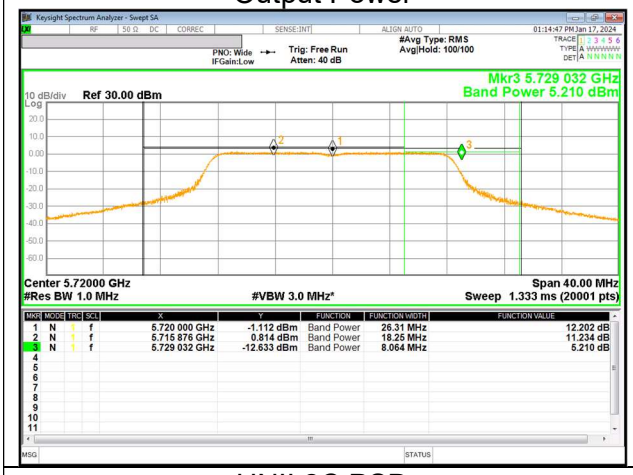
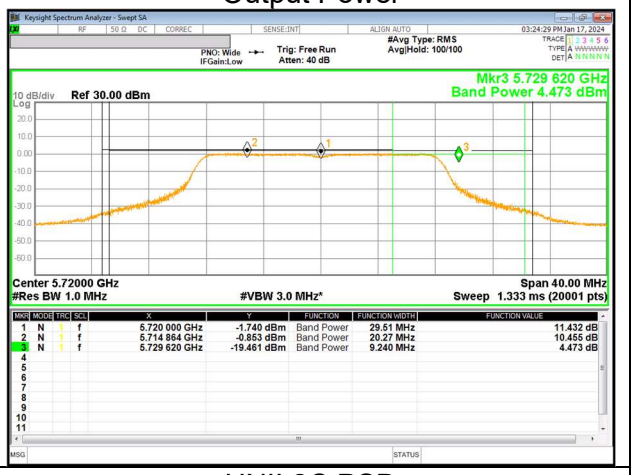
UNII Straddle Ch. IEEE 802.11a mode Output Power and PSD

ANT1	ANT2
Output Power	Output Power
	
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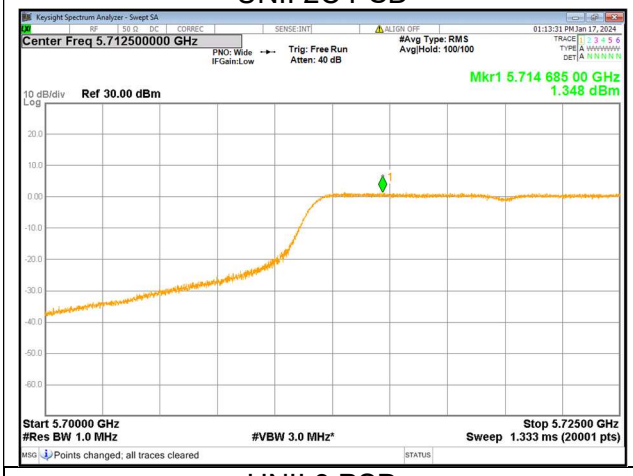	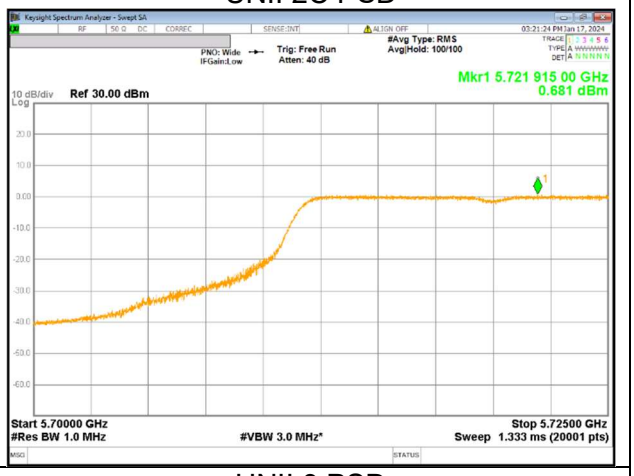
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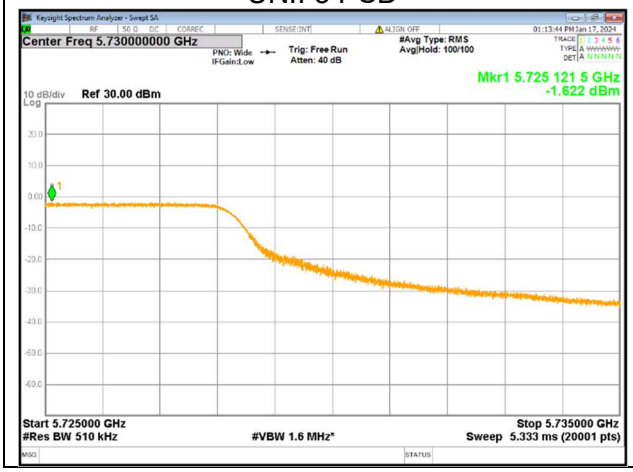
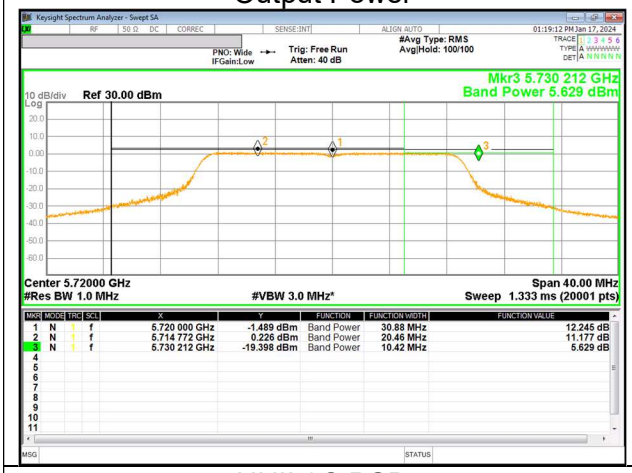
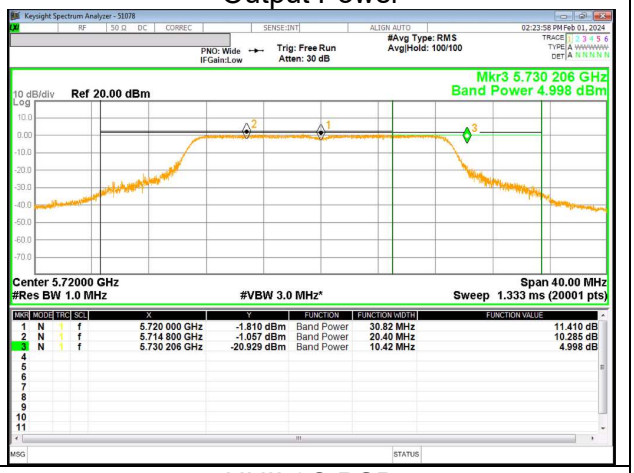
	

