RF TEST REPORT

Applicant	Murata Manufacturing Co., Ltd.
FCC ID	VPYLB2HV
IC	772C-LB2HV
Product	WLAN + Bluetooth LE module
Brand	Murata
Model	LBEE0ZZ2HV
Report No.	R2407A0901-R1
Issue Date	April 10, 2025

Eurofins TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 15C (2024) / RSS-Gen Issue 5 / RSS-247 Issue 3**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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

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TABLE OF CONTENT

Summary of Measurement Results

Number	Test Case	Clause in FCC rules	Clause in IC rules	Verdict
1	Maximum output power	15.247(b)(3)	RSS-247-5.4 (d)	PASS
2	99% Bandwidth and 6dB Bandwidth	15.247(a)(2) C63.10 6.9	RSS-247-5.2(a)/ RSS-Gen 6.7	PASS
3	Power spectral density	15.247(e)	RSS-247-5.2(b)/ RSS-247-5.4(d)	PASS
4	Band Edge	15.247(d)	RSS-247-5.5	PASS
5	Spurious RF Conducted Emissions	15.247(d)	RSS-247-5.5	PASS
Date of Testing: October 17, 2024 ~ November 5, 2024 Date of Sample Received: September 28, 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

CAB ID: CN0002

IC (recognition number is 8510A)

Eurofins TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform measurement.

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

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

A2LA (Certificate Number: 3857.01)

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

1.3. Testing Location

Company:	Eurofins TA Technology (Shanghai) Co., Ltd.
Address:	Building 3, No.145, Jintang Rd, Pudong Shanghai, P.R.China
City:	Shanghai
Post code:	201201
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2. General Description of Equipment Under Test

2.1. Applicant and Manufacturer Information

Applicant	Murata Manufacturing Co., Ltd.
Applicant address	10-1, Higashikotari 1-chome, Nagaokakyo-shi, Kyoto 617-8555, Japan
Manufacturer	Murata Manufacturing Co., Ltd.
Manufacturer address	10-1, Higashikotari 1-chome, Nagaokakyo-shi, Kyoto 617-8555, Japan

2.2. General Information

EUT Description		
Model	LBEE0ZZ2HV	
Lab internal SN	Conducted	R2407A0901/S01
Hardware Version	1.0	
Software Version	0.3.2	
Power Supply	External power supply	
Antenna Type	PDB Antenna	
Antenna Connector	A permanently attached antenna (meet with the standard FCC Part 15.203 requirement)	
Antenna Gain	0 dBi	
Additional Beamforming Gain	NA	
Operating Frequency Range(s)	802.11b/g/n(HT20): 2412 ~ 2462 MHz Bluetooth LE V5.4: 2402 ~2480 MHz	
Modulation Type	802.11b: DSSS 802.11g/n: OFDM Bluetooth LE: GFSK	
Max. Output Power	Wi-Fi 2.4GHz: 19.31 dBm Bluetooth LE: 8.57 dBm	
Max. EIRP	Wi-Fi 2.4GHz: 19.31 dBm Bluetooth LE: 8.57 dBm	
Auxiliary Test Equipment		
Mother board	Manufacturer: Murata Manufacturing Co., Ltd. Model: JS-1173	
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

RSS-Gen Issue 5, April 2018 + Amendment 1 (March 2019) + Amendment 2 (February 2021)

RSS-247 Issue 3, August 2023

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.

In order to find the worst case condition, Pre-tests are needed at the presence of different data rate. Preliminary tests have been done on all the configuration for confirming worst case. Data rate below means worst-case rate of each test item.

Worst-case data rates are shown as following table.

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

5. Test Case Results

5.1. Maximum output power

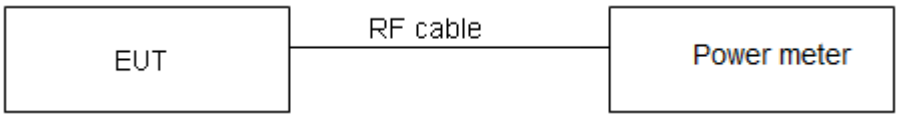
Ambient Condition

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

Methods of Measurement

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

Test Setup



Limits

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

Average Output Power	≤ 1W (30dBm)

Rule RSS-247 -5.4(d) specifies that "For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak output power shall not exceed 1 W. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e)."
Rule RSS-247 -5.4(f) Transmitters operating in the band 2400-2483.5 MHz, may employ antenna systems that emit multiple directional beams simultaneously or sequentially, for the purpose of directing signals to individual receivers or to groups of receivers, provided that the emissions comply with the following: Different information must be transmitted to each receiver.
If the transmitter employs an antenna system that emits multiple directional beams, but does not emit multiple directional beams simultaneously, the total output power conducted to the array or arrays that comprise the device (i.e. the sum of the power supplied to all antennas, antenna elements, staves, etc., and summed across all carriers or frequency channels) shall not exceed the applicable output power limit specified in sections 5.4(b) and 5.4(d). However, the total output power shall be reduced by 1 dB below the specified limits for each 3 dB that the directional gain of the antenna/antenna array exceeds 6 dBi. The directional antenna gain shall be computed as the sum of 10 log (number of array elements or staves) plus the directional gain of the element or stave having the highest gain.

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								
Wi-Fi 2.4GHz				Bluetooth (Low Energy)				
Channel	802.11b	802.11g	802.11n HT20	Channel	1M	2M	S=2	S=8
CH1	85	95	91	CH0	29	29	29	29
CH6	86	105	95	CH19	29	29	29	29
CH11	86	105	95	CH39	29	29	29	29

Test Mode	Duty cycle	Duty cycle correction Factor (dB)
802.11b	0.99	0.00
802.11g	0.99	0.00
802.11n HT20	0.99	0.00
Bluetooth LE (1M)	0.628	2.02
Bluetooth LE (2M)	0.333	4.78
Bluetooth LE (S=2)	0.571	2.44
Bluetooth LE (S=8)	0.828	0.82
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)	Average Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)	Conclusion
802.11b	2412/CH 1	19.31	19.31	30	19.31	36	PASS
	2437/CH 6	19.21	19.21	30	19.21	36	PASS
	2462/CH11	19.15	19.15	30	19.15	36	PASS
802.11g	2412/CH 1	17.17	17.17	30	17.17	36	PASS
	2437/CH 6	18.77	18.77	30	18.77	36	PASS
	2462/CH11	18.81	18.81	30	18.81	36	PASS
802.11n HT20	2412/CH 1	16.53	16.53	30	16.53	36	PASS
	2437/CH 6	16.84	16.84	30	16.84	36	PASS
	2462/CH11	16.83	16.83	30	16.83	36	PASS
Bluetooth (Low Energy) (1M)	2402/CH0	6.30	8.32	30	8.32	36	PASS
	2440/CH19	6.04	8.06	30	8.06	36	PASS
	2480/CH39	6.54	8.56	30	8.56	36	PASS
Bluetooth (Low Energy) (2M)	2402/CH0	3.38	8.16	30	8.16	36	PASS
	2440/CH19	3.14	7.92	30	7.92	36	PASS
	2480/CH39	3.57	8.35	30	8.35	36	PASS
Bluetooth (Low Energy) (S=2)	2402/CH0	5.67	8.11	30	8.11	36	PASS
	2440/CH19	5.72	8.16	30	8.16	36	PASS
	2480/CH39	6.09	8.53	30	8.53	36	PASS
Bluetooth (Low Energy) (S=8)	2402/CH0	7.28	8.10	30	8.10	36	PASS
	2440/CH19	7.24	8.06	30	8.06	36	PASS
	2480/CH39	7.75	8.57	30	8.57	36	PASS

Note: 1. Average Power with duty factor = Average Power Measured +Duty cycle correction factor
2. EIRP = A (Output Power) + G (Antenna Gain)

5.2. 99% Bandwidth and 6dB Bandwidth

Ambient Condition

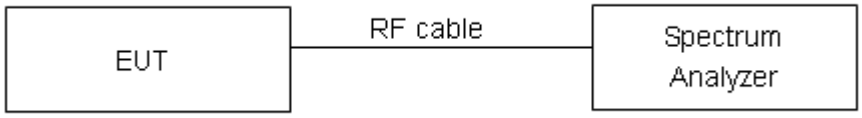
Temperature	Relative humidity
15°C ~ 35°C	20% ~ 80%

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.”

Rule RSS-247 -5.2(a) specifies that “The minimum 6 dB bandwidth shall be 500 kHz.”

minimum 6 dB bandwidth	≥ 500 kHz

Measurement Uncertainty

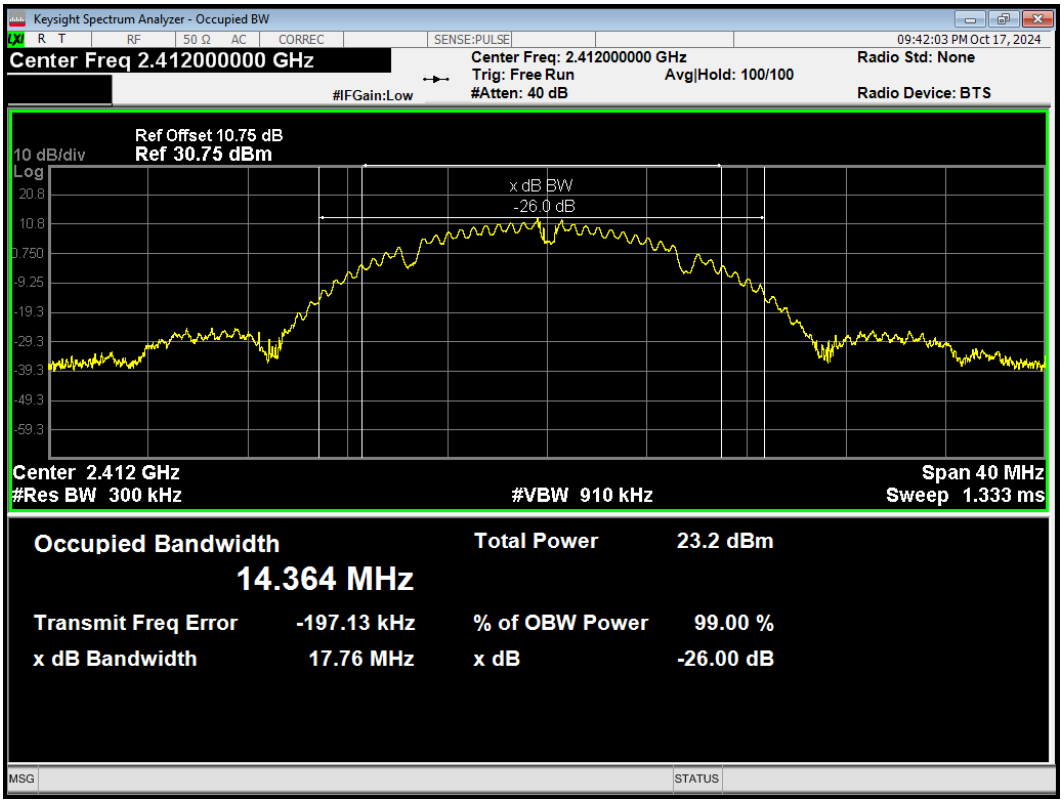
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 936 Hz.

Test Results:

Test Mode	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 6 dB bandwidth (MHz)	Limit (kHz)	Conclusion
802.11b	2412	14.364	9.018	500	PASS
	2437	14.329	9.004	500	PASS
	2462	14.262	8.561	500	PASS
802.11g	2412	17.599	17.205	500	PASS
	2437	17.787	17.074	500	PASS
	2462	17.710	16.823	500	PASS
802.11n HT20	2412	18.263	16.606	500	PASS
	2437	18.415	18.263	500	PASS
	2462	18.271	15.312	500	PASS
Bluetooth (Low Energy) (1M)	2402	1.034	0.731	500	PASS
	2440	1.035	0.723	500	PASS
	2480	1.038	0.707	500	PASS
Bluetooth (Low Energy) (2M)	2402	2.058	1.204	500	PASS
	2440	2.059	1.197	500	PASS
	2480	2.055	1.196	500	PASS
Bluetooth (Low Energy) (S=2)	2402	1.021	0.667	500	PASS
	2440	1.024	0.667	500	PASS
	2480	1.023	0.686	500	PASS
Bluetooth (Low Energy) (S=8)	2402	1.052	0.629	500	PASS
	2440	1.056	0.661	500	PASS
	2480	1.053	0.628	500	PASS

99%bandwidth

OBW 802.11b 2412MHz



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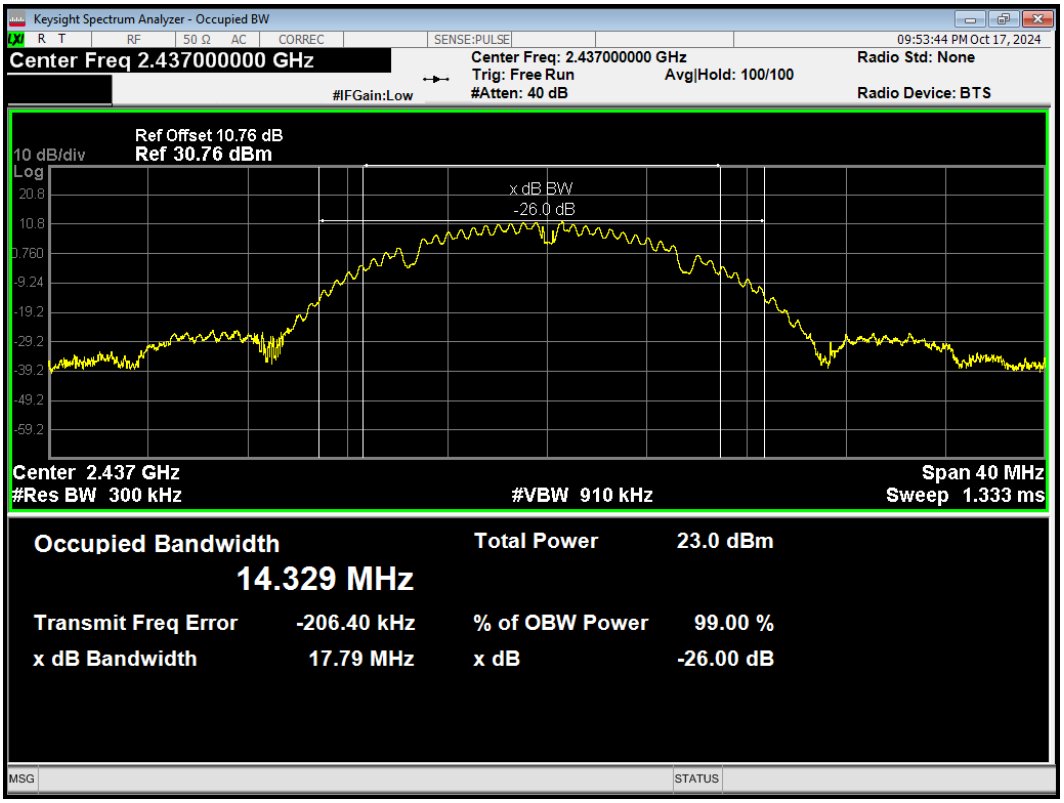

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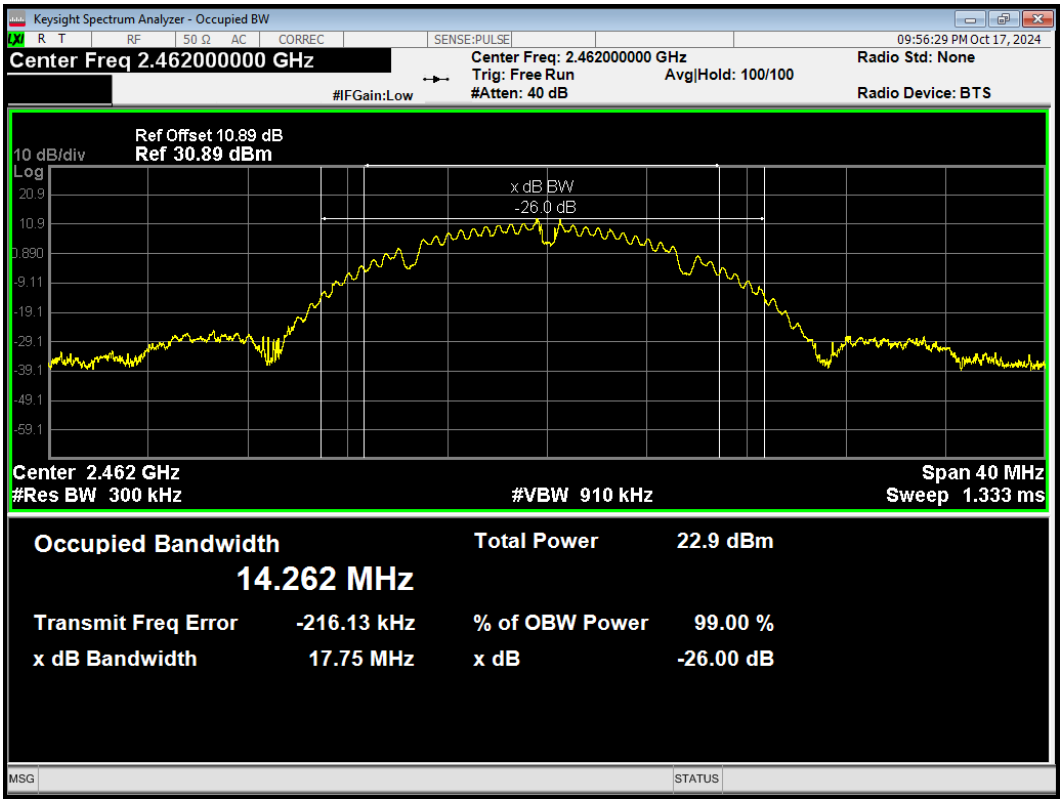

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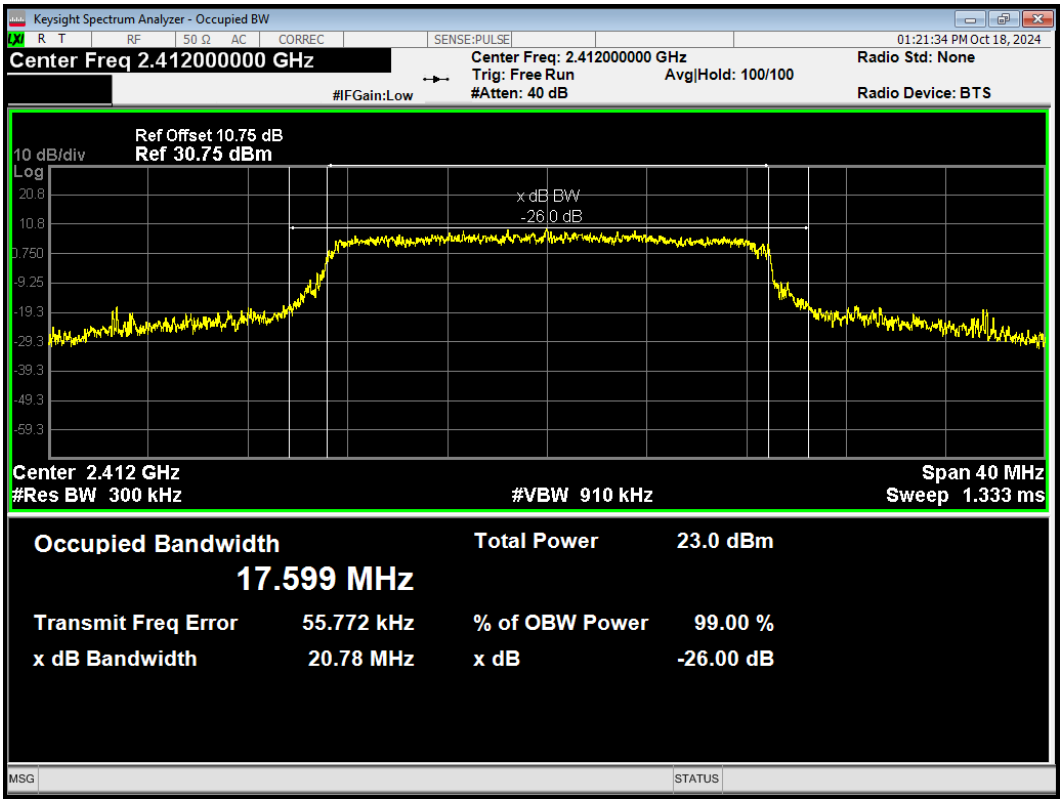

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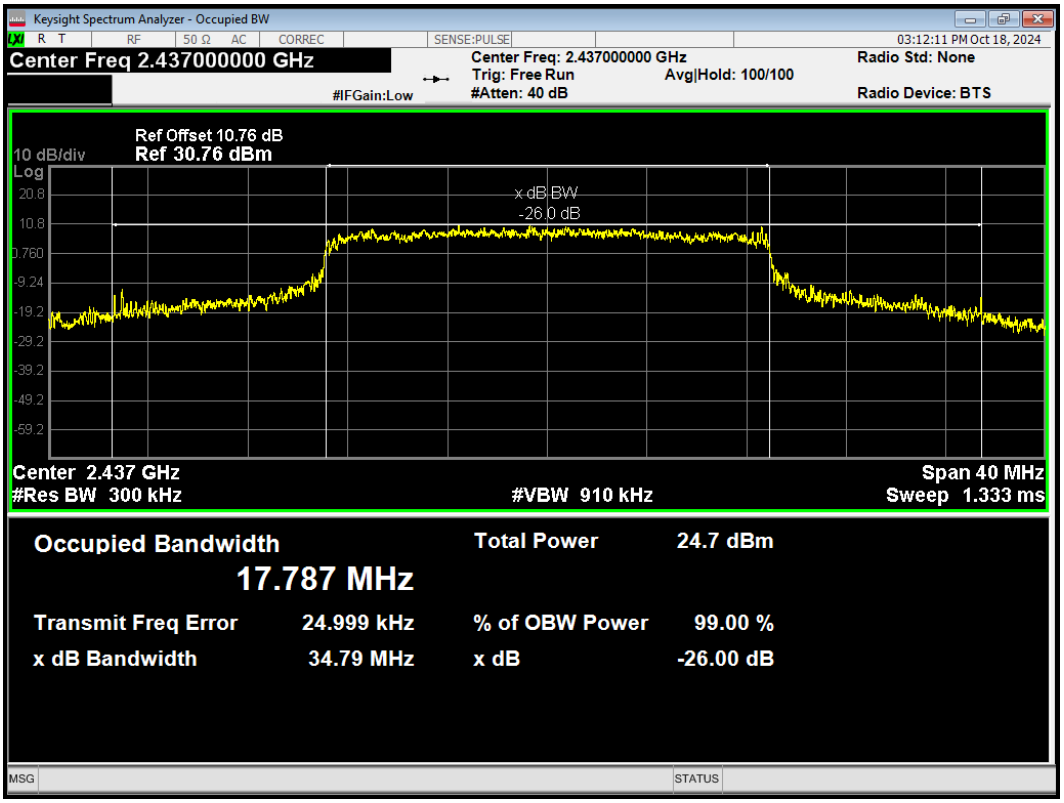

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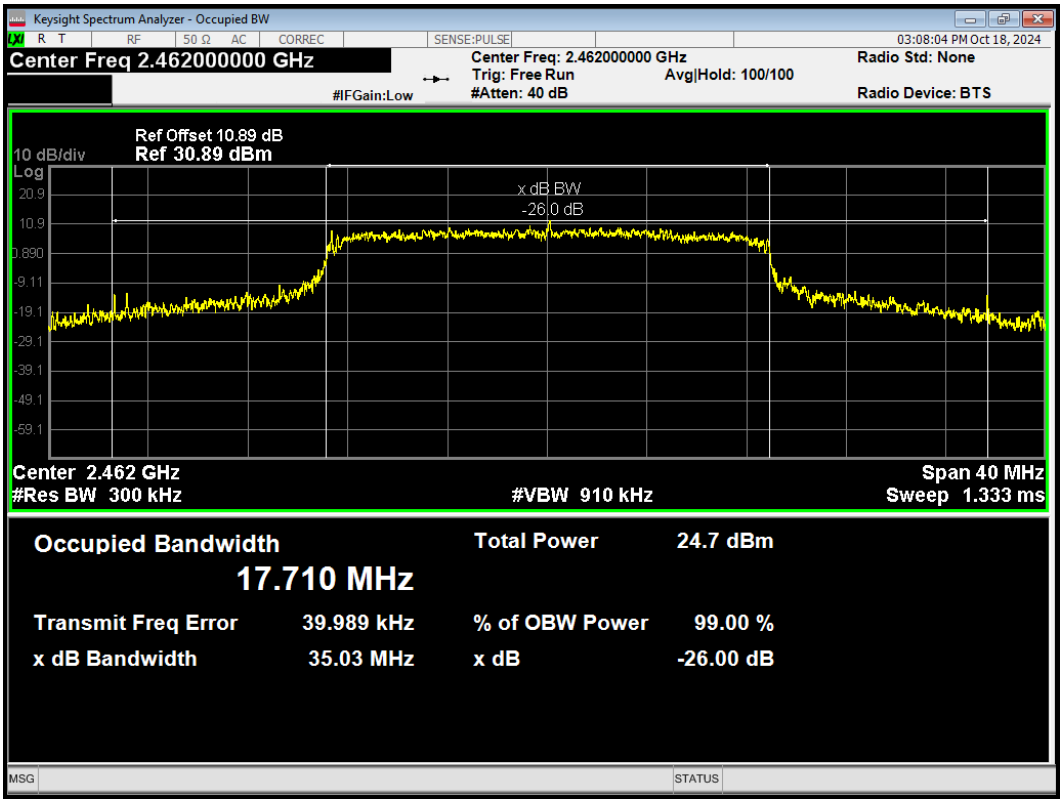
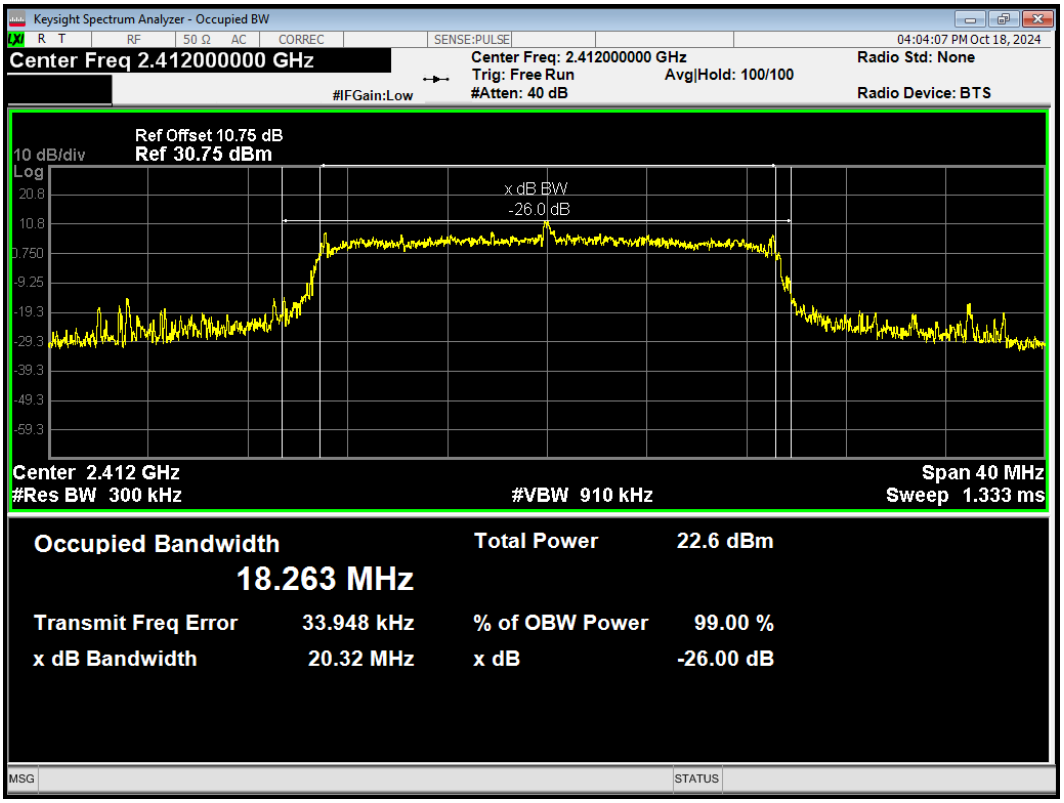


OBW 802.11n(HT20) 2412MHz



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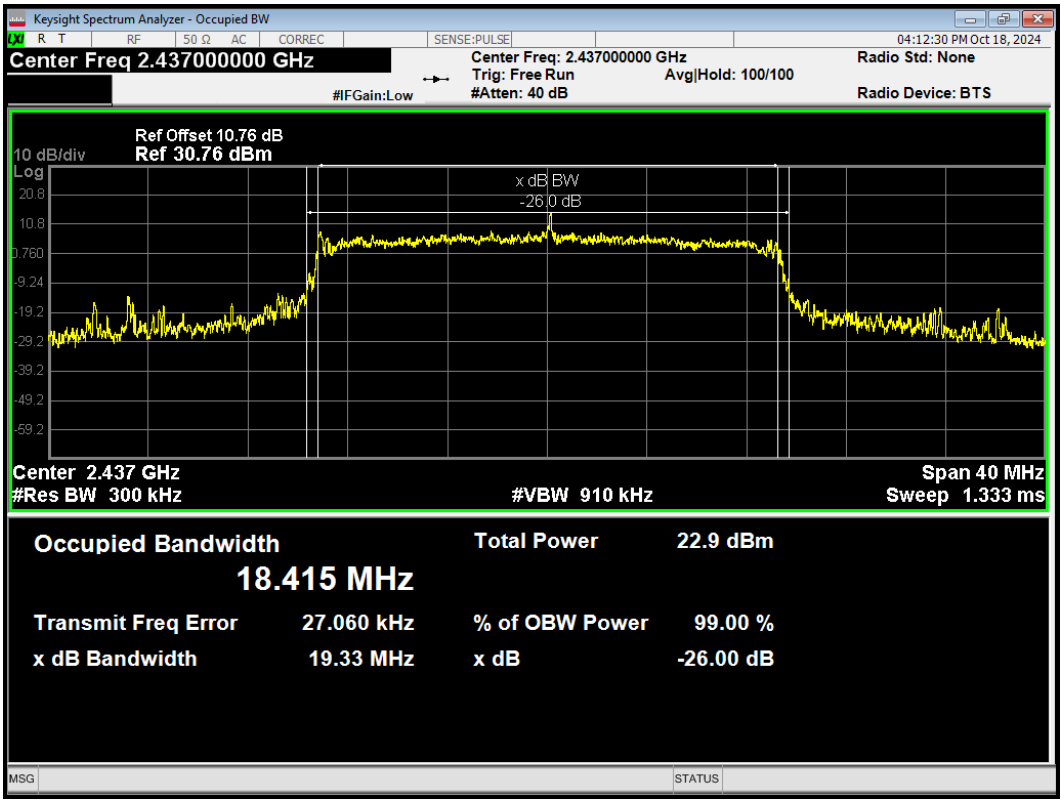

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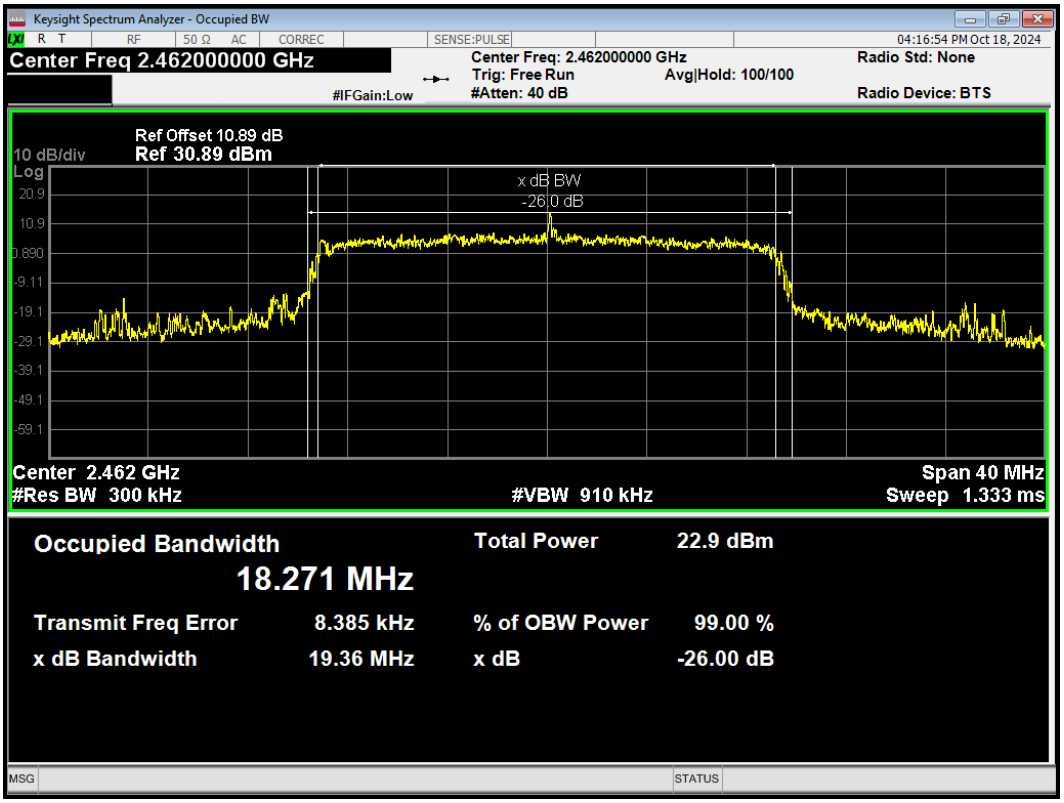
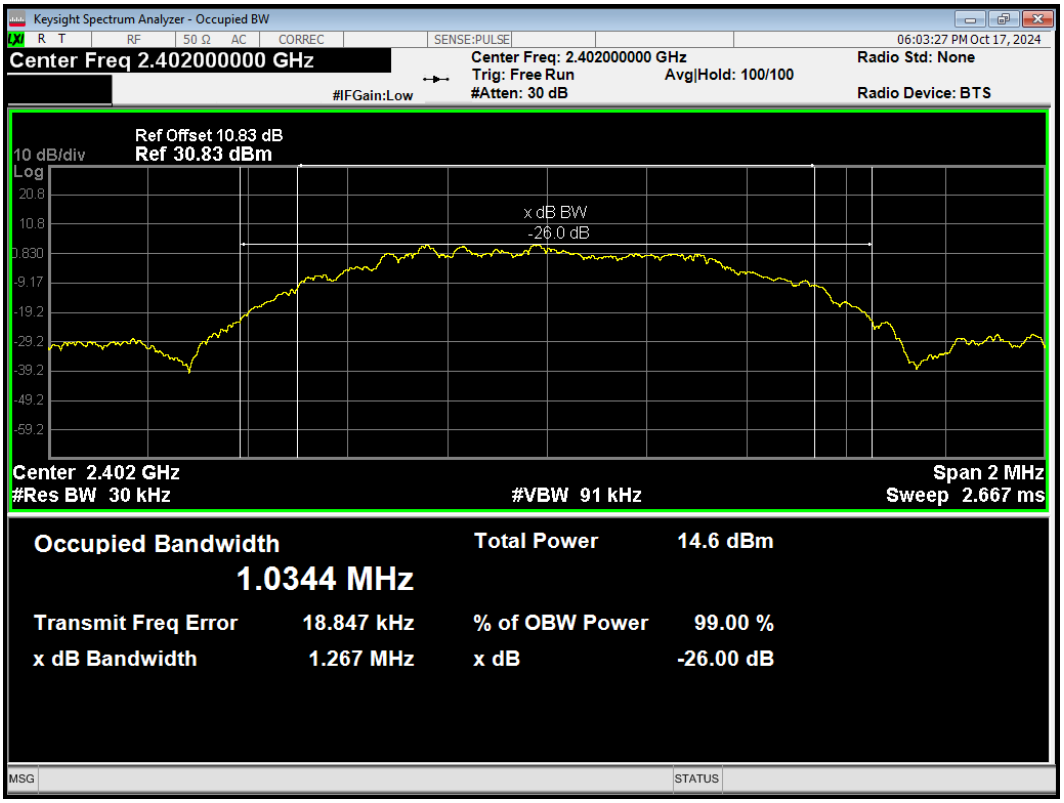


OBW BLE 1M 2402MHz



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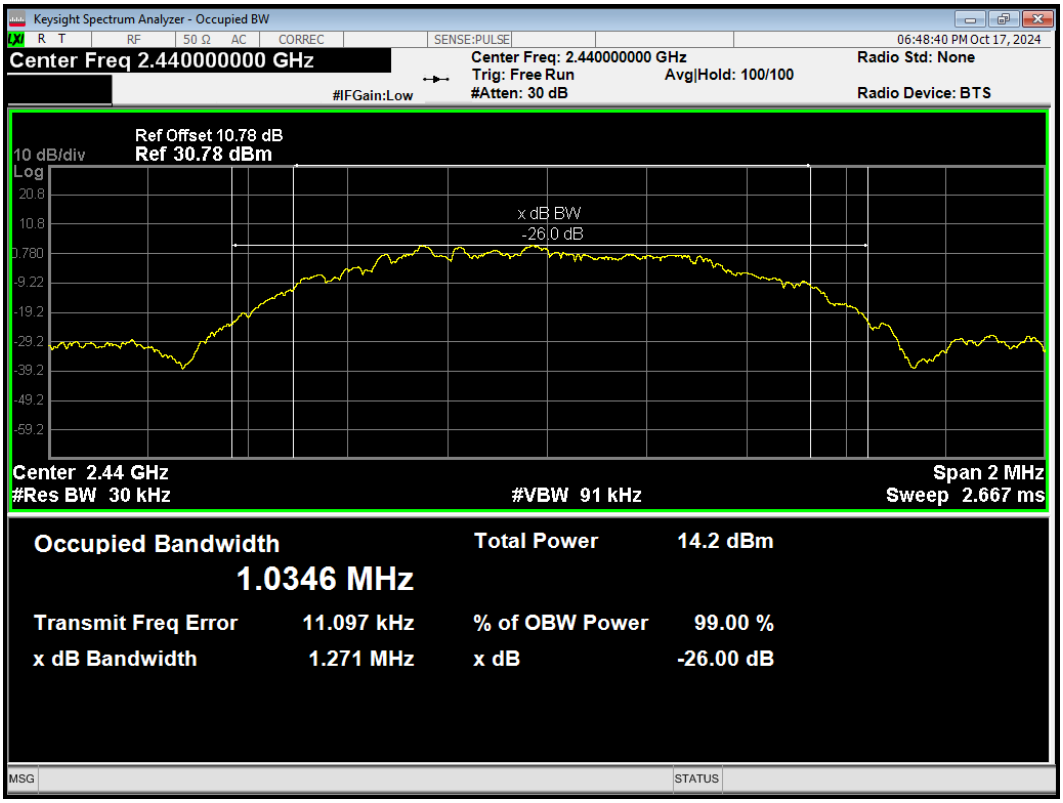

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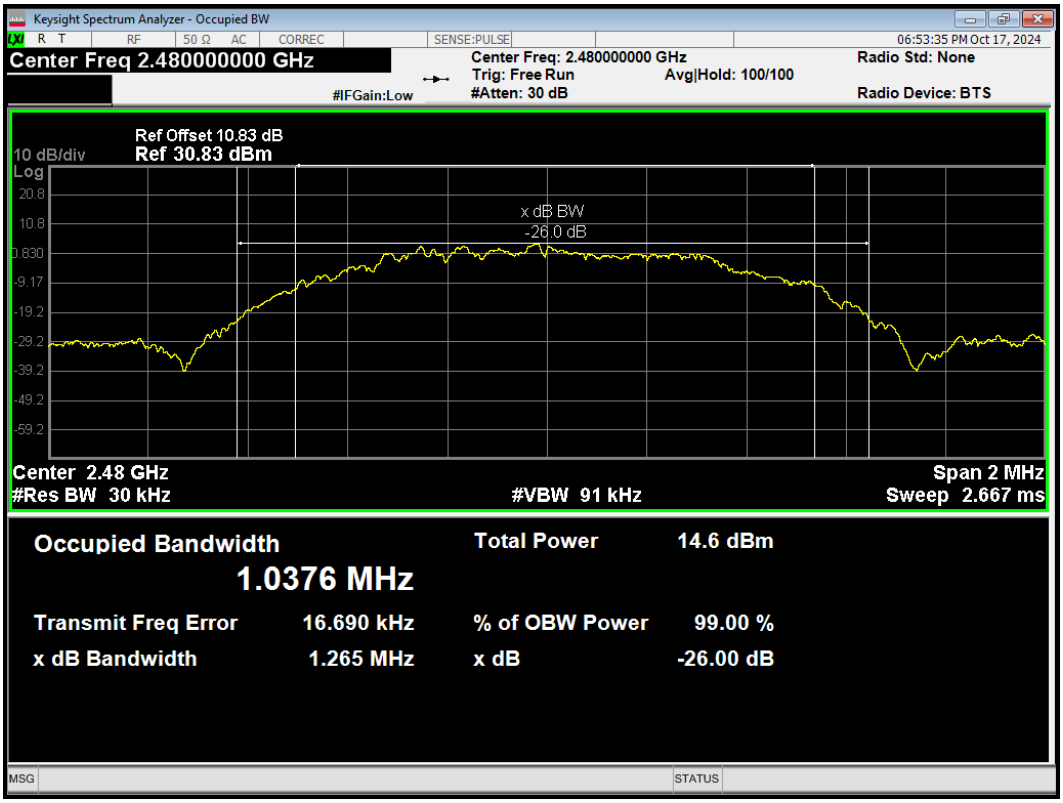

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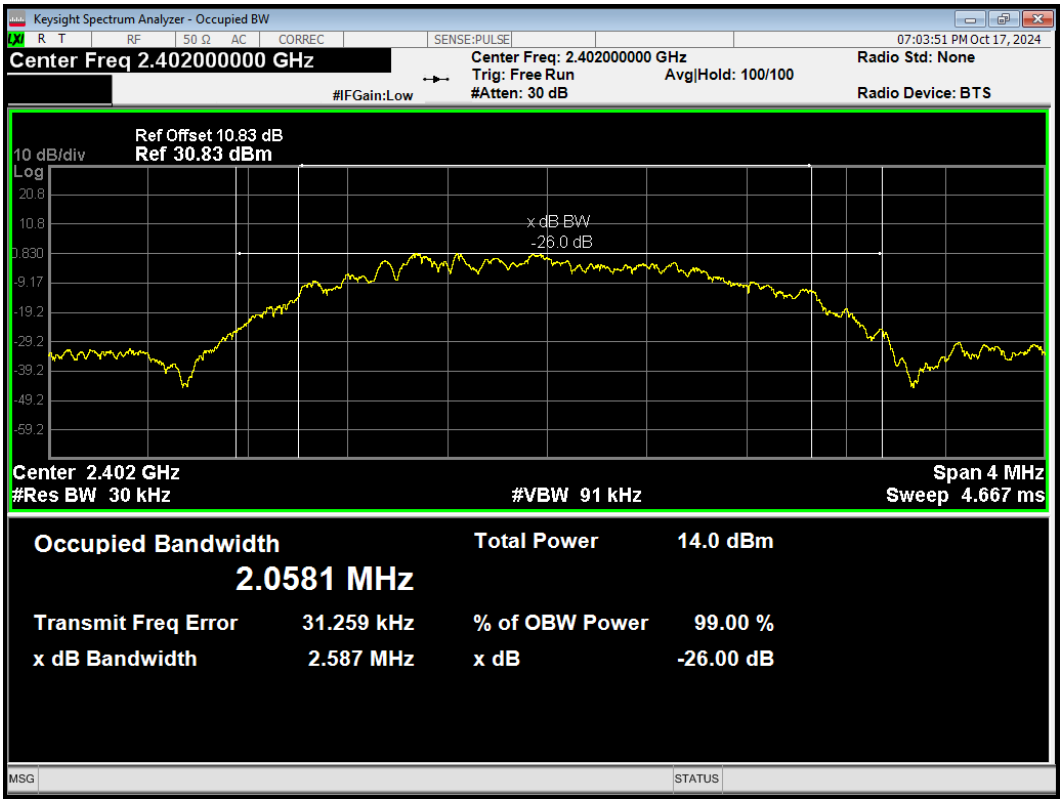

