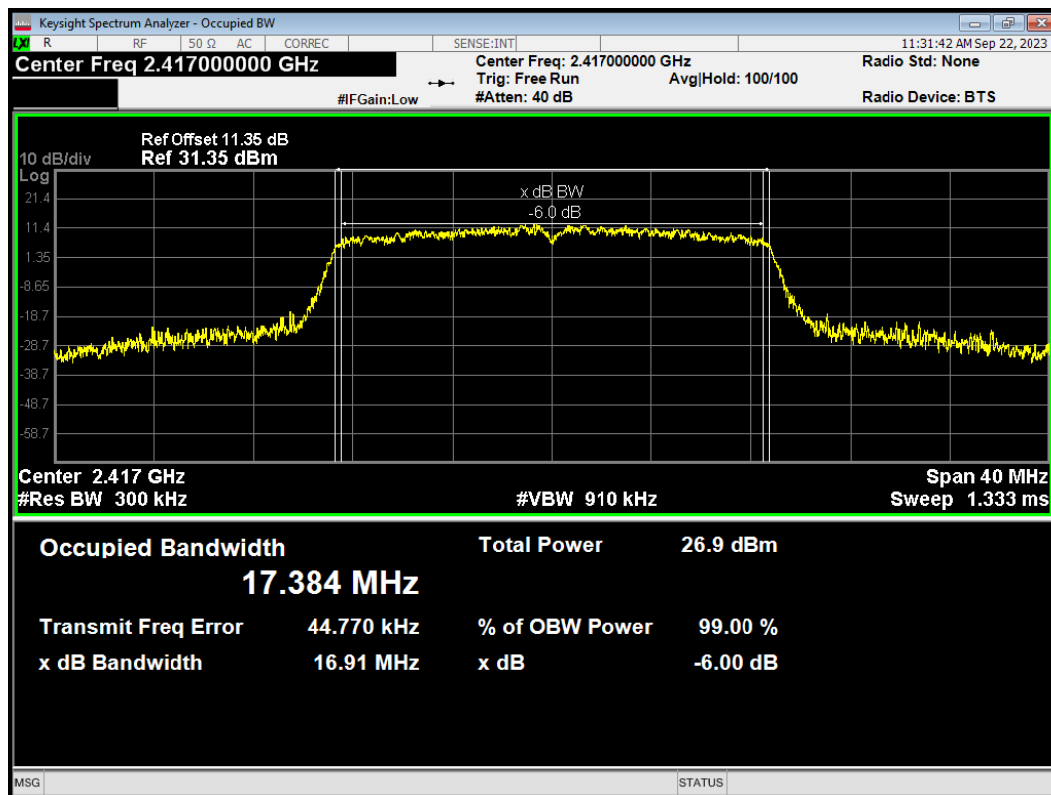
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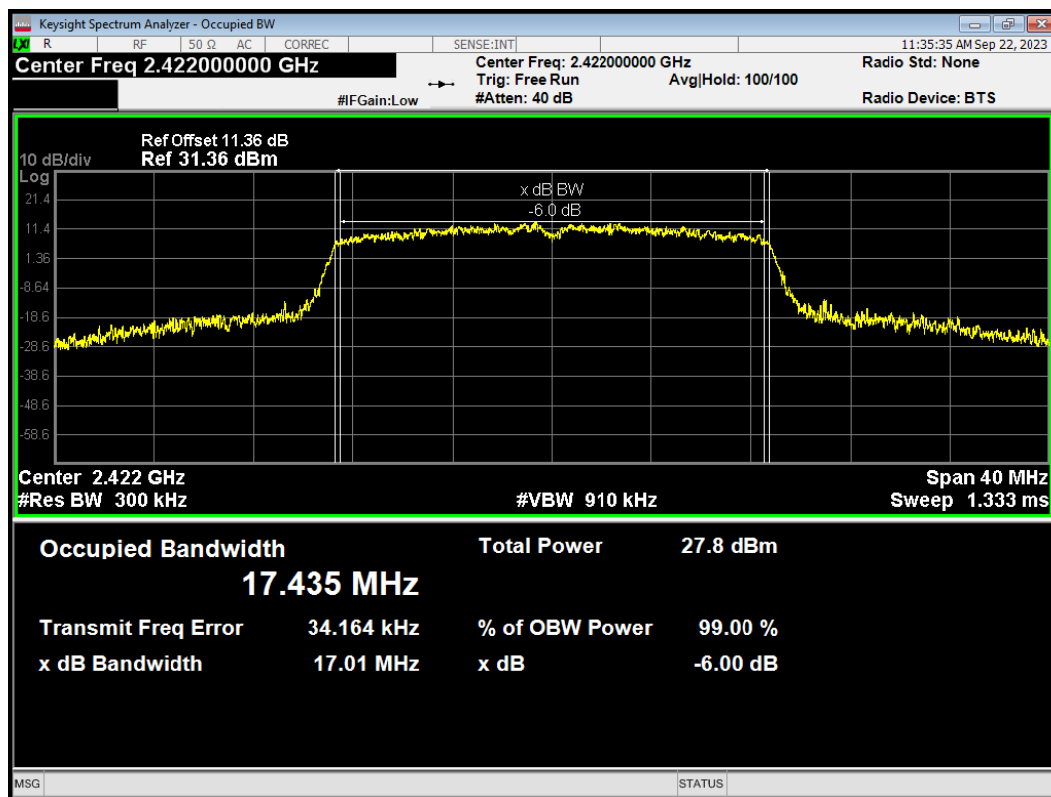
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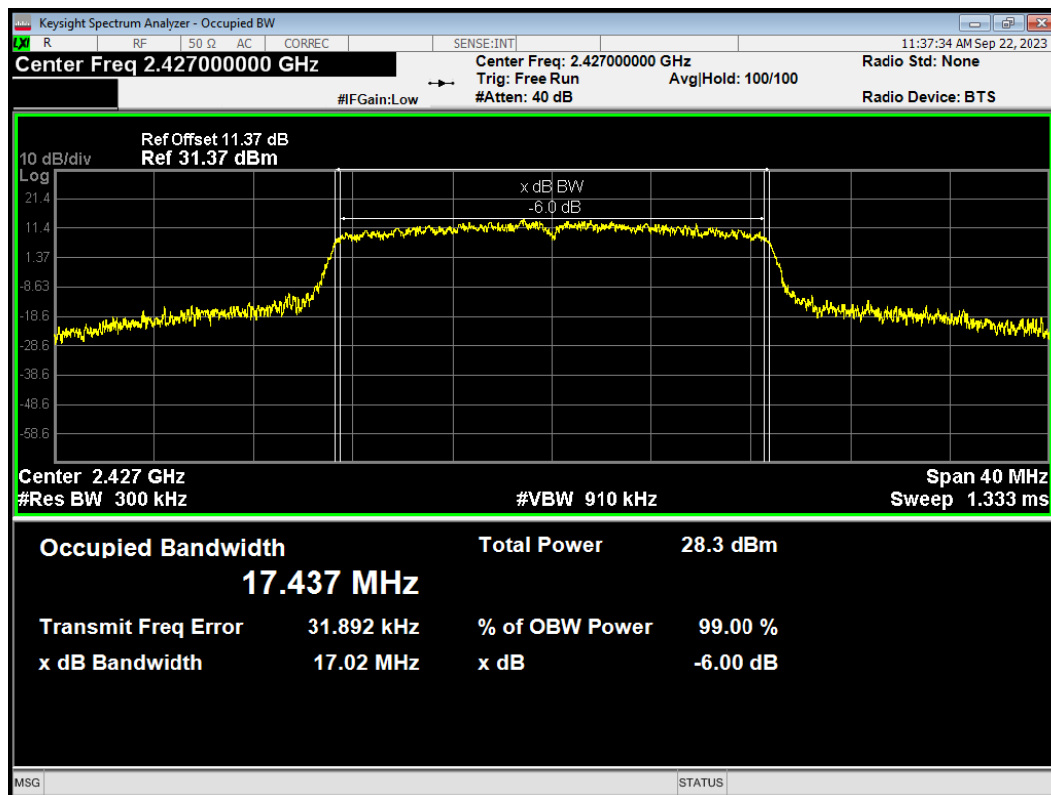
OBW 802.11n(HT20) 2417MHz



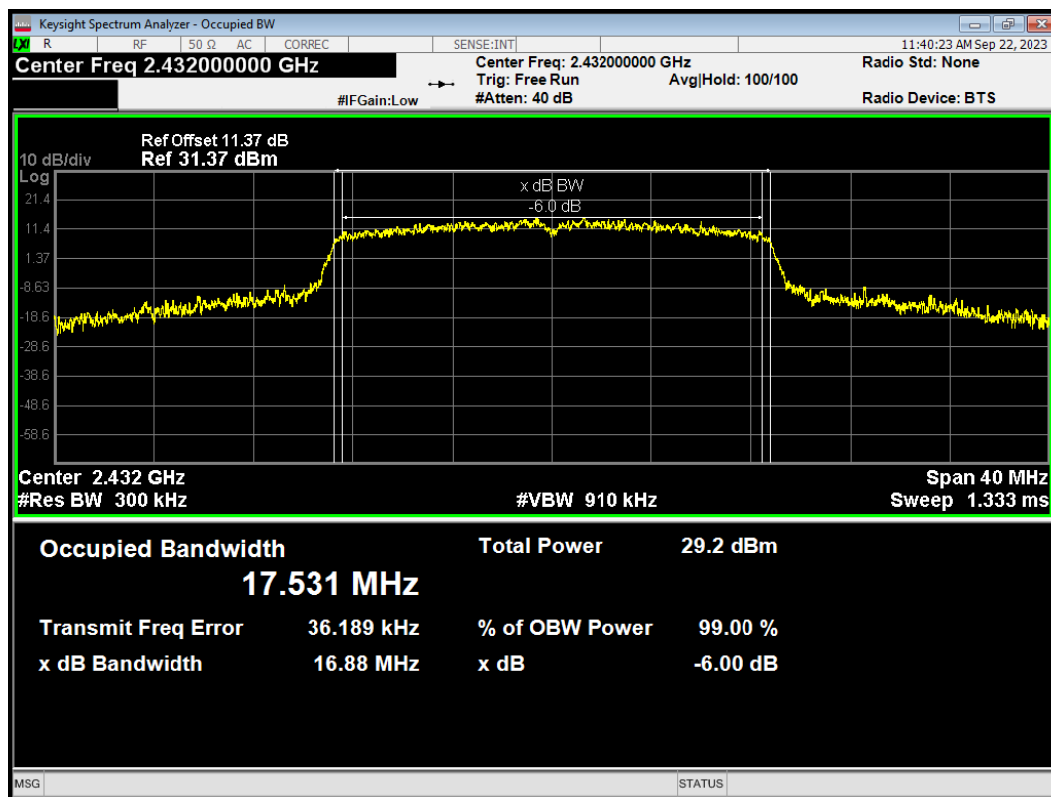
OBW 802.11n(HT20) 2422MHz



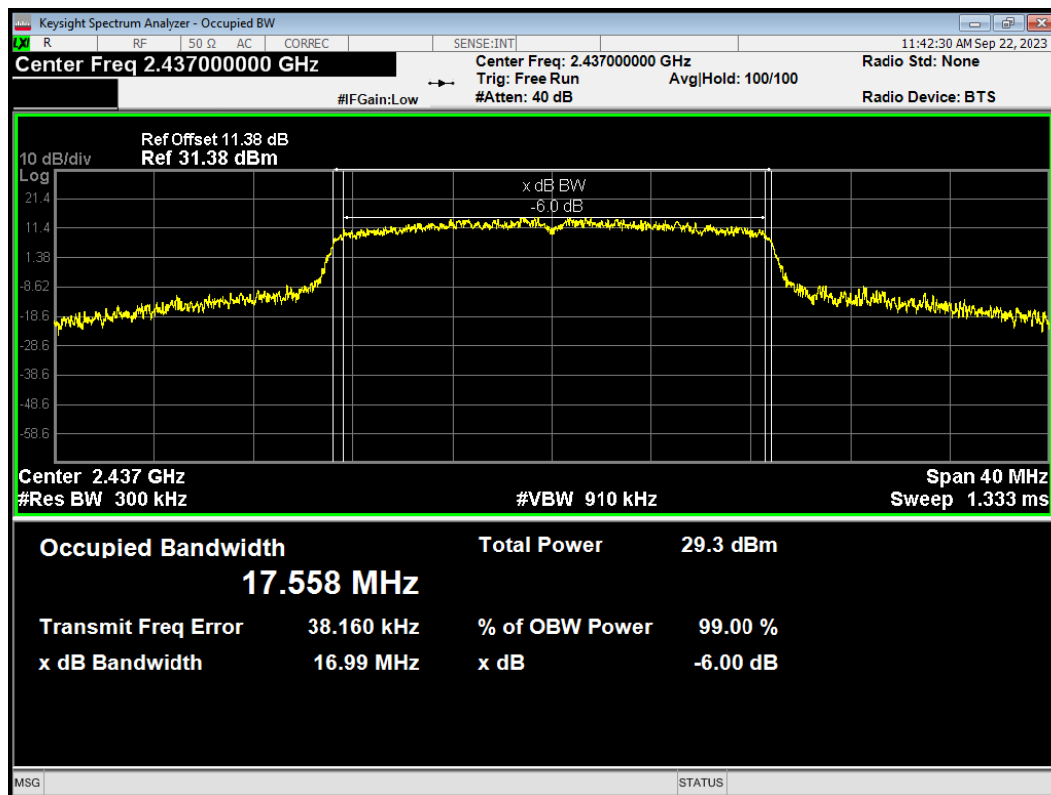
OBW 802.11n(HT20) 2427MHz



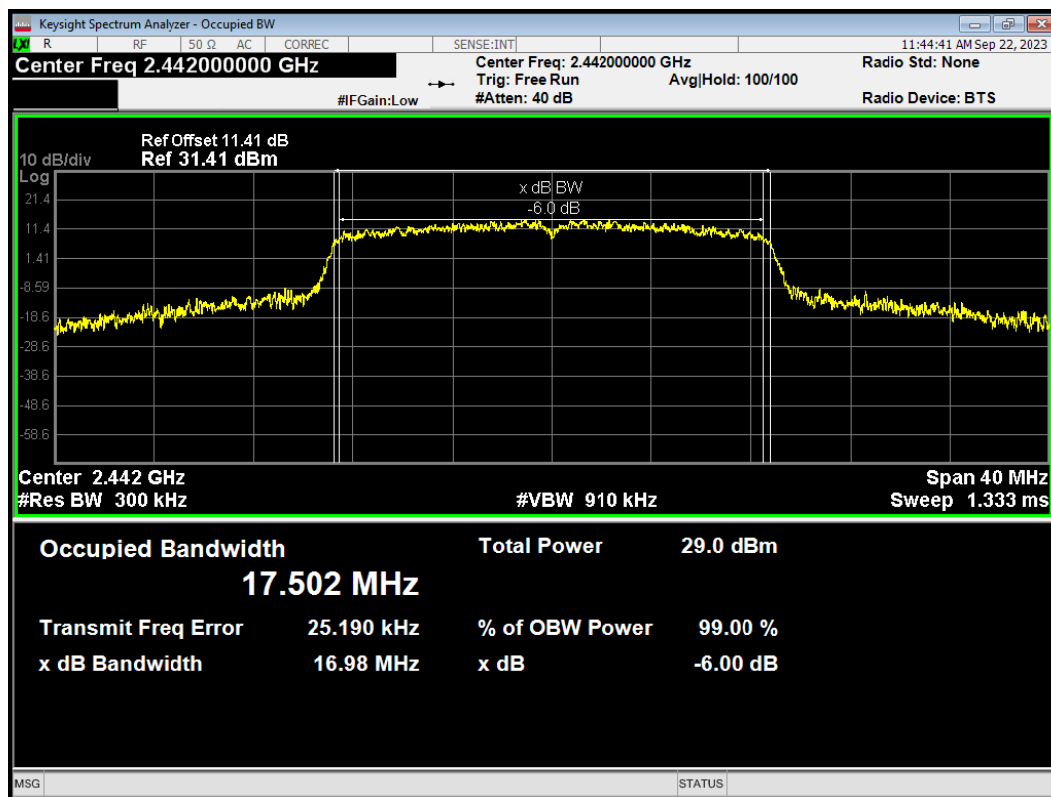
OBW 802.11n(HT20) 2432MHz



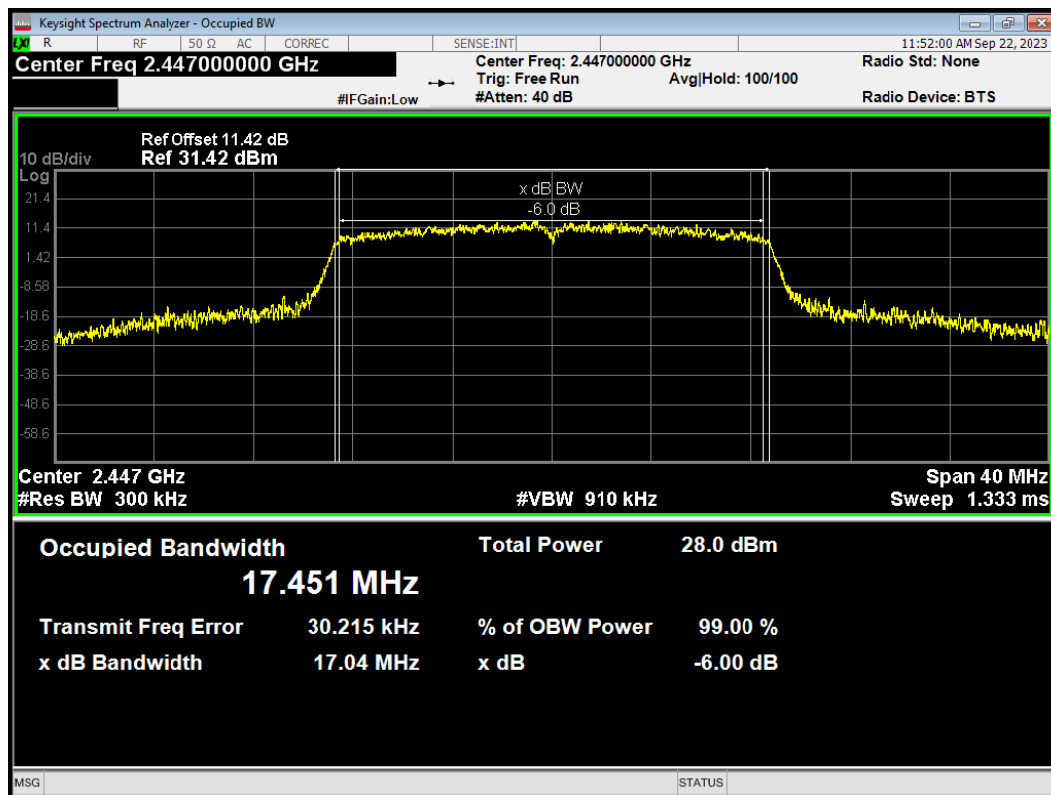
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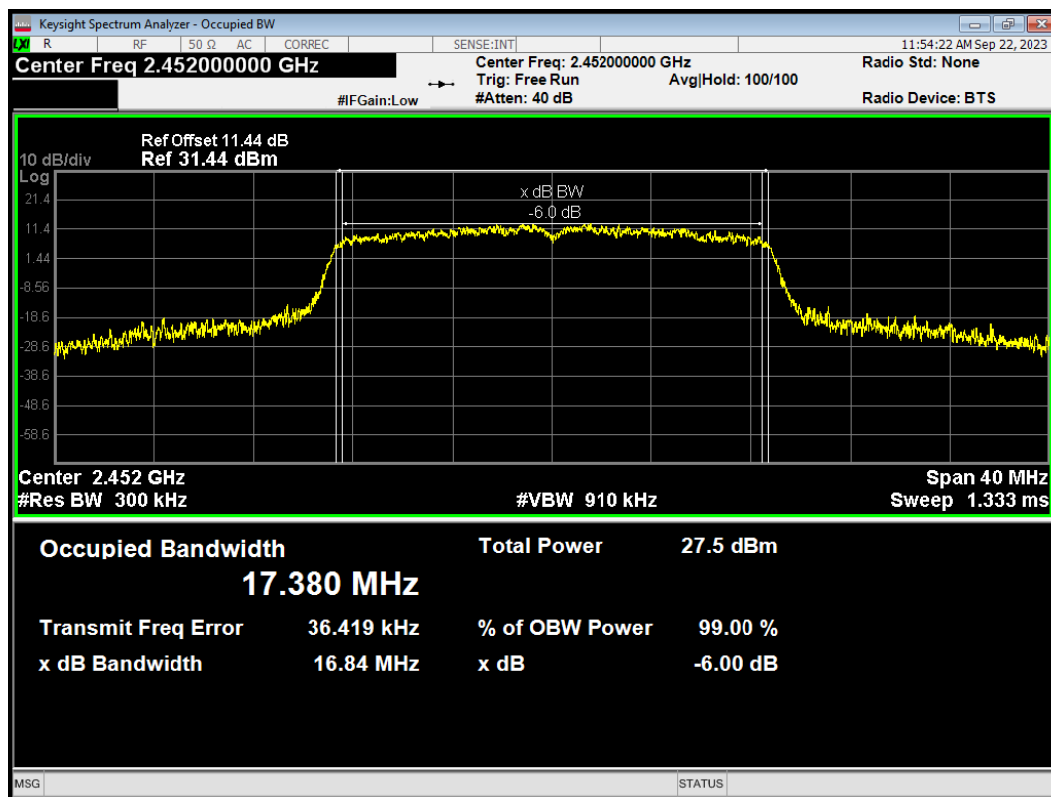
OBW 802.11n(HT20) 2442MHz



