

4.5 6dB Bandwidth

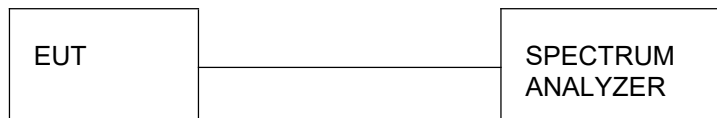
Limit

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz

Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 KHz RBW and 300 KHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

Test Configuration



Test Results

Ant 1

Type	Channel	6dB Bandwidth (MHz)	Limit (KHz)	Result
802.11b	01	10.17	≥500	Pass
	06	10.11		
	11	10.08		
802.11g	01	16.34	≥500	Pass
	06	15.52		
	11	16.32		
802.11n(HT20)	01	16.94	≥500	Pass
	06	16.94		
	11	15.56		
802.11n(HT40)	03	35.24	≥500	Pass
	06	33.93		
	09	33.59		

Ant 2

Type	Channel	6dB Bandwidth (MHz)	Limit (KHz)	Result
802.11b	01	10.11	≥500	Pass
	06	10.14		
	11	10.03		
802.11g	01	16.10	≥500	Pass
	06	15.33		
	11	16.02		
802.11n(HT20)	01	15.72	≥500	Pass
	06	17.53		
	11	15.05		
802.11n(HT40)	03	33.92	≥500	Pass
	06	35.12		
	09	35.20		

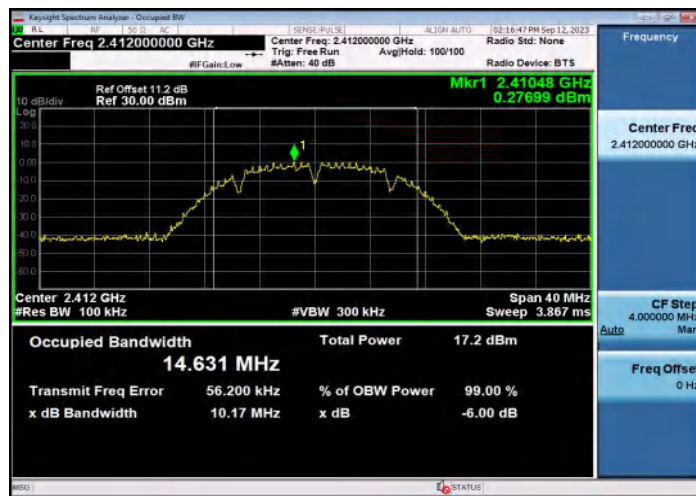
Note:

- 1) Measured peak power spectrum density at difference data rate for each mode and recorded worst case for each mode.
- 2) Test results including cable loss;
- 3) Worst case data at 1Mbps at IEEE 802.11b; 6Mbps at IEEE 802.11g; 6.5Mbps at IEEE 802.11n HT20; 13.5Mbps at IEEE 802.11n HT40;

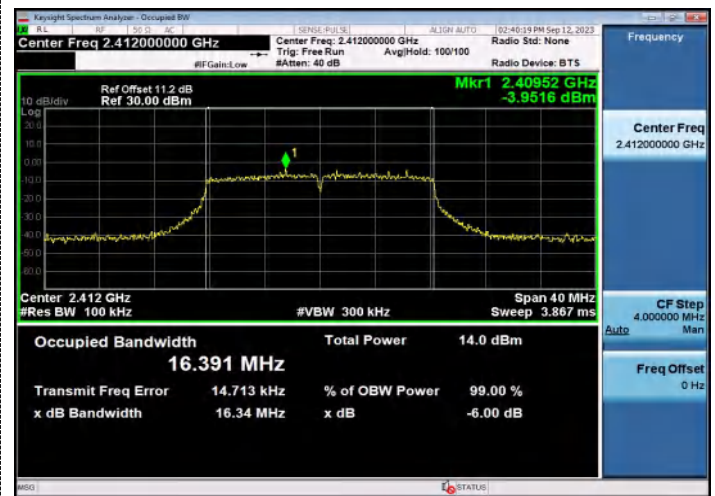
Please refer to following plots;

Ant 1

802.11b



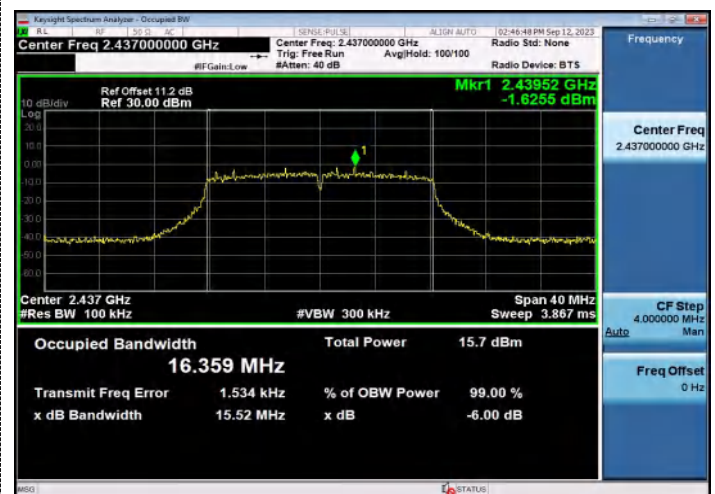
802.11g



CH01

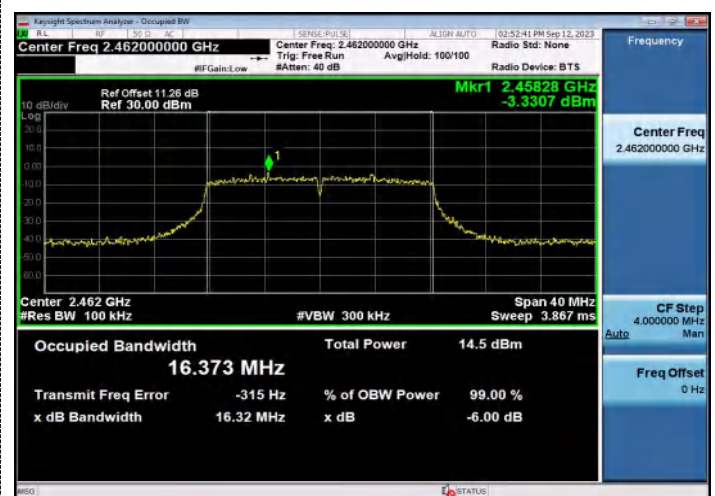
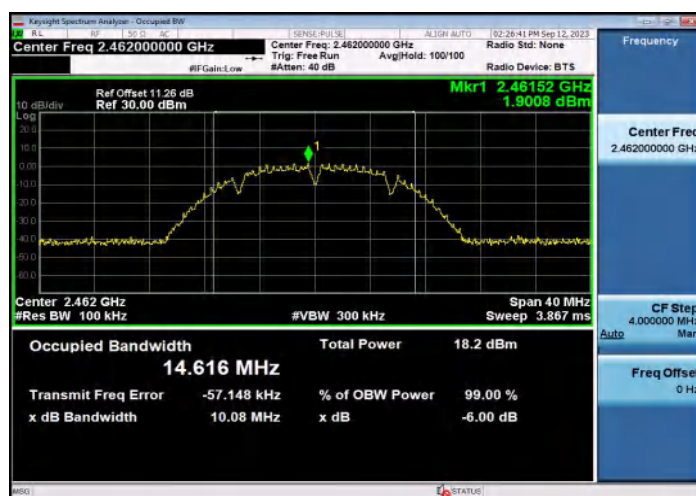


CH01



CH06

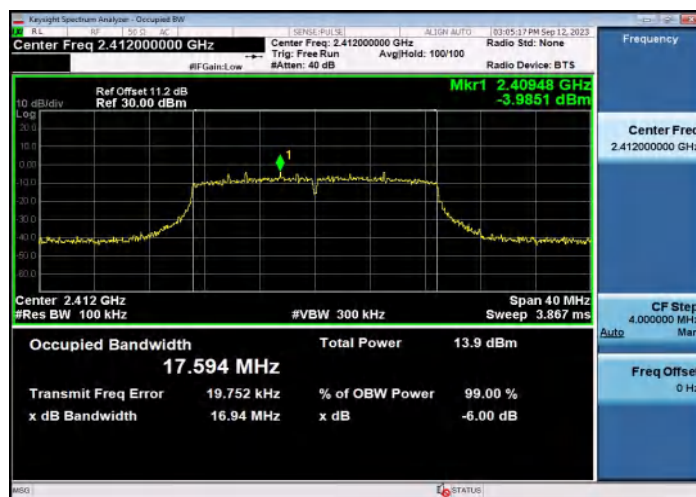
CH06



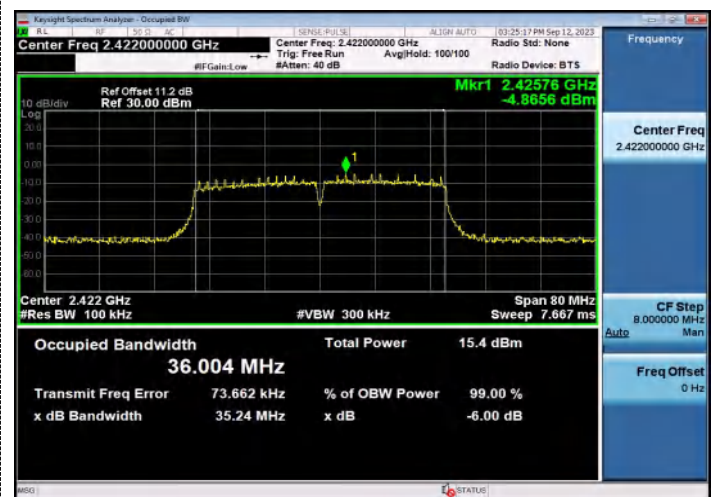
CH11

CH11

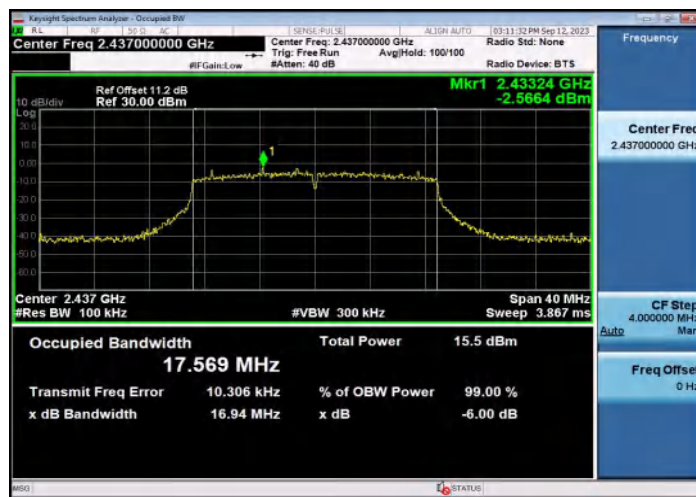
802.11n(HT20)



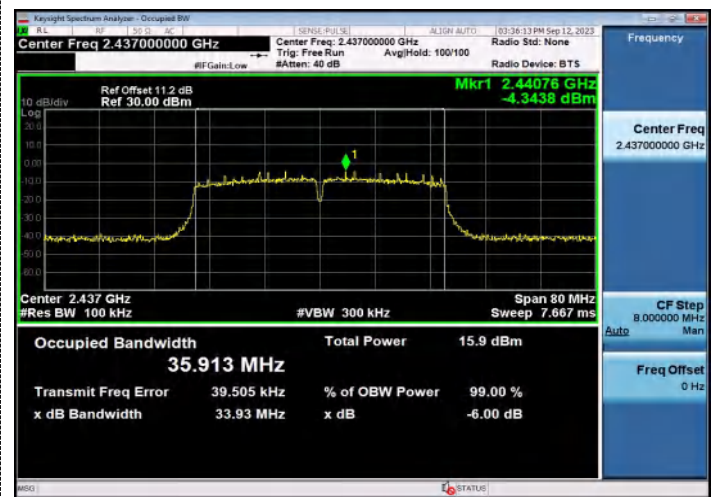
802.11n(HT40)



