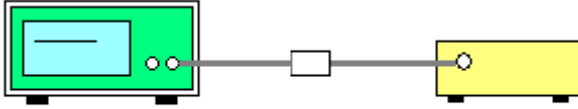




4.4 Power Spectral Density

4.4.1 Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	KDB 558074 D01 15.247 Meas Guidance v05r02
Limit:	The average power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.
Test Setup:	 The diagram illustrates the test setup. On the left is a green Spectrum Analyzer. A cable connects it to a small white rectangular attenuator. Another cable connects the attenuator to a yellow rectangular Equipment Under Test (EUT) on the right.
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. The testing follows Measurement procedure 10.2 method PKPSD of FCC KDB Publication No. 558074 D01 15.247 Meas Guidance v05r02. 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement. 3. Set to the maximum power setting and enable the EUT transmit continuously. 4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW): $3\text{ kHz} \leq \text{RBW} \leq 100\text{ kHz}$. Video bandwidth VBW $\geq 3 \times \text{RBW}$. Set the span to at least 1.5 times the OBW. 5. Detector = Peak, Sweep time = auto couple. 6. Employ trace averaging (Peak) mode over a minimum of 100 traces. Use the peak marker function to determine the maximum power level. 7. Measure and record the results in the test report.
Test Result:	PASS



4.4.2 Test Instruments

RF Test Room					
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-025	Feb. 20, 2024	Feb. 19, 2025
RF cable	Times	1-40G	HKE-034	Feb. 20, 2024	Feb. 19, 2025
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 20, 2024	Feb. 19, 2025
RF Test Software	Tonscend	JS1120-3 Version 3.5.39	HKE-083	N/A	N/A

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



4.4.3 Test Data

For antenna port 1

EUT Set Mode	Channel	Test Result (dBm/30kHz)	Result (dBm/3kHz)
802.11b	Lowest	0.55	-9.45
	Middle	-0.38	-10.38
	Highest	0.96	-9.04
802.11g	Lowest	-2.37	-12.37
	Middle	-2.35	-12.35
	Highest	-1.26	-11.26
802.11n(HT20)	Lowest	-1.76	-11.76
	Middle	-1.43	-11.43
	Highest	-1.40	-11.40
802.11n(HT40)	Lowest	-4.17	-14.17
	Middle	-3.85	-13.85
	Highest	-4.40	-14.40
802.11ax(HE20)	Lowest	-2.08	-12.08
	Middle	-1.65	-11.65
	Highest	-1.87	-11.87
802.11ax(HE40)	Lowest	-2.91	-12.91
	Middle	-3.15	-13.15
	Highest	-3.74	-13.74
PSD test result (dBm/3kHz)= PSD test result (dBm/30kHz)-10			
Limit: 8dBm/3kHz			
Test Result:		PASS	

Test plots as follows:



802.11b Modulation

Lowest channel



Middle channel



Highest channel



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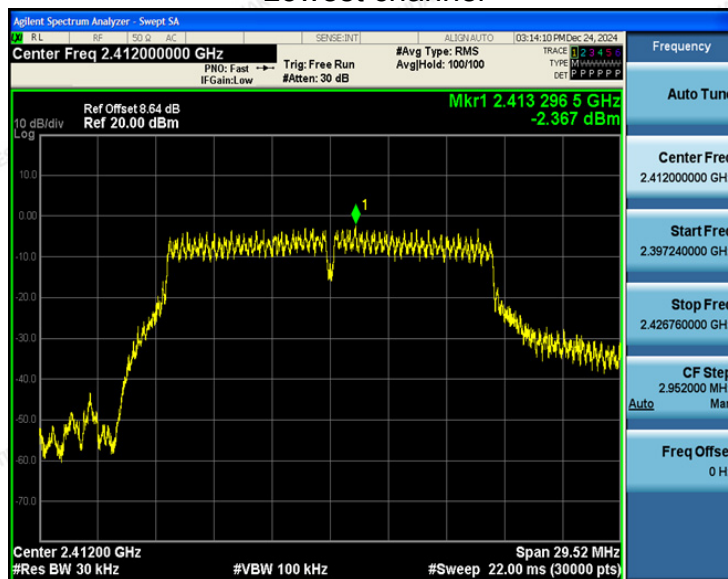
TEL : +86-755 2302 9901 FAX : +86-755 2302 9901 E-mail : service@cer-mark.com

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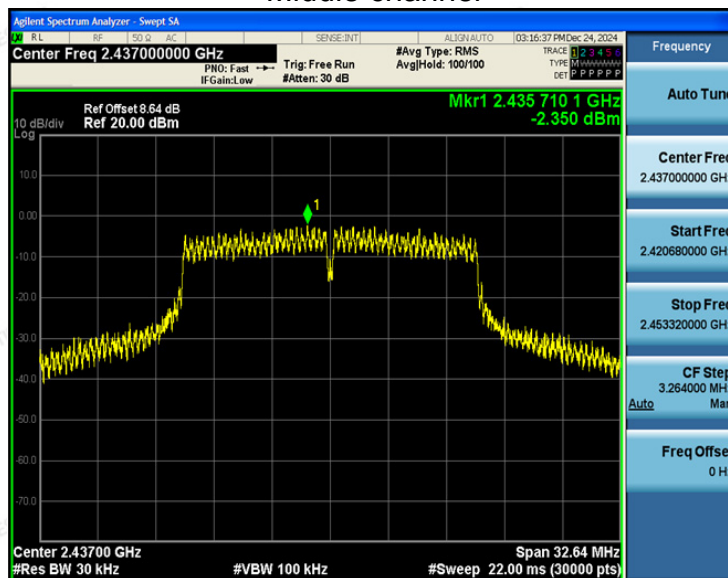


