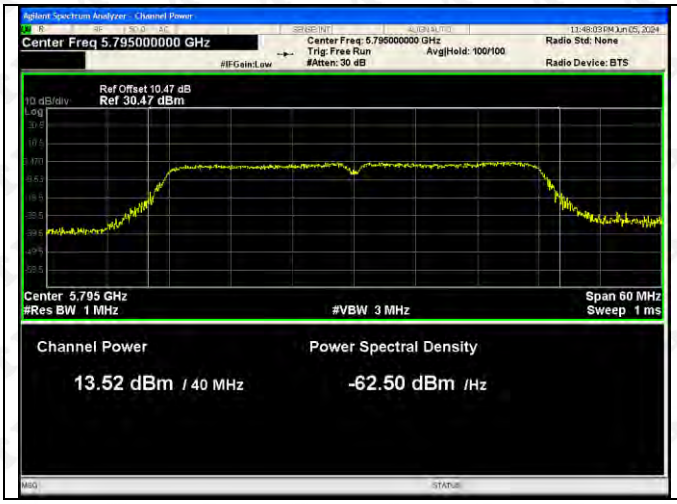
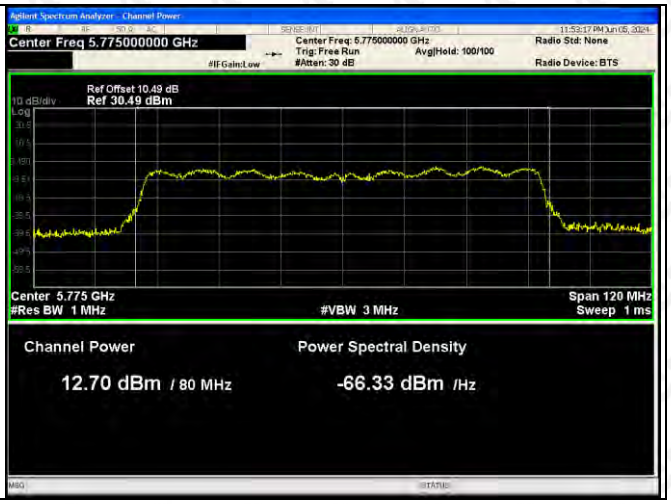
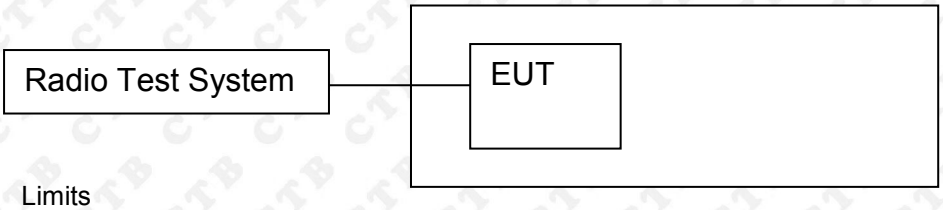

Agilent Spectrum Analyzer - Channel Power
Center Freq 5.795000000 GHz
Center Freq: 5.795000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
Ref Offset 10.47 dB
10 dB/div
Ref 30.47 dBm
Center 5.795 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 60 MHz
Sweep 1 ms
Channel Power
13.52 dBm / 40 MHz
Power Spectral Density
-62.50 dBm /Hz


Agilent Spectrum Analyzer - Channel Power
Center Freq 5.775000000 GHz
Center Freq: 5.775000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
Ref Offset 10.49 dB
10 dB/div
Ref 30.49 dBm
Center 5.775 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 120 MHz
Sweep 1 ms
Channel Power
12.70 dBm / 80 MHz
Power Spectral Density
-66.33 dBm /Hz

10. EMISSION BANDWIDTH& OCCUPIED BANDWIDTH

10.1 Block Diagram Of Test Setup



10.2 Limits

(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.
(e) Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

10.3 Test Procedure

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

1. Emission Bandwidth (EBW)
a) Set RBW = approximately 1% of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
2. Minimum Emission Bandwidth for the band 5.725−5.85 GHz
Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 kHz for the band 5.725−5.85 GHz. The following procedure shall be used for measuring this bandwidth:
a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 * RBW.
c) Detector = Peak.
d) Trace mode = max hold.

e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) 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 6 dB relative to the maximum level measured in the fundamental emission.
Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described in this section. For devices that use channel aggregation refer to III.A and III.C for determining emission bandwidth.

D. 99% Occupied Bandwidth

The 99% occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. Measurement of the 99% occupied bandwidth is *required* only as a condition for using the optional band-edge measurement techniques described in II.G.3.d). Measurements of 99% occupied bandwidth may also optionally be used in lieu of the EBW to define the minimum frequency range over which the 789033 D02 General UNII Test Procedures New Rules v02r01 Page 4 spectrum is integrated when measuring maximum conducted output power as described in II.E. However, the EBW must be measured to determine bandwidth dependent limits on maximum conducted output power in accordance with Section 15.407(a).
The following procedure shall be used for measuring (99%) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency.

2. Set span = 1.5 times to 5.0 times the OBW.

3. Set RBW = 1% to 5% of the OBW

4. Set VBW ≥ 3 * RBW

5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.

6. Use the 99% power bandwidth function of the instrument (if available).

7. If the instrument does not have a 99% power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

10.4 Test Results

Test mode Ant 1	Test Channel (MHz)	26dB Bandwidth (MHz)
802.11a	5180	20.964
	5200	21.127
	5240	21.181
802.11ac20	5180	21.422
	5200	21.445
	5240	21.333
802.11ac40	5190	41.186
	5230	40.884
802.11ac80	5210	81.582
802.11n(HT20)	5180	21.098
	5200	21.348
	5240	21.604
802.11n(HT40)	5190	40.182
	5230	39.849
802.11ax20	5180	21.58
	5200	21.509
	5240	21.43
802.11ax40	5190	40.697
	5230	41.046
802.11ax80	5210	79.903

Test mode Ant 2	Test Channel (MHz)	26dB Bandwidth (MHz)
802.11a	5180	20.928
	5200	21.234
	5240	21.08
802.11ac20	5180	21.42
	5200	21.452
	5240	21.479
802.11ac40	5190	41.439
	5230	40.863
802.11ac80	5210	79.673
802.11n(HT20)	5180	21.538
	5200	21.682
	5240	21.318
802.11n(HT40)	5190	40.002
	5230	40.125
802.11ax20	5180	21.044
	5200	20.887
	5240	20.786
802.11ax40	5190	41.279
	5230	40.552
802.11ax80	5210	81.625

5725-5850 MHz

Test mode Ant 1	Test Channel (MHz)	6dB Bandwidth (MHz)	Result
802.11a	5745	16.571	Pass
	5785	16.532	Pass
	5825	16.523	Pass
802.11ac20	5745	17.773	Pass
	5785	17.731	Pass
	5825	17.771	Pass
802.11ac40	5755	36.479	Pass
	5795	36.475	Pass
802.11ac80	5775	76.436	Pass
802.11n(HT20)	5745	17.767	Pass
	5785	17.727	Pass
	5825	17.742	Pass
802.11n(HT40)	5755	36.47	Pass
	5795	36.491	Pass
802.11ax20	5745	17.772	Pass
	5785	17.754	Pass
	5825	17.763	Pass
802.11ax40	5755	36.517	Pass
	5795	36.497	Pass
802.11ax80	5775	76.446	Pass

Test mode Ant 2	Test Channel (MHz)	6dB Bandwidth (MHz)	Result
802.11a	5745	16.528	Pass
	5785	16.515	Pass
	5825	16.505	Pass
802.11ac20	5745	17.74	Pass
	5785	17.785	Pass
	5825	17.768	Pass
802.11ac40	5755	36.463	Pass
	5795	36.479	Pass
802.11ac80	5775	76.448	Pass
802.11n(HT20)	5745	17.733	Pass
	5785	17.731	Pass
	5825	17.737	Pass
802.11n(HT40)	5755	36.494	Pass
	5795	36.461	Pass
802.11ax20	5745	17.76	Pass
	5785	17.754	Pass
	5825	17.77	Pass
802.11ax40	5755	36.449	Pass
	5795	36.461	Pass
802.11ax80	5775	76.449	Pass

