









Beamforming Mode:

Power Output:

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Max. Gain (dBi)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3							
33	6115	4.47	3.93	3.92	3.40	9.925	9.97	8.06	63.53	18.03	30	Pass
65	6275	4.61	4.11	3.80	3.11	9.912	9.96	8.06	63.387	18.02	30	Pass
93	6415	3.97	4.10	3.75	3.35	9.599	9.82	8.06	61.376	17.88	30	Pass
97	6435	4.02	4.06	3.89	3.64	9.831	9.93	7.82	59.566	17.75	30	Pass
105	6475	4.31	4.44	4.14	3.65	10.389	10.17	7.82	62.951	17.99	30	Pass
113	6515	4.39	4.41	4.32	3.63	10.519	10.22	7.82	63.68	18.04	30	Pass
117	6535	4.09	4.12	4.04	3.93	10.154	10.07	7.97	63.68	18.04	30	Pass
153	6715	3.97	3.93	3.84	3.56	9.657	9.85	7.97	60.534	17.82	30	Pass
181	6855	4.03	4.17	3.96	3.64	9.942	9.97	7.97	62.23	17.94	30	Pass
*185 (U-NII-7 Band)	6875	-0.72	-0.79	-1.42	-0.78	3.4252	5.35	7.97	21.478	13.32	30	Pass
*185 (U-NII-8 Band)	6875	-1.19	-0.63	-0.81	-1.49	3.348	5.25	8.38	23.067	13.63	30	Pass
213	7015	3.41	3.56	3.48	3.35	8.854	9.47	8.38	60.954	17.85	30	Pass
229	7095	1.35	0.77	1.17	1.02	5.132	7.1	8.38	35.318	15.48	30	Pass
233	7115	4.47	3.93	3.92	3.40	9.925	9.97	8.06	63.53	18.03	30	Pass

- Note: 1. *Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-2 and use spectrum analyzer test.
2. For U-NII-5: Directional gain = $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 8.06\text{dBi}$
3. For U-NII-6: Directional gain = $10 \log[(10^{G2/20} + 10^{G3/20})^2 / 2] = 7.82\text{dBi}$
4. For U-NII-7: Directional gain = $10 \log[(10^{G2/20} + 10^{G3/20})^2 / 2] = 7.97\text{dBi}$
5. For U-NII-8: Directional gain = $10 \log[(10^{G2/20} + 10^{G3/20})^2 / 2] = 8.38\text{dBi}$

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Max. Gain (dBi)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3							
35	6125	7.26	7.14	7.19	6.64	20.346	13.08	8.06	130.02	21.14	30	Pass
67	6285	7.31	7.11	6.84	6.32	19.639	12.93	8.06	125.603	20.99	30	Pass
91	6405	6.69	7.01	6.75	6.52	18.909	12.77	8.06	121.06	20.83	30	Pass
99	6445	7.11	7.02	6.95	6.74	19.851	12.98	7.82	120.226	20.80	30	Pass
107	6485	7.10	7.46	7.31	6.91	20.992	13.22	7.82	127.057	21.04	30	Pass
*115 (U-NII-6 Band)	6525	2.33	1.74	1.93	1.55	6.527	8.15	7.82	39.537	15.97	30	Pass
*115 (U-NII-7 Band)	6525	1.68	1.75	1.68	1.80	6.278	7.98	7.97	39.355	15.95	30	Pass
123	6565	7.23	7.33	7.21	7.03	20.999	13.22	7.97	131.522	21.19	30	Pass
155	6725	7.01	6.96	7.02	6.89	19.911	12.99	7.97	124.738	20.96	30	Pass
179	6845	7.18	7.10	7.02	6.87	20.252	13.06	7.97	126.765	21.03	30	Pass
*187 (U-NII-7 Band)	6885	-1.64	-2.10	-1.64	-1.93	2.7715	4.43	7.97	17.378	12.40	30	Pass
*187 (U-NII-8 Band)	6885	4.09	3.43	3.93	3.75	10.132	10.06	8.38	69.823	18.44	30	Pass
211	7005	6.62	6.55	6.71	6.46	18.225	12.61	8.38	125.603	20.99	30	Pass
227	7085	6.45	6.15	6.48	6.19	17.142	12.34	8.38	118.03	20.72	30	Pass

Note: 1. *Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-2 and use spectrum analyzer test.

2. For U-NII-5: Directional gain = $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 8.06\text{dBi}$

3. For U-NII-6: Directional gain = $10 \log[(10^{G2/20} + 10^{G3/20})^2 / 2] = 7.82\text{dBi}$

4. For U-NII-7: Directional gain = $10 \log[(10^{G2/20} + 10^{G3/20})^2 / 2] = 7.97\text{dBi}$

5. For U-NII-8: Directional gain = $10 \log[(10^{G2/20} + 10^{G3/20})^2 / 2] = 8.38\text{dBi}$

802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Max. Gain (dBi)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3							
39	6145	10.10	10.21	9.92	9.53	39.52	15.97	8.06	252.93	24.03	30	Pass
55	6225	10.14	9.84	9.40	9.13	36.86	15.67	8.06	236.048	23.73	30	Pass
87	6385	9.81	10.25	9.84	9.65	39.028	15.91	8.06	249.459	23.97	30	Pass
103	6465	10.06	10.46	10.17	9.79	41.184	16.15	7.82	249.459	23.97	30	Pass
*119 (U-NII-6 Band)	6545	1.17	0.82	0.90	1.15	5.405	7.33	7.82	32.734	15.15	30	Pass
*119 (U-NII-7 Band)	6545	6.85	7.03	6.39	6.64	20.181	13.05	7.97	126.474	21.02	30	Pass
135	6625	10.02	9.98	9.74	9.93	39.259	15.94	7.97	246.037	23.91	30	Pass
151	6705	9.71	10.12	9.88	9.66	38.609	15.87	7.97	242.103	23.84	30	Pass
167	6785	10.28	10.53	10.31	9.96	42.612	16.3	7.97	267.301	24.27	30	Pass
*183 (U-NII-7 Band)	6865	6.65	6.58	6.06	6.41	18.82	12.75	7.97	118.032	20.72	30	Pass
*183 (U-NII-8 Band)	6865	4.02	4.06	3.33	3.52	10.137	10.06	7.97	63.533	18.03	30	Pass
199	6945	9.79	10.06	9.62	9.59	37.928	15.79	8.38	261.216	24.17	30	Pass
215	7025	9.35	9.60	9.79	9.68	36.548	15.63	8.38	251.768	24.01	30	Pass

Note: 1. *Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-2 and use spectrum analyzer test.

2. For U-NII-5: Directional gain = $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 8.06\text{dBi}$

3. For U-NII-6: Directional gain = $10 \log[(10^{G2/20} + 10^{G3/20})^2 / 2] = 7.82\text{dBi}$

4. For U-NII-7: Directional gain = $10 \log[(10^{G2/20} + 10^{G3/20})^2 / 2] = 7.97\text{dBi}$

5. For U-NII-8: Directional gain = $10 \log[(10^{G2/20} + 10^{G3/20})^2 / 2] = 8.38\text{dBi}$

802.11ax (HE160)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Max. Gain (dBi)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3							
47	6185	13.39	13.14	12.85	12.55	79.698	19.01	8.06	509.33	27.07	30	Pass
79	6345	12.92	12.94	12.62	12.35	74.727	18.73	8.06	477.529	26.79	30	Pass
*111 (U-NII-6 Band)	6505	9.19	8.98	8.59	8.88	33.44	15.24	7.82	202.302	23.06	30	Pass
*111 (U-NII-7 Band)	6505	6.60	7.09	6.32	5.90	19.171	12.83	7.82	116.145	20.65	30	Pass
143	6665	13.38	13.24	12.89	13.12	82.829	19.18	7.97	518.8	27.15	30	Pass
*175 (U-NII-7 Band)	6825	10.18	10.22	9.55	9.69	42.144	16.25	7.97	264.241	24.22	30	Pass
*175 (U-NII-8 Band)	6825	2.25	2.65	2.17	1.22	6.967	8.43	7.97	43.652	16.40	30	Pass
207	6985	12.79	12.85	12.76	12.73	75.916	18.8	8.38	522.396	27.18	30	Pass

Note: 1. *Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-2 and use spectrum analyzer test.

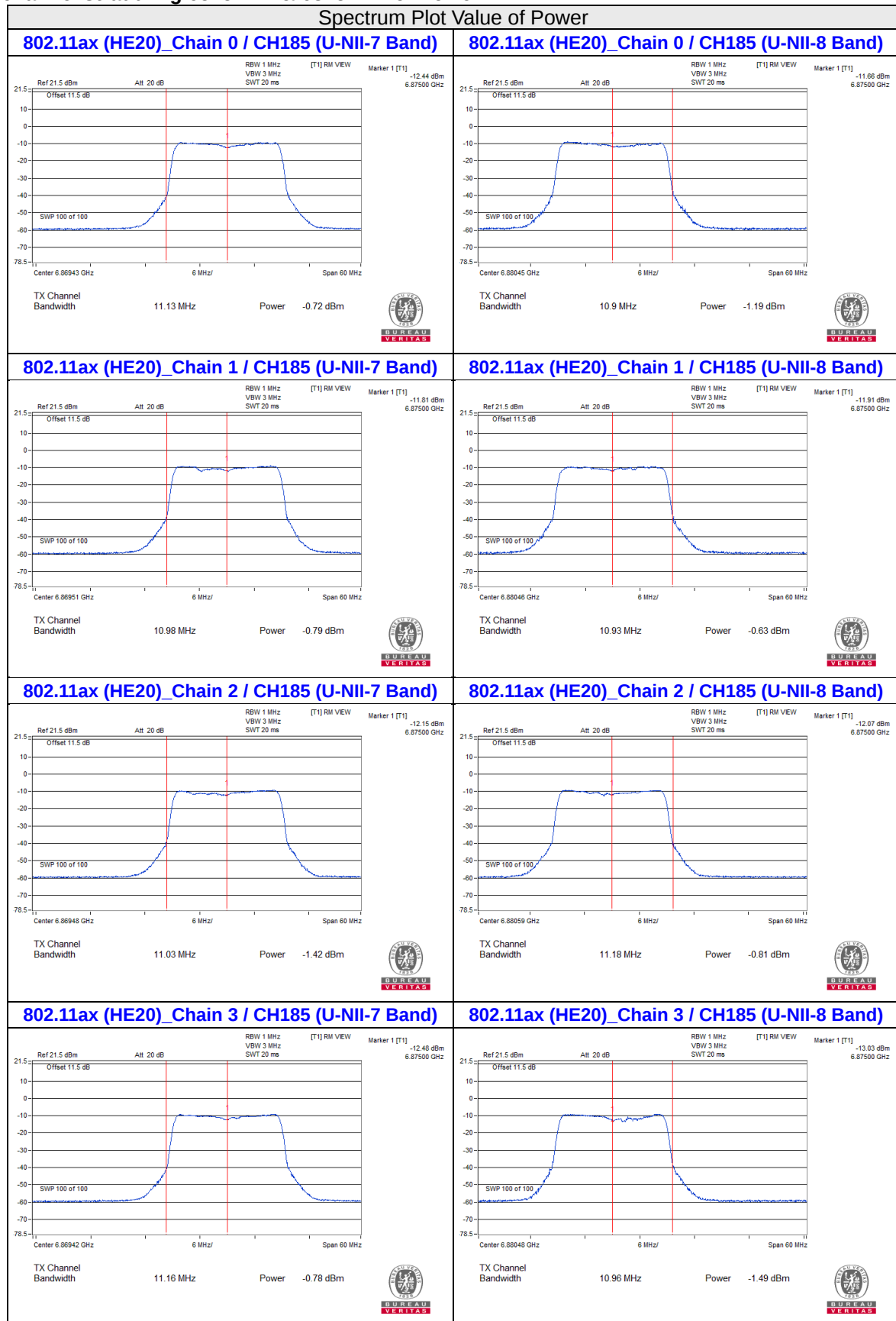
2. For U-NII-5: Directional gain = $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 8.06\text{dBi}$

3. For U-NII-6: Directional gain = $10 \log[(10^{G2/20} + 10^{G3/20})^2 / 2] = 7.82\text{dBi}$

4. For U-NII-7: Directional gain = $10 \log[(10^{G2/20} + 10^{G3/20})^2 / 2] = 7.97\text{dBi}$

5. For U-NII-8: Directional gain = $10 \log[(10^{G2/20} + 10^{G3/20})^2 / 2] = 8.38\text{dBi}$

For channel straddling 6525MHz & 6875MHz of Power













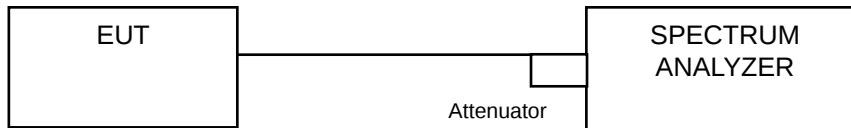


4.5 Emission Bandwidth Measurement

4.5.1 Limits of Emission Bandwidth Measurement

The maximum transmitter channel bandwidth for U-NII devices in the 5.925-7.125 GHz band is 320 MHz.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

FOR 99% OCCUPIED BANDWIDTH

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to SAMPLE. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

FOR 26dB BANDWIDTH

- Set RBW = approximately 1% of the emission bandwidth.
- Set the VBW > RBW.
- Detector = Peak.
- Trace mode = max hold.
- Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

4.5.5 Test Results

CDD Mode:

99% Occupied Bandwidth:

802.11ax (HE20)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)				Limit (MHz)
		Chain 0	Chain 1	Chain 2	Chain 3	
33	6115	19.2	19.08	19.08	19.08	320
65	6275	19.08	19.08	19.08	19.08	320
93	6415	19.08	19.08	19.08	19.2	320
97	6435	19.08	19.08	19.08	19.08	320
105	6475	19.08	19.08	19.08	19.08	320
113	6515	19.2	19.08	19.08	19.08	320
117	6535	19.08	19.08	19.2	19.08	320
153	6715	19.08	19.08	19.08	19.2	320
181	6855	19.08	19.08	19.08	19.08	320
185 (U-NII-7 Band)	6875	9.6	9.6	9.6	9.6	320
185 (U-NII-8 Band)	6875	9.48	9.6	9.48	9.48	320
213	7015	19.08	19.08	19.08	19.08	320
233	7115	19.08	19.2	19.2	19.2	320