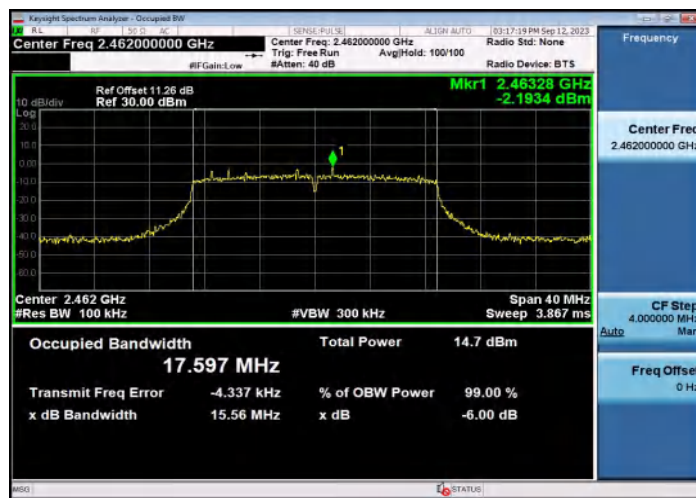
CH01



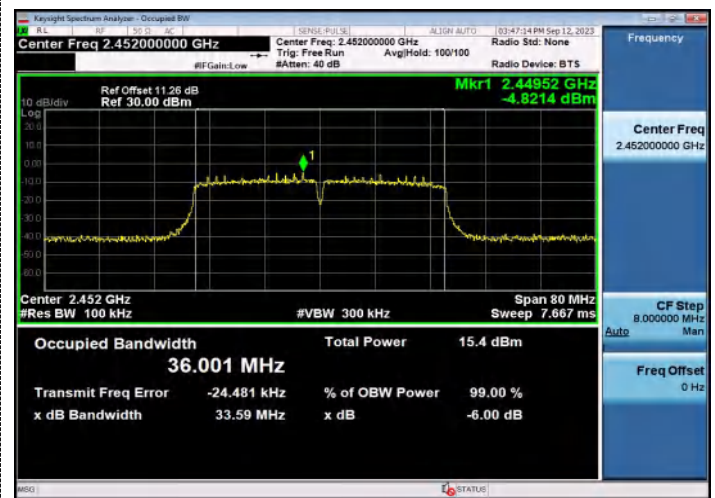
CH03



CH06



CH06



CH11

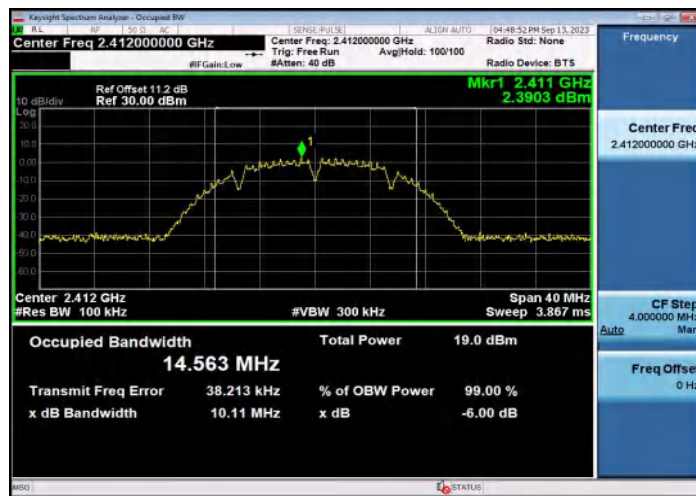


CH09

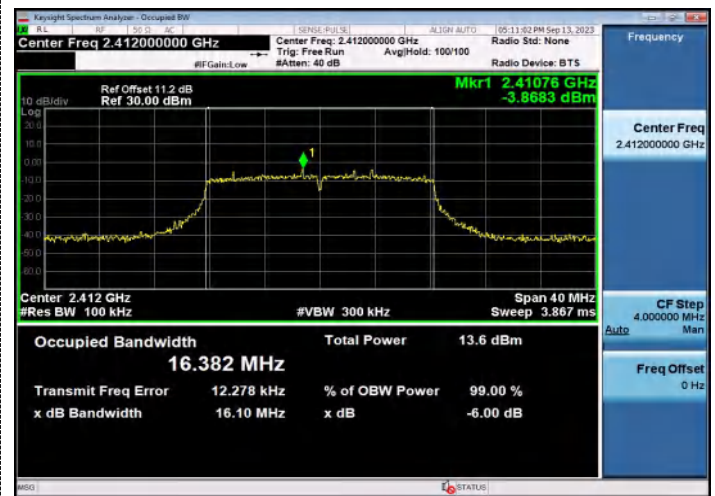


Ant 2

802.11b



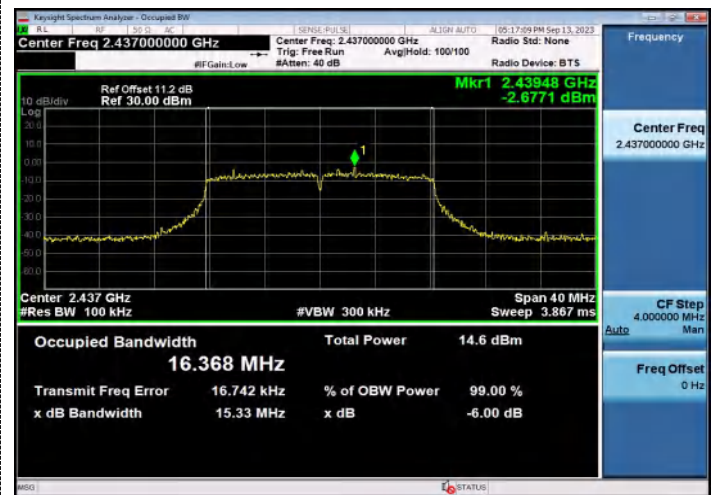
802.11g



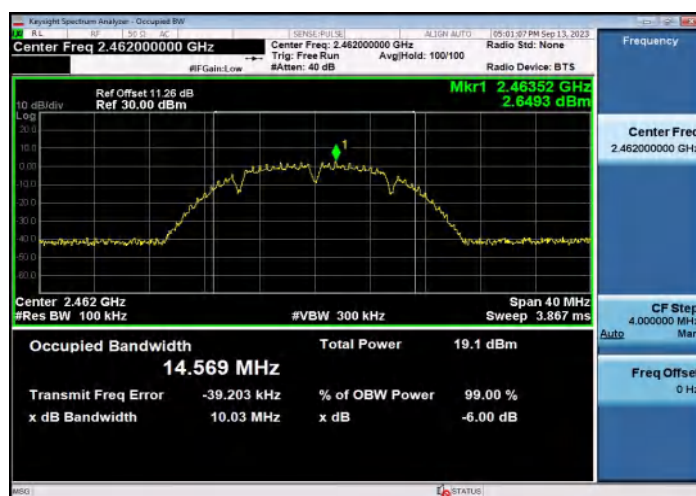
CH01



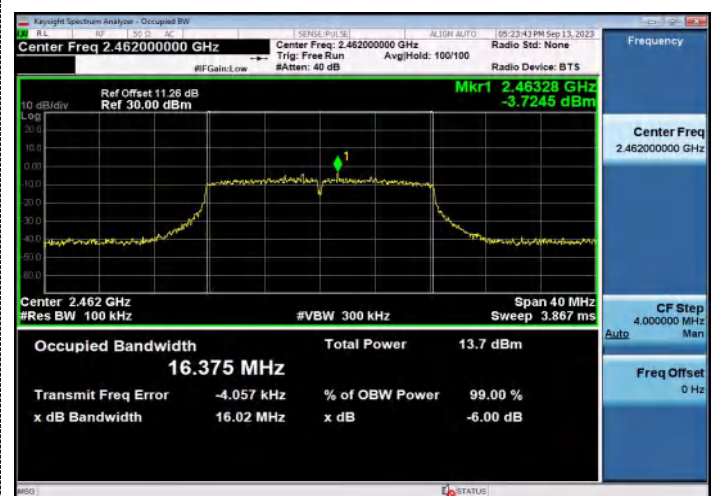
CH01



CH06



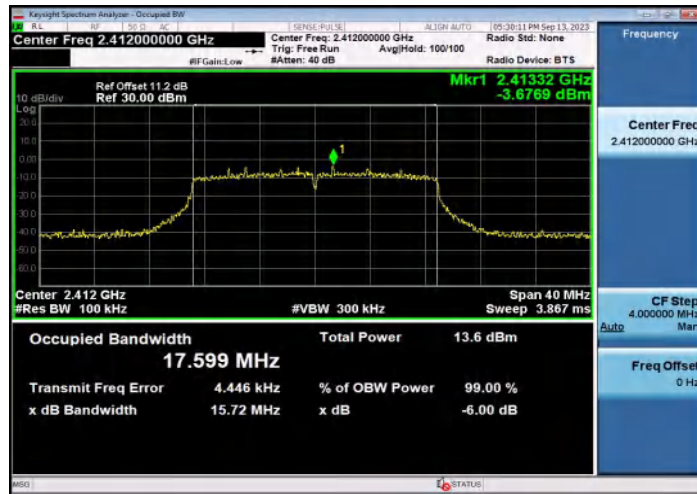
CH06



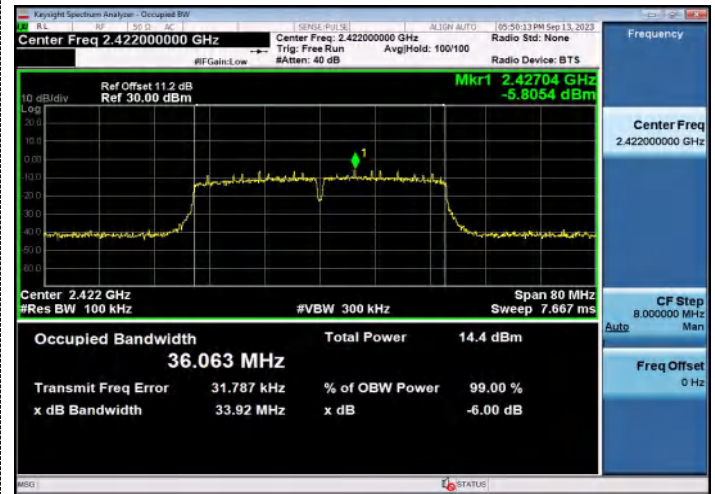
CH11

CH11

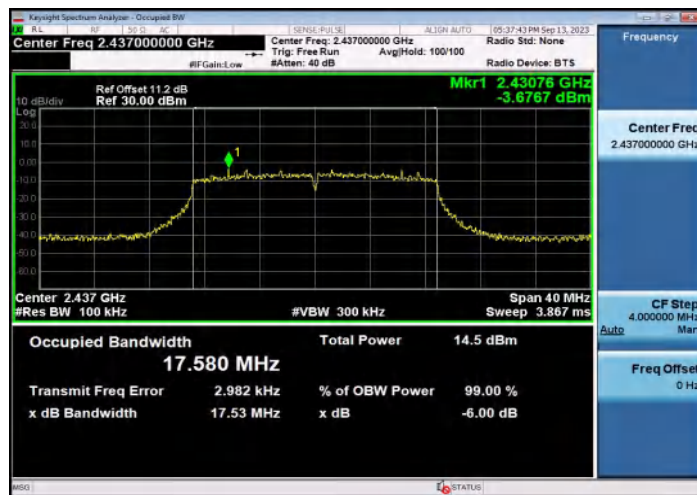
802.11n(HT20)



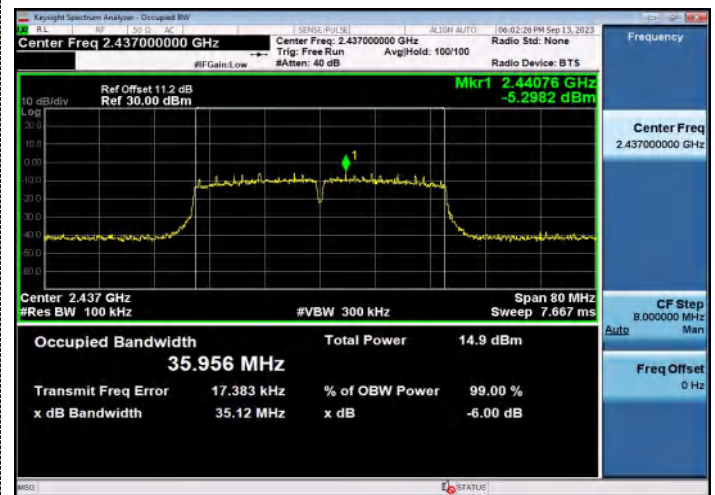
802.11n(HT40)



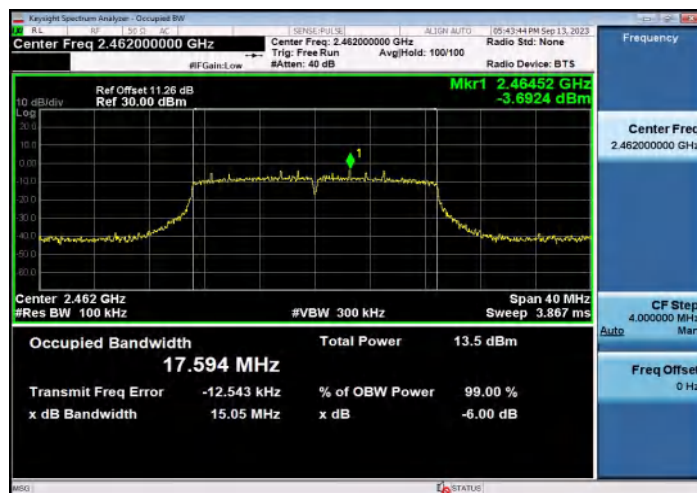
CH01



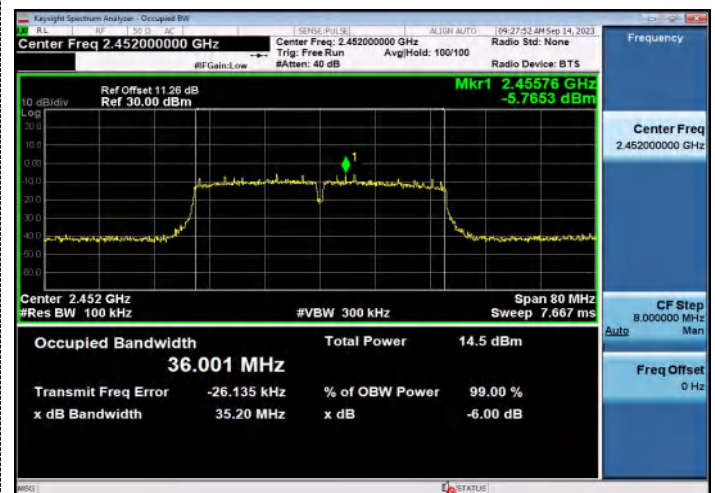
CH03



CH06



CH06



CH11

CH09

4.6 Out-of-band Emissions

Limit

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. Attenuation below the general limits specified in §15.209(a) is not required.

Test Procedure

Connect the transmitter output to spectrum analyzer using a low loss RF cable, and set the spectrum analyzer to RBW=100 kHz, VBW= 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, band edge and out-of-band emissions.

Test Configuration



Test Results

Remark: The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and band edge measurement data. And record the worst data in the report.

