

# RF TEST REPORT

**Applicant**      Quectel Wireless Solutions Co., Ltd.

**FCC ID**          XMR2023FCM360W

**Product**        Wi-Fi & Bluetooth Module

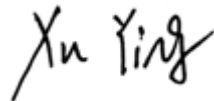
**Brand**            Quectel

**Model**           FCM360W

**Report No.**      R2303A0279-R1V3

**Issue Date**     June 5, 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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Approved by: Xu Kai

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Version	Revision description	Issue Date
Rev.0	Initial issue of report.	May 15, 2023
Rev.1	Update the description on page 6.	June 2, 2023
Rev.2	Update the description on page 6.	June 2, 2023
Rev.3	Update the description on page 6.	June 5, 2023
Note: This revised report (Report No.: R2303A0279-R1V3) supersedes and replaces the previously issued report (Report No.: R2303A0279- R1V2). 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
6	Unwanted Emissions	15.247(d),15.205,15.209	PASS
7	Conducted Emissions	15.207	PASS
Date of Testing: April 3, 2023 ~ April 14, 2023			
Date of Sample Received: March 31, 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  
Post code: 201201  
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Telephone: +86-021-50791141/2/3  
Fax: +86-021-50791141/2/3-8000  
Website: <http://www.ta-shanghai.com>  
E-mail: [xukai@ta-shanghai.com](mailto:xukai@ta-shanghai.com)

## 2. General Description of Equipment Under Test

### 2.1. Applicant and Manufacturer Information

Applicant	Quectel Wireless Solutions Co., Ltd.
Applicant address	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China, 200233
Manufacturer	Quectel Wireless Solutions Co., Ltd.
Manufacturer address	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China, 200233

### 2.2. General Information

EUT Description	
Model	FCM360W
SN	E1823BP26000049
Hardware Version	R1.0
Software Version	FCM360WAAR01A01
Power Supply	External power supply
Antenna Type	PCB Antenna
Antenna Connector	A permanently attached antenna (meet with the standard FCC Part 15.203 requirement)
Antenna Gain	0.1 dBi
additional beamforming gain	NA
Operating Frequency Range(s)	802.11b/g/n(HT20)/ ax(HE20): 2412 ~ 2462 MHz 802.11n(HT40): 2422 ~ 2452 MHz Bluetooth LE V5.1: 2402 ~2480 MHz
Modulation Type	802.11b: DSSS 802.11g/n(HT20/HT40): OFDM 802.11ax SU (HE20): OFDM Bluetooth LE: GFSK
Max. Output Power	Wi-Fi 2.4G: 16.39 dBm Bluetooth LE: 8.35 dBm
Auxiliary test equipment	
PC	PC Manufacturer: DELL Model: Latitude 3301 (SN: 1Q6DJW2)
Note: 1. The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant. 2. 802.11ax mode support RU sizes configuration, test results only support Full RU.	

### 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**

## 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
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ax HE20	MCS0



## 5. Test Case Results

### 5.1. Maximum output power

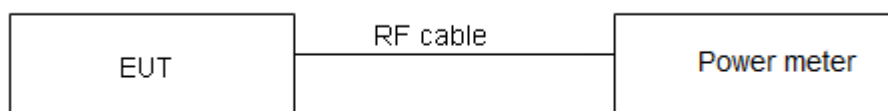
#### Ambient Condition

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

#### 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	$\leq 1W$ (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

Power Index							
Channel	802.11b	802.11g	802.11n HT20	Channel	802.11n HT40	Channel	802.11ax HE20
CH1	17	14	14	CH3	13	CH1	14
CH6	17	14	14	CH6	13	CH6	14
CH10	/	14	14	CH8	13	CH10	14
CH11	17	14	0	CH9	-5	CH11	0

Test Mode	Duty cycle	Duty cycle correction Factor(dB)
802.11b	0.93	0.30
802.11g	0.98	0.00
802.11n HT20	1.00	0.00
802.11n HT40	0.99	0.00
802.11ax HE20	0.99	0.00
Bluetooth LE (1M)	0.849	0.71
Bluetooth LE (2M)	0.569	2.45
Note: when Duty cycle $\geq 0.98$ , 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	15.78	16.08	30	PASS
	2437/CH 6	15.57	15.87	30	PASS
	2462/CH11	16.10	16.39	30	PASS
802.11g	2412/CH 1	13.20	13.20	30	PASS
	2437/CH 6	13.30	13.30	30	PASS
	2457/ CH10	13.73	13.73	30	PASS
	2462/CH11	13.79	13.79	30	PASS
802.11n HT20	2412/CH 1	13.29	13.29	30	PASS
	2437/CH 6	13.31	13.31	30	PASS
	2457/ CH10	13.69	13.69	30	PASS
	2462/CH11	13.66	13.66	30	PASS
802.11n HT40	2422/CH3	12.30	12.30	30	PASS
	2437/CH6	12.35	12.35	30	PASS
	2447/ CH8	12.26	12.26	30	PASS
	2452/CH9	12.61	12.61	30	PASS
802.11ax HE20	2412/ CH3	13.07	13.07	30	PASS
	2437/ CH6	13.16	13.16	30	PASS
	2457/ CH8	13.58	13.58	30	PASS
	2462/ CH9	13.61	13.61	30	PASS
Bluetooth (Low Energy) (1M)	2402/CH0	7.51	8.22	30	PASS
	2440/CH19	7.54	8.25	30	PASS
	2480/CH39	7.64	8.35	30	PASS
Bluetooth (Low Energy) (2M)	2402/CH0	5.89	8.34	30	PASS
	2440/CH19	5.78	8.24	30	PASS
	2480/CH39	5.87	8.32	30	PASS
Note: Average Power with duty factor = Average Power Measured +Duty cycle correction factor					

## 5.2. 99% Bandwidth and 6dB Bandwidth

### Ambient Condition

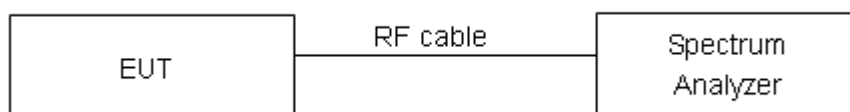
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

### Method of Measurement

The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable. 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

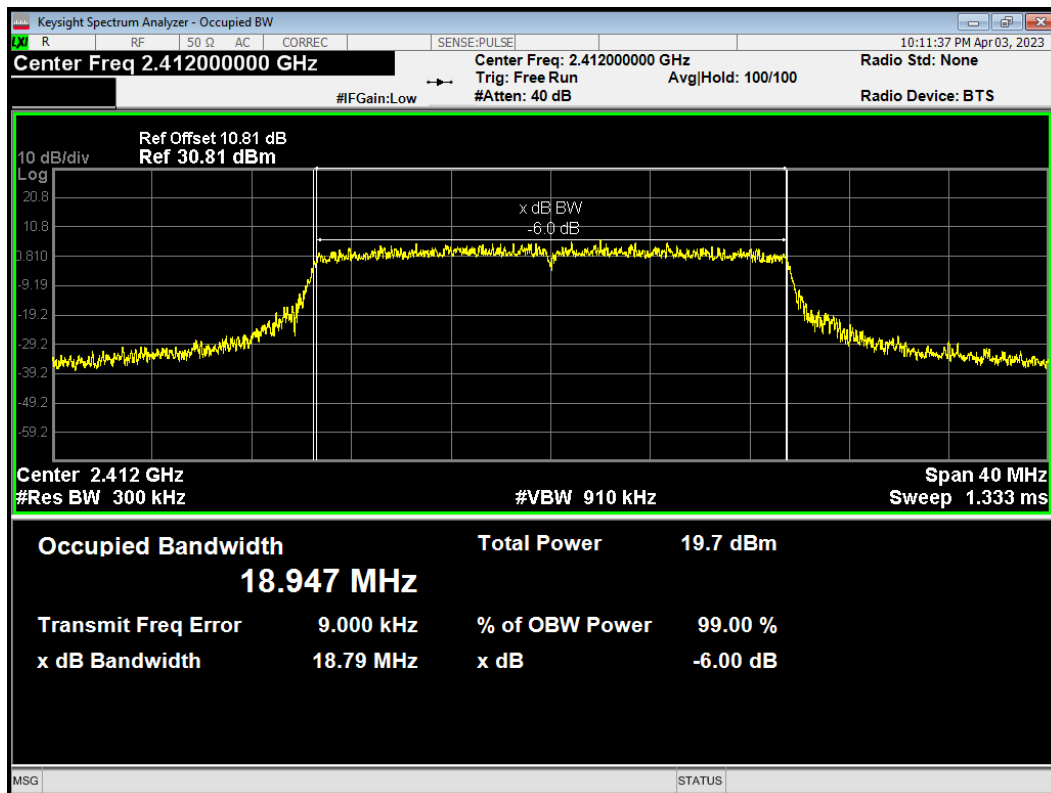
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U = 936$  Hz.

**Test Results:**

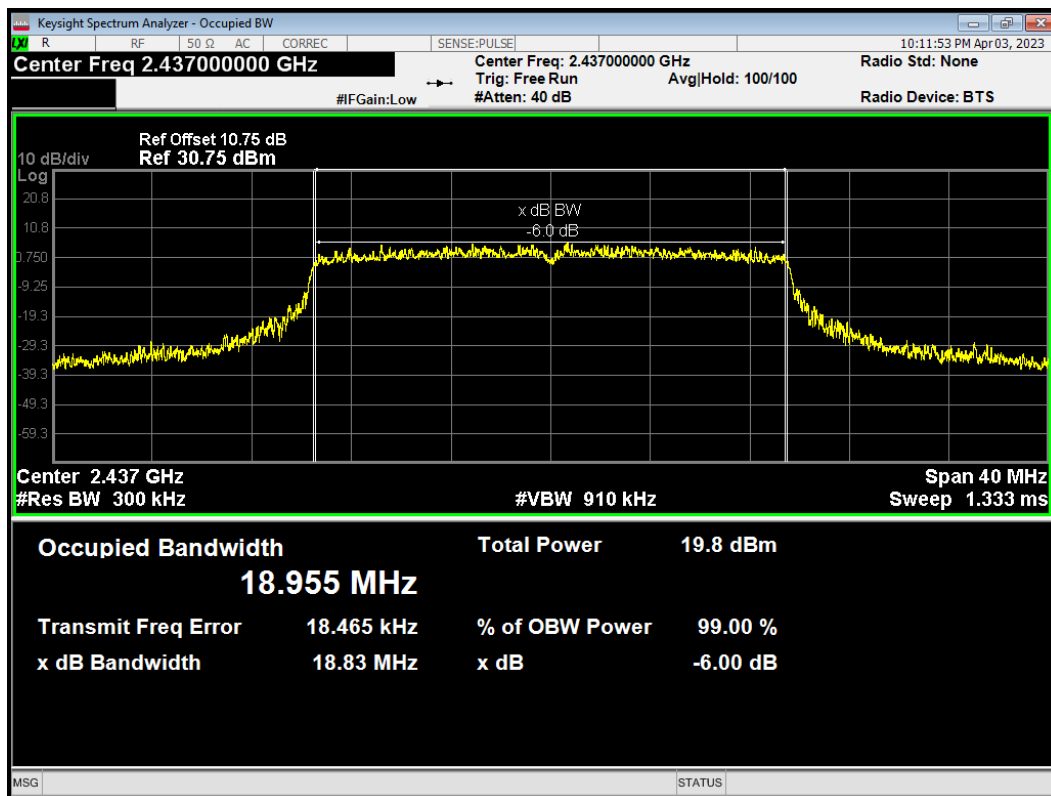
Test Mode	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 6 dB bandwidth (MHz)	Limit (kHz)	Conclusion
802.11b	2412	15.479	9.123	500	PASS
	2437	15.505	10.019	500	PASS
	2462	15.496	10.061	500	PASS
802.11g	2412	16.602	15.845	500	PASS
	2437	16.617	16.307	500	PASS
	2457	16.623	16.337	500	PASS
	2462	16.589	16.267	500	PASS
802.11n HT20	2412	17.825	16.920	500	PASS
	2437	17.814	16.933	500	PASS
	2457	17.793	17.614	500	PASS
	2462	17.815	17.055	500	PASS
802.11n HT40	2422	35.968	27.558	500	PASS
	2437	35.971	26.397	500	PASS
	2447	35.911	33.796	500	PASS
	2452	35.986	25.046	500	PASS
802.11ax HE20	2412	18.947	18.699	500	PASS
	2437	18.955	18.743	500	PASS
	2457	18.905	18.705	500	PASS
	2462	18.944	18.592	500	PASS
Bluetooth (Low Energy) (1M)	2402	1.034	0.66	500	PASS
	2440	1.034	0.66	500	PASS
	2480	1.034	0.66	500	PASS
Bluetooth (Low Energy) (2M)	2402	2.071	1.22	500	PASS
	2440	2.071	1.23	500	PASS
	2480	2.067	1.21	500	PASS

99%bandwidth

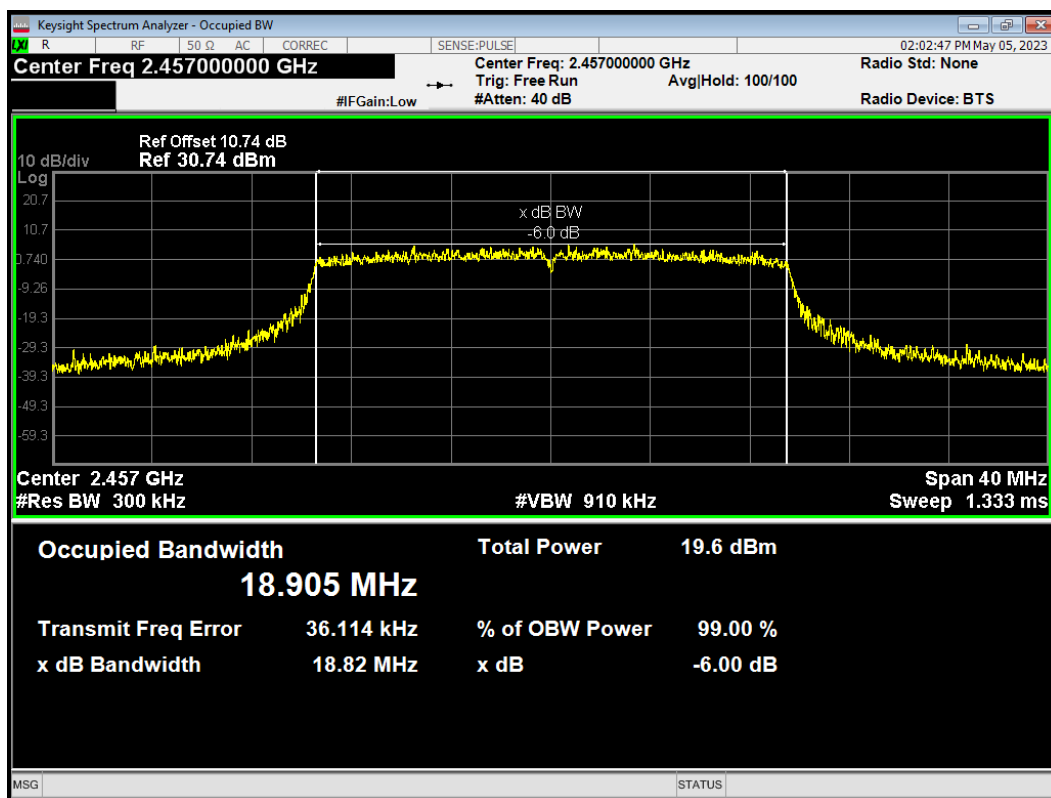
OBW 802.11ax(HE20) 2412MHz



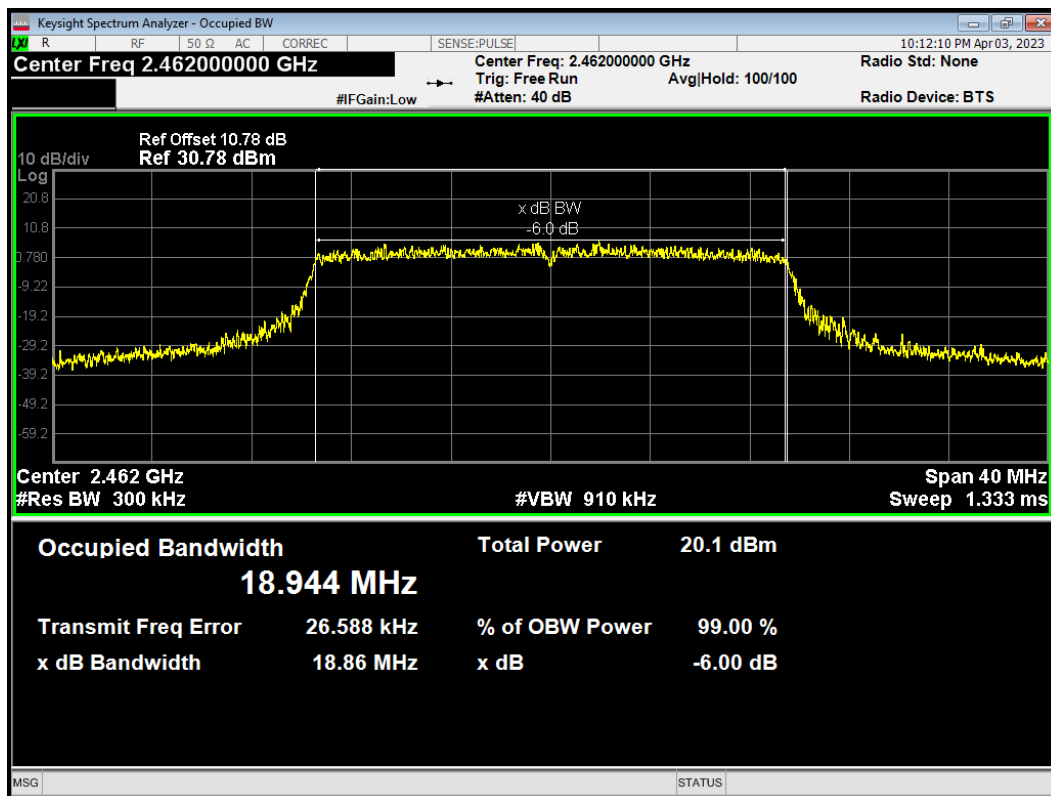
OBW 802.11ax(HE20) 2437MHz



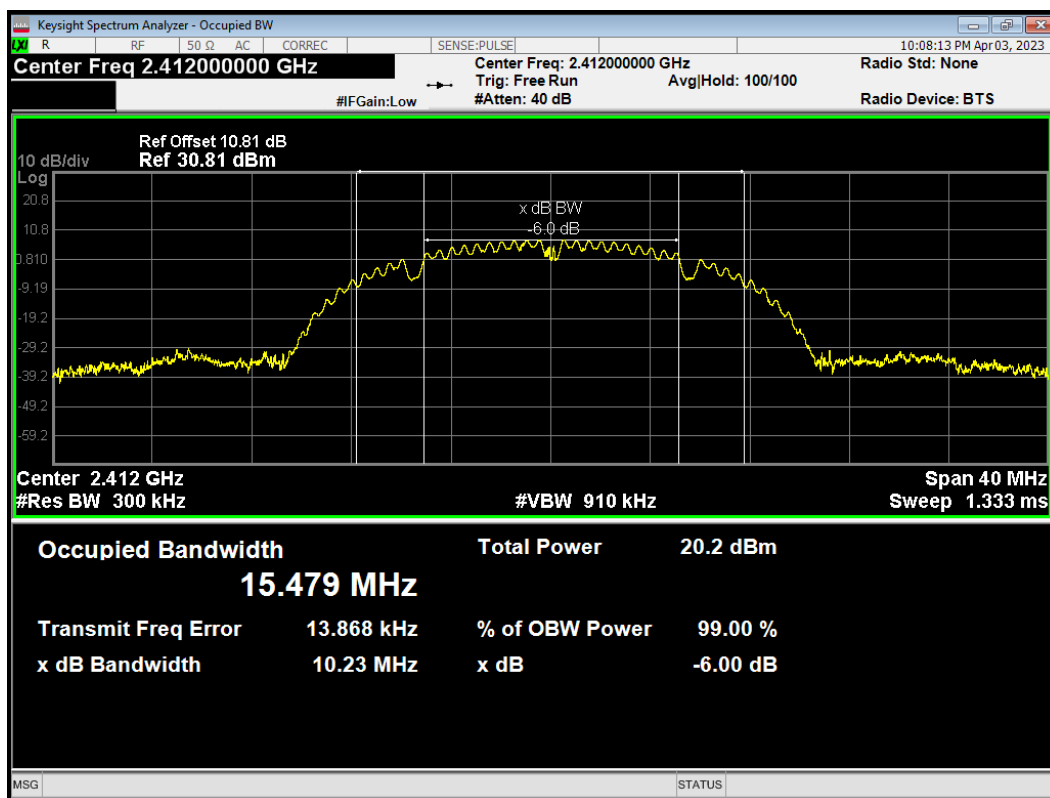
OBW 802.11ax(HE20) 2457MHz



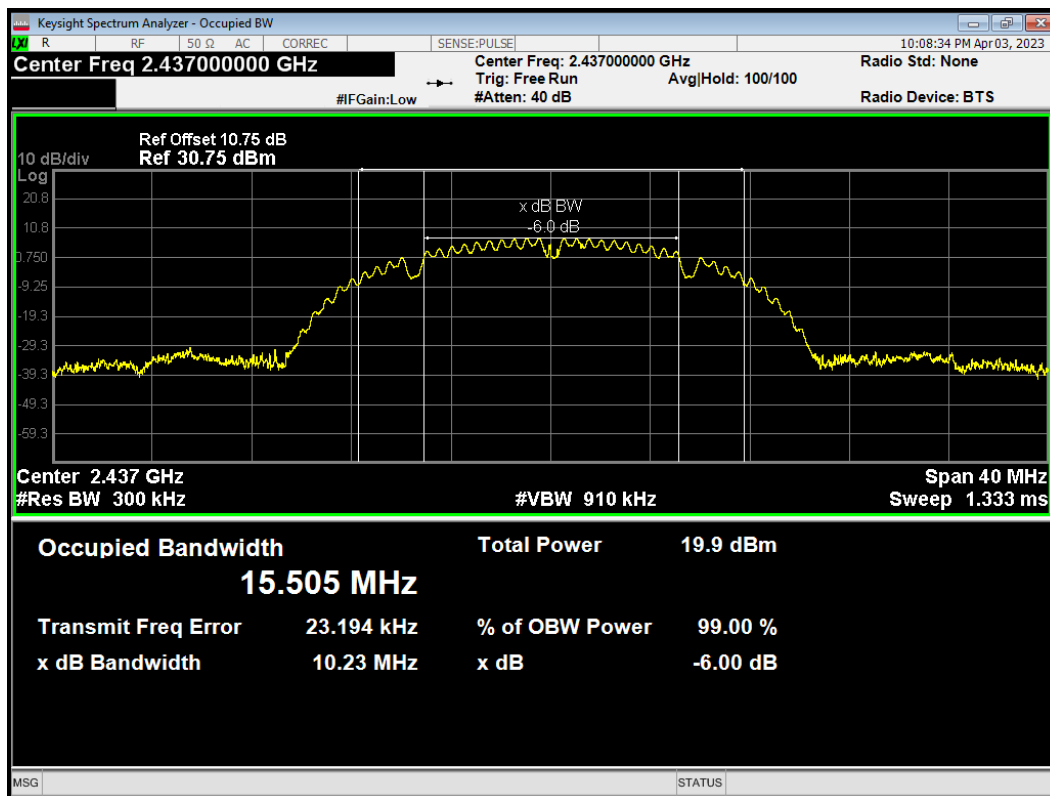
OBW 802.11ax(HE20) 2462MHz



# OBW 802.11b 2412MHz

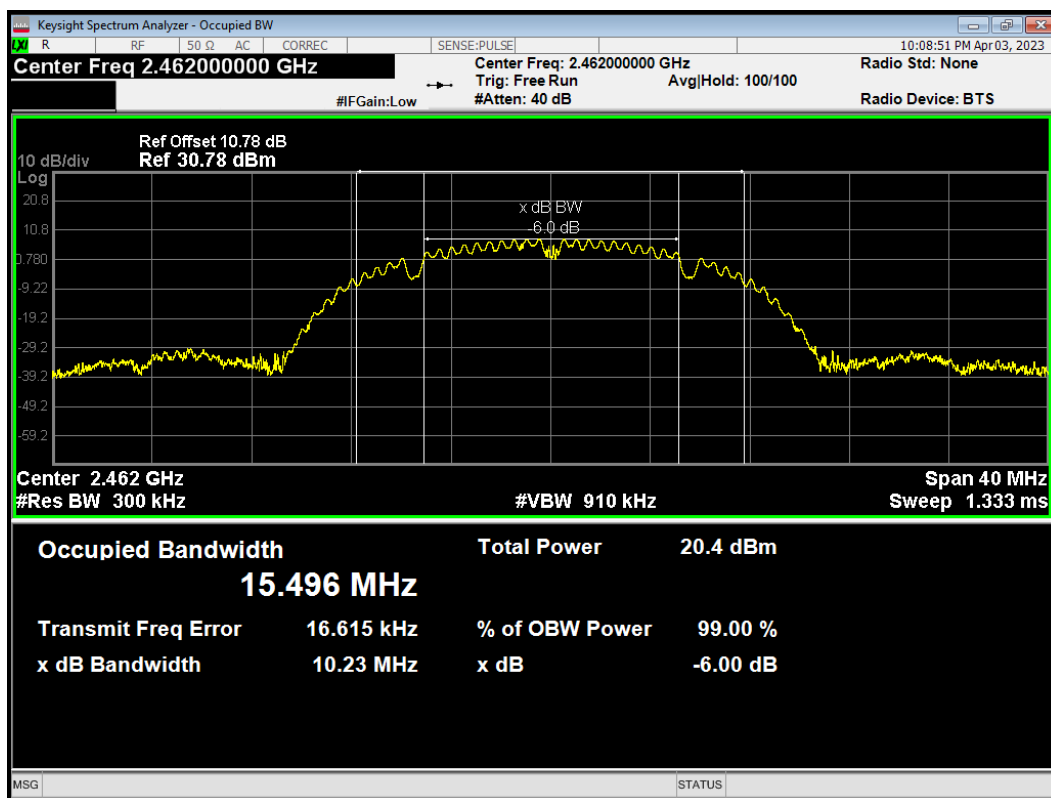


# OBW 802.11b 2437MHz

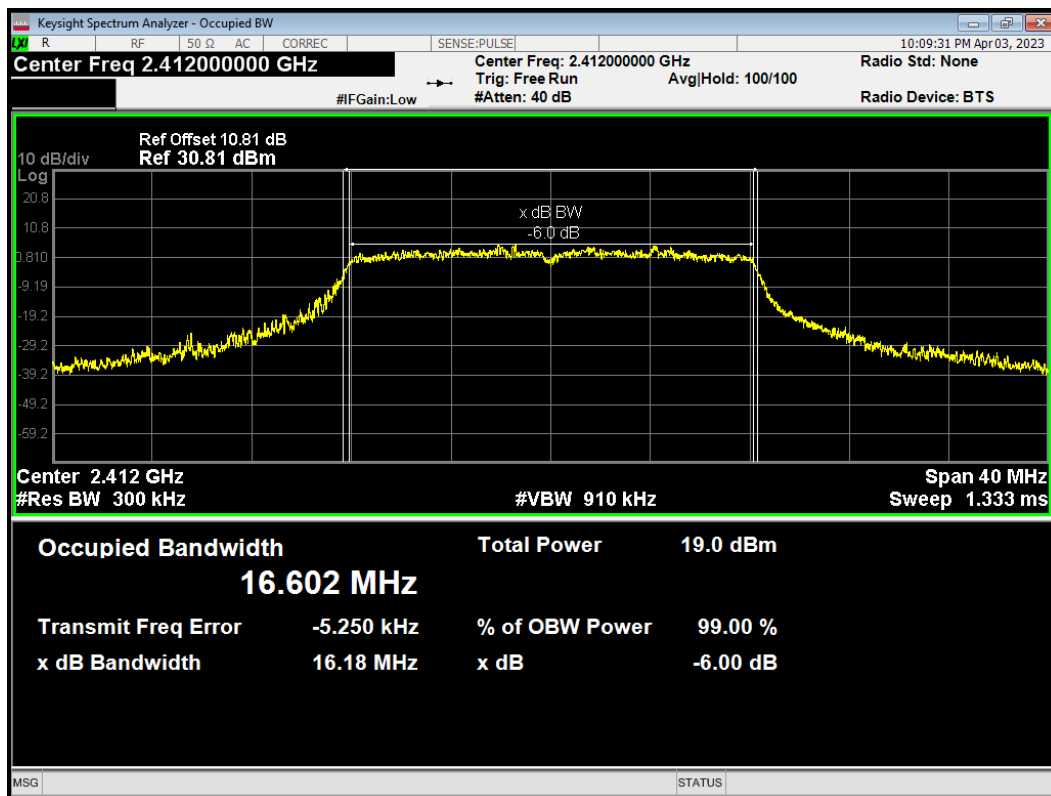




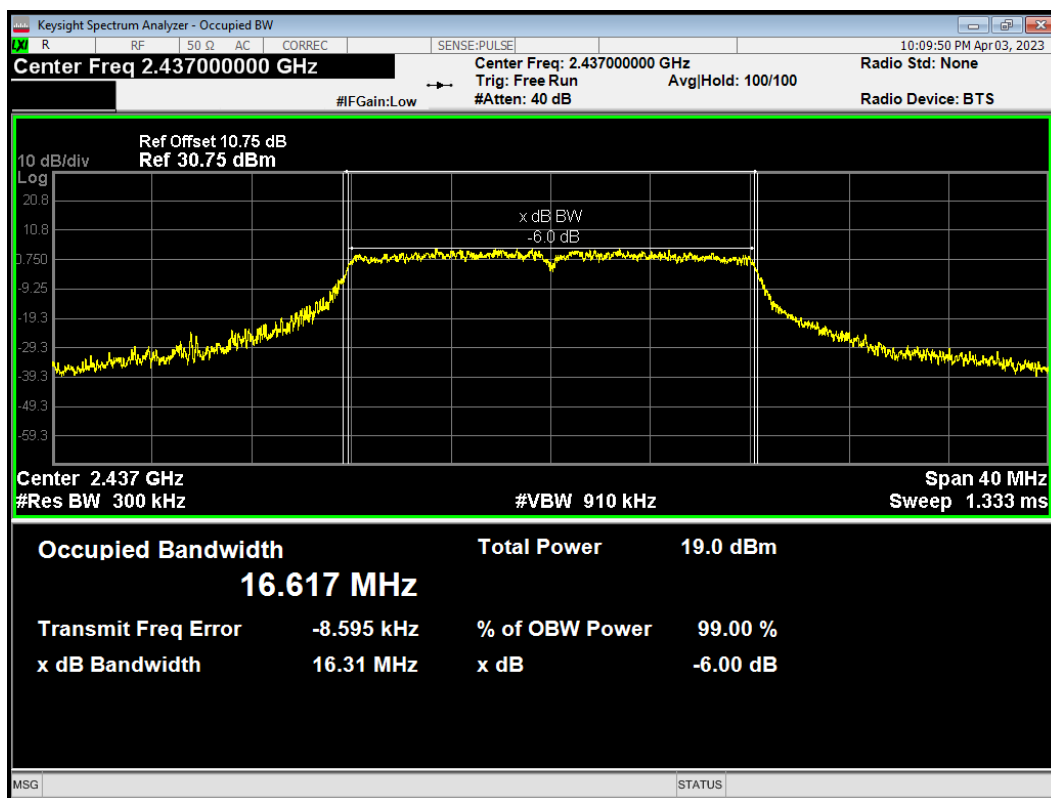
OBW 802.11b 2462MHz



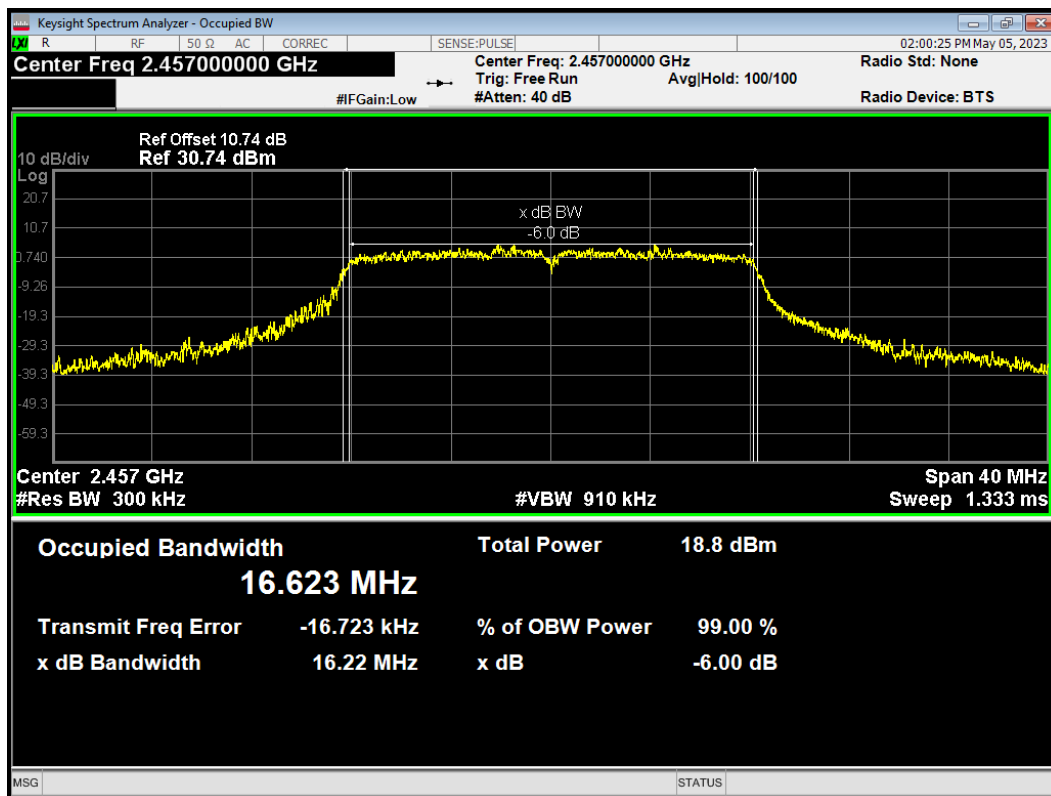
OBW 802.11g 2412MHz



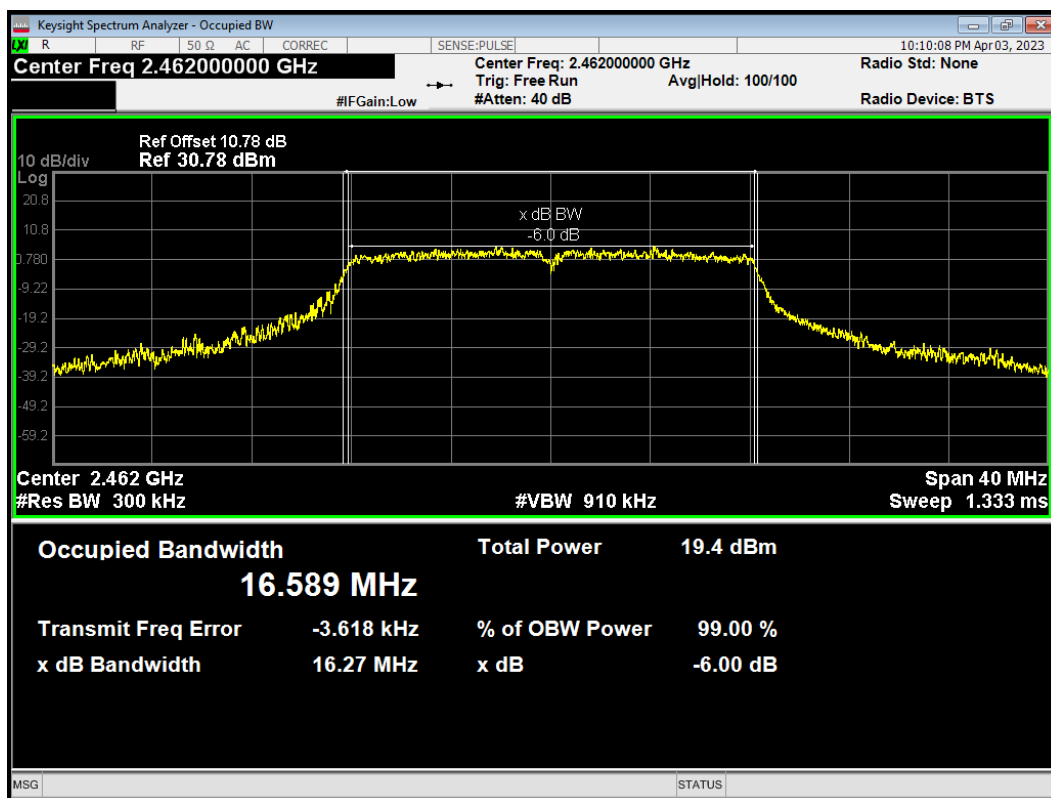
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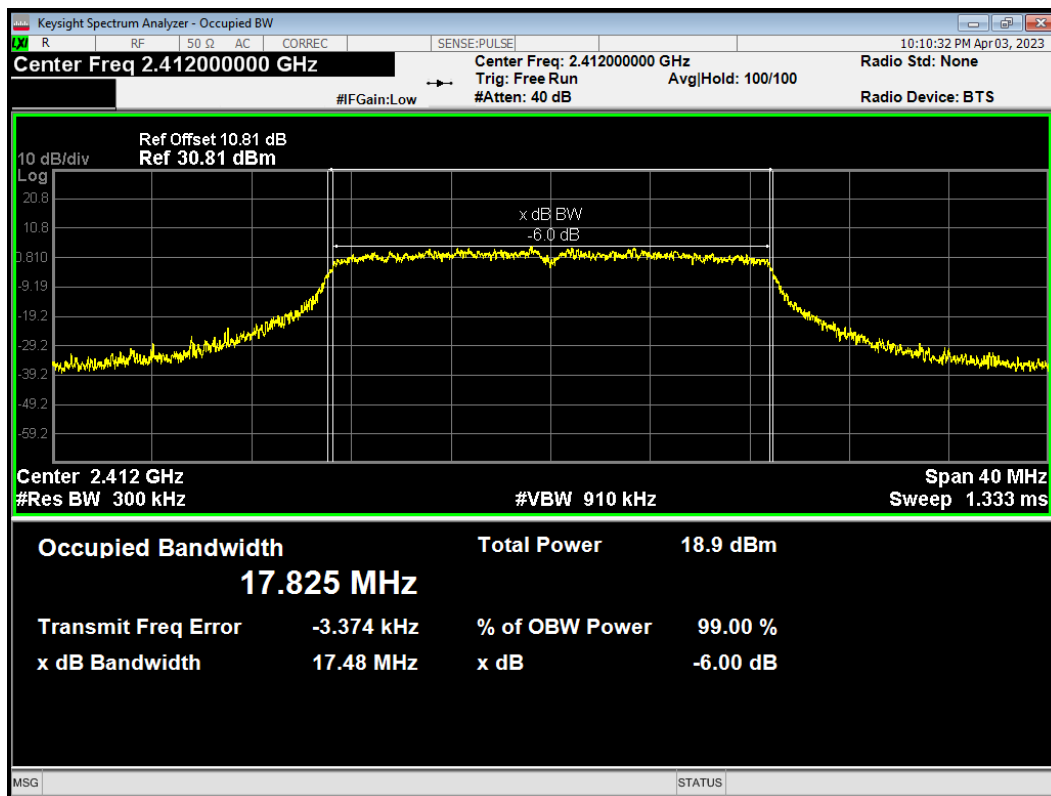
OBW 802.11g 2457MHz



