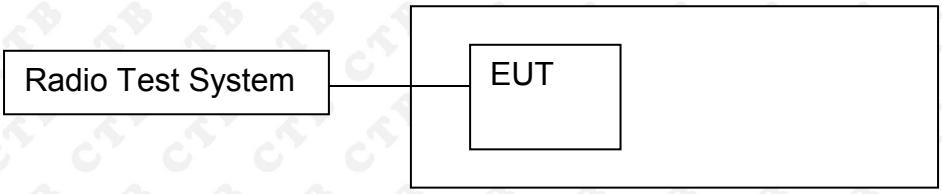
10. EMISSION BANDWIDTH& OCCUPIED BANDWIDTH

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 0	Test Channel (MHz)	26dB Bandwidth (MHz)	Limit (MHz)
802.11a	5180	30	≥0.5
	5200	30	≥0.5
	5240	30	≥0.5
802.11a20	5180	30	≥0.5
	5200	30	≥0.5
	5240	30	≥0.5
802.11a40	5190	60	≥0.5
	5230	60	≥0.5
802.11a80	5210	119.9	≥0.5
802.11n(HT20)	5180	30	≥0.5
	5200	30	≥0.5
	5240	30	≥0.5
802.11n(HT40)	5190	60	≥0.5
	5230	60	≥0.5

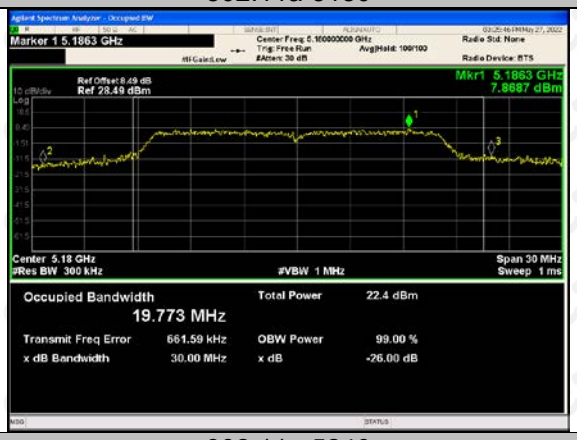
Test mode ANT 0	Test Channel (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
802.11a	5745	16.327	≥0.5
	5785	16.354	≥0.5
	5825	16.335	≥0.5
802.11a20	5745	17.046	≥0.5
	5785	16.951	≥0.5
	5825	16.644	≥0.5
802.11a40	5755	35.329	≥0.5
	5795	36.127	≥0.5
802.11a80	5775	75.256	≥0.5
802.11n(HT20)	5745	16.952	≥0.5
	5785	16.79	≥0.5
	5825	17.181	≥0.5
802.11n(HT40)	5755	35.803	≥0.5
	5795	35.553	≥0.5

Test mode ANT 1	Test Channel (MHz)	26dB Bandwidth (MHz)	Limit (MHz)
802.11a	5180	30	≥0.5
	5200	30	≥0.5
	5240	30	≥0.5
802.11a20	5180	30	≥0.5
	5200	30	≥0.5
	5240	30	≥0.5
802.11a40	5190	60	≥0.5
	5230	60	≥0.5
802.11a80	5210	119.9	≥0.5
802.11n(HT20)	5180	30	≥0.5
	5200	30	≥0.5
	5240	30	≥0.5
802.11n(HT40)	5190	60	≥0.5
	5230	60	≥0.5

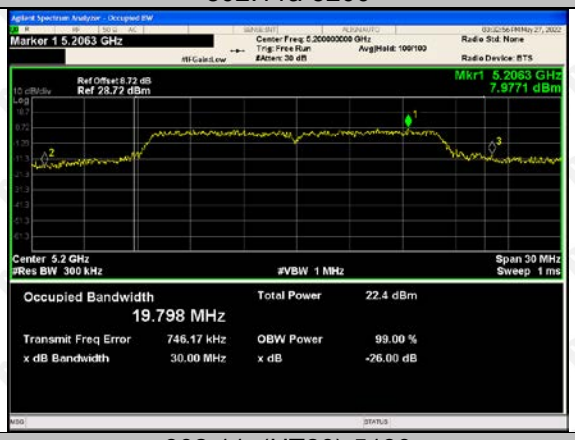
Test mode ANT 1	Test Channel (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
802.11a	5745	16.299	≥0.5
	5785	16.352	≥0.5
	5825	16.336	≥0.5
802.11a20	5745	17.153	≥0.5
	5785	16.95	≥0.5
	5825	17.254	≥0.5
802.11a40	5755	35.23	≥0.5
	5795	36.139	≥0.5
802.11a80	5775	75.237	≥0.5
802.11n(HT20)	5745	17.614	≥0.5
	5785	16.577	≥0.5
	5825	17.264	≥0.5
802.11n(HT40)	5755	35.349	≥0.5
	5795	35.74	≥0.5

Test Graph ANT 0

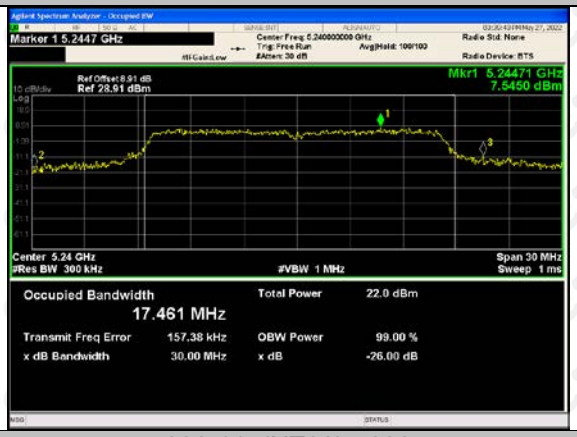
802.11a-5180



802.11a-5200



802.11a-5240



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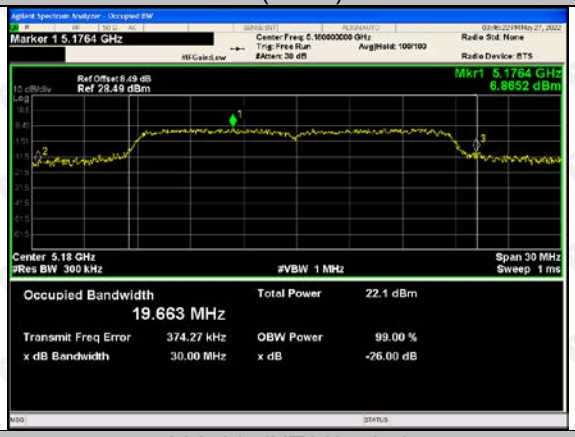

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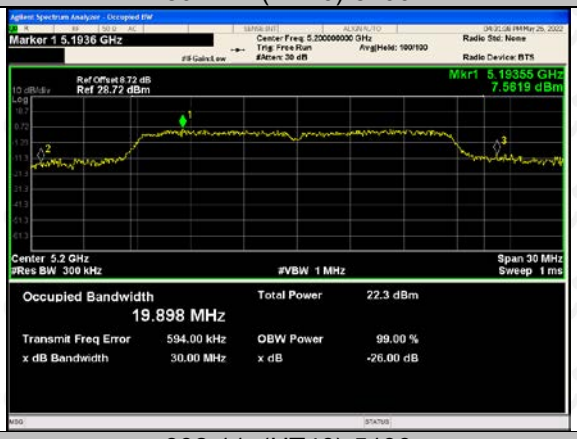
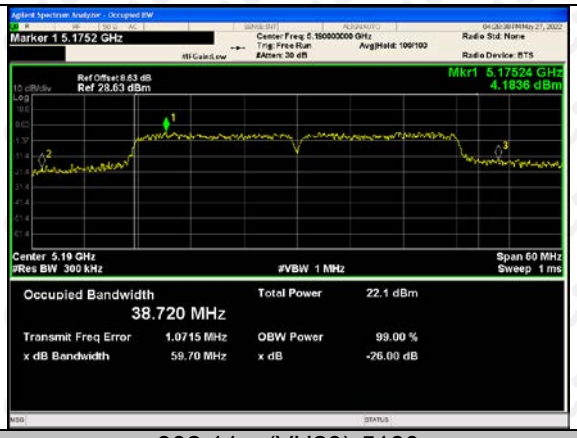
802.11n(HT20)-5240



802.11n(HT40)-5190

802.11n(HT40)-5230



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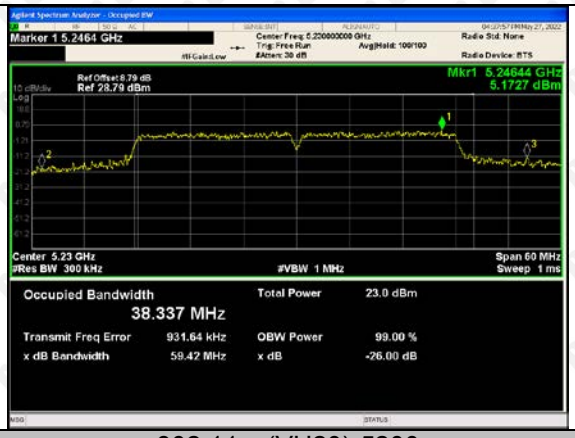

