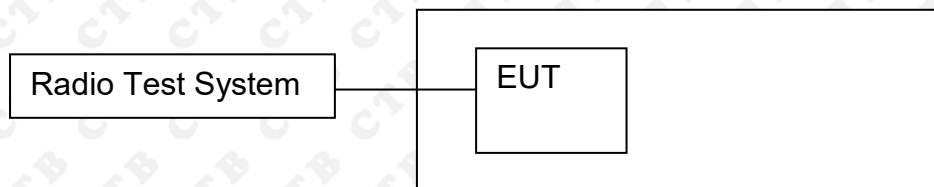


10. EMISSION BANDWIDTH& OCCUPIED BANDWIDTH

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 $11 \text{ dBm} + 10 \log B$, 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)

- Set RBW = approximately 1% of the emission bandwidth.
- Set the VBW > RBW.
- Detector = Peak.
- Trace mode = max hold.
- 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:

- Set RBW = 100 kHz.
- Set the video bandwidth (VBW) $\geq 3 * \text{RBW}$.

- 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 $\geq 3 * RBW$
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	28.062
	5200	29.106
	5240	29.3
802.11ac(VHT20)	5180	28.171
	5200	28.09
	5240	29.542
802.11ac(VHT40)	5190	52.686
	5230	58.512
802.11ac(VHT80)	5210	88.695
802.11n(HT20)	5180	27.042
	5200	28.969
	5240	28.442
802.11n(HT40)	5190	57.227
	5230	58.923

Test mode ANT 2	Test Channel (MHz)	26dB Bandwidth (MHz)
802.11a	5180	18.306
	5200	18.143
	5240	18.326
802.11ac(VHT20)	5180	19.228
	5200	19.295
	5240	19.452
802.11ac(VHT40)	5190	39.388
	5230	39.303
802.11ac(VHT80)	5210	78.881
802.11n(HT20)	5180	19.407
	5200	19.531
	5240	19.223
802.11n(HT40)	5190	39.085
	5230	39.231

5725-5850 MHz

Test mode Ant 1	Test Channel (MHz)	6dB Bandwidth (MHz)	Result
802.11a	5745	16.343	Pass
	5785	16.381	Pass
	5825	16.484	Pass
802.11ac(VHT20)	5745	17.511	Pass
	5785	17.523	Pass
	5825	17.276	Pass
802.11ac(VHT40)	5755	35.148	Pass
	5795	35.202	Pass
802.11ac(VHT80)	5775	73.853	Pass
802.11n(HT20)	5745	17.634	Pass
	5785	17.64	Pass
	5825	17.535	Pass
802.11n(HT40)	5755	35.683	Pass
	5795	35.209	Pass

Test mode Ant 2	Test Channel (MHz)	6dB Bandwidth (MHz)	Result
802.11a	5745	16.384	Pass
	5785	16.326	Pass
	5825	16.405	Pass
802.11ac(VHT20)	5745	17.659	Pass
	5785	17.268	Pass
	5825	17.354	Pass
802.11ac(VHT40)	5755	35.198	Pass
	5795	35.183	Pass
802.11ac(VHT80)	5775	72.687	Pass
802.11n(HT20)	5745	17.639	Pass
	5785	17.438	Pass
	5825	17.499	Pass
802.11n(HT40)	5755	33.989	Pass
	5795	35.159	Pass

5180-5240MHz
ANT 1

802.11a-5180



802.11a-5200



802.11a-5240



802.11ac(VHT20)-5180



802.11ac(VHT20)-5200



802.11ac(VHT20)-5240



802.11ac(VHT40)-5190

802.11ac(VHT40)-5230



802.11ac(VHT80)-5210



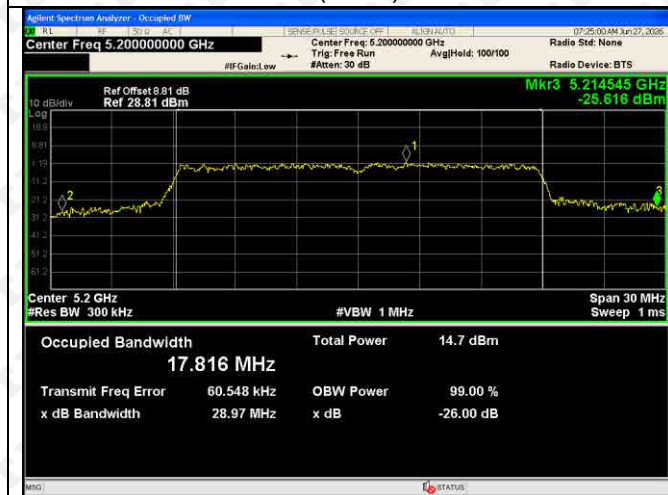
802.11n(HT20)-5180



802.11n(HT20)-5200



802.11n(HT20)-5180



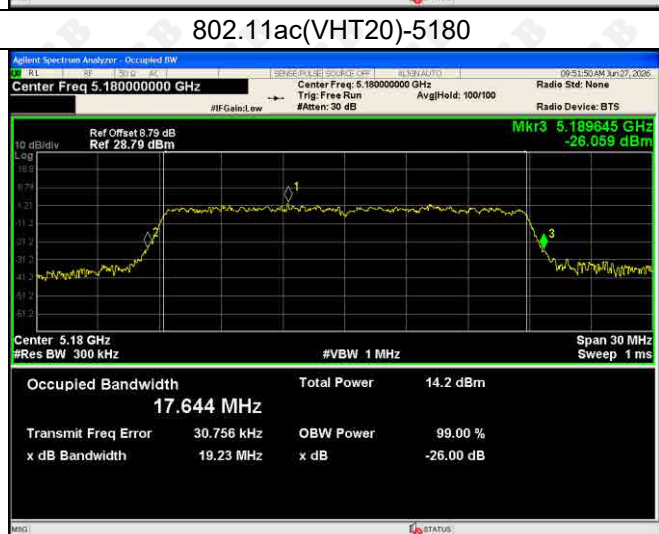
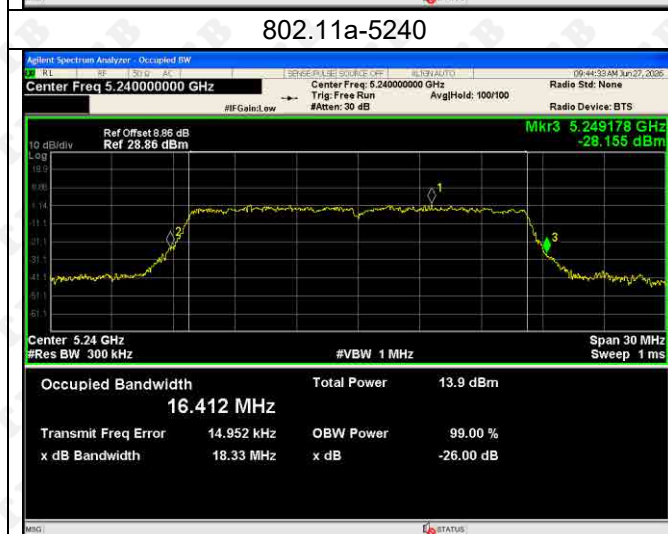
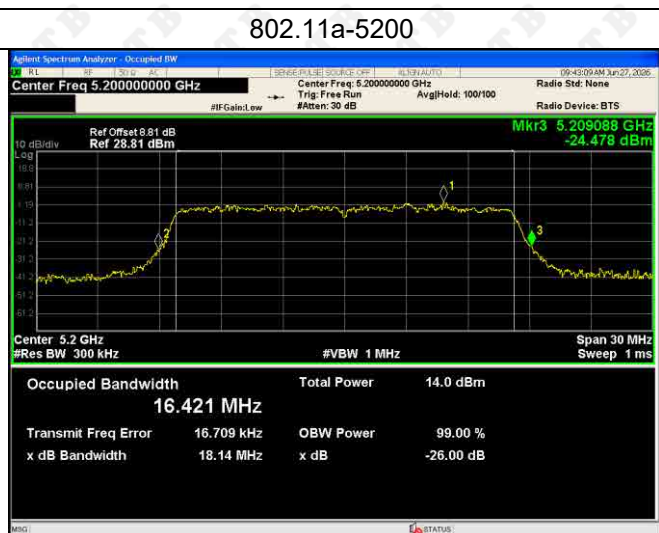
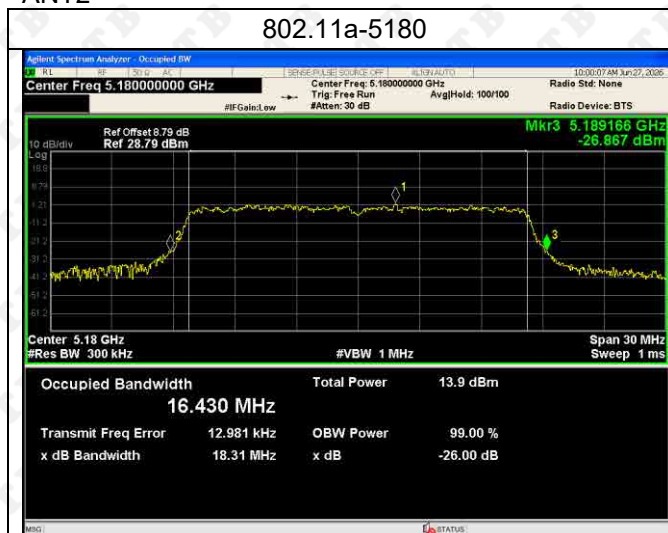
802.11n(HT40)-5190



