Appendix A: Test Results of Wi-Fi 802.11 b/g/n

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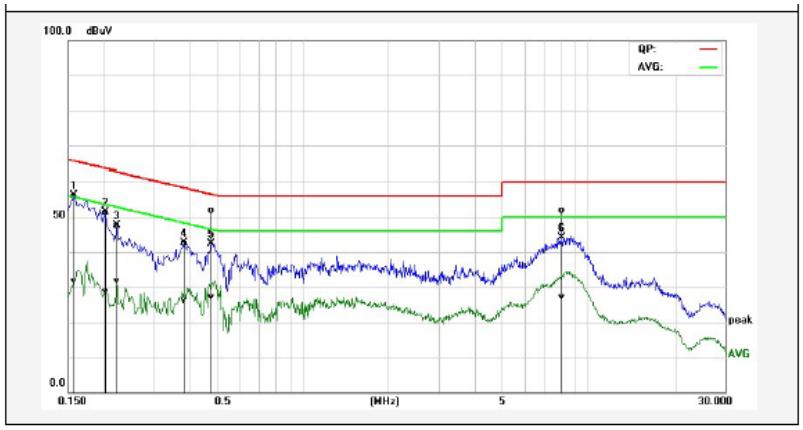
Appendix A.1 Test Results of Conducted Emission on AC Mains

Note: All modes have been tested, and the report only reflects the worst mode.

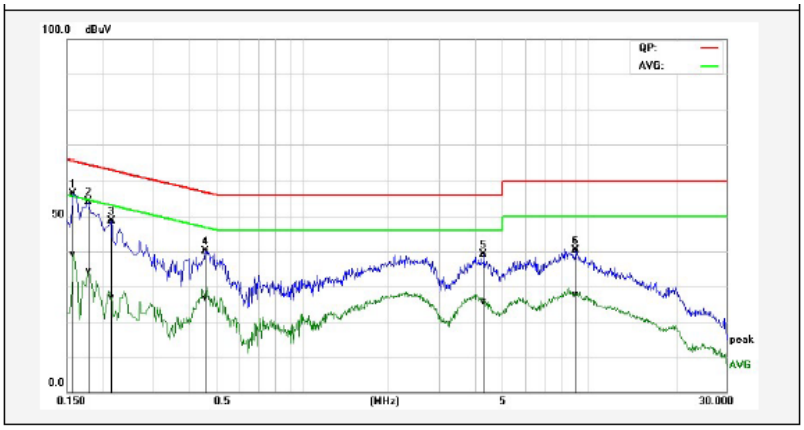
Test Mode：	Mode 5	Test Voltage ：	AC 230V/50Hz

L



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1P	0.1580	46.45	22.12	9.62	56.07	31.74	65.56	55.57	-9.49	-23.83	Pass
2P	0.2020	41.84	19.12	9.53	51.37	28.65	63.52	53.53	-12.15	-24.88	Pass
3P	0.2220	38.09	22.01	9.53	47.62	31.54	62.74	52.74	-15.12	-21.20	Pass
4P	0.3820	33.18	16.64	9.52	42.70	26.16	58.23	48.24	-15.53	-22.08	Pass
5*	0.4780	42.35	17.50	9.52	51.87	27.02	56.37	46.37	-4.50	-19.35	Pass
6P	8.0380	42.24	17.39	9.63	51.87	27.02	60.00	50.00	-8.13	-22.98	Pass

N



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1*	0.1580	46.88	29.52	9.56	56.44	39.08	65.56	55.57	-9.12	-16.49	Pass
2P	0.1780	44.46	24.84	9.59	54.05	34.43	64.57	54.58	-10.52	-20.15	Pass
3P	0.2140	39.03	17.33	9.63	48.66	26.96	63.04	53.05	-14.38	-26.09	Pass
4P	0.4580	30.39	17.00	9.62	40.01	26.62	56.73	46.73	-16.72	-20.11	Pass
5P	4.3140	29.49	16.07	9.57	39.06	25.64	56.00	46.00	-16.94	-20.36	Pass
6P	9.0300	30.47	17.92	9.83	40.30	27.75	60.00	50.00	-19.70	-22.25	Pass

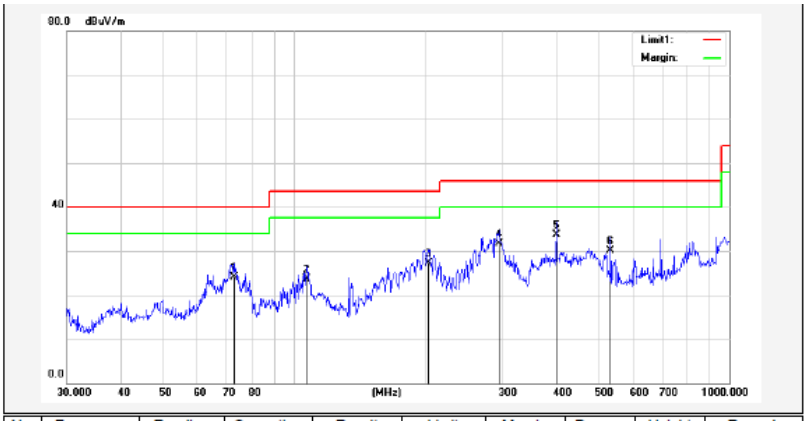
Correction Factor = insertion loss of LISN + cable loss;
Reading = Reading Amplitude in the instrument;
Result = Correction Factor + Reading;
Margin = Result – Limit.

Appendix A.2 Test Results of Radiated Spurious Emission

Note: All modes have been tested, and the report only reflects the worst mode.

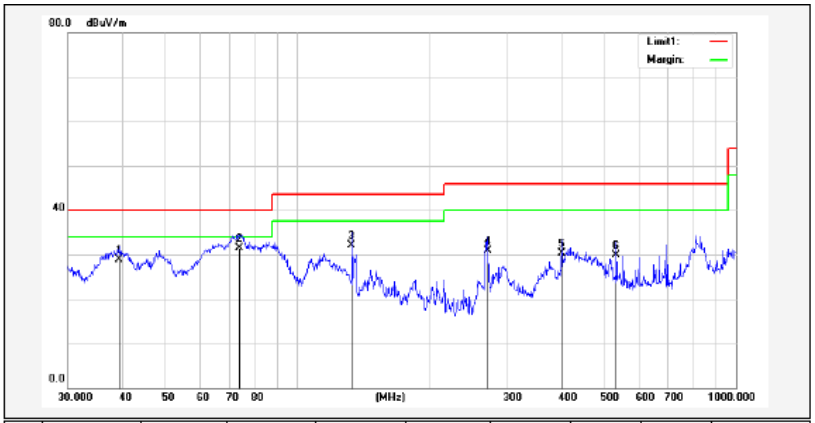
Below 1G:			
Test Mode：	Mode 5	Test Voltage ：	AC 230V/50Hz

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1	72.8465	38.33	-14.26	24.07	40.00	-15.93			QP
2	106.7587	38.58	-14.86	23.72	43.50	-19.78			QP
3	203.5227	42.30	-14.92	27.38	43.50	-16.12			QP
4	296.1836	41.91	-10.15	31.76	46.00	-14.24			QP
5*	400.4318	41.08	-7.43	33.65	46.00	-12.35			QP
6	533.8320	34.37	-4.26	30.11	46.00	-15.89			QP

Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1	39.2991	41.55	-12.62	28.93	40.00	-11.07			QP
2*	73.6170	46.06	-14.46	31.60	40.00	-8.40			QP
3	133.1511	45.09	-12.89	32.20	43.50	-11.30			QP
4	271.3245	42.80	-11.88	30.92	46.00	-15.08			QP
5	400.4318	37.77	-7.43	30.34	46.00	-15.66			QP
6	533.8320	34.21	-4.26	29.95	46.00	-16.05			QP

Correction Factor = antenna factor + cable loss – amplifier gain;
Reading = Reading Amplitude in the instrument;
Result = Correction Factor + Reading;
Margin = Result – Limit

Above 1GHz：

Note: All modes and antenna have been tested, and the report only reflects the worst mode(SISO ANT1).

802.11 b-Low (worst mode) Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1297.78	68.06	-24.47	43.59	74	-30.41	peak
2	1297.78	47.97	-24.47	23.5	54	-30.5	AVG
3	1902.081	67.07	-22.34	44.73	74	-29.27	peak
4	1902.081	47.13	-22.34	24.79	54	-29.21	AVG
5	4975.246	62.65	-15.6	47.05	74	-26.95	peak
6	4975.246	43.2	-15.6	27.6	54	-26.4	AVG
7	7506.206	55.94	-8.97	46.97	74	-27.03	peak
8	7506.206	35.35	-8.97	26.38	54	-27.62	AVG
9	10144.5	55.06	-6.06	49	74	-25	peak
10	10144.5	35.53	-6.06	29.47	54	-24.53	AVG
11	12715.63	54.12	-2.72	51.4	74	-22.6	peak
12	12715.63	34.26	-2.72	31.54	54	-22.46	AVG

802.11 b-Low (worst mode) Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1526.29	67.48	-24.33	43.15	74	-30.85	peak
2	1526.29	47.87	-24.33	23.54	54	-30.46	AVG
3	3278.635	62.94	-18.54	44.4	74	-29.6	peak
4	3278.635	43.11	-18.54	24.57	54	-29.43	AVG
5	5004.148	61.44	-15.59	45.85	74	-28.15	peak
6	5004.148	41.43	-15.59	25.84	54	-28.16	AVG
7	6532.007	57.53	-10.98	46.55	74	-27.45	peak
8	6532.007	37.87	-10.98	26.89	54	-27.11	AVG
9	9354.324	55.81	-6.45	49.36	74	-24.64	peak
10	9354.324	36.1	-6.45	29.65	54	-24.35	AVG
11	12715.63	54.91	-2.72	52.19	74	-21.81	peak
12	12715.63	34.71	-2.72	31.99	54	-22.01	AVG

802.11 b-Middle (worst mode) Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1305.319	67.84	-24.47	43.37	74	-30.63	peak
2	1305.319	47.78	-24.47	23.31	54	-30.69	AVG
3	1571.14	67.83	-23.86	43.97	74	-30.03	peak
4	1571.14	47.44	-23.86	23.58	54	-30.42	AVG
5	1992.294	66.56	-21.49	45.07	74	-28.93	peak
6	1992.294	47.48	-21.49	25.99	54	-28.01	AVG
7	5004.148	61.97	-15.59	46.38	74	-27.62	peak
8	5004.148	42.33	-15.59	26.74	54	-27.26	AVG
9	6164.401	57.44	-11.58	45.86	74	-28.14	peak
10	6164.401	37.33	-11.58	25.75	54	-28.25	AVG
11	9408.664	54.49	-6.22	48.27	74	-25.73	peak
12	9408.664	34.91	-6.22	28.69	54	-25.31	AVG

802.11 b-Middle (worst mode) Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1116.339	69.48	-26.04	43.44	74	-30.56	peak
2	1116.339	49.58	-26.04	23.54	54	-30.46	AVG
3	1499.997	70	-24.73	45.27	74	-28.73	peak
4	1499.997	50.41	-24.73	25.68	54	-28.32	AVG
5	4975.246	61.93	-15.6	46.33	74	-27.67	peak
6	4975.246	42.51	-15.6	26.91	54	-27.09	AVG
7	6093.401	56.88	-11.78	45.1	74	-28.9	peak
8	6093.401	37.08	-11.78	25.3	54	-28.7	AVG
9	8827.884	56.17	-7.96	48.21	74	-25.79	peak
10	8827.884	36.72	-7.96	28.76	54	-25.24	AVG
11	10625.64	55.16	-5.62	49.54	74	-24.46	peak
12	10625.64	35.4	-5.62	29.78	54	-24.22	AVG

802.11 b-High (worst mode) Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1743.794	68.13	-23.13	45	74	-29	peak
2	1743.794	48.49	-23.13	25.36	54	-28.64	AVG
3	4917.943	61.87	-15.72	46.15	74	-27.85	peak
4	4917.943	42.19	-15.72	26.47	54	-27.53	AVG
5	6128.798	56.19	-11.67	44.52	74	-29.48	peak
6	6128.798	36.56	-11.67	24.89	54	-29.11	AVG
7	7334.292	56.93	-9.32	47.61	74	-26.39	peak
8	7334.292	36.92	-9.32	27.6	54	-26.4	AVG
9	10144.5	54.88	-6.06	48.82	74	-25.18	peak
10	10144.5	34.13	-6.06	28.07	54	-25.93	AVG
11	12715.63	54.34	-2.72	51.62	74	-22.38	peak
12	12715.63	33.98	-2.72	31.26	54	-22.74	AVG

802.11 b-High (worst mode) Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1935.422	66.3	-22.08	44.22	74	-29.78	peak
2	1935.422	46.79	-22.08	24.71	54	-29.29	AVG
3	3535.05	62.01	-17.98	44.03	74	-29.97	peak
4	3535.05	42.06	-17.98	24.08	54	-29.92	AVG
5	5004.148	61.22	-15.59	45.63	74	-28.37	peak
6	5004.148	41.27	-15.59	25.68	54	-28.32	AVG
7	6569.953	57.08	-11.03	46.05	74	-27.95	peak
8	6569.953	37.76	-11.03	26.73	54	-27.27	AVG
9	8930.747	55.48	-7.76	47.72	74	-26.28	peak
10	8930.747	35.17	-7.76	27.41	54	-26.59	AVG
11	12069.74	55.33	-3.09	52.24	74	-21.76	peak
12	12069.74	35.6	-3.09	32.51	54	-21.49	AVG

Node:

1、Testing was carried out within frequency range 9kHz to the tenth harmonics. The measurement results below 30MHz and 18GHz - 26.5GHz were greater than 20dB below the limit, so only the radiated spurious emissions from 30MHz to 18GHz were reported..

2、Radiated emissions measured in frequency above 1GHz were made with an instrument using peak/average detector mode.

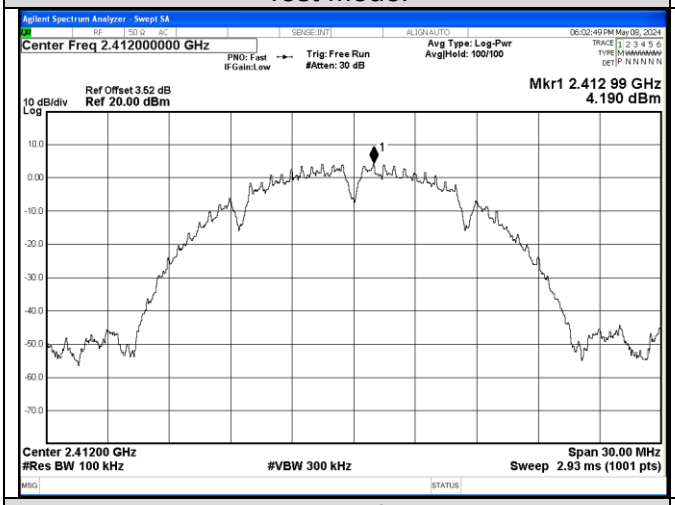
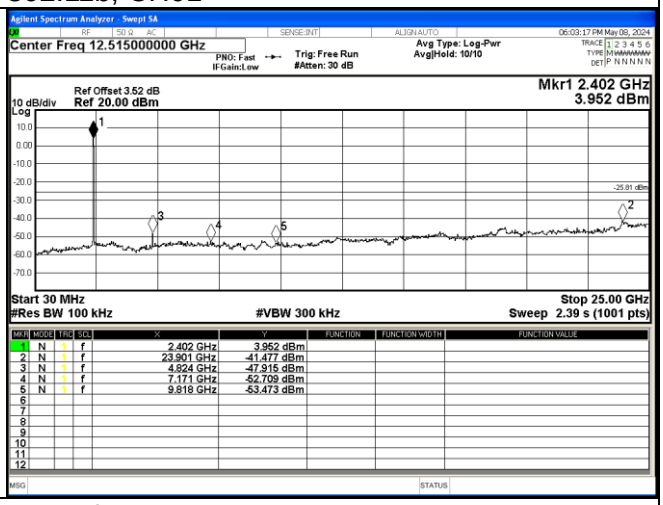
3、Average test would be performed if the peak result were greater than the average limit or as required by the applicant.