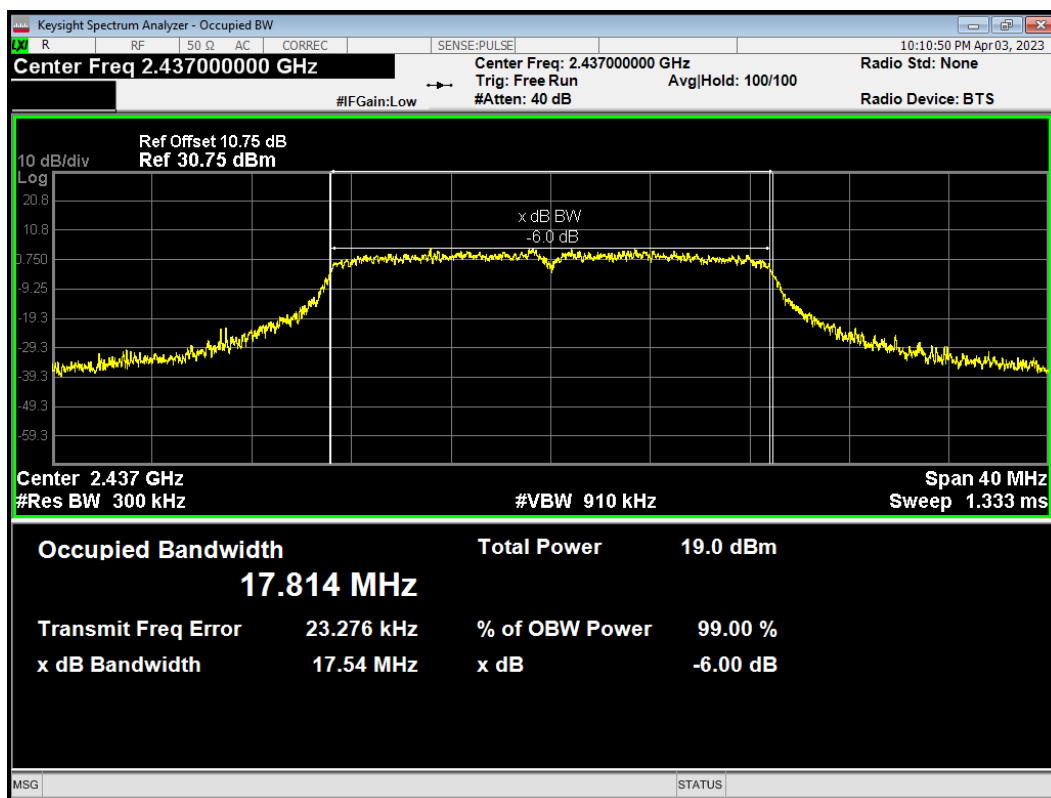
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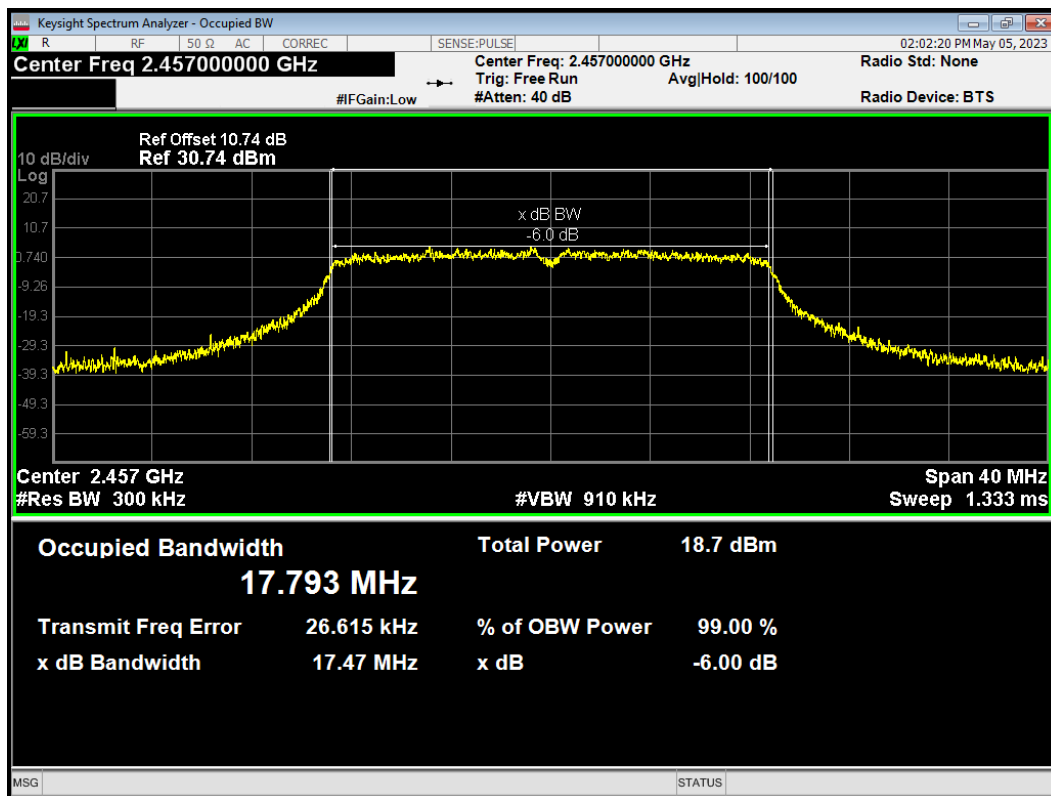
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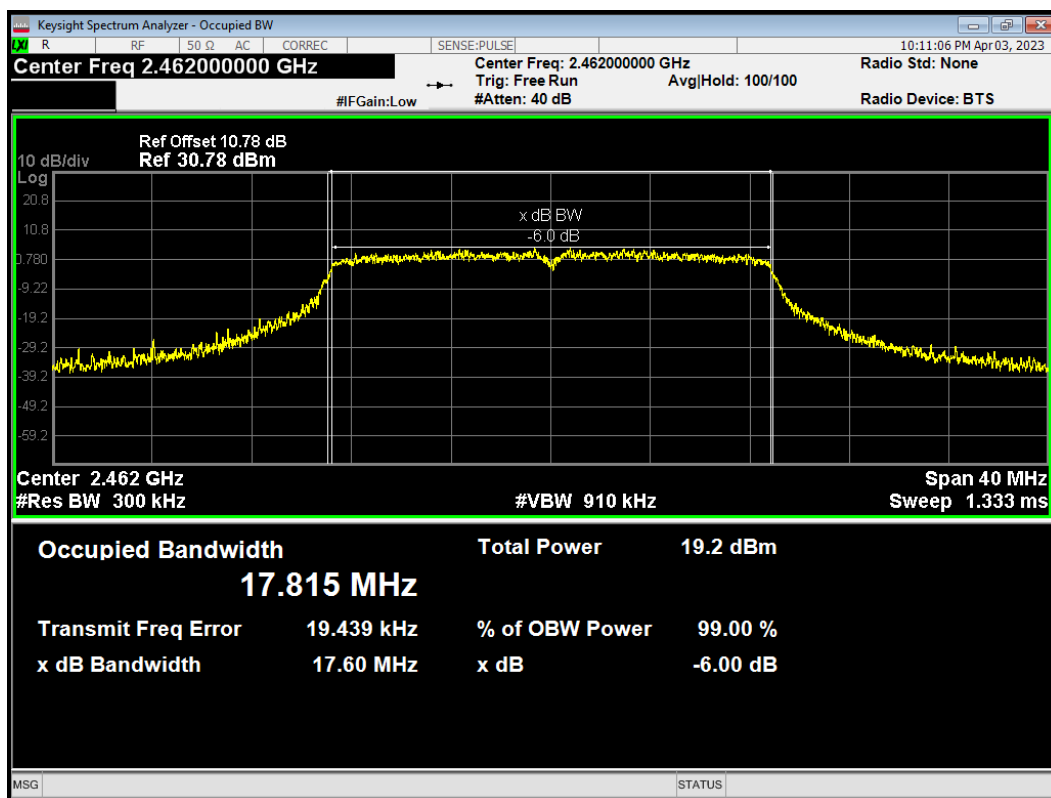
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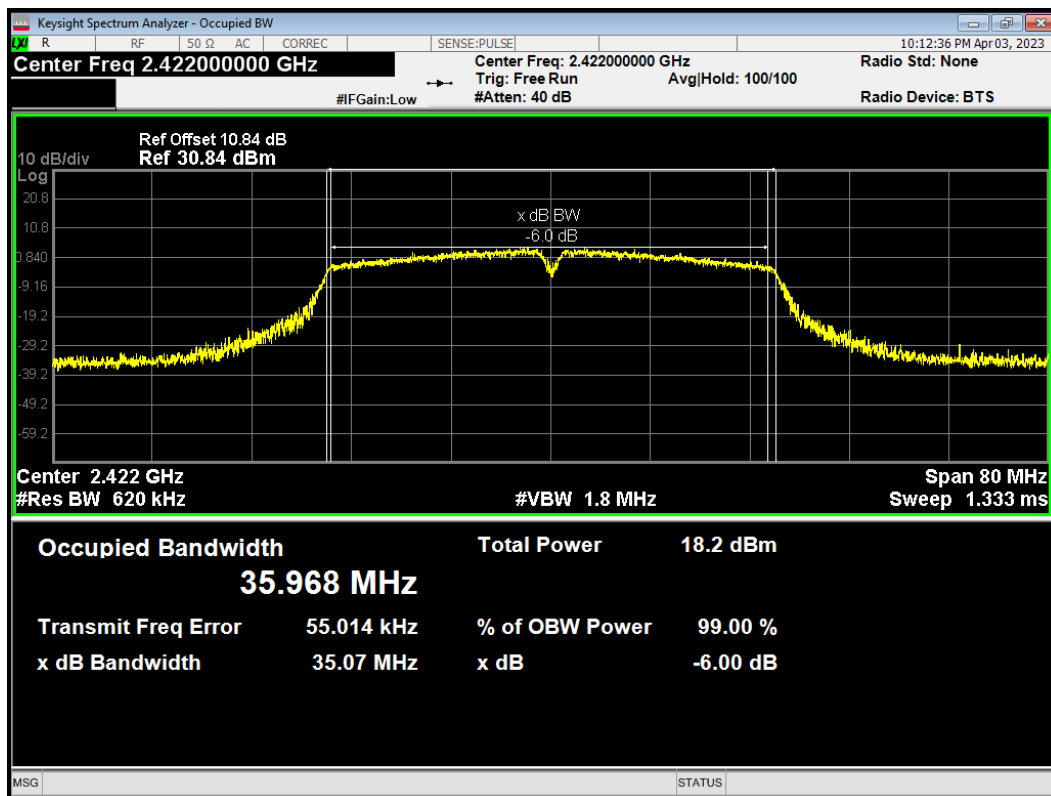
OBW 802.11n(HT20) 2457MHz



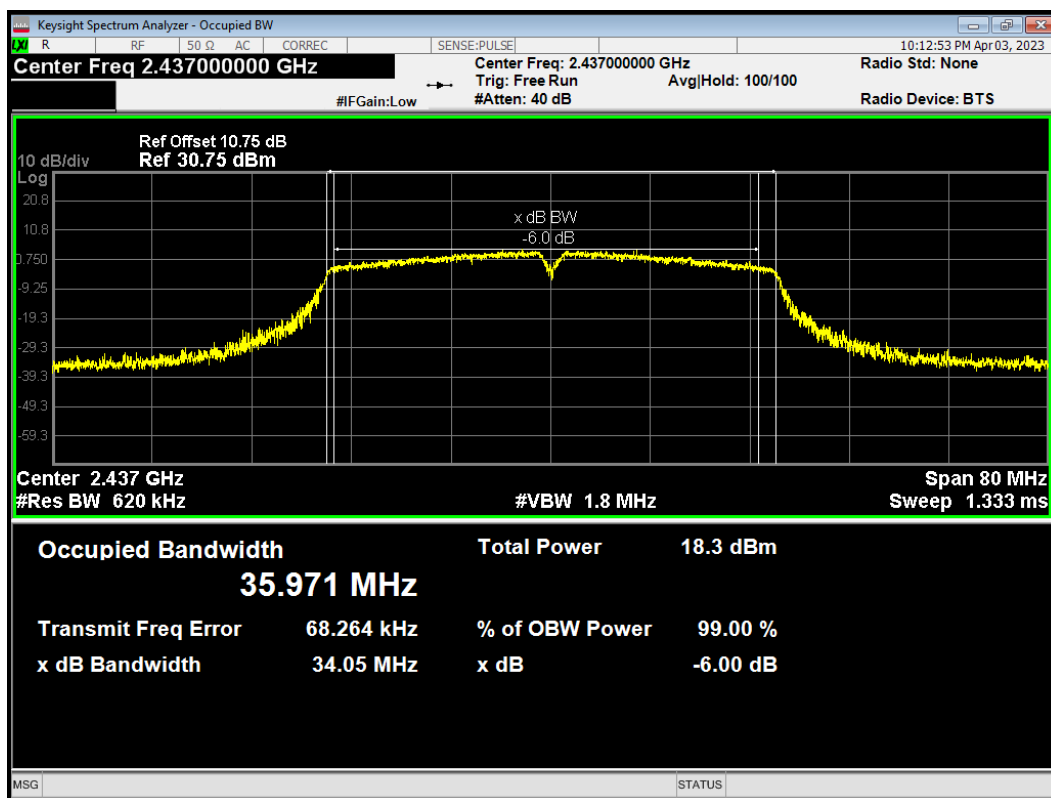
OBW 802.11n(HT20) 2462MHz



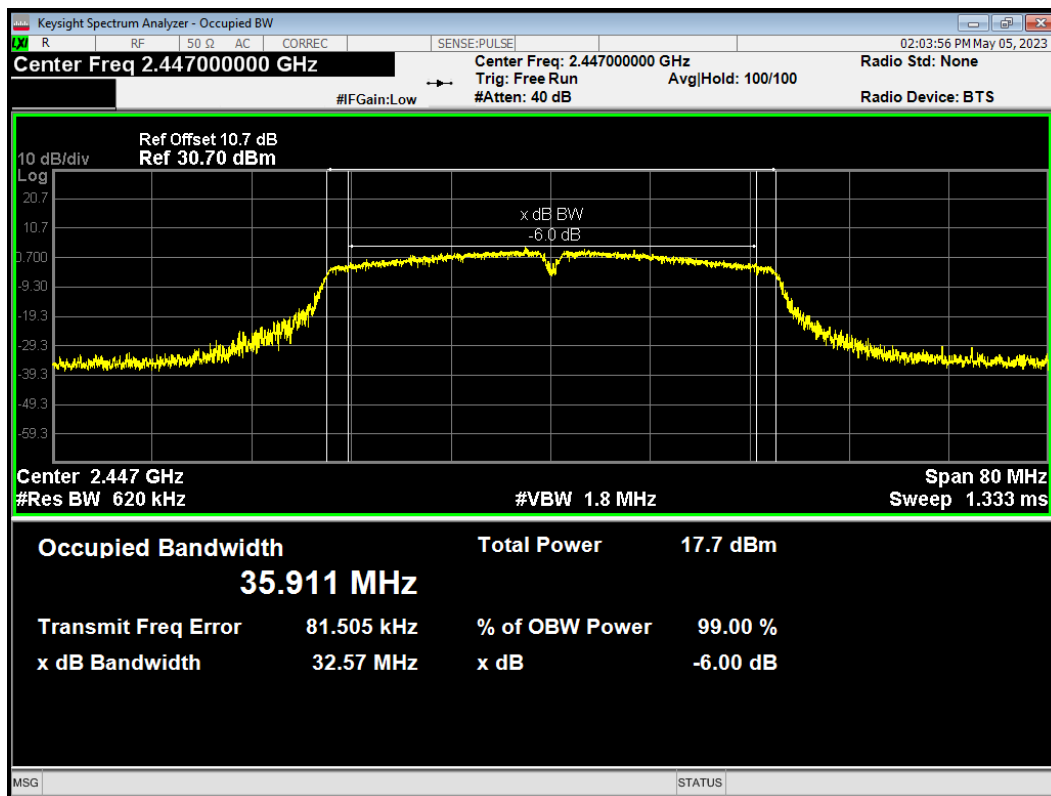
OBW 802.11n(HT40) 2422MHz



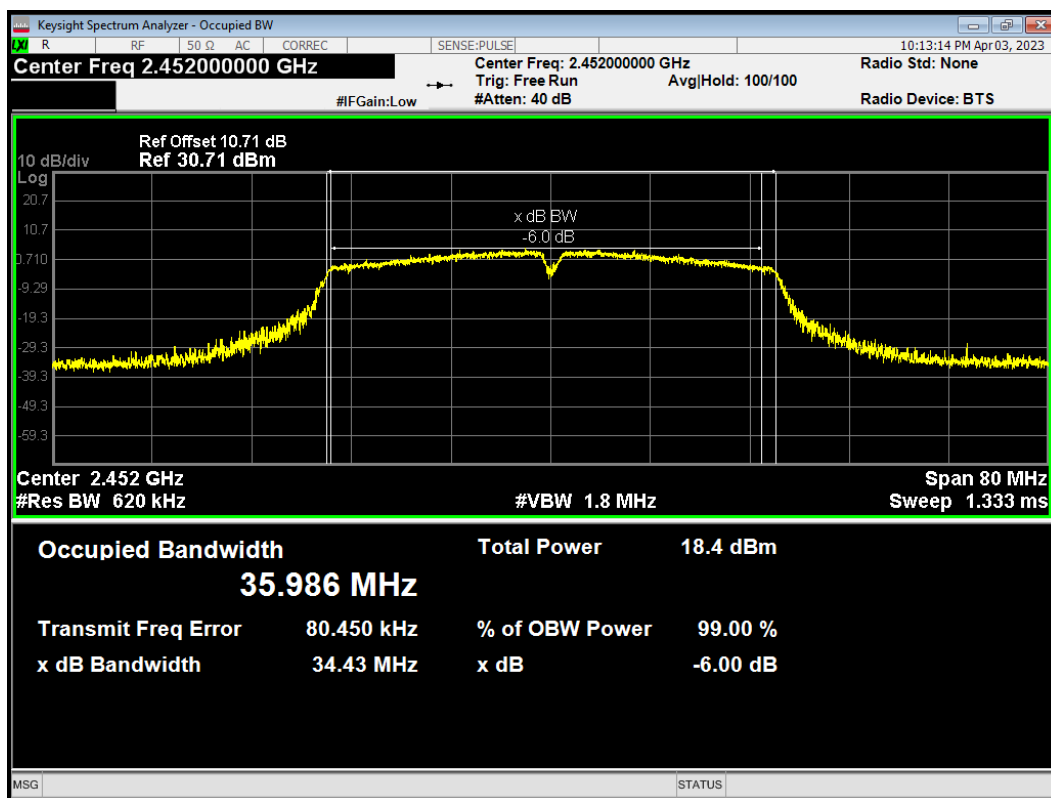
OBW 802.11n(HT40) 2437MHz



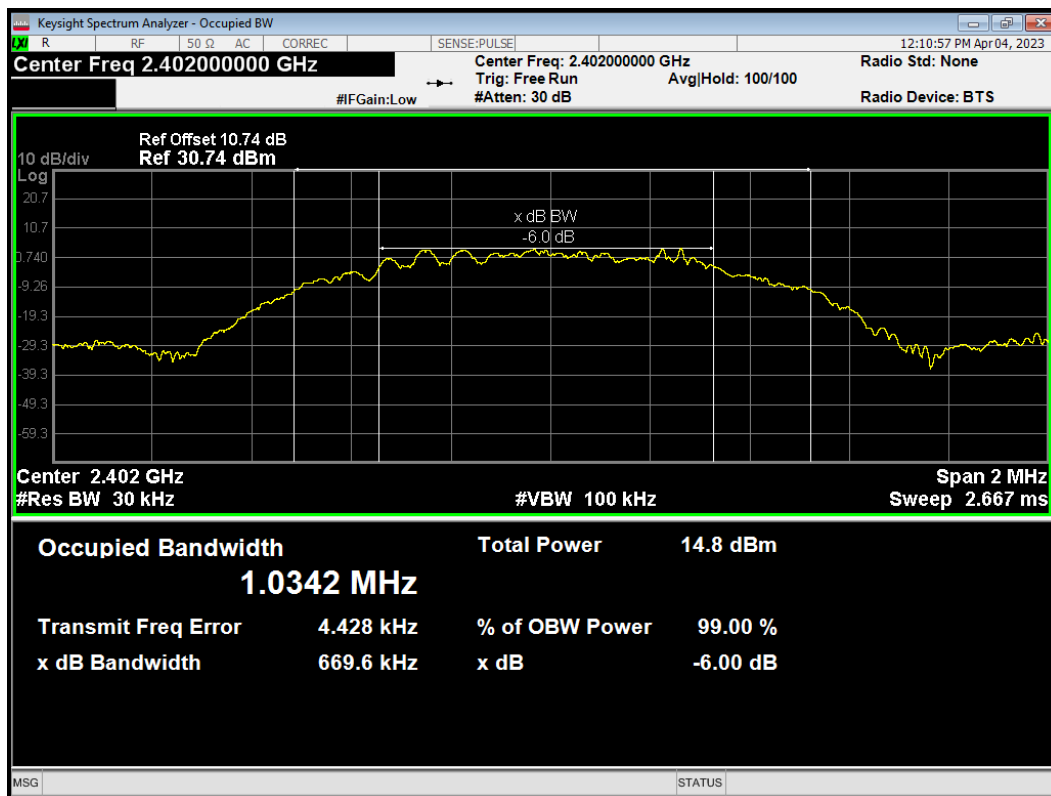
OBW 802.11n(HT40) 2447MHz



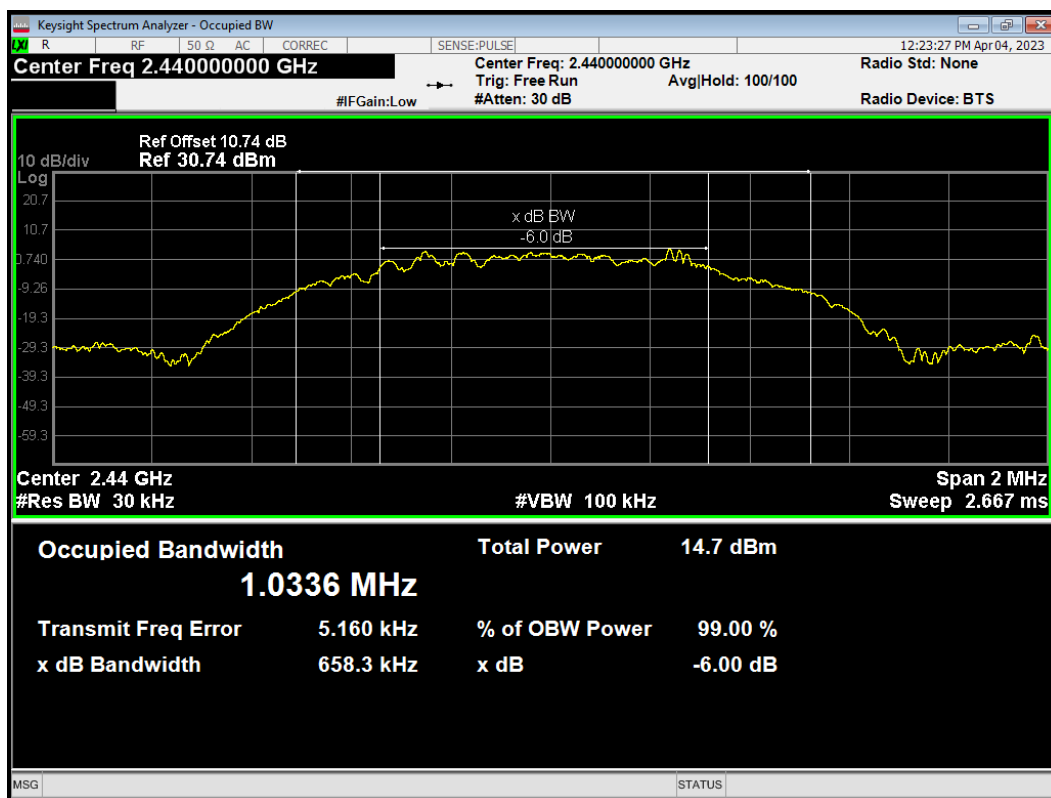
### OBW 802.11n(HT40) 2452MHz



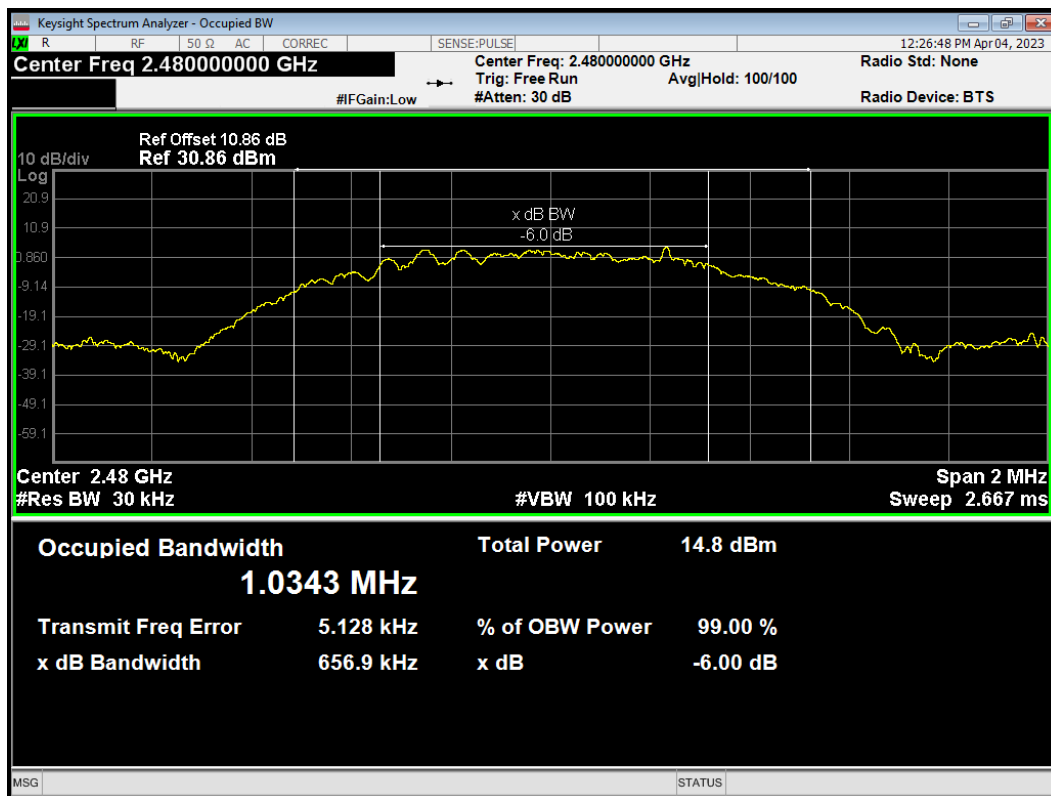
### OBW Bluetooth LE(1M)



# OBW Bluetooth LE(1M)

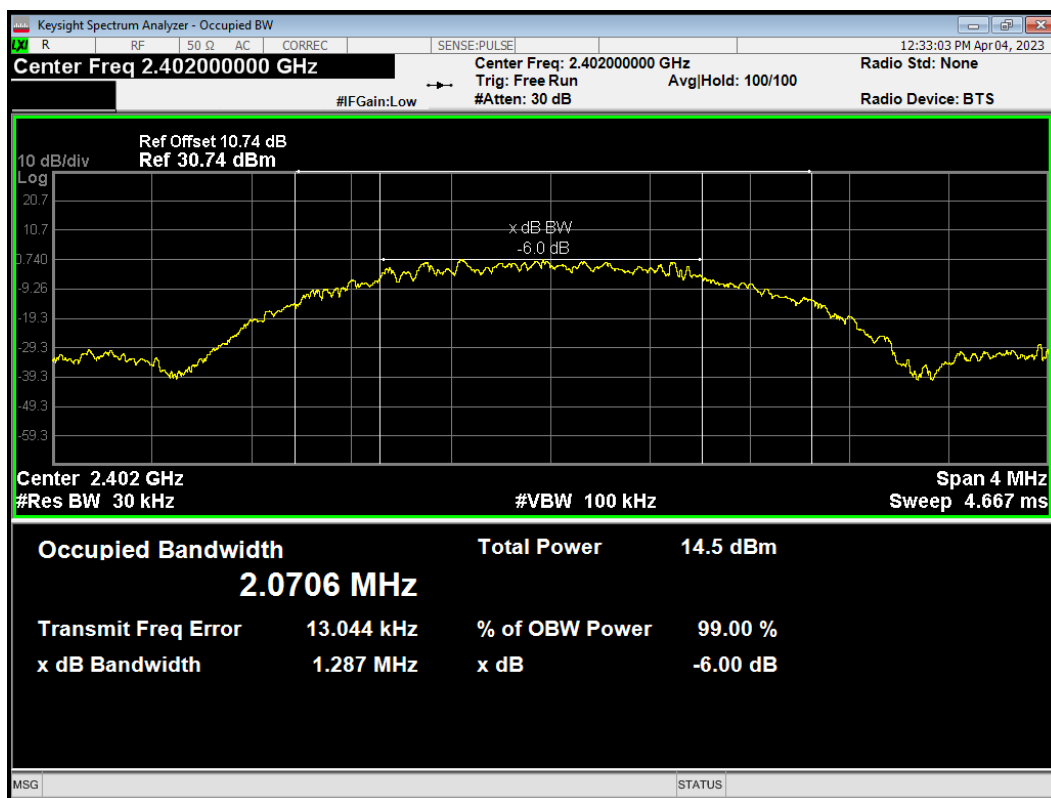


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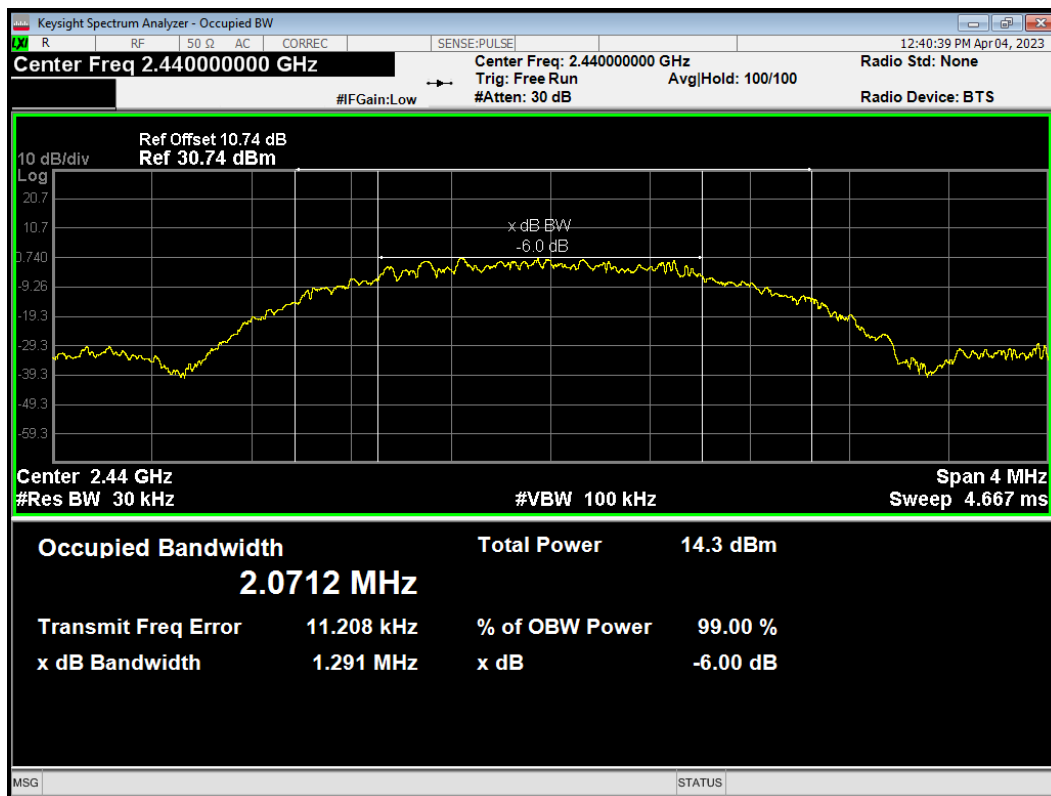




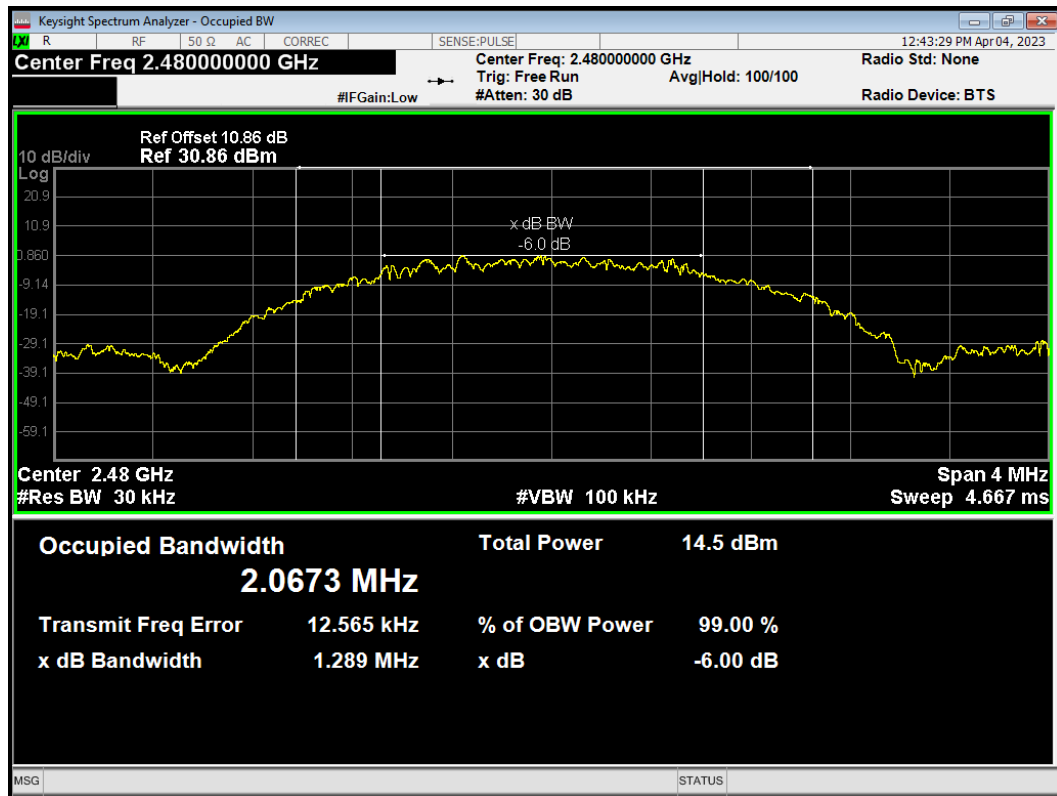
## OBW Bluetooth LE(2M)



## OBW Bluetooth LE(2M)

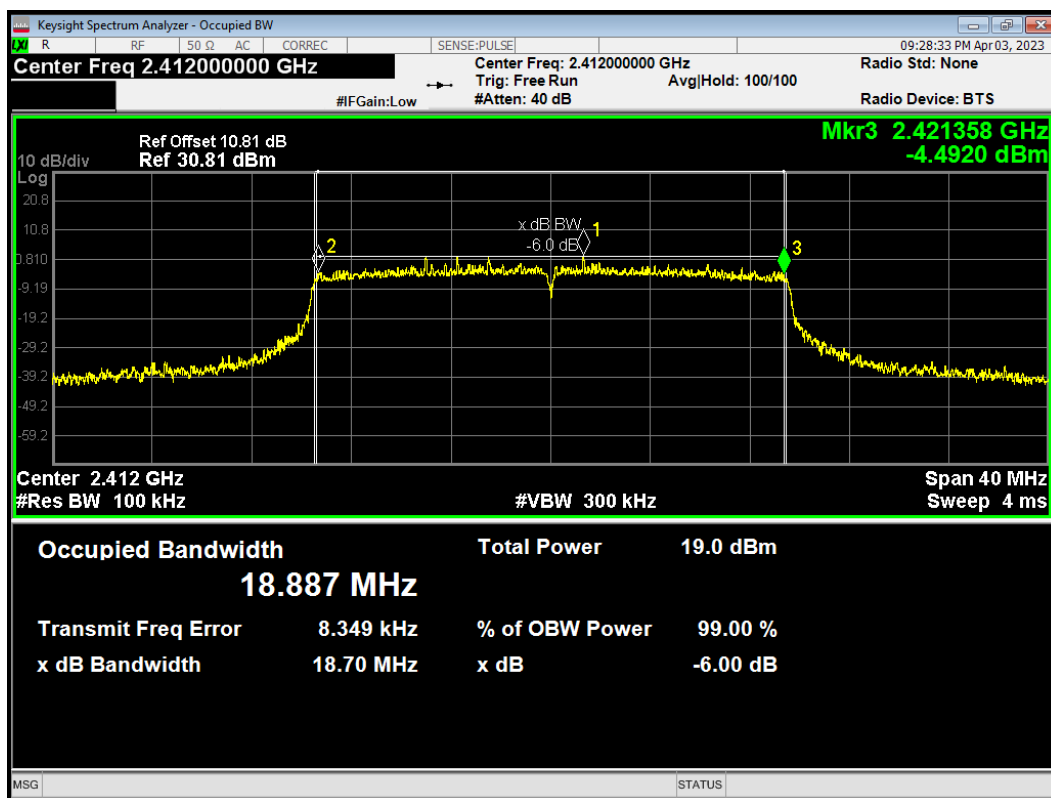


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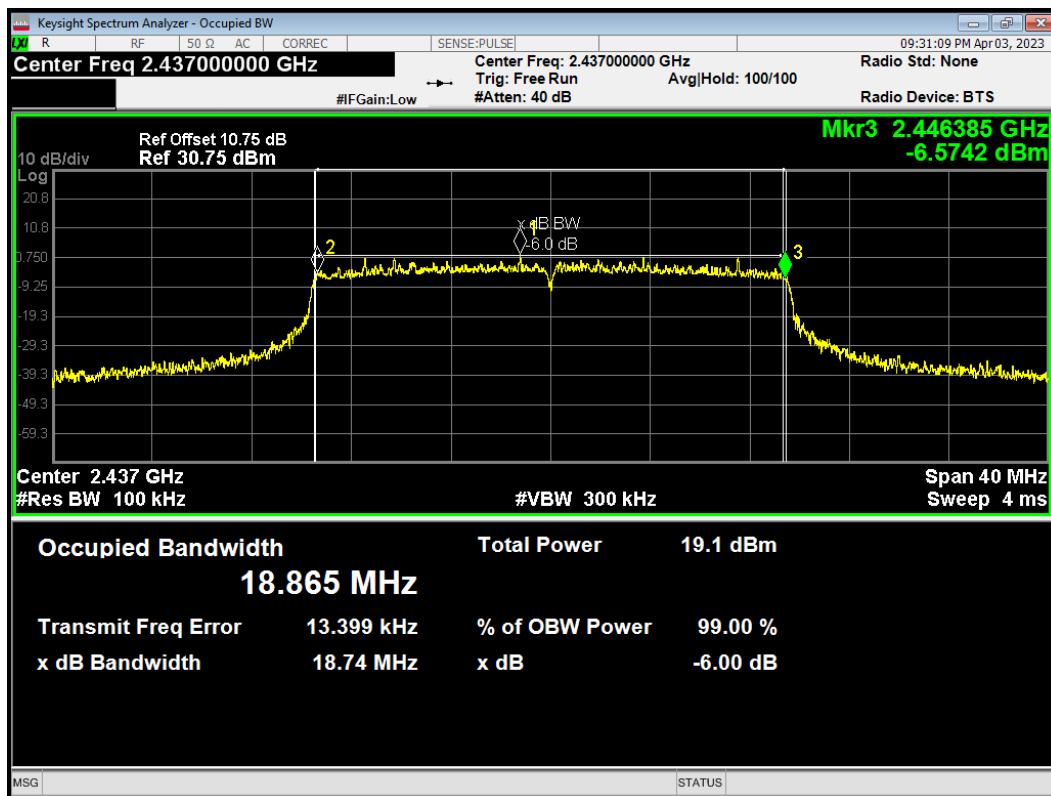