For channel straddling 6875MHz:

Total Values

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
185	6875	19.08	19.2	19.08	19.08

802.11ax (HE40)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)				Limit (MHz)
		Chain 0	Chain 1	Chain 2	Chain 3	
35	6125	37.68	37.92	37.68	37.92	320
67	6285	38.16	37.92	37.68	38.16	320
91	6405	37.68	37.92	37.92	38.16	320
99	6445	37.68	37.92	37.92	38.16	320
107	6485	37.68	38.16	38.16	37.68	320
115 (U-NII-6 Band)	6525	18.96	19.2	18.96	19.2	320
115 (U-NII-7 Band)	6525	18.96	18.72	18.72	18.72	320
123	6565	38.16	37.92	38.16	37.68	320
155	6725	37.68	37.92	37.92	37.92	320
179	6845	37.68	37.68	37.68	38.16	320
187 (U-NII-7 Band)	6885	8.96	8.96	9.2	8.96	320
187 (U-NII-8 Band)	6885	28.72	28.96	28.72	28.96	320
211	7005	38.16	37.68	38.16	37.92	320
227	7085	38.16	38.16	37.92	37.68	320

For channel straddling 6525MHz & 6875MHz:

Total Values

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
115	6525	37.92	37.92	37.68	37.92
187	6885	37.68	37.92	37.92	37.92

802.11ax (HE80)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)				
		Chain 0	Chain 1	Chain 2	Chain 3	Limit (MHz)
39	6145	76.8	77.76	77.28	77.28	320
55	6225	77.28	77.28	77.28	76.8	320
87	6385	77.28	77.28	77.28	76.8	320
103	6465	76.8	77.28	77.28	77.28	320
119 (U-NII-6 Band)	6545	18.4	18.88	18.88	18.88	320
119 (U-NII-7 Band)	6545	57.92	58.4	58.4	58.4	320
135	6625	77.28	77.28	77.28	77.28	320
151	6705	77.28	76.8	77.28	77.28	320
167	6785	76.8	77.28	77.28	77.28	320
183 (U-NII-7 Band)	6865	48.88	48.88	48.88	48.88	320
183 (U-NII-8 Band)	6865	28.4	28.4	28.4	28.4	320
199	6945	77.28	77.28	77.28	77.28	320
215	7025	77.28	76.8	77.76	77.28	320

For channel straddling 6525MHz & 6875MHz:

Total Values

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
119	6545	76.32	77.28	77.28	77.28
183	6865	77.28	77.28	77.28	77.28

802.11ax (HE160)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)				
		Chain 0	Chain 1	Chain 2	Chain 3	Limit (MHz)
47	6185	154.56	153.6	153.6	154.56	320
79	6345	154.56	154.56	155.52	156.48	320
111 (U-NII-6 Band)	6505	97.76	97.76	98.72	97.76	320
111 (U-NII-7 Band)	6505	56.8	56.8	57.76	56.8	320
143	6665	154.56	154.56	155.52	155.52	320
175 (U-NII-7 Band)	6825	128.72	127.76	128.72	127.76	320
175 (U-NII-8 Band)	6825	26.8	26.8	26.8	26.8	320
207	6985	155.52	154.56	155.52	154.56	320

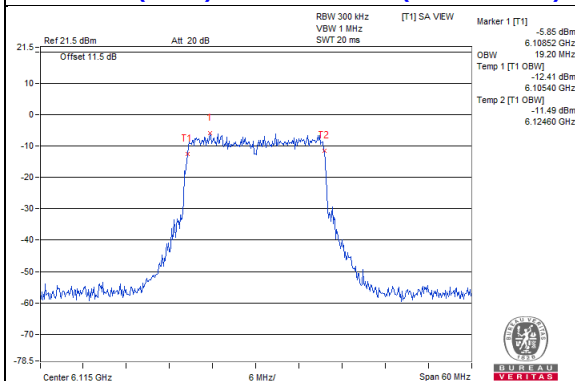
For channel straddling 6525MHz & 6875MHz:

Total Values

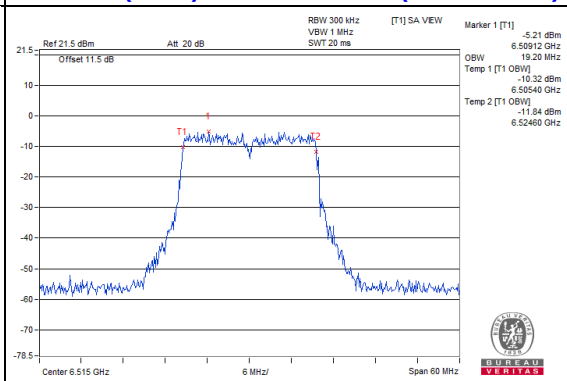
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
111	6505	154.56	154.56	156.48	154.56
175	6825	155.52	154.56	155.52	154.56

Spectrum Plot of Max. Value

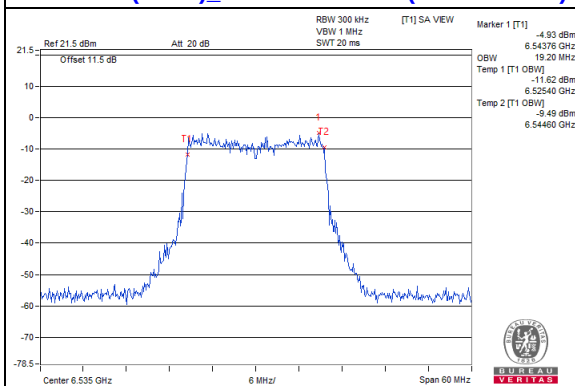
802.11ax (HE20)_Chain 0 / CH33 (U-NII-5 Band)



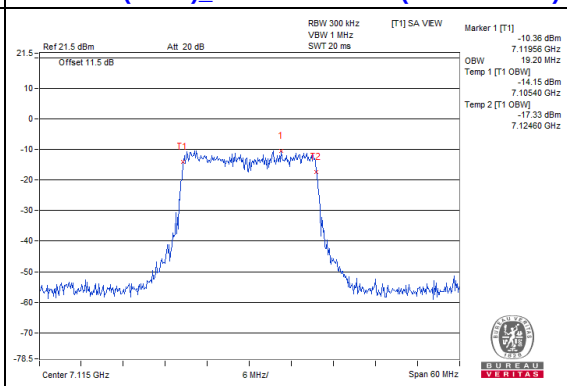
802.11ax (HE20)_Chain 0 / CH113 (U-NII-6 Band)

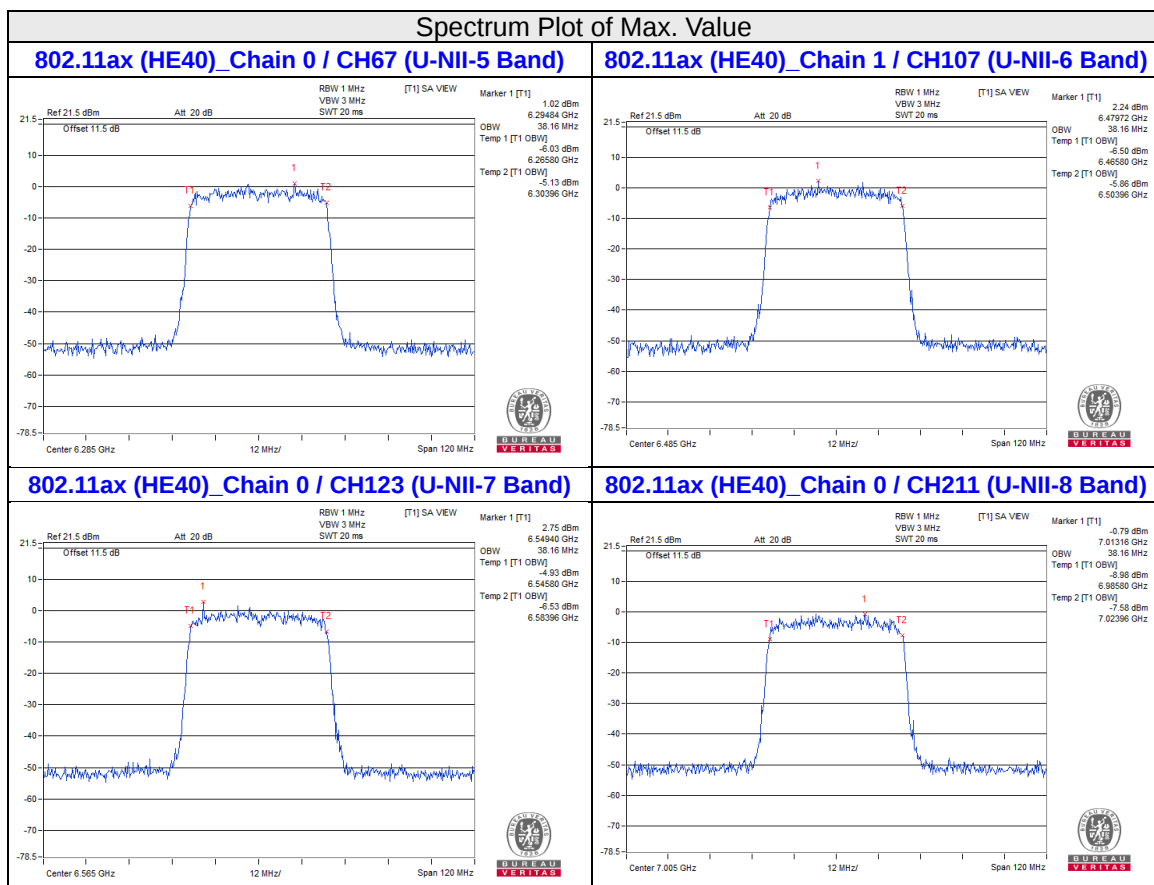


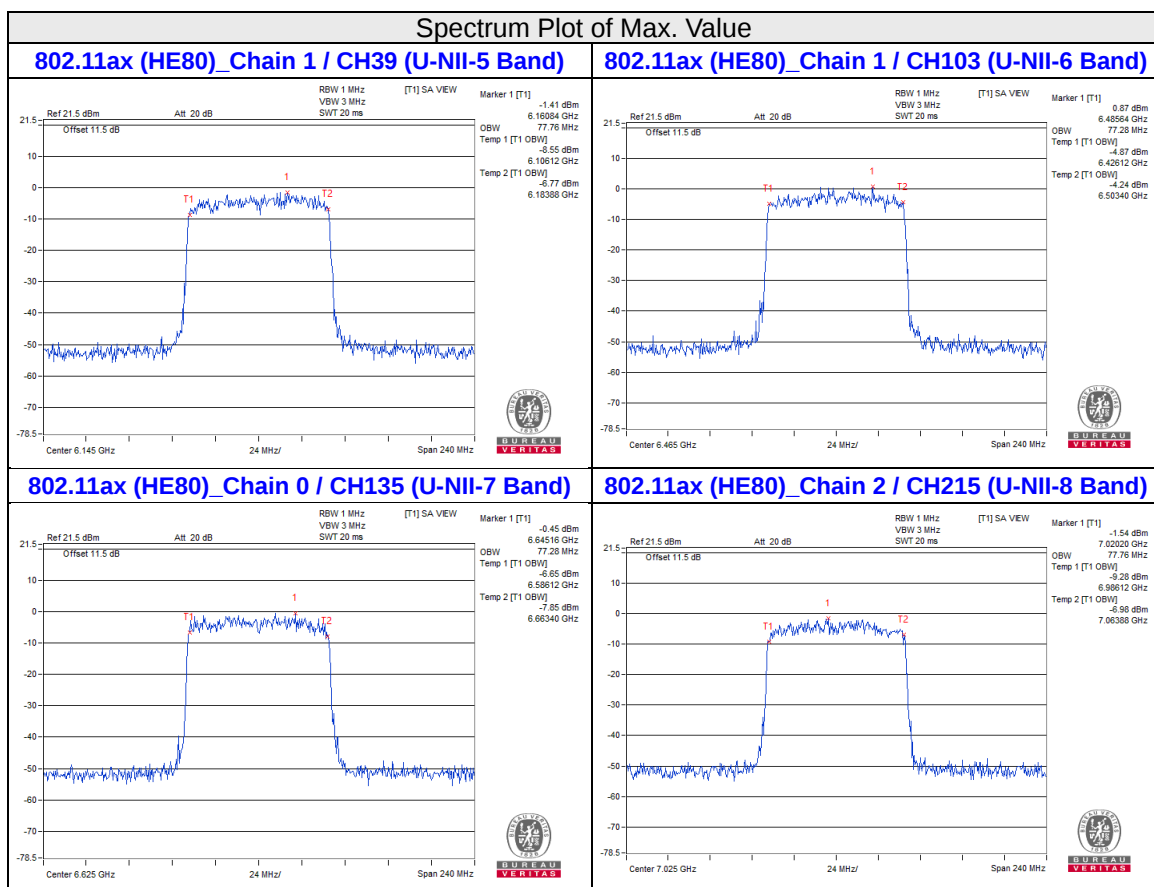
802.11ax (HE20)_Chain 2 / CH117 (U-NII-7 Band)