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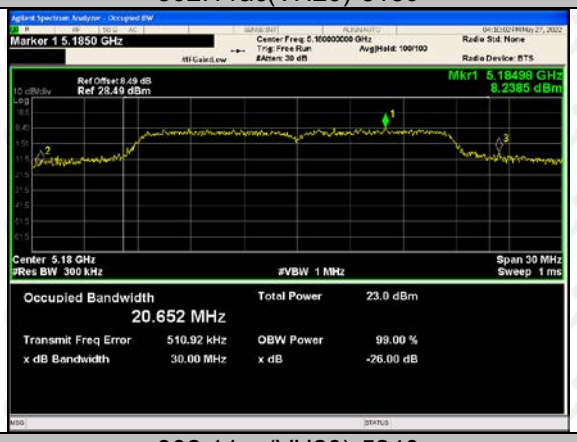

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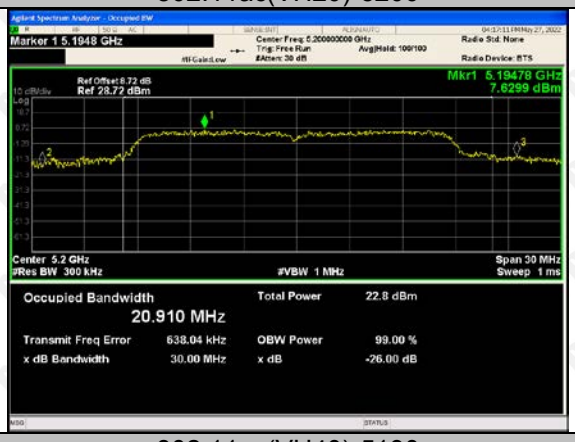
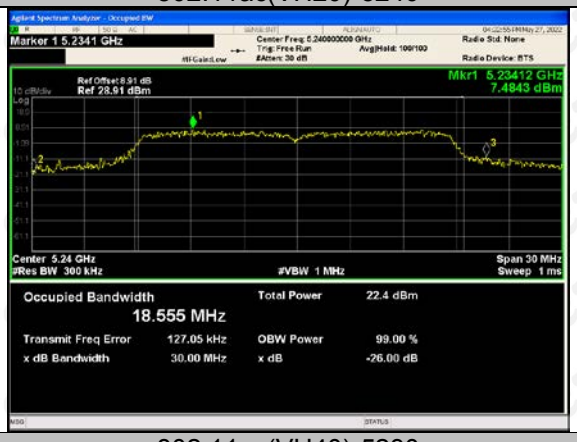
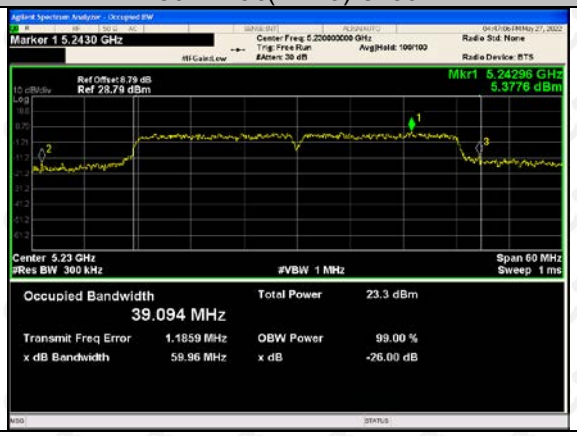


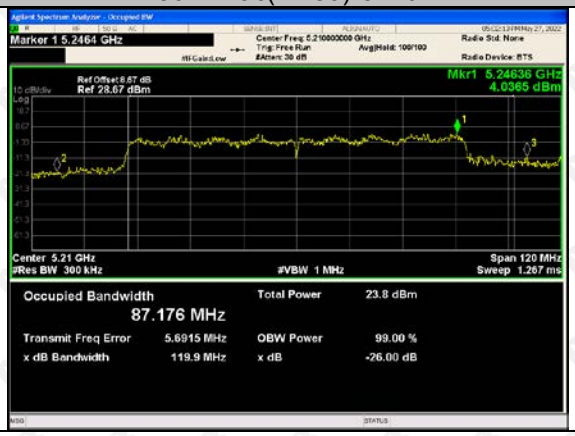
802.11ac(VH40)-5190



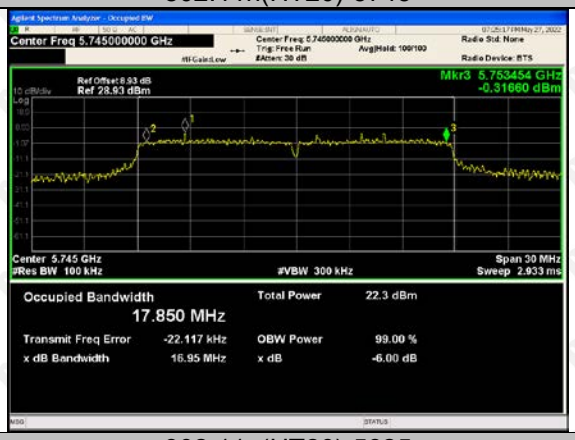
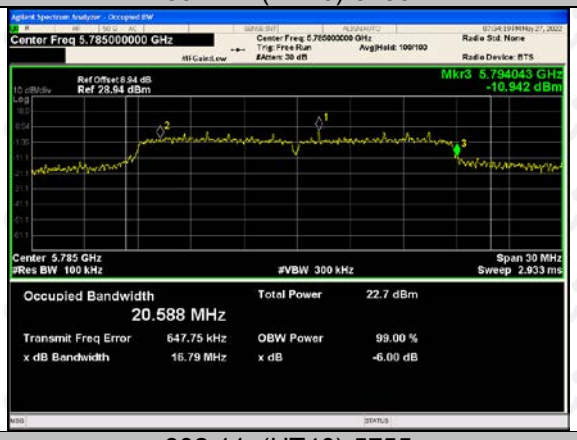
802.11ac(VH40)-5230

