3.3. Maximum Conducted Output Power

Limit

The Maximum Peak Output Power Measurement is 30dBm.

Test Procedure

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power sensor.

Test Configuration

Test Results

WIFI

Type	Channel	Output power Ant1 (dBm)	Output power Ant2 (dBm)	Output power Total (dBm)	Limit (dBm)	Result
802.11b	01	9.28	8.93	/	30.00	Pass
	06	9.16	9.37	/		
	11	9.50	9.57	/		
802.11g	01	9.38	8.82	/	30.00	Pass
	06	9.41	9.39	/		
	11	9.43	9.21	/		
802.11n(HT20) MIMO	01	5.43	5.37	8.41	30.00	Pass
	06	6.25	5.20	8.77		
	11	6.78	5.82	9.34		
802.11n(HT40) MIMO	03	6.85	5.75	9.35	30.00	Pass
	06	6.11	5.07	8.63		
	09	6.44	5.58	9.04		

Note: 1.The test results including the cable lose.

3.4. Power Spectral Density

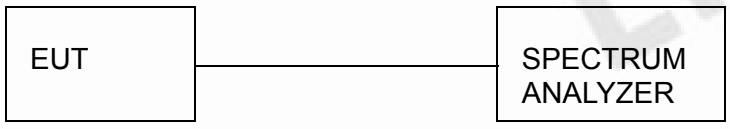
Limit

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.

Test Procedure

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW ≥ 3 kHz.
3. Set the VBW ≥ 3× RBW.
4. Set the span to 1.5 times the DTS channel bandwidth.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.
11. The resulting peak PSD level must be 8dBm.

Test Configuration



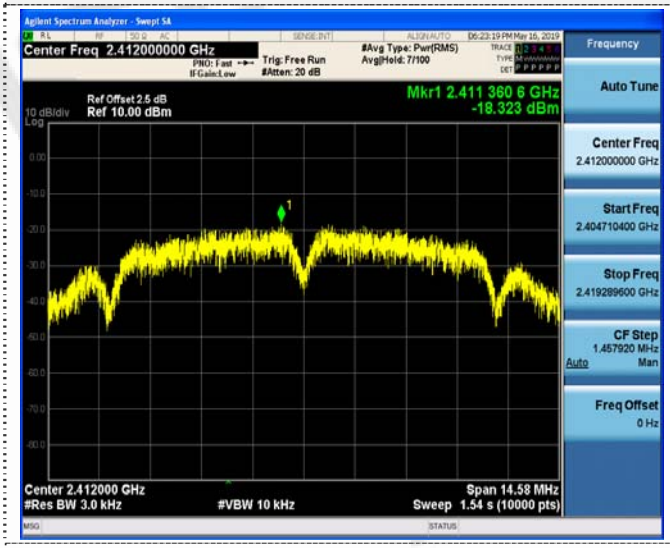
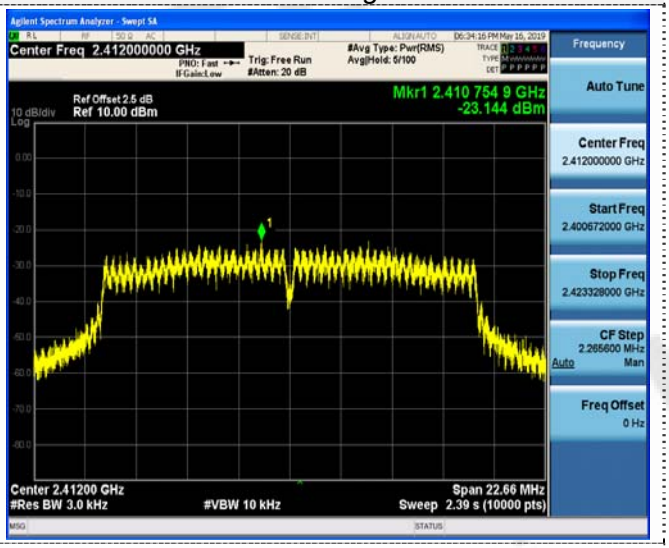
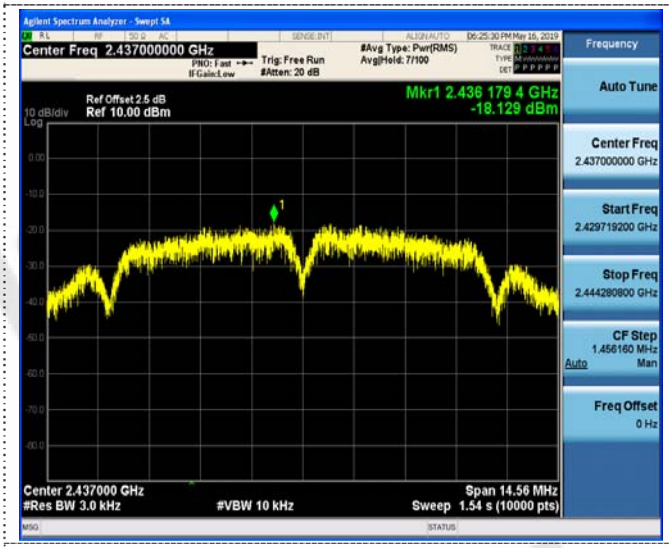
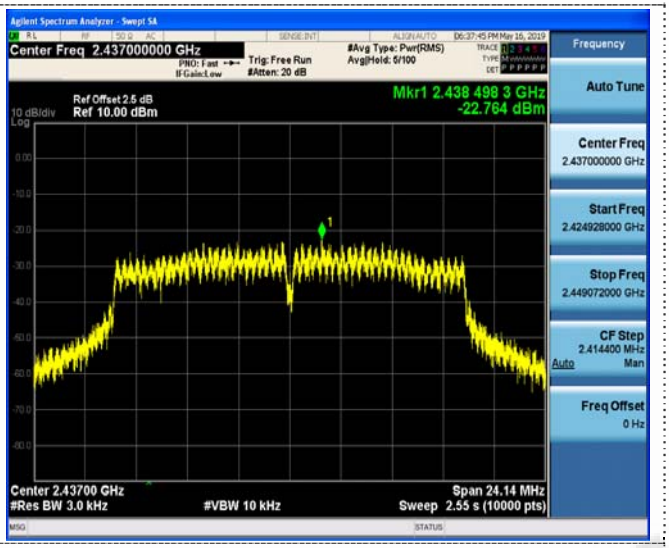
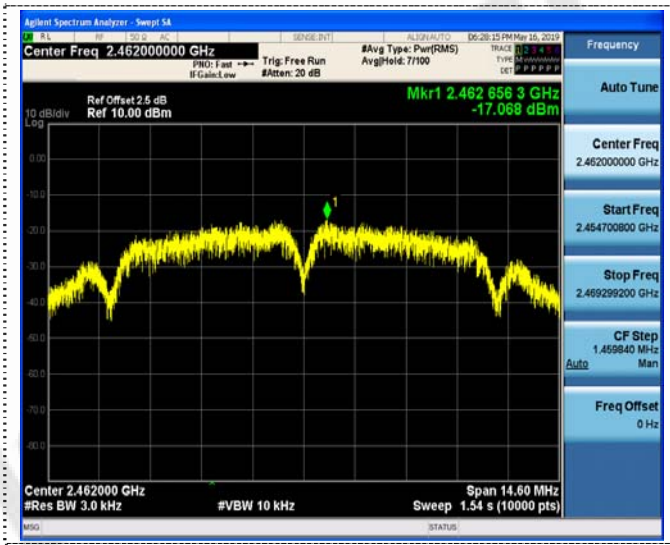
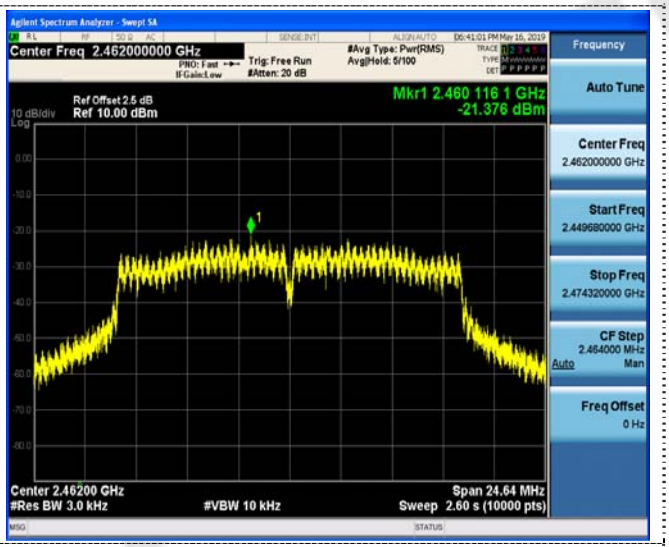
Test Results

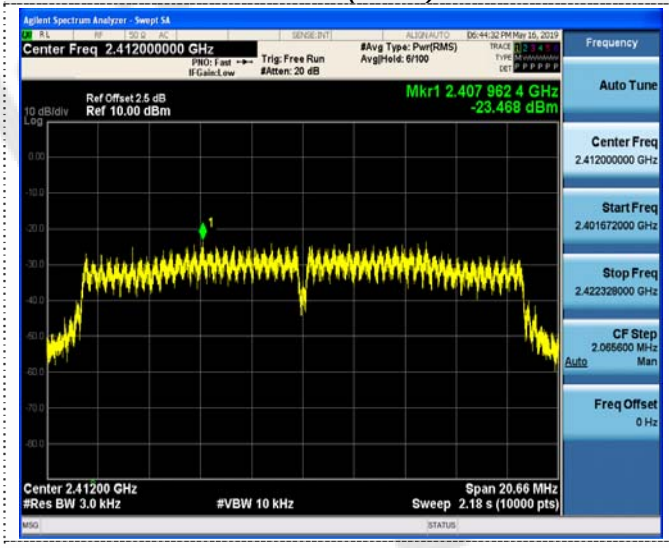
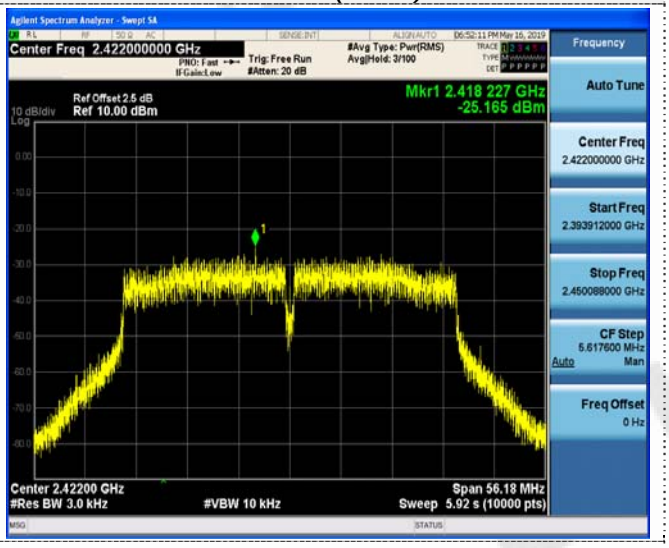
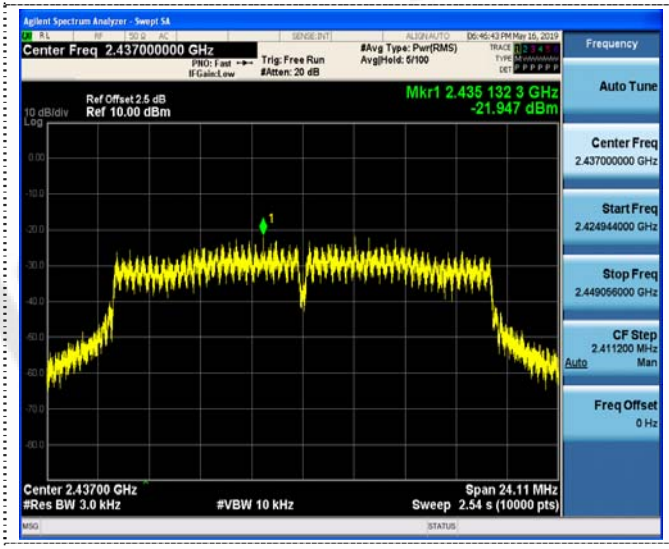
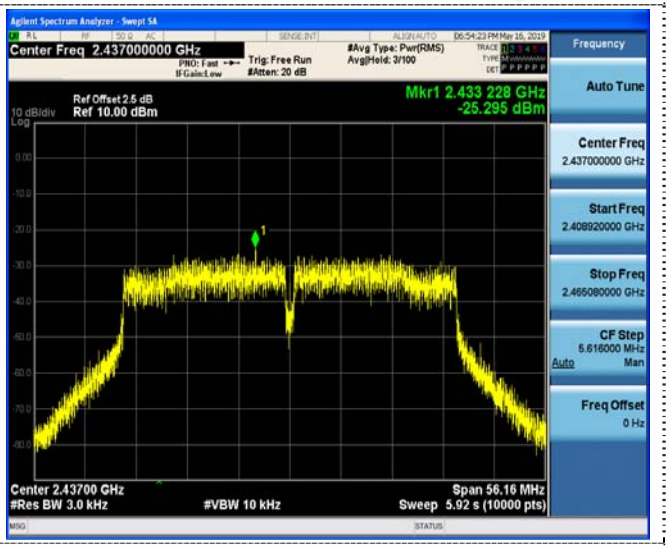
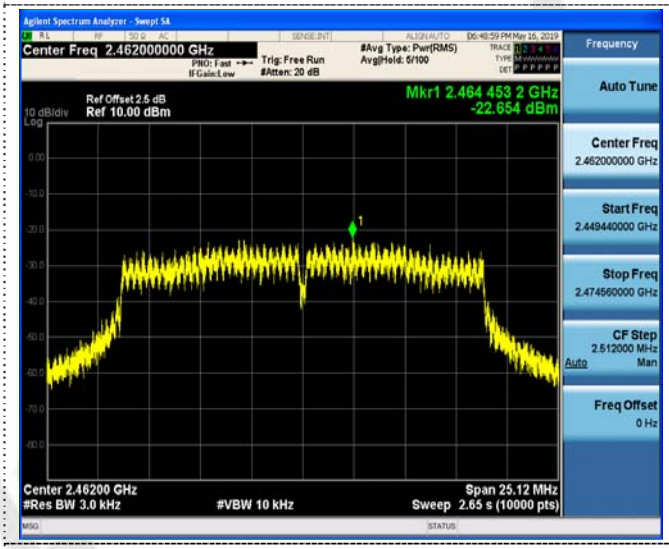
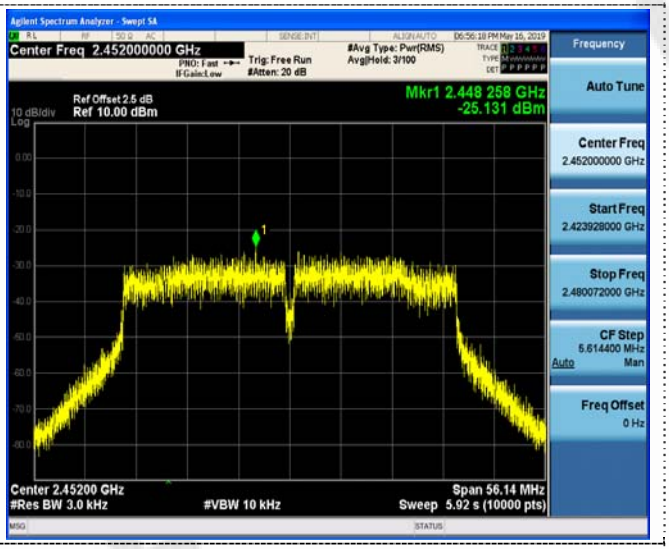
WIFI

Type	Channel	Power Spectral Density Ant1 (dBm/3KHz)	Power Spectral Density Ant2 (dBm/3KHz)	Power Spectral Density Total (dBm/3KHz)	Limit (dBm/3KHz)	Result
802.11b	01	-18.323	-18.456	/	8.00	Pass
	06	-18.129	-18.647	/		
	11	-17.068	-18.429	/		
802.11g	01	-23.144	-22.693	/	8.00	Pass
	06	-22.764	-23.810	/		
	11	-21.376	-23.366	/		
802.11n(HT20) MIMO	01	-23.468	-23.214	-20.33	8.00	Pass
	06	-21.947	-22.158	-19.04		
	11	-22.654	-23.940	-20.24		
802.11n(HT40) MIMO	03	-25.165	-26.283	-22.68	8.00	Pass
	06	-25.295	-26.871	-23.00		
	09	-25.131	-26.458	-22.73		