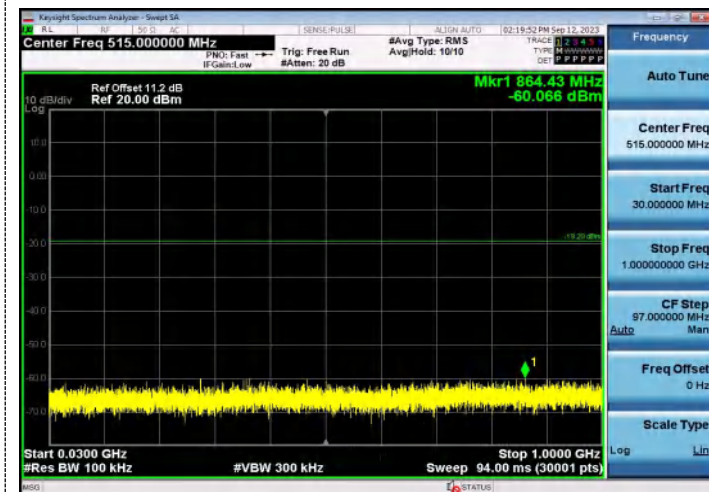
Test plot as follows:

Ant 1

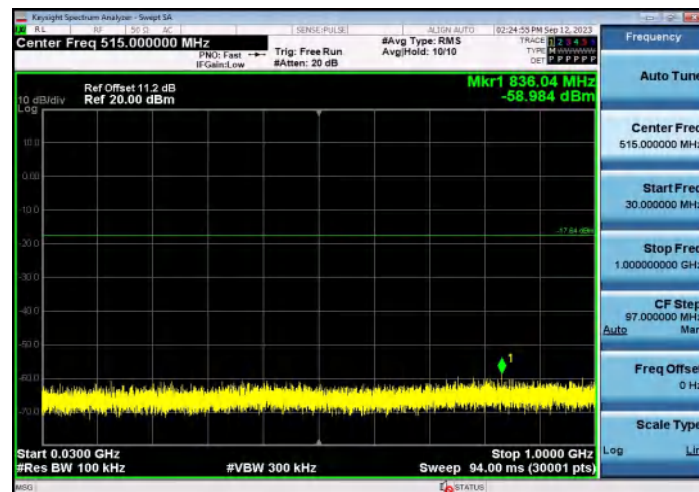
802.11b



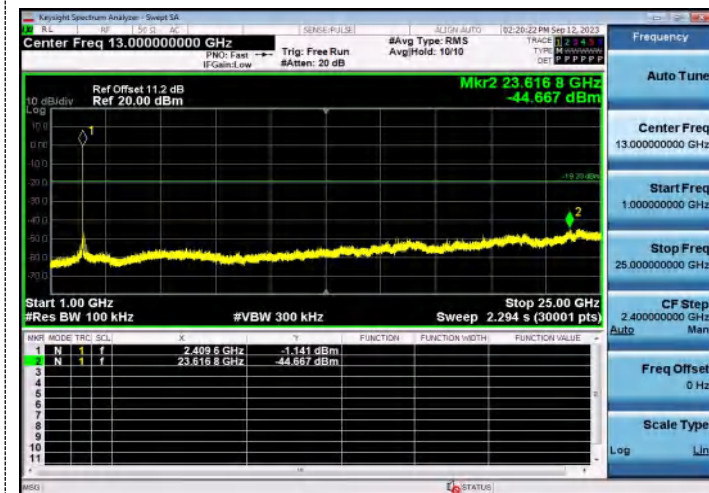
CH01



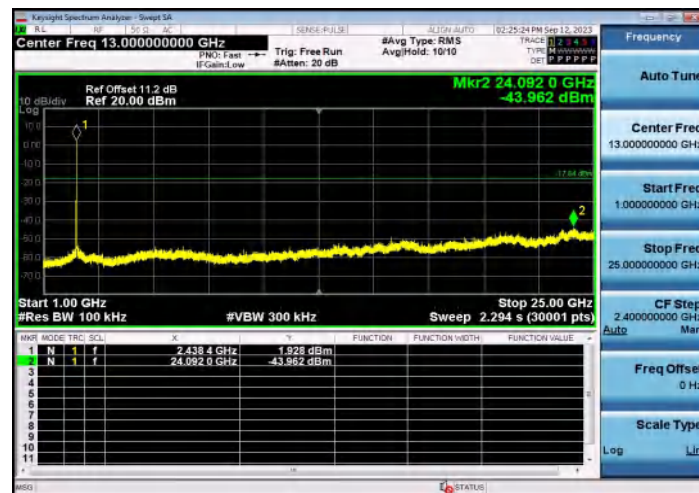
CH06



30MHz-1GHz



30MHz-1GHz



1GHz -25GHz

1GHz -25GHz

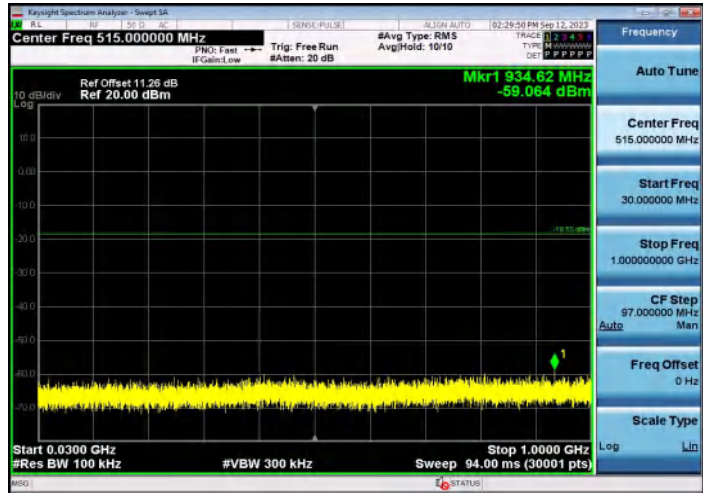
802.11b



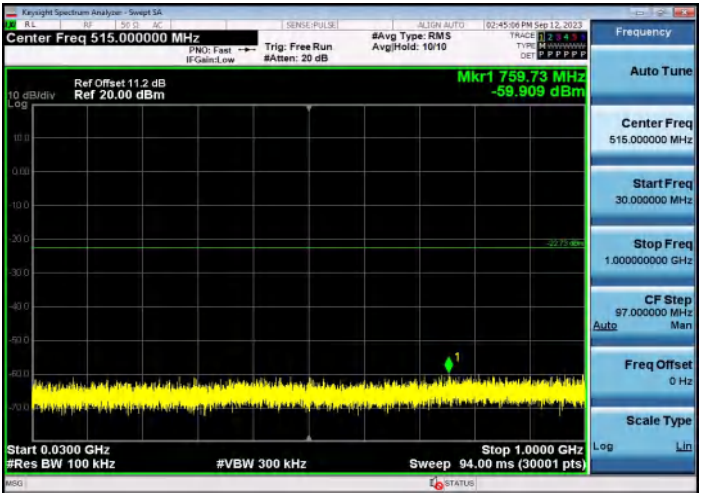
802.11g



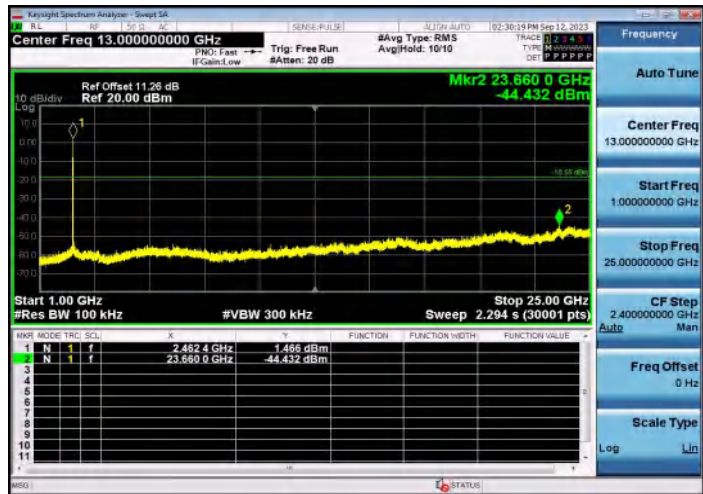
CH11



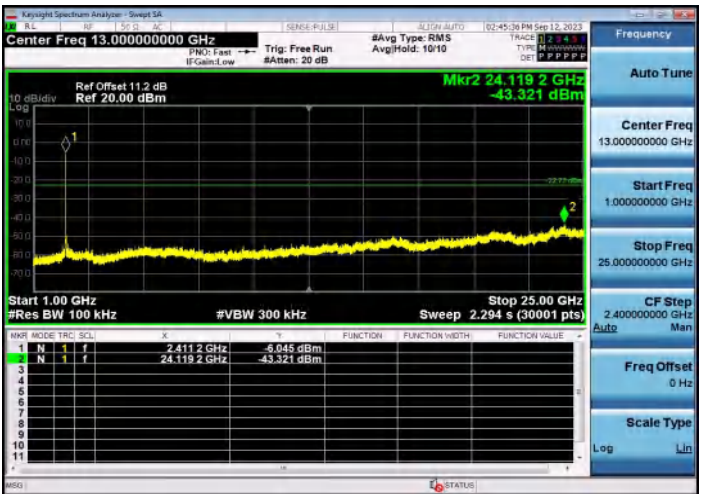
CH01



30MHz-1GHz



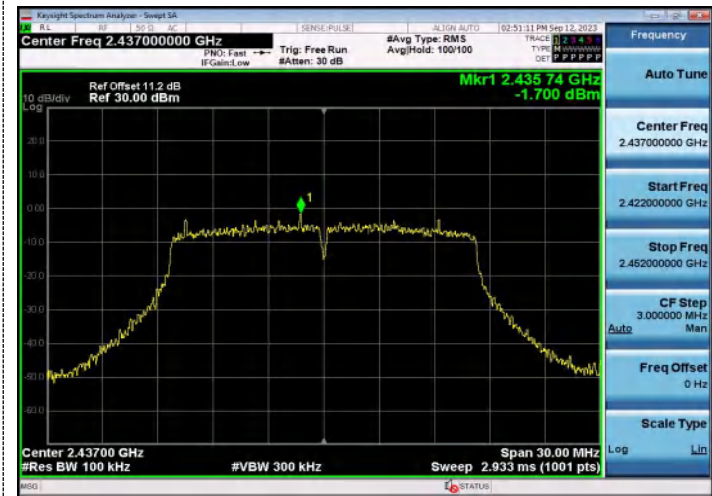
30MHz-1GHz



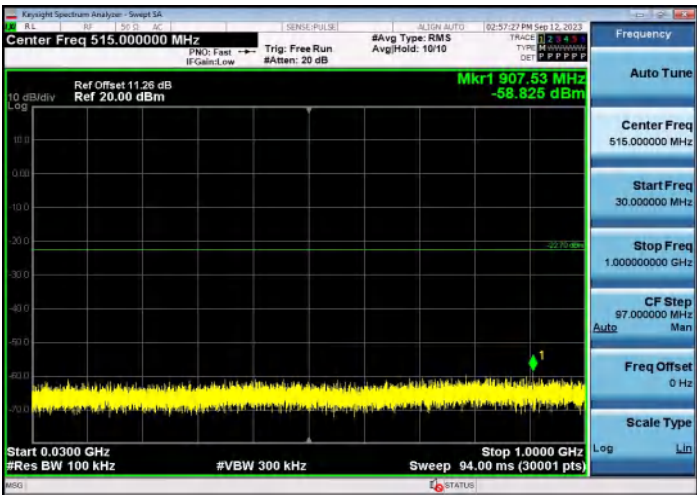
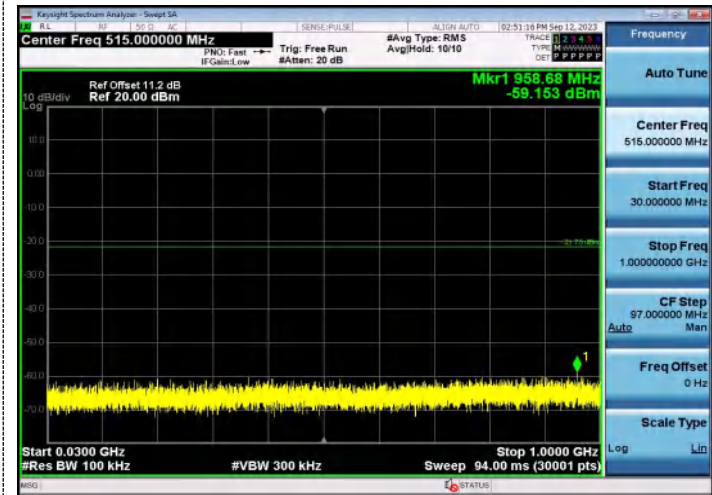
1GHz -25GHz

1GHz -25GHz

802.11g



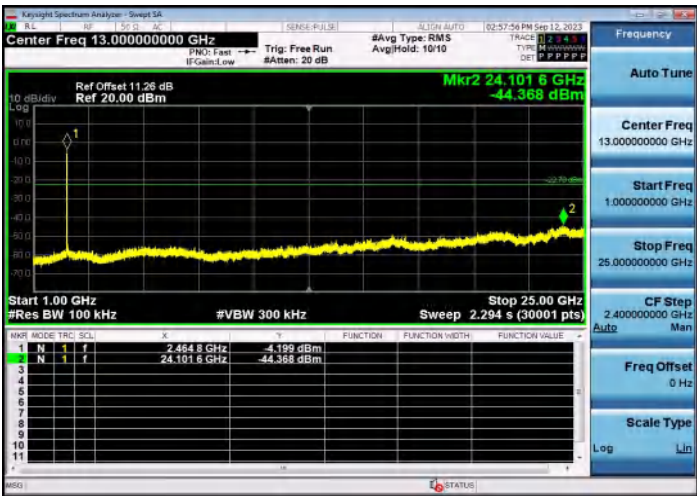
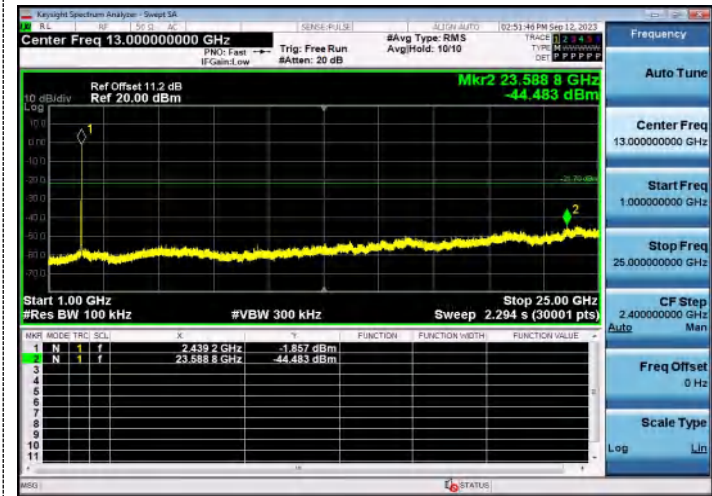
CH06



