8. Occupied Bandwidth

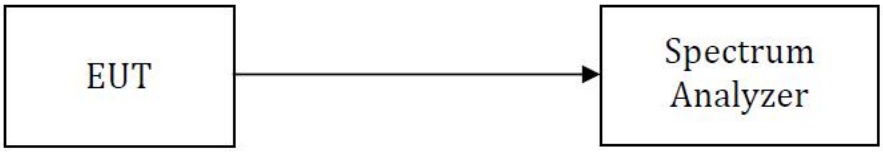
8.1 Standard and Limit

According to 15.247(a)(2), Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

8.2 Test Procedure

According to the ANSI 63.10-2013, section 6.9, the emission bandwidth test method as follows.

1) Remove the antenna from the EUT and connect to the spectrum analyzer via a low loss RF cable.
2) Set the spectrum analyzer to any one measured frequency within its operating range.
3) 6dB: Set RBW = 100kHz, VBW ≥ [3 × RBW], Sweep = Auto.
   99%: Set RBW = 1%~5% of 99% bandwidth, VBW ≥ [3 × RBW], Sweep = Auto.
4) Set a reference level on the measuring instrument equal to the highest peak value.
5) Measure the frequency difference of two frequencies that were attenuated 6dB from the reference level. Record the frequency difference as the emission bandwidth.
6) Repeat the above procedures until all frequencies measured were complete.

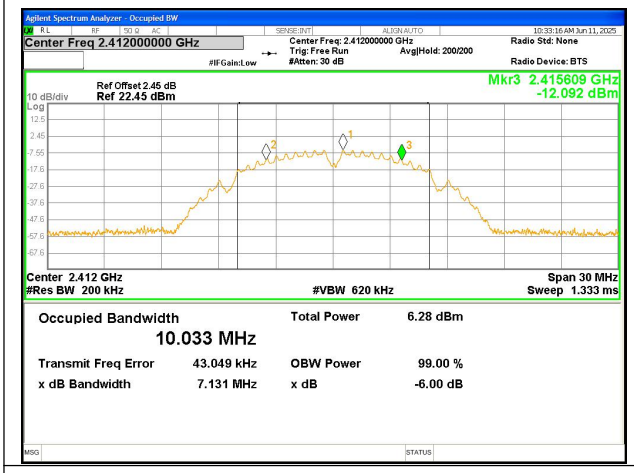
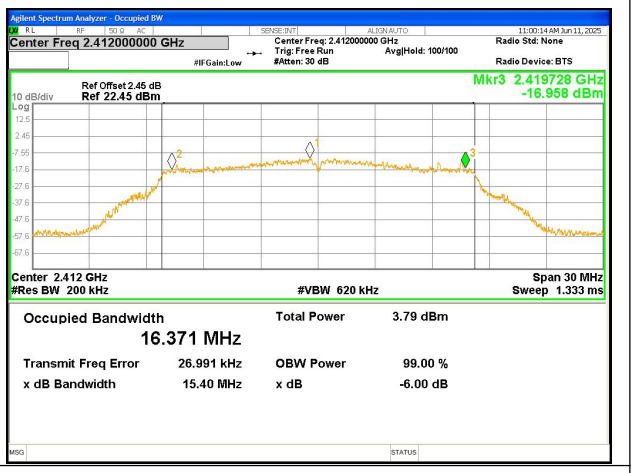
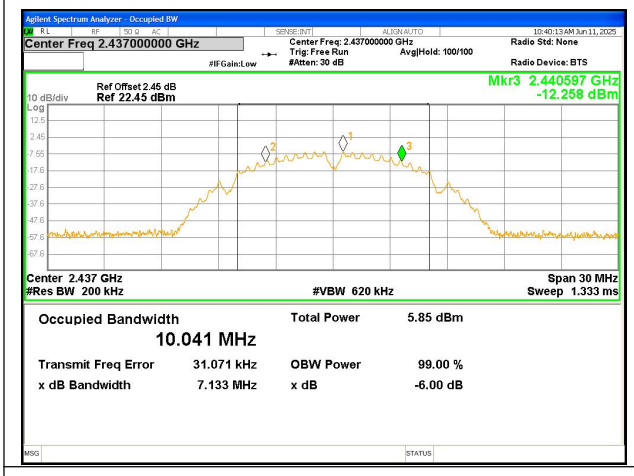
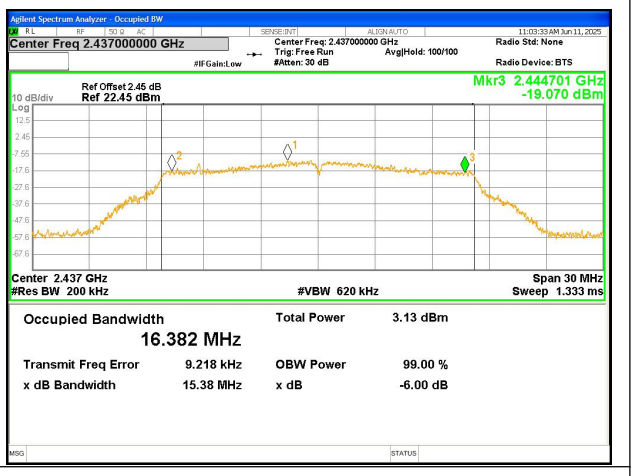
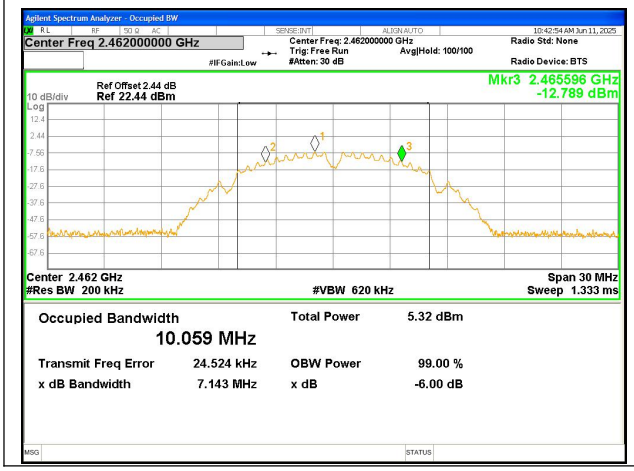
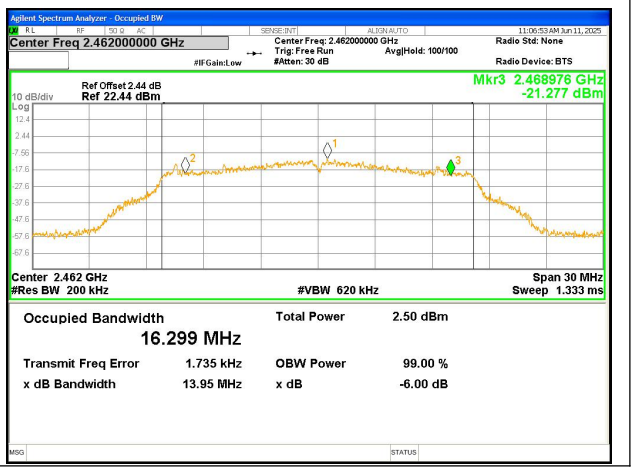