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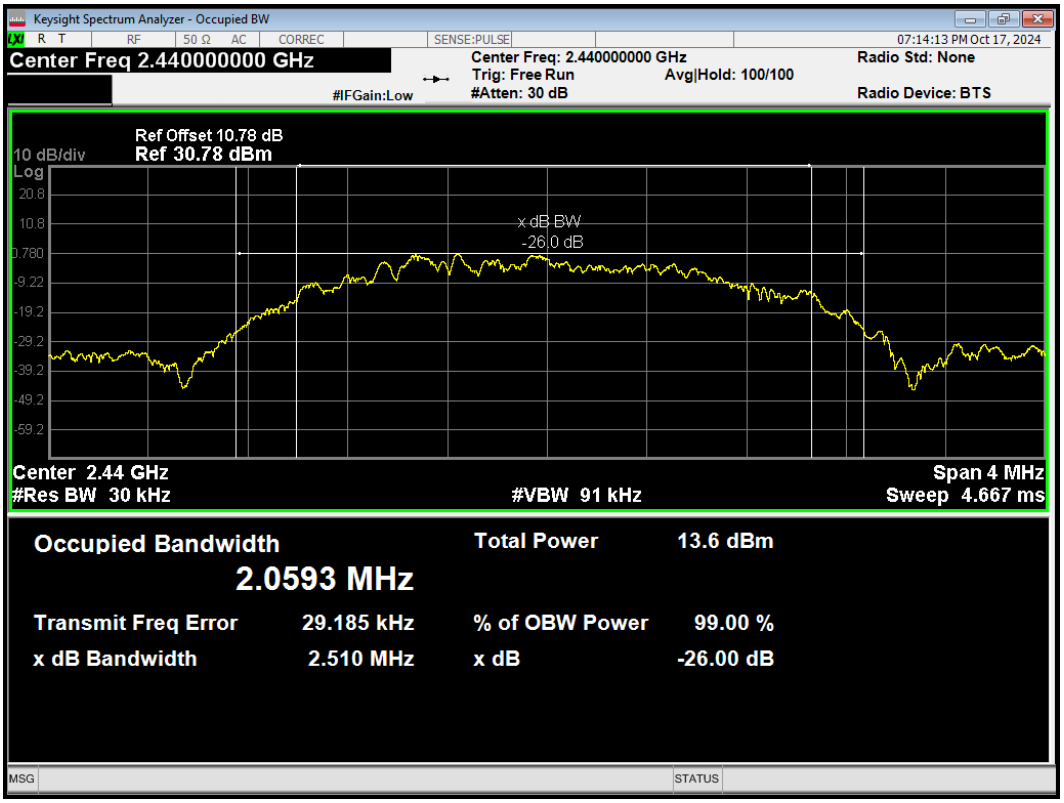
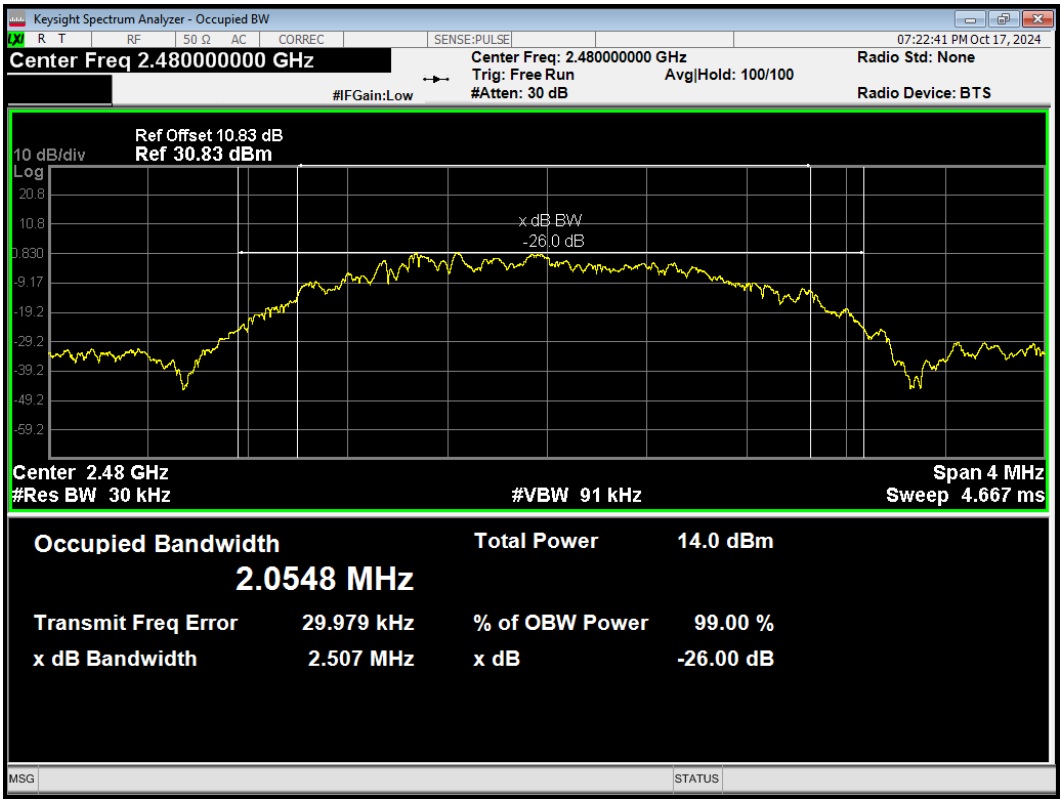
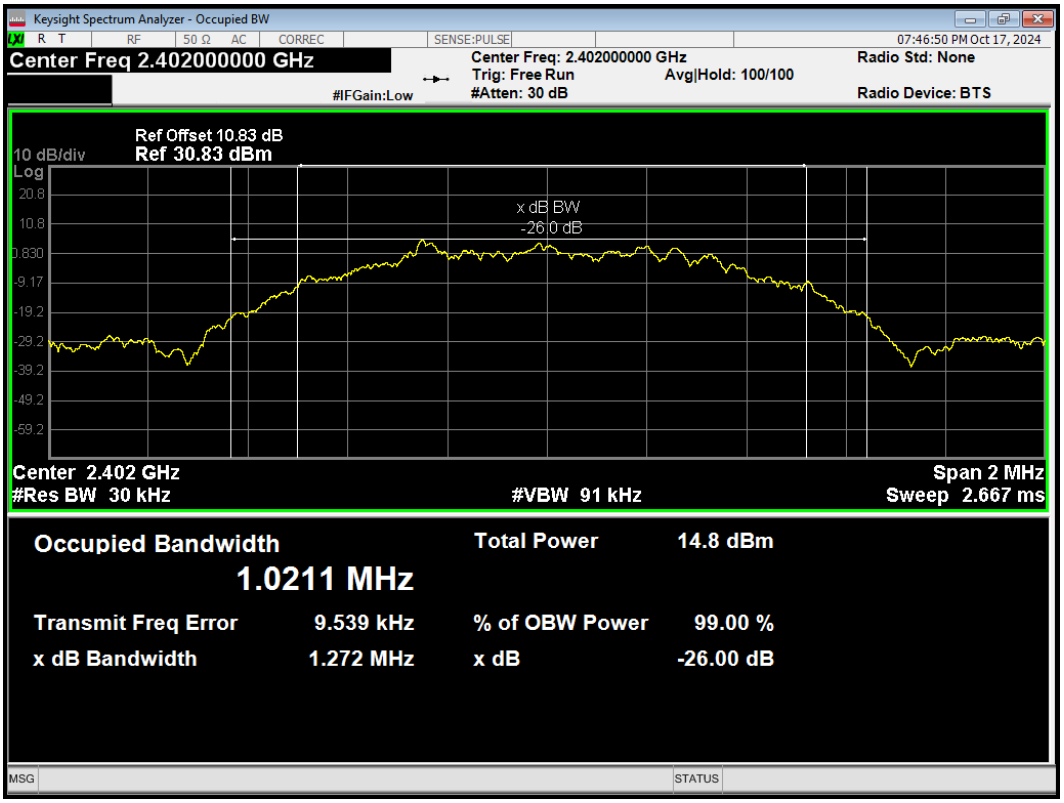


OBW BLE 2M 2480MHz



OBW BLE S=2 2402MHz



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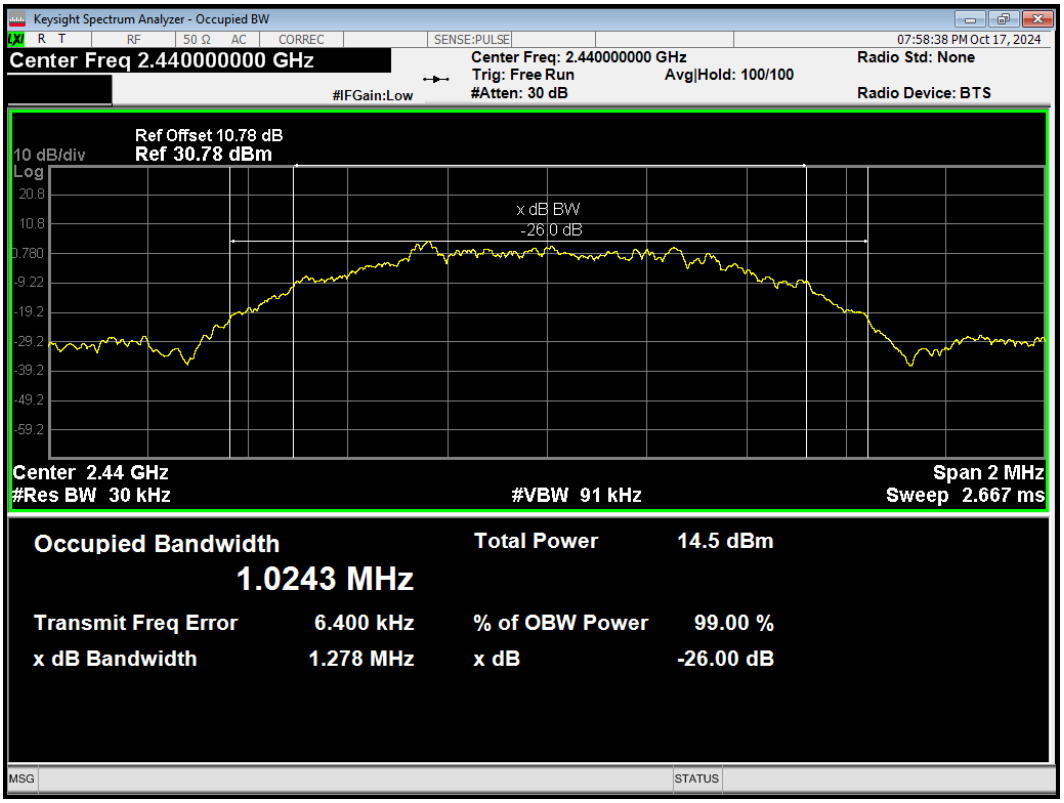

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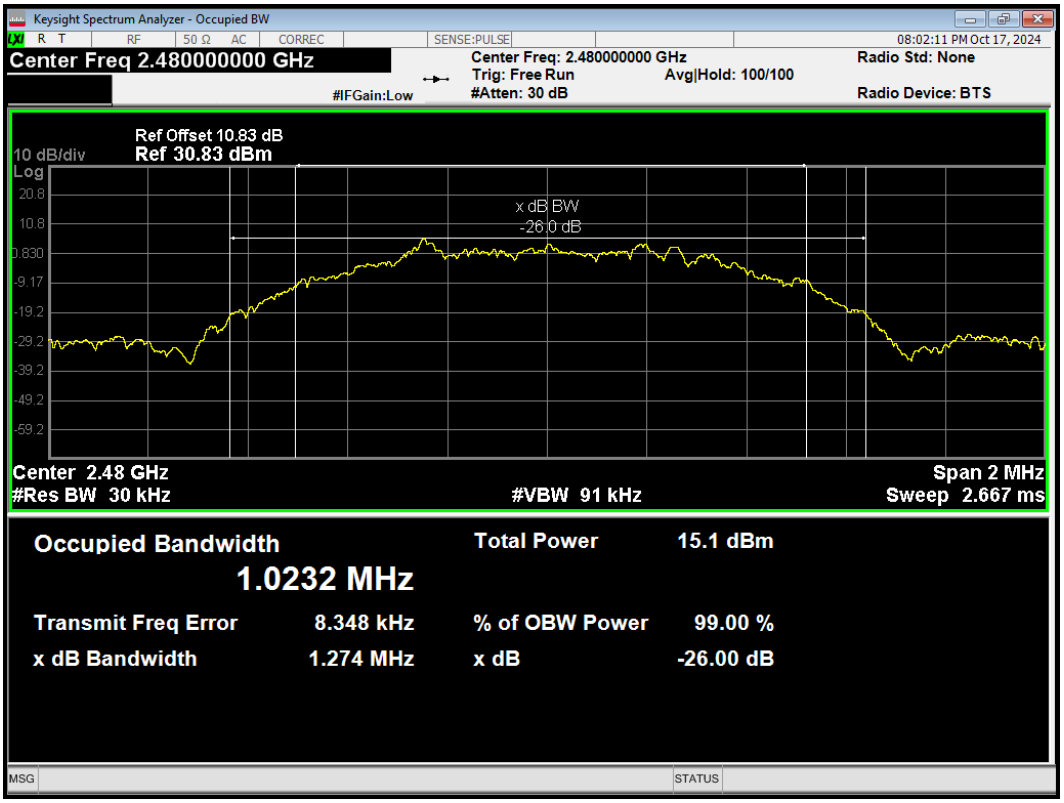

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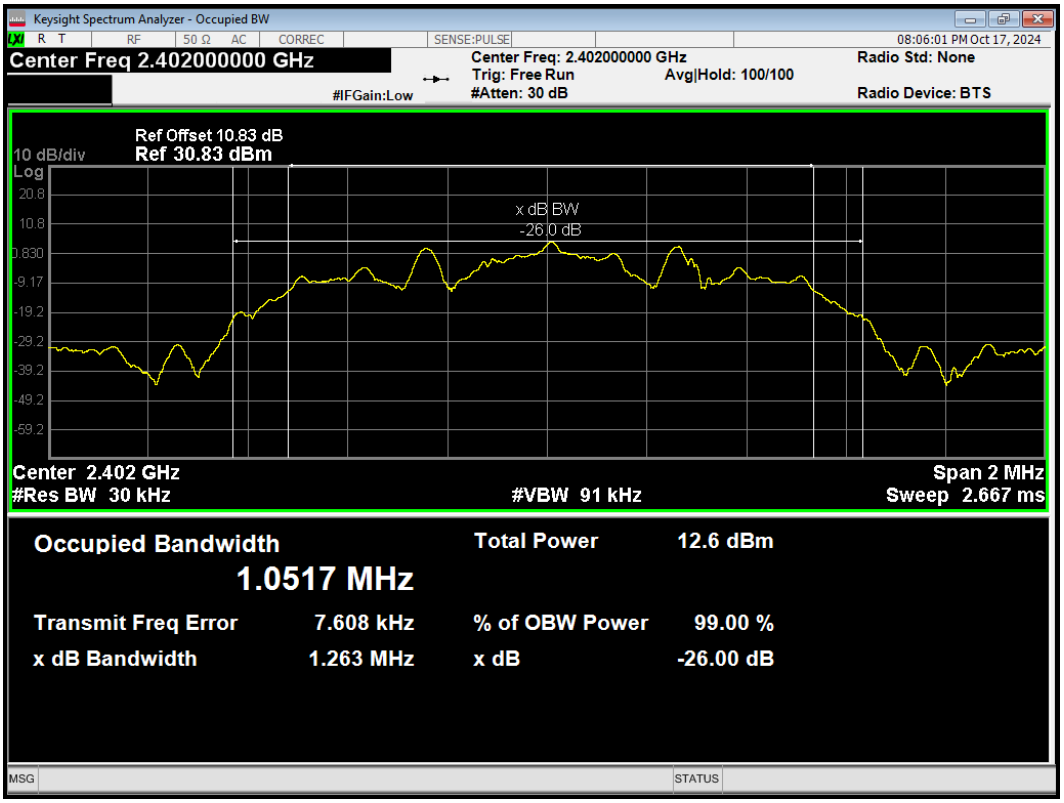

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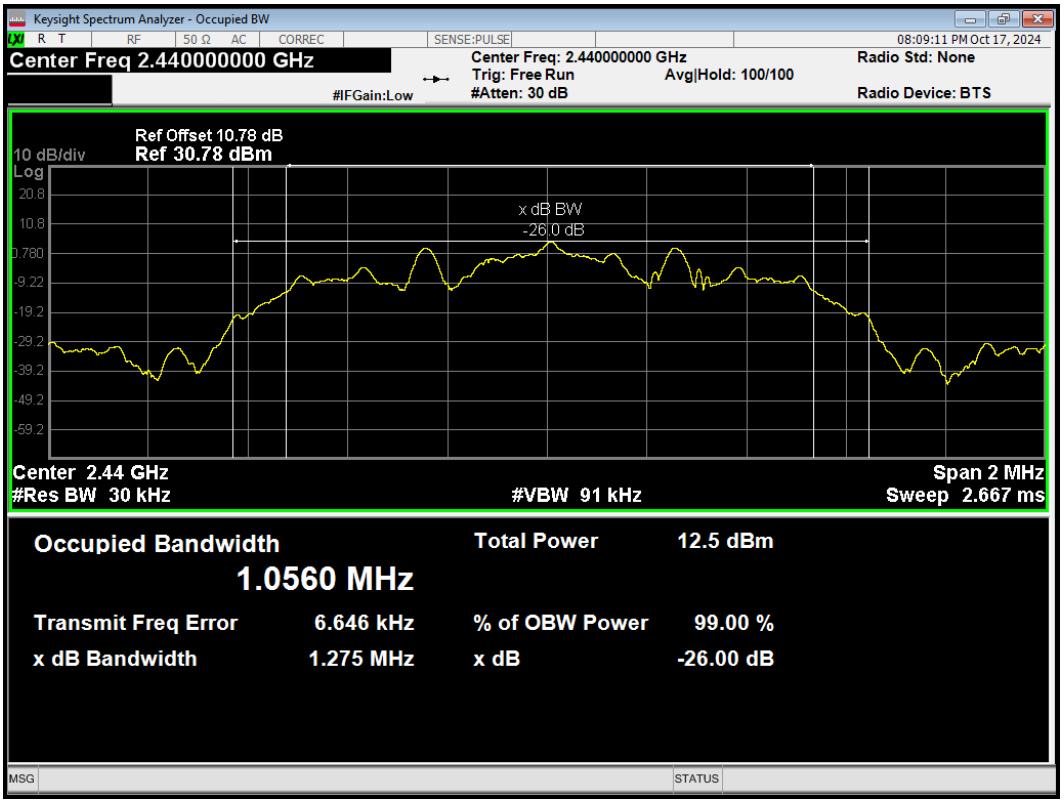

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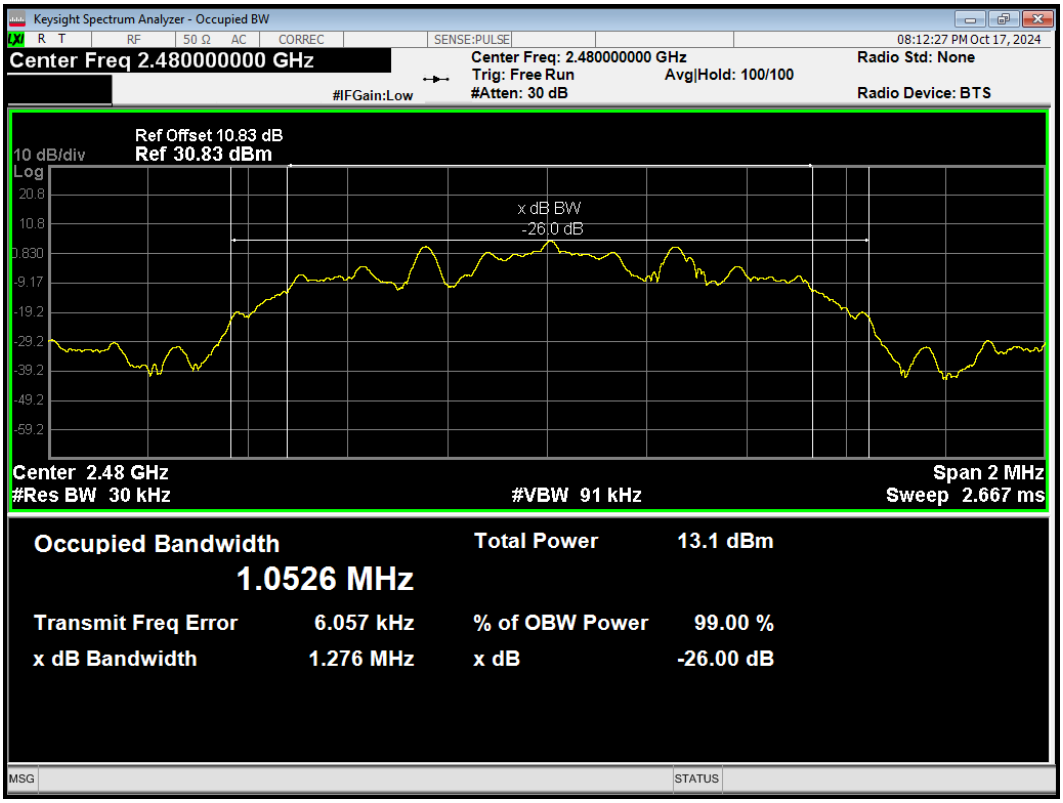
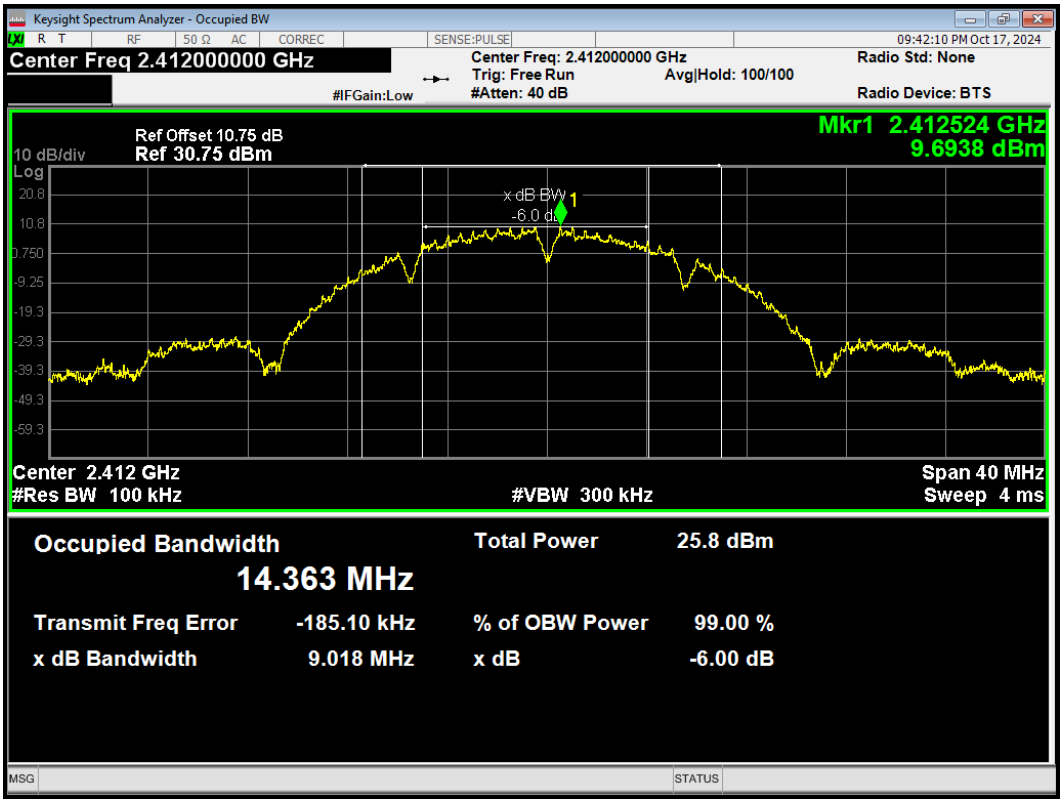
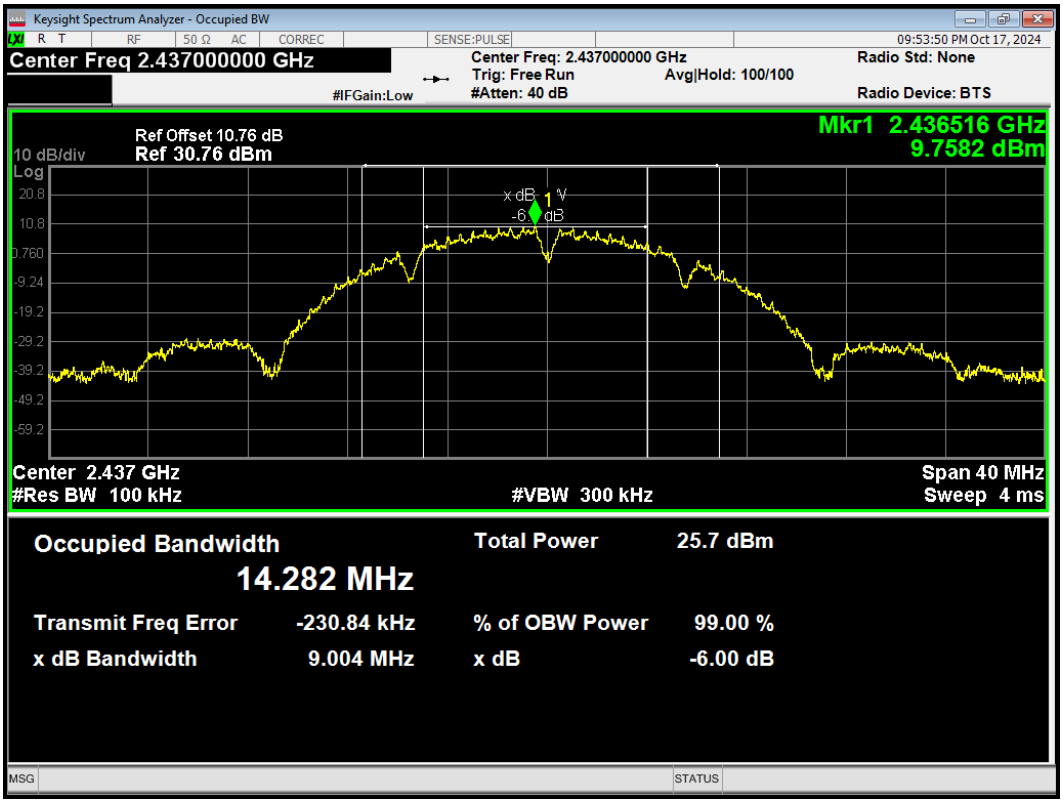