# 6 dB bandwidth

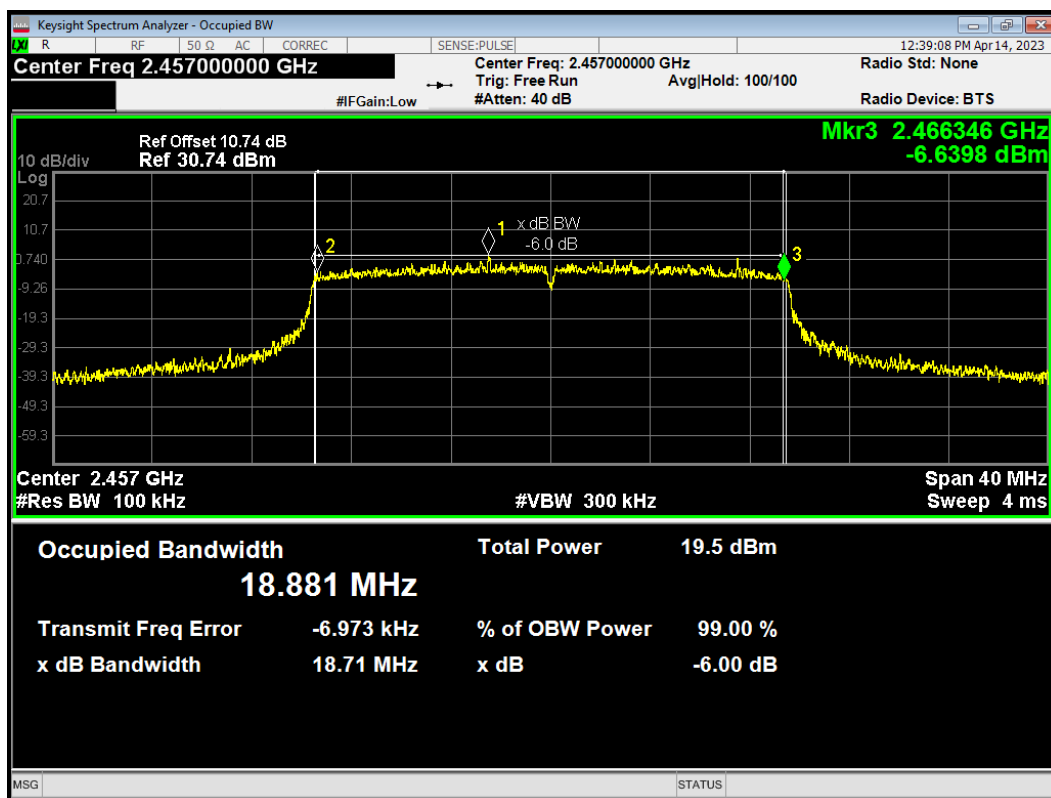
-6dB Bandwidth 802.11ax(HE20) 2412MHz



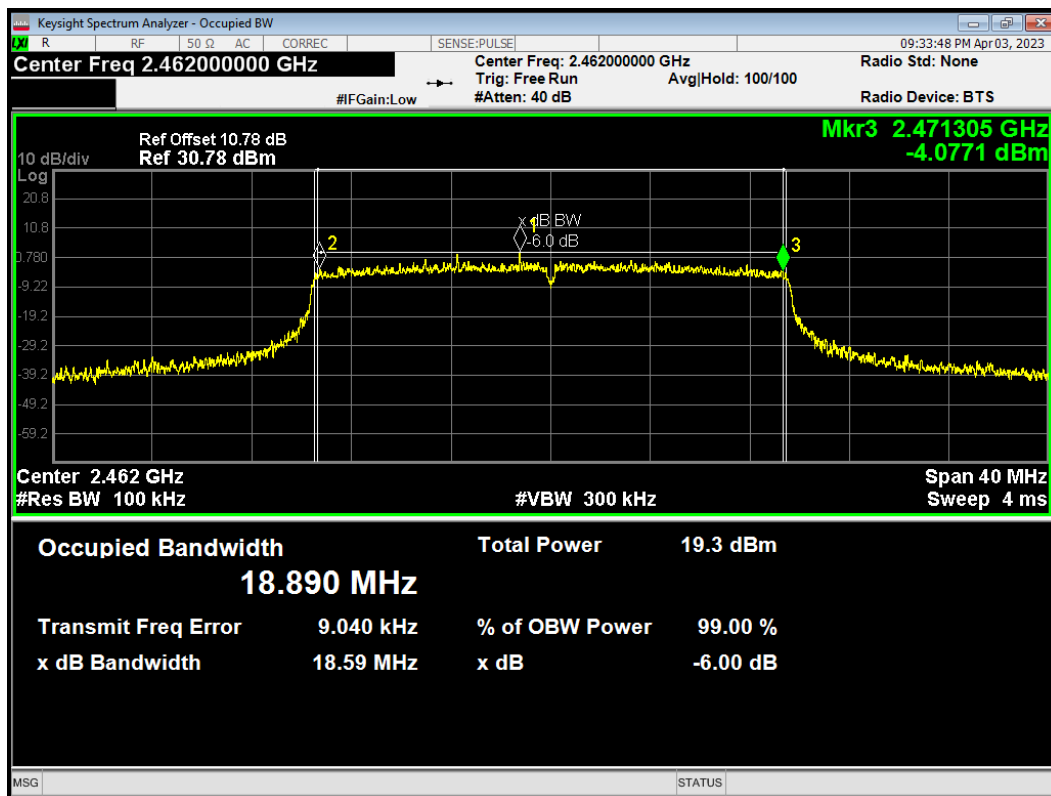
-6dB Bandwidth 802.11ax(HE20) 2437MHz



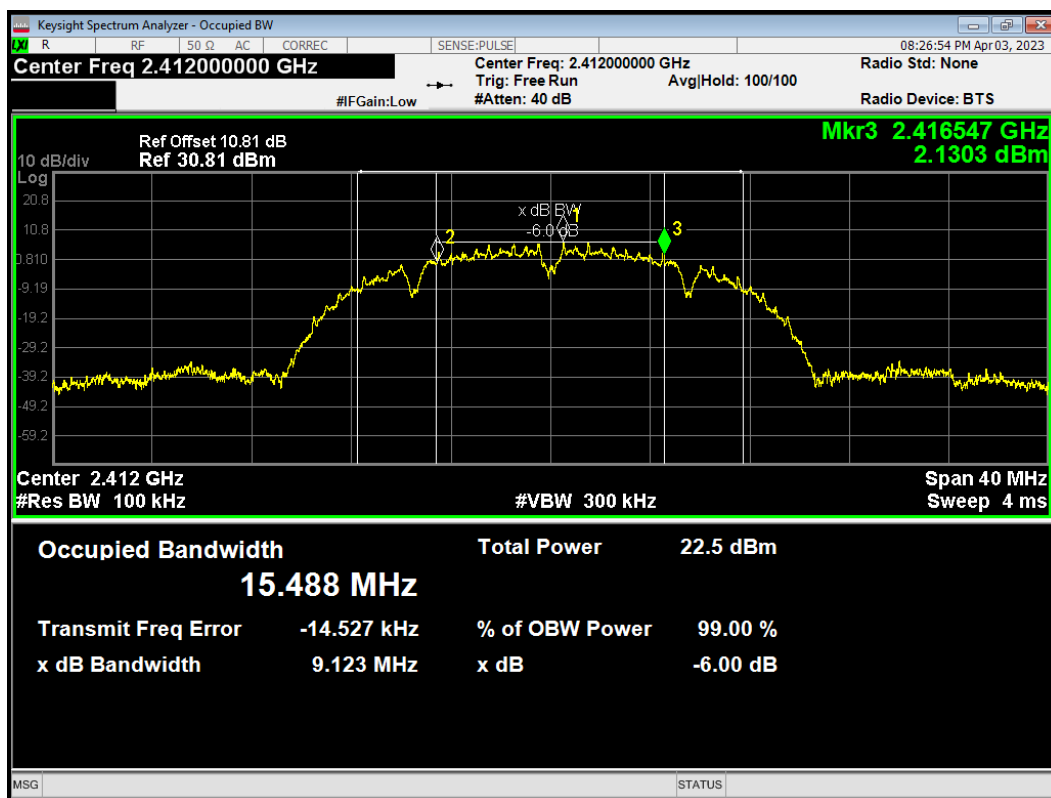
-6dB Bandwidth 802.11ax(HE20) 2457MHz



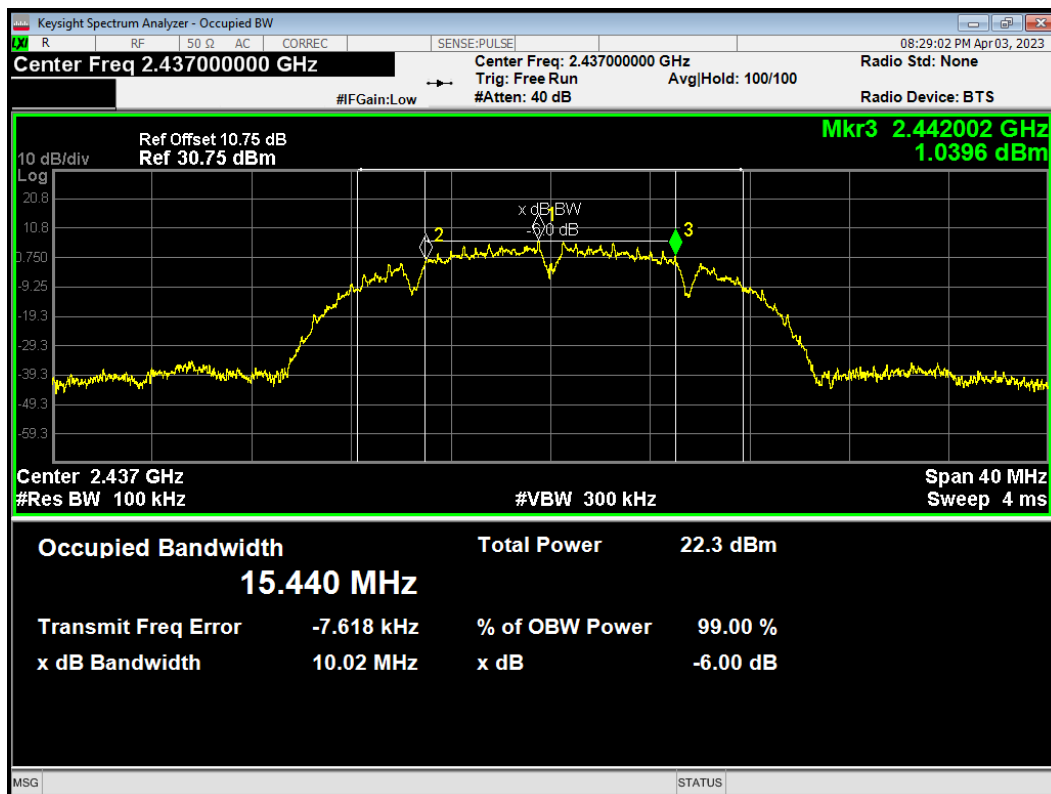
-6dB Bandwidth 802.11ax(HE20) 2462MHz



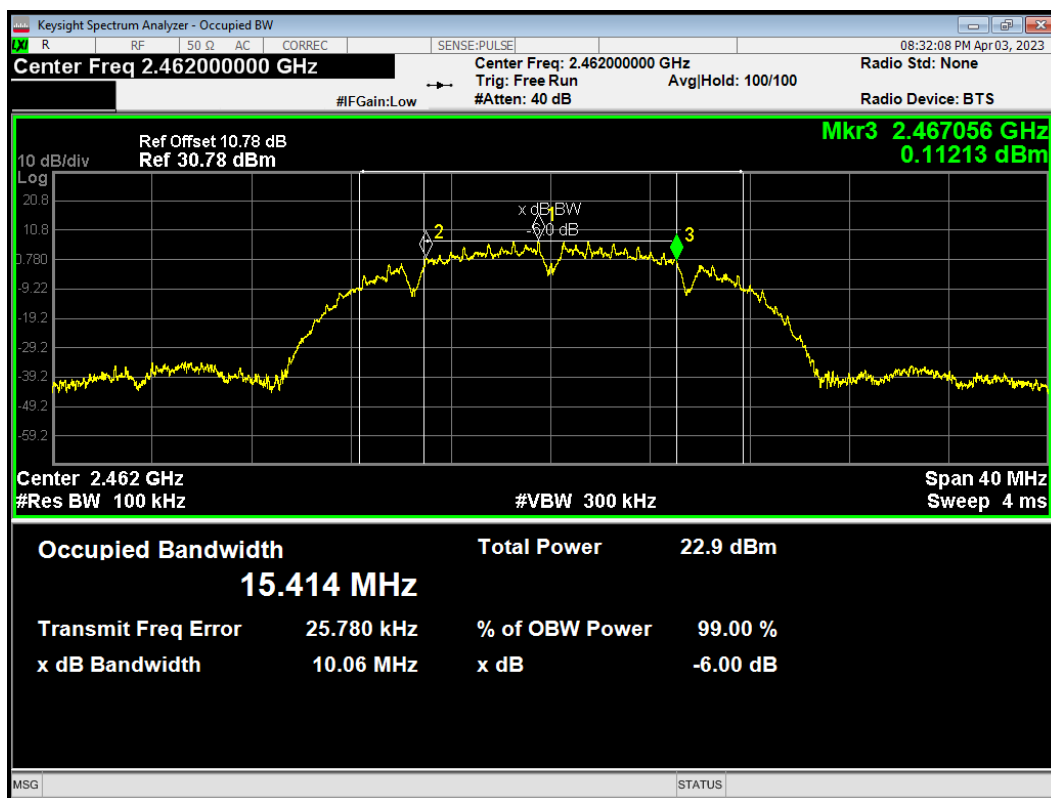
-6dB Bandwidth 802.11b 2412MHz



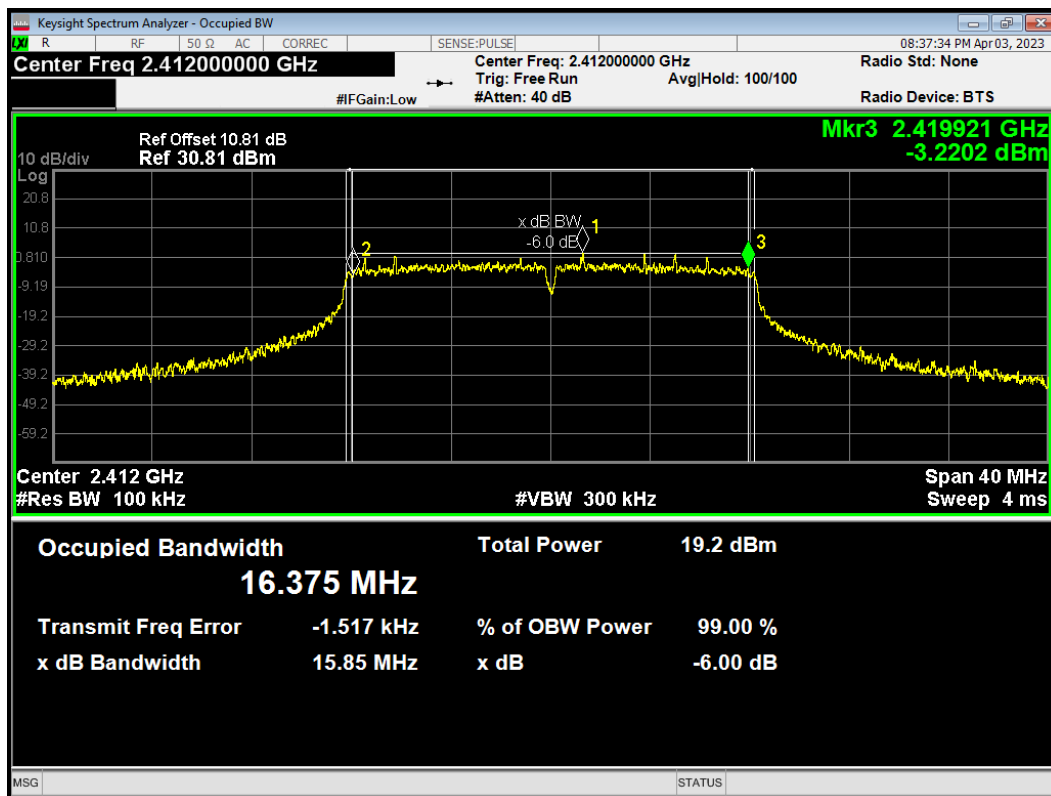
-6dB Bandwidth 802.11b 2437MHz



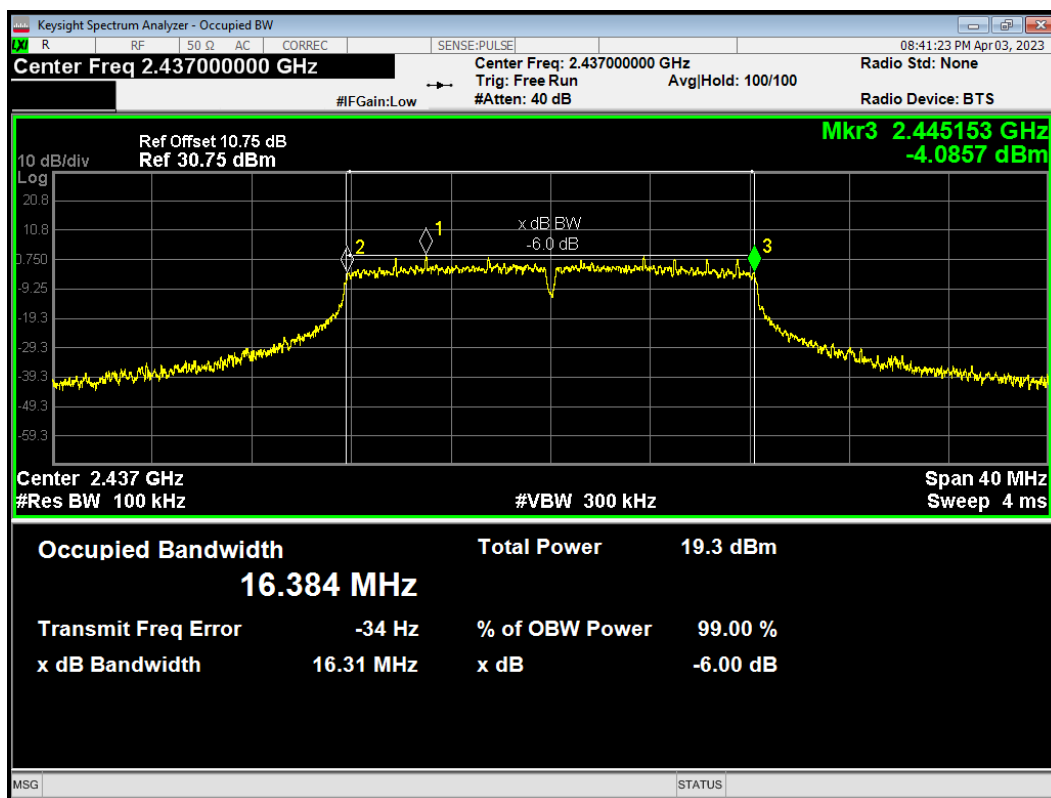
-6dB Bandwidth 802.11b 2462MHz



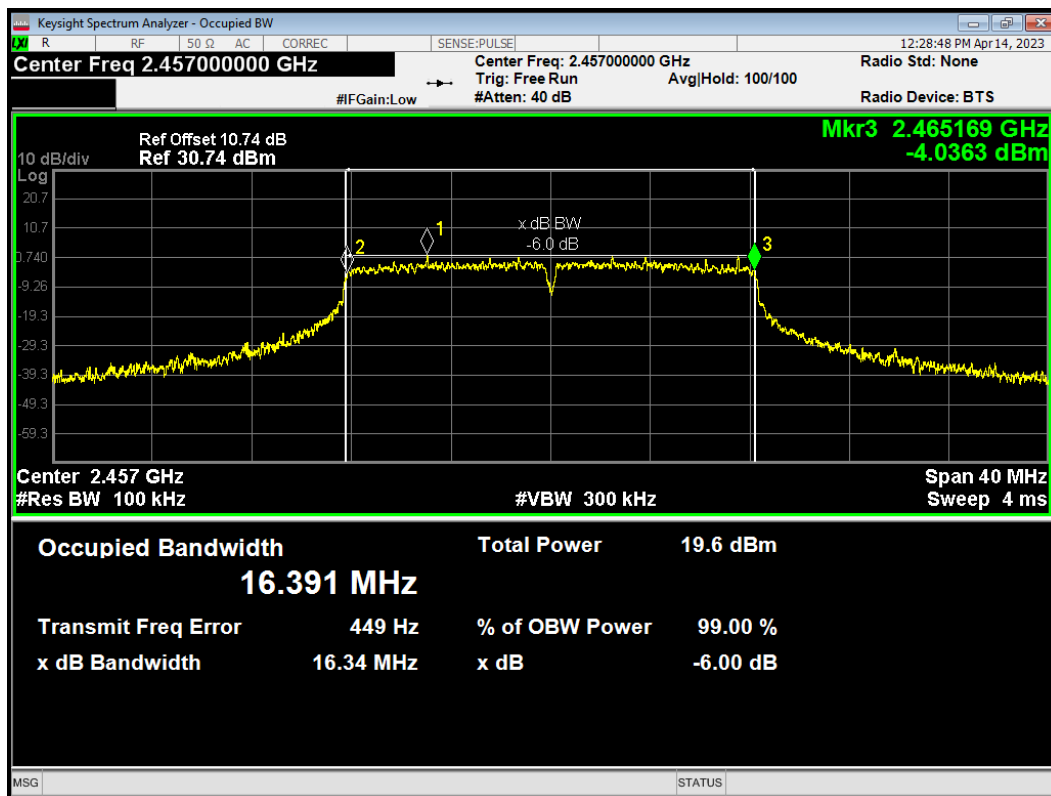
-6dB Bandwidth 802.11g 2412MHz



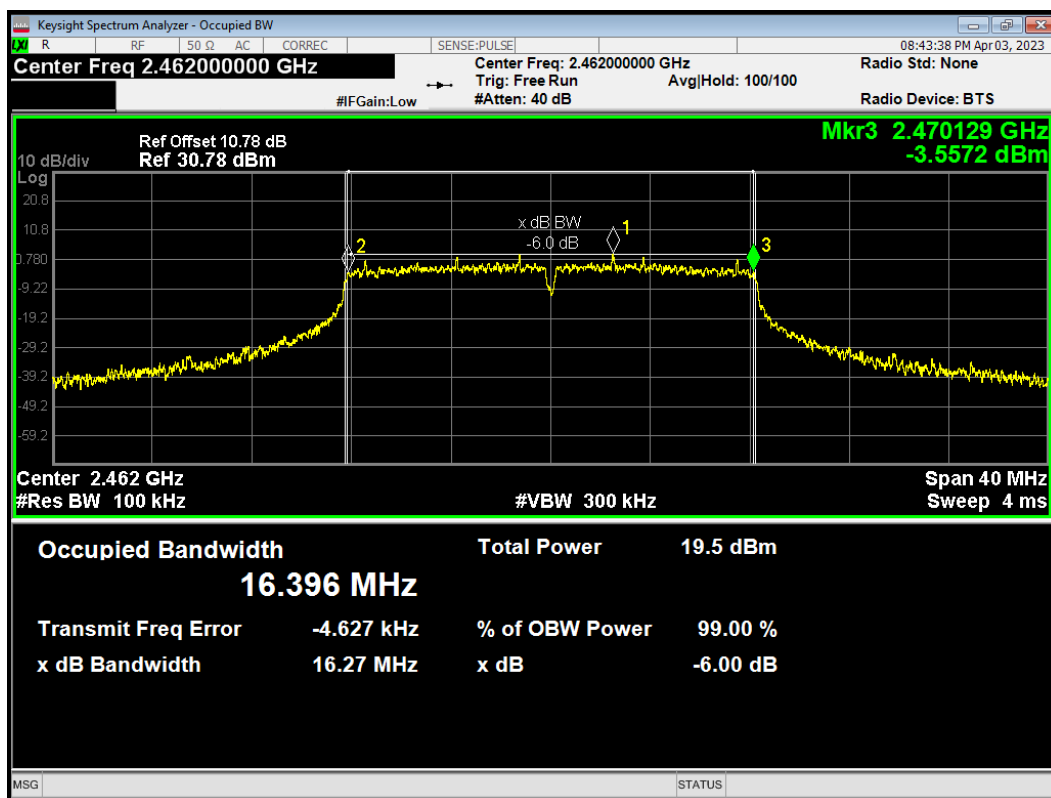
-6dB Bandwidth 802.11g 2437MHz



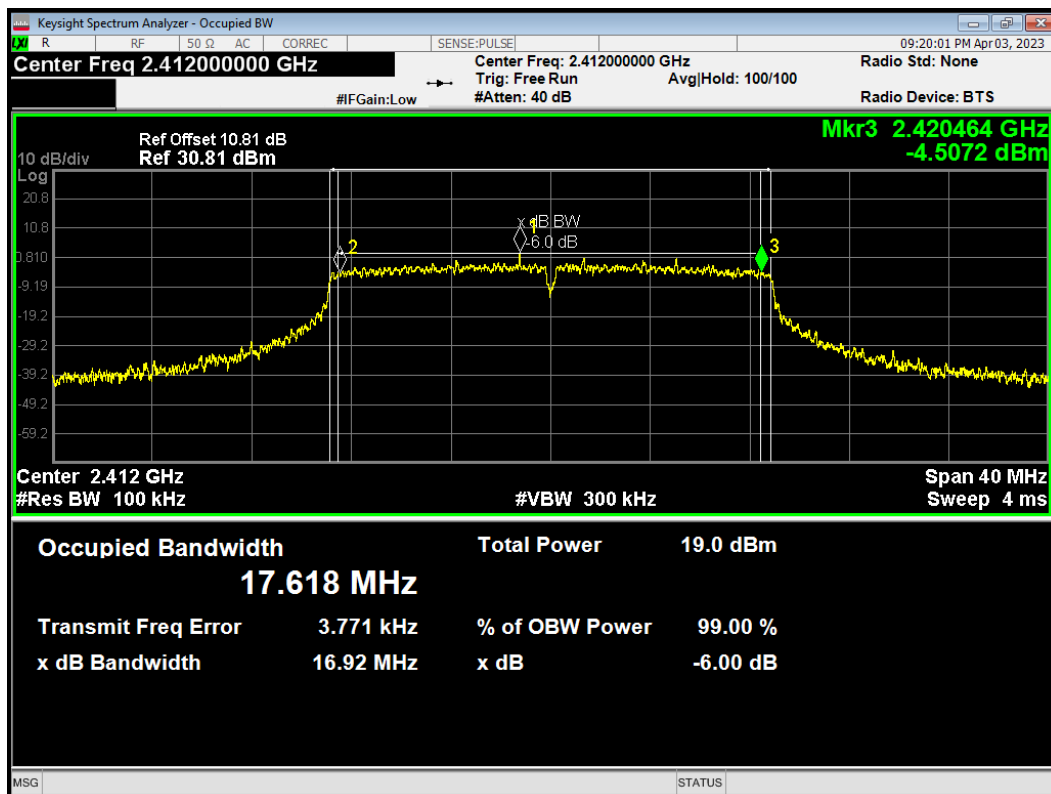
-6dB Bandwidth 802.11g 2457MHz



-6dB Bandwidth 802.11g 2462MHz

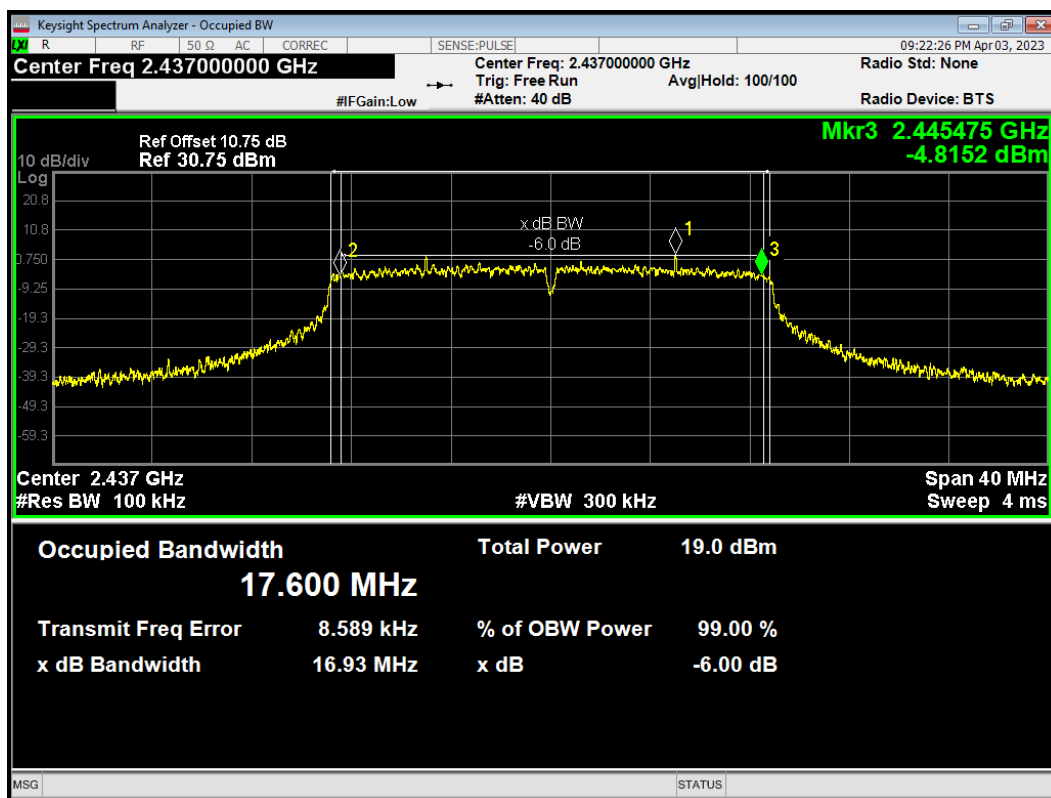


-6dB Bandwidth 802.11n(HT20) 2412MHz

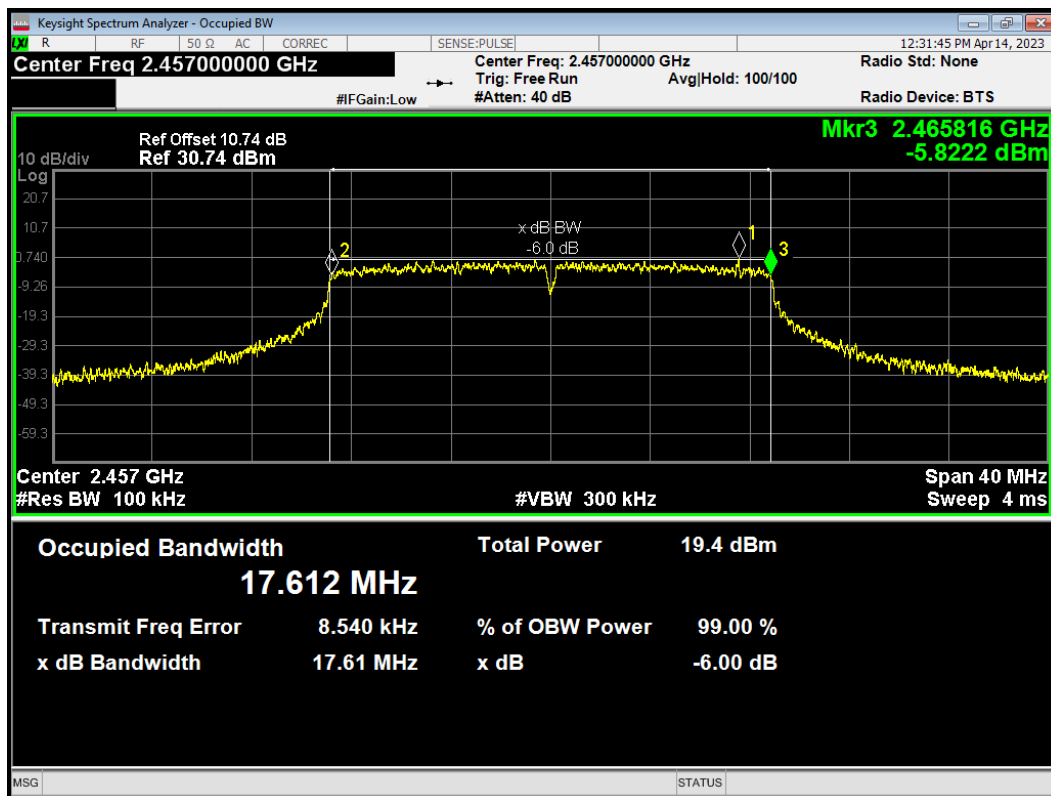




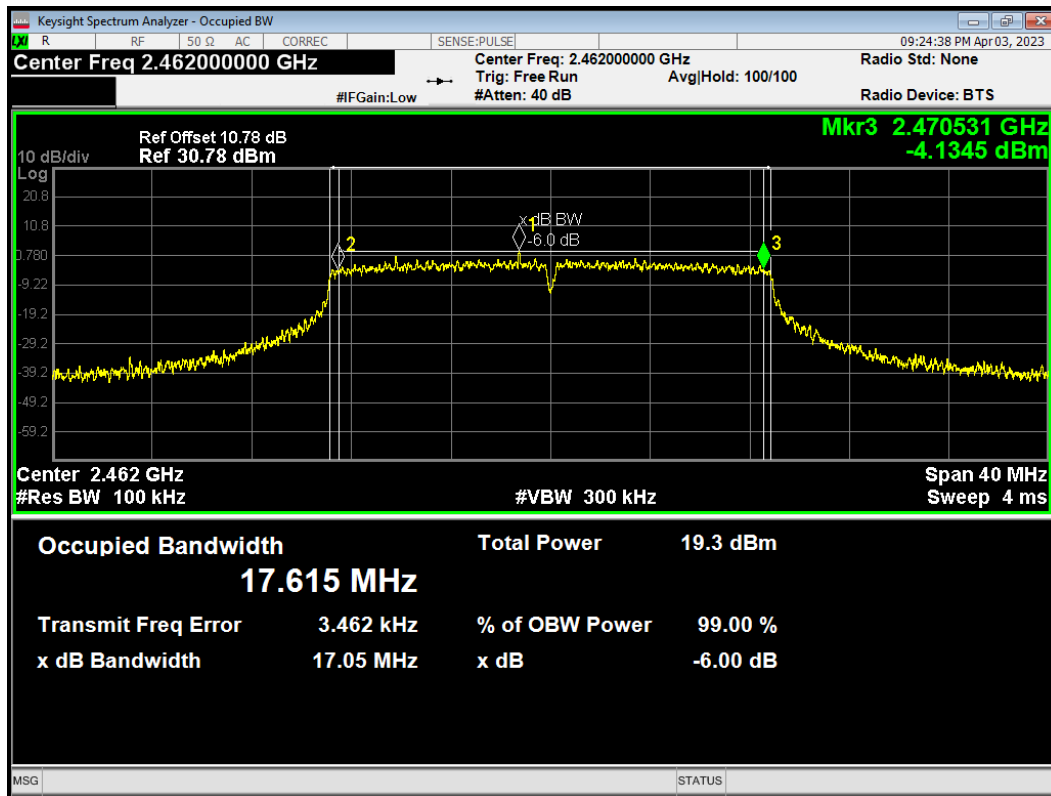
-6dB Bandwidth 802.11n(HT20) 2437MHz



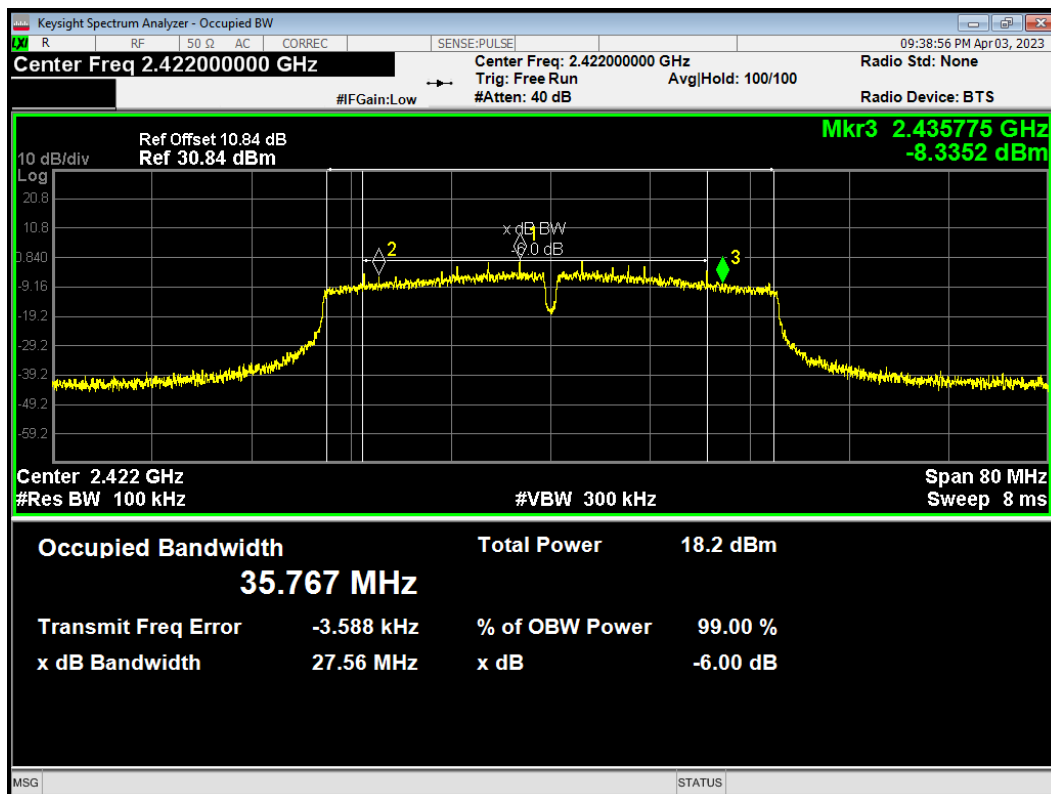
-6dB Bandwidth 802.11n(HT20) 2457MHz



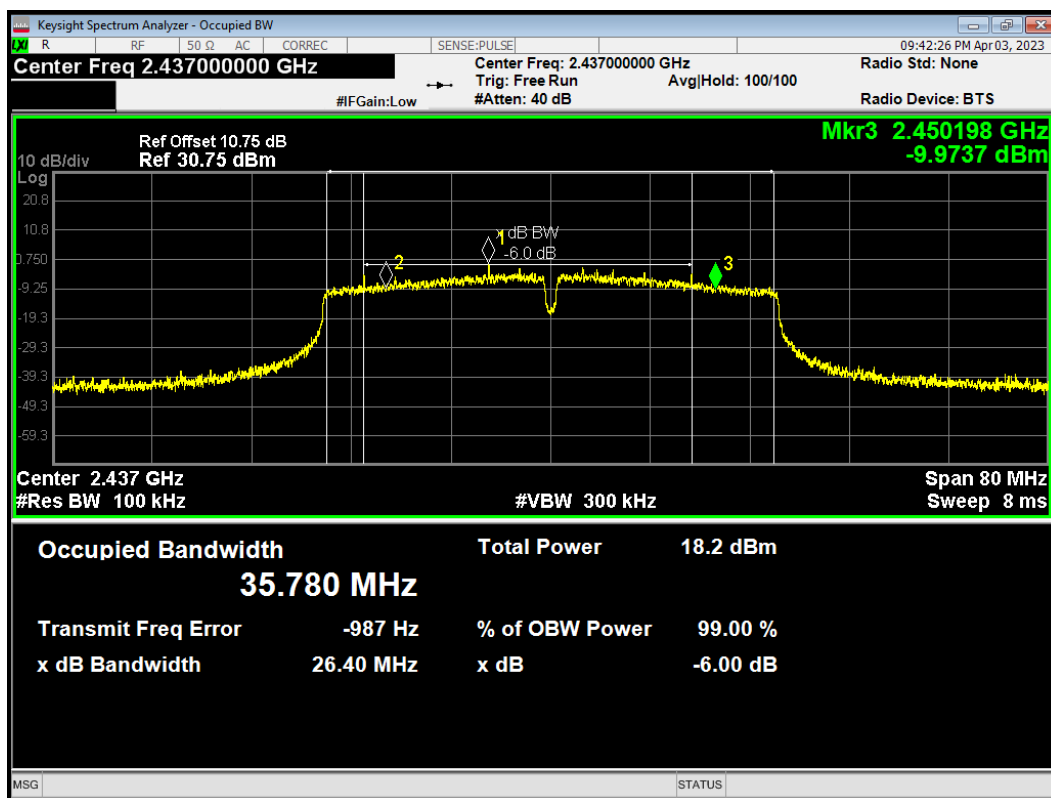
-6dB Bandwidth 802.11n(HT20) 2462MHz



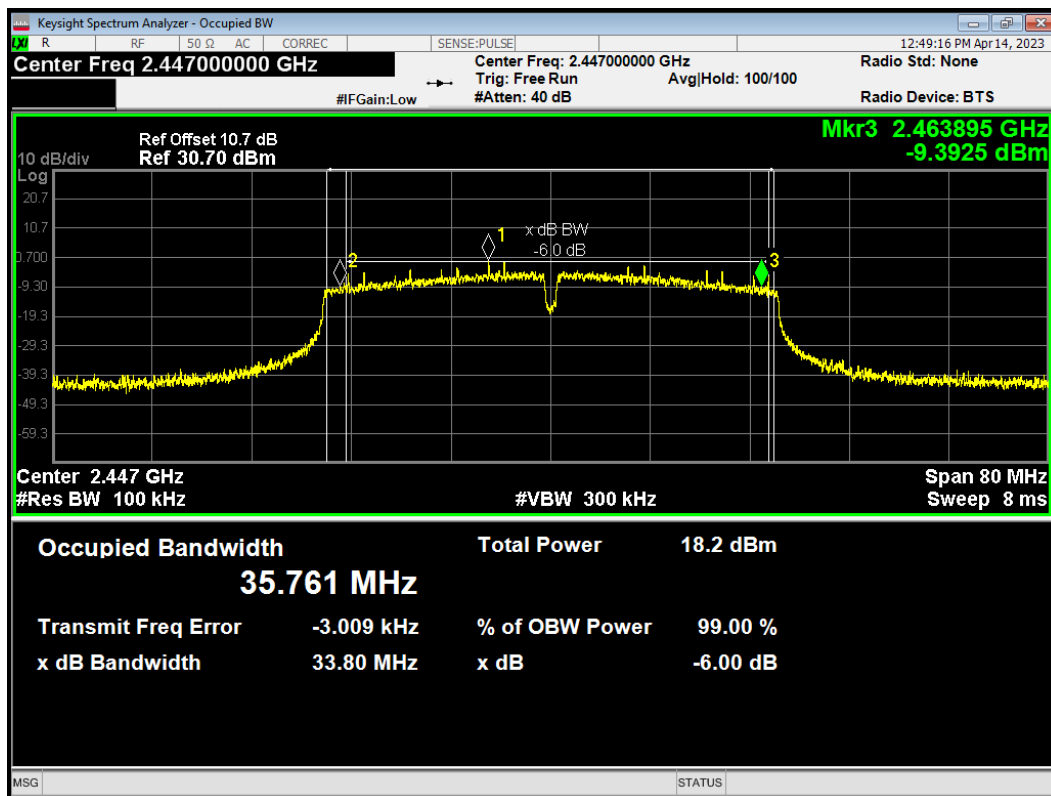
-6dB Bandwidth 802.11n(HT40) 2422MHz



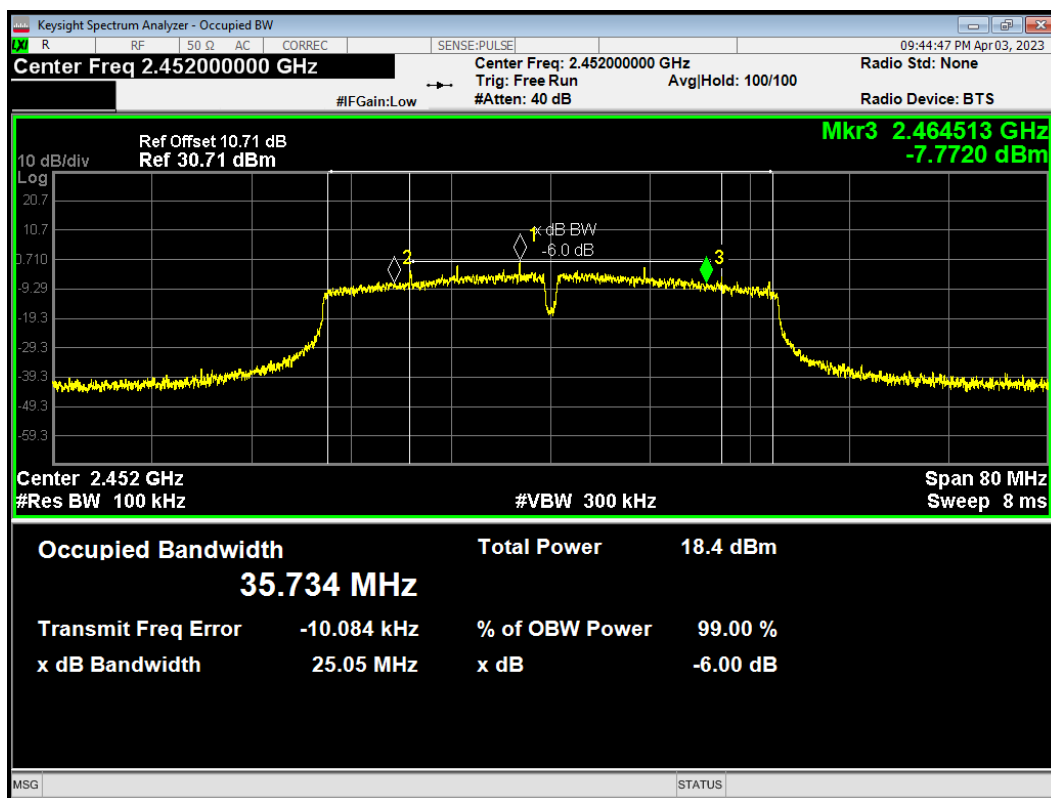
-6dB Bandwidth 802.11n(HT40) 2437MHz



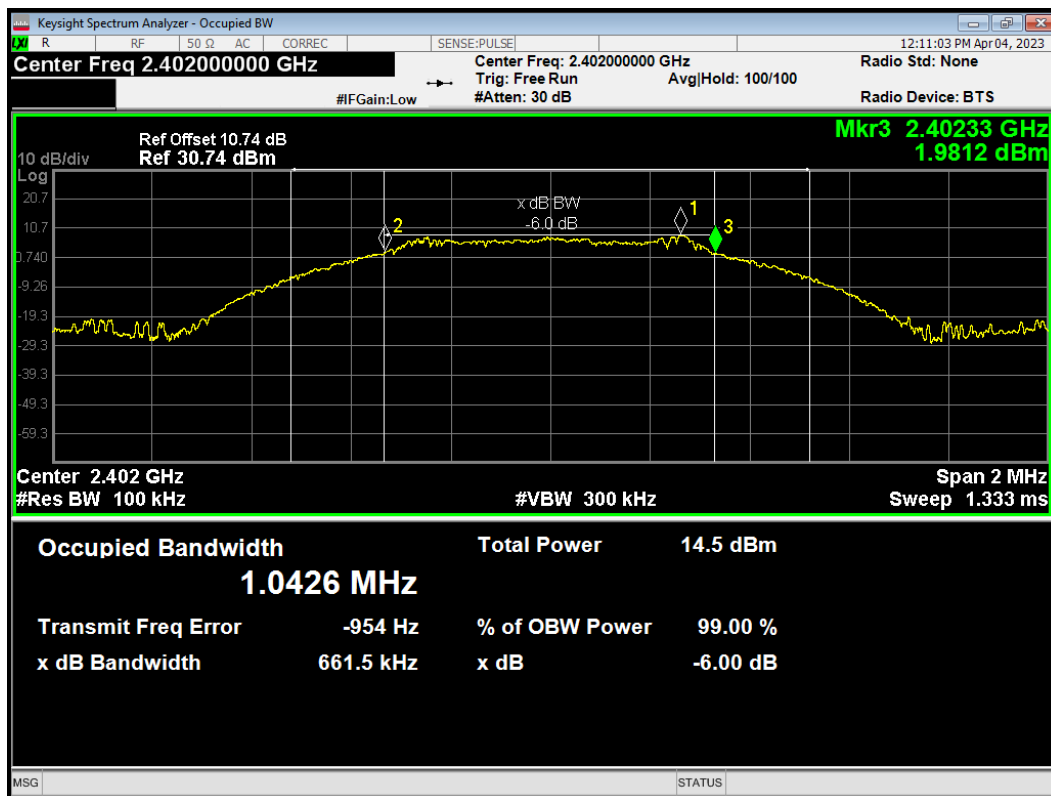
-6dB Bandwidth 802.11n(HT40) 2447MHz



