

RF TEST REPORT

Applicant Hangzhou Zhaotong
Microelectronics Co., Ltd.

FCC ID 2BOBE-ZT9612UV10

Product ZT9612UV10

Brand ZTOP

Model ZT9612UV10

Report No. R2412A1668-R1V2

Issue Date May 13, 2025

Eurofins TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 15C (2024)**. 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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| Version | Revision Description | Issue Date |
|---|--------------------------|----------------|
| Rev.0 | Initial issue of report. | March 25, 2025 |
| Rev.1 | Updated information. | April 22, 2025 |
| Rev.2 | Updated information. | May 13, 2025 |
| Note: This revised report (Report No.: R2412A1668-R1V2) supersedes and replaces the previously issued report (Report No.: R2412A1668-R1V1). Please discard or destroy the previously issued report and dispose of it accordingly. | | |

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 |

Date of Testing: December 2, 2024 ~ March 21, 2025

Date of Sample Received: December 2, 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.
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City: Shanghai
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2. General Description of Equipment Under Test

2.1. Applicant and Manufacturer Information

| | |
|----------------------|--|
| Applicant | Hangzhou Zhaotong Microelectronics Co., Ltd. |
| Applicant address | Room 113-11, Building D, Integrated Circuit Design Industrial Park, No. 858, Jianshe 2nd Road, Xiaoshan Economic and Technological Development Zone, Xiaoshan District, Hangzhou City, Zhejiang Province |
| Manufacturer | Hangzhou Zhaotong Microelectronics Co., Ltd. |
| Manufacturer address | Room 113-11, Building D, Integrated Circuit Design Industrial Park, No. 858, Jianshe 2nd Road, Xiaoshan Economic and Technological Development Zone, Xiaoshan District, Hangzhou City, Zhejiang Province |

2.2. General Information

| EUT Description | |
|------------------------------|---|
| Model | ZT9612UV10 |
| Lab internal SN | R2412A1668/S01 |
| Hardware Version | V1.0 |
| Software Version | C01B190 |
| Power Supply | External power supply |
| Antenna Type | External Antenna |
| Antenna Connector | RPSMA-K (meet with the standard FCC Part 15.203 requirement) |
| Antenna Gain | 4.44 dBi |
| Additional Beamforming Gain | NA |
| Direction Gain | Power: 4.44dBi PSD: 7.45dBi |
| Operating Frequency Range(s) | 802.11b/g/n(HT20)/ax(HE20): 2412 ~ 2462 MHz 802.11n(HT40)/ax(HE40): 2422 ~ 2452 MHz Bluetooth LE V5.2: 2402 ~2480 MHz |
| Modulation Type | 802.11b: DSSS 802.11g/n: OFDM 802.11ax: OFDMA Bluetooth LE: GFSK |
| Max. Output Power | Wi-Fi 2.4GHz: 20.23 dBm Bluetooth LE: 19.88 dBm |
| EUT Accessory | |
| USB Cable | Manufacturer: UGREEN Model: USB3.0 100cm |

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 (2024) 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.

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 |

| Test Mode | Data Rate |
|---------------|-----------|
| | CDD/MIMO |
| 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 | Antenna 1 | Antenna 2 | MIMO |
|---------------------------------|-----------|-----------|--|
| Maximum output power | 802.11b/g | 802.11b/g | 802.11n HT20 802.11n HT40 802.11ax HE20 802.11ax HE40 |
| 6dB Bandwidth | -- | 802.11b/g | 802.11n HT20 802.11n HT40 802.11ax HE20 802.11ax HE40 |
| Band Edge | -- | 802.11b/g | 802.11n HT20 802.11n HT40 802.11ax HE20 802.11ax HE40 |
| Power Spectral Density | 802.11b/g | 802.11b/g | 802.11n HT20 802.11n HT40 802.11ax HE20 802.11ax HE40 |
| Spurious RF Conducted Emissions | -- | 802.11b/g | 802.11n HT20 802.11n HT40 802.11ax HE20 802.11ax HE40 |

Note: Only the worst data was recorded in this report.

ERSU Mode

| Test Cases | Antenna 1 | Antenna 2 | MIMO |
|---------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Maximum output power | 802.11ax HE20 242-Tones | 802.11ax HE20 242-Tones | 802.11ax HE20 242-Tones |
| 6dB Bandwidth | -- | -- | 802.11ax HE20 242-Tones |
| Band Edge | -- | -- | 802.11ax HE20 242-Tones |
| Power Spectral Density | 802.11ax HE20 242-Tones | 802.11ax HE20 242-Tones | 802.11ax HE20 242-Tones |
| Spurious RF Conducted Emissions | -- | -- | 802.11ax HE20 242-Tones |

Note: Only the worst data was recorded in this report.

5. Test Case Results

5.1. Maximum output power

Ambient Condition

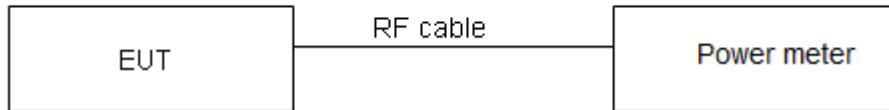
| Temperature | Relative humidity |
|-------------|-------------------|
| 15°C ~ 35°C | 20% ~ 80% |

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.

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 | ≤ 1W (30dBm) |
|----------------------|--------------|

Measurement Uncertainty

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

Test Results

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

| SISO Antenna Power Index | | | | | | | | |
|--------------------------|---------|---------|---------|-----------------|------------------|---------|-----------------|------------------|
| Antenna | Channel | 802.11b | 802.11g | 802.11n HT20 | 802.11ax HE20 | Channel | 802.11n HT40 | 802.11ax HE40 |
| Antenna 1 | CH1 | 10 | 16 | -- | -- | CH3 | -- | -- |
| | CH6 | 10 | 10 | -- | -- | CH6 | -- | -- |
| | CH11 | 10 | 10 | -- | -- | CH9 | -- | -- |
| Antenna 2 | CH1 | 10 | 16 | -- | -- | CH3 | -- | -- |
| | CH6 | 10 | 10 | -- | -- | CH6 | -- | -- |
| | CH11 | 10 | 10 | -- | -- | CH9 | -- | -- |
| MIMO | CH1 | -- | -- | 20 | 25 | CH3 | 25 | 25 |
| | CH6 | -- | -- | 20 | 25 | CH6 | 25 | 25 |
| | CH10 | -- | -- | 20 | 25 | CH8 | 25 | -- |
| | CH11 | -- | -- | 25 | 35 | CH9 | 35 | 25 |

| Test Mode | Duty cycle | Duty cycle correction Factor (dB) |
|--|------------|-----------------------------------|
| 802.11b | 0.992 | 0.00 |
| 802.11g | 0.952 | 0.21 |
| 802.11n HT20 | 0.824 | 0.84 |
| 802.11n HT40 | 0.881 | 0.55 |
| 802.11ax HE20 | 0.922 | 0.35 |
| 802.11ax HE40 | 0.770 | 1.14 |
| Bluetooth LE (1M) | 0.852 | 0.70 |
| Bluetooth LE (2M) | 0.573 | 2.42 |
| Bluetooth LE (S=2) | 0.600 | 2.22 |
| Bluetooth LE (S=8) | 0.957 | 0.19 |
| 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 |
|---|----------------------------------|------------------------------|--------------------------------------|-------------|------------|
| Bluetooth (Low Energy) (1M) | 2402/CH0 | 17.29 | 17.99 | 30 | PASS |
| | 2440/CH19 | 17.26 | 17.95 | 30 | PASS |
| | 2480/CH39 | 17.33 | 18.03 | 30 | PASS |
| Bluetooth (Low Energy) (2M) | 2402/CH0 | 15.44 | 17.86 | 30 | PASS |
| | 2440/CH19 | 15.70 | 18.12 | 30 | PASS |
| | 2480/CH39 | 15.36 | 17.77 | 30 | PASS |
| Bluetooth (Low Energy) (S=2) | 2402/CH0 | 17.66 | 19.88 | 30 | PASS |
| | 2440/CH19 | 17.44 | 19.66 | 30 | PASS |
| | 2480/CH39 | 17.56 | 19.78 | 30 | PASS |
| Bluetooth (Low Energy) (S=8) | 2402/CH0 | 14.96 | 15.15 | 30 | PASS |
| | 2440/CH19 | 14.80 | 14.99 | 30 | PASS |
| | 2480/CH39 | 14.53 | 14.72 | 30 | PASS |
| Note: Average Power with duty factor = Average Power Measured +Duty cycle correction factor | | | | | |

Antenna 1

| Test Mode | Carrier frequency (MHz)/ Channel | Average Power Measured (dBm) | Average Power with duty factor (dBm) | Limit (dBm) | Conclusion |
|-----------|----------------------------------|------------------------------|--------------------------------------|-------------|------------|
| 802.11b | 2412/CH 1 | 19.88 | 19.88 | 30 | PASS |
| | 2437/CH 6 | 19.94 | 19.94 | 30 | PASS |
| | 2462/CH11 | 19.32 | 19.32 | 30 | PASS |
| 802.11g | 2412/CH 1 | 17.56 | 17.78 | 30 | PASS |
| | 2437/CH 6 | 19.66 | 19.87 | 30 | PASS |
| | 2462/CH11 | 18.90 | 19.12 | 30 | PASS |

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

Antenna 2

| Test Mode | Carrier frequency (MHz)/ Channel | Average Power Measured (dBm) | Average Power with duty factor (dBm) | Limit (dBm) | Conclusion |
|-----------|----------------------------------|------------------------------|--------------------------------------|-------------|------------|
| 802.11b | 2412/CH 1 | 19.68 | 19.68 | 30 | PASS |
| | 2437/CH 6 | 19.57 | 19.57 | 30 | PASS |
| | 2462/CH11 | 19.01 | 19.01 | 30 | PASS |
| 802.11g | 2412/CH 1 | 18.14 | 18.35 | 30 | PASS |
| | 2437/CH 6 | 19.92 | 20.13 | 30 | PASS |
| | 2462/CH11 | 19.16 | 19.37 | 30 | PASS |

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

MIMO

| Test Mode | Carrier frequency (MHz) / Channel | MIMO Antenna 1 | | 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) | | | |
| 802.11n HT20 | 2412/CH 1 | 16.47 | 17.31 | 16.29 | 17.13 | 20.23 | 30 | PASS |
| | 2437/CH 6 | 16.21 | 17.05 | 16.44 | 17.28 | 20.18 | 30 | PASS |
| | 2457/CH 10 | 16.56 | 17.40 | 15.94 | 16.78 | 20.11 | 30 | PASS |
| | 2462/CH 11 | 14.04 | 14.88 | 13.89 | 14.73 | 17.82 | 30 | PASS |
| 802.11n HT40 | 2422/CH 3 | 14.28 | 14.83 | 14.33 | 14.88 | 17.86 | 30 | PASS |
| | 2437/CH 6 | 14.20 | 14.75 | 14.38 | 14.93 | 17.85 | 30 | PASS |
| | 2447/CH 8 | 14.08 | 15.22 | 13.75 | 14.30 | 17.79 | 30 | PASS |
| | 2452/CH 9 | 9.82 | 10.37 | 10.00 | 10.55 | 13.47 | 30 | PASS |
| 802.11ax HE20 | 2412/CH 1 | 14.39 | 14.74 | 14.13 | 14.48 | 17.62 | 30 | PASS |
| | 2437/CH 6 | 13.97 | 14.32 | 14.18 | 14.53 | 17.43 | 30 | PASS |
| | 2457/CH 10 | 13.64 | 13.99 | 13.09 | 13.44 | 16.73 | 30 | PASS |
| | 2462/CH 11 | 9.98 | 10.33 | 9.42 | 9.77 | 13.07 | 30 | PASS |
| 802.11ax HE40 | 2422/CH 3 | 13.85 | 14.99 | 13.98 | 15.12 | 18.07 | 30 | PASS |
| | 2437/CH 6 | 13.56 | 14.70 | 13.84 | 14.98 | 17.85 | 30 | PASS |
| | 2452/CH 9 | 13.58 | 14.72 | 13.38 | 14.52 | 17.63 | 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 = $10\log(10^{(\text{Power antenna1 in dBm}/10)} + 10^{(\text{Power antenna2 in dBm}/10)})$.

3. According to KDB 662911 D01 Multiple Transmitter Output v02r01 F2)f(i): If all antennas have the same gain, Directional gain = $G_{ANT} + \text{Array Gain}$,

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less, for 20-MHz channel widths with $N_{ANT} \geq 5$.

So directional gain = $G_{ANT} + \text{Array Gain} = 4.44 + 0 = 4.44$ dB_i<6dB_i. So the power limit is 30dBm

ERSU Mode

| Power Index | | | | |
|--|-------------------------------------|------------------|------------------|-------------|
| Test Mode | Channel/ Frequency (MHz) | Antenna 1 | Antenna 2 | MIMO |
| 802.11ax HE20 242-Tones:RU Index 61 | 2412/CH 1 | 10 | 10 | 10 |
| | 2437/CH 6 | 10 | 10 | 10 |
| | 2462/CH11 | 14 | 16 | 10 |

| Test Mode | Duty cycle | Duty cycle correction Factor (dB) |
|--|-------------------|--|
| 802.11ax HE20 242-Tones:RU Index 61 | 0.691 | 1.61 |

Note: when Duty cycle ≥ 0.98 , Duty cycle correction Factor not required.

Antenna 1

| Test Mode | Carrier frequency (MHz) / Channel | RU Index | Average Power Measured (dBm) | Average Power with duty factor (dBm) | Limit (dBm) | Conclusion |
|---|--|-----------------|---|---|------------------------|-------------------|
| 802.11ax HE20 242-Tones: RU Index 61 | 2412/CH 1 | 61 | 15.52 | 17.13 | 30 | PASS |
| | 2437/CH 6 | 61 | 15.62 | 17.23 | 30 | PASS |
| | 2462/CH11 | 61 | 17.37 | 18.98 | 30 | PASS |

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

Antenna 2

| Test Mode | Carrier frequency (MHz) / Channel | RU Index | Average Power Measured (dBm) | Average Power with duty factor (dBm) | Limit (dBm) | Conclusion |
|---|--|-----------------|---|---|------------------------|-------------------|
| 802.11ax HE20 242-Tones: RU Index 61 | 2412/CH 1 | 61 | 15.27 | 16.88 | 30 | PASS |
| | 2437/CH 6 | 61 | 15.50 | 17.11 | 30 | PASS |
| | 2462/CH11 | 61 | 16.35 | 17.96 | 30 | PASS |

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

MIMO

| Test Mode | Carrier frequency (MHz) / Channel | RU Index | MIMO ANT5 | | MIMO ANT10 | | 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) | | | |
| 802.11ax | 2412/CH 1 | 61 | 19.62 | 21.23 | 18.94 | 20.55 | 23.91 | 30 | PASS |
| | HE20 | 61 | 19.43 | 21.04 | 18.79 | 20.40 | 23.74 | 30 | PASS |
| 242-Tones | 2462/CH11 | 61 | 18.81 | 20.42 | 18.21 | 19.82 | 23.14 | 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 = $10\log(10^{(\text{Power ANT1 in dBm}/10)} + 10^{(\text{Power ANT2 in dBm}/10)})$.
 3. According to KDB 662911 D01 Multiple Transmitter Output v02r01 F)2)f(i): If all antennas have the same gain,
 Directional gain = $G_{\text{ANT}} + \text{Array Gain}$,
 For power measurements on IEEE 802.11 devices,
 Array Gain = 0 dB (i.e., no array gain) for $N_{\text{ANT}} \leq 4$;
 Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;
 Array Gain = $5 \log(N_{\text{ANT}}/N_{\text{ss}})$ dB or 3 dB, whichever is less, for 20-MHz channel widths with $N_{\text{ANT}} \geq 5$.
 So directional gain = $G_{\text{ANT}} + \text{Array Gain} = 4.44 + 0 = 4.44$ dB_i < 6 dB_i. So the power limit is 30 dBm

5.2. 99% Bandwidth and 6dB Bandwidth

Ambient Condition

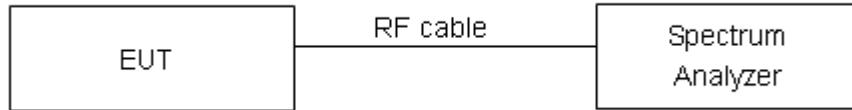
| Temperature | Relative humidity |
|-------------|-------------------|
| 15°C ~ 35°C | 20% ~ 80% |

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 |
|------------------------------|-------------------------|---------------------|------------------------------|-------------|------------|
| Bluetooth (Low Energy) (1M) | 2402 | 1.016 | 0.648 | 500 | PASS |
| | 2440 | 1.011 | 0.664 | 500 | PASS |
| | 2480 | 1.012 | 0.661 | 500 | PASS |
| Bluetooth (Low Energy) (2M) | 2402 | 2.000 | 1.137 | 500 | PASS |
| | 2440 | 2.023 | 1.134 | 500 | PASS |
| | 2480 | 1.991 | 1.148 | 500 | PASS |
| Bluetooth (Low Energy) (S=2) | 2402 | 1.002 | 0.652 | 500 | PASS |
| | 2440 | 1.003 | 0.658 | 500 | PASS |
| | 2480 | 1.001 | 0.655 | 500 | PASS |
| Bluetooth (Low Energy) (S=8) | 2402 | 1.032 | 0.668 | 500 | PASS |
| | 2440 | 1.028 | 0.632 | 500 | PASS |
| | 2480 | 1.031 | 0.669 | 500 | PASS |

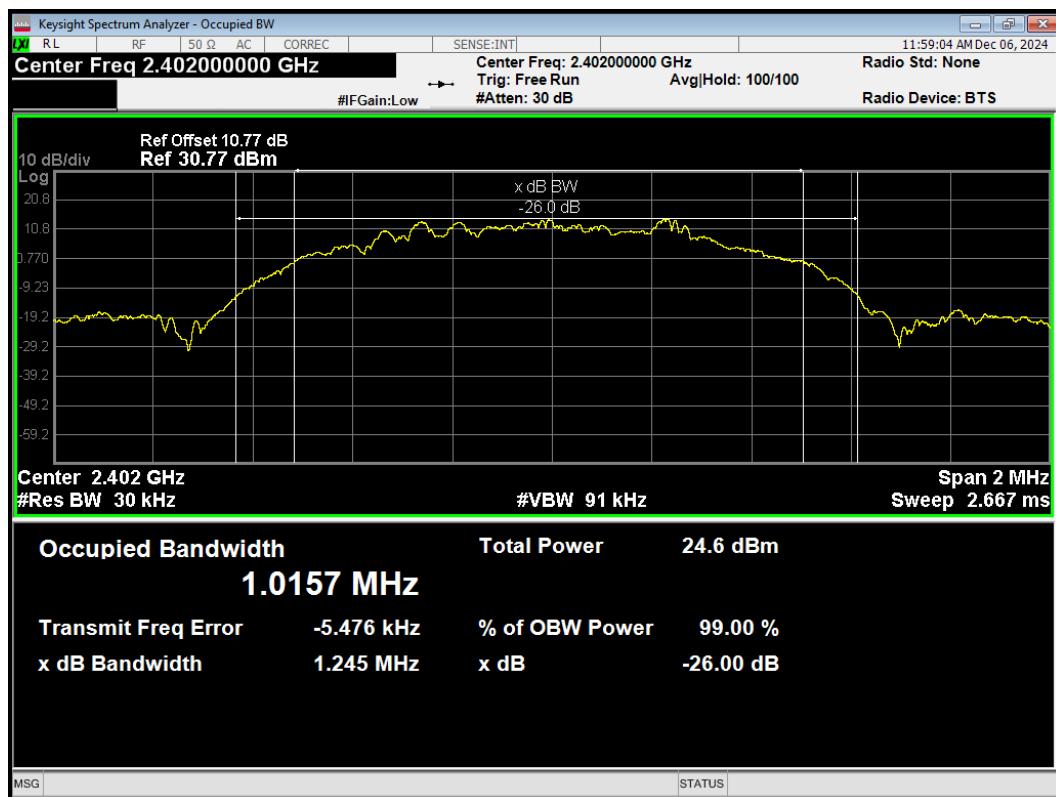
| Test Mode | Carrier frequency (MHz) | 99% bandwidth (MHz) | Minimum 6 dB bandwidth (MHz) | Limit (kHz) | Conclusion |
|---------------|-------------------------|---------------------|------------------------------|-------------|------------|
| 802.11b | 2412 | 16.713 | 14.017 | 500 | PASS |
| | 2437 | 16.718 | 12.554 | 500 | PASS |
| | 2462 | 16.714 | 12.578 | 500 | PASS |
| 802.11g | 2412 | 17.035 | 16.358 | 500 | PASS |
| | 2437 | 17.271 | 16.338 | 500 | PASS |
| | 2462 | 17.178 | 16.338 | 500 | PASS |
| 802.11n HT20 | 2412 | 18.200 | 17.589 | 500 | PASS |
| | 2437 | 18.083 | 17.593 | 500 | PASS |
| | 2457 | 18.058 | 17.602 | 500 | PASS |
| | 2462 | 18.095 | 17.610 | 500 | PASS |
| 802.11n HT40 | 2422 | 36.681 | 36.322 | 500 | PASS |
| | 2437 | 36.706 | 36.339 | 500 | PASS |
| | 2447 | 36.773 | 36.332 | 500 | PASS |
| | 2452 | 36.727 | 36.342 | 500 | PASS |
| 802.11ax HE20 | 2412 | 19.217 | 18.908 | 500 | PASS |
| | 2437 | 19.178 | 18.849 | 500 | PASS |
| | 2457 | 19.175 | 18.843 | 500 | PASS |
| | 2462 | 19.147 | 18.851 | 500 | PASS |
| 802.11ax HE40 | 2422 | 38.069 | 37.644 | 500 | PASS |
| | 2437 | 38.086 | 37.992 | 500 | PASS |
| | 2452 | 38.049 | 37.532 | 500 | PASS |

ERSU Mode

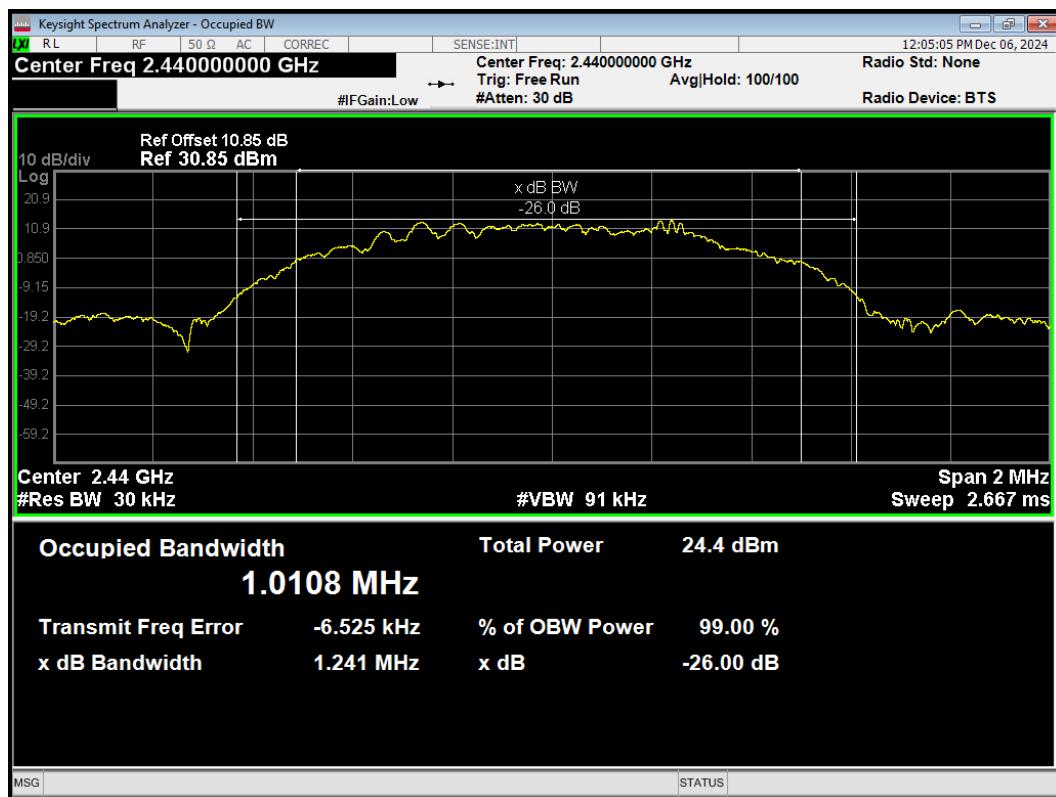
| Test Mode | Carrier frequency (MHz) | 99% bandwidth (MHz) | Minimum 6 dB bandwidth (MHz) | Limit (kHz) | Conclusion |
|--|-------------------------|---------------------|------------------------------|-------------|------------|
| 802.11ax HE20 242-Tones: RU Index 61 | 2412 | 19.193 | 17.459 | 500 | PASS |
| | 2437 | 19.201 | 18.806 | 500 | PASS |
| | 2462 | 19.134 | 17.641 | 500 | PASS |

