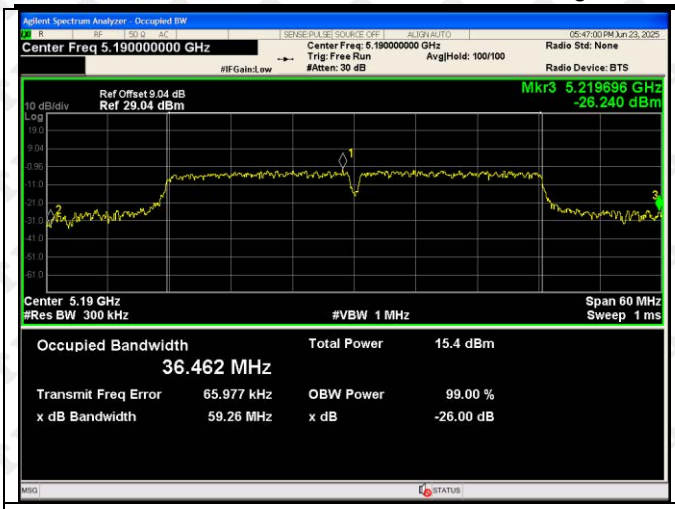
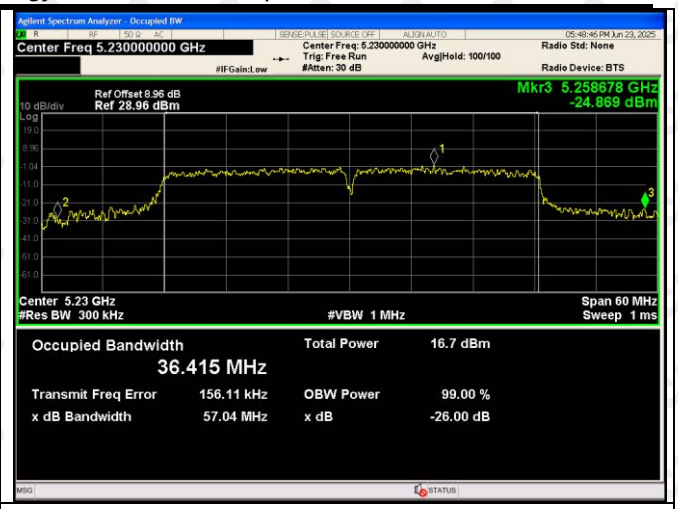
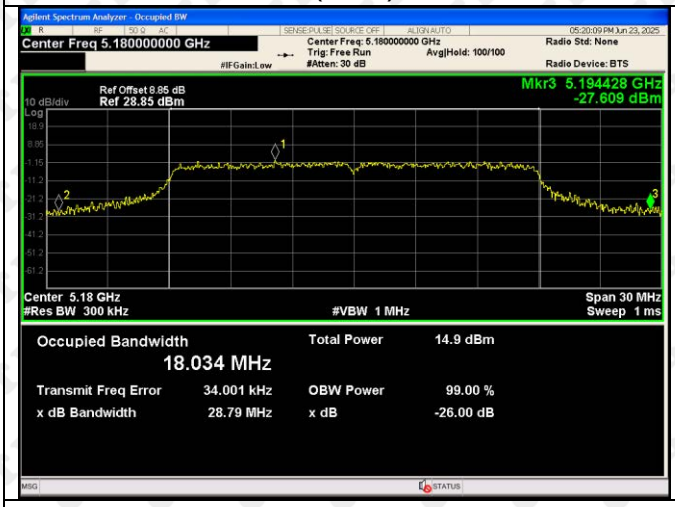


