



7. On Time, Duty Cycle and Measurement methods

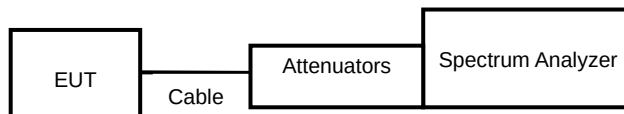
7.1. Test Limit

None; for reporting purposes only.

7.2. Test Procedure

KDB 789033 Zero-Span Spectrum Analyzer Method.

7.3. Test Setup Layout



7.4. Test Result and Data

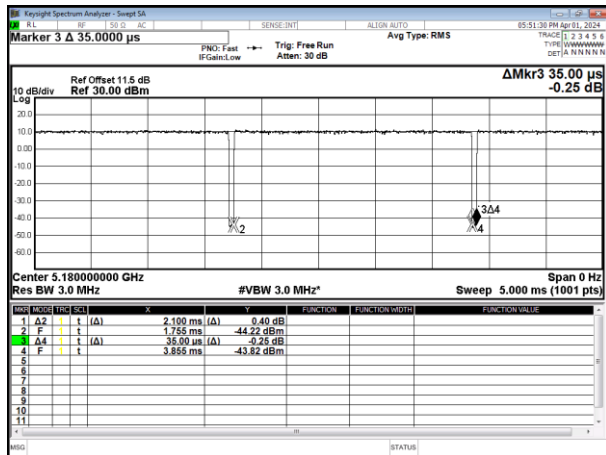
Modulation Mode	On Time (msec)	Period Time (msec)	Duty Cycle (%)
802.11a	2.100	2.135	98.36%
802.11ac VHT20	7.880	7.910	99.62%
802.11ac VHT40	7.880	7.910	99.62%
802.11ac VHT80	7.900	7.940	99.50%
802.11ac VHT160	5.540	5.570	99.46%
802.11ax HE20	7.890	7.920	99.62%
802.11ax HE40	7.890	7.920	99.62%
802.11ax HE80	7.890	7.930	99.50%
802.11ax HE160	4.540	4.570	99.34%

7.5. Measurement Methods

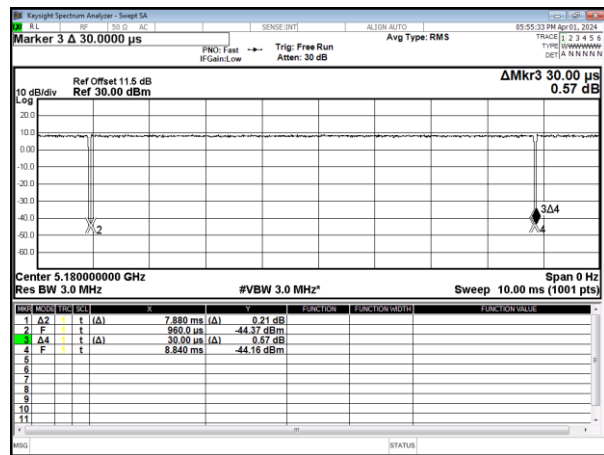
26 dB and 6dB Emission BW	KDB 789033 v02r01, Section C
99% Occupied BW	KDB 789033 v02r01, Section D
Conducted Output Power	KDB 789033 v02r01, Section E.2.d and E.3.b (Method PM-G)
Power Spectral Density	KDB 789033 v02r01, Section F
Unwanted emissions in restricted bands	KDB 789033 v02r01, Sections G and H
Unwanted emissions in non-restricted bands	KDB 789033 v02r01, Sections G and H



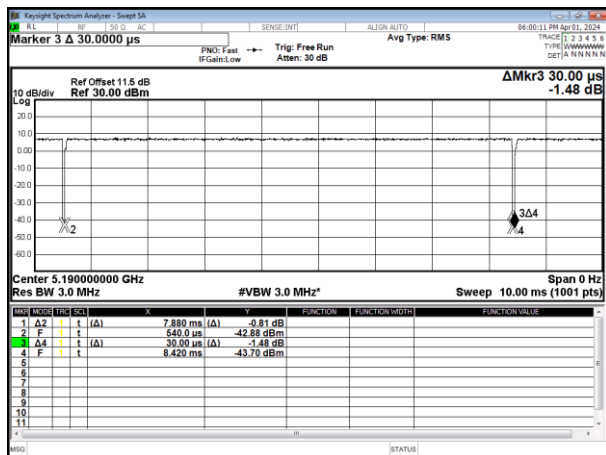
Modulation Type: 802.11a



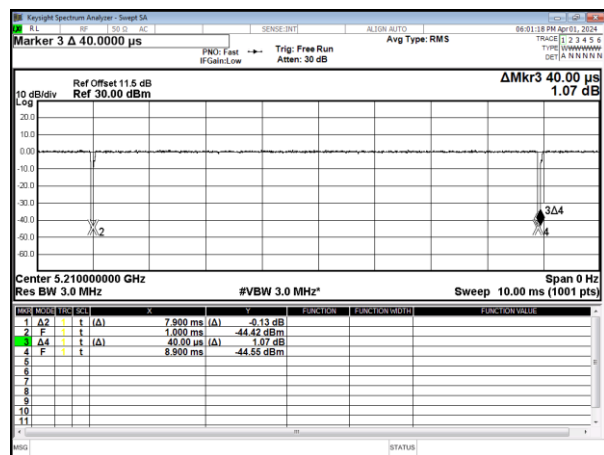
Modulation Type: 802.11ac VHT20



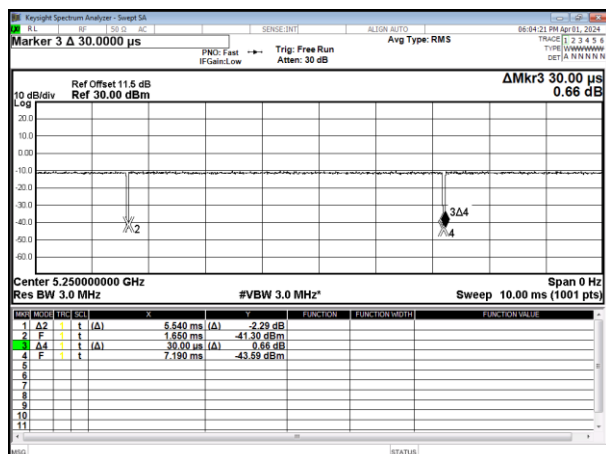
Modulation Type: 802.11ac VHT40



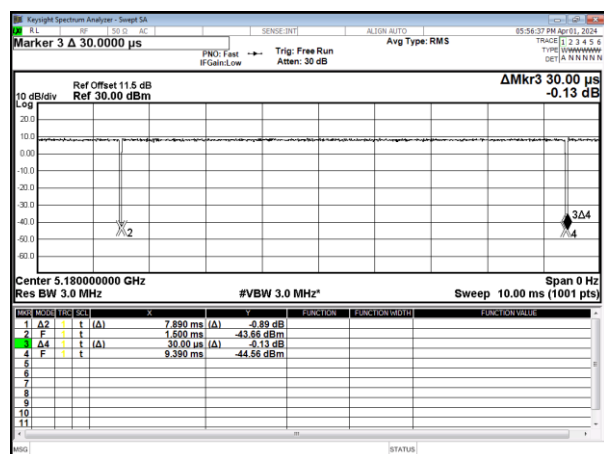
Modulation Type: 802.11ac VHT80



Modulation Type: 802.11ac VHT160

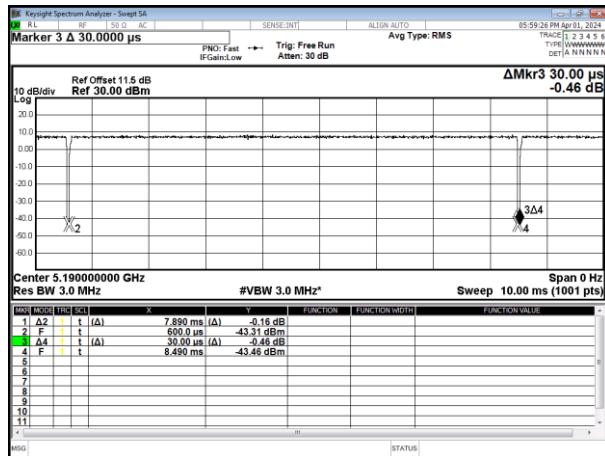


Modulation Type: 802.11ax HE20

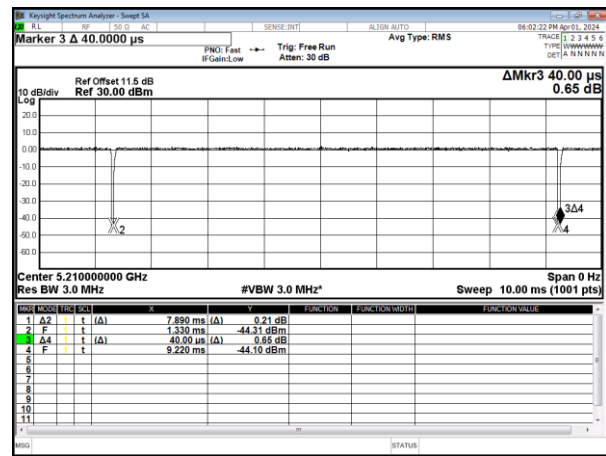




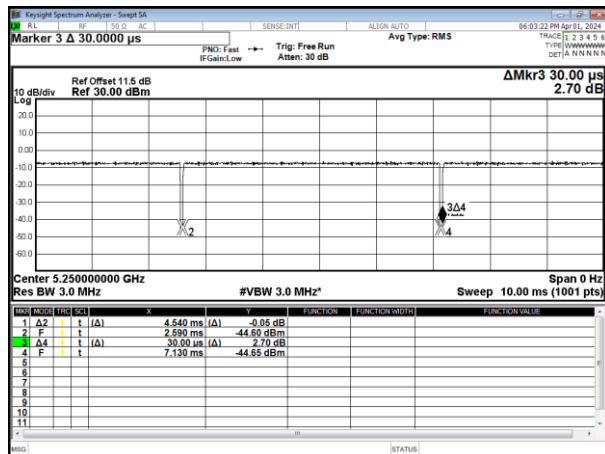
Modulation Type: 802.11ax HE40



Modulation Type: 802.11ax HE80



Modulation Type: 802.11ax HE160





8. 6dB Bandwidth & 99% Occupied Bandwidth

8.1. Test Limit

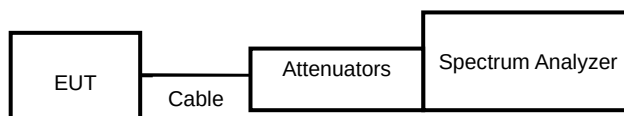
FCC §15.407

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

8.2. Test Procedure

Reference to 789033 v02r01 General UNII Test Procedures New Rules v01: The transmitter output is connected to a spectrum analyzer with the RBW set to 100KHz, the VBW $\geq 3 \times$ RBW, peak detector and max hold.

8.3. Test Setup Layout



**8.4. Test Result and Data (6dB Bandwidth)****In the 5.8GHz Band****MIMO**

Mode	Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)
			ANT A	ANT B	
802.11a	149	5745	15.19	15.19	0.50
	157	5785	15.19	15.17	0.50
	165	5825	15.17	15.18	0.50
802.11ac VHT20	149	5745	15.18	15.12	0.50
	157	5785	15.14	15.16	0.50
	165	5825	15.18	15.16	0.50
802.11ac VHT40	155	5755	35.34	35.11	0.50
	159	5795	29.50	35.12	0.50
802.11ac VHT80	155	5775	52.53	75.10	0.50
802.11ax HE20	149	5745	18.78	17.22	0.50
	157	5785	18.45	15.14	0.50
	165	5825	15.43	15.87	0.50
802.11ax HE40	155	5755	35.34	35.13	0.50
	159	5795	32.91	35.11	0.50
802.11ax HE80	155	5775	62.60	75.14	0.50

UNII Emission Bandwidth Result (Extends across 5725MHz band)

Mode	Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)
			ANT A	ANT B	
11a	144	5720	2.71	2.72	0.50
11ac VHT20	144	5720	3.43	3.41	0.50
11ac VHT40	142	5710	2.81	2.72	0.50
11ac VHT80	138	5690	2.83	2.77	0.50
11ax HE20	144	5720	4.06	4.09	0.50
11ax HE40	142	5710	3.51	3.62	0.50
11ax HE80	138	5690	3.64	3.63	0.50

**8.5. Test Result and Data (99% Occupied Bandwidth)****In the 5.8GHz Band**

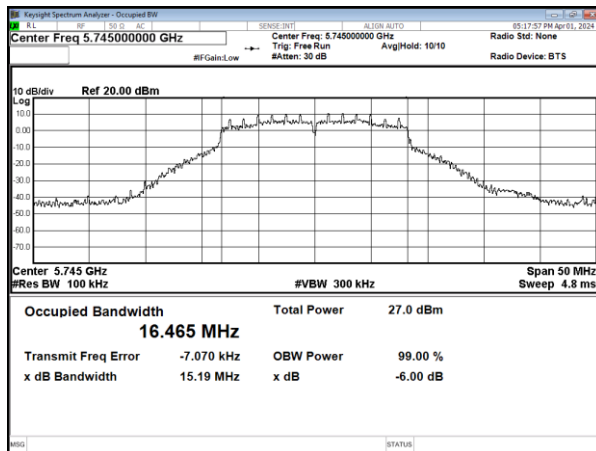
Mode	Channel	Frequency (MHz)	99% Bandwidth(MHz)	
			ANT A	ANT B
802.11a	149	5745	16.75	16.68
	157	5785	16.75	16.75
	165	5825	16.64	16.69
802.11ac VHT20	149	5745	17.82	17.77
	157	5785	17.80	17.83
	165	5825	17.79	17.90
802.11ac VHT40	155	5755	36.37	36.20
	159	5795	36.20	36.19
802.11ac VHT80	155	5775	75.13	75.04
802.11ax HE20	149	5745	18.93	18.99
	157	5785	18.99	18.90
	165	5825	18.94	18.94
802.11ax HE40	155	5755	37.72	37.70
	159	5795	37.46	37.46
802.11ax HE80	155	5775	76.64	76.50

