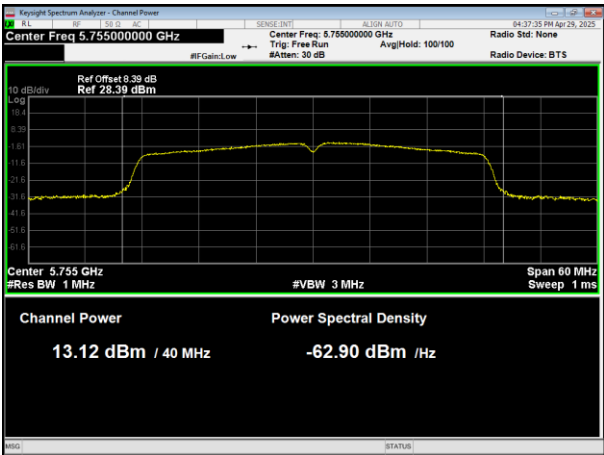
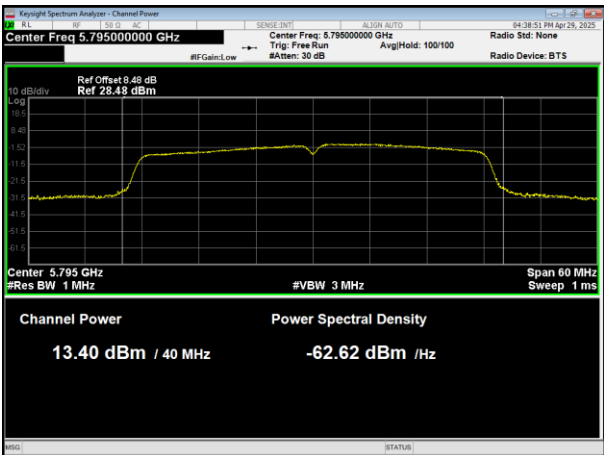




802.11n HT40



5755MHz



5795MHz



5.. POWER SPECTRAL DENSITY TEST

5.1. APPLIED PROCEDURES / LIMIT

In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

In addition, the maximum power spectral density shall not exceed 30 dBm in any 500 kHz band.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	= the frequency band of operation
RB	RBW $\geq$ 1MHz for band 1 RBW $\geq$ 510KHz for band 4
VB	VBW $\geq$ 3RBW
Detector	RMS (i.e., power averaging).
Trace	Average
Sweep Time	Auto

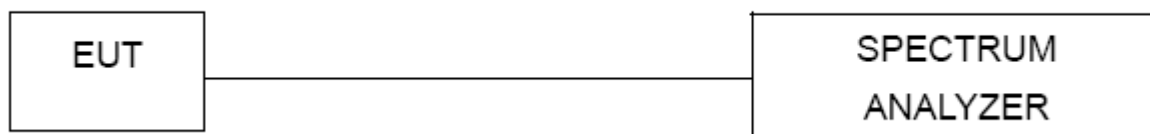
5.1.1. TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to Spectrum.
4. For U-NII1, U-NII-2A, U-NII-2C Band:
Set RBW=1MHz, VBW=3MHz, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)
For U-NII-3 Band:
Set RBW=510 kHz, VBW=3*RBW, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)
5. Use the cursor on spectrum to peak search the highest level of trace
6. Record the max. reading and add 10 log(1/duty cycle).
we test all antennas, the antenna 1 was worst mode and the data recording in the report.
7. Duty factor Reference is made to the test results in Section 7.1.5.

5.1.2. DEVIATION FROM STANDARD

No deviation.

5.1.3. TEST SETUP



5.1.4. EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



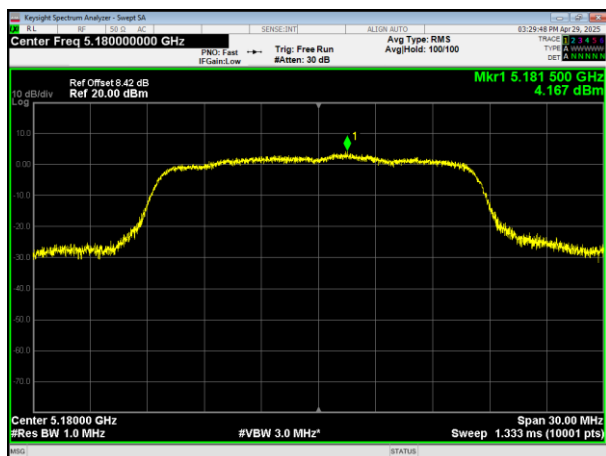
5.1.5. TEST RESULTS

	Mode	Test Channel	Reading Level (dBm/MHz)	Duty factor (dB)	PSD (dBm/MHz)	Limit (dBm)	Result
Band1	802.11a	Low	4.167	0.87	5.037	11.00	PASS
		Middle	3.142	1.12	4.262	11.00	PASS
		High	5.496	0.87	6.366	11.00	PASS
	802.11ac20	Low	3.816	0.13	3.946	11.00	PASS
		Middle	3.46	0.13	3.59	11.00	PASS
		High	6.206	0.13	6.336	11.00	PASS
	802.11ac40	Low	2.08	0.32	2.4	11.00	PASS
		High	1.821	0.26	2.081	11.00	PASS
	802.11n20	Low	3.891	0.13	4.021	11.00	PASS
		Middle	3.08	0.16	3.24	11.00	PASS
		High	5.761	0.13	5.891	11.00	PASS
	802.11n40	Low	2.015	0.32	2.335	11.00	PASS
		High	1.481	0.32	1.801	11.00	PASS

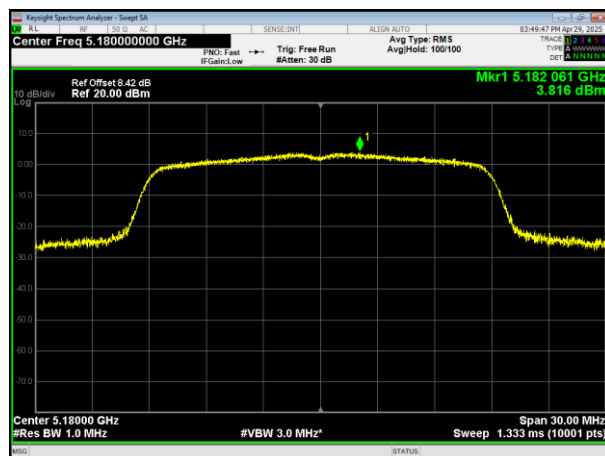
	Mode	Test Channel	Reading Level (dBm/510kHz)	Duty factor (dB)	PSD (dBm/500kHz)	Limit (dBm/500kHz)	Result
Band4	802.11a	Low	-0.307	0.87	0.563	30.00	PASS
		Middle	-0.746	0.87	0.124	30.00	PASS
		High	0.386	0.87	1.256	30.00	PASS
	802.11ac20	Low	0.862	0.16	1.022	30.00	PASS
		Middle	-0.289	0.13	-0.159	30.00	PASS
		High	0.585	0.16	0.745	30.00	PASS
	802.11ac40	Low	-1.634	0.26	-1.374	30.00	PASS
		High	-1.608	0.32	-1.288	30.00	PASS
	802.11n20	Low	0.057	0.16	0.217	30.00	PASS
		Middle	-0.416	0.13	-0.286	30.00	PASS
		High	0.627	0.13	0.757	30.00	PASS
	802.11n40	Low	-1.514	0.26	-1.254	30.00	PASS
		High	-2.026	0.26	-1.766	30.00	PASS