802.11g Modulation

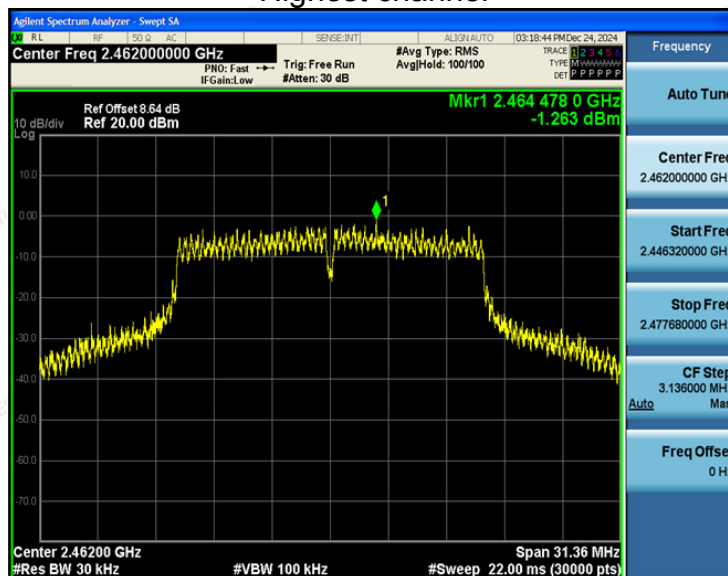
Lowest channel



Middle channel



Highest channel



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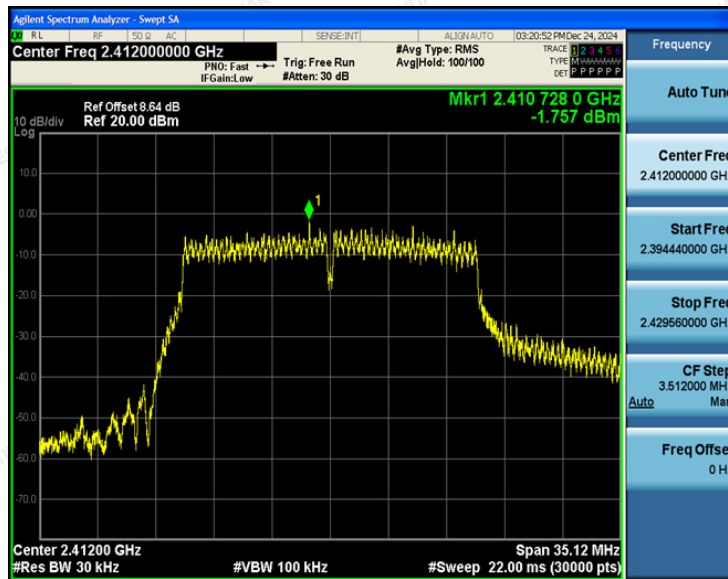
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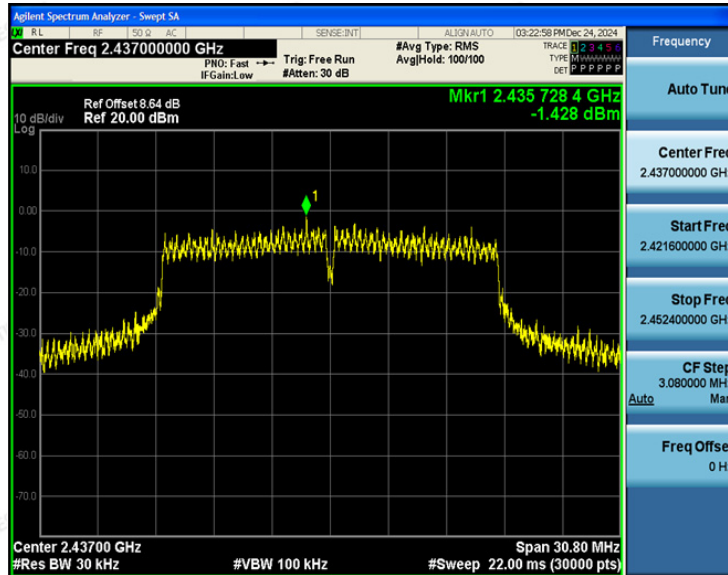