6 dB bandwidth

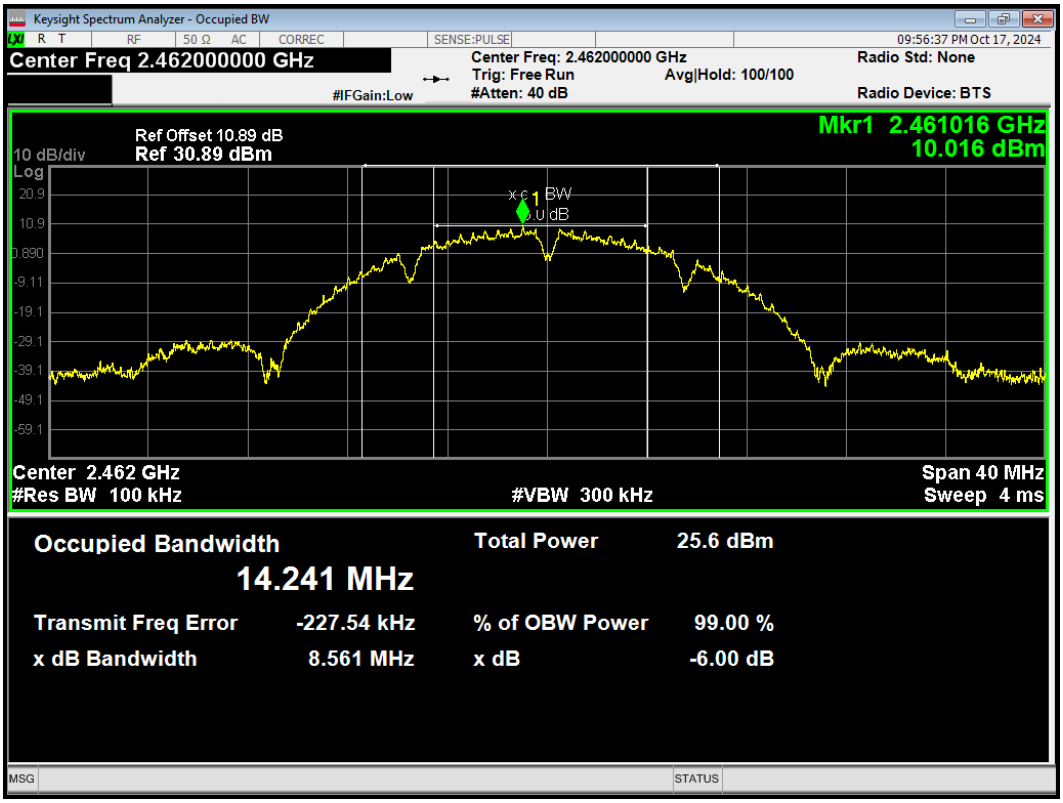
-6dB Bandwidth 802.11b 2412MHz



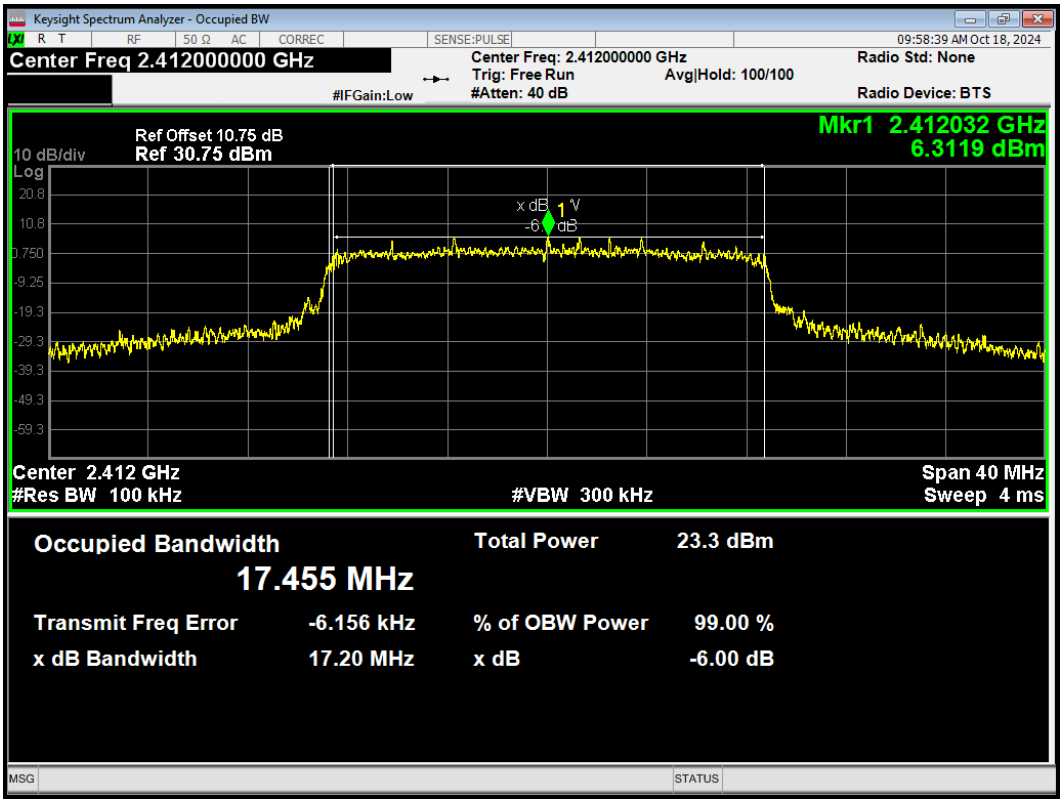
-6dB Bandwidth 802.11b 2437MHz



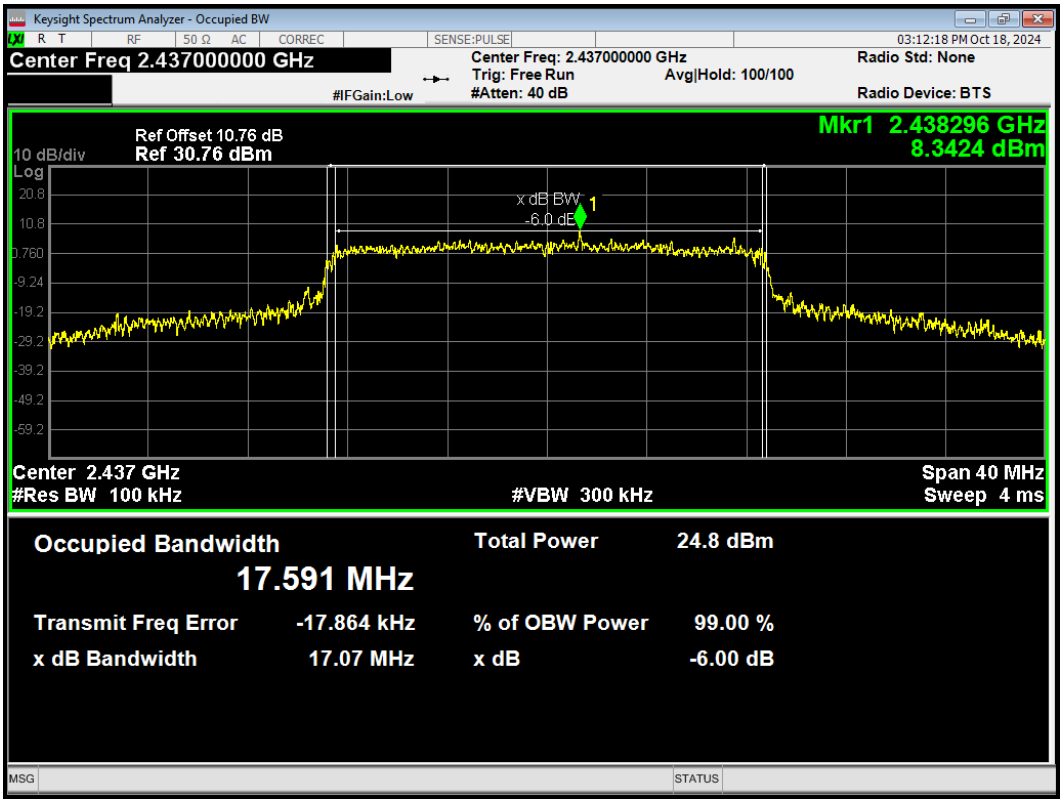
-6dB Bandwidth 802.11b 2462MHz



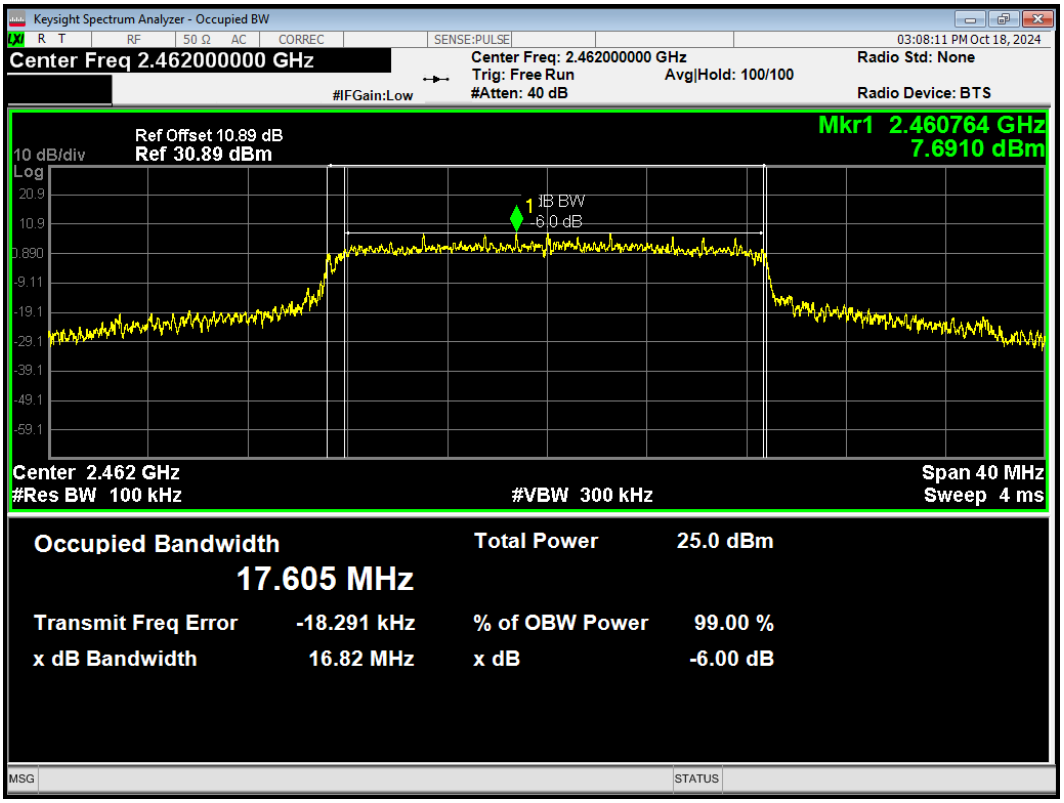
-6dB Bandwidth 802.11g 2412MHz



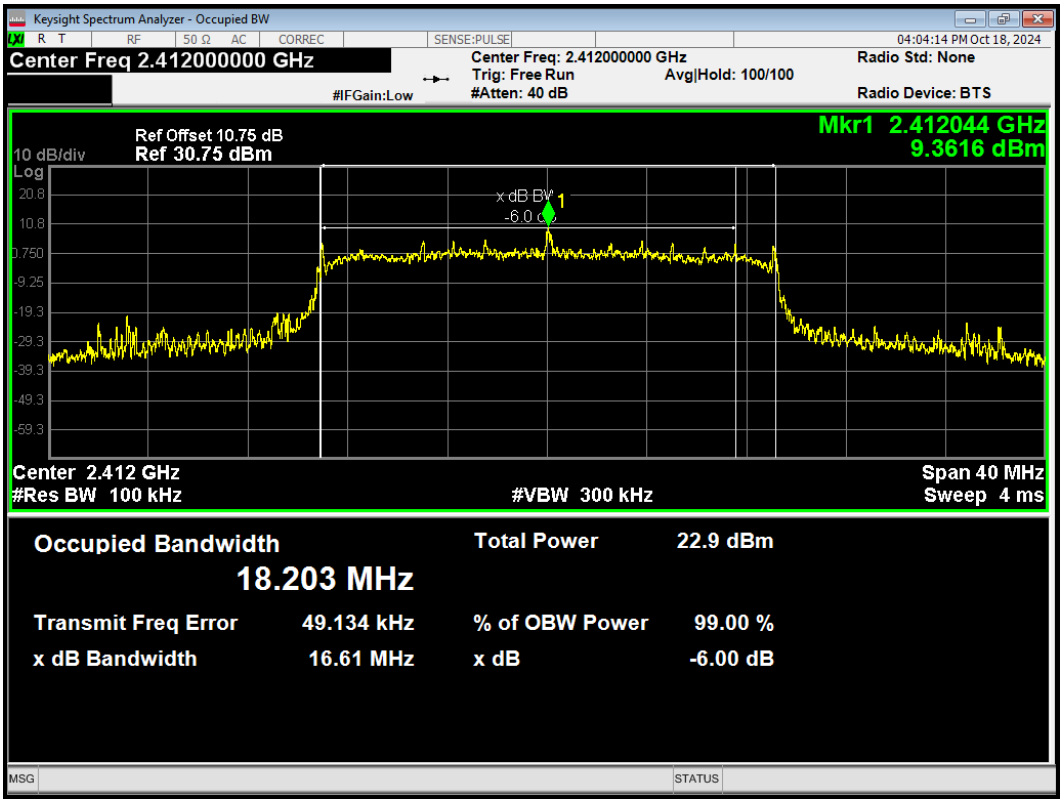
-6dB Bandwidth 802.11g 2437MHz



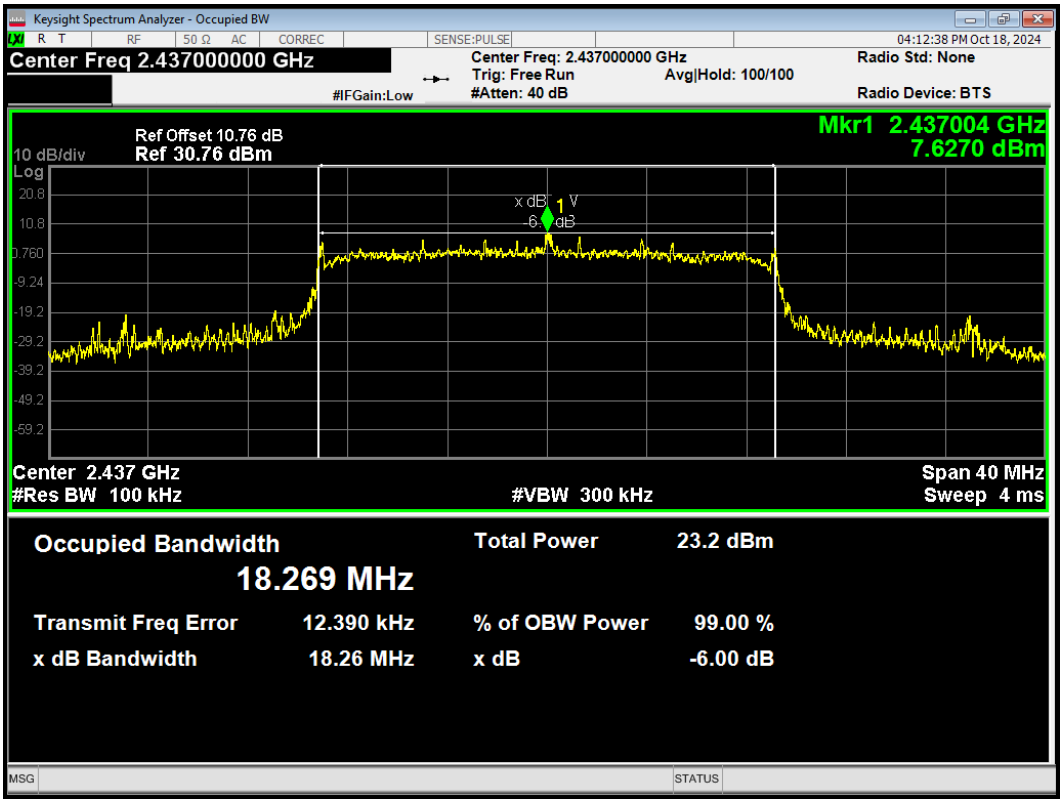
-6dB Bandwidth 802.11g 2462MHz



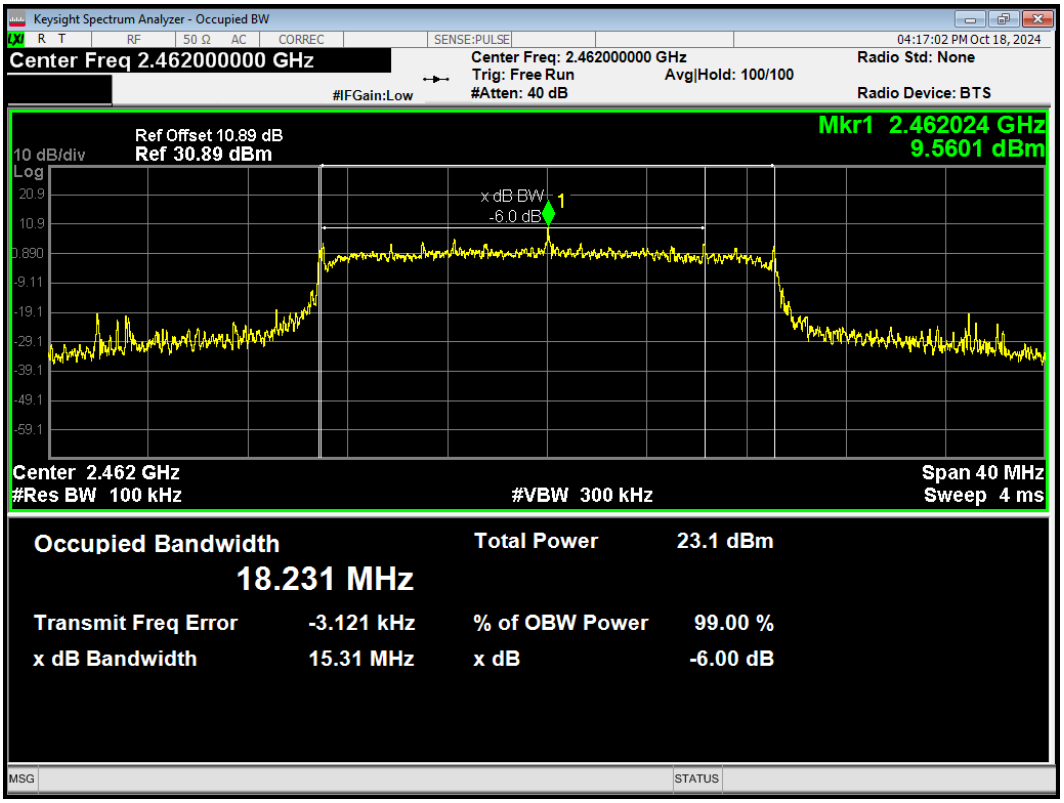
-6dB Bandwidth 802.11n(HT20) 2412MHz



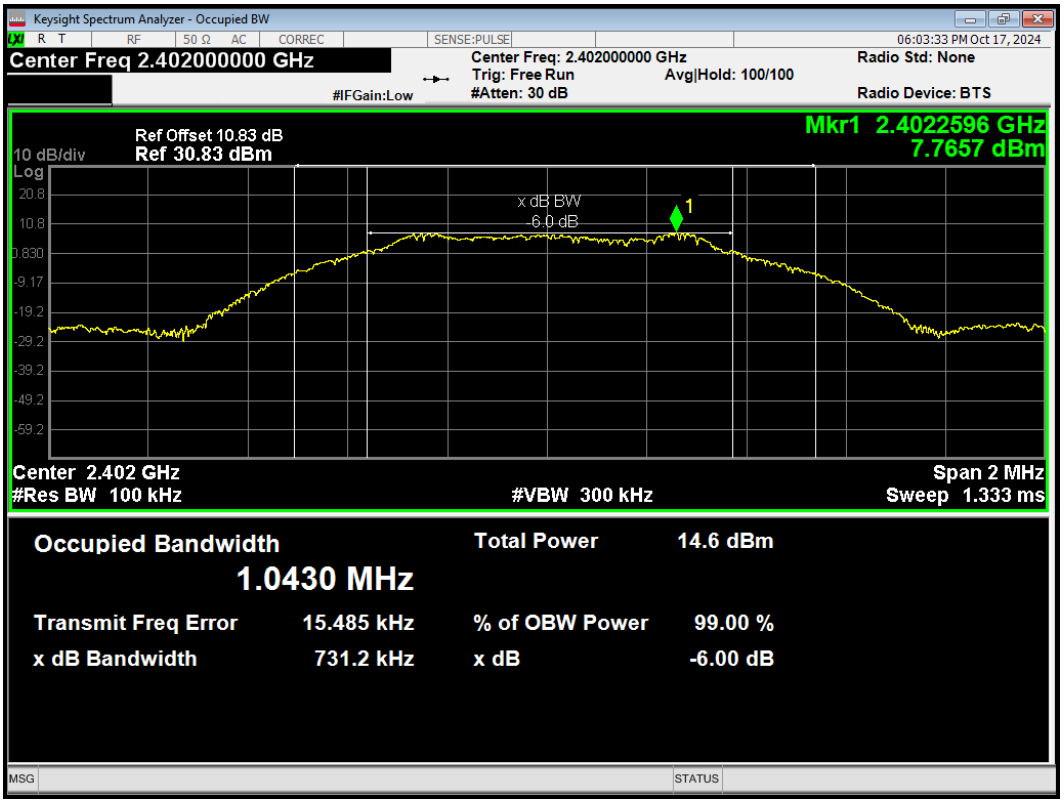
-6dB Bandwidth 802.11n(HT20) 2437MHz



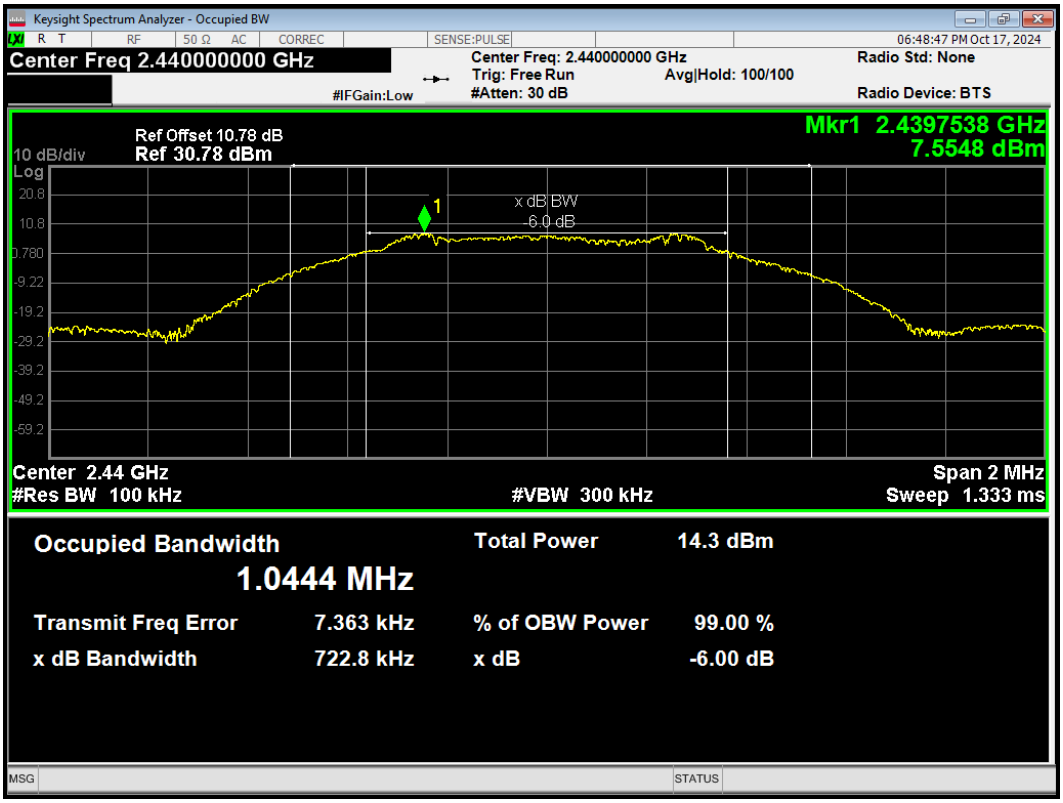
-6dB Bandwidth 802.11n(HT20) 2462MHz



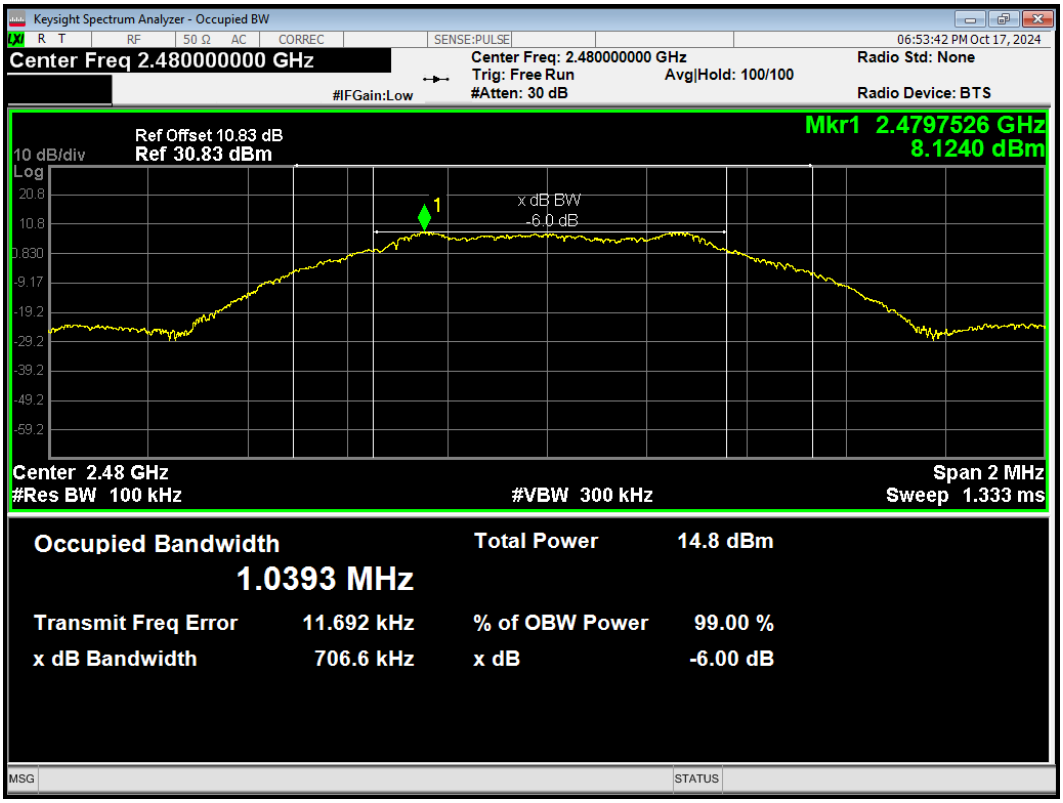
-6dB Bandwidth BLE 1M 2402MHz



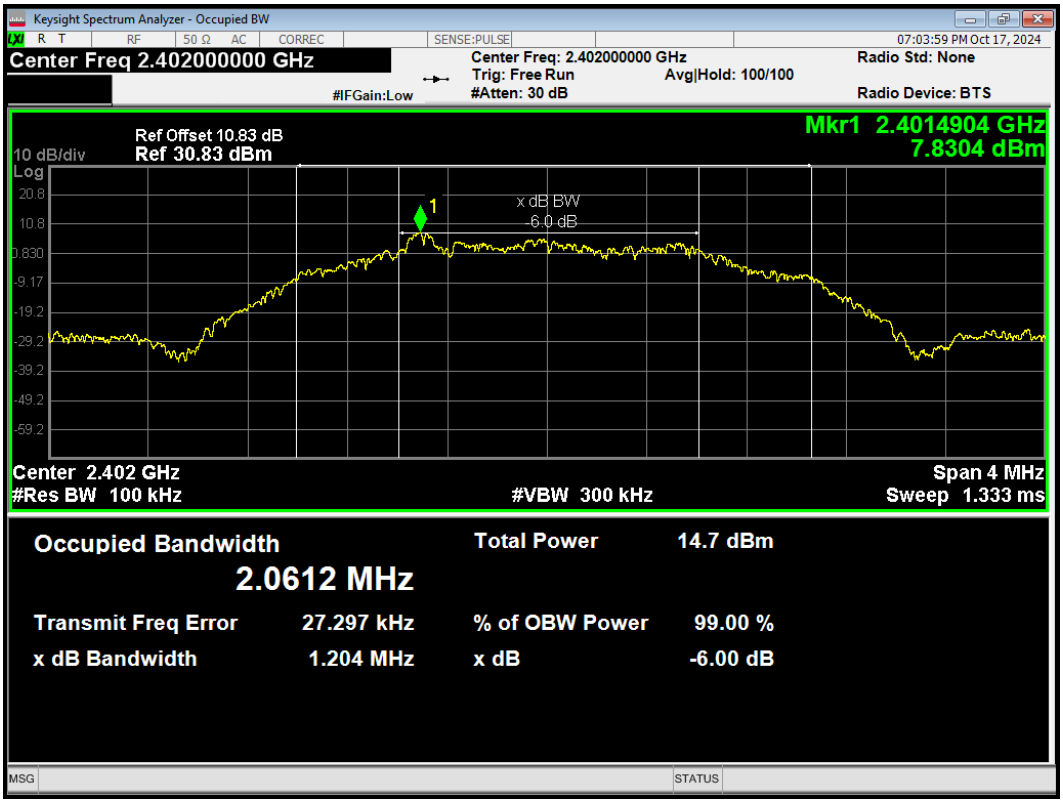
-6dB Bandwidth BLE 1M 2440MHz



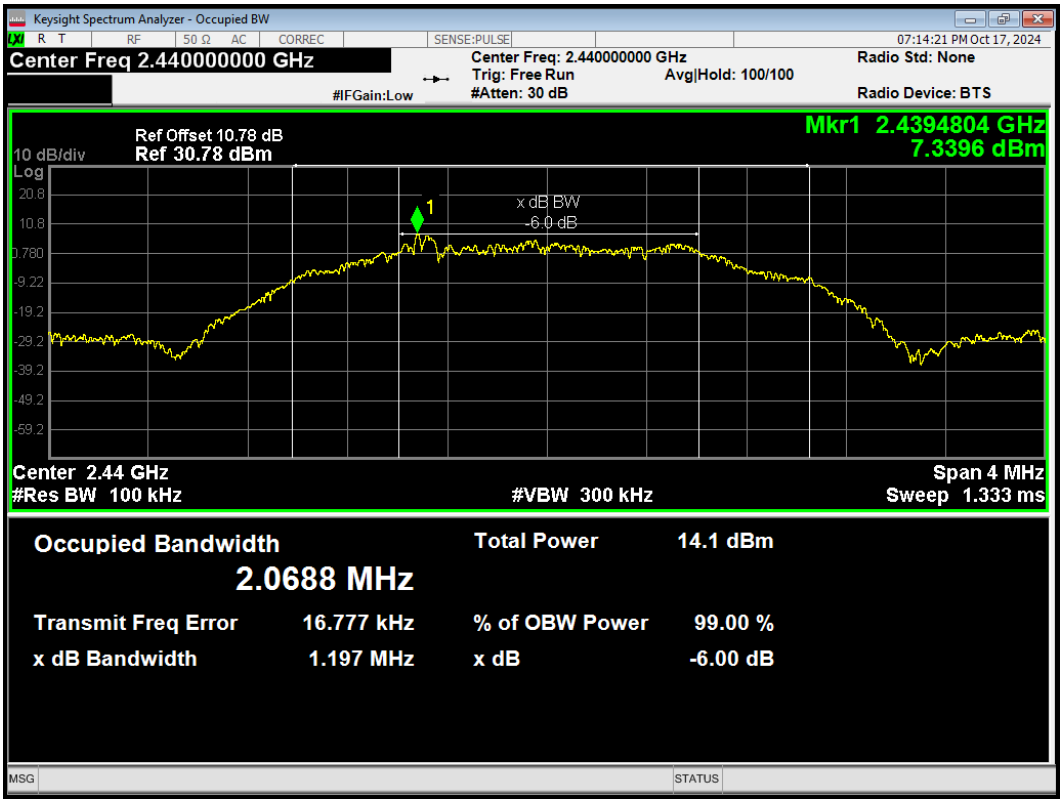
-6dB Bandwidth BLE 1M 2480MHz



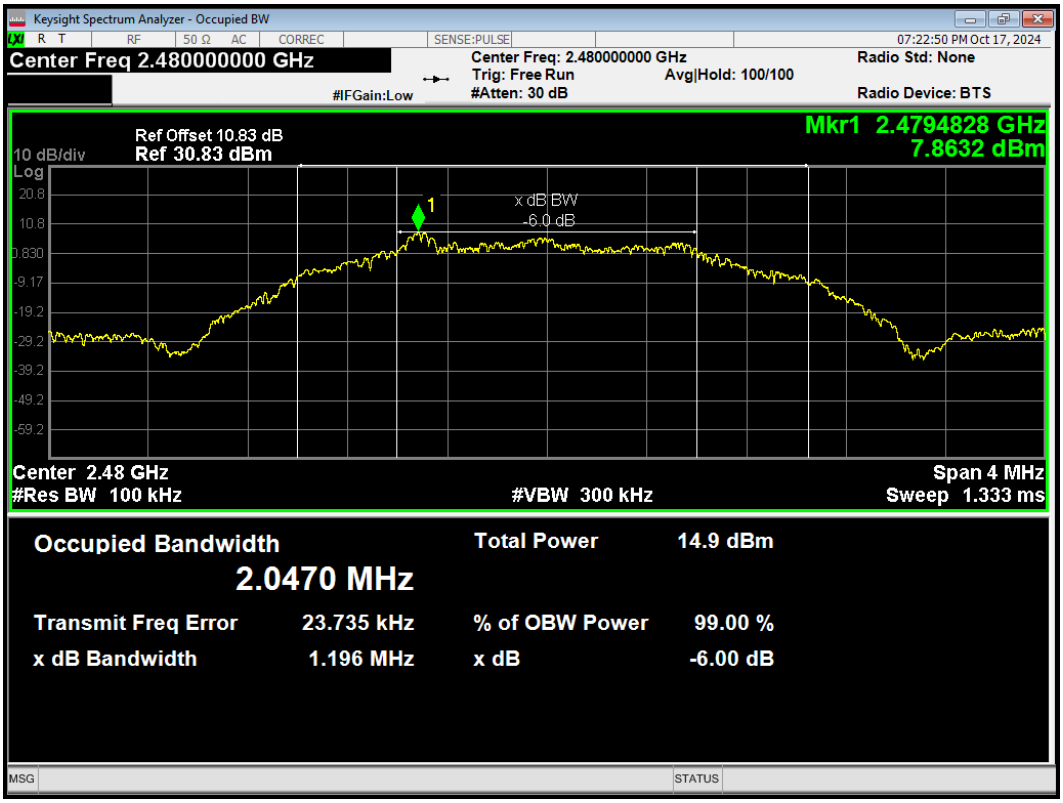
-6dB Bandwidth BLE 2M 2402MHz



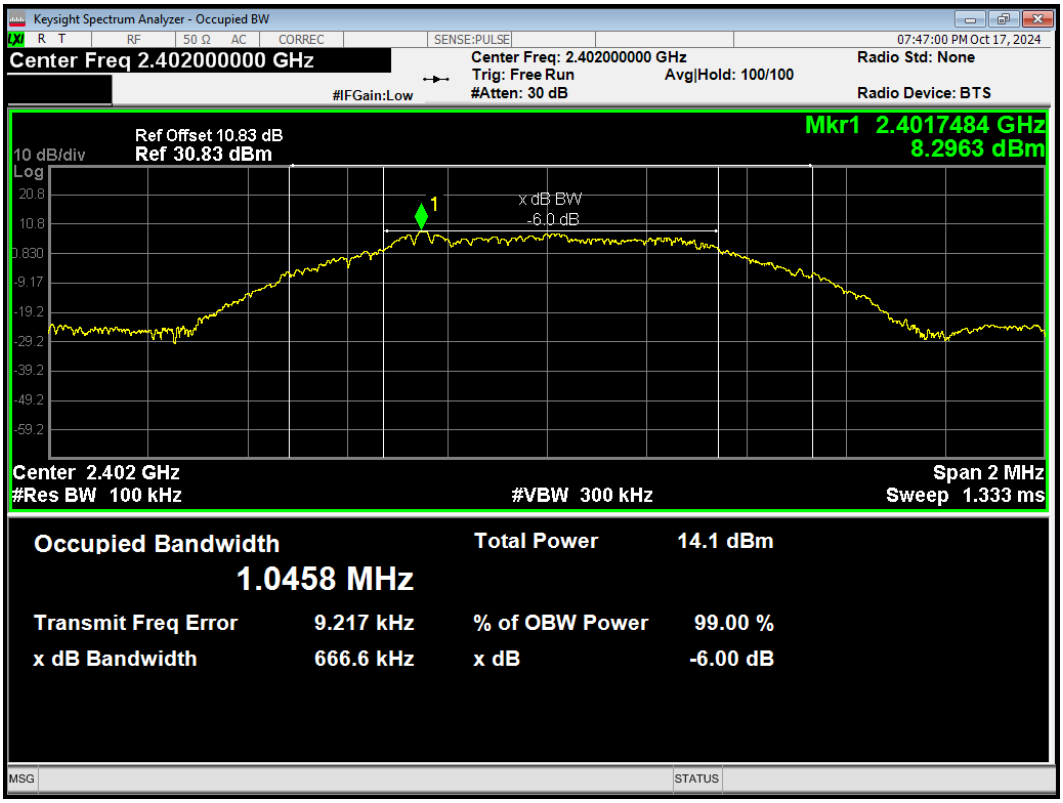
-6dB Bandwidth BLE 2M 2440MHz



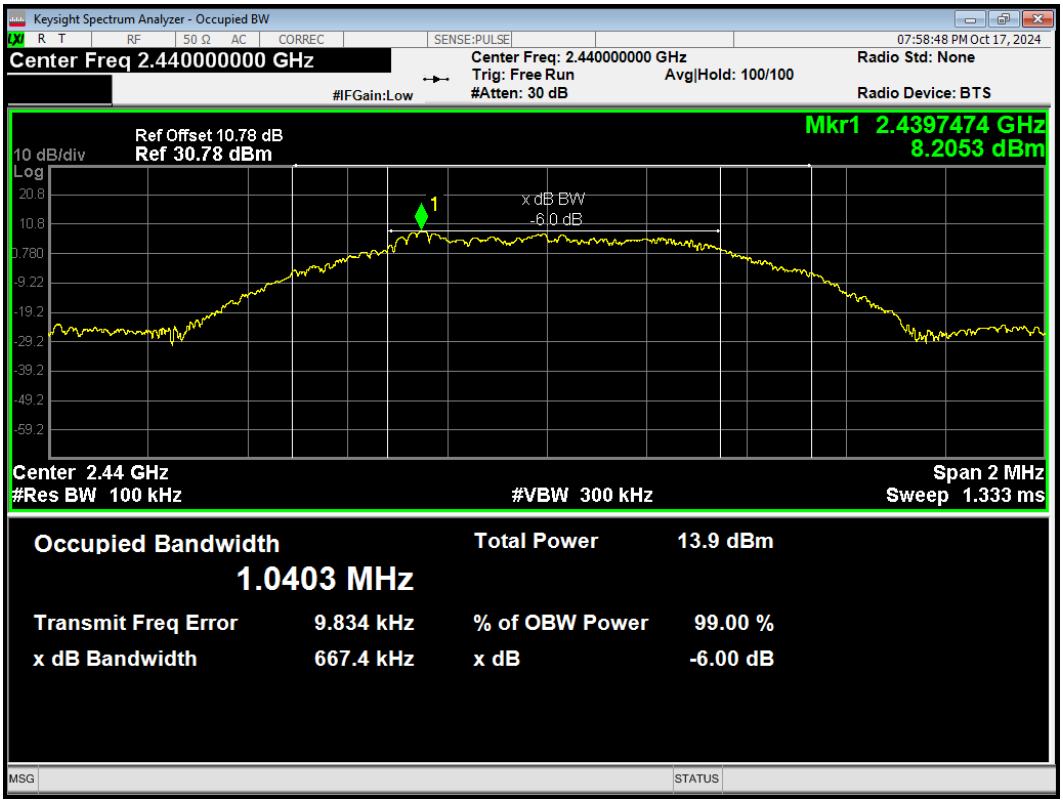
-6dB Bandwidth BLE 2M 2480MHz



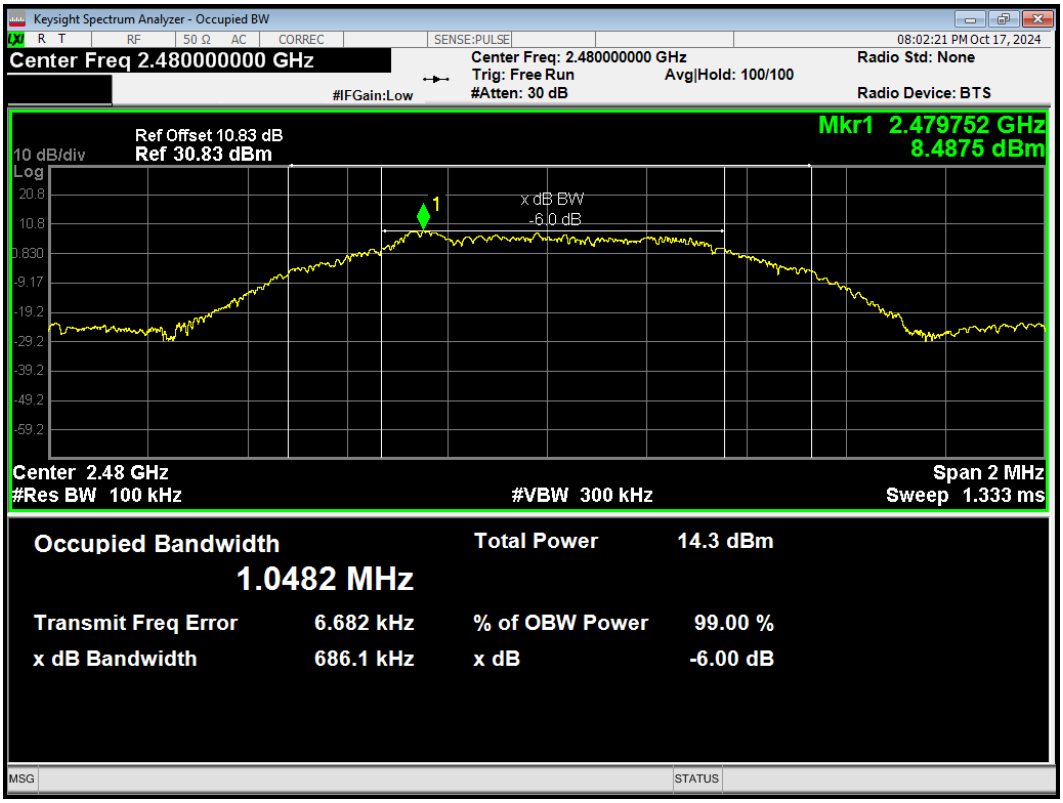
-6dB Bandwidth BLE S=2 2402MHz



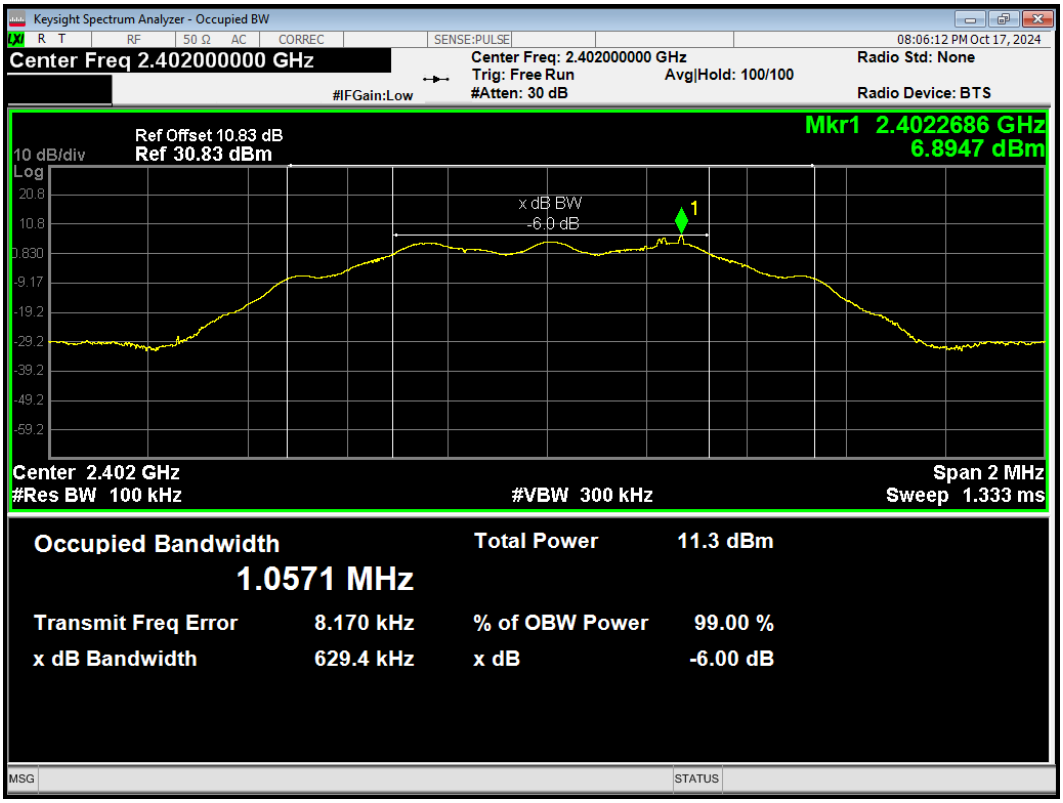
-6dB Bandwidth BLE S=2 2440MHz



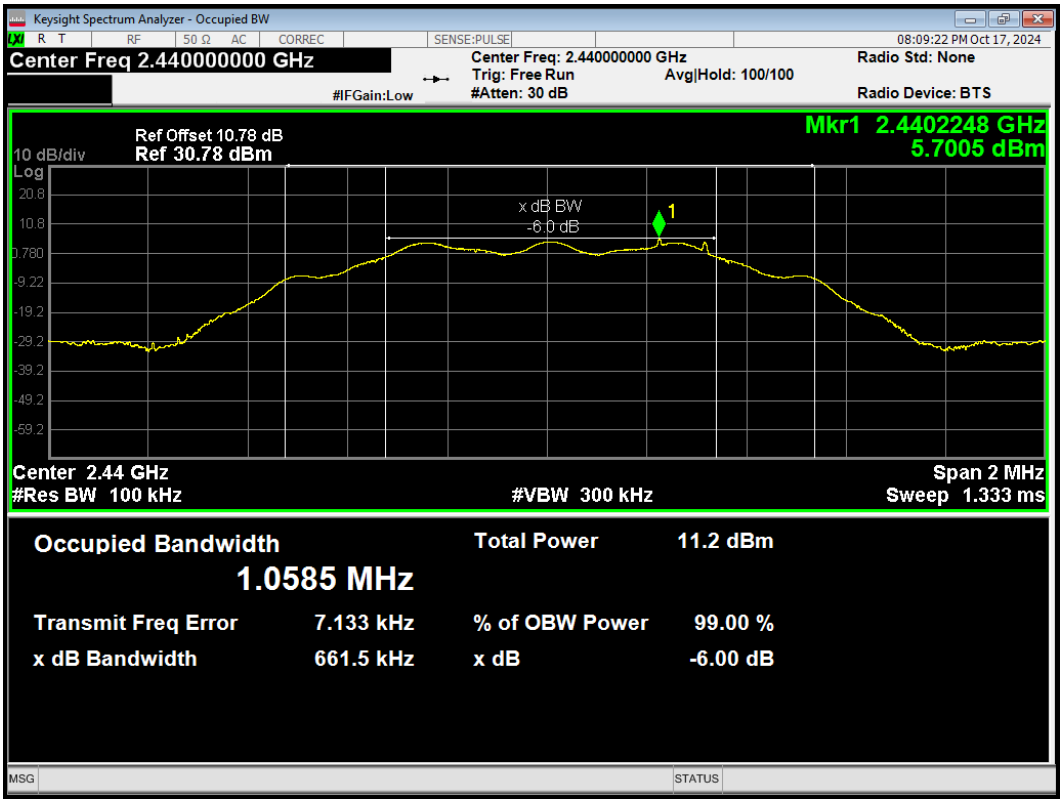
-6dB Bandwidth BLE S=2 2480MHz



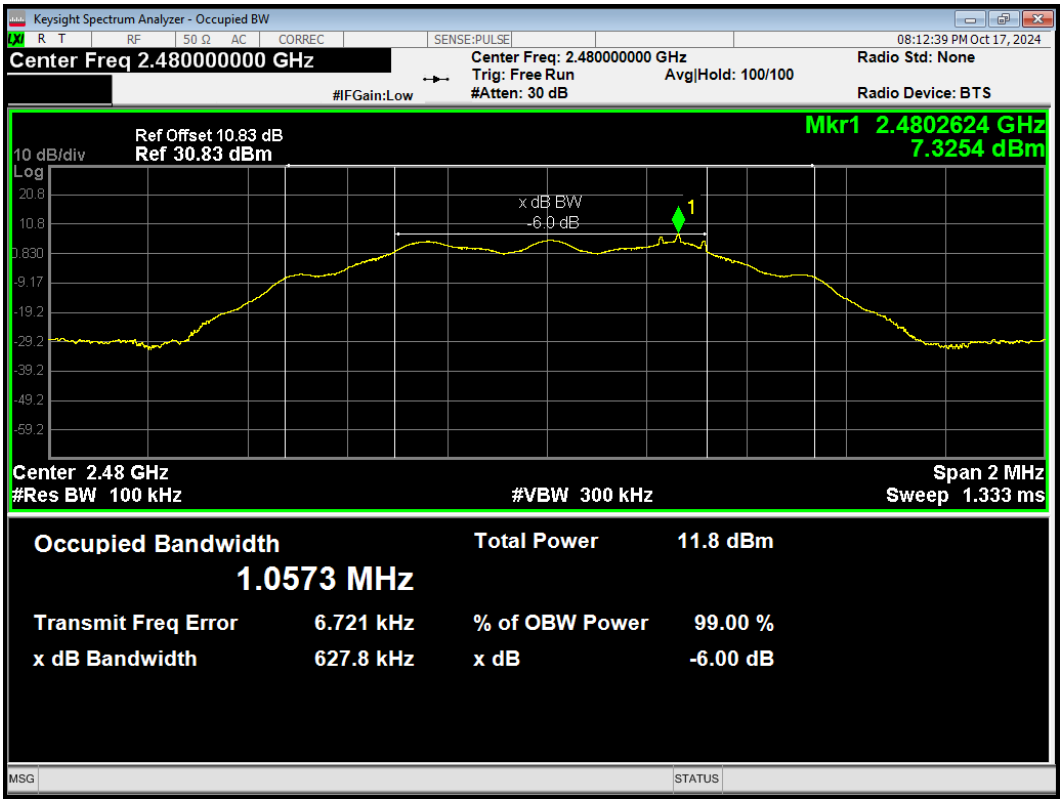
-6dB Bandwidth BLE S=8 2402MHz



-6dB Bandwidth BLE S=8 2440MHz



-6dB Bandwidth BLE S=8 2480MHz



5.3. Band Edge

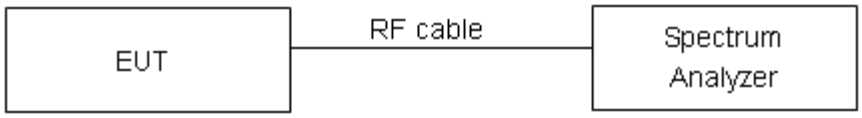
Ambient Condition

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.”

Rule RSS-247 -5.5 specifies that “In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that 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.”

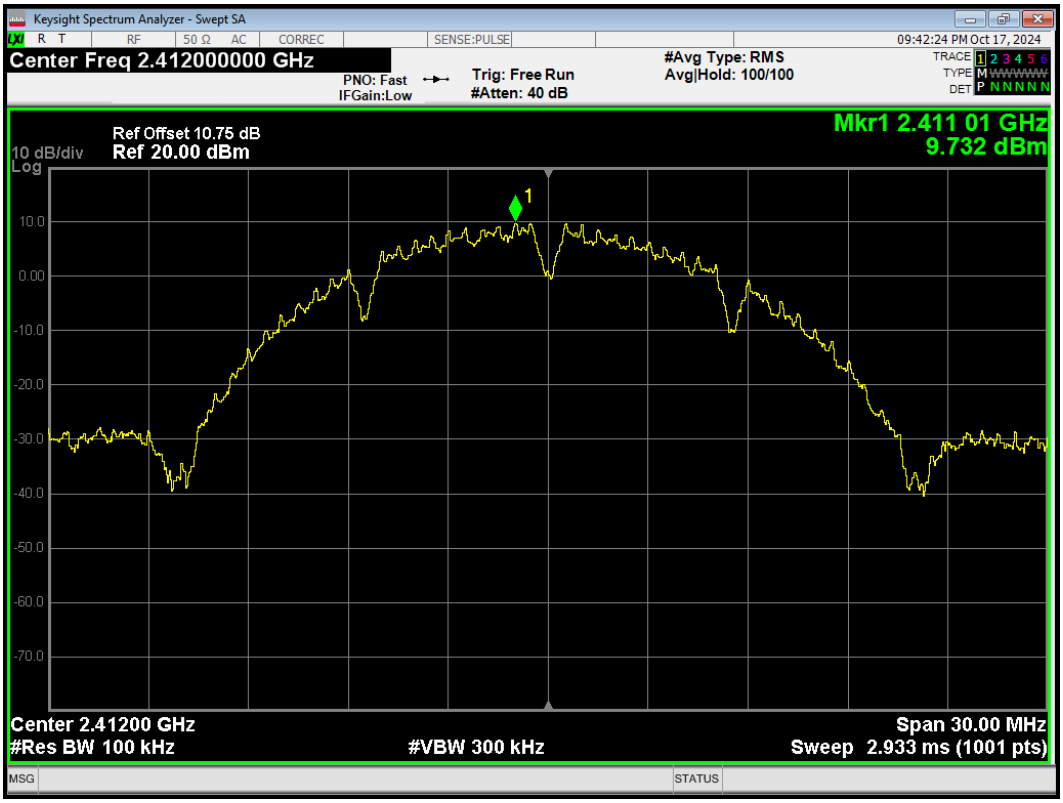
Measurement Uncertainty

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

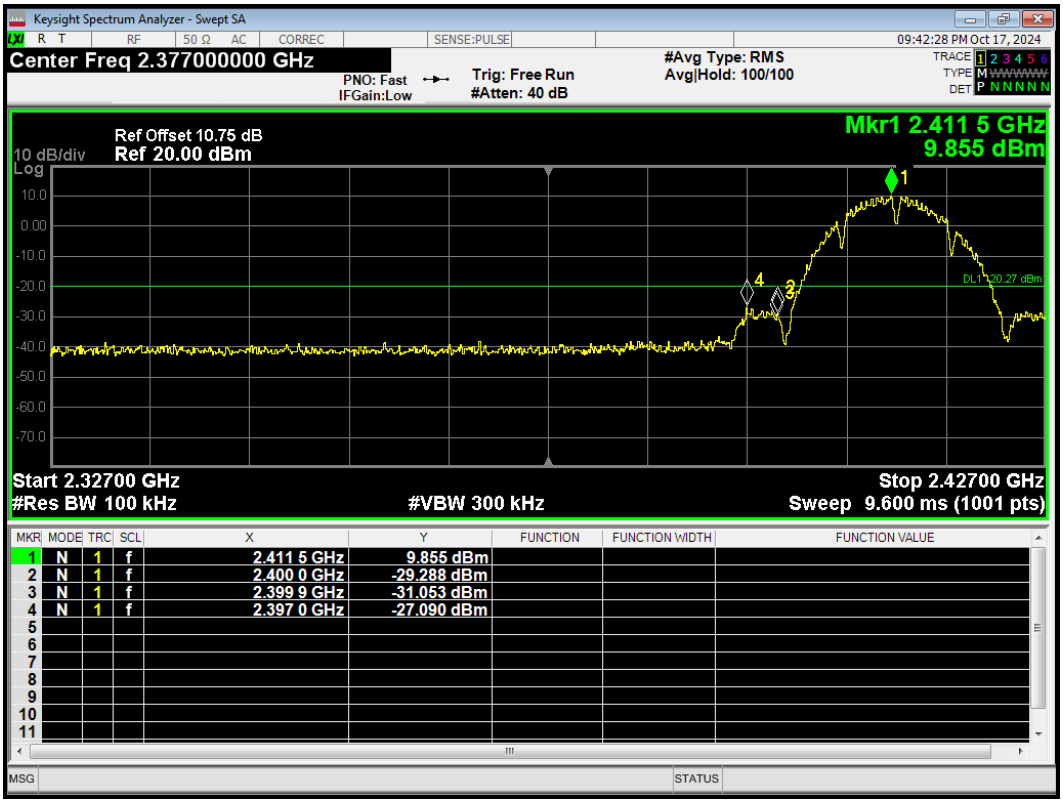
Frequency	Uncertainty
2GHz-3GHz	1.407 dB