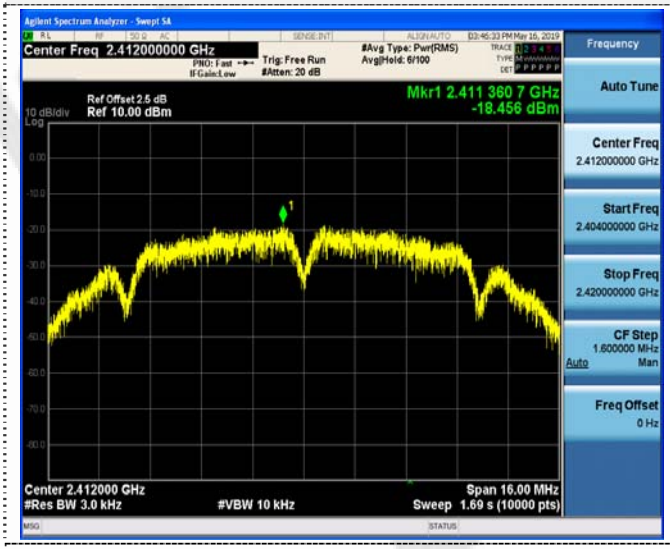
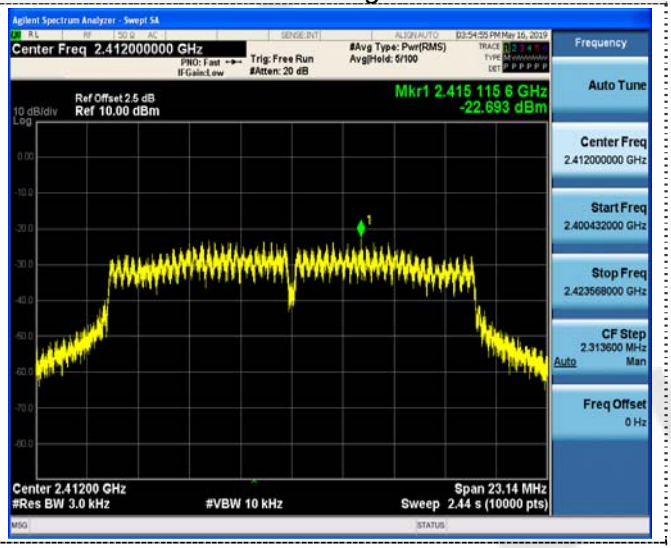
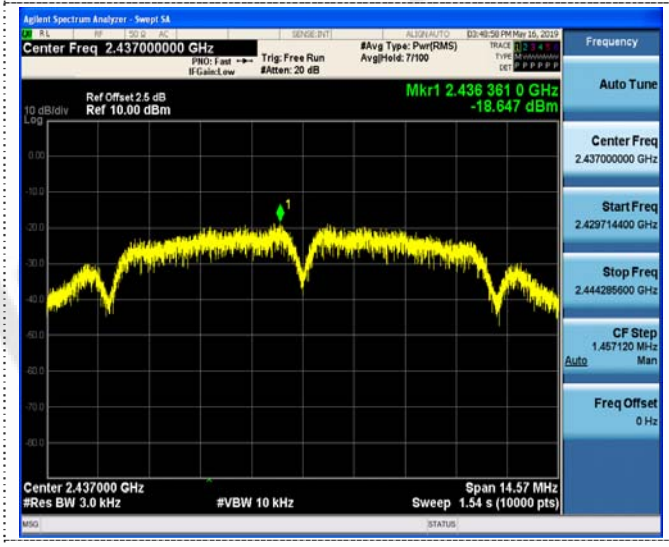
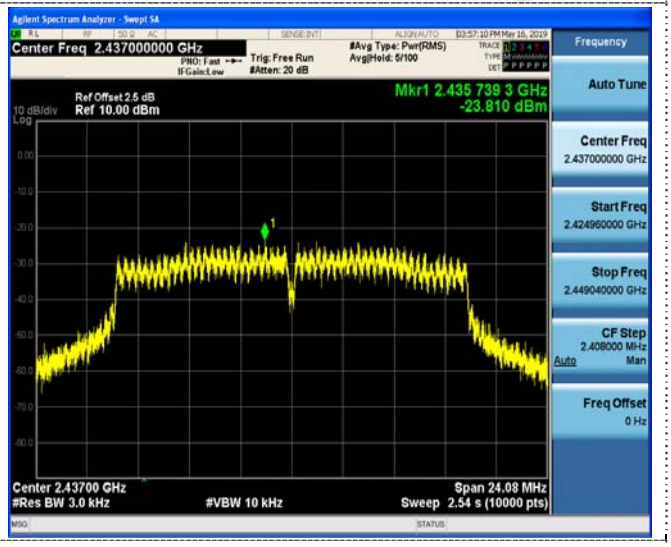
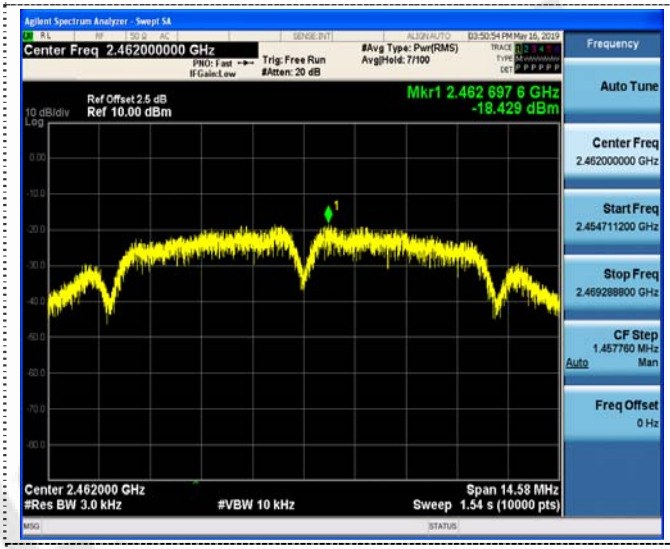
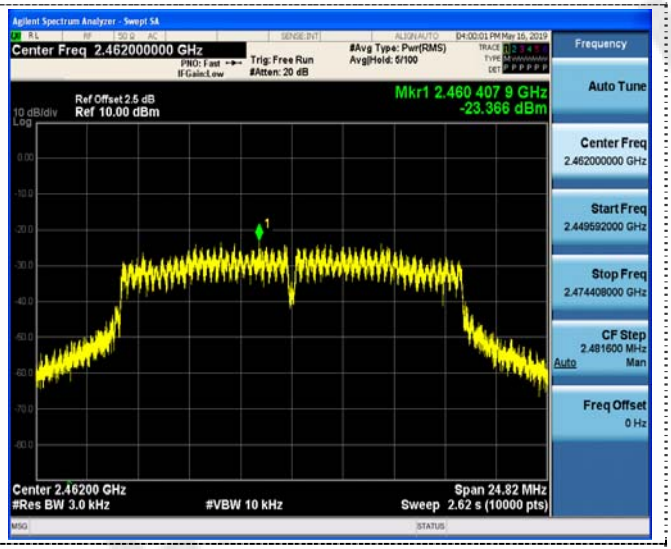
Test plot as follows:

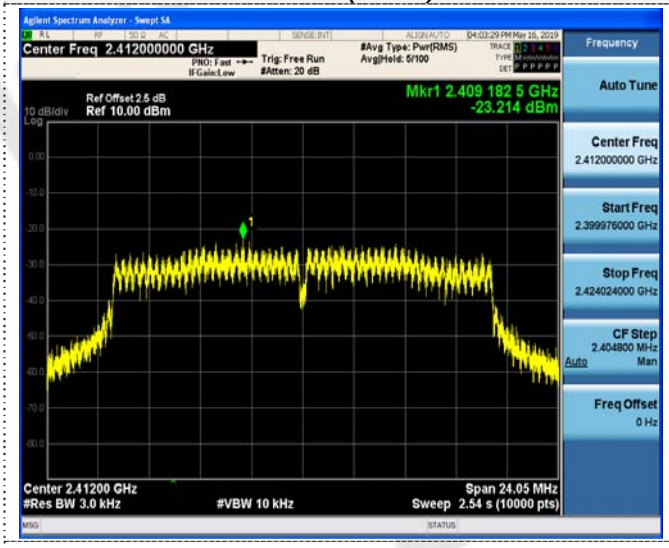
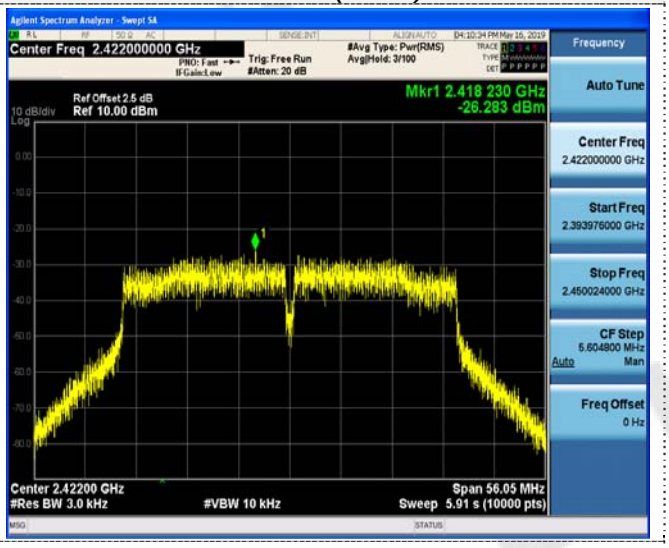
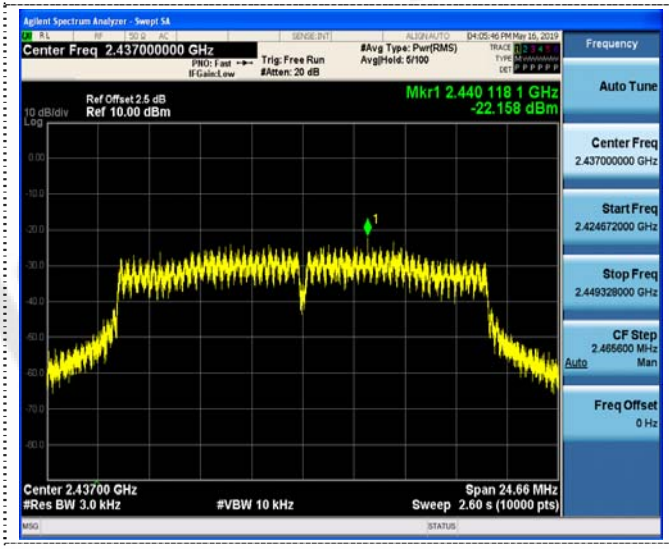
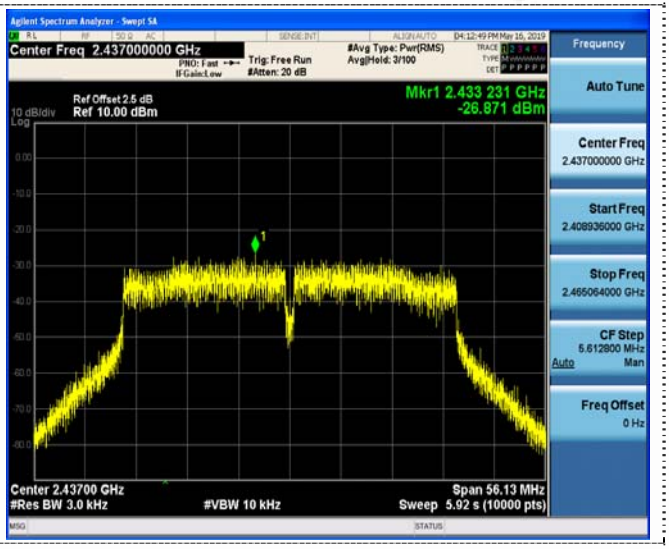
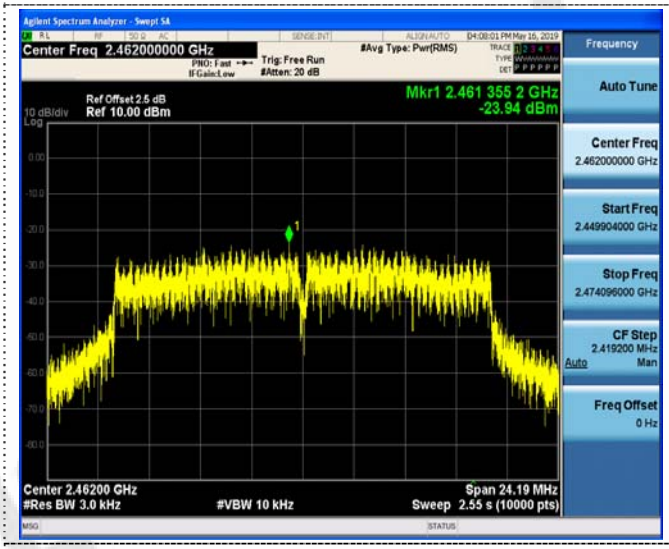
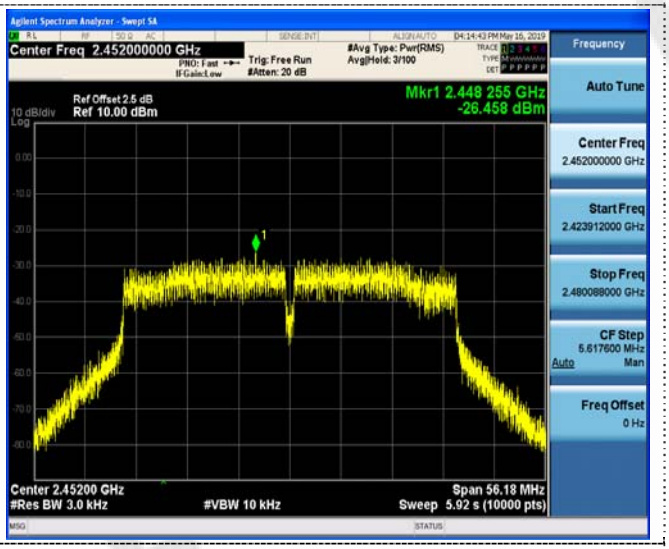
Ant. 1

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

3.5. 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

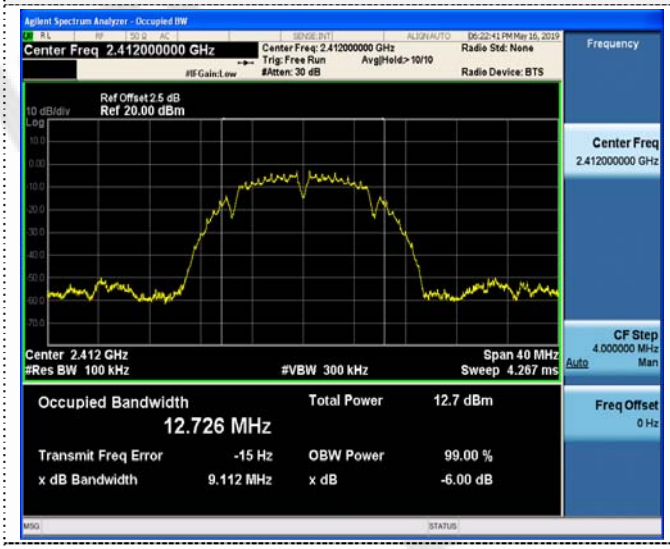
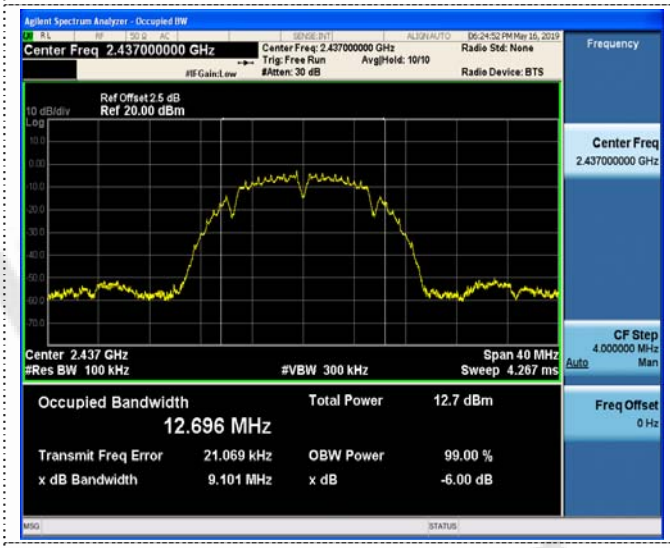
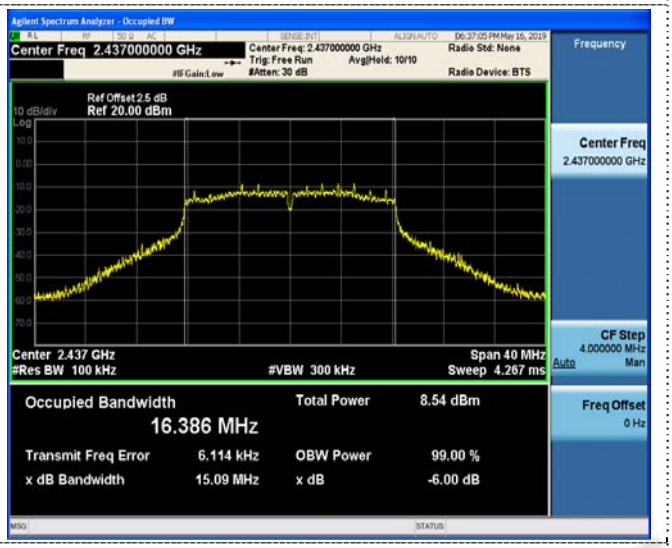
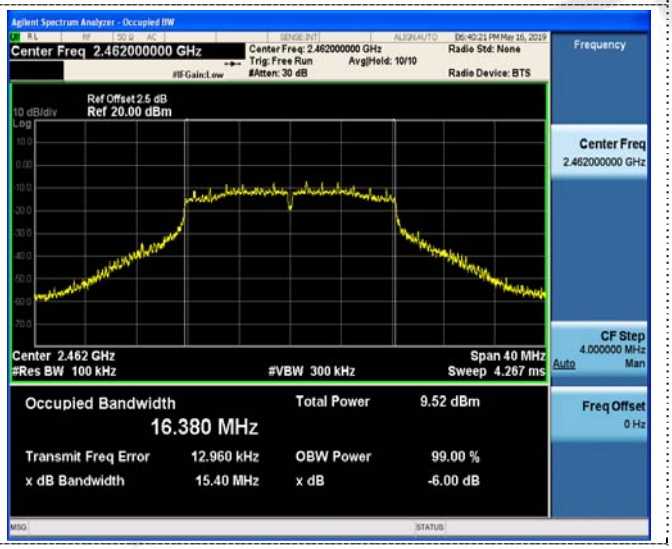
Test Results

