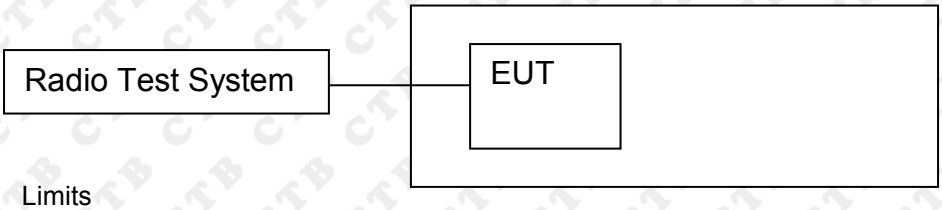
10. EMISSION BANDWIDTH& OCCUPIED BANDWIDTH

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	21.146
	5200	21.222
	5240	21.245
802.11ac20	5180	21.482
	5200	21.969
	5240	21.758
802.11ac40	5190	41.58
	5230	41.254
802.11ac80	5210	80.589
802.11n(HT20)	5180	21.74
	5200	21.776
	5240	21.573
802.11n(HT40)	5190	41.439
	5230	41.285

Test mode ANT 2	Test Channel (MHz)	26dB Bandwidth (MHz)
802.11a	5180	21.074
	5200	21.253
	5240	21.083
802.11ac20	5180	21.936
	5200	21.659
	5240	21.821
802.11ac40	5190	41.736
	5230	41.446
802.11ac80	5210	80.707
802.11n(HT20)	5180	21.665
	5200	21.818
	5240	21.777
802.11n(HT40)	5190	41.149
	5230	41.122

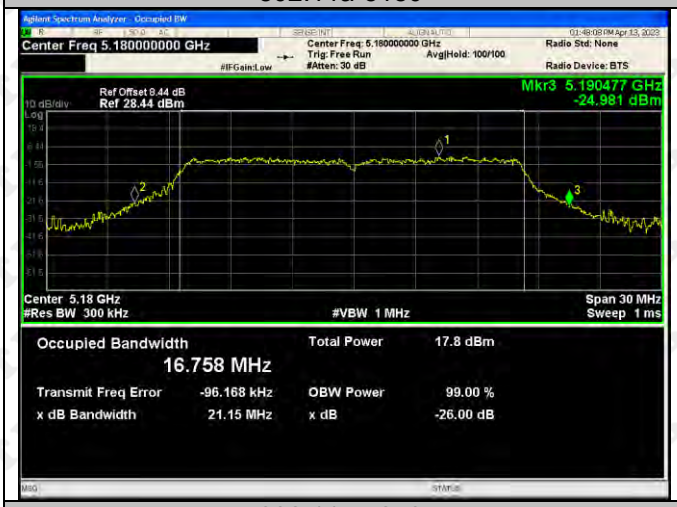
5725-5850 MHz

Test mode Ant 1	Test Channel (MHz)	6dB Bandwidth (MHz)	Result
802.11a	5745	16.55	Pass
	5785	16.568	Pass
	5825	16.537	Pass
802.11ac(VH20)	5745	17.762	Pass
	5785	17.737	Pass
	5825	17.689	Pass
802.11ac(VH40)	5755	36.517	Pass
	5795	36.48	Pass
802.11ac(VH80)	5775	76.247	Pass
802.11n(VH20)	5745	17.705	Pass
	5785	17.725	Pass
	5825	17.698	Pass
802.11n(VH40)	5755	36.51	Pass
	5795	36.513	Pass

Test mode Ant 2	Test Channel (MHz)	6dB Bandwidth (MHz)	Result
802.11a	5745	16.536	Pass
	5785	16.545	Pass
	5825	16.551	Pass
802.11ac(VH20)	5745	17.793	Pass
	5785	17.676	Pass
	5825	17.781	Pass
802.11ac(VH40)	5755	36.522	Pass
	5795	36.481	Pass
802.11ac(VH80)	5775	76.174	Pass
802.11n(VH20)	5745	17.69	Pass
	5785	17.748	Pass
	5825	17.788	Pass
802.11n(VH40)	5755	36.535	Pass
	5795	36.476	Pass

