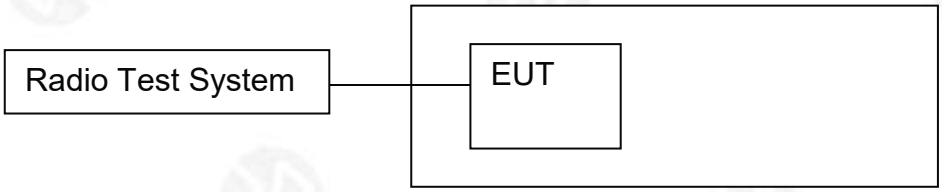
12. FREQUENCY STABILITY

12.1 Block Diagram Of Test Setup



12.2 Limit

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

12.3 Test procedure

1. The EUT was placed inside temperature chamber and powered and powered by nominal DC voltage.

2. Set EUT as normal operation.

3. Turn the EUT on and couple its output to spectrum.

4. Turn the EUT off and set the chamber to the highest temperature specified.

5. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT and measure the operating frequency.

6. Repeat step with the temperature chamber set to the lowest temperature.

12.4 Test Result

TX Frequency (5150-5250MHz)

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5180.0898	5180	0.0898	17.3334
		V max (V)	132	5180.1162	5180	0.1162	22.4240
		V min (V)	108	5180.0755	5180	0.0755	14.5758
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5180.0315	5180	0.0315	6.0859
		T (°C)	10	5180.0459	5180	0.0459	8.8517
		T (°C)	20	5180.0261	5180	0.0261	5.0452
		T (°C)	30	5180.0304	5180	0.0304	5.8615
		T (°C)	40	5180.0229	5180	0.0229	4.4153
Limits				±20ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5200.0376	5200	0.0376	7.2260
		V max (V)	132	5200.0126	5200	0.0126	2.4258
		V min (V)	108	5200.0387	5200	0.0387	7.4386
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5200.0383	5200	0.0383	7.3721
		T (°C)	10	5200.0275	5200	0.0275	5.2832
		T (°C)	20	5200.0167	5200	0.0167	3.2132
		T (°C)	30	5200.0394	5200	0.0394	7.5816
		T (°C)	40	5200.0170	5200	0.0170	3.2734
Limits				±20ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5240.0058	5240	0.0058	1.1004
		V max (V)	132	5240.0497	5240	0.0497	9.4929
		V min (V)	108	5240.0178	5240	0.0178	3.4014
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5240.0378	5240	0.0378	7.2205
		T (°C)	10	5240.0305	5240	0.0305	5.8155
		T (°C)	20	5240.0395	5240	0.0395	7.5452
		T (°C)	30	5240.0393	5240	0.0393	7.5001
		T (°C)	40	5240.0518	5240	0.0518	9.8835
Limits				±20ppm			
Result				Complies			

TX Frequency (5250-5350MHz)

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5260MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5260.0333	5260	0.0333	6.3297
		V max (V)	132	5260.0535	5260	0.0535	10.1772
		V min (V)	108	5260.0266	5260	0.0266	5.0625
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5260MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5260.0732	5260	0.0732	13.9182
		T (°C)	10	5260.0788	5260	0.0788	14.9826
		T (°C)	20	5260.0232	5260	0.0232	4.4116
		T (°C)	30	5260.0033	5260	0.0033	0.6243
		T (°C)	40	5260.0071	5260	0.0071	1.3565
Limits				±20ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5280MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5280.0492	5280	0.0492	9.3266
		V max (V)	132	5280.0027	5280	0.0027	0.5048
		V min (V)	108	5280.0794	5280	0.0794	15.0361
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5280MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5280.0835	5280	0.0835	15.8136
		T (°C)	10	5280.0303	5280	0.0303	5.7407
		T (°C)	20	5280.0435	5280	0.0435	8.2465
		T (°C)	30	5280.0164	5280	0.0164	3.1033
		T (°C)	40	5280.0301	5280	0.0301	5.6931
Limits				±20ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5320MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5320.0318	5320	0.0318	5.9824
		V max (V)	132	5320.0701	5320	0.0701	13.1818
		V min (V)	108	5320.0580	5320	0.0580	10.8998
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5320MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5320.0526	5320	0.0526	9.8806
		T (°C)	10	5320.0135	5320	0.0135	2.5426
		T (°C)	20	5320.0713	5320	0.0713	13.4033
		T (°C)	30	5320.0186	5320	0.0186	3.4927
		T (°C)	40	5320.0310	5320	0.0310	5.8239
Limits				±20ppm			
Result				Complies			

TX Frequency (5470-5725MHz)

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5500MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5550.0810	5500	50.0810	9105.6417
		V max (V)	132	5550.0854	5500	50.0854	9106.4322
		V min (V)	108	5550.0377	5500	50.0377	9097.7559
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5500MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5500.0080	5500	0.0080	1.4459
		T (°C)	10	5500.0446	5500	0.0446	8.1074
		T (°C)	20	5500.0673	5500	0.0673	12.2349
		T (°C)	30	5500.0629	5500	0.0629	11.4318
		T (°C)	40	5500.0824	5500	0.0824	14.9897
Limits				±20ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5580MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5580.0619	5580	0.0619	11.0923
		V max (V)	132	5580.0889	5580	0.0889	15.9381
		V min (V)	108	5580.0221	5580	0.0221	3.9601
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5580MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5580.0609	5580	0.0609	10.9191
		T (°C)	10	5580.0611	5580	0.0611	10.9498
		T (°C)	20	5580.0648	5580	0.0648	11.6089
		T (°C)	30	5580.0093	5580	0.0093	1.6602
		T (°C)	40	5580.0176	5580	0.0176	3.1625
Limits				±20ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5700MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5700.0055	5700	0.0055	0.9646
		V max (V)	132	5700.0300	5700	0.0300	5.2547
		V min (V)	108	5700.0854	5700	0.0854	14.9752
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5700MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5700.0889	5700	0.0889	15.5963
		T (°C)	10	5700.0048	5700	0.0048	0.8441
		T (°C)	20	5700.0799	5700	0.0799	14.0225
		T (°C)	30	5700.0644	5700	0.0644	11.2938
		T (°C)	40	5700.0528	5700	0.0528	9.2589
Limits				±20ppm			
Result				Complies			