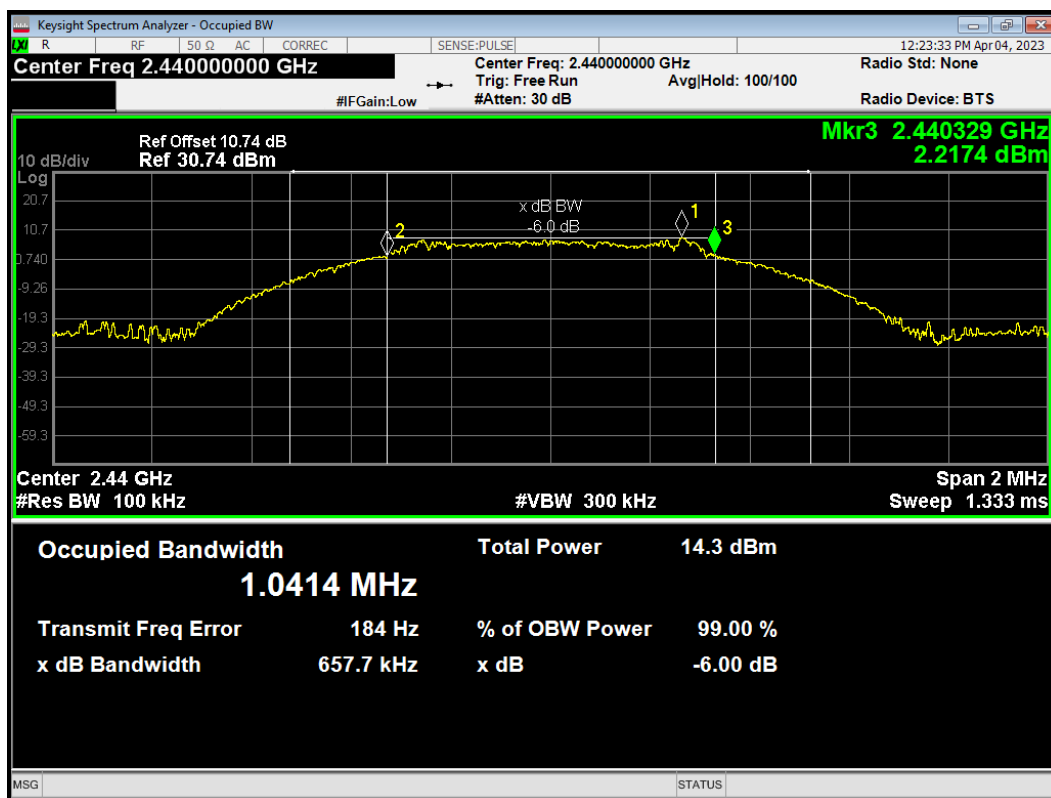
-6dB Bandwidth 802.11n(HT40) 2452MHz



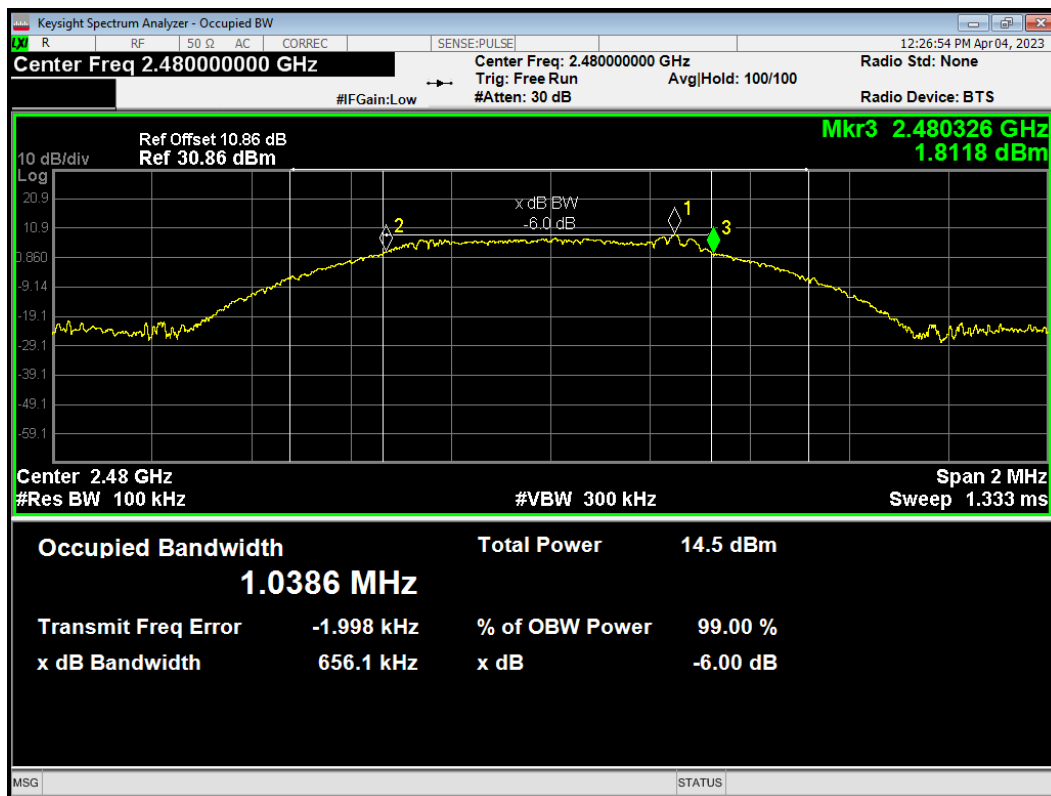
-6dB Bandwidth Bluetooth LE(1M)



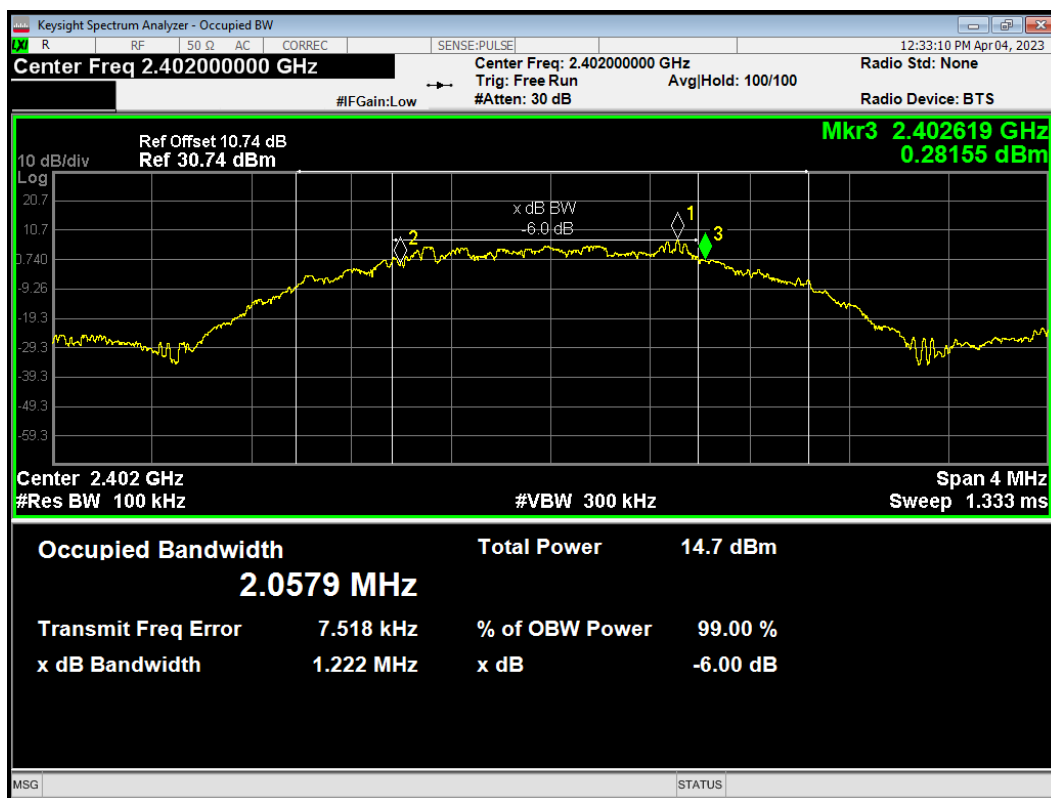
-6dB Bandwidth Bluetooth LE(1M)



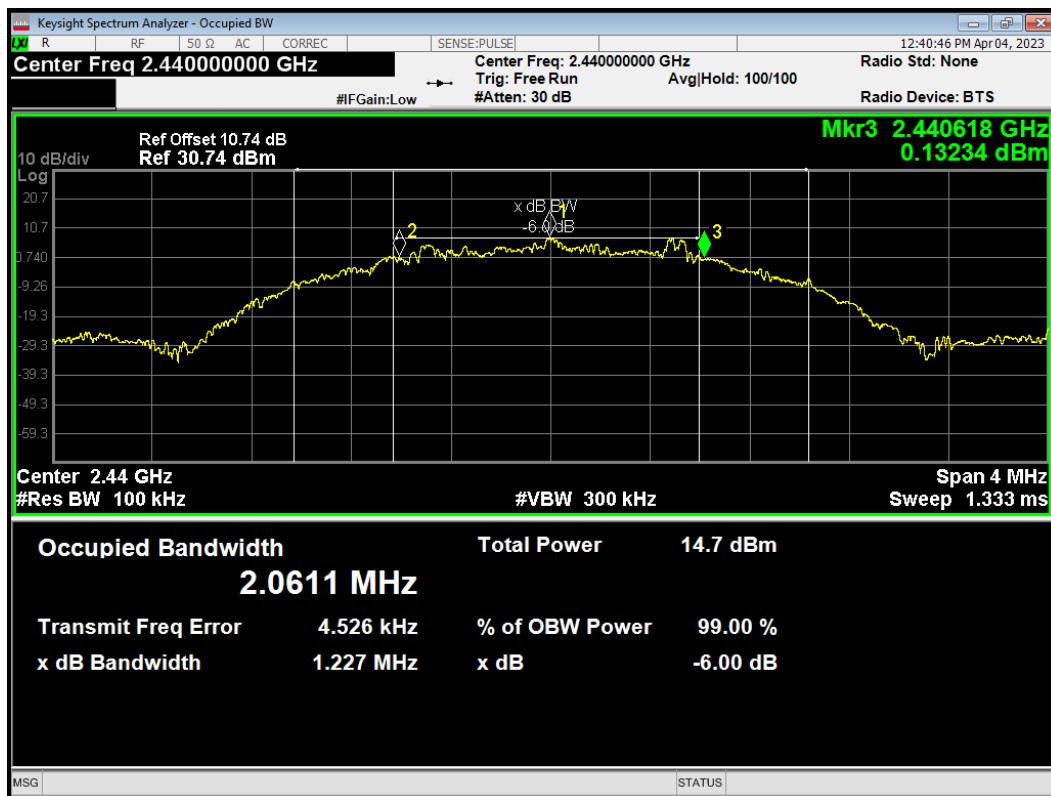
-6dB Bandwidth Bluetooth LE(1M)



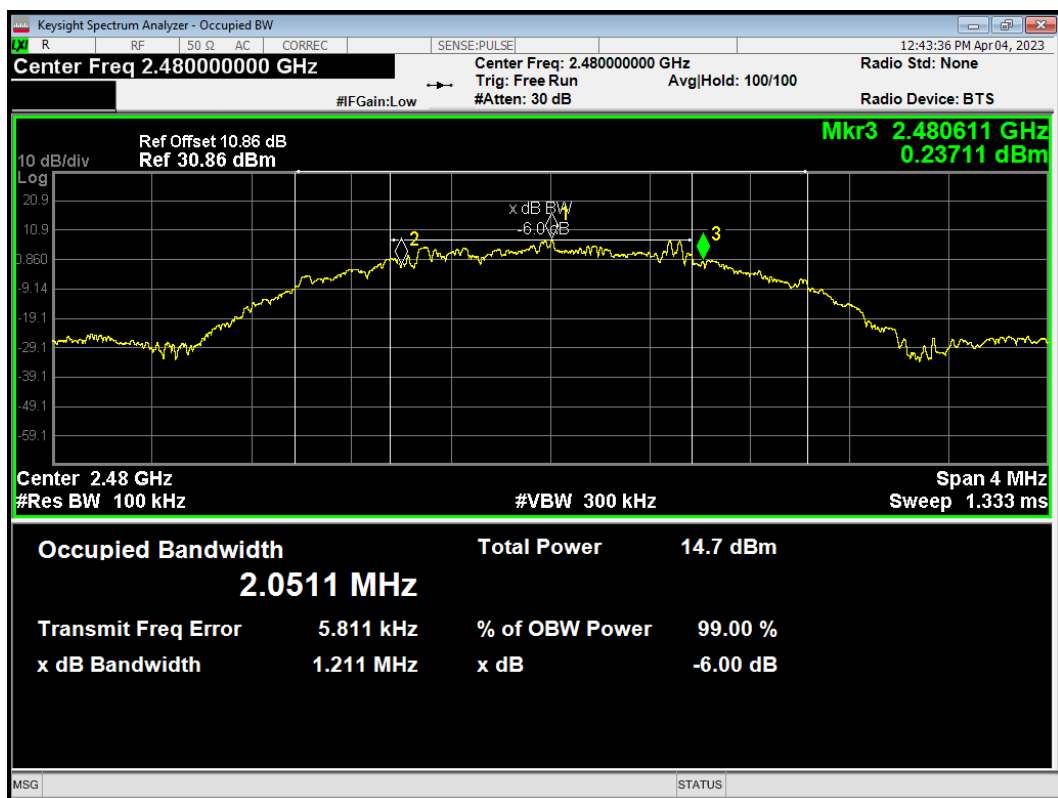
### -6dB Bandwidth Bluetooth LE(2M)



### -6dB Bandwidth Bluetooth LE(2M)



-6dB Bandwidth Bluetooth LE(2M)



### 5.3. Band Edge

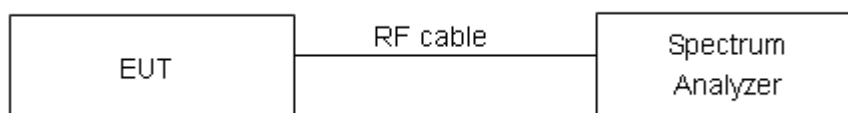
#### Ambient Condition

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

#### Method of Measurement

The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable 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

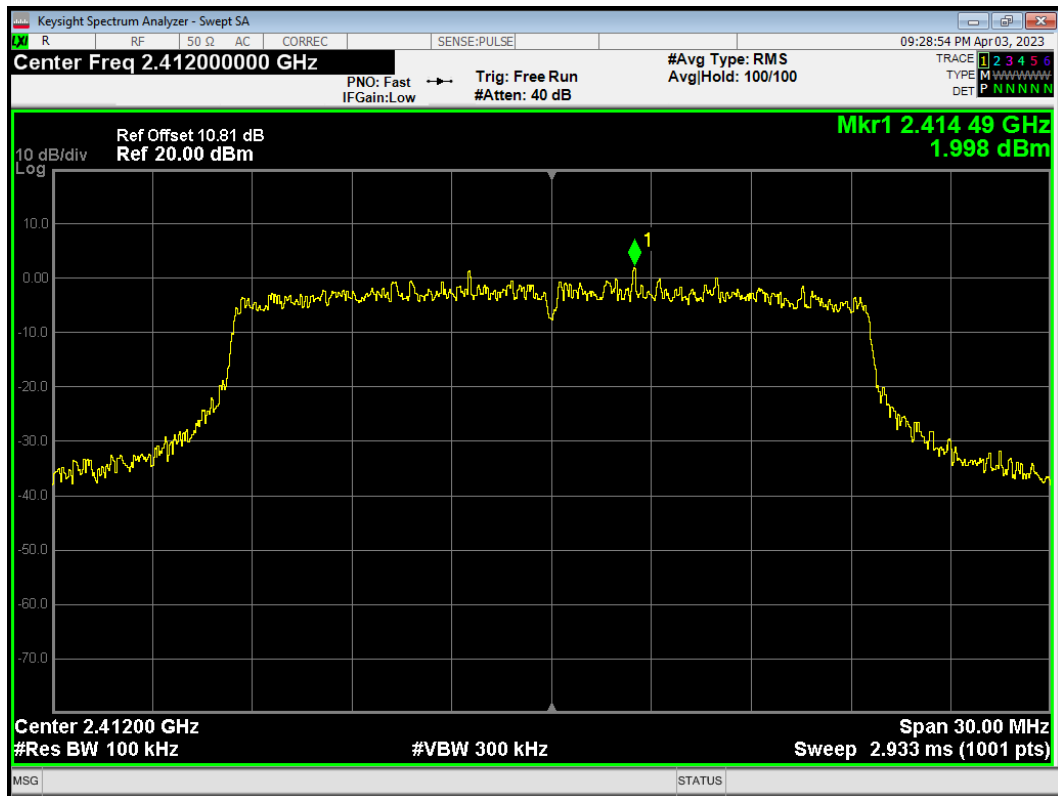
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 1.96$ .

Frequency	Uncertainty
2GHz-3GHz	1.407 dB

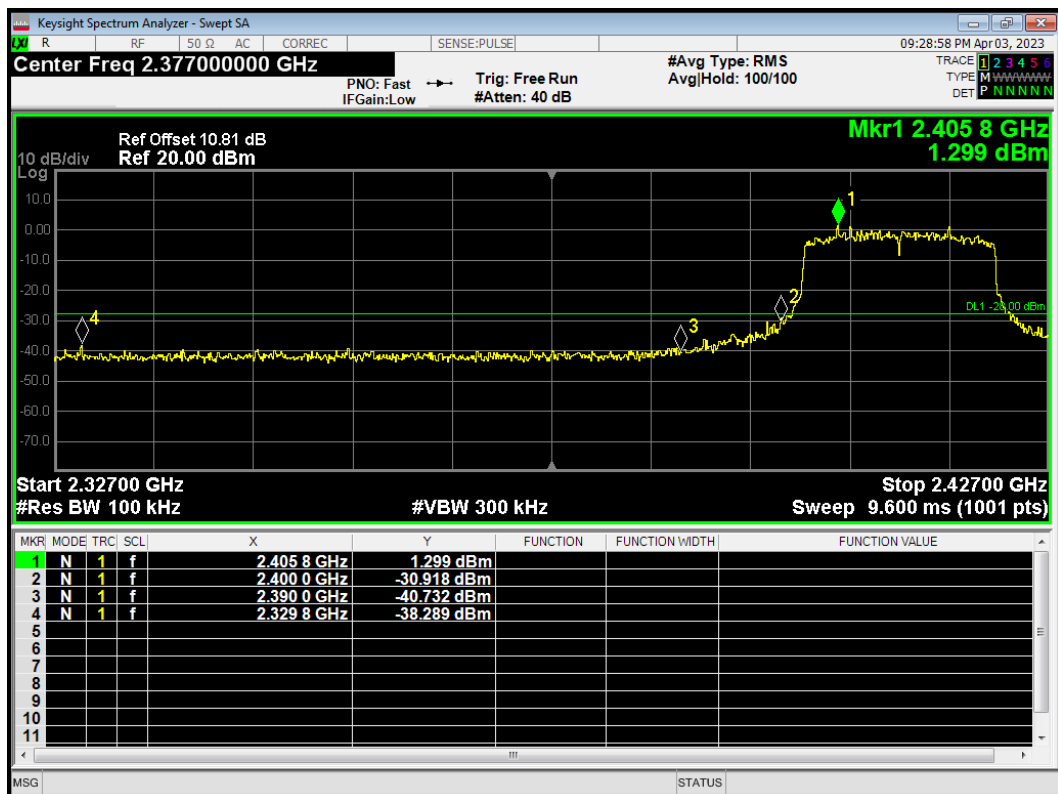


Test Results: PASS

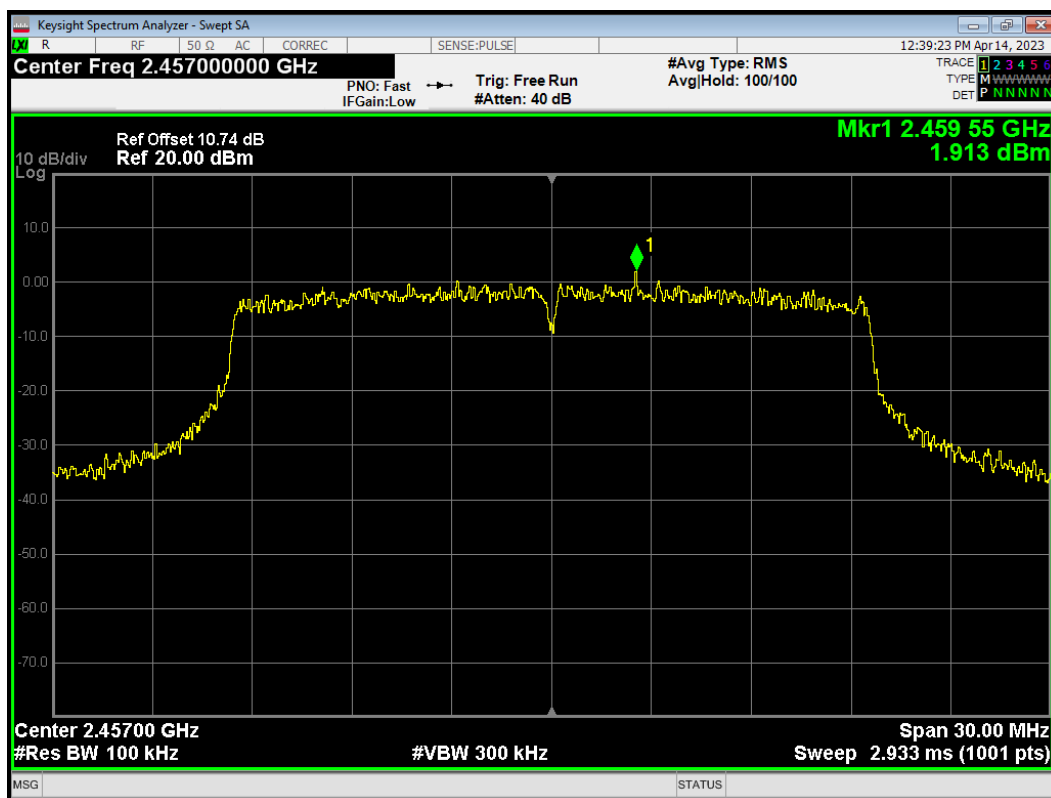
Band Edge 802.11ax(HE20) 2412MHz Ref



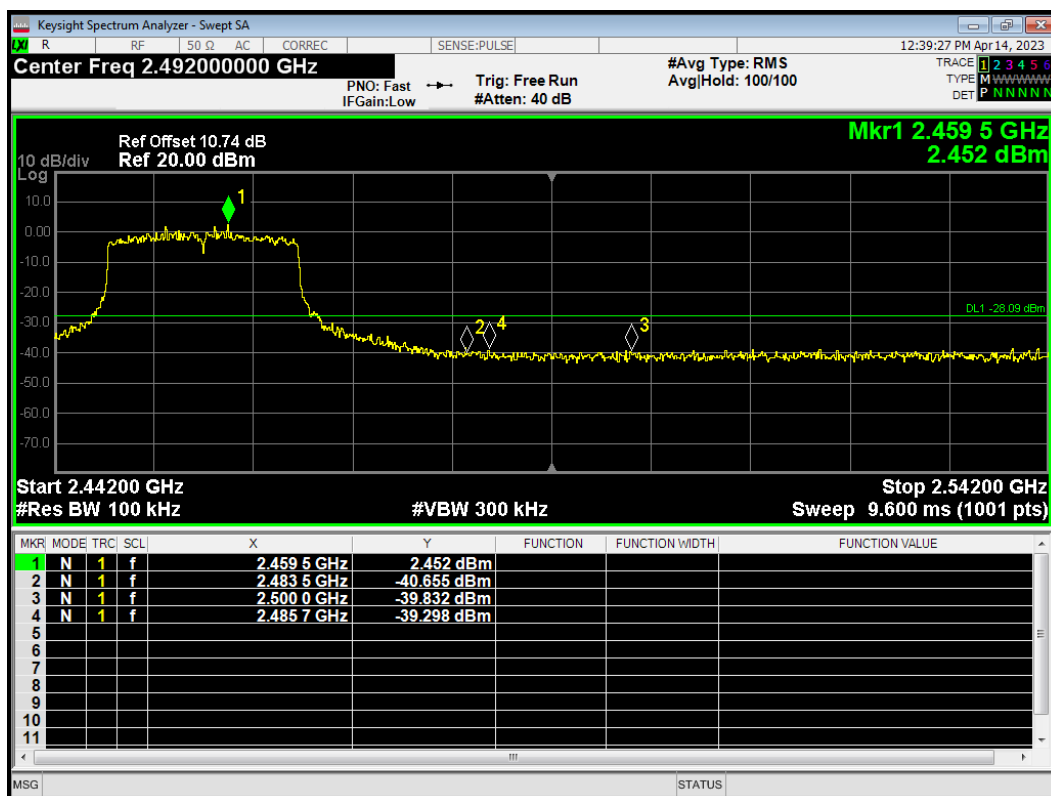
Band Edge 802.11ax(HE20) 2412MHz Emission



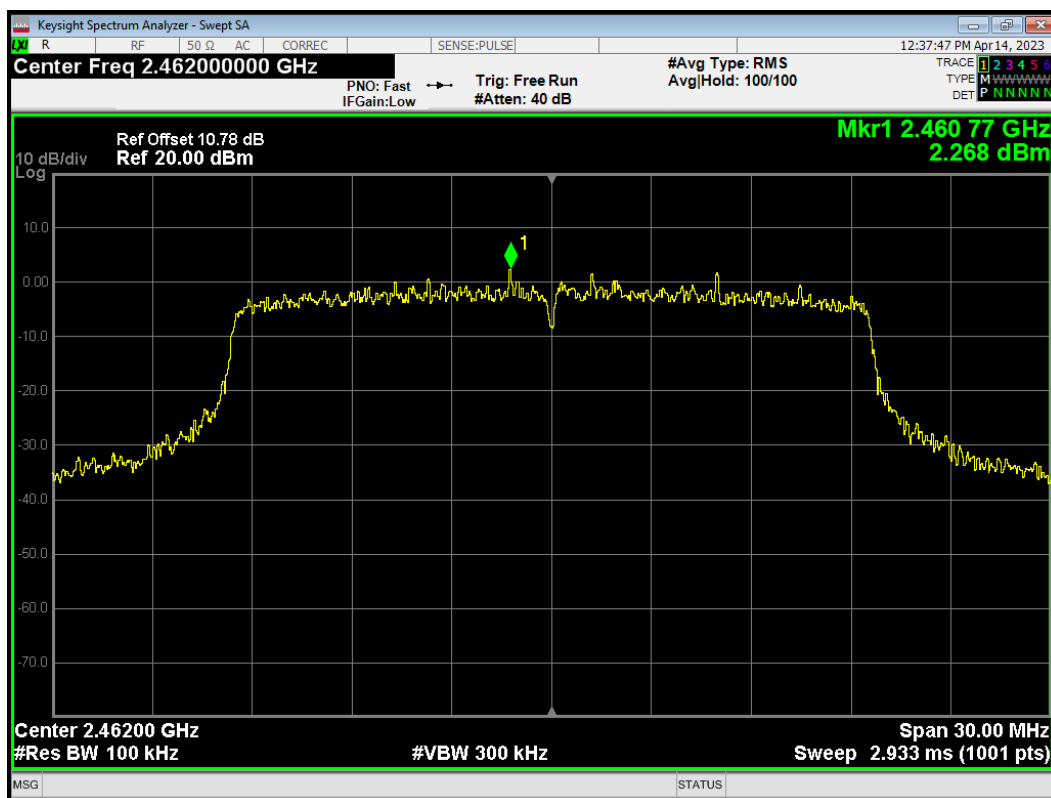
### Band Edge 802.11ax(HE20) 2457MHz Ref



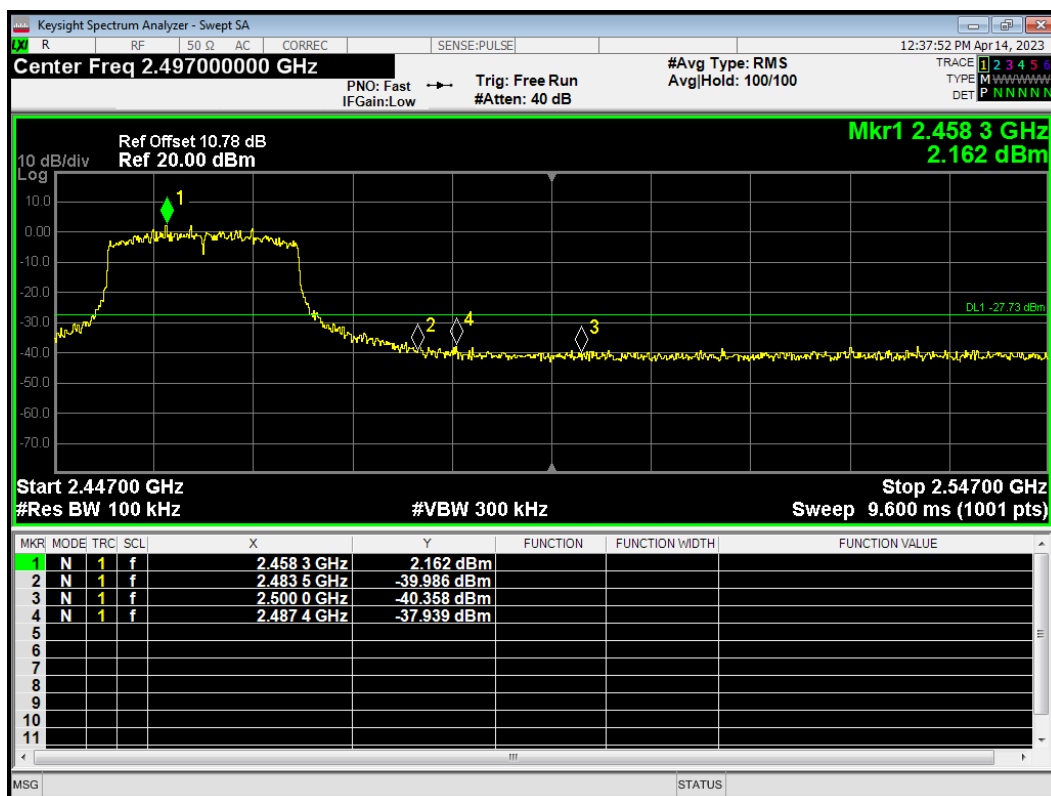
### Band Edge 802.11ax(HE20) 2457MHz Emission



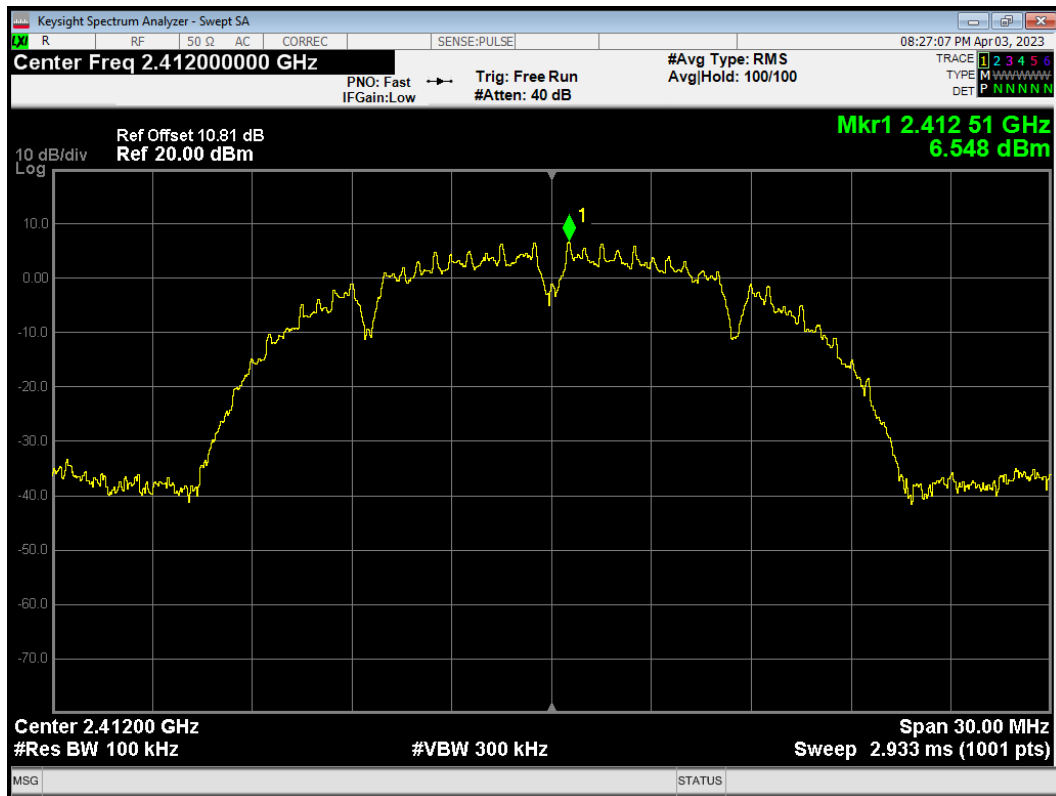
### Band Edge 802.11ax(HE20) 2462MHz Ref



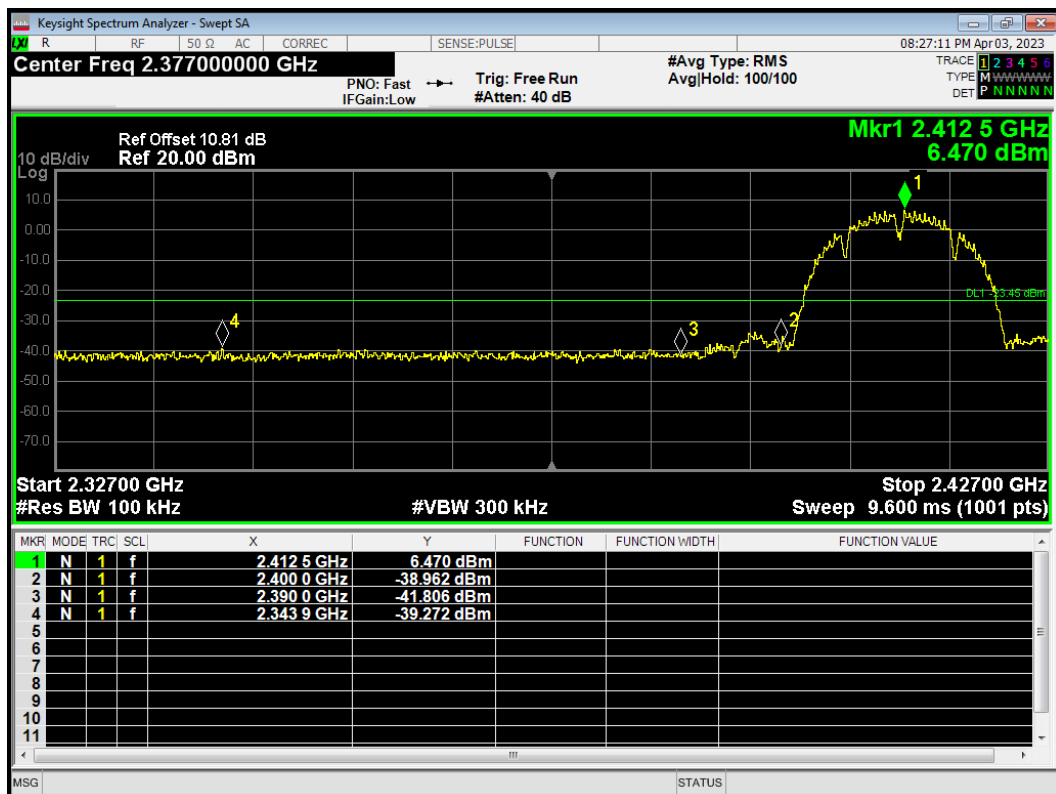
### Band Edge 802.11ax(HE20) 2462MHz Emission