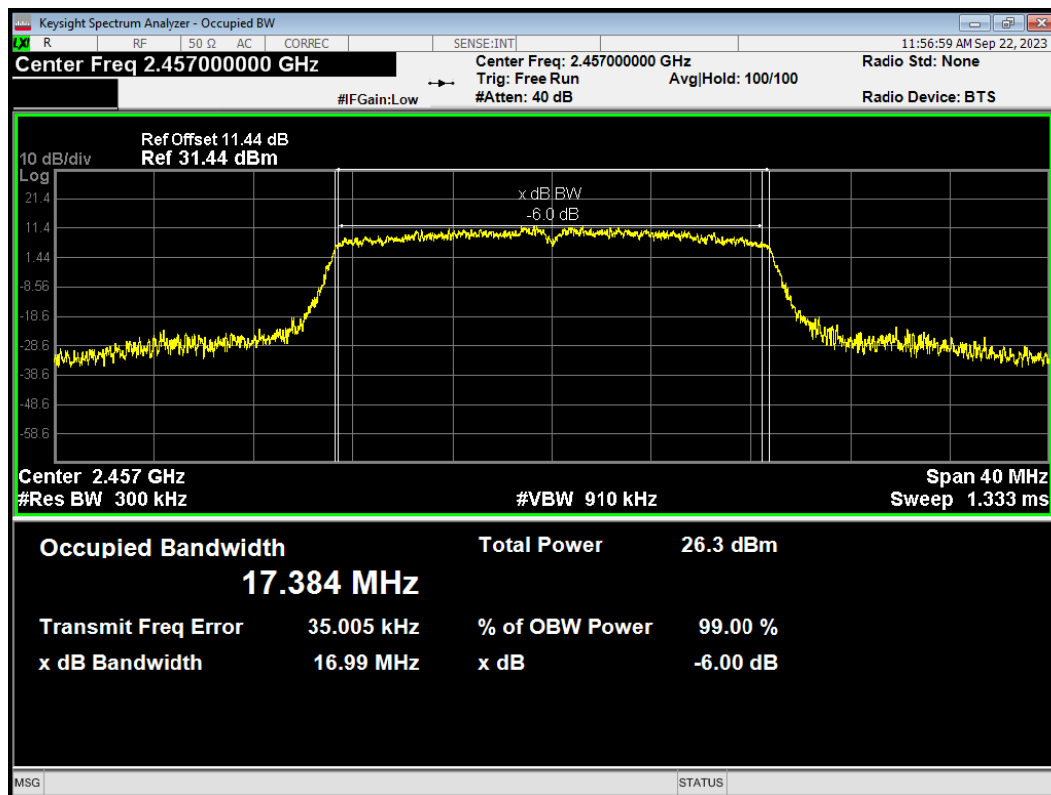
OBW 802.11n(HT20) 2447MHz



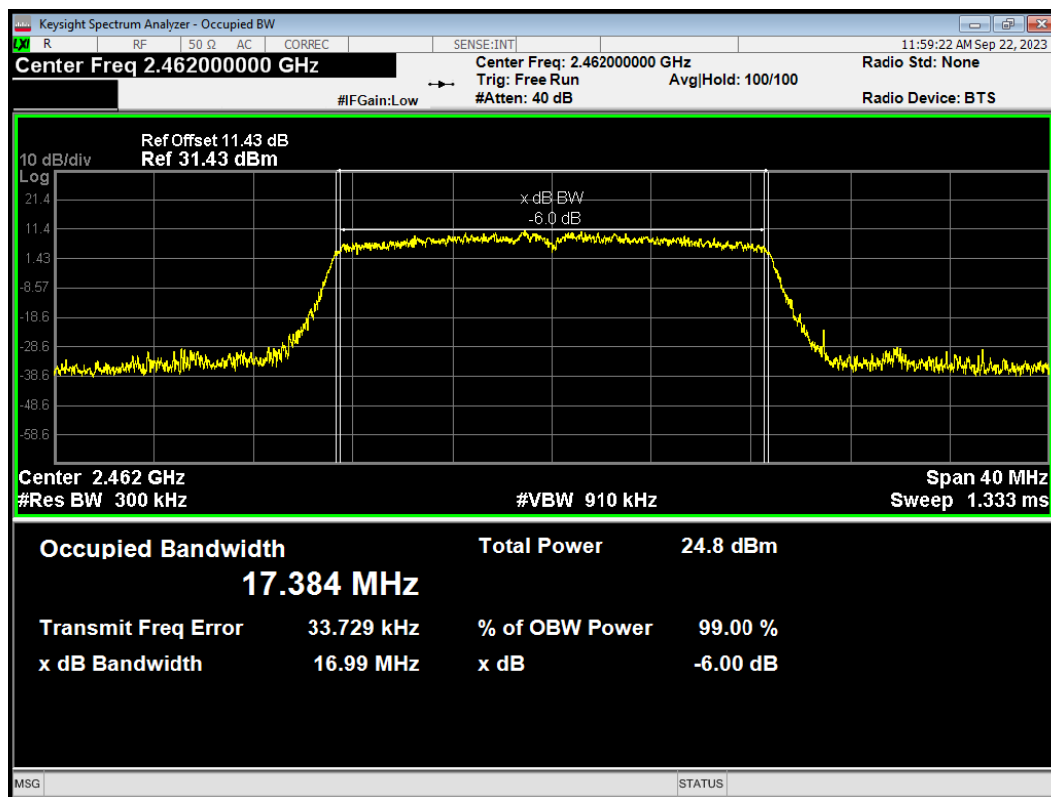
OBW 802.11n(HT20) 2452MHz



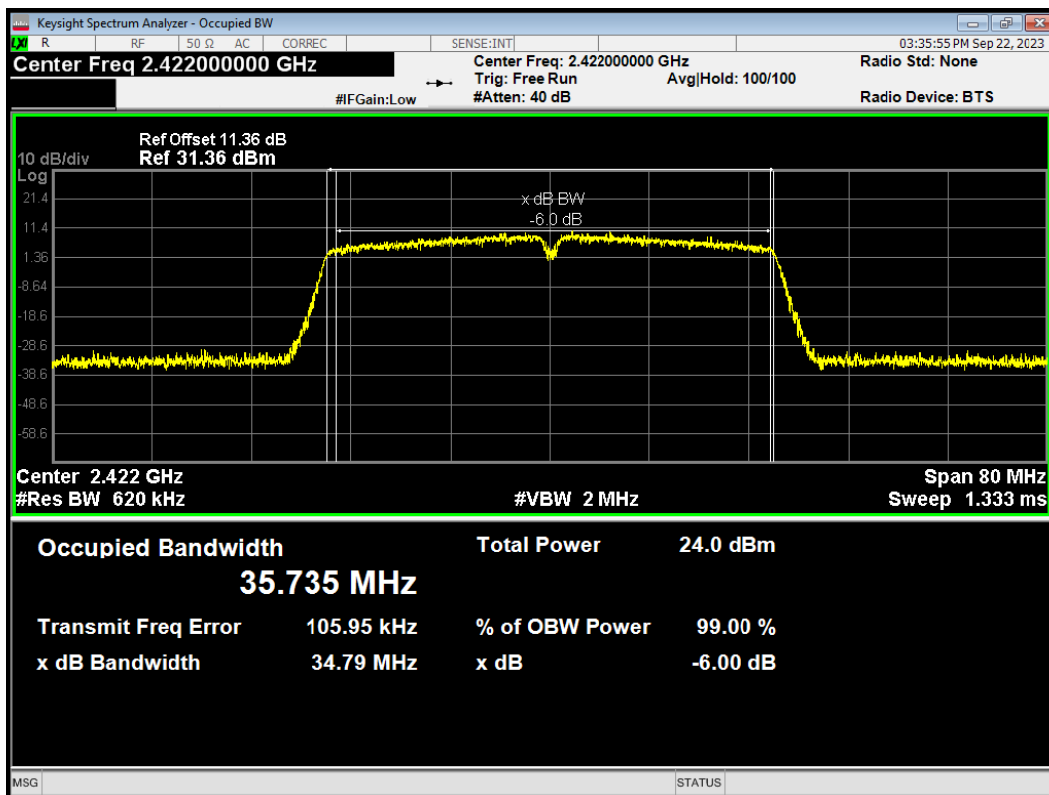
OBW 802.11n(HT20) 2457MHz



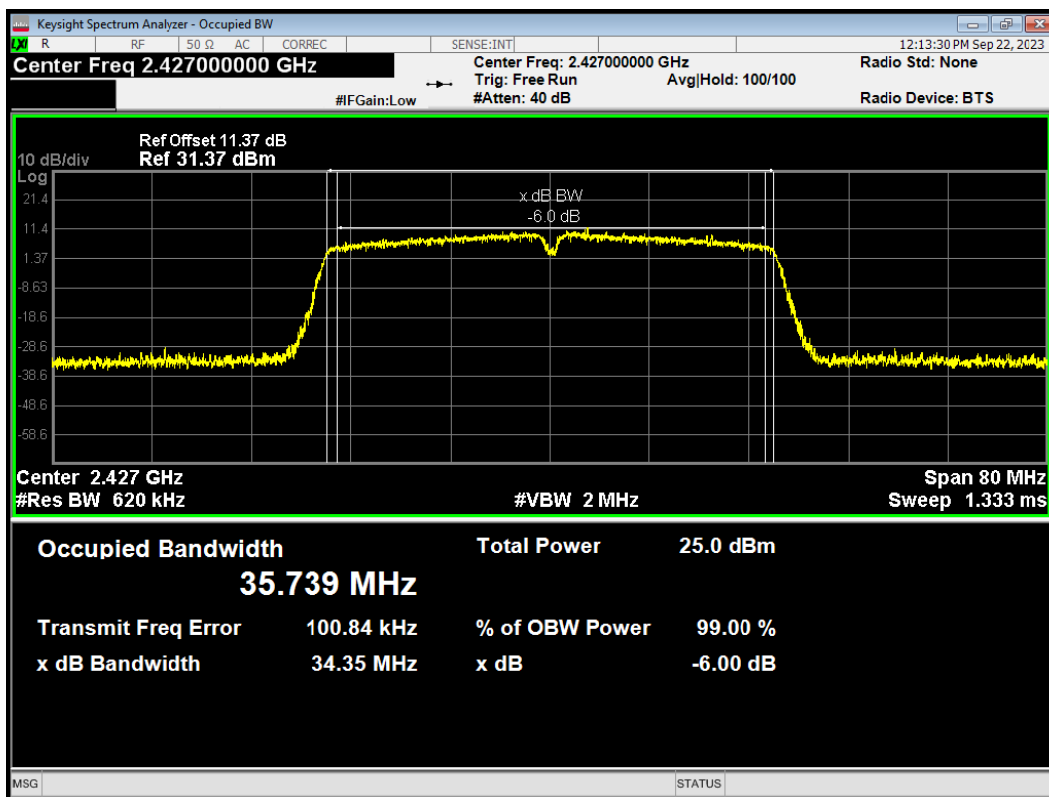
OBW 802.11n(HT20) 2462MHz



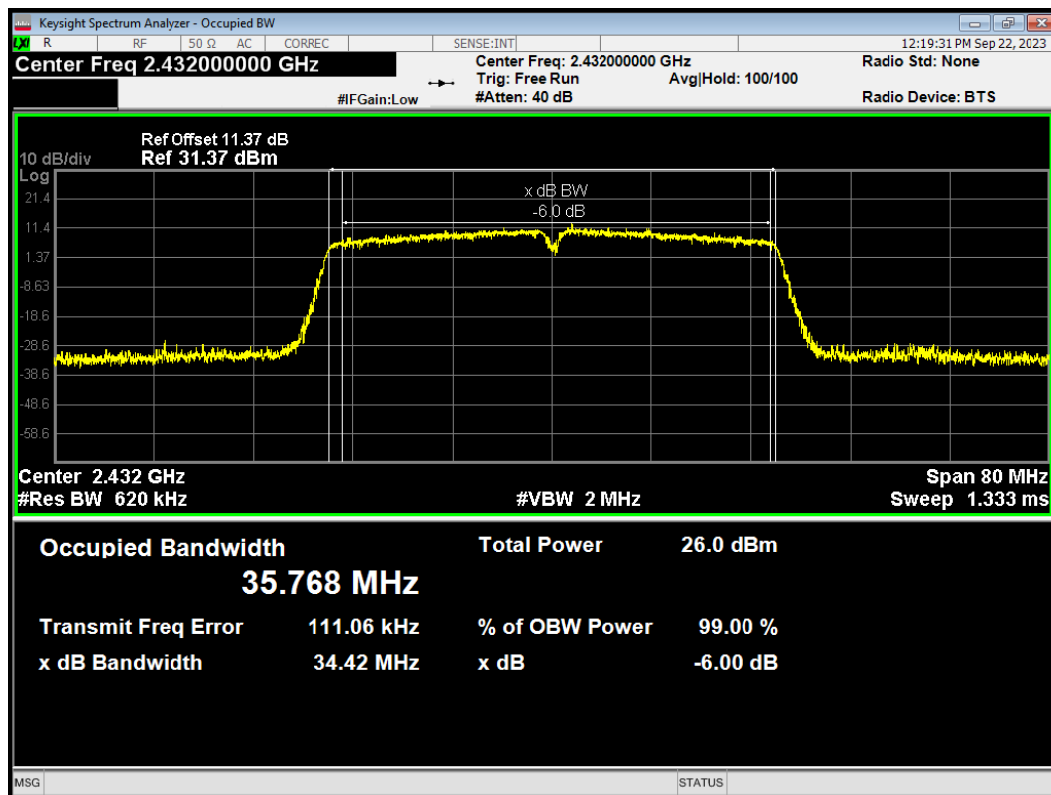
OBW 802.11n(HT40) 2422MHz



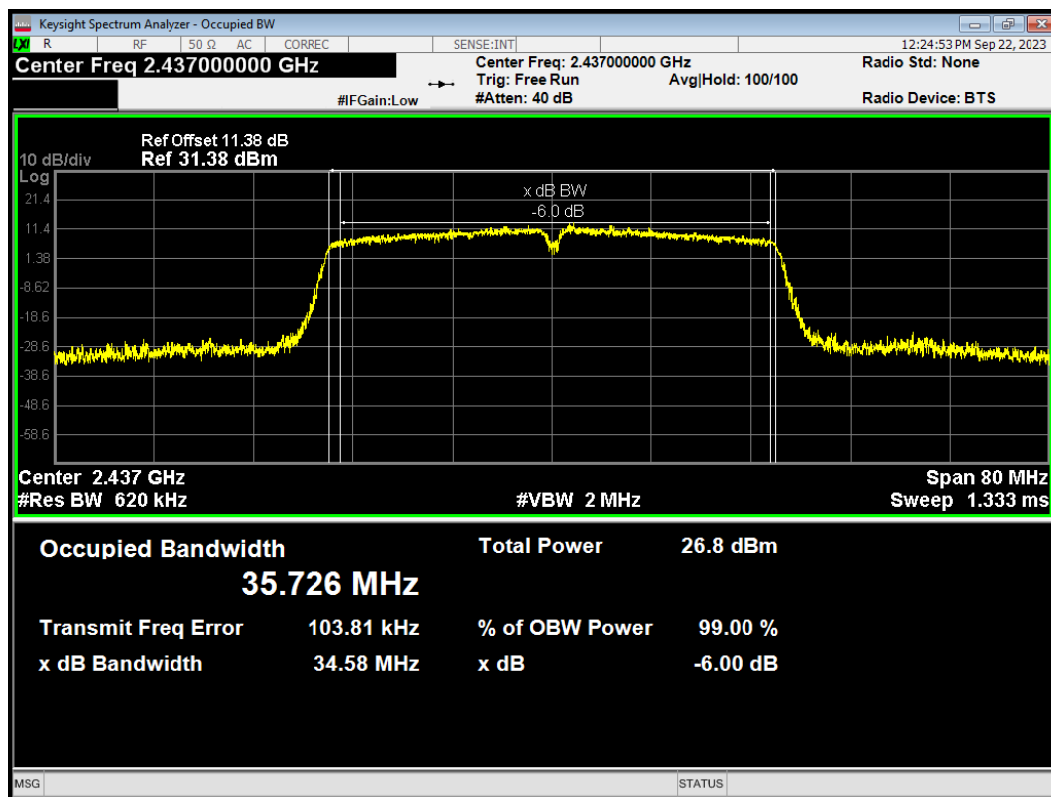
OBW 802.11n(HT40) 2427MHz



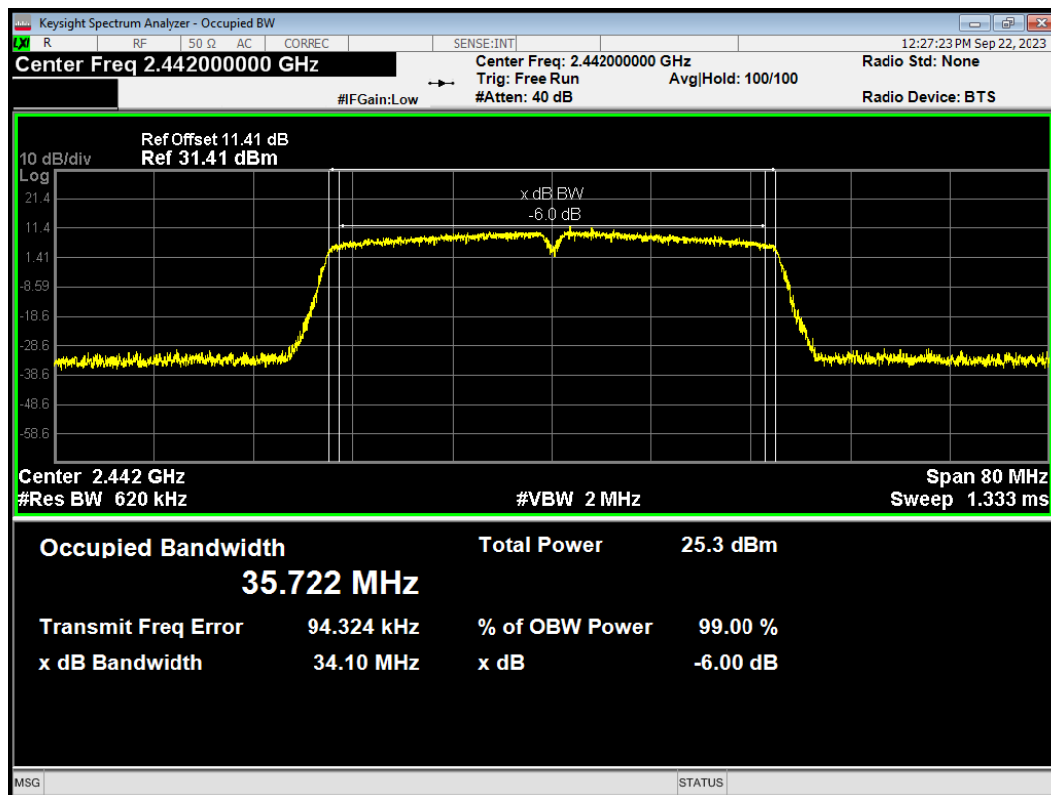
OBW 802.11n(HT40) 2432MHz



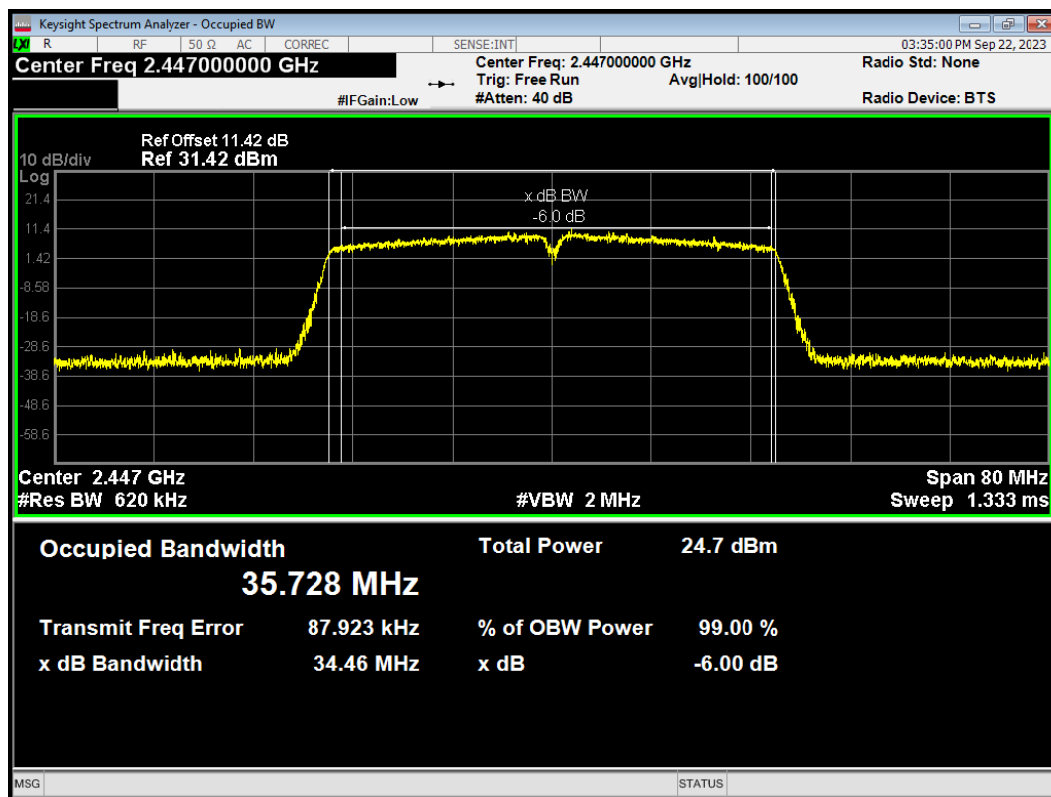
OBW 802.11n(HT40) 2437MHz



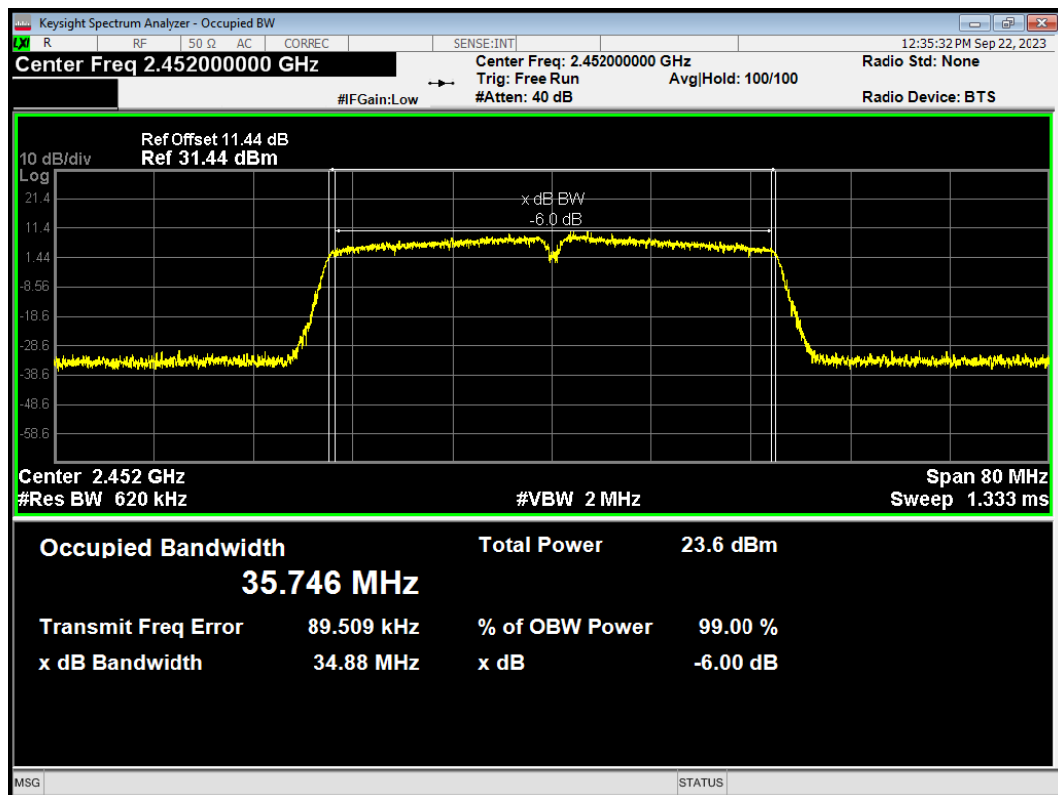
OBW 802.11n(HT40) 2442MHz



OBW 802.11n(HT40) 2447MHz

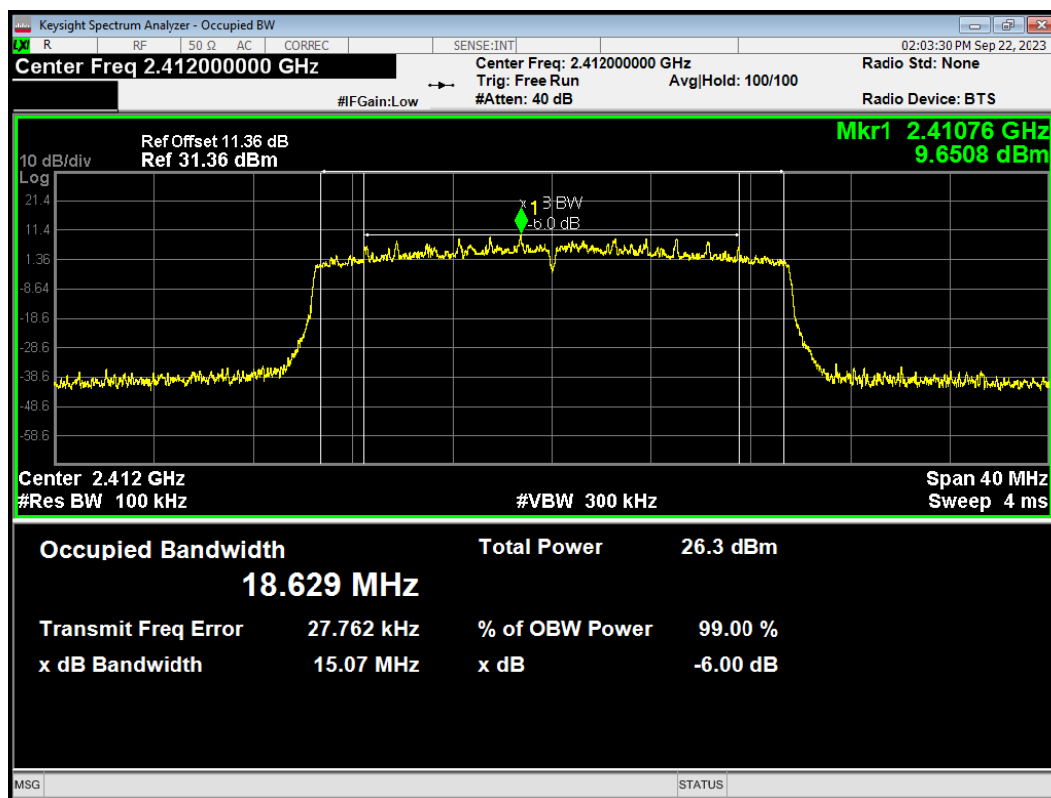


OBW 802.11n(HT40) 2452MHz

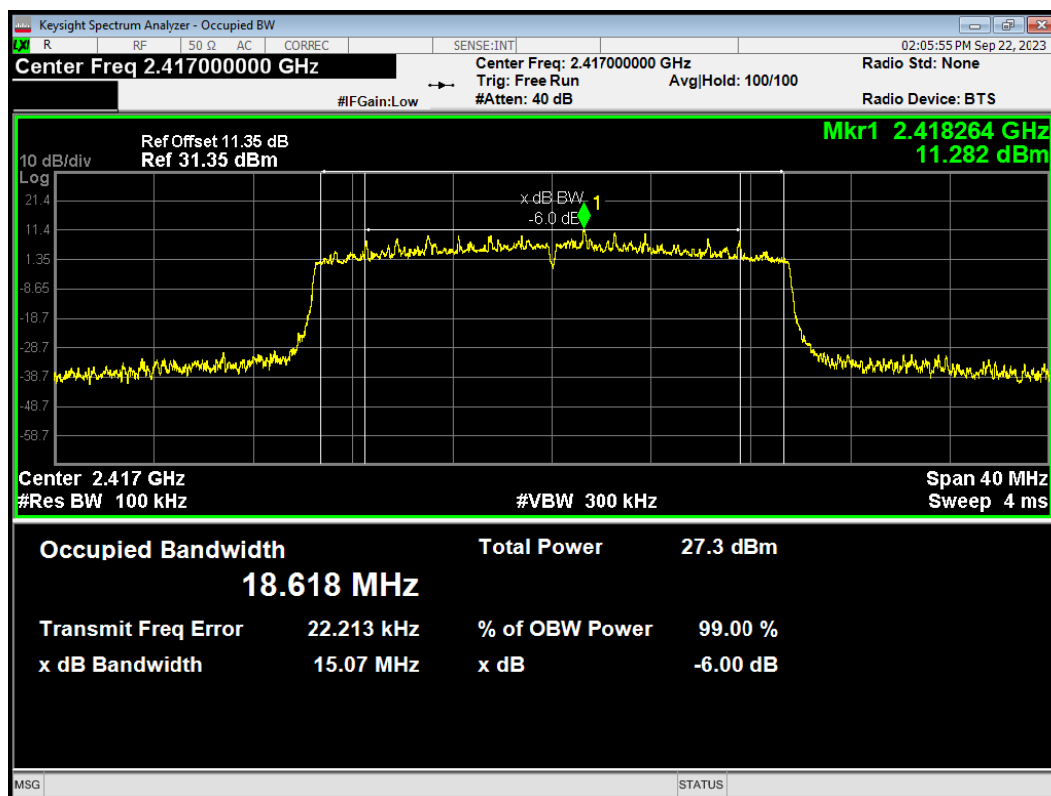


6 dB bandwidth

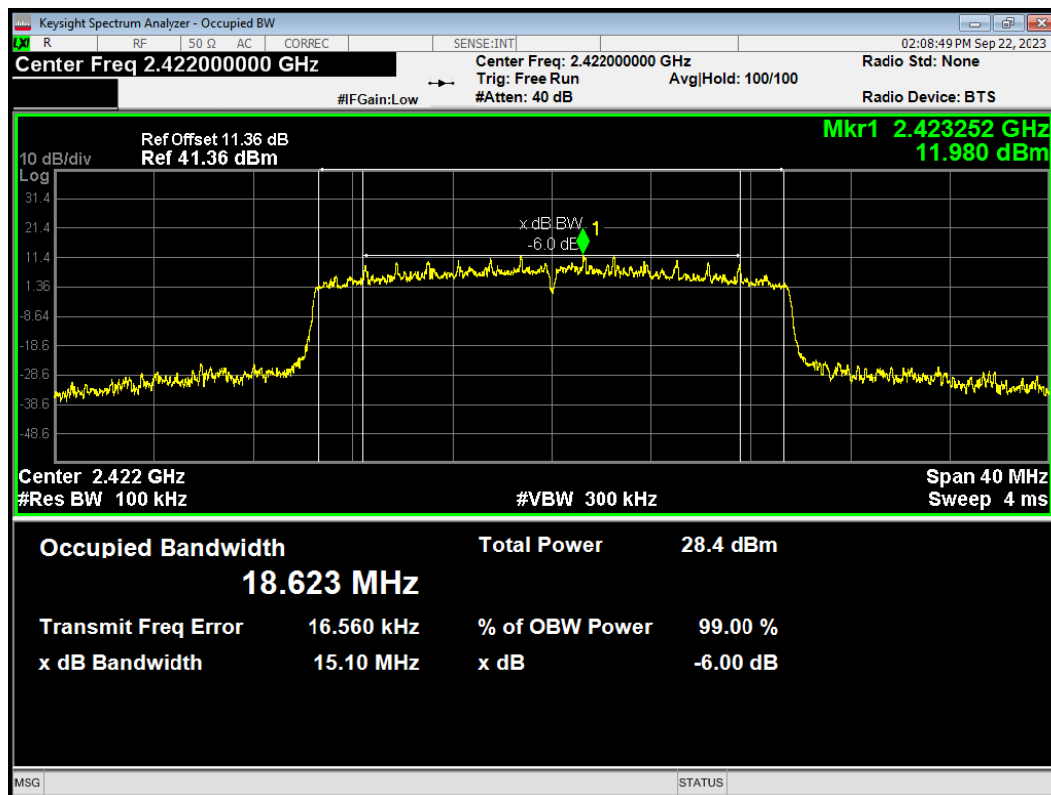
-6dB Bandwidth 802.11ax(HE20) 2412MHz



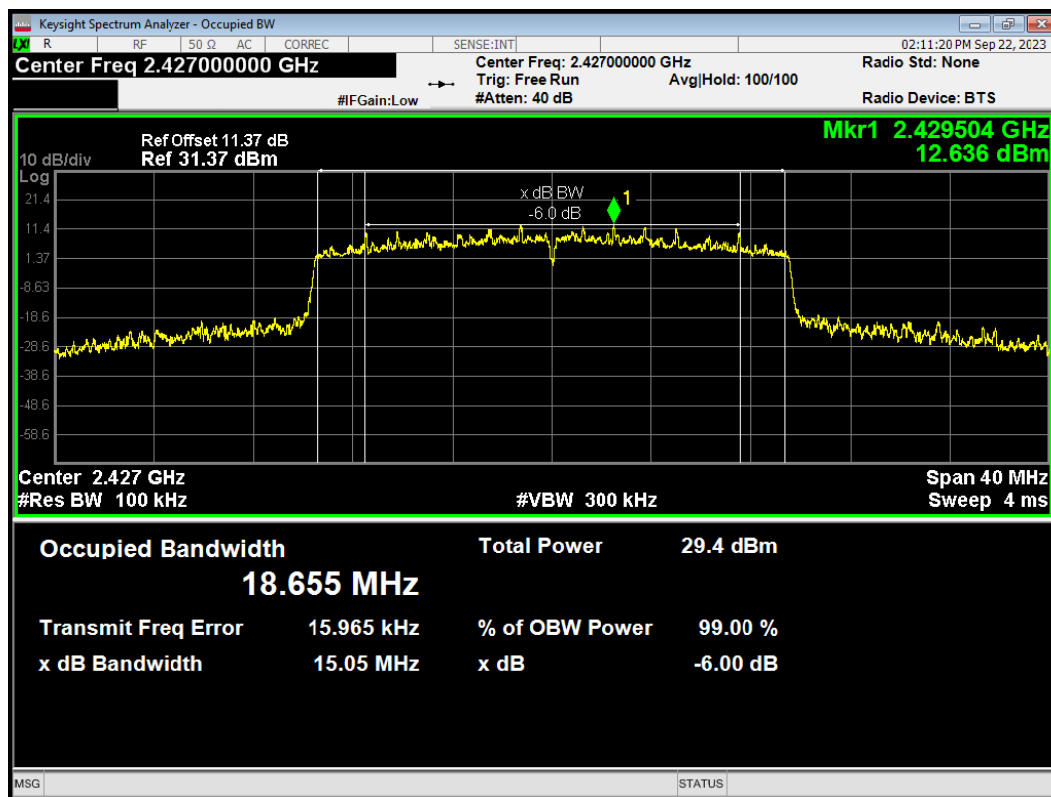
-6dB Bandwidth 802.11ax(HE20) 2417MHz



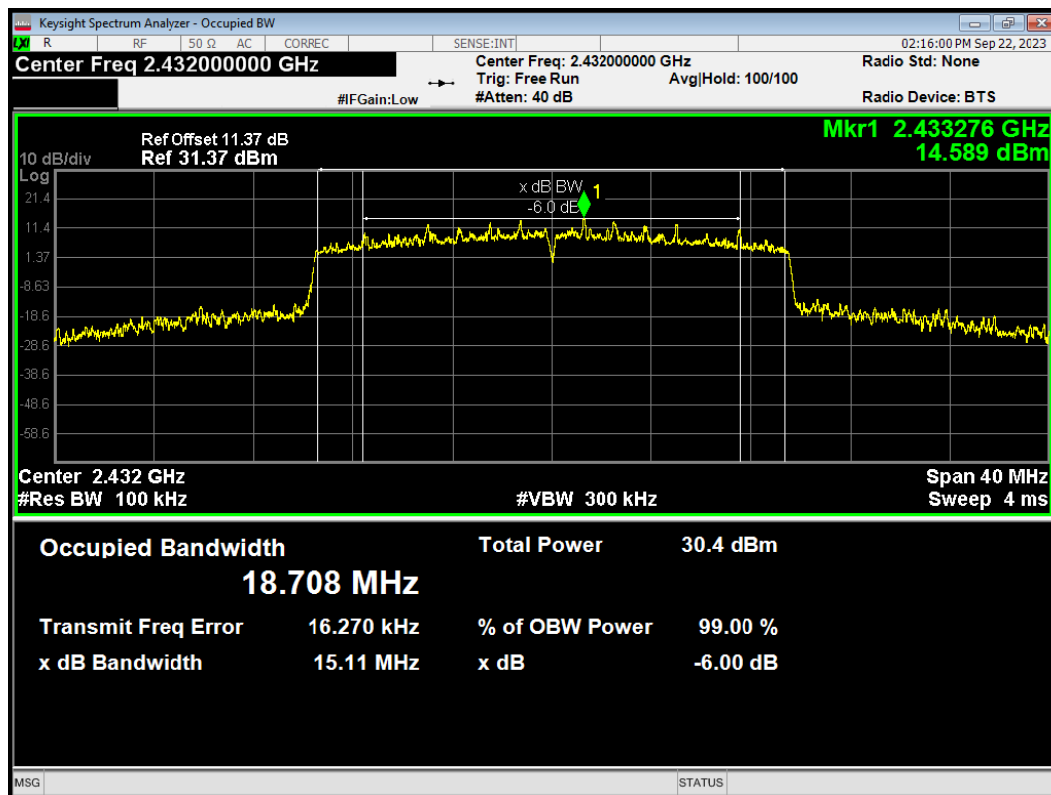
-6dB Bandwidth 802.11ax(HE20) 2422MHz



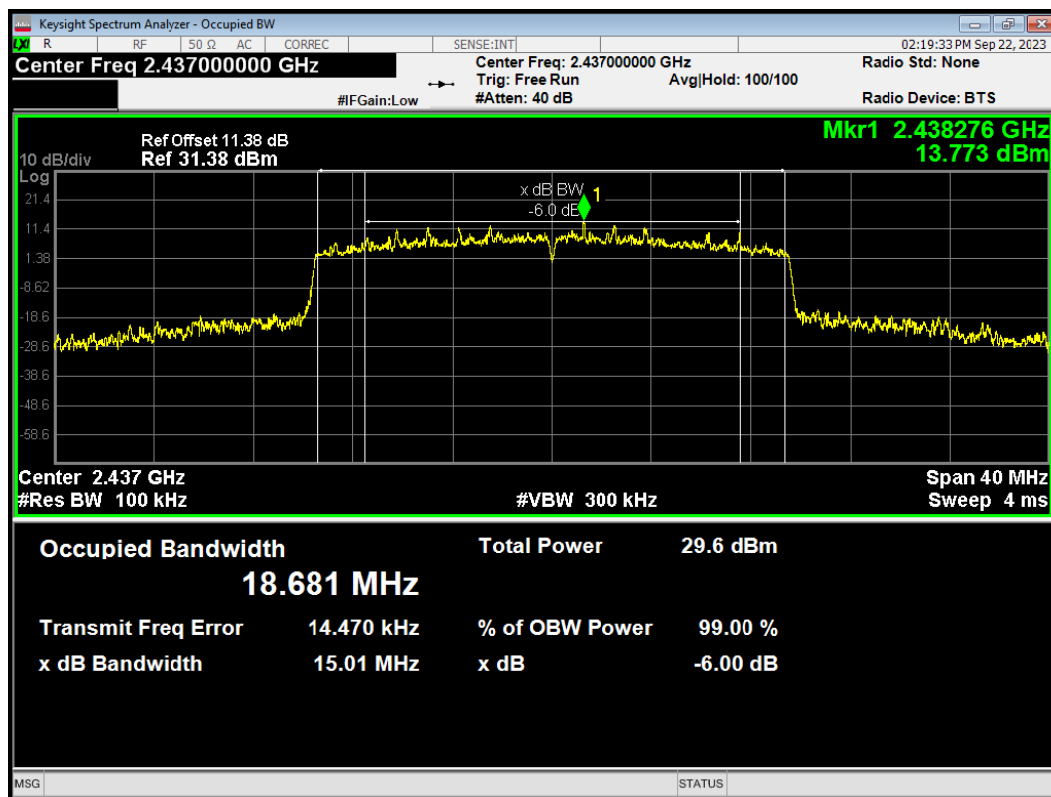
-6dB Bandwidth 802.11ax(HE20) 2427MHz



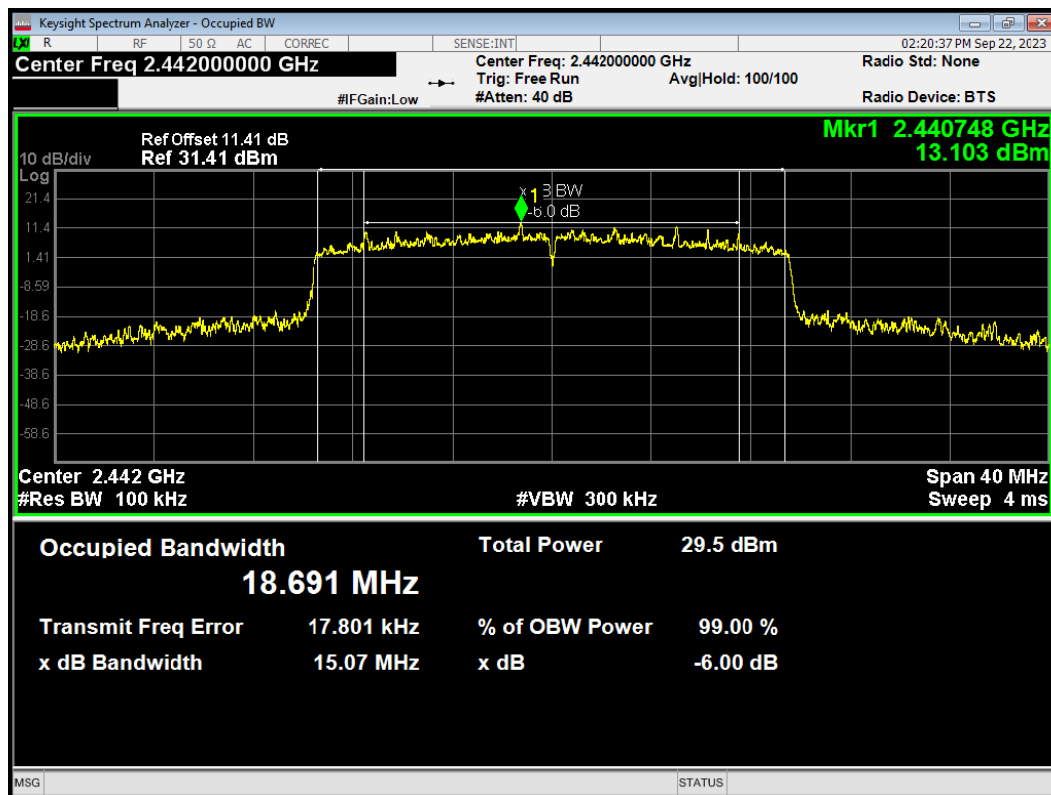
-6dB Bandwidth 802.11ax(HE20) 2432MHz



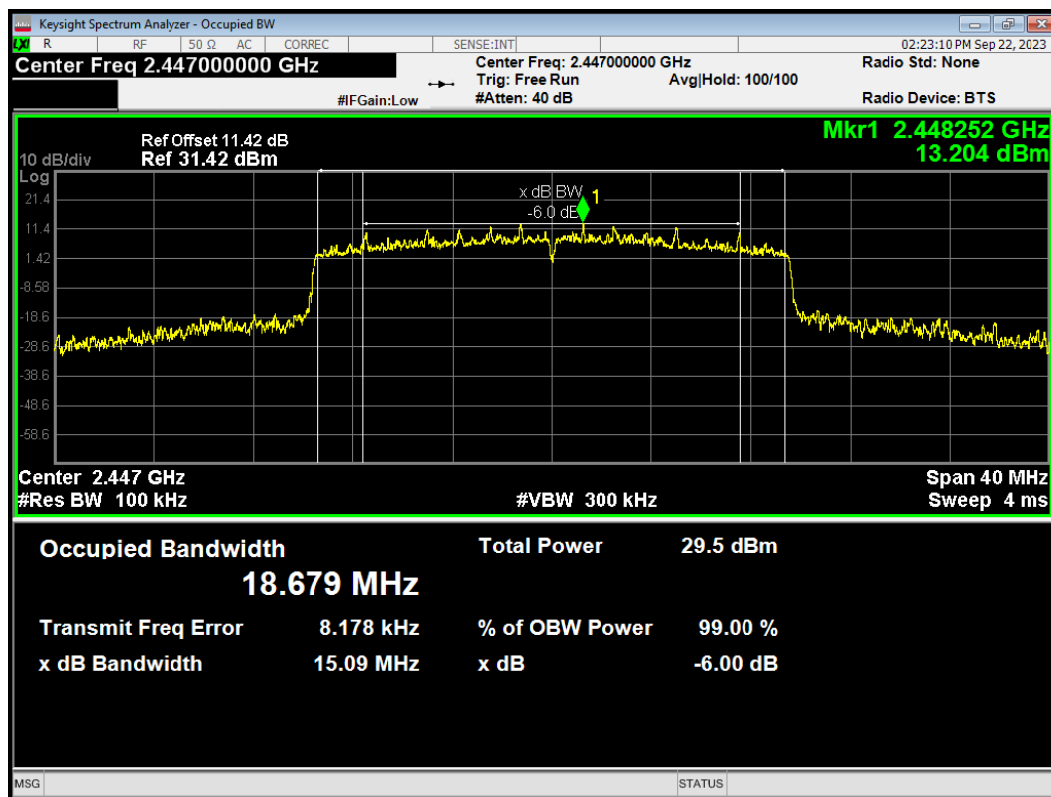
-6dB Bandwidth 802.11ax(HE20) 2437MHz



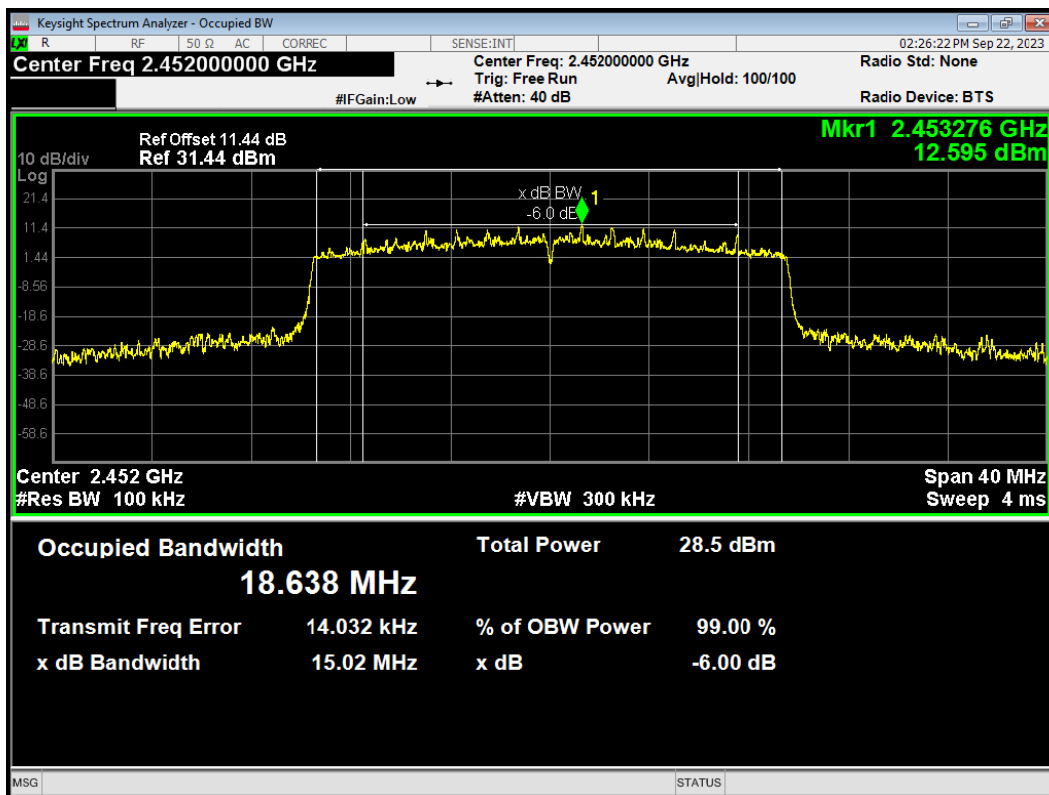
-6dB Bandwidth 802.11ax(HE20) 2442MHz



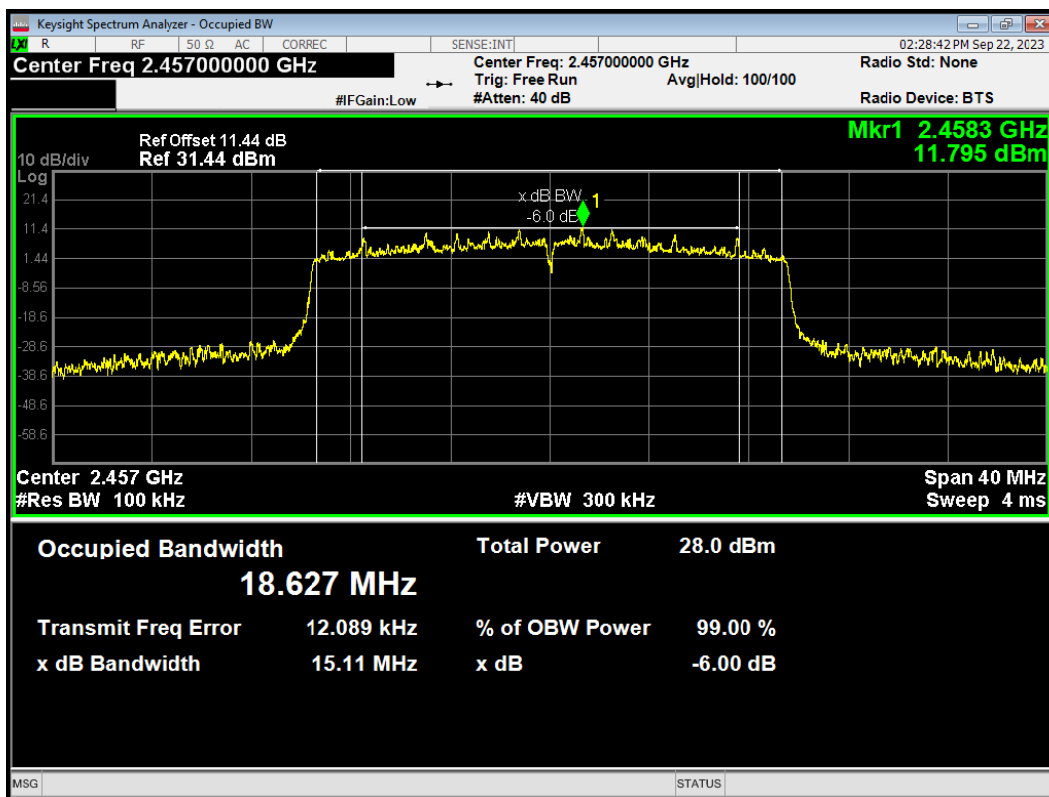
-6dB Bandwidth 802.11ax(HE20) 2447MHz



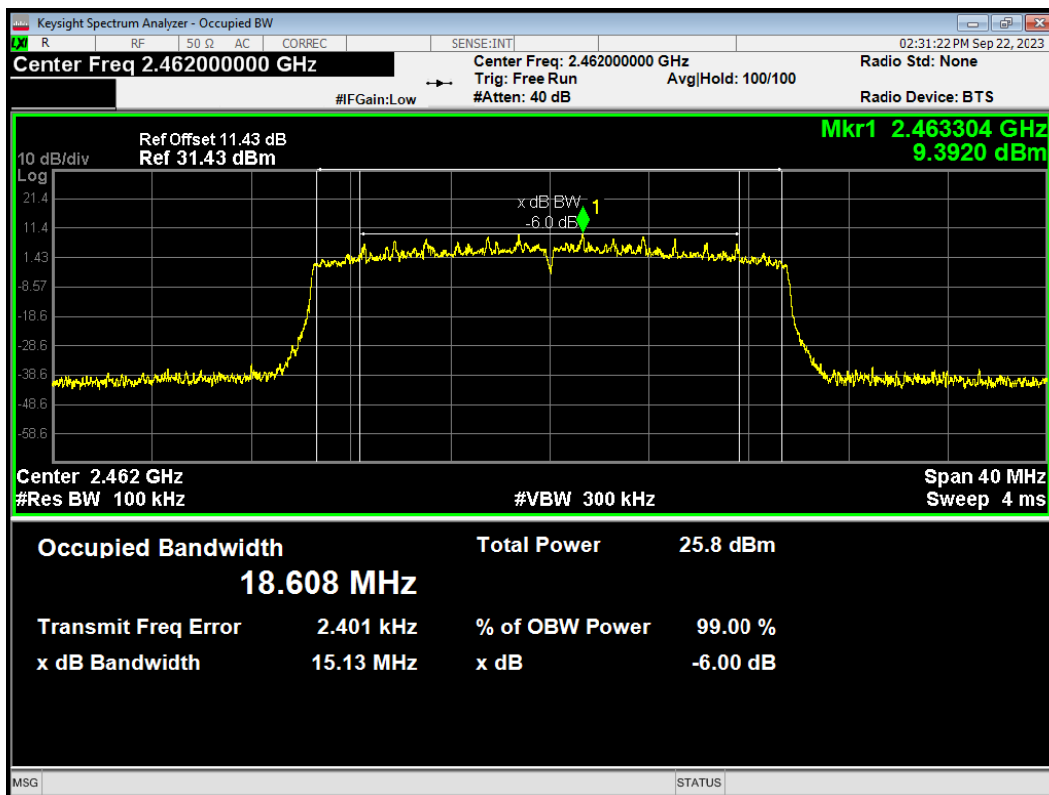
-6dB Bandwidth 802.11ax(HE20) 2452MHz



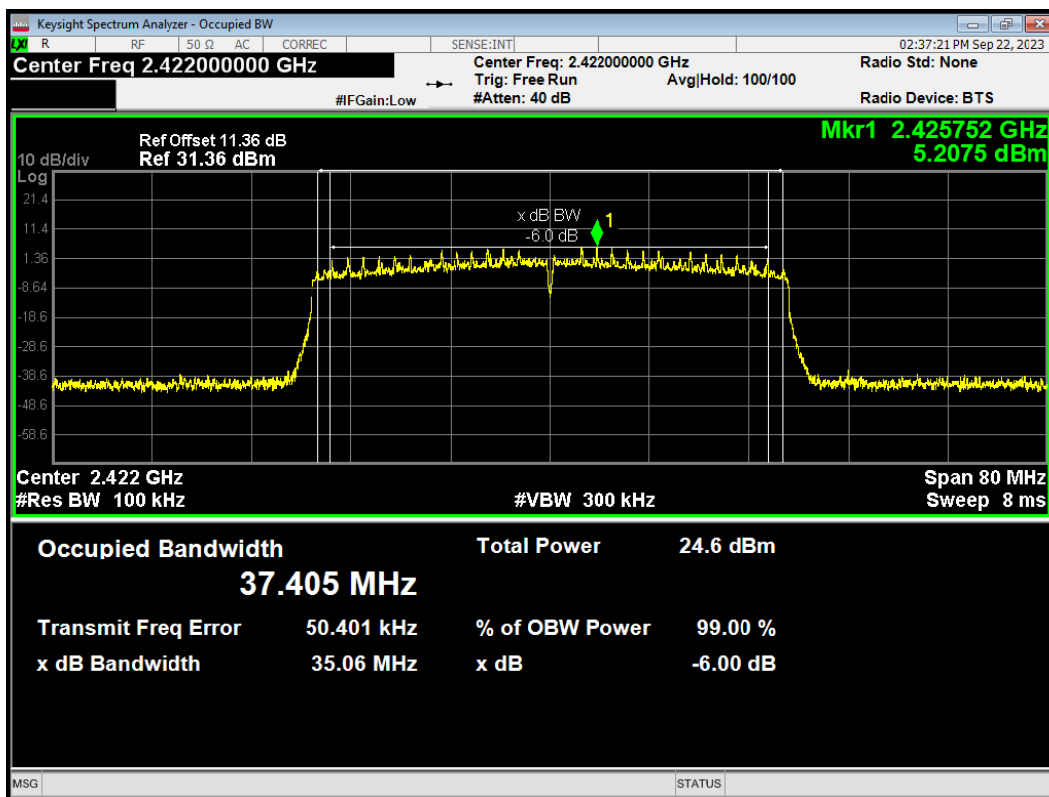
-6dB Bandwidth 802.11ax(HE20) 2457MHz



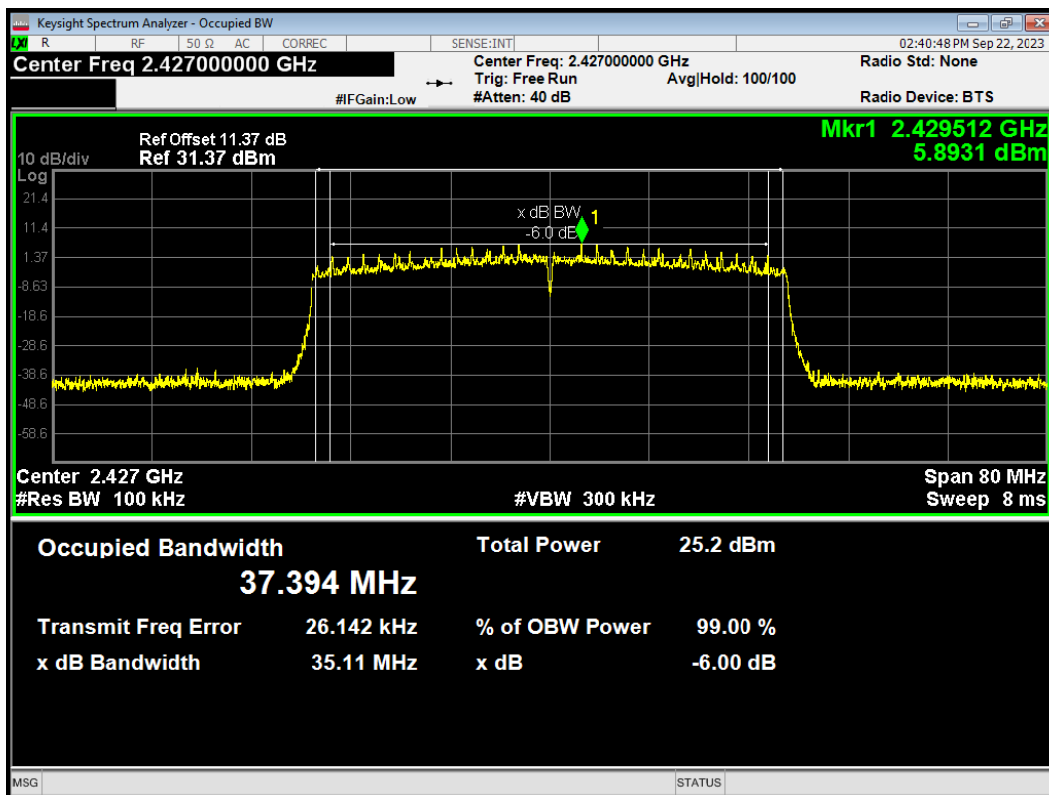
-6dB Bandwidth 802.11ax(HE20) 2462MHz



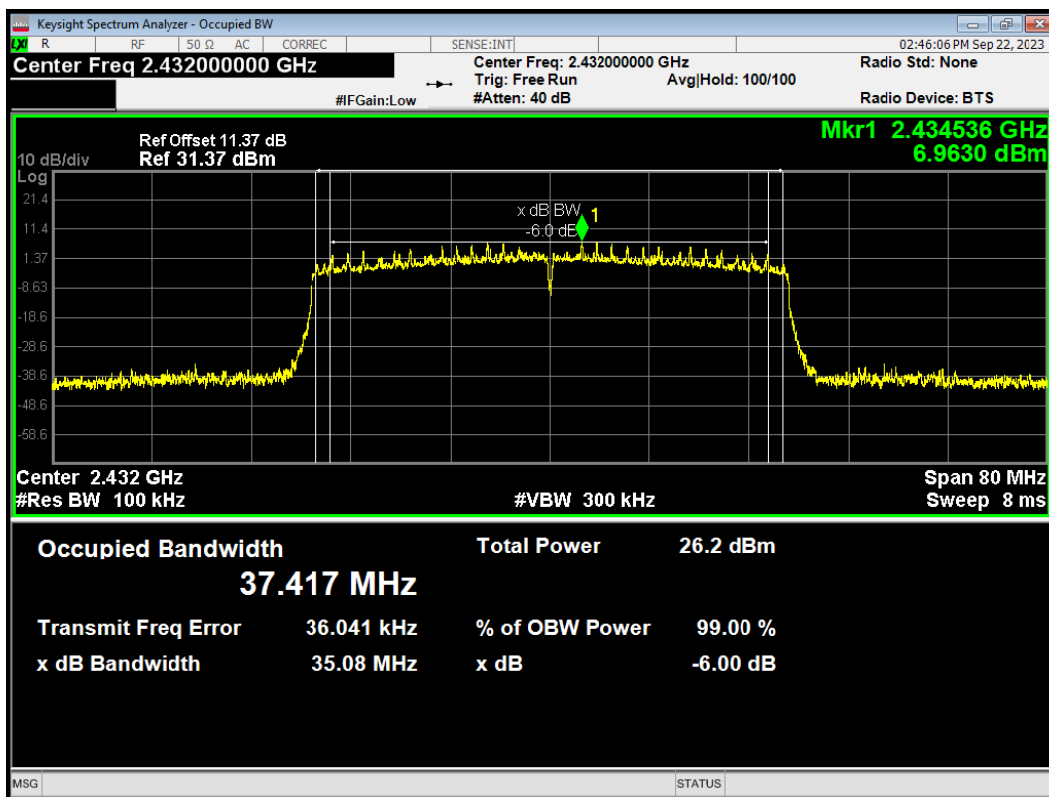
-6dB Bandwidth 802.11ax(HE40) 2422MHz



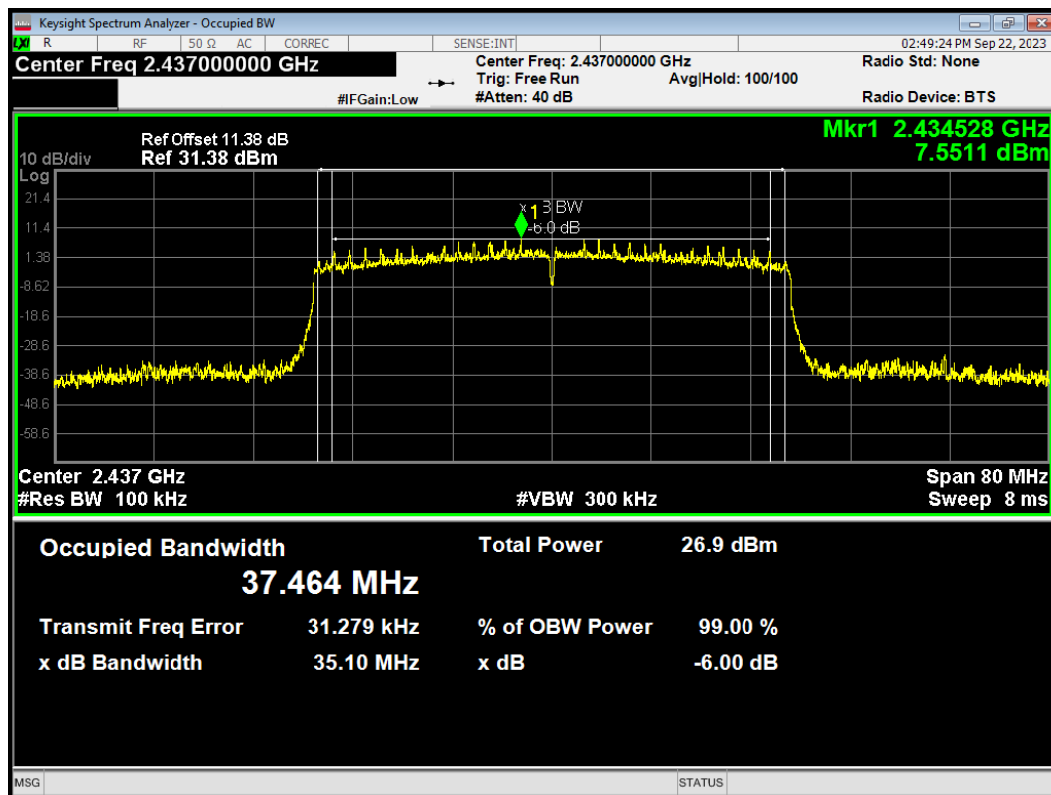
-6dB Bandwidth 802.11ax(HE40) 2427MHz