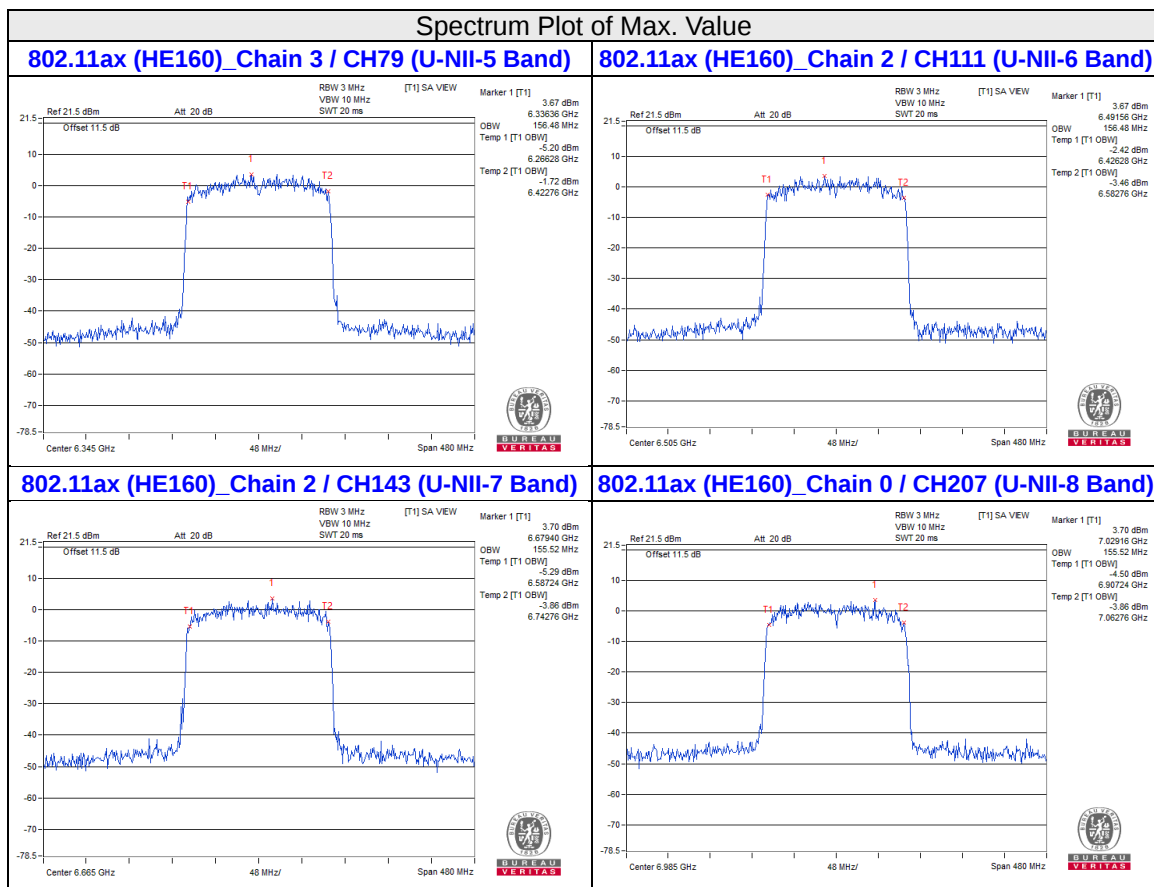


802.11ax (HE20)_Chain 1 / CH233 (U-NII-8 Band)

