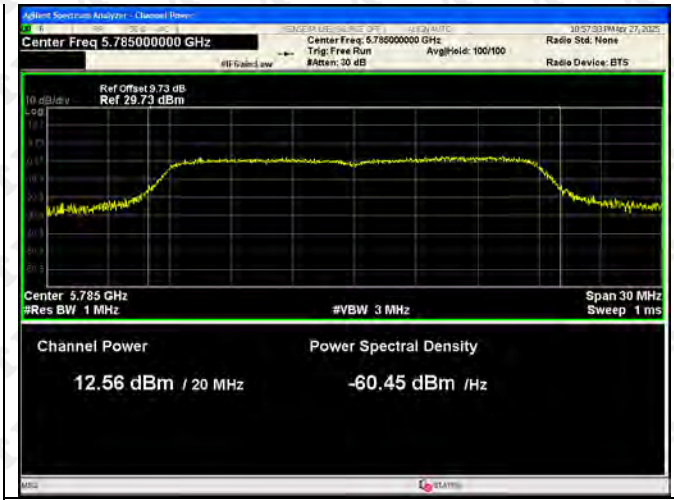
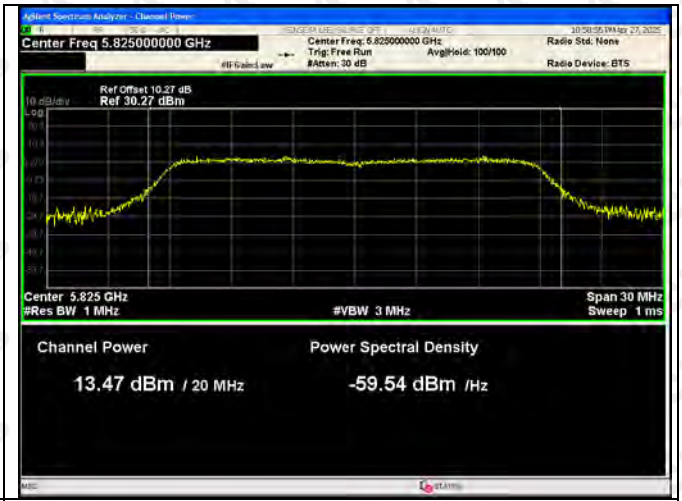
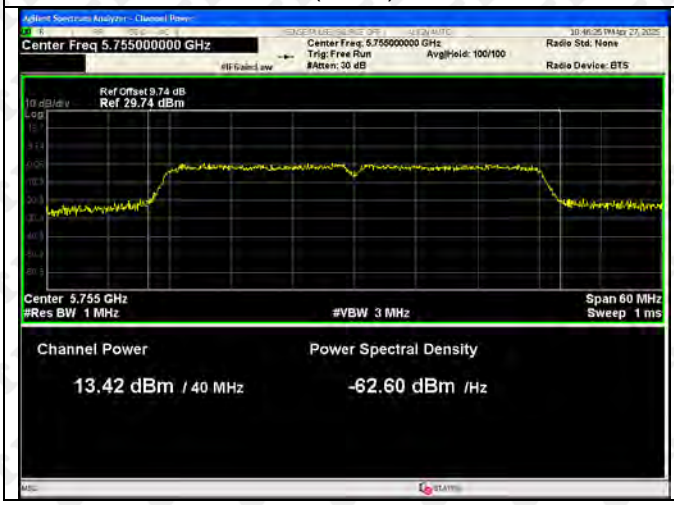
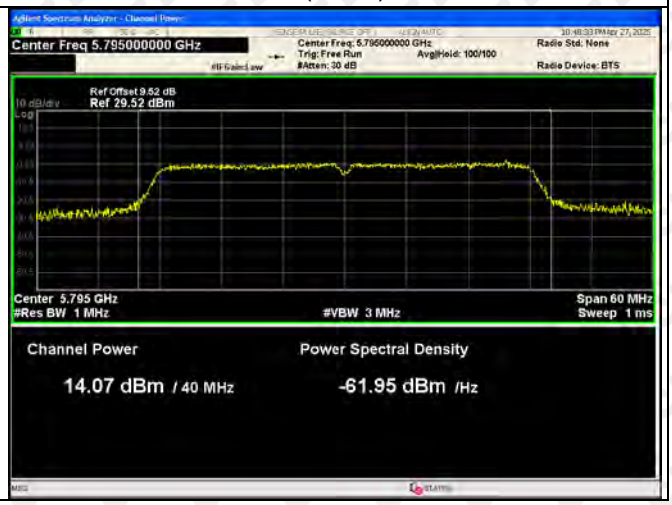


802.11n(HT40)-5795



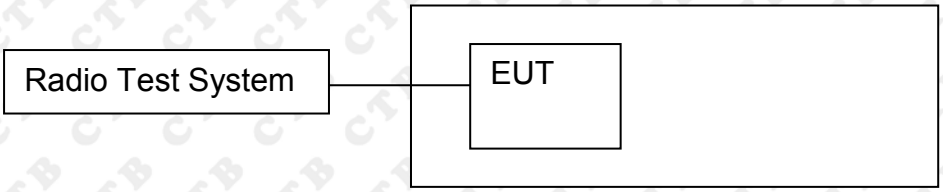
802.11n(HT40)-5825





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

5150-5250MHz:
module1 Worst mode:

Test mode	Test Channel (MHz)	26dB Bandwidth (MHz)
802.11a	5180	23.244
	5200	23.765
	5240	23.571
802.11ac20	5180	25.411
	5200	22.648
	5240	21.95
802.11ac40	5190	55.255
	5230	55.003
802.11ac80	5210	89.449
802.11n20	5180	21.441
	5200	21.471
	5240	20.969
802.11n40	5190	54.986
	5230	44.583

5150-5250MHz:
module2 (OPS computer) Worst mode:

Test mode	Test Channel (MHz)	26dB Bandwidth (MHz)
802.11a	5180	21.228
	5200	21.645
	5240	21.462
802.11ac20	5180	21.842
	5200	21.857
	5240	21.784
802.11ac40	5190	50.975
	5230	51.999
802.11ac80	5210	84.271
802.11n20	5180	20.723
	5200	21.743
	5240	21.302
802.11n40	5190	48.308
	5230	40.924

5250-5350 MHz:
module1 Worst mode:

Test mode	Test Channel (MHz)	26dB Bandwidth (MHz)
802.11a	5260	21.742
	5280	20.844
	5320	23.607
802.11ac20	5260	21.908
	5280	22.652
	5320	21.9
802.11ac40	5270	40.587
	5310	49.255
802.11ac80	5290	81.328
802.11n(HT20)	5260	21.546
	5280	21.367
	5320	26.212
802.11n(HT40)	5270	40.124
	5310	46.054

5250-5350 MHz:
module2 (OPS computer) Worst mode:

Test mode	Test Channel (MHz)	26dB Bandwidth (MHz)
802.11a	5260	20.895
	5280	20.762
	5320	21.419
802.11ac20	5260	21.883
	5280	21.809
	5320	22.578
802.11ac40	5270	39.911
	5310	42.57
802.11ac80	5290	80.264
802.11n(HT20)	5260	20.83
	5280	21.254
	5320	21.108
802.11n(HT40)	5270	40.785
	5310	40.25

5470-5725MHz:
module1 Worst mode:

Test mode	Test Channel (MHz)	26dB Bandwidth (MHz)
802.11a	5500	21.996
	5580	21.382
	5700	26.466
802.11ac20	5500	22.517
	5580	22.078
	5700	27.322
802.11ac40	5510	56.273
	5670	57.184
802.11ac80	5530	81.7
802.11n(HT20)	5500	22.675
	5580	21.232
	5700	26.496
802.11n(HT40)	5510	41.339
	5670	50.655

5470-5725MHz:
module2 (OPS computer) Worst mode:

Test mode	Test Channel (MHz)	26dB Bandwidth (MHz)
802.11a	5500	22.036
	5580	21.574
	5700	26.087
802.11ac20	5500	22.415
	5580	22.792
	5700	25.759
802.11ac40	5510	54.587
	5670	50.908
802.11ac80	5530	79.448
802.11n(HT20)	5500	21.944
	5580	21.251
	5700	26.116
802.11n(HT40)	5510	41.519
	5670	47.832

5725-5850MHz:
module1 Worst mode:

Test mode	Test Channel (MHz)	6dB Bandwidth (MHz)
802.11a	5745	16.495
	5785	16.51
	5825	16.527
802.11ac20	5745	17.748
	5785	17.71
	5825	17.758
802.11ac40	5755	36.418
	5795	36.387
802.11ac80	5775	76.247
802.11n20	5745	17.72
	5785	17.716
	5825	17.727
802.11n40	5755	36.525
	5795	36.525

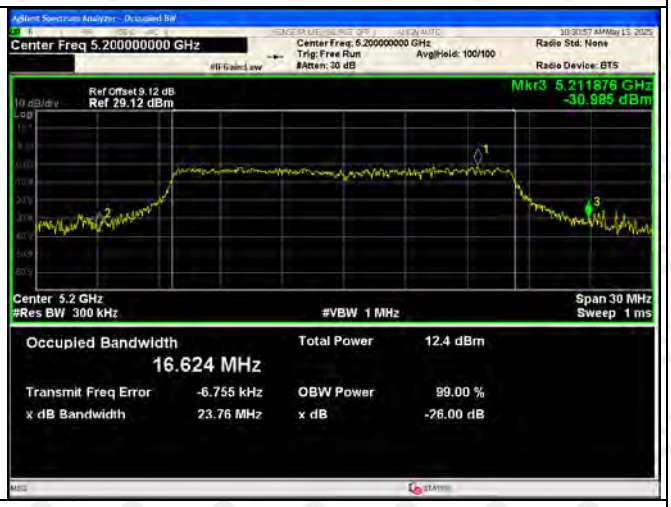
5725-5850MHz:
module2 (OPS computer) Worst mode:

Test mode	Test Channel (MHz)	6dB Bandwidth (MHz)
802.11a	5745	16.512
	5785	16.514
	5825	16.542
802.11ac20	5745	17.812
	5785	17.791
	5825	17.808
802.11ac40	5755	36.412
	5795	36.481
802.11ac80	5775	76.201
802.11n20	5745	17.709
	5785	17.727
	5825	17.731
802.11n40	5755	36.583
	5795	36.557

Test Graph:
5150-5250MHz-Power
module1 Worst mode:

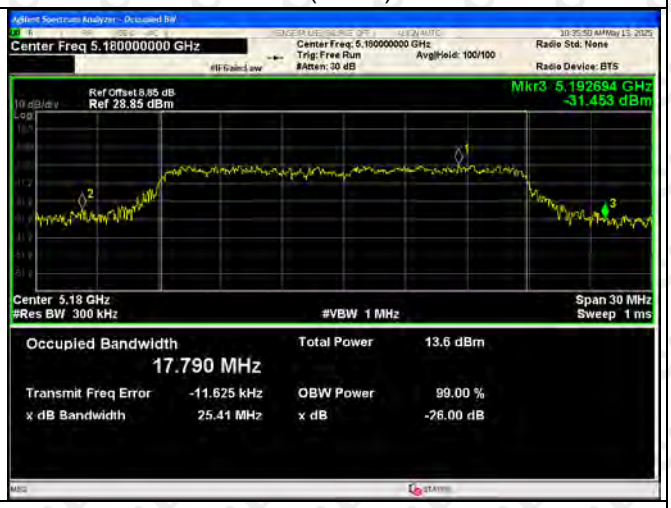
802.11a-5180

802.11a-5200



802.11a-5240

802.11ac(VH20)-5180

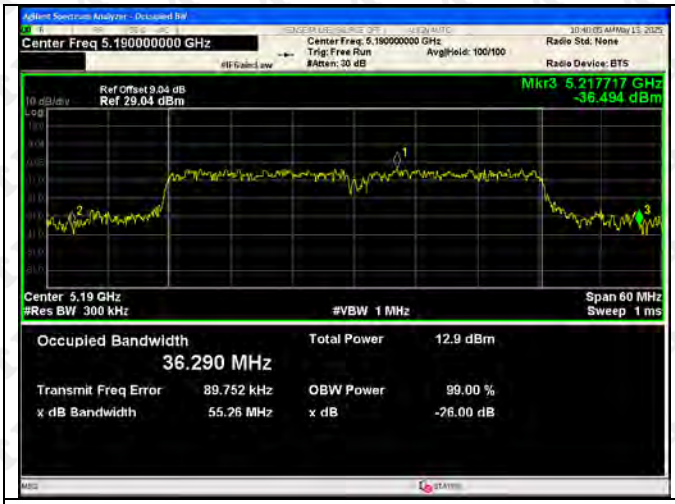


802.11ac(VH20)-5200

802.11ac(VH20)-5240

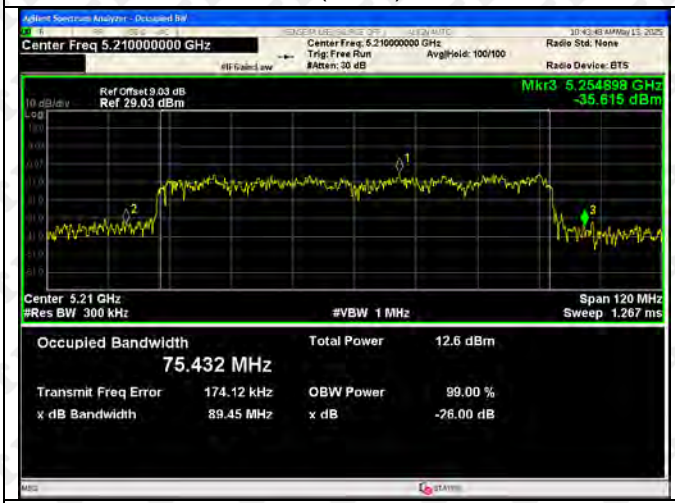
802.11ac(VH40)-5190

802.11ac(VH40)-5230



802.11ac(VH80)-5210

802.11n(HT20)-5180

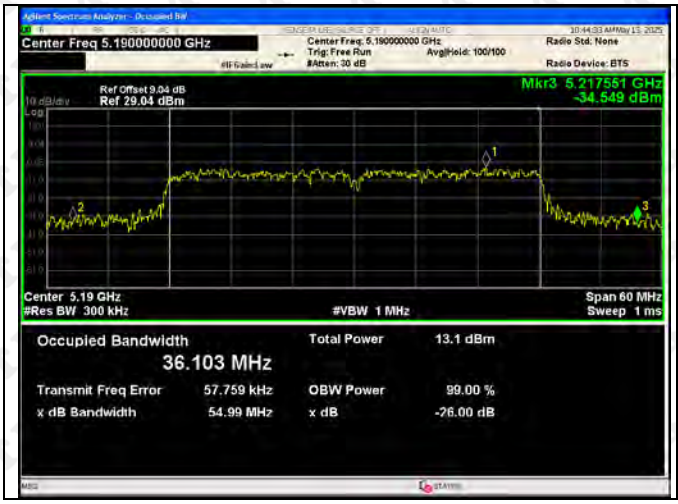


802.11n(HT20)-5200

802.11n(HT20)-5240

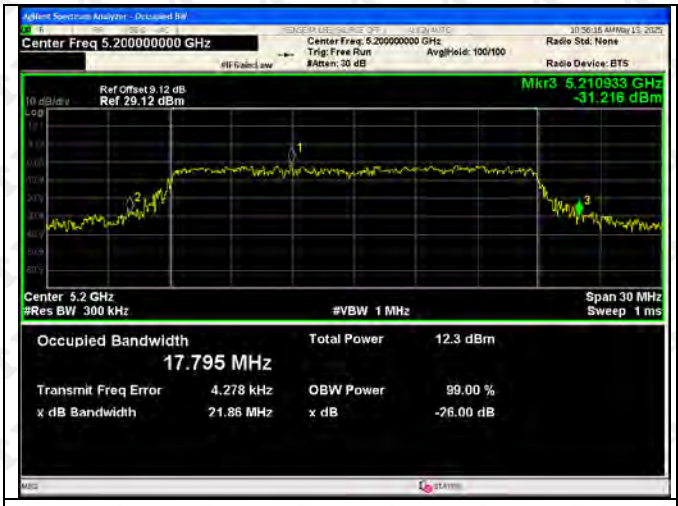
802.11n(HT40)-5190

802.11n(HT40)-5230



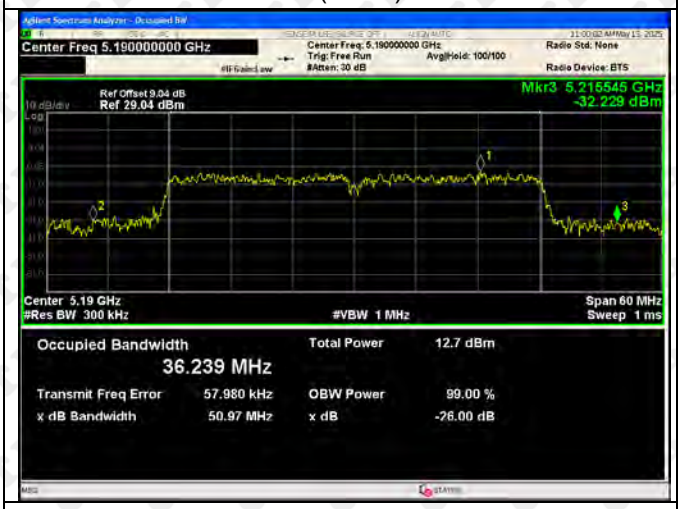
module2 (OPS computer) Worst mode:

802.11a-5180	802.11a-5200
	
802.11a-5240	802.11ac(VH20)-5180
	
802.11ac(VH20)-5200	802.11ac(VH20)-5240



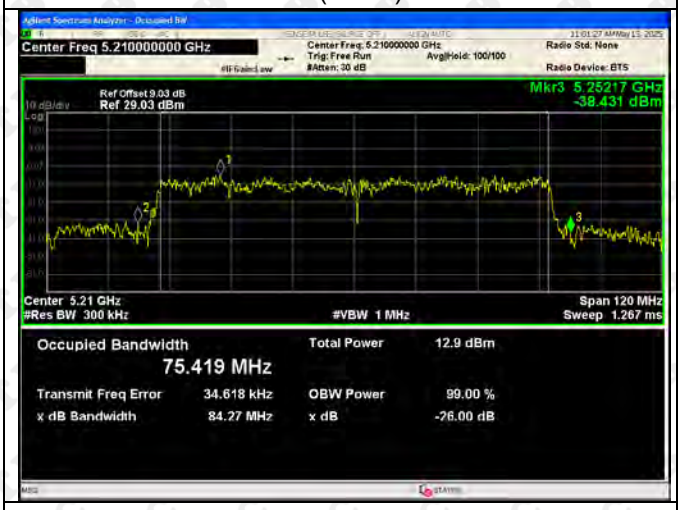
802.11ac(VH40)-5190

802.11ac(VH40)-5230



802.11ac(VH80)-5210

802.11n(HT20)-5180

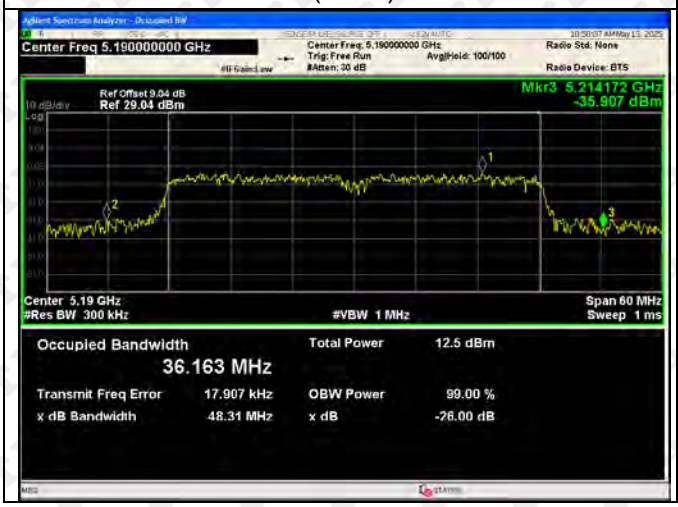


802.11n(HT20)-5200

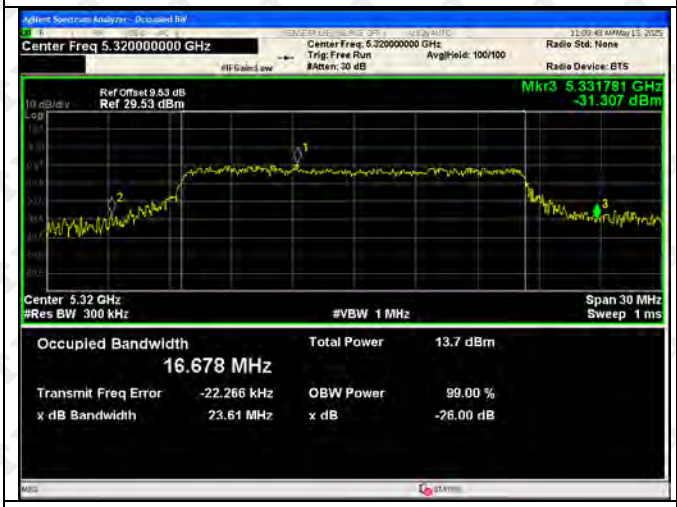
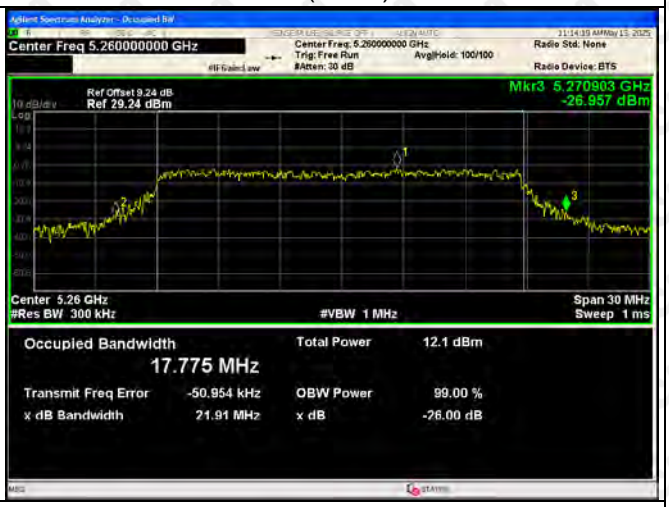
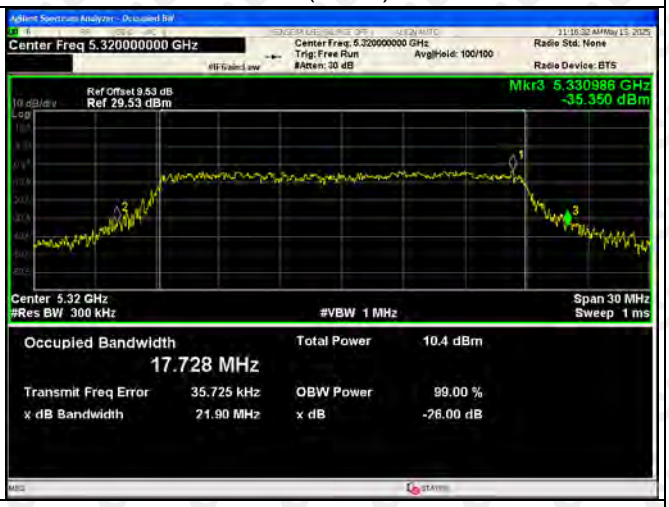
802.11n(HT20)-5240