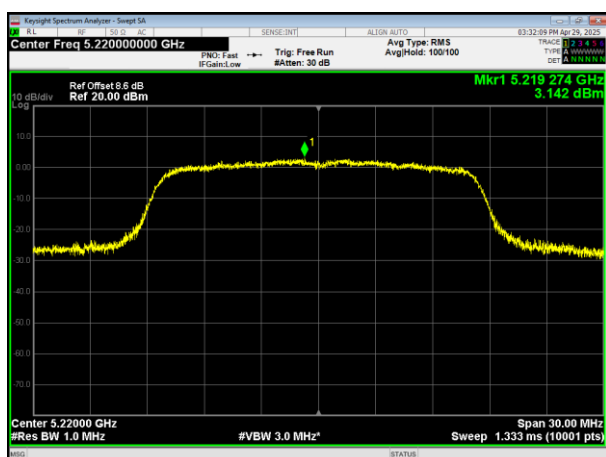
802.11a



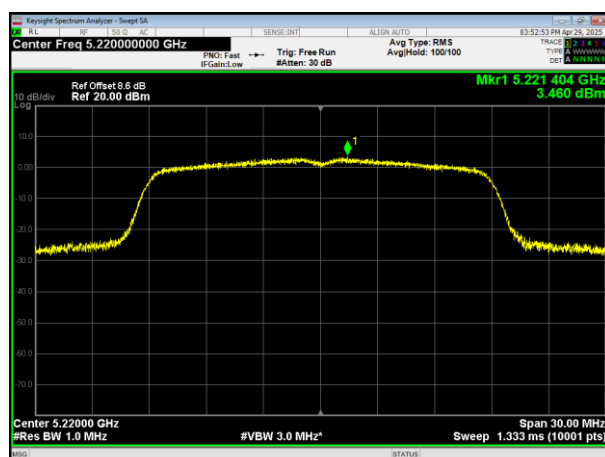
802.11ac HT20



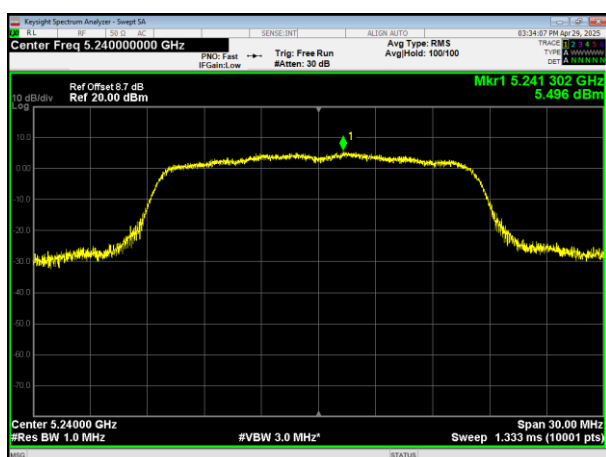
5180MHz



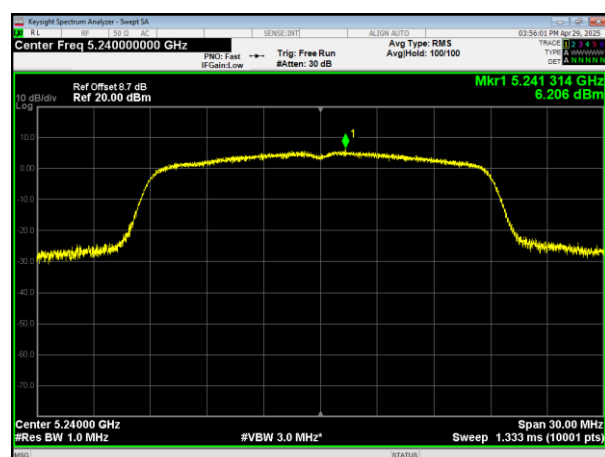
5180MHz



5200MHz



5200MHz

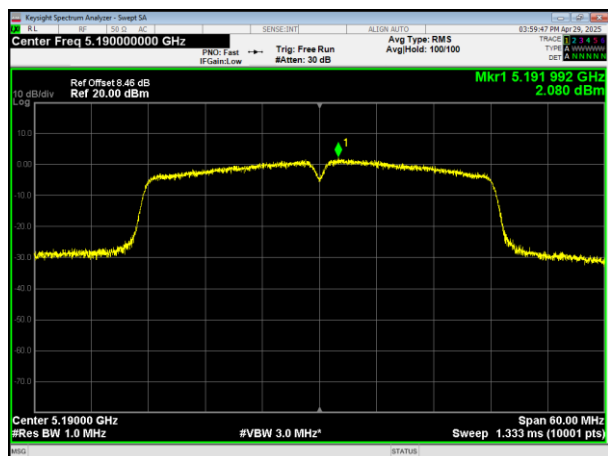


5240MHz

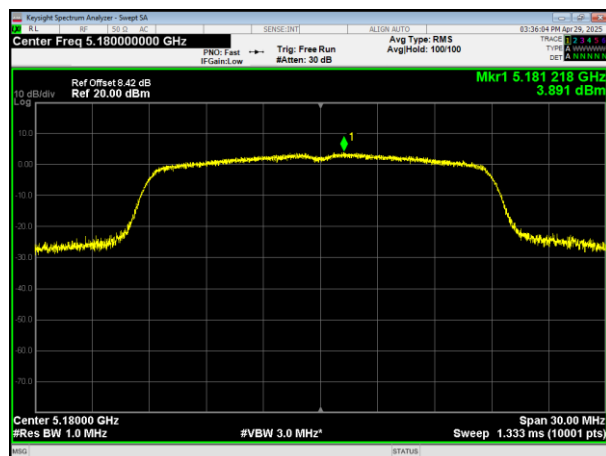
5240MHz



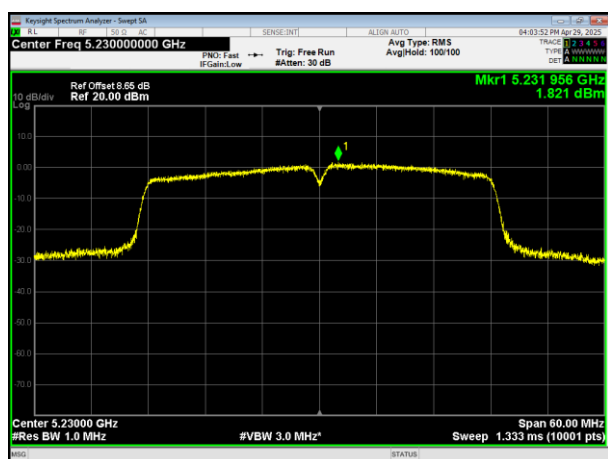
802.11ac HT40



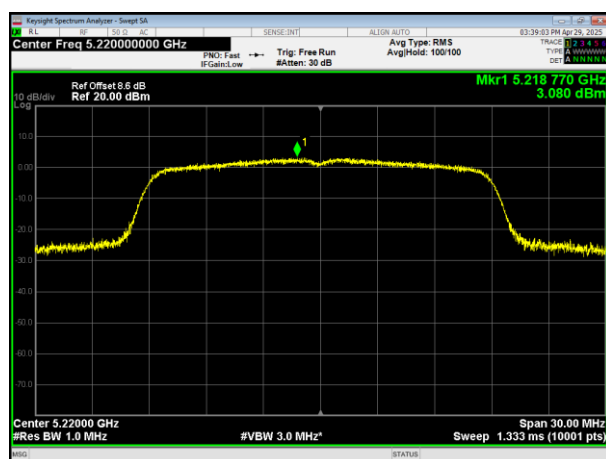
802.11n HT20



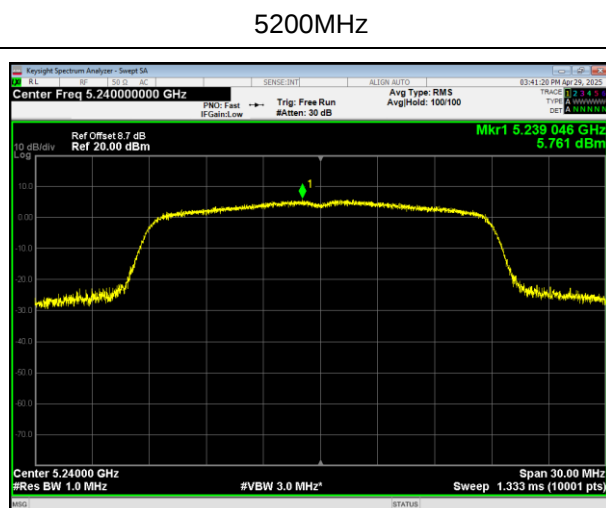
5190MHz



5180MHz



5230MHz

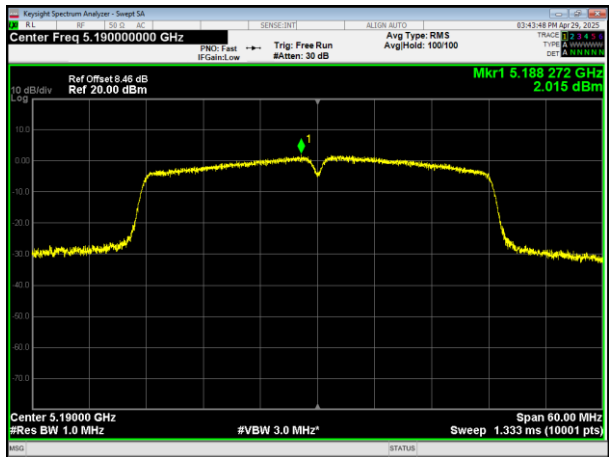


5200MHz

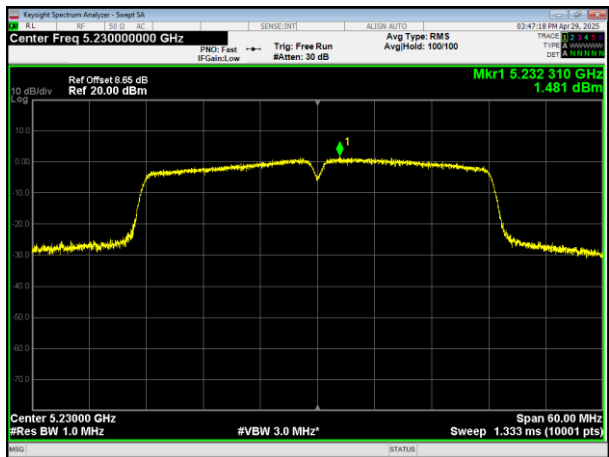
5240MHz



802.11n HT40



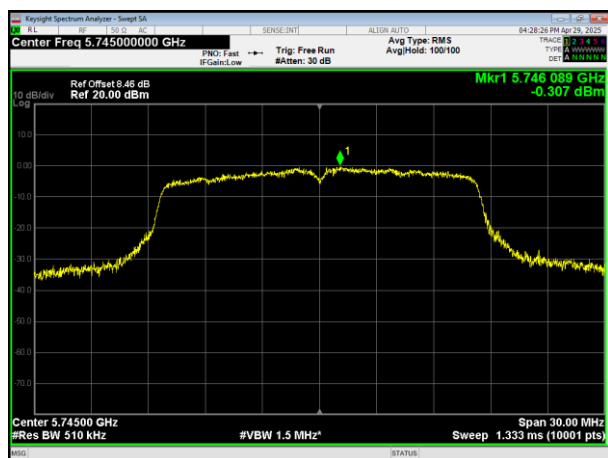
5190MHz



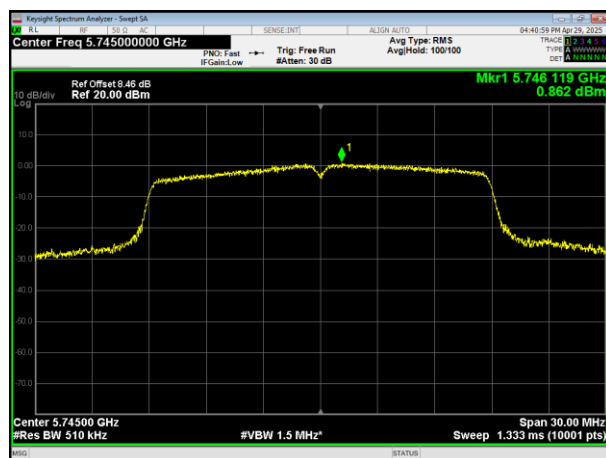
5230MHz



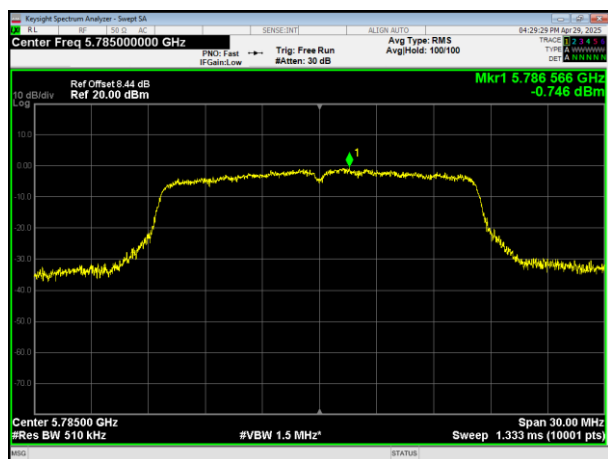
802.11a



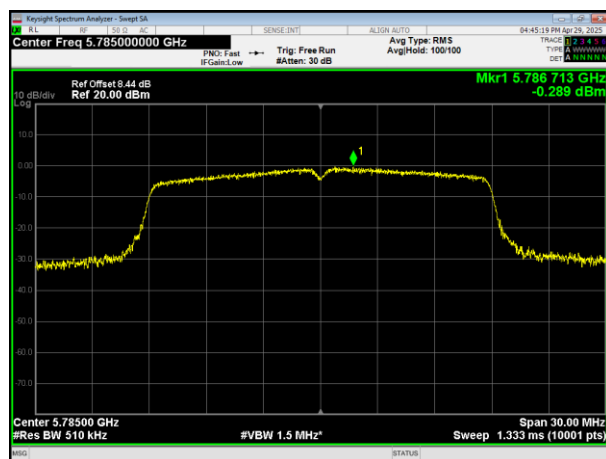
802.11ac HT20



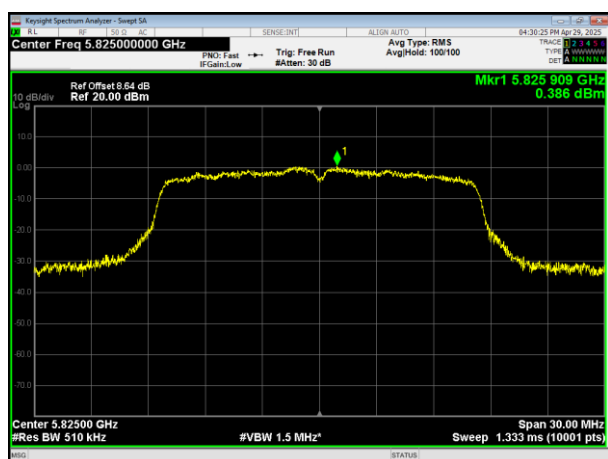
5745MHz



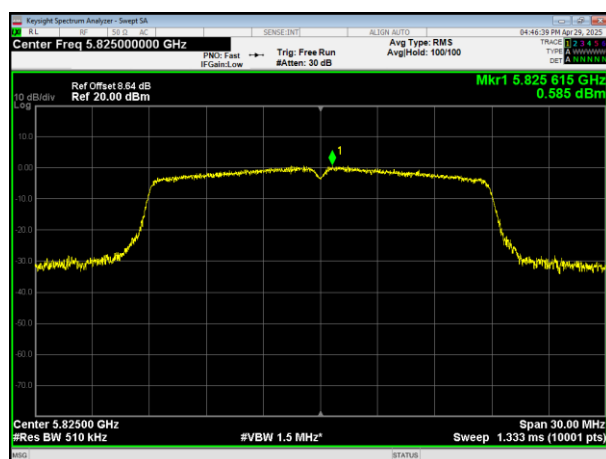
5745MHz



5785MHz



5785MHz

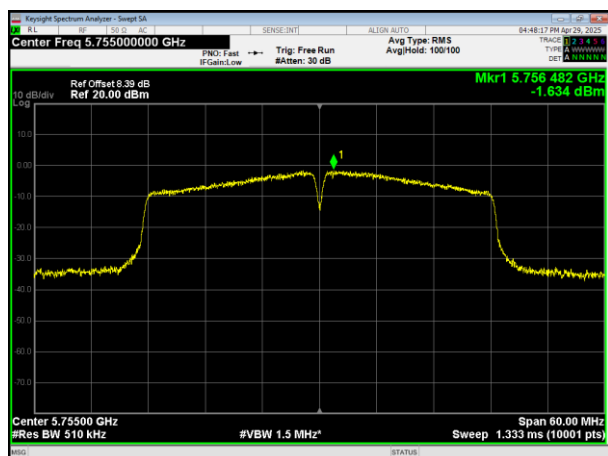


5825MHz

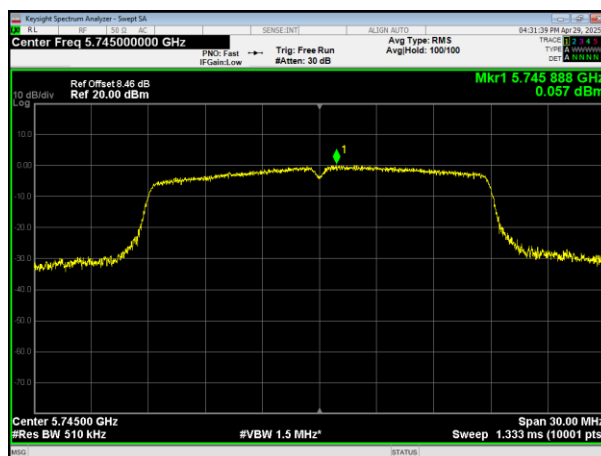
5825MHz



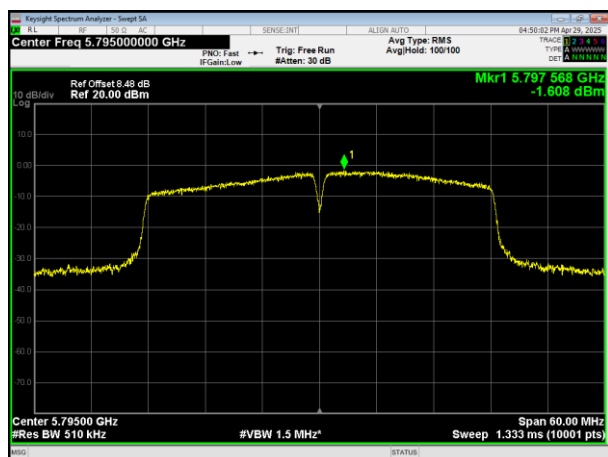
802.11ac HT40



802.11n HT20



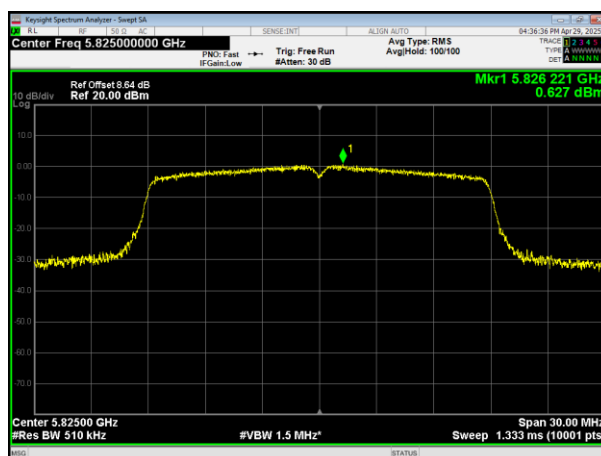
5755MHz



5745MHz



5795MHz

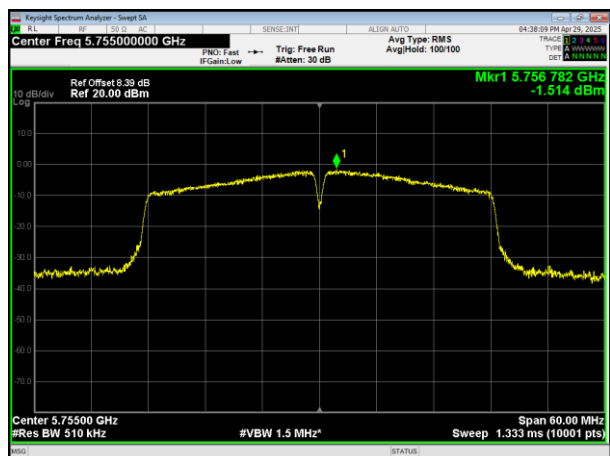


5785MHz

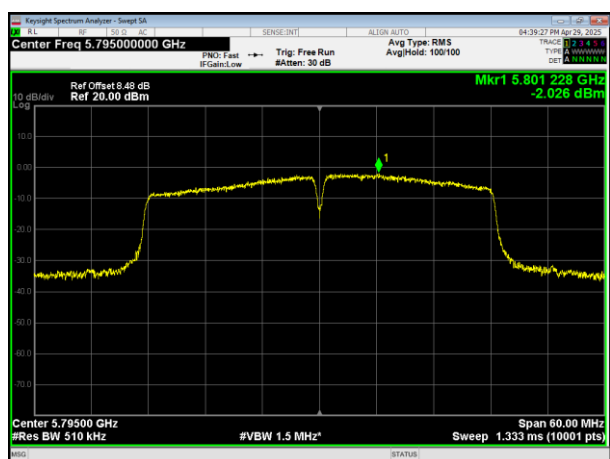
5825MHz



802.11n HT40



5755MHz



5795MHz



6.. 6DB&26DB&99% BANDWIDTH TEST

6.1. APPLIED PROCEDURES / LIMIT

The 26 dB bandwidth is used to determine the conducted power limits.

There is no limit bandwidth for U-NII-1, U-NII-2-A and U-NII-2-C.

The minimum of 6dB Bandwidth measurement is 0.5 MHz for U-NII-3

6.1.1. TEST PROCEDURE

6dB Bandwidth	