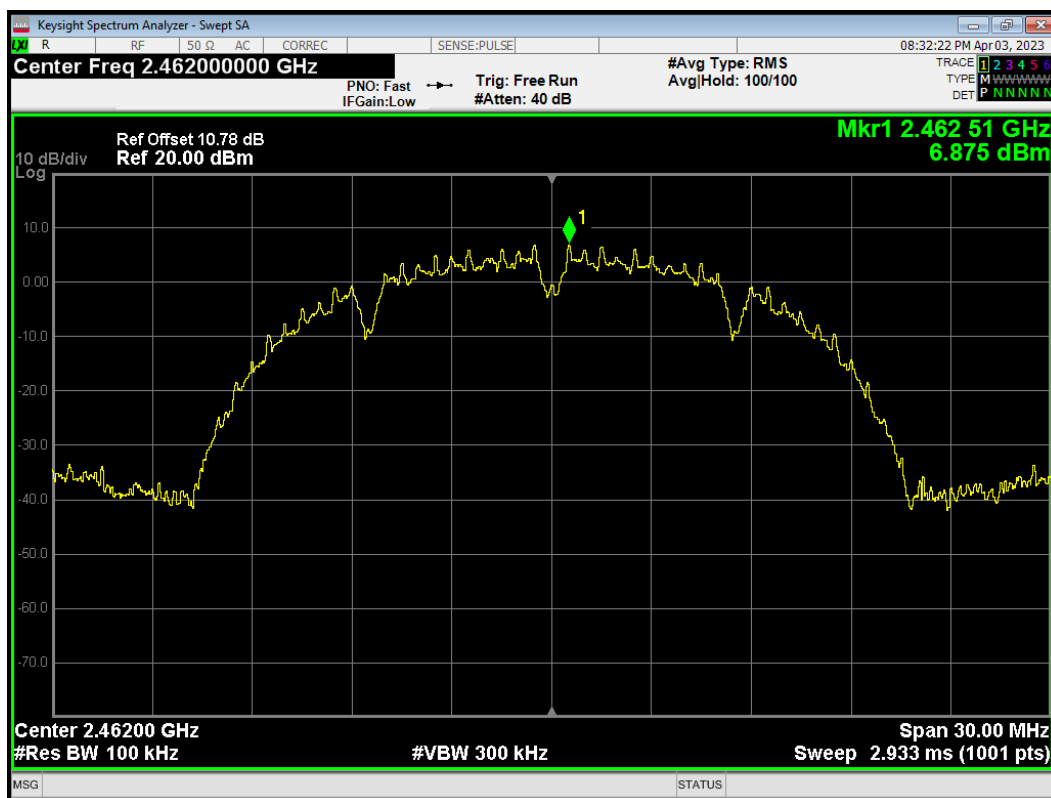
### Band Edge 802.11b 2412MHz Ref



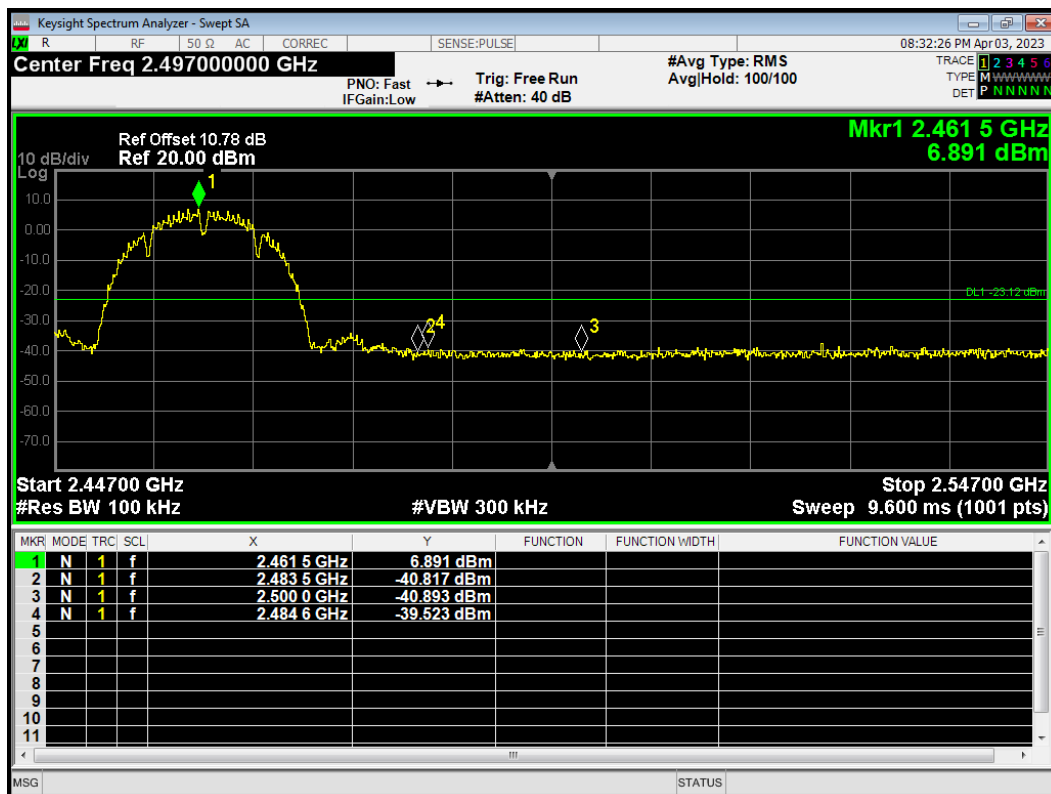
### Band Edge 802.11b 2412MHz Emission



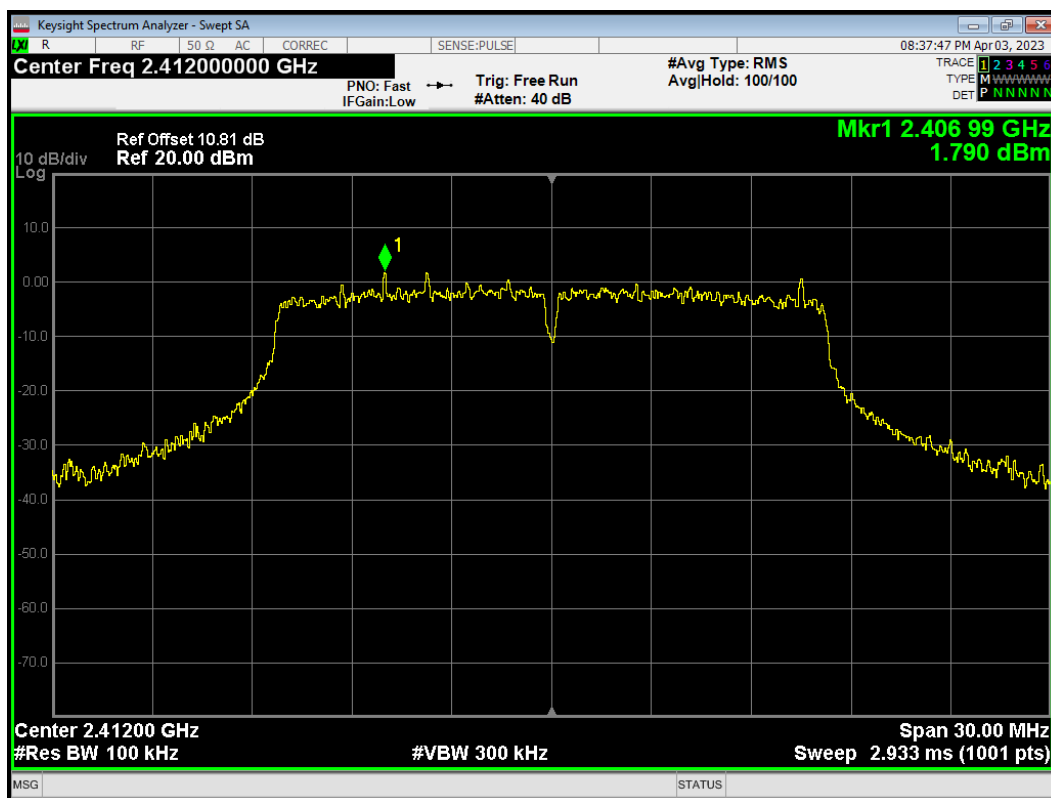
### Band Edge 802.11b 2462MHz Ref



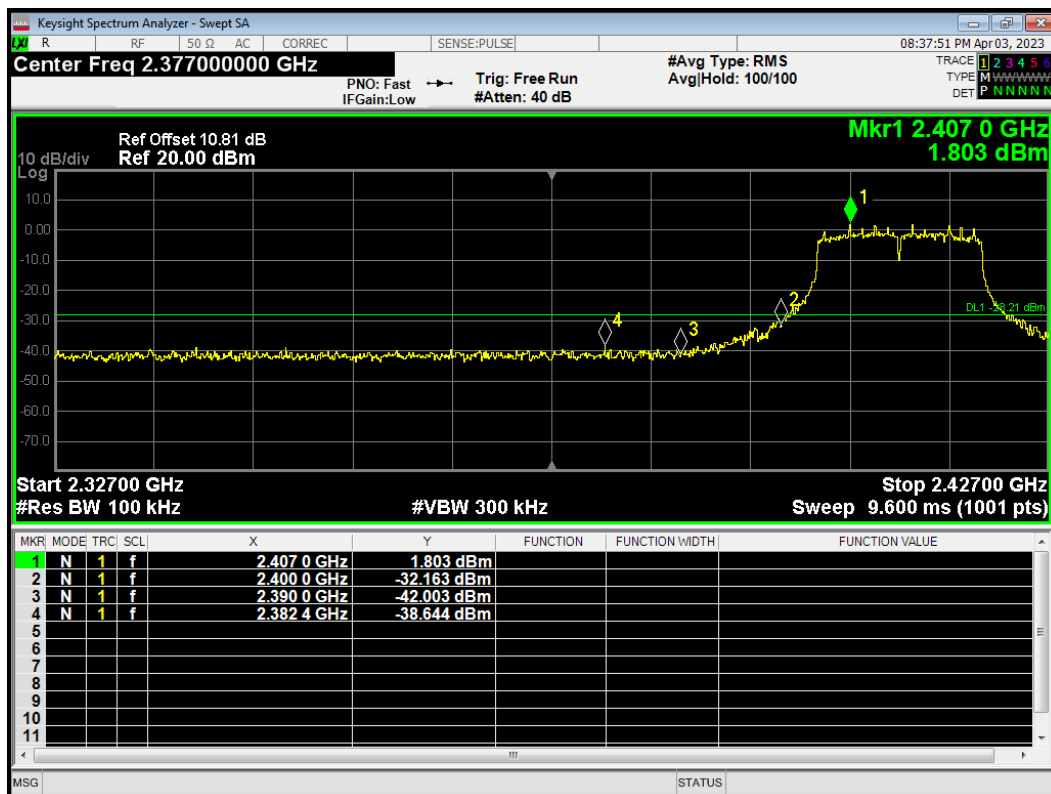
### Band Edge 802.11b 2462MHz Emission



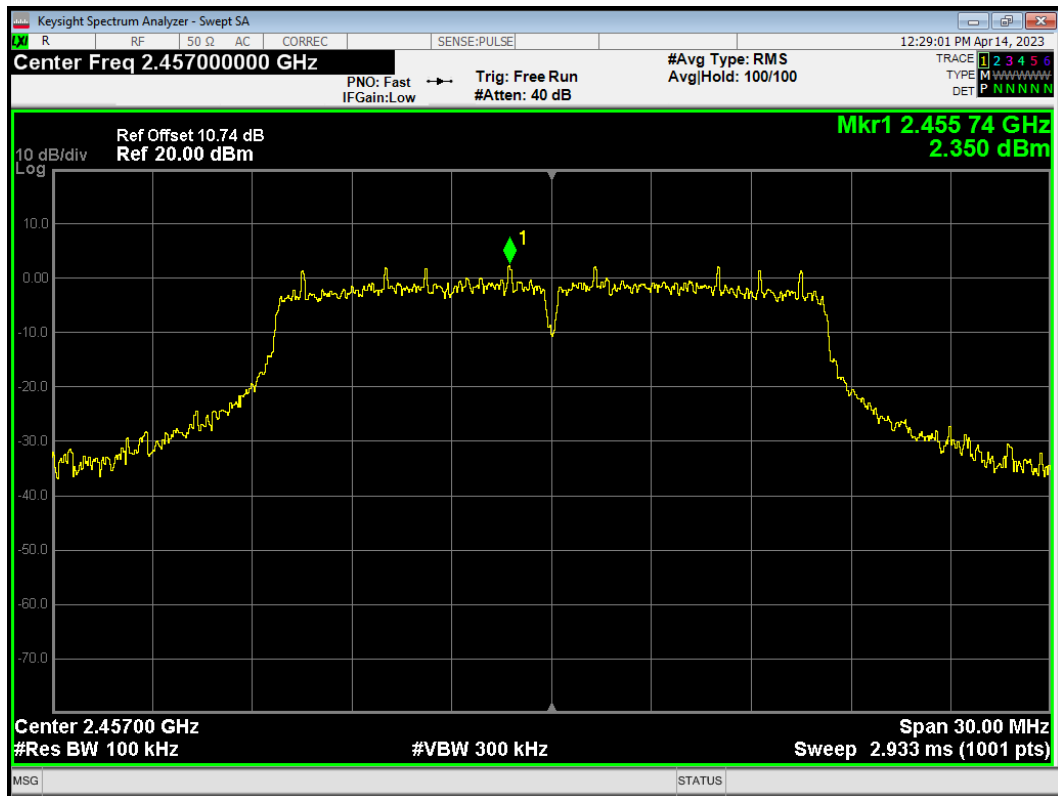
### Band Edge 802.11g 2412MHz Ref



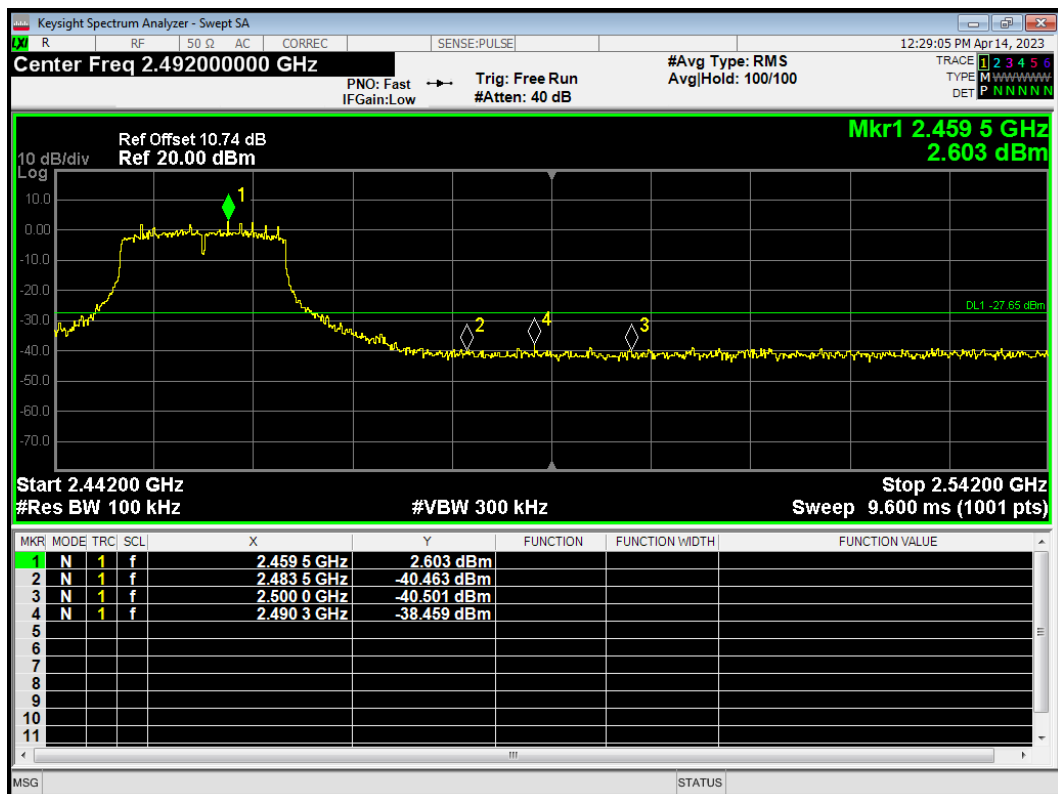
### Band Edge 802.11g 2412MHz Emission



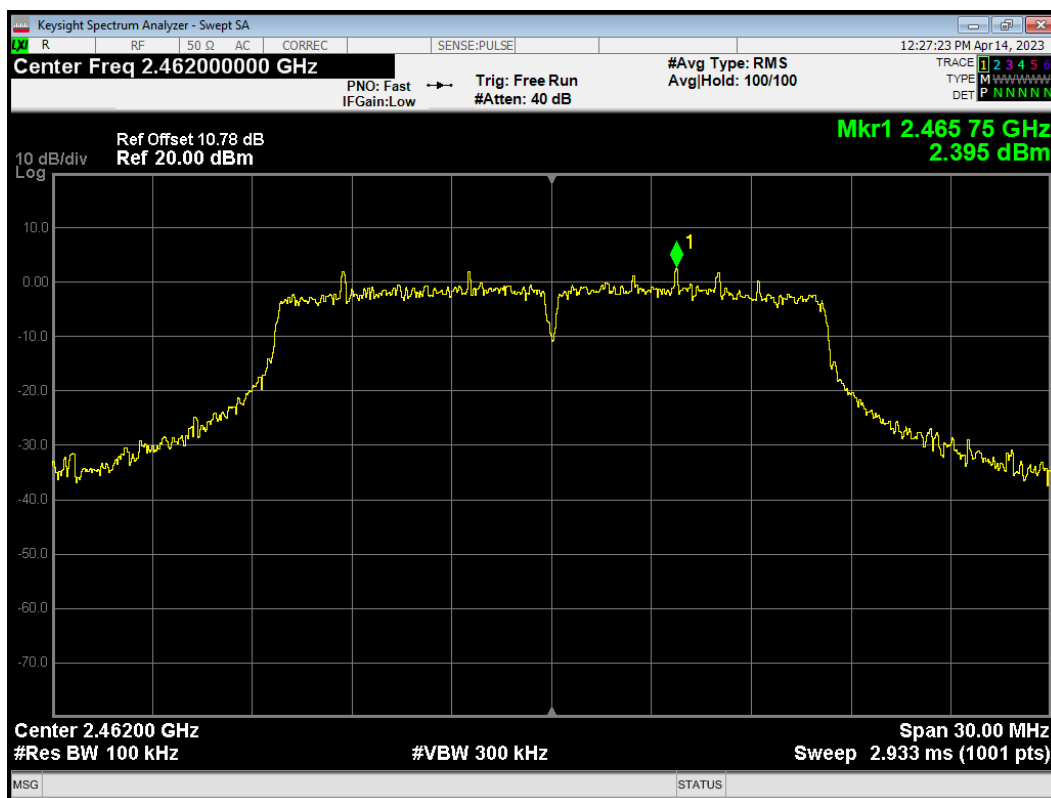
### Band Edge 802.11g 2457MHz Ref



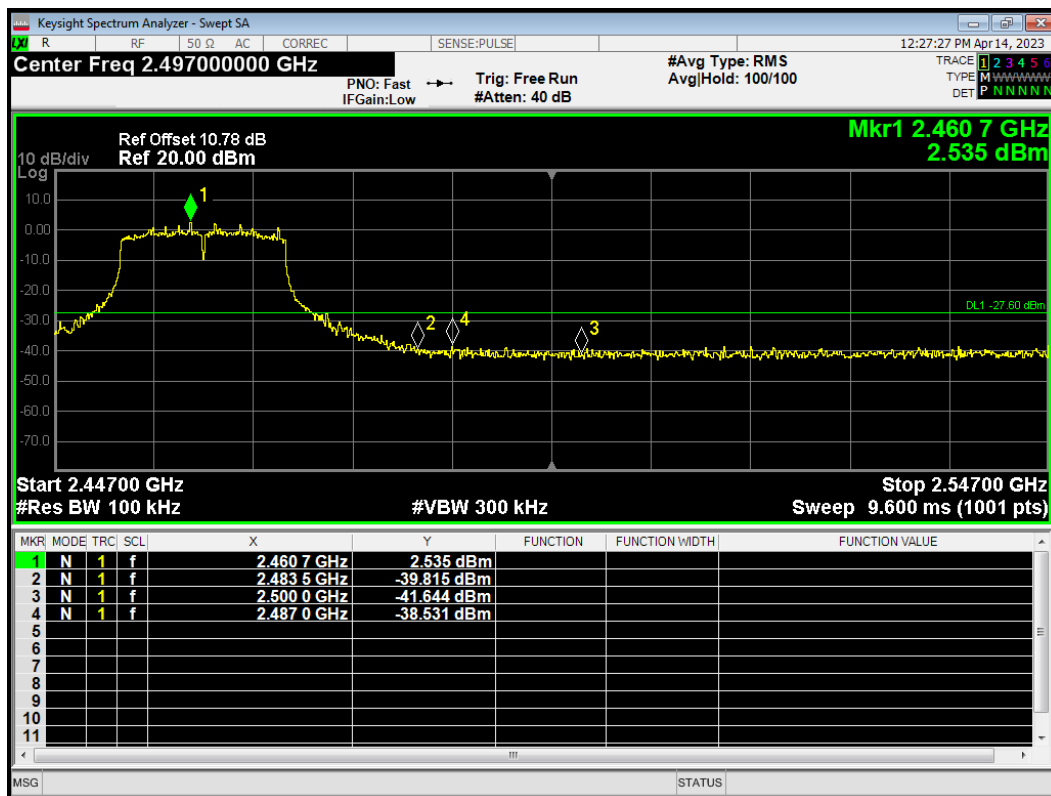
### Band Edge 802.11g 2457MHz Emission



### Band Edge 802.11g 2462MHz Ref

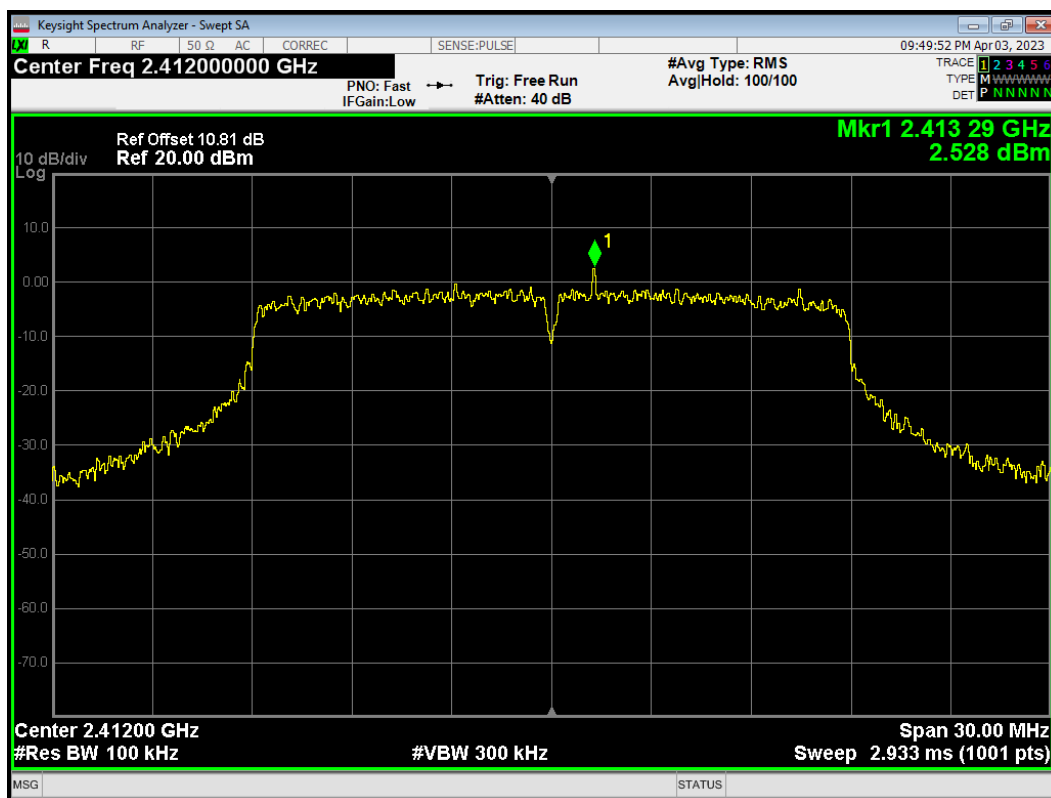


### Band Edge 802.11g 2462MHz Emission

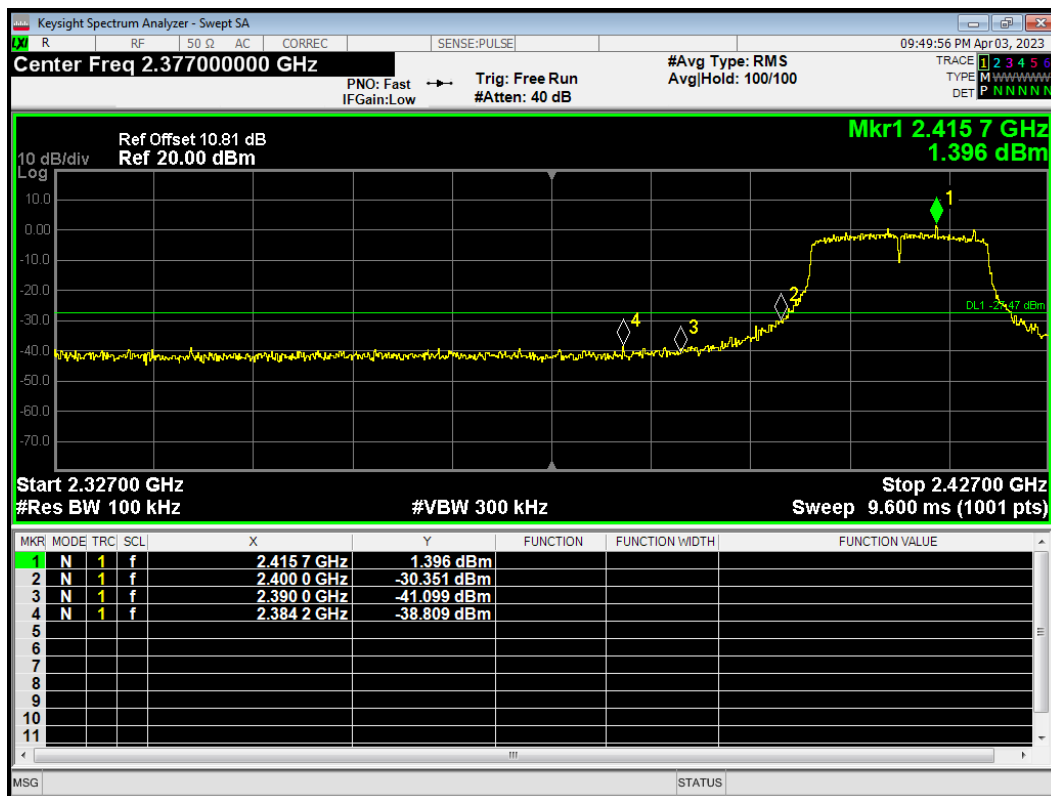




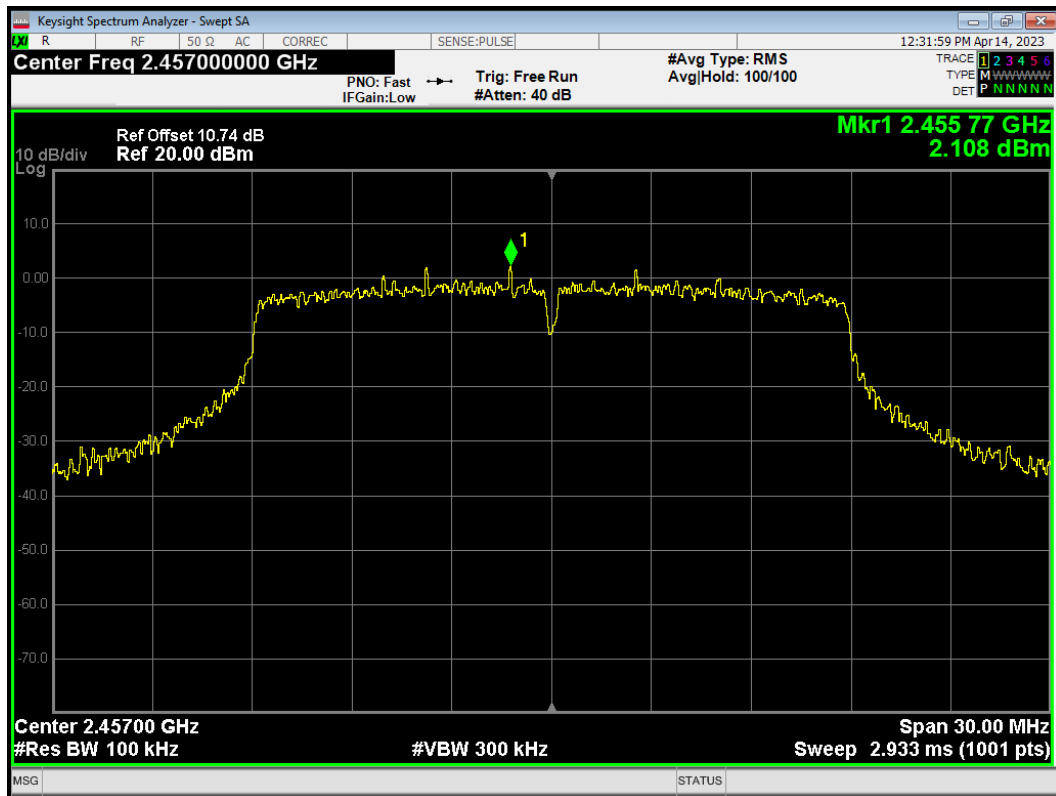
### Band Edge 802.11n(HT20) 2412MHz Ref



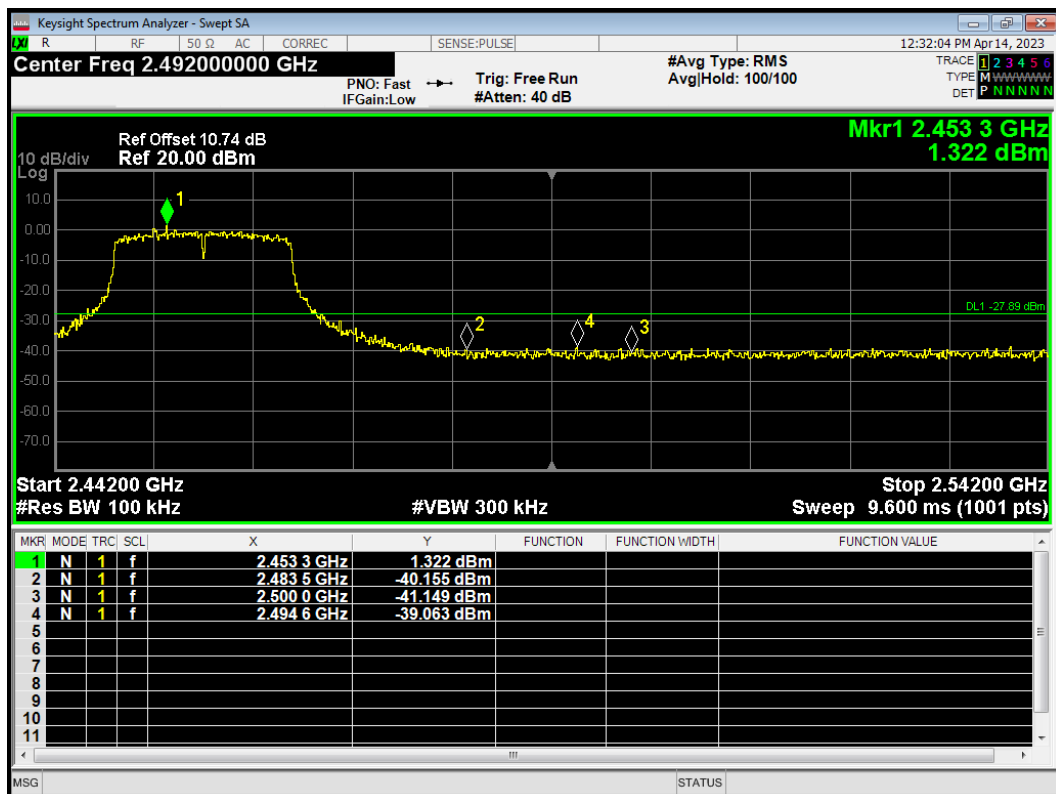
### Band Edge 802.11n(HT20) 2412MHz Emission



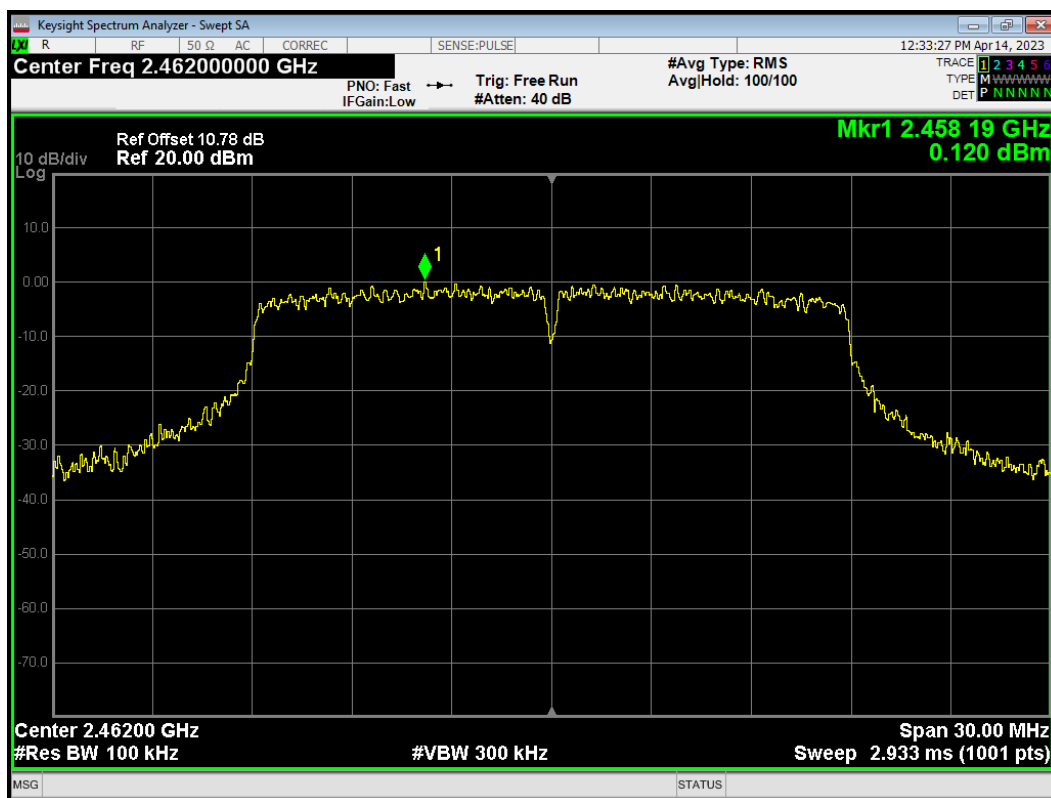
### Band Edge 802.11n(HT20) 2457MHz Ref



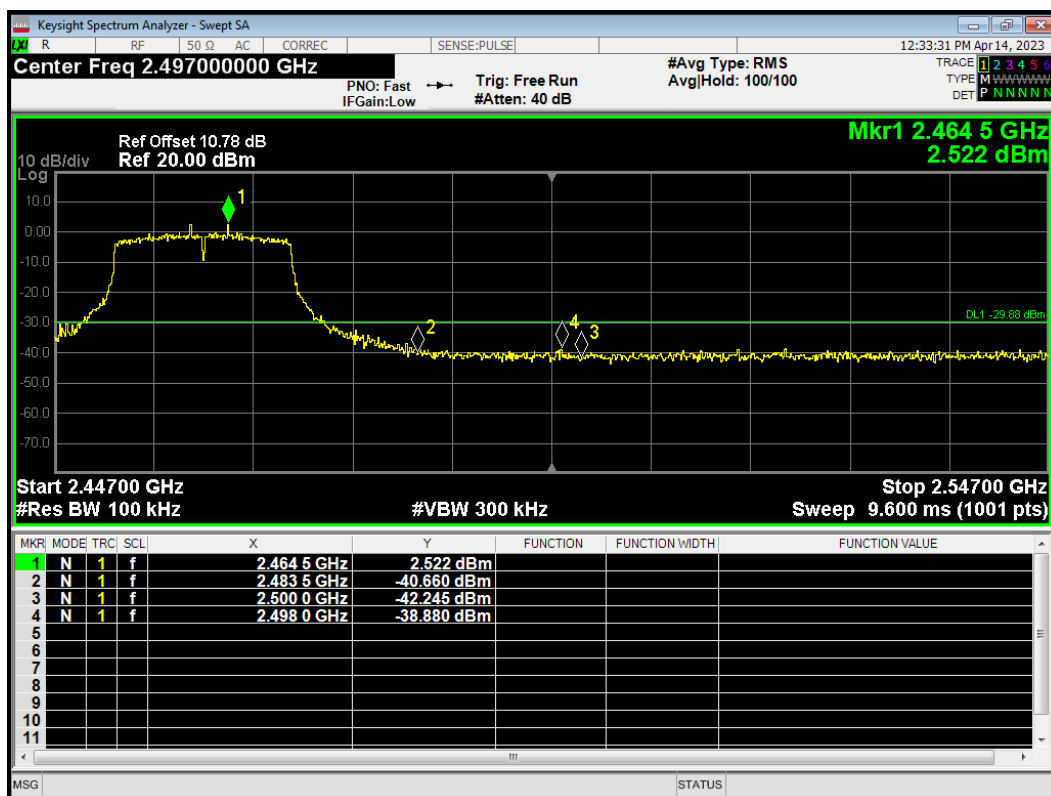
### Band Edge 802.11n(HT20) 2457MHz Emission



