



Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ ANT-0

5190 MHz

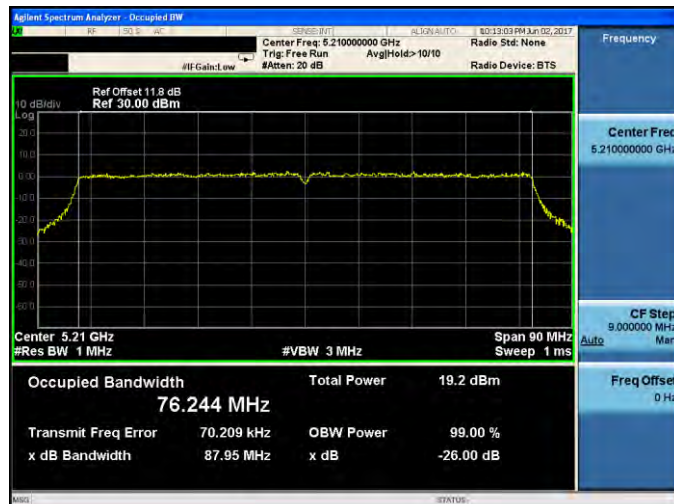


5230 MHz



Mode 5: IEEE 802.11ac 80MHz Continuous TX mode_ ANT-0

5210 MHz





Mode 2: IEEE 802.11a Continuous TX mode_ ANT-1

5180 MHz



5200 MHz



5240 MHz





Mode 3: IEEE 802.11ac 20MHz Continuous TX mode_ ANT-1

5180 MHz	 Ref Offset 11.8 dB Ref 30.00 dBm Center 5.18 GHz #Res BW 300 kHz #VBW 1 MHz Span 25 MHz Sweep 1 ms Occupied Bandwidth 17.641 MHz Total Power 25.1 dBm Transmit Freq Error 10.113 kHz OBW Power 99.00 % x dB Bandwidth 21.85 MHz x dB -26.00 dB
5200 MHz	 Ref Offset 11.8 dB Ref 30.00 dBm Center 5.2 GHz #Res BW 300 kHz #VBW 1 MHz Span 45 MHz Sweep 1 ms Occupied Bandwidth 23.887 MHz Total Power 27.5 dBm Transmit Freq Error 1.5771 MHz OBW Power 99.00 % x dB Bandwidth 41.26 MHz x dB -26.00 dB
5240 MHz	 Ref Offset 11.8 dB Ref 30.00 dBm Center 5.24 GHz #Res BW 300 kHz #VBW 1 MHz Span 45 MHz Sweep 1 ms Occupied Bandwidth 25.224 MHz Total Power 27.6 dBm Transmit Freq Error 1.7552 MHz OBW Power 99.00 % x dB Bandwidth 41.53 MHz x dB -26.00 dB



Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ ANT-1

5190 MHz	Ref Offset 11.8 dB Ref 30.00 dBm Center 5.19 GHz #Res BW 1 MHz #VBW 3 MHz Span 50 MHz Sweep 1 ms Occupied Bandwidth 36.172 MHz Total Power 24.3 dBm Transmit Freq Error -16.556 kHz OBW Power 99.00 % x dB Bandwidth 39.79 MHz x dB -26.00 dB
5230 MHz	Ref Offset 11.8 dB Ref 30.00 dBm Center 5.23 GHz #Res BW 1 MHz #VBW 3 MHz Span 85 MHz Sweep 1 ms Occupied Bandwidth 42.582 MHz Total Power 27.1 dBm Transmit Freq Error 2.6368 MHz OBW Power 99.00 % x dB Bandwidth 77.80 MHz x dB -26.00 dB

Mode 5: IEEE 802.11ac 80MHz Continuous TX mode_ ANT-1

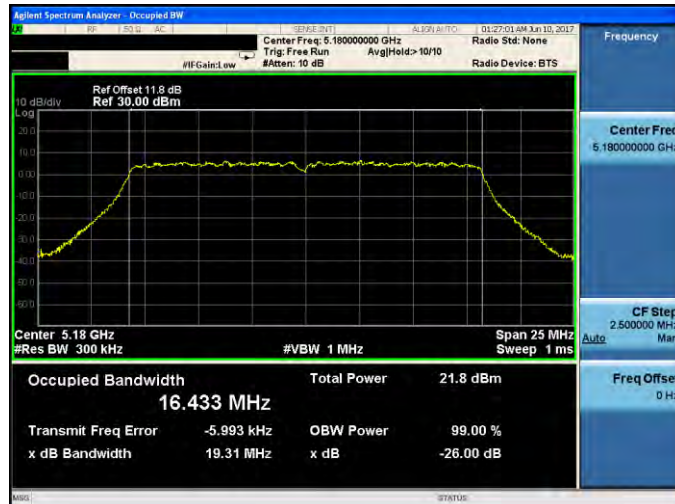
5210 MHz	Ref Offset 11.8 dB Ref 30.00 dBm Center 5.21 GHz #Res BW 1 MHz #VBW 3 MHz Span 90 MHz Sweep 1 ms Occupied Bandwidth 76.081 MHz Total Power 19.3 dBm Transmit Freq Error -29.730 kHz OBW Power 99.00 % x dB Bandwidth 86.50 MHz x dB -26.00 dB
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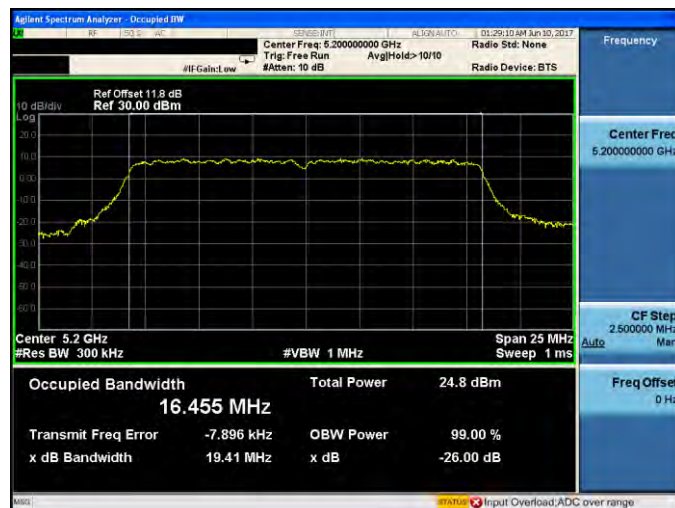
Beamforming on

Mode 2: IEEE 802.11a Continuous TX mode _ ANT-0

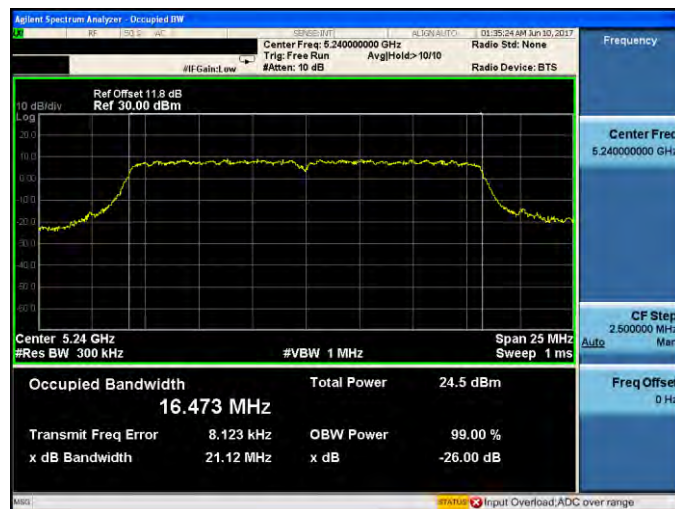
5180 MHz



5200 MHz



5240 MHz



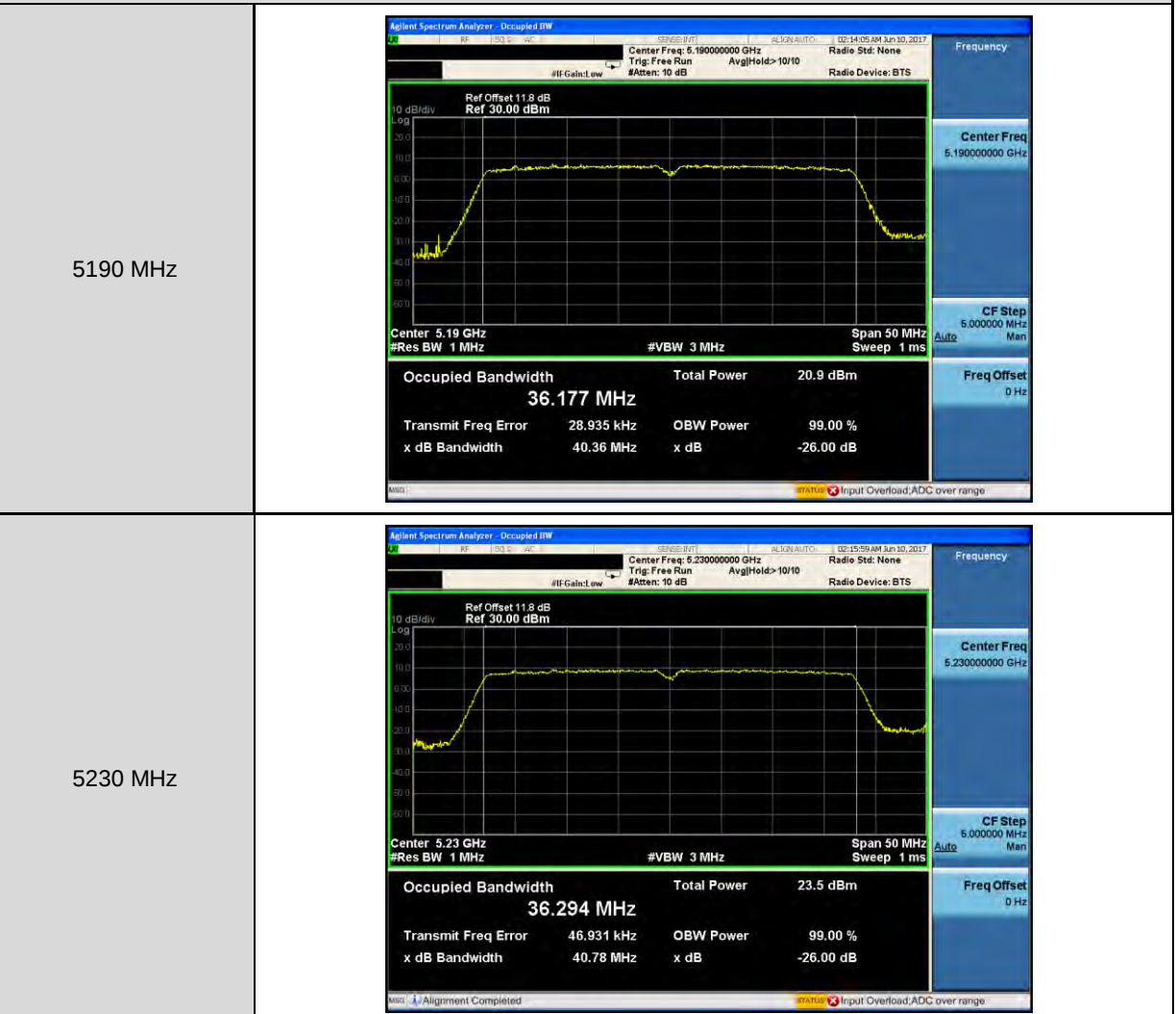


Mode 3: IEEE 802.11ac 20MHz Continuous TX mode_ ANT-0

5180 MHz	Ref Offset 11.8 dB Ref 30.00 dBm Center 5.18 GHz #Res BW 300 kHz #VBW 1 MHz Span 25 MHz Sweep 1 ms Occupied Bandwidth 17.608 MHz Total Power 21.8 dBm Transmit Freq Error -2.076 kHz OBW Power 99.00 % x dB Bandwidth 20.20 MHz x dB -26.00 dB Frequency Center Freq 5.18000000 GHz CF Step 2.500000 MHz Auto Man Freq Offset 0 Hz STATUS: Input Overload, ADC over range
5200 MHz	Ref Offset 11.8 dB Ref 30.00 dBm Center 5.2 GHz #Res BW 300 kHz #VBW 1 MHz Span 25 MHz Sweep 1 ms Occupied Bandwidth 17.688 MHz Total Power 25.6 dBm Transmit Freq Error 9.175 kHz OBW Power 99.00 % x dB Bandwidth 22.99 MHz x dB -26.00 dB Frequency Center Freq 5.20000000 GHz CF Step 2.500000 MHz Auto Man Freq Offset 0 Hz STATUS: Input Overload, ADC over range
5240 MHz	Ref Offset 11.8 dB Ref 30.00 dBm Center 5.24 GHz #Res BW 300 kHz #VBW 1 MHz Span 25 MHz Sweep 1 ms Occupied Bandwidth 17.653 MHz Total Power 25.4 dBm Transmit Freq Error -4.220 kHz OBW Power 99.00 % x dB Bandwidth 20.38 MHz x dB -26.00 dB Frequency Center Freq 5.24000000 GHz CF Step 2.500000 MHz Auto Man Freq Offset 0 Hz STATUS: Input Overload, ADC over range



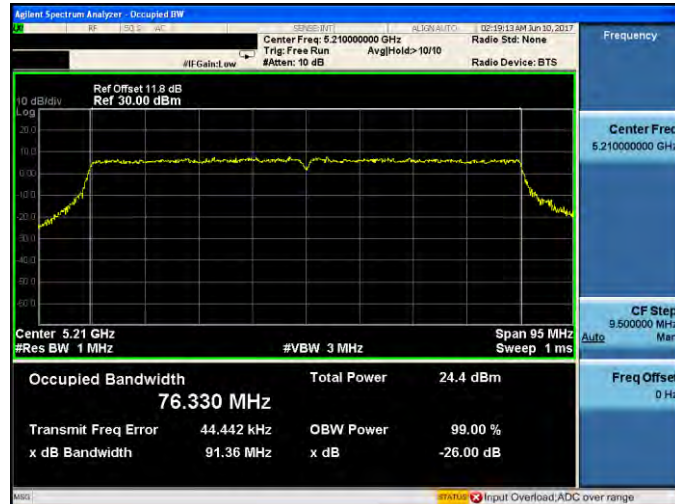
Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ ANT-0





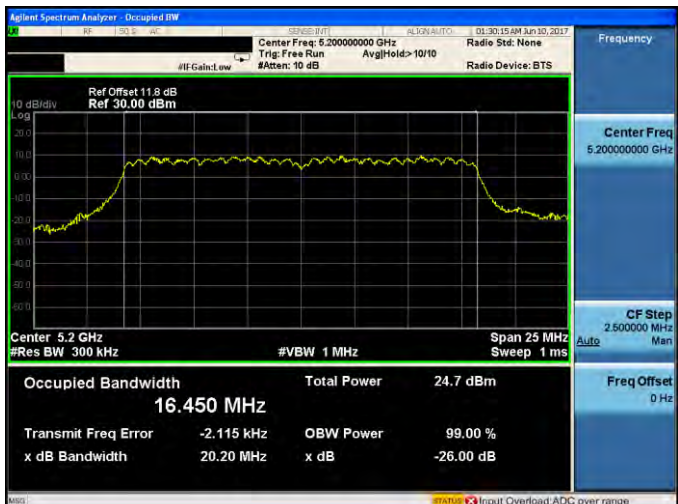
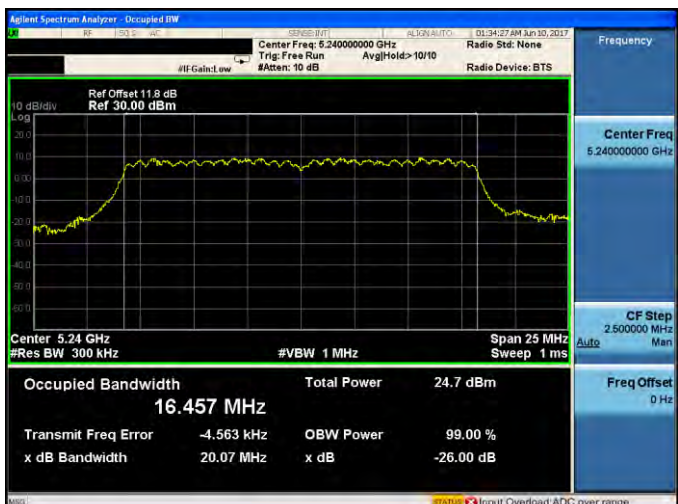
Mode 5: IEEE 802.11ac 80MHz Continuous TX mode_ ANT-0

5210 MHz



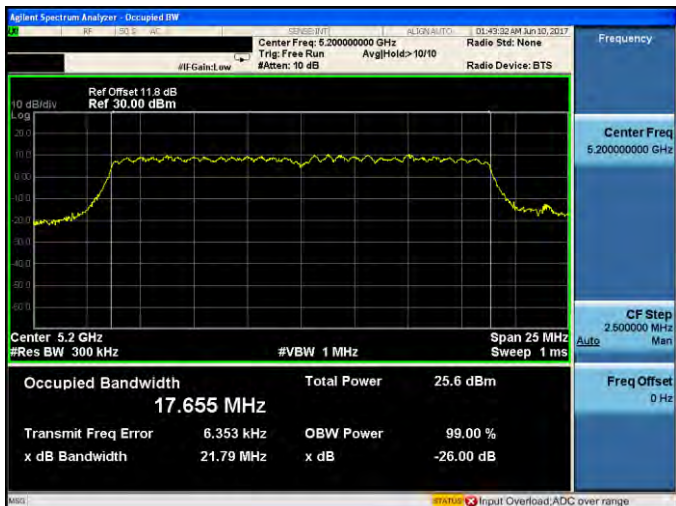
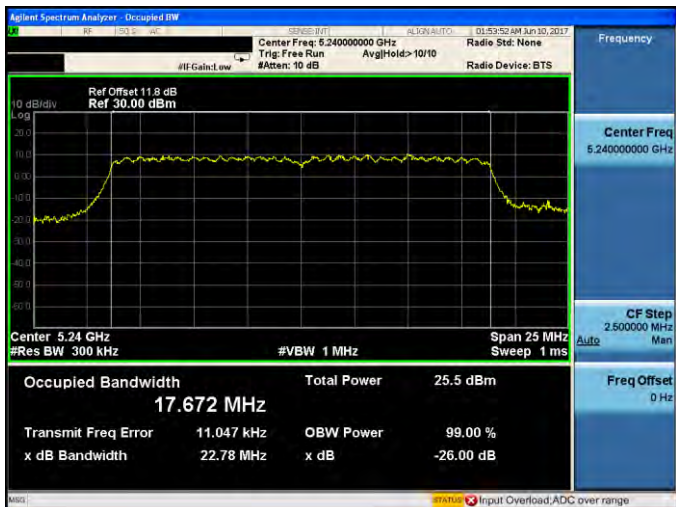