99%bandwidth

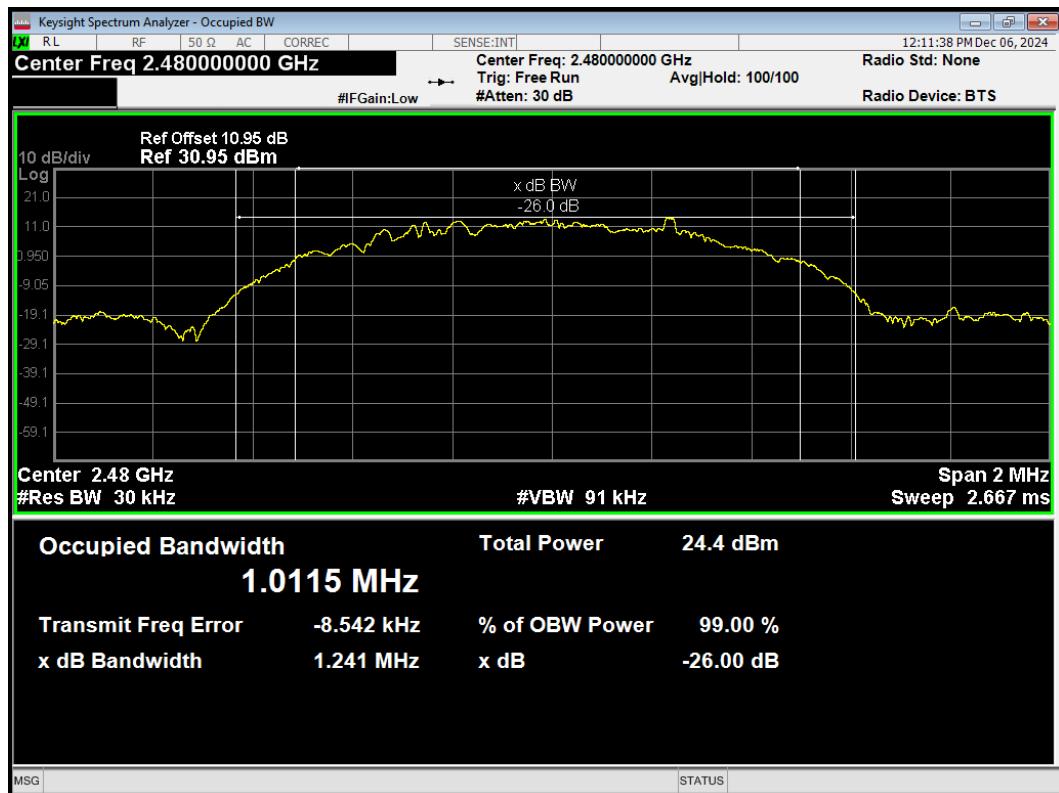
OBW Bluetooth LE (1M) 2402MHz



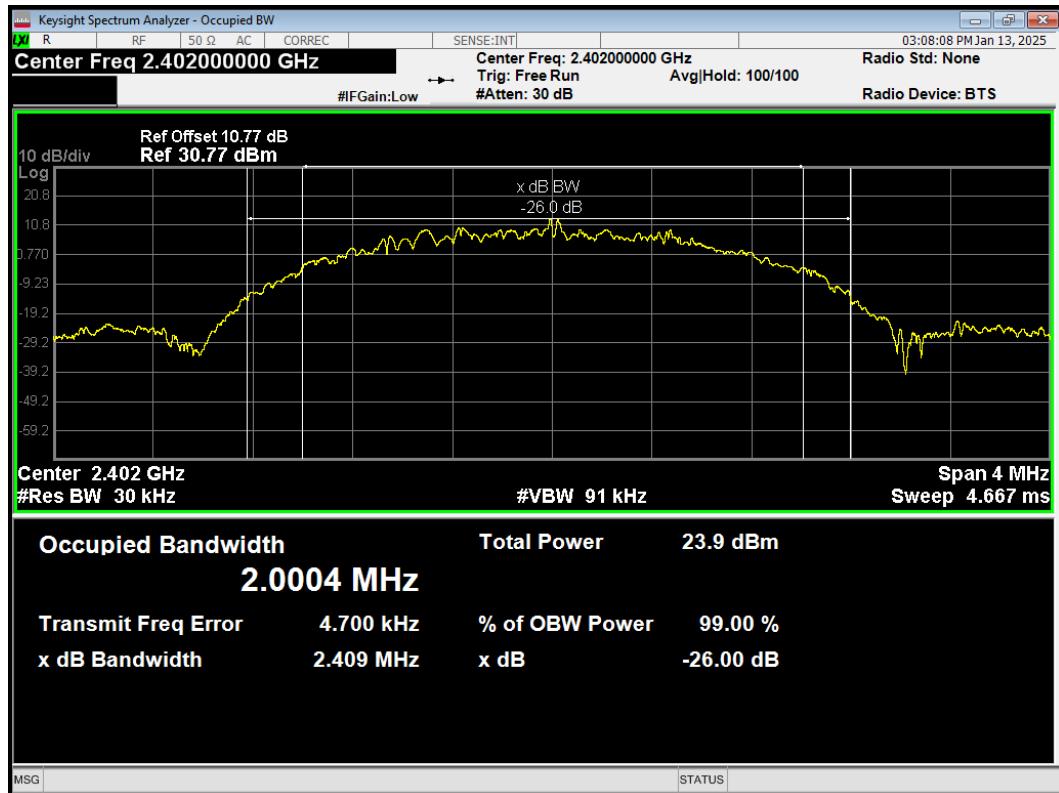
OBW Bluetooth LE (1M) 2440MHz



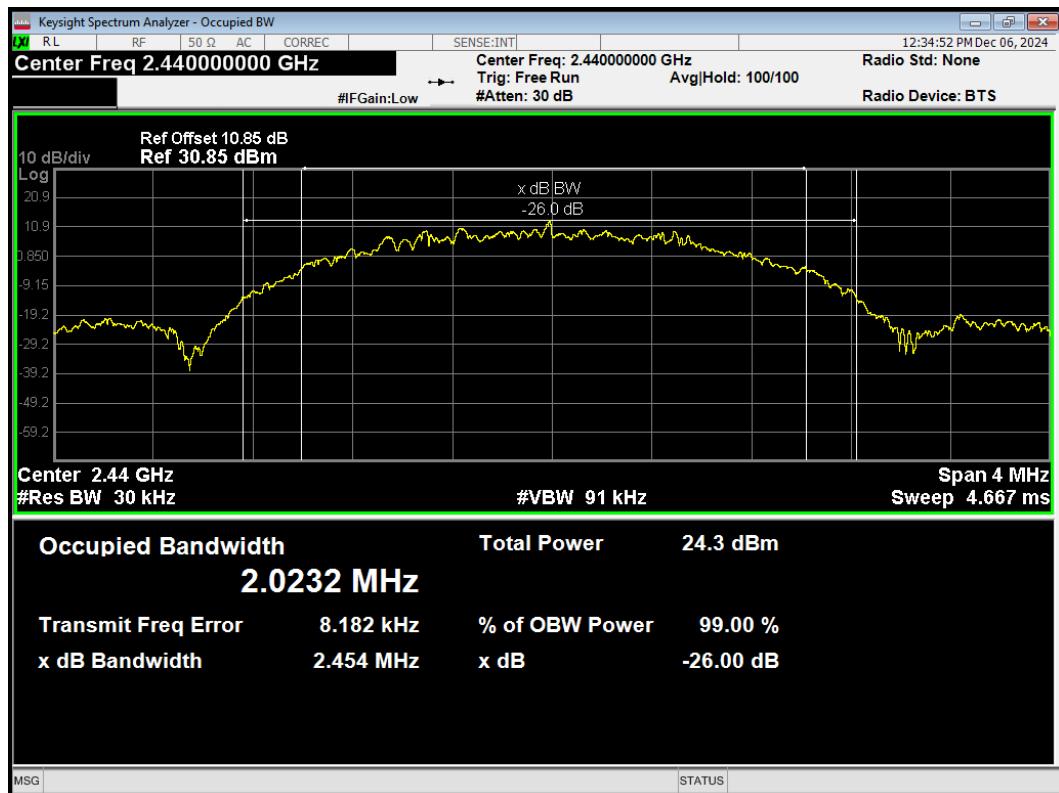
OBW Bluetooth LE (1M) 2480MHz



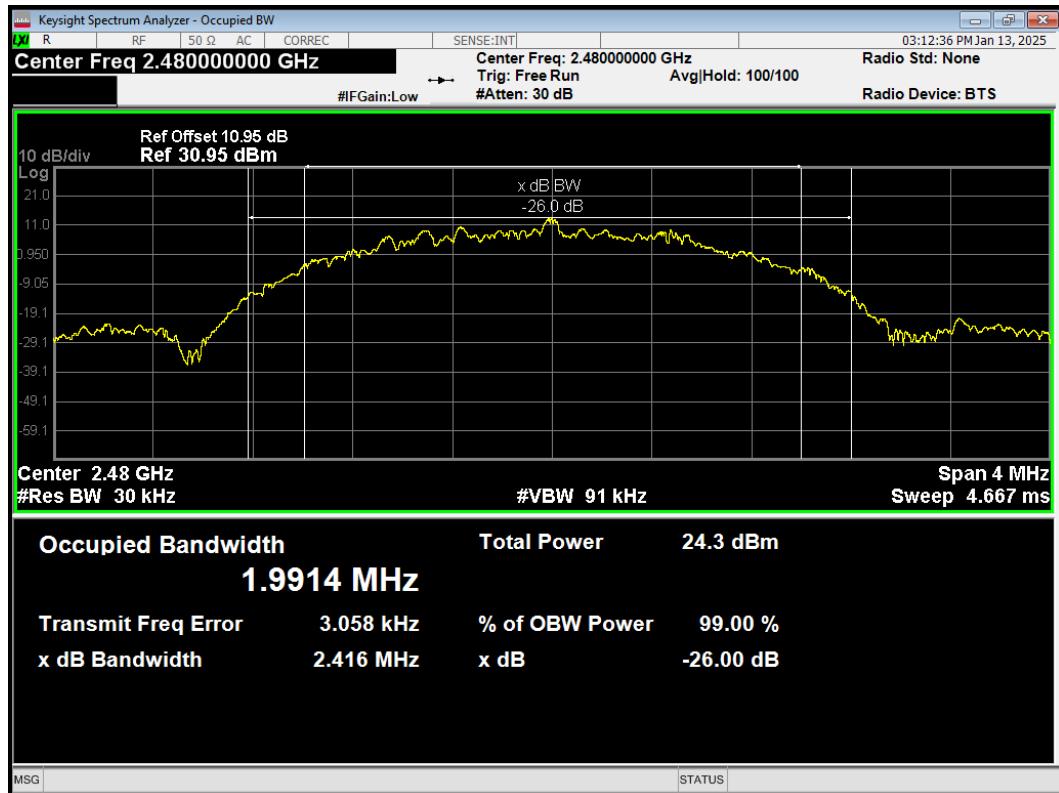
OBW Bluetooth LE (2M) 2402MHz



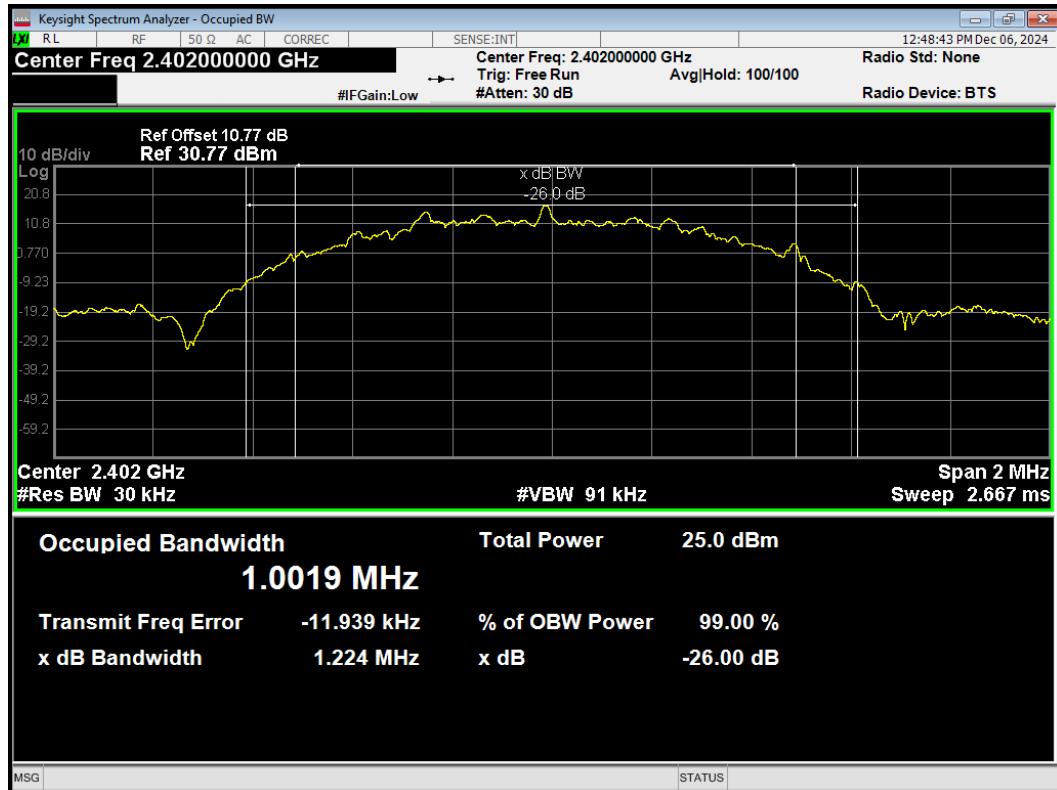
OBW Bluetooth LE (2M) 2440MHz



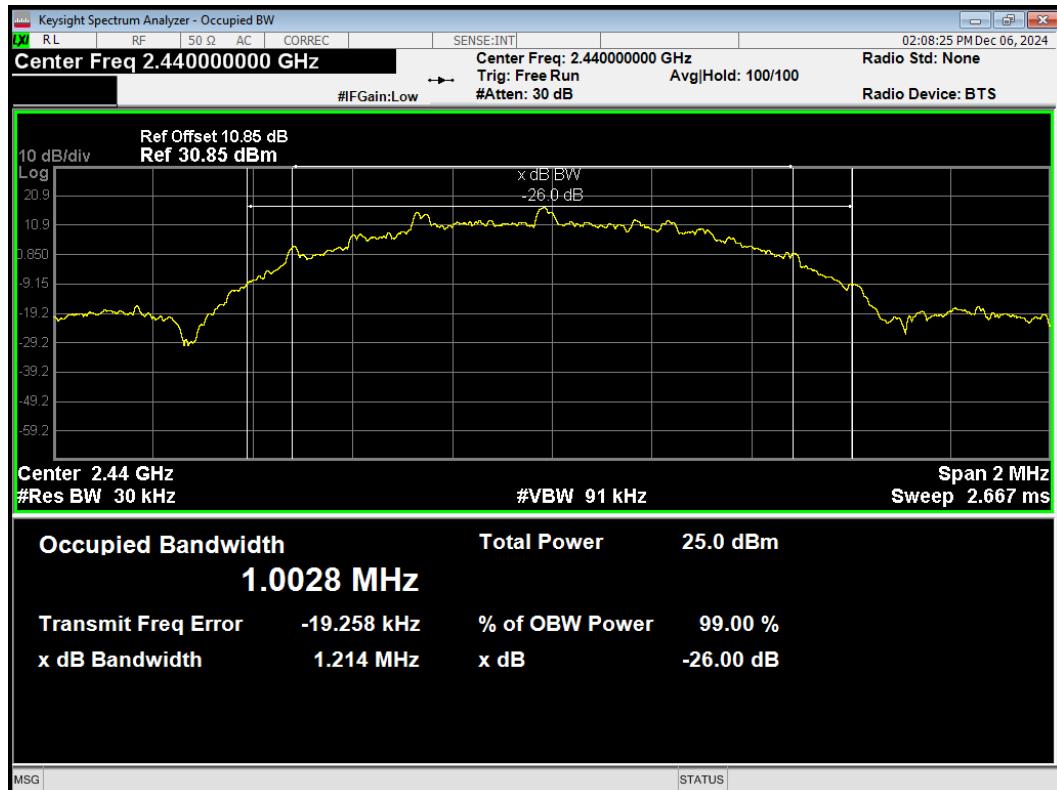
OBW Bluetooth LE (2M) 2480MHz



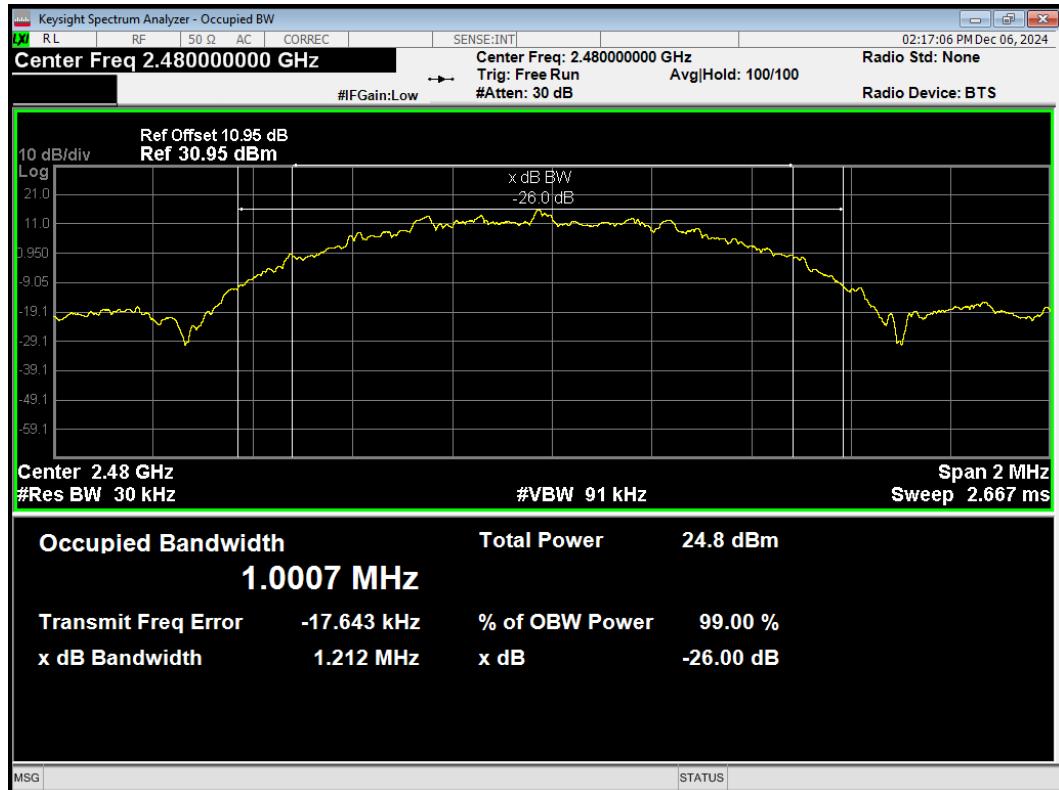
OBW Bluetooth LE (S=2) 2402MHz



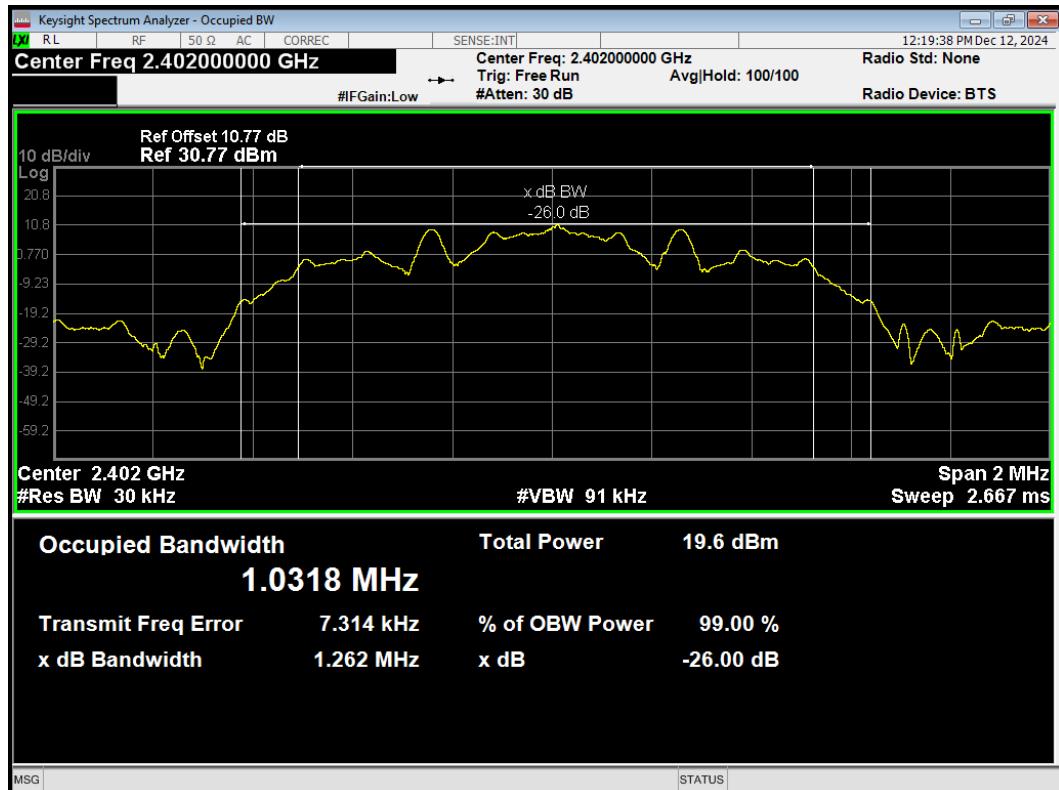
OBW Bluetooth LE (S=2) 2440MHz



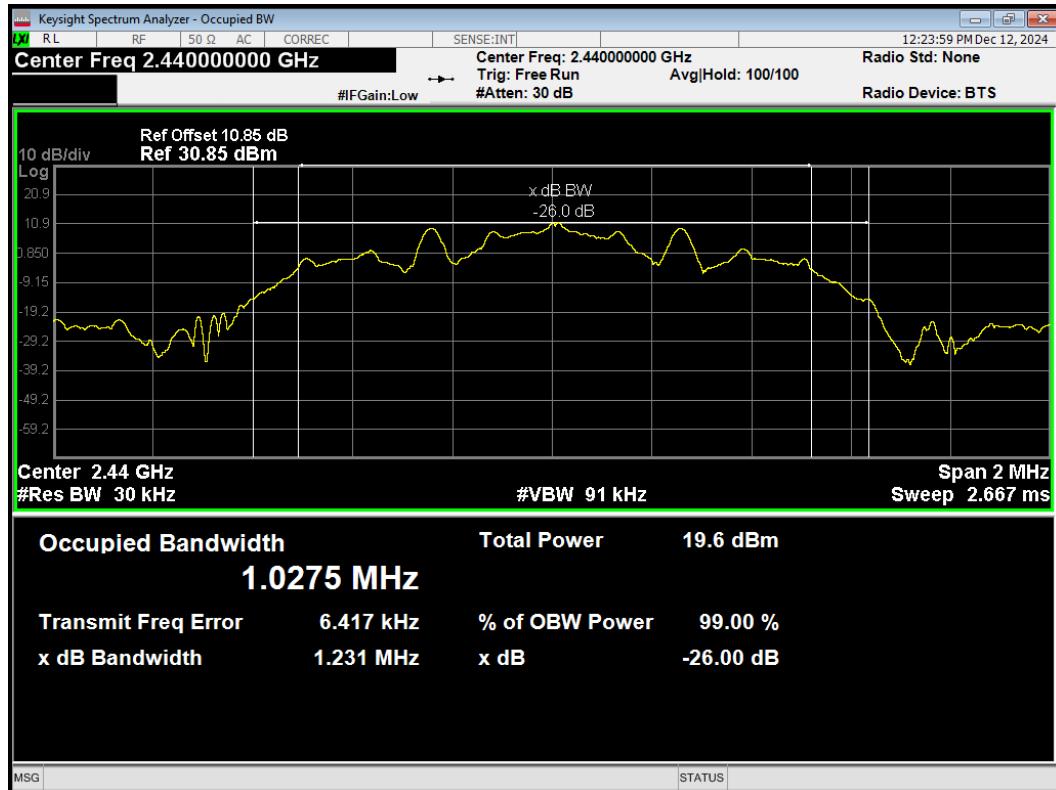
OBW Bluetooth LE (S=2) 2480MHz



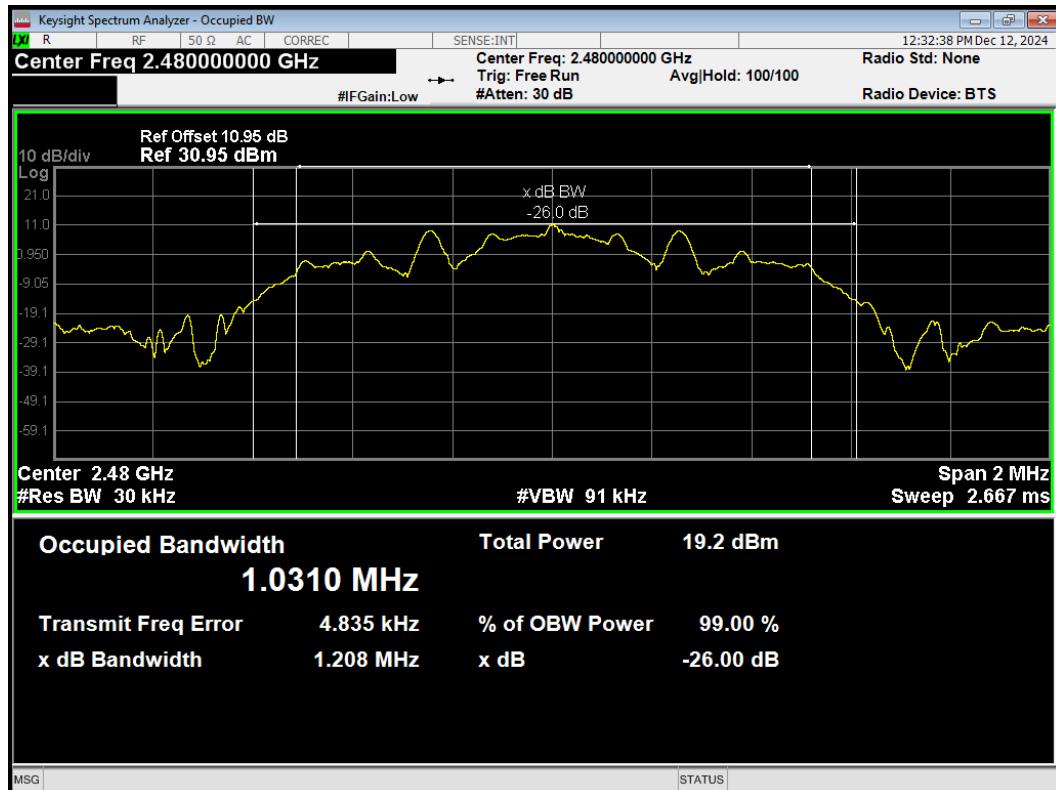
OBW Bluetooth LE (S=8) 2402MHz



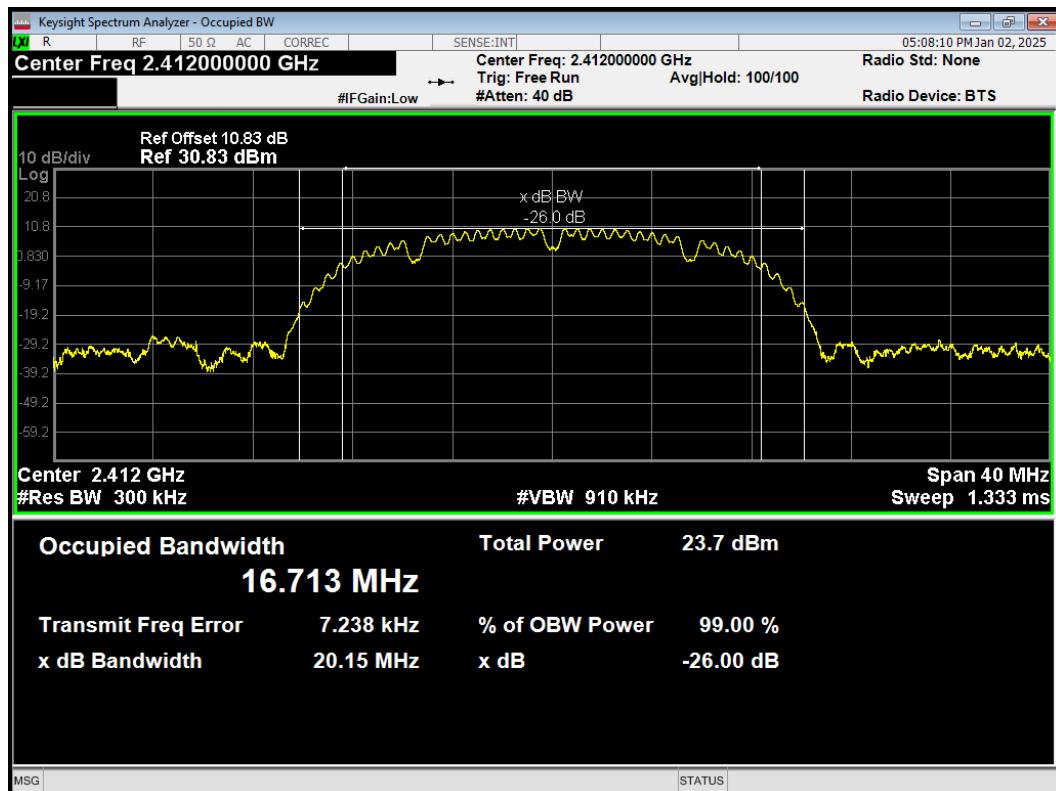
OBW Bluetooth LE (S=8) 2440MHz



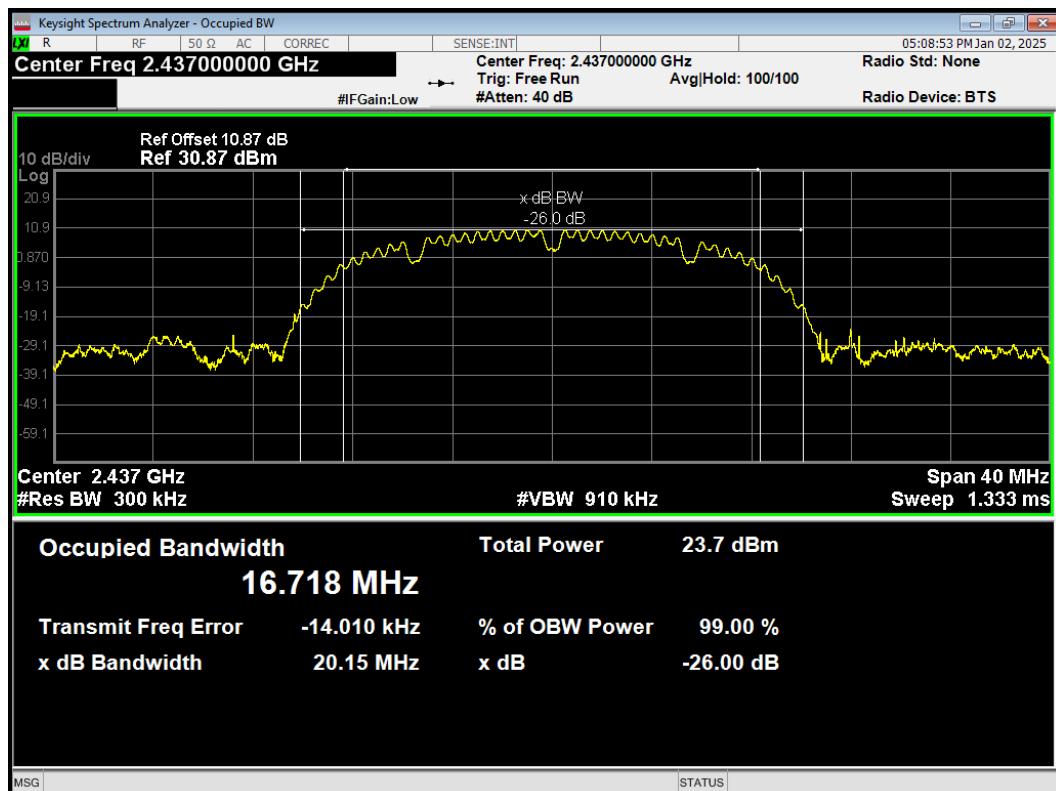
OBW Bluetooth LE (S=8) 2480MHz



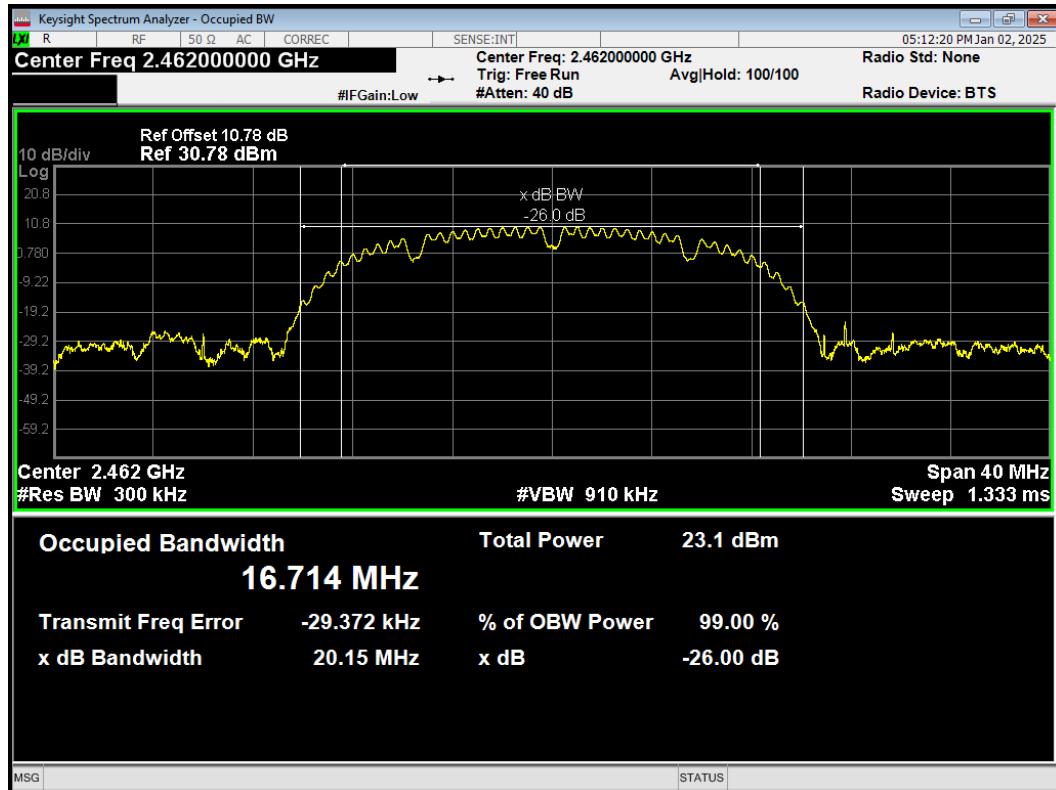
OBW 802.11b 2412MHz



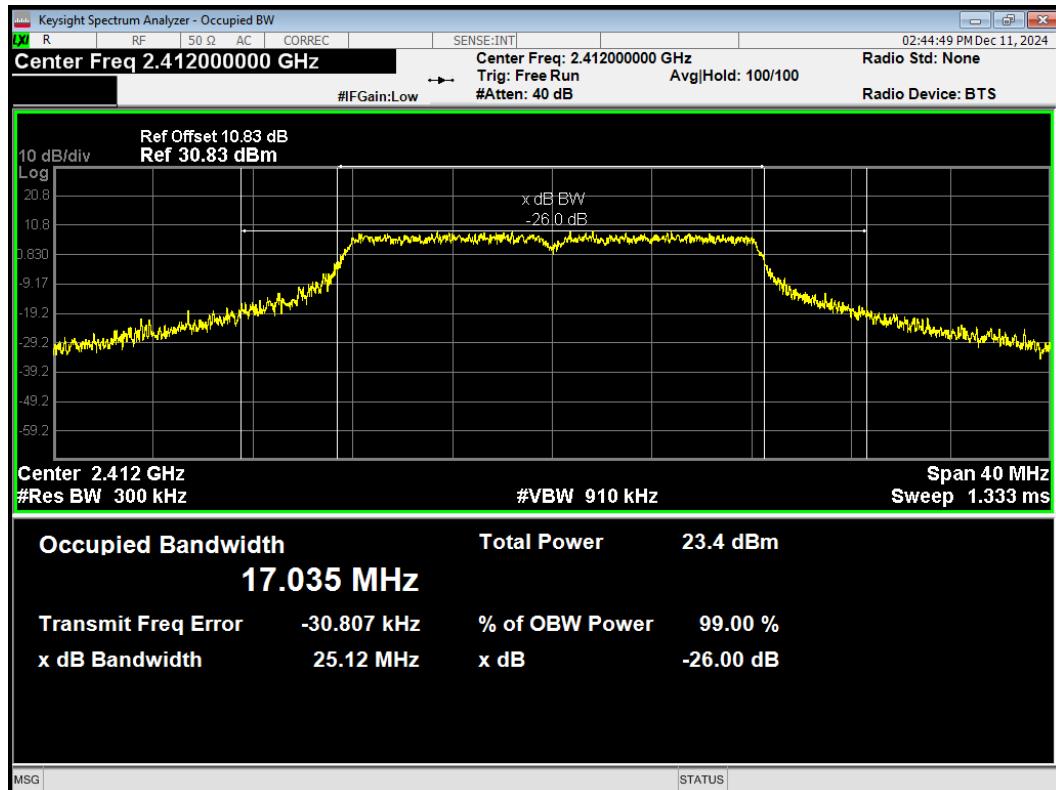
OBW 802.11b 2437MHz



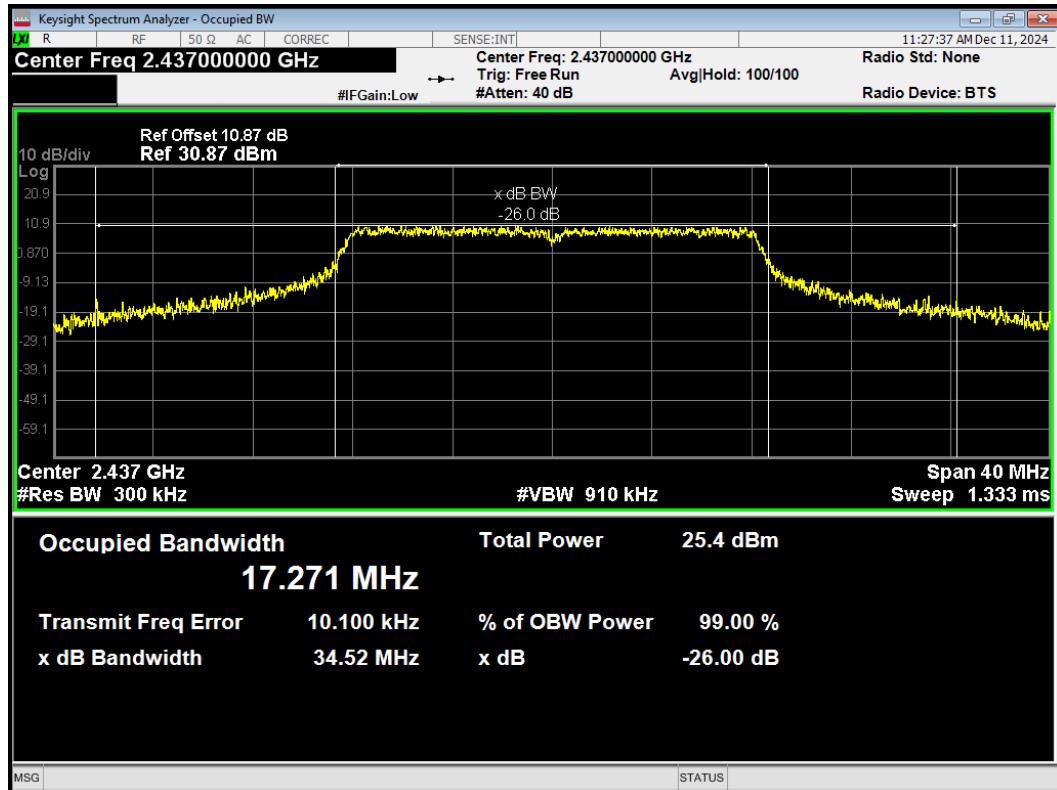
OBW 802.11b 2462MHz



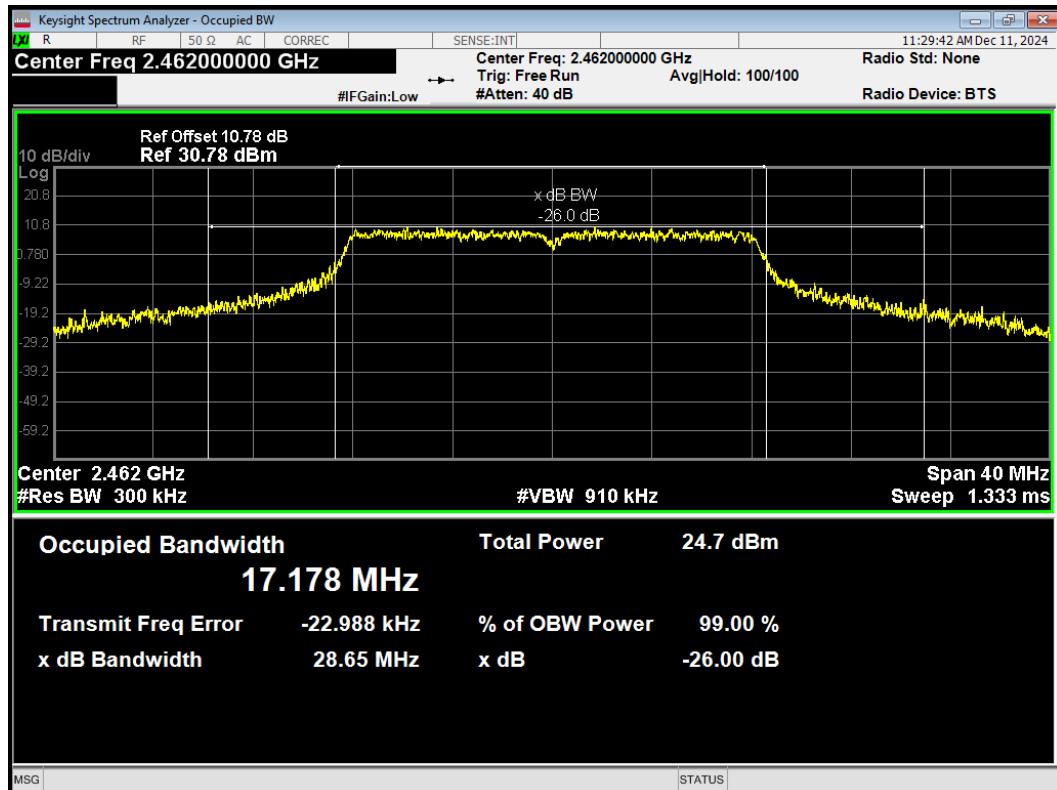
OBW 802.11g 2412MHz



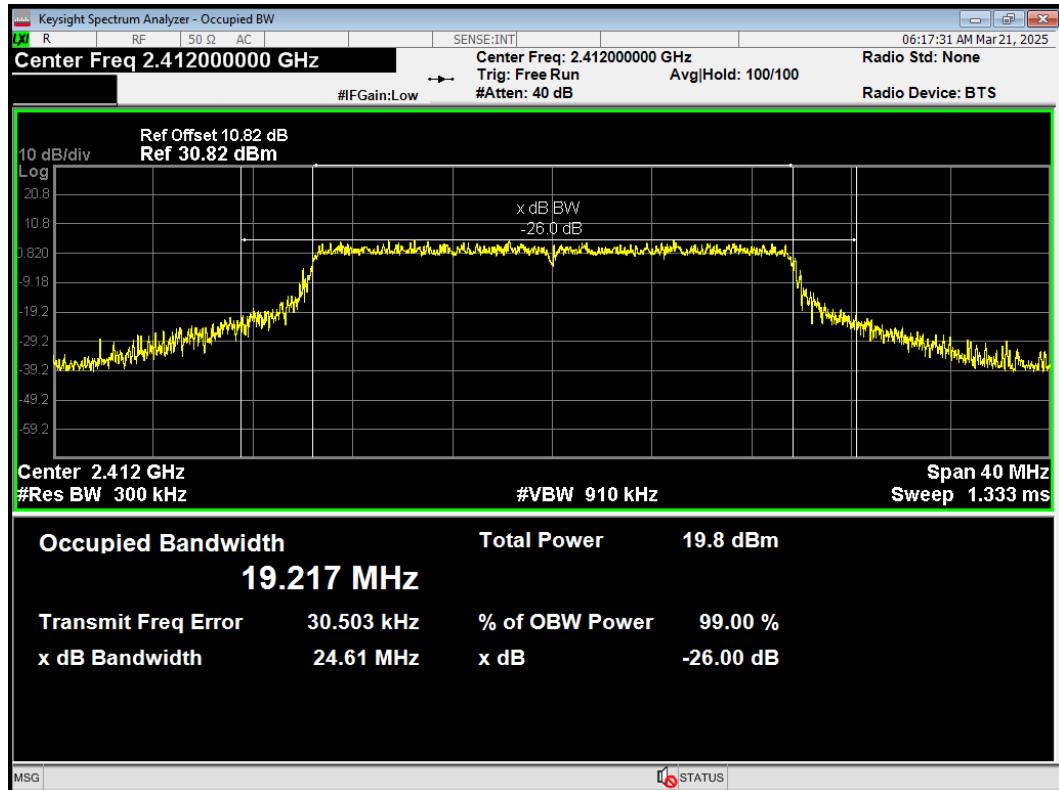
OBW 802.11g 2437MHz



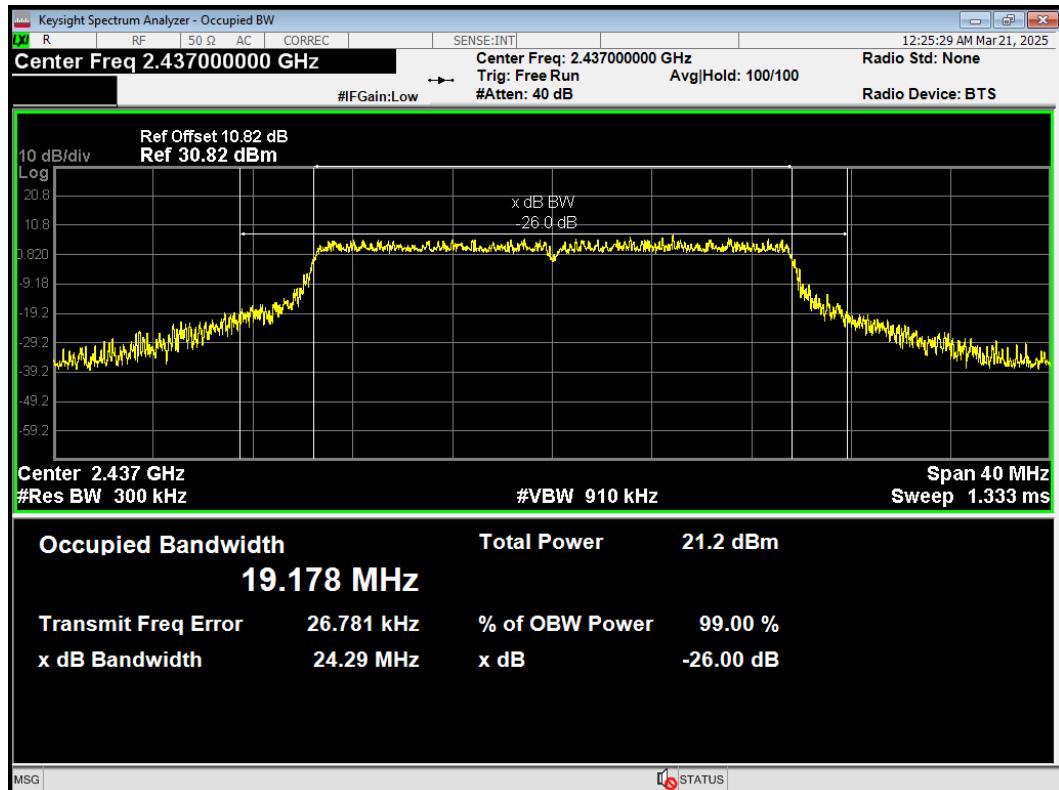
OBW 802.11g 2462MHz



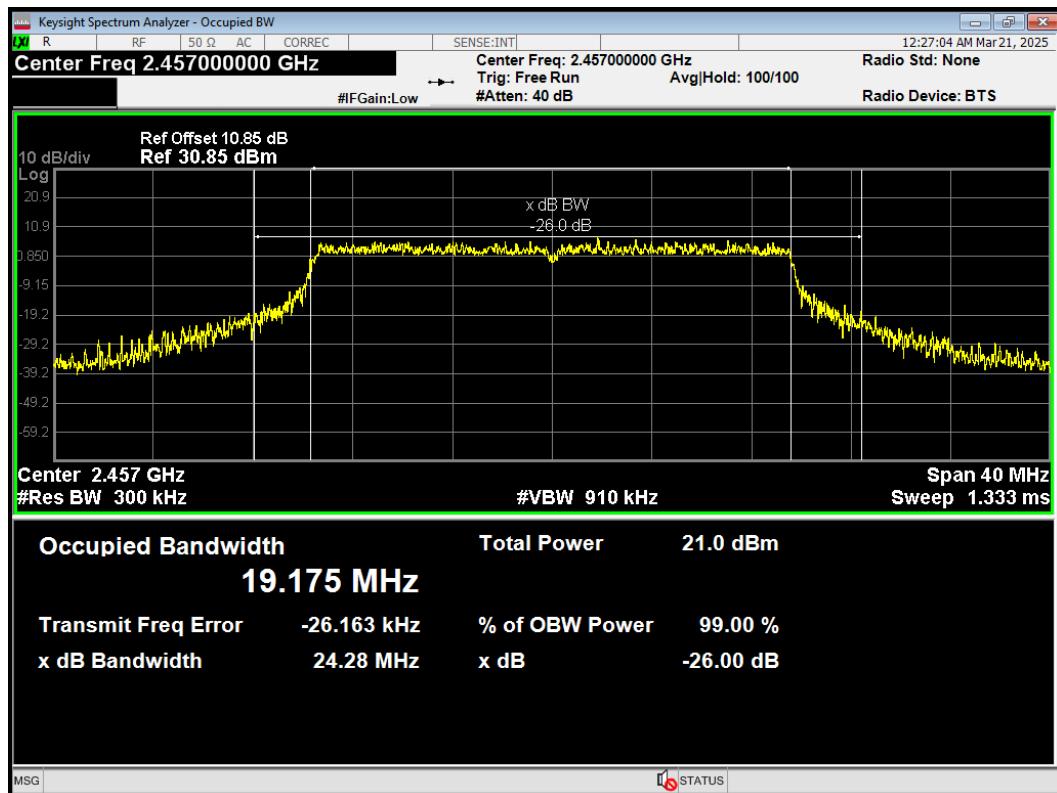
OBW 802.11ax(HE20) 2412MHz



