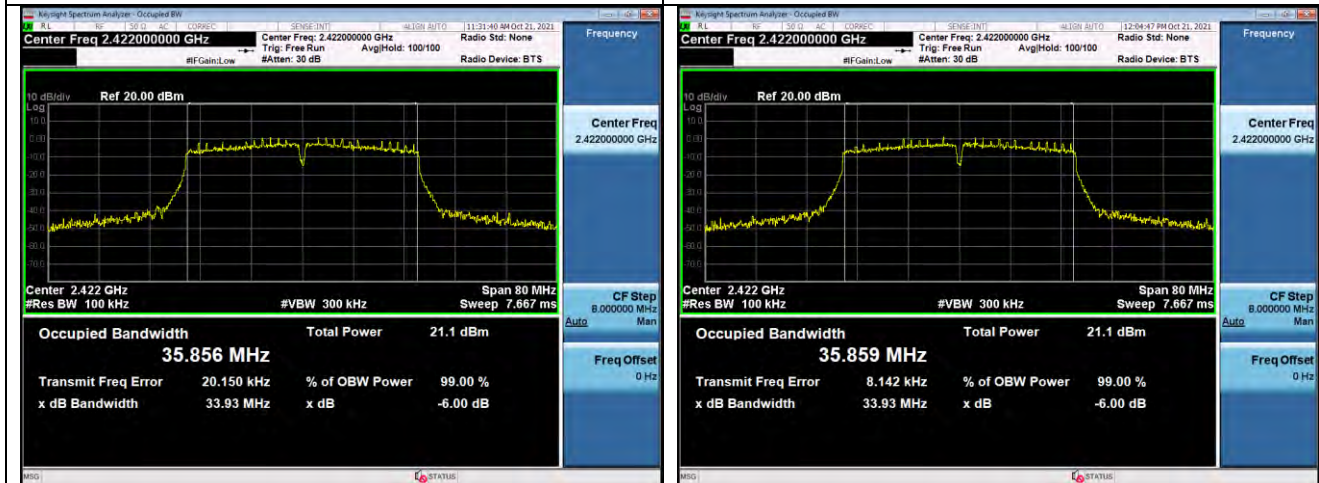




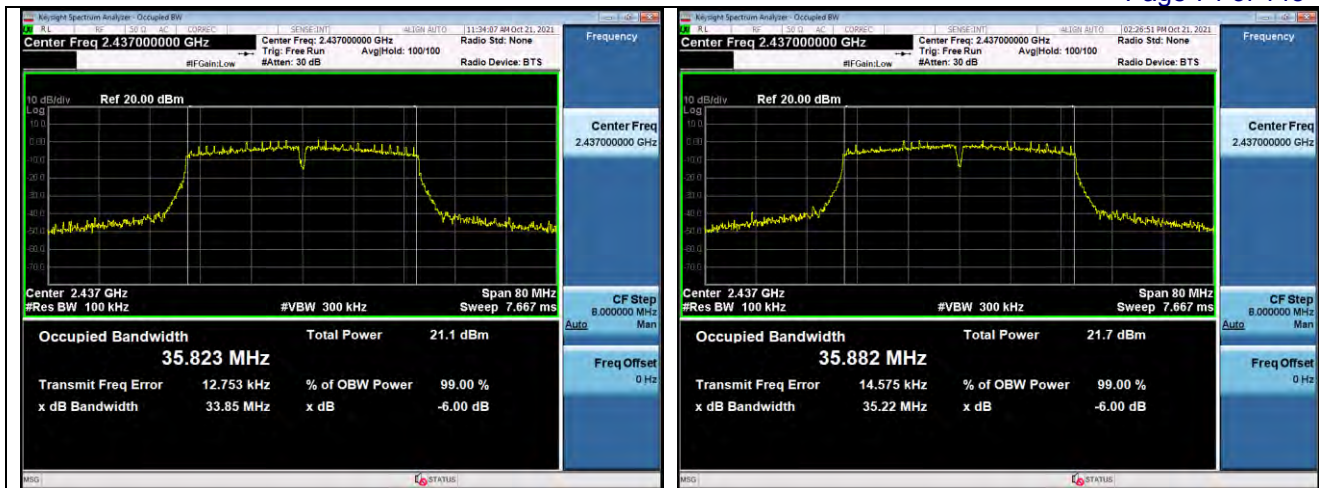
Highest channel

Highest channel

ANT1
802.11n(HT40)
Lowest channelANT2
802.11n(HT40)
Lowest channel

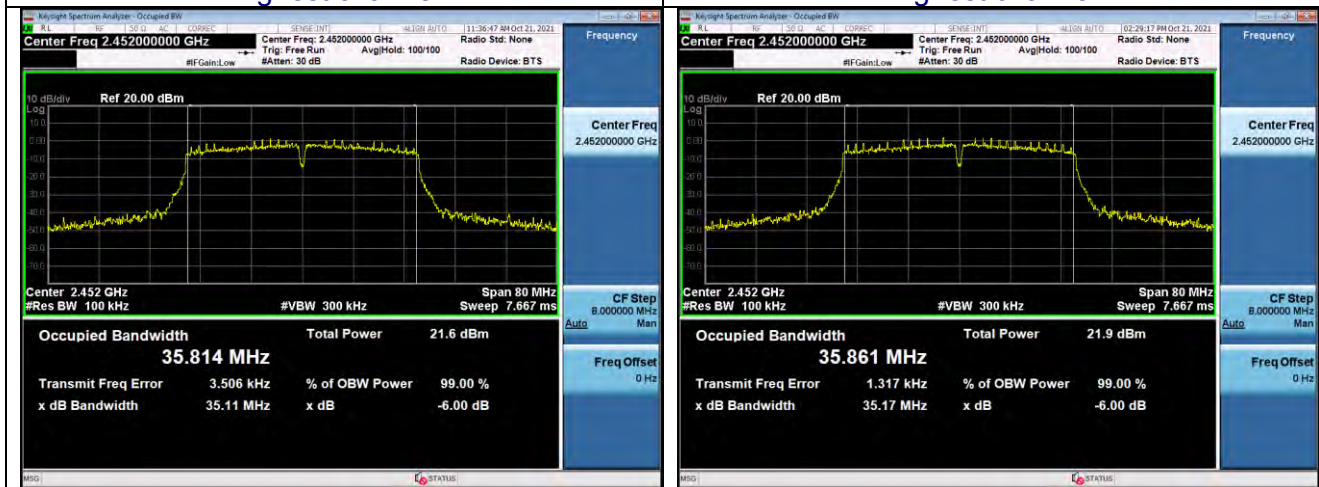
Middle channel

Middle channel



Highest channel

Highest channel



8. OUTPUT POWER TEST

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	KDB558074 D0115.247 Meas Guidance v05r02

8.1 APPLIED PROCEDURES/LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

8.2 TEST PROCEDURE

- a. The EUT was directly connected to the Power meter

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP



8.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

8.6 TEST RESULT

Temperature :	26℃	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	AC110V

Module A

Test Channel	Frequency	Maximum Peak Conducted Output Power (dBm)			LIMIT
	(MHz)	Antenna 1	Antenna 2	MIMO	dBm
TX 802.11b Mode					
CH01	2412	16.35	16.69	/	30
CH06	2437	15.17	16.65	/	30
CH11	2462	16.56	16.07	/	30
TX 802.11g Mode					
CH01	2412	13.57	15.06	/	30
CH06	2437	14.62	15.45	/	30
CH11	2462	14.31	15.37	/	30
TX 802.11n20 Mode					
CH01	2412	13.93	14.28	17.12	27.99
CH06	2437	14.27	13.59	16.95	27.99
CH11	2462	14.14	14.15	17.16	27.99
TX 802.11n40 Mode					
CH03	2422	11.94	11.97	14.97	27.99
CH06	2437	12.43	12.38	15.42	27.99
CH09	2452	12.34	12.34	15.35	27.99

Note: This product supports antenna 1 and antenna 2 launch, but only support 802.11 n for MIMO mode, not support 802.11 b and 802.11 g for MIMO mode.

Module B

Test Channel	Frequency	Maximum Peak Conducted Output Power (dBm)			LIMIT
	(MHz)	Antenna 1	Antenna 2	MIMO	dBm
TX 802.11b Mode					
CH01	2412	17.12	17.62	/	30
CH06	2437	17.98	17.50	/	30
CH11	2462	17.97	17.26	/	30
TX 802.11g Mode					
CH01	2412	15.31	15.34	/	30

CH06	2437	15.20	15.26	/	30
CH11	2462	15.11	15.19	/	30
TX 802.11n20 Mode					
CH01	2412	15.21	15.20	18.22	27.99
CH06	2437	15.12	15.08	18.11	27.99
CH11	2462	15.10	15.03	18.08	27.99
TX 802.11n40 Mode					
CH03	2422	13.92	13.94	16.94	27.99
CH06	2437	13.94	14.70	17.35	27.99
CH09	2452	14.42	14.72	17.58	27.99

Note: This product supports antenna 1 and antenna 2 launch, but only support 802.11 n for MIMO mode, not support 802.11 b and 802.11 g for MIMO mode.

$$\text{POWER(MIMO)} = \text{LIMIT} - (8.01 - 6) = 30 - 2.01 = 27.99$$

9. CONDUCTED BAND EDGE AND SPURIOUS EMISSION

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	KDB558074 D0115.247 Meas Guidance v05r02

9.1 APPLICABLE STANDARD

in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in§15.205(a), must also comply with the radiated emission limits specified in15.209(a).

9.2 TEST PROCEDURE

Using the following spectrum analyzer setting:

- A) Set the RBW = 100KHz.
- B) Set the VBW = 300KHz.
- C) Sweep time = auto couple.
- D) Detector function = peak.
- E) Trace mode = max hold.
- F) Allow trace to fully stabilize.

9.3 DEVIATION FROM STANDARD

No deviation.

9.4 TEST SETUP



9.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

9.6 TEST RESULTS

Test plot as follows:

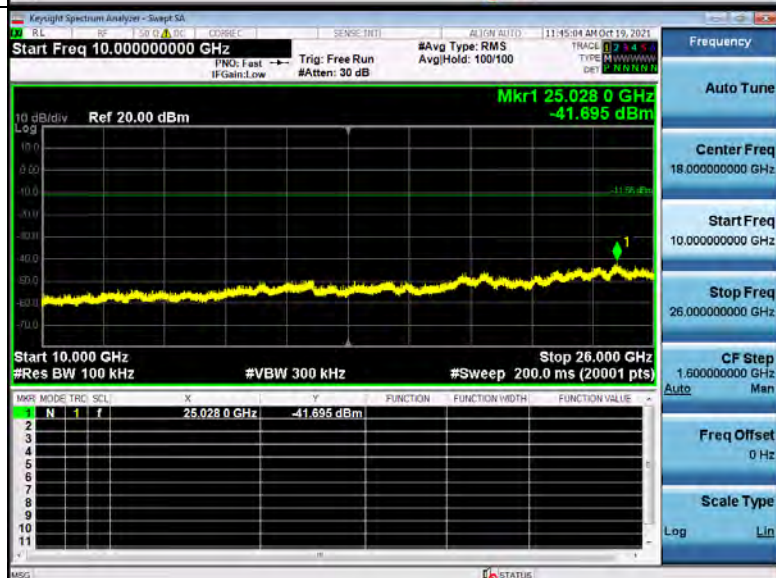
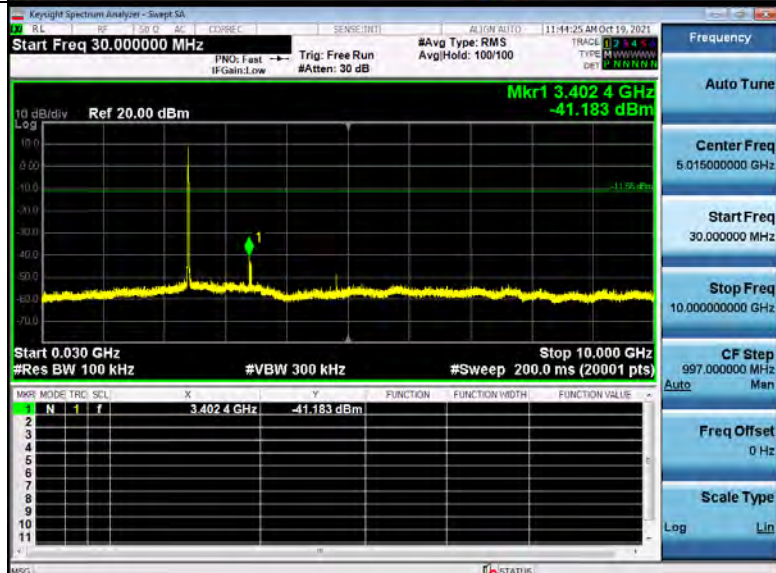
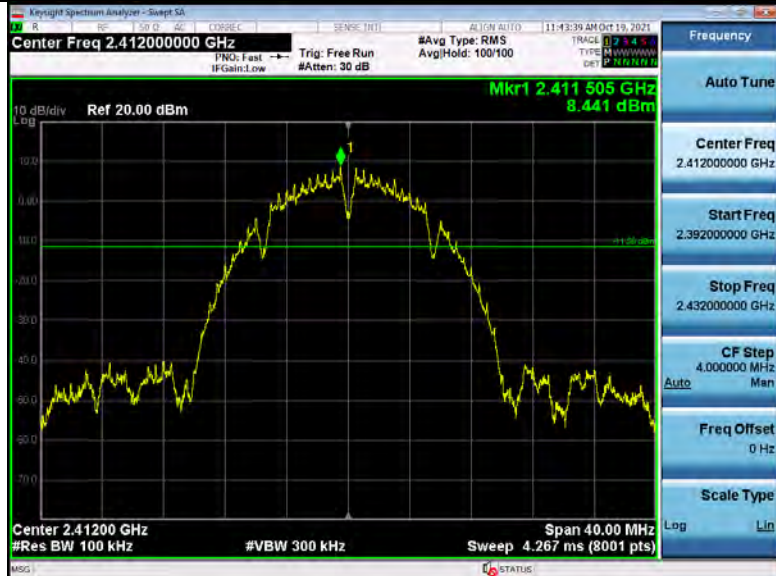
Module A

ANT1

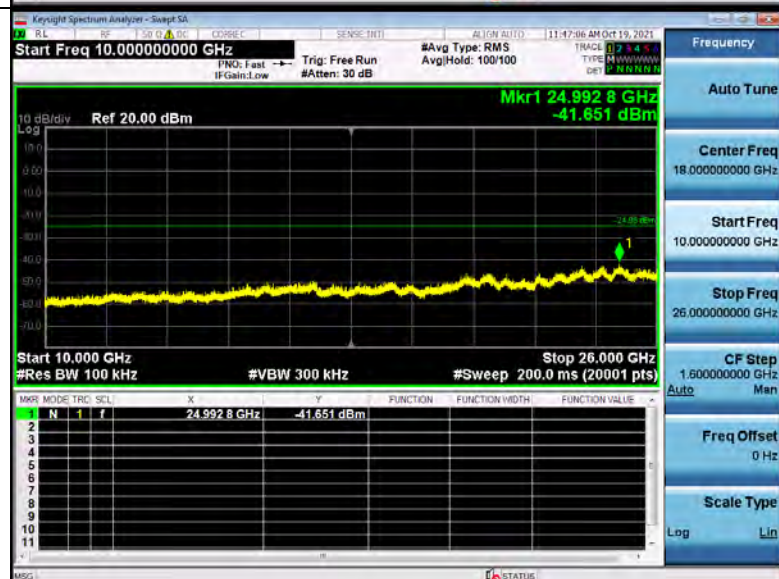
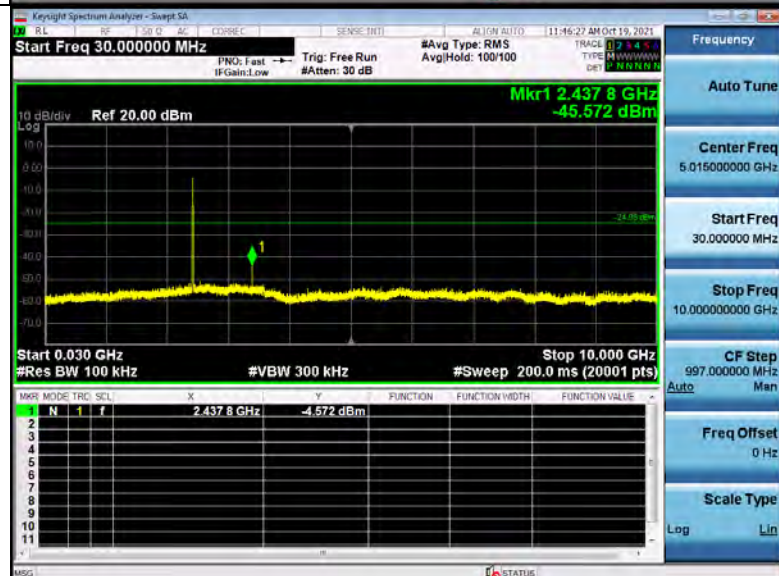
802.11b Modulation

Spurious emission

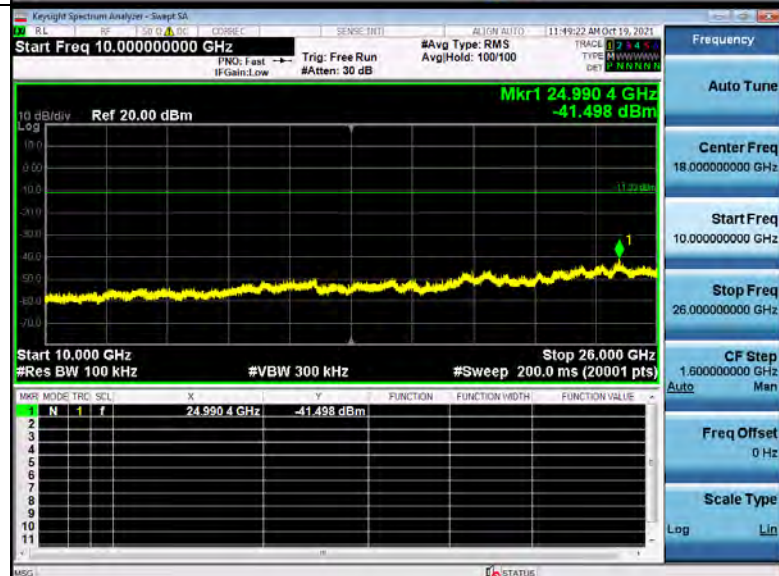
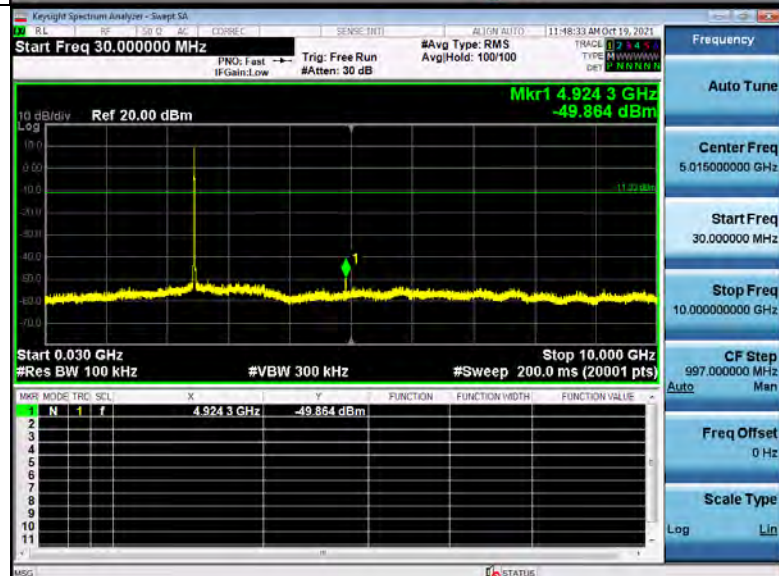
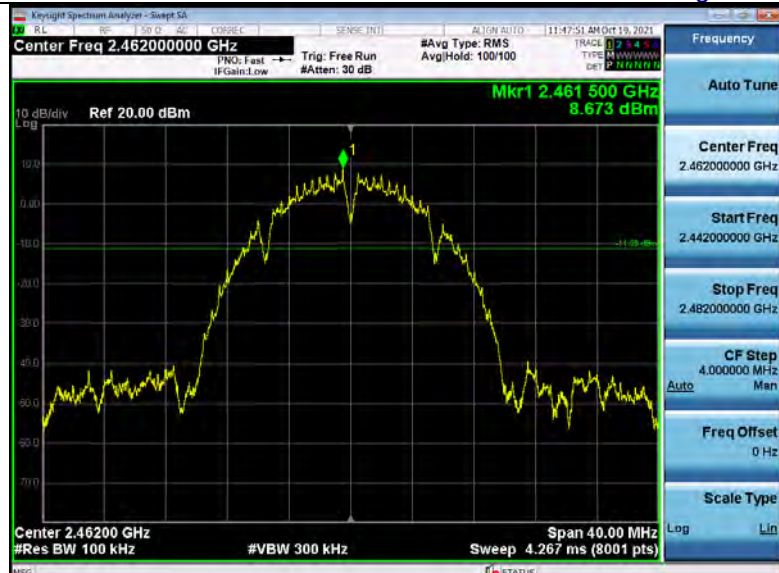
Low Channel



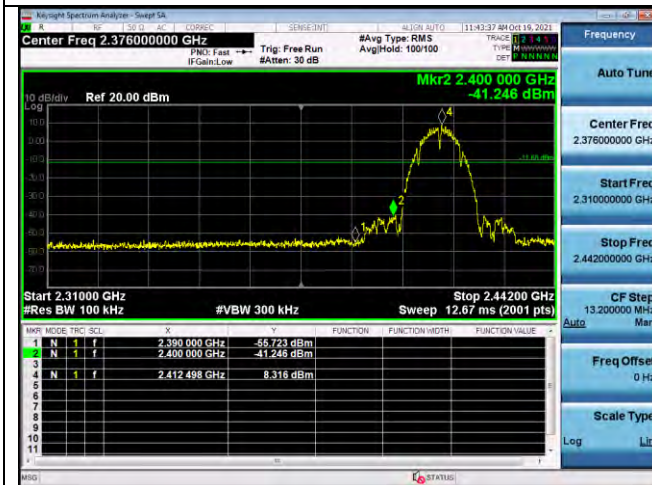
Middle Channel



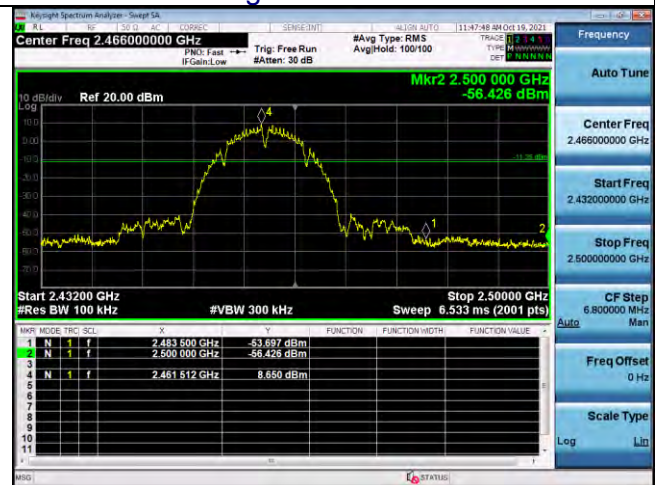
High Channel



Lowest Channel



Highest Channel



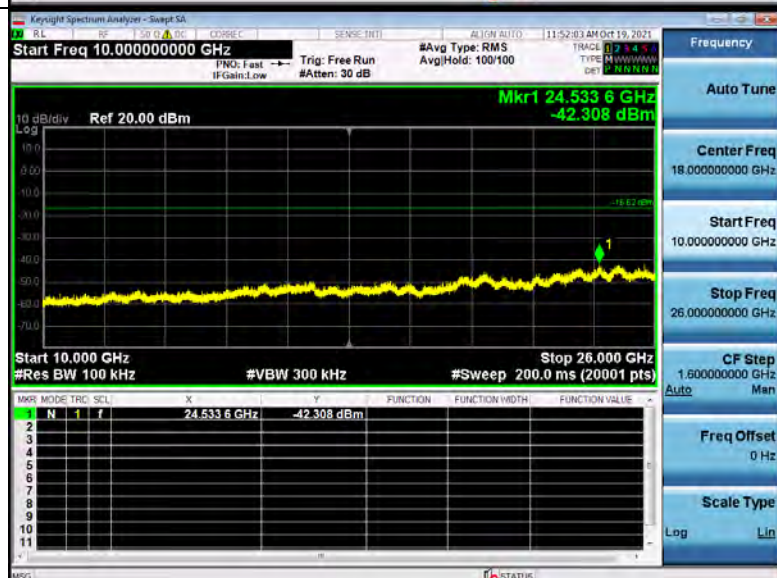
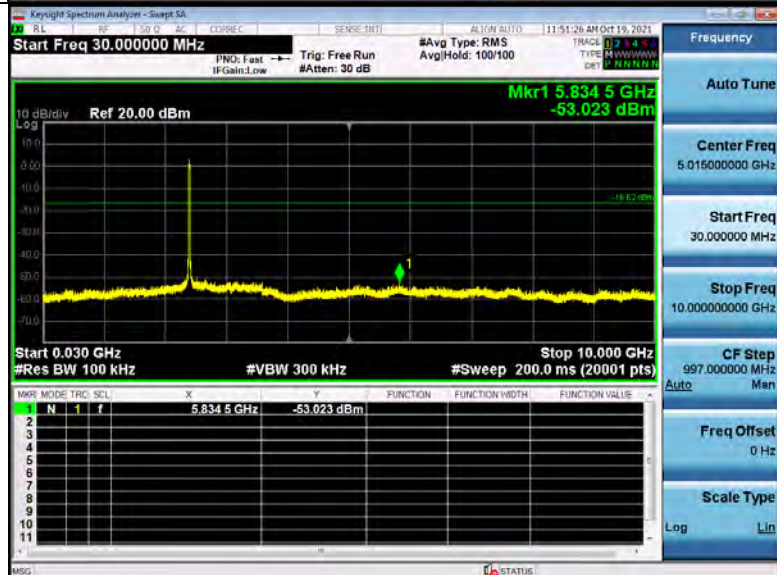
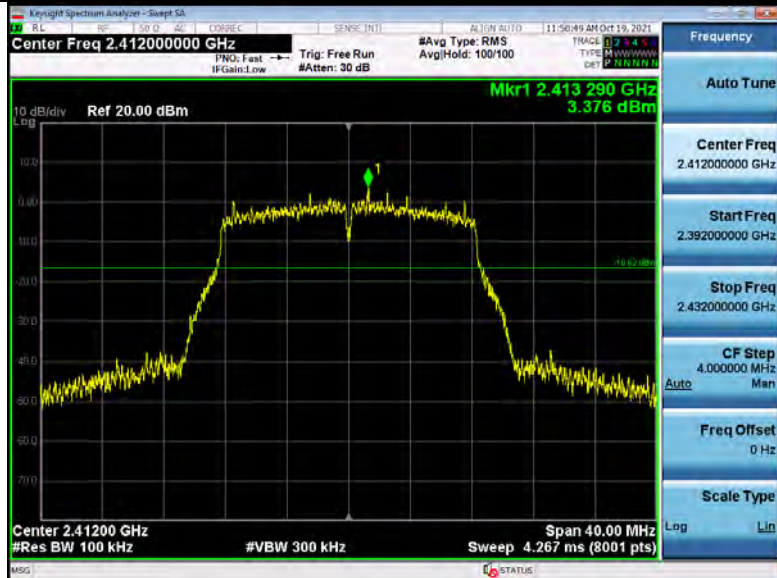
Left Band Edge