Spectrum Parameters	Setting
RBW	100KHz
VBW	300KHz
Span	30MHz(20MHz Bandwidth mode) 60MHz(40MHz Bandwidth mode) 120MHz(80MHz Bandwidth mode)
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

26dB Bandwidth	
Spectrum Parameters	Setting
RBW	approximately 1% of the emission bandwidth
VBW	>RBW
Span	30MHz(20MHz Bandwidth mode) 60MHz(40MHz Bandwidth mode) 120MHz(80MHz Bandwidth mode)
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

99% Occupied Bandwidth	
Spectrum Parameters	Setting
RBW	1% to 5% of the OBW
VBW	Approximately three times the RBW
Span	between 1.5 times and 5.0 times the OBW
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

6.1.2. DEVIATION FROM STANDARD

No deviation.

6.1.3. TEST SETUP





6.1.4. EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

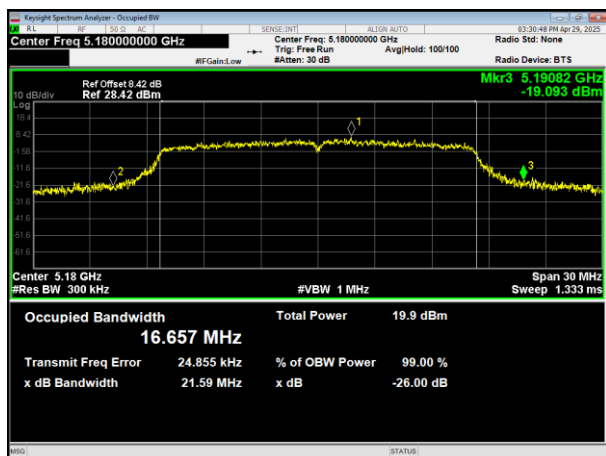
6.1.5. TEST RESULTS

		Test Channel	26dB Bandwidth (MHz)	Result
Band 1	802.11a	Low	21.59	Pass
		Middle	28.223	Pass
		High	20.328	Pass
	802.11ac HT20	Low	29.574	Pass
		Middle	29.871	Pass
		High	25.079	Pass
	802.11ac HT40	Low	51.024	Pass
		High	55.856	Pass
	802.11n HT20	Low	29.228	Pass
		Middle	29.557	Pass
		High	28.847	Pass
	802.11n HT40	Low	51.98	Pass
		High	56.761	Pass

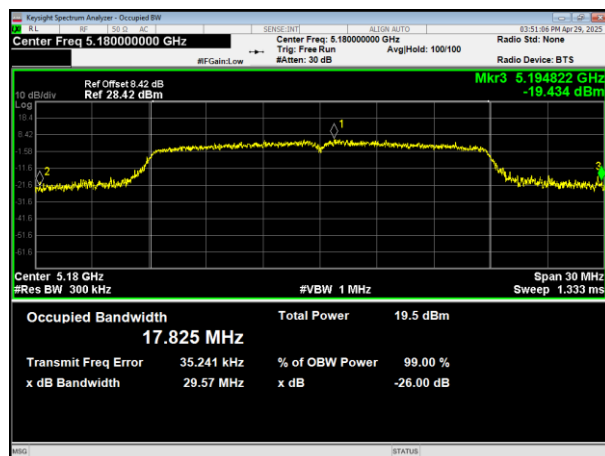
		Test Channel	6dB Bandwidth (MHz)	6dB Bandwidth Limit (MHz)	Result
Band 4	802.11a	Low	15.758	>0.5	Pass
		Middle	15.774	>0.5	Pass
		High	16.257	>0.5	Pass
	802.11ac HT20	Low	14.048	>0.5	Pass
		Middle	16.591	>0.5	Pass
		High	15.053	>0.5	Pass
	802.11ac HT40	Low	28.74	>0.5	Pass
		High	31.327	>0.5	Pass
	802.11n HT20	Low	15.084	>0.5	Pass
		Middle	15.927	>0.5	Pass
		High	17.501	>0.5	Pass
	802.11n HT40	Low	28.747	>0.5	Pass
		High	32.523	>0.5	Pass