Test Setup Block Diagram

8.3 Test Data and Results

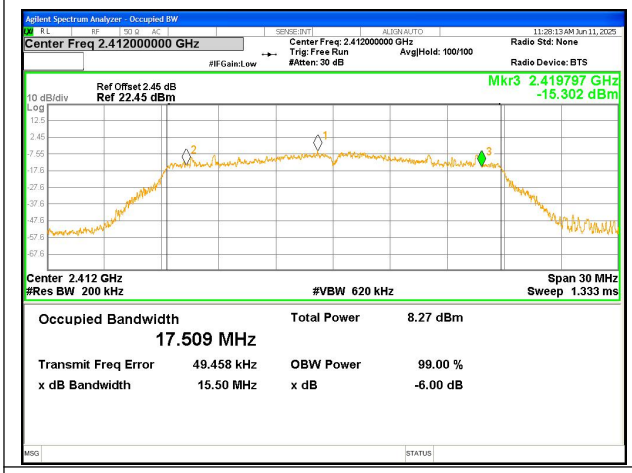
Test Mode	Test Channel (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	6dB BW Limit (MHz)	Test Result
802.11b	2412	7.131	10.034	0.5	Pass
	2437	7.133	10.037	0.5	Pass
	2462	7.143	10.063	0.5	Pass
802.11g	2412	15.402	16.353	0.5	Pass
	2437	15.383	16.38	0.5	Pass
	2462	13.948	16.328	0.5	Pass
802.11n(HT20)	2412	15.496	17.522	0.5	Pass
	2437	15.468	17.544	0.5	Pass
	2462	15.12	17.468	0.5	Pass
802.11n(HT40)	2422	36.279	36.236	0.5	Pass
	2437	36.215	36.256	0.5	Pass
	2452	36.245	36.274	0.5	Pass

6dB Bandwidth:

802.11b	802.11g
2412MHz	2412MHz
	
2437MHz	2437MHz
	
2462MHz	2462MHz
	

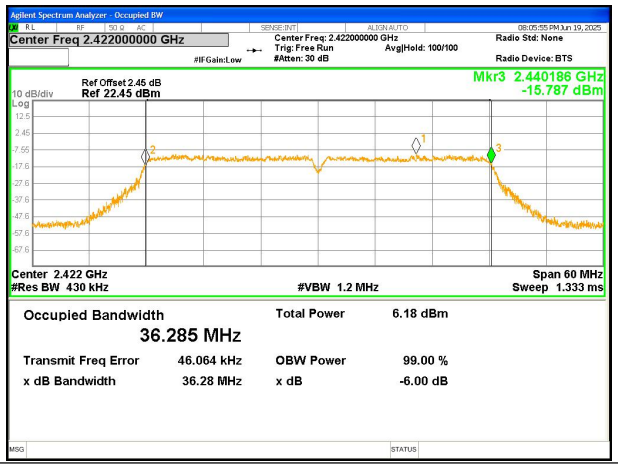
802.11n(HT20)