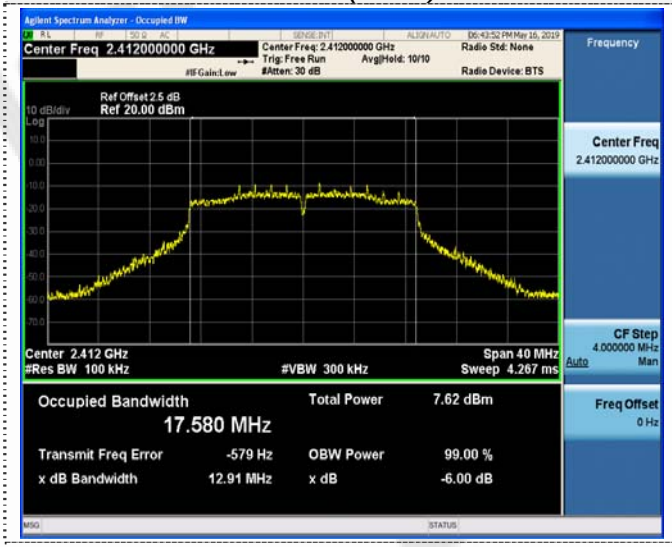
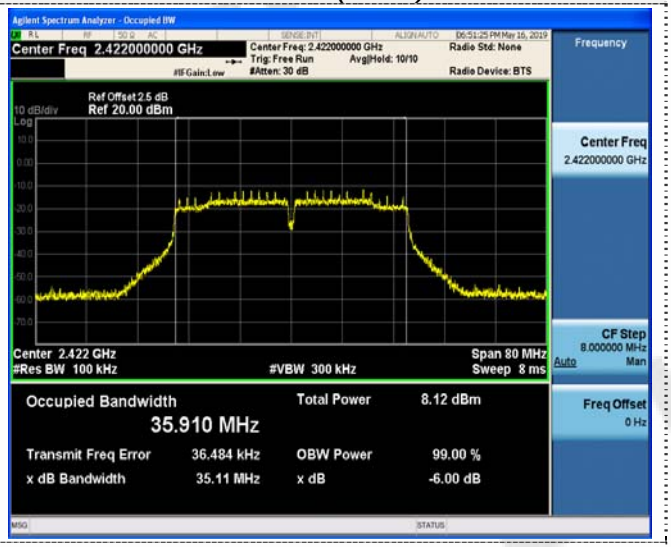
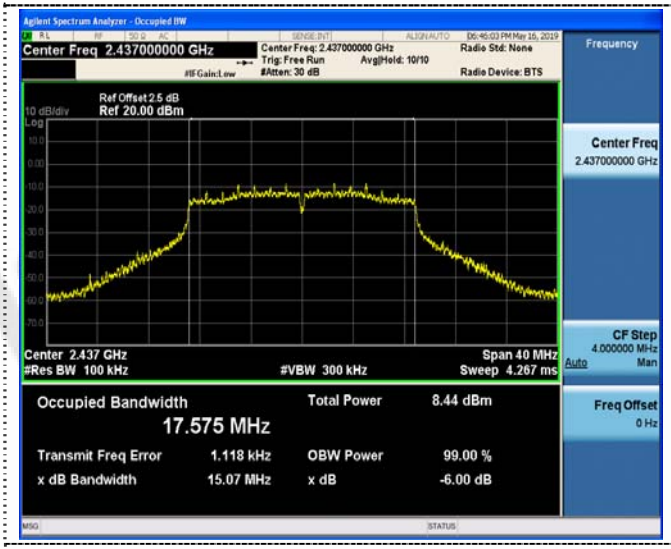
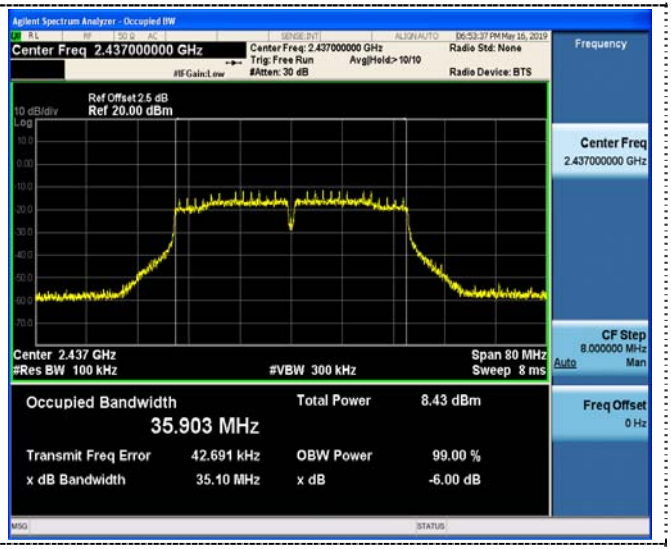
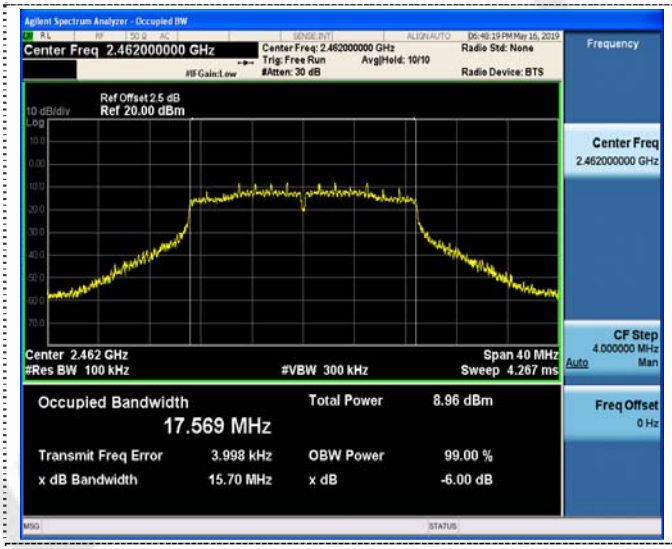
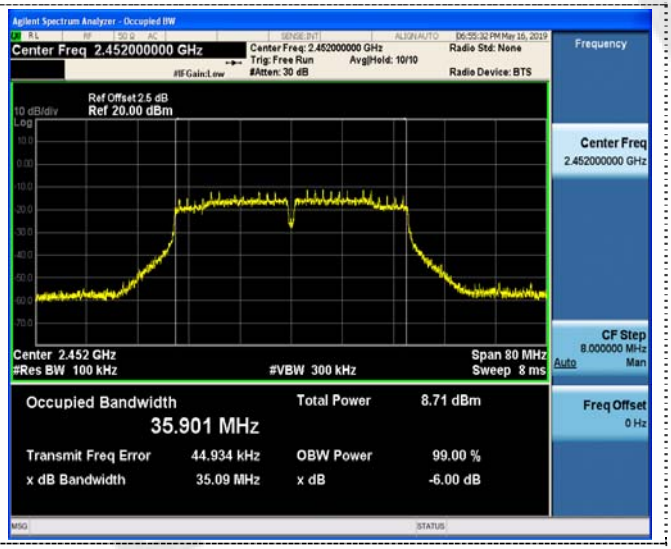
WIFI

Type	Channel	6dB Bandwidth Ant1 (MHz)	6dB Bandwidth Ant2 (MHz)	Limit (KHz)	Result
802.11b	01	9.112	10.00	≥500	Pass
	06	9.101	9.107		
	11	9.124	9.111		
802.11g	01	14.16	14.46	≥500	Pass
	06	15.09	15.05		
	11	15.40	15.51		
802.11n(HT20)	01	12.91	15.03	≥500	Pass
	06	15.07	15.41		
	11	15.70	15.12		
802.11n(HT40)	03	35.11	35.03	≥500	Pass
	06	35.10	35.08		
	09	35.09	35.11		

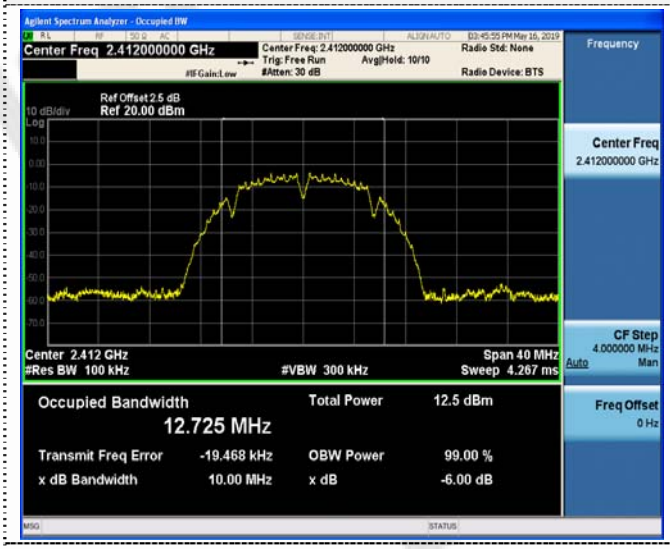
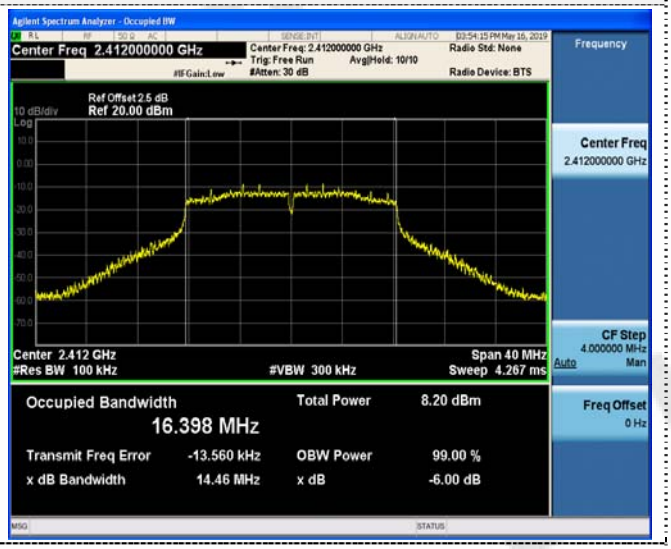
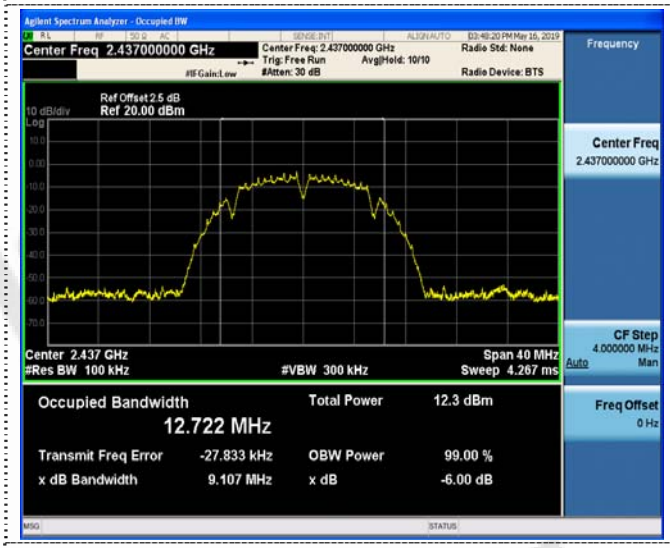
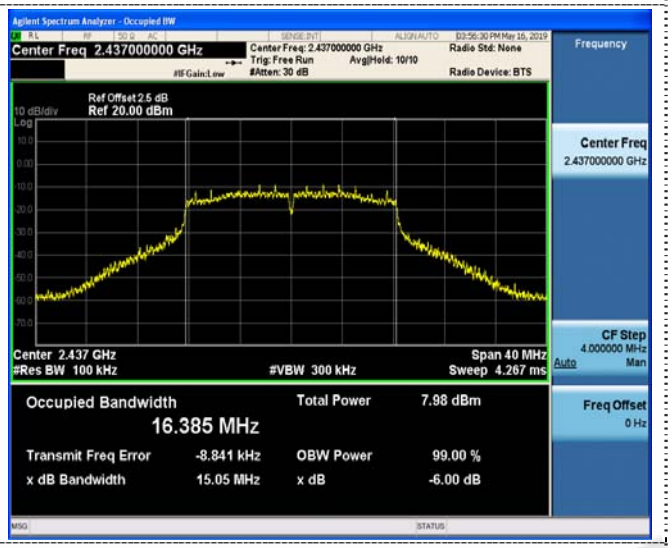
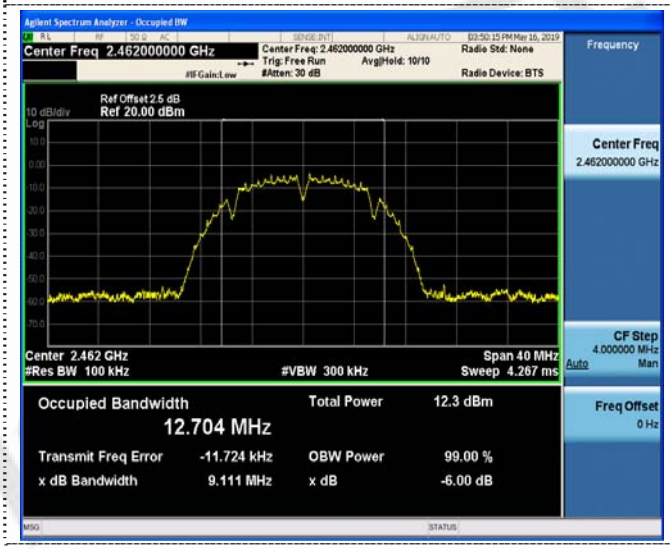
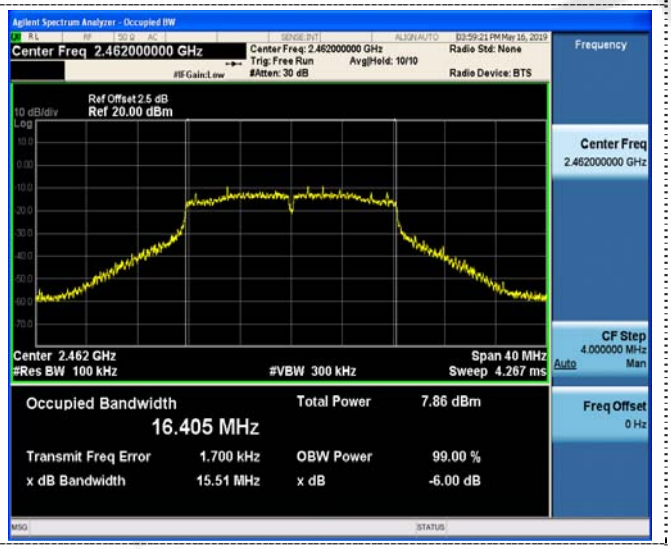
Test plot as follows:

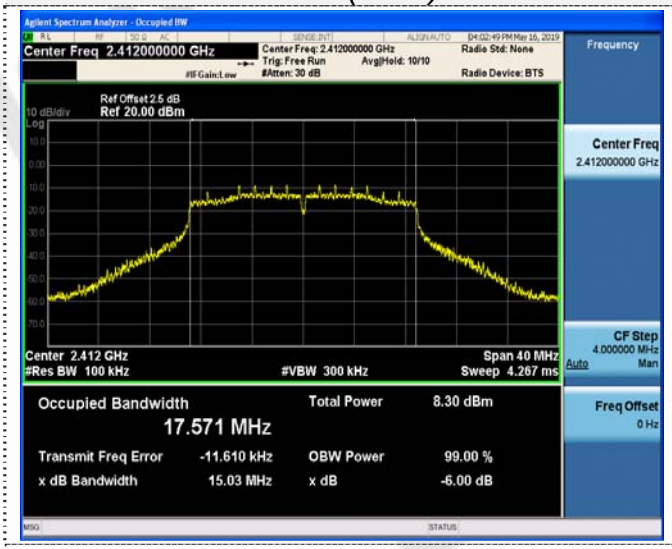
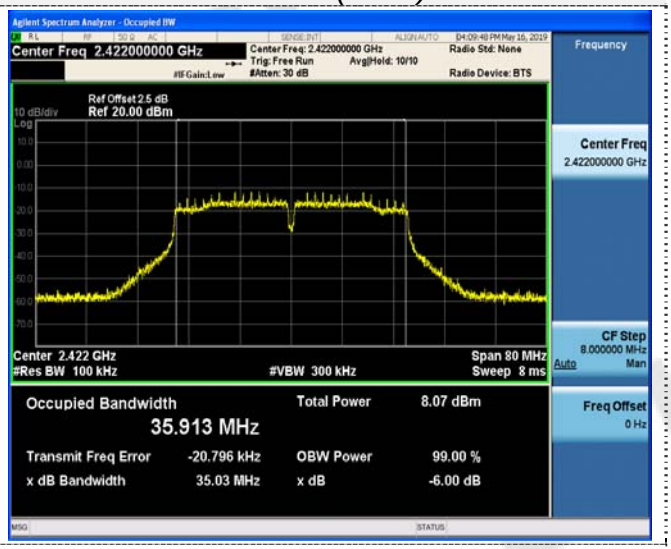
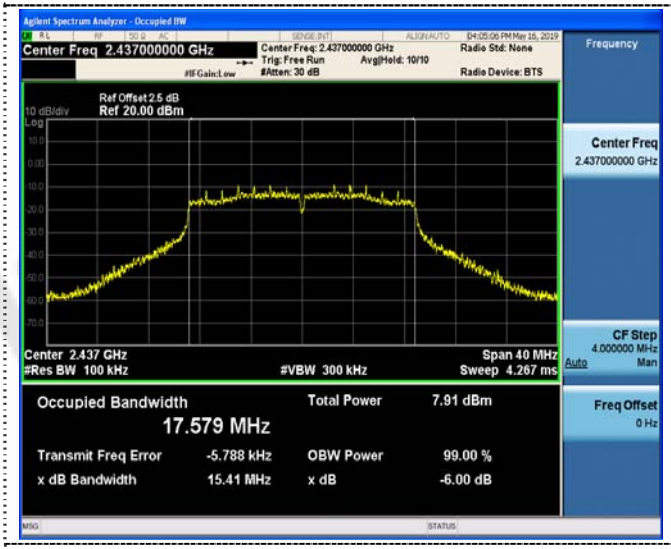
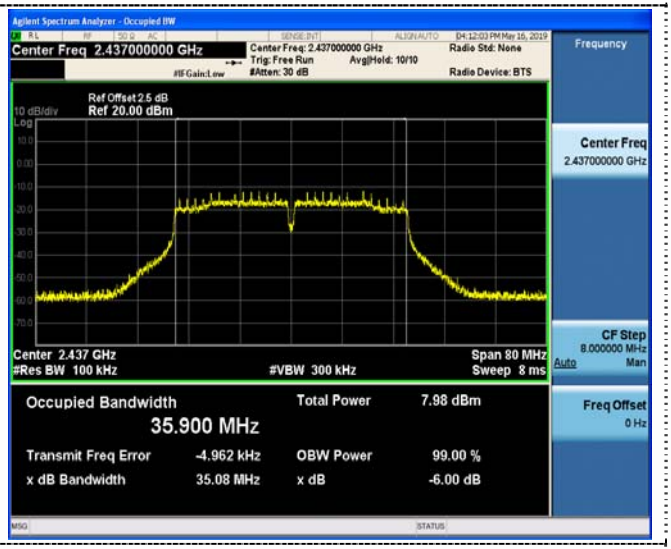
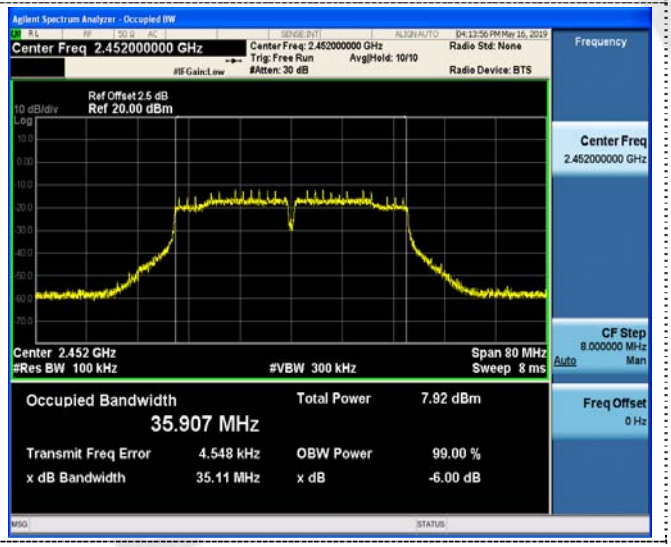
Ant.1

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

3.6. Out-of-band Emissions

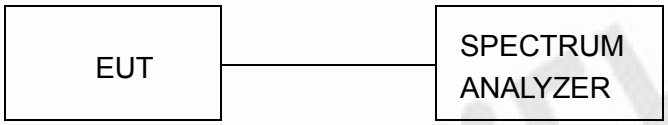
Limit

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 con-ducted or a radiated measurement, pro-vided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter com-plies 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 setting are made of the in-band reference level, bandedge and out-of-band emissions.

Test Configuration

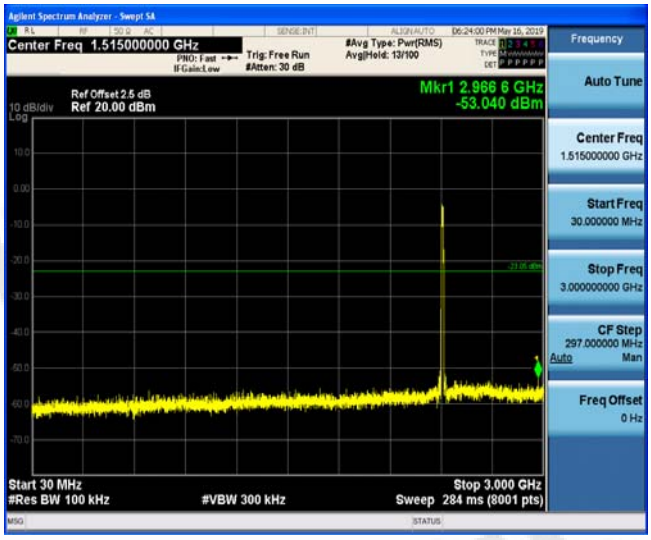
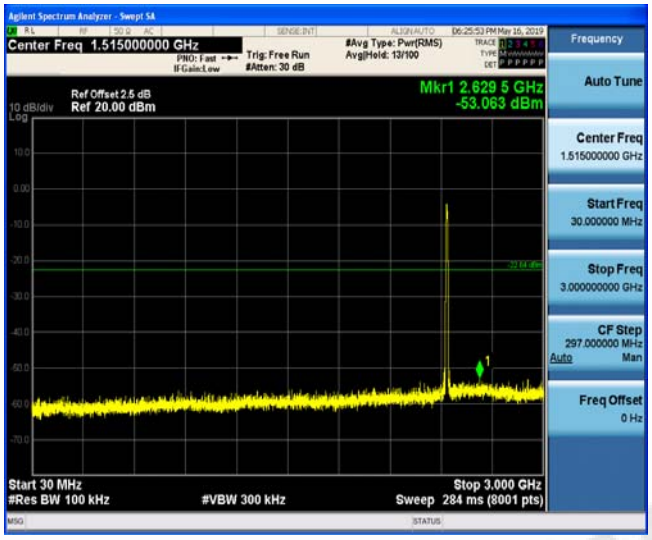
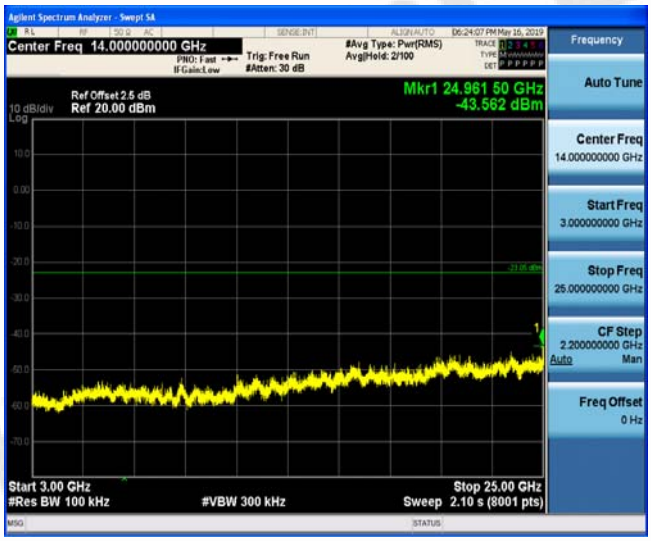
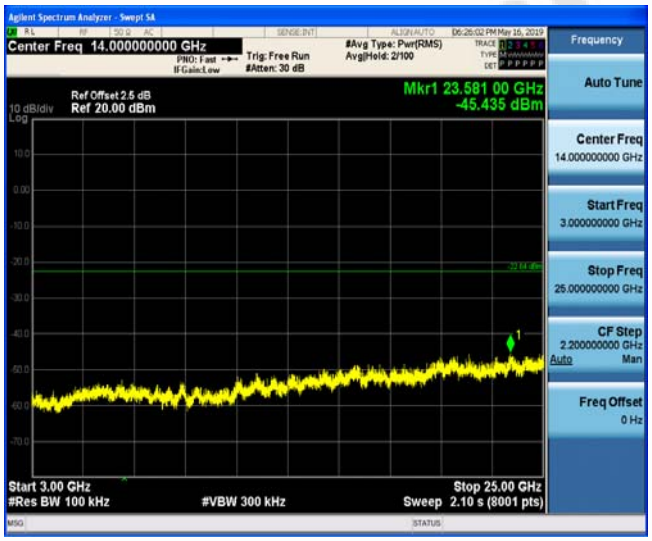


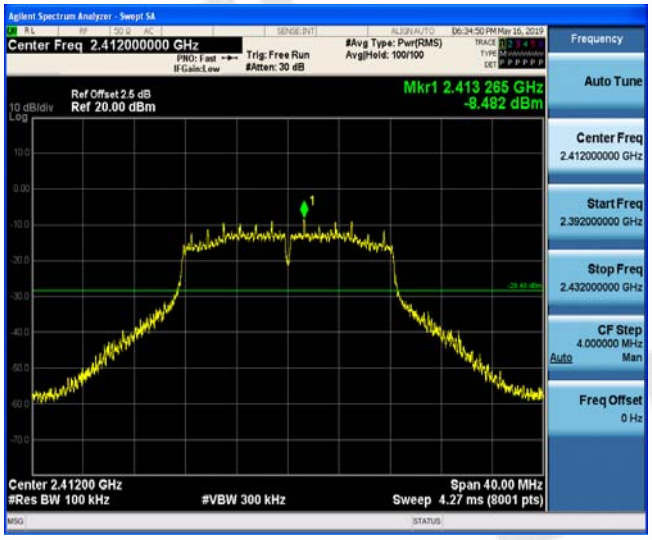
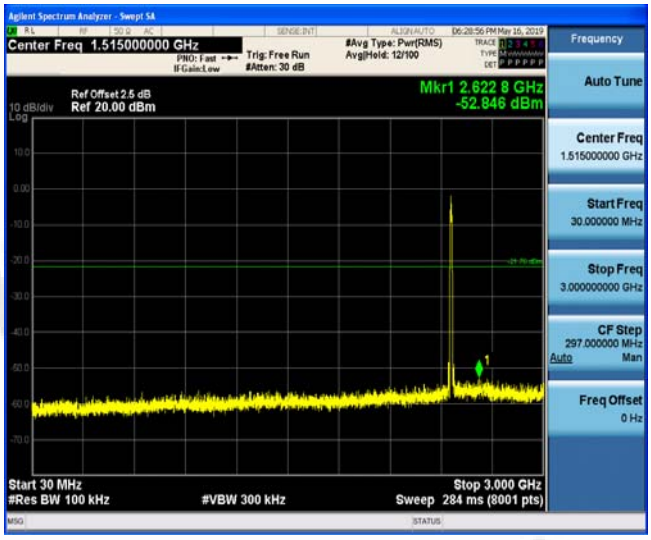
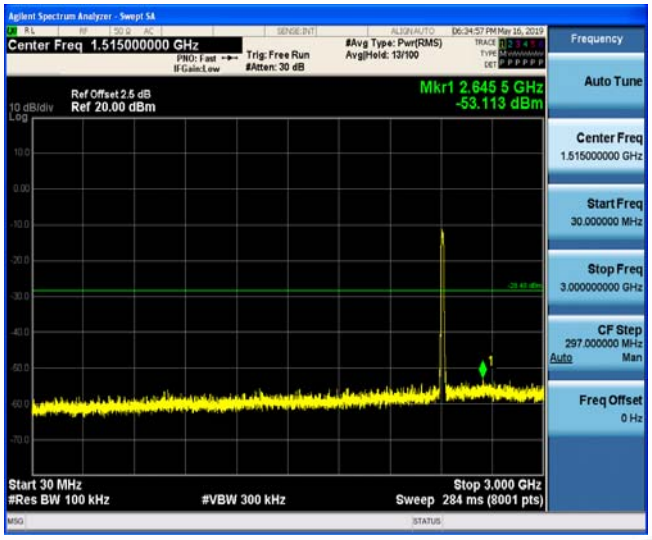
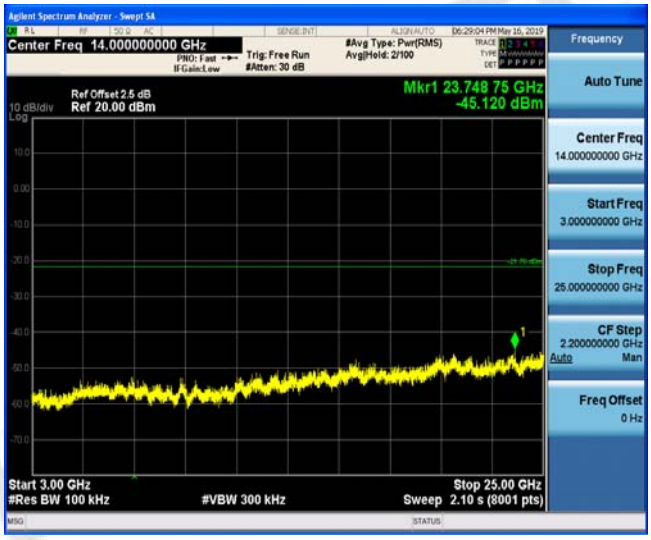
Test Results

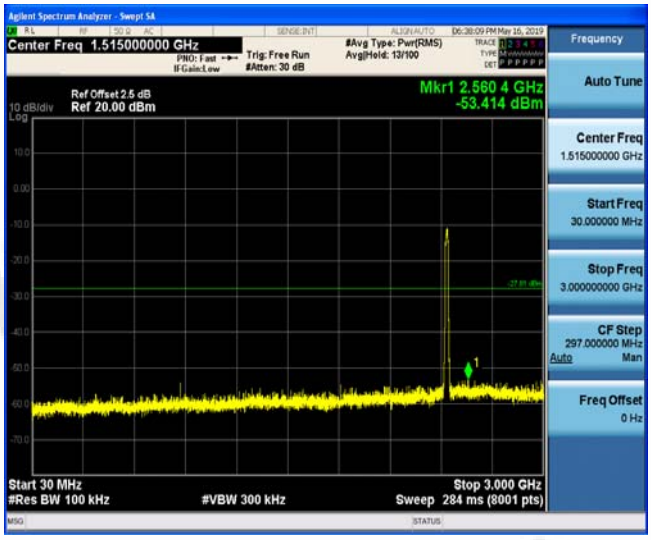
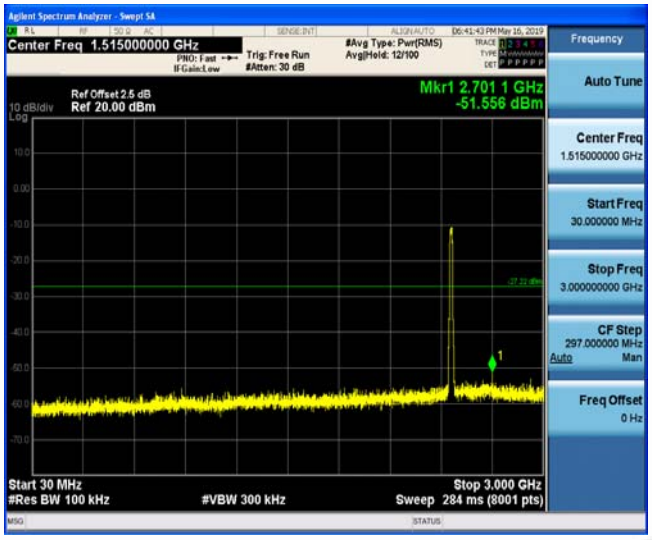
Remark: The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandage measurement data.