Test Results: PASS

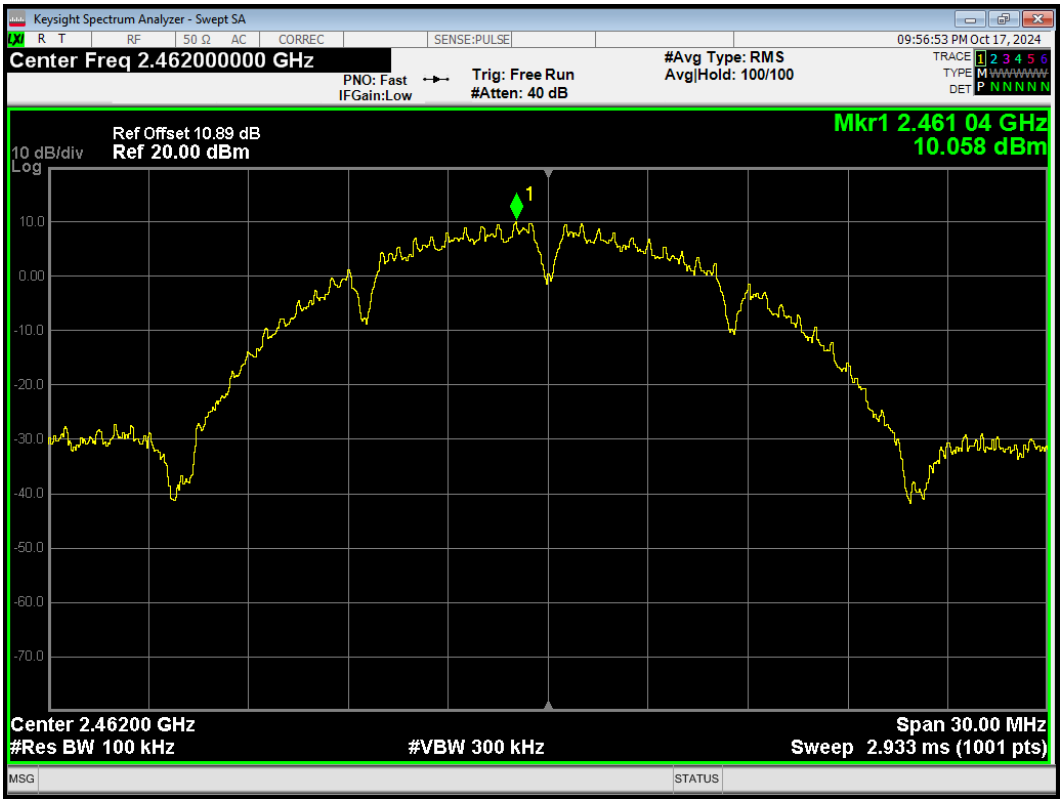
Band Edge 802.11b 2412MHz Ref



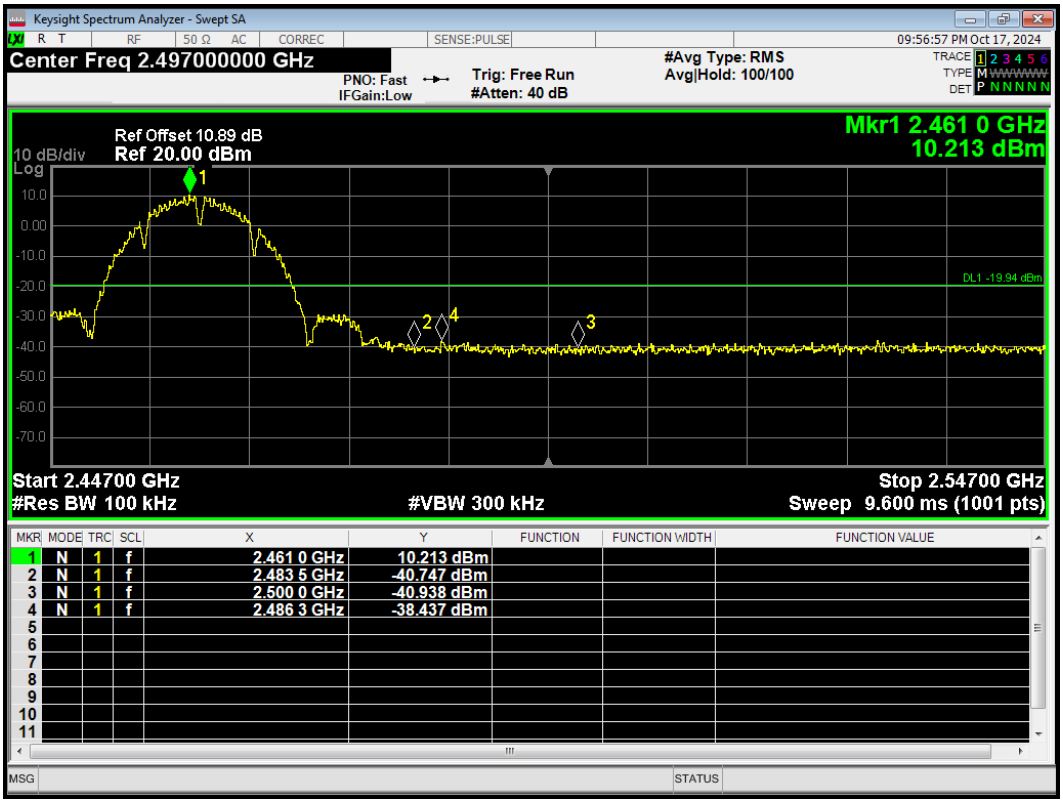
Band Edge 802.11b 2412MHz Emission



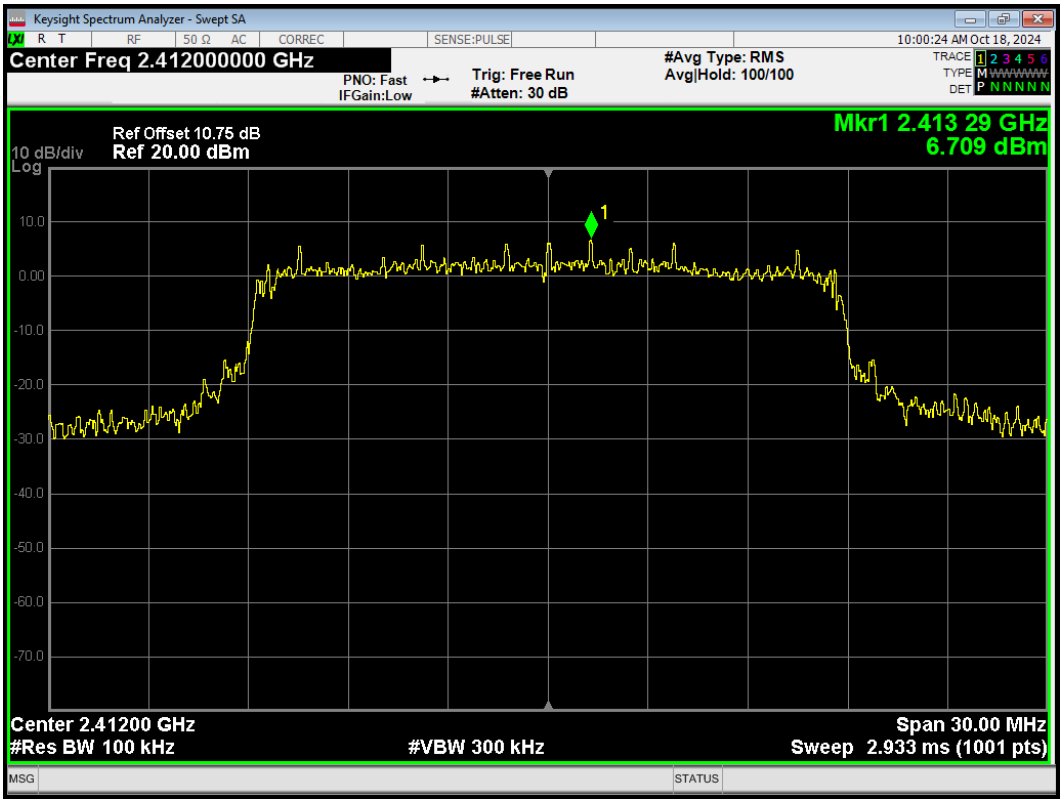
Band Edge 802.11b 2462MHz Ref



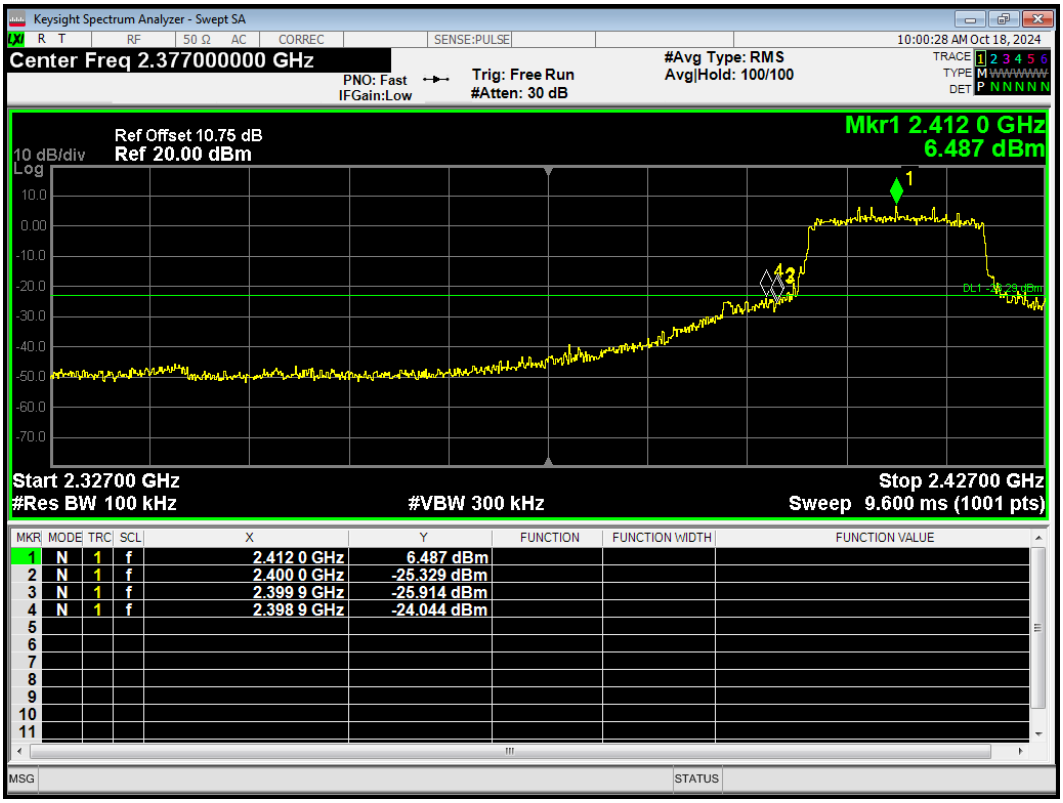
Band Edge 802.11b 2462MHz Emission



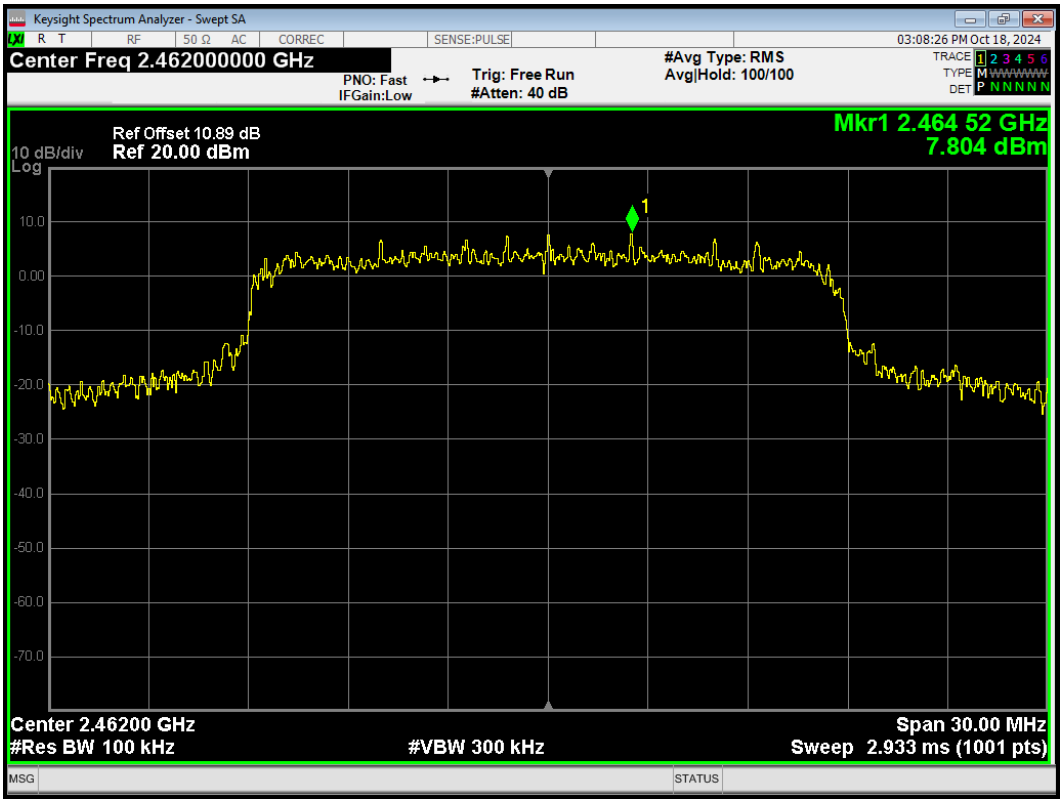
Band Edge 802.11g 2412MHz Ref



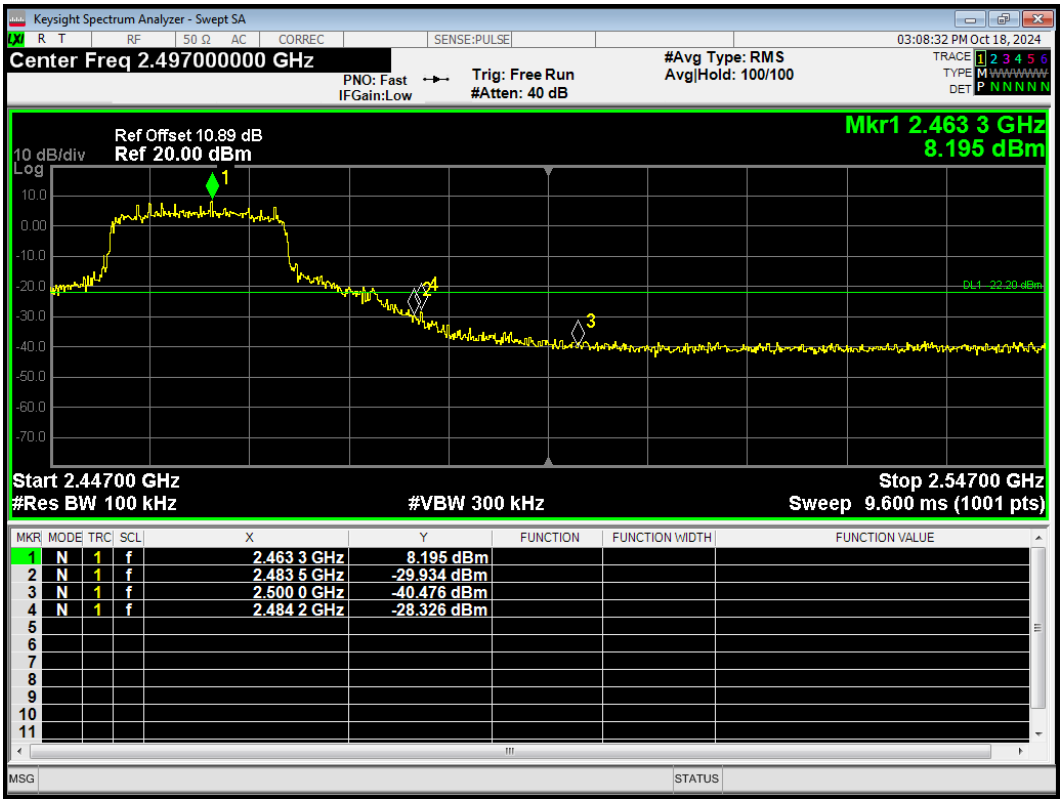
Band Edge 802.11g 2412MHz Emission



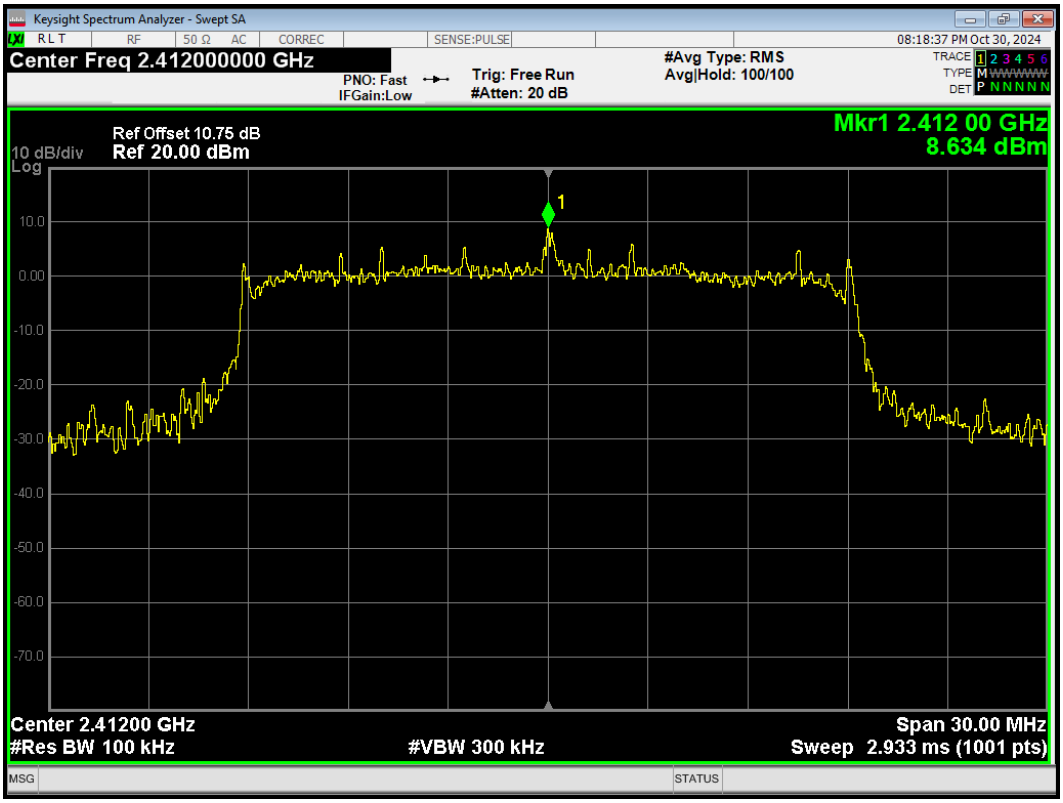
Band Edge 802.11g 2462MHz Ref



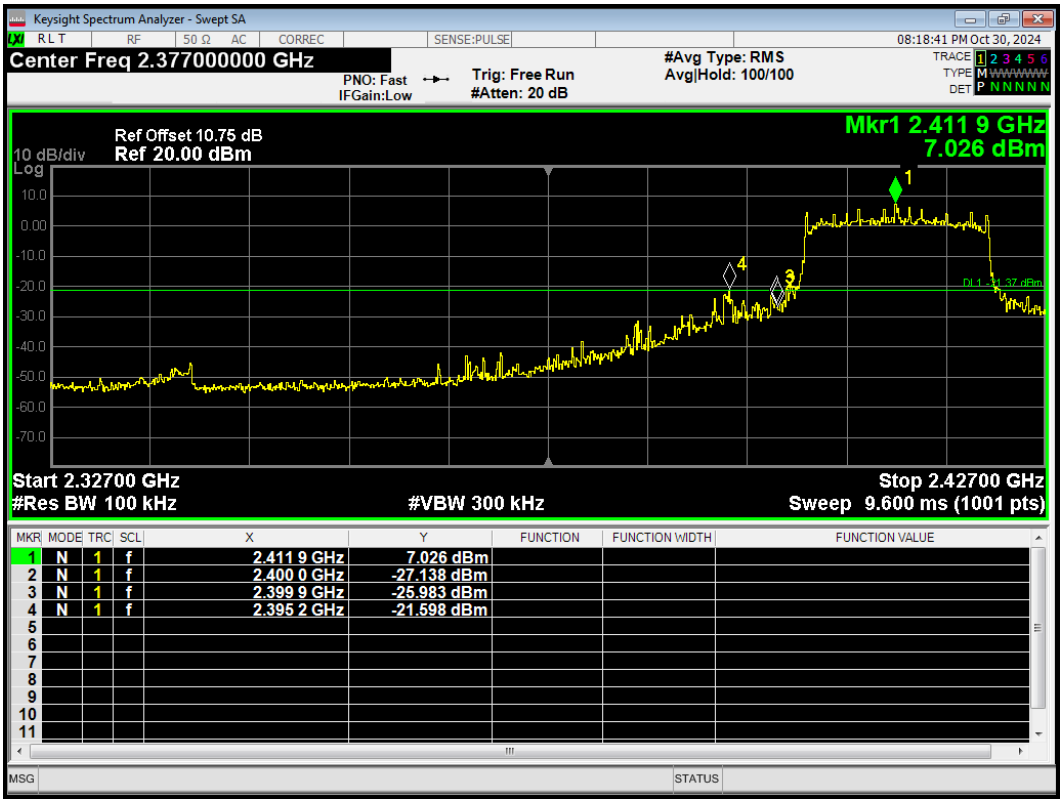
Band Edge 802.11g 2462MHz Emission



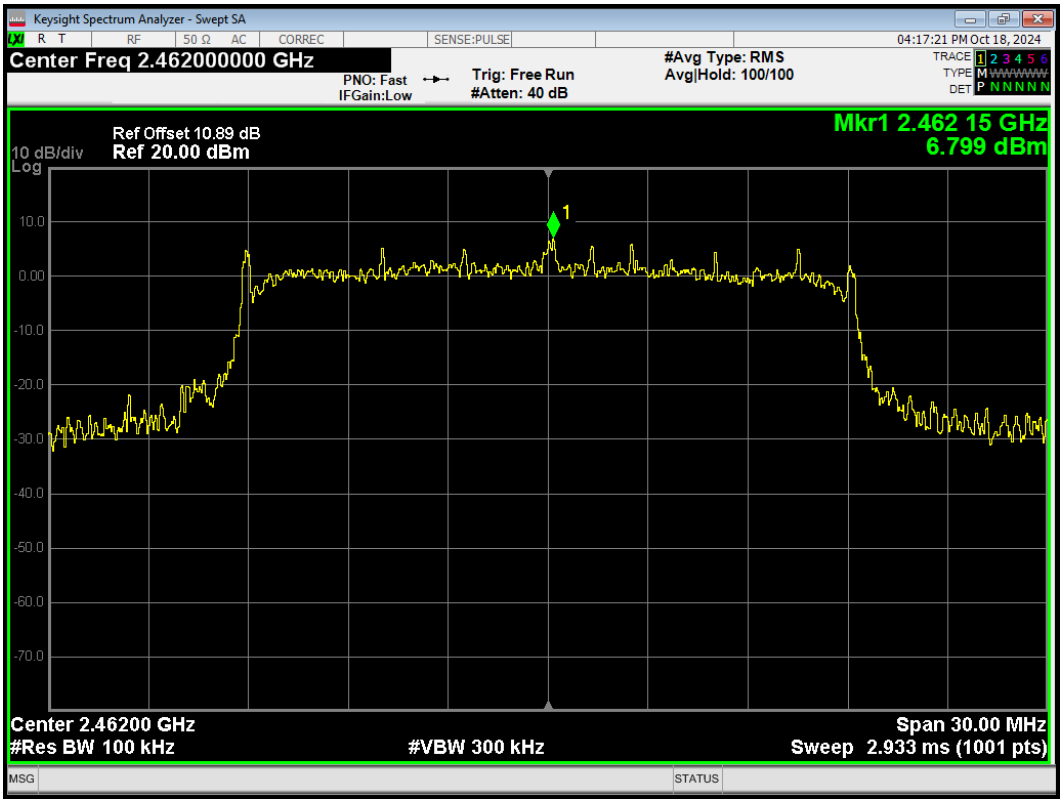
Band Edge 802.11n(HT20) 2412MHz Ref



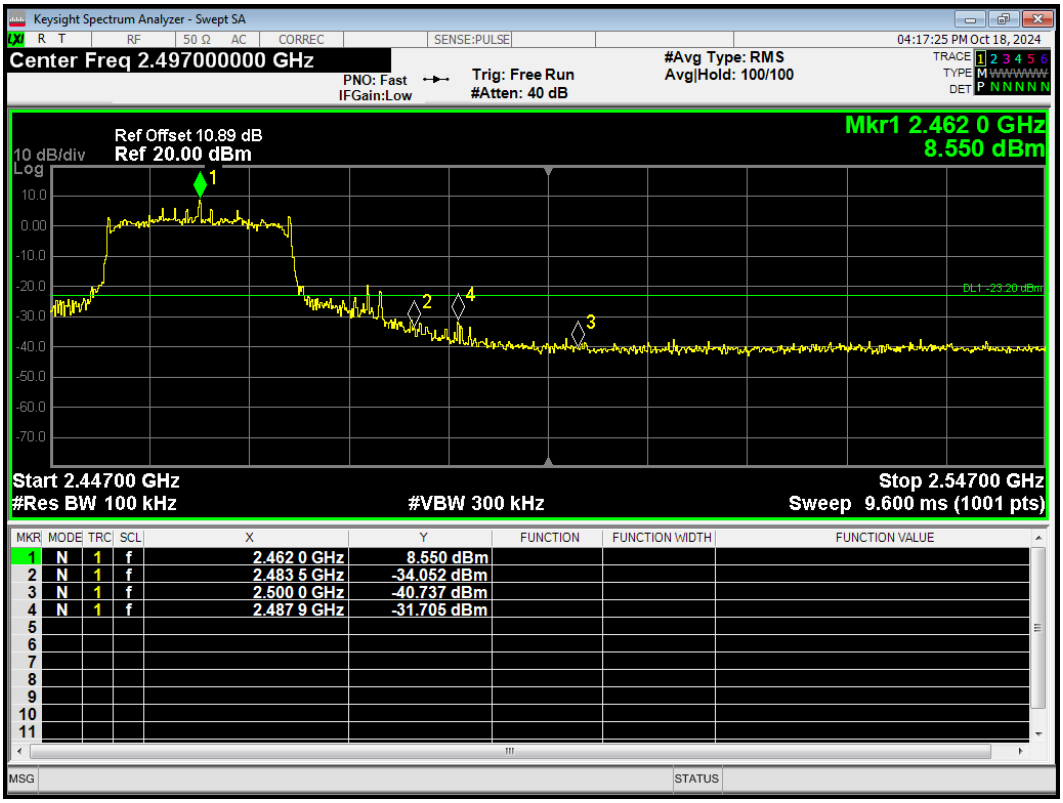
Band Edge 802.11n(HT20) 2412MHz Emission



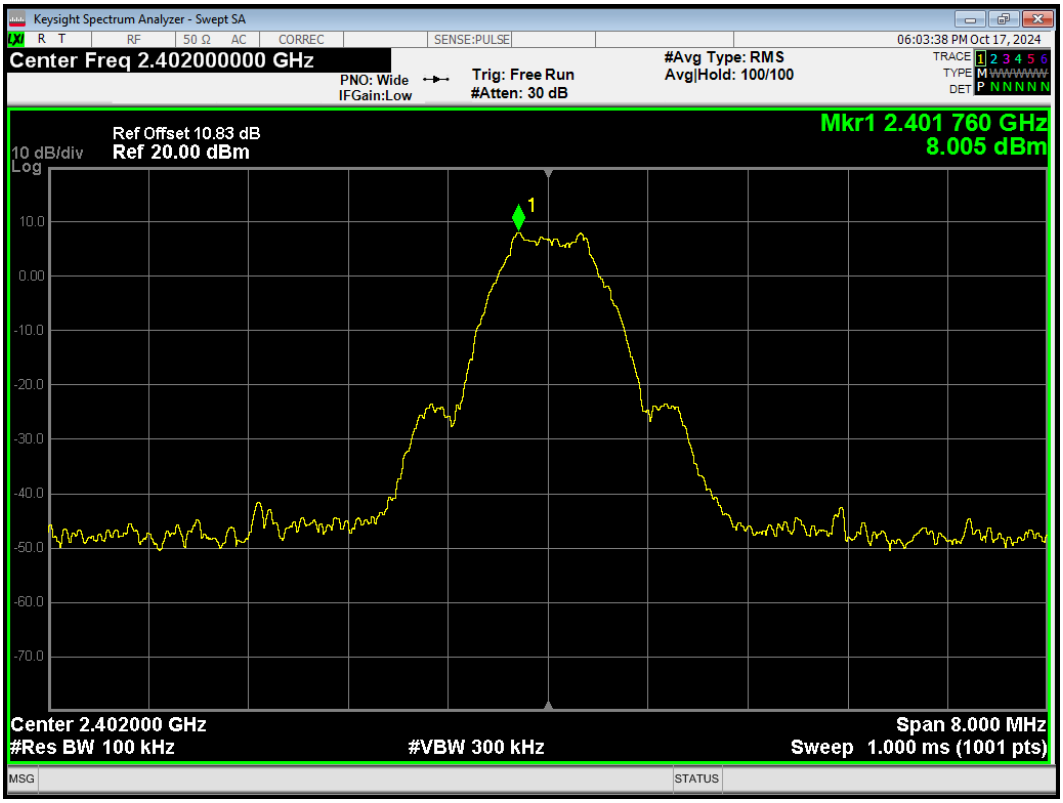
Band Edge 802.11n(HT20) 2462MHz Ref



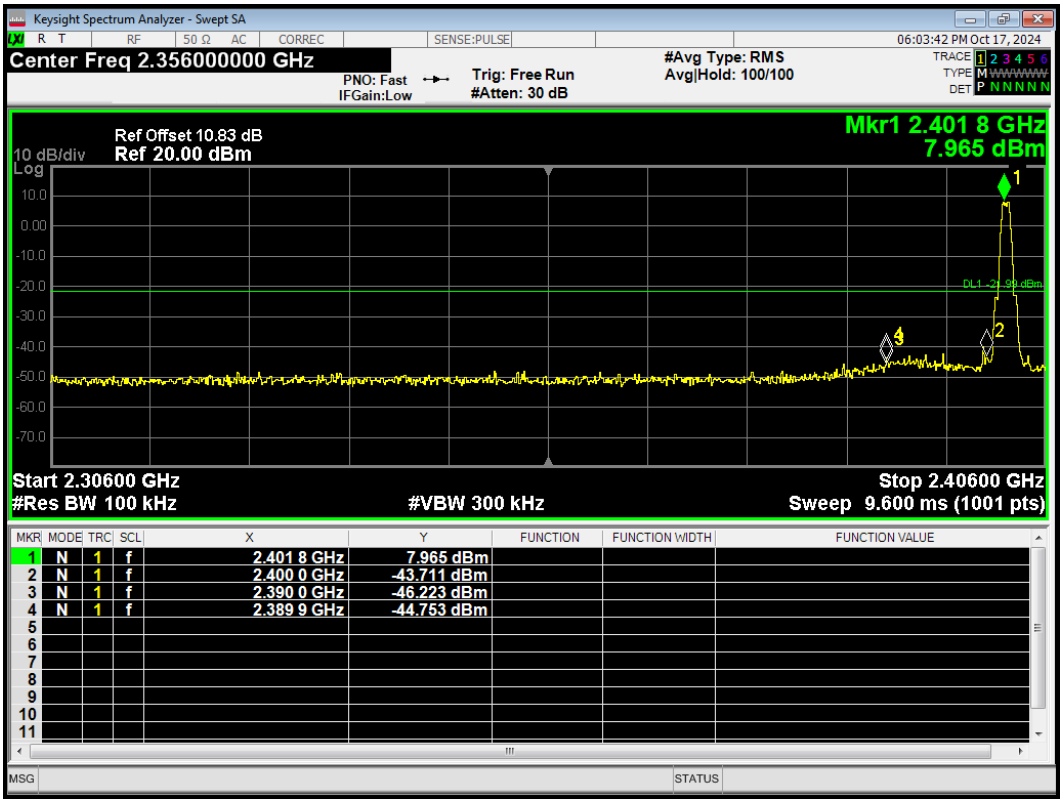
Band Edge 802.11n(HT20) 2462MHz Emission