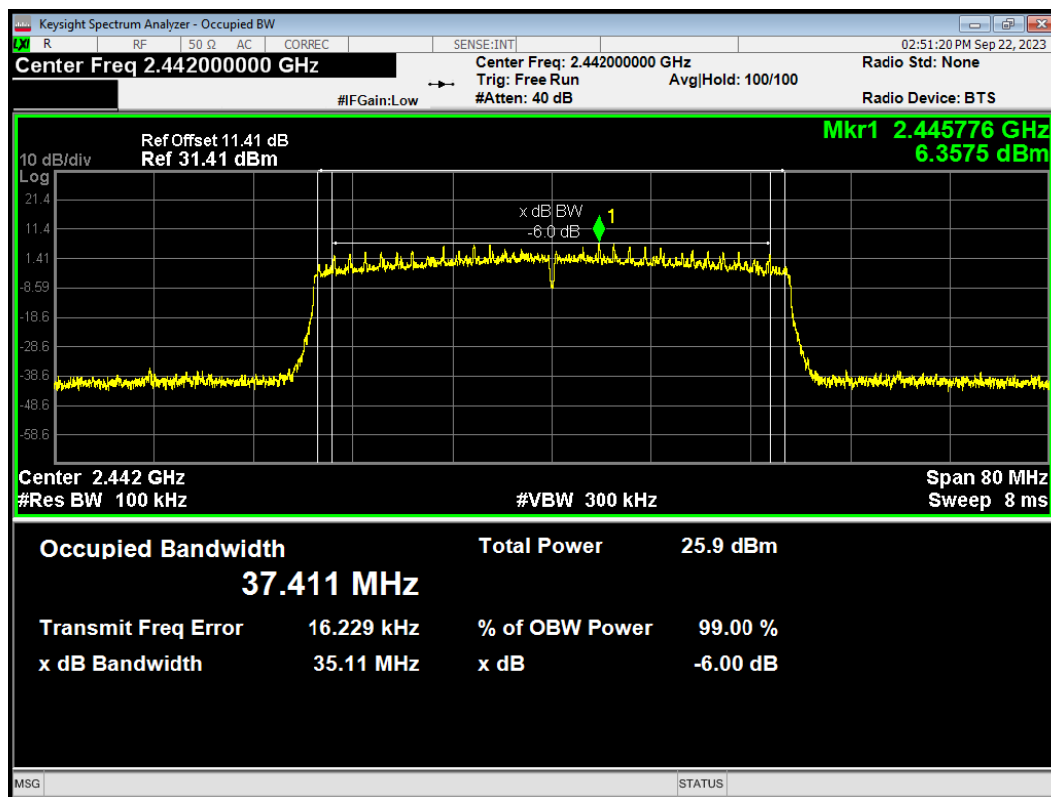
-6dB Bandwidth 802.11ax(HE40) 2432MHz



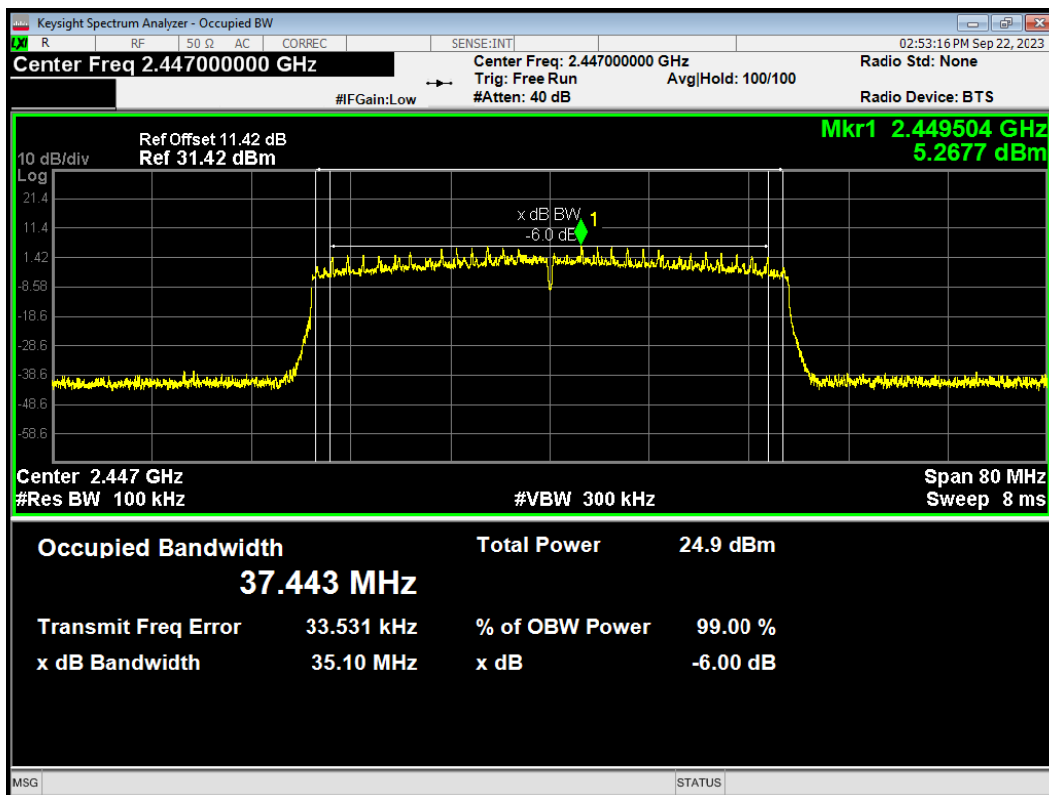
-6dB Bandwidth 802.11ax(HE40) 2437MHz



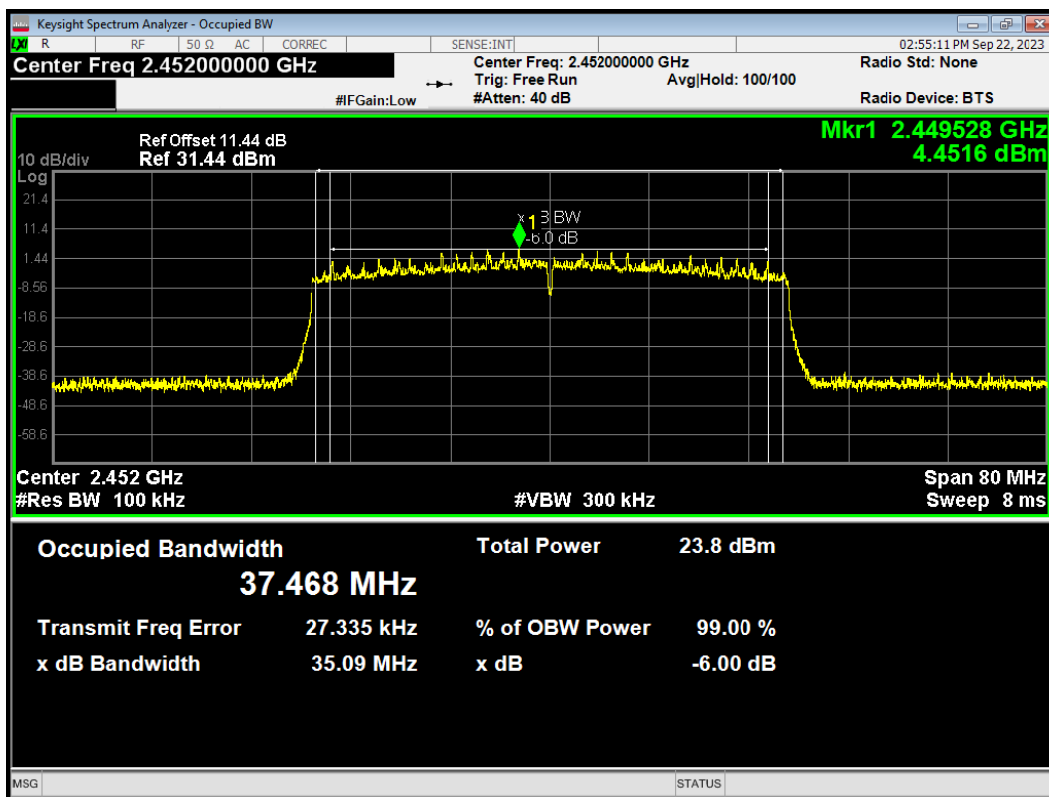
-6dB Bandwidth 802.11ax(HE40) 2442MHz



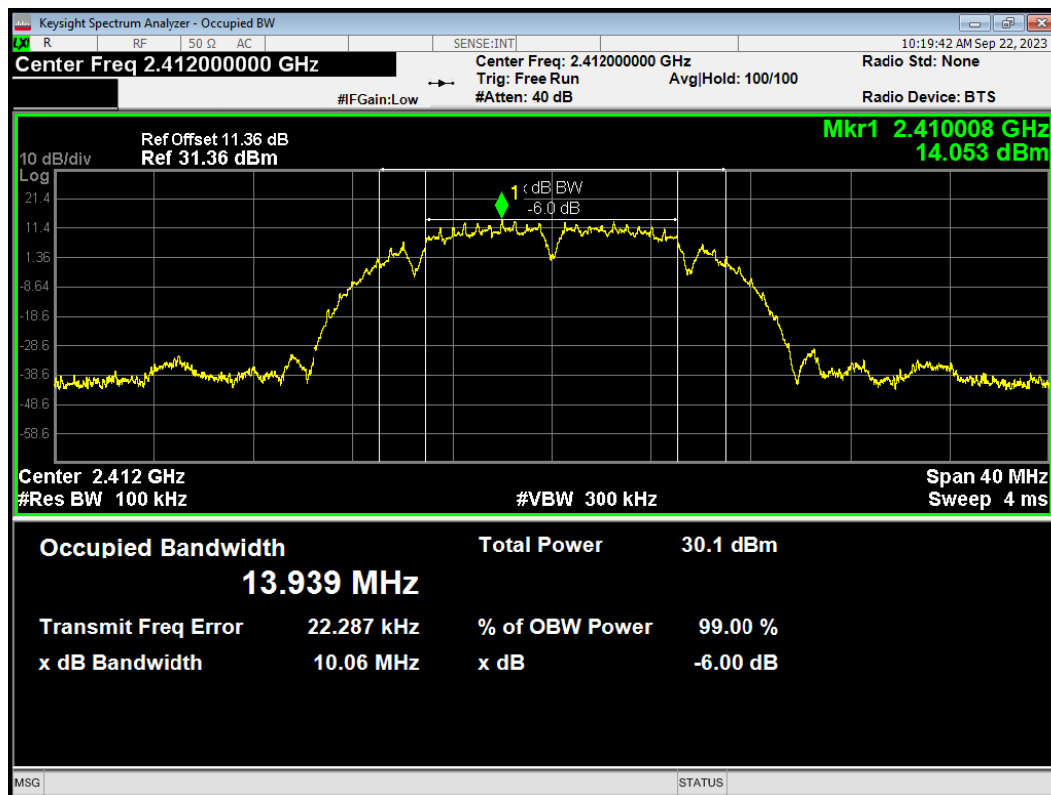
-6dB Bandwidth 802.11ax(HE40) 2447MHz



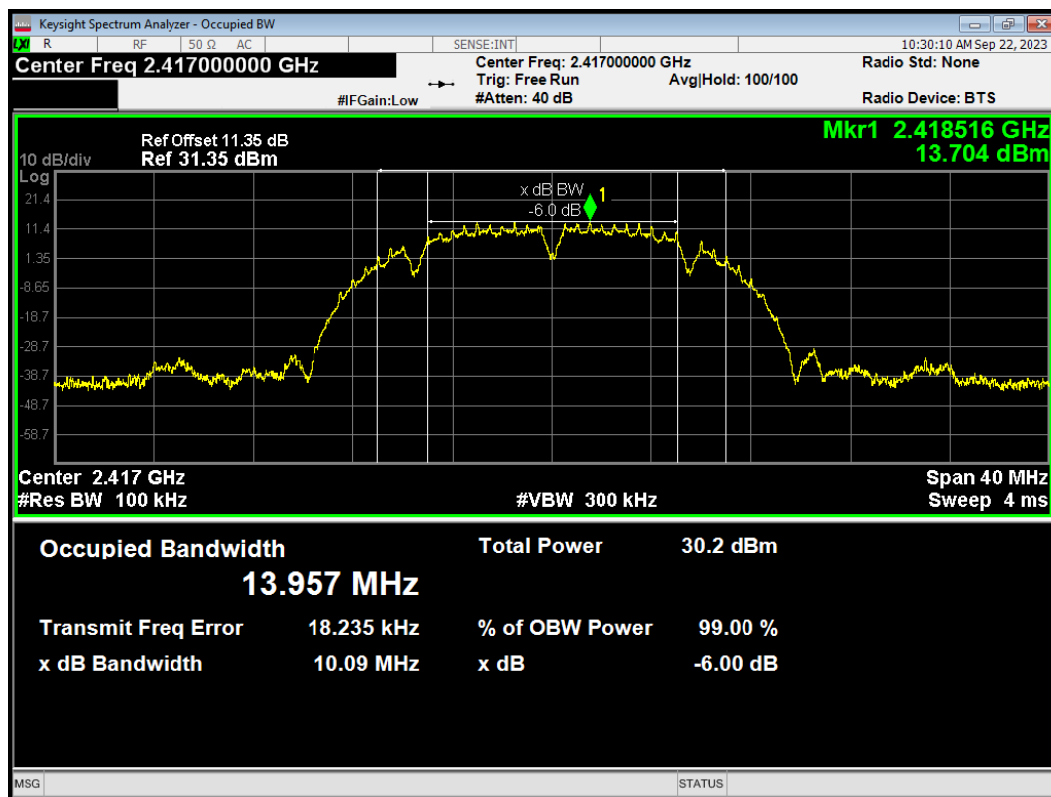
-6dB Bandwidth 802.11ax(HE40) 2452MHz



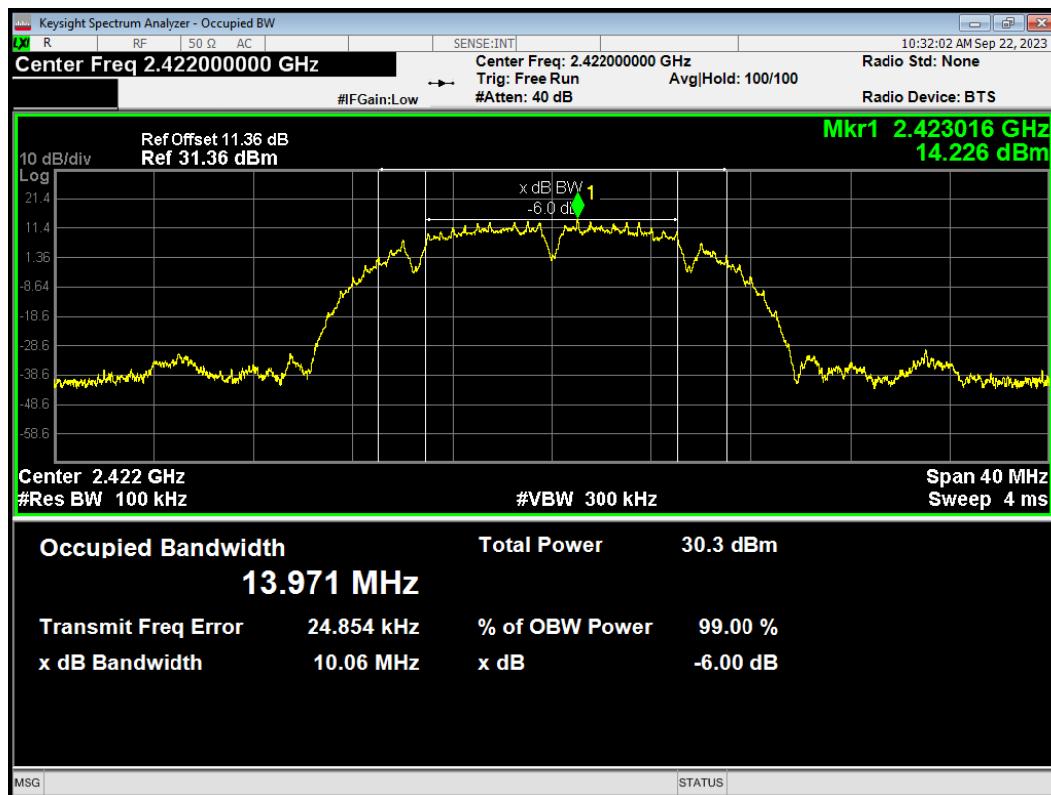
-6dB Bandwidth 802.11b 2412MHz



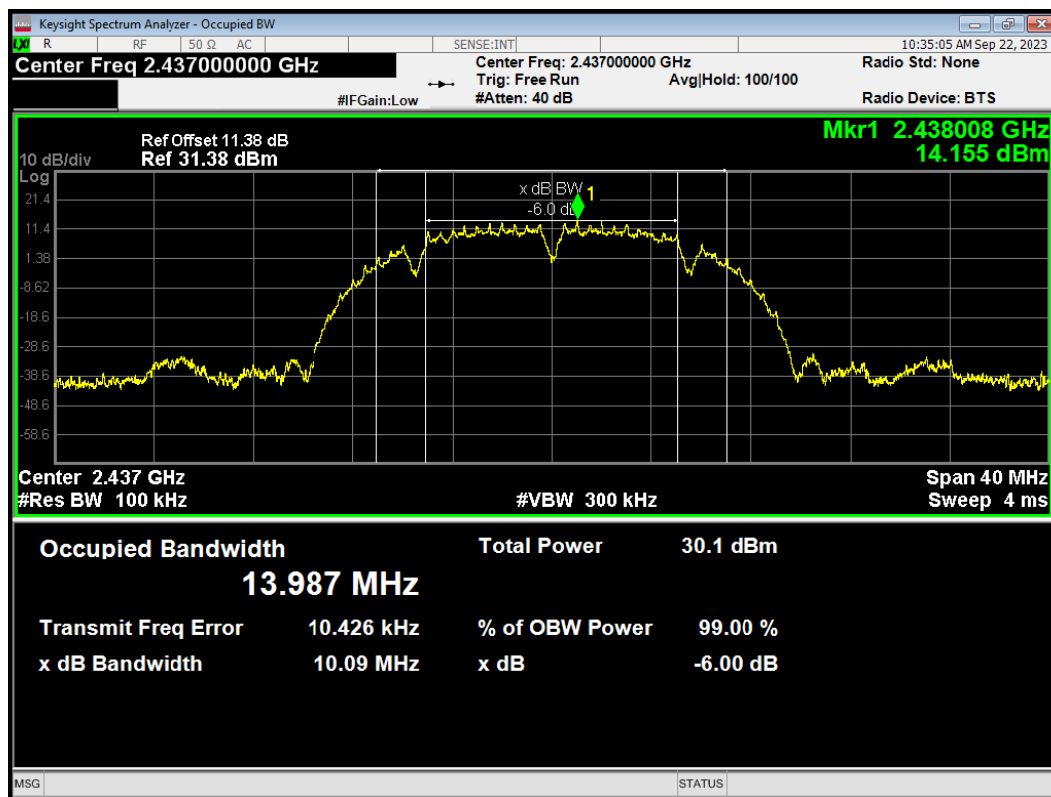
-6dB Bandwidth 802.11b 2417MHz



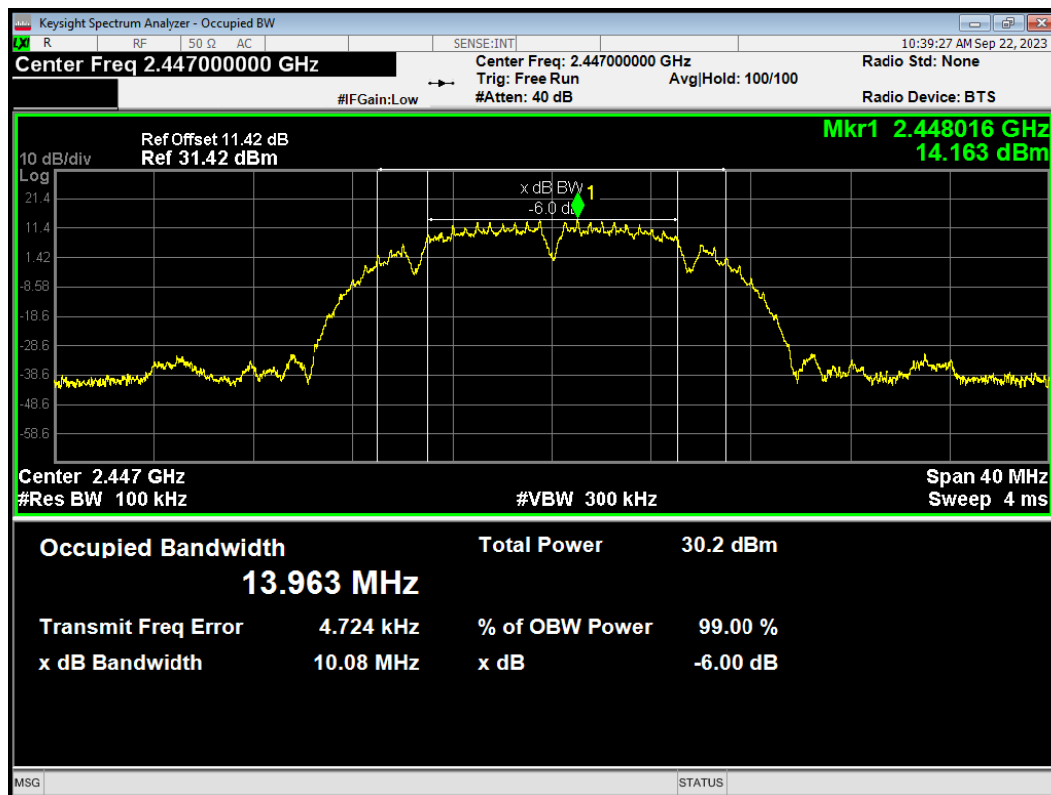
-6dB Bandwidth 802.11b 2422MHz



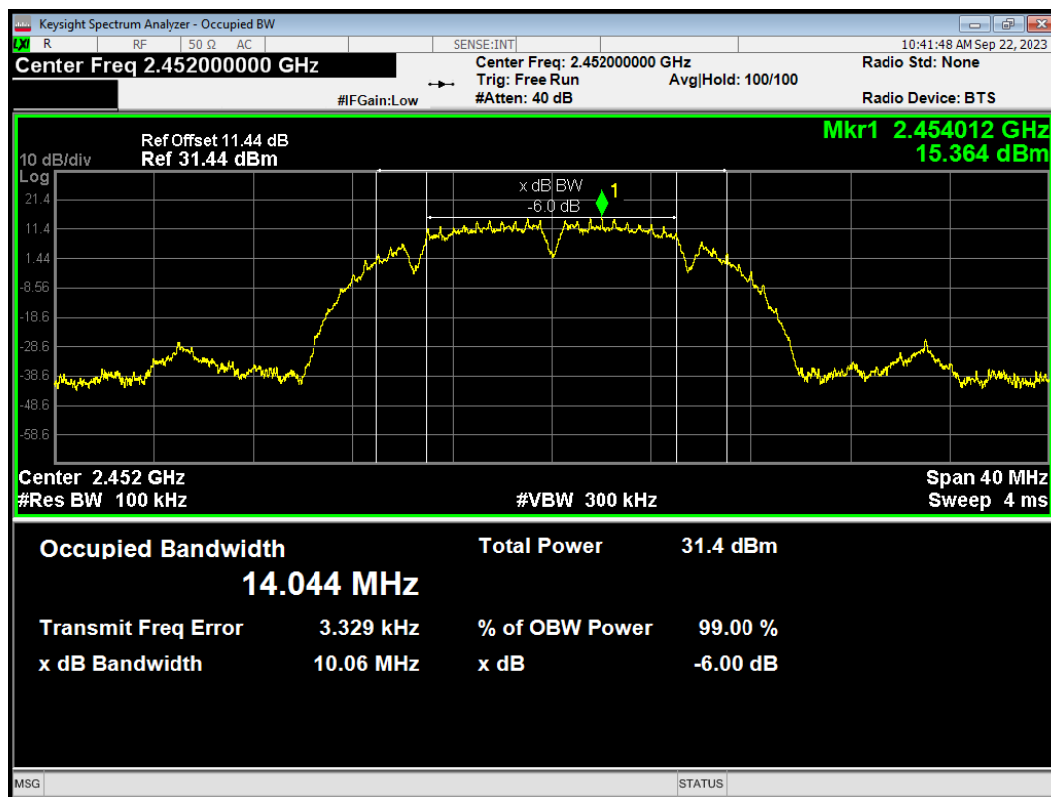
-6dB Bandwidth 802.11b 2437MHz



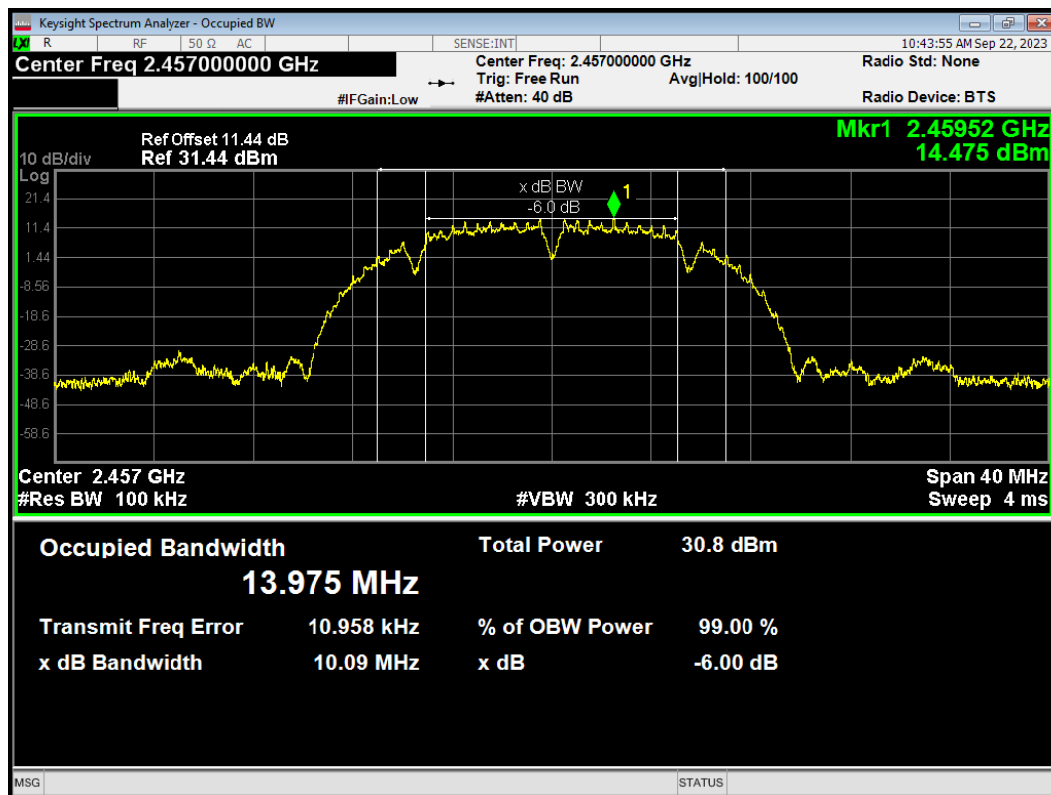
-6dB Bandwidth 802.11b 2447MHz



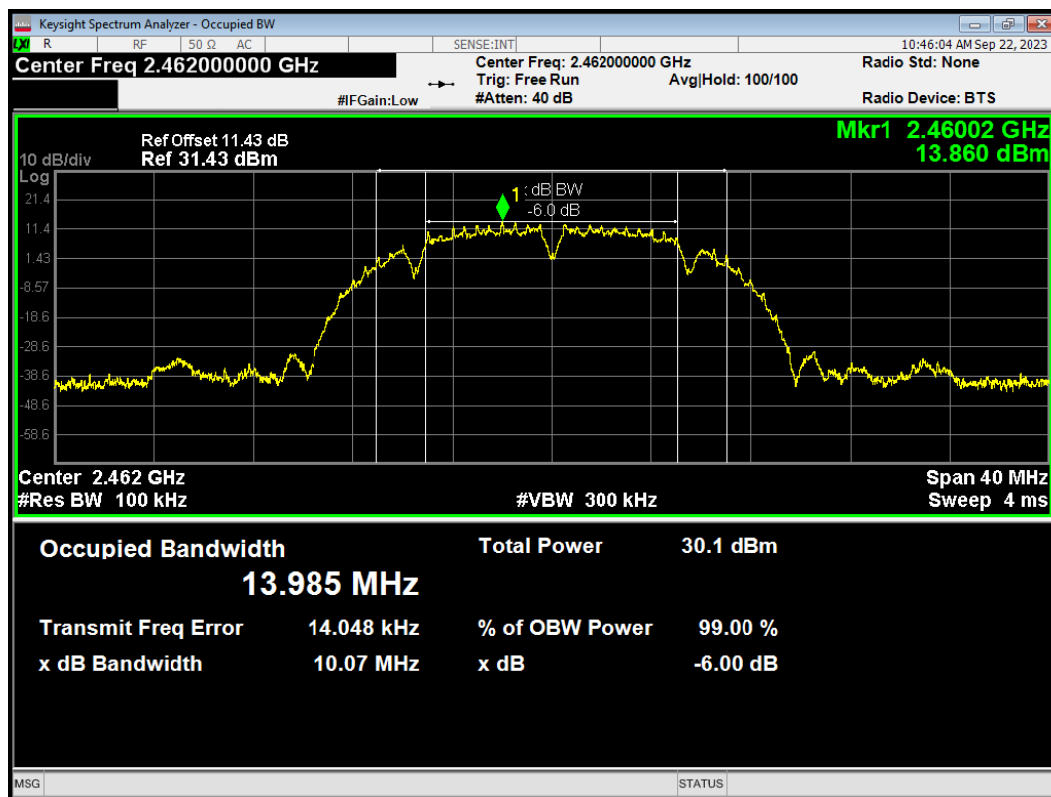
-6dB Bandwidth 802.11b 2452MHz



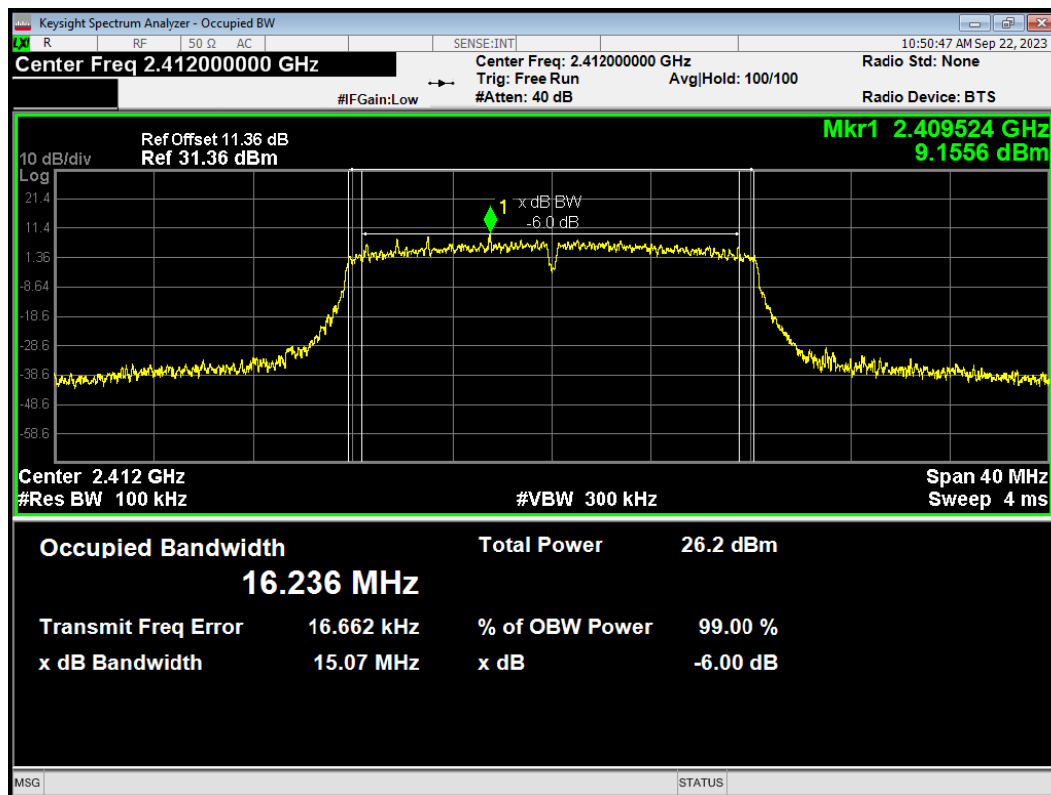
-6dB Bandwidth 802.11b 2457MHz



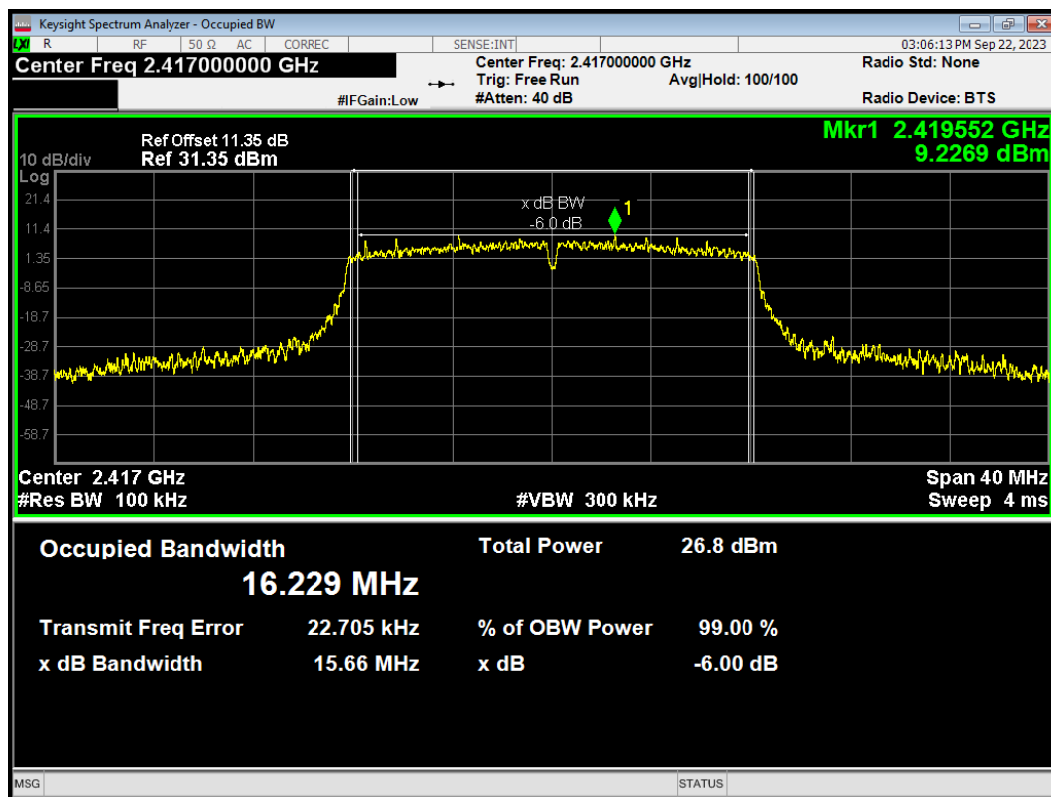
-6dB Bandwidth 802.11b 2462MHz



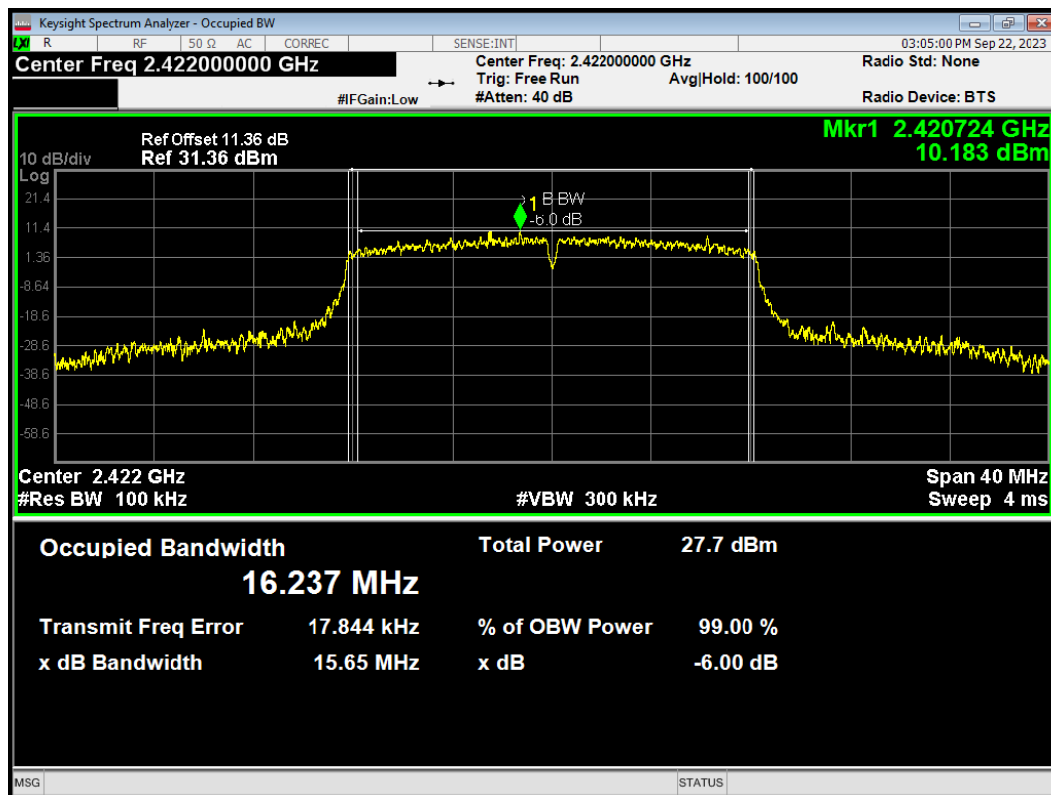
-6dB Bandwidth 802.11g 2412MHz



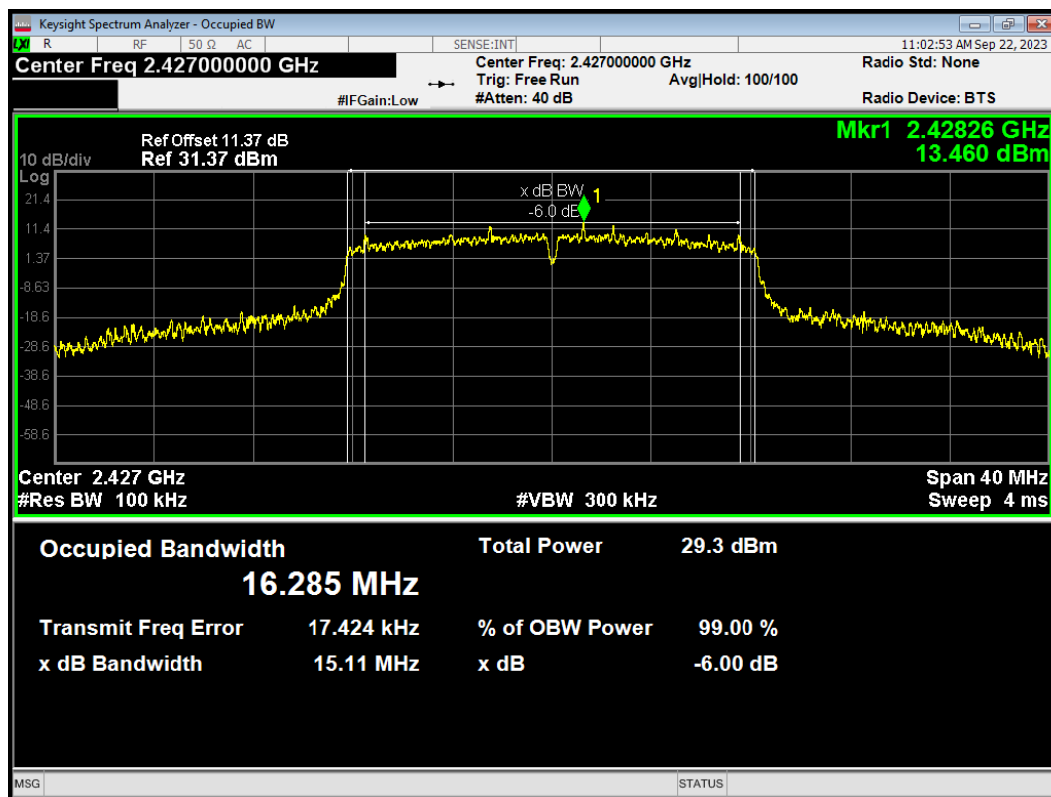
-6dB Bandwidth 802.11g 2417MHz



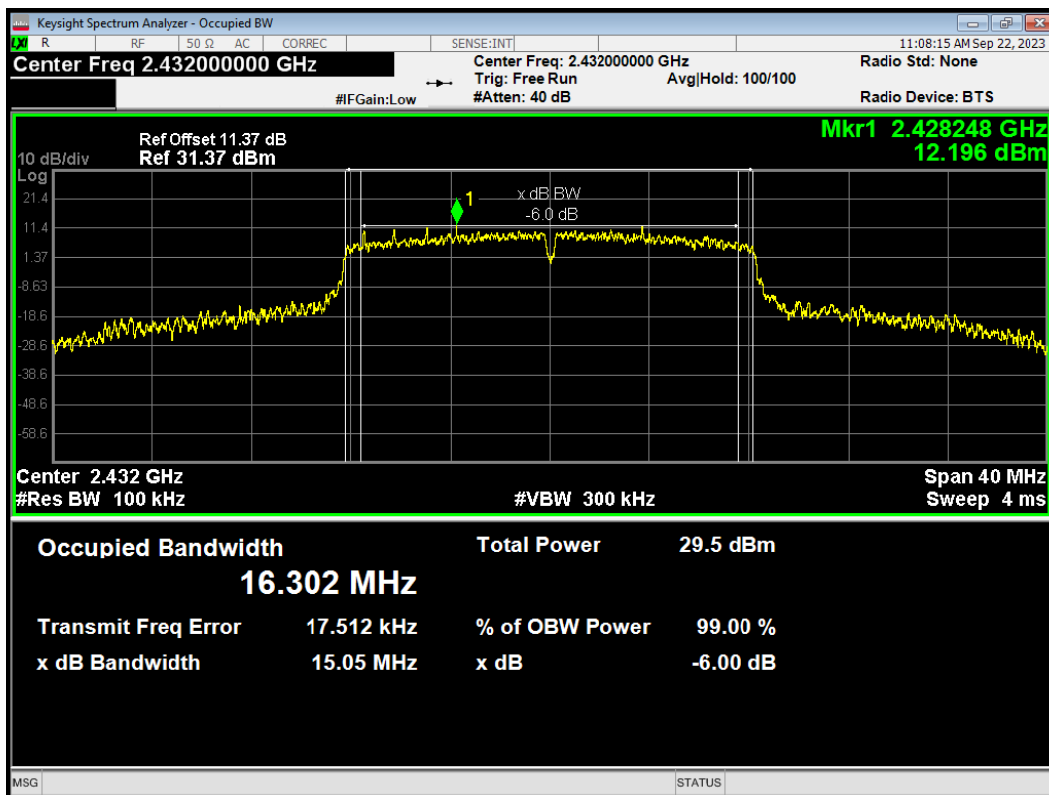
-6dB Bandwidth 802.11g 2422MHz



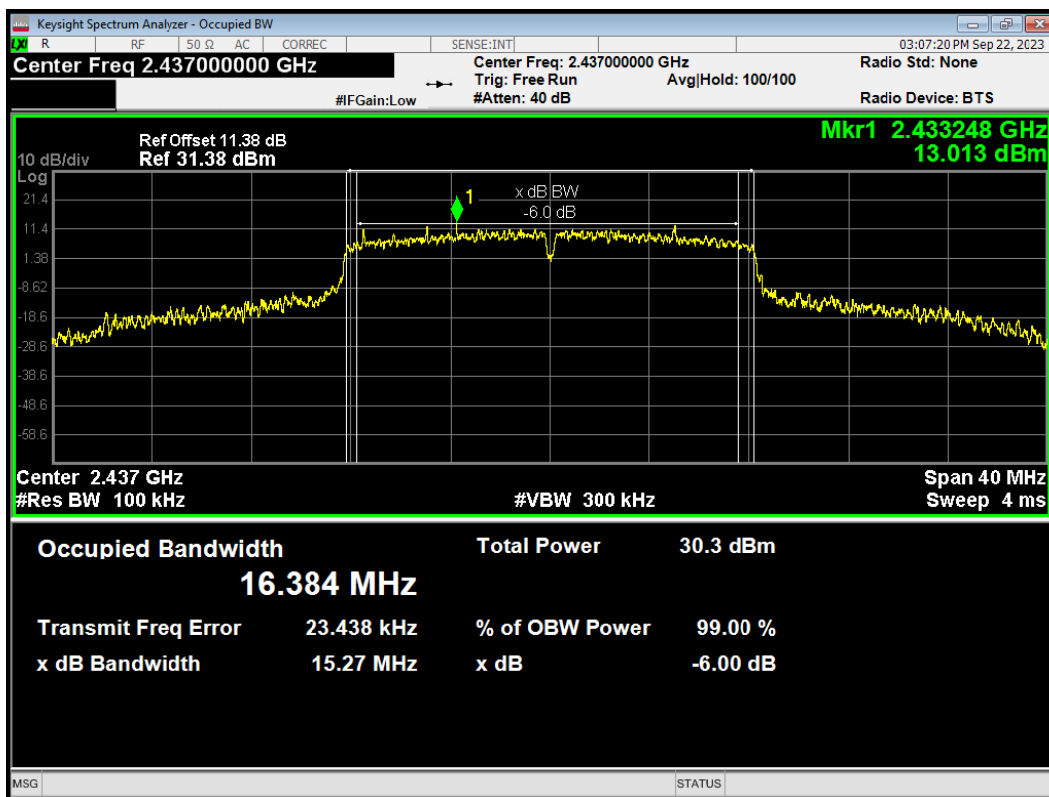
-6dB Bandwidth 802.11g 2427MHz



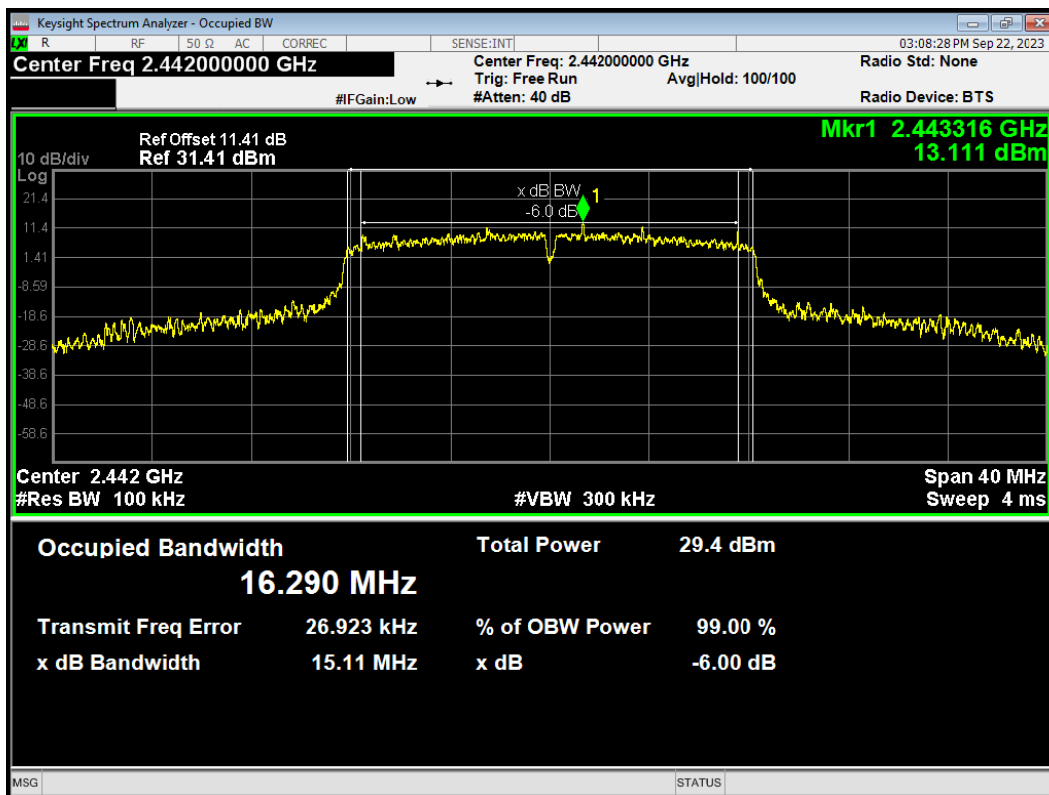
-6dB Bandwidth 802.11g 2432MHz



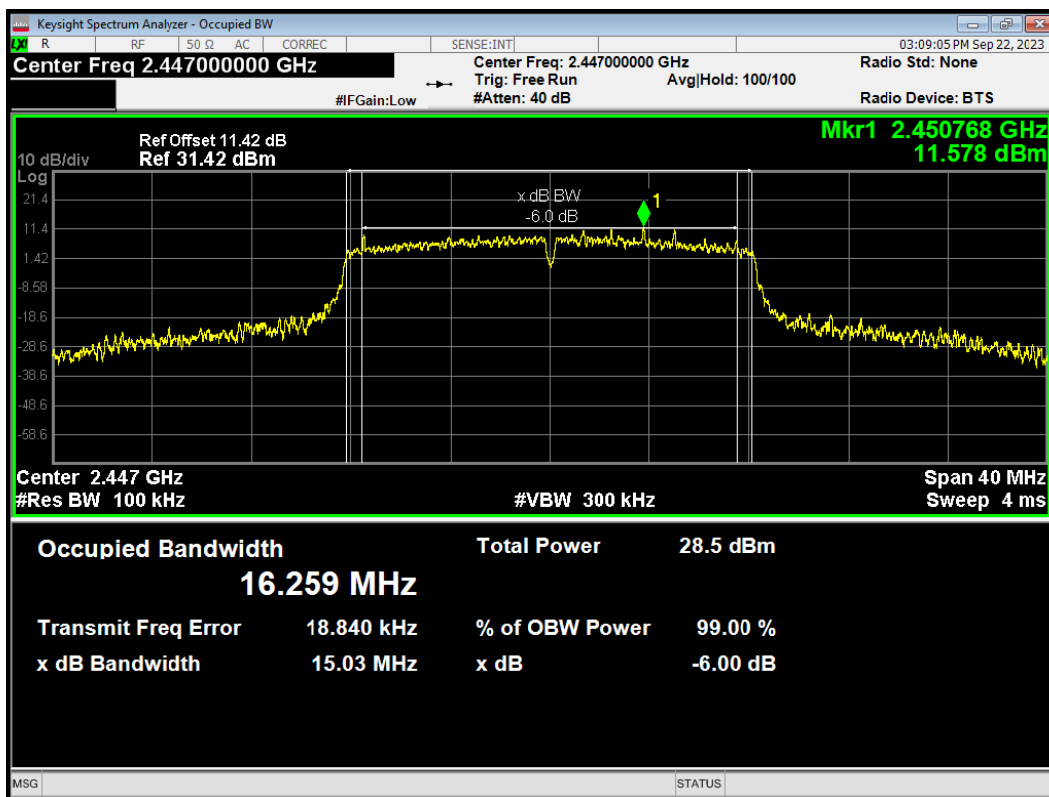
-6dB Bandwidth 802.11g 2437MHz



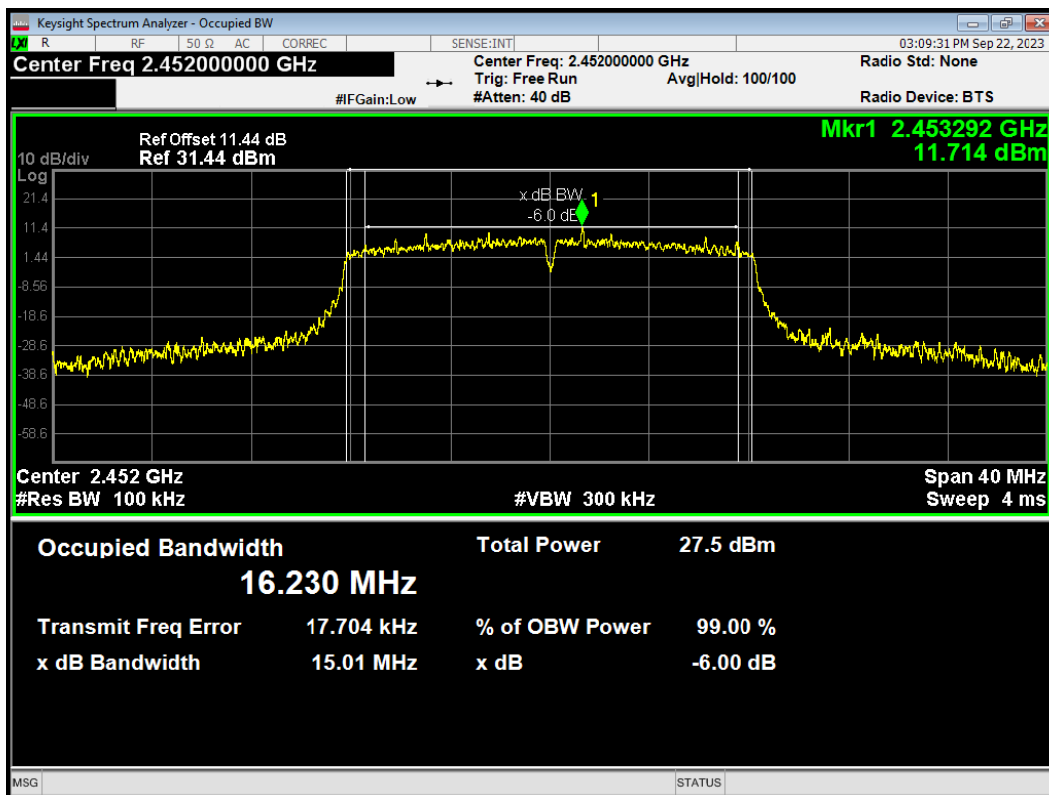
-6dB Bandwidth 802.11g 2442MHz



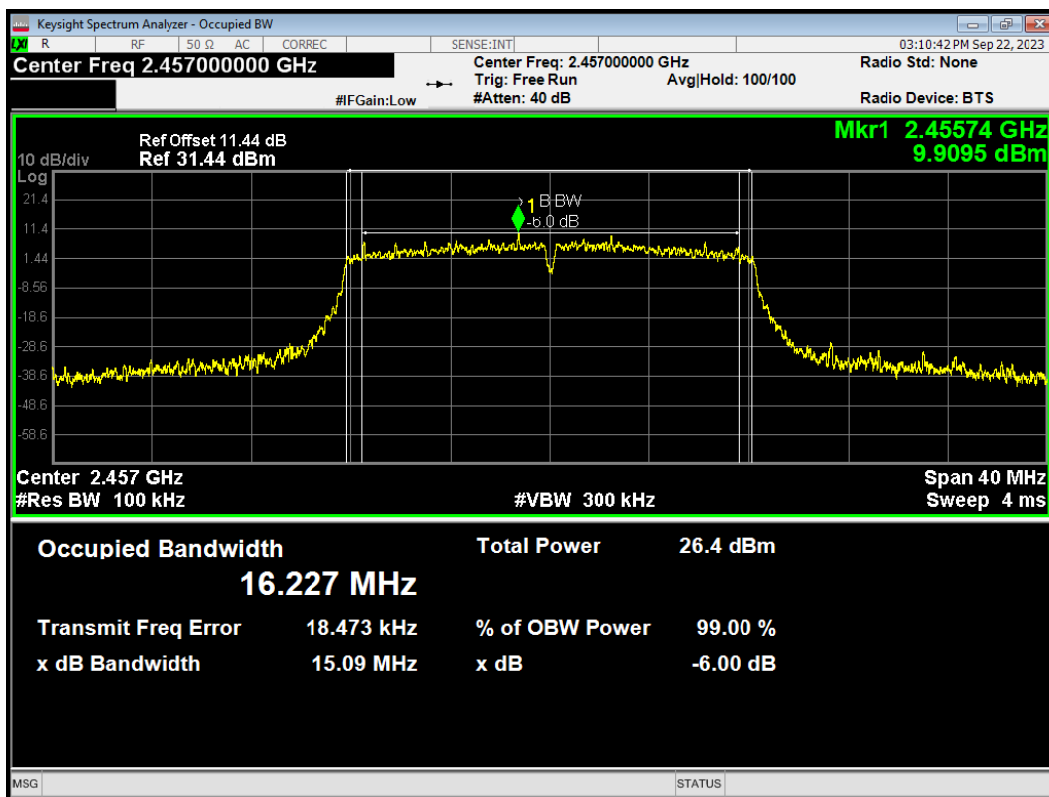
-6dB Bandwidth 802.11g 2447MHz



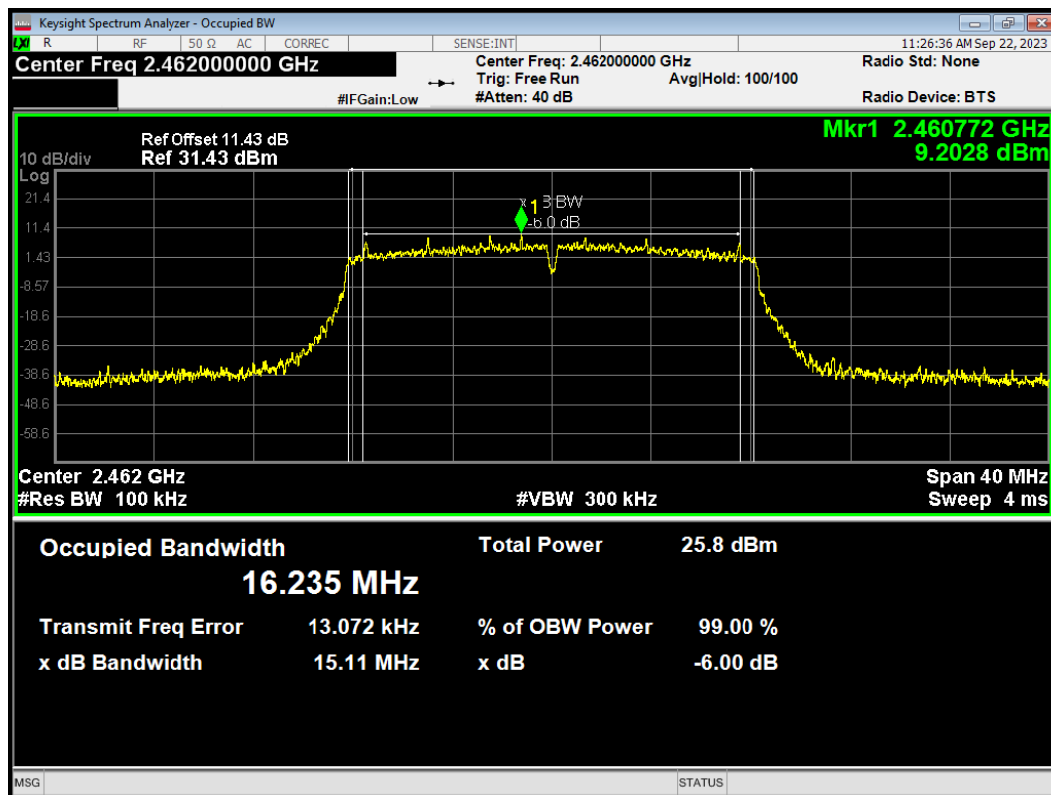
-6dB Bandwidth 802.11g 2452MHz



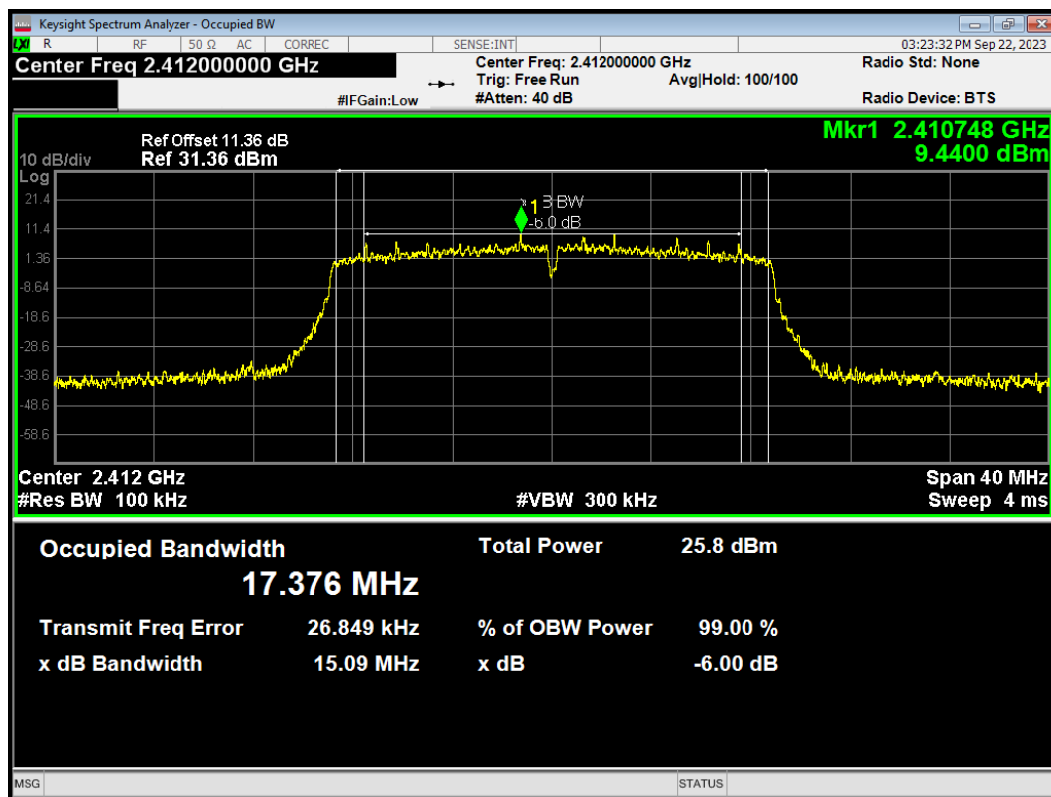
-6dB Bandwidth 802.11g 2457MHz



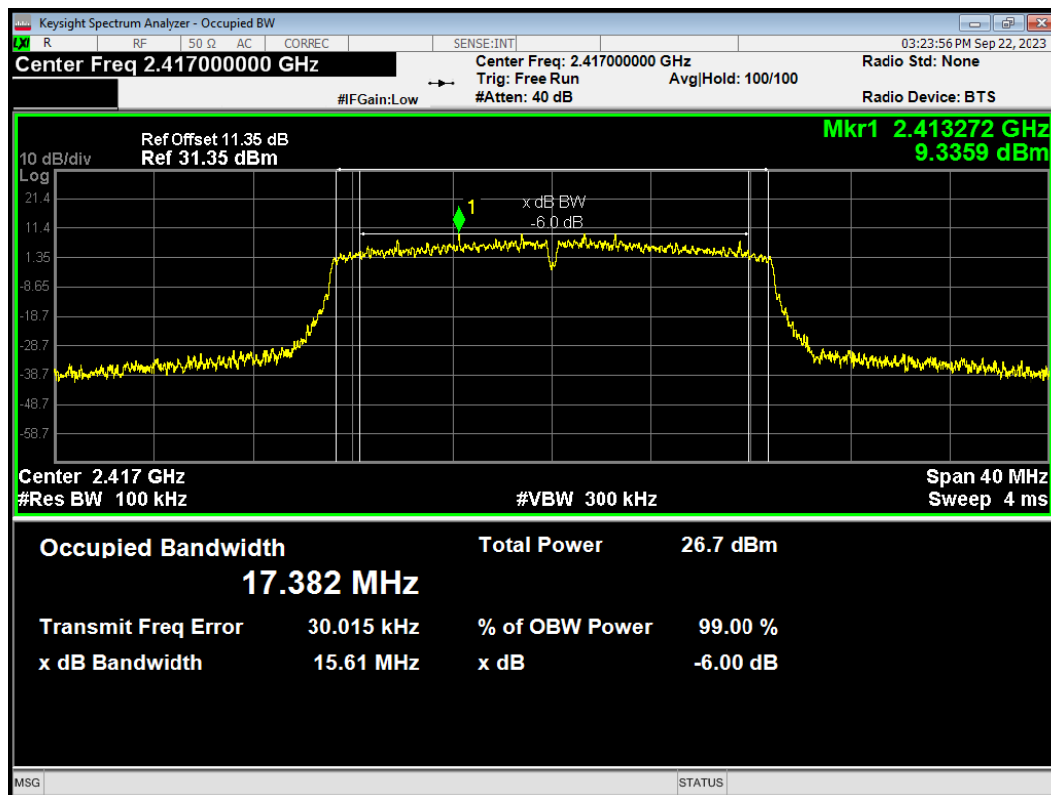
-6dB Bandwidth 802.11g 2462MHz



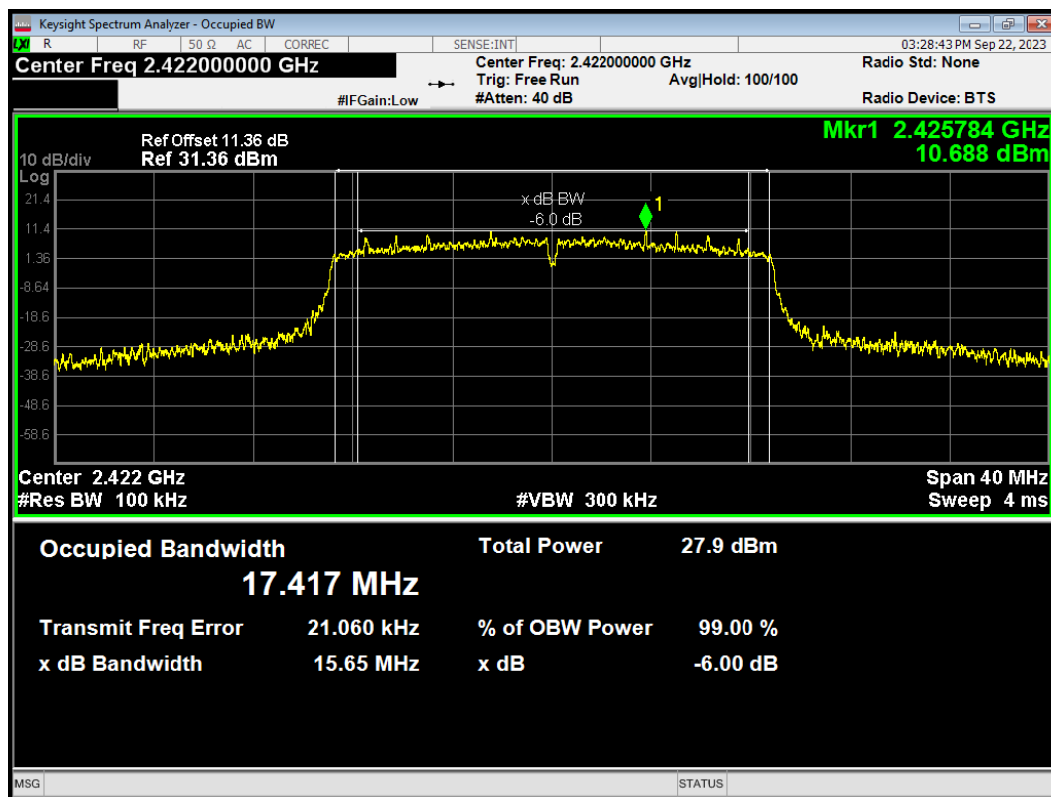
