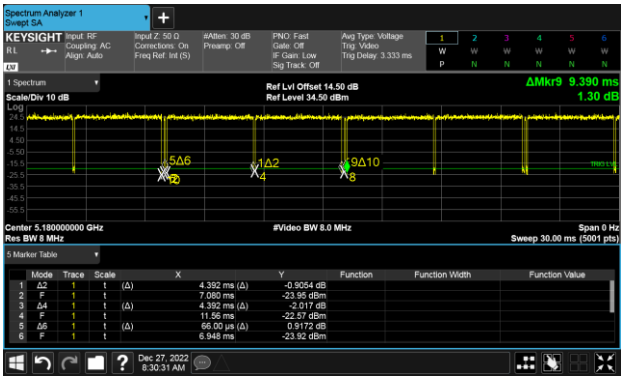
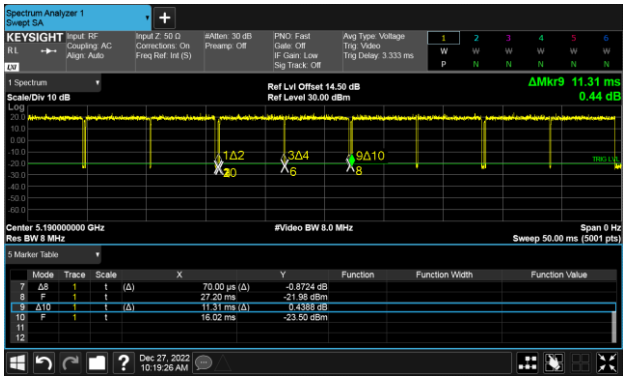
Beamforming

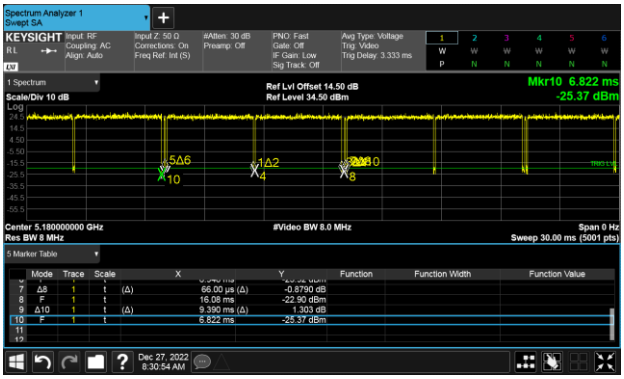
Modulation Type: 802.11ax HE20 (7.3Mbps)



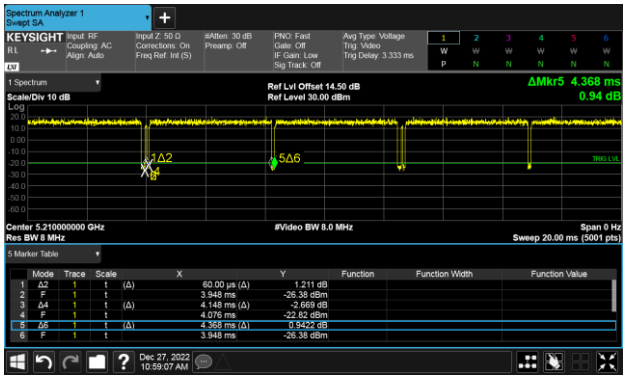
Modulation Type: 802.11ax HE40 (14.6Mbps)



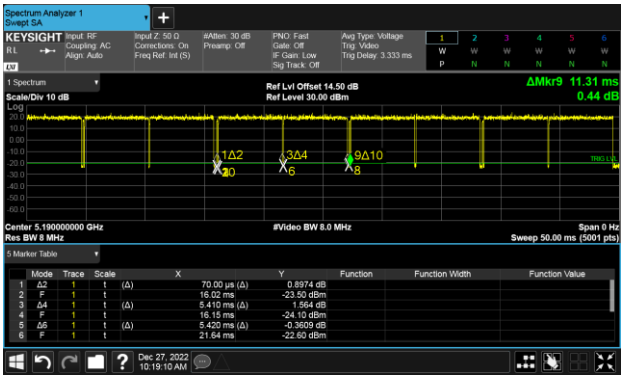
Modulation Type: 802.11ax HE20 (7.3Mbps)



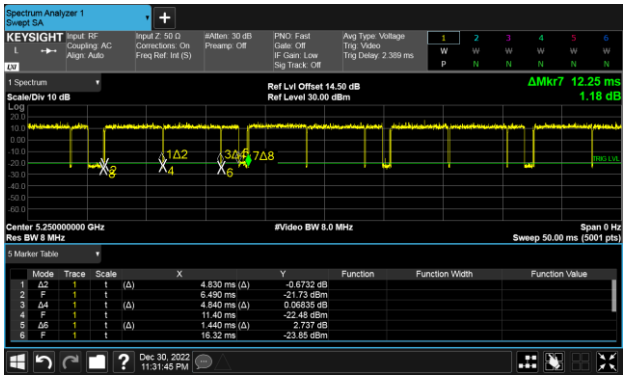
Modulation Type: 802.11ax HE80 (30.6Mbps)



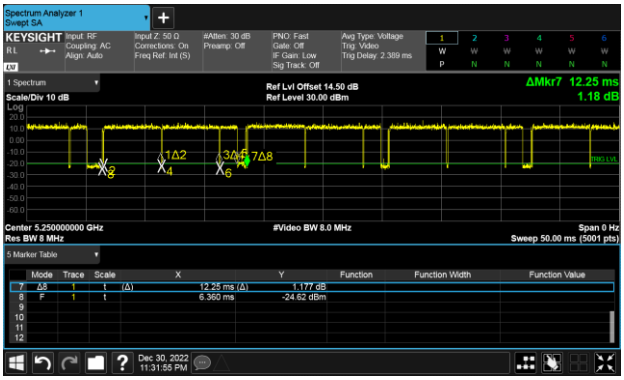
Modulation Type: 802.11ax HE40 (14.6Mbps)



Modulation Type: 802.11ax HE160 (61.3Mbps)



Modulation Type: 802.11ax HE160 (61.3Mbps)



8. 6dB Bandwidth & 99% Occupied Bandwidth

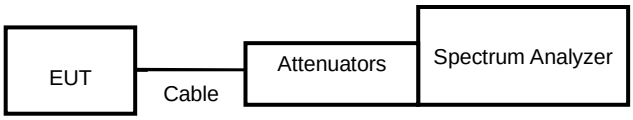
8.1. Test Limit

FCC §15.407
The minimum 6 dB bandwidth shall be at least 500 kHz.

8.2. Test Procedure

Reference to 789033 D02 General UNII Test Procedures New Rules v01: The transmitter output is connected to a spectrum analyzer with the RBW set to100KHz, the VBW >= 3 x RBW, peak detector and max hold.

8.3. Test Setup Layout



8.4. Test Result and Data

Non-Beamforming

In the 5.8G Band							
Modulation Type	Channel	Frequency (MHz)	6dB Bandwidth(MHz)				Minimum Limit (MHz)
			ANT A	ANT B	ANT C	ANT D	
11a	149	5745	16.37	16.36	16.35	16.37	0.50
11a	157	5785	16.37	16.35	16.38	16.37	0.50
11a	165	5825	16.39	16.35	16.36	16.37	0.50
11ax HE20	149	5745	18.95	18.96	19.00	18.96	0.50
11ax HE20	157	5785	18.98	18.93	18.99	18.98	0.50
11ax HE20	165	5825	19.01	18.95	19.00	18.99	0.50
11ax HE40	151	5755	37.85	37.61	37.86	37.66	0.50
11ax HE40	159	5795	37.66	37.75	37.74	37.67	0.50
11ax HE80	155	5775	77.30	77.28	77.32	77.29	0.50

Modulation Type	Channel	Frequency (MHz)	99% Bandwidth(MHz)			
			ANT A	ANT B	ANT C	ANT D
11a	149	5745	17.11	17.05	16.94	16.90
11a	157	5785	17.13	17.05	16.94	16.93
11a	165	5825	17.14	17.07	16.97	16.91
11ax HE20	149	5745	19.17	19.13	19.17	19.10
11ax HE20	157	5785	19.15	19.10	19.10	19.12
11ax HE20	165	5825	19.19	19.12	19.19	19.08
11ax HE40	151	5755	38.02	37.92	37.95	37.95
11ax HE40	159	5795	38.06	37.90	37.91	38.06
11ax HE80	155	5775	77.28	77.23	77.17	77.29

Non-Beamforming

UNII Emission Bandwidth Result (Extends across 5725MHz band)						
Modulation Type	Data Rate / MCS	Frequency (MHz)	6dB Bandwidth(MHz)			
			ANT A	ANT B	ANT C	ANT D
11a	6 Mbps	5720	3.24	3.24	3.24	3.22
11ax HE20	NSS1-MCS0	5720	4.58	4.54	4.59	4.55
11ax HE40	NSS1-MCS0	5710	4.12	4.09	4.05	3.92
11ax HE80	NSS1-MCS0	5690	4.01	3.96	3.85	3.85

UNII Emission Bandwidth Result (Extends across 5725MHz band)						
Modulation Type	Data Rate / MCS	Frequency (MHz)	99% Bandwidth(MHz)			
			ANT A	ANT B	ANT C	ANT D
11a	6 Mbps	5720	4.75	4.85	4.84	4.70
11ax HE20	NSS1-MCS0	5720	5.07	5.06	5.06	5.06
11ax HE40	NSS1-MCS0	5710	5.02	4.90	4.98	4.93
11ax HE80	NSS1-MCS0	5690	5.91	6.35	5.83	5.55

Beamforming

In the 5.8G Band							
Modulation Type	Channel	Frequency (MHz)	6dB Bandwidth(MHz)				Minimum Limit (MHz)
			ANT A	ANT B	ANT C	ANT D	
11ax HE20	149	5745	19.02	16.45	17.85	16.32	0.50
11ax HE20	157	5785	19.03	17.73	17.54	17.60	0.50
11ax HE20	165	5825	19.05	16.52	16.56	17.19	0.50
11ax HE40	151	5755	38.01	35.73	35.69	35.75	0.50
11ax HE40	159	5795	37.37	35.53	35.13	37.13	0.50
11ax HE80	155	5775	69.45	75.81	75.83	75.14	0.50

Modulation Type	Channel	Frequency (MHz)	99% Bandwidth(MHz)			
			ANT A	ANT B	ANT C	ANT D
11ax HE20	149	5745	19.19	19.13	19.10	19.11
11ax HE20	157	5785	19.24	19.16	19.11	19.13
11ax HE20	165	5825	19.18	19.08	19.12	19.11
11ax HE40	151	5755	38.01	37.85	37.79	37.80
11ax HE40	159	5795	38.13	37.84	37.89	38.22
11ax HE80	155	5775	77.09	76.81	76.89	77.52

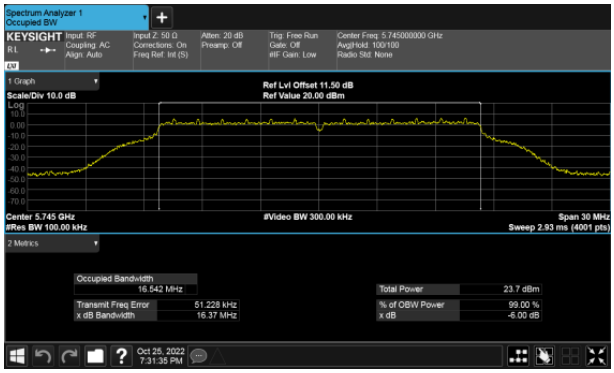
Beamforming

UNII Emission Bandwidth Result (Extends across 5725MHz band)						
Modulation Type	Data Rate / MCS	Frequency (MHz)	6dB Bandwidth(MHz)			
			ANT A	ANT B	ANT C	ANT D
11ax HE20	NSS1-MCS0	5720	4.55	3.19	4.24	3.59
11ax HE40	NSS1-MCS0	5710	4.07	3.64	3.14	3.20
11ax HE80	NSS1-MCS0	5690	4.08	3.50	3.13	3.53

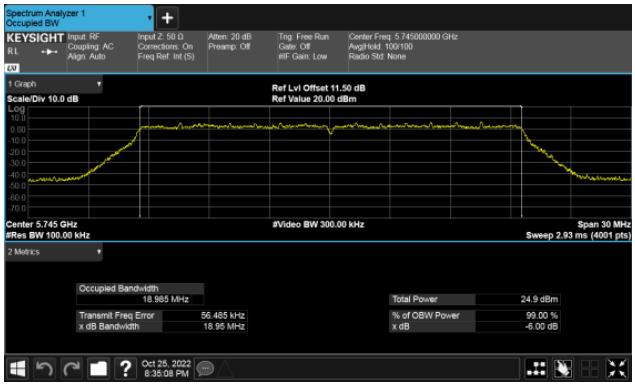
UNII Emission Bandwidth Result (Extends across 5725MHz band)						
Modulation Type	Data Rate / MCS	Frequency (MHz)	99% Bandwidth(MHz)			
			ANT A	ANT B	ANT C	ANT D
11ax HE20	NSS1-MCS0	5720	5.01	5.04	5.03	5.05
11ax HE40	NSS1-MCS0	5710	5.77	7.35	5.14	5.09
11ax HE80	NSS1-MCS0	5690	43.30	48.83	48.68	37.85