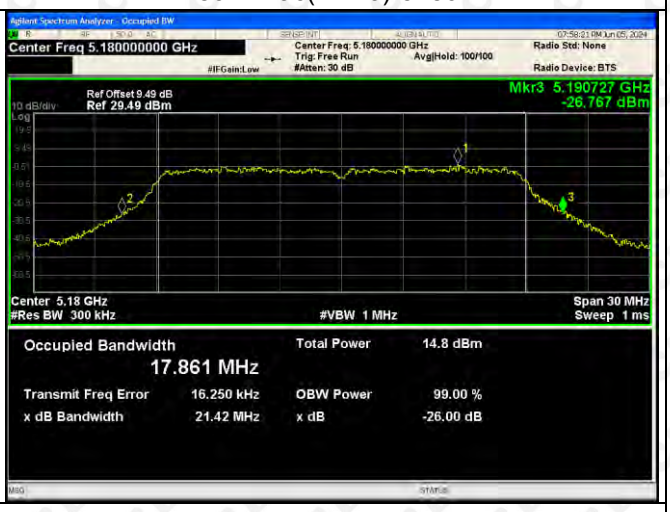
Test Graph
ANT 1

802.11a-5180

802.11a-5200

802.11a-5240

802.11ac(VH20)-5180



802.11ac(VH20)-5200

802.11ac(VH20)-5240

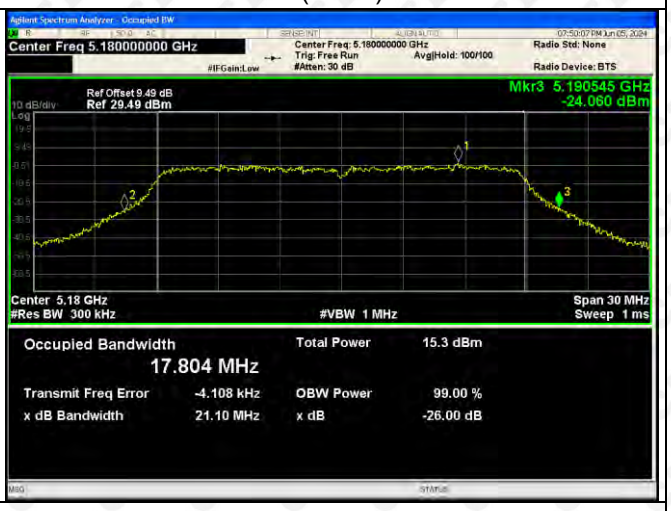
802.11ac(VH40)-5190

802.11ac(VH40)-5230

802.11ac(VH80)-5210

802.11n(HT20)-5180

802.11n(HT20)-5200



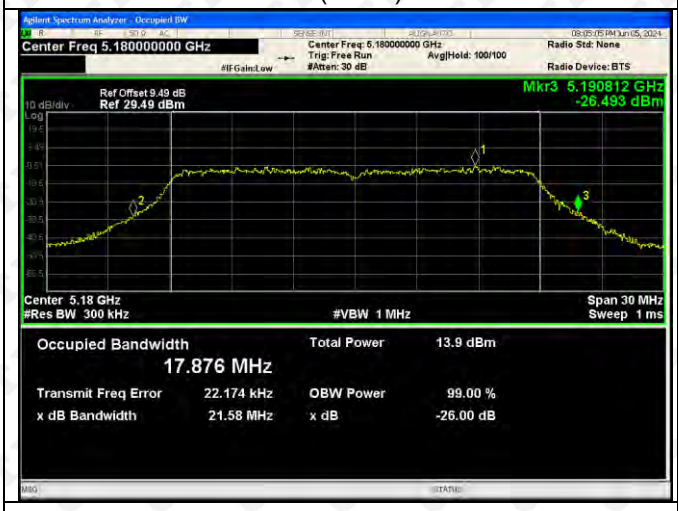
802.11n(HT20)-5240

802.11n(HT40)-5190

802.11n(HT40)-5230

802.11ax(VH20)-5180

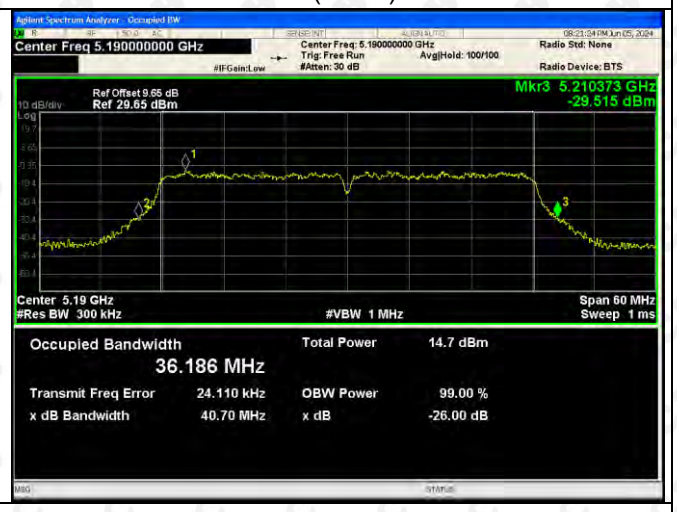
802.11ax(VH20)-5200



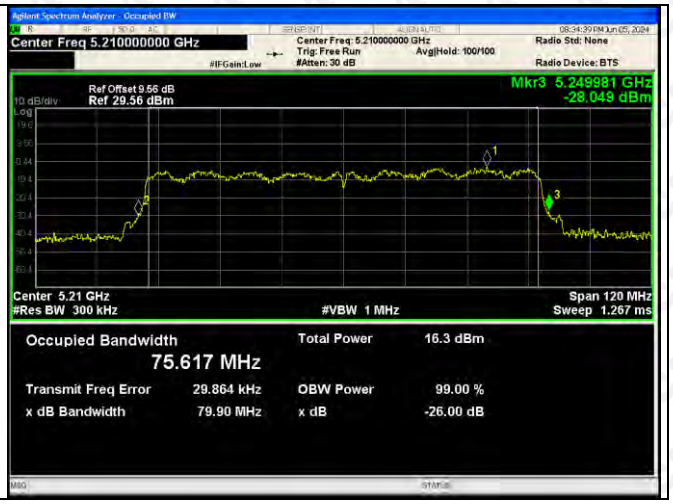
802.11ax(VH20)-5240

802.11ax(VH40)-5190

802.11ax(VH40)-5230

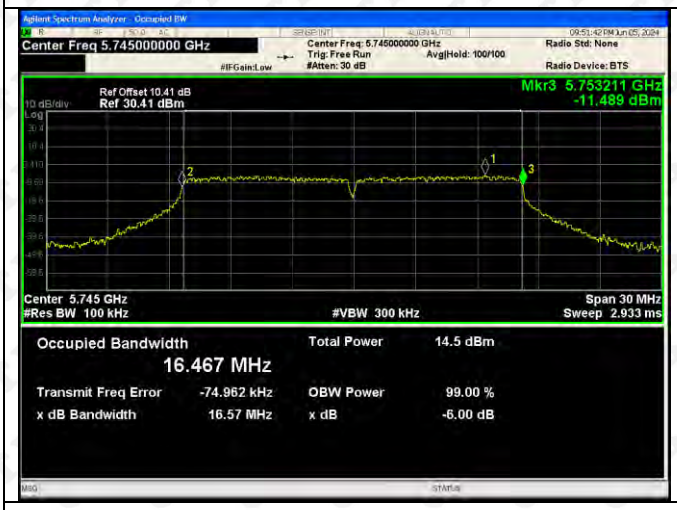


802.11ax(VH80)-5210



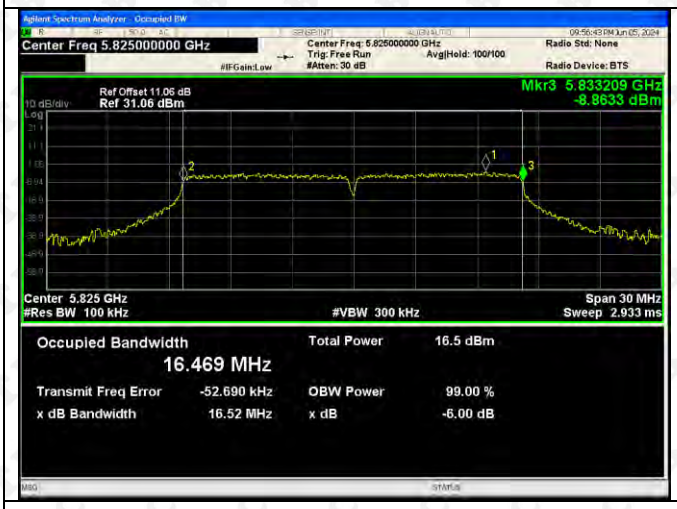