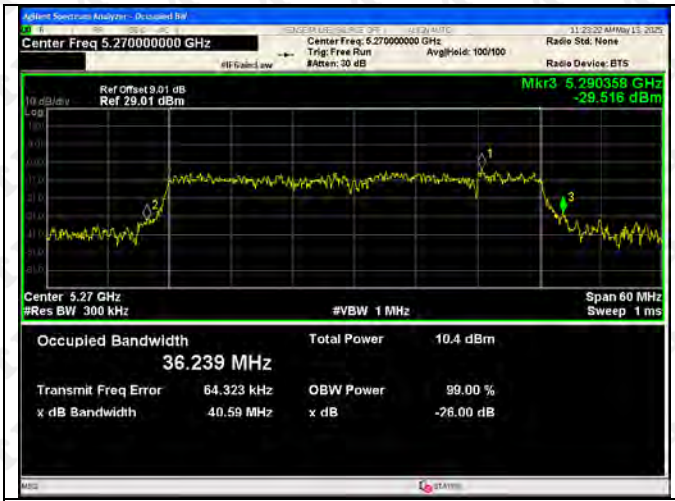
802.11n(HT40)-5190

802.11n(HT40)-5230

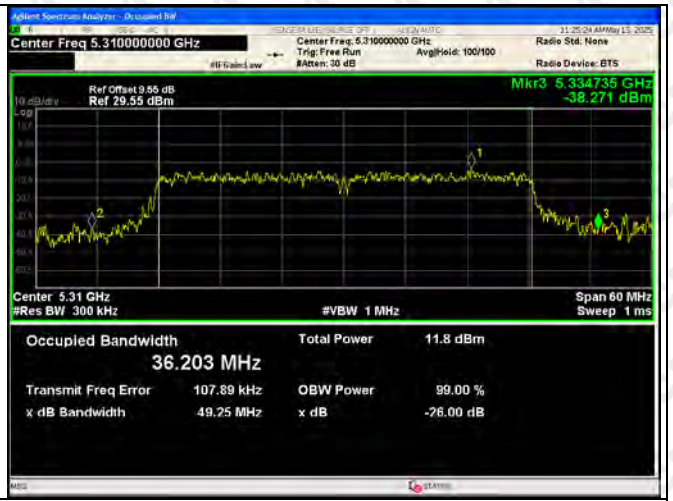


5250-5350MHz-Power
module1 Worst mode:

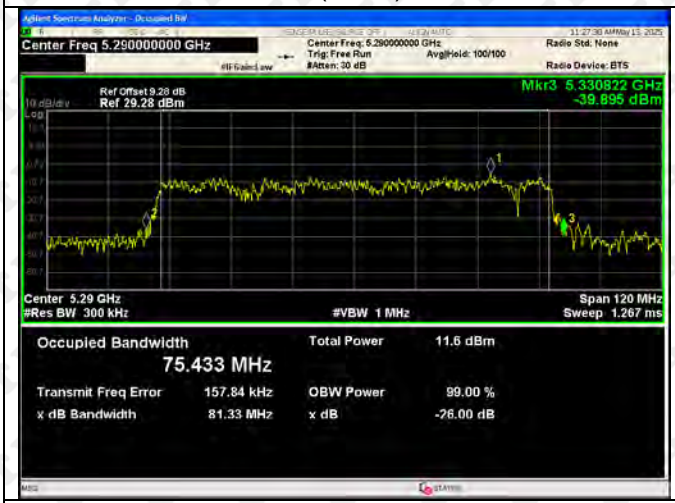
802.11a-5260	802.11a-5280
	
802.11a-5320	802.11ac(VH20)-5260
	
802.11ac(VH20)-5280	802.11ac(VH20)-5320
	
802.11ac(VH40)-5270	802.11ac(VH40)-5310



802.11ac(VH80)-5290



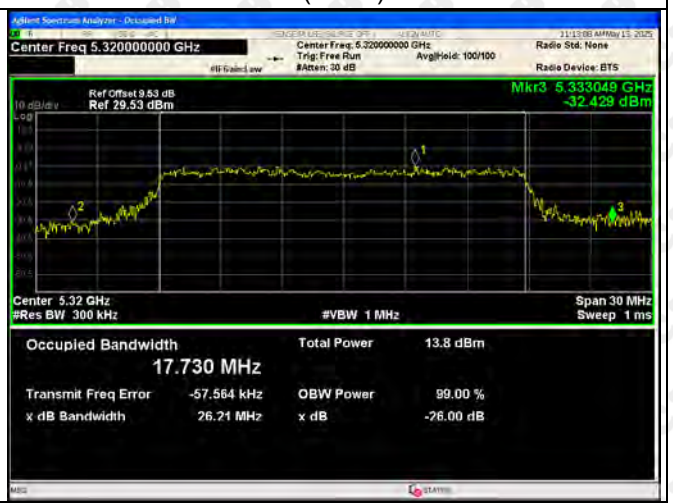
802.11n(HT20)-5260



802.11n(HT20)-5280

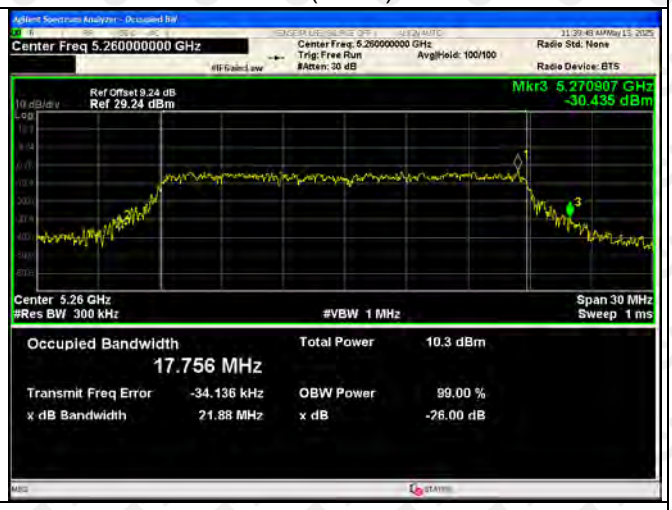
802.11n(HT20)-5320

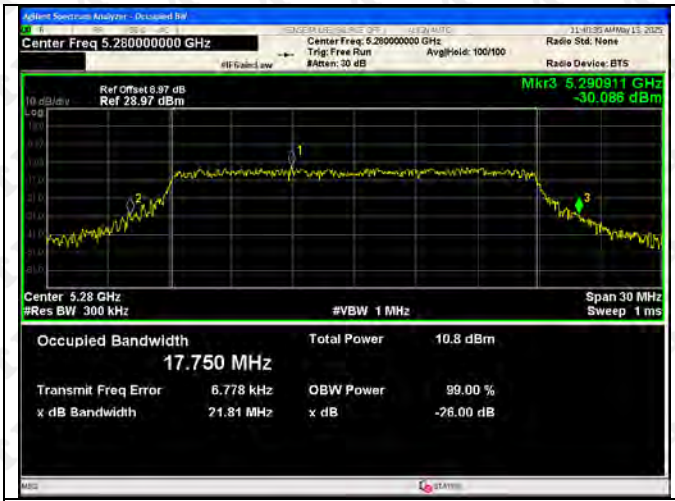
802.11n(HT40)-5270



802.11n(HT40)-5310

module2 (OPS computer) Worst mode:

802.11a-5260	802.11a-5280
	
802.11a-5320	802.11ac(VH20)-5260
	
802.11ac(VH20)-5280	802.11ac(VH20)-5320



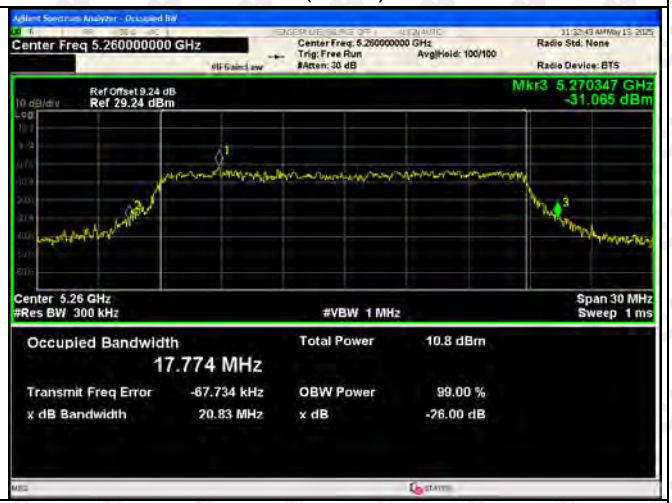
802.11ac(VH40)-5270

802.11ac(VH40)-5310

802.11ac(VH80)-5290

802.11n(HT20)-5260

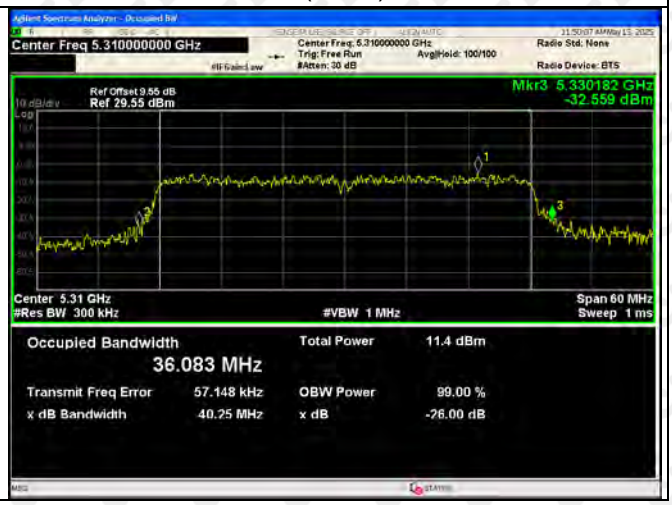
802.11n(HT20)-5280



802.11n(HT20)-5320

802.11n(HT40)-5270

802.11n(HT40)-5310



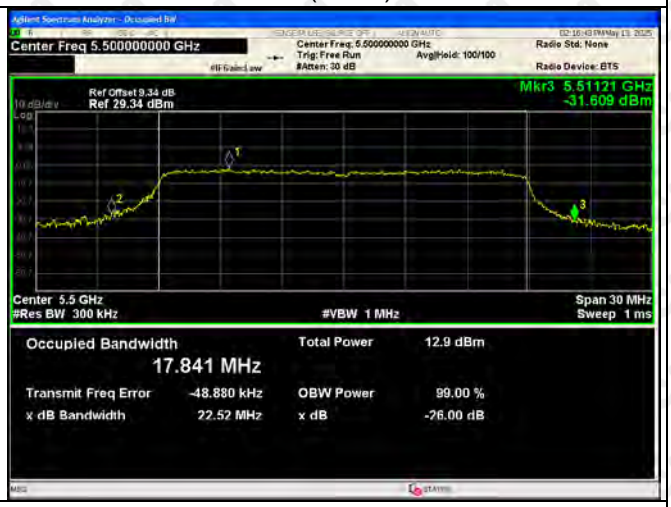
5470-5725MHz-Power
module1(OPS computer) Worst mode:

802.11a-5500

802.11a-5580

802.11a-5700

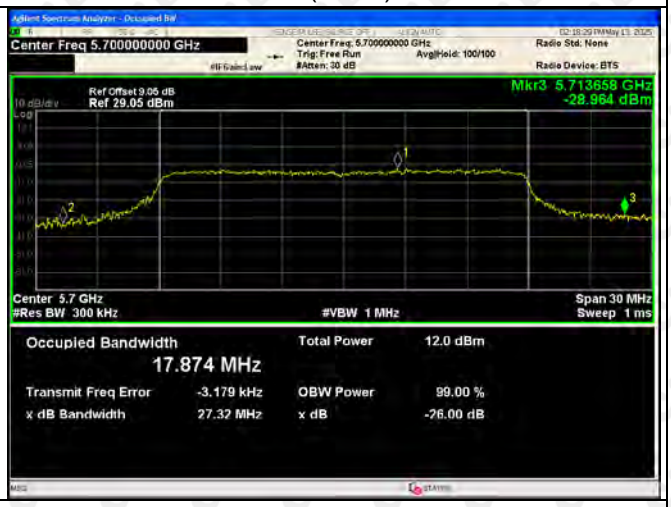
802.11ac(VH20)-5500



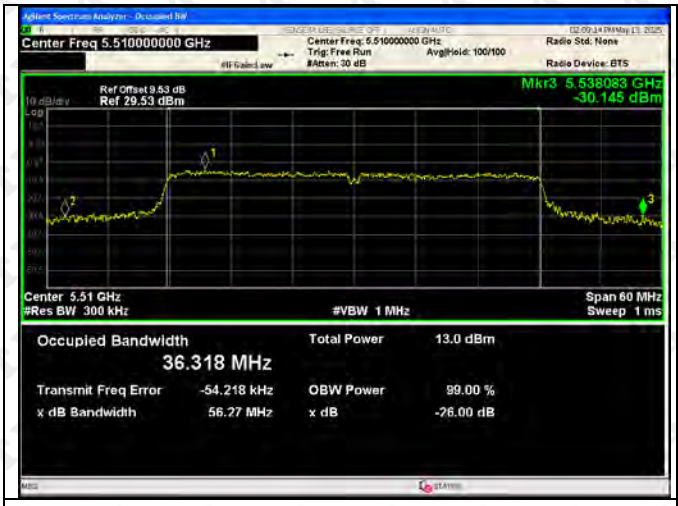
802.11ac(VH20)-5580

802.11ac(VH20)-5700

802.11ac(VH40)-5510



802.11ac(VH40)-5670



802.11ac(VH80)-5530

802.11n(HT20)-5500

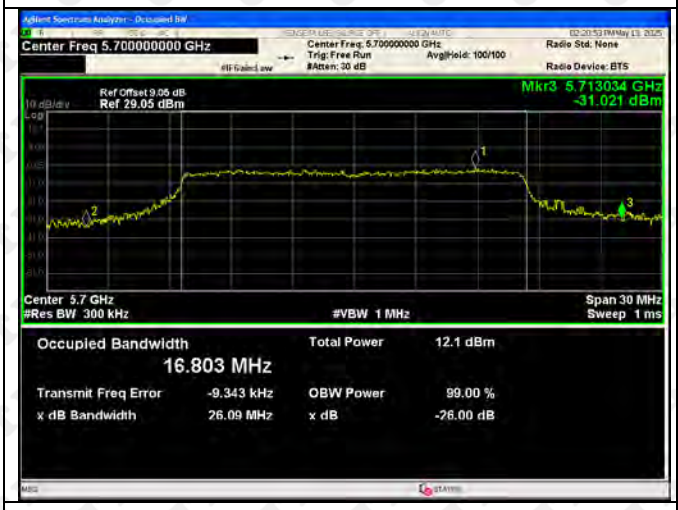
802.11n(HT20)-5580

802.11n(HT20)-5700

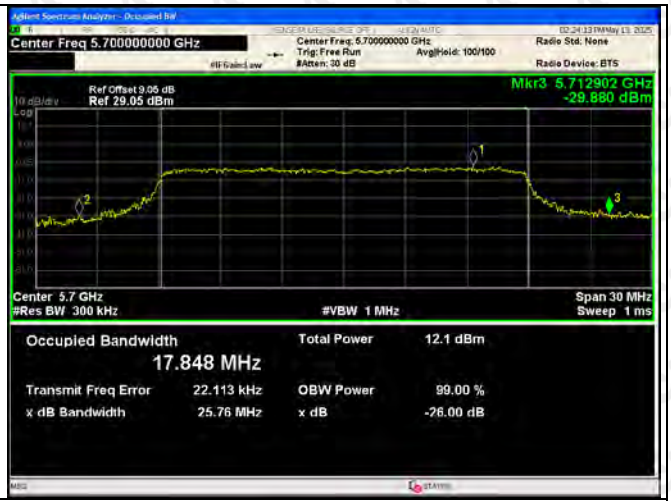
802.11n(HT40)-5510

802.11n(HT40)-5670

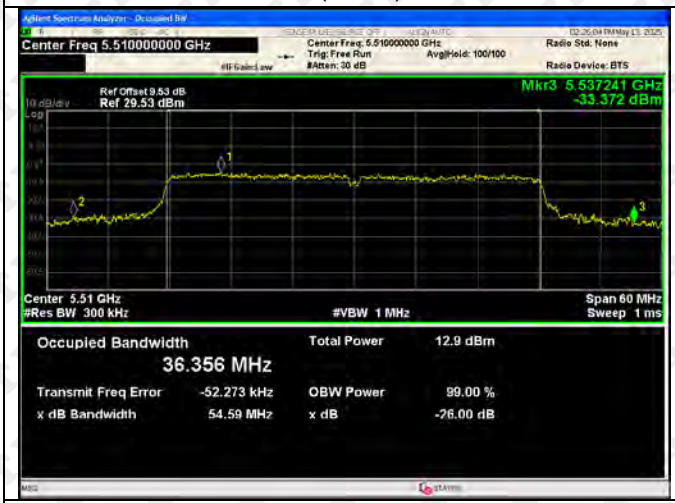
module2 (OPS computer) Worst mode:

802.11a-5500	802.11a-5580
	
802.11a-5700	802.11ac(VH20)-5500
	
802.11ac(VH20)-5580	802.11ac(VH20)-5700

802.11ac(VH40)-5510

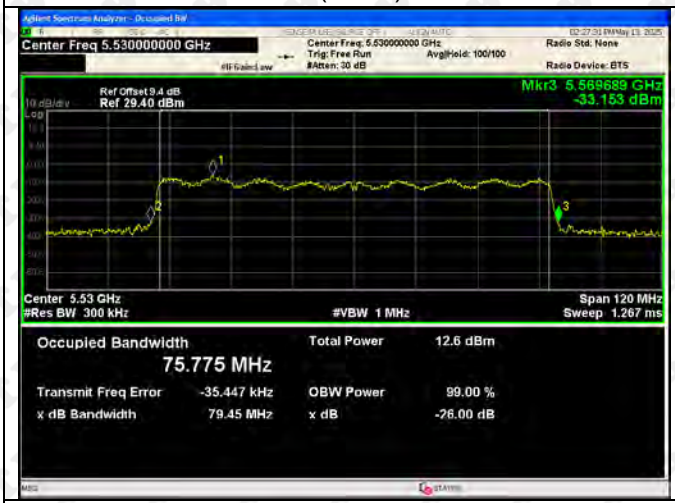


802.11ac(VH40)-5670



802.11ac(VH80)-5530

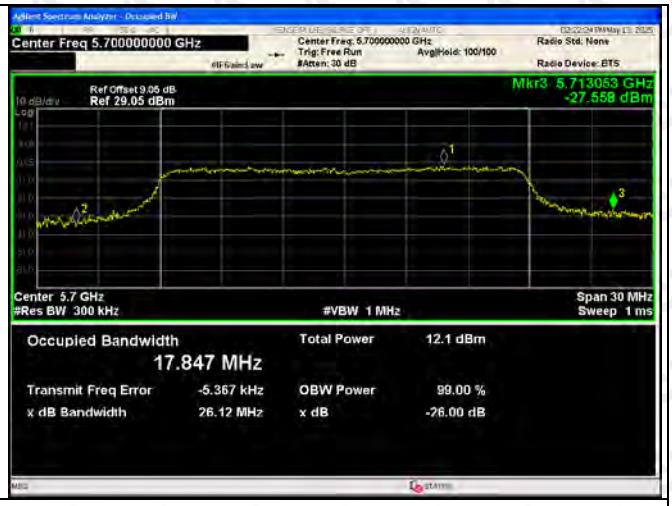
802.11n(HT20)-5500



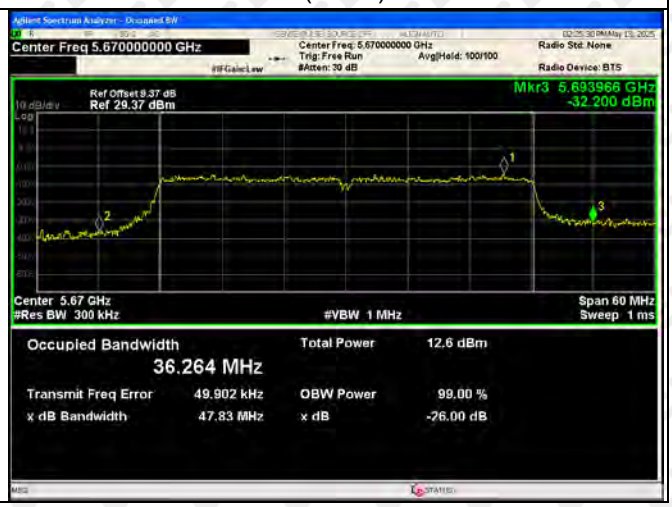
802.11n(HT20)-5580

802.11n(HT20)-5700

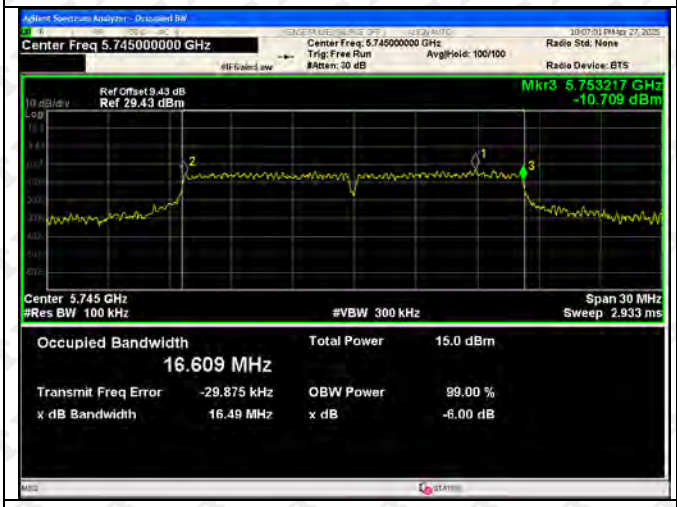
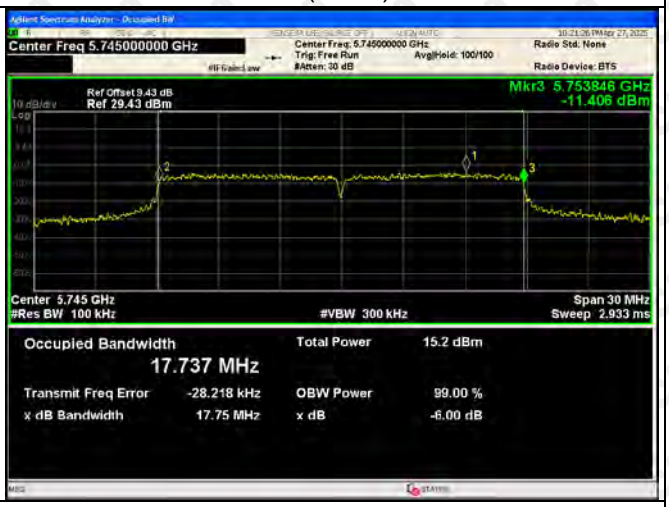
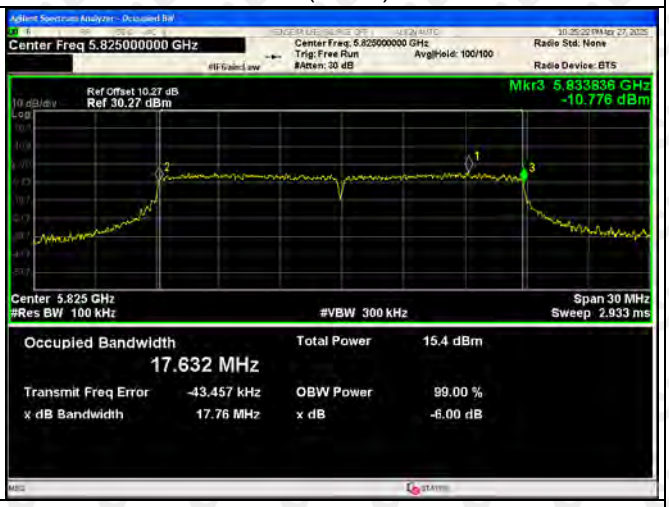
802.11n(HT40)-5510



802.11n(HT40)-5670

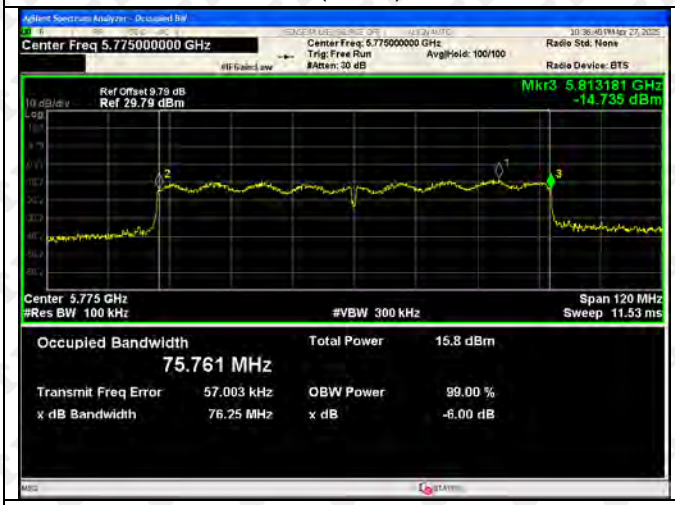


5725-5850MHz:-Power
module1 Worst mode:

802.11a-5745	802.11a-5785
	
802.11a-5825	802.11ac(VH20)-5745
	
802.11ac(VH20)-5785	802.11ac(VH20)-5825
	
802.11ac(VH40)-5755	802.11ac(VH40)-5795

802.11ac(VH80)-5775

802.11n(HT20)-5745



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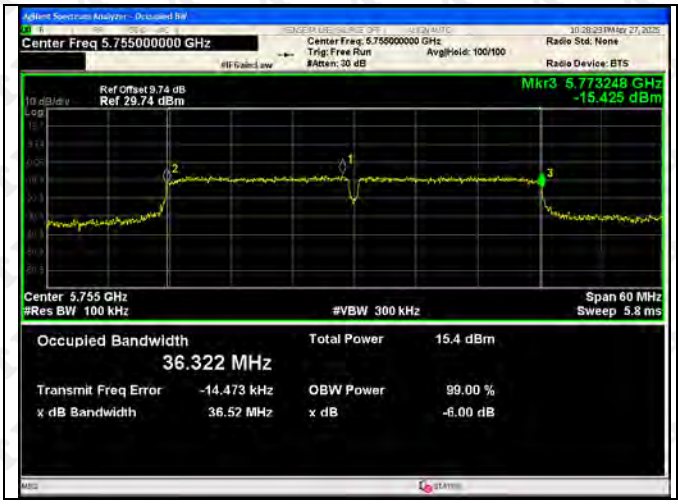
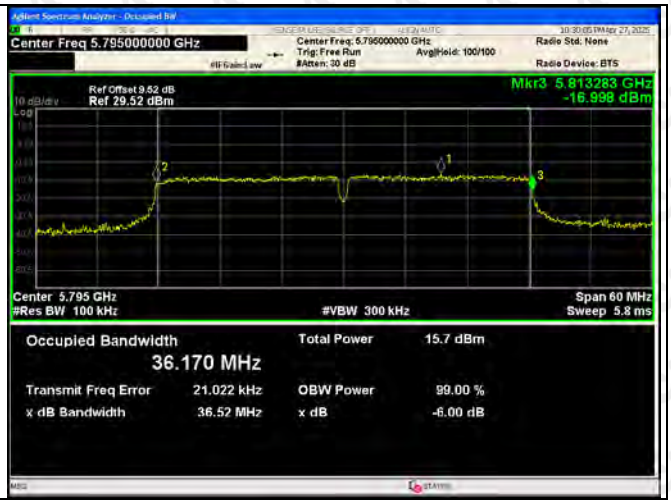
802.11n(HT20)-5825

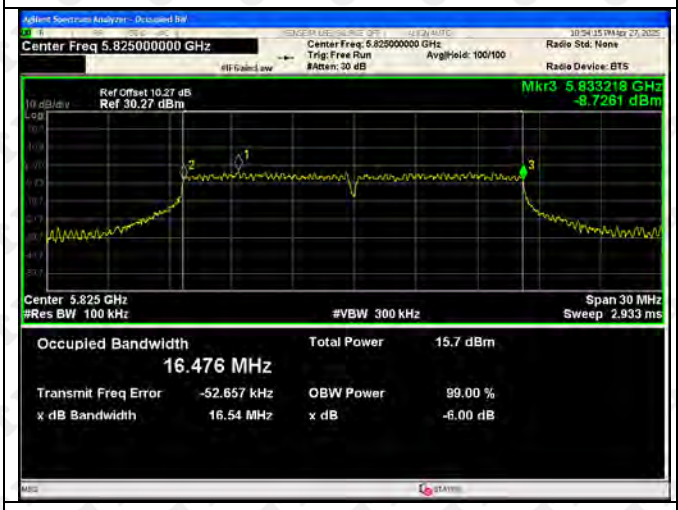
802.11n(HT40)-5795

802.11n(HT40)-5825





module2 (OPS computer) Worst mode:

802.11a-5745	802.11a-5785
	
802.11a-5825	802.11ac(VH20)-5745
	
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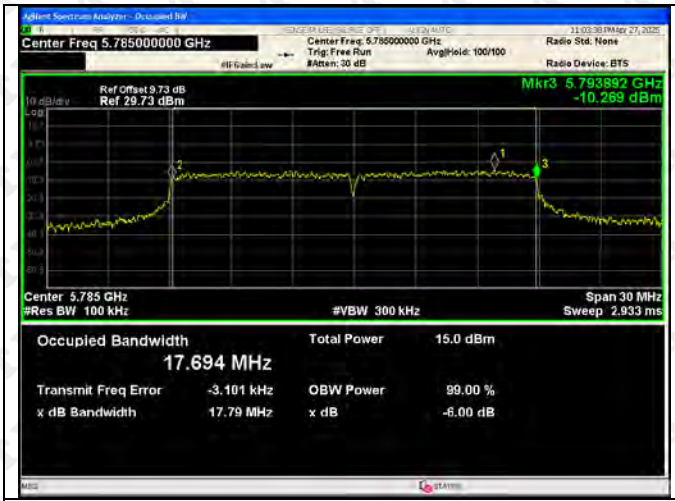
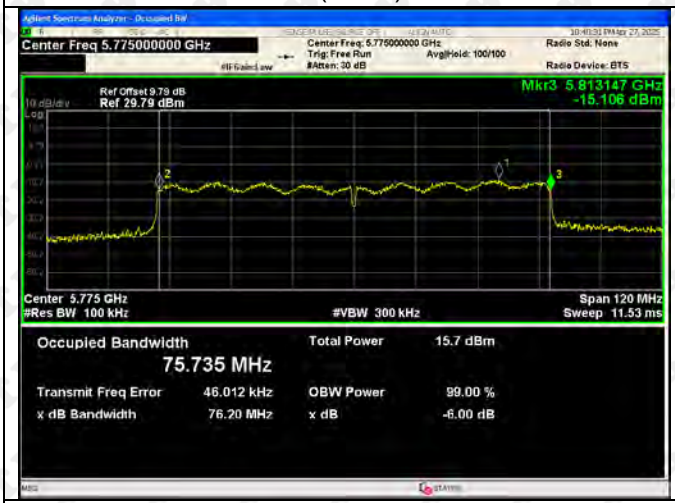


802.11ac(VH40)-5755

802.11ac(VH40)-5795

802.11ac(VH80)-5775

802.11n(HT20)-5745

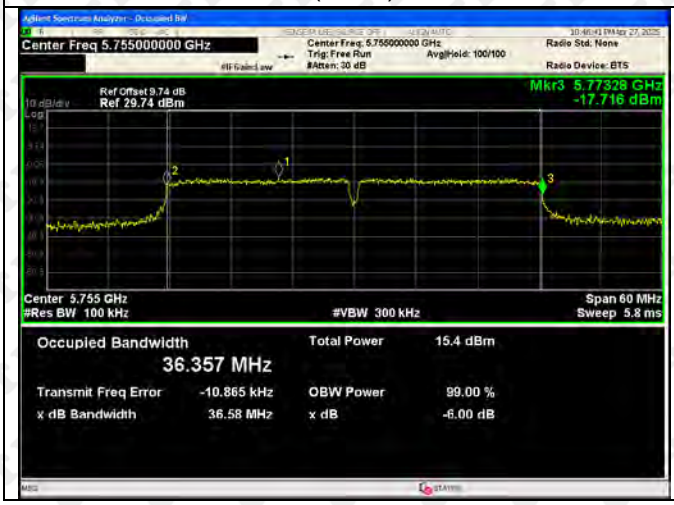


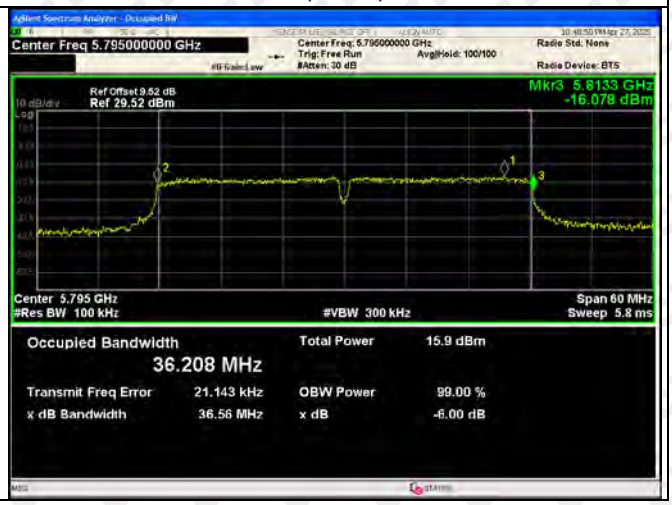
802.11n(HT20)-5785

802.11n(HT20)-5825

802.11n(HT40)-5795

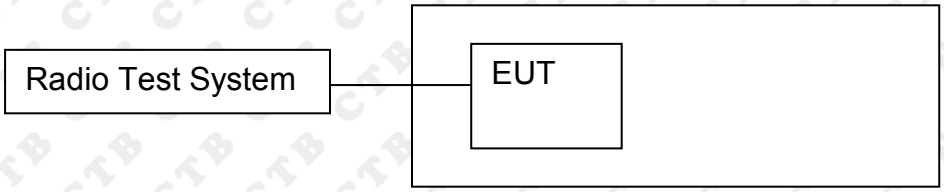
802.11n(HT40)-5825





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

5150-5250MHz:MHz
module1 Worst mode:

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	3.237	-2.771	/	11	Pass
	5200	4.455	-2.698	/	11	Pass
	5240	4.257	-2.472	/	11	Pass
802.11ac(VH20)	5180	4.239	-2.993	4.991	11	Pass
	5200	3.882	-3.132	4.670	11	Pass
	5240	4.493	-2.88	5.223	11	Pass
802.11ac(VH40)	5190	0.565	-5.933	1.443	11	Pass
	5230	0.532	-5.986	1.406	11	Pass
802.11ac(VH80)	5230	-7.633	-7.808	-4.709	11	Pass
802.11n(VH20)	5210	3.707	-2.903	4.564	11	Pass
	5180	4.051	-3.064	4.822	11	Pass
	5200	4.097	-3.074	4.859	11	Pass
802.11n (VH40)	5240	0.724	-5.776	1.601	11	Pass
	5190	0.523	-6.02	1.393	11	Pass

5150-5250MHz:
module2 (OPS computer) Worst mode:

Test mode	Test Channel (MHz)	PSD [dBm/MHz]	Limit [dBm/MHz]	Result
802.11a	5180	3.402	11	Pass
	5200	3.867	11	Pass
	5240	4.1	11	Pass
802.11ac(VH20)	5180	4.011	11	Pass
	5200	4.228	11	Pass
	5240	3.536	11	Pass
802.11ac(VH40)	5190	0.564	11	Pass
	5230	1.042	11	Pass
802.11ac(VH80)	5230	-6.869	11	Pass
802.11n(VH20)	5180	3.58	11	Pass
	5200	4.492	11	Pass
	5240	3.436	11	Pass
802.11n (VH40)	5190	1.178	11	Pass
	5230	0.907	11	Pass

5250-5350 MHzMHz
module1 Worst mode:

Test mode	Test Channel (MHz)	PSD [dBm/MHz] ANT 1	PSD [dBm/MHz] ANT 2	PSD [dBm/MHz] Total	Limit (dBm)	Result
802.11a	5260	2.488	-2.236	/	11	Pass
	5280	2.666	-2.368	/	11	Pass
	5320	2.919	-2.085	/	11	Pass
802.11ac(VH20)	5260	1.944	-2.645	3.240	11	Pass
	5280	2.306	-2.655	3.509	11	Pass
	5320	2.662	-2.514	3.814	11	Pass
802.11ac(VH40)	5270	-0.87	-5.59	0.392	11	Pass
	5310	-0.37	-5.438	0.807	11	Pass
802.11ac(VH80)	5290	-2.62	-7.48	-1.393	11	Pass
802.11n(VH20)	5260	2.269	-2.568	3.502	11	Pass
	5280	2.379	-2.789	3.533	11	Pass
	5320	2.631	-2.553	3.781	11	Pass
802.11n(VH40)	5270	-0.785	-5.509	0.476	11	Pass
	5310	-0.456	-5.364	0.760	11	Pass