6dB Bandwidth
Non-Beamforming, ANT A

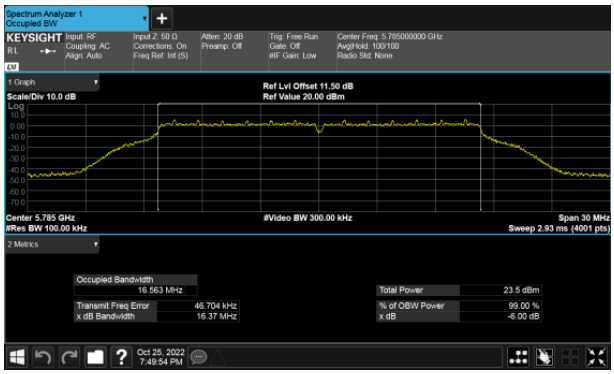
Modulation Type: 802.11a (6Mbps)
CH149



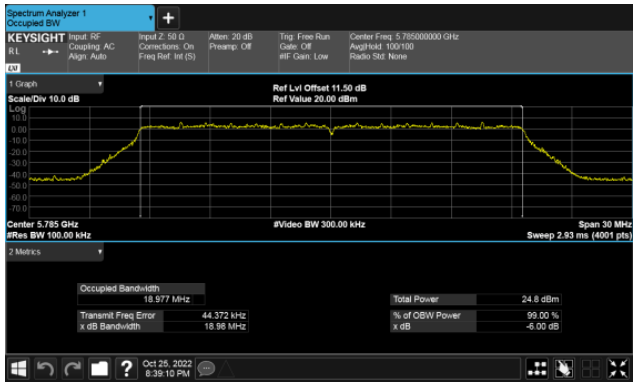
Modulation Type: 802.11ax HE20(7.3Mbps)
CH149



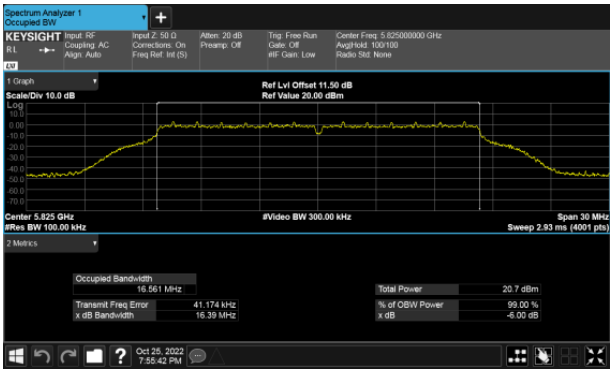
CH157



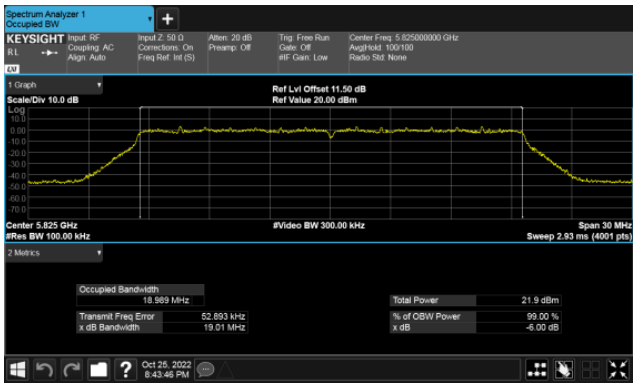
CH157



CH165

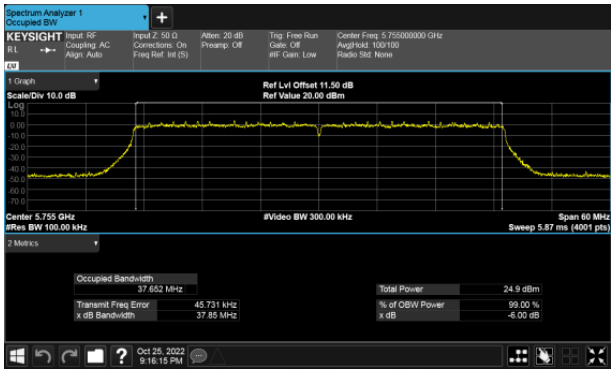


CH165

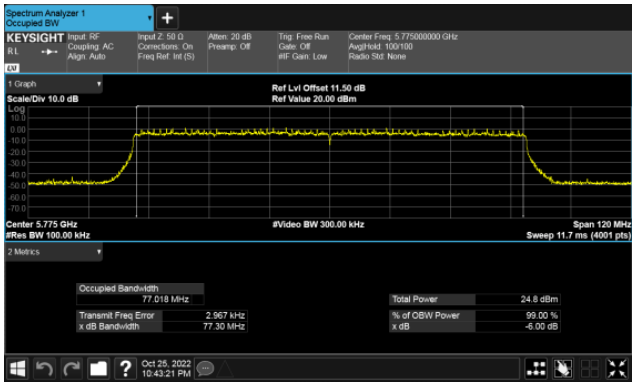


6dB Bandwidth
Non-Beamforming, ANT A

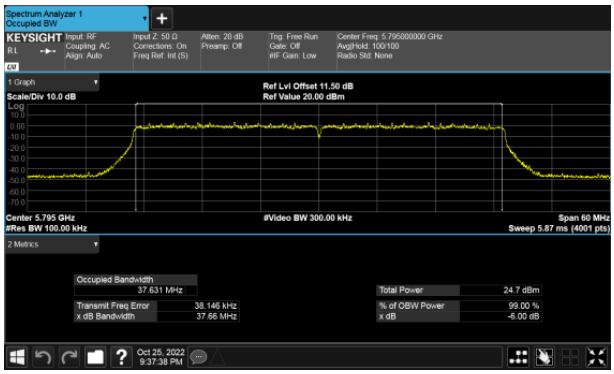
Modulation Type: 802.11ax HE40(14.6Mbps)
CH151



Modulation Type: 802.11ax HE80(30.6Mbps)
CH155

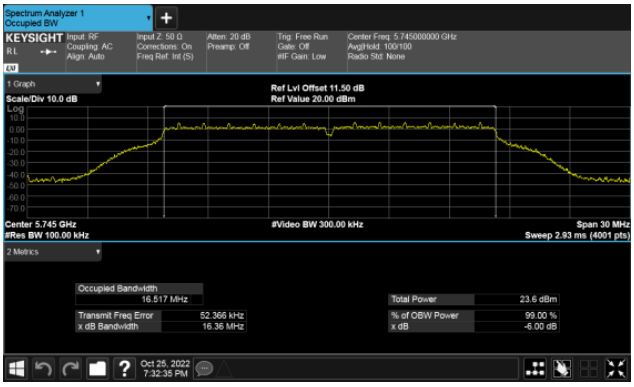


CH159

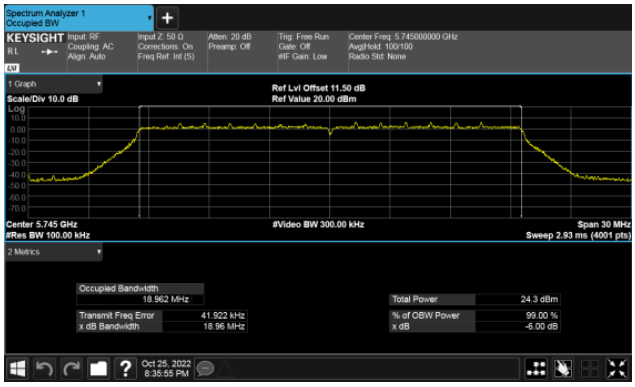


6dB Bandwidth
Non-Beamforming, ANT B

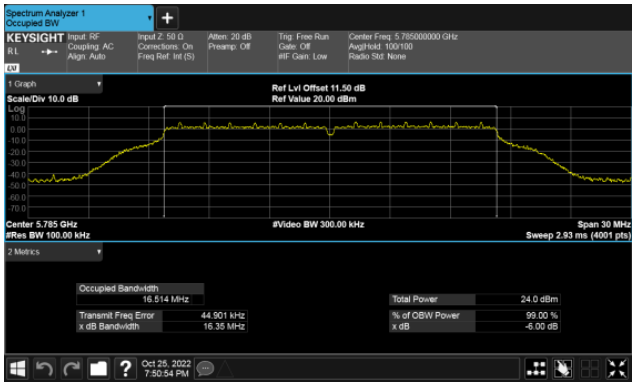
Modulation Type: 802.11a (6Mbps)
CH149



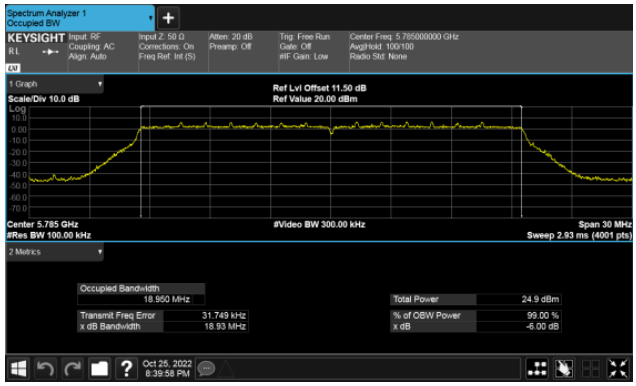
Modulation Type: 802.11ax HE20(7.3Mbps)
CH149



CH157



CH157



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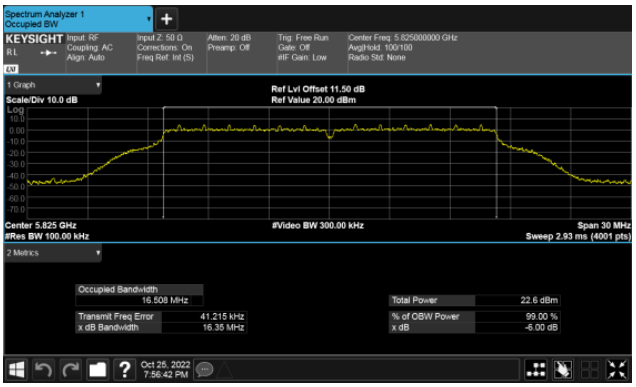
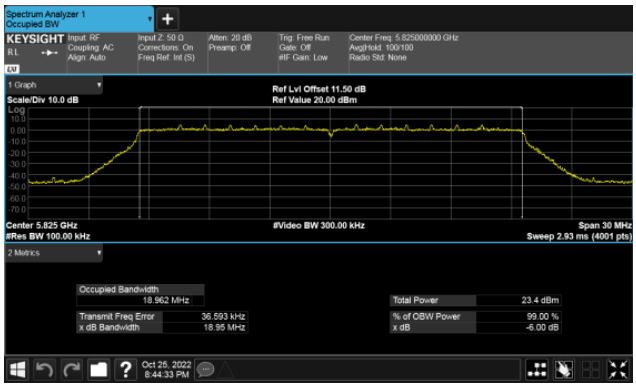
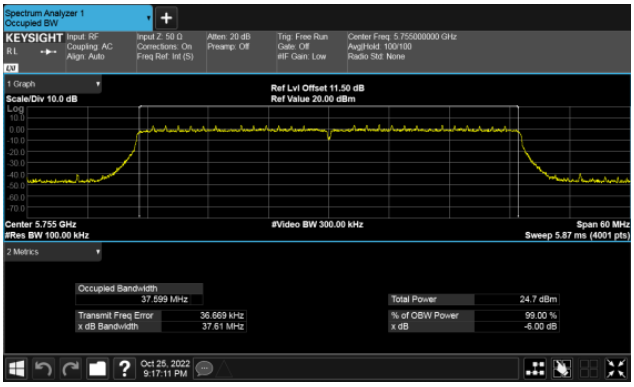