-6dB Bandwidth 802.11n(HT20) 2412MHz



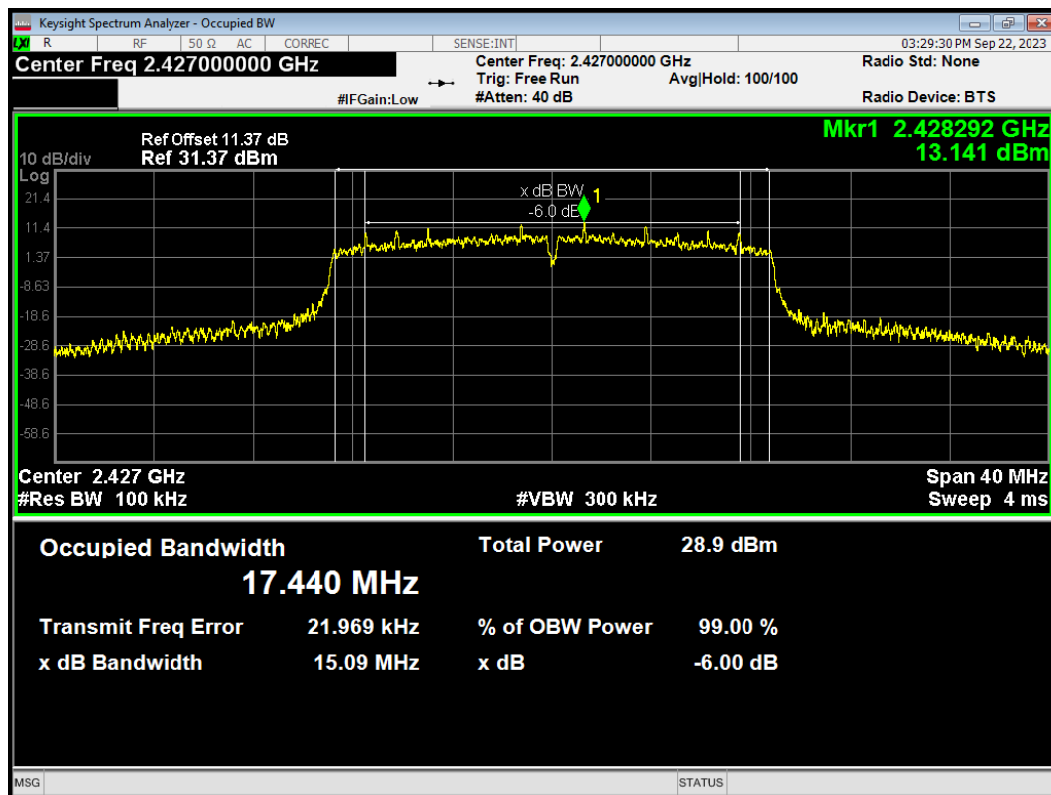
-6dB Bandwidth 802.11n(HT20) 2417MHz



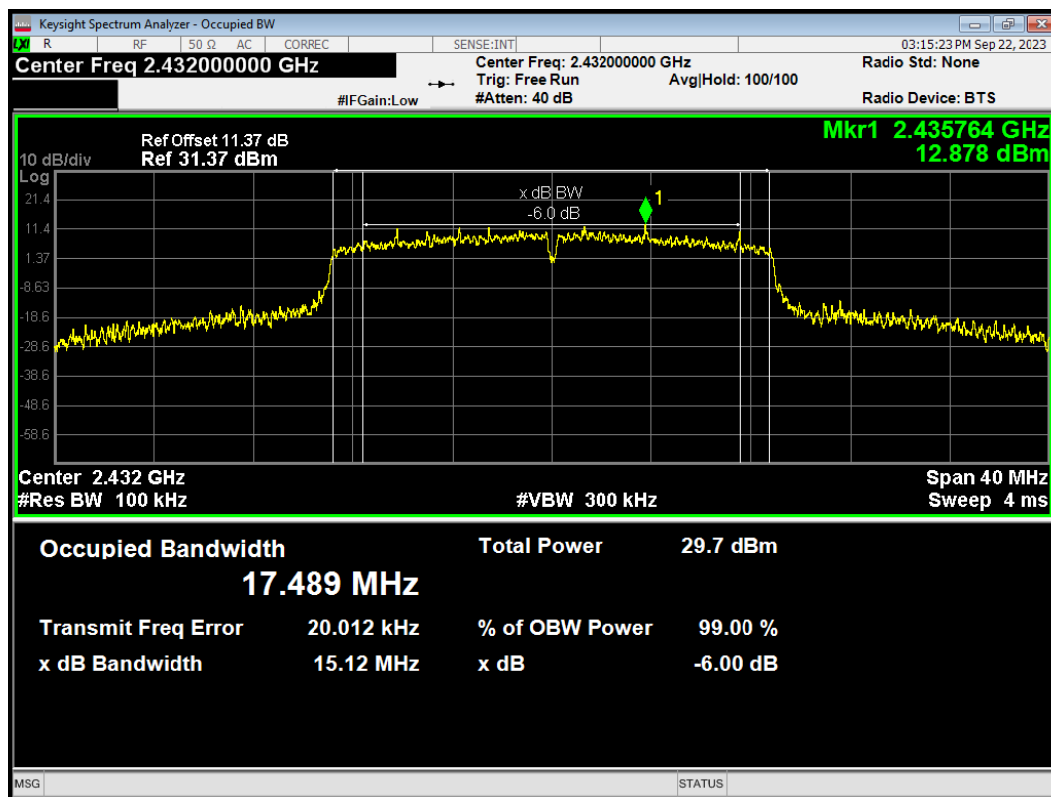
-6dB Bandwidth 802.11n(HT20) 2422MHz



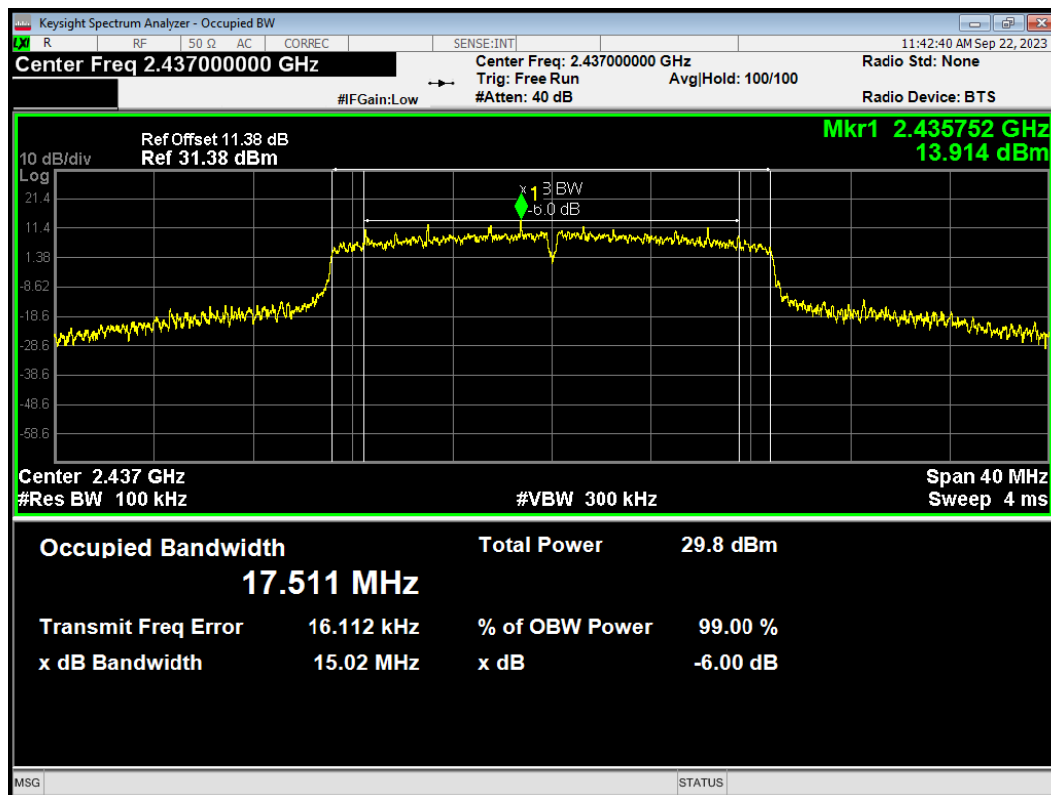
-6dB Bandwidth 802.11n(HT20) 2427MHz



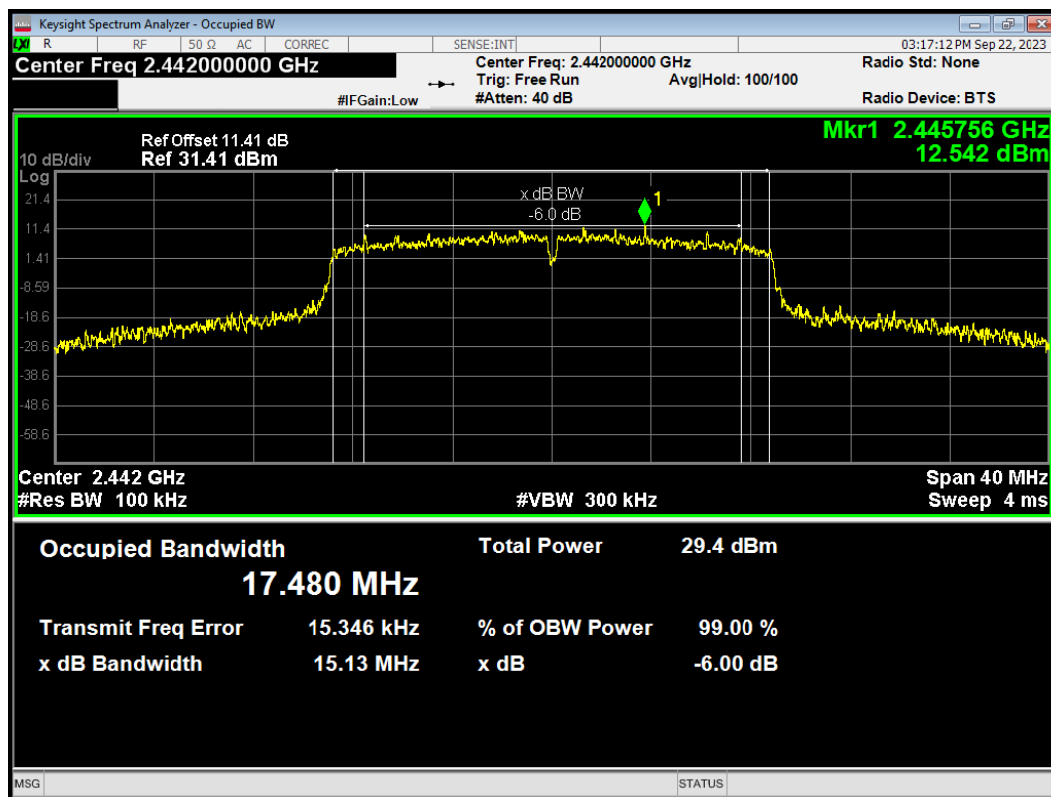
-6dB Bandwidth 802.11n(HT20) 2432MHz



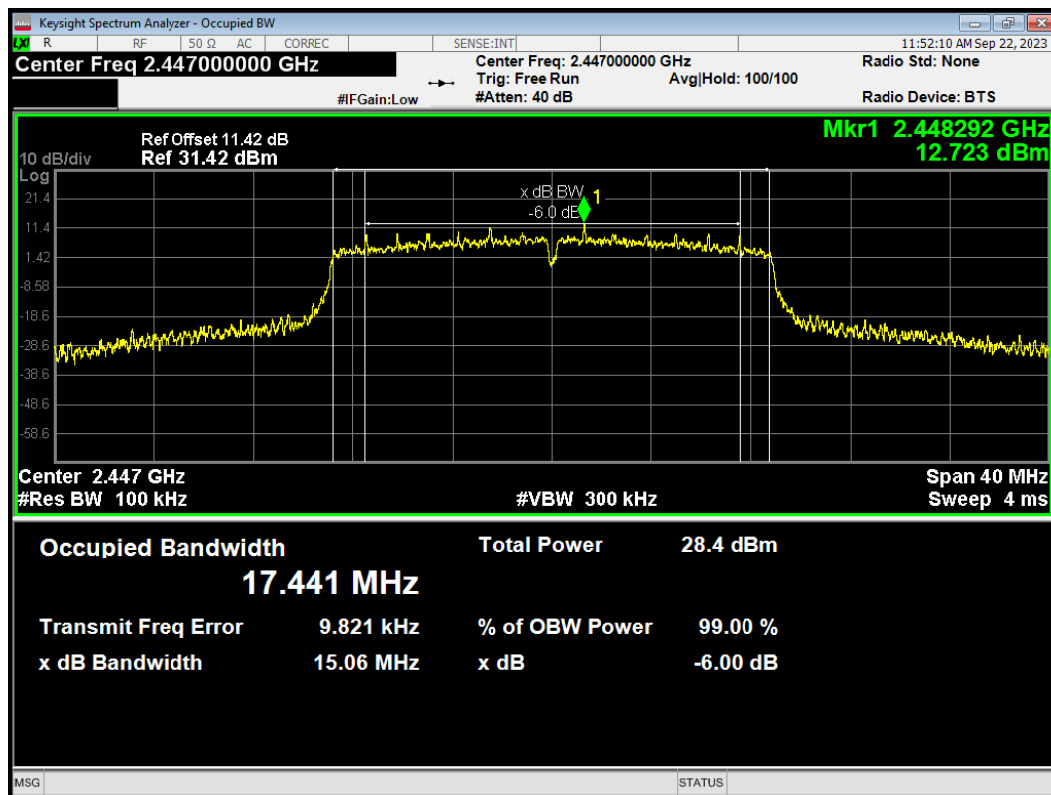
-6dB Bandwidth 802.11n(HT20) 2437MHz



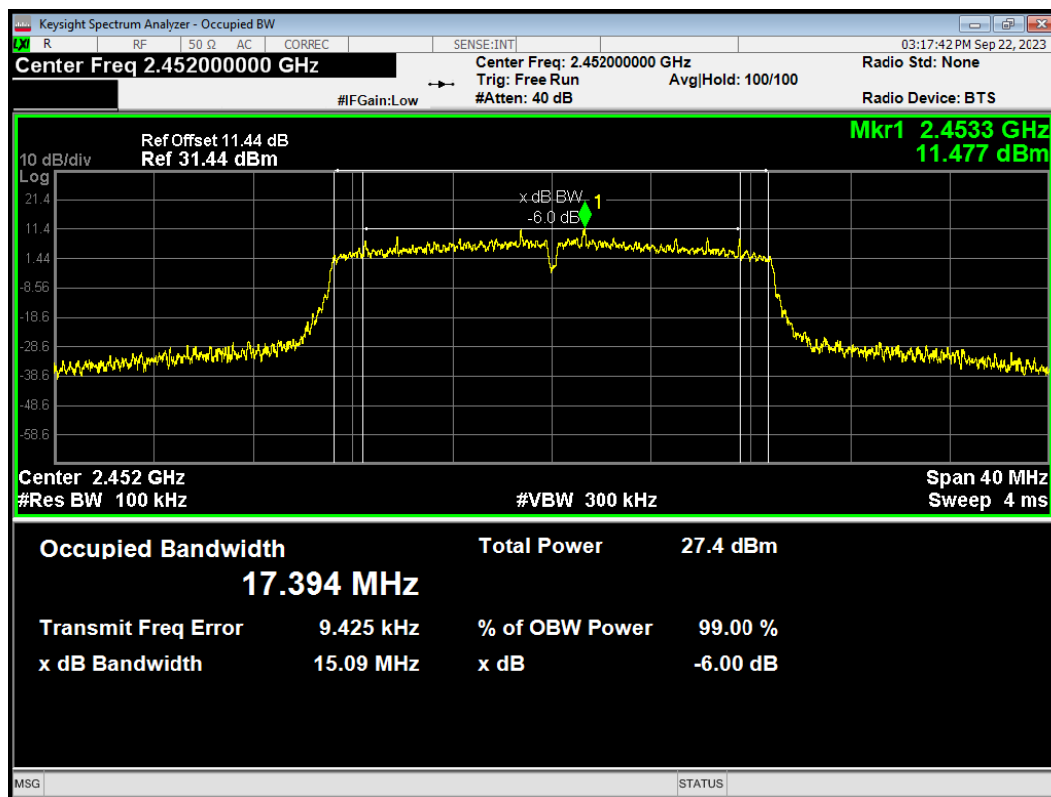
-6dB Bandwidth 802.11n(HT20) 2442MHz



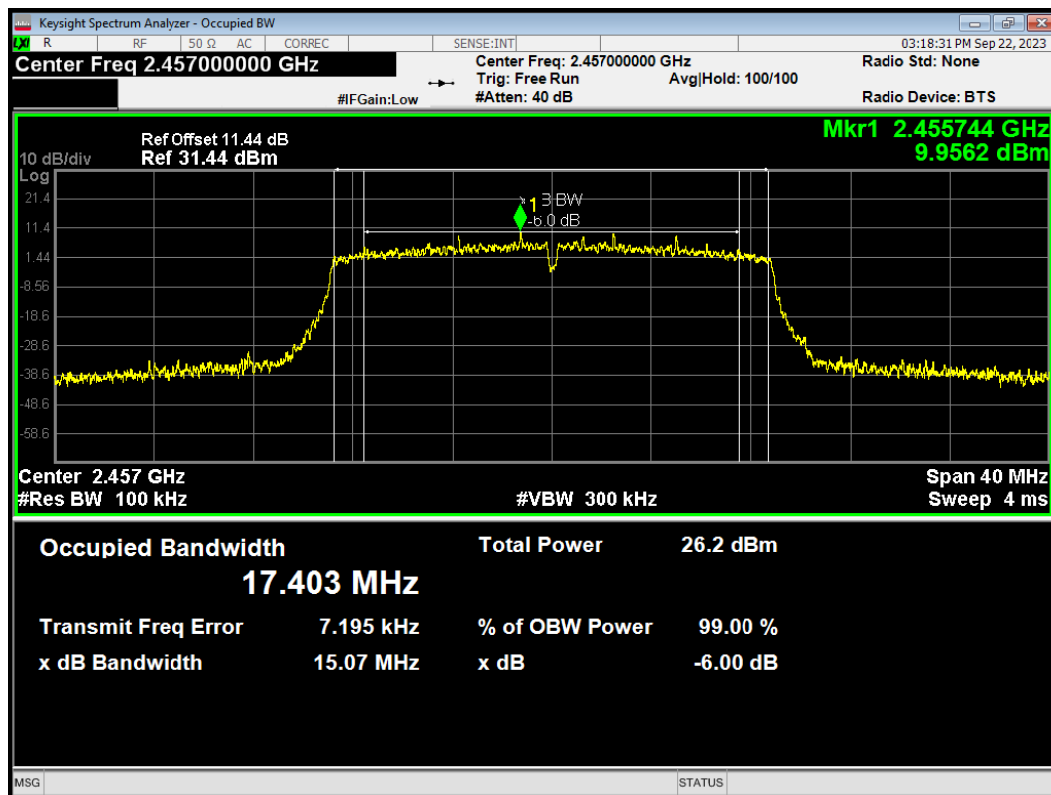
-6dB Bandwidth 802.11n(HT20) 2447MHz



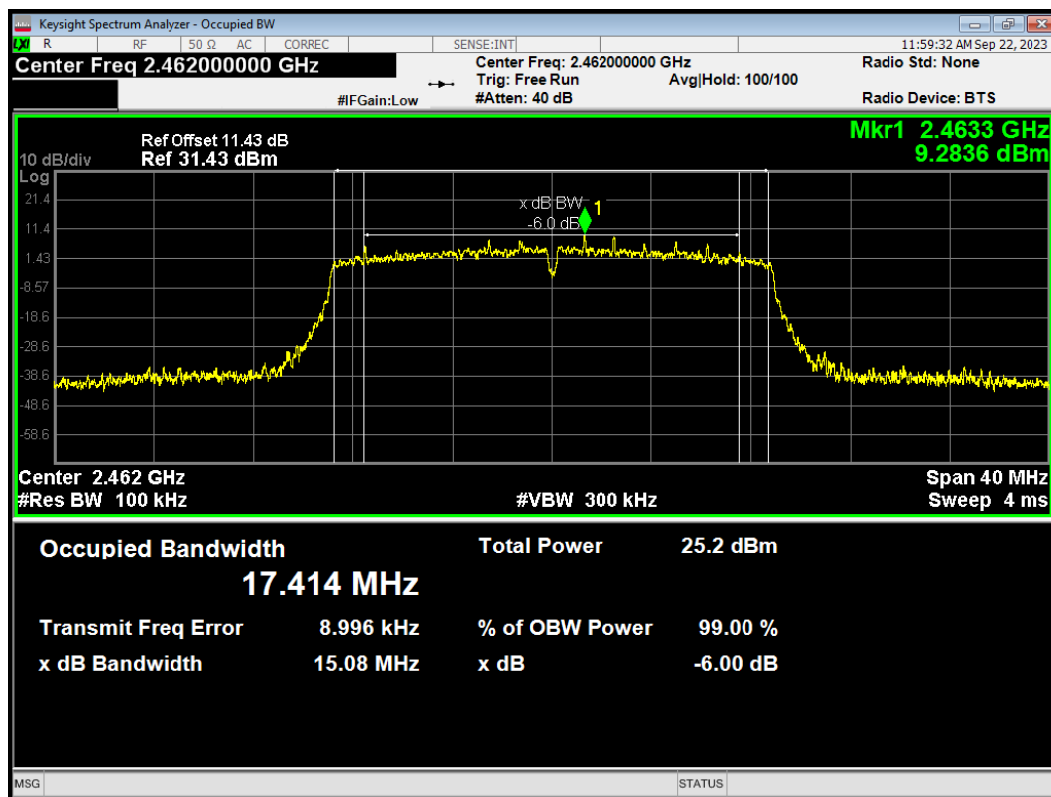
-6dB Bandwidth 802.11n(HT20) 2452MHz



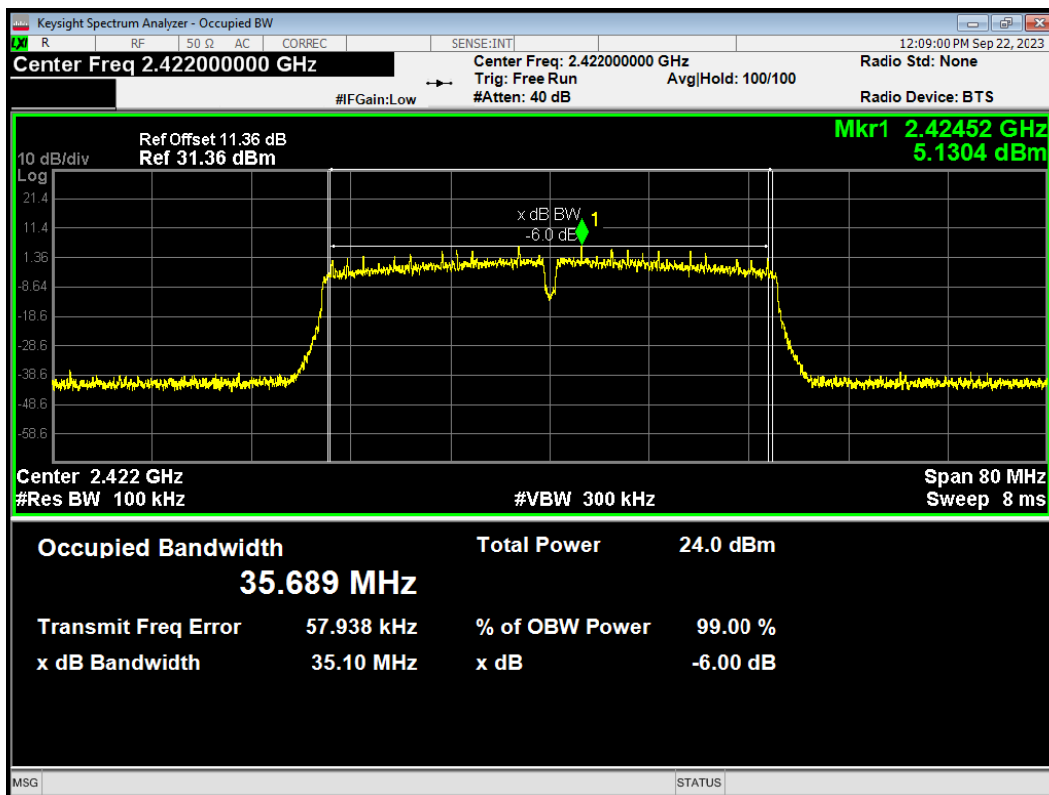
-6dB Bandwidth 802.11n(HT20) 2457MHz



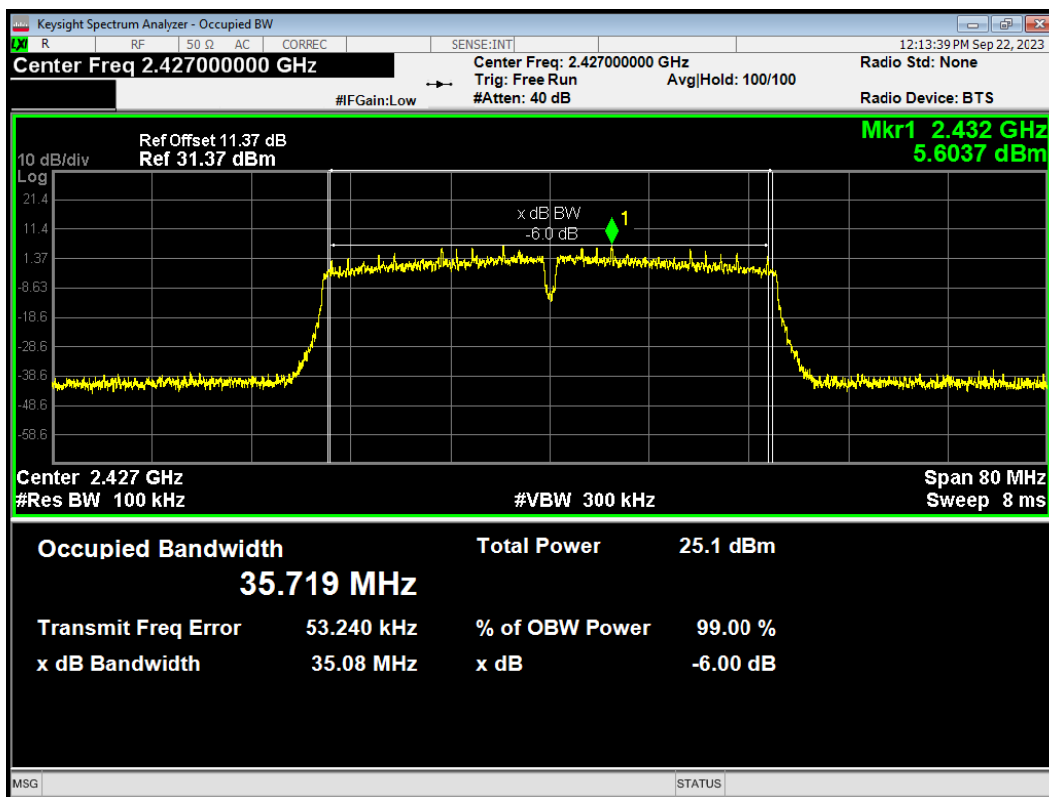
-6dB Bandwidth 802.11n(HT20) 2462MHz



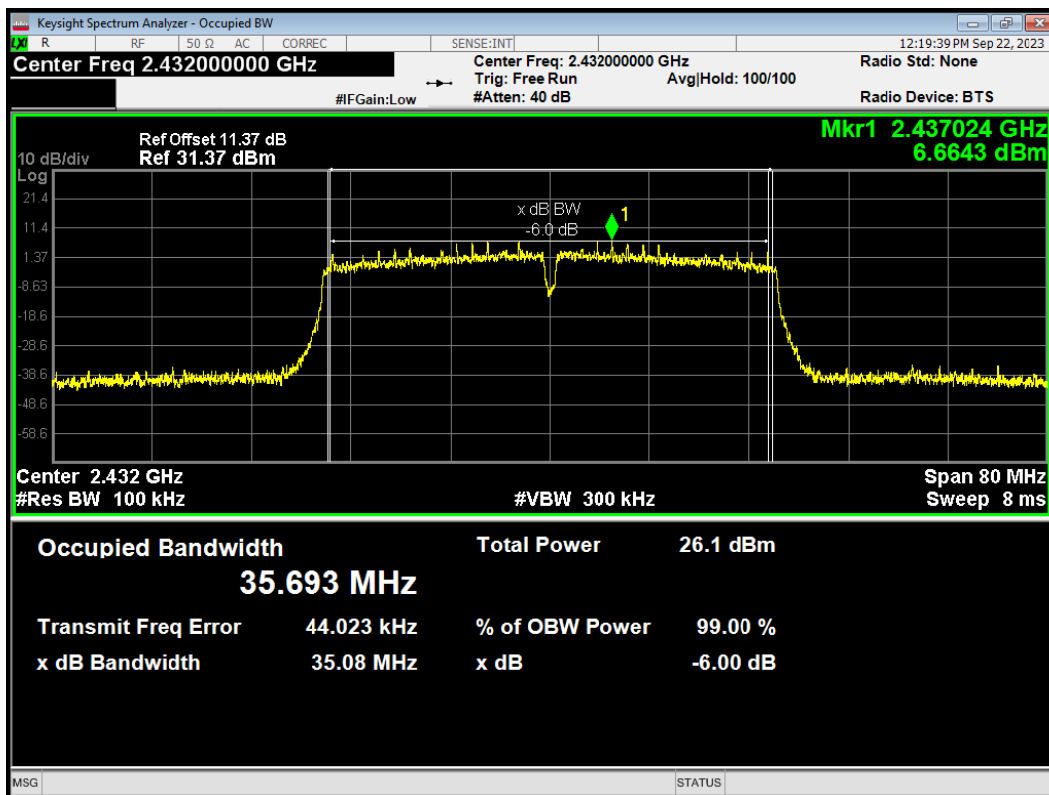
-6dB Bandwidth 802.11n(HT40) 2422MHz



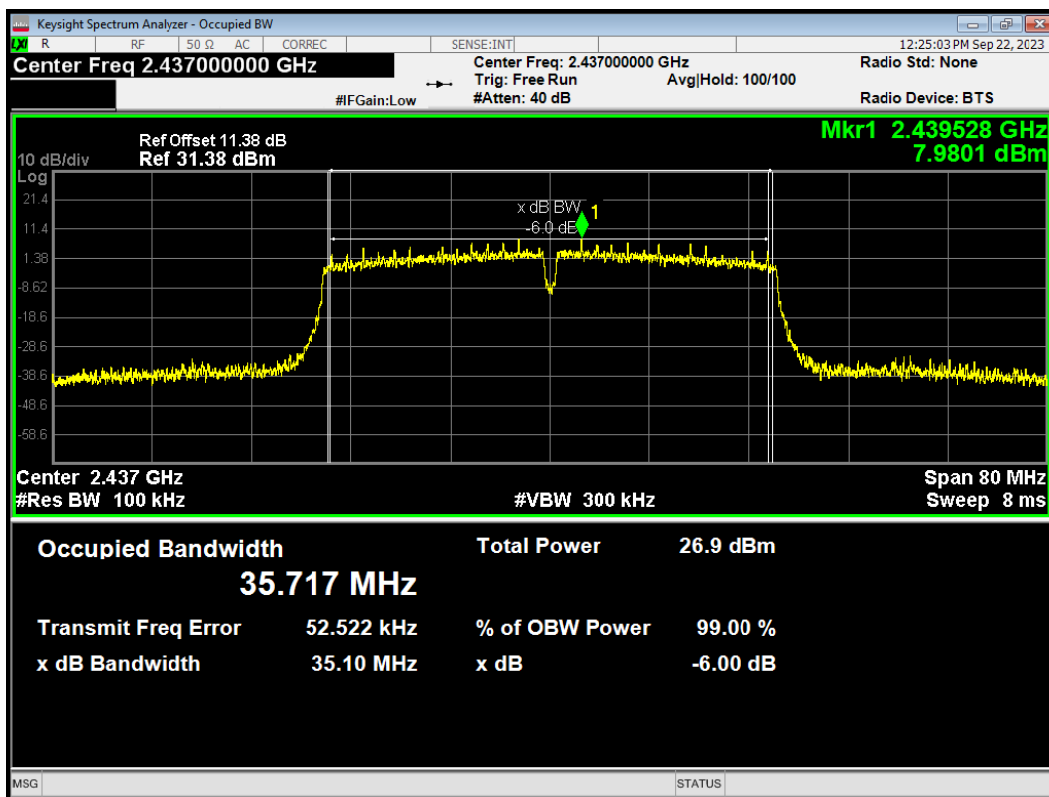
-6dB Bandwidth 802.11n(HT40) 2427MHz



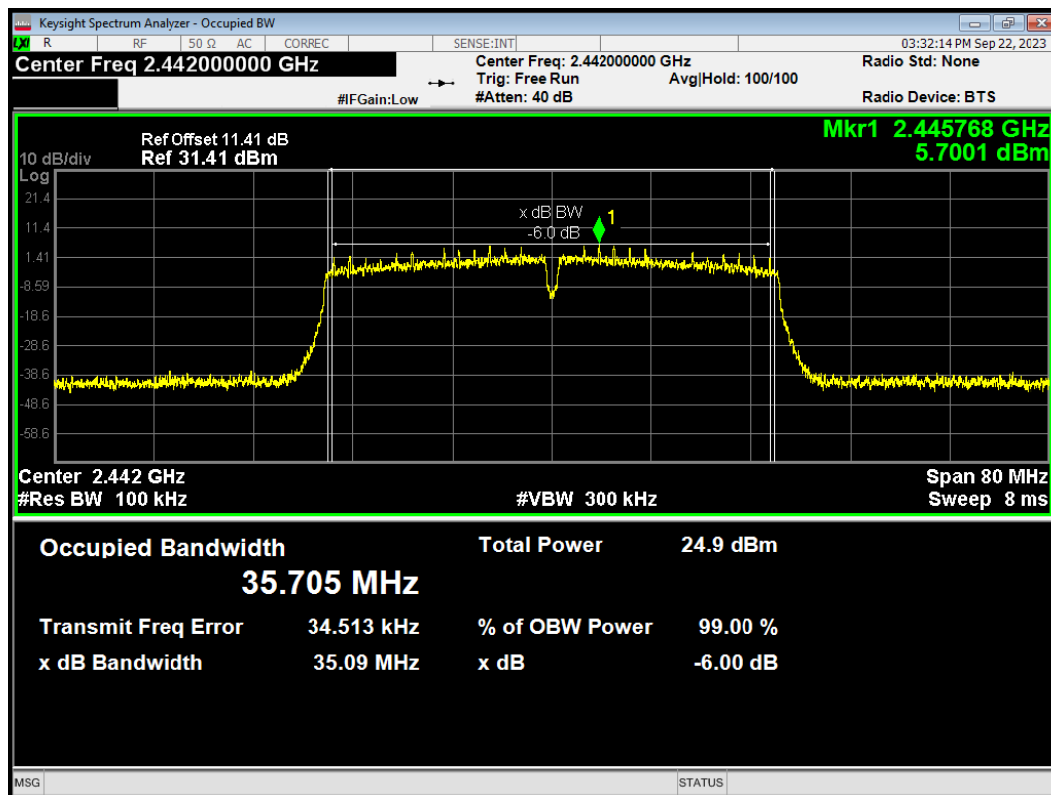
-6dB Bandwidth 802.11n(HT40) 2432MHz



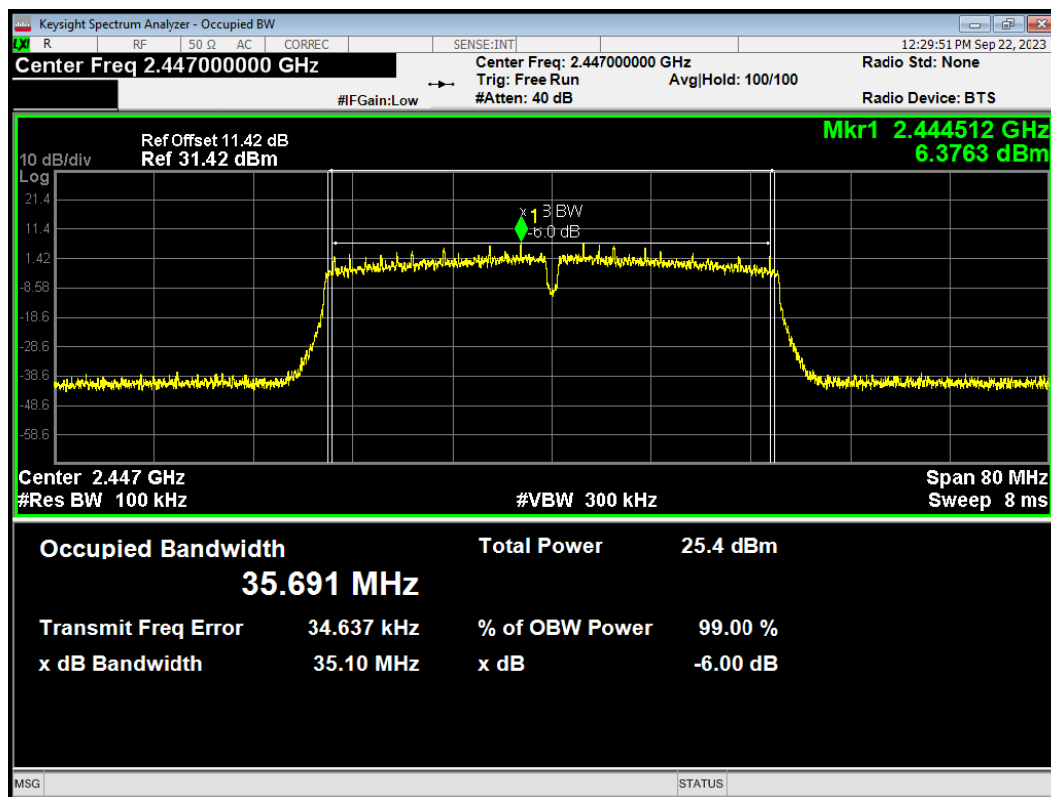
-6dB Bandwidth 802.11n(HT40) 2437MHz



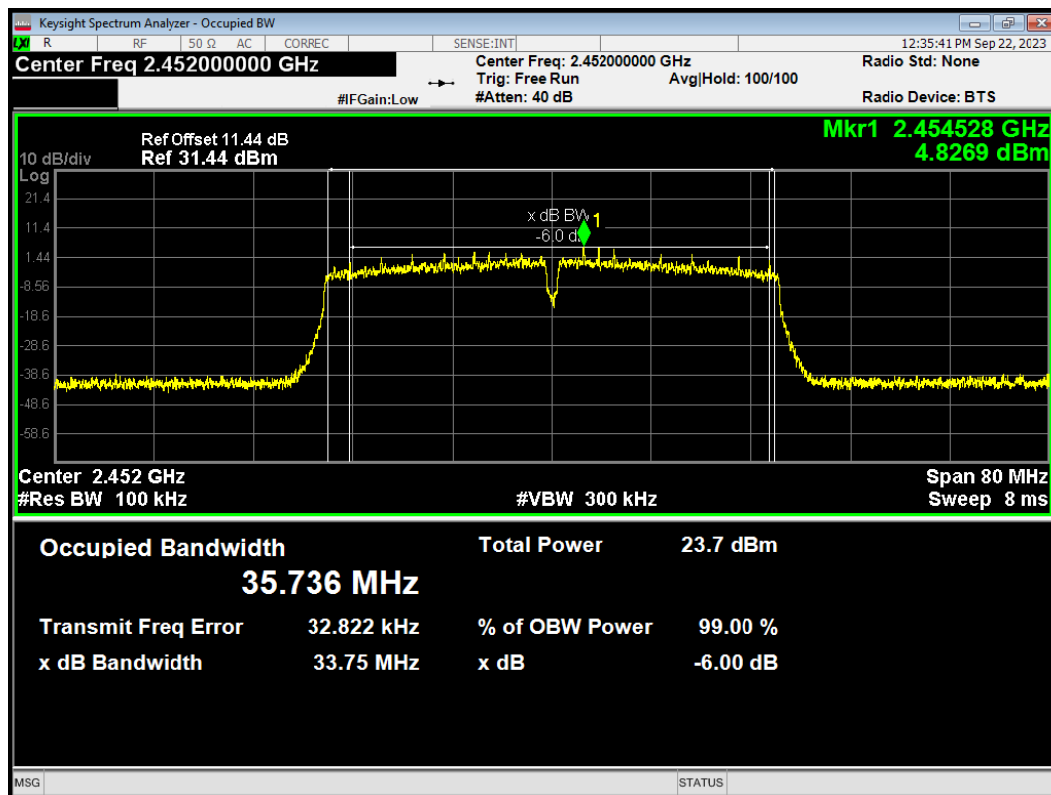
-6dB Bandwidth 802.11n(HT40) 2442MHz



-6dB Bandwidth 802.11n(HT40) 2447MHz



-6dB Bandwidth 802.11n(HT40) 2452MHz



5.3. Band Edge

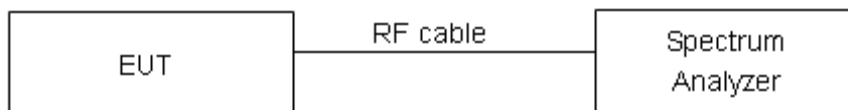
Ambient Condition

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 the band edge of the lowest and highest channels were measured. The peak detector is used and RBW is set to 100 kHz and VBW is set to 300 kHz on spectrum analyzer. Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

Rule Part 15.247(d) specifies that “In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.” If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.”