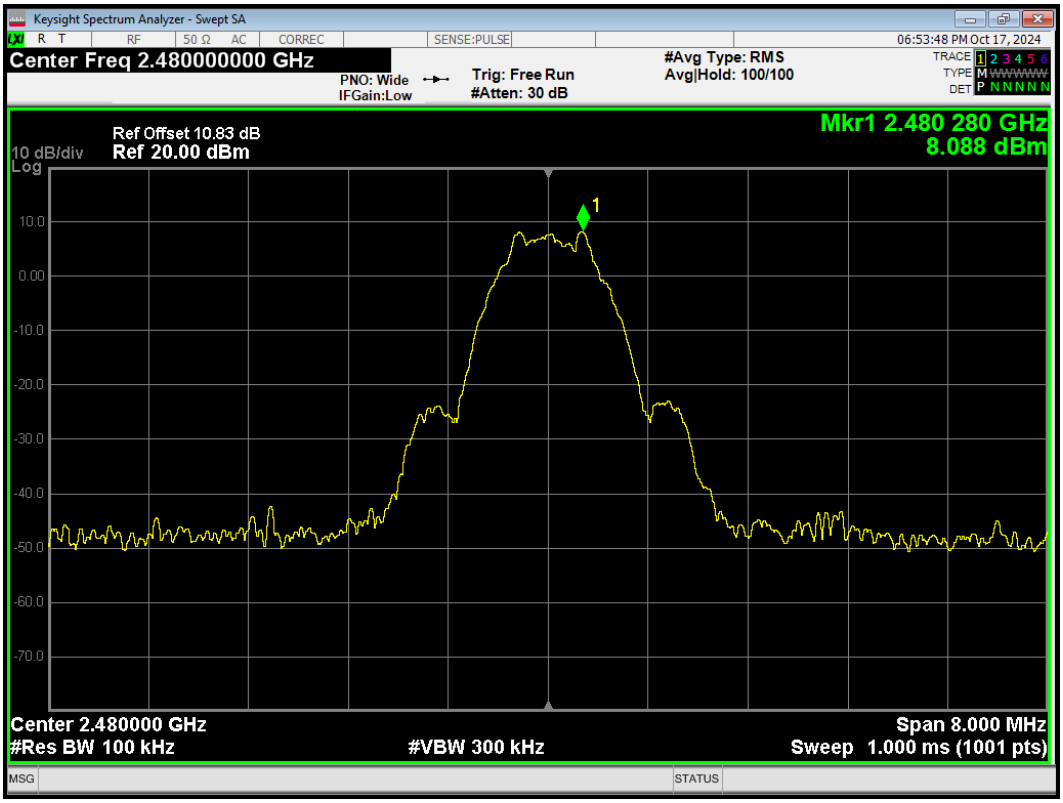
Band Edge BLE 1M 2402MHz Ref



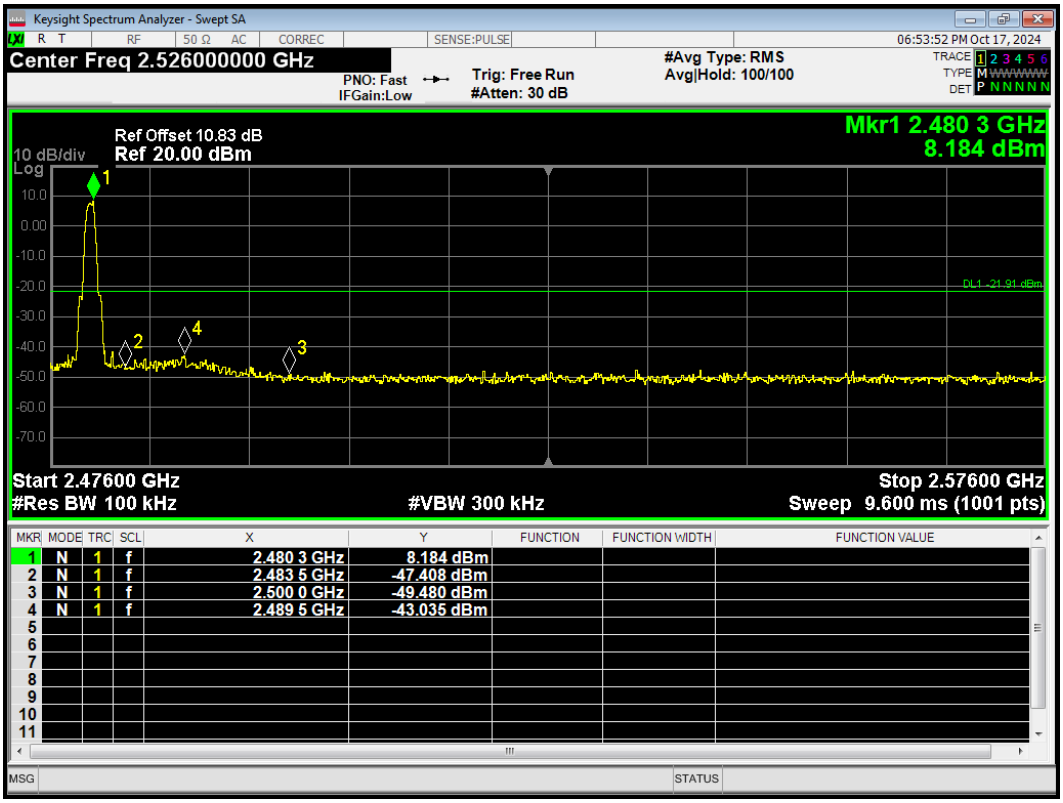
Band Edge BLE 1M 2402MHz Emission



Band Edge BLE 1M 2480MHz Ref

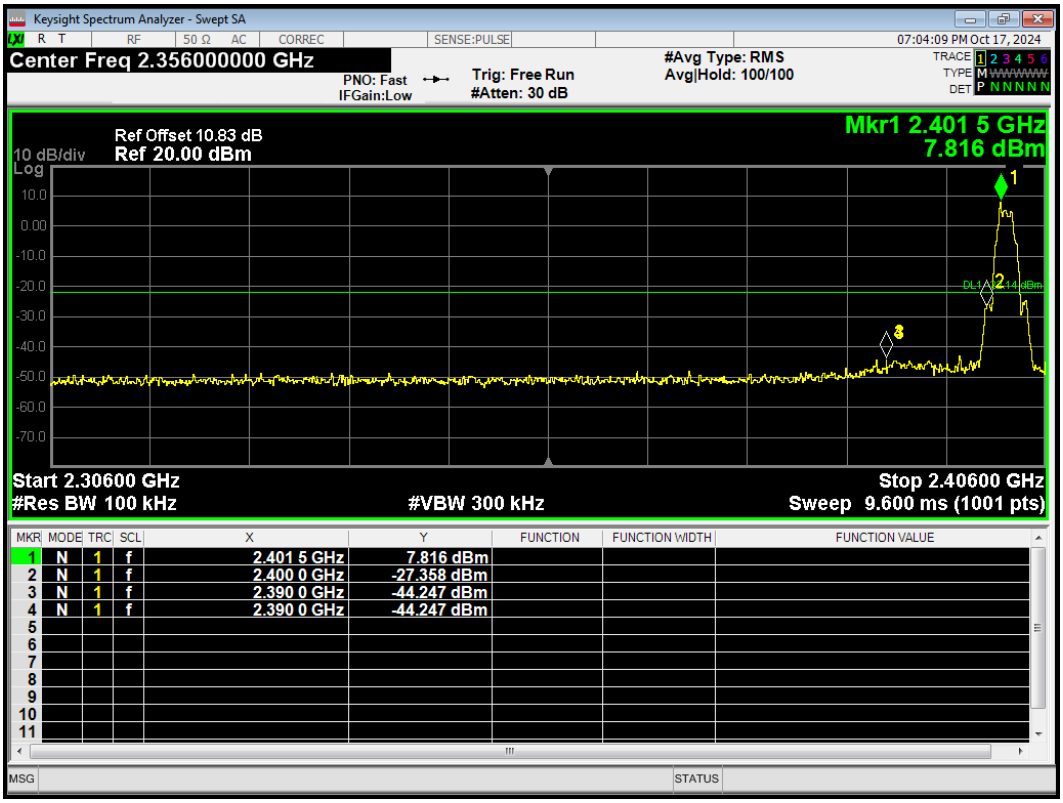


Band Edge BLE 1M 2480MHz Emission

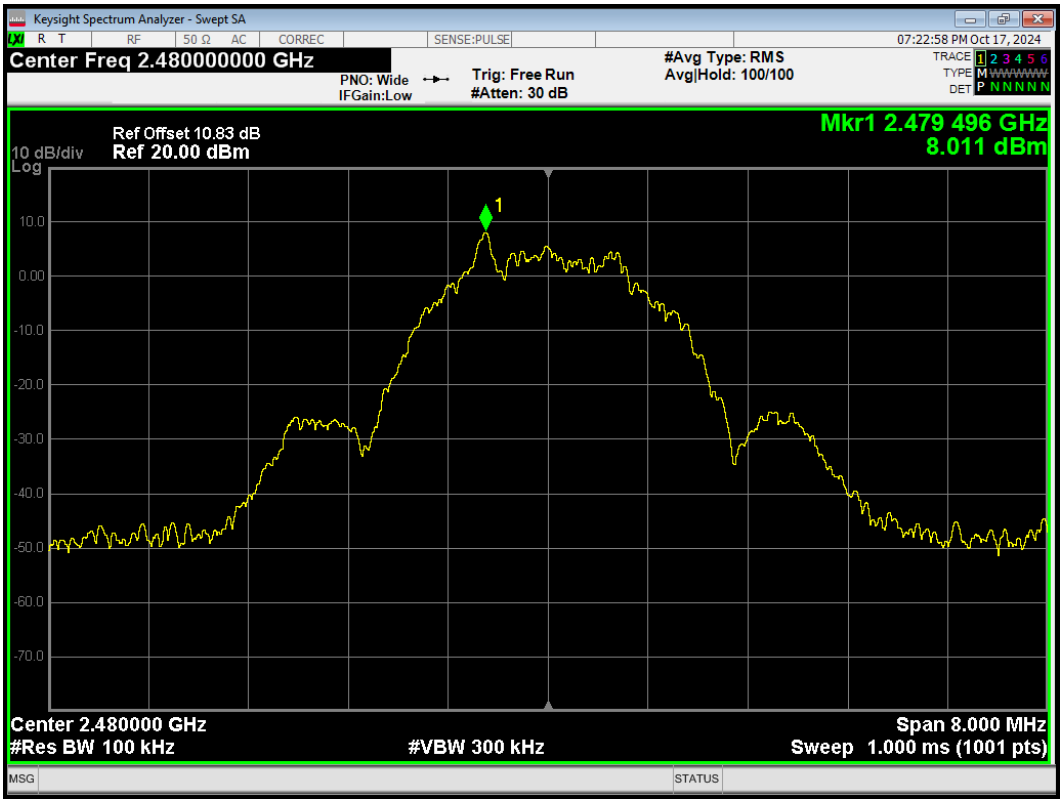


Band Edge BLE 2M 2402MHz Ref

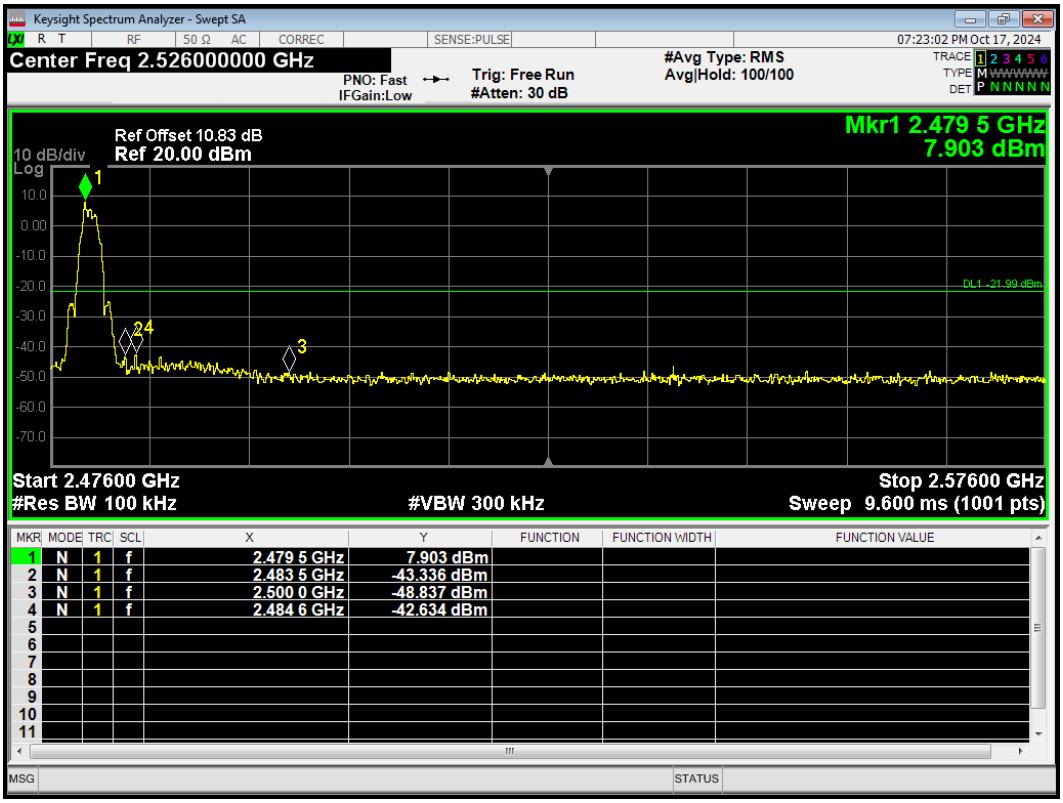
Band Edge BLE 2M 2402MHz Emission



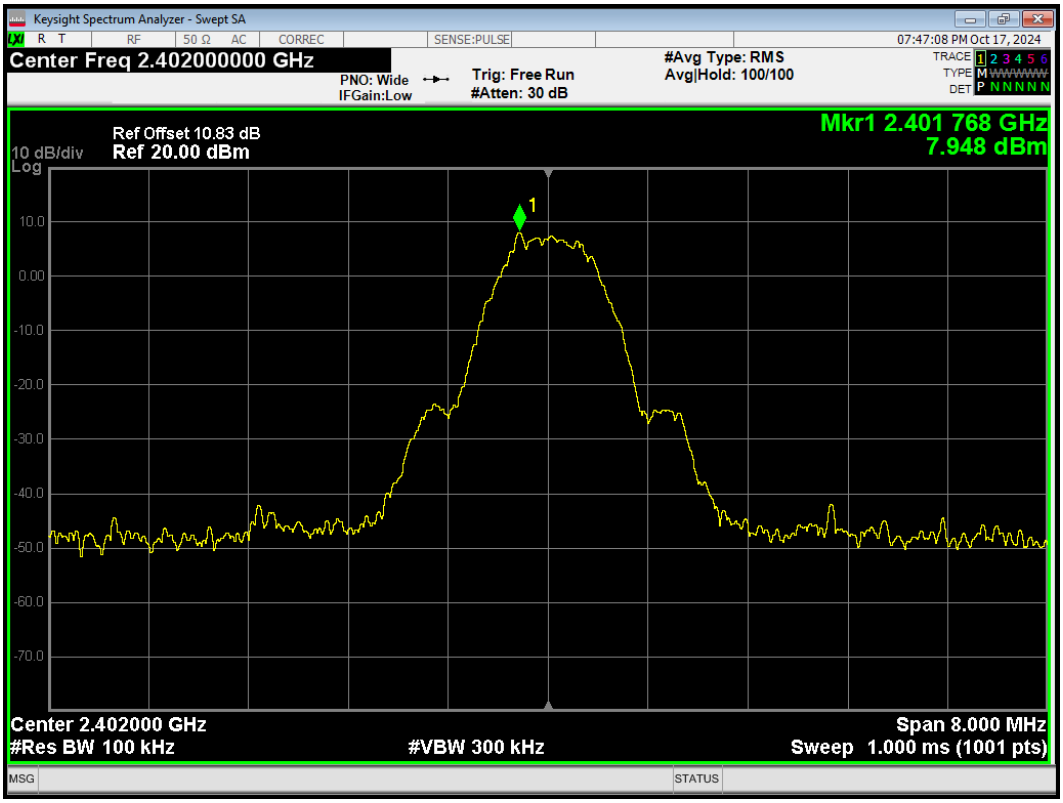
Band Edge BLE 2M 2480MHz Ref



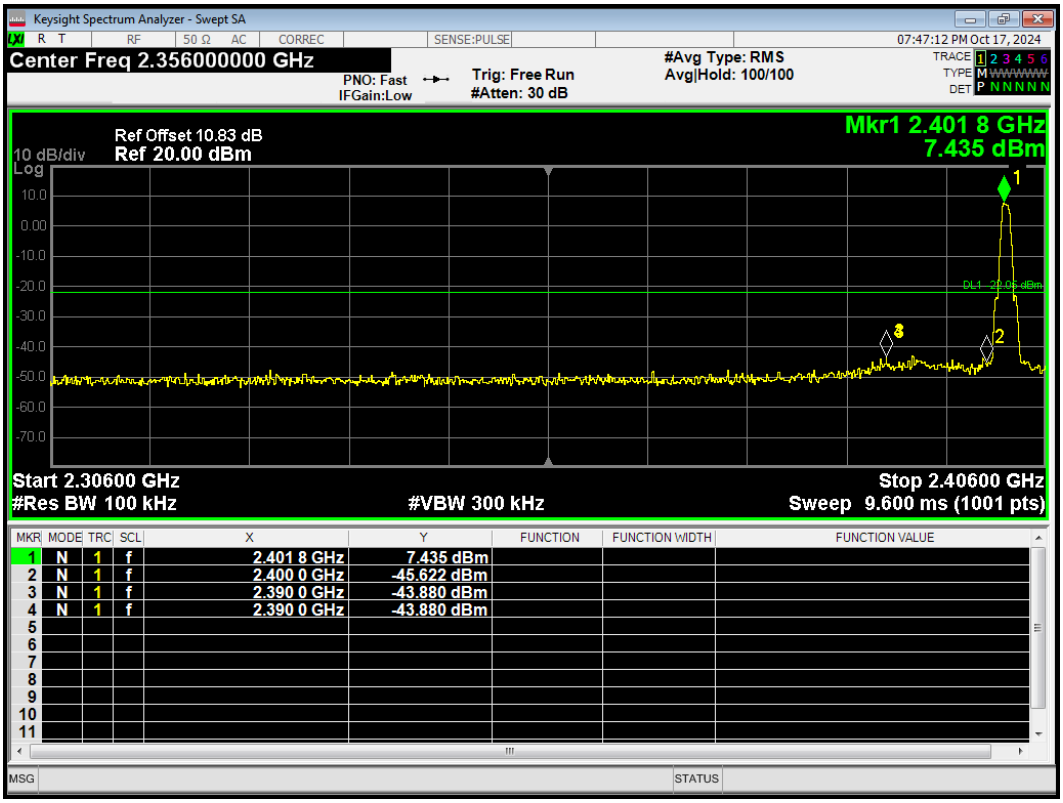
Band Edge BLE 2M 2480MHz Emission



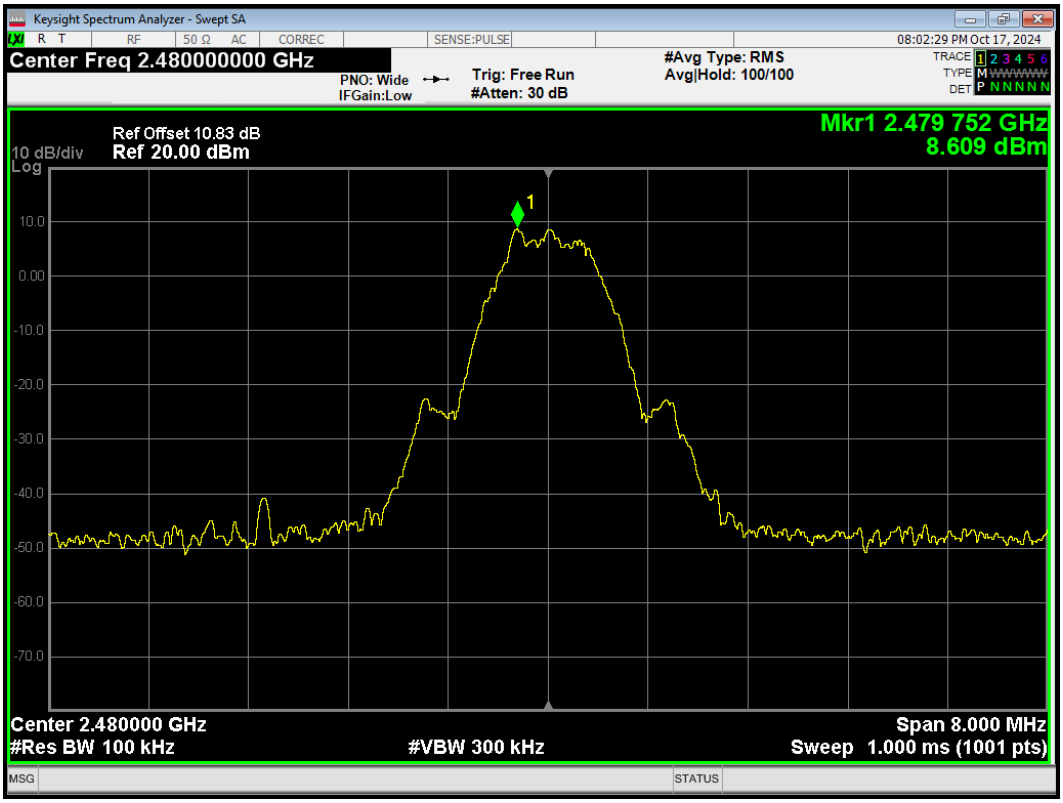
Band Edge BLE S=2 2402MHz Ref



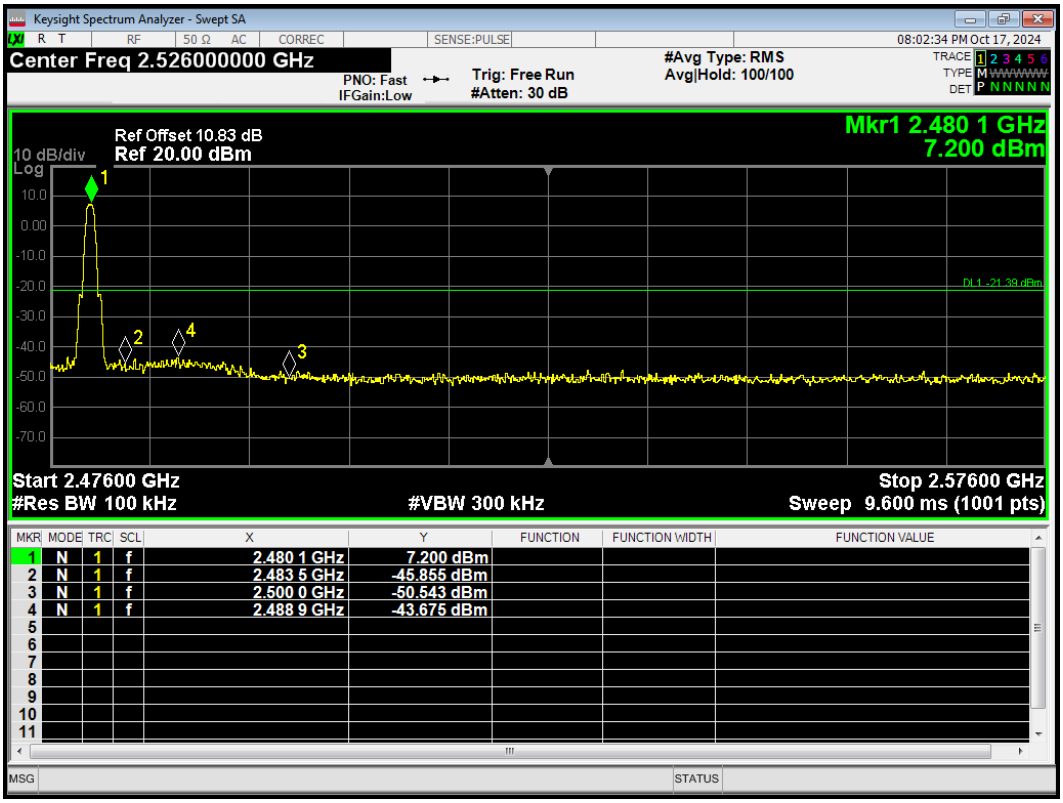
Band Edge BLE S=2 2402MHz Emission



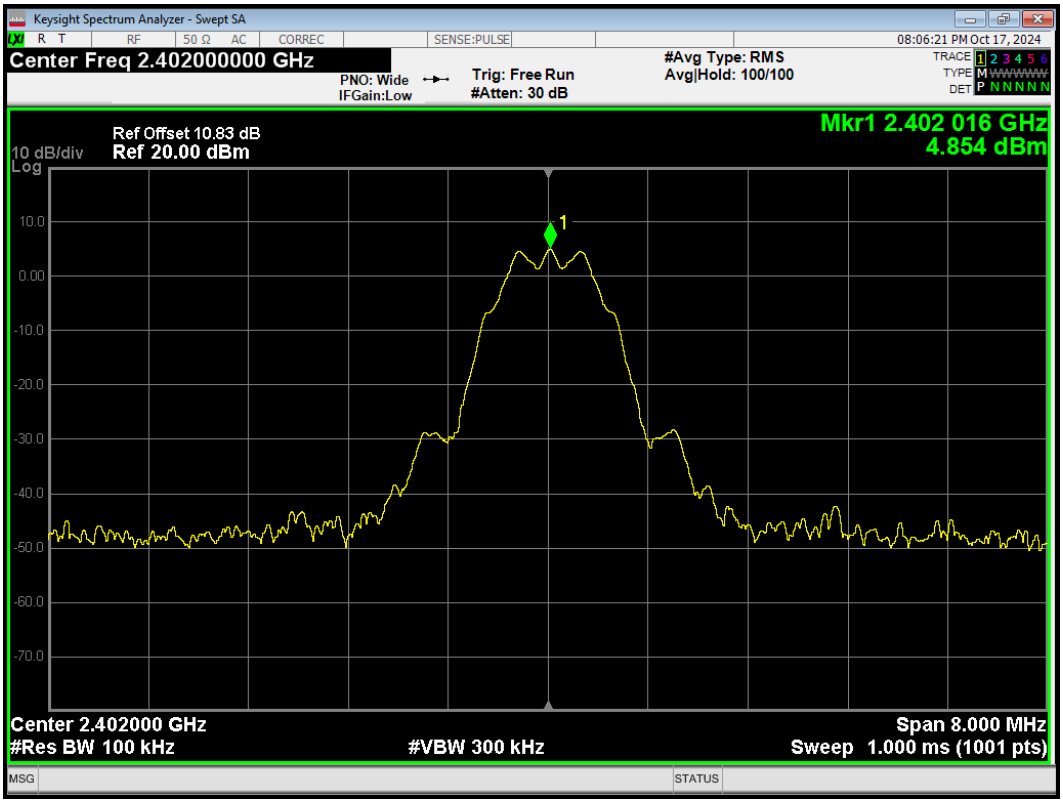
Band Edge BLE S=2 2480MHz Ref



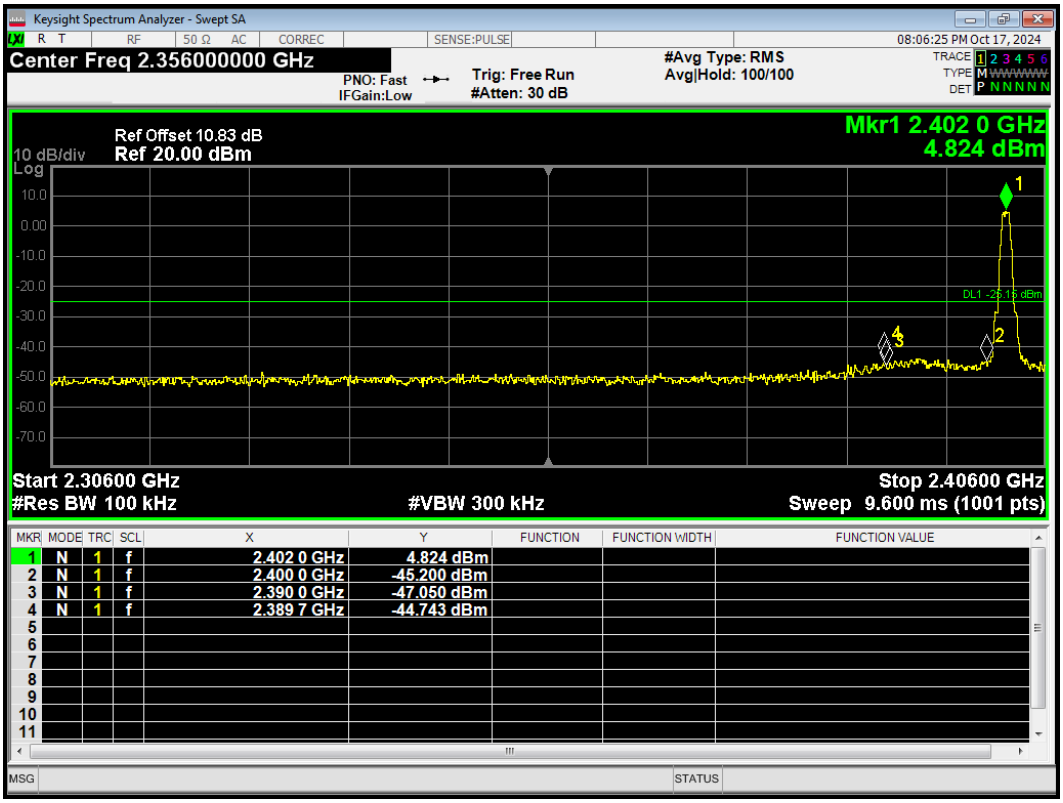
Band Edge BLE S=2 2480MHz Emission



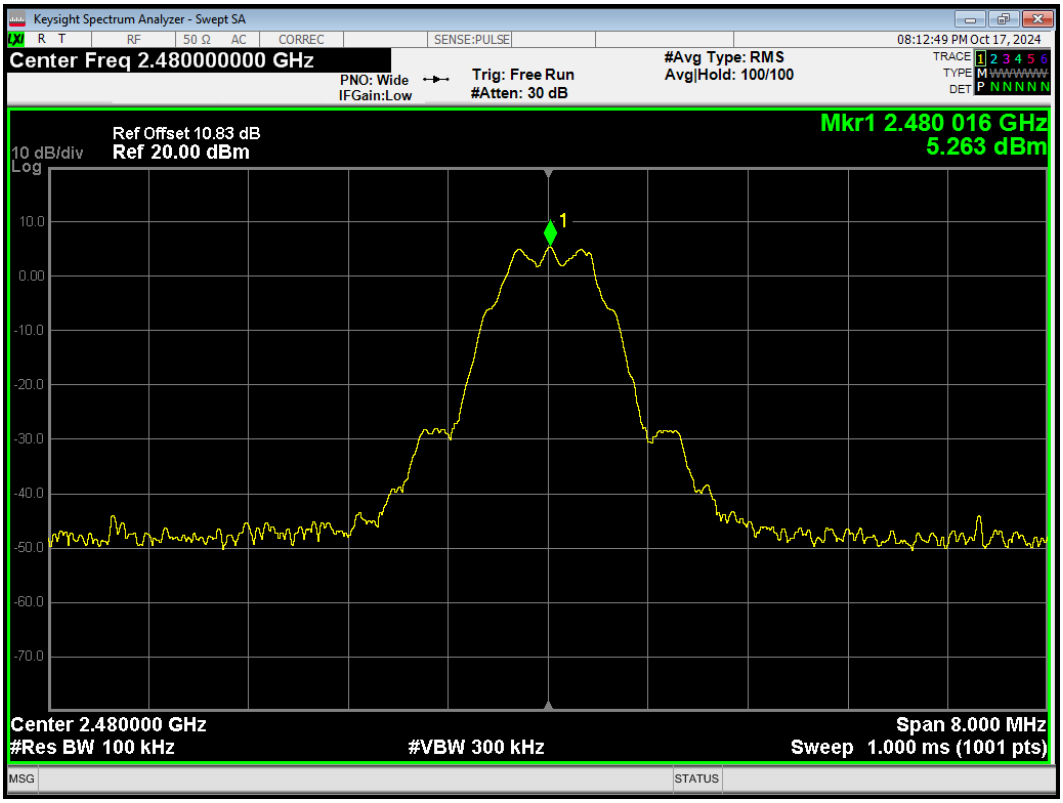
Band Edge BLE S=8 2402MHz Ref



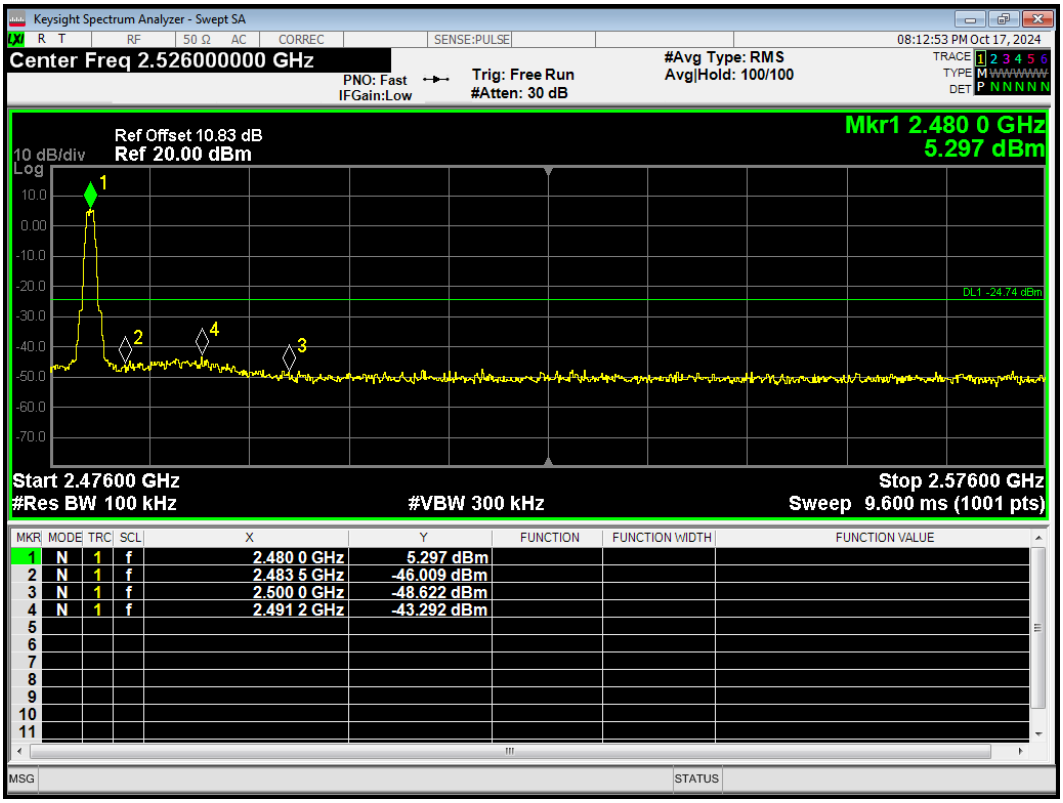
Band Edge BLE S=8 2402MHz Emission



Band Edge BLE S=8 2480MHz Ref



Band Edge BLE S=8 2480MHz Emission



5.4. Power Spectral Density

Ambient Condition

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

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.

a) Set instrument center frequency to DTS channel center frequency

b) Set span to at least 1.5 times the OBW

c) Set RBW to:3kHz≤RBW≤100kHz

d) Set VBW≥[3x RBW]

e) Detector=power averaging (rms) or sample detector (when rms not available)

f) Ensure that the number of measurement points in the sweep ≥ [2 X span/RBW]

g) Sweep time auto couple

h) Employ trace averaging (rms) mode over a minimum of 100 traces

i) Use the peak marker function to determine the maximum amplitude level.

j) 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.

a) Measure the duty cycle (D)of the transmitter output signal as described in 11.6

b) Set instrument center frequency to DTS channel center frequency

c) Set span to at least 1.5 times the OBW

d) Set RBW to:3kHz≤RBW≤100kHz

e) Set VBW≥[3x RBW]

f) Detector= power averaging (rms) or sample detector (when rms not available)

g) Ensure that the number of measurement points in the sweep ≥ [2 X span/RBW]

h) Sweep time =auto couple

i) Do not use sweep triggering; allow sweep to "free run”

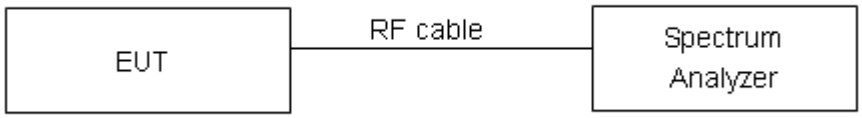
j) Employ trace averaging (rms) mode over a minimum of 100 traces

k) Use the peak marker function to determine the maximum amplitude level

l) 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

m) 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. ‘’

Rule RSS-247 -5.2(b) specifies that" The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. ‘’

Limits	≤ 8 dBm / 3kHz

Measurement Uncertainty

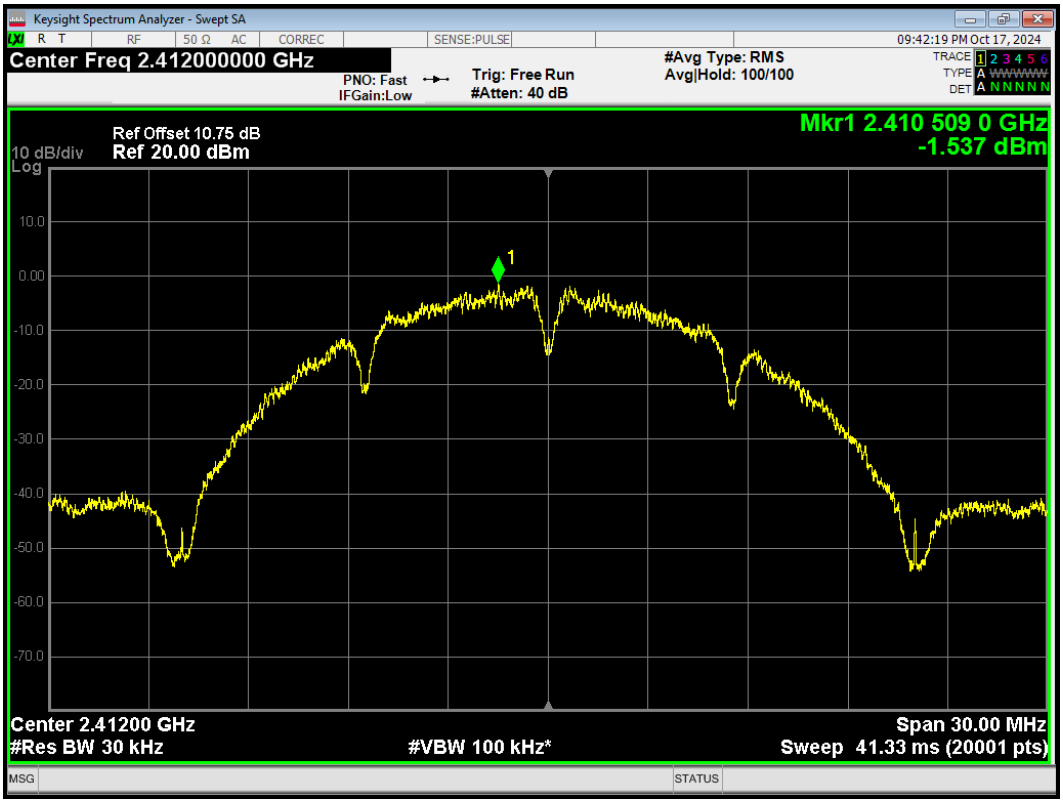
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 0.75dB.

Test Results:

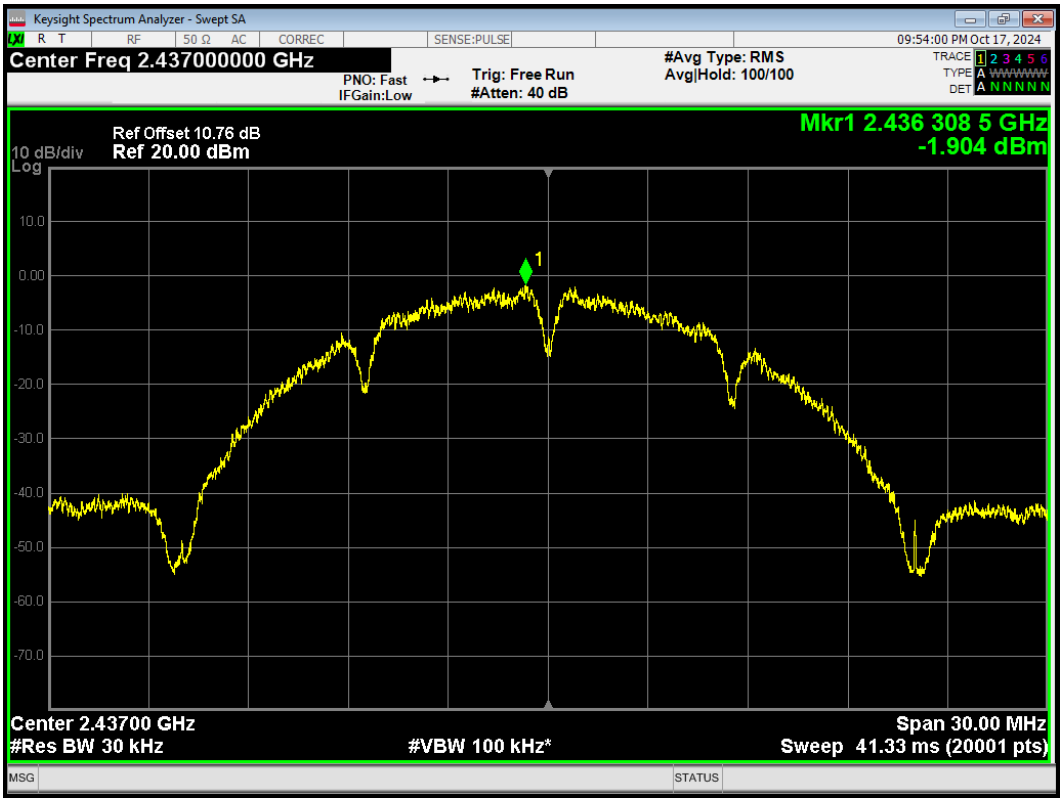
Test Mode	Carrier frequency (MHz))/ Channel	Read Value (dBm / 30kHz)	Power Spectral Density (dBm / 3kHz)	Limit (dBm / 3kHz)	Conclusion
802.11b	2412/CH 1	-1.54	-11.54	8	PASS
	2437/CH 6	-1.90	-11.90	8	PASS
	2462/CH11	-2.10	-12.10	8	PASS
802.11g	2412/CH 1	-6.59	-16.59	8	PASS
	2437/CH 6	-4.38	-14.38	8	PASS
	2462/CH11	-4.77	-14.77	8	PASS
802.11n HT20	2412/CH 1	-5.29	-15.29	8	PASS
	2437/CH 6	-5.32	-15.32	8	PASS
	2462/CH11	-5.03	-15.03	8	PASS
Note: Power Spectral Density (dBm/3kHz) =Read Value+Duty cycle correction factor + 10*log10(3/30)					

Test Mode	Carrier frequency (MHz))/ Channel	Read Value (dBm / 3kHz)	Power Spectral Density (dBm / 3kHz)	Limit (dBm / 3kHz)	Conclusion
Bluetooth (Low Energy) (1M)	2402/CH0	-11.94	-9.92	8	PASS
	2440/CH19	-12.00	-9.98	8	PASS
	2480/CH39	-12.01	-9.99	8	PASS
Bluetooth (Low Energy) (2M)	2402/CH0	-17.14	-12.36	8	PASS
	2440/CH19	-17.46	-12.68	8	PASS
	2480/CH39	-17.13	-12.35	8	PASS
Bluetooth (Low Energy) (S=2)	2402/CH0	-5.90	-3.46	8	PASS
	2440/CH19	-5.87	-3.43	8	PASS
	2480/CH39	-5.34	-2.90	8	PASS
Bluetooth (Low Energy) (S=8)	2402/CH0	-0.22	0.60	8	PASS
	2440/CH19	0.18	1.00	8	PASS
	2480/CH39	0.70	1.52	8	PASS
Note: Power Spectral Density =Read Value+Duty cycle correction factor					

PSD 802.11b 2412MHz



PSD 802.11b 2437MHz



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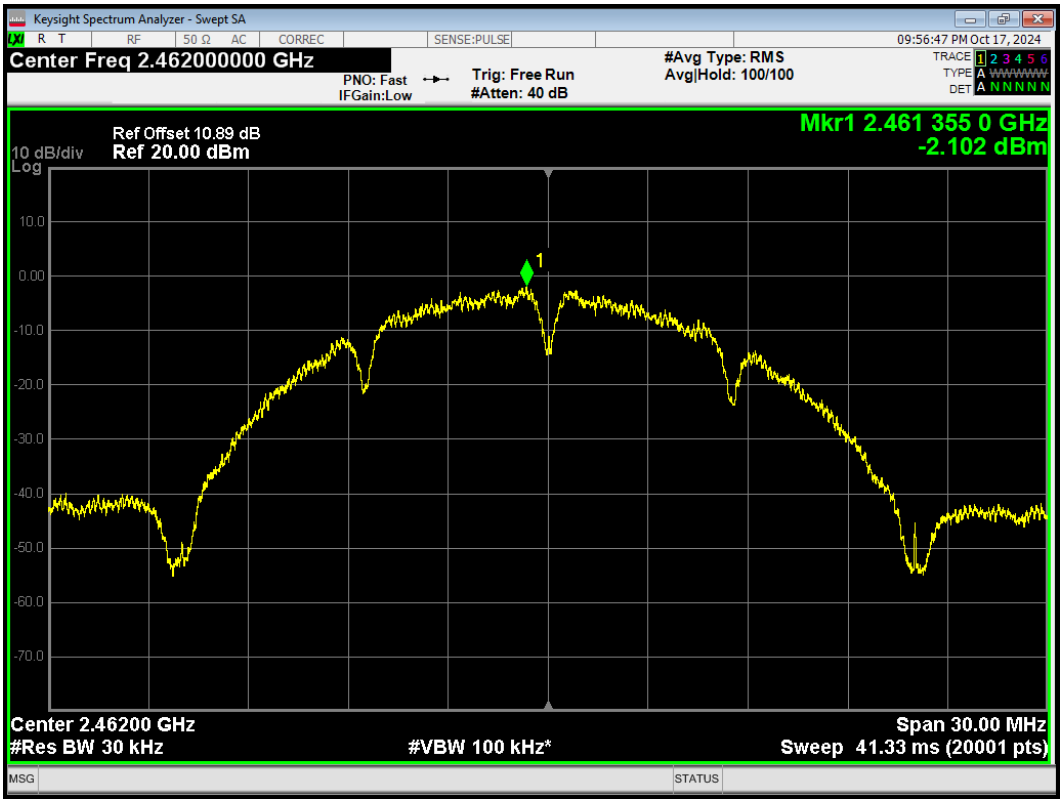

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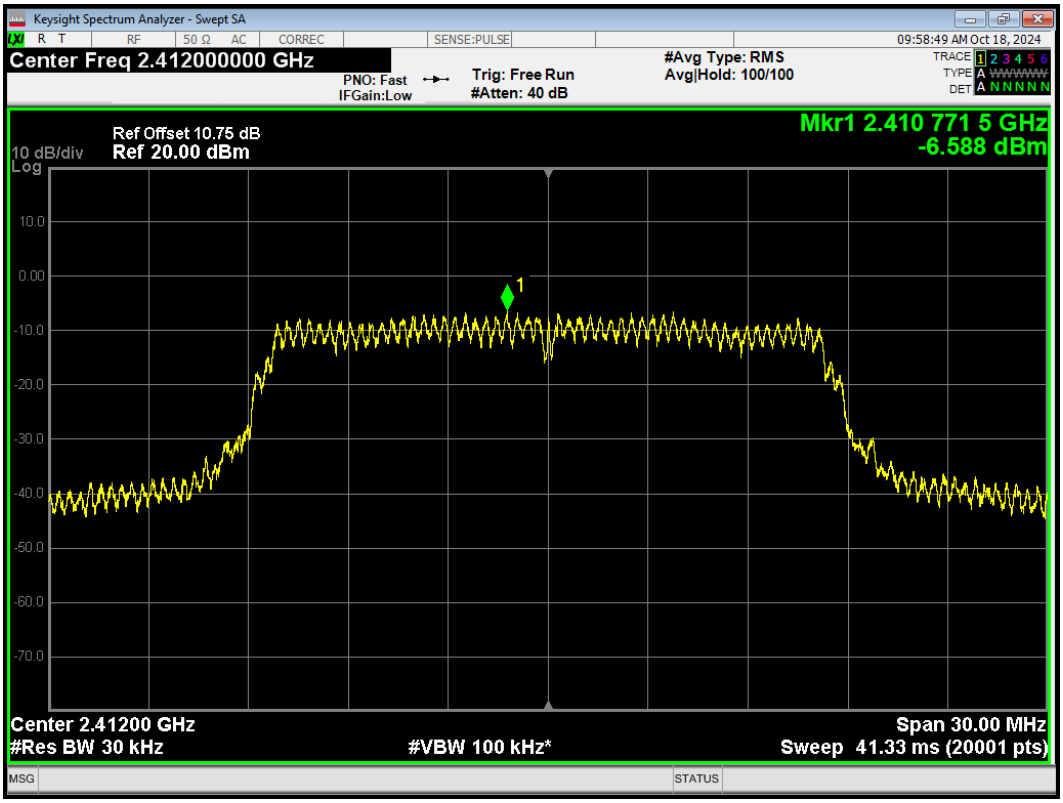

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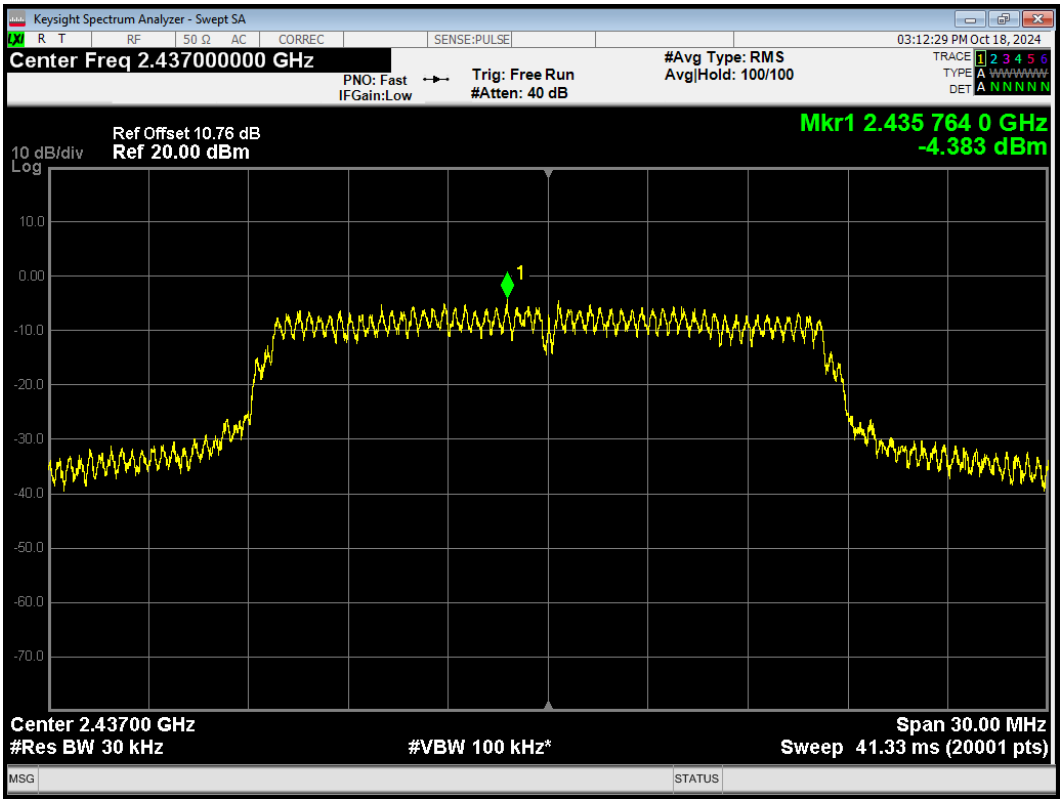

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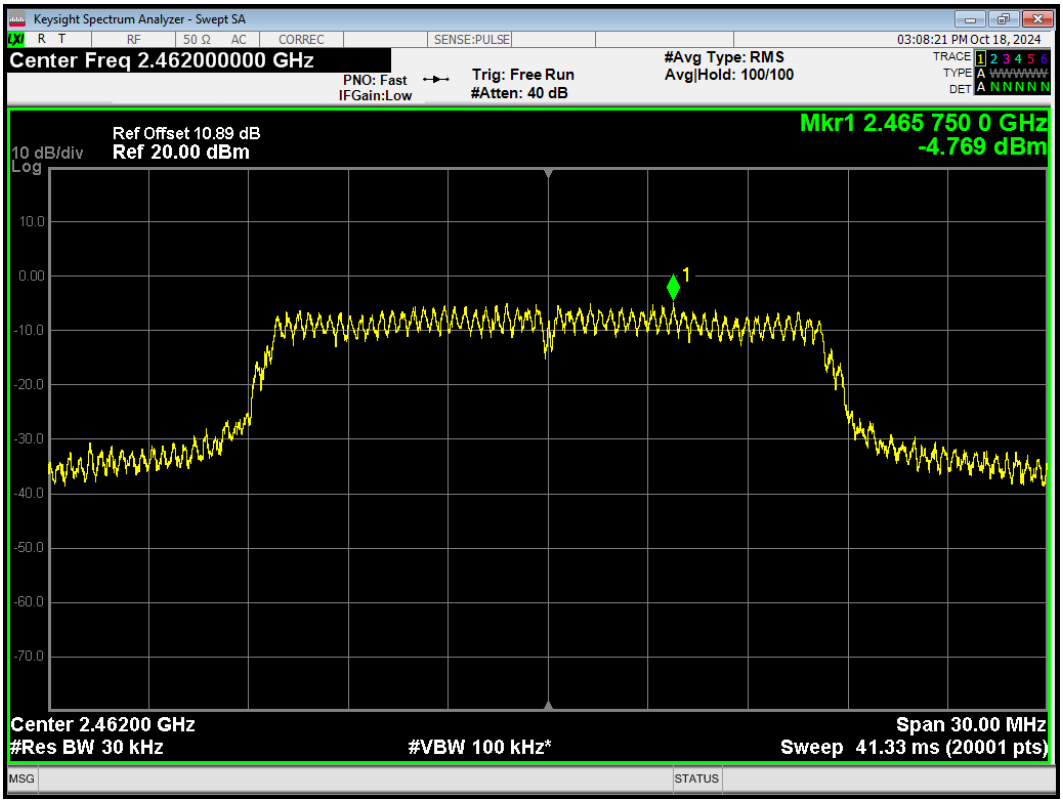
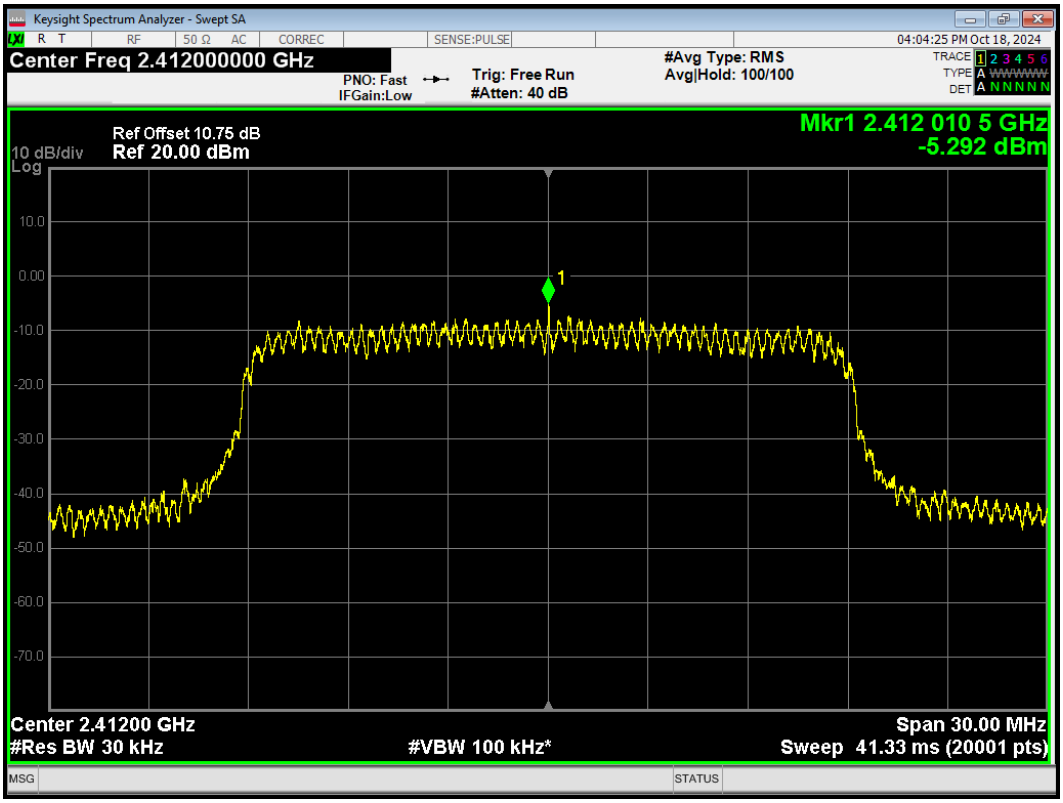


PSD 802.11n(HT20) 2412MHz



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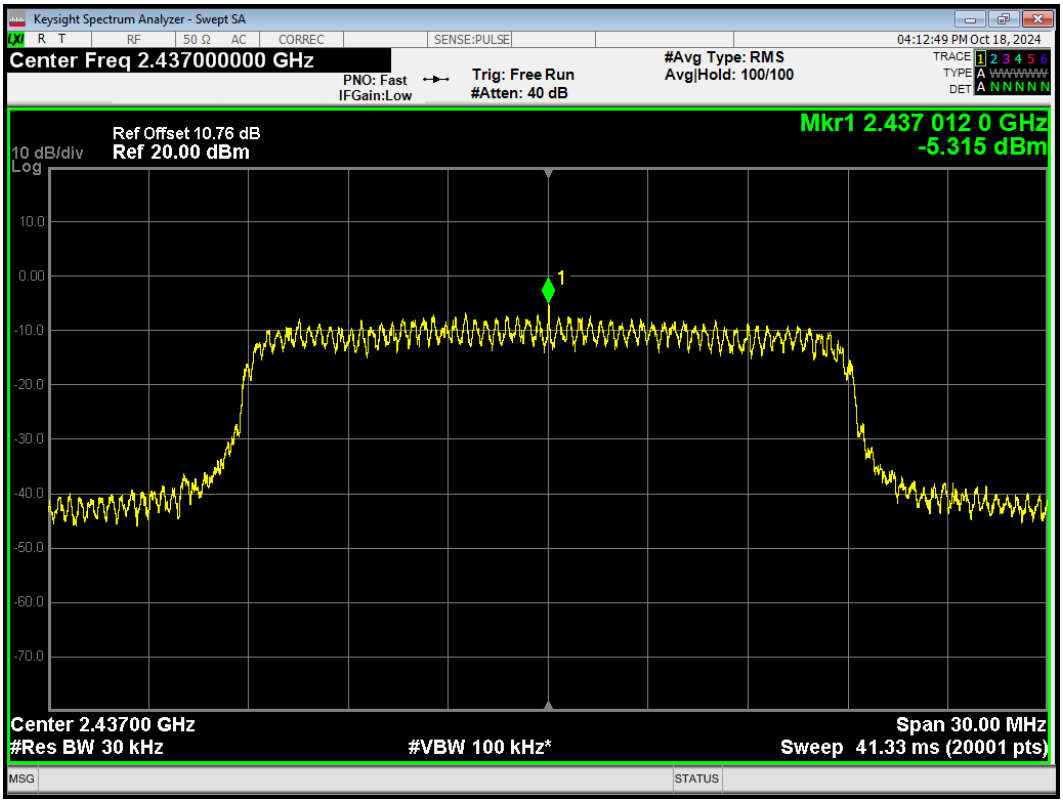

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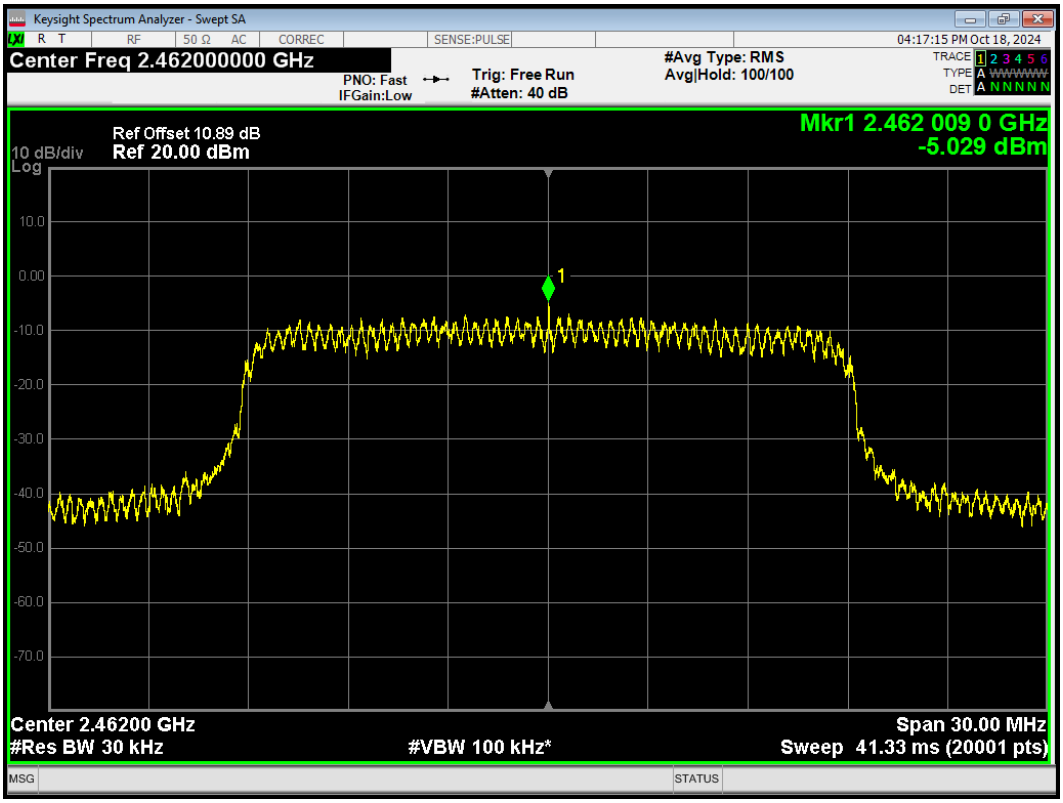
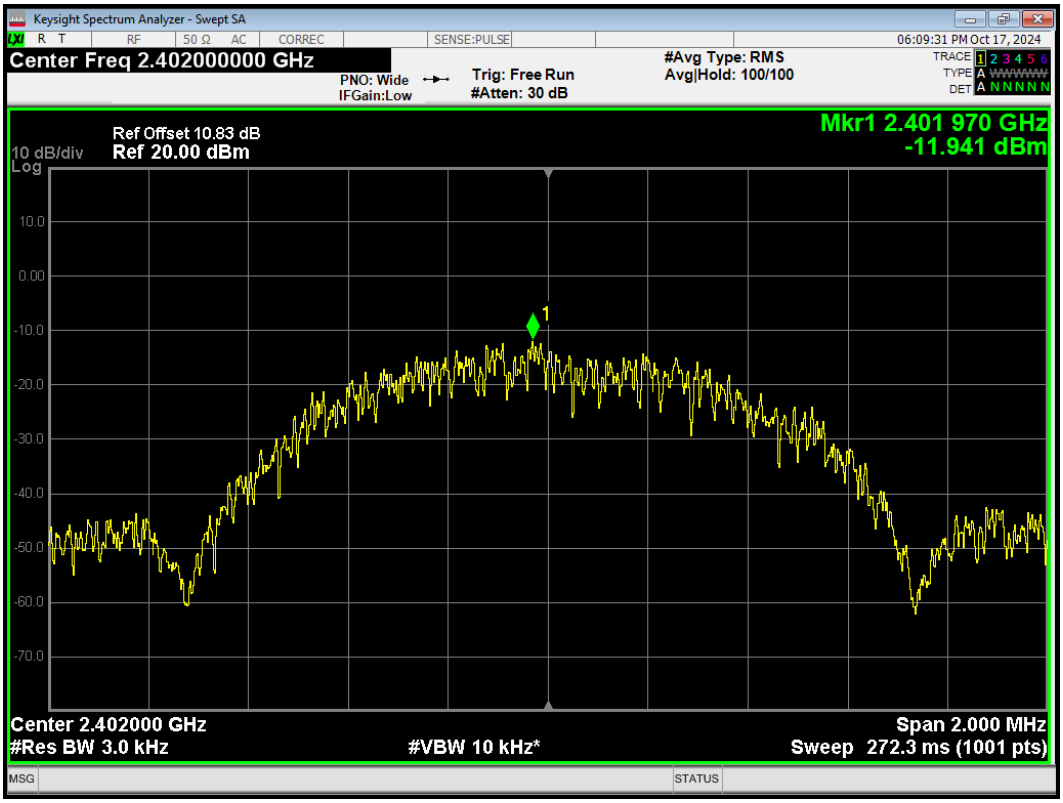