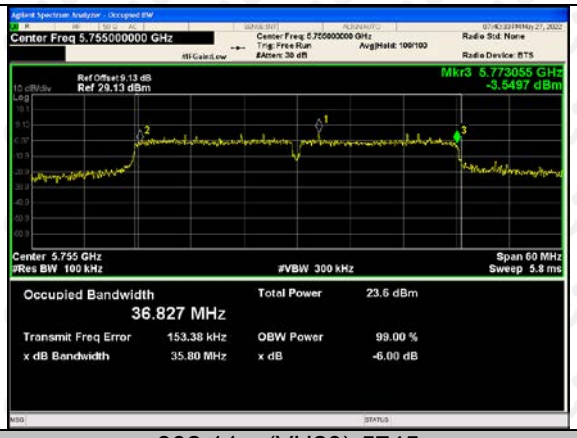
802.11ac(VH80)-5210





5725-5850MHz

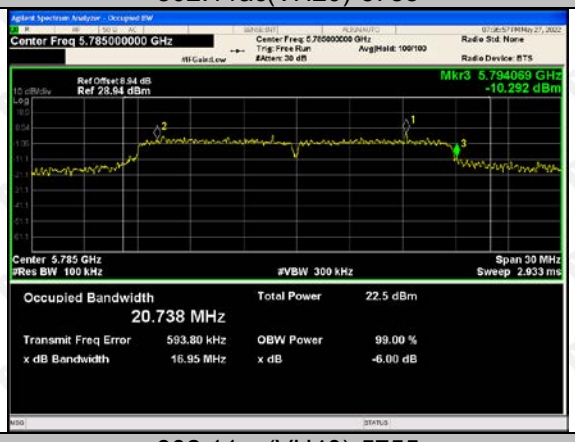
802.11a-5745	802.11a-5785
	
802.11a-5825	802.11n(HT20)-5745
	
802.11n(HT20)-5785	802.11n(HT20)-5825
	
802.11n(HT40)-5755	802.11n(HT40)-5795



802.11ac(VH20)-5745

802.11ac(VH20)-5785

802.11ac(VH20)-5825



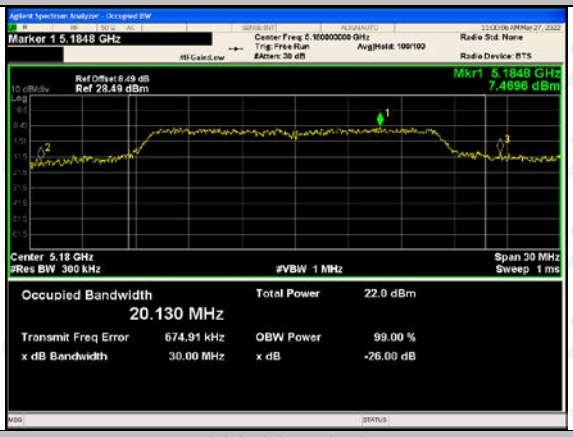
802.11ac(VH40)-5755

802.11ac(VH40)-5795

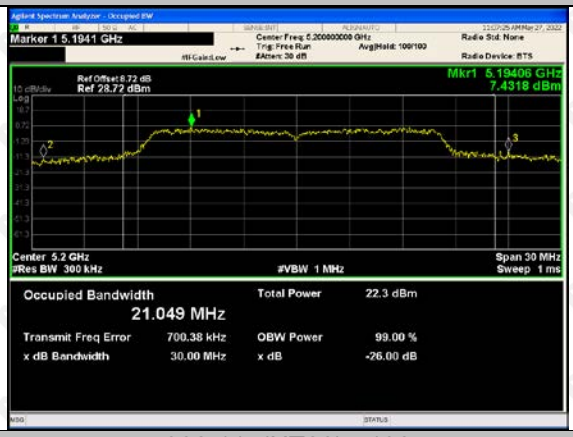
802.11ac(VH80)-5775

ANT 1

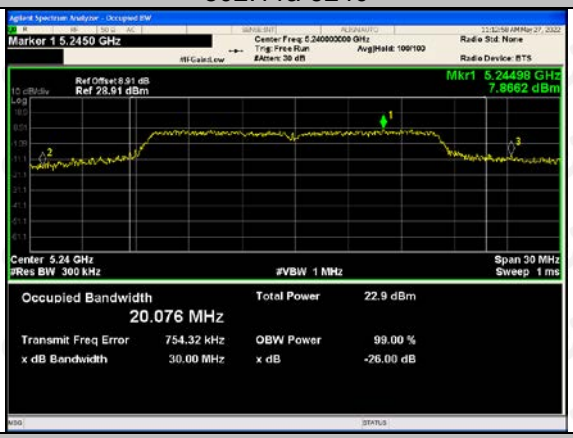
802.11a-5180



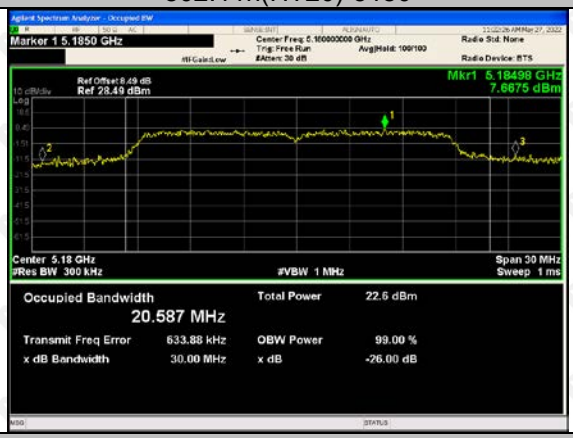
802.11a-5200



802.11a-5240



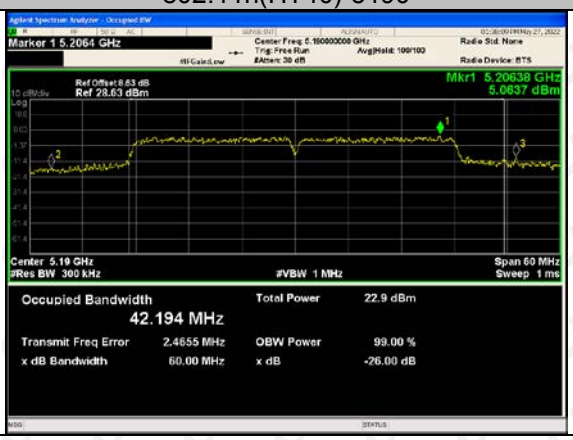
802.11n(HT20)-5180



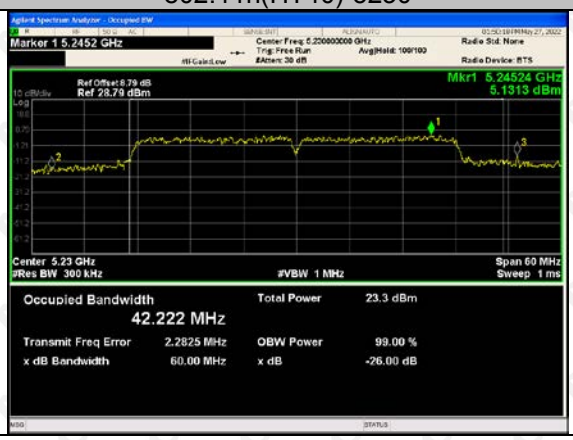
802.11n(HT20)-5200

802.11n(HT20)-5240

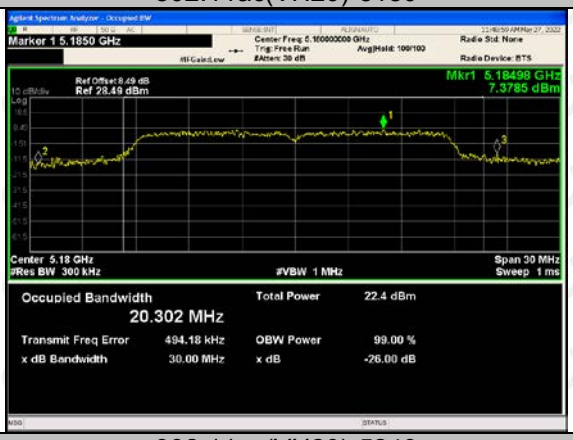
802.11n(HT40)-5190



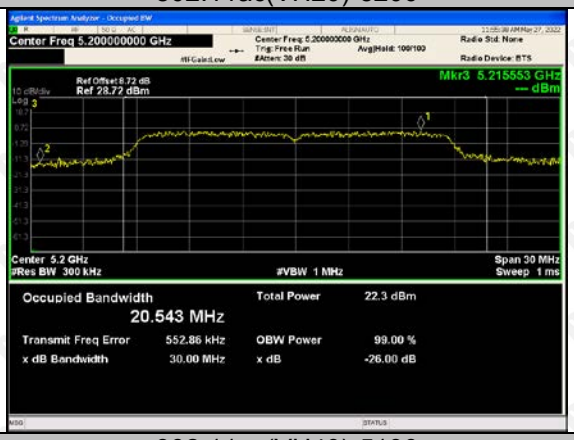
802.11n(HT40)-5230



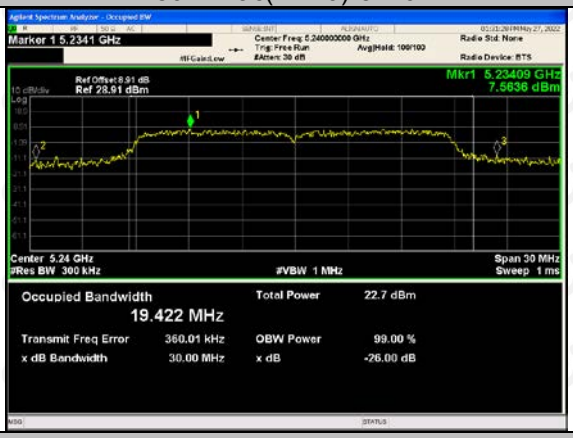
802.11ac(VH20)-5180



802.11ac(VH20)-5200



802.11ac(VH20)-5240



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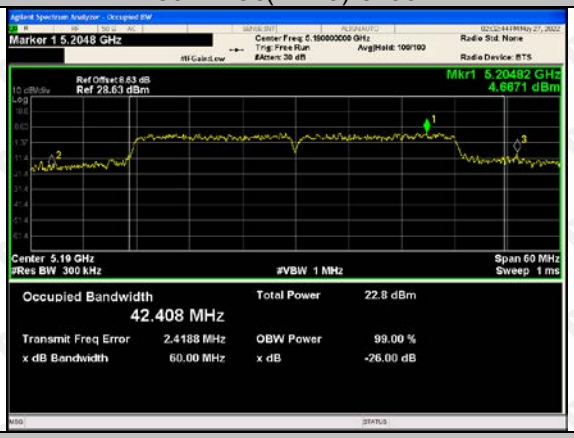

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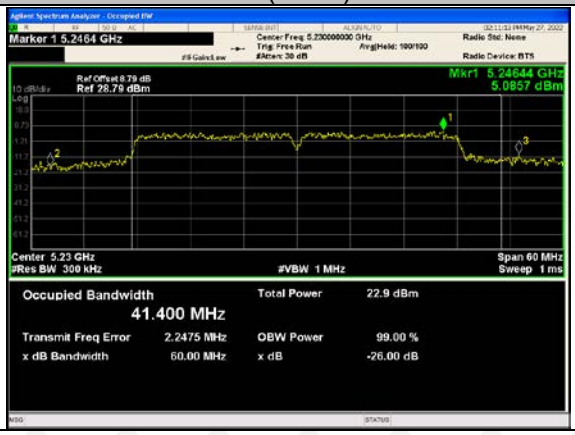
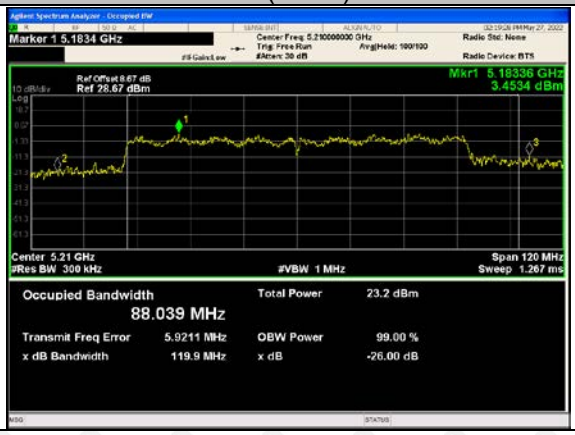