ANT1:
5725-5850MHz

802.11a-5745



802.11a-5785

802.11a-5825



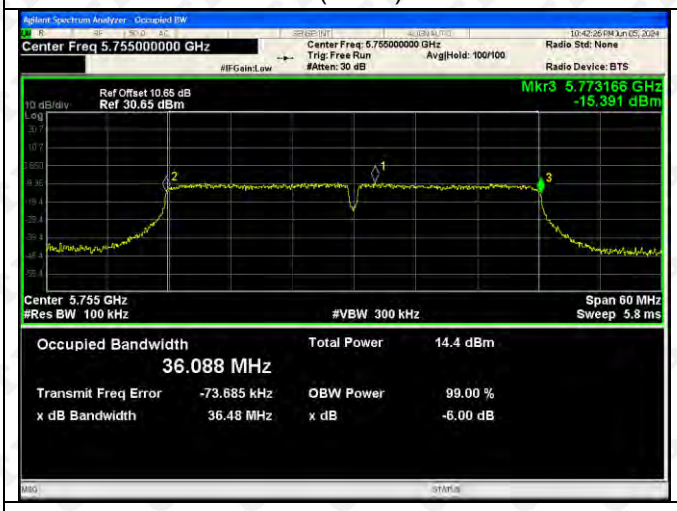
802.11ac(VH20)-5745

802.11ac(VH20)-5785

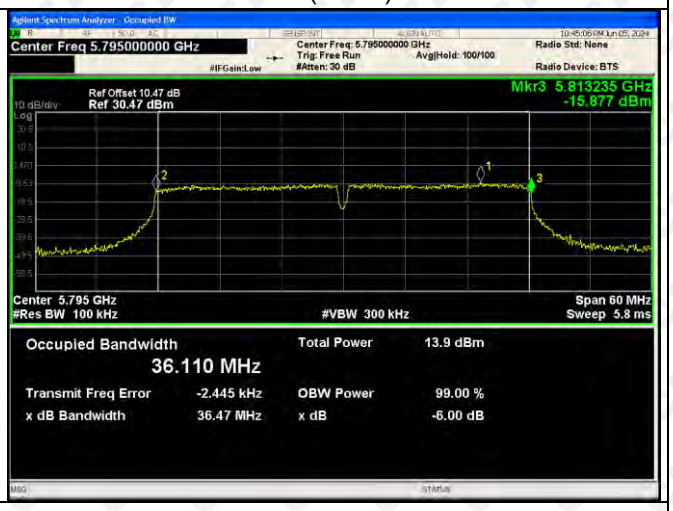
802.11ac(VH20)-5825

802.11ac(VH40)-5755

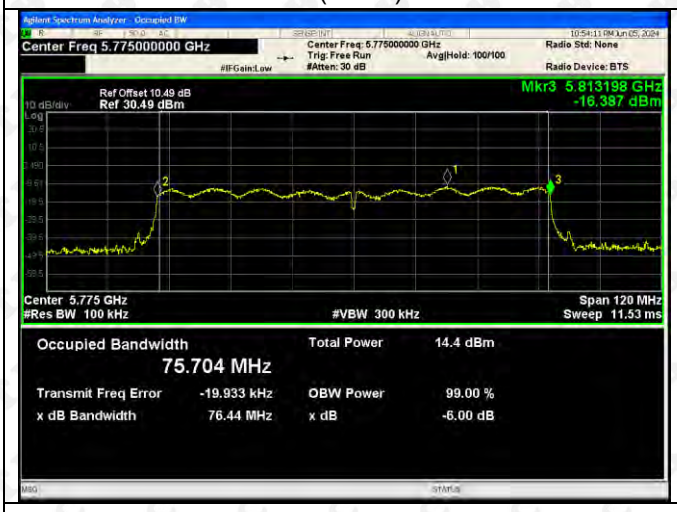
802.11ac(VH40)-5795



802.11ac(VH80)-5775



802.11n(HT20)-5745

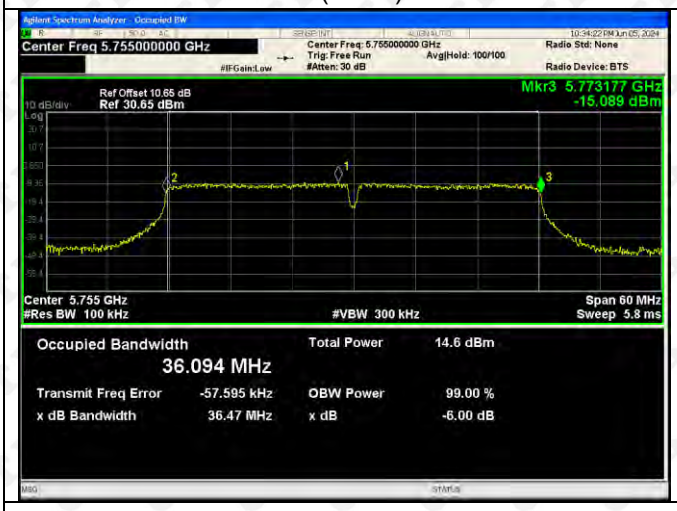


802.11n(HT20)-5785

802.11n(HT20)-5825

5802.11n(HT40)-5755

802.11n(HT40)-5795



802.11ax(VH20)-5745

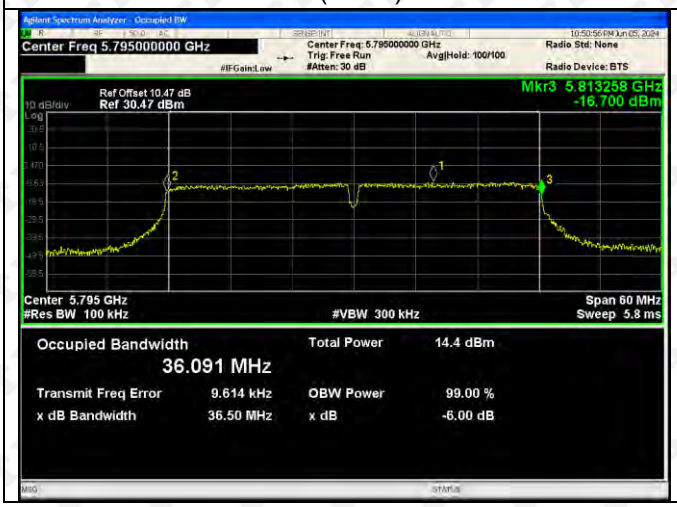
802.11ax(VH20)-5785

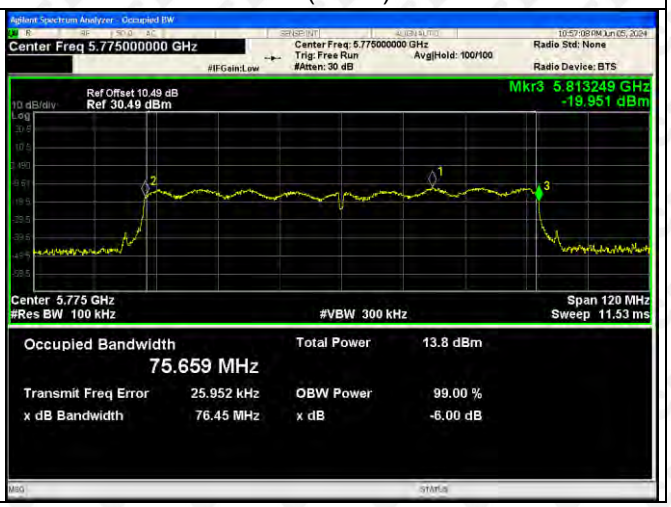
802.11ax(VH20)-5825

802.11ax(VH40)-5755

802.11ax(VH40)-5795

802.11ax(VH80)-5775