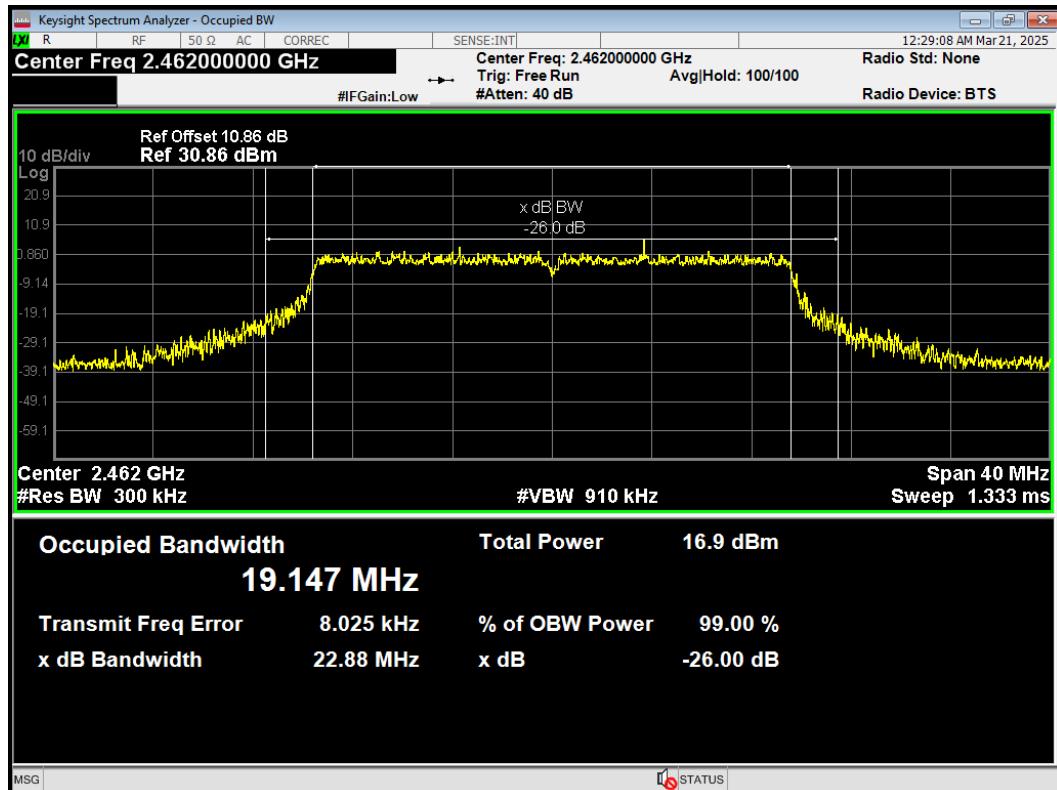
OBW 802.11ax(HE20) 2437MHz



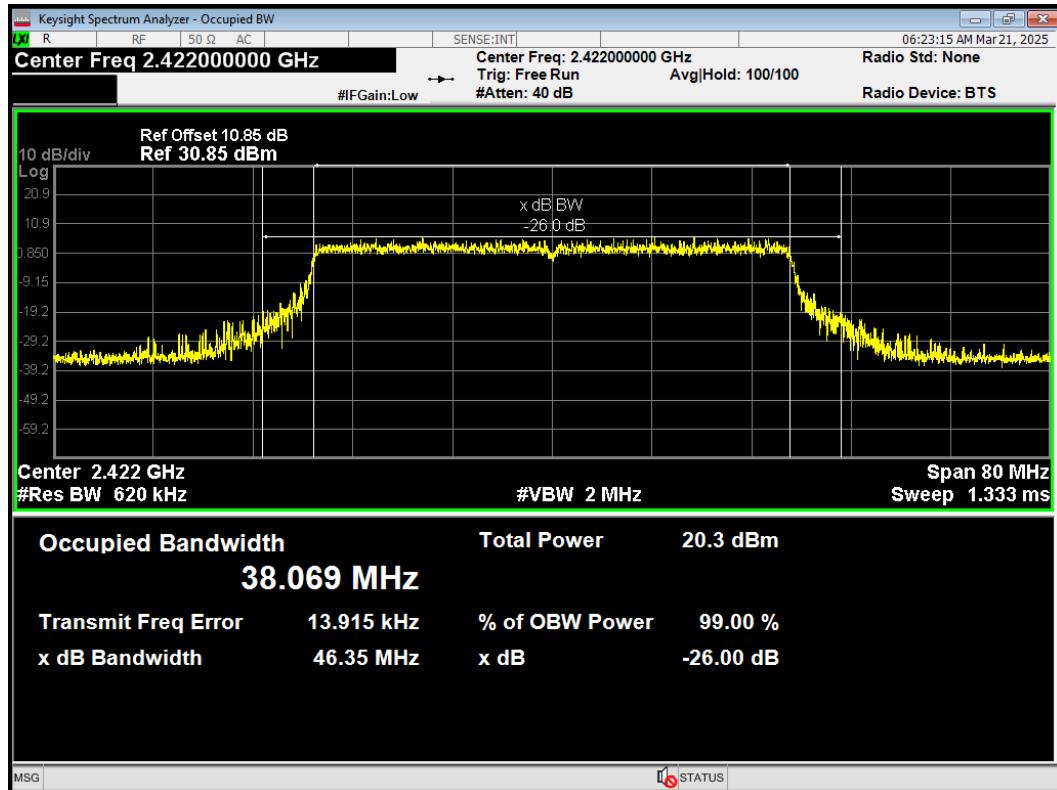
OBW 802.11ax(HE20) 2457MHz



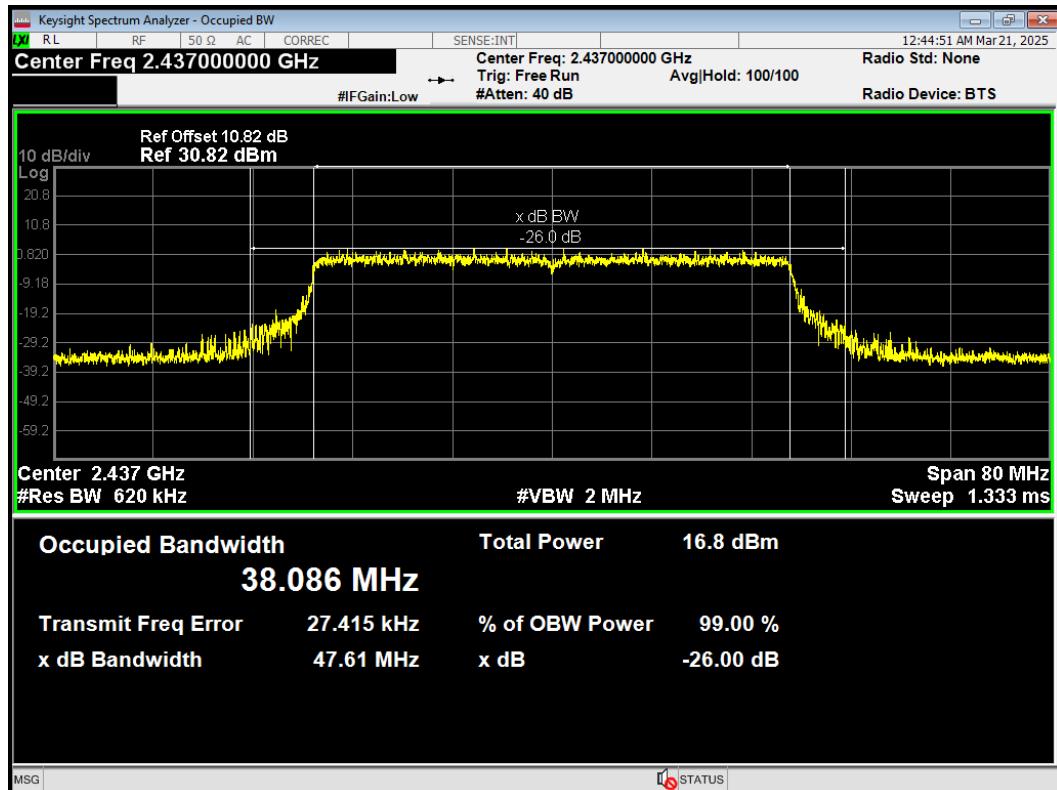
OBW 802.11ax(HE20) 2462MHz



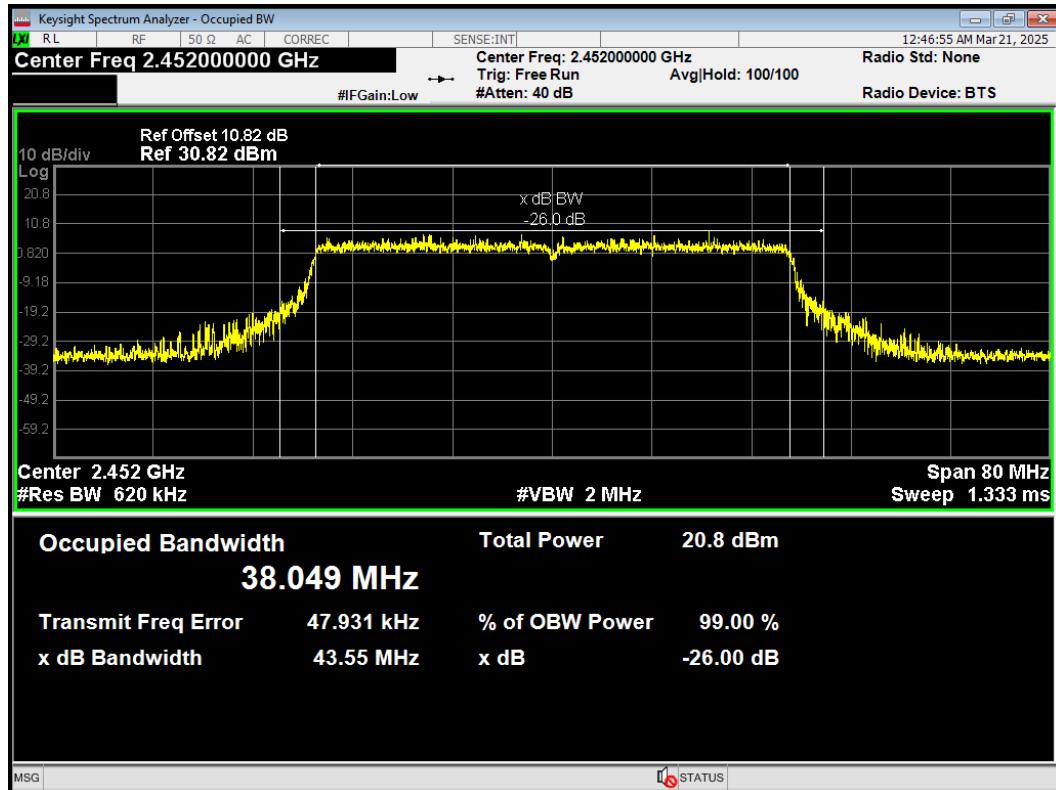
OBW 802.11ax(HE40) 2422MHz



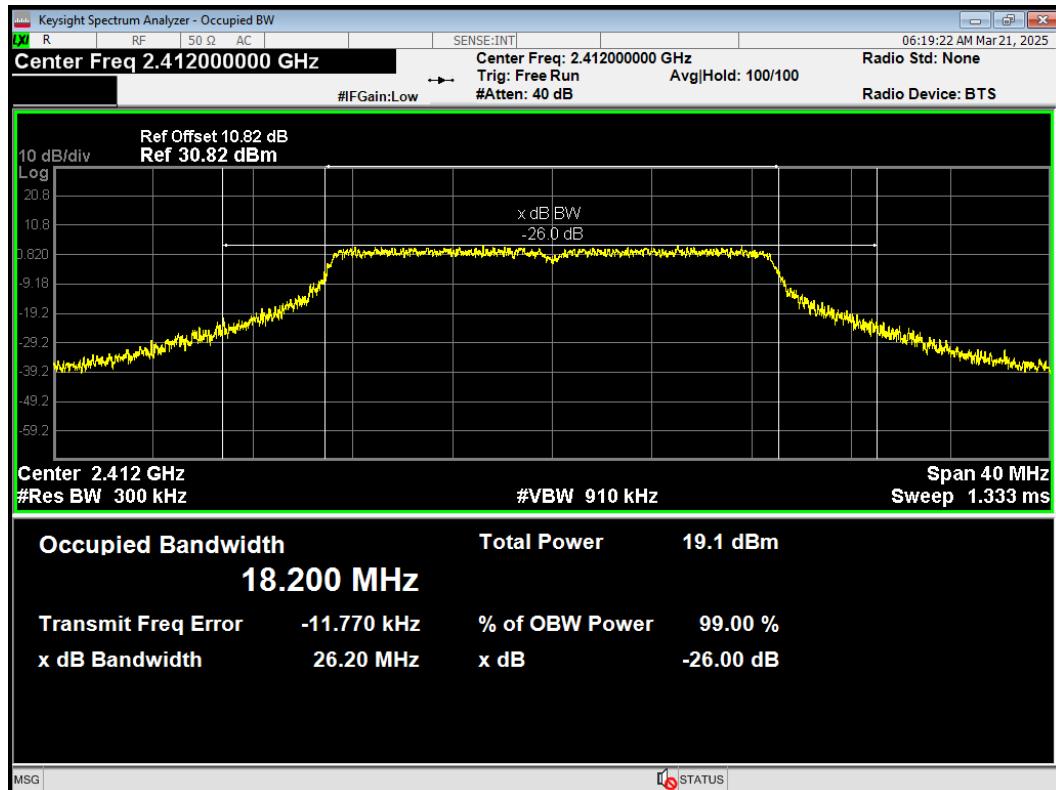
OBW 802.11ax(HE40) 2437MHz



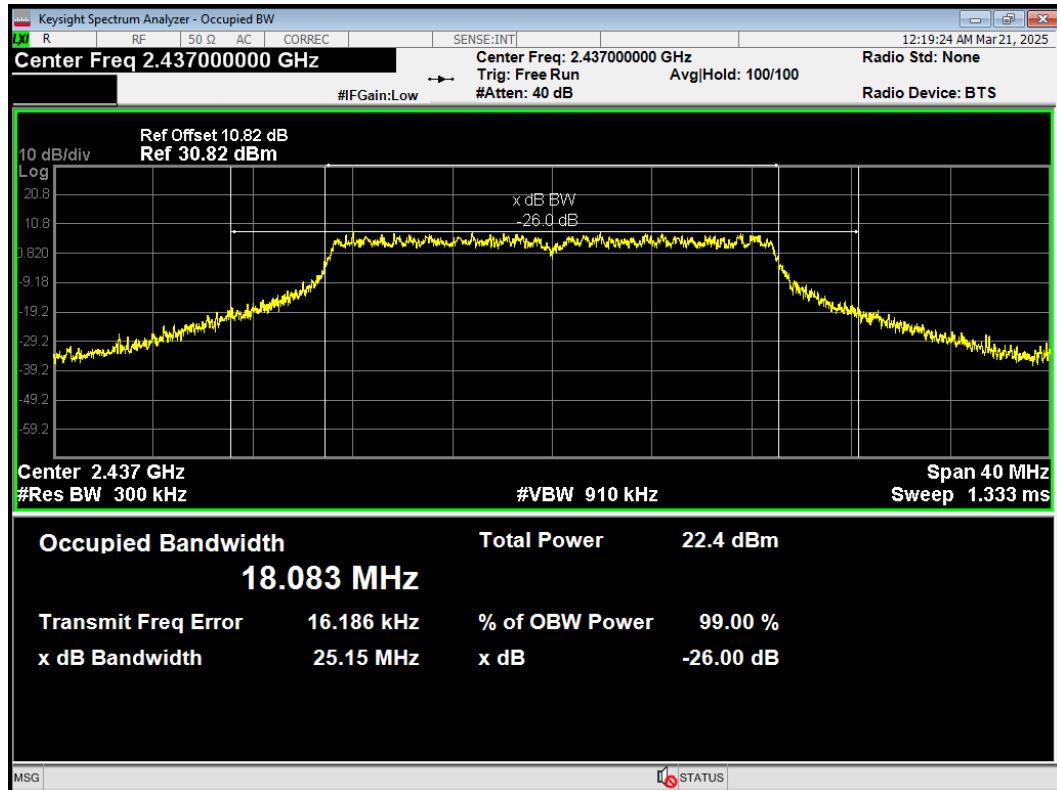
OBW 802.11ax(HE40) 2452MHz



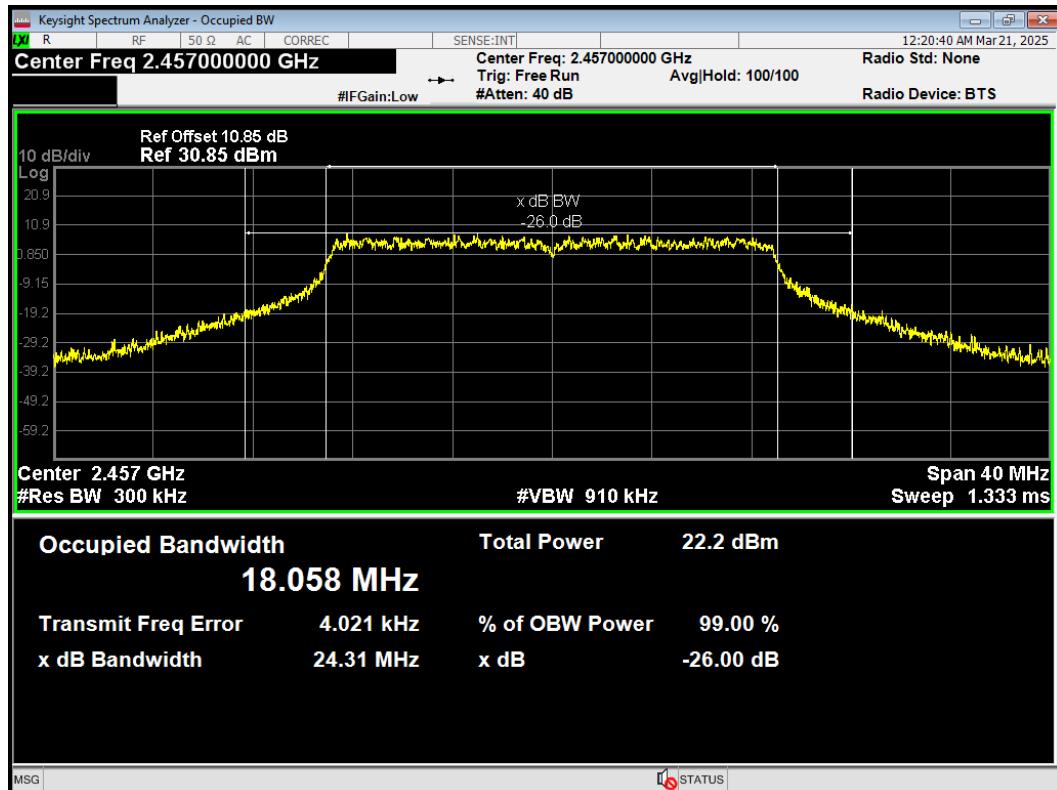
OBW 802.11n(HT20) 2412MHz



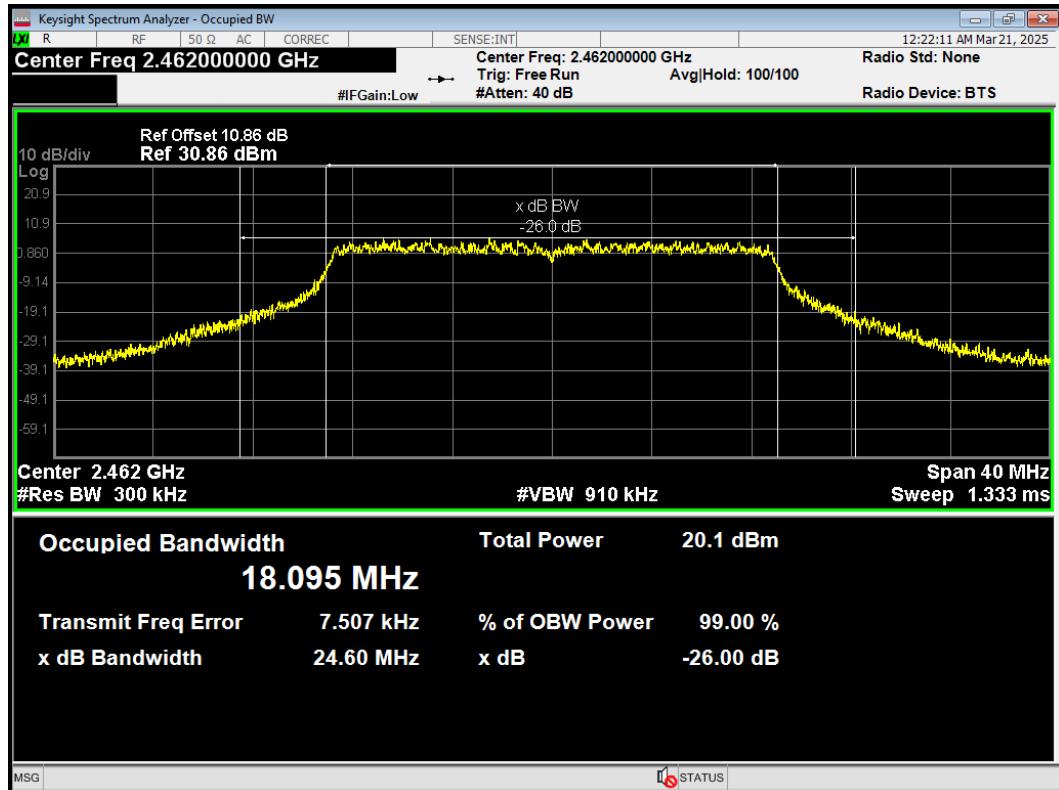
OBW 802.11n(HT20) 2437MHz



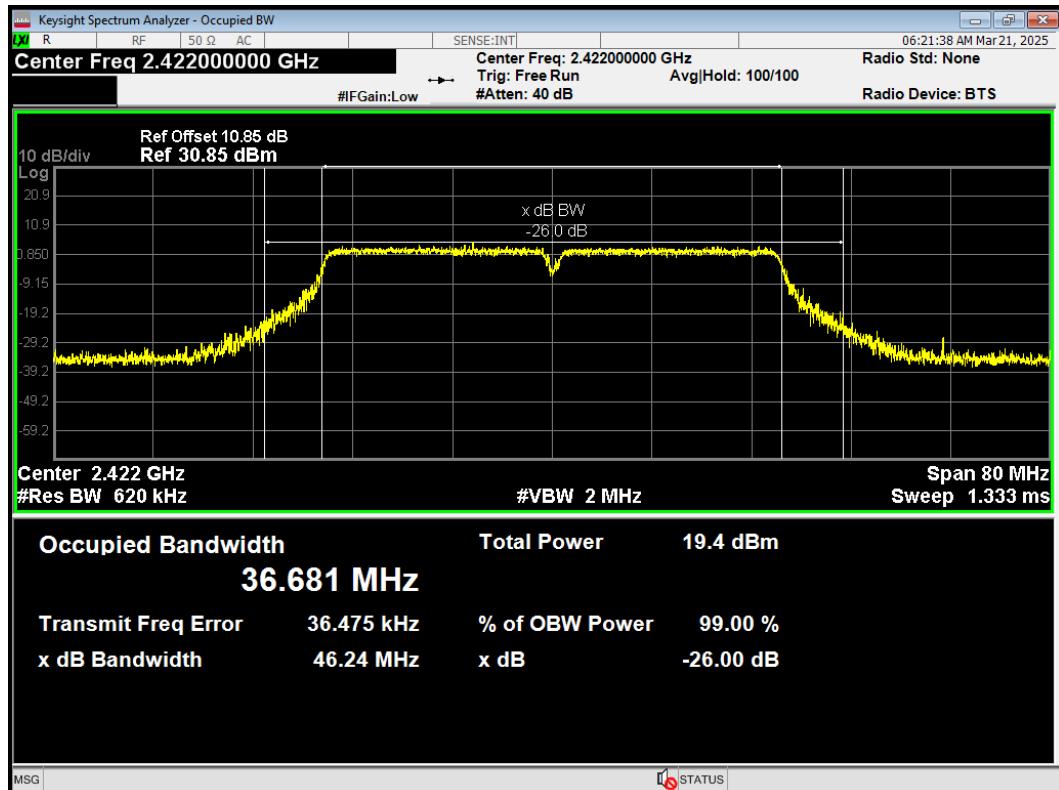
OBW 802.11n(HT20) 2457MHz



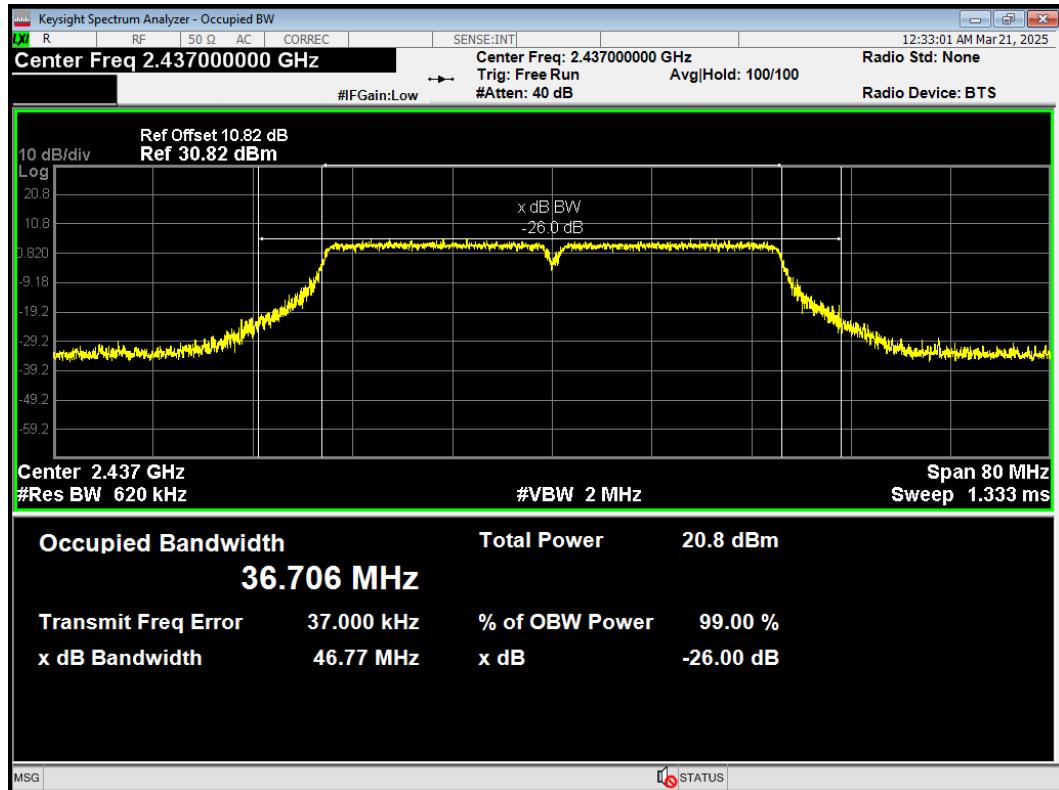
OBW 802.11n(HT20) 2462MHz



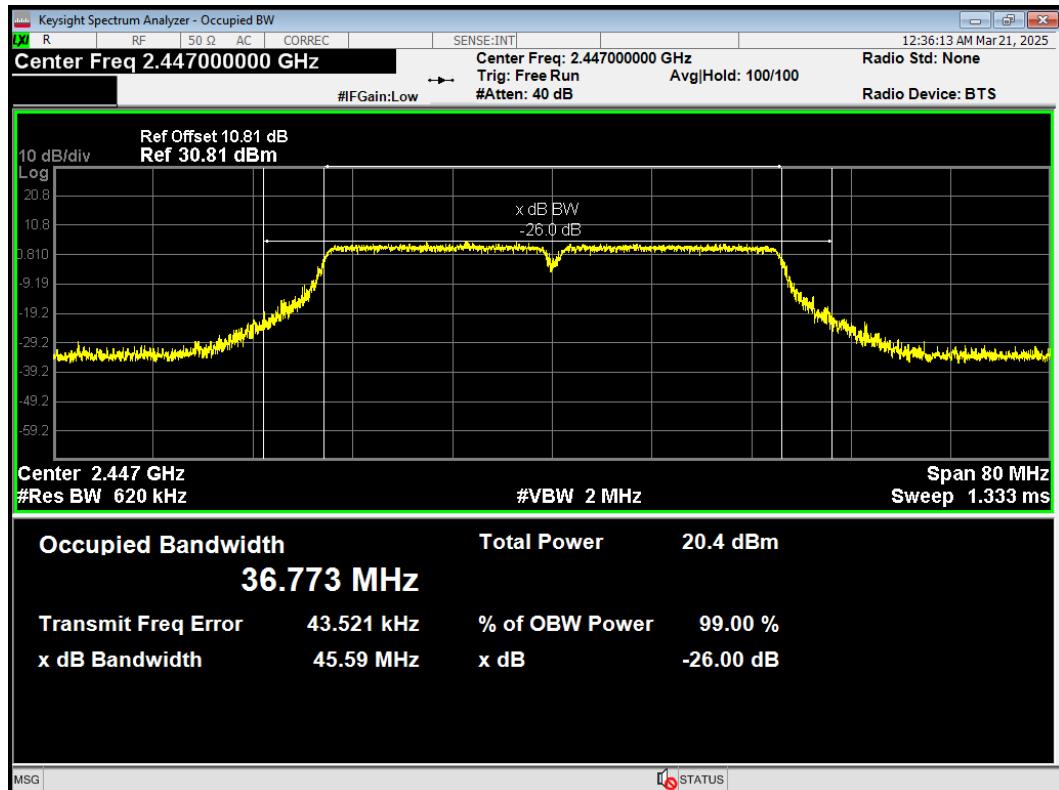
OBW 802.11n(HT40) 2422MHz



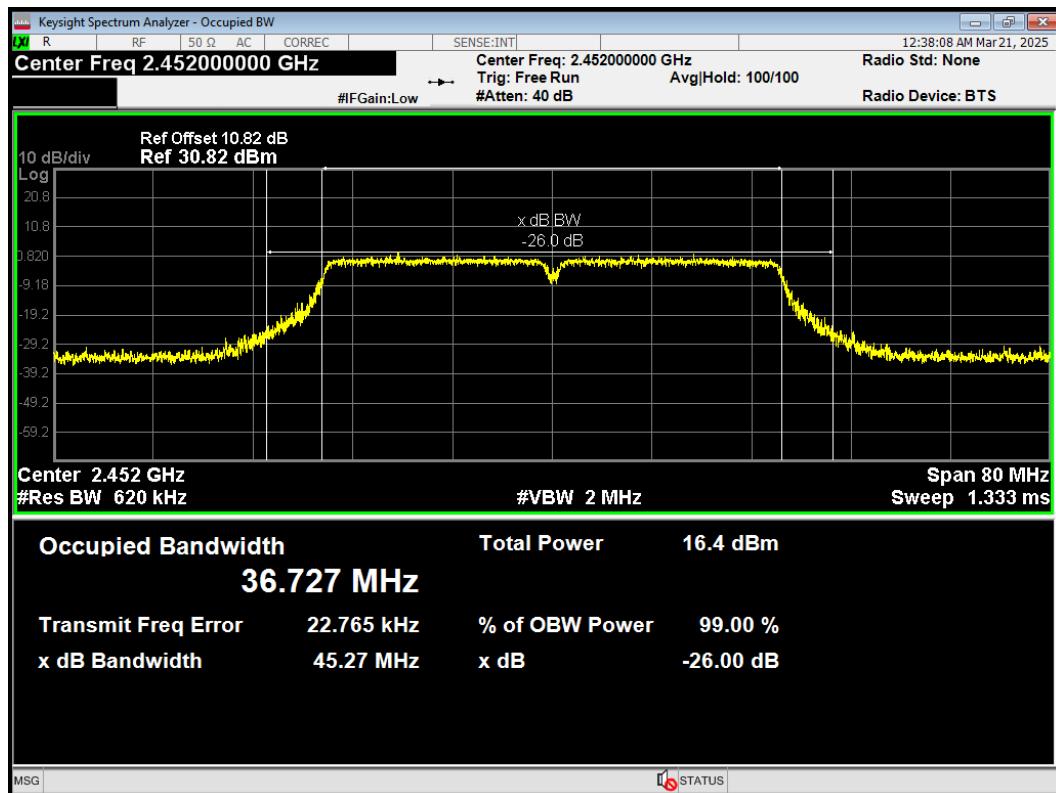
OBW 802.11n(HT40) 2437MHz



OBW 802.11n(HT40) 2447MHz

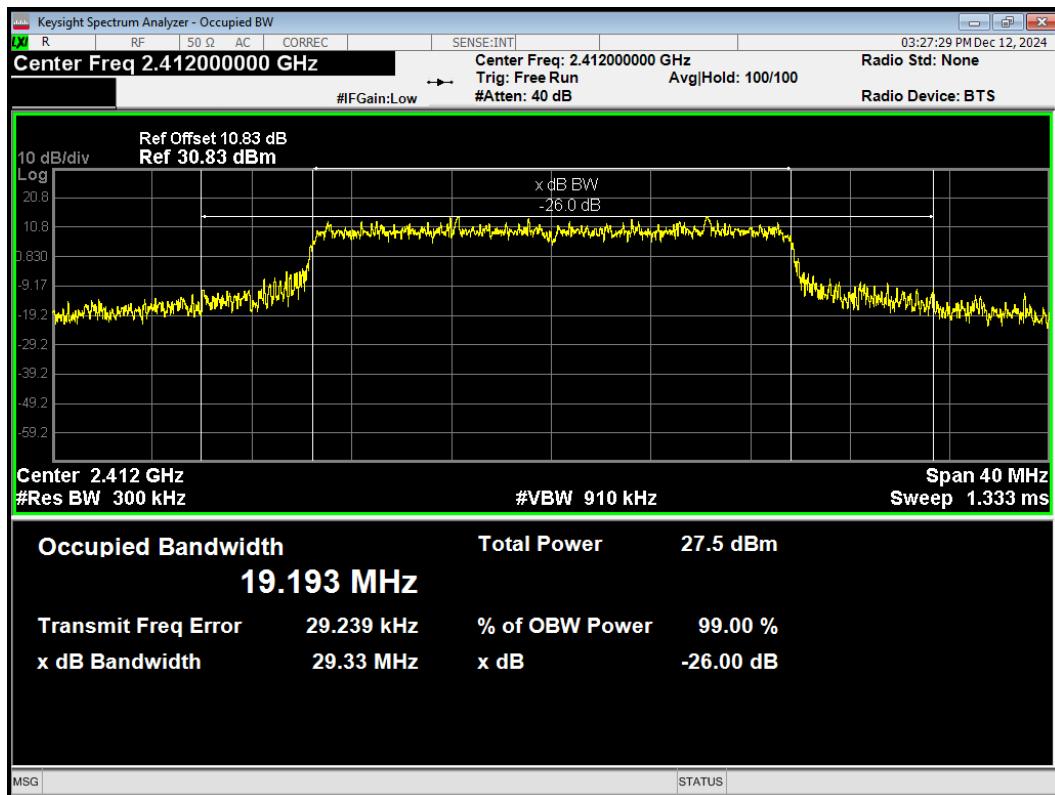


OBW 802.11n(HT40) 2452MHz

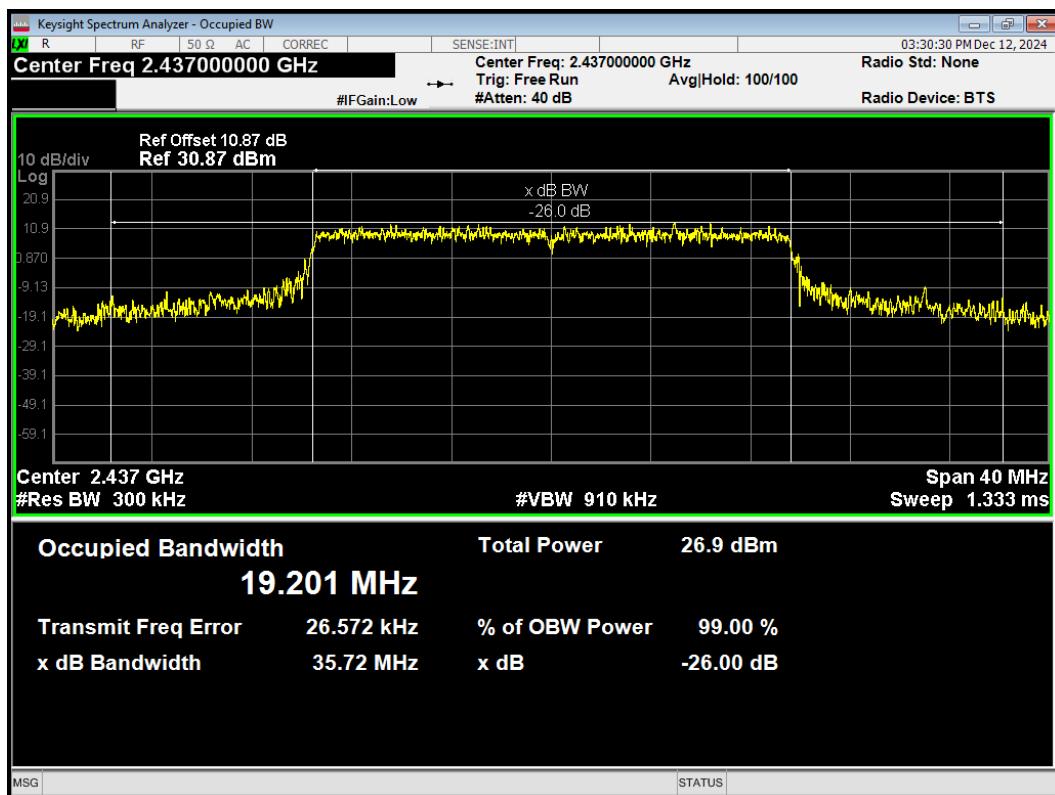


ERSU Mode

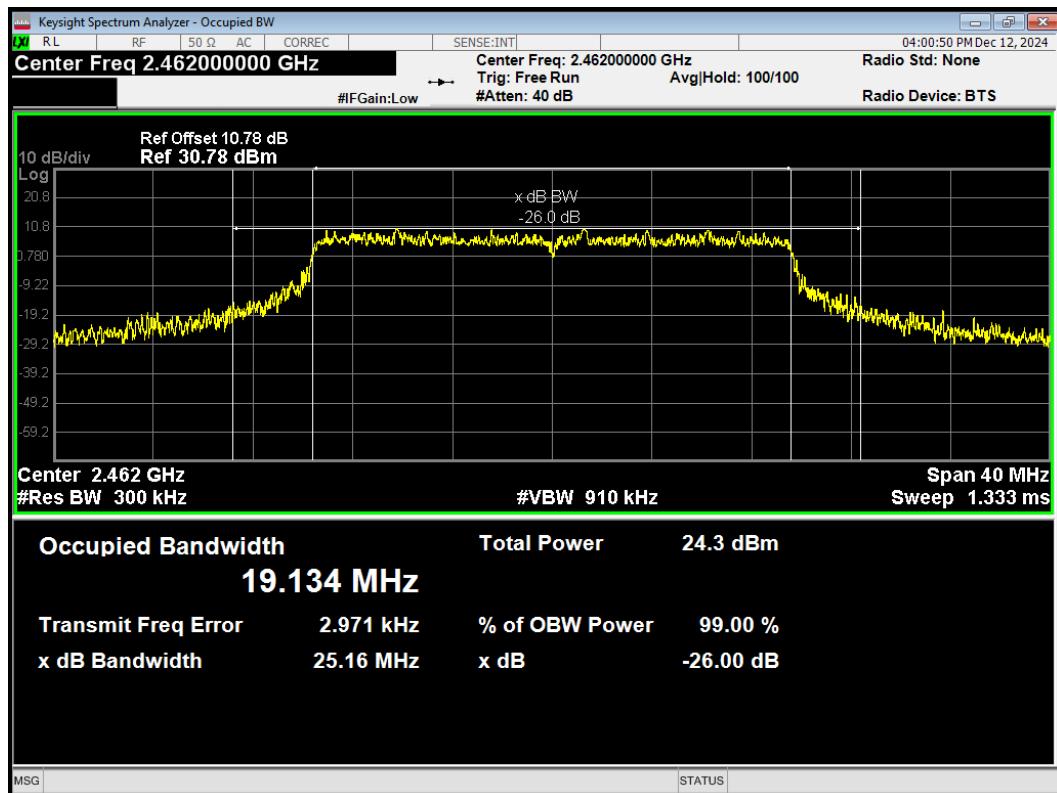
OBW 802.11ax(HE20) 242-Tones 2412MHz



OBW 802.11ax(HE20) 242-Tones 2437MHz

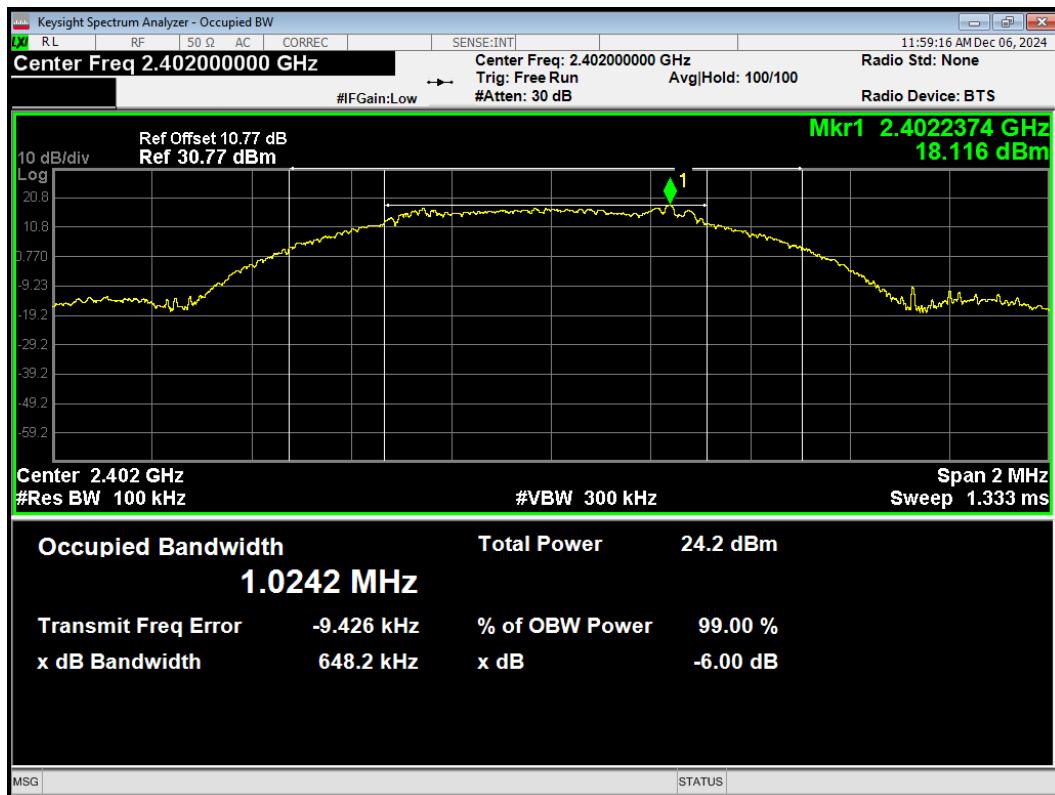


OBW 802.11ax(HE20) 242-Tones 2462MHz

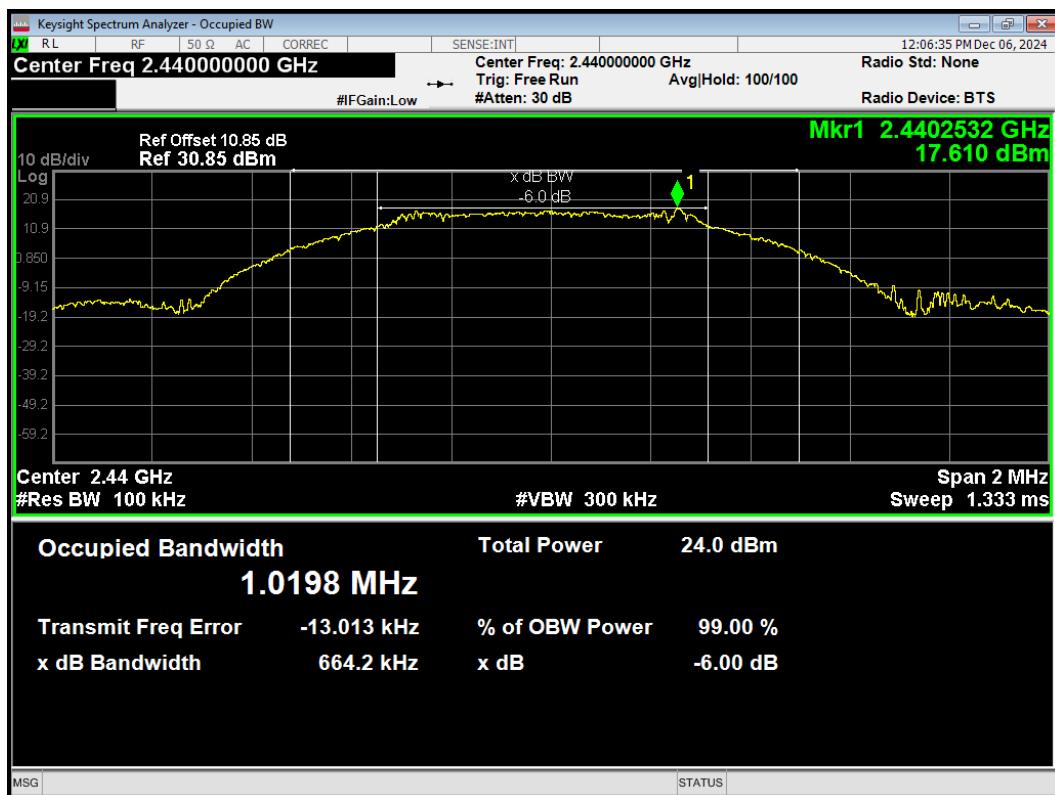


6 dB bandwidth

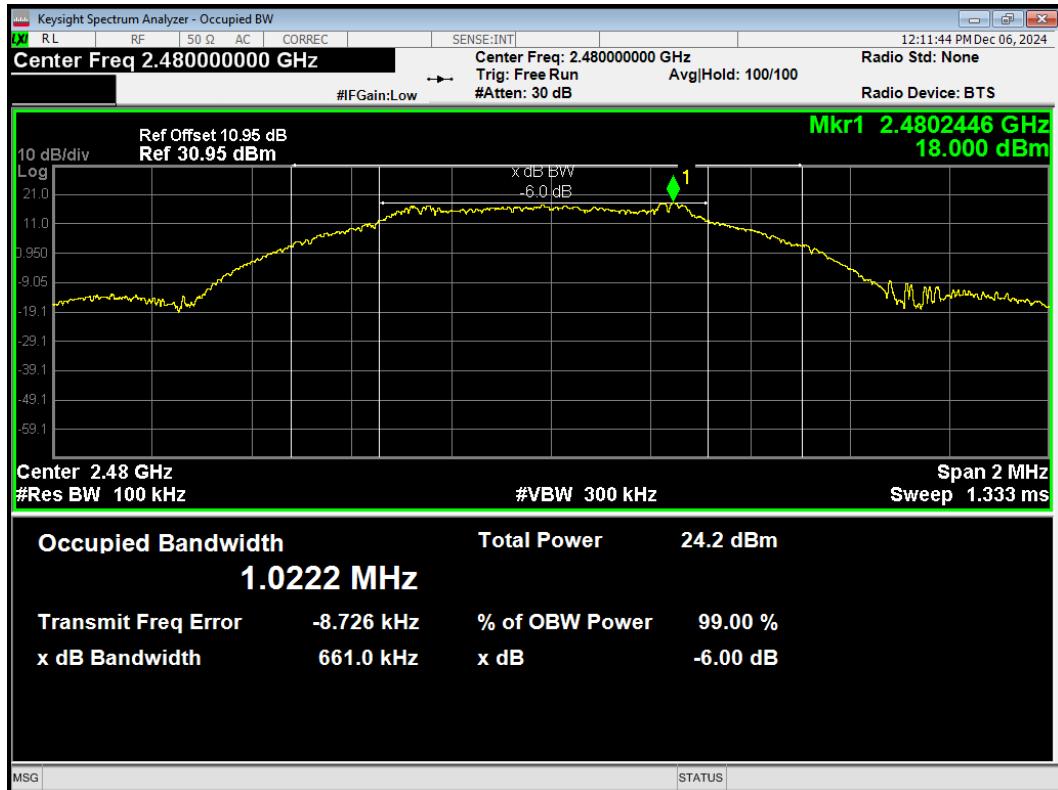
-6dB Bandwidth Bluetooth LE (1M) 2402MHz