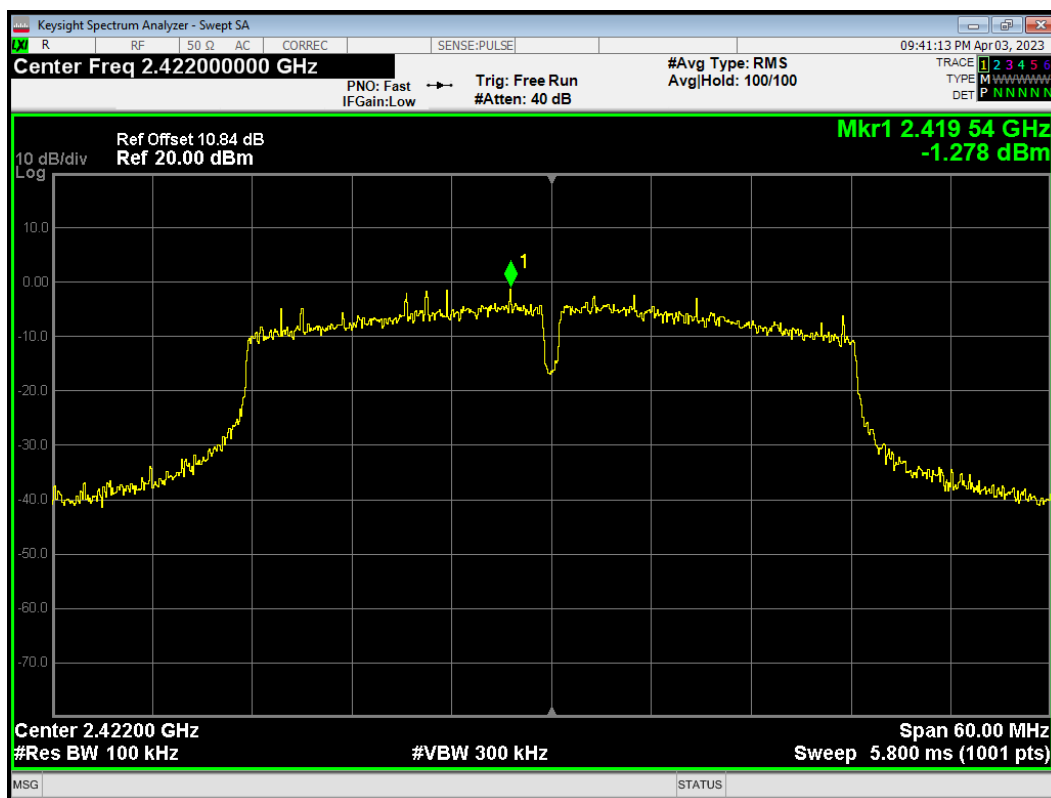
### Band Edge 802.11n(HT20) 2462MHz Ref



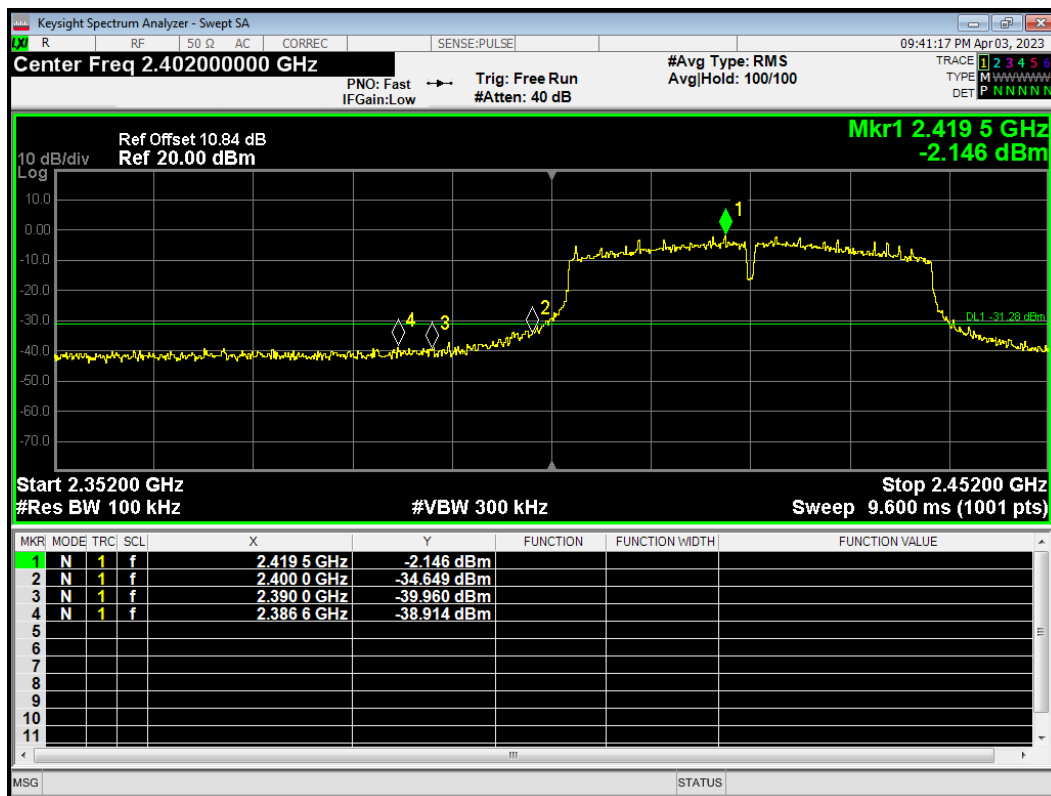
### Band Edge 802.11n(HT20) 2462MHz Emission



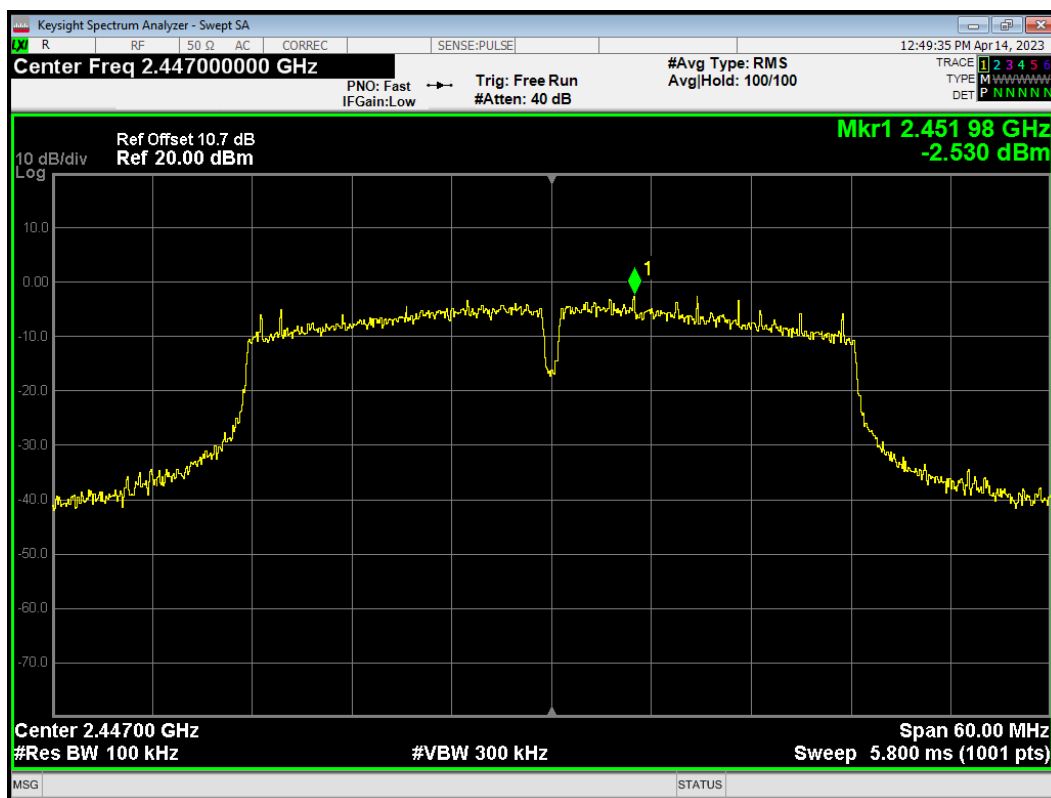
### Band Edge 802.11n(HT40) 2422MHz Ref



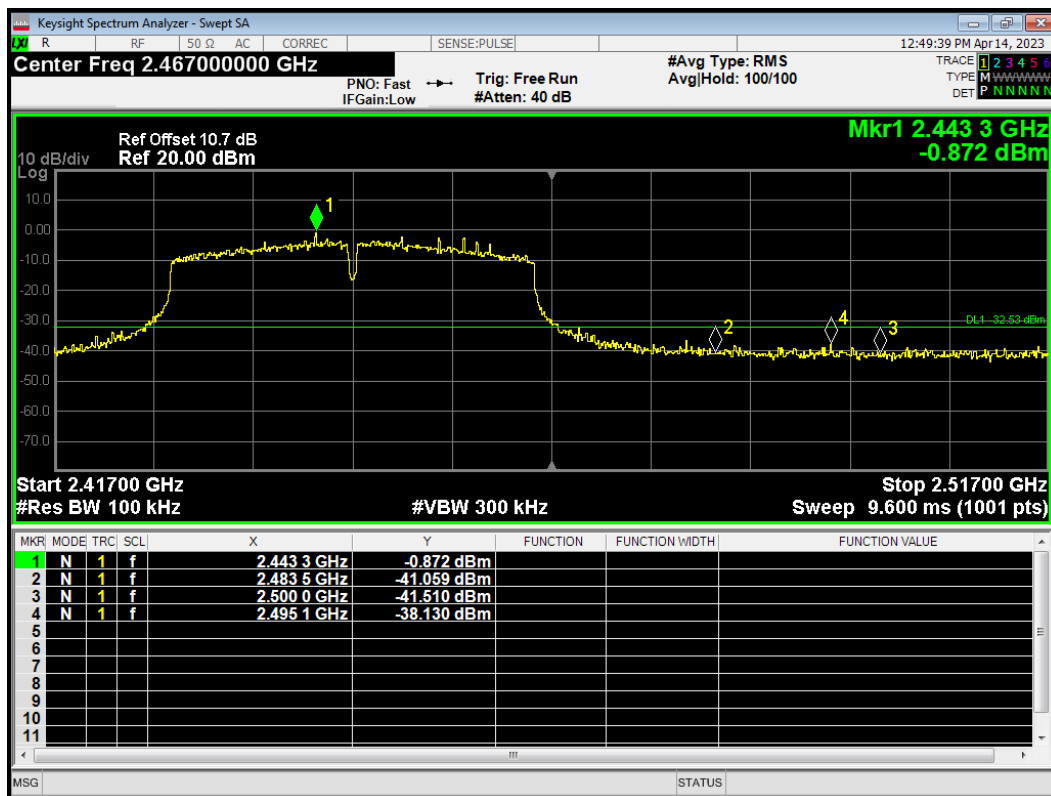
### Band Edge 802.11n(HT40) 2422MHz Emission



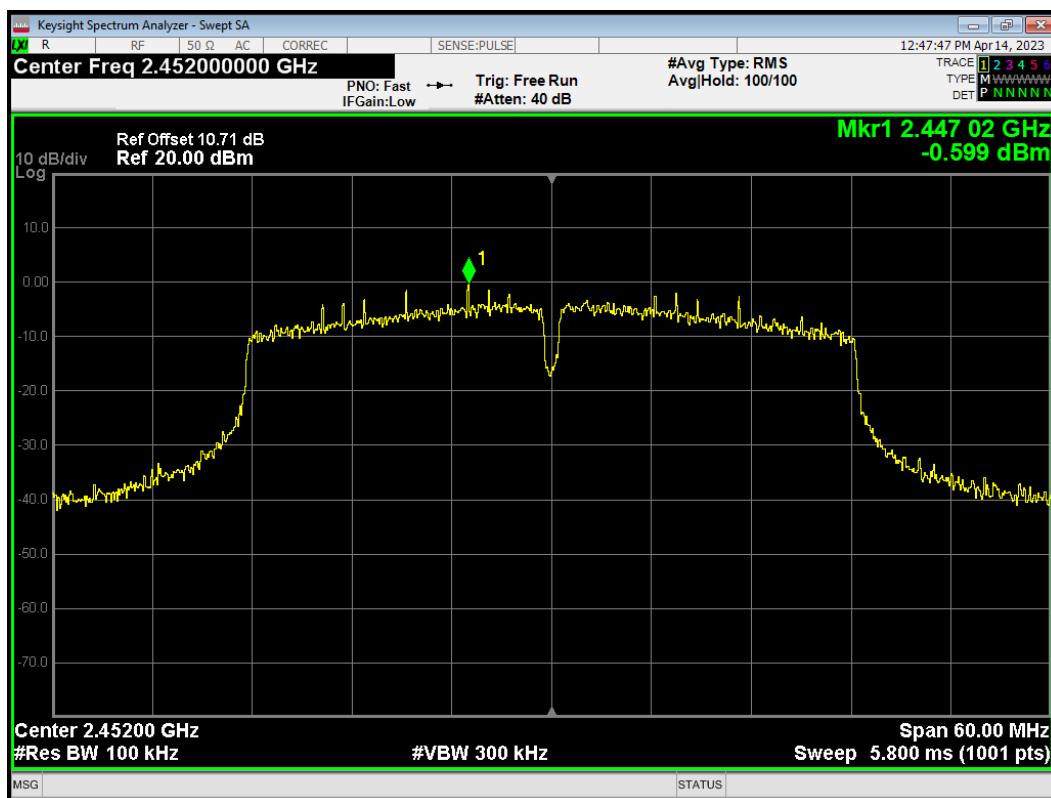
### Band Edge 802.11n(HT40) 2447MHz Ref



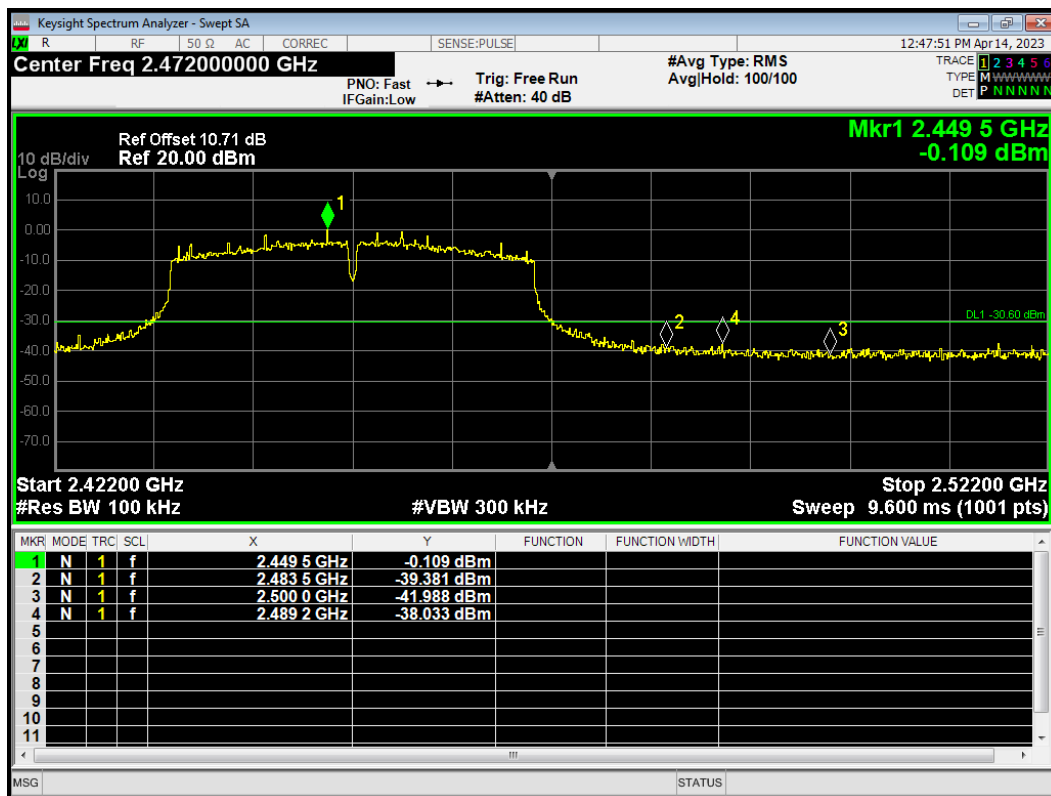
### Band Edge 802.11n(HT40) 2447MHz Emission



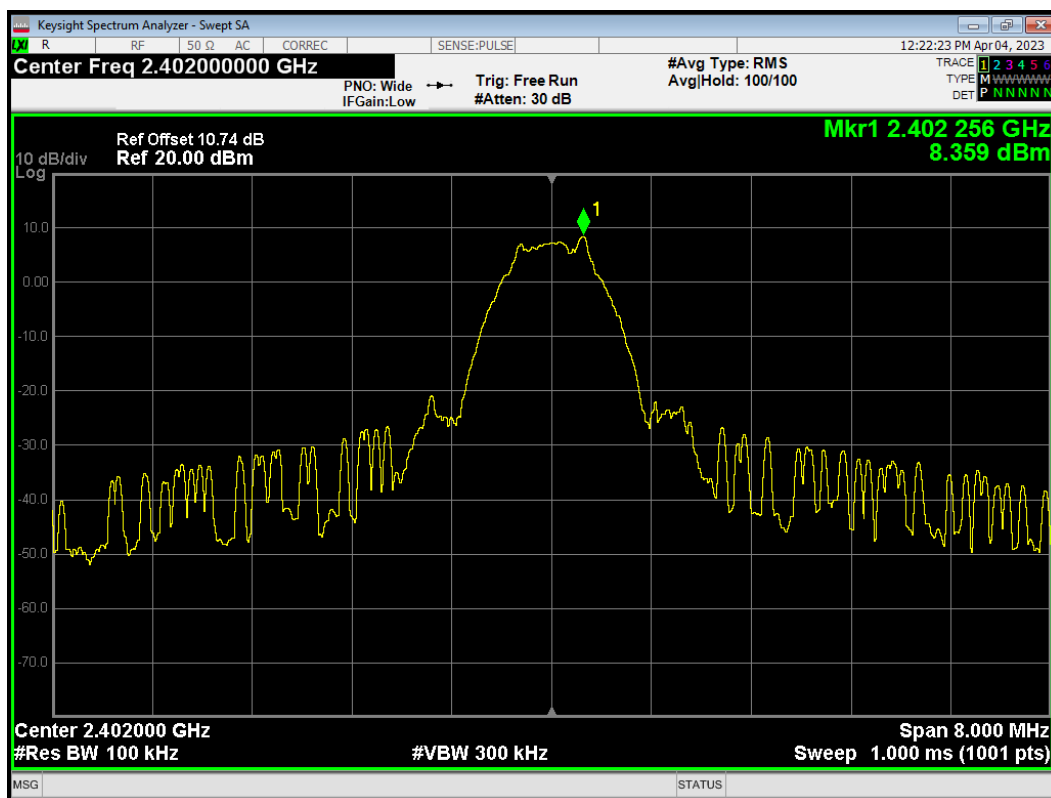
### Band Edge 802.11n(HT40) 2452MHz Ref



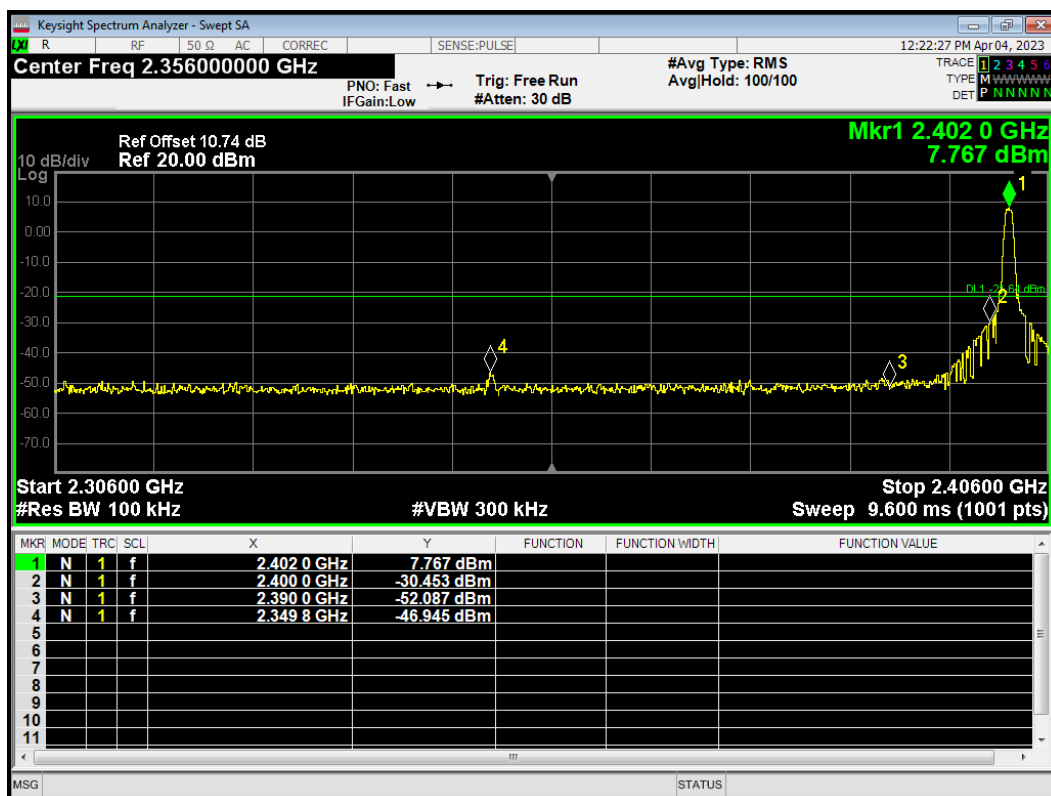
### Band Edge 802.11n(HT40) 2452MHz Emission



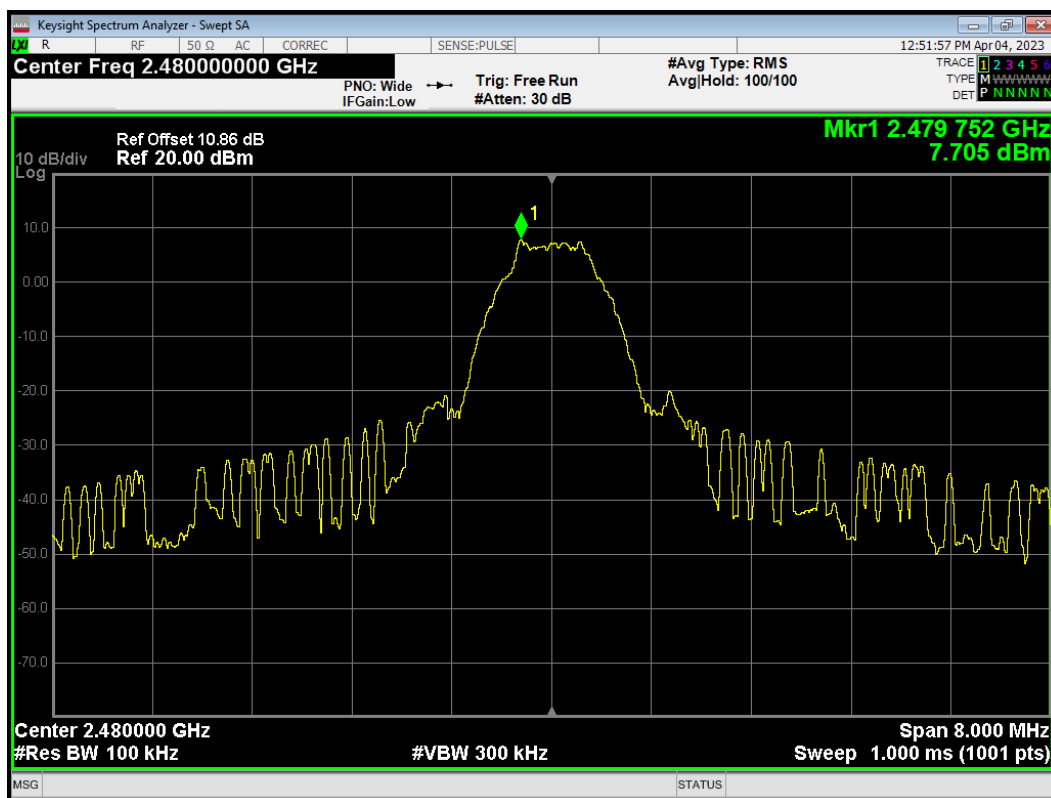
### Band Edge Bluetooth LE(1M)



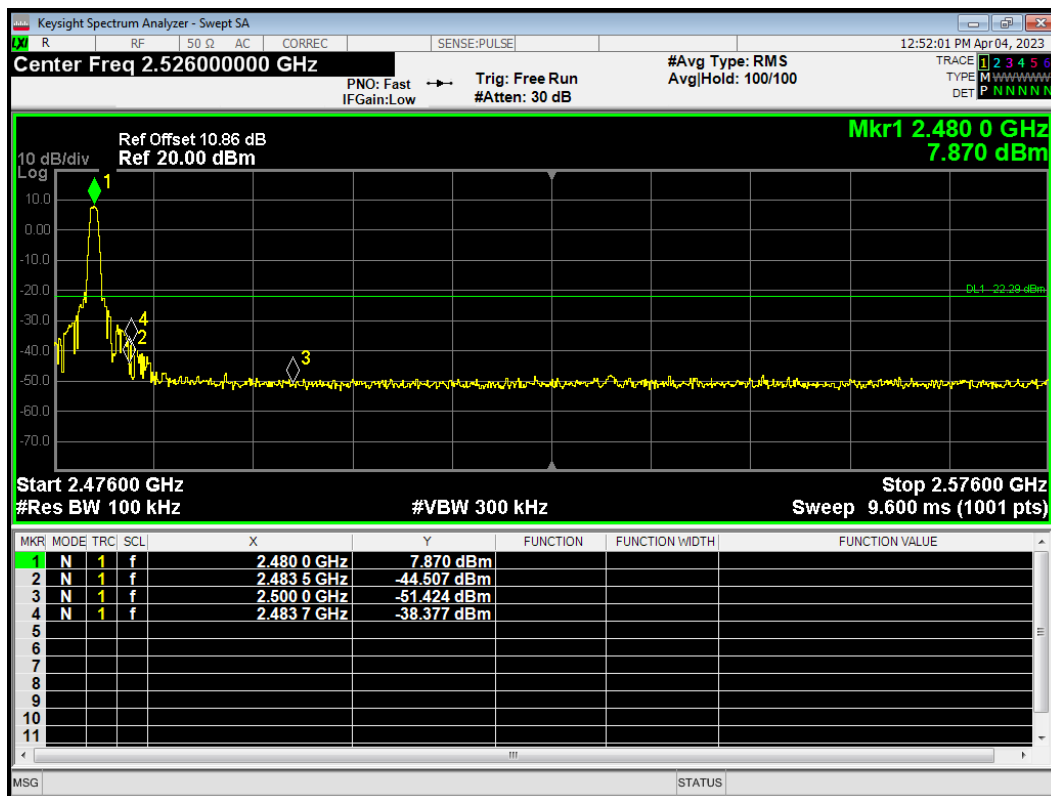
### Band Edge Bluetooth LE(1M)



### Band Edge Bluetooth LE(1M)

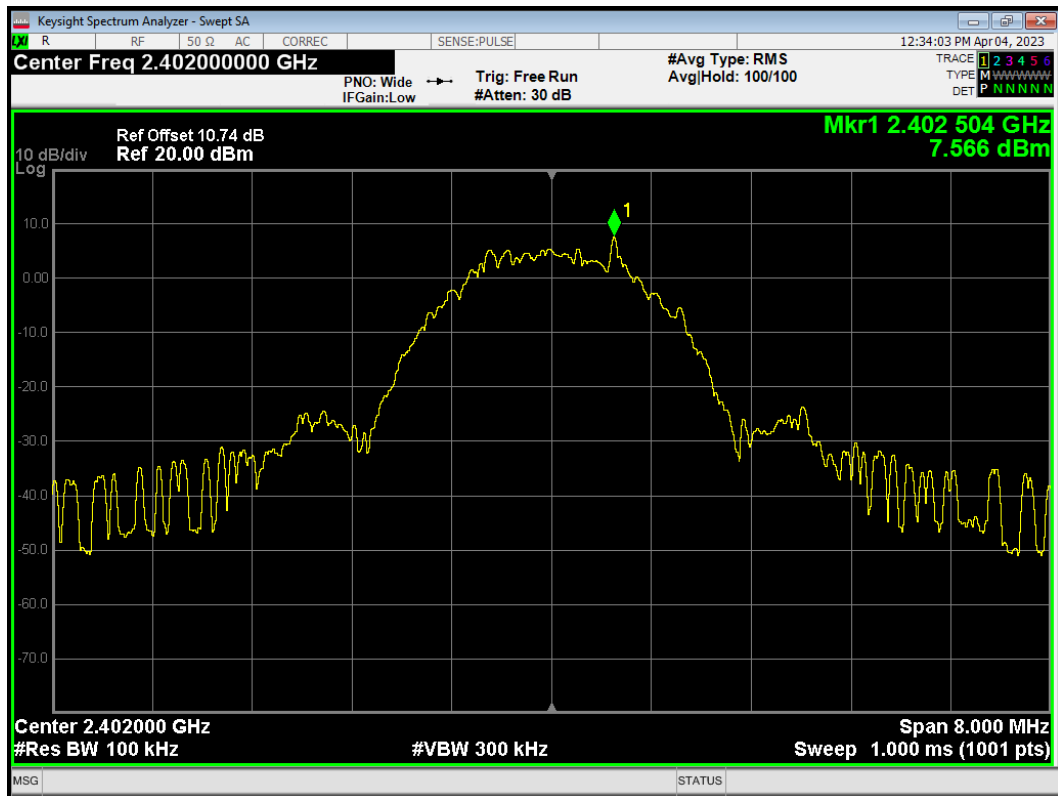


### Band Edge Bluetooth LE(1M)

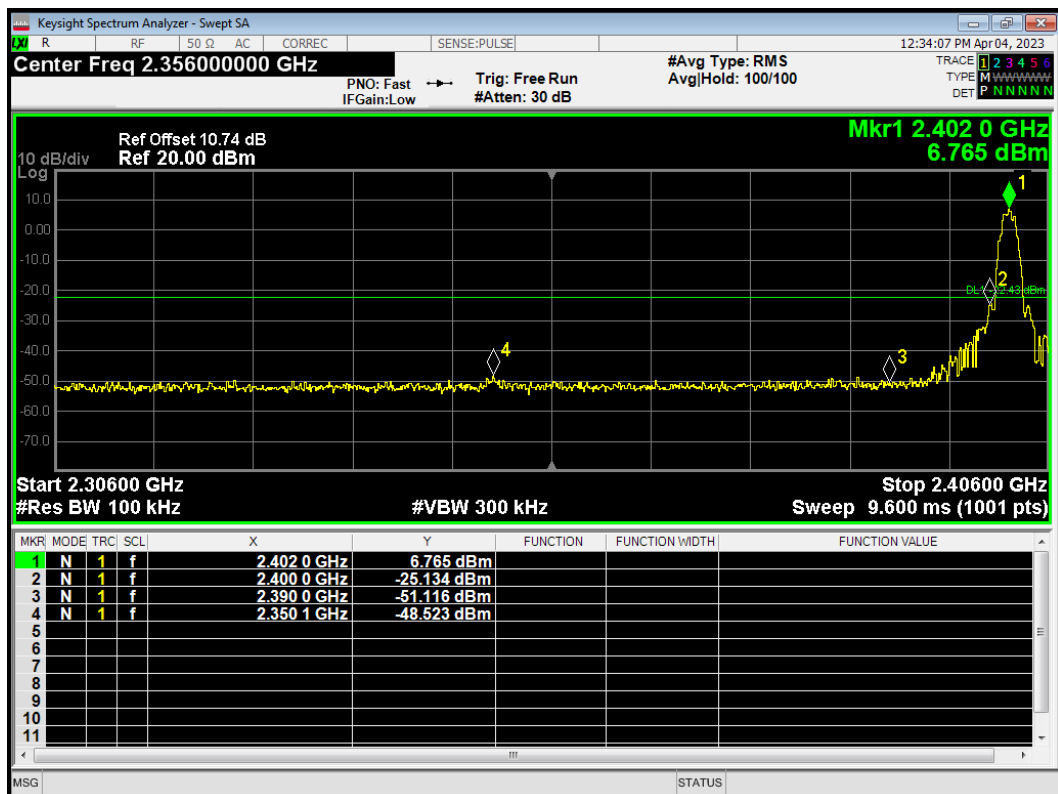




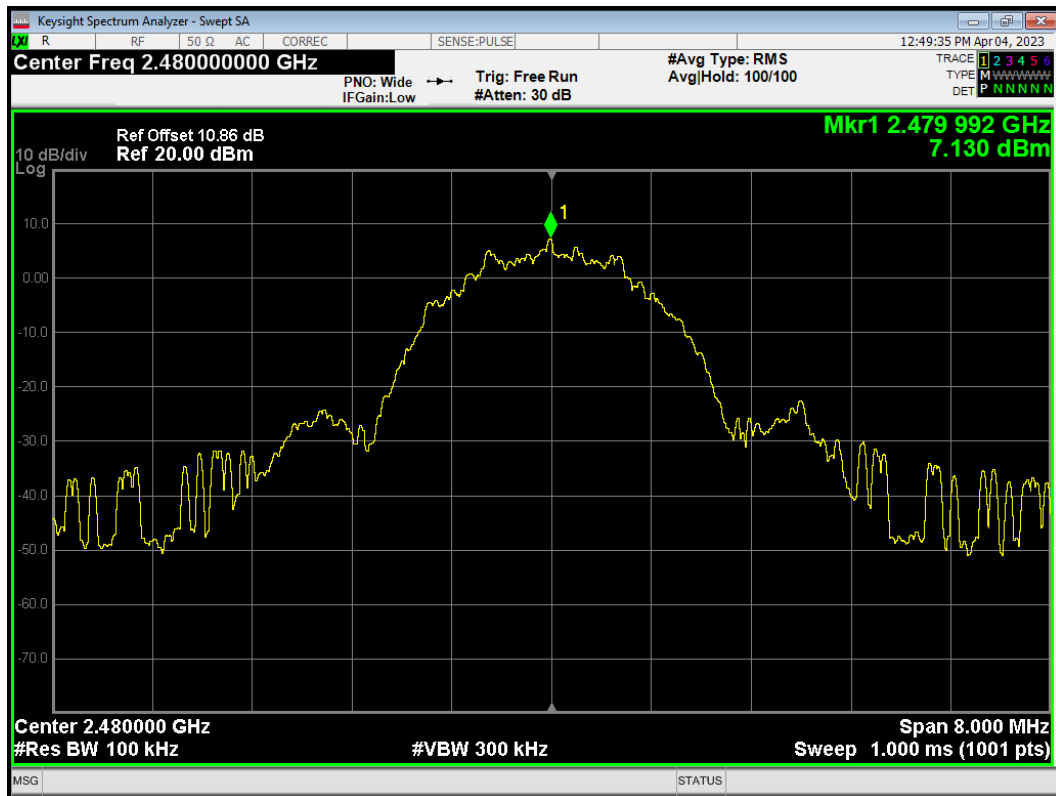
### Band Edge Bluetooth LE(2M)



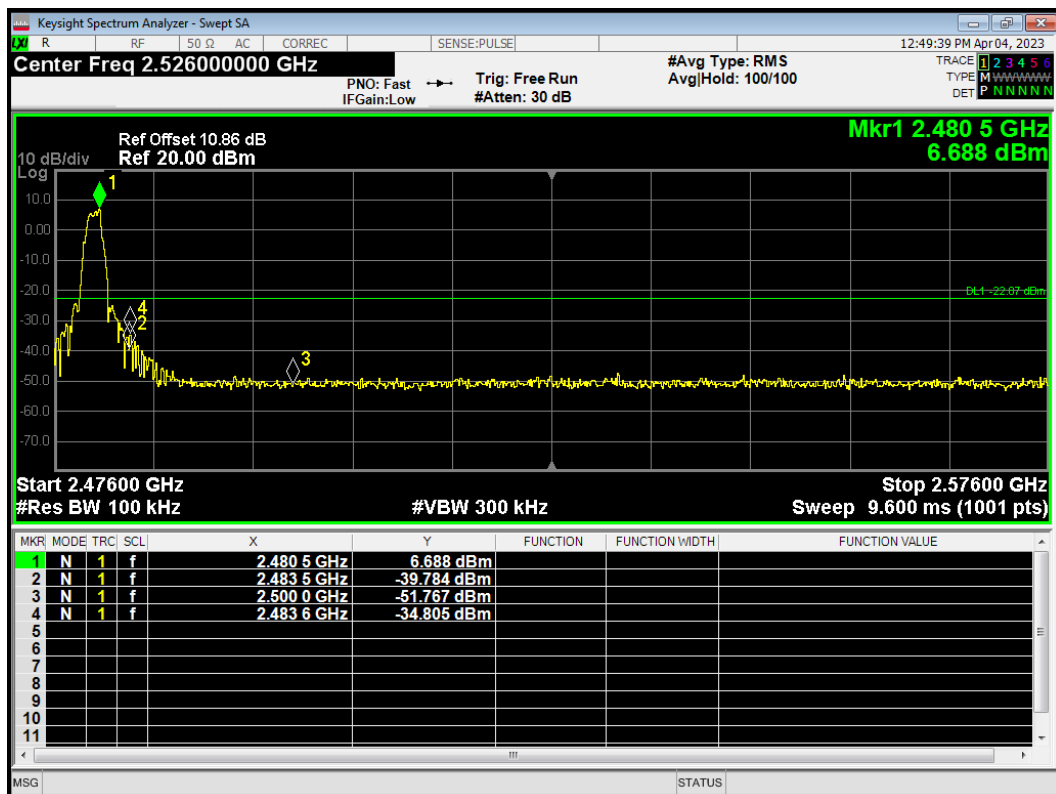
### Band Edge Bluetooth LE(2M)



### Band Edge Bluetooth LE(2M)



### Band Edge Bluetooth LE(2M)



## 5.4. Power Spectral Density

### Ambient Condition

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

### Method of Measurement

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

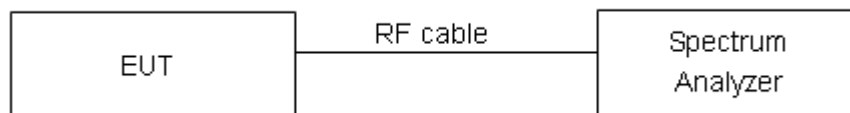
Method AVGPSD-1 was used for this test. Duty cycle

- Set instrument center frequency to DTS channel center frequency
- Set span to at least 1.5 times the OBW
- Set RBW to:  $3\text{kHz} \leq \text{RBW} \leq 100\text{kHz}$
- Set VBW  $\geq [3 \times \text{RBW}]$
- Detector=power averaging (rms) or sample detector (when rms not available)
- Ensure that the number of measurement points in the sweep  $\geq [2 \times \text{span}/\text{RBW}]$
- Sweep time auto couple
- Employ trace averaging (rms) mode over a minimum of 100 traces
- Use the peak marker function to determine the maximum amplitude level.
- If the measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced)

Method AVGPSD-2 was used for this test. Duty cycle

- Measure the duty cycle (D) of the transmitter output signal as described in 11.6
- Set instrument center frequency to DTS channel center frequency
- Set span to at least 1.5 times the OBW
- Set RBW to:  $3\text{kHz} \leq \text{RBW} \leq 100\text{kHz}$
- Set VBW  $\geq [3 \times \text{RBW}]$
- Detector= power averaging (rms) or sample detector (when rms not available)
- Ensure that the number of measurement points in the sweep  $\geq [2 \times \text{span}/\text{RBW}]$
- Sweep time =auto couple
- Do not use sweep triggering; allow sweep to "free run"
- Employ trace averaging (rms) mode over a minimum of 100 traces
- Use the peak marker function to determine the maximum amplitude level
- Add  $[10 \log(1/ D)]$ , where D is the duty cycle measured in step a), to the measured PSD to compute the average PSD during the actual transmission time
- If measured value exceeds requirement specified by regulatory agency then reduce RBW (but no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced)

## Test setup



## Limits

Rule Part 15.247(e) specifies that” For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. “

Limits	$\leq 8 \text{ dBm} / 3\text{kHz}$
--------	------------------------------------

## Measurement Uncertainty

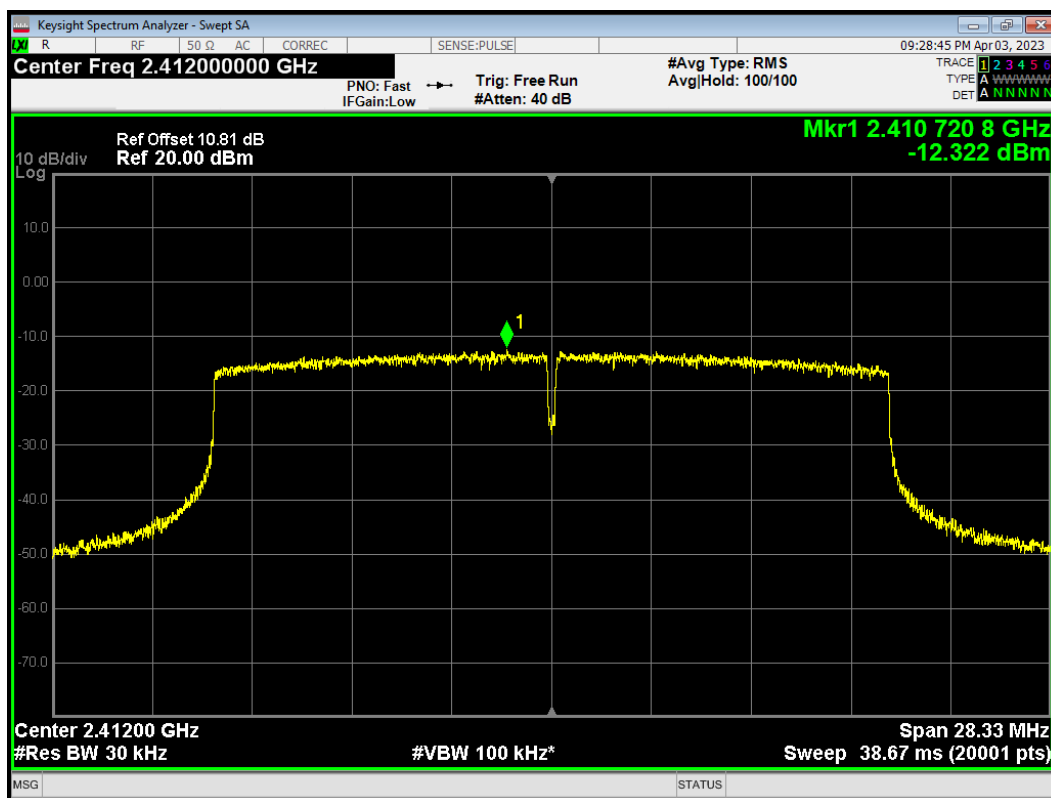
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U = 0.75\text{dB}$ .