PSD BLE 1M 2402MHz



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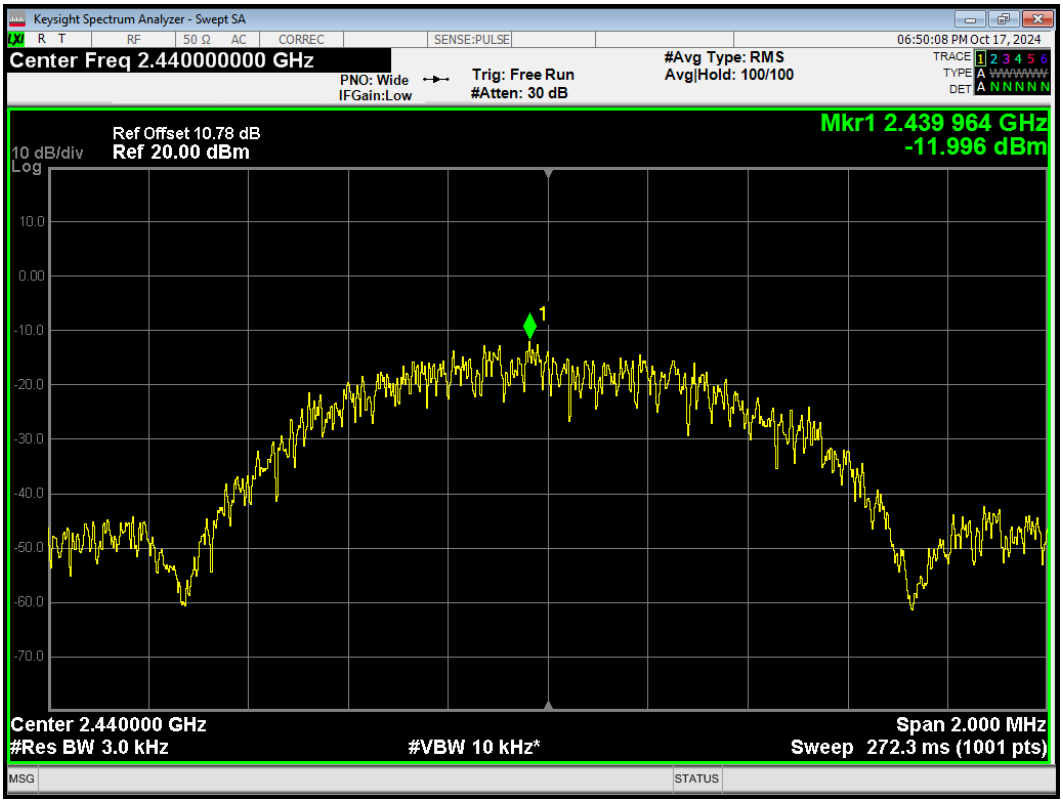

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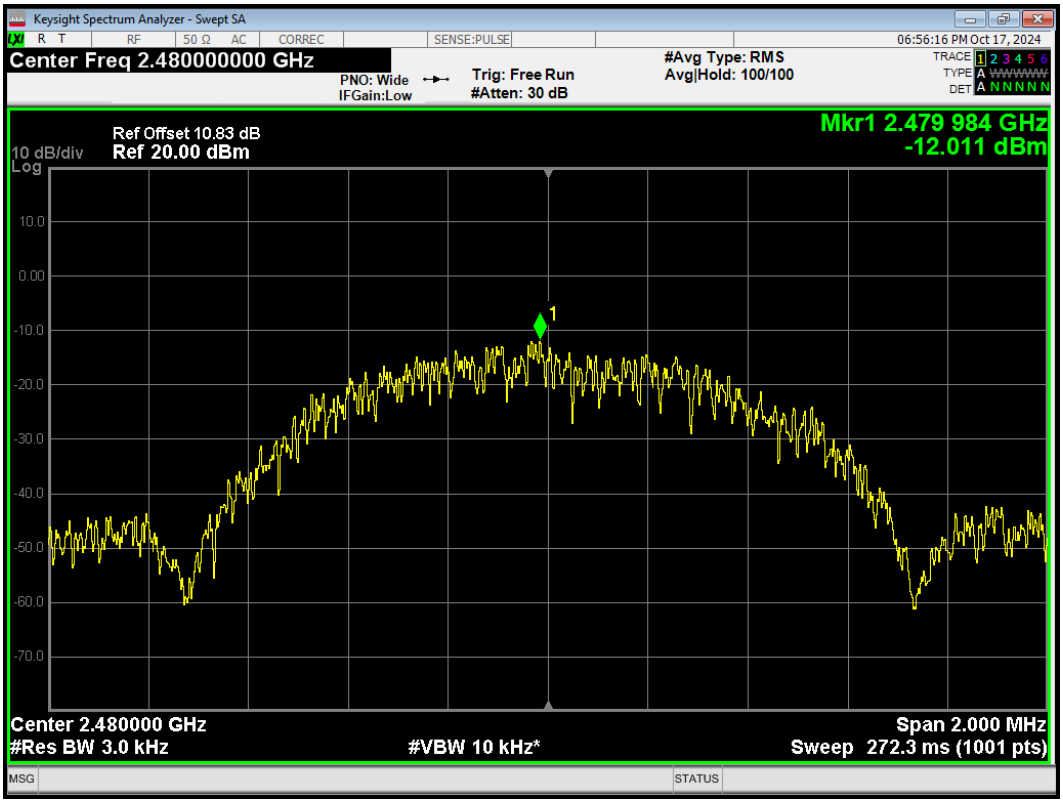

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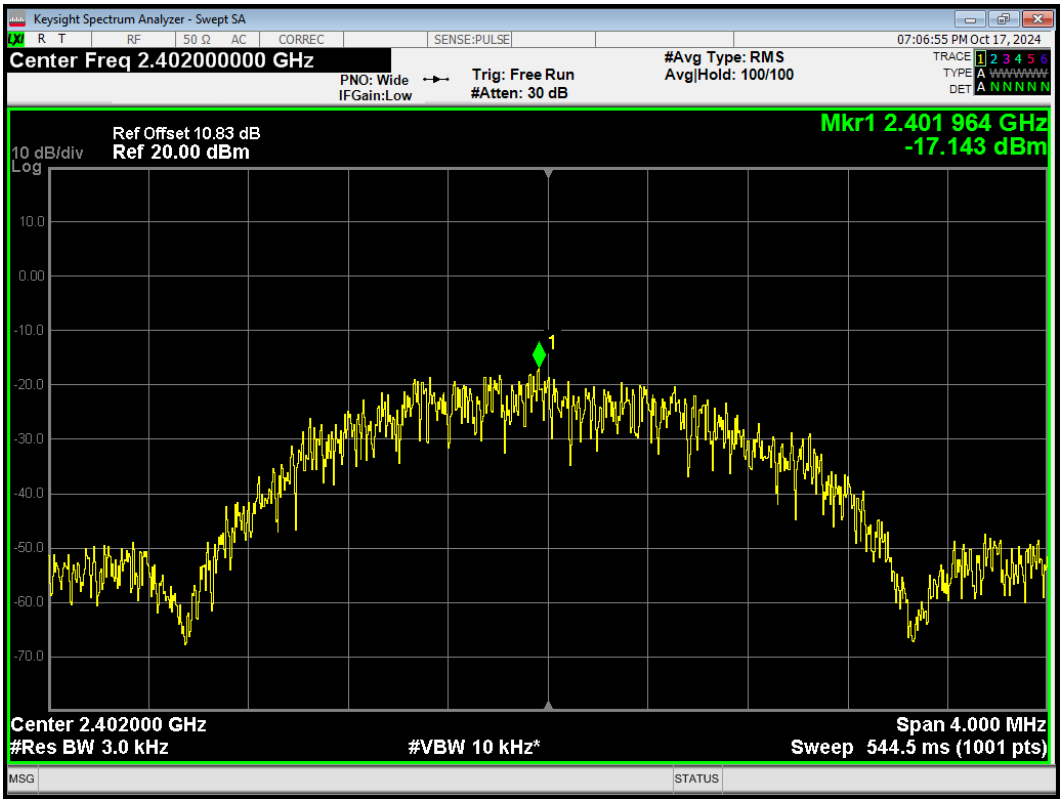

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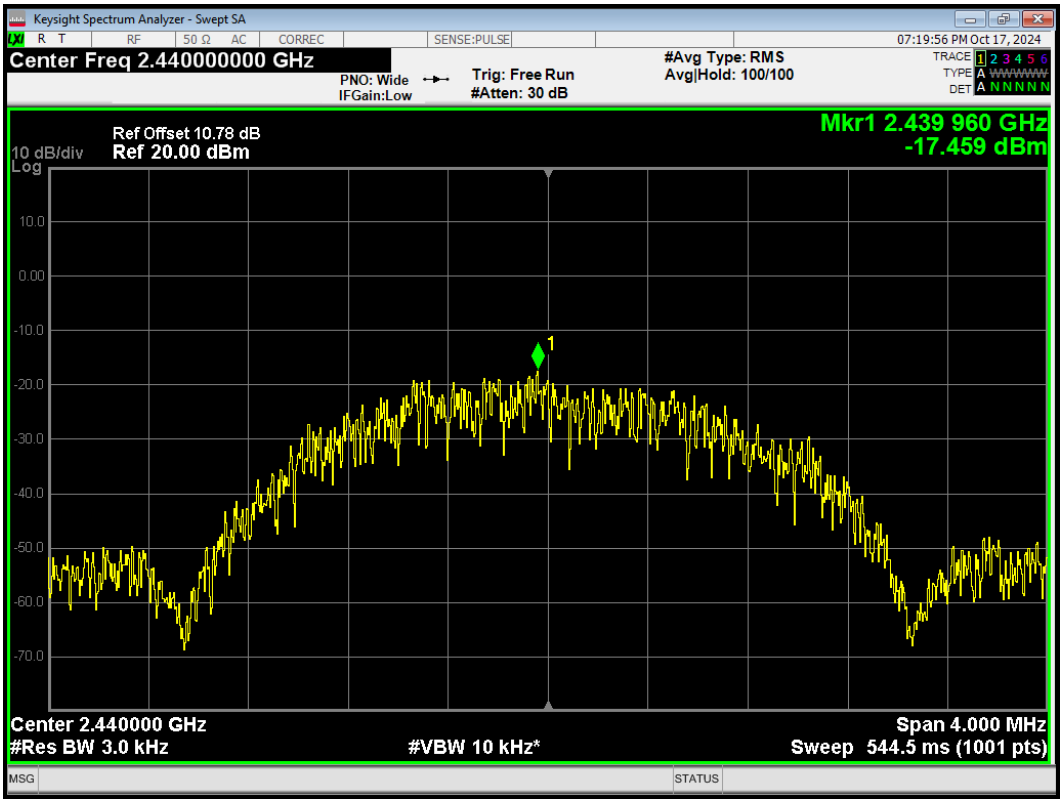

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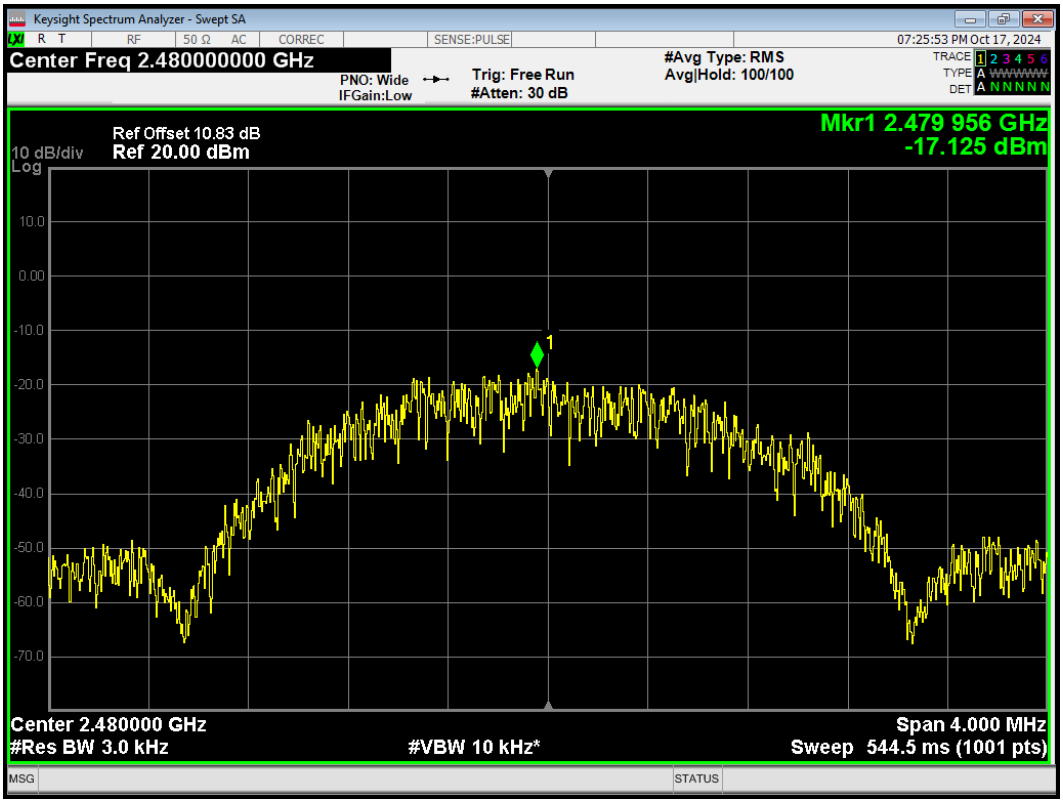
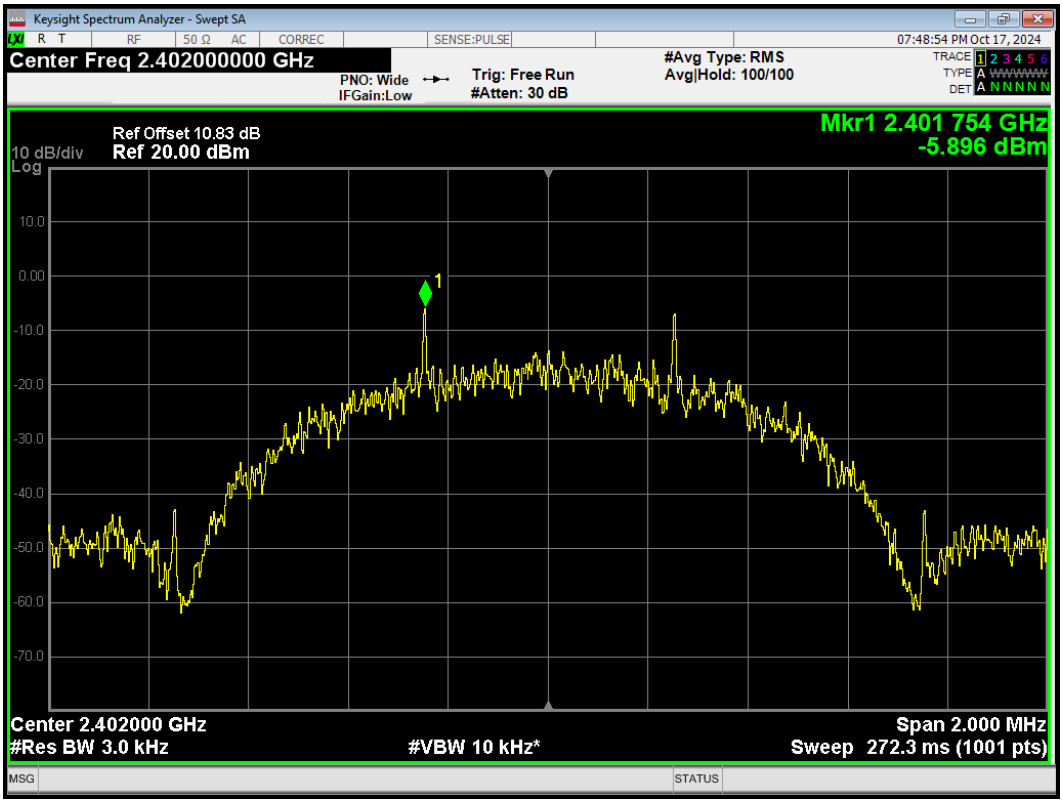


PSD BLE S=2 2402MHz



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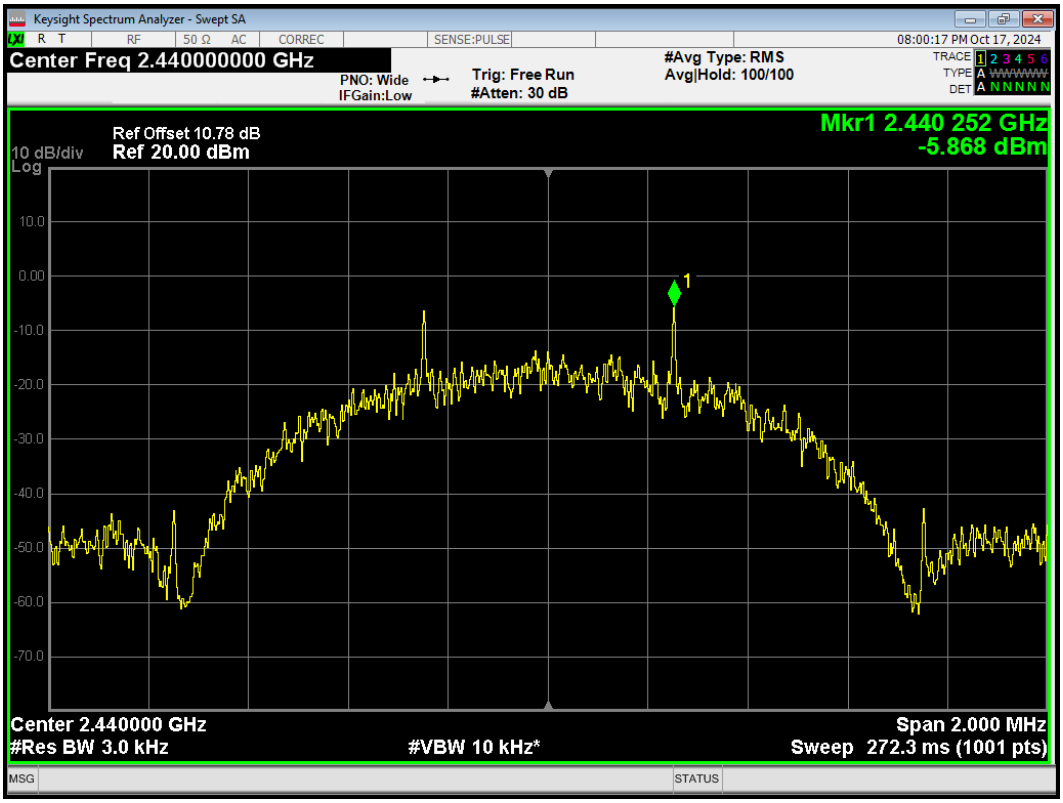
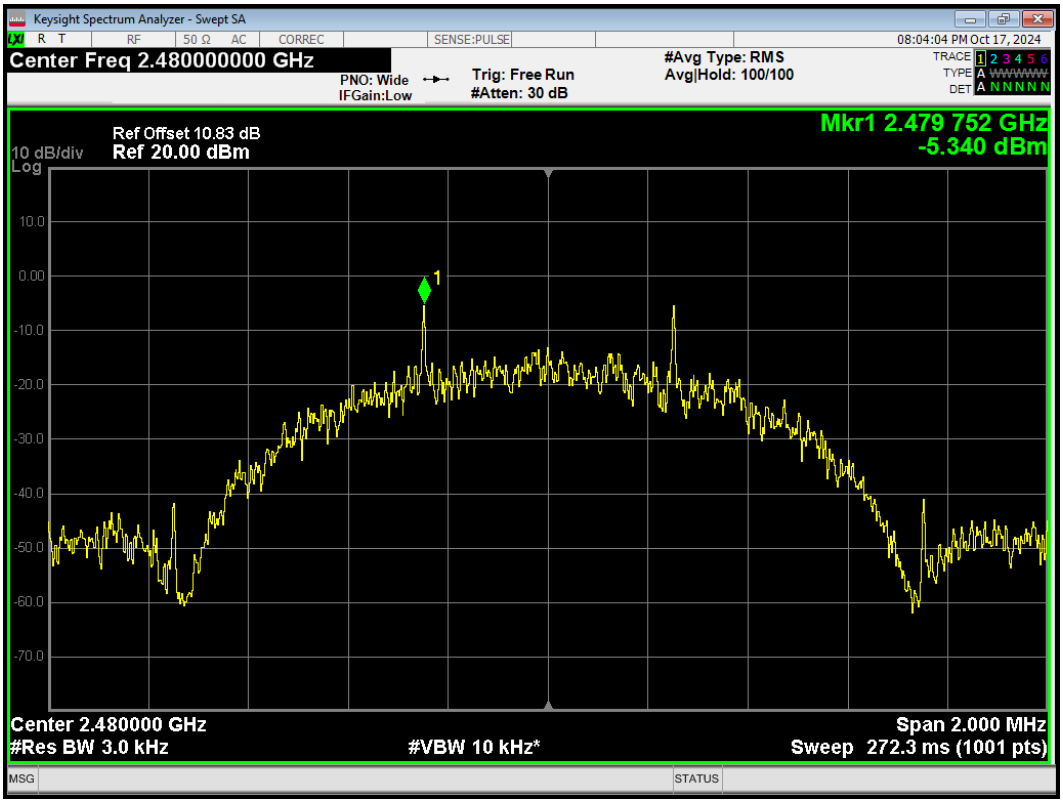
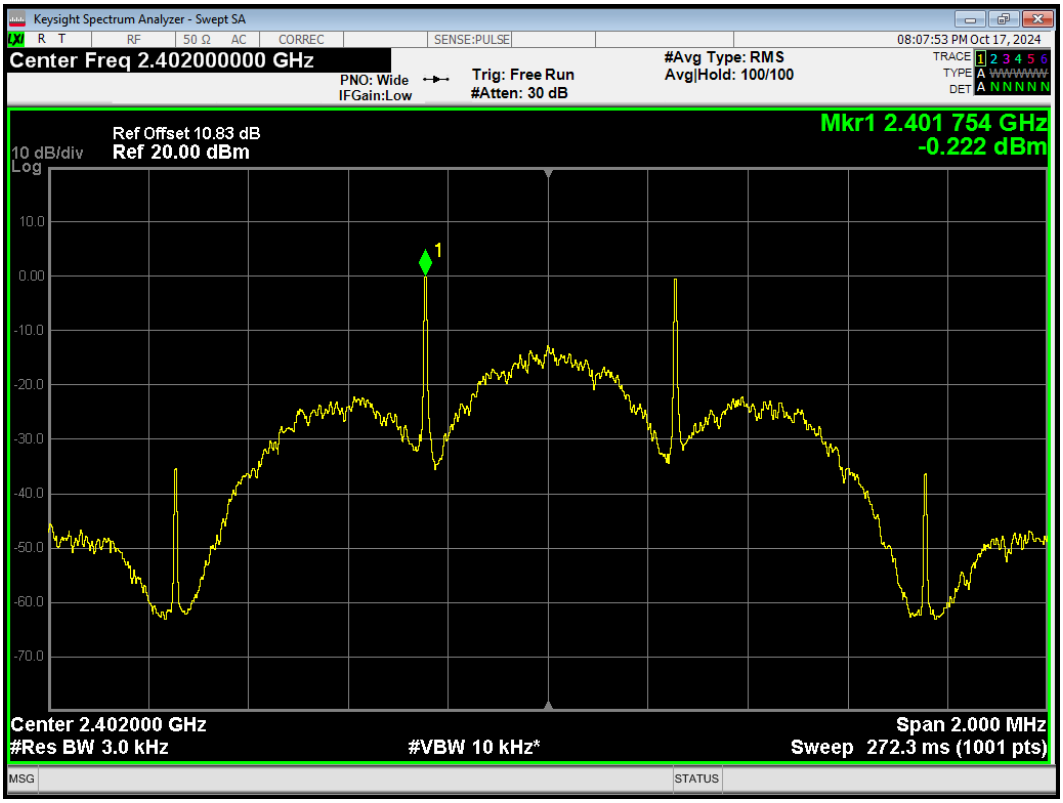


PSD BLE S=2 2480MHz



PSD BLE S=8 2402MHz



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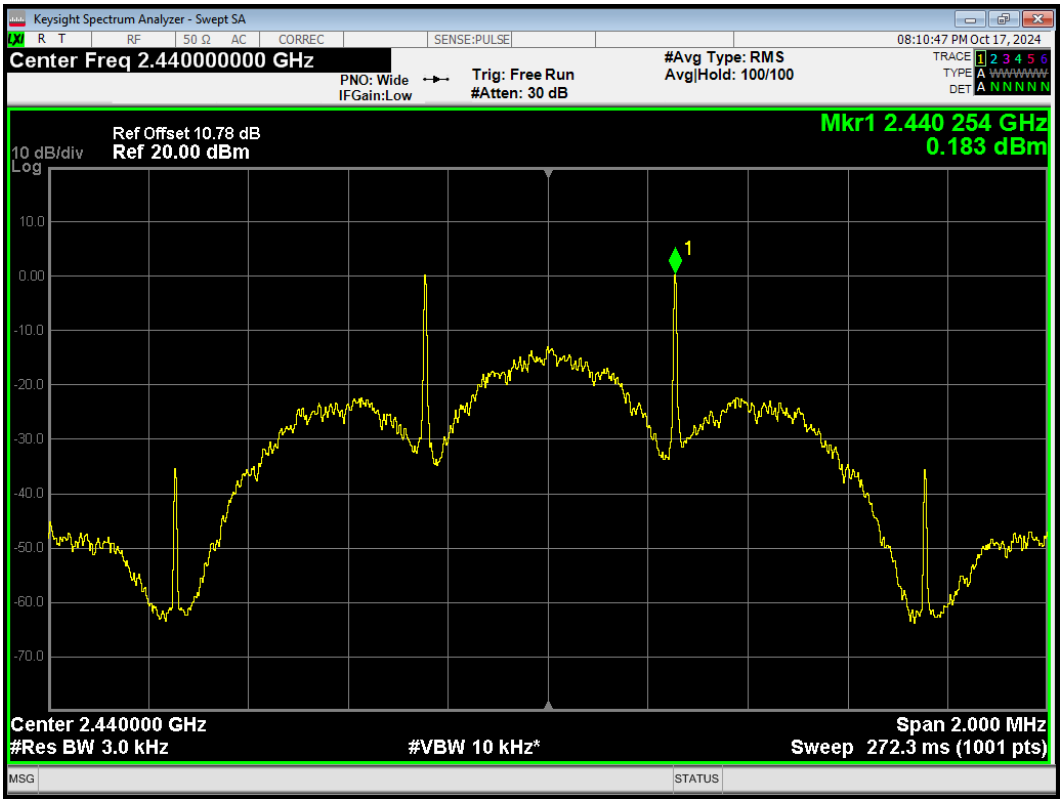

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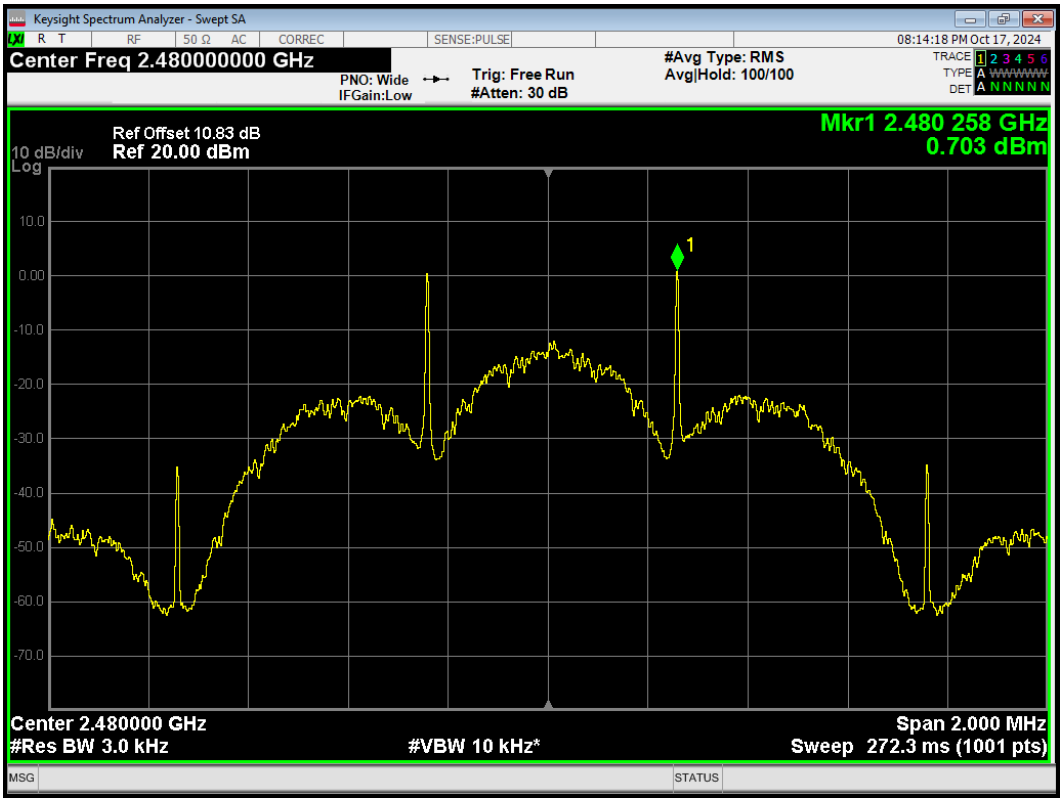


5.5. Spurious RF Conducted Emissions

Ambient Condition

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

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 AUTO.
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. ”

Rule RSS-247 5.5 pacifies that “In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB.”

Test Mode	Carrier frequency (MHz)	Reference value (dBm)	Limit
802.11b	2412	9.730	-20.27
	2437	10.080	-19.92
	2462	9.670	-20.33

802.11g	2412	6.610	-23.39
	2437	7.540	-22.46
	2462	7.910	-22.09
802.11n HT20	2412	9.160	-20.84
	2437	8.900	-21.10
	2462	9.510	-20.49
Bluetooth (Low Energy) (1M)	2402	7.840	-22.16
	2440	7.590	-22.41
	2480	8.090	-21.91
Bluetooth (Low Energy) (2M)	2402	7.870	-22.13
	2440	7.320	-22.68
	2480	7.910	-22.09
Bluetooth (Low Energy) (S=2)	2402	8.250	-21.75
	2440	8.250	-21.75
	2480	8.650	-21.35
Bluetooth (Low Energy) (S=8)	2402	6.830	-23.17
	2440	6.800	-23.20
	2480	5.270	-24.73

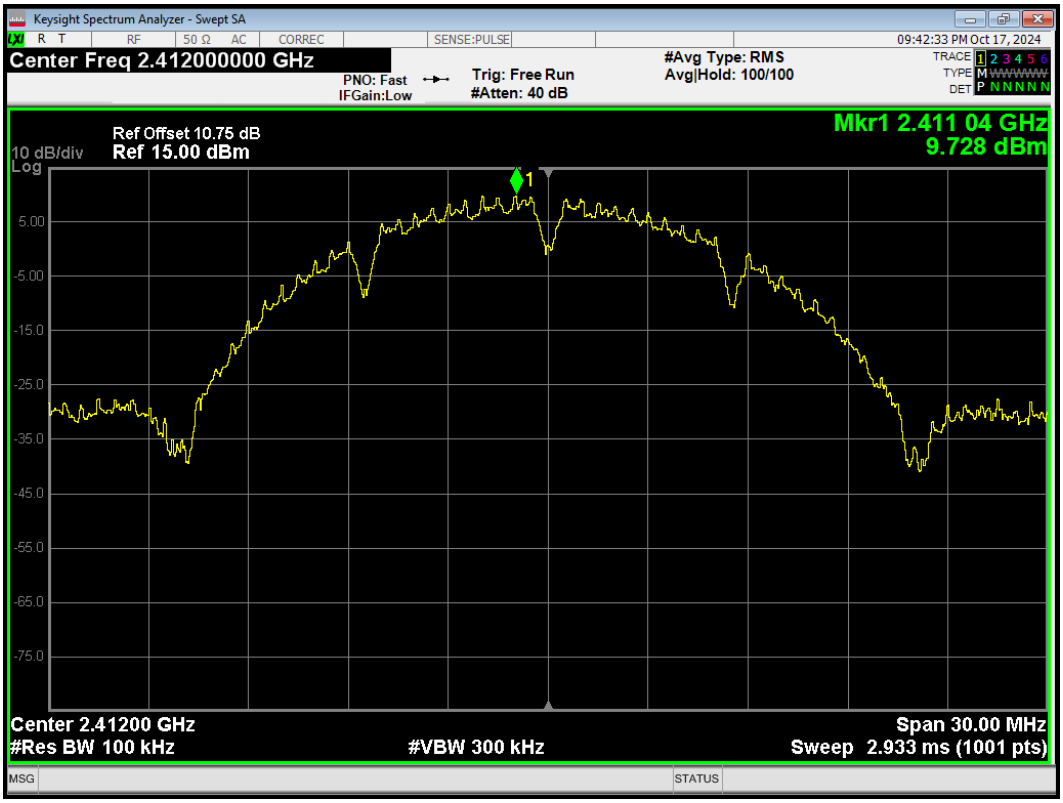
Measurement Uncertainty

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

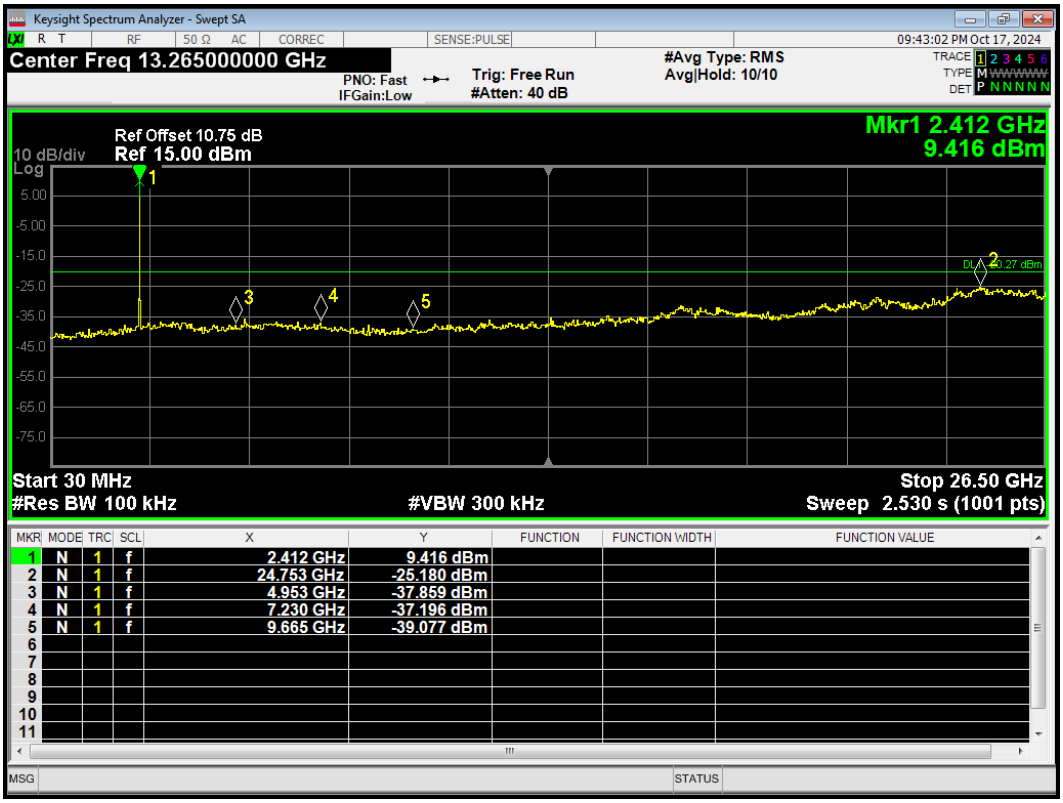
Frequency	Uncertainty
100kHz-2GHz	0.684 dB
2GHz-26GHz	1.407 dB

Test Results:

Tx. Spurious 802.11b 2412MHz Ref



Tx. Spurious 802.11b 2412MHz Emission



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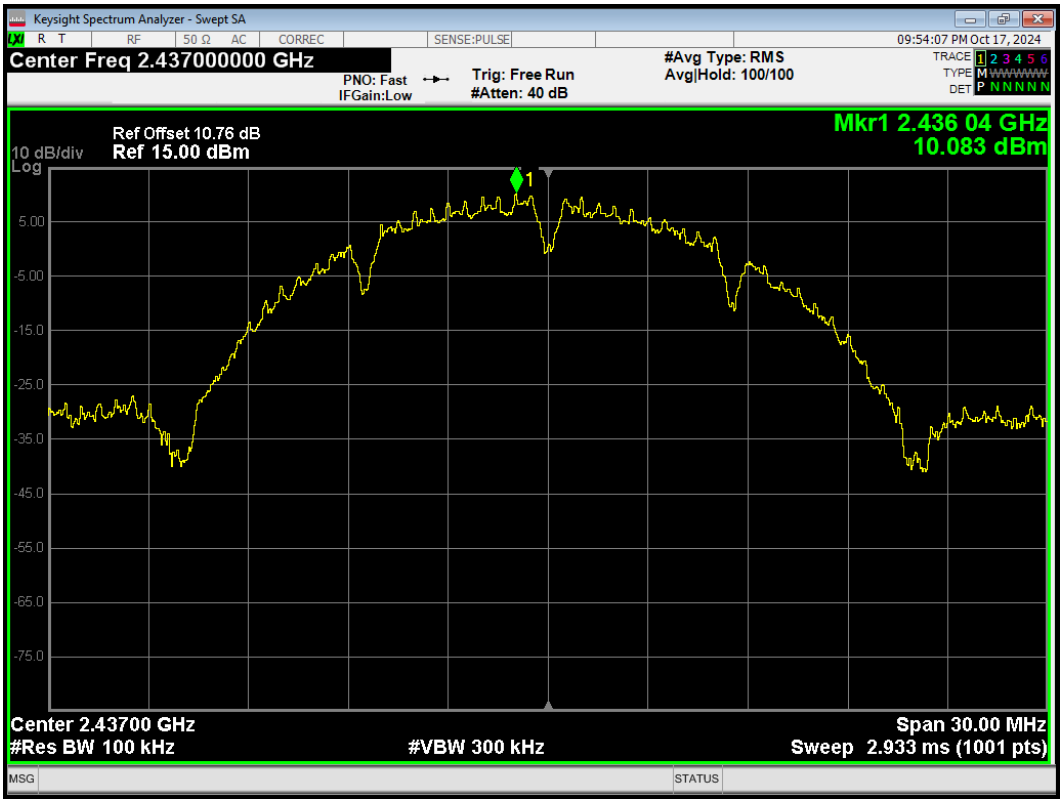

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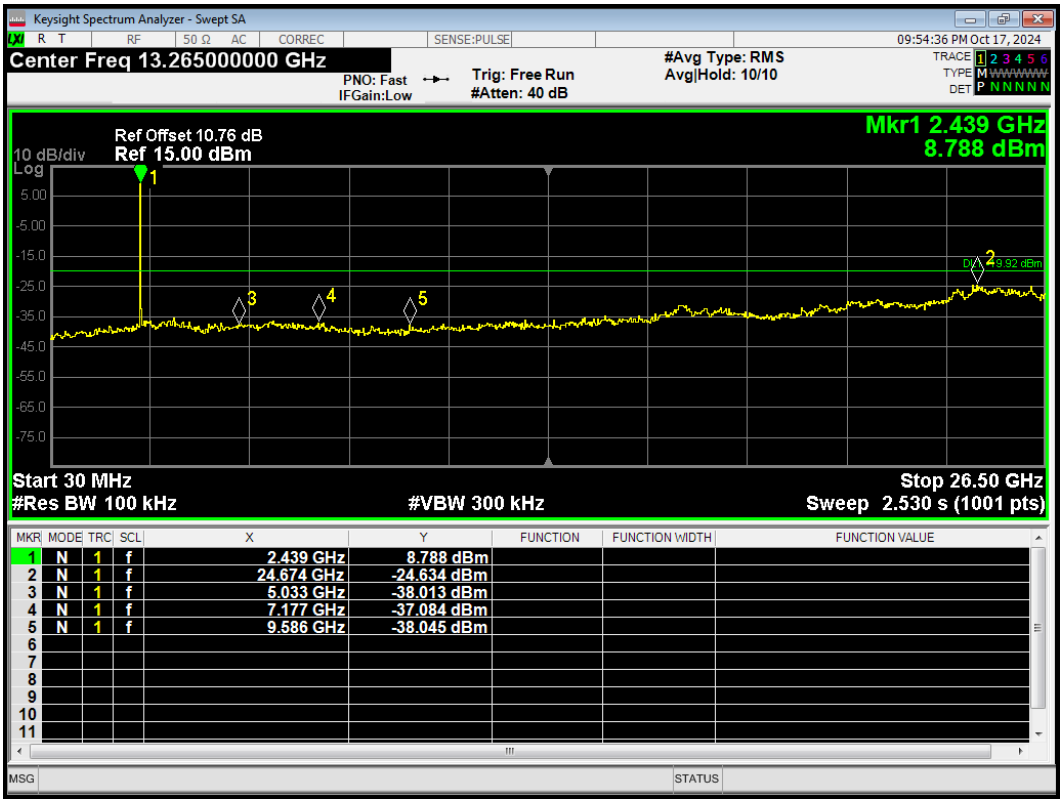

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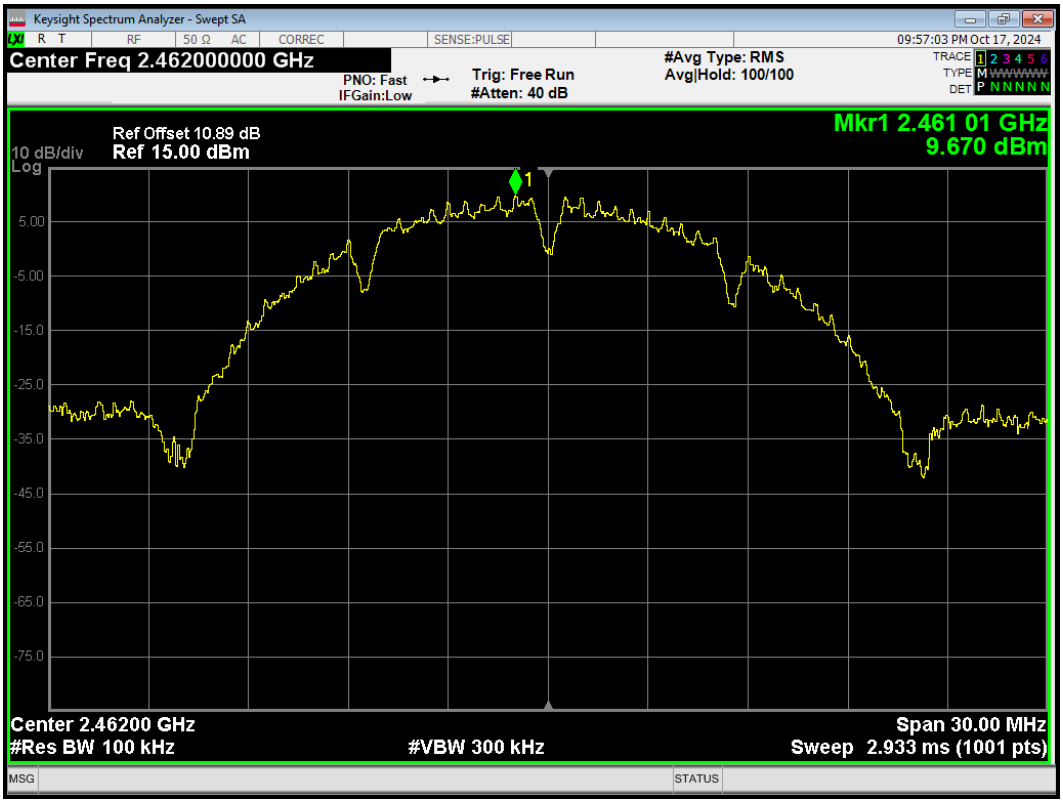