Right Band Edge

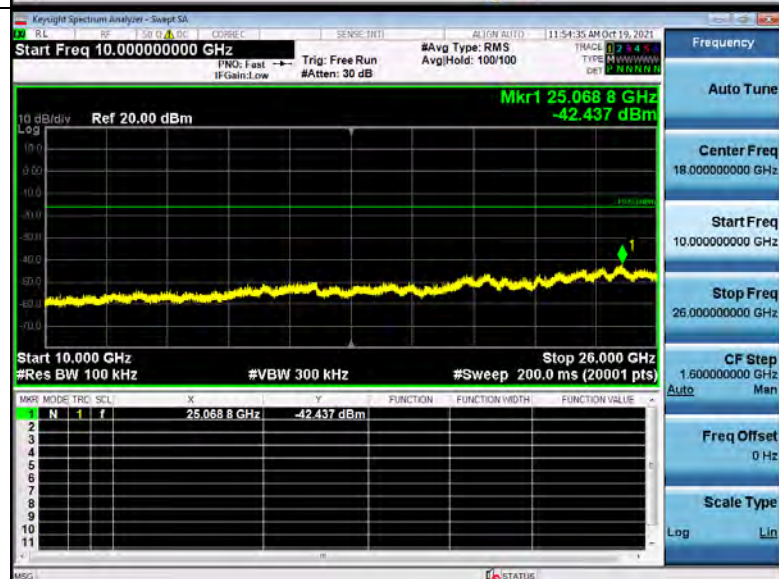
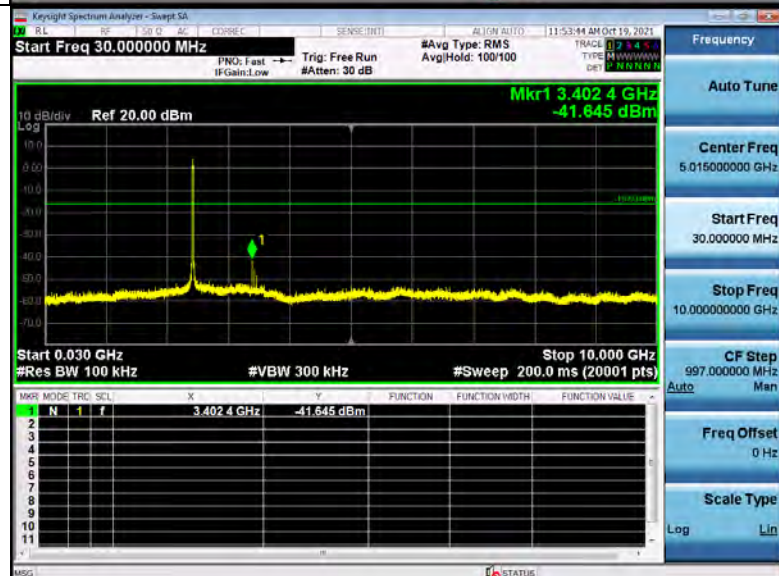
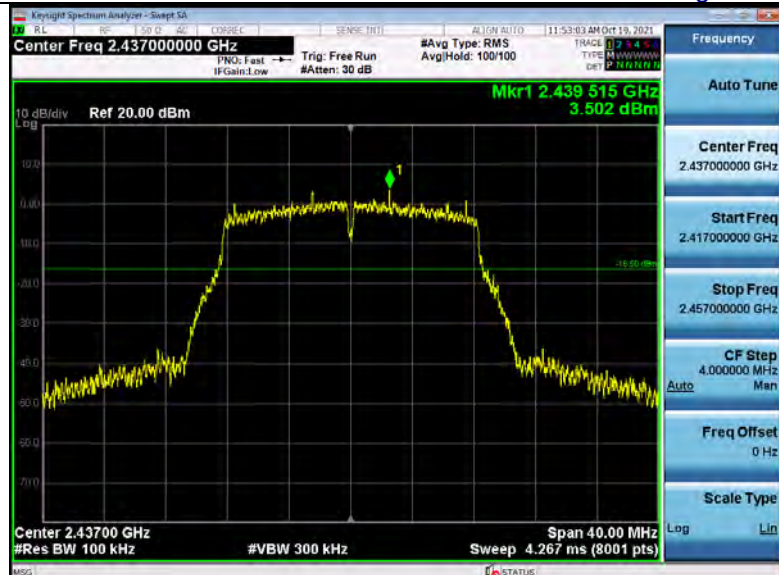
802.11g Modulation

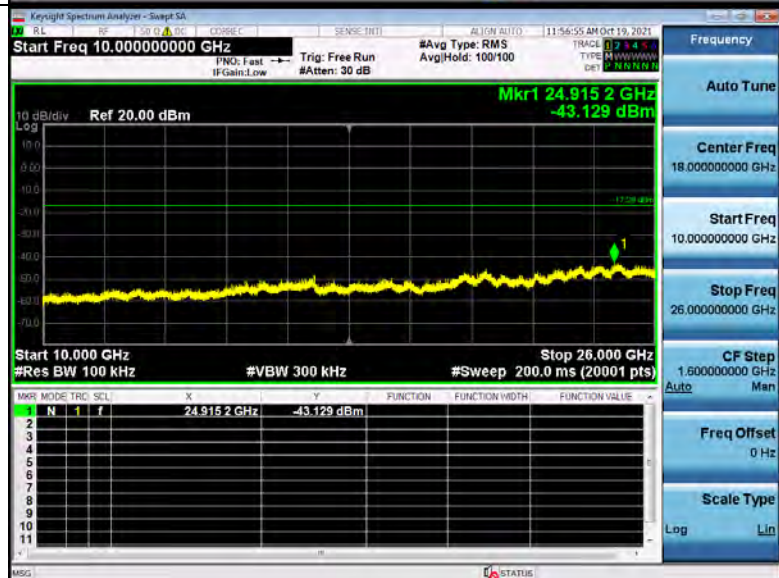
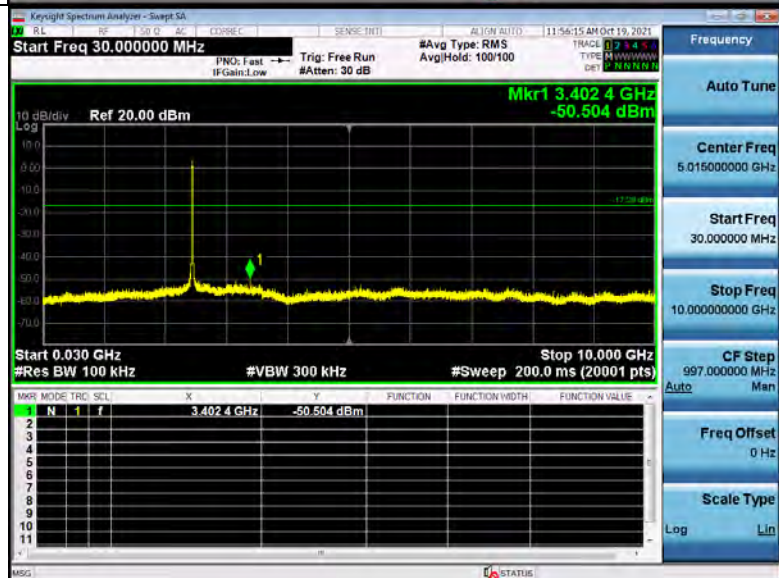
Spurious emission

Low Channel

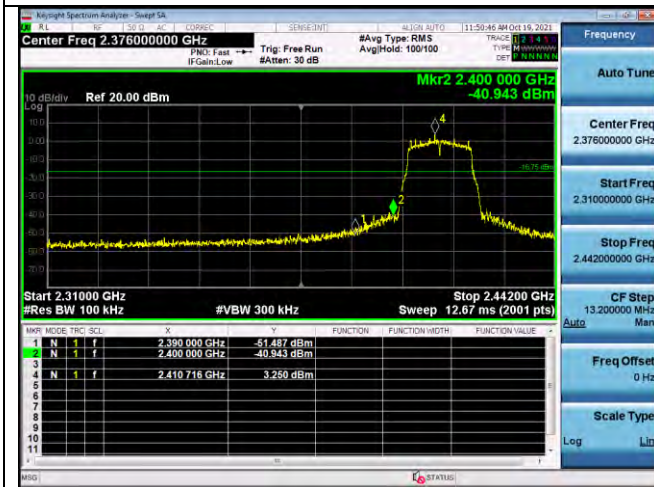


Middle Channel



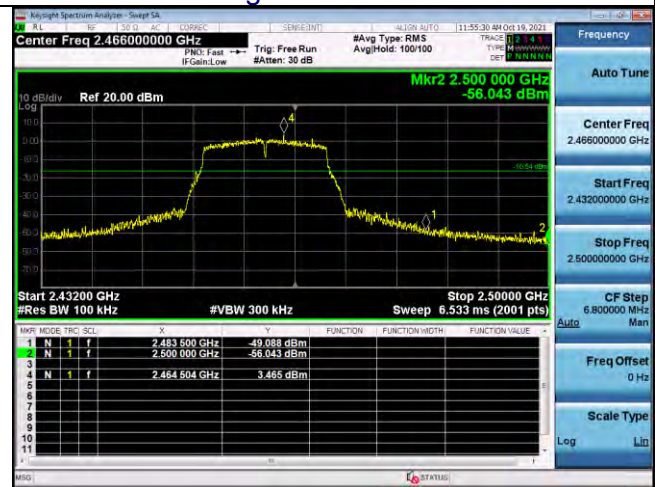
[illegible]

Lowest Channel



Left Band Edge

Highest Channel

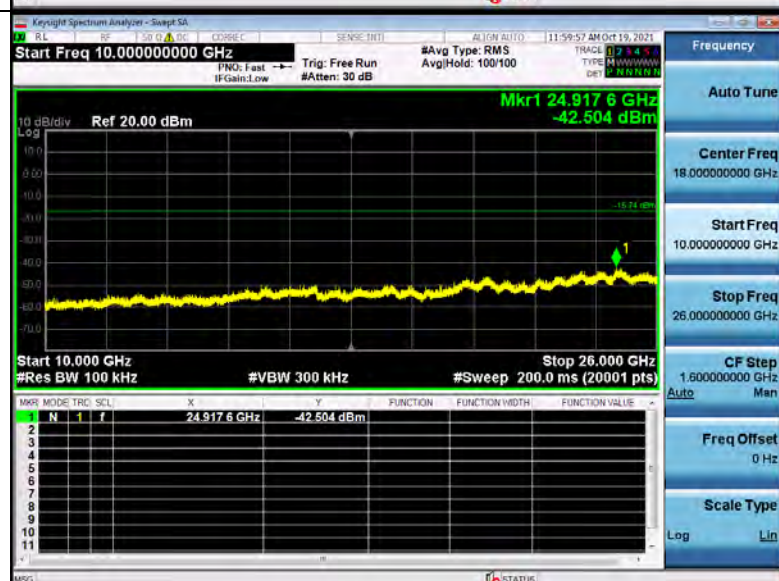
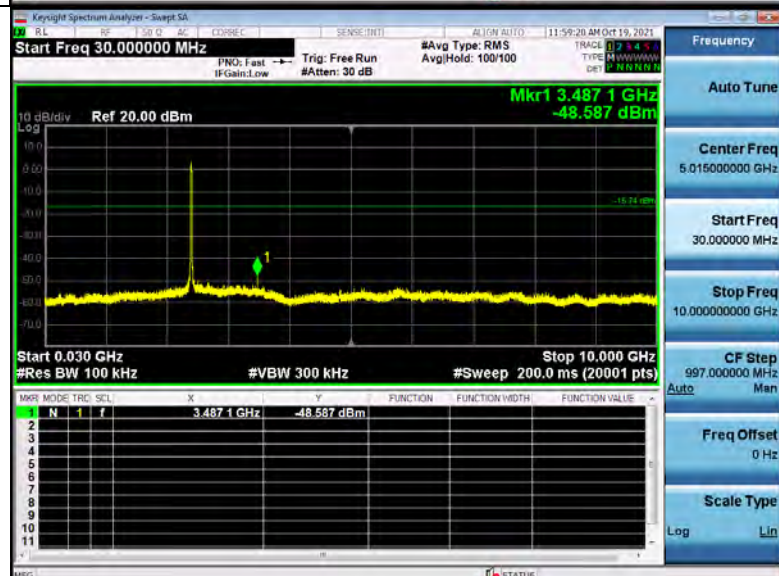
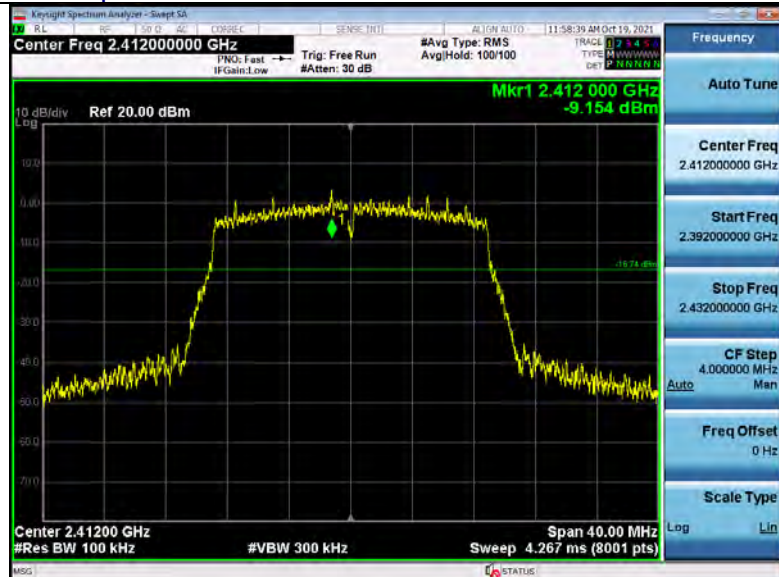


Right Band Edge

802.11n20 Modulation

Spurious emission

Low Channel



Keysight Spectrum Analyzer - Screenshot

Center Freq 2.437000000 GHz

Span 40.00 MHz

Ref 20.00 dBm

Log

10 dB/div

0.00

10.00

20.00

30.00

40.00

50.00

60.00

70.00

Mkr1 2.435 730 GHz

3.933 dBm

-10.00 dBm

Center 2.43700 GHz

#Res BW 100 kHz

#VBW 300 kHz

Sweep 4.267 ms (8001 pts)

Frequency

Auto Tune

Center Freq 2.437000000 GHz

Start Freq 2.417000000 GHz

Stop Freq 2.457000000 GHz

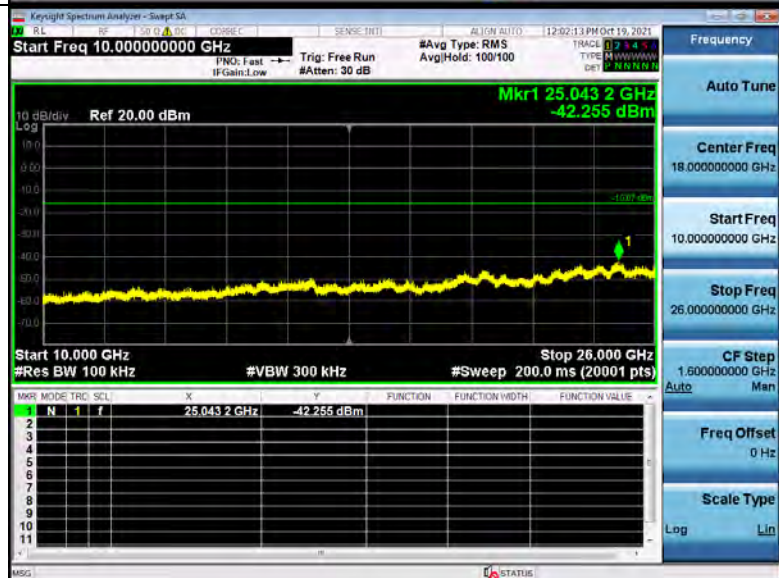
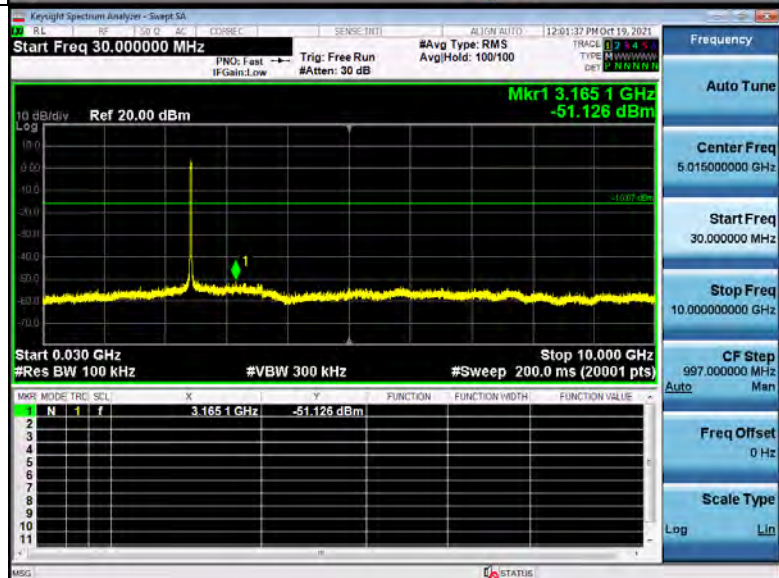
CF Step 4.000000 MHz

Auto Man

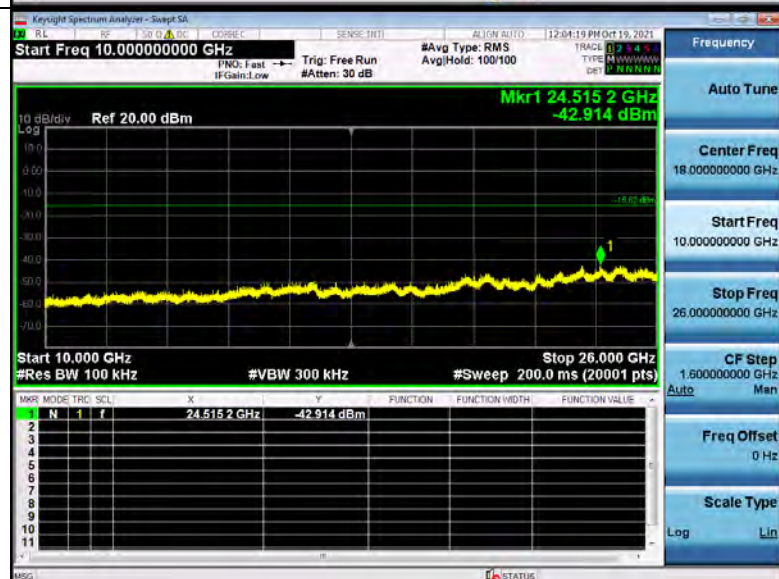
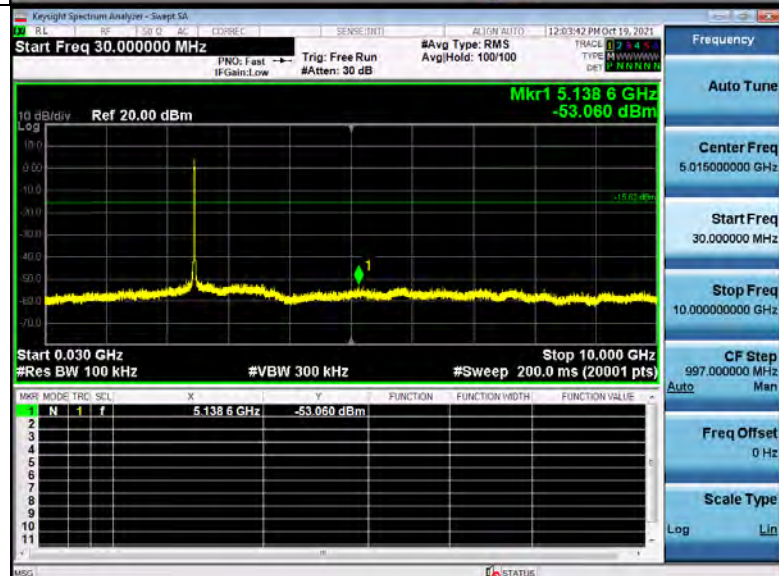
Freq Offset 0 Hz

Scale Type

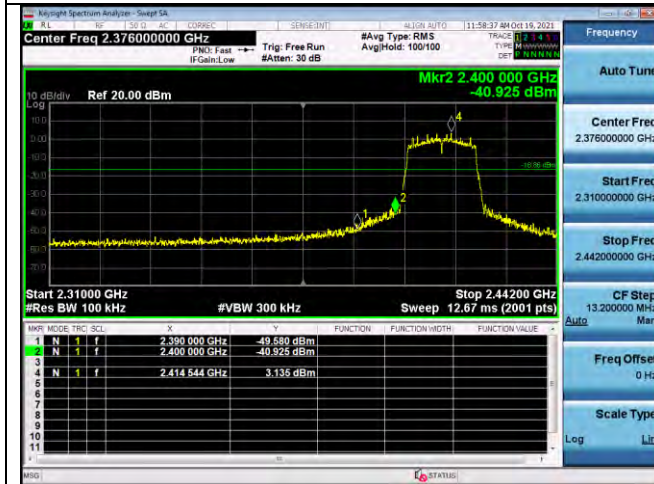
Log Lin



High Channel

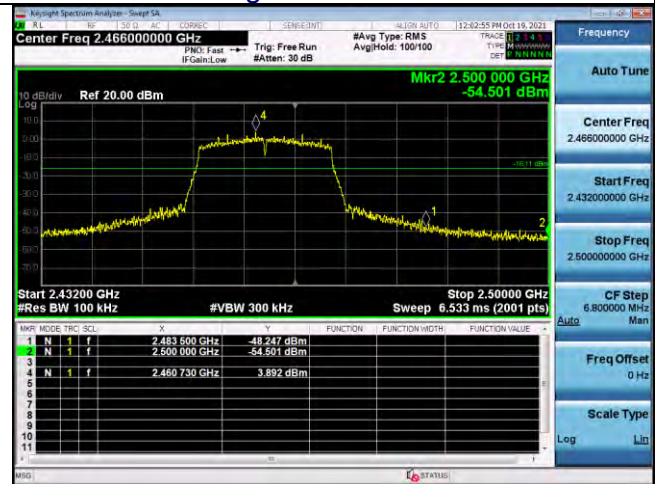


Lowest Channel



Left Band Edge

Highest Channel

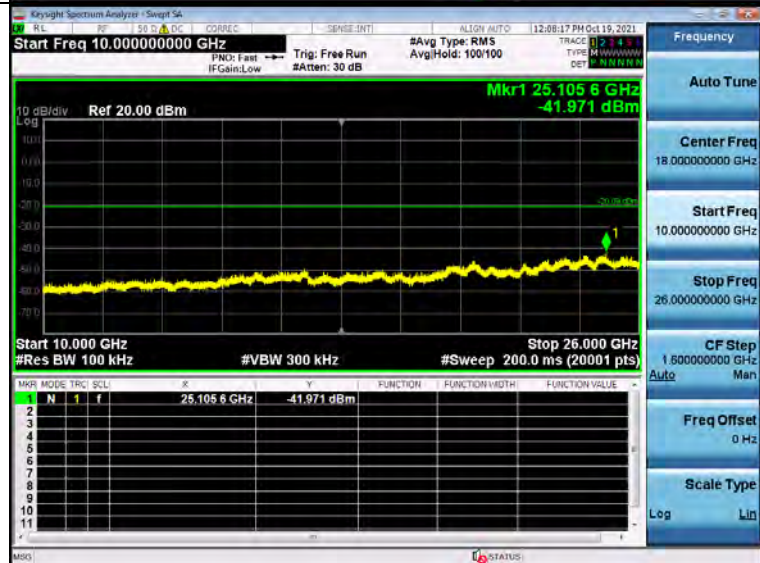
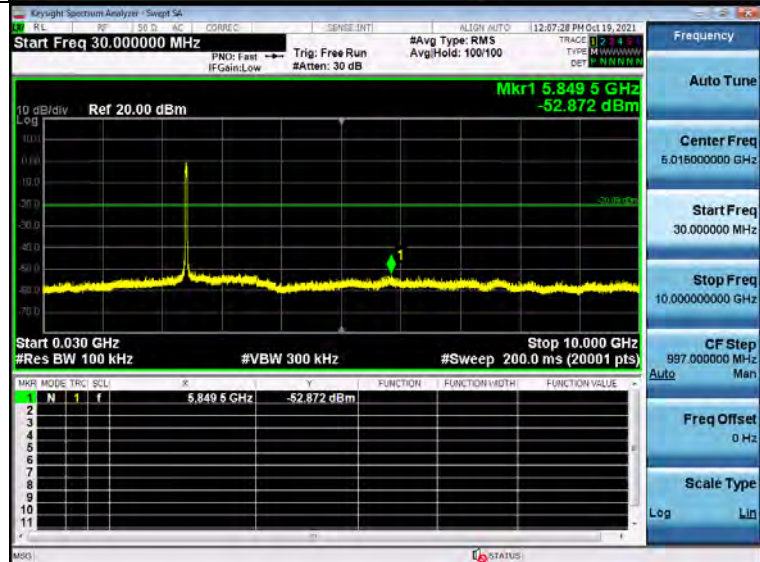