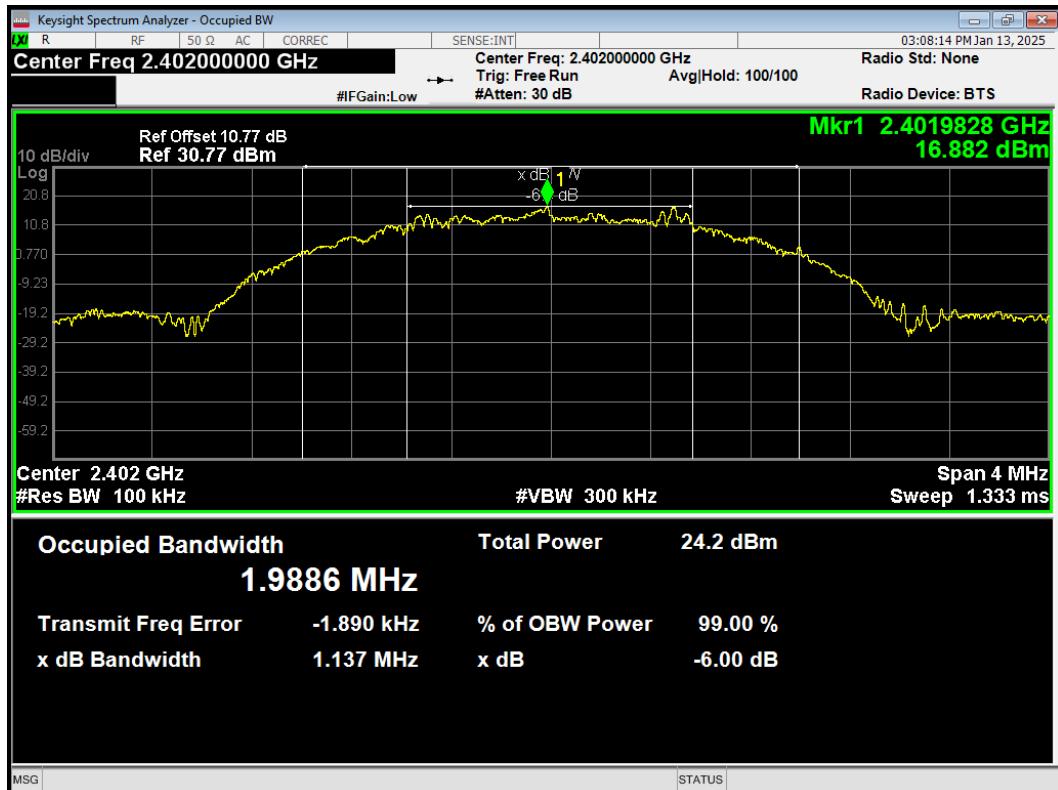
-6dB Bandwidth Bluetooth LE (1M) 2440MHz



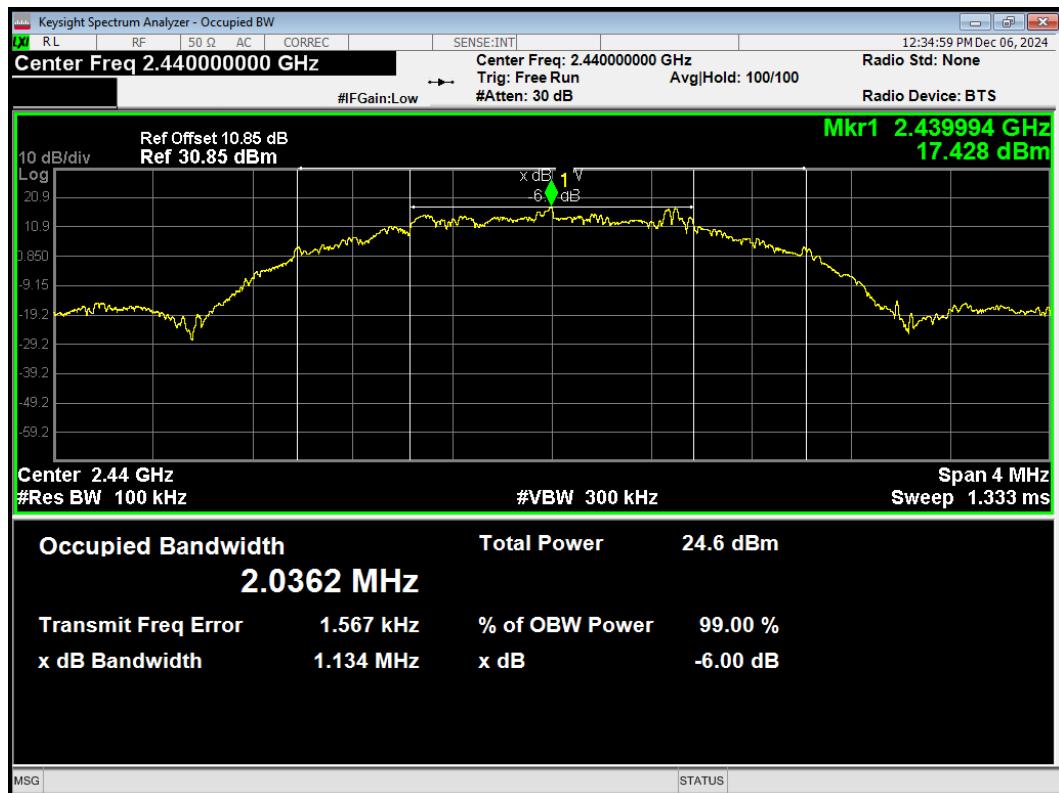
-6dB Bandwidth Bluetooth LE (1M) 2480MHz



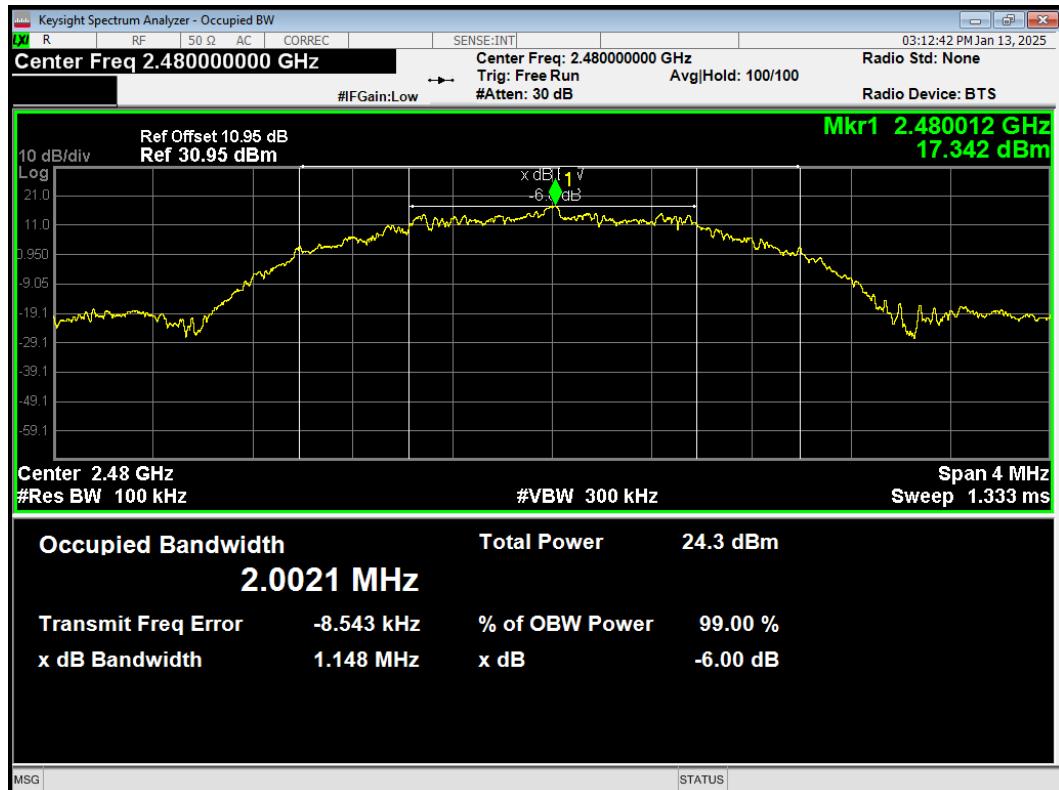
-6dB Bandwidth Bluetooth LE (2M) 2402MHz



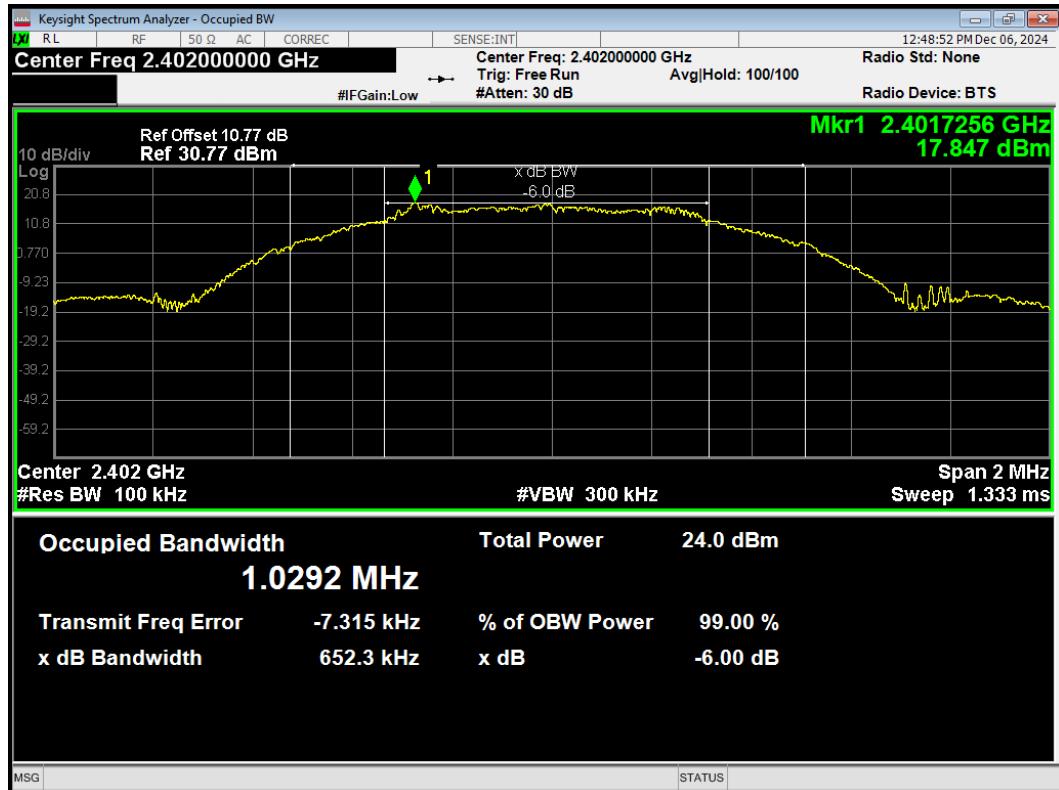
-6dB Bandwidth Bluetooth LE (2M) 2440MHz



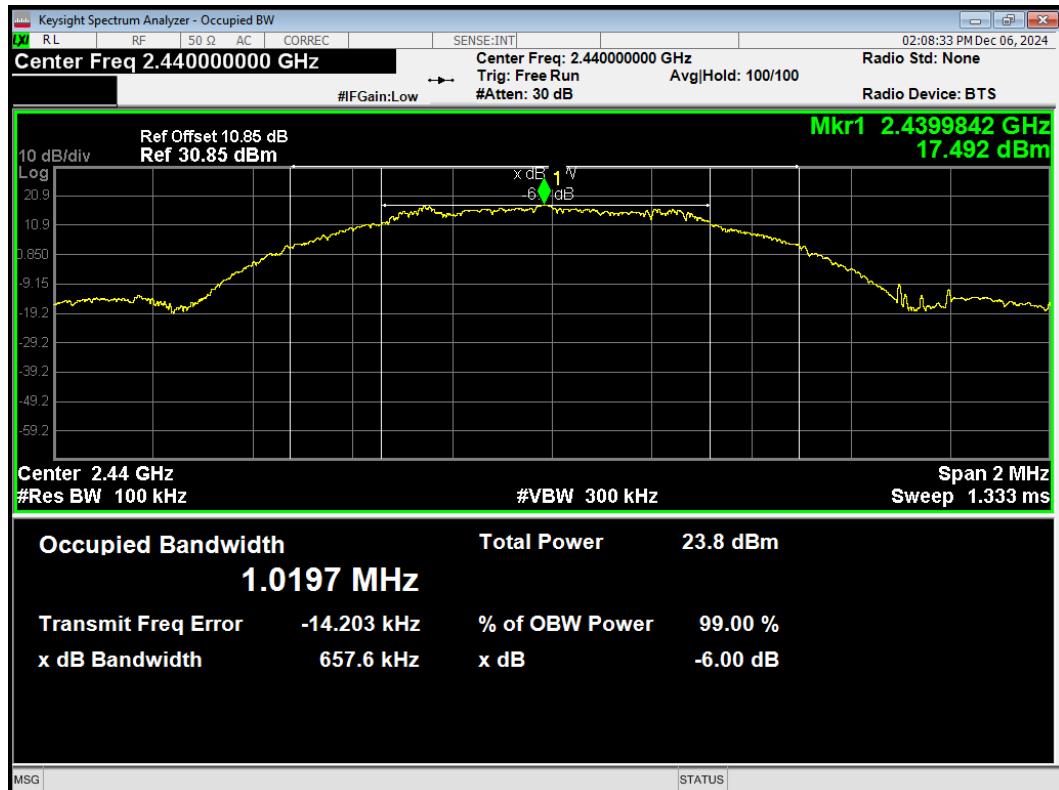
-6dB Bandwidth Bluetooth LE (2M) 2480MHz



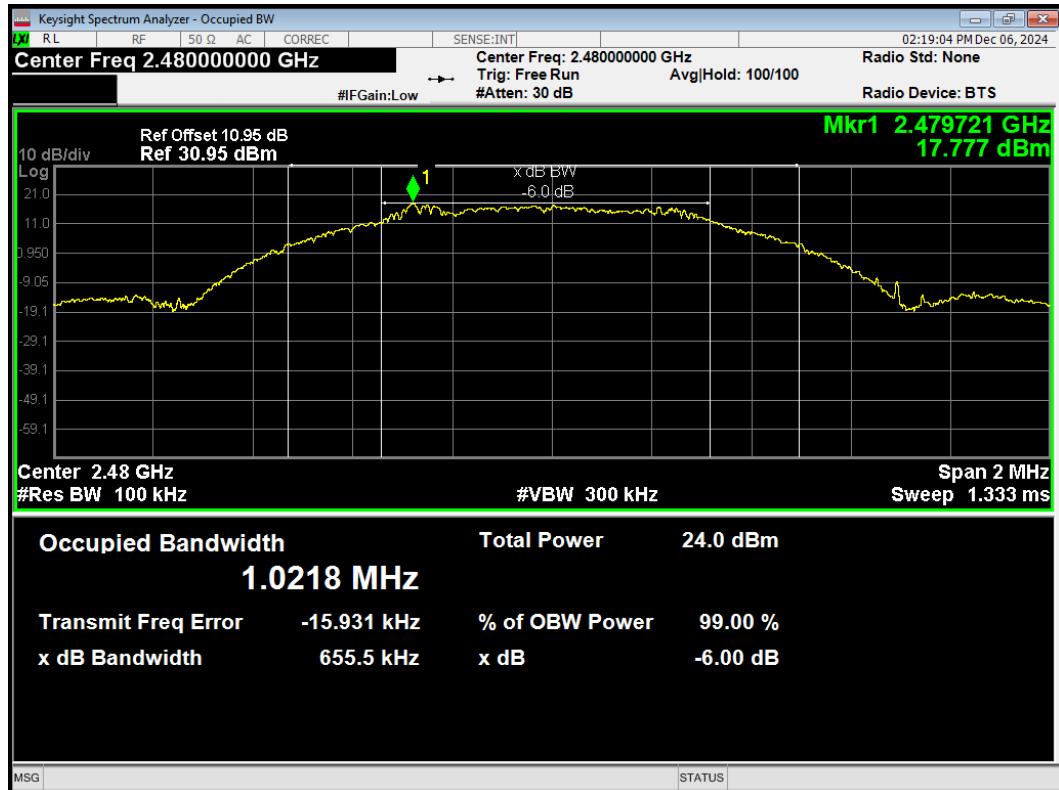
-6dB Bandwidth Bluetooth LE (S=2) 2402MHz



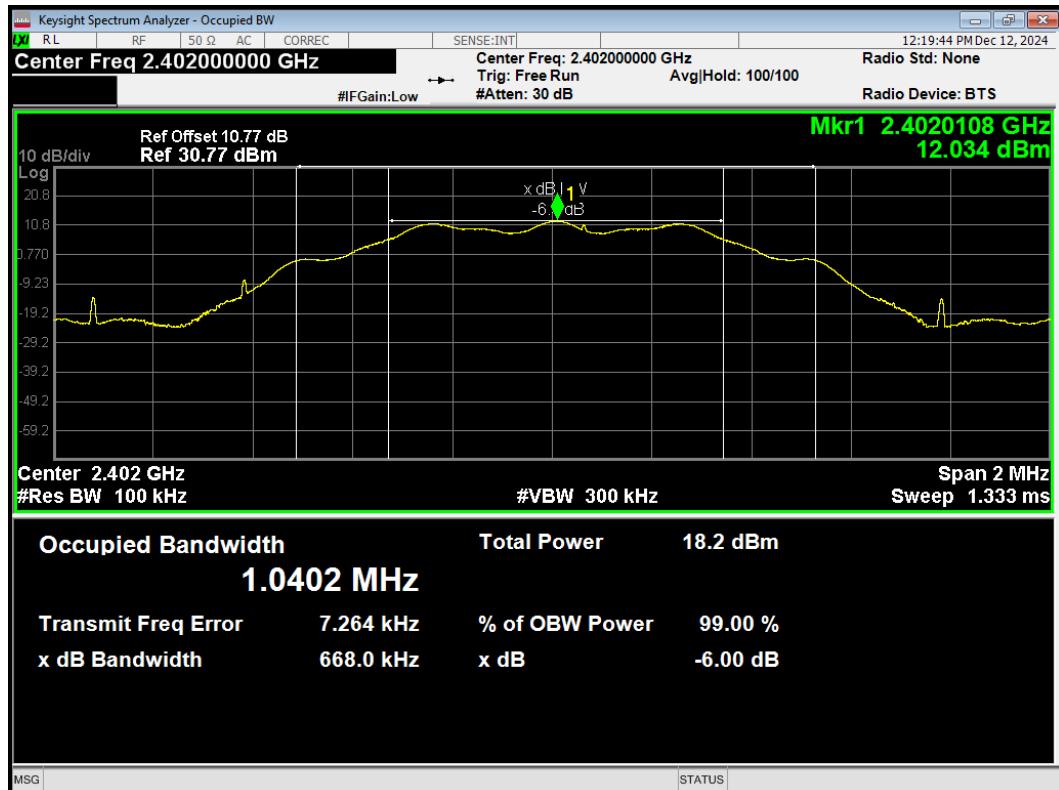
-6dB Bandwidth Bluetooth LE (S=2) 2440MHz



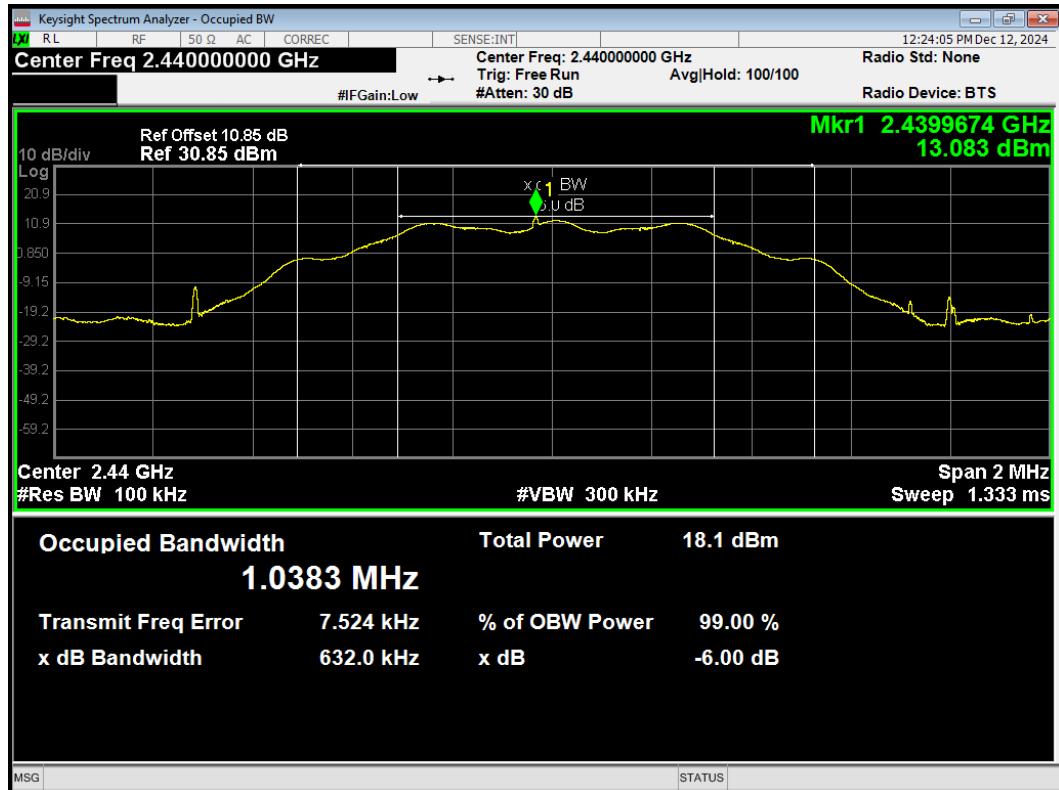
-6dB Bandwidth Bluetooth LE (S=2) 2480MHz



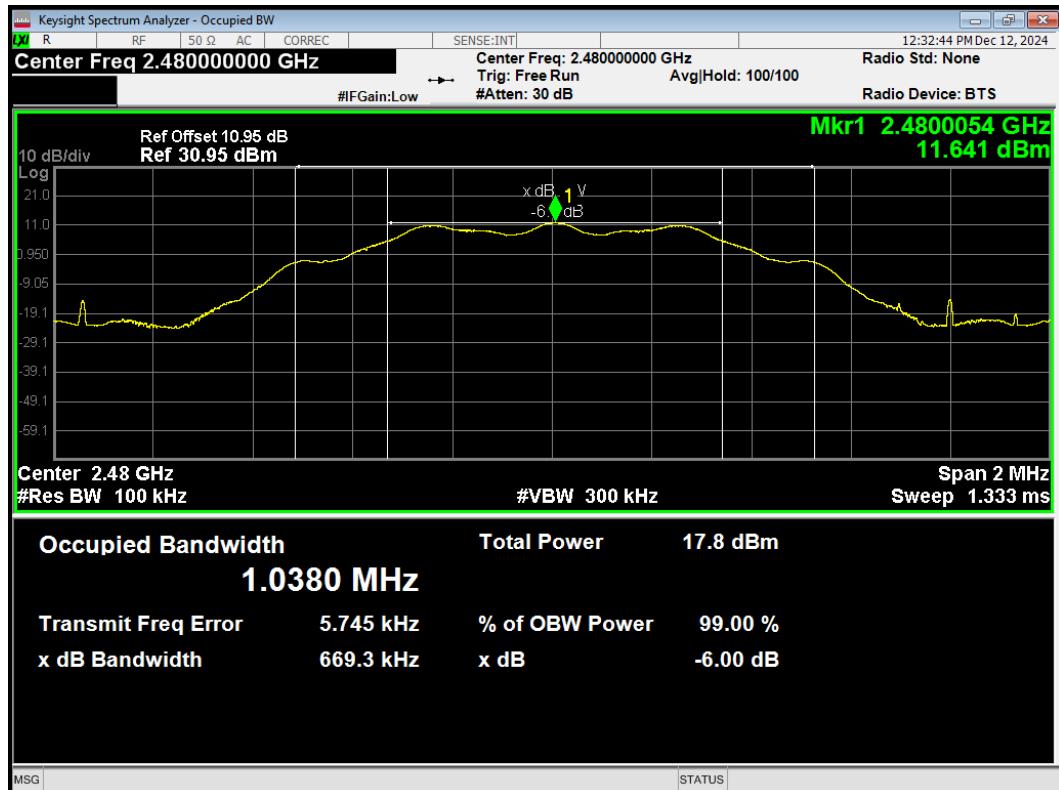
-6dB Bandwidth Bluetooth LE (S=8) 2402MHz



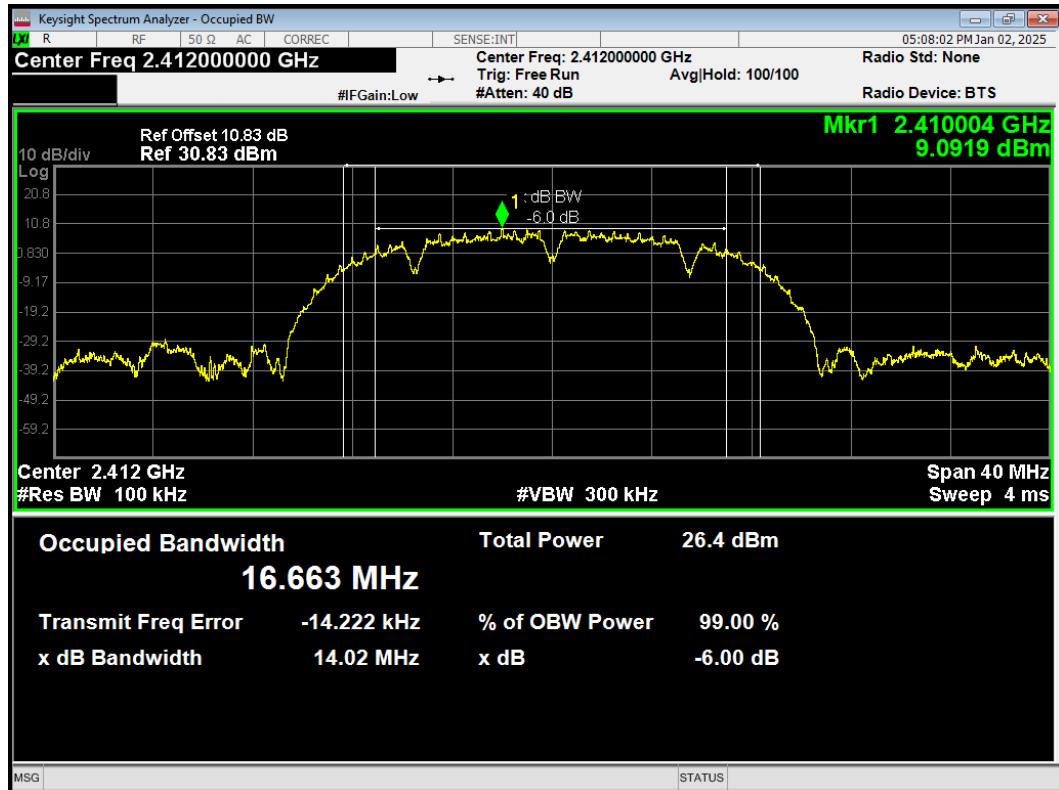
-6dB Bandwidth Bluetooth LE (S=8) 2440MHz



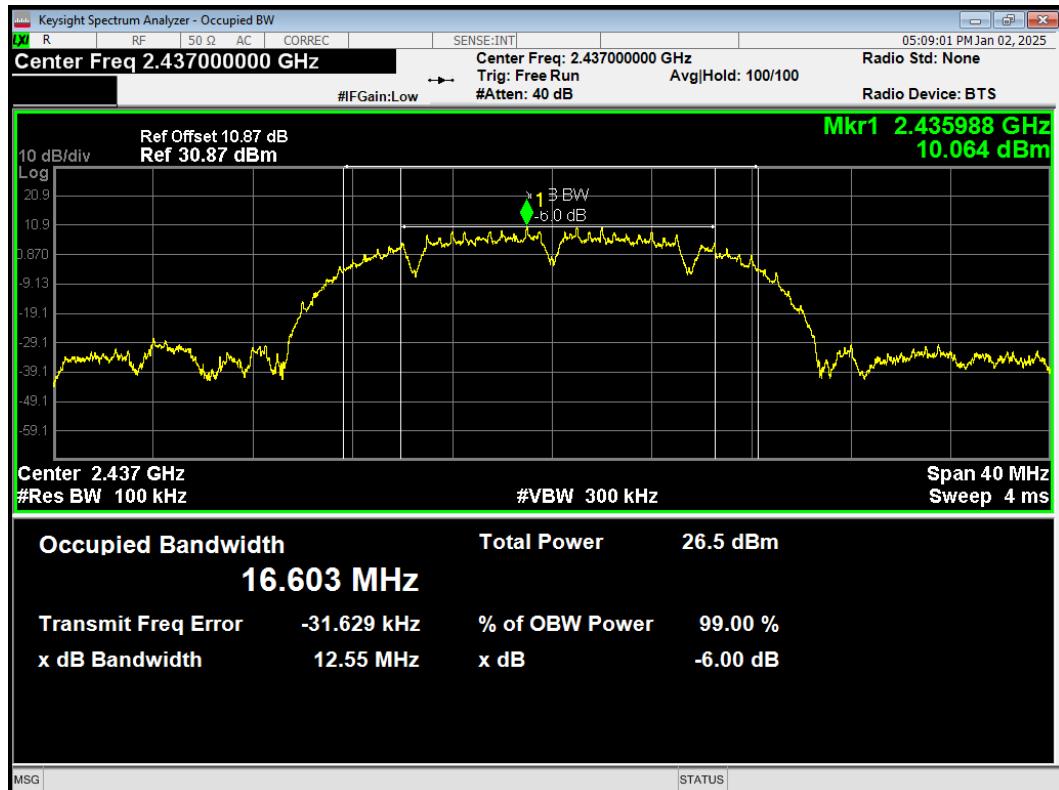
-6dB Bandwidth Bluetooth LE (S=8) 2480MHz