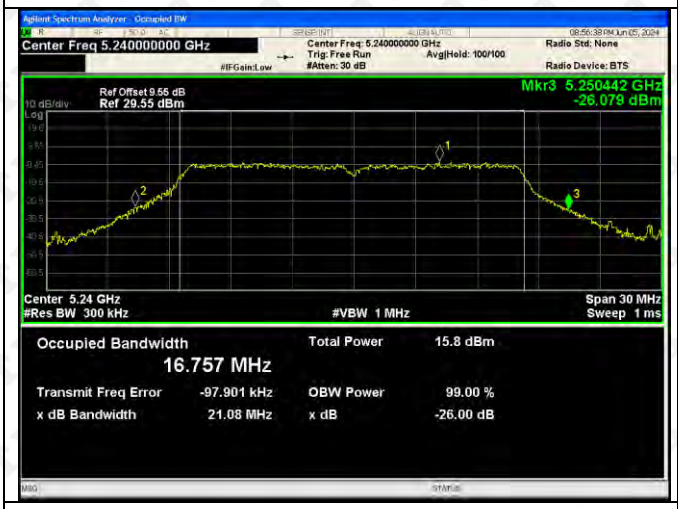


Test Graph
ANT 2

802.11a-5180

802.11a-5200

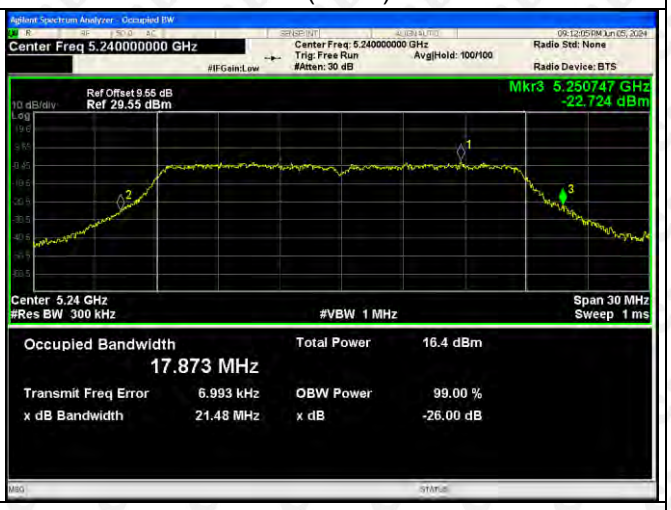
802.11a-5240



802.11ac(VH20)-5180

802.11ac(VH20)-5200

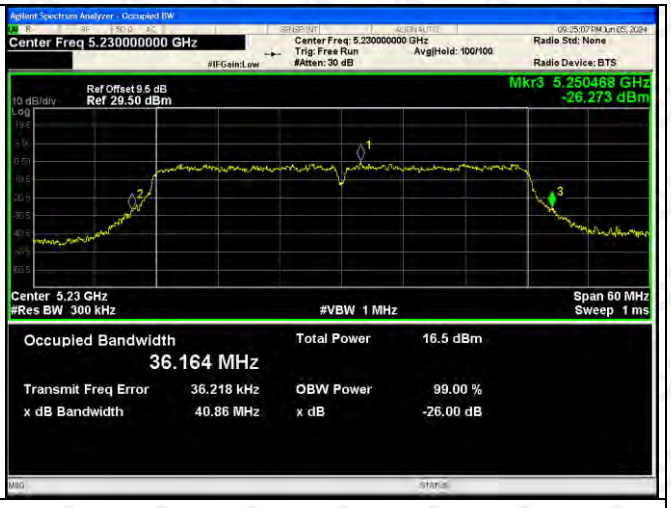
802.11ac(VH20)-5240



802.11ac(VH40)-5190

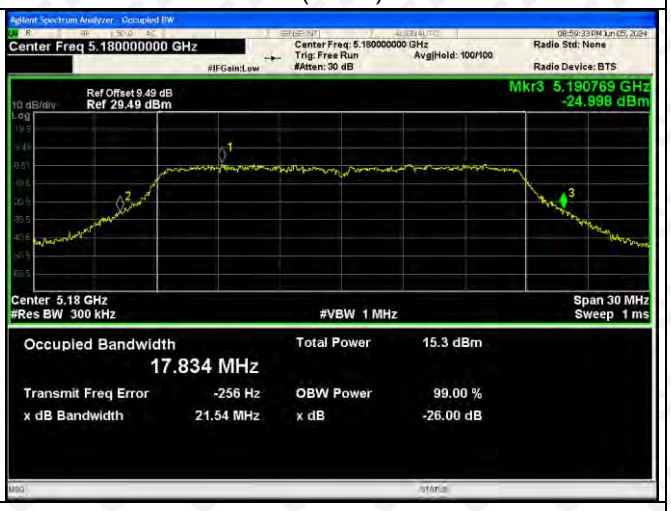
802.11ac(VH40)-5230

802.11ac(VH80)-5210



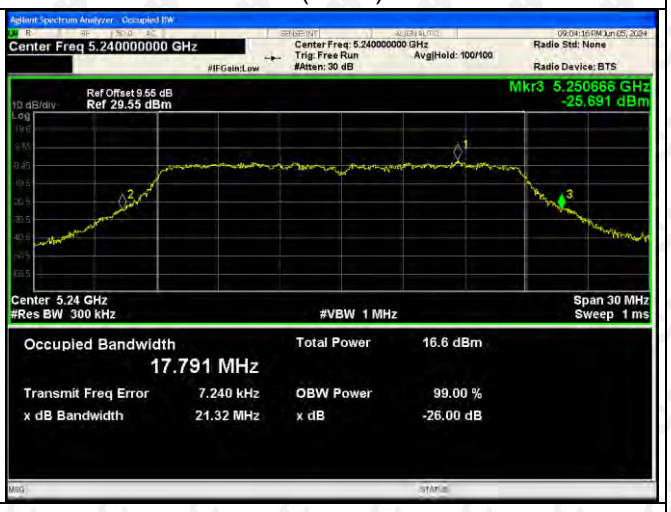
802.11n(HT20)-5180

802.11n(HT20)-5200



802.11n(HT20)-5240

802.11n(HT40)-5190

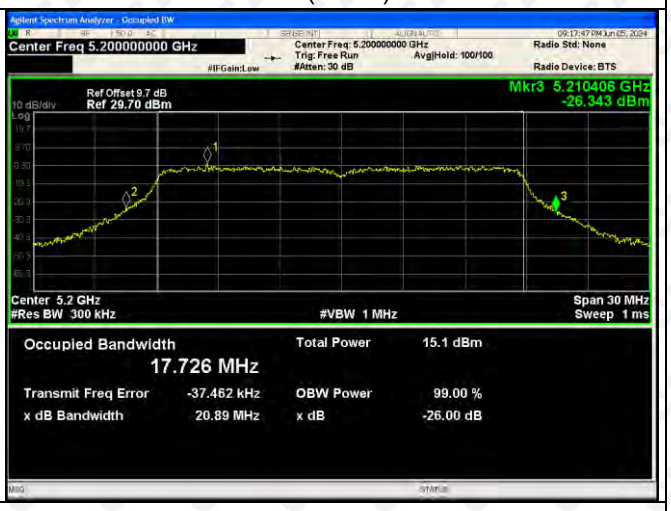


802.11n(HT40)-5230

802.11ax(VH20)-5180

802.11ax(VH20)-5200

802.11ax(VH20)-5240



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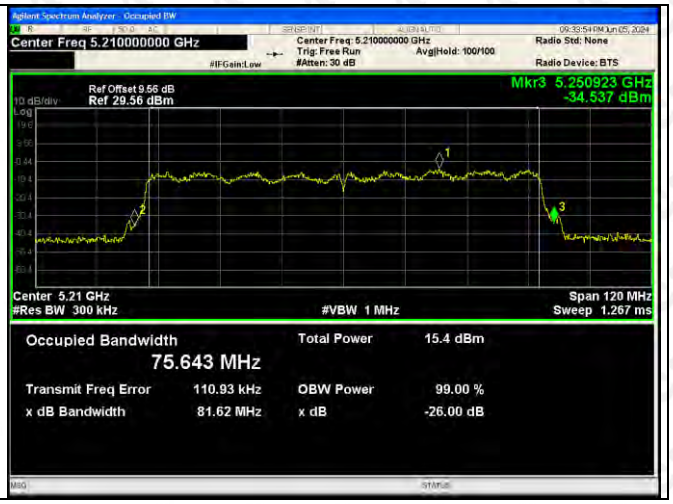
802.11ax(VH40)-5230