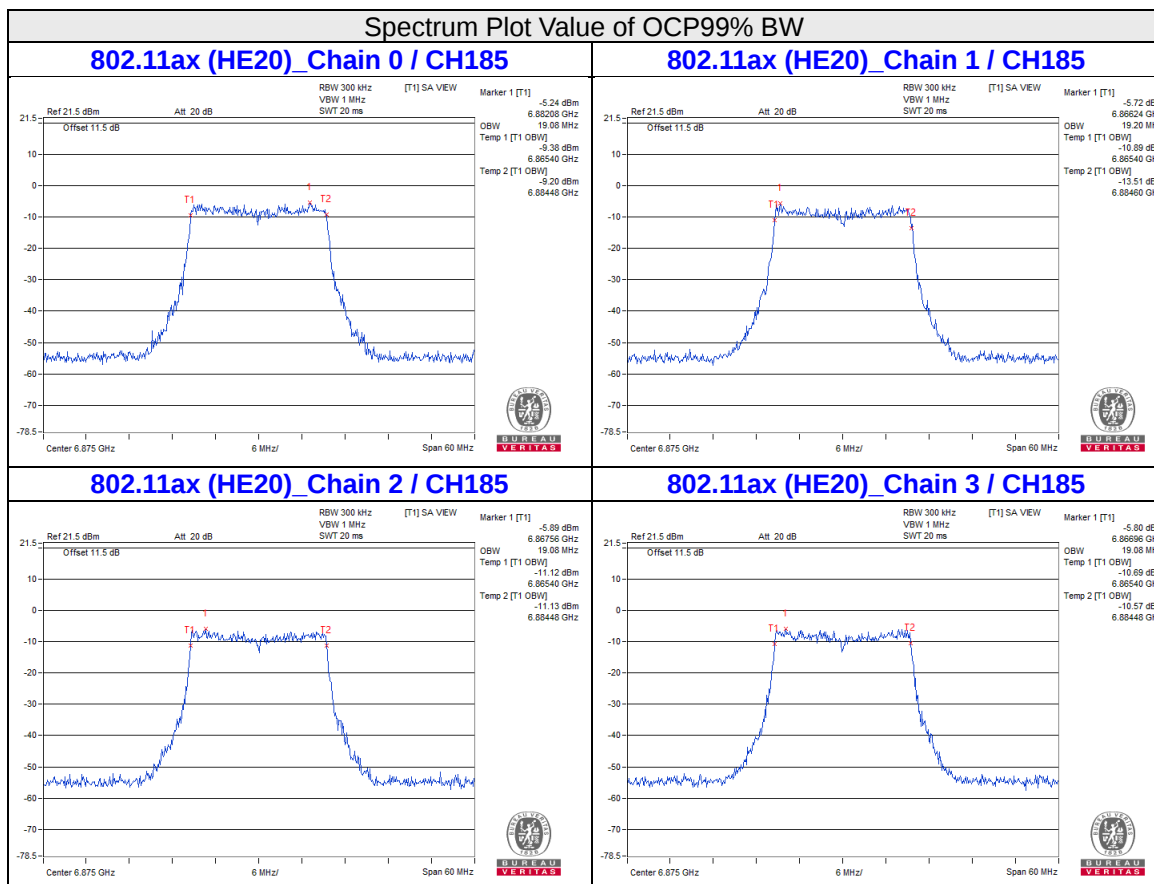


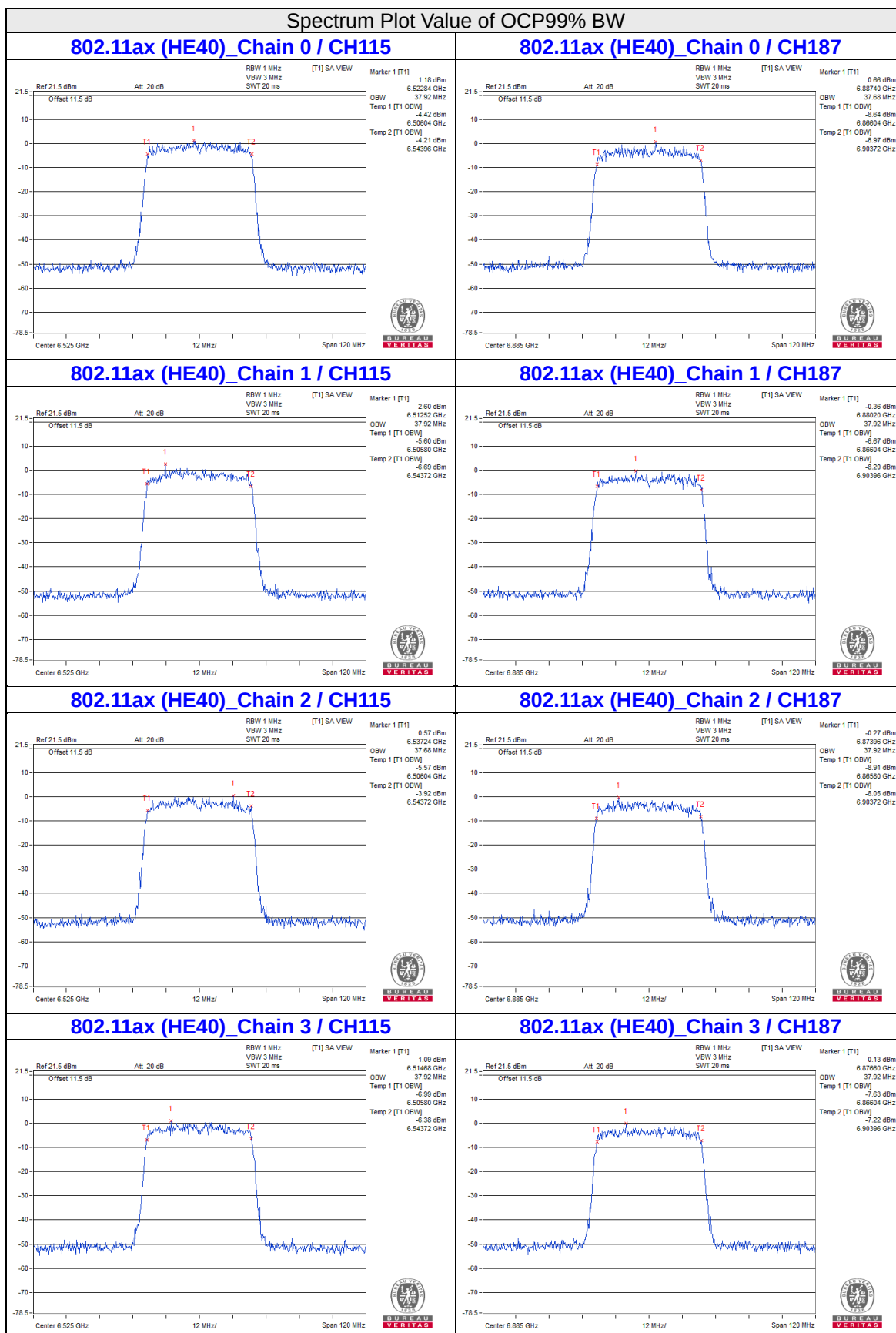


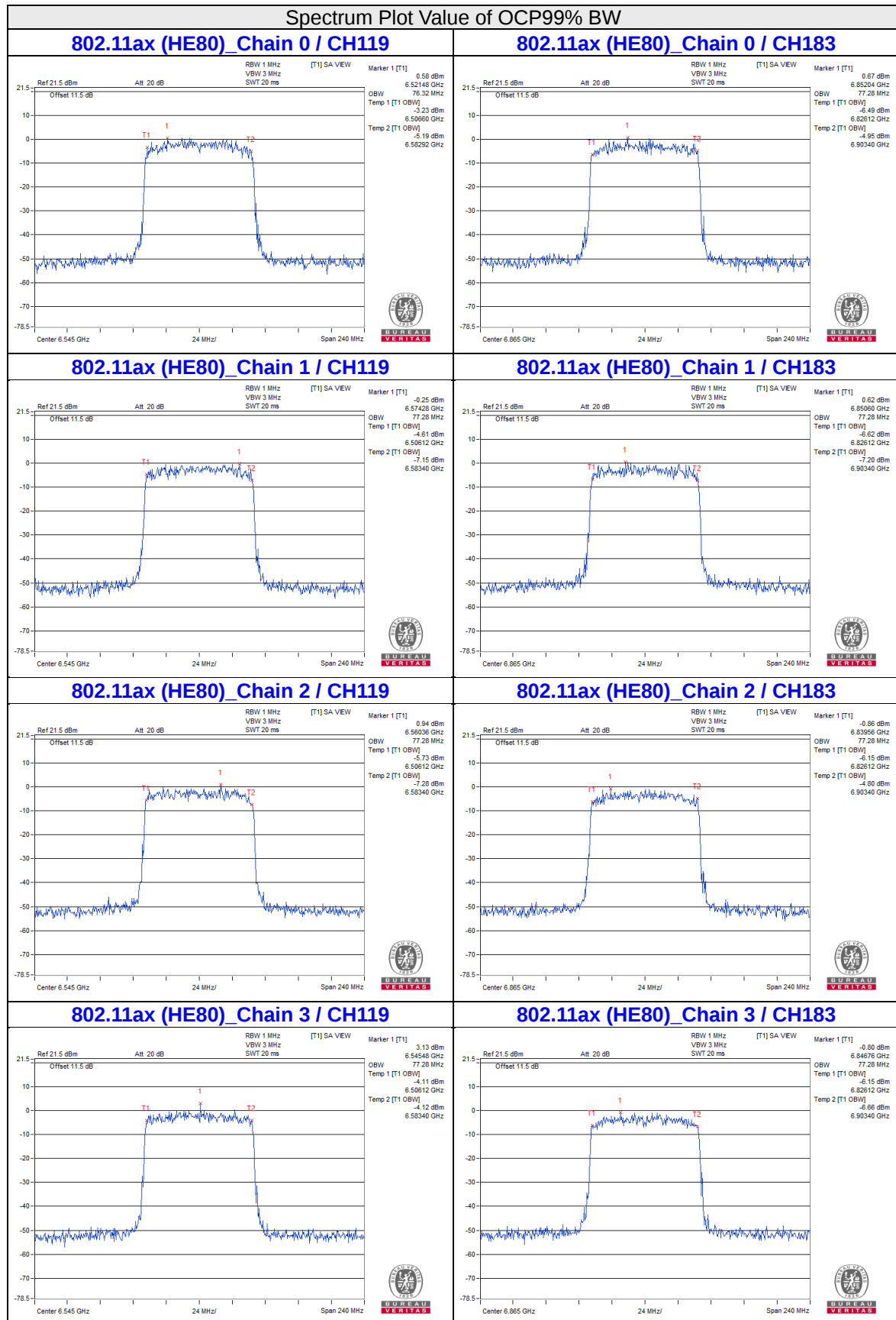


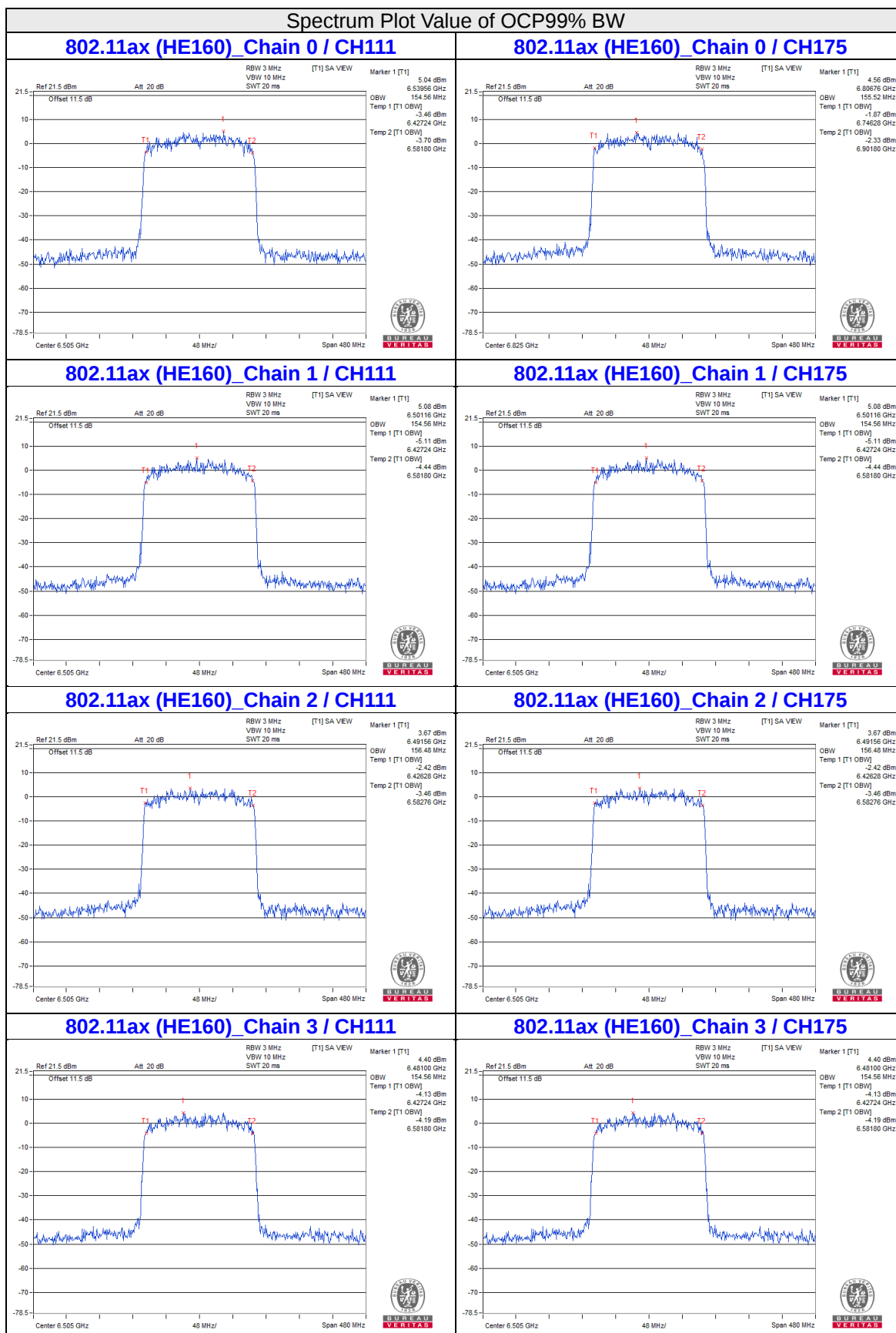


For channel straddling 6525MHz & channel straddling 6875MHz:









Note:

For U-NII-6 channel straddling 6525MHz bandwidth = 6525MHz - Temp 1
 For U-NII-7 channel straddling 6525MHz bandwidth = Temp 2 - 6525MHz
 For U-NII-7 channel straddling 6875MHz bandwidth = 6875MHz - Temp 1
 For U-NII-8 channel straddling 6875MHz bandwidth = Temp 2 - 6875MHz

26dB Bandwidth:

802.11ax (HE20)

Channel	Frequency (MHz)	26dB Bandwidth (MHz)				
		Chain0	Chain1	Chain2	Chain3	Limit (MHz)
33	6115	21.62	21.79	21.98	21.88	320
65	6275	21.68	22.43	22.03	22.01	320
93	6415	22.24	21.77	22.23	22.17	320
97	6435	21.79	21.76	21.84	22.1	320
105	6475	22.03	22.04	21.62	21.96	320
113	6515	22.33	22.14	22.17	22.08	320
117	6535	22.06	22.62	21.83	22.07	320
153	6715	22.05	22.37	21.96	22.05	320
181	6855	22.03	22.14	21.96	21.9	320
185 (U-NII-7 Band)	6875	11.13	10.98	11.03	11.16	320
185 (U-NII-8 Band)	6875	10.9	10.93	11.18	10.96	320
213	7015	21.81	22.23	21.89	22.04	320
233	7115	21.95	22.14	22.22	22.34	320

For channel straddling 6875MHz:

Total Values

Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
185	6875	22.03	21.91	22.21	22.12

802.11ax (HE40)

Channel	Frequency (MHz)	26dB Bandwidth (MHz)				
		Chain0	Chain1	Chain2	Chain3	Limit (MHz)
35	6125	41.32	41.18	41.51	41.15	320
67	6285	41.28	41.11	41.17	41.22	320
91	6405	41.36	41.45	41.28	41.15	320
99	6445	41.44	41.58	41.47	41.28	320
107	6485	41.19	41.25	41.44	41.12	320
115 (U-NII-6 Band)	6525	20.72	20.74	20.5	20.61	320
115 (U-NII-7 Band)	6525	20.7	20.65	20.55	20.61	320
123	6565	41.15	41.24	41.1	41.14	320
155	6725	41.24	41.59	41.13	41.16	320
179	6845	41.13	41.35	41.19	41.16	320
187 (U-NII-7 Band)	6885	10.8	10.52	10.57	10.62	320
187 (U-NII-8 Band)	6885	30.61	30.52	30.66	30.72	320
211	7005	41.6	41.27	41.34	41.26	320
227	7085	41.51	41.1	41.2	41.01	320

For channel straddling 6525MHz & 6875MHz:

Total Values

Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
115	6525	41.42	41.39	41.05	41.22
187	6885	41.41	41.04	41.23	41.34

802.11ax (HE80)

Channel	Frequency (MHz)	26dB Bandwidth (MHz)				
		Chain0	Chain1	Chain2	Chain3	Limit (MHz)
39	6145	82.18	81.81	82.18	82.54	320
55	6225	82.33	82.25	82.53	81.7	320
87	6385	82.26	82.53	82.1	82.39	320
103	6465	82.36	82.45	82.08	82.19	320
119 (U-NII-6 Band)	6545	21.11	21.35	21.56	21.39	320
119 (U-NII-7 Band)	6545	61.27	61.23	61.26	60.93	320
135	6625	82.62	82.32	82.08	82.06	320
151	6705	82.07	82.24	82.27	82.27	320
167	6785	82.89	82.06	82.52	82.41	320
183 (U-NII-7 Band)	6865	51.3	51.12	50.77	51.09	320
183 (U-NII-8 Band)	6865	31.02	31.27	30.97	31.2	320
199	6945	82.65	82.36	82.24	82.09	320
215	7025	82.55	82.31	81.97	81.59	320

For channel straddling 6525MHz & 6875MHz:

Total Values

Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
119	6545	82.38	82.58	82.82	82.32
183	6865	82.32	82.39	81.74	82.29

802.11ax (HE160)

Channel	Frequency (MHz)	26dB Bandwidth (MHz)				
		Chain0	Chain1	Chain2	Chain3	Limit (MHz)
47	6185	166.21	166.6	166.19	165.97	320
79	6345	166.47	165.54	166.79	166	320
111 (U-NII-6 Band)	6505	102.92	103.44	103.05	103.59	320
111 (U-NII-7 Band)	6505	63.26	63.31	63.05	63.26	320
143	6665	167.52	166.77	166.72	166.88	320
175 (U-NII-7 Band)	6825	133	133.2	133.13	133.36	320
175 (U-NII-8 Band)	6825	33.27	33.28	33.1	33	320
207	6985	166.35	167.22	166.59	166.56	320

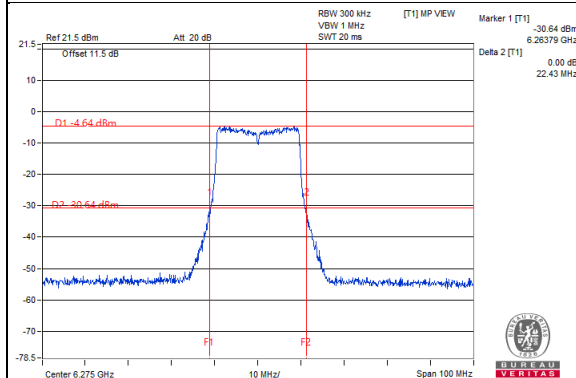
For channel straddling 6525MHz & 6875MHz:

Total Values

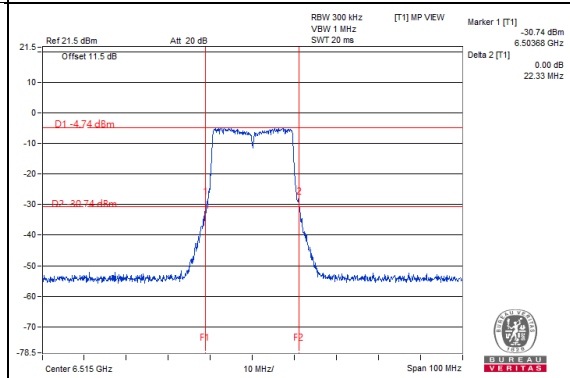
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
111	6505	166.18	166.75	166.1	166.85
175	6825	166.27	166.48	166.23	166.36

Spectrum Plot of Max. Value

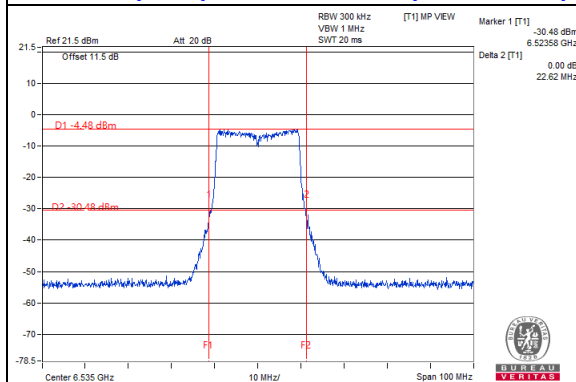
802.11ax (HE20)_Chain 1 / CH65 (U-NII-5 Band)



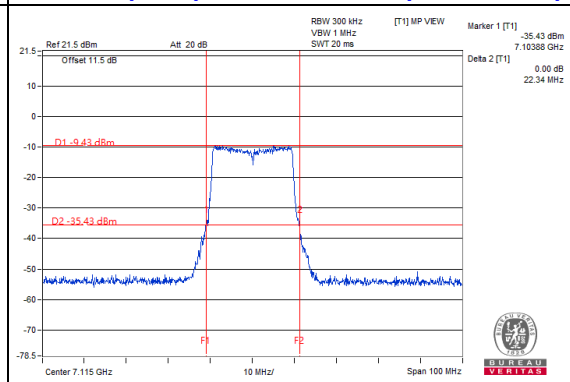
802.11ax (HE20)_Chain 0 / CH113 (U-NII-6 Band)

