

RF TEST REPORT

Applicant Dspread Technology (Beijing) Inc
FCC ID 2AGQ6-D70
Product Type Smart POS
Model D70
Report No. R2411A1678-R2
Issue Date January 24, 2025

Eurofins TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 15C (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

Eurofins TA Technology (Shanghai) Co., Ltd.

Building 3, No.145, Jintang Rd, Pudong Shanghai, P.R.China

TEL: +86-021-50791141/2/3

FAX: +86-021-50791141/2/3-8000

TABLE OF CONTENT

1. Test Laboratory	4
1.1. Notes of the Test Report.....	4
1.2. Test Facility	4
1.3. Testing Location.....	4
2. General Description of Equipment Under Test.....	5
2.1. Applicant and Manufacturer Information	5
2.2. General Information	5
3. Applied Standards	6
4. Test Configuration	7
5. Test Case Results	8
5.1. Maximum output power	8
5.2. 99% Bandwidth and 6dB Bandwidth	11
5.3. Band Edge	37
5.4. Power Spectral Density	54
5.5. Spurious RF Conducted Emissions.....	69
5.6. Unwanted Emission	95
5.7. Conducted Emission	138
6. Main Test Instruments.....	143
ANNEX A: The EUT Appearance.....	144
ANNEX B: Test Setup Photos	145

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: November 7, 2024 ~ December 4, 2024			
Date of Sample Received: November 7, 2024			
Note: All indications of Pass/Fail in this report are opinions expressed by Eurofins TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.			

1. Test Laboratory

1.1. Notes of the Test Report

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

1.2. Test Facility

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

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

A2LA (Certificate Number: 3857.01)

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

1.3. Testing Location

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

2. General Description of Equipment Under Test

2.1. Applicant and Manufacturer Information

Applicant	Dspread Technology (Beijing) Inc
Applicant address	Rm.407, B12C, #10 (Universal Business Park), Jiuxianqiao Road, Chaoyang District, Beijing, China,100015
Manufacturer	Dspread Technology (Beijing) Inc
Manufacturer address	Rm.407, B12C, #10 (Universal Business Park), Jiuxianqiao Road, Chaoyang District, Beijing, China,100015

2.2. General Information

EUT Description	
Model	D70
Lab internal SN	R2411A1678/S01
Hardware Version	1.1.0
Software Version	1.1.0
Power Supply	Battery / AC adapter
Antenna Type	Monopole Antenna
Antenna Connector	A permanently attached antenna (meet with the standard FCC Part 15.203 requirement)
Antenna Gain	1.14 dBi
Additional Beamforming Gain	NA
Operating Frequency Range(s)	802.11b/g/n(HT20): 2412 ~ 2462 MHz 802.11n(HT40): 2422 ~ 2452 MHz Bluetooth LE V5.0: 2402 ~2480 MHz
Modulation Type	802.11b: DSSS 802.11g/n: OFDM Bluetooth LE: GFSK
Max. Output Power	Wi-Fi 2.4G: 19.09 dBm Bluetooth LE: -0.27 dBm
EUT Accessory	
Battery	Manufacturer: Guangdong Fenghua New Energy Co.,Ltd. Model: F50109MA
USB Cable	Manufacturer: ShenZhen FKY-QY Hardware&Electronics.,Ltd. Model: XC04W1000100
Note: 1. The EUT is sent from the applicant to Eurofins TA and the information of the EUT is declared by the applicant.	

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 (2023) Radio Frequency Devices

ANSI C63.10-2013

Reference standard:

KDB 558074 D01 15.247 Meas Guidance v05r02

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
Bluetooth (Low Energy)	1Mbps; 2Mbps
Bluetooth (Low Energy) (S=2)	500kbps
Bluetooth (Low Energy) (S=8)	125kbps
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0

5. Test Case Results

5.1. Maximum output power

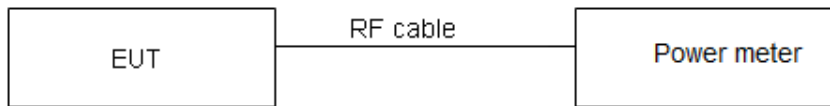
Ambient Condition

Temperature	Relative humidity
15°C ~ 35°C	20% ~ 80%

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.

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	$\leq 1\text{W (30dBm)}$
----------------------	--------------------------

Measurement Uncertainty

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

Test Results

Power Index					
Channel	802.11b	802.11g	802.11n HT20	Channel	802.11n HT40
CH1	19.50	17.00	17.50	CH3	15.00
CH6	19.50	17.00	17.50	CH6	15.00
CH11	19.50	17.00	16.00	CH9	13.00

Power Index				
Bluetooth (Low Energy)				
Channel	1M	2M	S=2	S=8
CH0	default	default	default	default
CH19	default	default	default	default
CH39	default	default	default	default

Test Mode	Duty cycle	Duty cycle correction Factor (dB)
802.11b	1.000	0.00
802.11g	0.969	0.14
802.11n HT20	0.969	0.14
802.11n HT40	0.935	0.29
Bluetooth LE (1M)	0.851	0.70
Bluetooth LE (2M)	0.929	0.32
Bluetooth LE (S=2)	0.910	0.41
Bluetooth LE (S=8)	0.978	0.10
Note: when Duty cycle ≥ 0.98 , Duty cycle correction Factor not required.		

Test Mode	Carrier frequency (MHz)/ Channel	Average Power Measured (dBm)	Average Power with duty factor (dBm)	Limit (dBm)	Conclusion
802.11b	2412/CH 1	18.98	18.98	30	PASS
	2437/CH 6	19.09	19.09	30	PASS
	2462/CH11	18.97	18.97	30	PASS
802.11g	2412/CH 1	16.44	16.58	30	PASS
	2437/CH 6	16.52	16.66	30	PASS
	2462/CH11	16.41	16.55	30	PASS
802.11n HT20	2412/CH 1	16.70	16.84	30	PASS
	2437/CH 6	16.79	16.93	30	PASS
	2462/CH11	15.35	15.49	30	PASS
802.11n HT40	2422/CH3	14.69	14.98	30	PASS
	2437/CH6	14.54	14.83	30	PASS
	2452/CH9	12.51	12.80	30	PASS
Bluetooth (Low Energy) (1M)	2402/CH0	-1.60	-0.90	30	PASS
	2440/CH19	-0.97	-0.27	30	PASS
	2480/CH39	-1.19	-0.49	30	PASS
Bluetooth (Low Energy) (2M)	2402/CH0	-3.25	-2.93	30	PASS
	2440/CH19	-2.83	-2.51	30	PASS
	2480/CH39	-2.96	-2.64	30	PASS
Bluetooth (Low Energy) (S=2)	2402/CH0	-1.31	-0.90	30	PASS
	2440/CH19	-0.79	-0.38	30	PASS
	2480/CH39	-1.04	-0.63	30	PASS
Bluetooth (Low Energy) (S=8)	2402/CH0	-0.99	-0.89	30	PASS
	2440/CH19	-0.51	-0.41	30	PASS
	2480/CH39	-0.56	-0.46	30	PASS
Note: Average Power with duty factor = Average Power Measured +Duty cycle correction factor					

5.2. 99% Bandwidth and 6dB Bandwidth

Ambient Condition

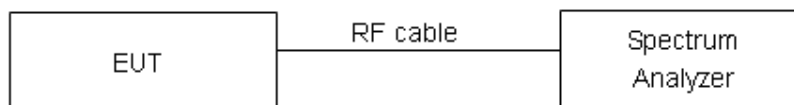
Temperature	Relative humidity
15°C ~ 35°C	20% ~ 80%

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
------------------------	-----------

Measurement Uncertainty

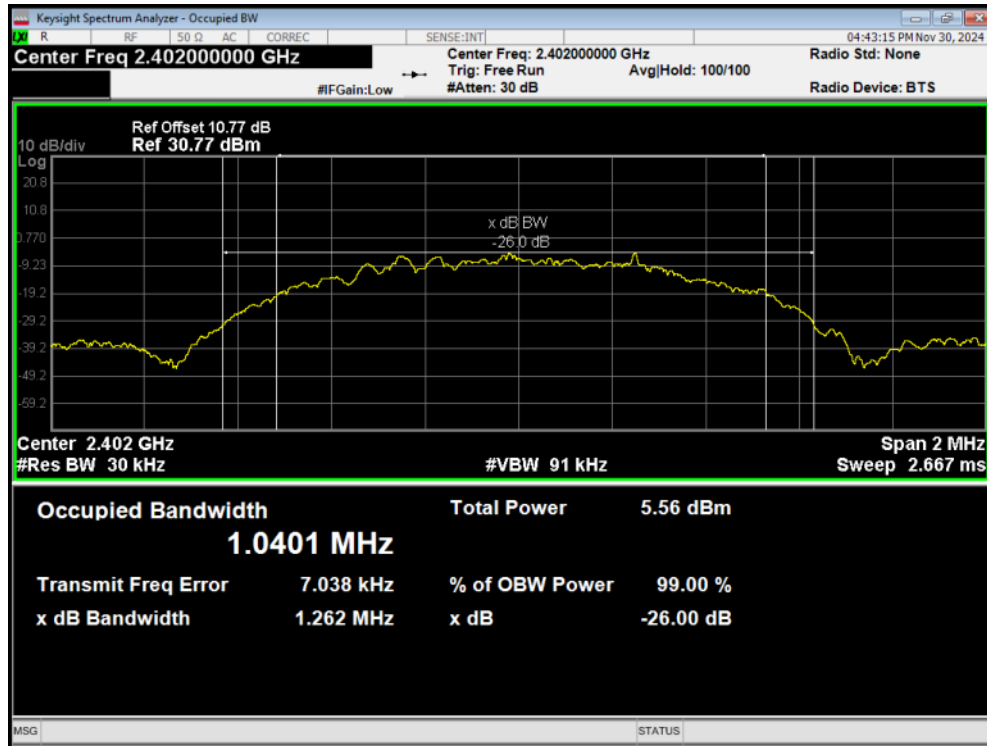
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U = 936$ Hz.

Test Results:

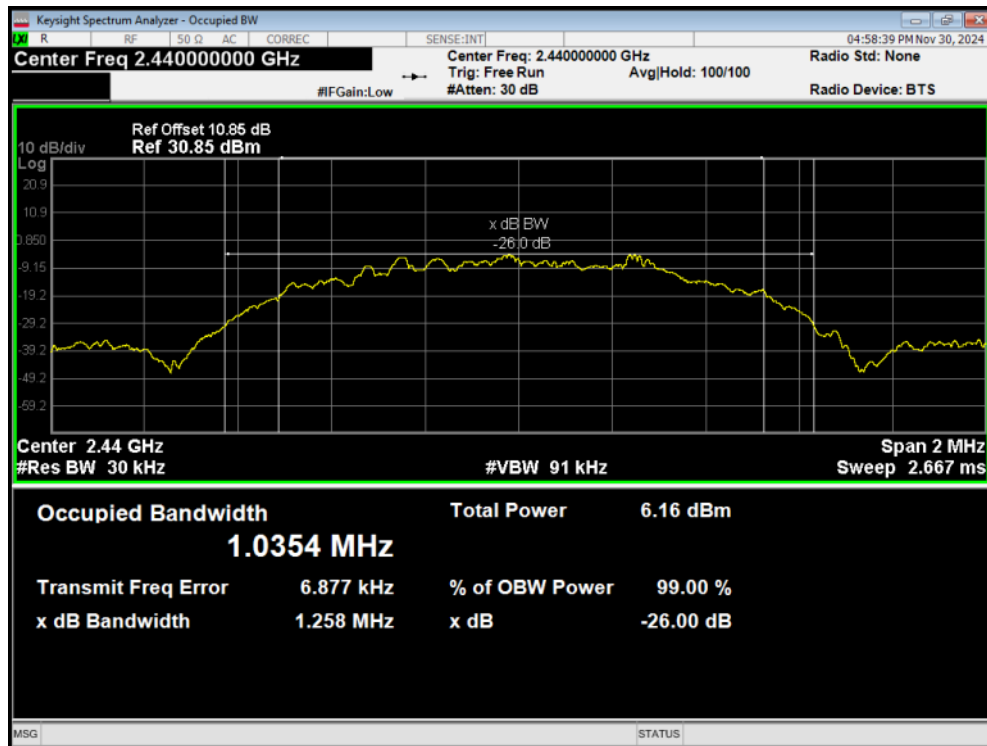
Test Mode	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 6 dB bandwidth (MHz)	Limit (kHz)	Conclusion
802.11b	2412	12.969	8.056	500	PASS
	2437	12.967	8.523	500	PASS
	2462	13.038	7.096	500	PASS
802.11g	2412	16.643	15.104	500	PASS
	2437	16.669	14.729	500	PASS
	2462	16.638	15.793	500	PASS
802.11n HT20	2412	17.700	15.078	500	PASS
	2437	17.680	15.062	500	PASS
	2462	17.703	15.139	500	PASS
802.11n HT40	2422	36.059	35.086	500	PASS
	2437	36.009	35.040	500	PASS
	2452	36.037	30.098	500	PASS
Bluetooth (Low Energy) (1M)	2402	1.040	0.647	500	PASS
	2440	1.035	0.658	500	PASS
	2480	1.040	0.656	500	PASS
Bluetooth (Low Energy) (2M)	2402	2.086	1.100	500	PASS
	2440	2.071	1.126	500	PASS
	2480	2.077	1.152	500	PASS
Bluetooth (Low Energy) (S=2)	2402	1.027	0.658	500	PASS
	2440	1.025	0.666	500	PASS
	2480	1.020	0.647	500	PASS
Bluetooth (Low Energy) (S=8)	2402	1.058	0.682	500	PASS
	2440	1.054	0.685	500	PASS
	2480	1.053	0.684	500	PASS