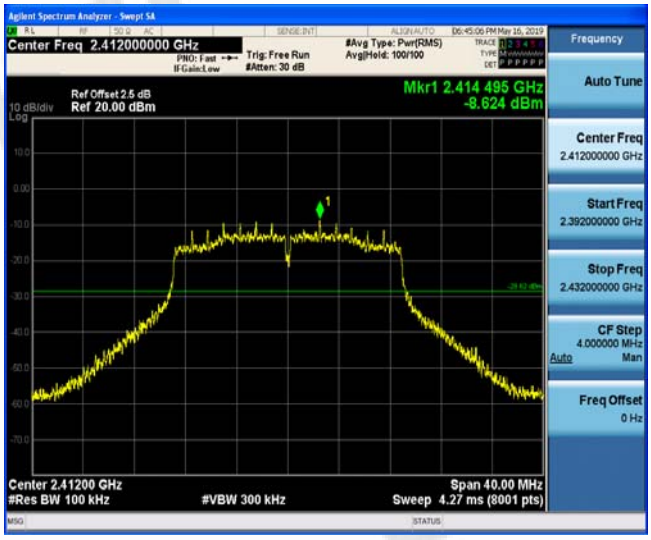
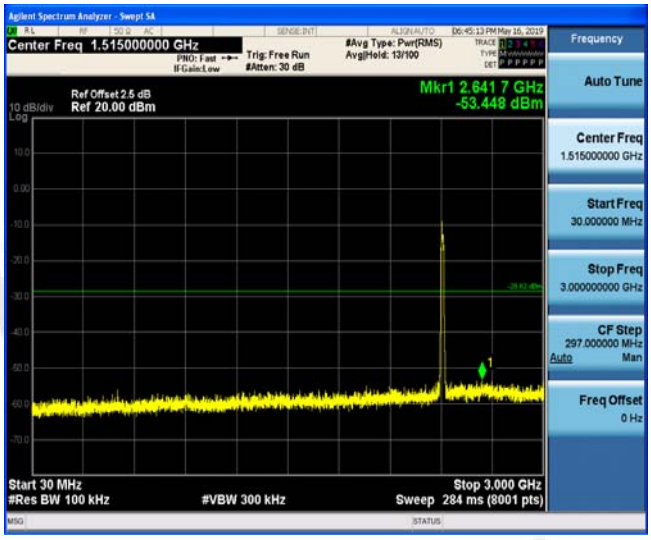
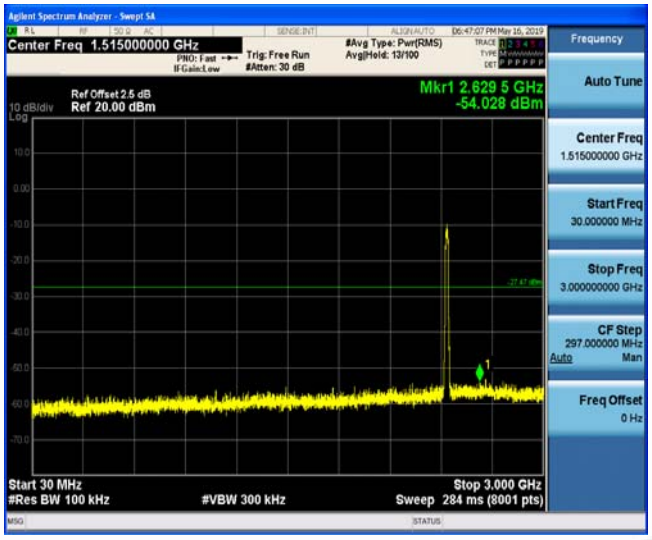
Test plot as follows:

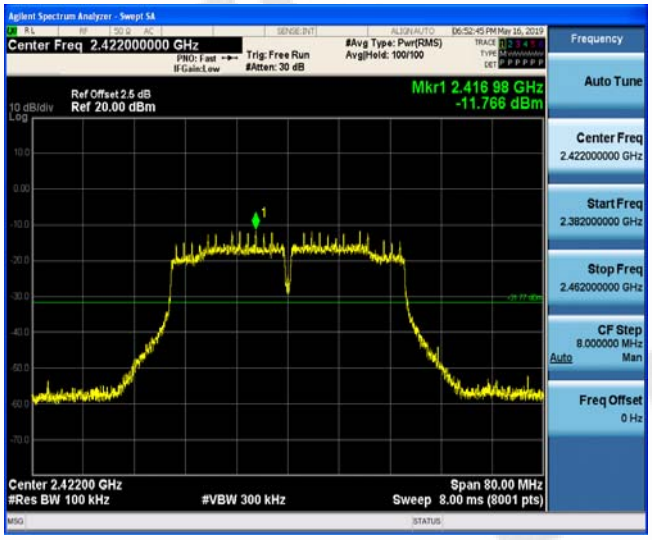
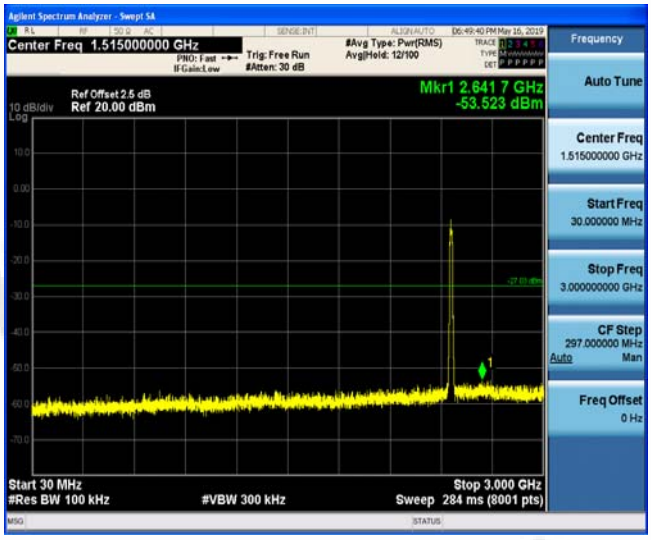
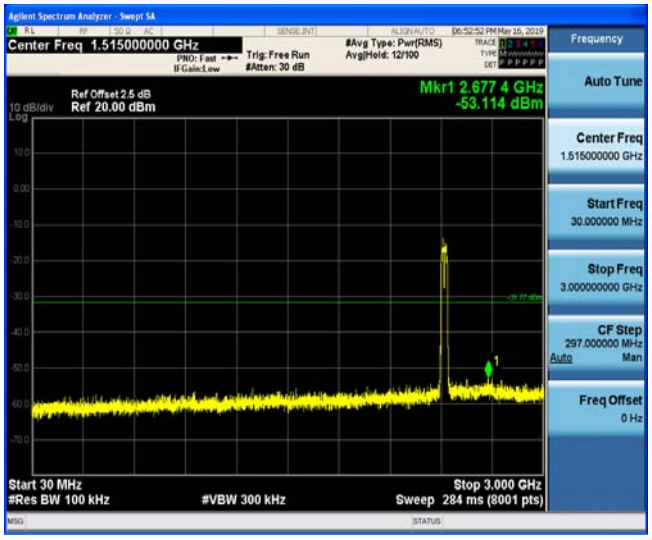
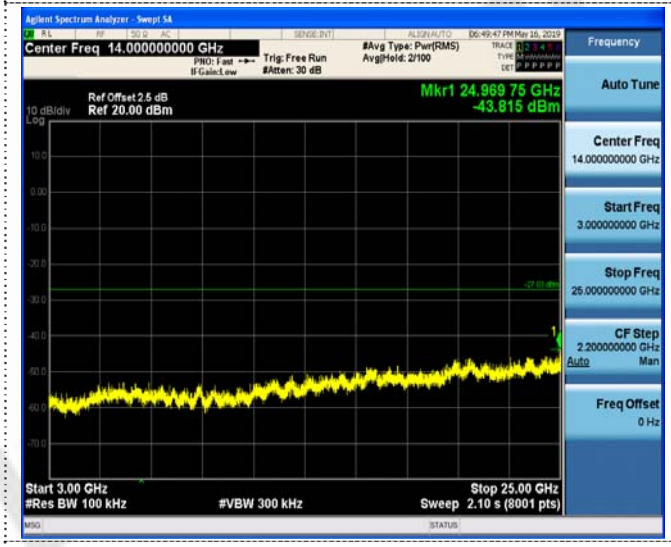
Ant.1

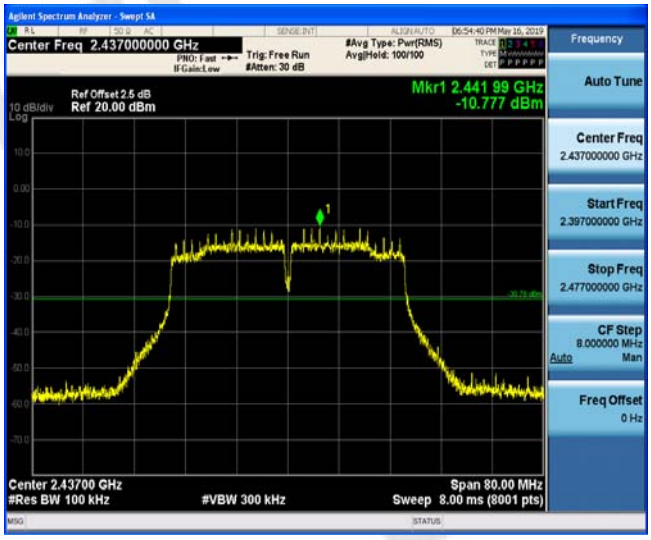
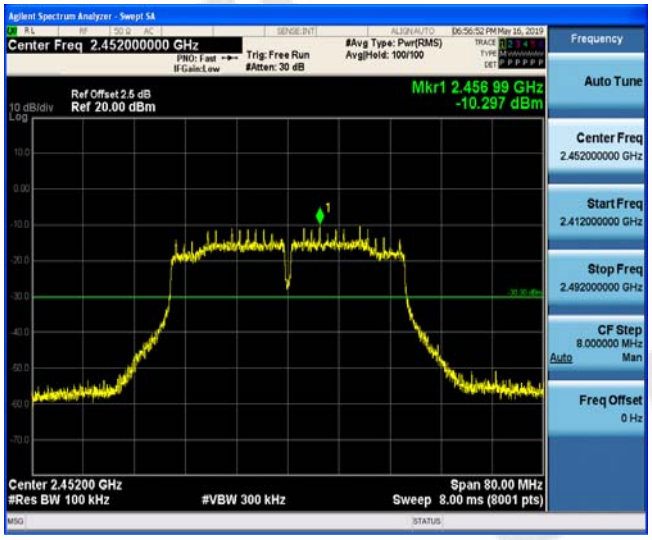
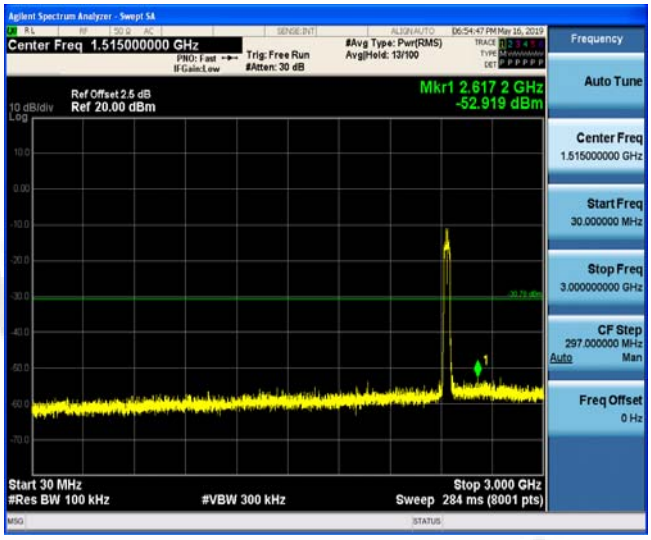
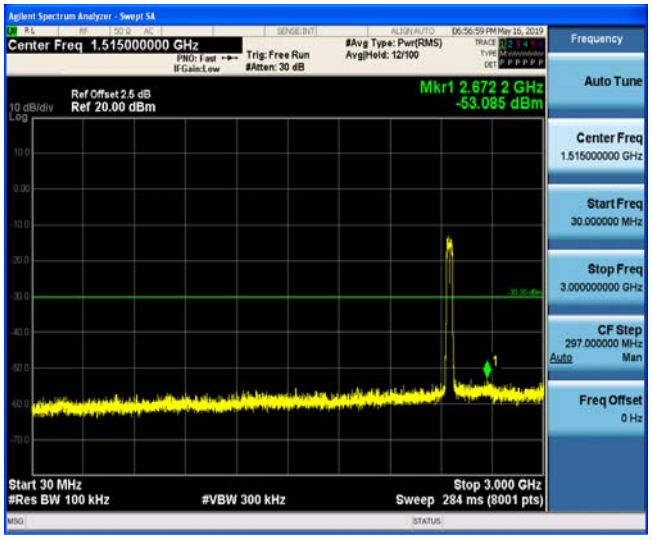
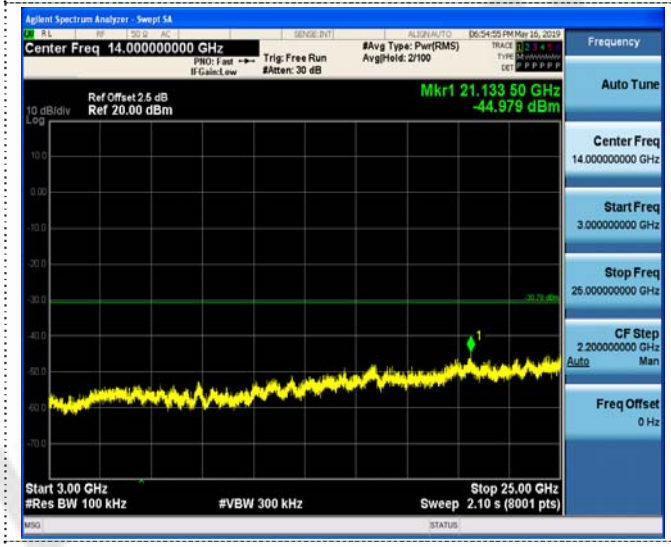
802.11b CH01	*802.11b CH06*
	
Reference	
	
30MHz-3GHz	30MHz-3GHz
	
3GHz-25GHz	3GHz-25GHz

802.11b CH11	*802.11g CH01*
	
Reference	Reference
	
30MHz-3GHz	30MHz-3GHz
	
3GHz-25GHz	3GHz-25GHz

802.11g CH06	*802.11g CH11*
	
Reference	Reference
	
30MHz-3GHz	30MHz-3GHz
	
3GHz-25GHz	3GHz-25GHz

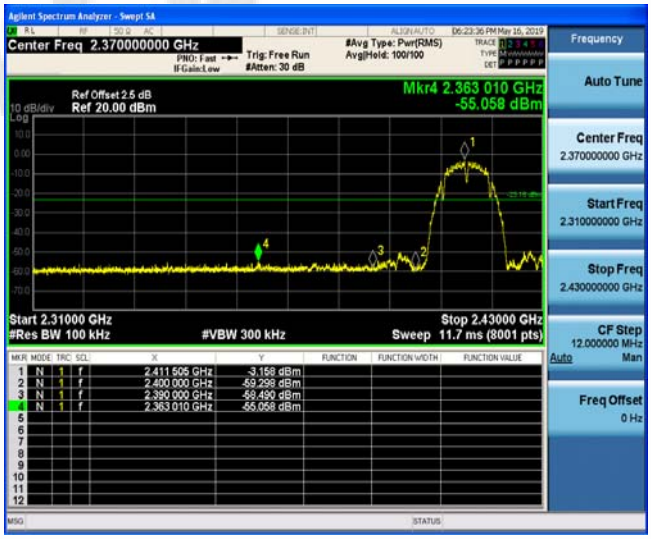
802.11n(HT20) CH01	*802.11n(HT20) CH06*
	
Reference	
	
30MHz-3GHz	30MHz-3GHz
	
3GHz-25GHz	3GHz-25GHz

802.11n(HT20) CH11	*802.11n(HT40) CH03*
	
Reference	Reference
	
30MHz-3GHz	30MHz-3GHz
	
3GHz-25GHz	3GHz-25GHz

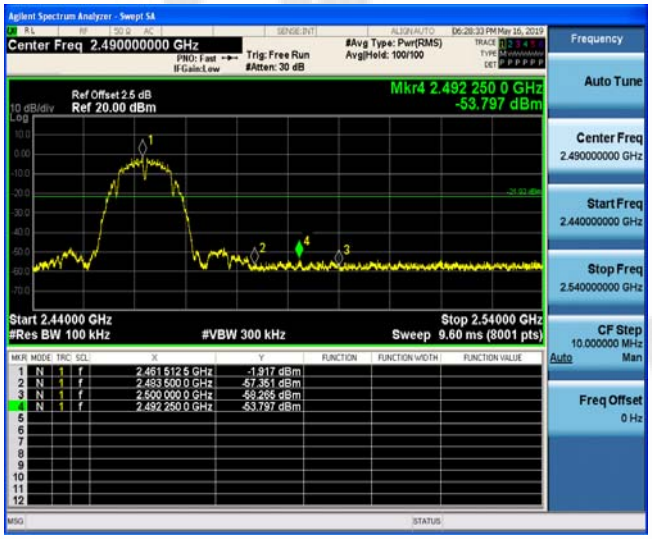
802.11n(HT40) CH06	*802.11n(HT40) CH09*
	
Reference	Reference
	
30MHz-3GHz	30MHz-3GHz
	
3GHz-25GHz	3GHz-25GHz

Band-edge Measurements for RF Conducted Emissions:

802.11b

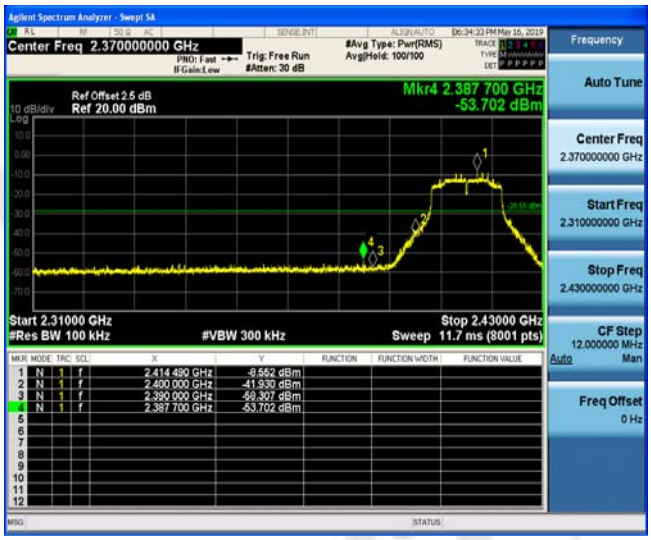


Left bandedge

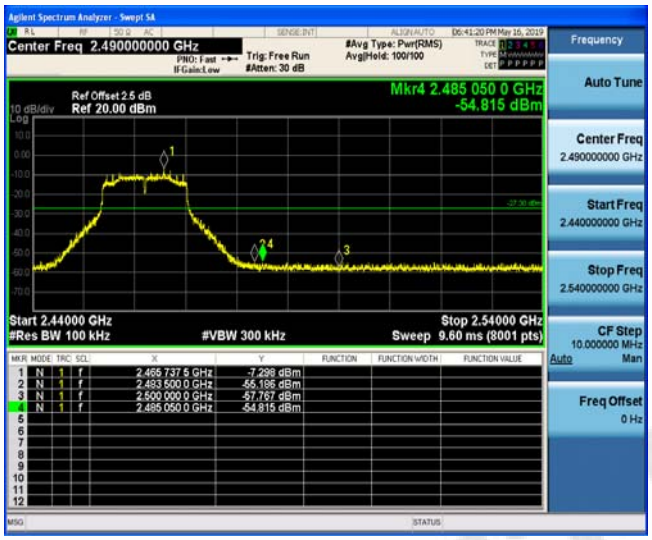


Right bandedge

802.11g

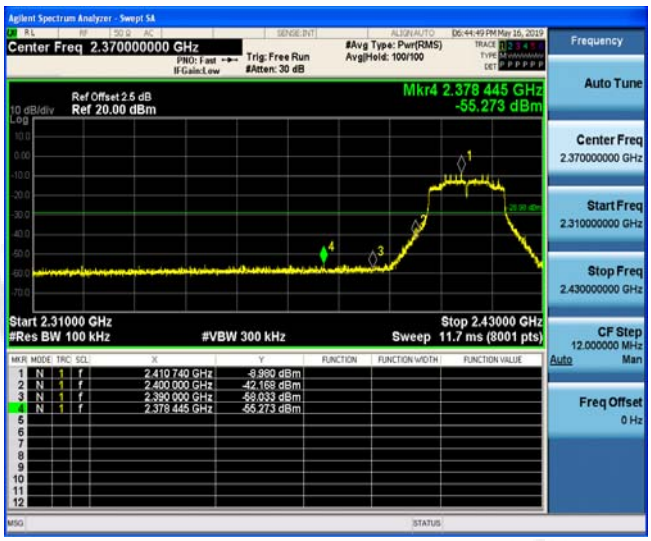


Left bandedge

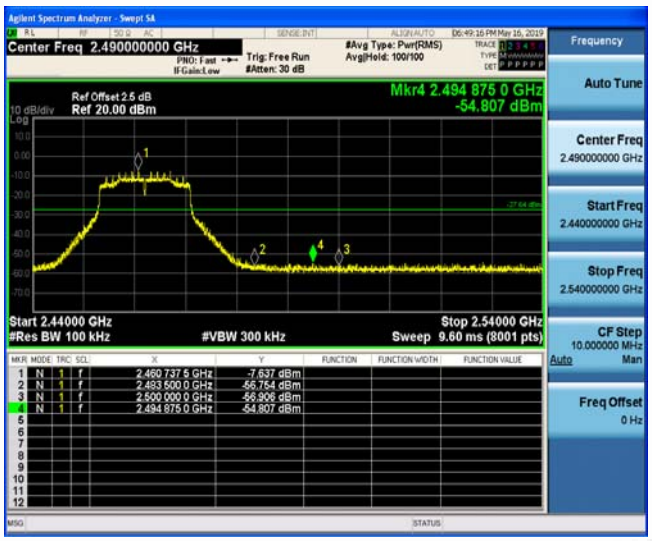


Right bandedge

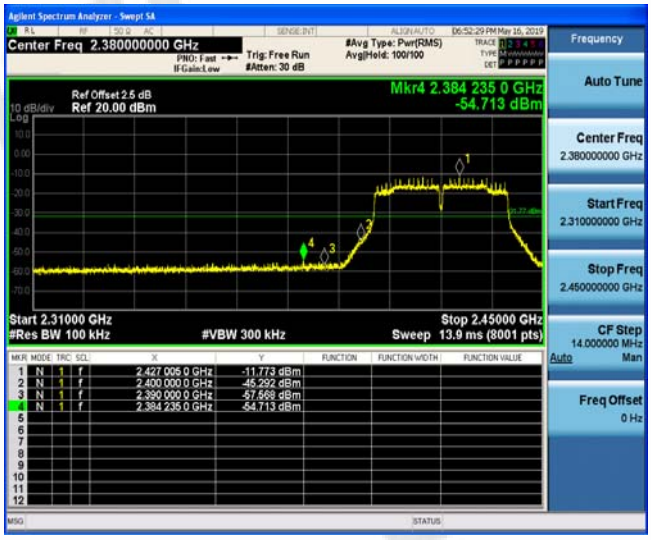
802.11n(HT20)



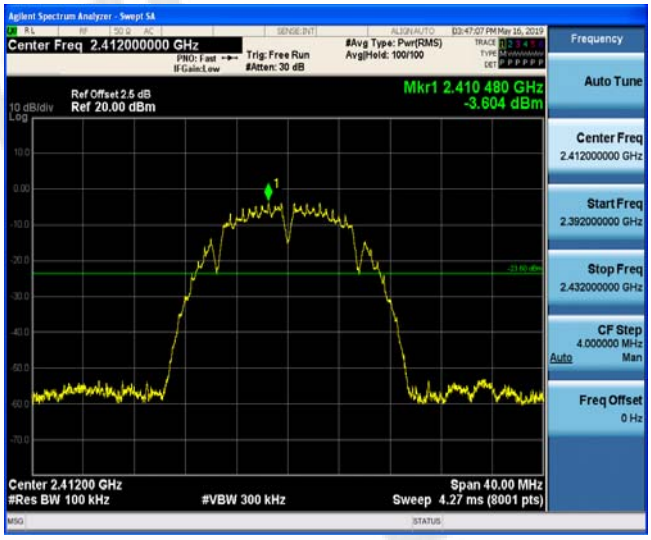
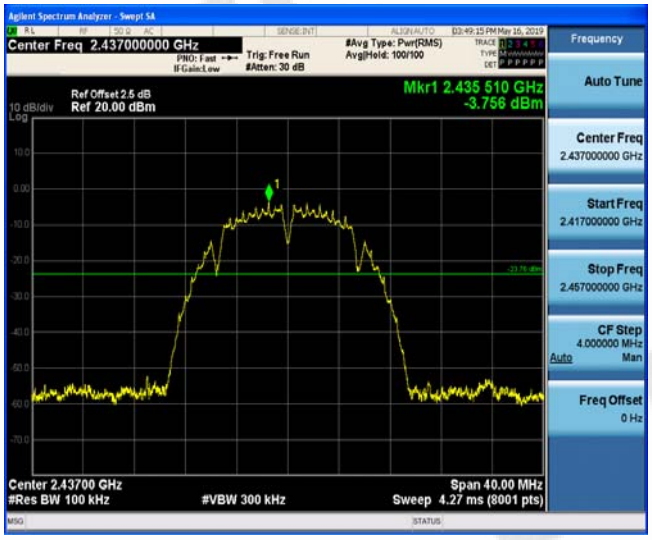
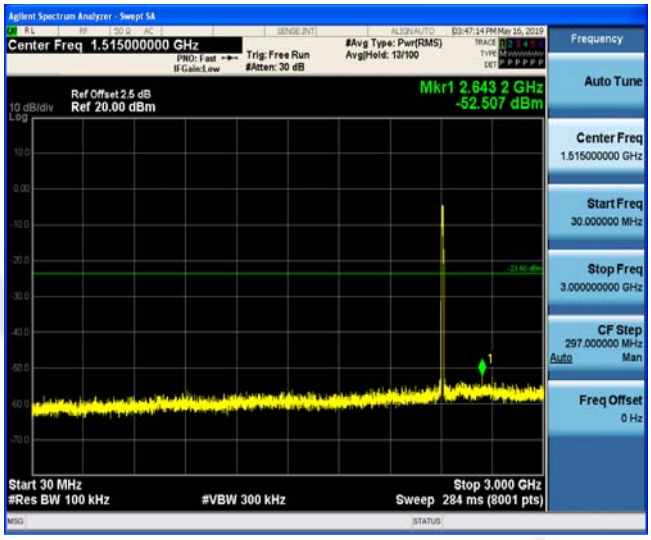
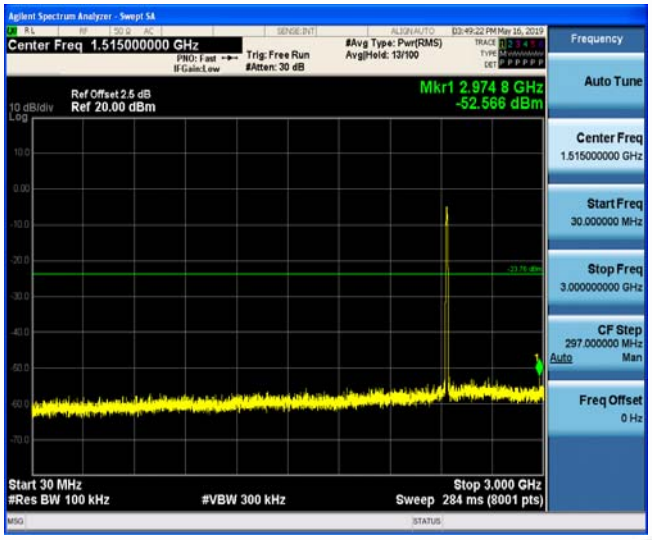
Left bandedge

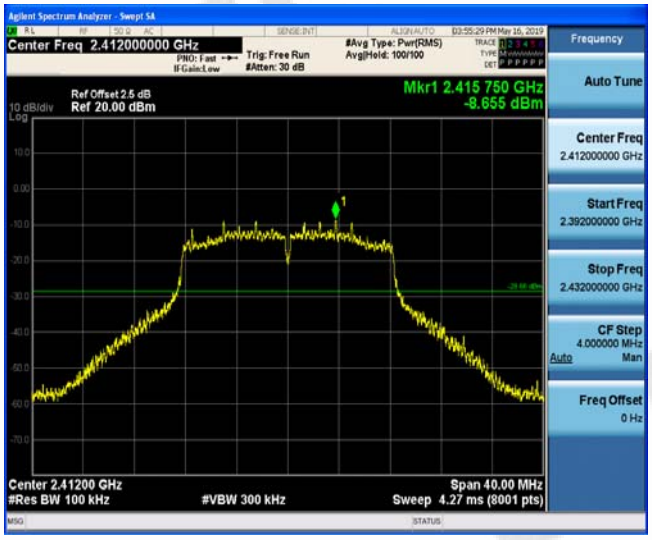
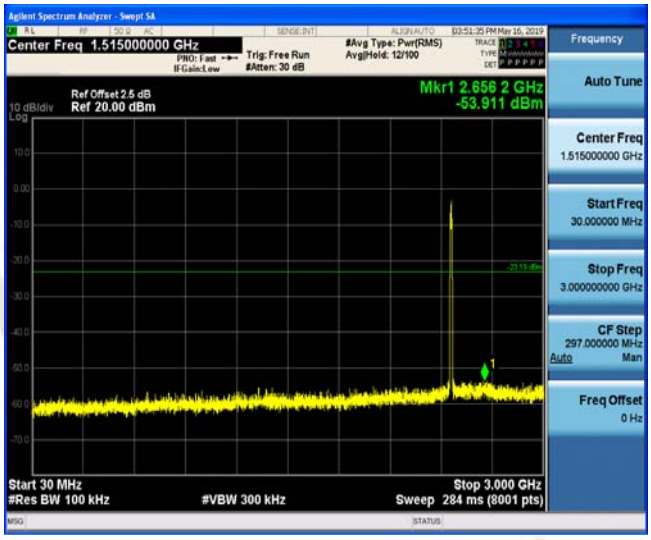
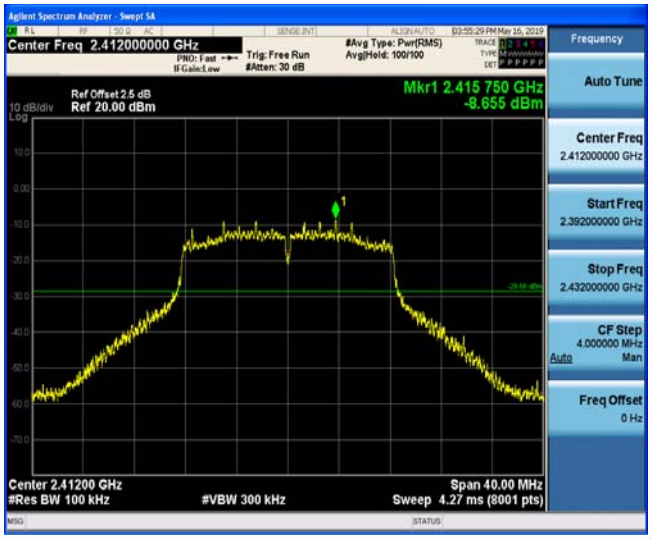


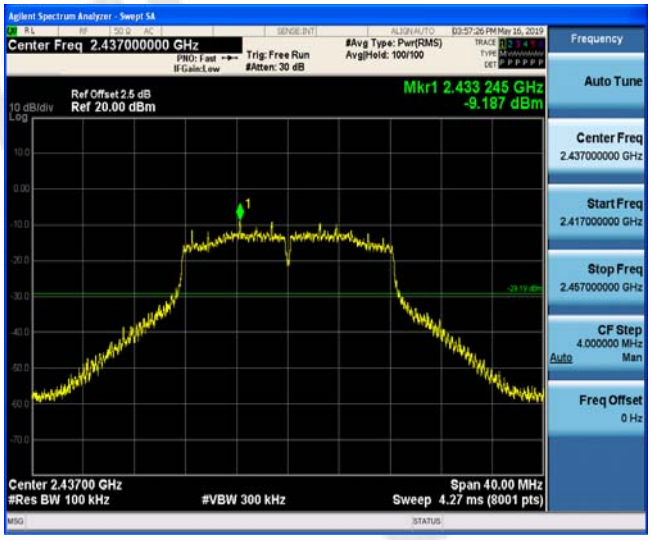
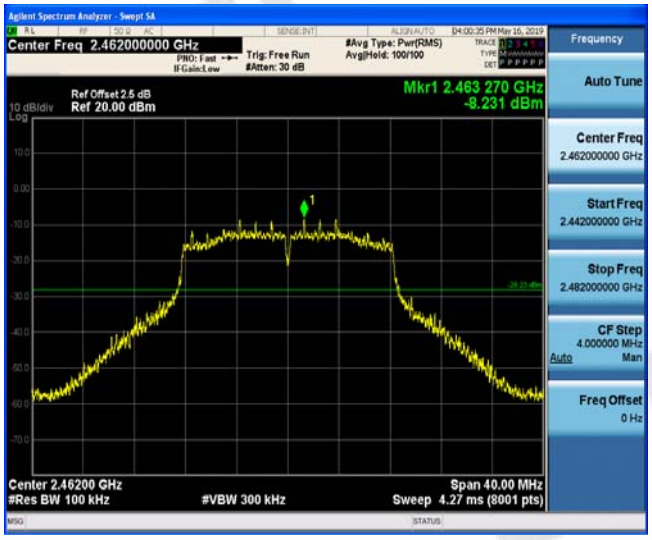
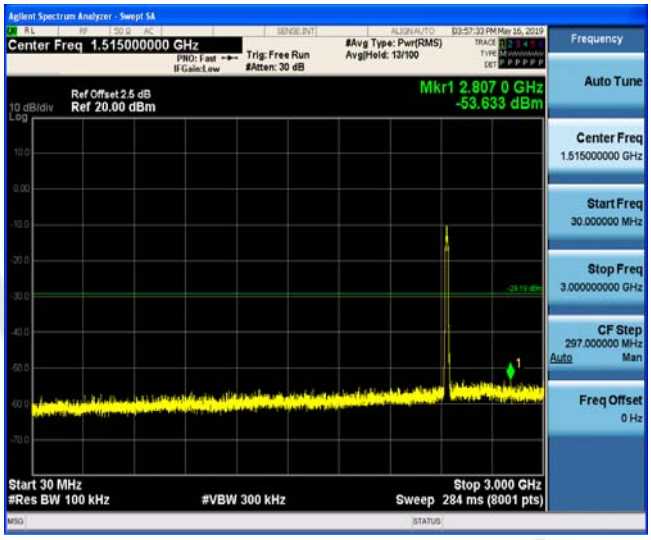
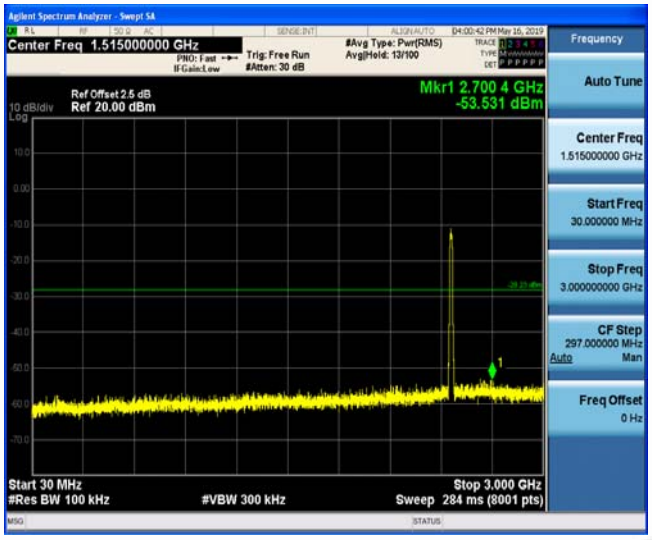
Right bandedge