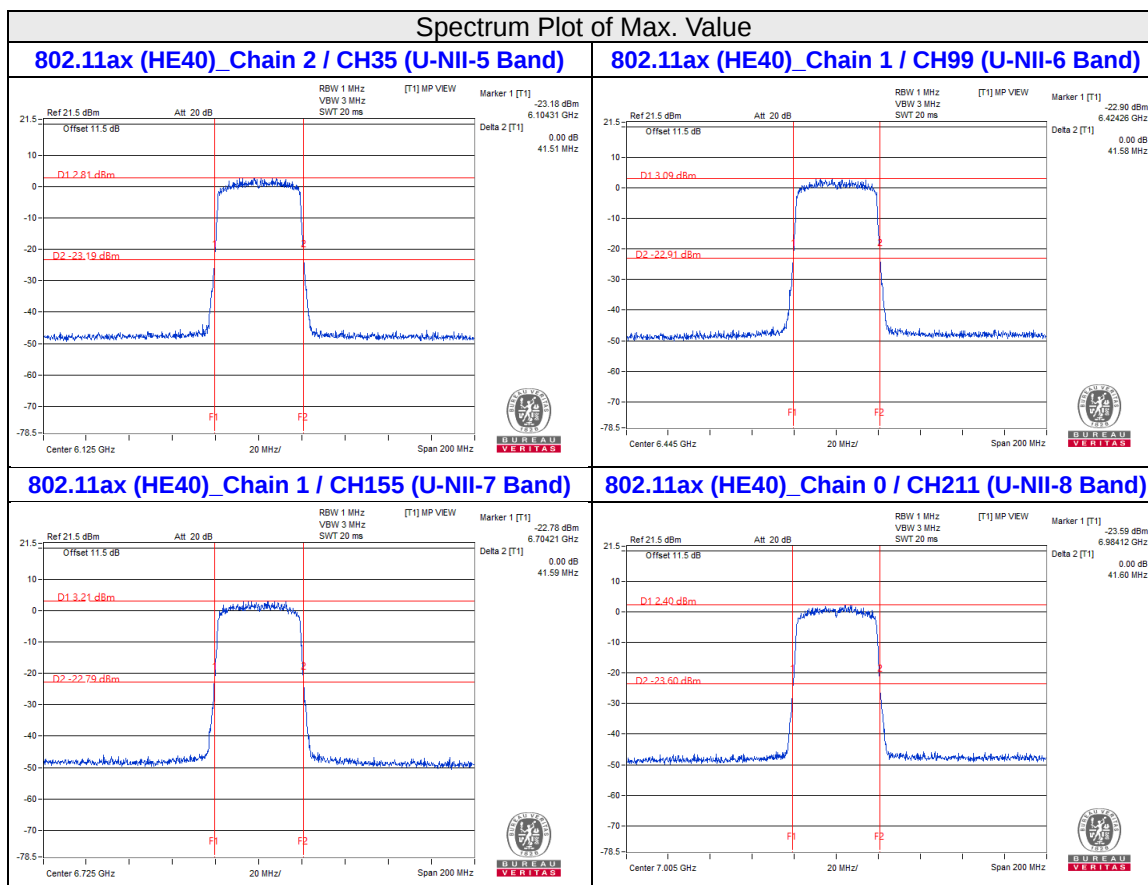


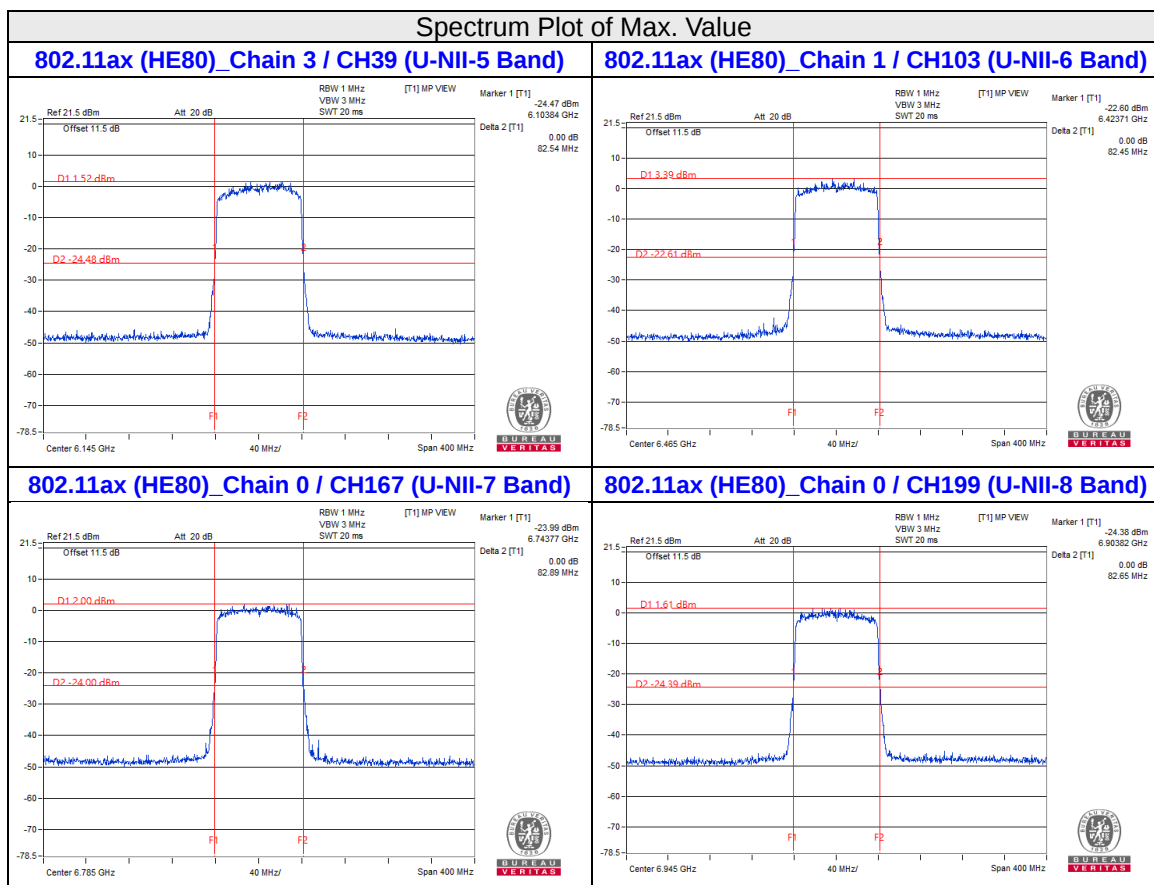
802.11ax (HE20)_Chain 1 / CH117 (U-NII-7 Band)

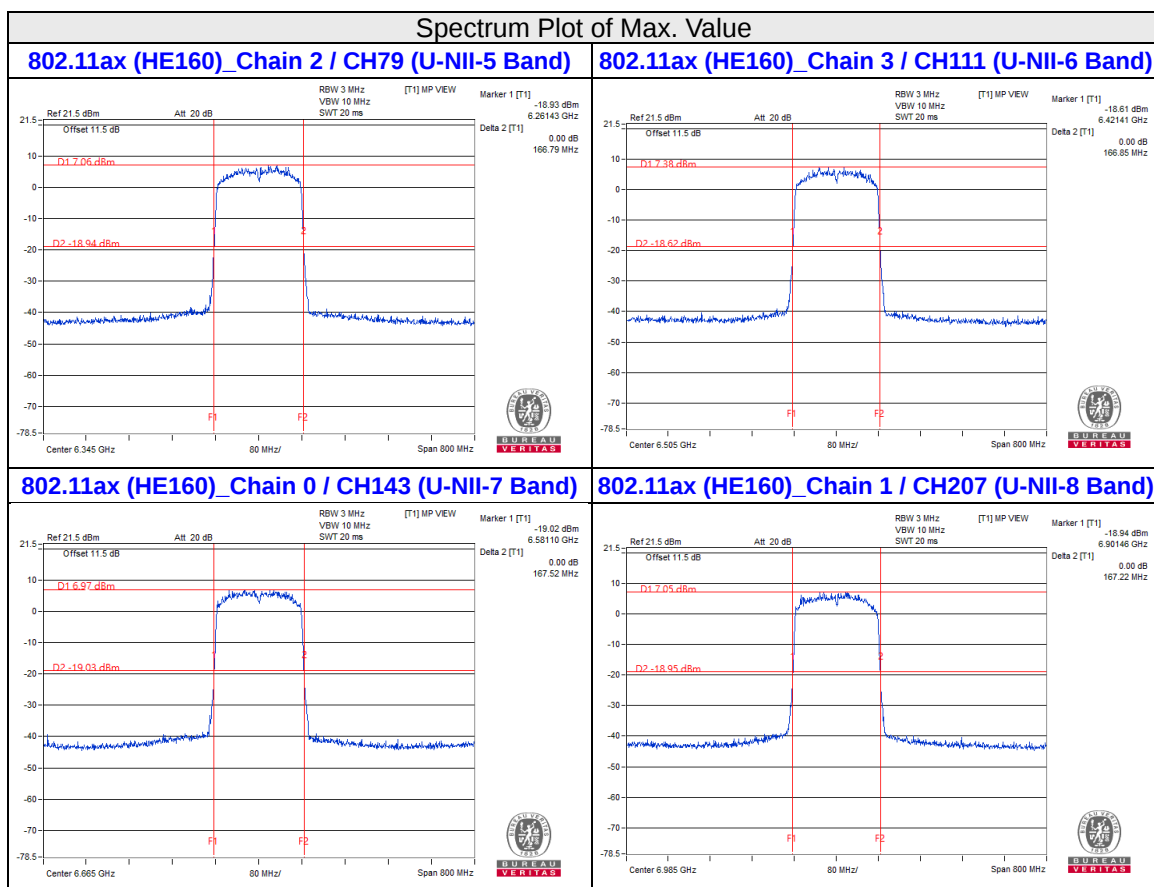


802.11ax (HE20)_Chain 3 / CH233 (U-NII-8 Band)