99%bandwidth

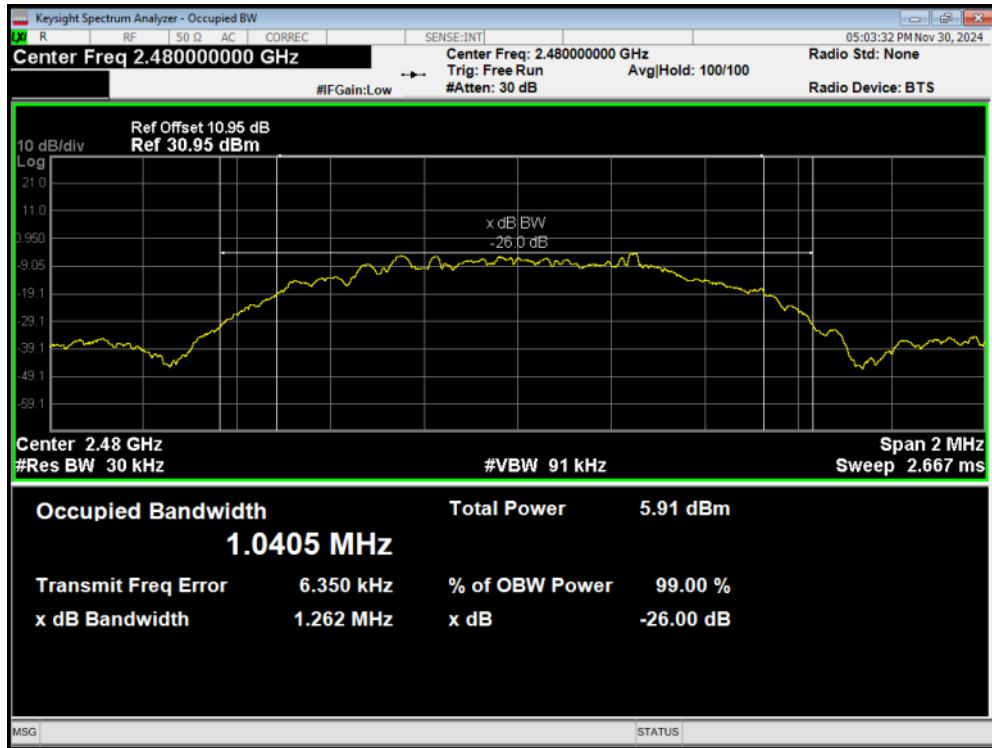
OBW BLE (1M) 2402MHz



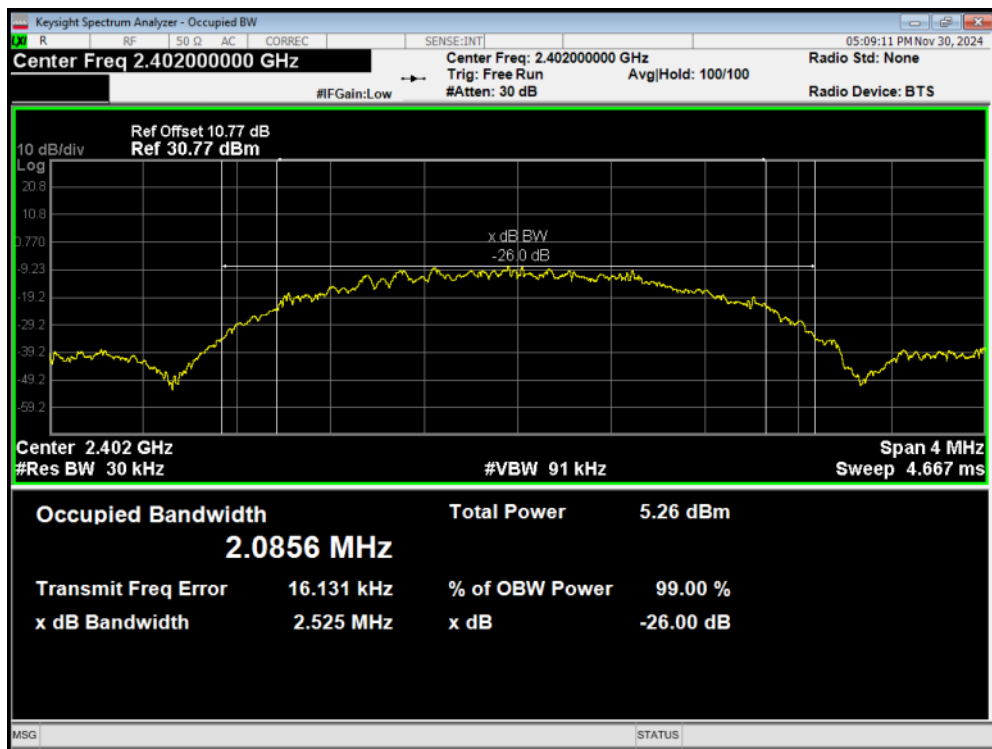
OBW BLE (1M) 2440MHz



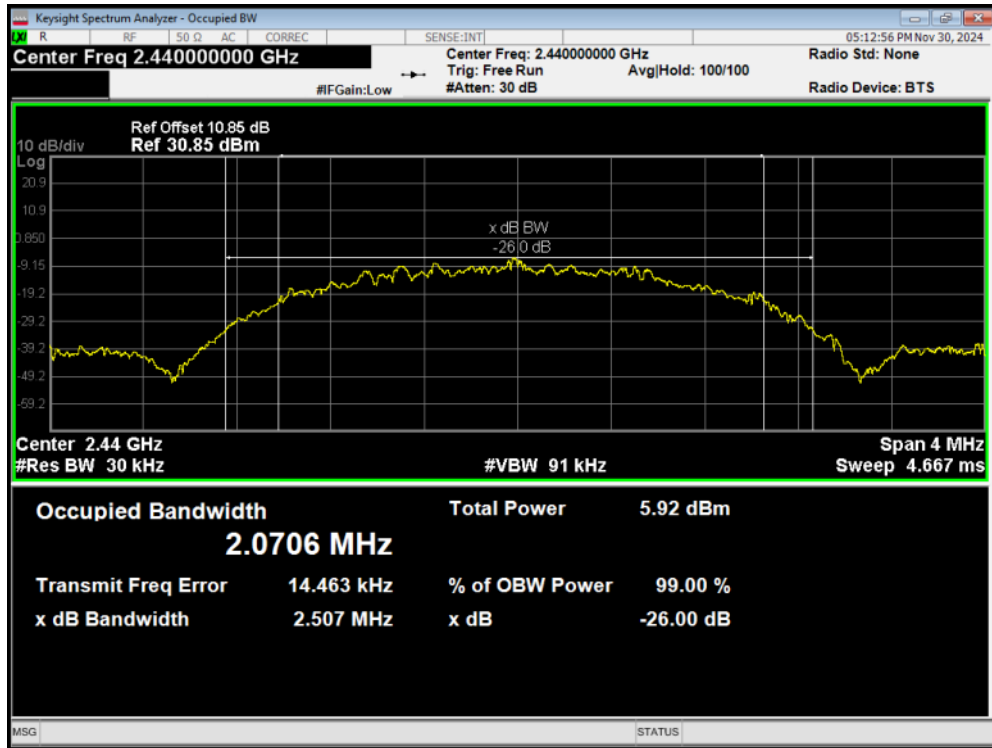
OBW BLE (1M) 2480MHz



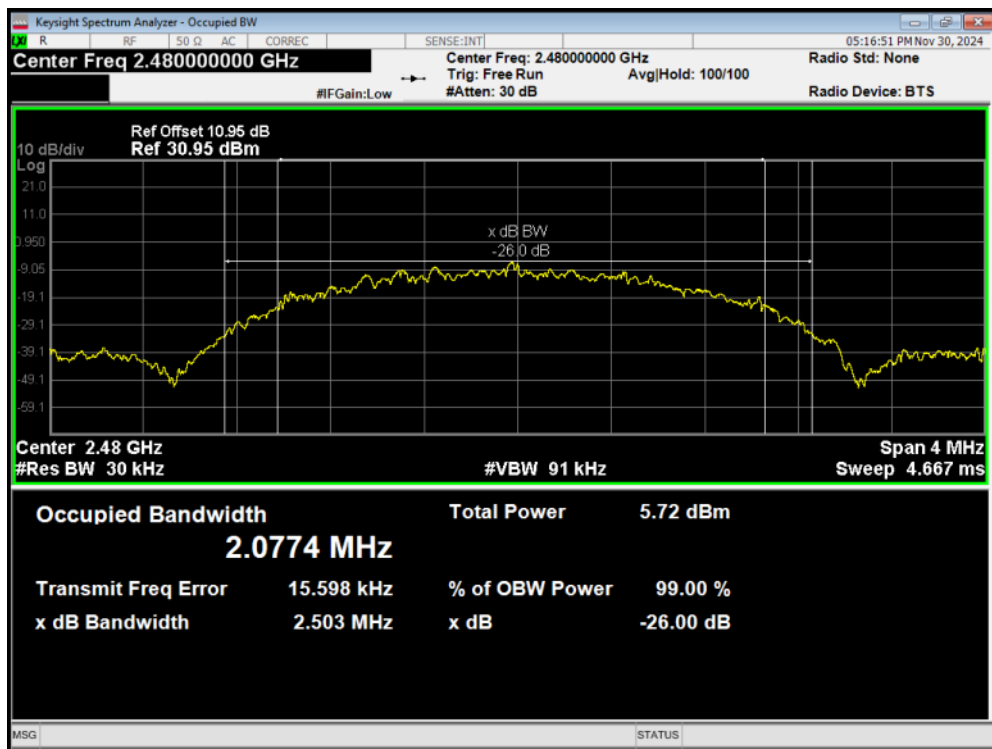
OBW BLE (2M) 2402MHz



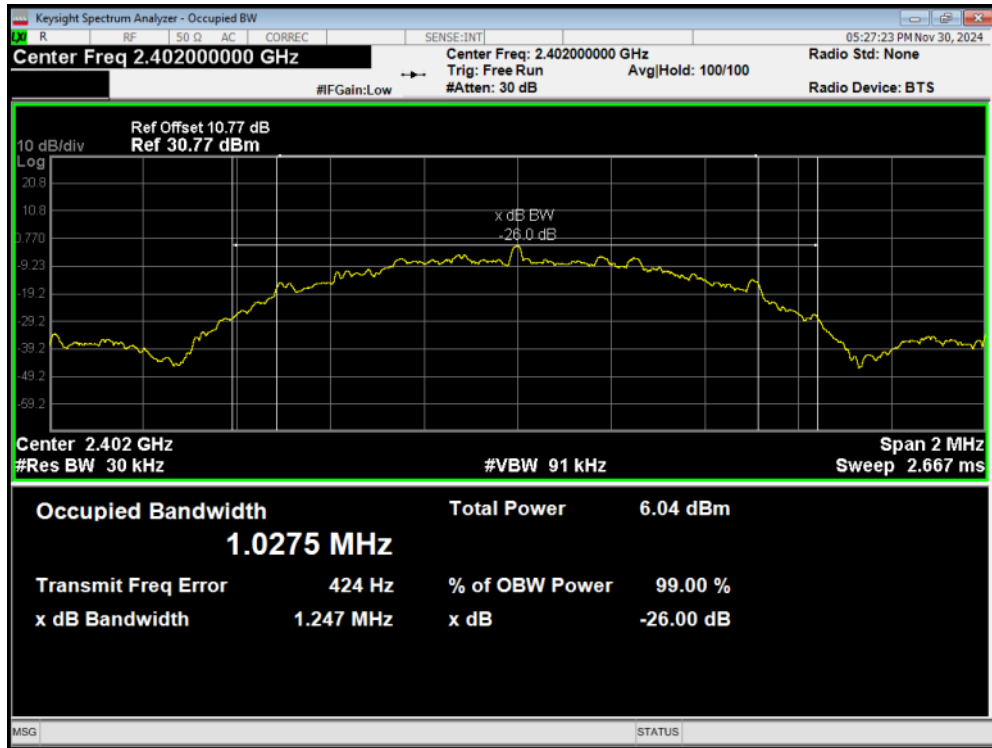
OBW BLE (2M) 2440MHz



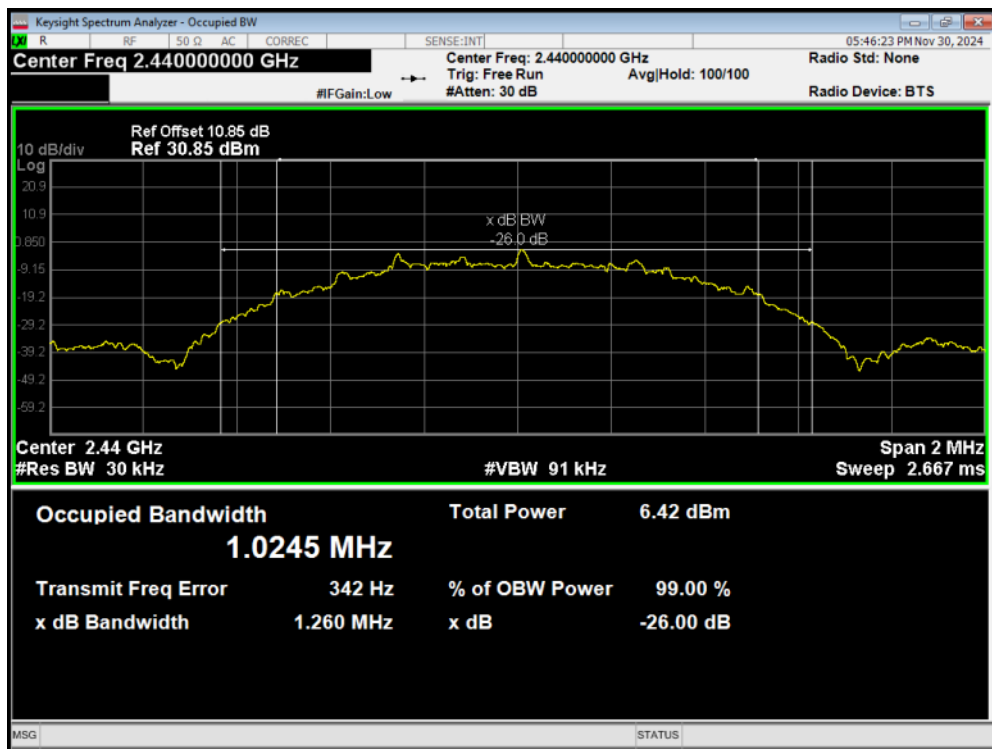
OBW BLE (2M) 2480MHz



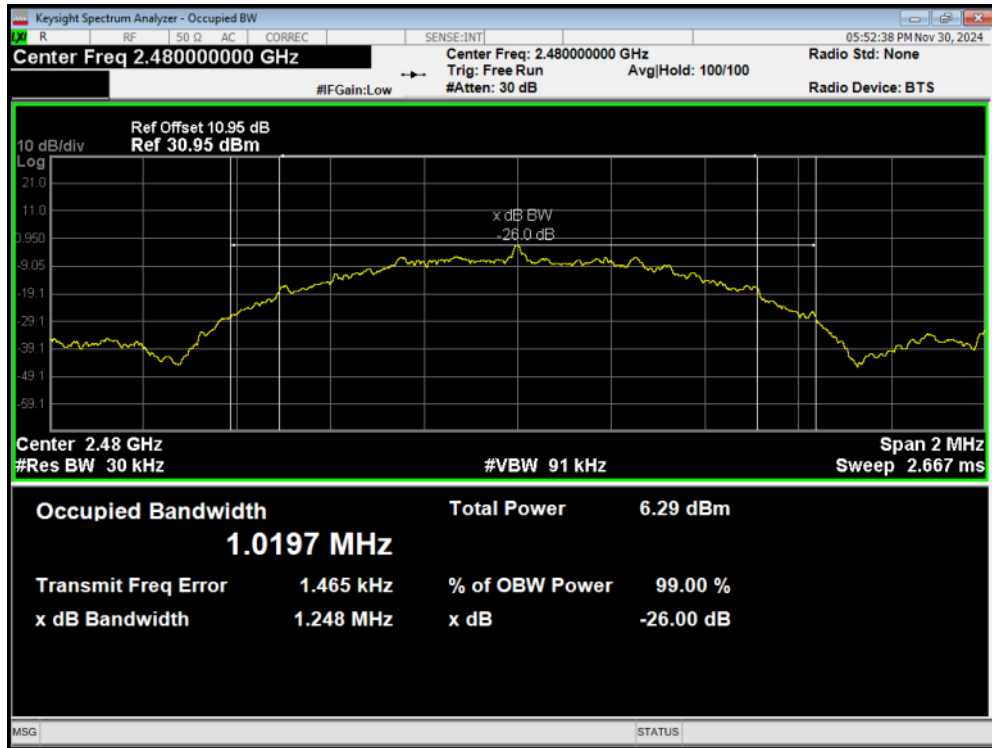
OBW BLE (S=2) 2402MHz



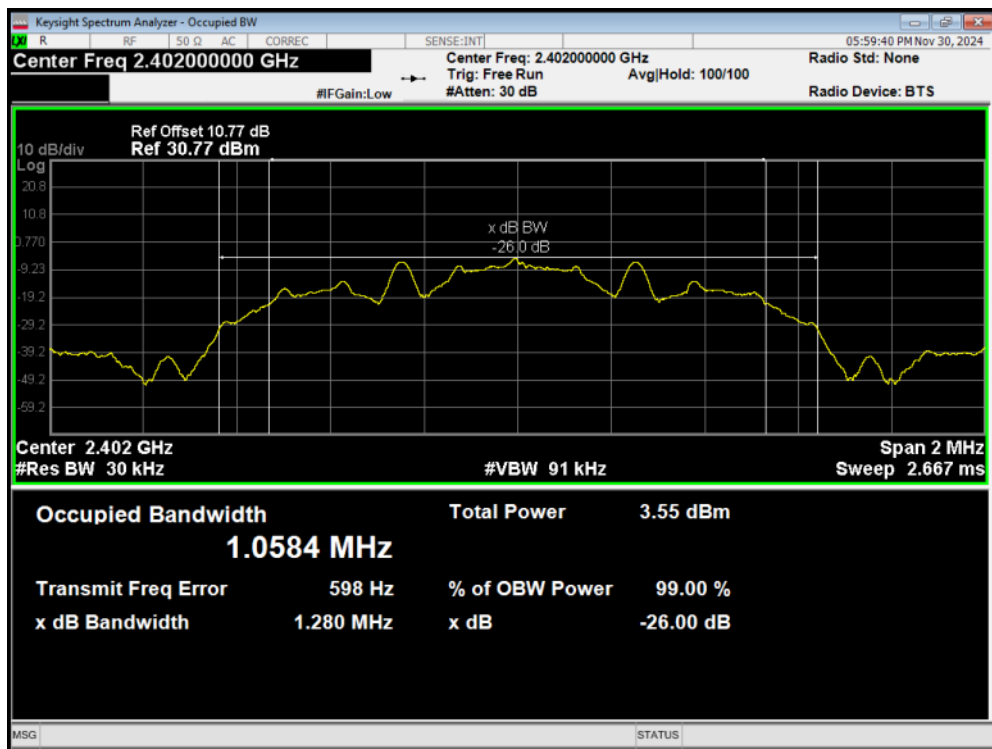
OBW BLE (S=2) 2440MHz



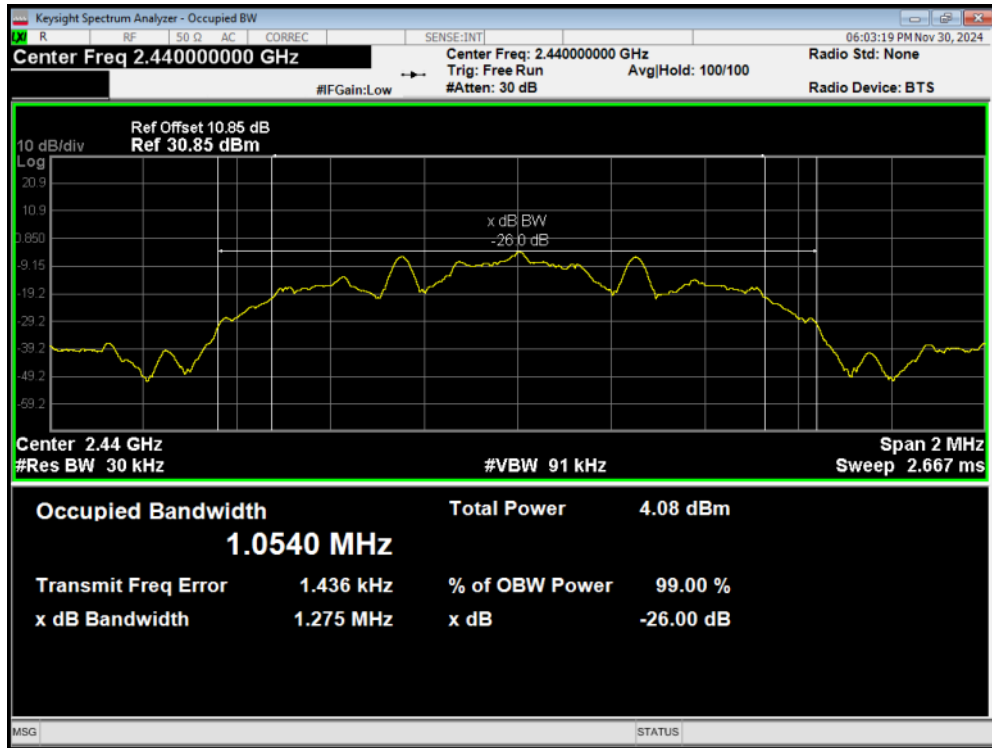
OBW BLE (S=2) 2480MHz