UNII Emission Bandwidth Result (Extends across 5725MHz band)

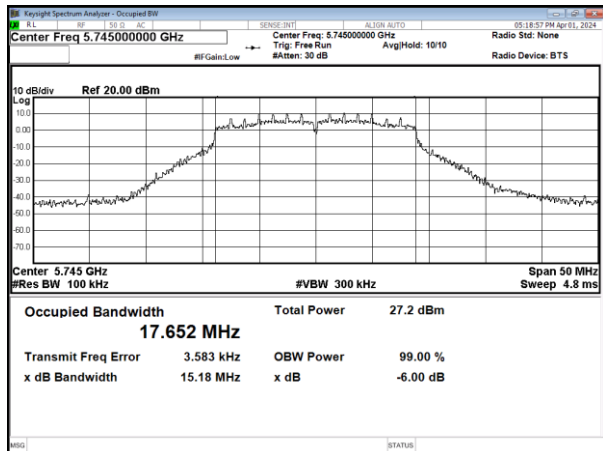
Mode	Channel	Frequency (MHz)	99% Bandwidth(MHz)	
			ANT A	ANT B
11a	144	5720	5.59	5.67
11ac VHT20	144	5720	5.62	5.51
11ac VHT40	142	5710	6.23	5.73
11ac VHT80	138	5690	15.57	19.40
11ax HE20	144	5720	5.10	5.07
11ax HE40	142	5710	5.27	5.21
11ax HE80	138	5690	10.39	10.12



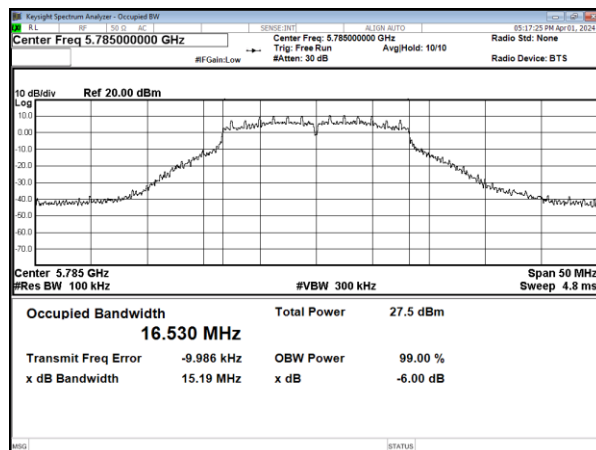
MIMO (ANT A)
6dB Bandwidth
Modulation Type: 802.11a
CH149



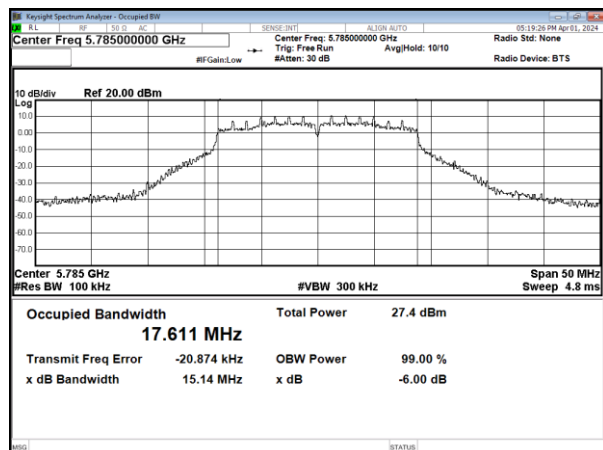
Modulation Type: 802.11ac, VHT20
CH149



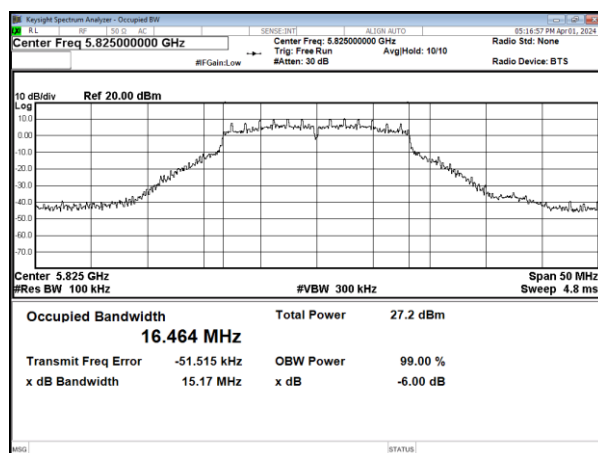
CH157



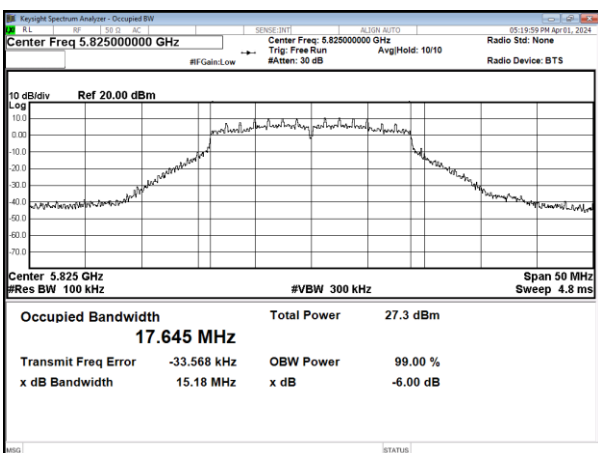
CH157



CH165

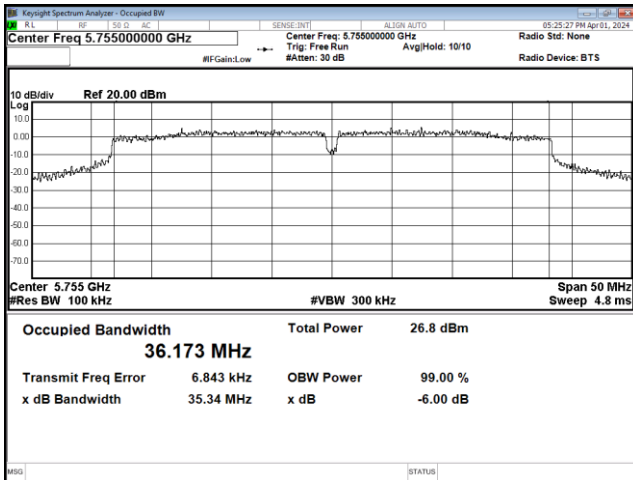


CH165

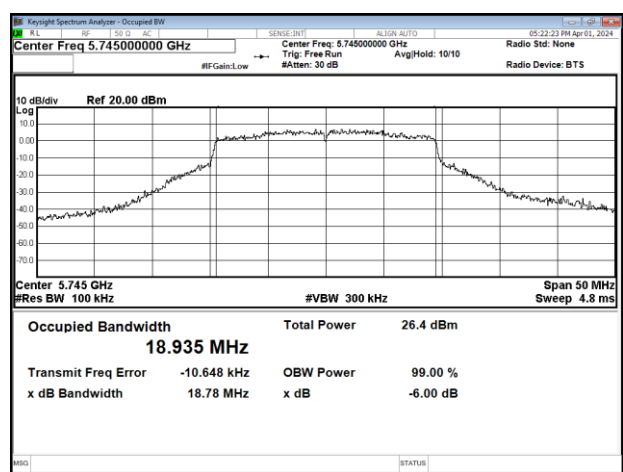




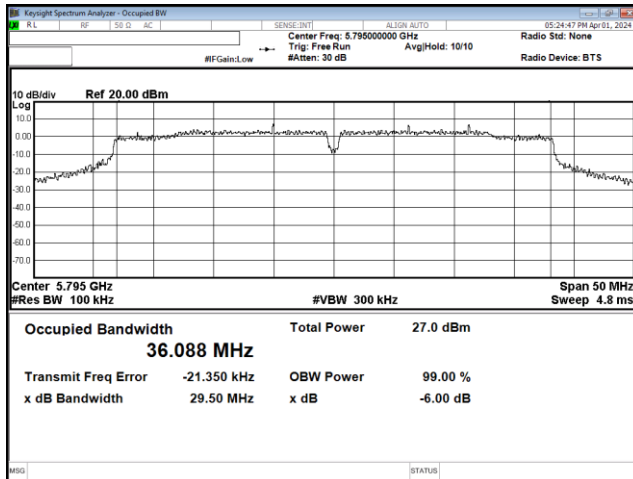
6dB Bandwidth
Modulation Type: 802.11ac, VHT40
CH151



