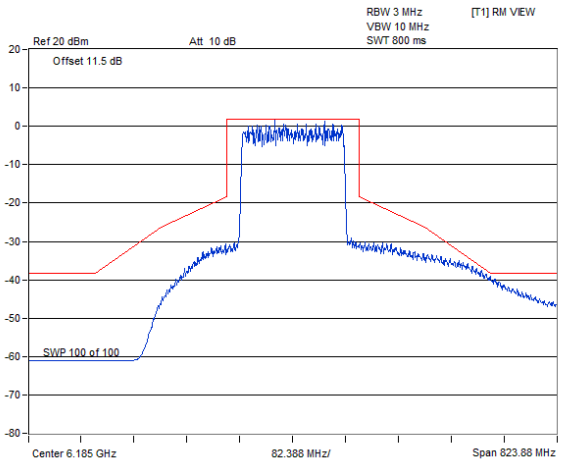
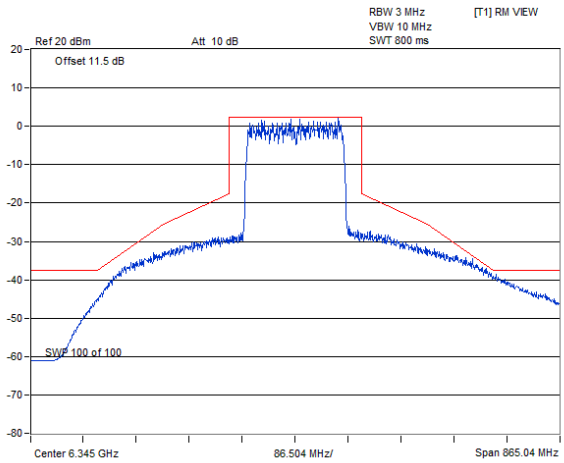
802.11be (EHT160) Beamforming

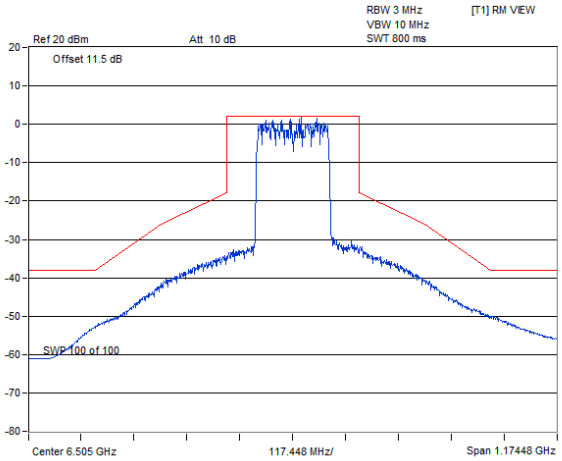
Spectrum Plot



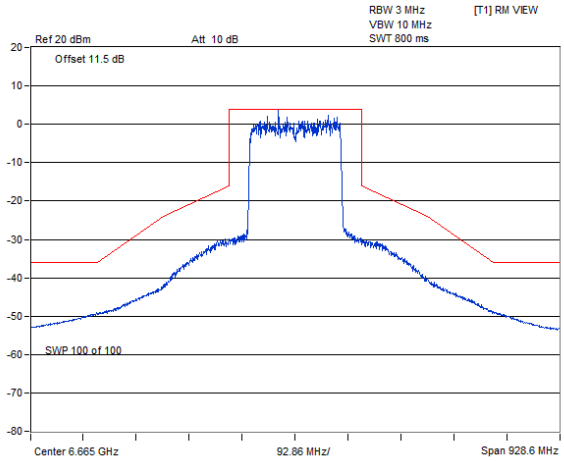
802.11be (EHT160) Beamforming / Chain 0 : CH 47



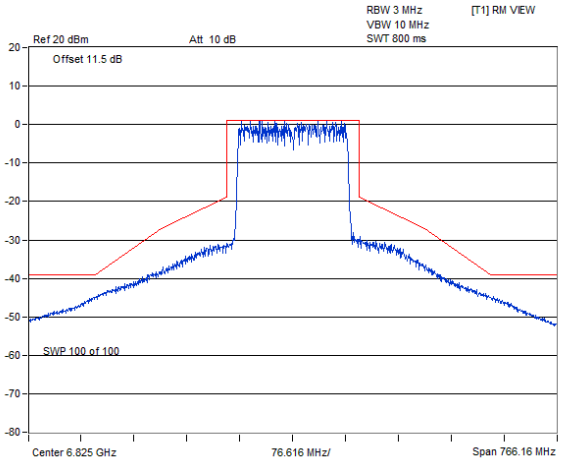
802.11be (EHT160) Beamforming / Chain 0 : CH 79



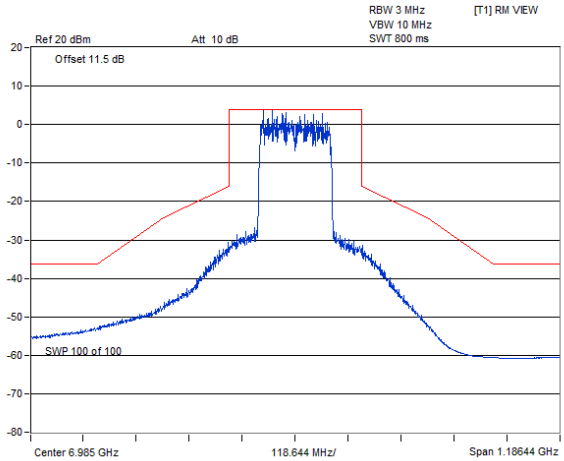
802.11be (EHT160) Beamforming / Chain 0 : CH 111



802.11be (EHT160) Beamforming / Chain 0 : CH 143

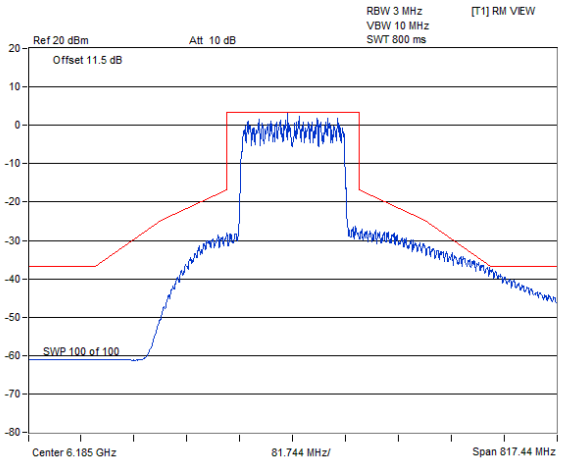


802.11be (EHT160) Beamforming / Chain 0 : CH 175

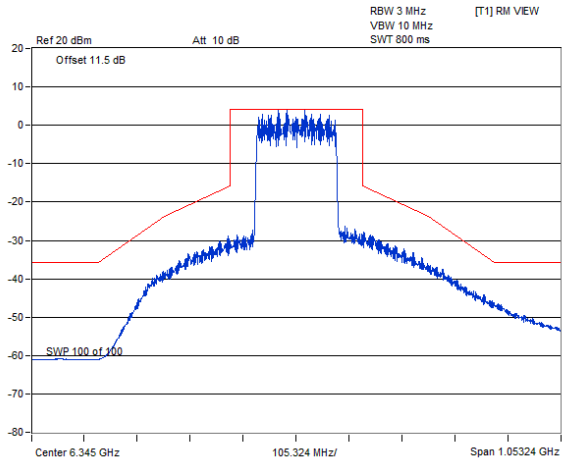


802.11be (EHT160) Beamforming / Chain 0 : CH 207

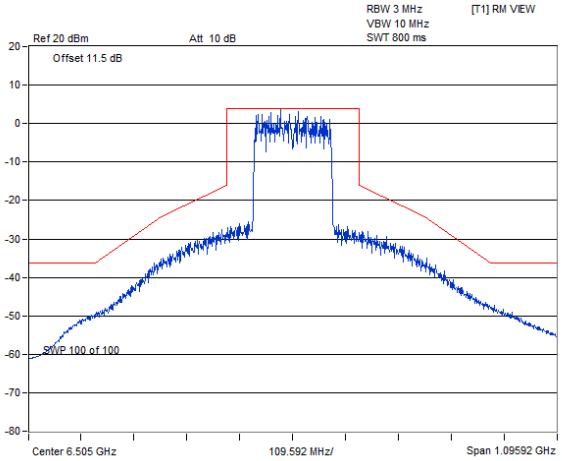
Spectrum Plot



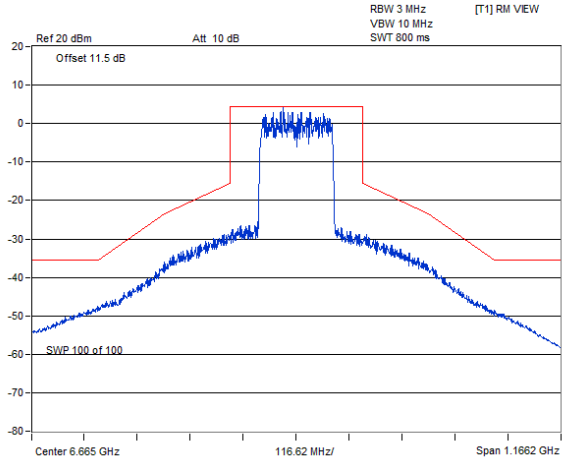
802.11be (EHT160) Beamforming / Chain 1 : CH 47



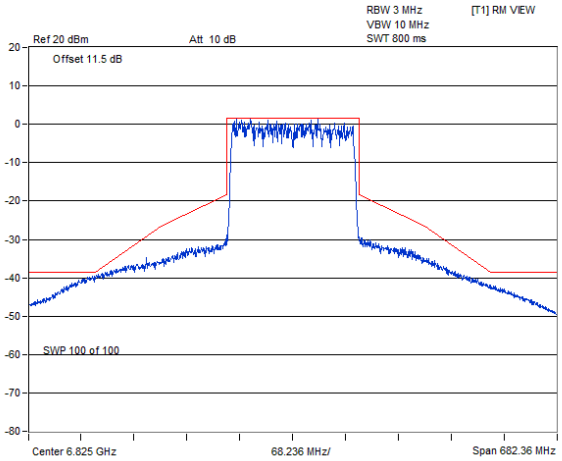
802.11be (EHT160) Beamforming / Chain 1 : CH 79



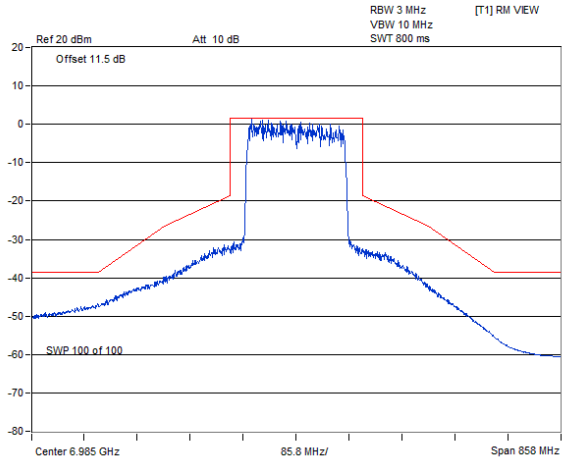
802.11be (EHT160) Beamforming / Chain 1 : CH 111



