



802.11g

We test all antenna's data, the data only show the antenna1 worst mode.

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre- amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:2412									
V	2390	76.26	52.12	2.73	27.38	54.25	74	-19.75	PK
V	2390	65.28	52.12	2.73	27.38	43.27	54	-10.73	AV
V	2400	76.53	52.16	2.78	27.41	54.56	74	-19.44	PK
V	2400	64.34	52.16	2.78	27.41	42.37	54	-11.63	AV
H	2390	76.38	52.12	2.73	27.38	54.37	74	-19.63	PK
H	2390	65.86	52.12	2.73	27.38	43.85	54	-10.15	AV
H	2400	76.87	52.16	2.78	27.41	54.9	74	-19.1	PK
H	2400	65.93	52.16	2.78	27.41	43.96	54	-10.04	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre- amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:2462									
V	2483.5	76.16	52.23	2.86	27.44	54.23	74	-19.77	PK
V	2483.5	65.58	52.23	2.86	27.44	43.65	54	-10.35	AV
V	2500	76.86	52.26	2.88	27.49	54.97	74	-19.03	PK
V	2500	65.67	52.26	2.88	27.49	43.78	54	-10.22	AV
H	2483.5	76.41	52.23	2.86	27.44	54.48	74	-19.52	PK
H	2483.5	65.96	52.23	2.86	27.44	44.03	54	-9.97	AV
H	2500	76.52	52.26	2.88	27.49	54.63	74	-19.37	PK
H	2500	65.36	52.26	2.88	27.49	43.47	54	-10.53	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



802.11n HT20

We test all antenna's data, the data only show the mode 6 worst mode.

Polar (H/V)	Frequency	Meter Reading	Pre- amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
operation frequency:2412									
V	2390	76.22	52.12	2.73	27.38	54.21	74	-19.79	PK
V	2390	65.84	52.12	2.73	27.38	43.83	54	-10.17	AV
V	2400	77.89	52.16	2.78	27.41	55.92	74	-18.08	PK
V	2400	65.14	52.16	2.78	27.41	43.17	54	-10.83	AV
H	2390	77.56	52.12	2.73	27.38	55.55	74	-18.45	PK
H	2390	65.38	52.12	2.73	27.38	43.37	54	-10.63	AV
H	2400	76.23	52.16	2.78	27.41	54.26	74	-19.74	PK
H	2400	65.65	52.16	2.78	27.41	43.68	54	-10.32	AV

Polar (H/V)	Frequency	Meter Reading	Pre- amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
operation frequency:2462									
V	2483.5	77.36	52.23	2.86	27.44	55.43	74	-18.57	PK
V	2483.5	65.58	52.23	2.86	27.44	43.65	54	-10.35	AV
V	2500	76.65	52.26	2.88	27.49	54.76	74	-19.24	PK
V	2500	65.36	52.26	2.88	27.49	43.47	54	-10.53	AV
H	2483.5	77.85	52.23	2.86	27.44	55.92	74	-18.08	PK
H	2483.5	65.94	52.23	2.86	27.44	44.01	54	-9.99	AV
H	2500	76.67	52.26	2.88	27.49	54.78	74	-19.22	PK
H	2500	66.36	52.26	2.88	27.49	44.47	54	-9.53	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



802.11n HT40

We test all antenna's data, the data only show the mode 6 worst mode.

Polar (H/V)	Frequency	Meter Reading	Pre- amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
operation frequency:2422									
V	2390	76.34	52.12	2.73	27.38	54.33	74	-19.67	PK
V	2390	65.47	52.12	2.73	27.38	43.46	54	-10.54	AV
V	2400	77.16	52.16	2.78	27.41	55.19	74	-18.81	PK
V	2400	65.38	52.16	2.78	27.41	43.41	54	-10.59	AV
H	2390	77.43	52.12	2.73	27.38	55.42	74	-18.58	PK
H	2390	65.29	52.12	2.73	27.38	43.28	54	-10.72	AV
H	2400	76.14	52.16	2.78	27.41	54.17	74	-19.83	PK
H	2400	65.69	52.16	2.78	27.41	43.72	54	-10.28	AV

Polar (H/V)	Frequency	Meter Reading	Pre- amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
operation frequency:2452									
V	2483.5	77.15	52.23	2.86	27.44	55.22	74	-18.78	PK
V	2483.5	65.69	52.23	2.86	27.44	43.76	54	-10.24	AV
V	2500	76.55	52.26	2.88	27.49	54.66	74	-19.34	PK
V	2500	65.13	52.26	2.88	27.49	43.24	54	-10.76	AV
H	2483.5	77.67	52.23	2.86	27.44	55.74	74	-18.26	PK
H	2483.5	65.56	52.23	2.86	27.44	43.63	54	-10.37	AV
H	2500	76.44	52.26	2.88	27.49	54.55	74	-19.45	PK
H	2500	66.87	52.26	2.88	27.49	44.98	54	-9.02	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



3.4 CONDUCTED BAND EDGE EMISSION&CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

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

3.4.1 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).

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.

3.4.2 TEST PROCEDURE

Using the following spectrum analyzer setting:

Set the RBW = 100KHz.

Set the VBW = 300KHz.

Sweep time = auto couple.

Detector function = peak.

Trace mode = max hold.

Allow trace to fully stabilize.

3.4.3 DEVIATION FROM STANDARD

No deviation.

3.4.4 TEST SETUP



3.4.5 EUT OPERATION CONDITIONS

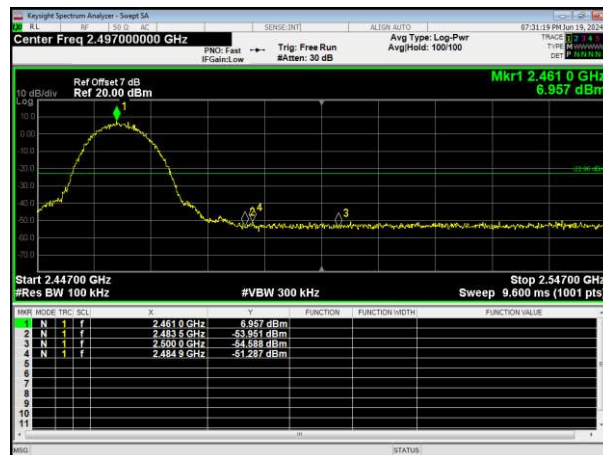
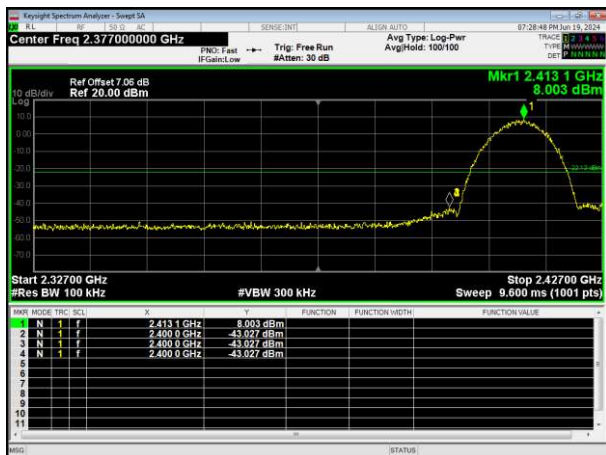
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

3.4.6 TEST RESULTS

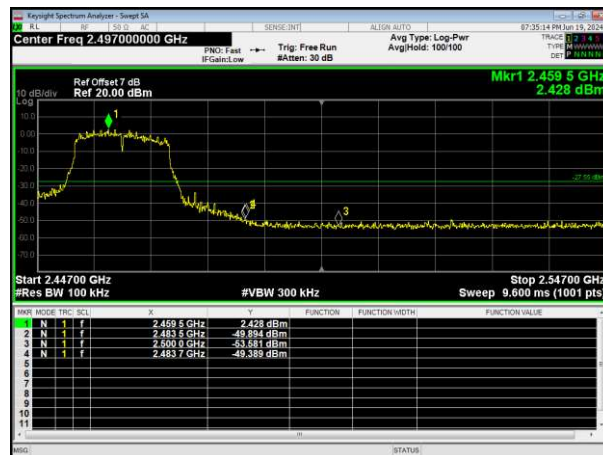
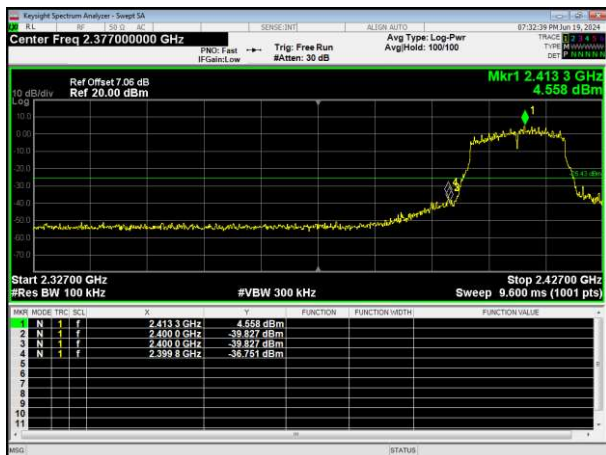


We test all antenna's data, the data only show the antenna1 worst mode.