Mode 2: IEEE 802.11a Continuous TX mode_ ANT-1

5180 MHz	 Ref Offset 11.8 dB Ref 30.00 dBm Center 5.18 GHz #Res BW 300 kHz #VBW 1 MHz Span 25 MHz Sweep 1 ms <table><tr><td>Occupied Bandwidth</td><td>Total Power</td></tr><tr><td>16.427 MHz</td><td>22.0 dBm</td></tr><tr><td>Transmit Freq Error</td><td>OBW Power</td></tr><tr><td>-8.128 kHz</td><td>99.00 %</td></tr><tr><td>x dB Bandwidth</td><td>x dB</td></tr><tr><td>19.01 MHz</td><td>-26.00 dB</td></tr></table>	Occupied Bandwidth	Total Power	16.427 MHz	22.0 dBm	Transmit Freq Error	OBW Power	-8.128 kHz	99.00 %	x dB Bandwidth	x dB	19.01 MHz	-26.00 dB
Occupied Bandwidth	Total Power												
16.427 MHz	22.0 dBm												
Transmit Freq Error	OBW Power												
-8.128 kHz	99.00 %												
x dB Bandwidth	x dB												
19.01 MHz	-26.00 dB												
5200 MHz	 Ref Offset 11.8 dB Ref 30.00 dBm Center 5.2 GHz #Res BW 300 kHz #VBW 1 MHz Span 25 MHz Sweep 1 ms <table><tr><td>Occupied Bandwidth</td><td>Total Power</td></tr><tr><td>16.450 MHz</td><td>24.7 dBm</td></tr><tr><td>Transmit Freq Error</td><td>OBW Power</td></tr><tr><td>-2.115 kHz</td><td>99.00 %</td></tr><tr><td>x dB Bandwidth</td><td>x dB</td></tr><tr><td>20.20 MHz</td><td>-26.00 dB</td></tr></table> STATUS Input Overload/ADC over range	Occupied Bandwidth	Total Power	16.450 MHz	24.7 dBm	Transmit Freq Error	OBW Power	-2.115 kHz	99.00 %	x dB Bandwidth	x dB	20.20 MHz	-26.00 dB
Occupied Bandwidth	Total Power												
16.450 MHz	24.7 dBm												
Transmit Freq Error	OBW Power												
-2.115 kHz	99.00 %												
x dB Bandwidth	x dB												
20.20 MHz	-26.00 dB												
5240 MHz	 Ref Offset 11.8 dB Ref 30.00 dBm Center 5.24 GHz #Res BW 300 kHz #VBW 1 MHz Span 25 MHz Sweep 1 ms <table><tr><td>Occupied Bandwidth</td><td>Total Power</td></tr><tr><td>16.457 MHz</td><td>24.7 dBm</td></tr><tr><td>Transmit Freq Error</td><td>OBW Power</td></tr><tr><td>-4.563 kHz</td><td>99.00 %</td></tr><tr><td>x dB Bandwidth</td><td>x dB</td></tr><tr><td>20.07 MHz</td><td>-26.00 dB</td></tr></table> STATUS Input Overload/ADC over range	Occupied Bandwidth	Total Power	16.457 MHz	24.7 dBm	Transmit Freq Error	OBW Power	-4.563 kHz	99.00 %	x dB Bandwidth	x dB	20.07 MHz	-26.00 dB
Occupied Bandwidth	Total Power												
16.457 MHz	24.7 dBm												
Transmit Freq Error	OBW Power												
-4.563 kHz	99.00 %												
x dB Bandwidth	x dB												
20.07 MHz	-26.00 dB												

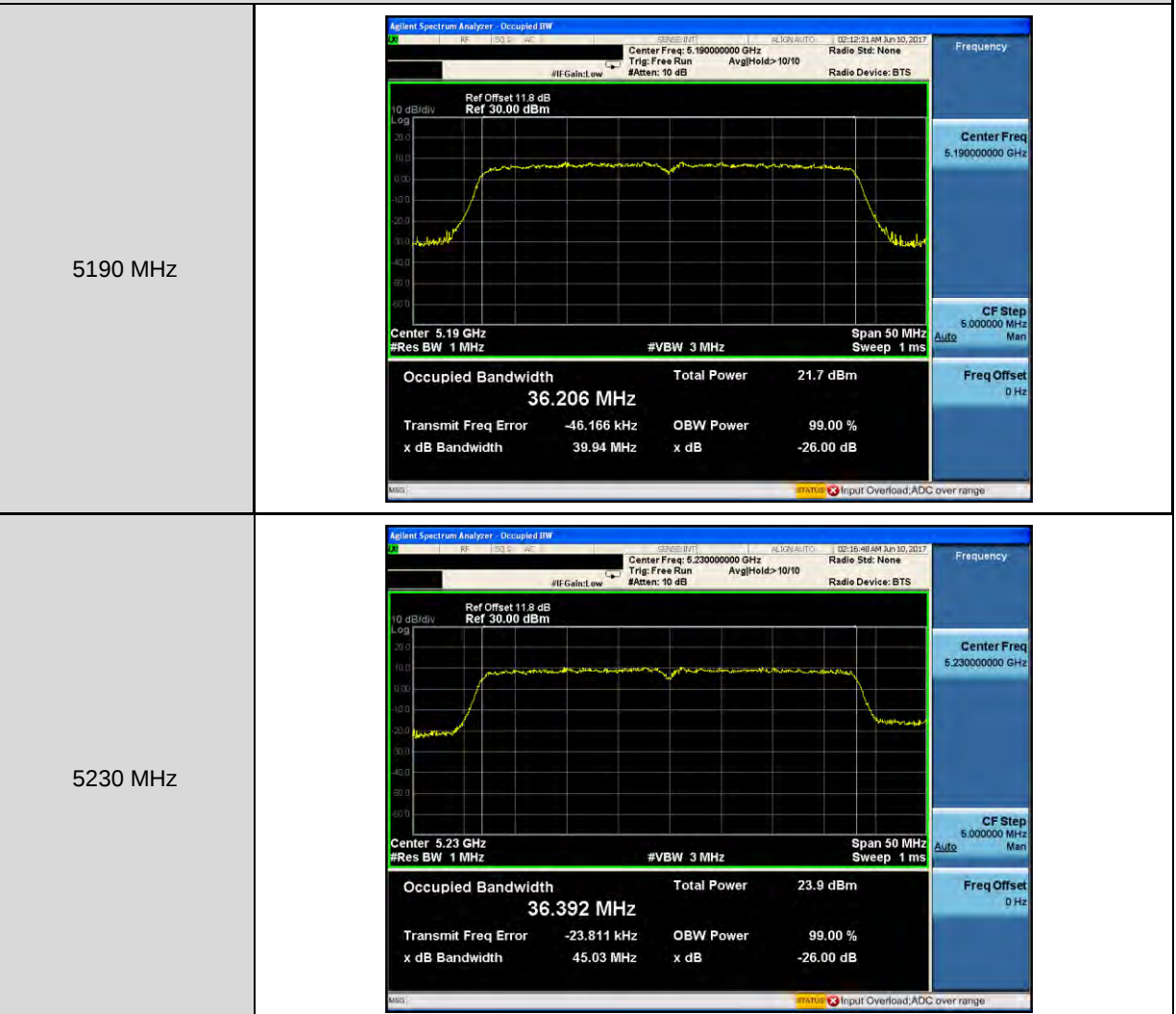


Mode 3: IEEE 802.11ac 20MHz Continuous TX mode_ ANT-1

5180 MHz	 Ref Offset 11.8 dB Ref 30.00 dBm Center 5.18 GHz #Res BW 300 kHz #VBW 1 MHz Span 25 MHz Sweep 1 ms Occupied Bandwidth 17.616 MHz Total Power 21.9 dBm Transmit Freq Error 4.655 kHz OBW Power 99.00 % x dB Bandwidth 19.97 MHz x dB -26.00 dB Center Freq 5.18000000 GHz CF Step 2.500000 MHz Freq Offset 0 Hz STATUS: Input Overload, ADC over range
5200 MHz	 Ref Offset 11.8 dB Ref 30.00 dBm Center 5.2 GHz #Res BW 300 kHz #VBW 1 MHz Span 25 MHz Sweep 1 ms Occupied Bandwidth 17.655 MHz Total Power 25.6 dBm Transmit Freq Error 6.353 kHz OBW Power 99.00 % x dB Bandwidth 21.79 MHz x dB -26.00 dB Center Freq 5.20000000 GHz CF Step 2.500000 MHz Freq Offset 0 Hz STATUS: Input Overload, ADC over range
5240 MHz	 Ref Offset 11.8 dB Ref 30.00 dBm Center 5.24 GHz #Res BW 300 kHz #VBW 1 MHz Span 25 MHz Sweep 1 ms Occupied Bandwidth 17.672 MHz Total Power 25.5 dBm Transmit Freq Error 11.047 kHz OBW Power 99.00 % x dB Bandwidth 22.78 MHz x dB -26.00 dB Center Freq 5.24000000 GHz CF Step 2.500000 MHz Freq Offset 0 Hz STATUS: Input Overload, ADC over range



Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ ANT-1





Mode 5: IEEE 802.11ac 80MHz Continuous TX mode_ ANT-1

5210 MHz



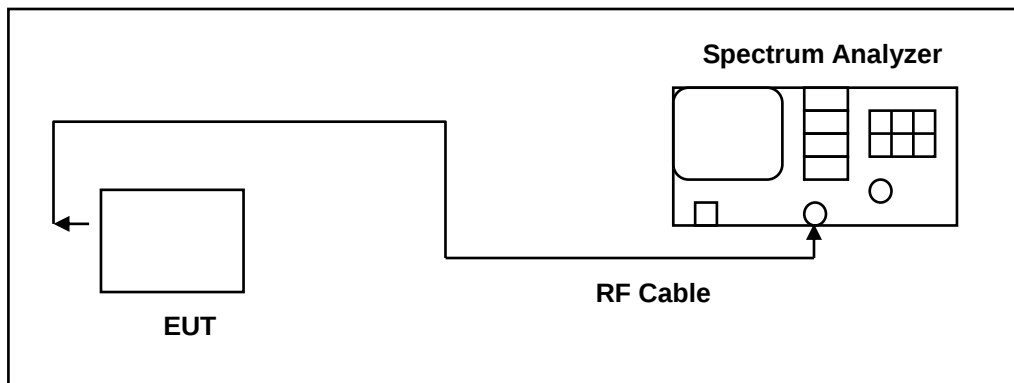
4.6. 6dB RF Bandwidth Measurement

■ Limit

6dB RF Bandwidth

Systems using digital modulation techniques may operate in the 5725~5850MHz bands. The minimum 6 dB band-width shall be at least 500 kHz.

■ Test Setup



■ Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/19/2016	1 year
Test Site	ATL	TE05	TE05	N.C.R.	-----

Note: N.C.R. = No Calibration Request.

■ Test Procedure

6dB RF Bandwidth

The EUT tested to UNII test procedure of KDB789033 D02 for compliance to FCC 47CFR 15.407 requirements.

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A peak output reading was taken, a DISPLAY line was drawn 6 dB lower than peak level. The 6 dB bandwidth was determined from where the channel output spectrum intersected the display line.

The test was performed at 3 channels.

Test Result

Test Item	6dB RF Bandwidth		
Test Mode	Mode 2: IEEE 802.11a Continuous TX mode		
Frequency (MHz)	6dB Bandwidth (kHz)		Limit (kHz)
	ANT-0	ANT-1	
5745	16340	16290	> 500
5785	16350	16300	> 500
5825	16330	15710	> 500

Test Item	6dB RF Bandwidth		
Test Mode	Mode 3: IEEE 802.11ac 20MHz Continuous TX mode		
Frequency (MHz)	6dB Bandwidth (kHz)		Limit (kHz)
	ANT-0	ANT-1	
5745	17600	16640	> 500
5785	17580	17530	> 500
5825	17560	17150	> 500

Test Item	6dB RF Bandwidth		
Test Mode	Mode 4: IEEE 802.11ac 40MHz Continuous TX mode		
Frequency (MHz)	6dB Bandwidth (kHz)		Limit (kHz)
	ANT-0	ANT-1	
5755	35300	35690	> 500
5795	35090	35030	> 500

Test Item	6dB RF Bandwidth		
Test Mode	Mode 5: IEEE 802.11ac 80MHz Continuous TX mode		
Frequency (MHz)	6dB Bandwidth (kHz)		Limit (kHz)
	ANT-0	ANT-1	
5775	76400	76380	> 500



Beamforming on

Test Item	6dB RF Bandwidth		
Test Mode	Mode 2: IEEE 802.11a Continuous TX mode		
Frequency (MHz)	6dB Bandwidth (kHz)		Limit (kHz)
	ANT-0	ANT-1	
5745	16360	16360	> 500
5785	16360	16070	> 500
5825	16390	15740	> 500

Test Item	6dB RF Bandwidth		
Test Mode	Mode 3: IEEE 802.11ac 20MHz Continuous TX mode		
Frequency (MHz)	6dB Bandwidth (kHz)		Limit (kHz)
	ANT-0	ANT-1	
5745	17580	17570	> 500
5785	17590	17560	> 500
5825	17590	17560	> 500

Test Item	6dB RF Bandwidth		
Test Mode	Mode 4: IEEE 802.11ac 40MHz Continuous TX mode		
Frequency (MHz)	6dB Bandwidth (kHz)		Limit (kHz)
	ANT-0	ANT-1	
5755	35140	35110	> 500
5795	35140	35420	> 500

Test Item	6dB RF Bandwidth		
Test Mode	Mode 5: IEEE 802.11ac 80MHz Continuous TX mode		
Frequency (MHz)	6dB Bandwidth (kHz)		Limit (kHz)
	ANT-0	ANT-1	
5775	76410	76440	> 500



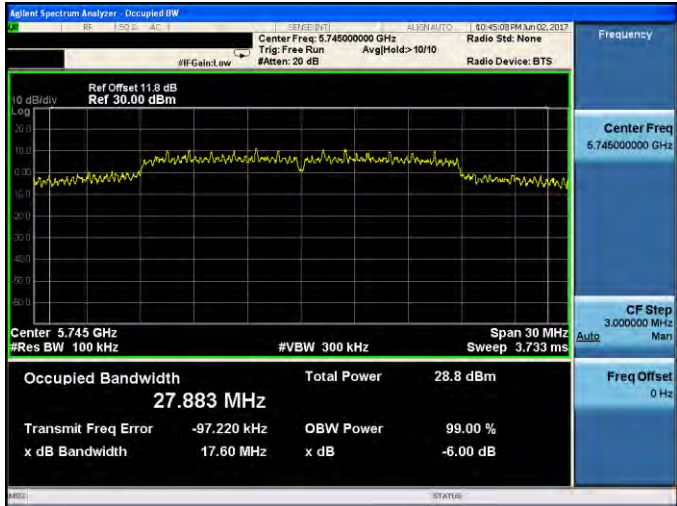
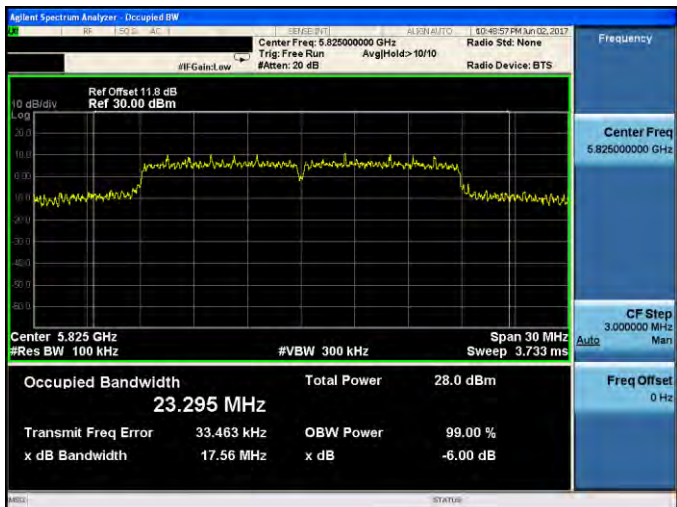
■ Test Graphs

Mode 2: IEEE 802.11a Continuous TX mode_ANT-0

5745 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 5.74500000 GHz Trig: Free Run #IFGain: Low #Atten: 20 dB Radio Std: None Radio Device: BTS Ref Offset 11.8 dB Ref 30.00 dBm Center 5.745 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 3.733 ms Occupied Bandwidth 16.589 MHz Total Power 26.9 dBm Transmit Freq Error -1.755 kHz OBW Power 99.00 % x dB Bandwidth 16.34 MHz x dB -6.00 dB Frequency Center Freq 5.74500000 GHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz
5785 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 5.78500000 GHz Trig: Free Run #IFGain: Low #Atten: 20 dB Radio Std: None Radio Device: BTS Ref Offset 11.8 dB Ref 30.00 dBm Center 5.785 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 3.733 ms Occupied Bandwidth 16.513 MHz Total Power 25.5 dBm Transmit Freq Error 2.188 kHz OBW Power 99.00 % x dB Bandwidth 16.35 MHz x dB -6.00 dB Frequency Center Freq 5.78500000 GHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz
5825 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 5.82500000 GHz Trig: Free Run #IFGain: Low #Atten: 20 dB Radio Std: None Radio Device: BTS Ref Offset 11.8 dB Ref 30.00 dBm Center 5.825 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 3.733 ms Occupied Bandwidth 20.878 MHz Total Power 27.9 dBm Transmit Freq Error 412.38 kHz OBW Power 99.00 % x dB Bandwidth 16.33 MHz x dB -6.00 dB Frequency Center Freq 5.82500000 GHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz

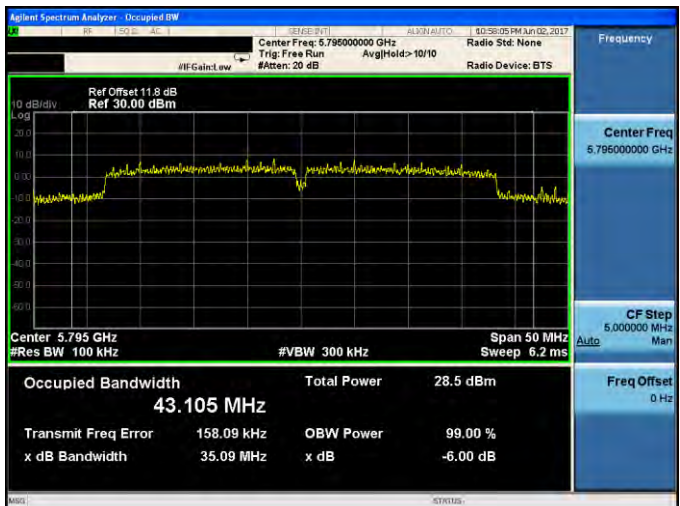


Mode 3: IEEE 802.11ac 20MHz Continuous TX mode_ANT-0

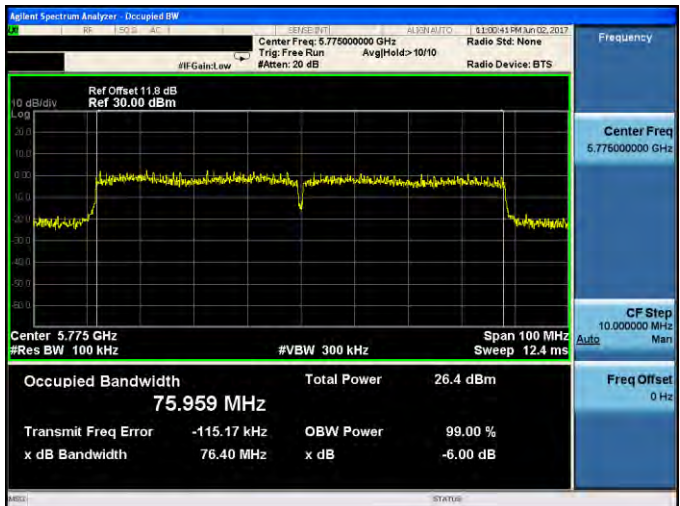
5745 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 5.74500000 GHz Trig: Free Run #IF Gain: Low #Atten: 20 dB Radio Std: None Radio Device: BTS Ref Offset 11.8 dB Ref 30.00 dBm Center 5.745 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 3.733 ms Occupied Bandwidth 27.883 MHz Total Power 28.8 dBm Transmit Freq Error -97.220 kHz OBW Power 99.00 % x dB Bandwidth 17.60 MHz x dB -6.00 dB Frequency Center Freq 5.74500000 GHz CF Step 3.000000 MHz Freq Offset 0 Hz
5785 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 5.78500000 GHz Trig: Free Run #IF Gain: Low #Atten: 20 dB Radio Std: None Radio Device: BTS Ref Offset 11.8 dB Ref 30.00 dBm Center 5.785 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 3.733 ms Occupied Bandwidth 17.673 MHz Total Power 26.1 dBm Transmit Freq Error -6.588 kHz OBW Power 99.00 % x dB Bandwidth 17.58 MHz x dB -6.00 dB Frequency Center Freq 5.78500000 GHz CF Step 3.000000 MHz Freq Offset 0 Hz
5825 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 5.82500000 GHz Trig: Free Run #IF Gain: Low #Atten: 20 dB Radio Std: None Radio Device: BTS Ref Offset 11.8 dB Ref 30.00 dBm Center 5.825 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 3.733 ms Occupied Bandwidth 23.295 MHz Total Power 28.0 dBm Transmit Freq Error 33.463 kHz OBW Power 99.00 % x dB Bandwidth 17.56 MHz x dB -6.00 dB Frequency Center Freq 5.82500000 GHz CF Step 3.000000 MHz Freq Offset 0 Hz



Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ANT-0

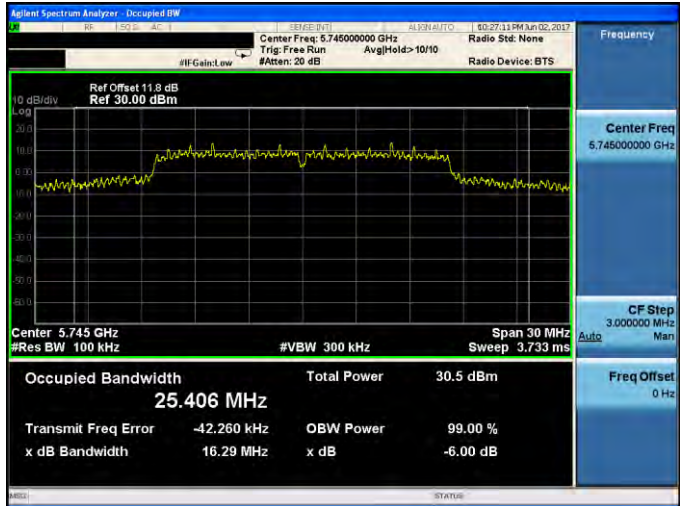
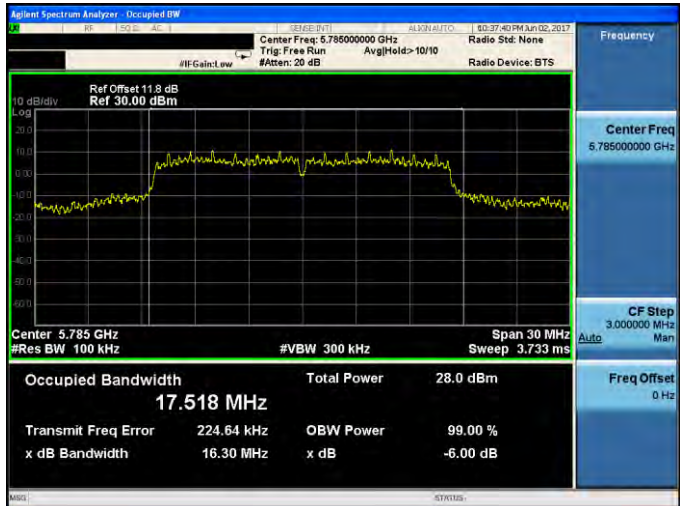
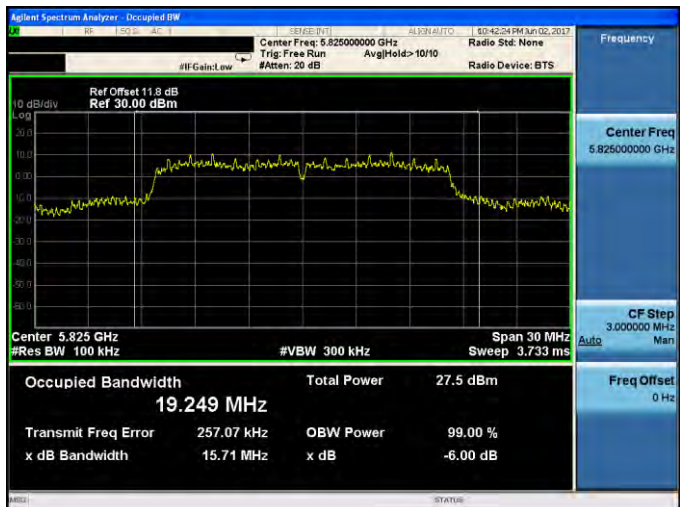
5755 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 5.75500000 GHz Trig: Free Run #IF Gain: Low #Atten: 20 dB Radio Std: None Radio Device: BTS Ref Offset 11.8 dB Ref 30.00 dBm Center 5.755 GHz #Res BW 100 kHz #VBW 300 kHz Span 50 MHz Sweep 6.2 ms Occupied Bandwidth 35.993 MHz Total Power 25.7 dBm Transmit Freq Error -22.224 kHz OBW Power 99.00 % x dB Bandwidth 35.30 MHz x dB -6.00 dB Frequency Center Freq 5.75500000 GHz CF Step 5.000000 MHz Freq Offset 0 Hz
5795 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 5.79500000 GHz Trig: Free Run #IF Gain: Low #Atten: 20 dB Radio Std: None Radio Device: BTS Ref Offset 11.8 dB Ref 30.00 dBm Center 5.795 GHz #Res BW 100 kHz #VBW 300 kHz Span 50 MHz Sweep 6.2 ms Occupied Bandwidth 43.105 MHz Total Power 28.5 dBm Transmit Freq Error 158.09 kHz OBW Power 99.00 % x dB Bandwidth 35.09 MHz x dB -6.00 dB Frequency Center Freq 5.79500000 GHz CF Step 5.000000 MHz Freq Offset 0 Hz

Mode 5: IEEE 802.11ac 80MHz Continuous TX mode_ANT-0

5775 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 5.77500000 GHz Trig: Free Run #IF Gain: Low #Atten: 20 dB Radio Std: None Radio Device: BTS Ref Offset 11.8 dB Ref 30.00 dBm Center 5.775 GHz #Res BW 100 kHz #VBW 300 kHz Span 100 MHz Sweep 12.4 ms Occupied Bandwidth 75.959 MHz Total Power 26.4 dBm Transmit Freq Error -115.17 kHz OBW Power 99.00 % x dB Bandwidth 76.40 MHz x dB -6.00 dB Frequency Center Freq 5.77500000 GHz CF Step 10.000000 MHz Freq Offset 0 Hz
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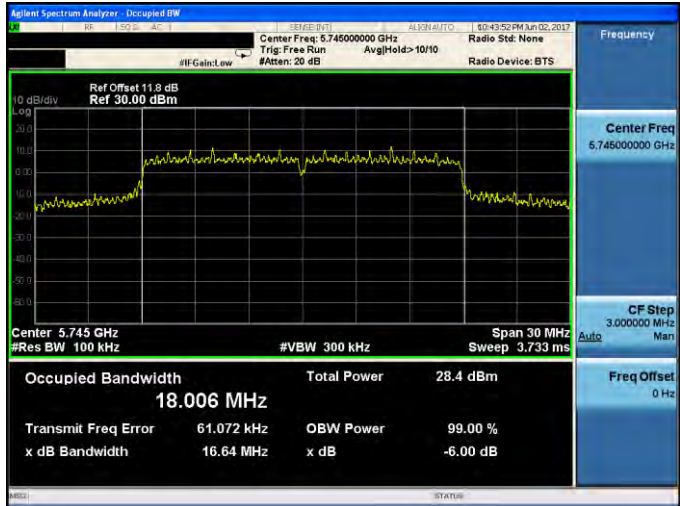
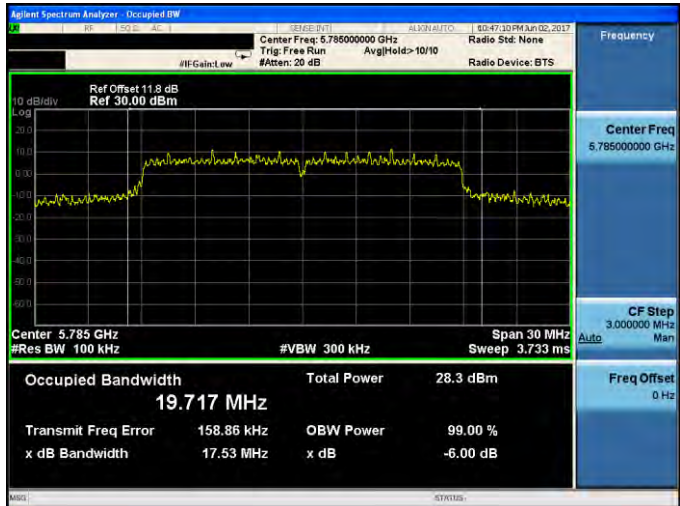
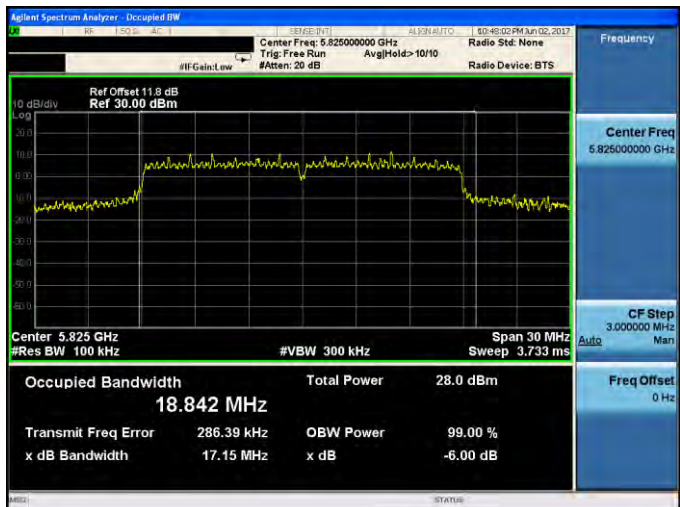


Mode 2: IEEE 802.11a Continuous TX mode_ANT-1

5745 MHz	
5785 MHz	
5825 MHz	

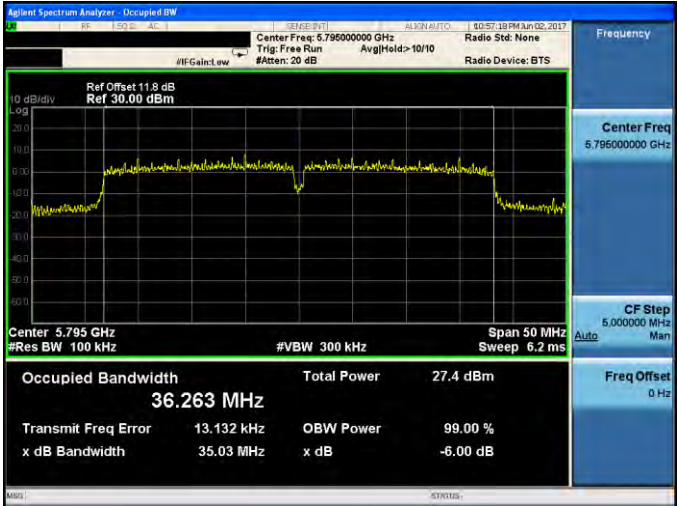


Mode 3: IEEE 802.11ac 20MHz Continuous TX mode_ANT-1

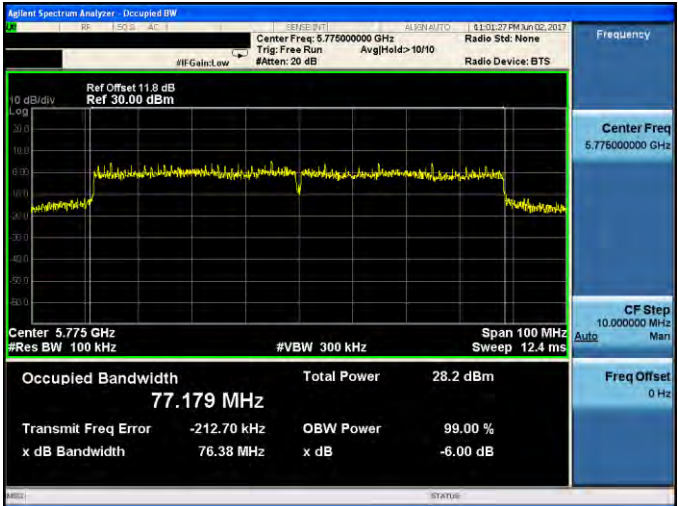
5745 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 5.74500000 GHz Trig: Free Run #IF Gain: Low #Atten: 20 dB Avg Hold> 10/10 Radio Std: None Radio Device: BTS Ref Offset 11.8 dB Ref 30.00 dBm Center 5.745 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 3.733 ms Occupied Bandwidth 18.006 MHz Total Power 28.4 dBm Transmit Freq Error 61.072 kHz OBW Power 99.00 % x dB Bandwidth 16.64 MHz x dB -6.00 dB Frequency Center Freq 5.74500000 GHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz
5785 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 5.78500000 GHz Trig: Free Run #IF Gain: Low #Atten: 20 dB Avg Hold> 10/10 Radio Std: None Radio Device: BTS Ref Offset 11.8 dB Ref 30.00 dBm Center 5.785 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 3.733 ms Occupied Bandwidth 19.717 MHz Total Power 28.3 dBm Transmit Freq Error 158.86 kHz OBW Power 99.00 % x dB Bandwidth 17.53 MHz x dB -6.00 dB Frequency Center Freq 5.78500000 GHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz
5825 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 5.82500000 GHz Trig: Free Run #IF Gain: Low #Atten: 20 dB Avg Hold> 10/10 Radio Std: None Radio Device: BTS Ref Offset 11.8 dB Ref 30.00 dBm Center 5.825 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 3.733 ms Occupied Bandwidth 18.842 MHz Total Power 28.0 dBm Transmit Freq Error 286.39 kHz OBW Power 99.00 % x dB Bandwidth 17.15 MHz x dB -6.00 dB Frequency Center Freq 5.82500000 GHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz



Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ANT-1

5755 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 5.75500000 GHz Trig: Free Run #Gain: Low #Atten: 20 dB Radio Std: None Radio Device: BTS Ref Offset 11.8 dB Ref 30.00 dBm Center 5.755 GHz #Res BW 100 kHz #VBW 300 kHz Span 50 MHz Sweep 6.2 ms Occupied Bandwidth 38.609 MHz Total Power 28.8 dBm Transmit Freq Error 42.213 kHz OBW Power 99.00 % x dB Bandwidth 35.69 MHz x dB -6.00 dB Center Freq 5.75500000 GHz CF Step 5.000000 MHz Freq Offset 0 Hz
5795 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 5.79500000 GHz Trig: Free Run #Gain: Low #Atten: 20 dB Radio Std: None Radio Device: BTS Ref Offset 11.8 dB Ref 30.00 dBm Center 5.795 GHz #Res BW 100 kHz #VBW 300 kHz Span 50 MHz Sweep 6.2 ms Occupied Bandwidth 36.263 MHz Total Power 27.4 dBm Transmit Freq Error 13.132 kHz OBW Power 99.00 % x dB Bandwidth 35.03 MHz x dB -6.00 dB Center Freq 5.79500000 GHz CF Step 5.000000 MHz Freq Offset 0 Hz