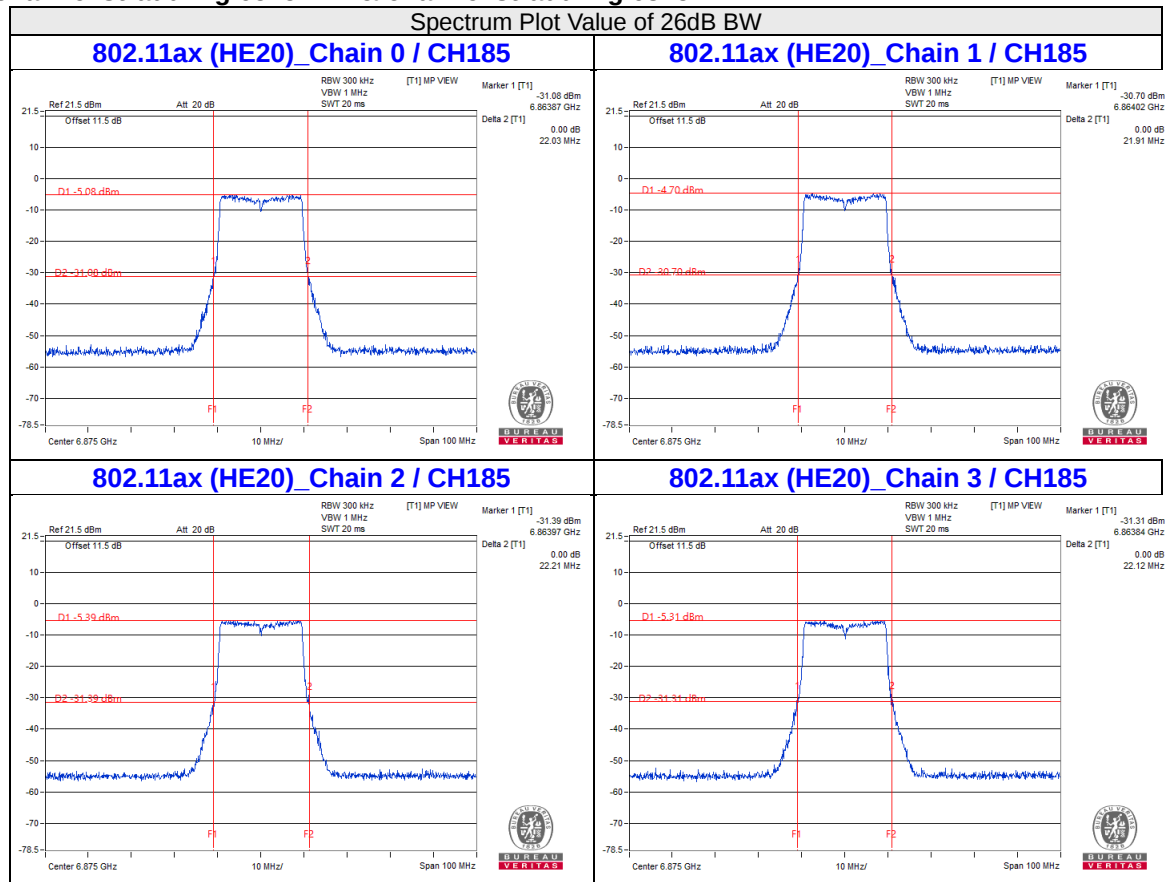


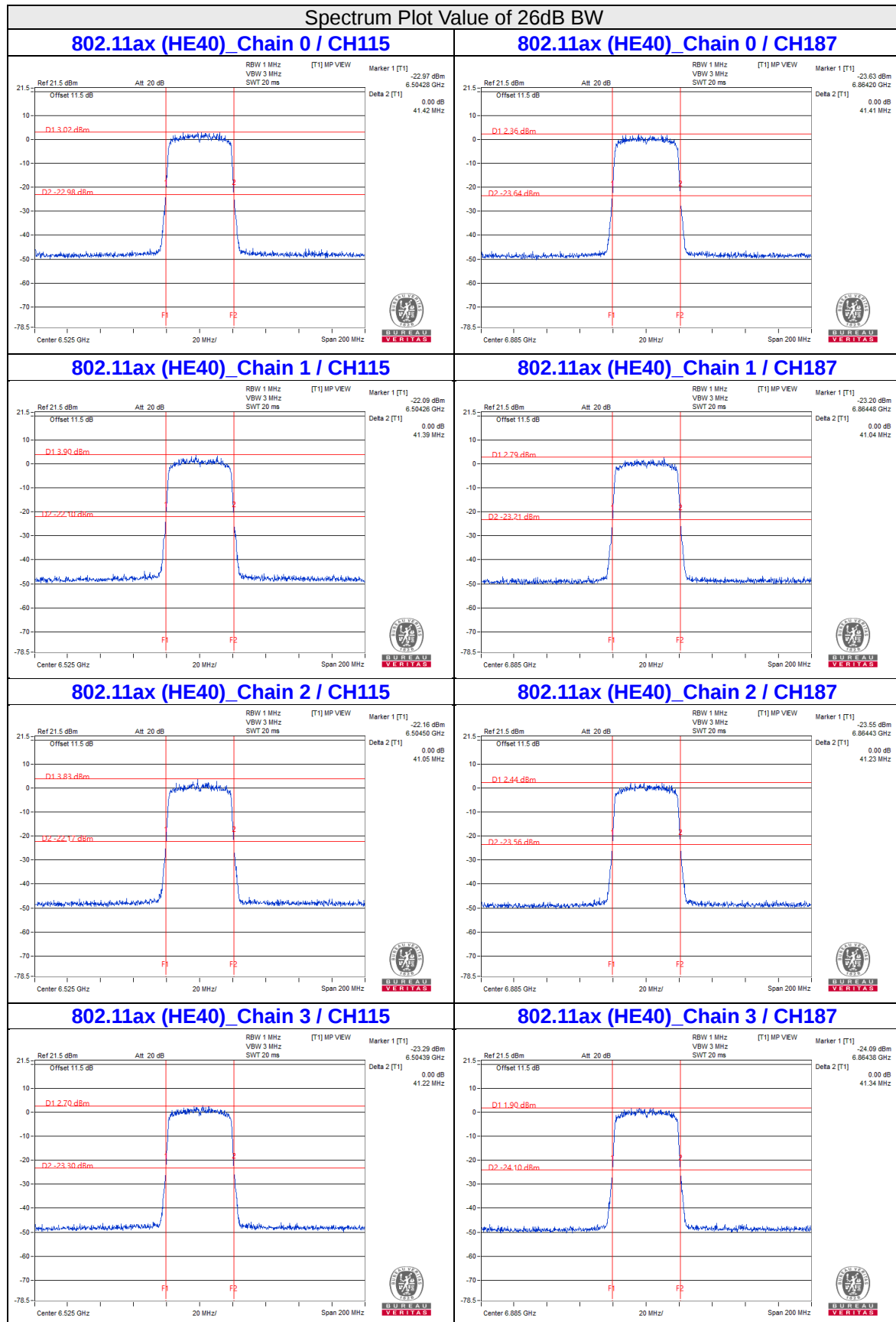


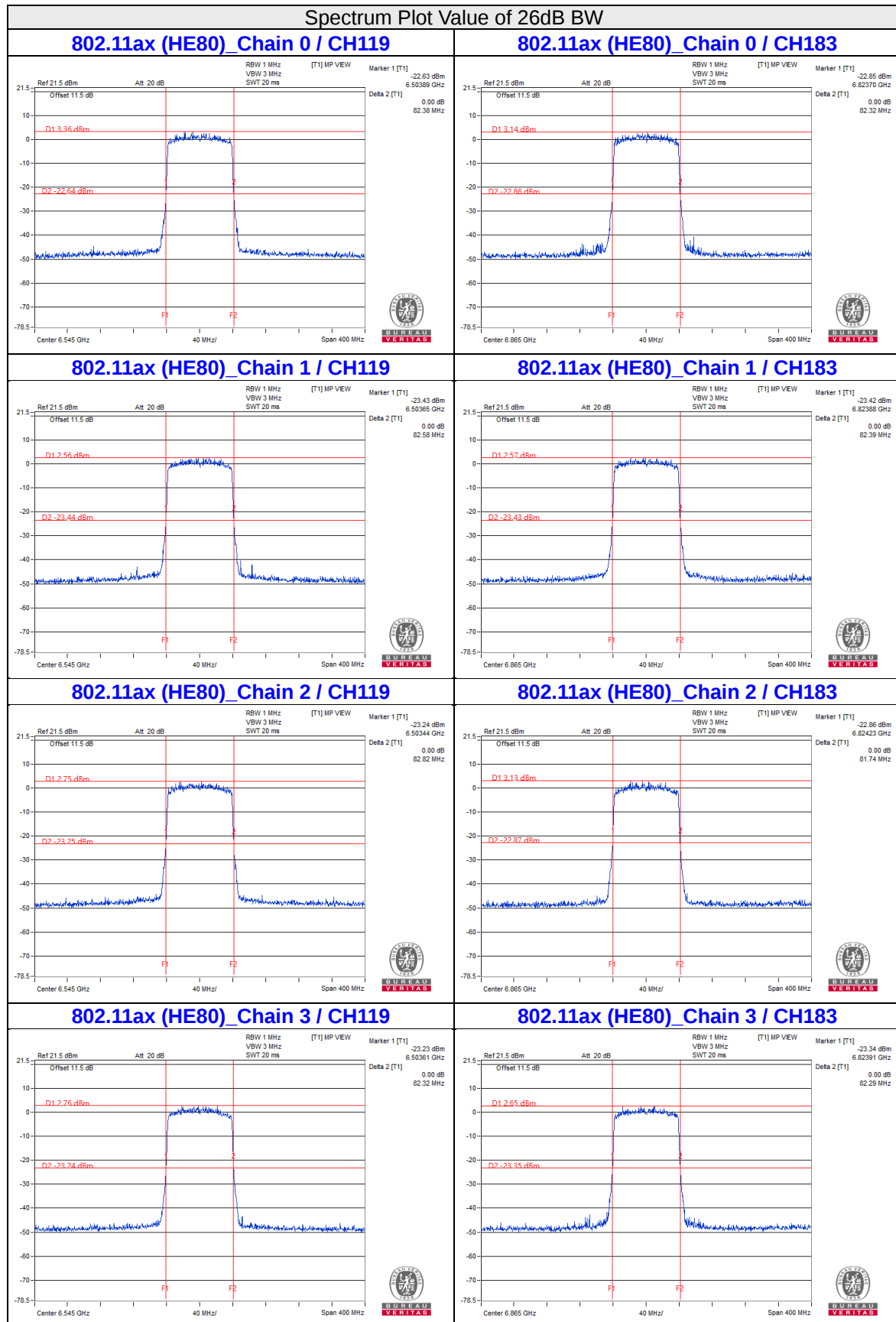


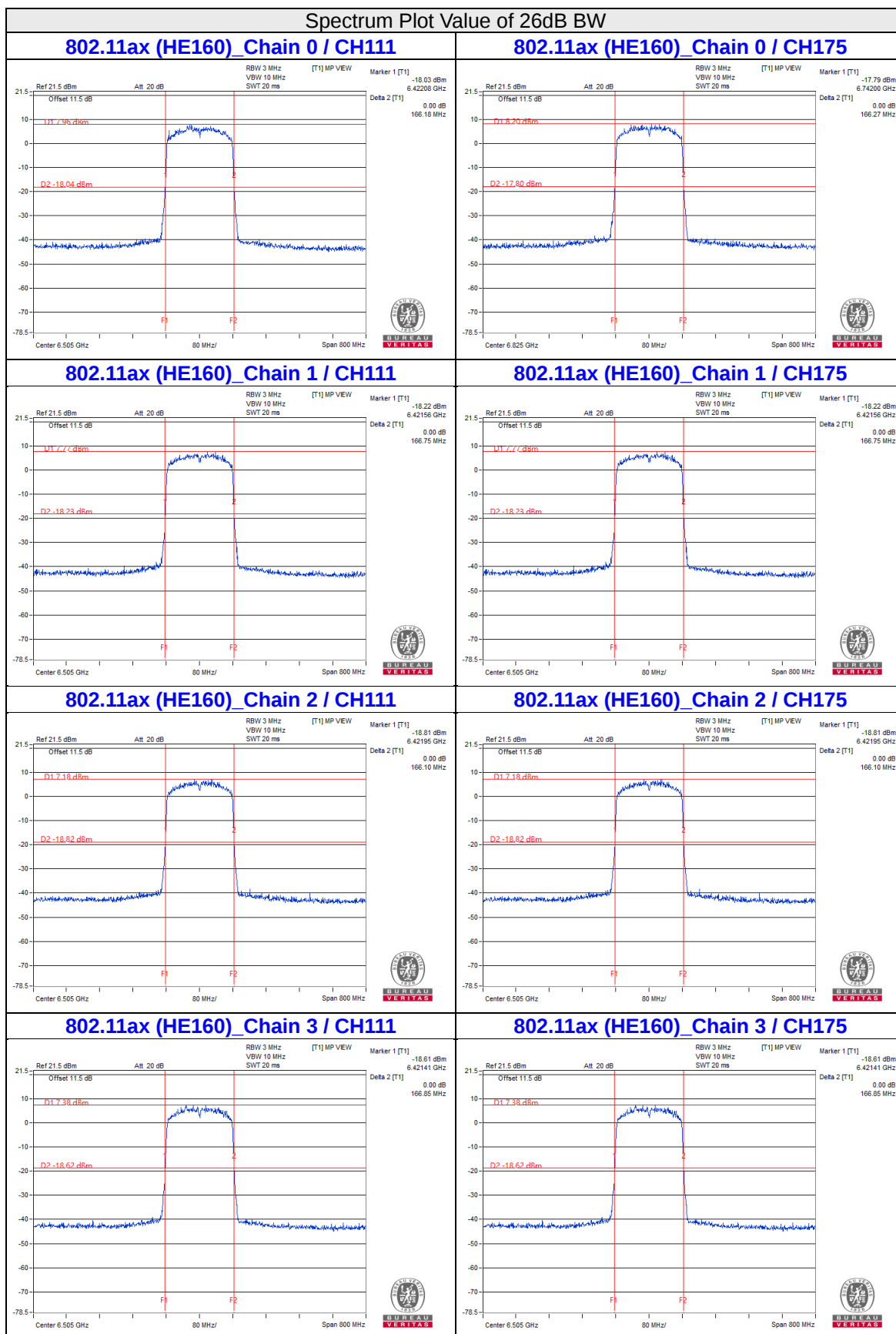


For channel straddling 6525MHz & channel straddling 6875MHz:









Note:

For U-NII-6 channel straddling 6525MHz bandwidth = 6525MHz - Marker 1
 For U-NII-7 channel straddling 6525MHz bandwidth = Delta 2 - (6525MHz - Marker 1)
 For U-NII-7 channel straddling 6875MHz bandwidth = 6875MHz - Marker 1
 For U-NII-8 channel straddling 6875MHz bandwidth = Delta 2 - (6875MHz - Marker 1)

4.6 Peak Power Spectral Density Measurement

4.6.1 Limits of Peak Power Spectral Density Measurement

Operation Band	EUT Category	Limit
		Peak Power Density (EIRP)
U-NII-5 U-NII-6 U-NII-7 U-NII-8	Indoor AP / subordinate modes	5 dBm/MHz

4.6.2 Test Setup For Conducted Method



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

Using method SA-2

- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz, Set VBW $\geq$ 3 MHz
- Sweep time = auto, trigger set to "free run".
- Detector = RMS
- Trace average at least 100 traces in power averaging mode.
- Record the max value and add 10 log (1/duty cycle)

4.6.5 EUT Operating Condition

Same as Item 4.3.6.

4.6.6 Test Results

CDD Mode:

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD (dBm/MHz)	Directional Gain (dBi)	EIRP PSD (dBm/MHz)	EIRP PSD Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3						
33	6115	-9.39	-9.62	-10.08	-10.25	0.24	-3.56	8.06	4.50	5.00	Pass
61	6255	-9.50	-9.98	-10.16	-10.39	0.24	-3.73	8.06	4.33	5.00	Pass
93	6415	-10.04	-9.74	-10.06	-9.96	0.24	-3.68	8.06	4.38	5.00	Pass
97	6435	-9.49	-9.21	-9.42	-9.30	0.24	-3.09	7.82	4.73	5.00	Pass
105	6475	-9.46	-8.92	-9.30	-9.25	0.24	-2.96	7.82	4.86	5.00	Pass
113	6515	-9.32	-9.60	-9.85	-9.60	0.24	-3.32	7.82	4.50	5.00	Pass
117	6535	-9.40	-9.25	-9.51	-9.40	0.24	-3.12	7.97	4.85	5.00	Pass
153	6715	-9.36	-9.31	-9.29	-9.48	0.24	-3.09	7.97	4.88	5.00	Pass
181	6855	-9.43	-9.56	-9.72	-10.02	0.24	-3.41	7.97	4.56	5.00	Pass
185 (U-NII-7 Band)	6875	-10.09	-10.12	-10.21	-10.65	0.24	-4.00	7.97	3.97	5.00	Pass
185 (U-NII-8 Band)	6875	-10.04	-9.87	-9.94	-10.46	0.24	-3.81	8.38	4.57	5.00	Pass
213	7015	-10.10	-9.98	-10.03	-9.96	0.24	-3.75	8.38	4.63	5.00	Pass
233	7115	-14.28	-14.43	-14.26	-14.09	0.24	-8.00	8.38	0.38	5.00	Pass

- Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. For U-NII-5: Directional gain = $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 8.06\text{dBi}$
3. For U-NII-6: Directional gain = $10 \log[(10^{G2/20} + 10^{G3/20})^2 / 2] = 7.82\text{dBi}$
4. For U-NII-7: Directional gain = $10 \log[(10^{G2/20} + 10^{G3/20})^2 / 2] = 7.97\text{dBi}$
5. For U-NII-8: Directional gain = $10 \log[(10^{G2/20} + 10^{G3/20})^2 / 2] = 8.38\text{dBi}$
6. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD (dBm/MHz)	Directional Gain (dBi)	EIRP PSD (dBm/MHz)	EIRP PSD Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3						
35	6125	-9.84	-9.62	-10.04	-9.77	0.23	-3.56	8.06	4.50	5.00	Pass
59	6245	-9.63	-9.50	-10.29	-10.26	0.23	-3.66	8.06	4.40	5.00	Pass
91	6405	-10.09	-9.65	-9.93	-10.28	0.23	-3.73	8.06	4.33	5.00	Pass
99	6445	-9.71	-9.45	-9.64	-9.90	0.23	-3.42	7.82	4.40	5.00	Pass
107	6485	-9.75	-8.84	-10.03	-9.68	0.23	-3.30	7.82	4.52	5.00	Pass
115 (U-NII-6 Band)	6525	-9.26	-9.44	-10.42	-9.92	0.23	-3.49	7.82	4.33	5.00	Pass
115 (U-NII-7 Band)	6525	-9.46	-9.47	-10.34	-10.01	0.23	-3.55	7.97	4.42	5.00	Pass
123	6565	-8.93	-9.64	-9.30	-9.33	0.23	-3.04	7.97	4.93	5.00	Pass
155	6725	-9.33	-8.80	-9.93	-9.53	0.23	-3.13	7.97	4.84	5.00	Pass
179	6845	-9.67	-8.97	-9.08	-9.47	0.23	-3.04	7.97	4.93	5.00	Pass
187 (U-NII-7 Band)	6885	-10.81	-10.61	-11.17	-11.26	0.23	-4.70	7.97	3.27	5.00	Pass
187 (U-NII-8 Band)	6885	-9.94	-9.70	-10.11	-10.37	0.23	-3.77	8.38	4.61	5.00	Pass
211	7005	-9.87	-10.00	-10.35	-10.17	0.23	-3.84	8.38	4.54	5.00	Pass
227	7085	-9.85	-9.64	-10.17	-9.81	0.23	-3.61	8.38	4.77	5.00	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

2. For U-NII-5: Directional gain = $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 8.06\text{dBi}$

3. For U-NII-6: Directional gain = $10 \log[(10^{G2/20} + 10^{G3/20})^2 / 2] = 7.82\text{dBi}$

4. For U-NII-7: Directional gain = $10 \log[(10^{G2/20} + 10^{G3/20})^2 / 2] = 7.97\text{dBi}$

5. For U-NII-8: Directional gain = $10 \log[(10^{G2/20} + 10^{G3/20})^2 / 2] = 8.38\text{dBi}$

6. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE80)