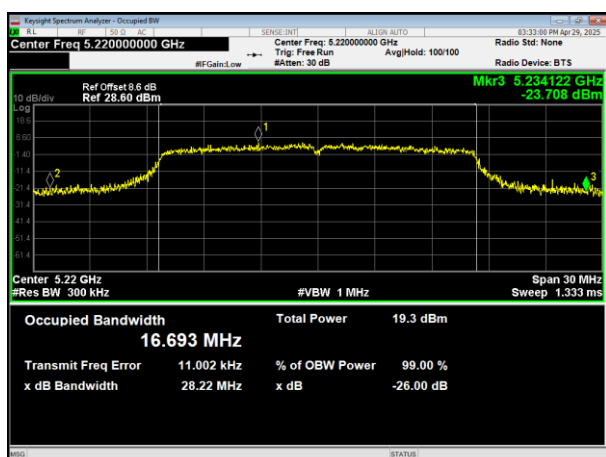
802.11a



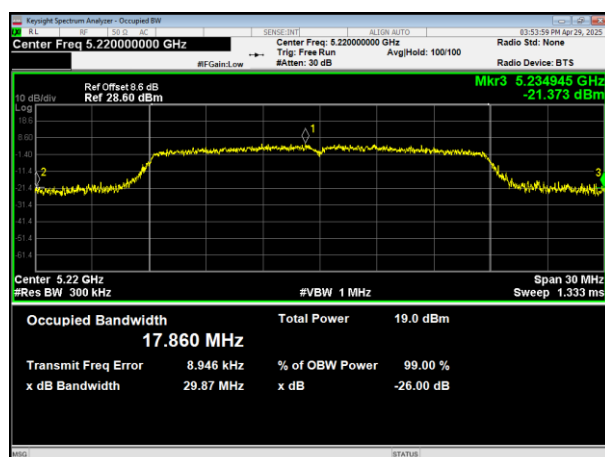
802.11ac HT20



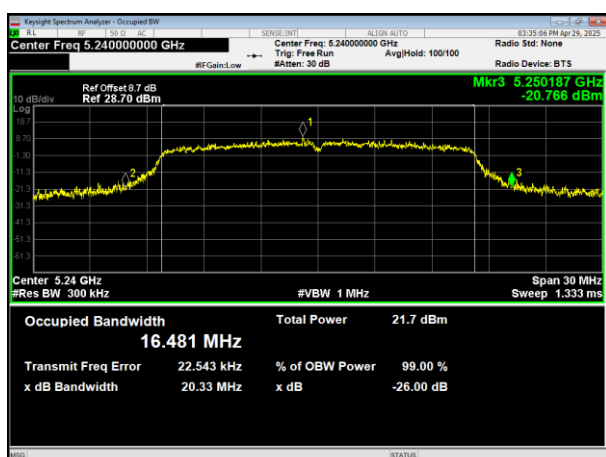
5180MHz



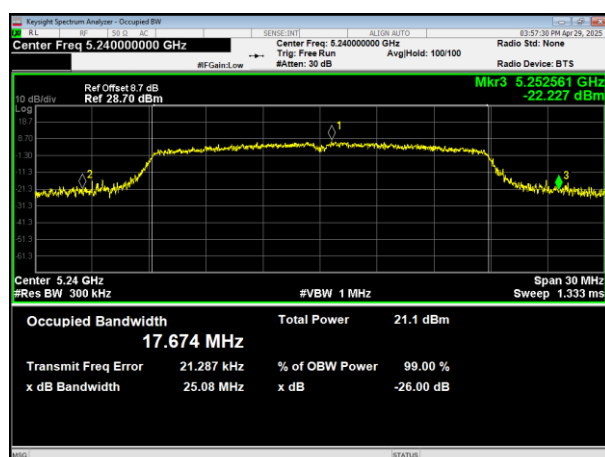
5180MHz



5200MHz



5200MHz

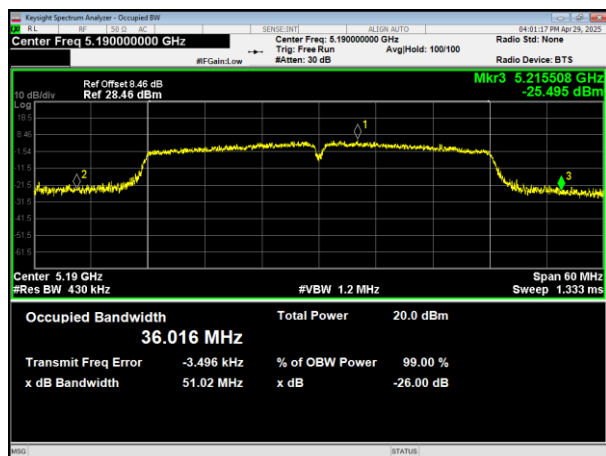


5240MHz

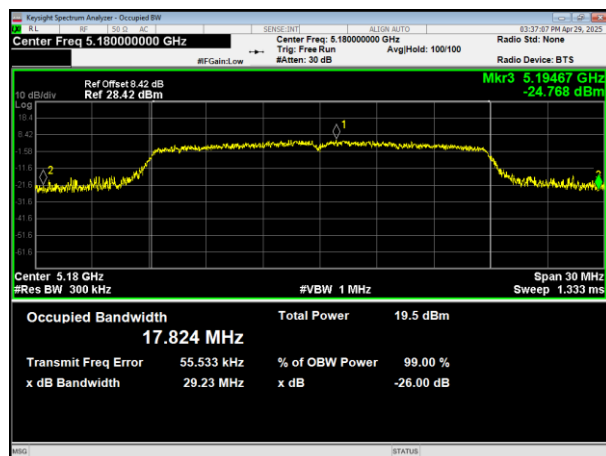
5240MHz



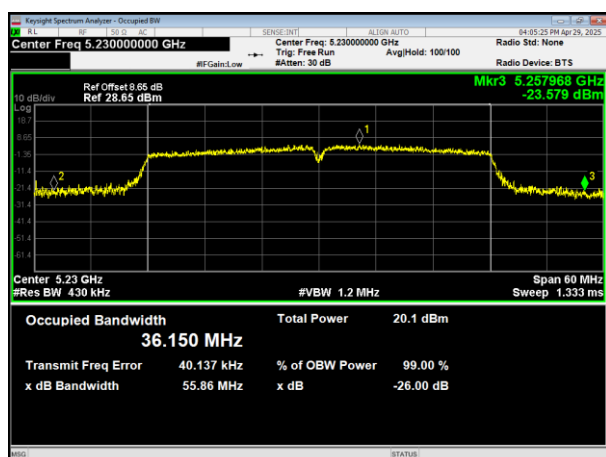
802.11ac HT40



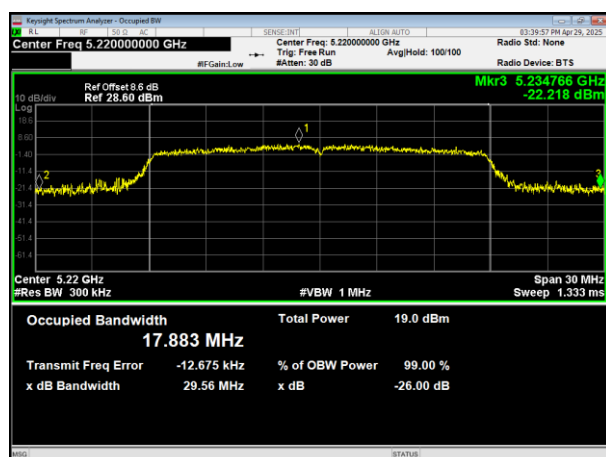
802.11n HT20



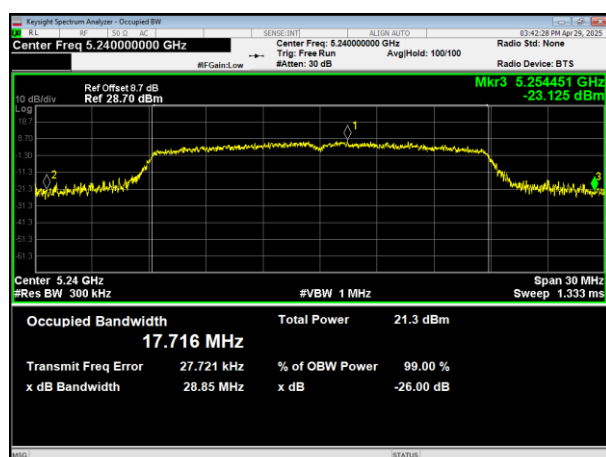
5190MHz



5180MHz



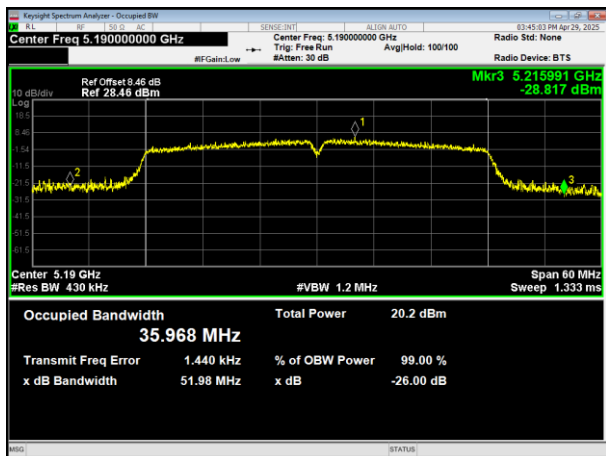
5230MHz



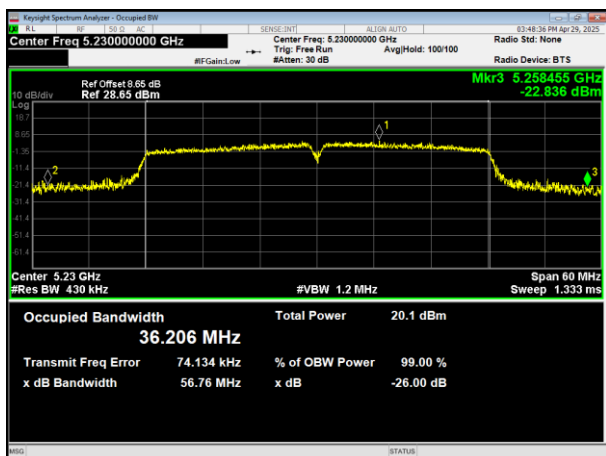
5240MHz



802.11n HT40



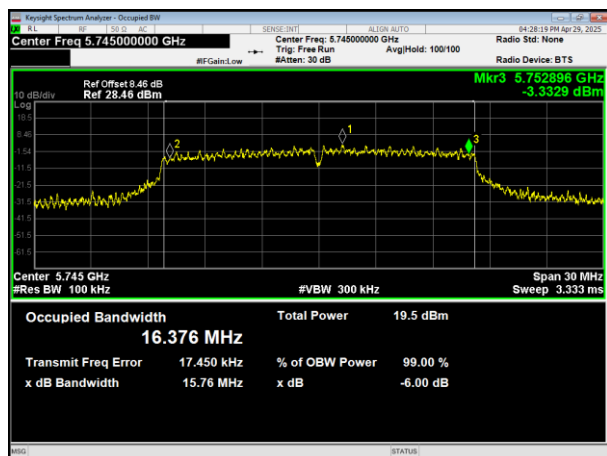
5190MHz



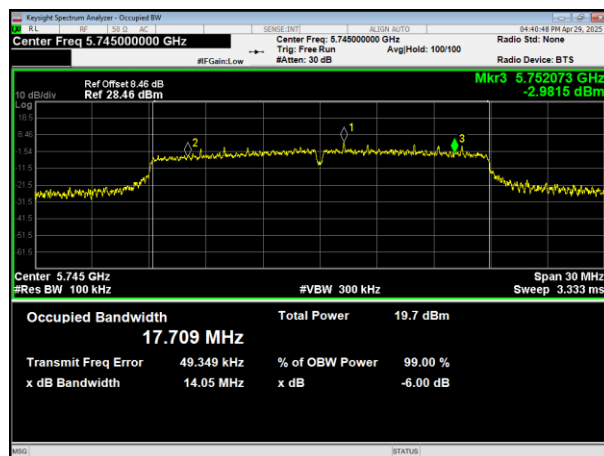
5230MHz



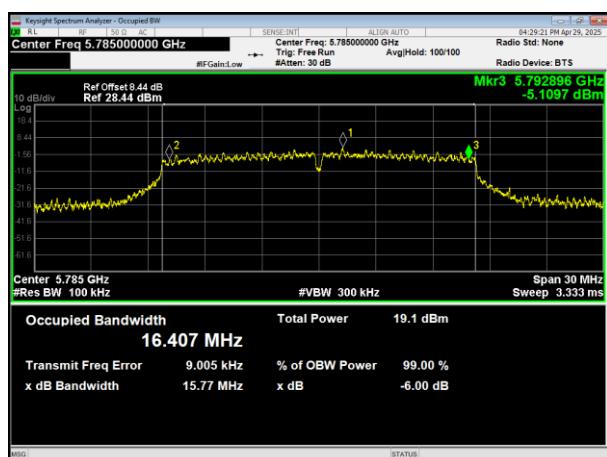
802.11a



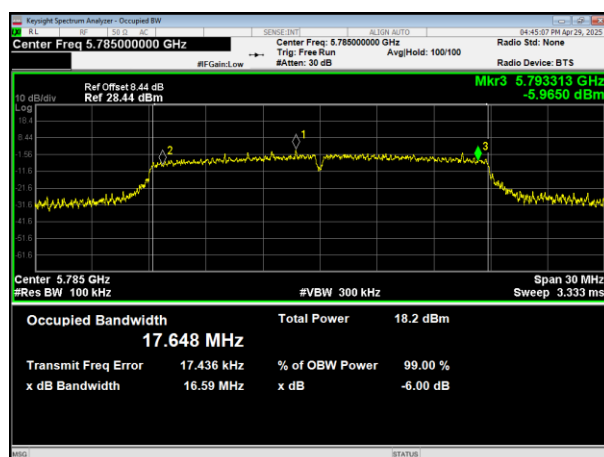
802.11ac HT20



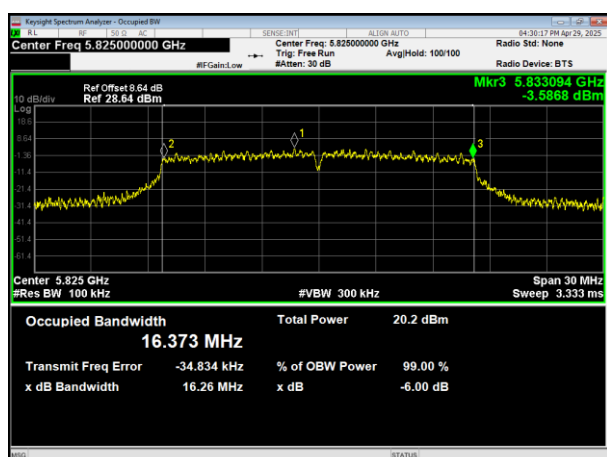
5745MHz