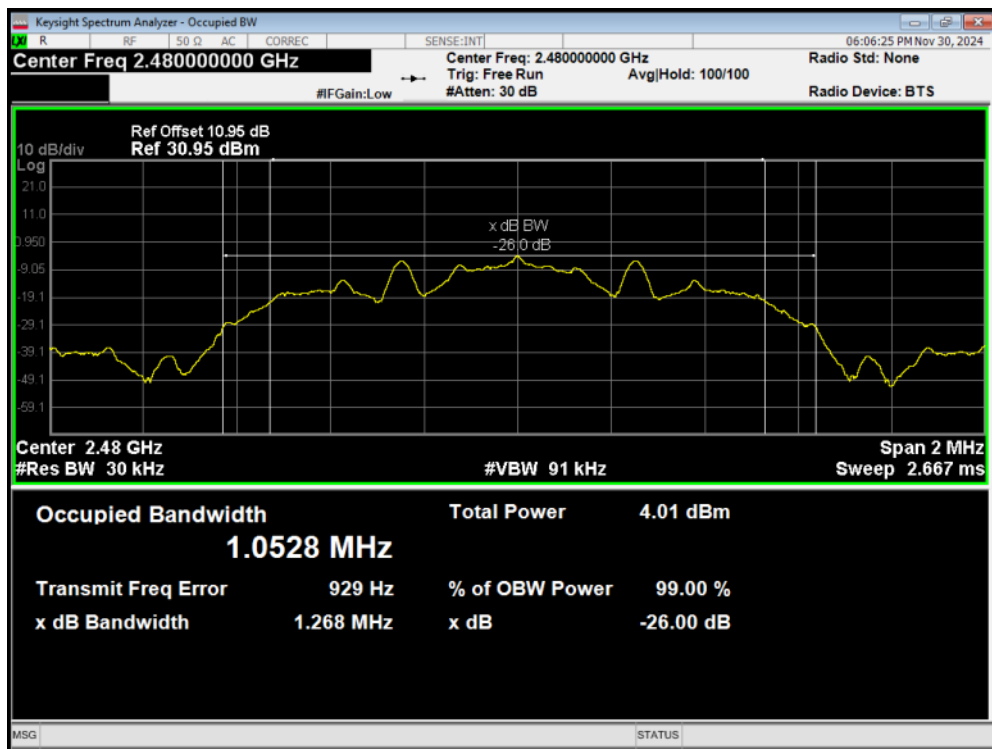
OBW BLE (S=8) 2402MHz



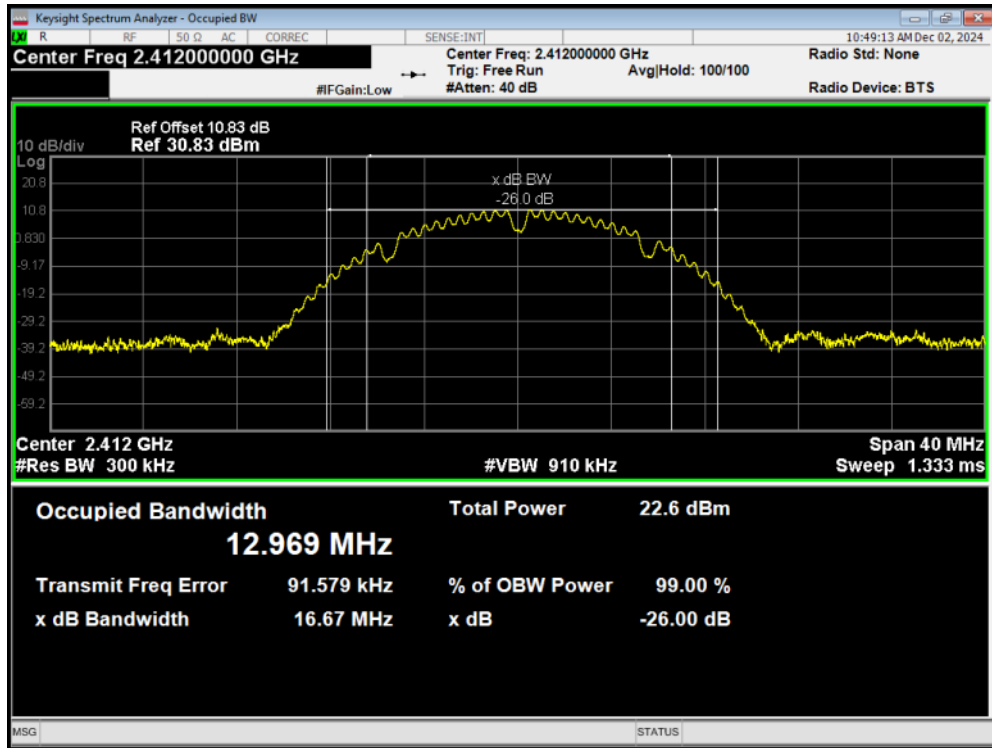
OBW BLE (S=8) 2440MHz



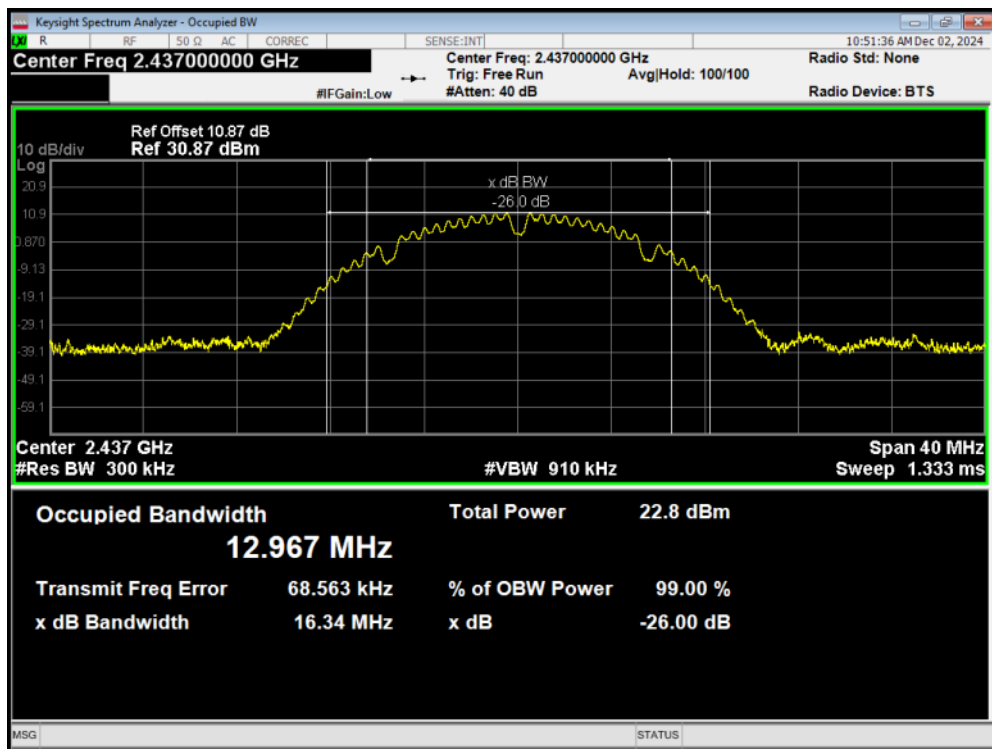
OBW BLE (S=8) 2480MHz



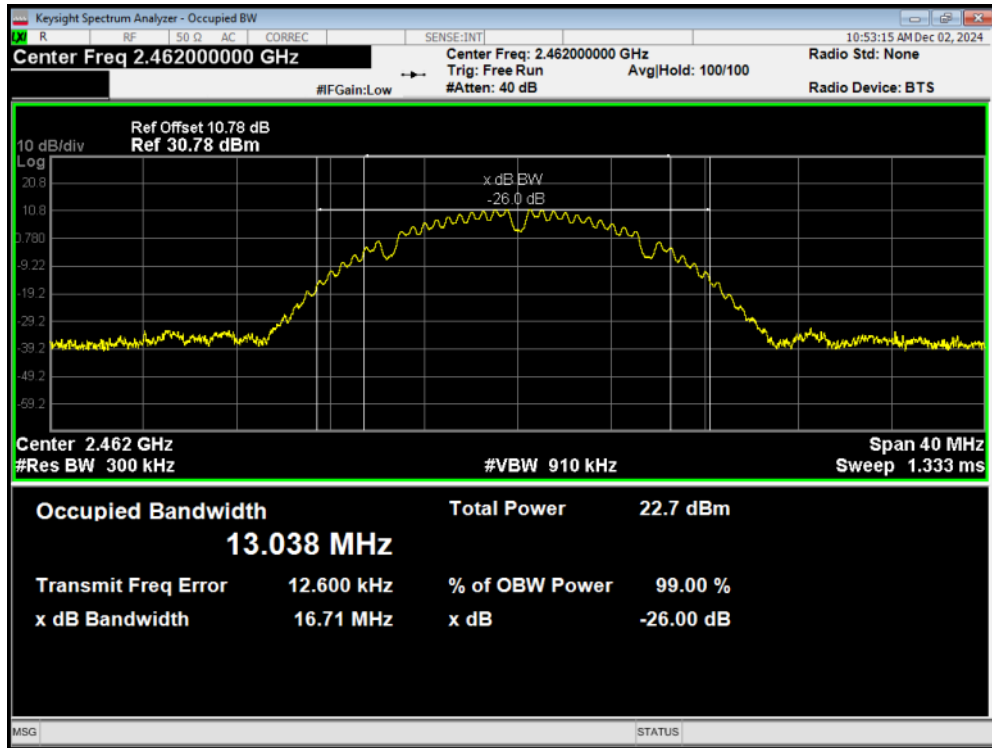
OBW 802.11b 2412MHz



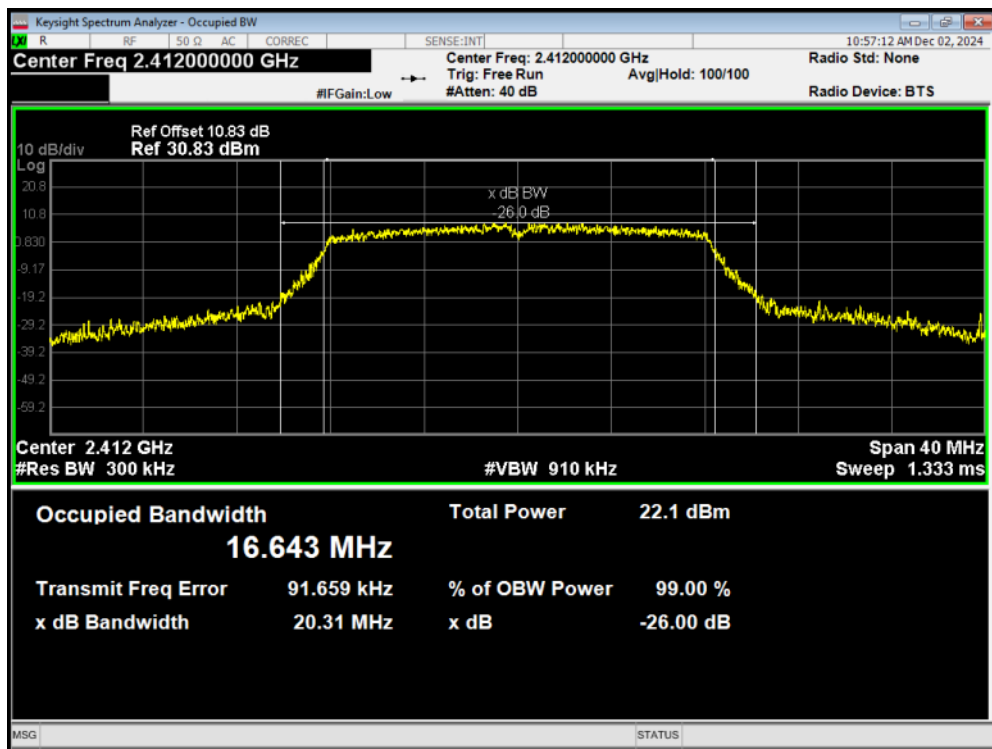
OBW 802.11b 2437MHz



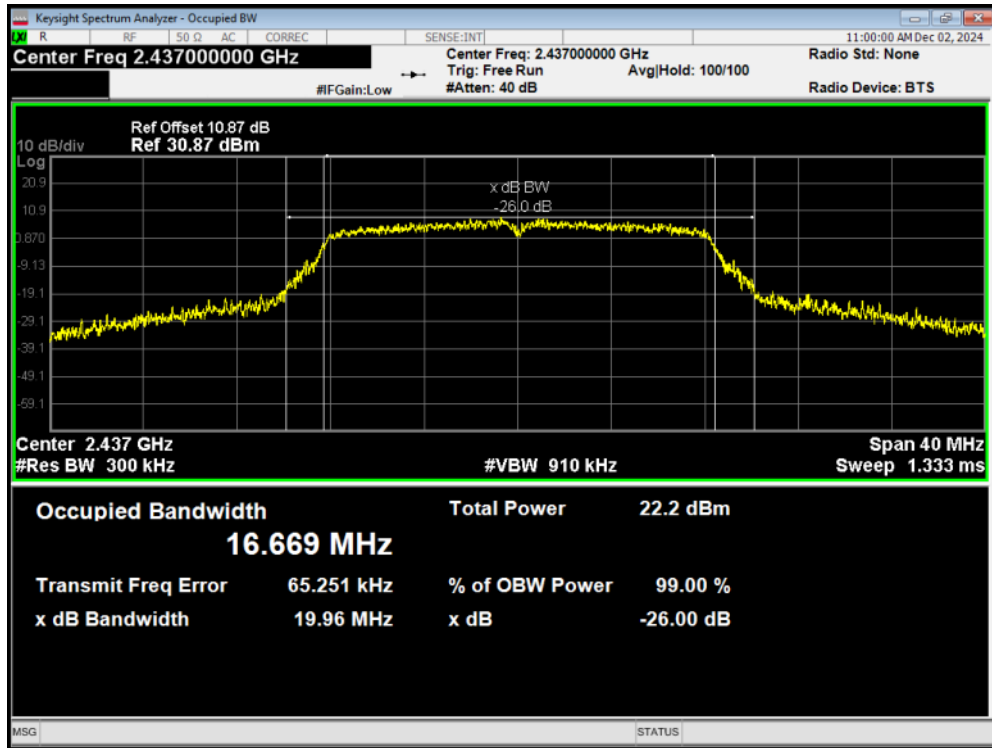
OBW 802.11b 2462MHz



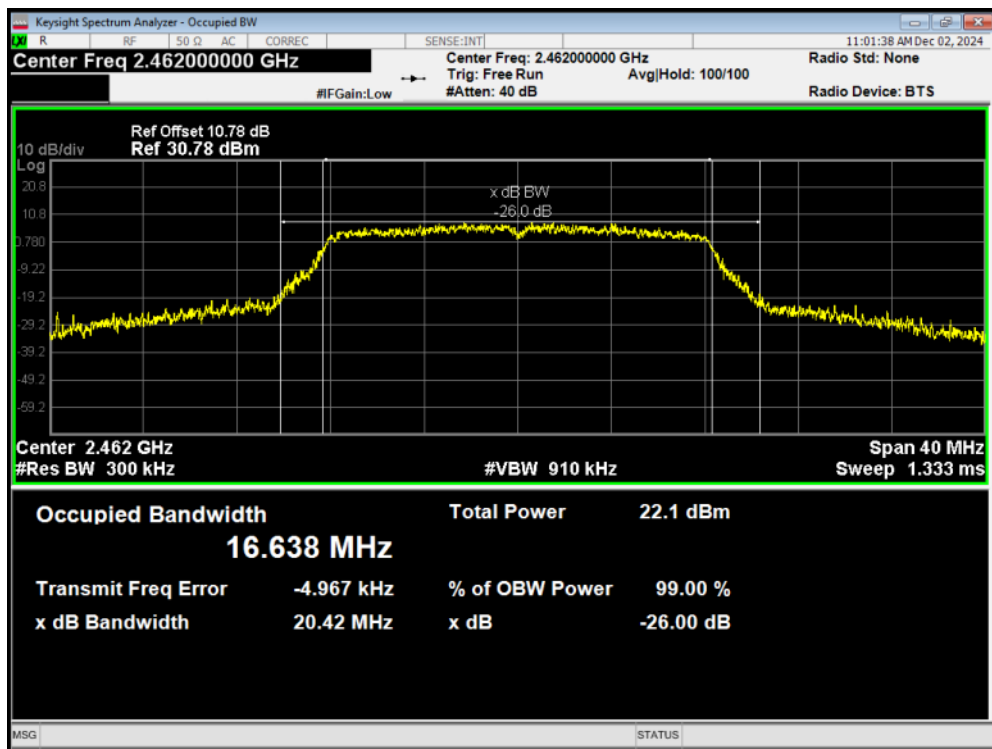
OBW 802.11g 2412MHz



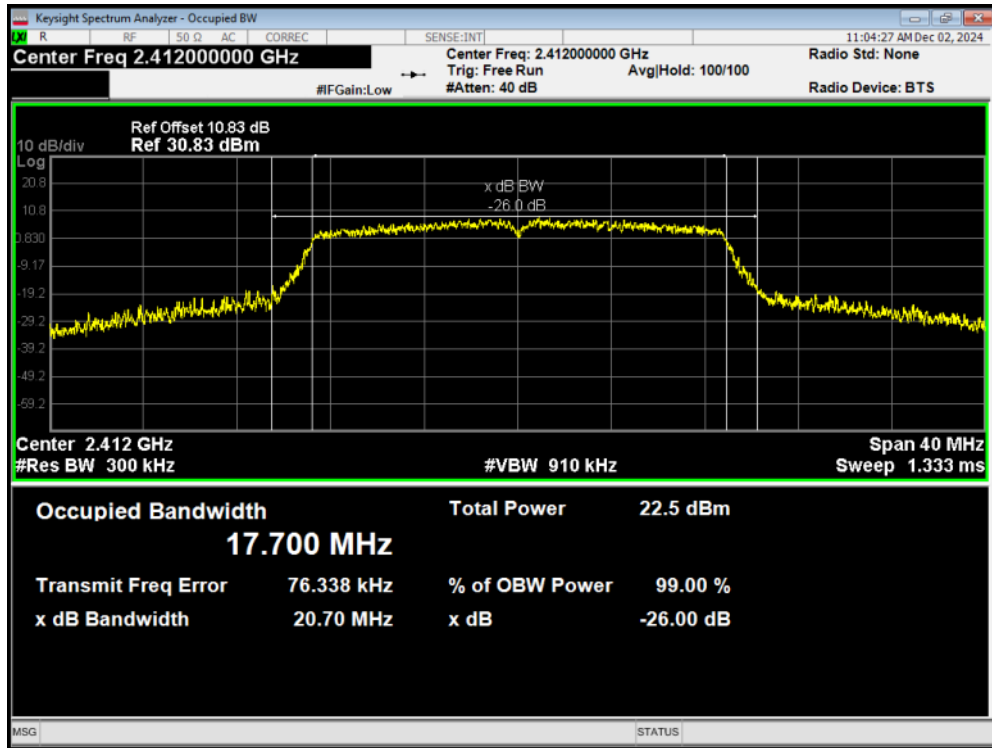
OBW 802.11g 2437MHz



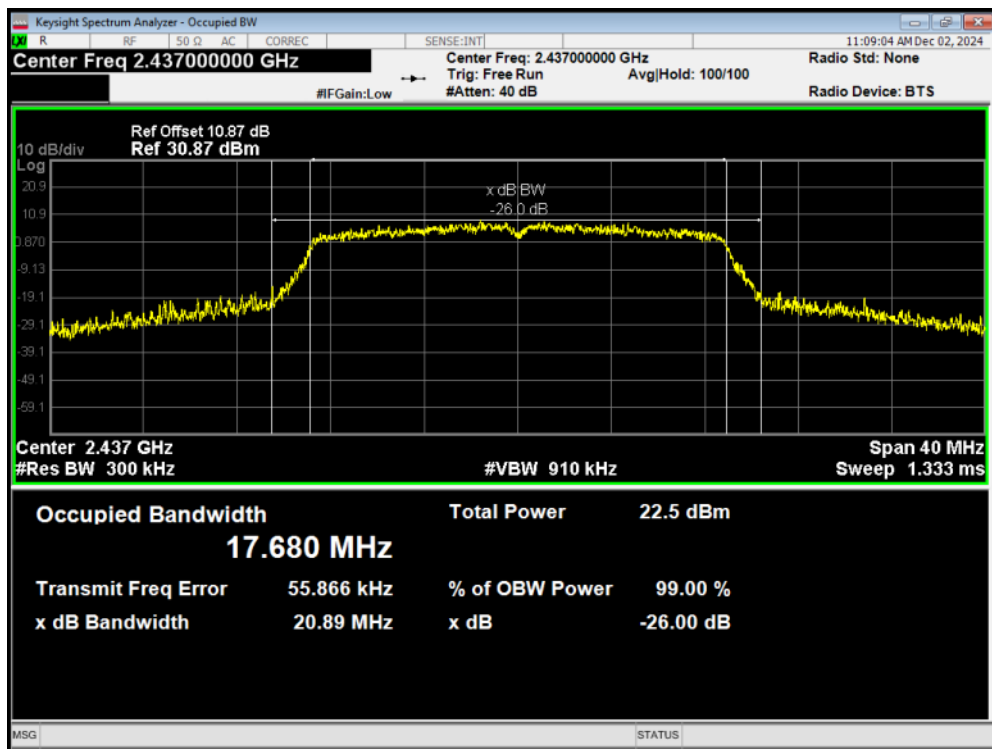
OBW 802.11g 2462MHz