2412MHz

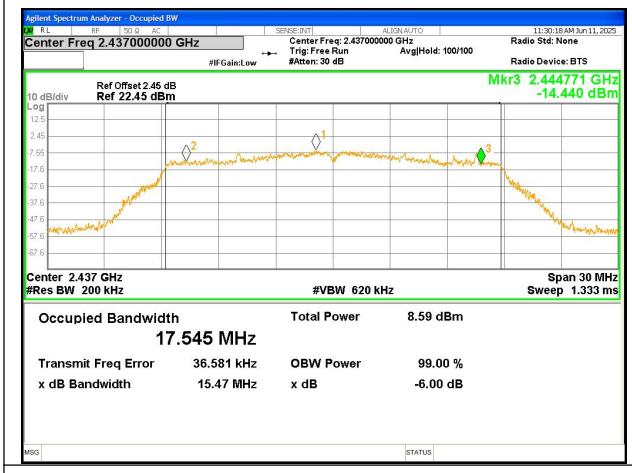


802.11n(HT40)

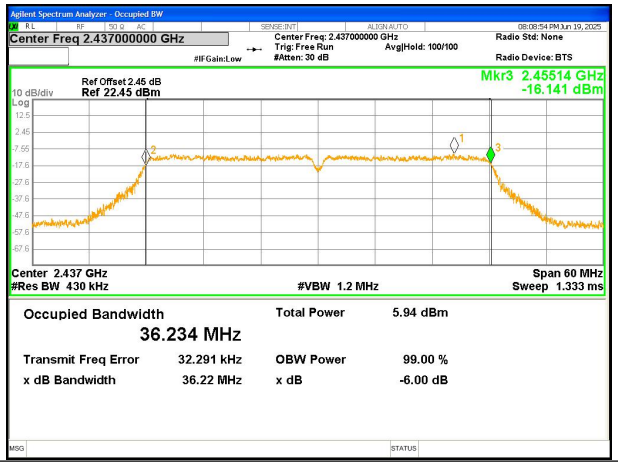
2422MHz



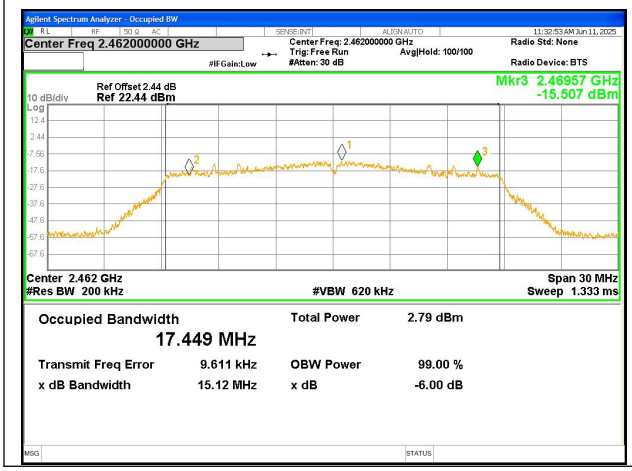
2437MHz



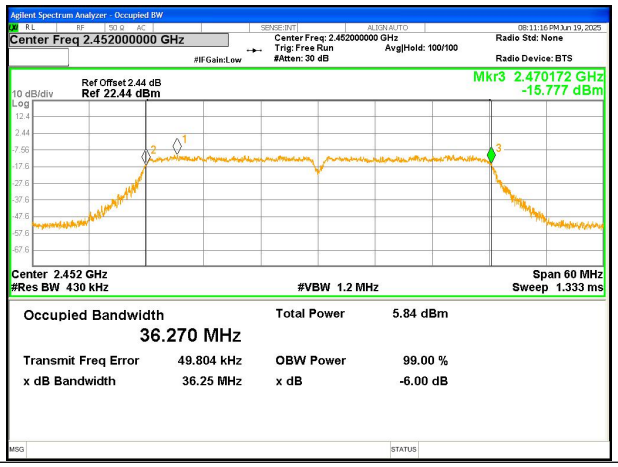
2437MHz



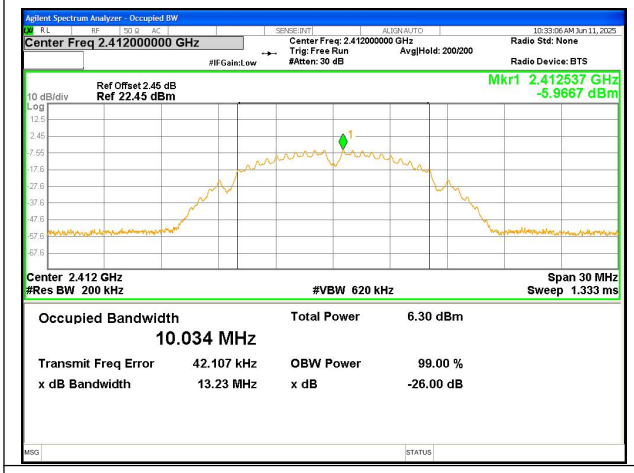