802.11ac(VH80)-5210



802.11a-5745

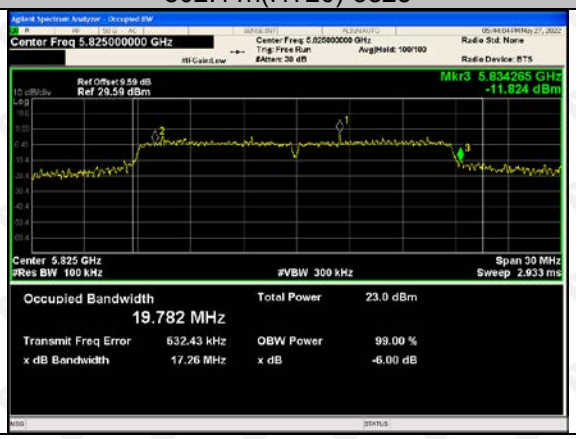
802.11a-5785

802.11a-5825

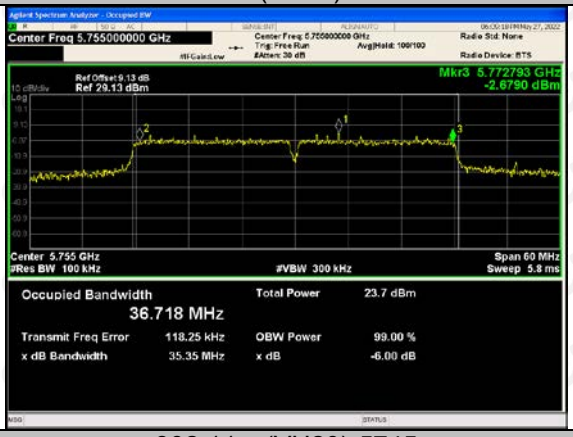
802.11n(HT20)-5745

802.11n(HT20)-5785

802.11n(HT20)-5825



802.11n(HT40)-5755



802.11n(HT40)-5795

802.11ac(VH20)-5745

802.11ac(VH20)-5785

802.11ac(VH20)-5825

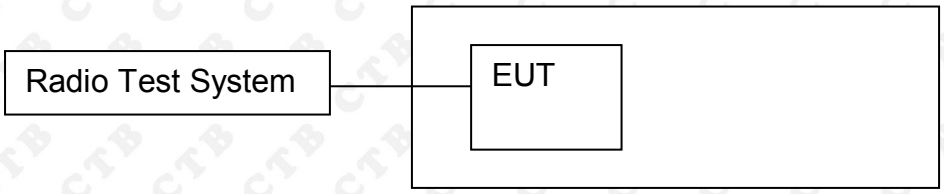
802.11ac(VH40)-5755

802.11ac(VH40)-5795

802.11ac(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.1.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.

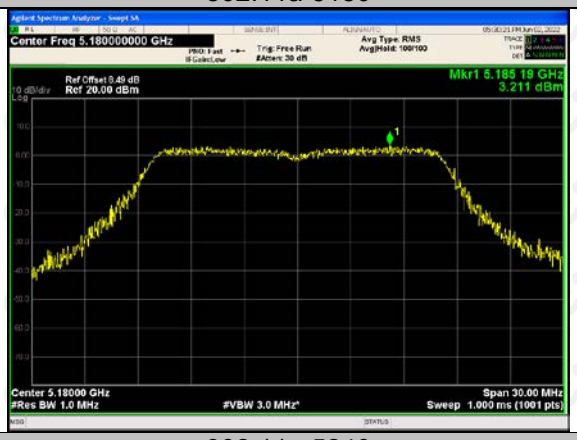
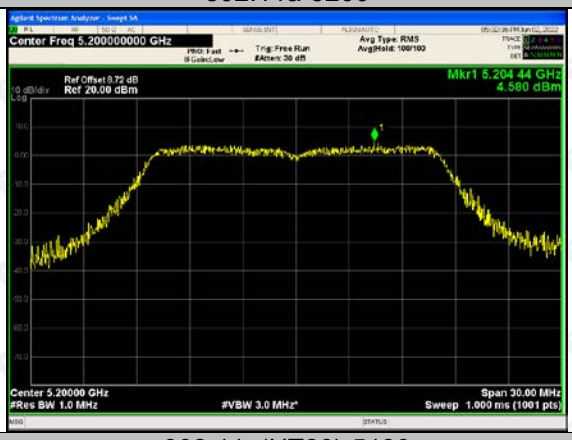
11.4 Test Result

ANT 0+1

Test mode	Test Channel (MHz)	PSD [dBm/MHz] ANT 1	PSD [dBm/MHz] ANT 2	PSD [dBm/MHz] Total	Limit (dBm)	Result
802.11a	5180	3.211	4.105	6.691	11	Pass
	5200	4.58	4.781	7.692	11	Pass
	5240	3.92	3.296	6.629	11	Pass
802.11n(HT20)	5180	3.503	3.699	6.612	11	Pass
	5200	4.251	3.903	7.091	11	Pass
	5240	4.484	4.061	7.288	11	Pass
802.11n(HT40)	5190	4.561	2.99	6.856	11	Pass
	5230	3.511	4.955	7.303	11	Pass
802.11ac(VH20)	5210	3.171	3.832	6.524	11	Pass
	5180	3.906	4.01	6.969	11	Pass
	5200	4.339	4.331	7.345	11	Pass
802.11ac(VH40)	5240	4.355	4.37	7.373	11	Pass
	5190	3.424	3.981	6.722	11	Pass
802.11ac(VH80)	5230	3.509	4.425	7.001	11	Pass

Test mode	Test Channel (MHz)	PSD [dBm/500kHz] ANT 1	PSD [dBm/500kHz] ANT 2	PSD [dBm/500kHz] Total	Limit (dBm)	Result
802.11a	5745	9.337	8.976	12.171	30	Pass
	5785	8.581	9.194	11.909	30	Pass
	5825	8.779	10.1	12.500	30	Pass
802.11n(HT20)	5745	8.482	8.973	11.745	30	Pass
	5785	8.579	8.114	11.363	30	Pass
	5825	8.538	8.875	11.720	30	Pass
802.11n(HT40)	5755	6.109	6.319	9.226	30	Pass
	5795	6.935	6.558	9.761	30	Pass
802.11ac(VH20)	5745	5.561	4.835	8.223	30	Pass
	5785	8.633	8.625	11.639	30	Pass
	5825	9.193	8.614	11.923	30	Pass
802.11ac(VH40)	5755	8.682	8.572	11.638	30	Pass
	5795	6.586	6.409	9.509	30	Pass
802.11ac(VH80)	5775	6.464	5.782	9.147	30	Pass

ANT 0

802.11a-5180	802.11a-5200
	
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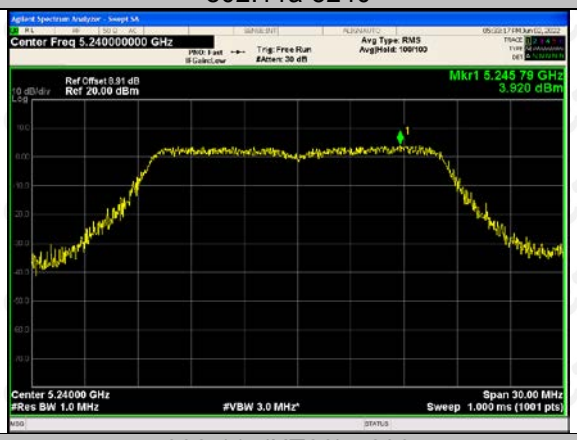	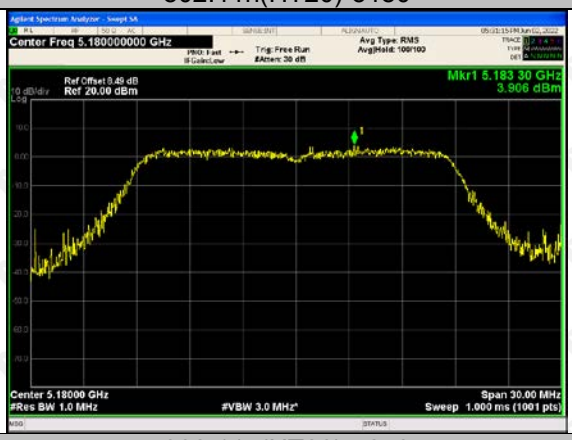
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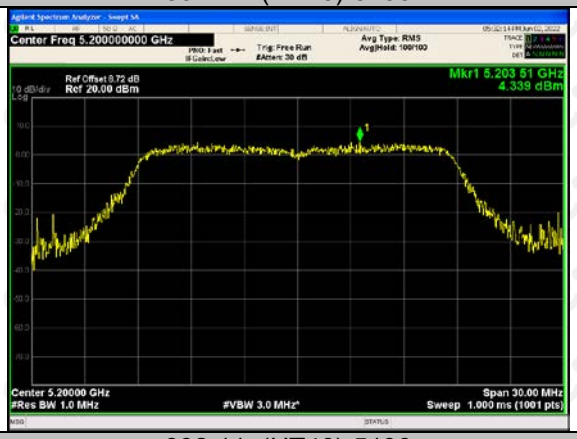	
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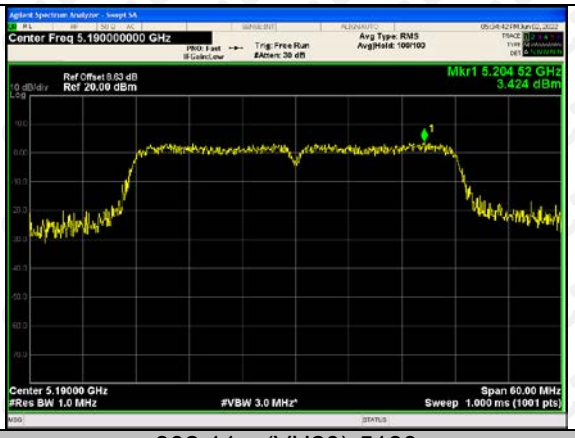
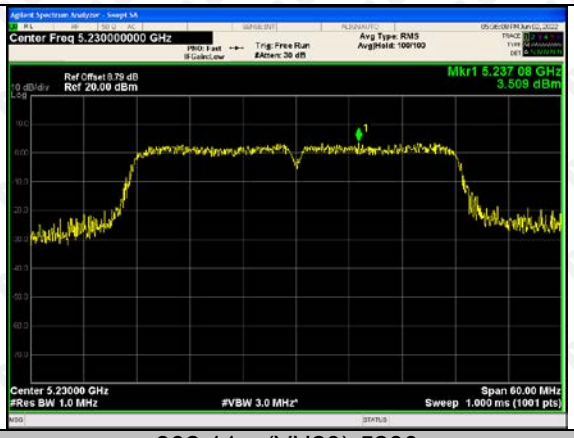