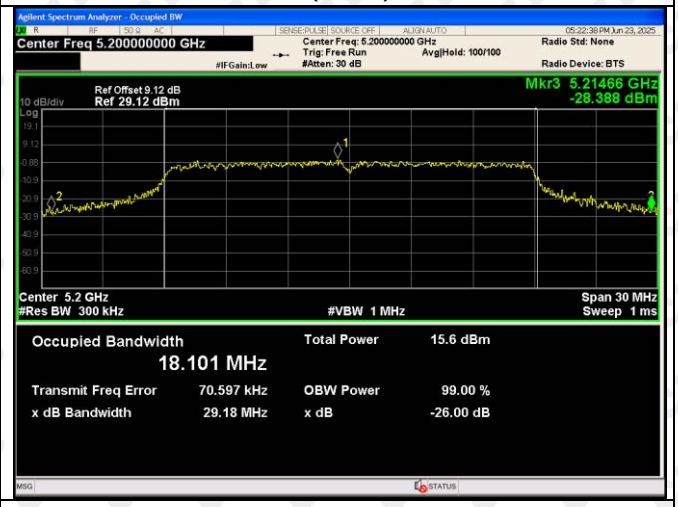
802.11n(HT20)-5180



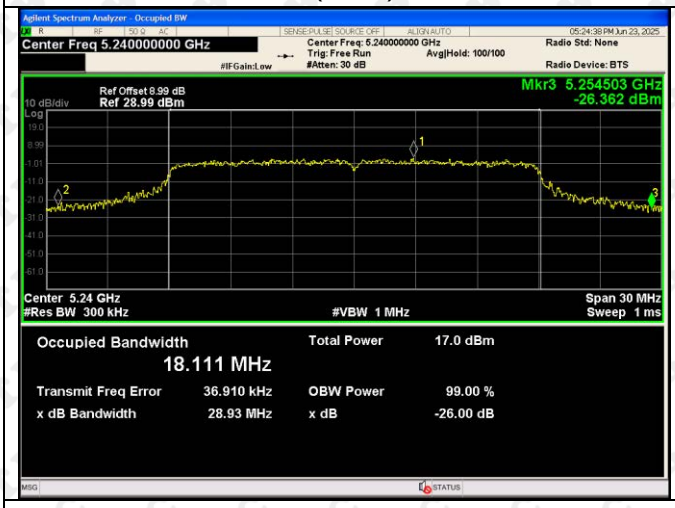
802.11n(HT20)-5200



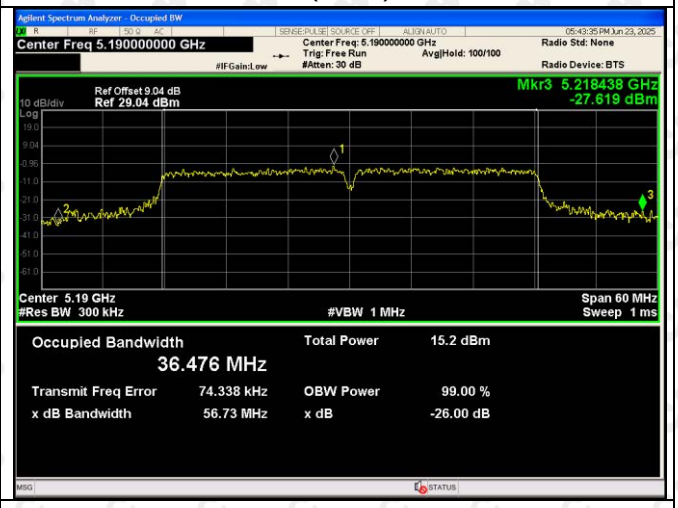
802.11n(HT20)-5240



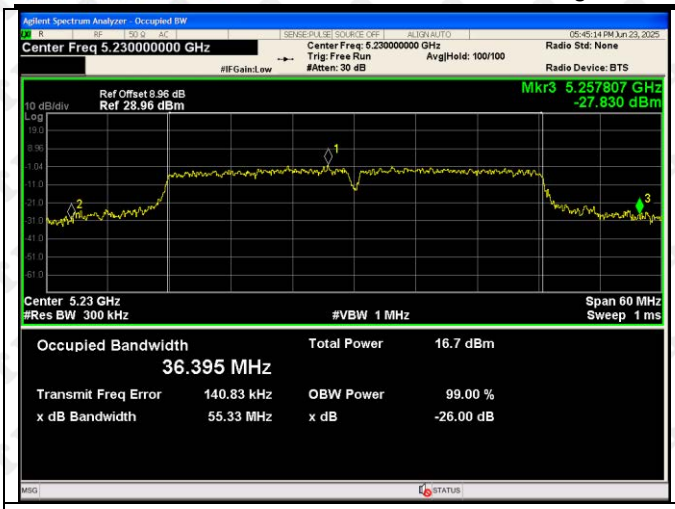
802.11n(HT40)-5190



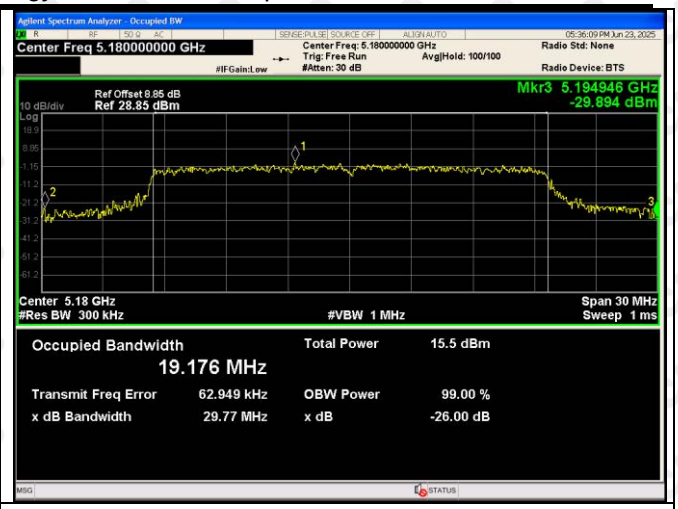
802.11n(HT40)-5230



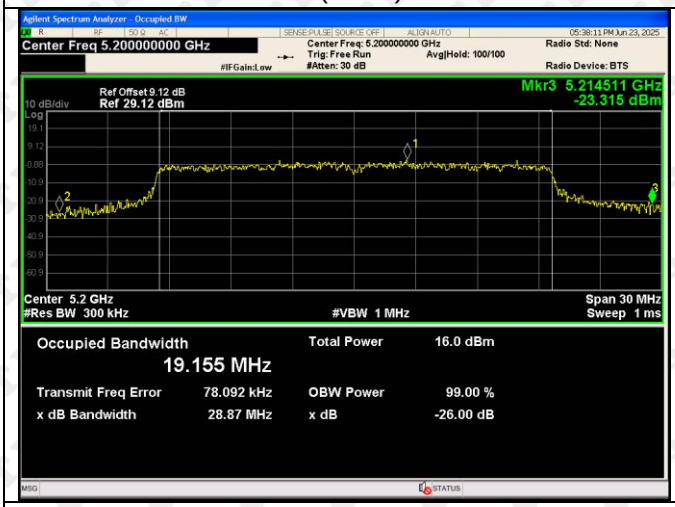
802.11ax(VH20)-5180



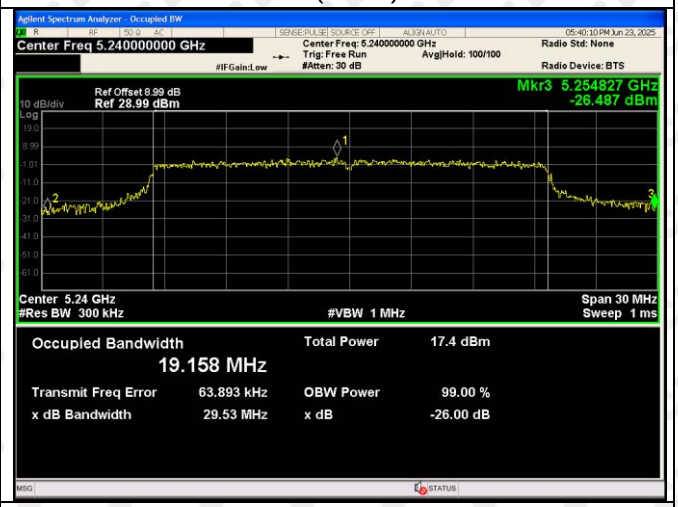
802.11ax(VH20)-5200



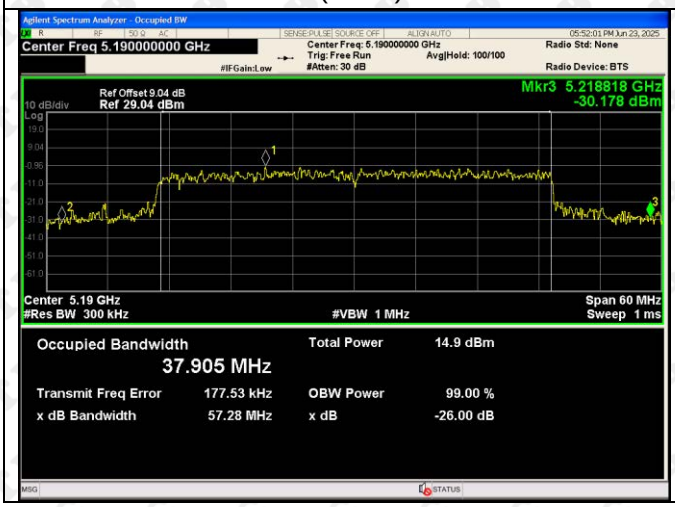
802.11ax(VH20)-5240

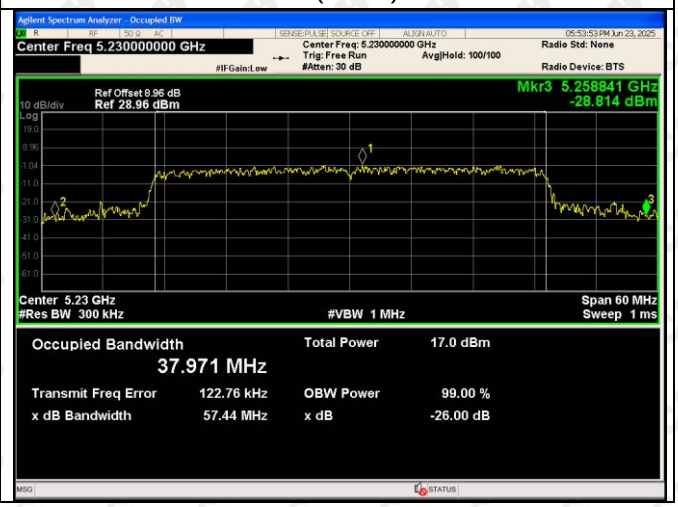


802.11ax(VH40)-5190



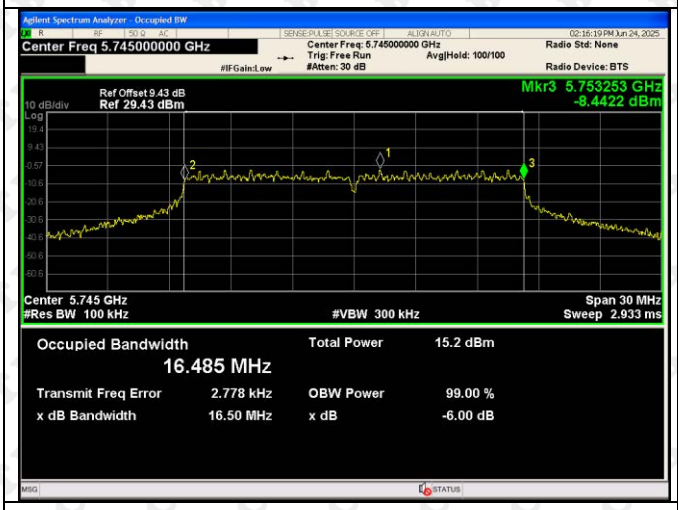
802.11ax(VH40)-5230



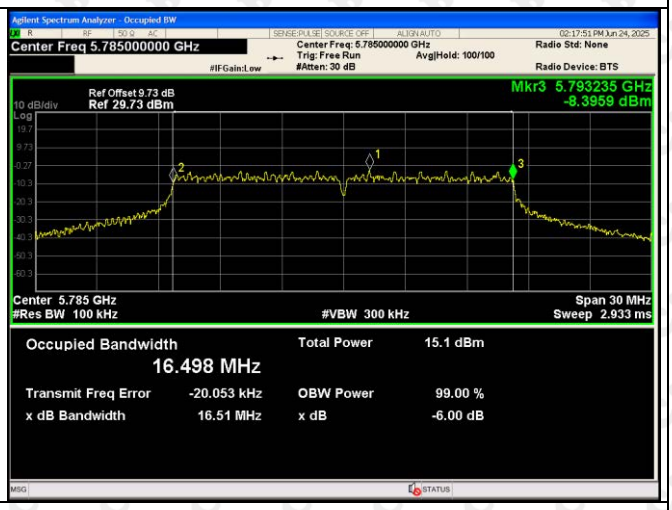


5745-5825MHz

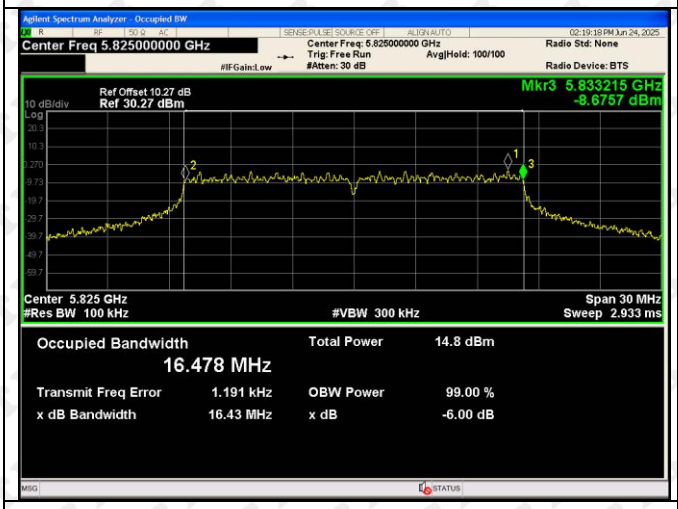
802.11a-5745



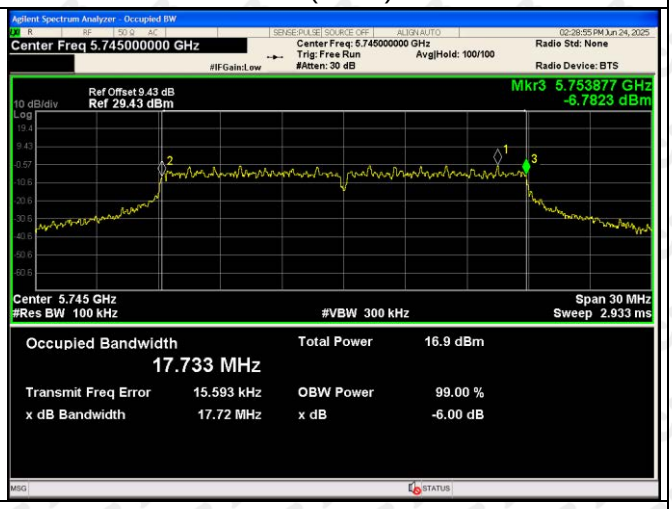
802.11a-5785