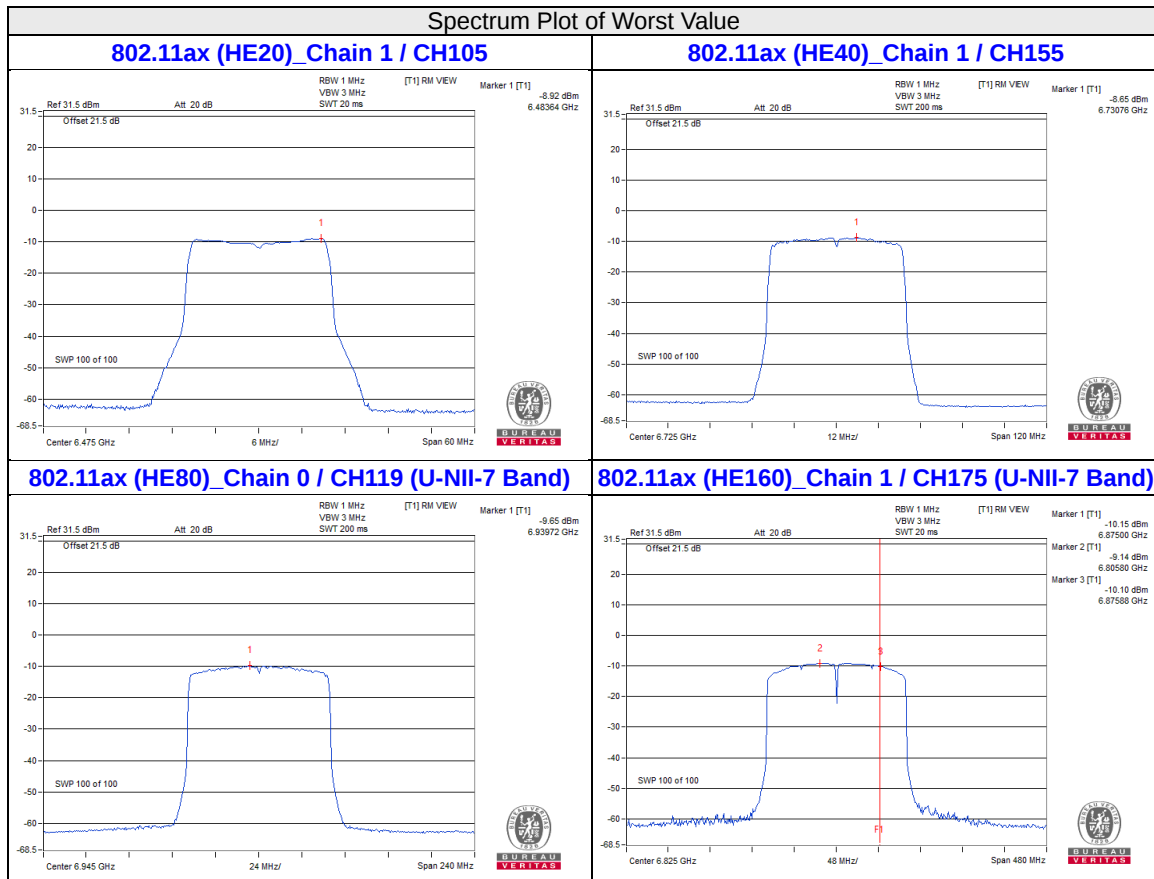
Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD (dBm/MHz)	Directional Gain (dBi)	EIRP PSD (dBm/MHz)	EIRP PSD Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3						
39	6145	-9.70	-10.00	-10.34	-10.23	0.29	-3.75	8.06	4.31	5.00	Pass
55	6225	-9.51	-10.00	-10.10	-9.96	0.29	-3.57	8.06	4.49	5.00	Pass
87	6385	-10.09	-9.75	-9.92	-9.74	0.29	-3.56	8.06	4.50	5.00	Pass
103	6465	-9.24	-9.11	-9.94	-9.38	0.29	-3.09	7.82	4.73	5.00	Pass
119 (U-NII-6 Band)	6545	-9.72	-9.51	-9.89	-9.94	0.29	-3.45	7.82	4.37	5.00	Pass
119 (U-NII-7 Band)	6545	-9.00	-9.45	-9.67	-9.26	0.29	-3.02	7.97	4.95	5.00	Pass
135	6625	-9.58	-9.54	-10.08	-9.67	0.29	-3.40	7.97	4.57	5.00	Pass
151	6705	-9.81	-9.26	-9.90	-9.55	0.29	-3.31	7.97	4.66	5.00	Pass
167	6785	-9.75	-9.58	-10.26	-10.00	0.29	-3.57	7.97	4.40	5.00	Pass
183 (U-NII-7 Band)	6865	-9.49	-9.47	-10.00	-9.66	0.29	-3.33	7.97	4.64	5.00	Pass
183 (U-NII-8 Band)	6865	-9.64	-9.46	-10.00	-9.83	0.29	-3.41	8.38	4.56	5.00	Pass
199	6945	-9.76	-9.74	-10.26	-10.02	0.29	-3.62	8.38	4.76	5.00	Pass
215	7025	-10.15	-9.96	-9.96	-10.07	0.29	-3.72	8.38	4.66	5.00	Pass

- Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. For U-NII-5: Directional gain = $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 8.06\text{dBi}$
3. For U-NII-6: Directional gain = $10 \log[(10^{G2/20} + 10^{G3/20})^2 / 2] = 7.82\text{dBi}$
4. For U-NII-7: Directional gain = $10 \log[(10^{G2/20} + 10^{G3/20})^2 / 2] = 7.97\text{dBi}$
5. For U-NII-8: Directional gain = $10 \log[(10^{G2/20} + 10^{G3/20})^2 / 2] = 8.38\text{dBi}$
6. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE160)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD (dBm/MHz)	Directional Gain (dBi)	EIRP PSD (dBm/MHz)	EIRP PSD Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3						
47	6185	-9.52	-9.81	-9.94	-9.94	0.31	-3.47	8.06	4.59	5.00	Pass
79	6345	-9.76	-9.43	-10.54	-10.27	0.31	-3.65	8.06	4.41	5.00	Pass
111 (U-NII-6 Band)	6505	-9.26	-9.43	-10.28	-10.00	0.31	-3.40	7.82	4.42	5.00	Pass
111 (U-NII-7 Band)	6505	-9.59	-9.61	-10.01	-9.66	0.31	-3.39	7.97	4.43	5.00	Pass
143	6665	-9.72	-9.59	-10.35	-10.00	0.31	-3.58	7.97	4.39	5.00	Pass
175 (U-NII-7 Band)	6825	-9.30	-9.22	-9.65	-9.36	0.31	-3.05	7.97	4.92	5.00	Pass
175 (U-NII-8 Band)	6825	-10.29	-10.10	-10.27	-10.08	0.31	-3.86	8.38	4.11	5.00	Pass
207	6985	-9.82	-9.48	-10.65	-9.82	0.31	-3.59	8.38	4.79	5.00	Pass

- Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. For U-NII-5: Directional gain = $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 8.06\text{dBi}$
3. For U-NII-6: Directional gain = $10 \log[(10^{G2/20} + 10^{G3/20})^2 / 2] = 7.82\text{dBi}$
4. For U-NII-7: Directional gain = $10 \log[(10^{G2/20} + 10^{G3/20})^2 / 2] = 7.97\text{dBi}$
5. For U-NII-8: Directional gain = $10 \log[(10^{G2/20} + 10^{G3/20})^2 / 2] = 8.38\text{dBi}$
6. Refer to section 3.3 for duty cycle spectrum plot.

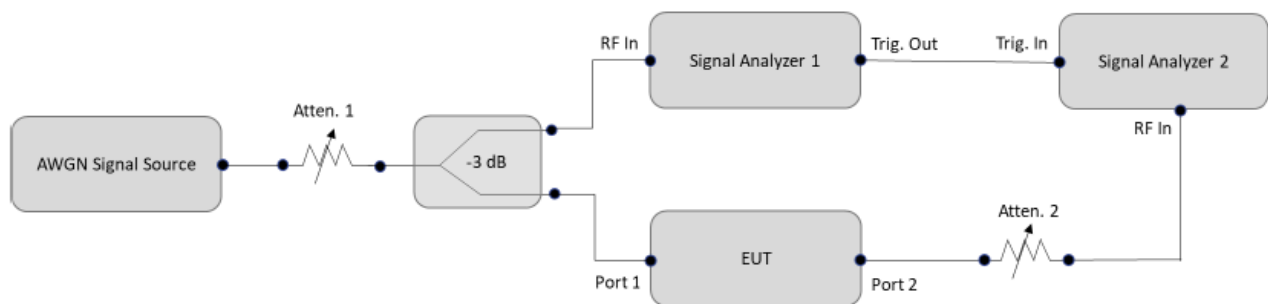


4.7 Contention Based Protocol Measurement

4.7.1 Limits of Contention Based Protocol Measurement

Unlicensed indoor low-power devices must detect co-channel radio frequency power that is at least -62 dBm (The threshold is referenced to a 0 dBi antenna gain.) or lower. Additionally, indoor low-power devices must detect co-channel energy with 90% or greater certainty.

4.7.2 Test Setup



4.7.3 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum AnalyzerR&S	FSW8	101497	Nov 10, 2020	Nov 09, 2021
Spectrum AnalyzerR&S	FSV40	101516	Mar. 04, 2020	Mar. 03, 2021
MXG X-Series RF Vector Signal GeneratorAgilent	N5182B	MY59100182	Apr. 10, 2020	Apr. 09, 2021
Power Splitter/combinerMini-Circuits	ZN2PD-9G	ZN2PD-9G	Jun. 16, 2020	Jun. 15, 2021

- NOTE:**
1. The test was performed in Femtocell room.
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 3. Tested Date: Feb. 24, 2021

4.7.4 Test Procedure

- Set the signal analyzer center frequency to the nominal EUT channel center frequency. The span range of the signal analyzer shall be between two times and five times the OBW of the EUT. Connect the output port of the EUT to the signal analyzer 2. Ensure that the attenuator 2 provides enough attenuation to not overload the signal analyzer 2 receiver.
- Monitoring the signal analyzer 2, verify the EUT is operating and transmitting with the parameters (set as following section 4.7.5 EUT operating condition).
- Determine number of times detection threshold test as following table,

If	Number of Tests	Placement of Incumbent Transmission
$BW_{EUT} \leq BW_{Inc}$	Once	Same as EUT transmission
$BW_{Inc} < BW_{EUT} \leq 2 \times BW_{Inc}$	Once	Contained within BW_{EUT}
$2 \times BW_{Inc} < BW_{EUT} \leq 4 \times BW_{Inc}$	Twice. (Incumbent transmission is contained within BW_{EUT})	Closely to the lower edge and upper edge of the EUT Channel
$BW_{EUT} > 4 \times BW_{Inc}$	Three times	Closely to the lower edge ,in the middle and upper edge of the EUT Channel

- Using an AWGN signal source, generate (but do not transmit, i.e., RF OFF) a 10 MHz-wide AWGN signal. Use step c table to determine the center frequency of the 10 MHz AWGN signal relative to the EUT's channel bandwidth and center frequency.
- Set the AWGN signal power to an extremely low level (more than 20 dB below the -62 dBm threshold). Connect the AWGN signal source, via a 3-dB splitter, to the signal analyzer 1 and the EUT.
- Transmit the AWGN signal (RF ON) and verify its characteristics on the signal analyzer 1.
- Monitor the signal analyzer 2 to verify if the AWGN signal has been detected and the EUT has ceased transmission. If the EUT continues to transmit, then incrementally increase the AWGN signal power level until the EUT stops transmitting.
- (Including all losses in the RF paths) Determine and record the AWGN signal power level (at the EUT's antenna port) at which the EUT ceased transmission. Repeat the procedure at least 10 times to verify the EUT can detect an AWGN signal with 90% (or better) level of certainty.
- Refer to step c table to determine number of times the detection threshold testing needs to be repeated. If testing is required more than once, then go back to step d, choose a different center frequency for the AWGN signal and repeat the process.

Note: A more stringent test level with 0dBi antenna gain (-62dBm + 0dBi = -62dBm) is selected for the test instead of the rule's required test level (-62dBm + 3.2dBi (smallest antenna gain) = -58.8dBm).

4.7.5 EUT Operating Condition

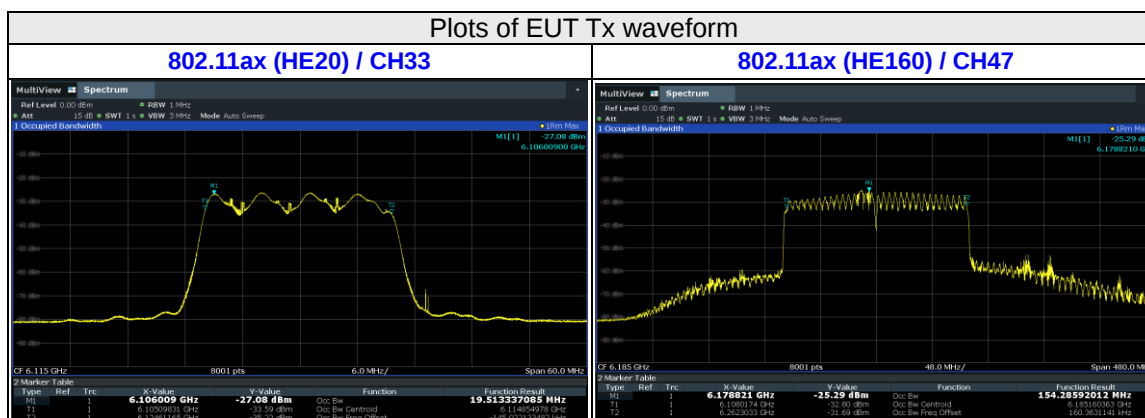
Set the EUT to transmit with a constant duty cycle and relative operating parameters which including power level, operating frequency, modulation and bandwidth.