802.11n(HT40)-5230



ANT2





802.11ac(VHT40)-5190



802.11ac(VHT40)-5230



802.11ac(VHT80)-5210



802.11ac(VHT80)-5230



802.11n(HT20)-5180



802.11n(HT20)-5240



802.11n(HT40)-5190

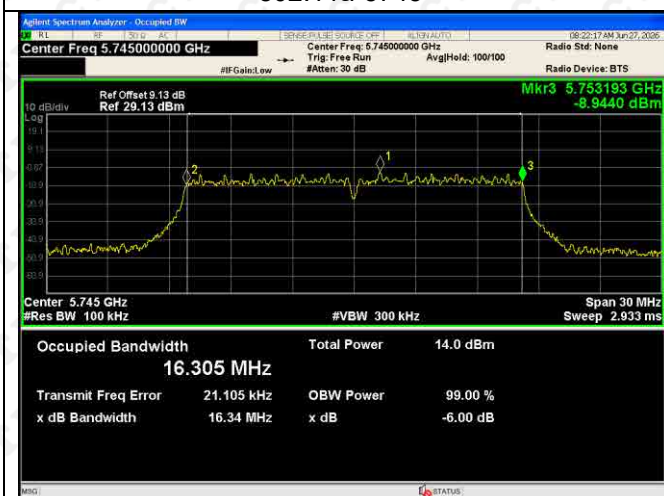


802.11n(HT40)-5230

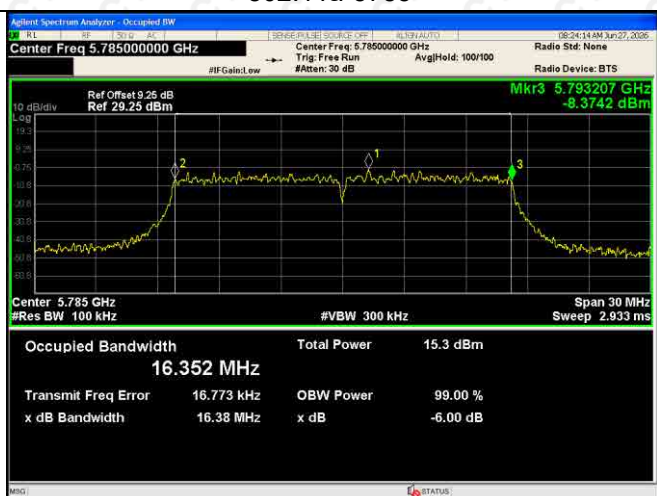


5745-5825MHz
ANT 1:

802.11a-5745



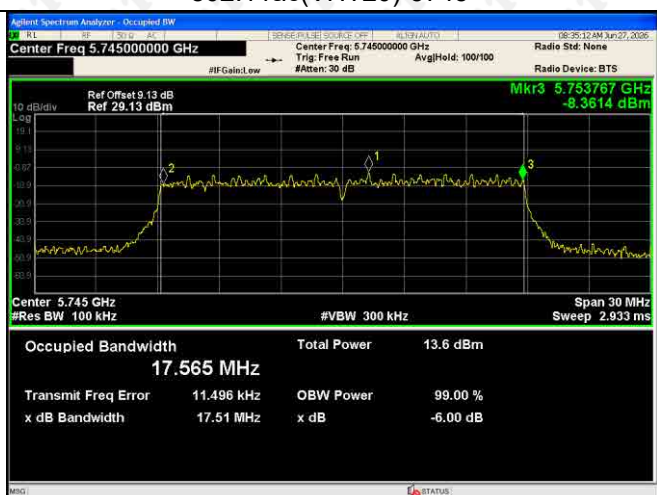
802.11a-5785



802.11a-5825



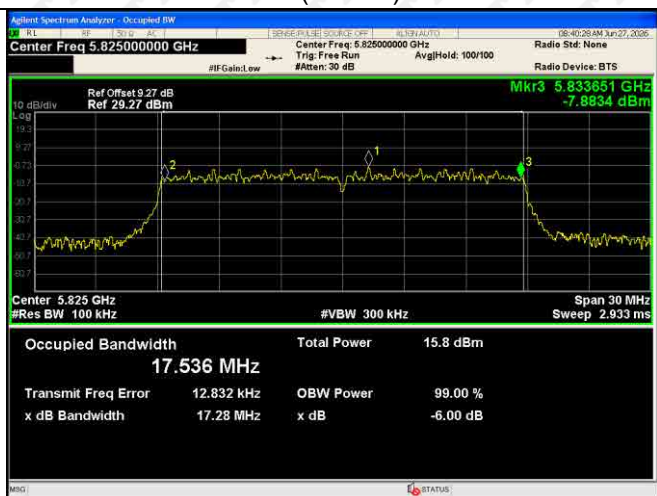
802.11ac(VHT20)-5745



802.11ac(VHT20)-5785

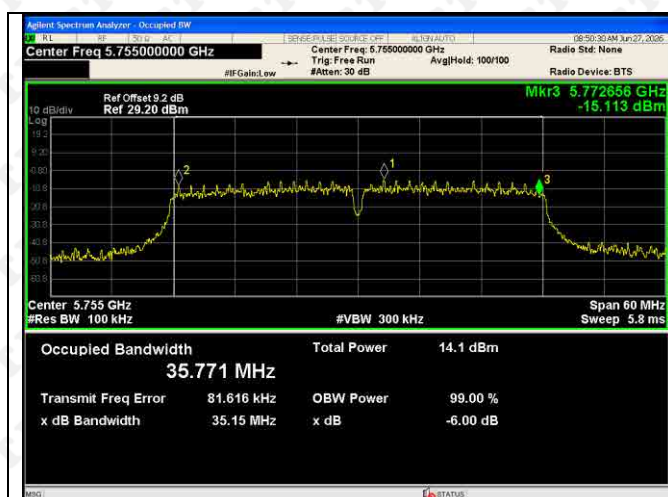


802.11ac(VHT20)-5825

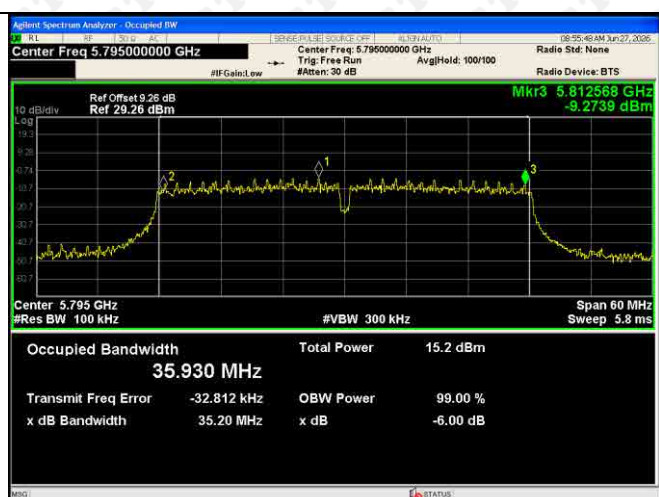


802.11ac(VHT40)-5755

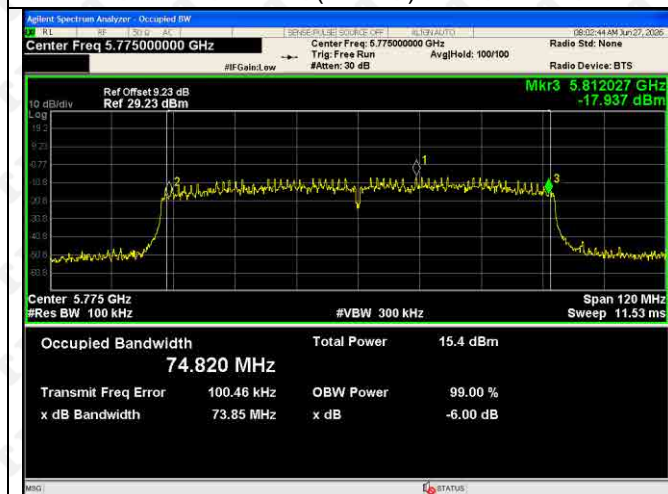
802.11ac(VHT40)-5795



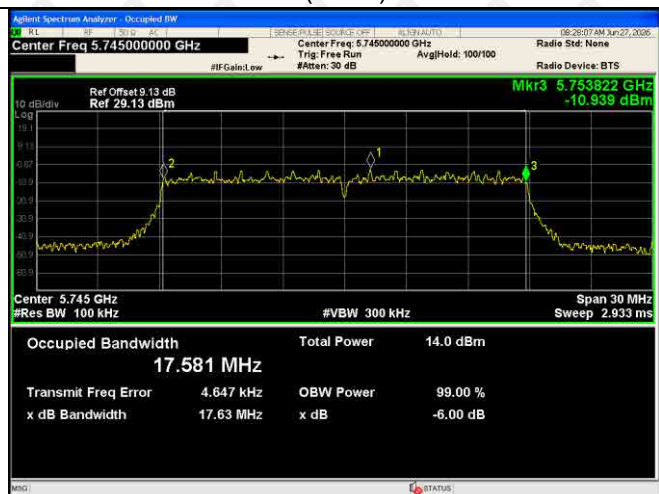
802.11ac(VHT80)-5775



802.11n(HT20)-5745



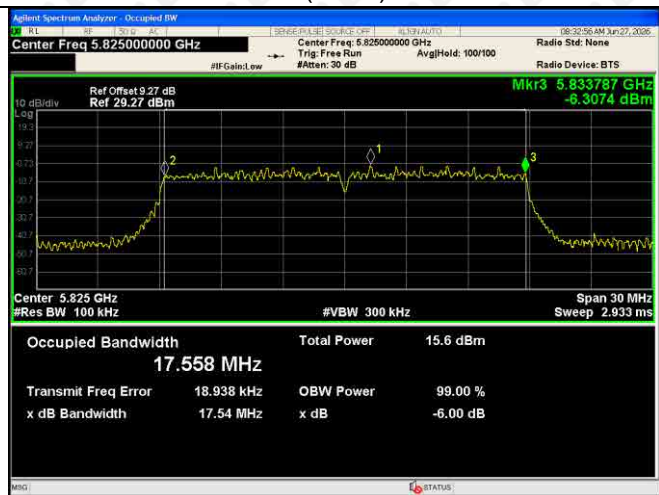
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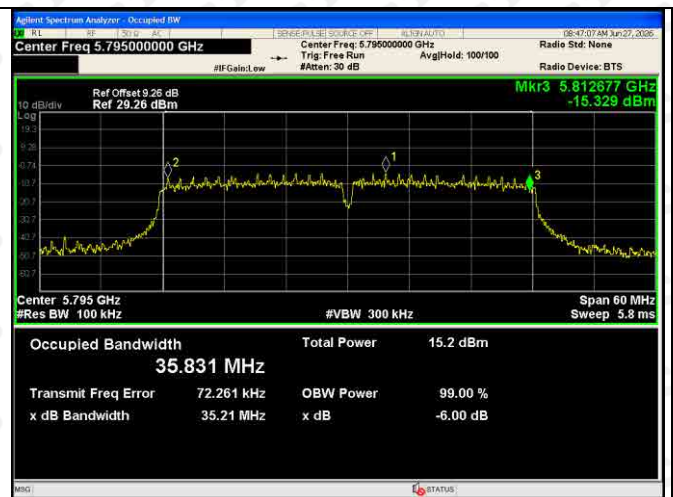
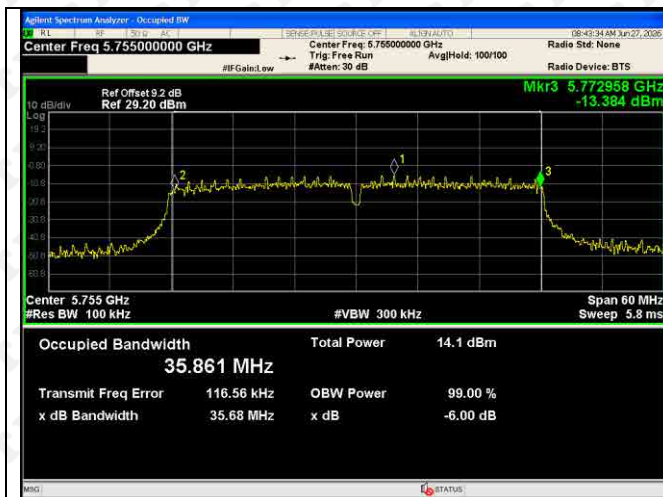
802.11n(HT20)-5745



5802.11n(HT40)-5755



802.11n(HT40)-5795

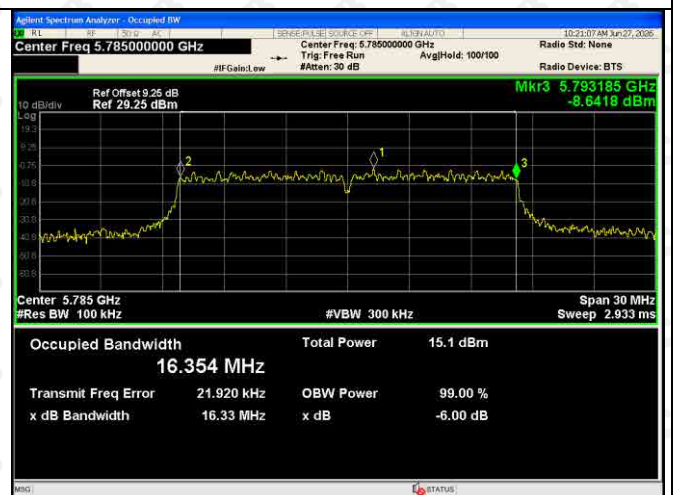


ANT2:

802.11a-5745



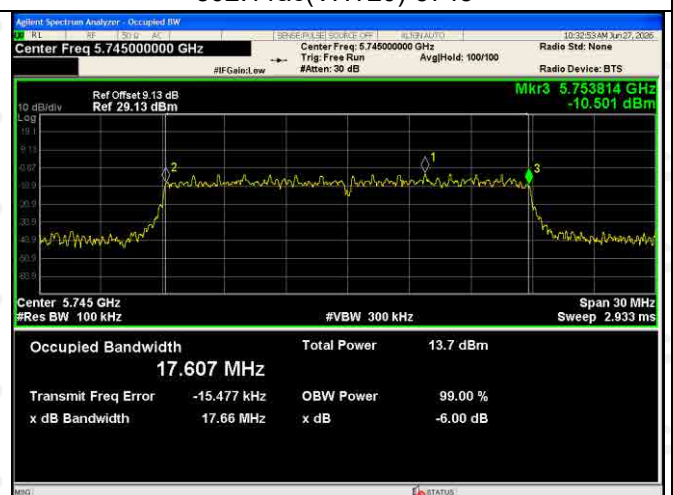
802.11a-5785



802.11a-5825



802.11ac(VHT20)-5745



802.11ac(VHT20)-5785

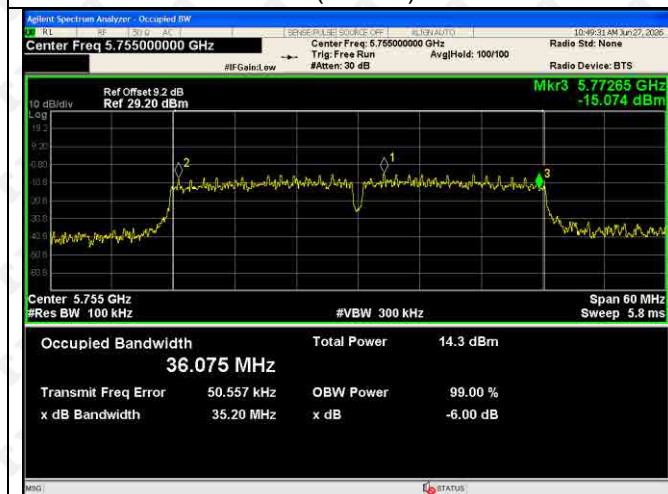
802.11ac(VHT20)-5825



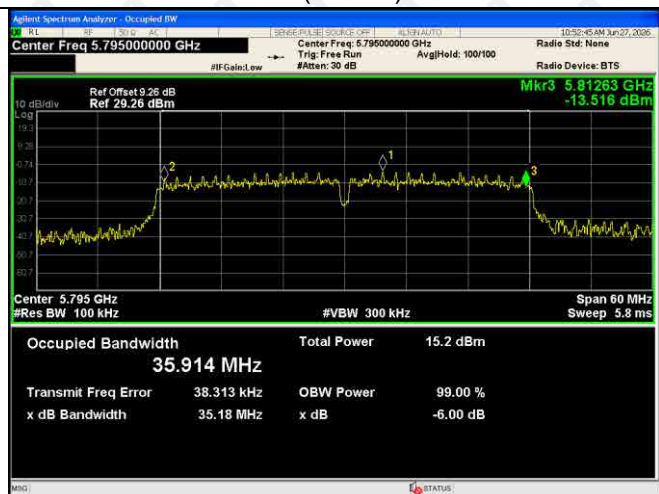
802.11ac(VHT40)-5755



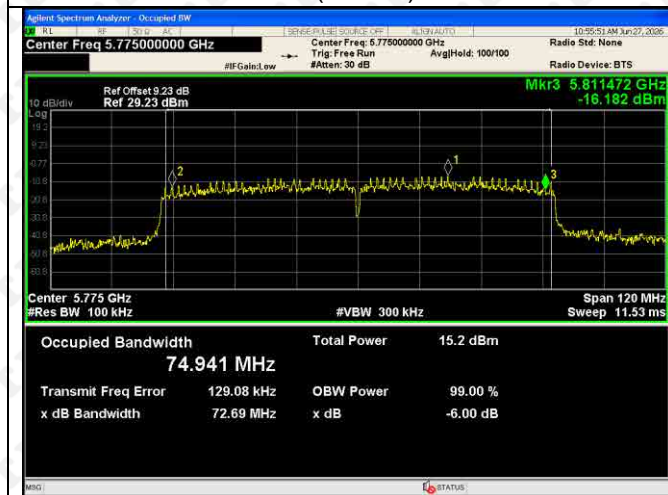
802.11ac(VHT40)-5795



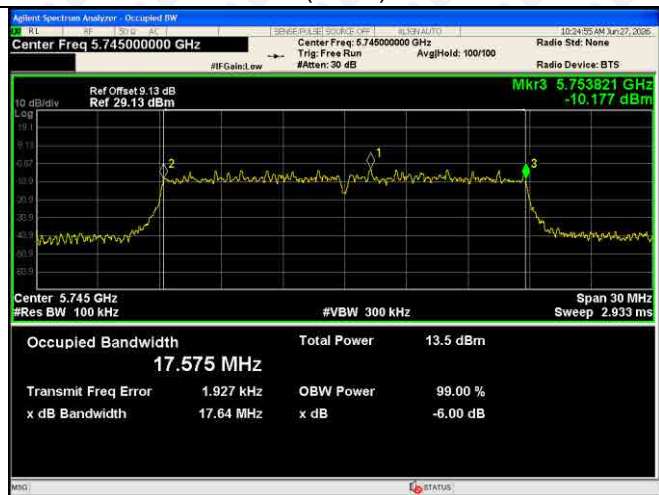
802.11ac(VHT80)-5775



802.11ac(VHT80)-5795



802.11n(HT20)-5745



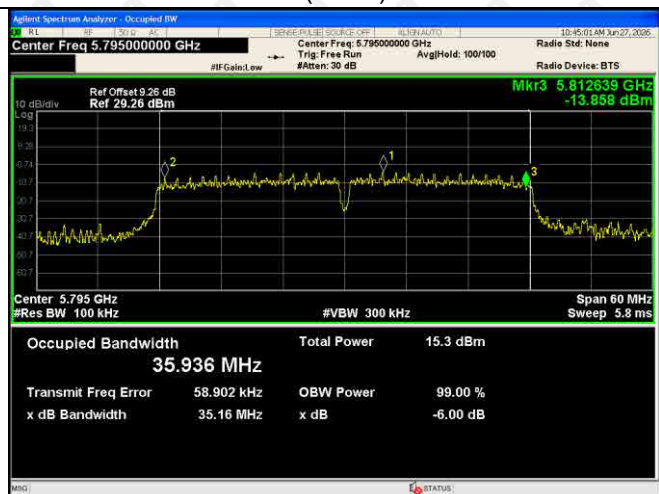
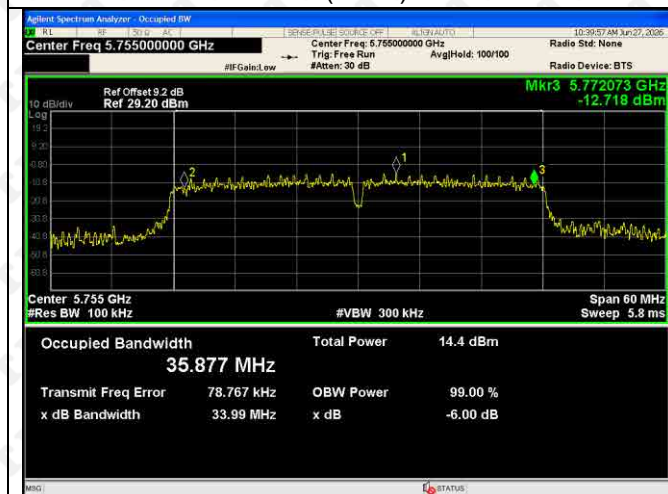
802.11n(HT20)-5785



5802.11n(HT40)-5755

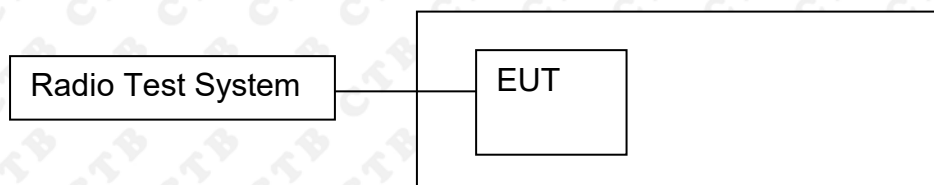


802.11n(HT40)-5795



11. POWER SPECTRAL DENSITY

11.1 Block Diagram Of Test Setup



11.2 Limit

(1) For the band 5.15-5.25 GHz.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, 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 $\text{RBW} \geq 1/T$, where T is defined in II.B.I.a).

b) Set $\text{VBW} \geq 3 \text{ RBW}$.

c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10 \log (500 \text{ kHz/RBW})$ to the measured result, whereas RBW ($< 500 \text{ kHz}$) 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 $10 \log (1 \text{ MHz/RBW})$ to the measured result, whereas RBW ($< 1 \text{ MHz}$) 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.