802.11n (HT20) Modulation

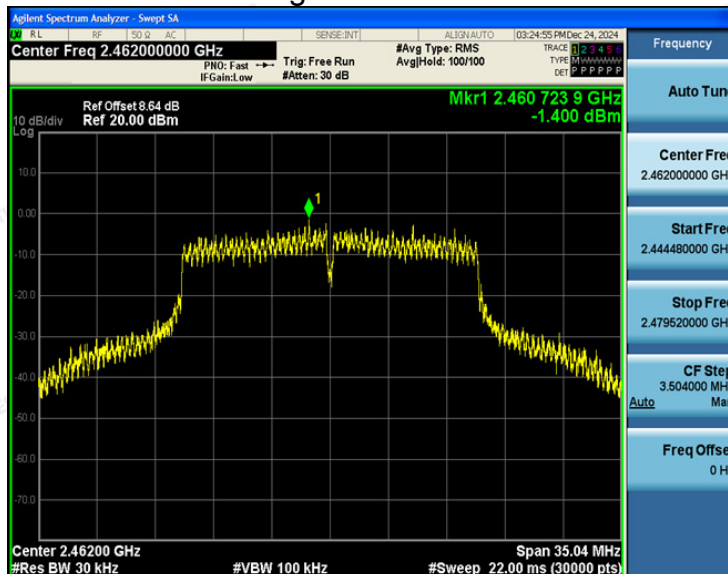
Lowest channel



Middle channel



Highest channel



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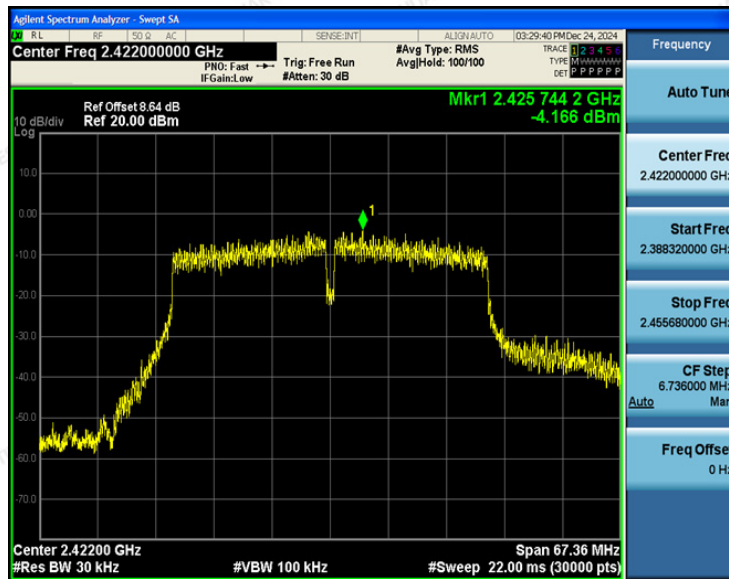
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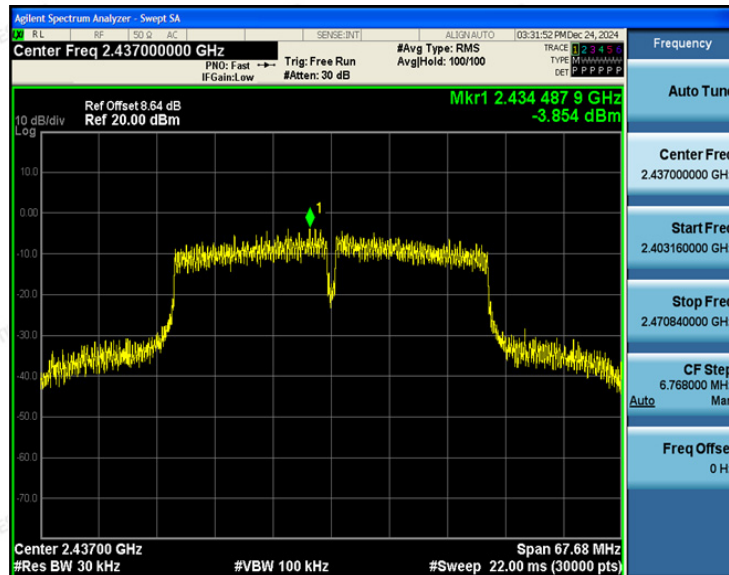


802.11n (HT40) Modulation

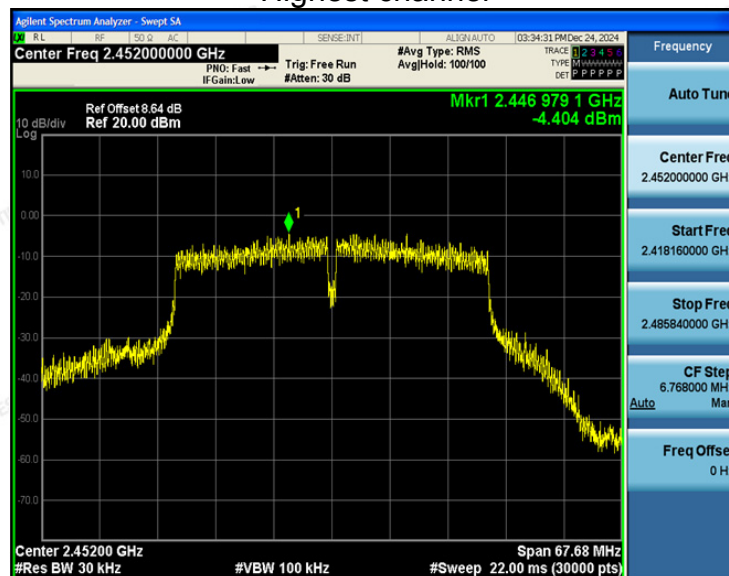
Lowest channel



Middle channel



Highest channel



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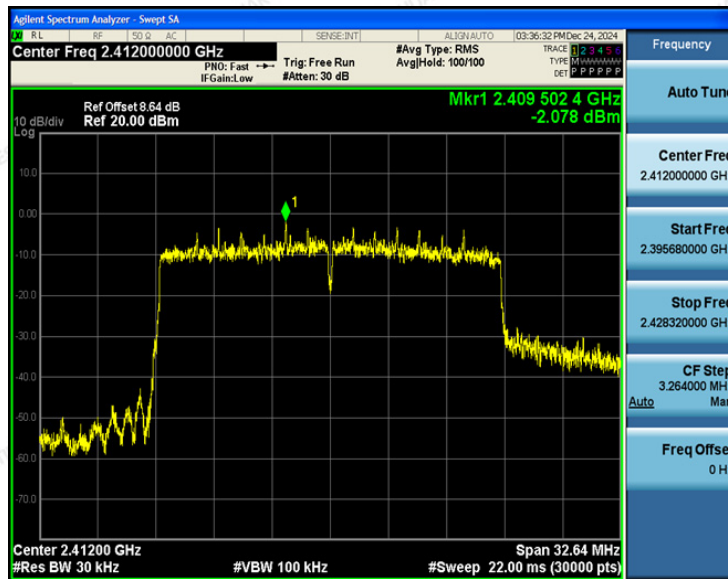
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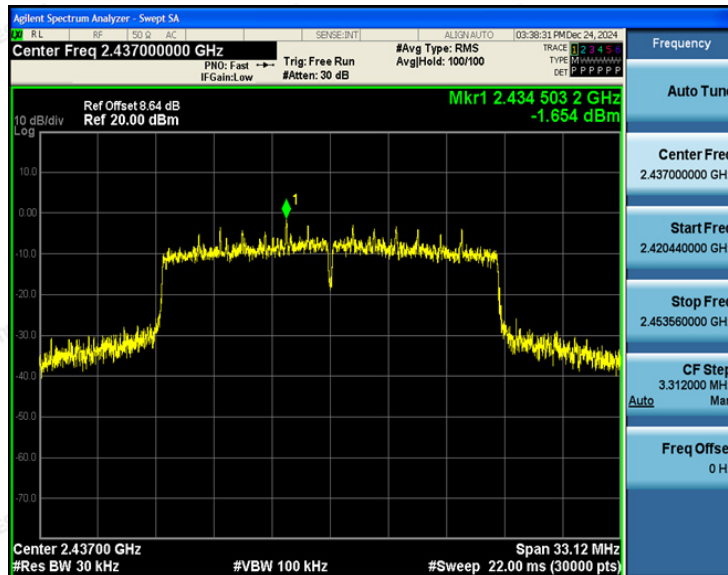