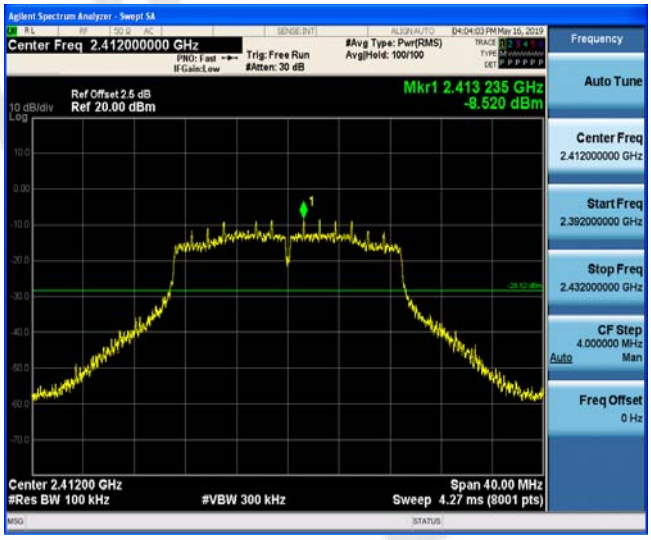
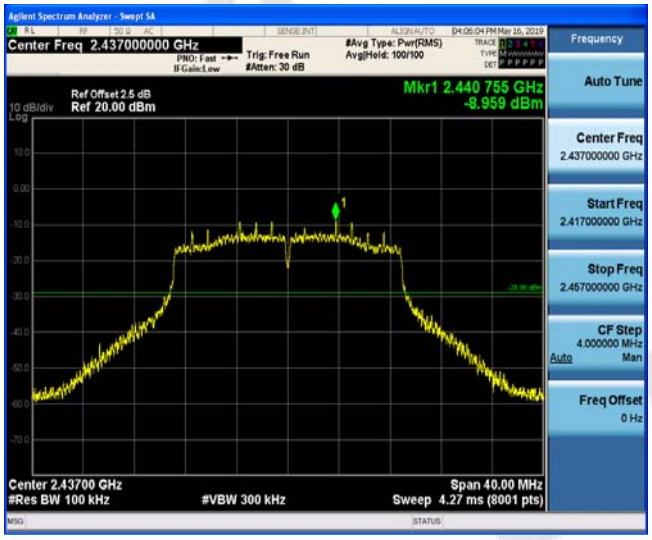
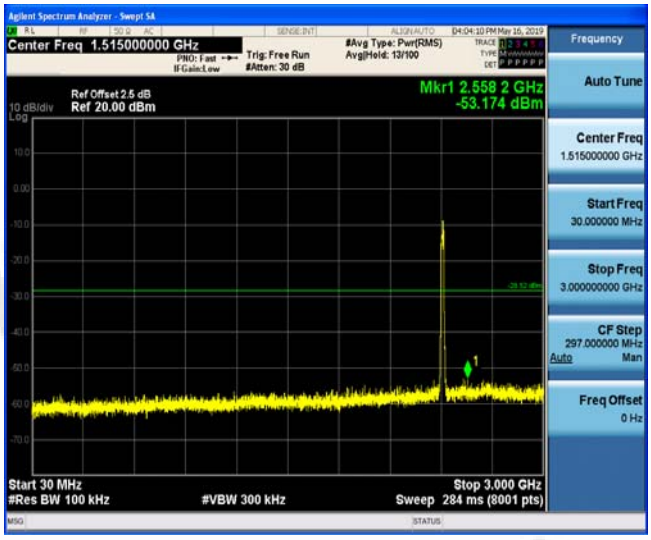
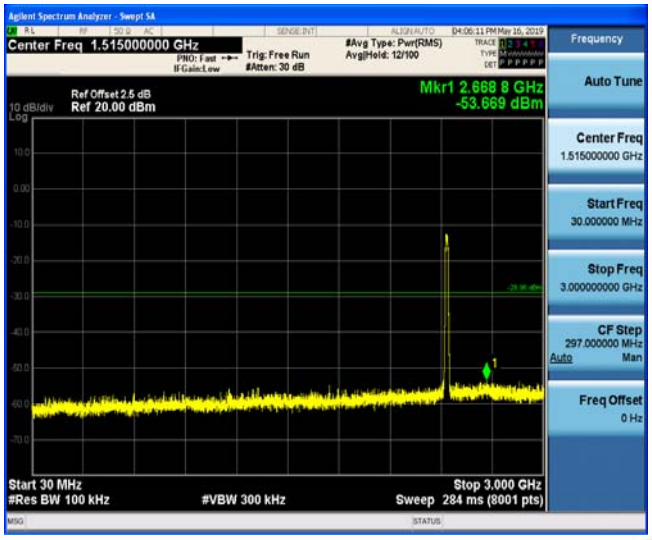
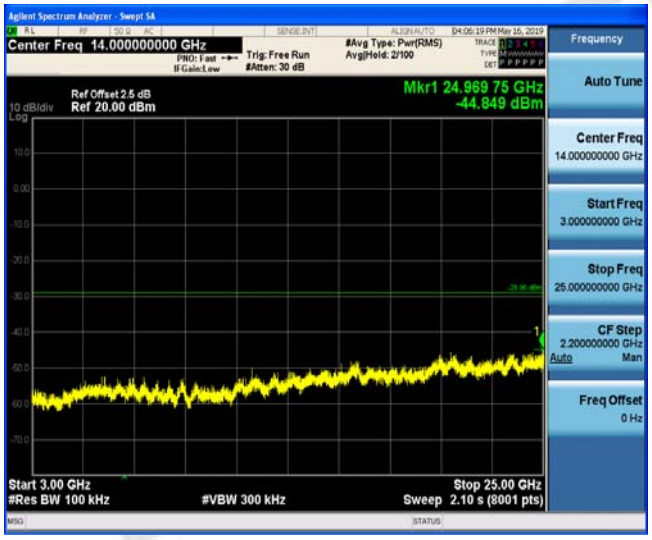
802.11n(HT40)	
	
Left bandedge	Right bandedge

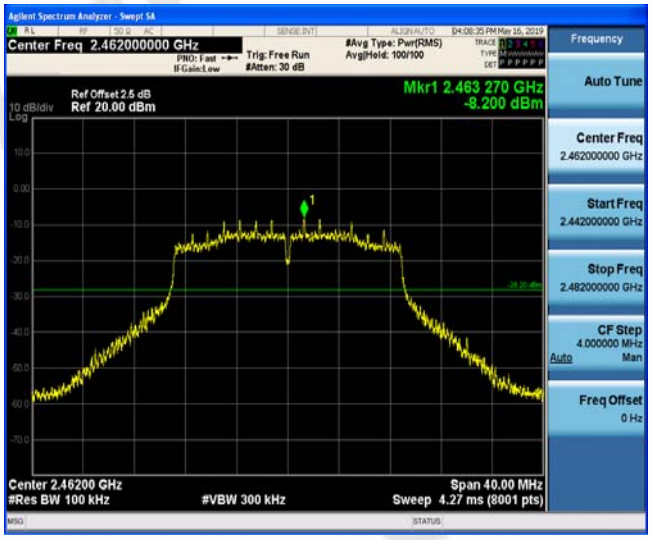
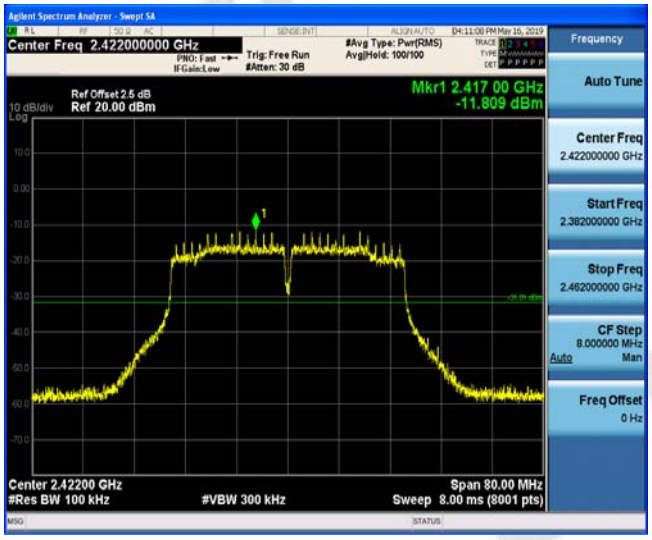
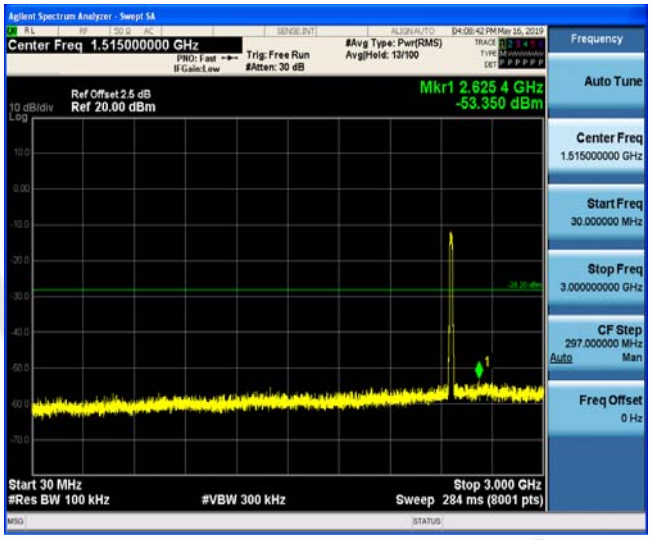
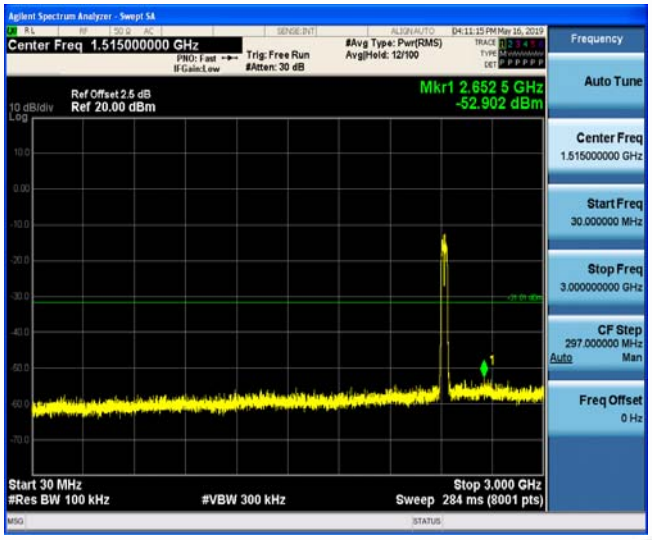
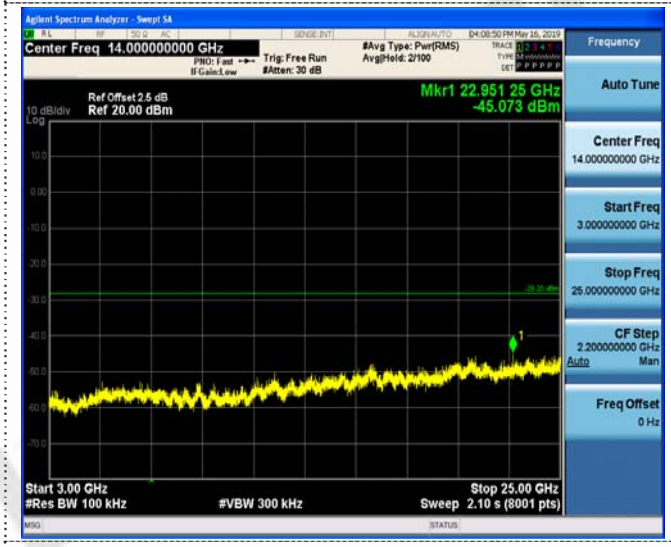
Ant.2

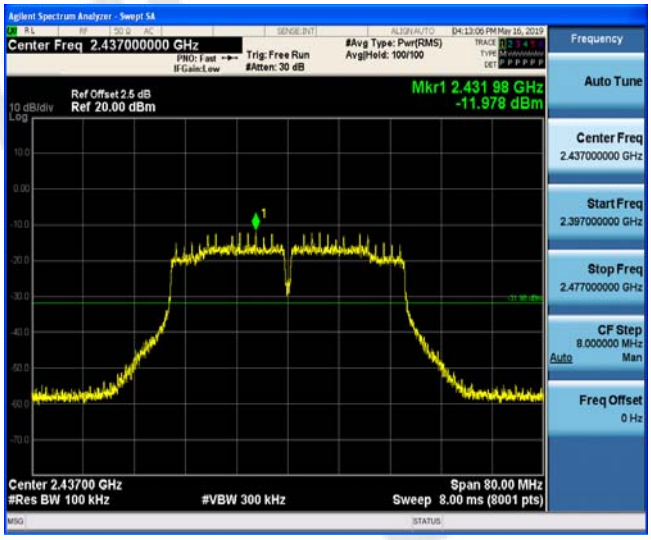
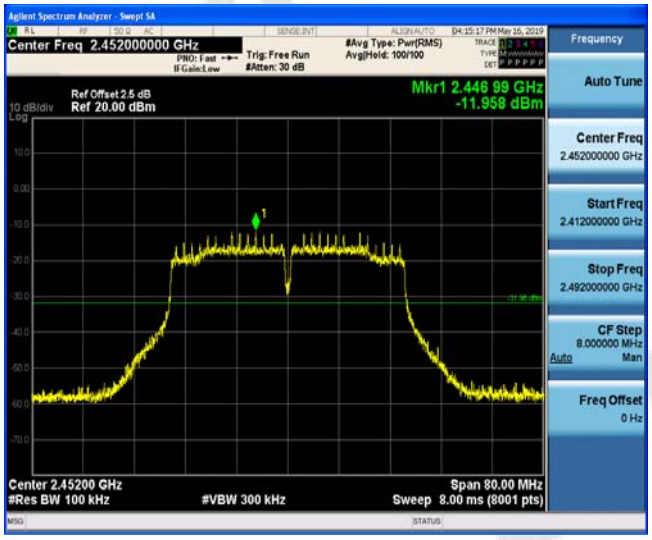
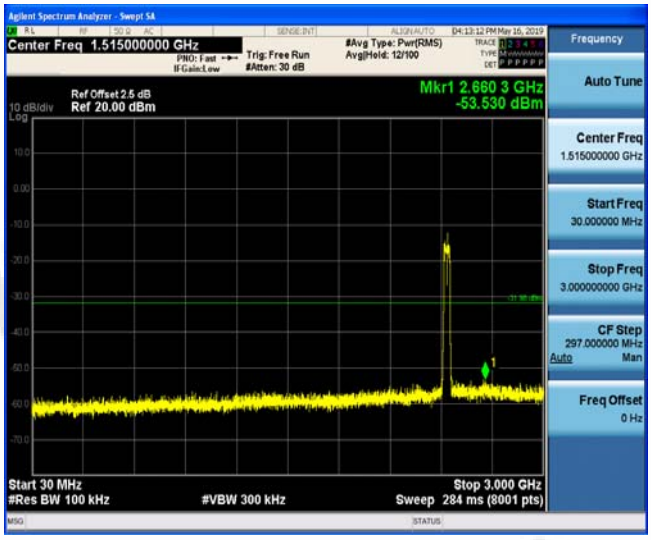
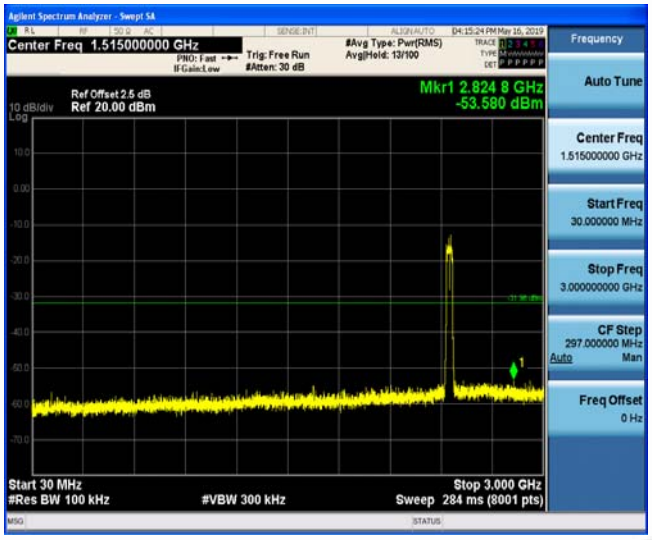
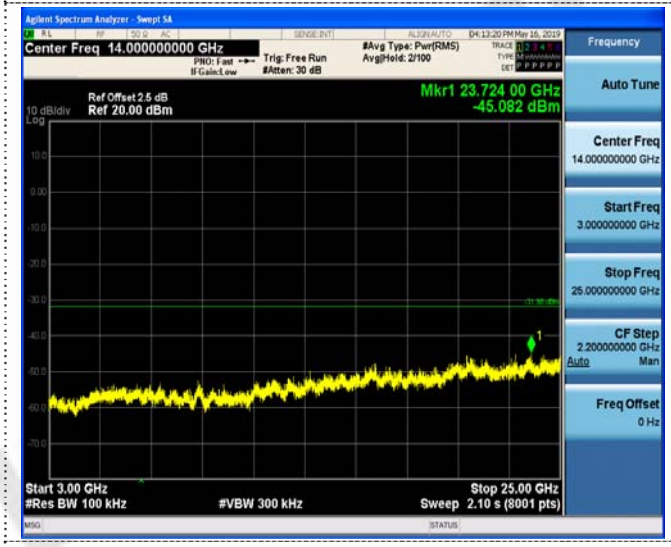
802.11b CH01	*802.11b CH06*
	