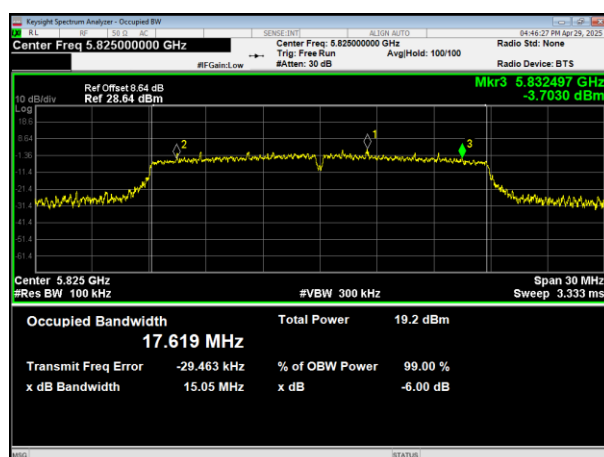
5745MHz



5785MHz



5785MHz

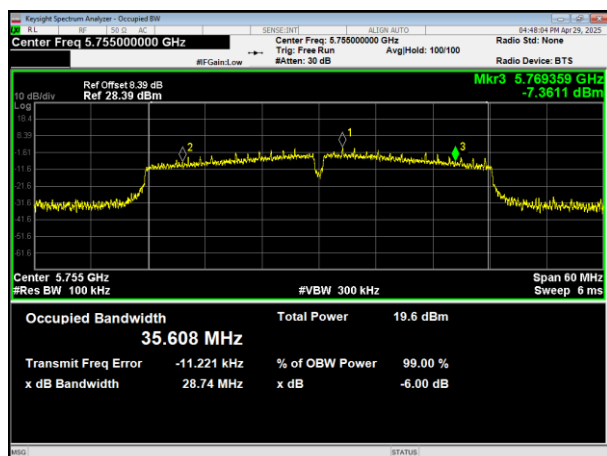


5825MHz

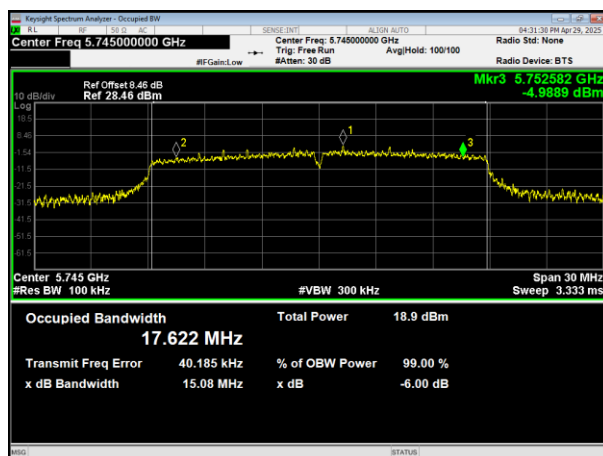
5825MHz



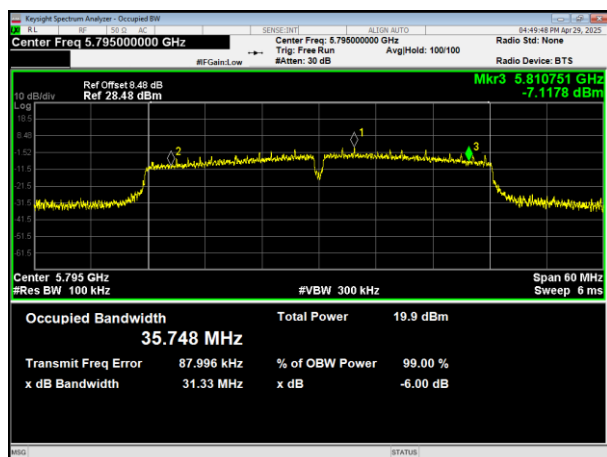
802.11ac HT40



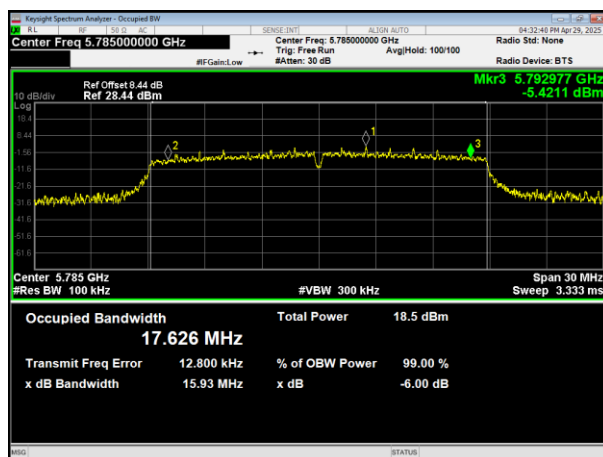
802.11n HT20



5755MHz



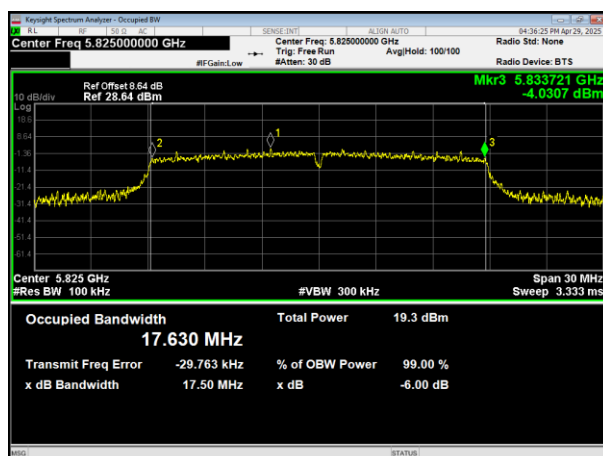
5745MHz



5795MHz



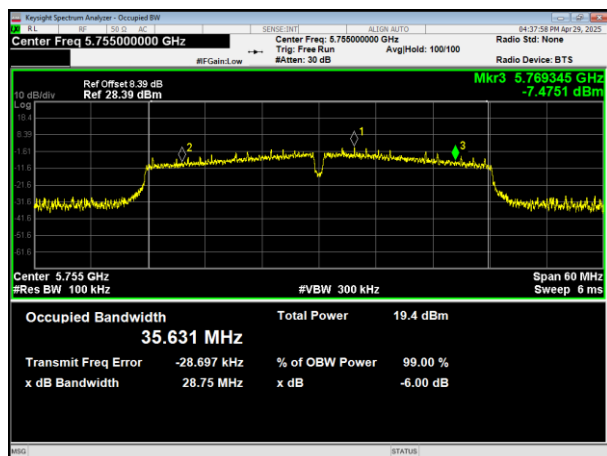
5785MHz



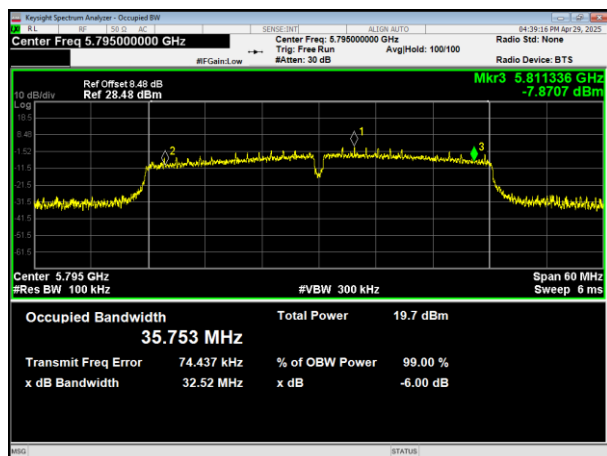
5825MHz



802.11n HT40



5755MHz



5795MHz



7.. DUTY CYCLE TEST SIGNAL

7.1. APPLIED PROCEDURES / LIMIT

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle. All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

7.1.1. TEST PROCEDURE

1. Set RBW = 1 MHz.
2. Set the video bandwidth (VBW) $\geq$ RBW.
3. Detector = Peak.
4. Sweep = auto couple.
5. Allow the trace to stabilize.
6. Span=0

7.1.2. DEVIATION FROM STANDARD

No deviation.