Right Band Edge

802.11n40 Modulation

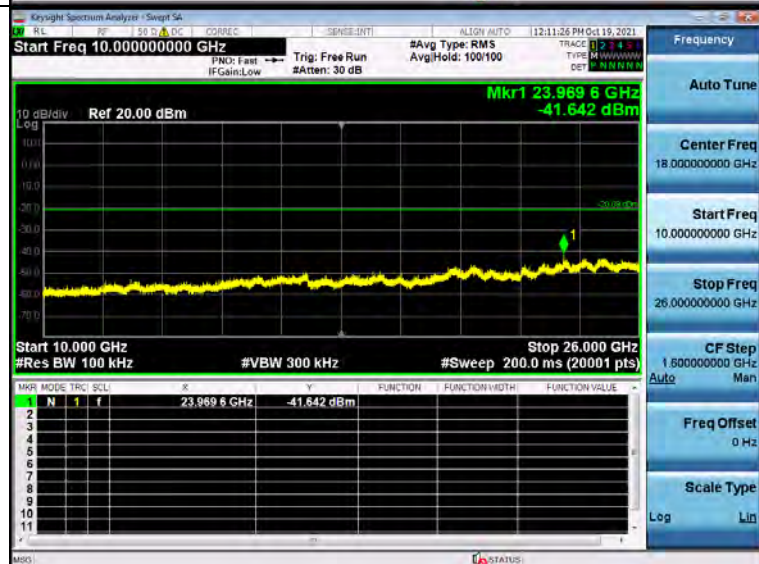
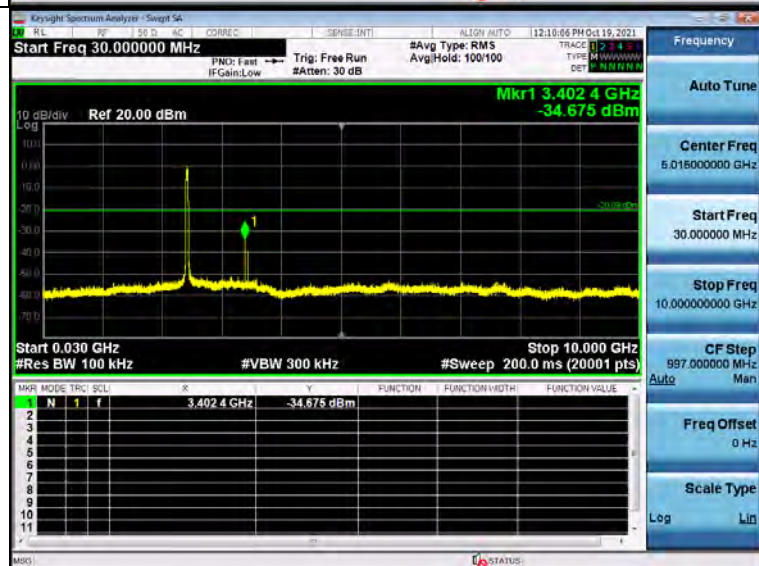
Spurious emission

Low Channel

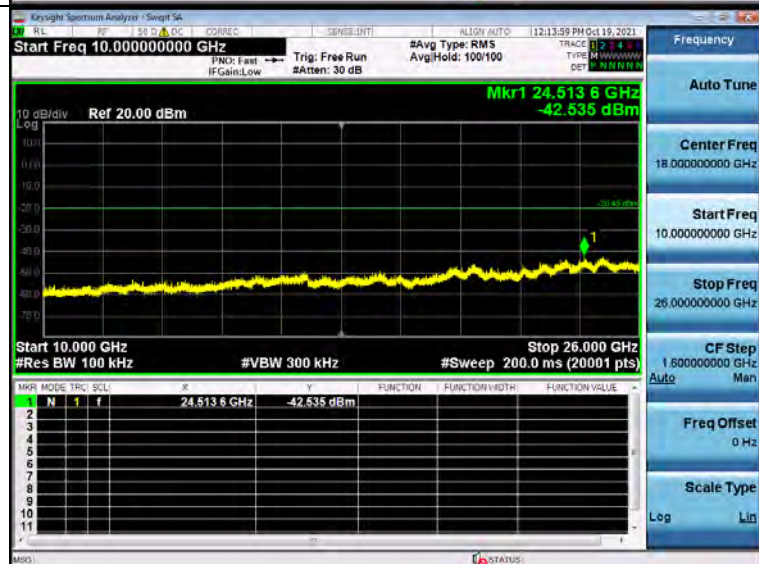
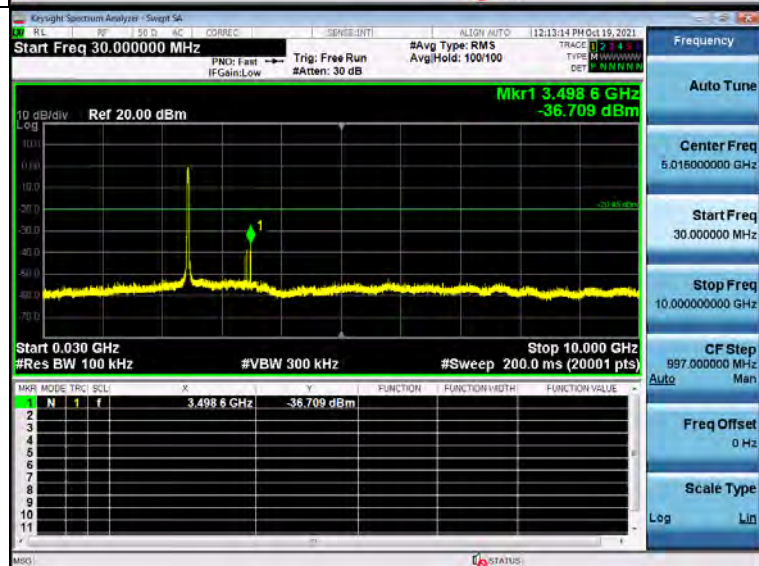




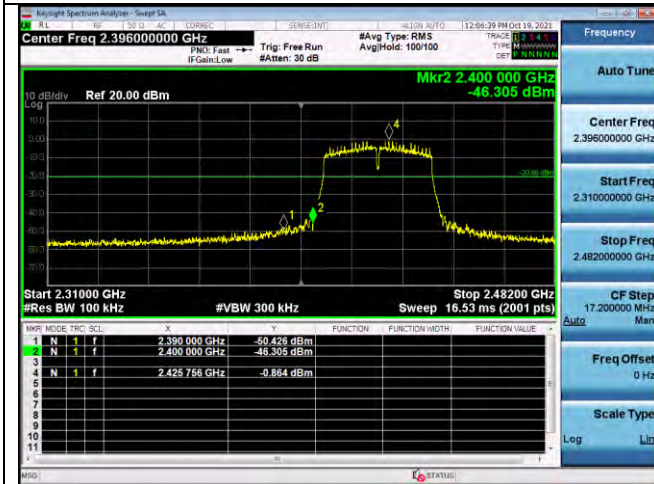
Middle Channel



High Channel

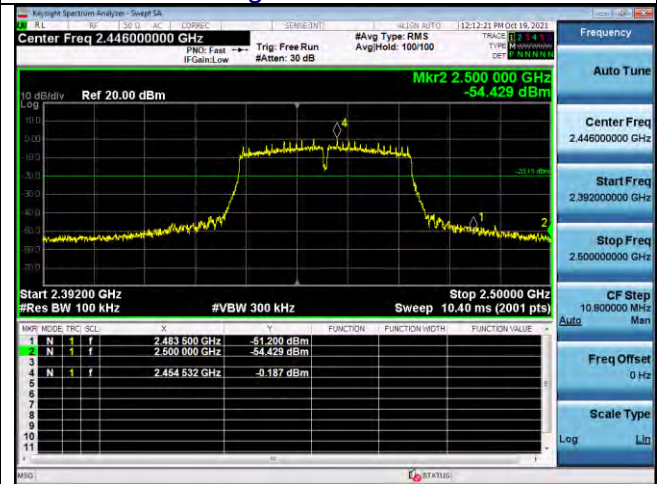


Lowest Channel



Left Band Edge

Highest Channel



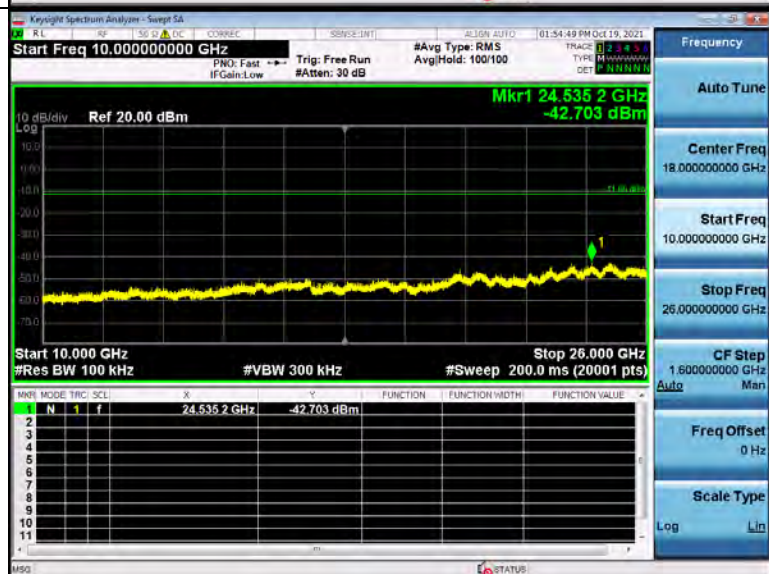
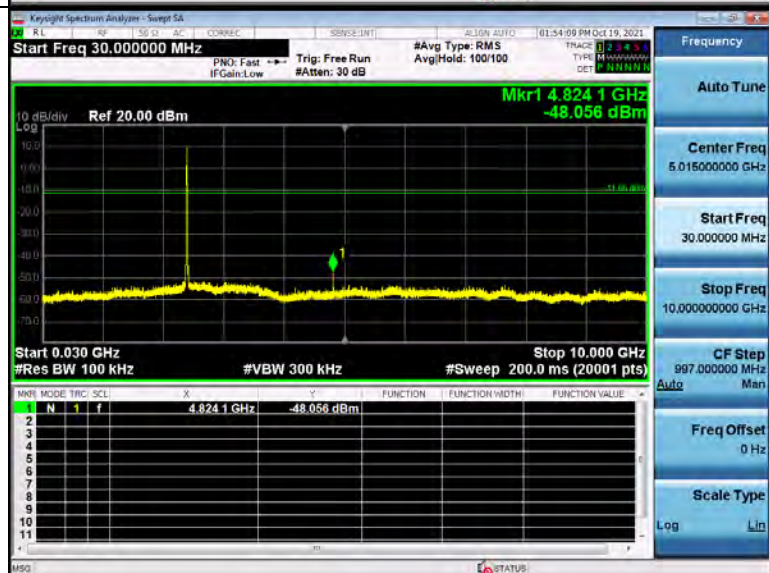
Right Band Edge

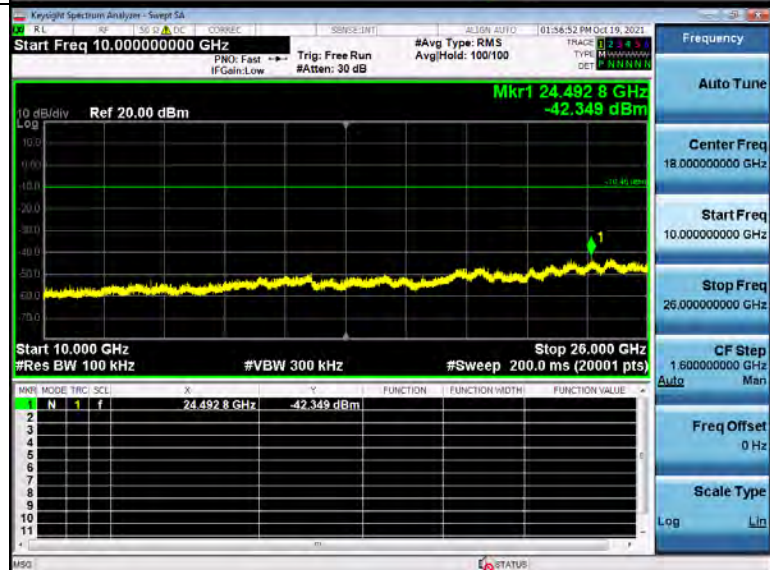
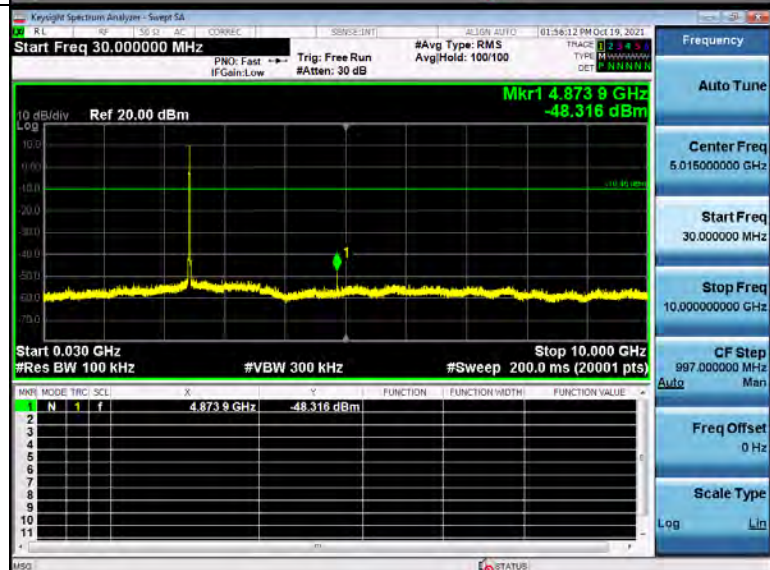
ANT2

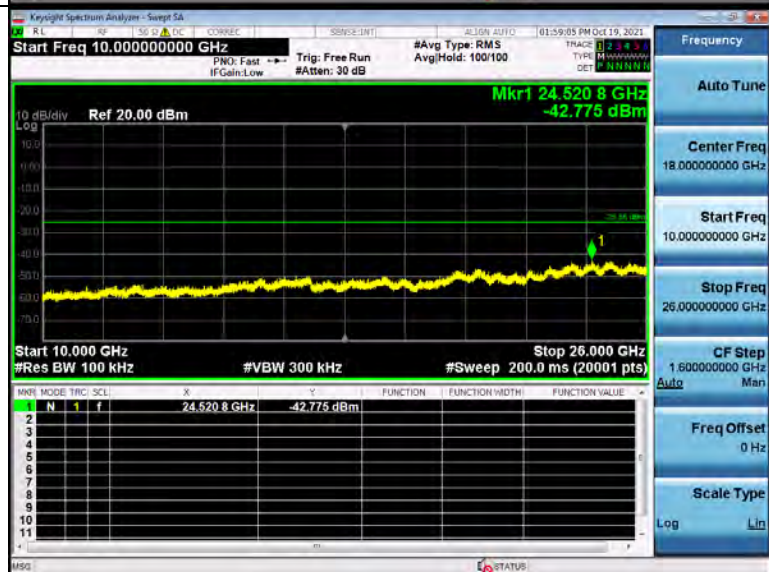
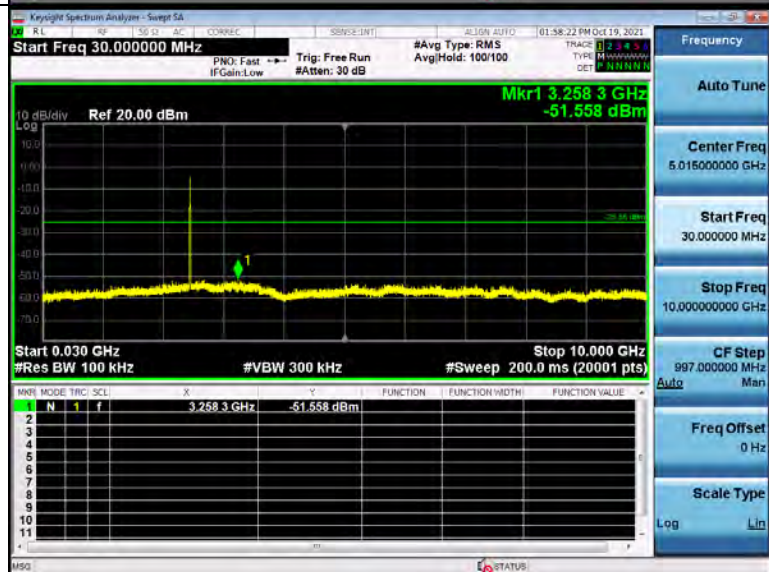
802.11b Modulation

Spurious emission

Low Channel



[illegible]

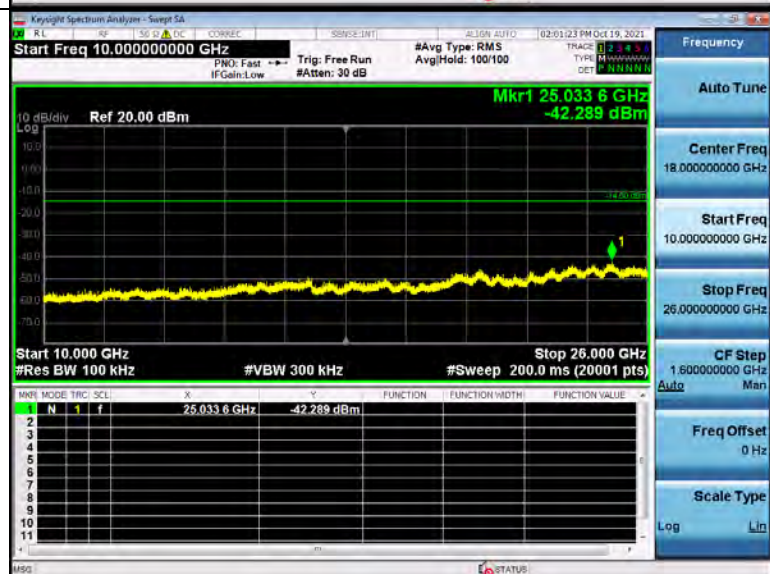
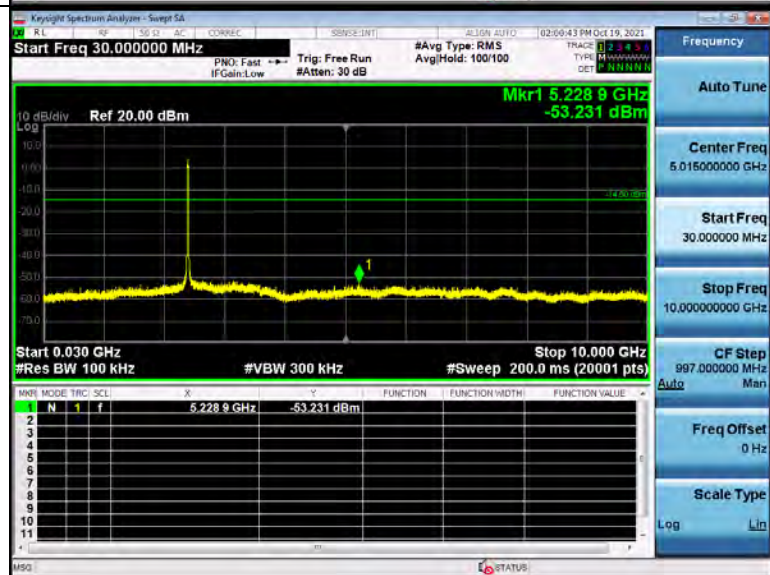
[illegible]

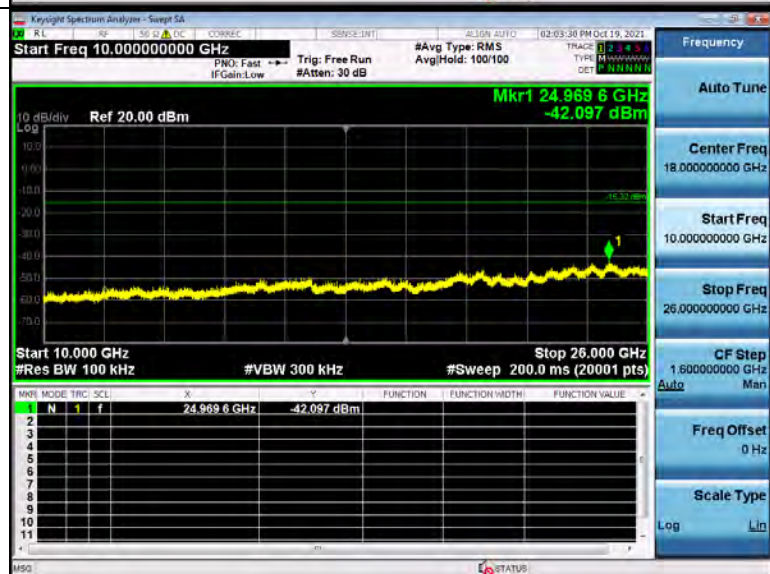
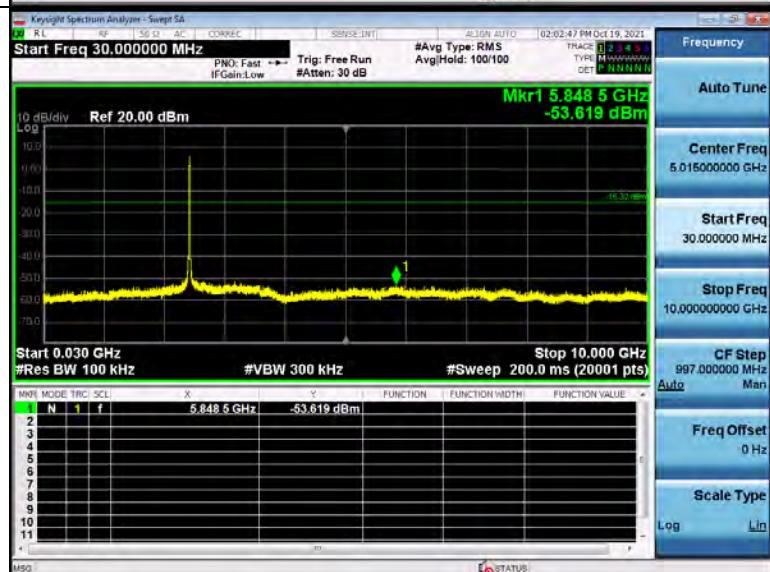