802.11be (EHT160) Beamforming / Chain 1 : CH 143

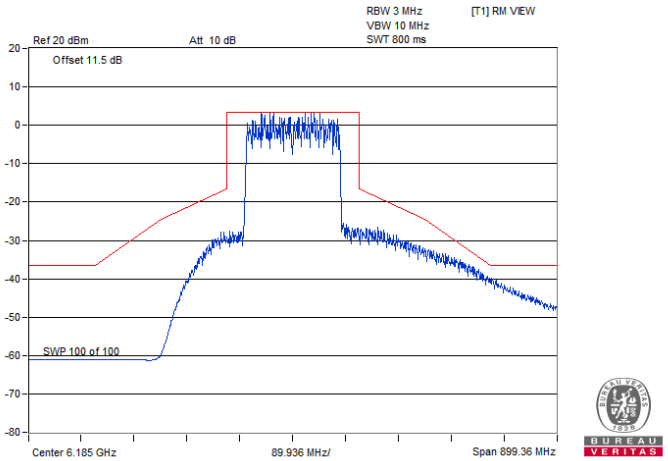


802.11be (EHT160) Beamforming / Chain 1 : CH 175

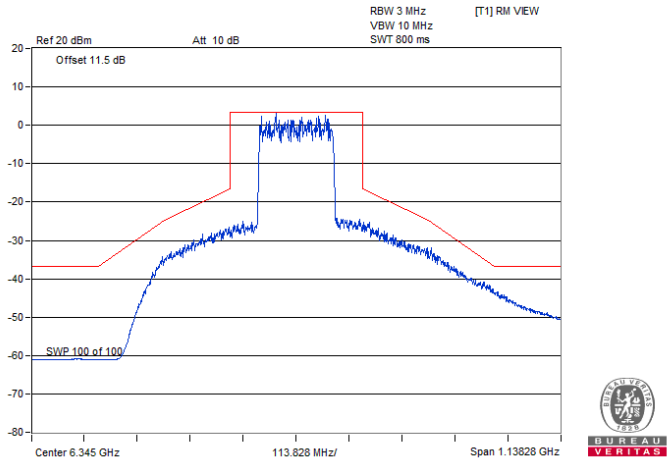


802.11be (EHT160) Beamforming / Chain 1 : CH 207

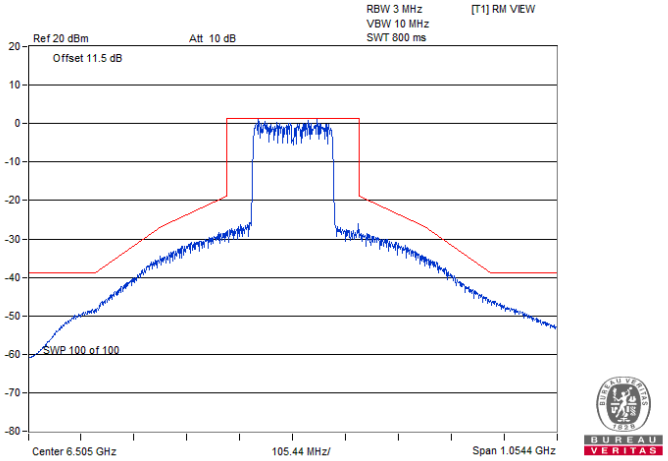
Spectrum Plot



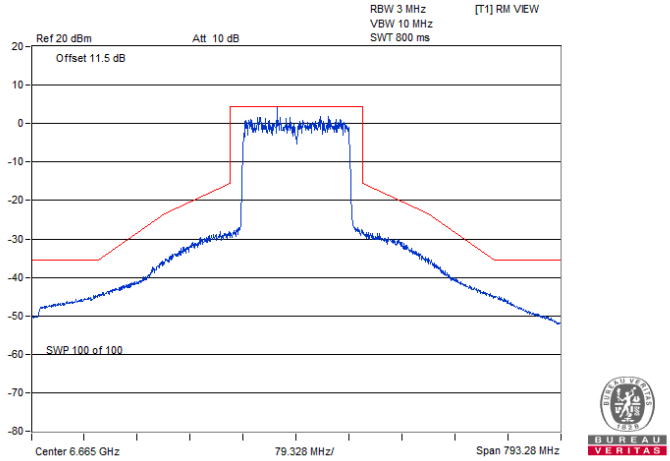
802.11be (EHT160) Beamforming / Chain 2 : CH 47



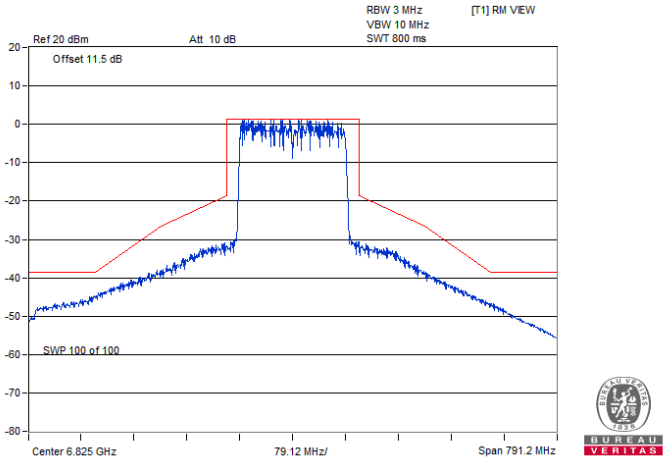
802.11be (EHT160) Beamforming / Chain 2 : CH 79



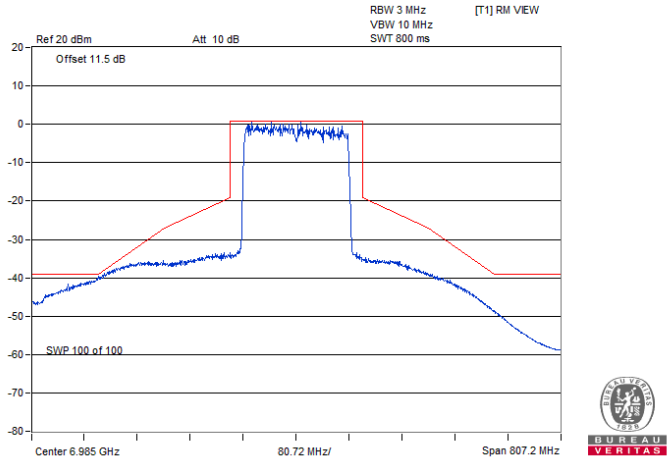
802.11be (EHT160) Beamforming / Chain 2 : CH 111



802.11be (EHT160) Beamforming / Chain 2 : CH 143

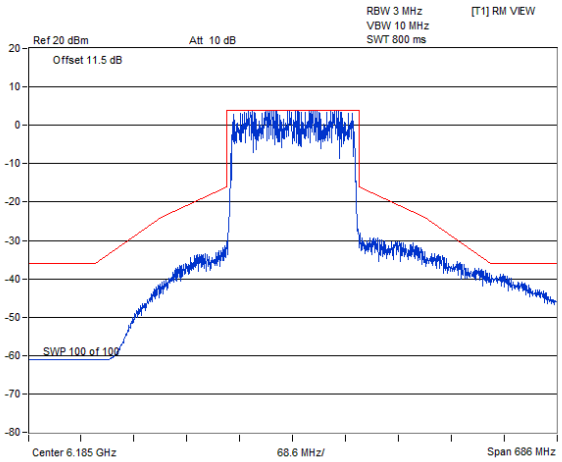


802.11be (EHT160) Beamforming / Chain 2 : CH 175

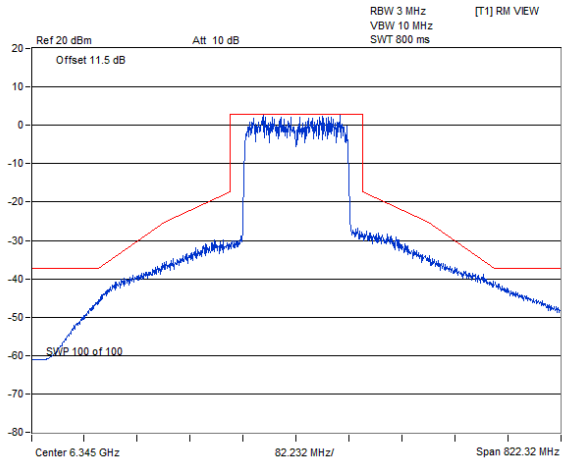


802.11be (EHT160) Beamforming / Chain 2 : CH 207

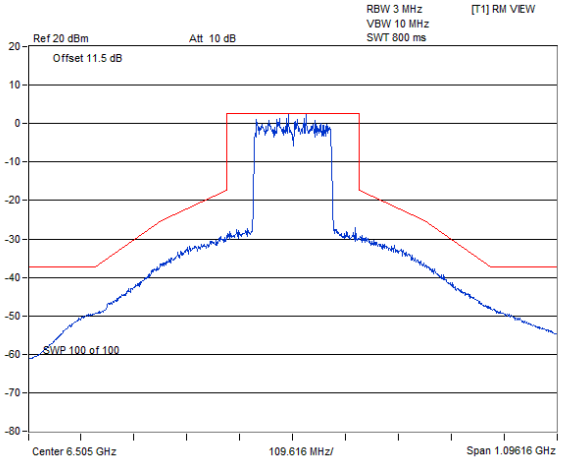
Spectrum Plot



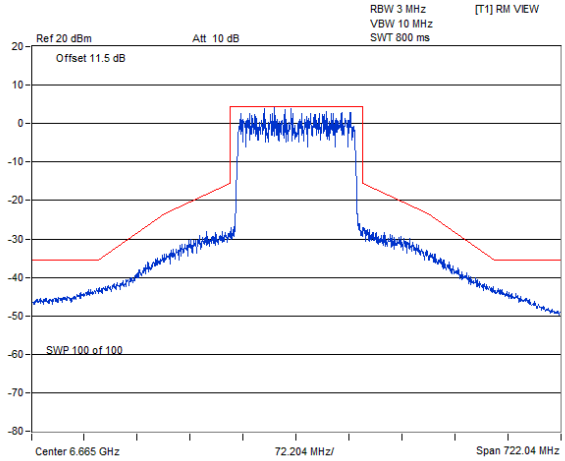
802.11be (EHT160) Beamforming / Chain 3 : CH 47



