

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

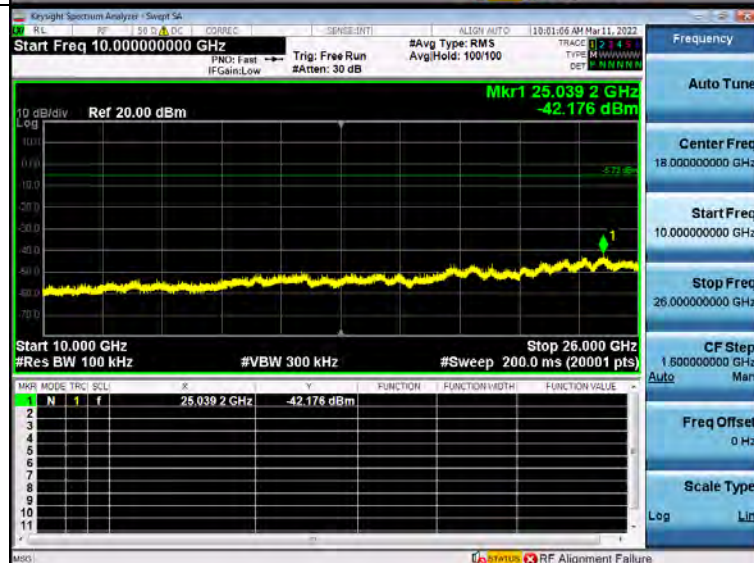
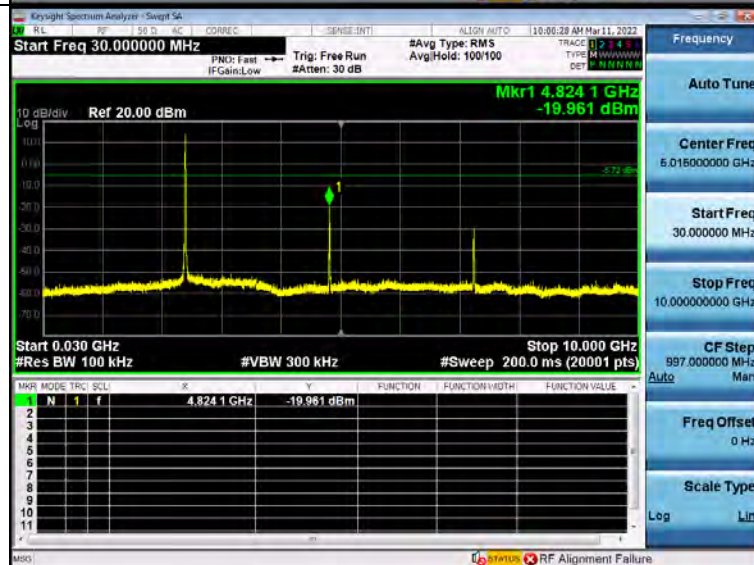
Test plot as follows:

ANT1

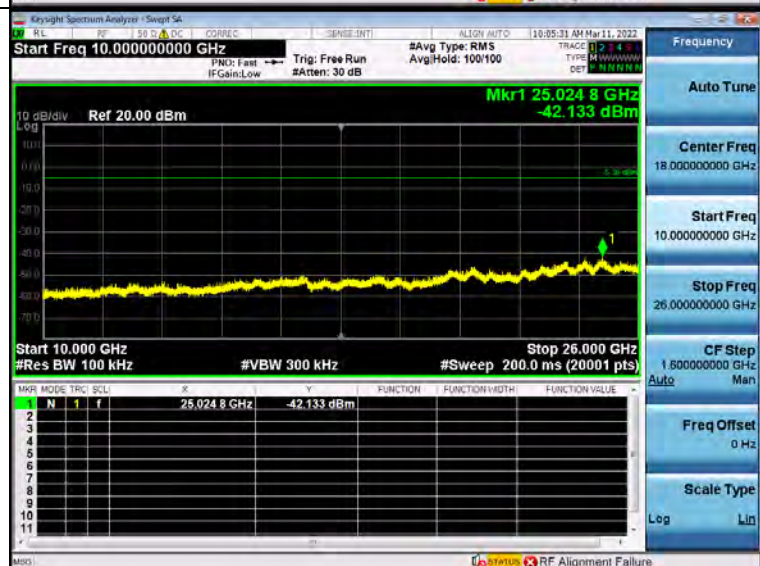
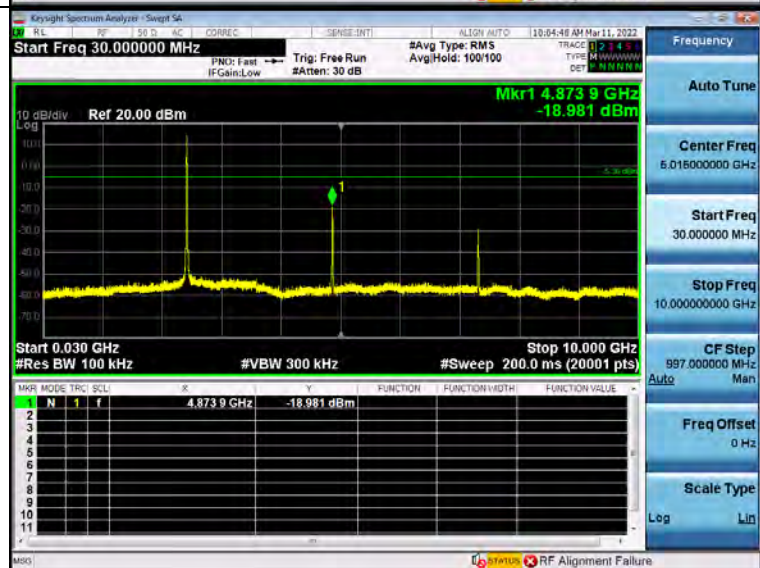
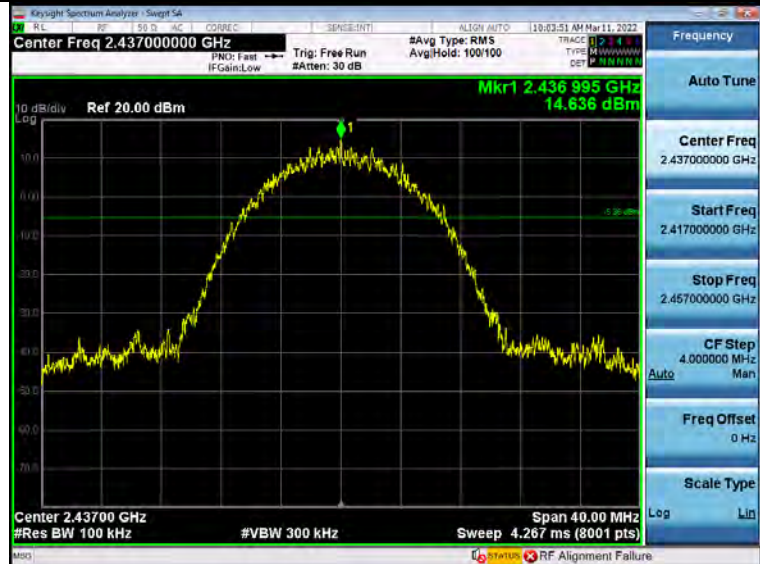
802.11b Modulation

Spurious emission

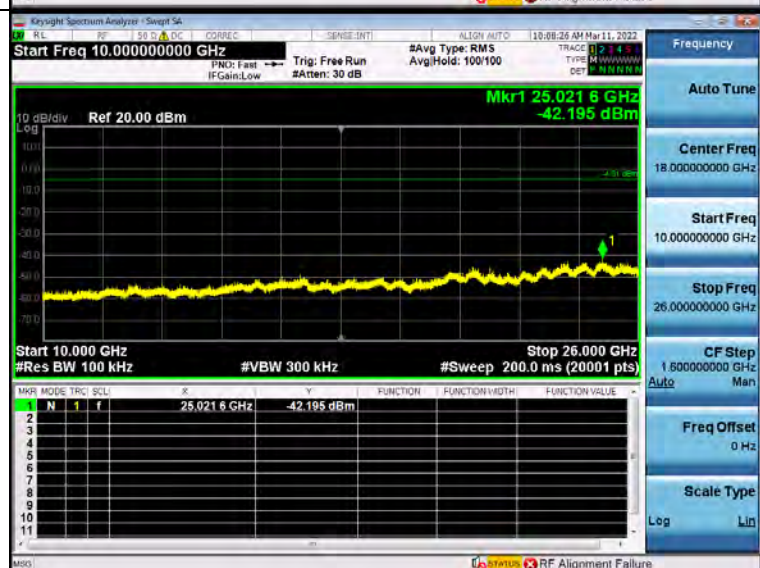
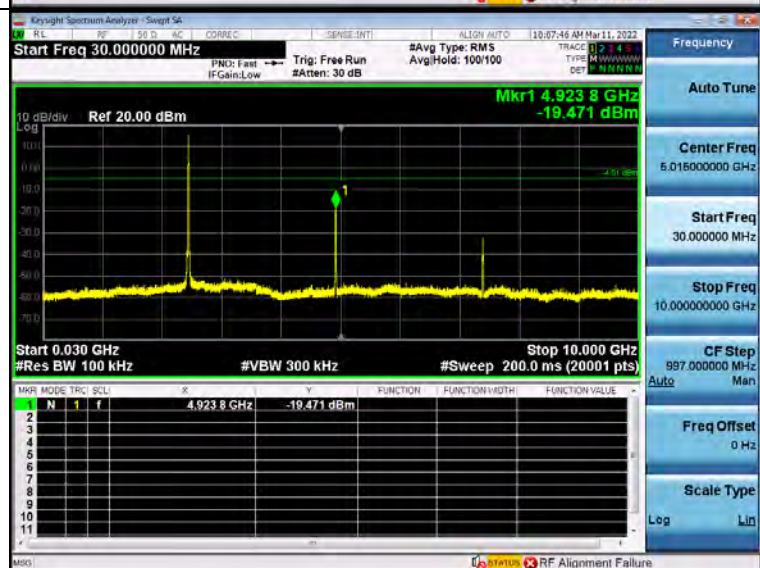
Low Channel



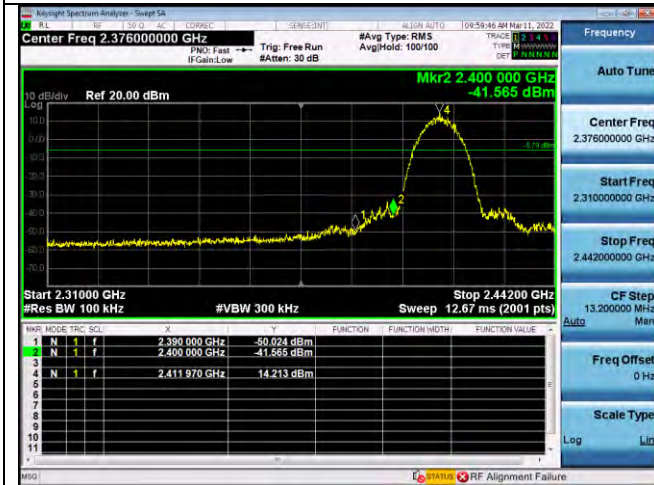
Middle Channel



The screenshot displays a Keysight Spectrum Analyzer interface. The main plot shows a signal spectrum with a peak at 2.462 GHz. The y-axis is labeled 'Log' and ranges from -70 dBm to 10 dBm. The x-axis is labeled 'Center Freq 2.46200000 GHz'. A green horizontal line indicates the reference level at 20.00 dBm. The signal peak is marked with a green dot and labeled 'Mkr1 2.462 000 GHz 15.187 dBm'. The signal bandwidth is set to 100 kHz, and the resolution bandwidth (RBW) is 300 kHz. The sweep rate is 4.267 ms (8001 pts). The center frequency is 2.46200000 GHz. The span is 40.00 MHz. The RBW is 100 kHz. The VBW is 300 kHz. The trigger is set to Free Run. The attenuation is 30 dB. The IF gain is low. The PNO is fast. The alignment is failure.

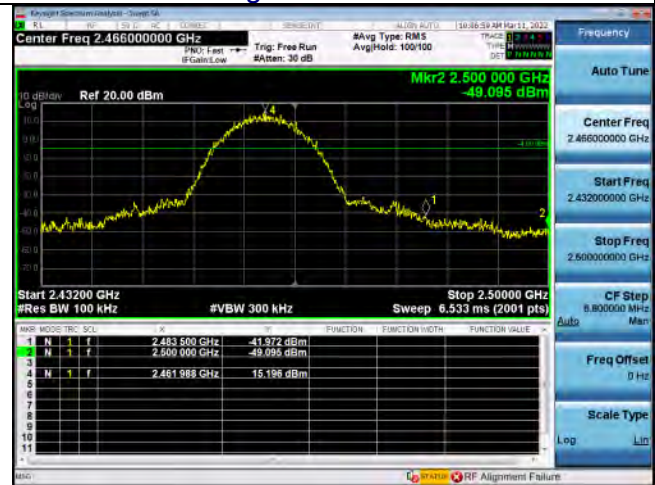


Lowest Channel



Left Band Edge

Highest Channel

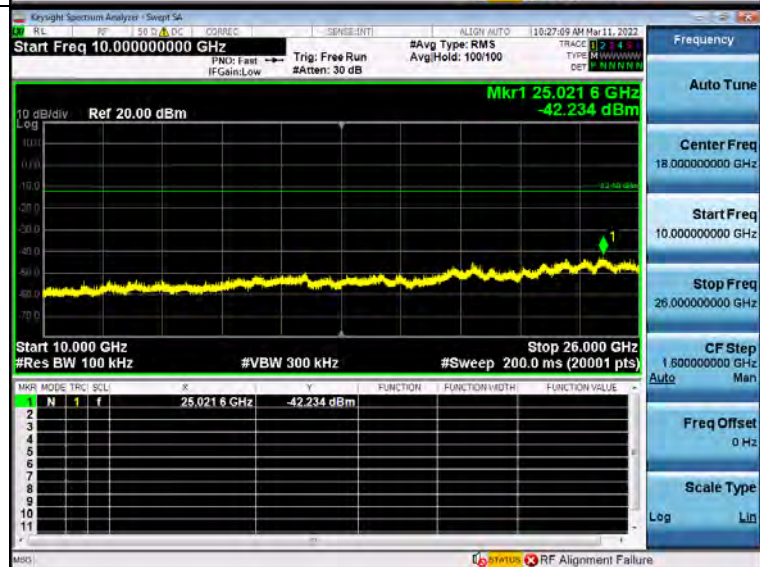
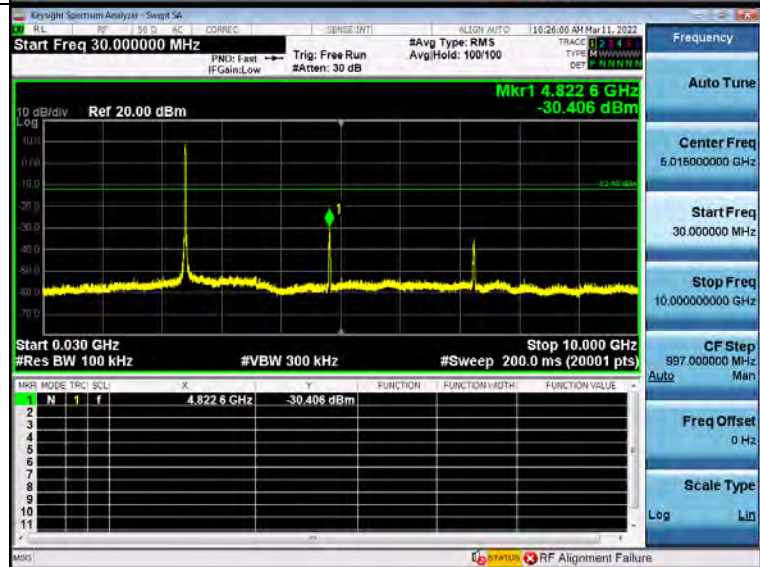
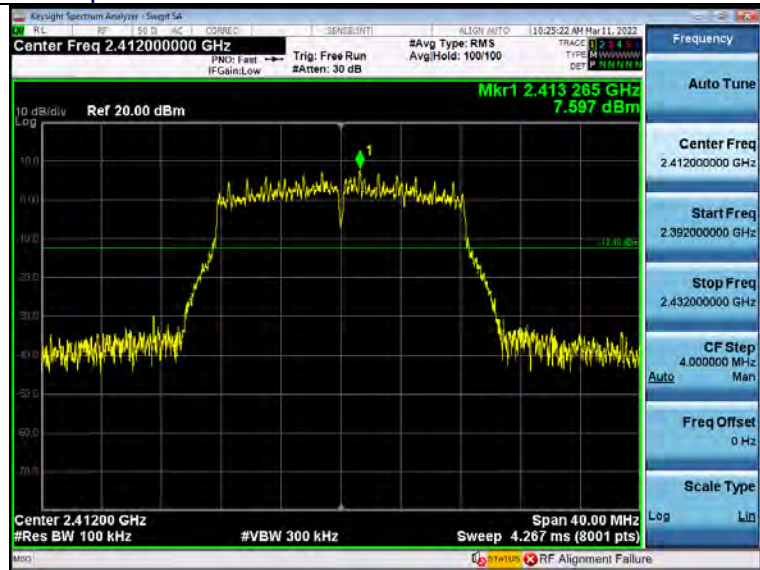