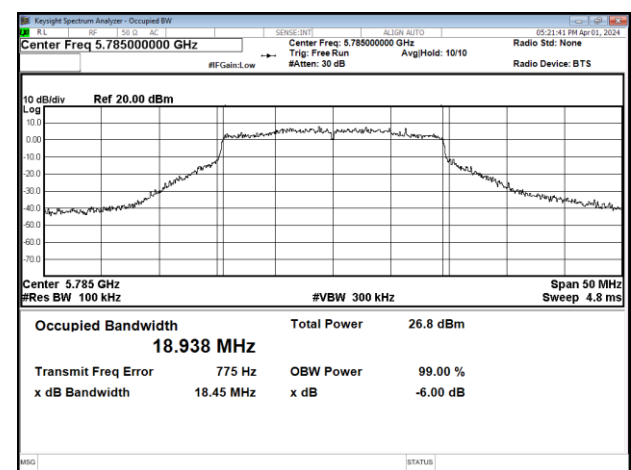
Modulation Type: 802.11ax HE20
CH149



CH159

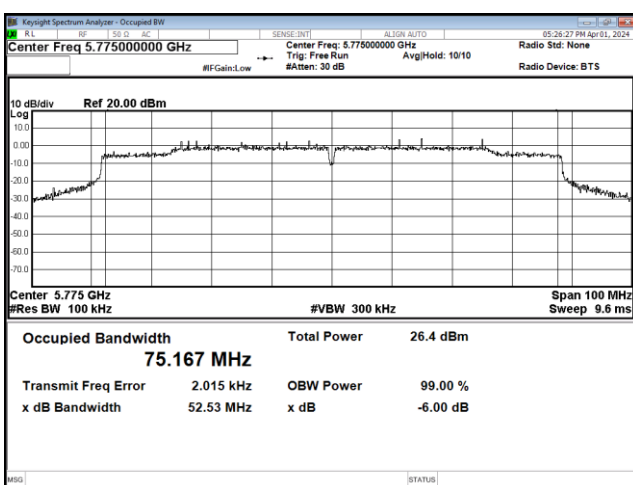


CH157

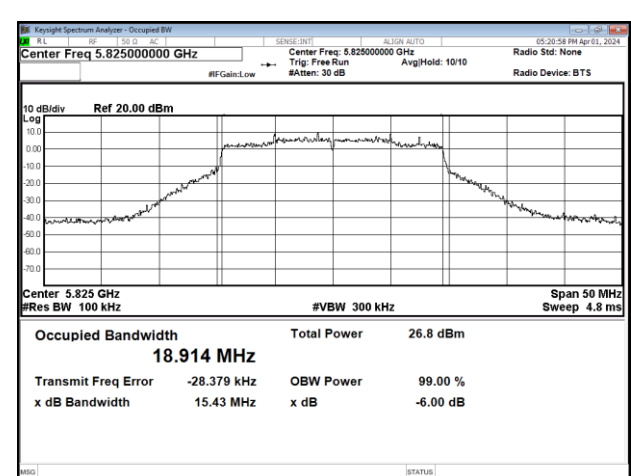


Modulation Type: 802.11ac, VHT80

CH155

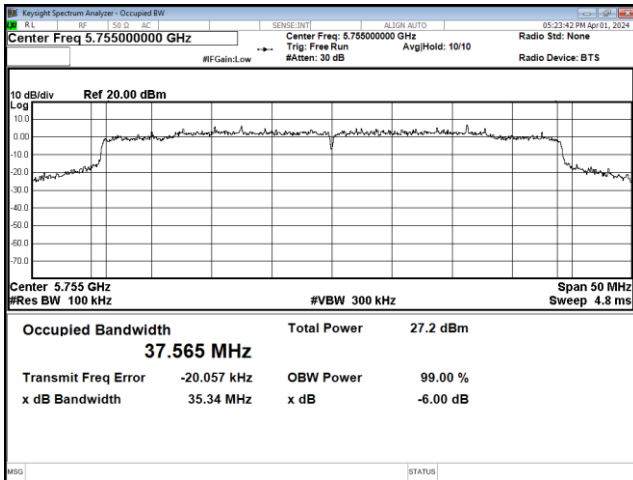


CH165

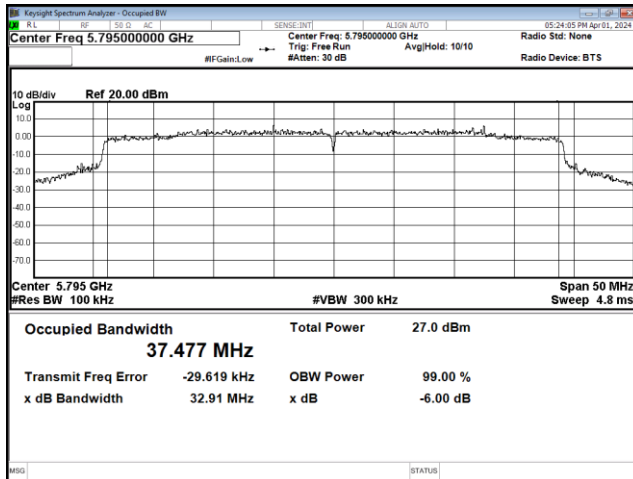




6dB Bandwidth
Modulation Type: 802.11 ax HE40
CH151

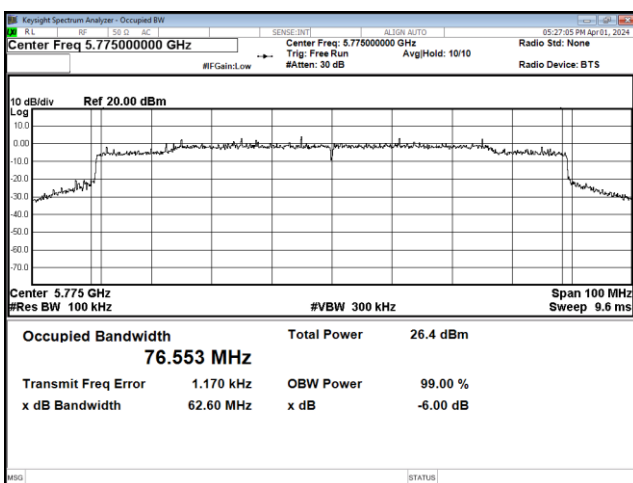


CH159



Modulation Type: 802.11ax HE80

CH155





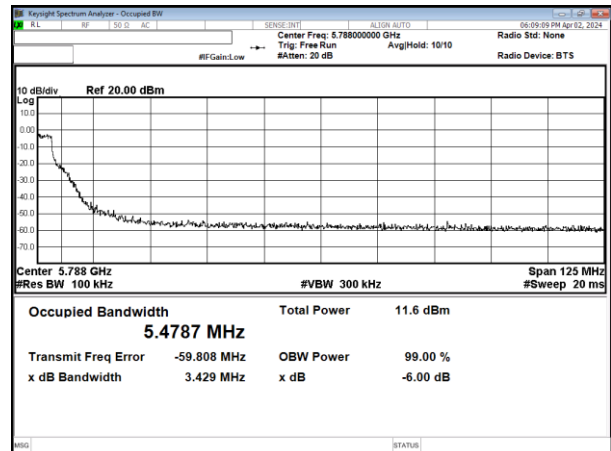
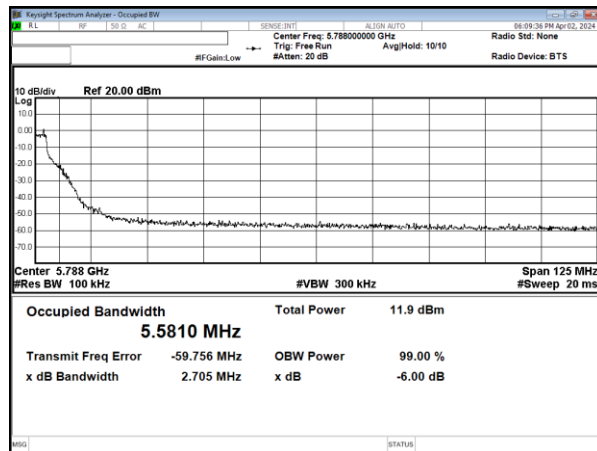
6dB Bandwidth (UNII Emission Bandwidth Result (Extends across 5725MHz band))

Modulation Standard: 802.11a

Modulation Standard: 802.11ac VHT20

CH144

CH144

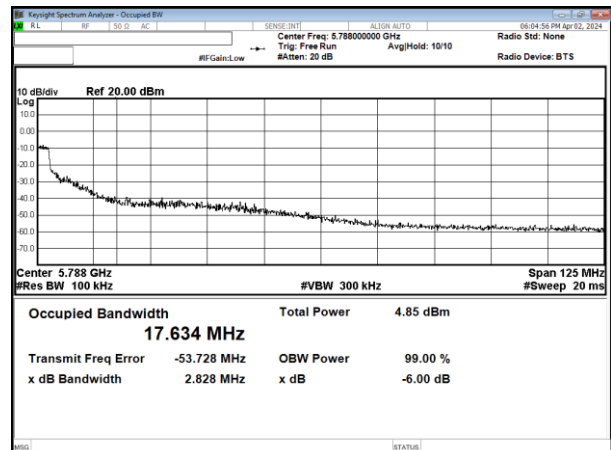
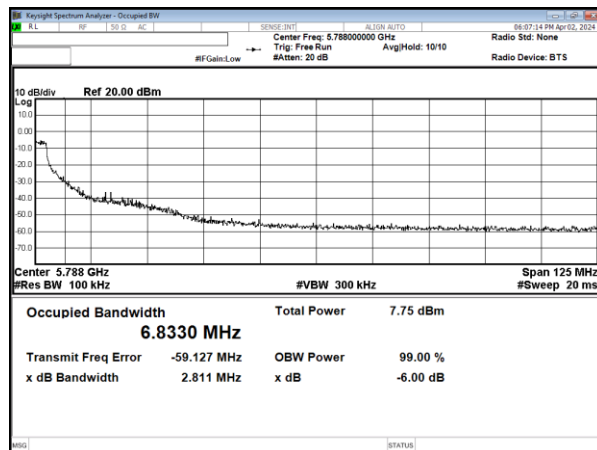


Modulation Standard: 802.11ac VHT40

Modulation Standard: 802.11ac VHT80

CH142

CH138

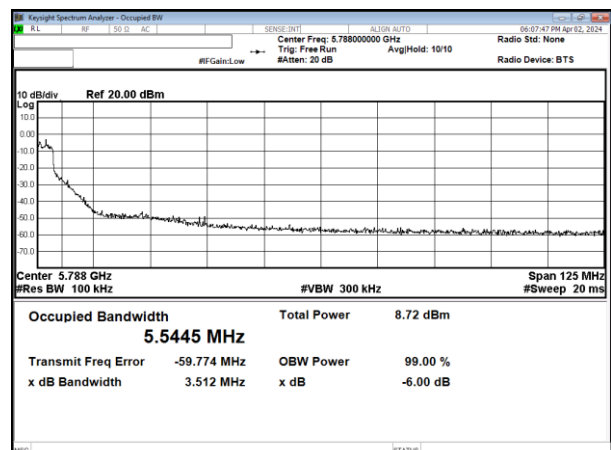
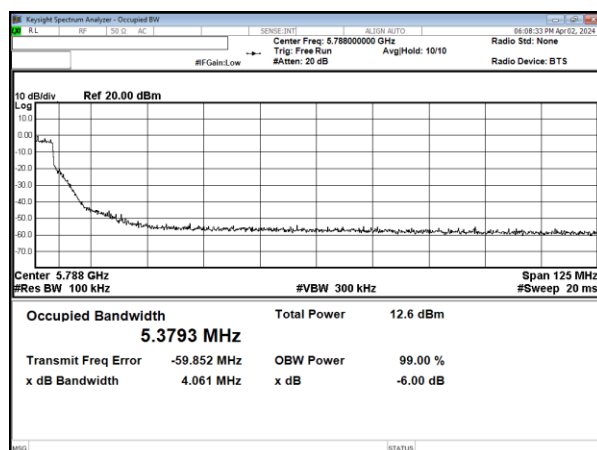


Modulation Standard: 802.11 ax HE20

Modulation Standard: 802.11 ax HE40

CH144

CH142

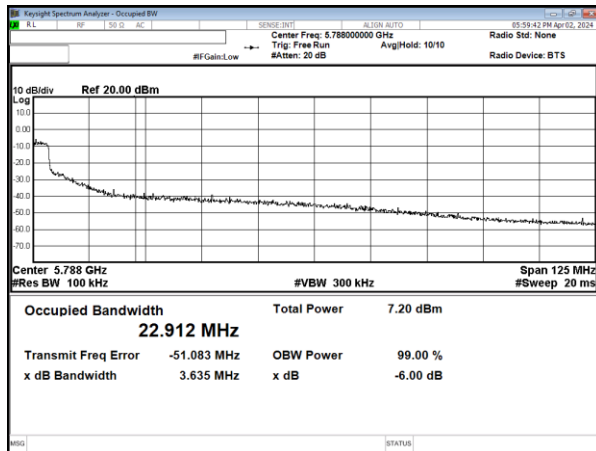




6dB Bandwidth (Extends across 5725MHz band)

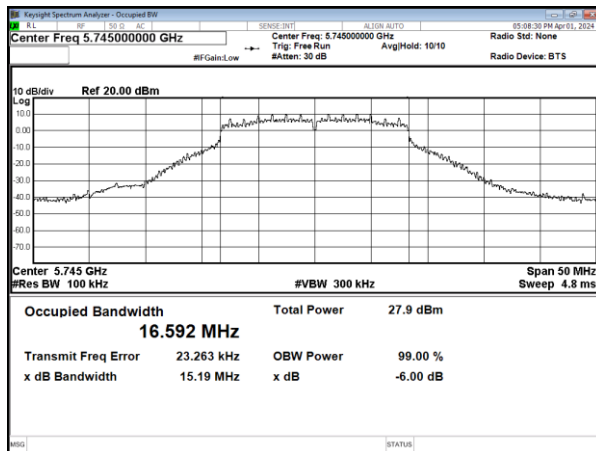
Modulation Standard: 802.11 ax HE80

CH138

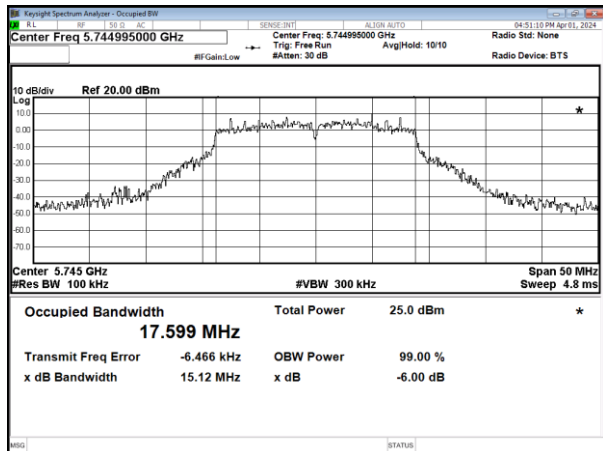




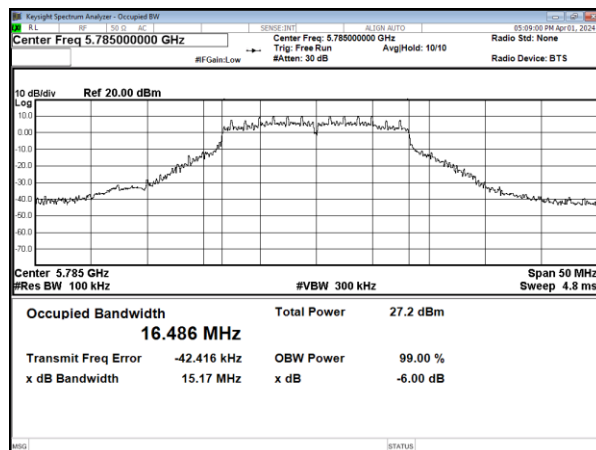
MIMO (ANT B)
6dB Bandwidth
Modulation Type: 802.11a
CH149