CH11

30MHz-1GHz

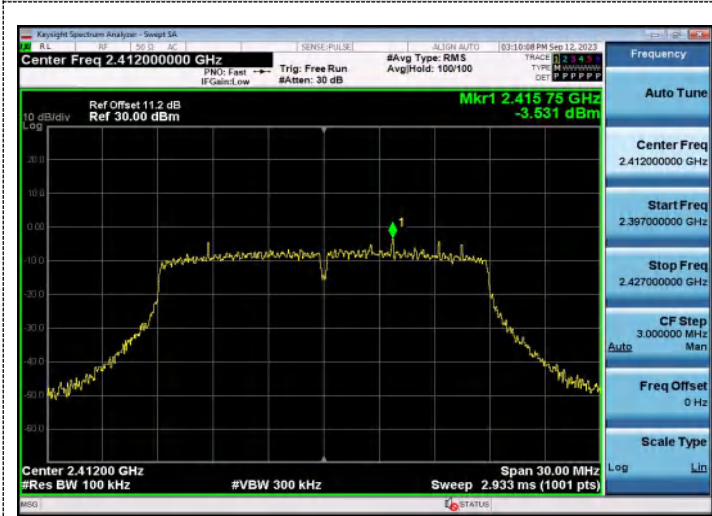
30MHz-1GHz



1GHz -25GHz

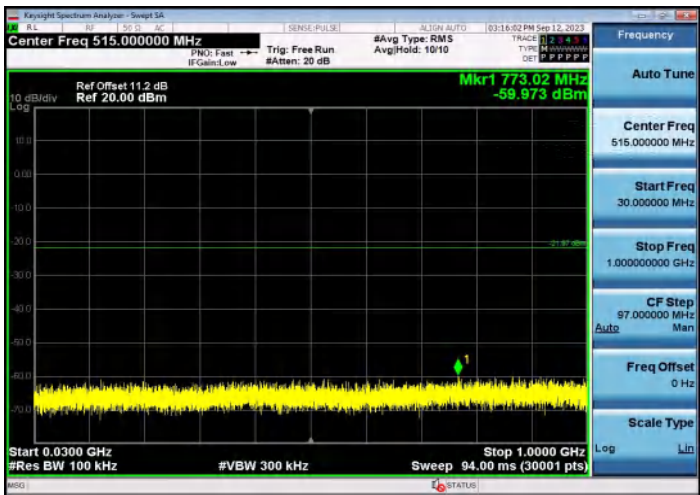
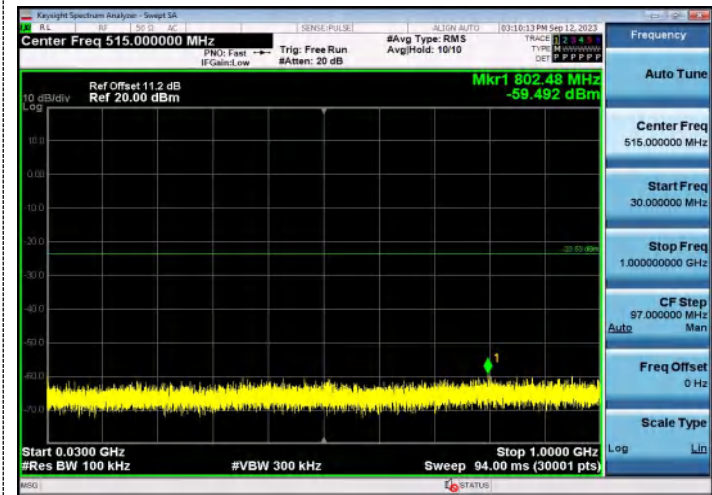
1GHz -25GHz

802.11n(HT20)



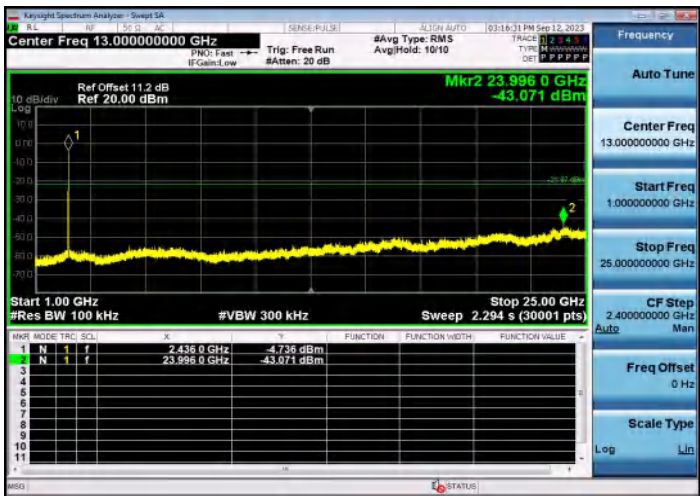
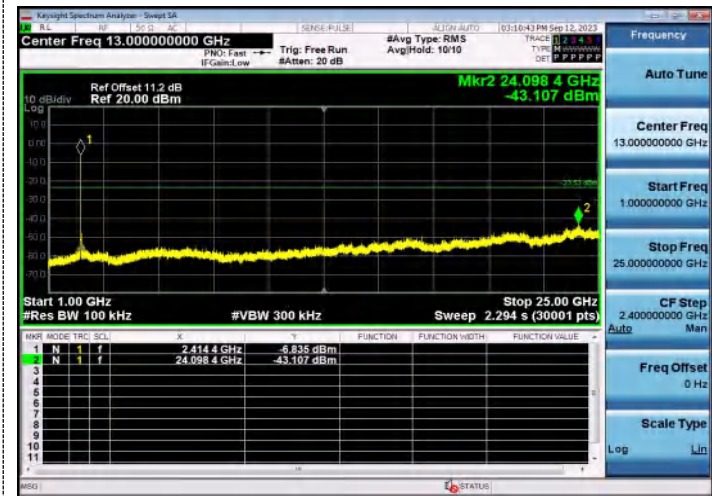
CH01

CH06



30MHz-1GHz

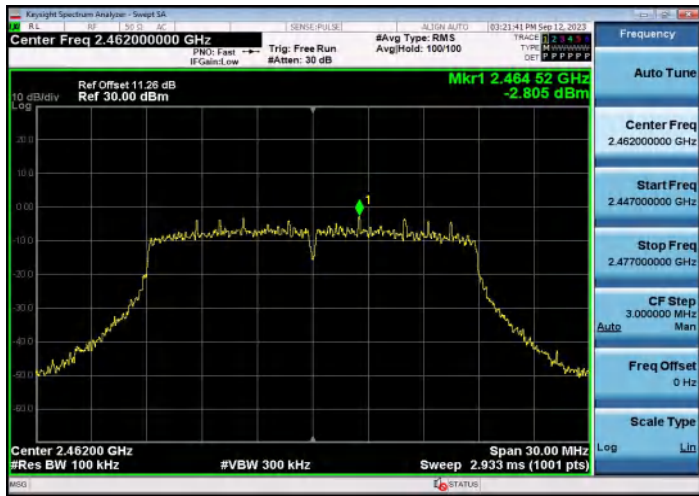
30MHz-1GHz



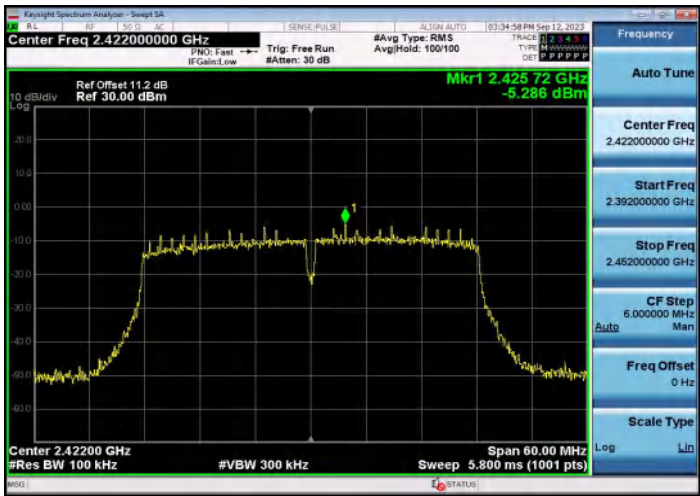
1GHz -25GHz

1GHz -25GHz

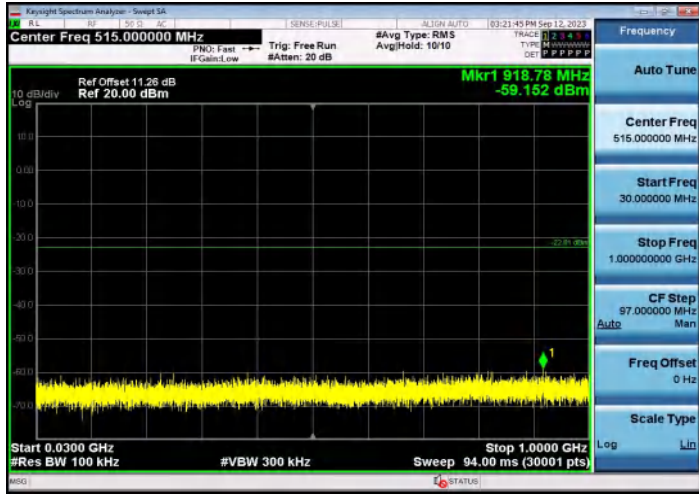
802.11n(HT20)



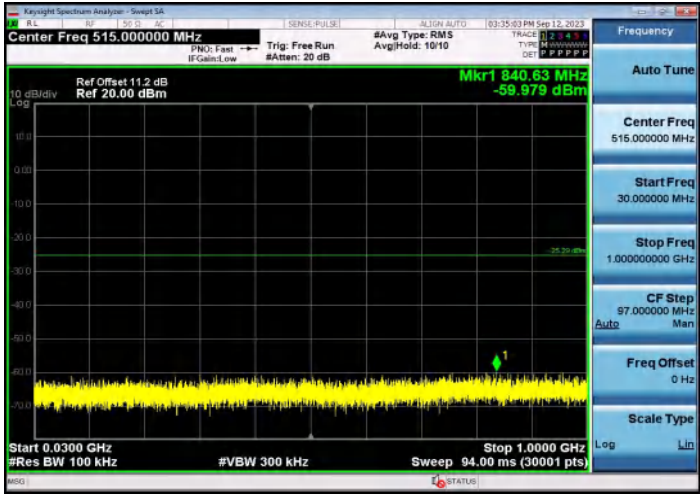
802.11n(HT40)



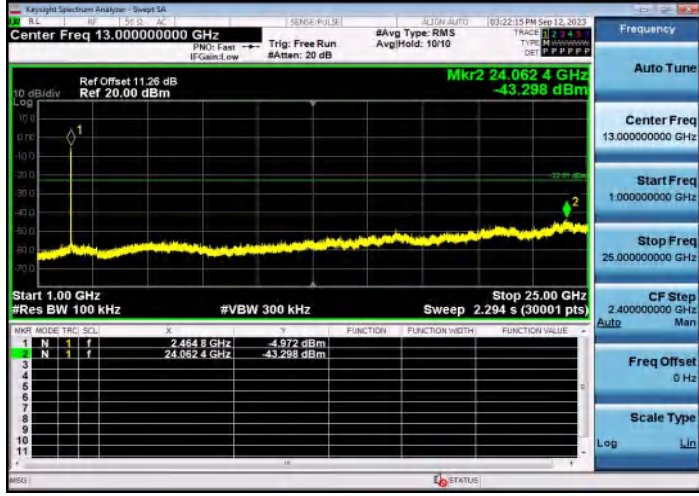
CH11



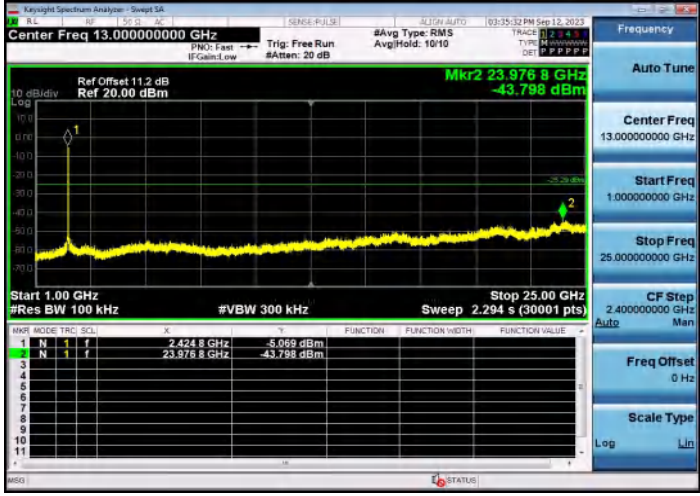
CH03



30MHz-1GHz



30MHz-1GHz



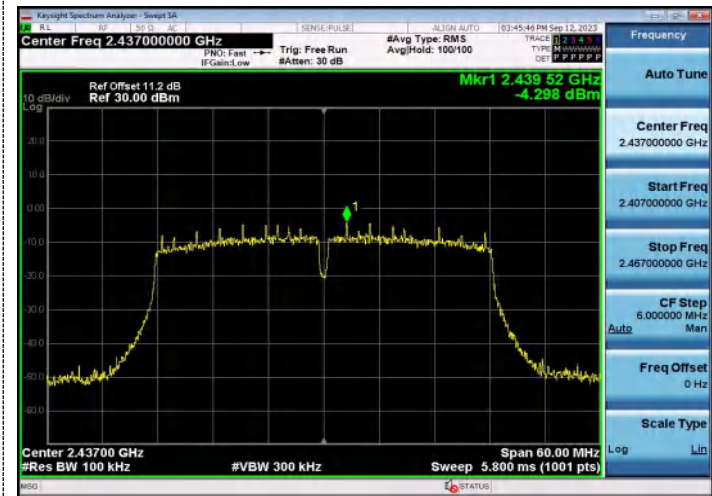
1GHz -25GHz



1GHz -25GHz

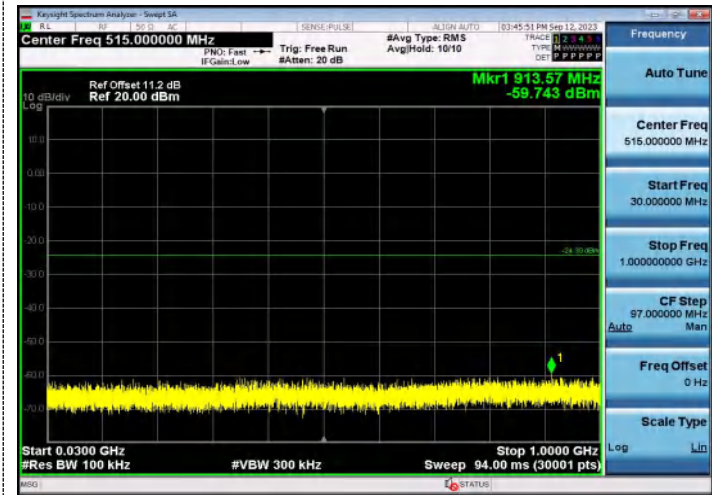


802.11n(HT40)