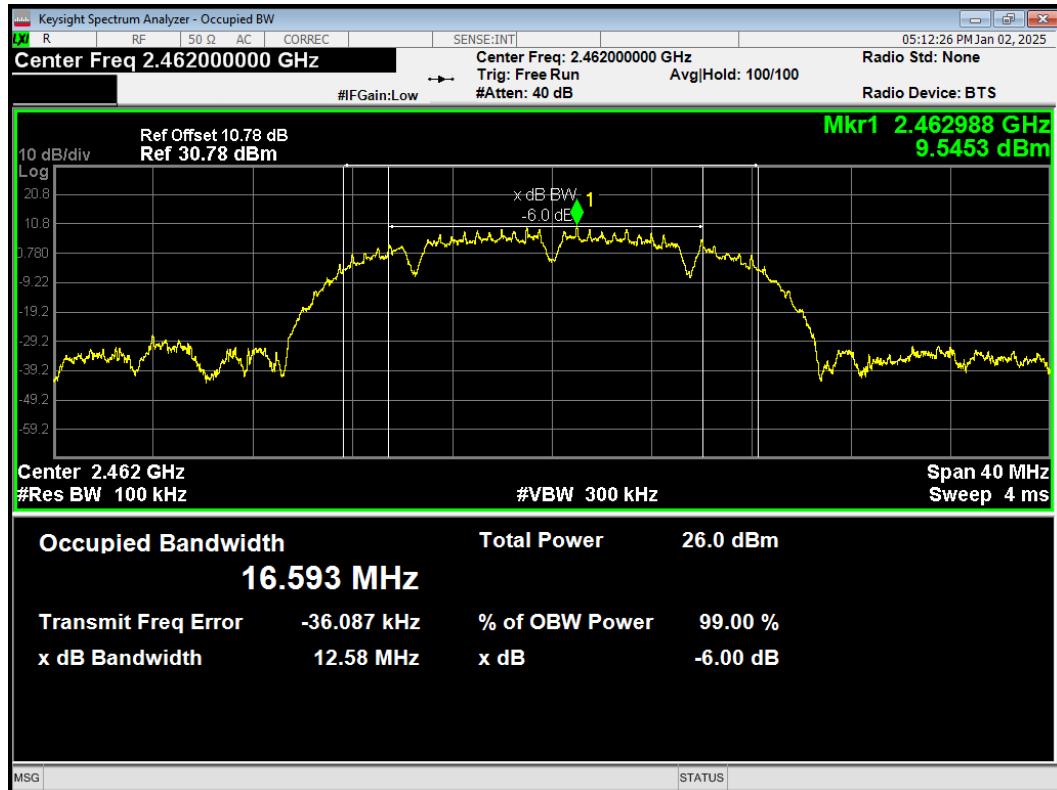
-6dB Bandwidth 802.11b 2412MHz



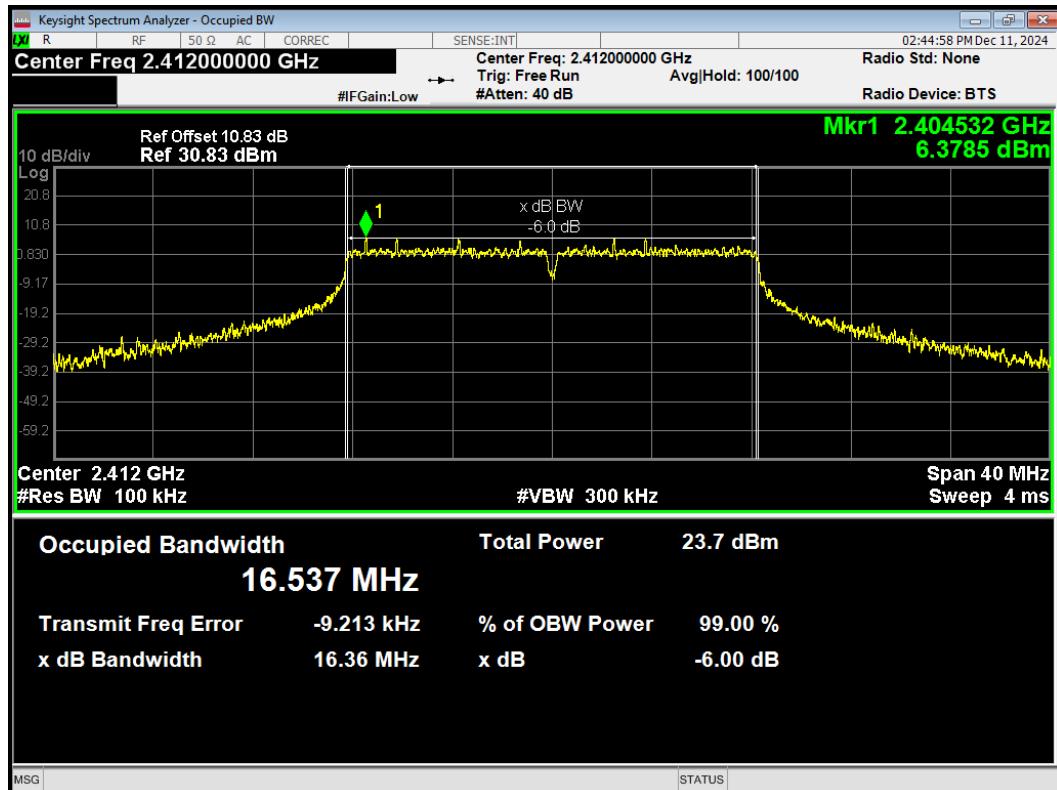
-6dB Bandwidth 802.11b 2437MHz



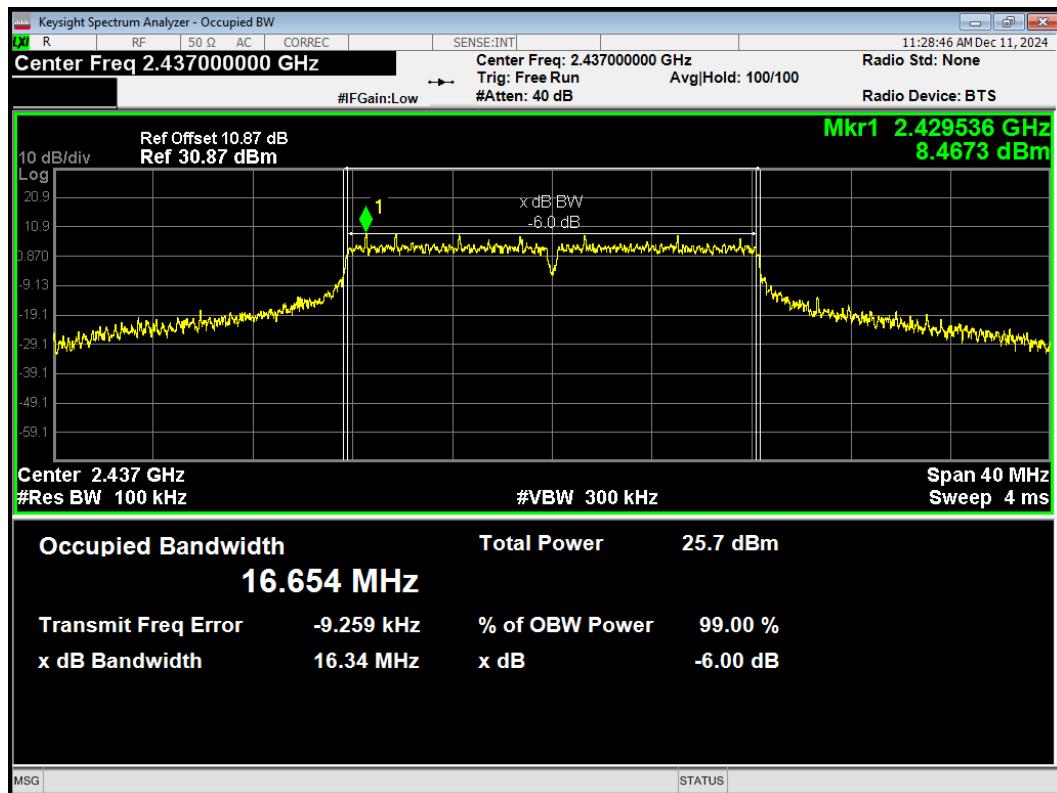
-6dB Bandwidth 802.11b 2462MHz



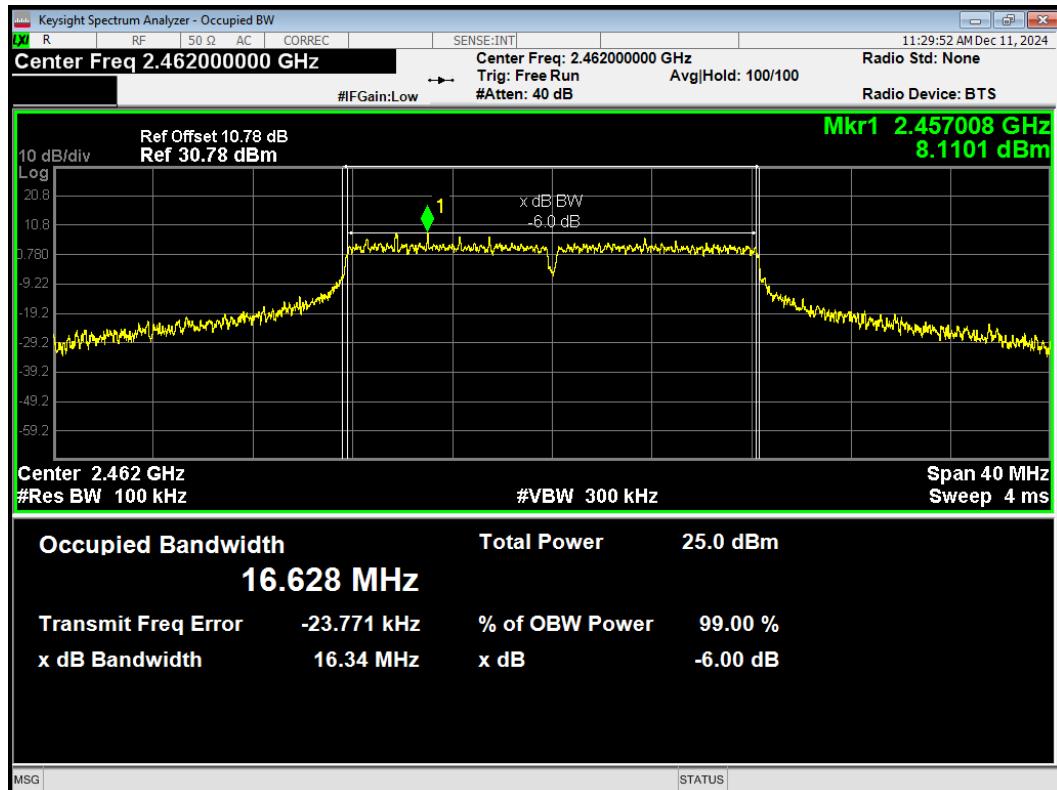
-6dB Bandwidth 802.11g 2412MHz



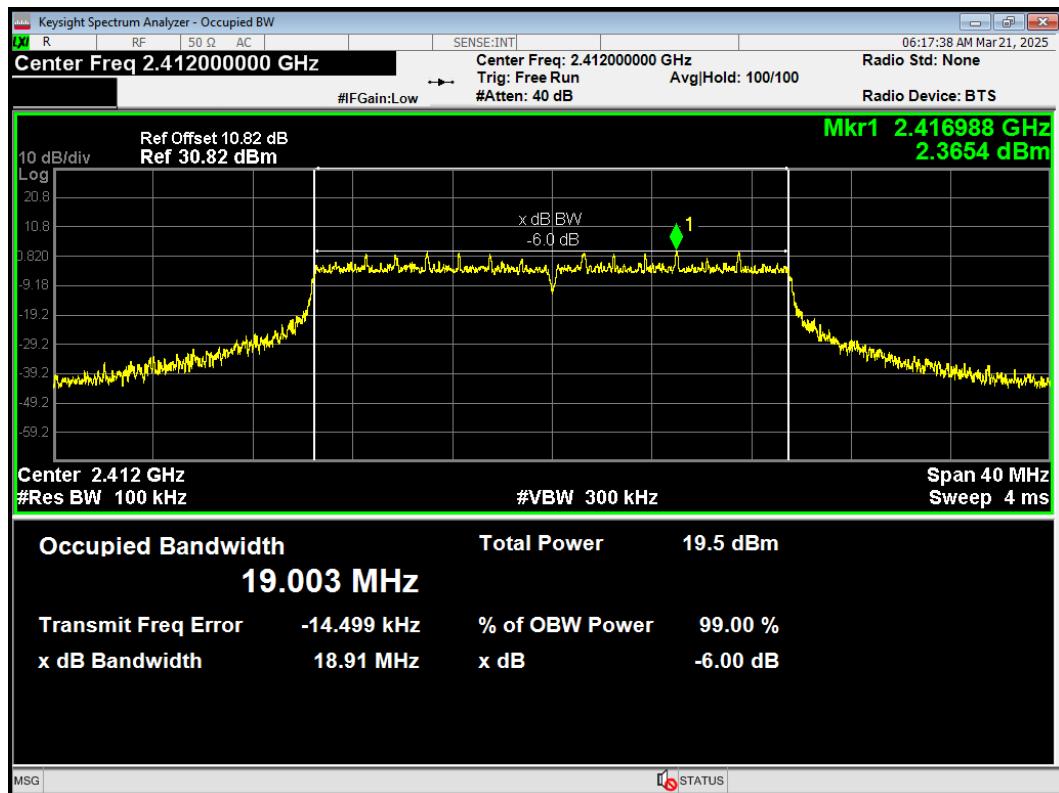
-6dB Bandwidth 802.11g 2437MHz



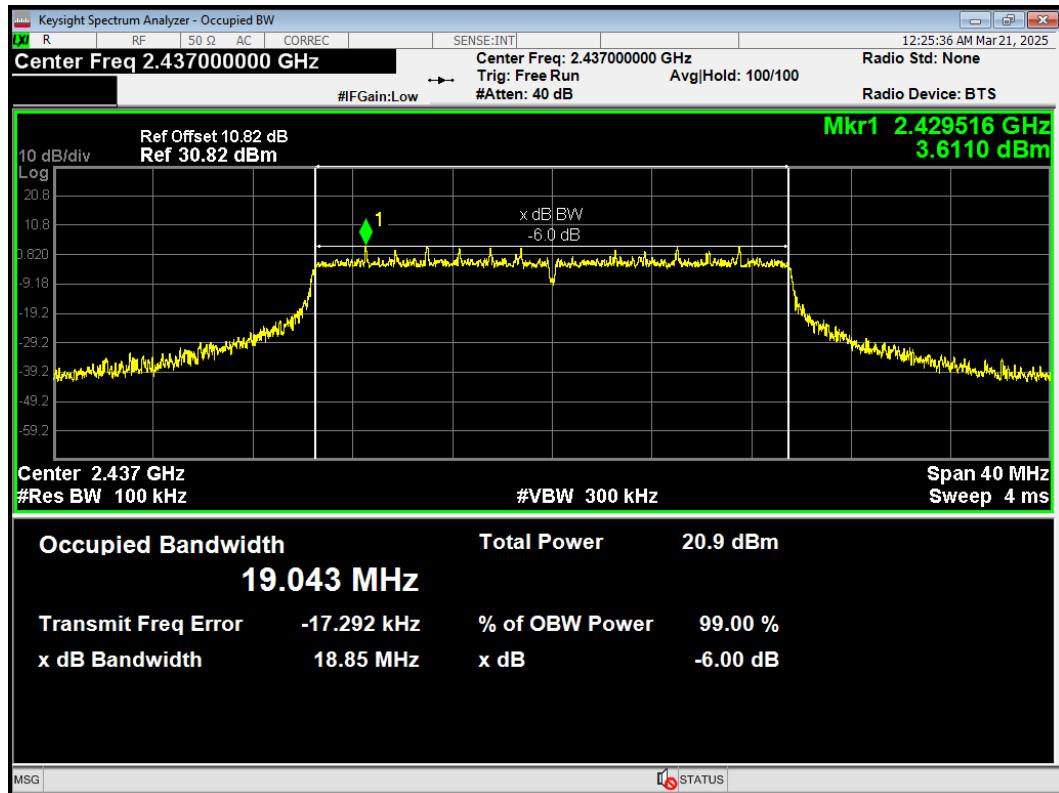
-6dB Bandwidth 802.11g 2462MHz



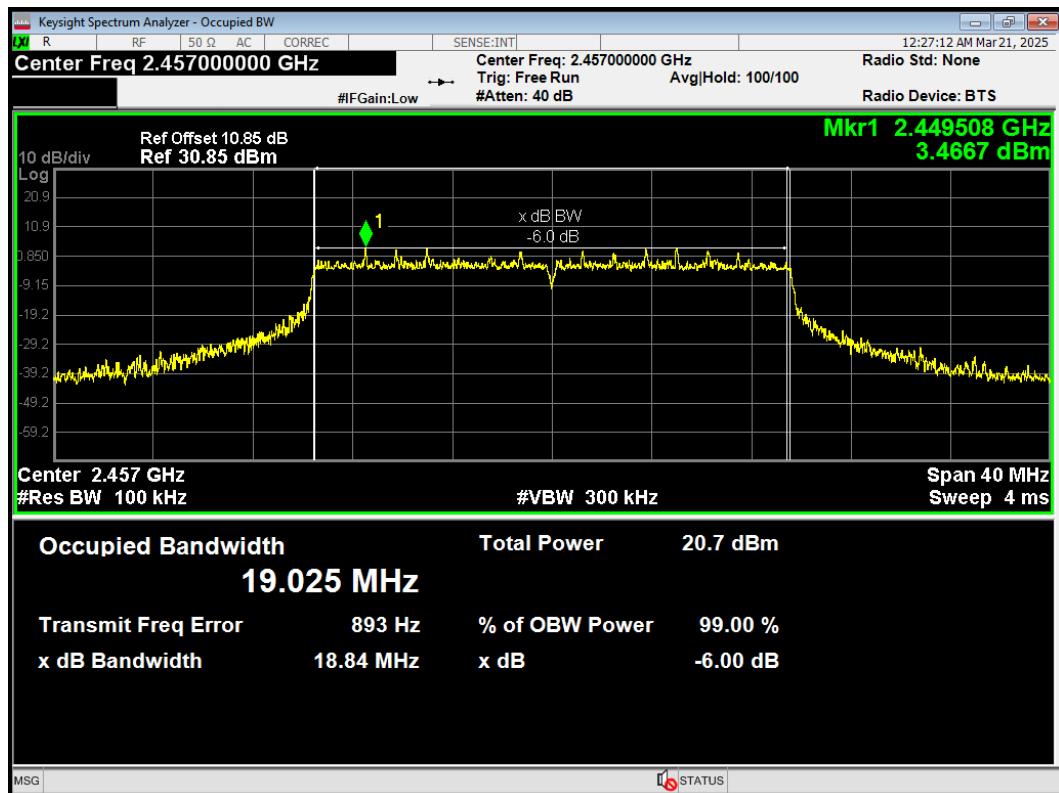
-6dB Bandwidth 802.11ax(HE20) 2412MHz



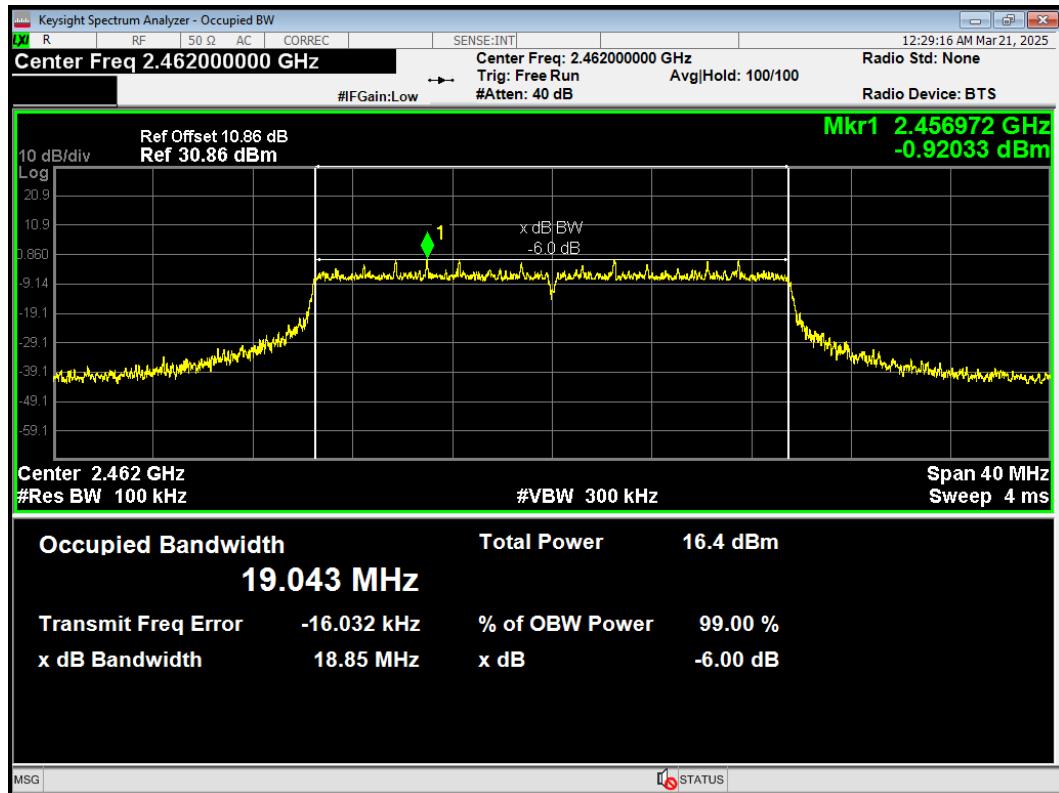
-6dB Bandwidth 802.11ax(HE20) 2437MHz



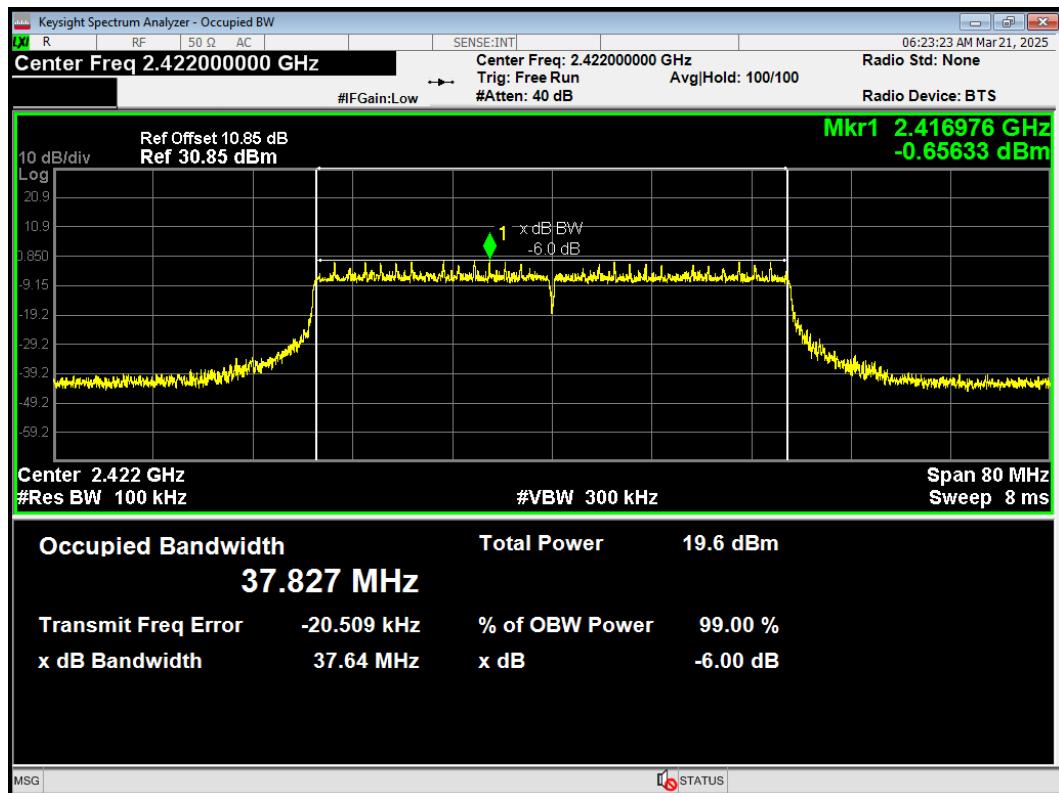
-6dB Bandwidth 802.11ax(HE20) 2457MHz



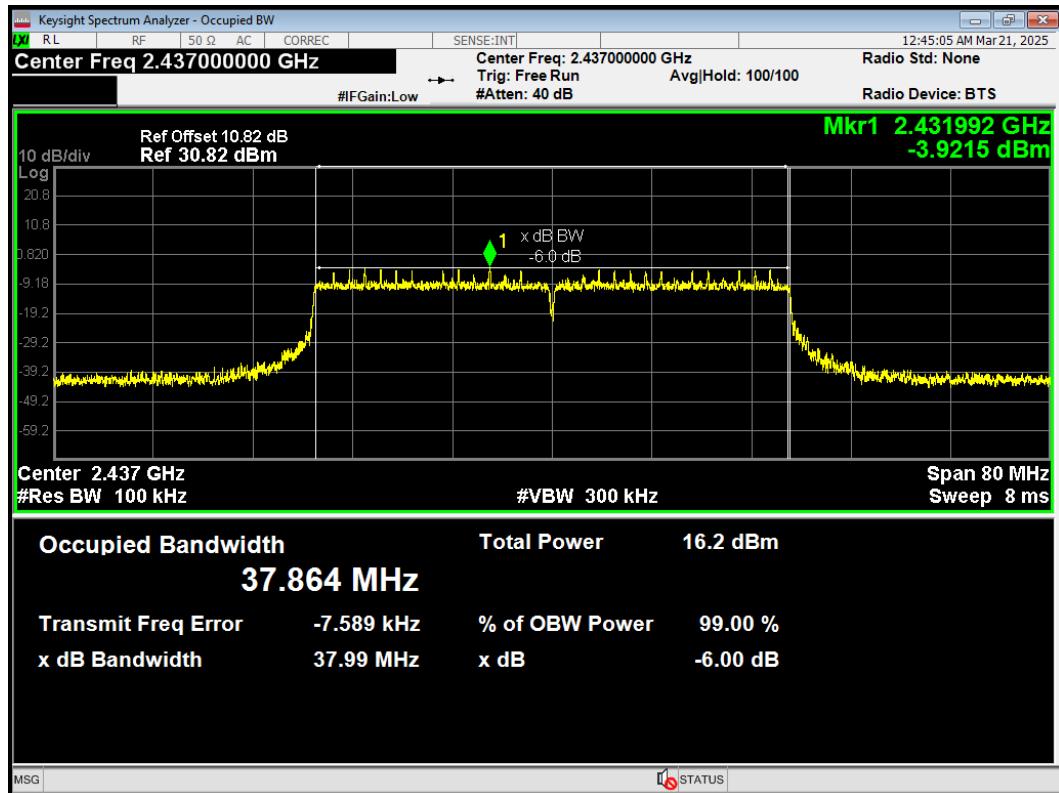
-6dB Bandwidth 802.11ax(HE20) 2462MHz



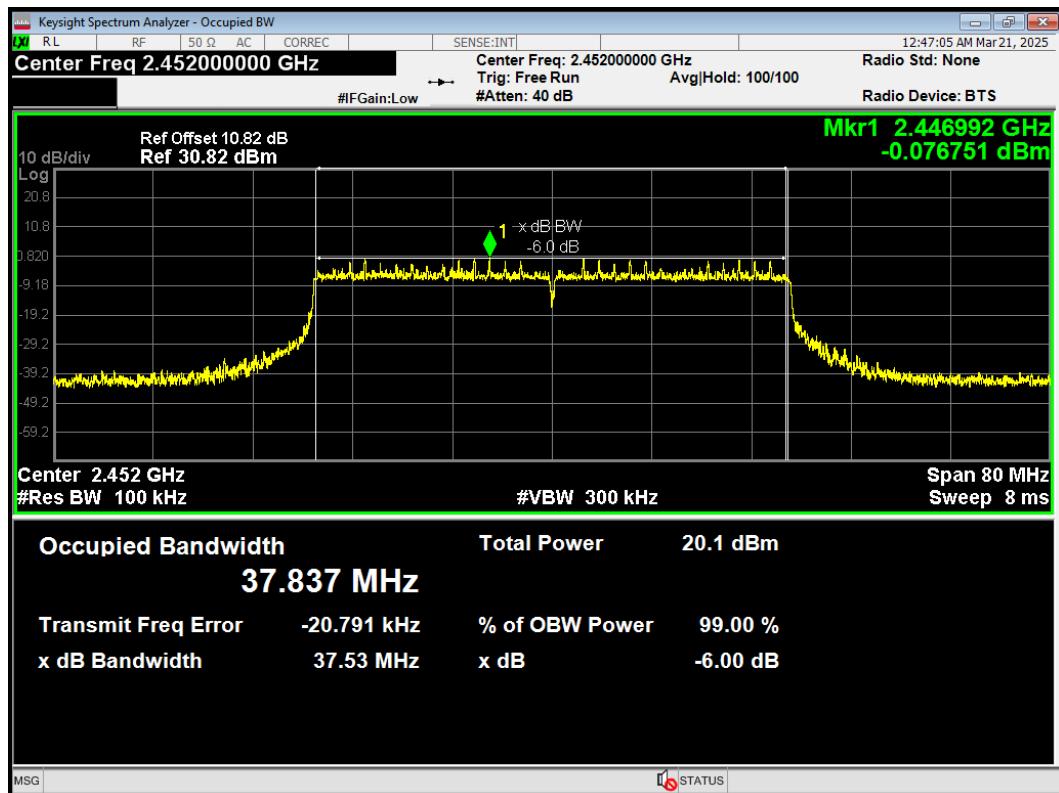
-6dB Bandwidth 802.11ax(HE40) 2422MHz



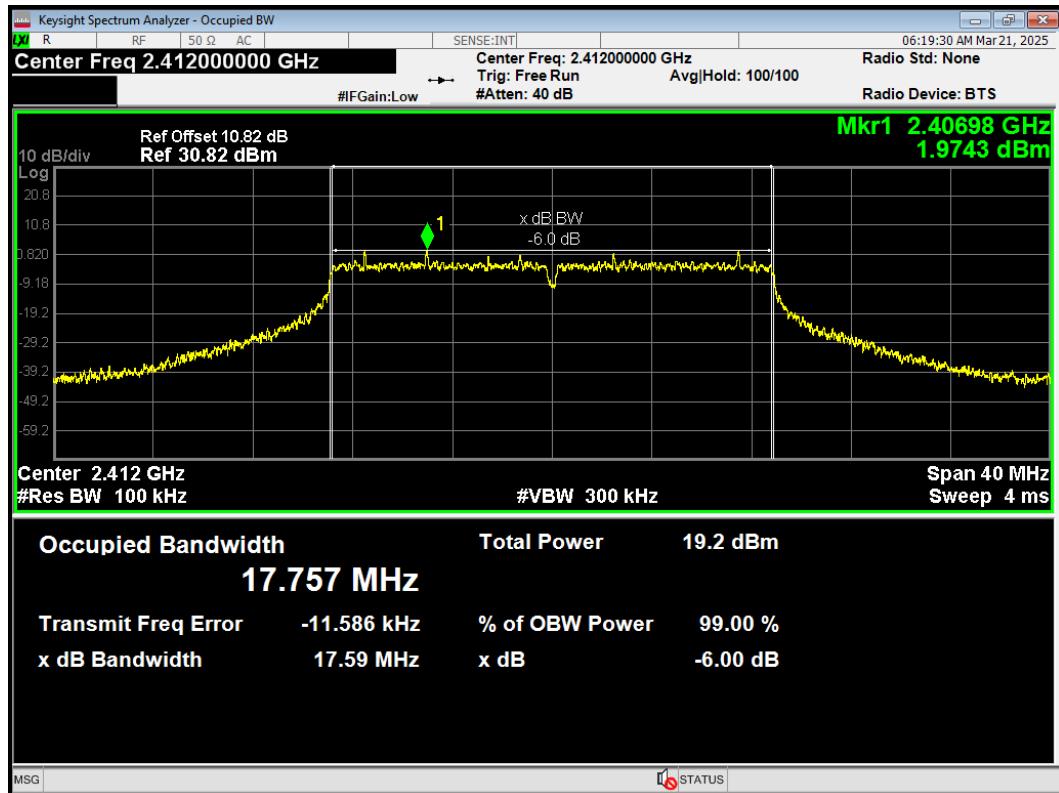
-6dB Bandwidth 802.11ax(HE40) 2437MHz



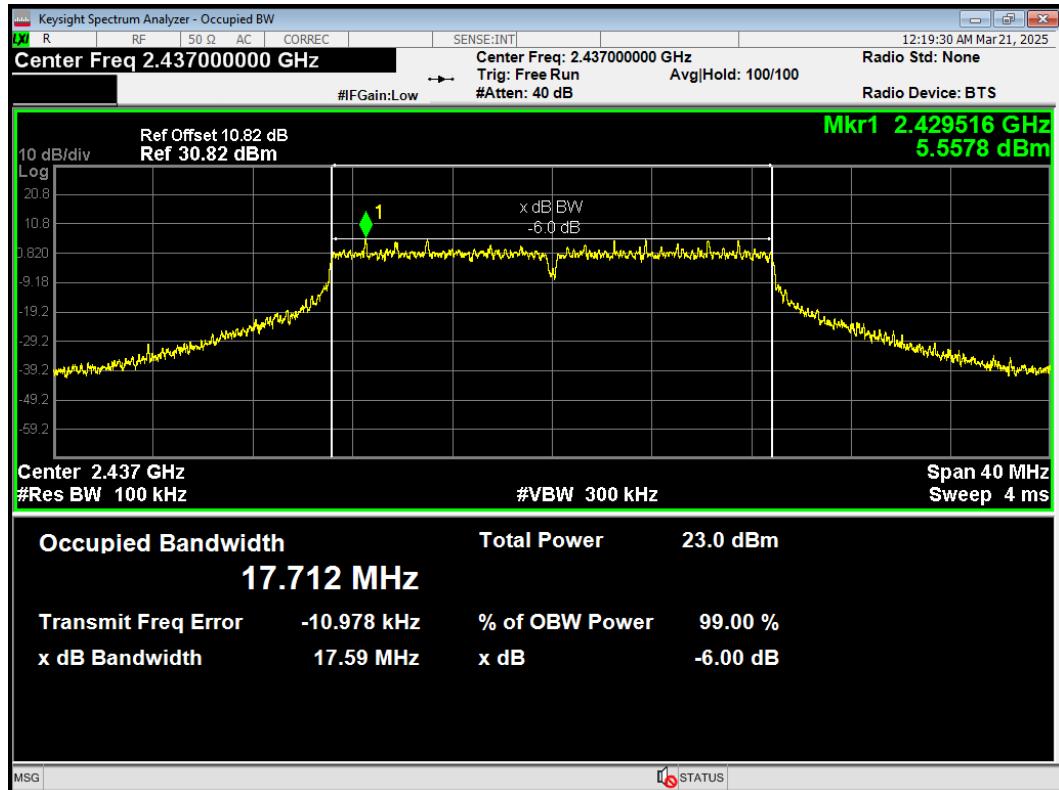
-6dB Bandwidth 802.11ax(HE40) 2452MHz



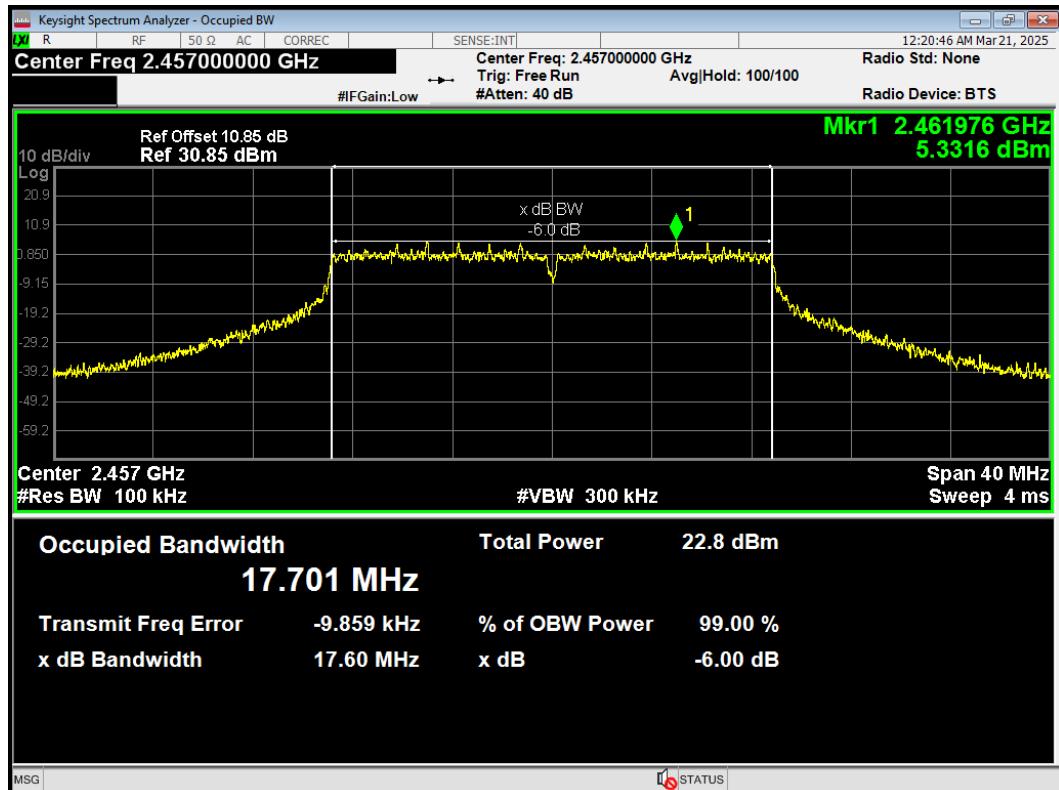
-6dB Bandwidth 802.11n(HT20) 2412MHz



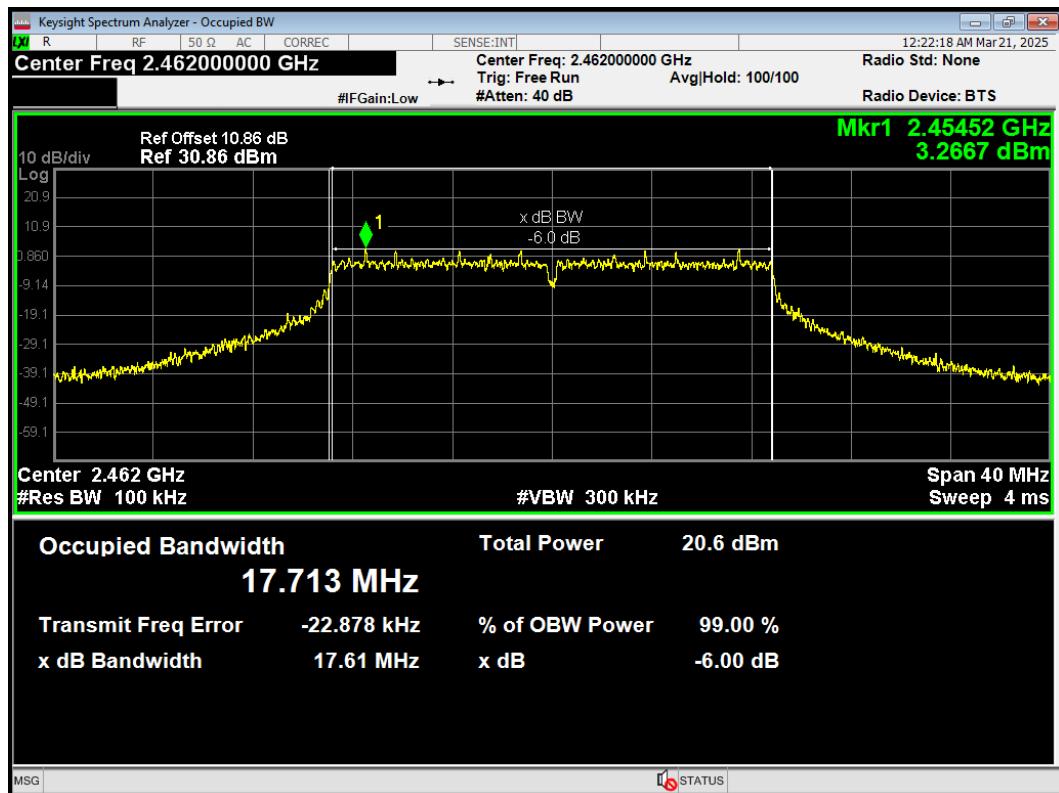
-6dB Bandwidth 802.11n(HT20) 2437MHz



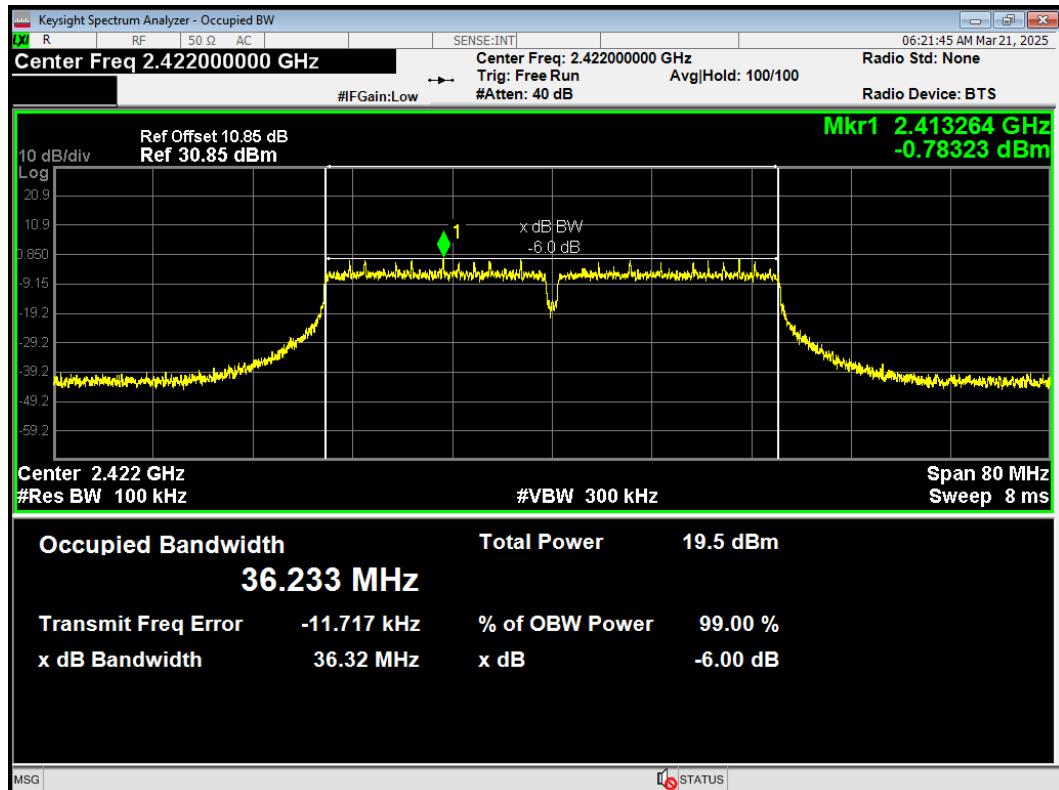
-6dB Bandwidth 802.11n(HT20) 2457MHz



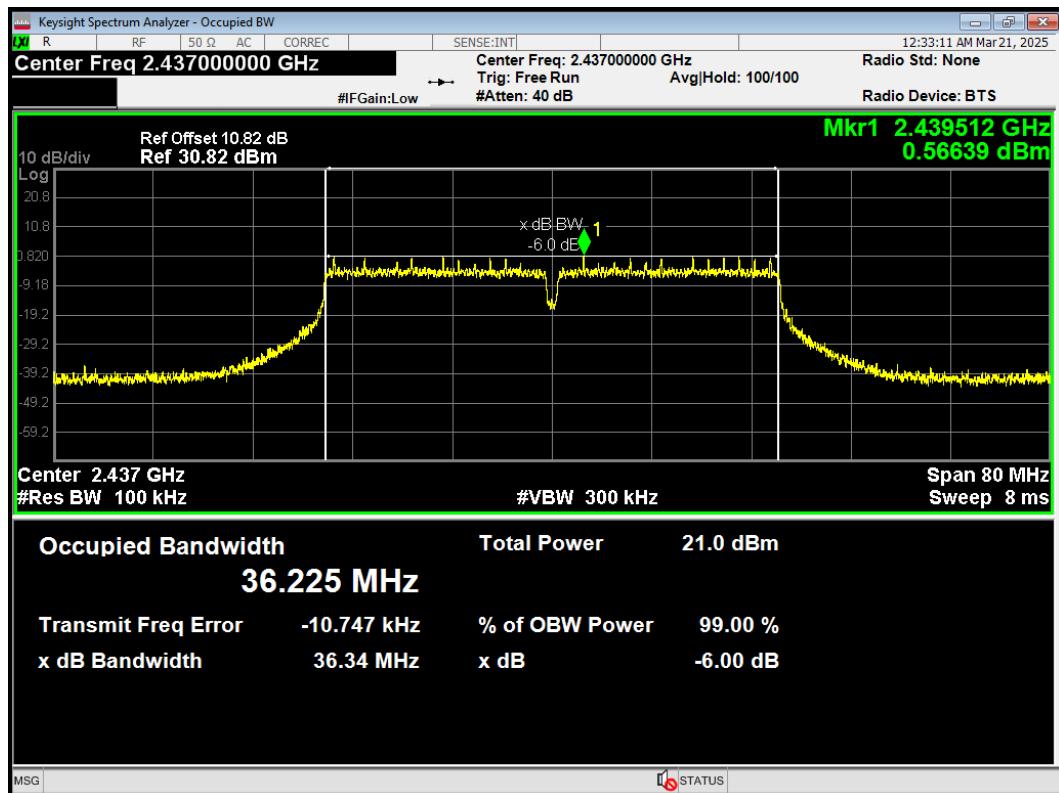
-6dB Bandwidth 802.11n(HT20) 2462MHz



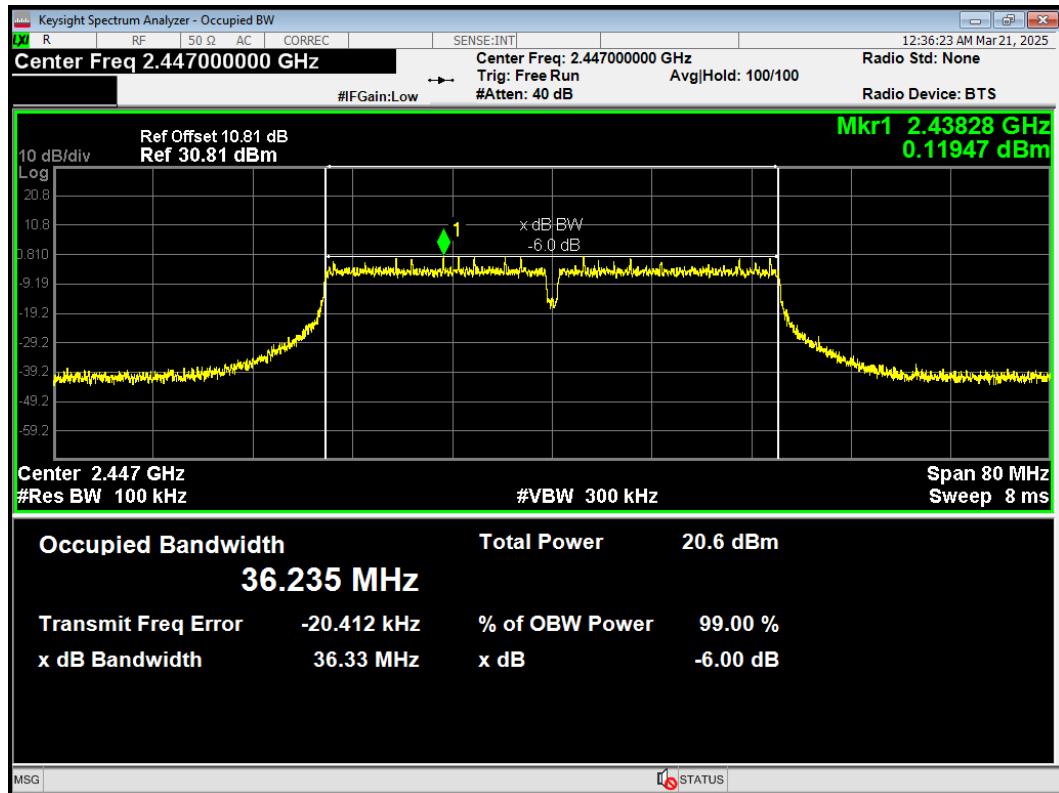
-6dB Bandwidth 802.11n(HT40) 2422MHz



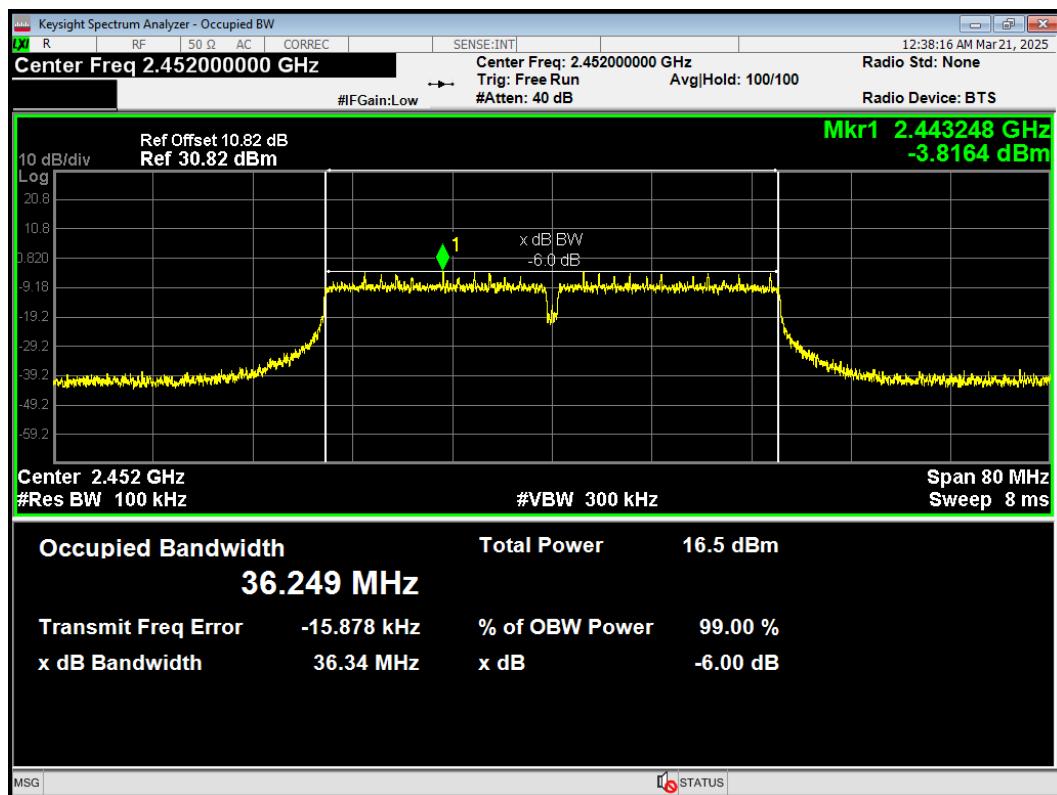
-6dB Bandwidth 802.11n(HT40) 2437MHz



-6dB Bandwidth 802.11n(HT40) 2447MHz