4.7.6 Test Results

For U-NII-5 band

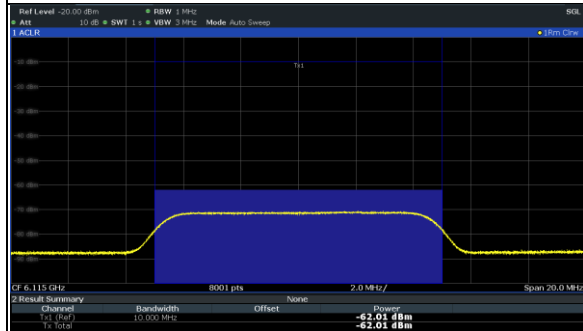
Contention Based Protocol Measurement									
Measurement Mode :		Conducted measurement		The Incumbent Signal(AWGN) Level(dBm) :			-62	at the antenna connector	
Device Type :		Indoor AP / subordinate modes		Antenna Gain(dBi) :			0		
Operation Mode	Channel Bandwidth (MHz)	Channel Number	Channel Frequency (MHz)	AWGN Signal Frequency (MHz)	Number of Times	Number of Detected	Detection Rate	Minimum Limit	Pass/Fail
802.11ax	20	33	6115	6115	10	10	100%	90%	Pass
	160	47	6185	6110	10	10	100%	90%	Pass
				6185	10	10	100%	90%	Pass
				6260	10	10	100%	90%	Pass
Result	Complied								

Lowest Interference(AWGN) Level Check						
Operation Mode	Channel Bandwidth (MHz)	Channel Number	Channel Frequency (MHz)	AWGN Signal Frequency (MHz)	Threshold Level (dBm)	EUT Status
802.11ax	20	33	6115	6115	-68	Start transmitting
	160	47	6185	6110	-64	Start transmitting
				6185	-64	Start transmitting
				6260	-64	Start transmitting

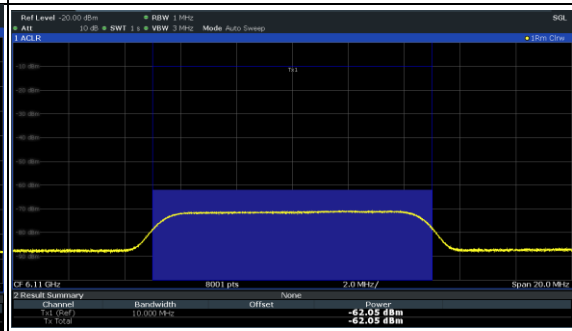


Plots of Incumbent signal level

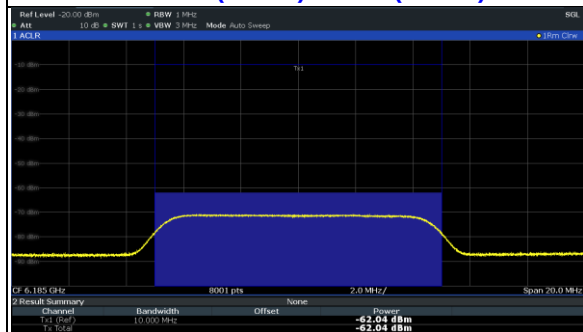
802.11ax (HE20) / CH33



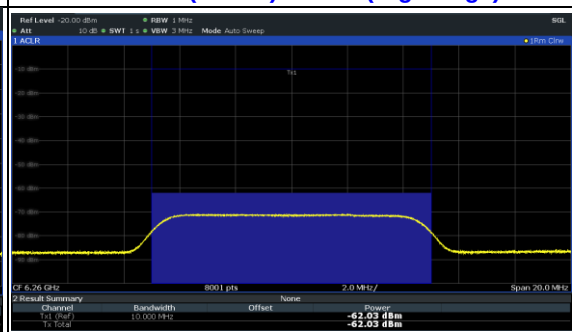
802.11ax (HE160) / CH47 (Low Edge)

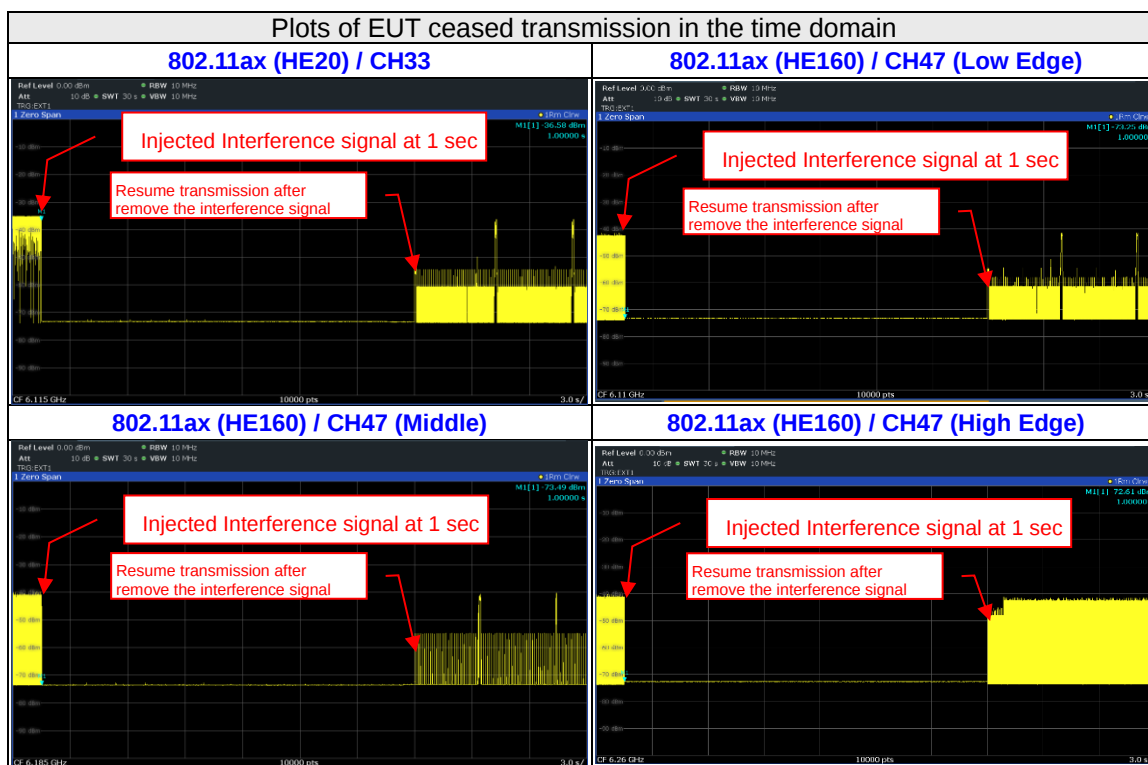


802.11ax (HE160) / CH47 (Middle)



802.11ax (HE160) / CH47 (High Edge)

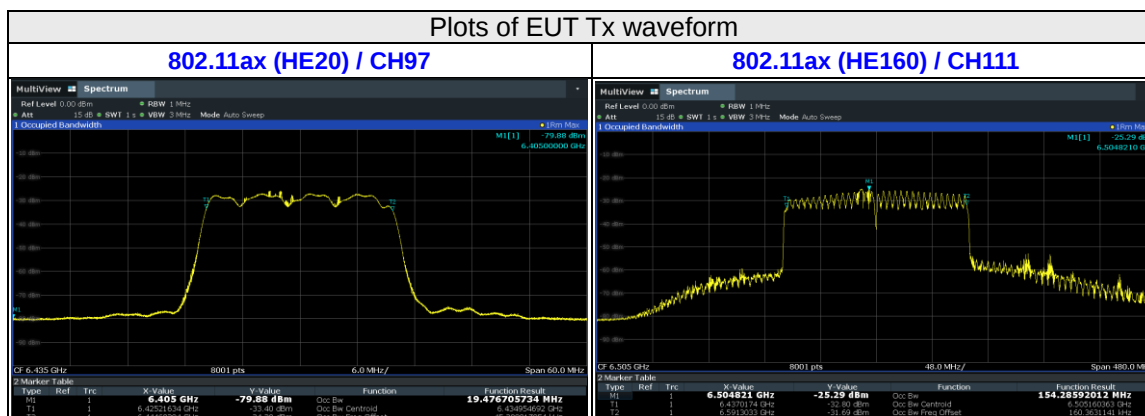




For U-NII-6 band

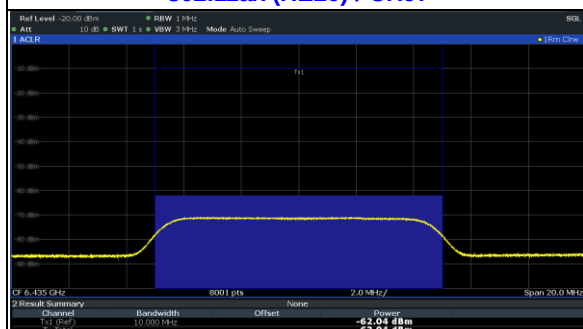
Contention Based Protocol Measurement									
Measurement Mode :		Conducted measurement		The Incumbent Signal(AWGN) Level(dBm) :			-62	at the antenna connector	
Device Type :		Indoor AP / subordinate modes		Antenna Gain(dBi) :			0		
Operation Mode	Channel Bandwidth (MHz)	Channel Number	Channel Frequency (MHz)	AWGN Signal Frequency (MHz)	Number of Times	Number of Detected	Detection Rate	Minimum Limit	Pass/Fail
802.11ax	20	97	6435	6435	10	10	100%	90%	Pass
	160	111	6505	6430	10	10	100%	90%	Pass
				6505	10	10	100%	90%	Pass
				6580	10	10	100%	90%	Pass
Result	Complied								

Lowest Interference(AWGN) Level Check						
Operation Mode	Channel Bandwidth (MHz)	Channel Number	Channel Frequency (MHz)	AWGN Signal Frequency (MHz)	Threshold Level (dBm)	EUT Status
802.11ax	20	97	6435	6435	-68	Start transmitting
	160	111	6505	6430	-64	Start transmitting
				6505	-64	Start transmitting
				6580	-64	Start transmitting

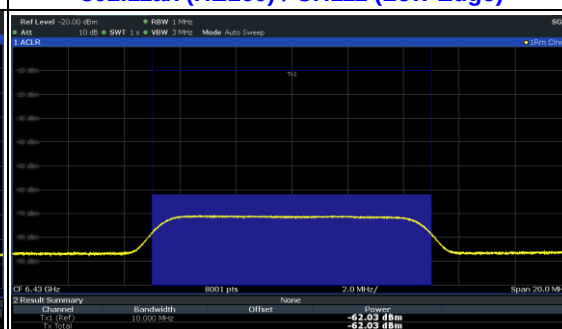


Plots of Incumbent signal level

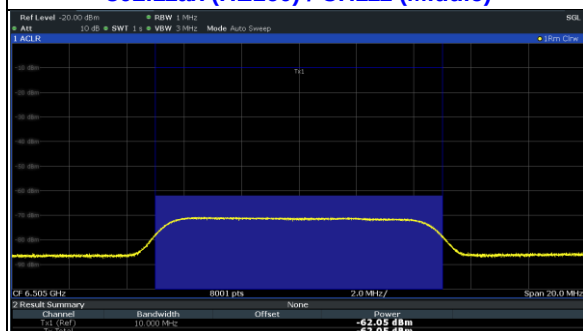
802.11ax (HE20) / CH97



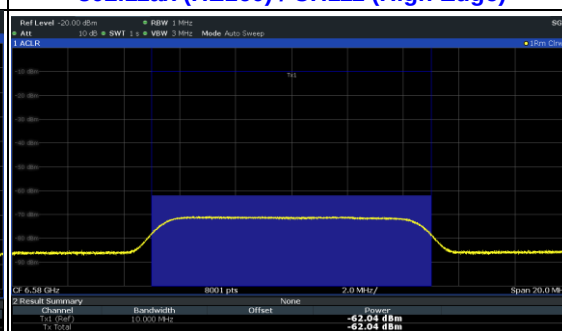
802.11ax (HE160) / CH111 (Low Edge)



802.11ax (HE160) / CH111 (Middle)

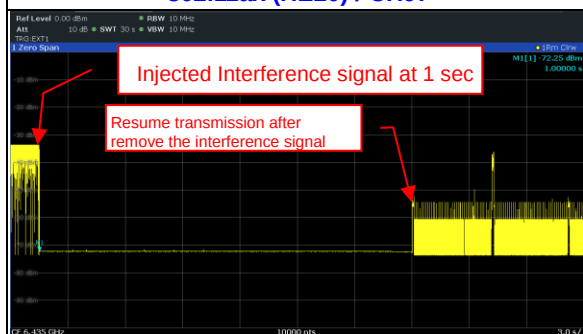


802.11ax (HE160) / CH111 (High Edge)

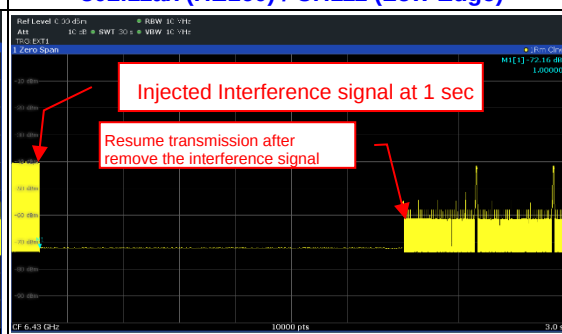


Plots of EUT ceased transmission in the time domain

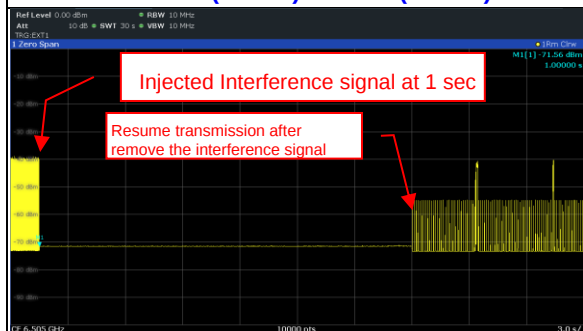
802.11ax (HE20) / CH97



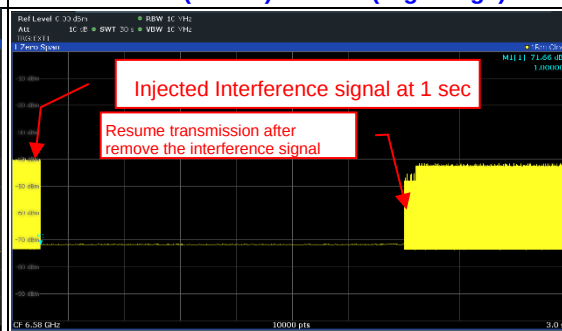
802.11ax (HE160) / CH111 (Low Edge)



802.11ax (HE160) / CH111 (Middle)



802.11ax (HE160) / CH111 (High Edge)



For U-NII-7 band

Contention Based Protocol Measurement									
Measurement Mode :		Conducted measurement		The Incumbent Signal(AWGN) Level(dBm) :			-62	at the antenna connector	
Device Type :		Indoor AP / subordinate modes		Antenna Gain(dBi) :			0		
Operation Mode	Channel Bandwidth (MHz)	Channel Number	Channel Frequency (MHz)	AWGN Signal Frequency (MHz)	Number of Times	Number of Detected	Detection Rate	Minimum Limit	Pass/Fail
802.11ax	20	129	6595	6595	10	10	100%	90%	Pass
	160	143	6665	6590	10	10	100%	90%	Pass
				6665	10	10	100%	90%	Pass
				6740	10	10	100%	90%	Pass
Result	Complied								

Lowest Interference(AWGN) Level Check						
Operation Mode	Channel Bandwidth (MHz)	Channel Number	Channel Frequency (MHz)	AWGN Signal Frequency (MHz)	Threshold Level (dBm)	EUT Status
802.11ax	20	129	6595	6595	-68	Start transmitting
	160	143	6665	6590	-64	Start transmitting
				6665	-64	Start transmitting
				6740	-64	Start transmitting