802.11a-5825



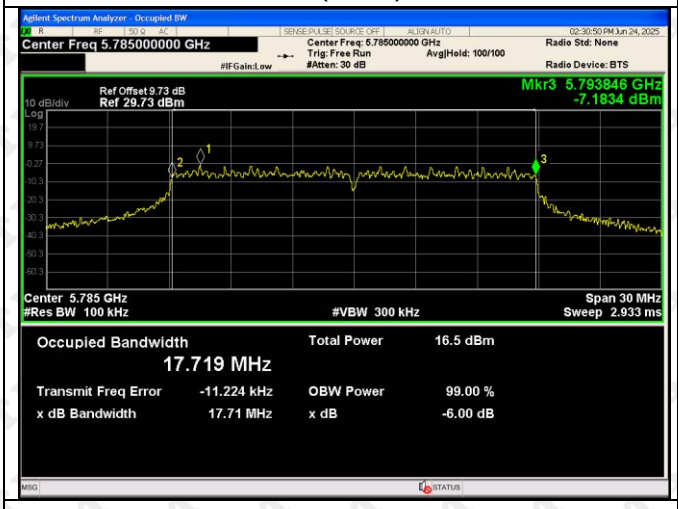
802.11ac(VH20)-5745



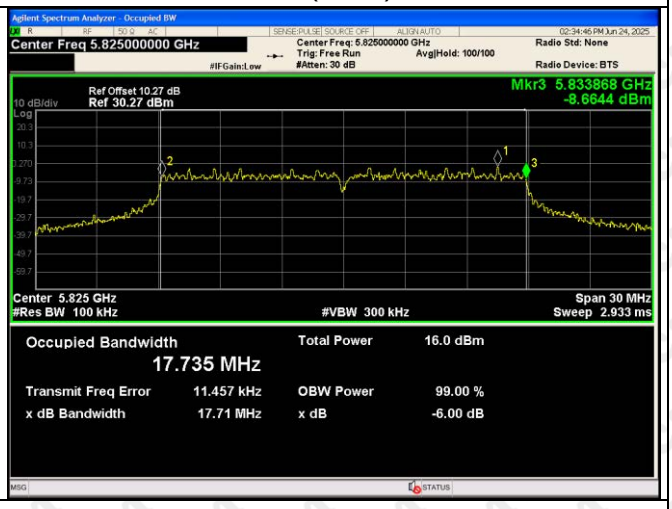
802.11ac(VH20)-5785

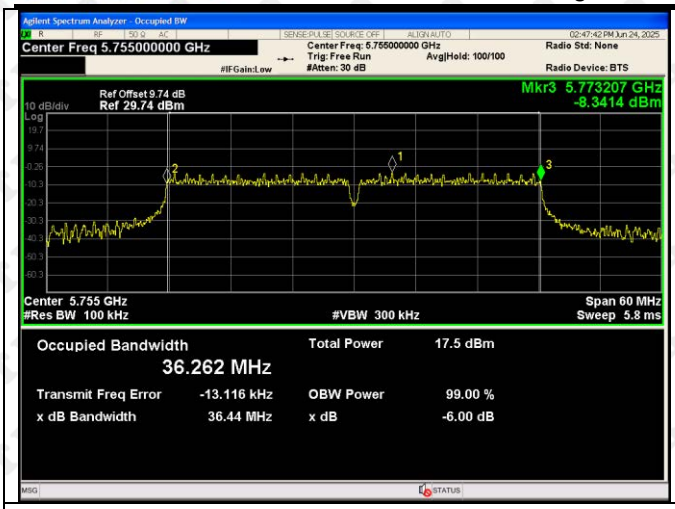
802.11ac(VH20)-5825

802.11ac(VH40)-5755

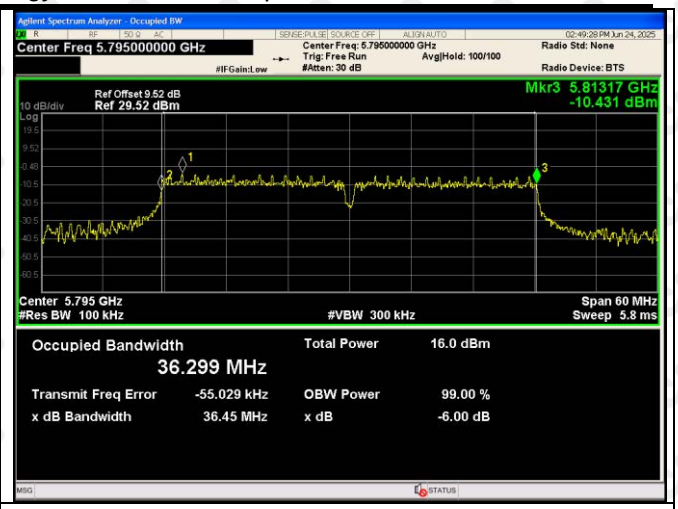


802.11ac(VH40)-5795

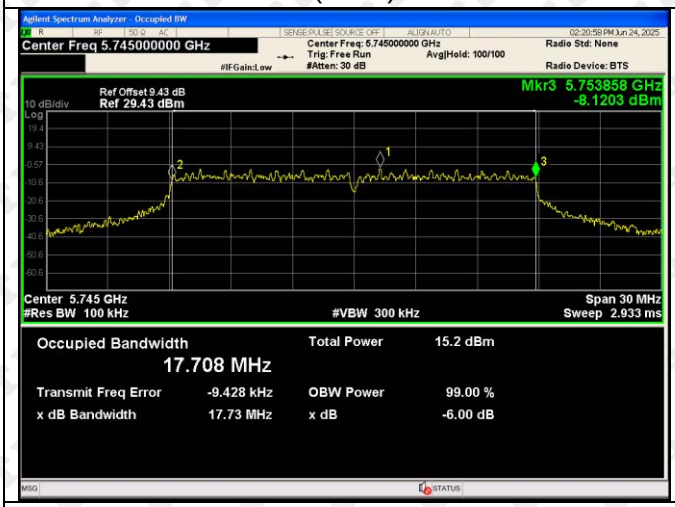




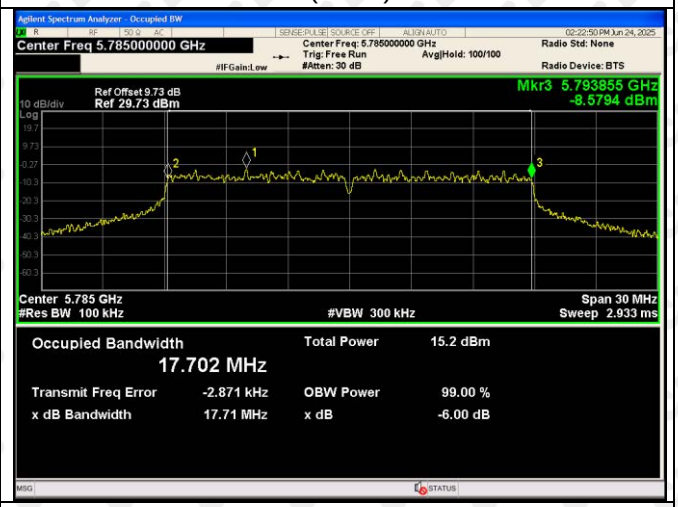
802.11n(HT20)-5745



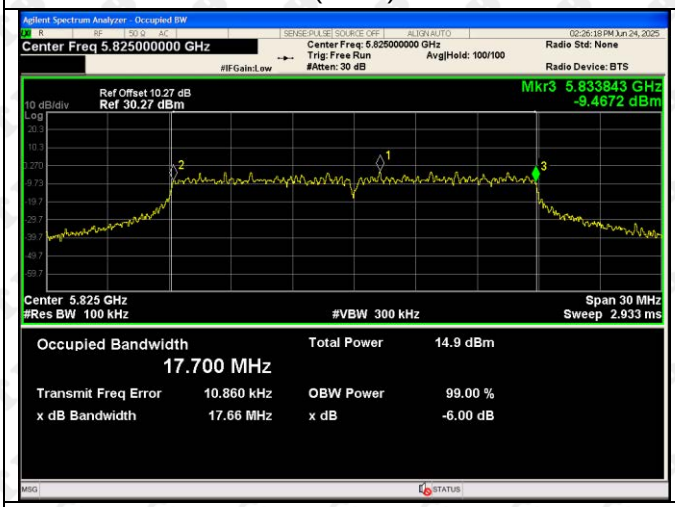
802.11n(HT20)-5785



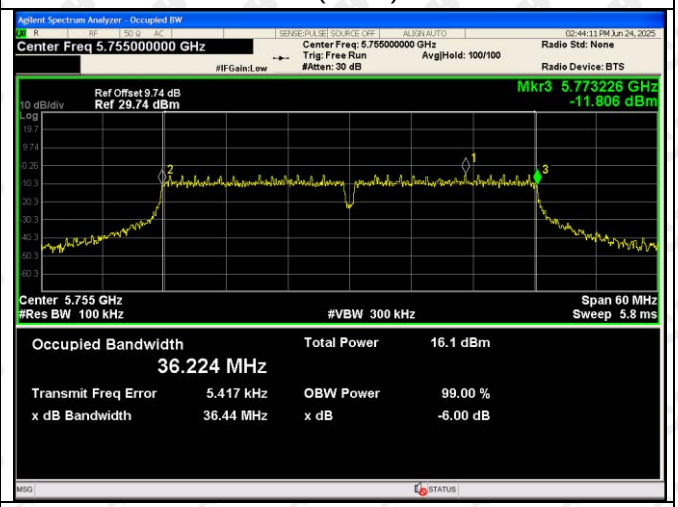
802.11n(HT20)-5825



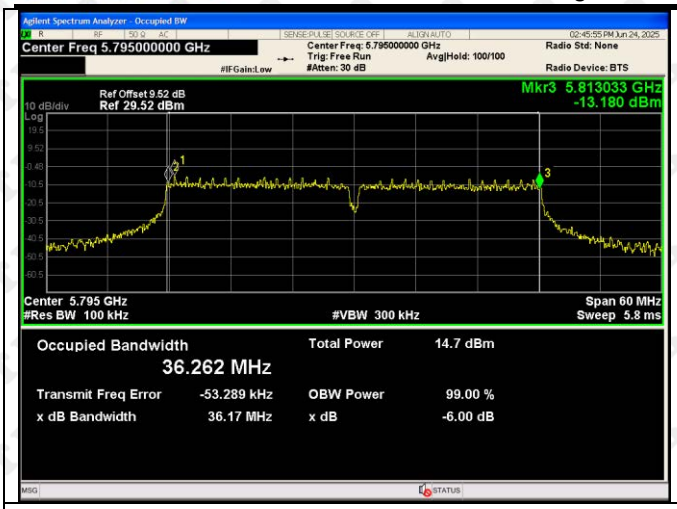
5802.11n(HT40)-5755



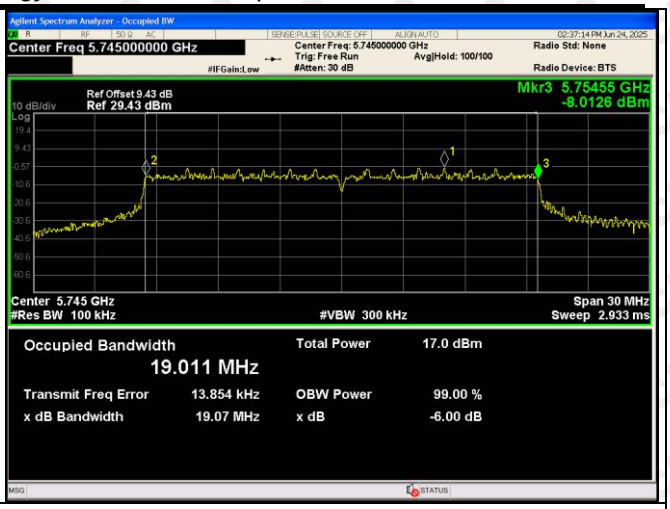
802.11n(HT40)-5795



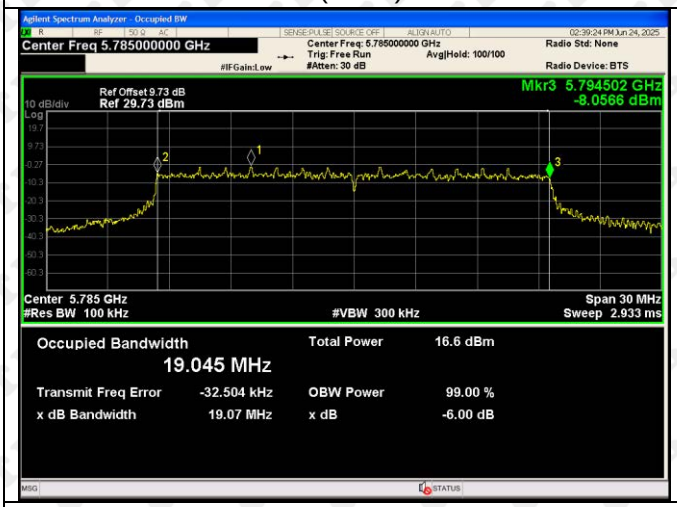
802.11ax(VH20)-5745



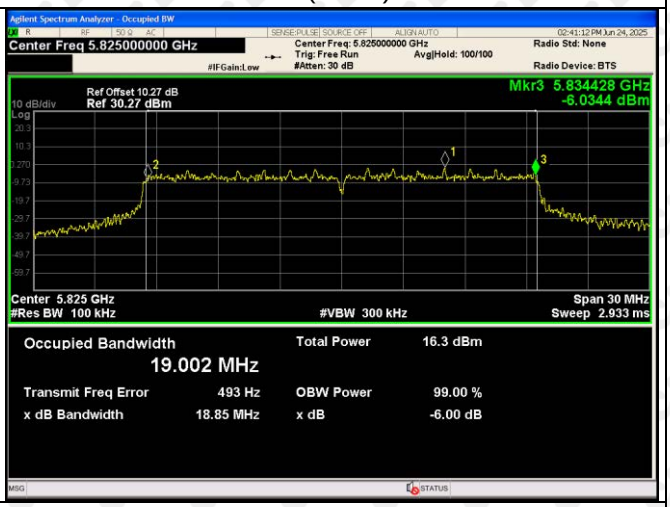
802.11ax(VH20)-5785



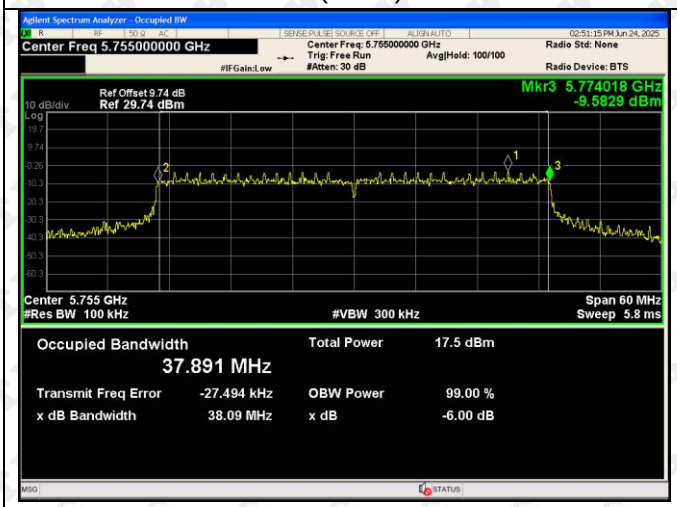