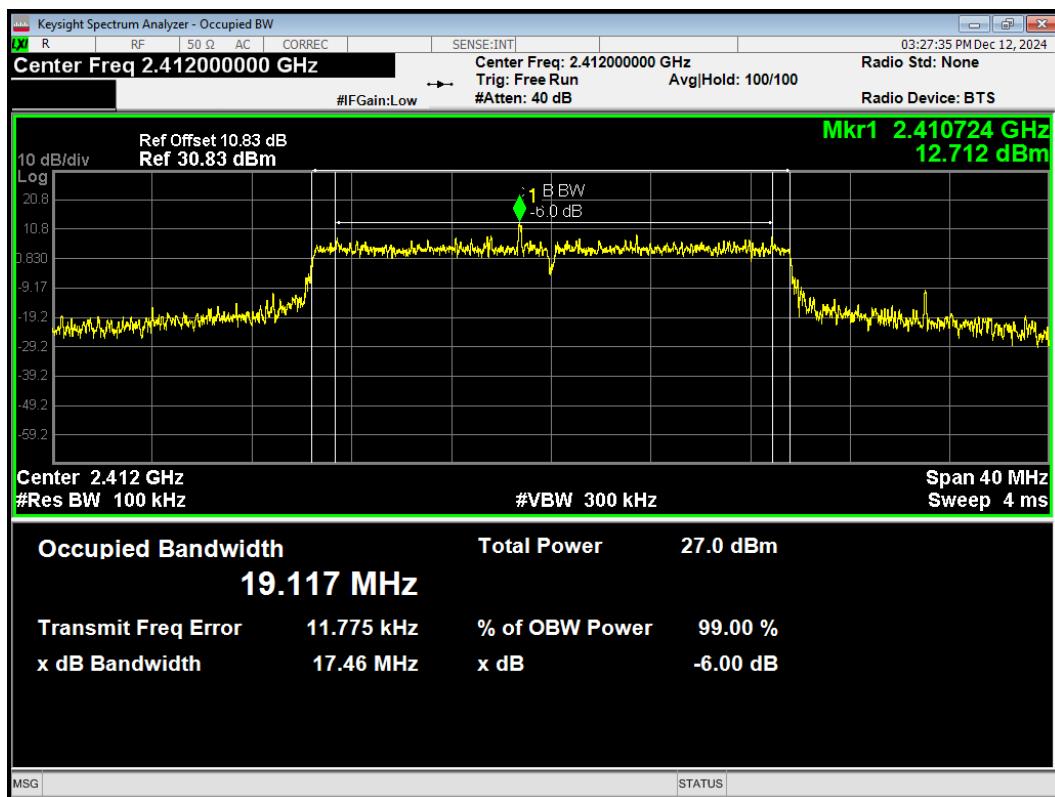


-6dB Bandwidth 802.11n(HT40) 2452MHz

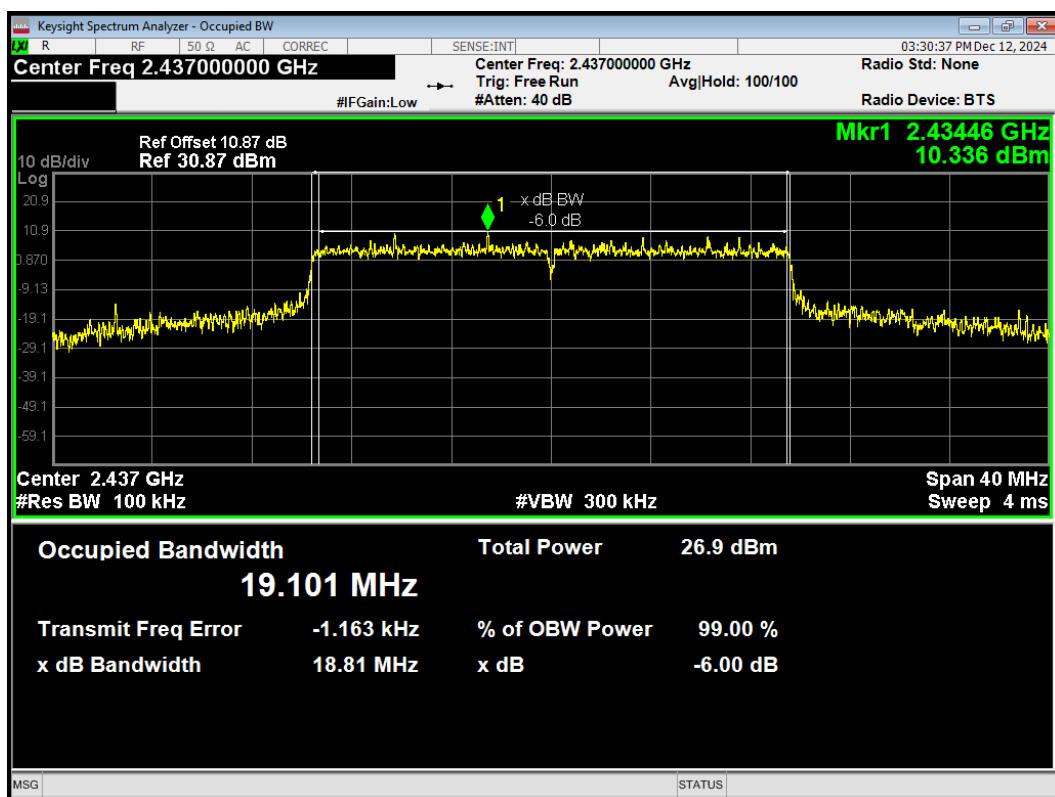


ERSU Mode

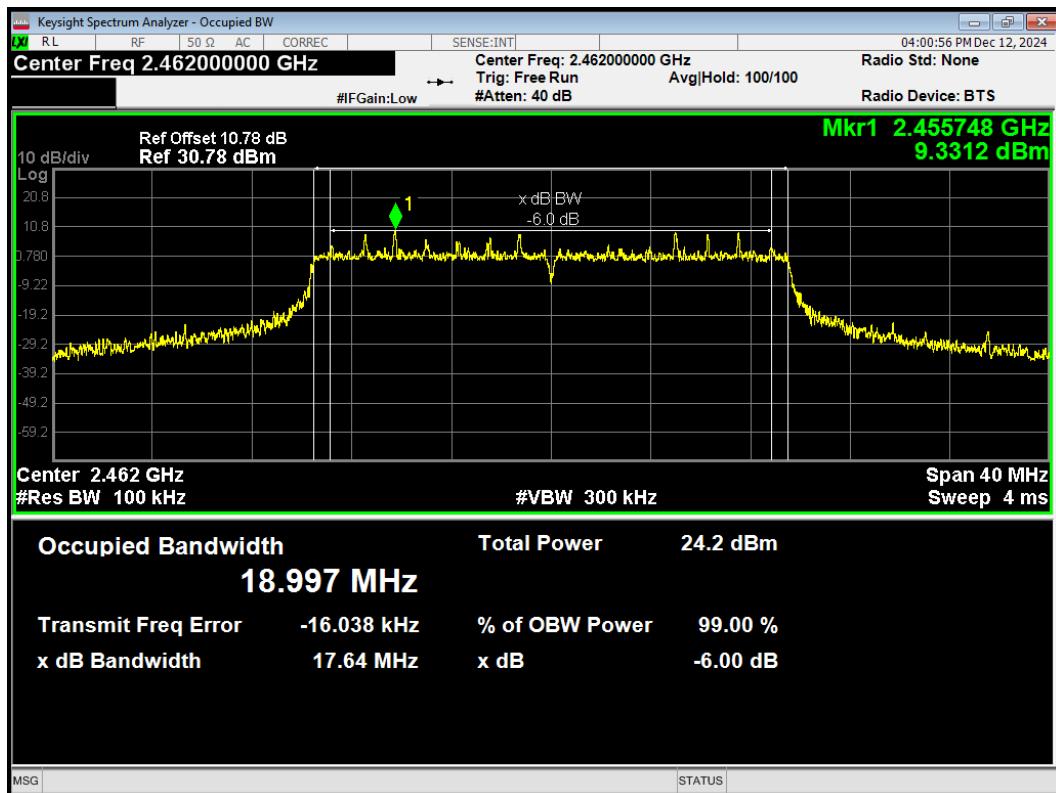
-6dB Bandwidth 802.11ax(HE20) 242-Tones 2412MHz



-6dB Bandwidth 802.11ax(HE20) 242-Tones 2437MHz



-6dB Bandwidth 802.11ax(HE20) 242-Tones 2462MHz



5.3. Band Edge

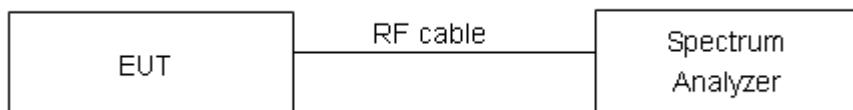
Ambient Condition

| 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.”

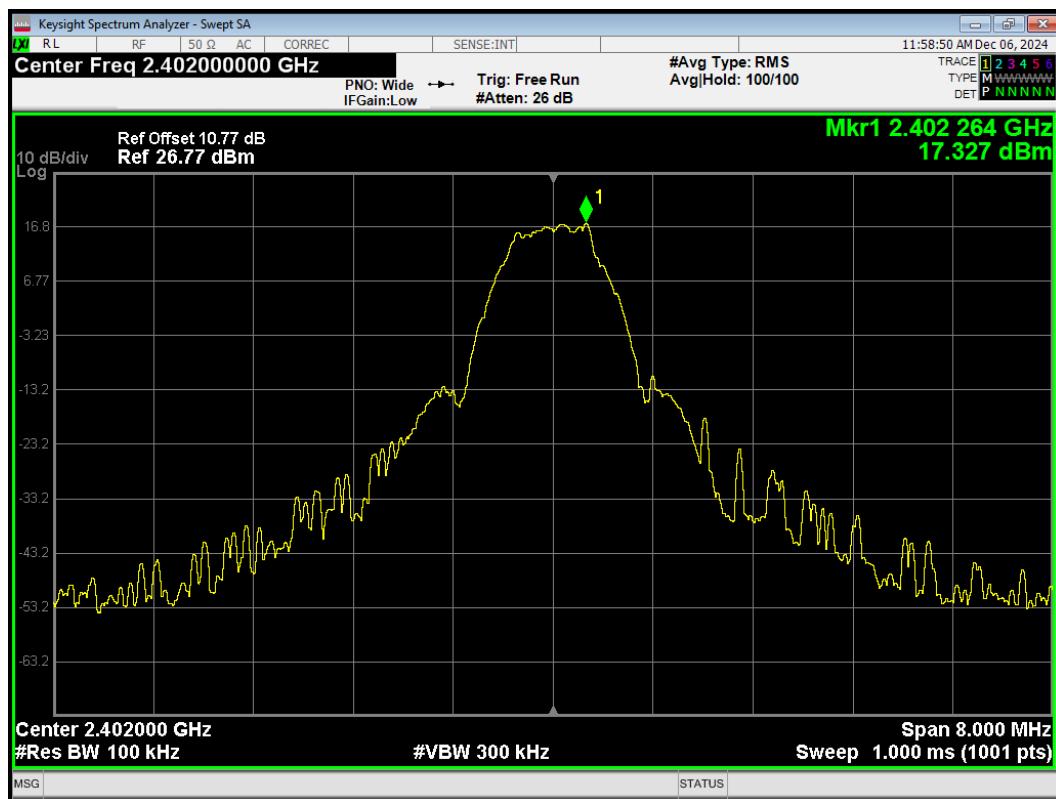
Measurement Uncertainty

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

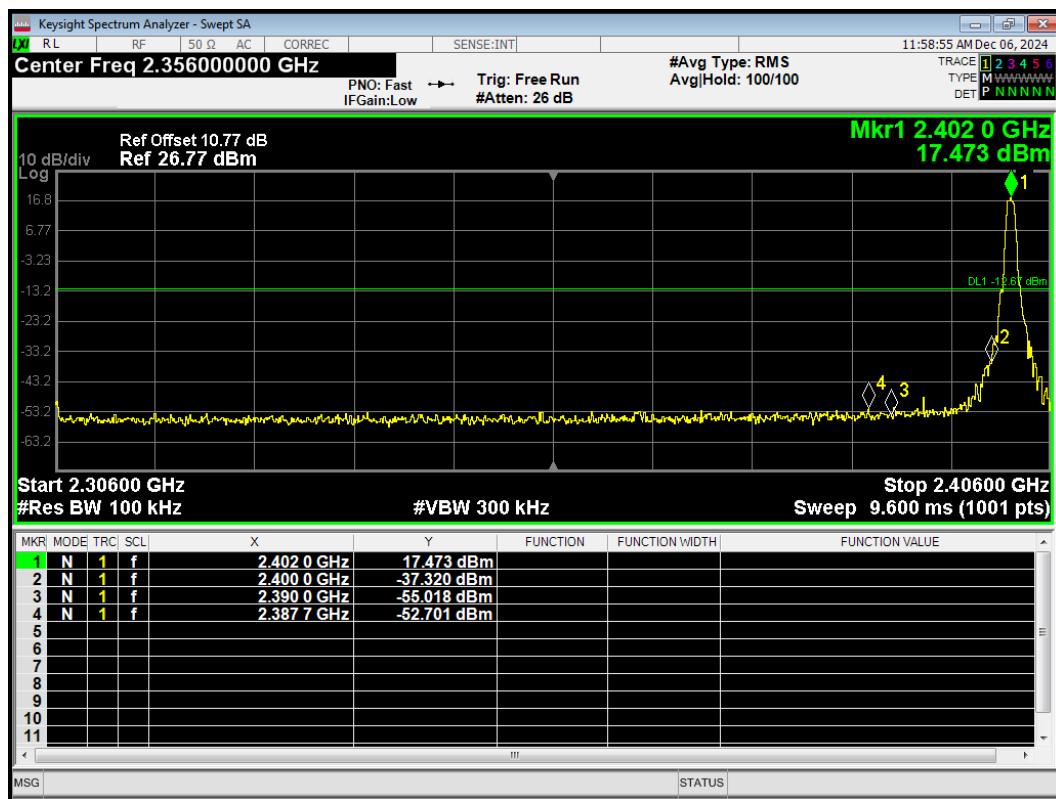
| Frequency | Uncertainty |
|-----------|-------------|
| 2GHz-3GHz | 1.407 dB |

Test Results:

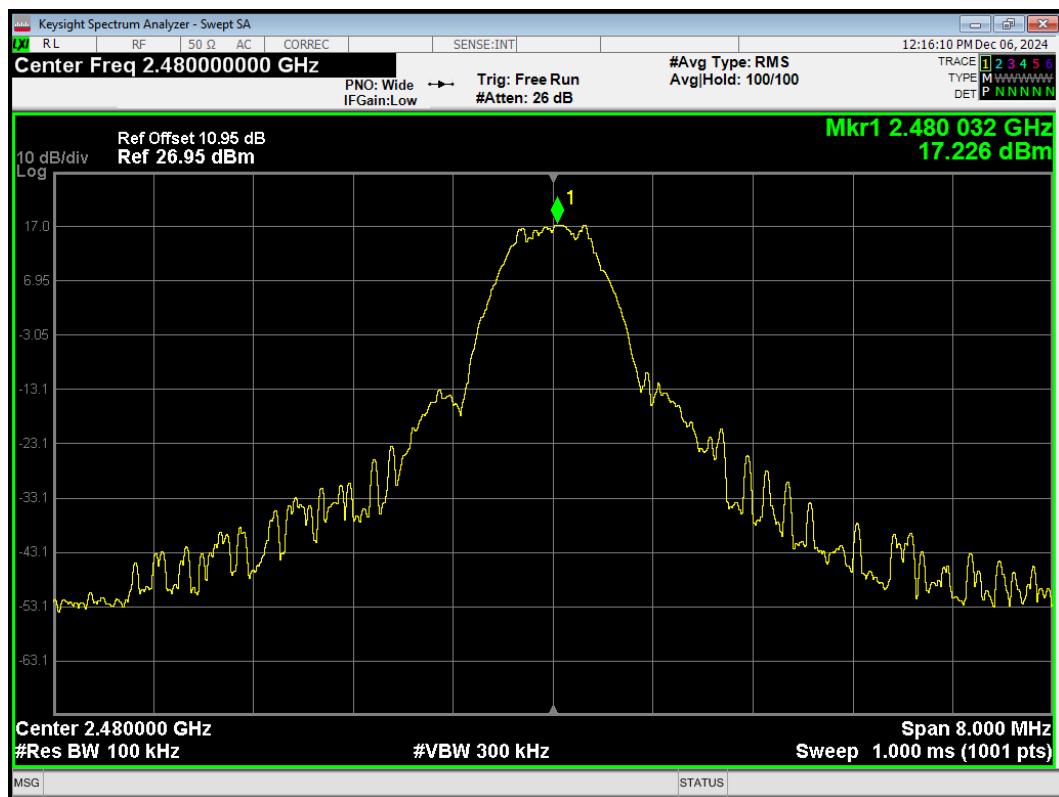
Band Edge Bluetooth LE (1M) 2402MHz Ref



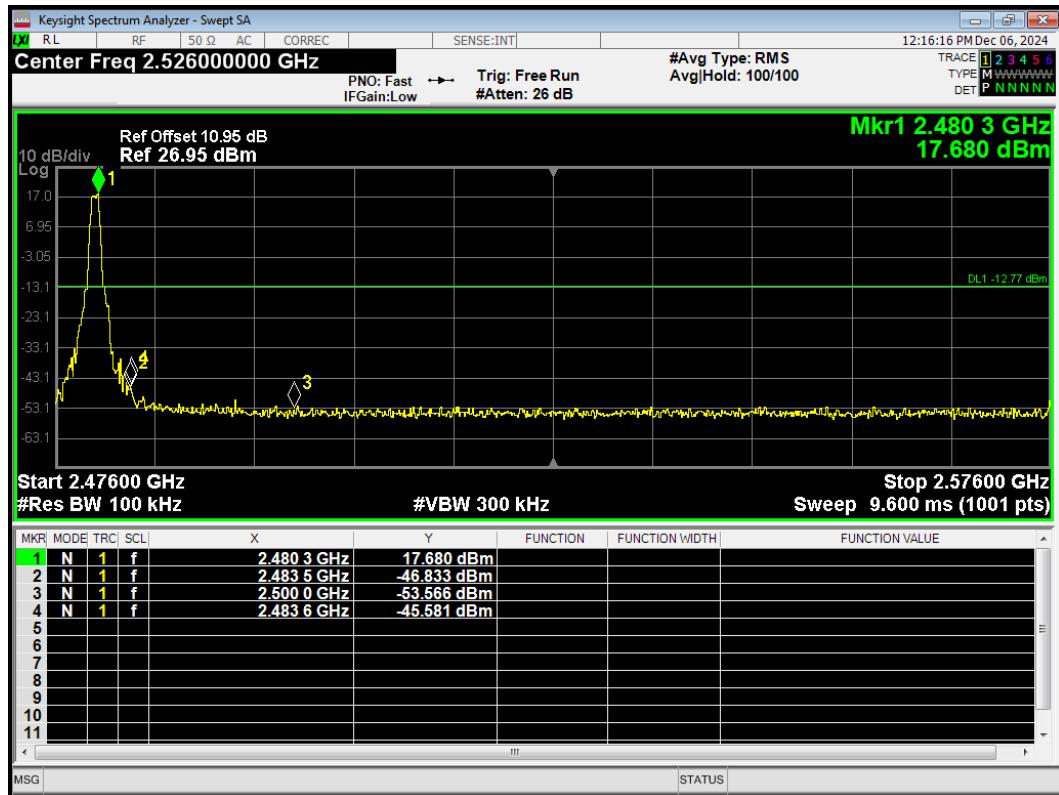
Band Edge Bluetooth LE (1M) 2402MHz Emission



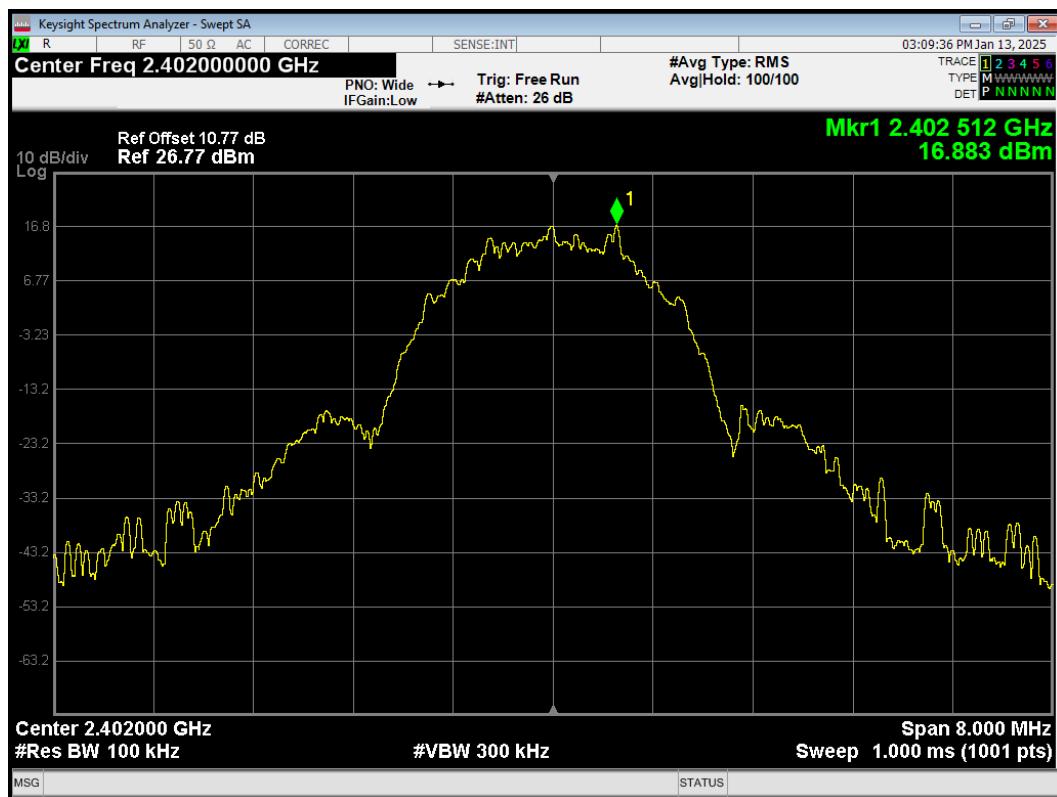
Band Edge Bluetooth LE (1M) 2480MHz Ref



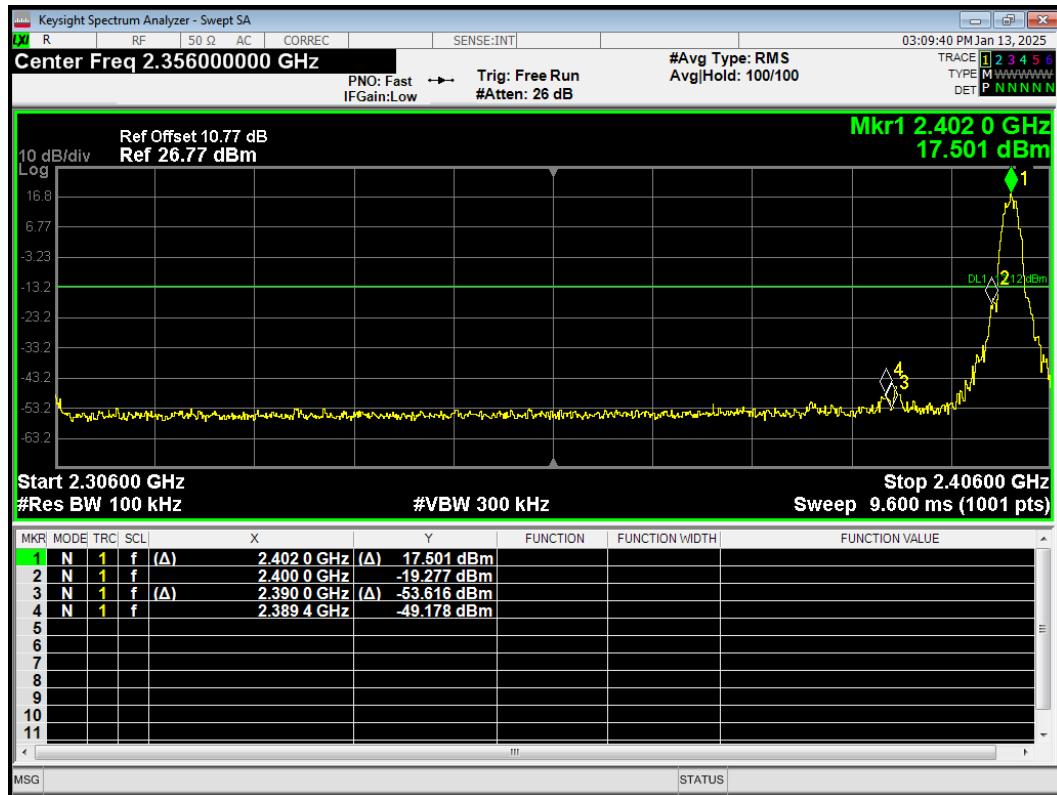
Band Edge Bluetooth LE (1M) 2480MHz Emission



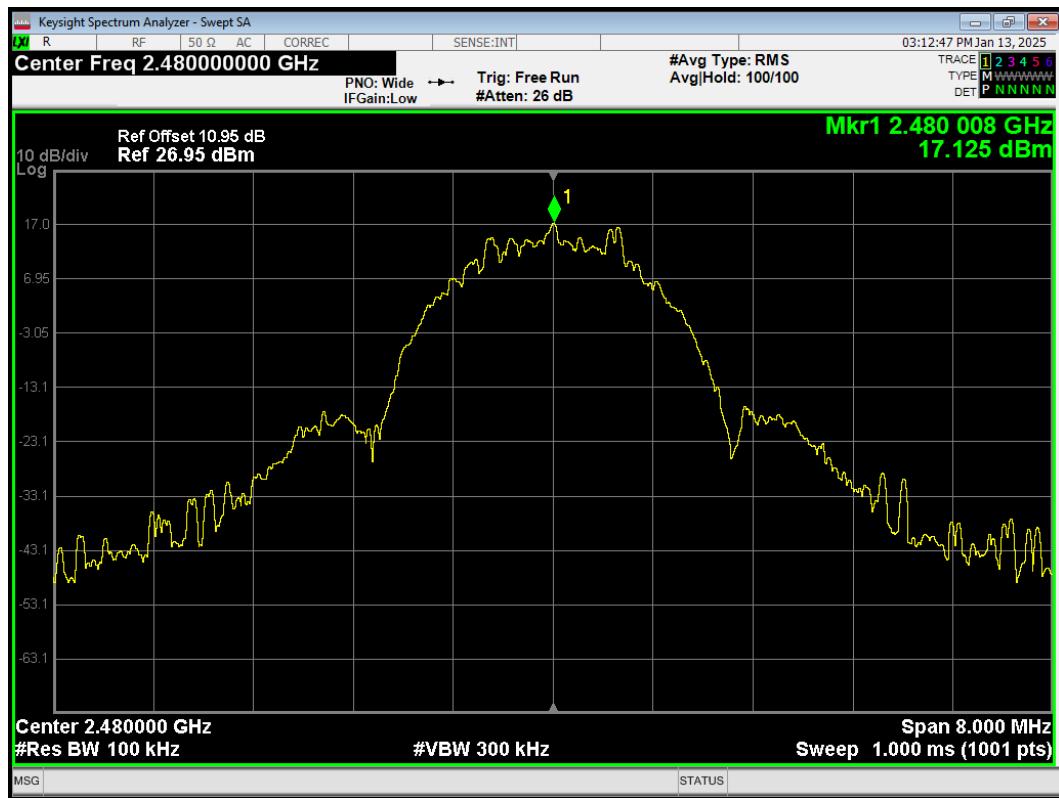
Band Edge Bluetooth LE (2M) 2402MHz Ref



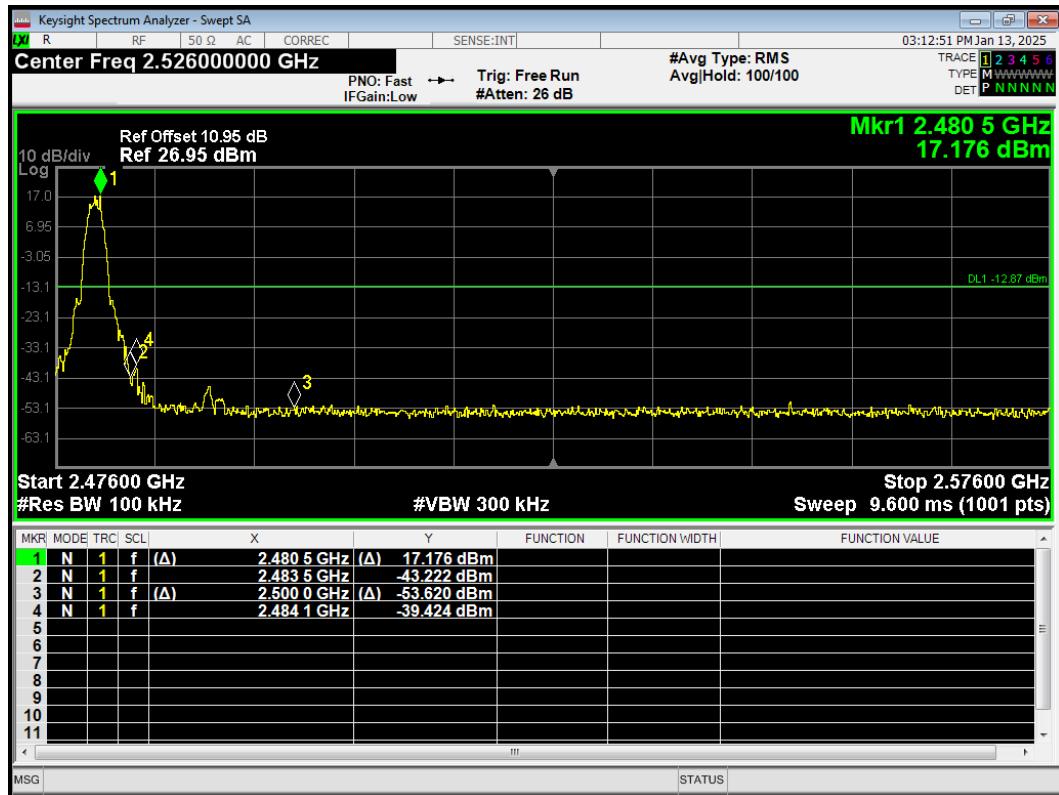
Band Edge Bluetooth LE (2M) 2402MHz Emission



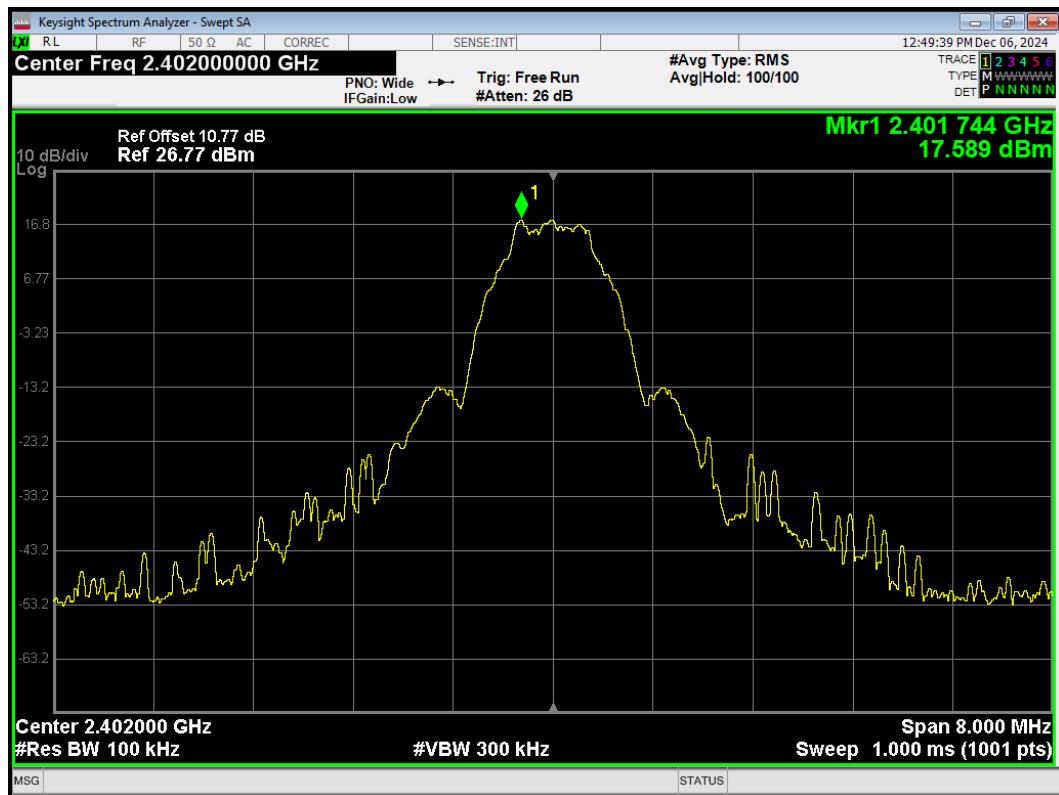
Band Edge Bluetooth LE (2M) 2480MHz Ref



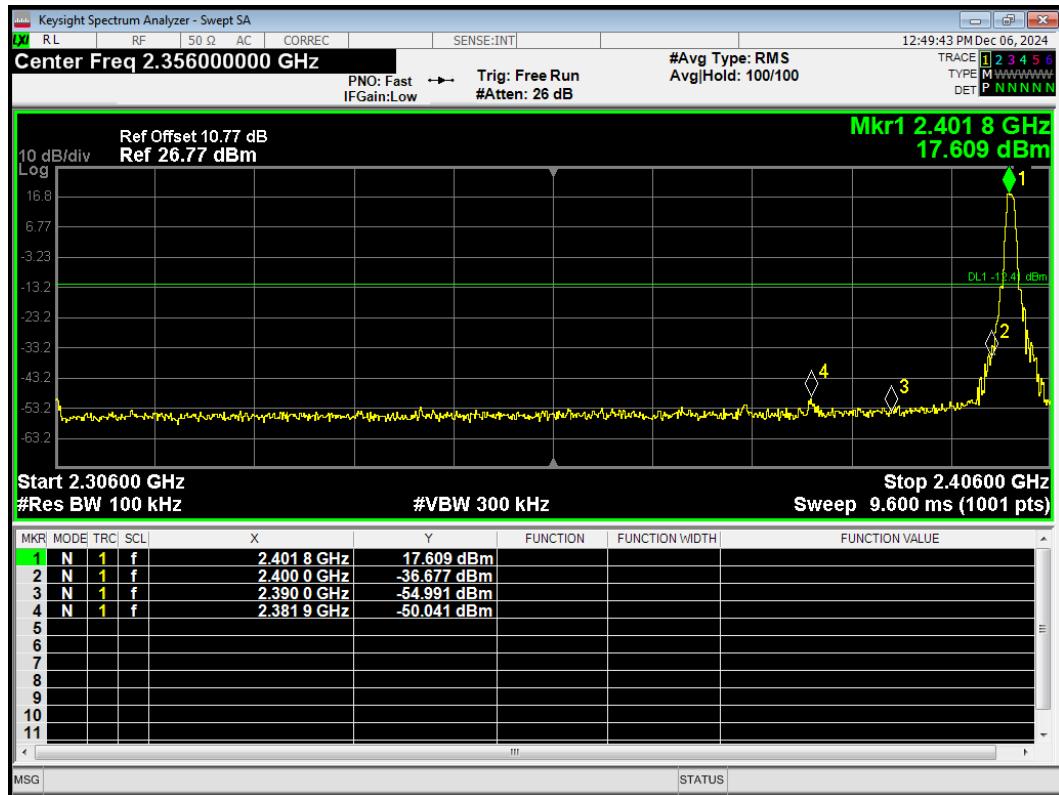
Band Edge Bluetooth LE (2M) 2480MHz Emission



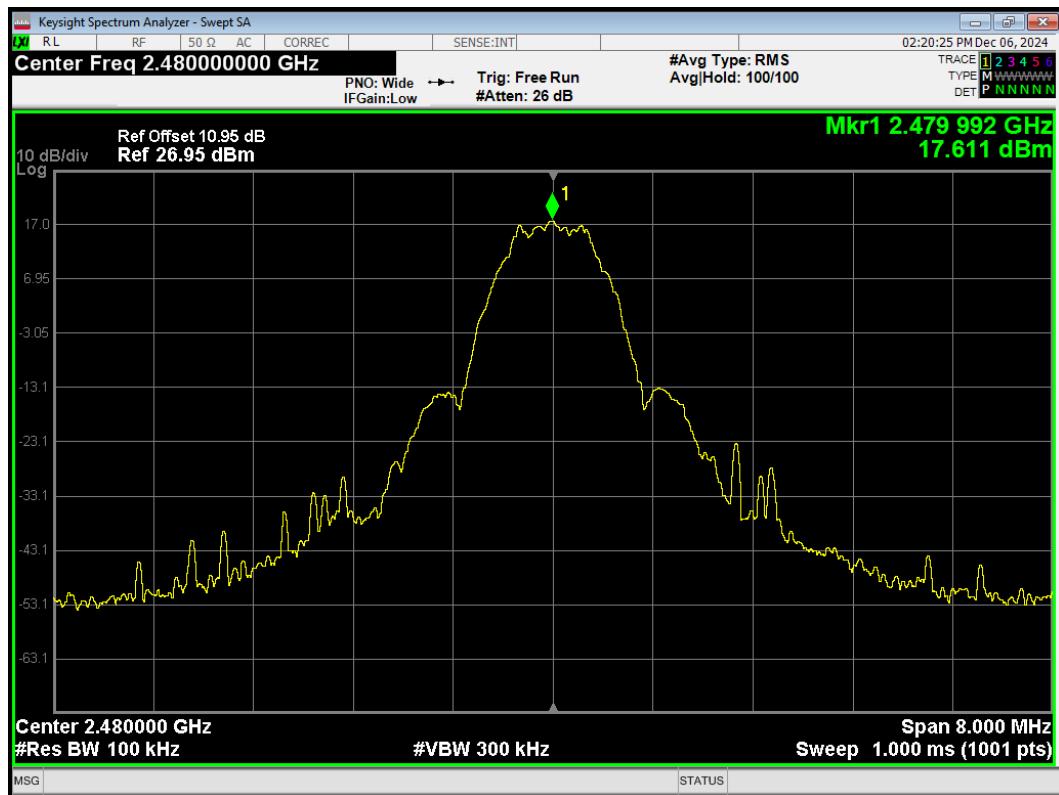
Band Edge Bluetooth LE (S=2) 2402MHz Ref



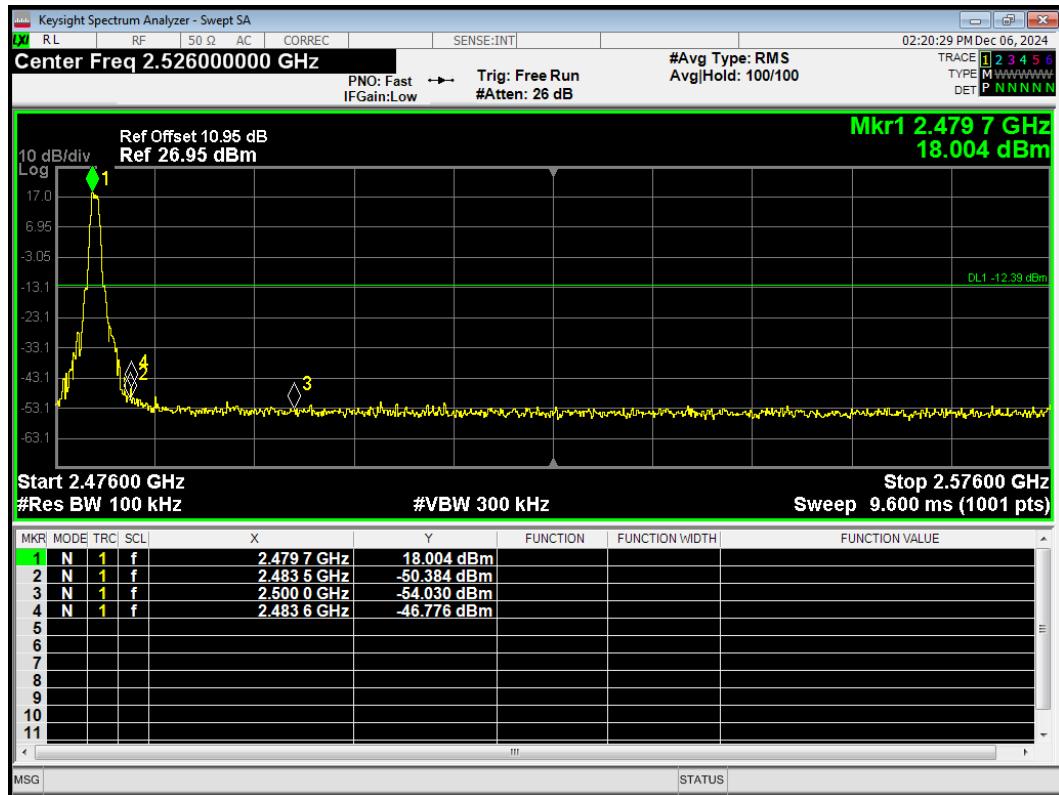
Band Edge Bluetooth LE (S=2) 2402MHz Emission