4、Margin (dB), result in dBuV/m – limit in dBuV/m.

Restricted band Requirements							
Note: All modes and antenna have been tested, and the report only reflects the worst mode(MIMO 802.11 n(HT20)).							
802.11 n(HT20)-Low (worst mode)							
Horizontal							
No.	**Frequency (MHz)**	**Reading (dBuV)**	**Correct Factor(dB/m)**	**Result (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Remark**
1	2355.17	51.27	2.81	54.08	74	-19.92	peak
2	2355.17	31.35	2.81	34.16	54	-19.84	AVG
3	2390	56	3.01	59.01	74	-14.99	peak
4	2390	35.51	3.01	38.52	54	-15.48	AVG
Vertical							
No.	**Frequency (MHz)**	**Reading (dBuV)**	**Correct Factor(dB/m)**	**Result (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Remark**
1	2348.437	51.01	2.77	53.78	74	-20.22	peak
2	2348.437	30.48	2.77	33.25	54	-20.75	AVG
3	2390	54.38	3.01	57.39	74	-16.61	peak
4	2390	37.6	3.01	40.61	54	-13.39	AVG
802.11 n(HT20)-High (worst mode)							
Horizontal							
No.	**Frequency (MHz)**	**Reading (dBuV)**	**Correct Factor(dB/m)**	**Result (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Remark**
1	2483.5	54.05	3.54	57.59	74	-16.41	peak
2	2483.5	33.71	3.54	37.25	54	-16.75	AVG
3	2484.669	53.19	3.55	56.74	74	-17.26	peak
4	2484.669	32.94	3.55	36.49	54	-17.51	AVG
Vertical							
No.	**Frequency (MHz)**	**Reading (dBuV)**	**Correct Factor(dB/m)**	**Result (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Remark**
1	2483.5	55.66	3.54	59.2	74	-14.8	peak
2	2483.5	36.03	3.54	39.57	54	-14.43	AVG
3	2490.882	51.57	3.6	55.17	74	-18.83	peak
4	2490.882	31.76	3.6	35.36	54	-18.64	AVG

Correction Factor = antenna factor + cable loss – amplifier gain;
Reading = Reading Amplitude in the instrument;
Result = Correction Factor + Reading;
Margin = Result – Limit

Appendix A.3 Test Results of Conducted Spurious Emissions Measured in 100 kHz Bandwidth

Conducted spurious emission	
Note: All antenna have been tested, and the report only reflects the worst mode(ANT1).	
Test Mode:	802.11b, CH01
	
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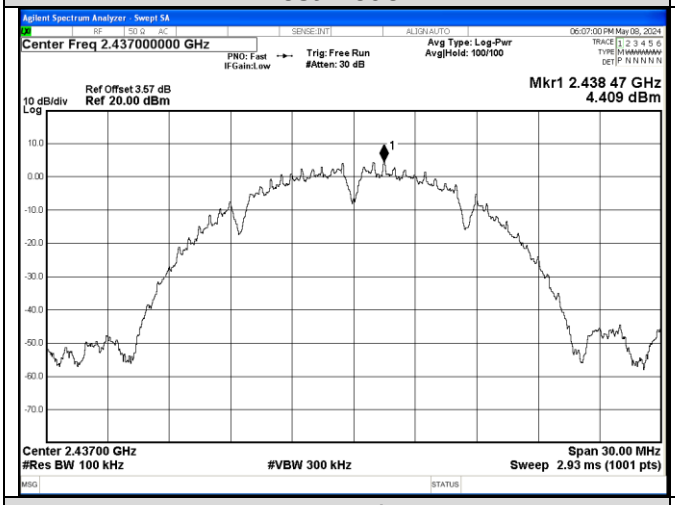	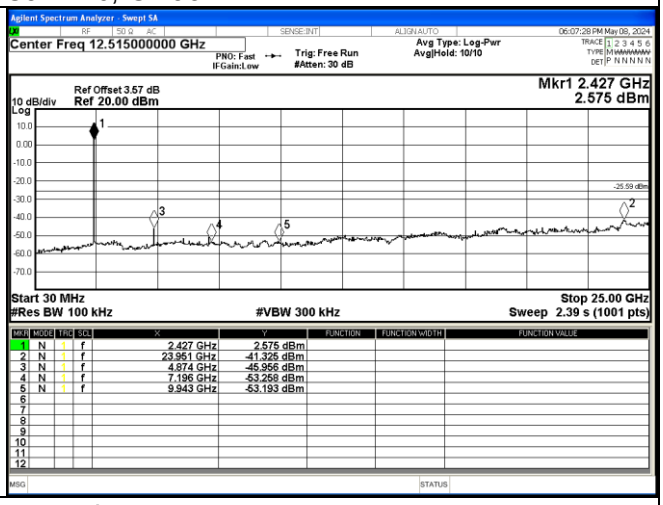
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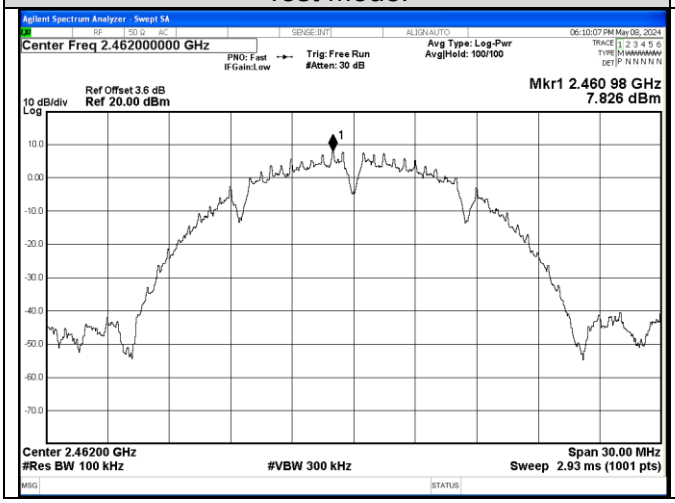	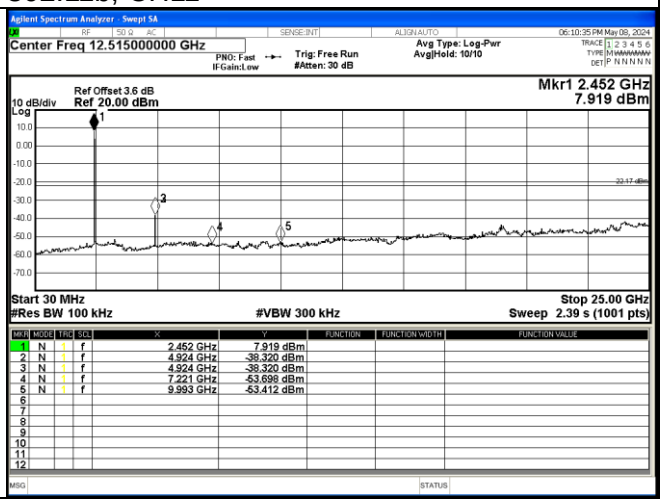

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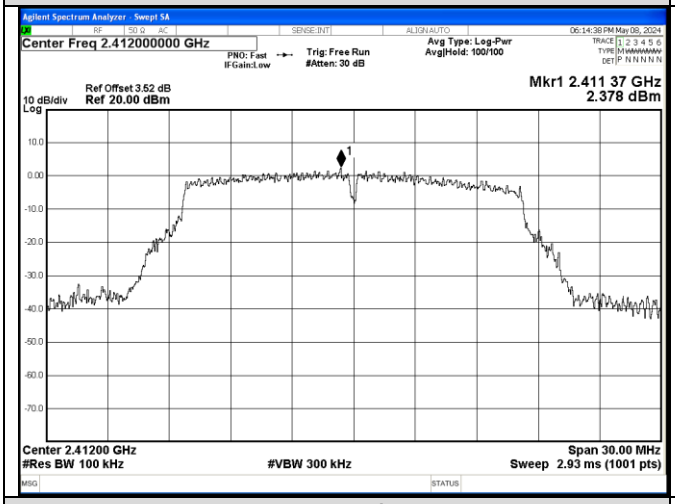	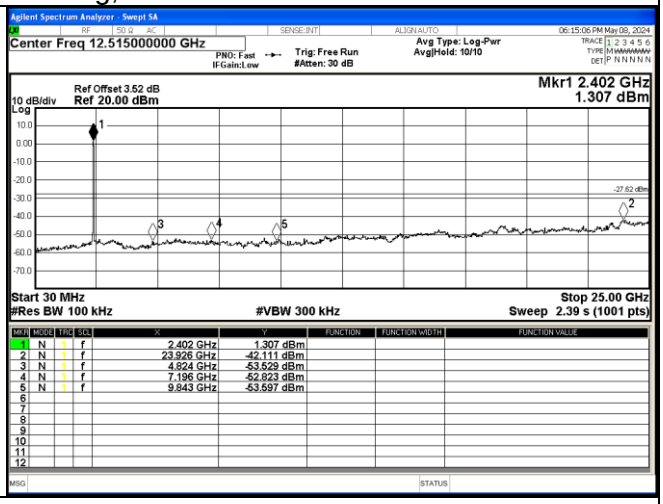
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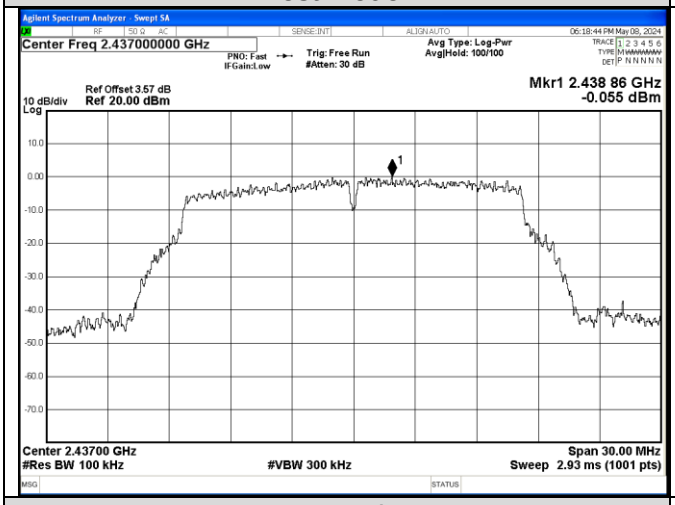	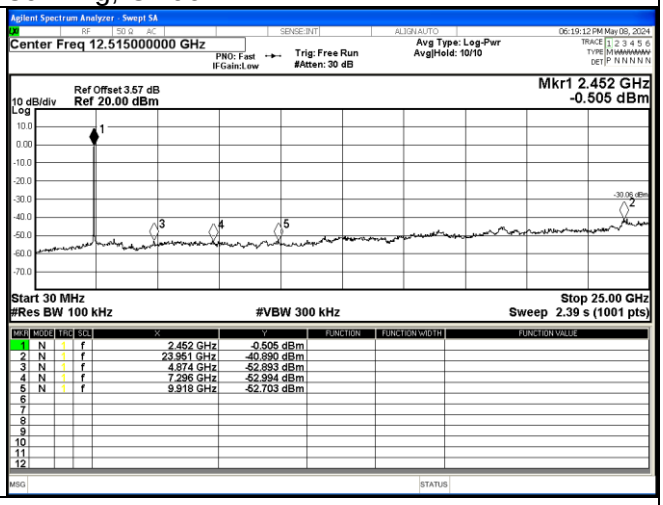
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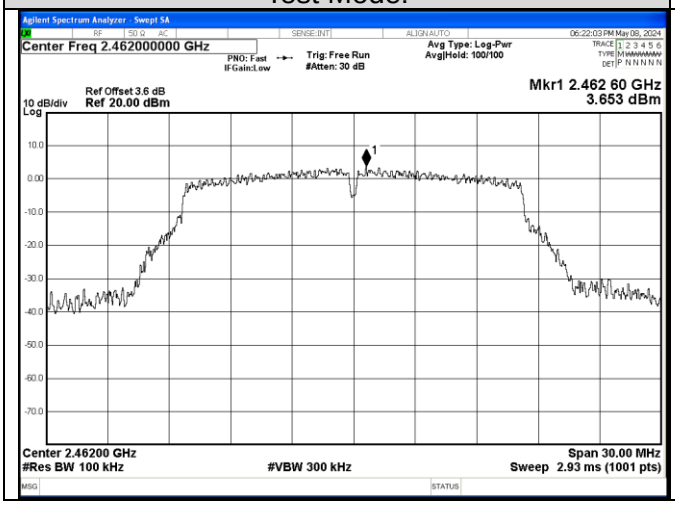	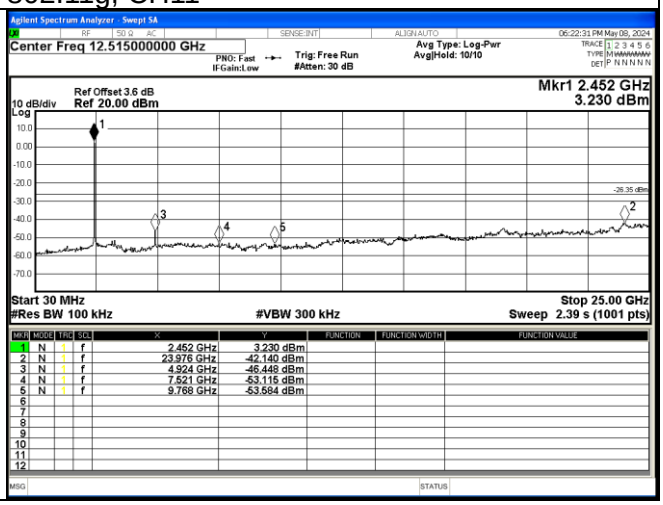