Right Band Edge

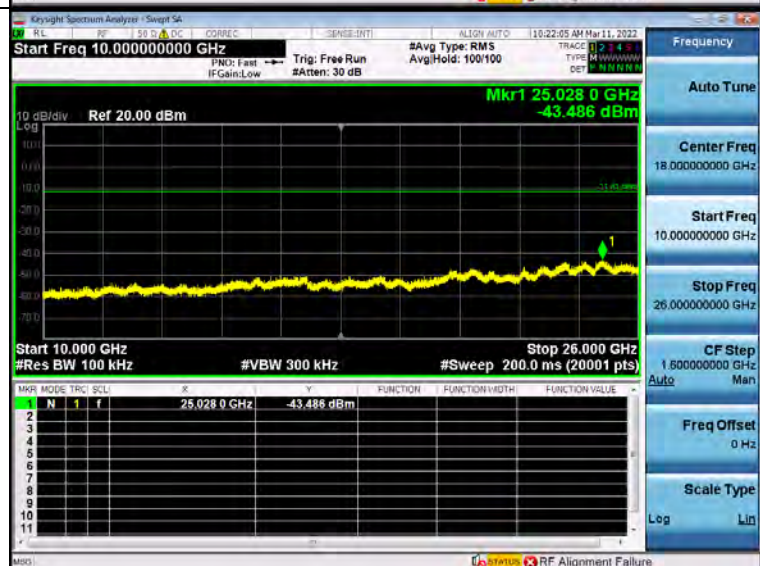
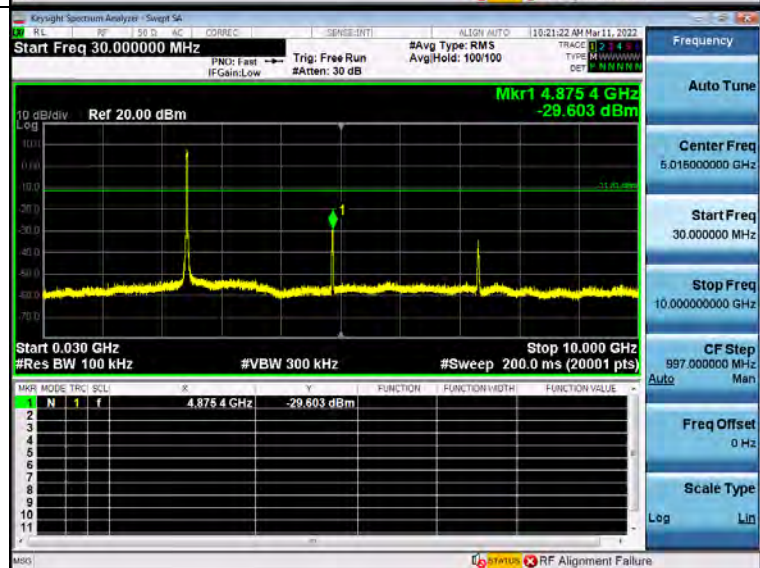
802.11g Modulation

Spurious emission

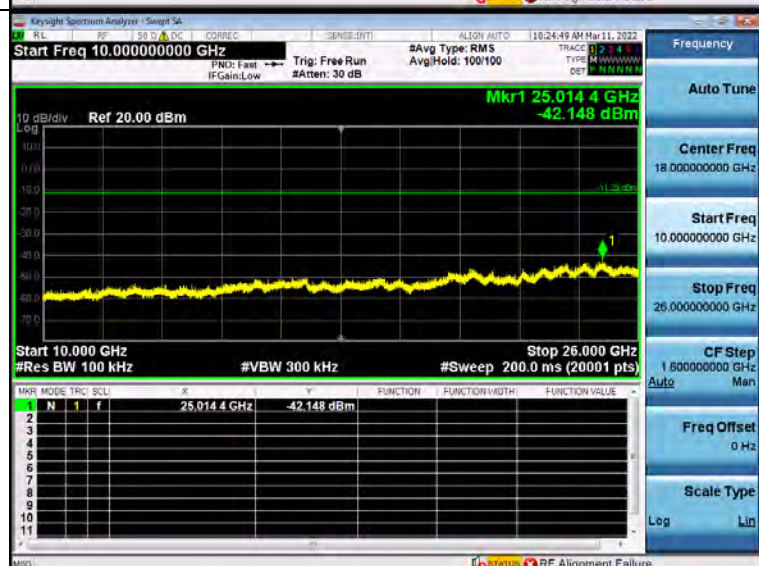
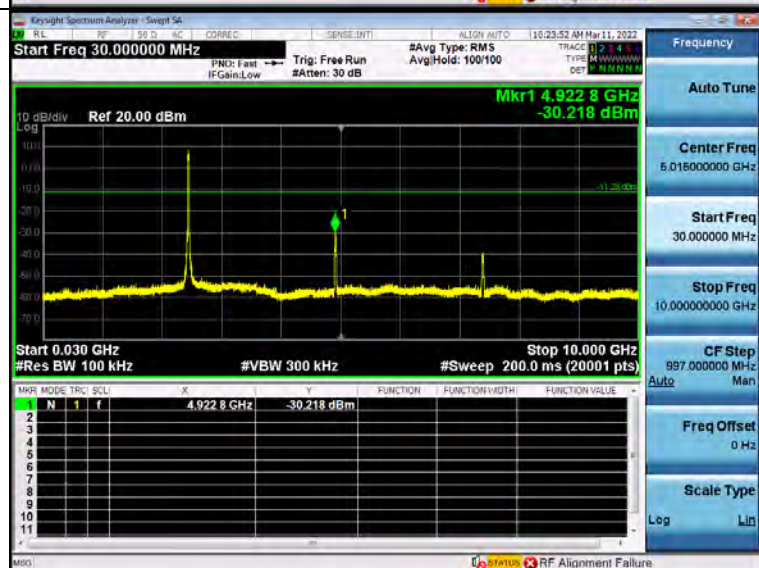
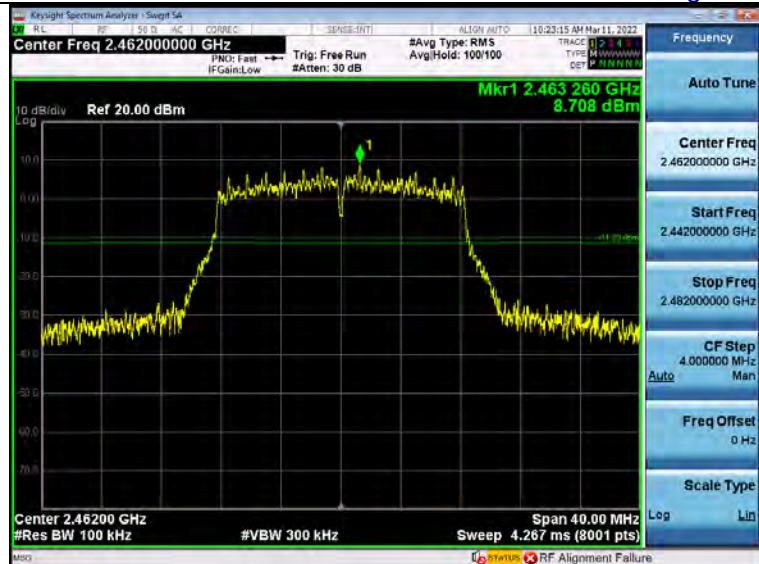
Low Channel



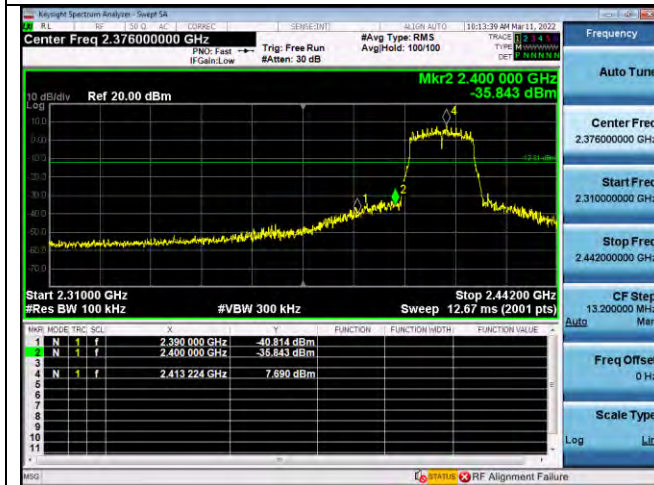
The screenshot displays a Keysight Spectrum Analyzer interface. The main plot shows a signal spectrum with a peak at 2.438 GHz. The y-axis is labeled '10 dBm' and 'Log'. The x-axis is labeled 'Center Freq 2.437000000 GHz'. The peak is labeled 'Mkr1 2.438 260 GHz' and '8.188 dBm'. The signal is identified as 'Trig: Free Run' and '#Atten: 30 dB'. 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 interface includes various control buttons and a status bar at the bottom.



High Channel

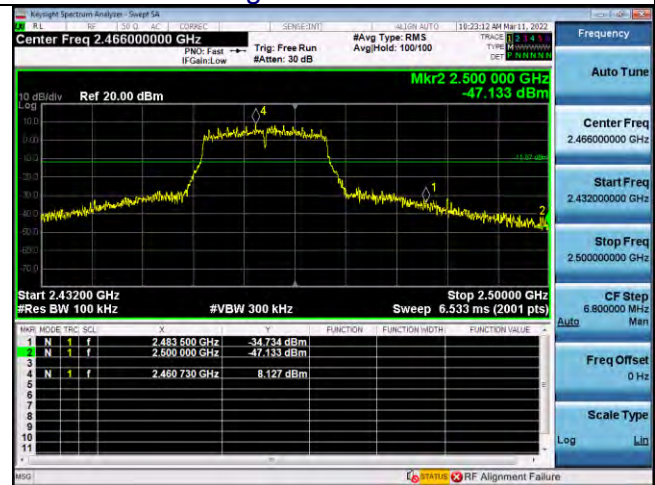


Lowest Channel



Left Band Edge

Highest Channel

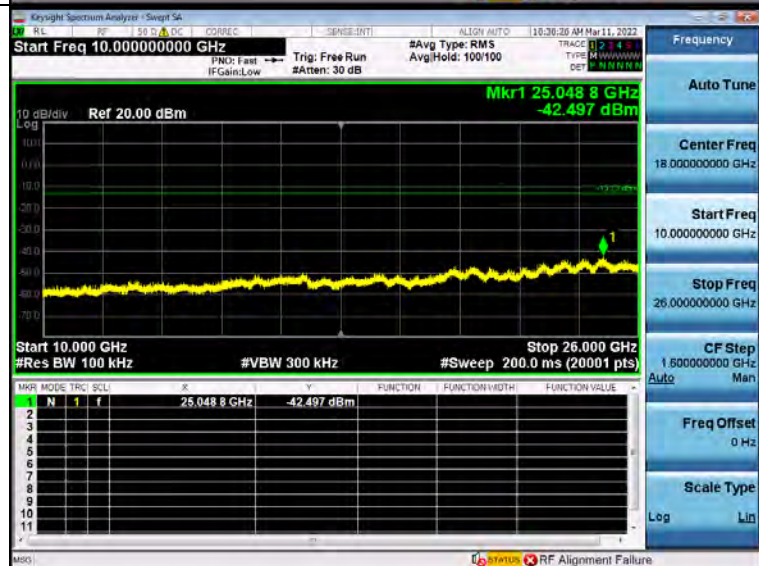
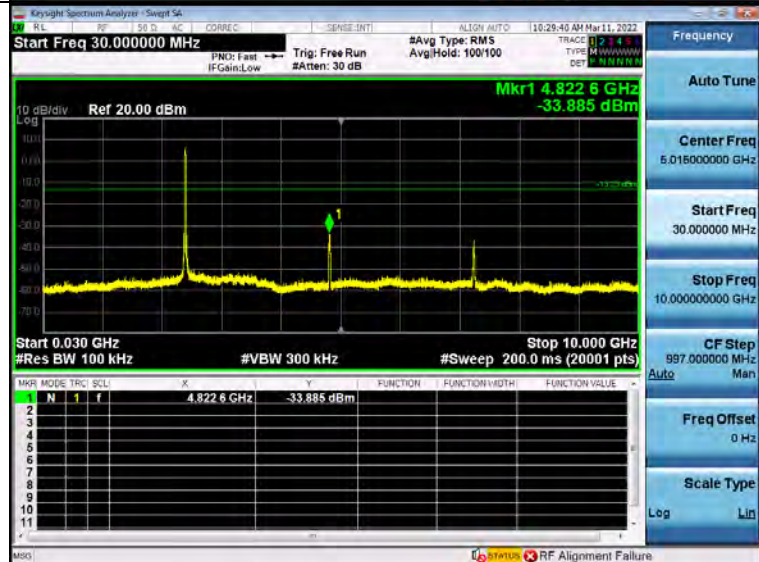
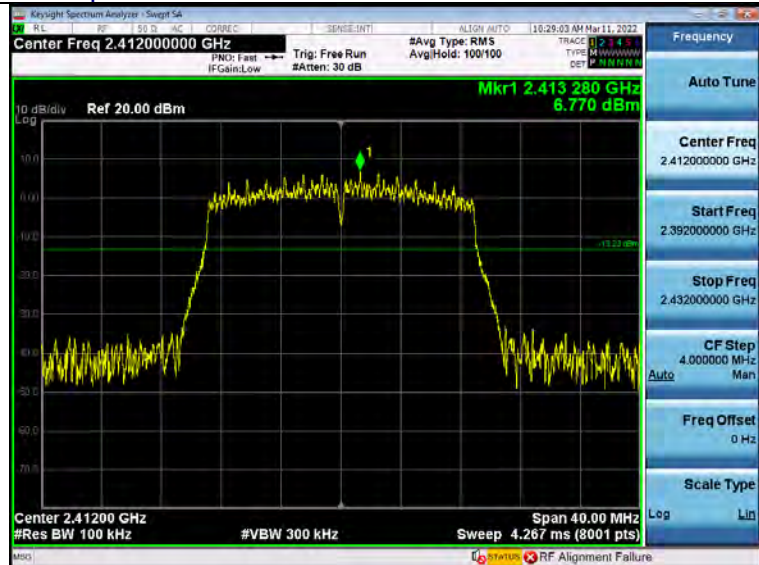