802.11ax (HE20) Modulation

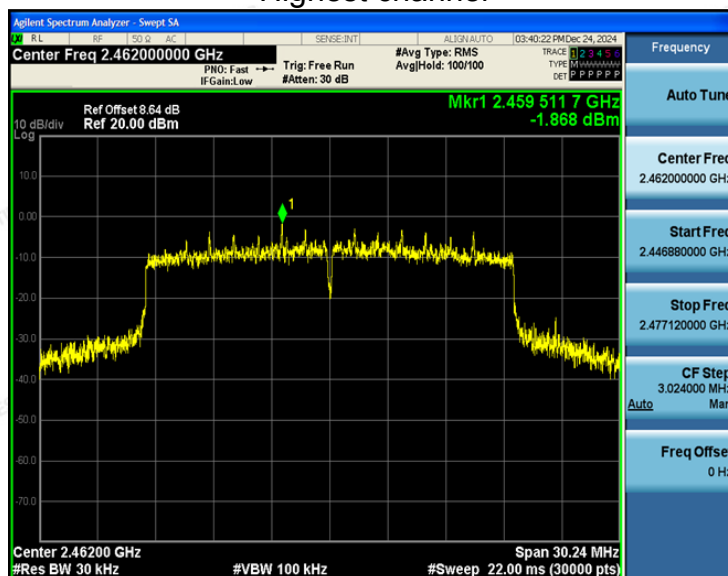
Lowest channel



Middle channel



Highest channel



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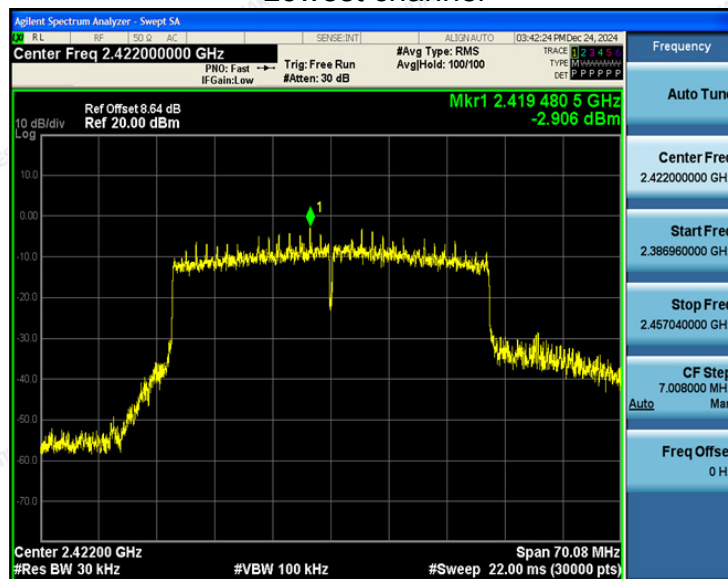
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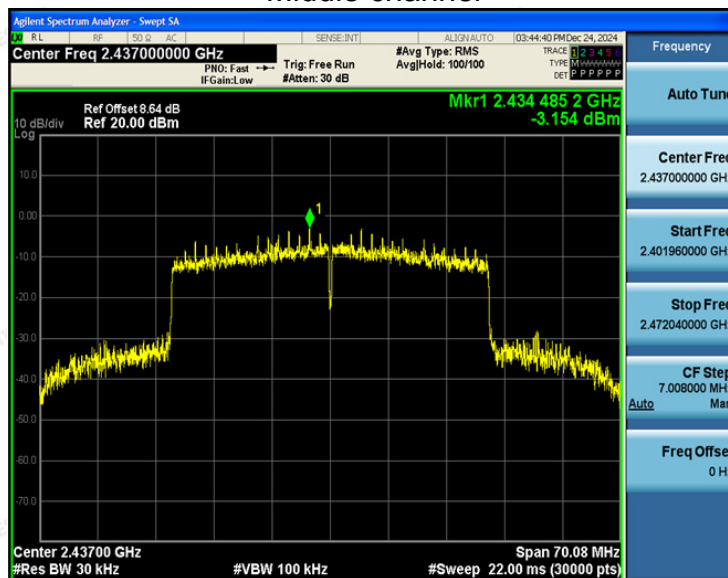