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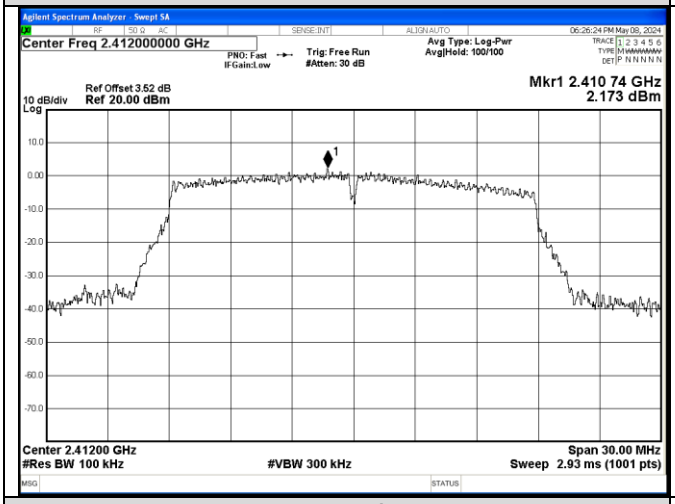	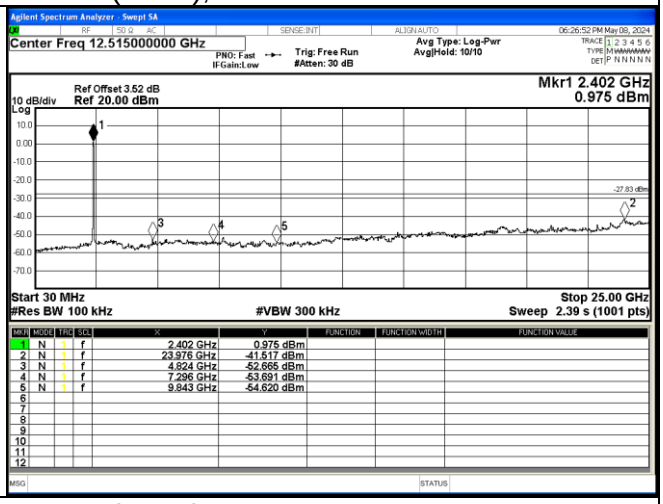
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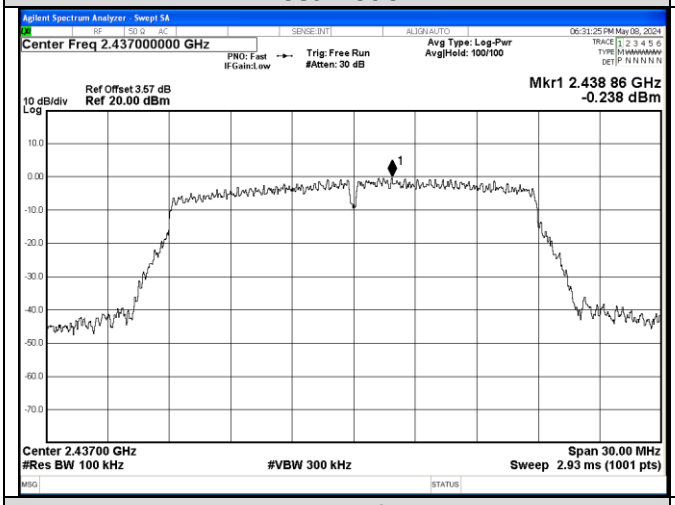	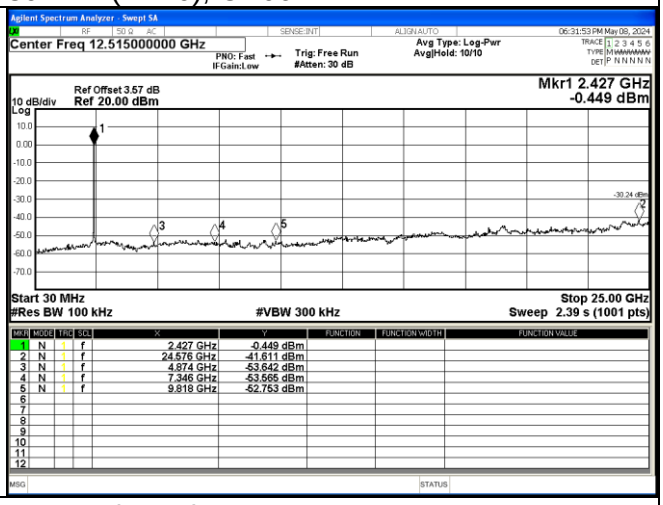
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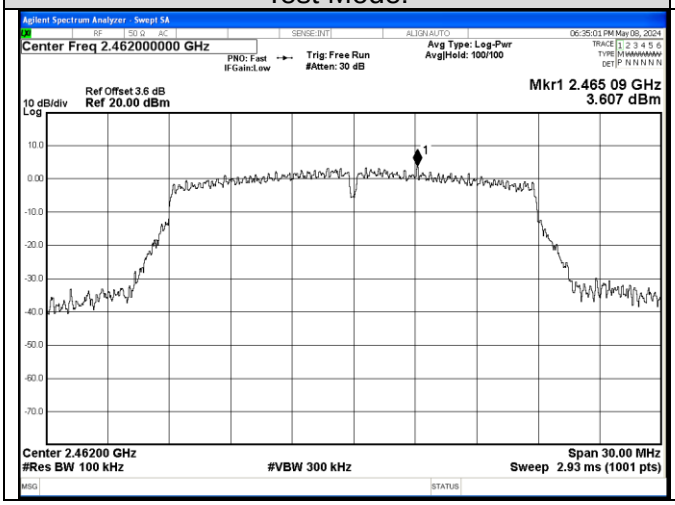
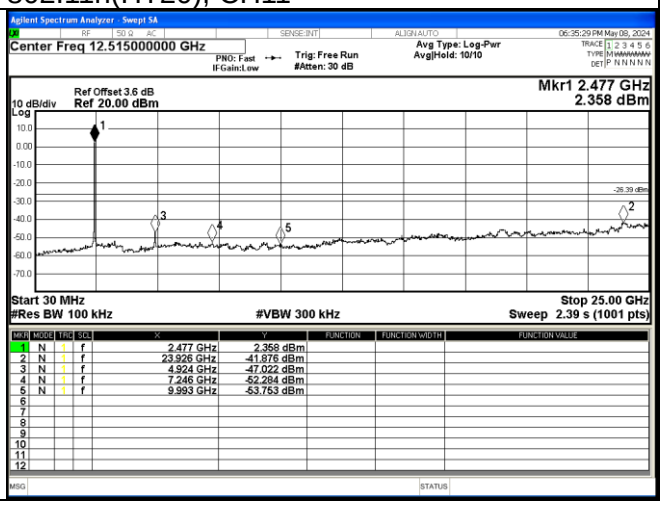
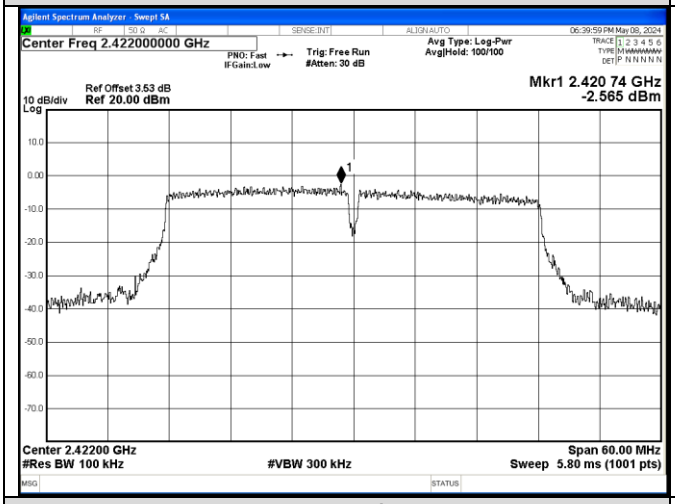
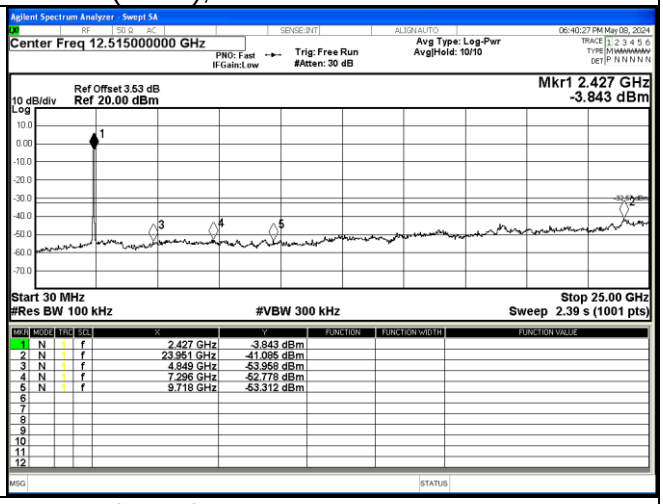
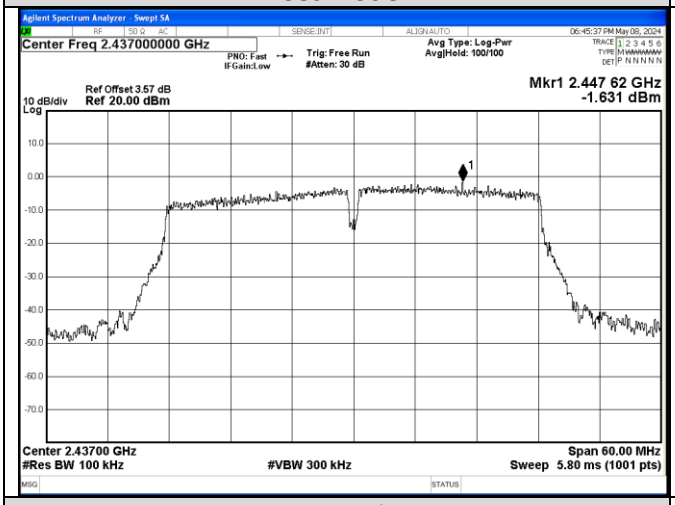
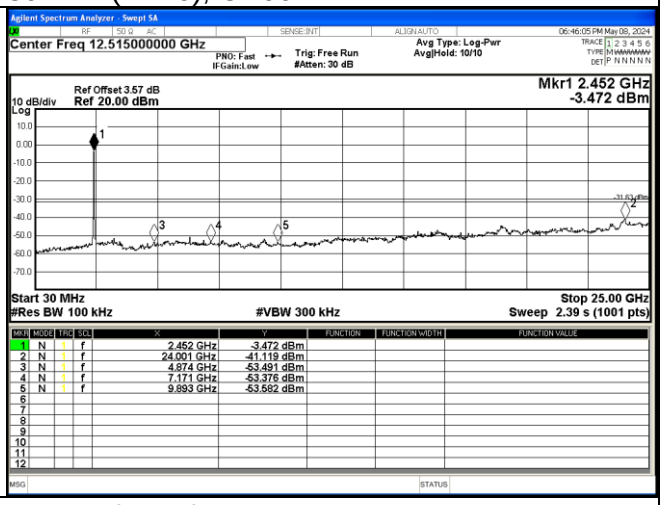
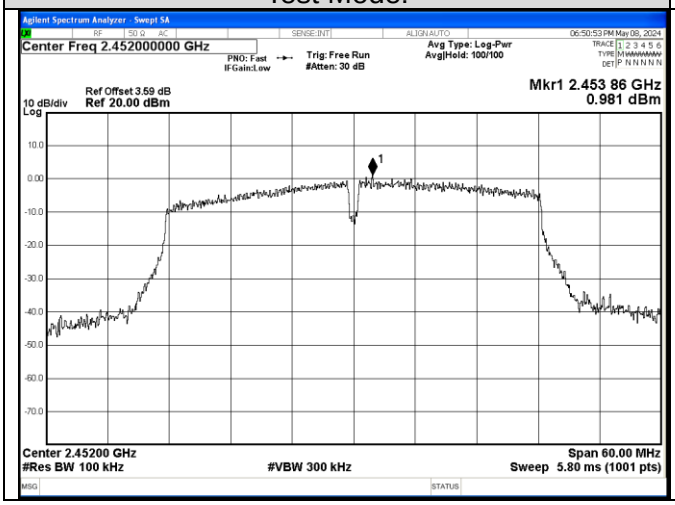
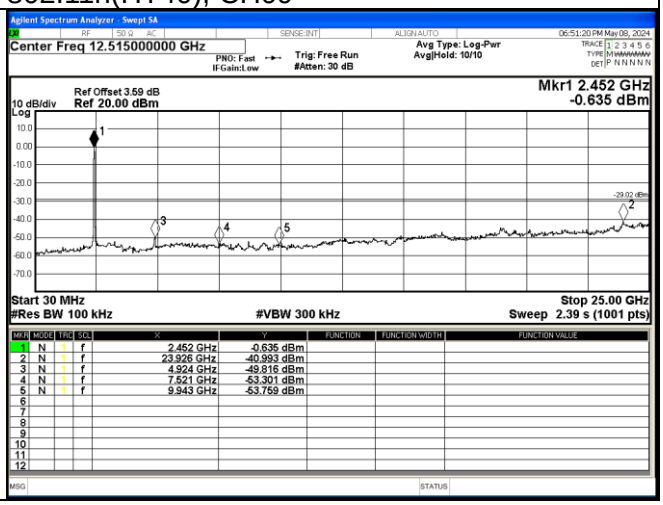
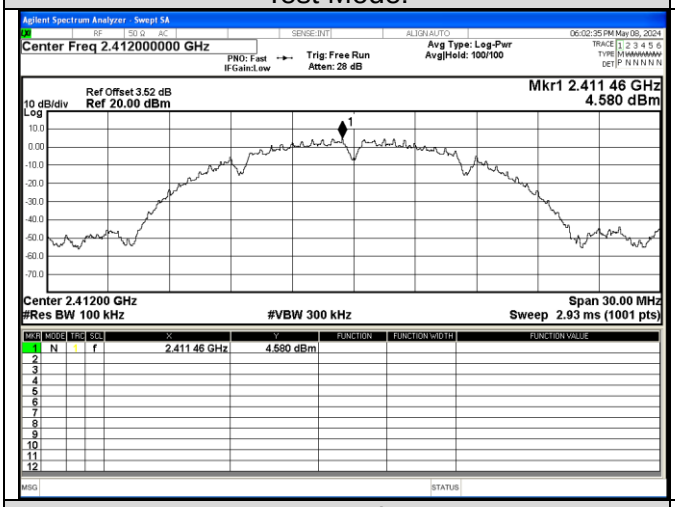
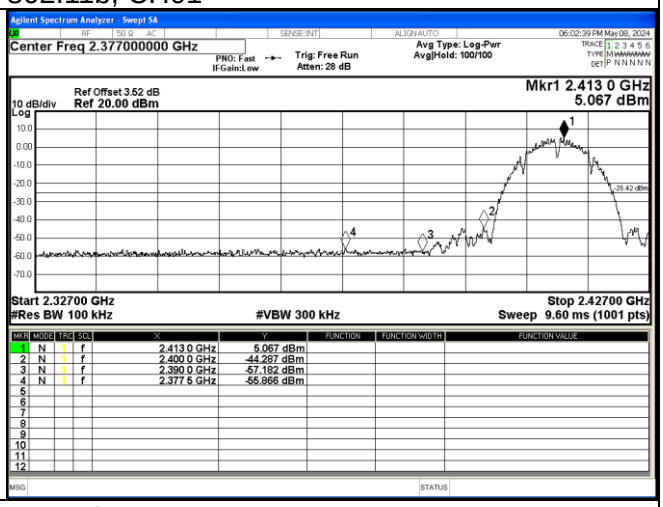
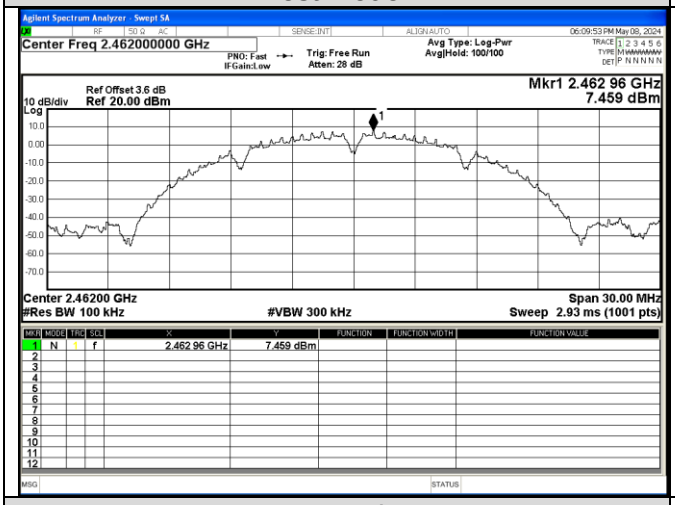
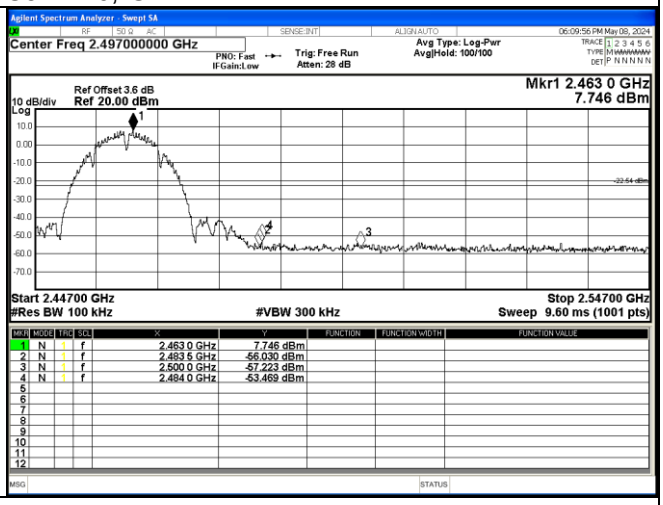
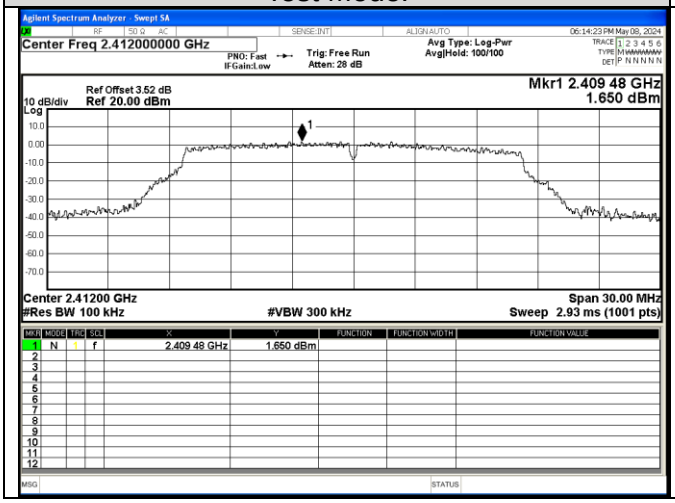
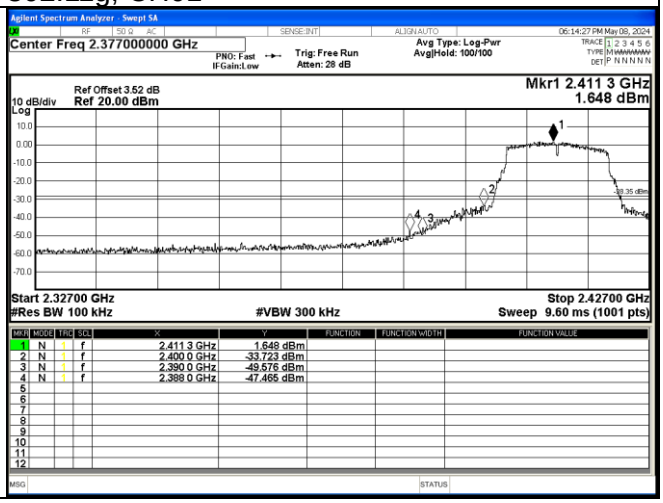
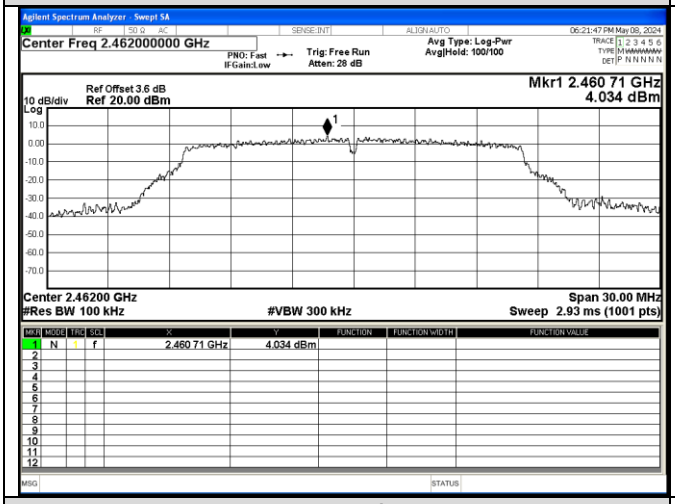
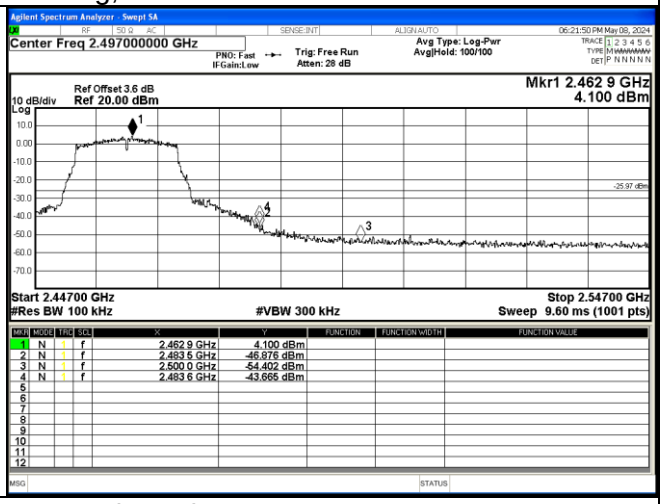
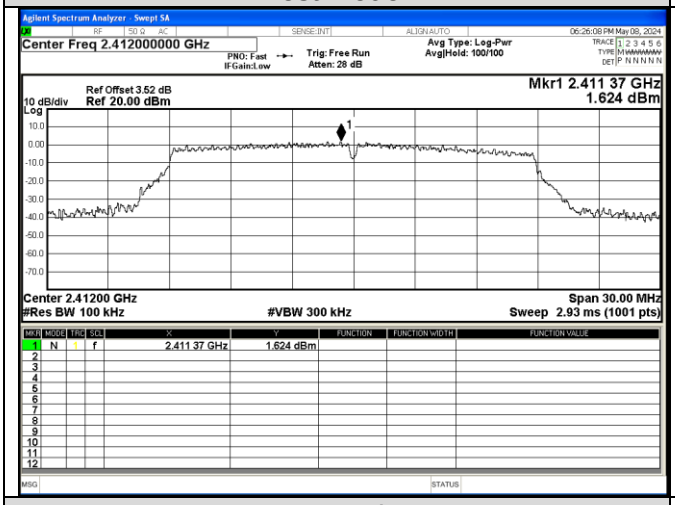
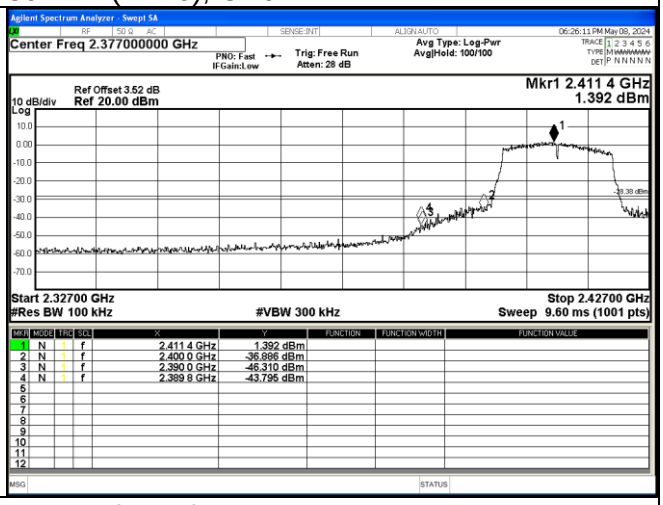
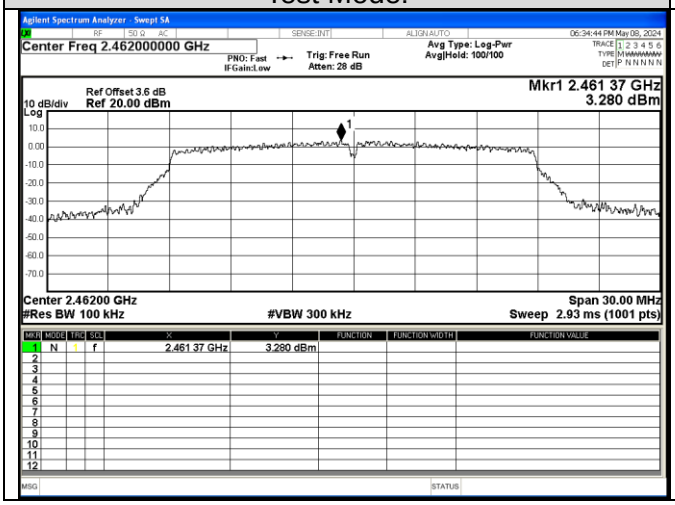
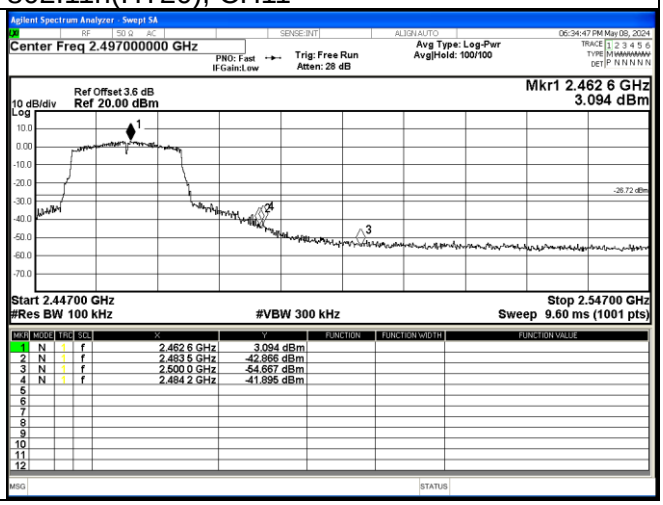
	