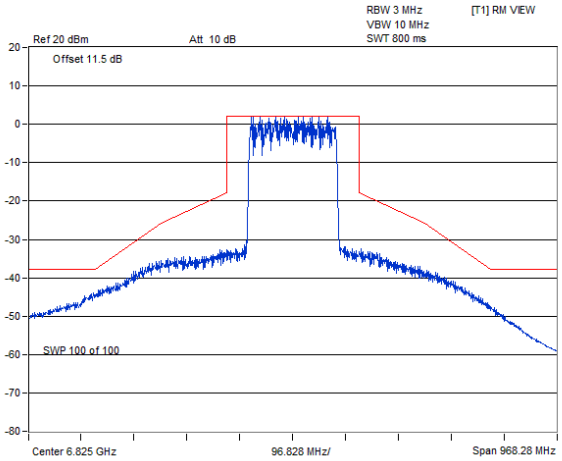
802.11be (EHT160) Beamforming / Chain 3 : CH 79



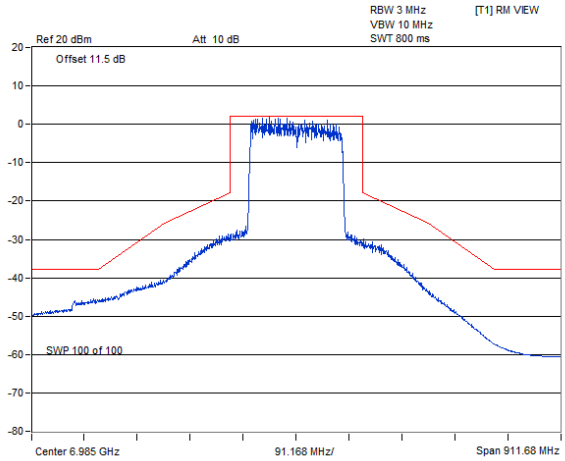
802.11be (EHT160) Beamforming / Chain 3 : CH 111



802.11be (EHT160) Beamforming / Chain 3 : CH 143



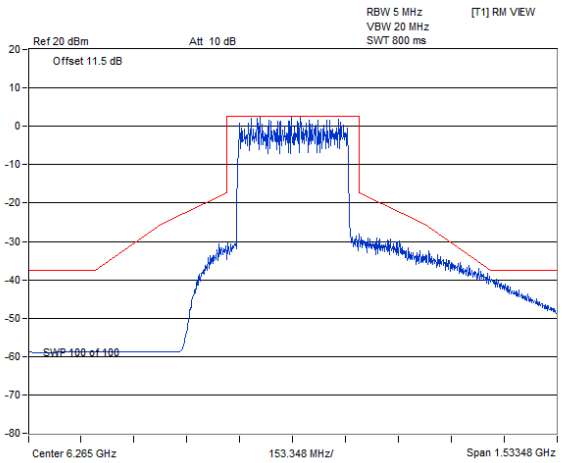
802.11be (EHT160) Beamforming / Chain 3 : CH 175



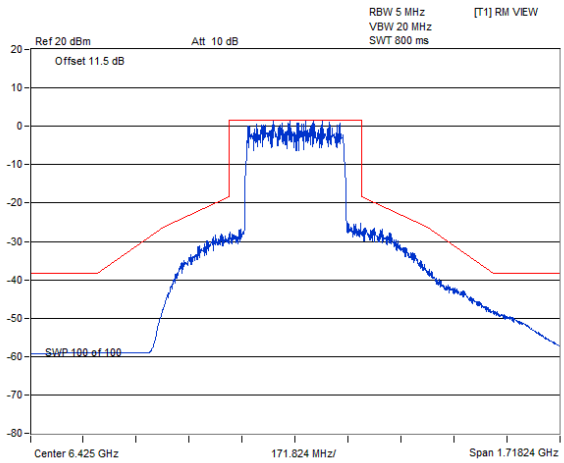
802.11be (EHT160) Beamforming / Chain 3 : CH 207

802.11be (EHT320) Beamforming

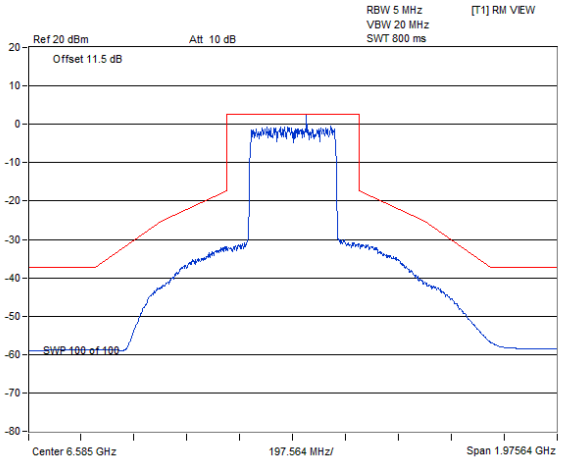
Spectrum Plot



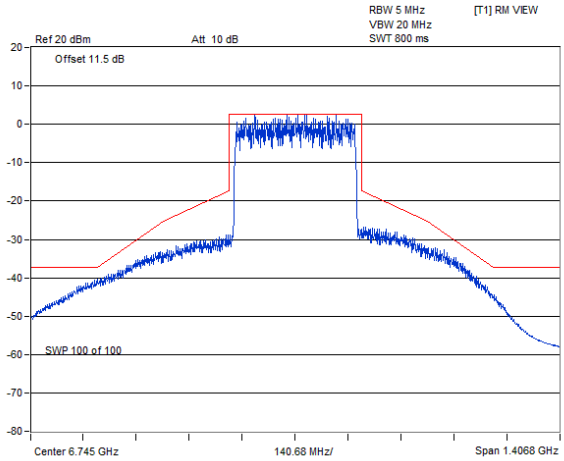
802.11be (EHT320) Beamforming / Chain 0 : CH 63



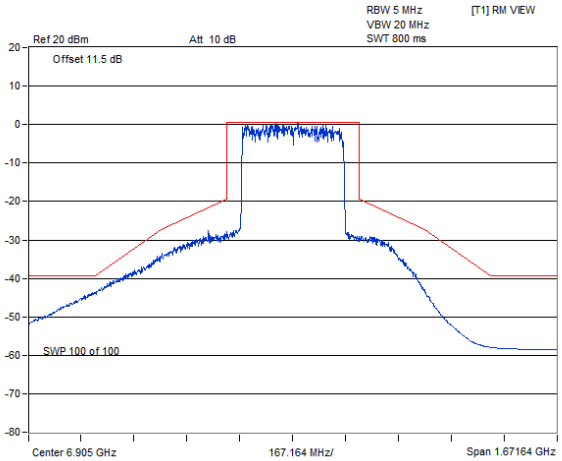
802.11be (EHT320) Beamforming / Chain 0 : CH 95



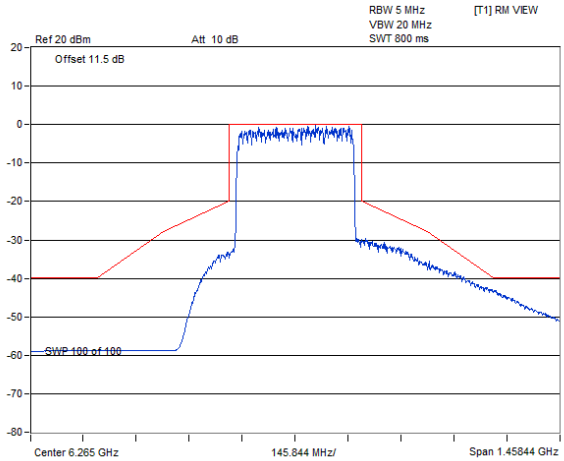
802.11be (EHT320) Beamforming / Chain 0 : CH 127



802.11be (EHT320) Beamforming / Chain 0 : CH 159

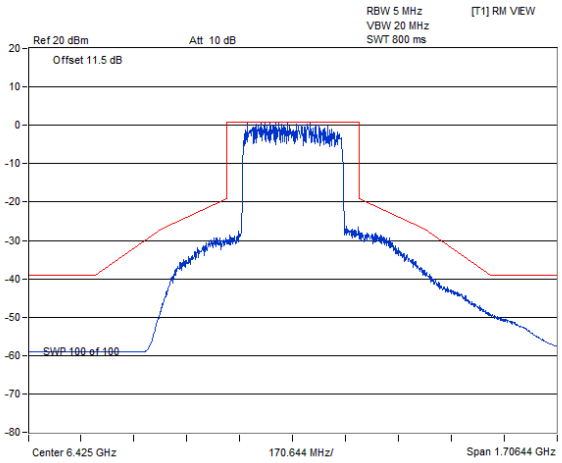


802.11be (EHT320) Beamforming / Chain 0 : CH 191

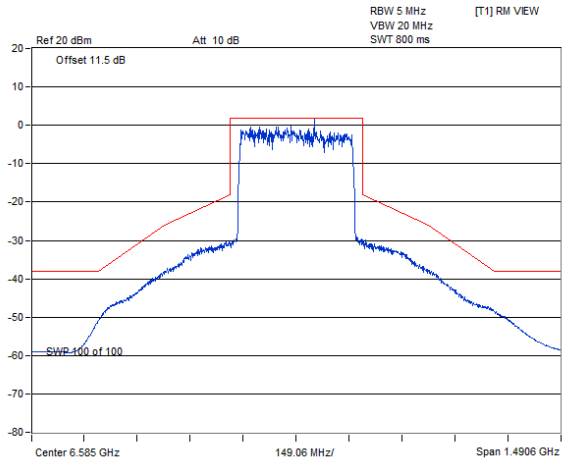


802.11be (EHT320) Beamforming / Chain 1 : CH 63

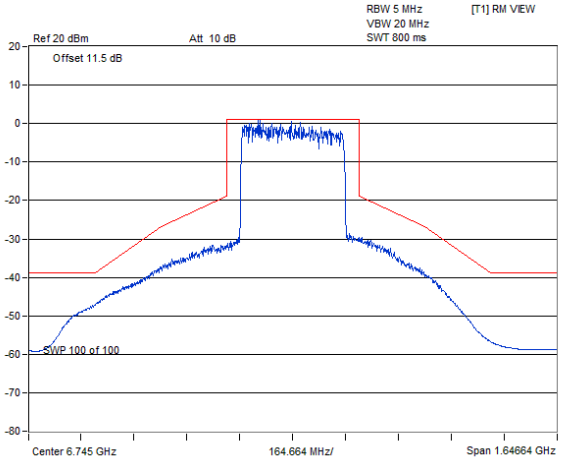
Spectrum Plot



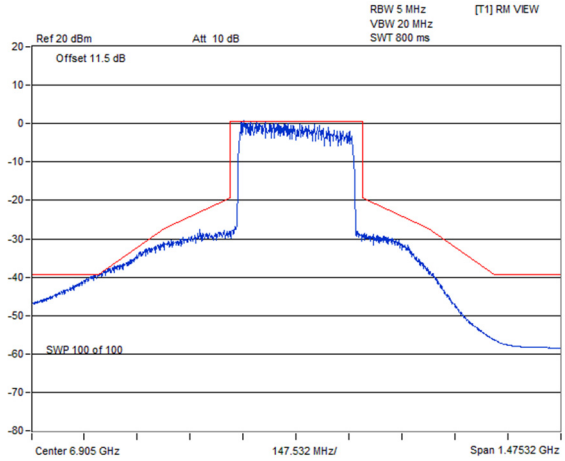
802.11be (EHT320) Beamforming / Chain 1 : CH 95