802.11g Modulation

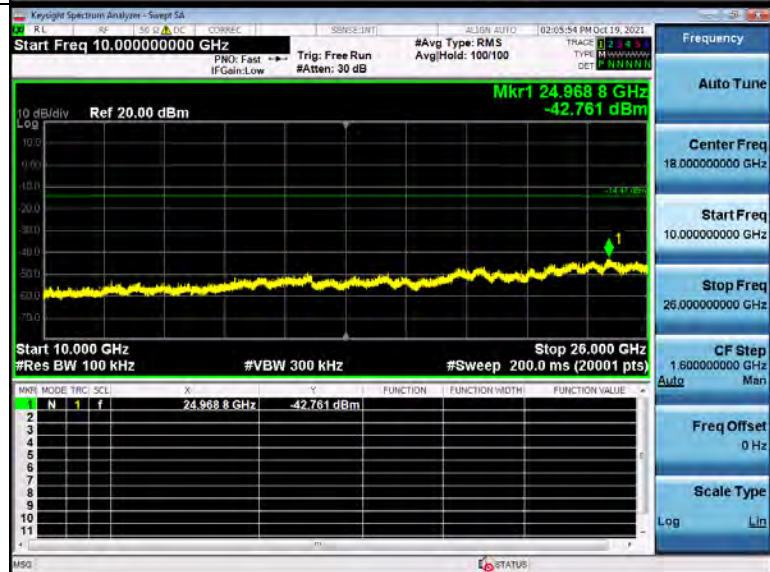
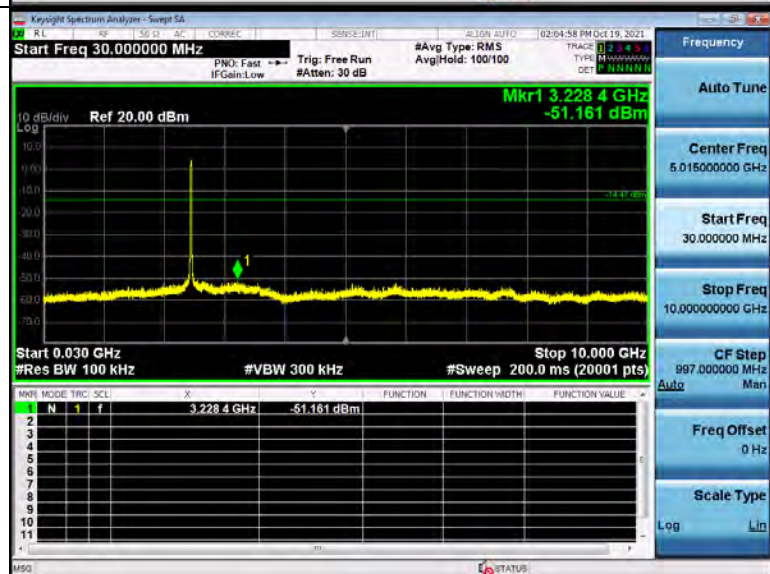
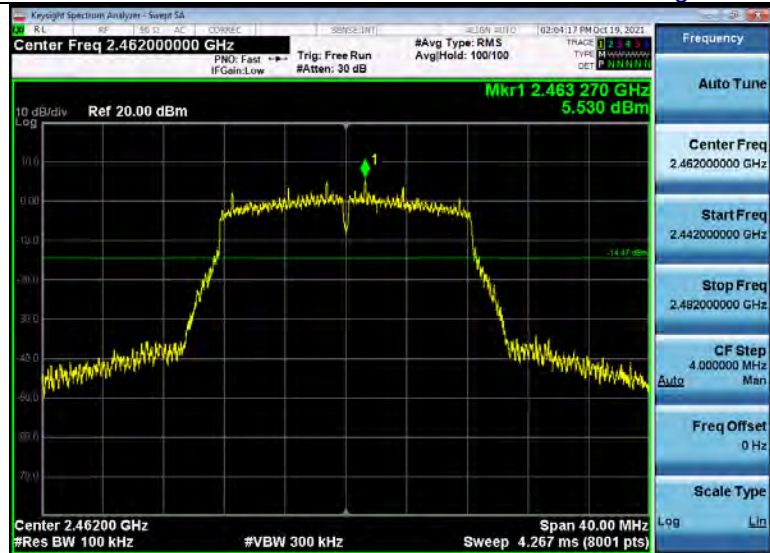
Spurious emission

Low Channel

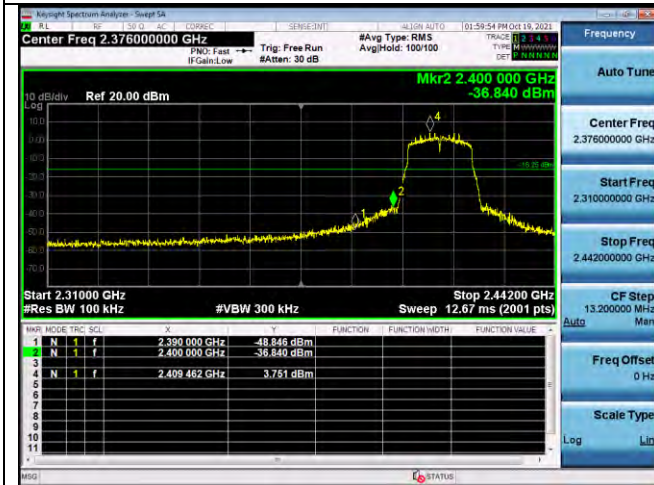


[illegible]

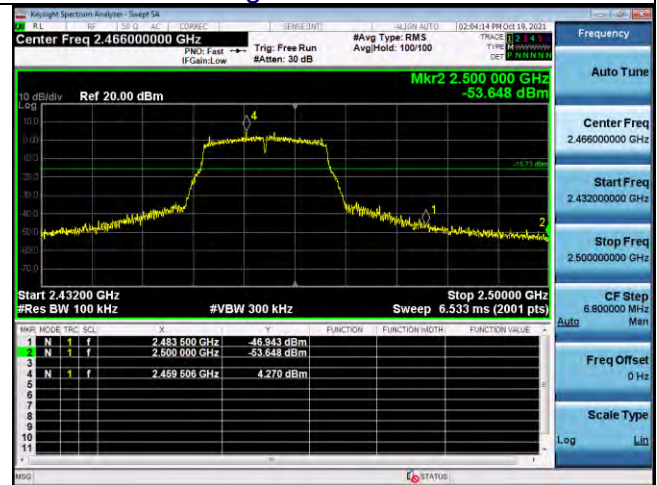
High Channel



Lowest Channel



Highest Channel



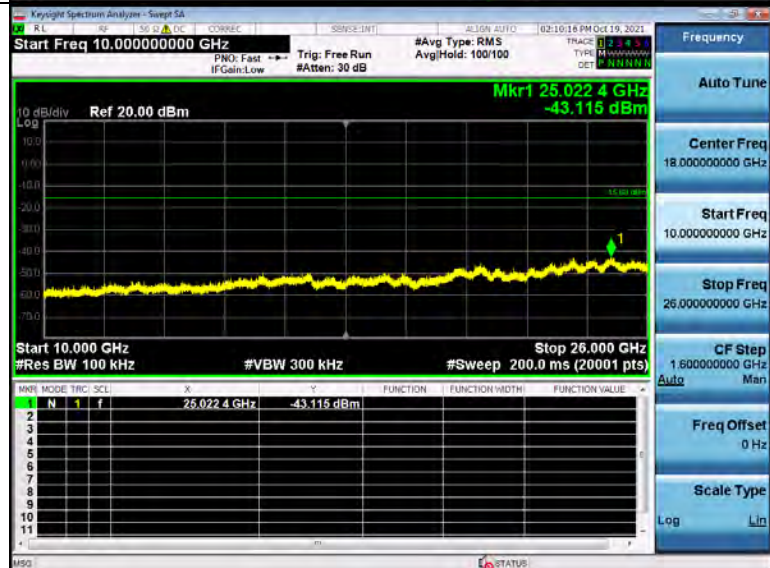
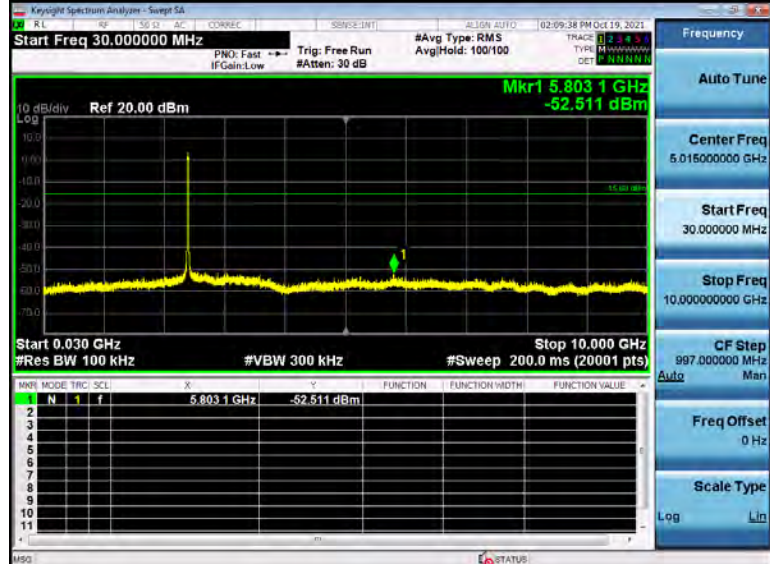
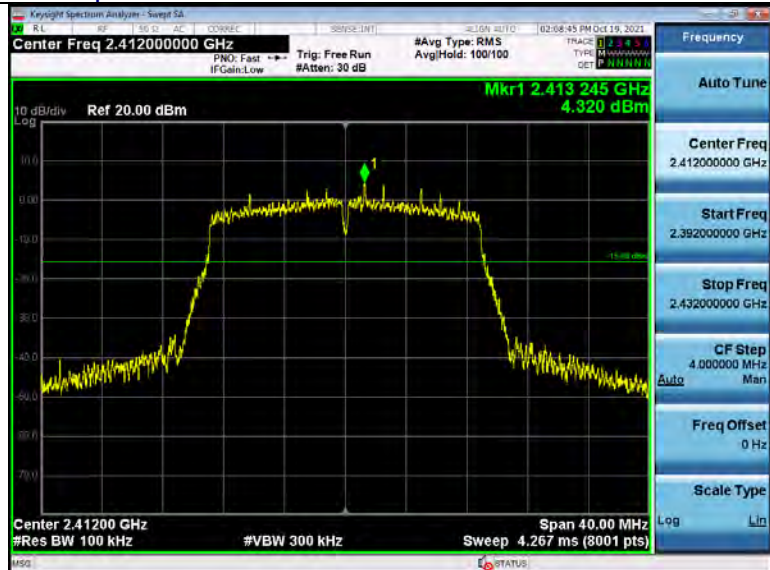
Left Band Edge

Right Band Edge

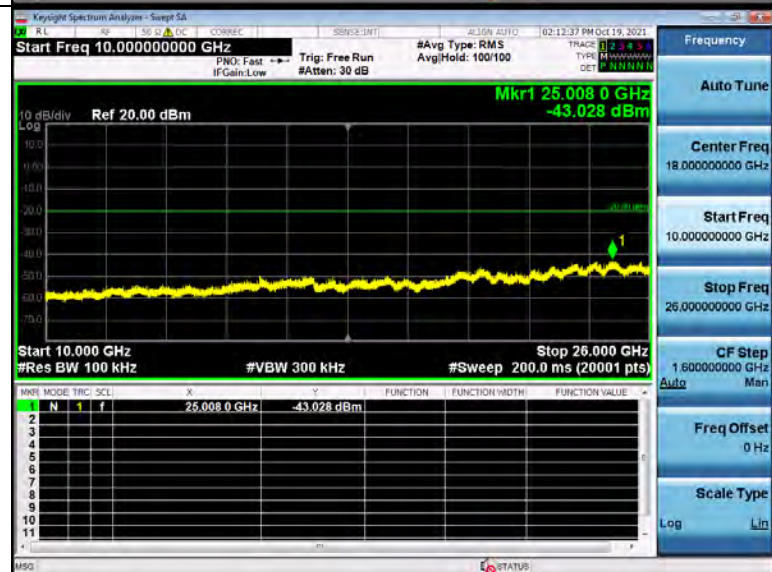
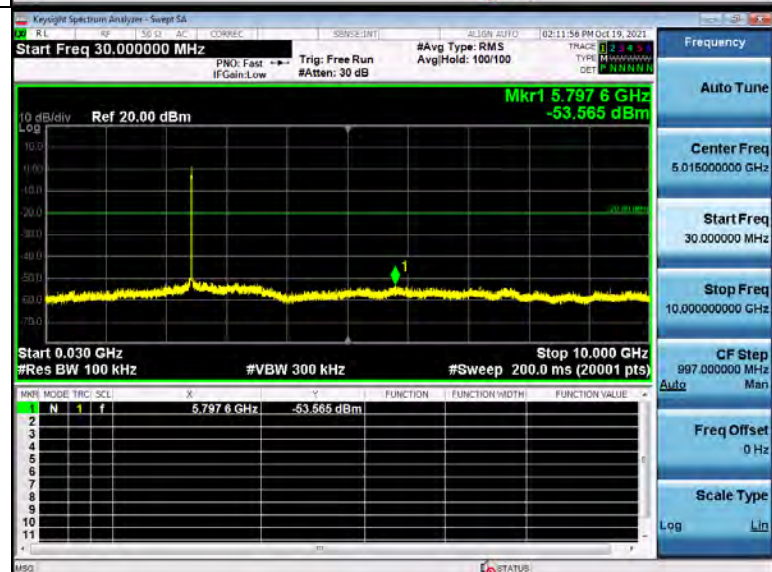
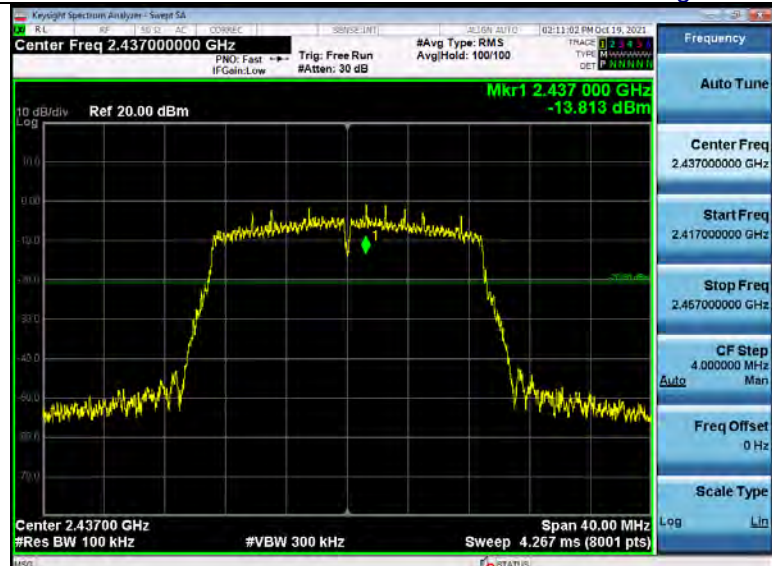
802.11n20 Modulation

Spurious emission

Low Channel

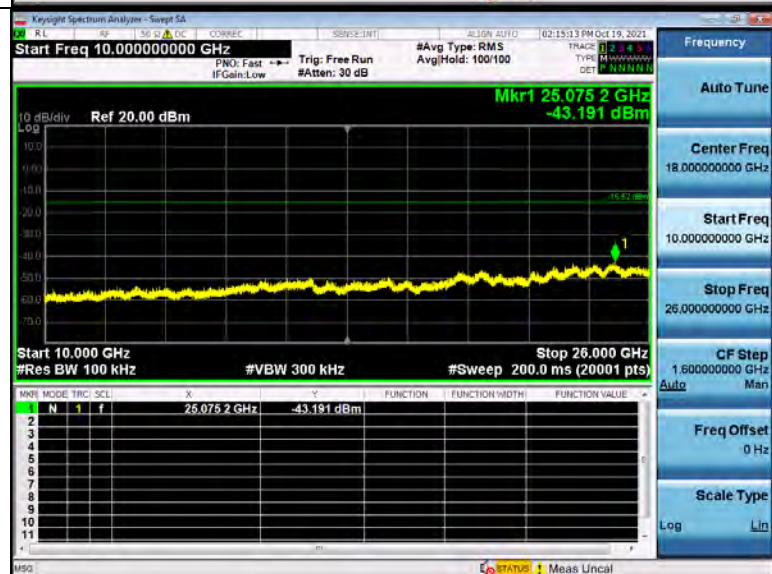
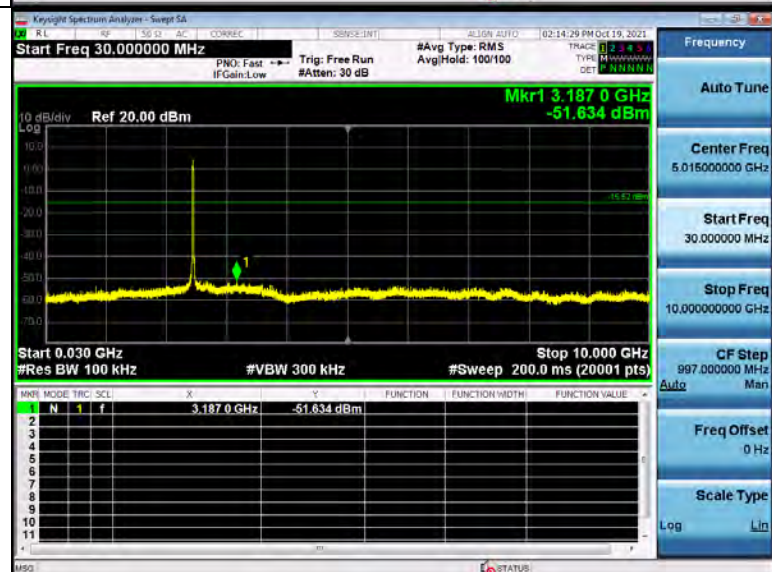


Middle Channel

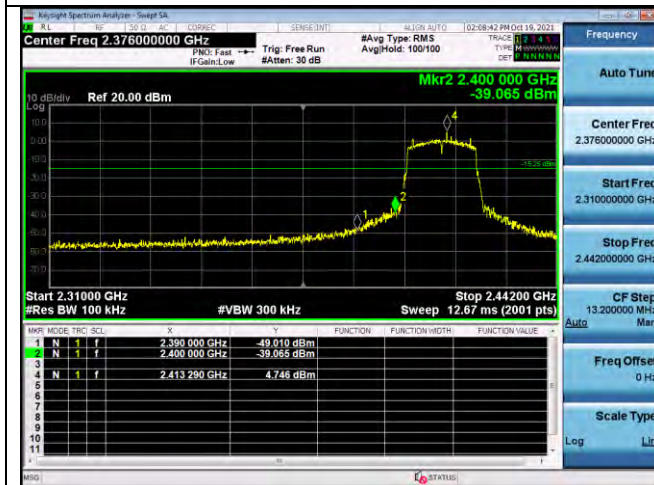


The screenshot shows a spectrum analyzer interface. The main display area shows a yellow trace representing the signal spectrum. A green horizontal line indicates the noise floor at -15.00 dBm. A peak in the signal is highlighted with a green arrow and labeled 'Mkr1'. The peak frequency is 2.463 275 GHz and its power level is 4.476 dBm. The center frequency is set to 2.46200000 GHz. The span is 40.00 MHz, and the resolution bandwidth (RBW) is 100 kHz. The video bandwidth (VBW) is 300 kHz. The sweep time is 4.267 ms (8001 pts). The reference level is 20.00 dBm. The scale is logarithmic (Log).

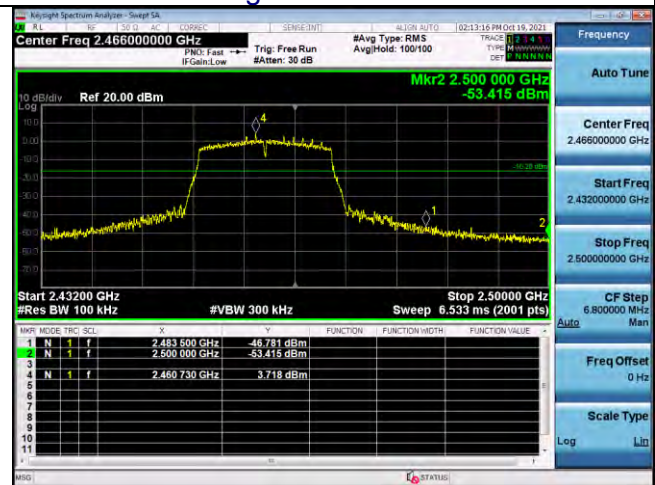
Parameter	Value
Center Freq	2.46200000 GHz
Span	40.00 MHz
Res BW	100 kHz
VBW	300 kHz
Sweep	4.267 ms (8001 pts)
Ref Level	20.00 dBm
Noise Floor	-15.00 dBm
Peak Power (Mkr1)	4.476 dBm @ 2.463 275 GHz



Lowest Channel



Highest Channel



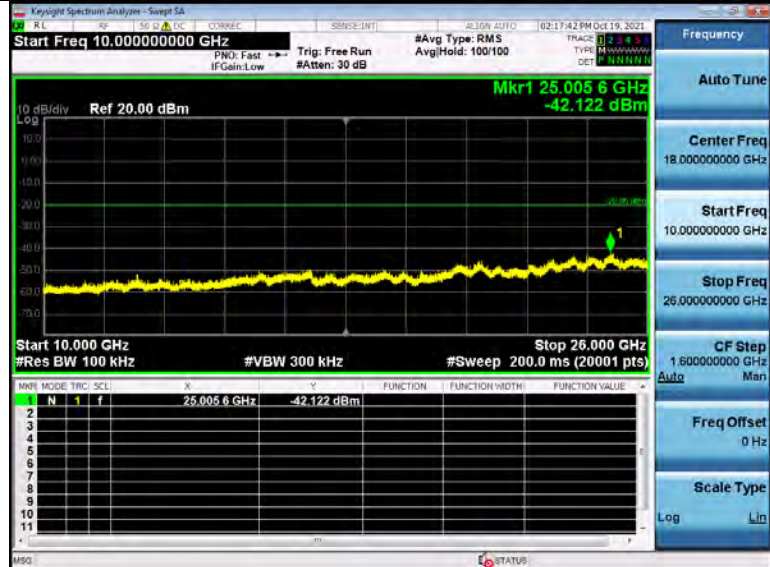
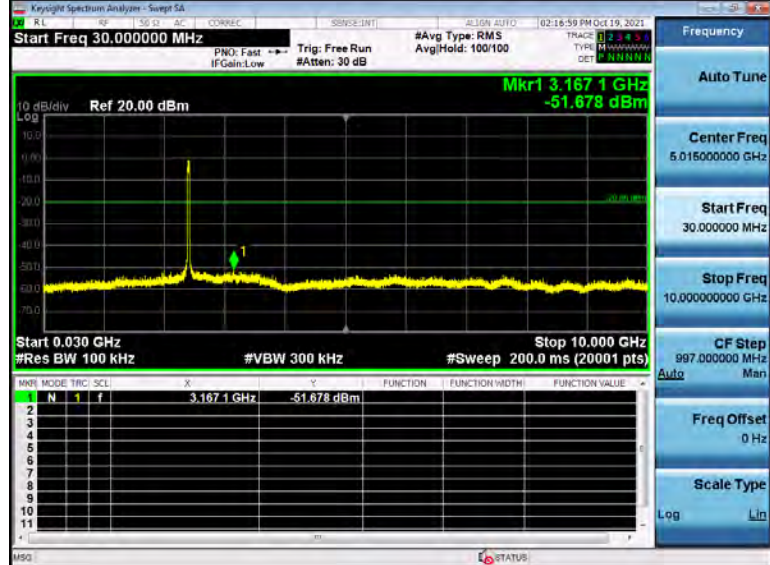
Left Band Edge

Right Band Edge

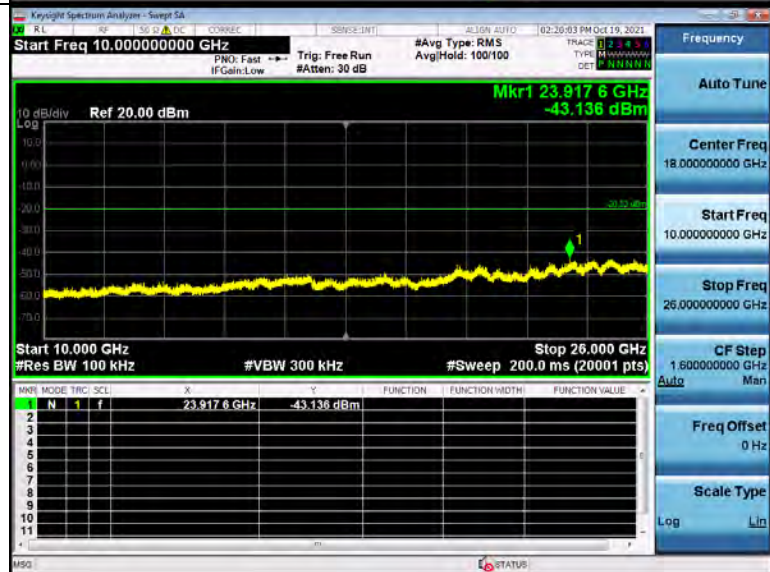
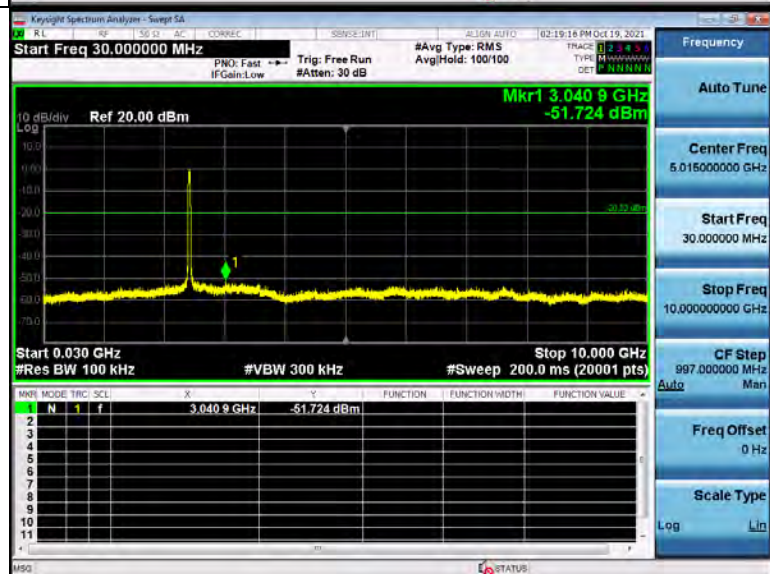
802.11n40 Modulation