**Test Results:**

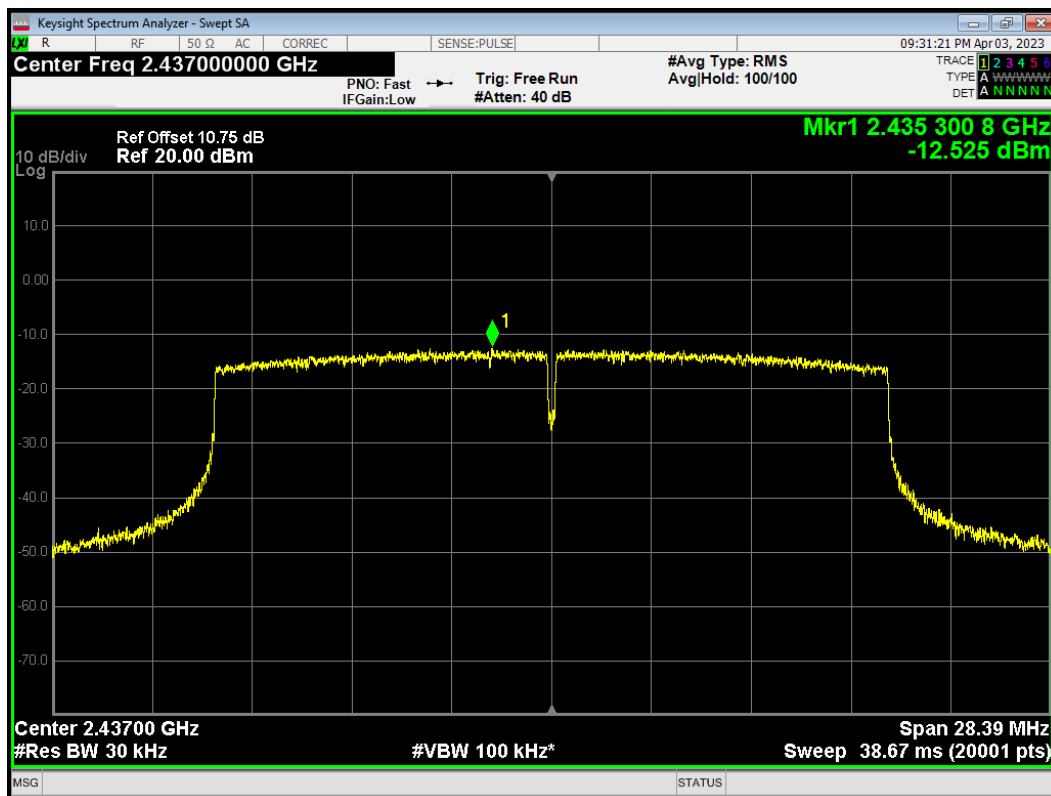
Test Mode	Channel Number	Read Value (dBm / 30kHz)	Power Spectral Density (dBm / 3kHz)	Limit (dBm / 3kHz)	Conclusion
802.11b	CH 1	-5.62	-15.32	8	PASS
	CH 6	-5.62	-15.32	8	PASS
	CH11	-4.71	-14.41	8	PASS
802.11g	CH 1	-10.32	-20.32	8	PASS
	CH 6	-10.23	-20.23	8	PASS
	CH10	-10.21	-20.21	8	PASS
	CH11	-10.20	-20.20	8	PASS
802.11n HT20	CH 1	-10.68	-20.68	8	PASS
	CH 6	-11.24	-21.24	8	PASS
	CH10	-10.50	-20.50	8	PASS
	CH11	-10.50	-20.50	8	PASS
802.11n HT40	CH3	-14.17	-24.17	8	PASS
	CH6	-14.05	-24.05	8	PASS
	CH8	-13.76	-23.76	8	PASS
	CH9	-13.32	-23.32	8	PASS
802.11 ax HE20	CH3	-12.32	-22.32	8	PASS
	CH6	-12.53	-22.53	8	PASS
	CH8	-11.82	-21.82	8	PASS
	CH9	-11.91	-21.91	8	PASS
Note: Power Spectral Density (dBm/3kHz) =Read Value+Duty cycle correction factor + 10*log10(3 / 30)					

Test Mode	Channel Number	Read Value (dBm / 3kHz)	Power Spectral Density (dBm / 3kHz)	Limit (dBm / 3kHz)	Conclusion
Bluetooth (Low Energy) (1M)	0	-13.71	-13.00	8	PASS
	19	-14.08	-13.37	8	PASS
	39	-13.65	-12.94	8	PASS
Bluetooth (Low Energy) (2M)	0	-17.63	-15.18	8	PASS
	19	-18.19	-15.74	8	PASS
	39	-17.93	-15.48	8	PASS
Note: Power Spectral Density =Read Value+Duty cycle correction factor					