CH165

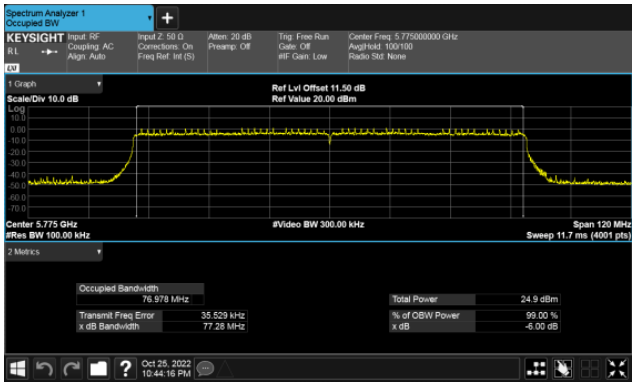


6dB Bandwidth
Non-Beamforming, ANT B

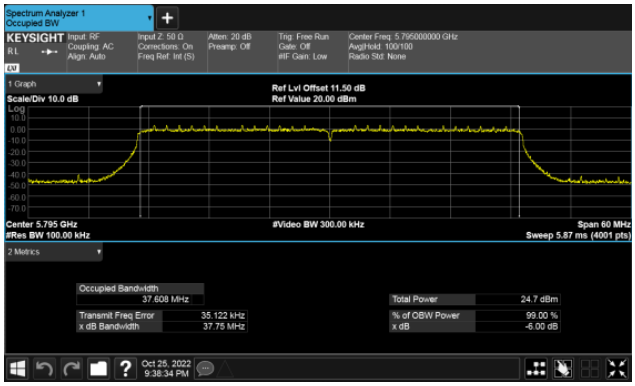
Modulation Type: 802.11ax HE40(14.6Mbps)
CH151



Modulation Type: 802.11ax HE80(30.6Mbps)
CH155

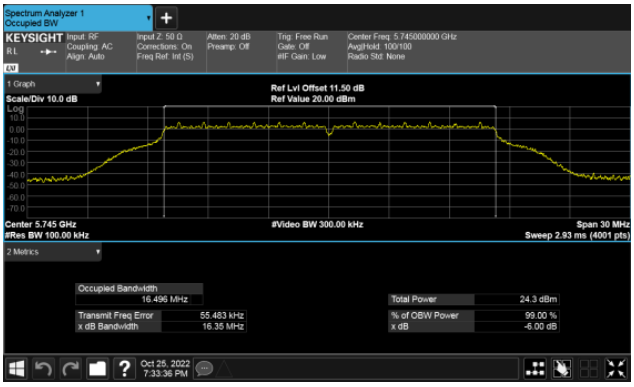


CH159

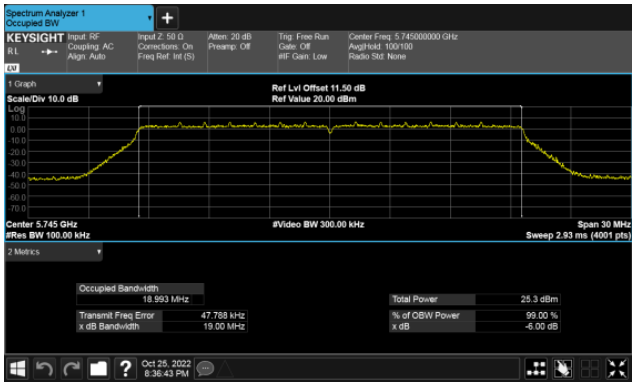


6dB Bandwidth
Non-Beamforming, ANT C

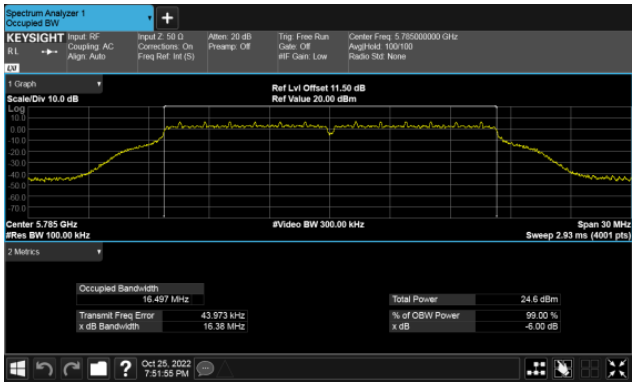
Modulation Type: 802.11a (6Mbps)
CH149



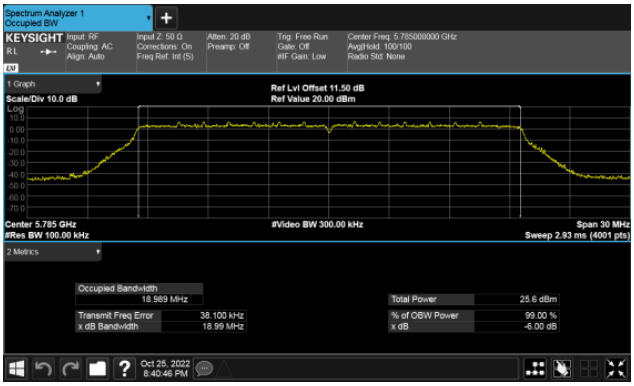
Modulation Type: 802.11ax HE20(7.3Mbps)
CH149



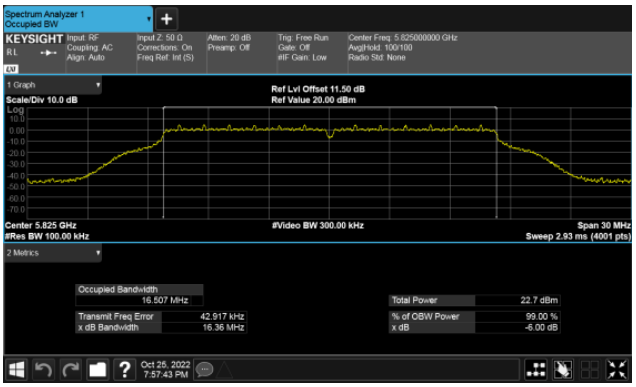
CH157



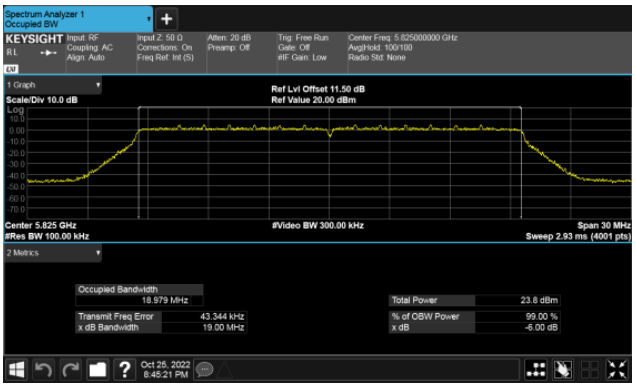
CH157



CH165

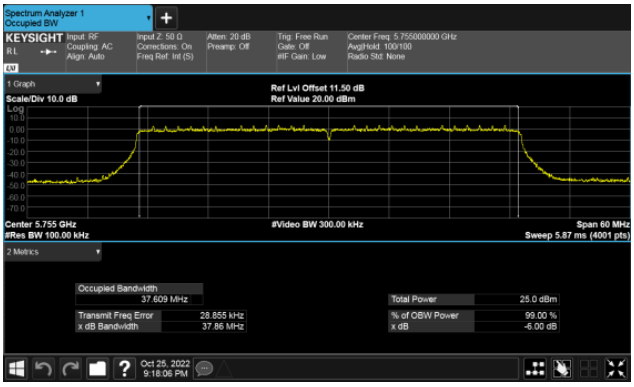


CH165

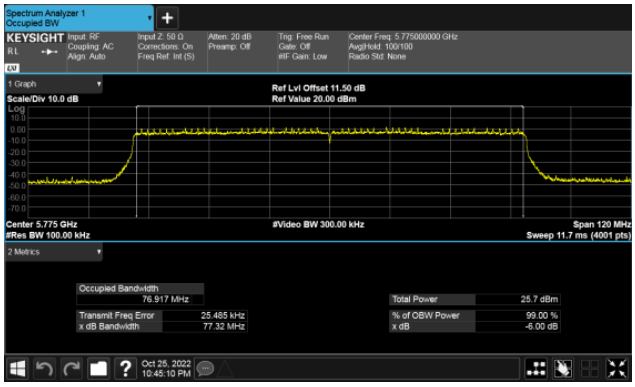


6dB Bandwidth
Non-Beamforming, ANT C

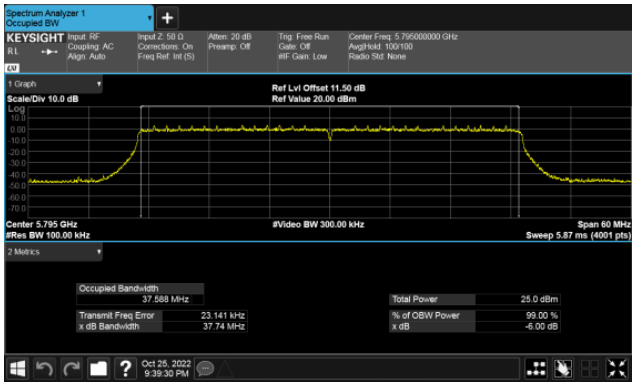
Modulation Type: 802.11ax HE40(14.6Mbps)
CH151



Modulation Type: 802.11ax HE80(30.6Mbps)
CH155

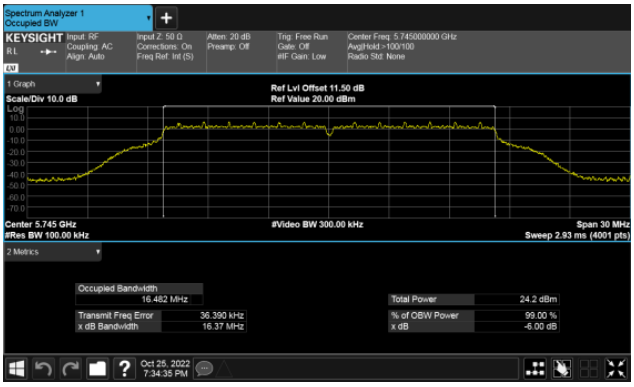


CH159

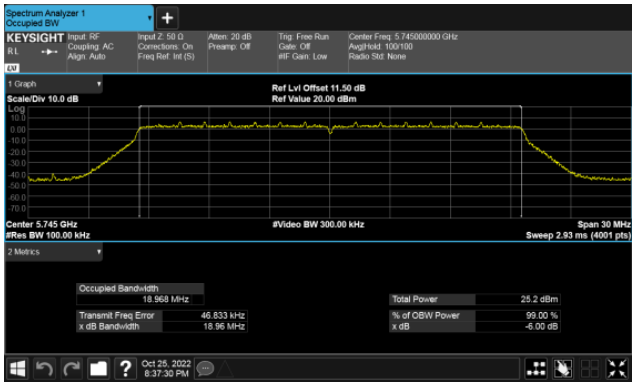


6dB Bandwidth
Non-Beamforming, ANT D

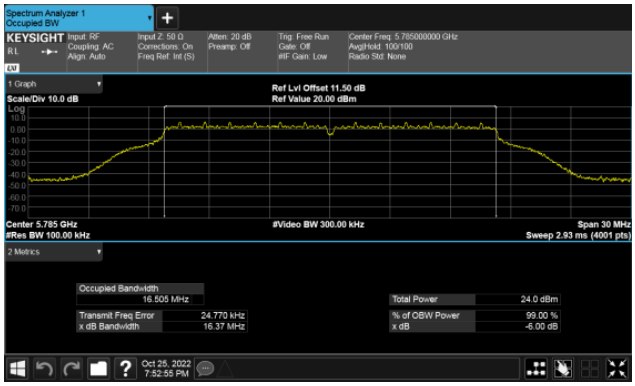
Modulation Type: 802.11a (6Mbps)
CH149



Modulation Type: 802.11ax HE20(7.3Mbps)
CH149



CH157



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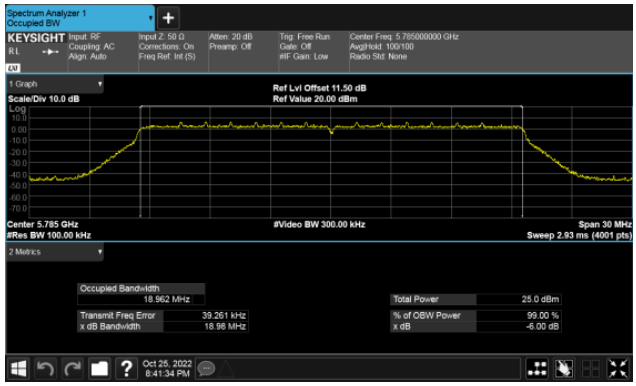