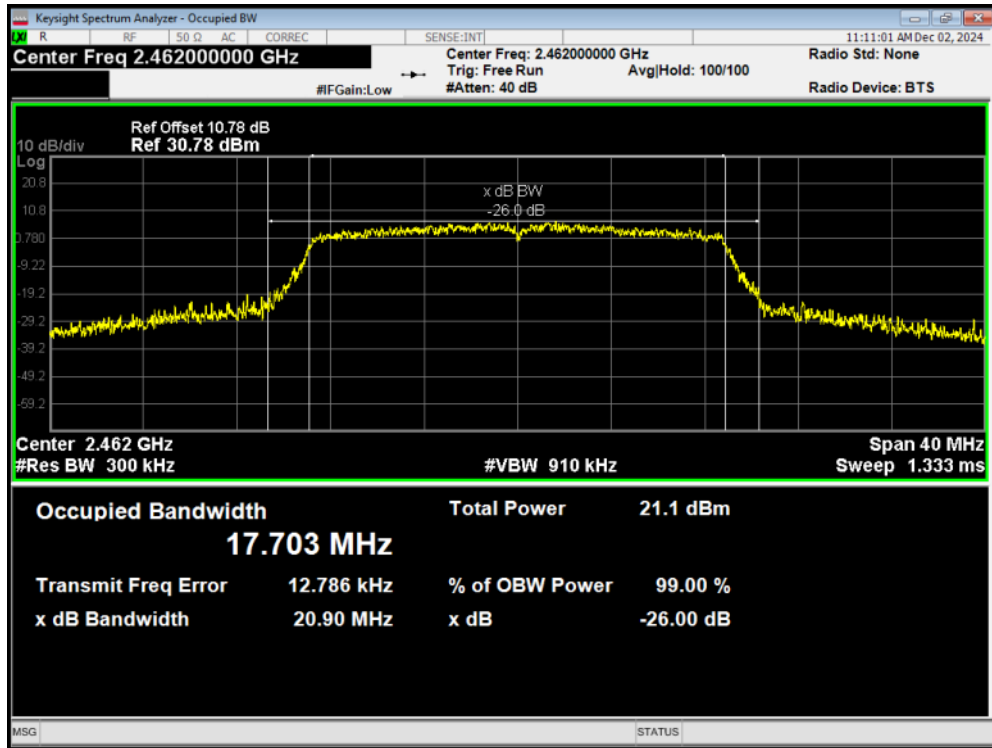
OBW 802.11n(HT20) 2412MHz



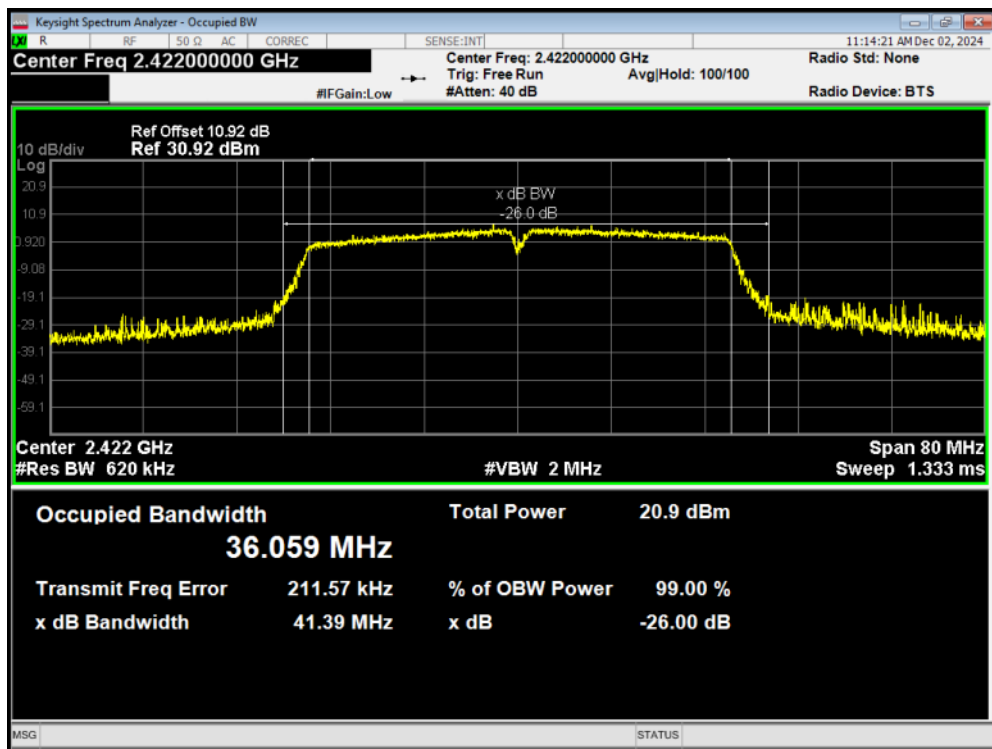
OBW 802.11n(HT20) 2437MHz



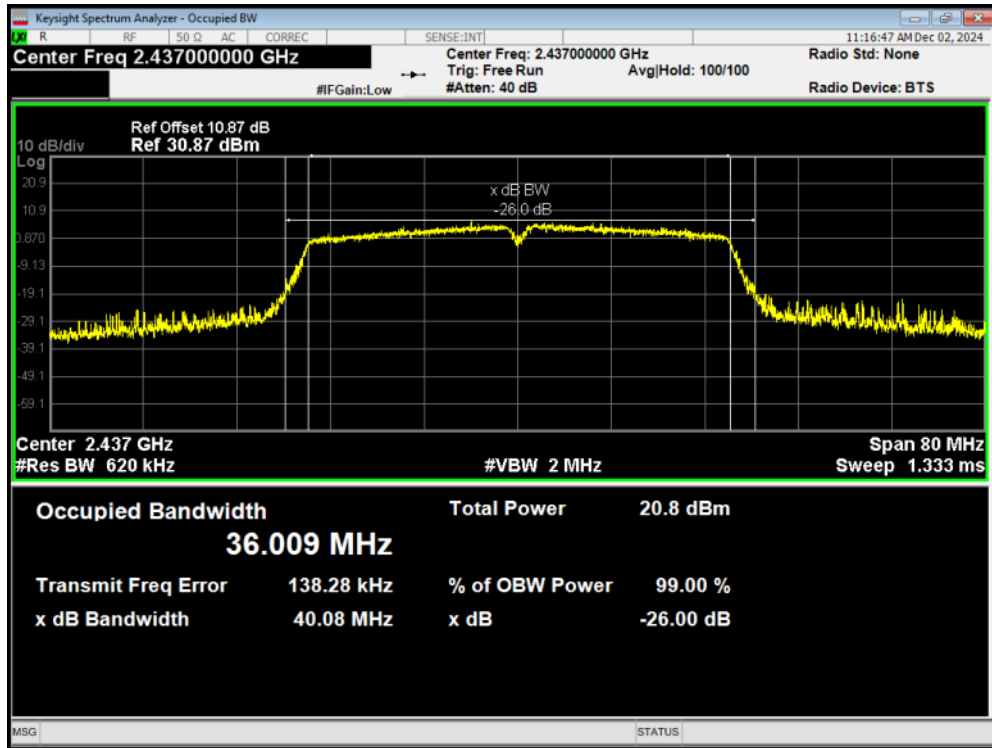
OBW 802.11n(HT20) 2462MHz



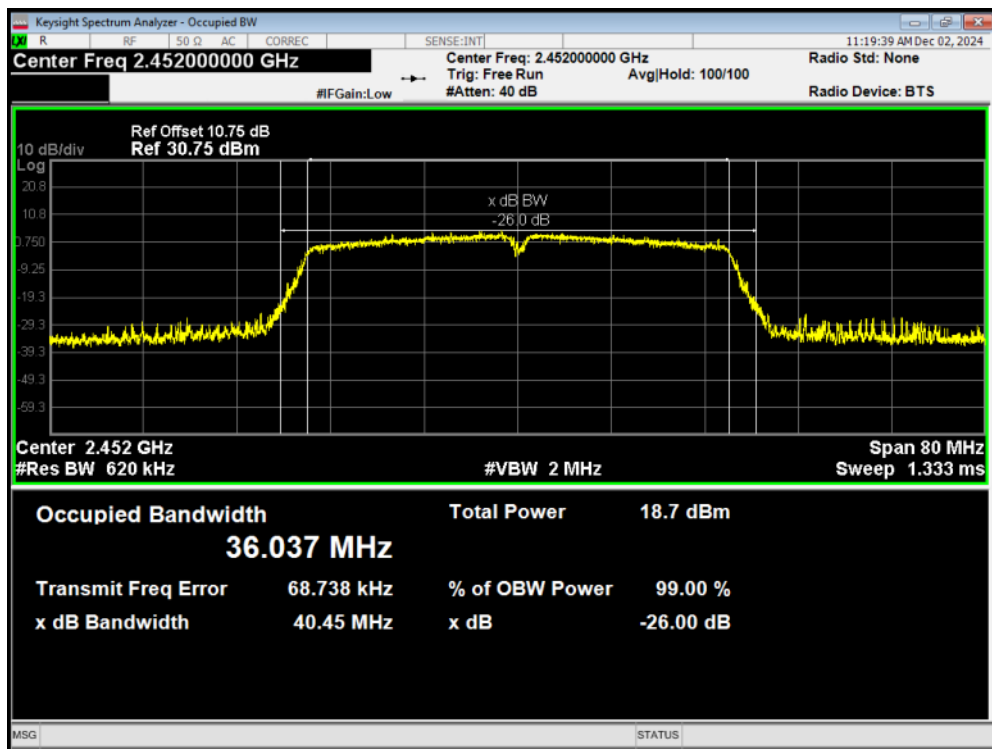
OBW 802.11n(HT40) 2422MHz



OBW 802.11n(HT40) 2437MHz

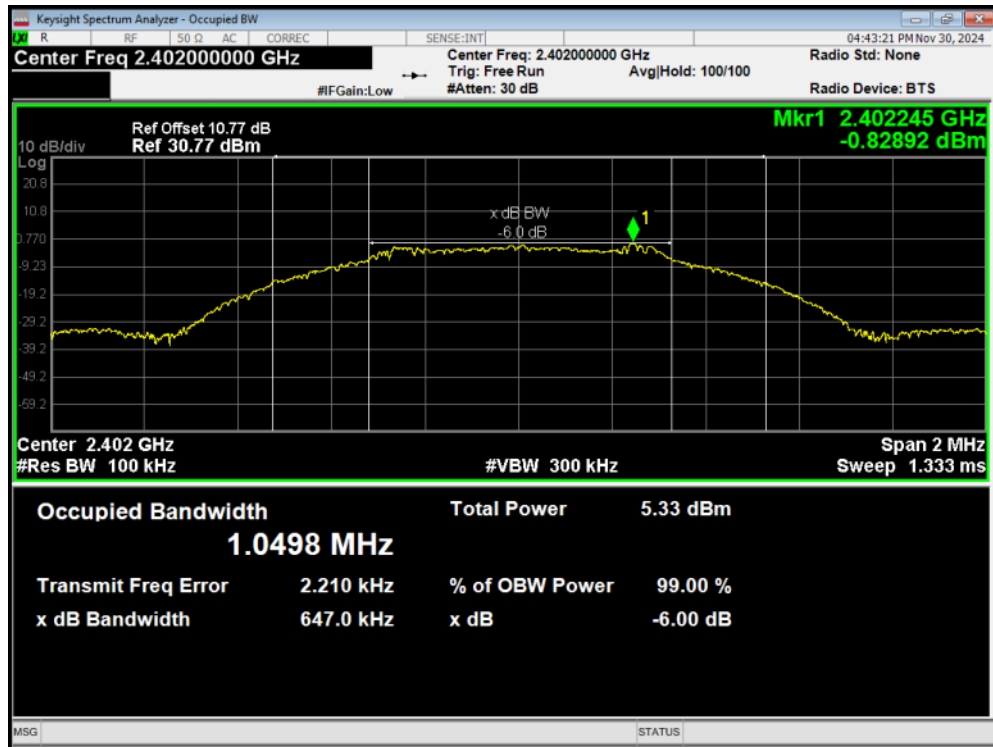


OBW 802.11n(HT40) 2452MHz

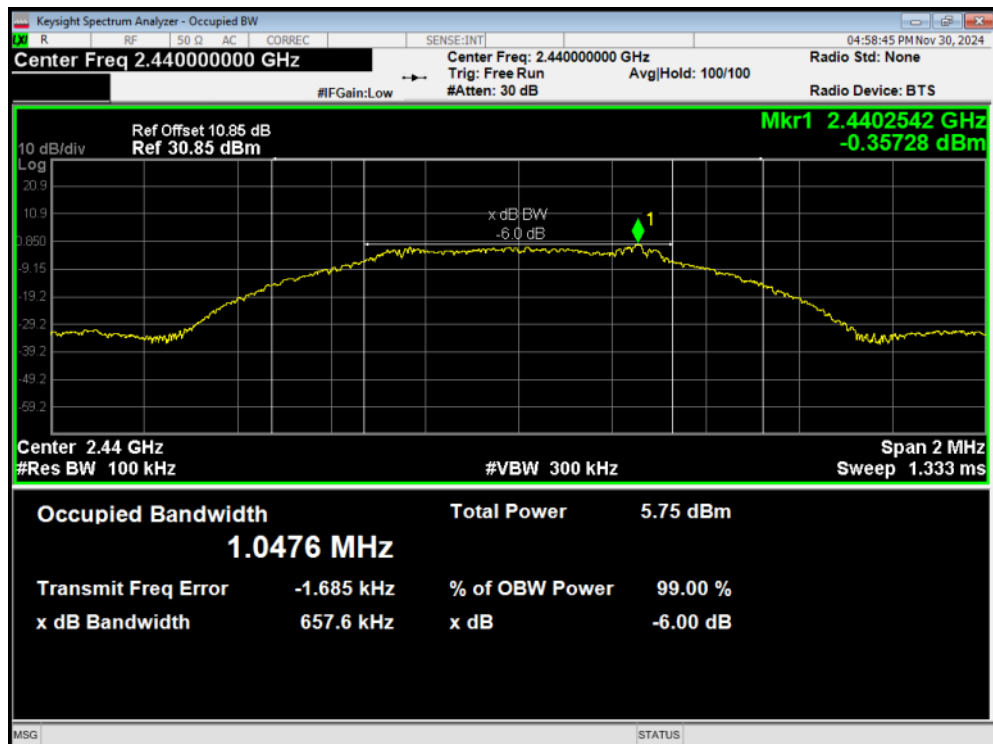


6 dB bandwidth

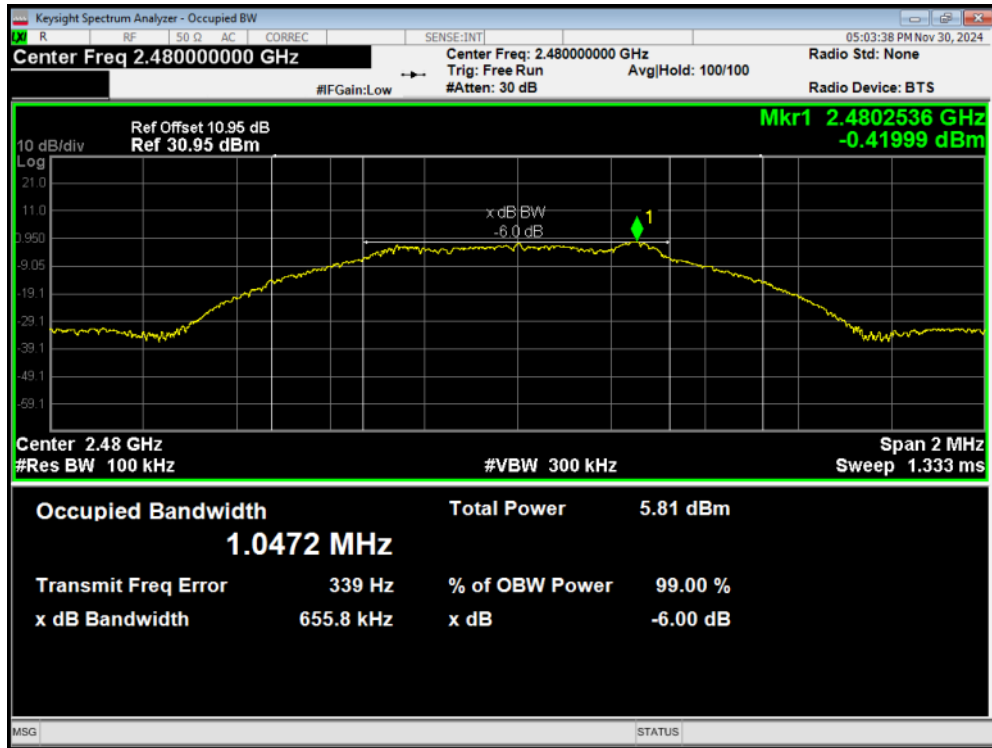
-6dB Bandwidth BLE (1M) 2402MHz



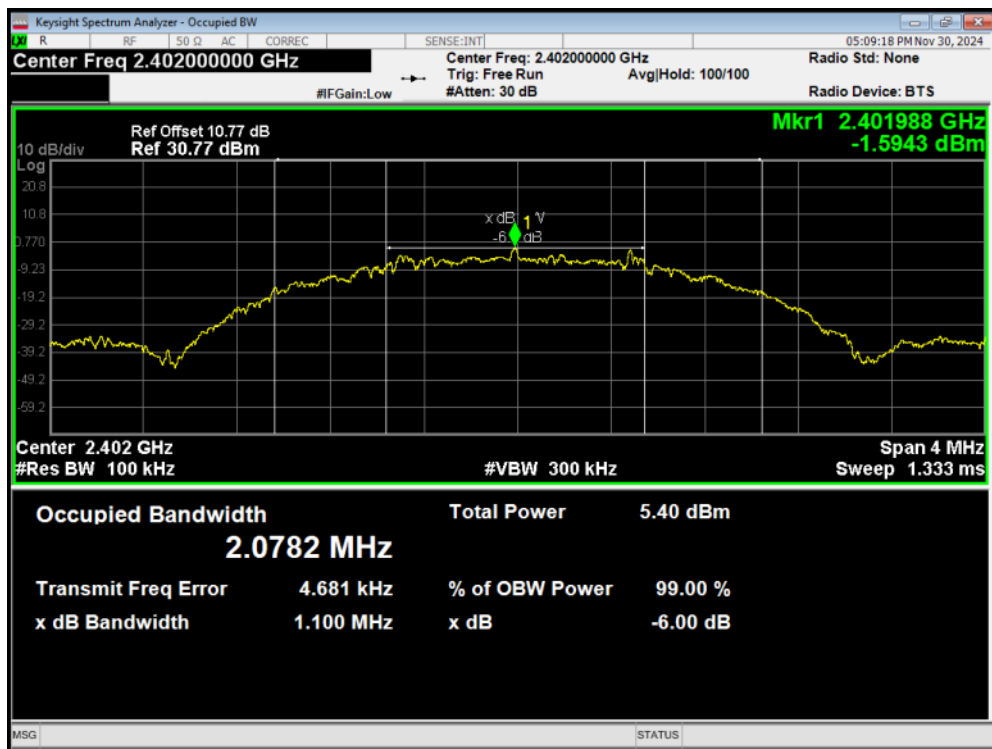
-6dB Bandwidth BLE (1M) 2440MHz