TX Frequency (5725-5850MHz)

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5745.0306	5745	0.0306	5.3307
		V max (V)	132	5745.0724	5745	0.0724	12.5996
		V min (V)	108	5745.0306	5745	0.0306	5.3307
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5745.0339	5745	0.0339	5.8966
		T (°C)	10	5745.0573	5745	0.0573	9.9792
		T (°C)	20	5745.0645	5745	0.0645	11.2277
		T (°C)	30	5745.0455	5745	0.0455	7.9172
		T (°C)	40	5745.0238	5745	0.0238	4.1349
Limits				±20ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5785MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5785.0112	5785	0.0112	1.9419
		V max (V)	132	5785.0608	5785	0.0608	10.5076
		V min (V)	108	5785.0837	5785	0.0837	14.4686
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5785MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5785.0204	5785	0.0204	3.5322
		T (°C)	10	5785.0188	5785	0.0188	3.2471
		T (°C)	20	5785.0018	5785	0.0018	0.3180
		T (°C)	30	5785.0571	5785	0.0571	9.8630
		T (°C)	40	5785.0006	5785	0.0006	0.1098
Limits				±20ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5825.0846	5825	0.0846	14.5244
		V max (V)	132	5825.0509	5825	0.0509	8.7318
		V min (V)	108	5825.0820	5825	0.0820	14.0699
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5825.0506	5825	0.0506	8.6813
		T (°C)	10	5825.0675	5825	0.0675	11.5880
		T (°C)	20	5825.0733	5825	0.0733	12.5769
		T (°C)	30	5825.0806	5825	0.0806	13.8290
		T (°C)	40	5825.0860	5825	0.0860	14.7599
Limits				±20ppm			
Result				Complies			

13. OPERATION IN THE ABSENCE OF INFORMATION TO THE TRANSMIT

13.1 Requirement

15.407(c) requirement:
The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signal ling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.

13.2 Test Results

Operation in the absence of information to the transmit:

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling
signal of ASK message transmitting from remote device and verify whether it shall resend or
discontinue transmission. (manufacturer declare)

14. DUTY CYCLE

14.1 Applied procedures / limit

Measurements of duty cycle and transmission duration shall be performed using one of the following techniques:

a) A diode detector and an oscilloscope that together have a sufficiently short response time to permit accurate measurements of the ON and OFF times of the transmitted signal.

b) The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the ON and OFF times of the transmitted signal:

1) Set the center frequency of the instrument to the center frequency of the transmission.

2) Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value.

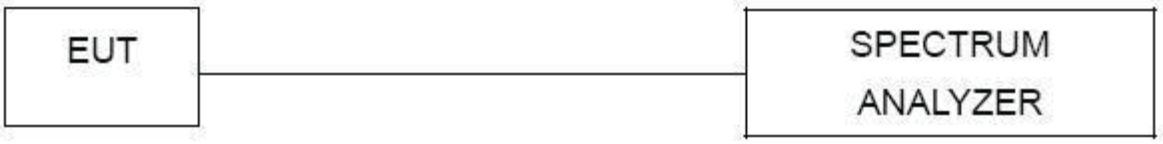
3) Set VBW ≥ RBW. Set detector = peak or average.

4) The zero-span measurement method shall not be used unless both RBW and VBW are > 50/*T* and the number of sweep points across duration *T* exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring the duty cycle shall not be used if $T \leq 16.7$ μs.)

14.2 DEVIATION FROM STANDARD

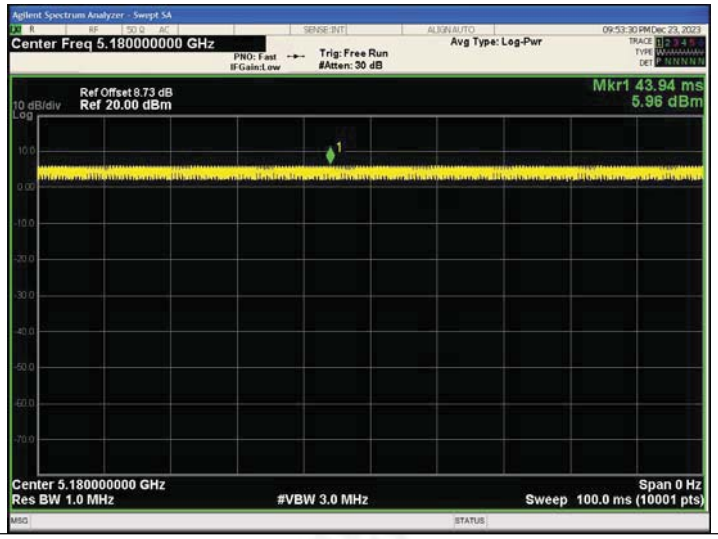
No deviation.

14.3 TEST SETUP

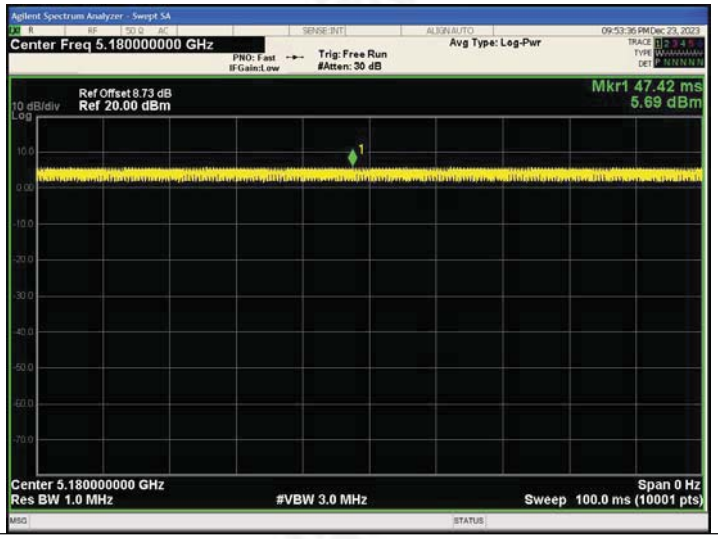


5.2G				
Mode	Frequency (MHz)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Result
802.11a	5180	100	5.96	Pass
802.11n20	5180	100	5.69	Pass
802.11n40	5190	100	1.27	Pass
802.11ac20	5180	100	5.49	Pass
802.11ac40	5190	100	0.89	Pass
802.11ax20	5180	100	5.36	Pass
802.11ax40	5190	100	0.81	Pass