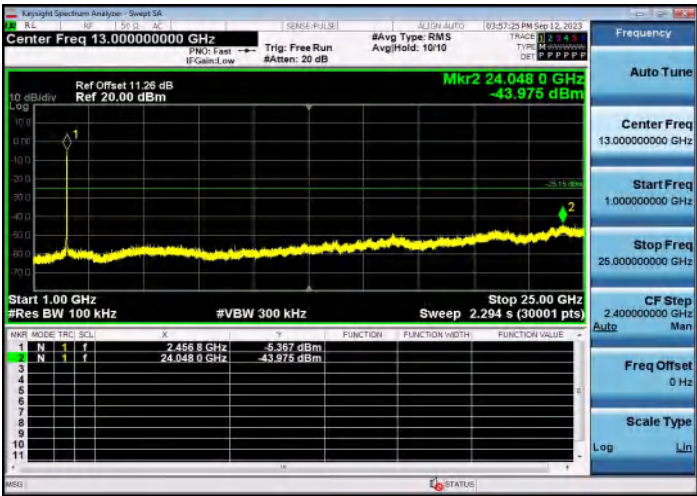
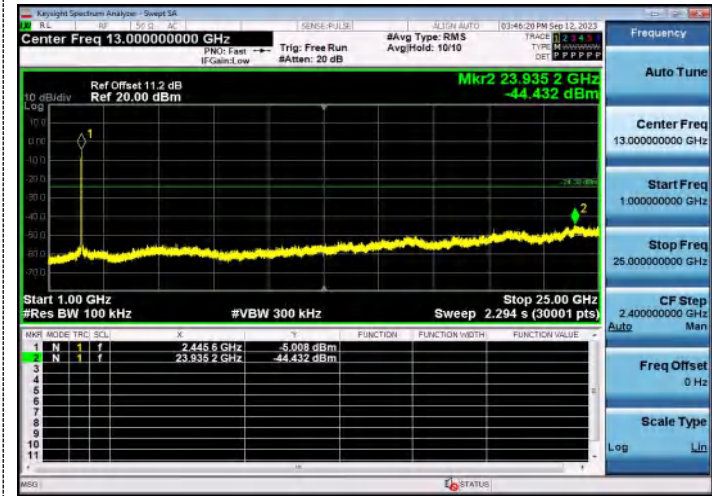
CH06

CH09



30MHz-1GHz

30MHz-1GHz



1GHz-25GHz

1GHz-25GHz

Ant 2

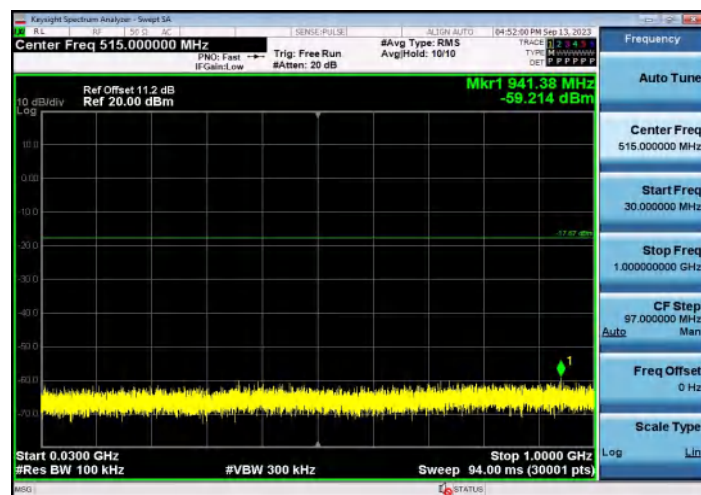
802.11b



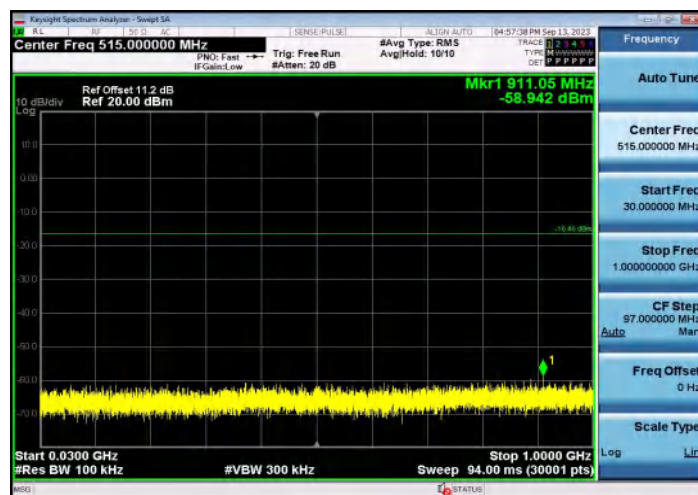
CH01



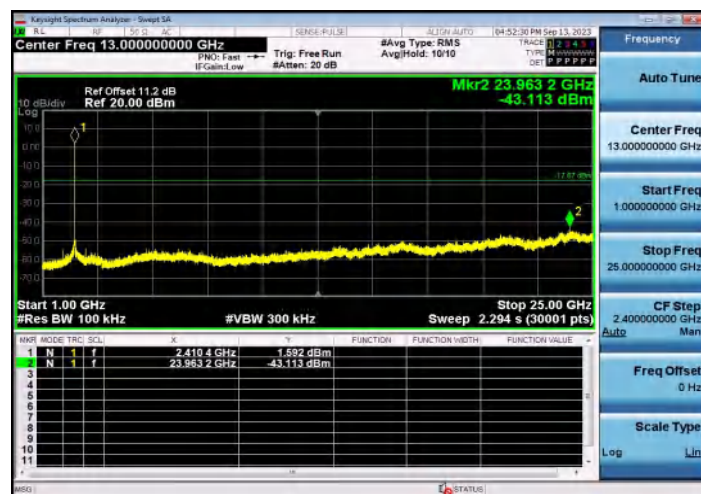
CH06



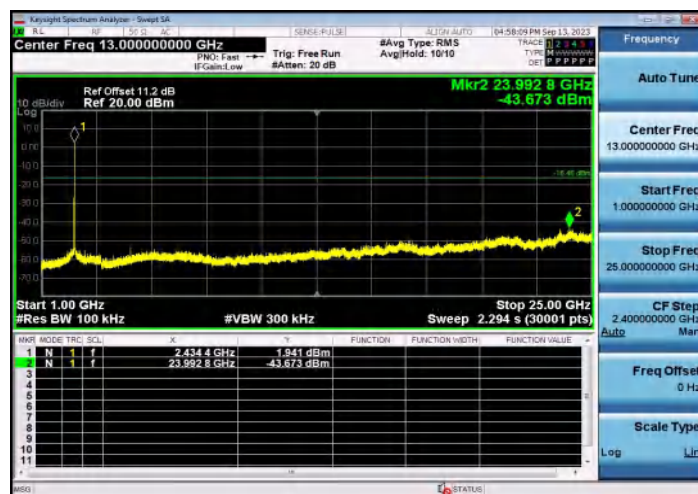
30MHz-1GHz



30MHz-1GHz



1GHz-25GHz

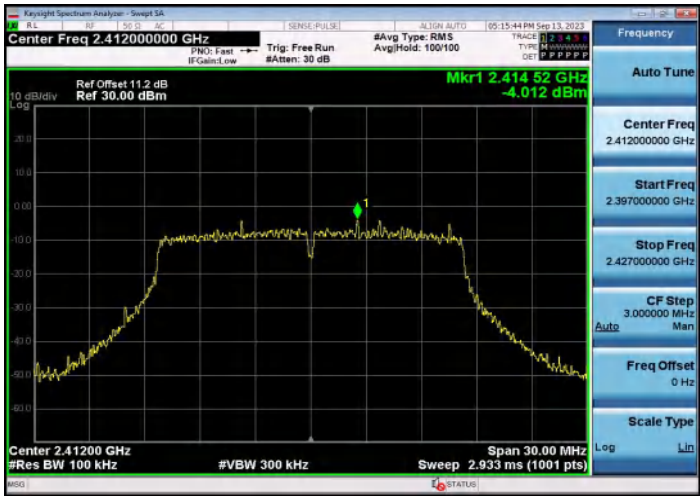


1GHz-25GHz

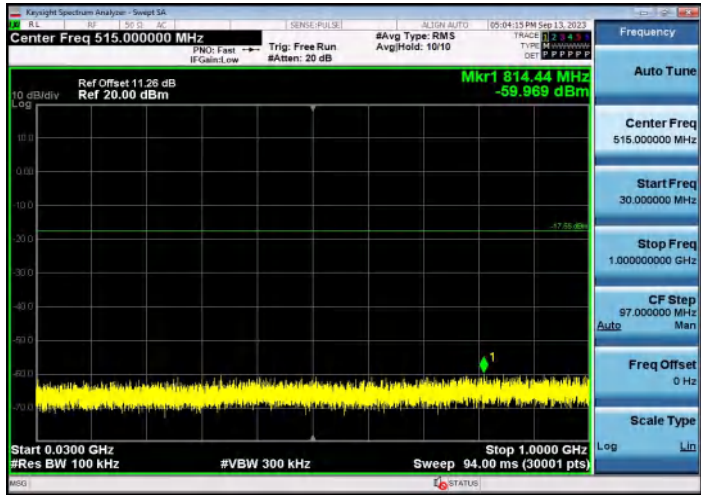
802.11b



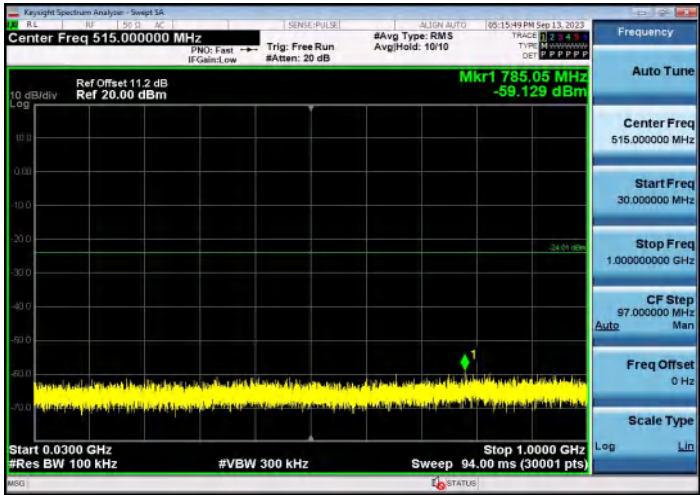
802.11g



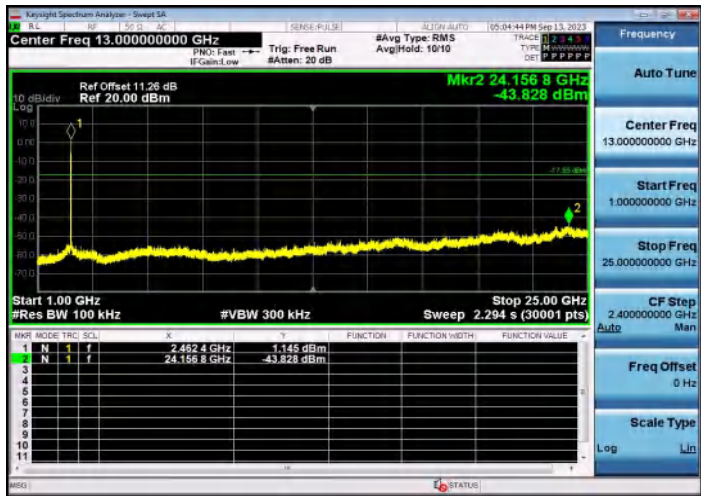
CH11



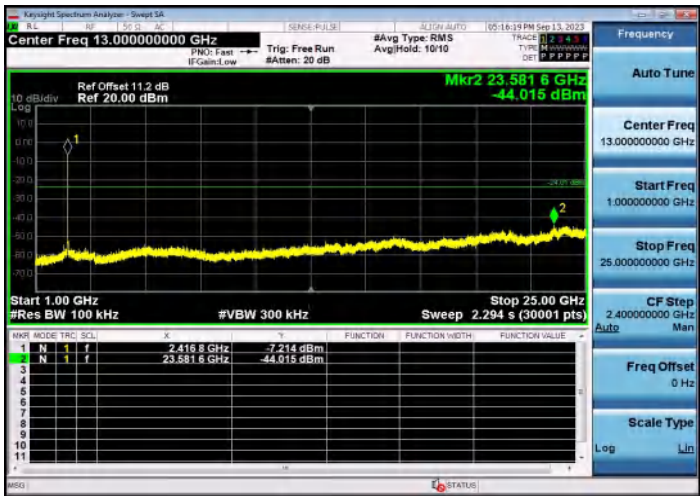
CH01



30MHz-1GHz



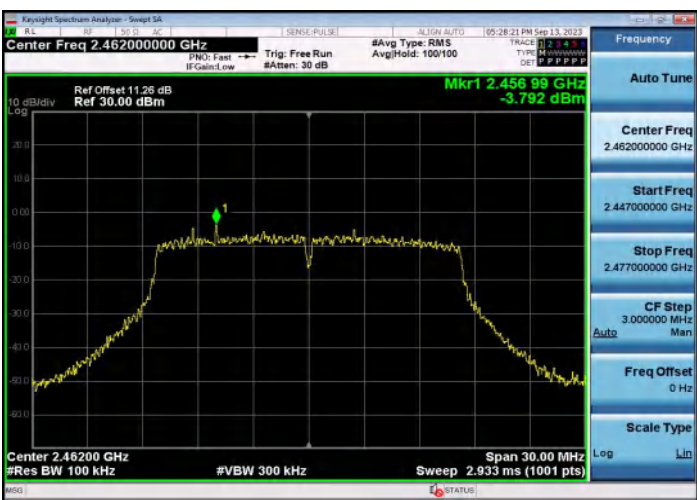
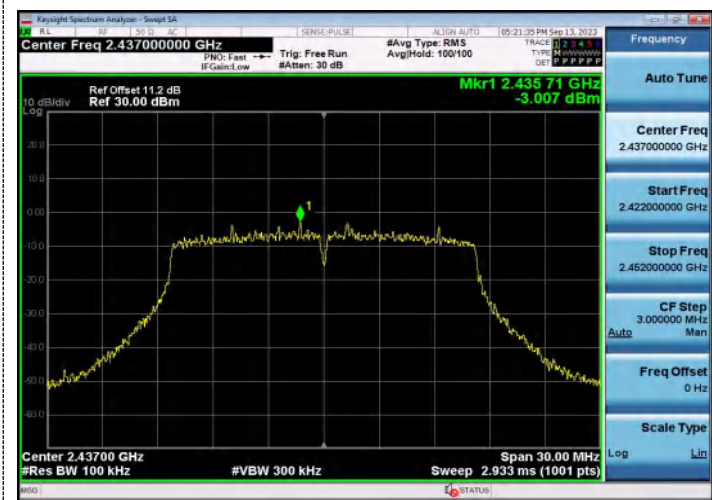
30MHz-1GHz