802.11ax(VH80)-5210



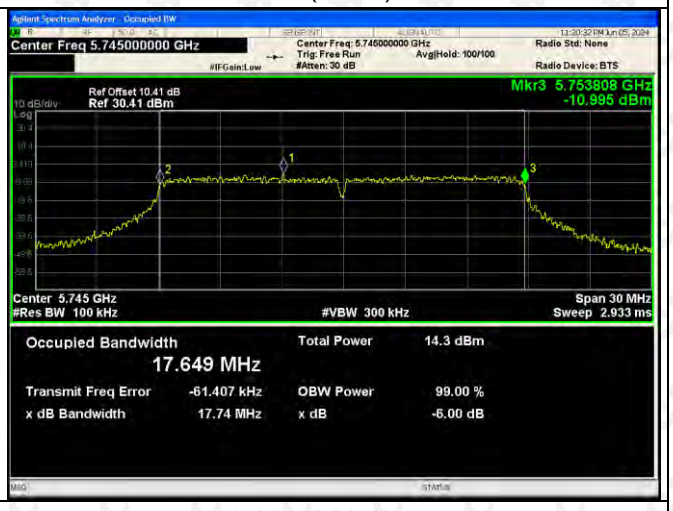
ANT2:
5725-5850MHz

802.11a-5745

802.11a-5785

802.11a-5825

802.11ac(VH20)-5745

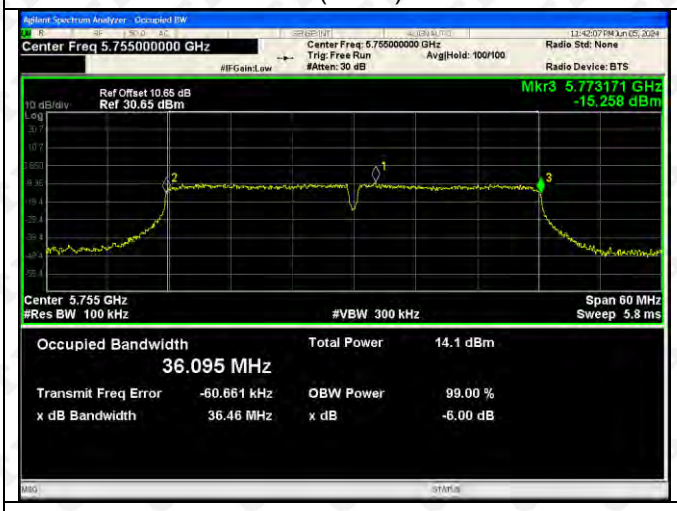


802.11ac(VH20)-5785

802.11ac(VH20)-5825

802.11ac(VH40)-5755

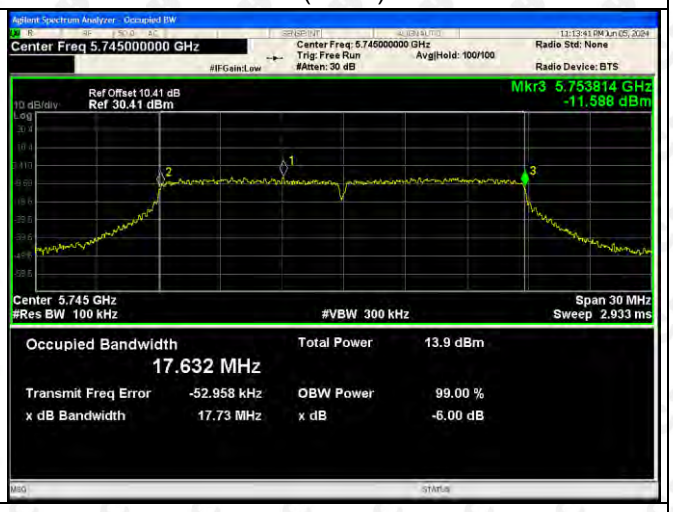
802.11ac(VH40)-5795



802.11ac(VH80)-5775

802.11n(HT20)-5745

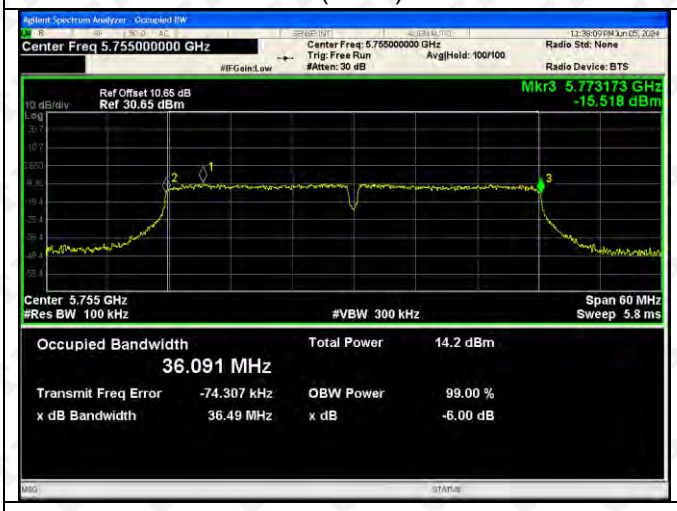
802.11n(HT20)-5785



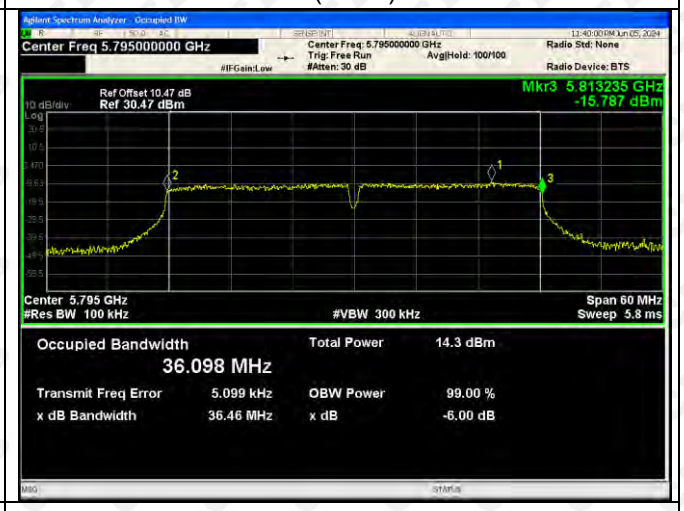
802.11n(HT20)-5825

5802.11n(HT40)-5755

802.11n(HT40)-5795



802.11ax(VH20)-5745

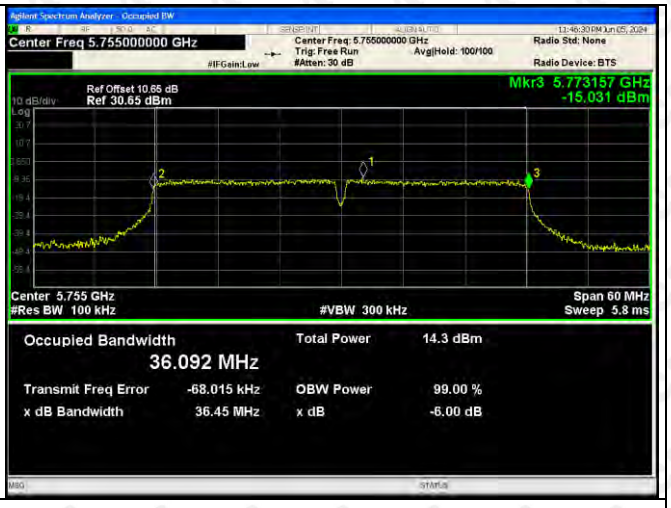


802.11ax(VH20)-5785

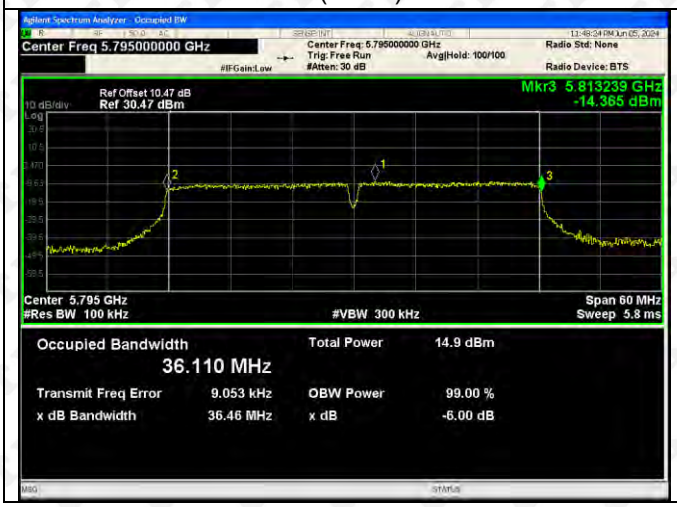
802.11ax(VH20)-5825

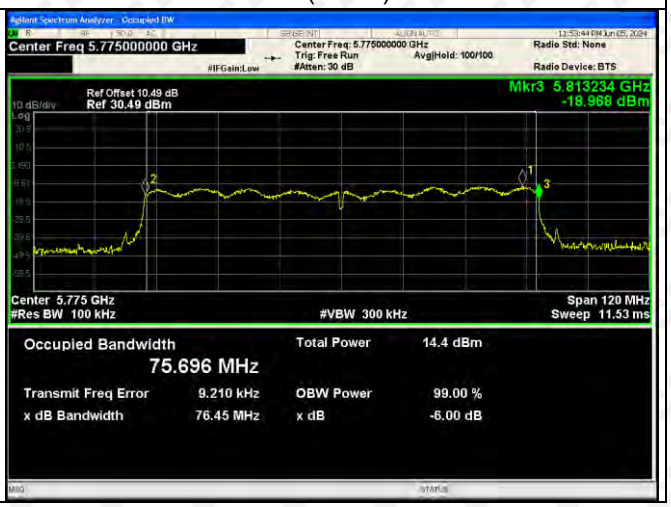
802.11ax(VH40)-5755

802.11ax(VH40)-5795



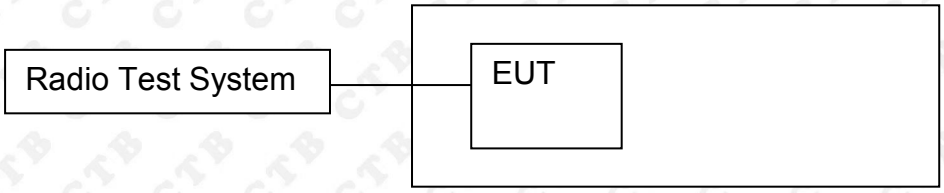
802.11ax(VH80)-5775





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

ANT 1+ANT2

Test mode	Test Channel (MHz)	PSD [dBm/MHz] ANT 1	PSD [dBm/MHz] ANT 2	PSD [dBm/MHz] Total	Limit (dBm/MHz)	Result
802.11a	5180	-2.699	-1.729	/	11	Pass
	5200	-1.854	-1.501	/	11	Pass
	5240	-0.897	-1.078	/	11	Pass
802.11ac(VH20)	5180	-2.347	-2.036	0.822	11	Pass
	5200	-1.933	-1.591	1.252	11	Pass
	5240	-0.976	-0.767	2.140	11	Pass
802.11ac(VH40)	5190	-5.525	-4.764	-2.118	11	Pass
	5230	-4.646	-3.689	-1.131	11	Pass
802.11ac(VH80)	5230	-5.732	-6.644	-3.154	11	Pass
802.11n(VH20)	5180	-1.969	-1.702	1.177	11	Pass
	5200	-1.925	-1.601	1.250	11	Pass
	5240	-1.154	-0.628	2.127	11	Pass
802.11n(VH40)	5190	-5.723	-5.367	-2.531	11	Pass
	5230	-5.591	-5.915	-2.740	11	Pass