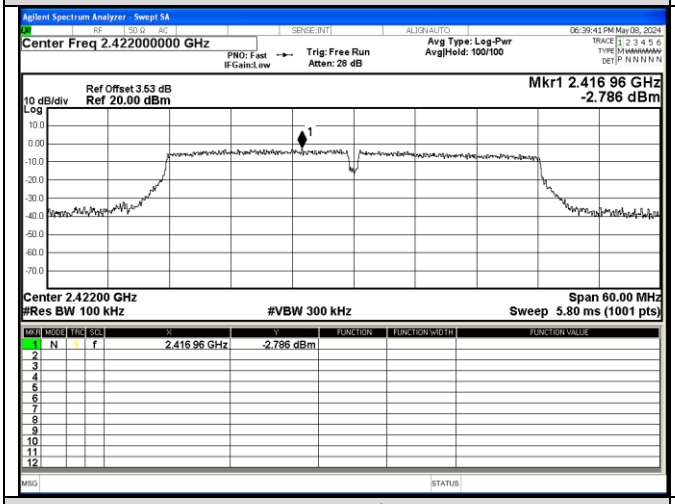
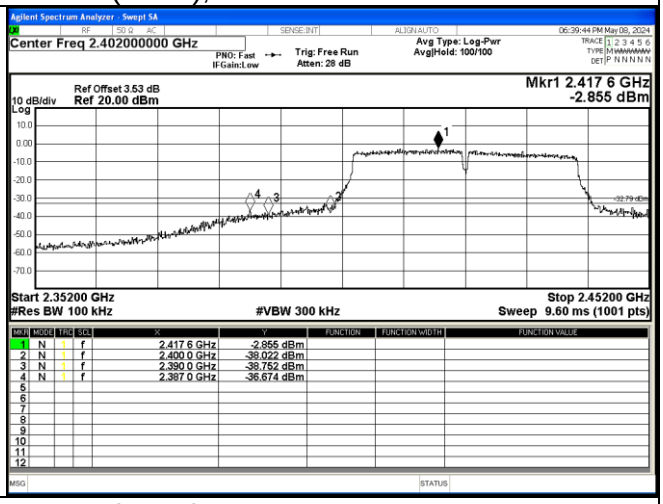
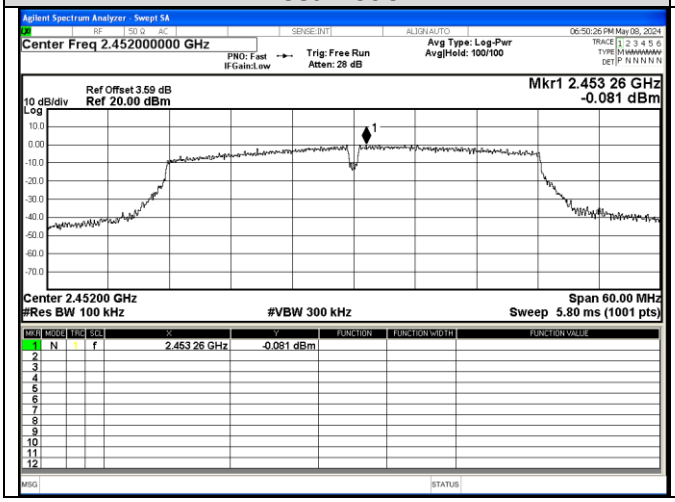
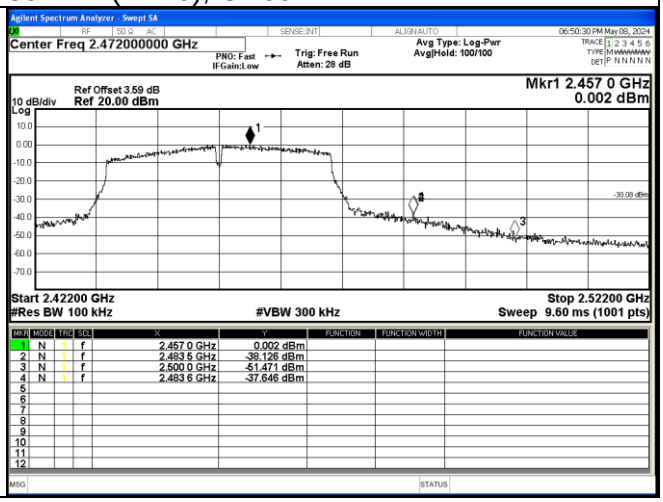
Test Mode:	802.11n(HT40), CH03
	
Test Mode:	802.11n(HT40), CH06
	
Test Mode:	802.11n(HT40), CH09
	

For Band edge (it's also the reference level for conducted spurious emission)

Note: All antenna have been tested, and the report only reflects the worst mode(ANT1).