Mode 5: IEEE 802.11ac 80MHz Continuous TX mode_ANT-1

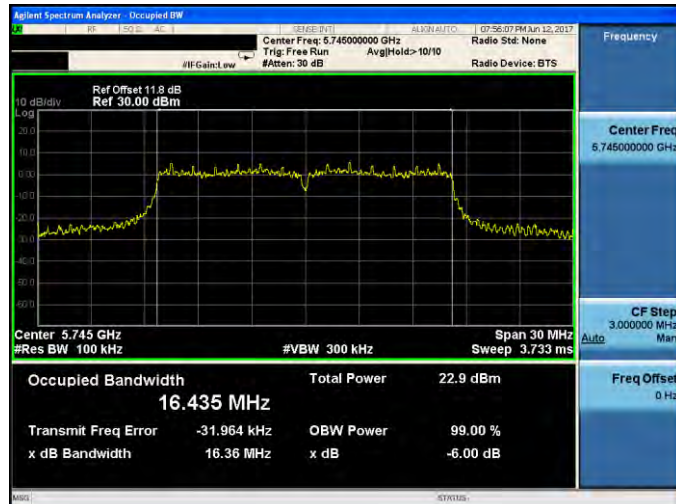
5775 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 5.77500000 GHz Trig: Free Run #Gain: Low #Atten: 20 dB Radio Std: None Radio Device: BTS Ref Offset 11.8 dB Ref 30.00 dBm Center 5.775 GHz #Res BW 100 kHz #VBW 300 kHz Span 100 MHz Sweep 12.4 ms Occupied Bandwidth 77.179 MHz Total Power 28.2 dBm Transmit Freq Error -212.70 kHz OBW Power 99.00 % x dB Bandwidth 76.38 MHz x dB -6.00 dB Center Freq 5.77500000 GHz CF Step 10.000000 MHz Freq Offset 0 Hz
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Beamforming on

Mode 2: IEEE 802.11a Continuous TX mode_ANT-0

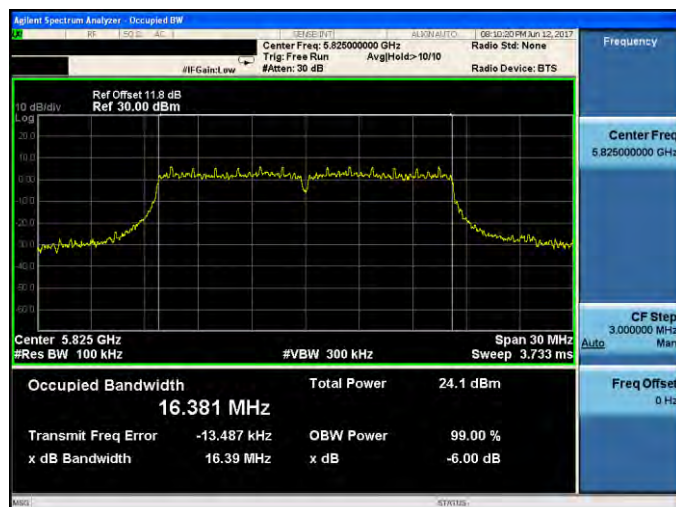
5745 MHz



5785 MHz

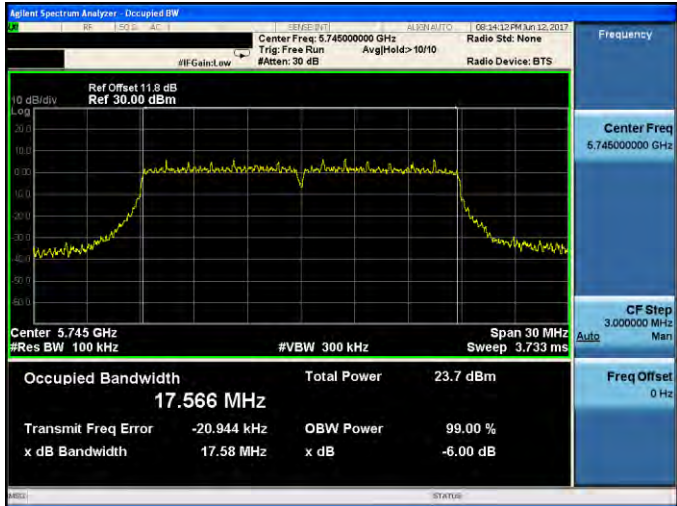
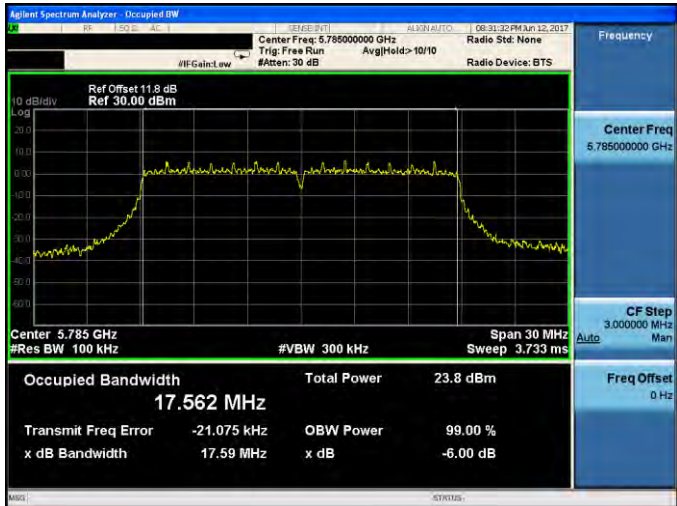
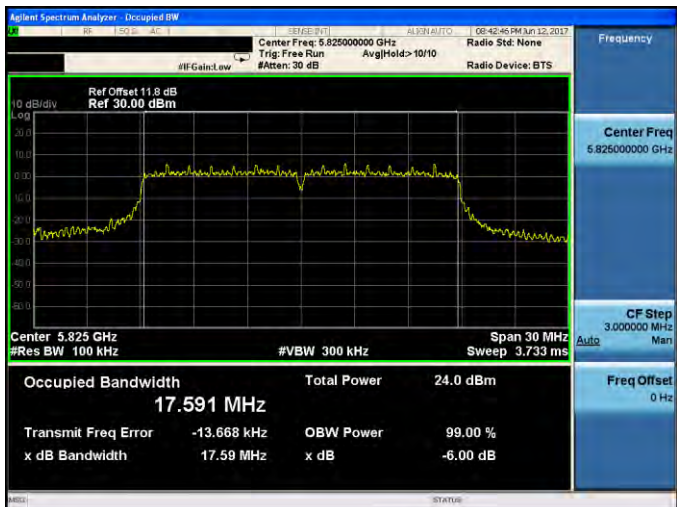


5825 MHz





Mode 3: IEEE 802.11ac 20MHz Continuous TX mode_ANT-0

5745 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 5.74500000 GHz Trig: Free Run #IFGain: Low #Atten: 30 dB Radio Std: None Radio Device: BTS Ref Offset 11.8 dB Ref 30.00 dBm Center 5.745 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 3.733 ms Occupied Bandwidth 17.566 MHz Total Power 23.7 dBm Transmit Freq Error -20.944 kHz OBW Power 99.00 % x dB Bandwidth 17.58 MHz x dB -6.00 dB Frequency Center Freq 5.74500000 GHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz
5785 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 5.78500000 GHz Trig: Free Run #IFGain: Low #Atten: 30 dB Radio Std: None Radio Device: BTS Ref Offset 11.8 dB Ref 30.00 dBm Center 5.785 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 3.733 ms Occupied Bandwidth 17.562 MHz Total Power 23.8 dBm Transmit Freq Error -21.075 kHz OBW Power 99.00 % x dB Bandwidth 17.59 MHz x dB -6.00 dB Frequency Center Freq 5.78500000 GHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz
5825 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 5.82500000 GHz Trig: Free Run #IFGain: Low #Atten: 30 dB Radio Std: None Radio Device: BTS Ref Offset 11.8 dB Ref 30.00 dBm Center 5.825 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 3.733 ms Occupied Bandwidth 17.591 MHz Total Power 24.0 dBm Transmit Freq Error -13.668 kHz OBW Power 99.00 % x dB Bandwidth 17.59 MHz x dB -6.00 dB Frequency Center Freq 5.82500000 GHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz



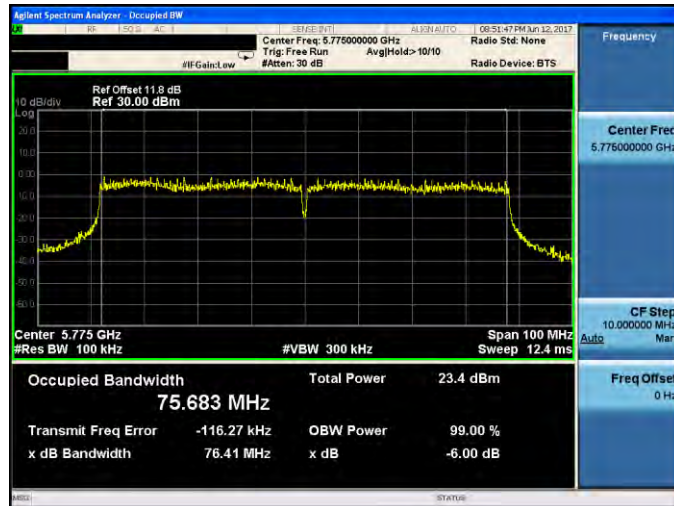
Mode 4: IEEE 802.11ac 40MHz Continuous TX mode _ANT-0

5755 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 5.75500000 GHz Trig: Free Run #IF Gain: Low #Atten: 30 dB Radio Std: None Radio Device: BTS Ref Offset 11.8 dB Ref 30.00 dBm Center 5.755 GHz #Res BW 100 kHz #VBW 300 kHz Span 50 MHz Sweep 6.2 ms Occupied Bandwidth 35.873 MHz Total Power 22.8 dBm Transmit Freq Error -47.519 kHz OBW Power 99.00 % x dB Bandwidth 35.14 MHz x dB -6.00 dB Center Freq 5.75500000 GHz CF Step 5.000000 MHz Freq Offset 0 Hz
5795 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 5.79500000 GHz Trig: Free Run #IF Gain: Low #Atten: 30 dB Radio Std: None Radio Device: BTS Ref Offset 11.8 dB Ref 30.00 dBm Center 5.795 GHz #Res BW 100 kHz #VBW 300 kHz Span 50 MHz Sweep 6.2 ms Occupied Bandwidth 35.917 MHz Total Power 22.8 dBm Transmit Freq Error -45.673 kHz OBW Power 99.00 % x dB Bandwidth 35.14 MHz x dB -6.00 dB Center Freq 5.79500000 GHz CF Step 5.000000 MHz Freq Offset 0 Hz



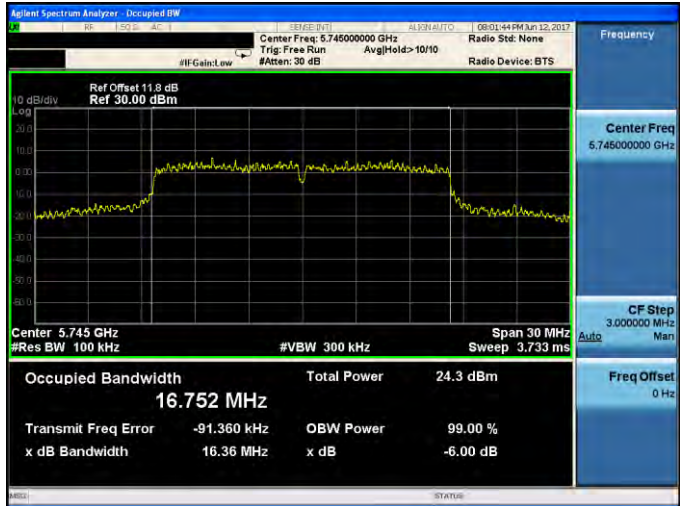
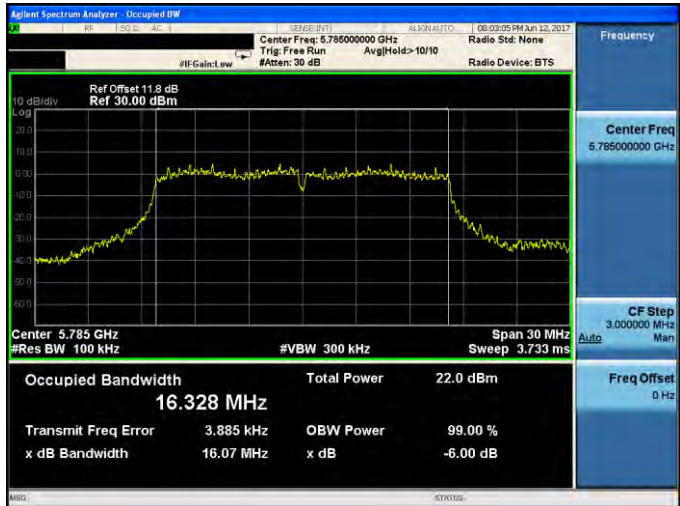
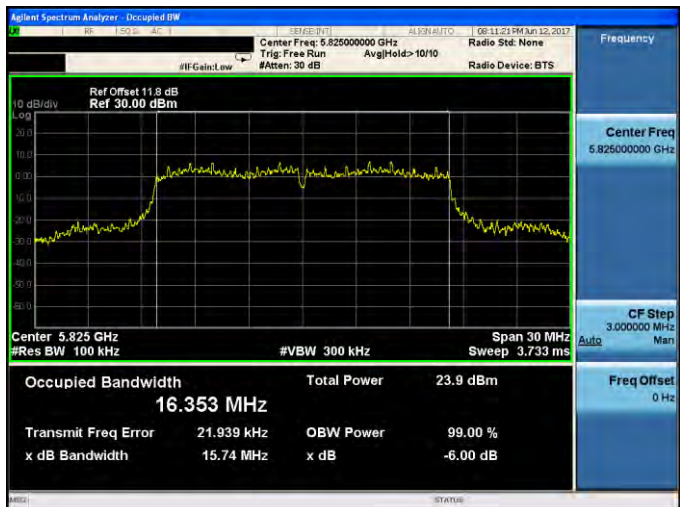
Mode 5: IEEE 802.11ac 80MHz Continuous TX mode_ANT-0

5775 MHz



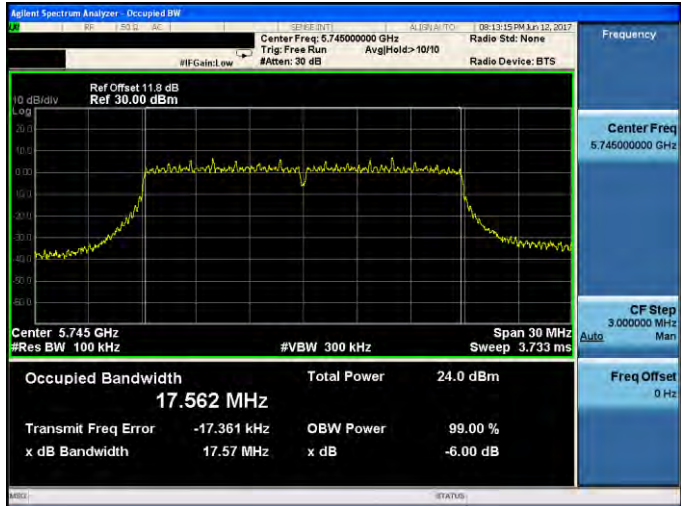
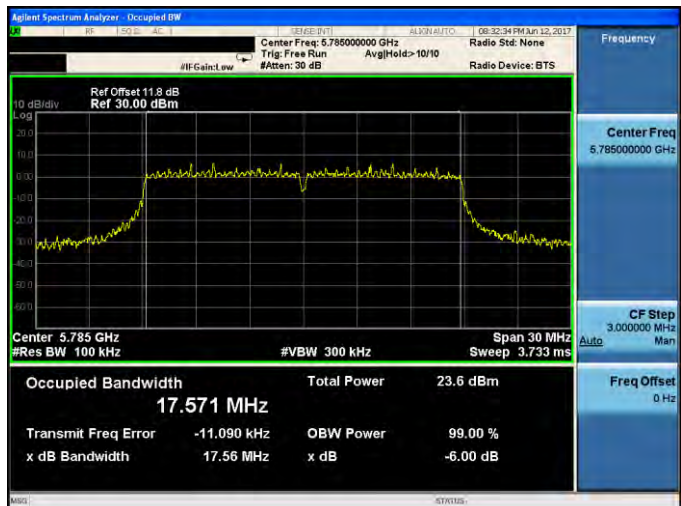
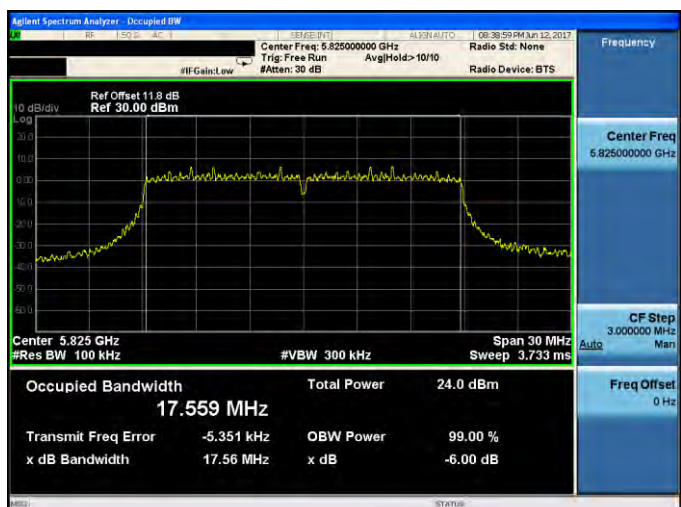