Spurious emission

Low Channel



Middle Channel



Keysight Spectrum Analyzer - Setup SA

Center Freq 2.45200000 GHz

PRO: Fast IF Gain: Low

Trig: Free Run #Atten: 30 dB

#Avg Type: RM5 Avg/Hold: 100/100

62:21:07 PM Oct 19, 2021

Trace 1 1 1 1 1

Type M M M M M M M M

Det P P P P P P P P

10 dB/Div Ref 20.00 dBm

Log

Mkr1 2.45573 GHz -0.752 dBm

Center 2.45200 GHz

#Res BW 100 kHz

#VBW 300 kHz

Span 80.00 MHz

Sweep 8.000 ms (8001 pts)

Auto Tune

Center Freq 2.45200000 GHz

Start Freq 2.412000000 GHz

Stop Freq 2.492000000 GHz

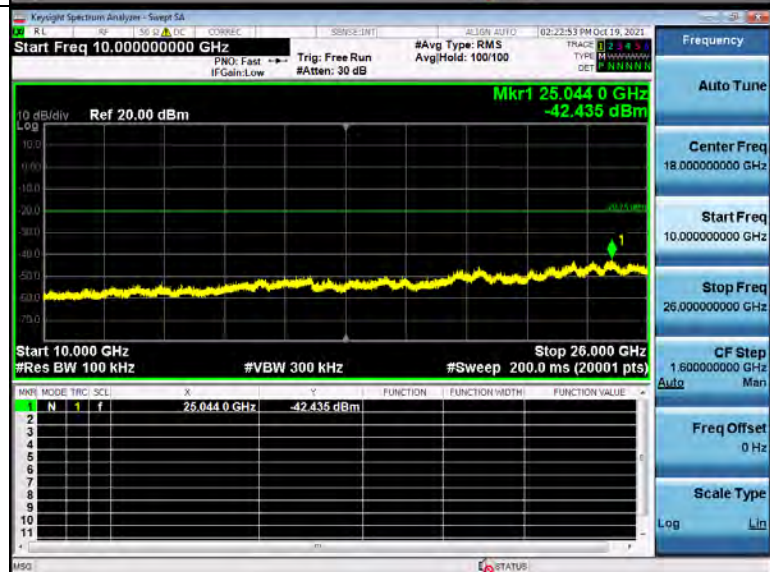
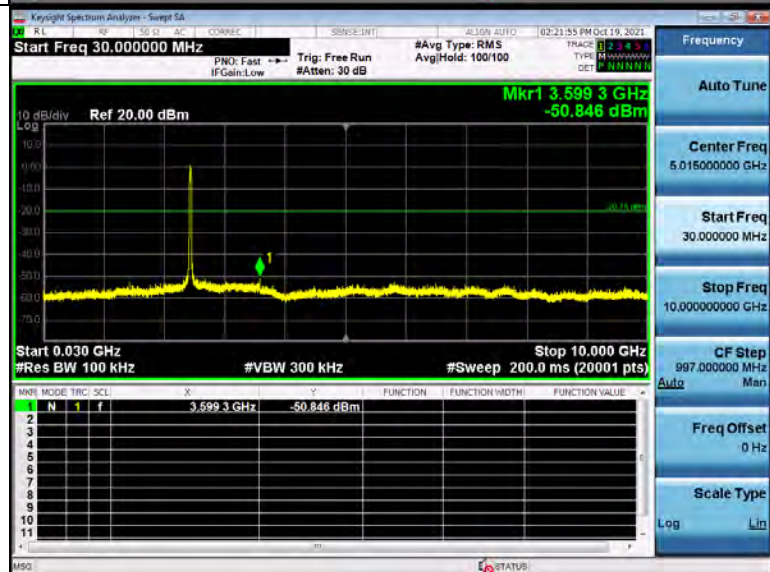
CF Step 8.000000 MHz

Auto Man

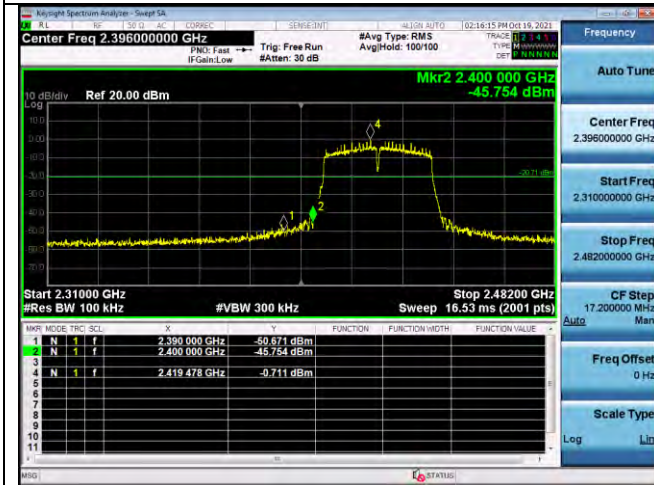
Freq Offset 0 Hz

Scale Type

Log Lin

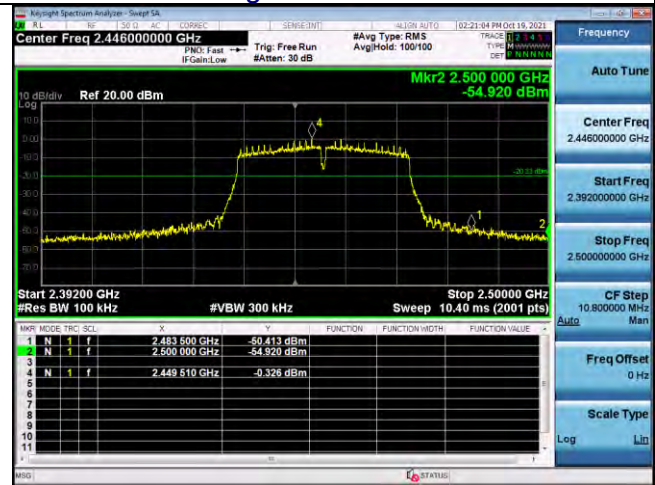


Lowest Channel



Left Band Edge

Highest Channel



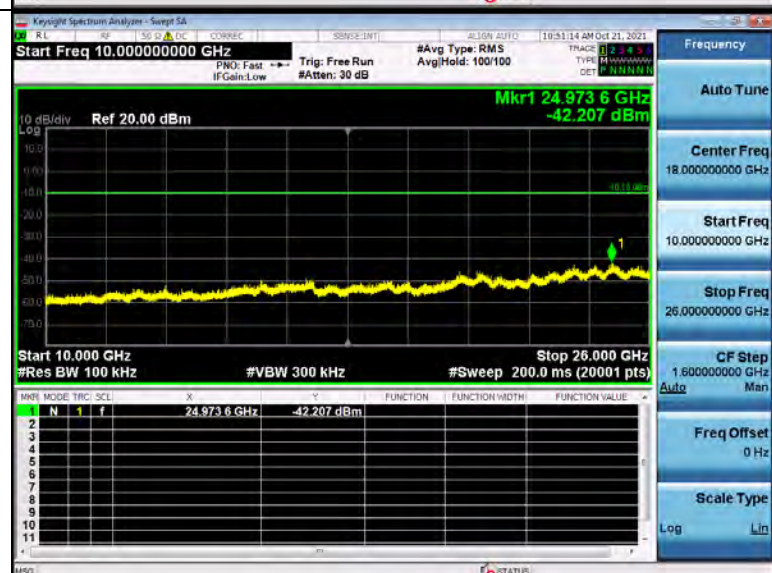
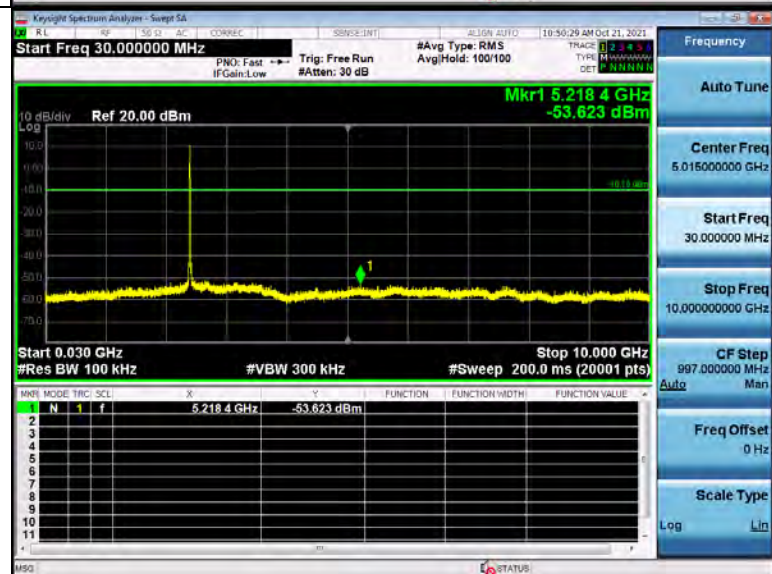
Right Band Edge

Module B

ANT1
802.11b Modulation

Spurious emission

Low Channel



Keysight Spectrum Analyzer - Setup SA

Center Freq 2.46200000 GHz

10 dB/Div Log

Ref 20.00 dBm

Center 2.46200 MHz

Span 40.00 MHz

#Res BW 100 kHz

#VBW 300 kHz

Sweep 4.267 ms (8001 pts)

Frequency

Auto Tune

Center Freq
2.46200000 GHz

Start Freq
2.44200000 GHz

Stop Freq
2.48200000 GHz

CF Step
4.000000 MHz

Auto

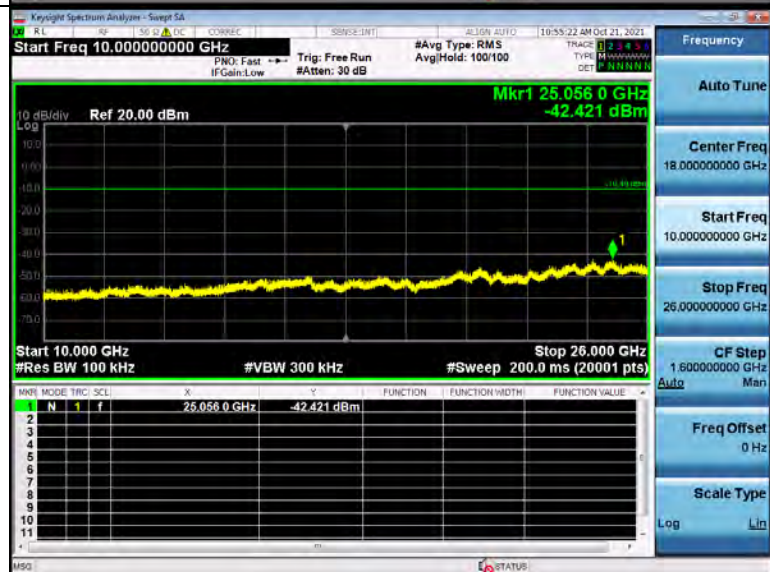
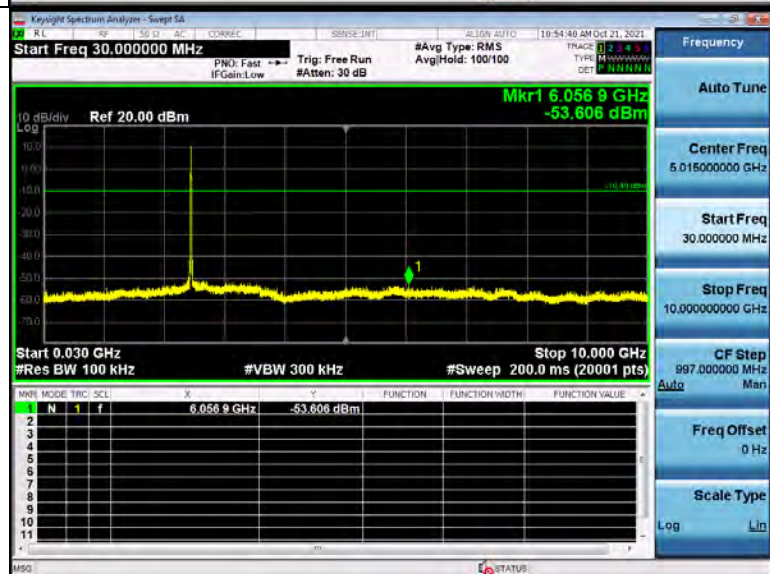
Man

Freq Offset
0 Hz

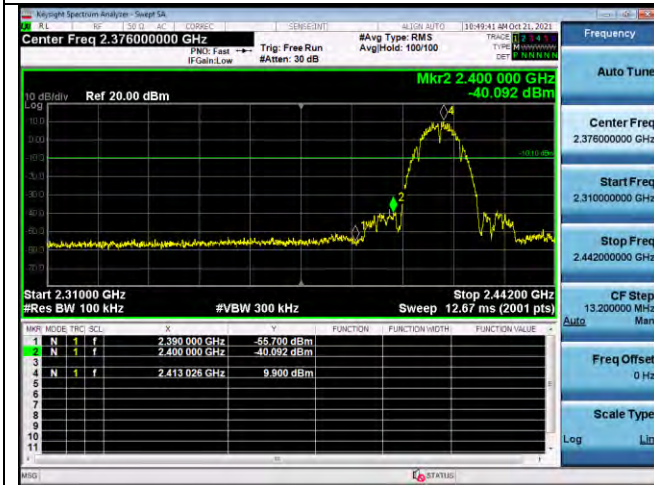
Scale Type

Log

Lin

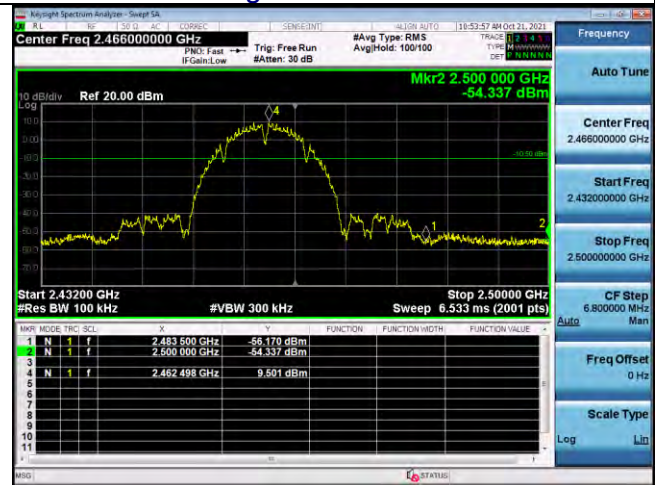


Lowest Channel



Left Band Edge

Highest Channel

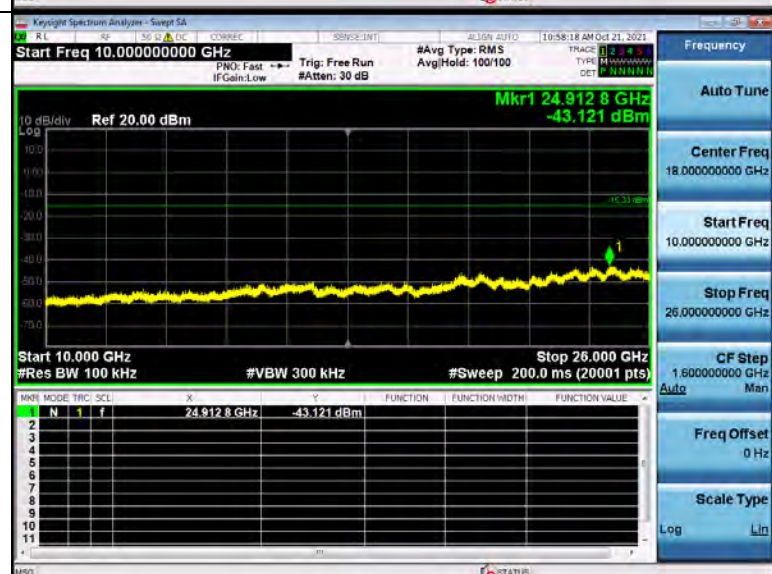
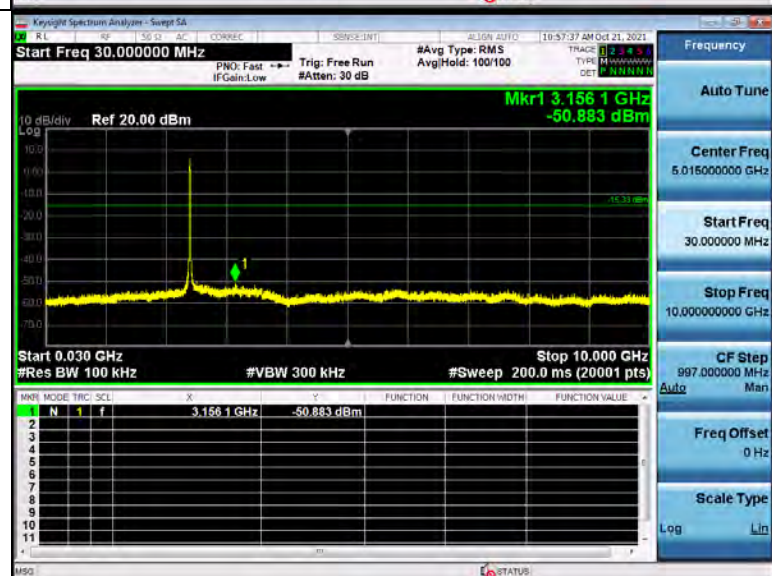
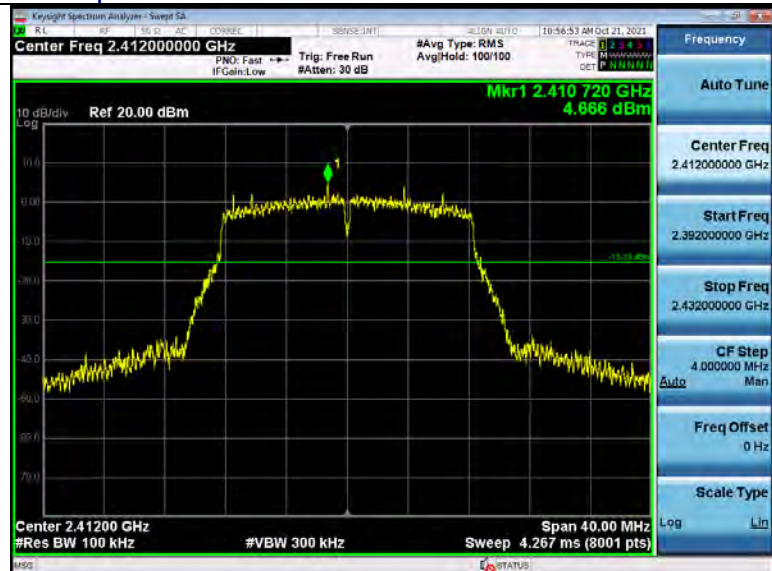


Right Band Edge

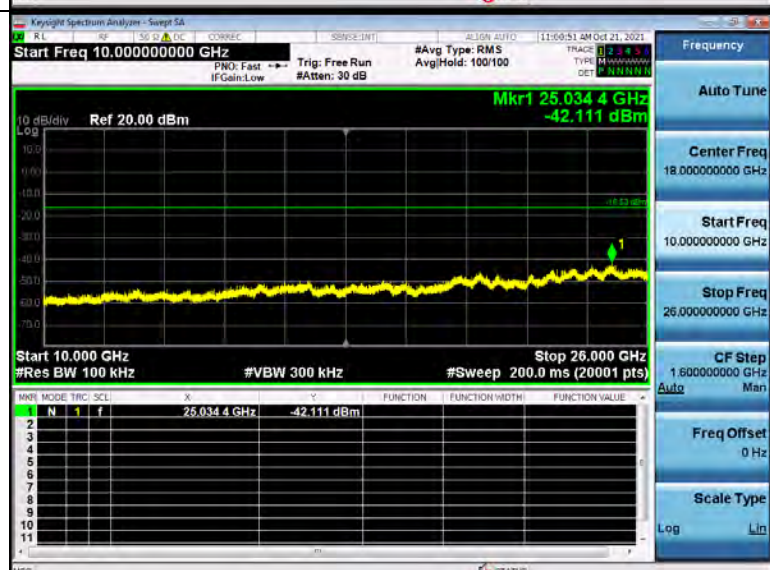
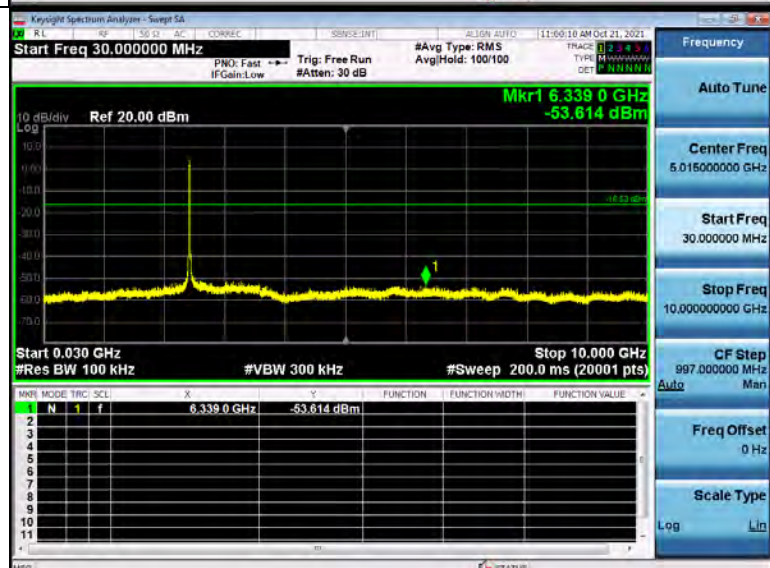
802.11g Modulation

Spurious emission

Low Channel



Middle Channel



Keysight Spectrum Analyzer - Screenshot

Center Freq 2.46200000 GHz

Span 40.00 MHz

Ref 20.00 dBm

Sweep 4.267 ms (8001 pts)

Auto Tune

Center Freq 2.46200000 GHz

Start Freq 2.44200000 GHz

Stop Freq 2.48200000 GHz

CF Step 4.000000 MHz

Auto

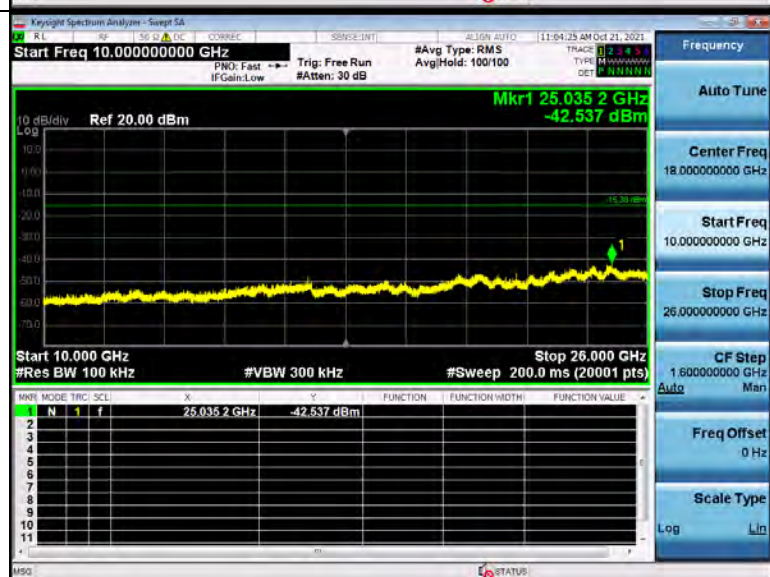
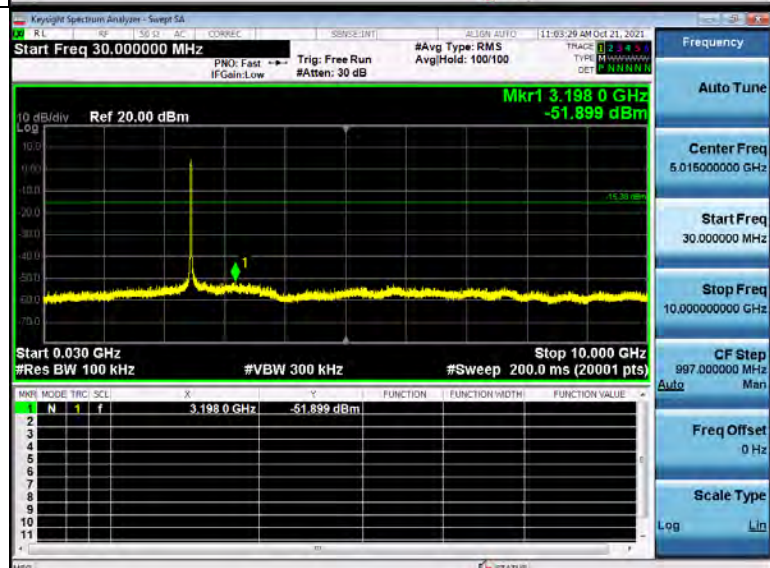
Man