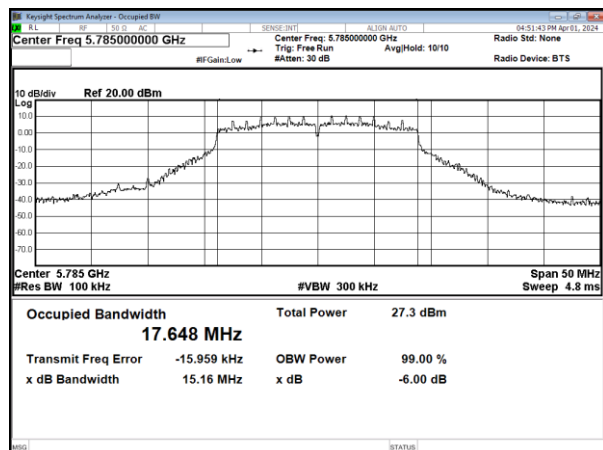
Modulation Type: 802.11ac, VHT20
CH149



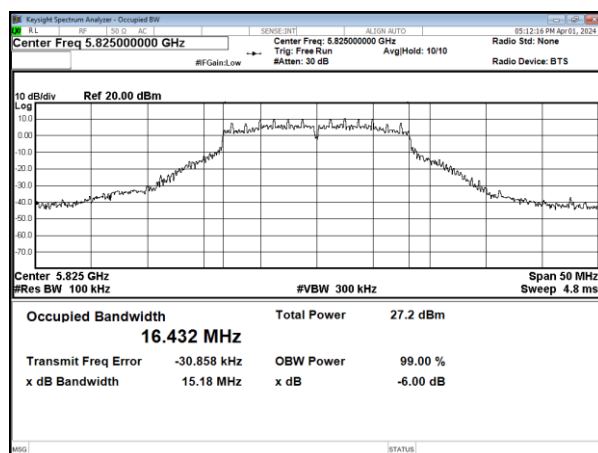
CH157



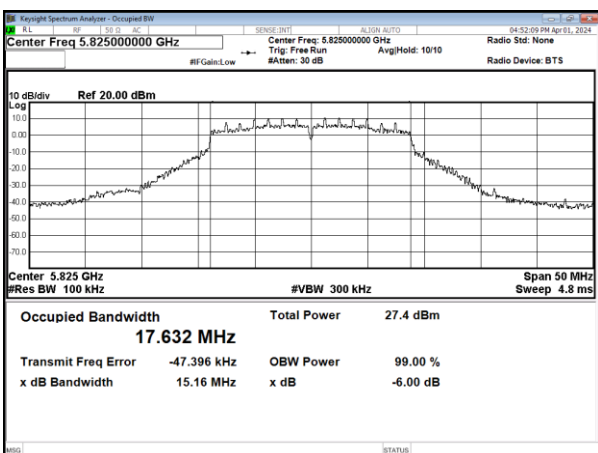
CH157



CH165

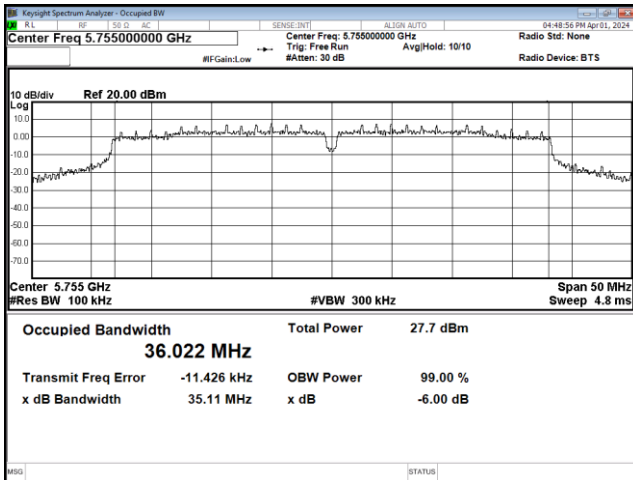


CH165

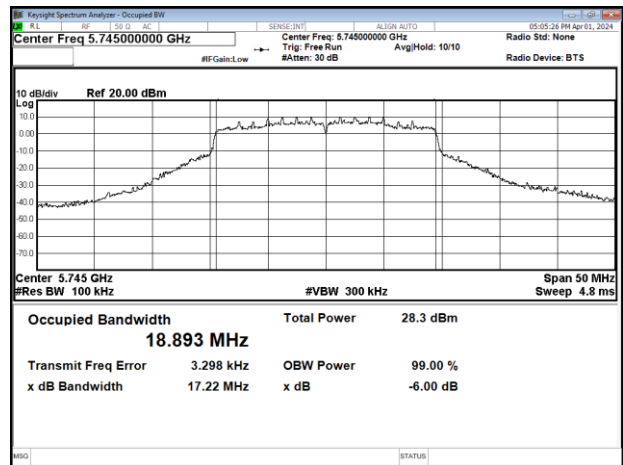




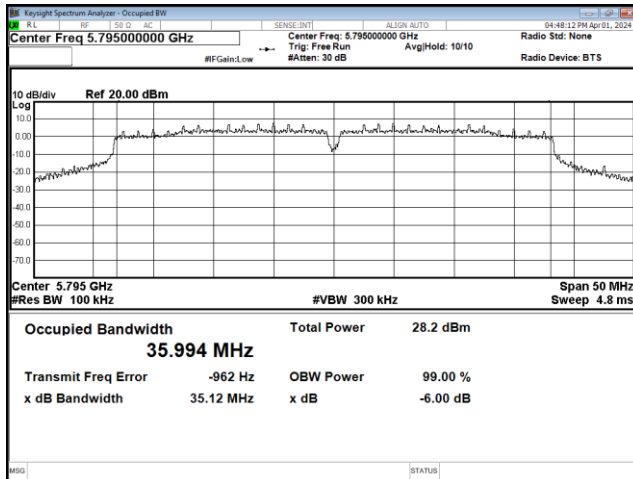
6dB Bandwidth
Modulation Type: 802.11ac, VHT40
CH151



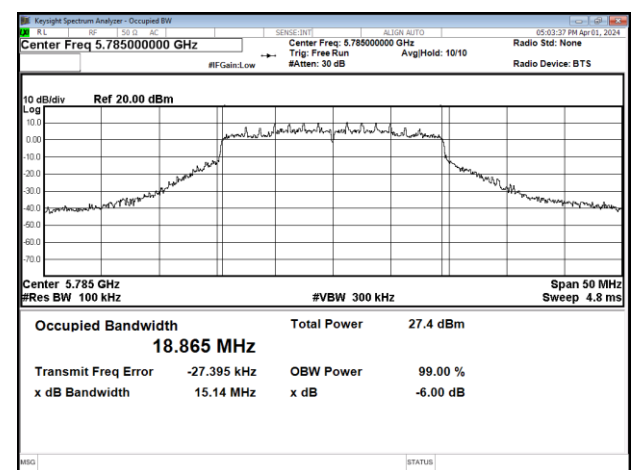
Modulation Type: 802.111ax HE20
CH149



CH159

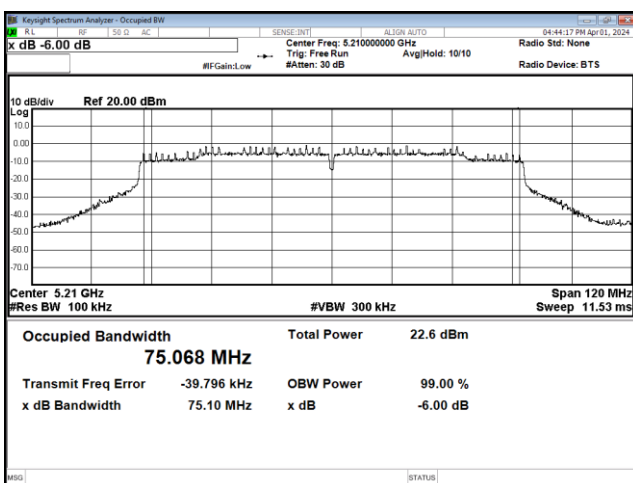


CH157

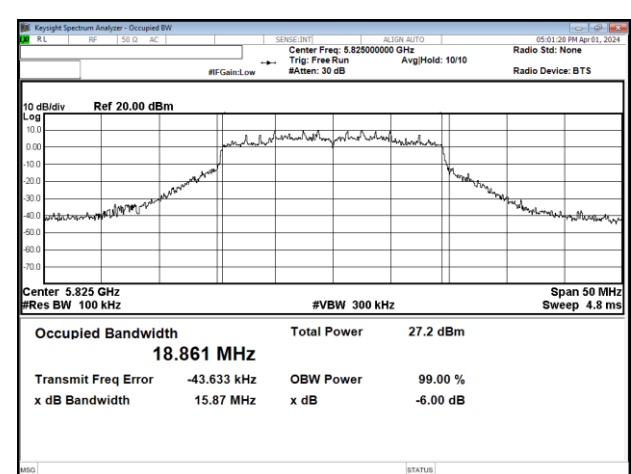


Modulation Type: 802.11ac, VHT80

CH155

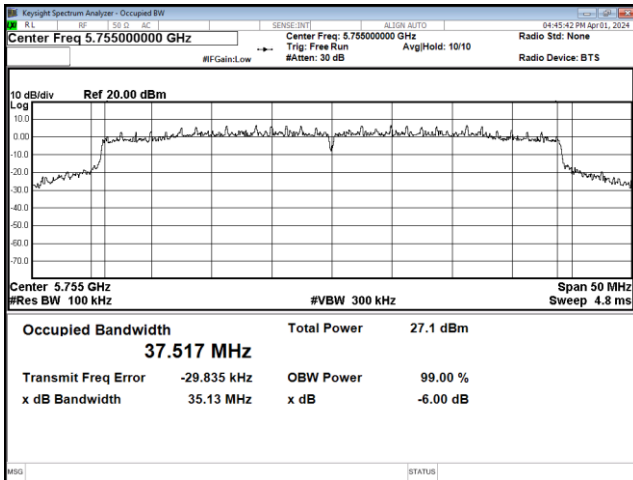


CH165

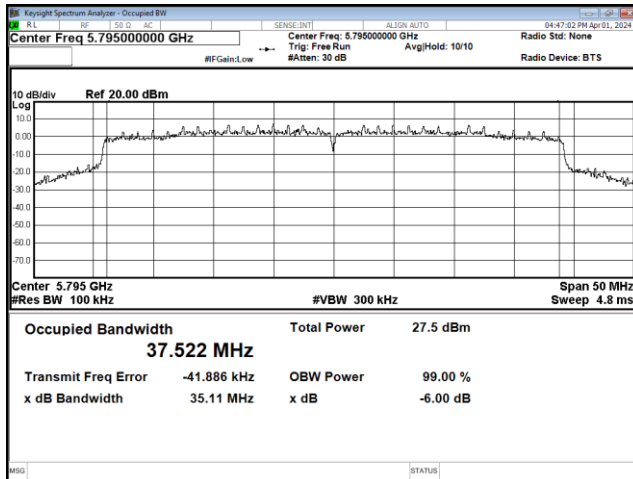




6dB Bandwidth
Modulation Type: 802.11 ax HE40
CH151

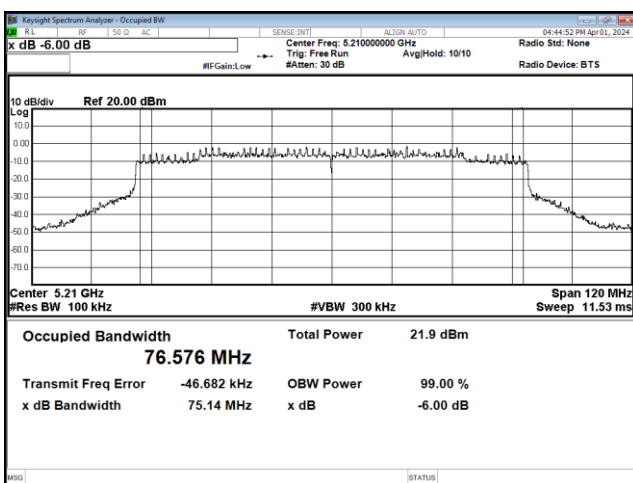


CH159



Modulation Type: 802.11ax HE80

CH155





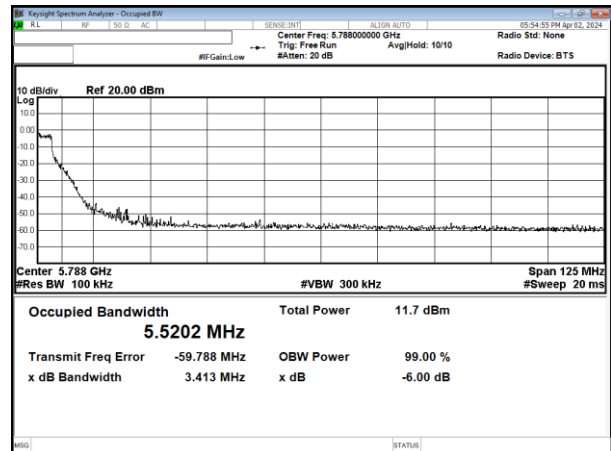
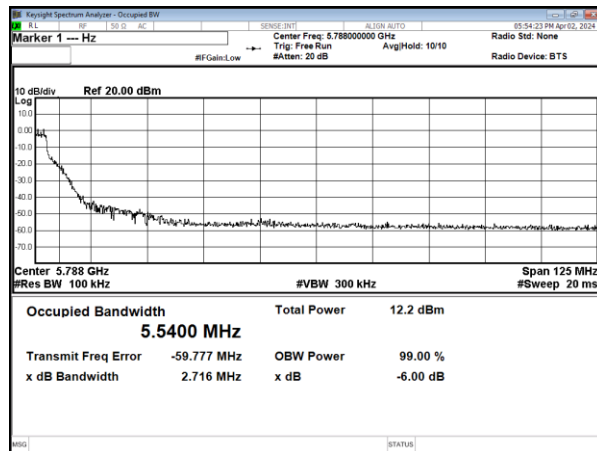
6dB Bandwidth (UNII Emission Bandwidth Result (Extends across 5725MHz band))