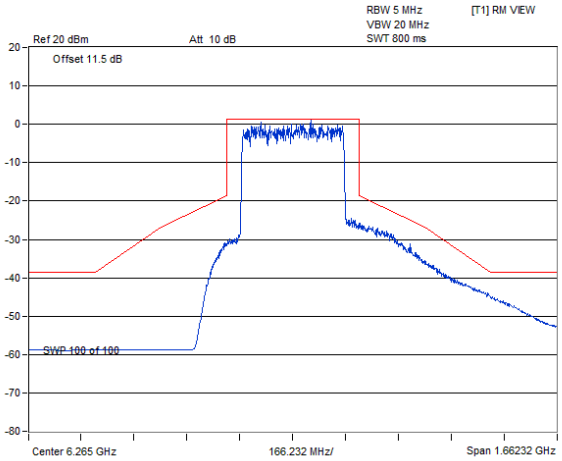
802.11be (EHT320) Beamforming / Chain 1 : CH 127



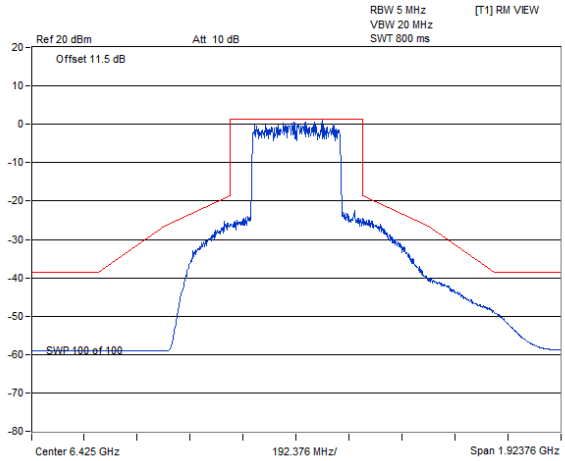
802.11be (EHT320) Beamforming / Chain 1 : CH 159



802.11be (EHT320) Beamforming / Chain 1 : CH 191

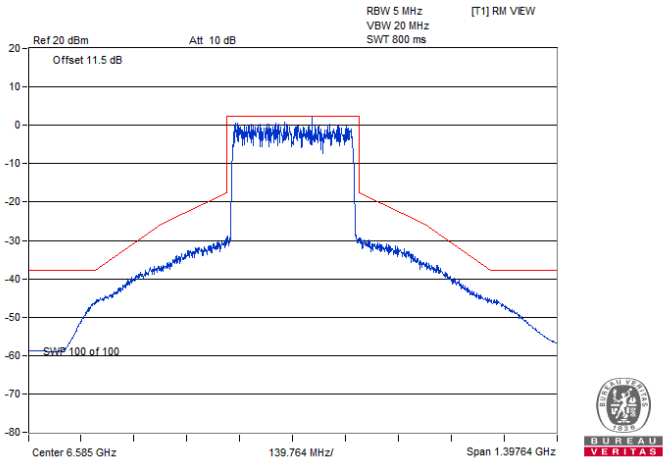


802.11be (EHT320) Beamforming / Chain 2 : CH 63

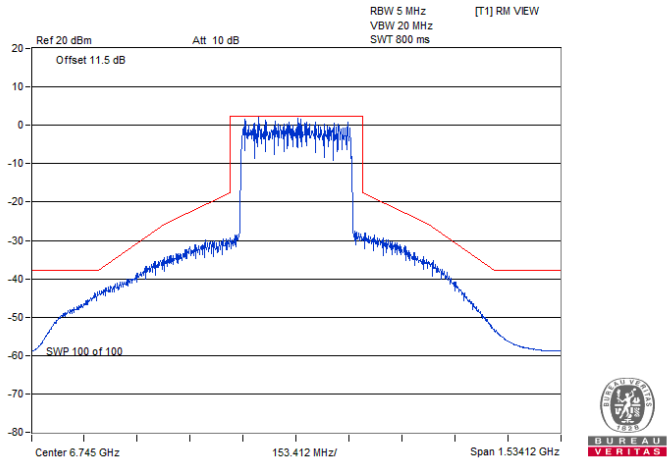


802.11be (EHT320) Beamforming / Chain 2 : CH 95

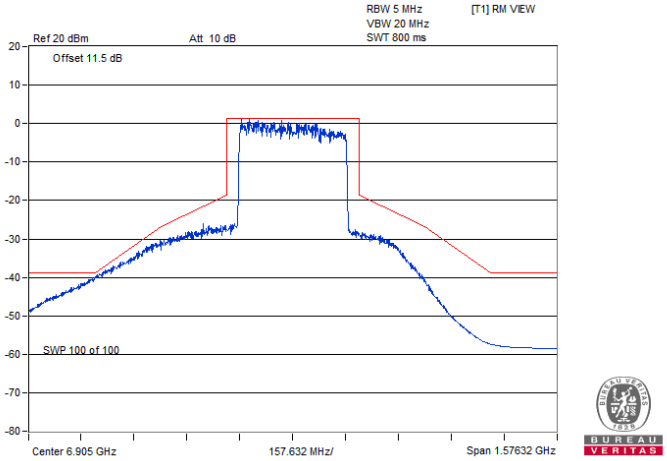
Spectrum Plot



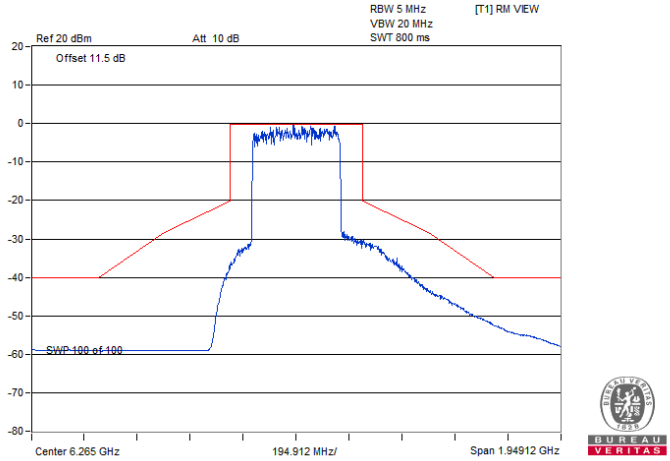
802.11be (EHT320) Beamforming / Chain 2 : CH 127



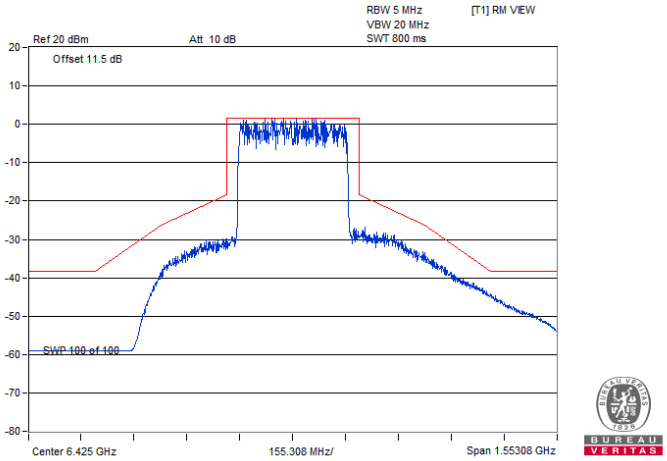
802.11be (EHT320) Beamforming / Chain 2 : CH 159



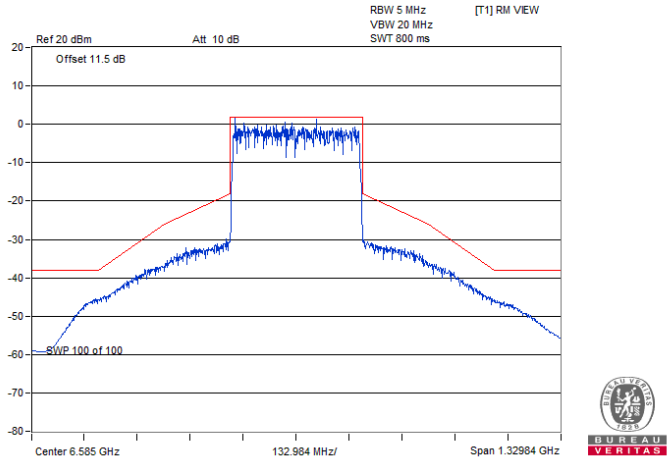
802.11be (EHT320) Beamforming / Chain 2 : CH 191