802.11ac(VH20)-5180



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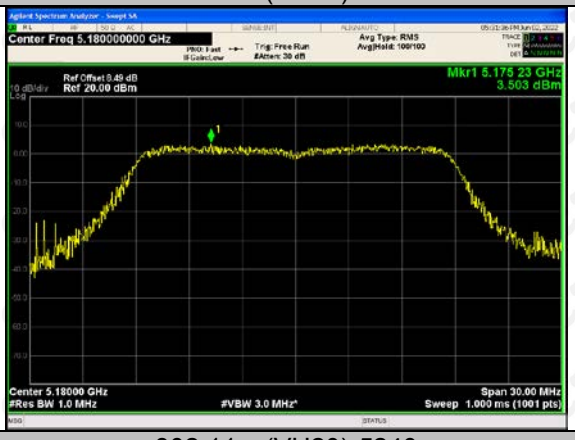
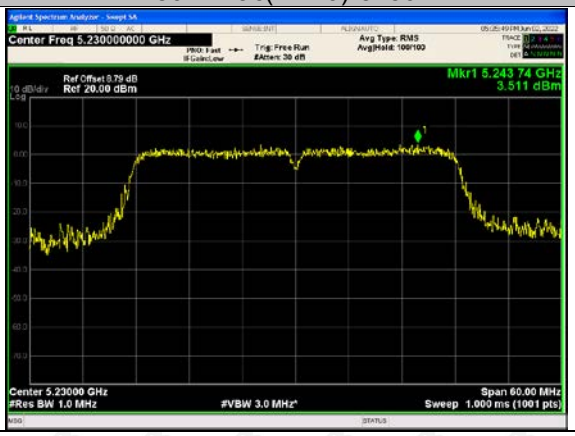


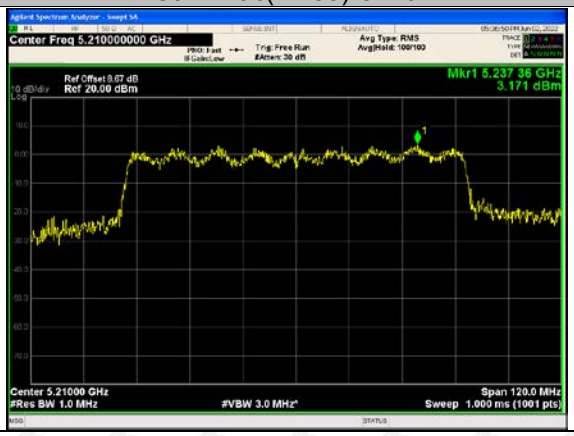
802.11ac(VH20)-5240

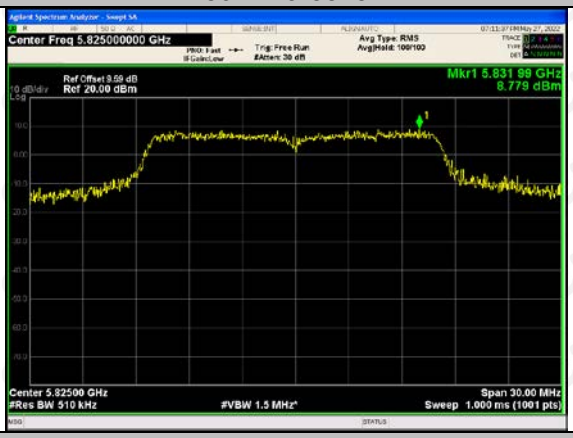
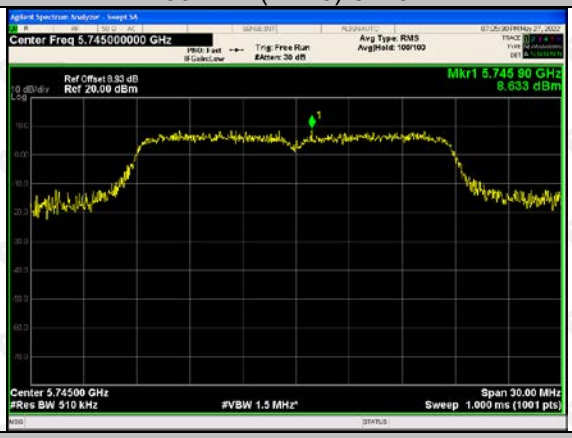
802.11ac(VH40)-5190

802.11ac(VH40)-5230

802.11ac(VH80)-5210





802.11a-5745	802.11a-5785
	
802.11a-5825	802.11n(HT20)-5745
	
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	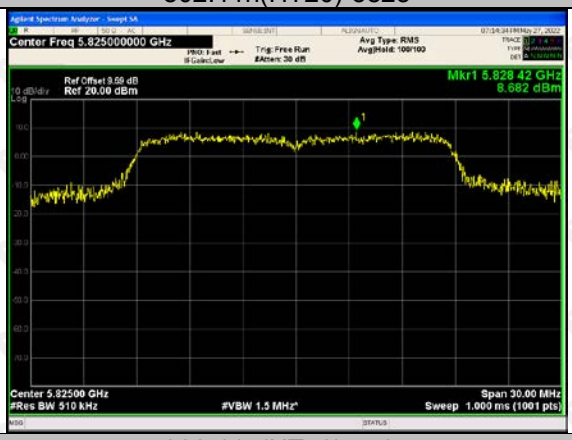
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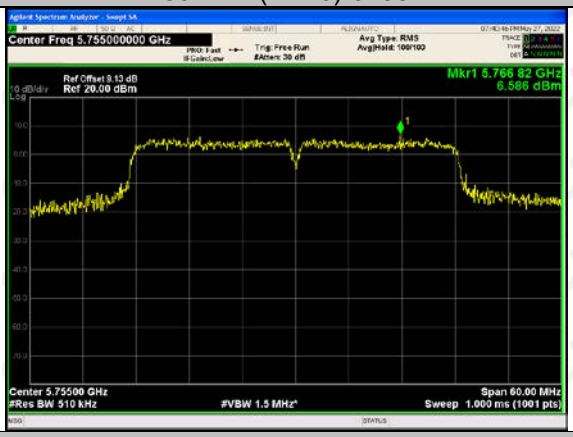	
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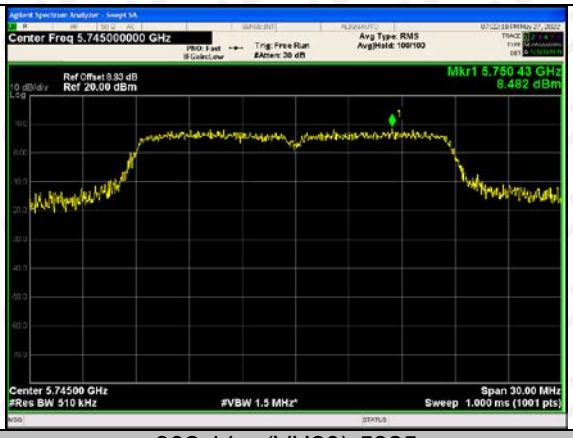
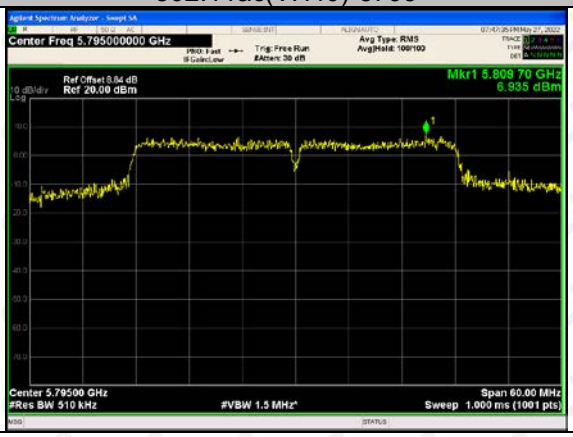