802.11b

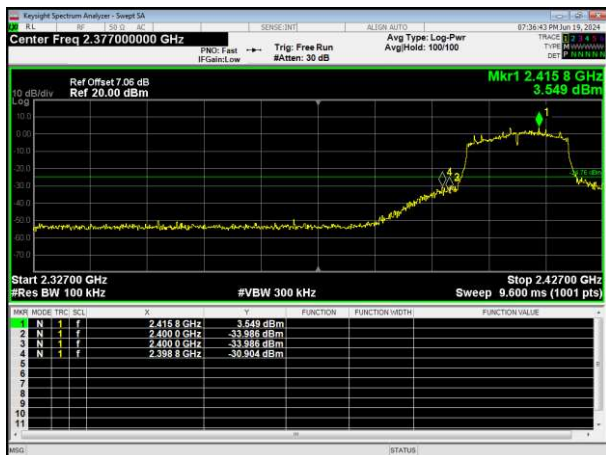


802.11g

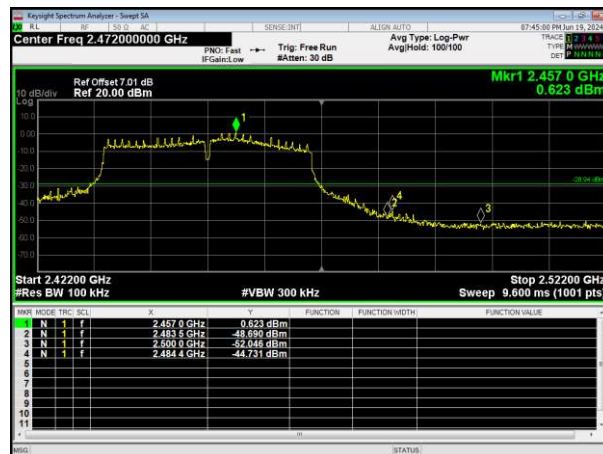
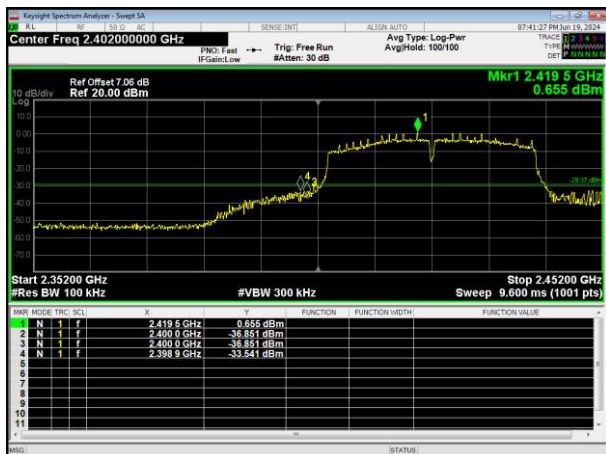




802.11n HT20



802.11n HT40



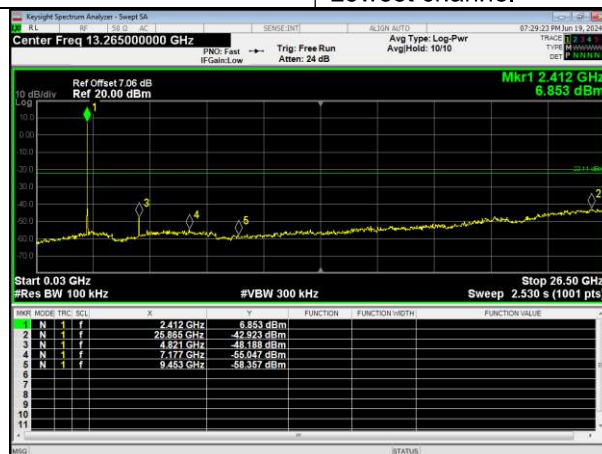


For Conducted

During the test, pre-scan the all modulation, and found the 802.11b(Antenna1) mode which it is worse case.

Test channel:

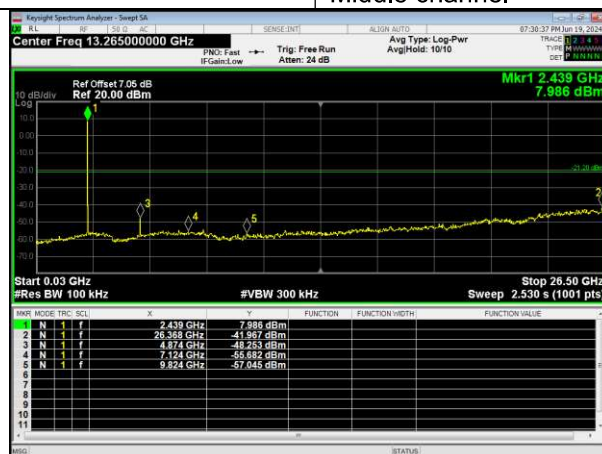
Lowest channel



0.03GHz~26.5GHz

Test channel:

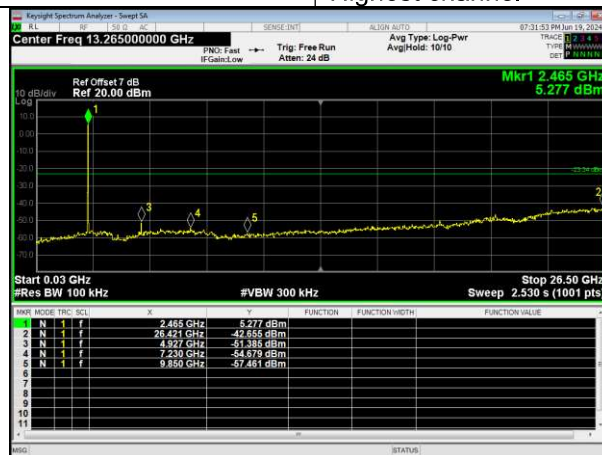
Middle channel



0.03GHz~26.5GHz

Test channel:

Highest channel



0.03GHz~26.5GHz



4. AVERAGE OUTPUT POWER

4.1 APPLIED PROCEDURES / LIMIT

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

4.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Set span to at least 1.5 times the OBW.
- Set RBW = 1% to 5% of the OBW, not to exceed 1 MHz.
- Set VBW $\geq [3 \times \text{RBW}]$.
- Number of points in sweep $\geq [2 \times \text{span} / \text{RBW}]$. (This gives bin-to-bin spacing $\leq \text{RBW} / 2$, so that narrowband signals are not lost between frequency bins.)
- Sweep time = auto.
- Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
- If transmit duty cycle < 98%, use a sweep trigger with the level set to enable triggering only on full power pulses. The transmitter shall operate at the maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no OFF intervals) or at duty cycle $\geq 98\%$, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run."
- Trace average at least 100 traces in power averaging (rms) mode.
- Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

4.1.2 DEVIATION FROM STANDARD

No deviation.

4.1.3 TEST SETUP



4.1.4 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.

**4.1.5 TEST RESULTS**

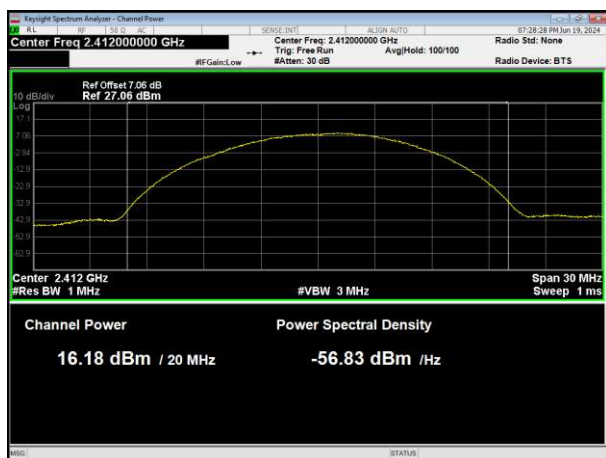
Temperature:	25 °C	Relative Humidity:	60%
Pressure:	1012 hPa	Test Voltage :	AC 120V/60Hz

Mode	Frequency (MHz)	Maximum Conducted Output Power(PK) (dBm)		ANT1&ANT2 MIMO Maximum Conducted Output Power (dBm)	LIMIT dBm
		Antenna1	Antenna2		
802.11b	2412	16.184	16.06	/	30
	2437	16.721	16.812	/	30
	2462	15.323	14.947	/	30
802.11g	2412	12.968	12.901	/	30
	2437	13.495	13.447	/	30
	2462	11.96	11.746	/	30
802.11n20	2412	14.202	14.11	17.17	30
	2437	14.368	14.528	17.46	30
	2462	12.744	12.664	15.71	30
802.11n40	2422	13.509	13.462	16.50	30
	2437	13.475	13.518	16.51	30
	2452	12.601	12.681	15.65	30