Modulation Standard: 802.11a

Modulation Standard: 802.11ac VHT20

CH144

CH144

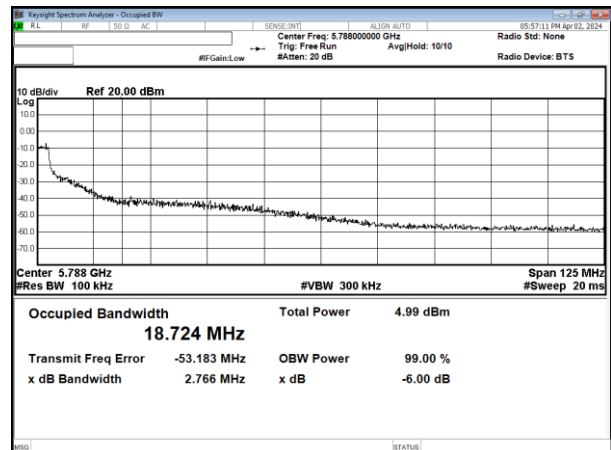
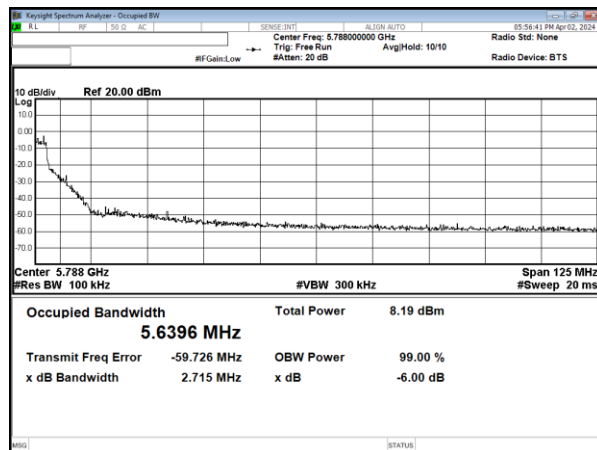


Modulation Standard: 802.11ac VHT40

Modulation Standard: 802.11ac VHT80

CH142

CH138

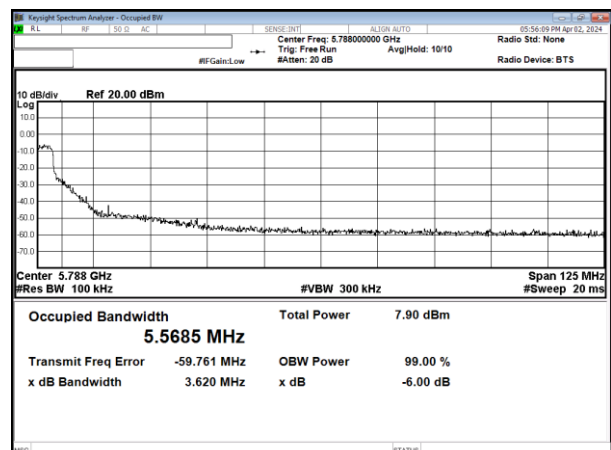
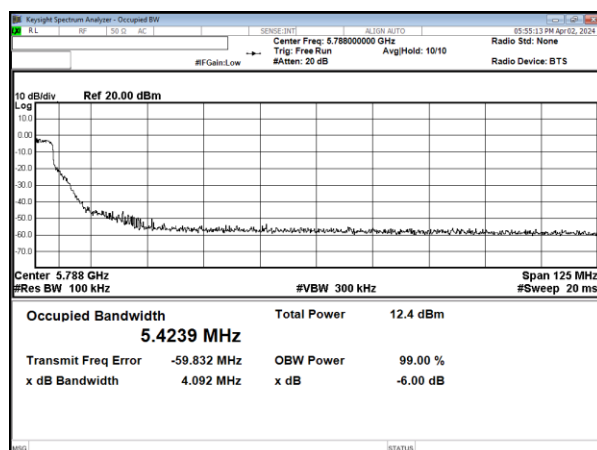


Modulation Standard: 802.11 ax HE20

Modulation Standard: 802.11 ax HE40

CH144

CH142

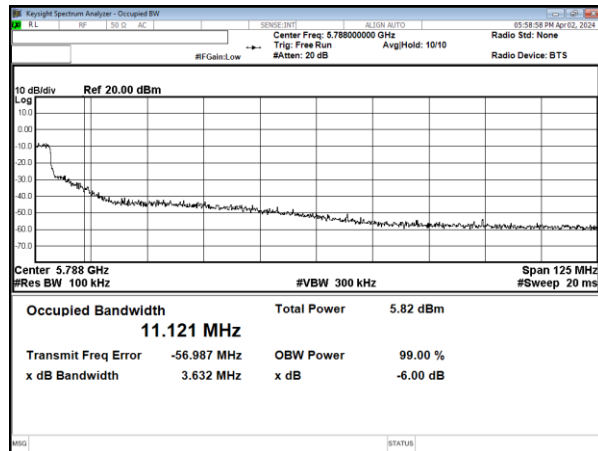




6dB Bandwidth (Extends across 5725MHz band)

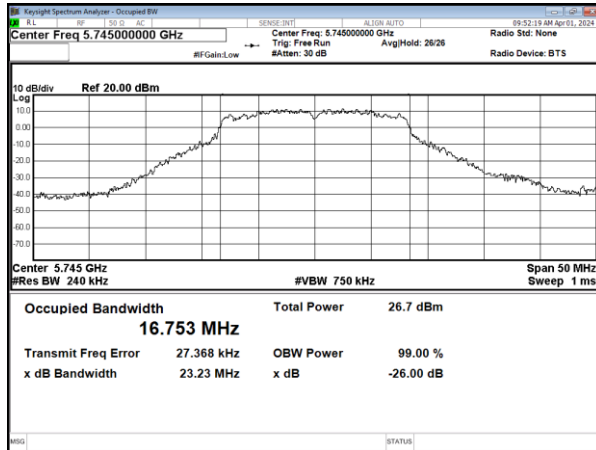
Modulation Standard: 802.11 ax HE80

CH138

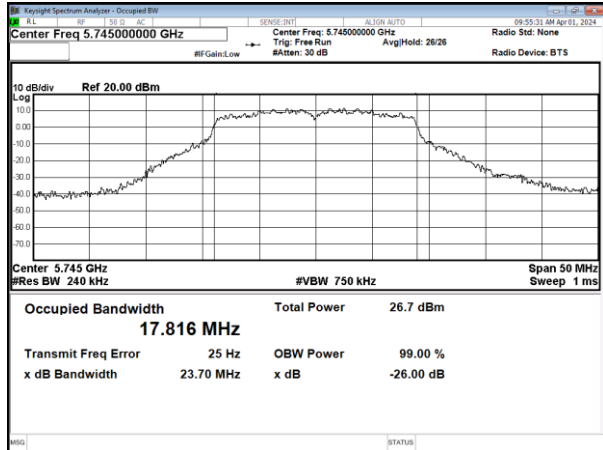




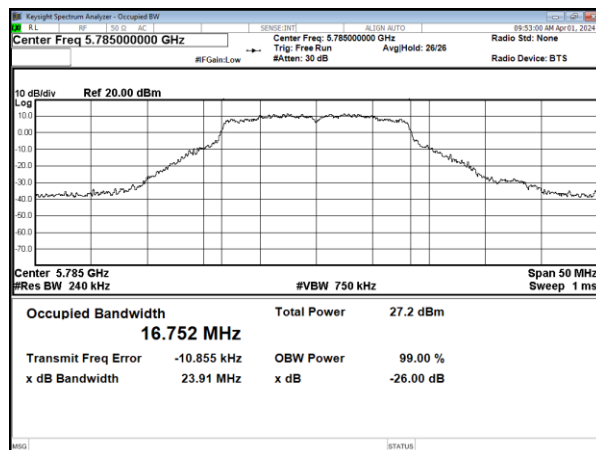
MIMO (ANT A)
99% Occupied Bandwidth
Modulation Type: 802.11a
CH149



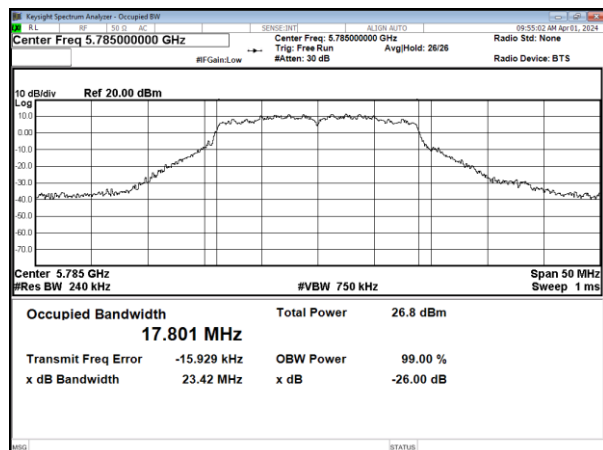
Modulation Type: 802.11ac, VHT20
CH149



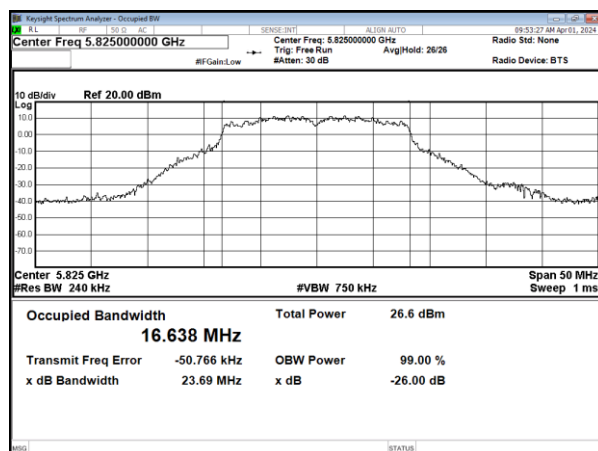
CH157



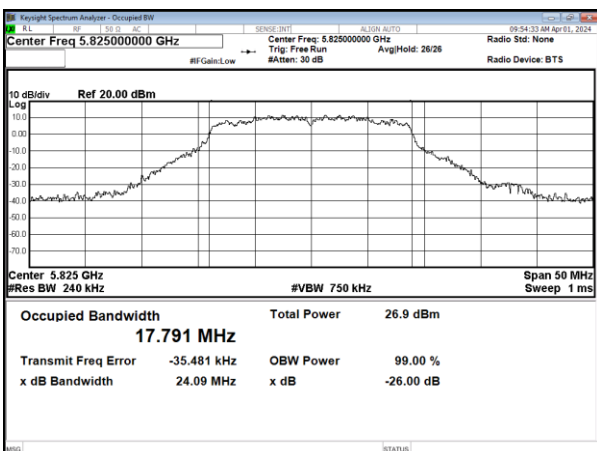
CH157



CH165

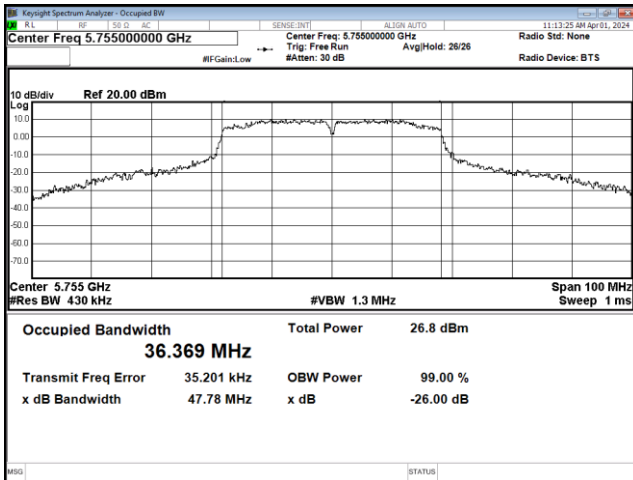


CH165

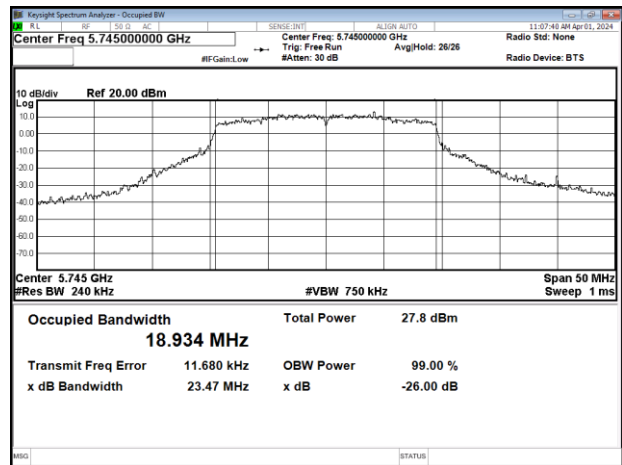




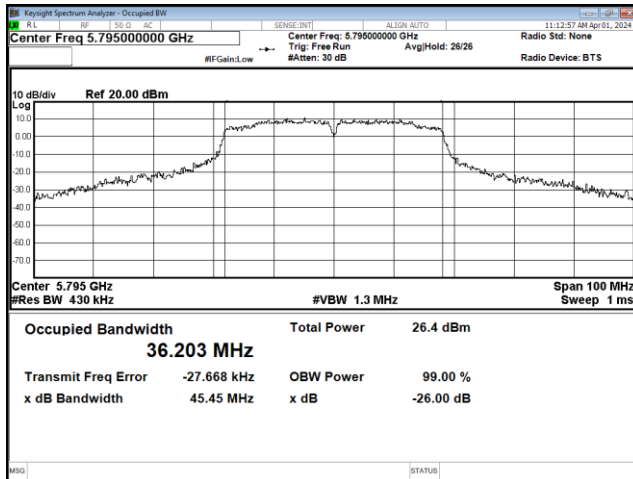
99% Occupied Bandwidth
Modulation Type: 802.11ac, VHT40
CH151