Mode 2: IEEE 802.11a Continuous TX mode _ANT-1

5745 MHz	
5785 MHz	
5825 MHz	

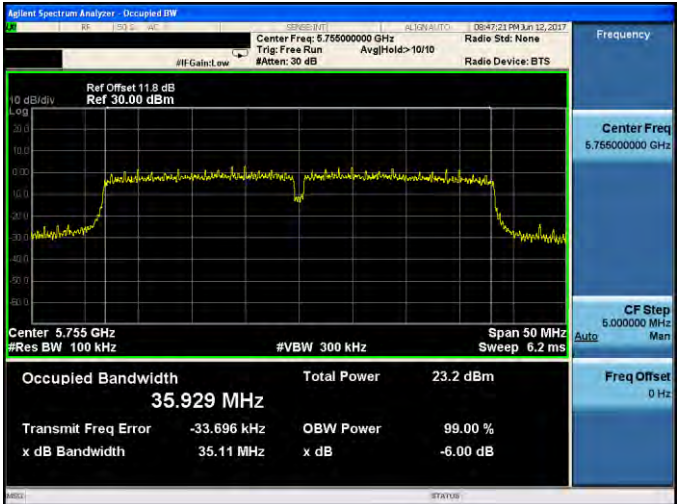


Mode 3: IEEE 802.11ac 20MHz Continuous TX mode_ANT-1

5745 MHz	
5785 MHz	
5825 MHz	



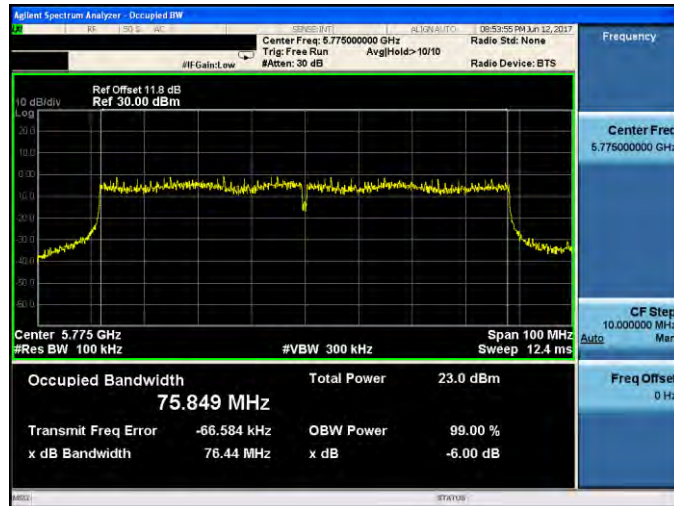
Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ANT-1

5755 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 5.755000000 GHz Trig: Free Run #IF Gain: Low #Atten: 30 dB Radio Std: None Radio Device: BTS Ref Offset 11.8 dB Ref 30.00 dBm Center 5.755 GHz #Res BW 100 kHz #VBW 300 kHz Span 50 MHz Sweep 6.2 ms Occupied Bandwidth 35.929 MHz Total Power 23.2 dBm Transmit Freq Error -33.696 kHz OBW Power 99.00 % x dB Bandwidth 35.11 MHz x dB -6.00 dB Frequency Center Freq 5.755000000 GHz CF Step 5.000000 MHz Auto Man Freq Offset 0 Hz
5795 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 5.795000000 GHz Trig: Free Run #IF Gain: Low #Atten: 30 dB Radio Std: None Radio Device: BTS Ref Offset 11.8 dB Ref 30.00 dBm Center 5.795 GHz #Res BW 100 kHz #VBW 300 kHz Span 50 MHz Sweep 6.2 ms Occupied Bandwidth 35.887 MHz Total Power 23.2 dBm Transmit Freq Error -33.055 kHz OBW Power 99.00 % x dB Bandwidth 35.42 MHz x dB -6.00 dB Frequency Center Freq 5.795000000 GHz CF Step 5.000000 MHz Auto Man Freq Offset 0 Hz



Mode 5: IEEE 802.11ac 80MHz Continuous TX mode_ANT-1

5775 MHz



4.7. Peak Power Spectral Density Measurement

■ Limit

Conducted power spectral density

Frequency Range (MHz)	FCC Limit
	Master
5.150 ~ 5.250 GHz	17 dBm/MHz
5.725 ~ 5.850 GHz	30 dBm/500KHz

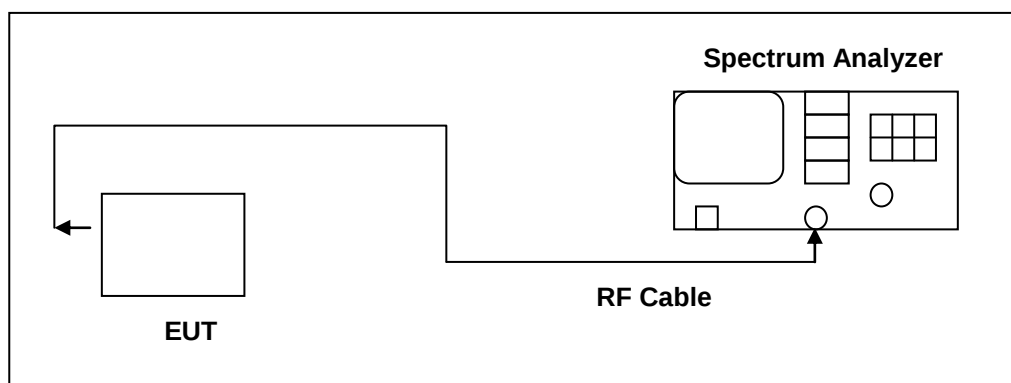
According FCC KDB 662911 D01 v02r01 – for power spectral density measurements on IEEE802.11 devices,

* CDD/BF mode : Directional Gain = $10 \cdot \log\{[10^{G1/20} + 10^{G2/20} + \dots + 10^{Gn/20}]^2 / NANT\}$ = 7.36 dBi > 6dBi

* CDD/BF mode power limit shall be reduced = 17 – 1.36 = 15.64 dBm/MHz (5.150 ~ 5.250 GHz)

* CDD/BF mode power limit shall be reduced = 30 – 1.36 = 28.64 dBm/500KHz (5.725 ~ 5.850 GHz)

■ Test Setup



■ Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/19/2016	1 year
Test Site	ATL	TE05	TE05	N.C.R.	-----

Note: N.C.R. = No Calibration Request.

**■ Test Procedure**

The test is performed in accordance with KDB789033: D02 General UNII Test Procedures New Rules v01r04, Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RBW	1 MHz (5725 ~ 5850MHz use 100 kHz)
VBW	3 MHz (5725 ~ 5850MHz use 300 kHz)
Detector	RMS
Trace	AVERAGE
Sweep Time	Auto
Trace Average	100 times
Note: If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10\log(500\text{kHz}/100\text{kHz})$ to the measured result.	

Test Result

Test Item	Conducted power spectral density			
Test Mode	Mode 2: IEEE 802.11a link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5180	6.940	0.123	7.063	< 15.64
5200	10.222	0.123	10.345	
5240	10.198	0.123	10.321	
Frequency (MHz)	ANT-1			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5180	7.547	0.123	7.670	< 15.64
5200	10.009	0.123	10.132	
5240	10.510	0.123	10.633	
Frequency (MHz)	ANT-0+1			Limit (dBm/MHz)
	Calculated (dBm/MHz)			
5180	10.387			< 15.64
5200	13.250			
5240	13.490			

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

Test Item	Conducted power spectral density			
Test Mode	Mode 2: IEEE 802.11a link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5745	1.05	0.123	8.16	< 28.64
5785	1.55	0.123	8.67	
5825	2.17	0.123	9.28	
Frequency (MHz)	ANT-1			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5745	3.00	0.123	10.11	< 28.64
5785	2.32	0.123	9.44	
5825	2.22	0.123	9.33	
Frequency (MHz)	ANT-0+1			Limit (dBm/500KHz)
	Calculated (dBm/500KHz)			
5745	12.25			< 28.64
5785	12.08			
5825	12.32			

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

Conversion ratio = 10*Log(500k/100k)

Test Item	Conducted power spectral density			
Test Mode	Mode 3: IEEE 802.11ac 20MHz link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5180	6.820	0.101	6.921	< 15.64
5200	10.357	0.101	10.458	
5240	10.960	0.101	11.061	
Frequency (MHz)	ANT-1			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5180	7.316	0.101	7.417	< 15.64
5200	10.455	0.101	10.556	
5240	9.889	0.101	9.990	
Frequency (MHz)	ANT-0+1			Limit (dBm/MHz)
	Calculated (dBm/MHz)			
5180	10.186			< 15.64
5200	13.517			
5240	13.568			

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.



Test Item	Conducted power spectral density			
Test Mode	Mode 3: IEEE 802.11ac 20MHz link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5745	0.85	0.101	7.94	< 28.64
5785	-0.22	0.101	6.87	
5825	1.48	0.101	8.57	
Frequency (MHz)	ANT-1			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5745	1.90	0.101	8.99	< 28.64
5785	1.35	0.101	8.44	
5825	1.81	0.101	8.90	
Frequency (MHz)	ANT-0+1			Limit (dBm/500KHz)
	Calculated (dBm/500KHz)			
5745	11.51			< 28.64
5785	10.74			
5825	11.75			

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

Conversion ratio = 10*Log(500k/100k)



Test Item	Conducted power spectral density			
Test Mode	Mode 4: IEEE 802.11ac 40MHz link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5190	3.379	0.238	3.617	< 15.64
5230	7.473	0.238	7.711	
Frequency (MHz)	ANT-1			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5190	3.947	0.238	4.185	< 15.64
5230	6.534	0.238	6.772	
Frequency (MHz)	ANT-0+1			Limit (dBm/MHz)
	Calculated (dBm/MHz)			
5190	6.920			< 15.64
5230	10.277			

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.



Test Item	Conducted power spectral density			
Test Mode	Mode 4: IEEE 802.11ac 40MHz link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5755	-2.98	0.238	4.24	< 28.64
5795	-0.26	0.238	6.97	
Frequency (MHz)	ANT-1			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5755	-0.22	0.238	7.01	< 28.64
5795	-1.16	0.238	6.07	
Frequency (MHz)	ANT-0+1			
	Calculated (dBm/500KHz)			Limit (dBm/500KHz)
5755	8.85			< 28.64
5795	9.55			

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

Conversion ratio = 10*Log(500k/100k)



Test Item	Conducted power spectral density			
Test Mode	Mode 5: IEEE 802.11ac 80MHz link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5210	-5.273	0.625	-4.648	< 15.64
Frequency (MHz)	ANT-1			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5210	-4.758	0.625	-4.133	< 15.64
Frequency (MHz)	ANT-0+1			
	Calculated (dBm/MHz)			Limit (dBm/MHz)
5210	-1.373			< 15.64

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.



Test Item	Conducted power spectral density			
Test Mode	Mode 5: IEEE 802.11ac 80MHz link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/MHz)
5775	-5.35	0.625	2.26	< 28.64
Frequency (MHz)	ANT-1			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/MHz)
5775	-3.23	0.625	4.38	< 28.64
Frequency (MHz)	ANT-0+1			
	Calculated (dBm/500KHz)			Limit (dBm/MHz)
5775	6.46			< 28.64

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

Conversion ratio = 10*Log(500k/100k)



Beamforming on

Test Item	Conducted power spectral density			
Test Mode	Mode 2: IEEE 802.11a link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5180	4.159	0.123	4.283	< 15.64
5200	6.943	0.123	7.067	
5240	6.611	0.123	6.735	
Frequency (MHz)	ANT-1			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5180	4.185	0.123	4.309	< 15.64
5200	6.952	0.123	7.076	
5240	7.082	0.123	7.206	
Frequency (MHz)	ANT-0+1			Limit (dBm/MHz)
	Calculated (dBm/MHz)			
5180	7.306			< 15.64
5200	10.082			
5240	9.987			

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.



Test Item	Conducted power spectral density			
Test Mode	Mode 2: IEEE 802.11a link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5745	-1.02	0.123	6.09	< 28.64
5785	-1.76	0.123	5.35	
5825	-0.10	0.123	7.01	
Frequency (MHz)	ANT-1			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5745	0.50	0.123	7.61	< 28.64
5785	-0.39	0.123	6.72	
5825	-0.18	0.123	6.93	
Frequency (MHz)	ANT-0+1			Limit (dBm/500KHz)
	Calculated (dBm/500KHz)			
5745	9.93			< 28.64
5785	9.10			
5825	9.98			

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

Conversion ratio = 10*Log(500k/100k)

Test Item	Conducted power spectral density			
Test Mode	Mode 3: IEEE 802.11ac 20MHz link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5180	3.440	0.101	3.879	< 15.64
5200	8.068	0.101	8.507	
5240	7.479	0.101	7.918	
Frequency (MHz)	ANT-1			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5180	3.806	0.101	4.245	< 15.64
5200	7.295	0.101	7.734	
5240	7.542	0.101	7.981	
Frequency (MHz)	ANT-0+1			Limit (dBm/MHz)
	Calculated (dBm/MHz)			
5180	7.076			< 15.64
5200	11.148			
5240	10.960			

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.



Test Item	Conducted power spectral density			
Test Mode	Mode 3: IEEE 802.11ac 20MHz link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5745	-1.56	0.101	5.87	< 28.64
5785	-2.46	0.101	4.97	
5825	-0.41	0.101	7.02	
Frequency (MHz)	ANT-1			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5745	-0.66	0.101	6.76	< 28.64
5785	-1.05	0.101	6.38	
5825	-0.64	0.101	6.79	
Frequency (MHz)	ANT-0+1			Limit (dBm/500KHz)
	Calculated (dBm/500KHz)			
5745	9.35			< 28.64
5785	8.74			
5825	9.91			

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

Conversion ratio = 10*Log(500k/100k)



Test Item	Conducted power spectral density			
Test Mode	Mode 4: IEEE 802.11ac 40MHz link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5190	1.206	0.238	1.827	< 15.64
5230	5.024	0.238	5.645	
Frequency (MHz)	ANT-1			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5190	1.035	0.238	1.656	< 15.64
5230	4.246	0.238	4.867	
Frequency (MHz)	ANT-0+1			Limit (dBm/MHz)
	Calculated (dBm/MHz)			
5190	4.753			< 15.64
5230	8.284			

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.



Test Item	Conducted power spectral density			
Test Mode	Mode 4: IEEE 802.11ac 40MHz link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5755	-4.83	0.238	2.78	< 28.64
5795	-2.22	0.238	5.39	
Frequency (MHz)	ANT-1			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5755	-2.63	0.238	4.98	< 28.64
5795	-3.20	0.238	4.41	
Frequency (MHz)	ANT-0+1			
	Calculated (dBm/500KHz)			Limit (dBm/500KHz)
5755	7.03			< 28.64
5795	7.94			

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

Conversion ratio = 10*Log(500k/100k)



Test Item	Conducted power spectral density			
Test Mode	Mode 5: IEEE 802.11ac 80MHz link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5210	-7.939	0.625	-6.758	< 15.64
Frequency (MHz)	ANT-1			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5210	-7.422	0.625	-6.241	< 15.64
Frequency (MHz)	ANT-0+1			
	Calculated (dBm/MHz)			Limit (dBm/MHz)
5210	-3.482			< 15.64

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.



Test Item	Conducted power spectral density			
Test Mode	Mode 5: IEEE 802.11ac 80MHz link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/MHz)
5775	-7.17	0.625	1.01	< 28.64
Frequency (MHz)	ANT-1			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/MHz)
5775	-5.39	0.625	2.78	< 28.64
Frequency (MHz)	ANT-0+1			
	Calculated (dBm/500KHz)			Limit (dBm/MHz)
5775	4.99			< 28.64

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

Conversion ratio = 10*Log(500k/100k)



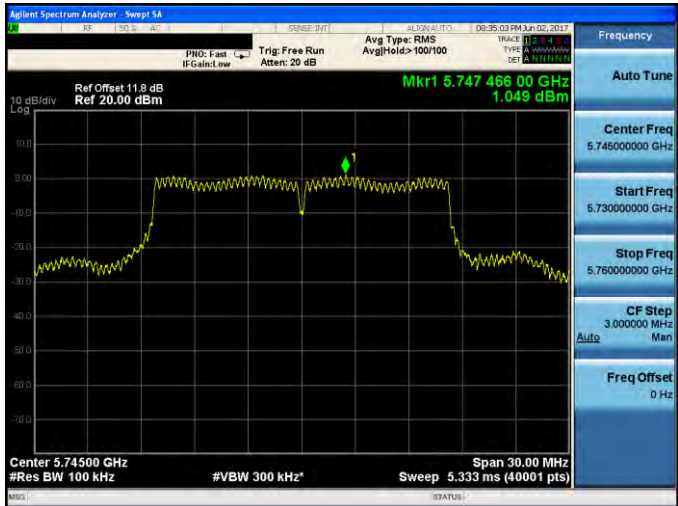
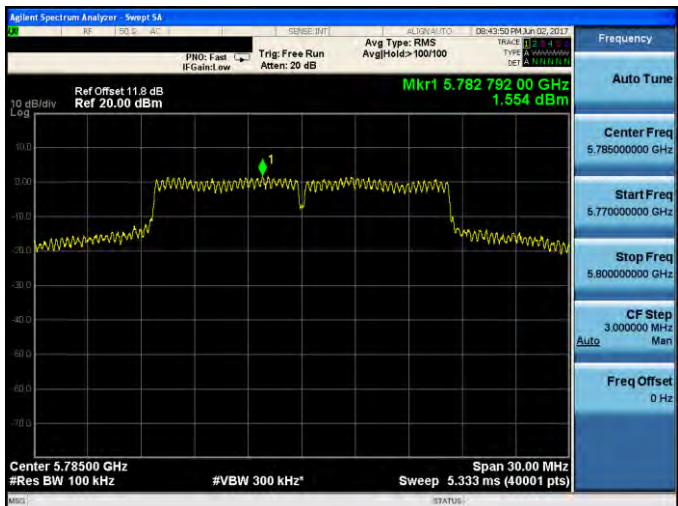
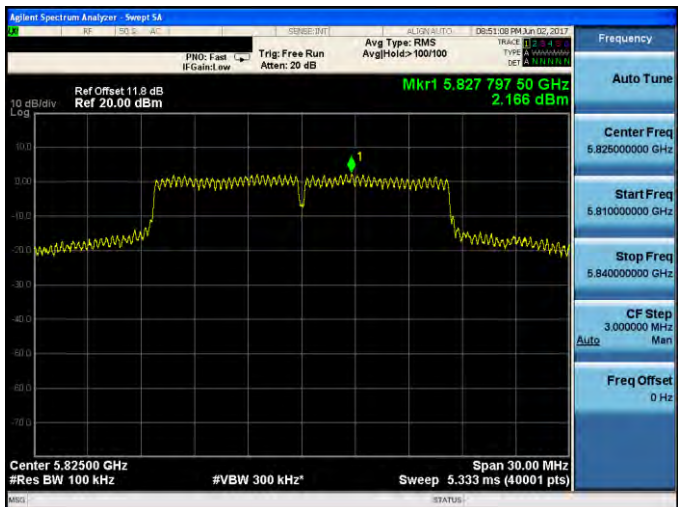
■ Test Graphs