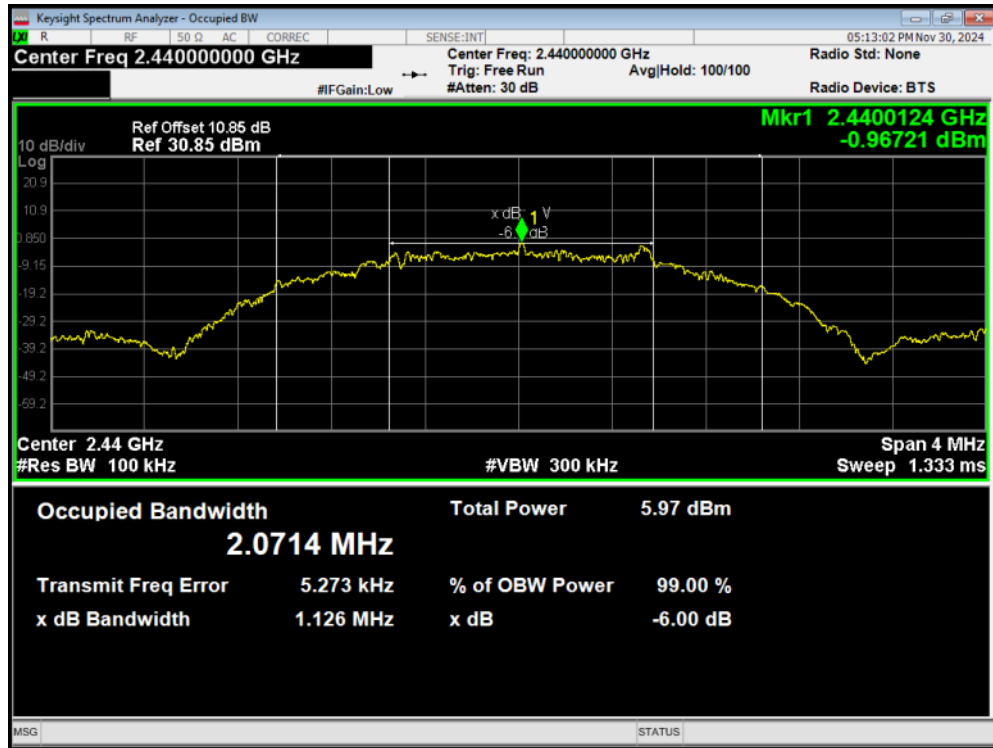
-6dB Bandwidth BLE (1M) 2480MHz



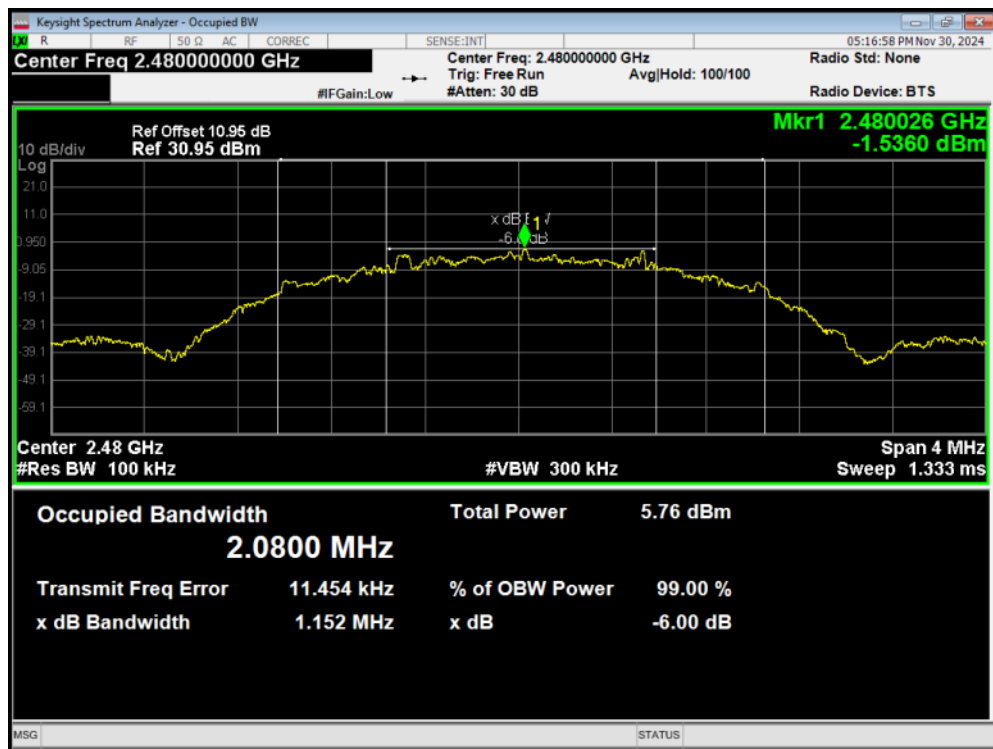
-6dB Bandwidth BLE (2M) 2402MHz



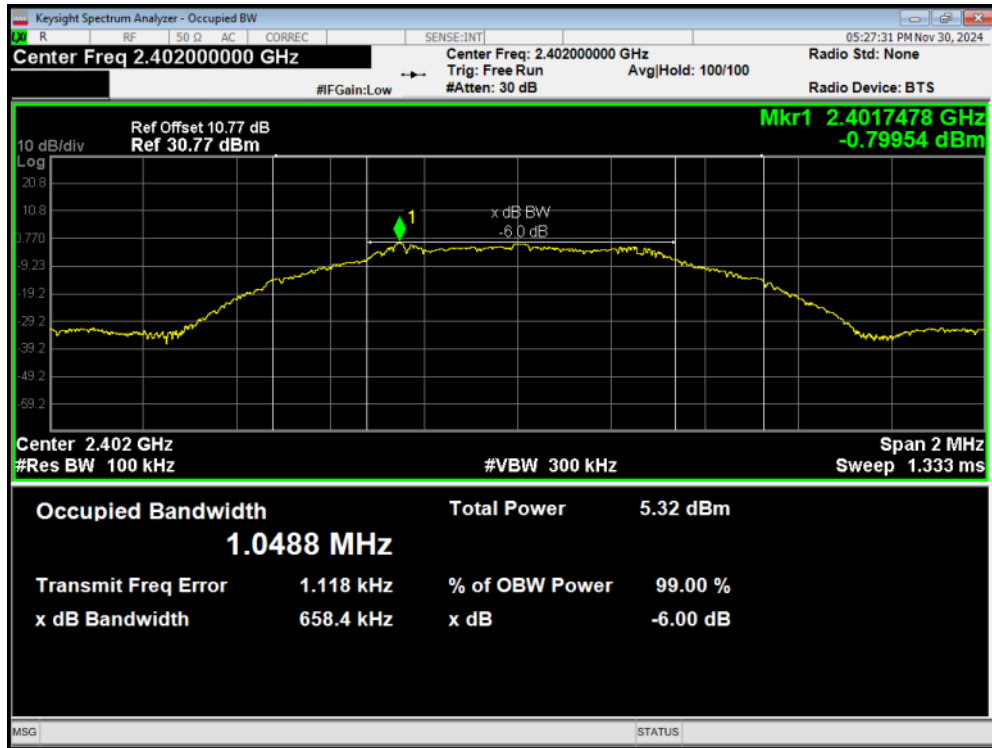
-6dB Bandwidth BLE (2M) 2440MHz



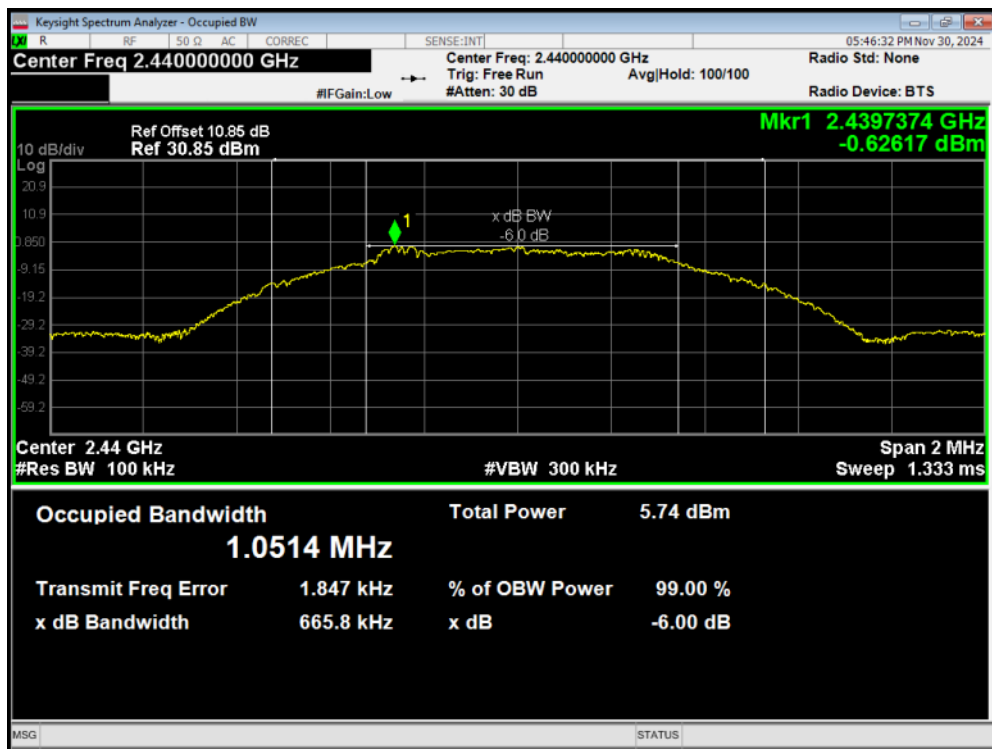
-6dB Bandwidth BLE (2M) 2480MHz



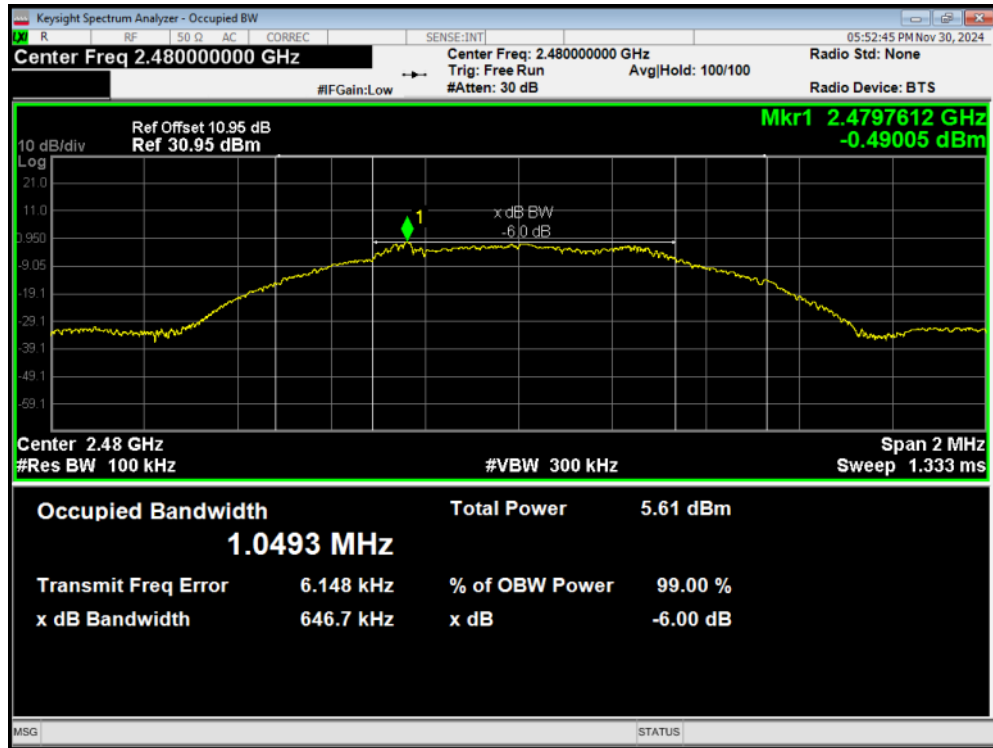
-6dB Bandwidth BLE (S=2) 2402MHz



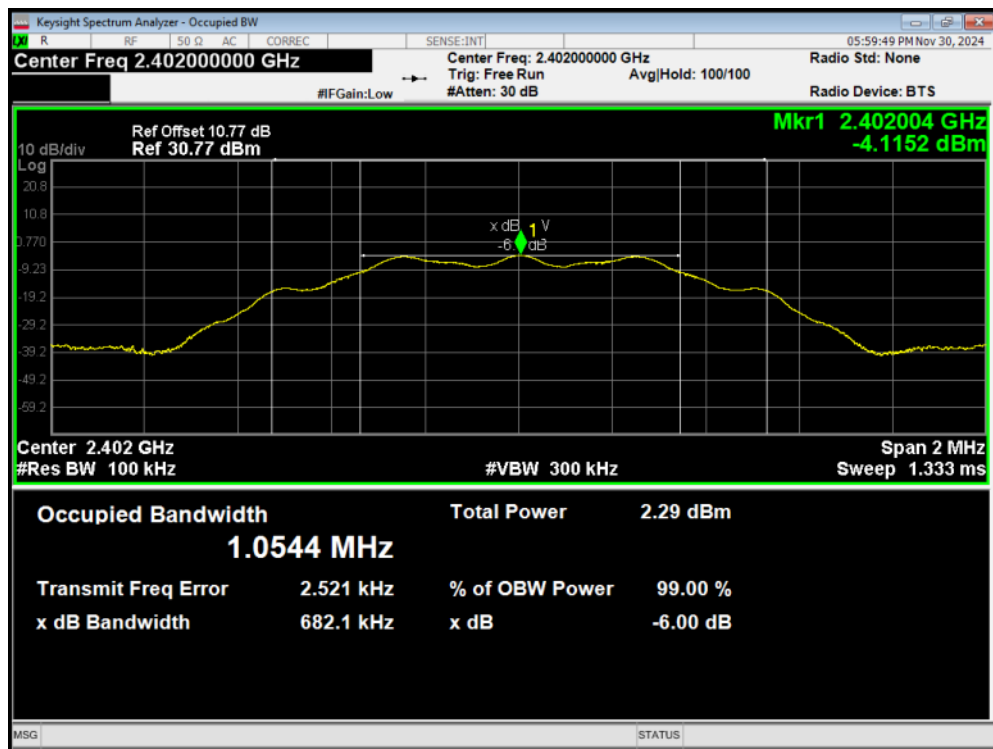
-6dB Bandwidth BLE (S=2) 2440MHz



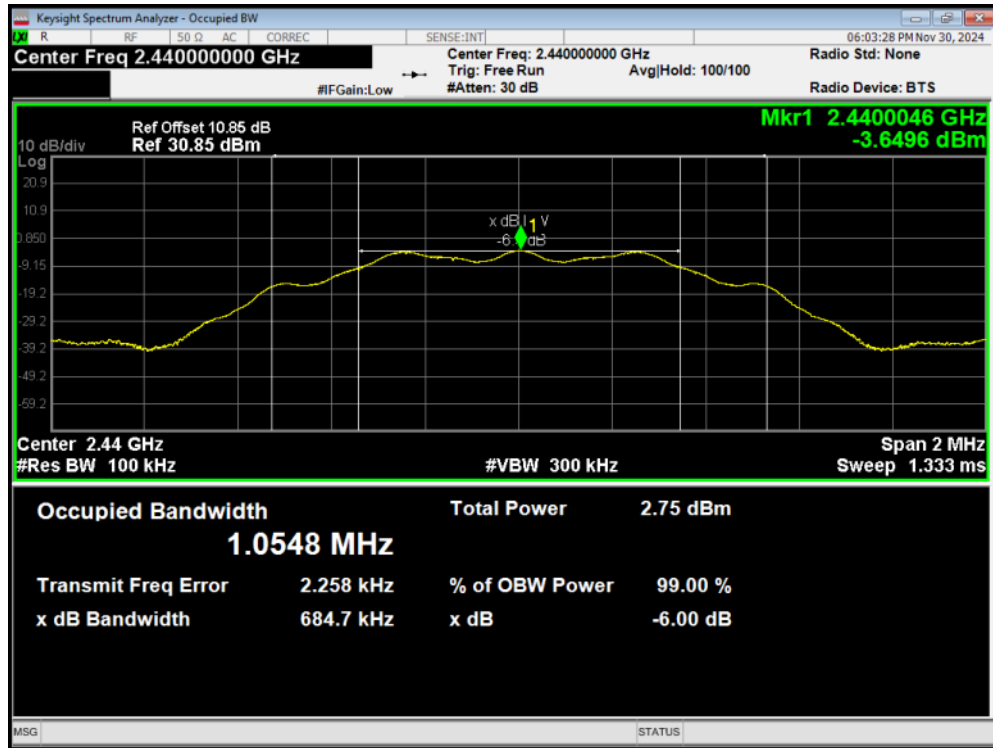
-6dB Bandwidth BLE (S=2) 2480MHz



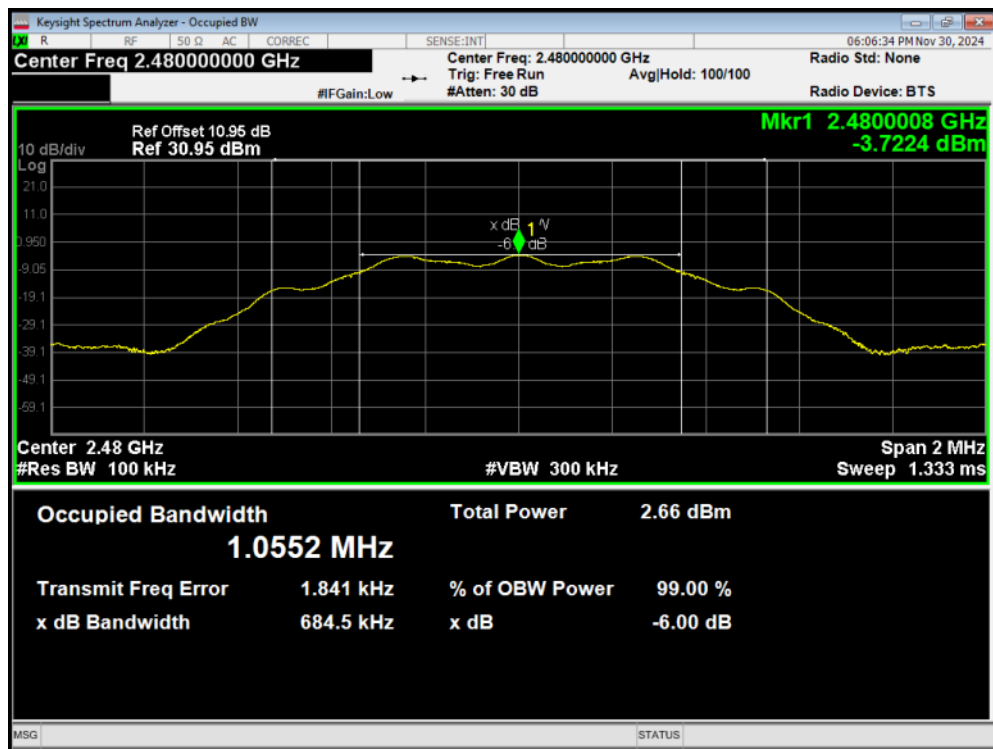
-6dB Bandwidth BLE (S=8) 2402MHz