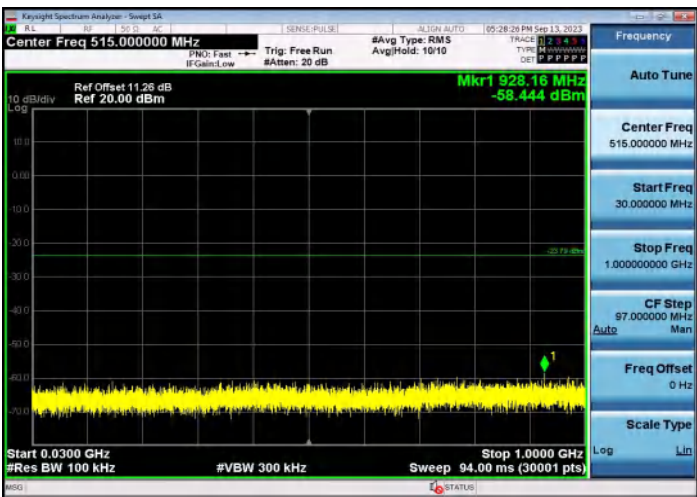
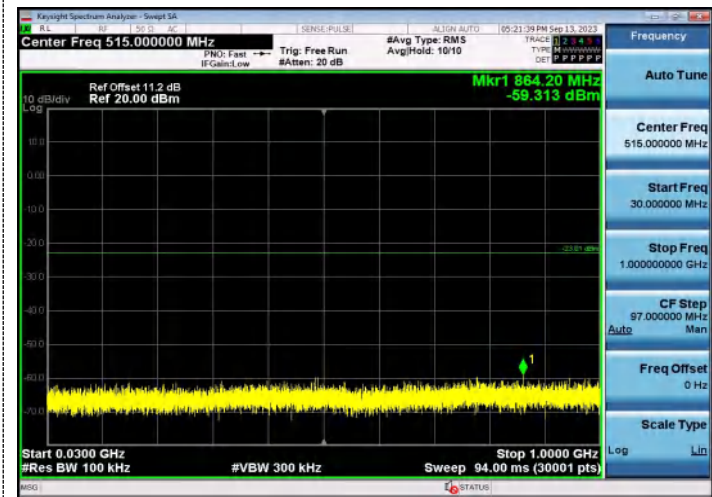
1GHz -25GHz

1GHz -25GHz

802.11g

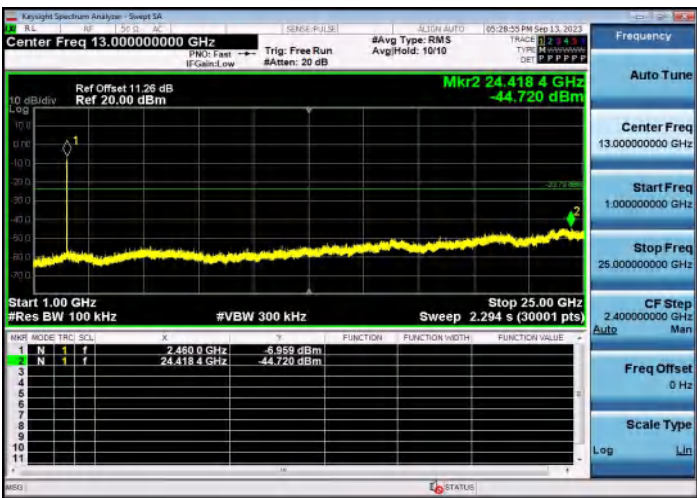
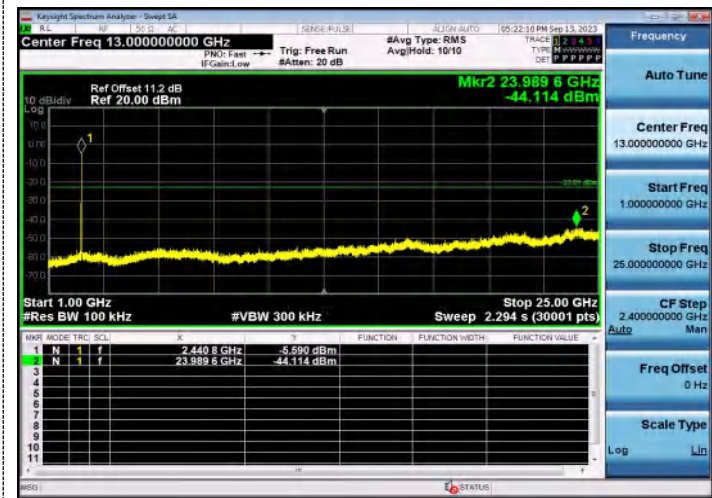


CH06



30MHz-1GHz

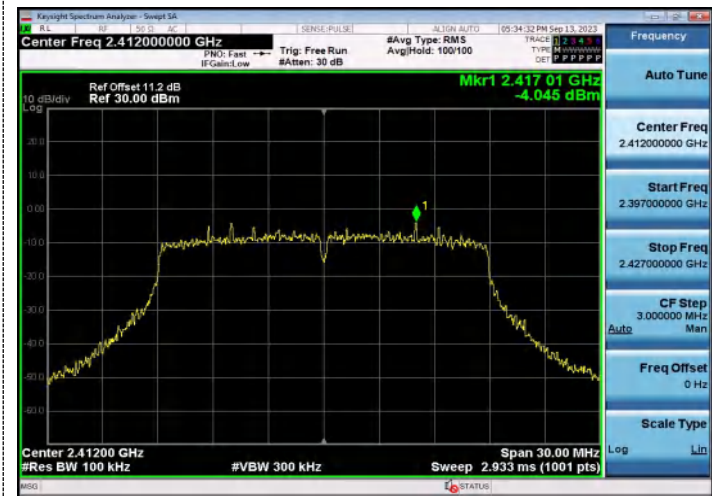
30MHz-1GHz



1GHz -25GHz

1GHz -25GHz

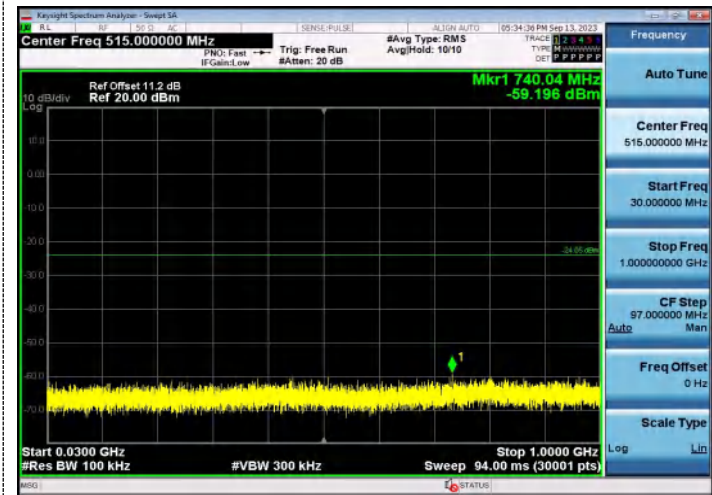
802.11n(HT20)



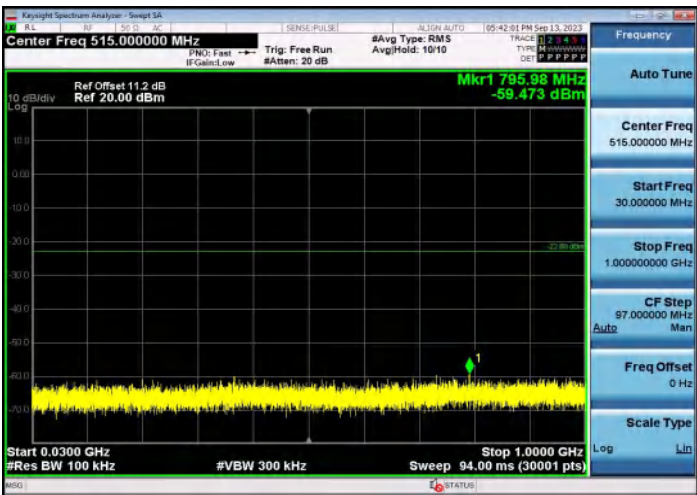
CH01



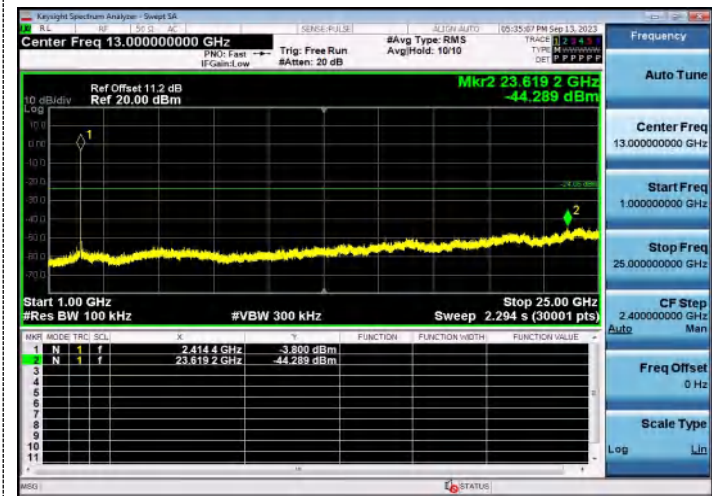
CH06



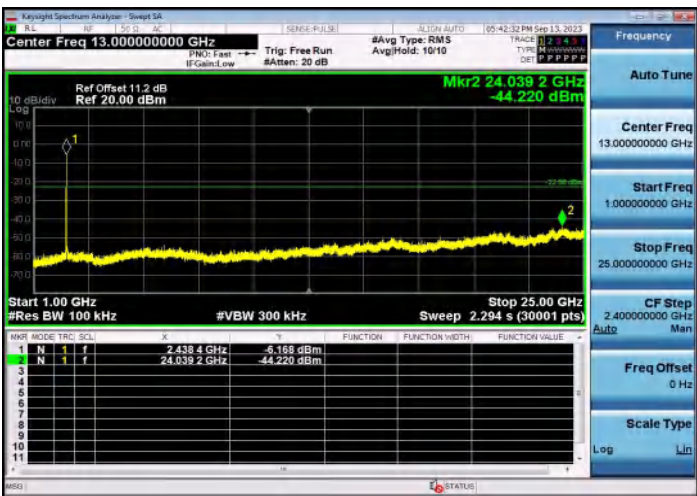
30MHz-1GHz



30MHz-1GHz

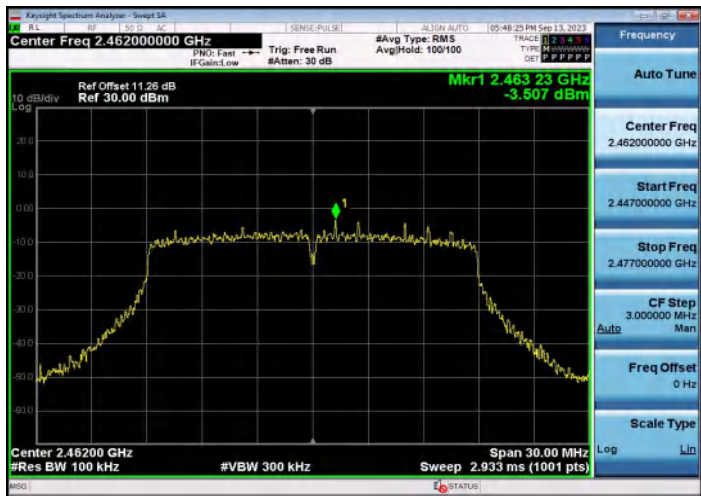


1GHz-25GHz

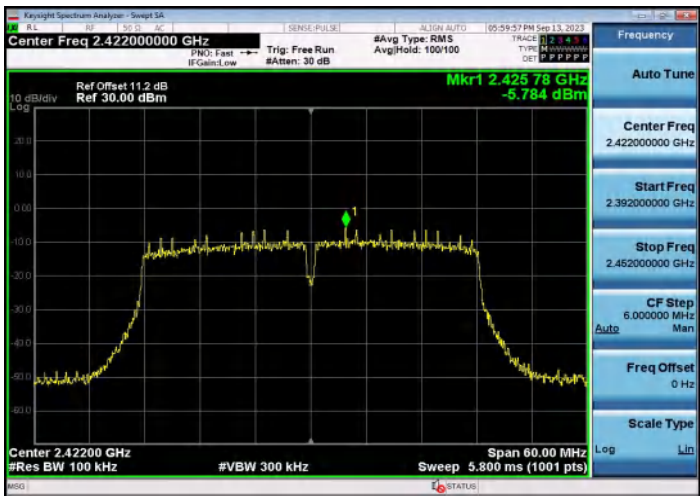


1GHz-25GHz

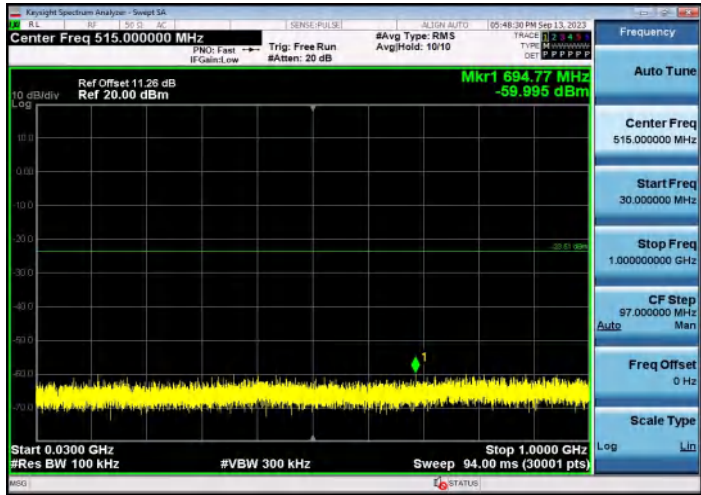
802.11n(HT20)