7.1.3. TEST SETUP



7.1.4. EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



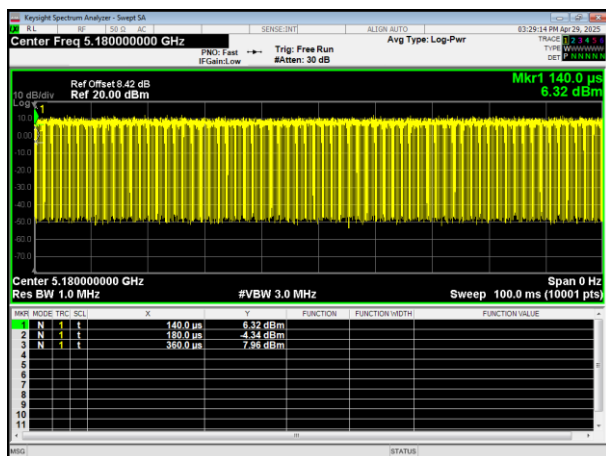
7.1.5. TEST RESULTS

		Test Channel	Duty Cycle(%)	Duty Fator (dB) 10 * log (1/ Duty cycle)
Band 1	802.11a	Low	81.82	0.87
		Middle	77.27	1.12
		High	81.82	0.87
	802.11ac HT20	Low	97.04	0.13
		Middle	97.06	0.13
		High	97.06	0.13
	802.11ac HT40	Low	92.86	0.32
		High	94.29	0.26
	802.11n HT20	Low	97.01	0.13
		Middle	96.3	0.16
		High	97.01	0.13
	802.11n HT40	Low	92.86	0.32
		High	92.86	0.32

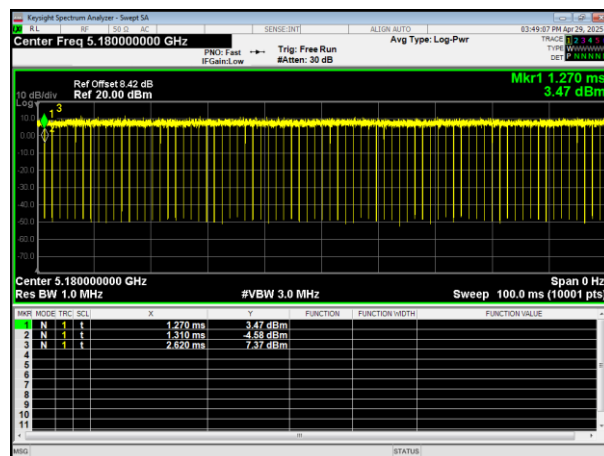
		Test Channel	Duty Cycle(%)	Duty Fator (dB) 10 * log (1/ Duty cycle)
Band 4	802.11a	Low	81.82	0.87
		Middle	81.82	0.87
		High	81.82	0.87
	802.11ac HT20	Low	96.32	0.16
		Middle	97.06	0.13
		High	96.32	0.16
	802.11ac HT40	Low	94.29	0.26
		High	92.86	0.32
	802.11n HT20	Low	96.3	0.16
		Middle	97.01	0.13
		High	97.01	0.13
	802.11n HT40	Low	94.2	0.26
		High	94.2	0.26