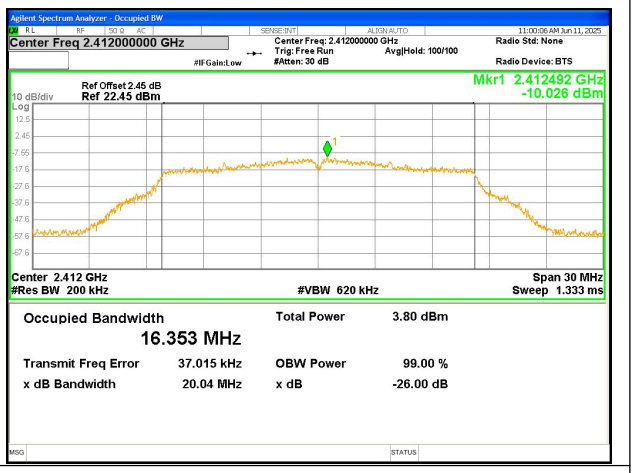
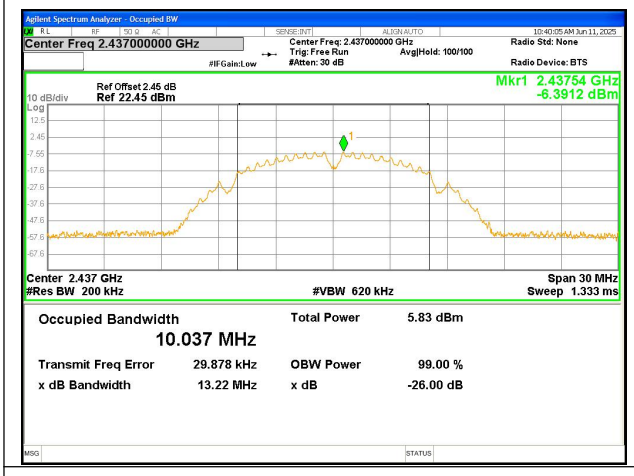
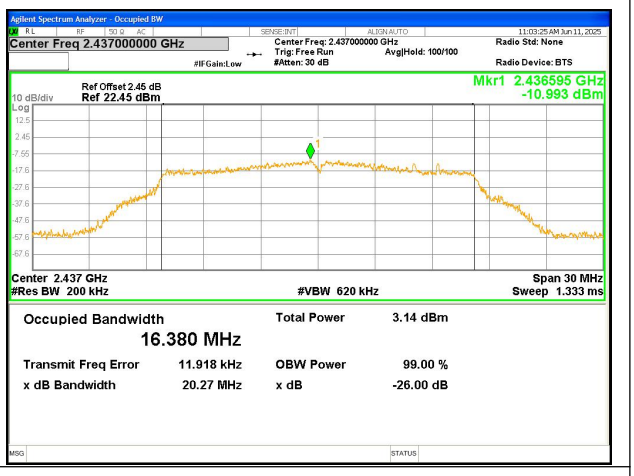
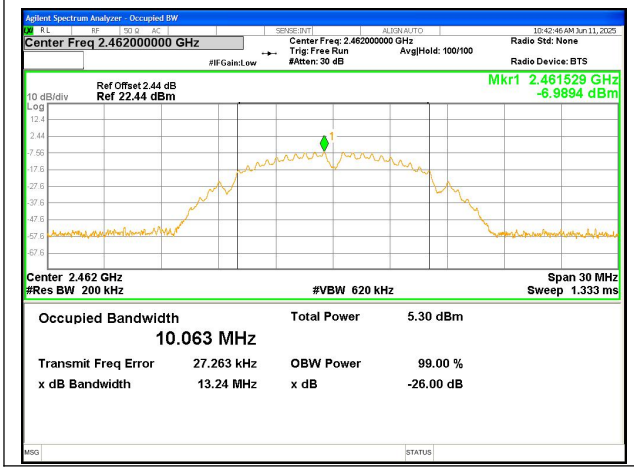
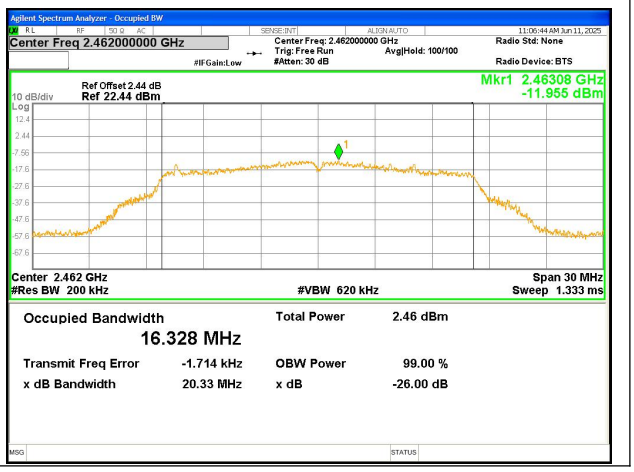
2462MHz



2452MHz

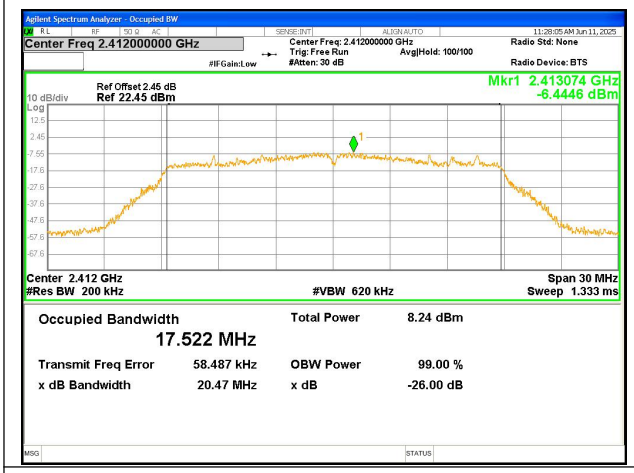


99% Bandwidth:

802.11b	802.11g
2412MHz	2412MHz
	
2437MHz	2437MHz
	
2462MHz	2462MHz
	

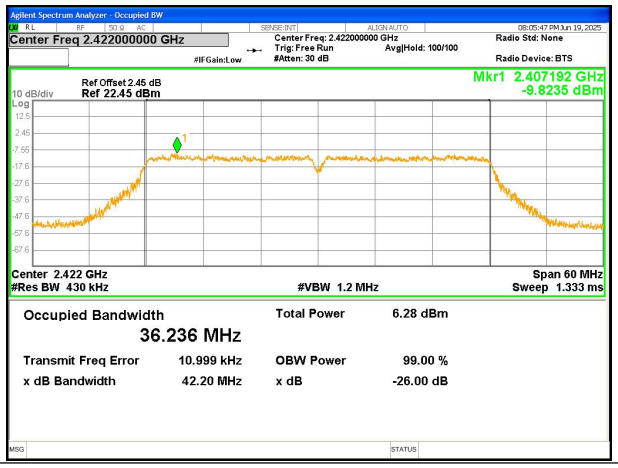
802.11n(HT20)

2412MHz

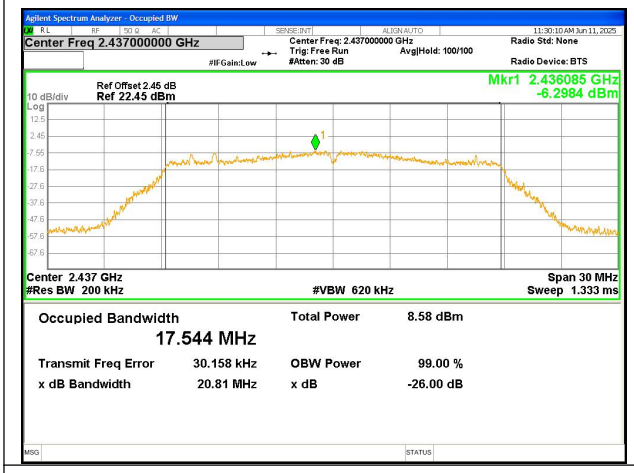


802.11n(HT40)