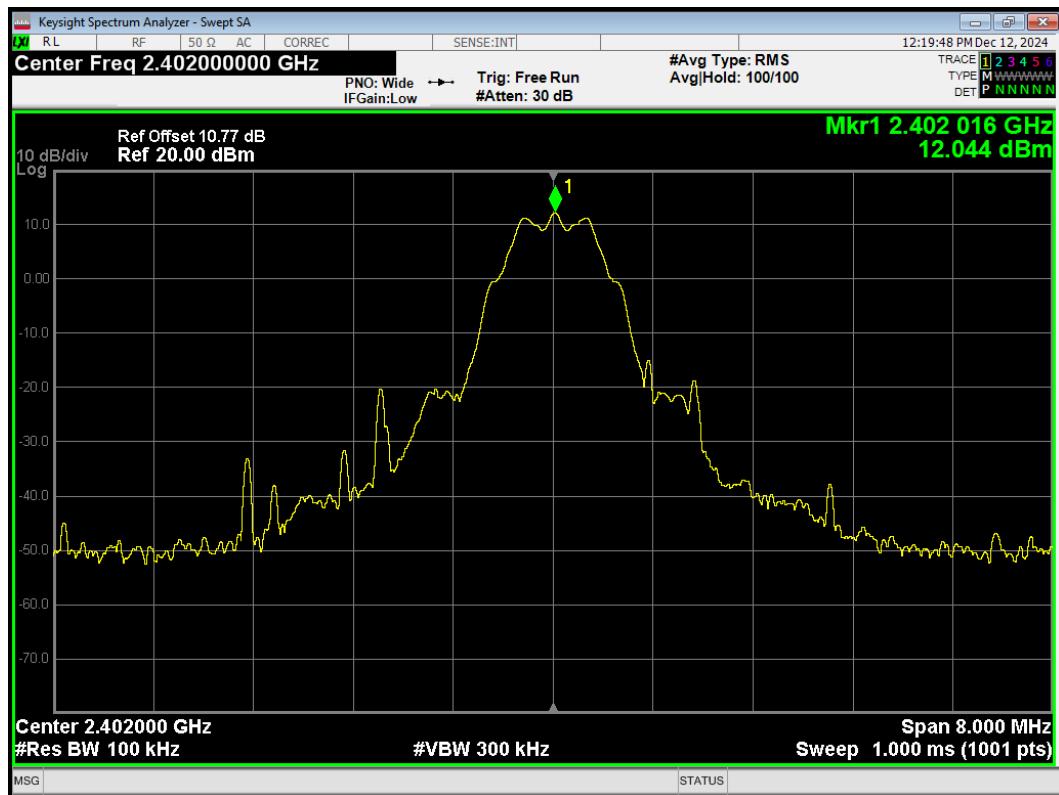
Band Edge Bluetooth LE (S=2) 2480MHz Ref



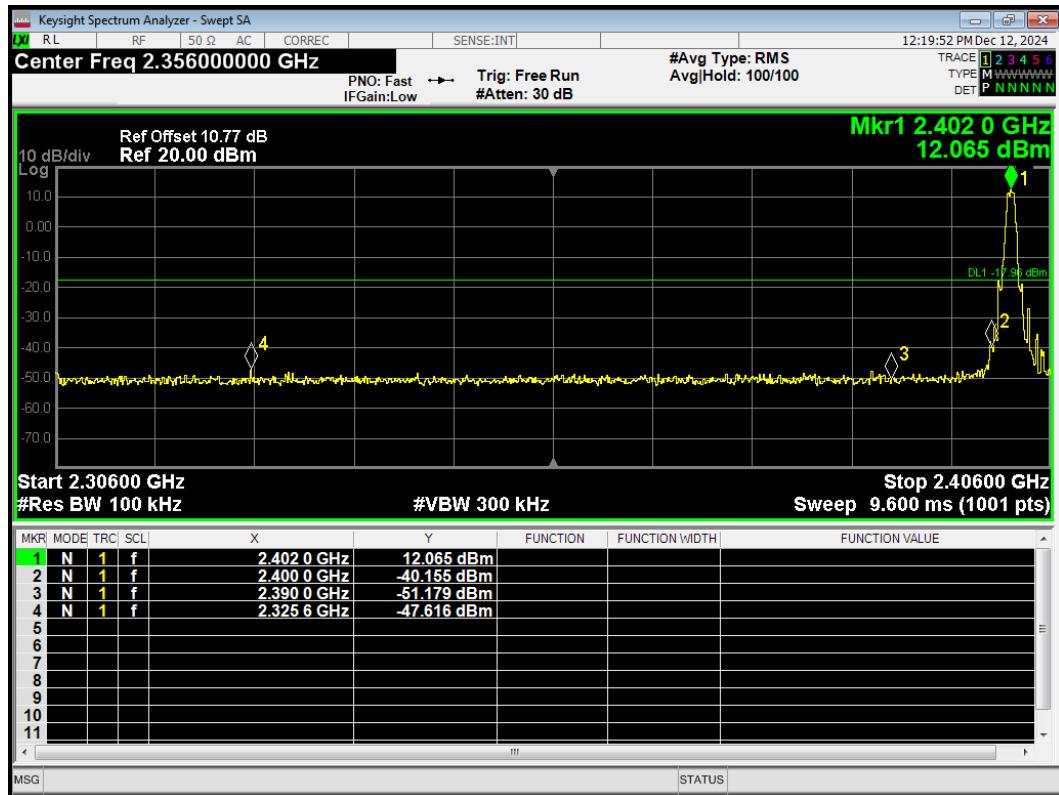
Band Edge Bluetooth LE (S=2) 2480MHz Emission



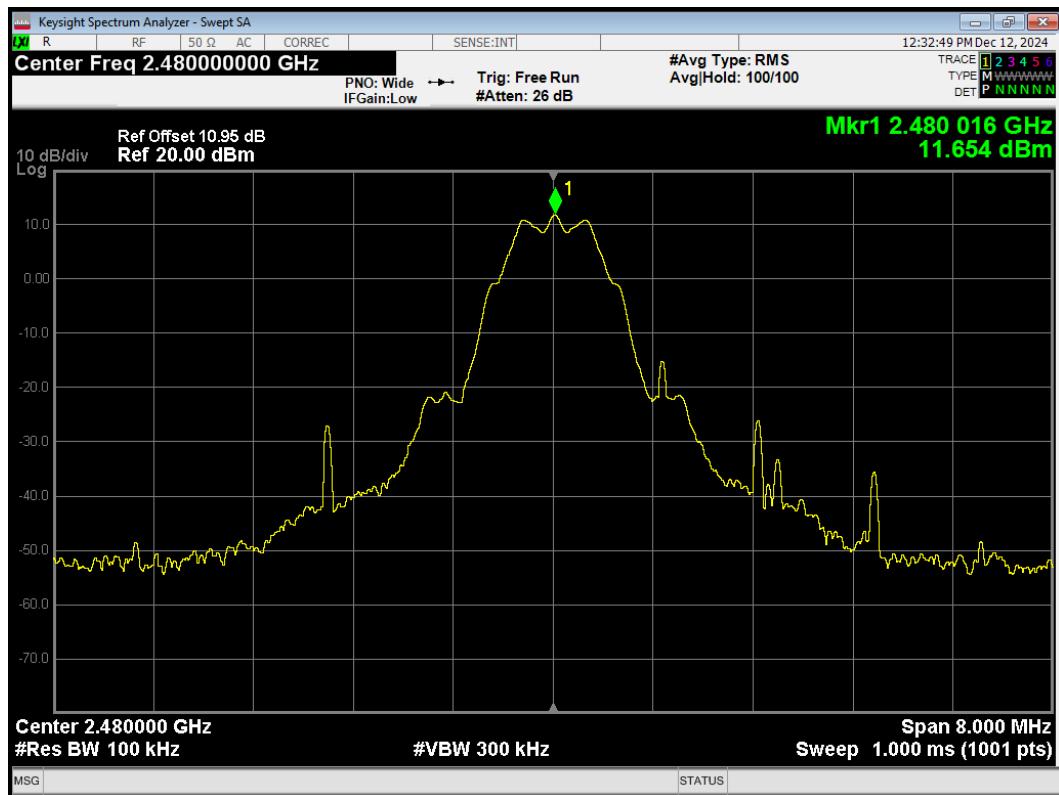
Band Edge Bluetooth LE (S=8) 2402MHz Ref



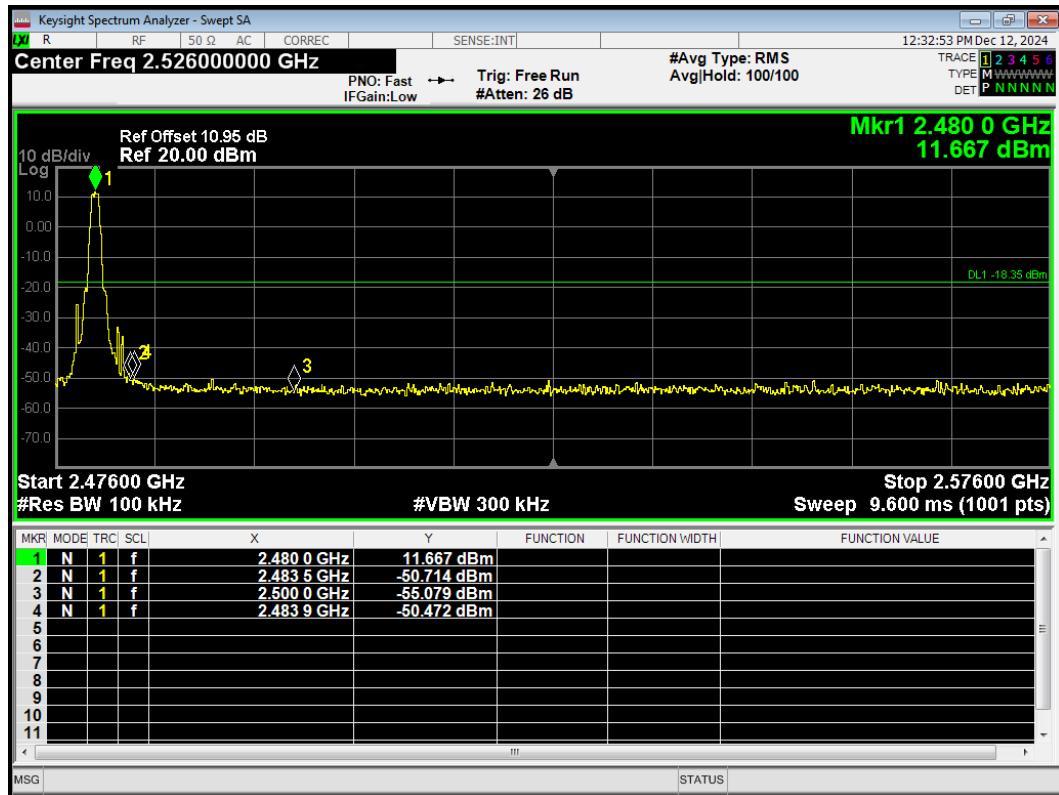
Band Edge Bluetooth LE (S=8) 2402MHz Emission



Band Edge Bluetooth LE (S=8) 2480MHz Ref



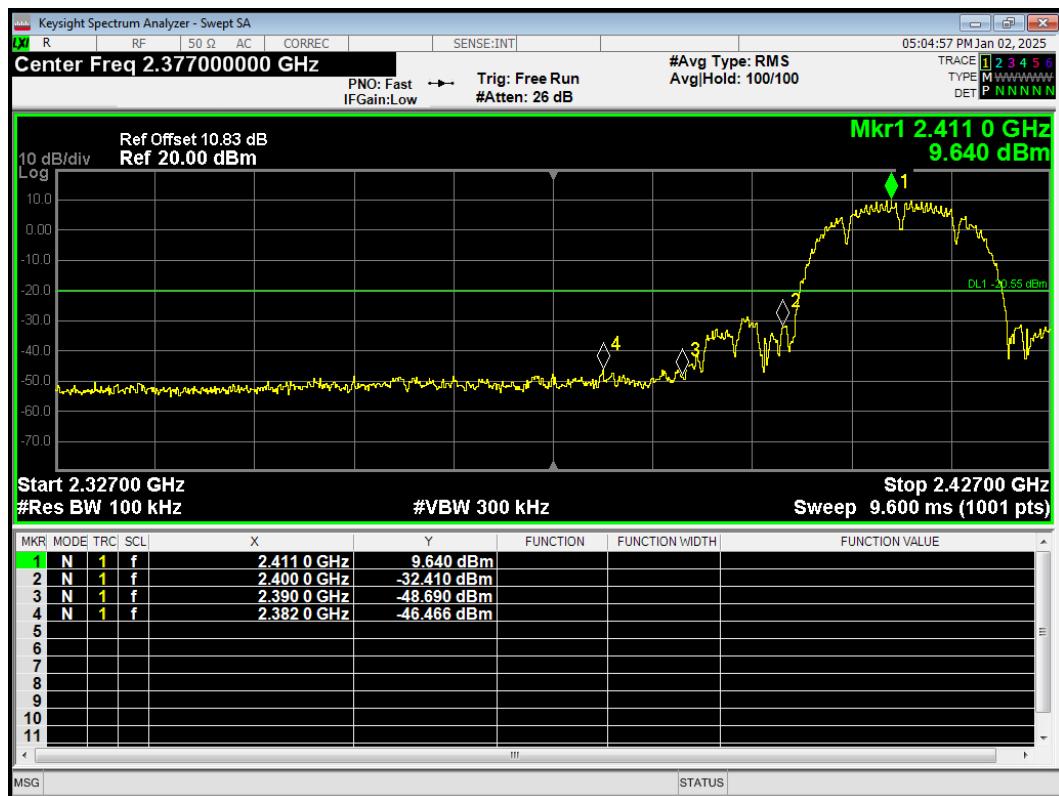
Band Edge Bluetooth LE (S=8) 2480MHz Emission



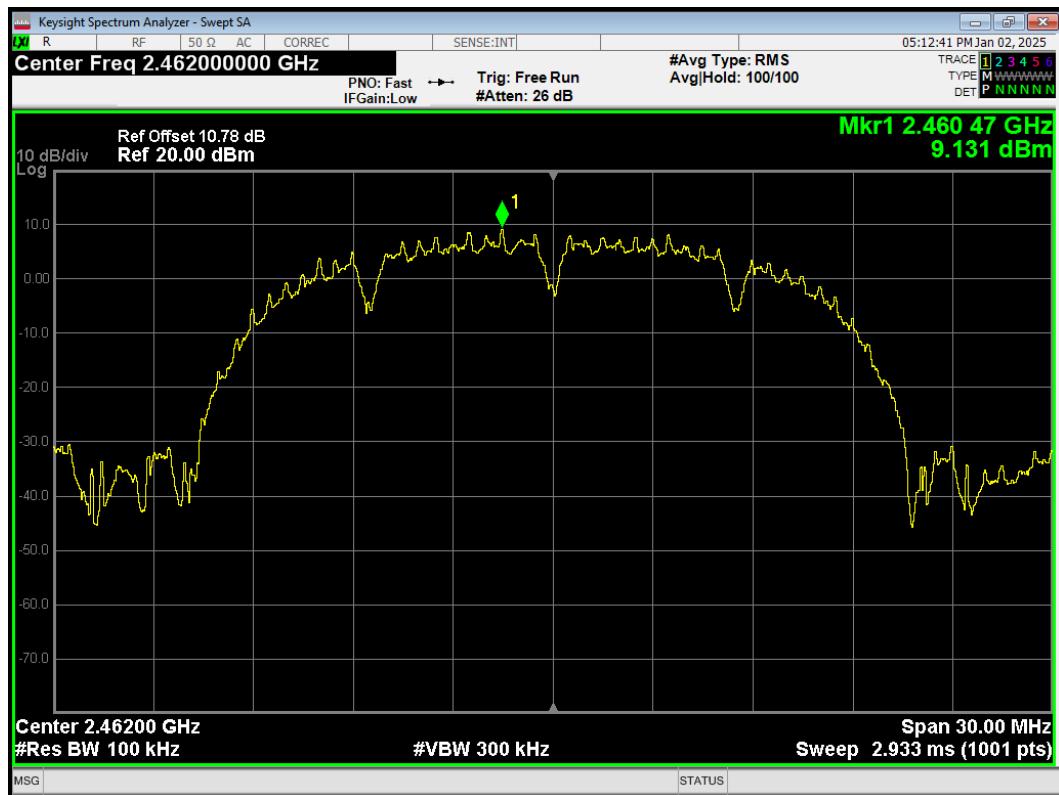
Band Edge 802.11b 2412MHz Ref



Band Edge 802.11b 2412MHz Emission



Band Edge 802.11b 2462MHz Ref



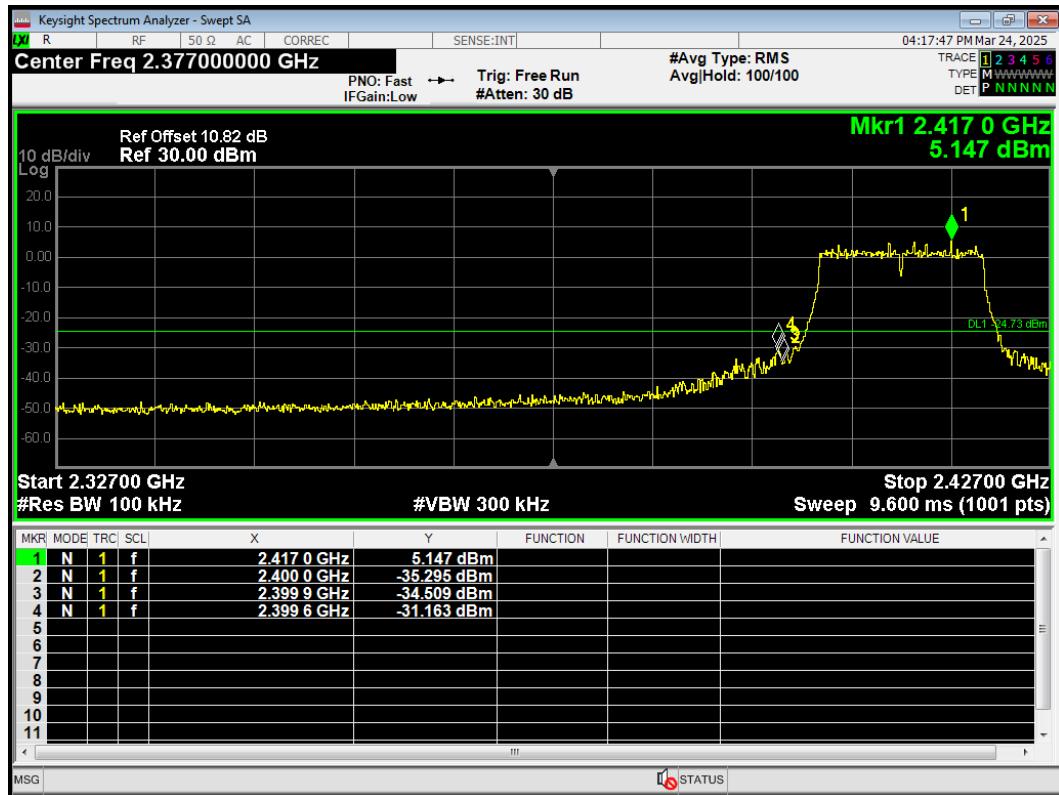
Band Edge 802.11b 2462MHz Emission



Band Edge 802.11g 2412MHz Ref



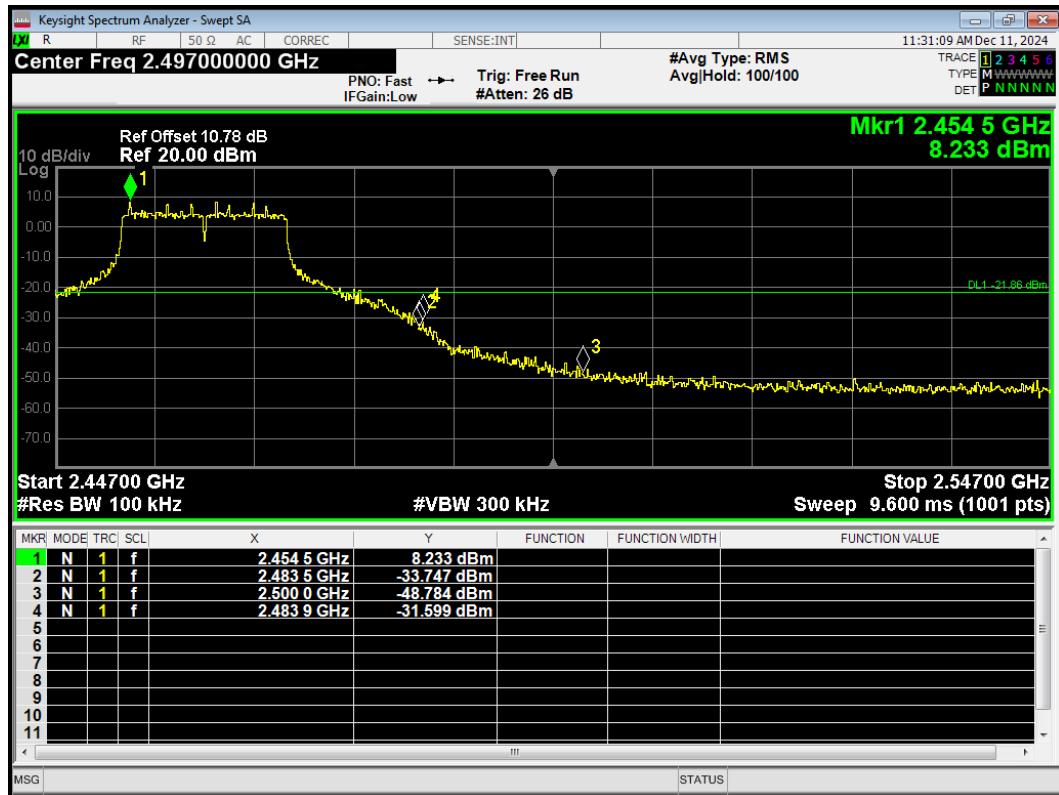
Band Edge 802.11g 2412MHz Emission



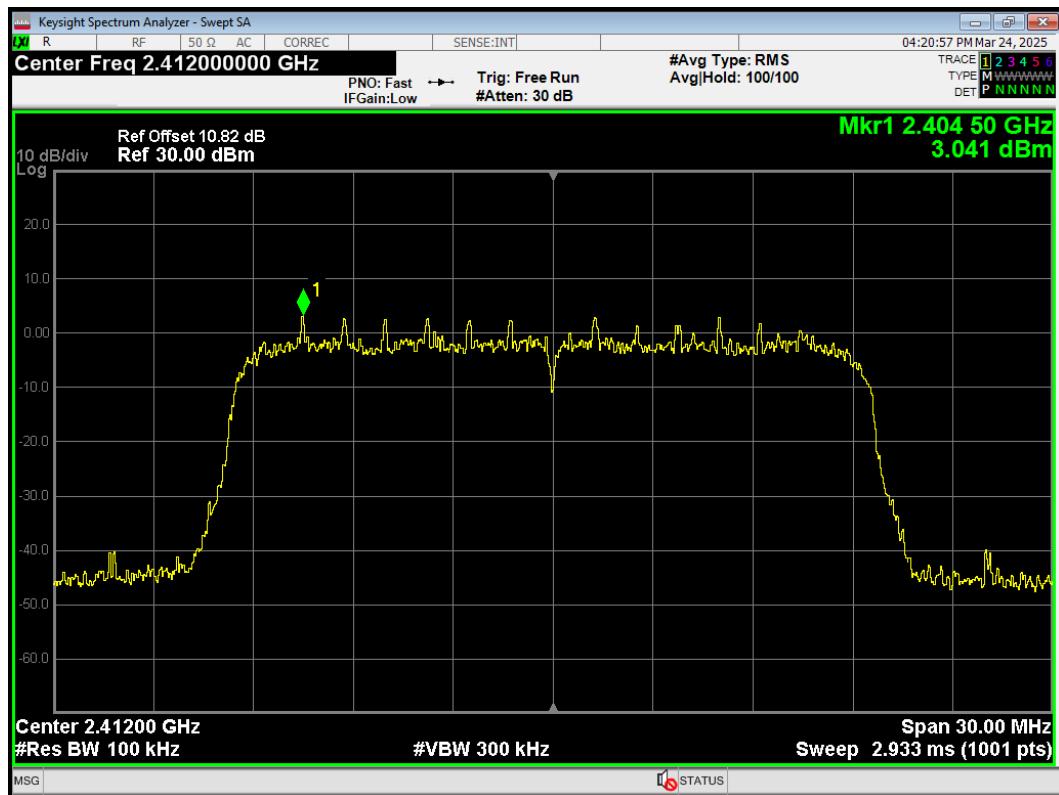
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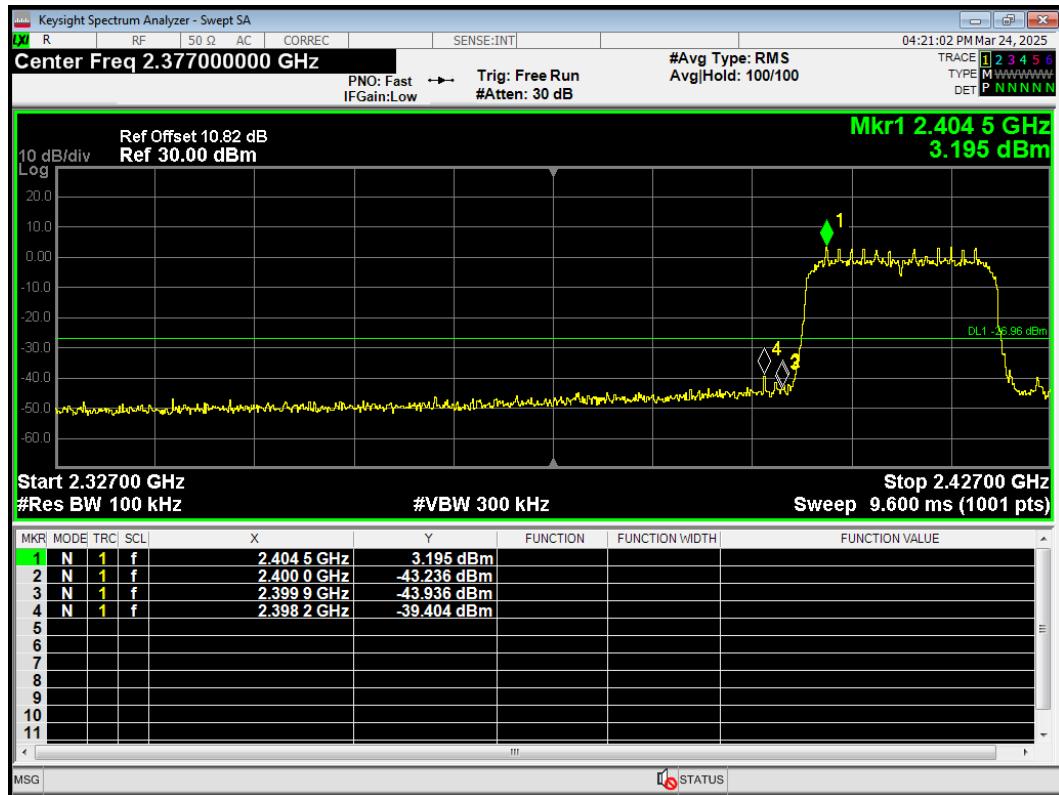
Band Edge 802.11g 2462MHz Emission



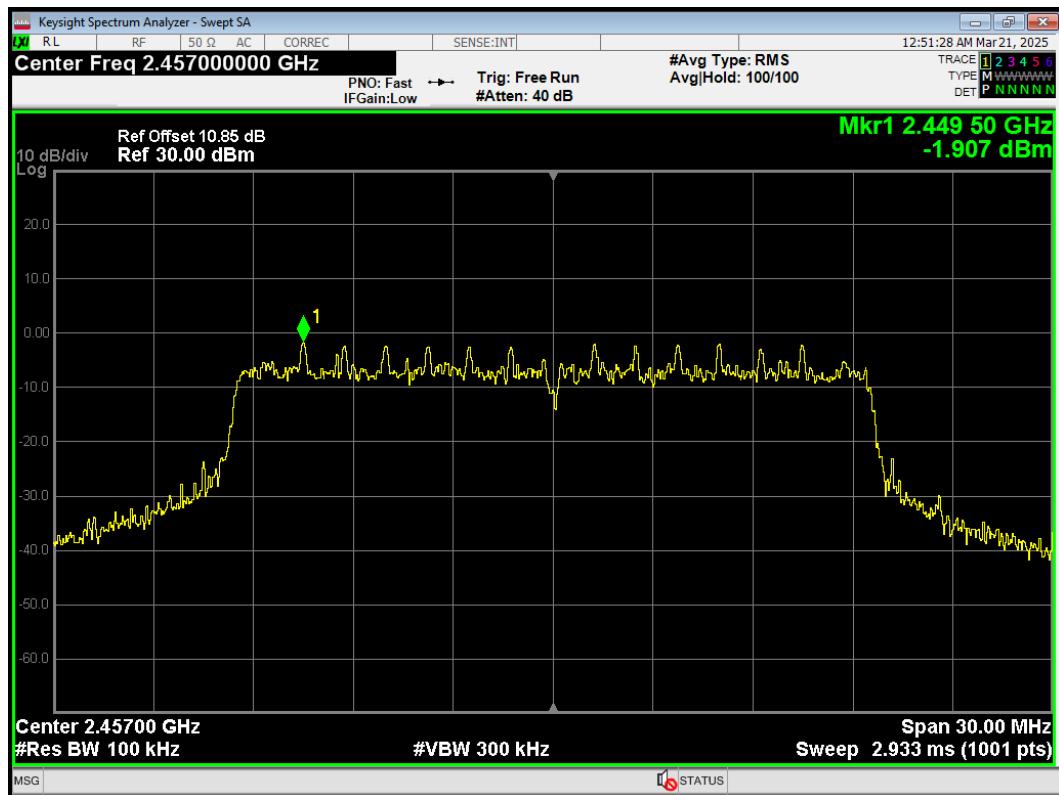
Band Edge 802.11ax(HE20) 2412MHz Ref



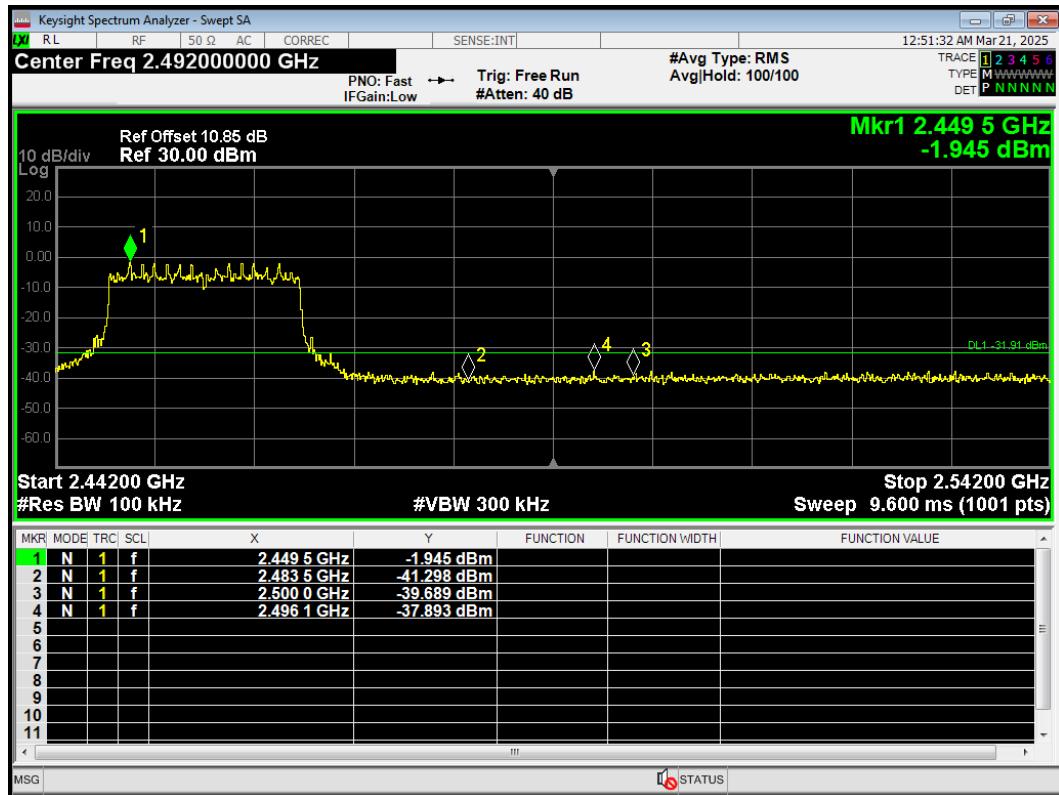
Band Edge 802.11ax(HE20) 2412MHz Emission



Band Edge 802.11ax(HE20) 2457MHz Ref



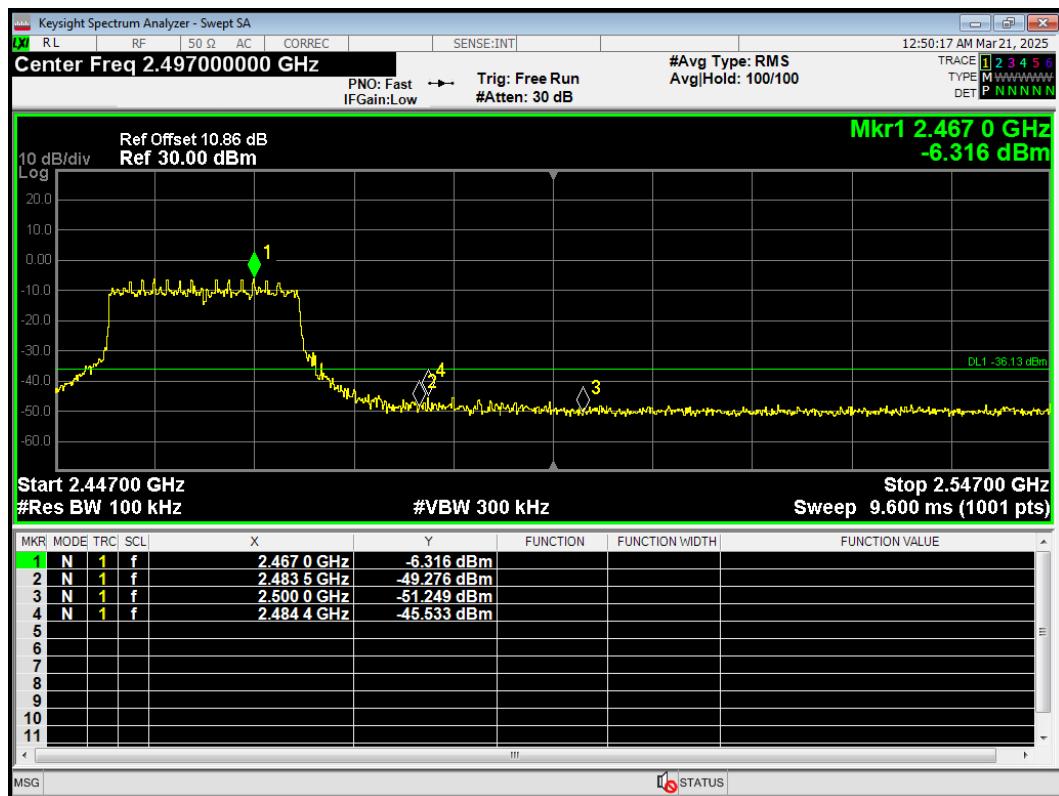
Band Edge 802.11ax(HE20) 2457MHz Emission



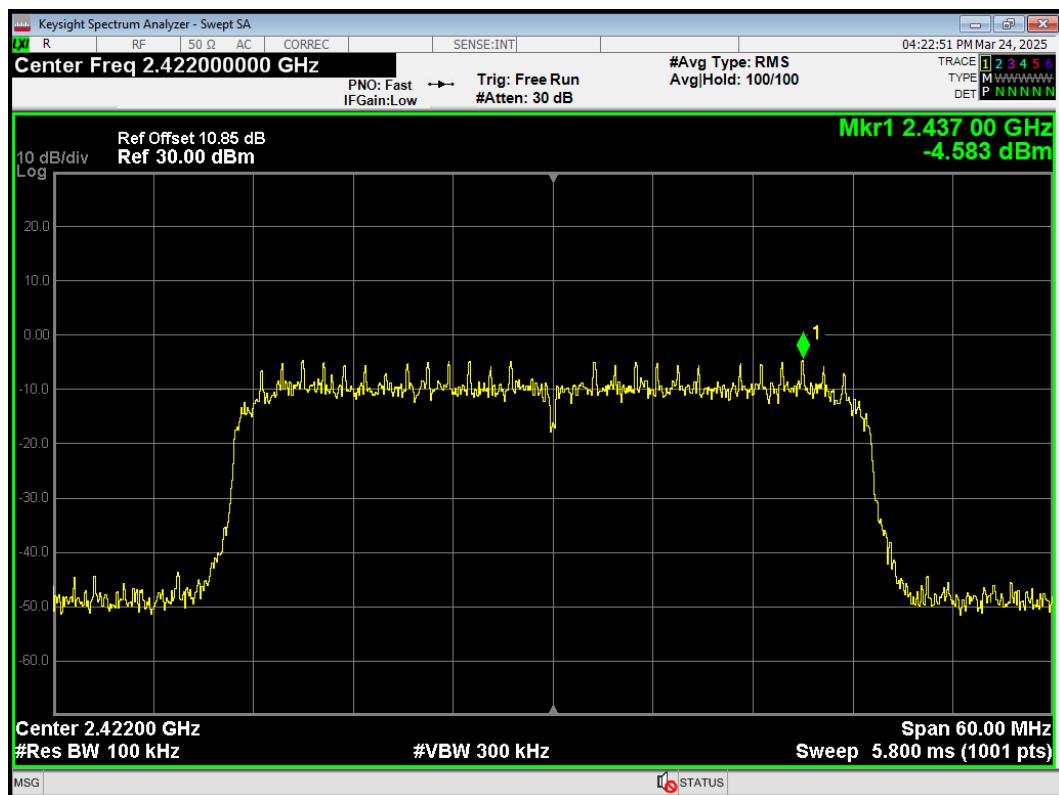
Band Edge 802.11ax(HE20) 2462MHz Ref



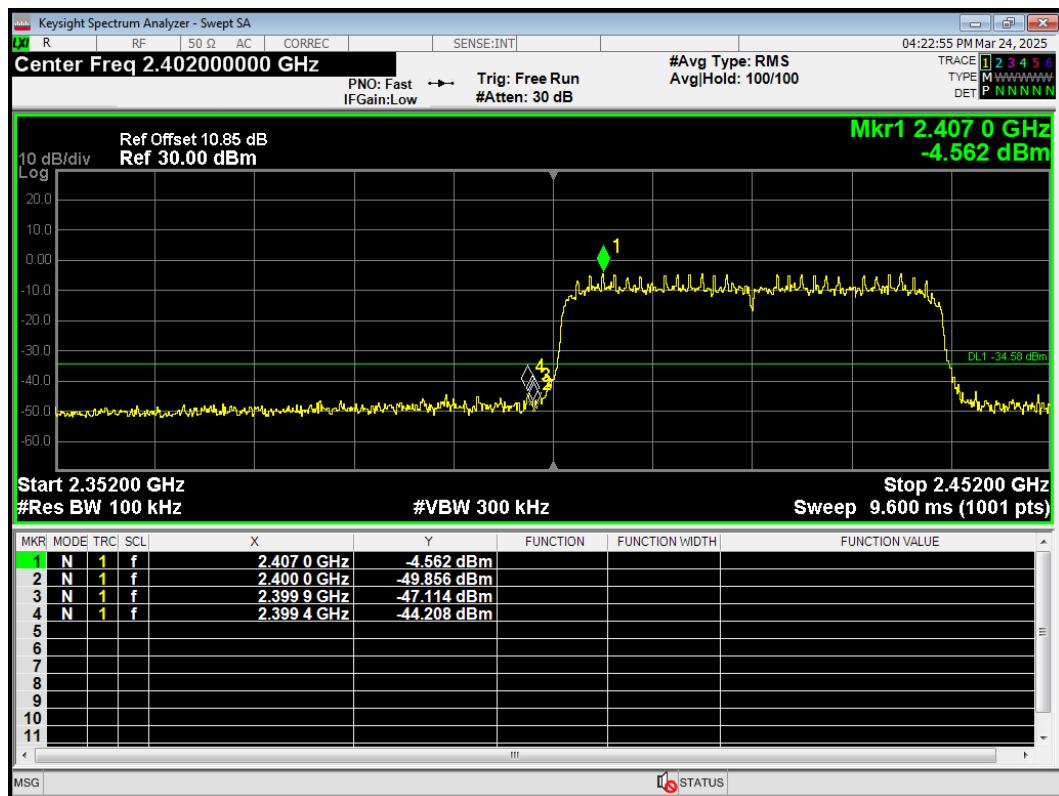
Band Edge 802.11ax(HE20) 2462MHz Emission