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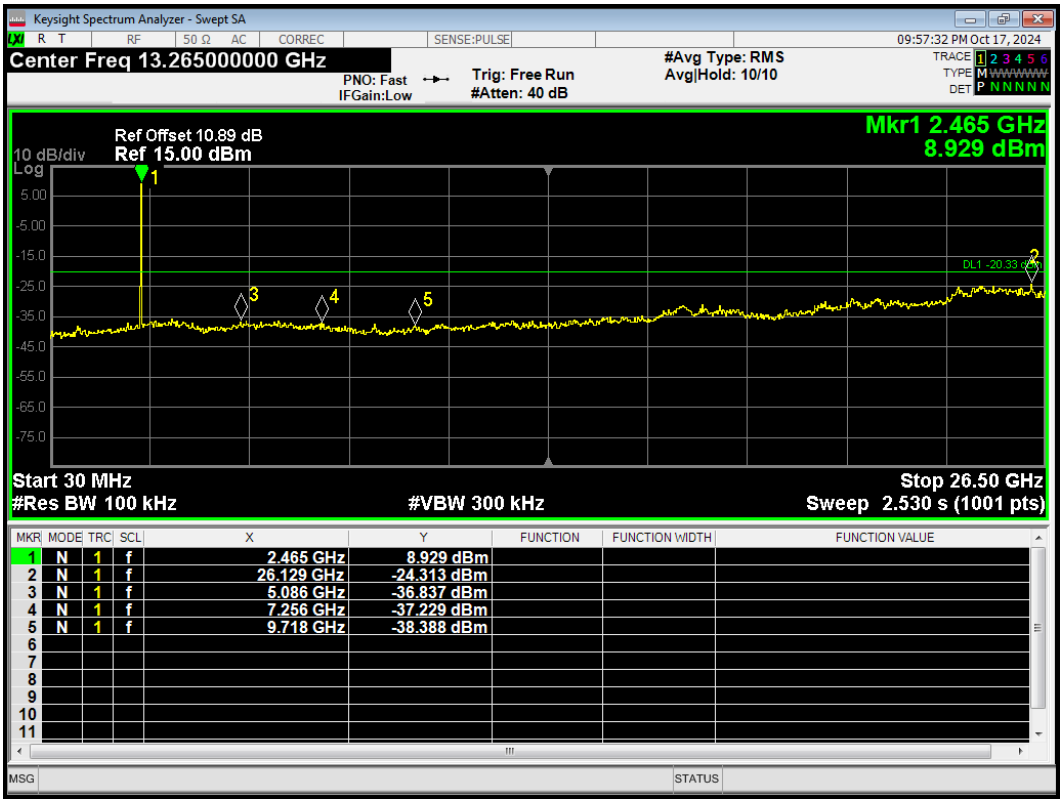

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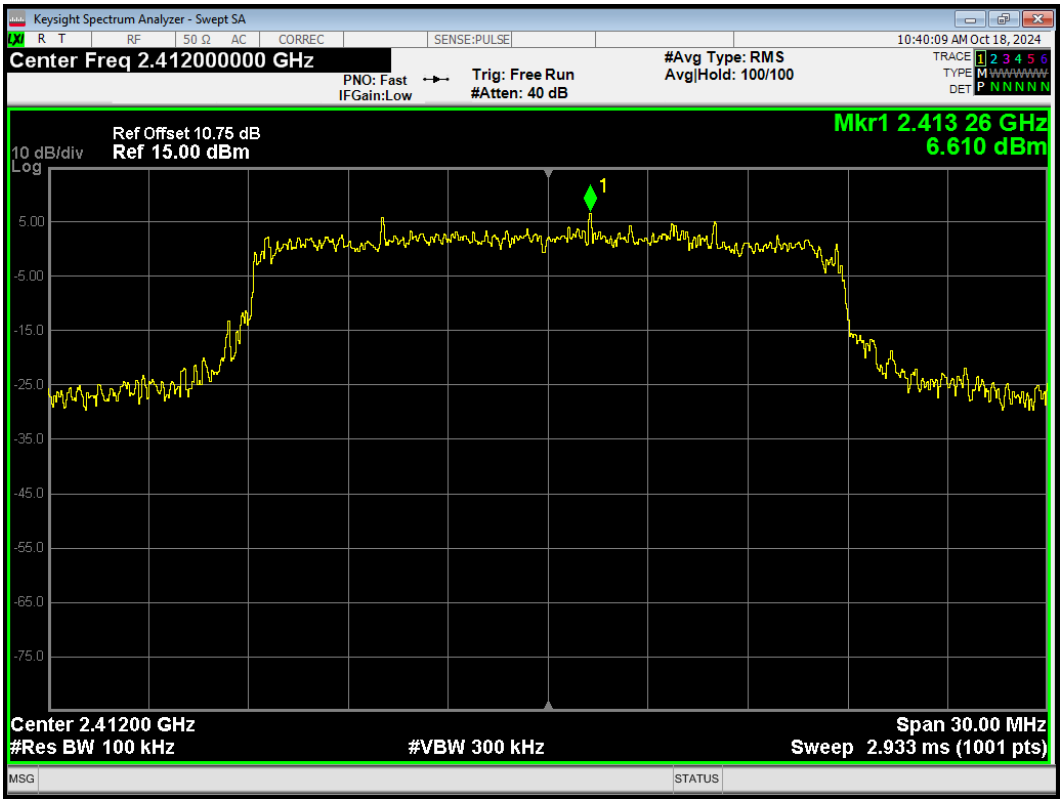

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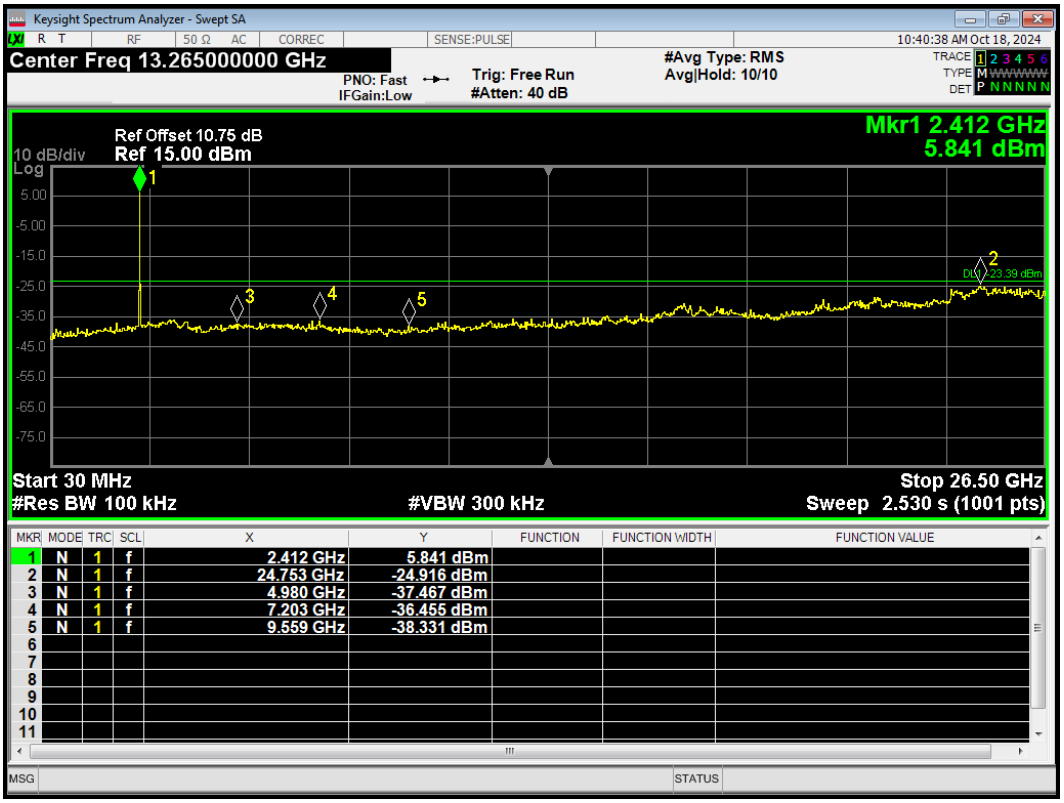

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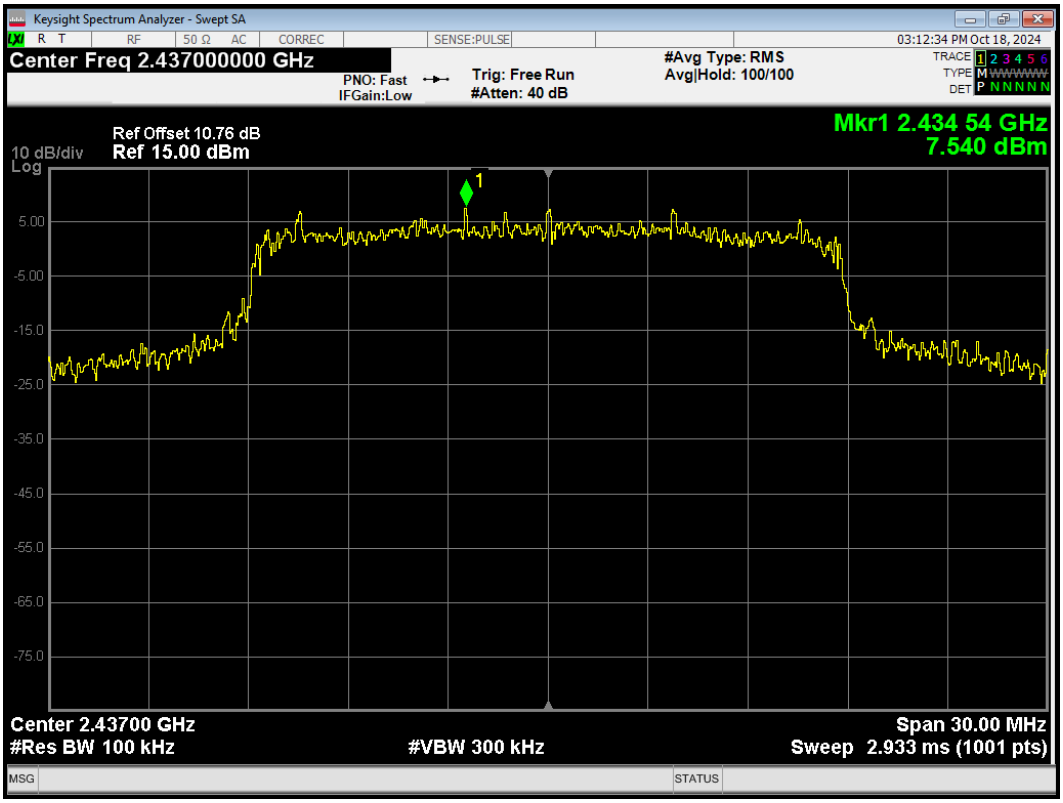

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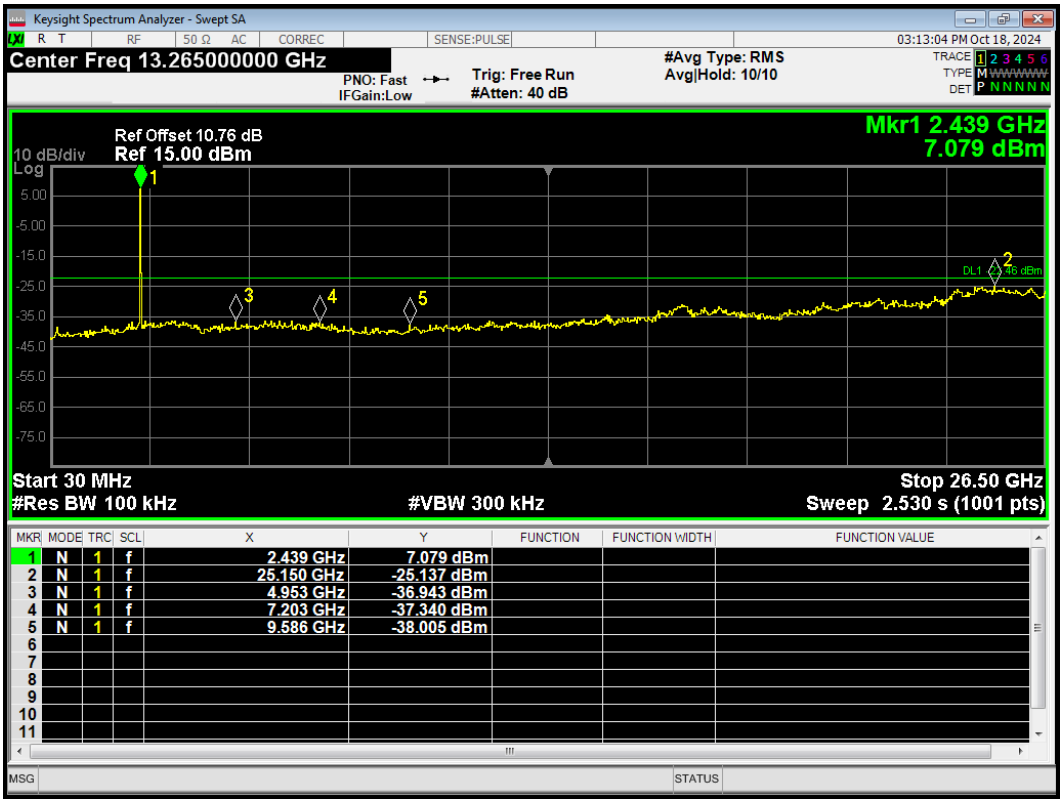

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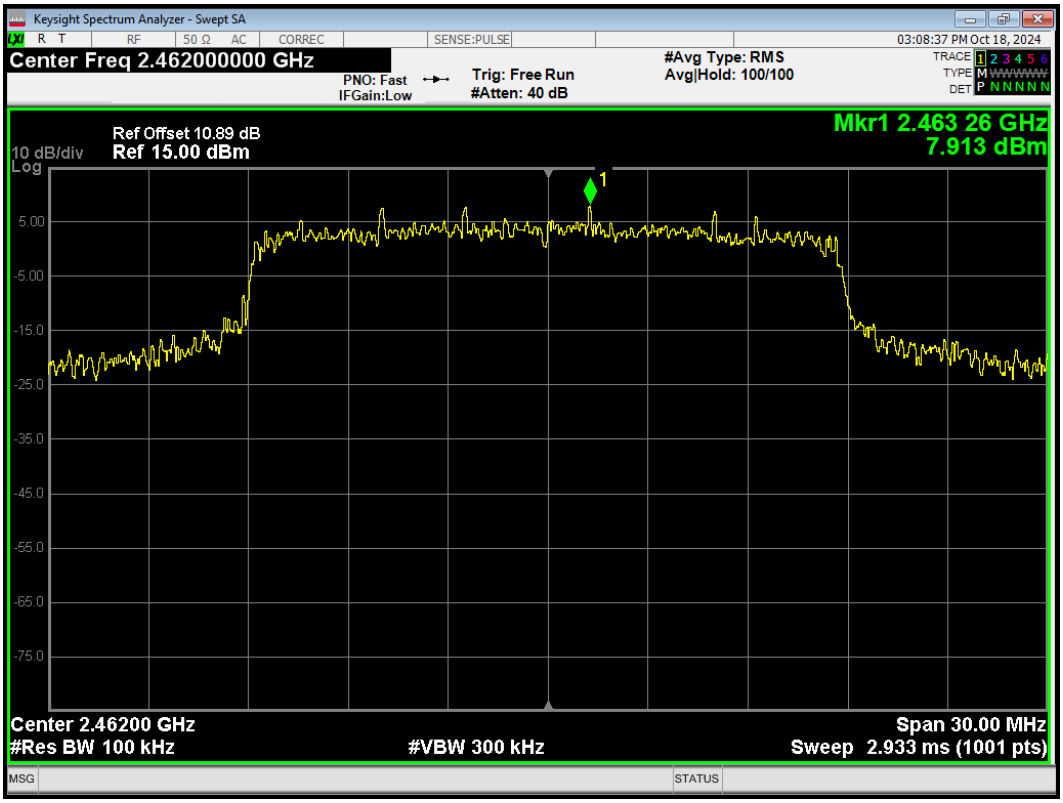

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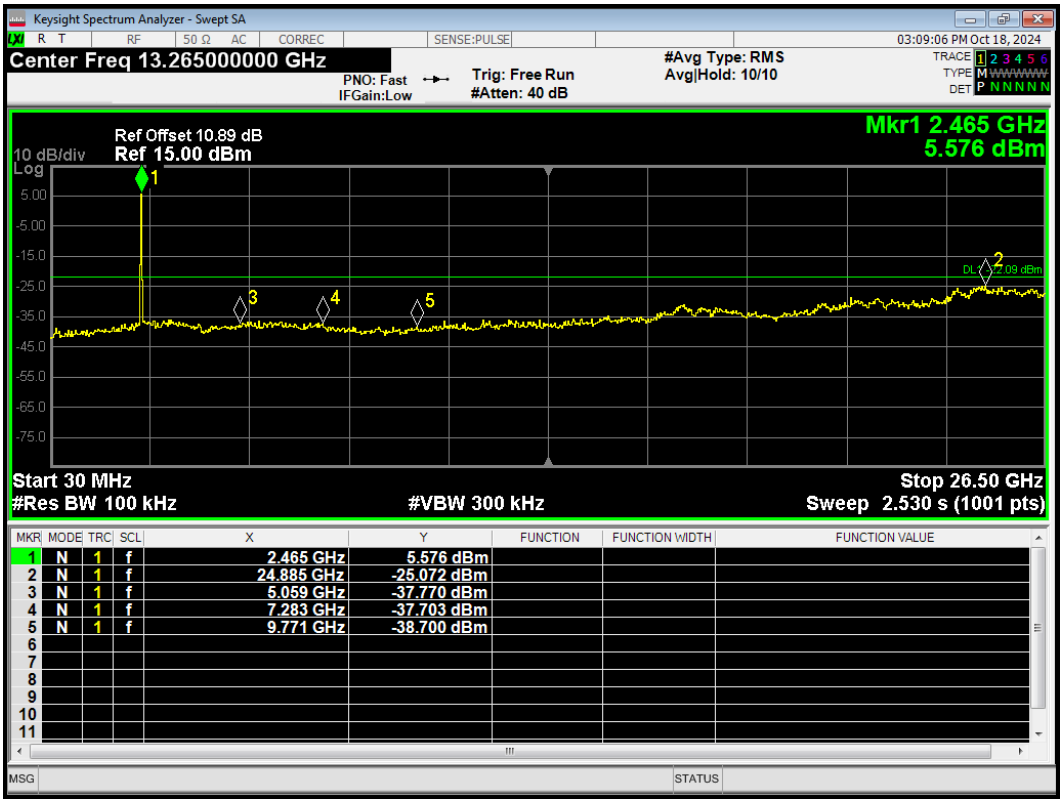

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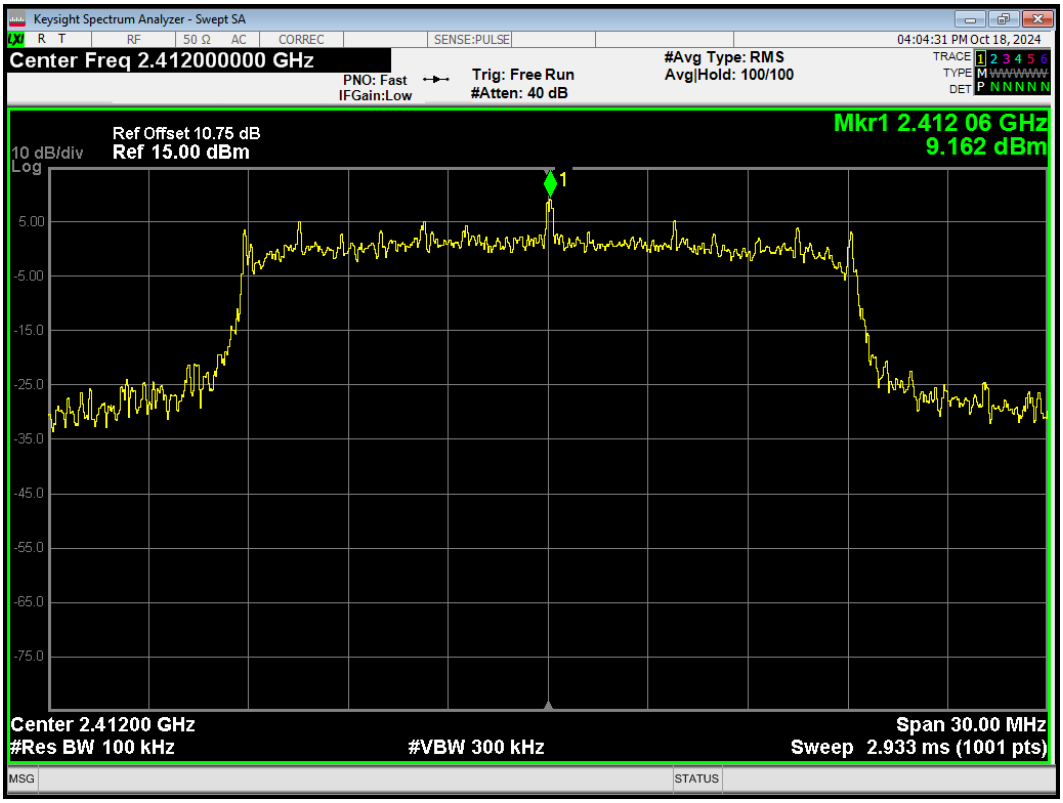

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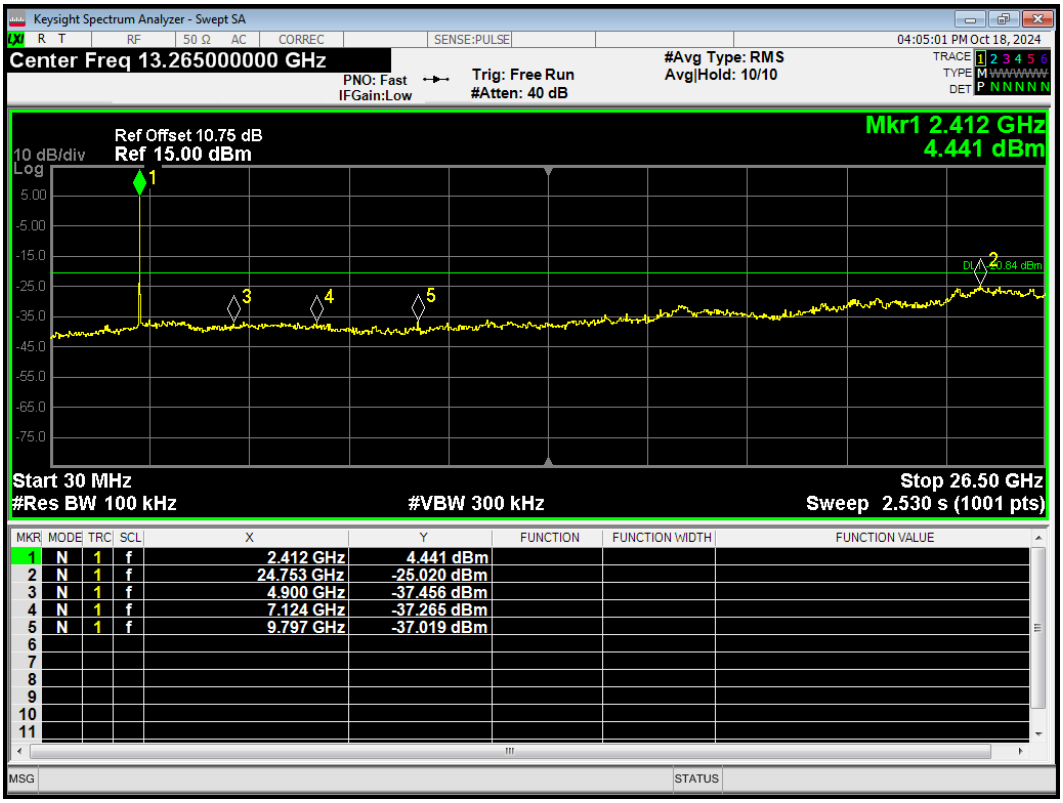

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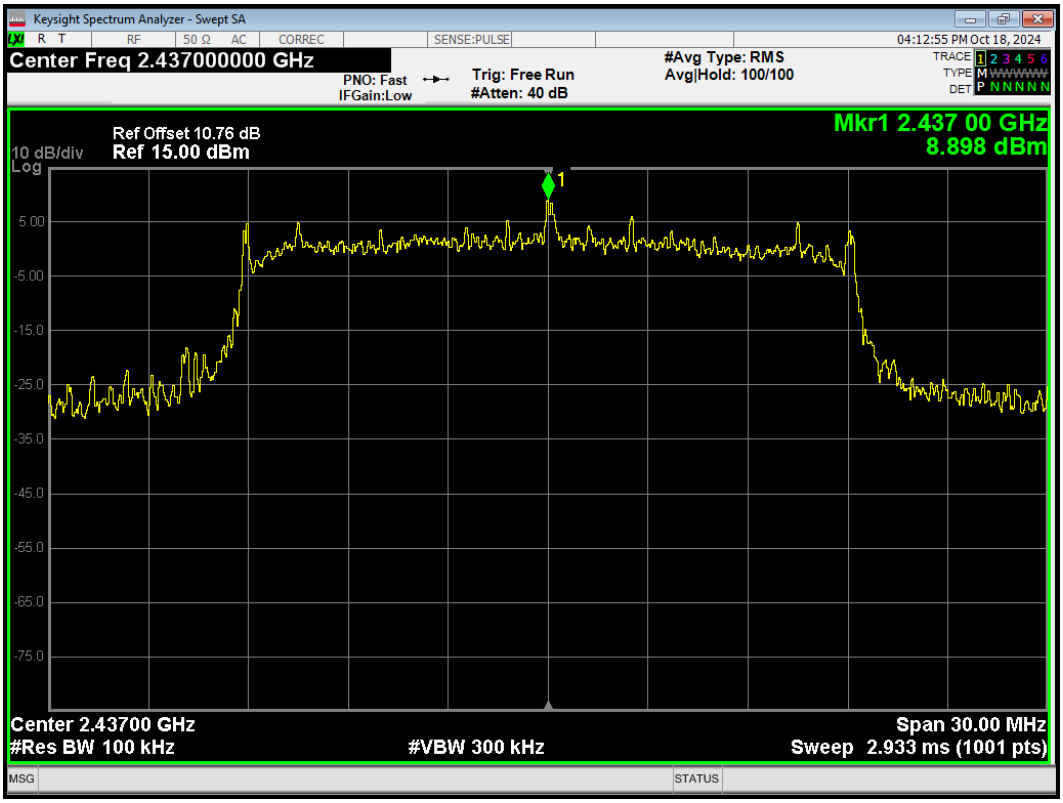

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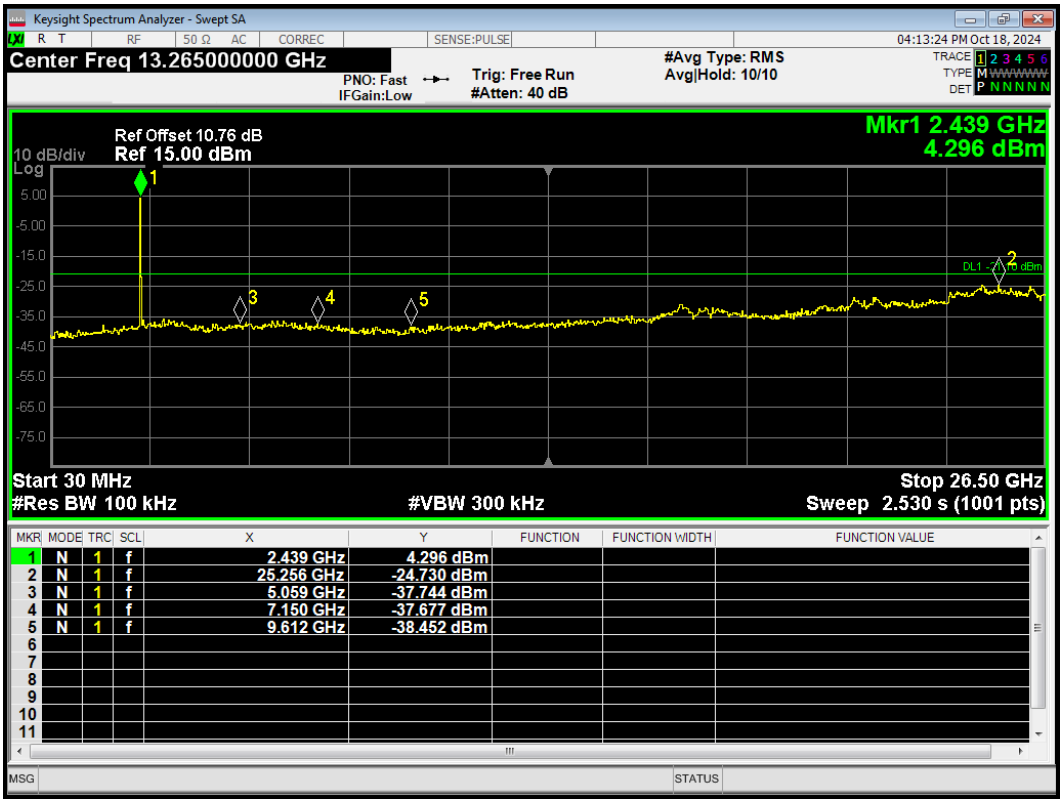

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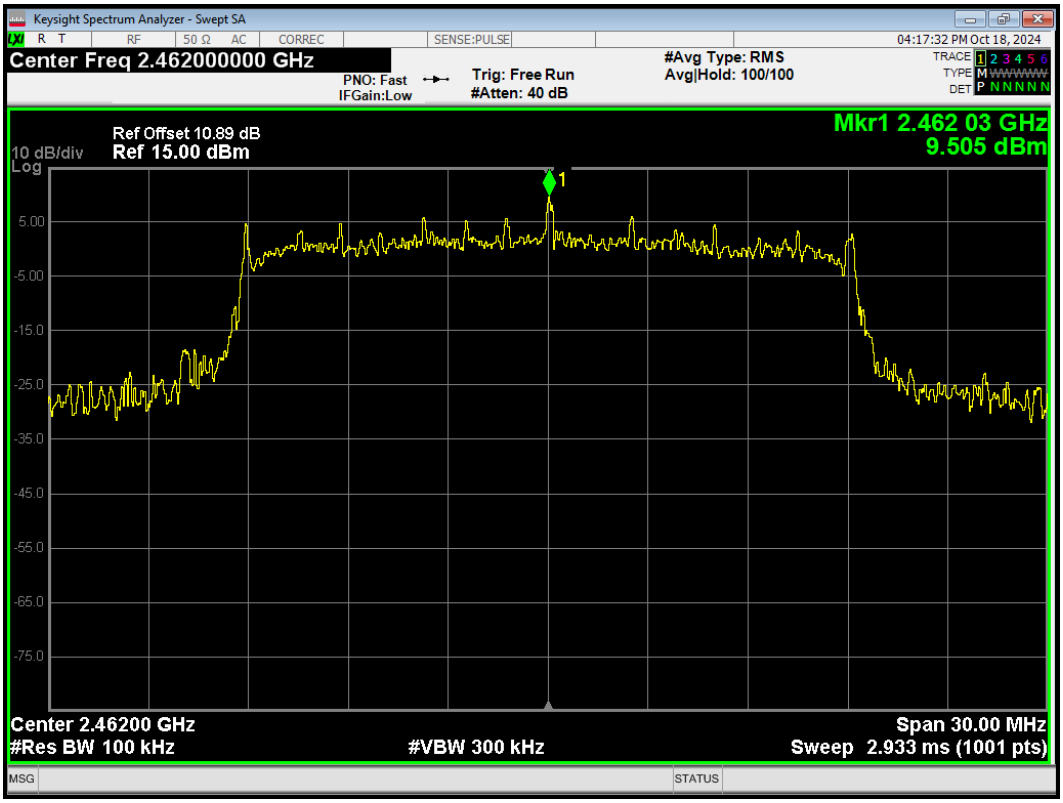

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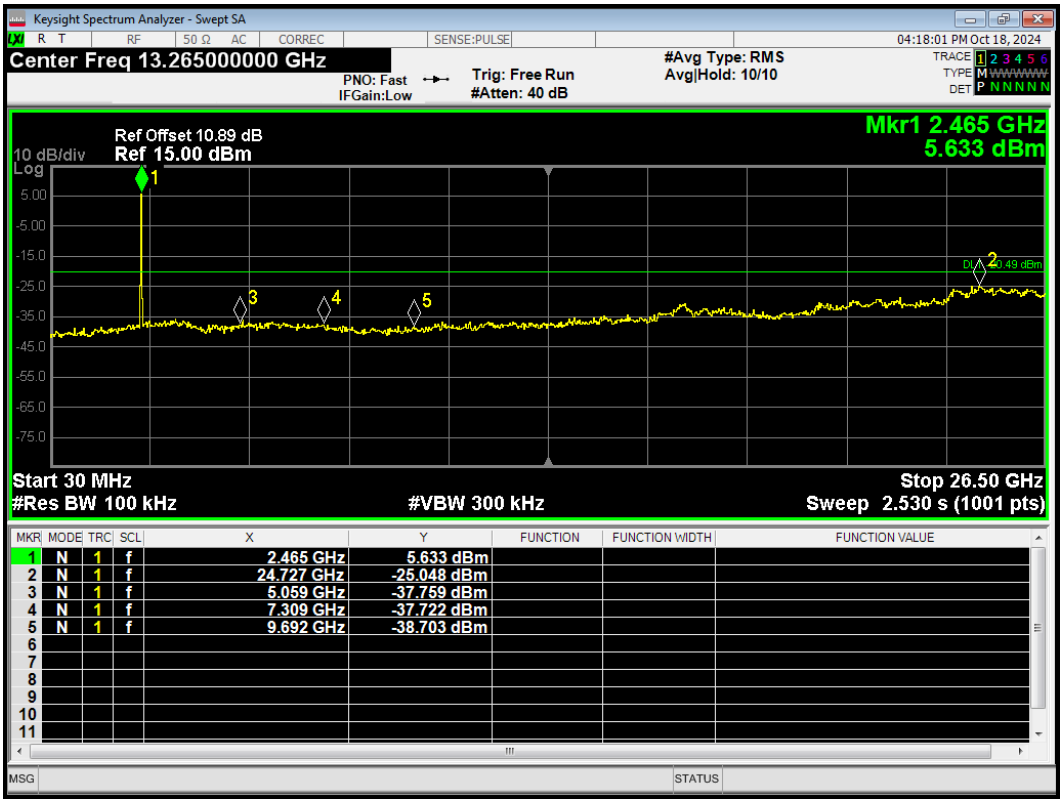

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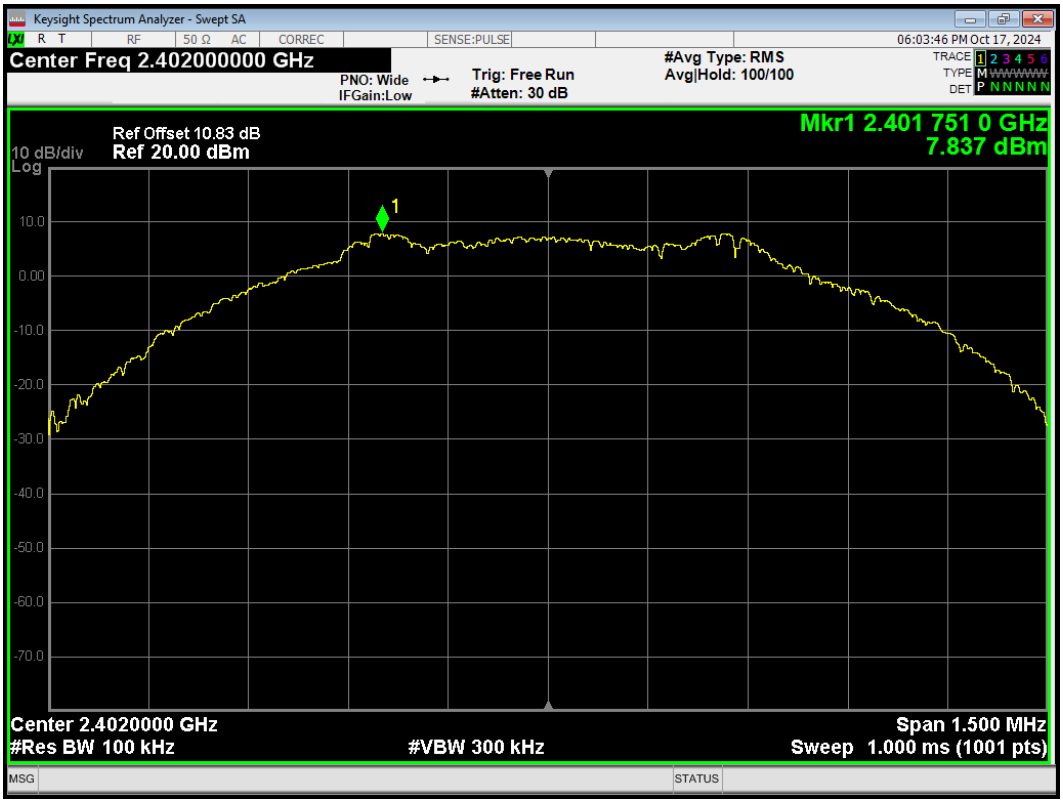

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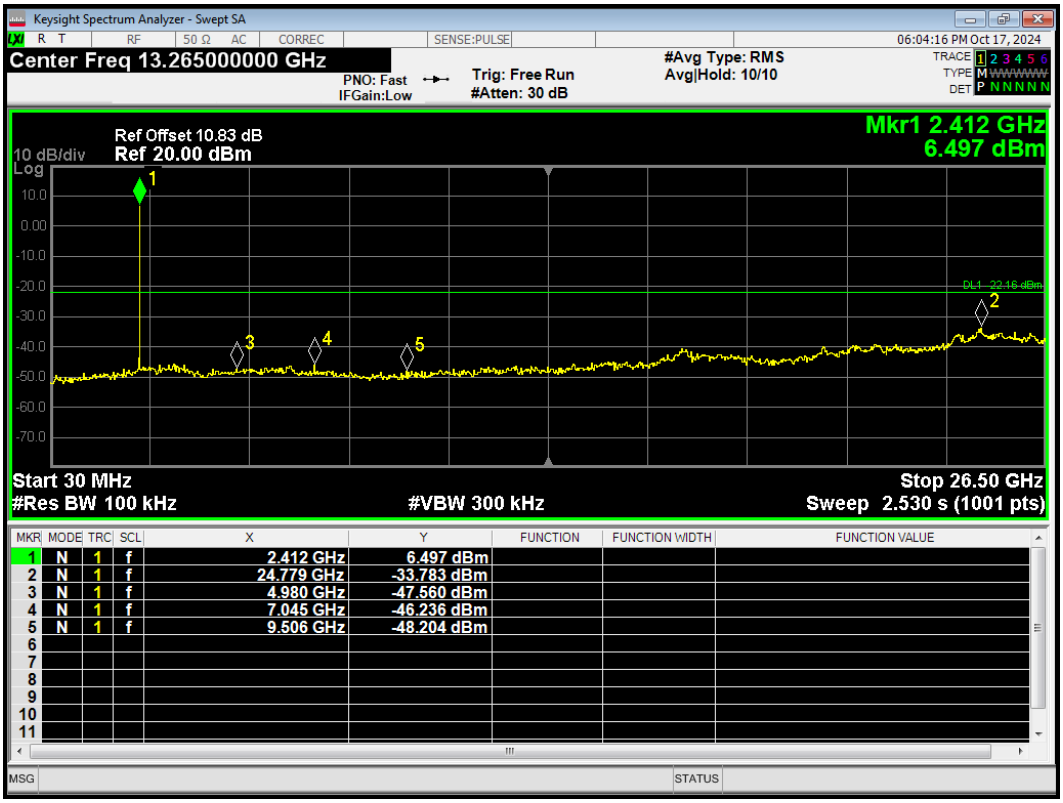

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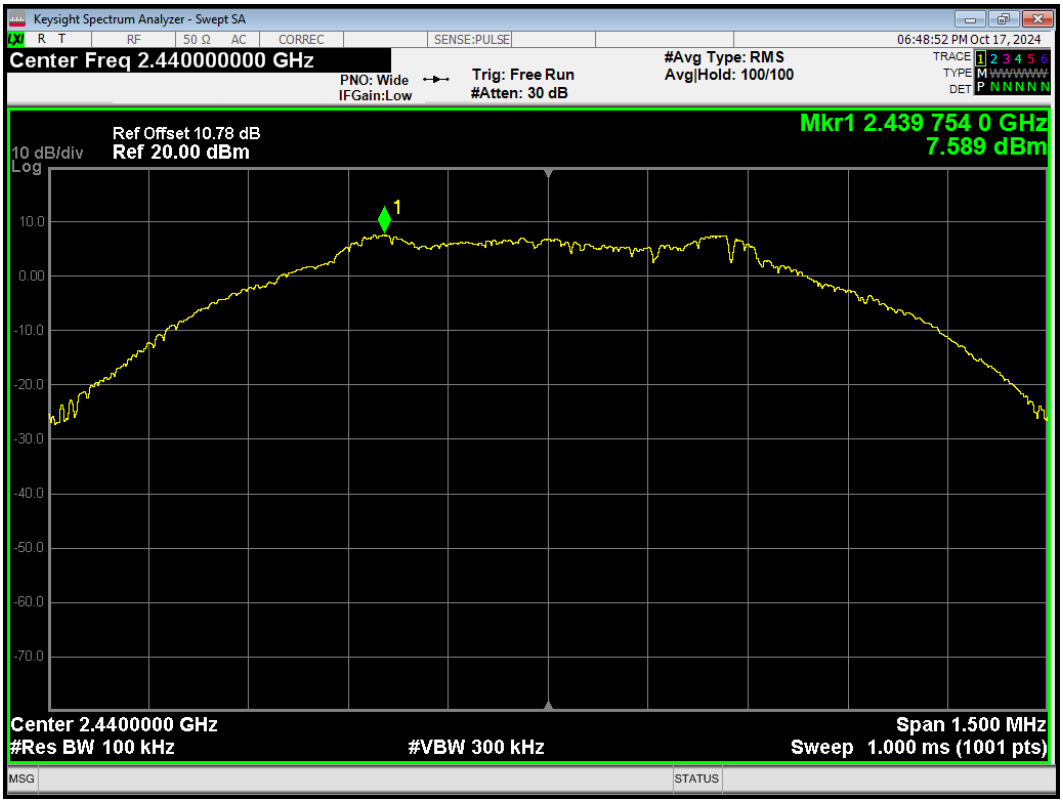

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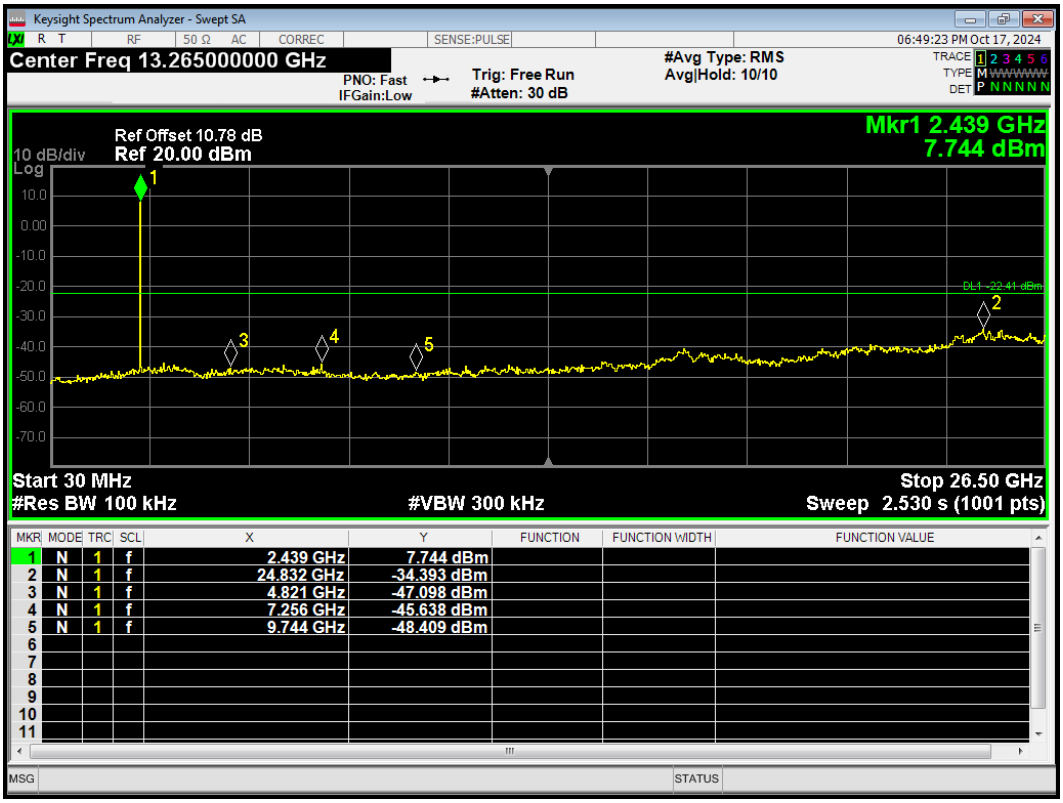

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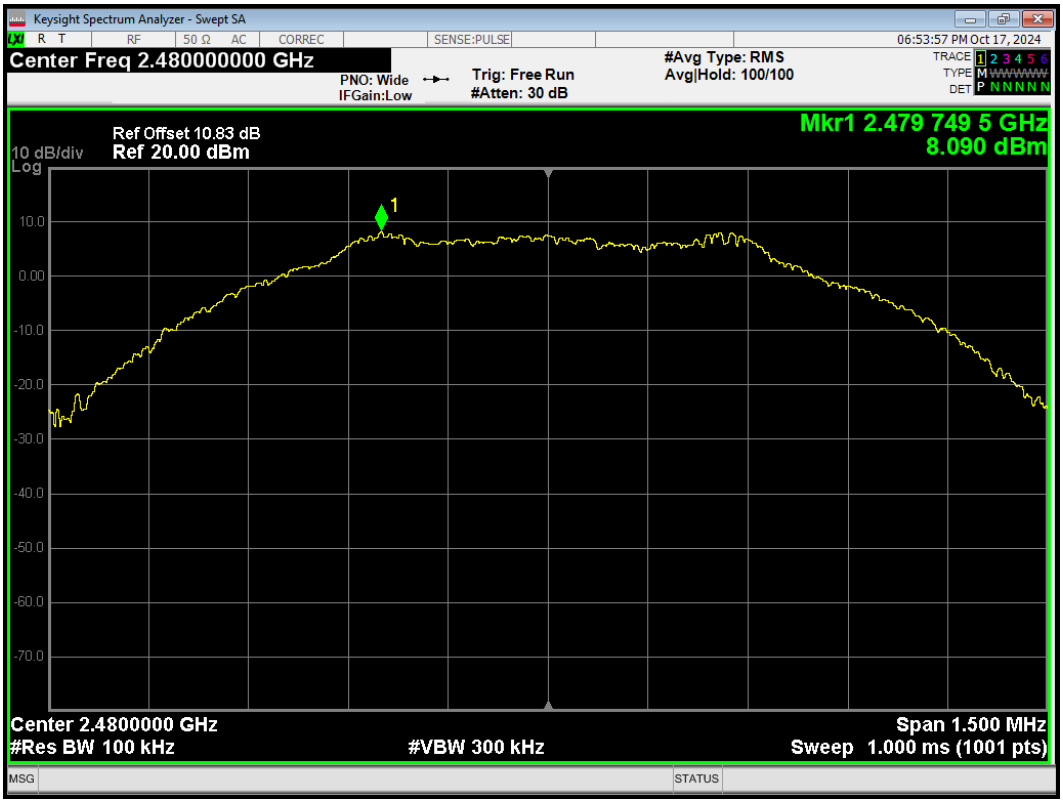