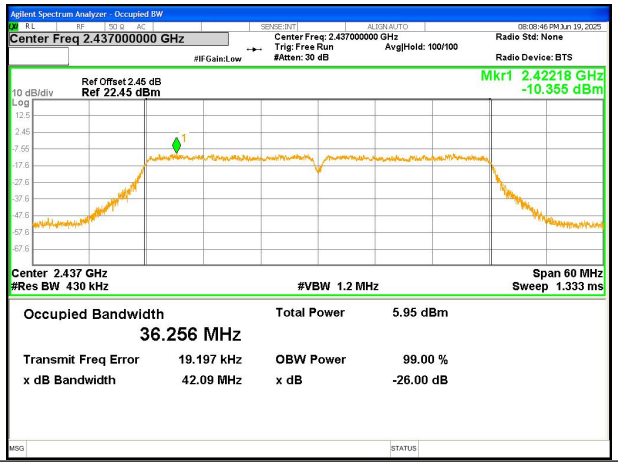
2422MHz



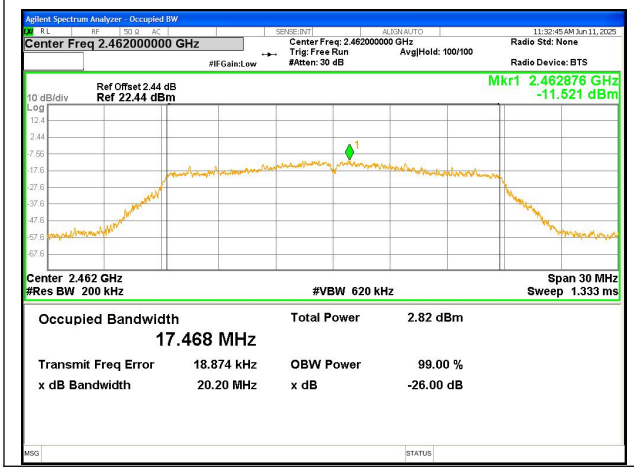
2437MHz



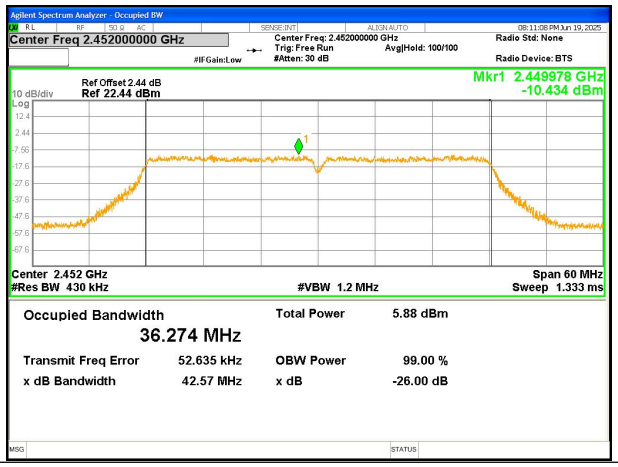
2437MHz



2462MHz



2452MHz



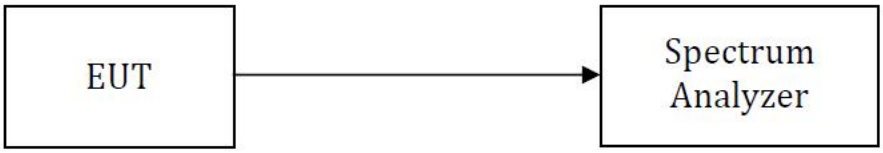
9. Maximum Power Spectral Density

9.1 Standard and Limit

According to FCC 15.247(e), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

9.2 Test Procedure

1) Remove the antenna from the EUT and connect to the spectrum analyzer via a low loss RF cable.
2) Set the spectrum analyzer to any one measured frequency within its operating range.
3) Set RBW = 3kHz, VBW = 10kHz, Sweep = Auto, Detector = RMS.
4) Measure the highest amplitude appearing on spectral display and mark the value.
5) Repeat above procedures until all frequencies measured were complete.

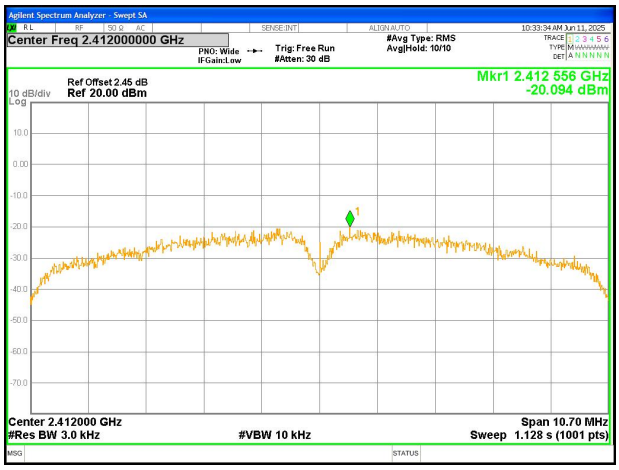
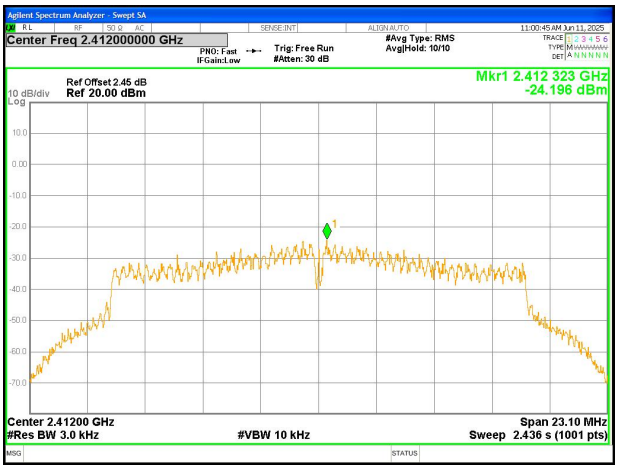
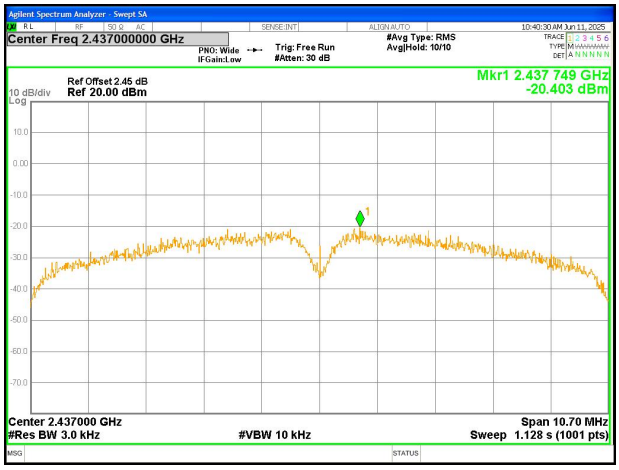
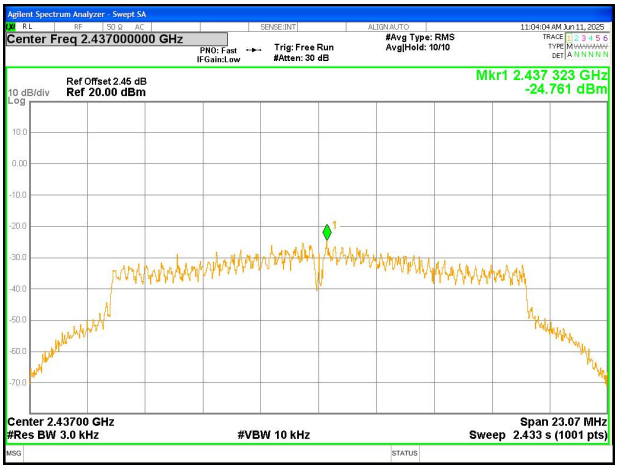
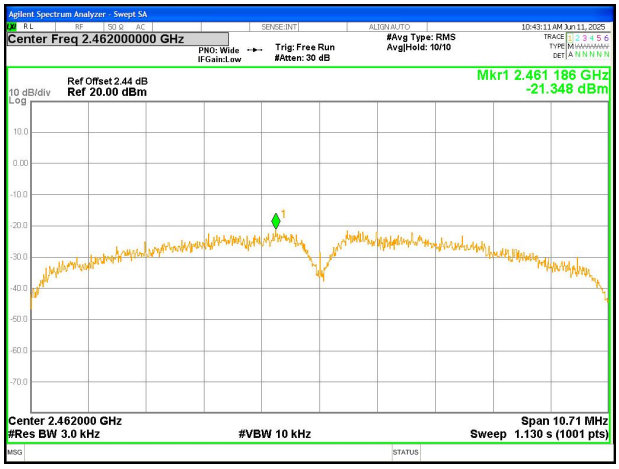
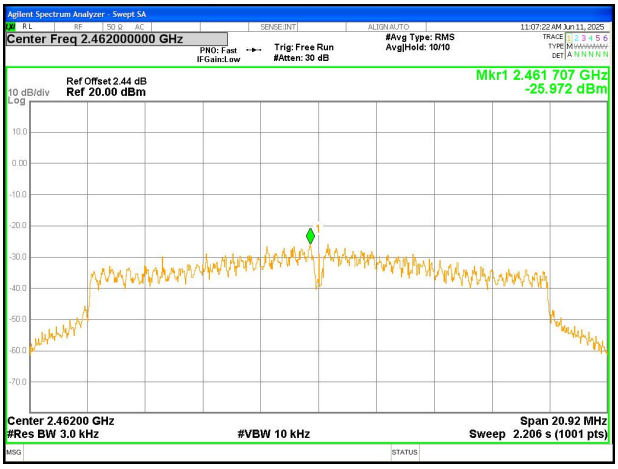