Frequency Offset 0 Hz

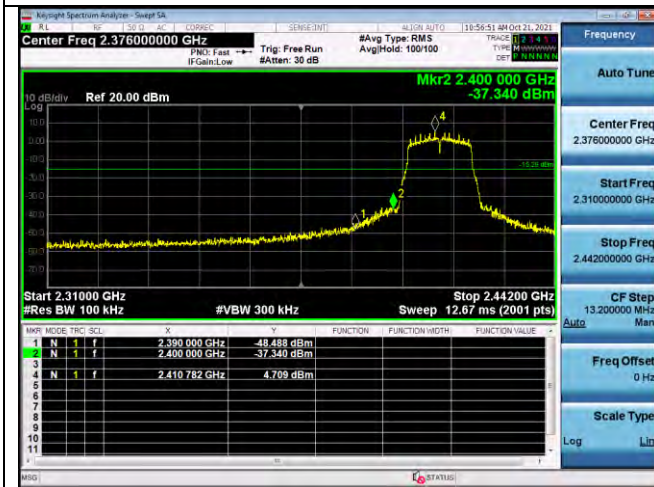
Scale Type

Log

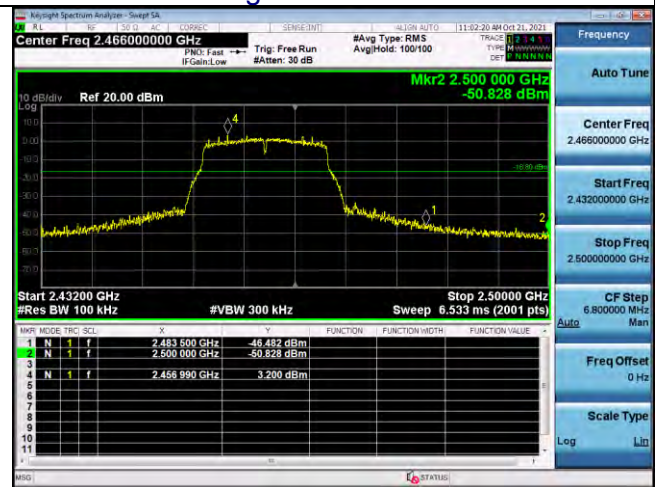
Lin



Lowest Channel



Highest Channel



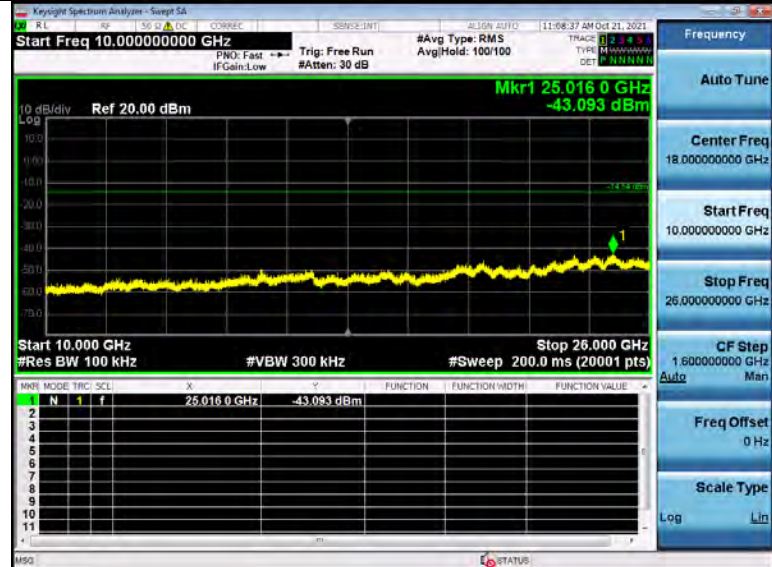
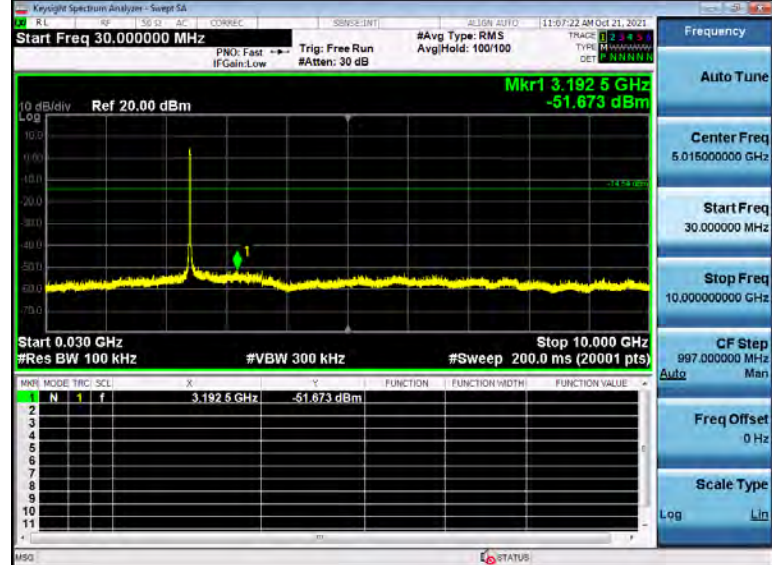
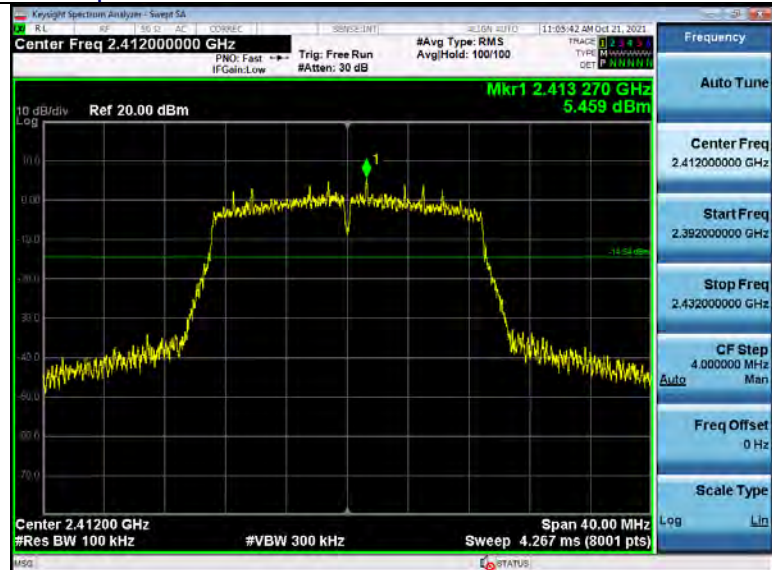
Left Band Edge

Right Band Edge

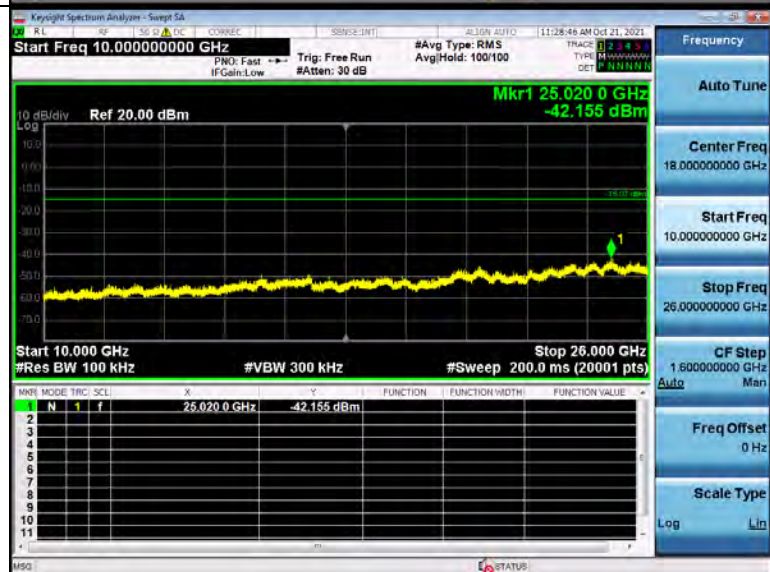
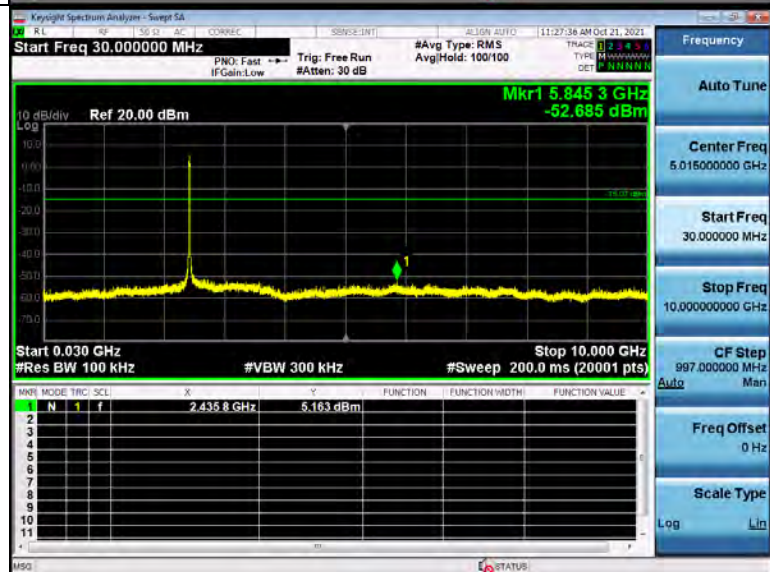
802.11n20 Modulation

Spurious emission

Low Channel



The screenshot shows a spectrum analyzer interface. The main display area shows a yellow trace representing the signal spectrum. A green horizontal line indicates the reference level at -120.0 dBm. The signal is centered around 2.437 GHz, with a peak labeled 'Mkr1' at 2.438 245 GHz and a power level of 4.932 dBm. The frequency range is from 2.43700000 GHz to 2.46700000 GHz, with a span of 40.00 MHz. The resolution bandwidth (RBW) is 100 kHz, and the video bandwidth (VBW) is 300 kHz. The sweep time is 200.0 ms (8001 pts). The center frequency is 2.43700000 GHz. The scale type is Log.



Keysight Spectrum Analyzer - Setup SA

Center Freq 2.46200000 GHz

Ref 20.00 dBm

10 dB/div

Log

Center Freq 2.46200000 GHz

Start Freq 2.442000000 GHz

Stop Freq 2.482000000 GHz

CF Step 4.000000 MHz

Freq Offset 0 Hz

Scale Type Log

Center 2.46200 GHz

#Res BW 100 kHz

#VBW 300 kHz

Span 40.00 MHz

Sweep 4.267 ms (8001 pts)

Trig: Free Run

#Atten: 30 dB

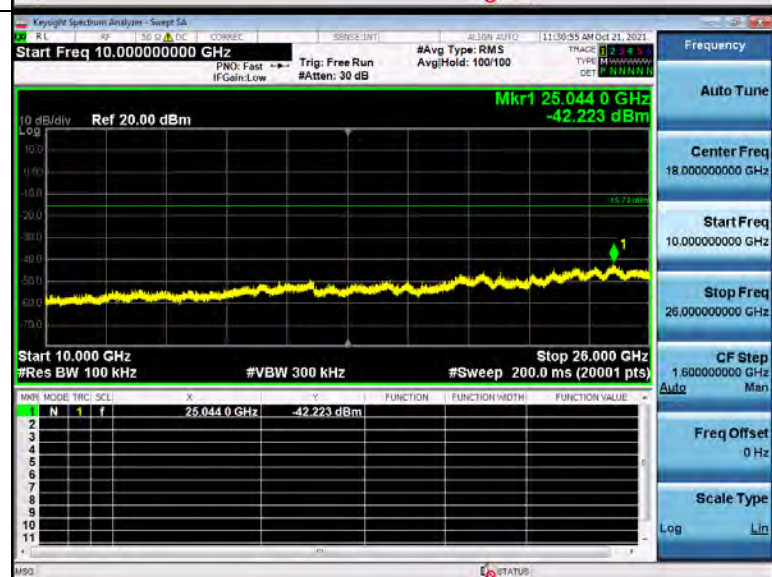
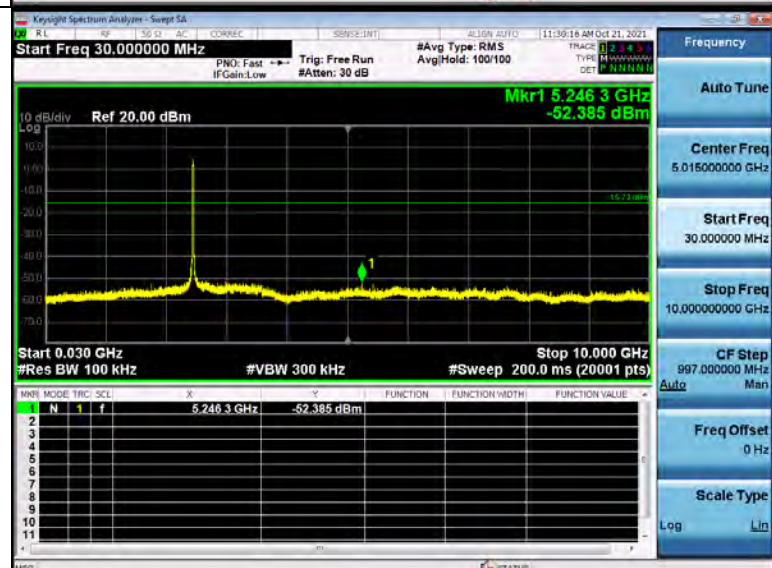
#Avg Type: RMS

Avg/Hold: 100/100

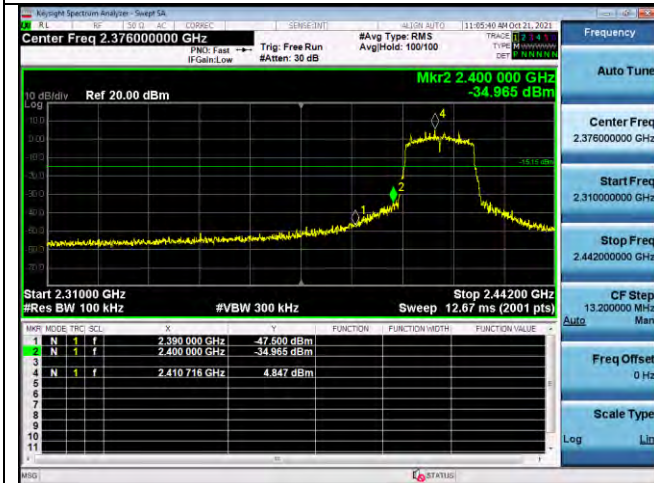
Trace 1 2.460 720 GHz

4.277 dBm

15.02 dBm

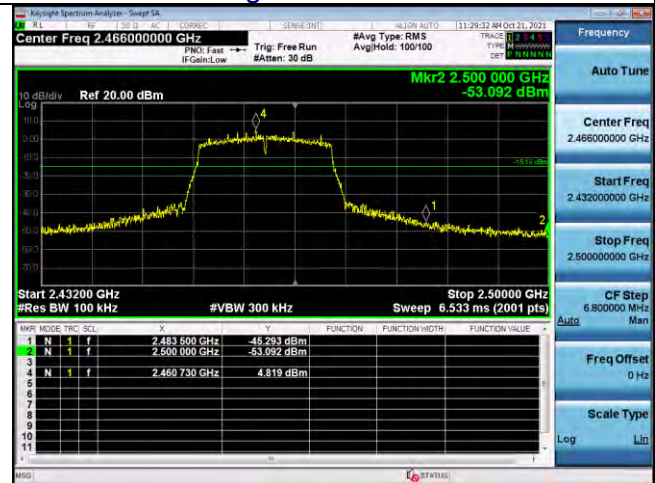


Lowest Channel



Left Band Edge

Highest Channel

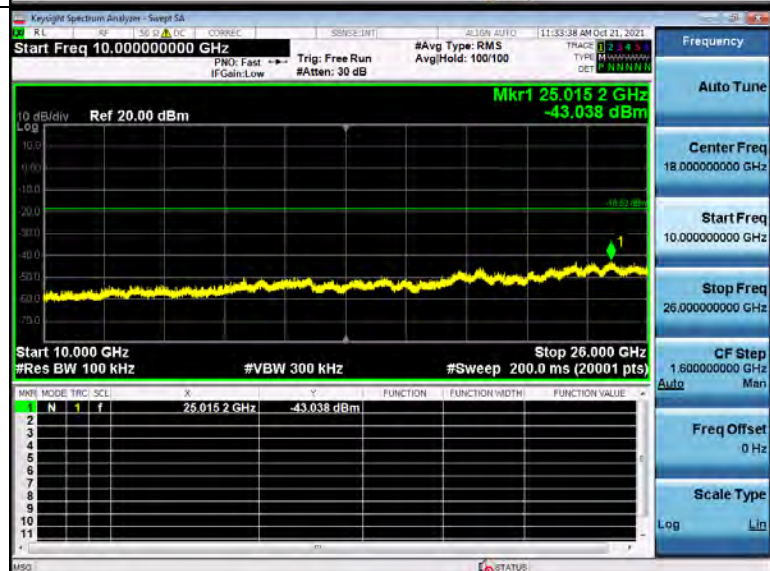
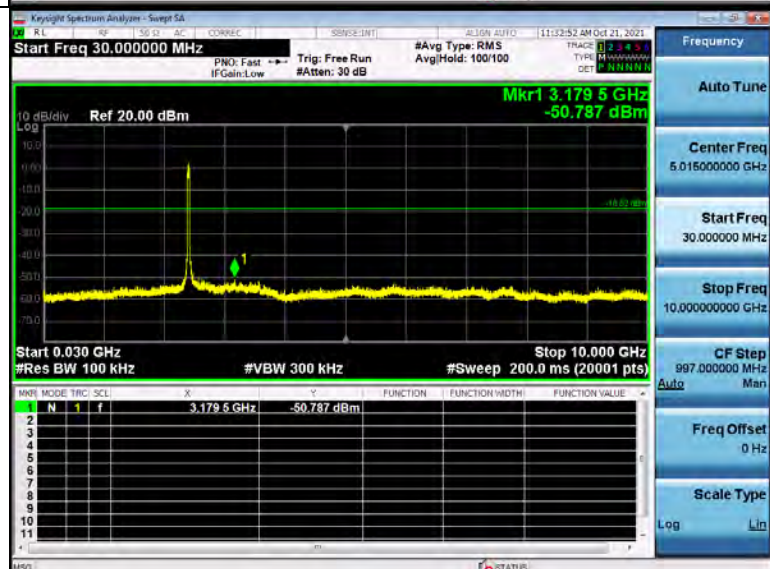
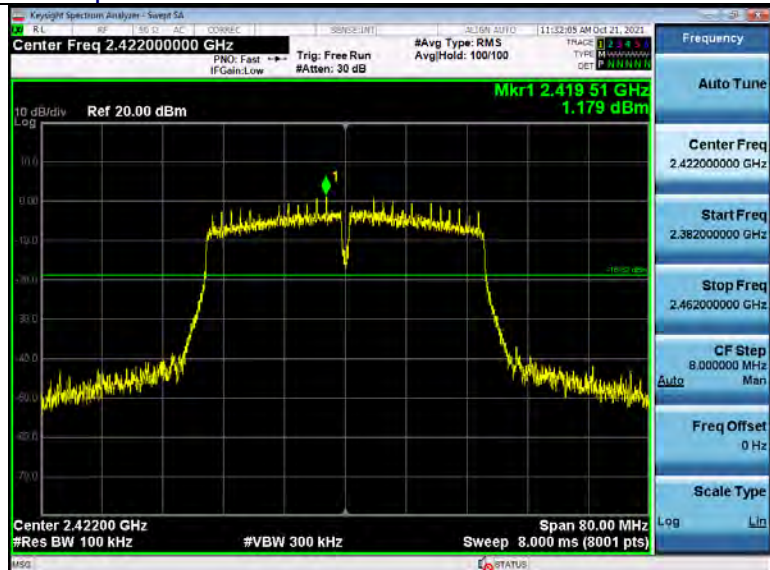


Right Band Edge

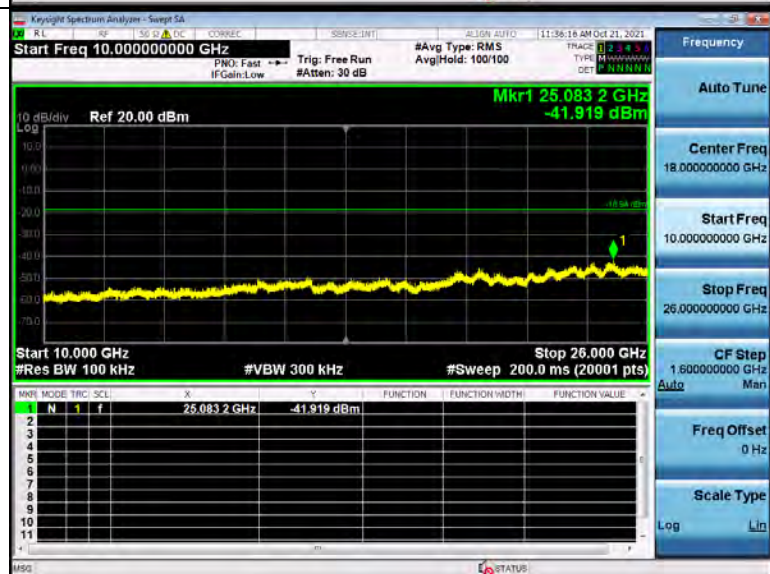
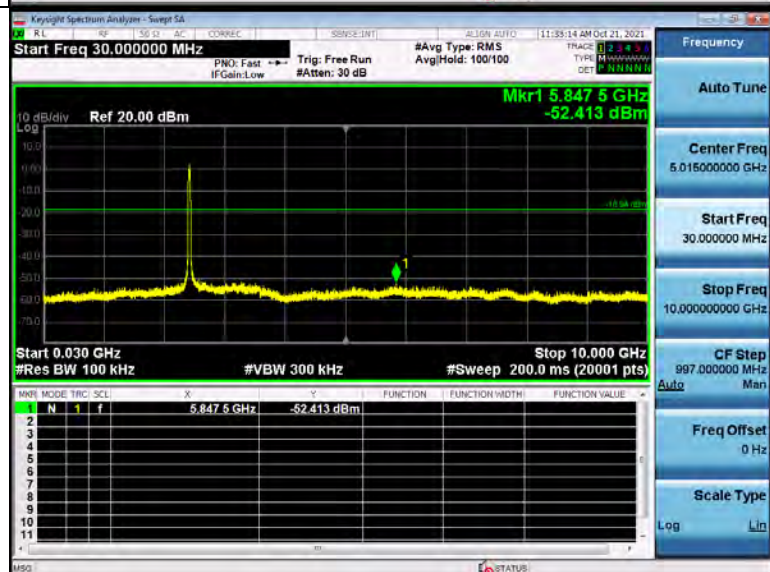
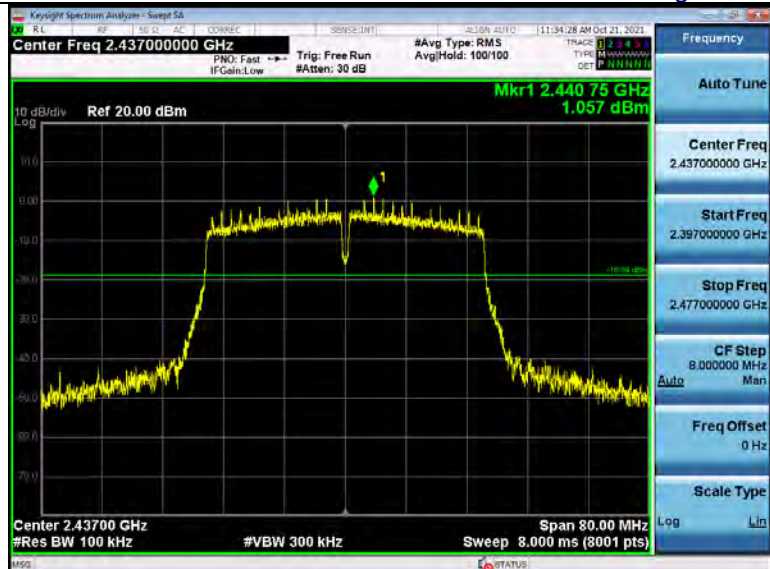
802.11n40 Modulation