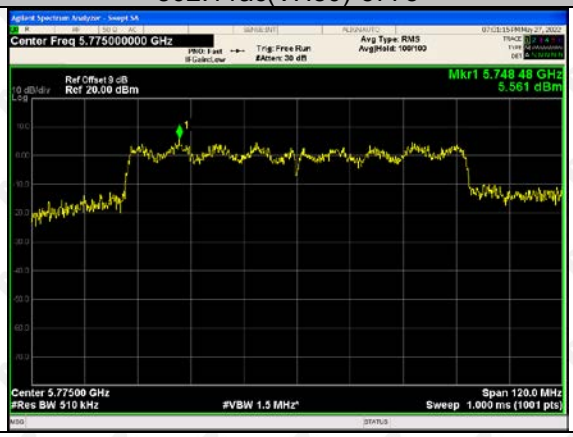
802.11ac(VH20)-5825

802.11ac(VH40)-5755

802.11ac(VH40)-5795

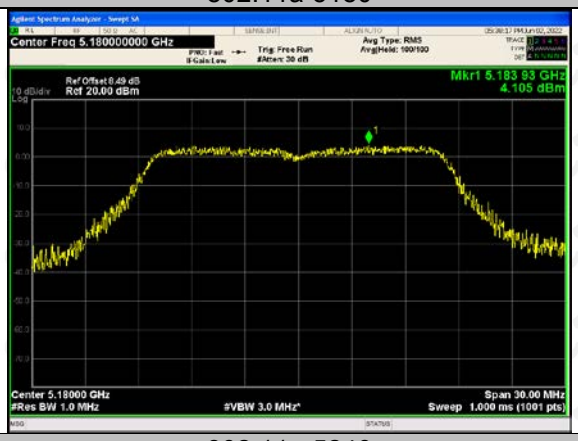
802.11ac(VH80)-5775





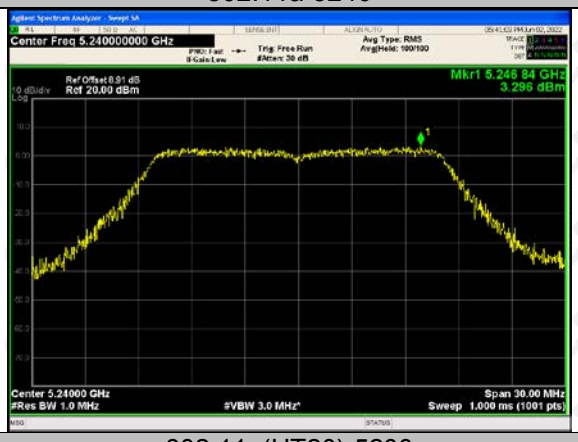
ANT 1

802.11a-5180



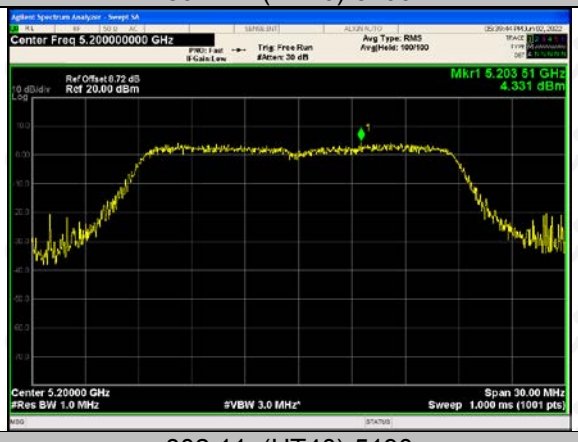
802.11a-5200

802.11a-5240



802.11n(HT20)-5180

802.11n(HT20)-5200



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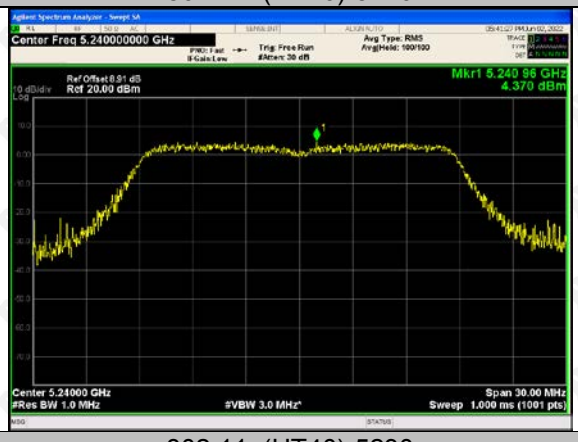
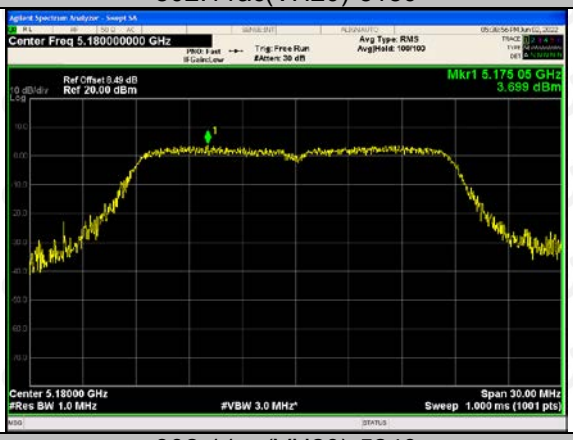
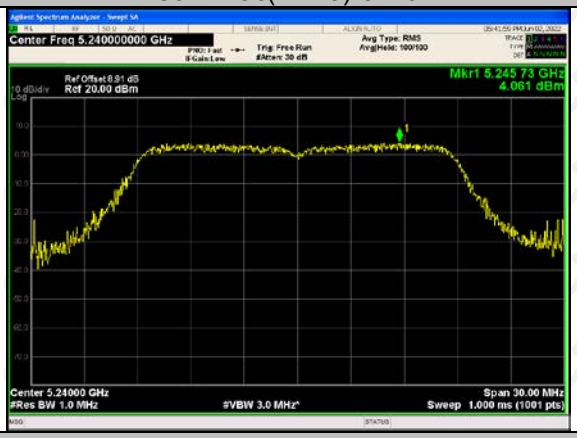
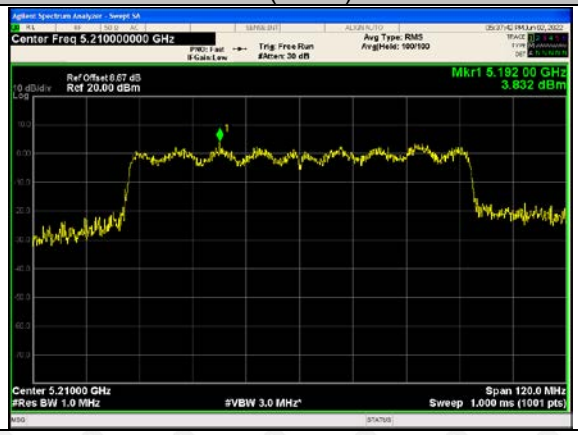
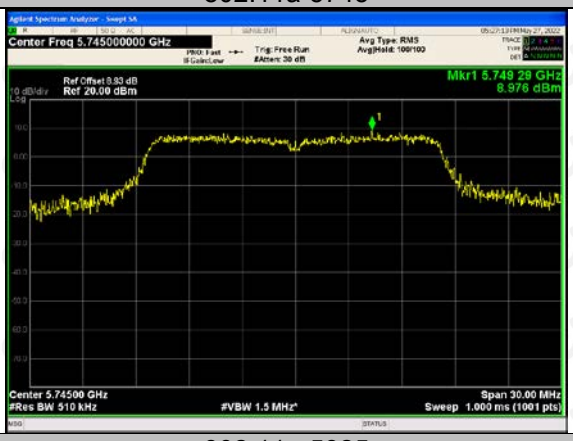