802.11ax(VH20)-5825

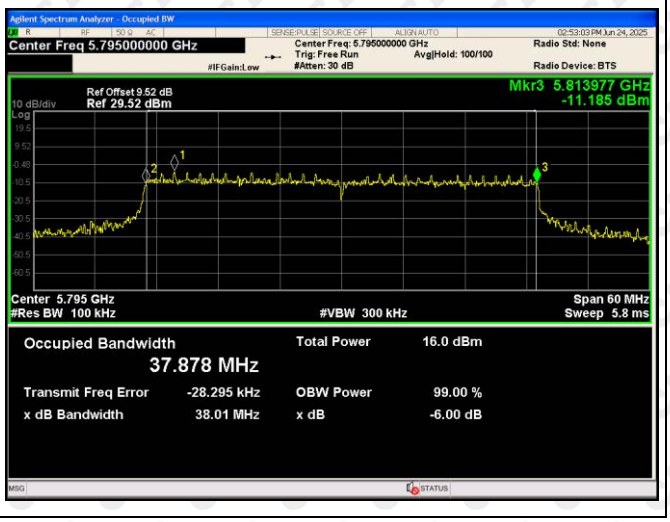


802.11ax(VH40)-5755



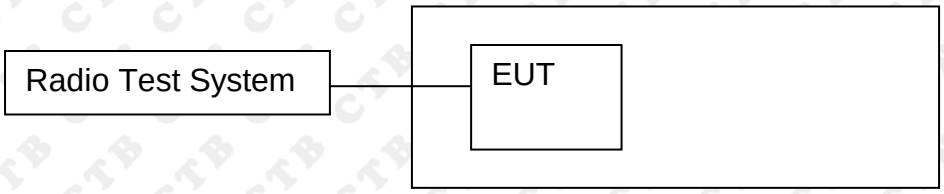
802.11ax(VH40)-5795





11. POWER SPECTRAL DENSITY

11.1 Block Diagram Of Test Setup



11.2 Limit

(1) For the band 5.15-5.25 GHz.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

11.3 Test procedure

According to KDB789033 D02v02r01 sectionE, the following is the measurement procedure.

For devices operating in the bands 5.15−5.25 GHz, 5.25−5.35 GHz, and 5.47−5.725 GHz, the preceding procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in Section 15.407(a)(5). For devices operating in the band 5.725−5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:
a) Set RBW ≥ 1/*T*, where *T* is defined in II.B.I.a).

b) Set VBW ≥ 3 RBW.