Mode 2: IEEE 802.11a Continuous TX mode_ ANT-0

5180 MHz	
5200 MHz	
5240 MHz	



Mode 2: IEEE 802.11a Continuous TX mode_ ANT-0

5745 MHz	
5785 MHz	
5825 MHz	

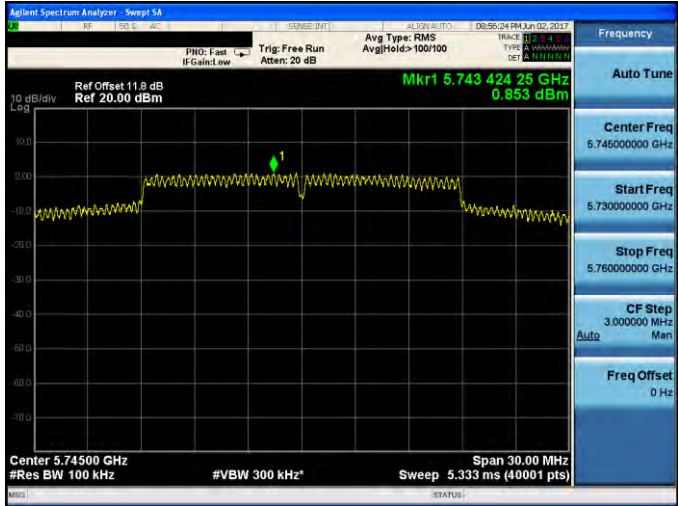
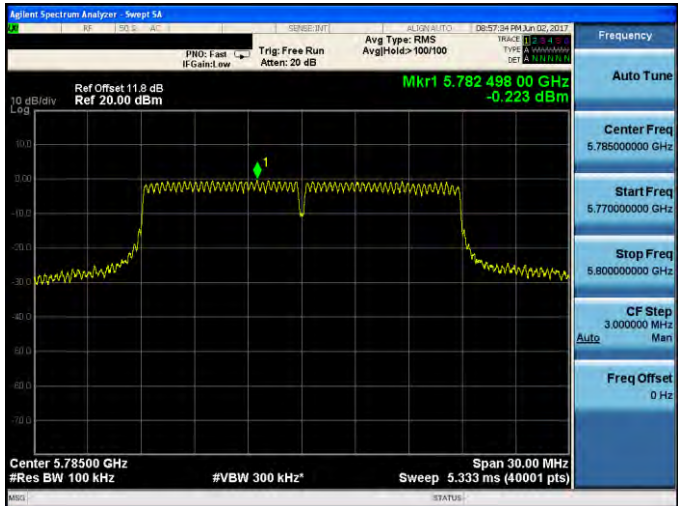
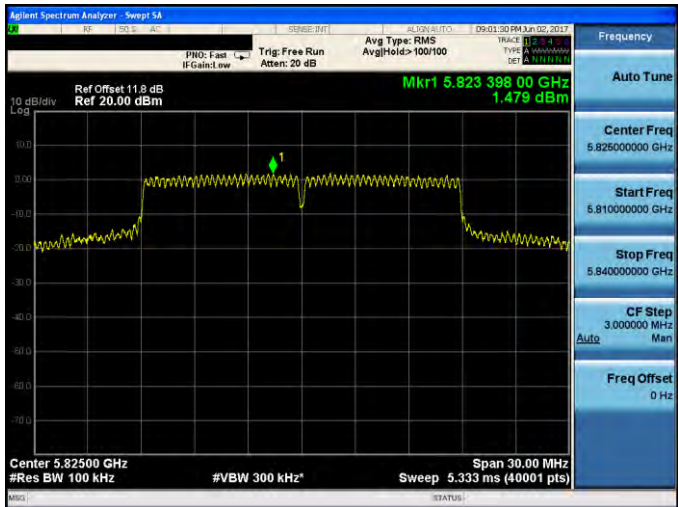


Mode 3: IEEE 802.11ac 20MHz Continuous TX mode _ ANT-0

5180 MHz	
5200 MHz	
5240 MHz	



Mode 3: IEEE 802.11ac 20MHz Continuous TX mode _ ANT-0

5745 MHz	
5785 MHz	
5825 MHz	



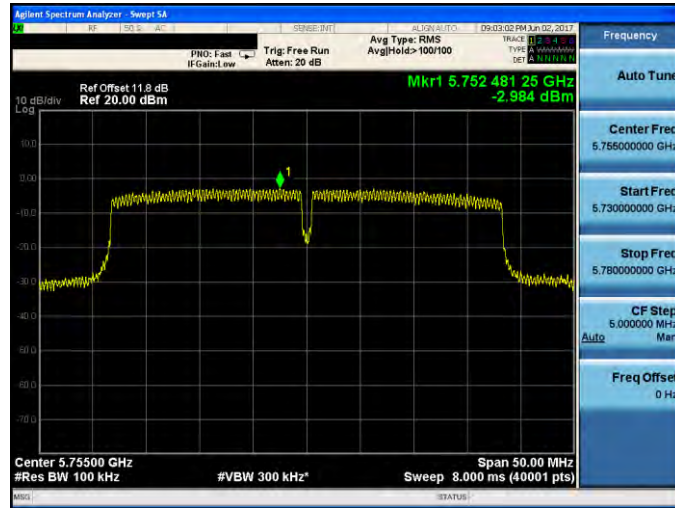
Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ ANT-0





Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ ANT-0

5755 MHz



5795 MHz





Mode 5: IEEE 802.11ac 80MHz Continuous TX mode _ANT-0

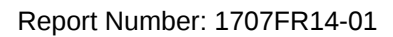
5210 MHz



Mode 5: IEEE 802.11ac 80MHz Continuous TX mode _ANT-0

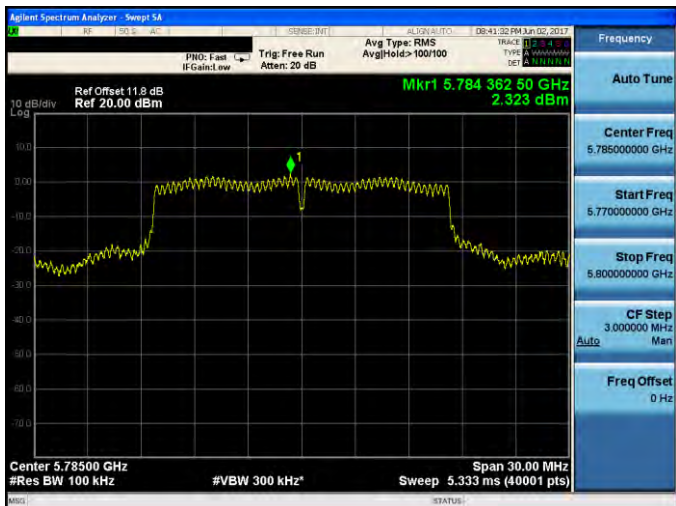
5775 MHz



285 of 309

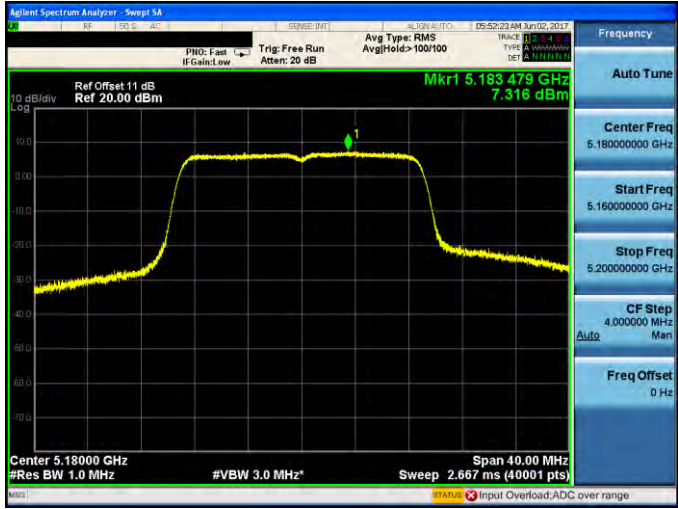


Mode 2: IEEE 802.11a Continuous TX mode_ ANT-1

5745 MHz	
5785 MHz	
5825 MHz	

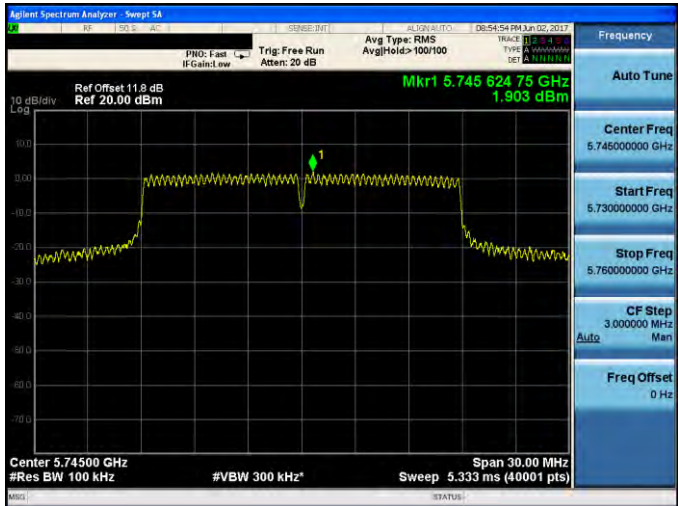
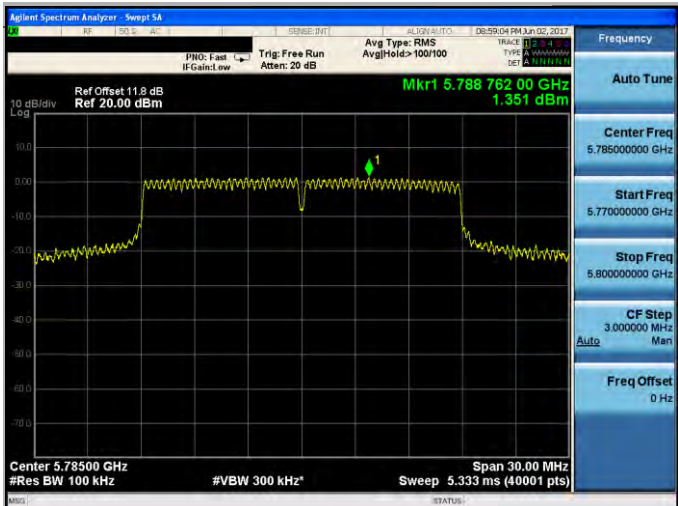
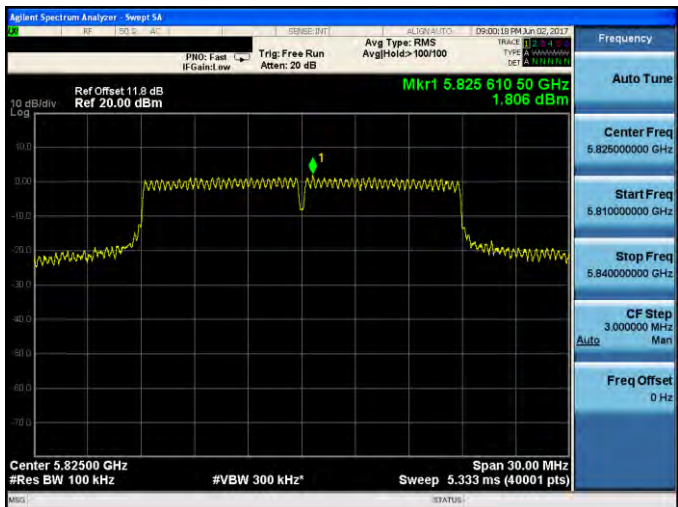


Mode 3: IEEE 802.11ac 20MHz Continuous TX mode _ ANT-1

5180 MHz	
5200 MHz	
5240 MHz	



Mode 3: IEEE 802.11ac 20MHz Continuous TX mode _ ANT-1

5745 MHz	
5785 MHz	
5825 MHz	



Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ ANT-1





Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ ANT-1





Mode 5: IEEE 802.11ac 80MHz Continuous TX mode _ANT-1

5210 MHz



Mode 5: IEEE 802.11ac 80MHz Continuous TX mode _ANT-1

5775 MHz

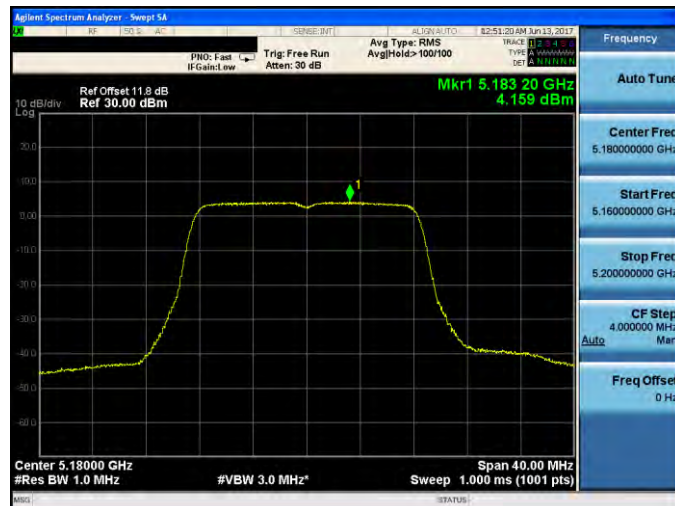




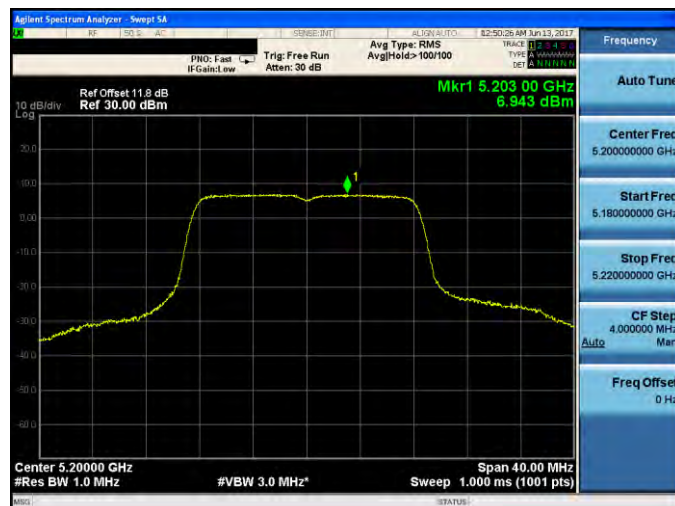
Beamforming on

Mode 2: IEEE 802.11a Continuous TX mode _ ANT-0

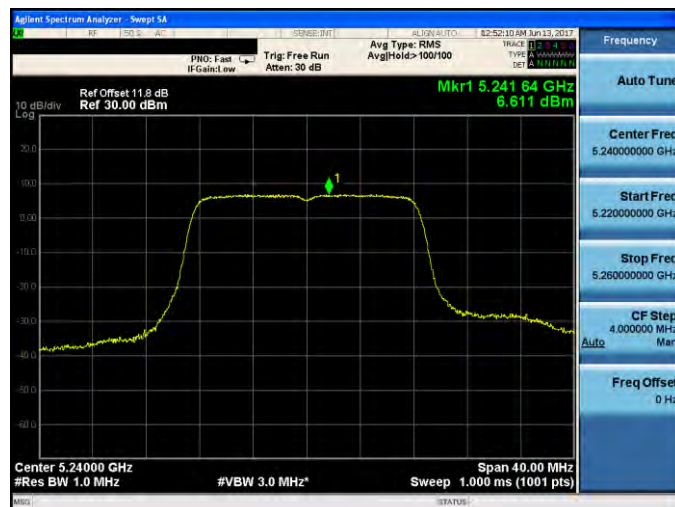
5180 MHz



5200 MHz

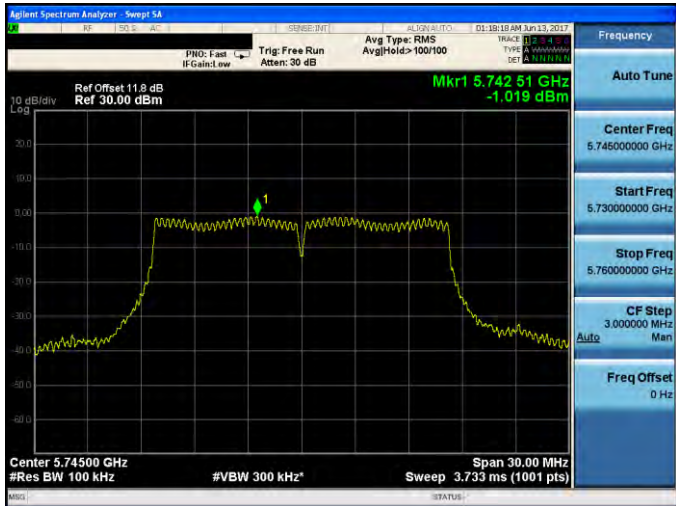
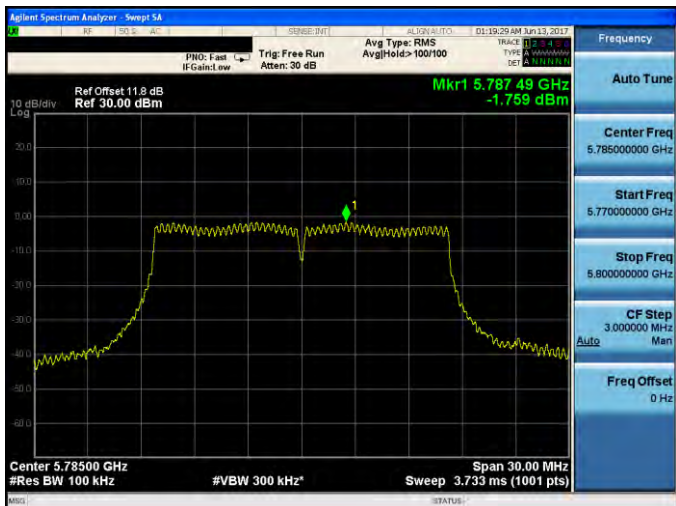
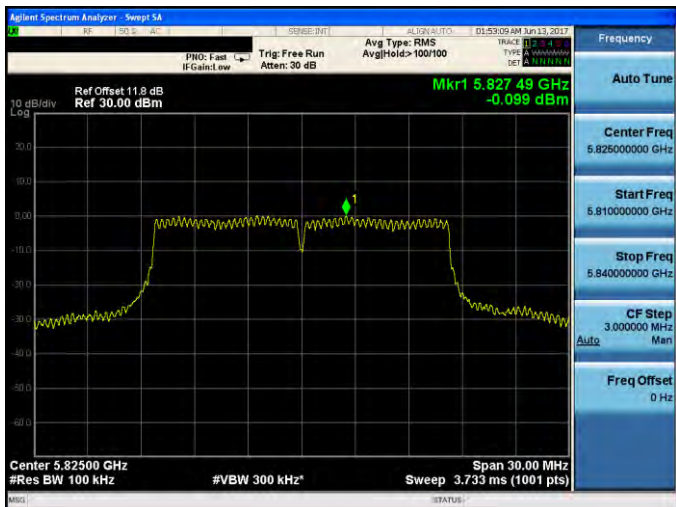