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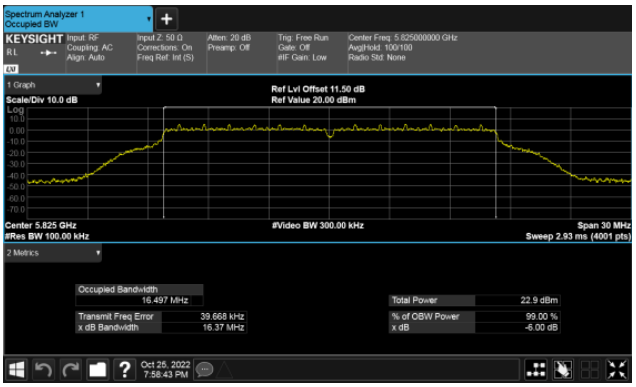
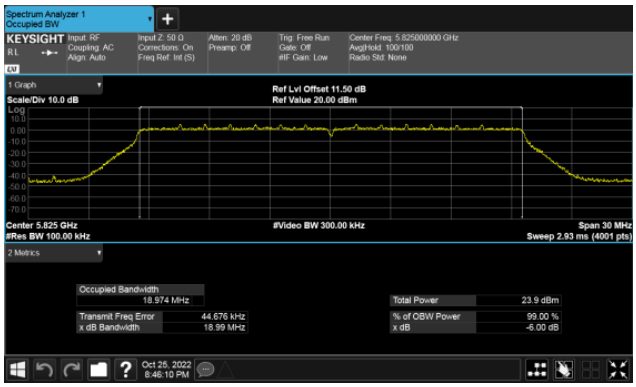
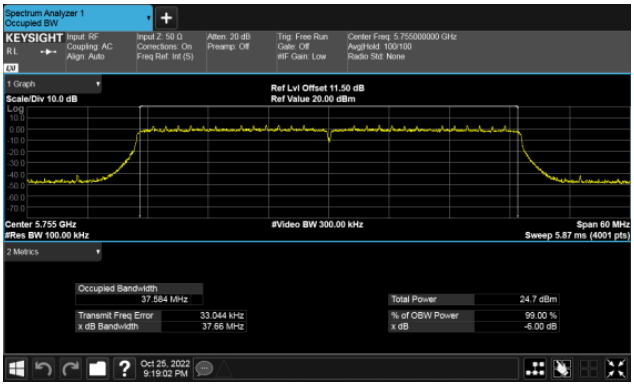


CH165

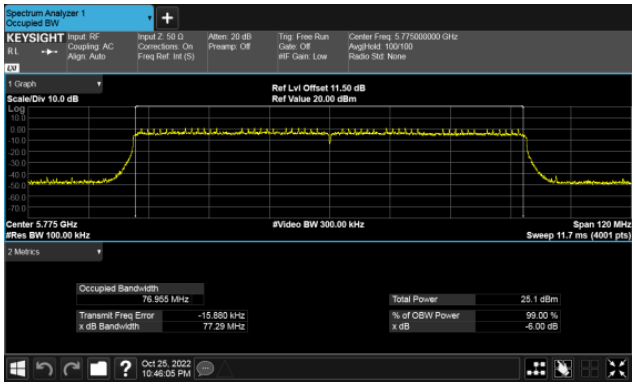


6dB Bandwidth
Non-Beamforming, ANT D

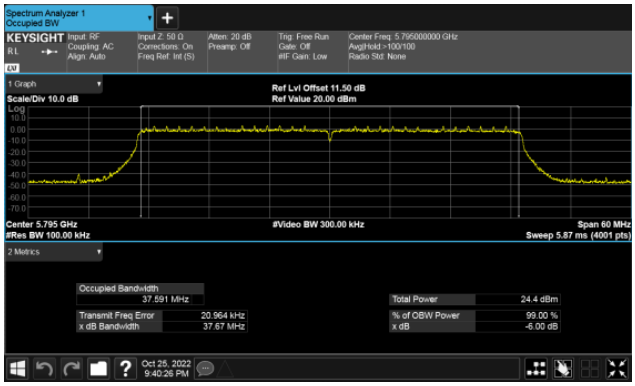
Modulation Type: 802.11ax HE40(14.6Mbps)
CH151



Modulation Type: 802.11ax HE80(30.6Mbps)
CH155

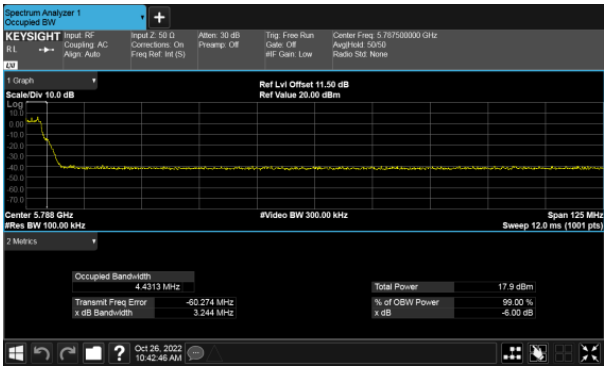


CH159

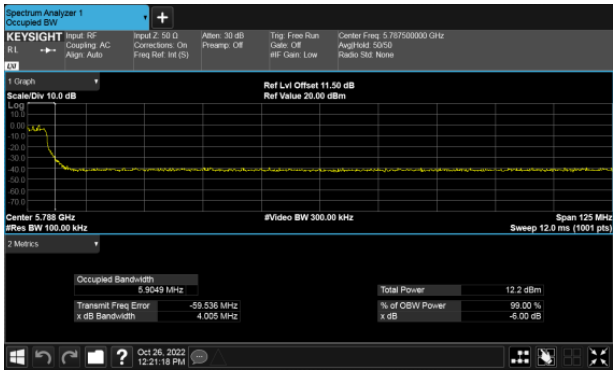


6dB Bandwidth
Non-Beamforming, ANT A
Extends across 5725MHz Band, Straddle Channel

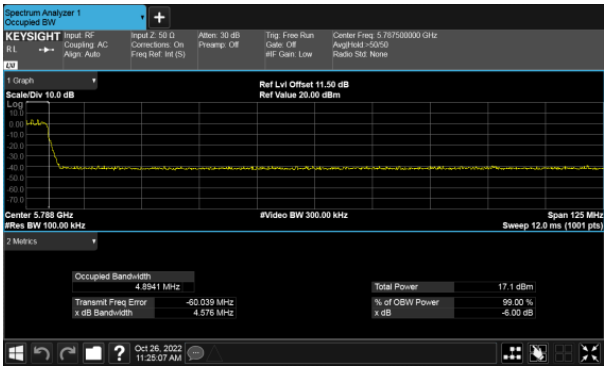
Modulation Type: 802.11a (6Mbps)
CH144



Modulation Type: 802.11ax HE80(30.6Mbps)
CH138



Modulation Type: 802.11ax HE20(7.3Mbps)
CH144

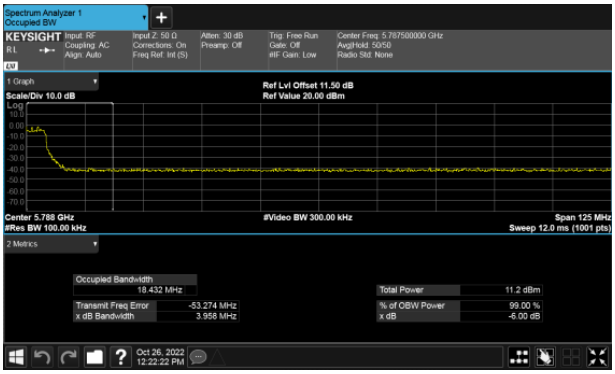


Modulation Type: 802.11ax HE40(14.6Mbps)
CH142

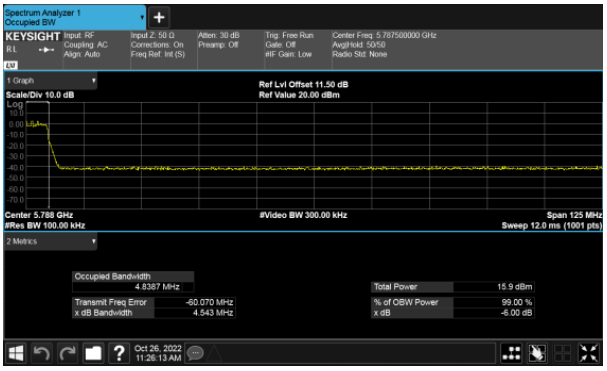
6dB Bandwidth
Non-Beamforming, ANT B
Extends across 5725MHz Band, Straddle Channel

Modulation Type: 802.11a (6Mbps)
CH144

Modulation Type: 802.11ax HE80(30.6Mbps)
CH138



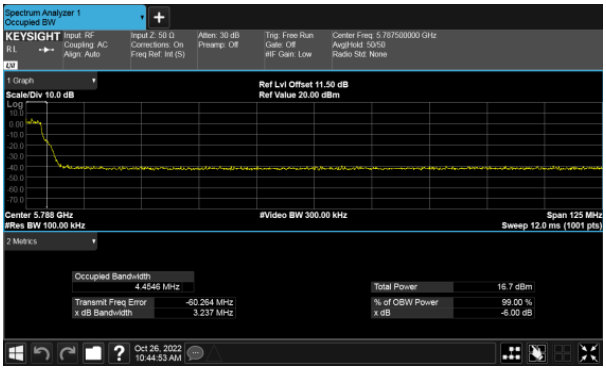
Modulation Type: 802.11ax HE20(7.3Mbps)
CH144



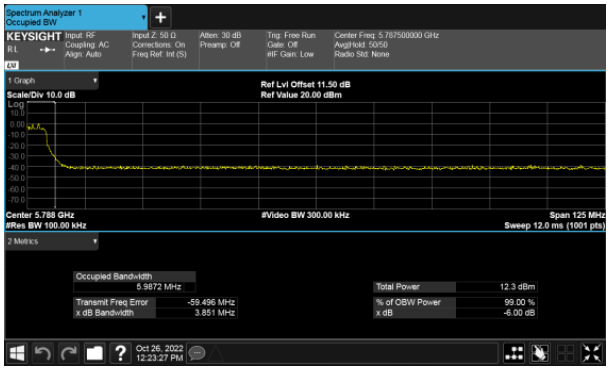
Modulation Type: 802.11ax HE40(14.6Mbps)
CH142

6dB Bandwidth
Non-Beamforming, ANT C
Extends across 5725MHz Band, Straddle Channel

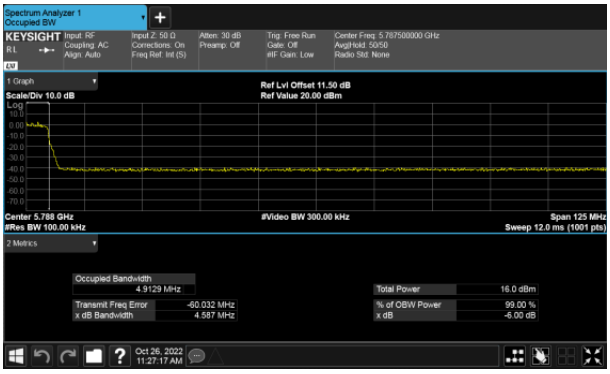
Modulation Type: 802.11a (6Mbps)
CH144



Modulation Type: 802.11ax HE80(30.6Mbps)
CH138



Modulation Type: 802.11ax HE20(7.3Mbps)
CH144

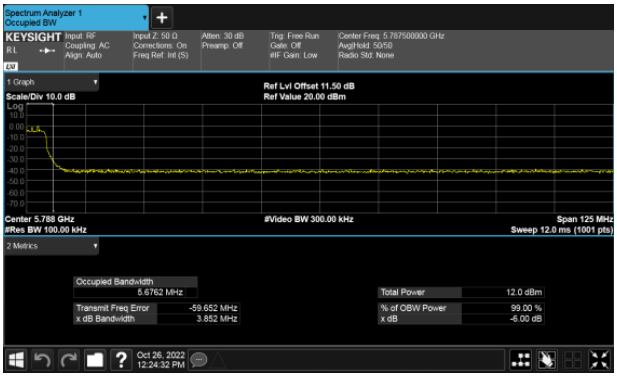


Modulation Type: 802.11ax HE40(14.6Mbps)
CH142

6dB Bandwidth
Non-Beamforming, ANT D
Extends across 5725MHz Band, Straddle Channel

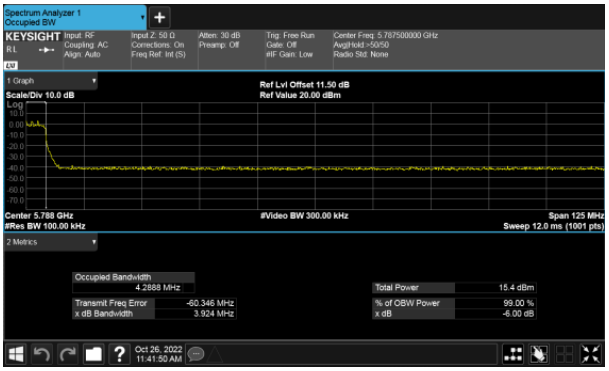
Modulation Type: 802.11a (6Mbps)
CH144

Modulation Type: 802.11ax HE80(30.6Mbps)
CH138



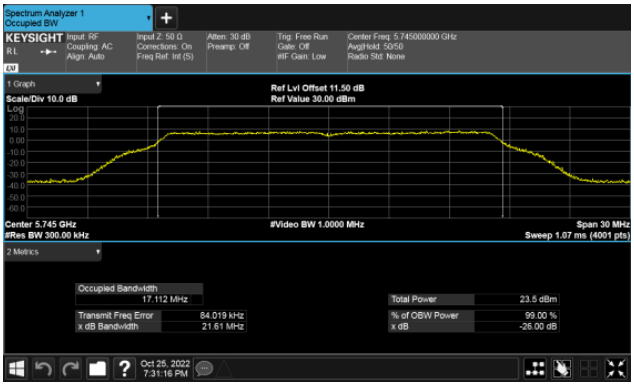
Modulation Type: 802.11ax HE20(7.3Mbps)
CH144