5250-5350 MHz:
module2 (OPS computer) Worst mode:

Test mode	Test Channel (MHz)	PSD [dBm/MHz]	Limit (dBm)	Result
802.11a	5260	2.095	11	Pass
	5280	2.699	11	Pass
	5320	2.818	11	Pass
802.11ac(HT20)	5260	2.084	11	Pass
	5280	2.351	11	Pass
	5320	2.474	11	Pass
802.11ac(HT40)	5270	-0.695	11	Pass
	5310	-0.05	11	Pass
802.11ac(HT80)	5290	-2.759	11	Pass
802.11n(VH20)	5260	2.053	11	Pass
	5280	2.248	11	Pass
	5320	2.575	11	Pass
802.11n(VH40)	5270	-0.409	11	Pass
	5310	-0.113	11	Pass

5470-5725MHz:
module1 Worst mode:

Test mode	Test Channel (MHz)	PSD [dBm/MHz] ANT 1	PSD [dBm/MHz] ANT 2	PSD [dBm/MHz] Total	Limit (dBm)	Result
802.11a	5500	1.486	-2.647	/	30	Pass
	5580	0.581	-5.579	/	30	Pass
	5700	1.071	-3.325	/	30	Pass
802.11ac(VH20)	5500	0.961	-2.657	2.529	30	Pass
	5580	0.402	-3.281	1.950	30	Pass
	5700	0.873	-2.665	2.465	30	Pass
802.11ac(VH40)	5510	-2.139	-5.25	-0.411	30	Pass
	5670	-2.65	-6.188	-1.058	30	Pass
802.11ac(VH80)	5670	-3.969	-8.251	-2.592	30	Pass
802.11n(HT20)	5530	0.945	-2.423	2.590	30	Pass
	5500	0.236	-3.241	1.847	30	Pass
	5580	0.911	-2.701	2.480	30	Pass
802.11n(HT40)	5700	-1.864	-5.351	-0.256	30	Pass
	5510	-2.581	-6.301	-1.044	30	Pass

5470-5725MHz:
module2 (OPS computer) Worst mode:

Test mode	Test Channel (MHz)	PSD [dBm/MHz]	Limit (dBm)	Result
802.11a	5500	1.465	30	Pass
	5580	0.655	30	Pass
	5700	1.077	30	Pass
802.11ac(VH20)	5530	1.028	30	Pass
	5500	0.327	30	Pass
	5580	0.896	30	Pass
802.11ac(VH40)	5700	-2.005	30	Pass
	5510	-2.802	30	Pass
802.11ac(VH80)	5670	-3.98	30	Pass
802.11n(HT20)	5500	0.841	30	Pass
	5580	0.361	30	Pass
	5700	1.04	30	Pass
802.11n(HT40)	5510	-1.811	30	Pass
	5670	-2.49	30	Pass

5725-5850MHz:
module1 Worst mode:

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	1.517	-5.245	/	30	Pass
	5785	2.448	-3.918	/	30	Pass
	5825	3.642	-2.916	/	30	Pass
802.11ac(VH20)	5745	1.595	-5.278	2.406	30	Pass
	5785	1.047	-4.191	2.184	30	Pass
	5825	1.663	-4.899	2.529	30	Pass
802.11ac(VH40)	5755	-2.056	-9.33	-1.310	30	Pass
	5795	-1.837	-8.24	-0.942	30	Pass
802.11ac(VH80)	5775	-3.547	-9.971	-2.656	30	Pass
802.11n(HT20)	5745	0.754	-5.444	1.688	30	Pass
	5785	0.716	-4.201	1.929	30	Pass
	5825	1.674	-3.001	2.948	30	Pass
802.11n(HT40)	5755	-1.774	-9.363	-1.077	30	Pass
	5795	-0.872	-8.163	-0.129	30	Pass

5725-5850MHz:
module2 (OPS computer) Worst mode:

Test mode	Test Channel (MHz)	PSD [dBm/500kHz]	Limit [dBm/MHz]	Result
802.11a	5745	1.653	30	Pass
	5785	1.589	30	Pass
	5825	2.077	30	Pass
802.11ac(VH20)	5745	1.581	30	Pass
	5785	1.804	30	Pass
	5825	1.785	30	Pass
802.11ac(VH40)	5755	-1.941	30	Pass
	5795	-1.983	30	Pass
802.11ac(VH80)	5775	-3.337	30	Pass
802.11n(HT20)	5745	1.63	30	Pass
	5785	1.196	30	Pass
	5825	1.874	30	Pass
802.11n(HT40)	5755	-1.904	30	Pass
	5795	-1.716	30	Pass

Test Graph:
5150-5250MHz
module1 Worst mode:

802.11a-5180

802.11a-5200

802.11a-5240

802.11ac(VH20)-5180

802.11ac(VH20)-5200

802.11ac(VH20)-5240

802.11ac(VH40)-5190

802.11ac(VH40)-5230

802.11ac(VH80)-5210

802.11n(HT20)-5180

802.11n(HT20)-5200

802.11n(HT20)-5240

802.11n(HT40)-5190

802.11n(HT40)-5230

module2 (OPS computer) Worst mode:

802.11a-5180	802.11a-5200
	
802.11a-5240	802.11ac(VH20)-5180
	
802.11ac(VH20)-5200	802.11ac(VH20)-5240

802.11ac(VH40)-5190

802.11ac(VH40)-5230

802.11ac(VH80)-5210

802.11n(HT20)-5180

802.11n(HT20)-5200

802.11n(HT20)-5240

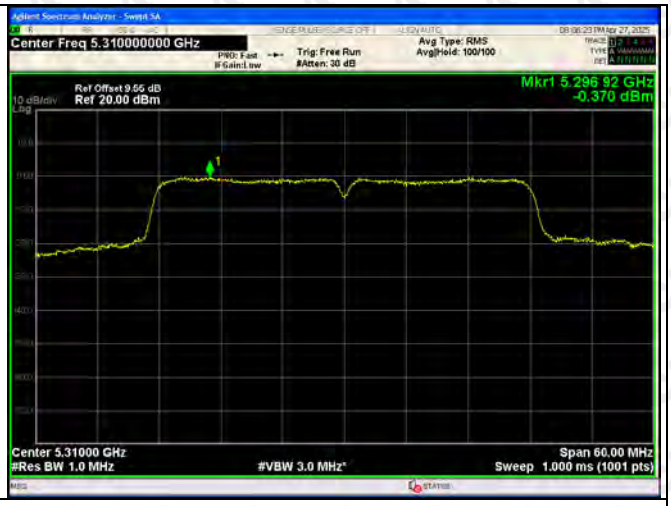
802.11n(HT40)-5190

802.11n(HT40)-5230

5250-5350MHz
module1 Worst mode:

802.11a-5260	802.11a-5280
	
802.11a-5320	802.11ac(VH20)-5260
	
802.11ac(VH20)-5280	802.11ac(VH20)-5320
	
802.11ac(VH40)-5270	802.11ac(VH40)-5310

802.11ac(VH80)-5290



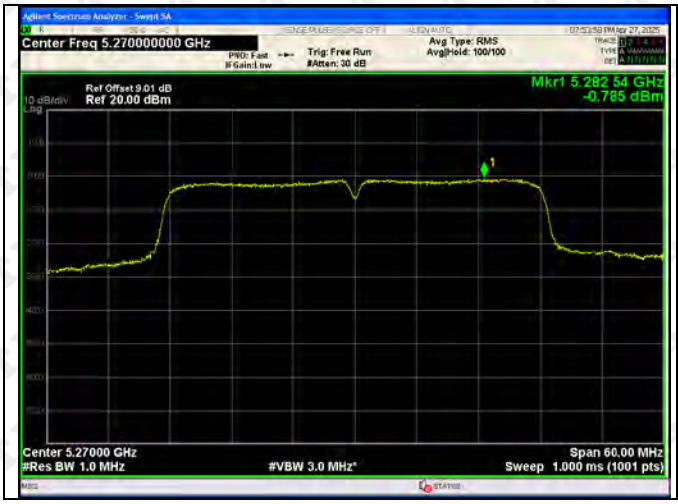
802.11n(HT20)-5260

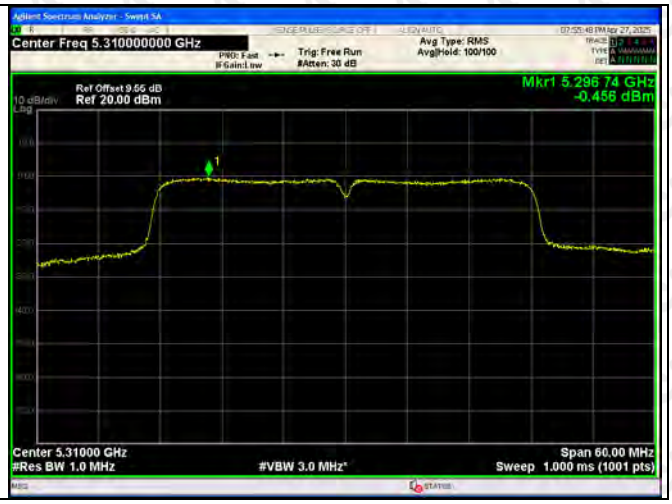
802.11n(HT20)-5280

802.11n(HT20)-5320

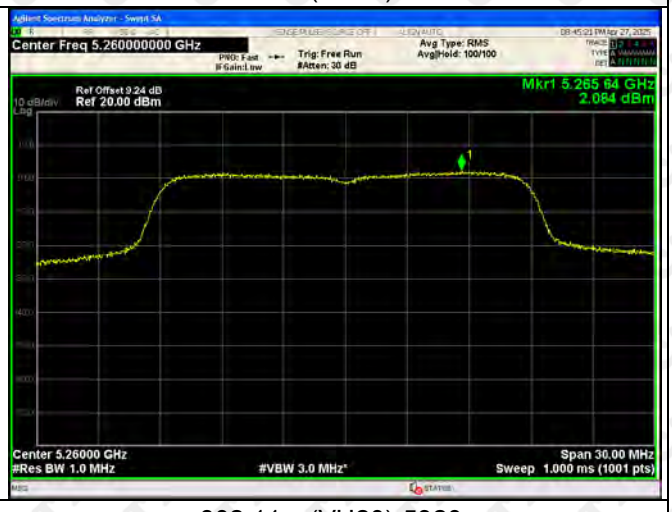
802.11n(HT40)-5270

802.11n(HT40)-5310





module2 (OPS computer) Worst mode:

802.11a-5260	802.11a-5280
	
802.11a-5320	802.11ac(VH20)-5260
	
802.11ac(VH20)-5280	802.11ac(VH20)-5320

802.11ac(VH40)-5270

802.11ac(VH40)-5310

802.11ac(VH80)-5290

802.11n(HT20)-5260

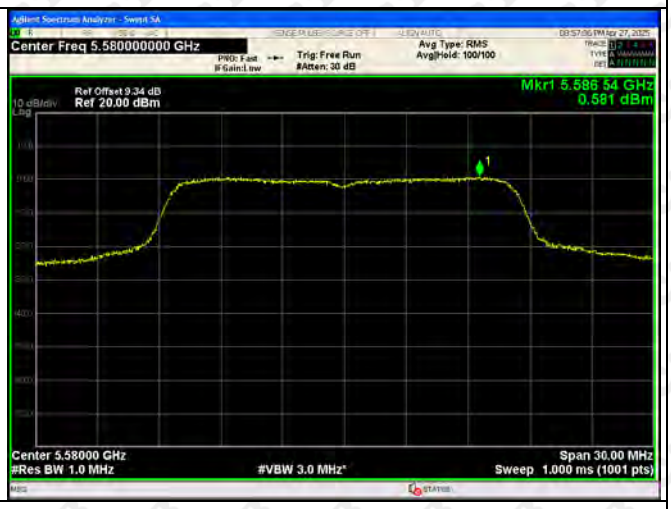
802.11n(HT20)-5280

802.11n(HT20)-5320

802.11n(HT40)-5270

802.11n(HT40)-5310

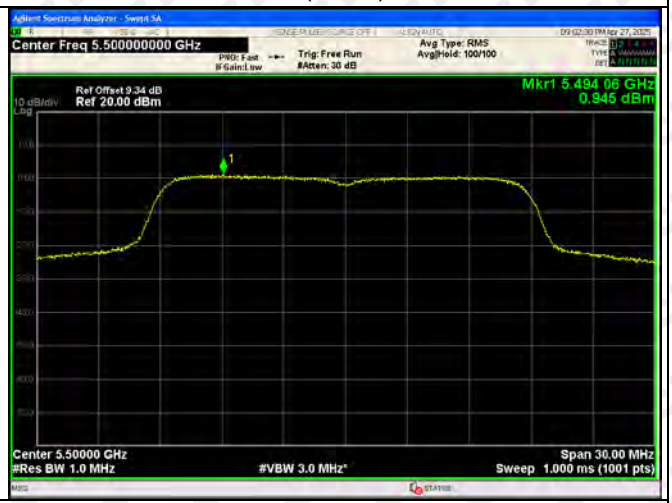
5470-5725MHz
module1 Worst mode:

802.11a-5500	802.11a-5580
	
802.11a-5700	802.11ac(VH20)-5500
	
802.11ac(VH20)-5580	802.11ac(VH20)-5700
	
802.11ac(VH40)-5510	802.11ac(VH40)-5670

802.11ac(VH80)-5530

802.11n(HT20)-5500

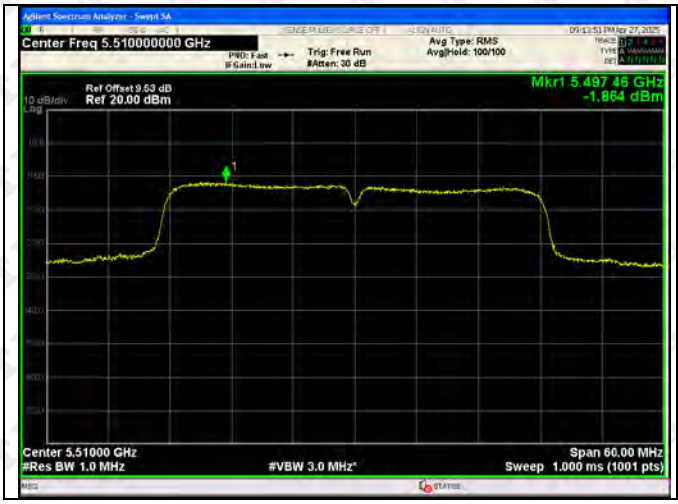
802.11n(HT20)-5580



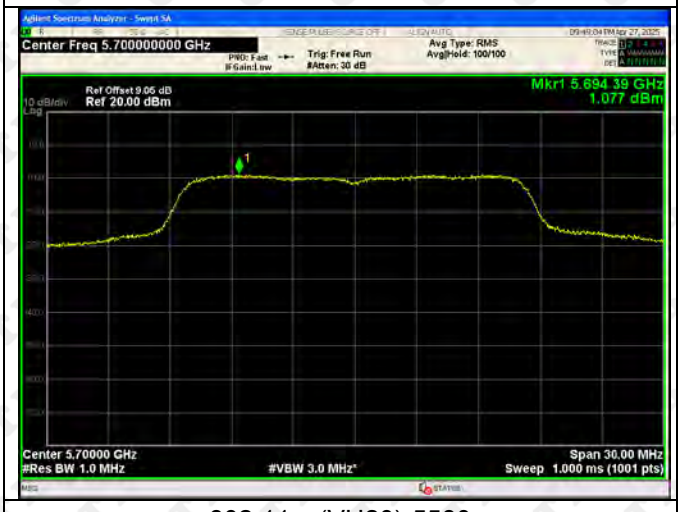
802.11n(HT20)-5700

802.11n(HT40)-5510

802.11n(HT40)-5670



module2 (OPS computer) Worst mode:

802.11a-5500	802.11a-5580
	
802.11a-5700	802.11ac(VH20)-5500
	
802.11ac(VH20)-5580	802.11ac(VH20)-5700

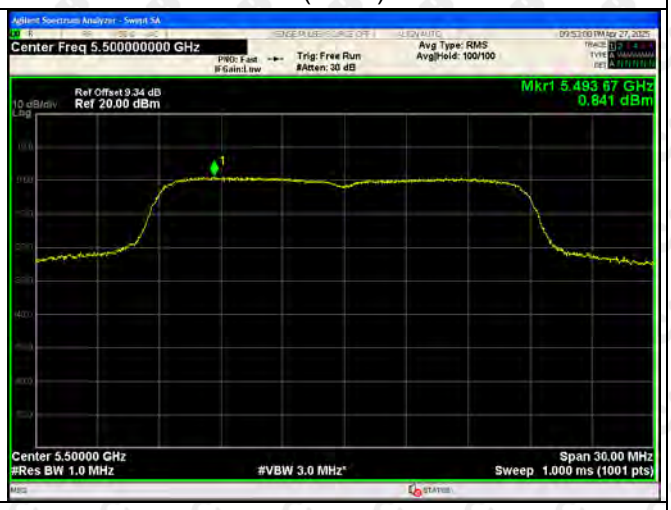
802.11ac(VH40)-5510

802.11ac(VH40)-5670

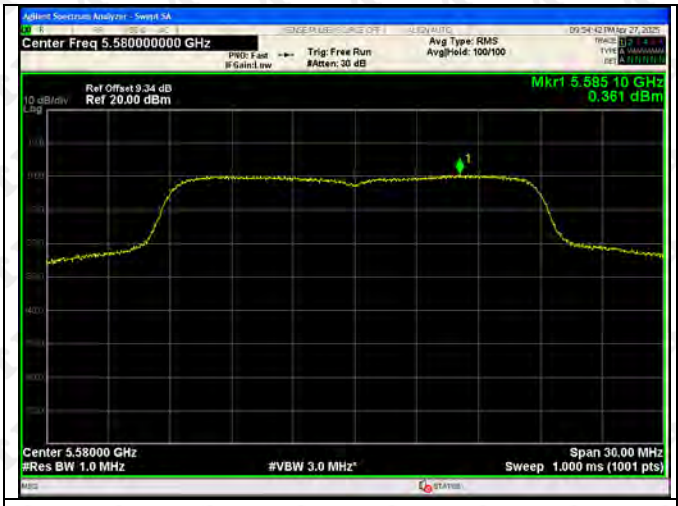
802.11ac(VH80)-5530

802.11n(HT20)-5500

802.11n(HT20)-5580



802.11n(HT20)-5700



802.11n(HT40)-5510

802.11n(HT40)-5670

5725-5850MHz:
module1 Worst mode:

802.11a-5745	802.11a-5785
	
802.11a-5825	802.11ac(VH20)-5745
	
802.11ac(VH20)-5785	802.11ac(VH20)-5825
	
802.11ac(VH40)-5755	802.11ac(VH40)-5795

802.11ac(VH80)-5775

802.11n(HT20)-5745

802.11n(HT20)-5785

802.11n(HT20)-5825

802.11n(HT40)-5795

802.11n(HT40)-5825

module2 (OPS computer) Worst mode:

802.11a-5745	802.11a-5785
	
802.11a-5825	802.11ac(VH20)-5745
	
802.11ac(VH20)-5785	802.11ac(VH20)-5825

802.11ac(VH40)-5755

802.11ac(VH40)-5795

802.11ac(VH80)-5775

802.11n(HT20)-5745

802.11n(HT20)-5785

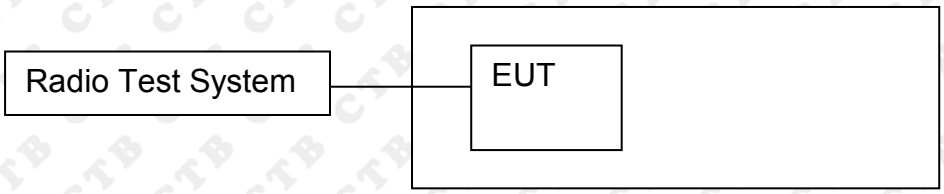
802.11n(HT20)-5825

802.11n(HT40)-5795

802.11n(HT40)-5825

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)

module1 Worst mode:

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	5180.0162	5180	0.0162	3.1362
		V max (V)	132	5180.0689	5180	0.0689	13.3002
		V min (V)	108	5180.0667	5180	0.0667	12.8836
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	5180.0006	5180	0.0006	0.1166
		T (°C)	10	5180.0134	5180	0.0134	2.5916
		T (°C)	20	5180.0077	5180	0.0077	1.4918
		T (°C)	30	5180.0042	5180	0.0042	0.8097
		T (°C)	40	5180.0367	5180	0.0367	7.0806
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	5200.0466	5200	0.0466	8.9613
		V max (V)	132	5200.0197	5200	0.0197	3.7905
		V min (V)	108	5200.0392	5200	0.0392	7.5398
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	5200.0118	5200	0.0118	2.2693
		T (°C)	10	5200.0224	5200	0.0224	4.3022
		T (°C)	20	5200.0231	5200	0.0231	4.4464
		T (°C)	30	5200.0212	5200	0.0212	4.0731
		T (°C)	40	5200.0055	5200	0.0055	1.0547
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	5240.0081	5240	0.0081	1.5512
		V max (V)	132	5240.0203	5240	0.0203	3.8805
		V min (V)	108	5240.0160	5240	0.0160	3.0495
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	5240.0279	5240	0.0279	5.3202
		T (°C)	10	5240.0445	5240	0.0445	8.4871
		T (°C)	20	5240.0282	5240	0.0282	5.3897
		T (°C)	30	5240.0063	5240	0.0063	1.2025
		T (°C)	40	5240.0322	5240	0.0322	6.1402
Limits				±20ppm			
Result				Complies			

TX Frequency (5250-5350MHz)

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5260MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5260.0287	5260	0.0287	5.4587
		V max (V)	132	5260.0274	5260	0.0274	5.2132
		V min (V)	108	5260.0250	5260	0.0250	4.7497
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5260MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5260.0535	5260	0.0535	10.1650
		T (°C)	10	5260.0276	5260	0.0276	5.2392
		T (°C)	20	5260.0408	5260	0.0408	7.7564
		T (°C)	30	5260.0767	5260	0.0767	14.5850
		T (°C)	40	5260.0440	5260	0.0440	8.3706
Limits				±20ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5280MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5280.0348	5280	0.0348	6.5964
		V max (V)	132	5280.0566	5280	0.0566	10.7155
		V min (V)	108	5280.0801	5280	0.0801	15.1788
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5280MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5280.0244	5280	0.0244	4.6304
		T (°C)	10	5280.0261	5280	0.0261	4.9461
		T (°C)	20	5280.0327	5280	0.0327	6.1851
		T (°C)	30	5280.0449	5280	0.0449	8.4996
		T (°C)	40	5280.0091	5280	0.0091	1.7289
Limits				±20ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5320MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5320.0601	5320	0.0601	11.2919
		V max (V)	132	5320.0134	5320	0.0134	2.5192
		V min (V)	108	5320.0508	5320	0.0508	9.5495
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5320MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5320.0672	5320	0.0672	12.6327
		T (°C)	10	5320.0633	5320	0.0633	11.9038
		T (°C)	20	5320.0321	5320	0.0321	6.0310
		T (°C)	30	5320.0111	5320	0.0111	2.0811
		T (°C)	40	5320.0532	5320	0.0532	9.9981
Limits				±20ppm			
Result				Complies			

TX Frequency (5470-5725MHz)