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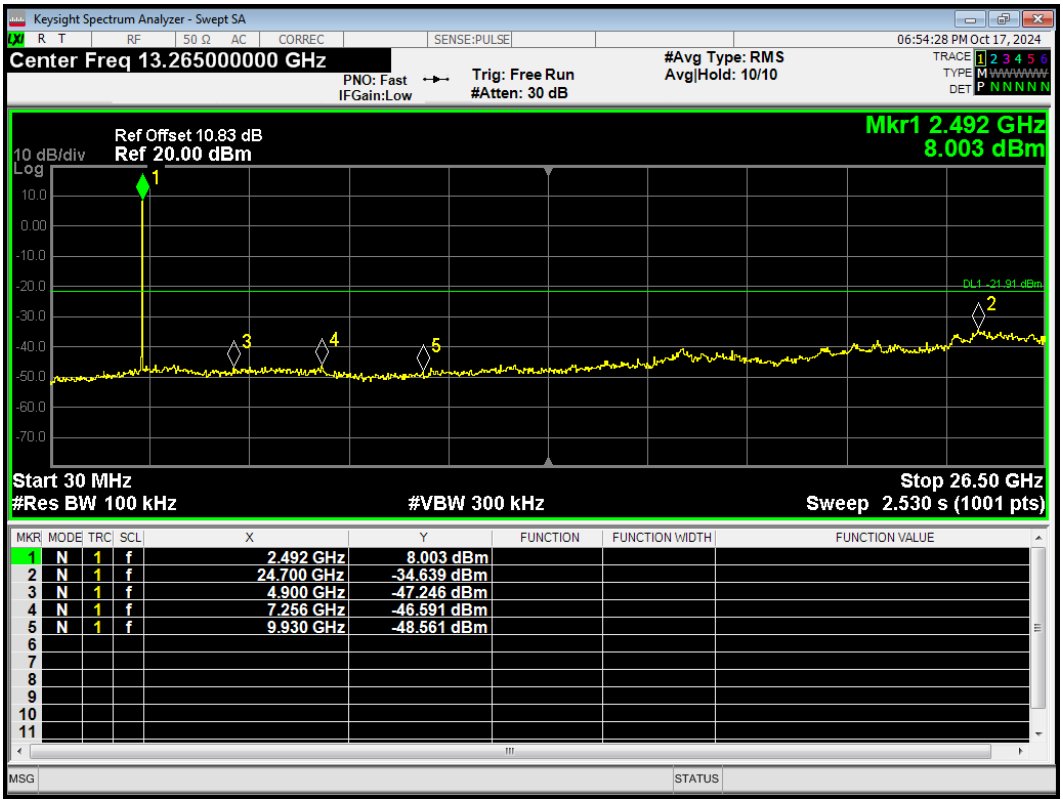

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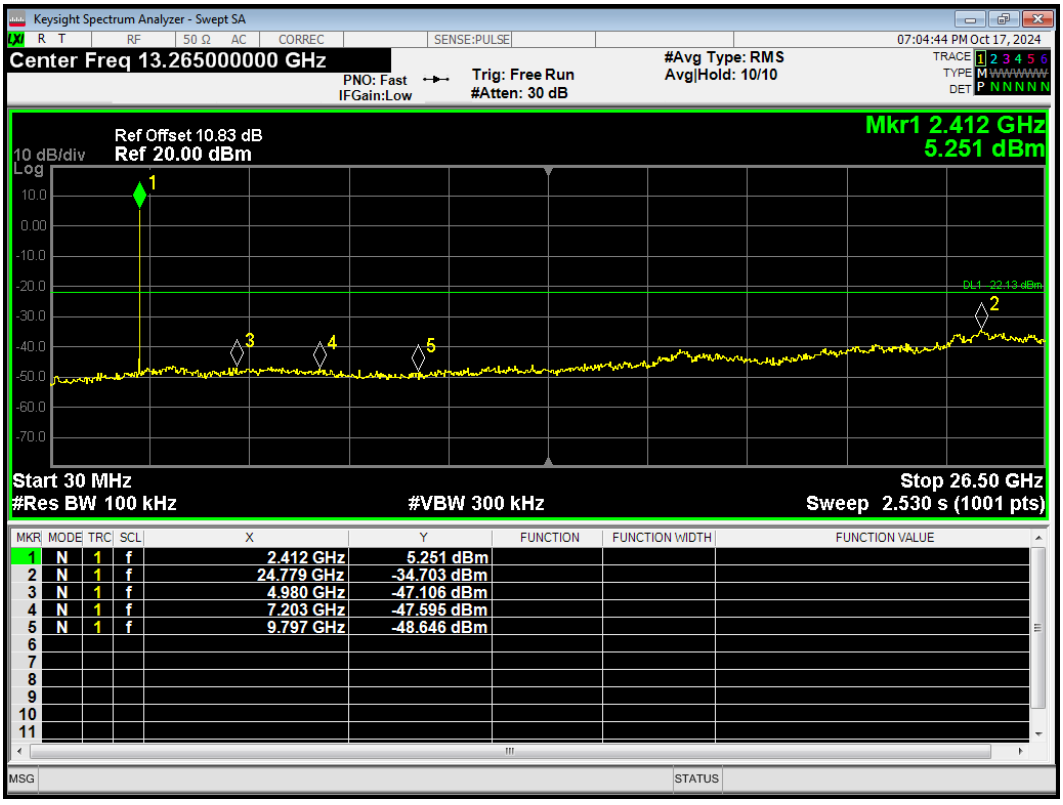
Tx. Spurious BLE 2M 2402MHz Emission



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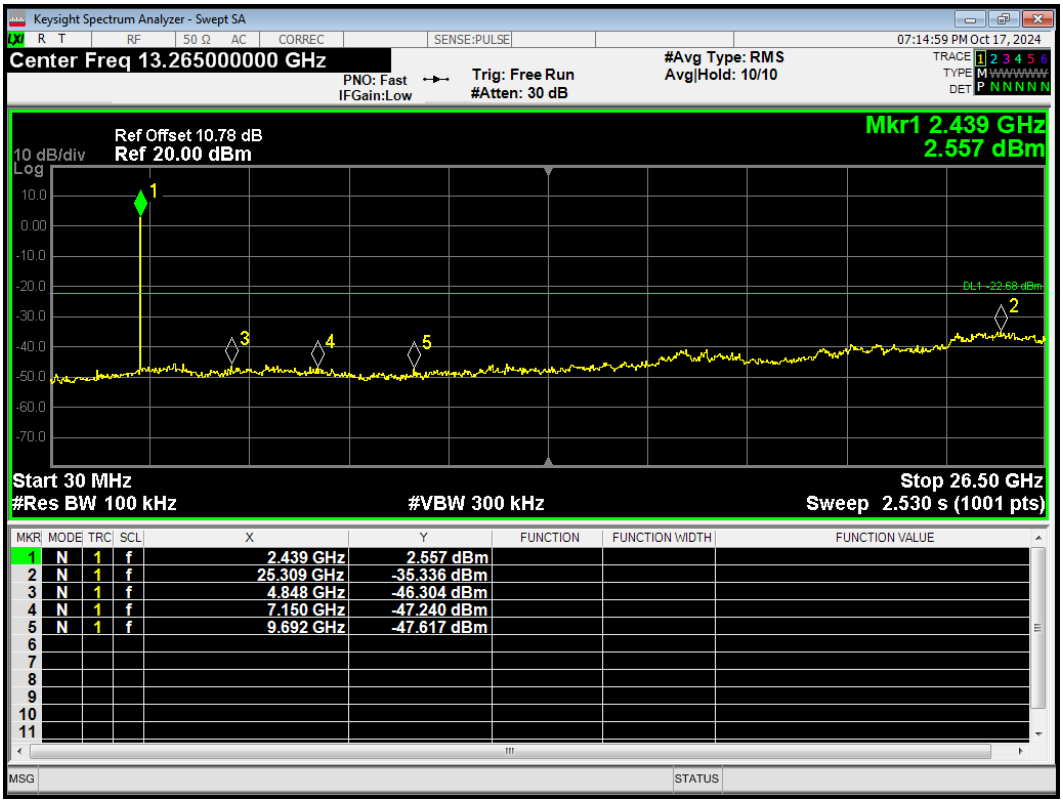
Tx. Spurious BLE 2M 2440MHz Emission



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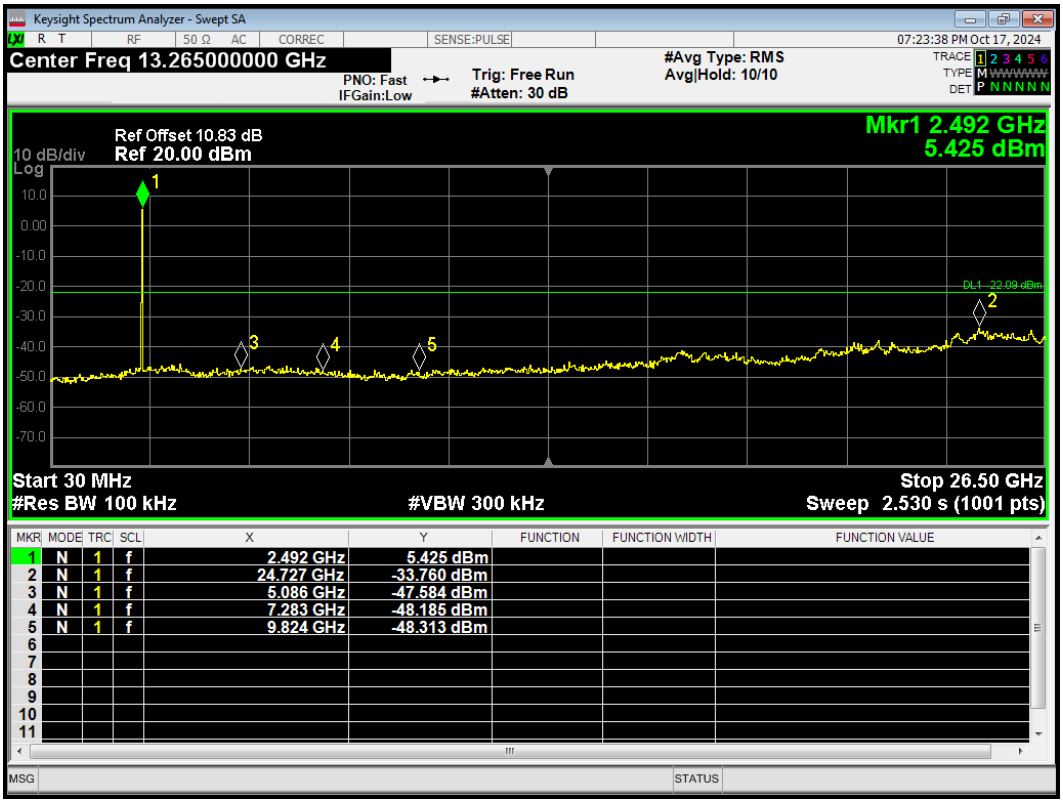

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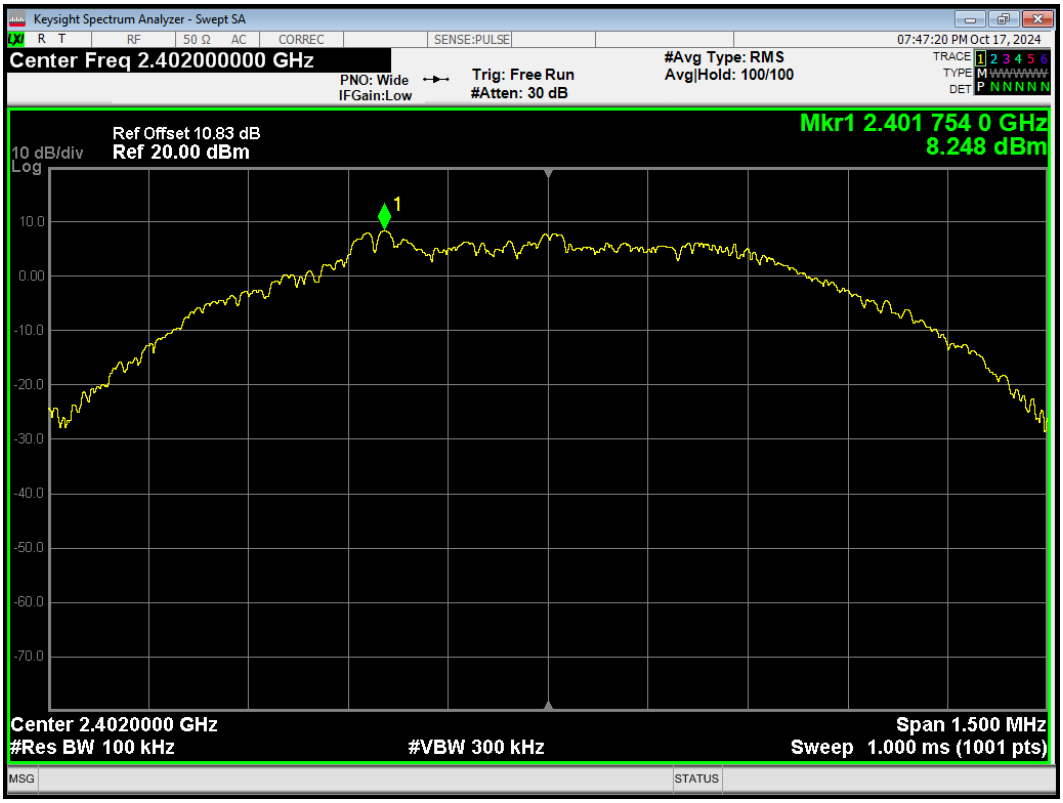
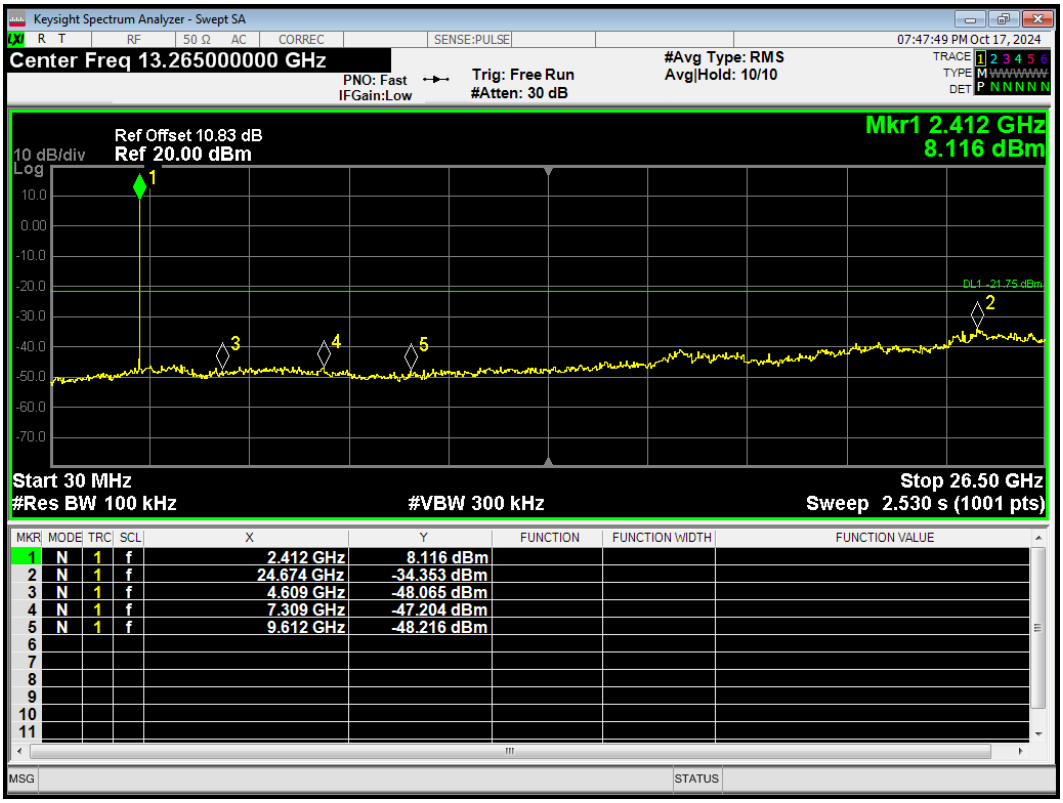
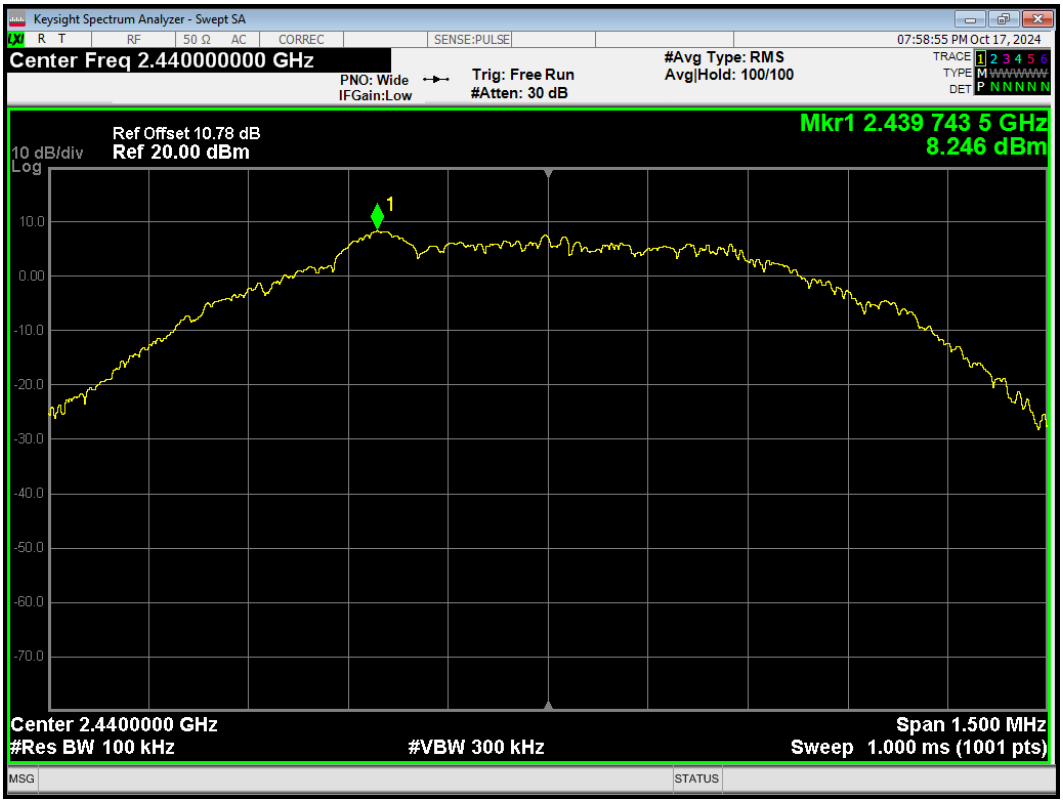


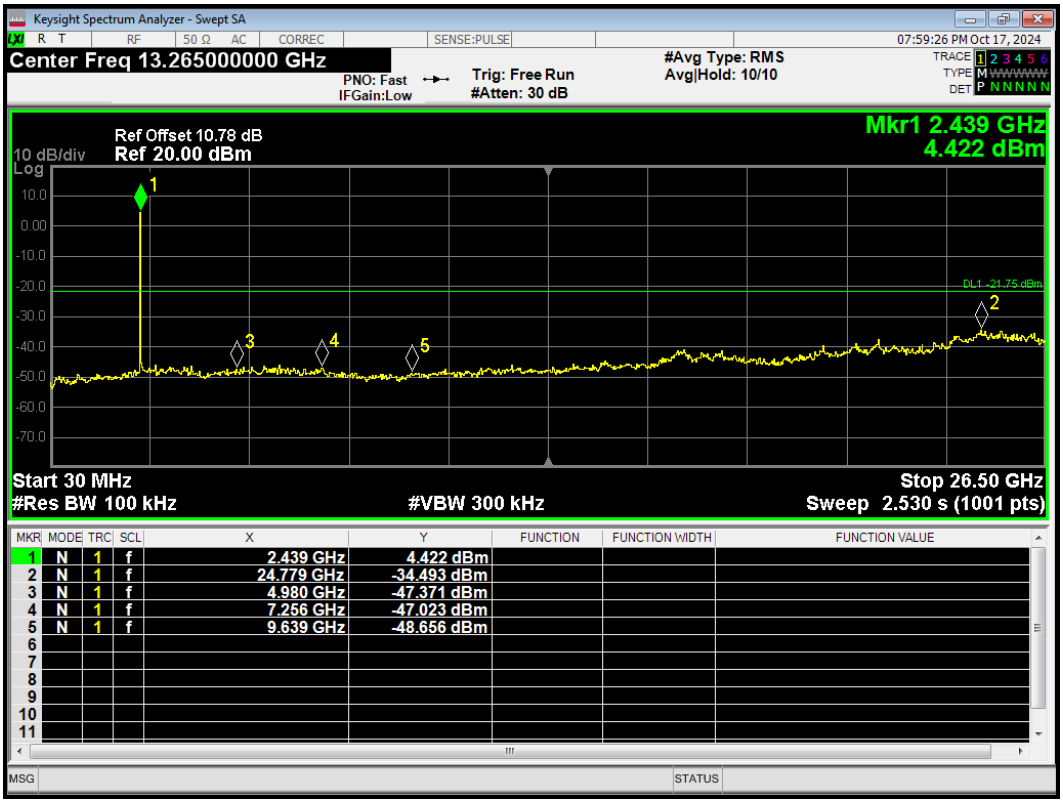
Tx. Spurious BLE S=2 2402MHz Emission



Tx. Spurious BLE S=2 2440MHz Ref

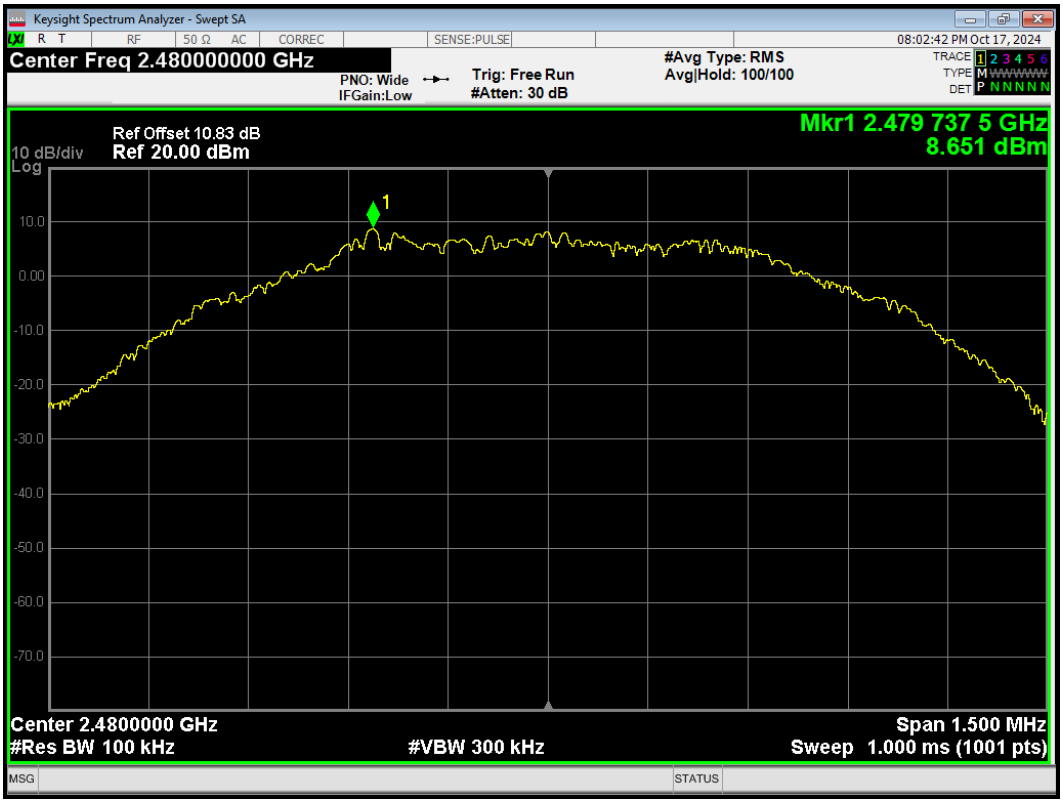


Tx. Spurious BLE S=2 2440MHz Emission

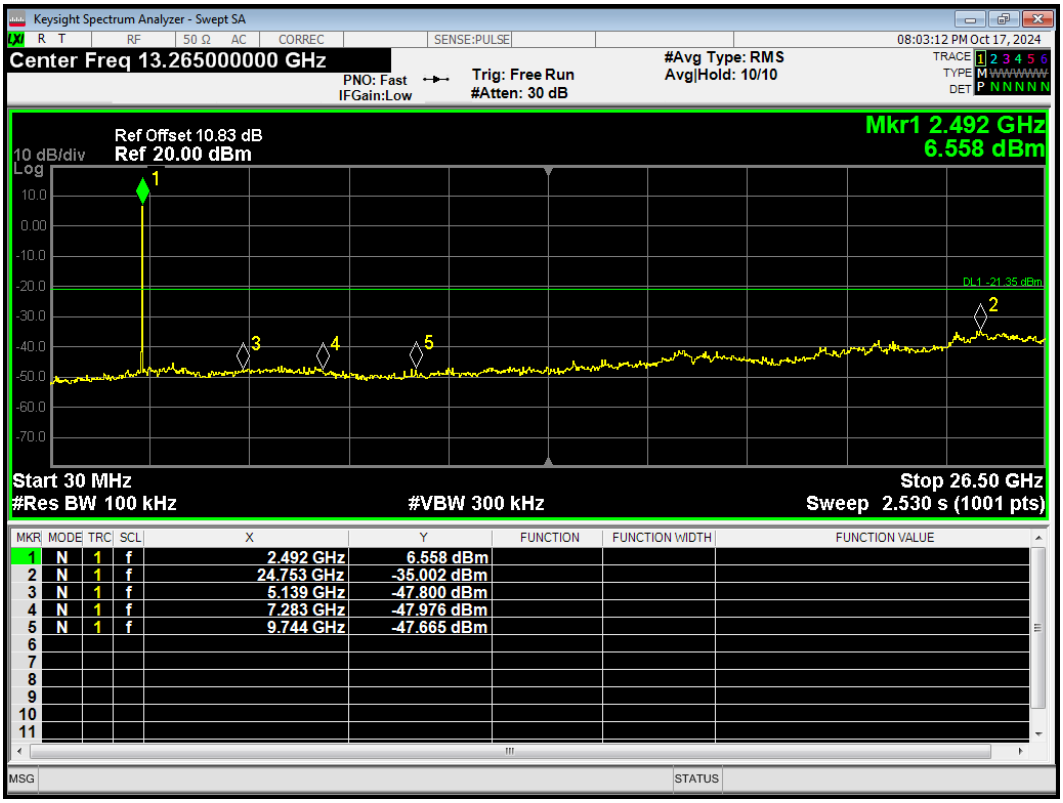


MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.439 GHz	4.422 dBm			
2	N	1	f	24.779 GHz	-34.493 dBm			
3	N	1	f	4.980 GHz	-47.371 dBm			
4	N	1	f	7.256 GHz	-47.023 dBm			
5	N	1	f	9.639 GHz	-48.656 dBm			
6								
7								
8								
9								
10								
11								

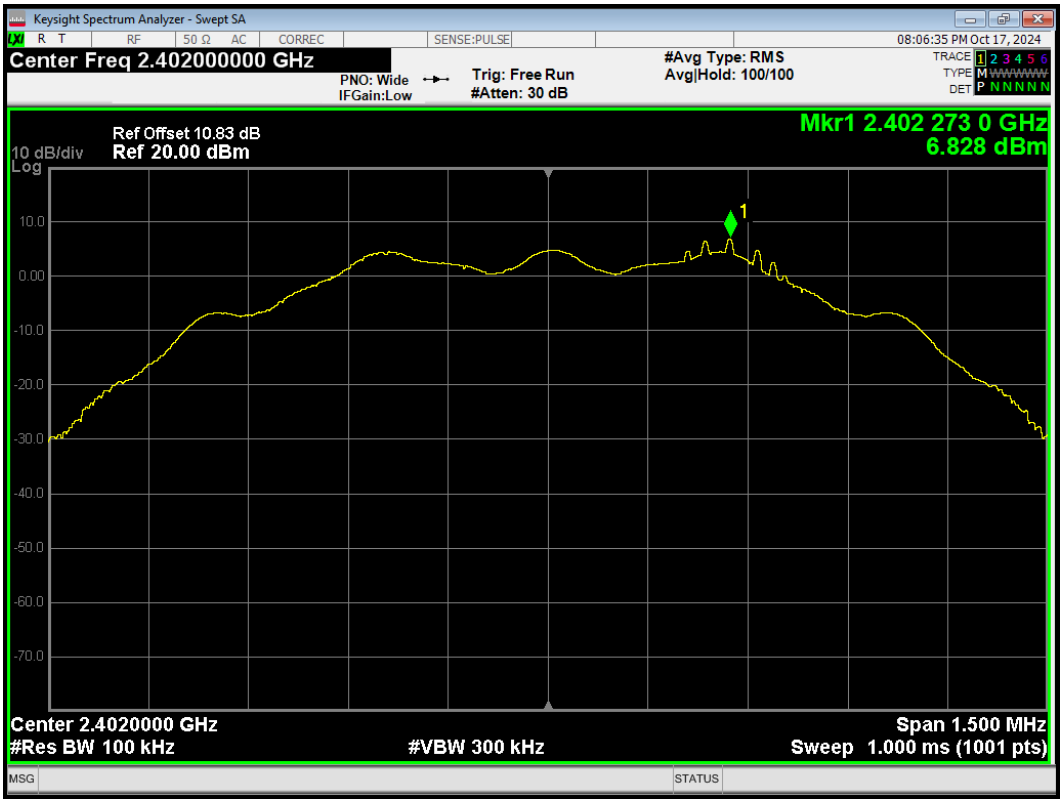
Tx. Spurious BLE S=2 2480MHz Ref



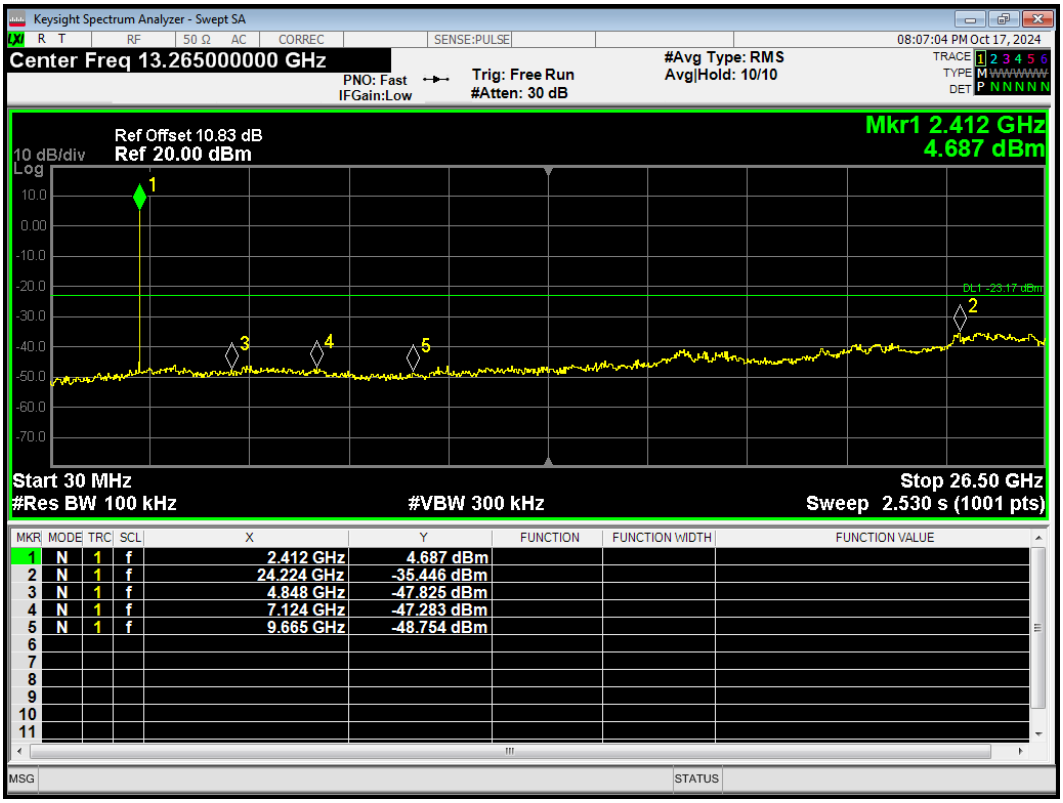
Tx. Spurious BLE S=2 2480MHz Emission



Tx. Spurious BLE S=8 2402MHz Ref



Tx. Spurious BLE S=8 2402MHz Emission



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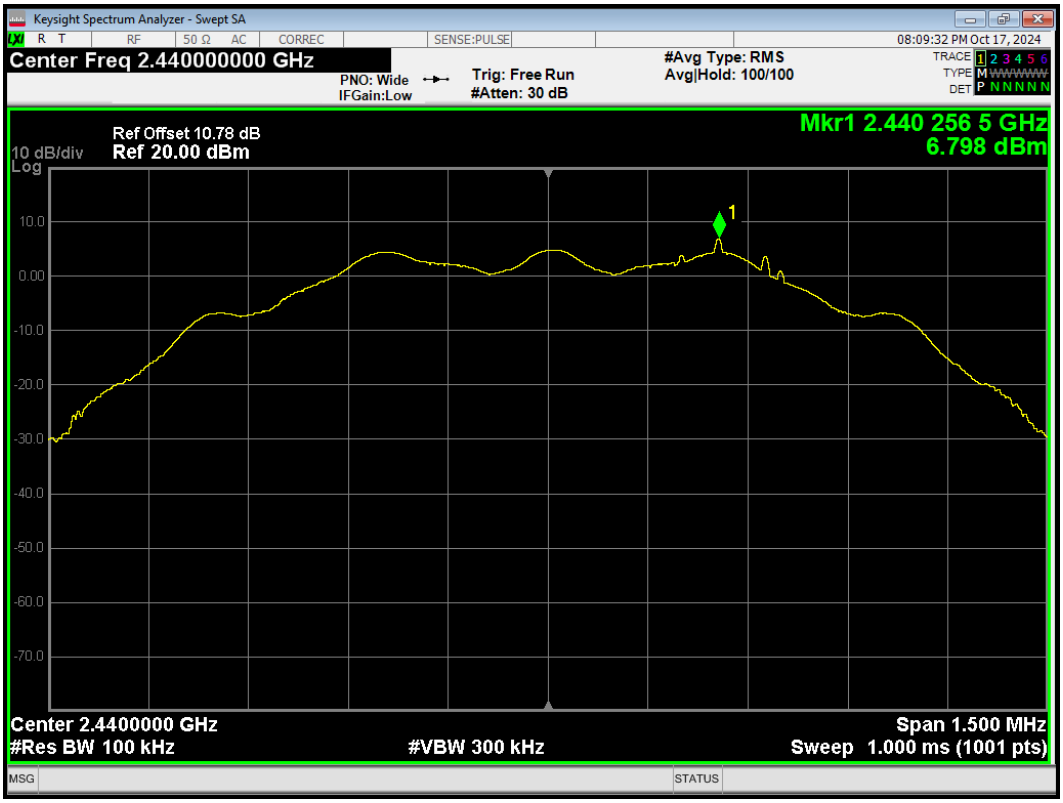
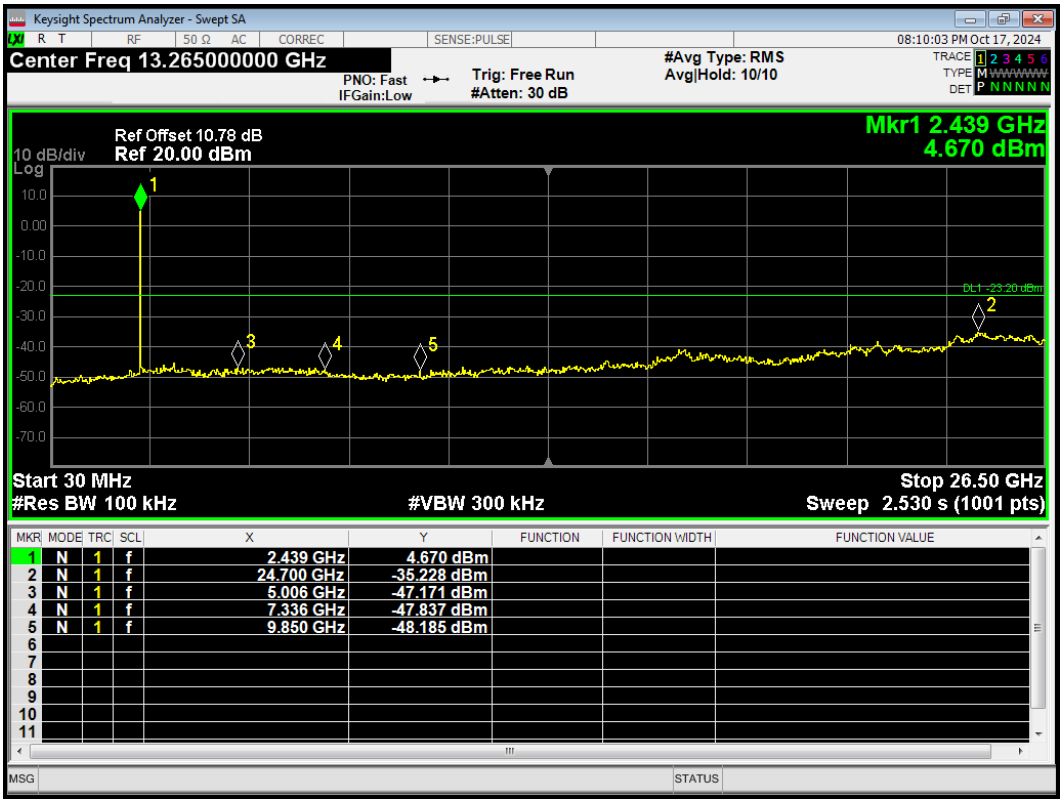
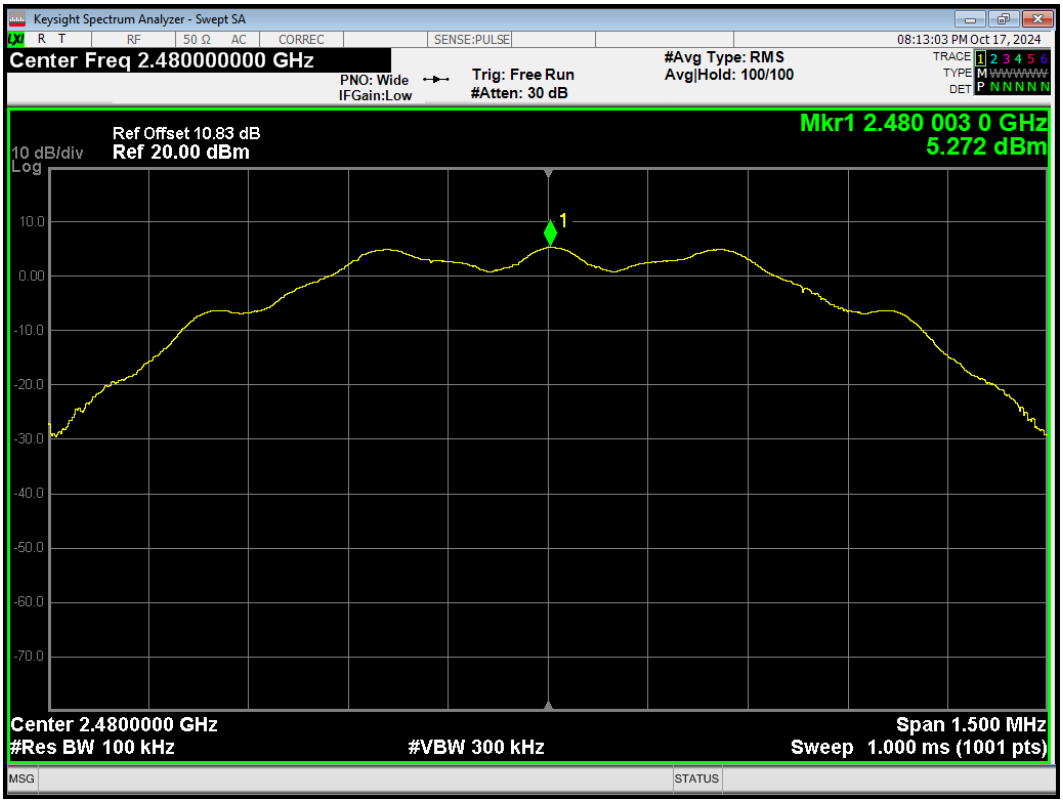


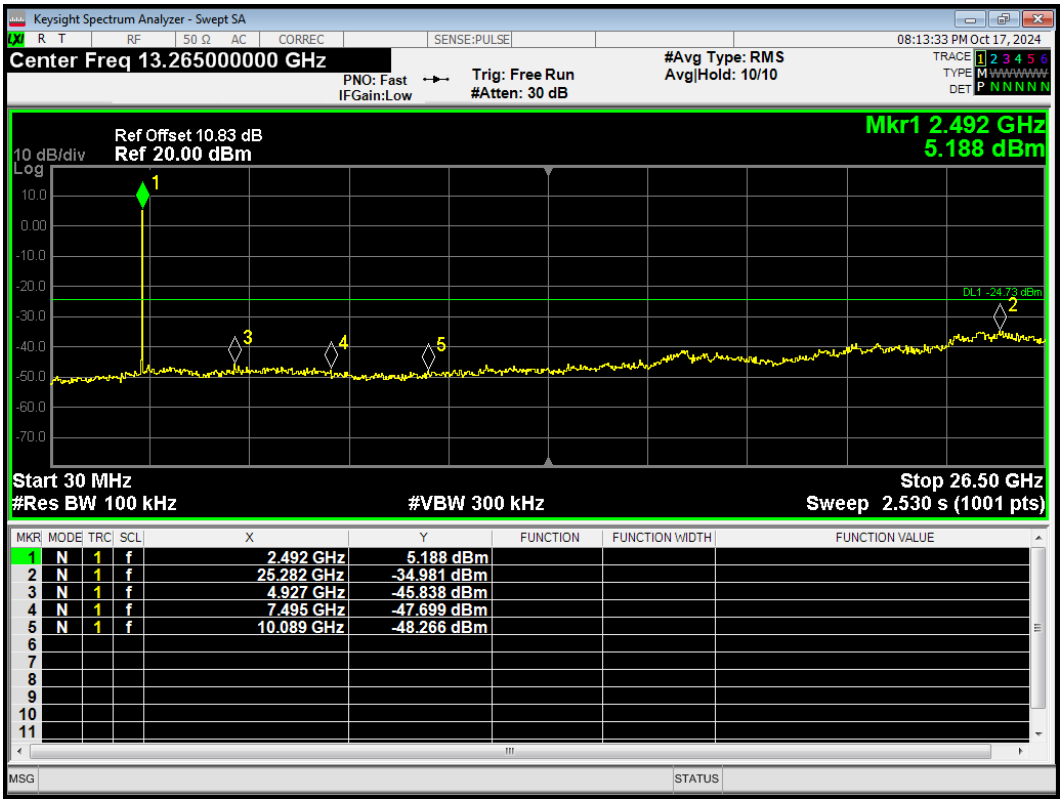
Tx. Spurious BLE S=8 2440MHz Emission



Tx. Spurious BLE S=8 2480MHz Ref



Tx. Spurious BLE S=8 2480MHz Emission



6. Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Power Sensor	R&S	NRP18S	101954	2024-05-07	2025-05-06
Spectrum Analyzer	KEYSIGHT	N9020A	MY51330870	2024-05-07	2025-05-06
DC Power Supply	UNI-T	UTP1306S+	2205D0517426	2023-12-05	2024-12-04

ANNEX A: The EUT Appearance

The EUT Appearance are submitted separately.

ANNEX B: Test Setup Photos

The Test Setup Photos are submitted separately.

******** END OF REPORT ********