802.11ax (HE40) Modulation

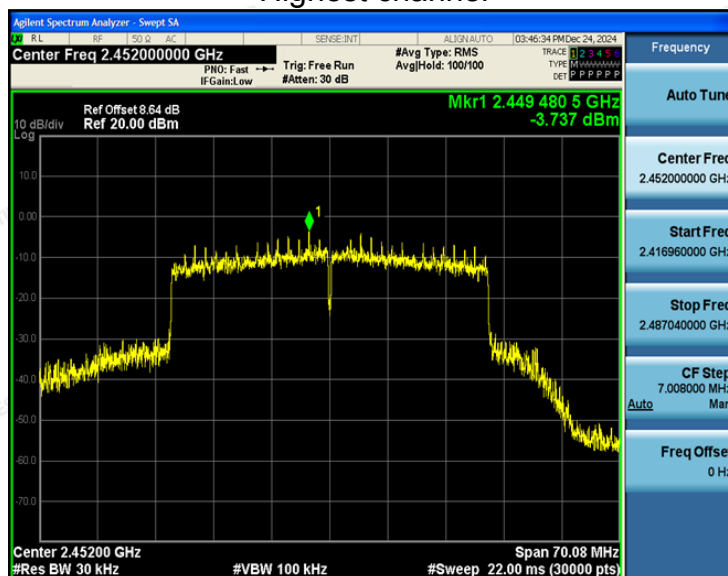
Lowest channel



Middle channel



Highest channel



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**For antenna port 2**

EUT Set Mode	Channel	Test Result (dBm/30kHz)	Result (dBm/3kHz)
802.11b	Lowest	0.45	-9.55
	Middle	0.28	-9.72
	Highest	2.45	-7.55
802.11g	Lowest	-1.14	-11.14
	Middle	-0.77	-10.77
	Highest	-0.36	-10.36
802.11n(HT20)	Lowest	-1.23	-11.23
	Middle	-0.80	-10.80
	Highest	-0.33	-10.33
802.11n(HT40)	Lowest	-1.23	-11.23
	Middle	-1.12	-11.12
	Highest	-1.06	-11.06
802.11ax(HE20)	Lowest	-2.20	-12.20
	Middle	-2.04	-12.04
	Highest	-1.68	-11.68
802.11ax(HE40)	Lowest	-1.48	-11.48
	Middle	-1.63	-11.63
	Highest	-1.36	-11.36
PSD test result (dBm/3kHz)= PSD test result (dBm/30kHz)-10			
Limit: 8dBm/3kHz			
Test Result:		PASS	

Test plots as follows:



802.11b Modulation

Lowest channel



Middle channel



Highest channel



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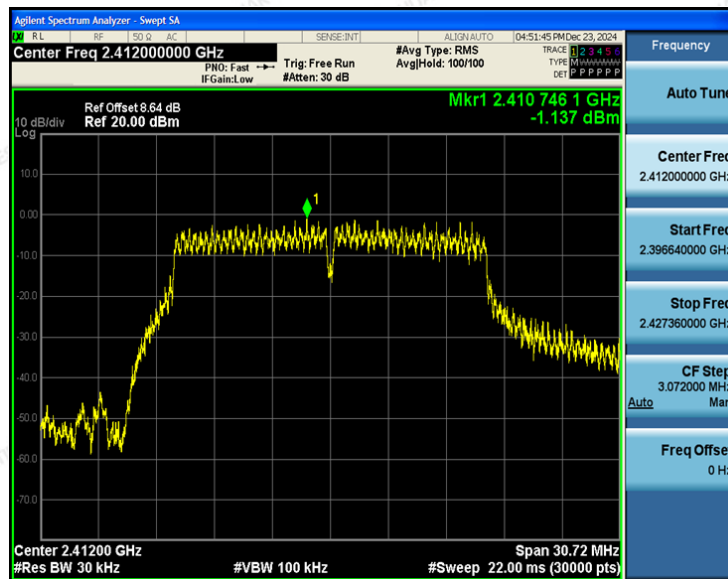
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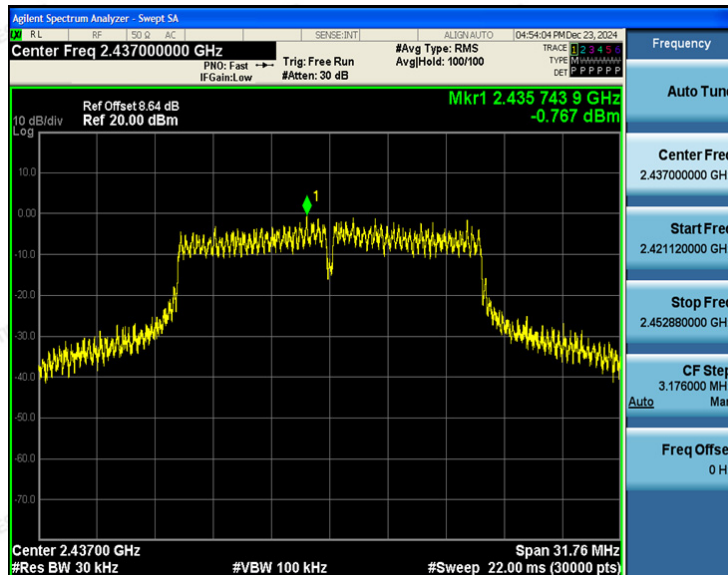