Right Band Edge

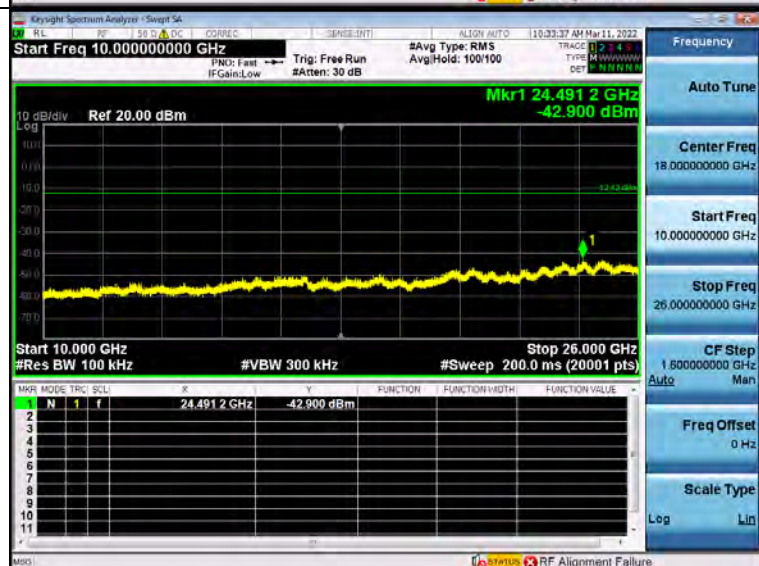
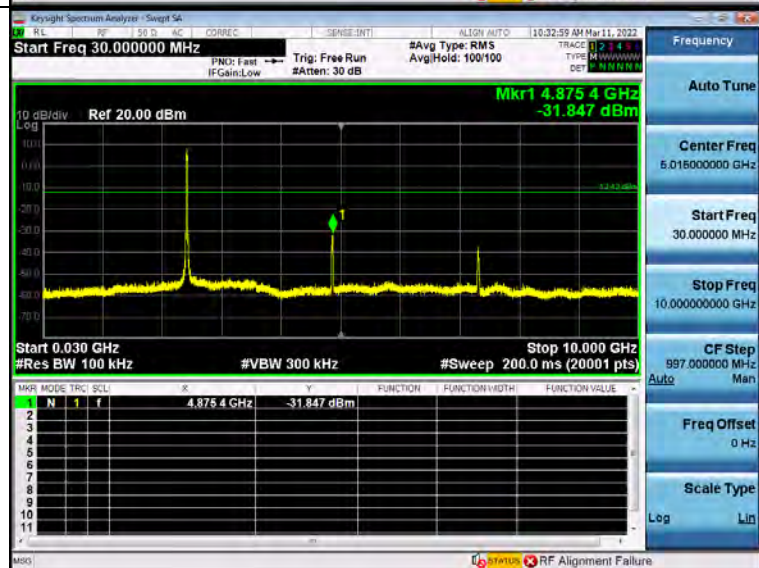
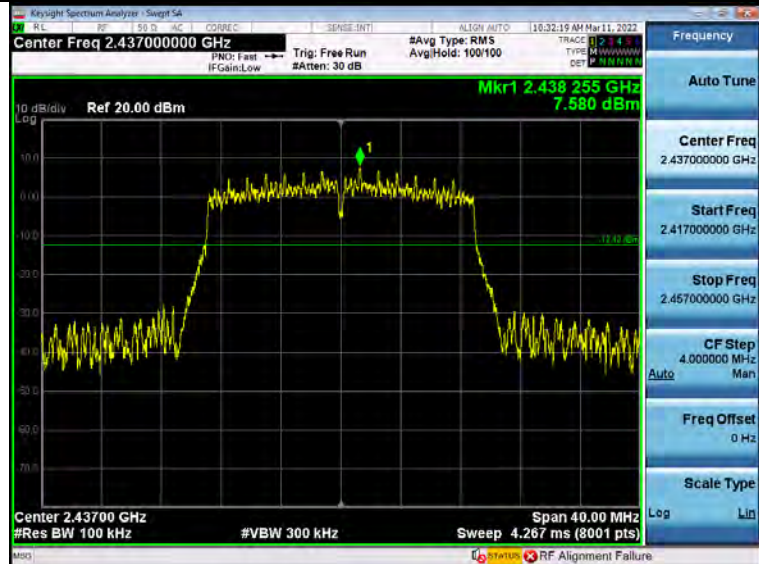
802.11n20 Modulation

Spurious emission

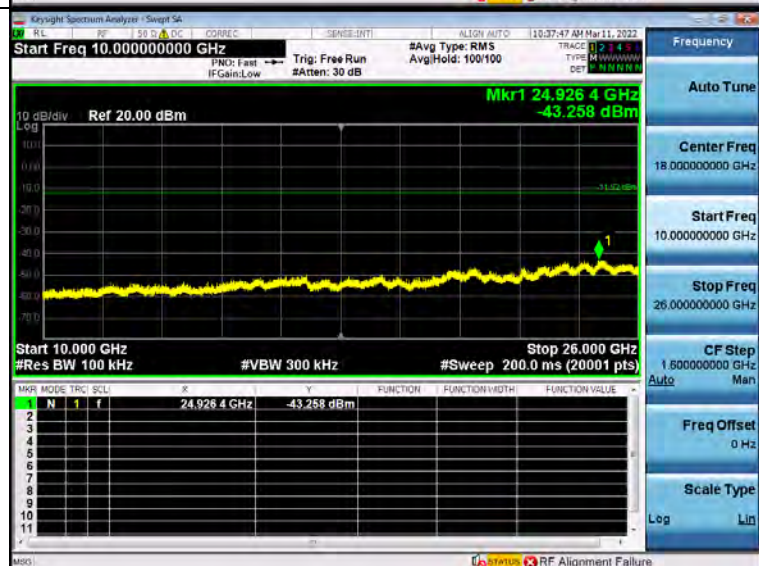
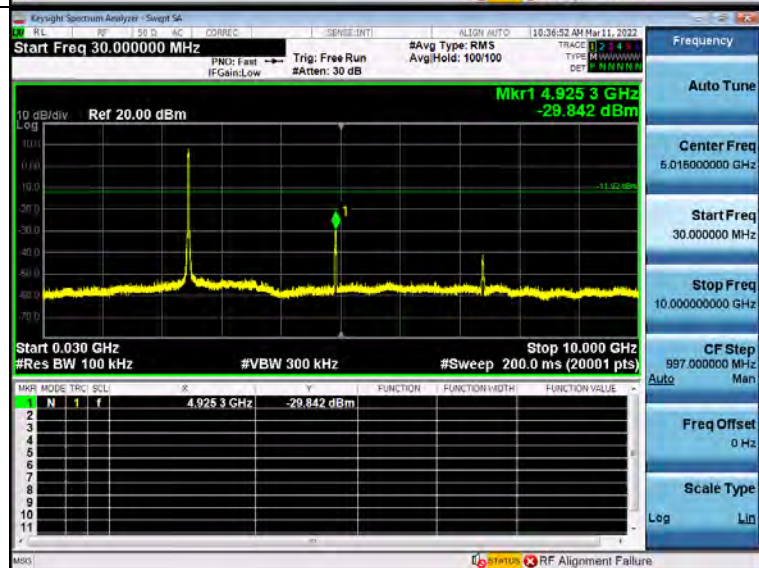
Low Channel



Middle Channel



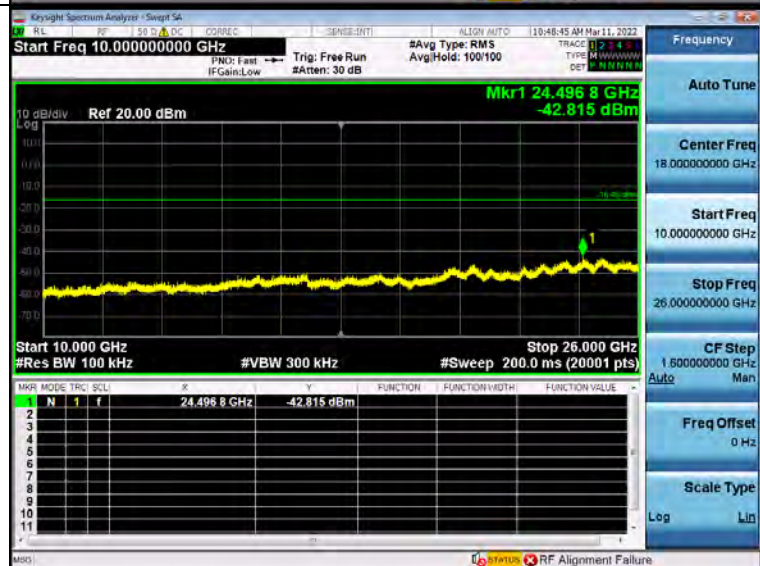
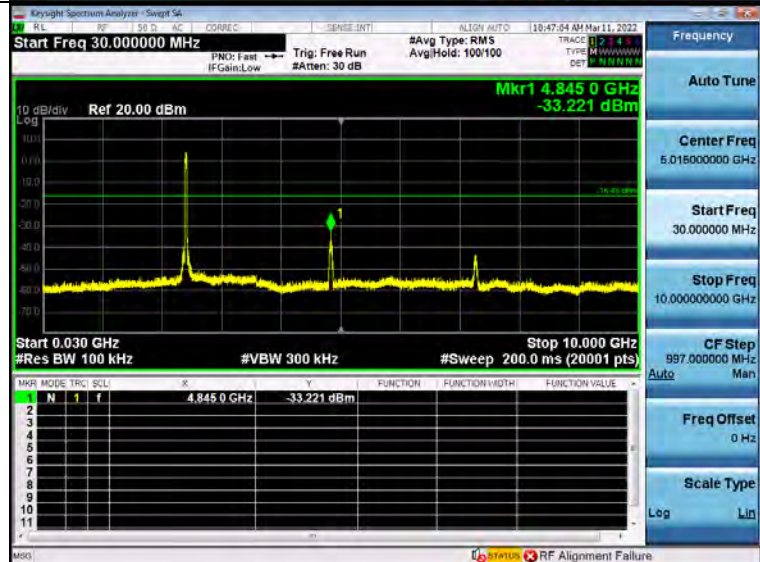
High Channel



802.11n40 Modulation

Spurious emission

Low Channel



Keysight Spectrum Analyzer - SigStk 5A

Center Freq 2.437000000 GHz

Span 80.00 MHz

Res BW 100 kHz

VBW 300 kHz

Sweep 8.000 ms (8001 pts)

10 dBm

Ref 20.00 dBm

Mkr1 2.434 50 GHz 4.040 dBm

Frequency

Auto Tune

Center Freq 2.437000000 GHz

Start Freq 2.397000000 GHz

Stop Freq 2.477000000 GHz

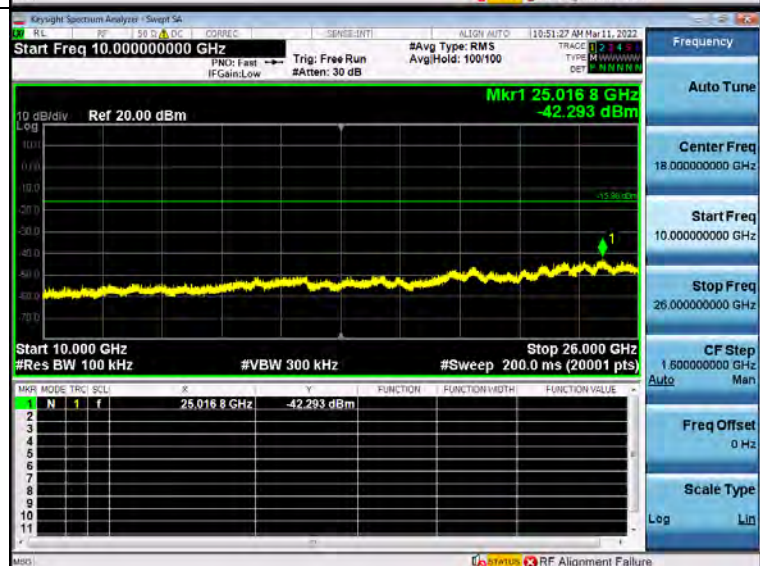
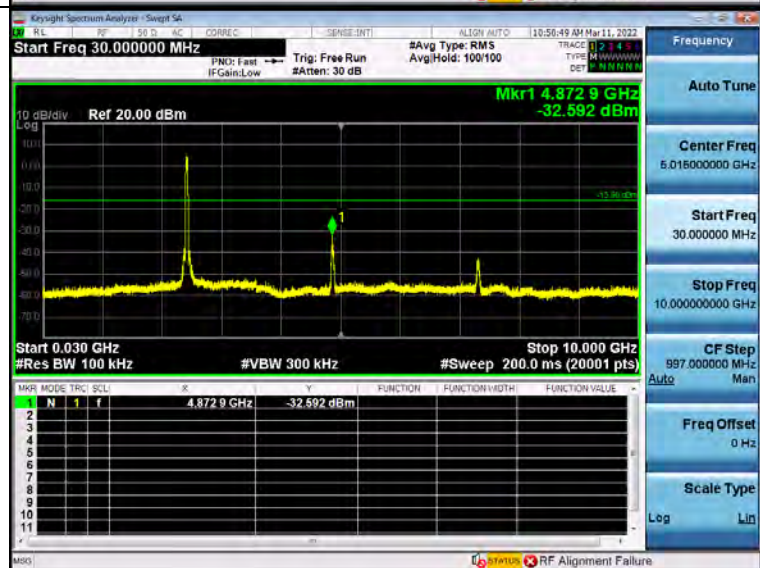
CF Step 8.000000 MHz

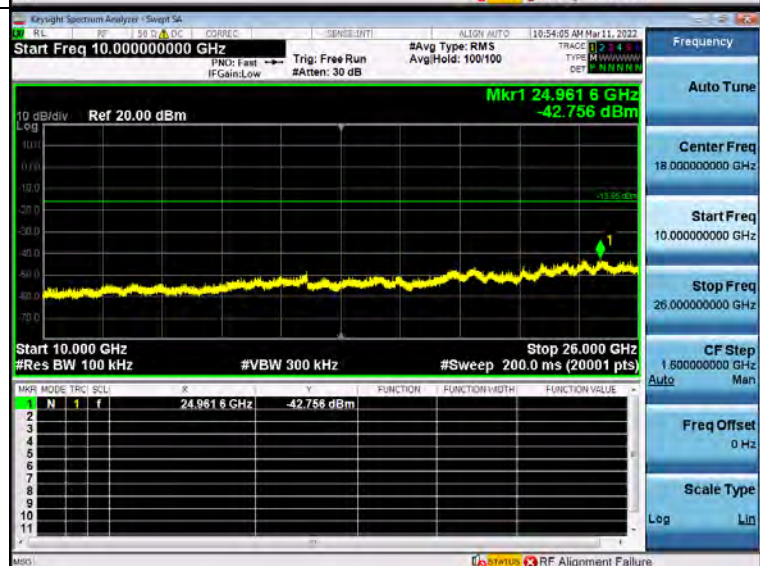
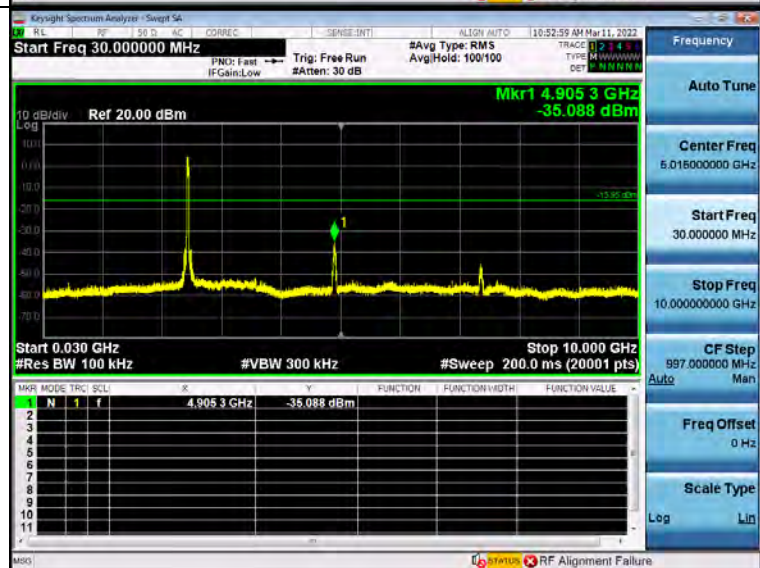
Auto Man

Freq Offset 0 Hz

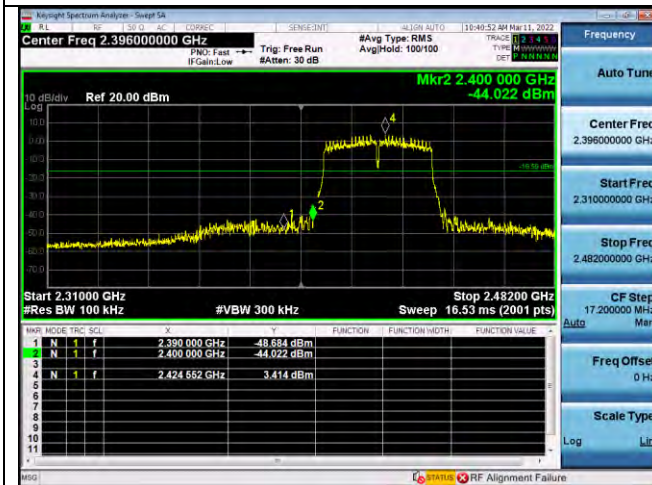
Scale Type

Log Lin



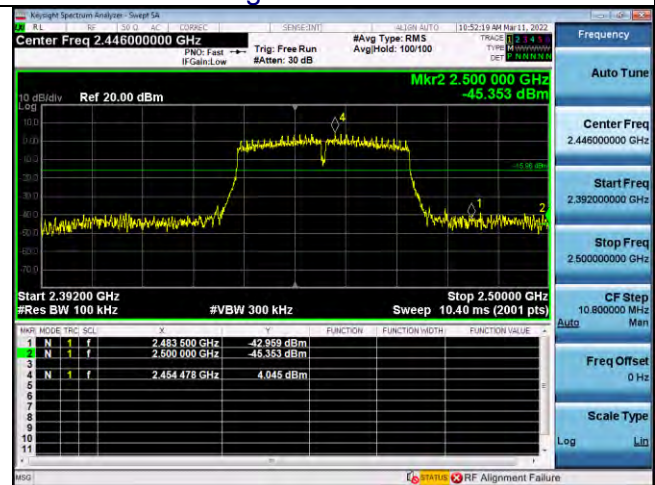
[illegible]