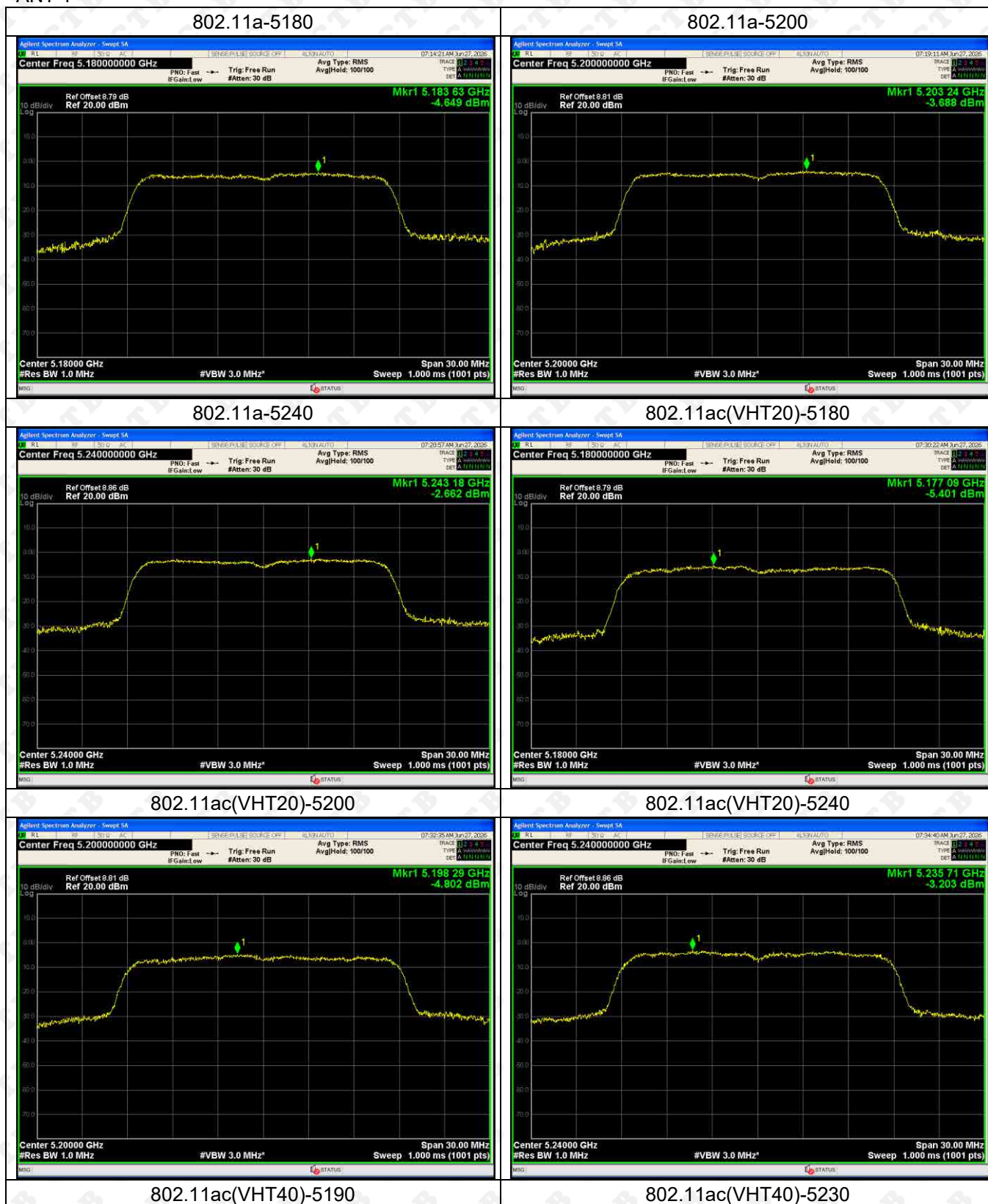
11.4 Test Result

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	-4.649	-4.3	/	11	Pass
	5200	-3.688	-4.429	/	11	Pass
	5240	-2.662	-5.035	/	11	Pass
802.11ac(VHT20)	5180	-5.401	-5.221	-2.300	11	Pass
	5200	-4.802	-5.654	-2.197	11	Pass
	5240	-3.203	-5.199	-1.077	11	Pass
802.11ac(VHT40)	5190	-8.695	-9.35	-6.000	11	Pass
	5230	-7.208	-8.627	-4.850	11	Pass
802.11ac(VHT80)	5230	-12.423	-14.013	-10.135	11	Pass
802.11n(HT20)	5180	-5.027	-4.936	-1.971	11	Pass
	5200	-4.22	-5.537	-1.818	11	Pass
	5240	-2.884	-4.739	-0.703	11	Pass
802.11n(HT40)	5190	-8.973	-9.213	-6.081	11	Pass
	5230	-7.356	-8.607	-4.926	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	-7.716	-8.575	/	30	Pass
	5785	-6.725	-6.492	/	30	Pass
	5825	-5.988	-5.956	/	30	Pass
802.11ac(VHT20)	5745	-9.006	-8.924	-5.955	30	Pass
	5785	-7.814	-7.641	-4.716	30	Pass
	5825	-6.762	-6.747	-3.744	30	Pass
802.11ac(VHT40)	5755	-12.328	-12.064	-9.184	30	Pass
	5795	-11.471	-11.422	-8.436	30	Pass
802.11ac(VHT80)	5795	-15.244	-15.225	-12.224	30	Pass
802.11n(HT20)	5775	-8.719	-8.909	-5.803	30	Pass
	5745	-6.923	-7.691	-4.280	30	Pass
	5785	-6.784	-6.41	-3.583	30	Pass
802.11n(HT40)	5825	-11.917	-11.835	-8.866	30	Pass
	5755	-11.045	-10.056	-7.512	30	Pass