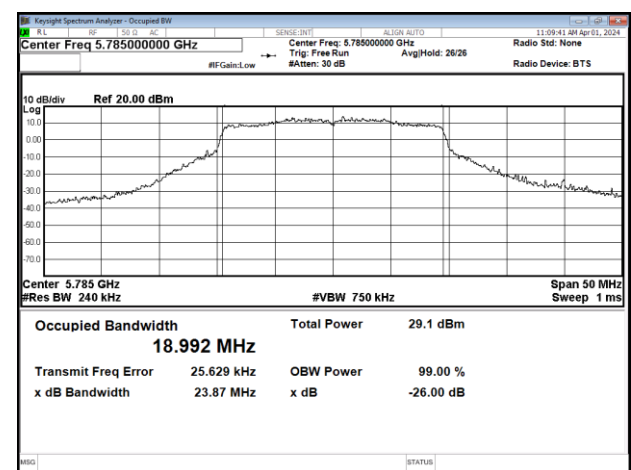
Modulation Type: 802.111ax HE20
CH149



CH159

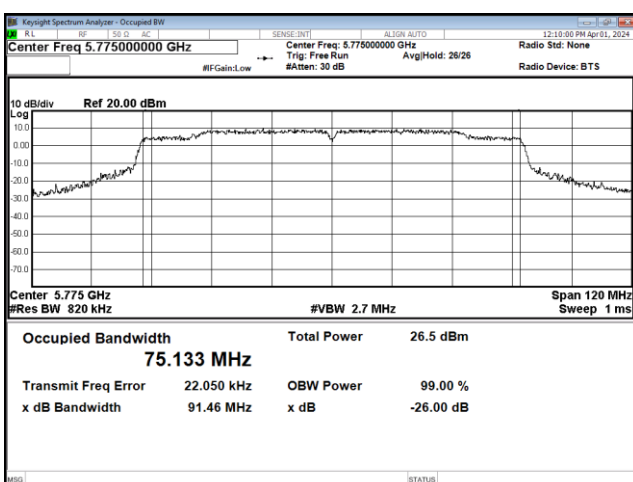


CH157

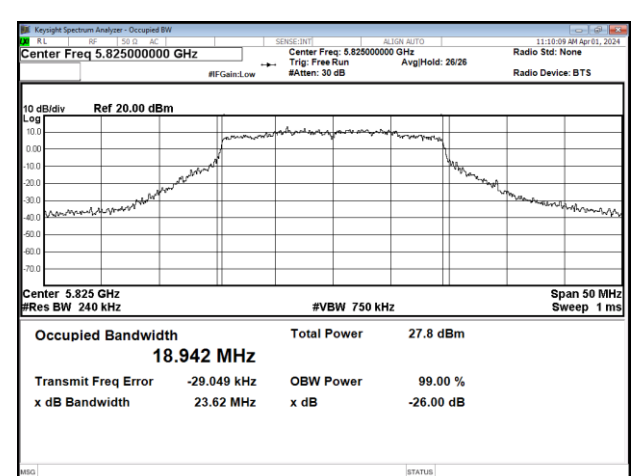


Modulation Type: 802.11ac, VHT80

CH155

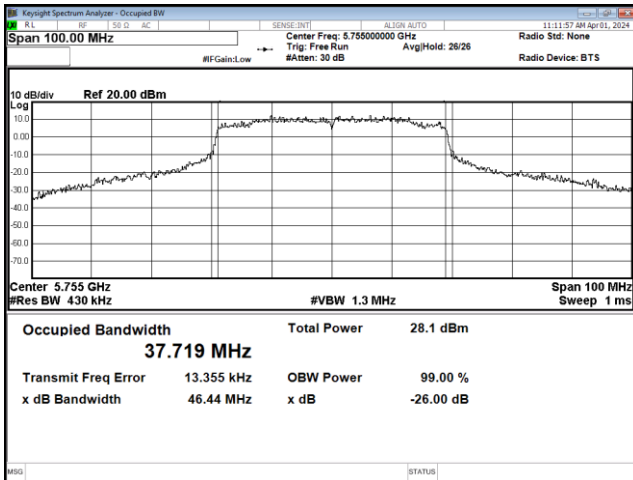


CH165

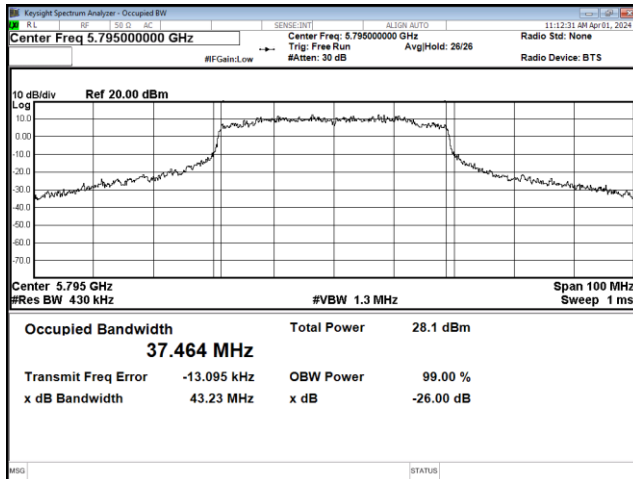




99% Occupied Bandwidth
Modulation Type: 802.11ax HE40
CH151

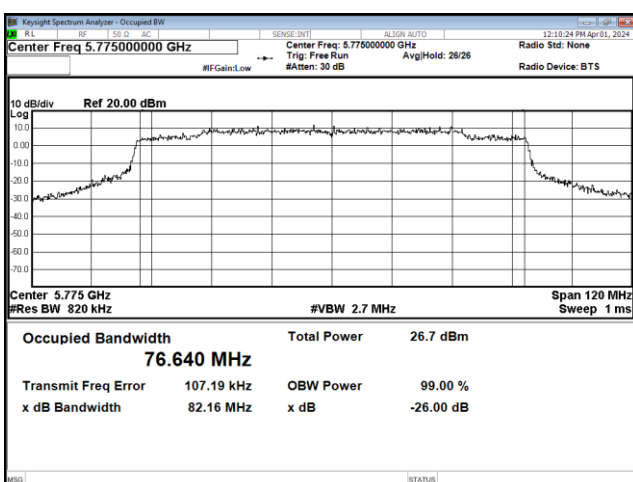


CH159



Modulation Type: 802.11ax HE80

CH155

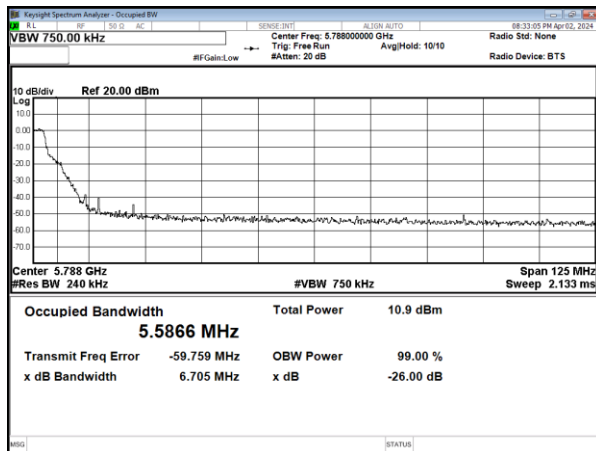




99% Occupied Bandwidth (UNII Emission Bandwidth Result (Extends across 5725MHz band))

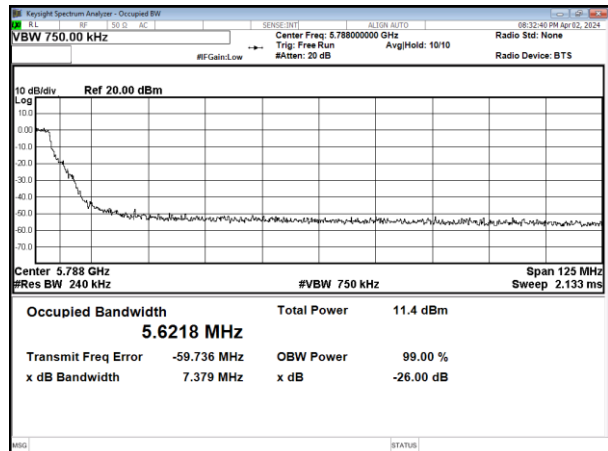
Modulation Standard: 802.11a

CH144



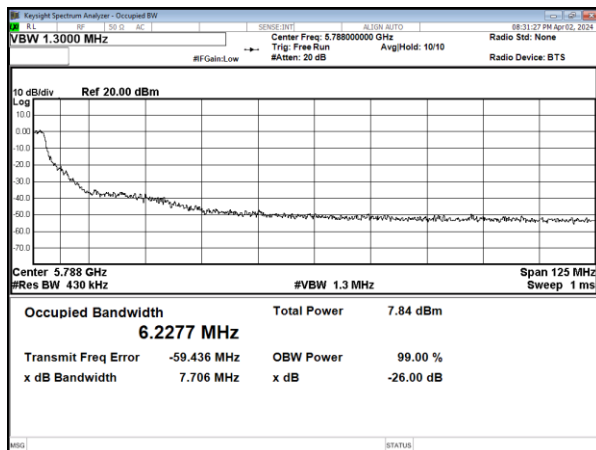
Modulation Standard: 802.11ac VHT20

CH144



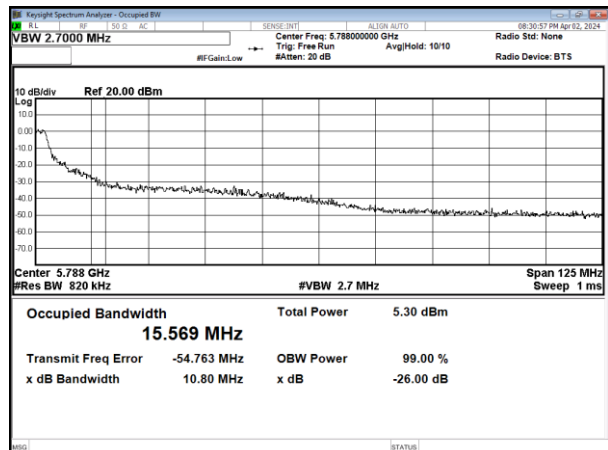
Modulation Standard: 802.11ac VHT40

CH142



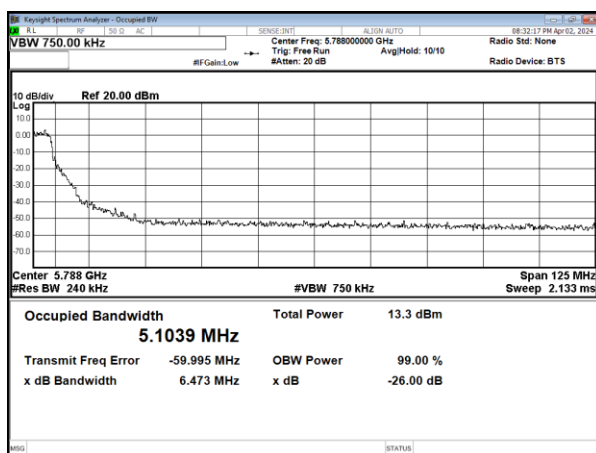
Modulation Standard: 802.11ac VHT80

CH138



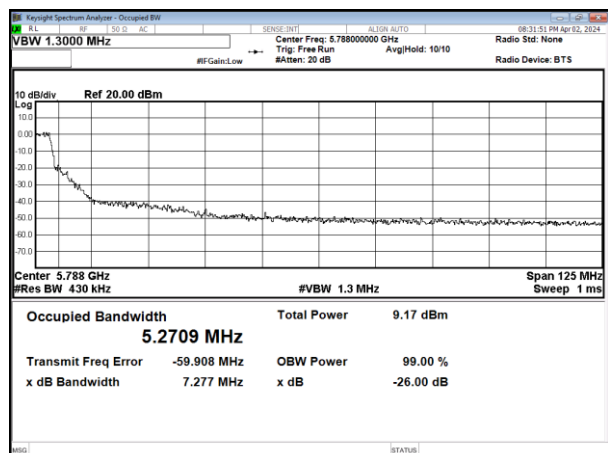
Modulation Standard: 802.11 ax HE20

CH144



Modulation Standard: 802.11 ax HE40

CH142

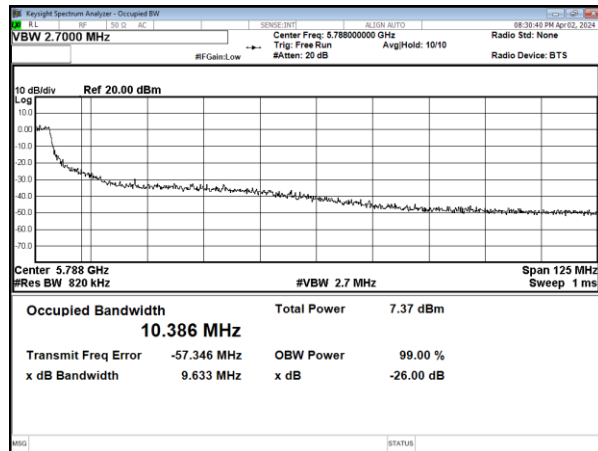




99% Occupied Bandwidth (UNII Emission Bandwidth Result (Extends across 5725MHz band))