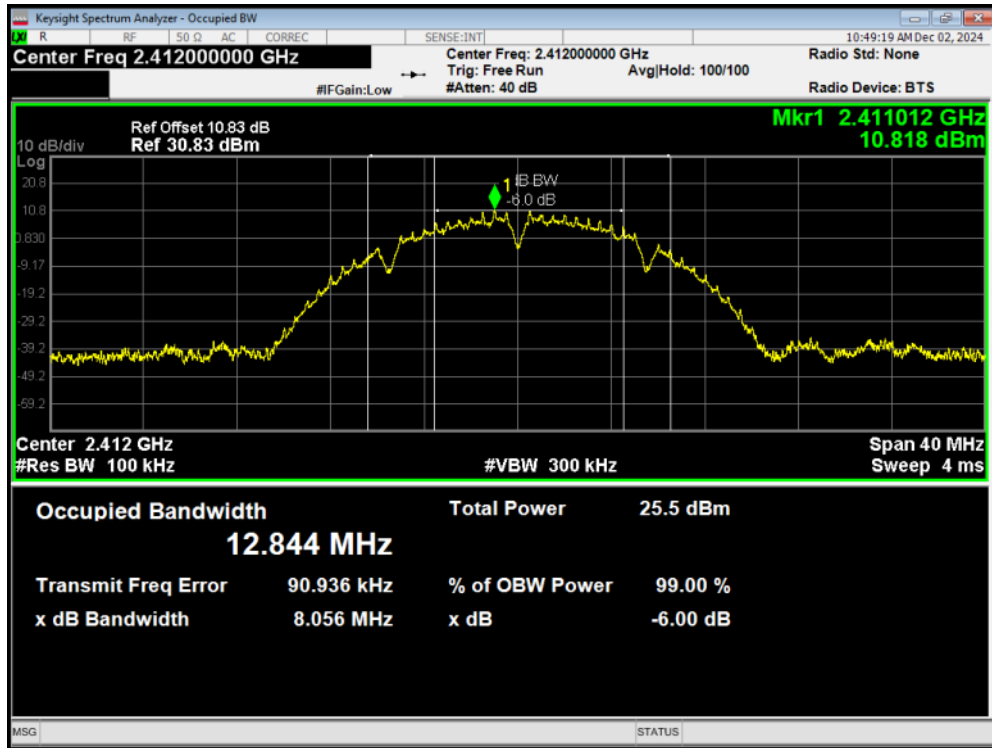
-6dB Bandwidth BLE (S=8) 2440MHz



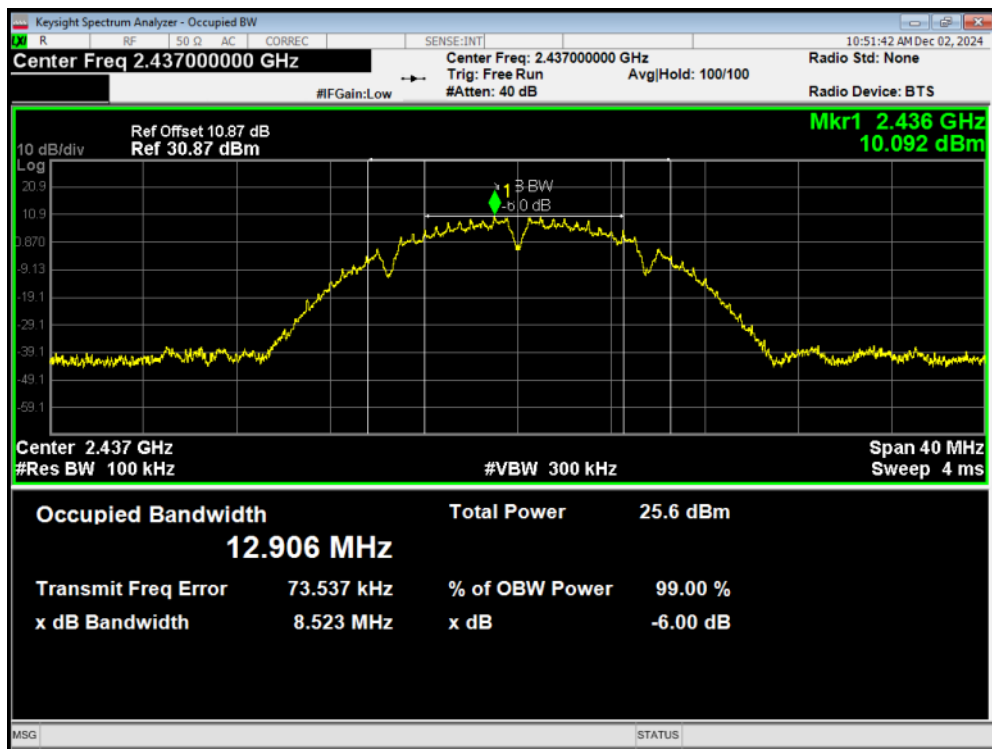
-6dB Bandwidth BLE (S=8) 2480MHz



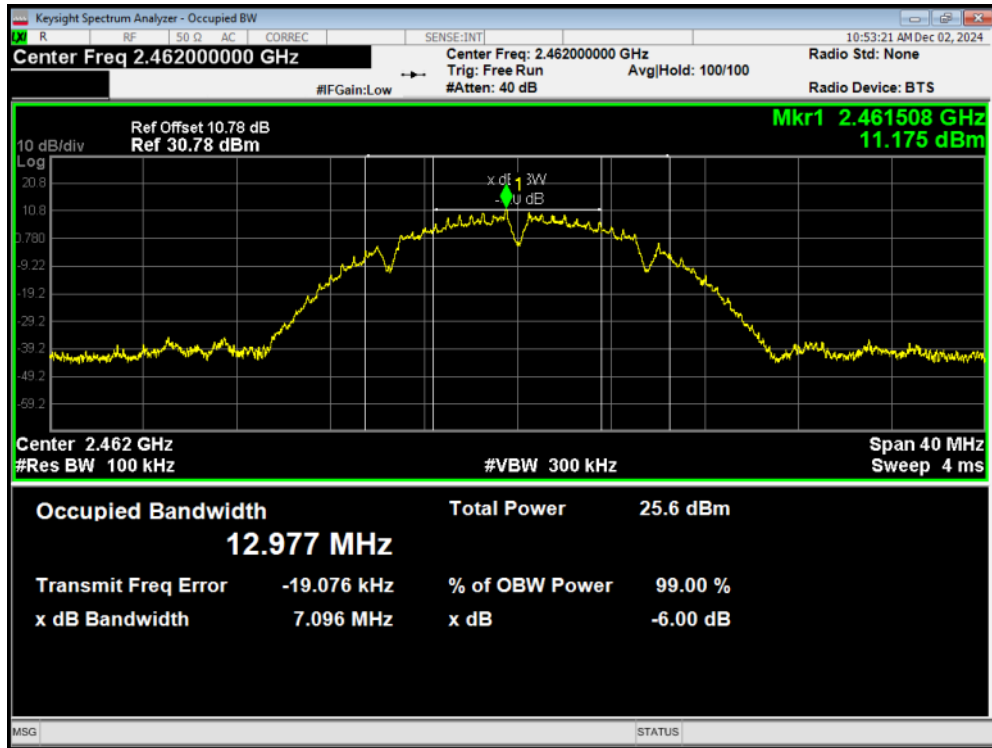
-6dB Bandwidth 802.11b 2412MHz



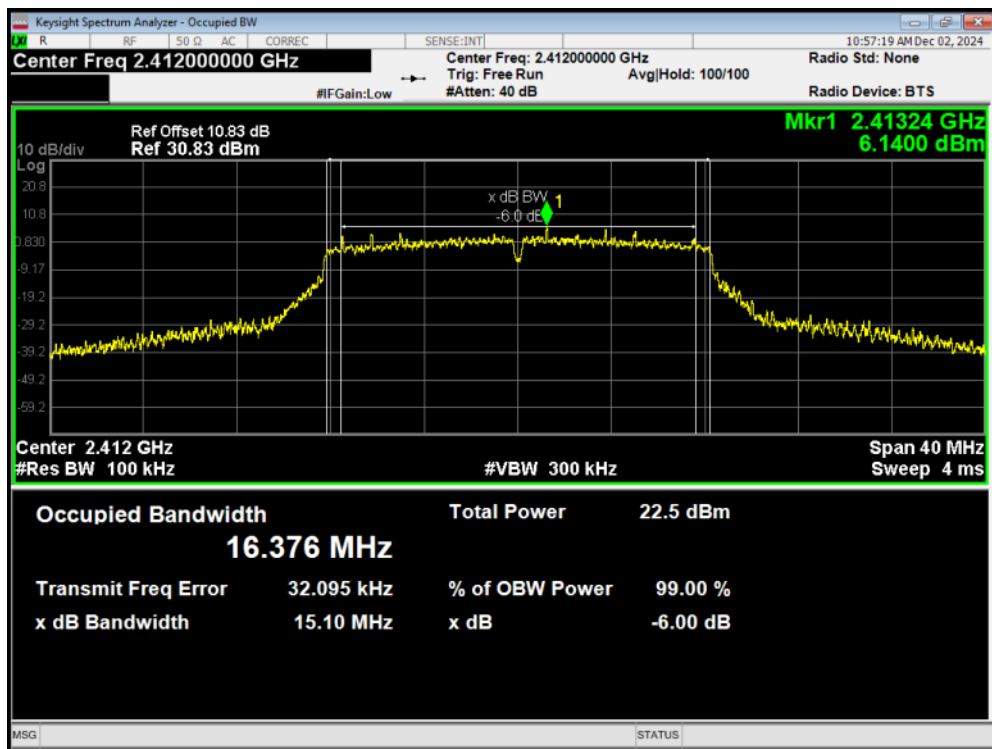
-6dB Bandwidth 802.11b 2437MHz



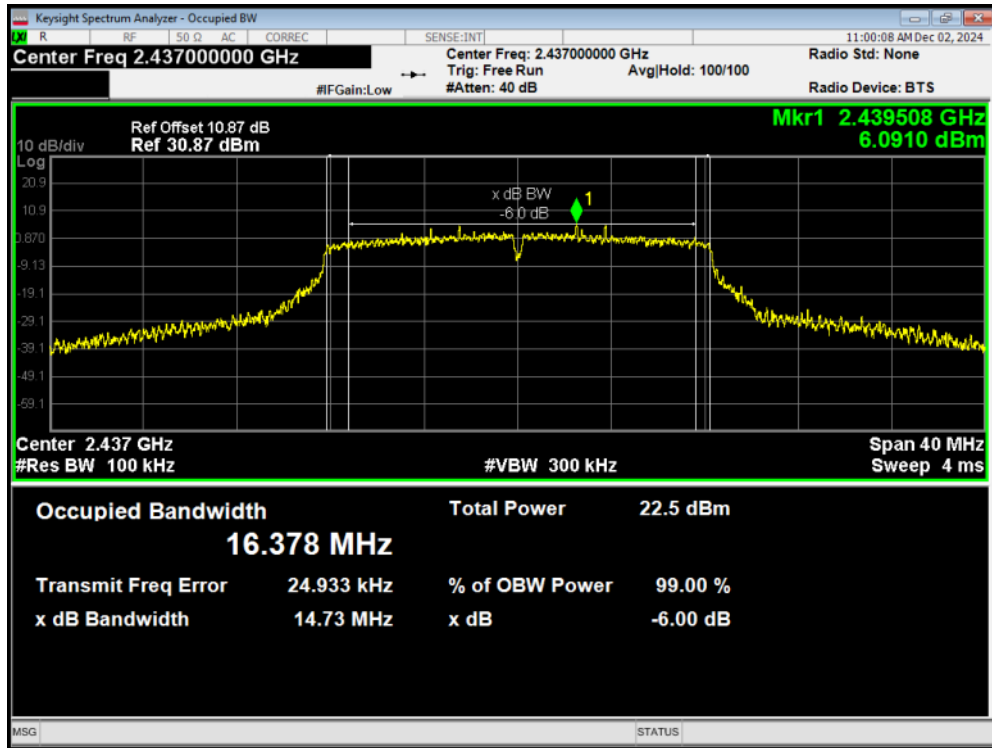
-6dB Bandwidth 802.11b 2462MHz



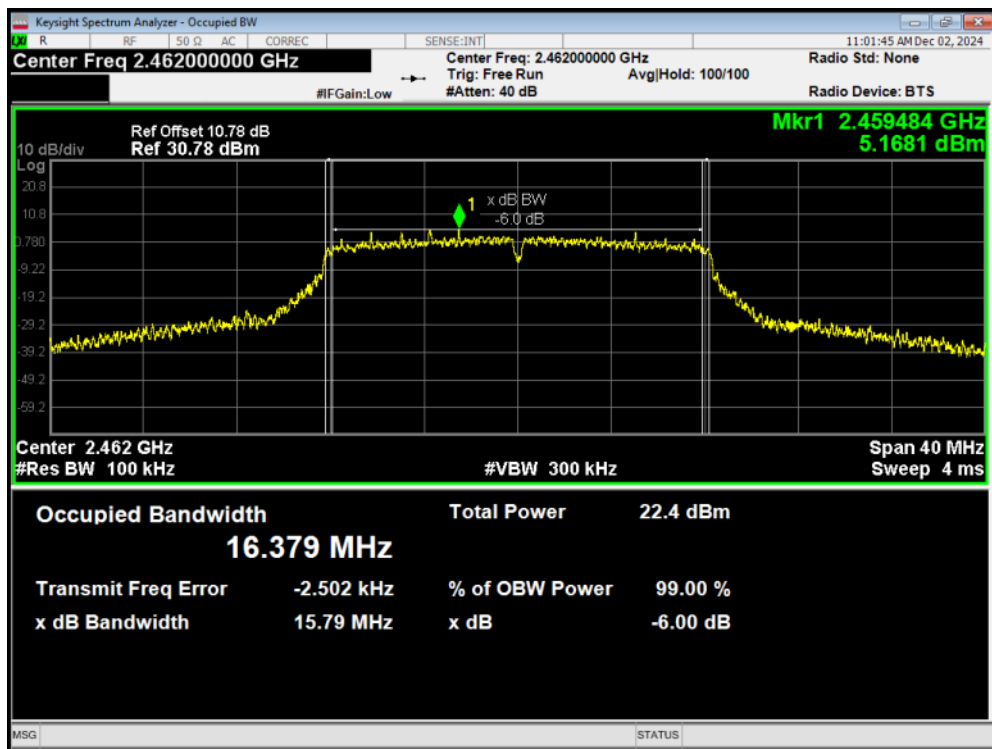
-6dB Bandwidth 802.11g 2412MHz



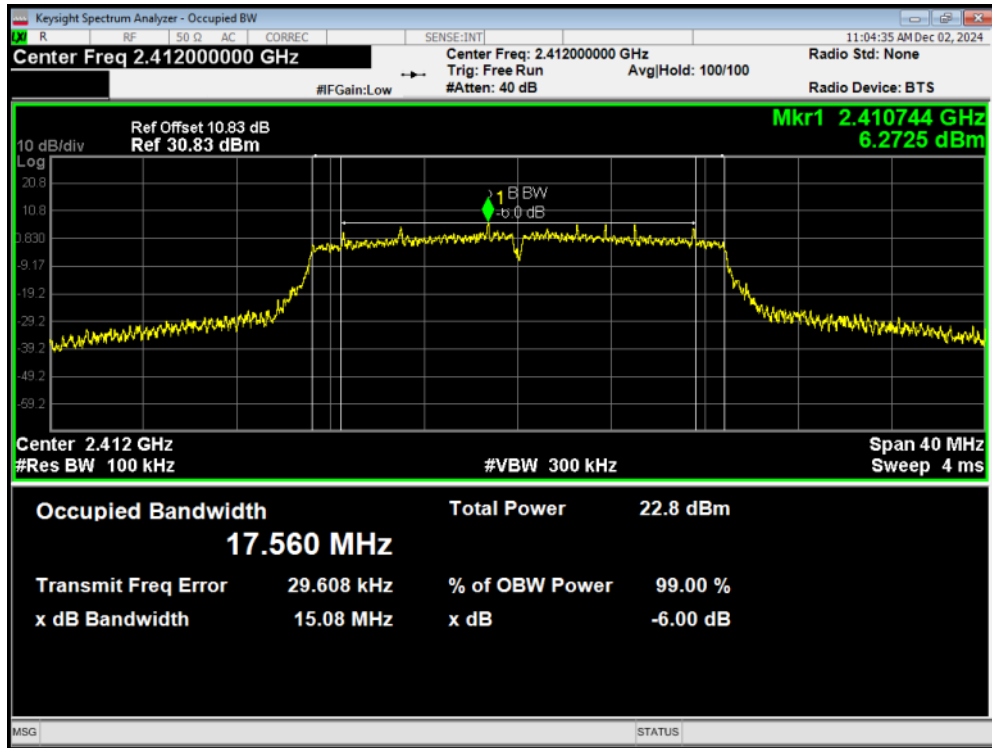
-6dB Bandwidth 802.11g 2437MHz



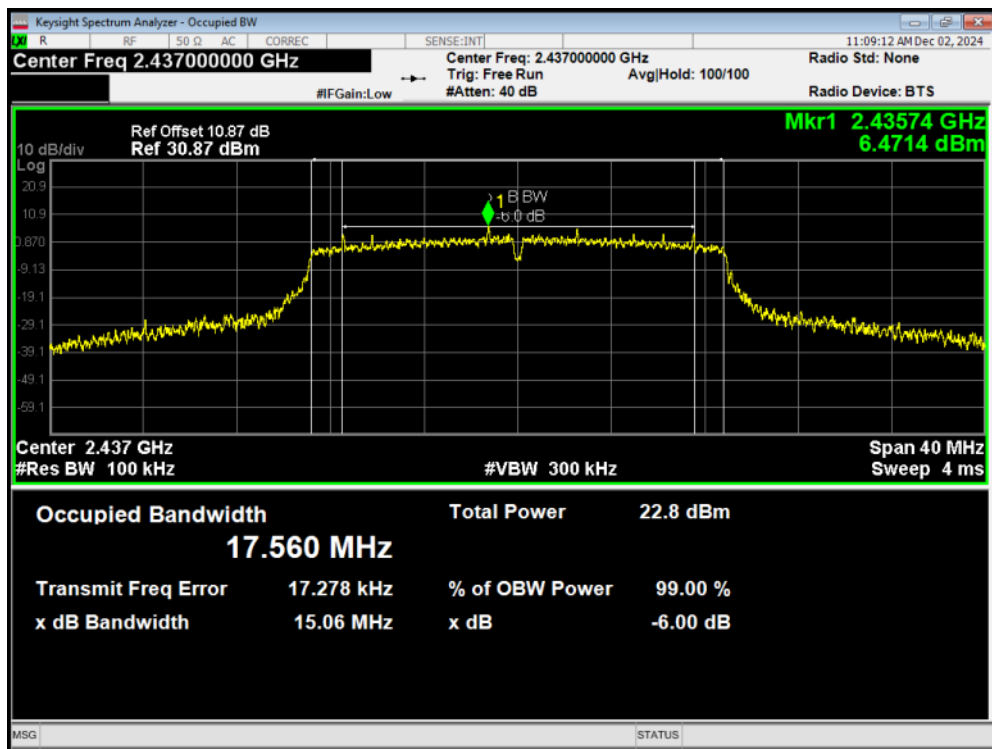