802.11n(HT40)-5190

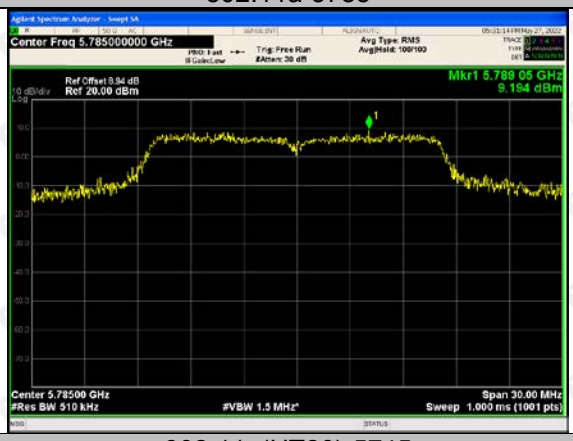
802.11n(HT40)-5230

802.11ac(VH20)-5180	802.11ac(VH20)-5200
	
802.11ac(VH20)-5240	802.11ac(VH40)-5190
	
802.11ac(VH40)-5230	802.11ac(VH80)-5210
	

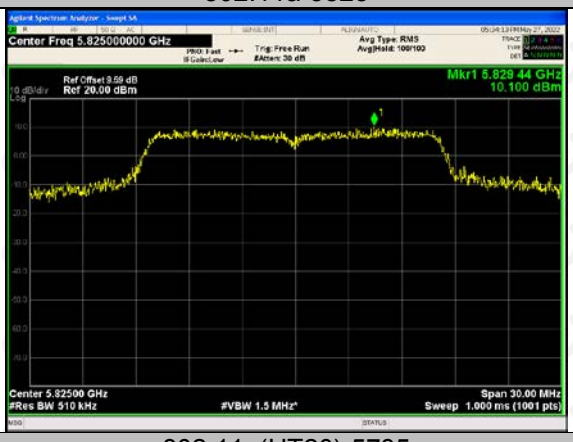
802.11a-5745



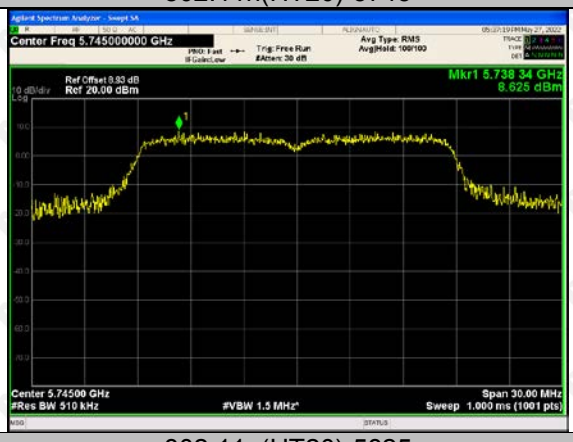
802.11a-5785



802.11a-5825



802.11n(HT20)-5745

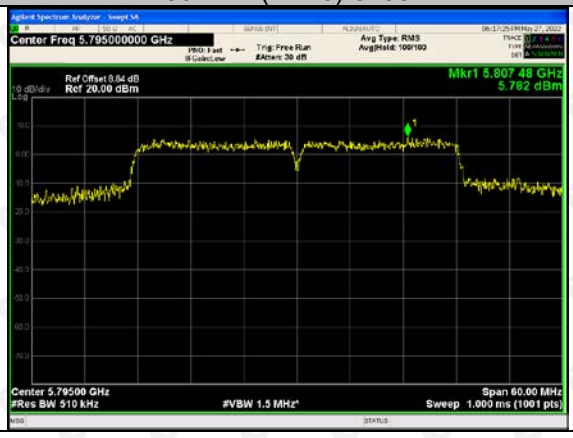


802.11n(HT20)-5785

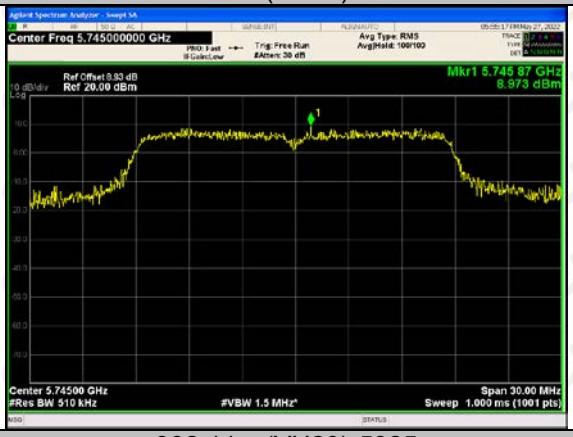
802.11n(HT20)-5825

802.11n(HT40)-5755

802.11n(HT40)-5795



802.11ac(VH20)-5745



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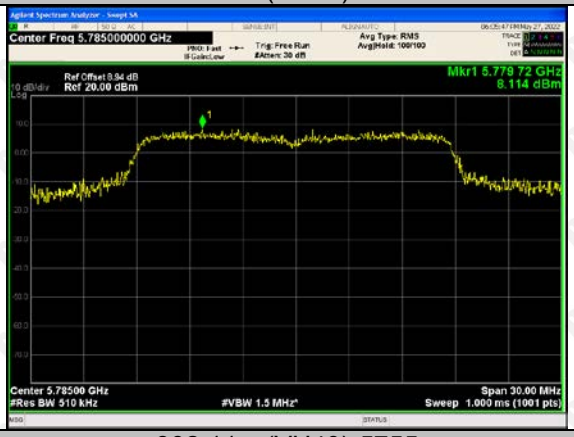
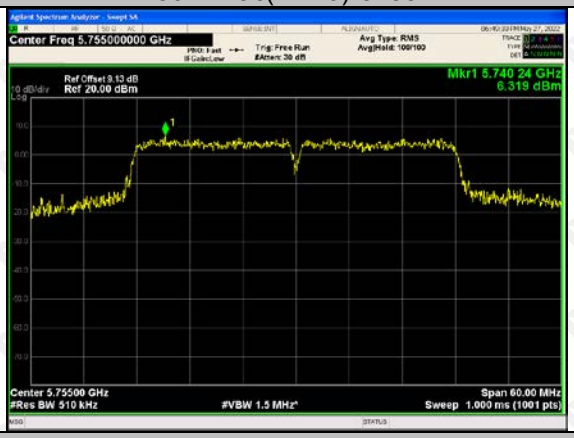
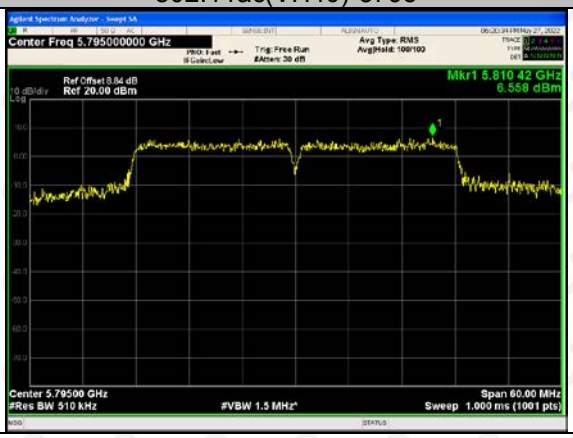


802.11ac(VH20)-5825

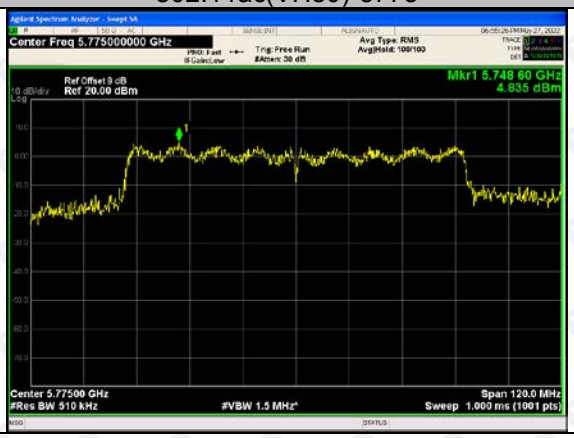
802.11ac(VH40)-5755



802.11ac(VH40)-5795

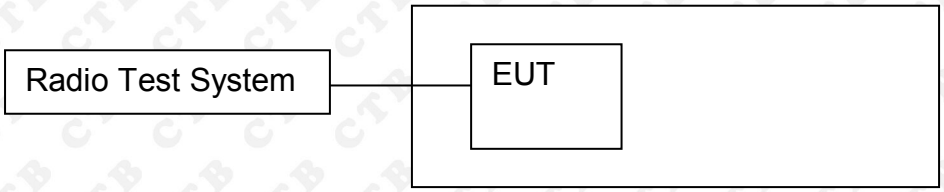


802.11ac(VH80)-5775



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

ANT0:

TX Frequency (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)	120	5180.0159	5180	0.0159	3.0695
		V max (V)	132	5180.0172	5180	0.0172	3.3205
		V min (V)	108	5180.0165	5180	0.0165	3.1853
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)	-20	5180.0149	5180	0.0149	2.8764
		T (°C)	-10	5180.0104	5180	0.0104	2.0077
		T (°C)	0	5180.0131	5180	0.0131	2.5290
		T (°C)	10	5180.0185	5180	0.0185	3.5714
		T (°C)	20	5180.0192	5180	0.0192	3.7066
		T (°C)	30	5180.0135	5180	0.0135	2.6062
		T (°C)	40	5180.0124	5180	0.0124	2.3938
		T (°C)	50	5180.0196	5180	0.0196	3.7838
		T (°C)	60	5180.0148	5180	0.0148	2.8571
		T (°C)	70	5180.0198	5180	0.0198	3.8224
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	5200.0136	5200	0.0136	2.6154
		V max (V)	132	5200.0122	5200	0.0122	2.3462
		V min (V)	108	5200.0169	5200	0.0169	3.2500
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)	-20	5200.0142	5200	0.0142	2.7308
		T (°C)	-10	5200.0123	5200	0.0123	2.3654
		T (°C)	0	5200.0124	5200	0.0124	2.3846
		T (°C)	10	5200.0132	5200	0.0132	2.5385
		T (°C)	20	5200.0125	5200	0.0125	2.4038
		T (°C)	30	5200.0128	5200	0.0128	2.4615
		T (°C)	40	5200.0135	5200	0.0135	2.5962
		T (°C)	50	5200.0117	5200	0.0117	2.2500
		T (°C)	60	5200.0198	5200	0.0198	3.8077
		T (°C)	70	5200.0123	5200	0.0123	2.3654
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	5240.0132	5240	0.0132	2.5191
		V max (V)	132	5240.0113	5240	0.0113	2.1565
		V min (V)	108	5240.0198	5240	0.0198	3.7786
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)	-20	5240.0187	5240	0.0187	3.5687
		T (°C)	-10	5240.0134	5240	0.0134	2.5573
		T (°C)	0	5240.0155	5240	0.0155	2.9580
		T (°C)	10	5240.0159	5240	0.0159	3.0344
		T (°C)	20	5240.0123	5240	0.0123	2.3473
		T (°C)	30	5240.0139	5240	0.0139	2.6527
		T (°C)	40	5240.0158	5240	0.0158	3.0153
		T (°C)	50	5240.0169	5240	0.0169	3.2252
		T (°C)	60	5240.0155	5240	0.0155	2.9580
		T (°C)	70	5240.0113	5240	0.0113	2.1565
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	5745.0135	5745	0.0135	2.3499
		V max (V)	132	5745.0123	5745	0.0123	2.1410
		V min (V)	108	5745.0156	5745	0.0156	2.7154
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)	-20	5745.0157	5745	0.0157	2.7328
		T (°C)	-10	5745.0103	5745	0.0103	1.7929
		T (°C)	0	5745.0124	5745	0.0124	2.1584
		T (°C)	10	5745.0178	5745	0.0178	3.0983
		T (°C)	20	5745.0186	5745	0.0186	3.2376
		T (°C)	30	5745.0132	5745	0.0132	2.2977
		T (°C)	40	5745.0115	5745	0.0115	2.0017
		T (°C)	50	5745.0196	5745	0.0196	3.4117
		T (°C)	60	5745.0109	5745	0.0109	1.8973
		T (°C)	70	5745.0298	5745	0.0298	5.1871
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	5785.0158	5785	0.0158	2.7312
		V max (V)	132	5785.0135	5785	0.0135	2.3336
		V min (V)	108	5785.0166	5785	0.0166	2.8695
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)	-20	5785.0183	5785	0.0183	3.1634
		T (°C)	-10	5785.0135	5785	0.0135	2.3336
		T (°C)	0	5785.0126	5785	0.0126	2.1780
		T (°C)	10	5785.0139	5785	0.0139	2.4028
		T (°C)	20	5785.0152	5785	0.0152	2.6275
		T (°C)	30	5785.0126	5785	0.0126	2.1780
		T (°C)	40	5785.0133	5785	0.0133	2.2990
		T (°C)	50	5785.0189	5785	0.0189	3.2671
		T (°C)	60	5785.0157	5785	0.0157	2.7139
		T (°C)	70	5785.0149	5785	0.0149	2.5756
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	5825.0142	5825	0.0142	2.4378
		V max (V)	132	5825.0168	5825	0.0168	2.8841
		V min (V)	108	5825.0129	5825	0.0129	2.2146
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)	-20	5825.0138	5825	0.0138	2.3691
		T (°C)	-10	5825.0135	5825	0.0135	2.3176
		T (°C)	0	5825.0159	5825	0.0159	2.7296
		T (°C)	10	5825.0147	5825	0.0147	2.5236
		T (°C)	20	5825.0195	5825	0.0195	3.3476
		T (°C)	30	5825.0105	5825	0.0105	1.8026
		T (°C)	40	5825.0174	5825	0.0174	2.9871
		T (°C)	50	5825.0188	5825	0.0188	3.2206
		T (°C)	60	5825.0156	5825	0.0156	2.6781
		T (°C)	70	5825.0178	5825	0.0178	3.0558
Limits				±20ppm			
Result				Complies			