Measurement Uncertainty

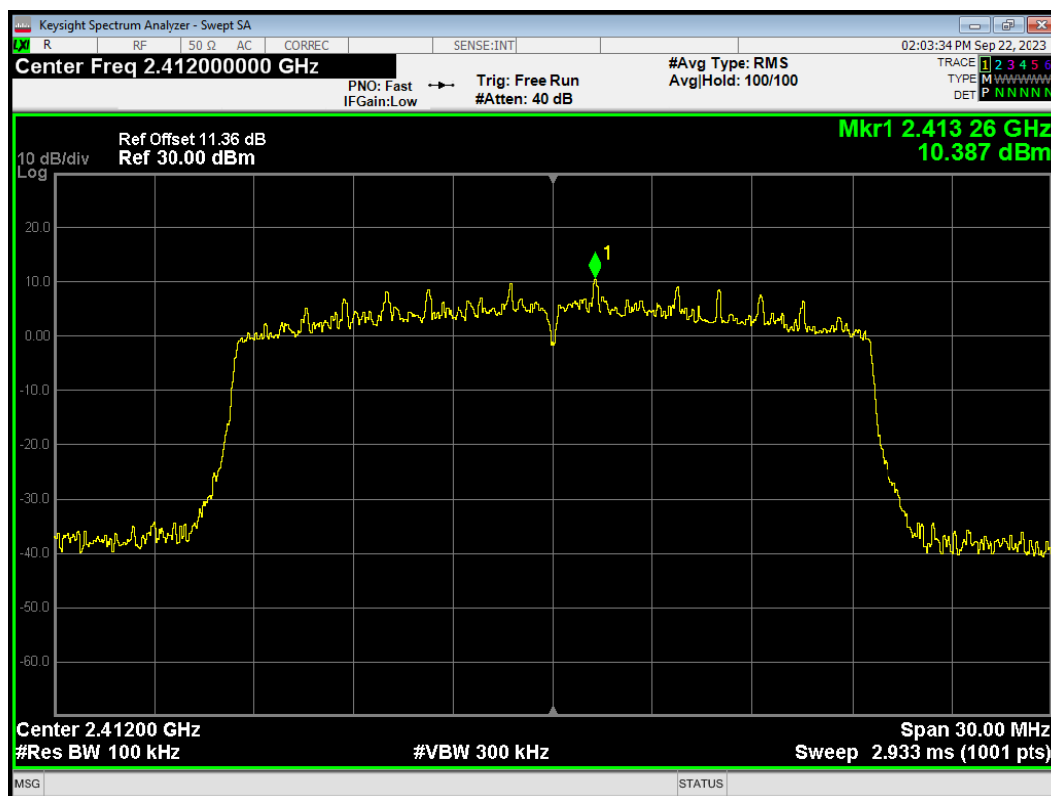
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$.

Frequency	Uncertainty
2GHz-3GHz	1.407 dB

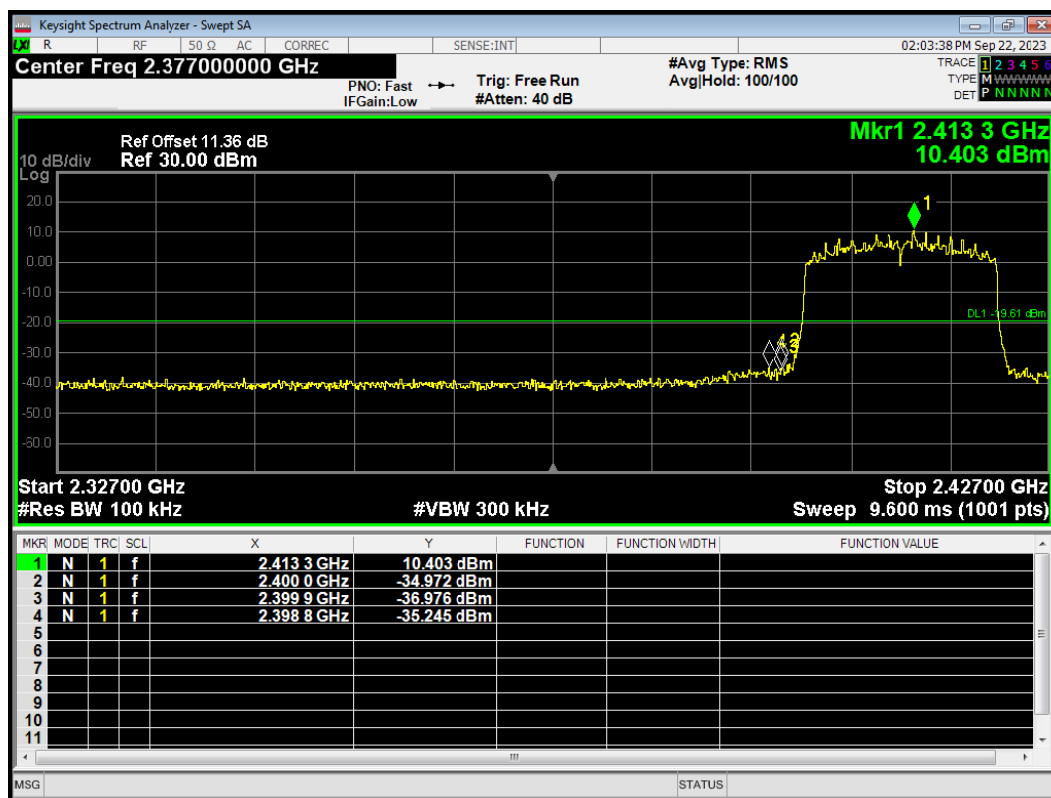
Test Results: PASS

AOT

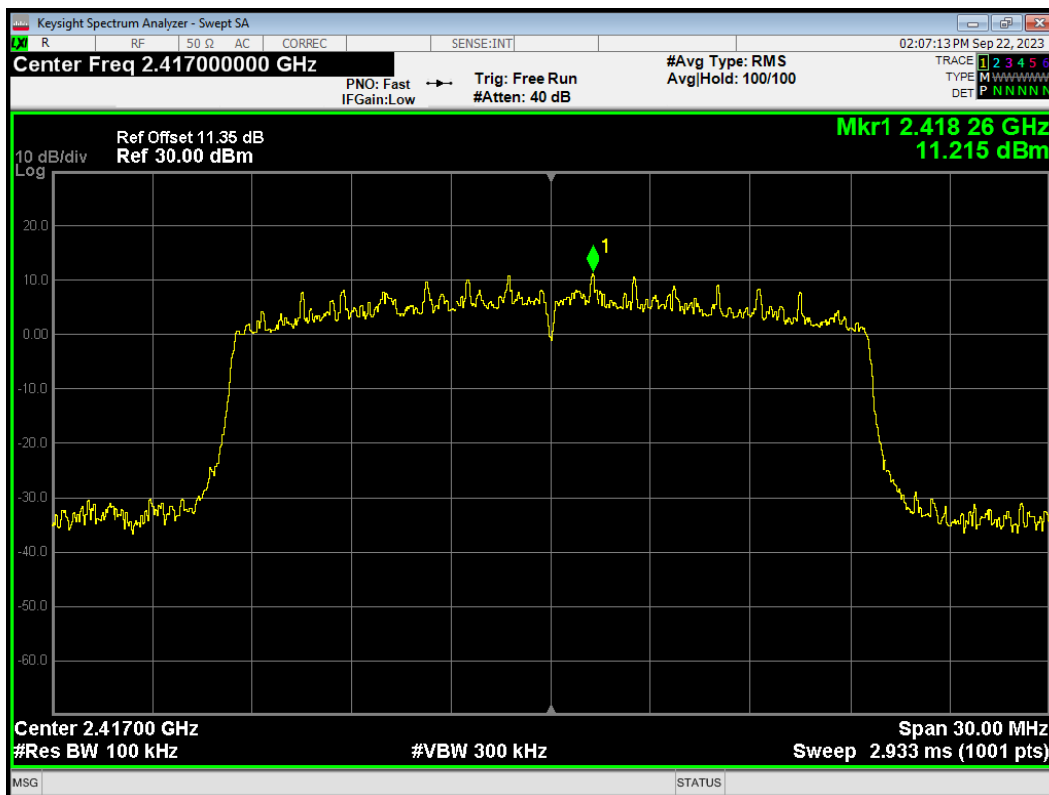
Band Edge 802.11ax(HE20) 2412MHz Ref



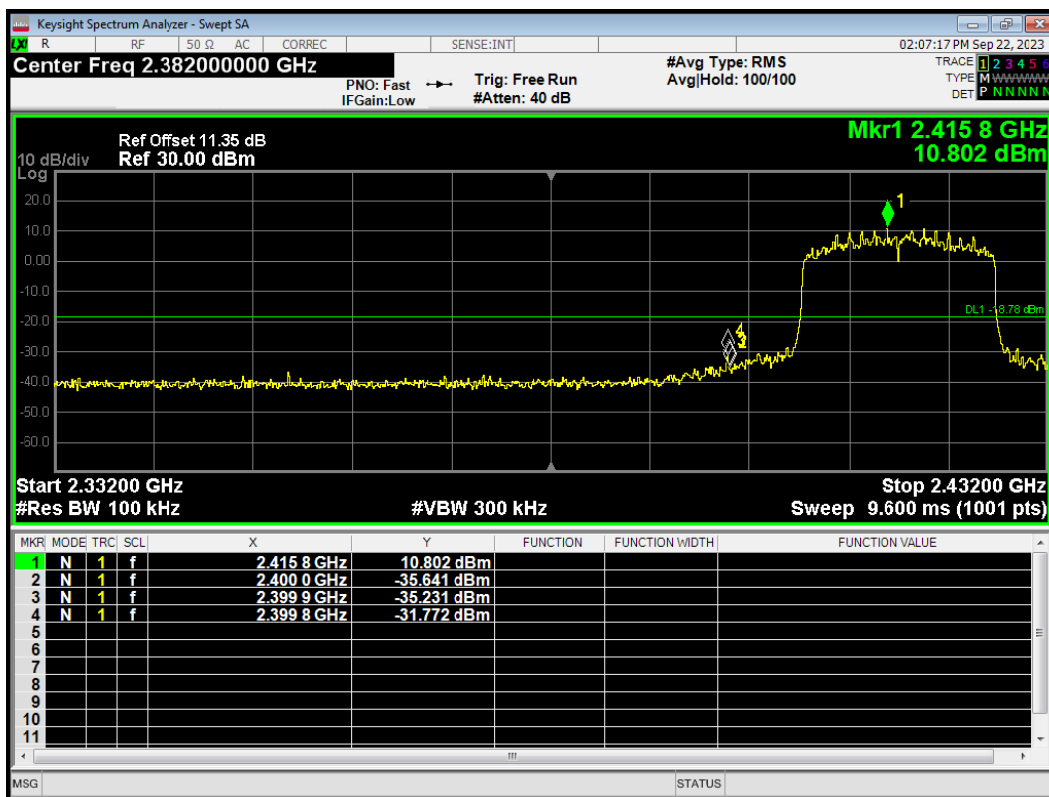
Band Edge 802.11ax(HE20) 2412MHz Emission



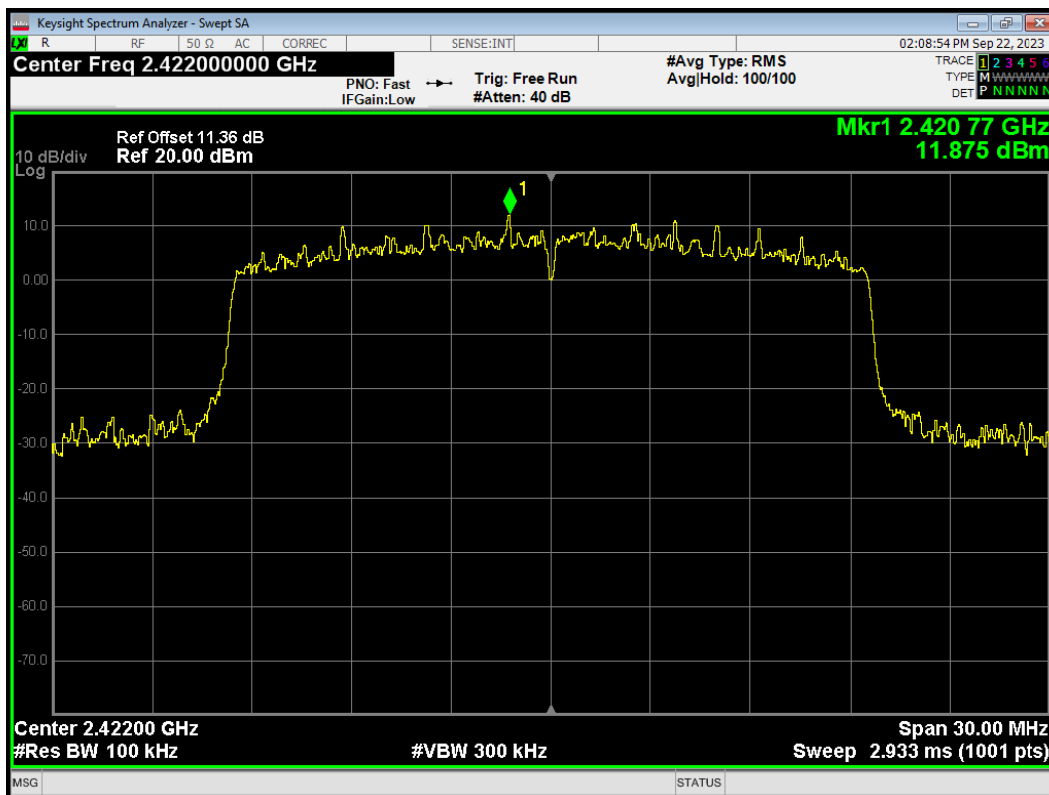
Band Edge 802.11ax(HE20) 2417MHz Ref



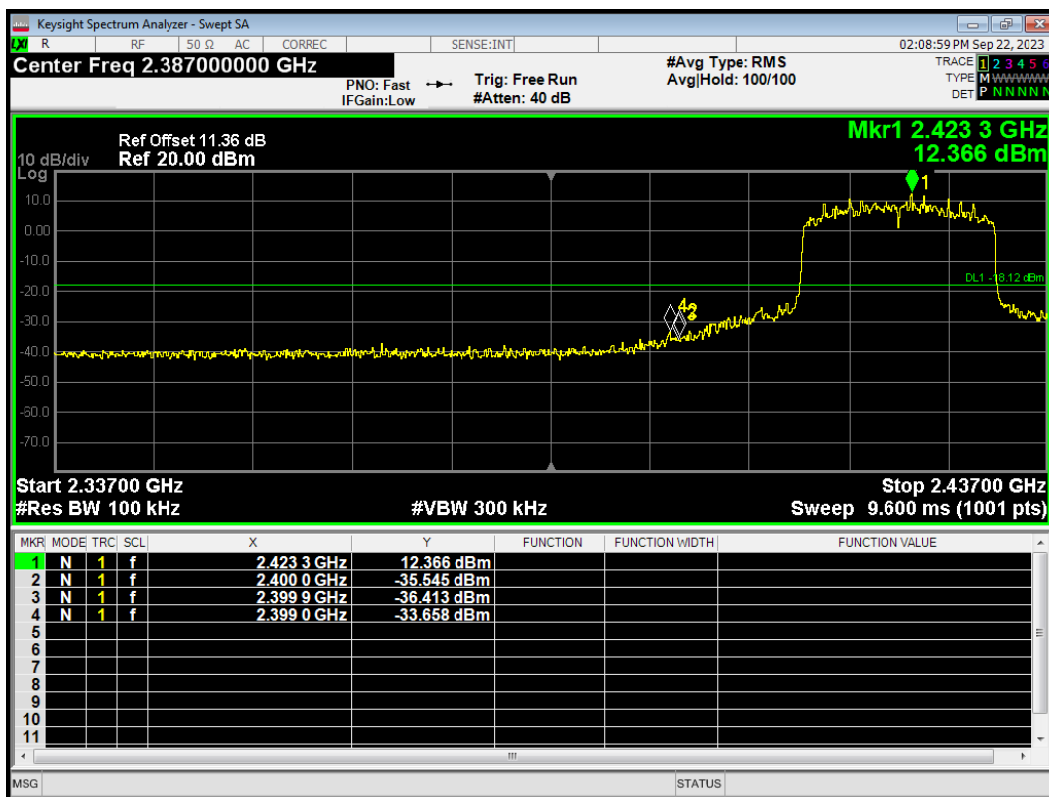
Band Edge 802.11ax(HE20) 2417MHz Emission



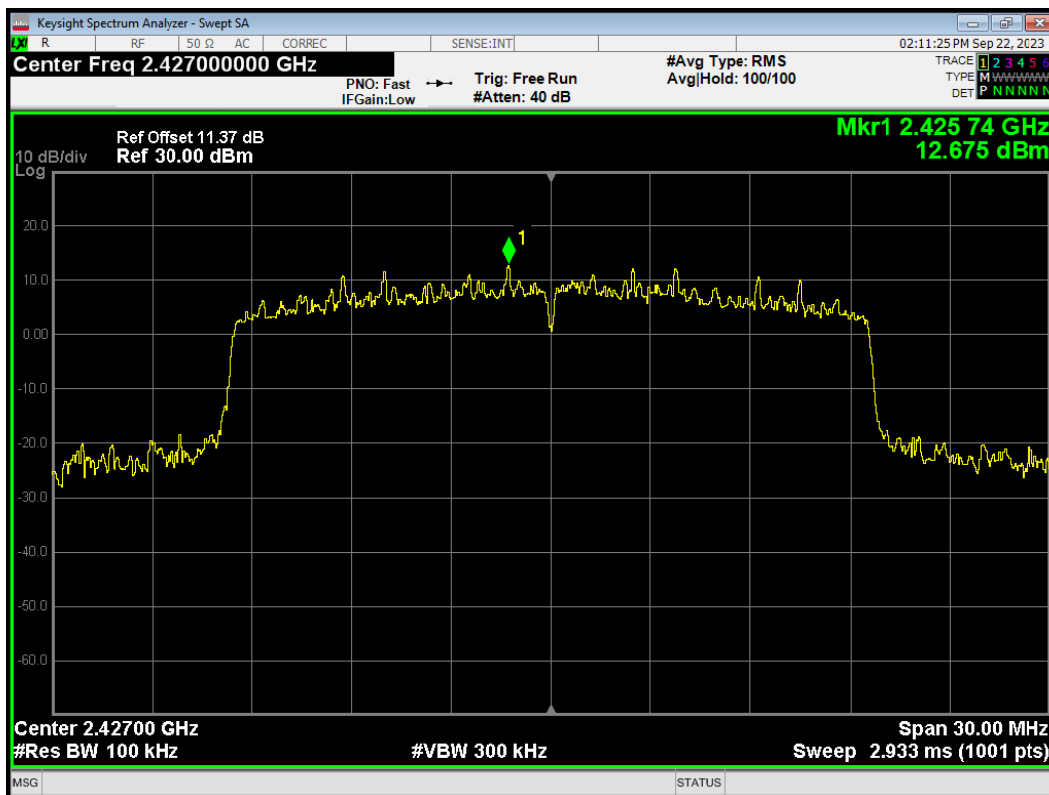
Band Edge 802.11ax(HE20) 2422MHz Ref



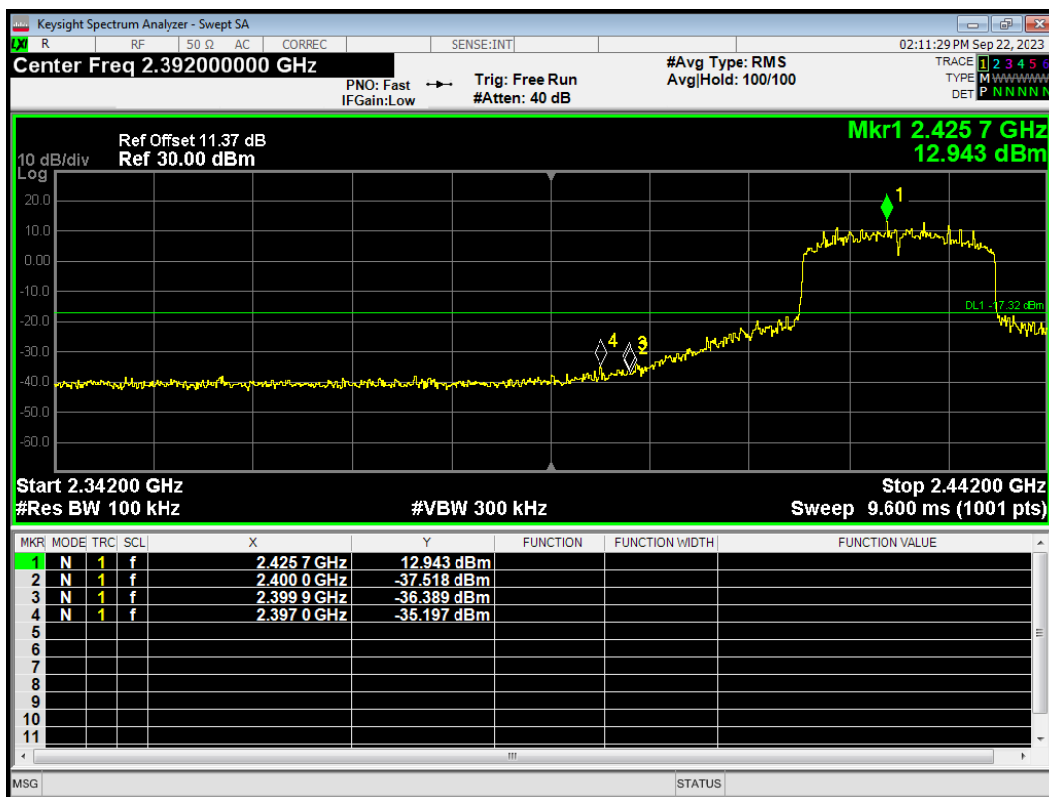
Band Edge 802.11ax(HE20) 2422MHz Emission



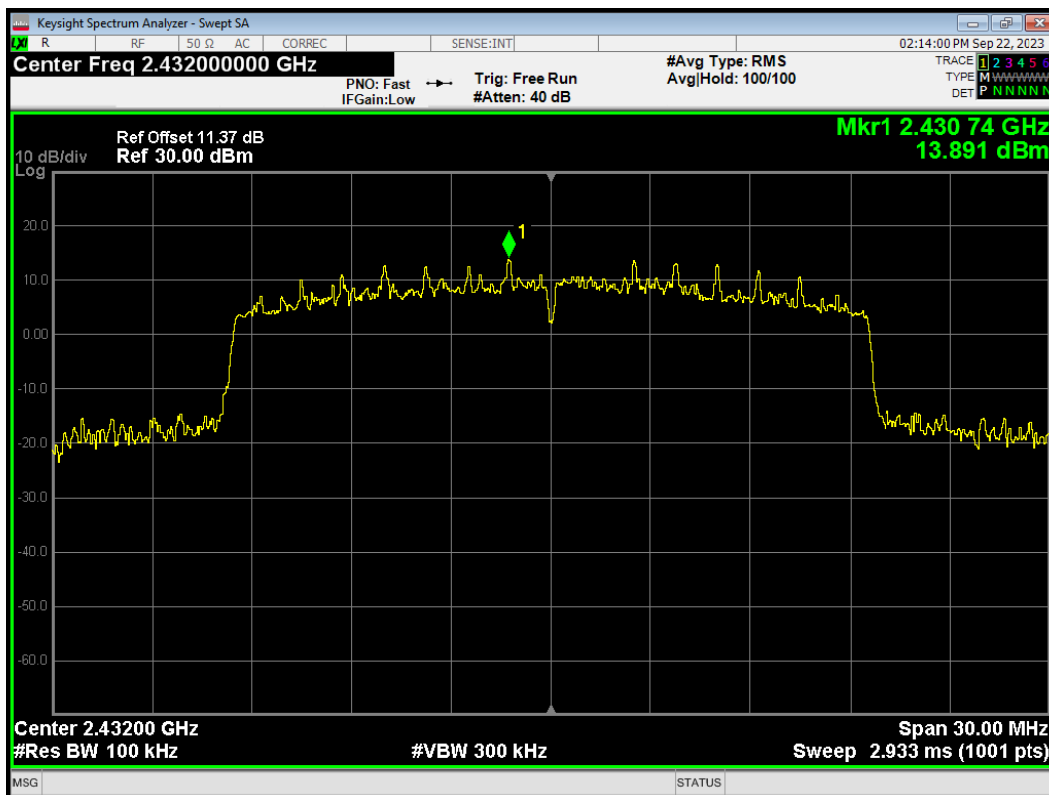
Band Edge 802.11ax(HE20) 2427MHz Ref



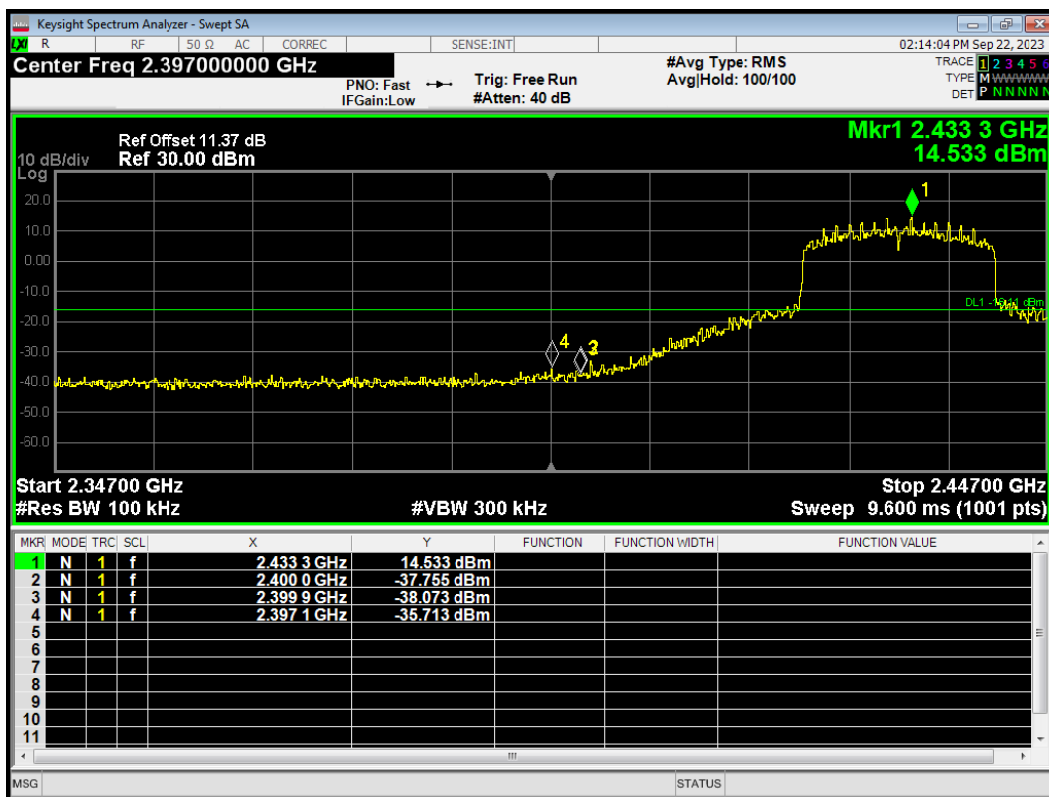
Band Edge 802.11ax(HE20) 2427MHz Emission



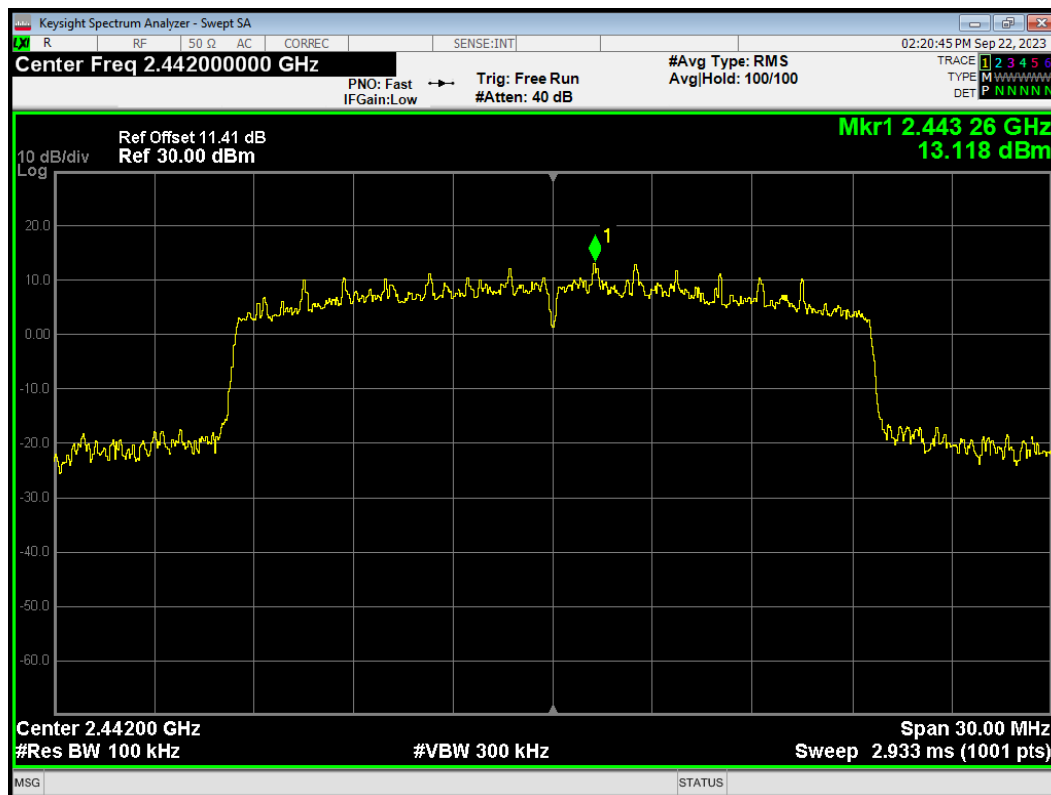
Band Edge 802.11ax(HE20) 2432MHz Ref



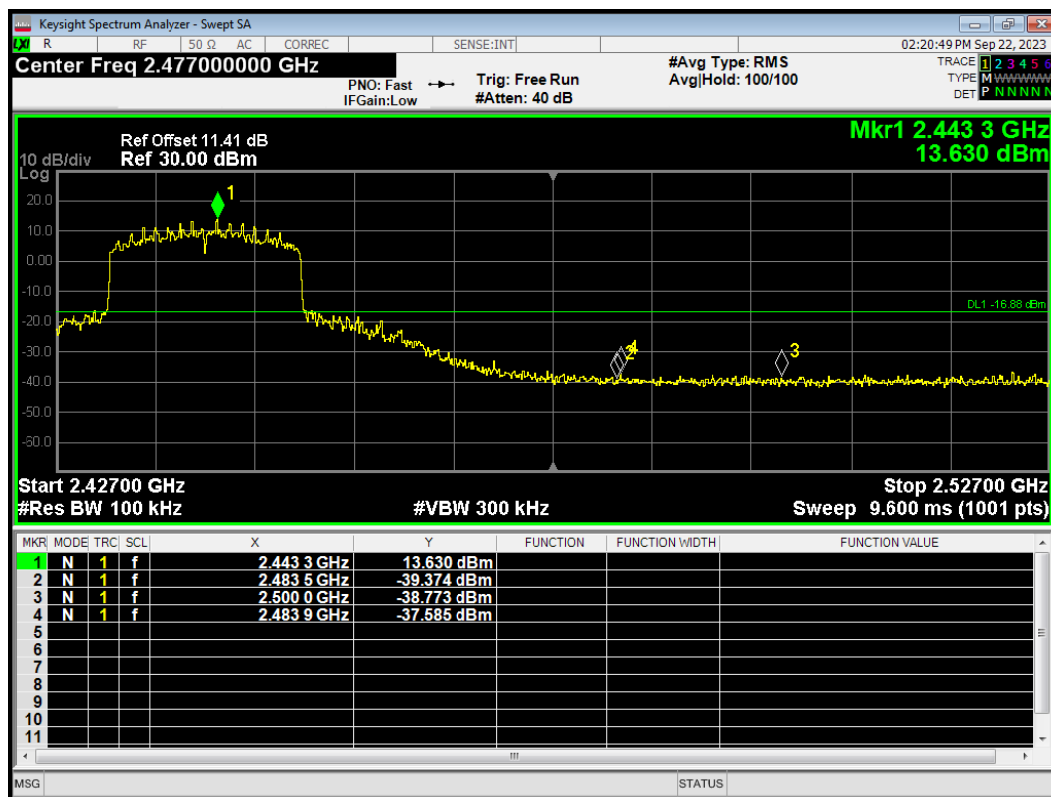
Band Edge 802.11ax(HE20) 2432MHz Emission



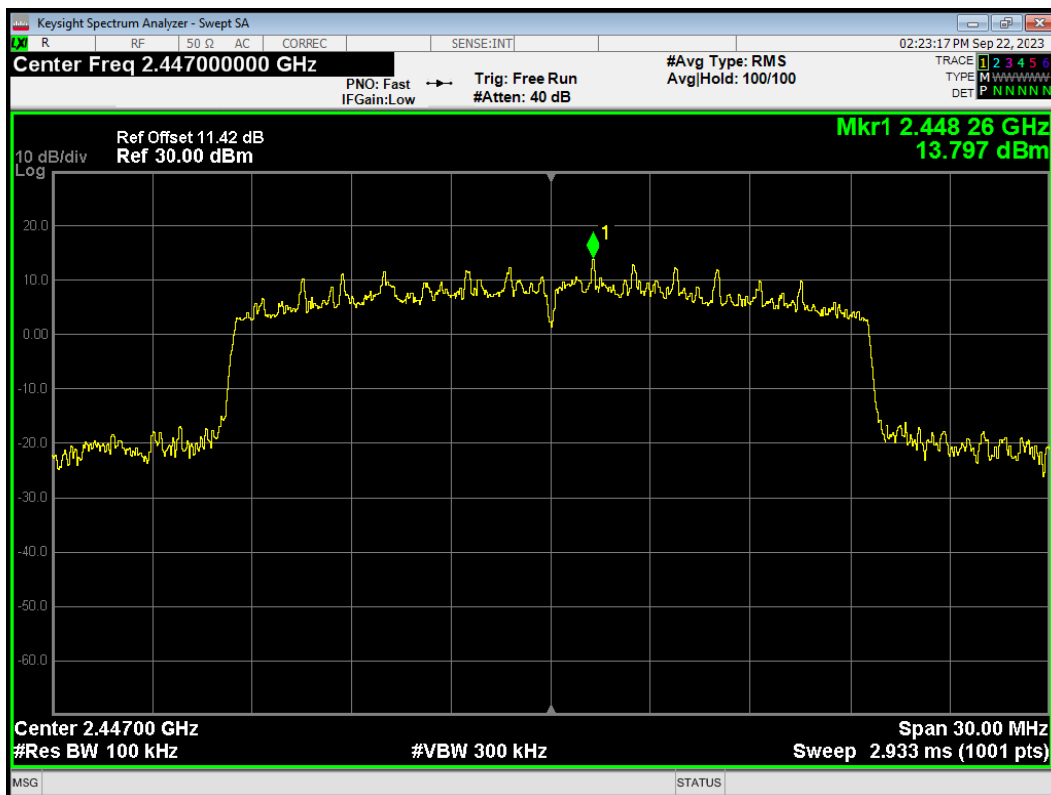
Band Edge 802.11ax(HE20) 2442MHz Ref



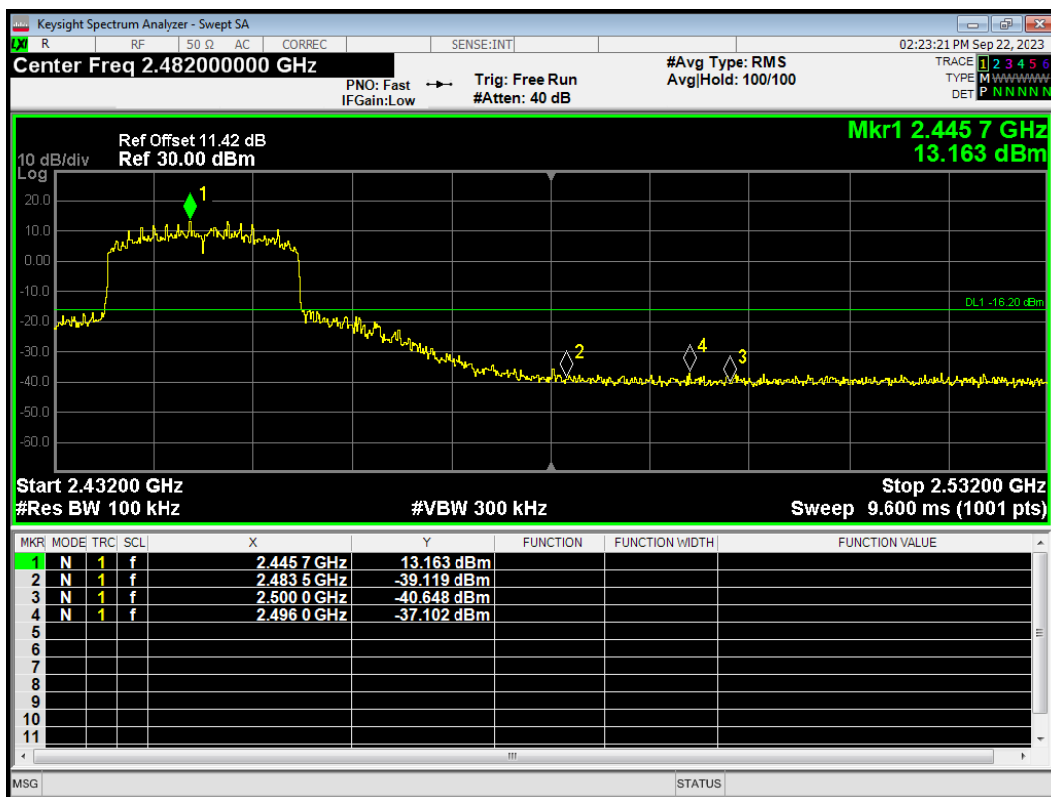
Band Edge 802.11ax(HE20) 2442MHz Emission



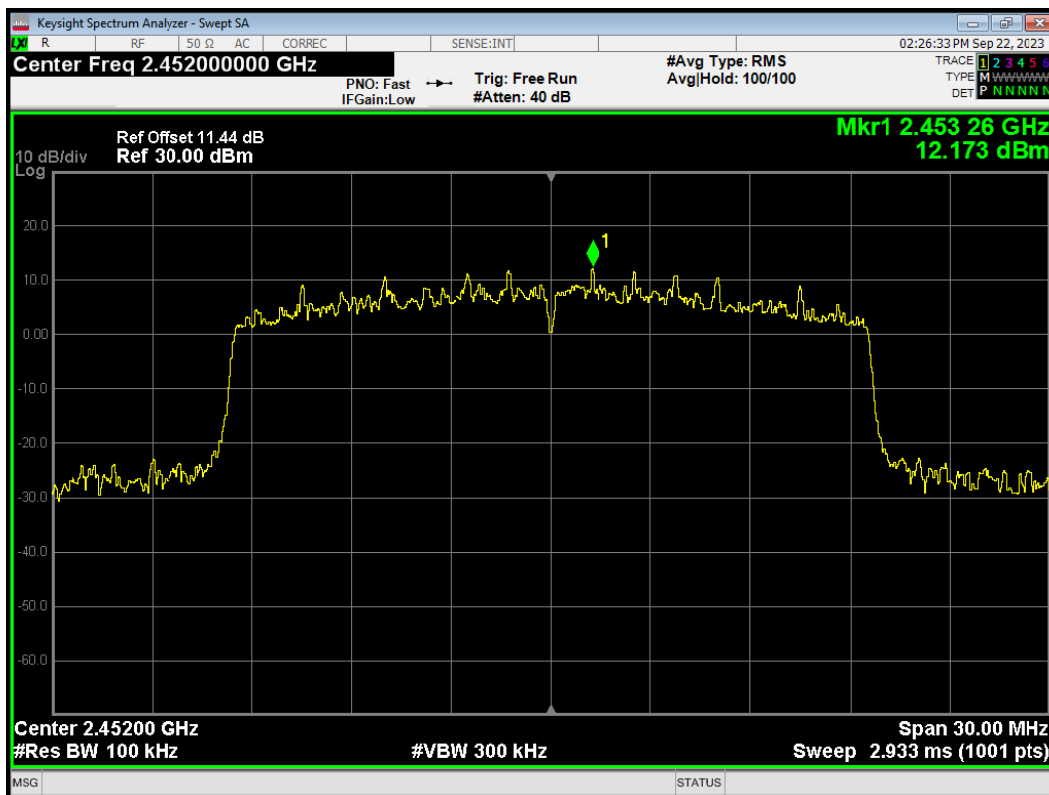
Band Edge 802.11ax(HE20) 2447MHz Ref



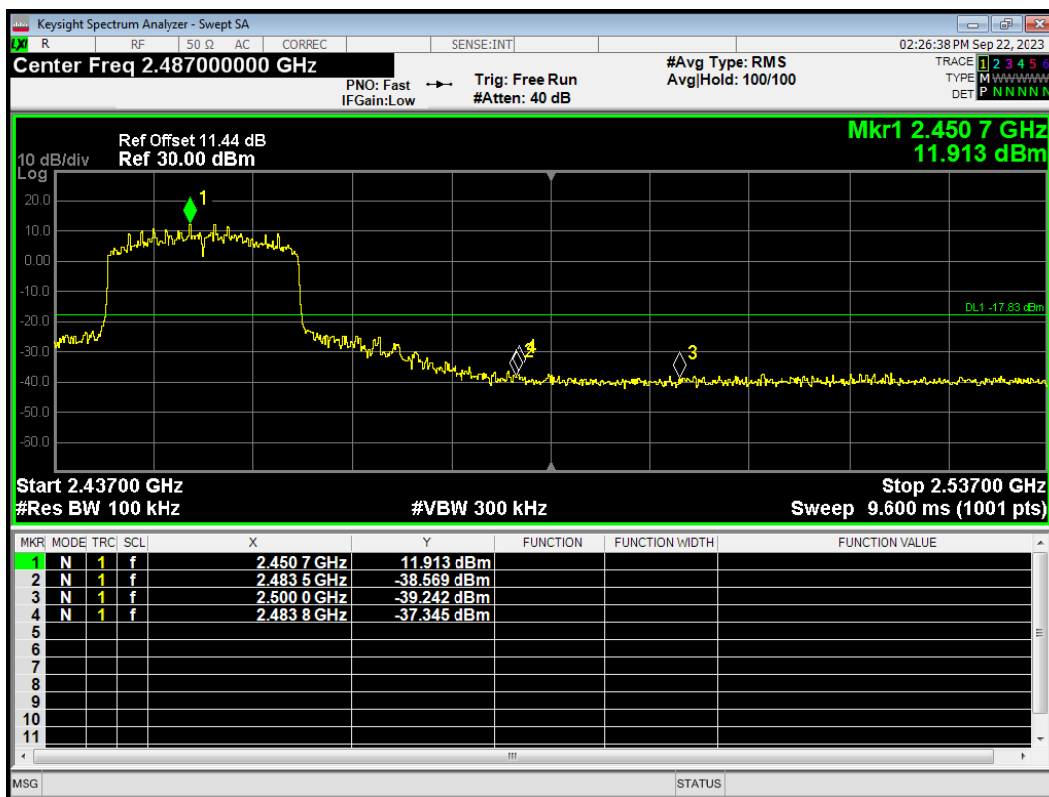
Band Edge 802.11ax(HE20) 2447MHz Emission