Antenna1:

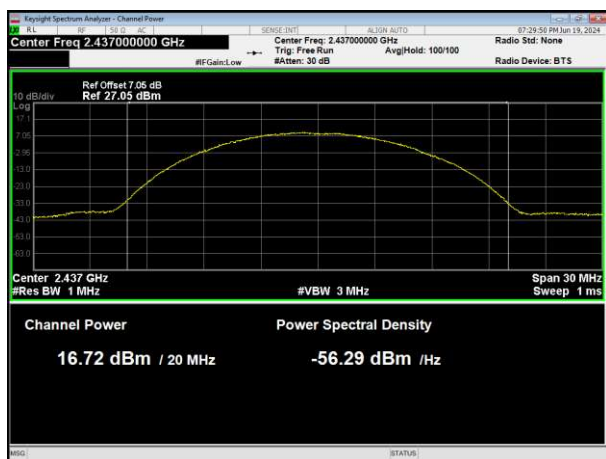
802.11b



802.11g



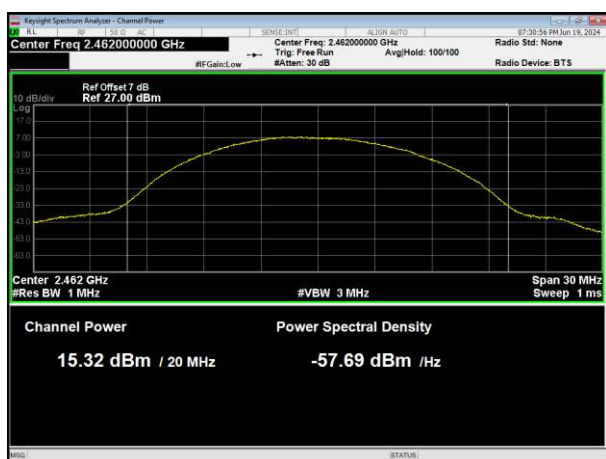
2412MHz



2412MHz



2437MHz



2437MHz



2462MHz

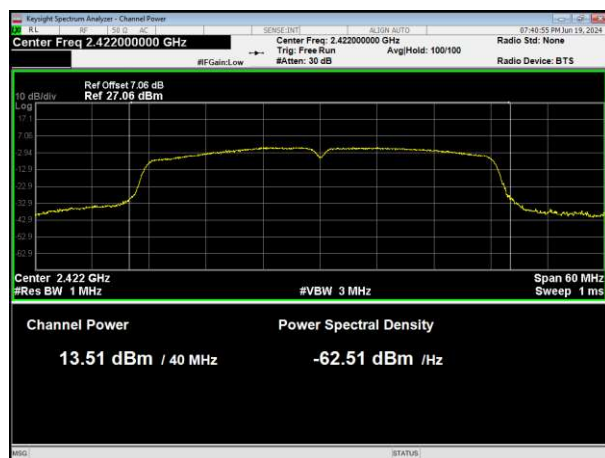
2462MHz



802.11n HT20



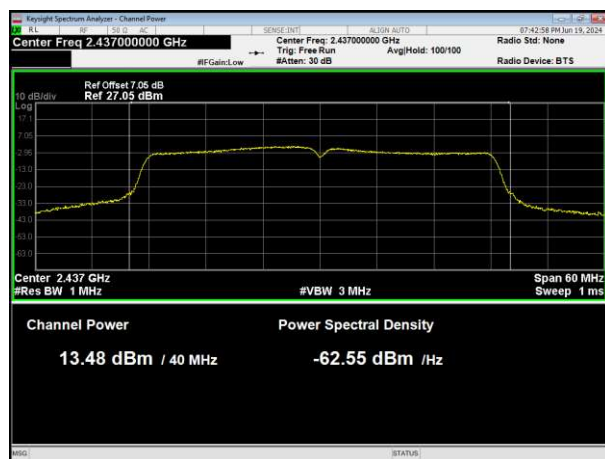
802.11n HT40



2412MHz



2422MHz



2437MHz



2437MHz



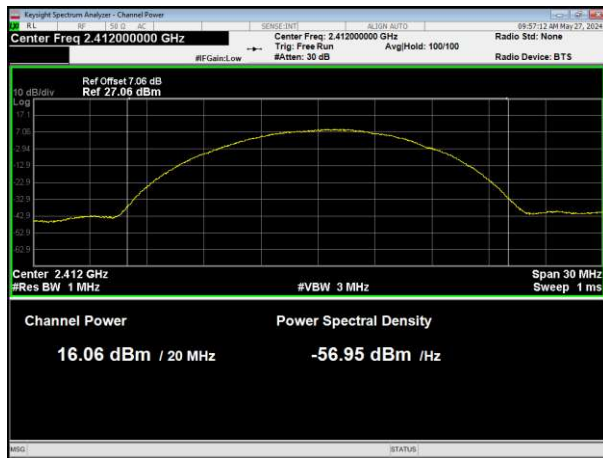
2462MHz

2452MHz

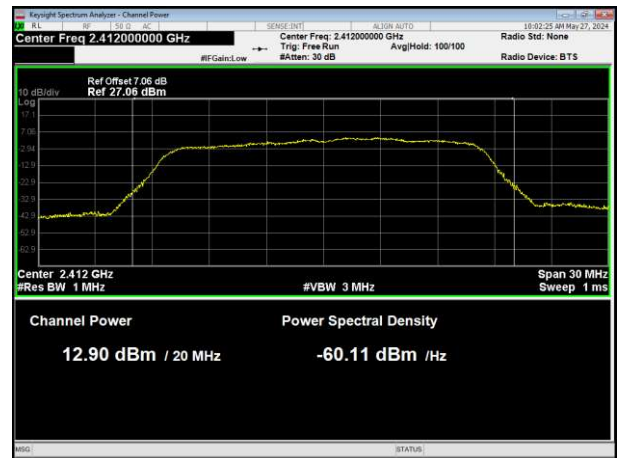


Antenna2:

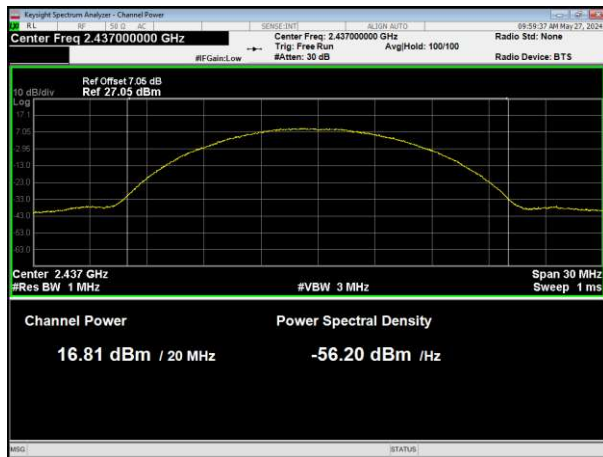
802.11b



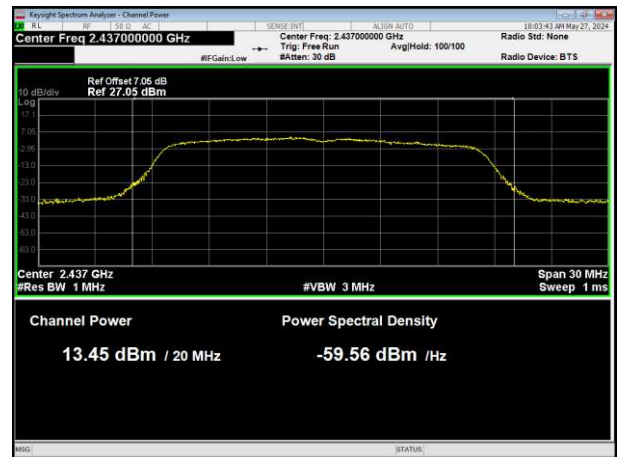
802.11g



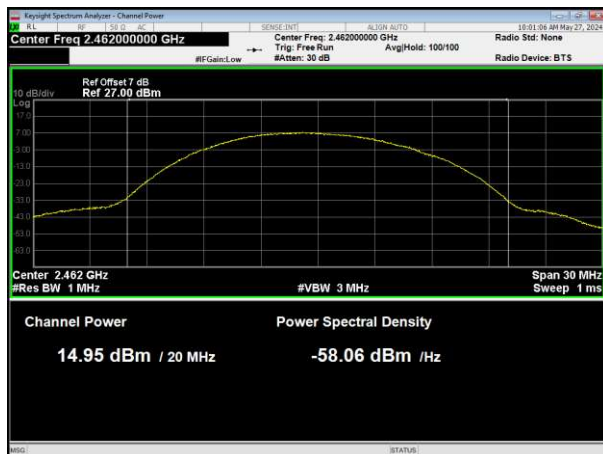
2412MHz



2412MHz



2437MHz



2437MHz

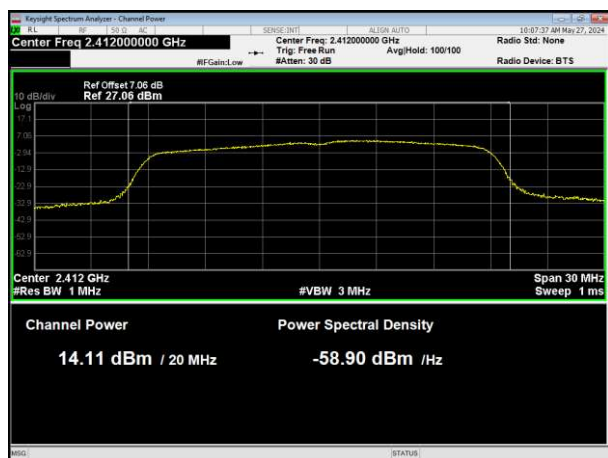


2462MHz

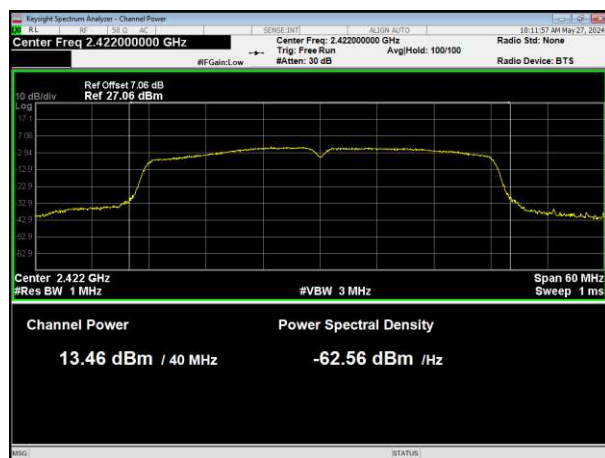
2462MHz



802.11n HT20



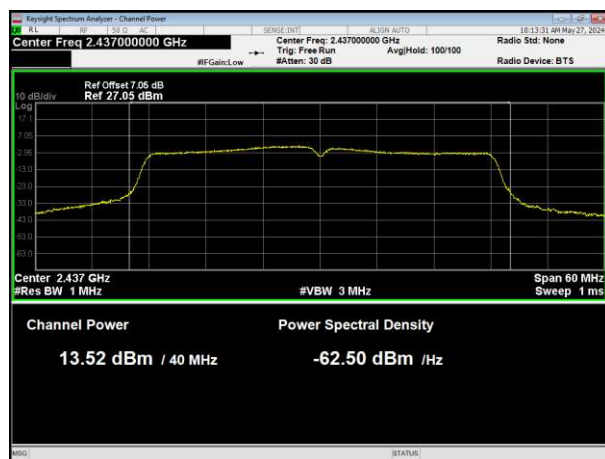
802.11n HT40



2412MHz



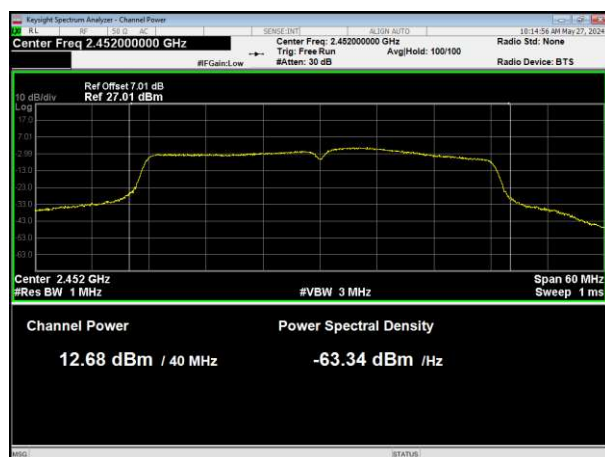
2422MHz



2437MHz



2437MHz



2462MHz

2452MHz



5. POWER SPECTRAL DENSITY TEST

5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	= the frequency band of operation
RB	$RBW \geq 3kHz$
VB	$VBW \geq 3RBW$
Detector	power averaging (rms) or sample detector (when rms not available).
Trace	Max Hold
Sweep Time	Auto

5.1.1 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,

5.1.2 DEVIATION FROM STANDARD

No deviation.

5.1.3 TEST SETUP



5.1.4 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.

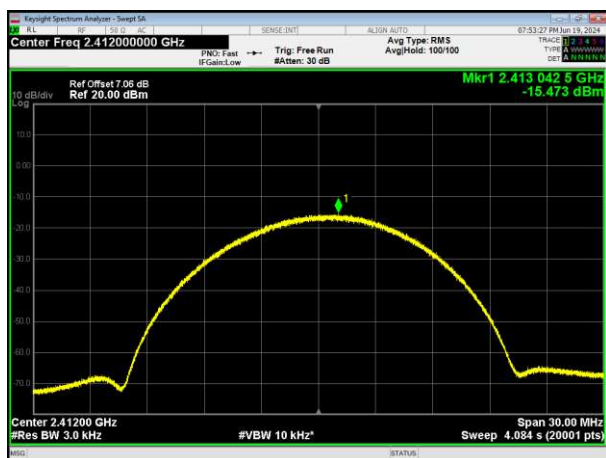
**5.1.5 TEST RESULTS**

	Frequency	Reading Level(dBm)		ANT1&ANT2 MIMO Power Spectral Density (dBm/3KHz)	Limit (dBm)	Result
		ANT1	ANT2			
802.11b	2412 MHz	-15.473	-14.938	/	<8	PASS
	2437 MHz	-15.685	-15.356	/	<8	PASS
	2462 MHz	-17.111	-17.069	/	<8	PASS
802.11g	2412 MHz	-18.988	-19.192	/	<8	PASS
	2437 MHz	-19.389	-19.052	/	<8	PASS
	2462 MHz	-20.989	-20.649	/	<8	PASS
802.11n (20MHz)	2412 MHz	-19.442	-18.985	-16.20	<8	PASS
	2437 MHz	-19.62	-19.266	-16.43	<8	PASS
	2462 MHz	-20.818	-20.757	-17.78	<8	PASS
802.11n (40MHz)	2422 MHz	-20.792	-20.97	-17.87	<8	PASS
	2437 MHz	-20.054	-20.455	-17.24	<8	PASS
	2452 MHz	-20.863	-21.573	-18.19	<8	PASS

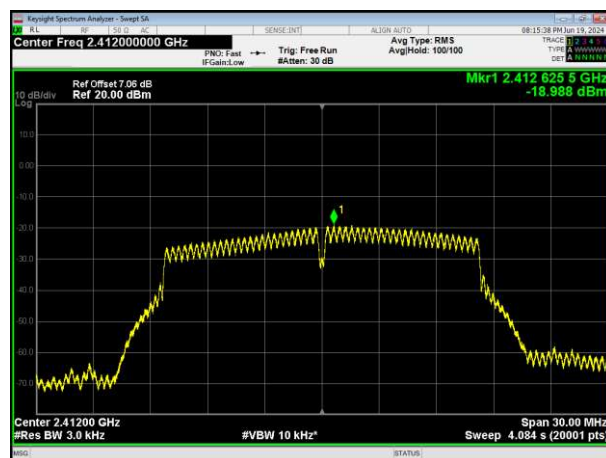


Antenna1:

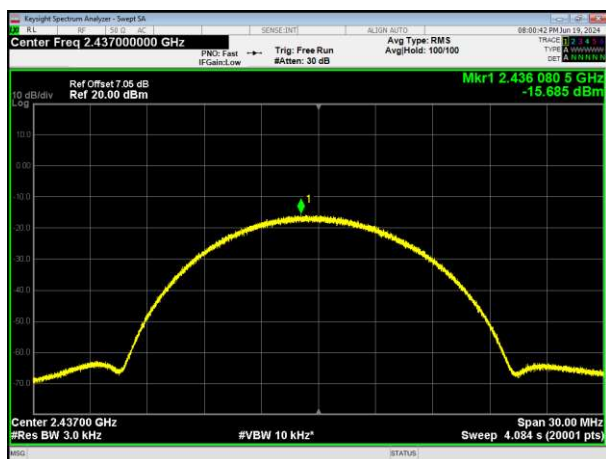
802.11b



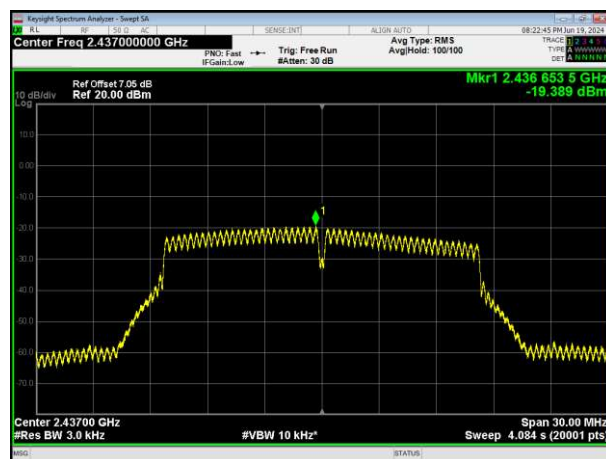
802.11g



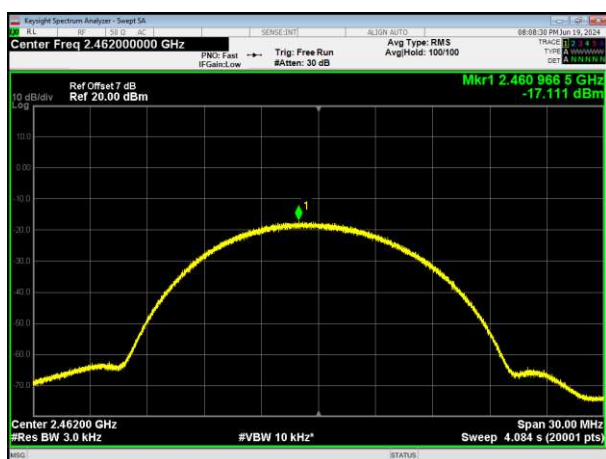
2412MHz



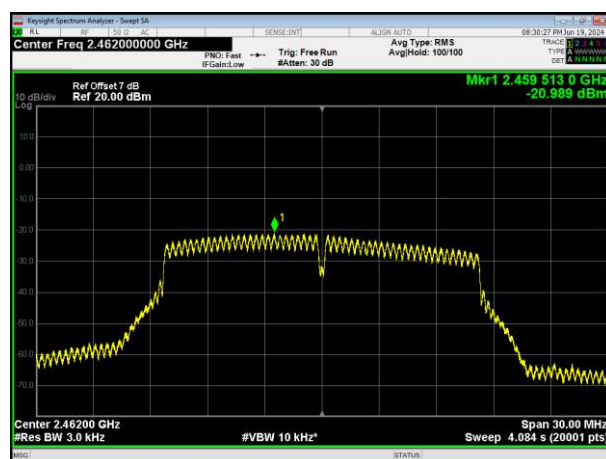
2412MHz



2437MHz



2437MHz

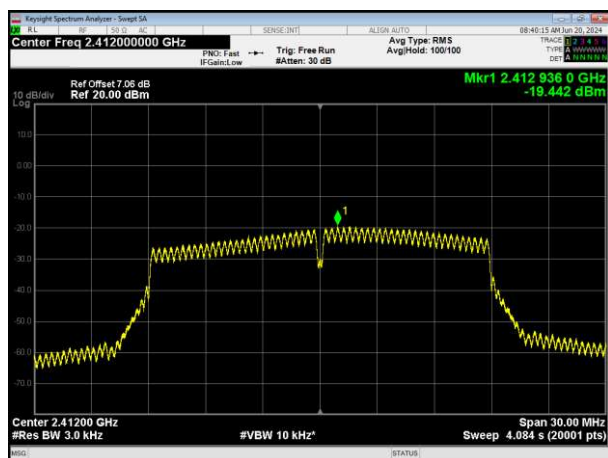


2462MHz

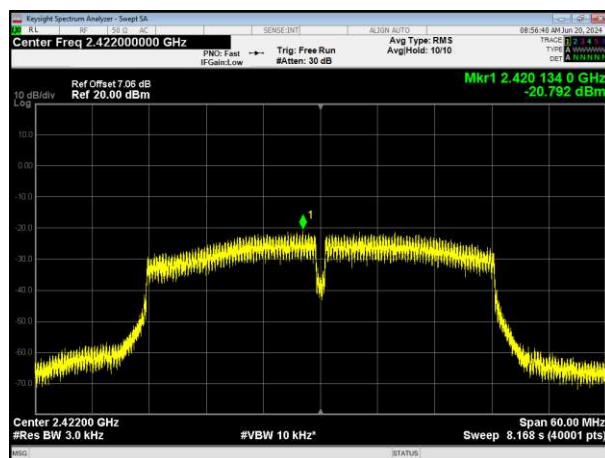
2462MHz



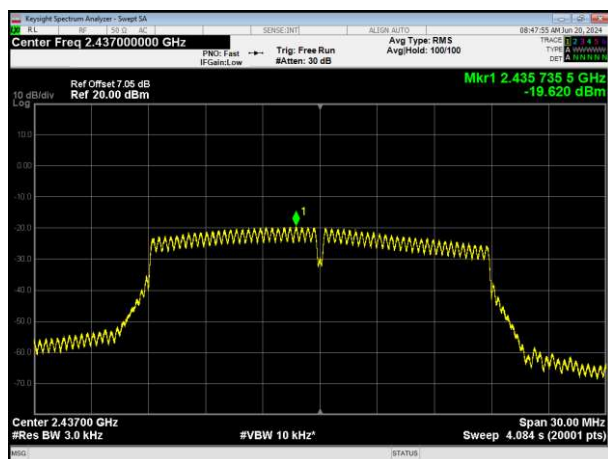
802.11n HT20



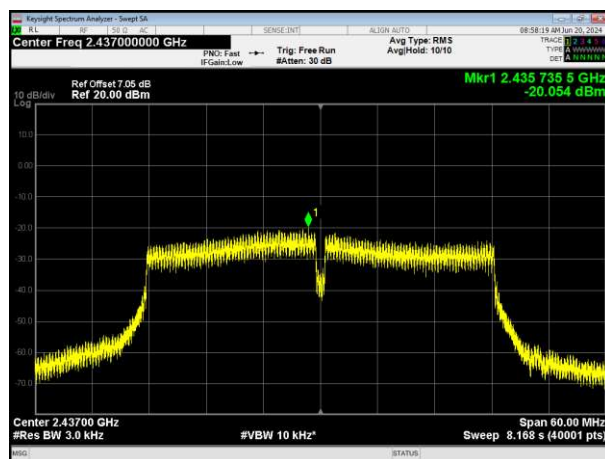
802.11n HT40



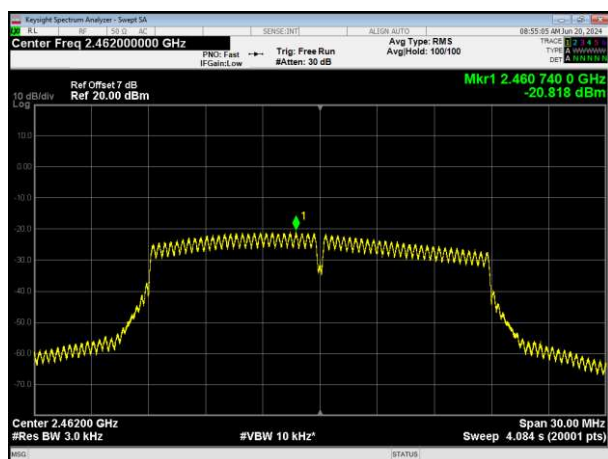
2412MHz



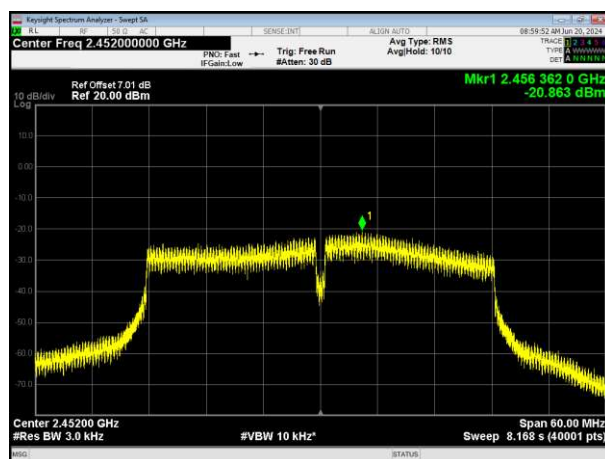
2422MHz



2437MHz



2437MHz



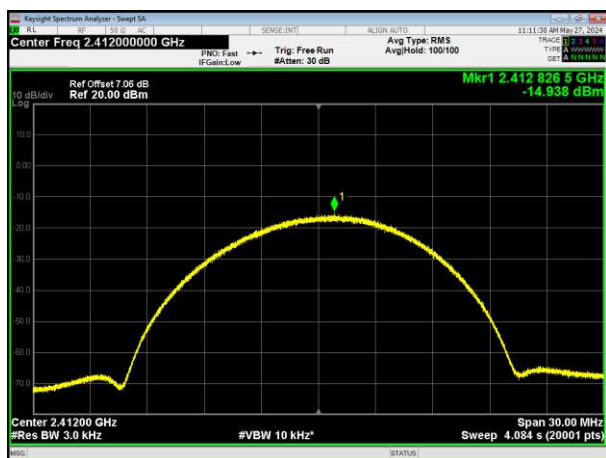
2462MHz

2452MHz

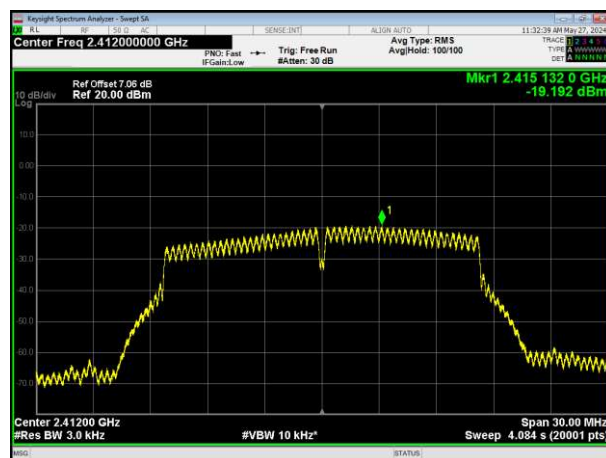


Antenna2:

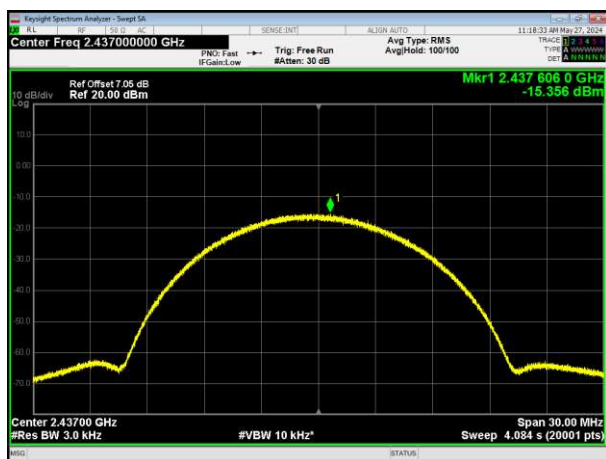
802.11b



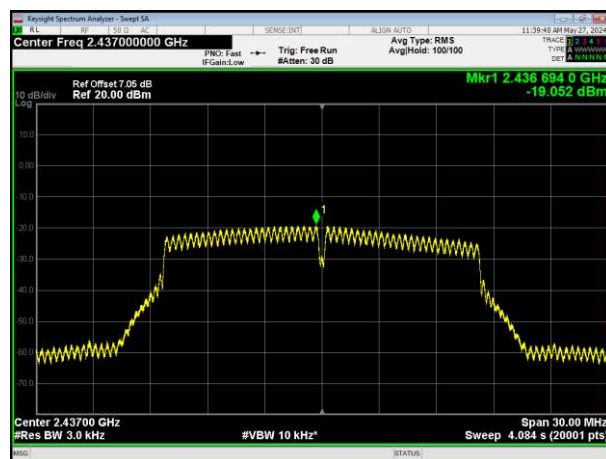
802.11g



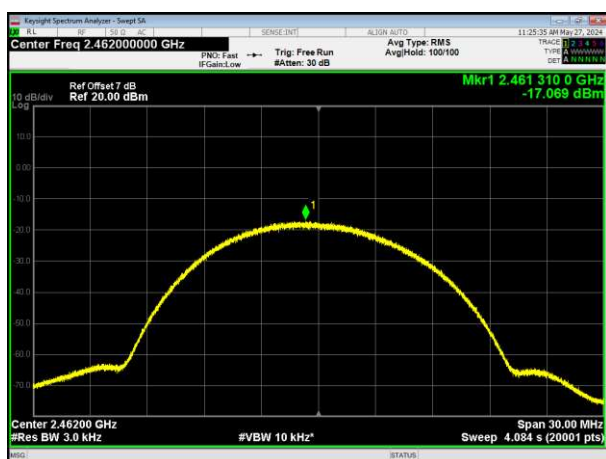
2412MHz



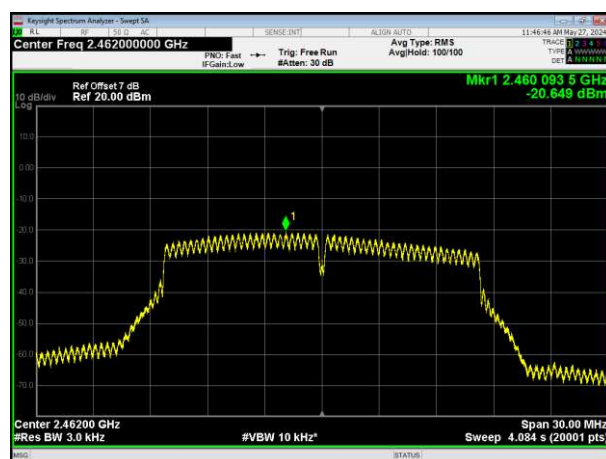
2412MHz



2437MHz



2437MHz

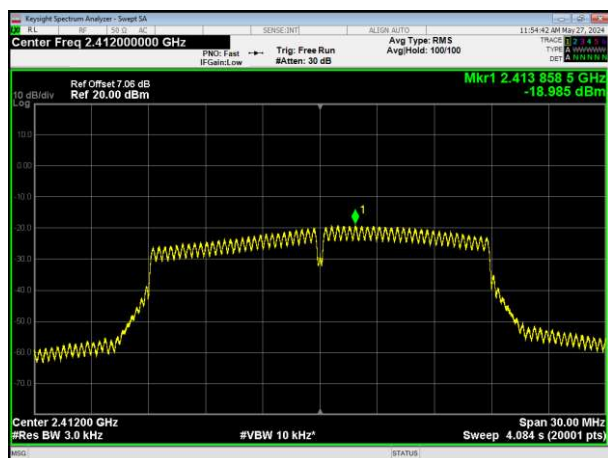


2462MHz

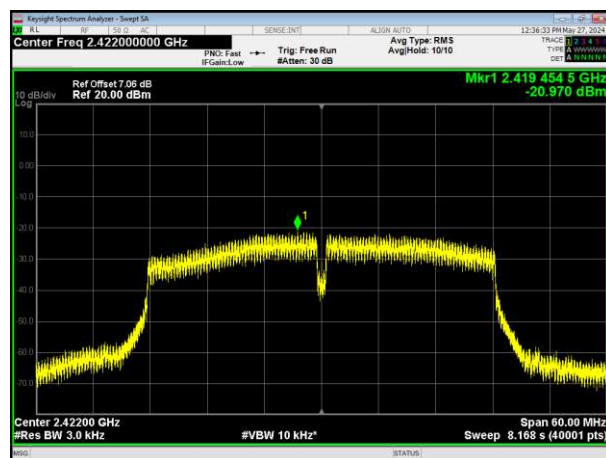
2462MHz



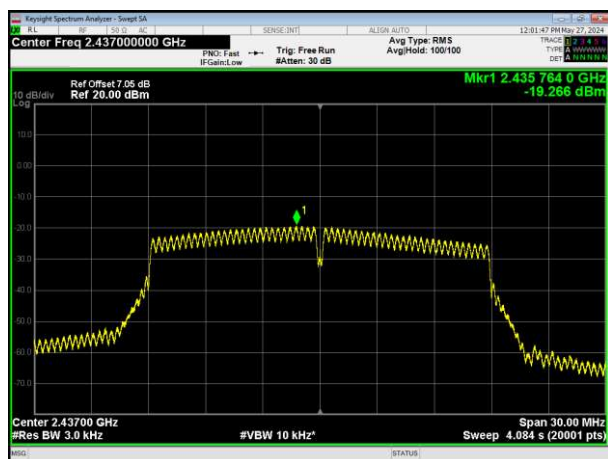
802.11n HT20



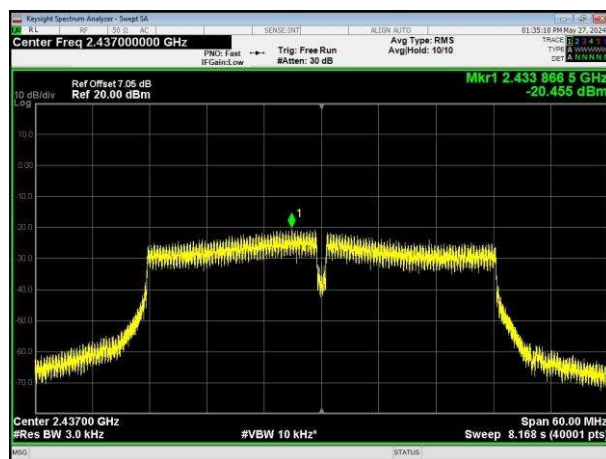
802.11n HT40



2412MHz



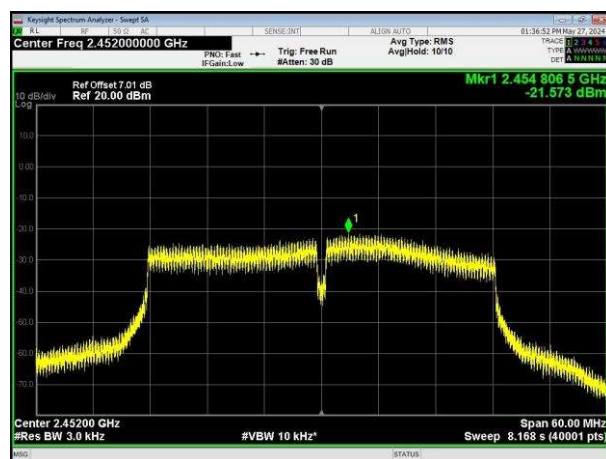
2422MHz



2437MHz



2437MHz



2462MHz

2452MHz



6. 6DB BANDWIDTH TEST

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range(MHz)	Result
15.247(a)(2)	Bandwidth	$\geq 500\text{KHz}$ (6dB bandwidth)	2400-2483.5	PASS

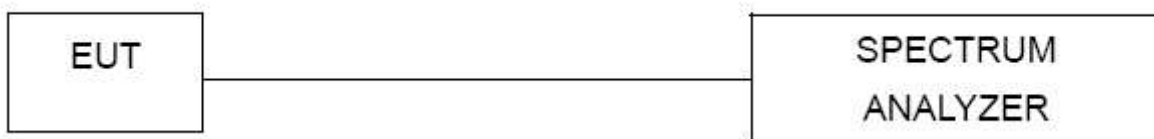
6.1.1 TEST PROCEDURE

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) $\geq$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

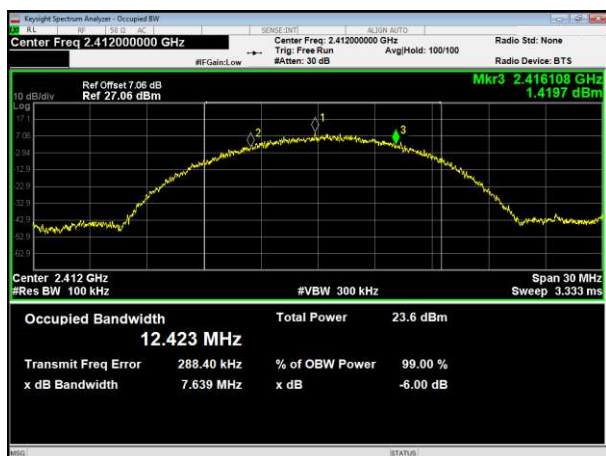
**6.1.5 TEST RESULTS**

Test CH		Channel Bandwidth (MHz)		Limit(KHz)	Result
		Ant1	Ant2		
802.11b	Lowest	7.639	7.41	>500	Pass
	Middle	8.149	7.834		
	Highest	7.732	8.13		
802.11g	Lowest	14.413	14.068		
	Middle	15.696	15.661		
	Highest	15.677	15.712		
802.11n (20MHz)	Lowest	13.842	13.808		
	Middle	12.874	14.427		
	Highest	15.948	13.823		
802.11n (40MHz)	Lowest	30.05	32.553		
	Middle	35.06	35.096		
	Highest	31.327	32.486		

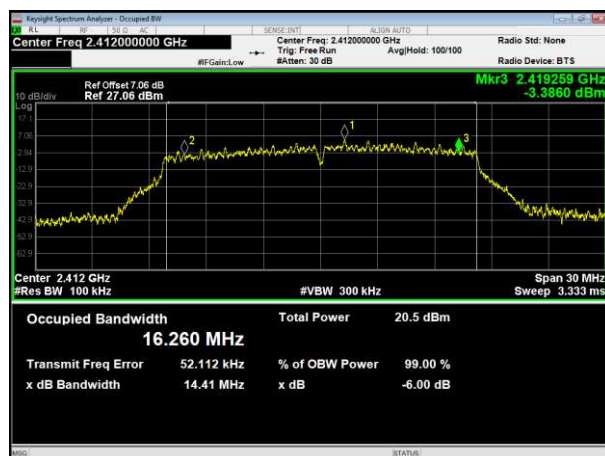


Antenna1:

802.11b



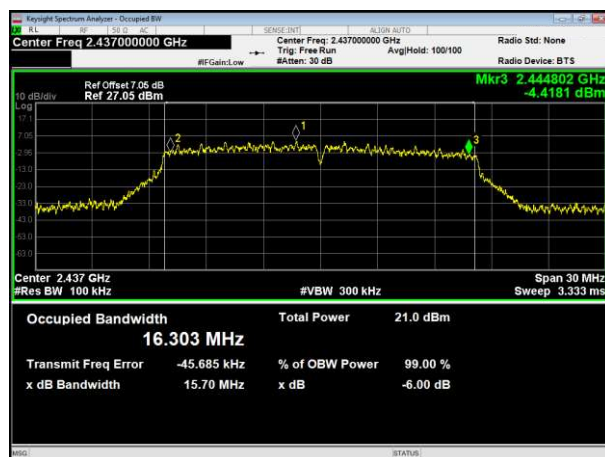
802.11g



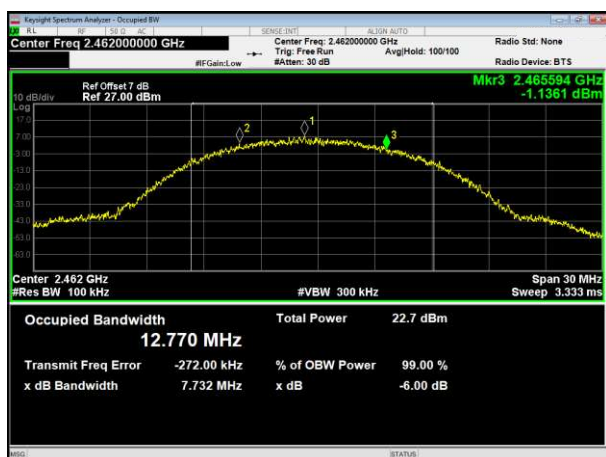
2412MHz



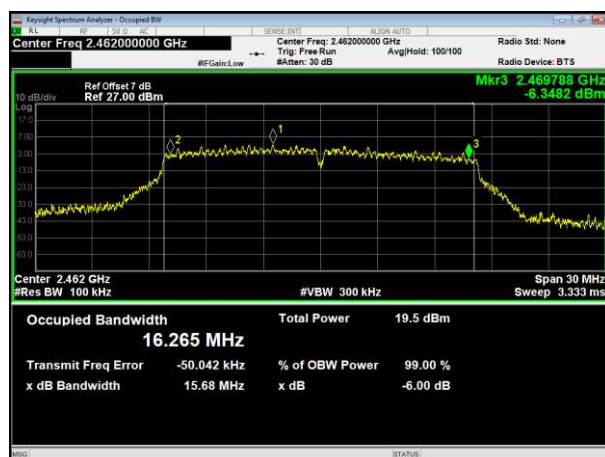
2412MHz



2437MHz



2437MHz



2462MHz

2462MHz



802.11n HT20



802.11n HT40



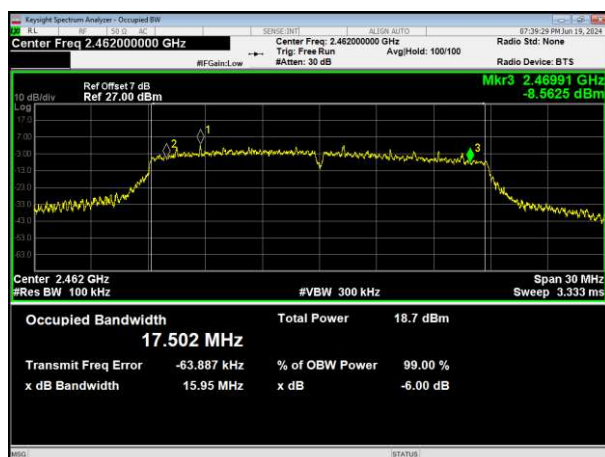
2412MHz



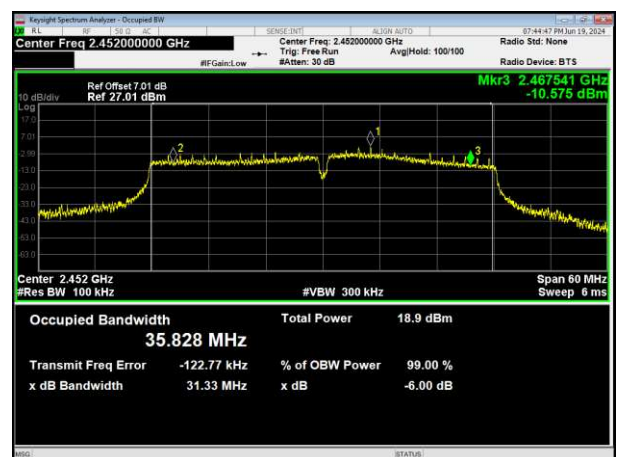
2422MHz



2437MHz



2437MHz



2462MHz

2452MHz

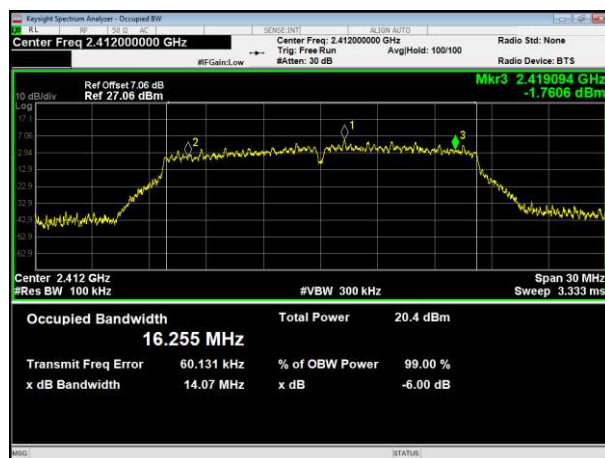


Antenna2:

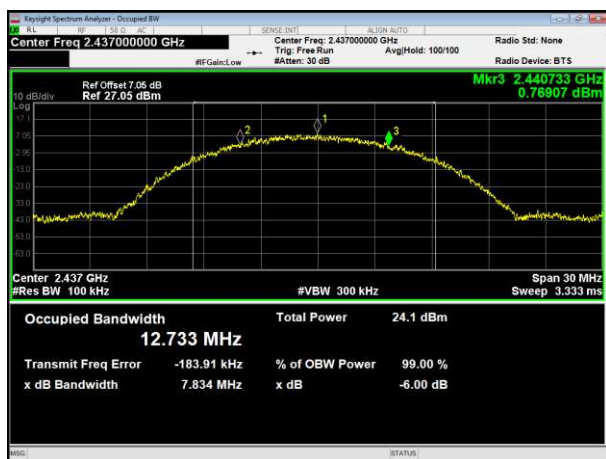
802.11b



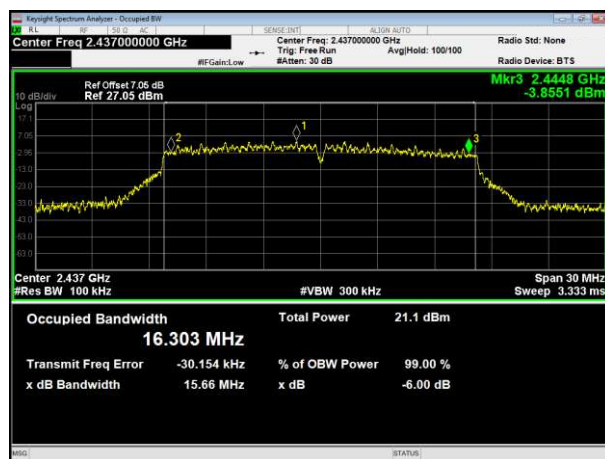
802.11g



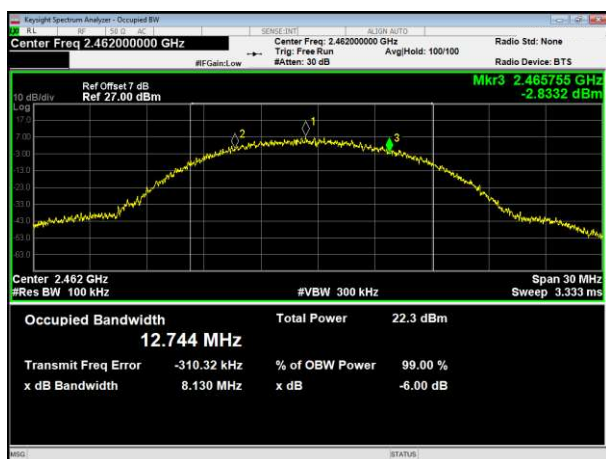
2412MHz



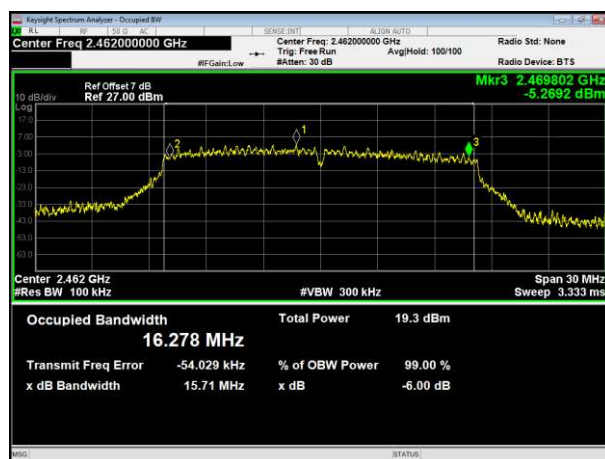
2412MHz



2437MHz