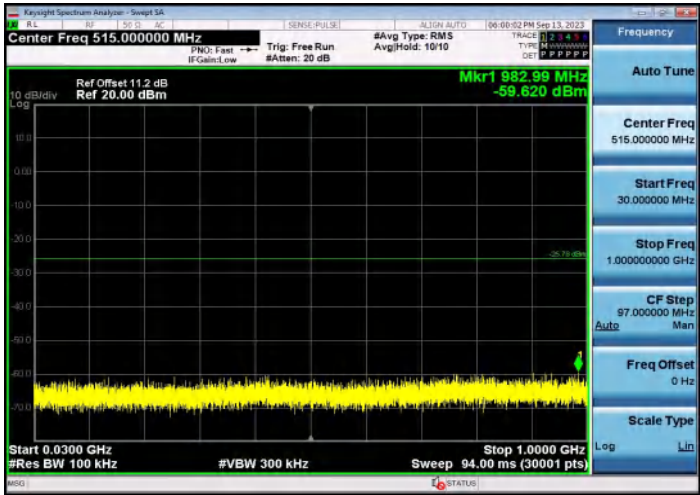
802.11n(HT40)



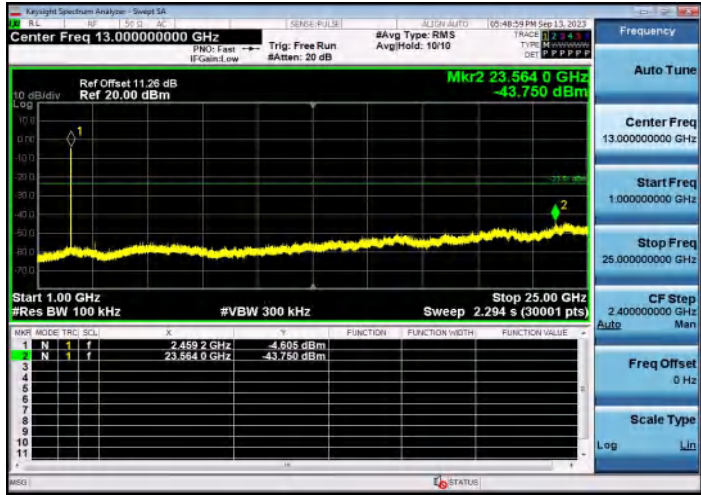
CH11



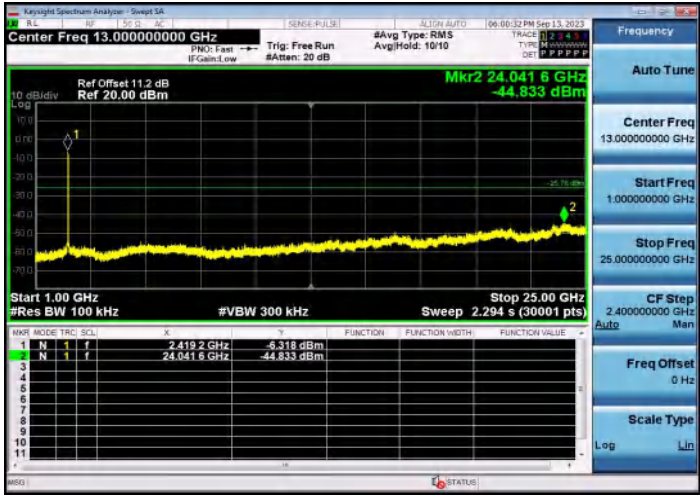
CH03



30MHz-1GHz



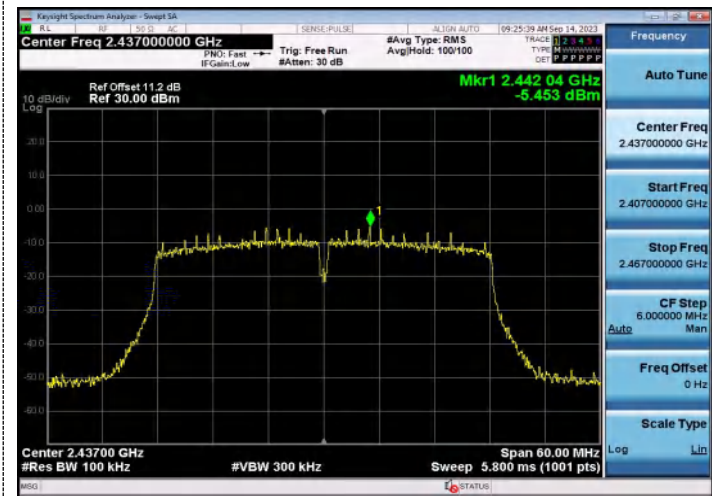
30MHz-1GHz



1GHz -25GHz

1GHz -25GHz

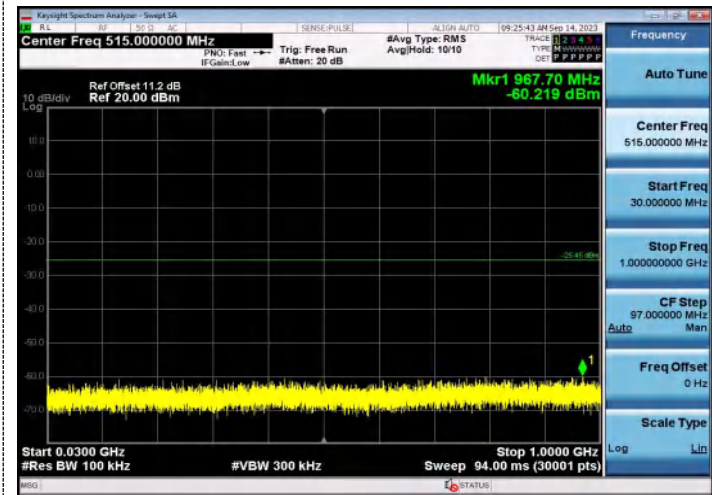
802.11n(HT40)



CH06



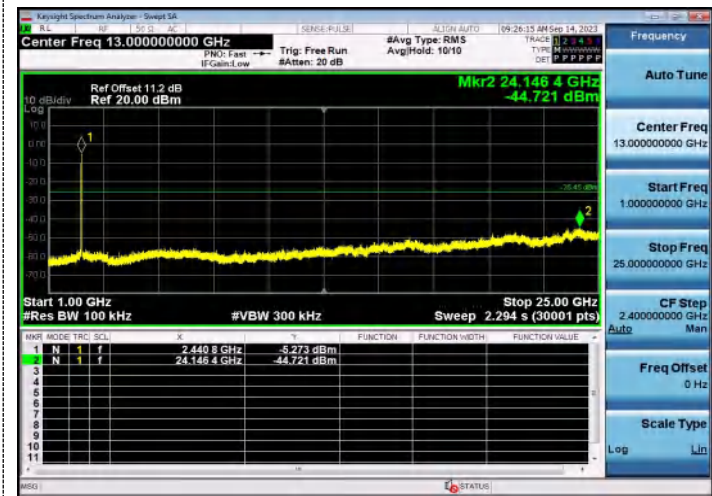
CH09



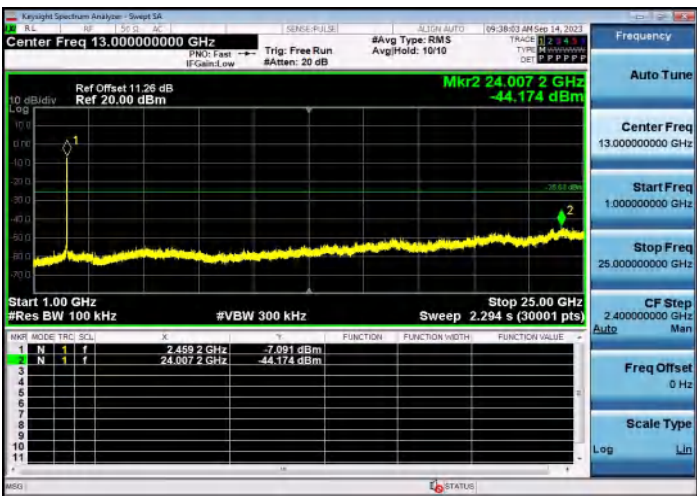
30MHz-1GHz



30MHz-1GHz



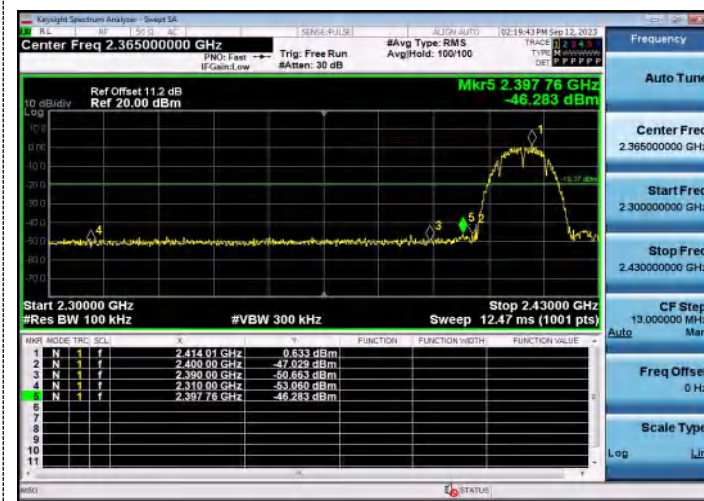
1GHz-25GHz



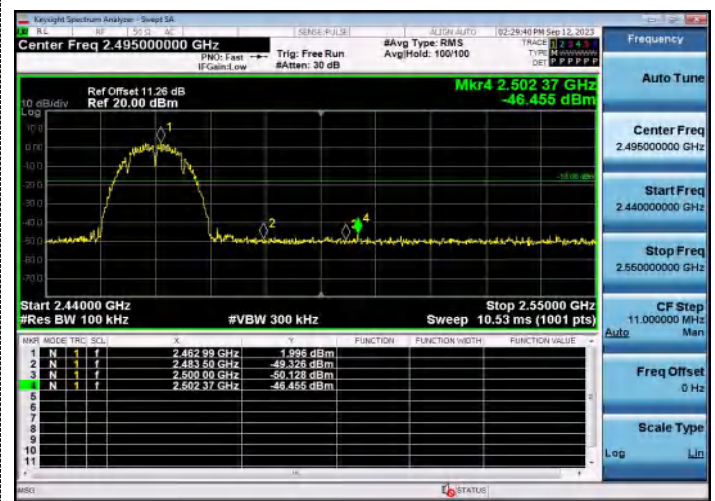
1GHz-25GHz

Ant 1

802.11b

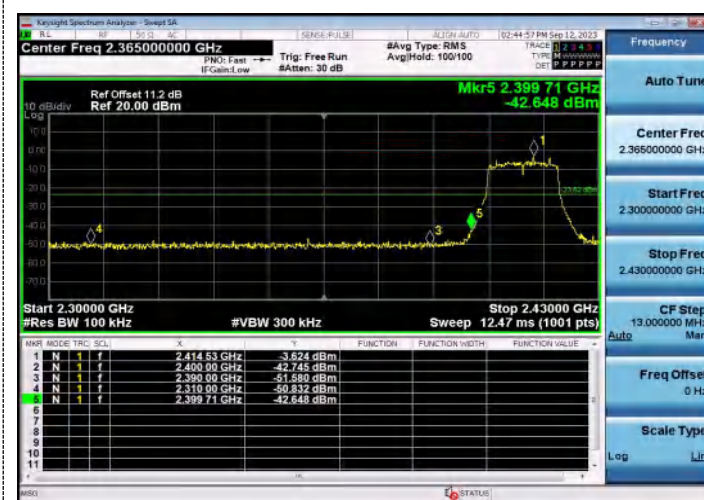


Left bandedge

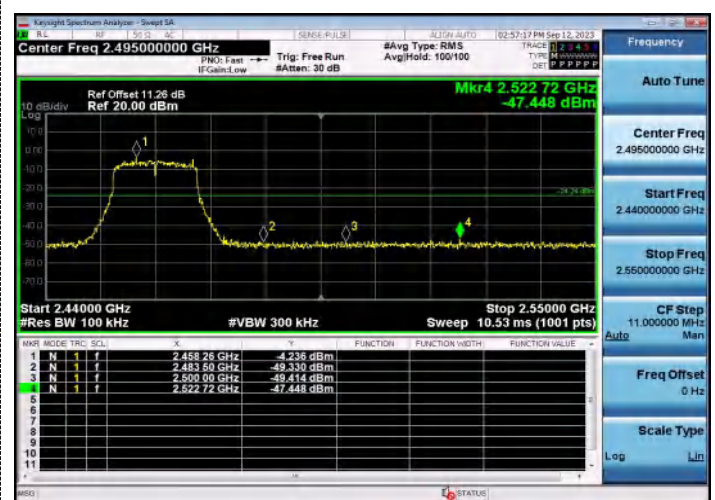


Right bandedge

802.11g

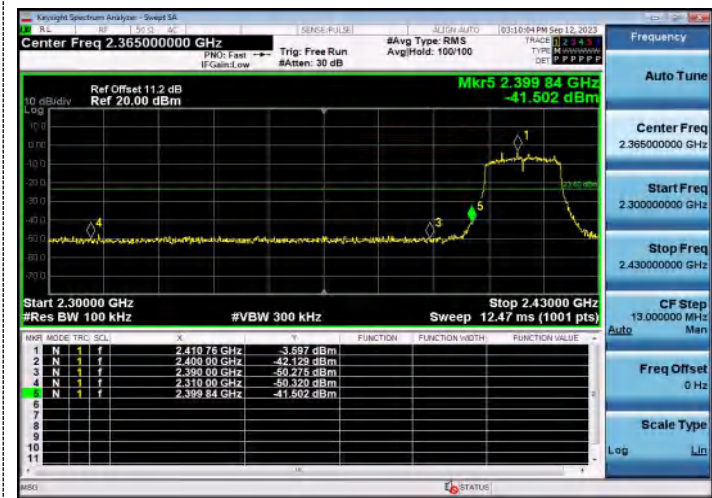


Left bandedge



Right bandedge

802.11n(HT20)