5180-5240MHz
ANT 1





802.11ac(VHT80)-5210



802.11n(HT20)-5180



802.11n(HT20)-5200



802.11n(HT20)-5240



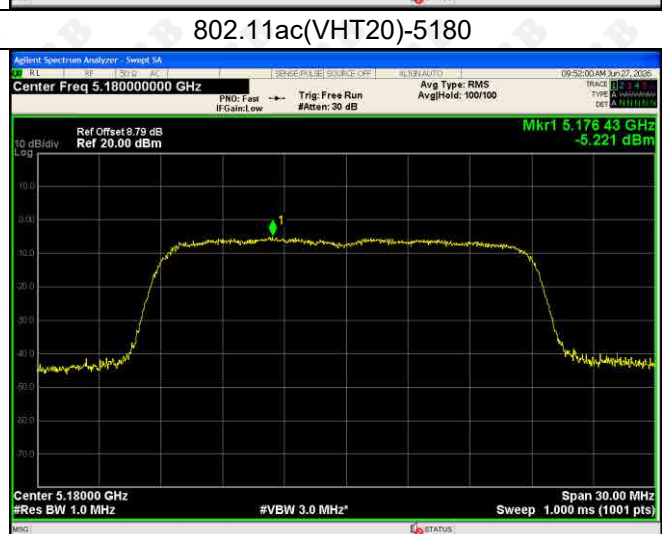
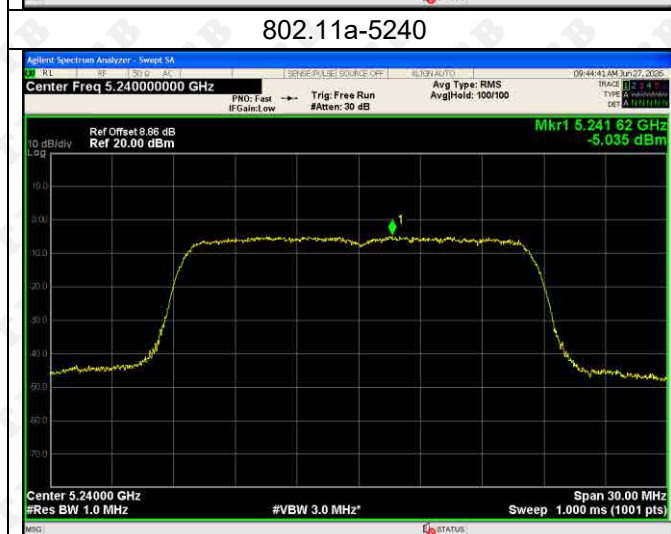
802.11n(HT40)-5190



802.11n(HT40)-5230



ANT2





802.11ac(VHT40)-5190



802.11ac(VHT40)-5230



802.11ac(VHT80)-5210



802.11n(HT20)-5180



802.11n(HT20)-5200



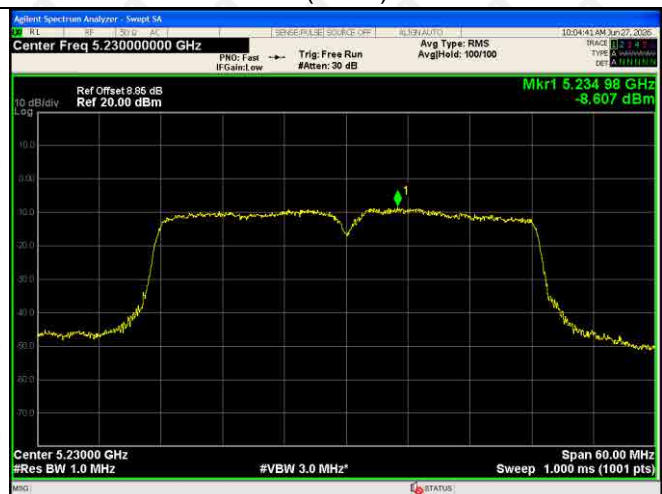
802.11n(HT20)-5240



802.11n(HT40)-5190

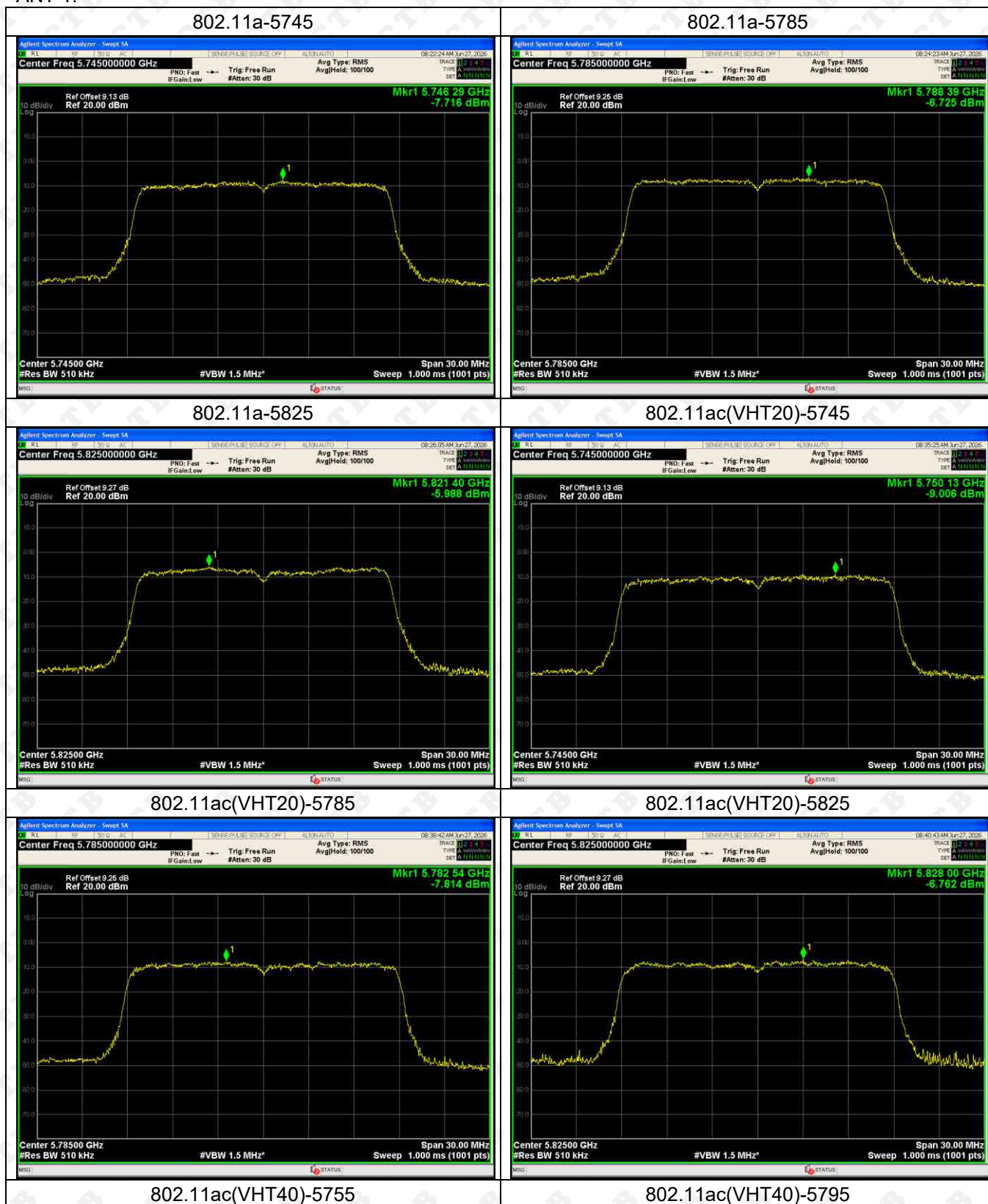


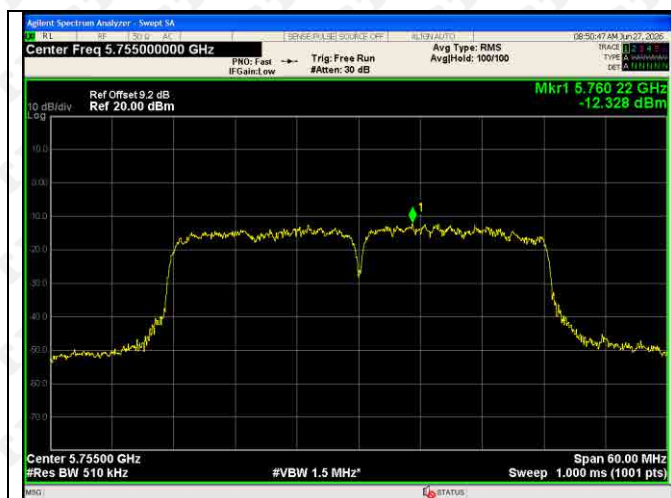
802.11n(HT40)-5230



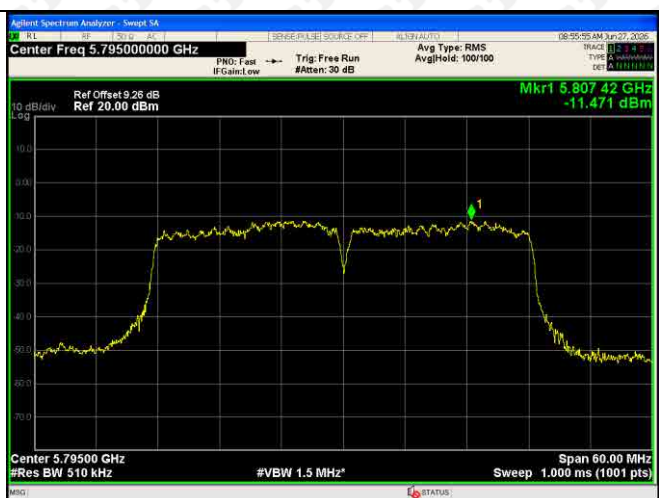
5745-5825MHz

ANT 1:





802.11ac(VHT80)-5775



802.11n(HT20)-5745



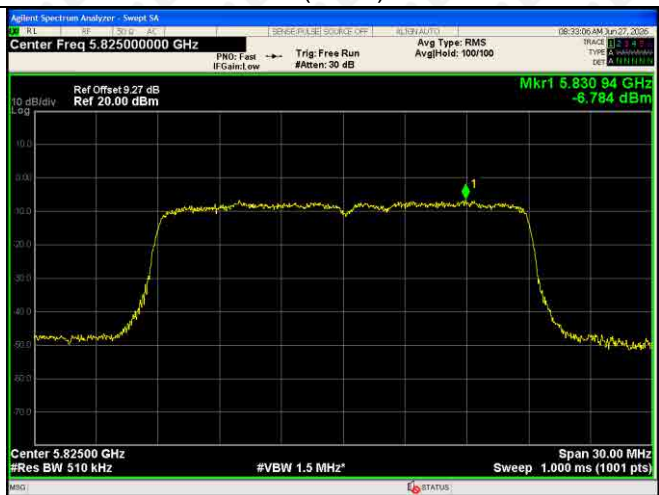
802.11n(HT20)-5785



802.11n(HT20)-5825



5802.11n(HT40)-5755

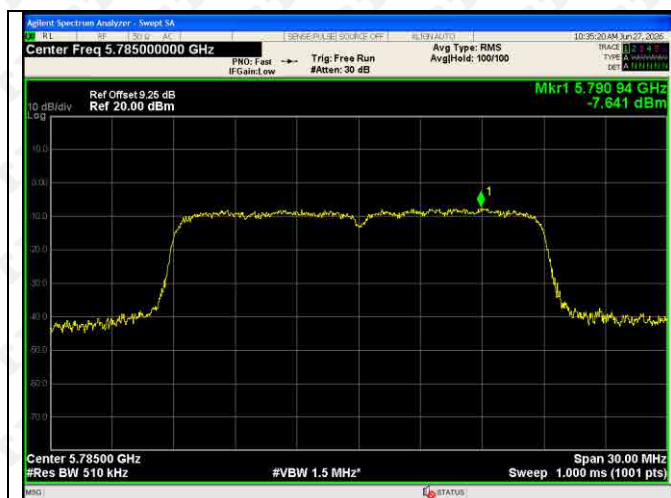


802.11n(HT40)-5795



ANT2:





802.11ac(VHT40)-5755



802.11ac(VHT40)-5795



802.11ac(VHT80)-5775



802.11n(HT20)-5745



802.11n(HT20)-5785



802.11n(HT20)-5825



5802.11n(HT40)-5755

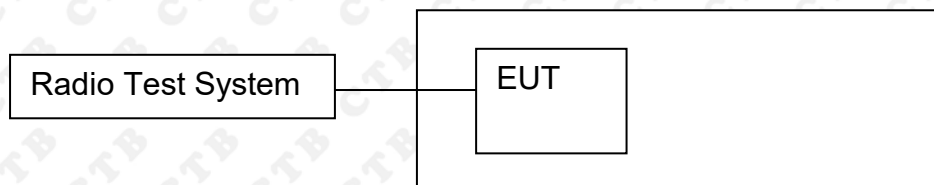


802.11n(HT40)-5795



12. FREQUENCY STABILITY

12.1 Block Diagram Of Test Setup



12.2 Limit

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

12.3 Test procedure

1. The EUT was placed inside temperature chamber and powered and powered by nominal DC voltage.
2. Set EUT as normal operation.
3. Turn the EUT on and couple its output to spectrum.
4. Turn the EUT off and set the chamber to the highest temperature specified.
5. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT and measure the operating frequency.
6. Repeat step with the temperature chamber set to the lowest temperature.

12.4 Test Result

ANT1:

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	5180.0094	5180	0.0094	1.8222
		V max (V)	132	5180.0005	5180	0.0005	0.1037
		V min (V)	108	5180.0647	5180	0.0647	12.4868
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	5180.0167	5180	0.0167	3.2161
		T (°C)	10	5180.0120	5180	0.0120	2.3212
		T (°C)	20	5180.0002	5180	0.0002	0.0458
		T (°C)	30	5180.0178	5180	0.0178	3.4277
		T (°C)	40	5180.0426	5180	0.0426	8.2219
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	5200.0004	5200	0.0004	0.0773
		V max (V)	132	5200.0505	5200	0.0505	9.7172
		V min (V)	108	5200.0206	5200	0.0206	3.9602
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	5200.0295	5200	0.0295	5.6771
		T (°C)	10	5200.0020	5200	0.0020	0.3818
		T (°C)	20	5200.0199	5200	0.0199	3.8175
		T (°C)	30	5200.0189	5200	0.0189	3.6256
		T (°C)	40	5200.0279	5200	0.0279	5.3714
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	5240.0289	5240	0.0289	5.5215
		V max (V)	132	5240.0413	5240	0.0413	7.8824
		V min (V)	108	5240.0413	5240	0.0413	7.8728
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	5240.0029	5240	0.0029	0.5549
		T (°C)	10	5240.0273	5240	0.0273	5.2020
		T (°C)	20	5240.0408	5240	0.0408	7.7803
		T (°C)	30	5240.0085	5240	0.0085	1.6229
		T (°C)	40	5240.0199	5240	0.0199	3.7940
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	5180.0321	5180	0.0321	6.1923
		V max (V)	132	5180.0533	5180	0.0533	10.2913
		V min (V)	108	5180.0725	5180	0.0725	13.9937
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	5180.0607	5180	0.0607	11.7145
		T (°C)	10	5180.0558	5180	0.0558	10.7668
		T (°C)	20	5180.0724	5180	0.0724	13.9864
		T (°C)	30	5180.0824	5180	0.0824	15.9090
		T (°C)	40	5180.0641	5180	0.0641	12.3728
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	5200.0800	5200	0.0800	15.3925
		V max (V)	132	5200.0768	5200	0.0768	14.7782
		V min (V)	108	5200.0695	5200	0.0695	13.3718
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	5200.0391	5200	0.0391	7.5096
		T (°C)	10	5200.0328	5200	0.0328	6.3061
		T (°C)	20	5200.0796	5200	0.0796	15.3094
		T (°C)	30	5200.0152	5200	0.0152	2.9231
		T (°C)	40	5200.0574	5200	0.0574	11.0398
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	5240.0590	5240	0.0590	11.2611
		V max (V)	132	5240.0718	5240	0.0718	13.7093
		V min (V)	108	5240.0001	5240	0.0001	0.0116
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	5240.0732	5240	0.0732	13.9771
		T (°C)	10	5240.0027	5240	0.0027	0.5115
		T (°C)	20	5240.0686	5240	0.0686	13.0864
		T (°C)	30	5240.0330	5240	0.0330	6.3012
		T (°C)	40	5240.0418	5240	0.0418	7.9833
Limits				±20ppm			
Result				Complies			