802.11be (EHT320) Beamforming / Chain 3 : CH 63

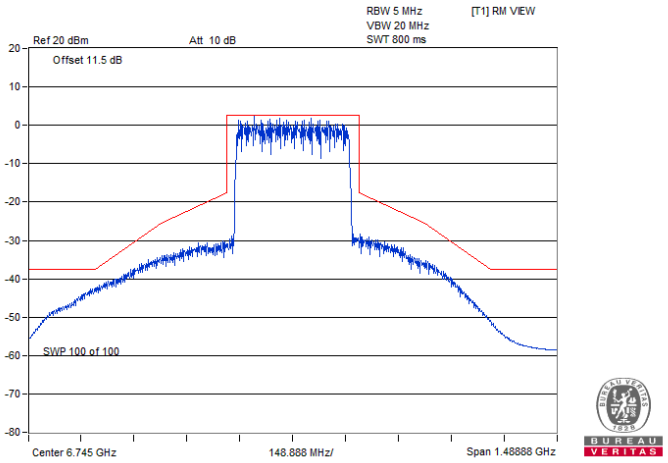


802.11be (EHT320) Beamforming / Chain 3 : CH 95

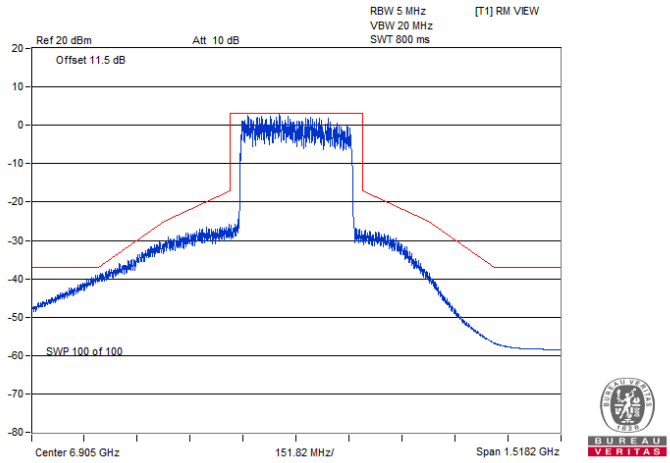


802.11be (EHT320) Beamforming / Chain 3 : CH 127

Spectrum Plot



802.11be (EHT320) Beamforming / Chain 3 : CH 159



802.11be (EHT320) Beamforming / Chain 3 : CH 191

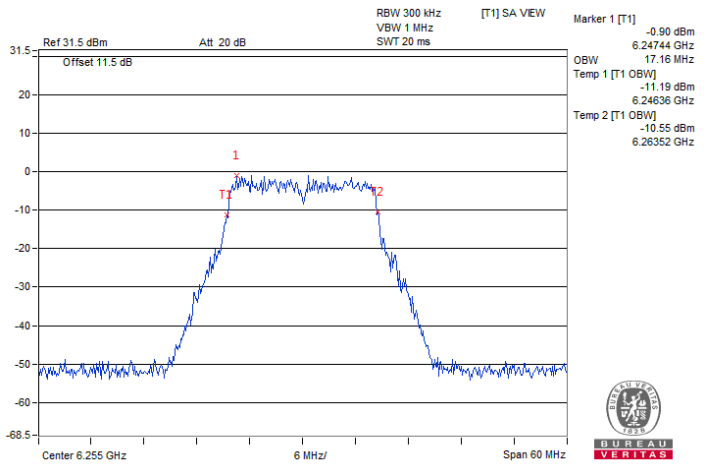
7.5 Occupied Bandwidth

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Wayne Lin

802.11a

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)				Maximum Limit (MHz)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3		
33	6115	17.02	17.02	16.92	17.02	320	Pass
61	6255	17.04	17.04	17.16	16.92	320	Pass
93	6415	16.92	16.92	16.80	16.92	320	Pass
97	6435	16.92	16.92	16.92	16.92	320	Pass
105	6475	16.92	16.92	16.92	16.92	320	Pass
113	6515	17.04	17.04	17.04	16.80	320	Pass
117	6535	16.92	16.92	16.80	16.92	320	Pass
149	6695	16.92	16.92	16.80	16.92	320	Pass
181	6855	16.92	17.04	16.80	17.04	320	Pass
185	6875	16.92	17.02	16.92	16.92	320	Pass
209	6995	16.80	16.92	16.92	16.80	320	Pass
229	7095	16.92	17.04	16.92	16.92	320	Pass
233	7115	16.92	17.04	16.92	16.92	320	Pass

Spectrum Plot of Maximum Value



802.11a / Chain 2 : CH 61

Beamforming (4T1S)

802.11be (EHT20) Beamforming

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)				Maximum Limit (MHz)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3		
33	6115	19.14	19.14	19.14	19.04	320	Pass
61	6255	19.14	19.14	19.24	19.14	320	Pass
93	6415	19.14	19.14	19.14	19.14	320	Pass
97	6435	19.14	19.14	19.14	19.14	320	Pass
105	6475	19.14	19.14	19.14	19.14	320	Pass
113	6515	19.14	19.14	19.14	19.14	320	Pass
117	6535	19.14	19.14	19.14	19.14	320	Pass
149	6695	19.04	19.04	19.14	19.04	320	Pass
181	6855	19.14	19.14	19.14	19.14	320	Pass
185	6875	19.14	19.14	19.14	19.14	320	Pass
209	6995	19.14	19.14	19.14	19.14	320	Pass
229	7095	19.14	19.14	19.14	19.14	320	Pass
233	7115	19.14	19.14	19.14	19.14	320	Pass

802.11be (EHT40) Beamforming

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)				Maximum Limit (MHz)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3		
35	6125	38.46	38.27	38.46	38.46	320	Pass
59	6245	38.46	38.46	38.27	38.46	320	Pass
91	6405	38.27	38.27	38.27	38.27	320	Pass
99	6445	38.27	38.27	38.27	38.46	320	Pass
107	6485	38.27	38.27	38.46	38.27	320	Pass
115	6525	38.65	38.85	38.46	38.08	320	Pass
123	6565	38.27	38.27	38.46	38.46	320	Pass
155	6725	38.27	38.27	38.27	38.27	320	Pass
179	6845	38.27	38.27	38.65	38.27	320	Pass
187	6885	38.27	38.46	38.65	38.27	320	Pass
211	7005	38.27	38.46	38.46	38.27	320	Pass
227	7085	38.27	38.27	38.27	38.27	320	Pass

802.11be (EHT80) Beamforming

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)				Maximum Limit (MHz)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3		
39	6145	78.08	77.31	78.08	77.31	320	Pass
55	6225	77.70	77.70	78.08	78.08	320	Pass
87	6385	78.08	77.70	77.70	77.70	320	Pass
103	6465	77.69	78.08	77.31	78.08	320	Pass
119	6545	77.70	77.31	77.69	77.69	320	Pass
135	6625	78.08	78.08	77.70	78.08	320	Pass
151	6705	77.70	77.70	78.08	77.70	320	Pass
167	6785	78.08	77.70	78.08	77.70	320	Pass
183	6865	78.08	77.69	78.08	77.69	320	Pass
199	6945	77.69	77.69	77.31	77.70	320	Pass
215	7025	77.70	78.08	77.69	77.70	320	Pass

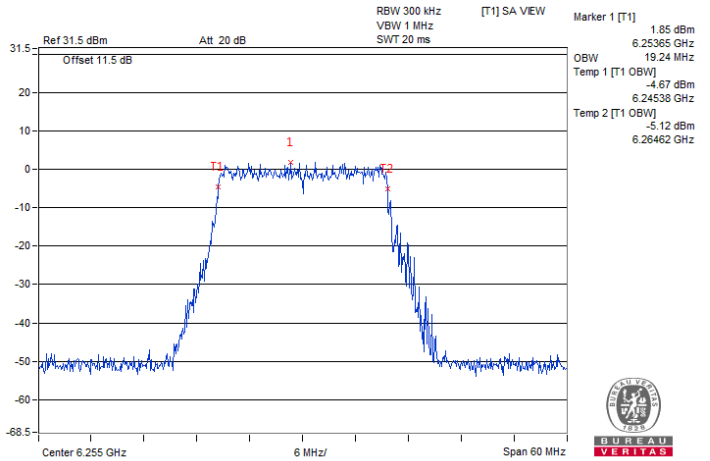
802.11be (EHT160) Beamforming

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)				Maximum Limit (MHz)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3		
47	6185	157.69	158.46	158.46	156.92	320	Pass
79	6345	157.69	157.69	158.46	156.92	320	Pass
111	6505	158.46	157.69	157.69	158.46	320	Pass
143	6665	157.69	159.23	156.92	157.69	320	Pass
175	6825	157.69	157.69	157.69	157.69	320	Pass
207	6985	156.15	156.92	157.69	156.92	320	Pass

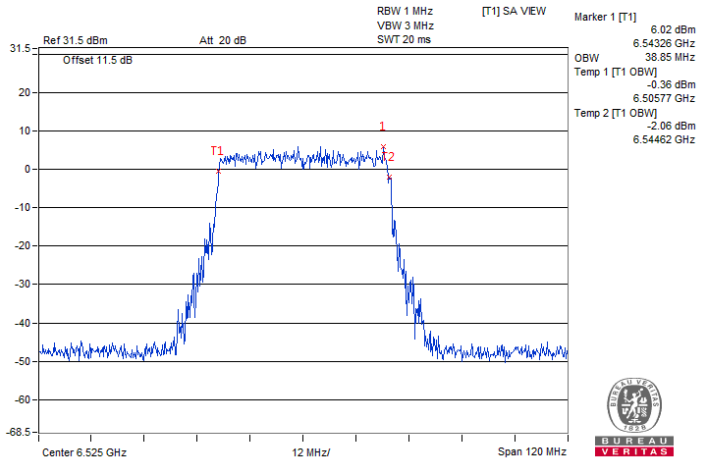
802.11be (EHT320) Beamforming

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)				Maximum Limit (MHz)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3		
63	6265	315.84	315.84	315.84	315.84	320	Pass
95	6425	316.80	315.84	315.84	316.80	320	Pass
127	6585	316.80	315.84	315.84	314.88	320	Pass
159	6745	315.84	315.84	315.84	315.84	320	Pass
191	6905	316.80	315.84	315.84	315.84	320	Pass

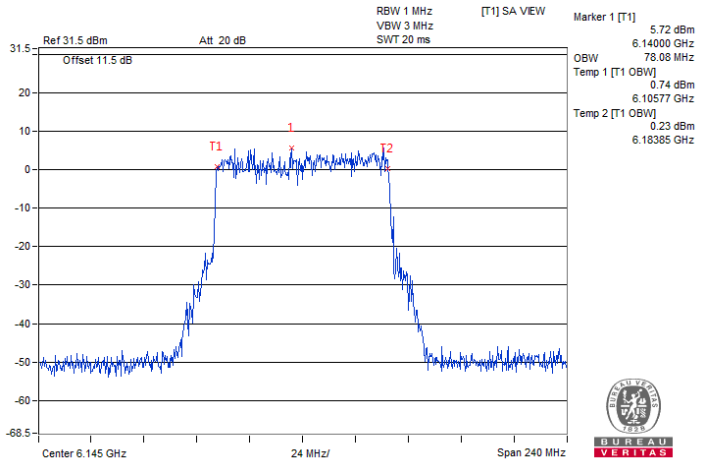
Spectrum Plot of Maximum Value



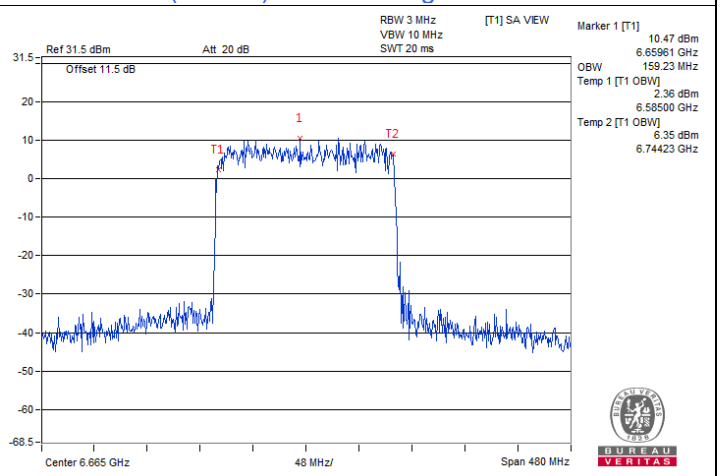
802.11be (EHT20) Beamforming / Chain 2 : CH 61



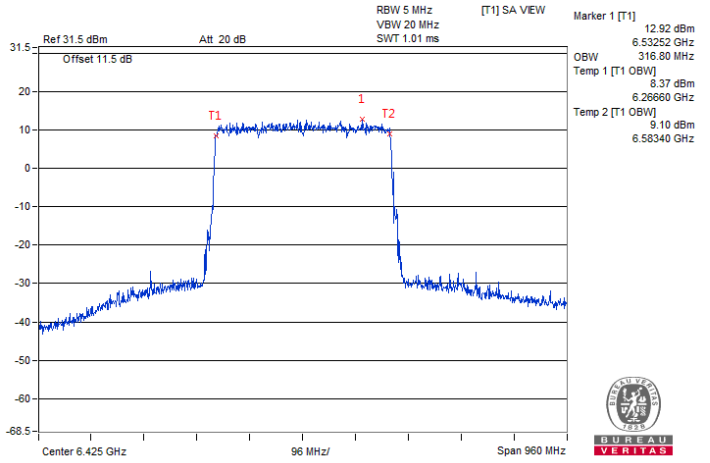
802.11be (EHT40) Beamforming / Chain 1 : CH 115