-6dB Bandwidth 802.11g 2462MHz



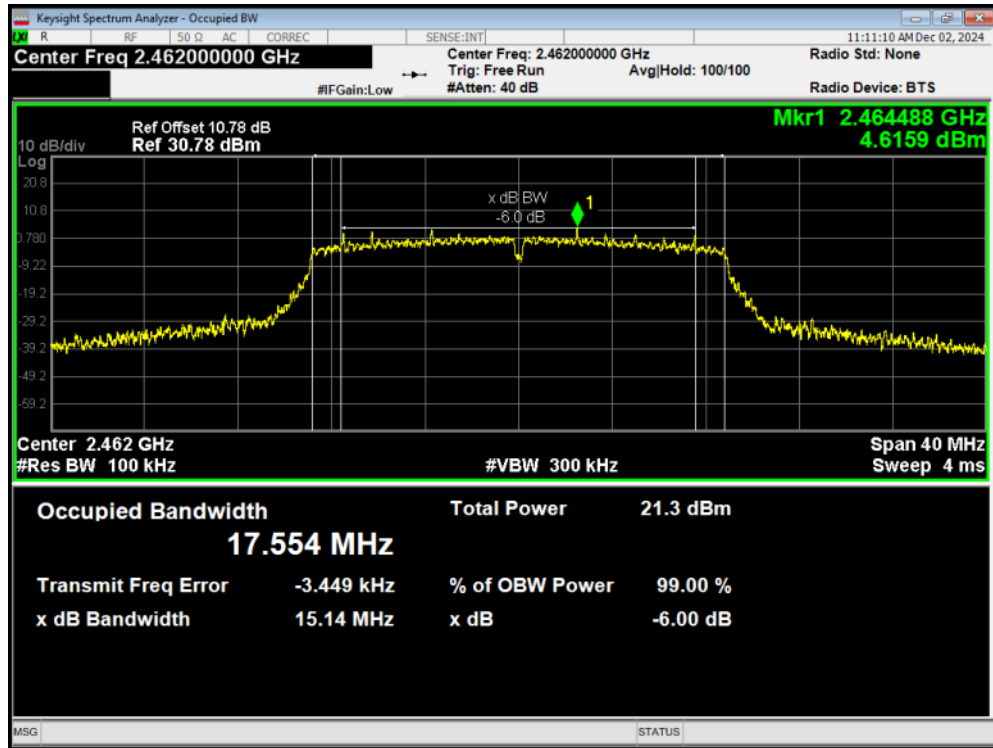
-6dB Bandwidth 802.11n(HT20) 2412MHz



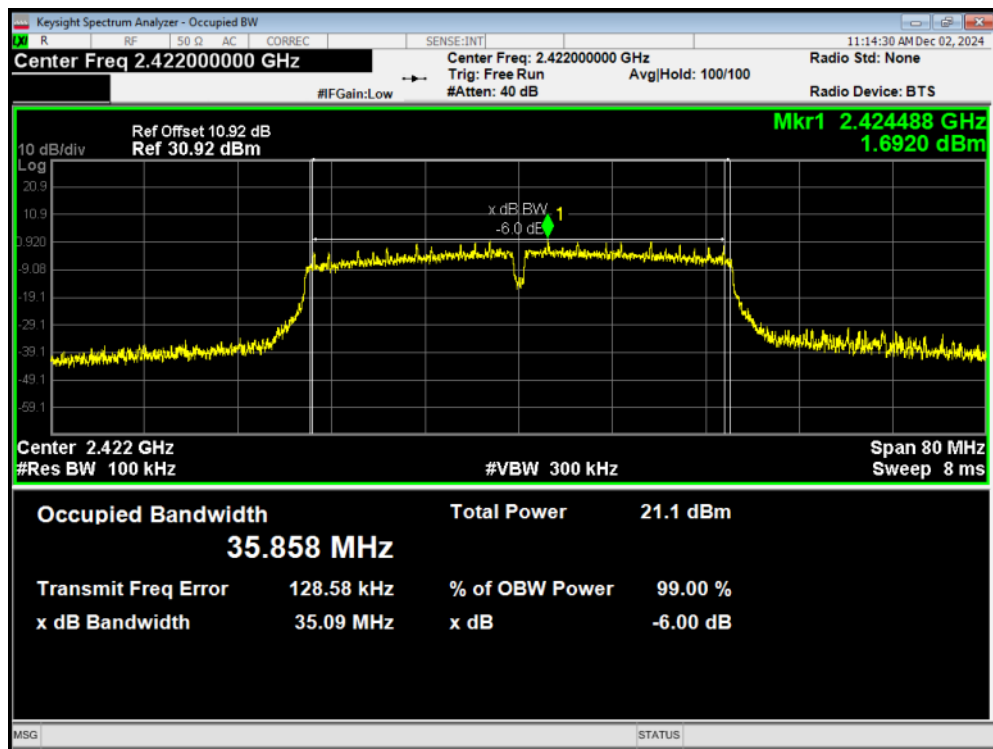
-6dB Bandwidth 802.11n(HT20) 2437MHz



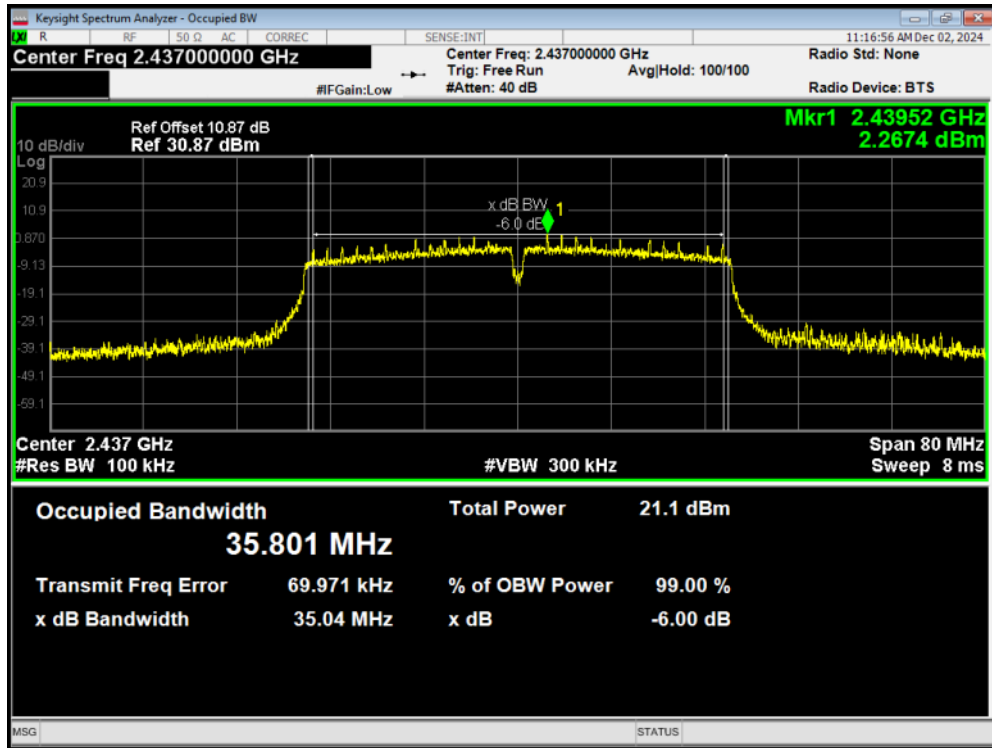
-6dB Bandwidth 802.11n(HT20) 2462MHz



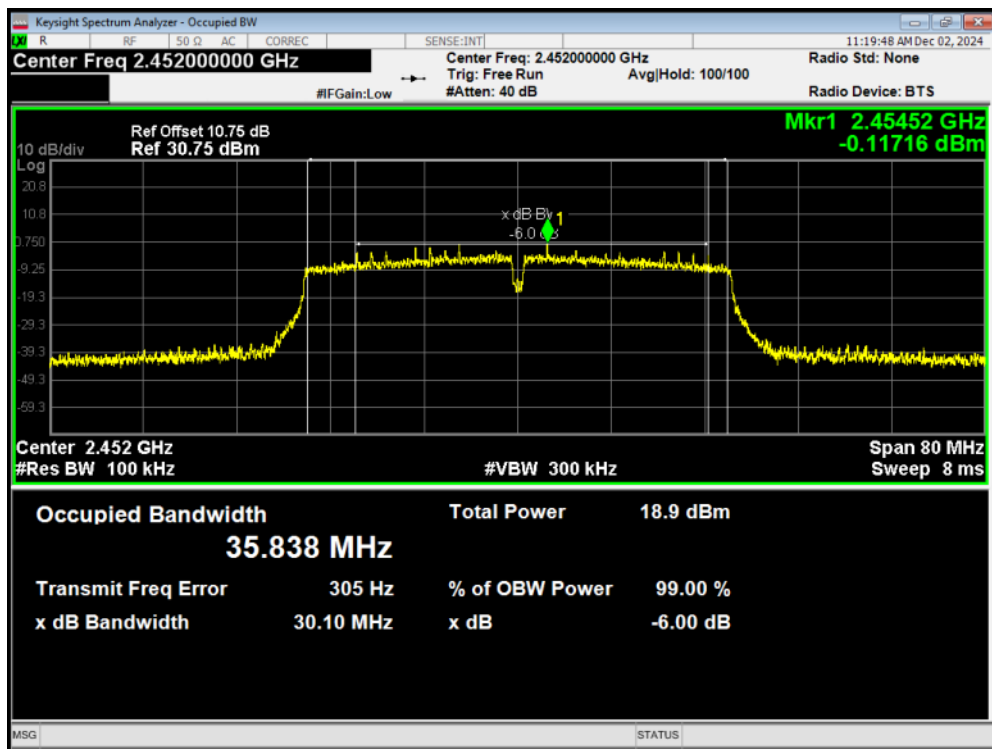
-6dB Bandwidth 802.11n(HT40) 2422MHz



-6dB Bandwidth 802.11n(HT40) 2437MHz



-6dB Bandwidth 802.11n(HT40) 2452MHz



5.3. Band Edge

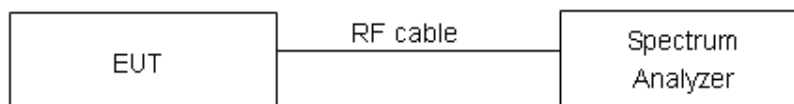
Ambient Condition

Temperature	Relative humidity
15°C ~ 35°C	20% ~ 80%

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.”