Test Graph ANT 1

802.11a-5180



802.11a-5200

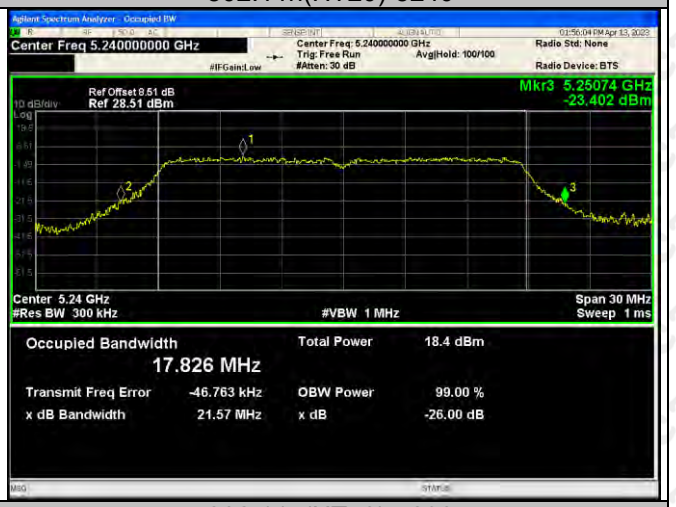
802.11a-5240

802.11n(HT20)-5180

802.11n(HT20)-5200

802.11n(HT20)-5240

802.11n(HT40)-5190



802.11n(HT40)-5230

802.11ac(VH20)-5180

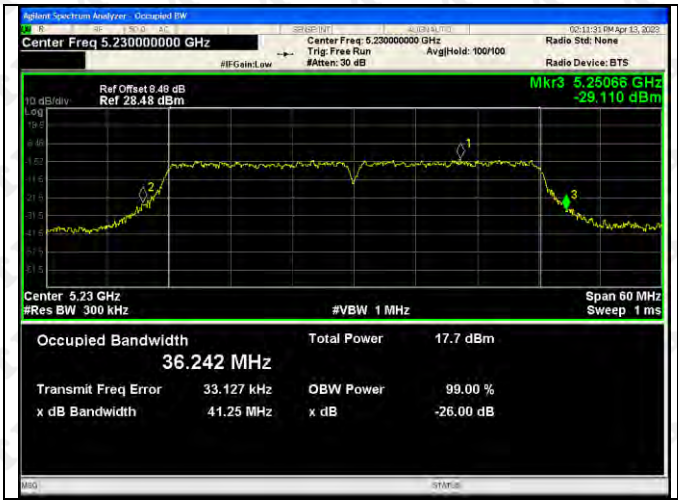
802.11ac(VH20)-5200

802.11ac(VH20)-5240

802.11ac(VH40)-5190

802.11ac(VH40)-5230

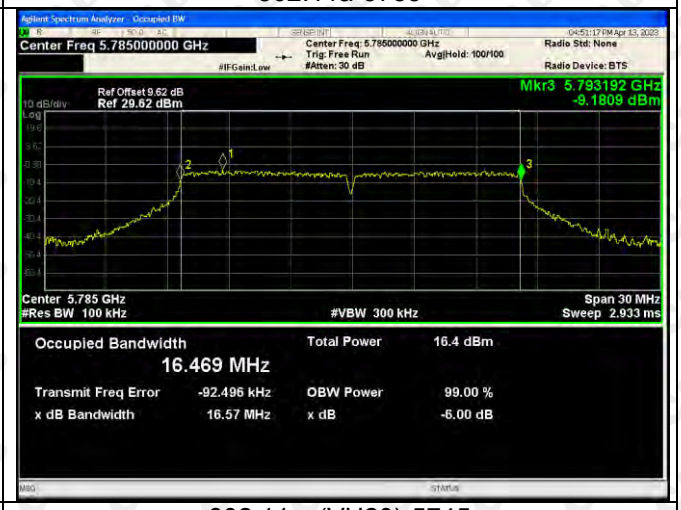
802.11ac(VH80)-5210



ANT1:
5725-5850MHz

802.11a-5745

802.11a-5785



802.11a-5825

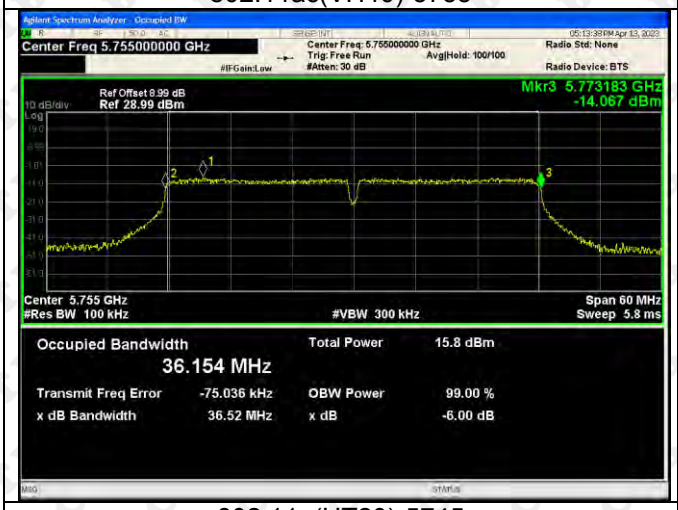
802.11ac(VH20)-5745

802.11ac(VH20)-5785

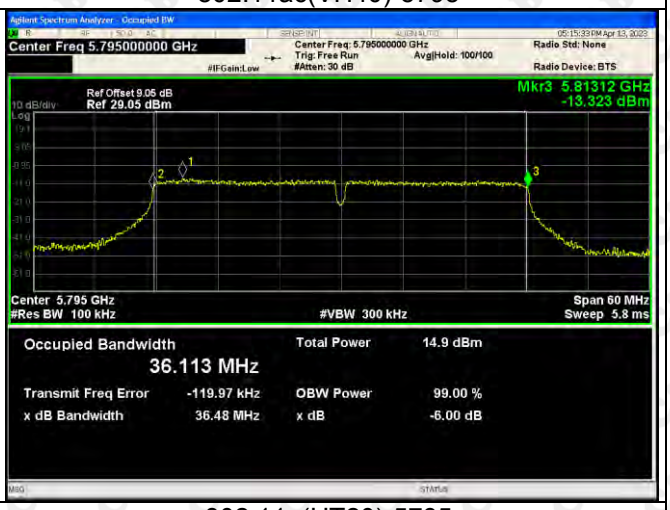
802.11ac(VH20)-5825

802.11ac(VH40)-5755