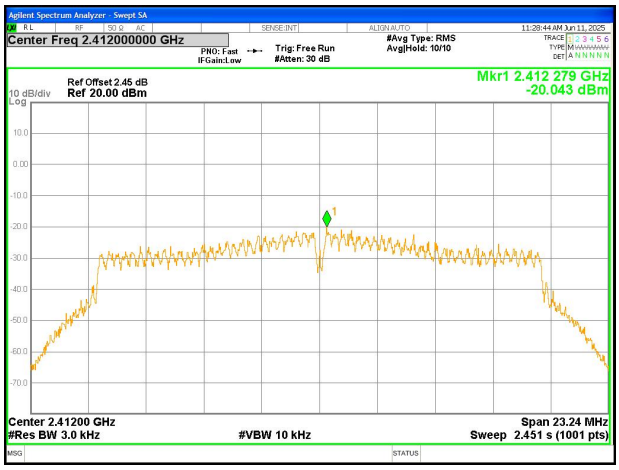
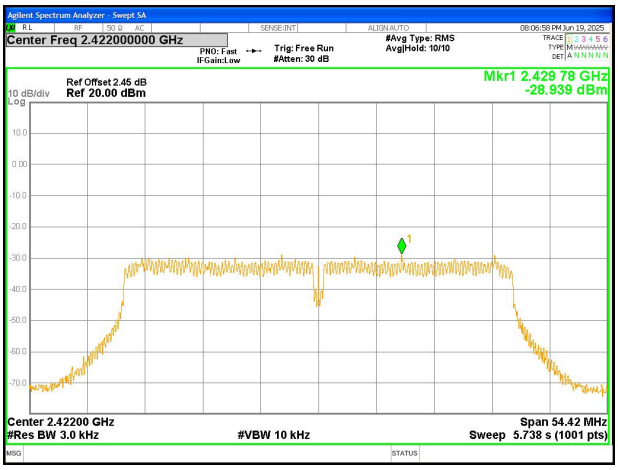
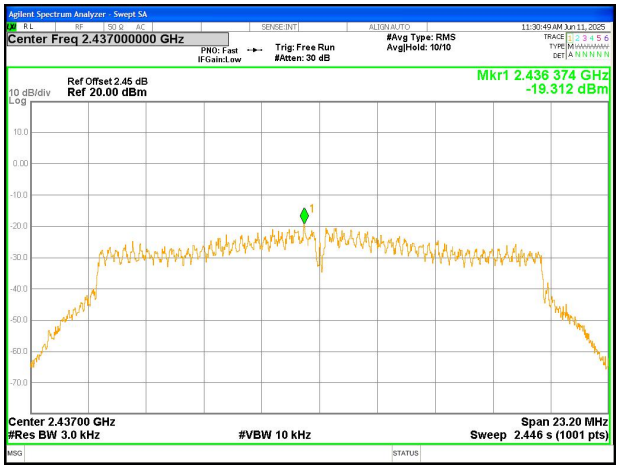
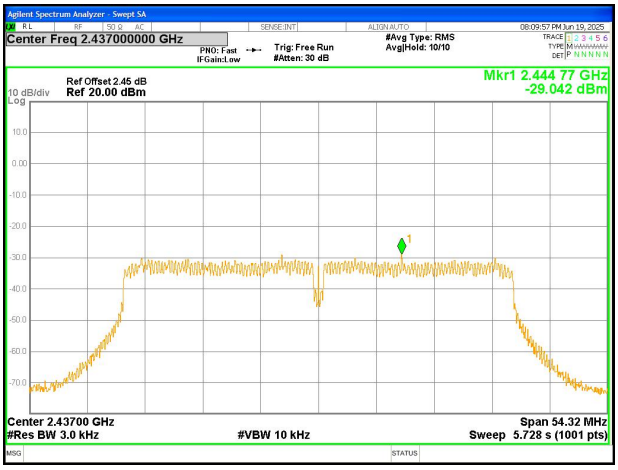
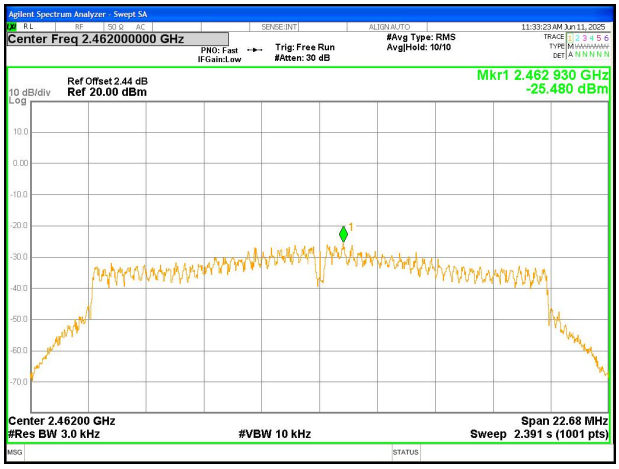
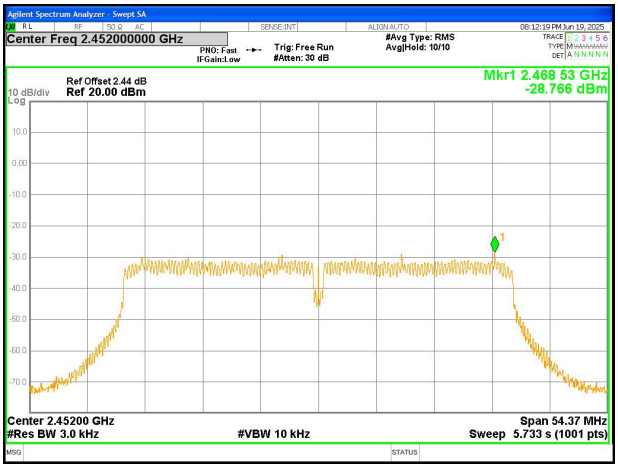
Test Setup Block Diagram