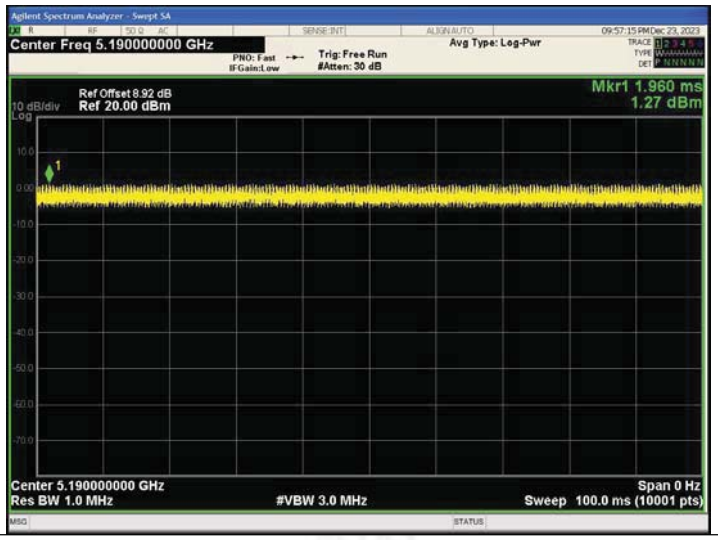
802.11a



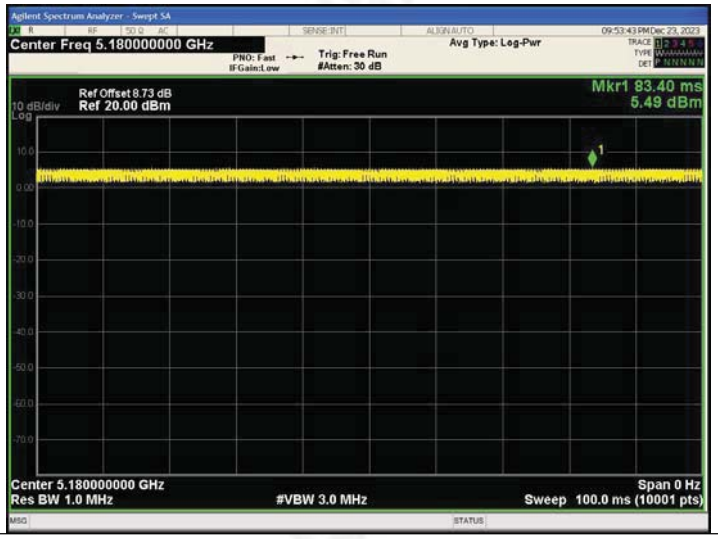
802.11n20



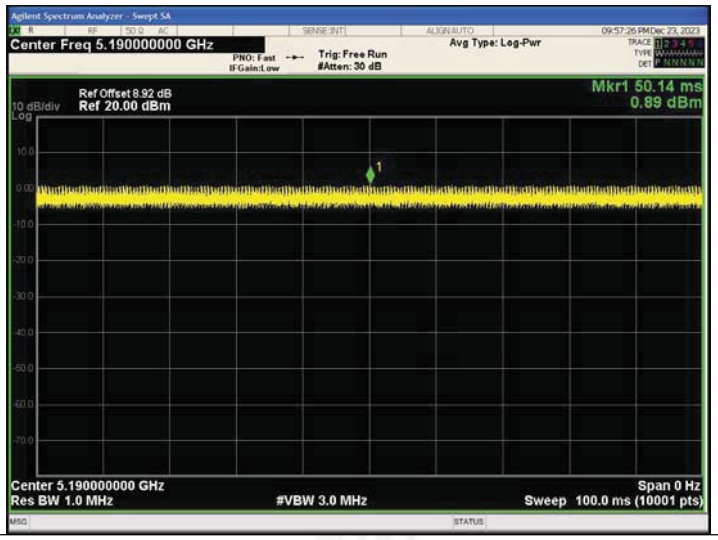
802.11n40



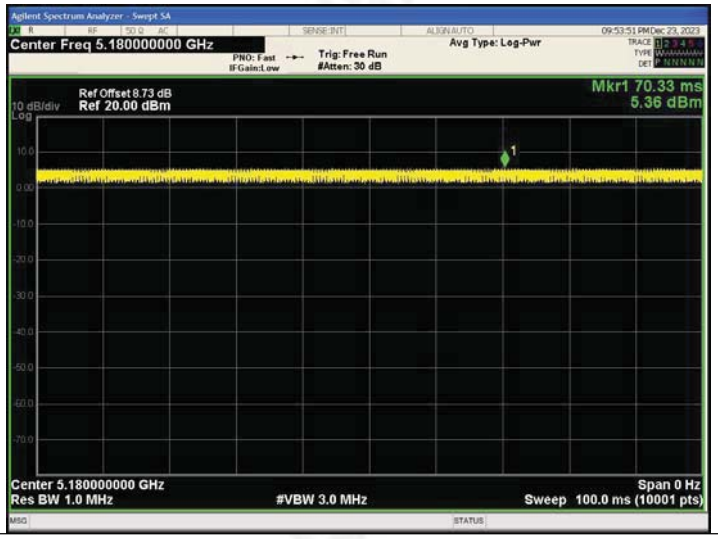
802.11ac20



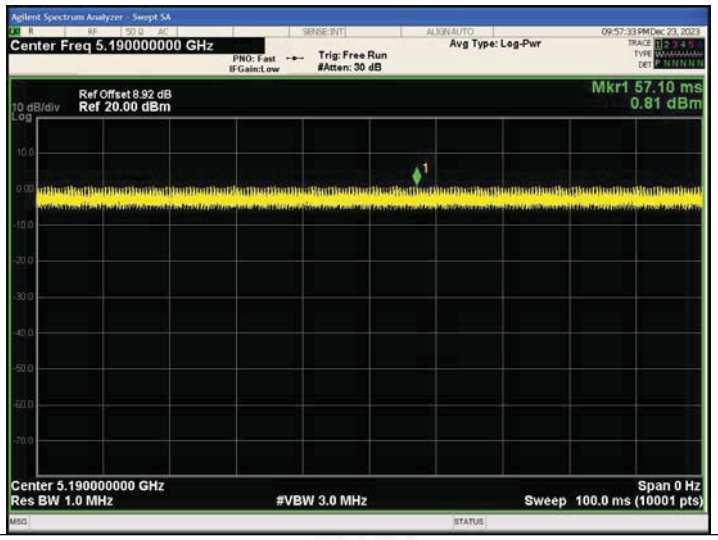
802.11ac40



802.11ax20



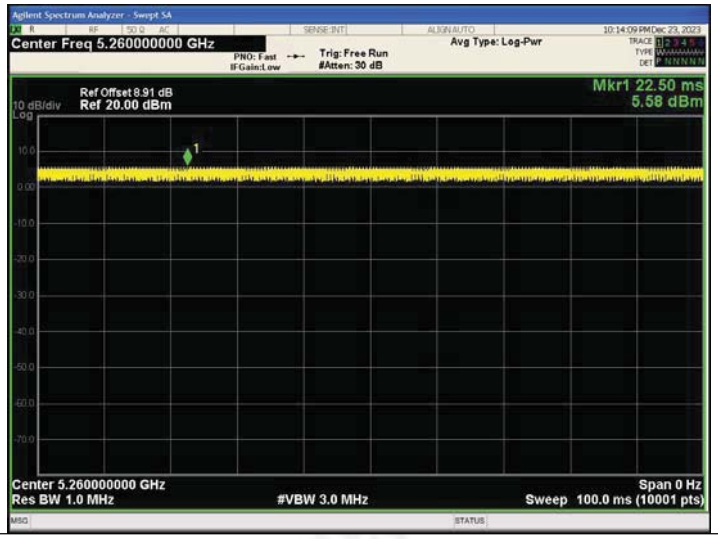
802.11ax40



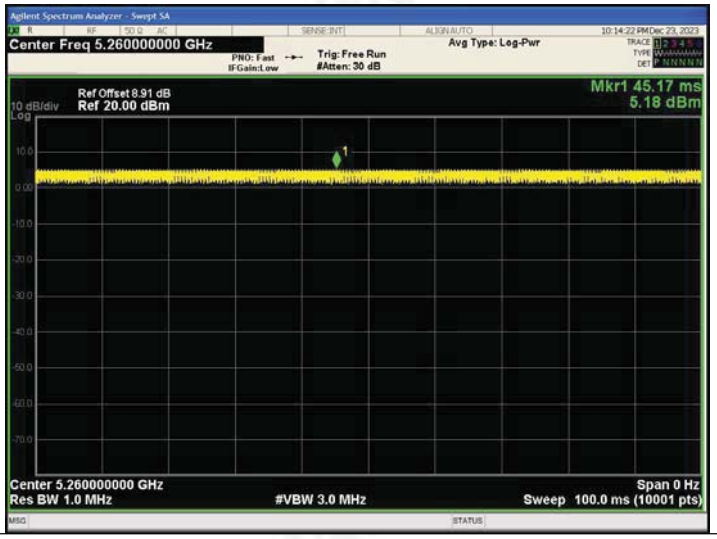
Note: All channel have been tested, and the report only reflects the worst case data.
Duty Cycle= Ton /Total*100%
Duty Cycle Correction Factor = 10log (1/Duty Cycle)

5.3G				
Mode	Frequency (MHz)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Result
802.11a	5260	100	5.58	Pass
802.11n20	5260	100	5.18	Pass
802.11n40	5270	100	1.61	Pass
802.11ac20	5260	100	5.01	Pass
802.11ac40	5270	100	1.24	Pass
802.11ax20	5260	100	4.92	Pass
802.11ax40	5270	100	1.07	Pass