802.11g Modulation

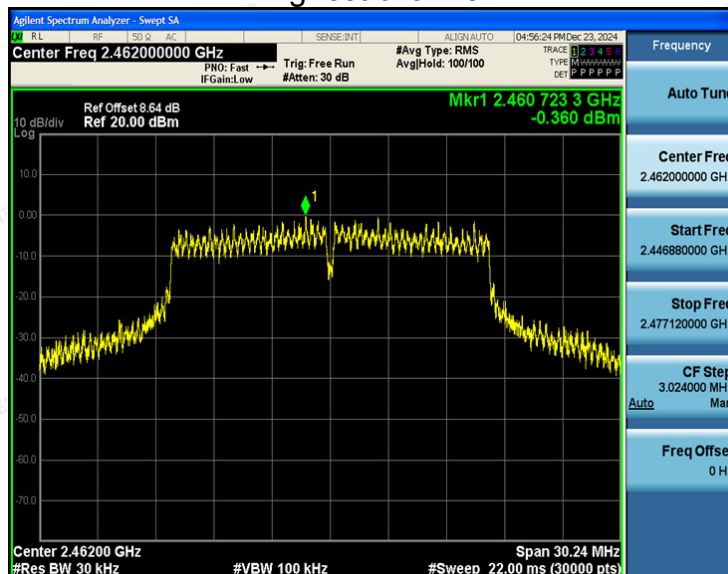
Lowest channel



Middle channel



Highest channel



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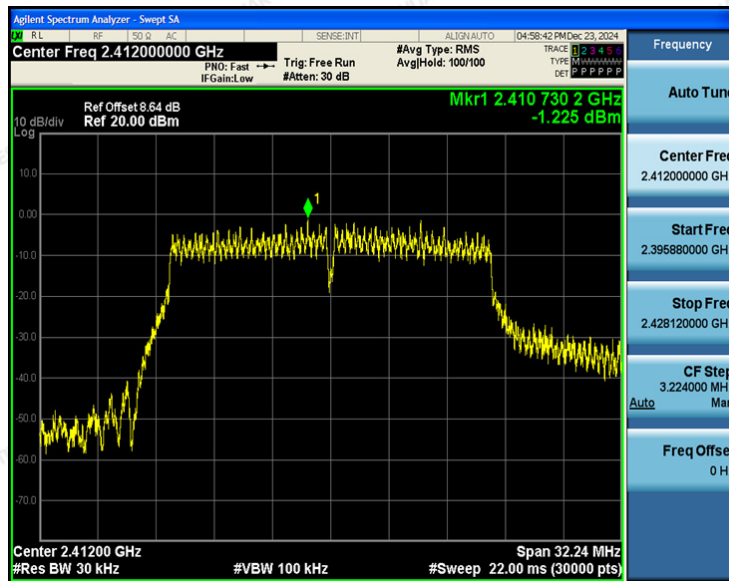
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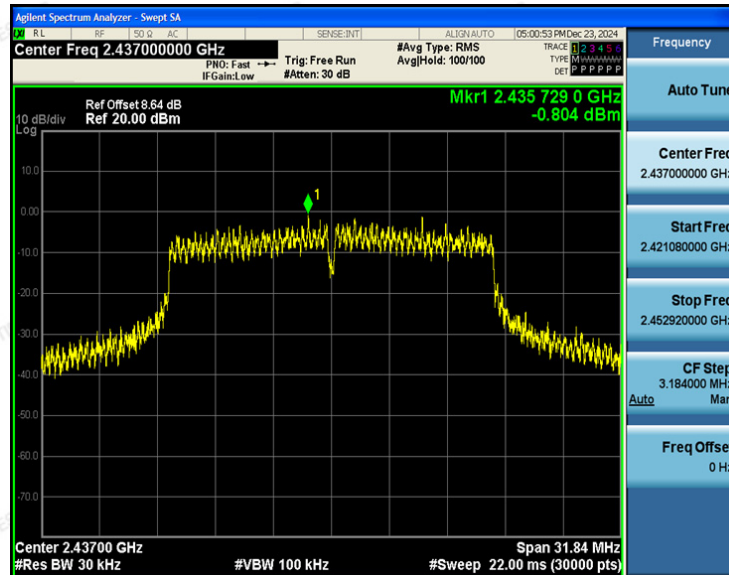


802.11n (HT20) Modulation

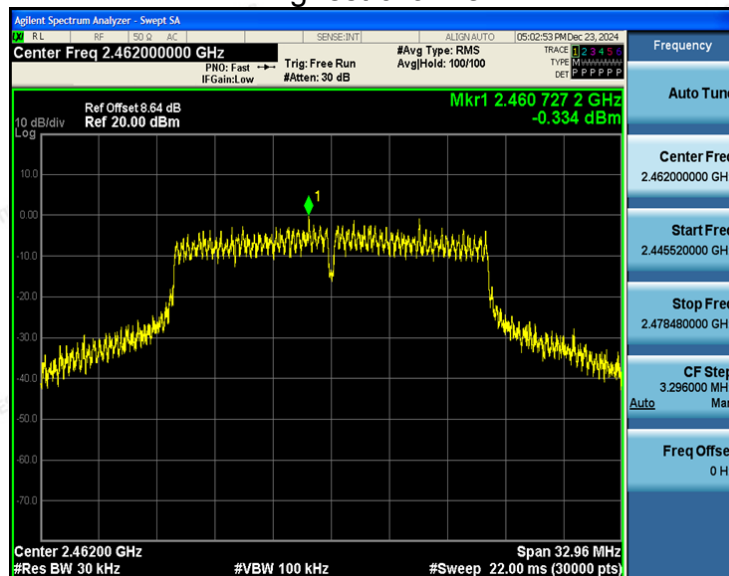
Lowest channel



Middle channel



Highest channel



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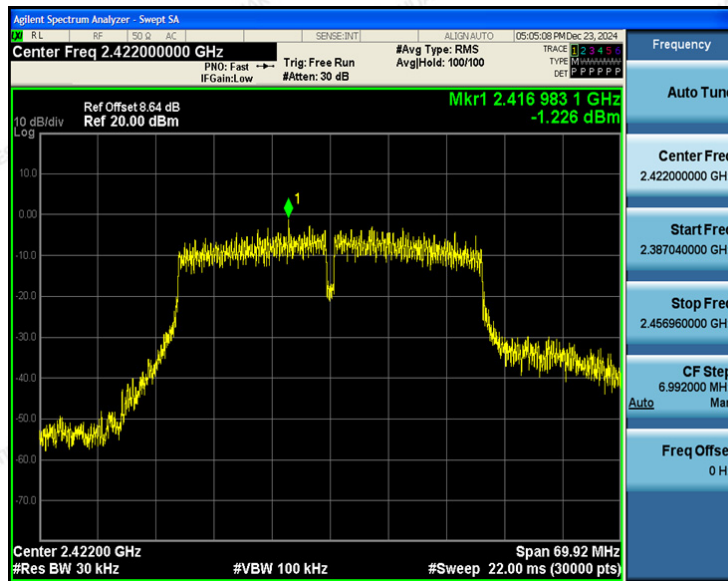
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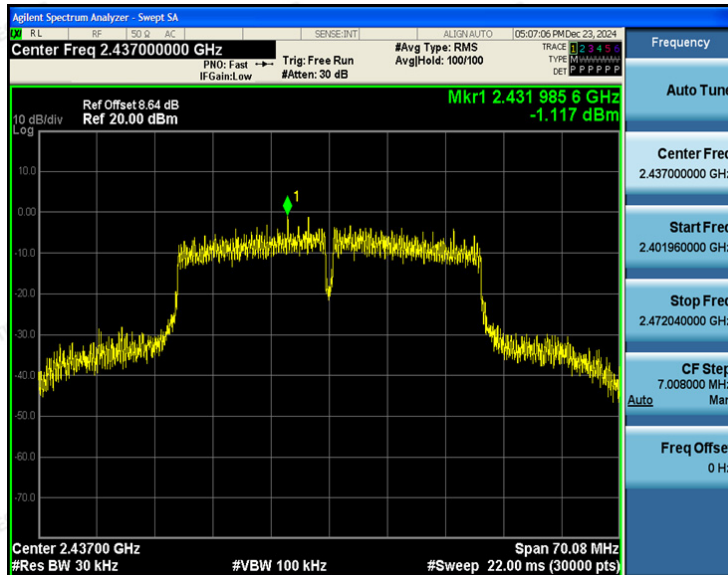