Reference	
	
30MHz-3GHz	30MHz-3GHz
	
3GHz-25GHz	3GHz-25GHz

802.11b CH11	*802.11g CH01*
	
Reference	Reference
	
30MHz-3GHz	30MHz-3GHz
	
3GHz-25GHz	3GHz-25GHz

802.11g CH06	*802.11g CH11*
	
Reference	Reference
	
30MHz-3GHz	30MHz-3GHz
	
3GHz-25GHz	3GHz-25GHz

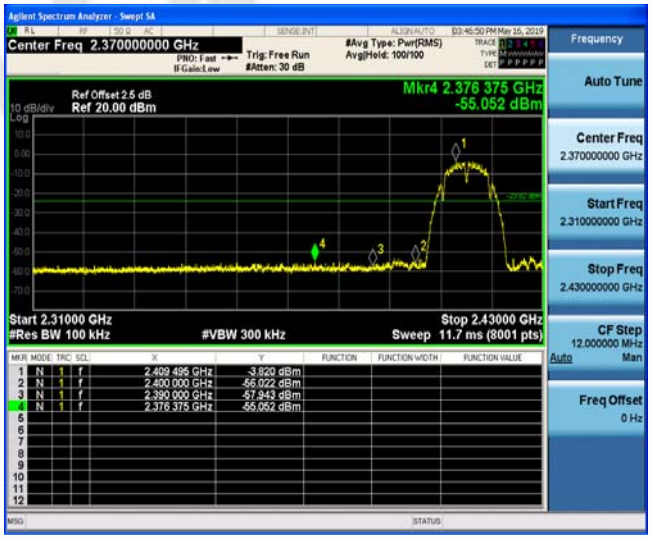
802.11n(HT20) CH01	*802.11n(HT20) CH06*
	
Reference	
	
30MHz-3GHz	30MHz-3GHz
	
3GHz-25GHz	3GHz-25GHz

802.11n(HT20) CH11	*802.11n(HT40) CH03*
	
Reference	Reference
	
30MHz-3GHz	30MHz-3GHz
	
3GHz-25GHz	3GHz-25GHz

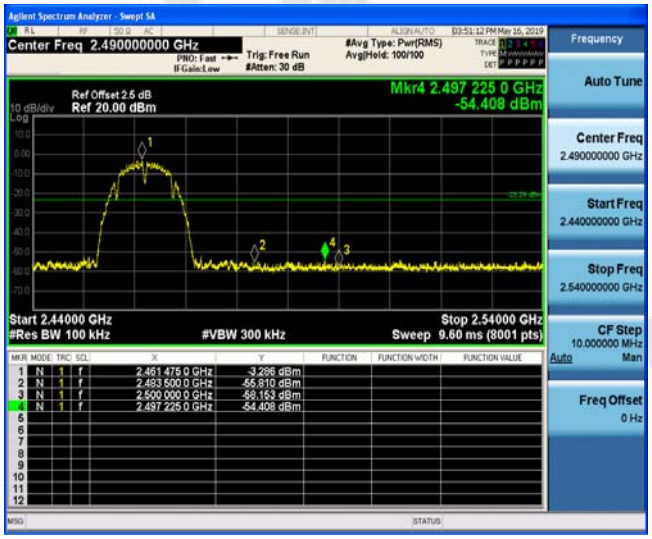
802.11n(HT40) CH06	802.11n(HT40) CH09
	
Reference	Reference
	
30MHz-3GHz	30MHz-3GHz
	
3GHz-25GHz	3GHz-25GHz

Band-edge Measurements for RF Conducted Emissions:

802.11b

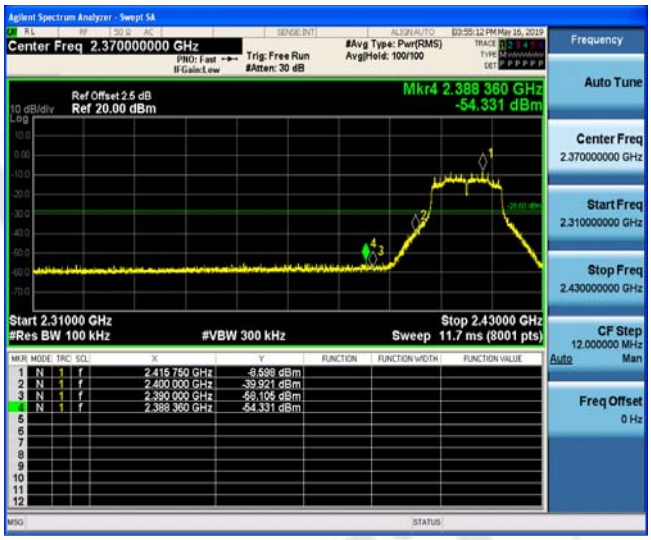


Left bandedge

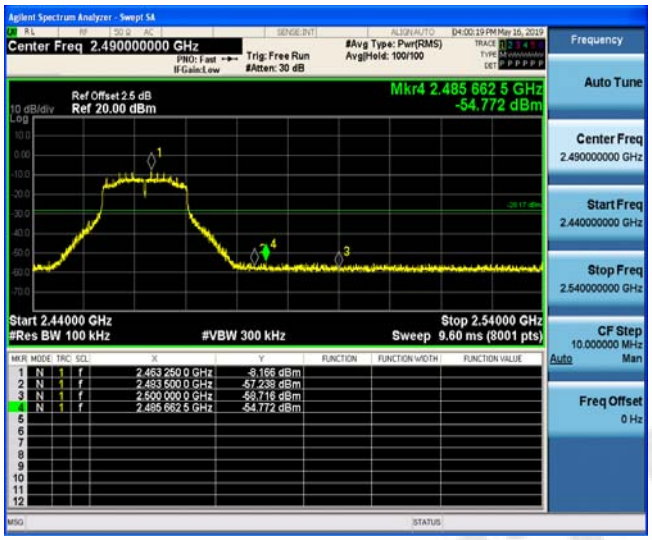


Right bandedge

802.11g

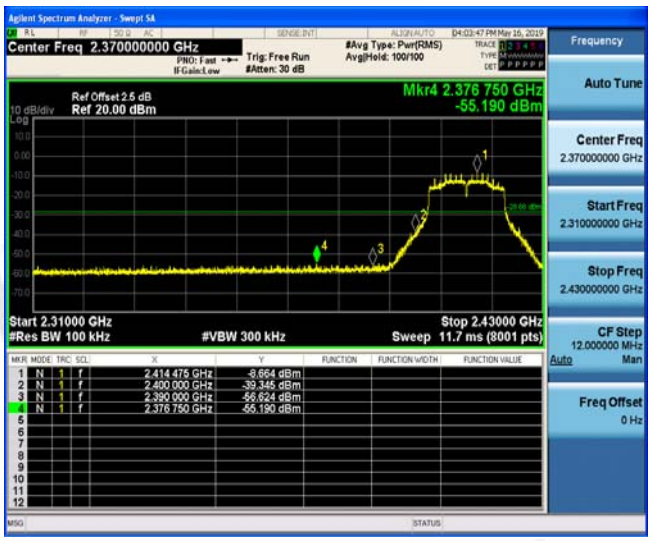


Left bandedge

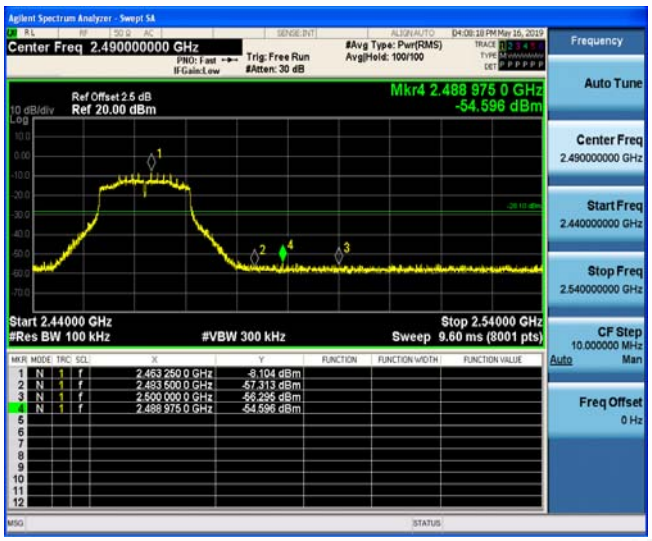


Right bandedge

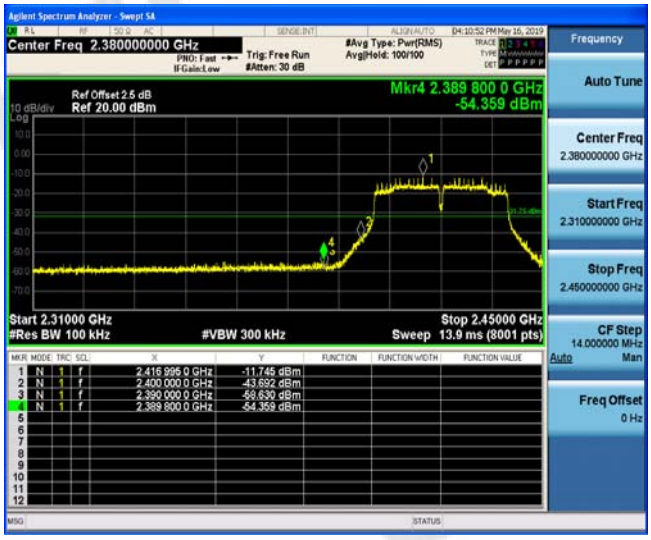
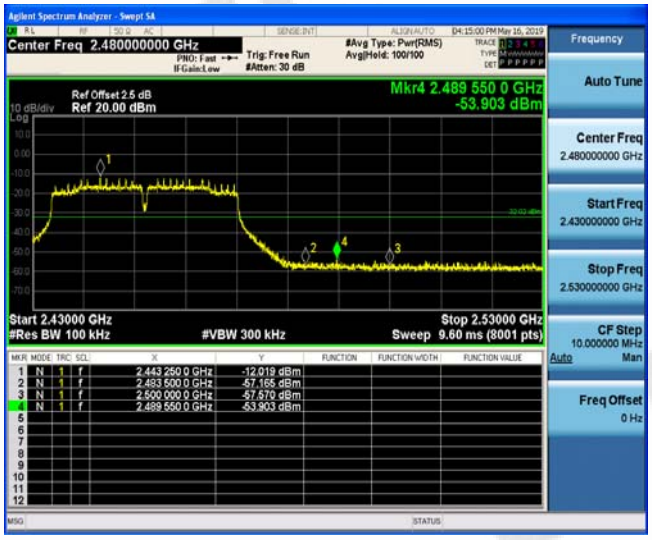
802.11n(HT20)



Left bandedge



Right bandedge

802.11n(HT40)	
	
Left bandedge	Right bandedge

3.7. Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203:

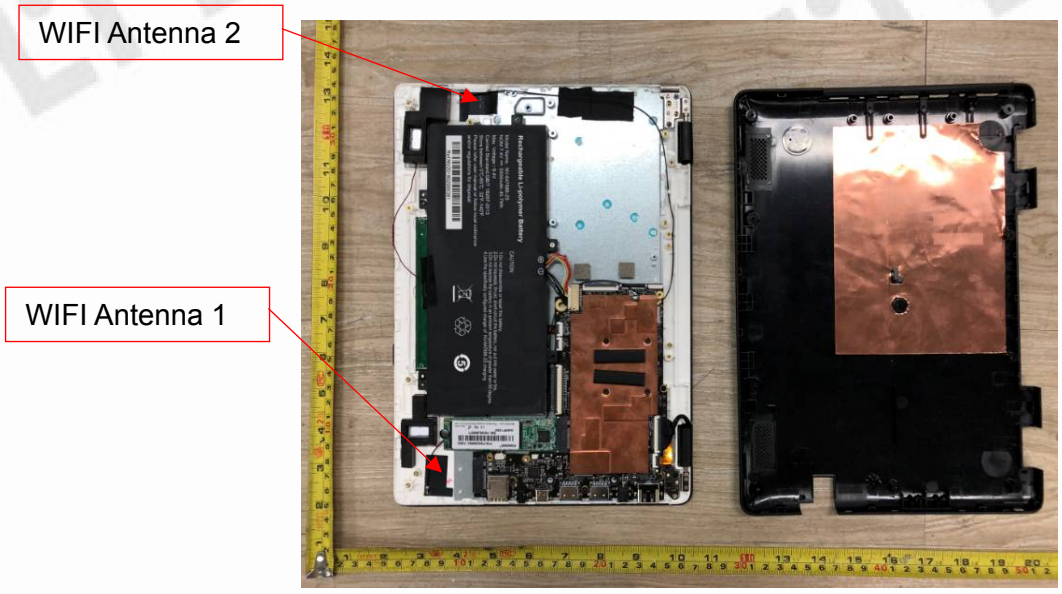
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit 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):

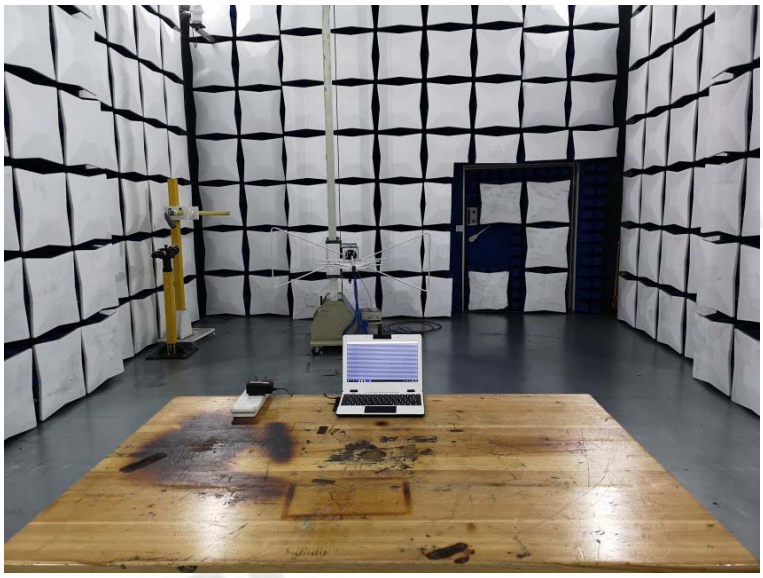
(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional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

Test Result:

The EUT used 2*TX 2*RX antenna, the maximum gain of WIFI antenna was 1.7dBi.



4. Test Setup Photos of the EUT



5. External and Internal Photos of the EUT

Reference to the test report No. CTL1905077021-WF02

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