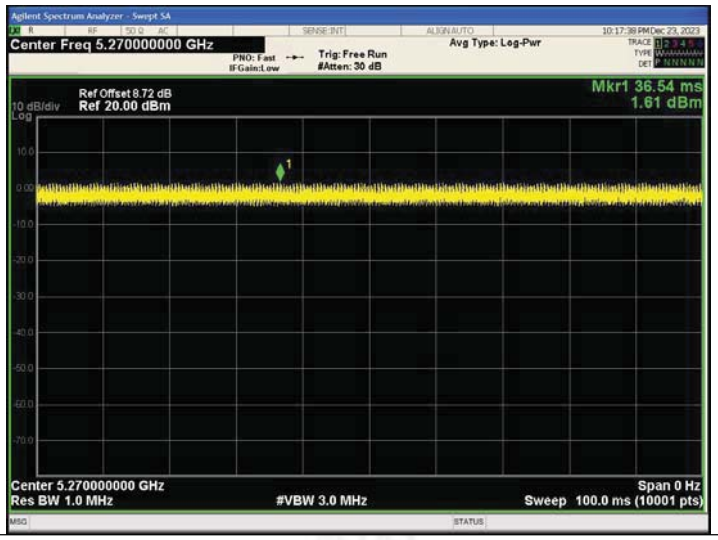
802.11a



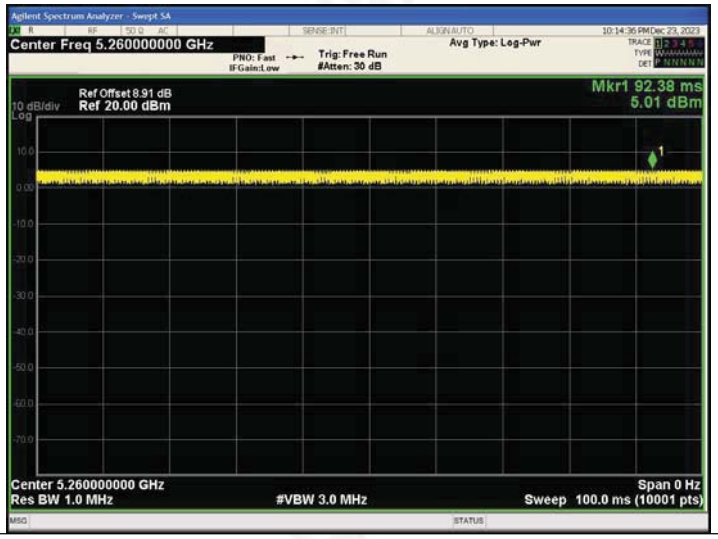
802.11n20



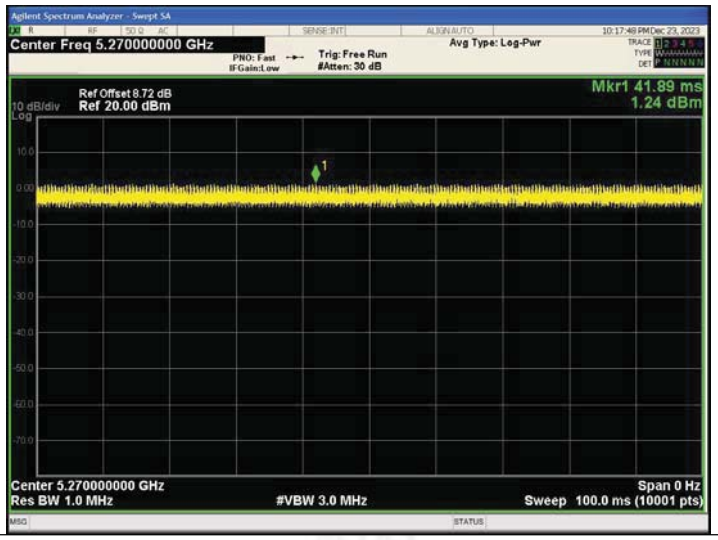
802.11n40



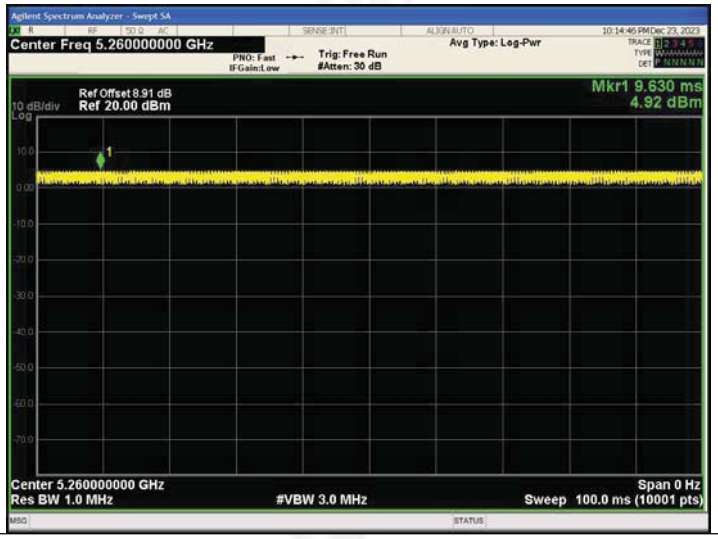
802.11ac20



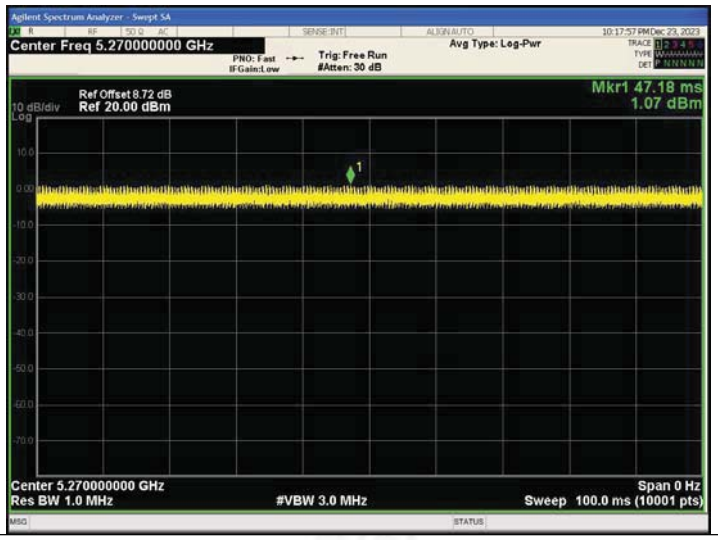
802.11ac40



802.11ax20



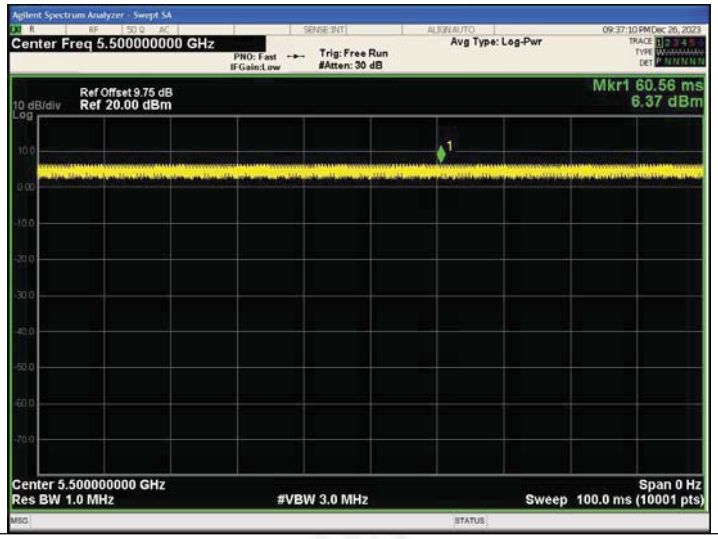
802.11ax40



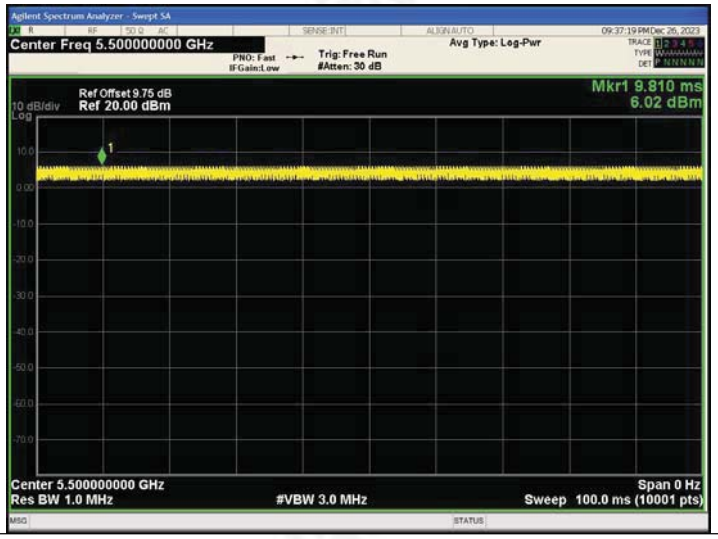
Note: All channel have been tested, and the report only reflects the worst case data.
Duty Cycle= Ton /Total*100%
Duty Cycle Correction Factor = 10log (1/Duty Cycle)