802.11n (HT40) Modulation

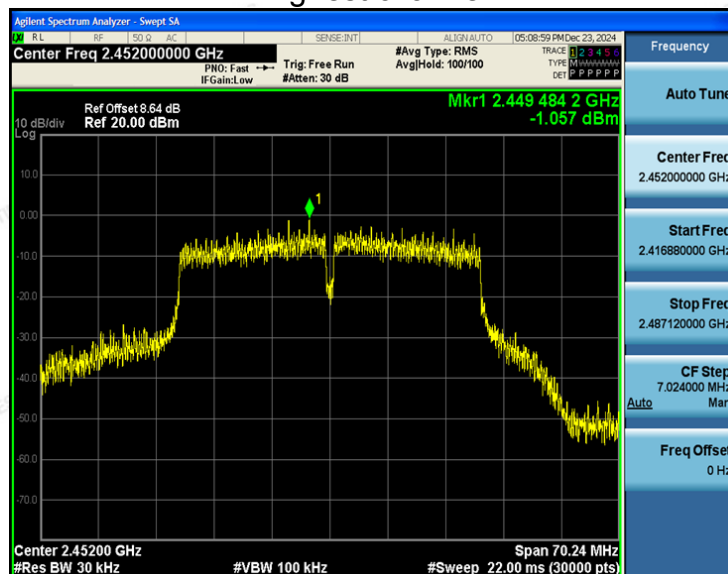
Lowest channel



Middle channel



Highest channel



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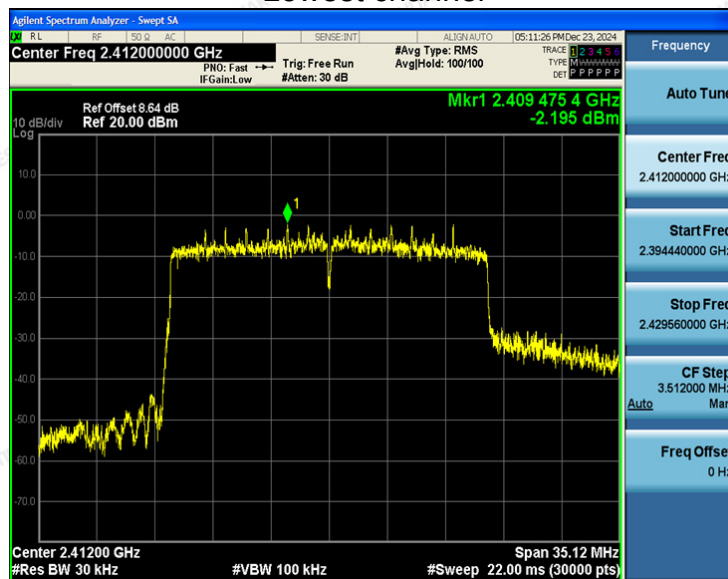
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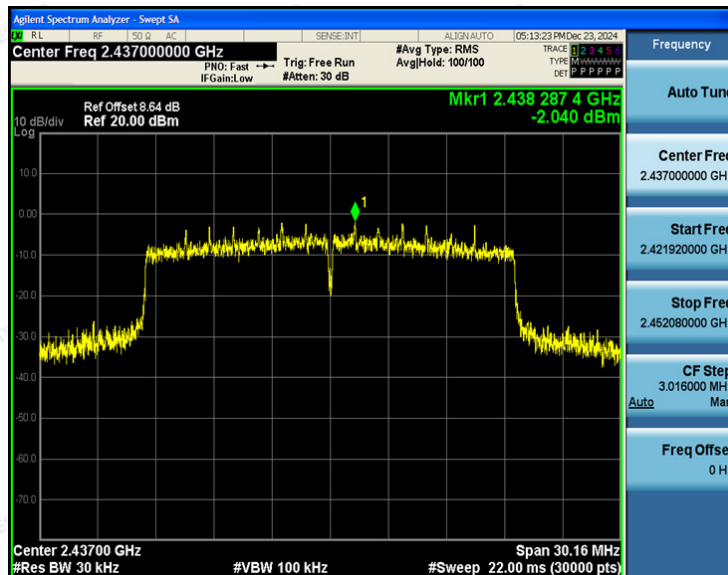