Test Mode:	802.11b, CH01
	
Test Mode:	802.11b, CH11
	
Test Mode:	802.11g, CH01
	

Test Mode:	802.11g, CH11
	
Test Mode:	802.11n(HT20), CH01
	
Test Mode:	802.11n(HT20), CH11
	

Test Mode:	802.11n(HT40), CH03
	
Test Mode:	802.11n(HT40), CH09
	

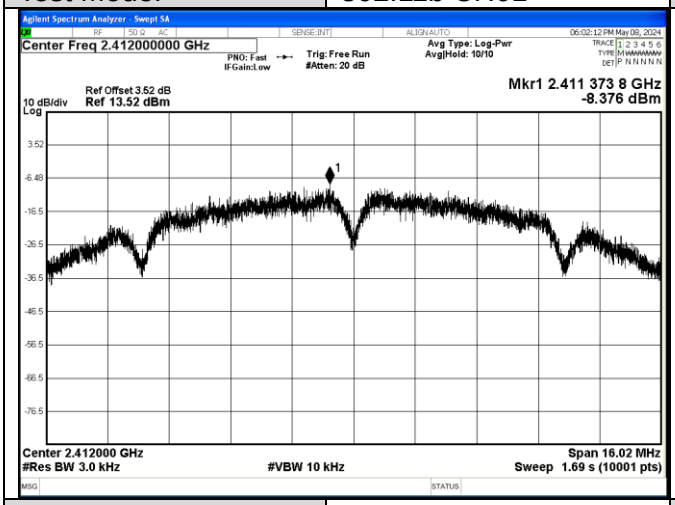
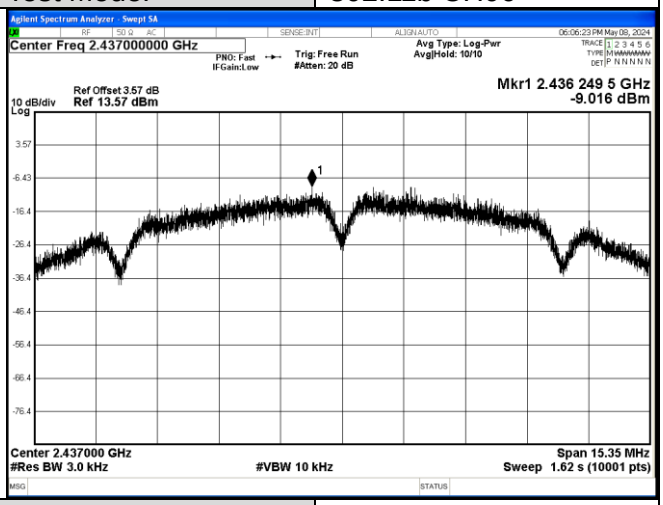
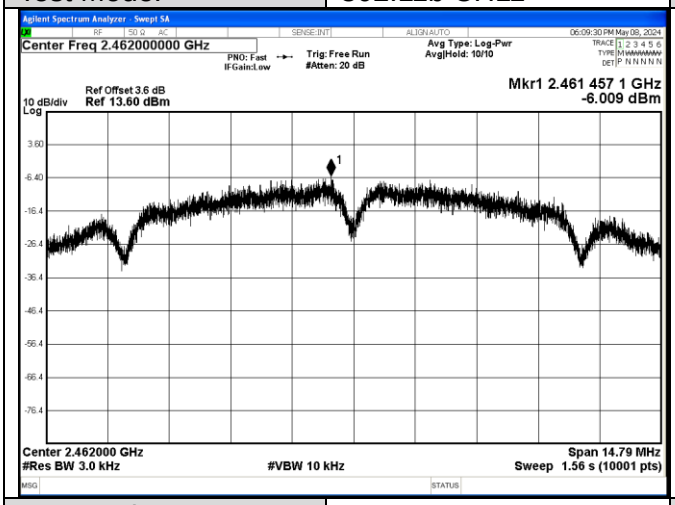
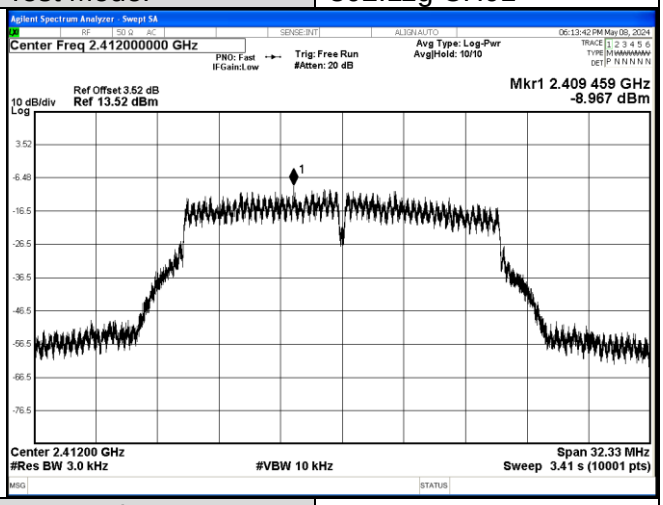
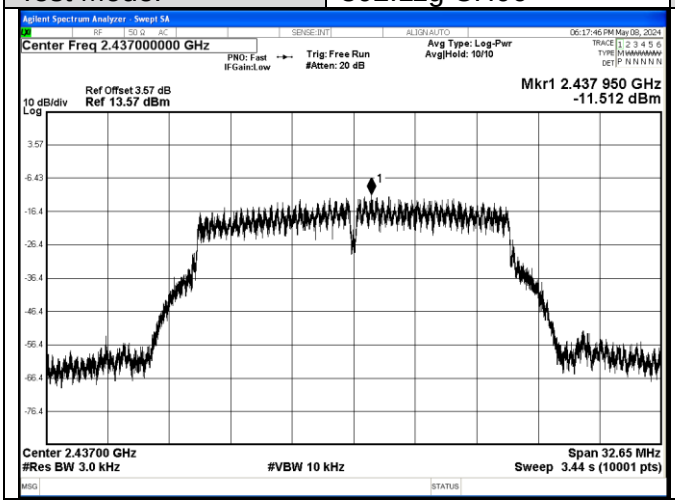
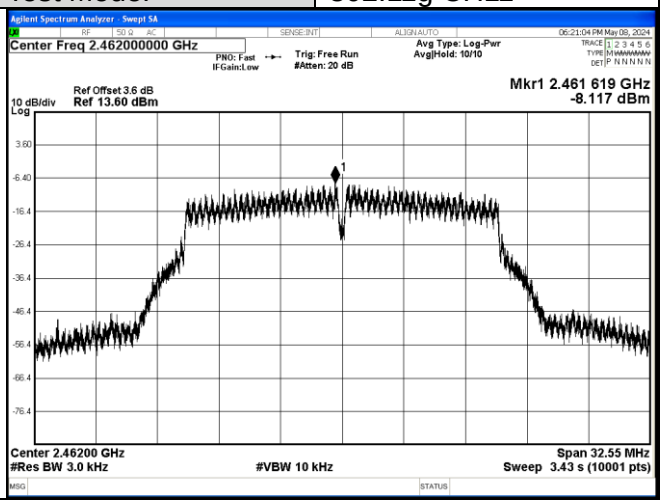
Appendix A.4 Test Results of Conducted Power Spectral Density

802.11b					
Frequency	Power Density (dBm/3kHz)			Limit (dBm/3KHz)	Result
	Ant1	Ant2	Total		
CH01	-8.376	-7.555	/	8	Pass
CH06	-9.016	-6.691	/	8	Pass
CH11	-6.009	-6.684	/	8	Pass

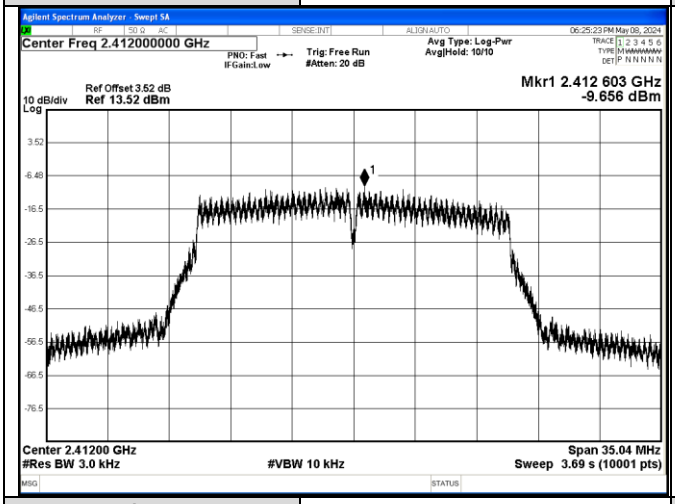
802.11g					
Frequency	Power Density (dBm/3kHz)			Limit (dBm/3KHz)	Result
	Ant1	Ant2	Total		
CH01	-8.967	-9.714	/	8	Pass
CH06	-11.512	-9.199	/	8	Pass
CH11	-8.117	-9.524	/	8	Pass

802.11n(HT20)					
Frequency	Power Density (dBm/3kHz)			Limit (dBm/3KHz)	Result
	Ant1	Ant2	Total		
CH01	-9.656	-9.724	-6.680	8	Pass
CH06	-11.448	-10.607	-7.997	8	Pass
CH11	-7.496	-8.086	-4.771	8	Pass

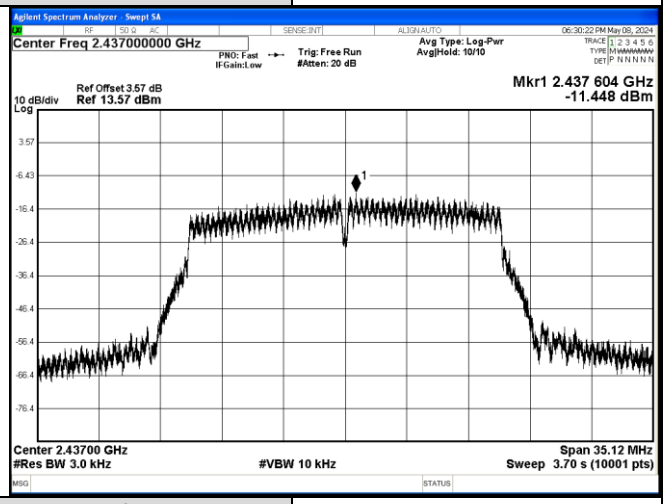
802.11n(HT40)					
Frequency	Power Density (dBm/3kHz)			Limit (dBm/3KHz)	Result
	Ant1	Ant2	Total		
CH3	-14.111	-12.882	-10.443	8	Pass
CH06	-13.495	-12.362	-9.881	8	Pass
CH09	-10.709	-12.549	-8.522	8	Pass