802.11ac(VH40)-5795

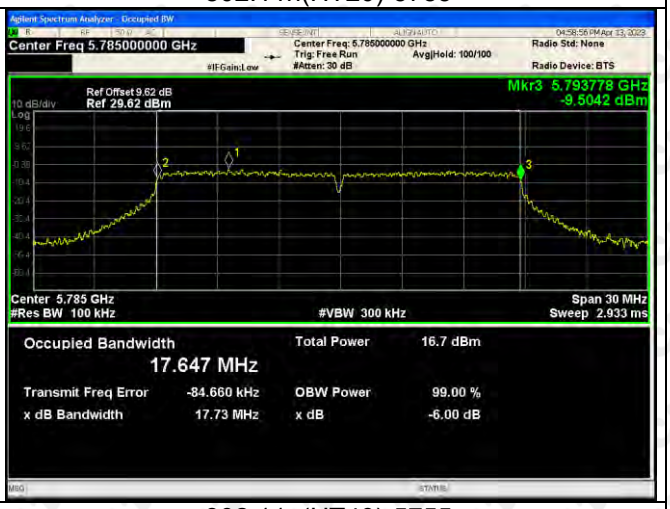


802.11n(HT20)-5745



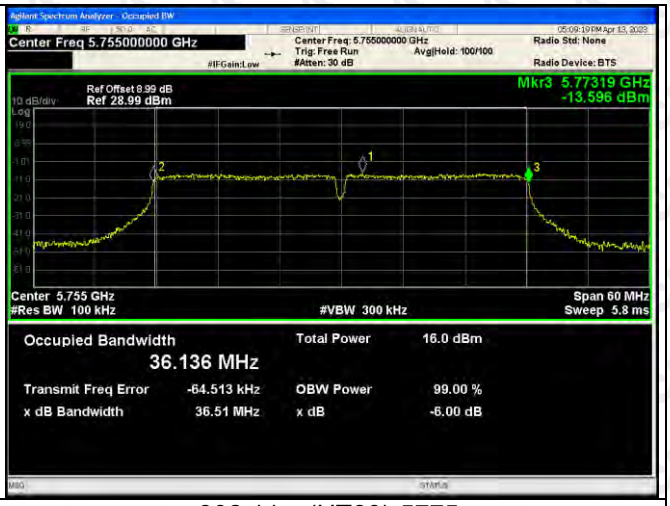
802.11n(HT20)-5785

802.11n(HT20)-5825

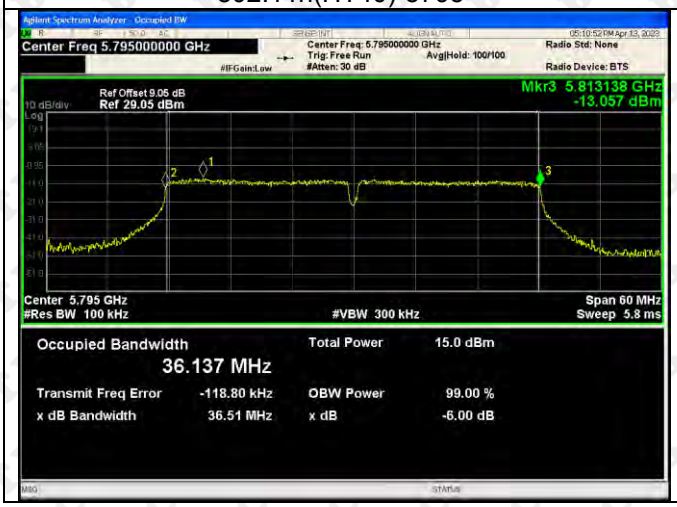


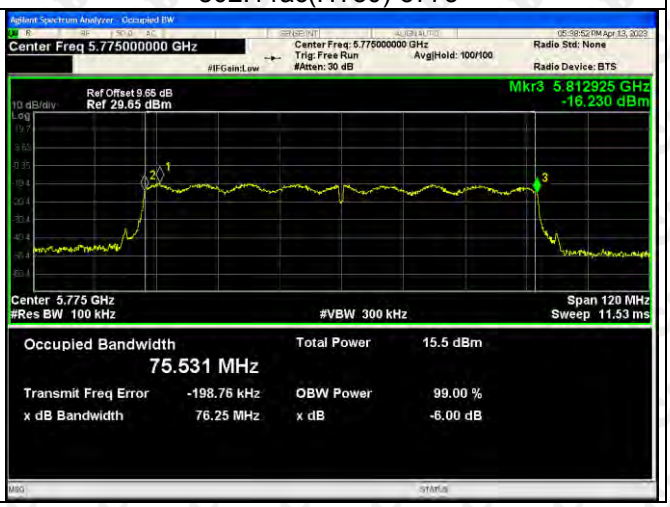
802.11n(HT40)-5755

802.11n(HT40)-5795



802.11ac(HT80)-5775

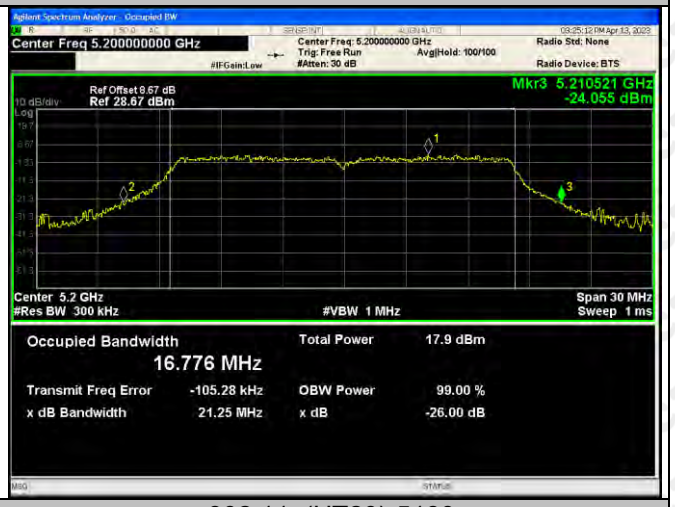




Test Graph ANT 2

802.11a-5180

802.11a-5200



802.11a-5240

802.11n(HT20)-5180

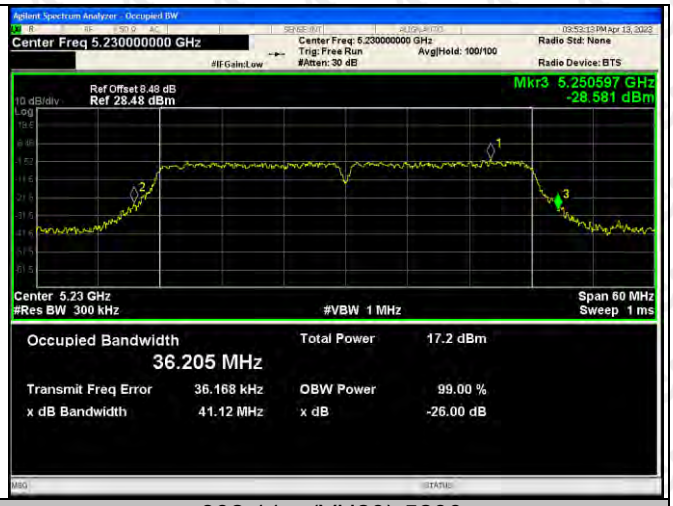
802.11n(HT20)-5200

802.11n(HT20)-5240

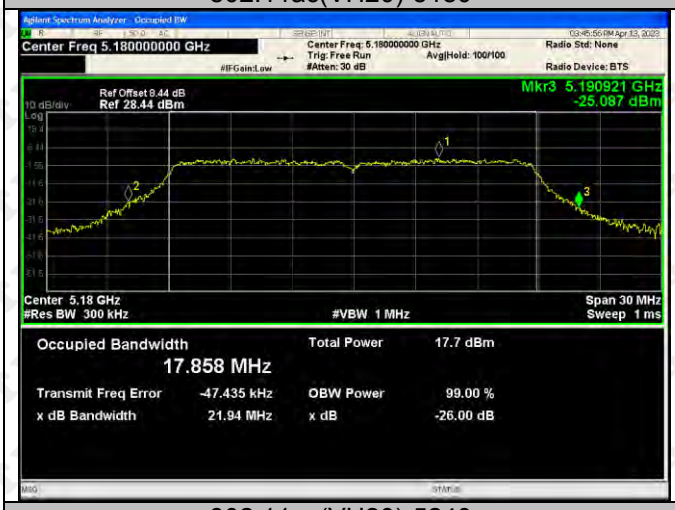
802.11n(HT40)-5190

802.11n(HT40)-5230

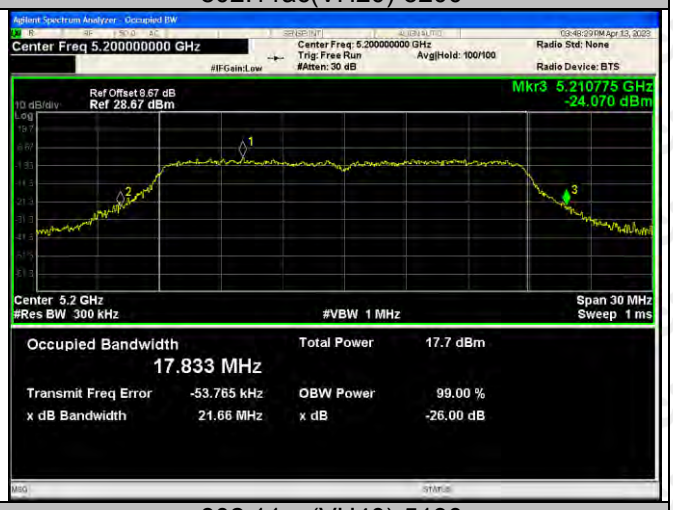
802.11ac(VH20)-5180