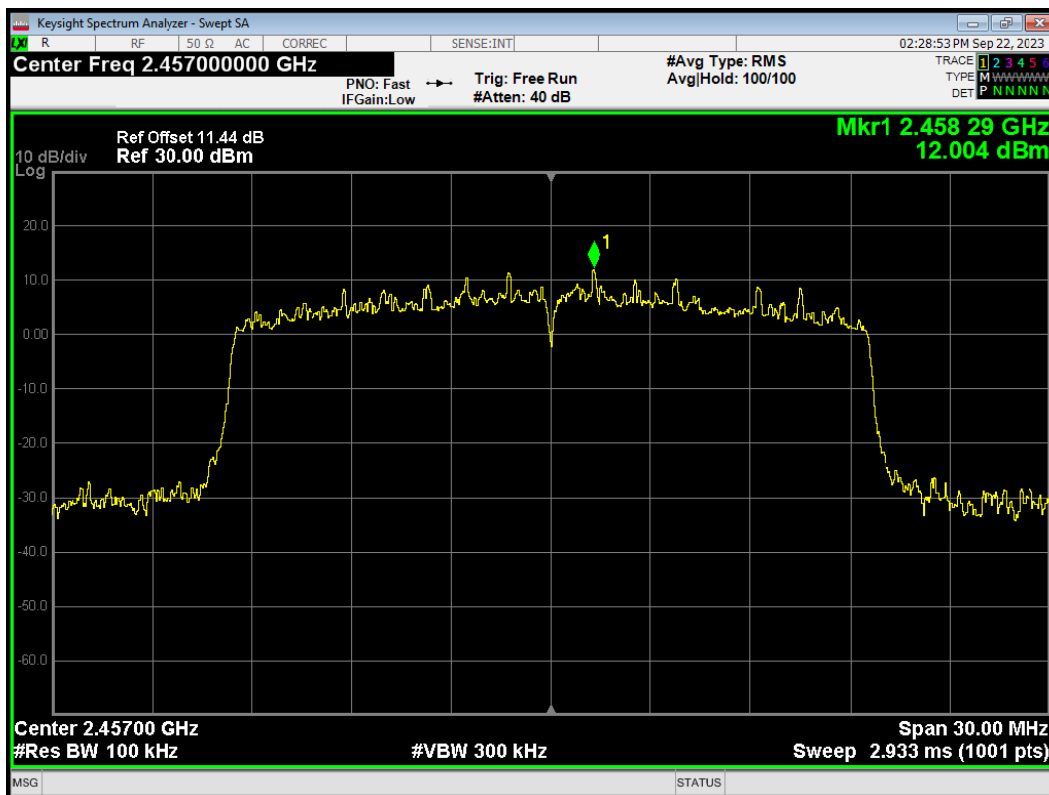
Band Edge 802.11ax(HE20) 2452MHz Ref



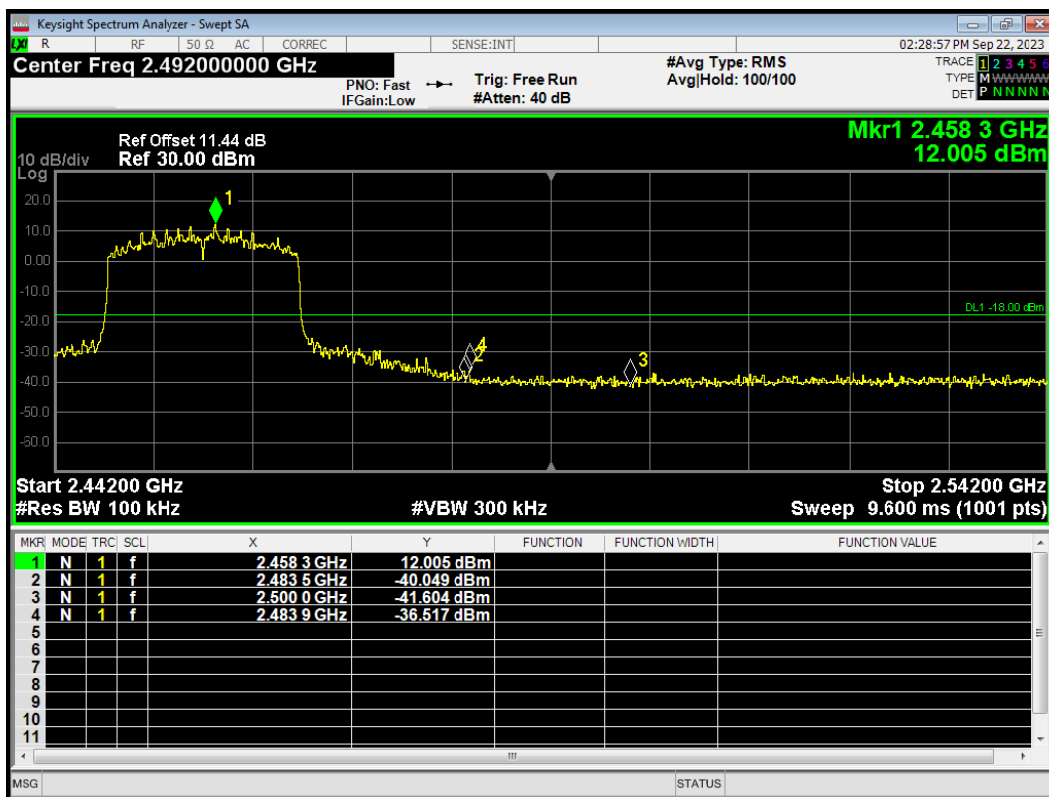
Band Edge 802.11ax(HE20) 2452MHz Emission



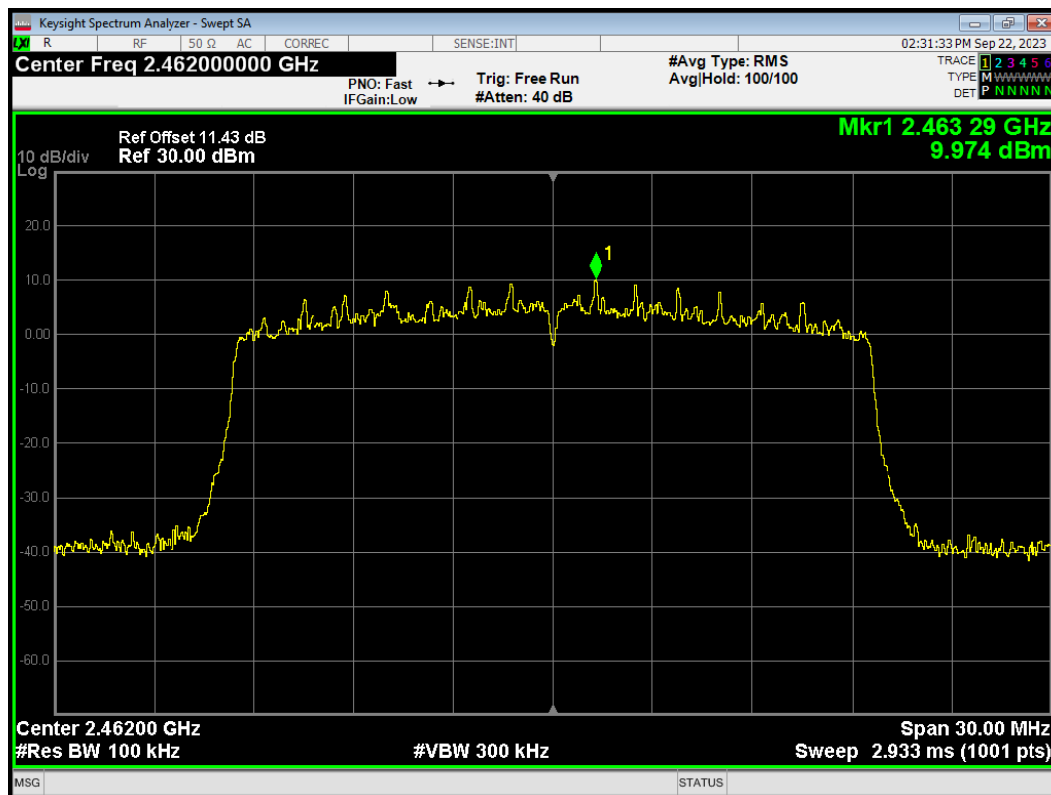
Band Edge 802.11ax(HE20) 2457MHz Ref



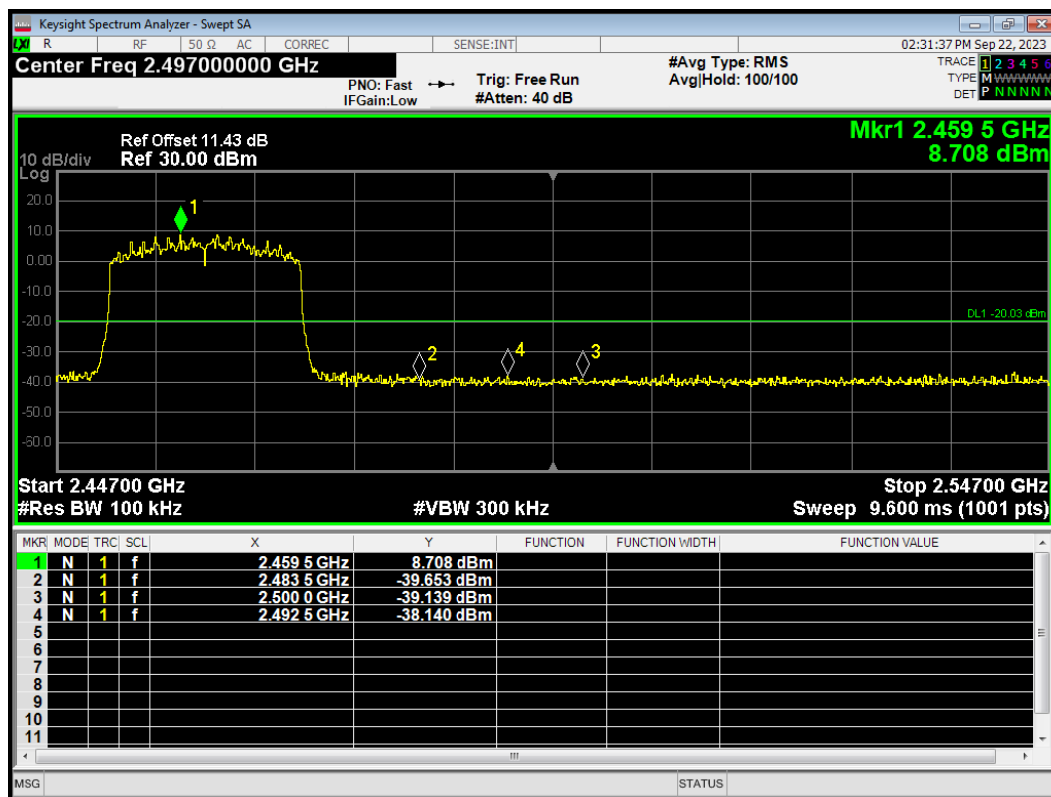
Band Edge 802.11ax(HE20) 2457MHz Emission



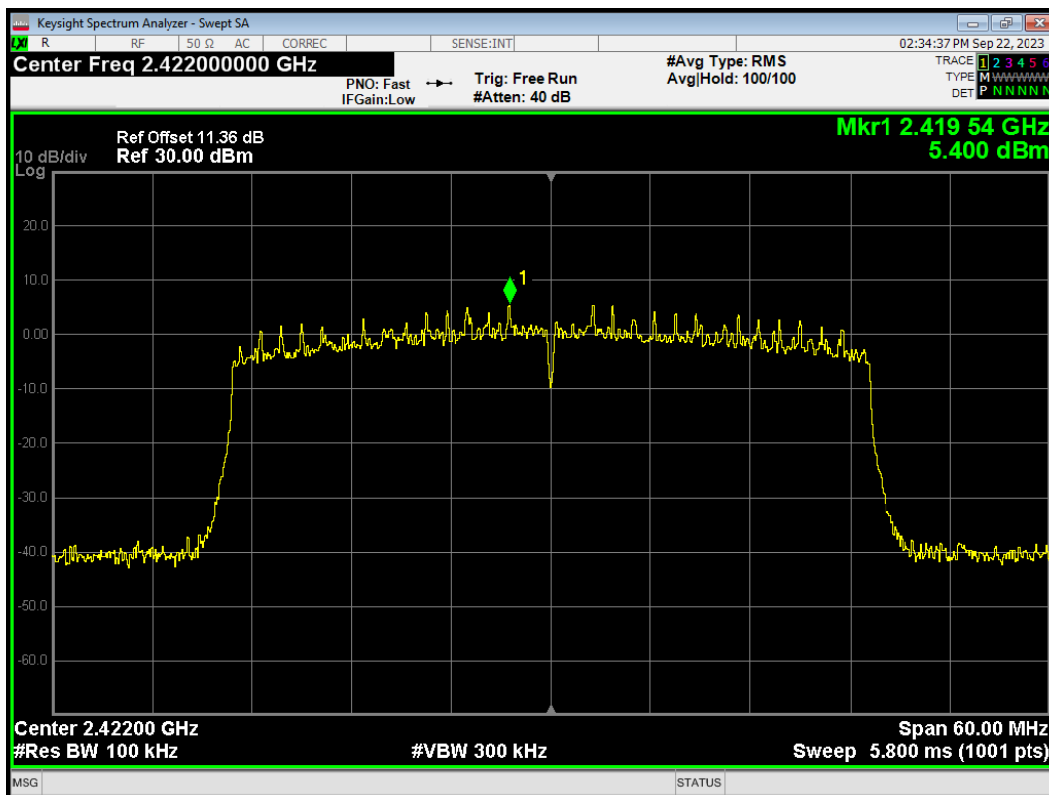
Band Edge 802.11ax(HE20) 2462MHz Ref



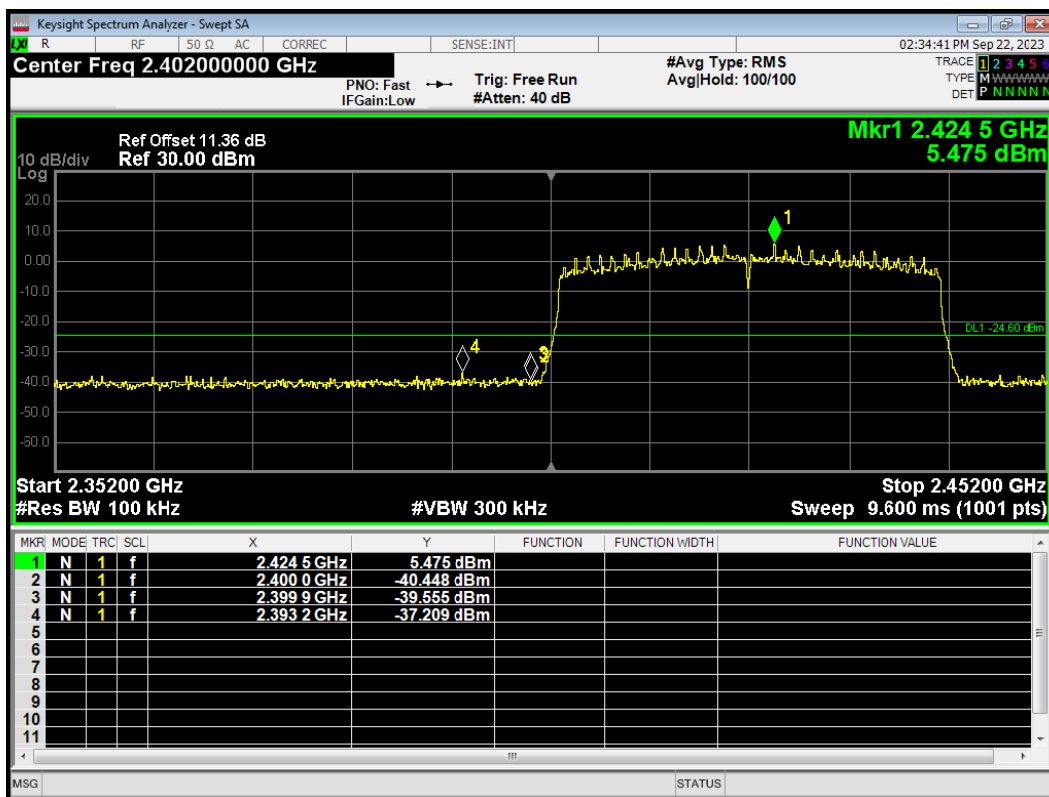
Band Edge 802.11ax(HE20) 2462MHz Emission



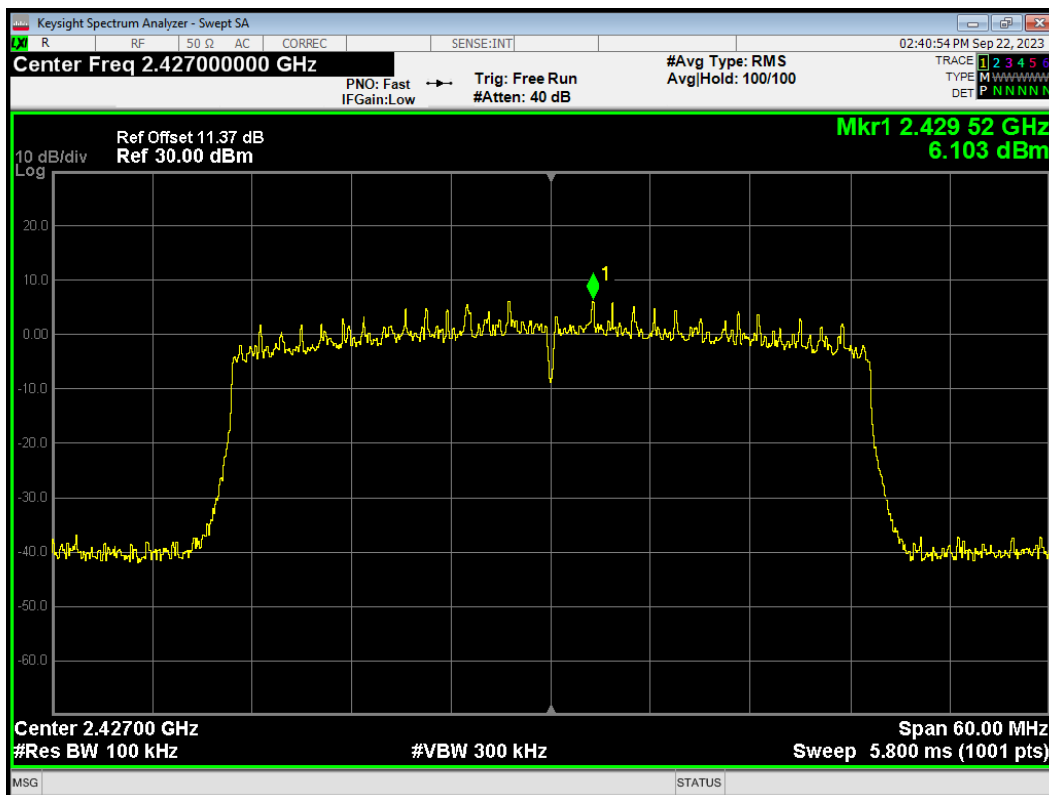
Band Edge 802.11ax(HE40) 2422MHz Ref



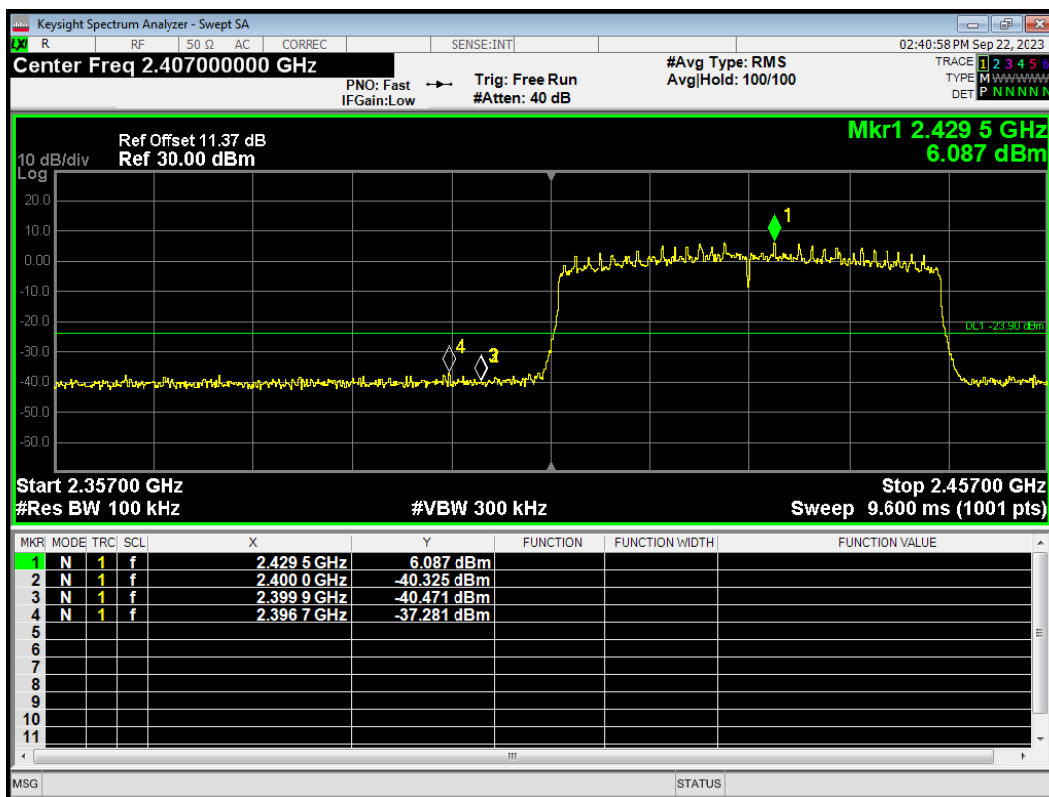
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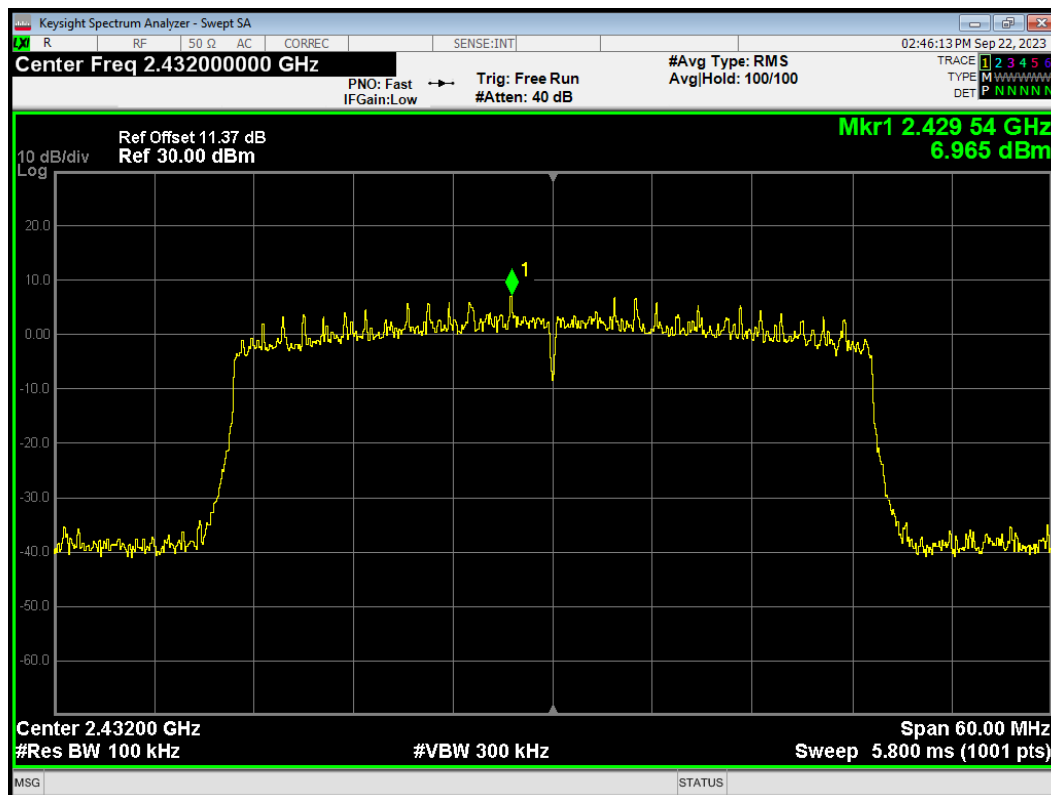
Band Edge 802.11ax(HE40) 2427MHz Ref



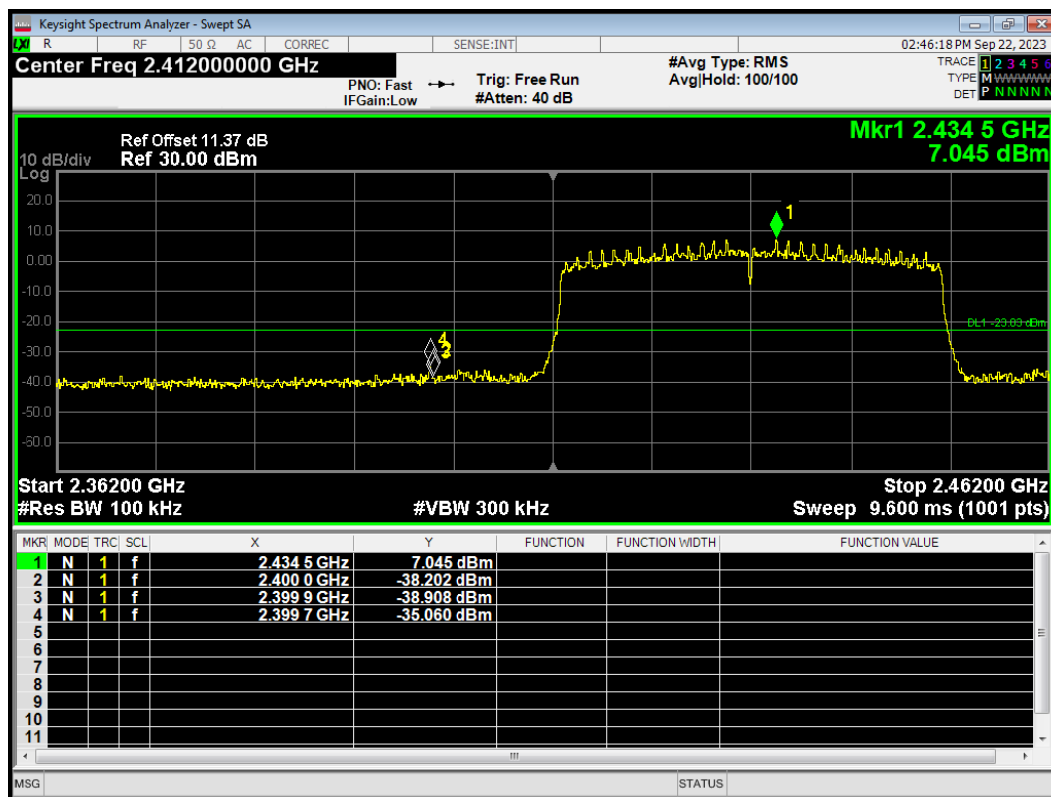
Band Edge 802.11ax(HE40) 2427MHz Emission



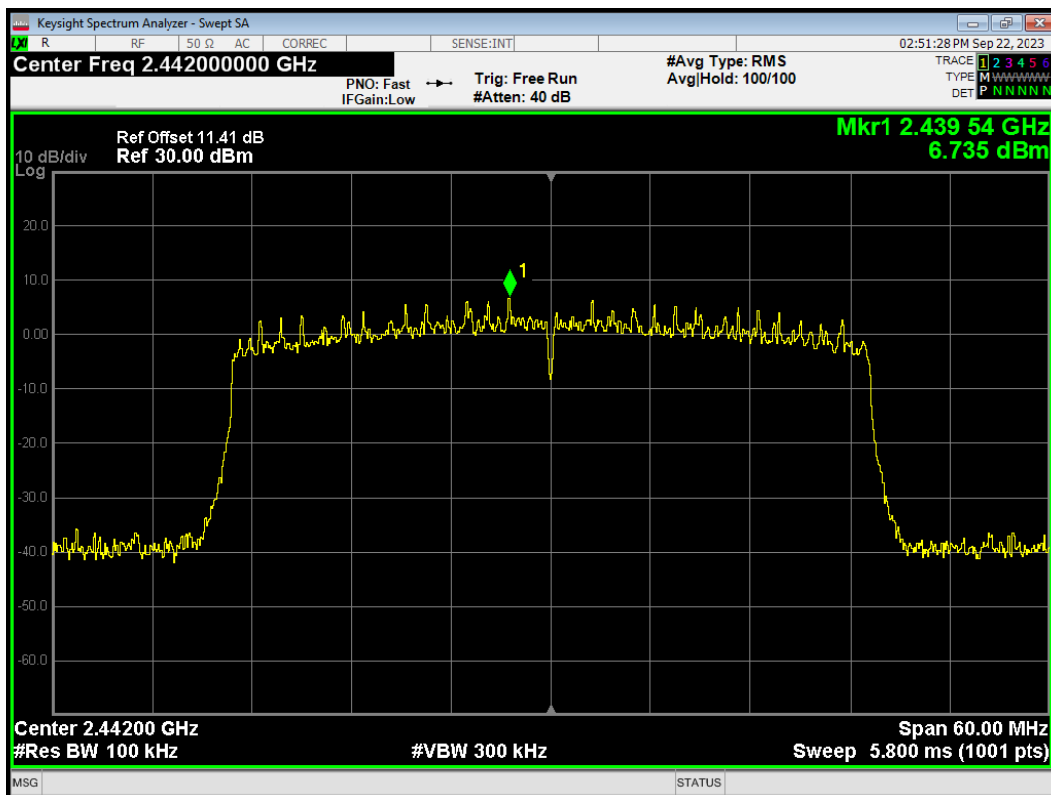
Band Edge 802.11ax(HE40) 2432MHz Ref



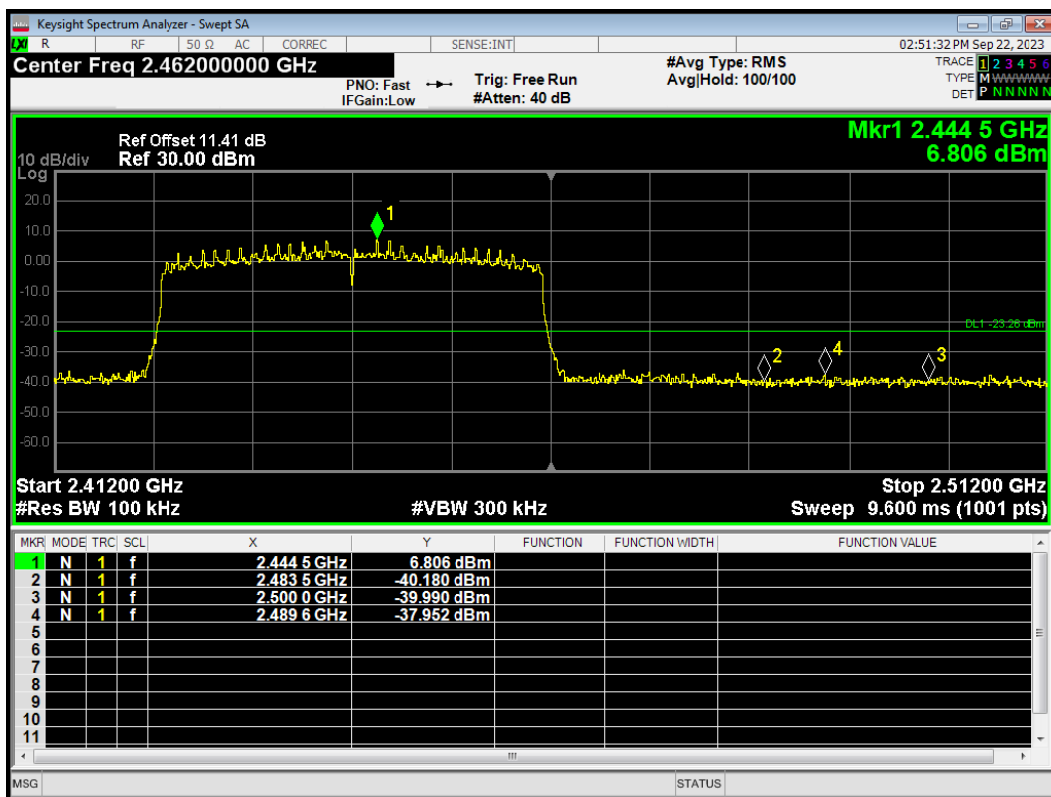
Band Edge 802.11ax(HE40) 2432MHz Emission



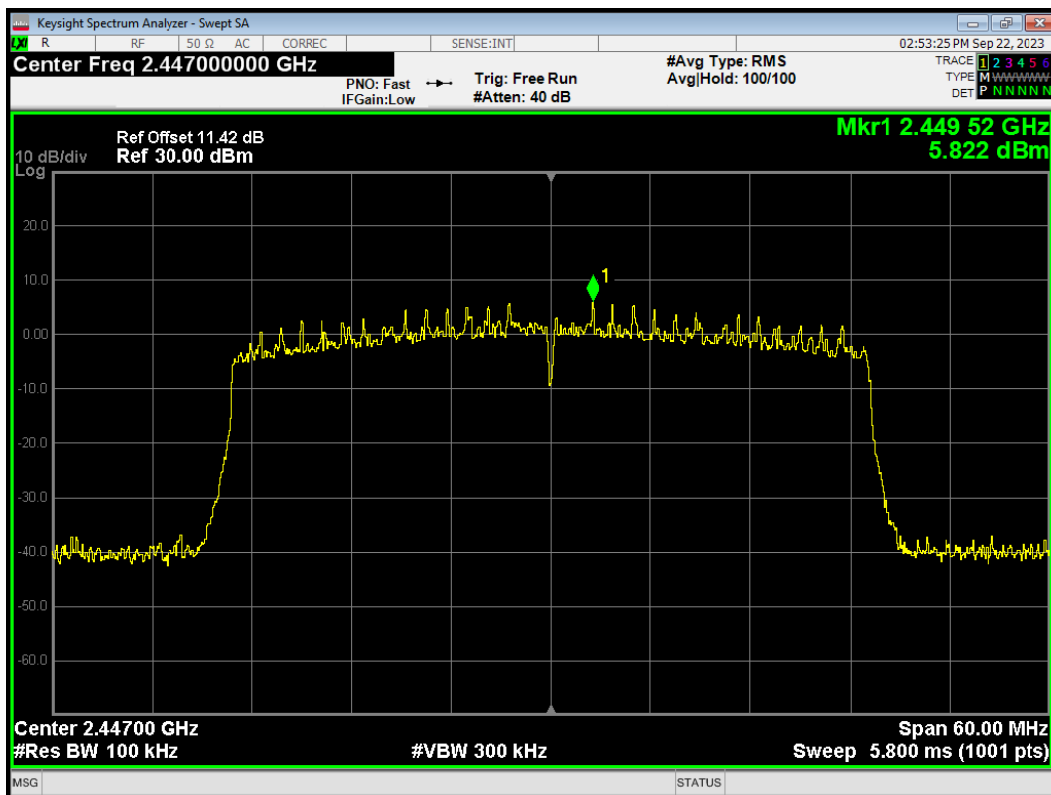
Band Edge 802.11ax(HE40) 2442MHz Ref



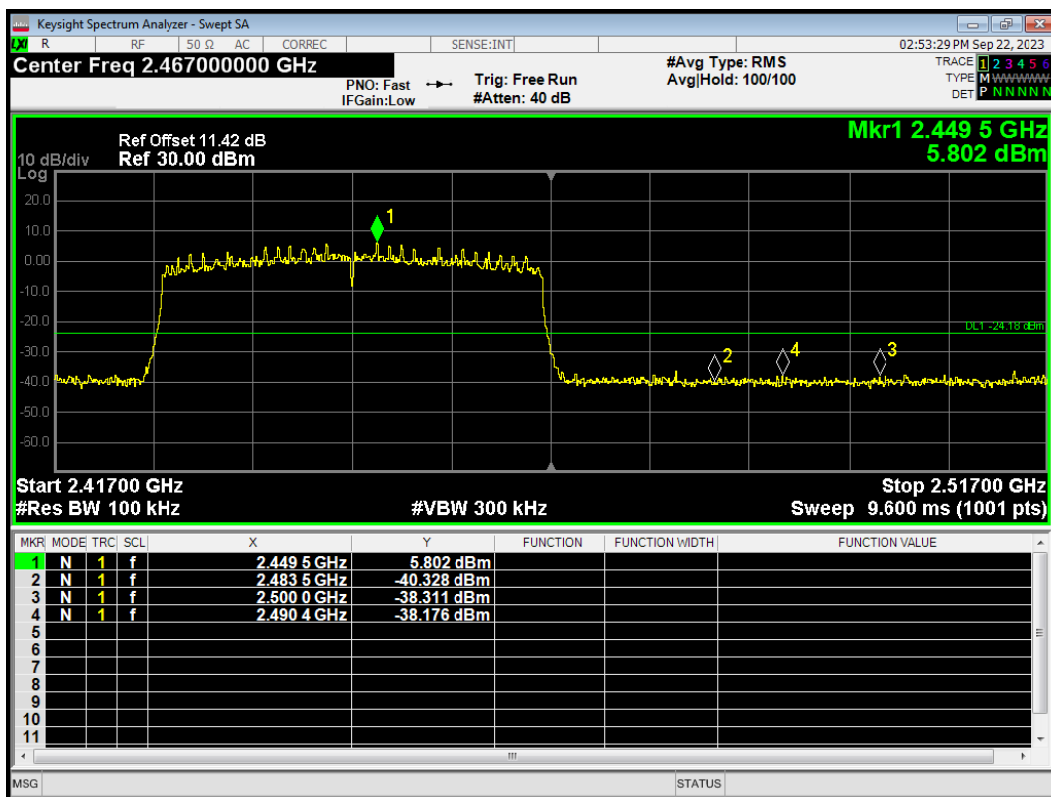
Band Edge 802.11ax(HE40) 2442MHz Emission



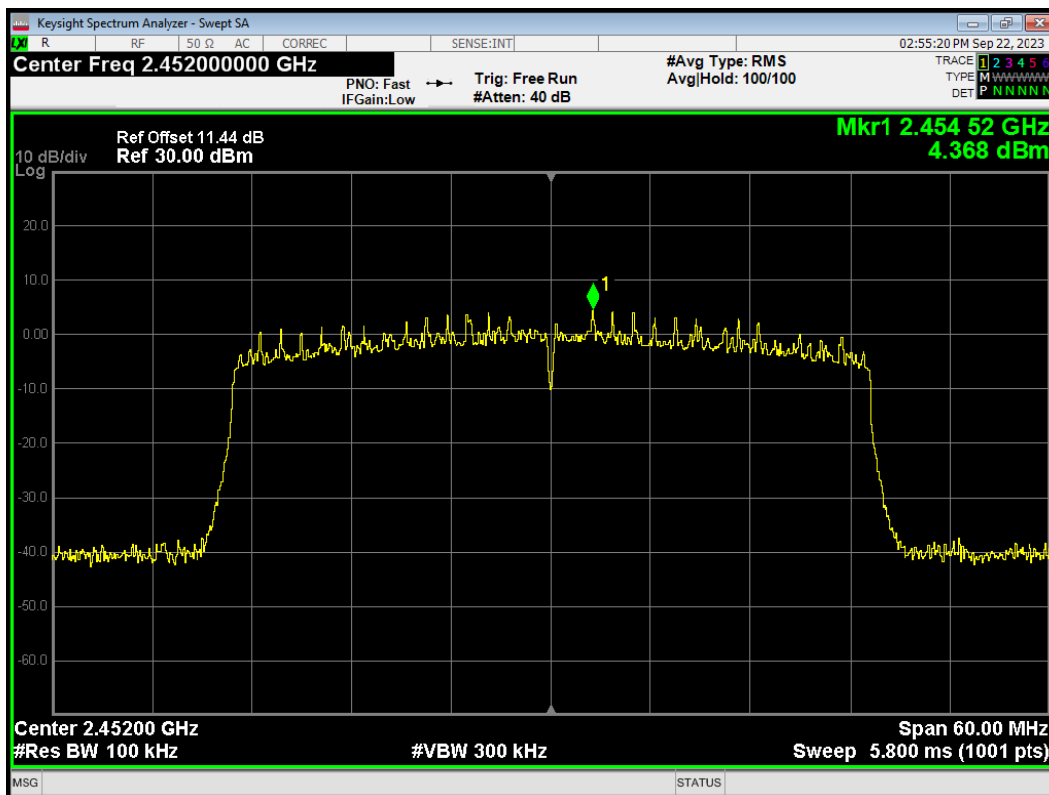
Band Edge 802.11ax(HE40) 2447MHz Ref



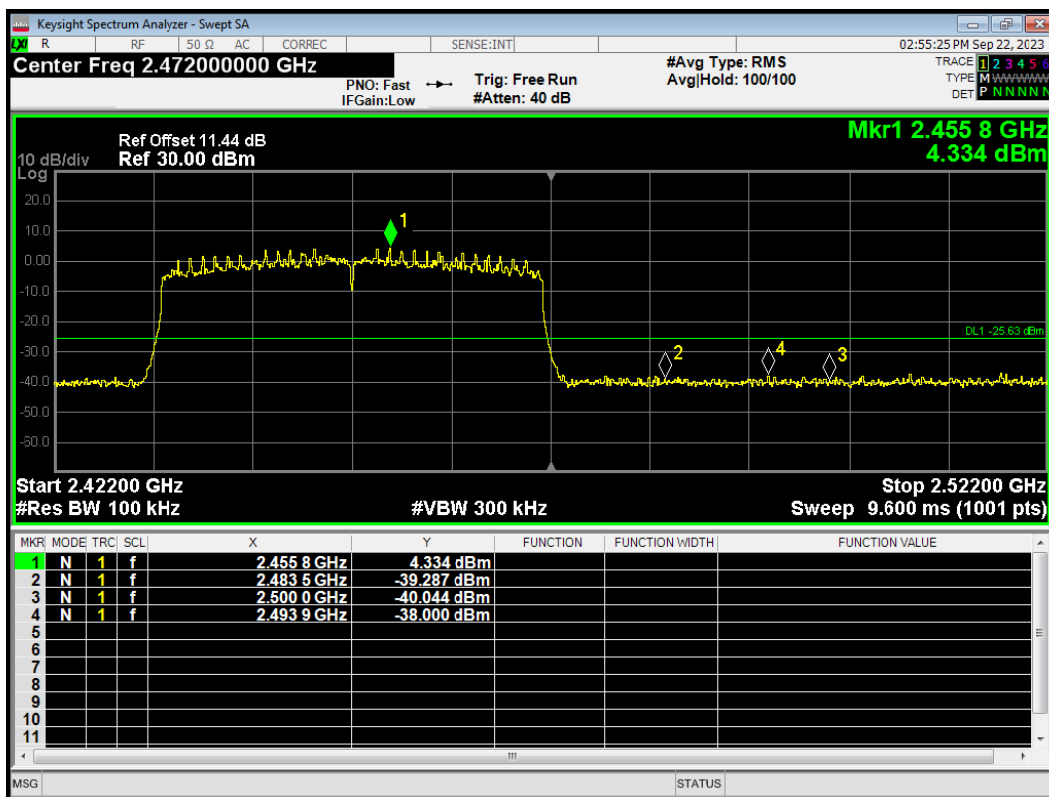
Band Edge 802.11ax(HE40) 2447MHz Emission