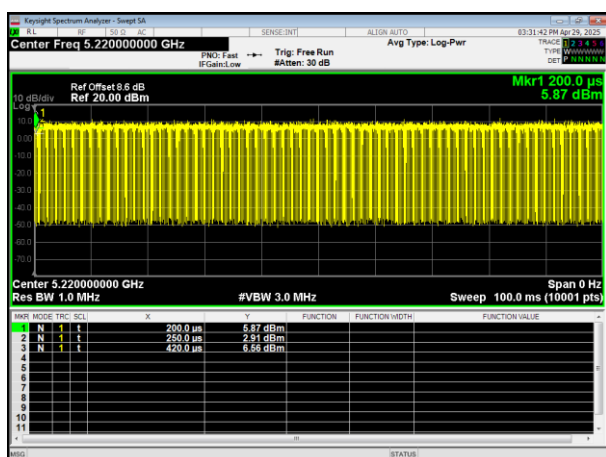
802.11a



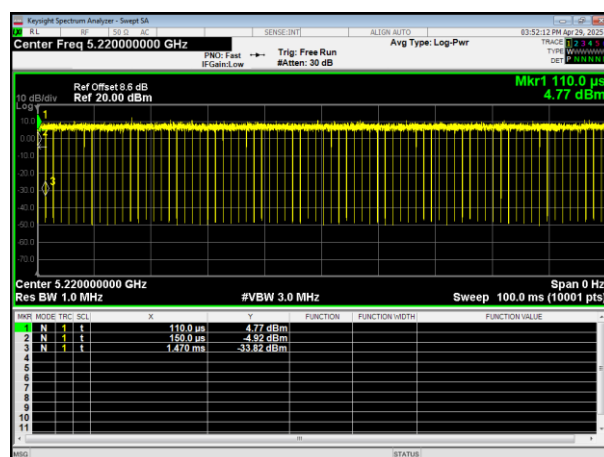
802.11ac HT20



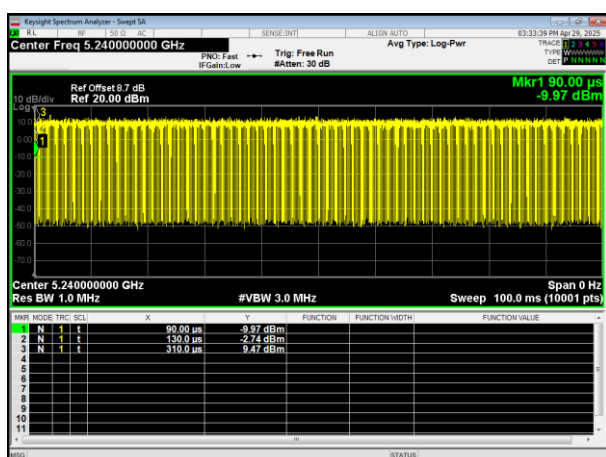
5180MHz



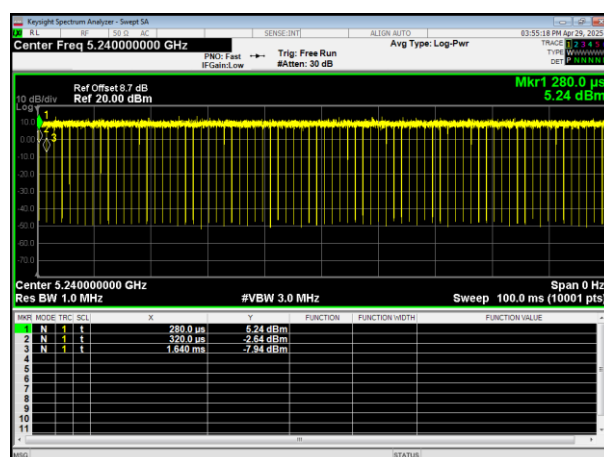
5180MHz



5200MHz



5200MHz



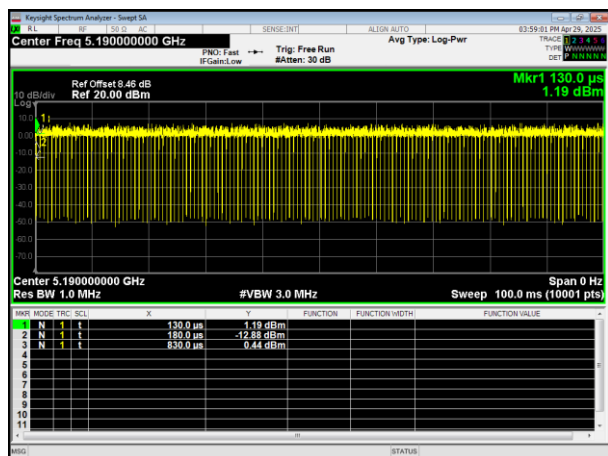
5240MHz



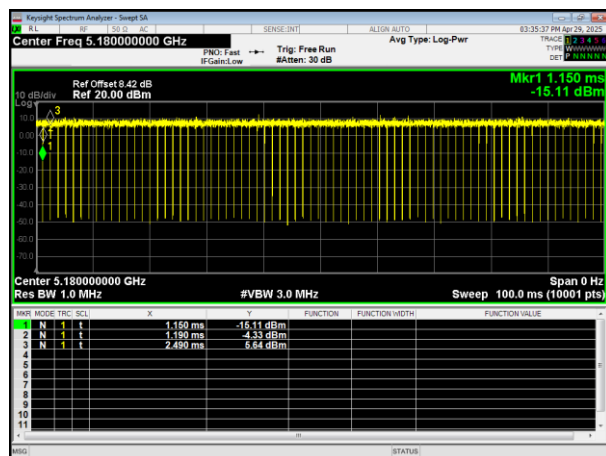
5240MHz



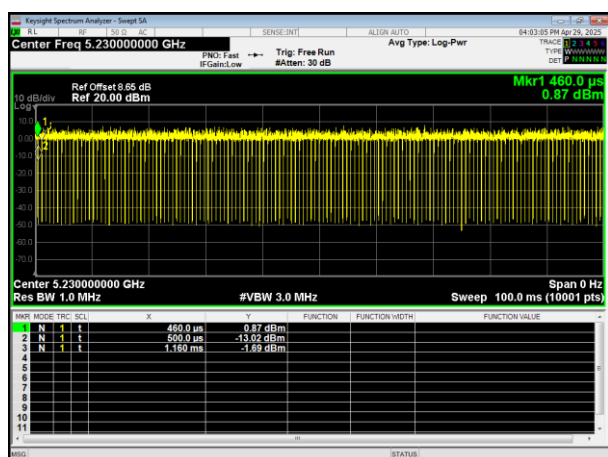
802.11ac HT40



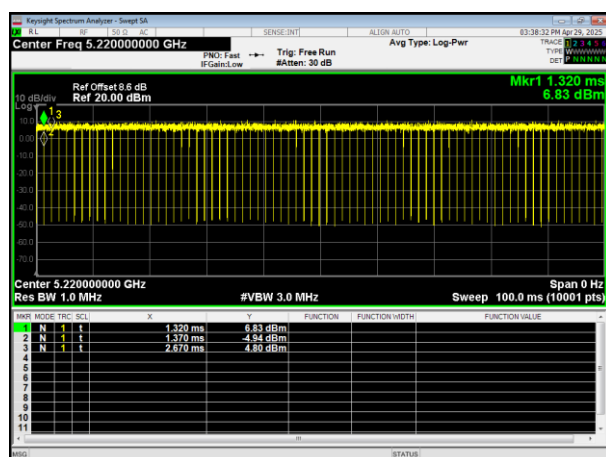
802.11n HT20



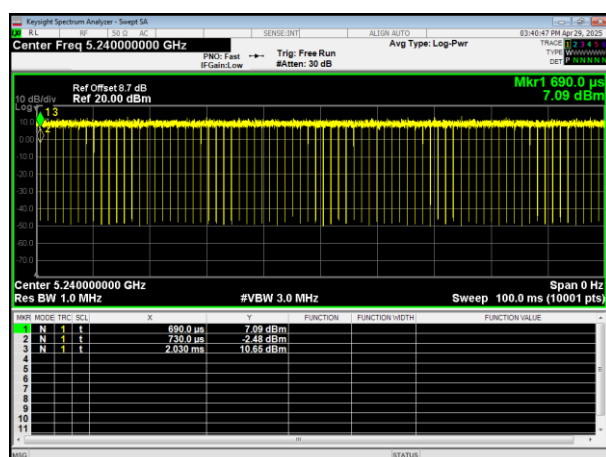
5190MHz



5180MHz



5230MHz

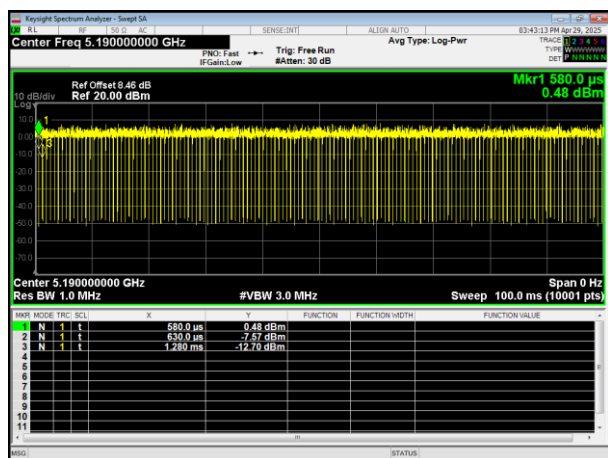


5200MHz

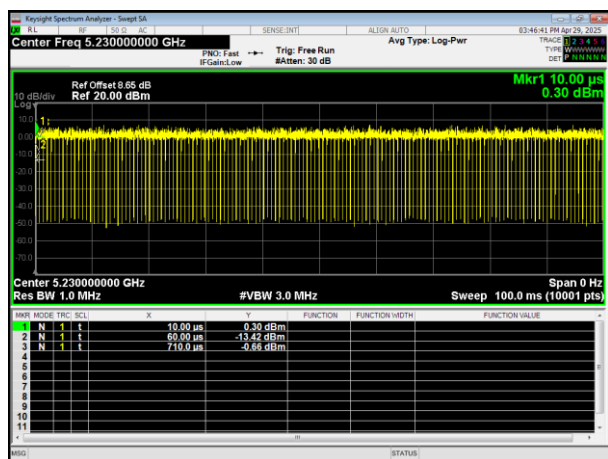
5240MHz



802.11n HT40



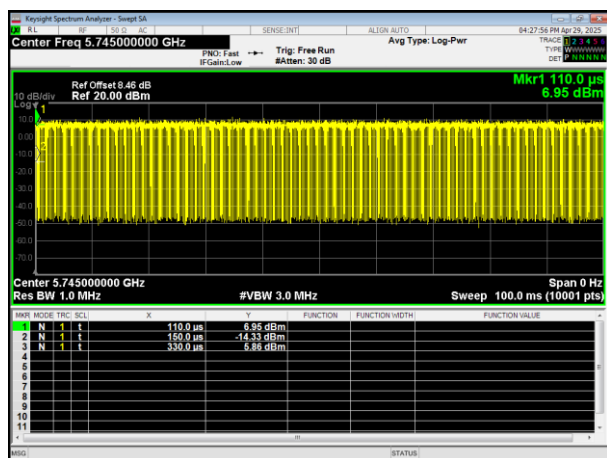
5190MHz



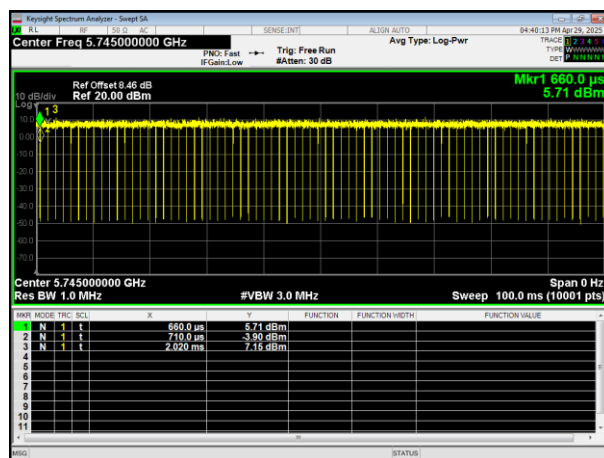
5230MHz



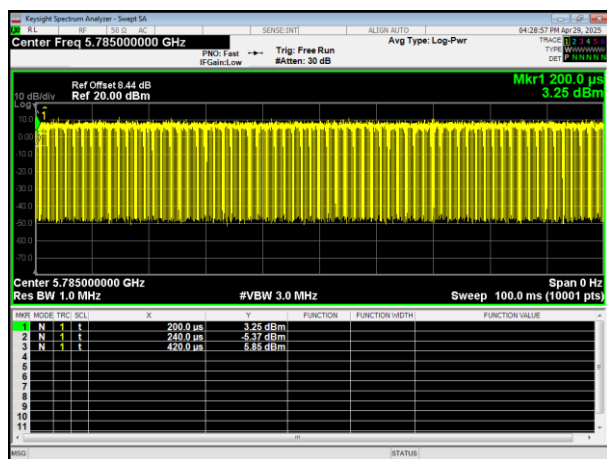
802.11a



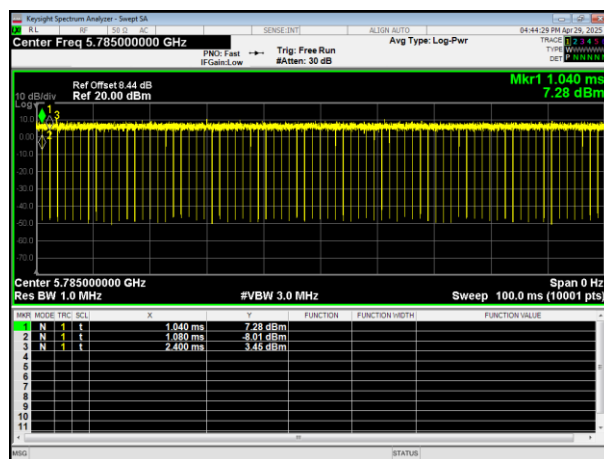
802.11ac HT20



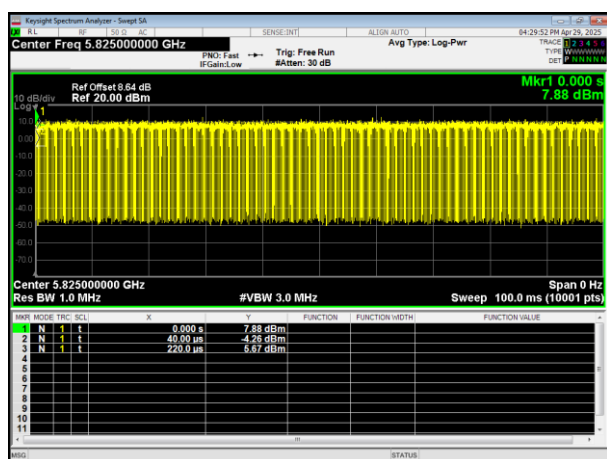
5745MHz



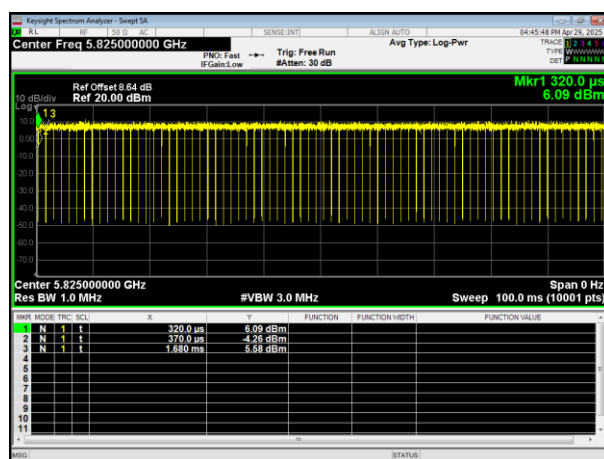
5745MHz



5785MHz



5785MHz

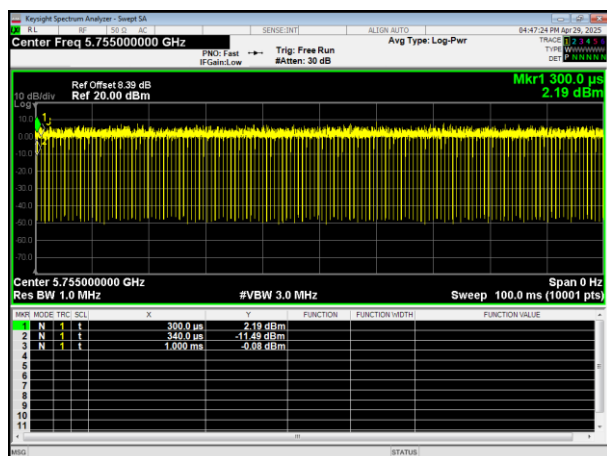


5825MHz

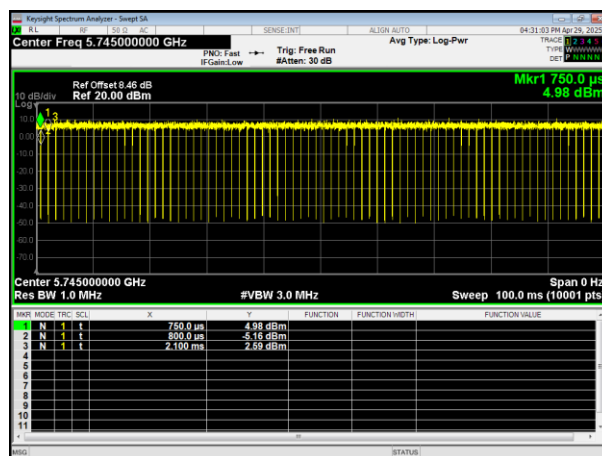
5825MHz



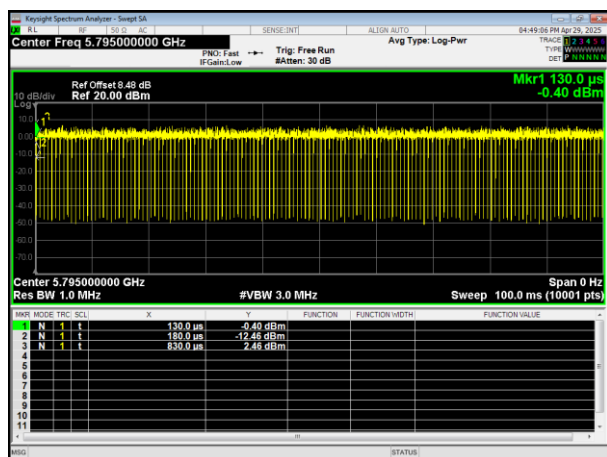
802.11ac HT40



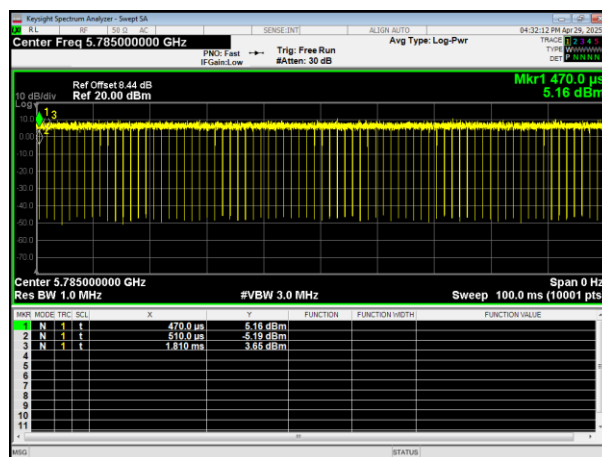
802.11n HT20



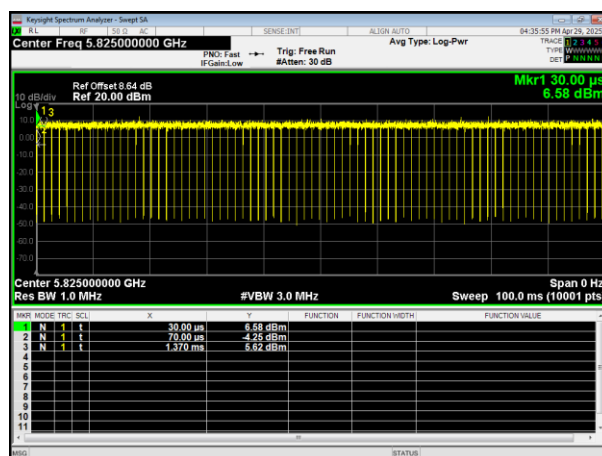
5755MHz



5745MHz



5795MHz

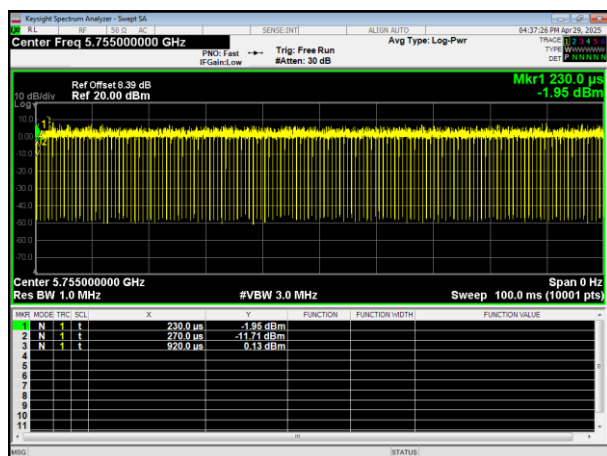


5785MHz

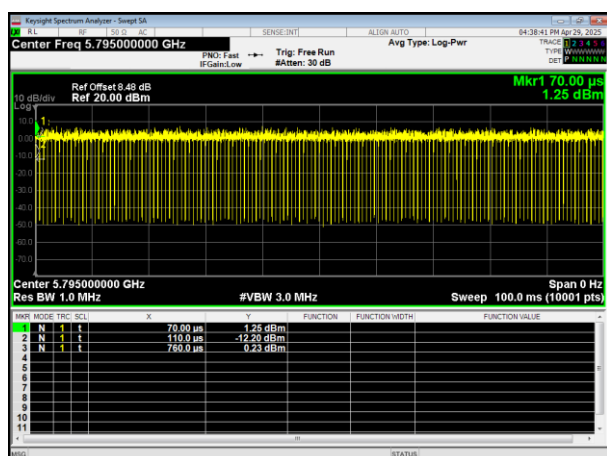
5825MHz



802.11n HT40



5755MHz



5795MHz



8.. FREQUENCY STABILITY

8.1. APPLIED PROCEDURES / 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.

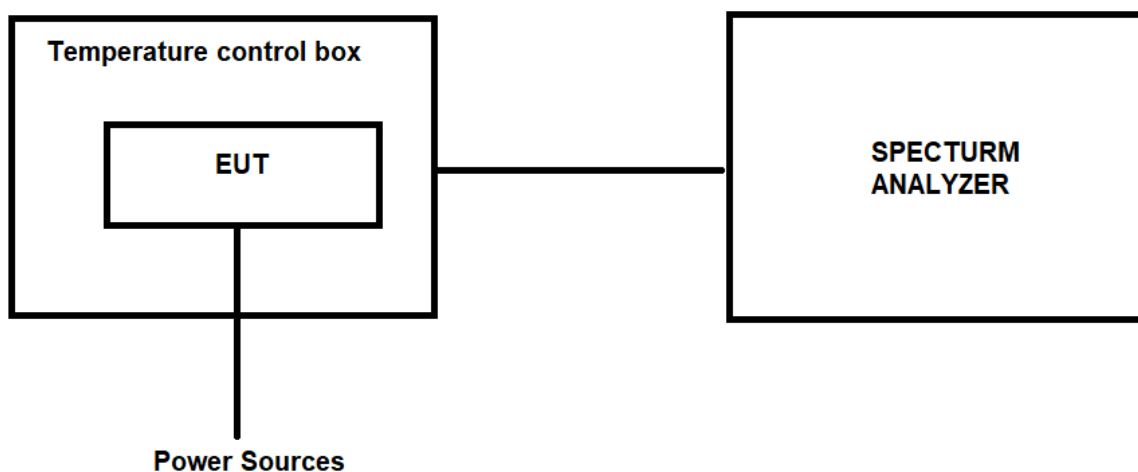
8.1.1. TEST PROCEDURE

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.

8.1.2. DEVIATION FROM STANDARD

No deviation.

8.1.3. TEST SETUP



8.1.4. EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



8.1.5. TEST RESULTS

Test Voltage	Test Temp.	Measured Frequency	Spectrum Frequency (MHz)			Δ Frequency (MHz)		
		(MHz)	802.11a	802.11n HT20	802.11ac HT20	802.11a	802.11n HT20	802.11ac HT20
132V	-20℃	5180	5180.0397	5180.0461	5180.0379	7.6641	8.8996	7.3166
		5220	5220.0431	5220.0389	5220.0401	8.2567	7.4521	7.6820
		5240	5240.0312	5240.0287	5240.0279	5.9542	5.4771	5.3244
		5745	5745.0467	5745.0467	5745.0398	8.1288	8.1288	6.9278
		5785	5785.0391	5785.0384	5785.0426	6.7589	6.6379	7.3639
		5825	5825.0403	5825.0423	5825.0436	6.9185	7.2618	7.4850
108V		5180	5180.0276	5180.0309	5180.0319	5.3282	5.9653	6.1583
		5220	5220.0434	5220.0428	5220.0417	8.3142	8.1992	7.9885
		5240	5240.0298	5240.0310	5240.0292	5.6870	5.9160	5.5725
		5745	5745.0360	5745.0296	5745.0334	6.2663	5.1523	5.8138
		5785	5785.0421	5785.0433	5785.0425	7.2774	7.4849	7.3466
		5825	5825.0553	5825.0512	5825.0483	9.4936	8.7897	8.2918
120V	25℃	5180	5180.0654	5180.0578	5180.0628	12.6255	11.1583	12.1236