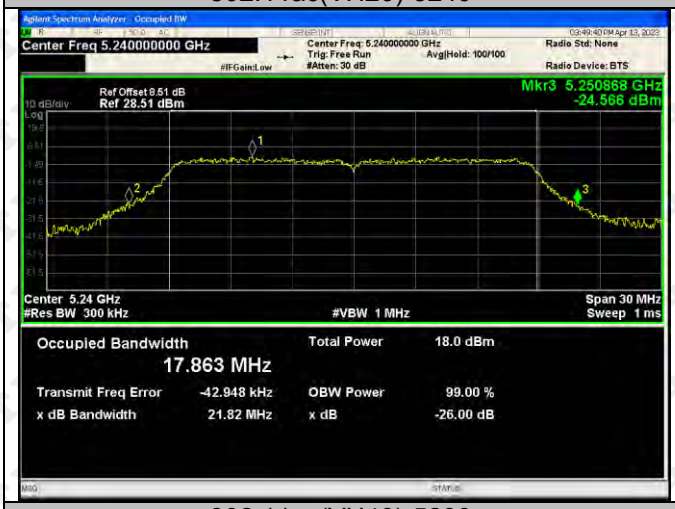
802.11ac(VH20)-5200



802.11ac(VH20)-5240

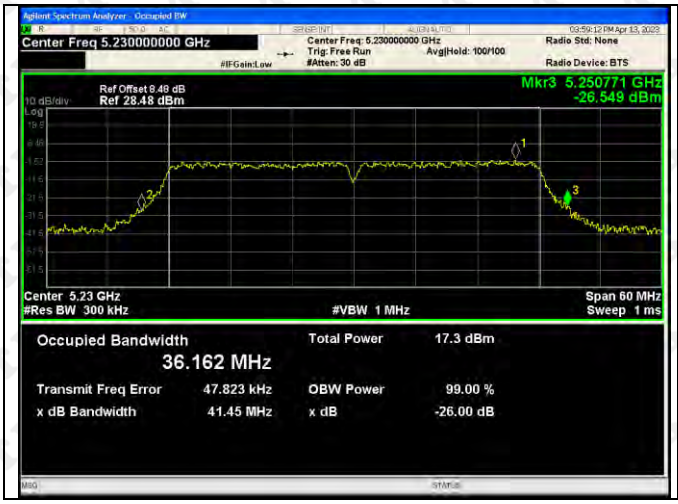


802.11ac(VH40)-5190



802.11ac(VH40)-5230

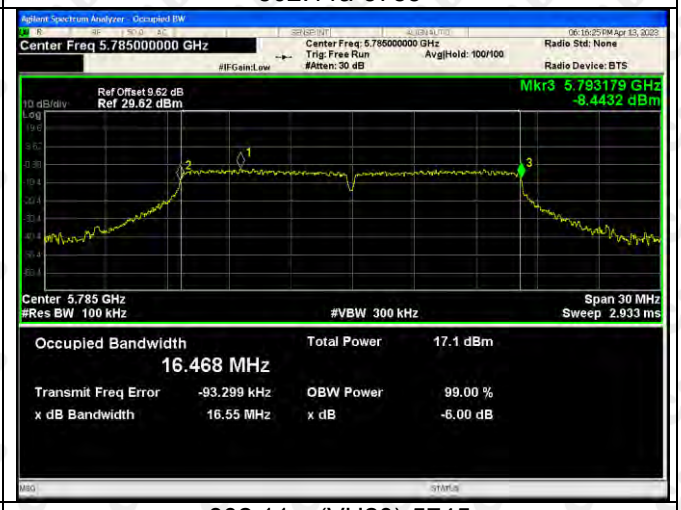
802.11ac(VH80)-5210



ANT2:
5725-5850MHz

802.11a-5745

802.11a-5785



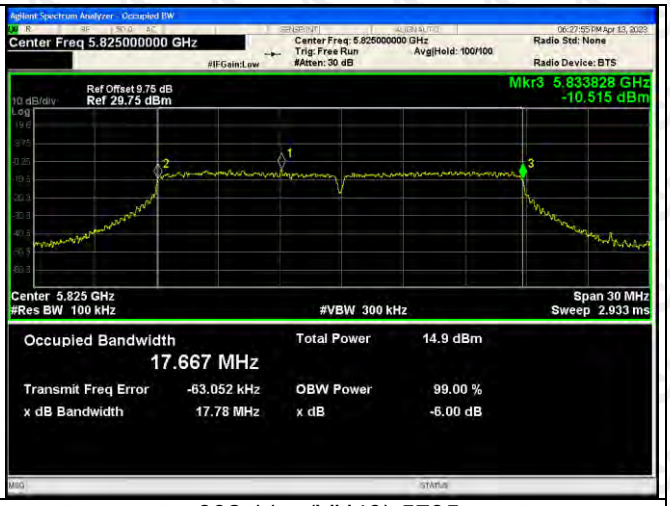
802.11a-5825

802.11ac(VH20)-5745

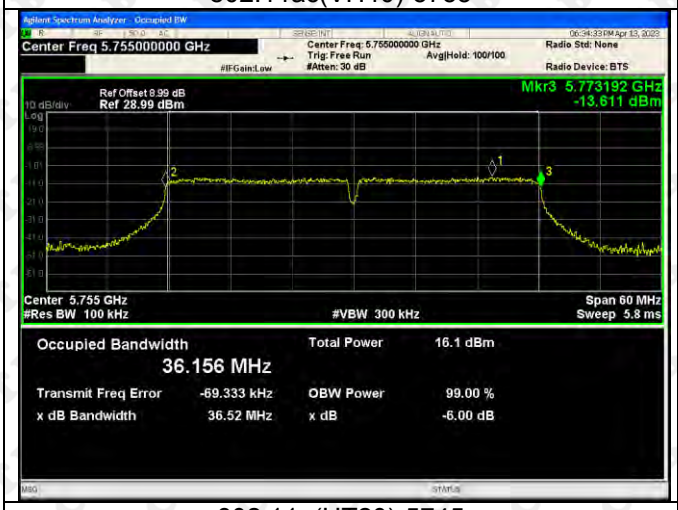
802.11ac(VH20)-5785

802.11ac(VH20)-5825

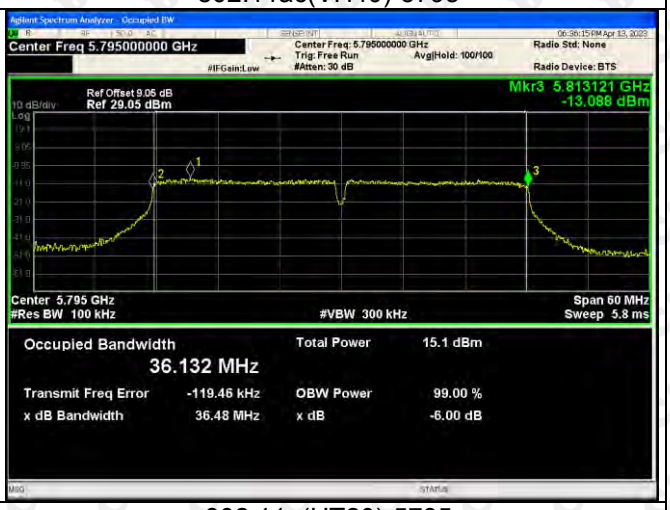
802.11ac(VH40)-5755



802.11ac(VH40)-5795

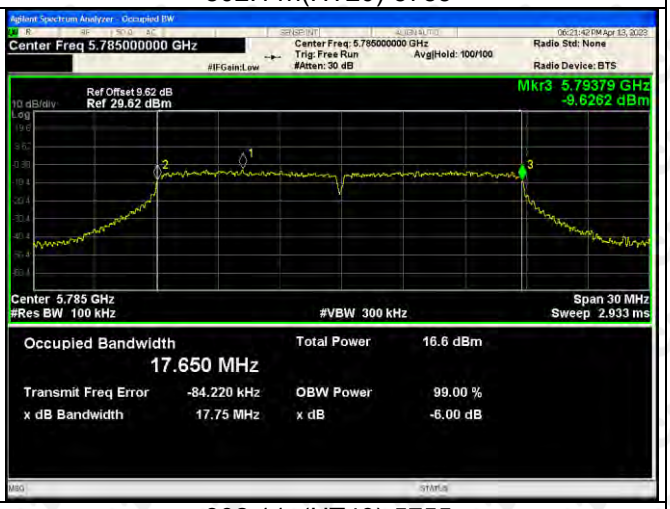


802.11n(HT20)-5745



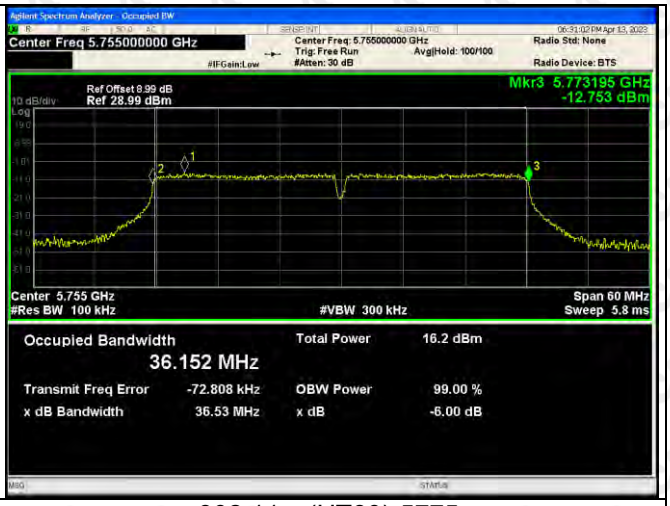
802.11n(HT20)-5785