Lowest Channel



Left Band Edge

Highest Channel

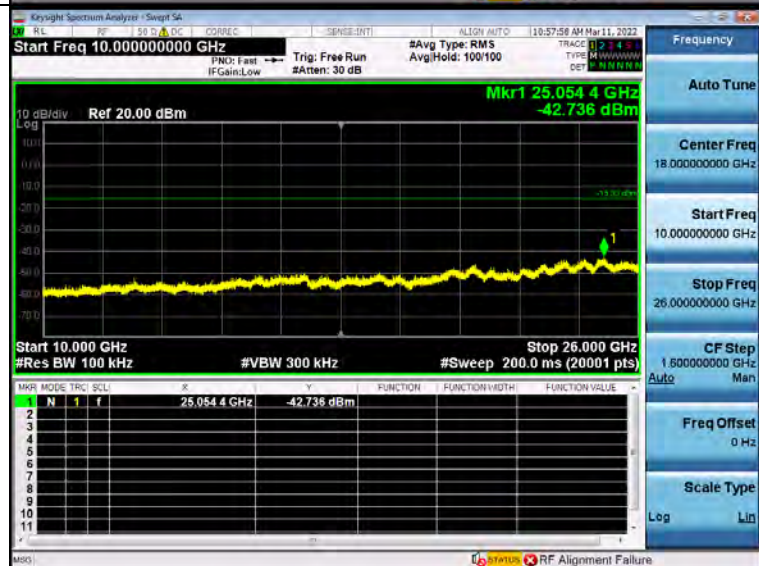
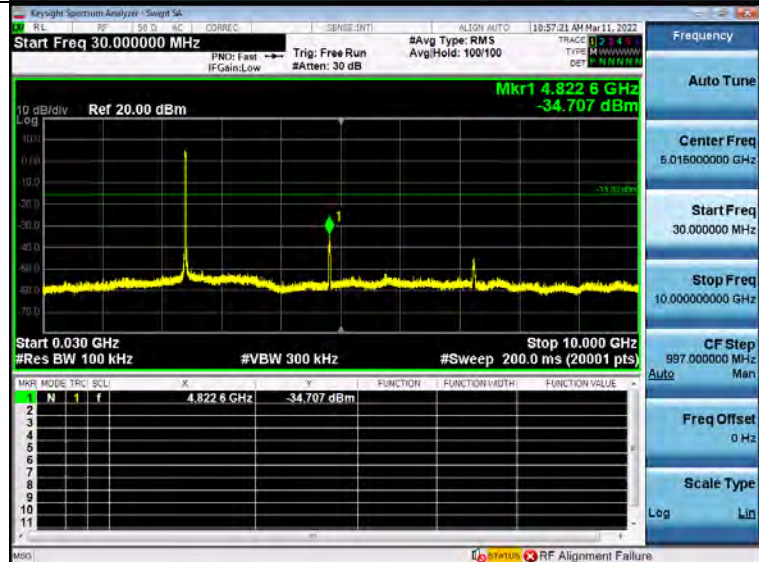


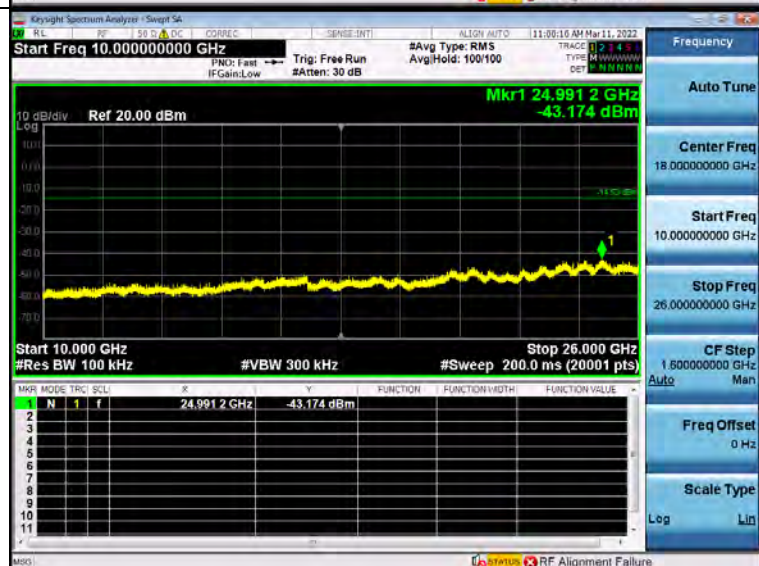
Right Band Edge

802.11ax20 Modulation

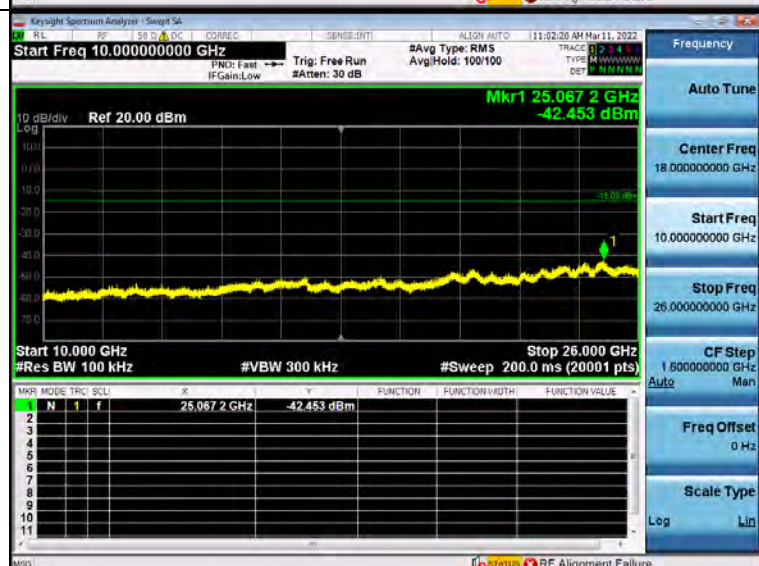
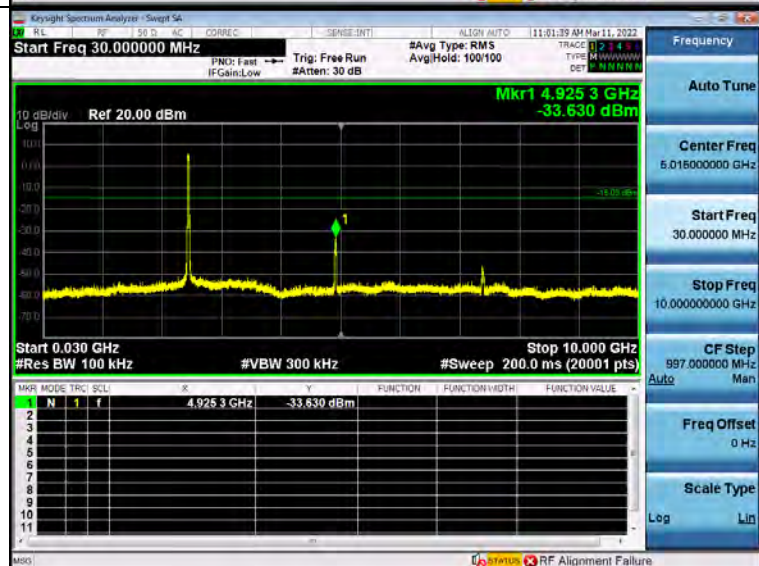
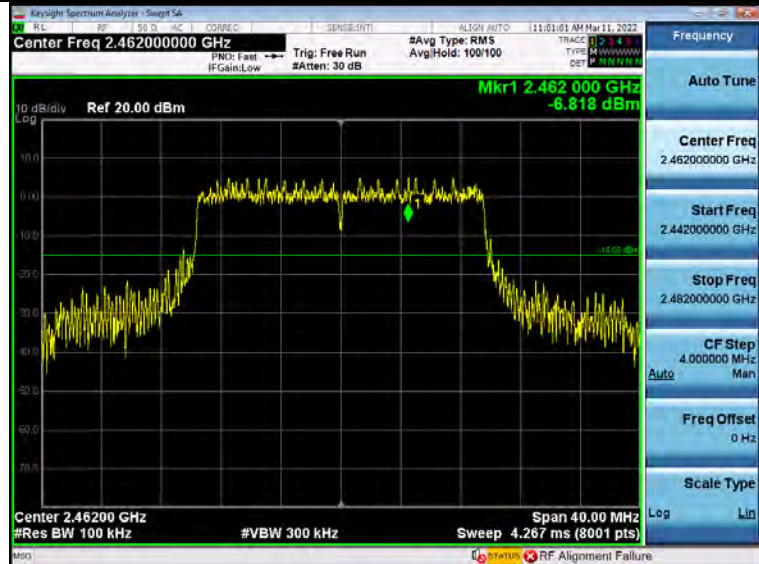
Spurious emission

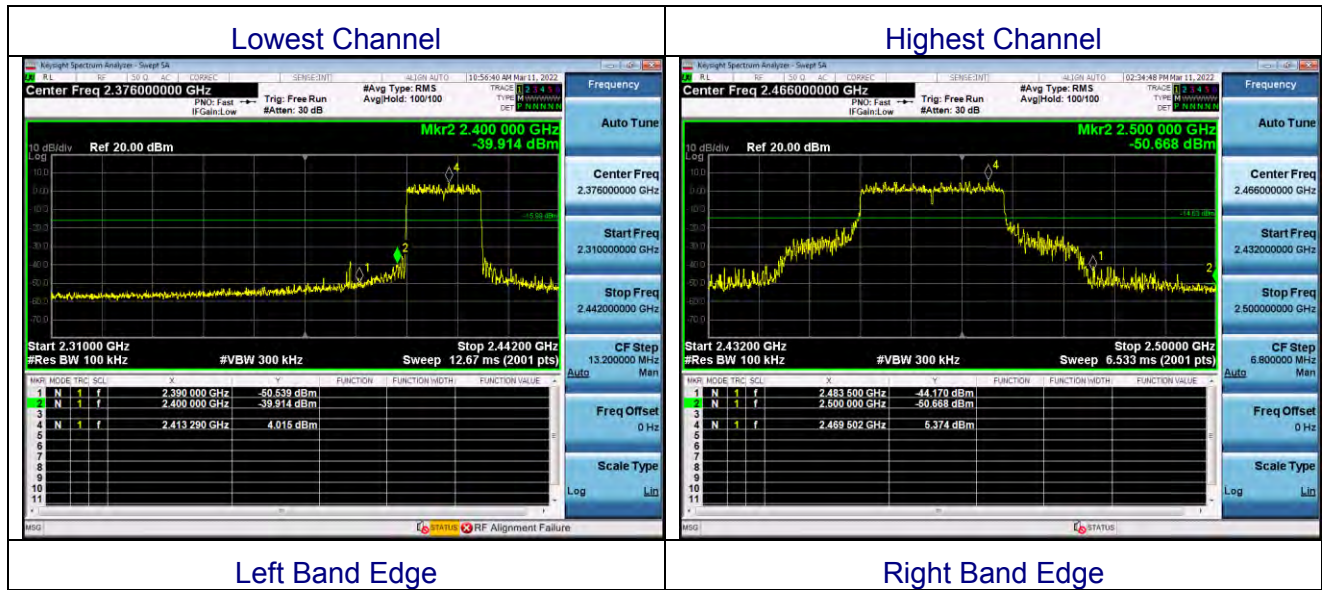
Low Channel





High Channel

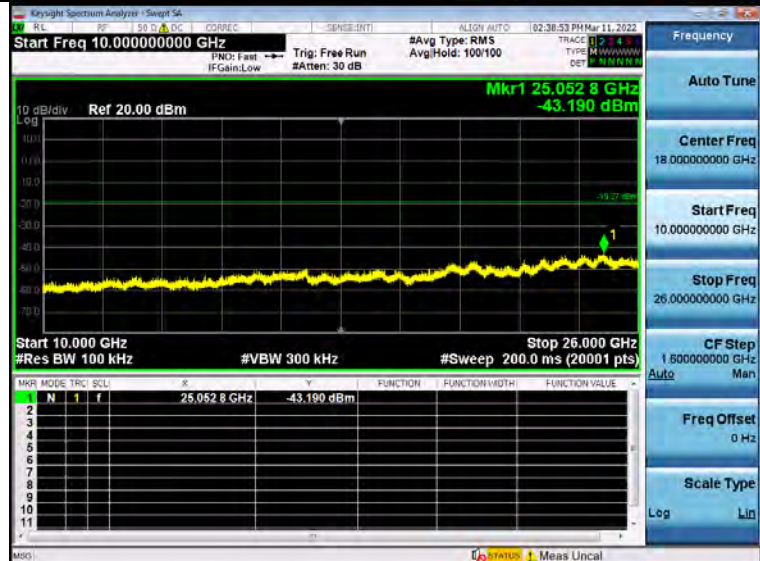
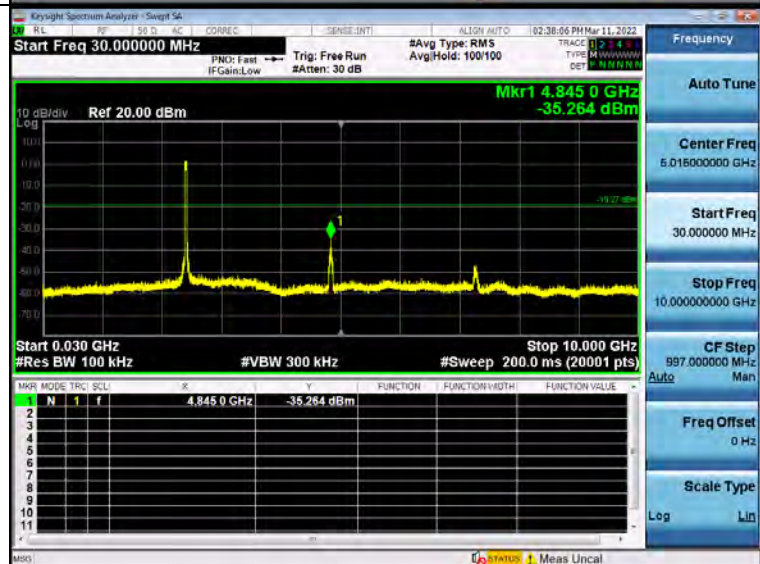
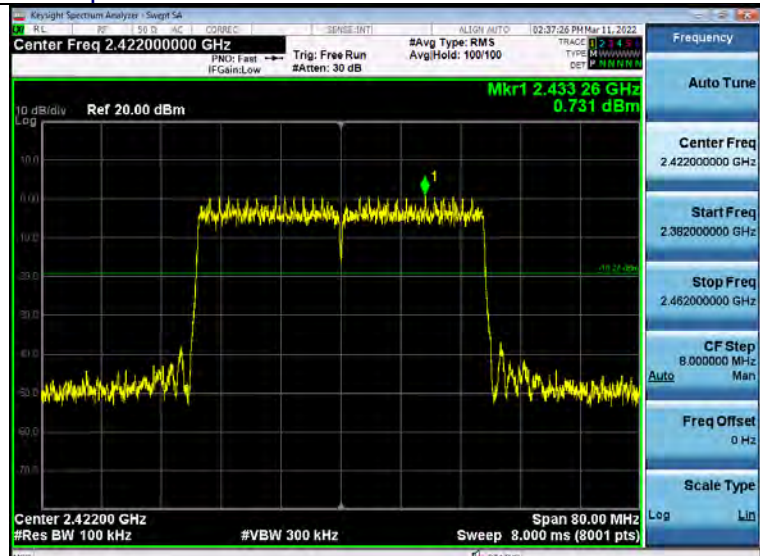