ANT1:

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	5745.0180	5745	0.0180	3.1341
		V max (V)	132	5745.0459	5745	0.0459	7.9936
		V min (V)	108	5745.0180	5745	0.0180	3.1341
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	5745.0175	5745	0.0175	3.0401
		T (°C)	10	5745.0697	5745	0.0697	12.1289
		T (°C)	20	5745.0928	5745	0.0928	16.1536
		T (°C)	30	5745.0055	5745	0.0055	0.9494
		T (°C)	40	5745.0925	5745	0.0925	16.1033
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	5785.0372	5785	0.0372	6.4330
		V max (V)	132	5785.0482	5785	0.0482	8.3336
		V min (V)	108	5785.0324	5785	0.0324	5.5998
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	5785.0022	5785	0.0022	0.3770
		T (°C)	10	5785.0447	5785	0.0447	7.7196
		T (°C)	20	5785.0242	5785	0.0242	4.1911
		T (°C)	30	5785.0759	5785	0.0759	13.1160
		T (°C)	40	5785.0163	5785	0.0163	2.8233
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	5825.0623	5825	0.0623	10.6986
		V max (V)	132	5825.0107	5825	0.0107	1.8330
		V min (V)	108	5825.0434	5825	0.0434	7.4445
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	5825.0827	5825	0.0827	14.1903
		T (°C)	10	5825.0413	5825	0.0413	7.0861
		T (°C)	20	5825.0802	5825	0.0802	13.7631
		T (°C)	30	5825.0333	5825	0.0333	5.7114
		T (°C)	40	5825.0711	5825	0.0711	12.2075
Limits				±20ppm			
Result				Complies			

ANT2:

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	5745.0877	5745	0.0877	15.2601
		V max (V)	132	5745.0720	5745	0.0720	12.5342
		V min (V)	108	5745.0639	5745	0.0639	11.1259
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	5745.0336	5745	0.0336	5.8421
		T (°C)	10	5745.0929	5745	0.0929	16.1780
		T (°C)	20	5745.0748	5745	0.0748	13.0222
		T (°C)	30	5745.0509	5745	0.0509	8.8668
		T (°C)	40	5745.0466	5745	0.0466	8.1199
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	5785.0920	5785	0.0920	15.9007
		V max (V)	132	5785.0313	5785	0.0313	5.4190
		V min (V)	108	5785.0097	5785	0.0097	1.6748
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	5785.0133	5785	0.0133	2.3050
		T (°C)	10	5785.0671	5785	0.0671	11.6014
		T (°C)	20	5785.0887	5785	0.0887	15.3333
		T (°C)	30	5785.0772	5785	0.0772	13.3394
		T (°C)	40	5785.0367	5785	0.0367	6.3418
		T (°C)	50	5785.0141	5785	0.0141	2.4331
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	5825.0654	5825	0.0654	11.2339
		V max (V)	132	5825.0809	5825	0.0809	13.8895
		V min (V)	108	5825.0504	5825	0.0504	8.6597
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	5825.0726	5825	0.0726	12.4634
		T (°C)	10	5825.0507	5825	0.0507	8.7050
		T (°C)	20	5825.0214	5825	0.0214	3.6673
		T (°C)	30	5825.0228	5825	0.0228	3.9130
		T (°C)	40	5825.0771	5825	0.0771	13.2322
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.

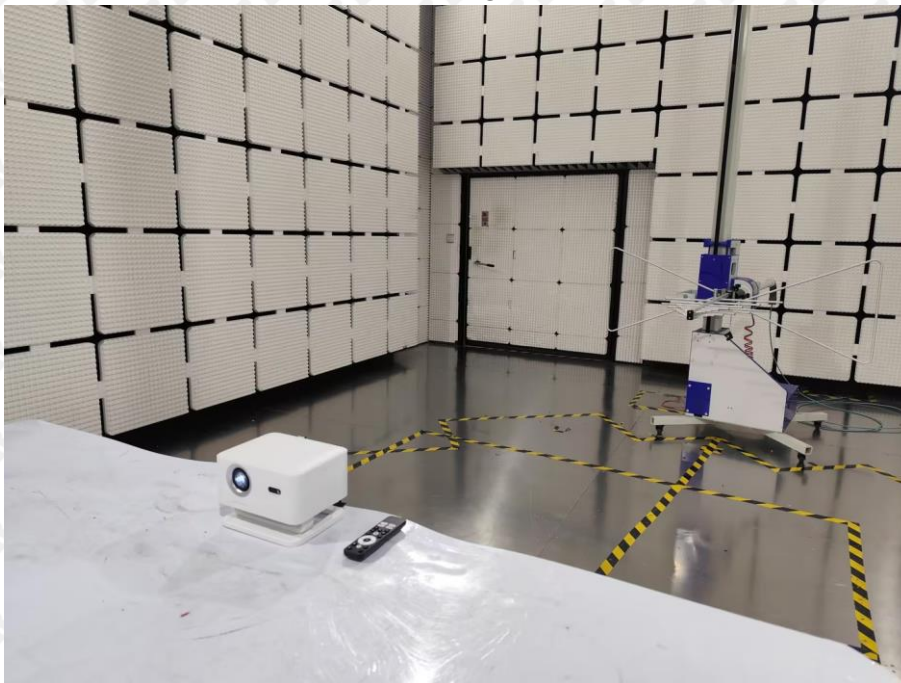
EUT Antenna:

The antenna is PCB antenna and no consideration of replacement. The best case gain of the antenna is WiFi (5.2G):Ant1: 3.98dBi, Ant2: 3.77dBi, WiFi (5.8G):Ant1: 5.81dBi, Ant2: 2.63dBi.

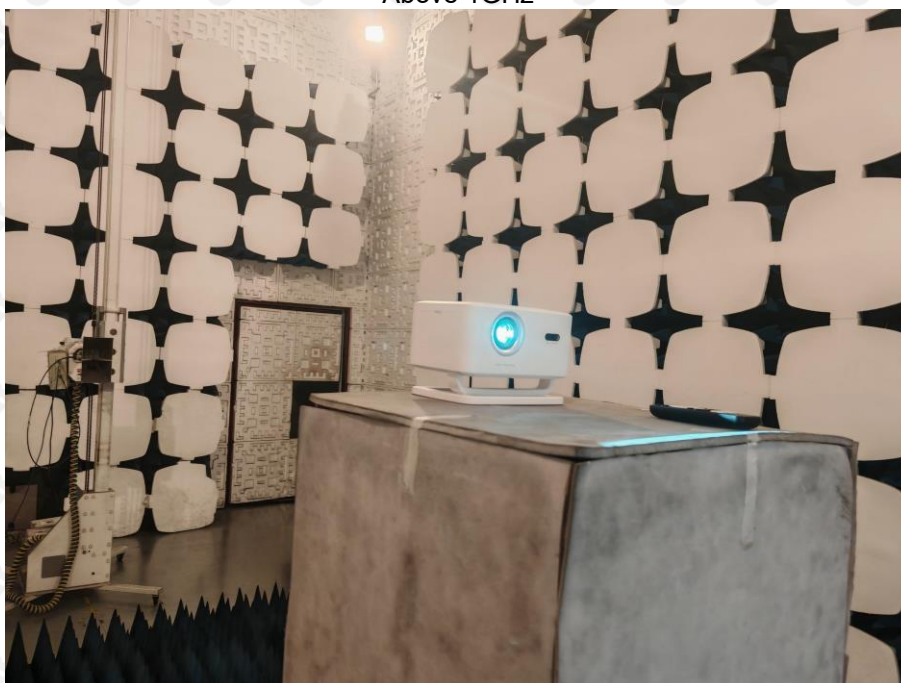
15. EUT TEST SETUP PHOTOGRAPHS

Spurious emissions

Below 1GHz



Above 1GHz



Conducted Emission



***** END OF REPORT *****