		5220	5220.0301	5220.0304	5220.0309	5.7663	5.8238	5.9195
		5240	5240.0443	5240.0379	5240.0432	8.4542	7.2328	8.2443
		5745	5745.0392	5745.0393	5745.0396	6.8233	6.8407	6.8930
		5785	5785.0492	5785.0506	5785.0536	8.5048	8.7468	9.2653
		5825	5825.0360	5825.0294	5825.0295	6.1803	5.0472	5.0644
132V	50℃	5180	5180.0386	5180.0379	5180.0432	7.4517	7.3166	8.3398
		5220	5220.0268	5220.0309	5220.0337	5.1341	5.9195	6.4559
		5240	5240.0454	5240.0417	5240.0418	8.6641	7.9580	7.9771
		5745	5745.0692	5745.0729	5745.0712	12.0453	12.6893	12.3934
		5785	5785.0501	5785.0496	5785.0513	8.6603	8.5739	8.8678
		5825	5825.0673	5825.0696	5825.0738	11.5536	11.9485	12.6695
108V	50℃	5180	5180.0382	5180.0387	5180.0409	7.3745	7.4710	7.8958
		5220	5220.0327	5220.0332	5220.0318	6.2644	6.3602	6.0920
		5240	5240.0386	5240.0418	5240.0389	7.3664	7.9771	7.4237
		5745	5745.0492	5745.0495	5745.0533	8.5640	8.6162	9.2776
		5785	5785.0369	5785.0327	5785.0318	6.3786	5.6525	5.4970
		5825	5825.0832	5825.0807	5825.0834	14.2833	13.8541	14.3176



Test Voltage	Test Temp.	Measured Frequency (MHz)	Spectrum Frequency (MHz)		Δ Frequency (MHz)	
			802.11n HT40	802.11ac HT40	802.11n HT40	802.11ac HT40
132V	-20℃	5190	5190.0279	5190.0342	5.3757	6.5896
		5230	5230.0428	5230.0410	8.1836	7.8394
		5755	5755.0573	5755.0587	9.9566	10.1998
		5795	5795.0688	5795.0685	11.8723	11.8205
108V	-20℃	5190	5190.0269	5190.0327	5.1830	6.3006
		5230	5230.0421	5230.0380	8.0497	7.2658
		5755	5755.0303	5755.0739	5.2650	12.8410
		5795	5795.0532	5795.0548	9.1803	9.4564
120V	25℃	5190	5190.0279	5190.0269	5.3757	5.1830
		5230	5230.0747	5230.0714	14.2830	13.6520
		5755	5755.0276	5755.0340	4.7958	5.9079
		5795	5795.0659	5795.0596	11.3719	10.2847
132V	50℃	5190	5190.0686	5190.0705	13.2177	13.5838
		5230	5230.0573	5230.0580	10.9560	11.0899
		5755	5755.0561	5755.0484	9.7480	8.4101
		5795	5795.0384	5795.0452	6.6264	7.7998
108V	50℃	5190	5190.0645	5190.0579	12.4277	11.1561
		5230	5230.0448	5230.0436	8.5660	8.3365
		5755	5755.0439	5755.0443	7.6281	7.6977
		5795	5795.0521	5795.0512	8.9905	8.8352



9.. TRANSMISSION IN THE ABSENCE OF DATA

9.1. STANDARD REQUIREMENT

According to §15.407(c)

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 signaling 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.

9.2. TEST RESULT

No non-compliance noted:
Refer to the theory of operation.

10.. ANTENNA REQUIREMENT

10.1. STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: 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.

10.2. EUT ANTENNA

The EUT antenna is Internal Antenna, It comply with the standard requirement.

11.. TEST SEUUP PHOTO

Reference to the appendix I for details.

12.. EUT PHOTO

Reference to the appendix II for details.

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