c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10 log (500 kHz/RBW) to the

measured result, whereas RBW (<500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.

d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10 log (1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.

e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.
Note: As a practical matter, it is recommended to use reduced RBW of 100 kHz for the II.F.5.c) and II.F.5.d), since RBW=100 kHz is available on nearly all spectrum analyzers.

11.4 Test Result

Test mode	Test Channel (MHz)	PSD [dBm/MHz]	Limit [dBm/MHz]	Result
802.11a	5180	-3.727	11	Pass
	5200	-3.107	11	Pass
	5240	-1.617	11	Pass
802.11ac(VH20)	5180	-4.010	11	Pass
	5200	-3.335	11	Pass
	5240	-1.807	11	Pass
802.11ac(VH40)	5190	-8.101	11	Pass
	5230	-6.288	11	Pass
802.11n(HT20)	5180	-3.801	11	Pass
	5200	-3.824	11	Pass
	5240	-2.310	11	Pass
802.11n(HT40)	5190	-7.948	11	Pass
	5230	-6.300	11	Pass
802.11ax(VH20)	5180	-4.166	11	Pass
	5200	-4.231	11	Pass
	5240	-2.600	11	Pass
802.11ax(VH40)	5190	-11.108	11	Pass
	5230	-6.663	11	Pass

Test mode	Test Channel (MHz)	PSD [dBm/500kHz]	Limit [dBm/MHz]	Result
802.11a	5745	-7.453	30	Pass
	5785	-7.537	30	Pass
	5825	-7.731	30	Pass
802.11ac(VH20)	5745	-6.357	30	Pass
	5785	-6.706	30	Pass
	5825	-6.797	30	Pass
802.11ac(VH40)	5755	-9.570	30	Pass
	5795	-10.518	30	Pass
802.11n(HT20)	5745	-7.477	30	Pass
	5785	-7.704	30	Pass
	5825	-7.966	30	Pass
802.11n(HT40)	5755	-10.713	30	Pass
	5795	-11.819	30	Pass
802.11ax(VH20)	5745	-6.943	30	Pass
	5785	-7.357	30	Pass
	5825	-7.675	30	Pass
802.11ax(VH40)	5755	-9.927	30	Pass
	5795	-11.192	30	Pass