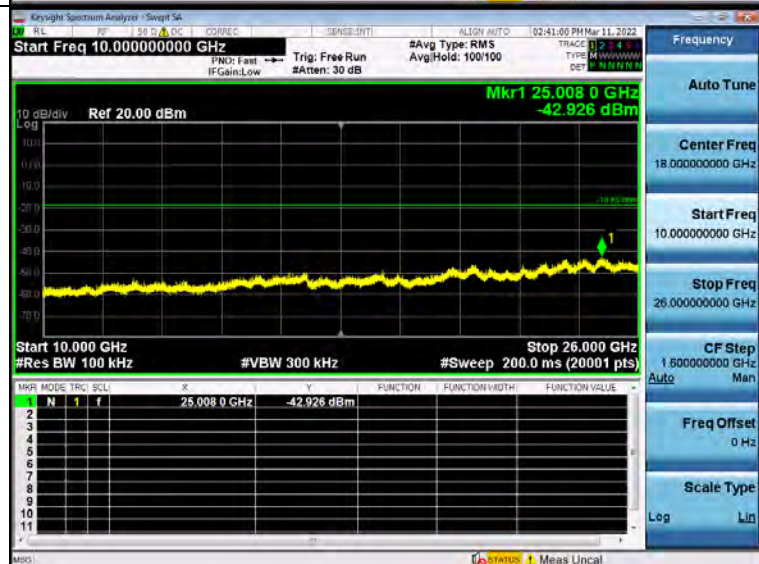
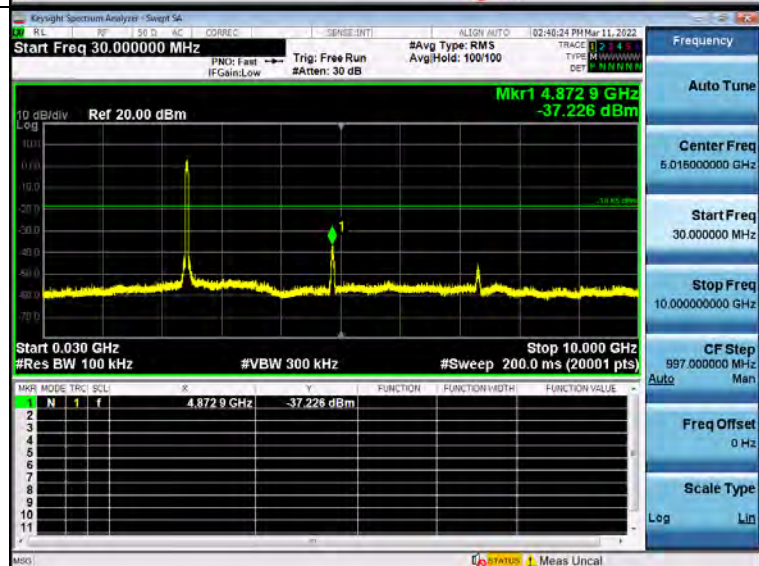
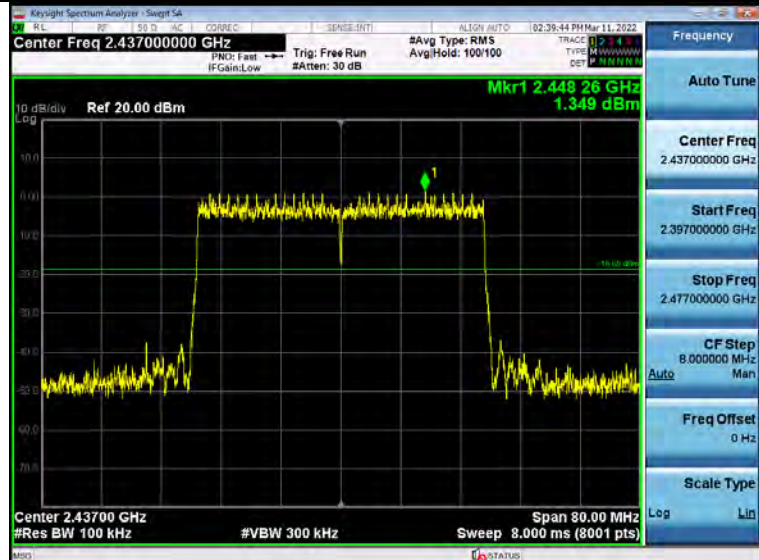
802.11ax40 Modulation

Spurious emission

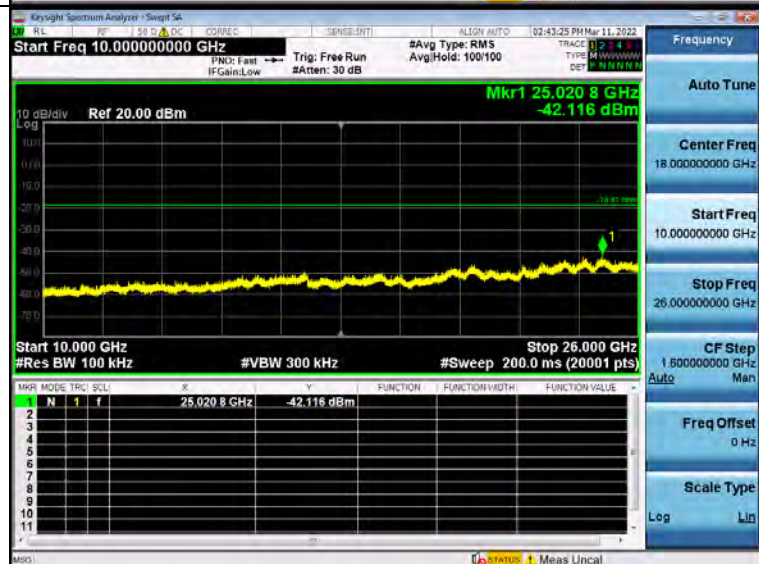
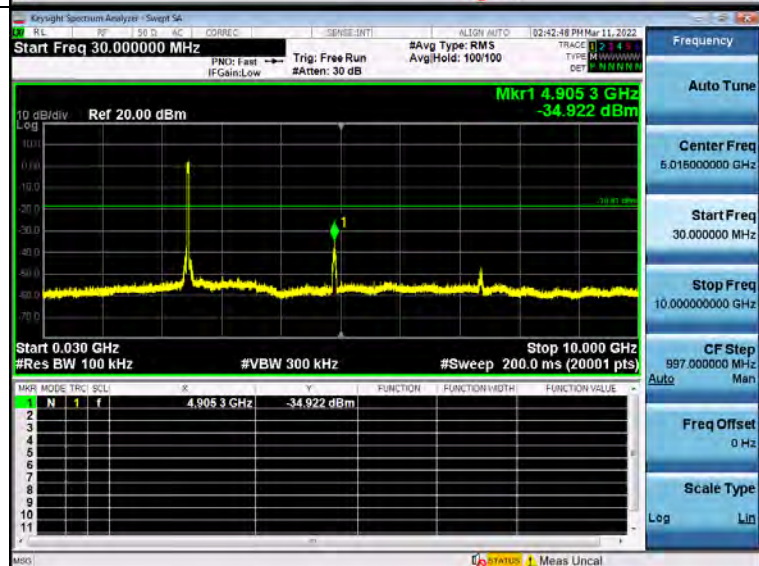
Low Channel



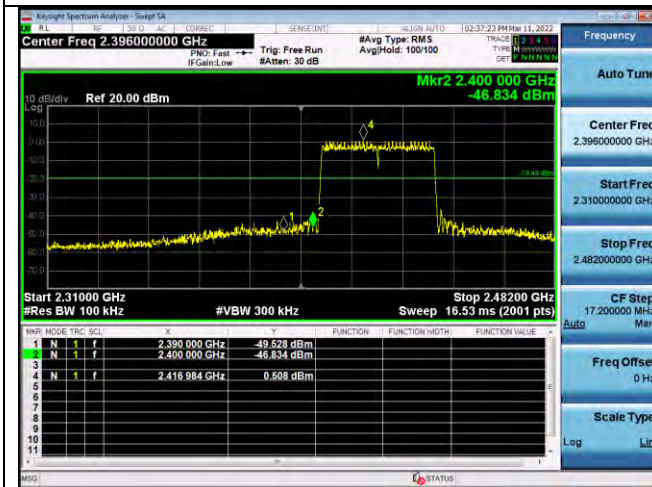
Middle Channel



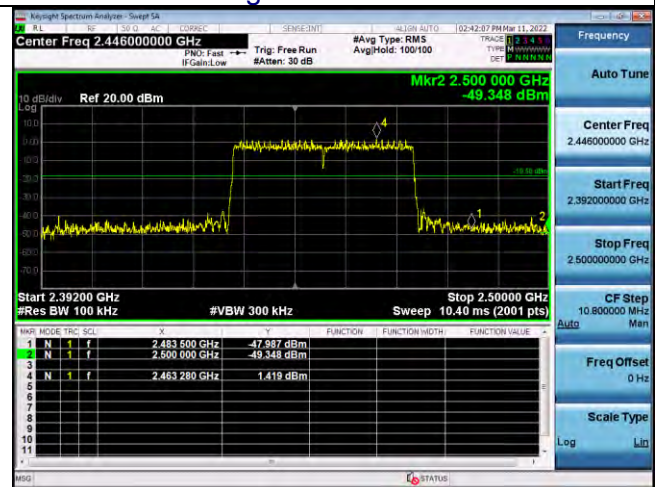
High Channel



Lowest Channel



Highest Channel



Left Band Edge

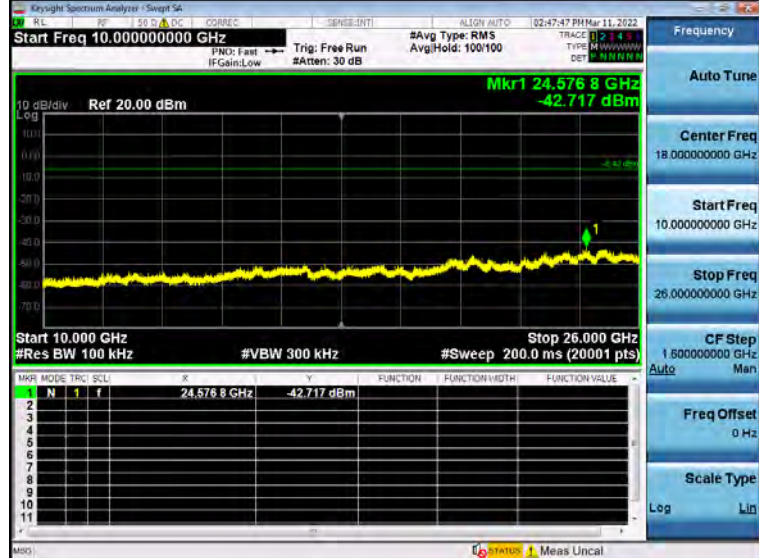
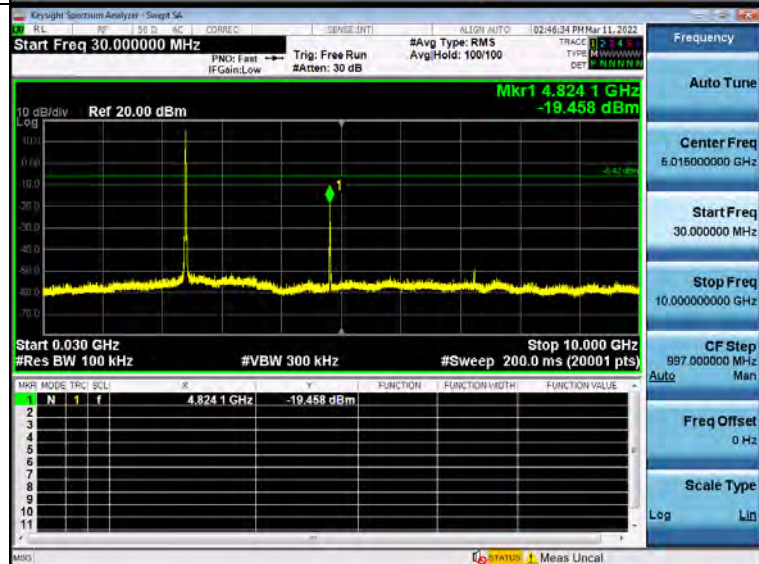
Right Band Edge

ANT2

802.11b Modulation

Spurious emission

Low Channel



Keysight Spectrum Analyzer - SigFit SA

Center Freq 2.437000000 GHz

RF COARSE

Trig: Free Run

#Avg Type: RMS

Avg/Hold: 100/100

02:48:50 PM Mar 11, 2022

TRACED 1 2 4

TYPE M W W W W W W W

DET P P P P P P P P

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

10 dB/div Ref 20.00 dBm

Log

Mkr1 2.436 745 GHz 14.008 dBm

Center 2.43700 GHz

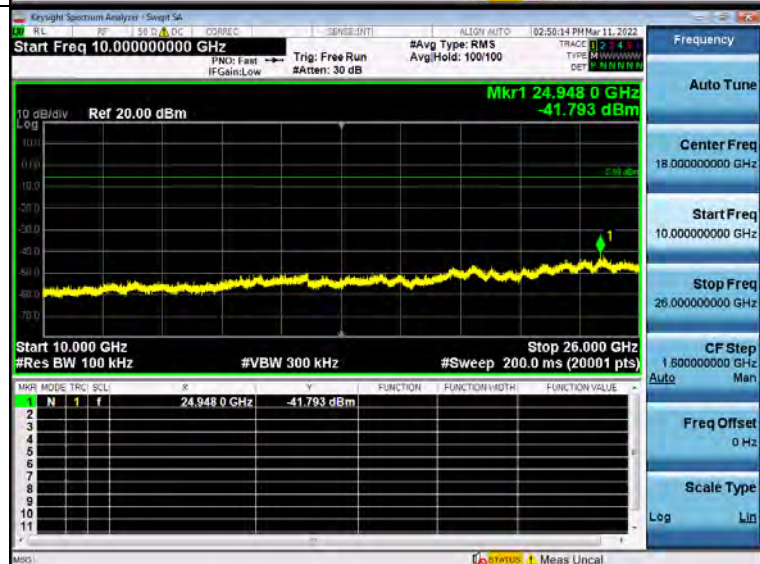
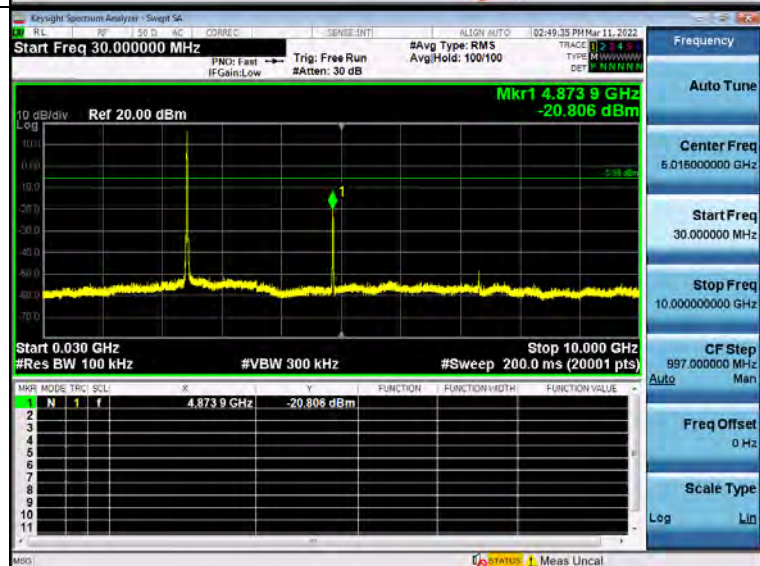
#Res BW 100 kHz