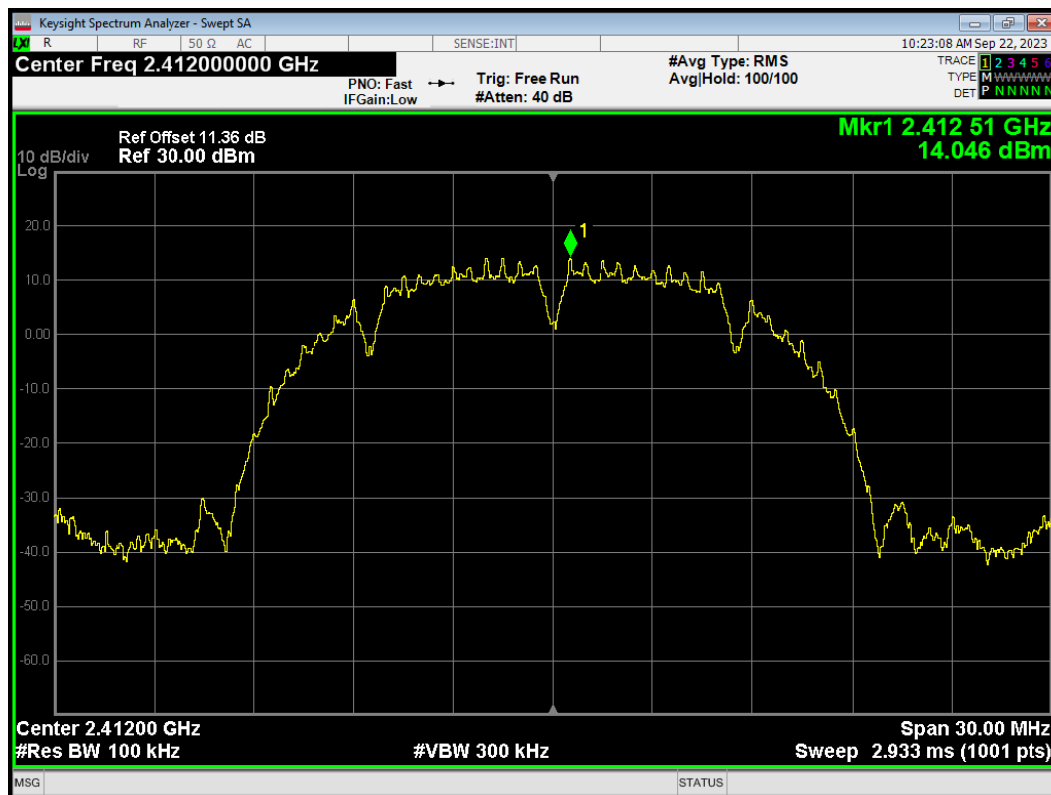
Band Edge 802.11ax(HE40) 2452MHz Ref



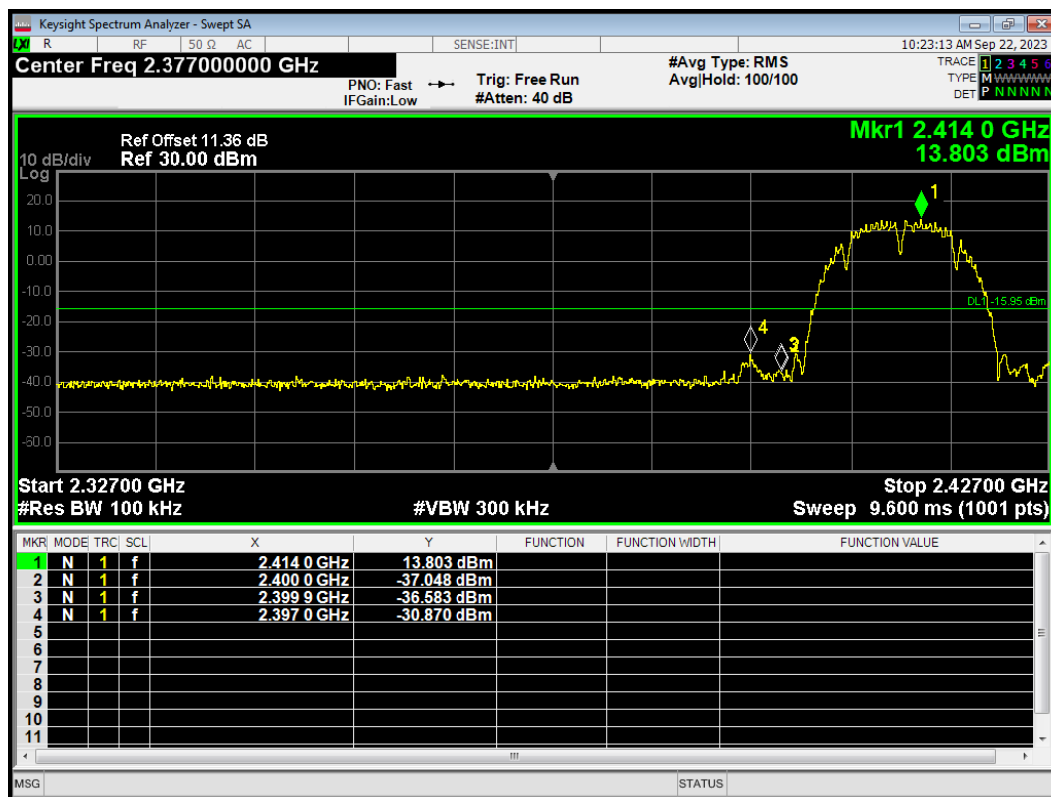
Band Edge 802.11ax(HE40) 2452MHz Emission



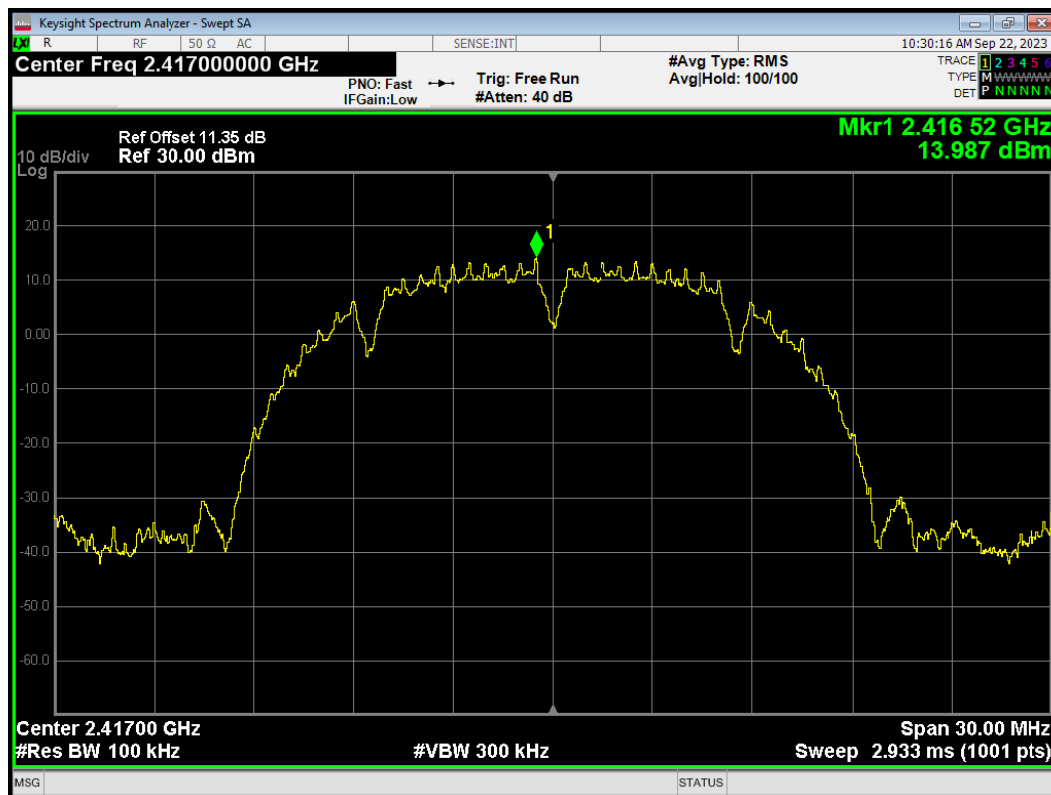
Band Edge 802.11b 2412MHz Ref



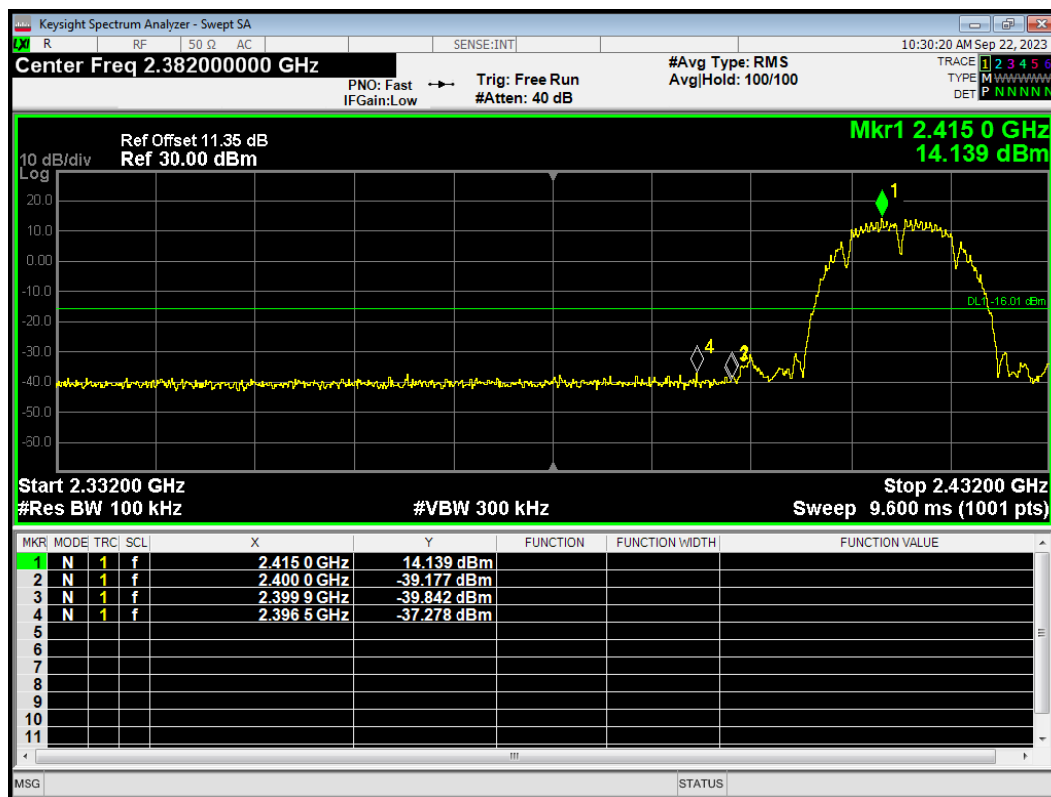
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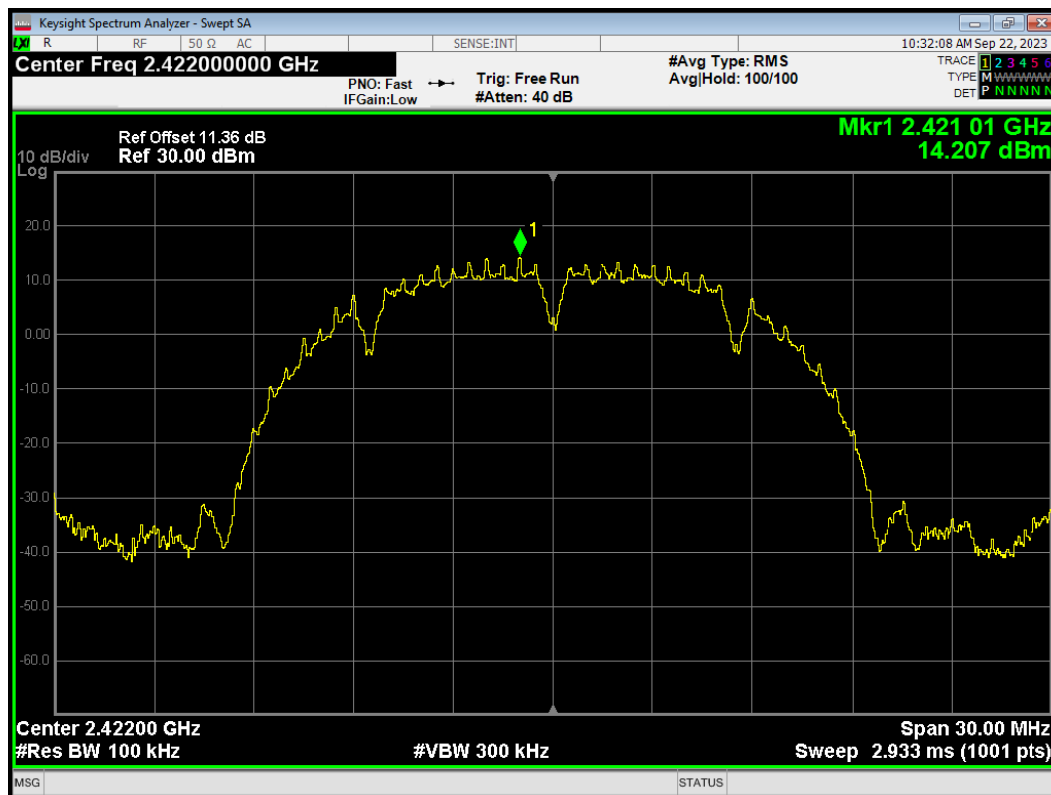
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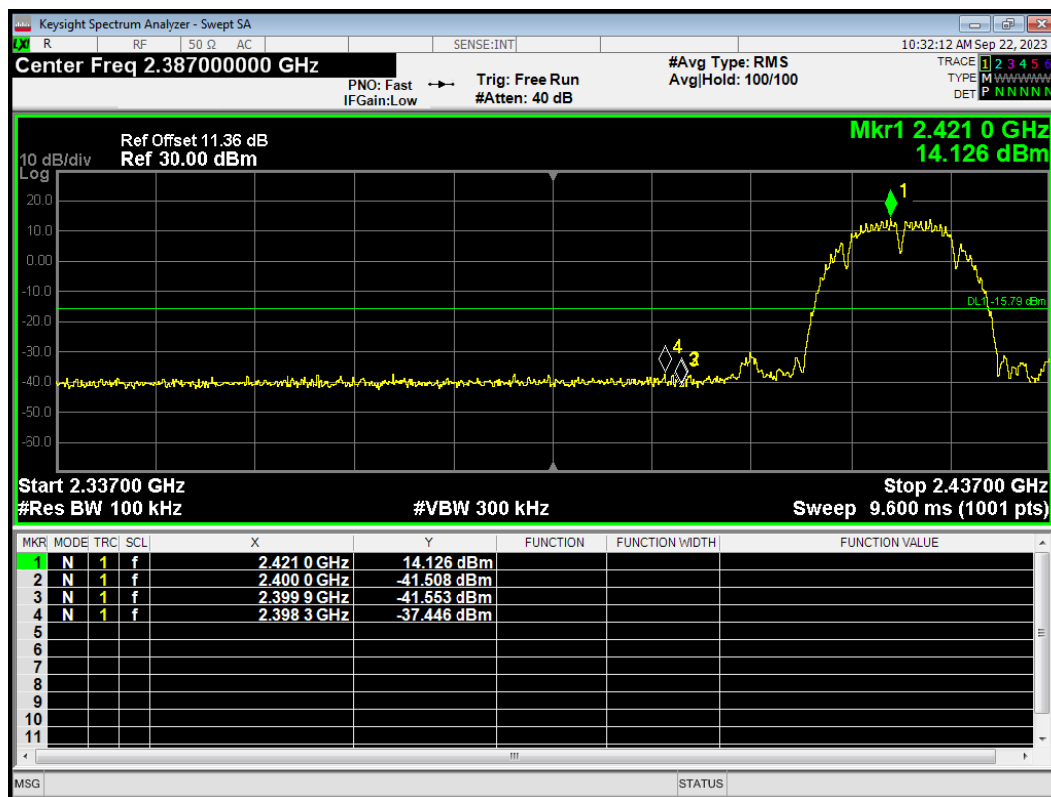
Band Edge 802.11b 2417MHz Emission



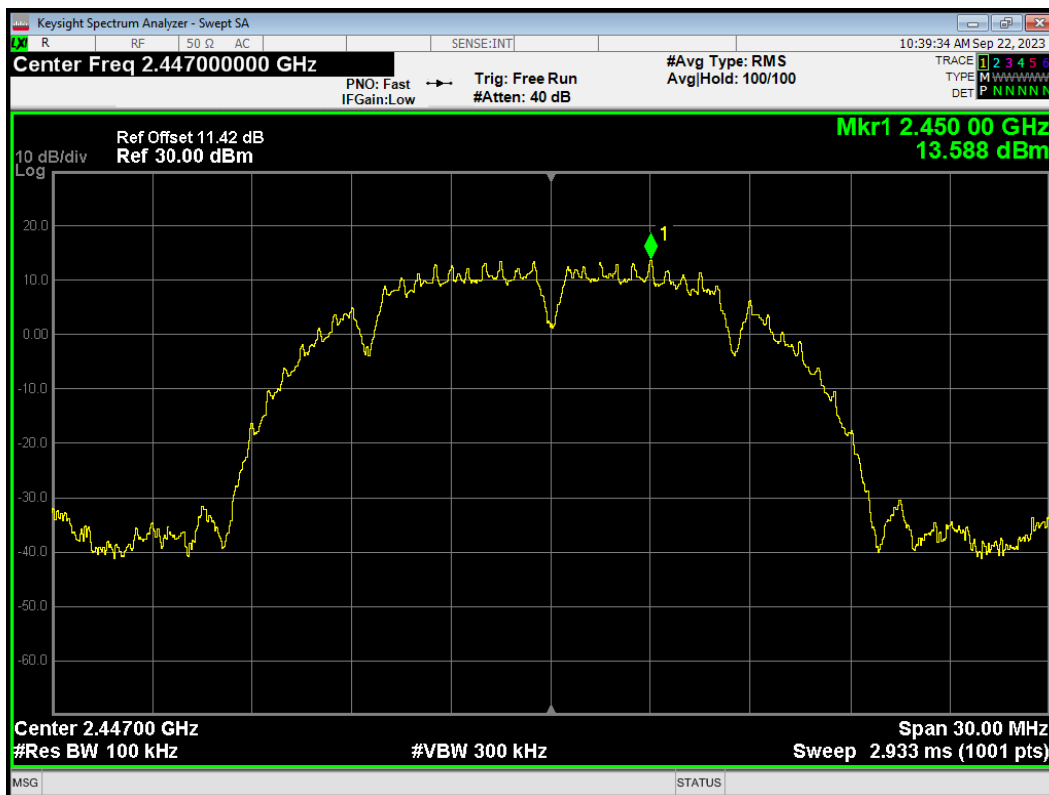
Band Edge 802.11b 2422MHz Ref



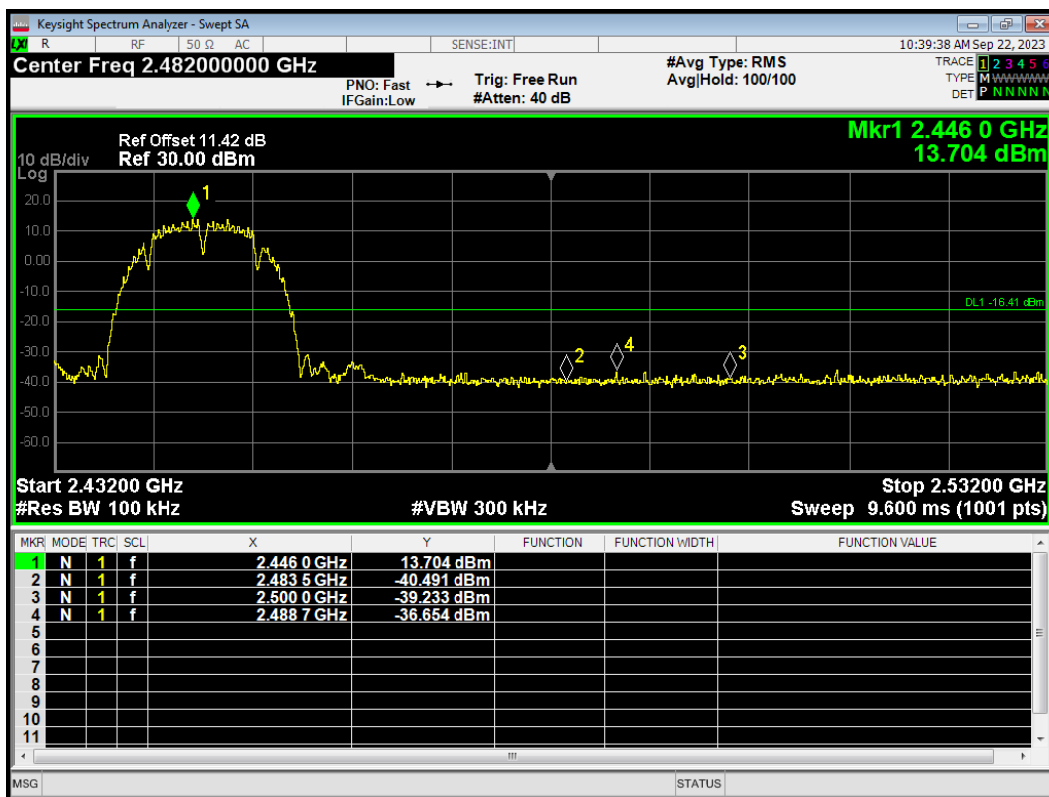
Band Edge 802.11b 2422MHz Emission



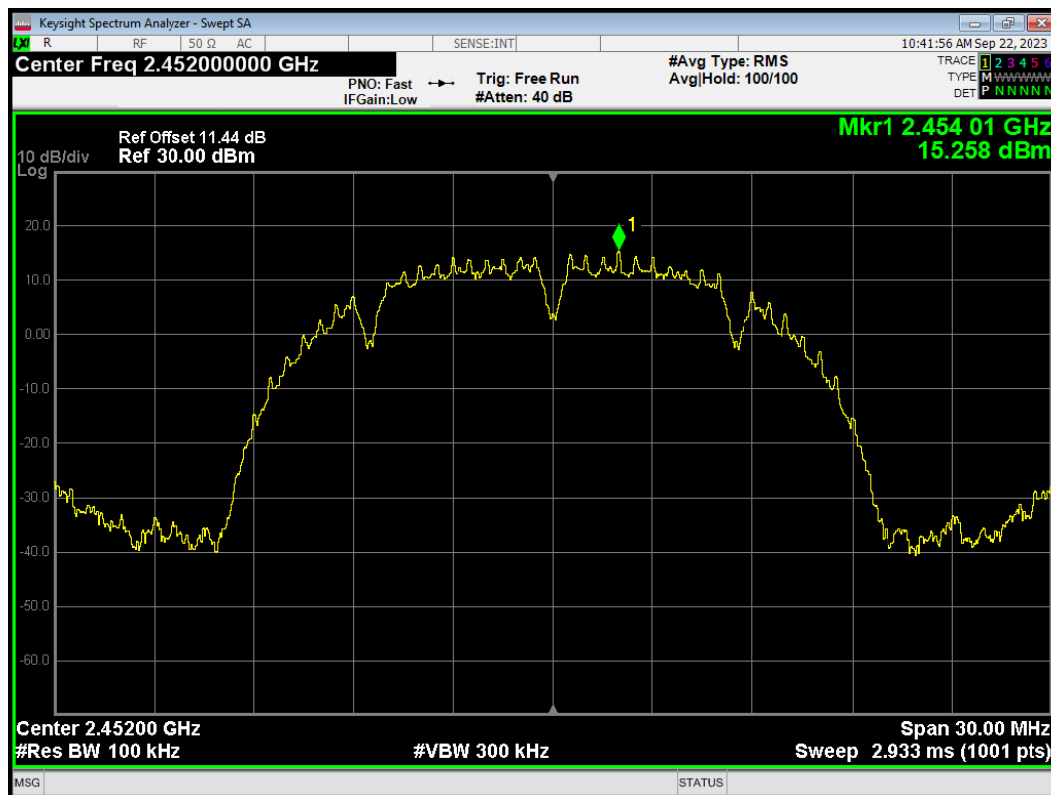
Band Edge 802.11b 2447MHz Ref



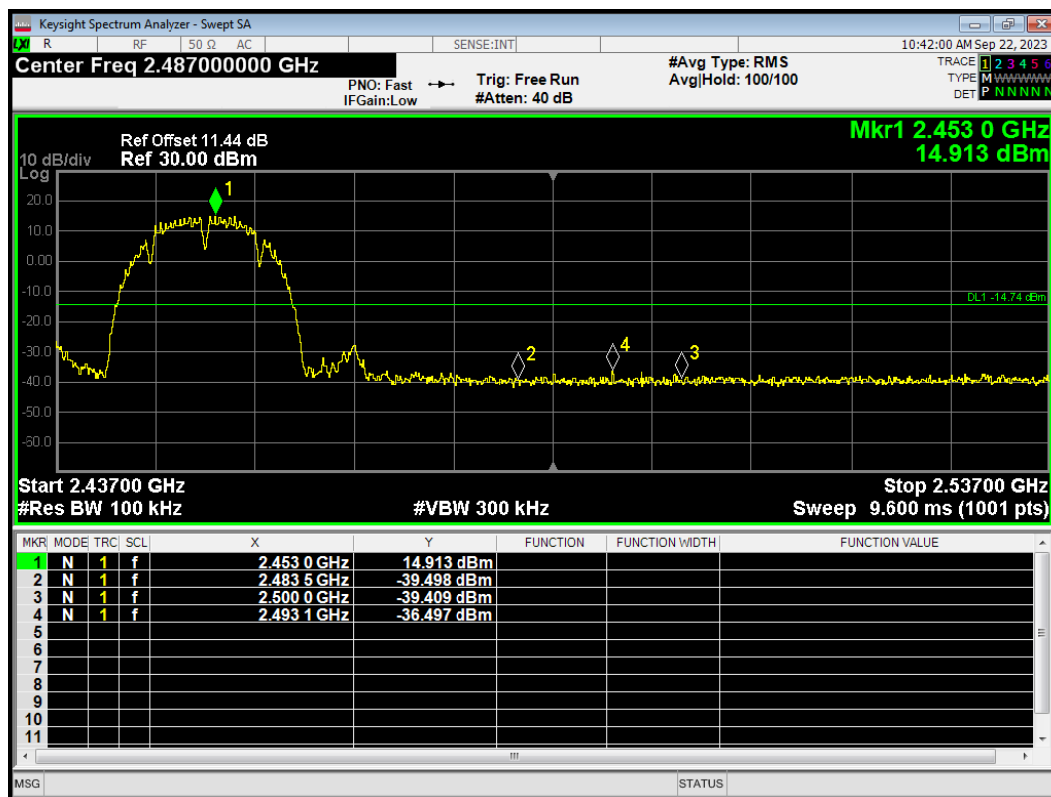
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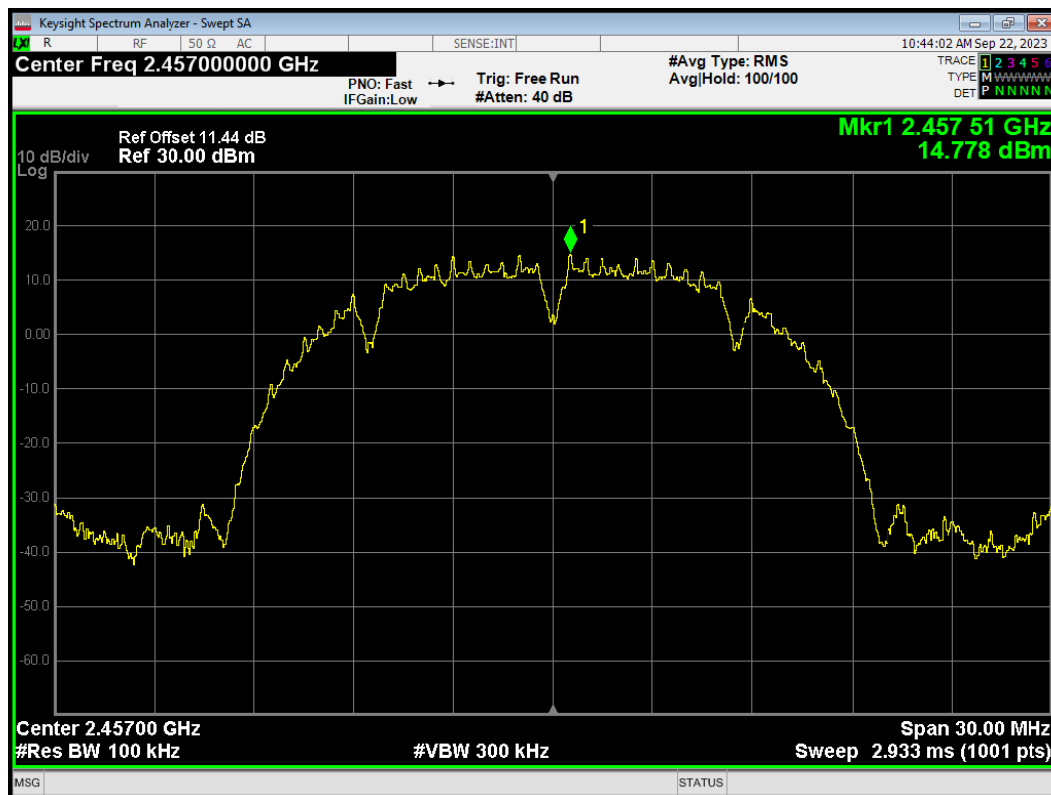
Band Edge 802.11b 2452MHz Ref



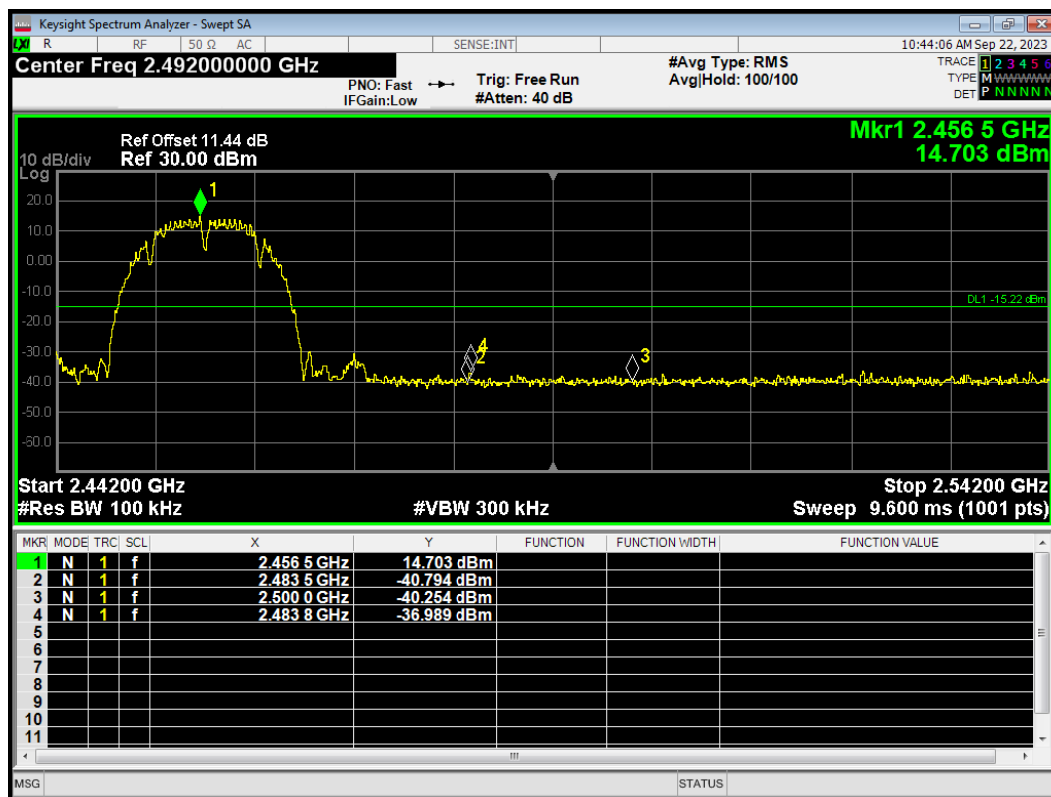
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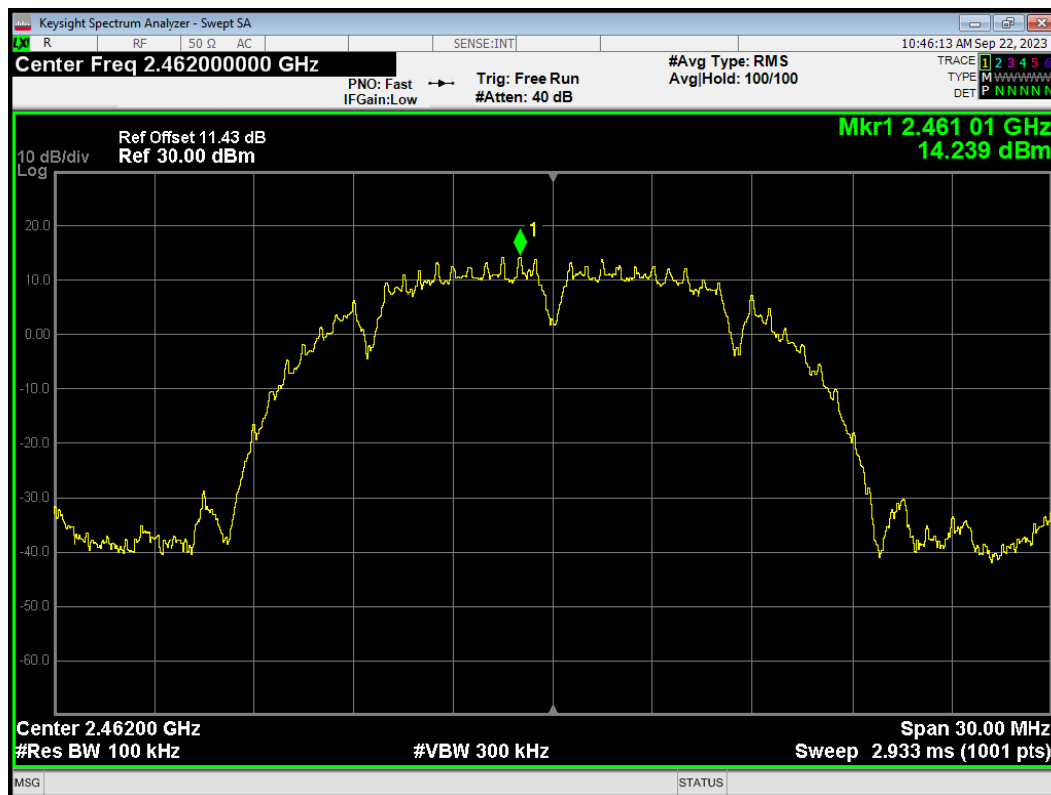
Band Edge 802.11b 2457MHz Ref



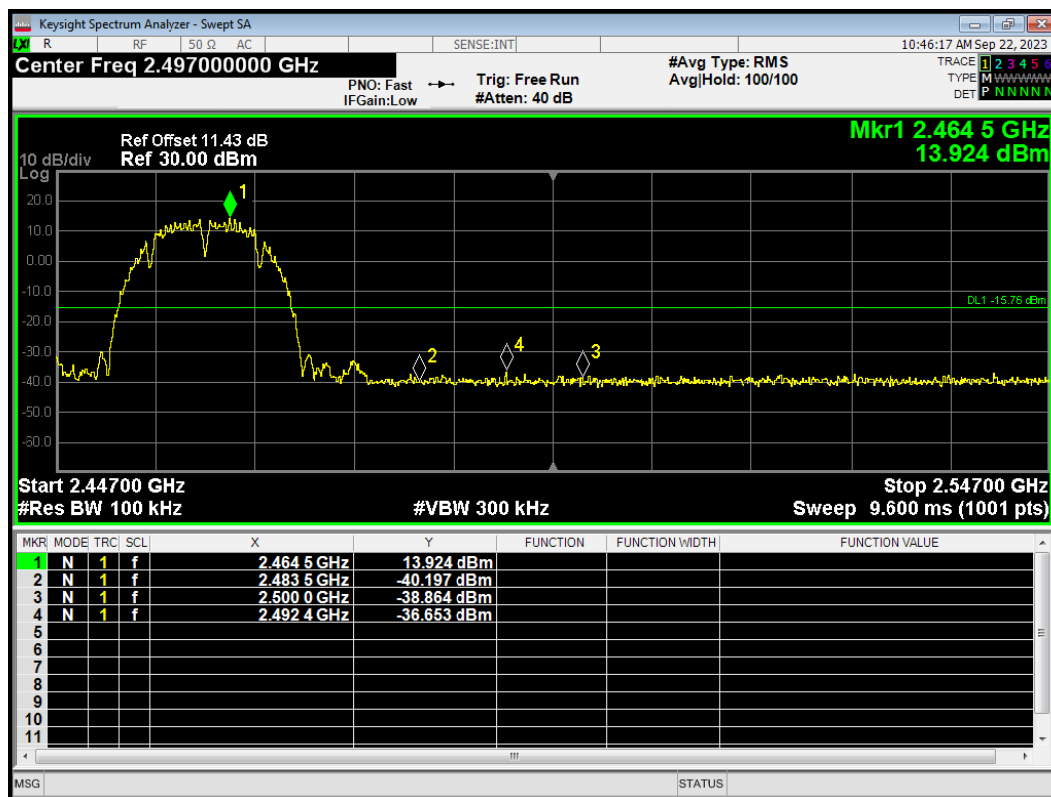
Band Edge 802.11b 2457MHz Emission



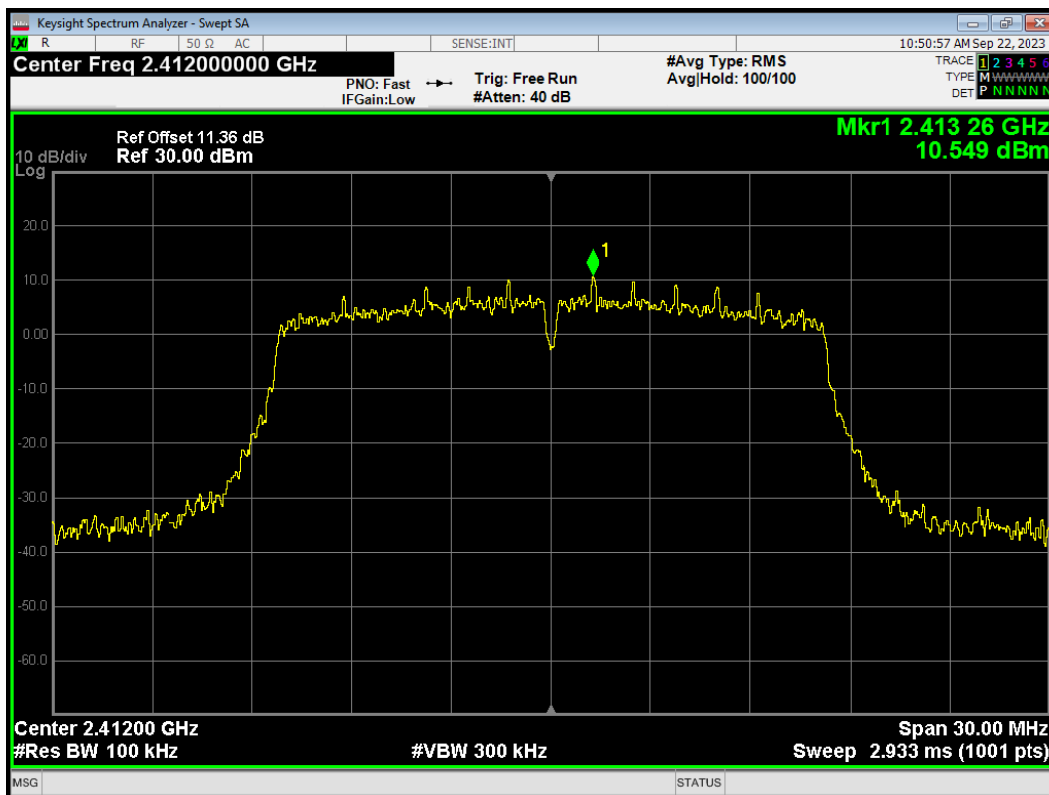
Band Edge 802.11b 2462MHz Ref



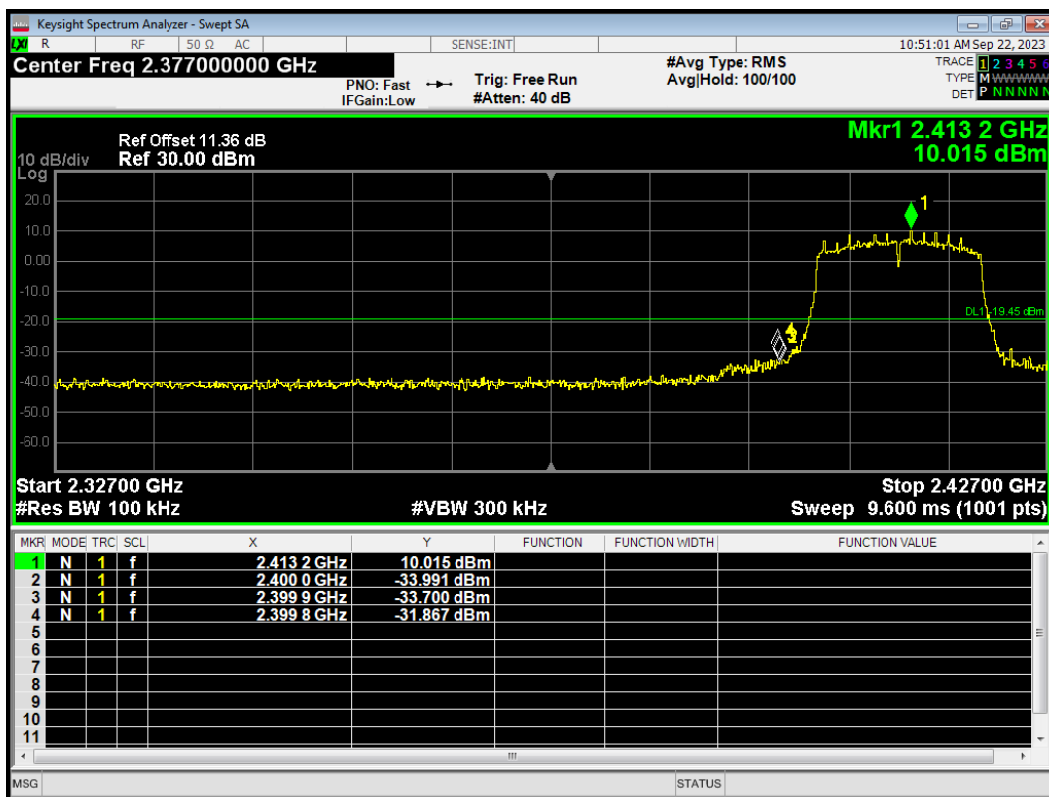
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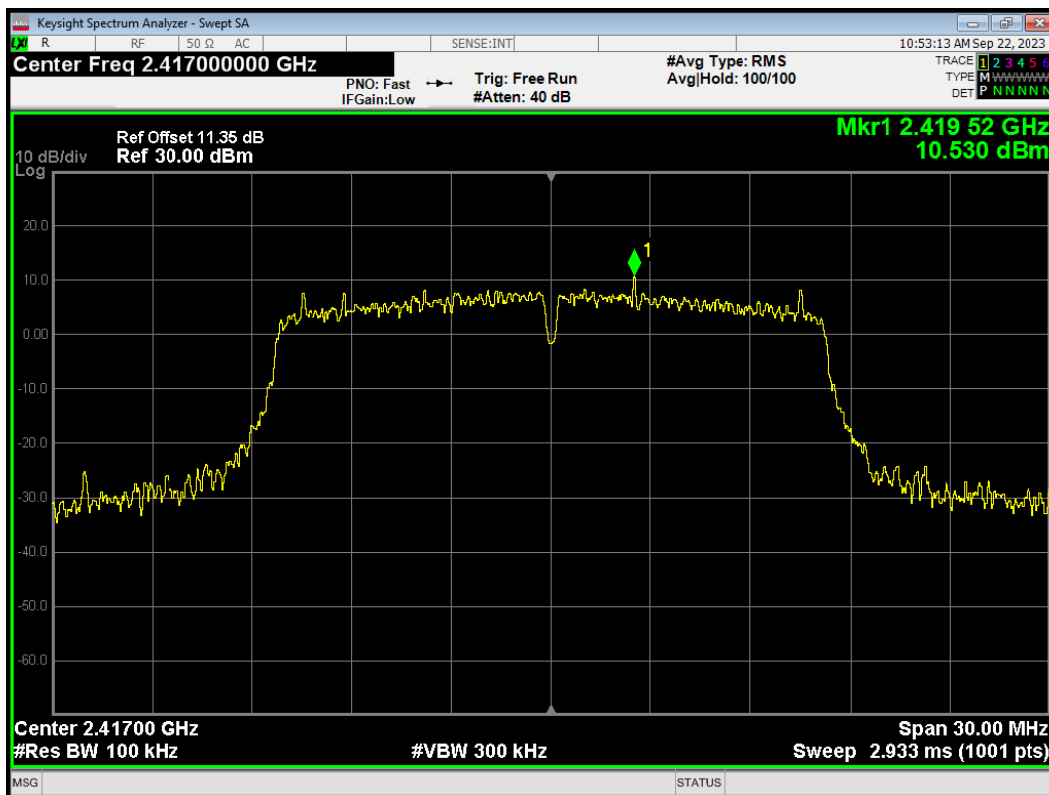
Band Edge 802.11g 2412MHz Ref