802.11n(HT20)-5825

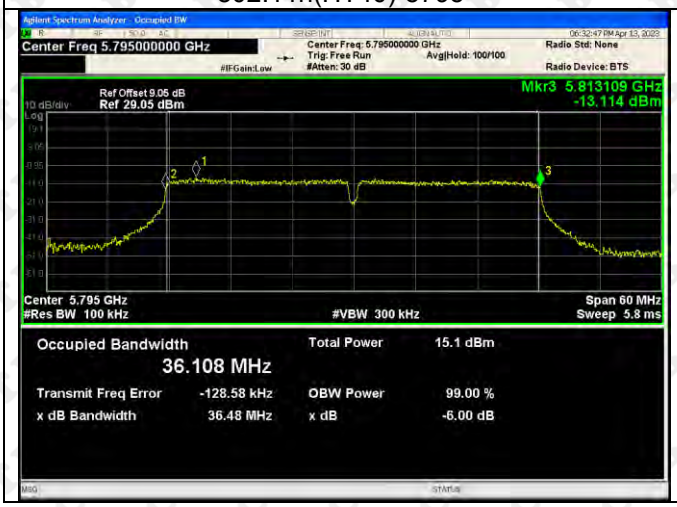


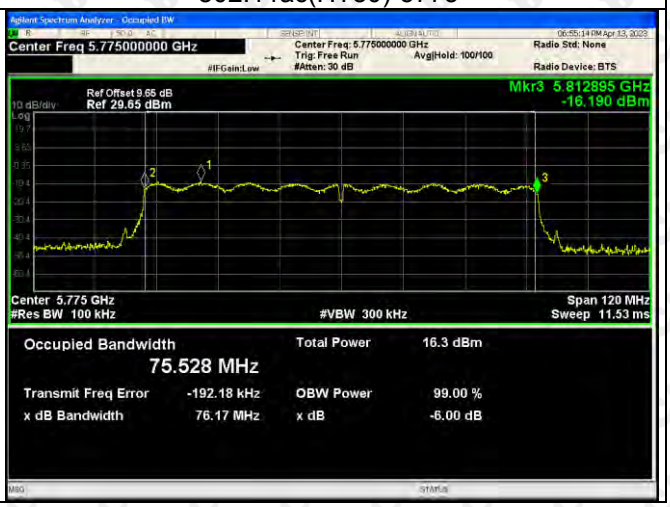
802.11n(HT40)-5755

802.11n(HT40)-5795



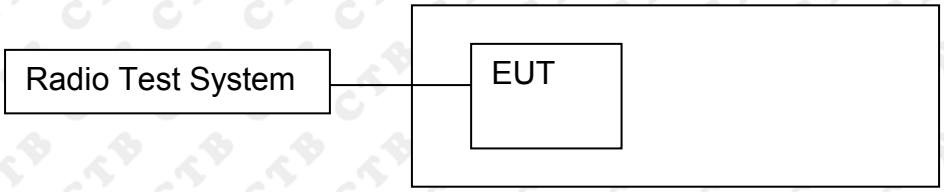
802.11ac(HT80)-5775





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	5.83	5.686	/	11	Pass
	5200	6.331	5.981	/	11	Pass
	5240	6.466	6.802	/	11	Pass
802.11ac(VH20)	5180	5.897	5.67	8.795	11	Pass
	5200	6.243	5.566	8.928	11	Pass
	5240	6.416	5.281	8.896	11	Pass
802.11ac(VH40)	5190	2.223	1.509	4.891	11	Pass
	5230	2.55	2.117	5.349	11	Pass
802.11n(VH20)	5180	5.618	6.615	9.155	11	Pass
	5200	5.85	4.887	8.405	11	Pass
	5240	1.514	6.067	7.372	11	Pass
802.11n(VH40)	5190	2.319	1.724	5.042	11	Pass
	5230	2.691	2.07	5.402	11	Pass
802.11ac(VH80)	5230	0.34	0.12	3.242	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	5.781	3.069	/	30	Pass
	5785	2.799	3.26	/	30	Pass
	5825	1.441	1.96	/	30	Pass
802.11ac(VH20)	5745	2.992	3.055	6.034	30	Pass
	5785	2.818	2.89	5.864	30	Pass
	5825	1.277	1.68	4.493	30	Pass
802.11ac(VH40)	5755	-1.035	-0.595	2.201	30	Pass
	5795	-2.095	-1.997	0.965	30	Pass
802.11n(VH20)	5775	2.837	-3.41	3.762	30	Pass
	5745	3.692	3.217	6.471	30	Pass
	5785	1.746	3.319	5.614	30	Pass
802.11n(VH40)	5825	-0.977	1.028	3.150	30	Pass
	5755	-0.841	-0.659	2.261	30	Pass
802.11ac(VH80)	5795	-3.705	-1.685	0.432	30	Pass