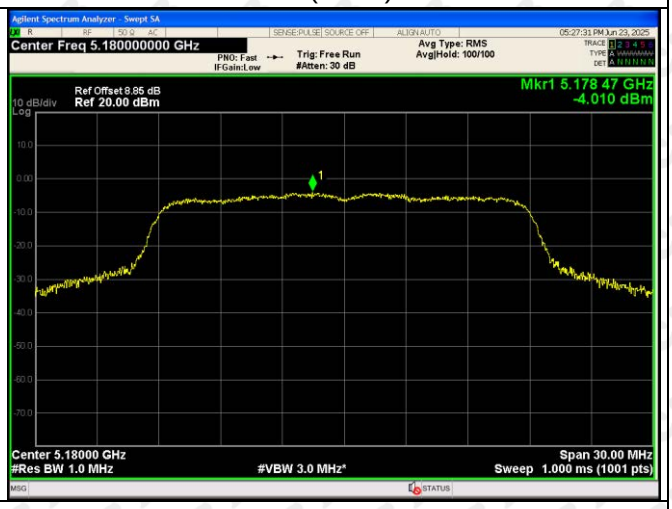
5180-5240MHz

802.11a-5180

802.11a-5200

802.11a-5240

802.11ac(VH20)-5180



802.11ac(VH20)-5200

802.11ac(VH20)-5240

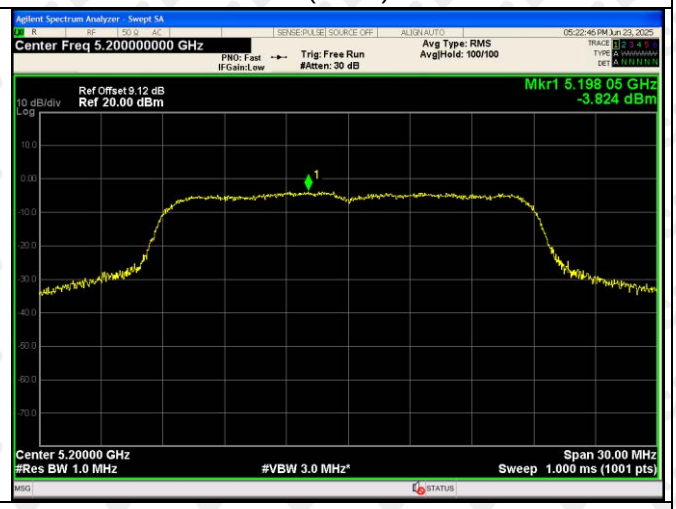
802.11ac(VH40)-5190

802.11ac(VH40)-5230

802.11n(HT20)-5180

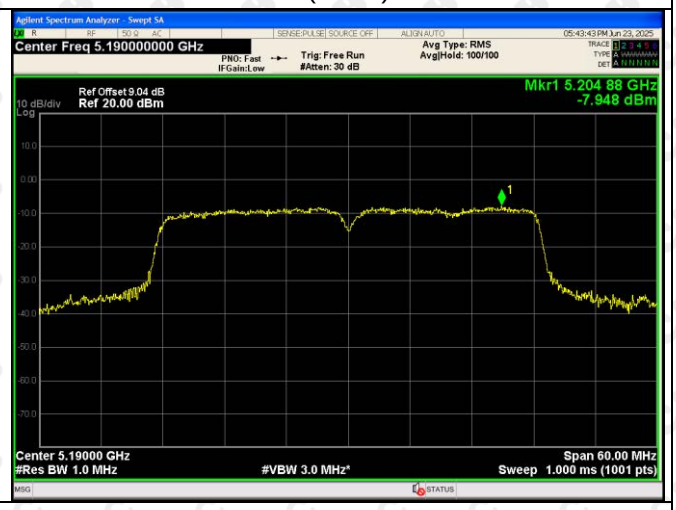
802.11n(HT20)-5200

802.11n(HT20)-5240



802.11n(HT40)-5190

802.11n(HT40)-5230

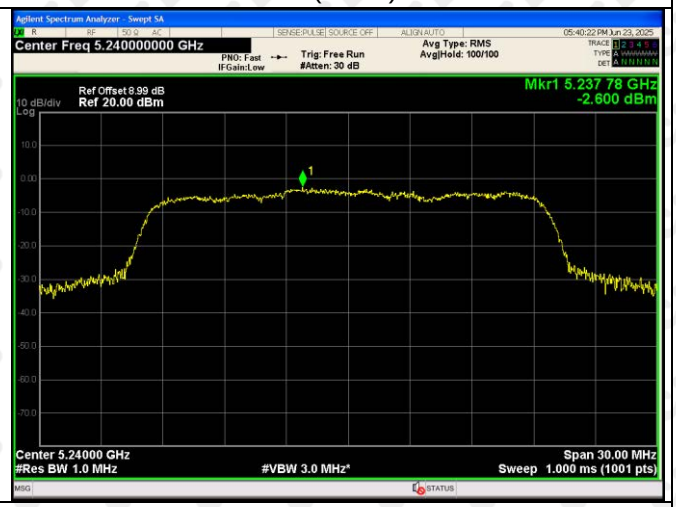


802.11ax(VH20)-5180

802.11ax(VH20)-5200

802.11ax(VH20)-5240

802.11ax(VH40)-5190

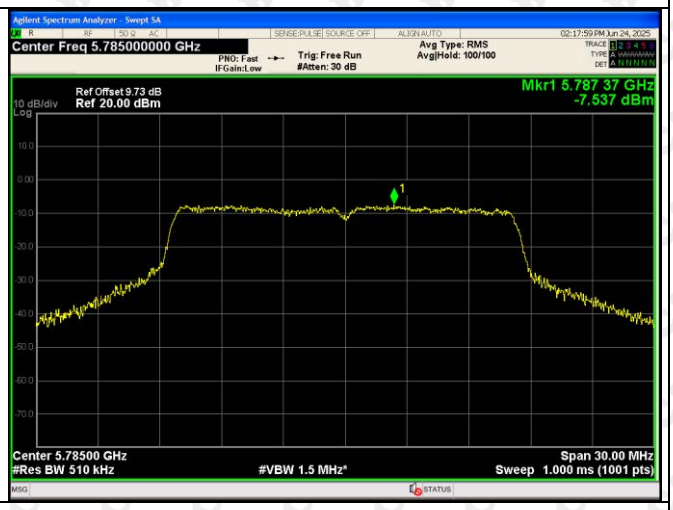


802.11ax(VH40)-5230

5745-5825MHz

802.11a-5745

802.11a-5785



802.11a-5825

802.11ac(VH20)-5745

802.11ac(VH20)-5785

802.11ac(VH20)-5825

802.11ac(VH40)-5755

802.11ac(VH40)-5795

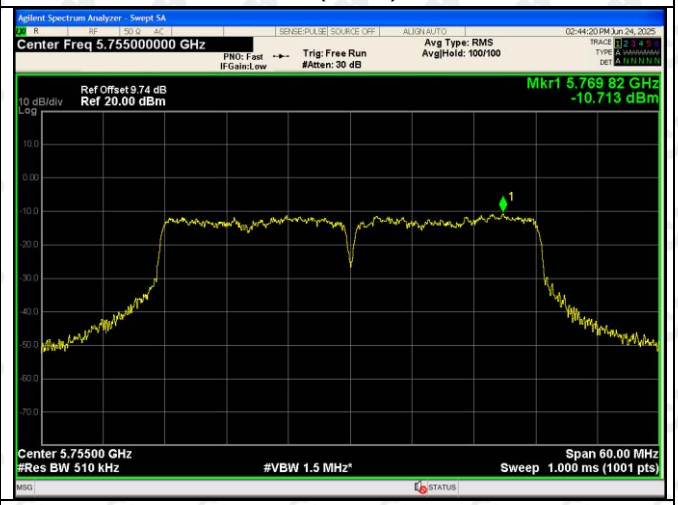
802.11n(HT20)-5745

802.11n(HT20)-5785

802.11n(HT20)-5825

5802.11n(HT40)-5755

802.11n(HT40)-5795



802.11ax(VH20)-5745

802.11ax(VH20)-5785

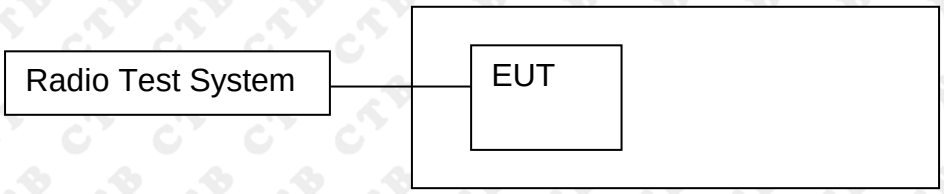
802.11ax(VH20)-5825

802.11ax(VH40)-5755

802.11ax(VH40)-5795

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

5180-5240MHz

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	12.00	5180.0139	5180	0.0139	2.6863
		V max (V)	13.20	5180.0235	5180	0.0235	4.5368
		V min (V)	10.80	5180.0222	5180	0.0222	4.2948
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	0	5180.0399	5180	0.0399	7.6991
		T (°C)	10	5180.0222	5180	0.0222	4.2871
		T (°C)	20	5180.0109	5180	0.0109	2.1091
		T (°C)	30	5180.0053	5180	0.0053	1.0281
		T (°C)	40	5180.0368	5180	0.0368	7.1127
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)	12.00	5200.0483	5200	0.0483	9.2856
		V max (V)	13.20	5200.0223	5200	0.0223	4.2933
		V min (V)	10.80	5200.0213	5200	0.0213	4.0907
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	0	5200.0144	5200	0.0144	2.7691
		T (°C)	10	5200.0333	5200	0.0333	6.4131
		T (°C)	20	5200.0368	5200	0.0368	7.0801
		T (°C)	30	5200.0389	5200	0.0389	7.4789
		T (°C)	40	5200.0323	5200	0.0323	6.2089
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)	12.00	5240.0442	5240	0.0442	8.4390
		V max (V)	13.20	5240.0044	5240	0.0044	0.8379
		V min (V)	10.80	5240.0087	5240	0.0087	1.6562