Modulation Type: 802.11ax HE40(14.6Mbps)
CH142

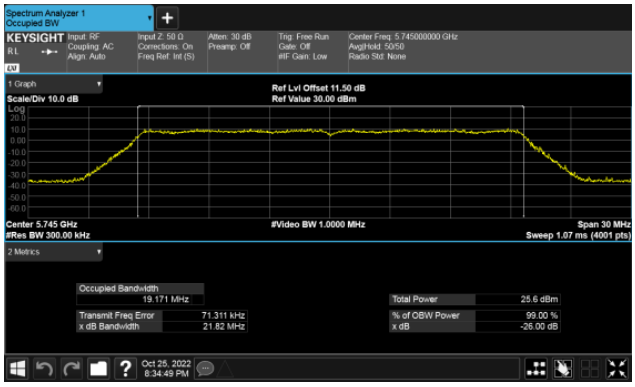


99% Occupied Bandwidth
Non-Beamforming, ANT A

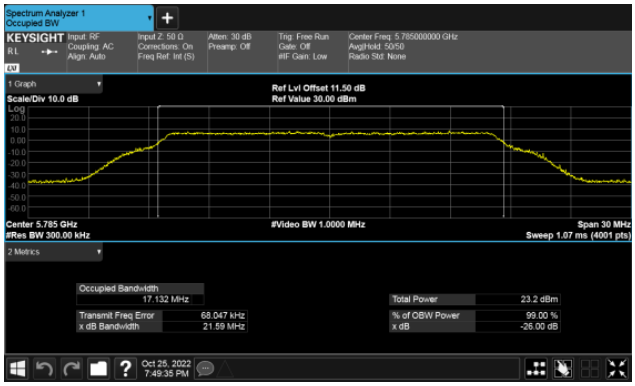
Modulation Type: 802.11a (6Mbps)
CH149



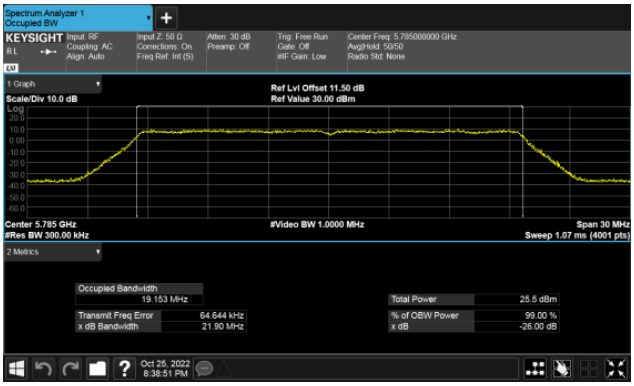
Modulation Type: 802.11ax HE20(7.3Mbps)
CH149



CH157

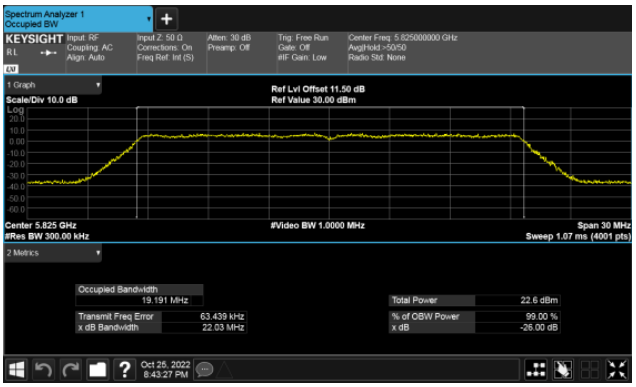


CH157



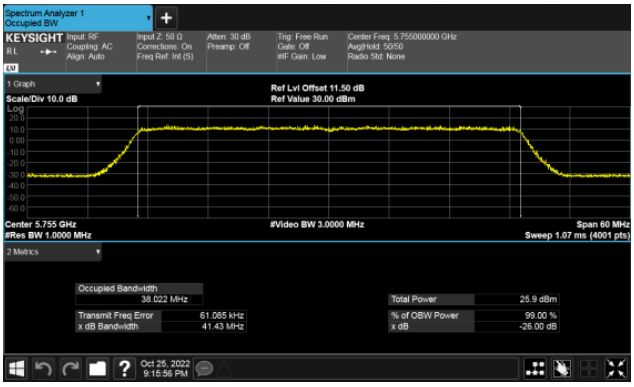
CH165

CH165

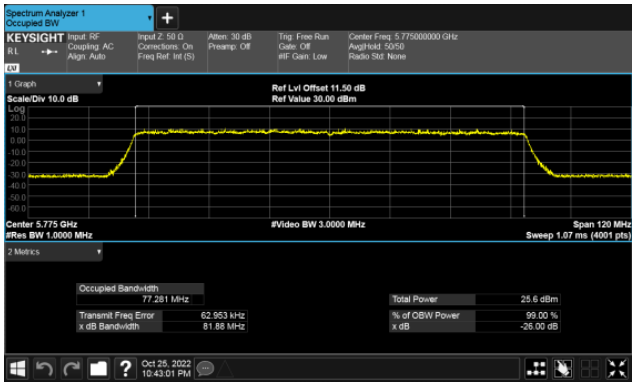


99% Occupied Bandwidth
Non-Beamforming, ANT A

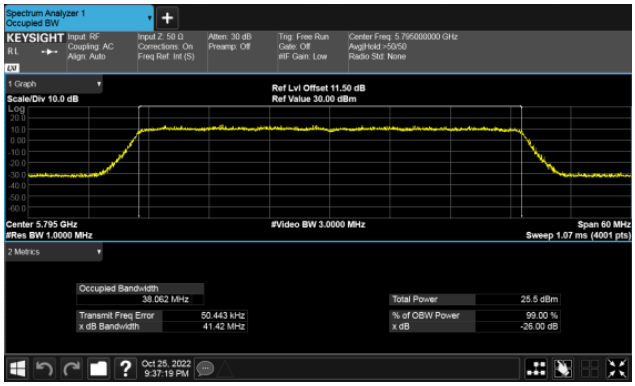
Modulation Type: 802.11ax HE40(14.6Mbps)
CH151



Modulation Type: 802.11ax HE80(30.6Mbps)
CH155

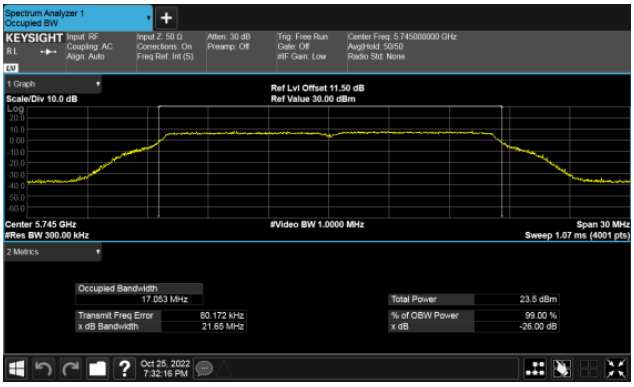


CH159

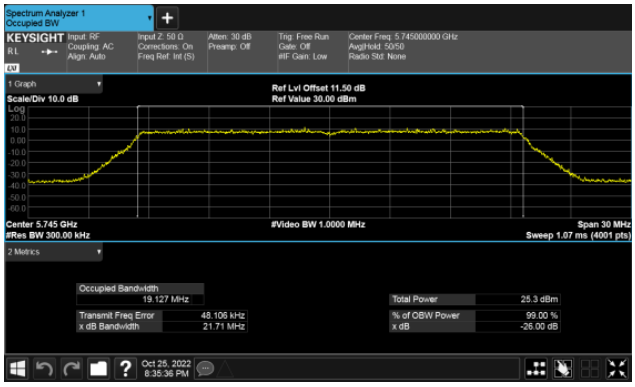


99% Occupied Bandwidth
Non-Beamforming, ANT B

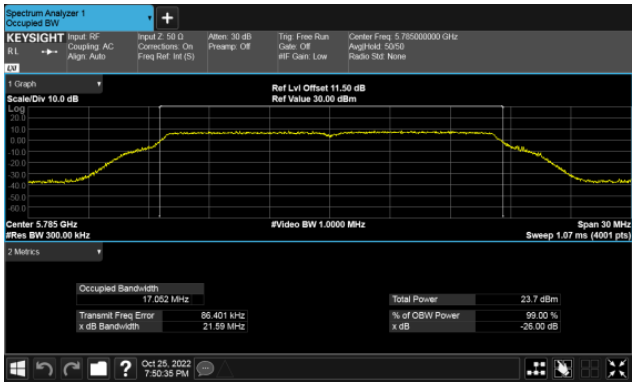
Modulation Type: 802.11a (6Mbps)
CH149



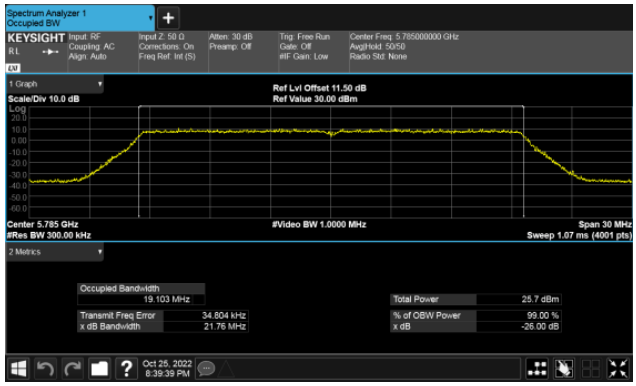
Modulation Type: 802.11ax HE20(7.3Mbps)
CH149



CH157

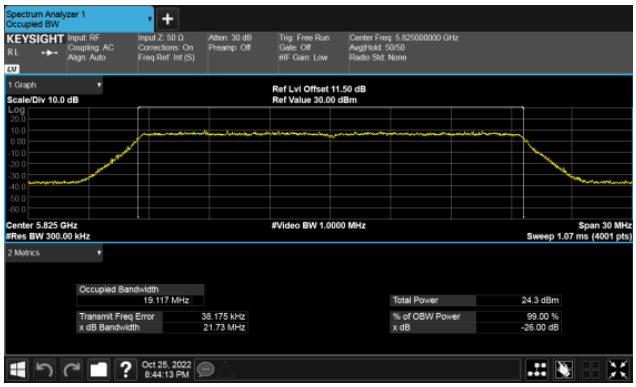


CH157



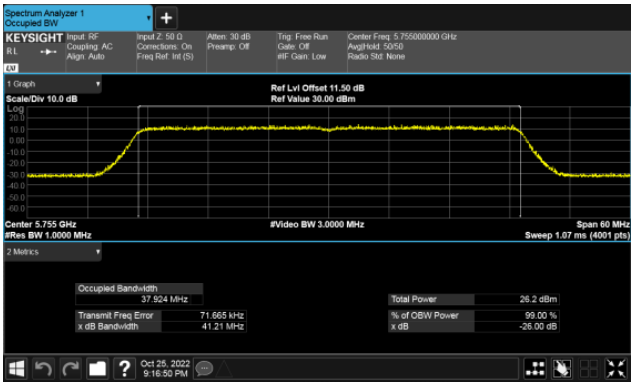
CH165

CH165

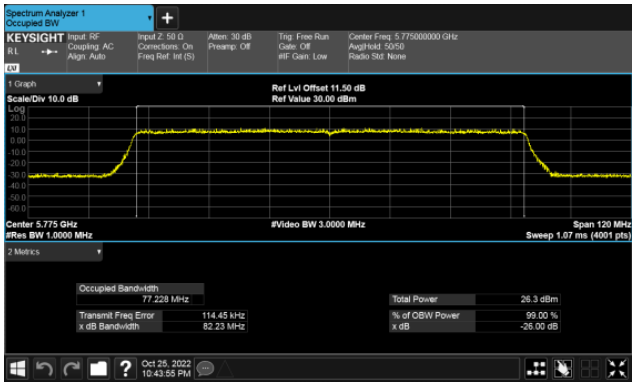


99% Occupied Bandwidth
Non-Beamforming, ANT B

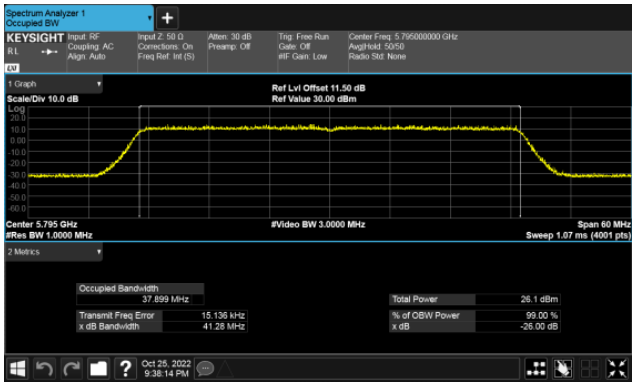
Modulation Type: 802.11ax HE40(14.6Mbps)
CH151