ANT 1

802.11a-5180

802.11a-5200

802.11a-5240

802.11n(HT20)-5180

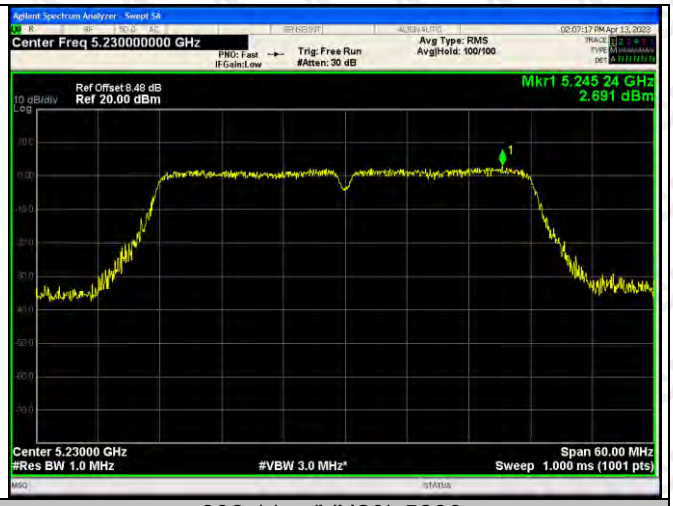
802.11n(HT20)-5200

802.11n(HT20)-5240

802.11n(HT40)-5190

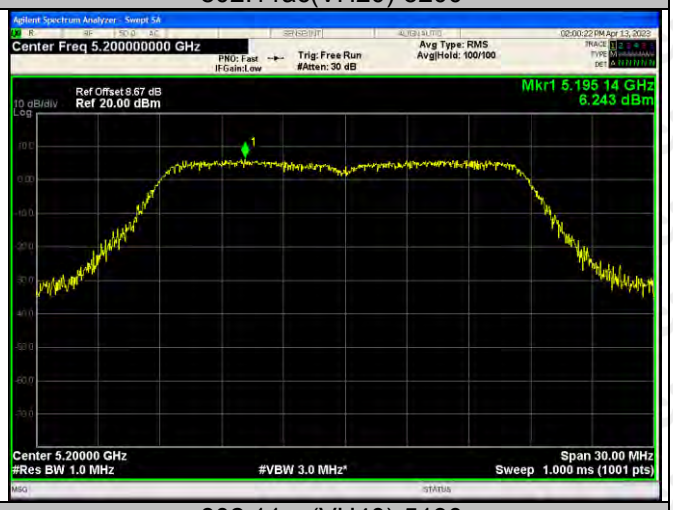
802.11n(HT40)-5230

802.11ac(VH20)-5180



802.11ac(VH20)-5200

802.11ac(VH20)-5240



802.11ac(VH40)-5190

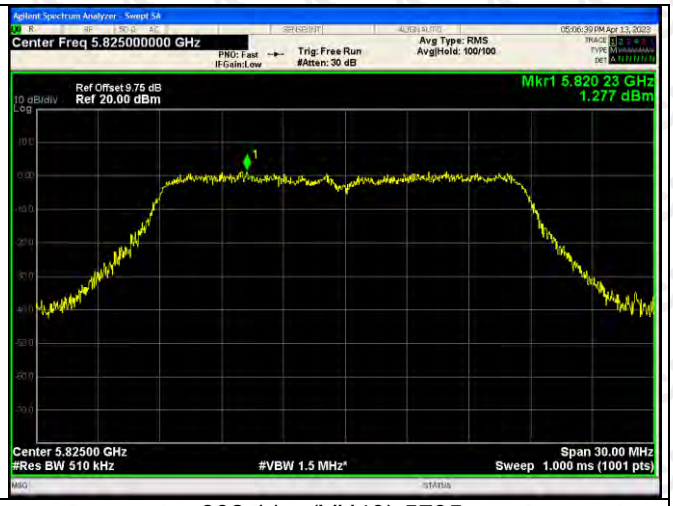
802.11ac(VH40)-5230

802.11ac(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

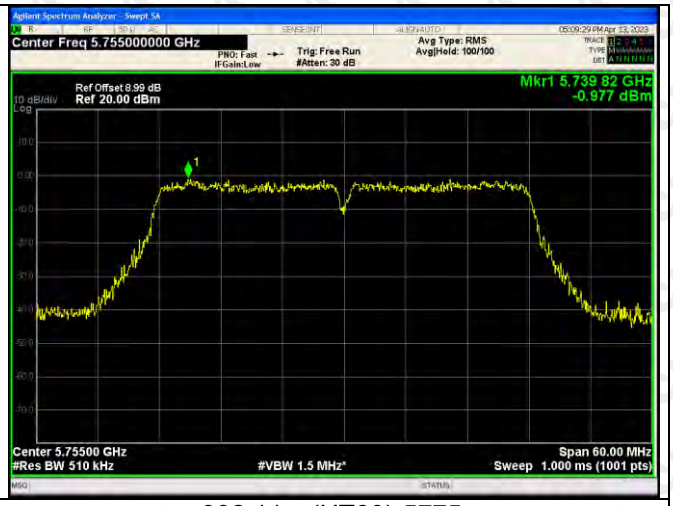
802.11n(HT20)-5745

802.11n(HT20)-5785

802.11n(HT20)-5825

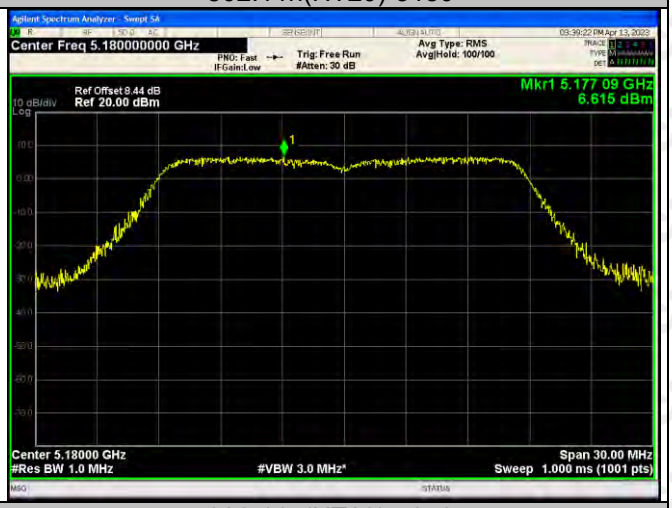
802.11n(HT40)-5755

802.11n(HT40)-5795



802.11ac(HT80)-5775

ANT 2

802.11a-5180	802.11a-5200
	
802.11a-5240	802.11n(HT20)-5180
	
802.11n(HT20)-5200	802.11n(HT20)-5240
	
802.11n(HT40)-5190	802.11n(HT40)-5230

802.11ac(VH20)-5180

802.11ac(VH20)-5200

802.11ac(VH20)-5240

802.11ac(VH40)-5190

802.11ac(VH40)-5230

802.11ac(VH80)-5210

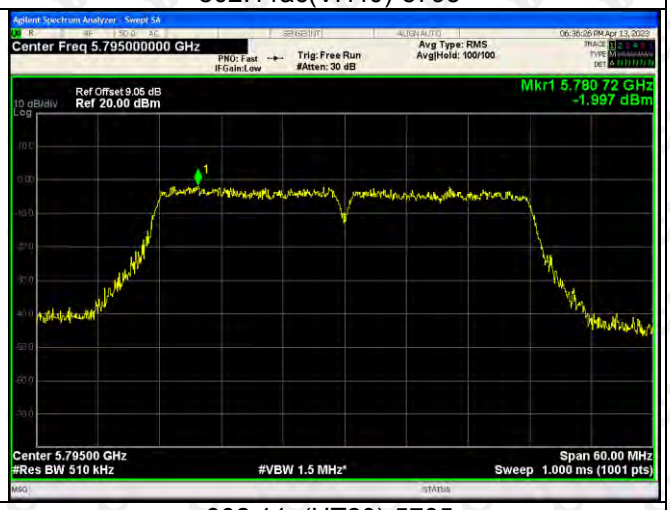
ANT2:

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

802.11n(HT20)-5745



802.11n(HT20)-5785

802.11n(HT20)-5825

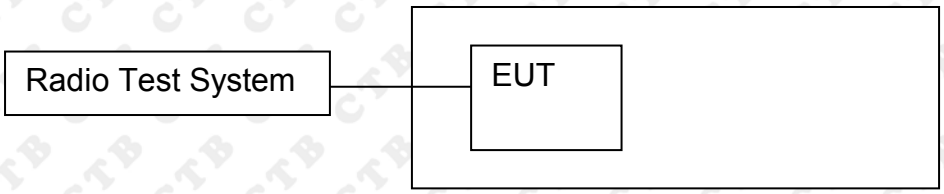
802.11n(HT40)-575

802.11n(HT40)-5795

802.11ac(HT80)-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	5180.1105	5180	0.1105	21.3386
		V max (V)	132	5180.1191	5180	0.1191	22.9966
		V min (V)	108	5180.0702	5180	0.0702	13.5609
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	5180.0098	5180	0.0098	1.8842
		T (°C)	10	5180.0463	5180	0.0463	8.9419
		T (°C)	20	5180.0288	5180	0.0288	5.5631
		T (°C)	30	5180.0300	5180	0.0300	5.7929
		T (°C)	40	5180.0233	5180	0.0233	4.4952
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	5200.0146	5200	0.0146	2.8043
		V max (V)	132	5200.0291	5200	0.0291	5.5958
		V min (V)	108	5200.0325	5200	0.0325	6.2446
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	5200.0245	5200	0.0245	4.7196
		T (°C)	10	5200.0390	5200	0.0390	7.4928
		T (°C)	20	5200.0072	5200	0.0072	1.3817
		T (°C)	30	5200.0023	5200	0.0023	0.4515
		T (°C)	40	5200.0316	5200	0.0316	6.0814
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	5240.0503	5240	0.0503	9.6068
		V max (V)	132	5240.0353	5240	0.0353	6.7308
		V min (V)	108	5240.0404	5240	0.0404	7.7063
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	5240.0241	5240	0.0241	4.5997
		T (°C)	10	5240.0534	5240	0.0534	10.1981
		T (°C)	20	5240.0480	5240	0.0480	9.1547
		T (°C)	30	5240.0531	5240	0.0531	10.1292
		T (°C)	40	5240.0192	5240	0.0192	3.6630
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	5745.0762	5745	0.0762	13.2574
		V max (V)	132	5745.0536	5745	0.0536	9.3231
		V min (V)	108	5745.0762	5745	0.0762	13.2574
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	5745.0182	5745	0.0182	3.1599
		T (°C)	10	5745.0374	5745	0.0374	6.5148
		T (°C)	20	5745.0058	5745	0.0058	1.0073
		T (°C)	30	5745.0745	5745	0.0745	12.9705
		T (°C)	40	5745.0862	5745	0.0862	15.0050
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	5785.0749	5785	0.0749	12.9559
		V max (V)	132	5785.0688	5785	0.0688	11.8856
		V min (V)	108	5785.0862	5785	0.0862	14.9039
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	5785.0509	5785	0.0509	8.7920
		T (°C)	10	5785.0024	5785	0.0024	0.4172
		T (°C)	20	5785.0851	5785	0.0851	14.7026
		T (°C)	30	5785.0816	5785	0.0816	14.1038
		T (°C)	40	5785.0651	5785	0.0651	11.2509
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	14.5212
		V max (V)	132	5825.0149	5825	0.0149	2.5617
		V min (V)	108	5825.0201	5825	0.0201	3.4459
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	5825.0116	5825	0.0116	1.9904
		T (°C)	10	5825.0100	5825	0.0100	1.7090
		T (°C)	20	5825.0624	5825	0.0624	10.7194
		T (°C)	30	5825.0095	5825	0.0095	1.6360
		T (°C)	40	5825.0451	5825	0.0451	7.7376
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	5180.0296	5180	0.0296	5.7172
		V max (V)	132	5180.0445	5180	0.0445	8.5962
		V min (V)	108	5180.0054	5180	0.0054	1.0405
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	5180.0364	5180	0.0364	7.0248
		T (°C)	10	5180.0170	5180	0.0170	3.2910
		T (°C)	20	5180.0254	5180	0.0254	4.9087
		T (°C)	30	5180.0529	5180	0.0529	10.2181
		T (°C)	40	5180.0640	5180	0.0640	12.3546
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	5200.0630	5200	0.0630	12.1111
		V max (V)	132	5200.0459	5200	0.0459	8.8177
		V min (V)	108	5200.0579	5200	0.0579	11.1414
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	5200.0203	5200	0.0203	3.9026
		T (°C)	10	5200.0622	5200	0.0622	11.9584
		T (°C)	20	5200.0107	5200	0.0107	2.0501
		T (°C)	30	5200.0216	5200	0.0216	4.1574
		T (°C)	40	5200.0145	5200	0.0145	2.7872
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	5240.0396	5240	0.0396	7.5555
		V max (V)	132	5240.0164	5240	0.0164	3.1372
		V min (V)	108	5240.0398	5240	0.0398	7.5987
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	5240.0920	5240	0.0920	17.5664
		T (°C)	10	5240.0015	5240	0.0015	0.2898
		T (°C)	20	5240.0158	5240	0.0158	3.0155
		T (°C)	30	5240.0762	5240	0.0762	14.5461
		T (°C)	40	5240.0518	5240	0.0518	9.8845
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	5745.0221	5745	0.0221	3.8533
		V max (V)	132	5745.0313	5745	0.0313	5.4487
		V min (V)	108	5745.0745	5745	0.0745	12.9628
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	5745.0562	5745	0.0562	9.7870
		T (°C)	10	5745.0014	5745	0.0014	0.2498
		T (°C)	20	5745.0258	5745	0.0258	4.4850
		T (°C)	30	5745.0686	5745	0.0686	11.9493
		T (°C)	40	5745.0209	5745	0.0209	3.6402
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	5785.0436	5785	0.0436	7.5325
		V max (V)	132	5785.0424	5785	0.0424	7.3208
		V min (V)	108	5785.0132	5785	0.0132	2.2855
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	5785.0649	5785	0.0649	11.2267
		T (°C)	10	5785.0302	5785	0.0302	5.2274
		T (°C)	20	5785.0507	5785	0.0507	8.7720
		T (°C)	30	5785.0448	5785	0.0448	7.7521
		T (°C)	40	5785.0068	5785	0.0068	1.1716
		T (°C)	50	5785.0593	5785	0.0593	10.2536
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	5825.0652	5825	0.0652	11.1982
		V max (V)	132	5825.0682	5825	0.0682	11.7105
		V min (V)	108	5825.0134	5825	0.0134	2.3006
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	5825.0165	5825	0.0165	2.8314
		T (°C)	10	5825.0309	5825	0.0309	5.3069
		T (°C)	20	5825.0924	5825	0.0924	15.8558
		T (°C)	30	5825.0837	5825	0.0837	14.3652
		T (°C)	40	5825.0403	5825	0.0403	6.9163
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): 4.43dBi, WiFi (5.8G): 4.57dBi.

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15. EUT PHOTOGRAPHS

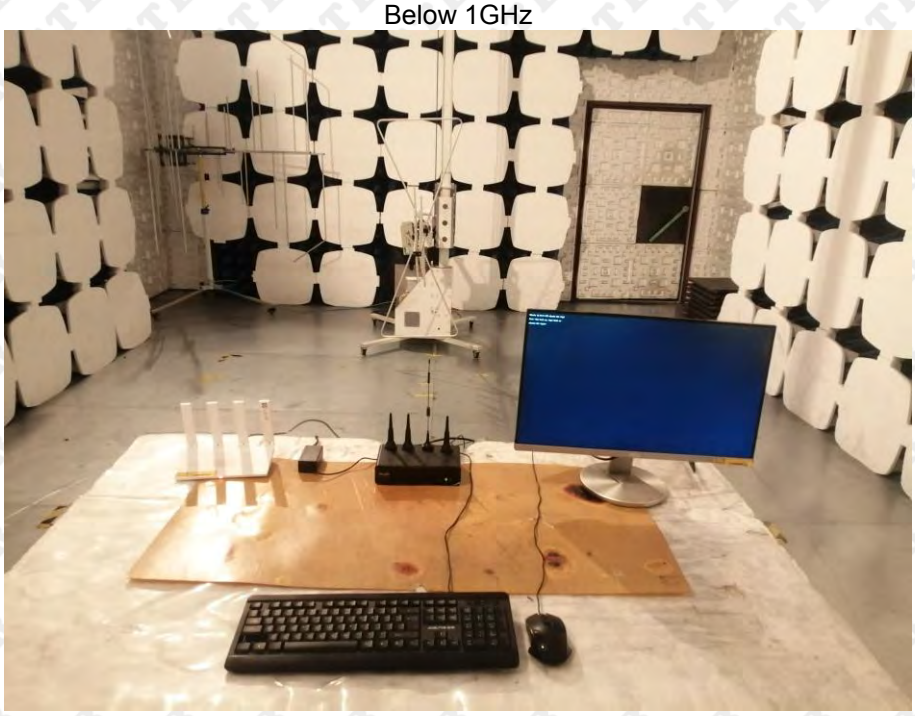
EUT Photo 1

EUT Photo 2

16. EUT TEST SETUP PHOTOGRAPHS

Radiated Emission

Below 1GHz



Above 1GHz

Conducted Emission

※※※※※ **END OF REPORT** ※※※※※