802.11ax(VH20)	5180	-3.176	-2.21	0.344	11	Pass
	5200	-3	-2.004	0.537	11	Pass
	5240	-2.064	-0.963	1.532	11	Pass
802.11ax(VH40)	5190	-5.431	-5.016	-2.208	11	Pass
	5230	-4.615	-4.14	-1.361	11	Pass
802.11ax(VH80)	5210	-6.008	-6.855	-3.401	11	Pass

Test mode	Test Channel (MHz)	PSD [dBm/MHz] ANT 1	PSD [dBm/MHz] ANT 2	PSD [dBm/MHz] Total	Limit (dBm)	Result
802.11a	5745	-5.022	-5.015	/	30	Pass
	5785	-4.842	-4.85	/	30	Pass
	5825	-2.906	-2.895	/	30	Pass
802.11ac(VH20)	5745	-6.208	-5.529	-2.845	30	Pass
	5785	-5.617	-5.835	-2.714	30	Pass
	5825	-2.468	-3.982	-0.149	30	Pass
802.11ac(VH40)	5755	-8.597	-8.717	-5.646	30	Pass
	5795	-9.048	-7.762	-5.347	30	Pass
802.11ac(VH80)	5795	-10.739	-10.885	-7.801	30	Pass
802.11n(VH20)	5775	-5.879	-5.823	-2.841	30	Pass
	5745	-5.576	-5.622	-2.589	30	Pass
	5785	-3.46	-3.283	-0.360	30	Pass
802.11n(VH40)	5825	-8.322	-8.821	-5.554	30	Pass
	5755	-7.374	-8.63	-4.946	30	Pass
802.11ax(VH20)	5745	-5.281	-6.253	-2.730	30	Pass
	5785	-5.391	-5.577	-2.473	30	Pass
	5825	-3.231	-4.302	-0.723	30	Pass
802.11ax(VH40)	5755	-8.619	-8.338	-5.466	30	Pass
	5795	-8.324	-7.8	-5.044	30	Pass
802.11ax(VH80)	5775	-10.851	-10.538	-7.681	30	Pass

ANT 1

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

802.11ac(VH80)-5210

802.11n(HT20)-5180

802.11n(HT20)-5200

802.11n(HT20)-5240

802.11n(HT40)-5190

802.11n(HT40)-5230

802.11ax(VH20)-5180

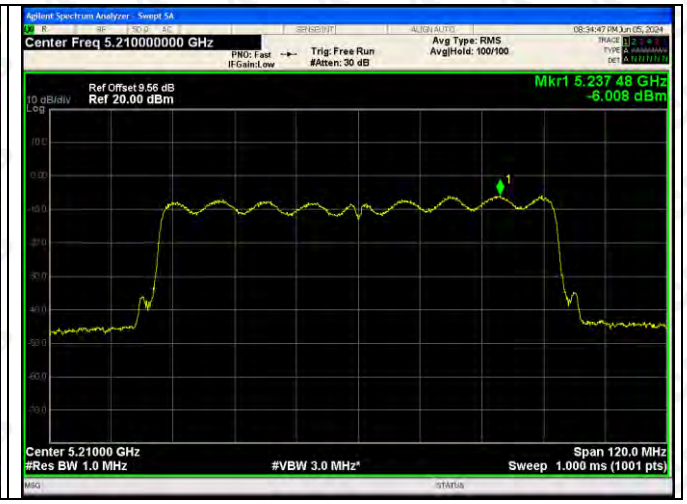
802.11ax(VH20)-5200

802.11ax(VH20)-5240

802.11ax(VH40)-5190

802.11ax(VH40)-5230

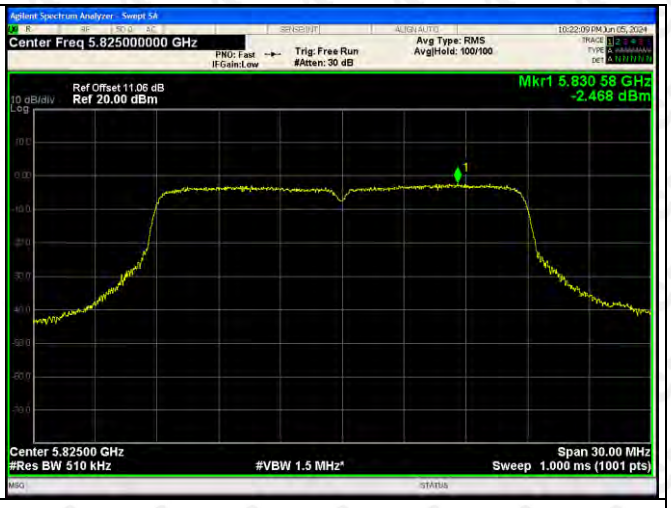
802.11ax(VH80)-5210



ANT1:

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

802.11ac(VH80)-5775

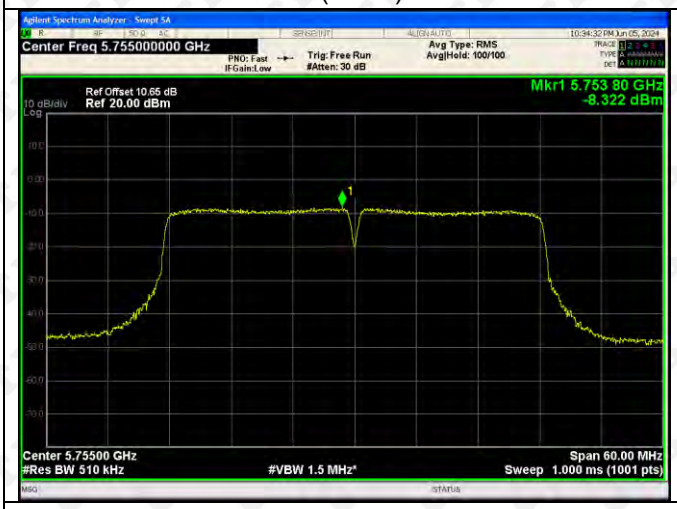
802.11n(HT20)-5745

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

802.11ax(VH80)-5775

ANT 2

802.11a-5180

802.11a-5200

802.11a-5240

802.11ac(VH20)-5180

802.11ac(VH20)-5200

802.11ac(VH20)-5240

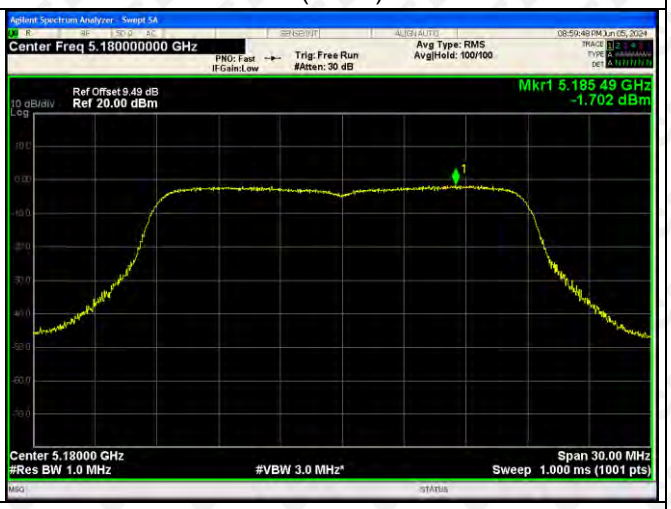
802.11ac(VH40)-5190

802.11ac(VH40)-5230

802.11ac(VH80)-5210

802.11n(HT20)-5180

802.11n(HT20)-5200



802.11n(HT20)-5240

802.11n(HT40)-5190

802.11n(HT40)-5230

802.11ax(VH20)-5180

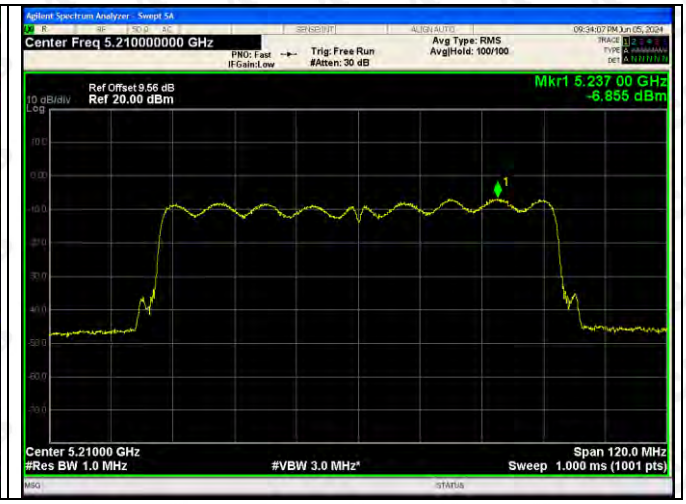
802.11ax(VH20)-5200

802.11ax(VH20)-5240

802.11ax(VH40)-5190

802.11ax(VH40)-5230

802.11ax(VH80)-5210

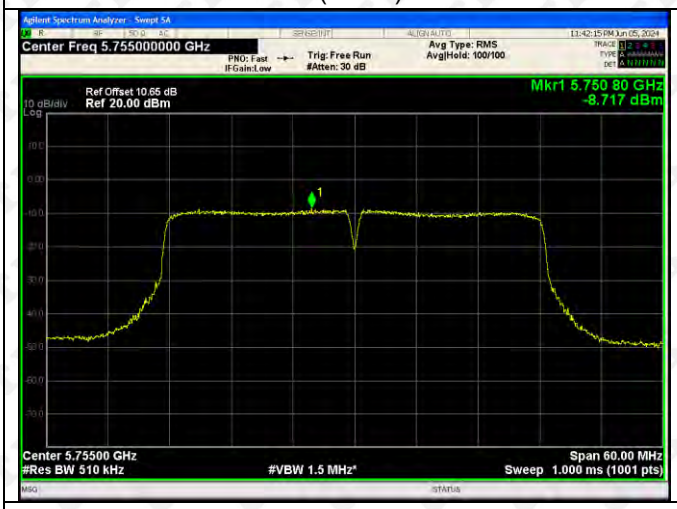


ANT2:

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



802.11ac(VH80)-5775

802.11n(HT20)-5745

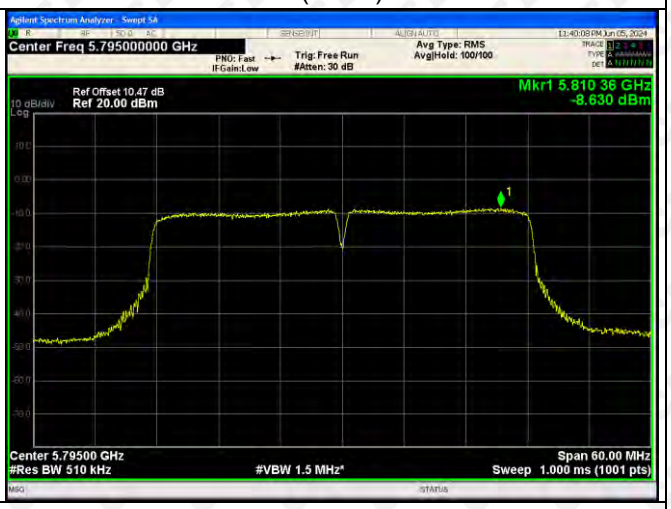
802.11n(HT20)-5785

802.11n(HT20)-5825

5802.11n(HT40)-5755

802.11n(HT40)-5795

802.11ax(VH20)-5745



802.11ax(VH20)-5785

802.11ax(VH20)-5825

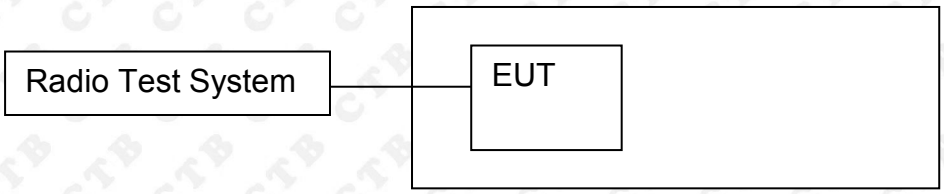
802.11ax(VH40)-5755

802.11ax(VH40)-5795

802.11ax(VH80)-5775

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)

ANT1

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	5180.1233	5180	0.1233	23.8083
		V max (V)	132	5180.0407	5180	0.0407	7.8518
		V min (V)	108	5180.1108	5180	0.1108	21.3888
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	5180.0251	5180	0.0251	4.8515
		T (°C)	10	5180.0134	5180	0.0134	2.5858
		T (°C)	20	5180.0218	5180	0.0218	4.2173
		T (°C)	30	5180.0236	5180	0.0236	4.5497
		T (°C)	40	5180.0406	5180	0.0406	7.8339
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	5200.0267	5200	0.0267	5.1413
		V max (V)	132	5200.0004	5200	0.0004	0.0827
		V min (V)	108	5200.0302	5200	0.0302	5.7993
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	5200.0316	5200	0.0316	6.0716
		T (°C)	10	5200.0431	5200	0.0431	8.2842
		T (°C)	20	5200.0214	5200	0.0214	4.1187
		T (°C)	30	5200.0040	5200	0.0040	0.7643
		T (°C)	40	5200.0124	5200	0.0124	2.3823
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	5240.0441	5240	0.0441	8.4134
		V max (V)	132	5240.0367	5240	0.0367	6.9959
		V min (V)	108	5240.0120	5240	0.0120	2.2963
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	5240.0417	5240	0.0417	7.9497
		T (°C)	10	5240.0284	5240	0.0284	5.4195
		T (°C)	20	5240.0326	5240	0.0326	6.2153
		T (°C)	30	5240.0496	5240	0.0496	9.4673
		T (°C)	40	5240.0528	5240	0.0528	10.0733
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	5745.0187	5745	0.0187	3.2476
		V max (V)	132	5745.0346	5745	0.0346	6.0311
		V min (V)	108	5745.0187	5745	0.0187	3.2476
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	5745.0200	5745	0.0200	3.4865
		T (°C)	10	5745.0120	5745	0.0120	2.0849
		T (°C)	20	5745.0906	5745	0.0906	15.7768
		T (°C)	30	5745.0460	5745	0.0460	8.0004
		T (°C)	40	5745.0674	5745	0.0674	11.7274
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	5785.0189	5785	0.0189	3.2757
		V max (V)	132	5785.0752	5785	0.0752	12.9918
		V min (V)	108	5785.0755	5785	0.0755	13.0570
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	5785.0016	5785	0.0016	0.2782
		T (°C)	10	5785.0453	5785	0.0453	7.8222
		T (°C)	20	5785.0051	5785	0.0051	0.8753
		T (°C)	30	5785.0349	5785	0.0349	6.0316
		T (°C)	40	5785.0066	5785	0.0066	1.1430
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	5825.0357	5825	0.0357	6.1354
		V max (V)	132	5825.0570	5825	0.0570	9.7911
		V min (V)	108	5825.0415	5825	0.0415	7.1190
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	5825.0151	5825	0.0151	2.5888
		T (°C)	10	5825.0556	5825	0.0556	9.5444
		T (°C)	20	5825.0532	5825	0.0532	9.1308
		T (°C)	30	5825.0528	5825	0.0528	9.0593
		T (°C)	40	5825.0427	5825	0.0427	7.3290
Limits				±20ppm			
Result				Complies			

ANT2:

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	5180.0345	5180	0.0345	6.6657
		V max (V)	132	5180.0435	5180	0.0435	8.3972
		V min (V)	108	5180.0891	5180	0.0891	17.1968
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	5180.0246	5180	0.0246	4.7412
		T (°C)	10	5180.0079	5180	0.0079	1.5346
		T (°C)	20	5180.0709	5180	0.0709	13.6849
		T (°C)	30	5180.0748	5180	0.0748	14.4494
		T (°C)	40	5180.0763	5180	0.0763	14.7276
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	5200.0074	5200	0.0074	1.4222
		V max (V)	132	5200.0461	5200	0.0461	8.8615
		V min (V)	108	5200.0834	5200	0.0834	16.0445
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	5200.0073	5200	0.0073	1.4028
		T (°C)	10	5200.0534	5200	0.0534	10.2631
		T (°C)	20	5200.0647	5200	0.0647	12.4517
		T (°C)	30	5200.0031	5200	0.0031	0.6028
		T (°C)	40	5200.0310	5200	0.0310	5.9681
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	5240.0737	5240	0.0737	14.0663
		V max (V)	132	5240.0385	5240	0.0385	7.3423
		V min (V)	108	5240.0669	5240	0.0669	12.7585
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	5240.0042	5240	0.0042	0.7977
		T (°C)	10	5240.0511	5240	0.0511	9.7486
		T (°C)	20	5240.0875	5240	0.0875	16.6991
		T (°C)	30	5240.0549	5240	0.0549	10.4742
		T (°C)	40	5240.0044	5240	0.0044	0.8458
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	5745.0254	5745	0.0254	4.4134
		V max (V)	132	5745.0177	5745	0.0177	3.0821
		V min (V)	108	5745.0405	5745	0.0405	7.0490
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	5745.0142	5745	0.0142	2.4769
		T (°C)	10	5745.0356	5745	0.0356	6.1972
		T (°C)	20	5745.0118	5745	0.0118	2.0464
		T (°C)	30	5745.0853	5745	0.0853	14.8432
		T (°C)	40	5745.0251	5745	0.0251	4.3627
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	5785.0056	5785	0.0056	0.9709
		V max (V)	132	5785.0293	5785	0.0293	5.0666
		V min (V)	108	5785.0755	5785	0.0755	13.0505
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	5785.0750	5785	0.0750	12.9718
		T (°C)	10	5785.0513	5785	0.0513	8.8637
		T (°C)	20	5785.0756	5785	0.0756	13.0681
		T (°C)	30	5785.0116	5785	0.0116	2.0022
		T (°C)	40	5785.0833	5785	0.0833	14.4015
		T (°C)	50	5785.0825	5785	0.0825	14.2665
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	5825.0615	5825	0.0615	10.5601
		V max (V)	132	5825.0653	5825	0.0653	11.2073
		V min (V)	108	5825.0407	5825	0.0407	6.9859
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	5825.0772	5825	0.0772	13.2490
		T (°C)	10	5825.0427	5825	0.0427	7.3357
		T (°C)	20	5825.0723	5825	0.0723	12.4039
		T (°C)	30	5825.0217	5825	0.0217	3.7267
		T (°C)	40	5825.0018	5825	0.0018	0.3149
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. 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.

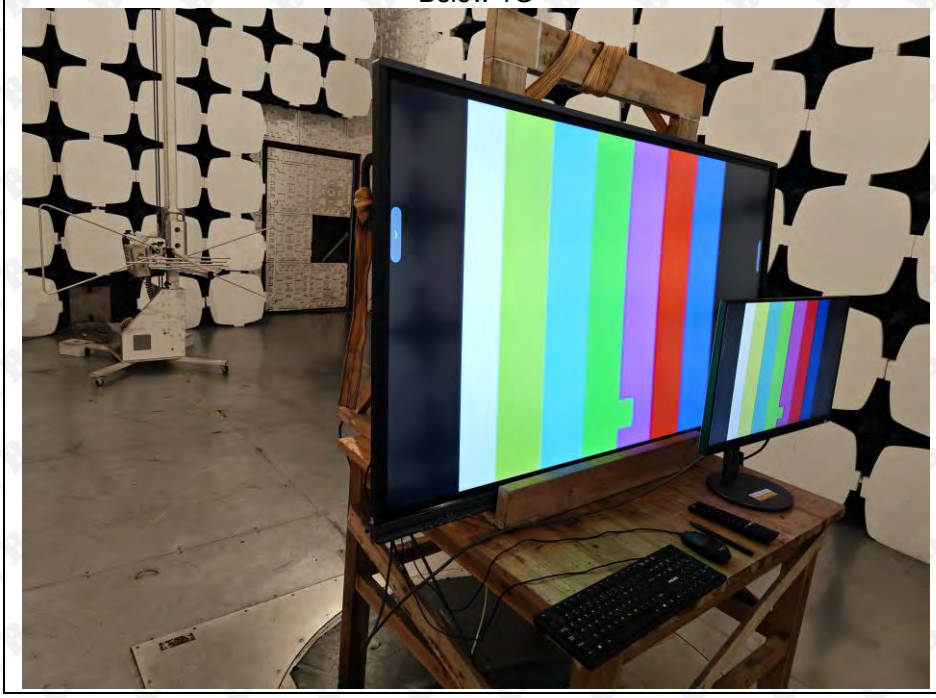
EUT Antenna:

The antenna is External antenna and no consideration of replacement. The best case gain of the antenna is WiFi (5.2G):Ant1: 3.28dBi, Ant2: 3.28dBi, WiFi (5.8G):Ant1: 4.69dBi, Ant2:4.69dBi.

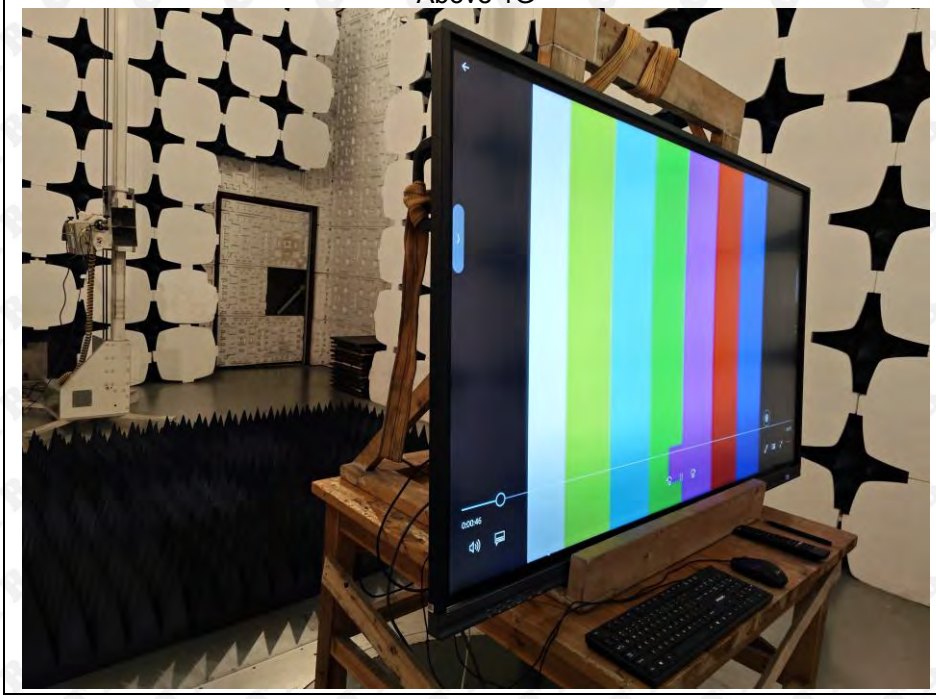
15. EUT TEST SETUP PHOTOGRAPHS

Radiated Emission

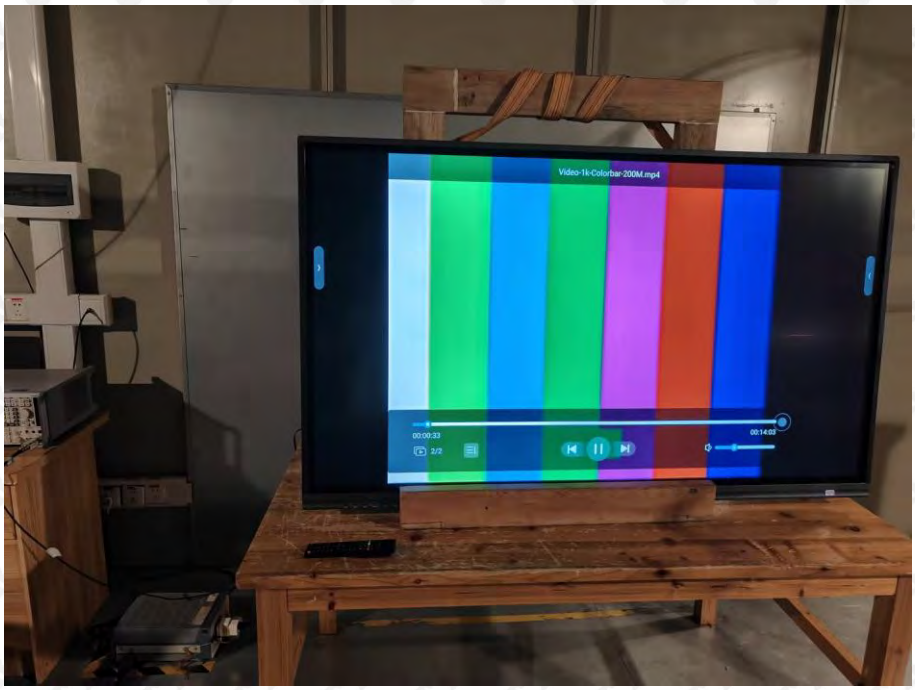
Below 1G



Above 1G



Conducted Emission



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