UNII Straddle Ch. IEEE 802.11n HT20 mode Output Power and PSD

ANT1	ANT2
Output Power	Output Power
	
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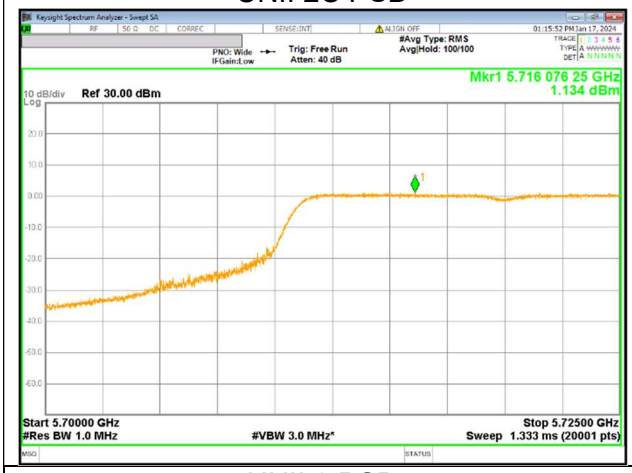	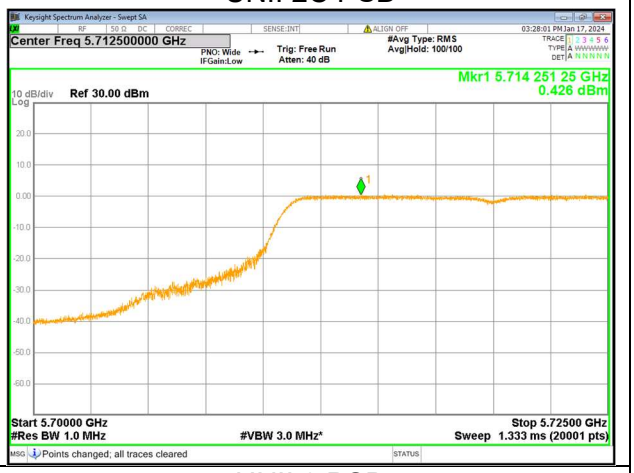
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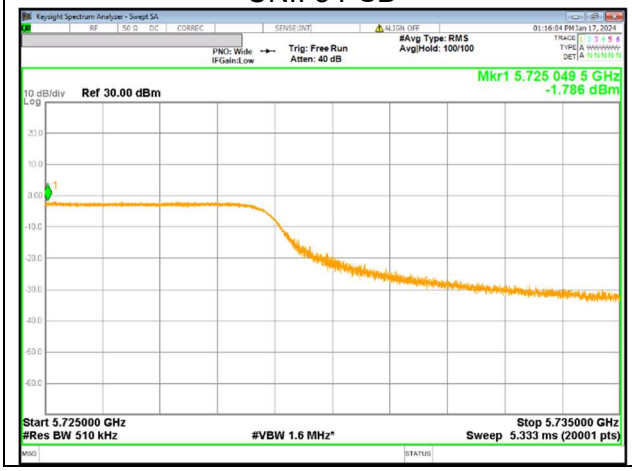
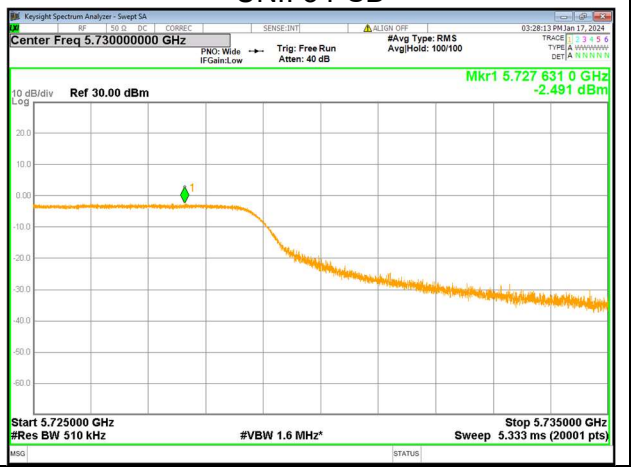
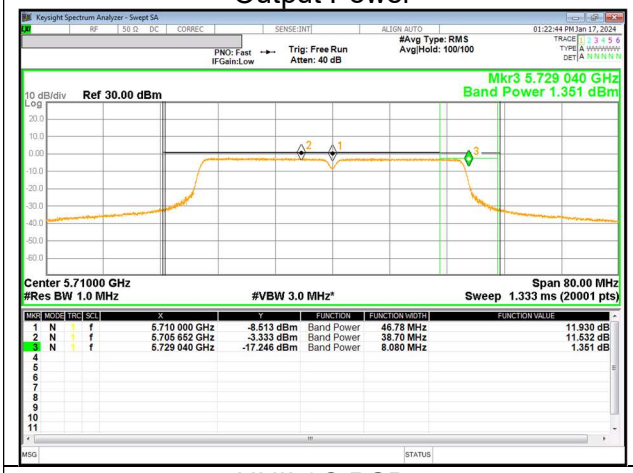
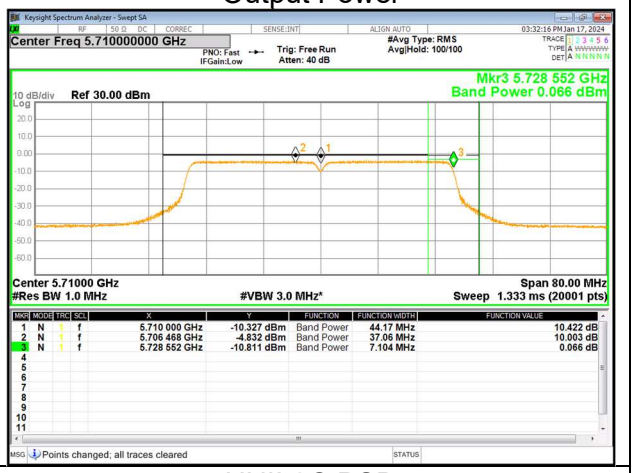
	

UNII Straddle Ch. IEEE 802.11n HT40 mode Output Power and PSD

ANT1	ANT2
Output Power	Output Power
	
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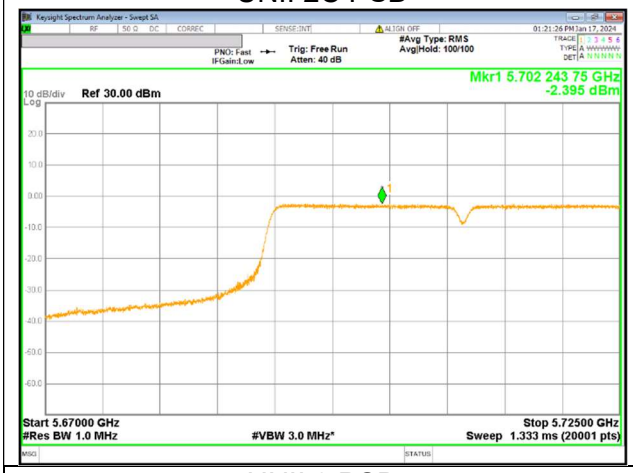
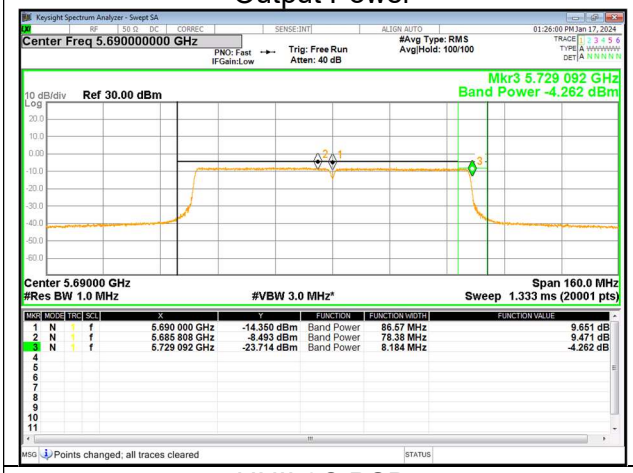
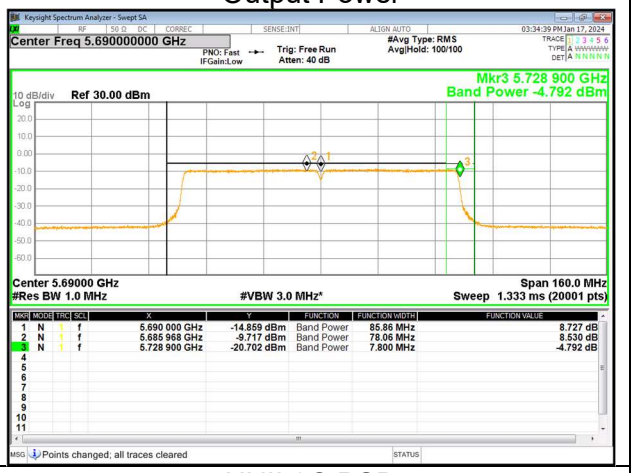
	