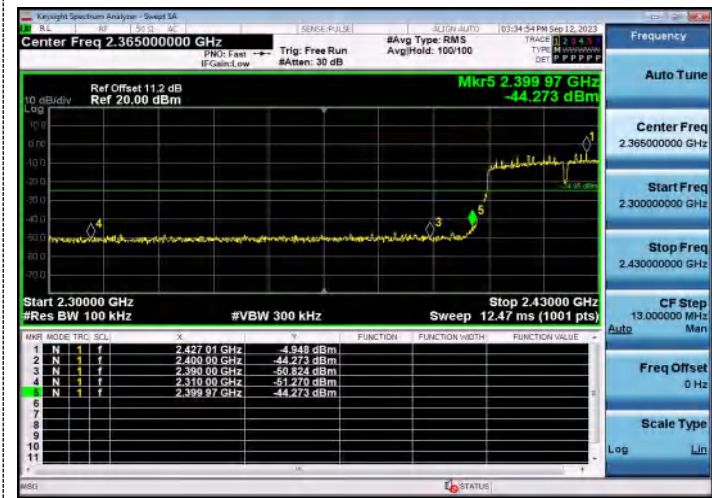


Left bandedge

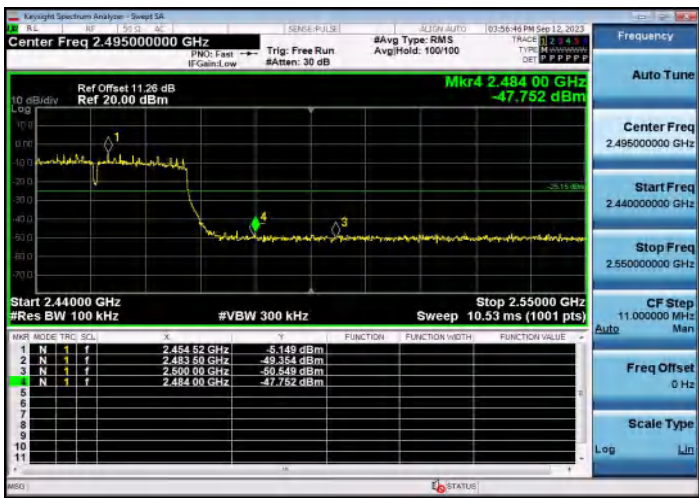


Right bandedge

802.11n(HT40)



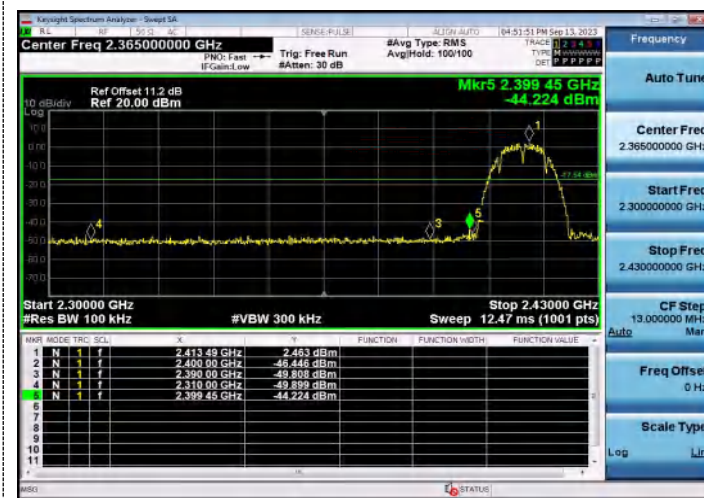
Left bandedge



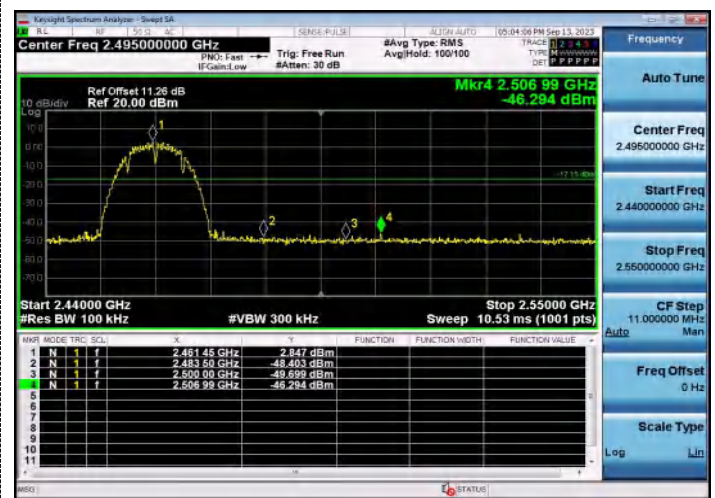
Right bandedge

Ant 2

802.11b

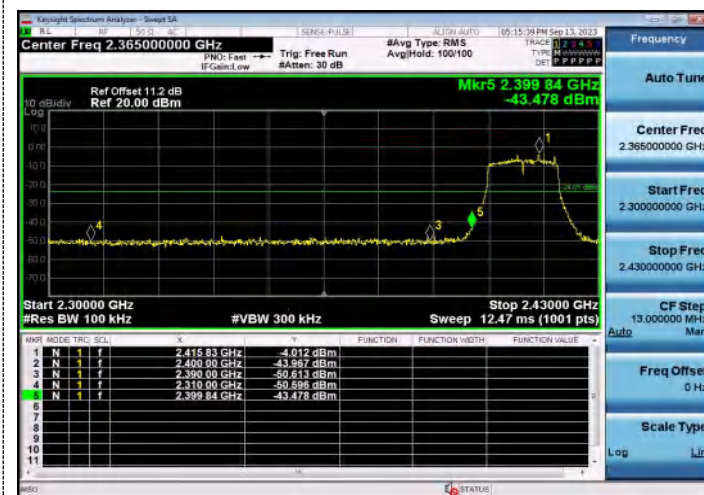


Left bandedge

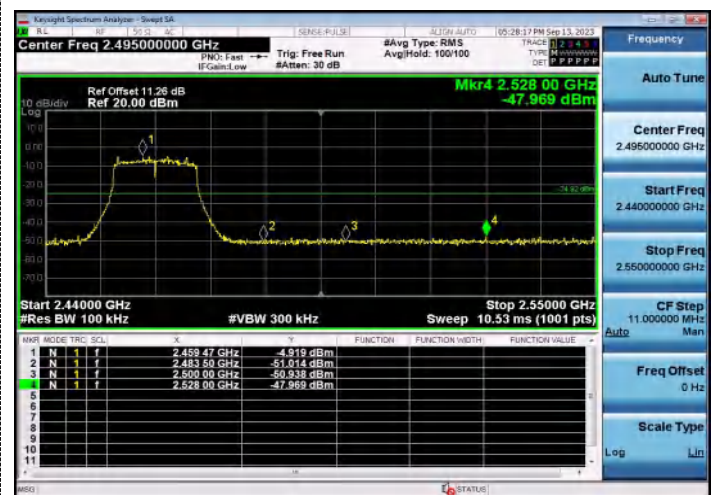


Right bandedge

802.11g

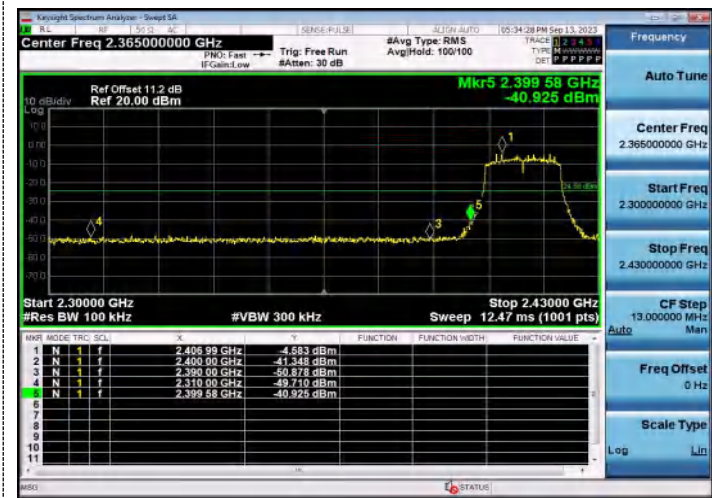


Left bandedge



Right bandedge

802.11n(HT20)

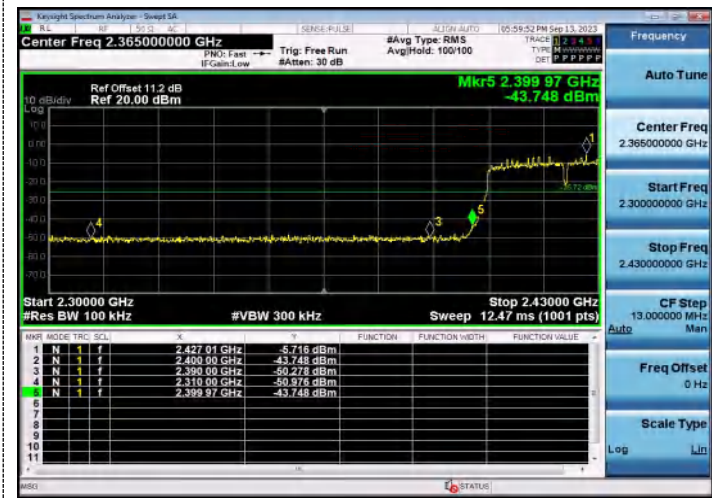


Left bandedge



Right bandedge

802.11n(HT40)



Left bandedge



Right bandedge

4.7 Antenna Requirement

Standard Applicable

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1) (I):

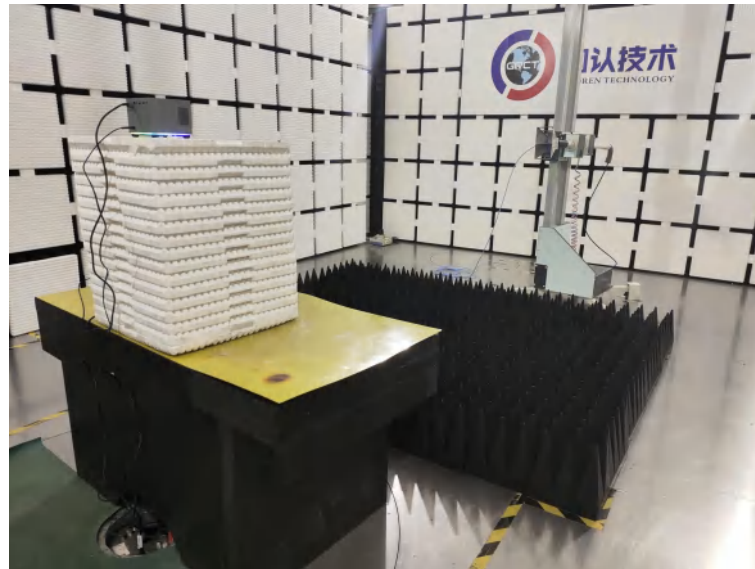
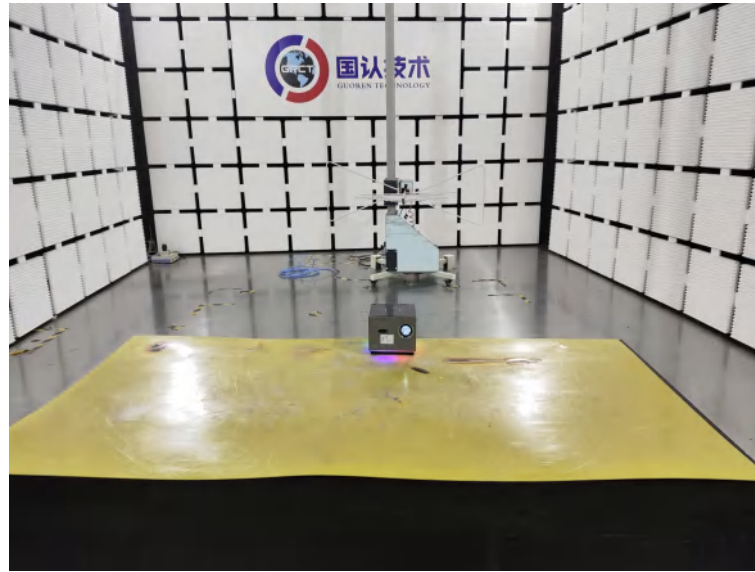
(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

Test Result:

The maximum gain of antenna was 1.67 dBi for 2.4GHz WIFI Ant 1, the maximum gain of antenna was 1.90 dBi for 2.4GHz WIFI Ant 2.

Remark: The antenna gain is provided by the customer, if the data provided by the customer is not accurate, Shenzhen GUOREN Certification Technology Service Co., Ltd. does not assume any responsibility.

5 Test Setup Photos of the EUT



6 Photos of the EUT

Reference to the test report No. GRCTR230902007-01.

***** End of Report *****