ANT 1			
Test Mode:	802.11b CH01	Test Mode:	802.11b CH06
			
Test Mode:	802.11b CH11	Test Mode:	802.11g CH01
			
Test Mode:	802.11g CH06	Test Mode:	802.11g CH11
			

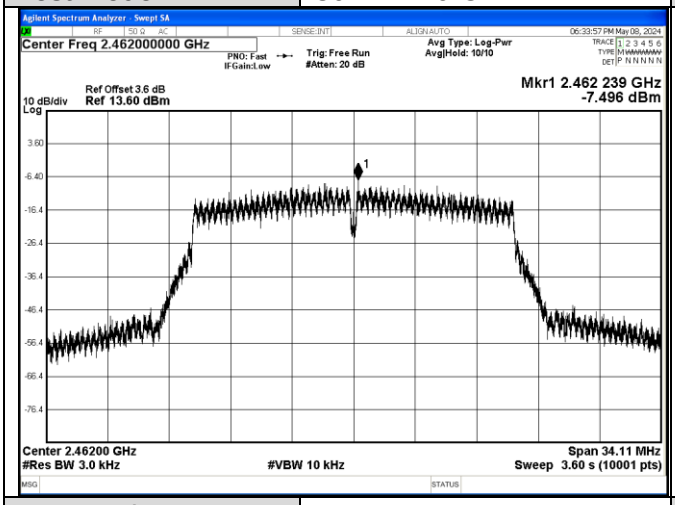
Test Mode:	802.11n20 CH01



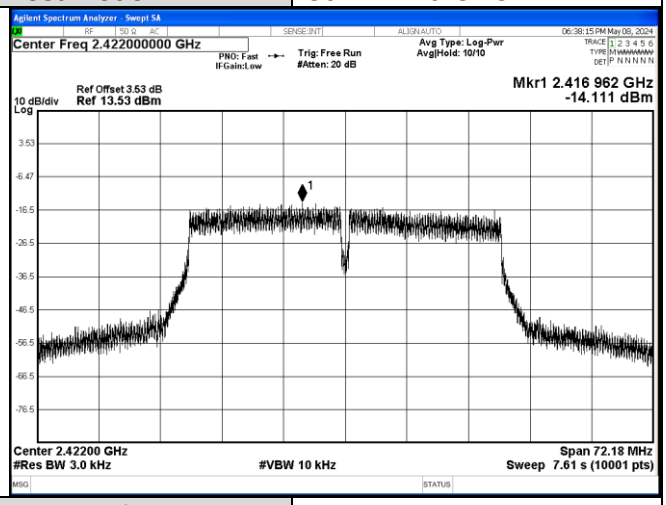
Test Mode:	802.11n20 CH06



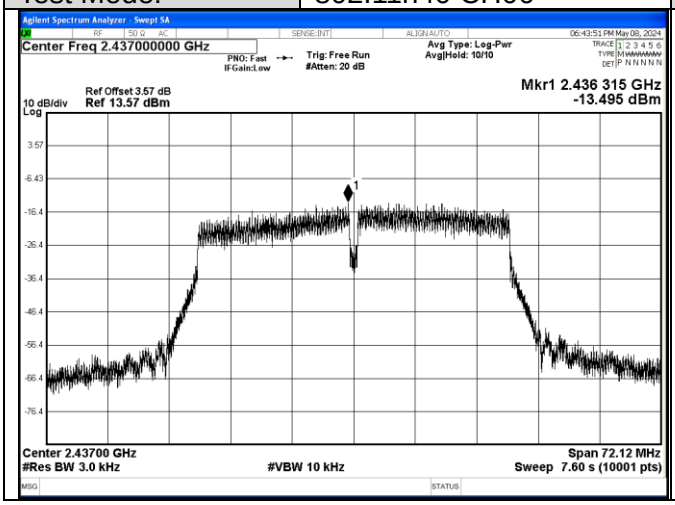
Test Mode:	802.11n20 CH11



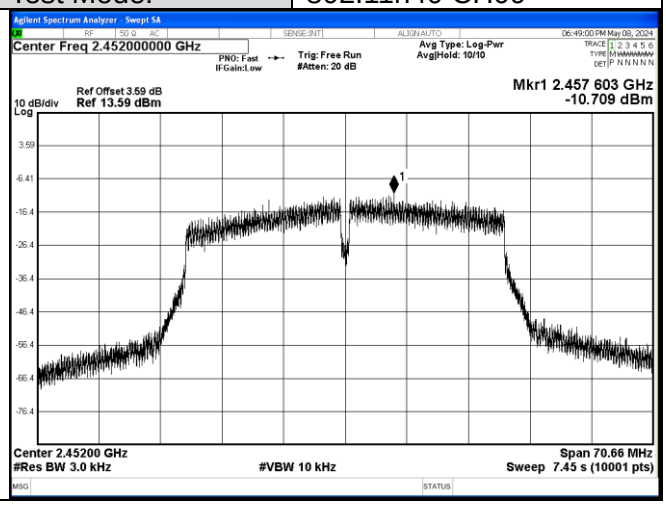
Test Mode:	802.11n40 CH3

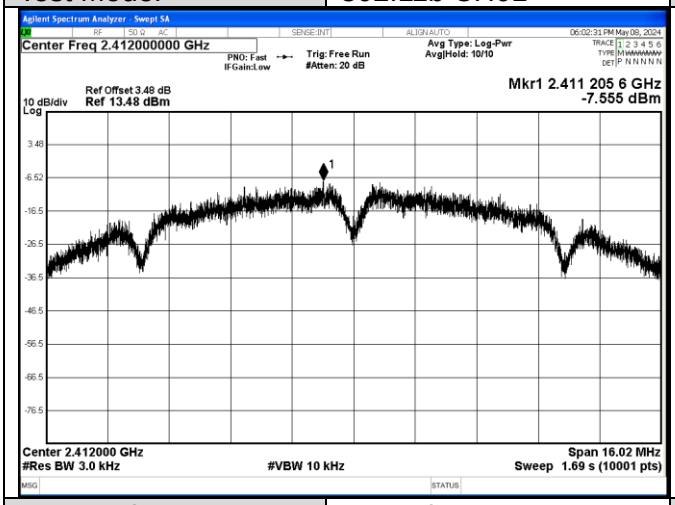
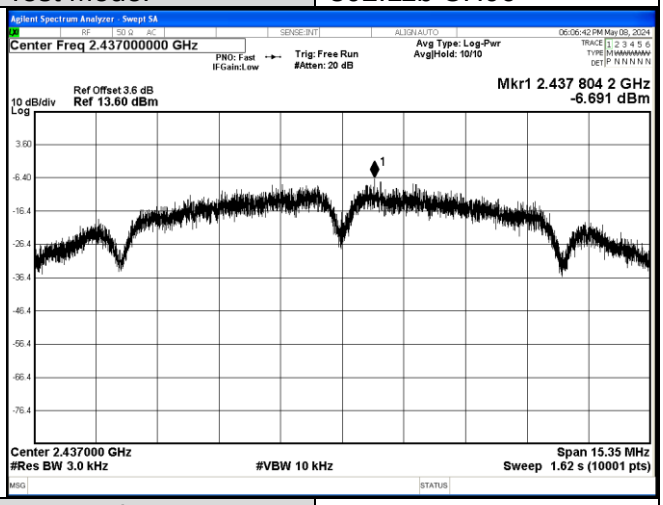
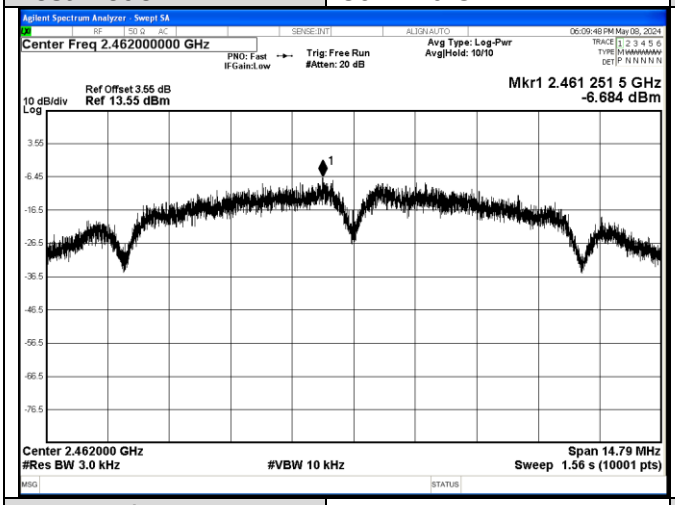
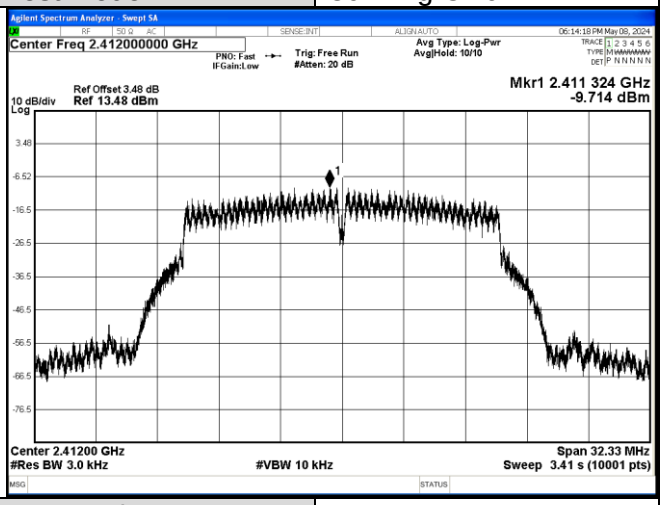
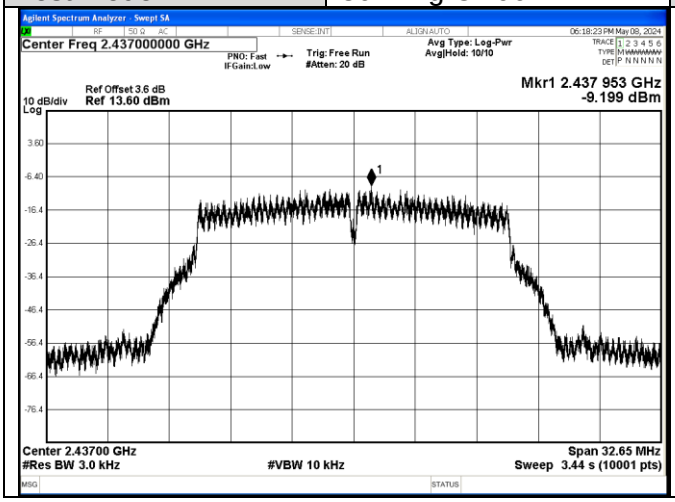
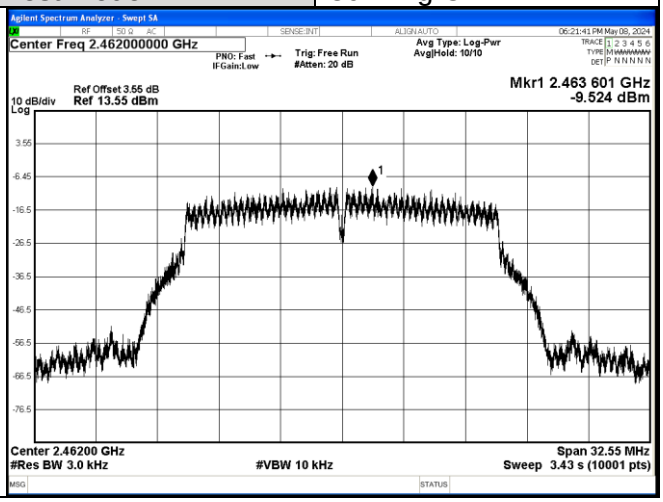


Test Mode:	802.11n40 CH06

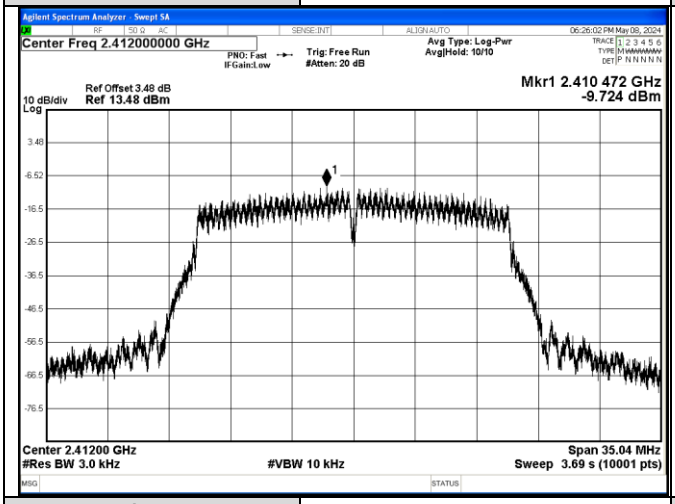


Test Mode:	802.11n40 CH09

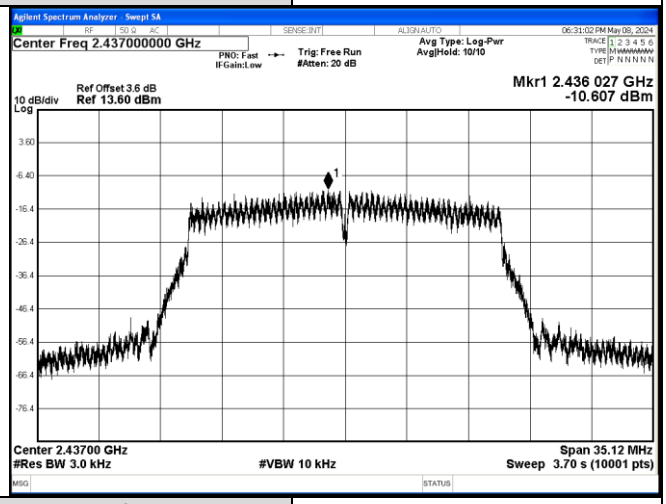


ANT 2			
Test Mode:	802.11b CH01	Test Mode:	802.11b CH06
			
Test Mode:	802.11b CH11	Test Mode:	802.11g CH01
			
Test Mode:	802.11g CH06	Test Mode:	802.11g CH11
			

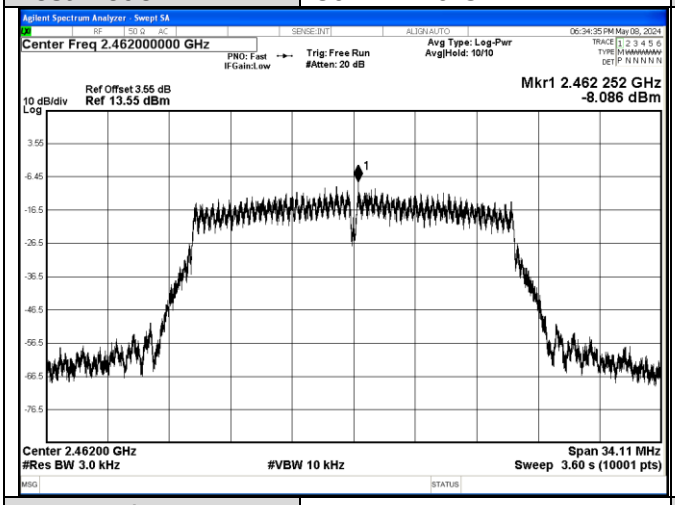
Test Mode:	802.11n20 CH01



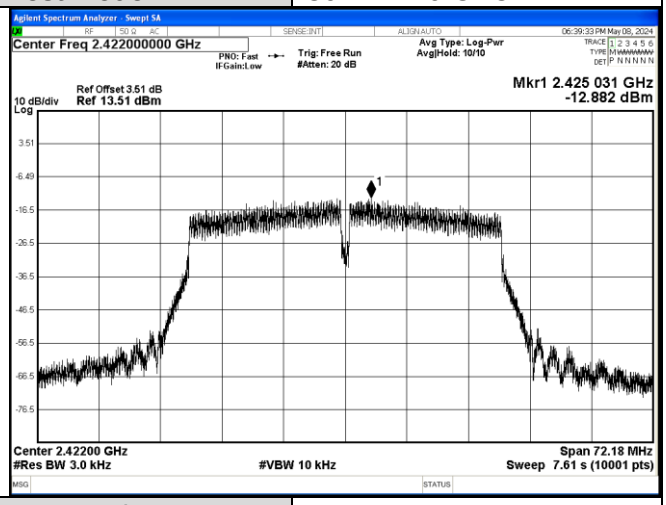
Test Mode:	802.11n20 CH06



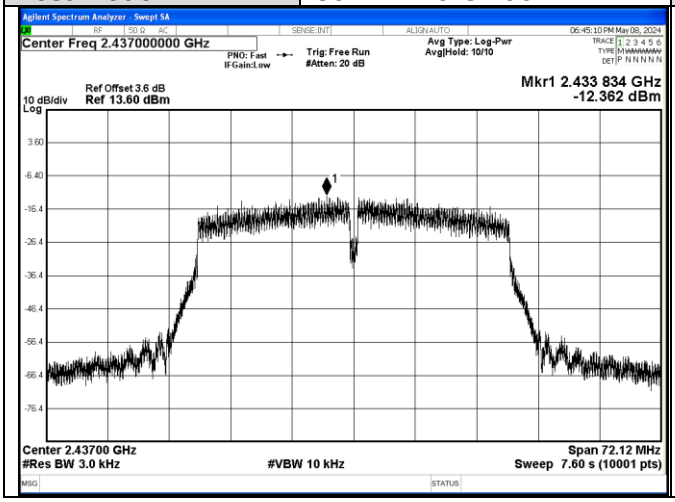
Test Mode:	802.11n20 CH11



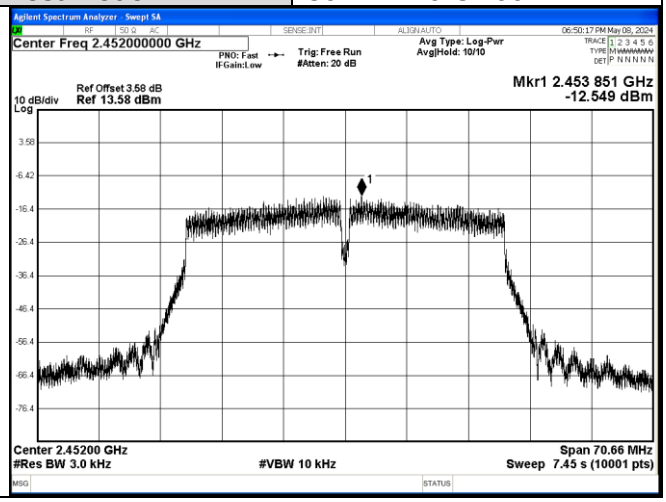
Test Mode:	802.11n40 CH3



Test Mode:	802.11n40 CH06



Test Mode:	802.11n40 CH09



Appendix A.5 Test Results of 6dB BANDWIDTH

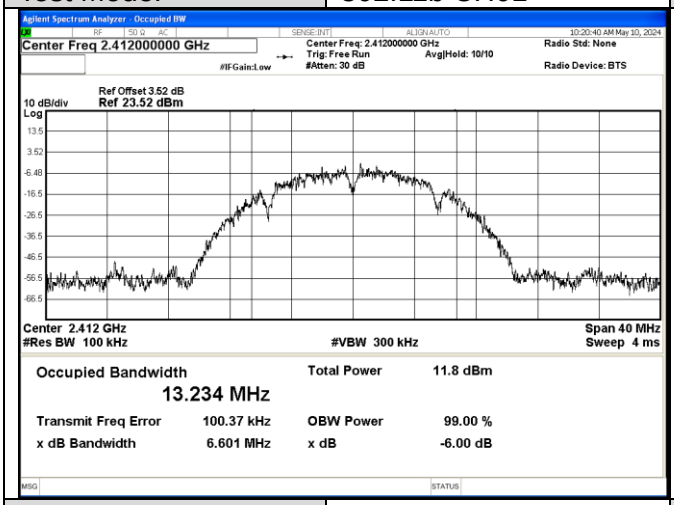
802.11b				
Frequency	6dB Bandwidth (MHz)		6dB limit (MHz)	Result
	ANT 1	ANT 2		
CH01	6.6006	7.5626	0.5	Pass
CH06	9.4708	7.6741	0.5	Pass
CH11	7.7646	7.3962	0.5	Pass