UNII 3 PSD	UNII 3 PSD
	

UNII Straddle Ch. IEEE 802.11ac VHT80 mode Output Power and PSD

ANT1	ANT2
Output Power	Output Power
	
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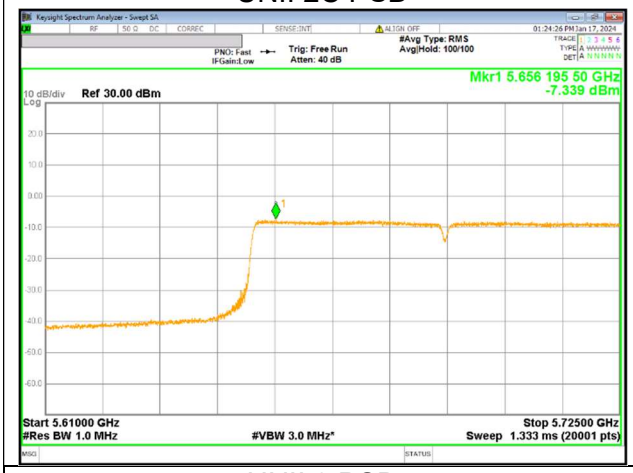
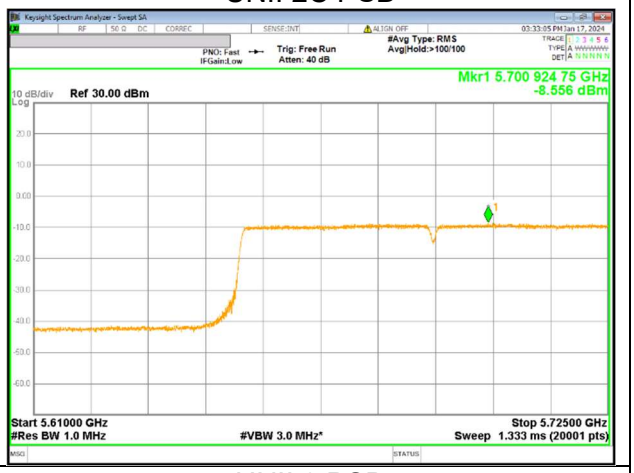
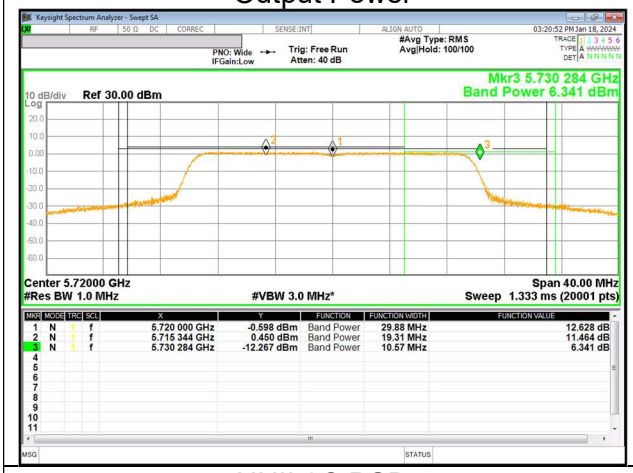
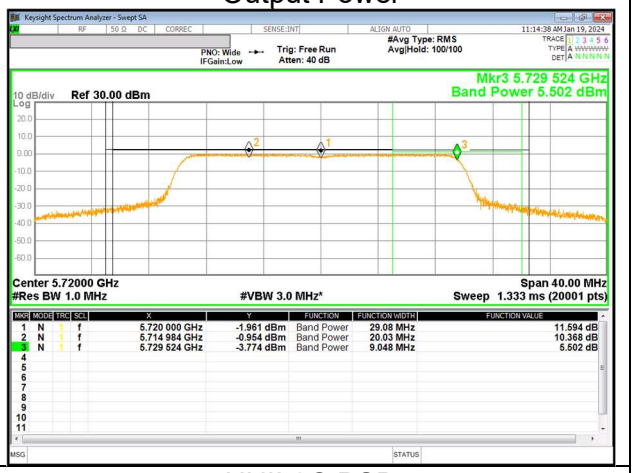
	
UNII 3 PSD	UNII 3 PSD
	

UNII Straddle Ch. IEEE 802.11ax HE20(SU) mode Output Power and PSD

ANT1	ANT2
Output Power	Output Power
	
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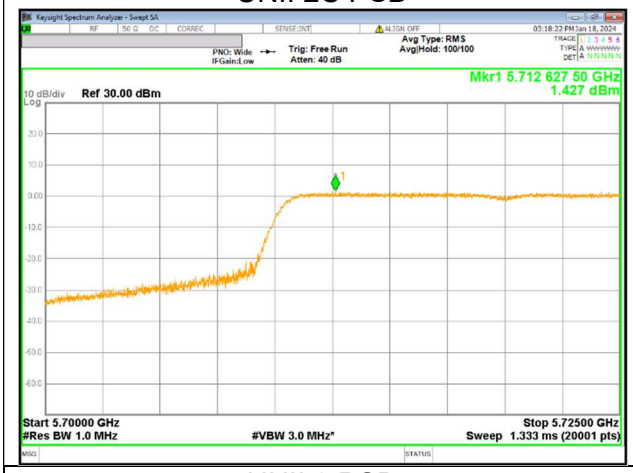
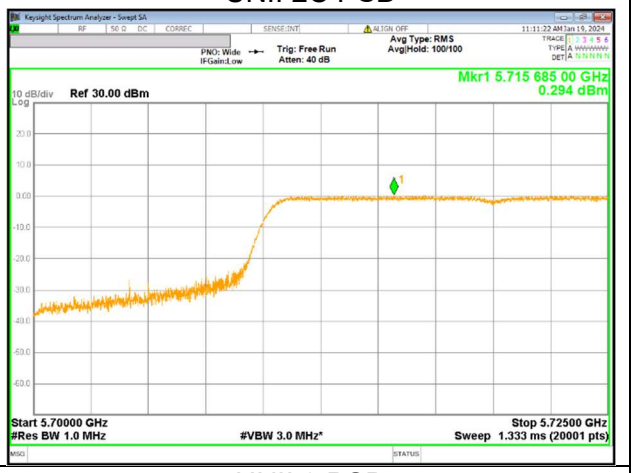
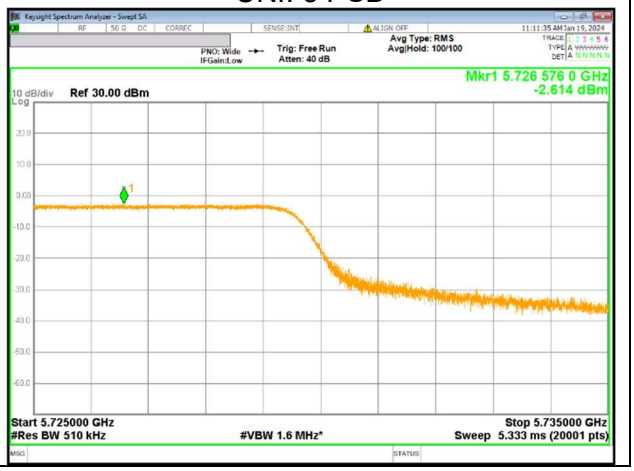
	