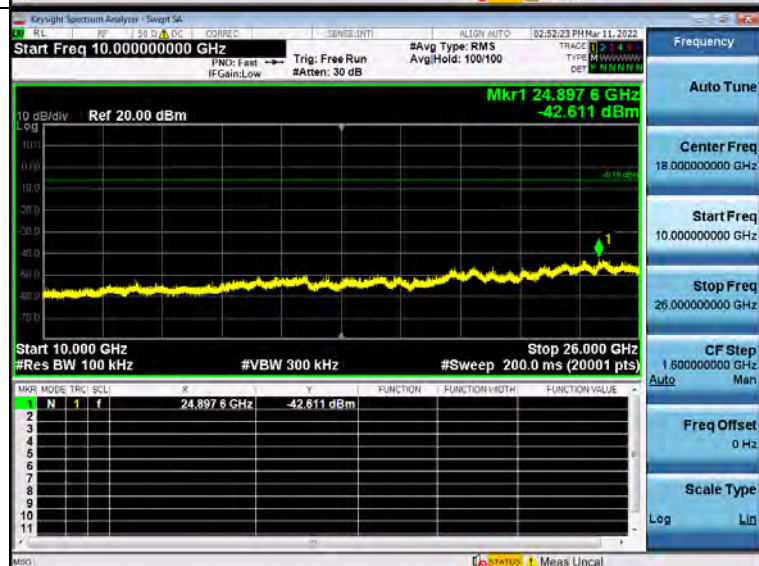
#VBW 300 kHz

Span 40.00 MHz

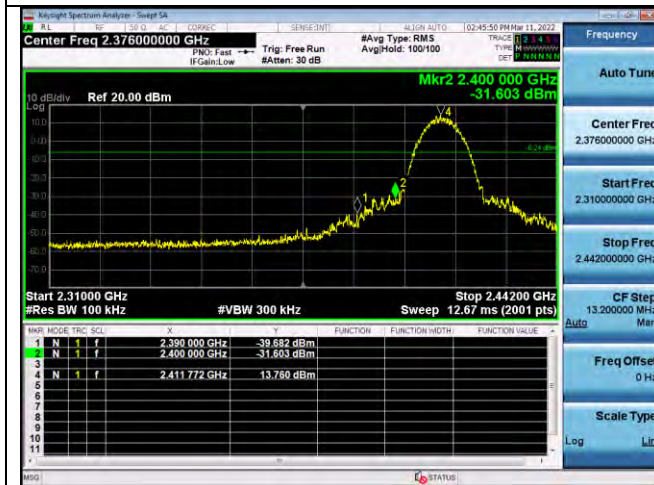
Sweep 4.267 ms (8001 pts)

MSO STATUS

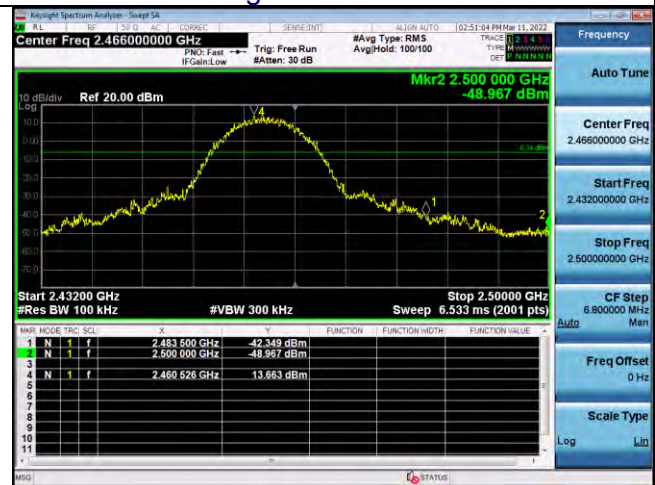




Lowest Channel



Highest Channel



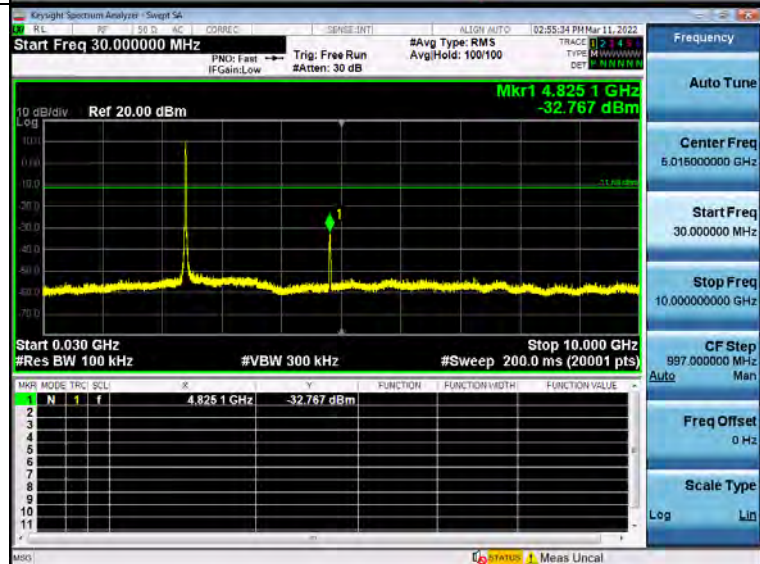
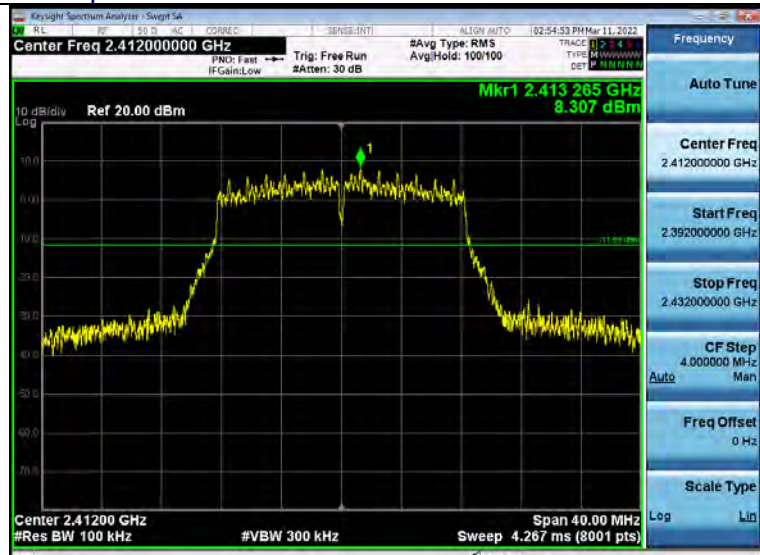
Left Band Edge

Right Band Edge

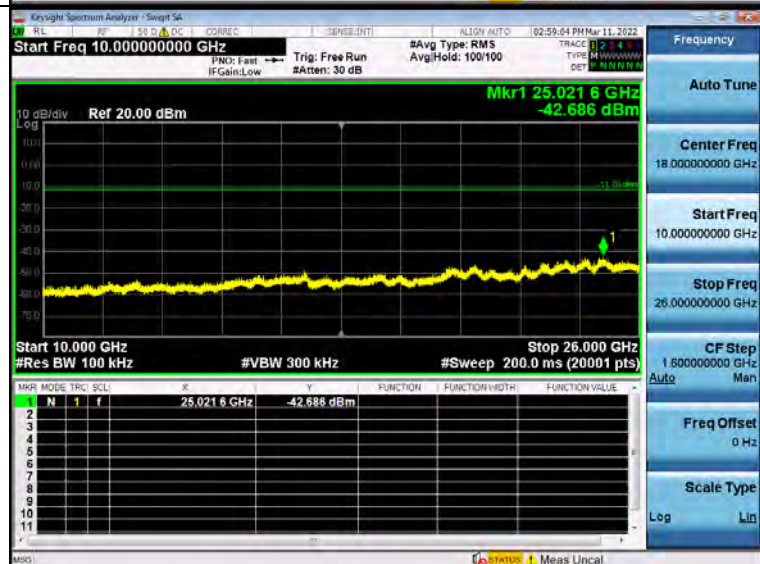
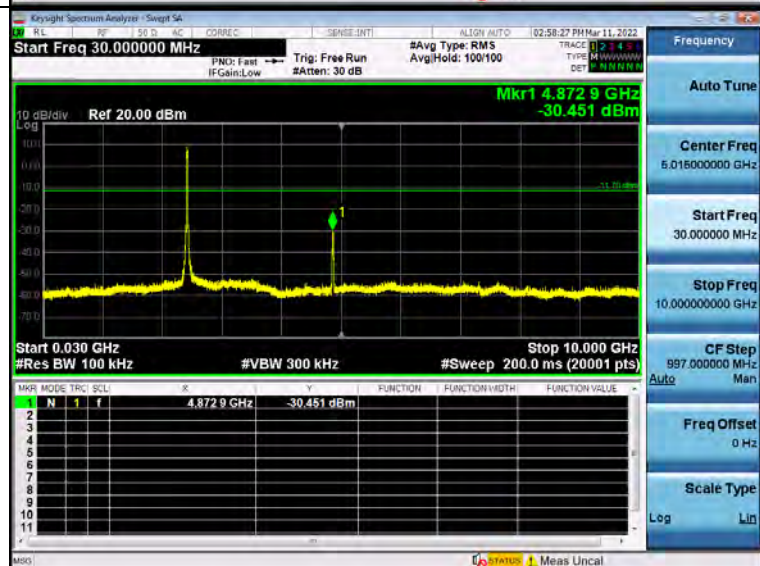
802.11g Modulation

Spurious emission

Low Channel



Middle Channel



Keysight Spectrum Analyzer - SigSt 5A

RF 150.0 AC

Center Freq 2.462000000 GHz PNO: Fast IFGain: Low Trig: Free Run atten: 30 dB #Avg Type: RMS Avg/Hold: 100/100 03:06:50 PM Mar 11, 2022 TRACE 1 2 1 4

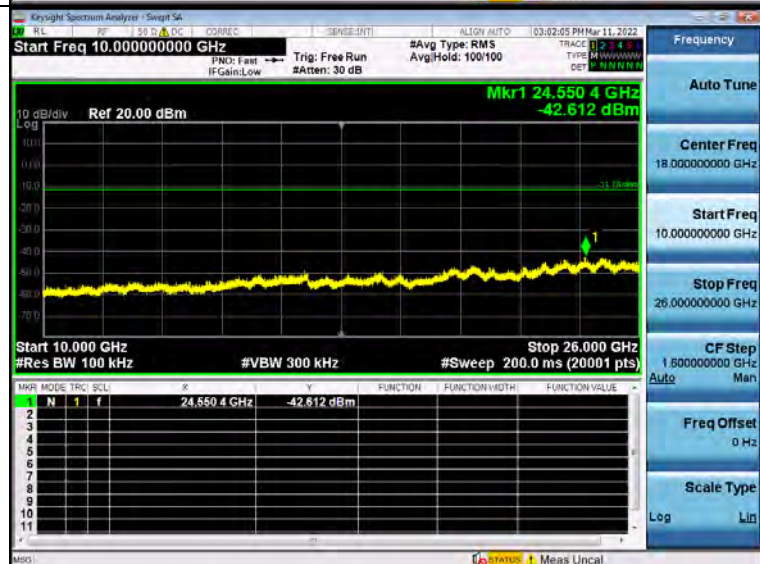
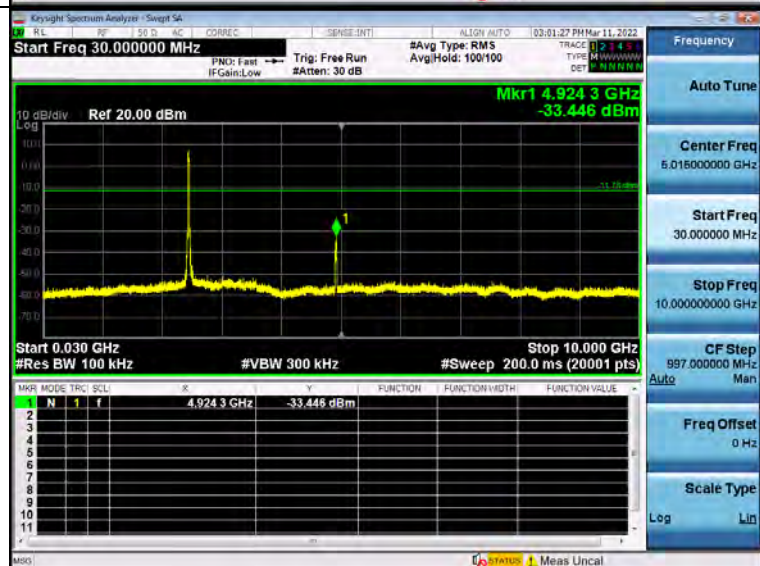
Mkr1 2.460 740 GHz 8.216 dBm

10 dB/div Ref 20.00 dBm

Log

Center 2.46200 GHz Res BW 100 kHz #VBW 300 kHz Span 40.00 MHz Sweep 4.267 ms (8001 pts)

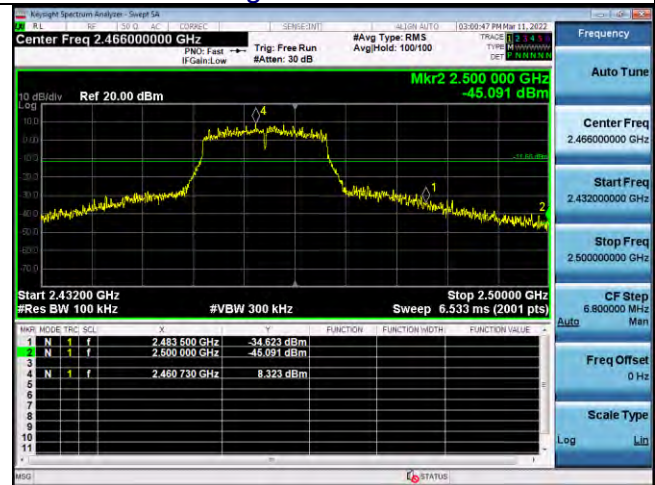
Frequency Auto Tune Center Freq 2.462000000 GHz Start Freq 2.442000000 GHz Stop Freq 2.482000000 GHz CF Step 4.000000 MHz Auto Man Freq Offset 0 Hz Scale Type Log Lin



Lowest Channel



Highest Channel



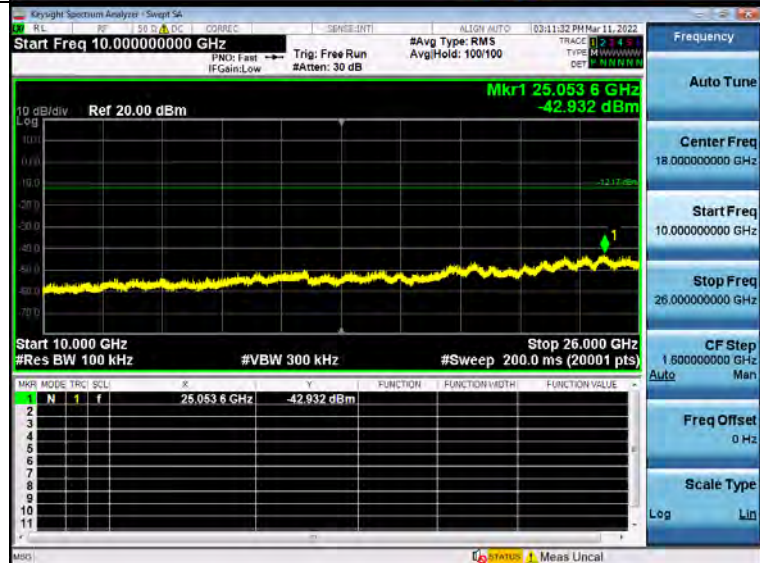
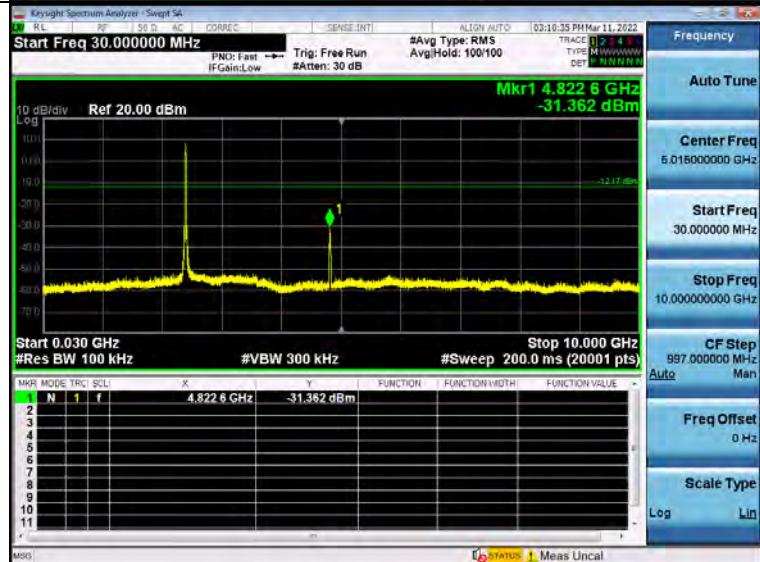
Left Band Edge