ANT1:

TX Frequency (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)	120	5180.0169	5180	0.0169	3.2625
		V max (V)	132	5180.0189	5180	0.0189	3.6486
		V min (V)	108	5180.0198	5180	0.0198	3.8224
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)	-20	5180.0149	5180	0.0149	2.8764
		T (°C)	-10	5180.0109	5180	0.0109	2.1042
		T (°C)	0	5180.0182	5180	0.0182	3.5135
		T (°C)	10	5180.0187	5180	0.0187	3.6100
		T (°C)	20	5180.0143	5180	0.0143	2.7606
		T (°C)	30	5180.0120	5180	0.0120	2.3166
		T (°C)	40	5180.0138	5180	0.0138	2.6641
		T (°C)	50	5180.0159	5180	0.0159	3.0695
		T (°C)	60	5180.0145	5180	0.0145	2.7992
		T (°C)	70	5180.0186	5180	0.0186	3.5907
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	5200.0182	5200	0.0182	3.5000
		V max (V)	132	5200.0125	5200	0.0125	2.4038
		V min (V)	108	5200.0186	5200	0.0186	3.5769
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)	-20	5200.0134	5200	0.0134	2.5769
		T (°C)	-10	5200.0143	5200	0.0143	2.7500
		T (°C)	0	5200.0157	5200	0.0157	3.0192
		T (°C)	10	5200.0128	5200	0.0128	2.4615
		T (°C)	20	5200.0137	5200	0.0137	2.6346
		T (°C)	30	5200.0133	5200	0.0133	2.5577
		T (°C)	40	5200.0102	5200	0.0102	1.9615
		T (°C)	50	5200.0122	5200	0.0122	2.3462
		T (°C)	60	5200.0178	5200	0.0178	3.4231
		T (°C)	70	5200.0167	5200	0.0167	3.2115
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	5240.0165	5240	0.0165	3.1489
		V max (V)	132	5240.0197	5240	0.0197	3.7595
		V min (V)	108	5240.0108	5240	0.0108	2.0611
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)	-20	5240.0196	5240	0.0196	3.7405
		T (°C)	-10	5240.0157	5240	0.0157	2.9962
		T (°C)	0	5240.0166	5240	0.0166	3.1679
		T (°C)	10	5240.0147	5240	0.0147	2.8053
		T (°C)	20	5240.0189	5240	0.0189	3.6069
		T (°C)	30	5240.0140	5240	0.0140	2.6718
		T (°C)	40	5240.0178	5240	0.0178	3.3969
		T (°C)	50	5240.0179	5240	0.0179	3.4160
		T (°C)	60	5240.0106	5240	0.0106	2.0229
		T (°C)	70	5240.0128	5240	0.0128	2.4427
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	5745.0118	5745	0.0118	2.0540
		V max (V)	132	5745.0140	5745	0.0140	2.4369
		V min (V)	108	5745.0123	5745	0.0123	2.1410
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)	-20	5745.0149	5745	0.0149	2.5936
		T (°C)	-10	5745.0104	5745	0.0104	1.8103
		T (°C)	0	5745.0125	5745	0.0125	2.1758
		T (°C)	10	5745.0176	5745	0.0176	3.0635
		T (°C)	20	5745.0103	5745	0.0103	1.7929
		T (°C)	30	5745.0118	5745	0.0118	2.0540
		T (°C)	40	5745.0125	5745	0.0125	2.1758
		T (°C)	50	5745.0187	5745	0.0187	3.2550
		T (°C)	60	5745.0124	5745	0.0124	2.1584
		T (°C)	70	5745.0187	5745	0.0187	3.2550
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	5785.0157	5785	0.0157	2.7139
		V max (V)	132	5785.0152	5785	0.0152	2.6275
		V min (V)	108	5785.0195	5785	0.0195	3.3708
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)	-20	5785.0144	5785	0.0144	2.4892
		T (°C)	-10	5785.0127	5785	0.0127	2.1953
		T (°C)	0	5785.0124	5785	0.0124	2.1435
		T (°C)	10	5785.0180	5785	0.0180	3.1115
		T (°C)	20	5785.0145	5785	0.0145	2.5065
		T (°C)	30	5785.0124	5785	0.0124	2.1435
		T (°C)	40	5785.0147	5785	0.0147	2.5411
		T (°C)	50	5785.0117	5785	0.0117	2.0225
		T (°C)	60	5785.0136	5785	0.0136	2.3509
		T (°C)	70	5785.0101	5785	0.0101	1.7459
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	5825.0125	5825	0.0125	2.1459
		V max (V)	132	5825.0120	5825	0.0120	2.0601
		V min (V)	108	5825.0198	5825	0.0198	3.3991
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)	-20	5825.0187	5825	0.0187	3.2103
		T (°C)	-10	5825.0125	5825	0.0125	2.1459
		T (°C)	0	5825.0150	5825	0.0150	2.5751
		T (°C)	10	5825.0187	5825	0.0187	3.2103
		T (°C)	20	5825.0115	5825	0.0115	1.9742
		T (°C)	30	5825.0128	5825	0.0128	2.1974
		T (°C)	40	5825.0135	5825	0.0135	2.3176
		T (°C)	50	5825.0177	5825	0.0177	3.0386
		T (°C)	60	5825.0156	5825	0.0156	2.6781
		T (°C)	70	5825.0104	5825	0.0104	1.7854
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.

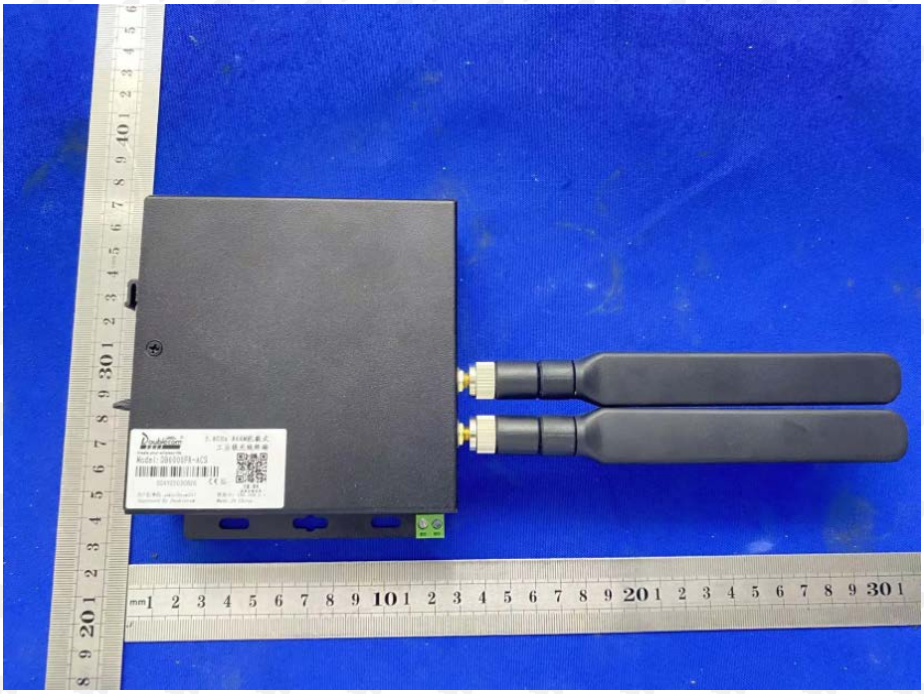
EUT Antenna:

The antenna is External Antenna and no consideration of replacement. The best case gain of the antenna is 1.0dBi.

15. EUT PHOTOGRAPHS

EUT Photo 1

EUT Photo 2



16. EUT TEST SETUP PHOTOGRAPHS

Spurious emissions

Below 1G

Above 1GHz

Conducted Emission

※※※※※ END OF REPORT ※※※※※