UNII 3 PSD	UNII 3 PSD
	

UNII Straddle Ch. IEEE 802.11ax HE40(SU) mode Output Power and PSD

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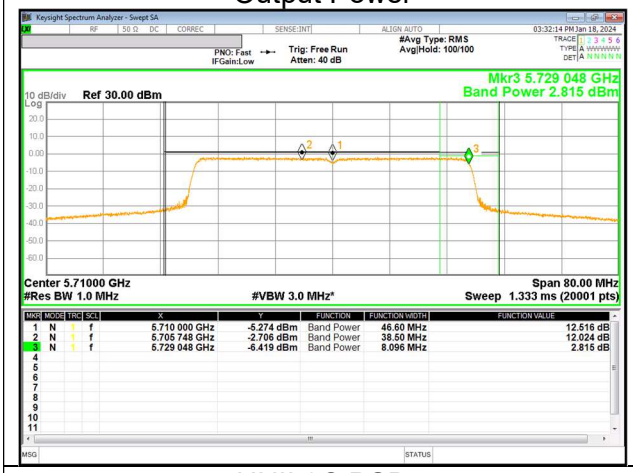
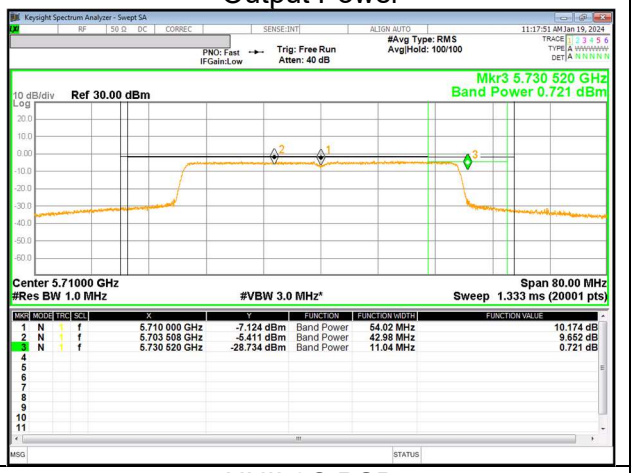
Output Power	Output Power
	
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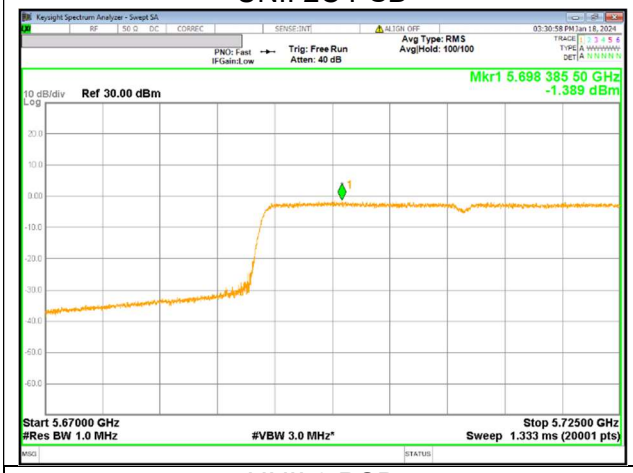	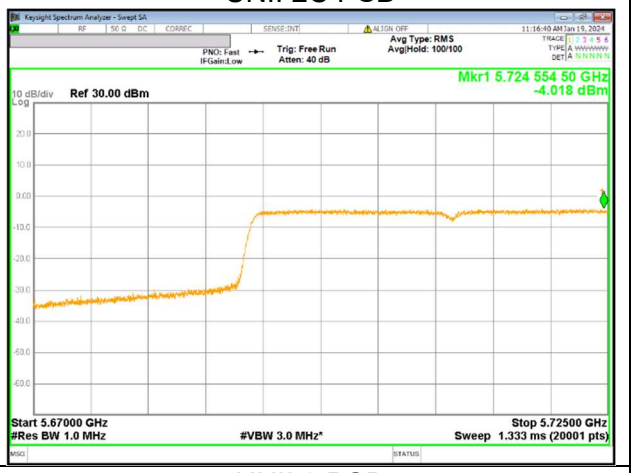
UNII 3 PSD	UNII 3 PSD
	