5240 MHz



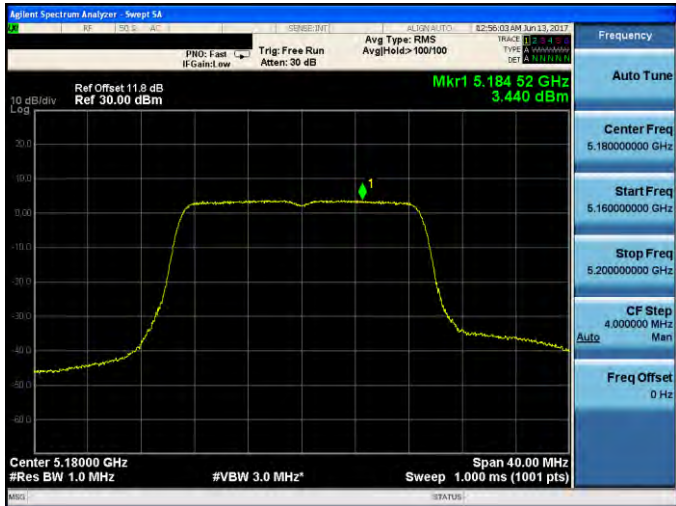
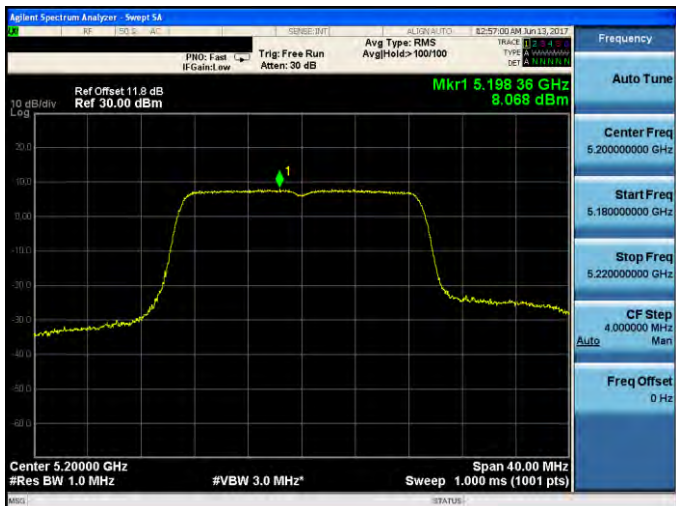


Mode 2: IEEE 802.11a Continuous TX mode_ ANT-0

5745 MHz	
5785 MHz	
5825 MHz	

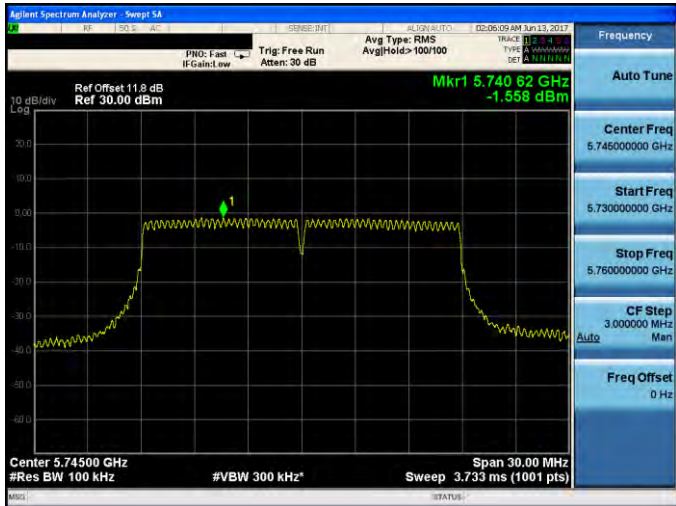
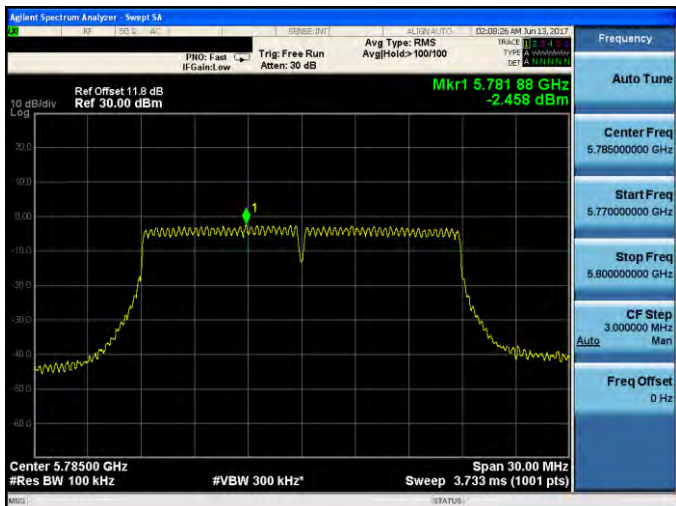
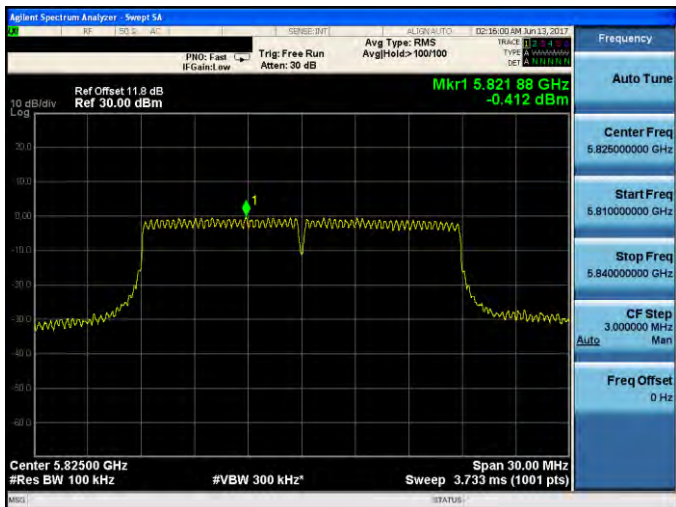