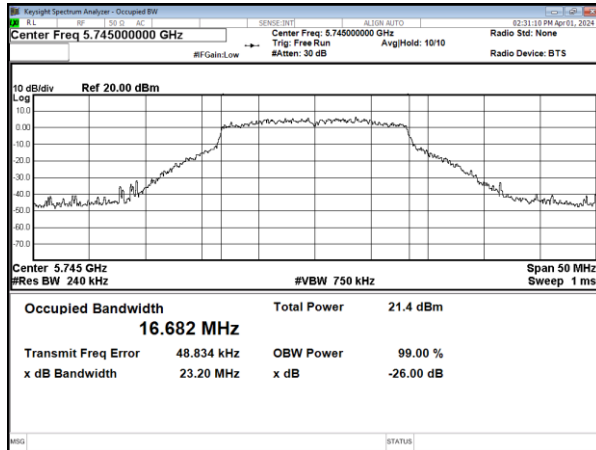
Modulation Standard: 802.11 ax HE80

CH138

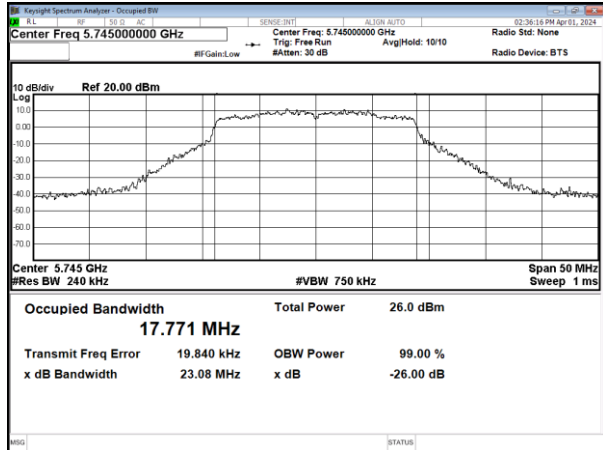




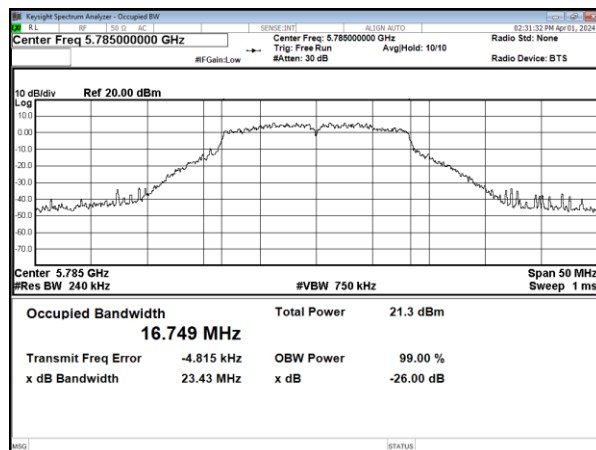
MIMO (ANT B)
99% Occupied Bandwidth
Modulation Type: 802.11a
CH149



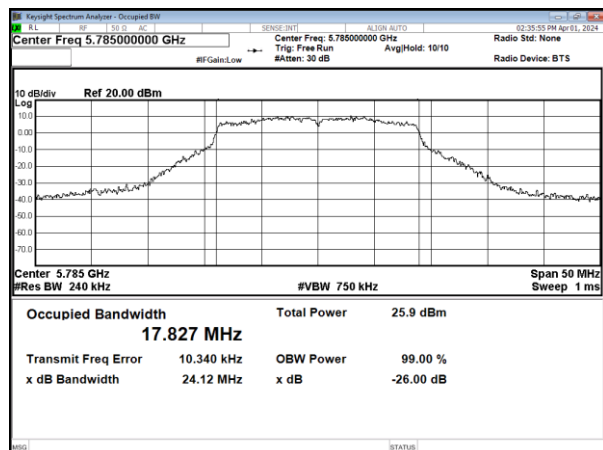
Modulation Type: 802.11ac, VHT20
CH149



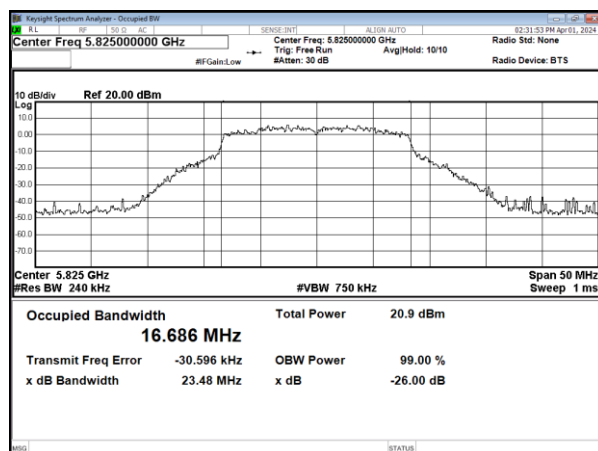
CH157



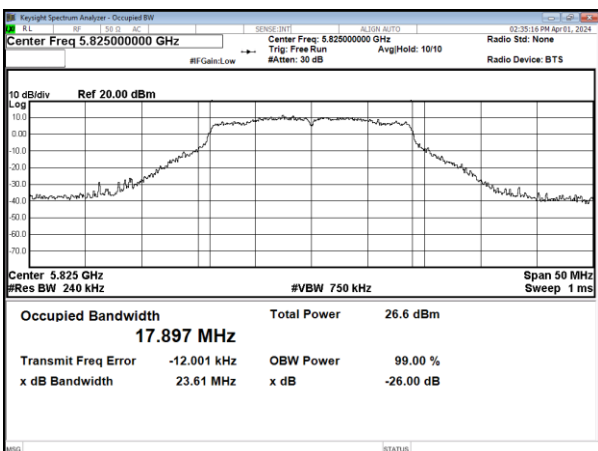
CH157



CH165

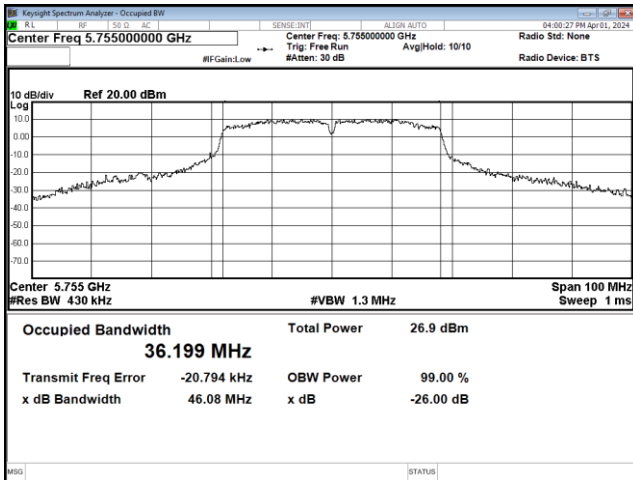


CH165

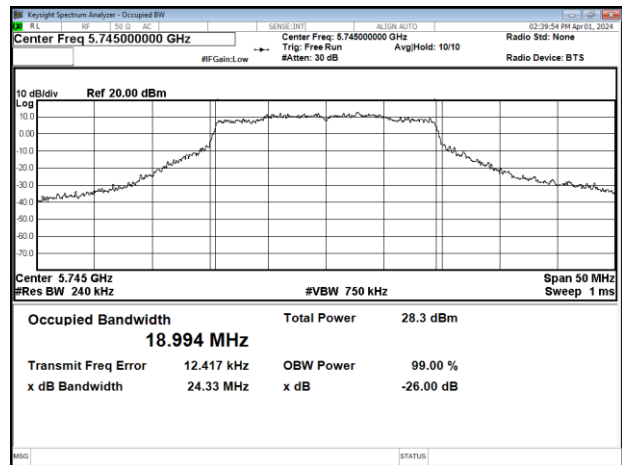




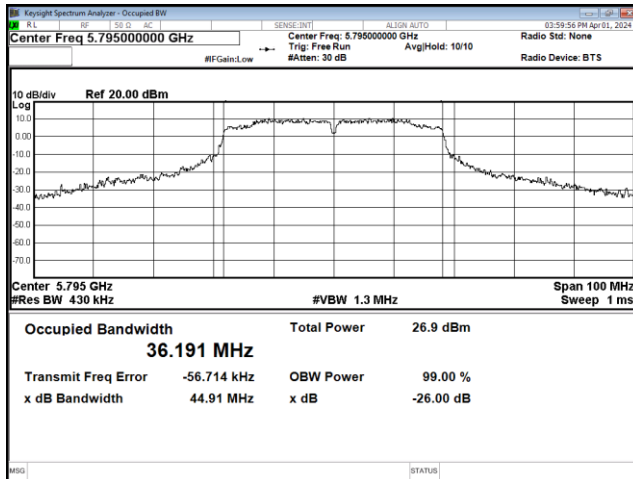
99% Occupied Bandwidth
Modulation Type: 802.11ac, VHT40
CH151