UNII Straddle Ch. IEEE 802.11ax HE80(SU) mode Output Power and PSD

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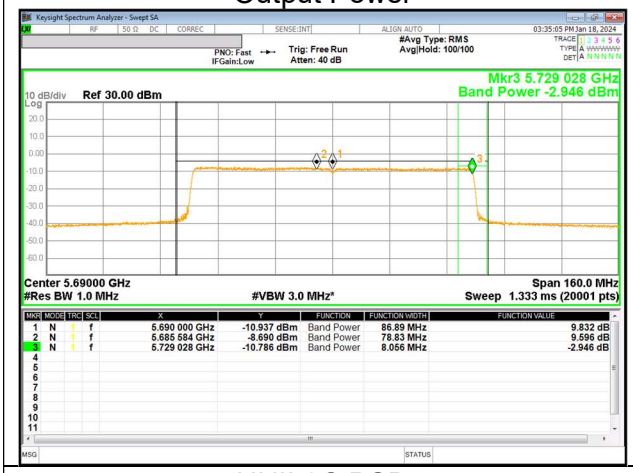	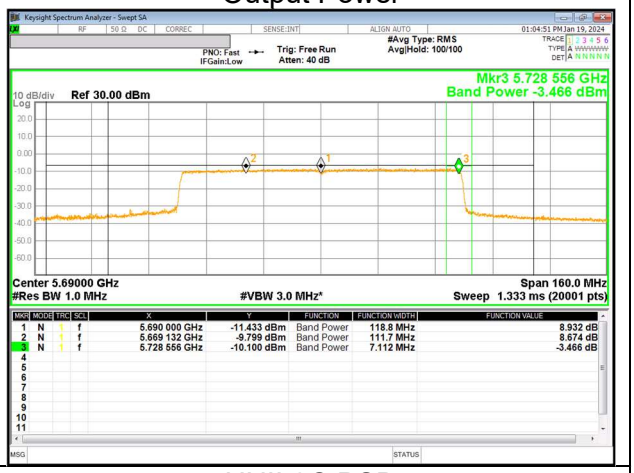
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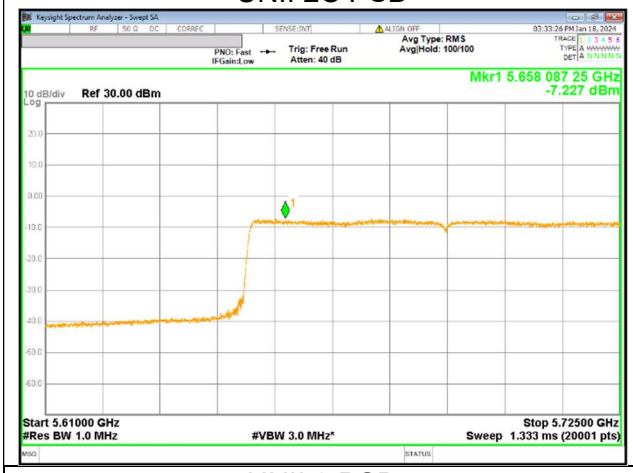
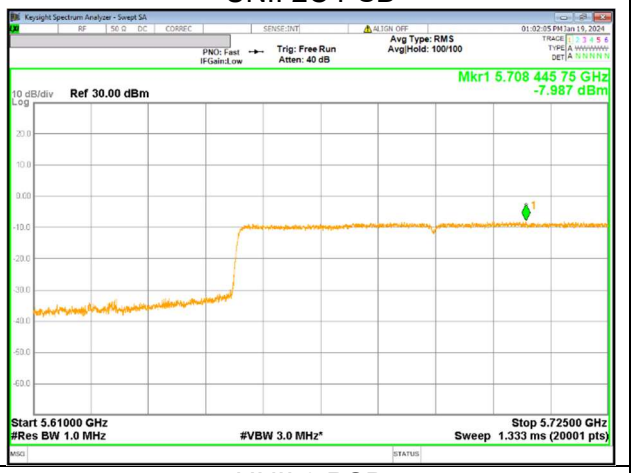
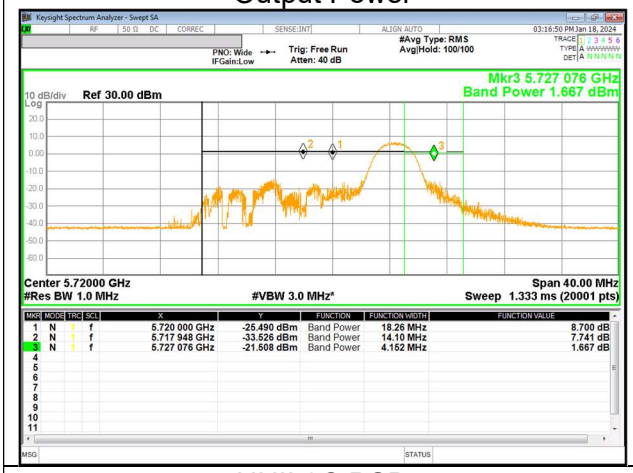
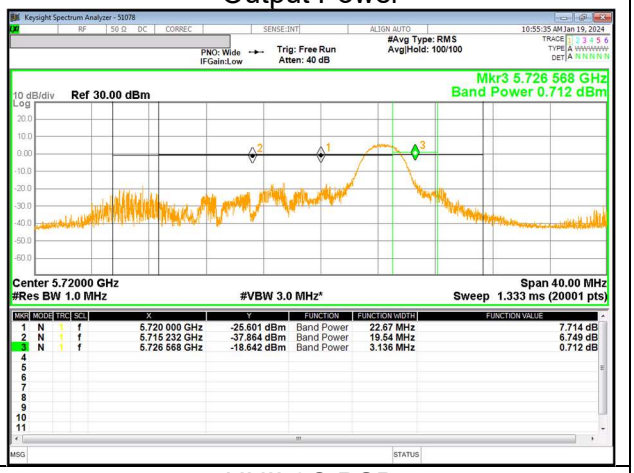
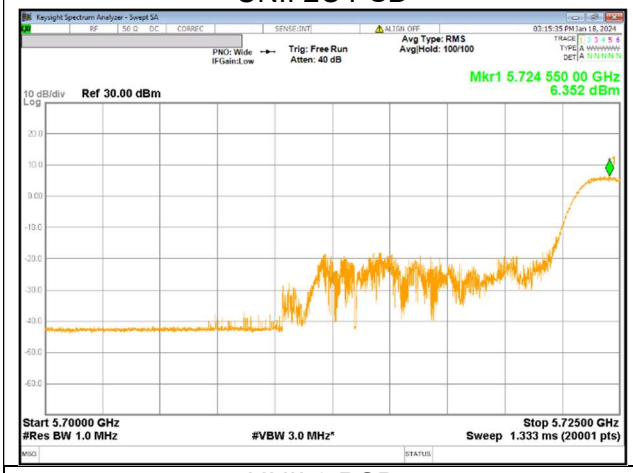
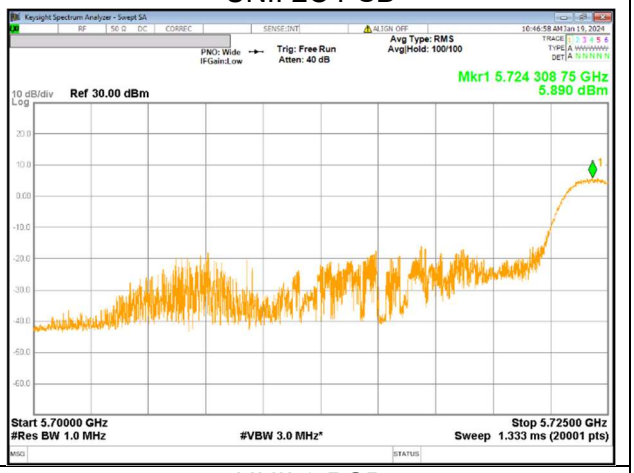
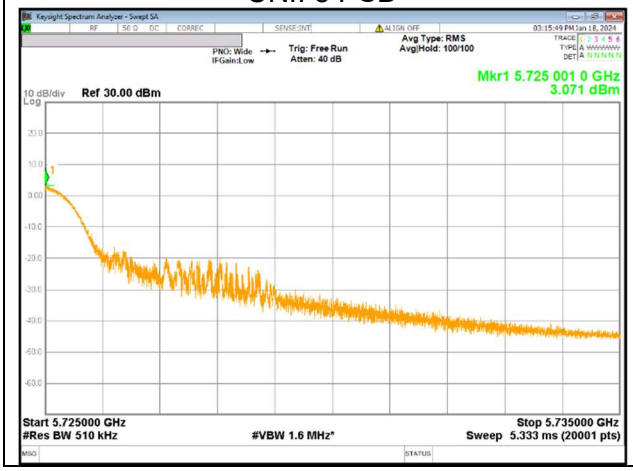
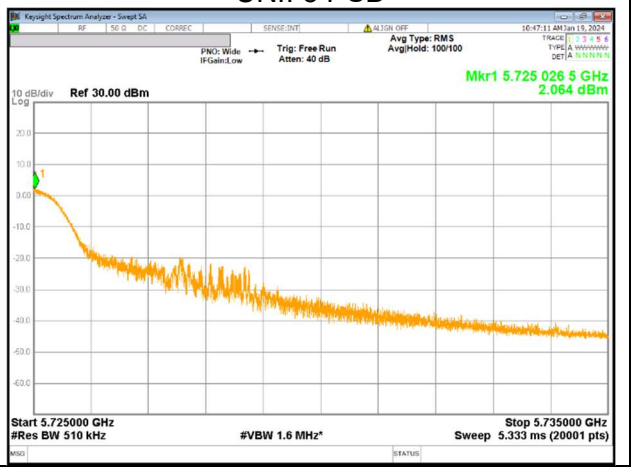
	