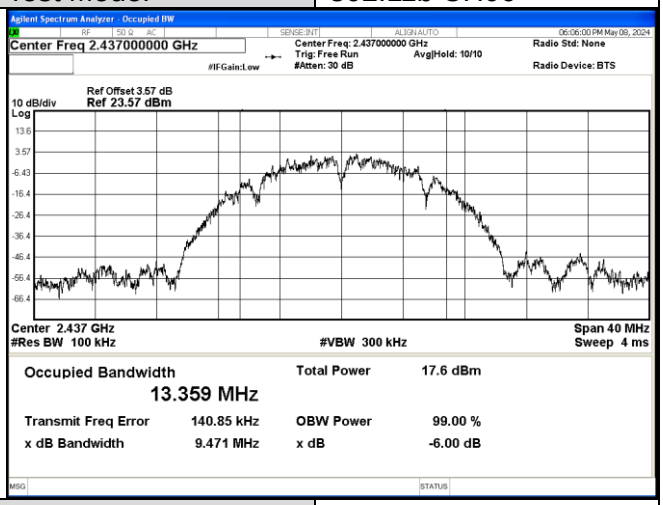
802.11g				
Frequency	6dB Bandwidth (MHz)		6dB limit (MHz)	Result
	ANT 1	ANT 2		
CH01	16.36	16.1666	0.5	Pass
CH06	16.1425	16.3254	0.5	Pass
CH11	15.6921	16.2744	0.5	Pass

802.11n(HT20)				
Frequency	6dB Bandwidth (MHz)		6dB limit (MHz)	Result
	ANT 1	ANT 2		
CH01	16.0197	17.5195	0.5	Pass
CH06	17.0494	17.5577	0.5	Pass
CH11	17.5794	17.0549	0.5	Pass

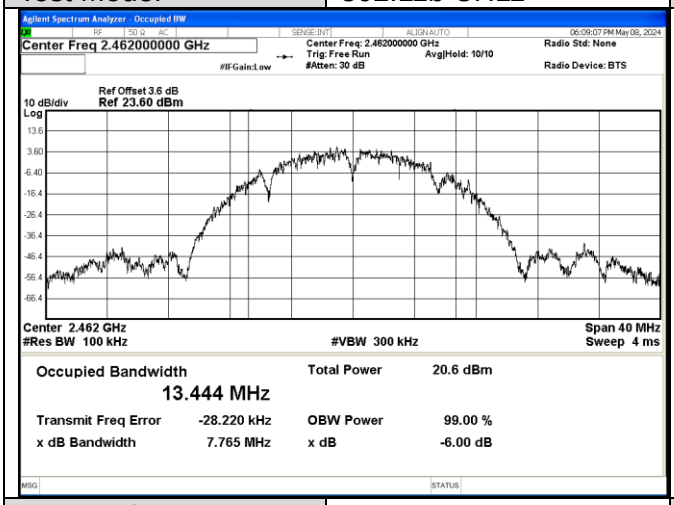
802.11n(HT40)				
Frequency	6dB Bandwidth (MHz)		6dB limit (MHz)	Result
	ANT 1	ANT 2		
CH3	36.3316	36.0892	0.5	Pass
CH06	36.3095	36.0614	0.5	Pass
CH09	29.4245	35.3293	0.5	Pass

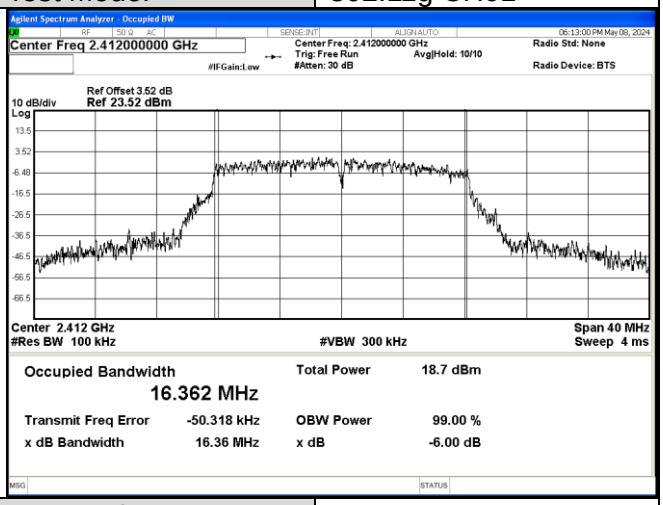
ANT 1			
Test Mode:	802.11b CH01	Test Mode:	802.11b CH06



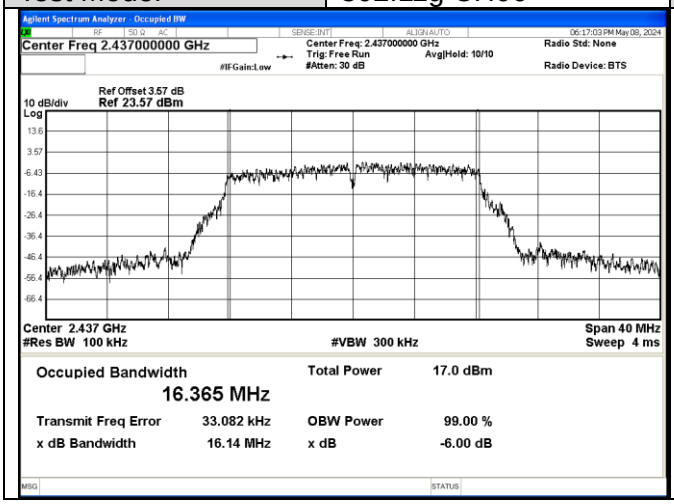


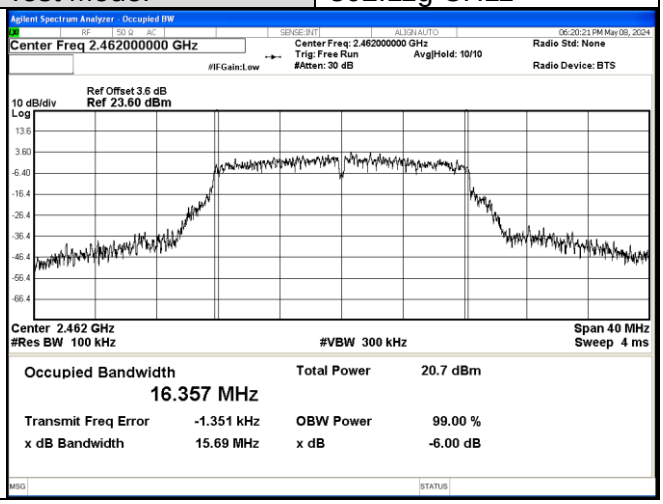
Test Mode:	802.11b CH11	Test Mode:	802.11g CH01



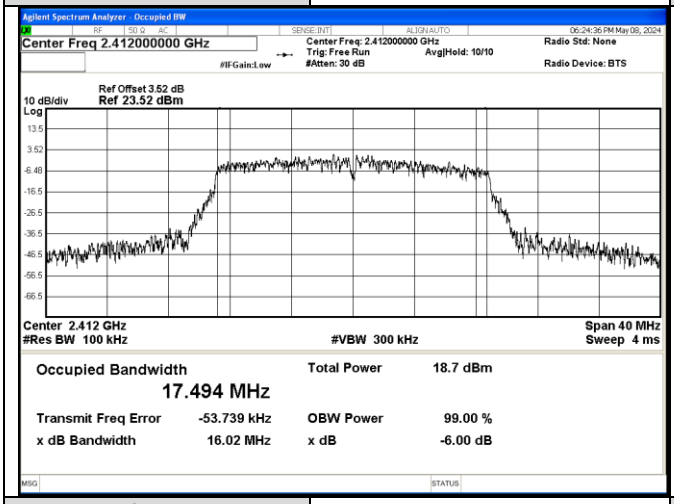


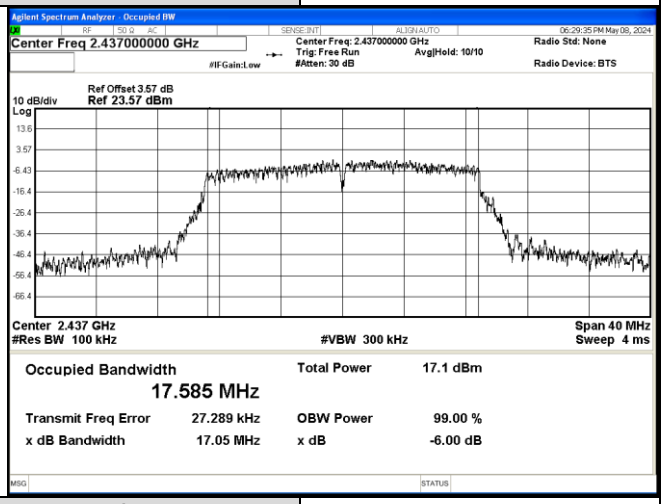
Test Mode:	802.11g CH06	Test Mode:	802.11g CH11



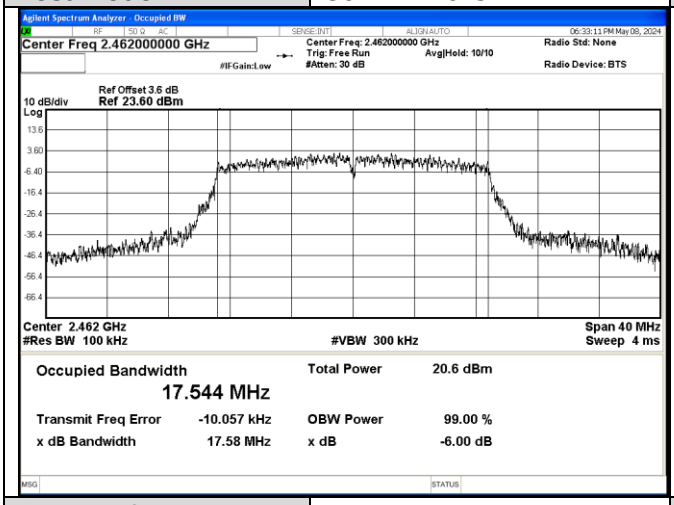


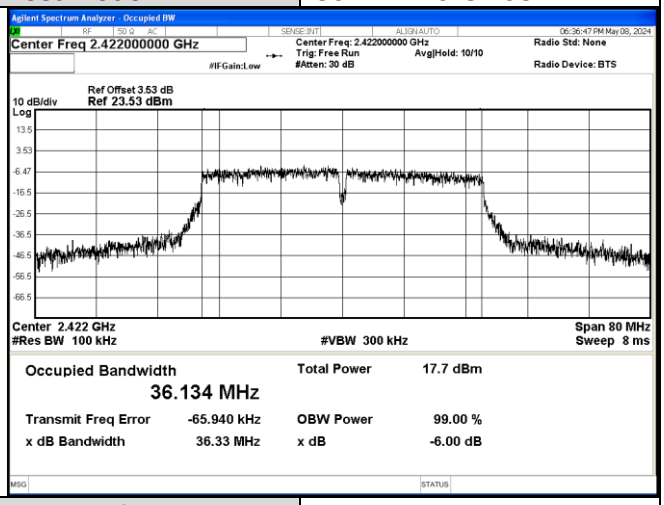
Test Mode:	802.11n20 CH01	Test Mode:	802.11n20 CH06



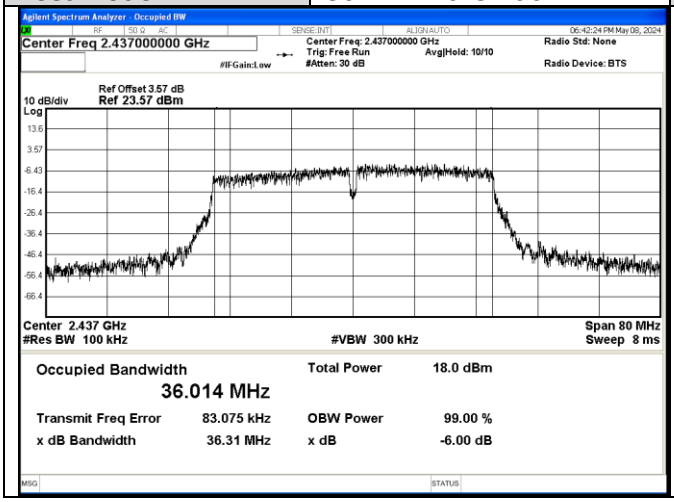


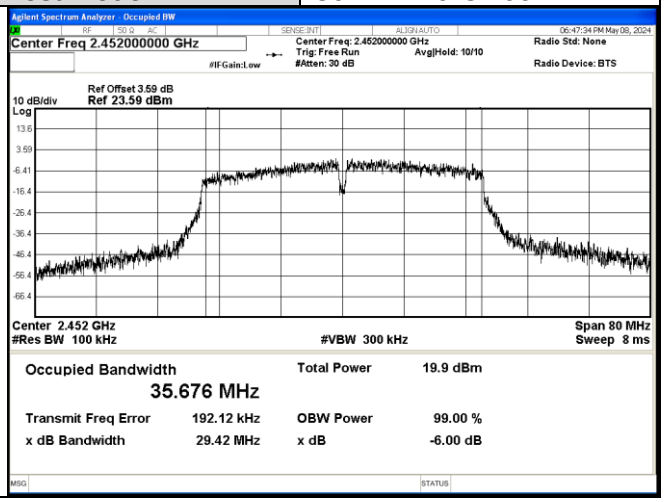
Test Mode:	802.11n20 CH11	Test Mode:	802.11n40 CH03