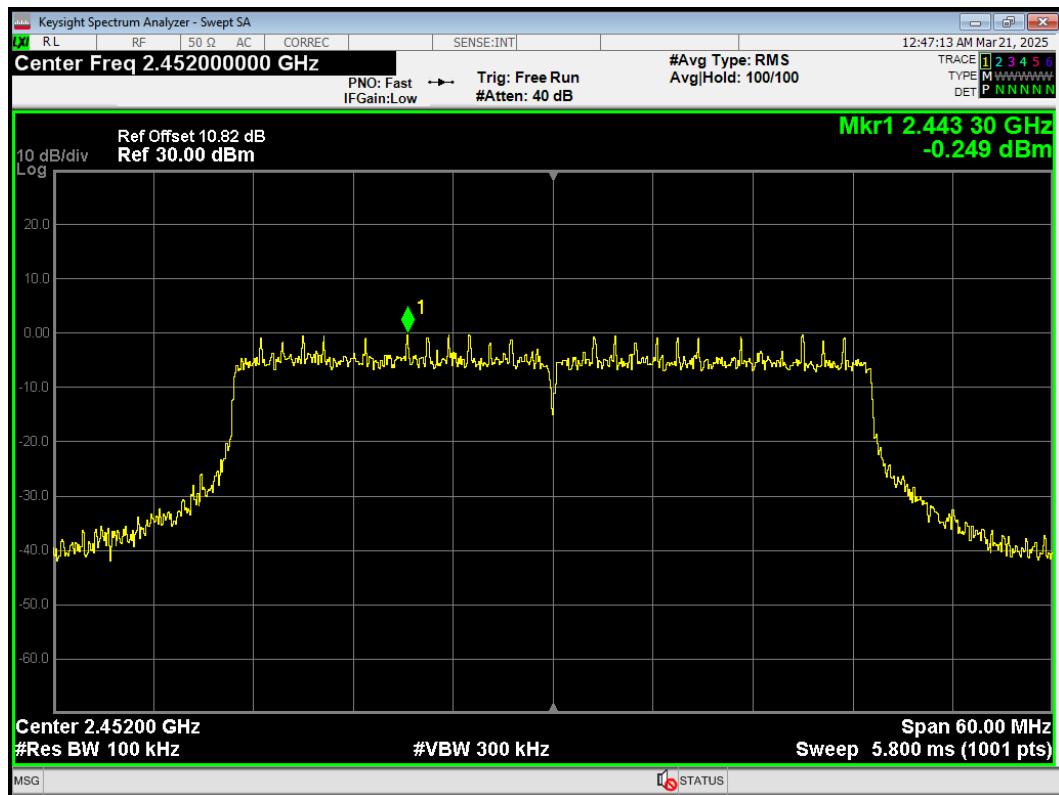
Band Edge 802.11ax(HE40) 2422MHz Ref



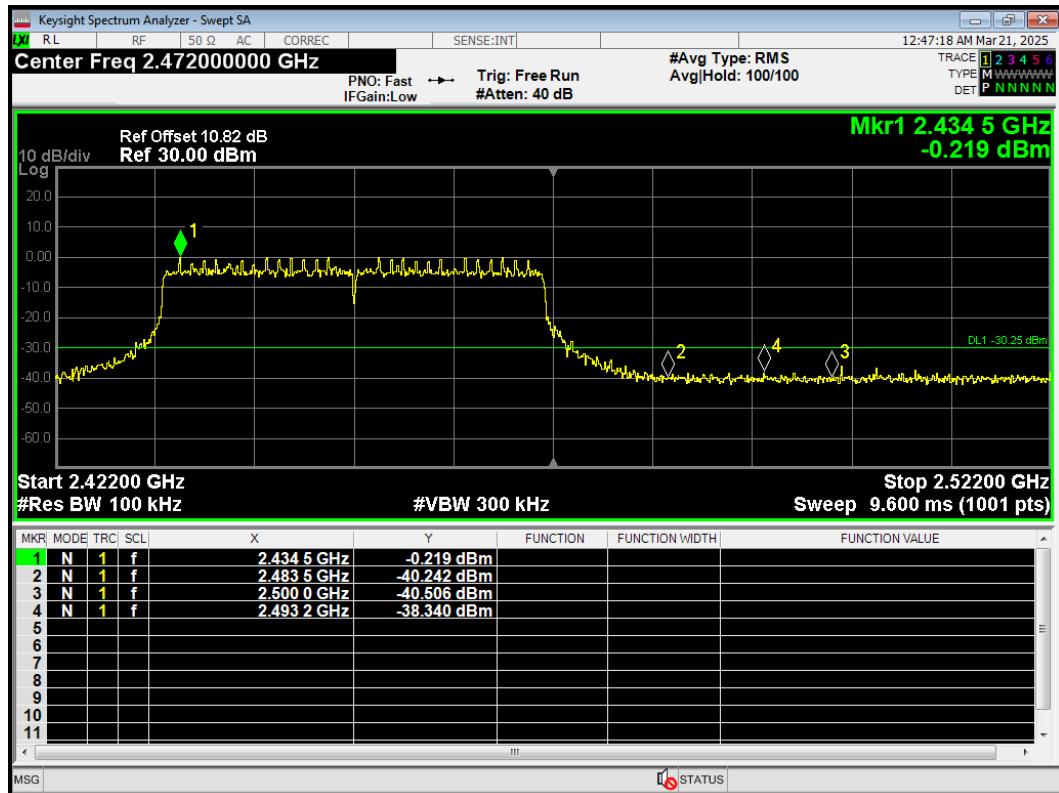
Band Edge 802.11ax(HE40) 2422MHz Emission



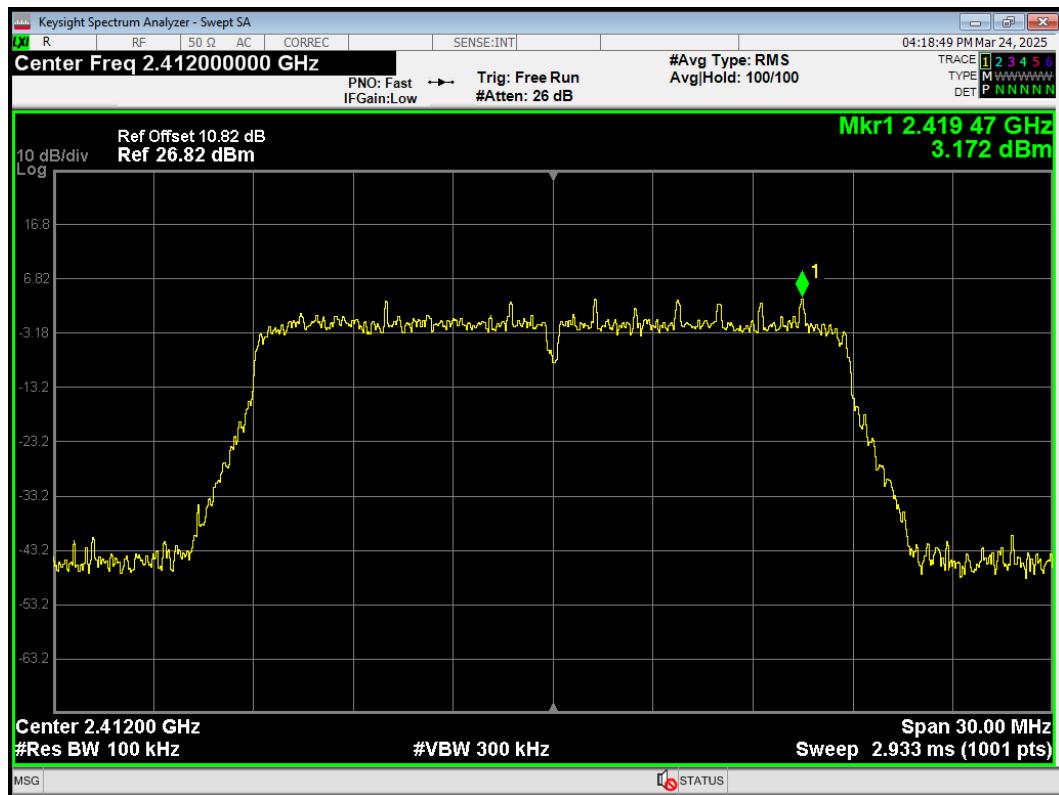
Band Edge 802.11ax(HE40) 2452MHz Ref



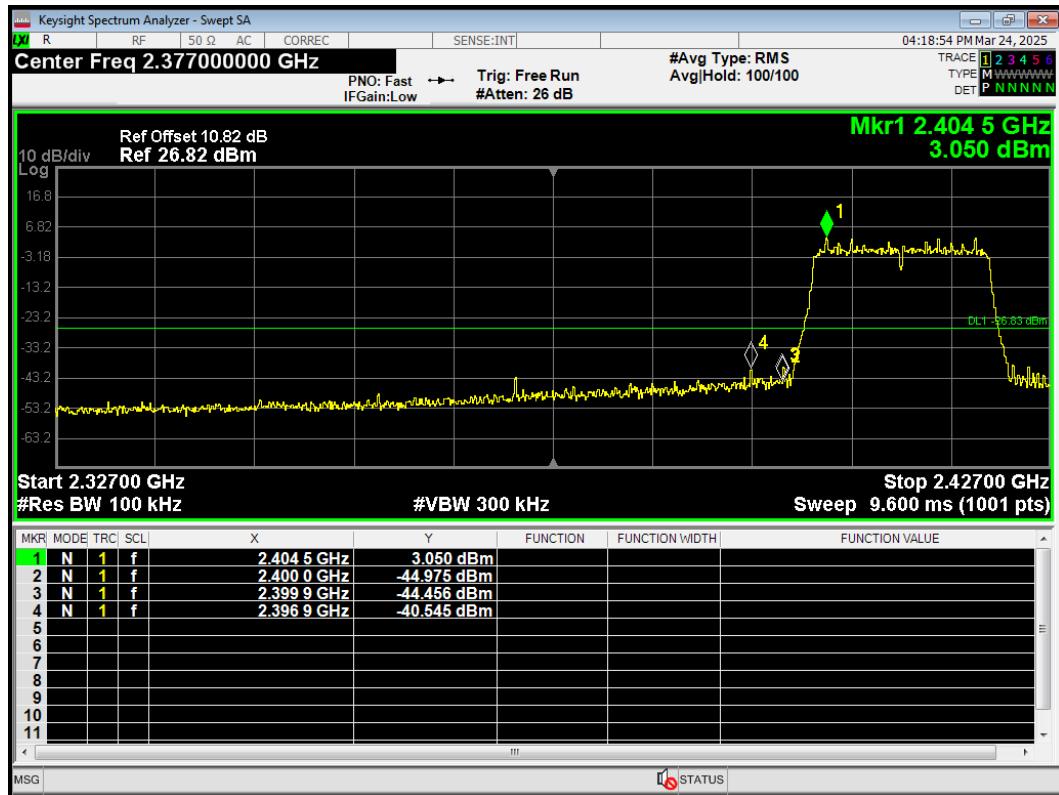
Band Edge 802.11ax(HE40) 2452MHz Emission



Band Edge 802.11n(HT20) 2412MHz Ref



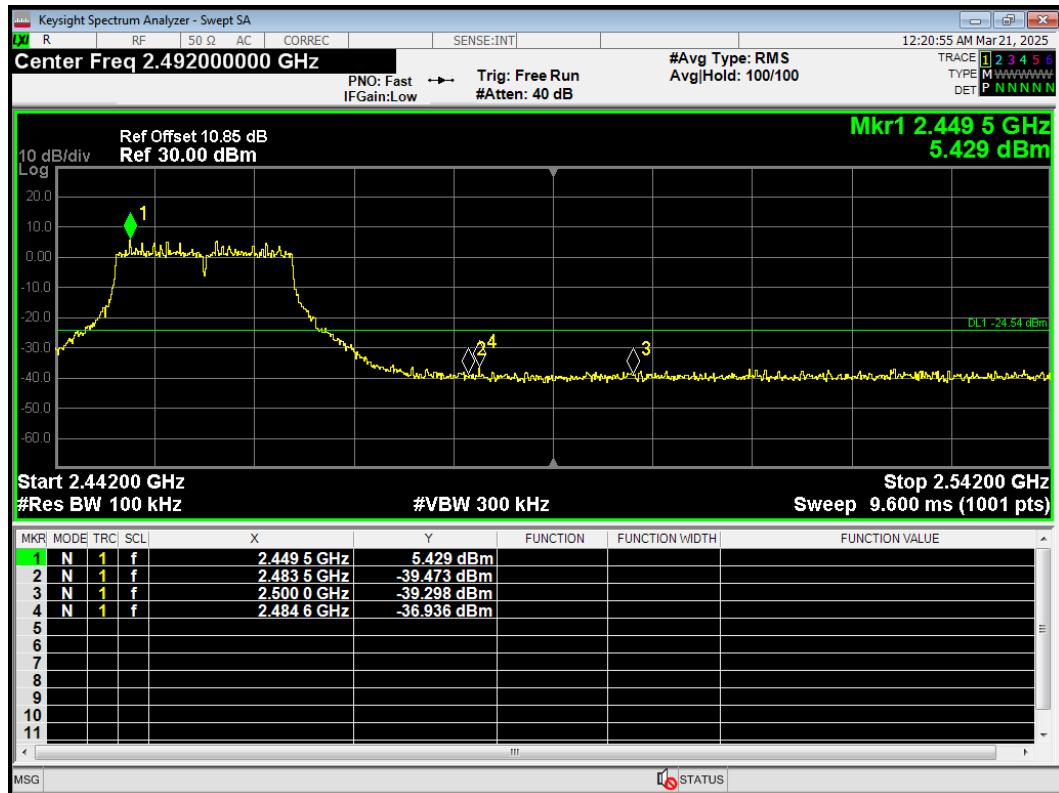
Band Edge 802.11n(HT20) 2412MHz Emission



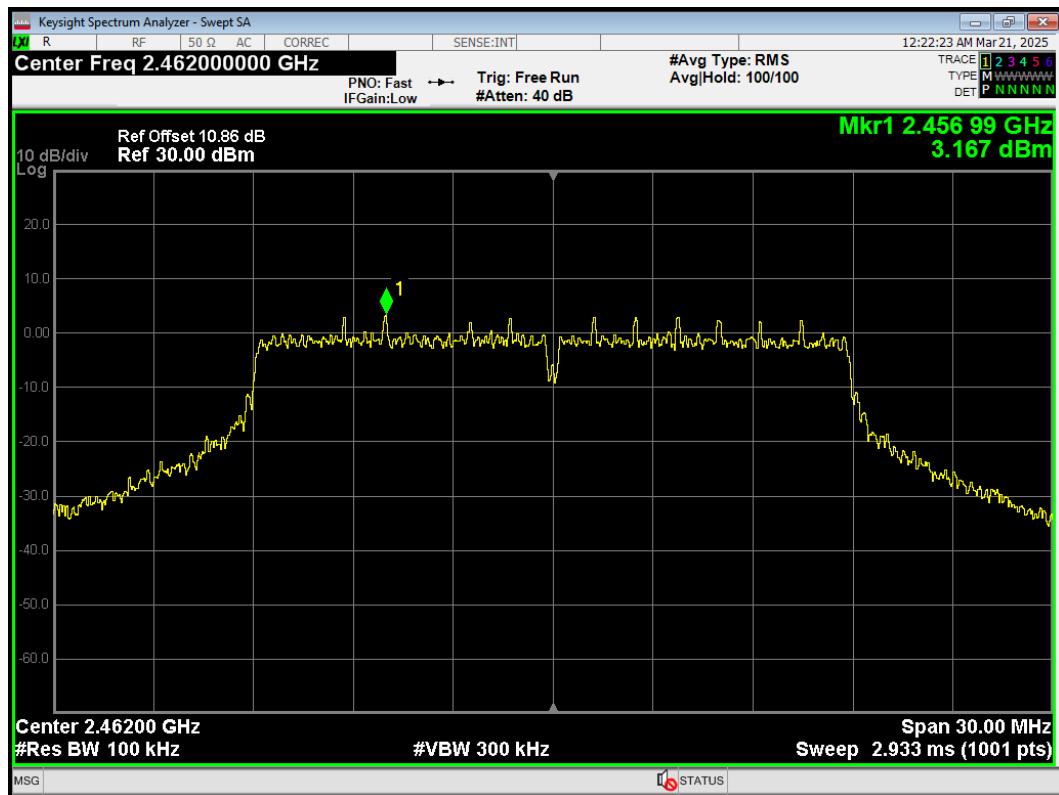
Band Edge 802.11n(HT20) 2457MHz Ref



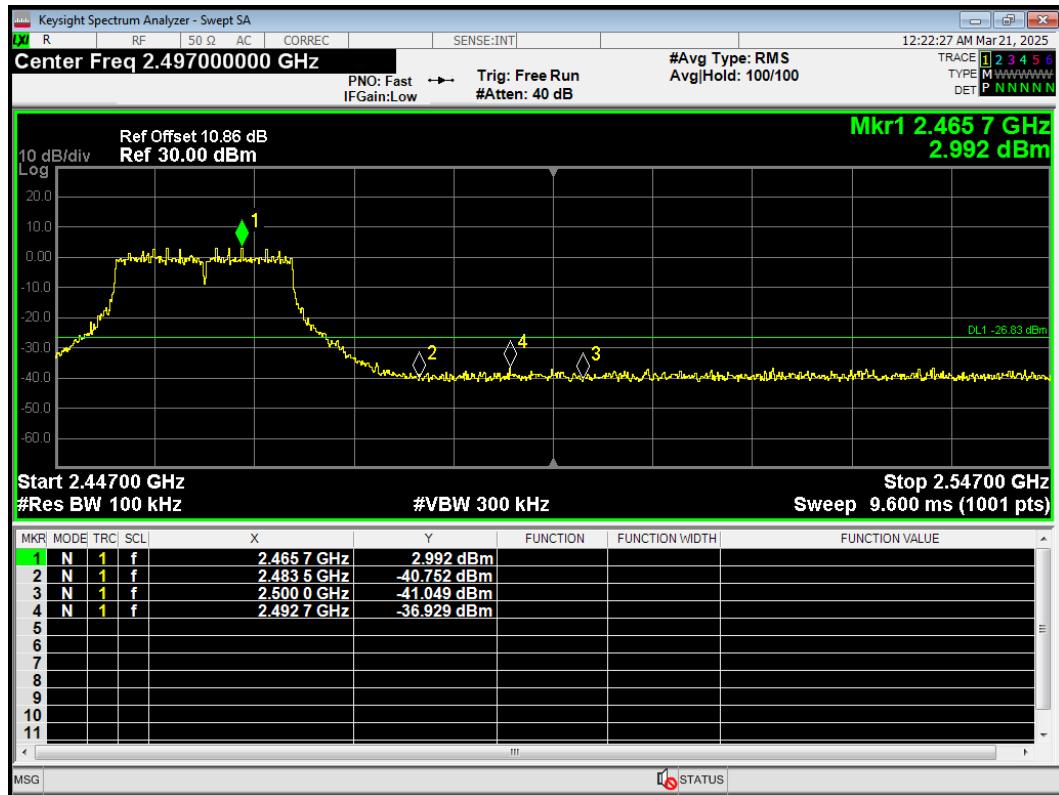
Band Edge 802.11n(HT20) 2457MHz Emission



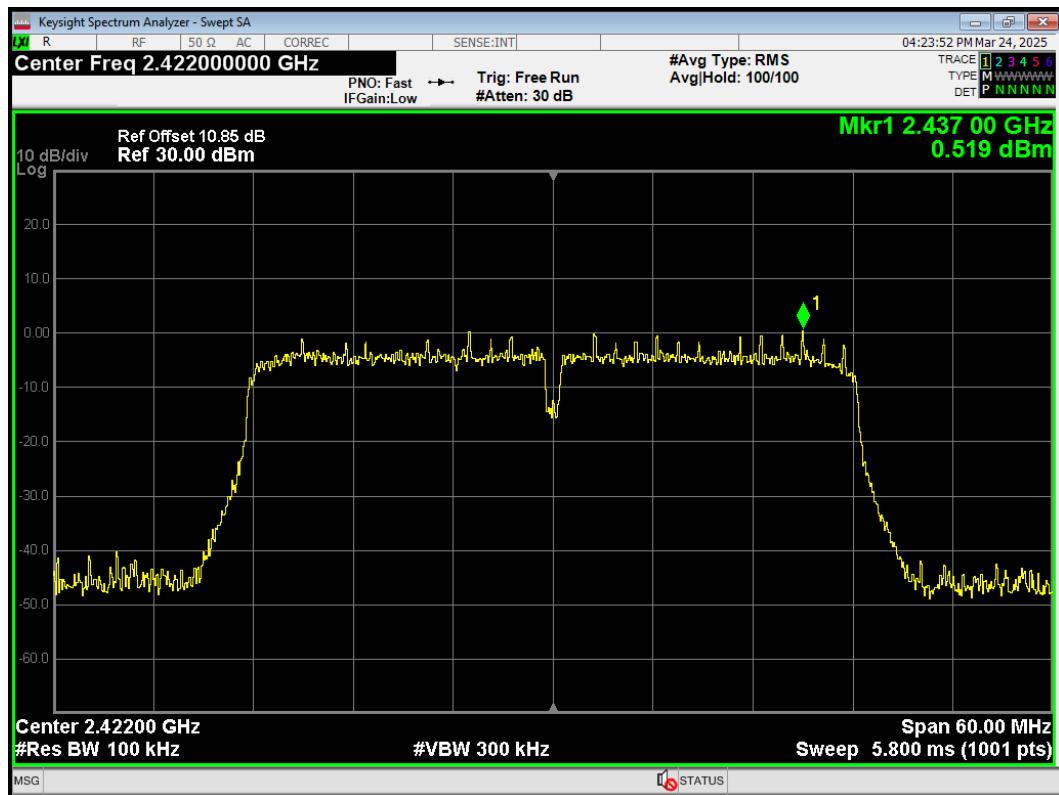
Band Edge 802.11n(HT20) 2462MHz Ref



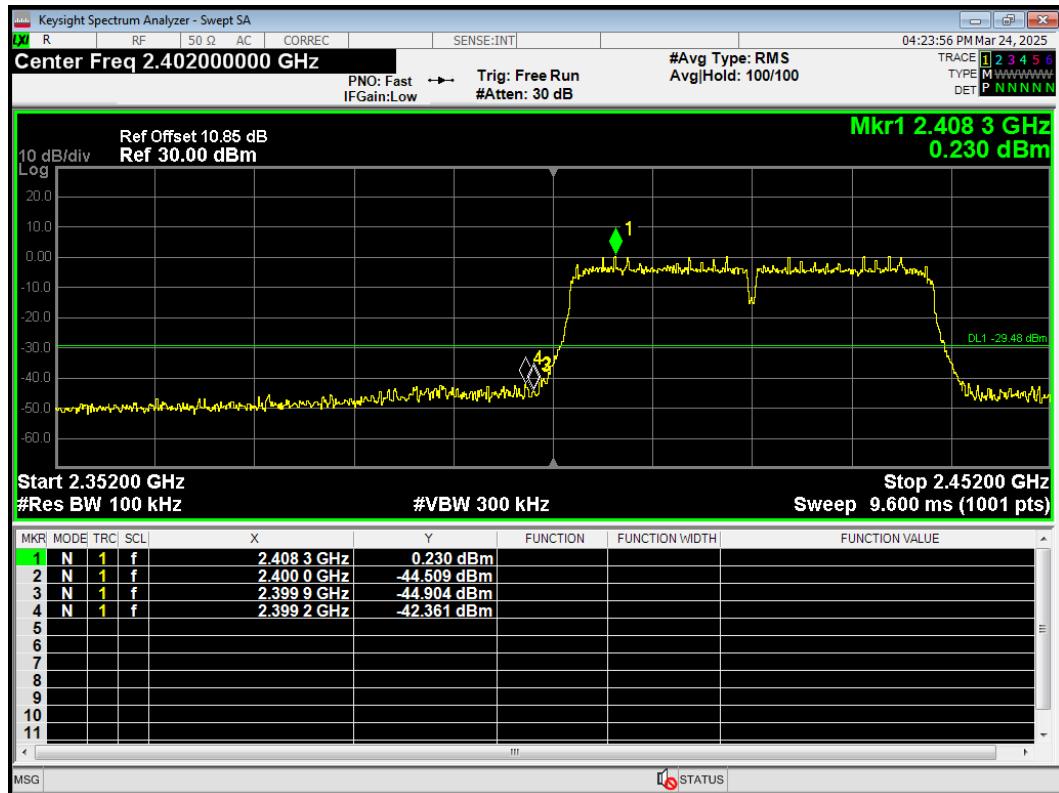
Band Edge 802.11n(HT20) 2462MHz Emission



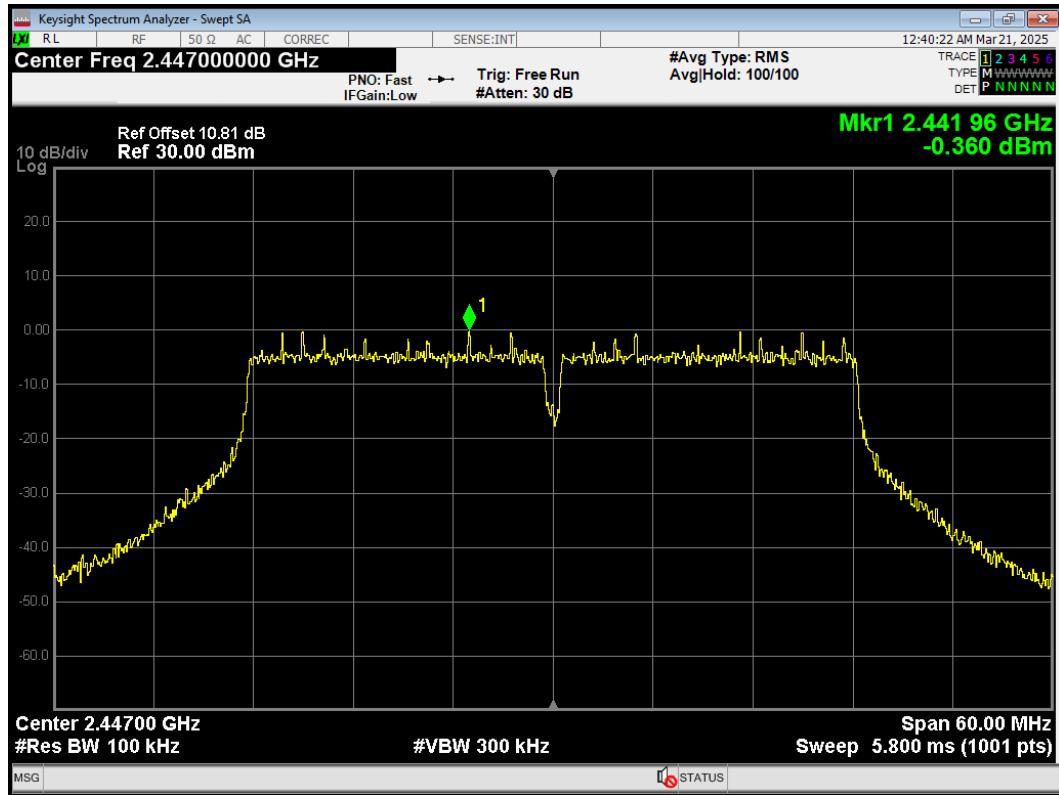
Band Edge 802.11n(HT40) 2422MHz Ref



Band Edge 802.11n(HT40) 2422MHz Emission



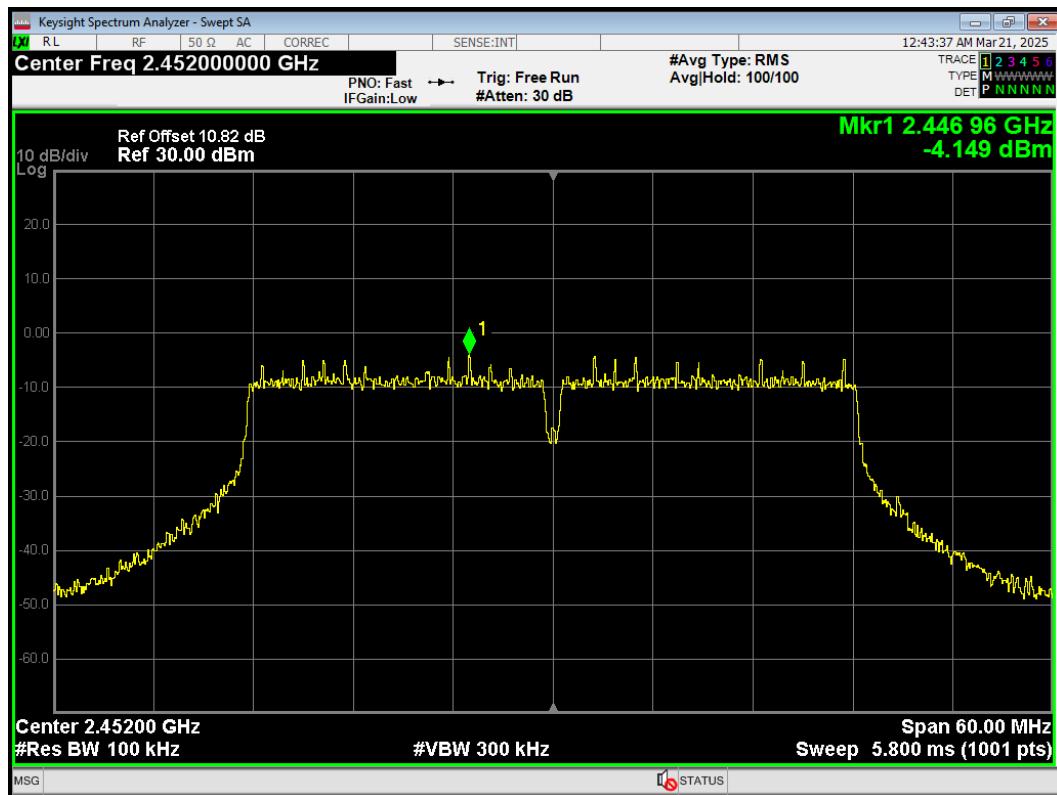
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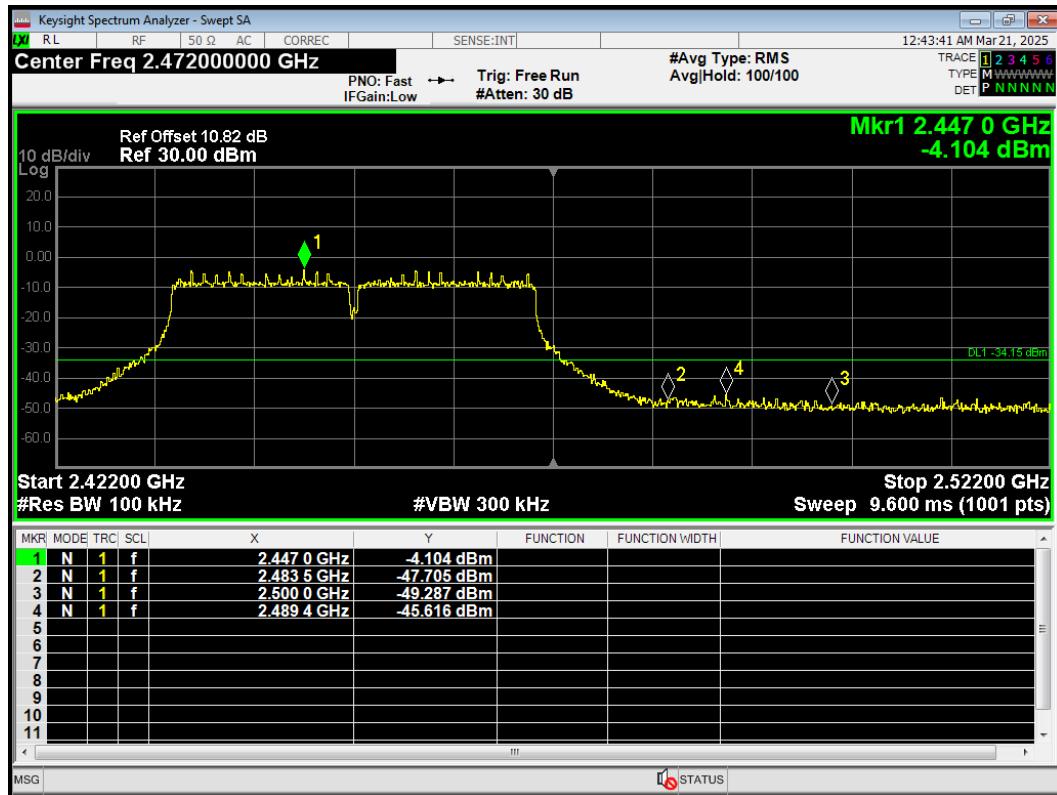
Band Edge 802.11n(HT40) 2447MHz Emission



Band Edge 802.11n(HT40) 2452MHz Ref

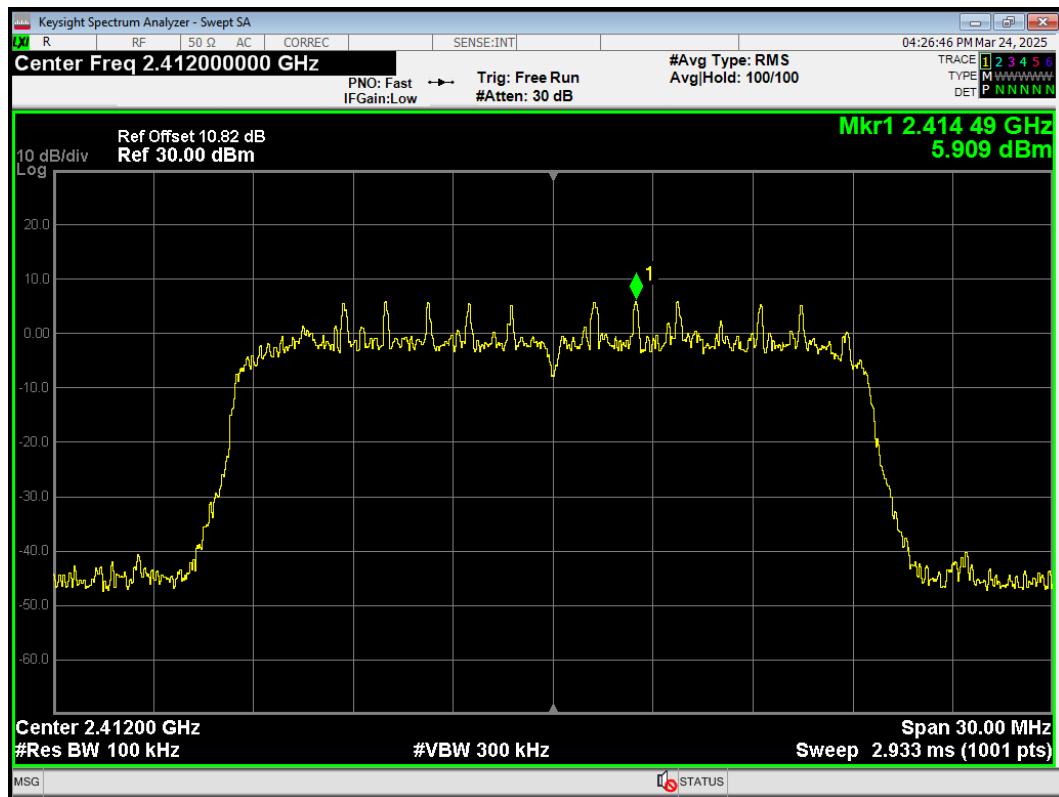


Band Edge 802.11n(HT40) 2452MHz Emission

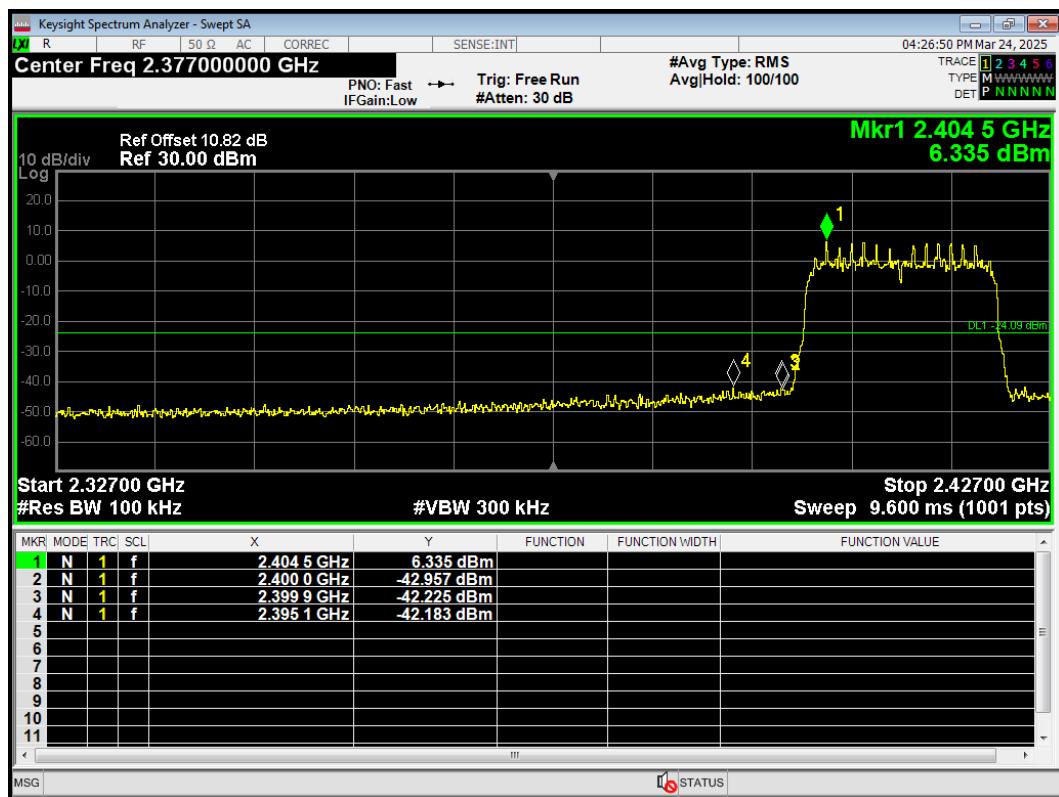


ERSU Mode

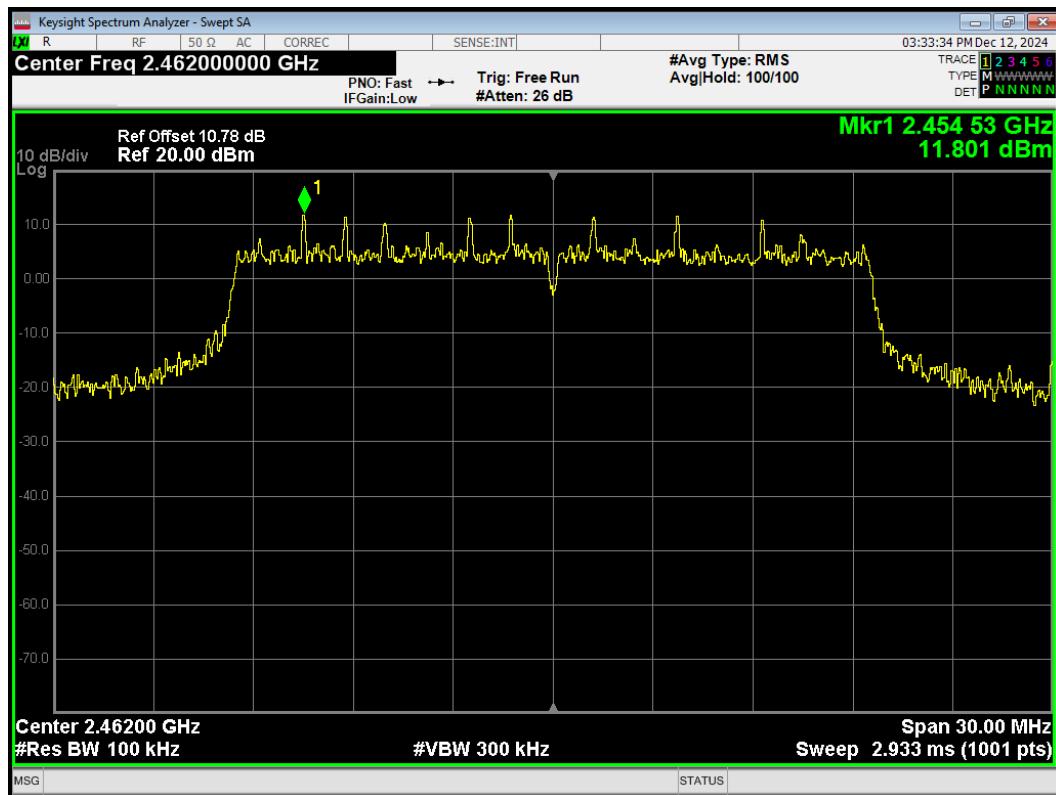
Band Edge 802.11ax HE20 242-Tones 2412MHz Ref



Band Edge 802.11ax HE20 242-Tones 2412MHz Emission



Band Edge 802.11ax(HE20) 242-Tones 2462MHz Ref



Band Edge 802.11ax(HE20) 242-Tones 2462MHz Emission