UNII 3 PSD	UNII 3 PSD
	

UNII Straddle Ch. IEEE 802.11ax HE20(6RU) mode Output Power and PSD

ANT1	ANT2
Output Power	Output Power
	
UNII 2C PSD	UNII 2C PSD
	
UNII 3 PSD	UNII 3 PSD
	

UNII Straddle Ch. IEEE 802.11ax HE40(15RU) mode Output Power and PSD

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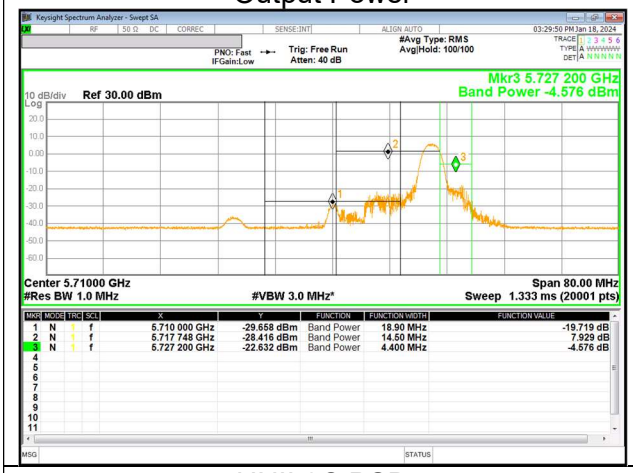
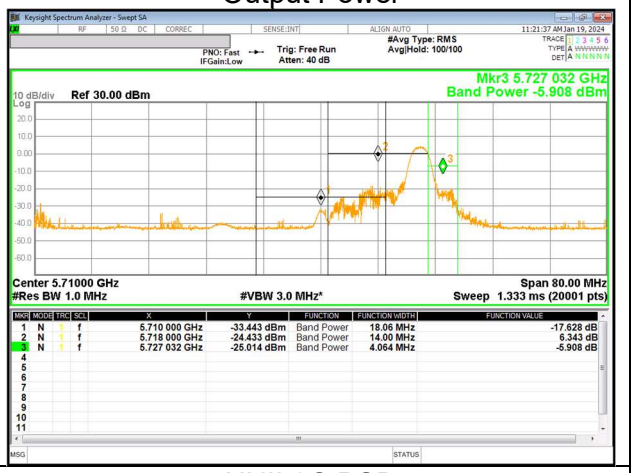
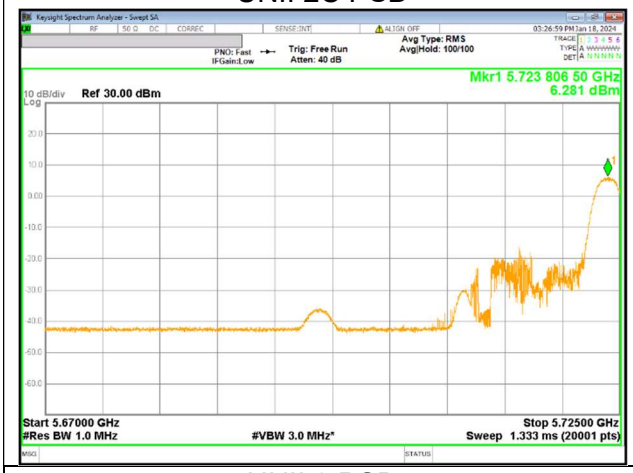
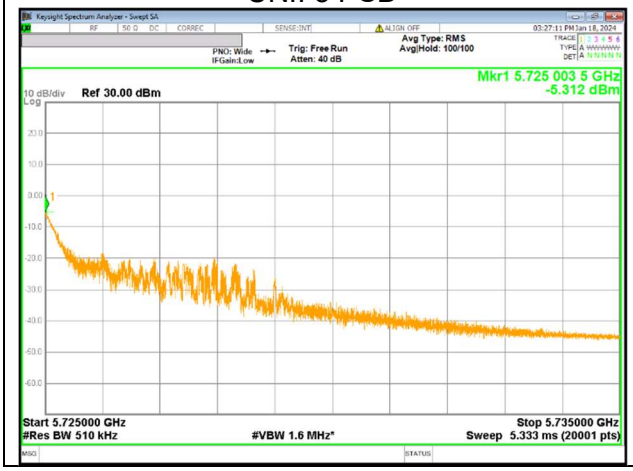
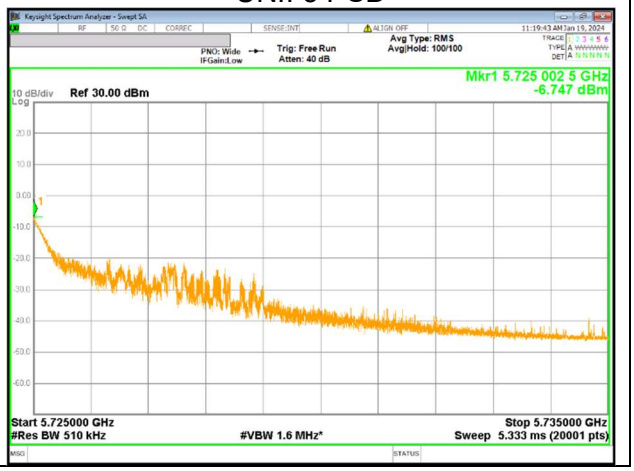
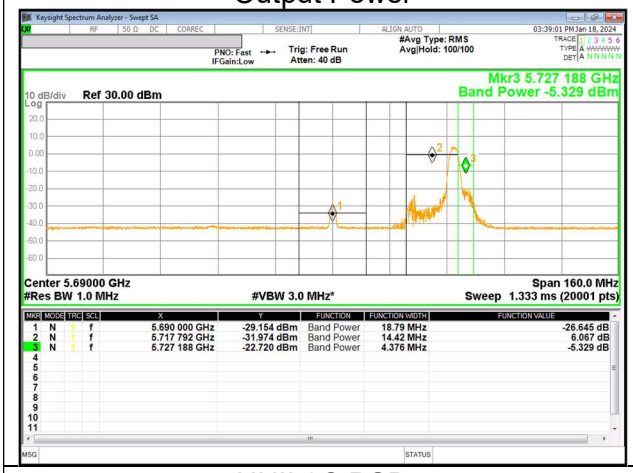
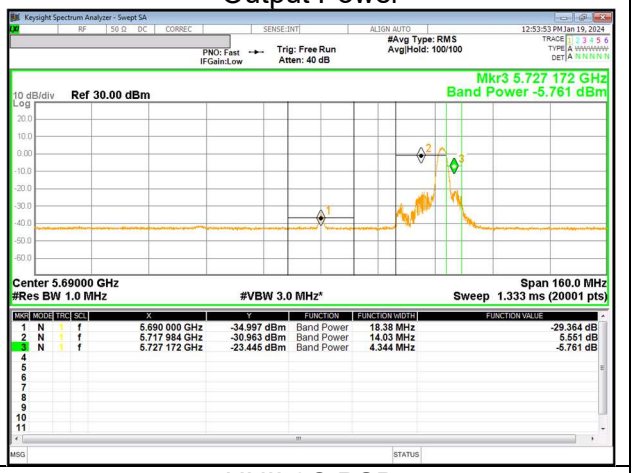
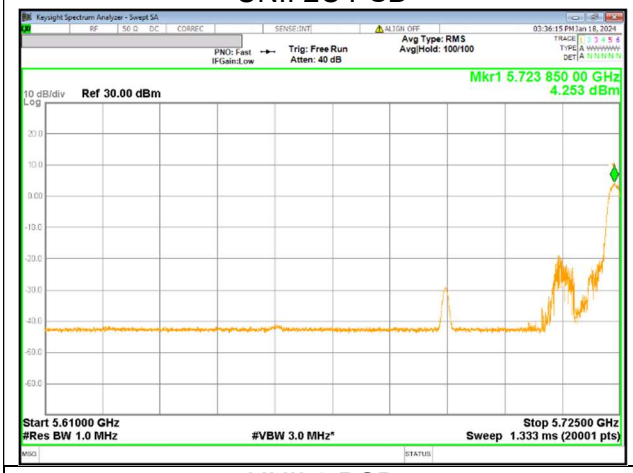
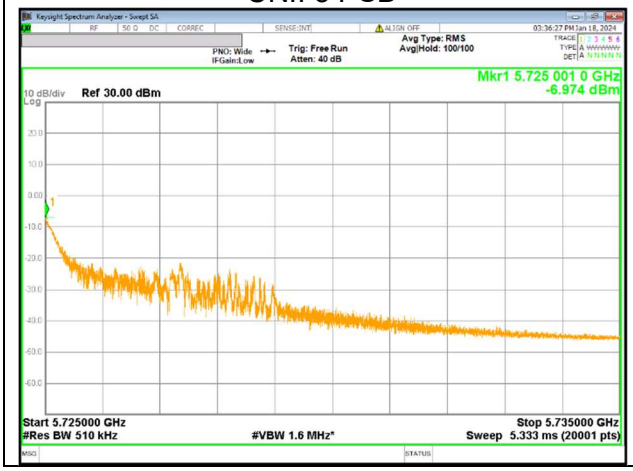
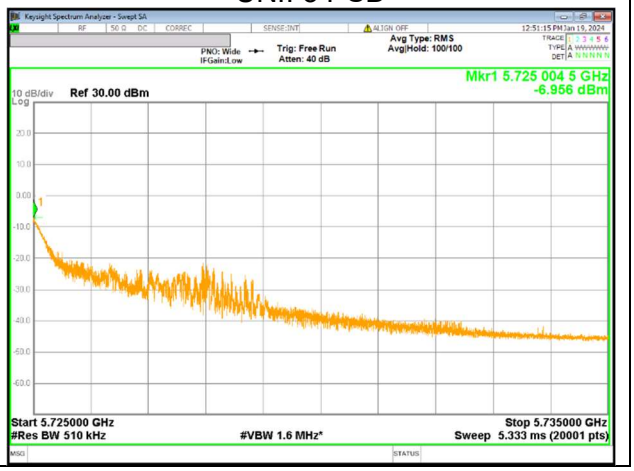
	
UNII 2C PSD	UNII 2C PSD
	
UNII 3 PSD	UNII 3 PSD
	

UNII Straddle Ch. IEEE 802.11ax HE80(34RU) mode Output Power and PSD

ANT1	ANT2
Output Power	Output Power
	
UNII 2C PSD	UNII 2C PSD
	
UNII 3 PSD	UNII 3 PSD
	

11. TRANSMITTER ABOVE 1 GHz

LIMITS

FCC §15.205 and §15.209

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits (μV/m)	Measurement Distance (m)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30 – 88	100**	3
88 - 216	150**	3
216 – 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.