802.11be (EHT80) Beamforming / Chain 0 : CH 39



802.11be (EHT160) Beamforming / Chain 1 : CH 143



802.11be (EHT320) Beamforming / Chain 0 : CH 95

Beamforming (4T4S)

802.11be (EHT20) Beamforming

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)				Maximum Limit (MHz)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3		
33	6115	19.14	19.14	19.04	19.14	320	Pass
61	6255	19.08	19.08	19.08	19.08	320	Pass
93	6415	19.14	19.14	19.20	19.08	320	Pass
97	6435	19.08	19.08	19.08	19.20	320	Pass
105	6475	19.08	19.08	19.08	19.08	320	Pass
113	6515	19.08	19.08	19.08	19.04	320	Pass
117	6535	19.08	19.08	19.08	19.08	320	Pass
149	6695	19.08	19.08	19.08	19.08	320	Pass
181	6855	19.08	19.08	19.14	19.14	320	Pass
185	6875	19.14	19.08	19.08	19.08	320	Pass
209	6995	19.20	19.08	19.20	19.08	320	Pass
229	7095	19.08	19.08	19.08	19.20	320	Pass
233	7115	19.14	19.14	19.14	19.14	320	Pass

802.11be (EHT40) Beamforming

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)				Maximum Limit (MHz)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3		
35	6125	38.46	38.27	38.46	38.46	320	Pass
59	6245	38.46	38.46	38.46	38.46	320	Pass
91	6405	38.27	38.46	38.46	38.46	320	Pass
99	6445	38.27	38.27	38.27	38.27	320	Pass
107	6485	38.27	38.27	38.27	38.27	320	Pass
115	6525	38.40	38.46	38.27	38.27	320	Pass
123	6565	38.27	38.27	38.27	38.46	320	Pass
155	6725	38.40	38.46	38.27	38.46	320	Pass
179	6845	38.40	38.27	38.27	38.27	320	Pass
187	6885	38.40	38.27	38.27	38.27	320	Pass
211	7005	38.40	38.27	38.46	38.46	320	Pass
227	7085	38.40	38.46	38.46	38.27	320	Pass

802.11be (EHT80) Beamforming

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)				Maximum Limit (MHz)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3		
39	6145	77.70	77.70	77.70	78.08	320	Pass
55	6225	77.70	78.08	78.08	78.08	320	Pass
87	6385	78.08	77.70	77.70	77.70	320	Pass
103	6465	77.31	77.70	78.08	77.70	320	Pass
119	6545	77.70	77.70	77.69	78.08	320	Pass
135	6625	78.08	78.08	77.70	78.08	320	Pass
151	6705	77.70	77.70	77.70	77.70	320	Pass
167	6785	78.08	77.70	77.70	77.70	320	Pass
183	6865	77.69	77.31	78.08	77.31	320	Pass
199	6945	77.31	77.70	77.31	78.08	320	Pass
215	7025	78.08	78.08	77.70	77.69	320	Pass

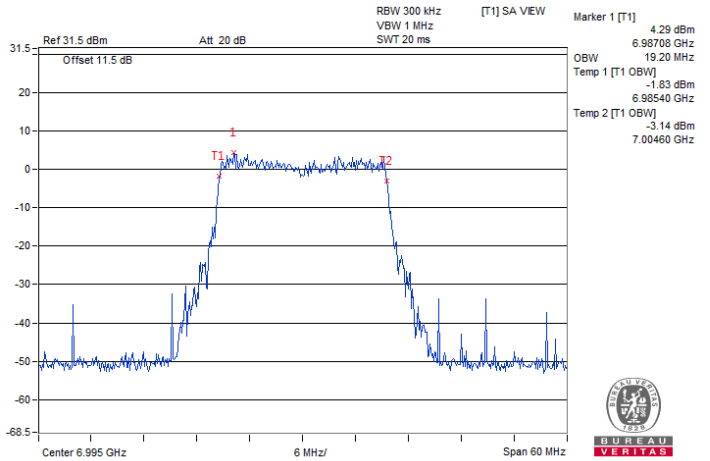
802.11be (EHT160) Beamforming

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)				Maximum Limit (MHz)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3		
47	6185	157.69	157.69	157.69	157.69	320	Pass
79	6345	158.46	157.69	158.46	157.69	320	Pass
111	6505	157.69	157.69	157.69	156.92	320	Pass
143	6665	157.69	157.69	157.69	157.69	320	Pass
175	6825	158.46	156.92	158.46	157.69	320	Pass
207	6985	156.92	157.69	157.69	157.69	320	Pass

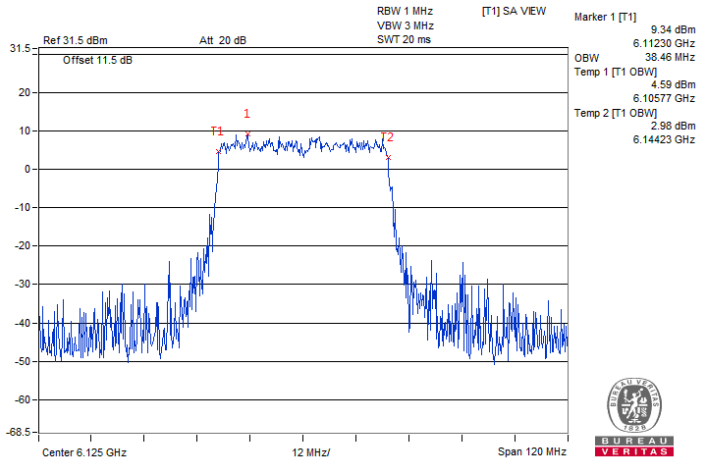
802.11be (EHT320) Beamforming

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)				Maximum Limit (MHz)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3		
63	6265	316.92	315.38	318.46	315.38	320	Pass
95	6425	318.46	316.92	316.92	316.92	320	Pass
127	6585	316.92	316.92	315.38	316.92	320	Pass
159	6745	316.92	315.38	316.92	316.92	320	Pass
191	6905	315.38	316.92	316.92	316.92	320	Pass

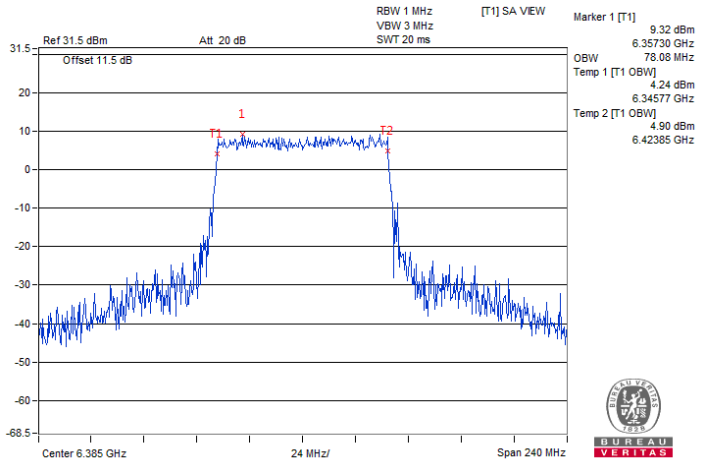
Spectrum Plot of Maximum Value



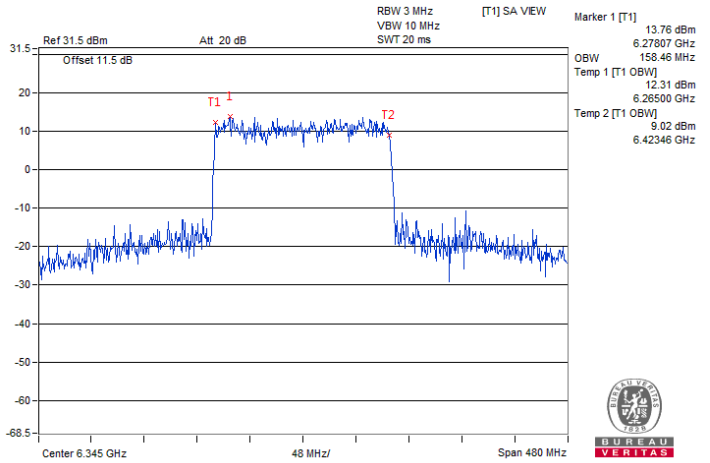
802.11be (EHT20) Beamforming / Chain 0 : CH 209



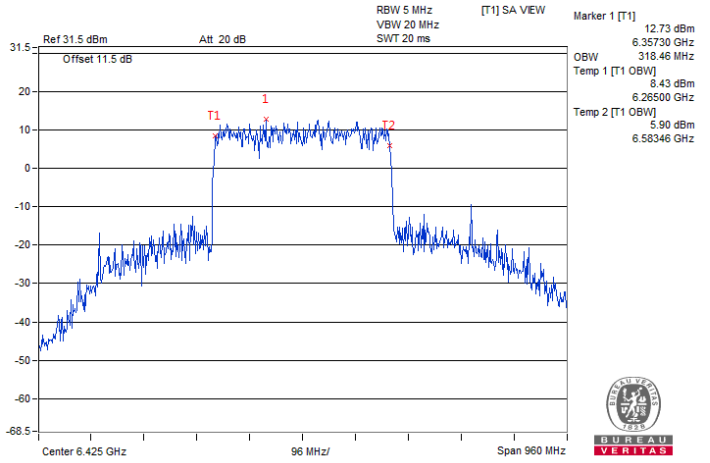
802.11be (EHT40) Beamforming / Chain 0 : CH 35



802.11be (EHT80) Beamforming / Chain 0 : CH 87



802.11be (EHT160) Beamforming / Chain 0 : CH 79



802.11be (EHT320) Beamforming / Chain 0 : CH 95

7.6 Frequency Stability

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Wayne Lin

802.11a

Frequency Stability Versus Temperature									
Operating Frequency: 6115 MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Test Result	Measured Frequency (MHz)	Test Result	Measured Frequency (MHz)	Test Result	Measured Frequency (MHz)	Test Result
40	120	6115.0091	Pass	6115.0077	Pass	6115.0101	Pass	6115.009	Pass
30	120	6114.9929	Pass	6114.9942	Pass	6114.9921	Pass	6114.9921	Pass
20	120	6114.9879	Pass	6114.9821	Pass	6114.9847	Pass	6114.9862	Pass
10	120	6115.0309	Pass	6115.033	Pass	6115.0313	Pass	6115.0318	Pass
0	120	6114.9835	Pass	6114.9893	Pass	6114.9858	Pass	6114.9879	Pass

Frequency Stability Versus Voltage									
Operating Frequency: 6115 MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Test Result	Measured Frequency (MHz)	Test Result	Measured Frequency (MHz)	Test Result	Measured Frequency (MHz)	Test Result
20	138	6114.9908	Pass	6114.9934	Pass	6114.9902	Pass	6114.9909	Pass
	120	6114.9879	Pass	6114.9821	Pass	6114.9847	Pass	6114.9862	Pass
	102	6114.9764	Pass	6114.9768	Pass	6114.9785	Pass	6114.9749	Pass