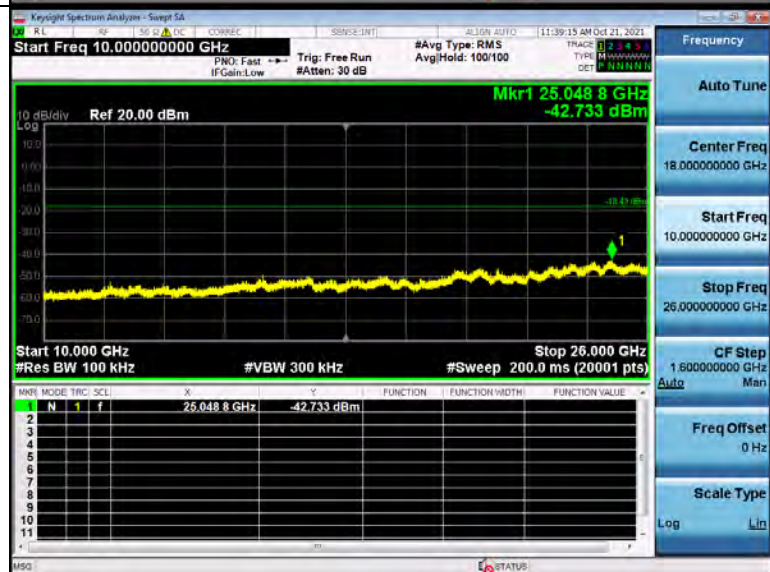
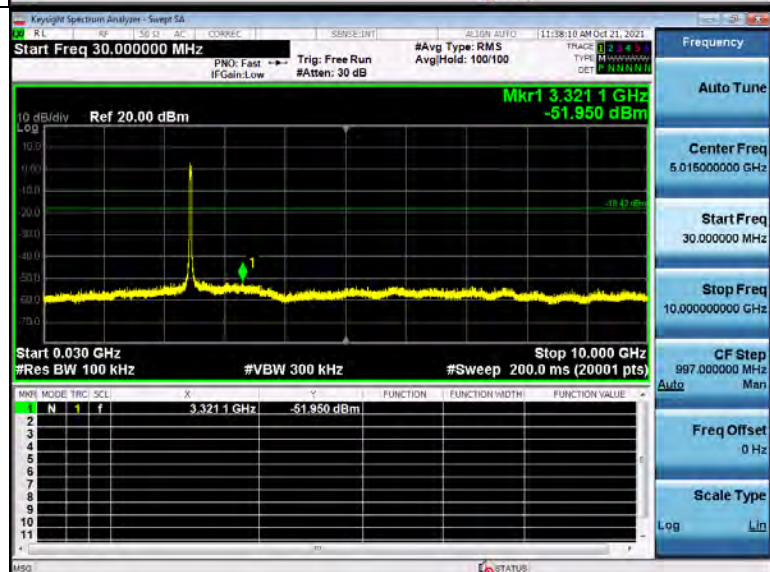
Spurious emission

Low Channel

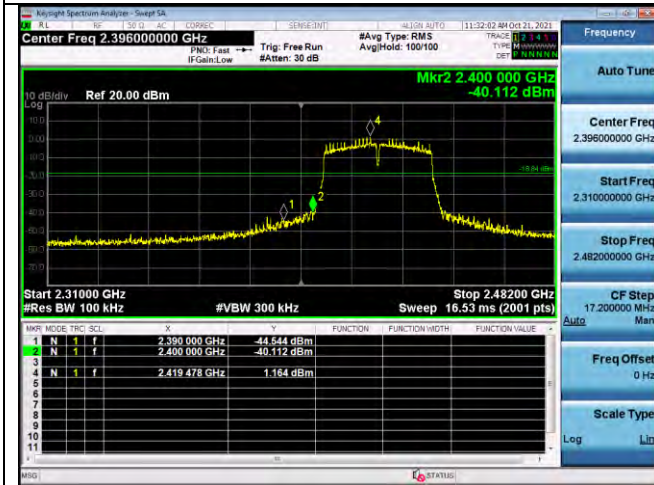


Middle Channel



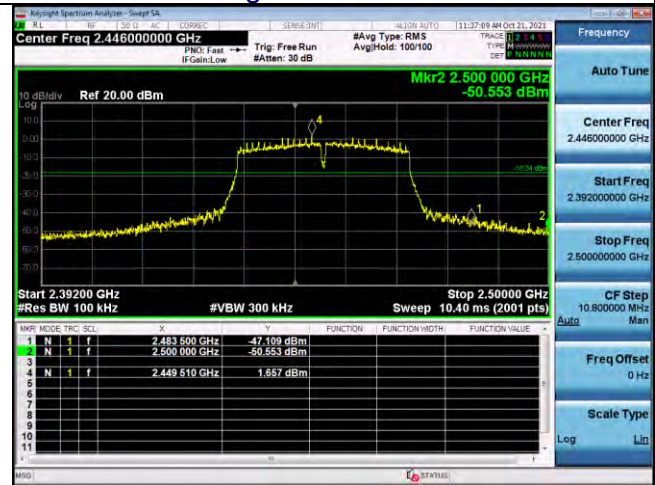
[illegible]

Lowest Channel



Left Band Edge

Highest Channel



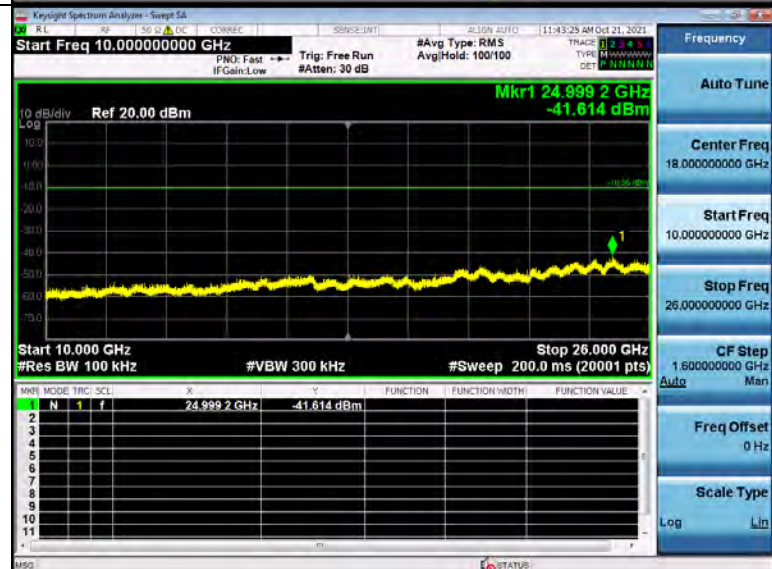
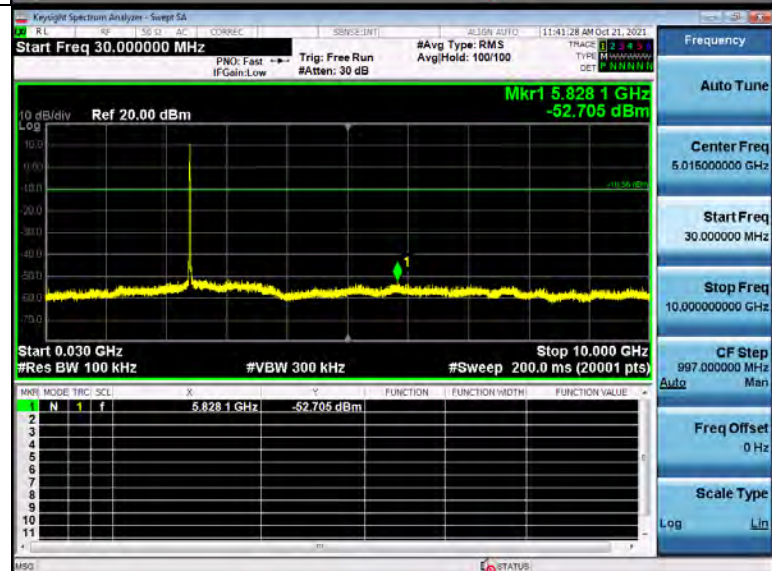
Right Band Edge

ANT2

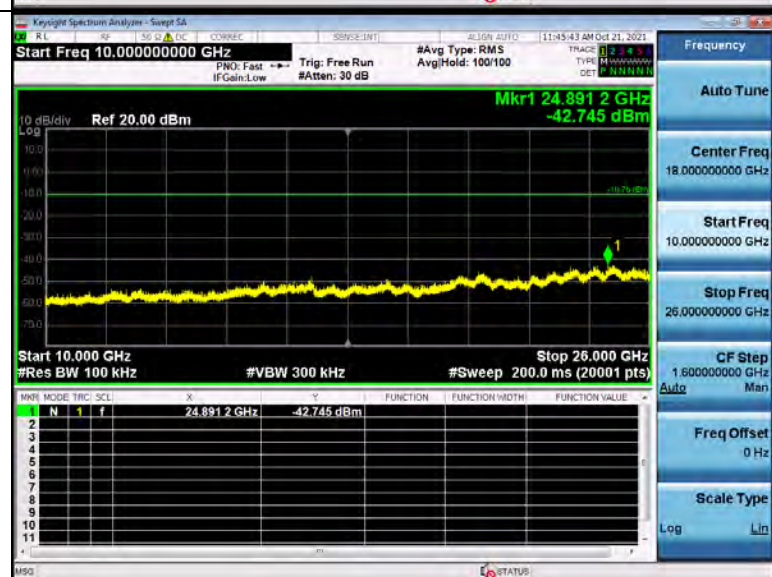
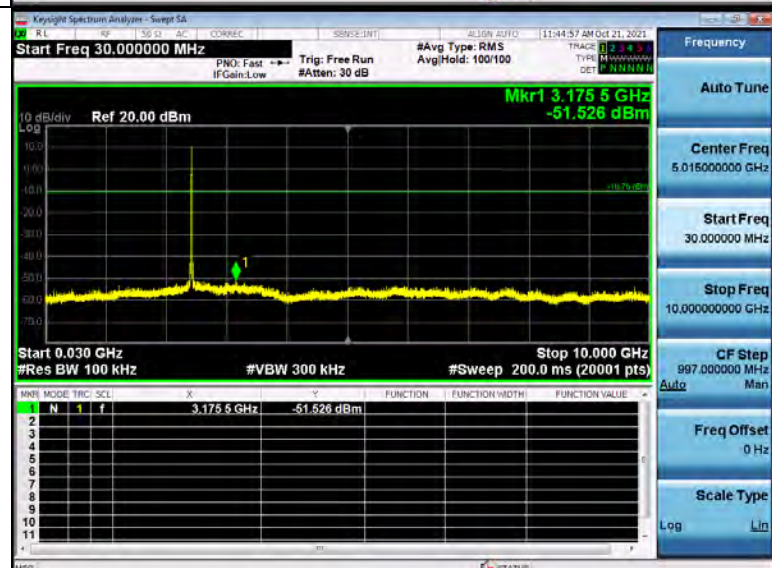
802.11b Modulation

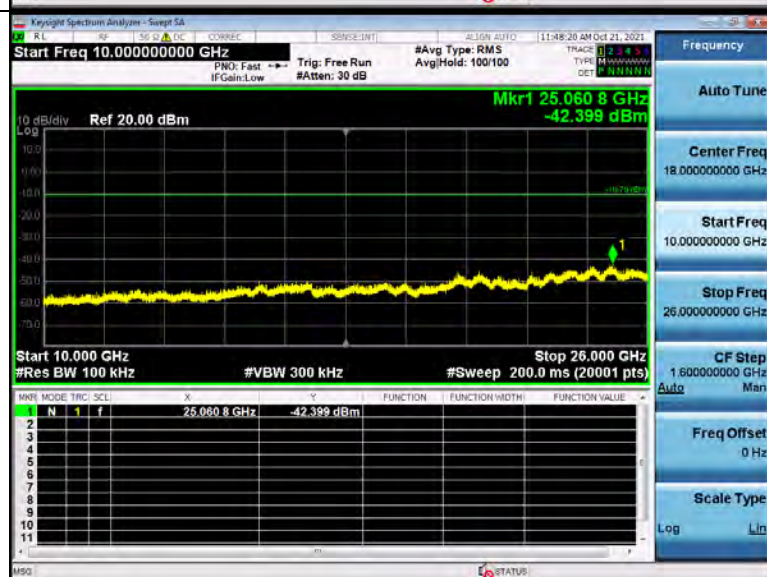
Spurious emission

Low Channel

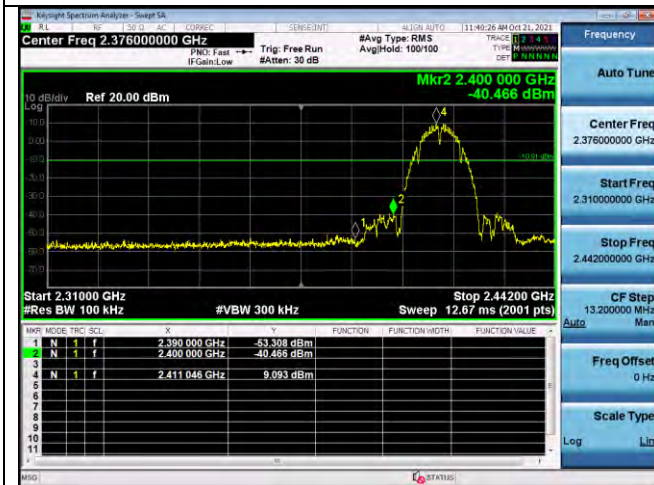


Middle Channel

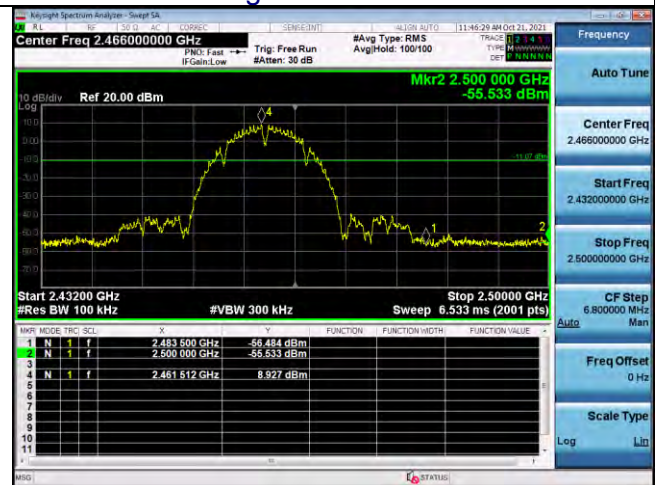




Lowest Channel



Highest Channel



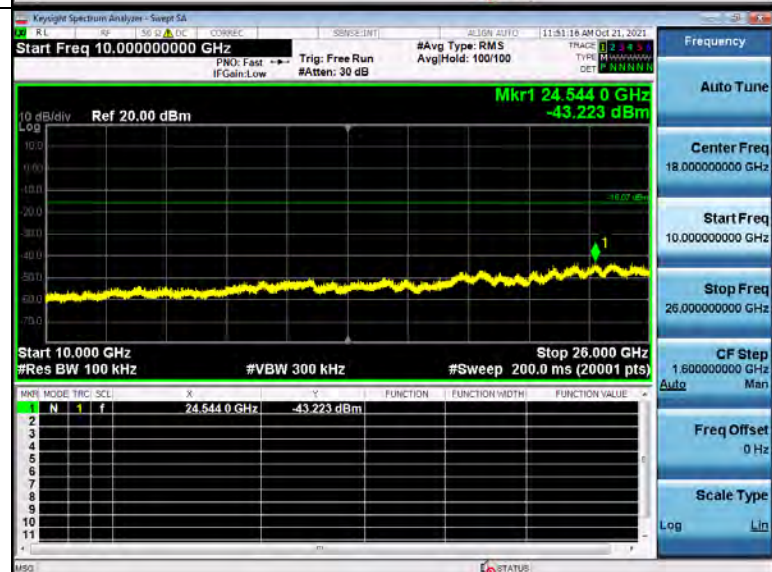
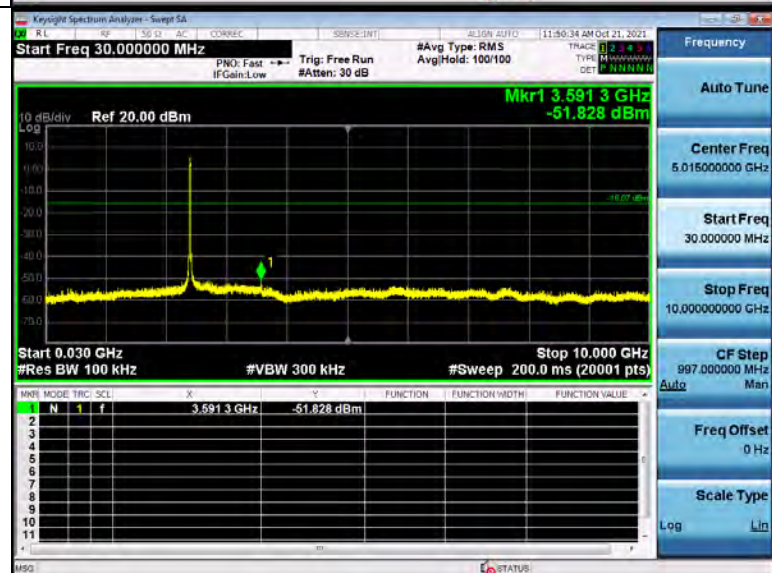
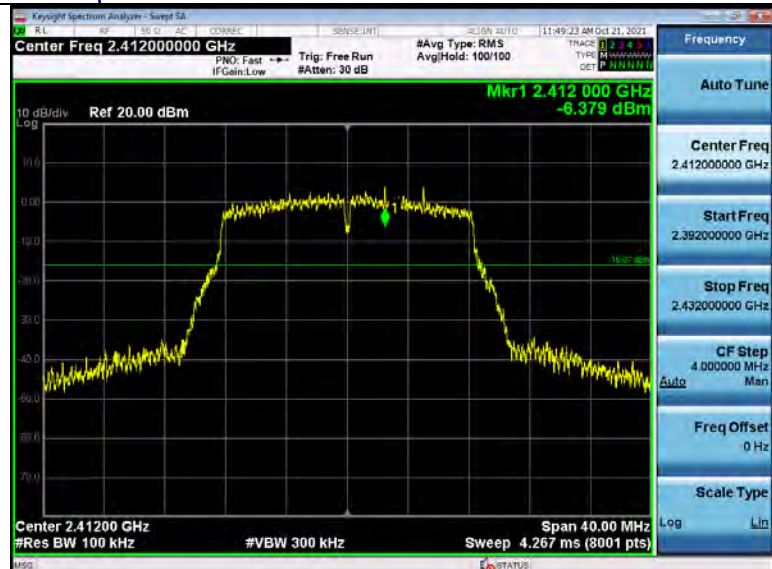
Left Band Edge

Right Band Edge

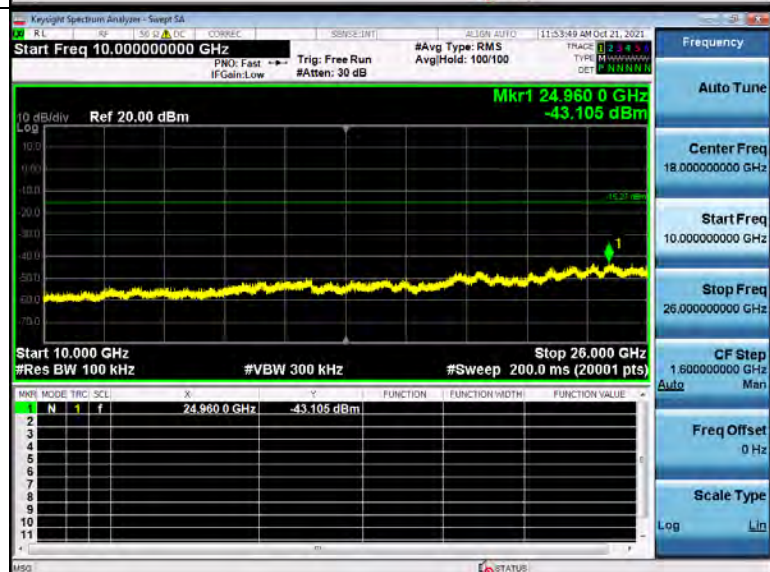
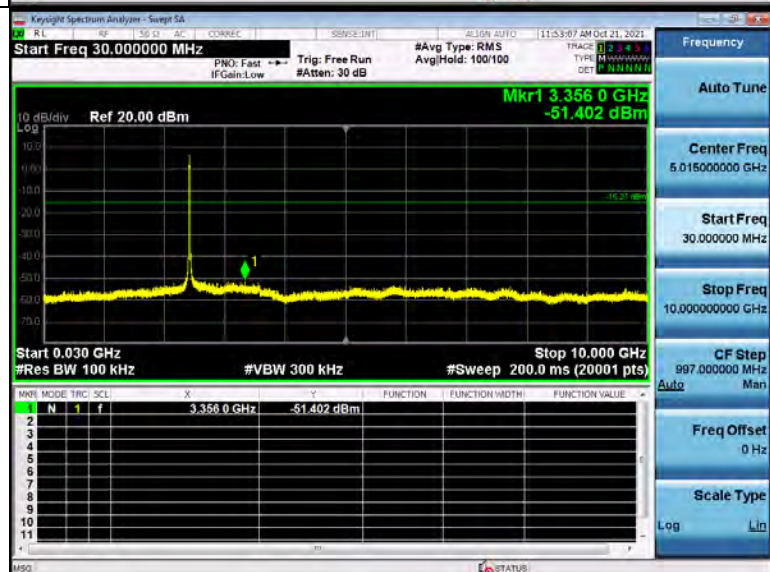
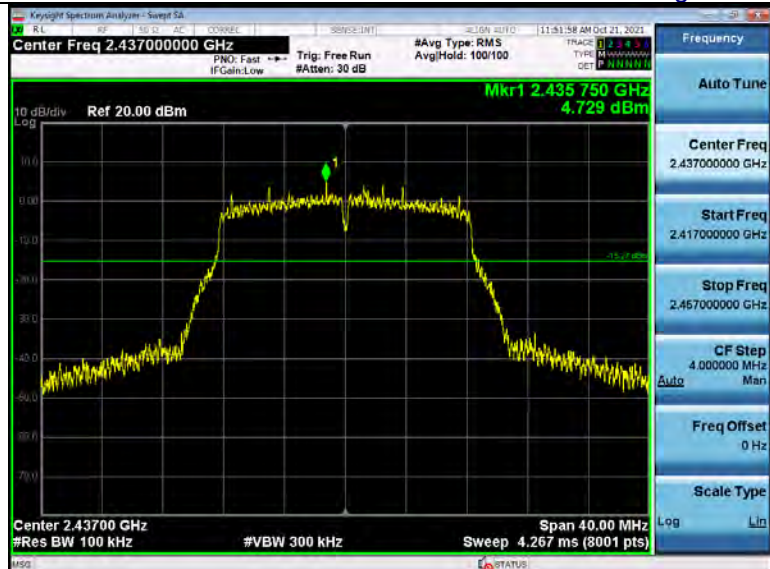
802.11g Modulation

Spurious emission

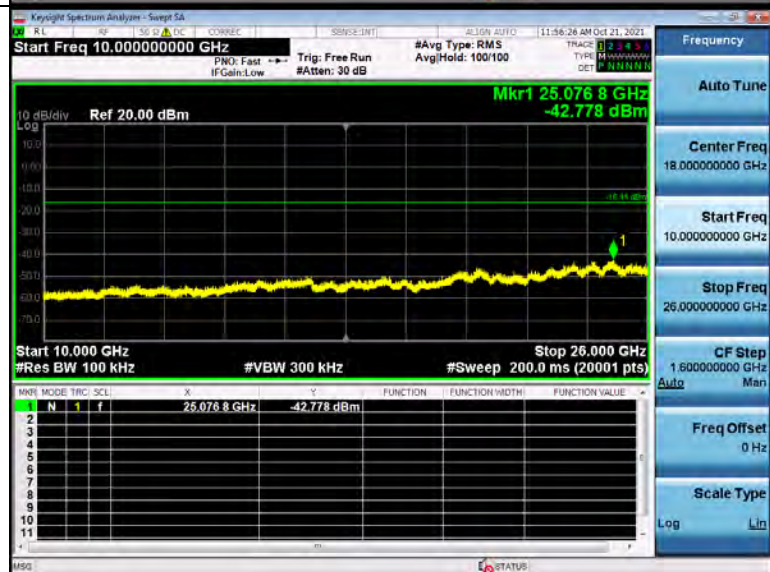
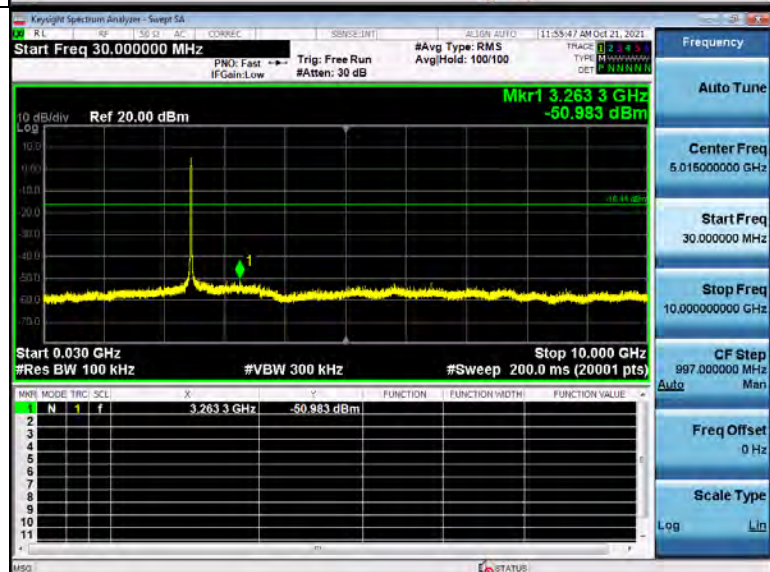
Low Channel