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5500MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5500.0237	5500	0.0237	4.3016
		V max (V)	132	5500.0917	5500	0.0917	16.6641
		V min (V)	108	5500.0307	5500	0.0307	5.5804
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5500MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5500.0637	5500	0.0637	11.5729
		T (°C)	10	5500.0018	5500	0.0018	0.3189
		T (°C)	20	5500.0520	5500	0.0520	9.4630
		T (°C)	30	5500.0350	5500	0.0350	6.3690
		T (°C)	40	5500.0725	5500	0.0725	13.1895
Limits				±20ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5580MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5580.0746	5580	0.0746	13.3687
		V max (V)	132	5580.0152	5580	0.0152	2.7253
		V min (V)	108	5580.0933	5580	0.0933	16.7194
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5580MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5580.0447	5580	0.0447	8.0029
		T (°C)	10	5580.0565	5580	0.0565	10.1295
		T (°C)	20	5580.0359	5580	0.0359	6.4348
		T (°C)	30	5580.0092	5580	0.0092	1.6402
		T (°C)	40	5580.0710	5580	0.0710	12.7283
Limits				±20ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5700MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5700.0556	5700	0.0556	9.7619
		V max (V)	132	5700.0445	5700	0.0445	7.8090
		V min (V)	108	5700.0177	5700	0.0177	3.1091
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5700MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5700.0256	5700	0.0256	4.4907
		T (°C)	10	5700.0405	5700	0.0405	7.0993
		T (°C)	20	5700.0322	5700	0.0322	5.6520
		T (°C)	30	5700.0372	5700	0.0372	6.5320
		T (°C)	40	5700.0024	5700	0.0024	0.4154
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	5745.0094	5745	0.0094	1.6430
		V max (V)	132	5745.0887	5745	0.0887	15.4374
		V min (V)	108	5745.0094	5745	0.0094	1.6430
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	5745.0122	5745	0.0122	2.1302
		T (°C)	10	5745.0762	5745	0.0762	13.2641
		T (°C)	20	5745.0729	5745	0.0729	12.6868
		T (°C)	30	5745.0161	5745	0.0161	2.8092
		T (°C)	40	5745.0751	5745	0.0751	13.0774
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	5785.0014	5785	0.0014	0.2454
		V max (V)	132	5785.0635	5785	0.0635	10.9698
		V min (V)	108	5785.0789	5785	0.0789	13.6347
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	5785.0524	5785	0.0524	9.0522
		T (°C)	10	5785.0126	5785	0.0126	2.1719
		T (°C)	20	5785.0777	5785	0.0777	13.4329
		T (°C)	30	5785.0063	5785	0.0063	1.0873
		T (°C)	40	5785.0166	5785	0.0166	2.8630
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	5825.0341	5825	0.0341	5.8527
		V max (V)	132	5825.0341	5825	0.0341	5.8582
		V min (V)	108	5825.0583	5825	0.0583	10.0156
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	5825.0538	5825	0.0538	9.2360
		T (°C)	10	5825.0491	5825	0.0491	8.4215
		T (°C)	20	5825.0307	5825	0.0307	5.2661
		T (°C)	30	5825.0238	5825	0.0238	4.0887
		T (°C)	40	5825.0680	5825	0.0680	11.6774
Limits				±20ppm			
Result				Complies			

module2 (OPS computer) Worst mode:

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	5180.0070	5180	0.0070	1.3560
		V max (V)	132	5180.0047	5180	0.0047	0.9051
		V min (V)	108	5180.0763	5180	0.0763	14.7213
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	5180.0586	5180	0.0586	11.3134
		T (°C)	10	5180.0884	5180	0.0884	17.0714
		T (°C)	20	5180.0080	5180	0.0080	1.5492
		T (°C)	30	5180.0567	5180	0.0567	10.9548
		T (°C)	40	5180.0408	5180	0.0408	7.8812
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	5200.0067	5200	0.0067	1.2891
		V max (V)	132	5200.0385	5200	0.0385	7.3963
		V min (V)	108	5200.0625	5200	0.0625	12.0207
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	5200.0547	5200	0.0547	10.5267
		T (°C)	10	5200.0491	5200	0.0491	9.4519
		T (°C)	20	5200.0624	5200	0.0624	11.9958
		T (°C)	30	5200.0637	5200	0.0637	12.2463
		T (°C)	40	5200.0682	5200	0.0682	13.1212
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	5240.0808	5240	0.0808	15.4259
		V max (V)	132	5240.0173	5240	0.0173	3.3005
		V min (V)	108	5240.0725	5240	0.0725	13.8283
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	5240.0251	5240	0.0251	4.7974
		T (°C)	10	5240.0193	5240	0.0193	3.6743
		T (°C)	20	5240.0400	5240	0.0400	7.6397
		T (°C)	30	5240.0033	5240	0.0033	0.6253
		T (°C)	40	5240.0138	5240	0.0138	2.6296
Limits				±20ppm			
Result				Complies			

TX Frequency (5250-5350MHz)

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5260MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5260.0652	5260	0.0652	12.4017
		V max (V)	132	5260.0445	5260	0.0445	8.4587
		V min (V)	108	5260.0649	5260	0.0649	12.3405
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5260MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5260.0029	5260	0.0029	0.5514
		T (°C)	10	5260.0129	5260	0.0129	2.4568
		T (°C)	20	5260.0440	5260	0.0440	8.3624
		T (°C)	30	5260.0753	5260	0.0753	14.3062
		T (°C)	40	5260.0203	5260	0.0203	3.8530
Limits				±20ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5280MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5280.0029	5280	0.0029	0.5473
		V max (V)	132	5280.0443	5280	0.0443	8.3983
		V min (V)	108	5280.0138	5280	0.0138	2.6231
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5280MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5280.0681	5280	0.0681	12.8885
		T (°C)	10	5280.0602	5280	0.0602	11.4022
		T (°C)	20	5280.0106	5280	0.0106	2.0129
		T (°C)	30	5280.0389	5280	0.0389	7.3716
		T (°C)	40	5280.0598	5280	0.0598	11.3183
Limits				±20ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5320MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5320.0630	5320	0.0630	11.8485
		V max (V)	132	5320.0560	5320	0.0560	10.5265
		V min (V)	108	5320.0799	5320	0.0799	15.0216
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5320MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5320.0075	5320	0.0075	1.4164
		T (°C)	-10	5320.0596	5320	0.0596	11.2030
		T (°C)	0	5320.0786	5320	0.0786	14.7801
		T (°C)	10	5320.0580	5320	0.0580	10.8954
		T (°C)	20	5320.0857	5320	0.0857	16.1184
		T (°C)	30	5320.0474	5320	0.0474	8.9038
		T (°C)	40	5320.0802	5320	0.0802	15.0814
		T (°C)	50	5320.0782	5320	0.0782	14.6956
		T (°C)	60	5320.0432	5320	0.0432	8.1276
		T (°C)	70	5320.0532	5320	0.0532	10.0019
Limits				±20ppm			
Result				Complies			

TX Frequency (5470-5725MHz)

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5500MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5500.0341	5500	0.0341	6.2035
		V max (V)	132	5500.0551	5500	0.0551	10.0234
		V min (V)	108	5500.0284	5500	0.0284	5.1581
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5500MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5500.0451	5500	0.0451	8.1920
		T (°C)	10	5500.0481	5500	0.0481	8.7370
		T (°C)	20	5500.0853	5500	0.0853	15.5018
		T (°C)	30	5500.0571	5500	0.0571	10.3875
		T (°C)	40	5500.0004	5500	0.0004	0.0660
Limits				±20ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5580MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5580.0026	5580	0.0026	0.4657
		V max (V)	132	5580.0226	5580	0.0226	4.0551
		V min (V)	108	5580.0484	5580	0.0484	8.6773
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5580MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5580.0626	5580	0.0626	11.2172
		T (°C)	10	5580.0279	5580	0.0279	5.0064
		T (°C)	20	5580.0629	5580	0.0629	11.2653
		T (°C)	30	5580.0653	5580	0.0653	11.6980
		T (°C)	40	5580.0689	5580	0.0689	12.3404
Limits				±20ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5700MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5700.0388	5700	0.0388	6.8034
		V max (V)	132	5700.0140	5700	0.0140	2.4624
		V min (V)	108	5700.0333	5700	0.0333	5.8444
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5700MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	0	5700.0191	5700	0.0191	3.3514
		T (°C)	10	5700.0105	5700	0.0105	1.8335
		T (°C)	20	5700.0233	5700	0.0233	4.0932
		T (°C)	30	5700.0431	5700	0.0431	7.5546
		T (°C)	40	5700.0476	5700	0.0476	8.3533
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	5745.0001	5745	0.0001	0.0163
		V max (V)	132	5745.0717	5745	0.0717	12.4833
		V min (V)	108	5745.0829	5745	0.0829	14.4352
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	5745.0637	5745	0.0637	11.0797
		T (°C)	10	5745.0682	5745	0.0682	11.8744
		T (°C)	20	5745.0921	5745	0.0921	16.0326
		T (°C)	30	5745.0749	5745	0.0749	13.0384
		T (°C)	40	5745.0812	5745	0.0812	14.1353
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	5785.0520	5785	0.0520	8.9878
		V max (V)	132	5785.0560	5785	0.0560	9.6859
		V min (V)	108	5785.0221	5785	0.0221	3.8288
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	5785.0927	5785	0.0927	16.0213
		T (°C)	10	5785.0277	5785	0.0277	4.7845
		T (°C)	20	5785.0404	5785	0.0404	6.9890
		T (°C)	30	5785.0930	5785	0.0930	16.0681
		T (°C)	40	5785.0061	5785	0.0061	1.0544
		T (°C)	50	5785.0823	5785	0.0823	14.2325
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	5825.0719	5825	0.0719	12.3492
		V max (V)	132	5825.0886	5825	0.0886	15.2021
		V min (V)	108	5825.0080	5825	0.0080	1.3680
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	5825.0264	5825	0.0264	4.5252
		T (°C)	10	5825.0768	5825	0.0768	13.1849
		T (°C)	20	5825.0856	5825	0.0856	14.6969
		T (°C)	30	5825.0796	5825	0.0796	13.6599
		T (°C)	40	5825.0129	5825	0.0129	2.2167
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 Dipole antenna and no consideration of replacement. The best case gain of the antenna is
WiFi (5G) module1:
WiFi (5.2G): ANT1: 2.56dBi, ANT2: 2.56dBi
WiFi (5.3G): ANT1: 3.2dBi, ANT2: 3.2dBi
WiFi (5.6G): ANT1: 2.87dBi, ANT2: 2.87dBi
WiFi (5.8G): ANT1: 3.43dBi, ANT2: 3.43dBi
WiFi (5G) module2 (OPS computer):
WiFi (5.2G): 1.11dBi
WiFi (5.3G): 2.68dBi
WiFi (5.6G): 5.40dBi
WiFi (5.8G): 4.26dBi

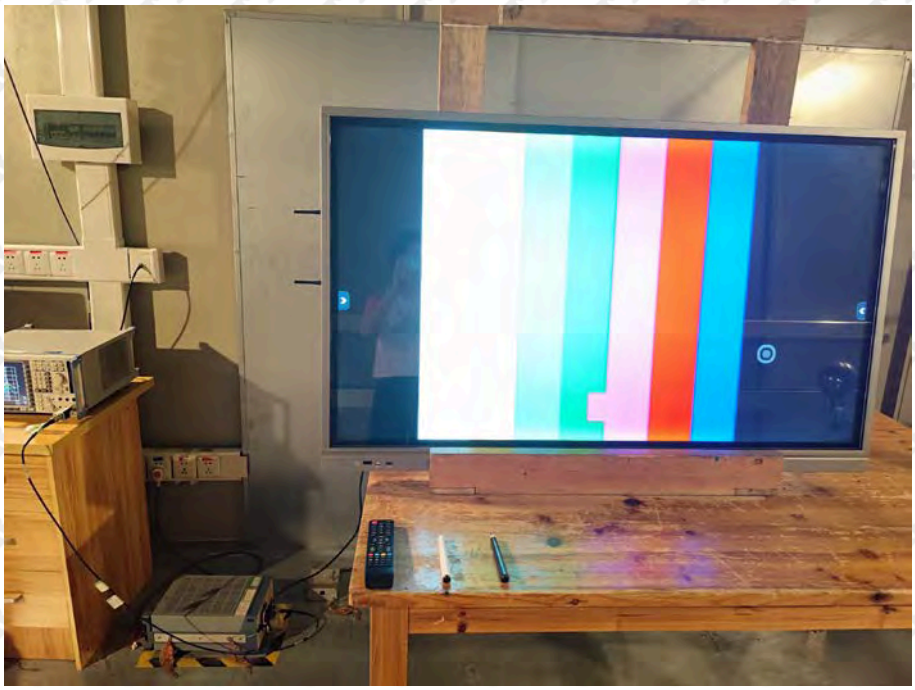
15. EUT TEST SETUP PHOTOGRAPHS

Spurious emissions

Below 1G

Above 1G

Conducted emissions



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