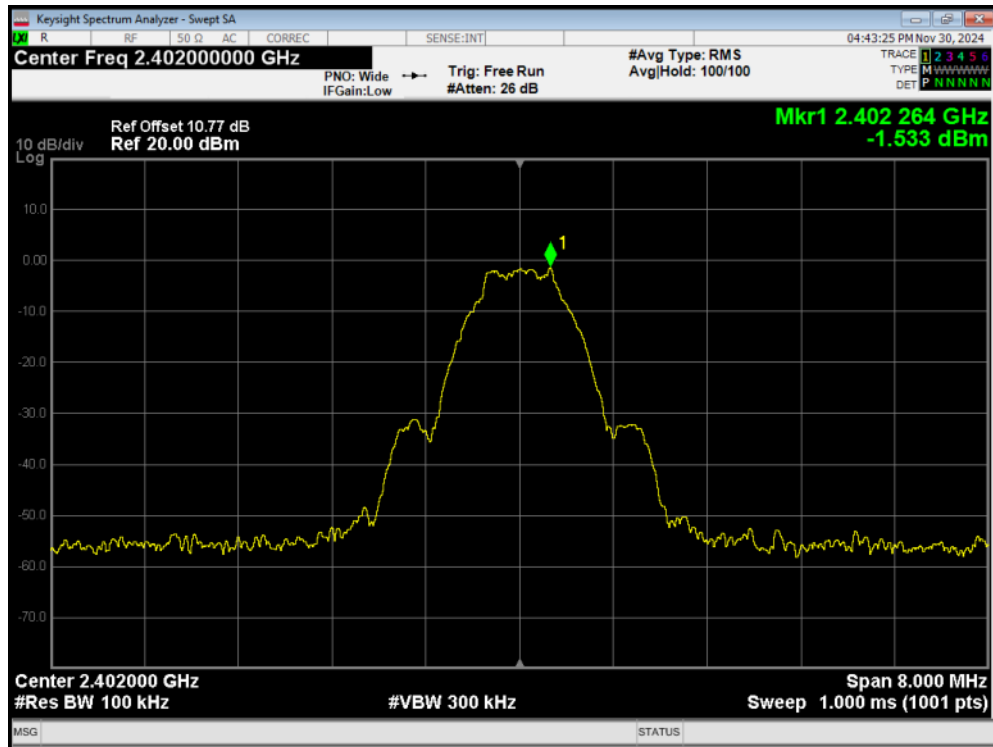
Measurement Uncertainty

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

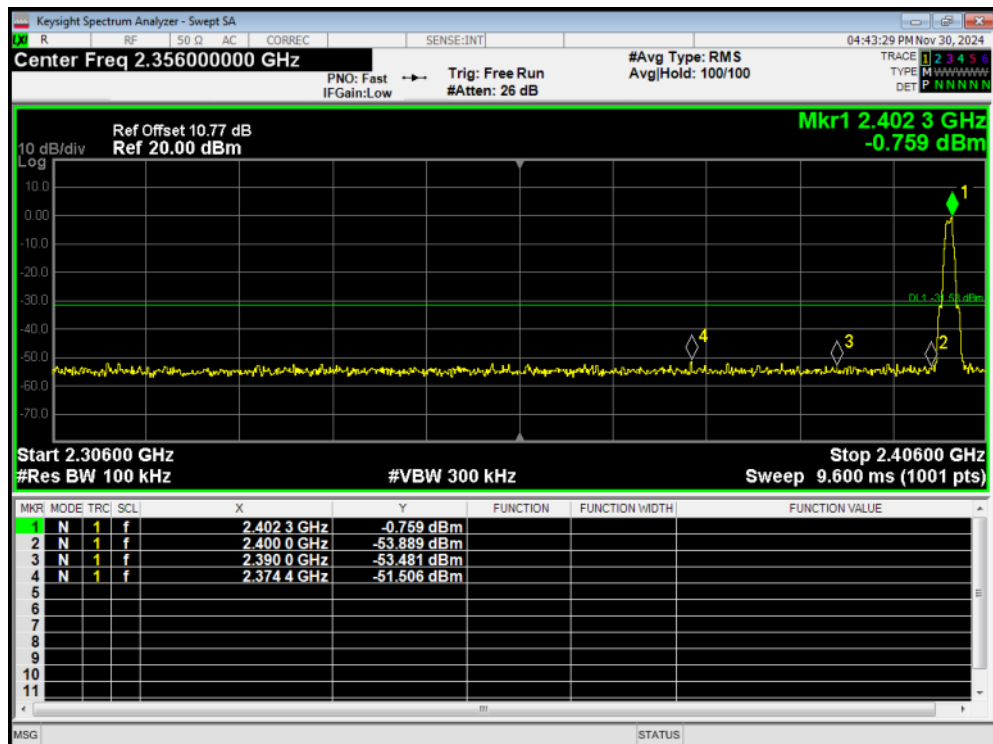
Frequency	Uncertainty
2GHz-3GHz	1.407 dB

Test Results: PASS

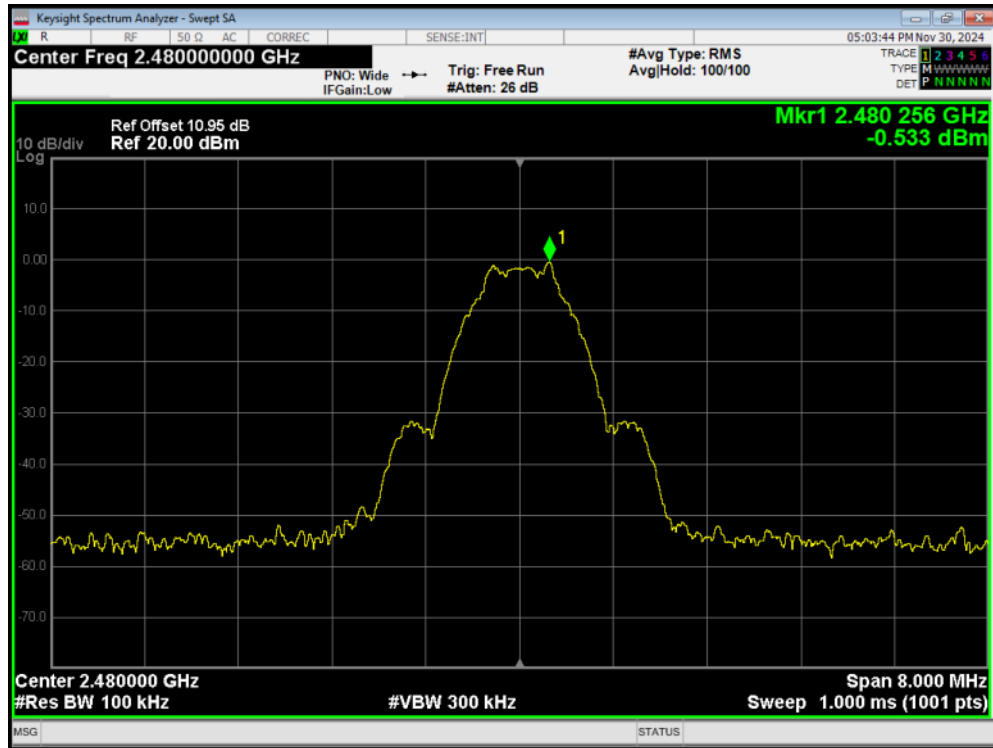
Band Edge BLE (1M) 2402MHz Ref



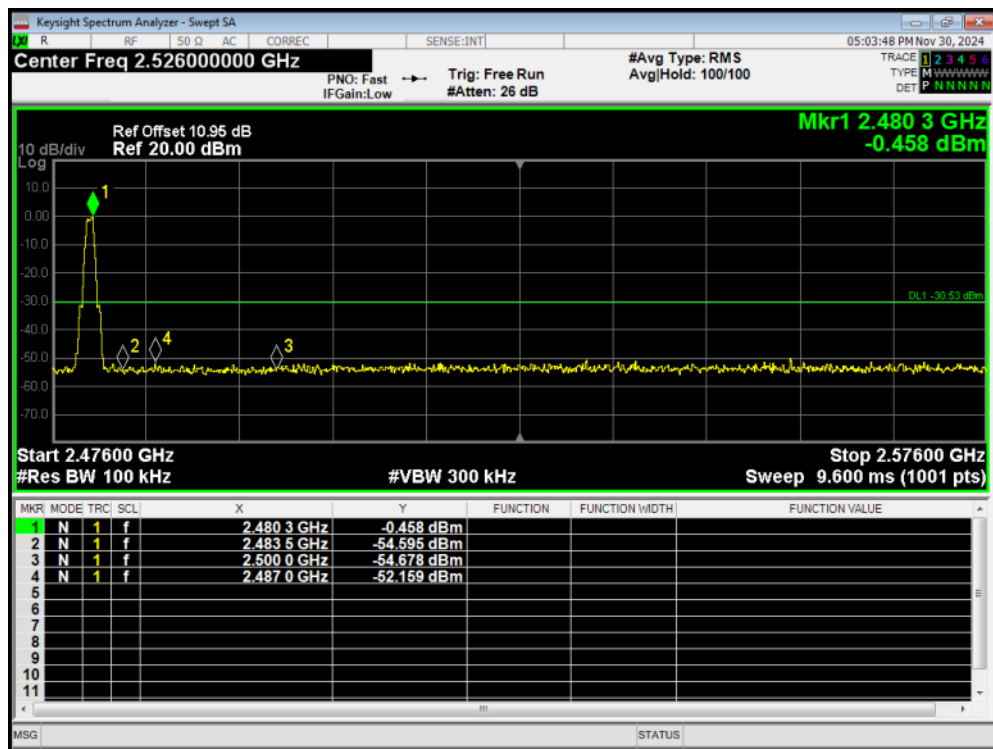
Band Edge BLE (1M) 2402MHz Emission



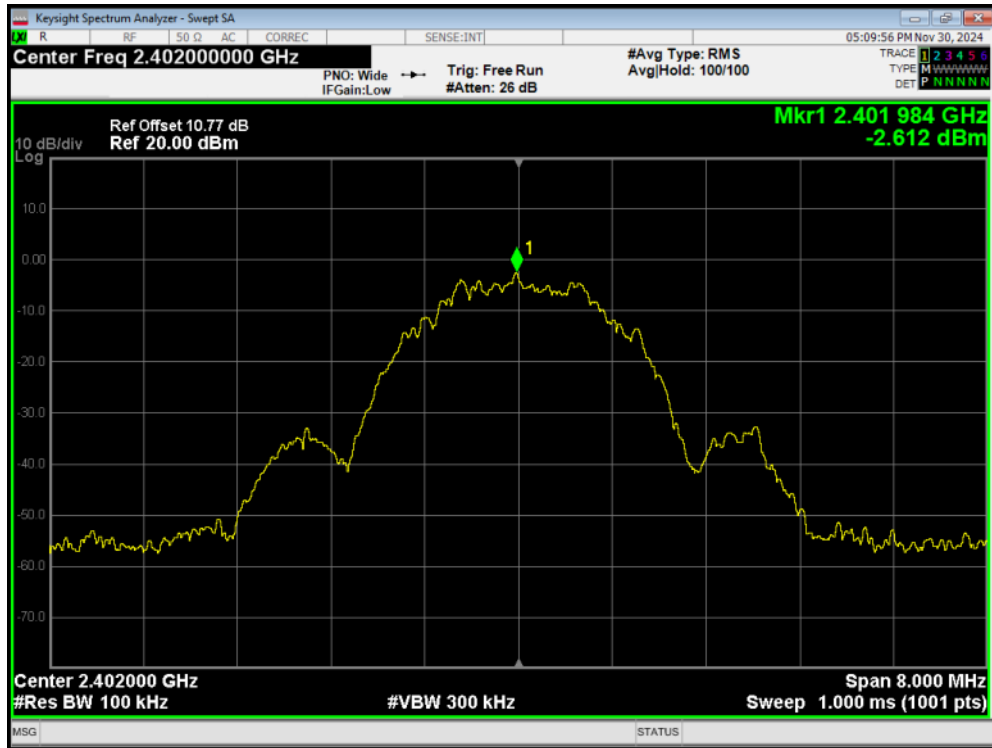
Band Edge BLE (1M) 2480MHz Ref



Band Edge BLE (1M) 2480MHz Emission



Band Edge BLE (2M) 2402MHz Ref



Band Edge BLE (2M) 2402MHz Emission