5.6G				
Mode	Frequency (MHz)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Result
802.11a	5500	100	6.37	Pass
802.11n20	5500	100	6.02	Pass
802.11n40	5510	100	1.02	Pass
802.11ac20	5500	100	5.90	Pass
802.11ac40	5510	100	0.81	Pass
802.11ax20	5500	100	5.83	Pass
802.11ax40	5510	100	0.71	Pass

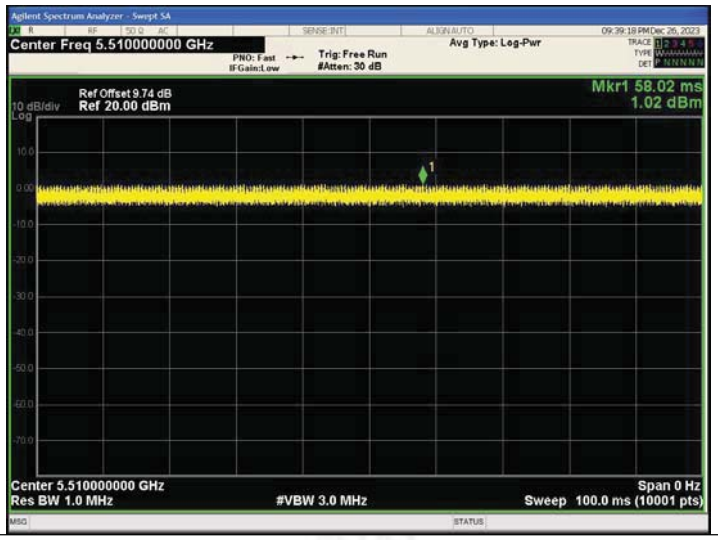
802.11a



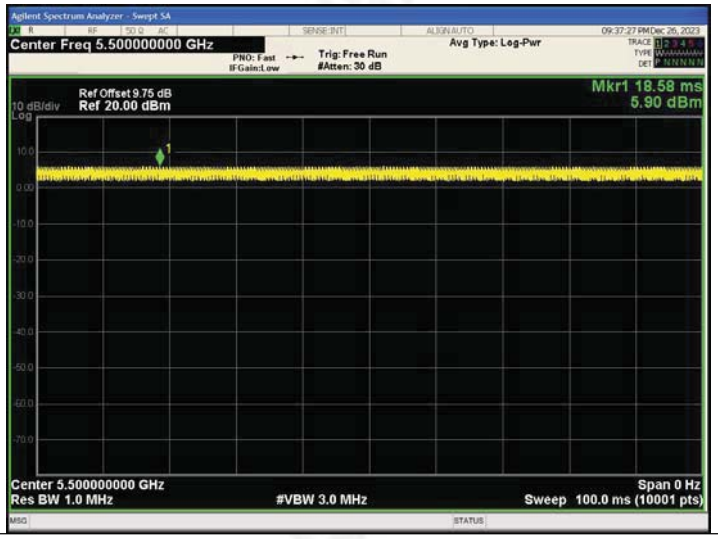
802.11n20



802.11n40



802.11ac20



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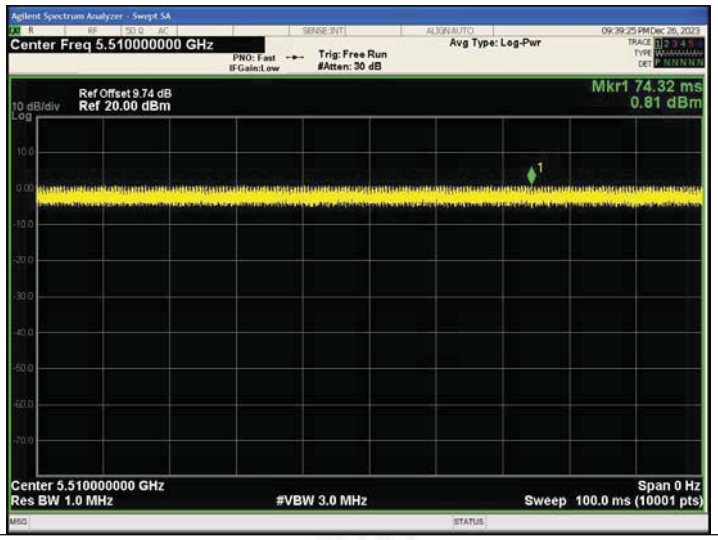