Modulation Type: 802.11ax HE80(30.6Mbps)
CH155

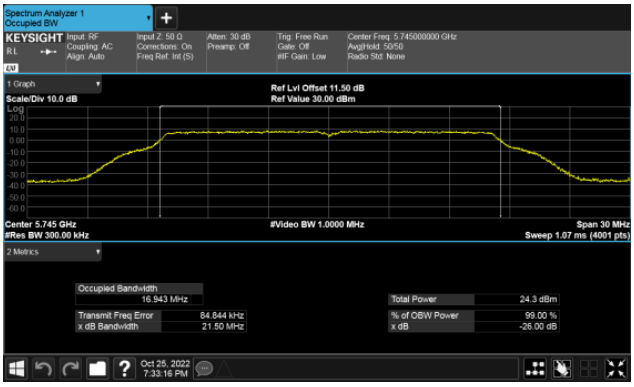


CH159

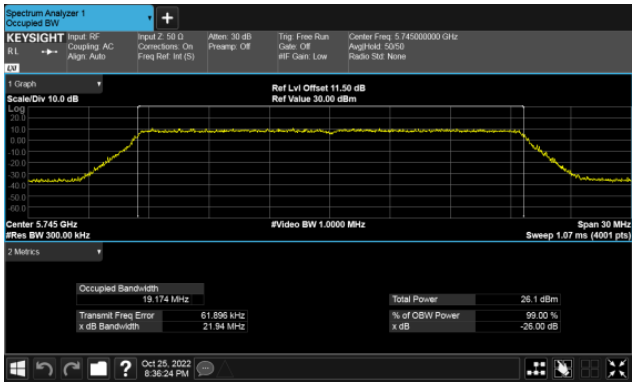


99% Occupied Bandwidth
Non-Beamforming, ANT C

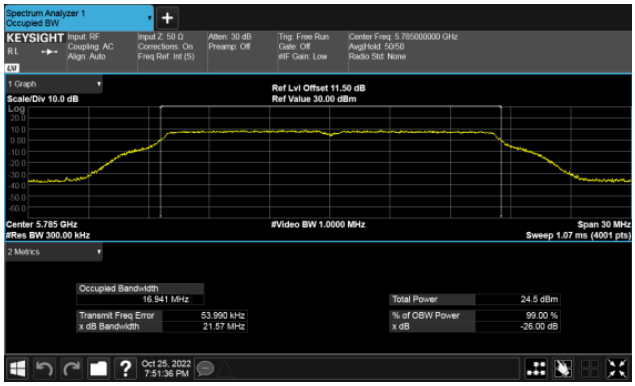
Modulation Type: 802.11a (6Mbps)
CH149



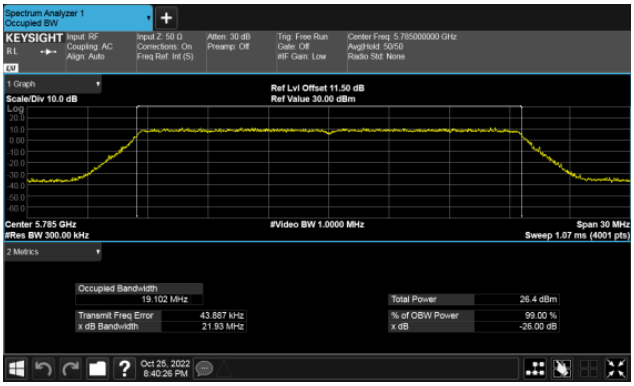
Modulation Type: 802.11ax HE20(7.3Mbps)
CH149



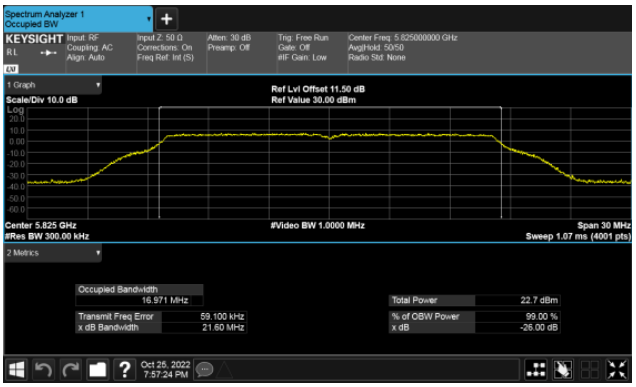
CH157



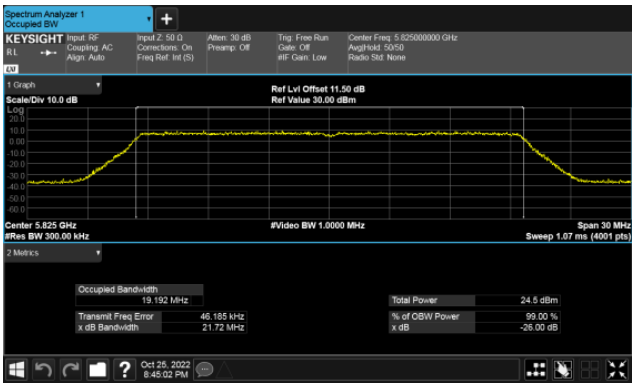
CH157



CH165

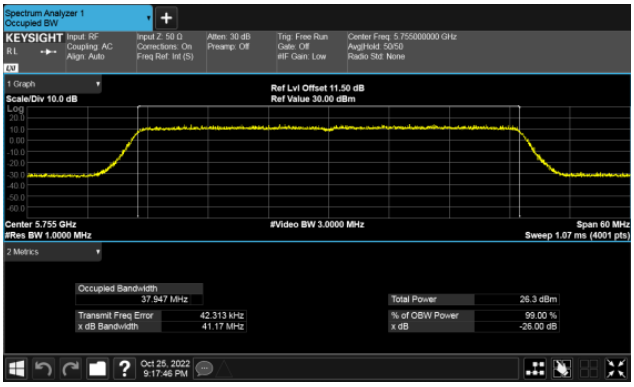


CH165

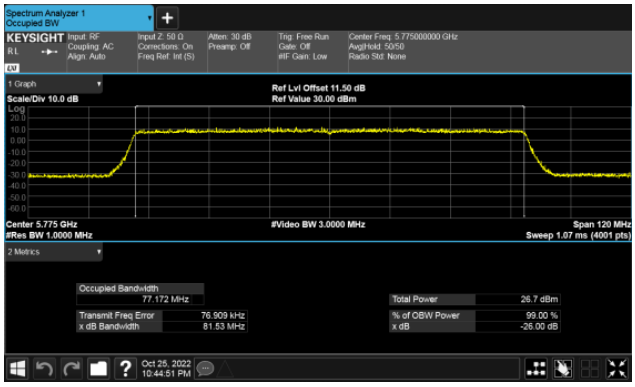


99% Occupied Bandwidth
Non-Beamforming, ANT C

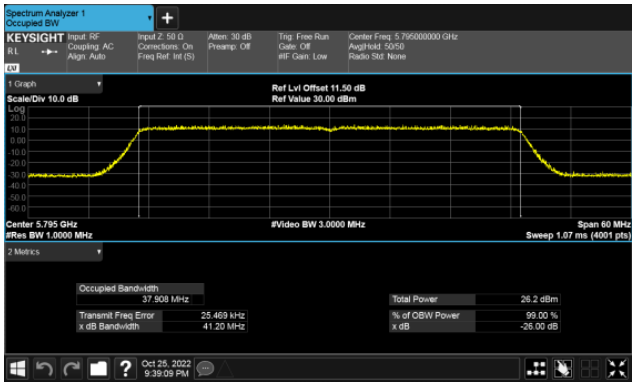
Modulation Type: 802.11ax HE40(14.6Mbps)
CH151



Modulation Type: 802.11ax HE80(30.6Mbps)
CH155



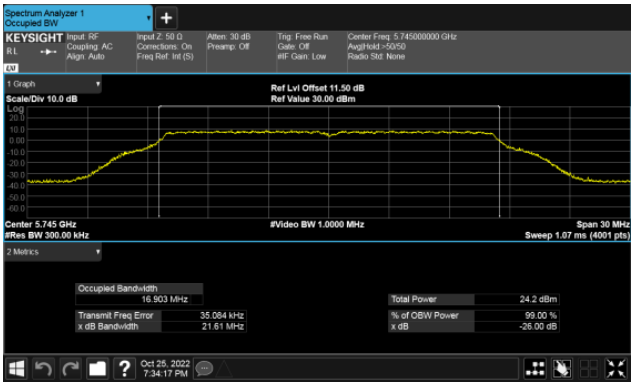
CH159



99% Occupied Bandwidth
Non-Beamforming, ANT D

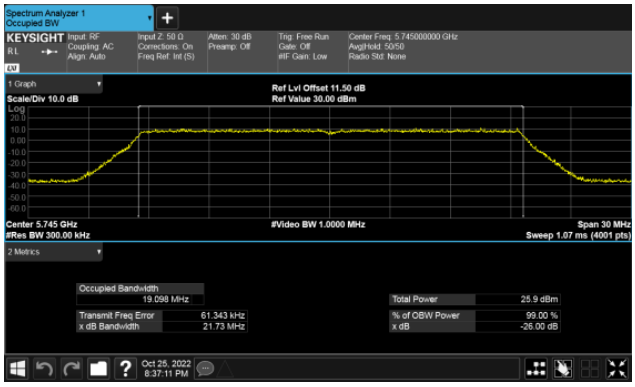
Modulation Type: 802.11a (6Mbps)

CH149

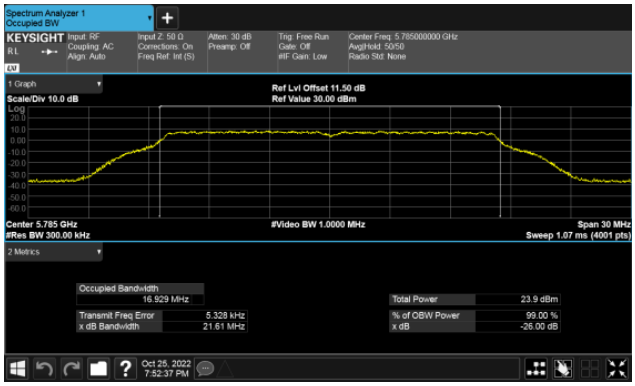


Modulation Type: 802.11ax HE20(7.3Mbps)