Right Band Edge

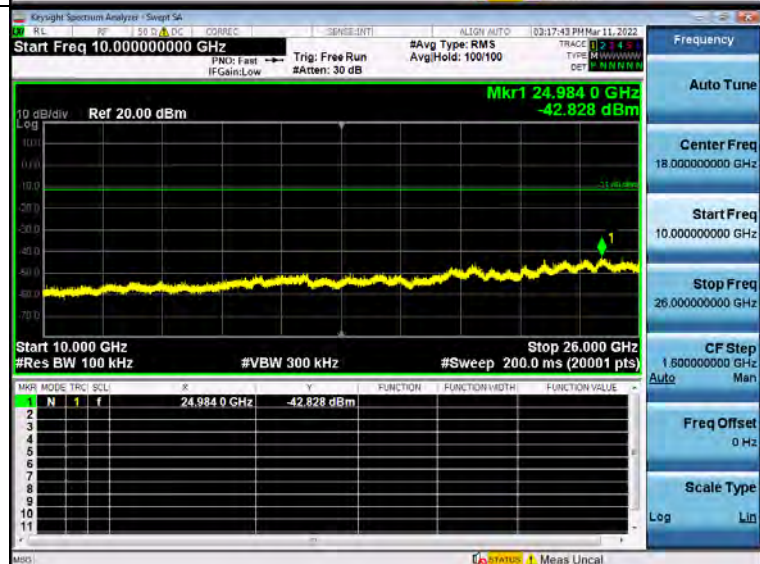
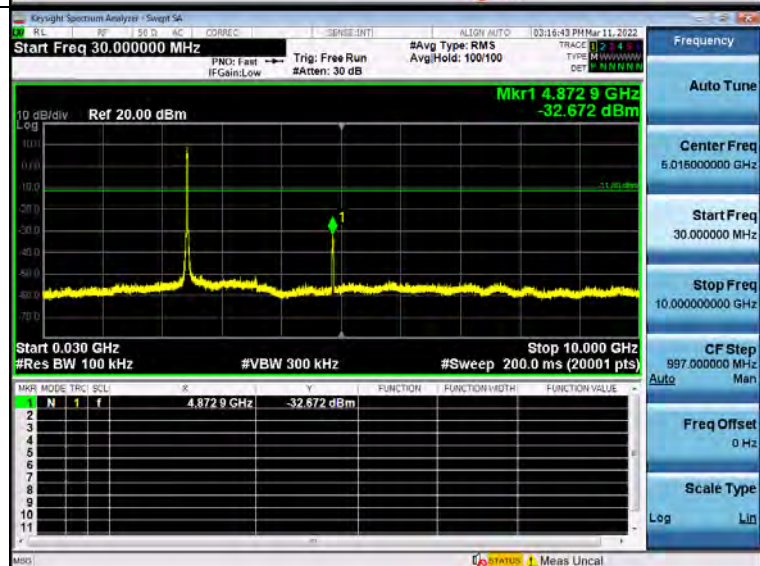
802.11n20 Modulation

Spurious emission

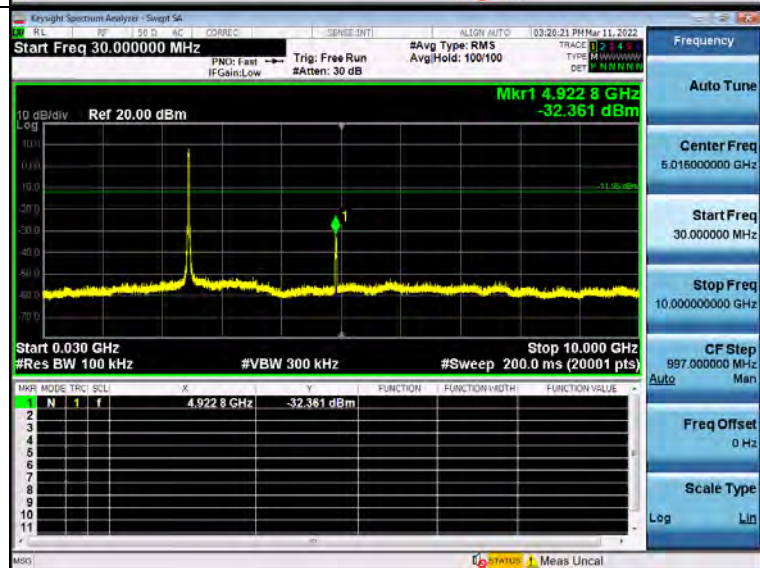
Low Channel



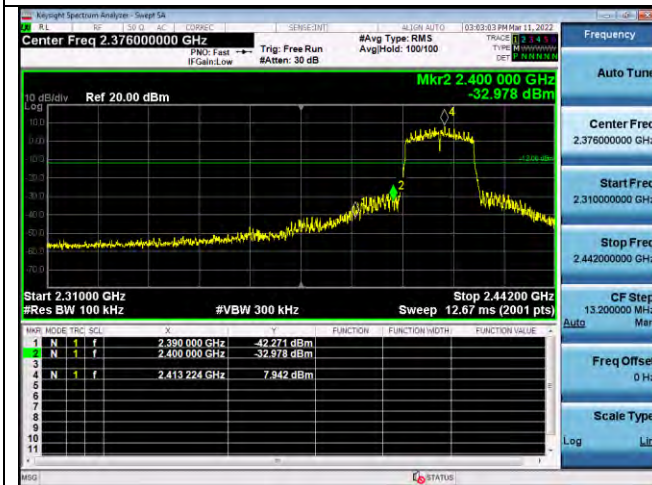
Middle Channel



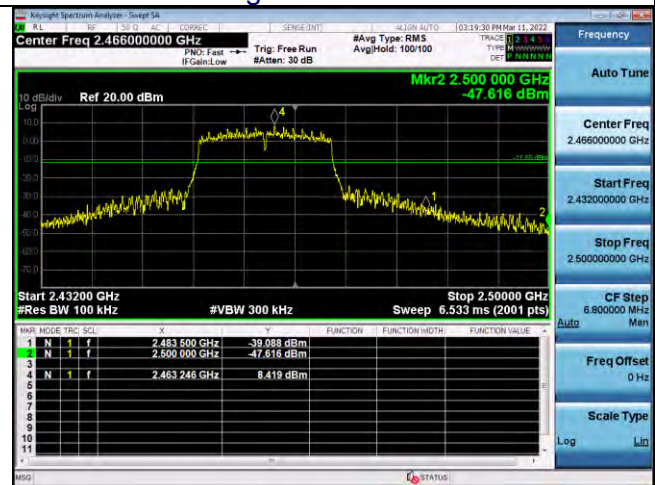
High Channel



Lowest Channel



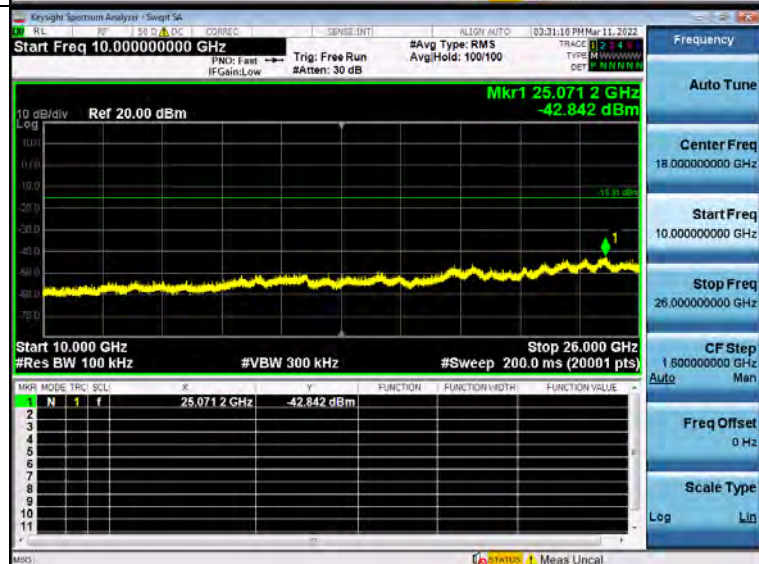
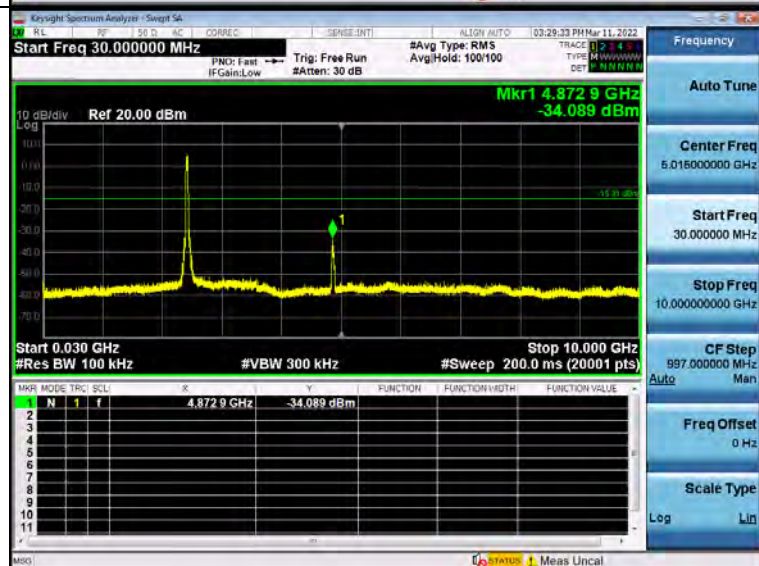
Highest Channel



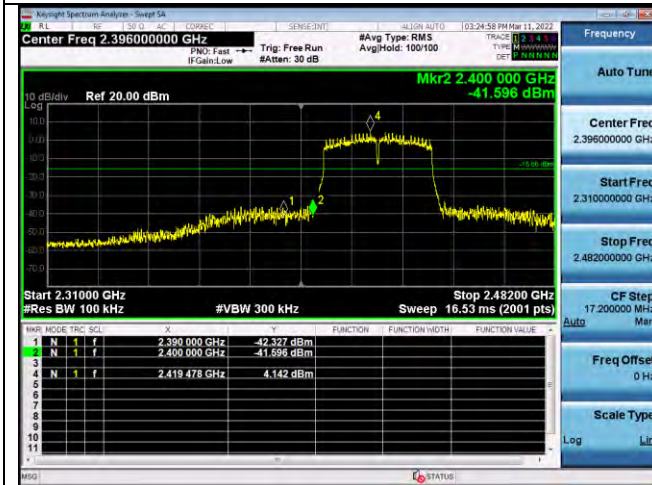
Left Band Edge

Right Band Edge

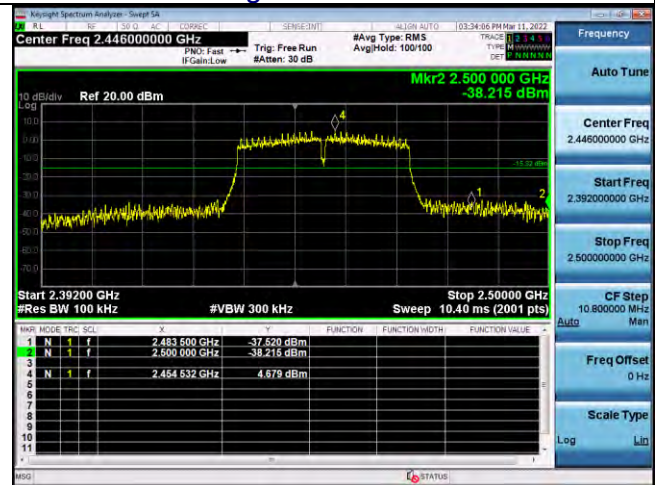
Middle Channel



Lowest Channel



Highest Channel



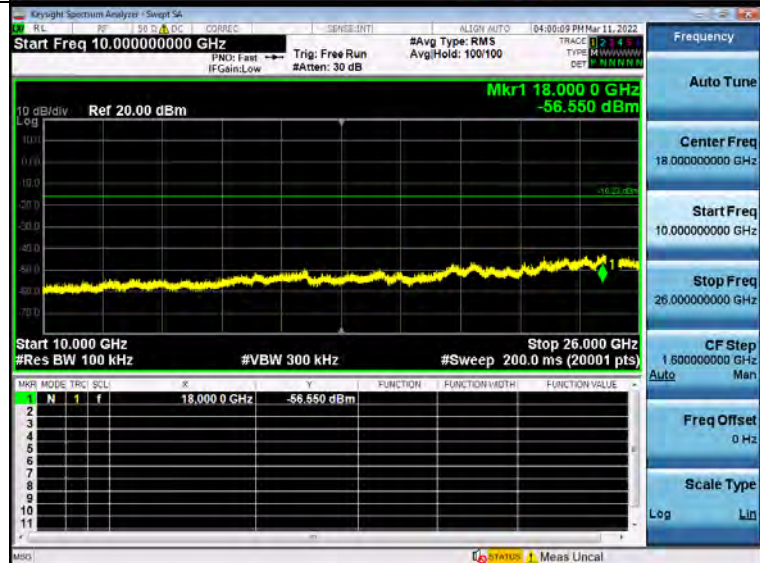
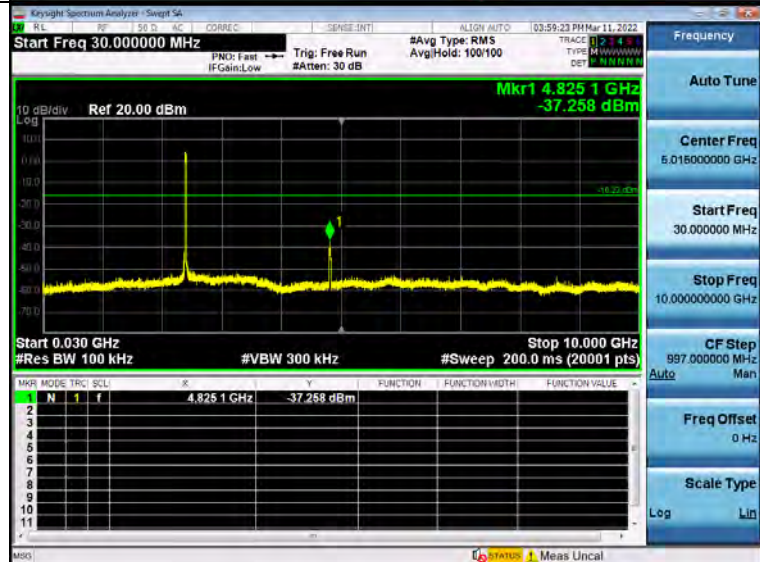
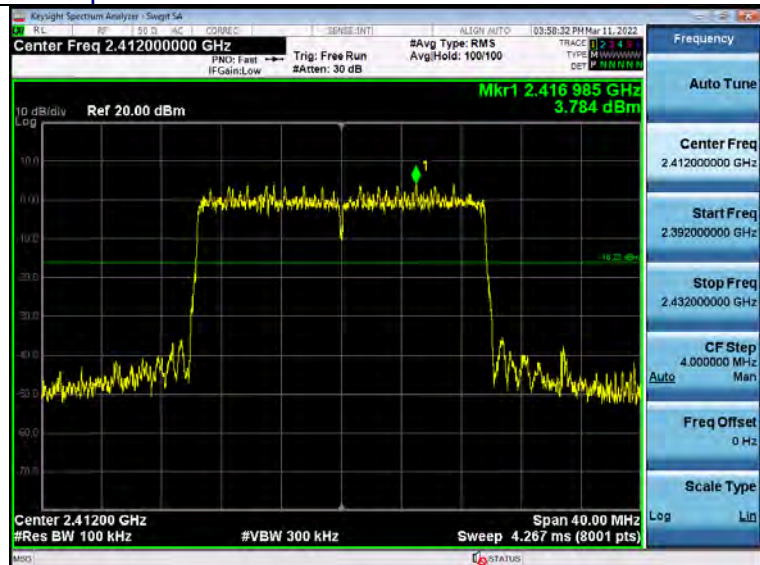
Left Band Edge