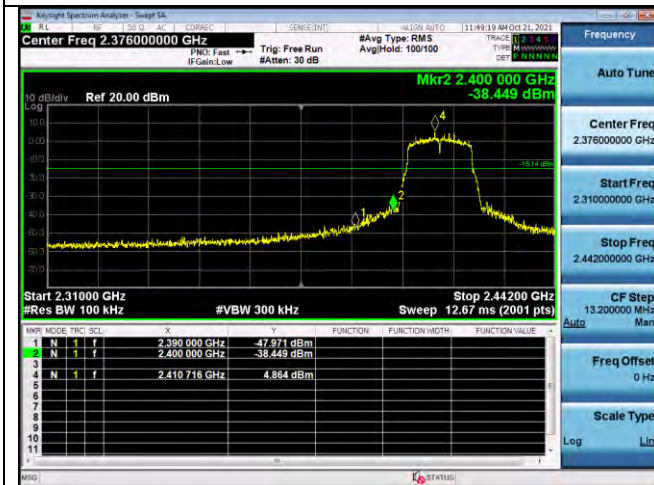
Middle Channel



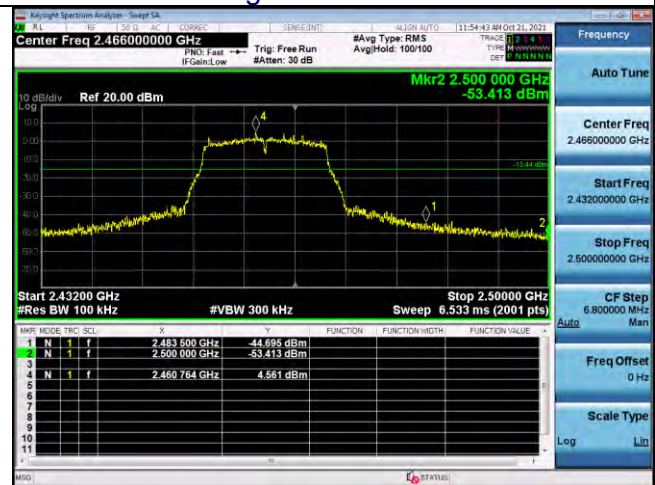
High Channel



Lowest Channel



Highest Channel



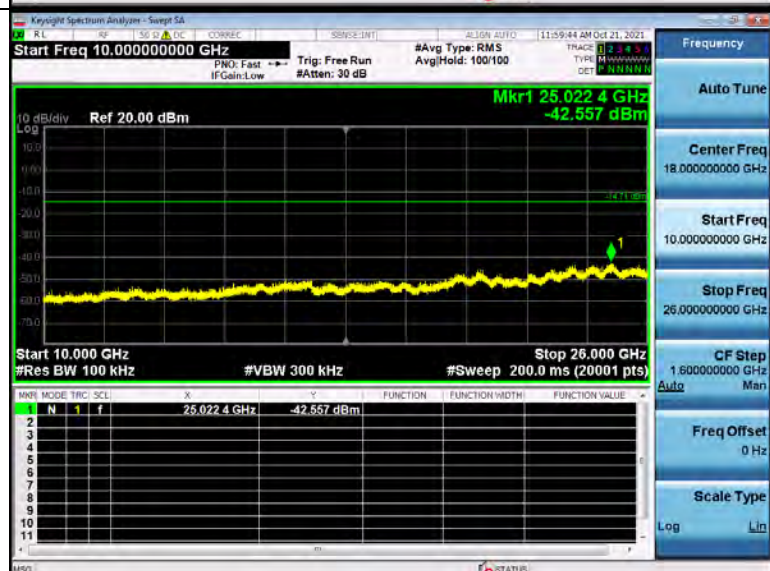
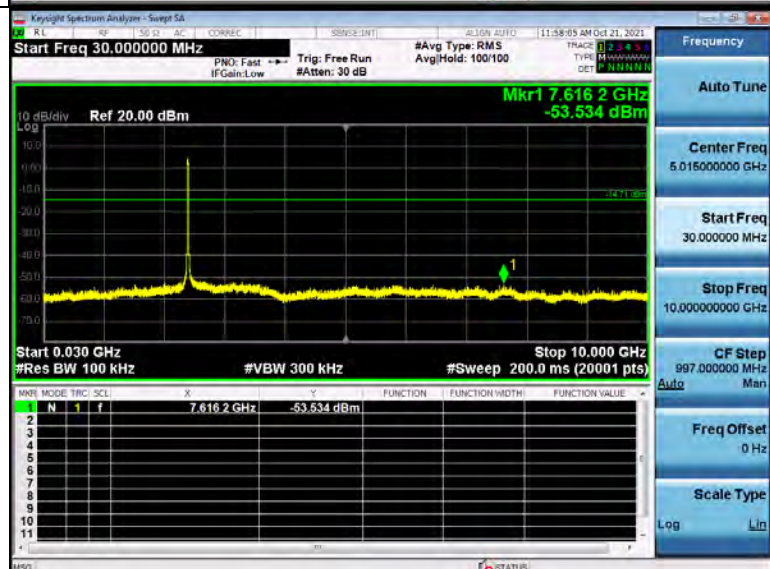
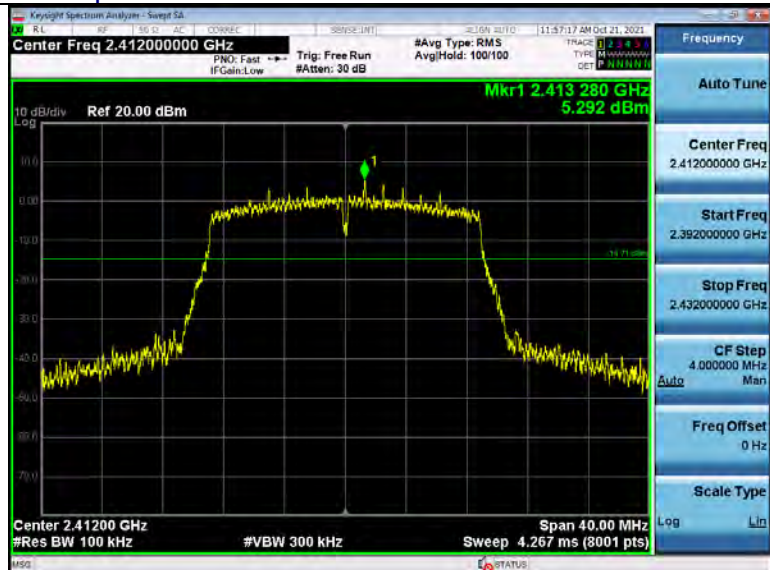
Left Band Edge

Right Band Edge

802.11n20 Modulation

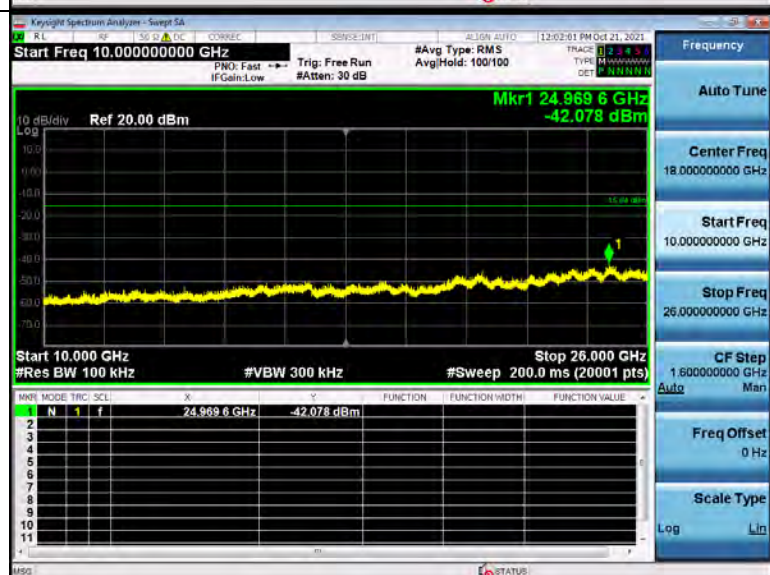
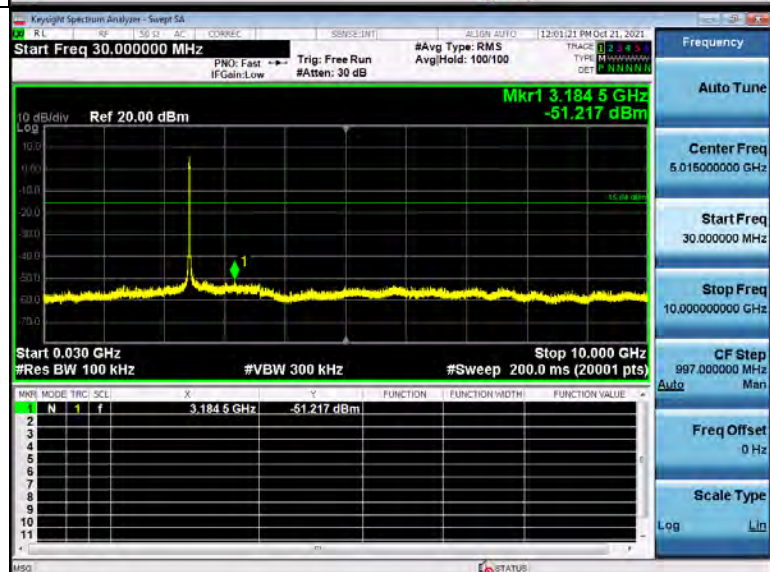
Spurious emission

Low Channel

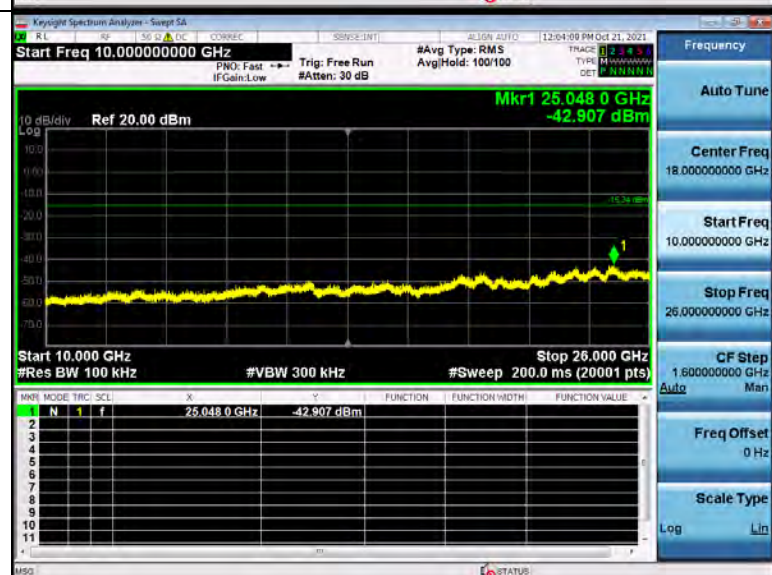
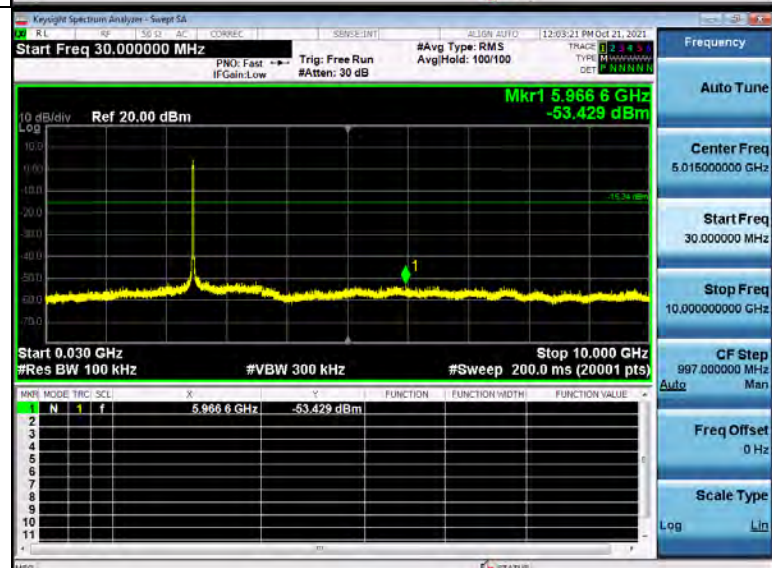
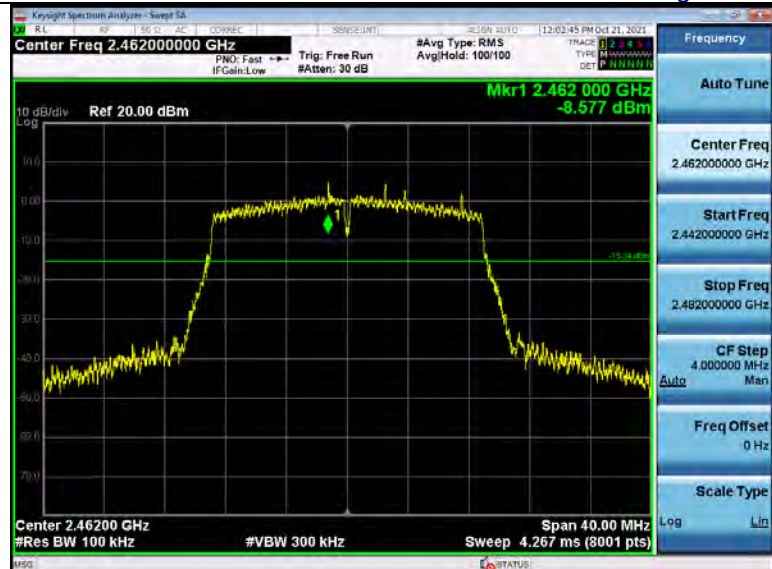


The screenshot displays a spectrum analyzer interface. The main plot shows a signal centered at 2.437 GHz with a bandwidth of 300 kHz. The signal level is approximately -15 dBm. Key parameters visible include:

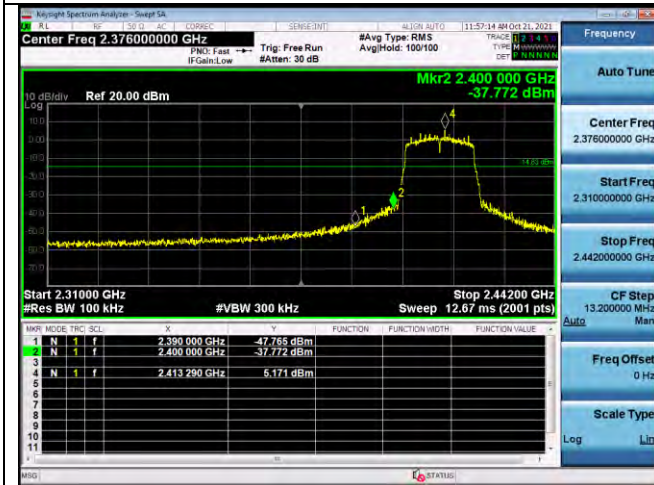
- Center Freq:** 2.437000000 GHz
- Span:** 40.00 MHz
- Res BW:** 100 kHz
- Sweep:** 4.267 ms (8001 pts)
- Mkr1:** 2.439 485 GHz, 4.164 dBm
- Trig:** Free Run
- #Attenuation:** 30 dB
- Avg Type:** RM5
- Avg Hold:** 100/100
- Ref Level:** 20.00 dBm
- Scale:** Log



High Channel

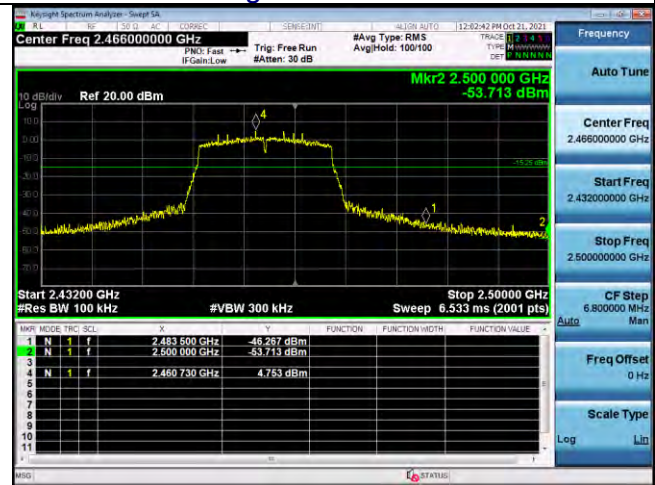


Lowest Channel



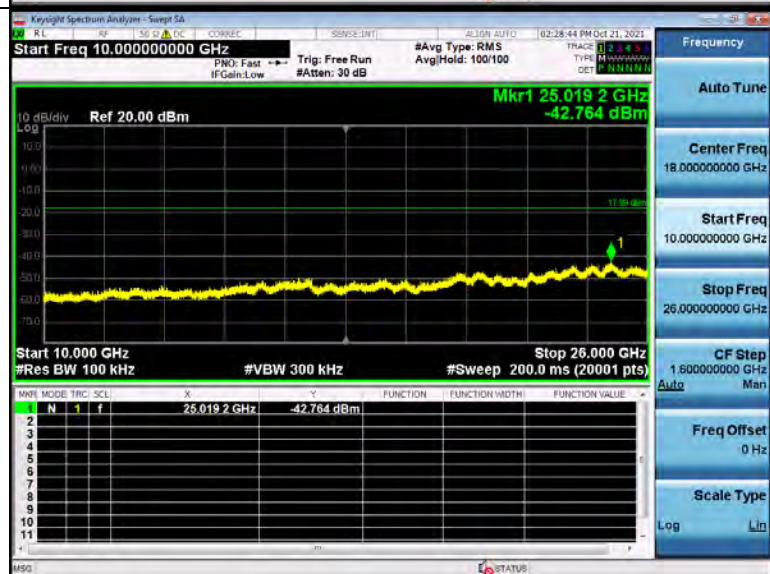
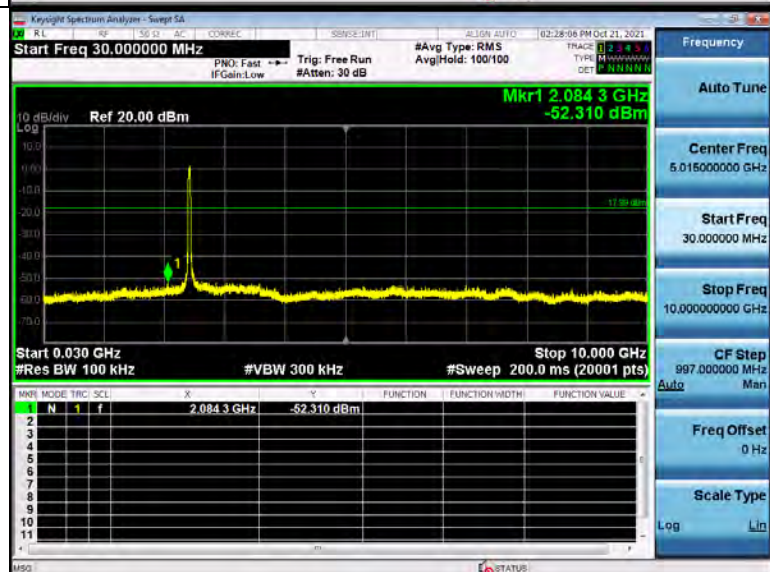
Left Band Edge

Highest Channel

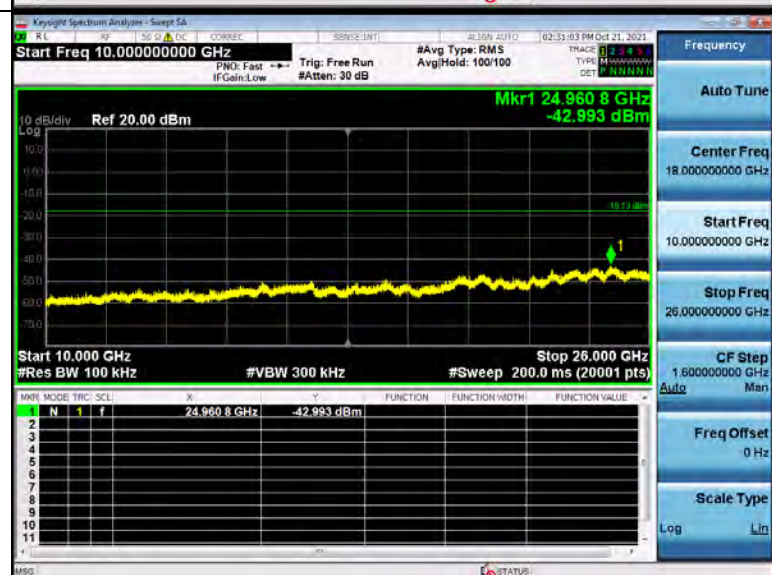
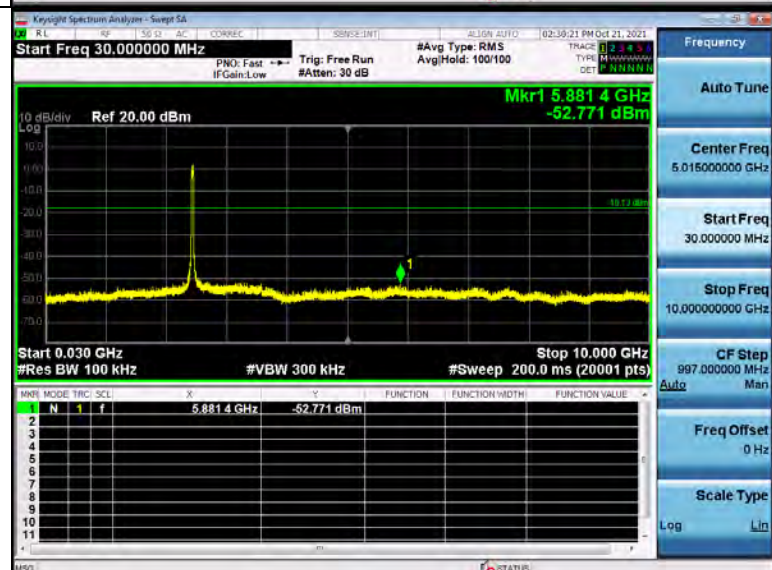


Right Band Edge

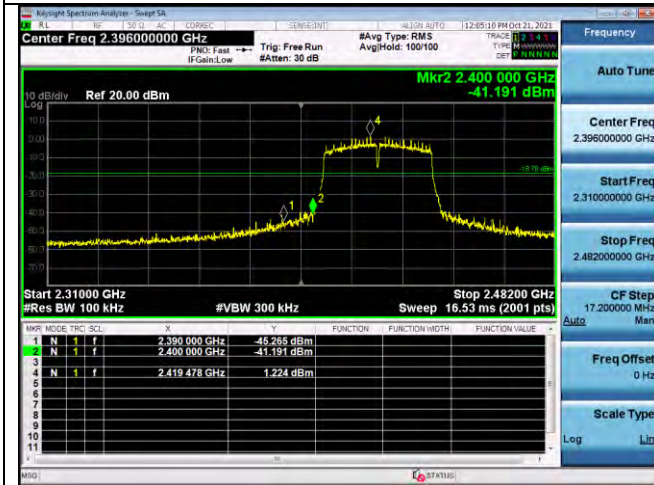
Middle Channel



High Channel

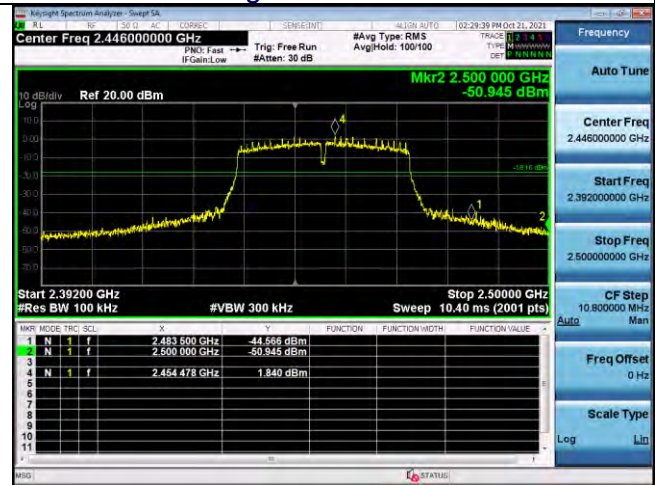


Lowest Channel



Left Band Edge

Highest Channel



Right Band Edge

10. ANTENNA REQUIREMENT

Standard requirement:

FCC Part15 C Section 15.203 /247(c)

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247, if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Refer to statement below for compliance.

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Antenna Connected Construction

The antenna used in this product is a Glue stick antenna, and the best case gain of the antenna is antenna port 1:5dBi and Antenna port 2:5dBi.

EUT Antenna:

ANT for Module A

ANT for Module B

ANT for BT/BLE



11. TEST SETUP PHOTO

Please refer to test setup file

12. EUT CONSTRUCTIONAL DETAILS

Reference to the external photos file and internal photos file for details.

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