7.7 Contention-based Protocol

Environmental Conditions:	25°C, 60% RH	Tested By:	Stan Shih

For Companion Device

Companion Device Information			
Product	**Brand**	**Model No.**	**Software/Firmware Version**
Quad-band WiFi 7 Orbi 9 Router	NETGEAR	RBE971*	RBRS7-B9.5.0.7009-single
Quad-band WiFi 7 Orbi 9 Satellite	NETGEAR	RBE970	RBSS7-B9.5.0.7009-single

*This product have two different colors of housing (black & white) for marketing purpose

Mode A

For U-NII-5

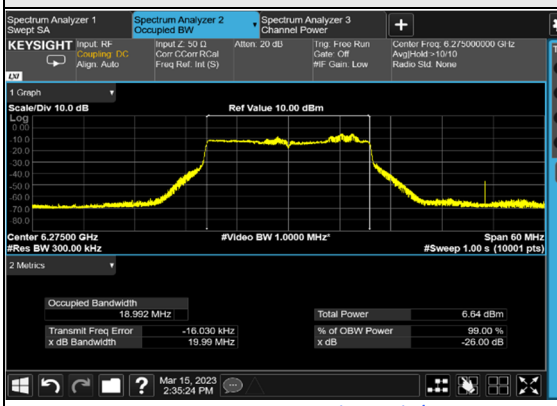
Contention Based Protocol Measurement										
Operation Mode	Channel Bandwidth (MHz)	Channel Number	Channel Freq. (MHz)	Injected Signal (AWGN)		Antenna Gain (dBi)	Path Loss (dB) (Note 3)	Adjusted Power (dBm)	Detection Limit	EUT TX Status
				Freq. (MHz)	Power (dBm)					
802.11be	20	65	6275	6275	-60.4	2.17	0	-62.57	-62	OFF
					-71.4	2.17	0	-73.57	-62	Minimal
					-79.83	2.17	0	-82	-62	ON
	320	63	6265	6110	-60.4	2.17	0	-62.57	-62	OFF
					-67.4	2.17	0	-69.57	-62	Minimal
					-79.83	2.17	0	-82	-62	ON
				6265	-60.4	2.17	0	-62.57	-62	OFF
					-67.4	2.17	0	-69.57	-62	Minimal
					-79.83	2.17	0	-82	-62	ON
				6420	-60.4	2.17	0	-62.57	-62	OFF
					-67.4	2.17	0	-69.57	-62	Minimal
					-79.83	2.17	0	-82	-62	ON

Notes:

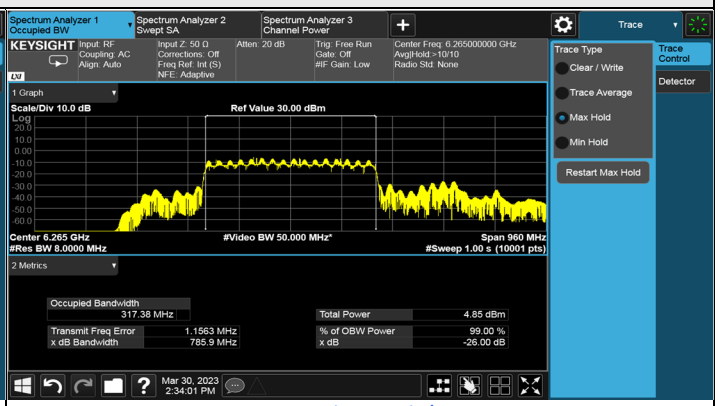
1. After investigation (consider antenna gain and path loss), the one representative port (Chain 0) was measured and presented in the report.
2. Adjusted Power (dBm) = Injected Signal (AWGN) Power (dBm) - Antenna Gain (dBi) + Path Loss (dB)
3. Antenna gain values include all the applicable path losses.

Contention Based Protocol Detection Probability															
Operation Mode	Channel Bandwidth (MHz)	AWGN Signal Freq. (MHz)	#01	#02	#03	#04	#05	#06	#07	#08	#09	#10	Detection Probability	Detection Limit	Test Result
802.11be	20	6275	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
	320	6110	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		6265	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		6420	v	x	v	v	v	v	v	v	v	v	90%	90%	Pass

Plots of EUT Tx waveform

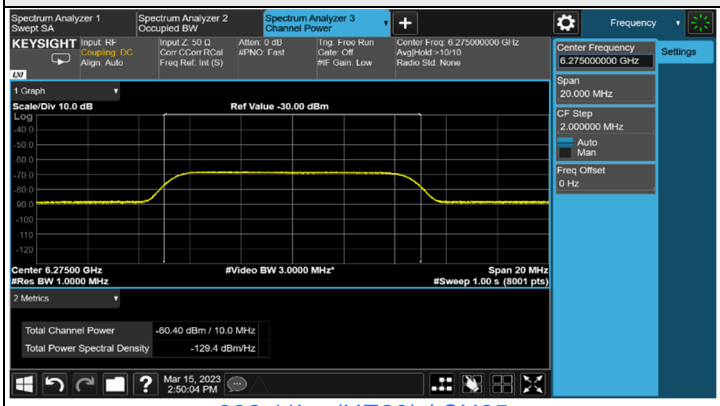


802.11be (HE20) / CH65

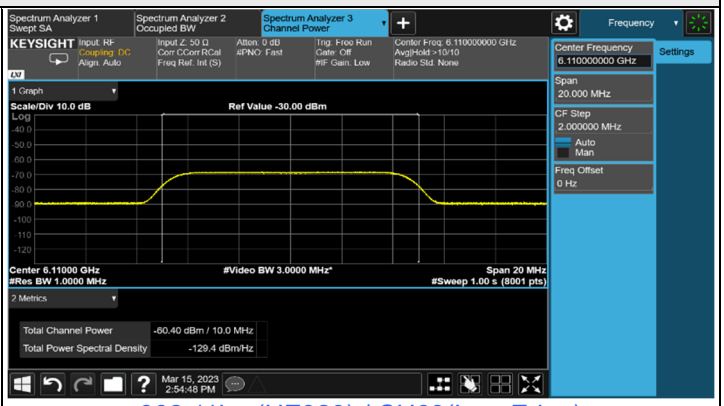


802.11be (HE320) / CH63

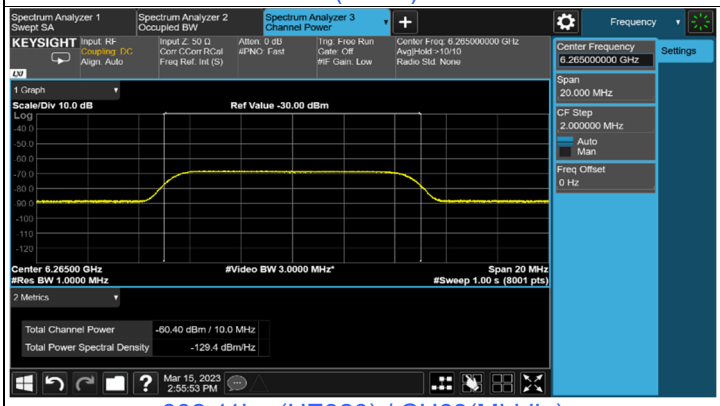
Plots of Injected signal (AWGN) level



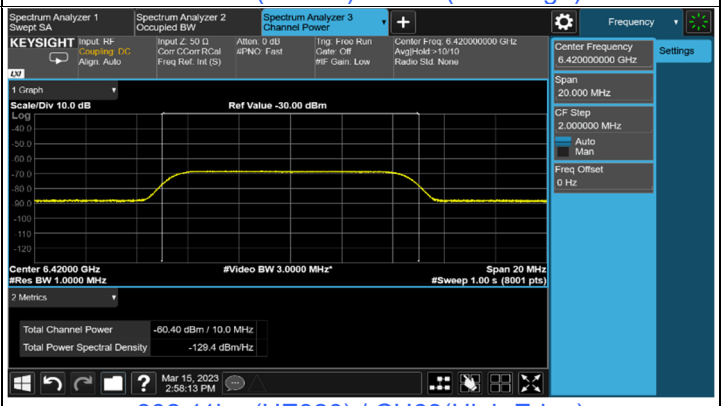
802.11be (HE20) / CH65



802.11be (HE320) / CH63(Low Edge)



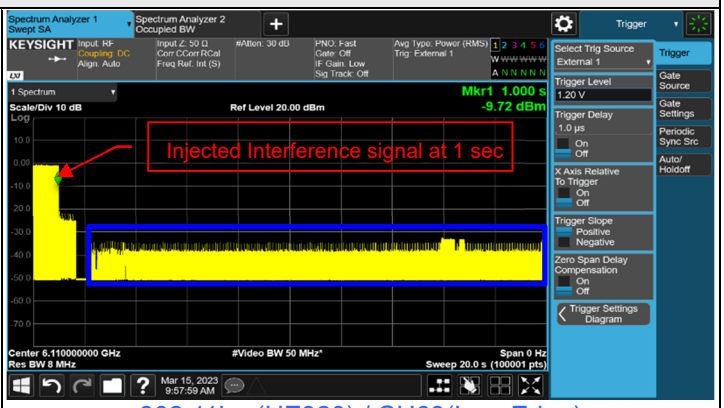
802.11be (HE320) / CH63(Middle)



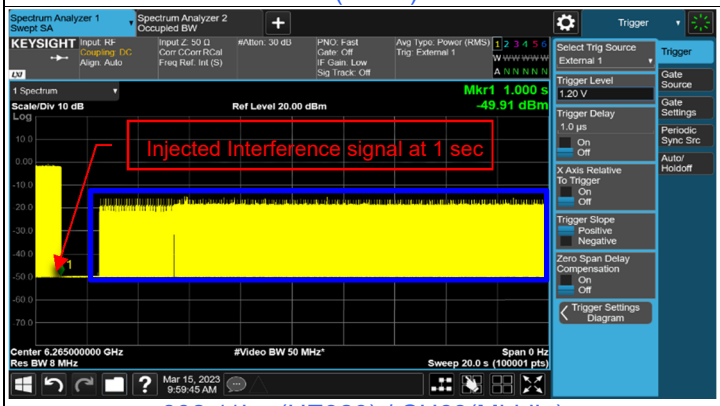
802.11be (HE320) / CH63(High Edge)

Plots of EUT ceased transmission in the time domain

802.11be (HE20) / CH65



802.11be (HE320) / CH63(Low Edge)



802.11be (HE320) / CH63(Middle)

802.11be (HE320) / CH63(High Edge)

*That shall be EUT's channel hopping behavior and signal coupling issue, we've verified it several times internally and found that the data transmission will be hopped to adjacent channels after the interference signal is detected and confirmed that the data transmission marked in blue comes from adjacent channels(signal coupling).