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	0	5240.0024	5240	0.0024	0.4660
		T (°C)	10	5240.0001	5240	0.0001	0.0115
		T (°C)	20	5240.0079	5240	0.0079	1.5104
		T (°C)	30	5240.0122	5240	0.0122	2.3191
		T (°C)	40	5240.0381	5240	0.0381	7.2702
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)	12.00	5745.0052	5745	0.0052	0.9018
		V max (V)	13.20	5745.0834	5745	0.0834	14.5124
		V min (V)	10.80	5745.0052	5745	0.0052	0.9018
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	0	5745.0506	5745	0.0506	8.8077
		T (°C)	10	5745.0688	5745	0.0688	11.9694
		T (°C)	20	5745.0478	5745	0.0478	8.3142
		T (°C)	30	5745.0450	5745	0.0450	7.8353
		T (°C)	40	5745.0644	5745	0.0644	11.2154
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)	12.00	5785.0558	5785	0.0558	9.6527
		V max (V)	13.20	5785.0157	5785	0.0157	2.7150
		V min (V)	10.80	5785.0223	5785	0.0223	3.8530
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5785MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	0	5785.0696	5785	0.0696	12.0348
		T (°C)	10	5785.0929	5785	0.0929	16.0625
		T (°C)	20	5785.0067	5785	0.0067	1.1646
		T (°C)	30	5785.0434	5785	0.0434	7.5050
		T (°C)	40	5785.0896	5785	0.0896	15.4849
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)	12.00	5825.0567	5825	0.0567	9.7285
		V max (V)	13.20	5825.0509	5825	0.0509	8.7329
		V min (V)	10.80	5825.0717	5825	0.0717	12.3007
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	0	5825.0426	5825	0.0426	7.3109
		T (°C)	10	5825.0918	5825	0.0918	15.7569
		T (°C)	20	5825.0098	5825	0.0098	1.6761
		T (°C)	30	5825.0346	5825	0.0346	5.9386
		T (°C)	40	5825.0696	5825	0.0696	11.9538
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 WLAN message transmitting from remote device and verify whether it shall reconnect. (manufacturer declare)

14. 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.

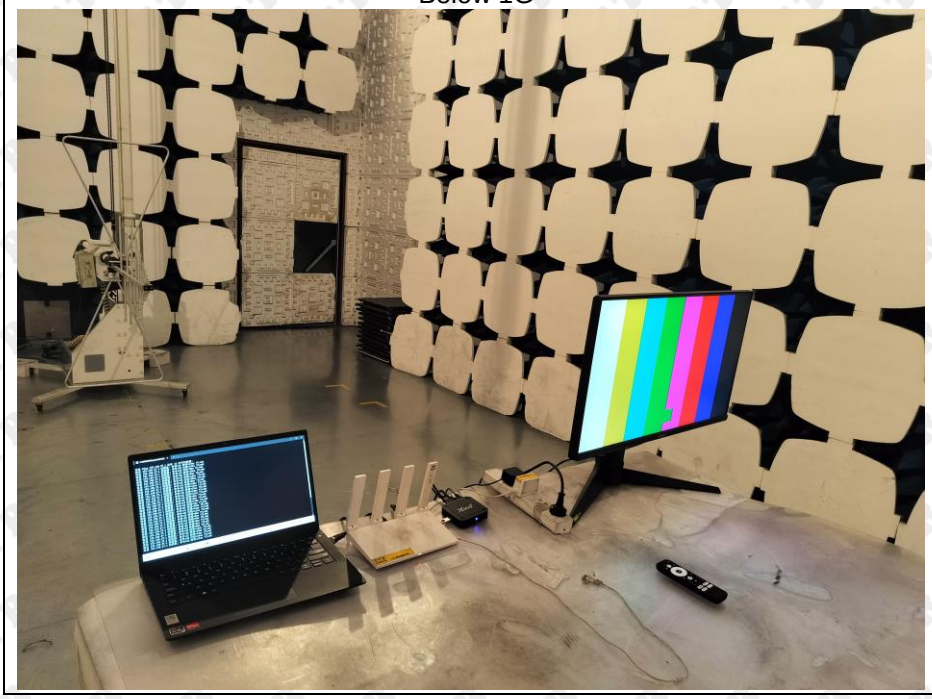
EUT Antenna:

The antenna is internal antenna and no consideration of replacement. The best case gain of the antenna is WiFi (5.2G): 1.06dBi, WiFi (5.8G): 1.8dBi

15. EUT TEST SETUP PHOTOGRAPHS

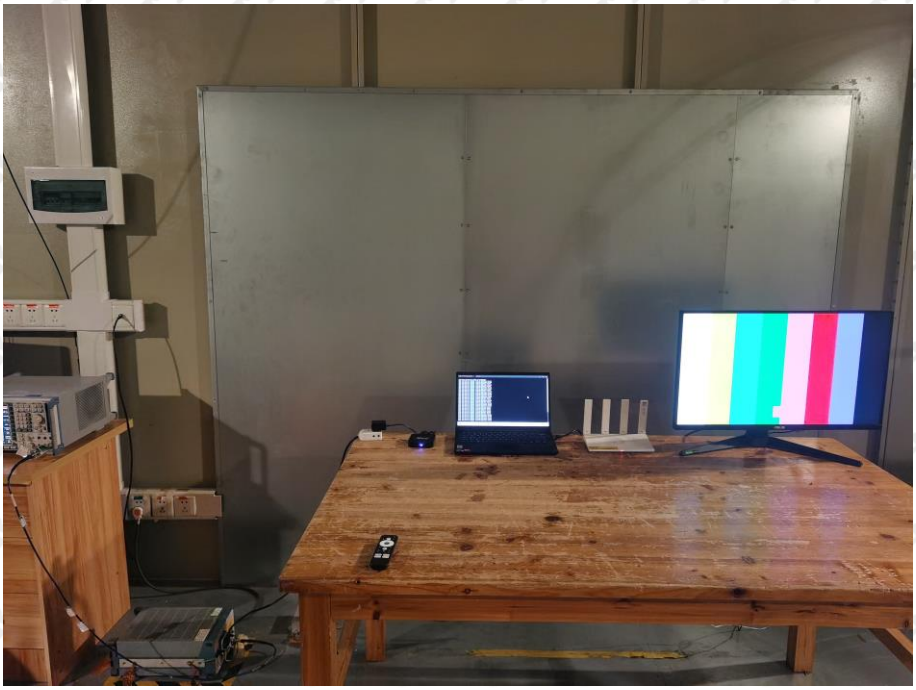
Radiated Emission

Below 1G



Above 1G

Conducted Emission



※※※※※ END OF REPORT ※※※※※