802.11ax (HE20) Modulation

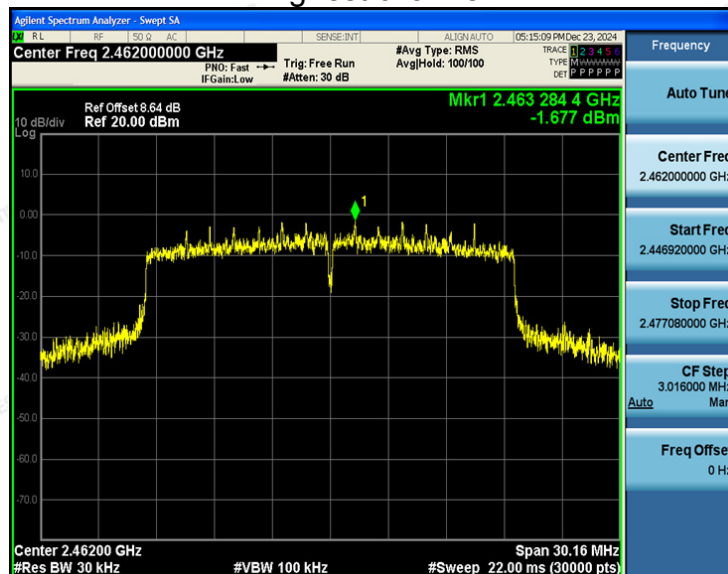
Lowest channel



Middle channel



Highest channel



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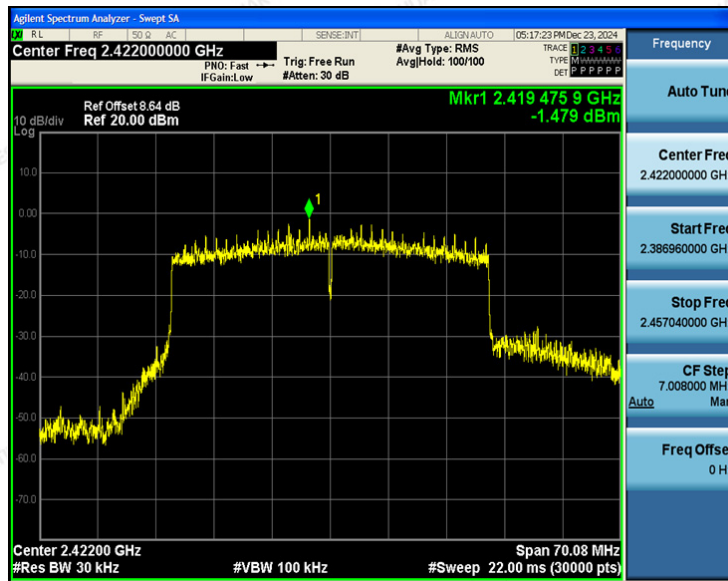
TEL : +86-755 2302 9901 FAX : +86-755 2302 9901 E-mail : service@cer-mark.com

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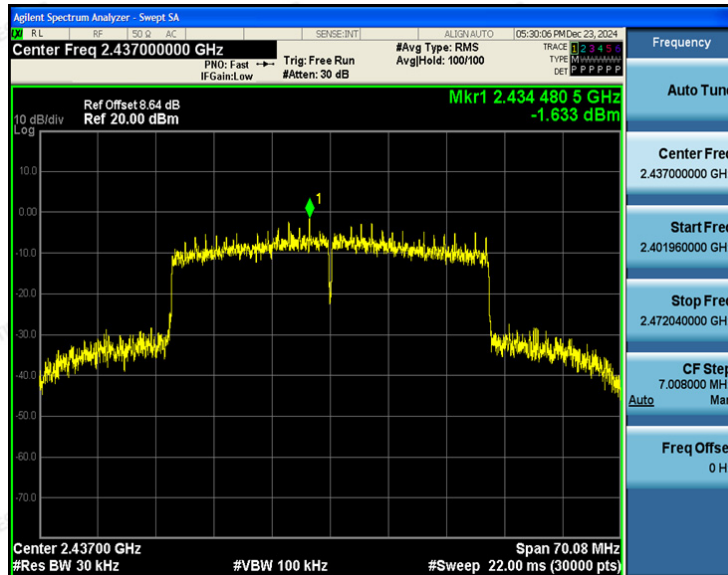


802.11ax (HE40) Modulation

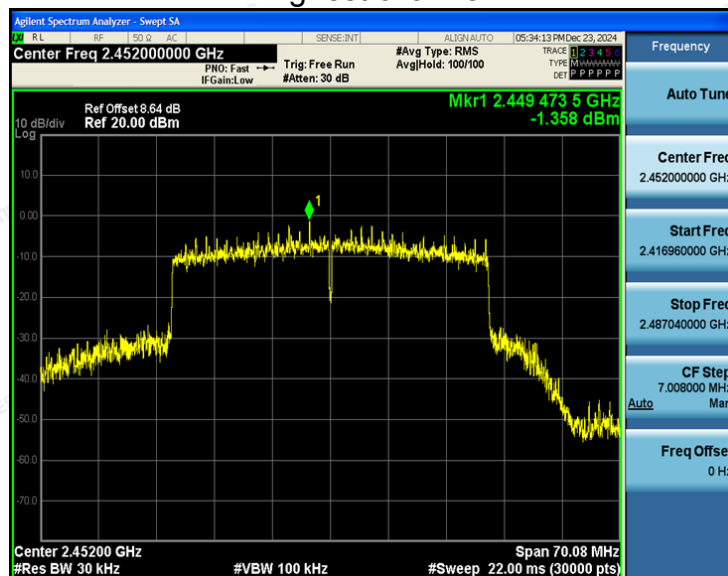
Lowest channel



Middle channel



Highest channel



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For MIMO antenna port 1+antenna port 2			
Frequency	Power Density (dBm)	Limit (dBm)	Result
TX 802.11n/HT20 Mode			
2412 MHz	-8.48	8	PASS
2437 MHz	-8.09	8	PASS
2462 MHz	-7.82	8	PASS
TX 802.11n/HT40 Mode			
2422 MHz	-9.45	8	PASS
2437 MHz	-9.26	8	PASS
2452 MHz	-9.41	8	PASS
TX 802.11ax/HE20 Mode			
2412 MHz	-9.13	8	PASS
2437 MHz	-8.83	8	PASS
2462 MHz	-8.76	8	PASS
TX 802.11ax/HE40 Mode			
2422 MHz	-9.13	8	PASS
2437 MHz	-9.31	8	PASS
2452 MHz	-9.38	8	PASS
Note: 1 According to KDB 662911, Result power = $10\log(10^{(\text{ant1}/10)} + 10^{(\text{ant2}/10)})$. 2 Result unit: W, The end result is converted to units of dBm. limit=8dBm-(direction gain-6dBi)= 8dBm			

Note: This product supports antenna 1, and antenna 2 launch, but only support 802.11 n/802.11ax for MIMO mode, not support 802.11 b and 802.11 g for MIMO mode.