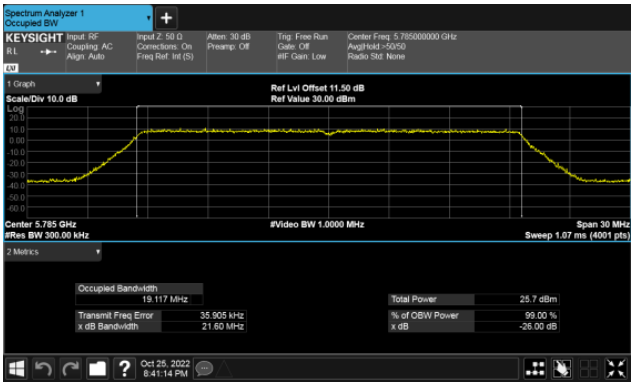
CH149



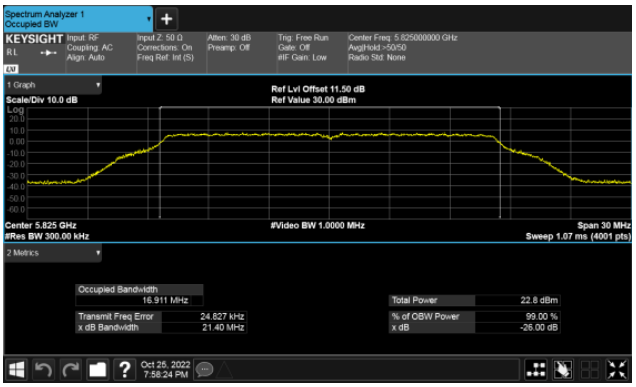
CH157



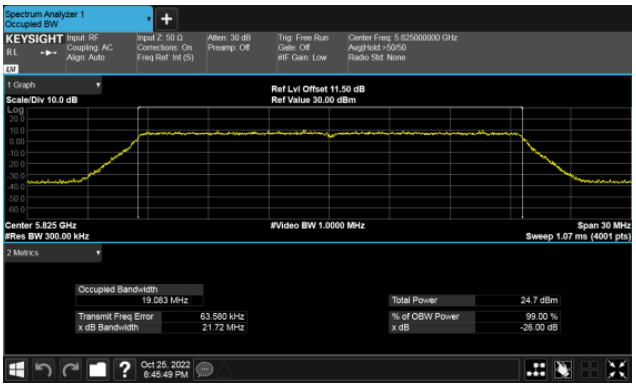
CH157



CH165

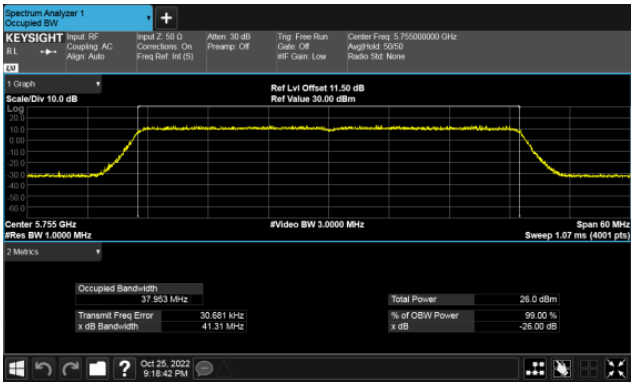


CH165

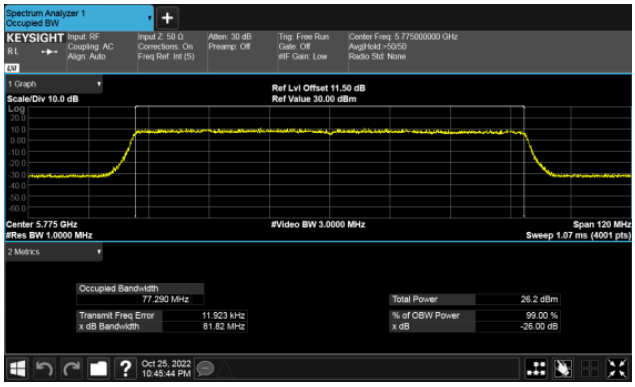


99% Occupied Bandwidth
Non-Beamforming, ANT D

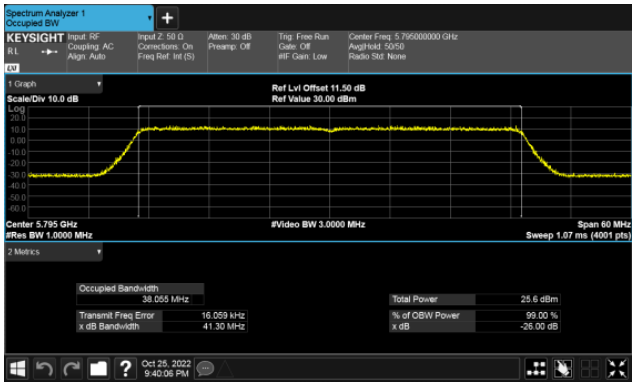
Modulation Type: 802.11ax HE40(14.6Mbps)
CH151



Modulation Type: 802.11ax HE80(30.6Mbps)
CH155

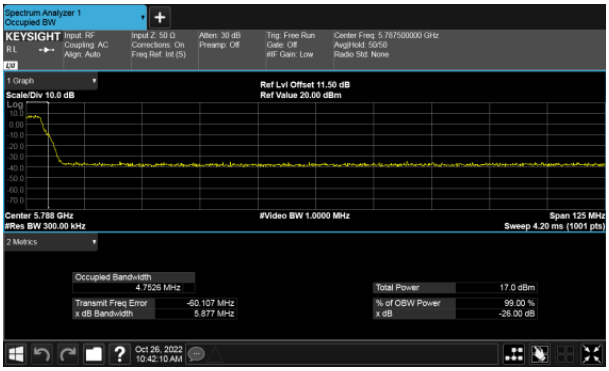


CH159

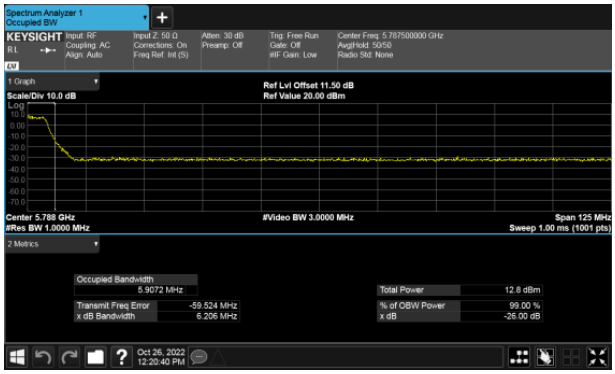


99% Occupied Bandwidth
Non-Beamforming, ANT A
Extends across 5725MHz Band, Straddle Channel

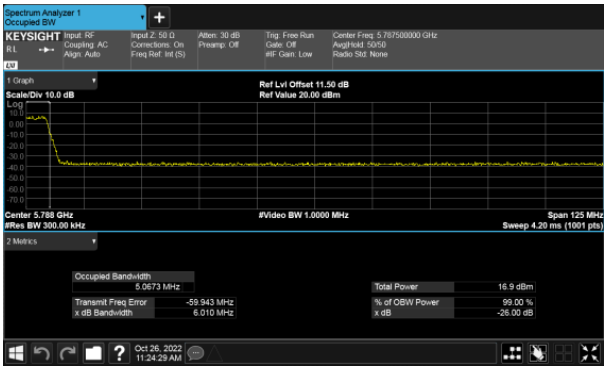
Modulation Type: 802.11a (6Mbps)
CH144



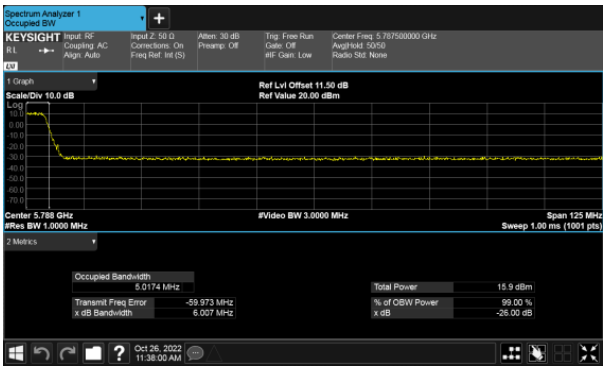
Modulation Type: 802.11ax HE80(30.6Mbps)
CH138



Modulation Type: 802.11ax HE20(7.3Mbps)
CH144

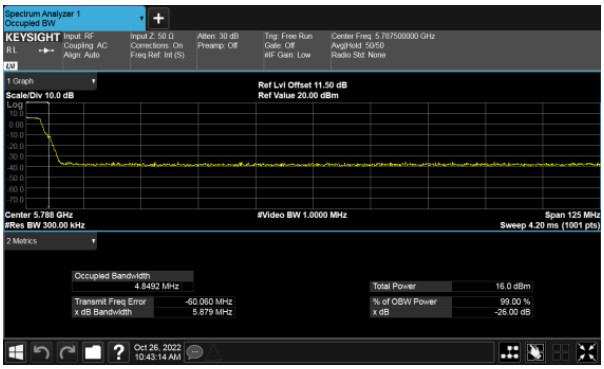


Modulation Type: 802.11ax HE40(14.6Mbps)
CH142

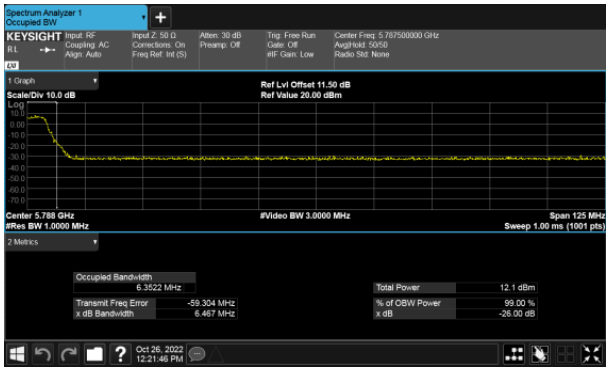


99% Occupied Bandwidth
Non-Beamforming, ANT B
Extends across 5725MHz Band, Straddle Channel

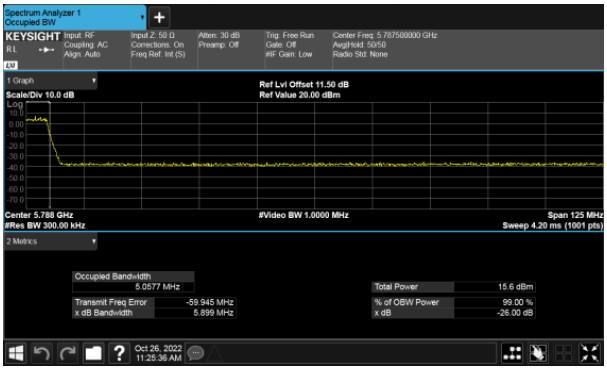
Modulation Type: 802.11a (6Mbps)
CH144



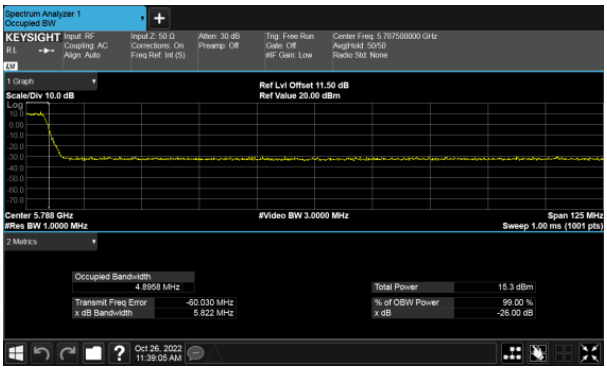
Modulation Type: 802.11ax HE80(30.6Mbps)
CH138



Modulation Type: 802.11ax HE20(7.3Mbps)
CH144

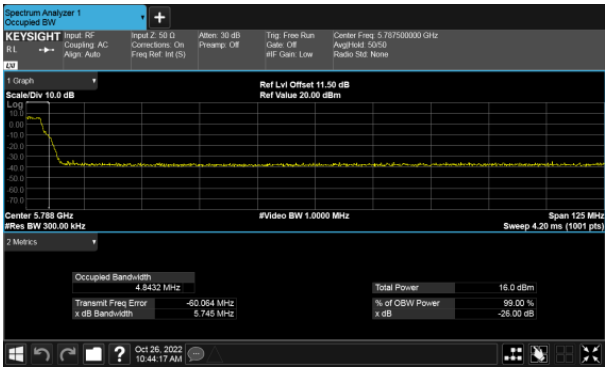


Modulation Type: 802.11ax HE40(14.6Mbps)
CH142

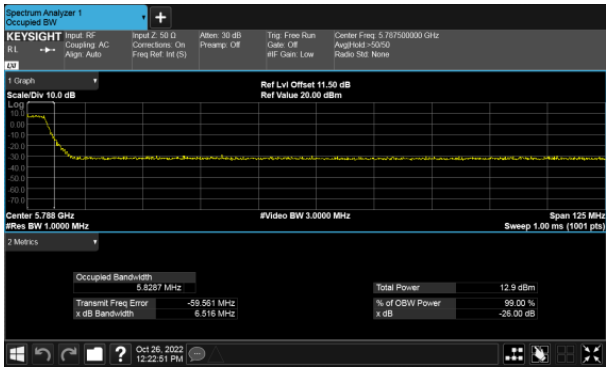


99% Occupied Bandwidth
Non-Beamforming, ANT C
Extends across 5725MHz Band, Straddle Channel

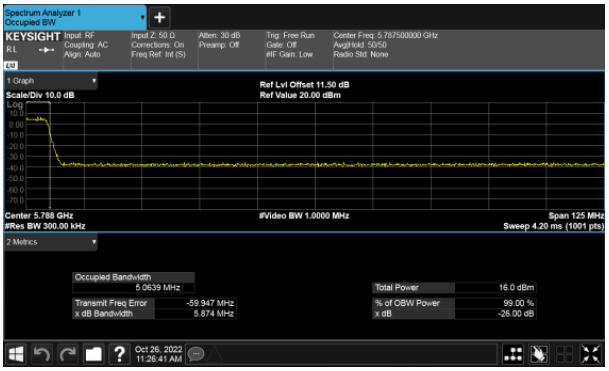
Modulation Type: 802.11a (6Mbps)
CH144



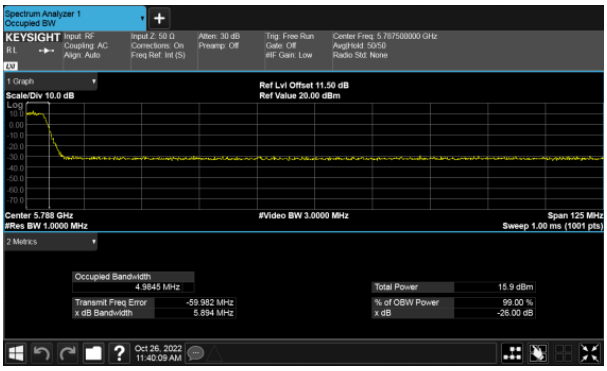
Modulation Type: 802.11ax HE80(30.6Mbps)
CH138