9.3 Test Data and Results

Test Mode	Test Channel (MHz)	Conducted PSD (dBm/3kHz)	Duty Factor (dB)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Test Result
802.11b	2412	-20.09	0	-20.09	8	Pass
	2437	-20.4	0	-20.4	8	Pass
	2462	-21.35	0	-21.35	8	Pass
802.11g	2412	-24.2	0.3	-23.9	8	Pass
	2437	-24.76	0.3	-24.46	8	Pass
	2462	-25.97	0.3	-25.67	8	Pass
802.11n(HT20)	2412	-20.04	0.32	-19.72	8	Pass
	2437	-19.31	0.32	-18.99	8	Pass
	2462	-25.48	0.35	-25.13	8	Pass
802.11n(HT40)	2422	-28.94	0	-28.94	8	Pass
	2437	-29.04	0	-29.04	8	Pass
	2452	-28.77	0	-28.77	8	Pass

Note: Total PSD = Conducted PSD + Duty Factor

802.11b	802.11g
2412MHz	2412MHz
	
2437MHz	2437MHz
	
2462MHz	2462MHz
	

802.11n(HT20)	802.11n(HT40)
2412MHz	2422MHz
	
2437MHz	2437MHz
	
2462MHz	2452MHz
	

10. Band-edge Emission(Conducted)

10.1 Standard and Limit

According to §15.247(d), 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. 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 in § 15.209(a) (see § 15.205(c)).

10.2 Test Procedure

Test is conducting under the description of ANSI C63.10 - 2013 section 11.11.2 and 11.11.3.
Reference level measurement:
1) Remove the antenna from the EUT and connect to the spectrum analyzer via a low loss RF cable.
2) Set instrument center frequency to DTS channel center frequency.
3) Set the span to 1.5 times the DTS bandwidth.
4) Set the RBW = 100 kHz.
5) Set the VBW [3 × RBW].
6) Detector = peak.
7) Sweep time = auto couple.
8) Trace mode = max hold.
9) Allow trace to fully stabilize.
10) Use the peak marker function to determine the maximum PSD level.
Emission level measurement:
1) Set the center frequency and span to encompass frequency range to be measured.
2) Set the RBW = 100 kHz.
3) Set the VBW [3 × RBW].
4) Detector = peak.
5) Sweep time = auto couple.
6) Trace mode = max hold.
7) Allow trace to fully stabilize.
8) Use the peak marker function to determine the maximum amplitude level.