For U-NII-6

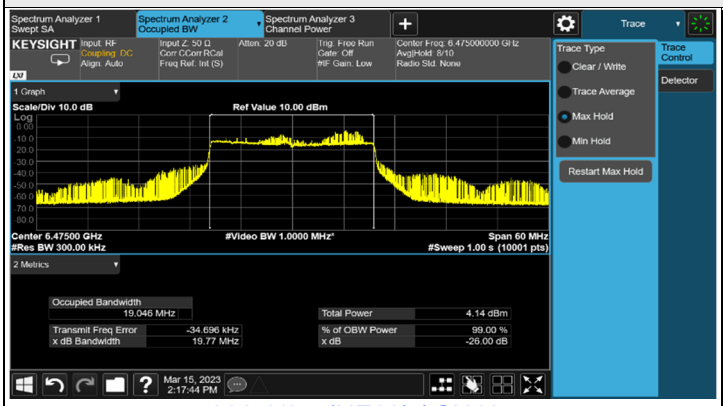
Contention Based Protocol Measurement										
Operation Mode	Channel Bandwidth (MHz)	Channel Number	Channel Freq. (MHz)	Injected Signal (AWGN)		Antenna Gain (dBi)	Path Loss (dB) (Note 3)	Adjusted Power (dBm)	Detection Limit	EUT TX Status
				Freq. (MHz)	Power (dBm)					
802.11be	20	105	6475	6475	-59.41	2.59	0	-62	-62	OFF
					-70.41	2.59	0	-73	-62	Minimal
					-79.41	2.59	0	-82	-62	ON
	320	95	6425	6270	-59.41	2.59	0	-62	-62	OFF
					-66.41	2.59	0	-69	-62	Minimal
					-79.41	2.59	0	-82	-62	ON
				6425	-59.41	2.59	0	-62	-62	OFF
					-66.41	2.59	0	-69	-62	Minimal
					-79.41	2.59	0	-82	-62	ON
				6580	-59.41	2.59	0	-62	-62	OFF
					-66.41	2.59	0	-69	-62	Minimal
					-79.41	2.59	0	-82	-62	ON

Notes:

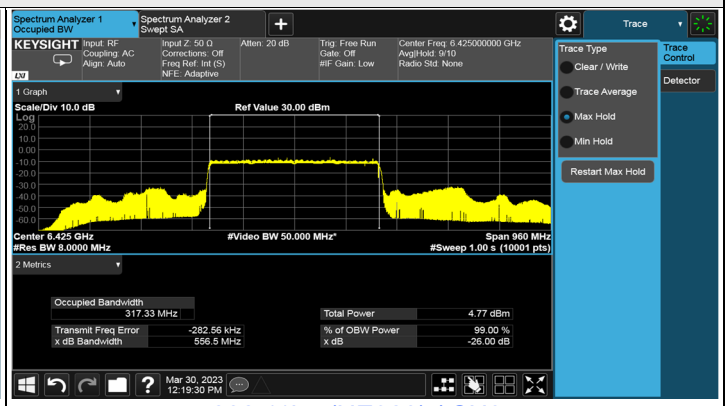
1. After investigation (consider antenna gain and path loss), the one representative port (Chain 0) was measured and presented in the report.
2. Adjusted Power (dBm) = Injected Signal (AWGN) Power (dBm) - Antenna Gain (dBi) + Path Loss (dB)
3. Antenna gain values include all the applicable path losses.

Contention Based Protocol Detection Probability															
Operation Mode	Channel Bandwidth (MHz)	AWGN Signal Freq. (MHz)	#01	#02	#03	#04	#05	#06	#07	#08	#09	#10	Detection Probability	Detection Limit	Test Result
802.11be	20	6475	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
	320	6270	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		6425	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		6580	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass

Plots of EUT Tx waveform

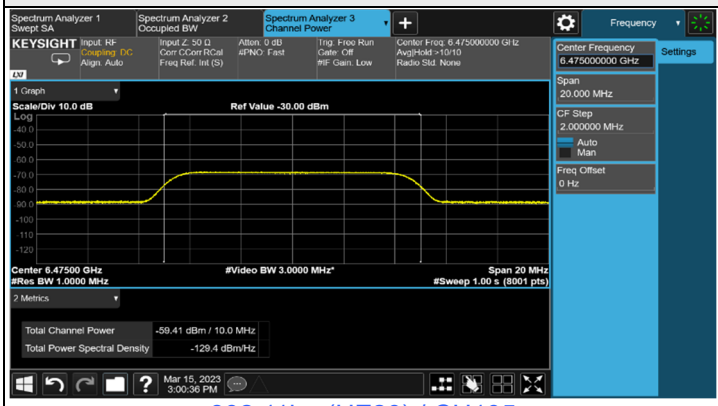


802.11be (HE20) / CH105

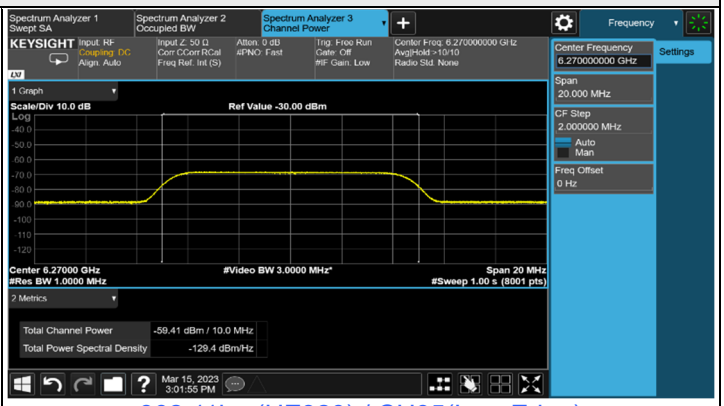


802.11be (HE320) / CH95

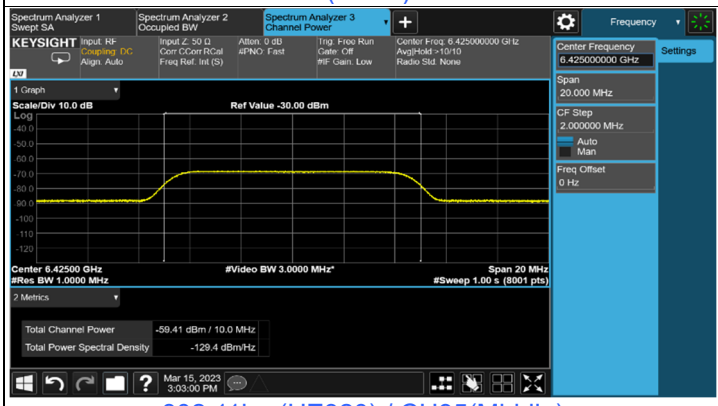
Plots of Injected signal (AWGN) level



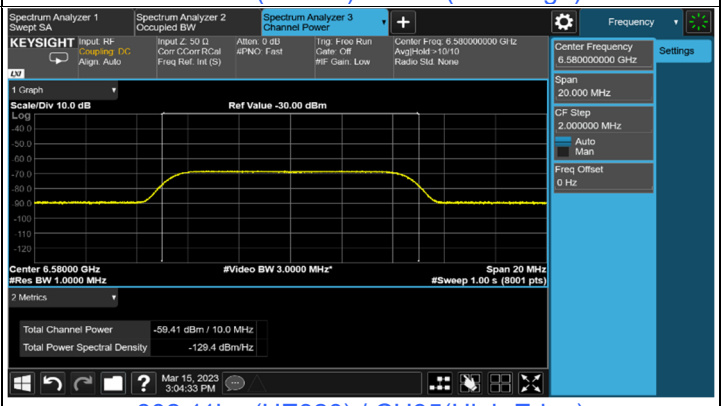
802.11be (HE20) / CH105



802.11be (HE320) / CH95(Low Edge)



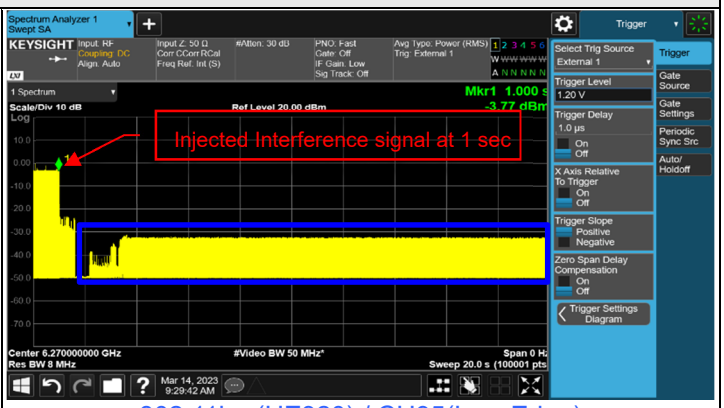
802.11be (HE320) / CH95(Middle)



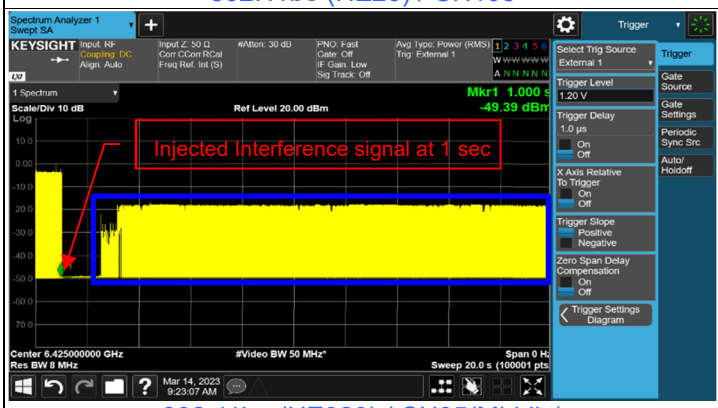
802.11be (HE320) / CH95(High Edge)

Plots of EUT ceased transmission in the time domain

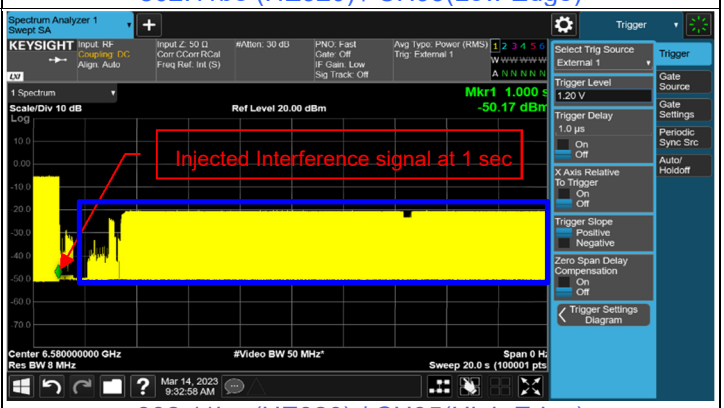
802.11be (HE20) / CH105



802.11be (HE320) / CH95(Low Edge)



802.11be (HE320) / CH95(Middle)



802.11be (HE320) / CH95(High Edge)

*That shall be EUT's channel hopping behavior and signal coupling issue, we've verified it several times internally and found that the data transmission will be hopped to adjacent channels after the interference signal is detected and confirmed that the data transmission marked in blue comes from adjacent channels(signal coupling).