FCC Part 15.205 (a) : Only spurious emissions are permitted in any of the frequency bands listed below :

MHz	MHz	MHz	MHz	GHz	GHz
0.009 ~ 0.110	8.41425 ~ 8.41475	108 ~ 121.94	1300 ~ 1427	4.5 ~ 5.15	14.47 ~ 14.5
0.495 ~ 0.505	12.29 ~ 12.293	123 ~ 138	1435 ~ 1626.5	5.35 ~ 5.46	15.35 ~ 16.2
2.1735 ~ 2.1905	12.51975 ~ 12.52025	149.9 ~ 150.05	1645.5 ~ 1646.5	7.25 ~ 7.75	17.7 ~ 21.4
4.125 ~ 4.128	12.57675 ~ 12.57725	156.52475 ~ 156.52525	1660 ~ 1710	8.025 ~ 8.5	22.01 ~ 23.12
4.17725 ~ 4.17775	13.36 ~ 13.41	156.7 ~ 156.9	1718.8 ~ 1722.2	9.0 ~ 9.2	23.6 ~ 24.0
4.20725 ~ 4.20775	16.42 ~ 16.423	162.0125 ~ 167.17	2200 ~ 2300	9.3 ~ 9.5	31.2 ~ 31.8
6.215 ~ 6.218	16.69475 ~ 16.69525	167.72 ~ 173.2	2310 ~ 2390	10.6 ~ 12.7	36.43 ~ 36.5
6.26775 ~ 6.26825	16.80425 ~ 16.80475	240 ~ 285	2483.5 ~ 2500	13.25 ~ 13.4	Above 38.6
6.31175 ~ 6.31225	25.5 ~ 25.67	322 ~ 335.4	2655 ~ 2900		
8.291 ~ 8.294	37.5 ~ 38.25	399.90 ~ 410	3260 ~ 3267		
8.362 ~ 8.366	73 ~ 74.6	608 ~ 614	3332 ~ 3339		
8.37625 ~ 8.38675	74.8 ~ 75.2	960 ~ 1240	3345.8 ~ 3358		
			3600 ~ 4400		

▪ FCC Part 15.205(b) : The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

FCC §15.407 (b)

(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(4) For transmitters operating solely in the 5.725–5.850 GHz band:
(i) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary,
provided the measured energy is integrated to show the total power over 1 MHz.
(6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.
(7) The provisions of §15.205 apply to intentional radiators operating under this section.
(8) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits.

Note

- Limit translation to field strength level (FCC §15.407)

E[dBuV/m] = EIRP[dBm] + 95.2 = -27dBm + 95.2 = 68.2dBuV/m

E[dBuV/m] = EIRP[dBm] + 95.2 = -17dBm + 95.2 = 78.2dBuV/m

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TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz and 100 cm for above 1GHz. EUT is set 3 meters away from the receiving antenna and scan from 1m to 4m to find out the highest emission.
The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Reference to KDB 789033 D02 v02r01 UNII part G) 6) c) Method AD:
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and add duty cycle factor to the reading offset for average measurements.

Pre-scans to detect harmonic and spurious emissions, the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 kHz for peak measurements.

The spectrum from 1GHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.
(From 30MHz to 1GHz, test was performed with the EUT set to transmit at the channel with highest output power)

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

Note : Emission was pre-scanned from 9kHz to 30MHz; No emissions were detected which was at least 20dB below the specification limit (consider distance correction factor).
Per FCC part 15.31(o), test results were not reported.

Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open are test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field based on KDB 414788.

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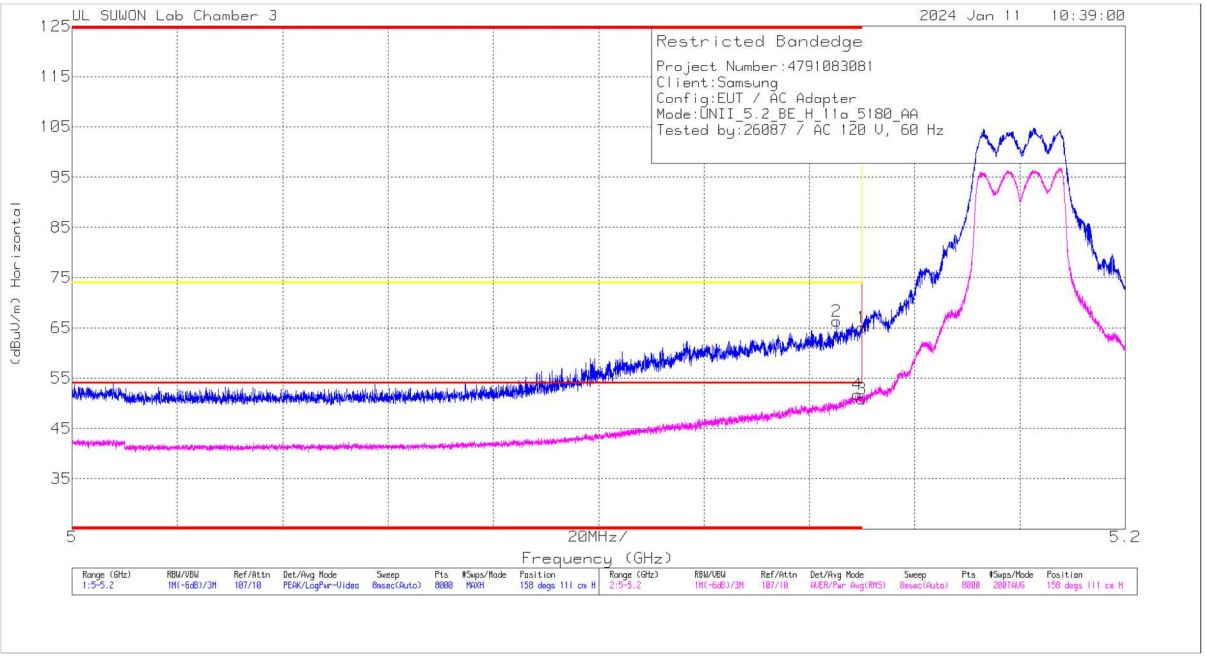
11.1. TX ABOVE 1GHz 2Tx MODE IN THE 5.2GHz BAND

BANDEDGE (WORST CASE: 802.11a / 5180 MHz)

HORIZONTAL PEAK AND AVERAGE DATA



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor(dB/m)	Loss(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 5.14999	51.33	Pk	34.4	-20.6	0	65.13	-	-	74	-8.87	158	111	H
2	* 5.14519	52.71	Pk	34.4	-20.8	0	66.31	-	-	74	-7.69	158	111	H
3	* 5.14999	36.93	RMS	34.4	-20.6	.2	50.93	54	-3.07	-	-	158	111	H
4	* 5.14917	37.89	RMS	34.4	-20.7	.2	51.79	54	-2.21	-	-	158	111	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