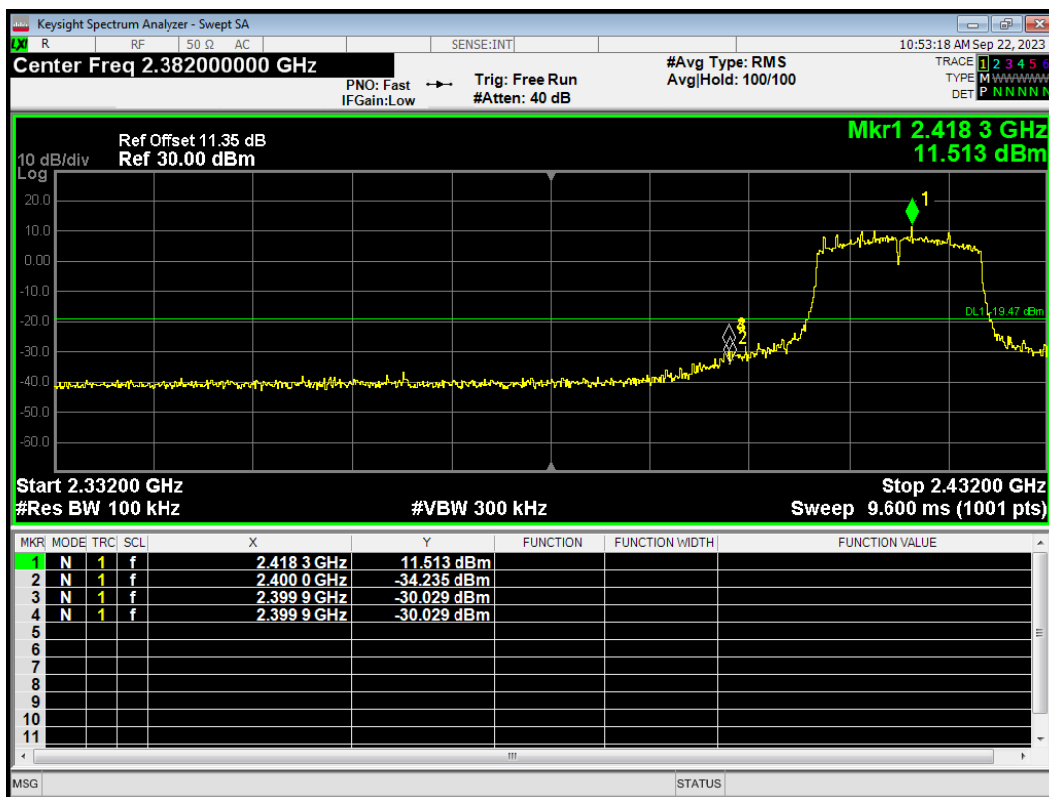
Band Edge 802.11g 2412MHz Emission



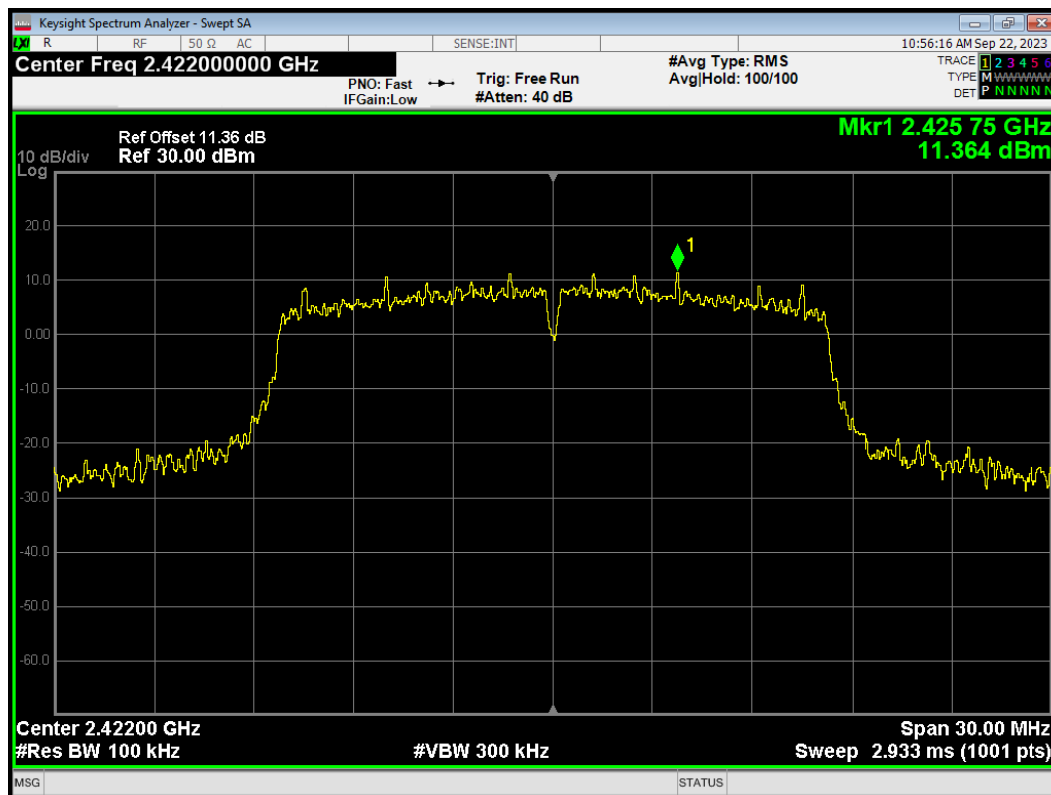
Band Edge 802.11g 2417MHz Ref



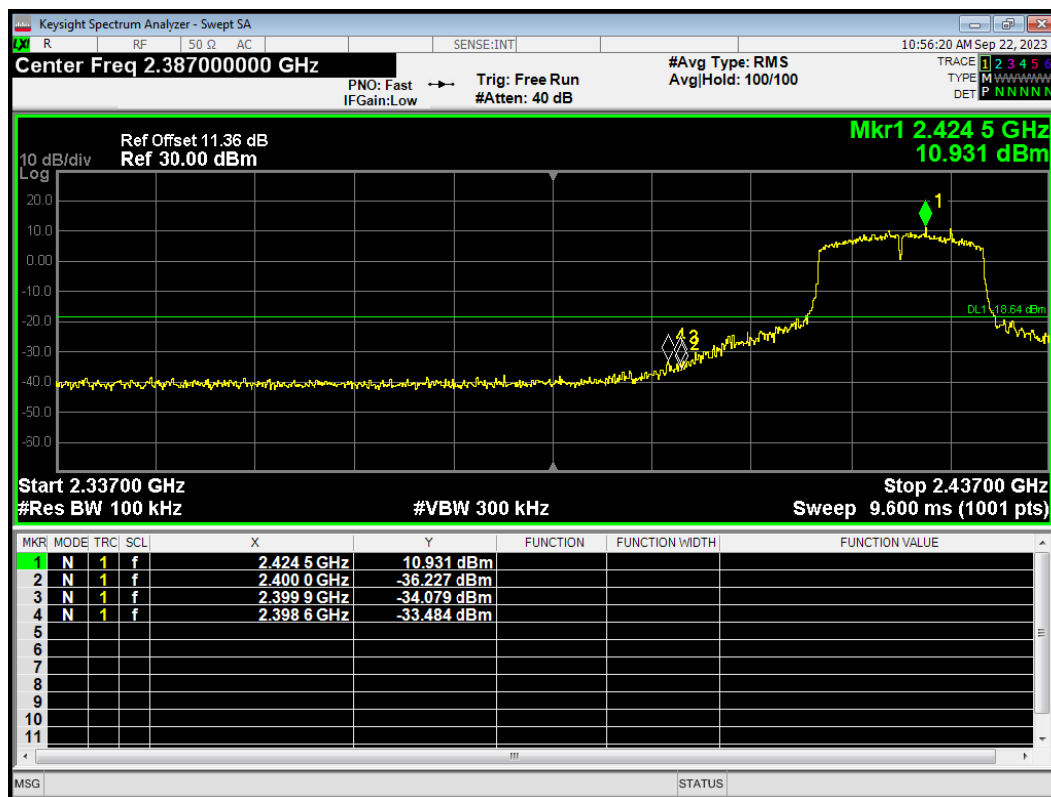
Band Edge 802.11g 2417MHz Emission



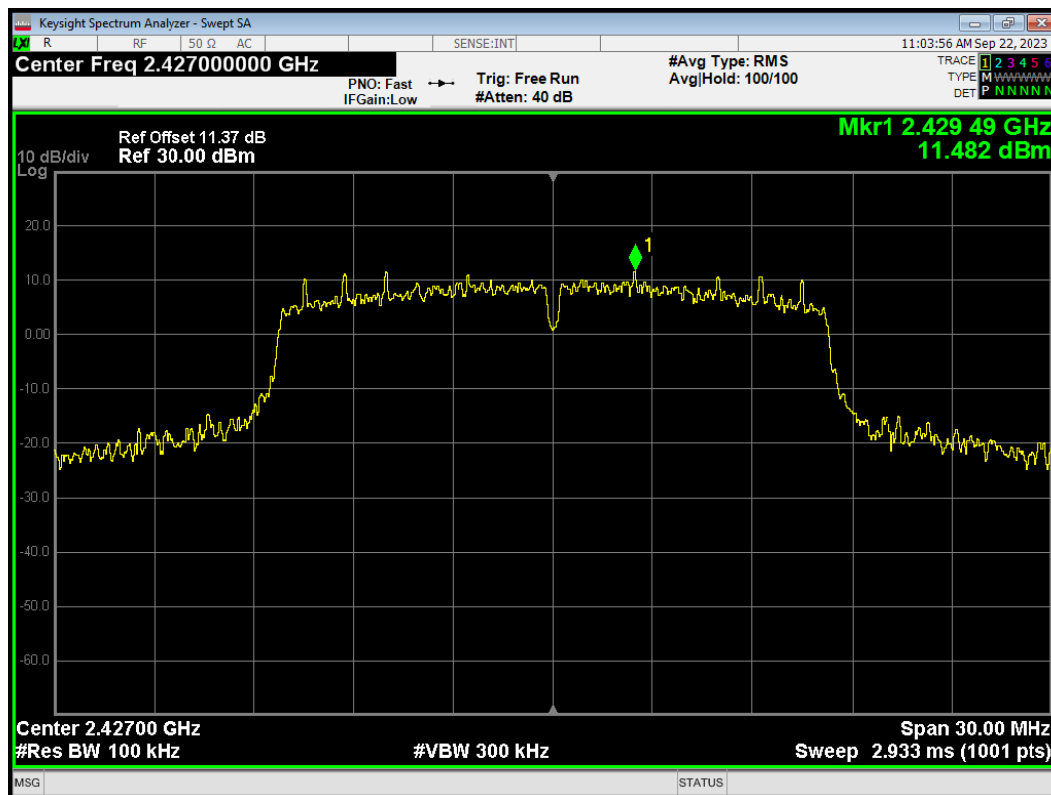
Band Edge 802.11g 2422MHz Ref



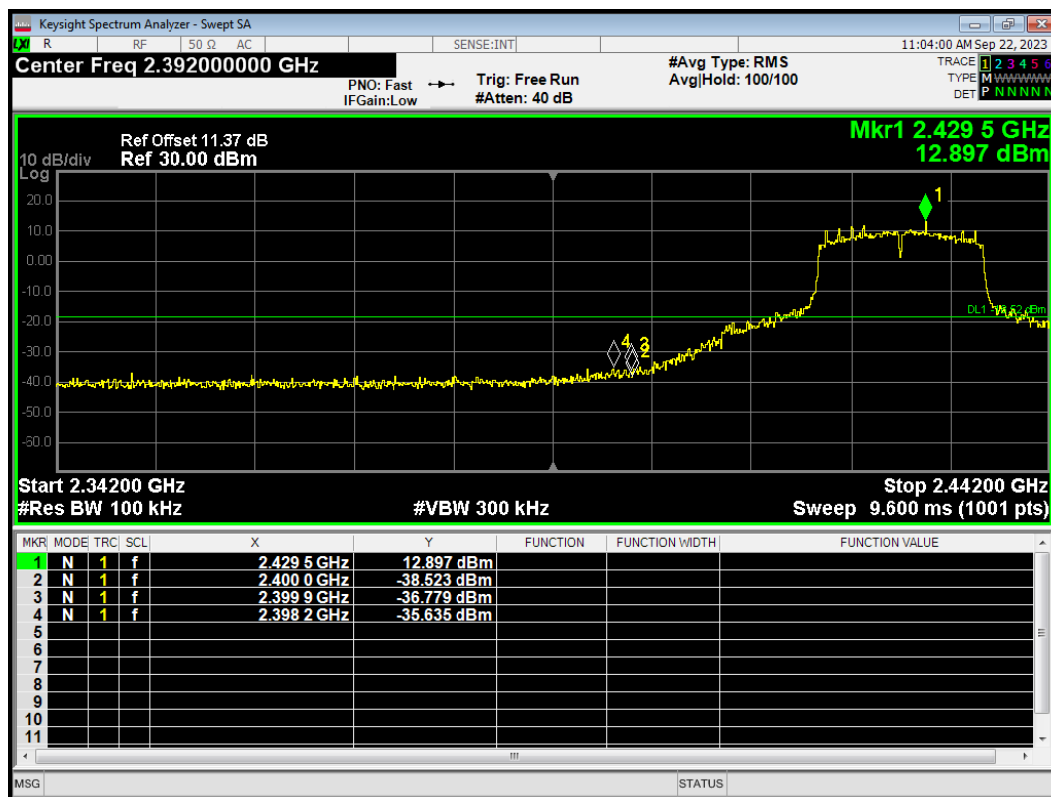
Band Edge 802.11g 2422MHz Emission



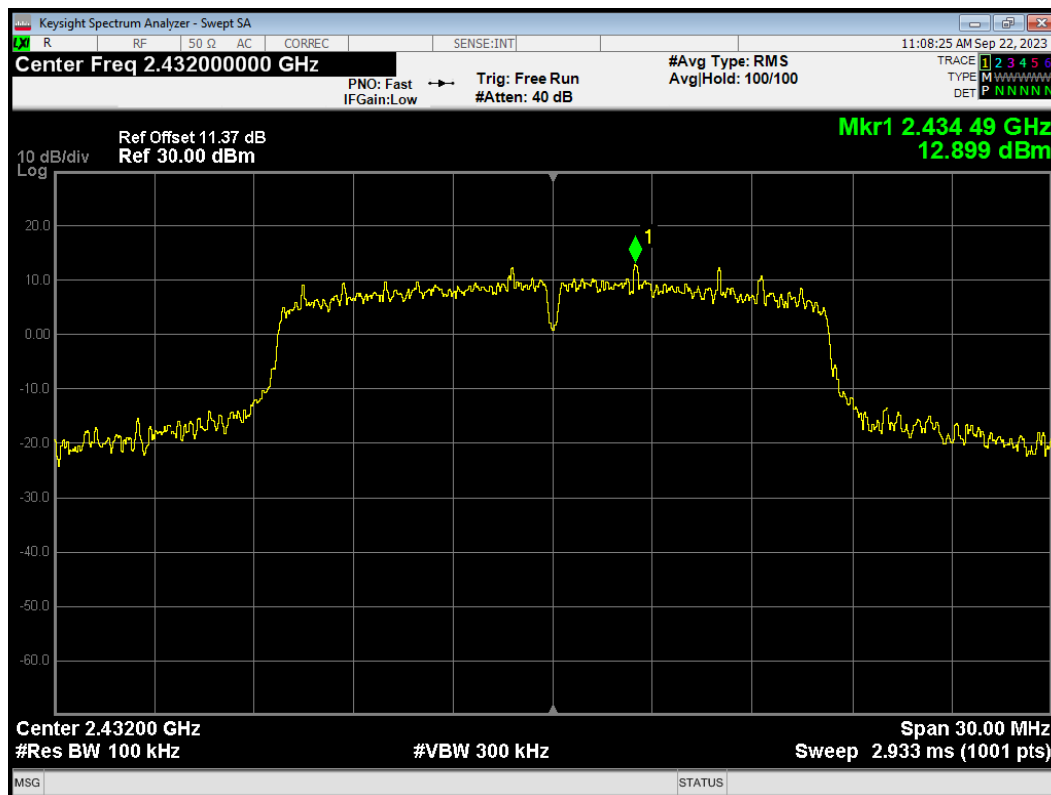
Band Edge 802.11g 2427MHz Ref



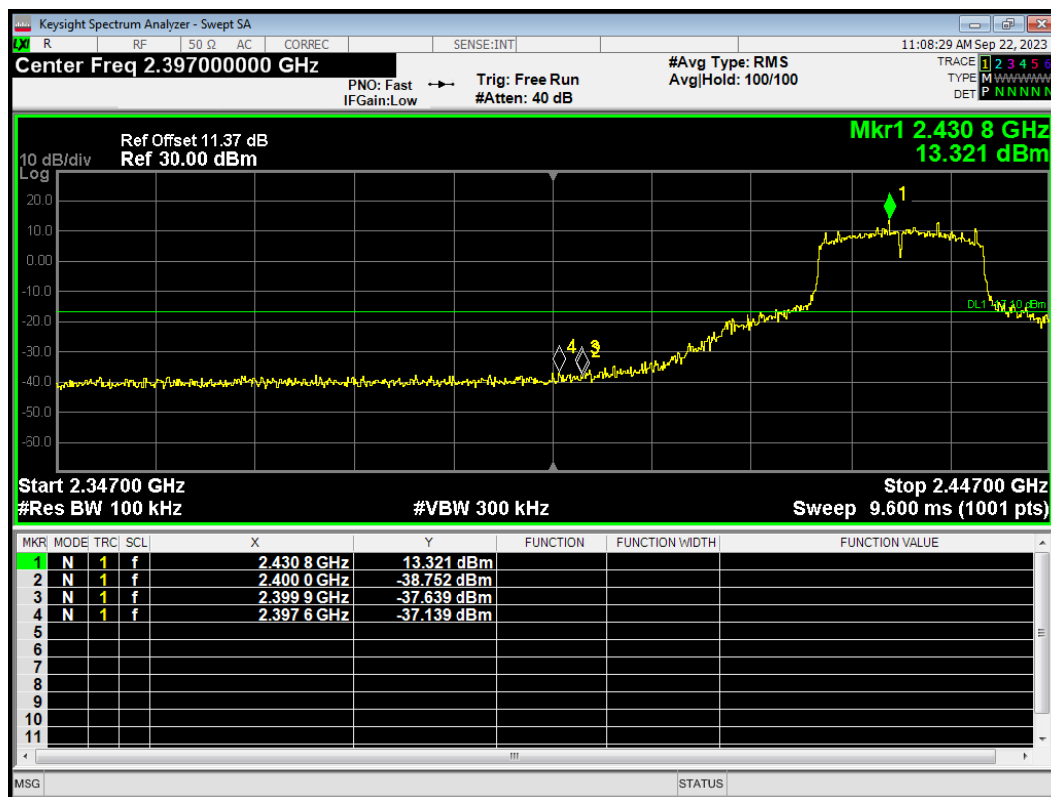
Band Edge 802.11g 2427MHz Emission



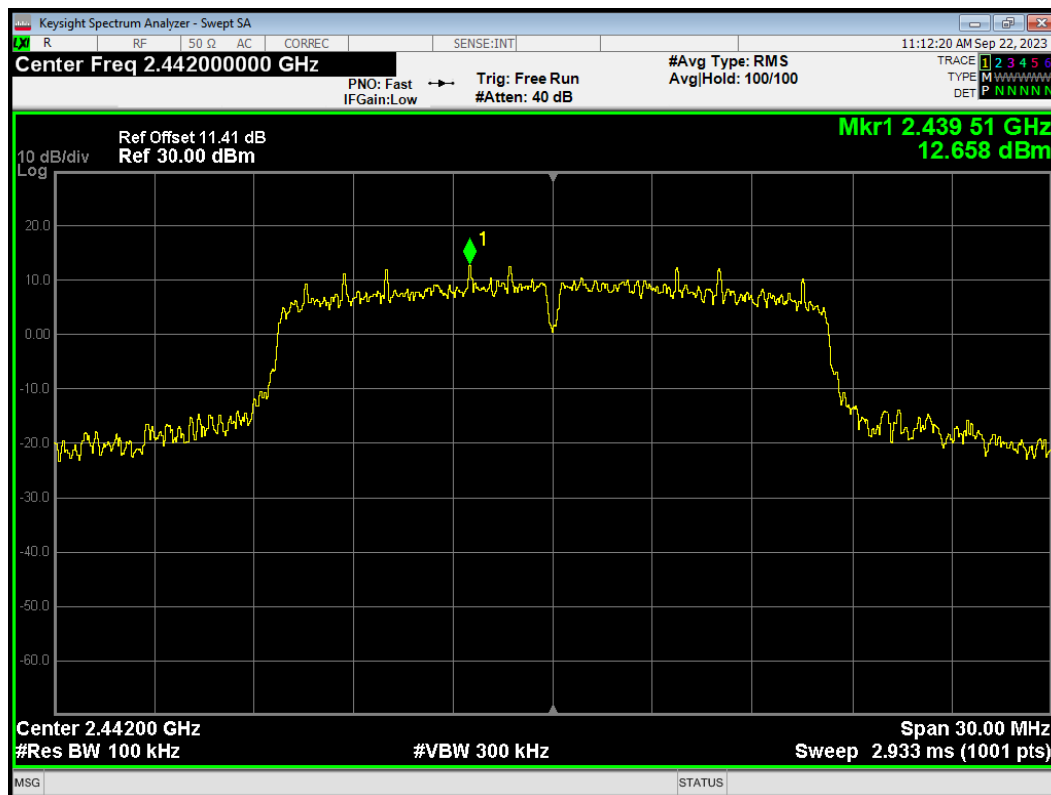
Band Edge 802.11g 2432MHz Ref



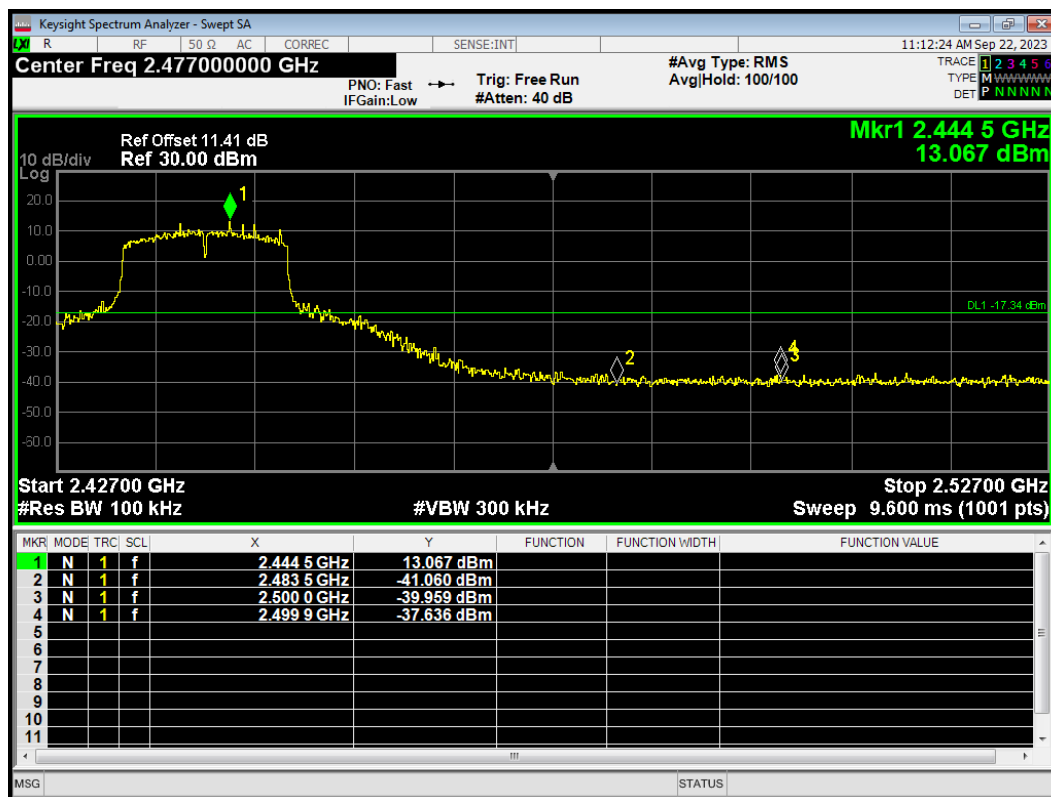
Band Edge 802.11g 2432MHz Emission



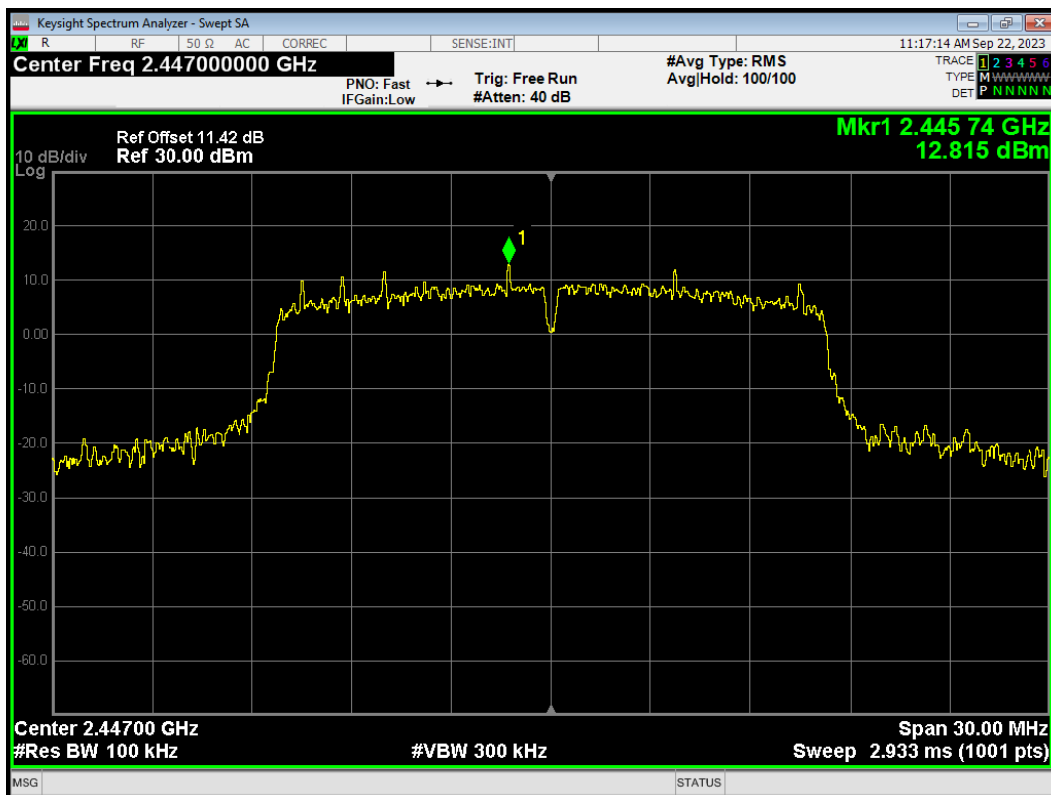
Band Edge 802.11g 2442MHz Ref



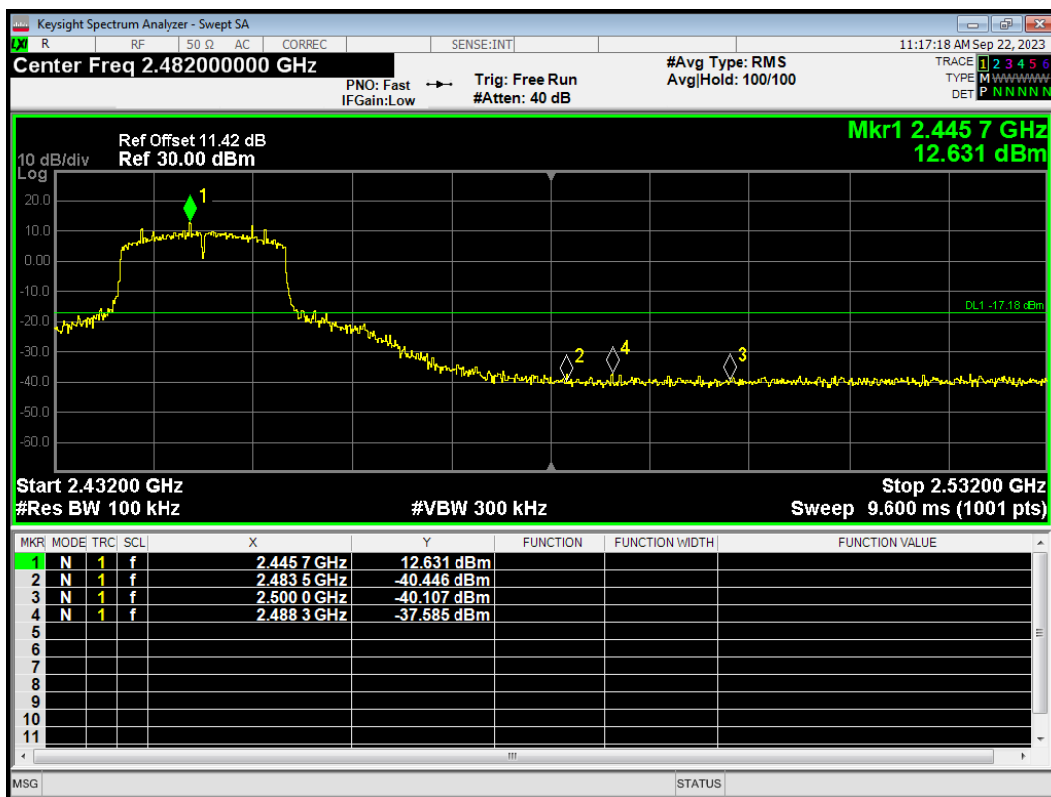
Band Edge 802.11g 2442MHz Emission



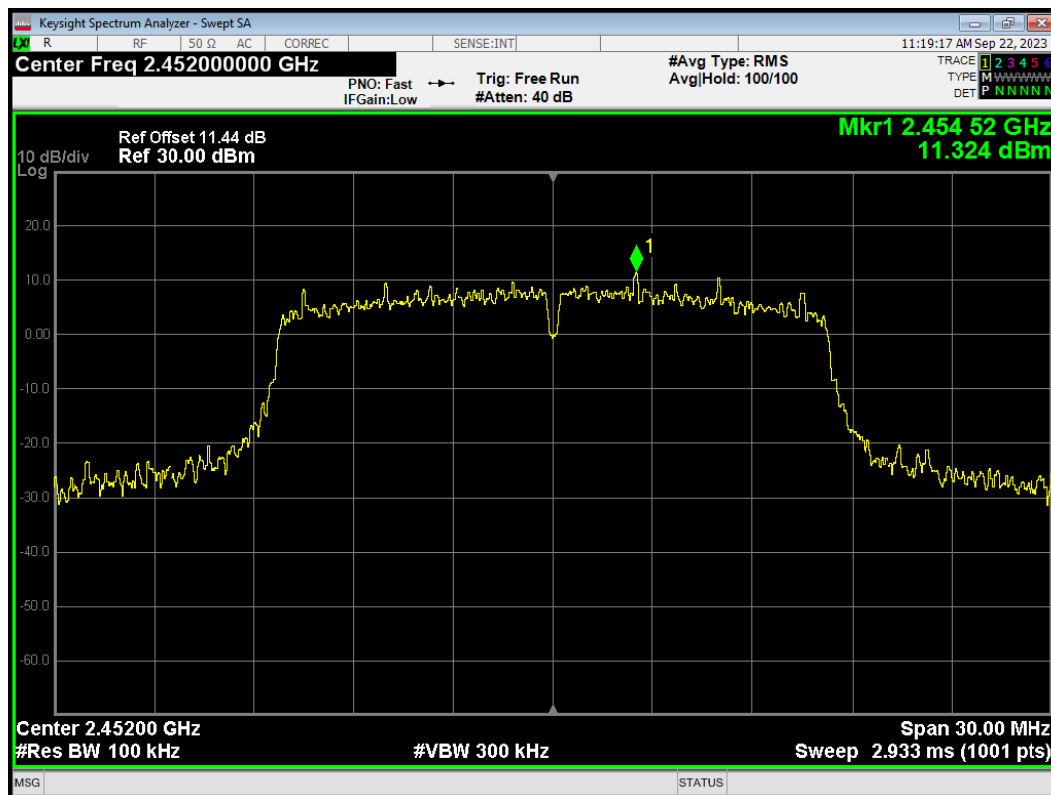
Band Edge 802.11g 2447MHz Ref



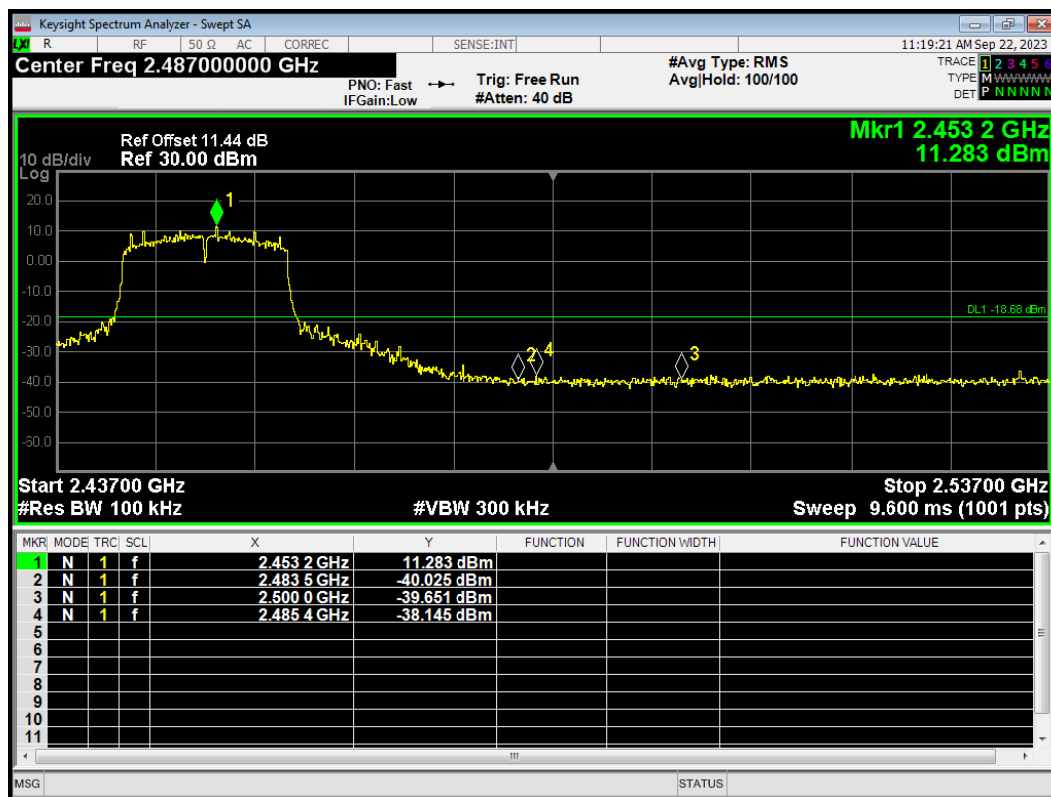
Band Edge 802.11g 2447MHz Emission



Band Edge 802.11g 2452MHz Ref



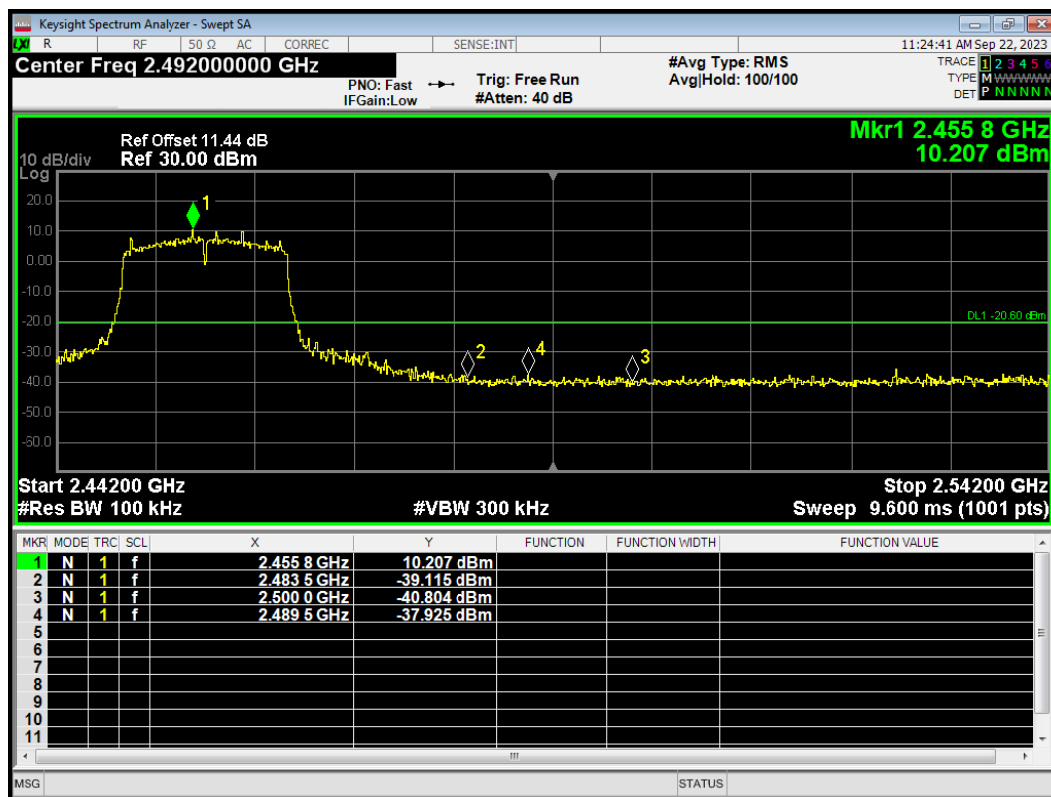
Band Edge 802.11g 2452MHz Emission



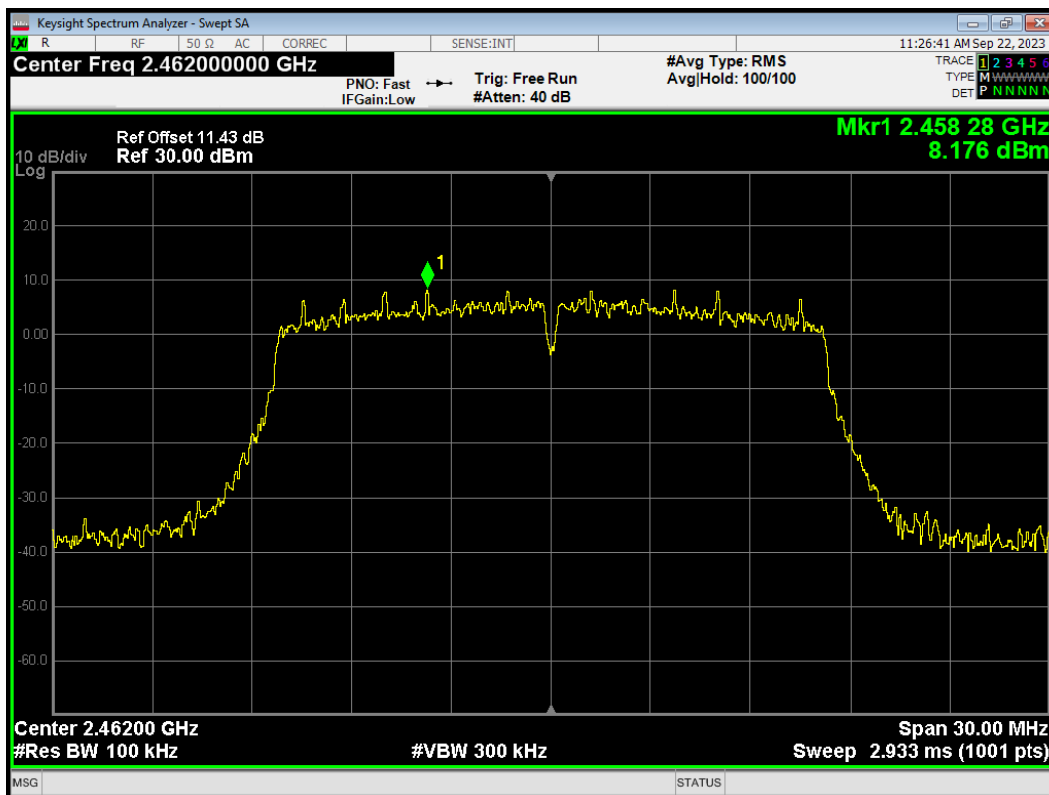
Band Edge 802.11g 2457MHz Ref



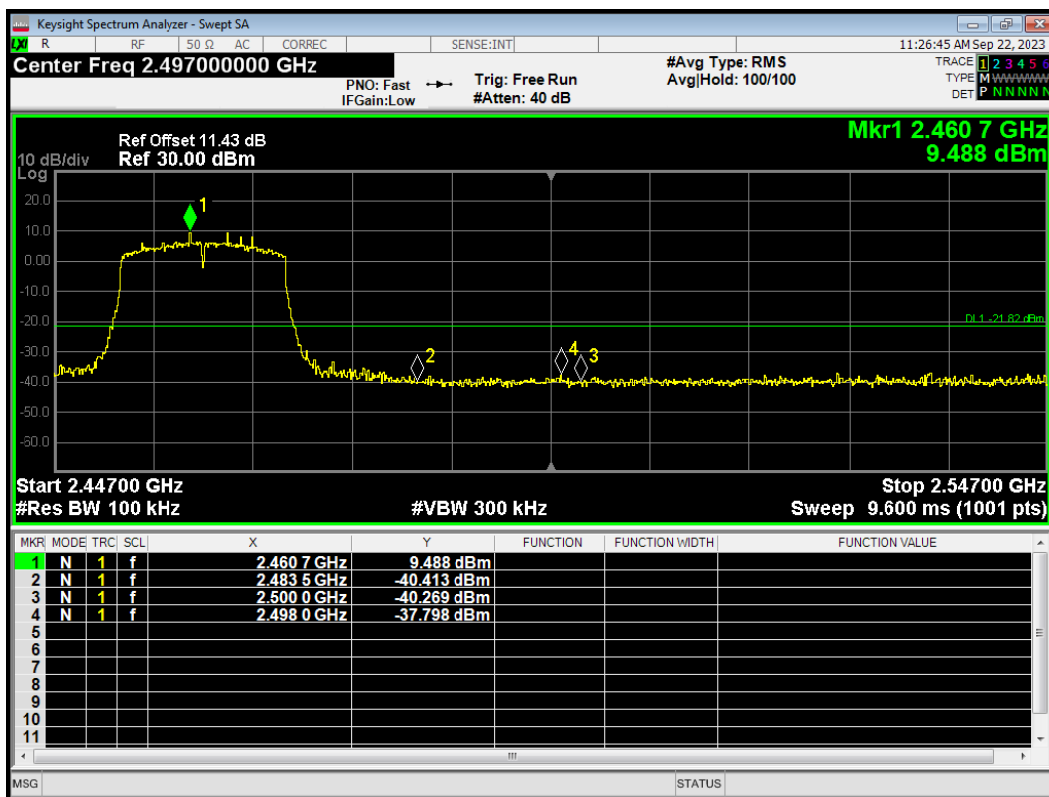
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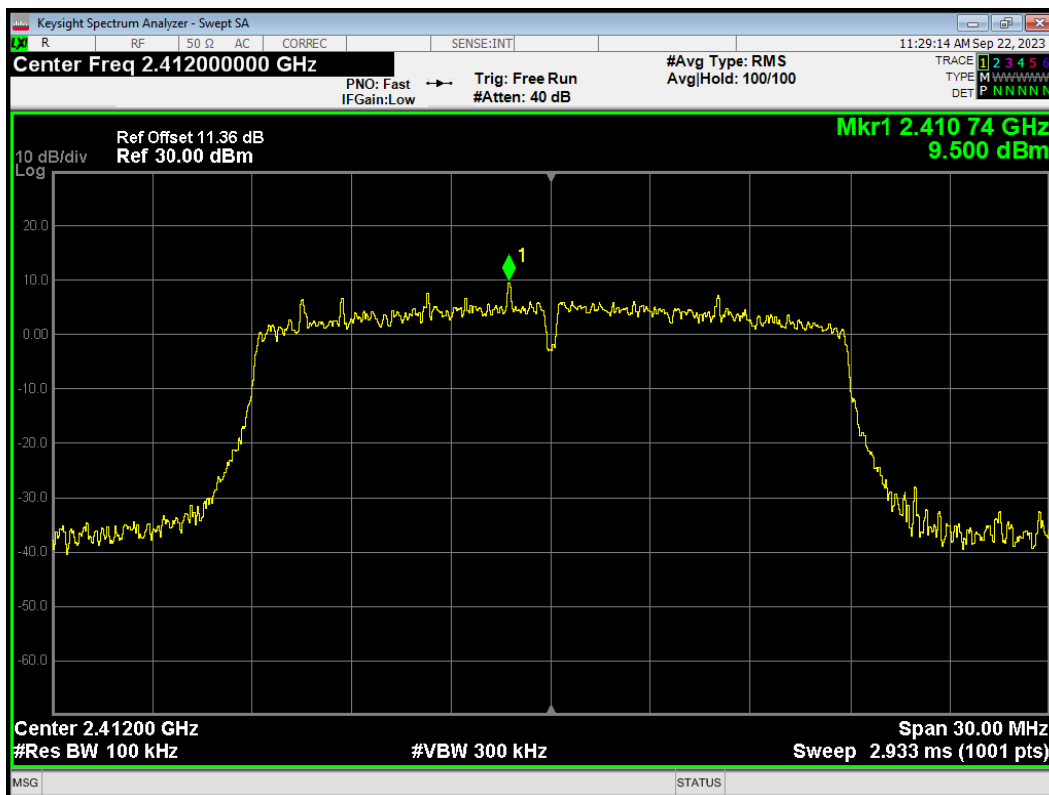
Band Edge 802.11g 2462MHz Ref



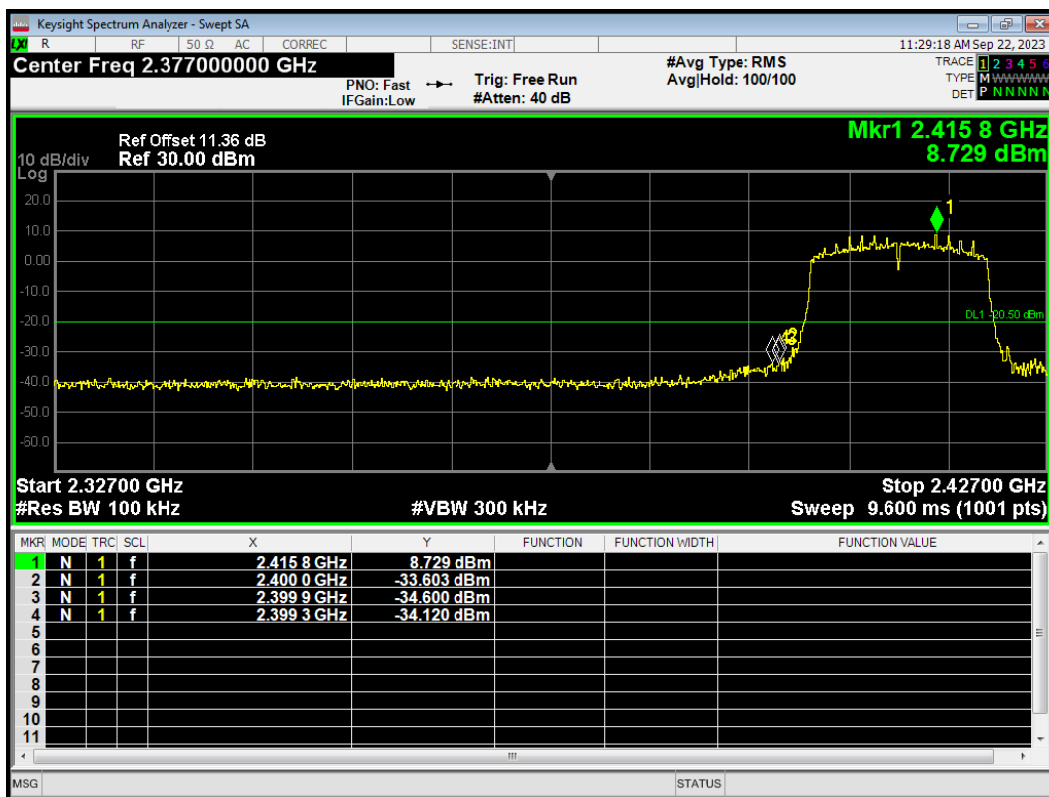
Band Edge 802.11g 2462MHz Emission



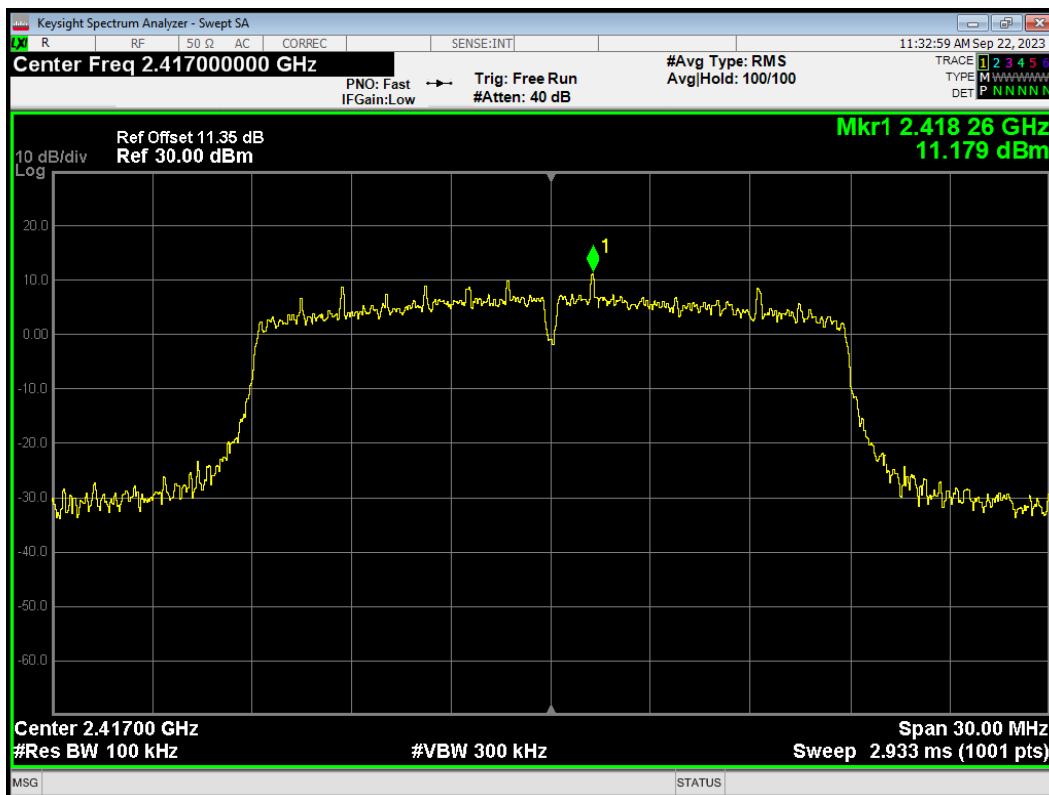
Band Edge 802.11n(HT20) 2412MHz Ref



Band Edge 802.11n(HT20) 2412MHz Emission



Band Edge 802.11n(HT20) 2417MHz Ref



Band Edge 802.11n(HT20) 2417MHz Emission