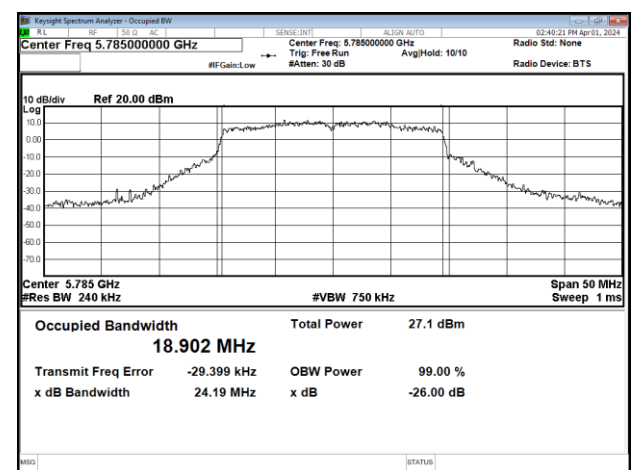
Modulation Type: 802.111ax HE20
CH149



CH159

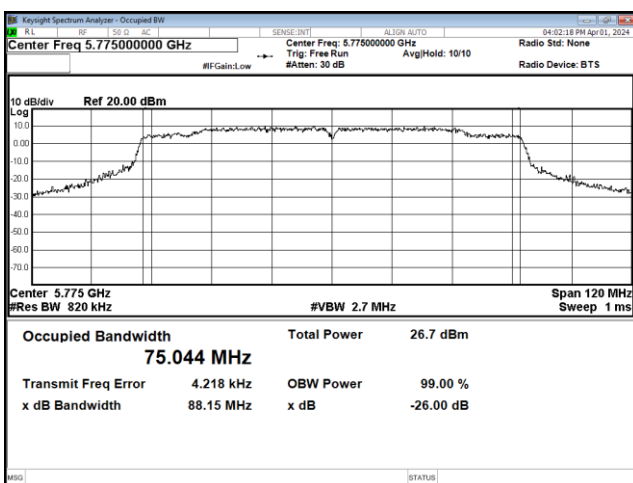


CH157

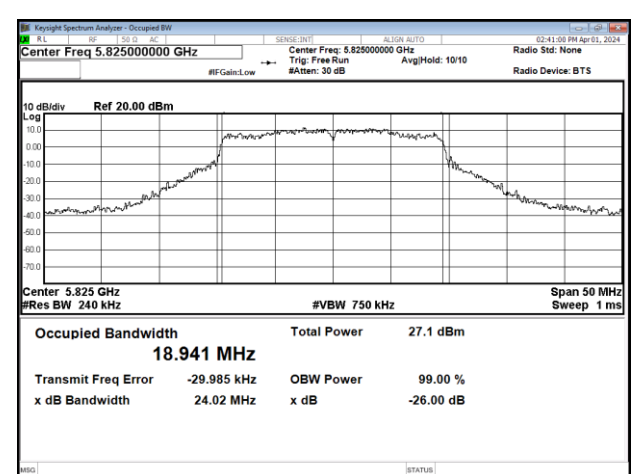


Modulation Type: 802.11ac, VHT80

CH155

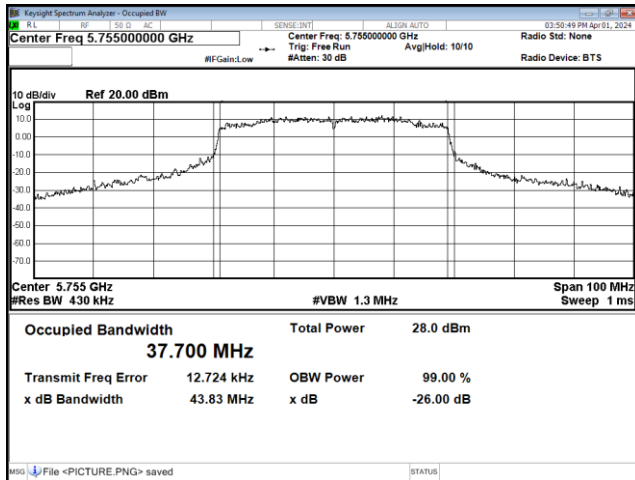


CH165

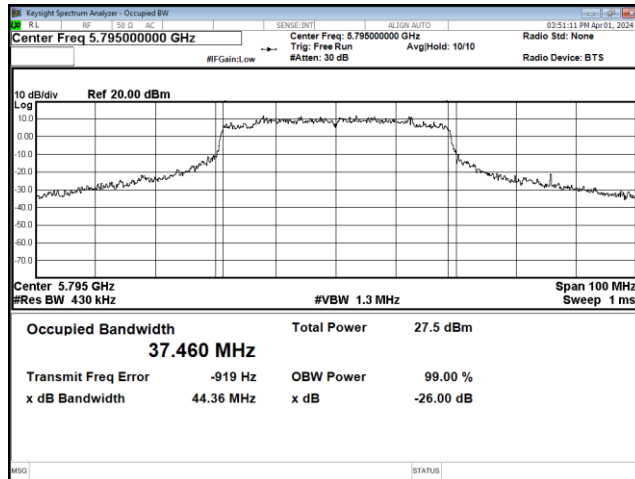




99% Occupied Bandwidth
Modulation Type: 802.11ax HE40
CH151

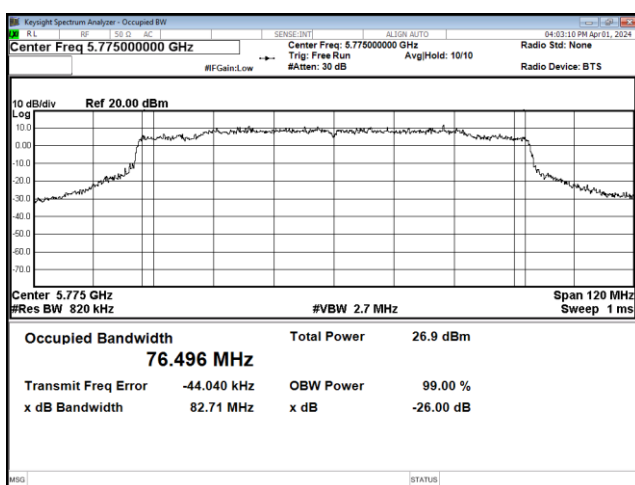


CH159



Modulation Type: 802.11ax HE80

CH155





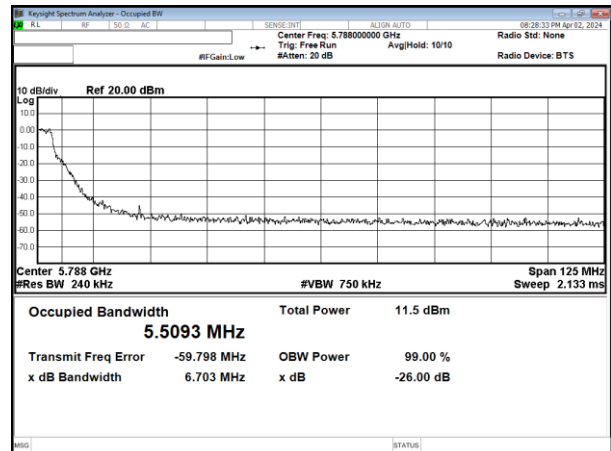
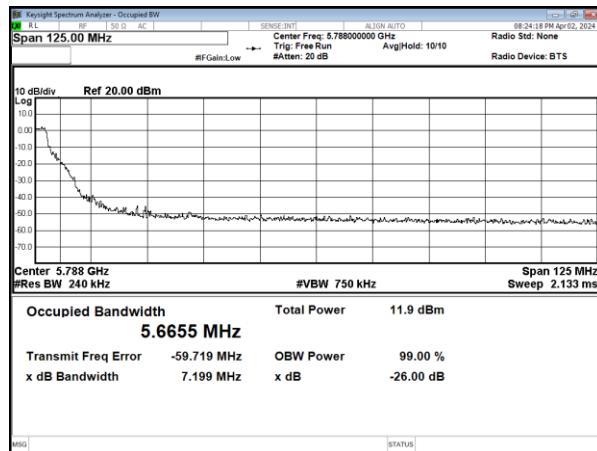
99% Occupied Bandwidth (UNII Emission Bandwidth Result (Extends across 5725MHz band))

Modulation Standard: 802.11a

Modulation Standard: 802.11ac VHT20

CH144

CH144

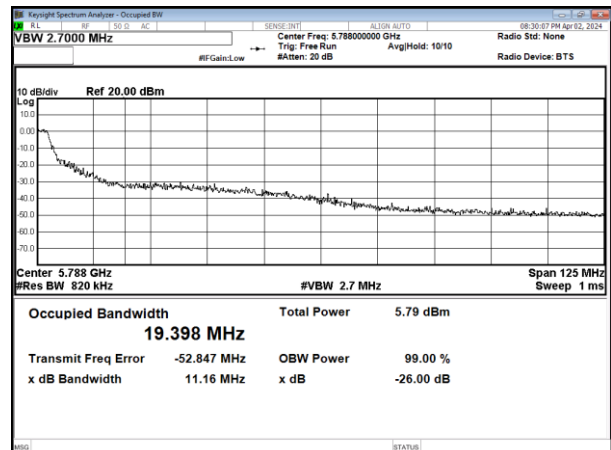
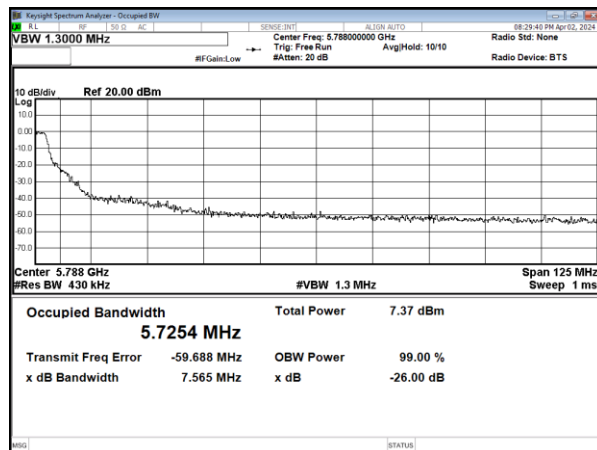


Modulation Standard: 802.11ac VHT40

Modulation Standard: 802.11ac VHT80

CH142

CH138

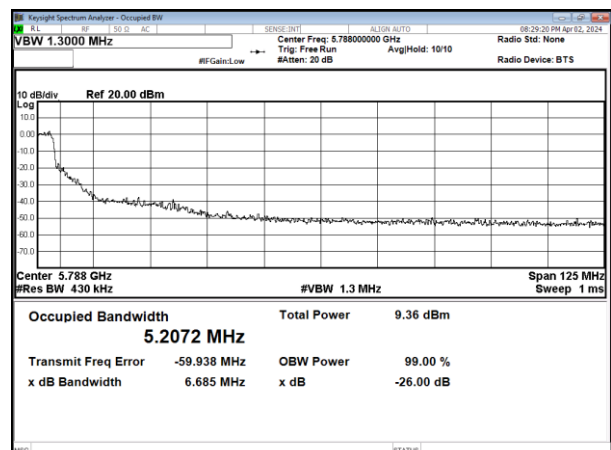
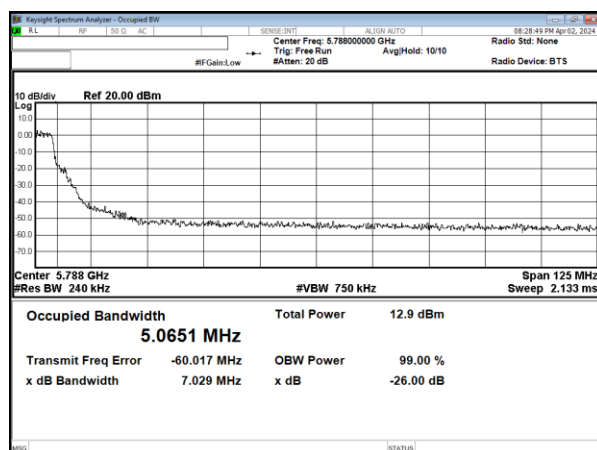


Modulation Standard: 802.11 ax HE20

Modulation Standard: 802.11 ax HE40

CH144

CH142

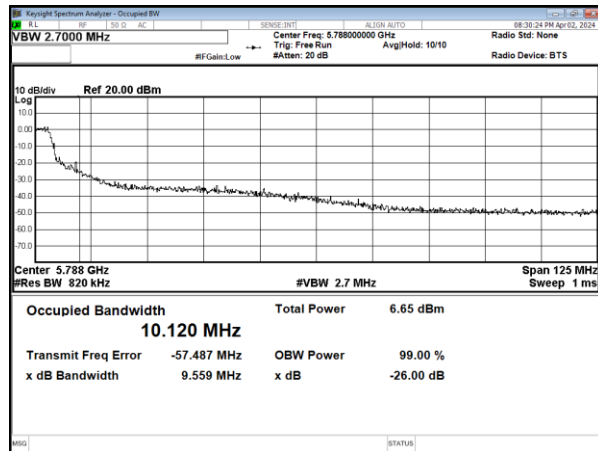




99% Occupied Bandwidth (UNII Emission Bandwidth Result (Extends across 5725MHz band))

Modulation Standard: 802.11 ax HE80

CH138





9. 26dB Bandwidth & 99% Occupied Bandwidth

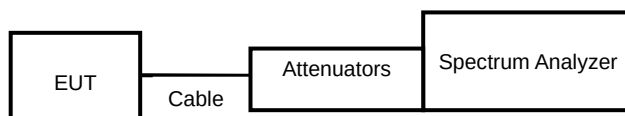
9.1. Test Limit

None; for reporting purposes only.

9.2. Test Procedure

Reference to 789033 v02r01 General UNII Test Procedures New Rules v01: The transmitter output is connected to a spectrum analyzer with the RBW = approximately 1% of the emission bandwidth, the VBW $\geq 3 \times$ RBW, peak detector and max hold.

9.3. Test Setup Layout



**9.4. Test Result and Data (26dB Bandwidth)****In the 5.2G Band**

Mode	Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
			ANT A	ANT B
802.11a	36	5180	24.53	24.21
	44	5220	24.09	23.77
	48	5240	23.37	23.39
802.11ac VHT20	36	5180	23.94	24.36
	44	5220	23.54	24.61
	48	5240	24.24	24.6
802.11ac VHT40	38	5190	42.99	43.31
	46	5230	43.91	44.67
802.11ac VHT80	42	5210	85.67	85.98
11ac VHT160	50	5250	163.5	162.3
802.11ax HE20	36	5180	24.12	23.67
	44	5220	23.76	23.42
	48	5240	24.13	24.62
802.11ax HE40	38	5190	42.87	43.14
	46	5230	42.63	41.89
802.11ax HE80	42	5210	82.09	82.11
11ax HE160	50	5250	163.5	163.5

In the 5.3G Band

Mode	Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
			ANT A	ANT B
802.11a	52	5260	23.65	23.83
	60	5300	23.93	23.58
	64	5320	24.31	23.1
802.11ac VHT20	52	5260	23.42	23.49
	60	5300	24.76	23.59
	64	5320	23.83	23.75
802.11ac VHT40	54	5270	45.48	45.24
	62	5310	45.32	42.72
802.11ac VHT80	58	5290	84.29	83.09
802.11ax HE20	52	5260	23.55	24.41
	60	5300	23.36	23.36
	64	5320	23.79	23.12
802.11ax HE40	54	5270	44.21	42.16
	62	5310	42.18	42.4
802.11ax HE80	58	5290	82.6	82.82

**In the 5.5G Band**

Mode	Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
			ANT A	ANT B
802.11a	100	5500	23.82	23.89
	116	5580	23.91	23.67
	140	5700	23.79	23.79
802.11ac VHT20	100	5500	23.50	24.49
	116	5580	23.66	23.37
	140	5700	23.21	24.28
802.11ac VHT40	102	5510	43.50	41.93
	110	5550	45.29	48.59
	134	5670	43.48	42.84
802.11ac VHT80	106	5530	83.80	83.76
	122	5610	90.22	90.27
802.11ac VHT160	114	5570	163	163.8
802.11ax HE20	100	5500	23.45	24.47
	116	5580	23.55	23.1
	140	5700	23.67	23.3
802.11ax HE40	102	5510	42.58	40.88
	110	5550	43.48	41.98
	134	5670	43.28	42.38
802.11ax HE80	106	5530	82.54	81.6
	122	5610	83.23	84.56
802.11ax HE160	114	5570	162.3	164.3

UNII Emission Bandwidth Result (Within 5470-5725MHz band)

Mode	Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
			ANT A	ANT B
11a	144	5720	17.48	17.51
11ac VHT20	144	5720	17.27	17.80
11ac VHT40	142	5710	36.67	36.18
11ac VHT80	138	5690	77.48	77.19
11ax HE20	144	5720	16.91	16.98
11ax HE40	142	5710	36.63	35.86
11ax HE80	138	5690	78.15	76.38

**9.5. Test Result and Data (99% Occupied Bandwidth)****In the 5.2G Band**

Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
			ANT A	ANT B
802.11a	36	5180	16.83	16.72
	44	5220	16.73	16.69
	48	5240	16.72	16.72
802.11ac VHT20	36	5180	17.82	17.77
	44	5220	17.82	17.94
	48	5240	17.88	17.86
802.11ac VHT40	38	5190	36.06	36.12
	46	5230	36.19	36.12
802.11ac VHT80	42	5210	75.10	75.19
802.11ac VHT160	50	5250	153.31	153.22
802.11ax HE20	36	5180	18.98	18.95
	44	5220	18.92	18.95
	48	5240	18.97	18.93
802.11ax HE40	38	5190	37.43	37.43
	46	5230	37.64	37.63
802.11ax HE80	42	5210	76.71	76.79
802.11ax HE160	50	5250	154.57	154.79

In the 5.3G Band

Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
			ANT A	ANT B
802.11a	52	5260	16.73	16.69
	60	5300	16.71	16.73
	64	5320	16.72	16.74
802.11ac VHT20	52	5260	17.75	17.82
	60	5300	17.95	17.82
	64	5320	17.77	17.85
802.11ac VHT40	54	5270	36.25	36.14
	62	5310	35.99	36.05
802.11ac VHT80	58	5290	75.06	75.03
802.11ax HE20	52	5260	18.95	18.97
	60	5300	18.90	18.94
	64	5320	18.96	18.82
802.11ax HE40	54	5270	37.63	37.65
	62	5310	37.40	37.55
802.11ax HE80	58	5290	76.74	76.64