BANDEDGE TEST DATA

Mode	Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB(1/m)]	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
802.11a	5180	MIMO	* 5.14999	51.33	Pk	34.40	-20.60	0.00	65.13	-	-	74.00	-8.87	158	111	H
			* 5.14519	52.71	Pk	34.40	-20.80	0.00	66.31	-	-	74.00	-7.69	158	111	H
			* 5.14999	36.93	RMS	34.40	-20.60	0.20	50.93	54.00	-3.07	-	-	158	111	H
			* 5.14917	37.89	RMS	34.40	-20.70	0.20	51.79	54.00	**-2.21**	-	-	158	111	H
			* 5.14999	51.03	Pk	34.40	-20.60	0.00	64.83	-	-	74.00	-9.17	149	100	V
			* 5.14814	52.79	Pk	34.40	-20.80	0.00	66.39	-	-	74.00	**-7.61**	149	100	V
			* 5.14999	37.33	RMS	34.40	-20.60	0.20	51.33	54.00	-2.67	-	-	149	100	V
			* 5.14914	37.88	RMS	34.40	-20.70	0.20	51.78	54.00	-2.22	-	-	149	100	V
802.11n (HT20)	5180	MIMO	* 5.14999	42.63	Pk	34.40	-20.60	0.00	56.43	-	-	74.00	-17.57	157	119	H
			* 5.14749	44.10	Pk	34.40	-20.80	0.00	57.70	-	-	74.00	-16.30	157	119	H
			* 5.14999	29.94	RMS	34.40	-20.60	0.12	43.86	54.00	-10.14	-	-	157	119	H
			* 5.14904	31.31	RMS	34.40	-20.70	0.12	45.13	54.00	-8.87	-	-	157	119	H
			* 5.14999	40.51	Pk	34.40	-20.60	0.00	54.31	-	-	74.00	-19.69	157	100	V
			* 5.14989	42.30	Pk	34.40	-20.60	0.00	56.10	-	-	74.00	-17.90	157	100	V
			* 5.14999	29.90	RMS	34.40	-20.60	0.12	43.82	54.00	-10.18	-	-	157	100	V
			* 5.14972	29.67	RMS	34.40	-20.60	0.12	43.59	54.00	-10.41	-	-	157	100	V
802.11n (HT40)	5190	MIMO	* 5.14999	48.85	Pk	34.40	-20.60	0.00	62.65	-	-	74.00	-11.35	160	100	H
			* 5.14964	50.27	Pk	34.40	-20.70	0.00	63.97	-	-	74.00	-10.03	160	100	H
			* 5.14999	35.65	RMS	34.40	-20.60	0.09	49.54	54.00	-4.46	-	-	160	100	H
			* 5.14994	35.73	RMS	34.40	-20.60	0.09	49.62	54.00	-4.38	-	-	160	100	H
			* 5.14999	47.65	Pk	34.40	-20.60	0.00	61.45	-	-	74.00	-12.55	145	100	V
			* 5.14997	50.34	Pk	34.40	-20.60	0.00	64.14	-	-	74.00	-9.86	145	100	V
			* 5.14999	34.80	RMS	34.40	-20.60	0.09	48.69	54.00	-5.31	-	-	145	100	V
			* 5.14969	36.23	RMS	34.40	-20.60	0.09	50.12	54.00	-3.88	-	-	145	100	V
802.11ac (VHT80)	5210	MIMO	* 5.14999	39.68	Pk	34.40	-20.60	0.00	53.48	-	-	74.00	-20.52	153	124	H
			* 5.14589	43.79	Pk	34.40	-20.80	0.00	57.39	-	-	74.00	-16.61	153	124	H
			* 5.14999	28.91	RMS	34.40	-20.60	0.54	43.25	54.00	-10.75	-	-	153	124	H
			* 5.14914	29.96	RMS	34.40	-20.70	0.54	44.20	54.00	-9.80	-	-	153	124	H
			* 5.14999	43.14	Pk	34.40	-20.60	0.00	56.94	-	-	74.00	-17.06	153	102	V
			* 5.14524	45.74	Pk	34.40	-20.80	0.00	59.34	-	-	74.00	-14.66	153	102	V
			* 5.14999	30.69	RMS	34.40	-20.60	0.54	45.03	54.00	-8.97	-	-	153	102	V
			* 5.14927	31.19	RMS	34.40	-20.70	0.54	45.43	54.00	-8.57	-	-	153	102	V
802.11ax (HE20) SU mode	5180	MIMO	* 5.14999	45.87	Pk	34.40	-20.60	0.00	59.67	-	-	74.00	-14.33	154	135	H
			* 5.14922	48.62	Pk	34.40	-20.70	0.00	62.32	-	-	74.00	-11.68	154	135	H
			* 5.14999	30.22	RMS	34.40	-20.60	0.23	44.25	54.00	-9.75	-	-	154	135	H
			* 5.14842	31.85	RMS	34.40	-20.80	0.23	45.68	54.00	-8.32	-	-	154	135	H
			* 5.14999	42.72	Pk	34.40	-20.60	0.00	56.52	-	-	74.00	-17.48	276	286	V
			* 5.14959	52.06	Pk	34.40	-20.70	0.00	65.76	-	-	74.00	-8.24	276	286	V
			* 5.14999	30.82	RMS	34.40	-20.60	0.23	44.85	54.00	-9.15	-	-	276	286	V
			* 5.14954	31.42	RMS	34.40	-20.70	0.23	45.35	54.00	-8.65	-	-	276	286	V
802.11ax (HE40) SU mode	5190	MIMO	* 5.14999	47.73	Pk	34.40	-20.60	0.00	61.53	-	-	74.00	-12.47	152	106	H
			* 5.14919	48.28	Pk	34.40	-20.70	0.00	61.98	-	-	74.00	-12.02	152	106	H
			* 5.14999	31.98	RMS	34.40	-20.60	0.48	46.26	54.00	-7.74	-	-	152	106	H
			* 5.14997	33.07	RMS	34.40	-20.60	0.48	47.35	54.00	-6.65	-	-	152	106	H
			* 5.14999	50.70	Pk	34.40	-20.60	0.00	64.50	-	-	74.00	-9.50	157	100	V
			* 5.14739	52.47	Pk	34.40	-20.80	0.00	66.07	-	-	74.00	-7.93	157	100	V
			* 5.14999	35.19	RMS	34.40	-20.60	0.48	49.47	54.00	-4.53	-	-	157	100	V
			* 5.14989	35.76	RMS	34.40	-20.60	0.48	50.04	54.00	**-3.96**	-	-	157	100	V
802.11ax (HE80) SU mode	5210	MIMO	* 5.14999	38.03	Pk	34.40	-20.60	0.00	51.83	-	-	74.00	-22.17	154	121	H
			* 5.14607	41.47	Pk	34.40	-20.80	0.00	55.07	-	-	74.00	-18.93	154	121	H
			* 5.14999	27.94	RMS	34.40	-20.60	0.63	42.37	54.00	-11.63	-	-	154	121	H
			* 5.0058	29.45	RMS	34.30	-20.90	0.63	43.48	54.00	-10.52	-	-	154	121	H
			* 5.14999	40.32	Pk	34.40	-20.60	0.00	54.12	-	-	74.00	-19.88	157	100	V
			* 5.14604	44.32	Pk	34.40	-20.80	0.00	57.92	-	-	74.00	-16.08	157	100	V
			* 5.14999	29.22	RMS	34.40	-20.60	0.63	43.65	54.00	-10.35	-	-	157	100	V
			* 5.14894	29.84	RMS	34.40	-20.70	0.63	44.17	54.00	-9.83	-	-	157	100	V
802.11ax (HE80) RU mode 26 Tone offset 0	5210	MIMO	* 5.14999	39.11	Pk	34.40	-20.60	0.00	52.91	-	-	74.00	-21.09	149	120	H
			* 5.0194	47.05	Pk	34.30	-20.90	0.00	60.45	-	-	74.00	-13.55	149	120	H
			* 5.14999	29.45	RMS	34.40	-20.60	0.12	43.37	54.00	-10.63	-	-	149	120	H
			* 5.14582	30.19	RMS	34.40	-20.80	0.12	43.91	54.00	-10.09	-	-	149	120	H
			* 5.14999	37.63	Pk	34.40	-20.60	0.00	51.43	-	-	74.00	-22.57	155	100	V
			* 5.02048	54.47	Pk	34.30	-20.90	0.00	67.87	-	-	74.00	**-6.13**	155	100	V
			* 5.14999	27.83	RMS	34.40	-20.60	0.12	41.75	54.00	-12.25	-	-	155	100	V
			* 5.01945	31.09	RMS	34.30	-20.90	0.12	44.61	54.00	-9.39	-	-	155	100	V
802.11ax (HE80) RU mode 484 Tone offset 65	5210	MIMO	* 5.14999	40.63	Pk	34.40	-20.60	0.00	54.43	-	-	74.00	-19.57	149	120	H
			* 5.14992	43.85	Pk	34.40	-20.60	0.00	57.65	-	-	74.00	-16.35	149	120	H
			* 5.14999	29.14	RMS	34.40	-20.60	0.46	43.40	54.00	-10.60	-	-	149	120	H
			* 5.14977	30.54	RMS	34.40	-20.60	0.46	44.80	54.00	-9.20	-	-	149	120	H
			* 5.14999	45.57	Pk	34.40	-20.60	0.00	59.37	-	-	74.00	-14.63	155	100	V
			* 5.14829	49.40	Pk	34.40	-20.80	0.00	63.00	-	-	74.00	-11.00	155	100	V
			* 5.14999	32.32	RMS	34.40	-20.60	0.46	46.58	54.00	-7.42	-	-	155	100	V
			* 5.14997	33.25	RMS	34.40	-20.60	0.46	47.51	54.00	-6.49	-	-	155	100	V

Note1. Pk - Peak detector, RMS - RMS detectior
Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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