Modulation Type: 802.11ax HE20(7.3Mbps)
CH144



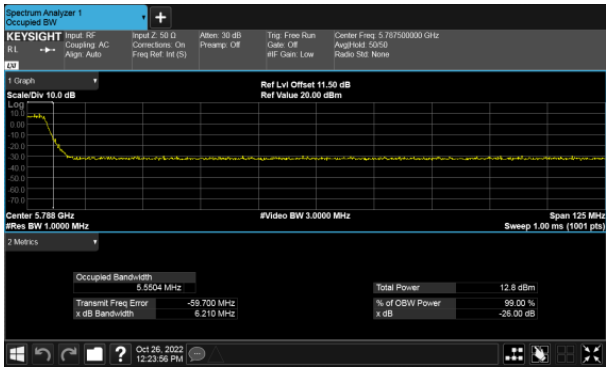
Modulation Type: 802.11ax HE40(14.6Mbps)
CH142



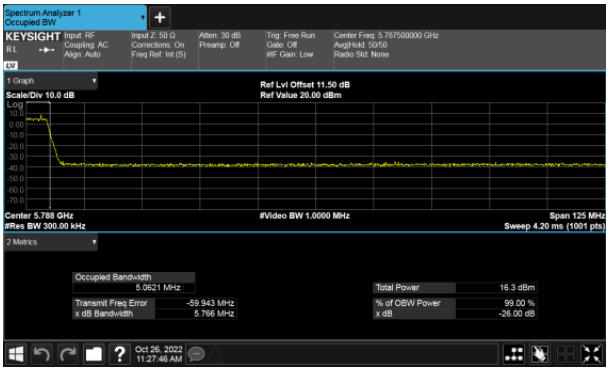
99% Occupied Bandwidth
Non-Beamforming, ANT D
Extends across 5725MHz Band, Straddle Channel

Modulation Type: 802.11a (6Mbps)
CH144

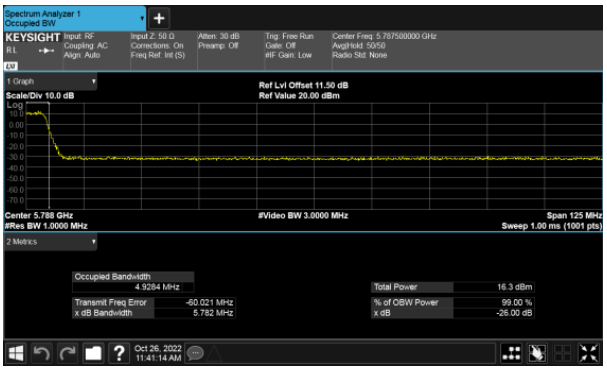
Modulation Type: 802.11ax HE80(30.6Mbps)
CH138



Modulation Type: 802.11ax HE20(7.3Mbps)
CH144

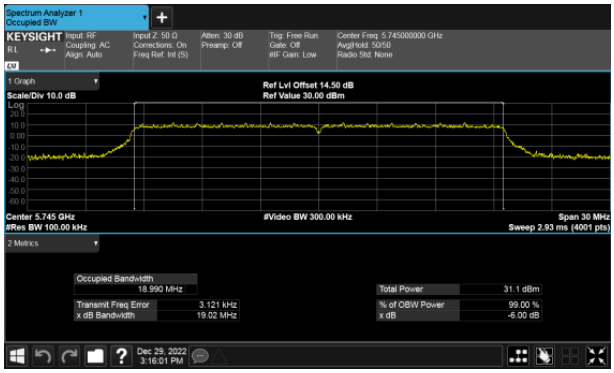


Modulation Type: 802.11ax HE40(14.6Mbps)
CH142

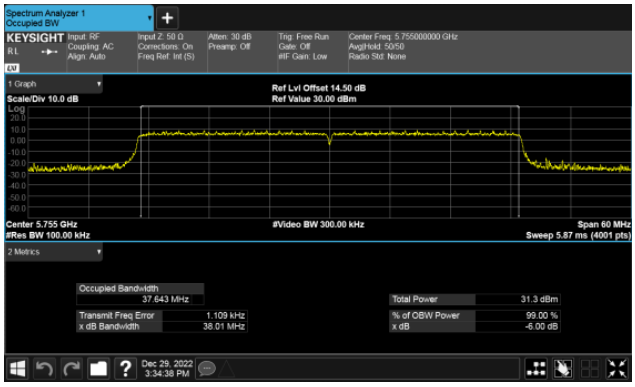


6dB Bandwidth
Beamforming, ANT A

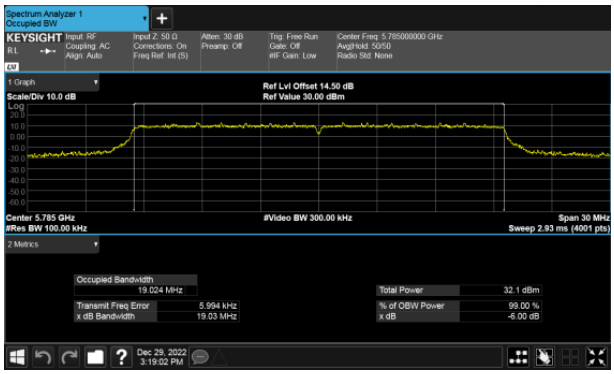
Modulation Type: 802.11ax HE20(7.3Mbps)
CH149



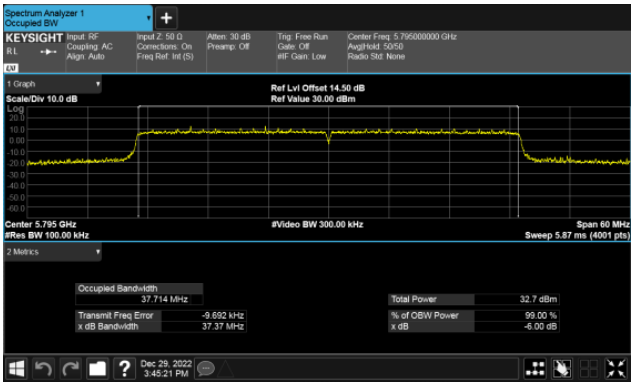
Modulation Type: 802.11ax HE40(14.6Mbps)
CH151



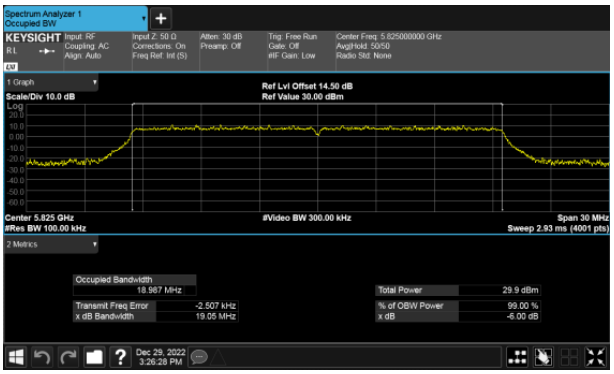
CH157



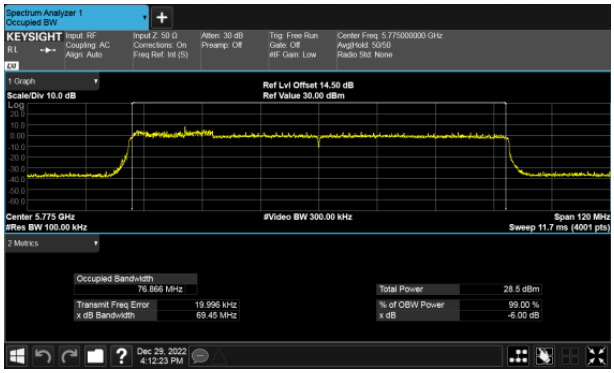
CH159



CH165

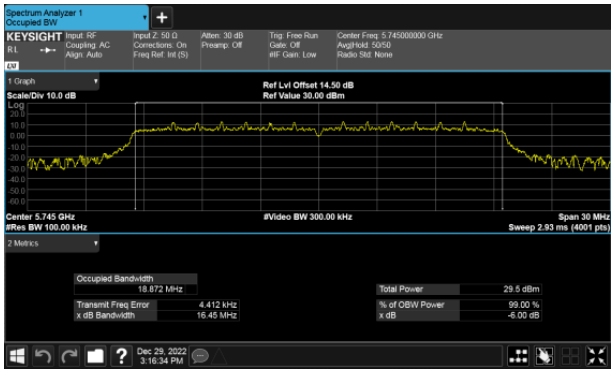


6dB Bandwidth
Beamforming, ANT A
Modulation Type: 802.11ax HE80(30.6Mbps)
CH155

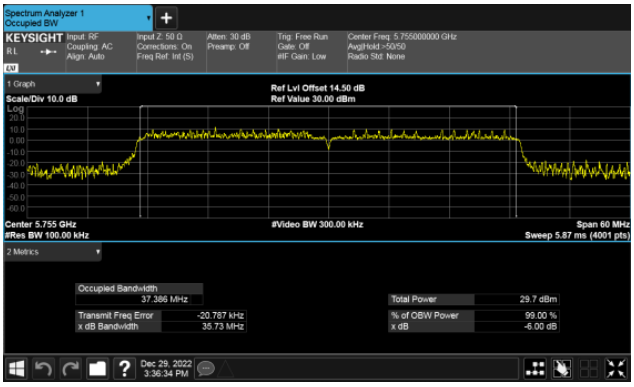


6dB Bandwidth
Beamforming, ANT B

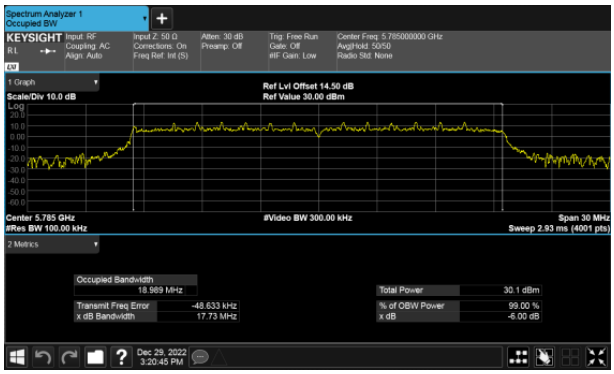
Modulation Type: 802.11ax HE20(7.3Mbps)
CH149



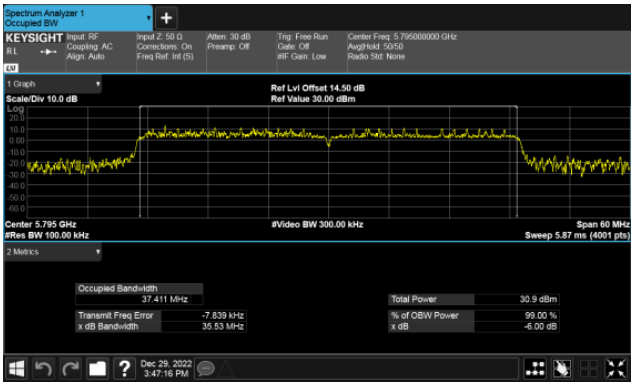
Modulation Type: 802.11ax HE40(14.6Mbps)
CH151



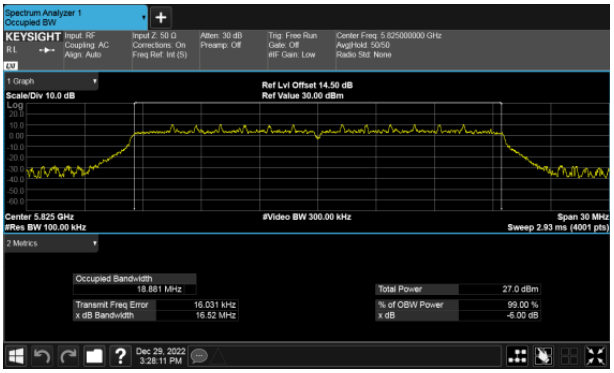
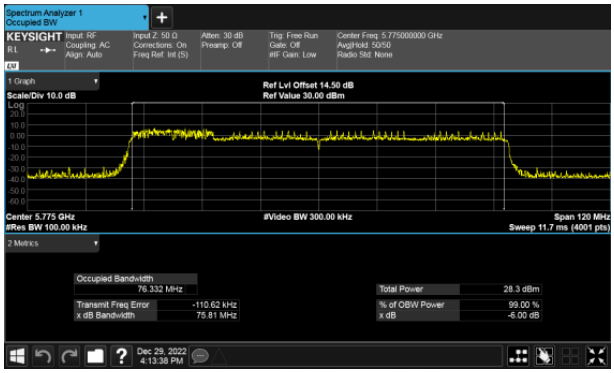
CH157



CH159



CH165



6dB Bandwidth
Beamforming, ANT B
Modulation Type: 802.11ax HE80(30.6Mbps)
CH155