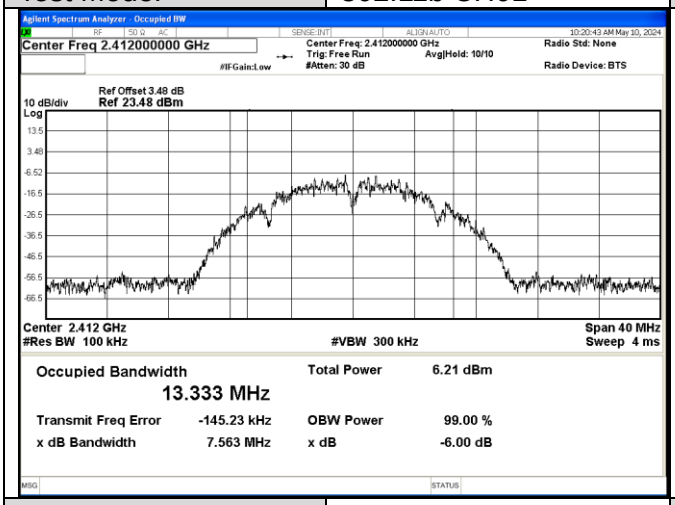
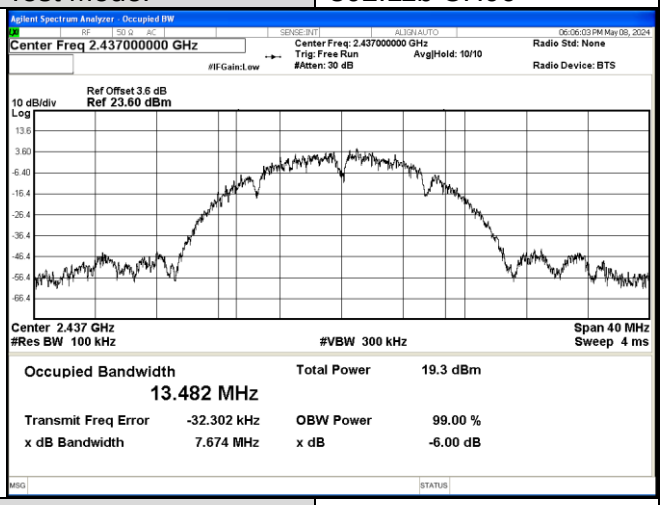
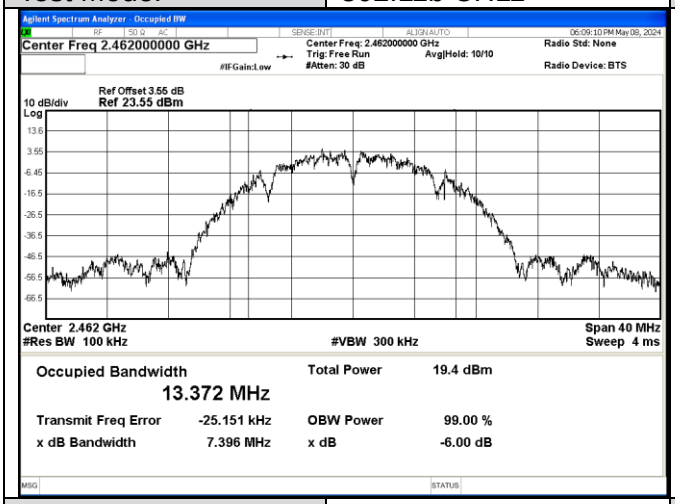
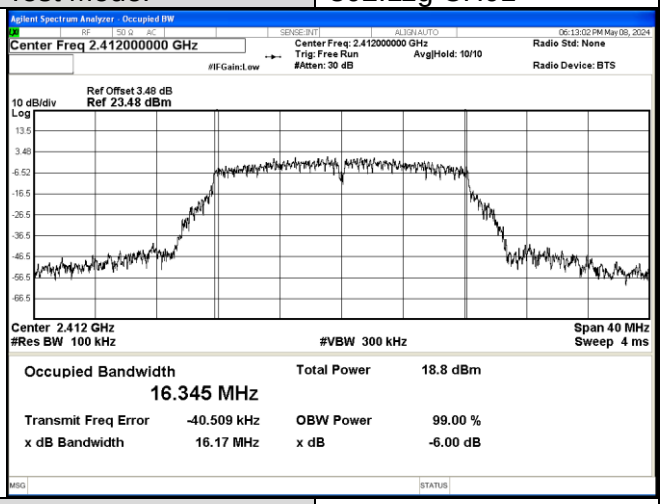
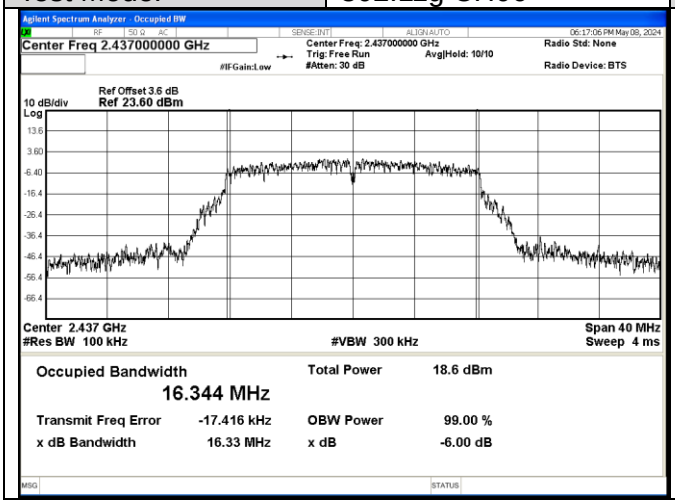
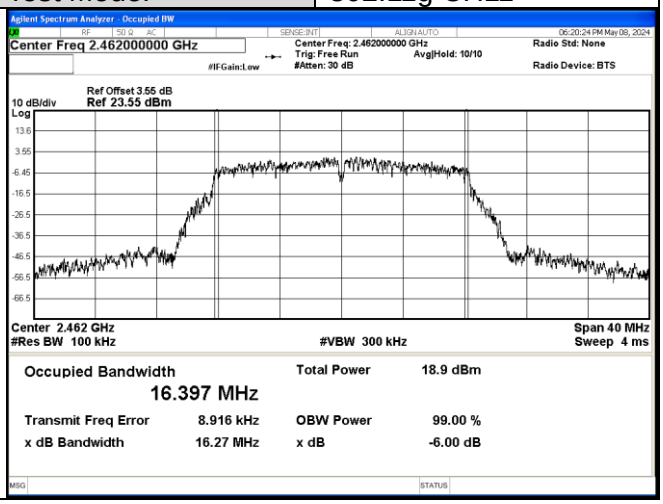




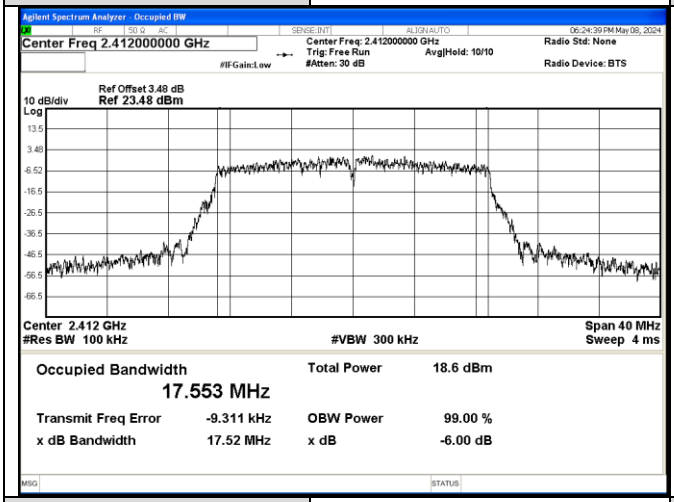
Test Mode:	802.11n40 CH06	Test Mode:	802.11n40 CH09



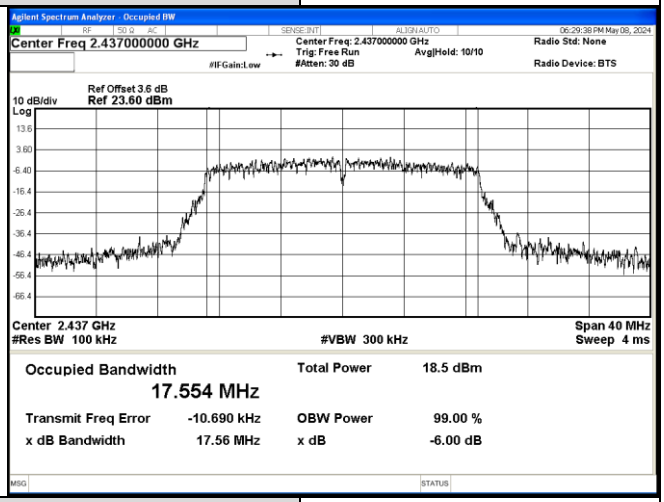


ANT 2			
Test Mode:	802.11b CH01	Test Mode:	802.11b CH06
			
Test Mode:	802.11b CH11	Test Mode:	802.11g CH01
			
Test Mode:	802.11g CH06	Test Mode:	802.11g CH11
			

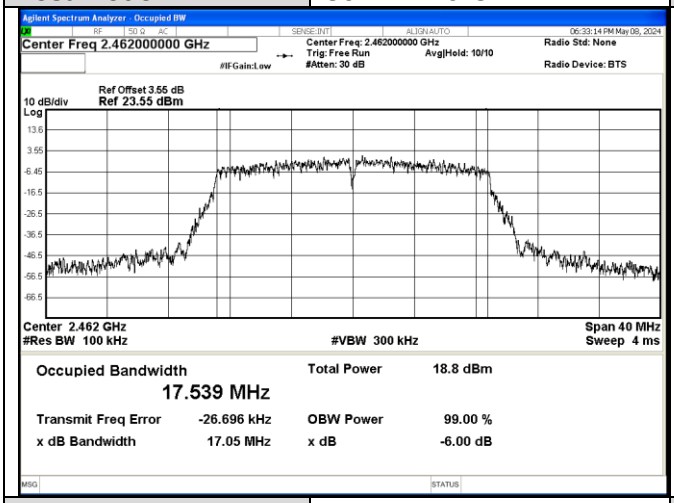
Test Mode:	802.11n20 CH01



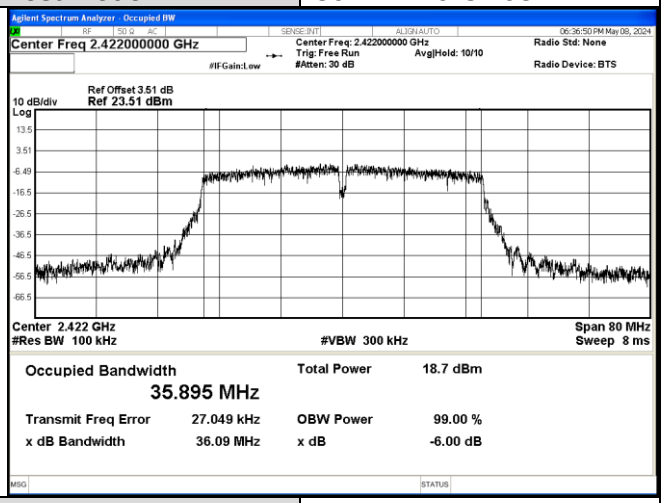
Test Mode:	802.11n20 CH06



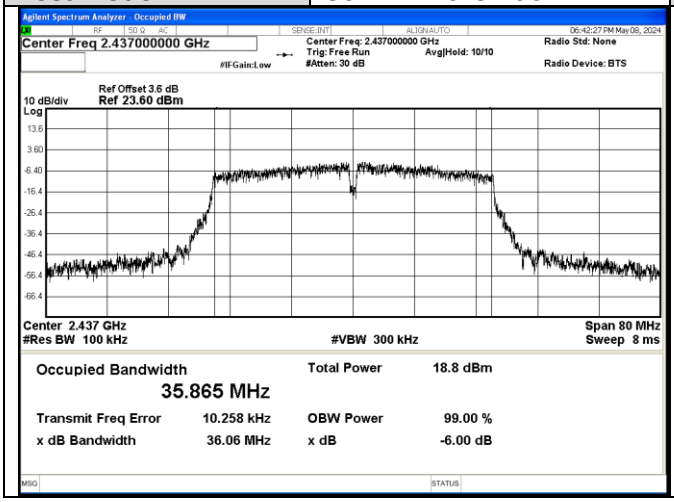
Test Mode:	802.11n20 CH11



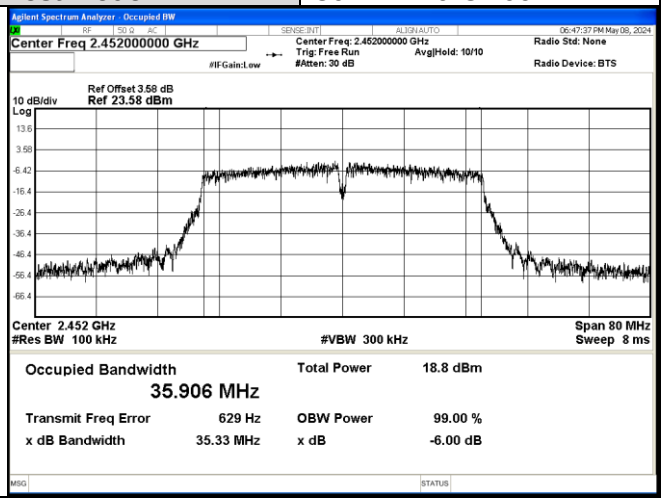
Test Mode:	802.11n40 CH03



Test Mode:	802.11n40 CH06



Test Mode:	802.11n40 CH09



Appendix A.6 Test Results of Maximum Conducted Output Power

802.11b								
Test Channel	Frequency	Conducted Peak Power (dBm)			Conducted Peak Power (W)		Limit	Result
	(MHz)	Ant1	Ant2	Total	Ant1	Ant2	W	
CH01	2412	14.907	15.83	/	0.0310	0.0383	1	Pass
CH06	2437	14.151	15.96	/	0.0260	0.0394	1	Pass
CH11	2462	17.452	16.015	/	0.0556	0.0399	1	Pass

802.11g								
Test Channel	Frequency	Conducted Peak Power (dBm)			Conducted Peak Power (W)		Limit	Result
	(MHz)	Ant1	Ant2	Total	Ant1	Ant2	W	
CH01	2412	19.323	19.066	/	0.0856	0.0806	1	Pass
CH06	2437	17.558	18.936	/	0.0570	0.0783	1	Pass
CH11	2462	21.033	19.339	/	0.1269	0.0859	1	Pass

802.11n20							
Test Channel	Frequency	Conducted Peak Power (dBm)			Conducted Peak Power (W)	Limit	Result
	(MHz)	Ant1	Ant2	Total		W	
CH01	2412	19.197	18.944	22.083	0.1615	1	Pass
CH06	2437	17.465	18.788	21.187	0.1314	1	Pass
CH11	2462	21.004	19.113	23.171	0.2075	1	Pass

802.11n40							
Test Channel	Frequency	Conducted Peak Power (dBm)			Conducted Peak Power (W)	Limit	Result
	(MHz)	Ant1	Ant2	Total		W	
CH03	2422	18.136	18.939	21.566	0.1434	1	Pass
CH06	2437	18.415	18.969	21.711	0.1483	1	Pass
CH09	2452	20.237	19.07	22.703	0.1863	1	Pass

Note:
1) The cable loss is taken into account in results.
2) Antenna gain(G) of 802.11 b/g/n: 3.47 dBi(ANT1&ANT2)
e.i.r.p.=P(Peak power)+ G, which is far below the 4 W.