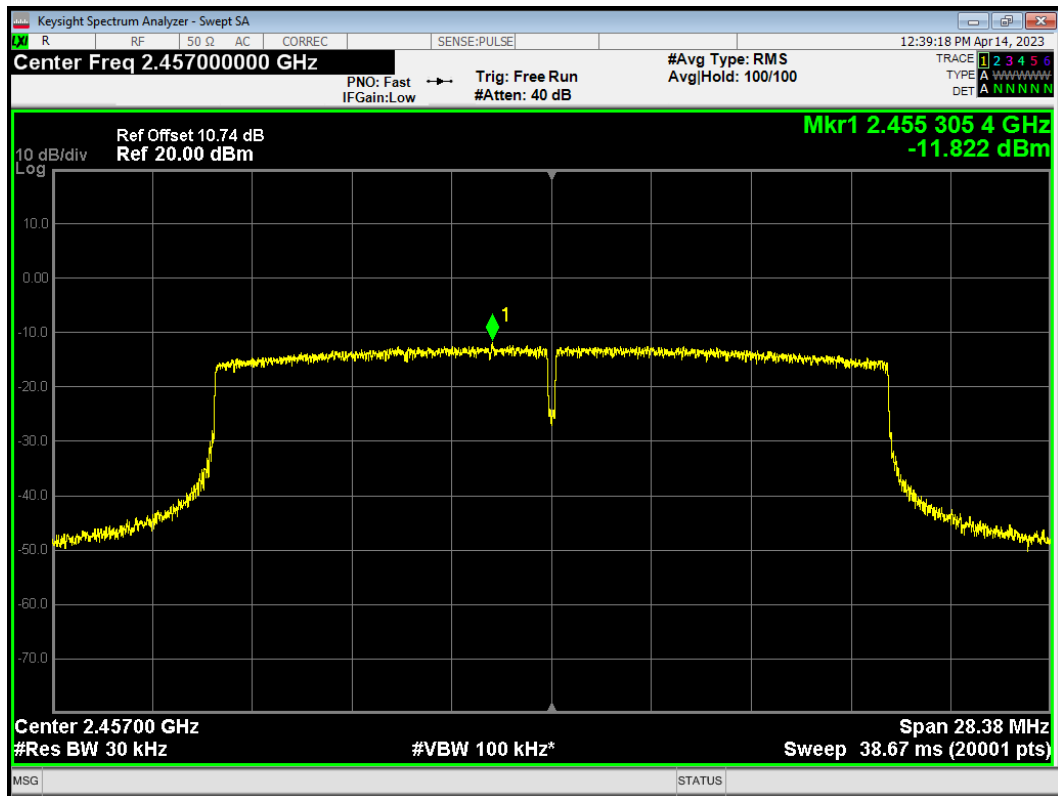
PSD 802.11ax(HE20) 2412MHz



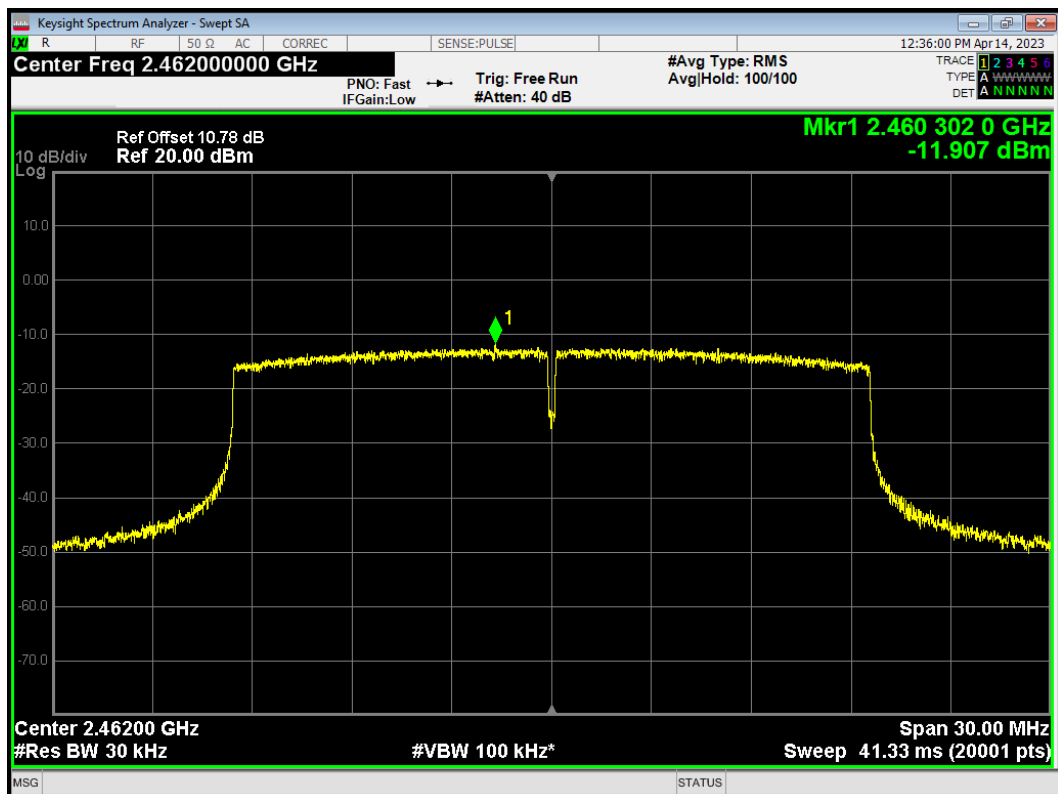
PSD 802.11ax(HE20) 2437MHz



PSD 802.11ax(HE20) 2457MHz

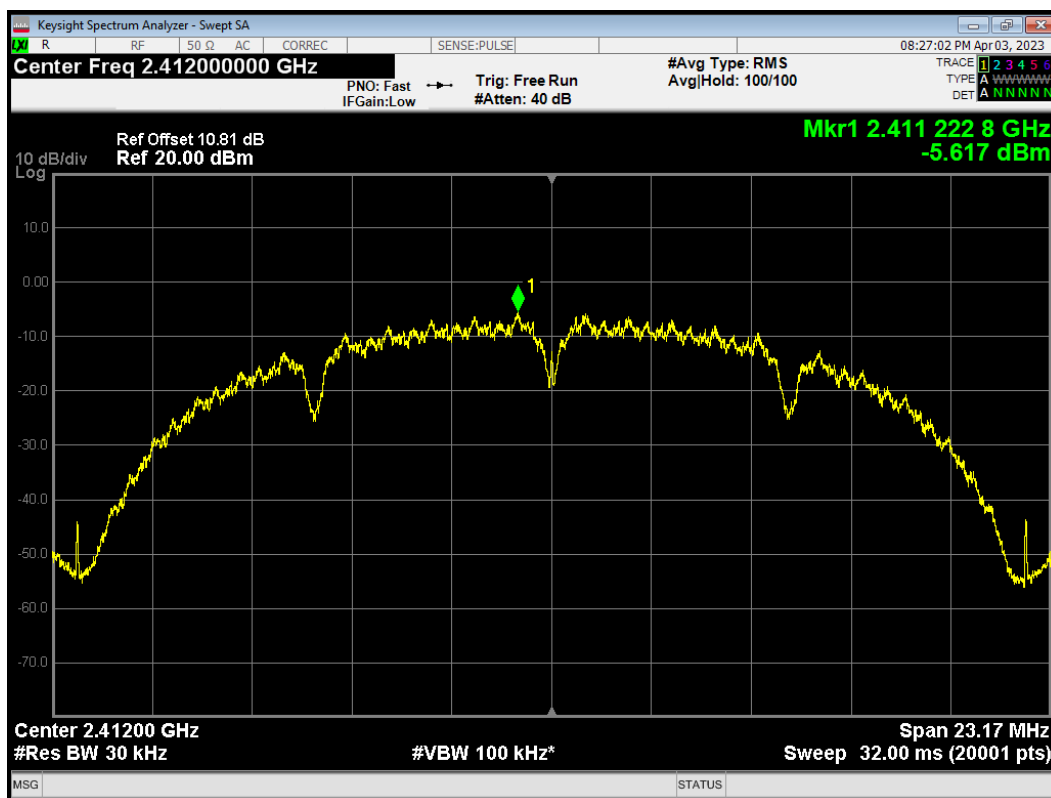


PSD 802.11ax(HE20) 2462MHz

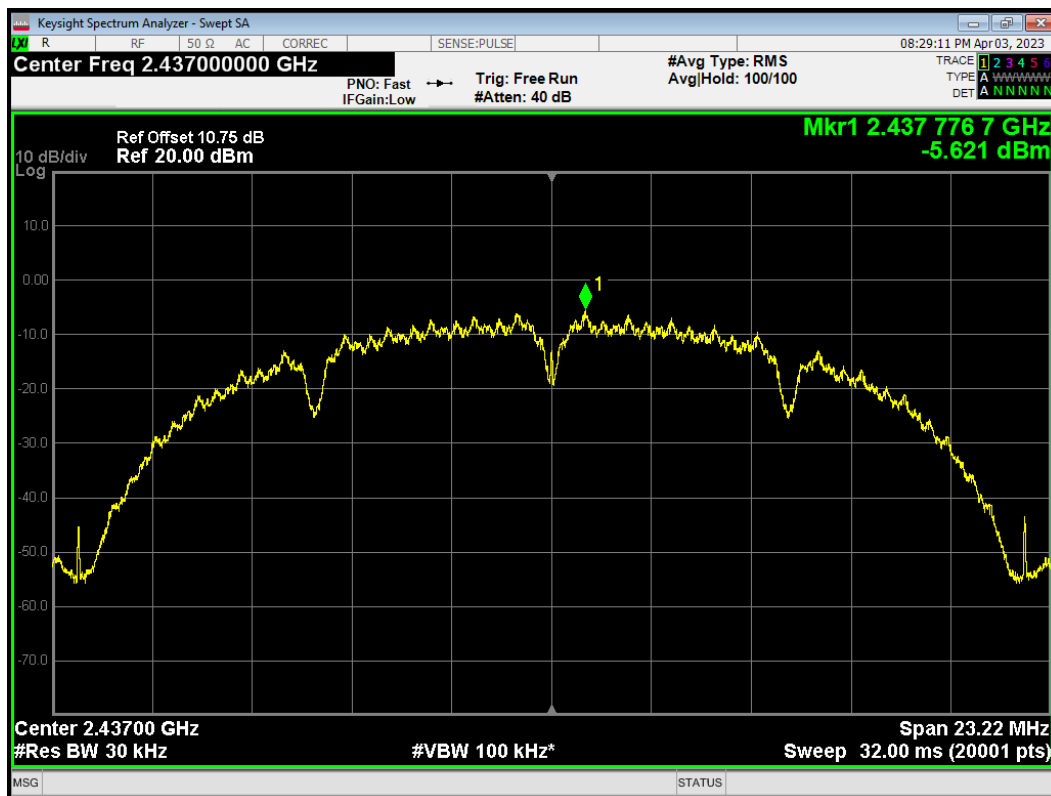




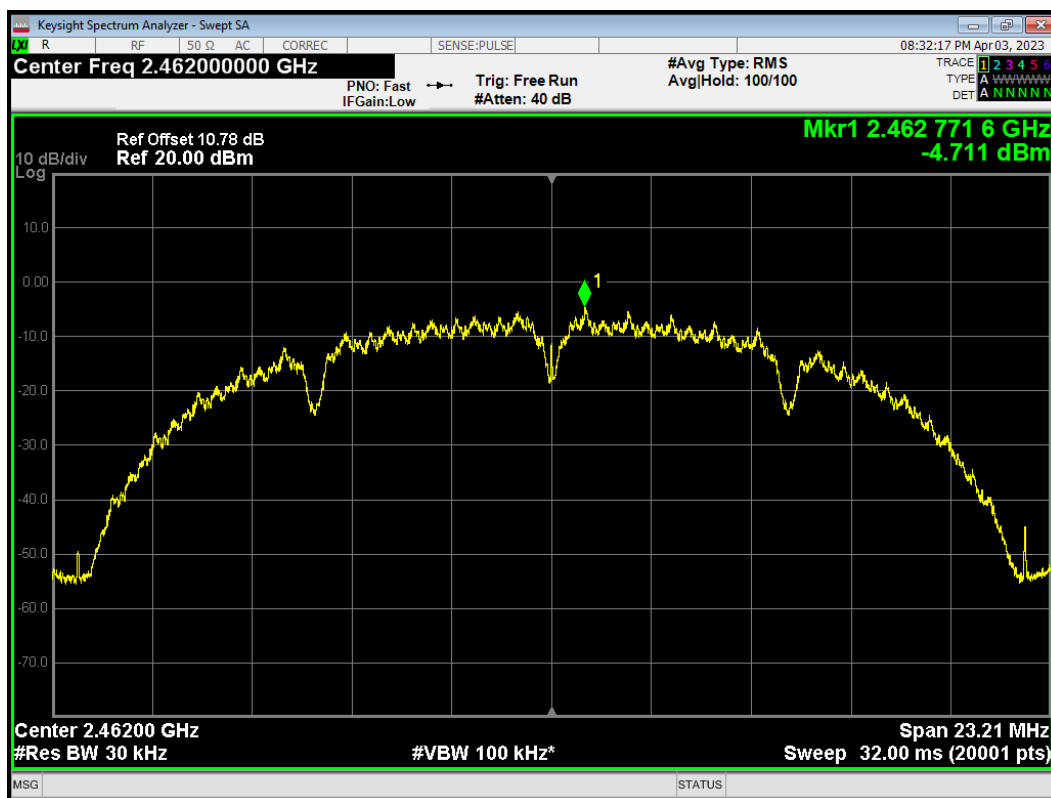
PSD 802.11b 2412MHz



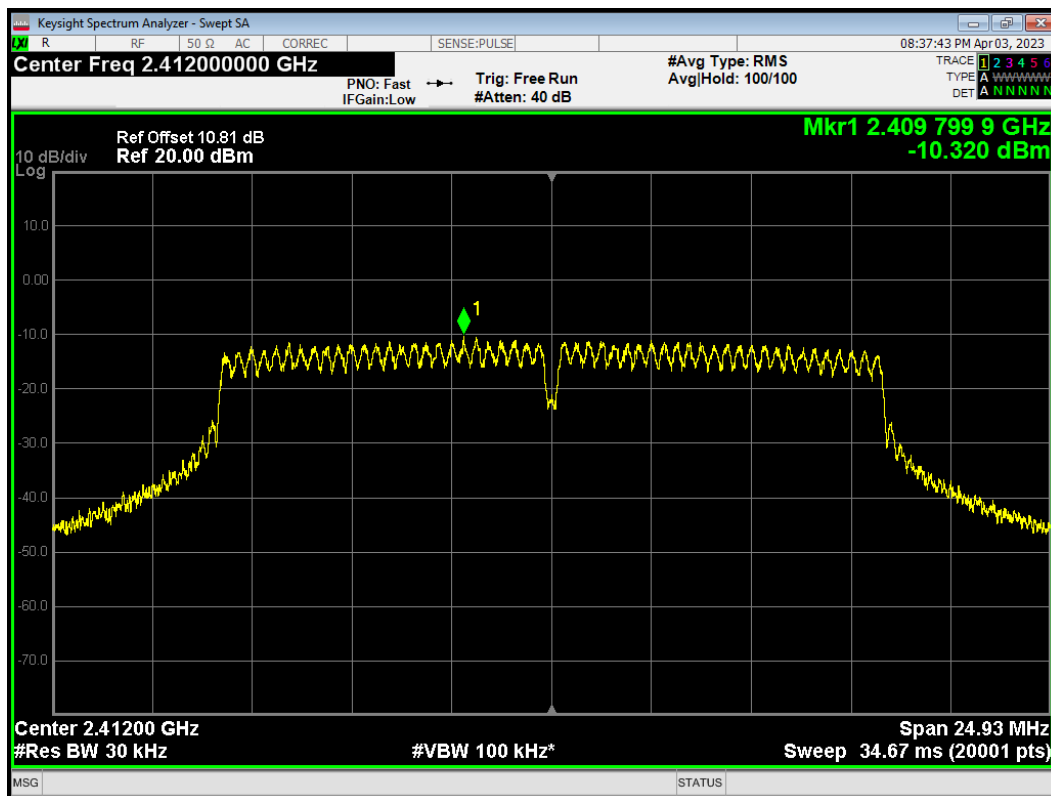
PSD 802.11b 2437MHz



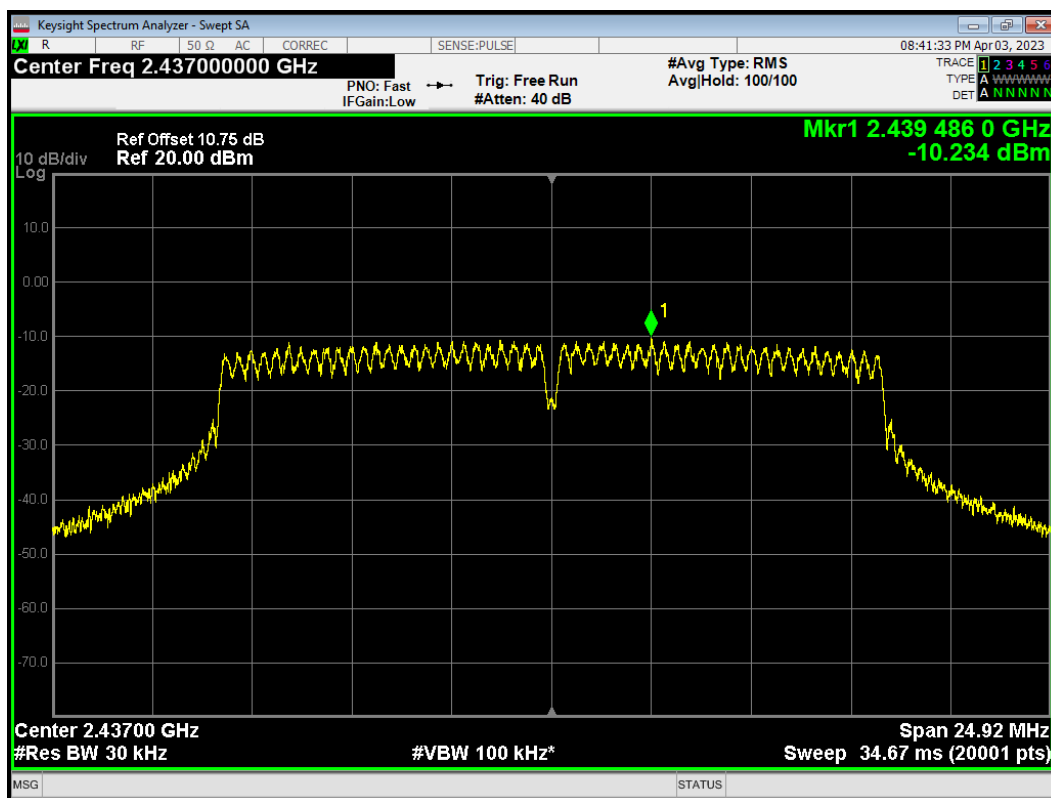
PSD 802.11b 2462MHz



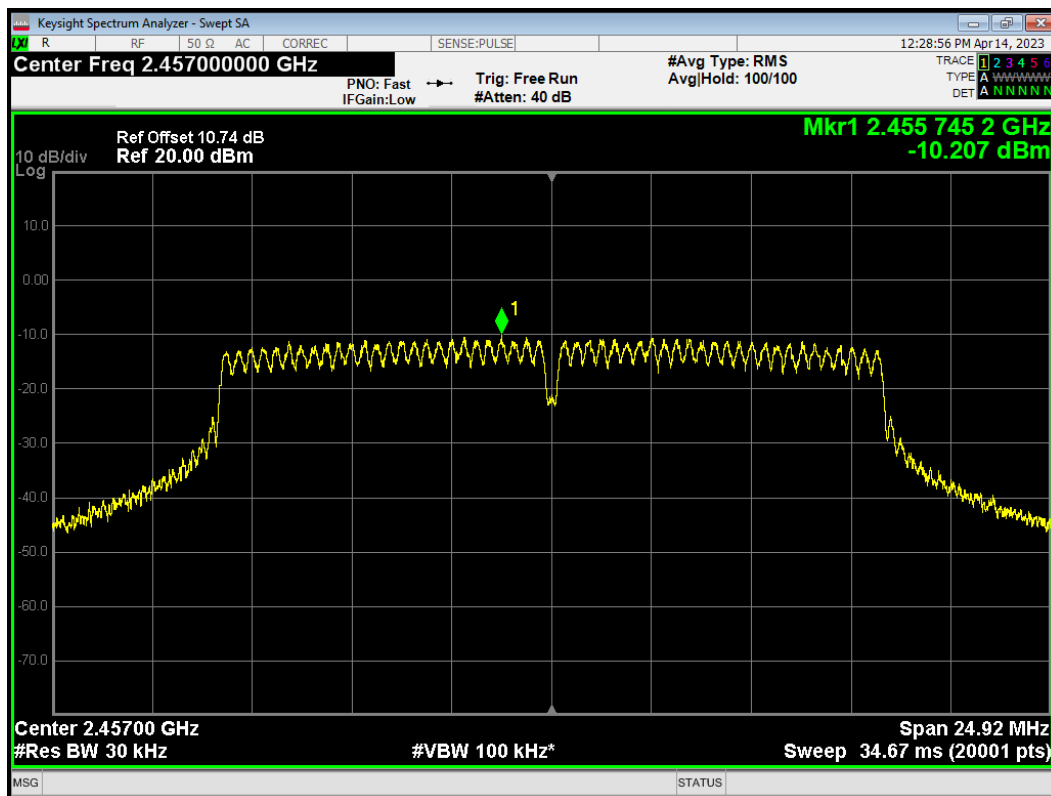
PSD 802.11g 2412MHz



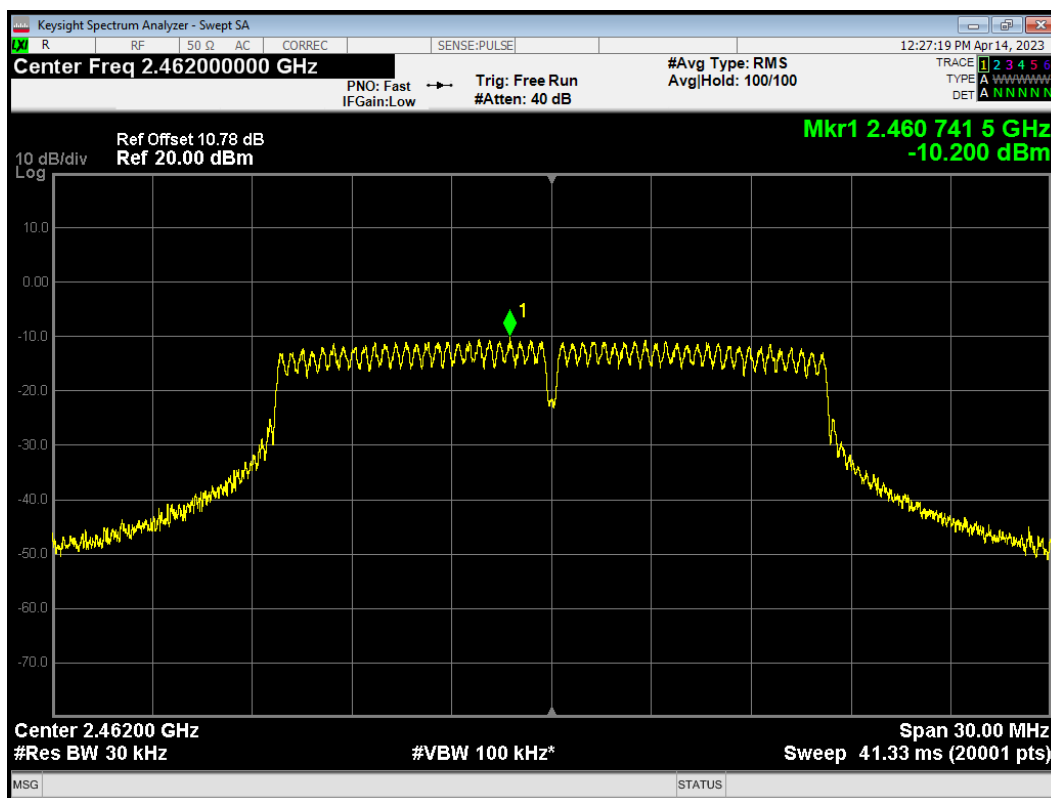
PSD 802.11g 2437MHz



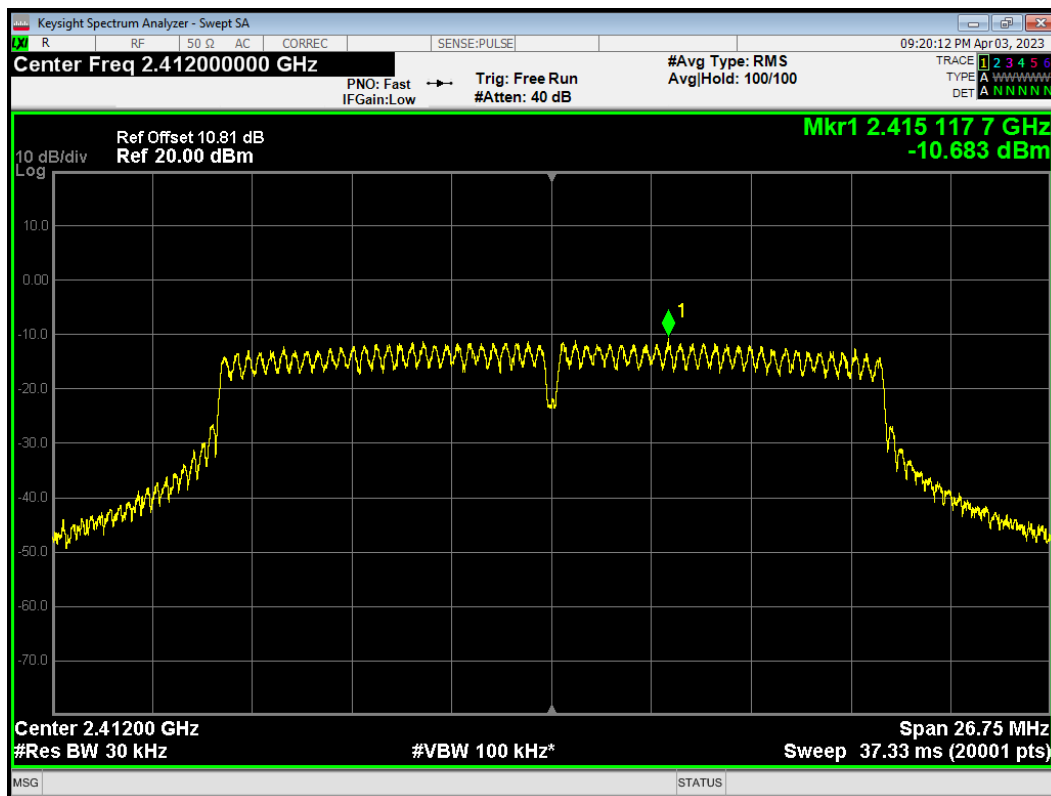
PSD 802.11g 2457MHz



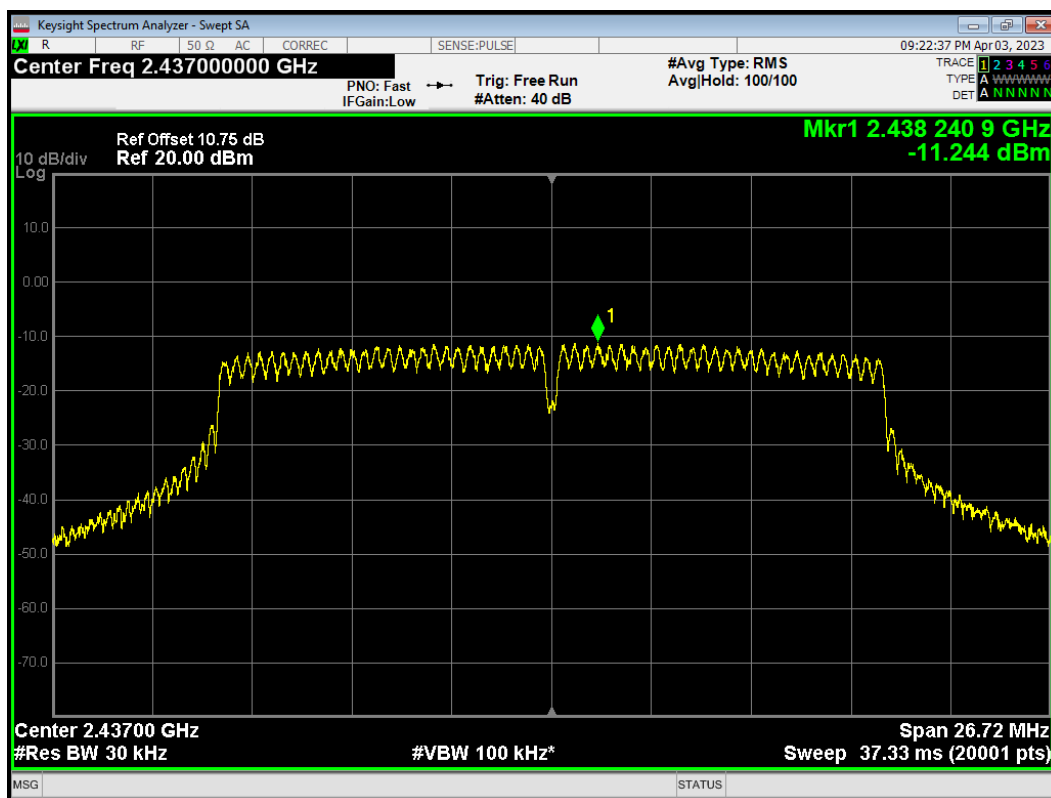
PSD 802.11g 2462MHz



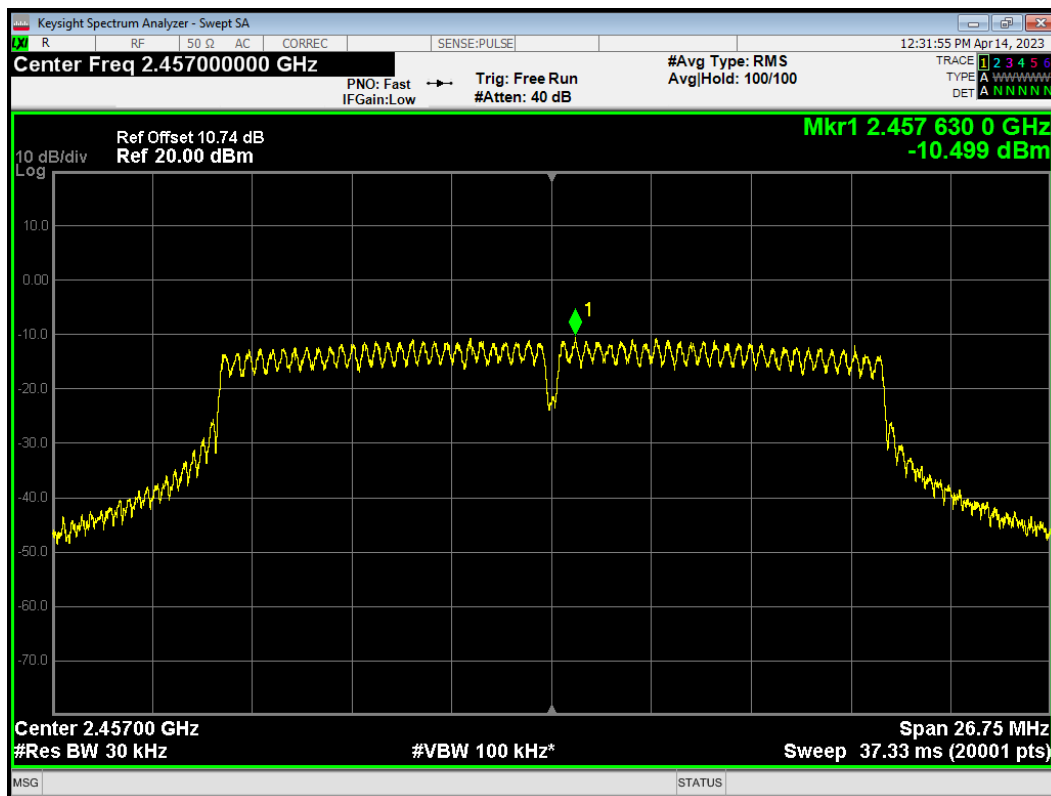
PSD 802.11n(HT20) 2412MHz



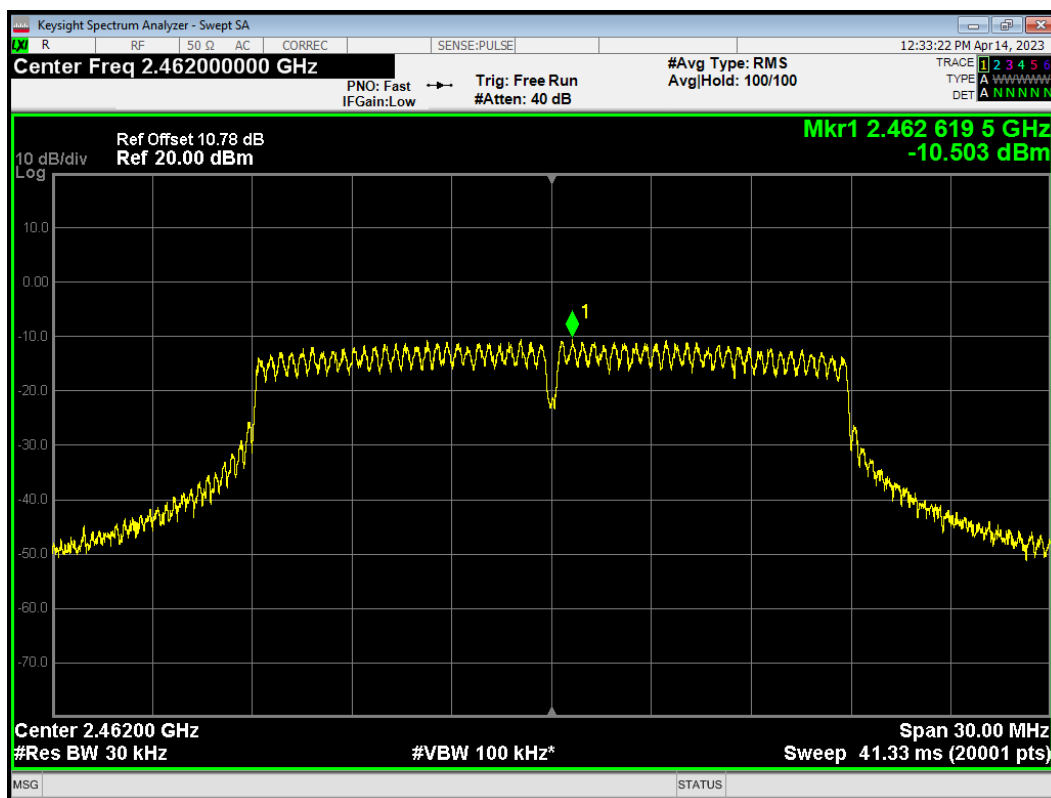
PSD 802.11n(HT20) 2437MHz



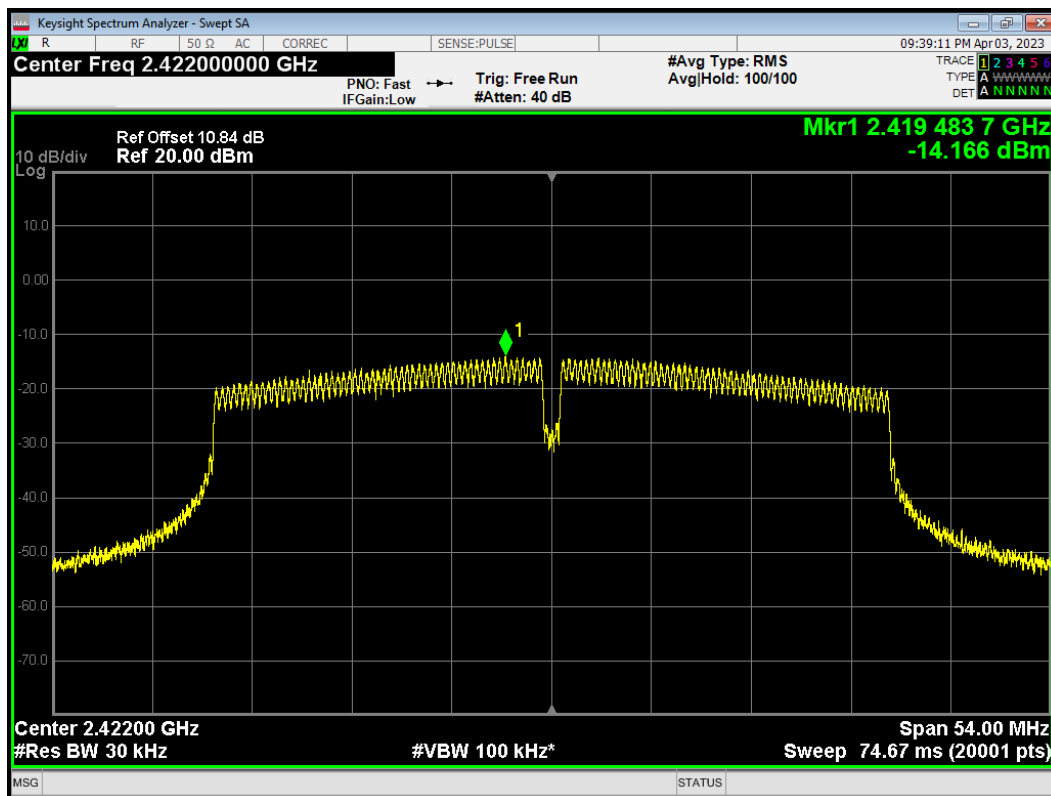
PSD 802.11n(HT20) 2457MHz



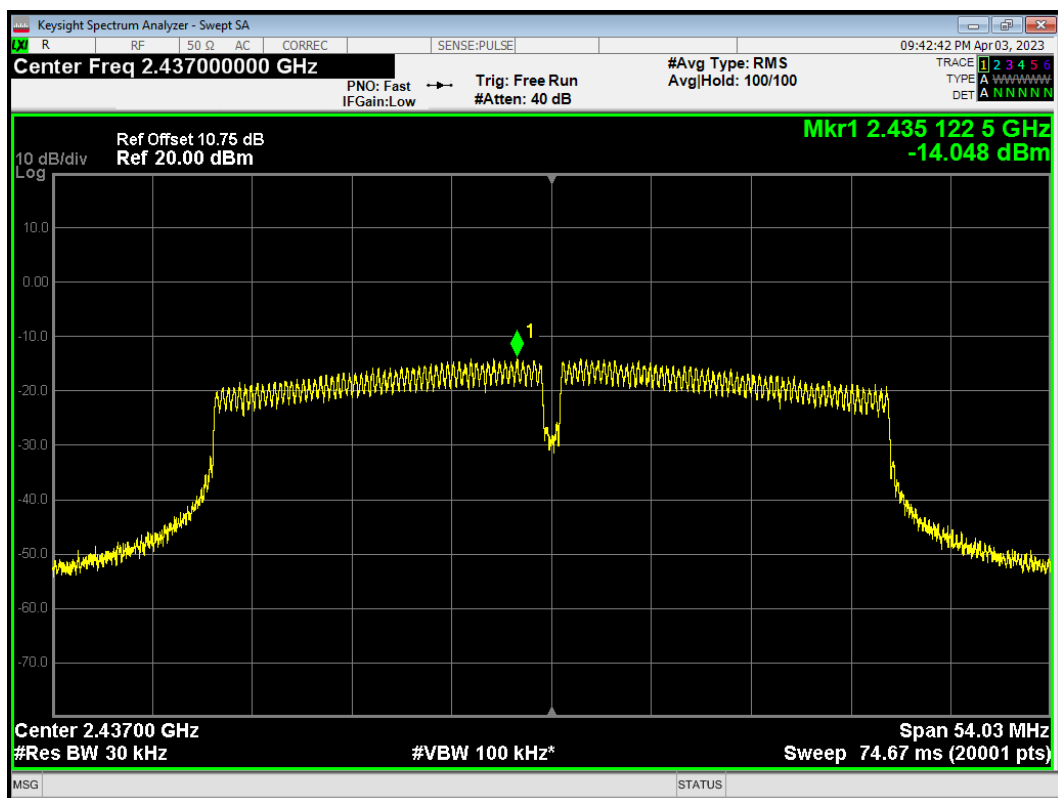
PSD 802.11n(HT20) 2462MHz



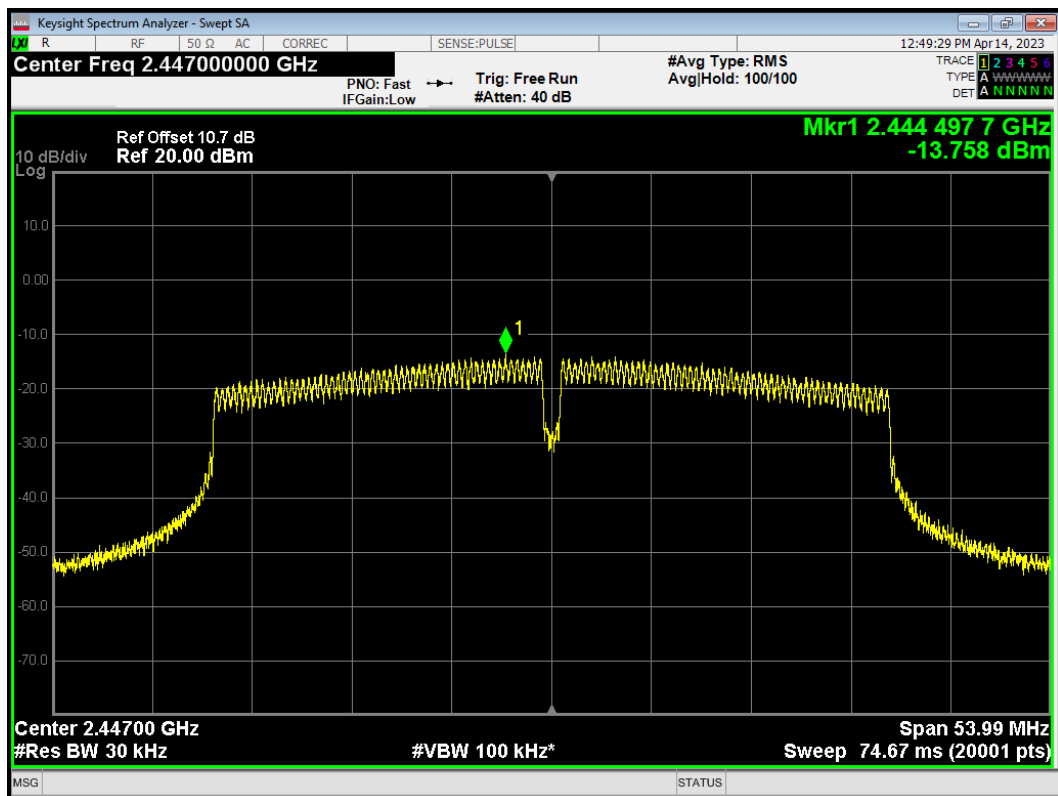
PSD 802.11n(HT40) 2422MHz



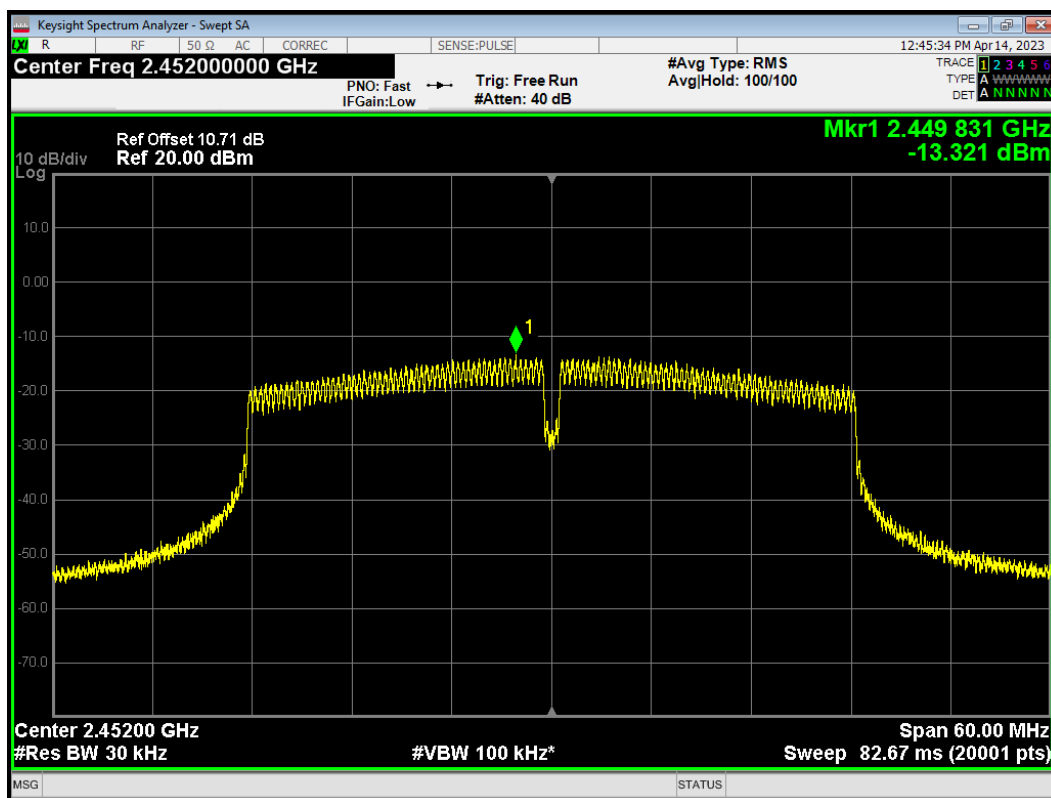
PSD 802.11n(HT40) 2437MHz



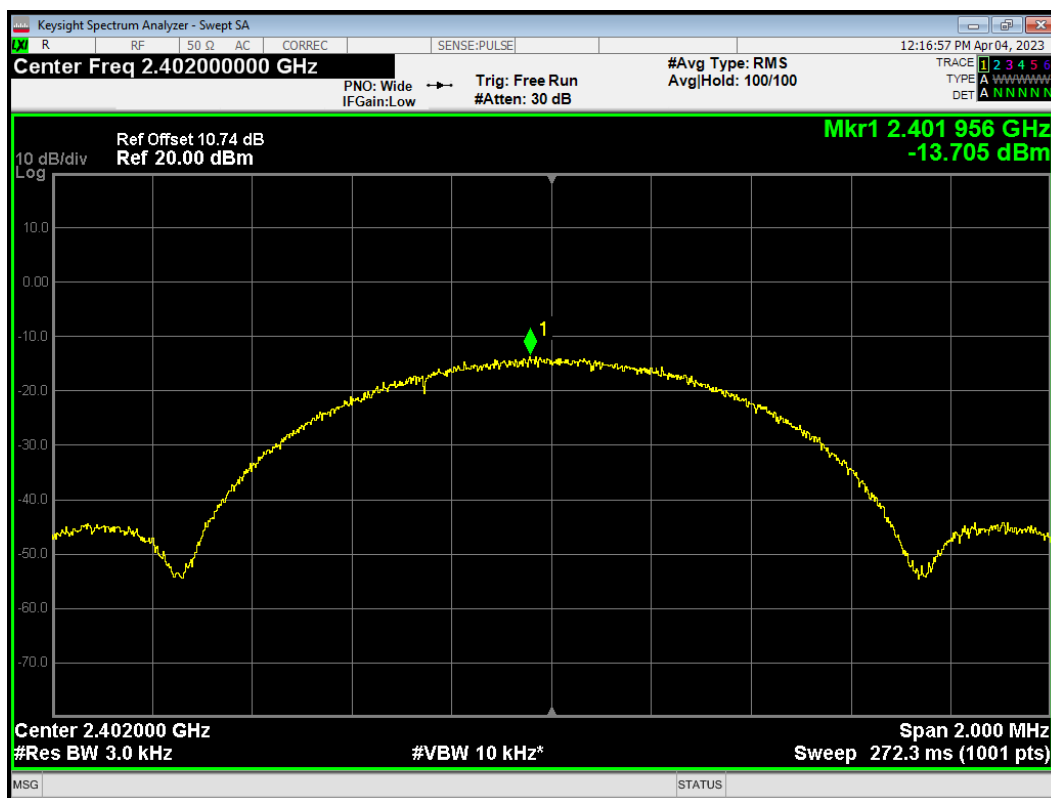
PSD 802.11n(HT40) 2447MHz



### PSD 802.11n(HT40) 2452MHz

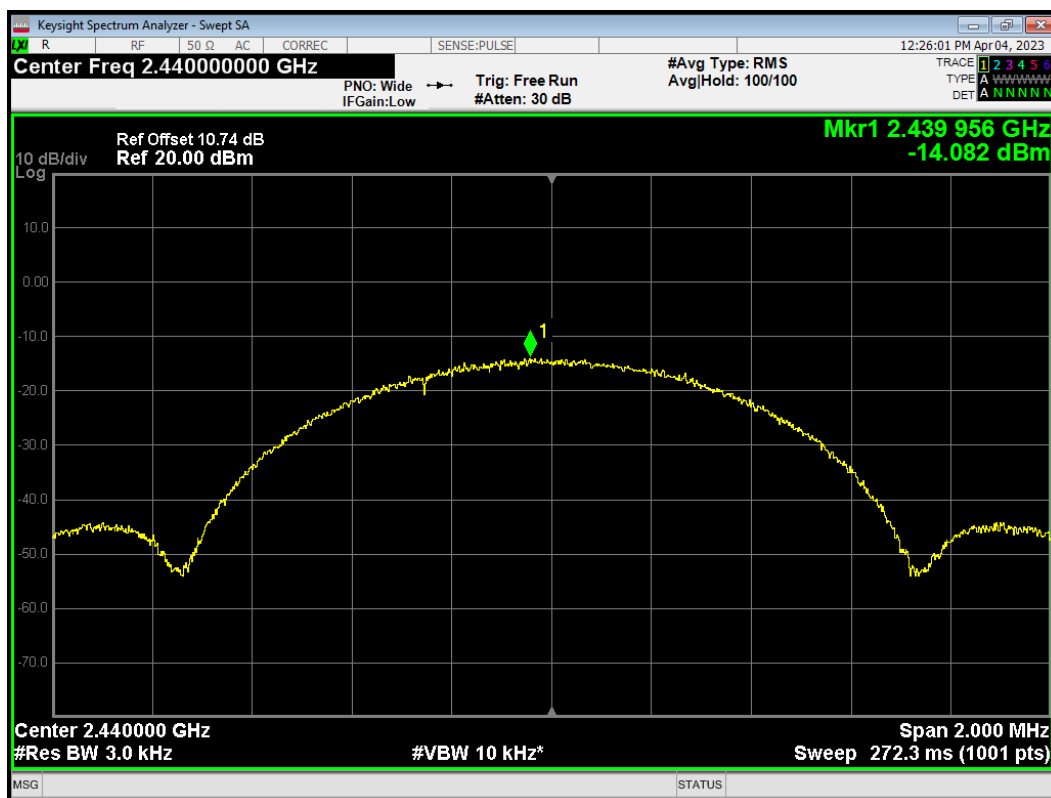


### PSD Bluetooth LE (1M)

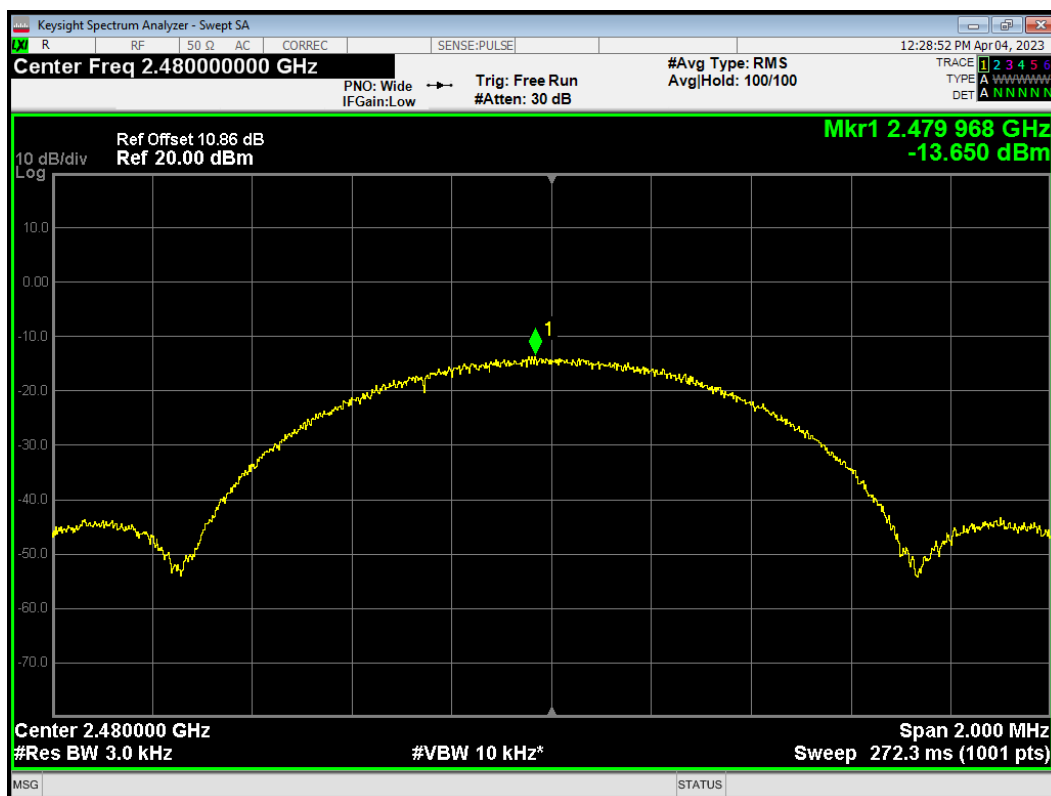




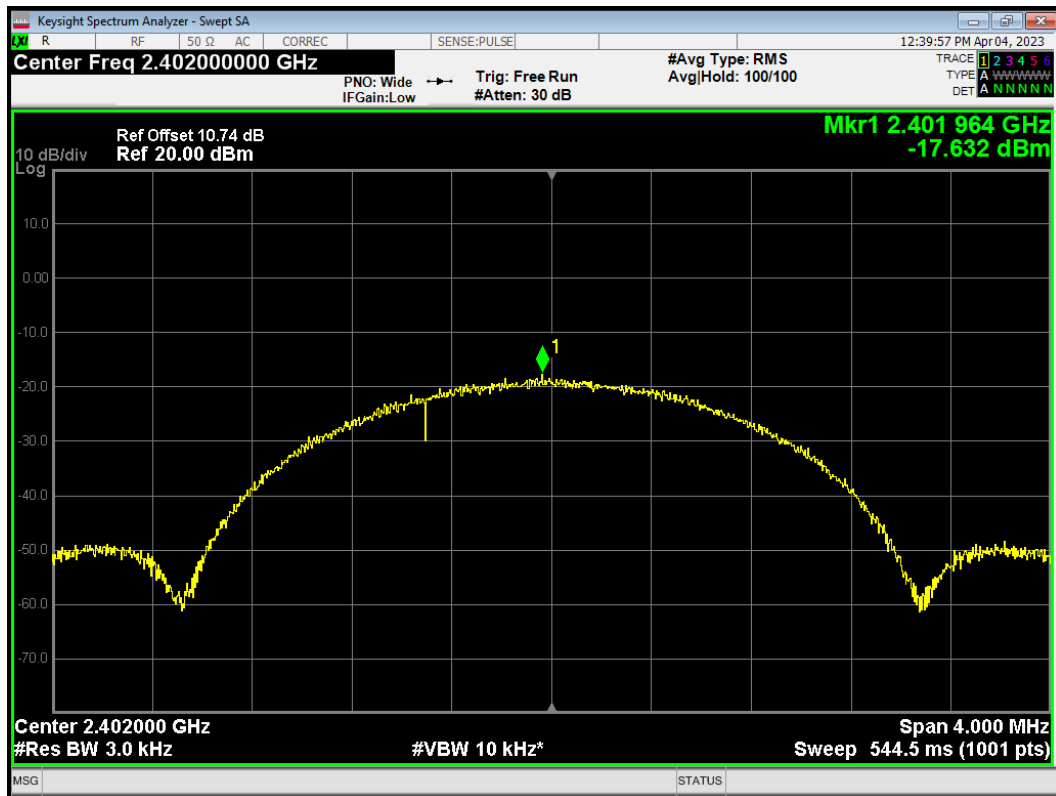
### PSD Bluetooth LE (1M)



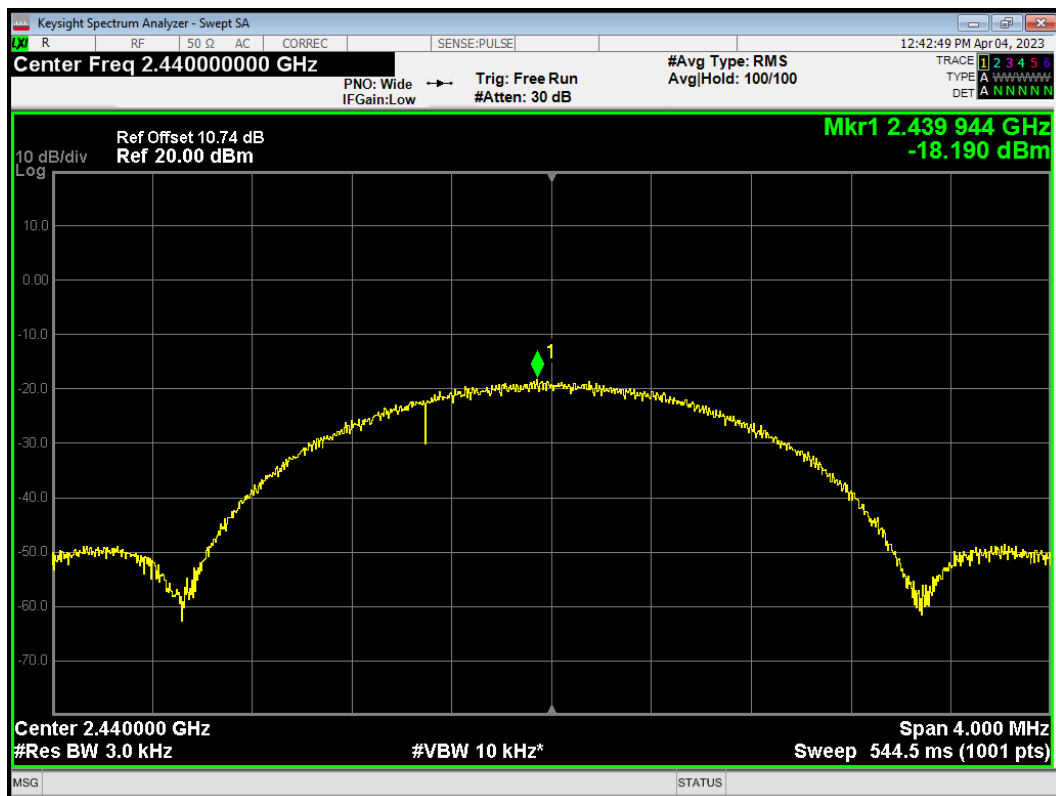
### PSD Bluetooth LE (1M)



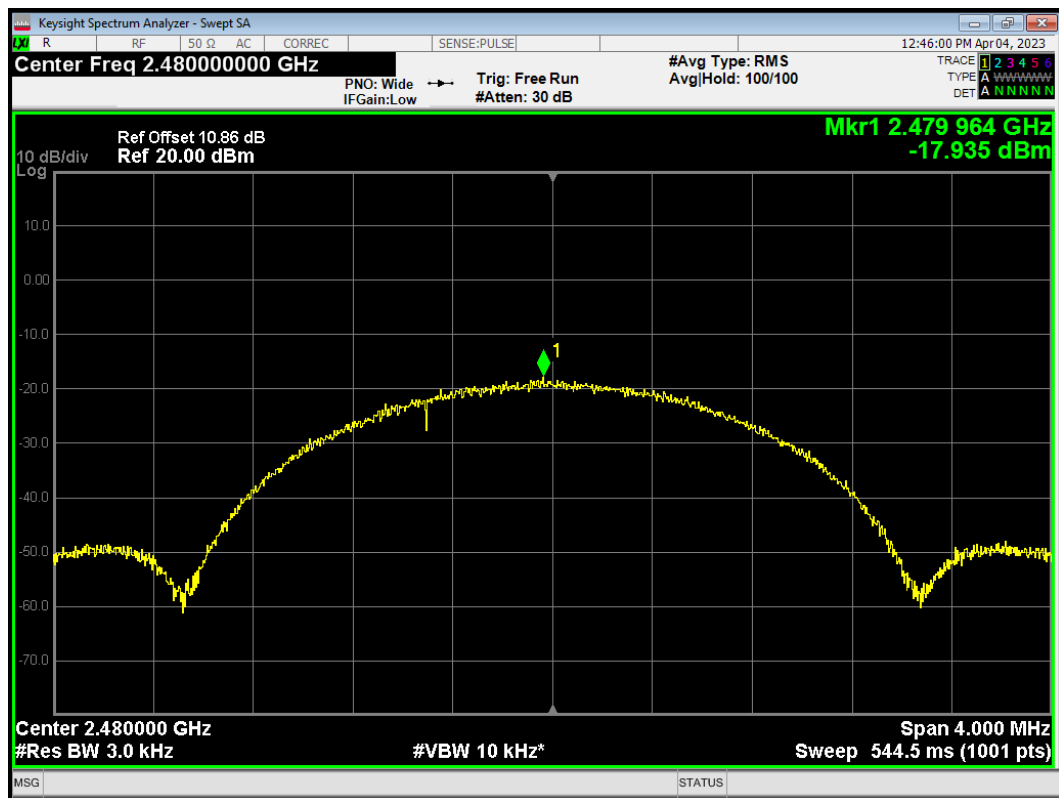
### PSD Bluetooth LE (2M)



### PSD Bluetooth LE (2M)



# PSD Bluetooth LE (2M)



## 5.5. Spurious RF Conducted Emissions

### Ambient Condition

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

### Method of Measurement

The EUT was connected to the spectrum analyzer with a known loss. The spectrum analyzer scans from 30MHz to the 10th harmonic of the carrier. The peak detector is used. Set RBW to 100 kHz and VBW to 300 kHz, Sweep is set to ATUO.

The test is in transmitting mode.

### Test Setup



### Limits

Rule Part 15.247(d) pacifies 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. ”

Test Mode	Carrier frequency (MHz)	Reference value (dBm)	Limit
802.11b	2412	6.280	-23.72
	2437	6.370	-23.63
	2462	6.920	-23.08
802.11g	2412	1.750	-28.25
	2437	1.990	-28.01
	2457	2.670	-27.33
	2462	2.570	-27.43
802.11n HT20	2412	2.140	-27.86
	2437	2.580	-27.42
	2457	1.860	-28.14
	2462	1.800	-28.20

802.11n HT40	2422	-0.810	-30.81
	2437	-0.660	-30.66
	2447	-0.780	-30.78
	2452	-1.360	-31.36
802.11ax HE20	2412	-0.050	-30.05
	2437	1.980	-28.02
	2457	1.750	-28.25
	2462	2.600	-27.40
Bluetooth (Low Energy) (1M)	2402	8.320	-21.68
	2440	8.260	-21.74
	2480	8.420	-21.58
Bluetooth (Low Energy) (2M)	2402	5.400	-24.60
	2440	7.220	-22.78
	2480	7.300	-22.70

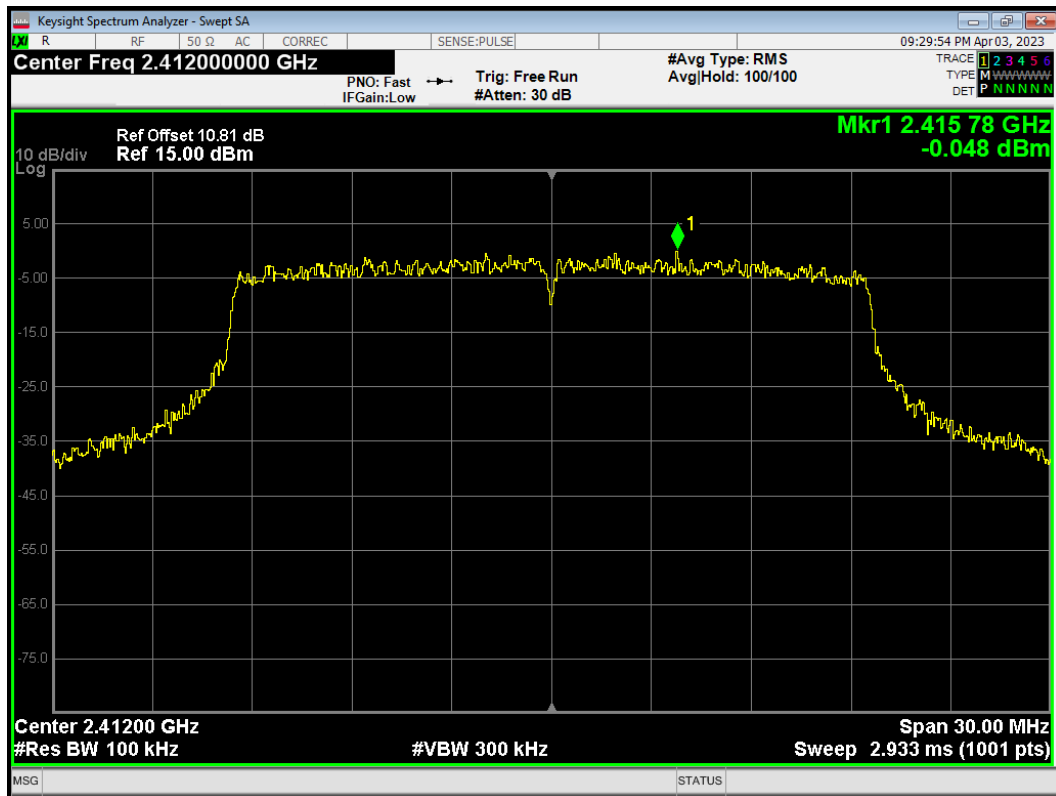
### Measurement Uncertainty

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

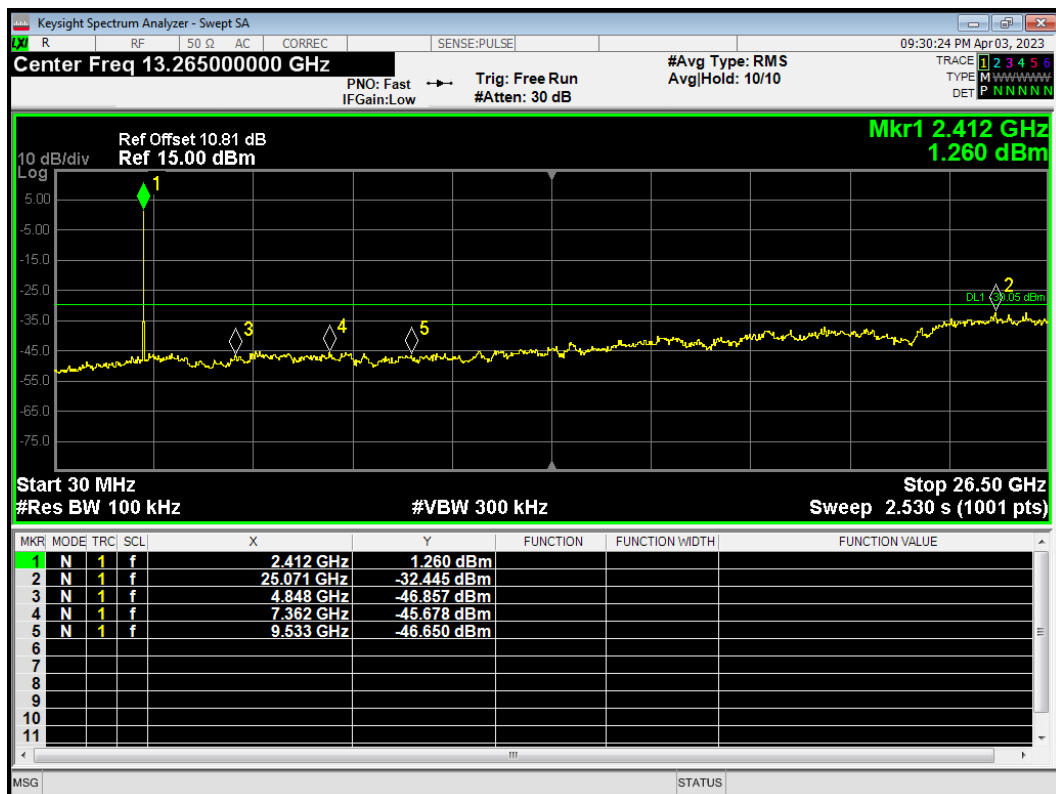
Frequency	Uncertainty
100kHz-2GHz	0.684 dB
2GHz-26GHz	1.407 dB

## Test Results:

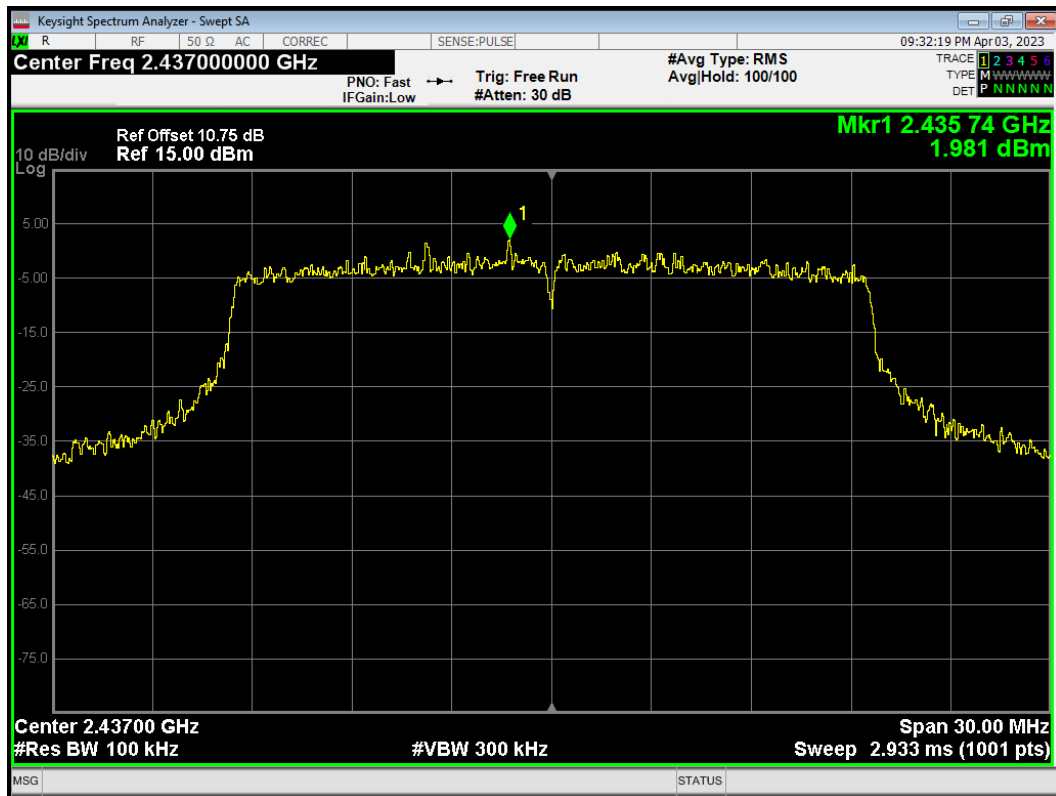
Tx. Spurious 802.11ax(HE20) 2412MHz Ref



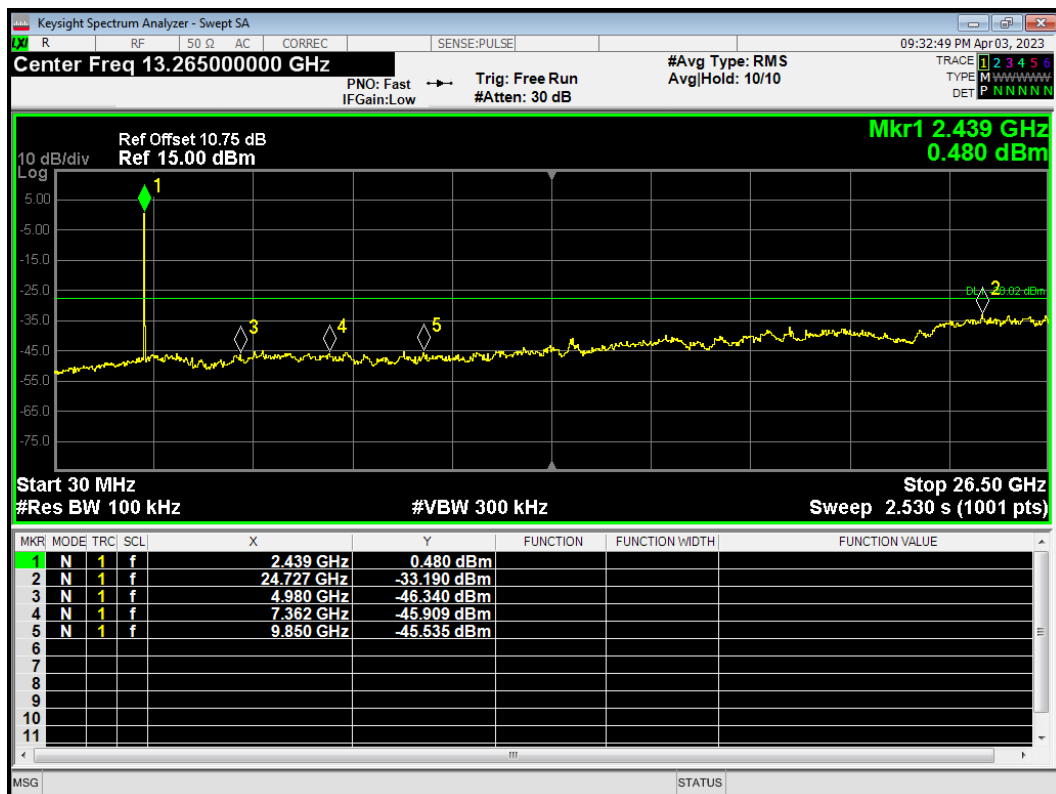
Tx. Spurious 802.11ax(HE20) 2412MHz Emission



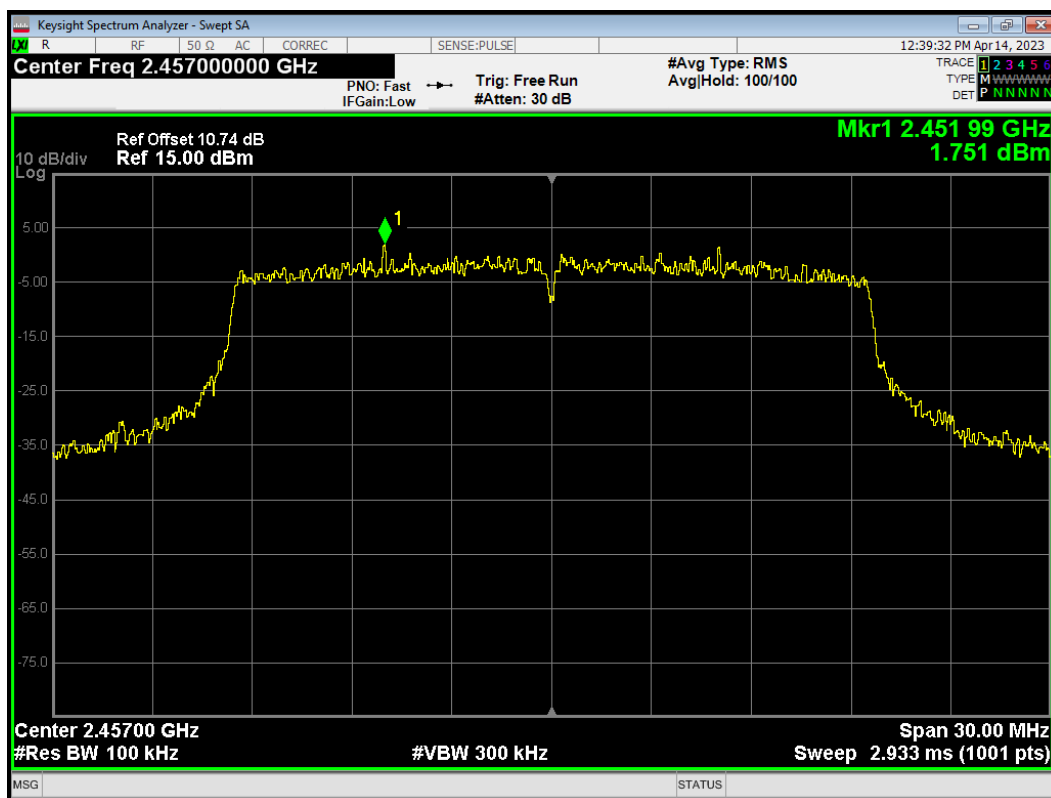
Tx. Spurious 802.11ax(HE20) 2437MHz Ref



Tx. Spurious 802.11ax(HE20) 2437MHz Emission



Tx. Spurious 802.11ax(HE20) 2457MHz Ref



Tx. Spurious 802.11ax(HE20) 2457MHz Emission