2437MHz

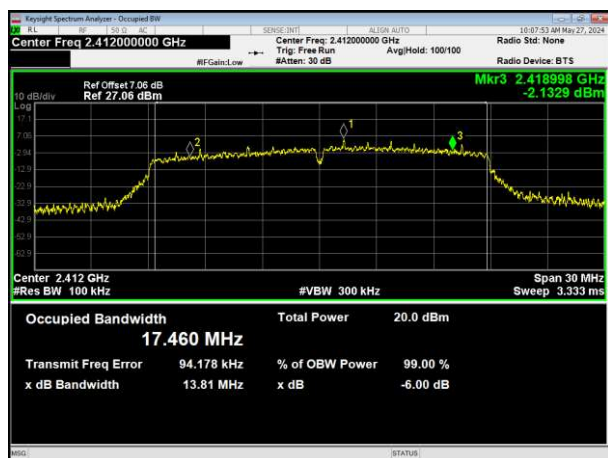


2462MHz

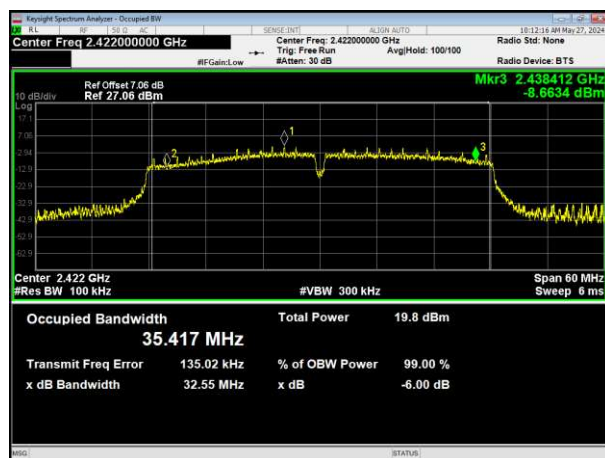
2462MHz



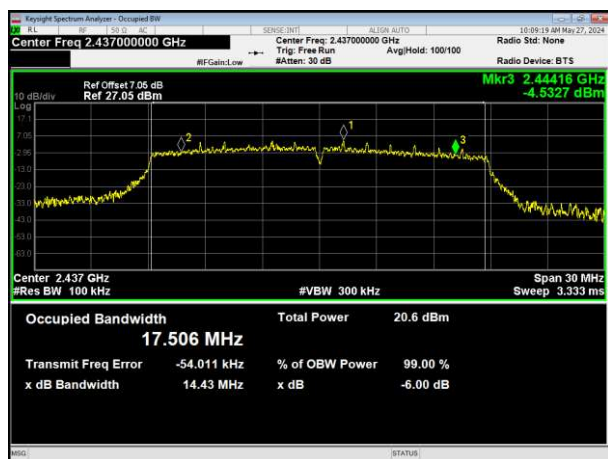
802.11n HT20



802.11n HT40



2412MHz



2422MHz



2437MHz



2437MHz



2462MHz

2452MHz



7. ANTENNA REQUIREMENT

7.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 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.

7.2 EUT ANTENNA

The EUT antenna is External antenna, It comply with the standard requirement.

8. TEST SEUUP PHOTO

Reference to the appendix I for details.

9. EUT PHOTO

Reference to the appendix II for details.

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