Right Band Edge

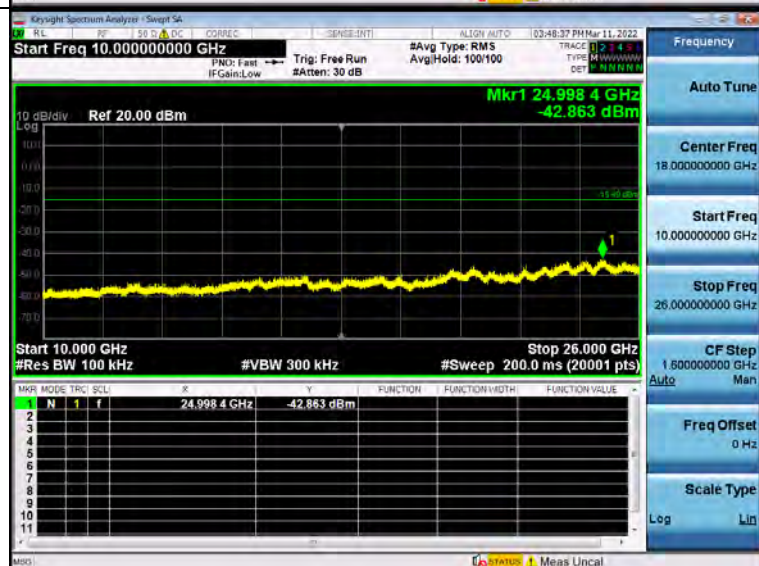
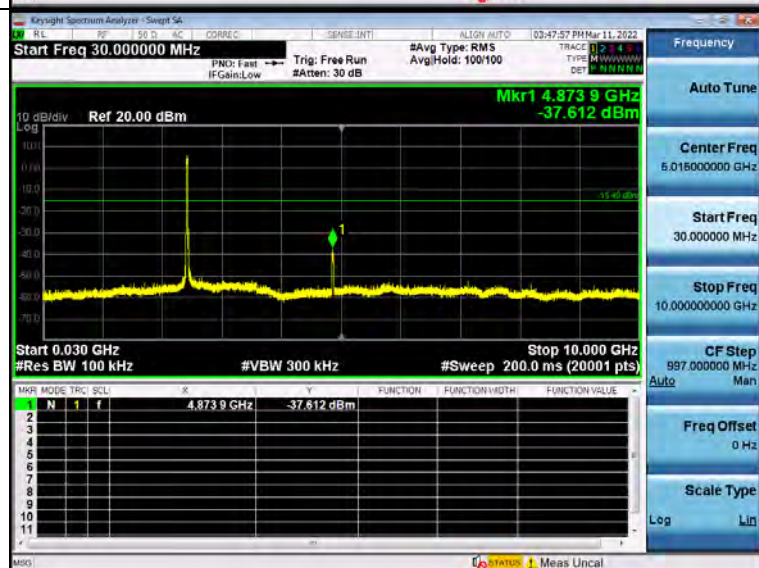
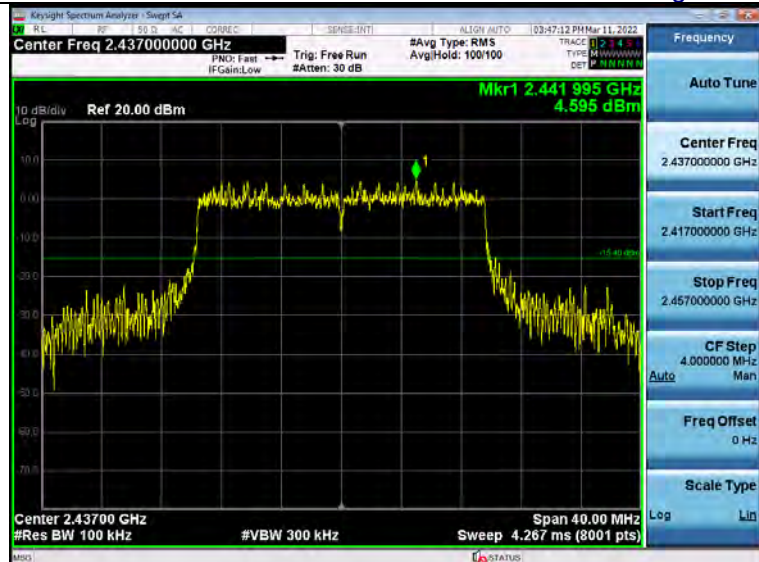
802.11ax20 Modulation

Spurious emission

Low Channel



Middle Channel



The screenshot displays the Keysight Spectrum Analyzer interface. The main plot shows a signal trace centered at 2.466990 GHz with a peak level of 4.558 dBm. The y-axis represents power in dBm, ranging from -70 to 10. The x-axis represents frequency in MHz, ranging from approximately 2.462 to 2.472. A green horizontal line indicates the noise floor at -144 dBm.

Top Bar Information:

- Keysight Spectrum Analyzer - Sigant SA
- RL RF I 50 D AC COARCO SENSE-INTI ALIGN AUTO 03:56:32 PM Mar 11, 2022
- Center Freq 2.462000000 GHz
- PNO: Fast IFGain: Low Trig: Free Run #Att: 30 dB
- #Avg Type: RMS Avg/Hold: 100/100
- TRACE 1 P 1 4 5 TYPE M W W W W W W DET M N D N M

Main Plot Labels:

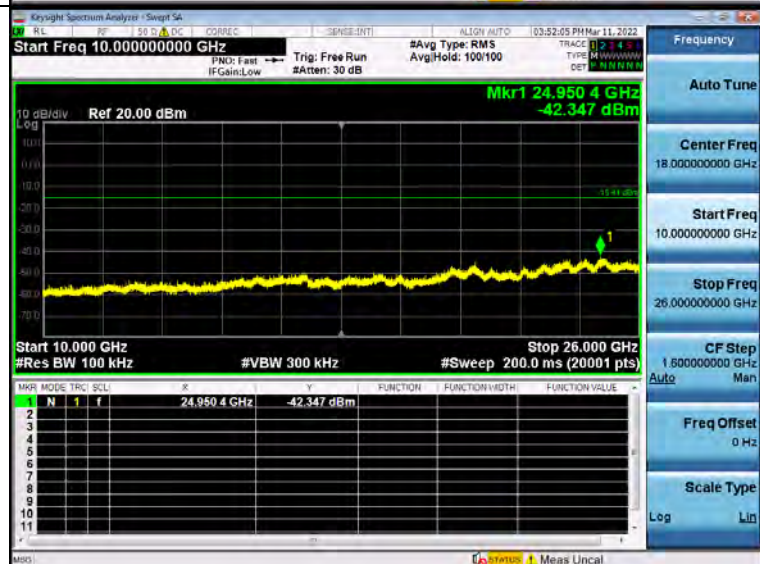
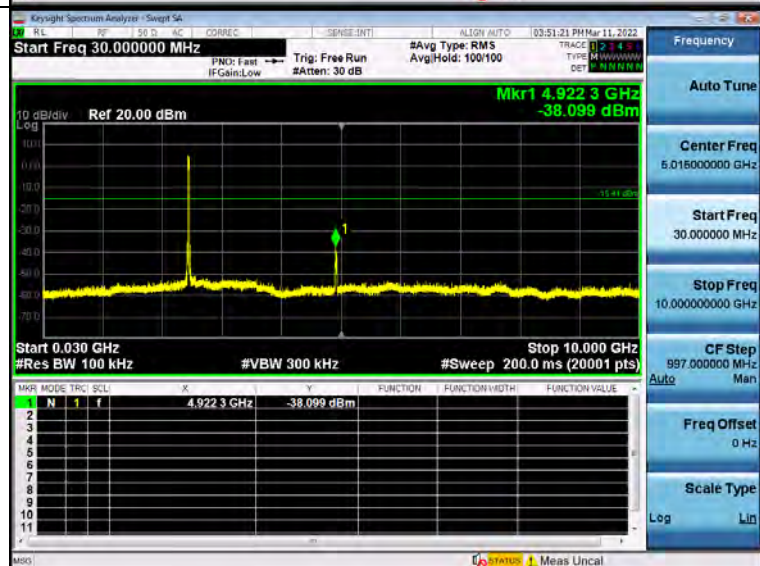
- 10 dB/div Ref 20.00 dBm
- Mkr1 2.466 990 GHz 4.558 dBm

Right Panel Controls:

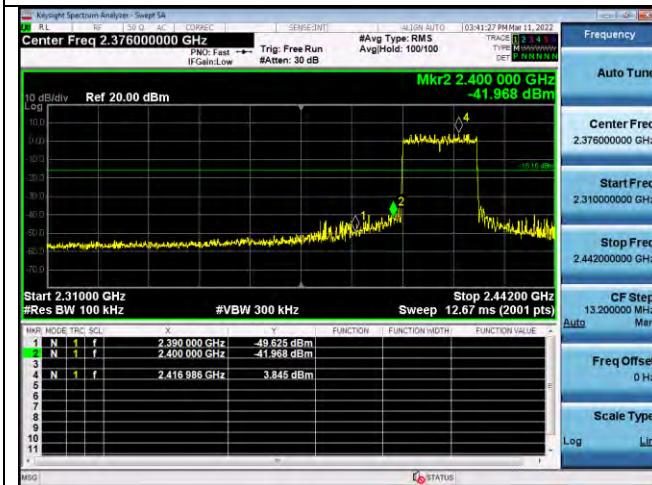
- Frequency
- Auto Tune
- Center Freq 2.462000000 GHz
- Start Freq 2.442000000 GHz
- Stop Freq 2.482000000 GHz
- CF Step 4.000000 MHz Man
- Freq Offset 0 Hz
- Scale Type
- Log Lin

Bottom Bar Information:

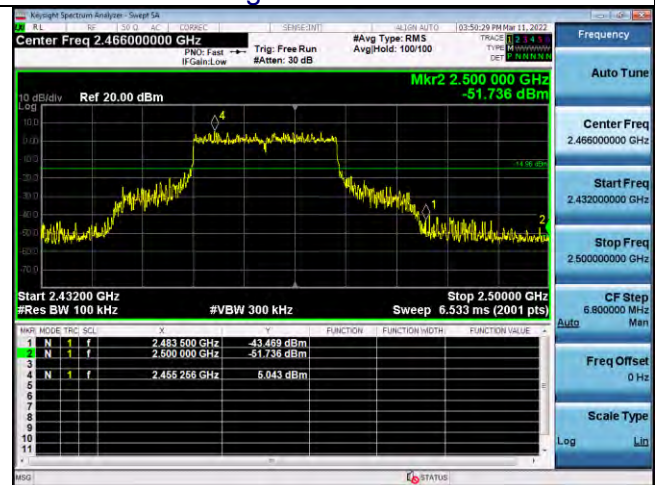
- Center 2.46200 GHz Span 40.00 MHz
- #Res BW 100 kHz Sweep 4.267 ms (8001 pts)
- #VBW 300 kHz
- MSO STATUS



Lowest Channel



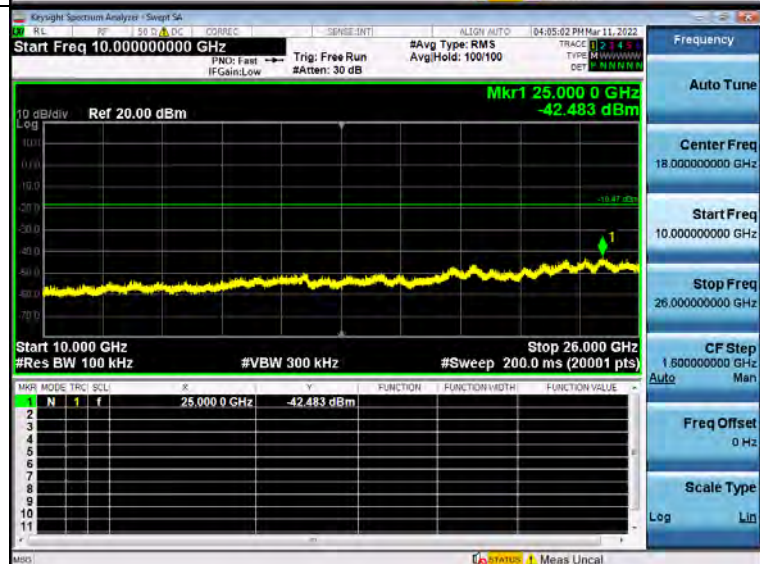
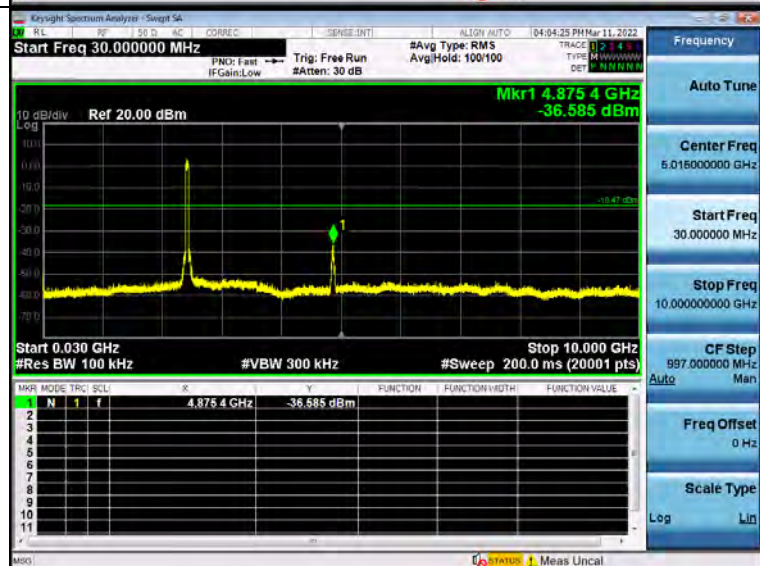
Highest Channel



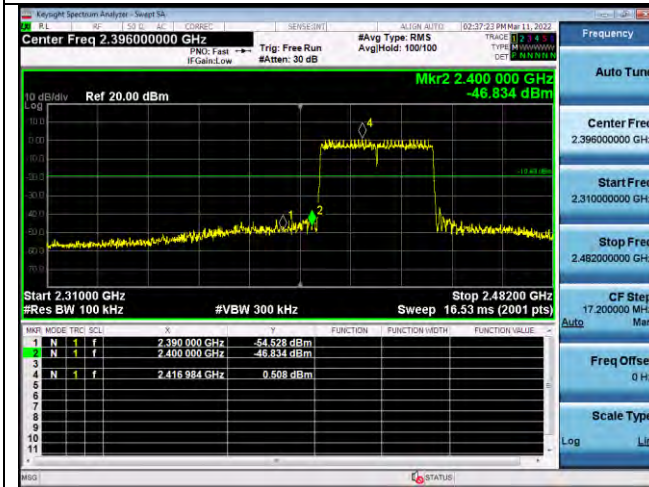
Left Band Edge

Right Band Edge

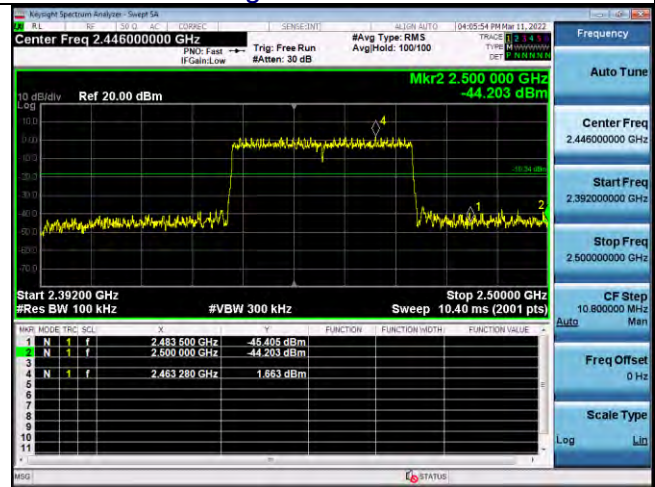
The screenshot displays the Keysight Spectrum Analyzer interface. At the top, the title bar reads "Keysight Spectrum Analyzer - SigSty SA". The main display area shows a spectrum plot with a yellow signal trace. A green horizontal line indicates the reference level at -20.0 dBm. The plot has a logarithmic scale from -80.0 to 10.0 dBm. The center frequency is set to 2.437000000 GHz, and the span is 80.00 MHz. The resolution bandwidth (RBW) is 100 kHz, and the video bandwidth (VBW) is 300 kHz. The sweep time is 8.000 ms (8001 pts). The signal trace shows a peak labeled "Mkr1 2.424 73 GHz 1.529 dBm". The right-hand side panel contains various settings: Frequency (Auto Tune), Center Freq (2.437000000 GHz), Start Freq (2.397000000 GHz), Stop Freq (2.477000000 GHz), CF Step (8.000000 MHz), Auto Man, Freq Offset (0 Hz), Scale Type (Log Lin), and Log Lin.



Lowest Channel



Highest Channel



Left Band Edge

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 are Internal antennas, and the best case gain of the antenna is antenna port 1:2dBi and Antenna port 2:2dBi.	
EUT Antenna: 2.4G-ANT 5G-ANT 	

11. TEST SETUP PHOTO





12. EUT CONSTRUCTIONAL DETAILS

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

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