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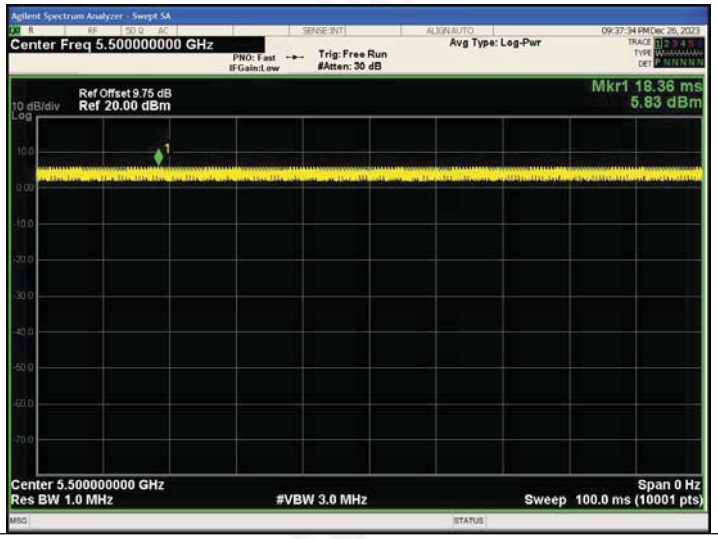

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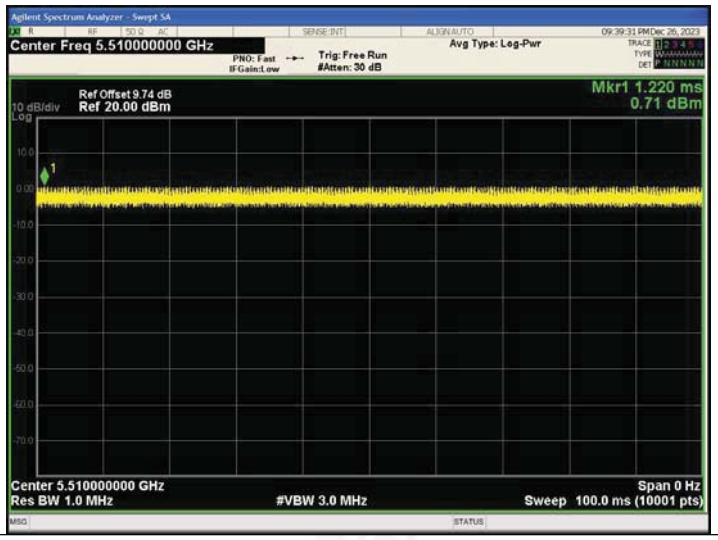


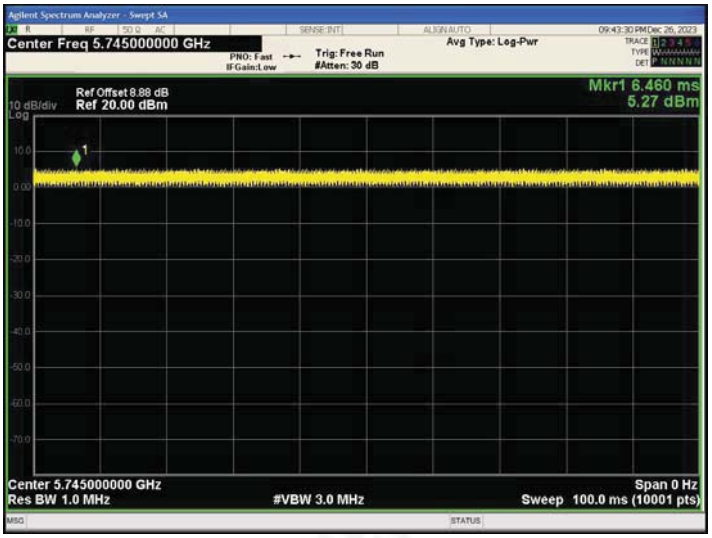
Note: All channel have been tested, and the report only reflects the worst case data.

Duty Cycle= Ton /Total*100%

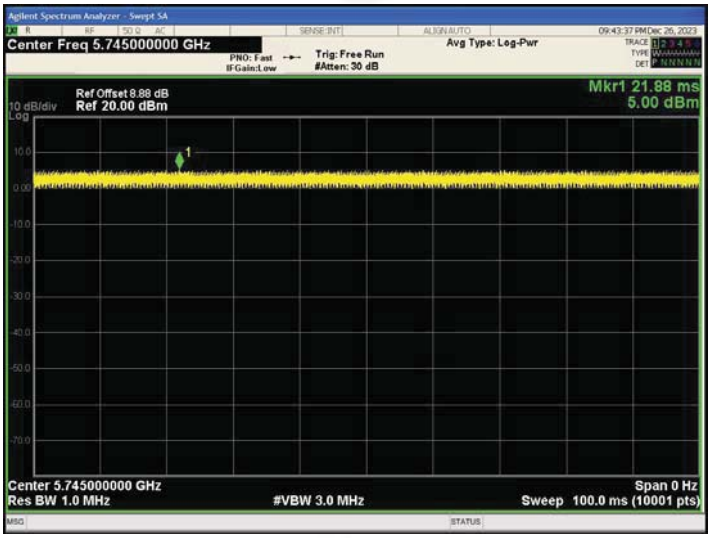
Duty Cycle Correction Factor = 10log (1/Duty Cycle)

5.8G				
Mode	Frequency (MHz)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Result
802.11a	5745	100	5.27	Pass
802.11n20	5745	100	5.00	Pass
802.11n40	5755	100	0.22	Pass
802.11ac20	5745	100	4.78	Pass
802.11ac40	5755	100	-0.08	Pass
802.11ax20	5745	100	4.66	Pass
802.11ax40	5755	100	-0.17	Pass

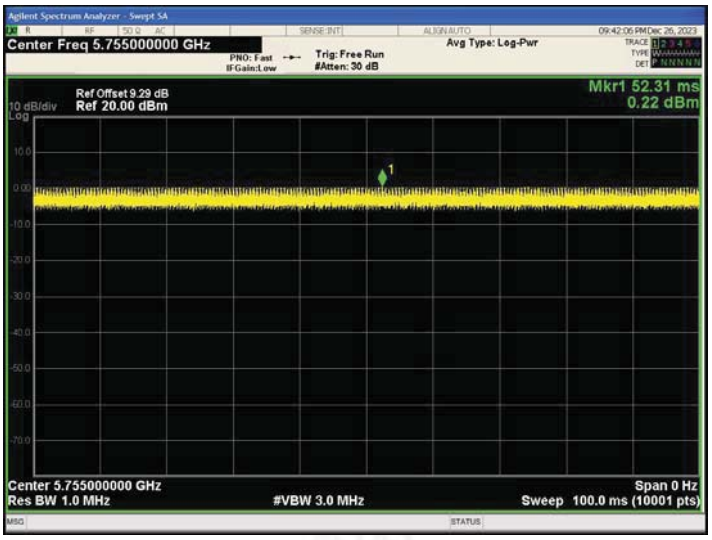
802.11a



802.11n20



802.11n40



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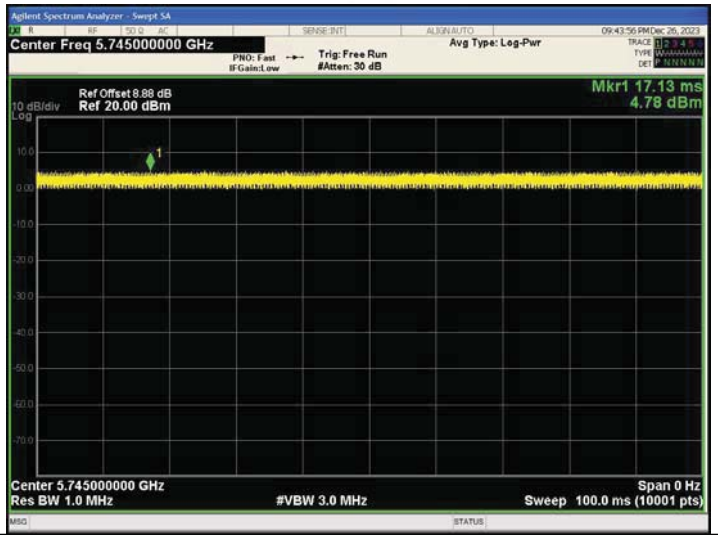

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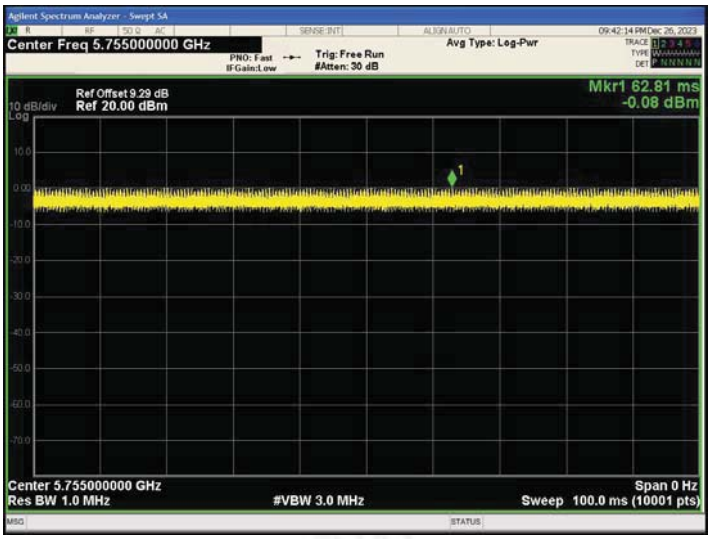

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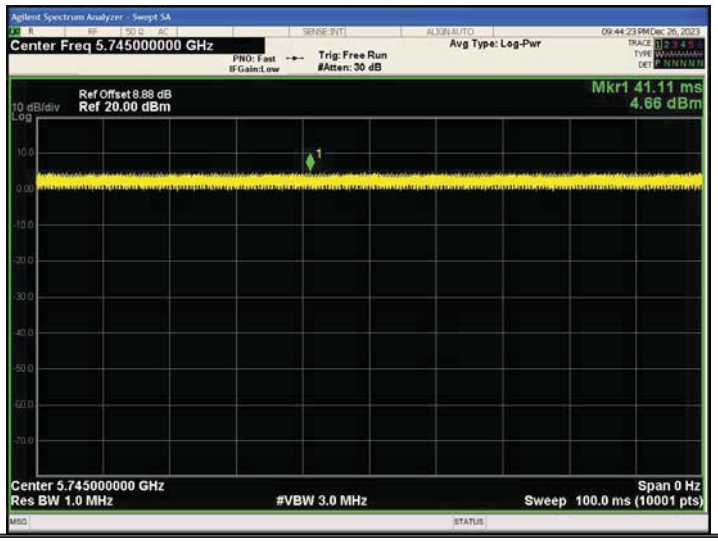
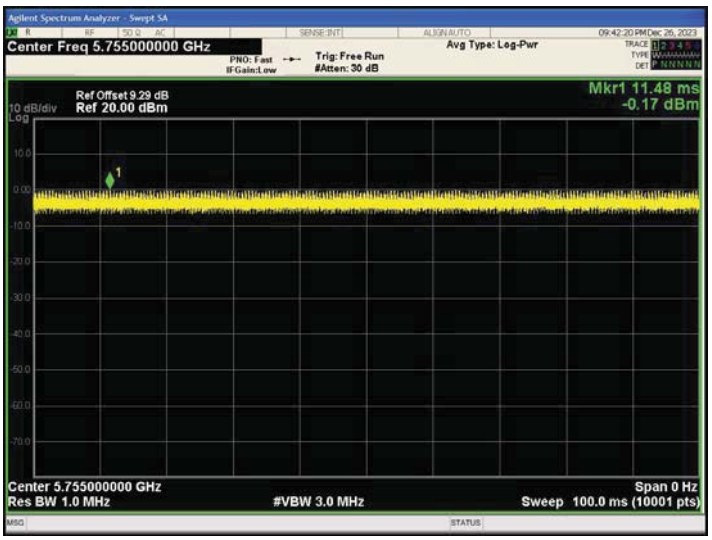


802.11ax40



Note: All channel have been tested, and the report only reflects the worst case data.
Duty Cycle= Ton /Total*100%
Duty Cycle Correction Factor = 10log (1/Duty Cycle)

15. ANTENNA REQUIREMENT

15.203 requirement:
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.
15.247(b) (4) requirement:
The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:

The antenna is Internal Antenna and no consideration of replacement. The best case gain of the antenna is 3.0dBi.

※※※※※ END OF REPORT ※※※※※