Mode 3: IEEE 802.11ac 20MHz Continuous TX mode _ ANT-0

5180 MHz	
5200 MHz	
5240 MHz	

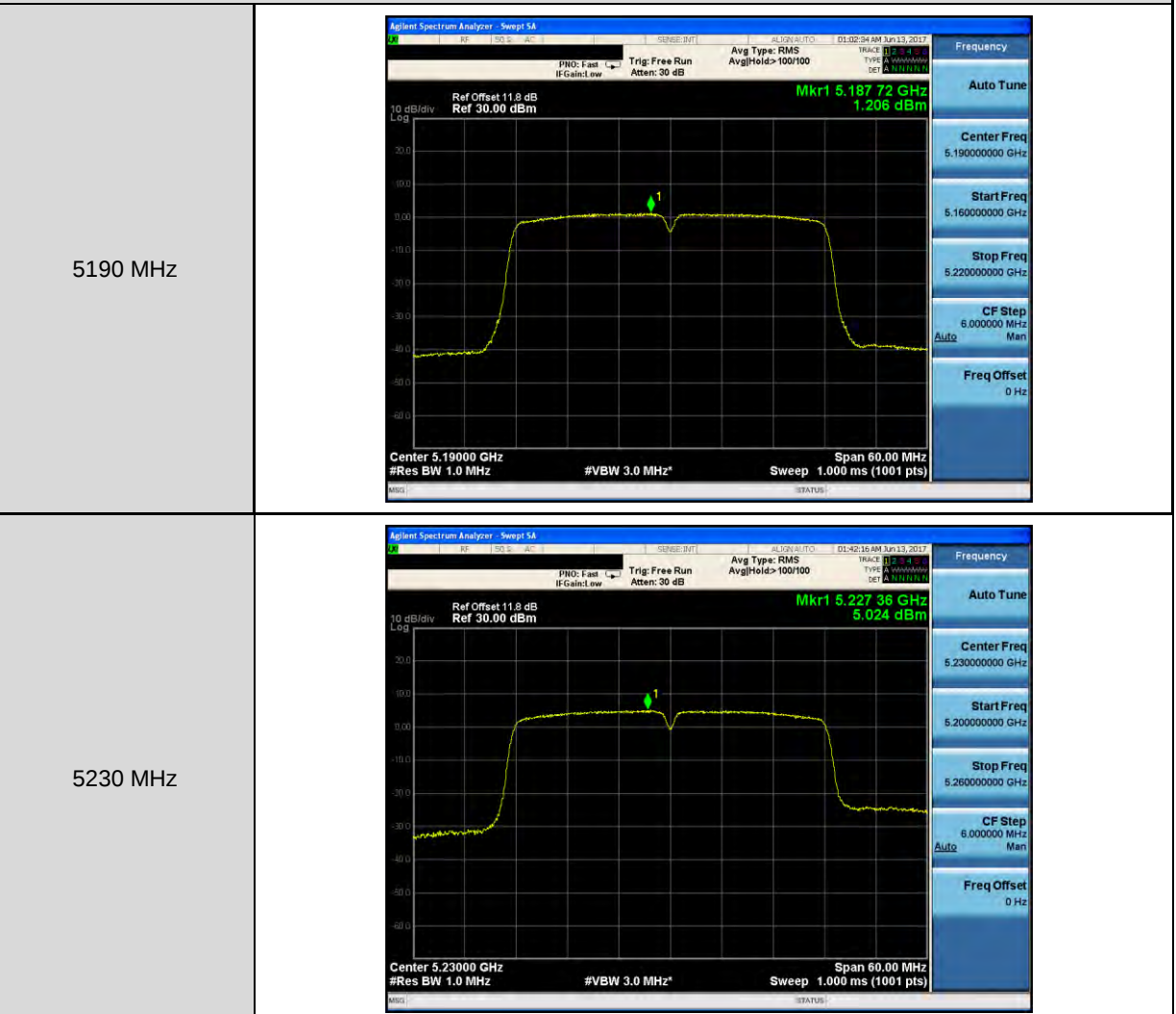


Mode 3: IEEE 802.11ac 20MHz Continuous TX mode _ ANT-0

5745 MHz	
5785 MHz	
5825 MHz	

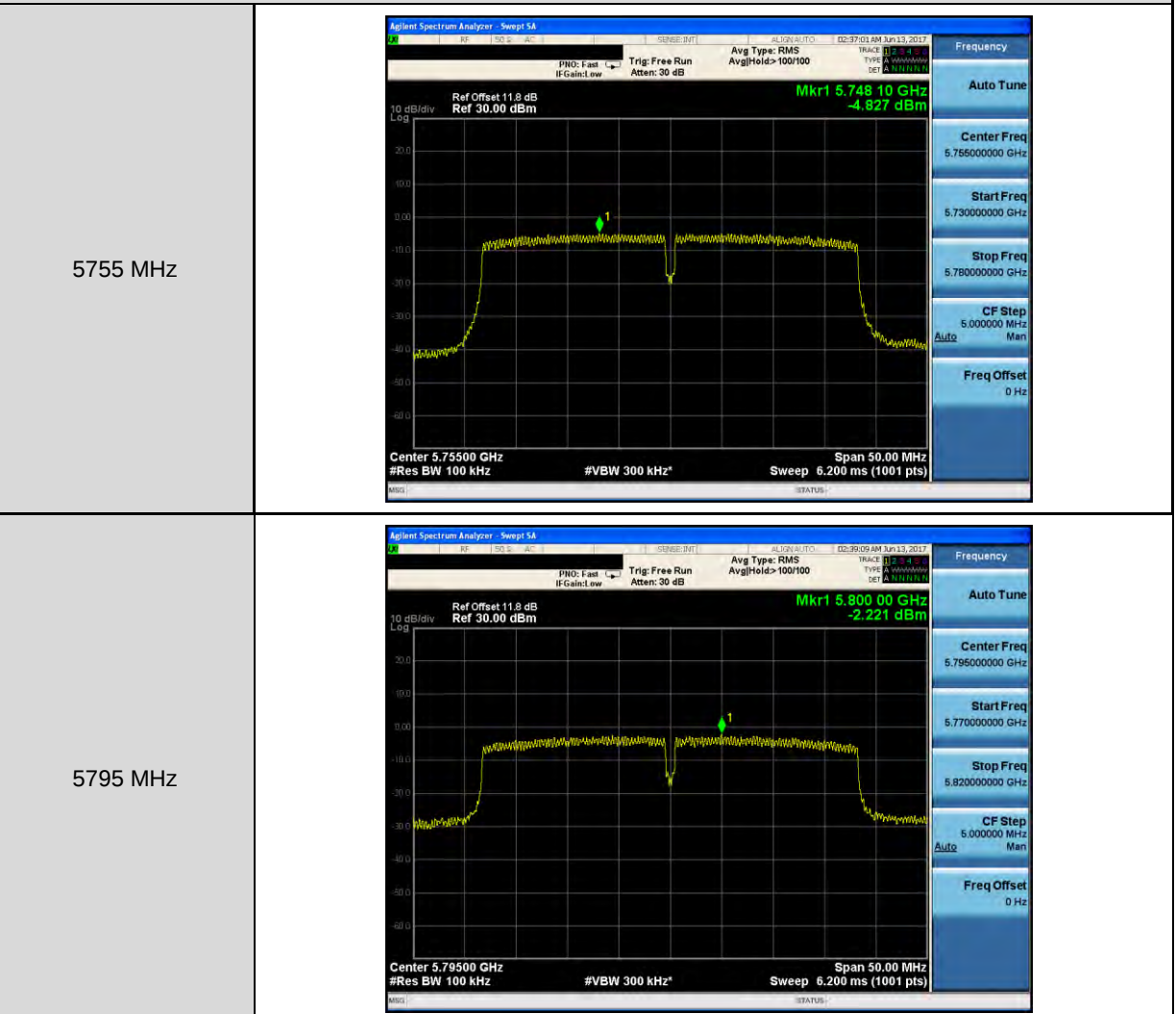


Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ ANT-0



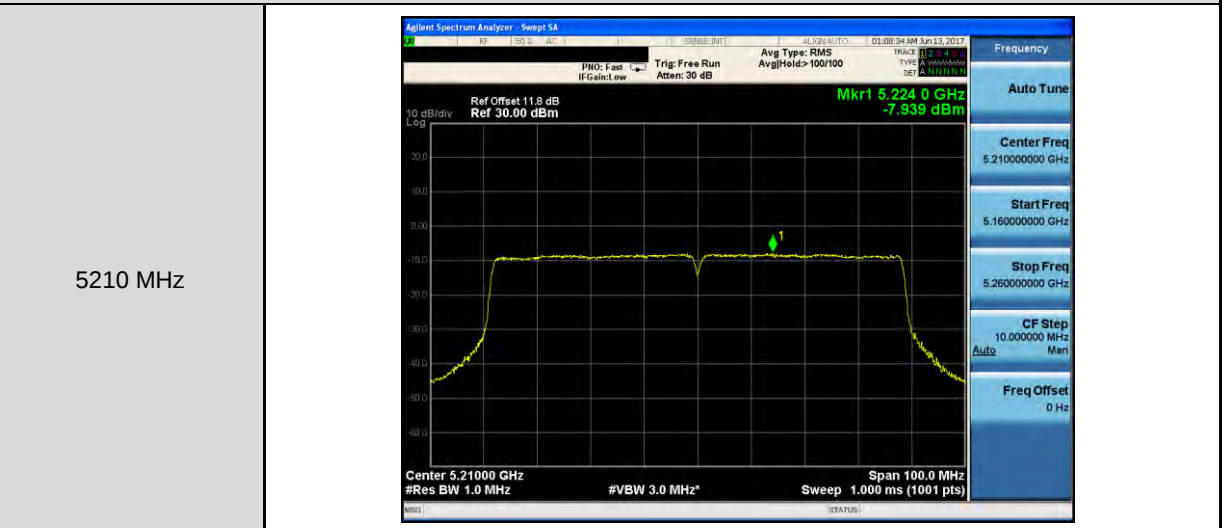


Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ ANT-0

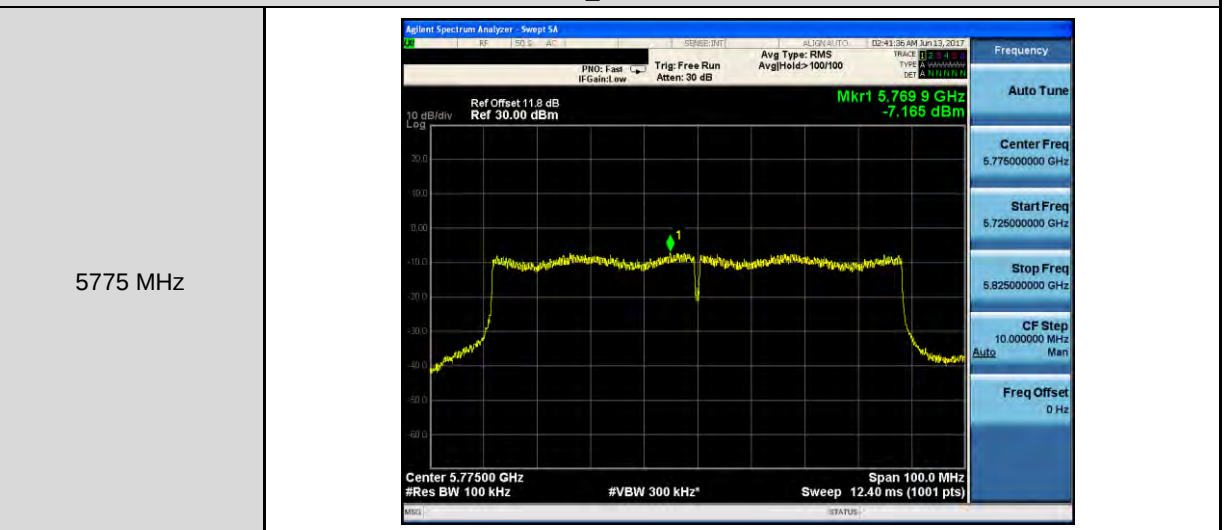




Mode 5: IEEE 802.11ac 80MHz Continuous TX mode _ANT-0

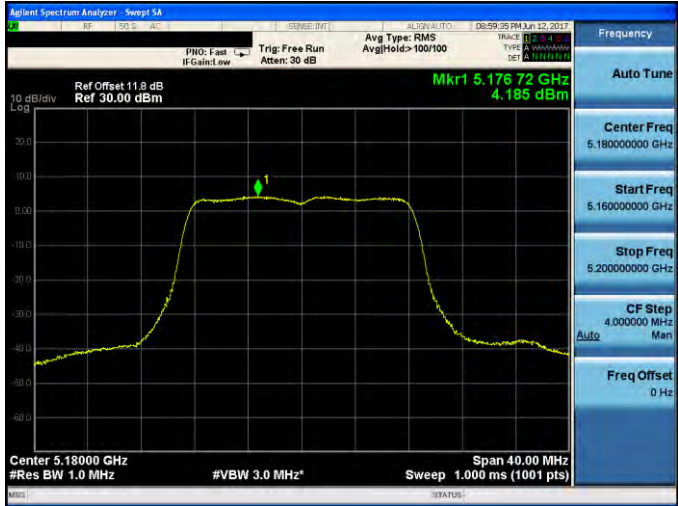
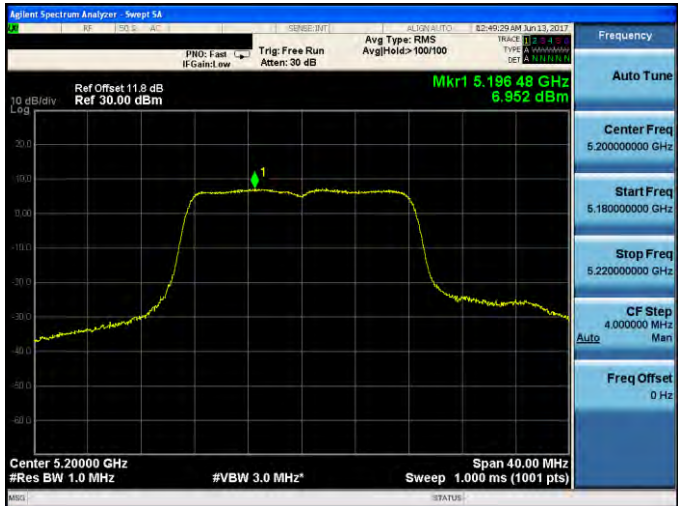
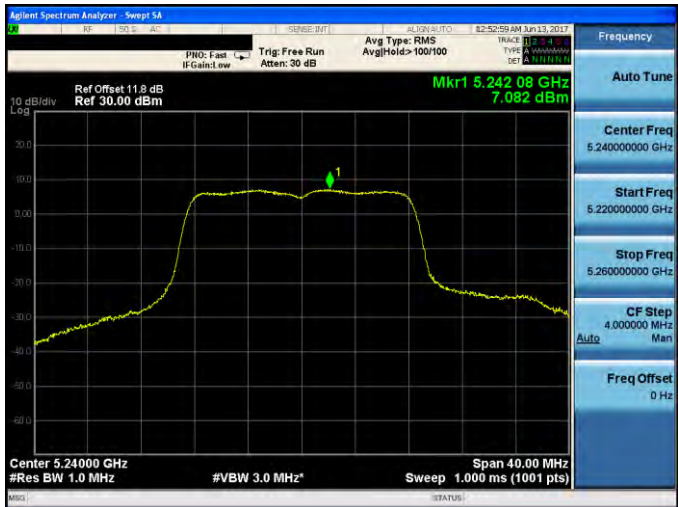


Mode 5: IEEE 802.11ac 80MHz Continuous TX mode _ANT-0





Mode 2: IEEE 802.11a Continuous TX mode_ ANT-1

5180 MHz	
5200 MHz	
5240 MHz	

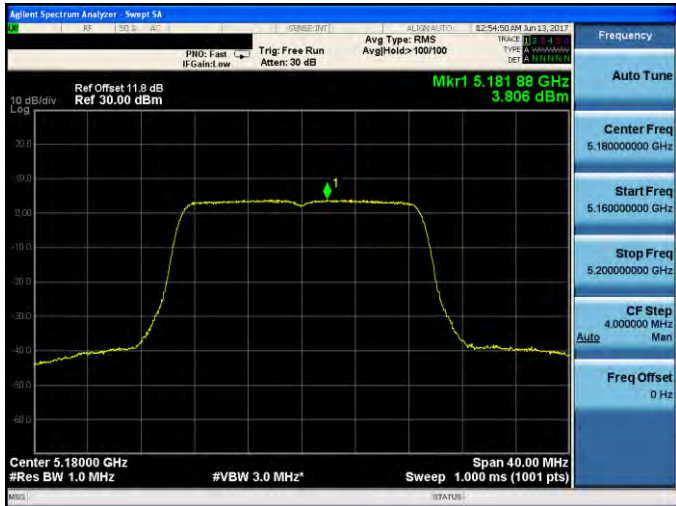
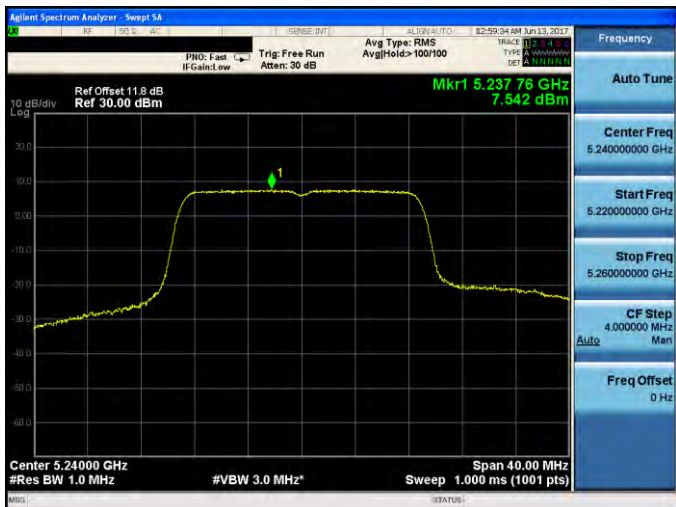


Mode 2: IEEE 802.11a Continuous TX mode_ ANT-1

5745 MHz	
5785 MHz	
5825 MHz	

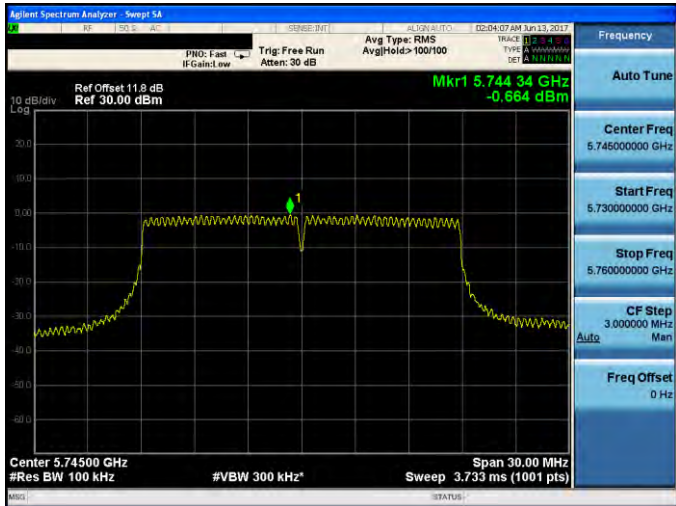
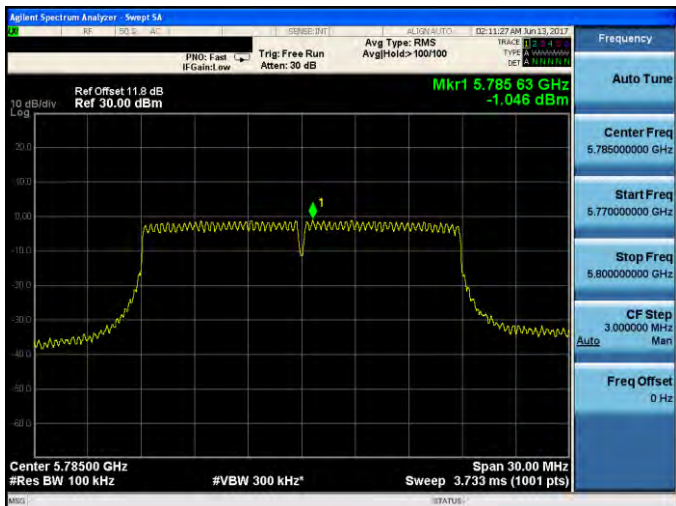
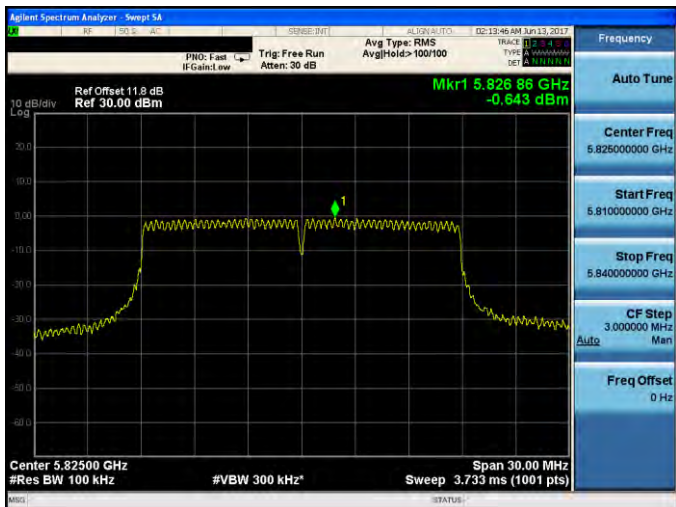


Mode 3: IEEE 802.11ac 20MHz Continuous TX mode _ ANT-1

5180 MHz	
5200 MHz	
5240 MHz	

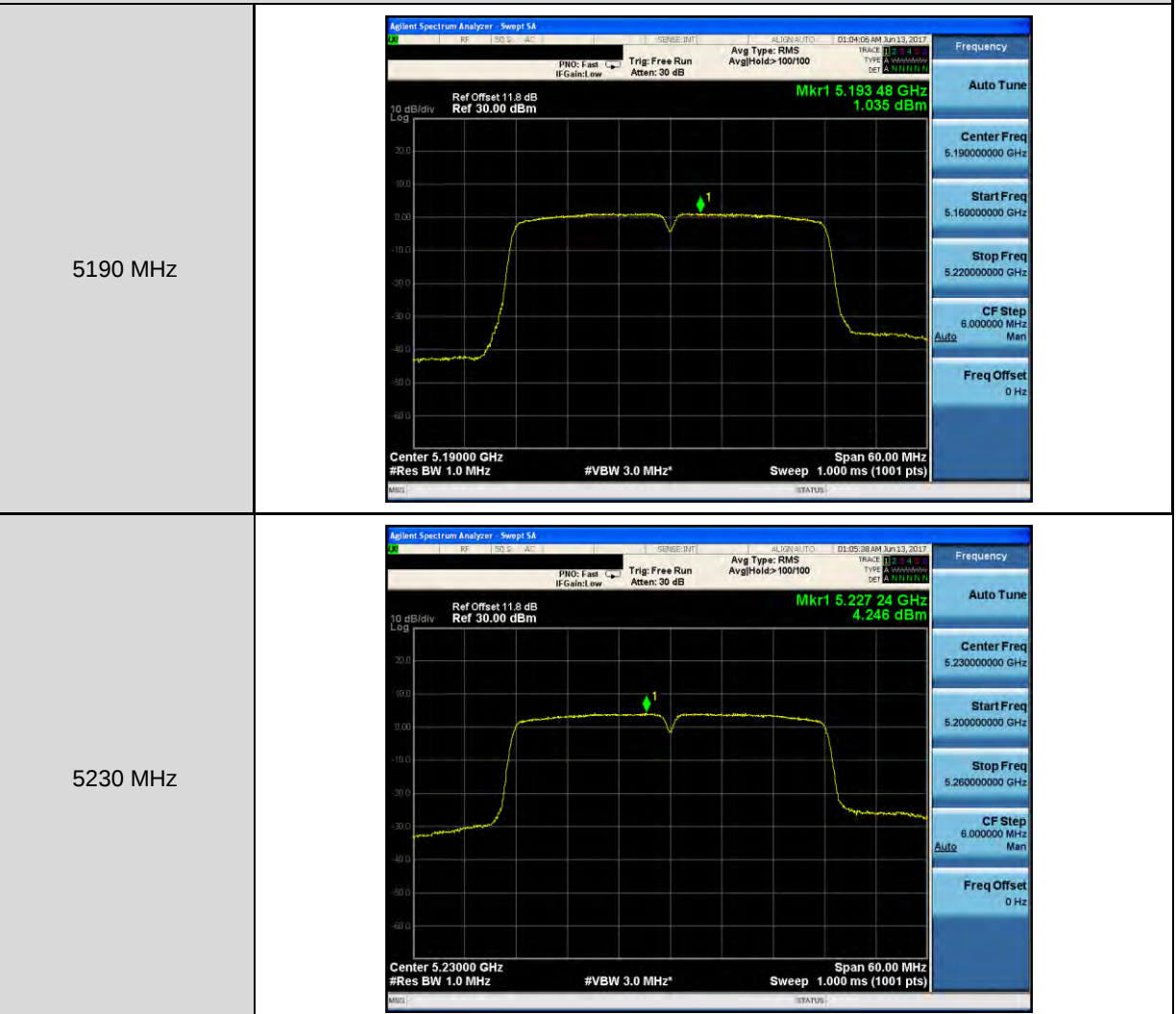


Mode 3: IEEE 802.11ac 20MHz Continuous TX mode _ ANT-1

5745 MHz	
5785 MHz	
5825 MHz	

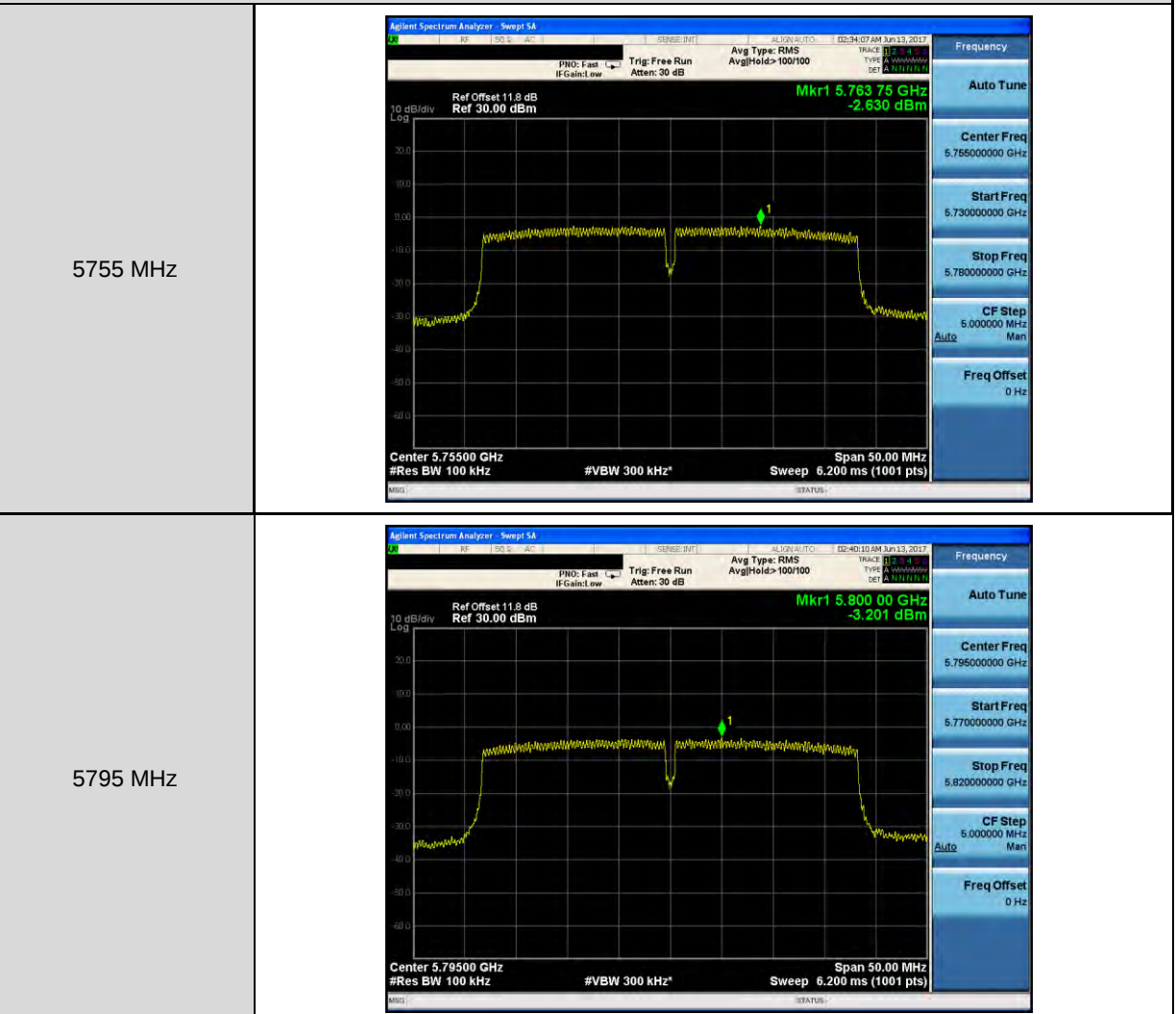


Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ ANT-1





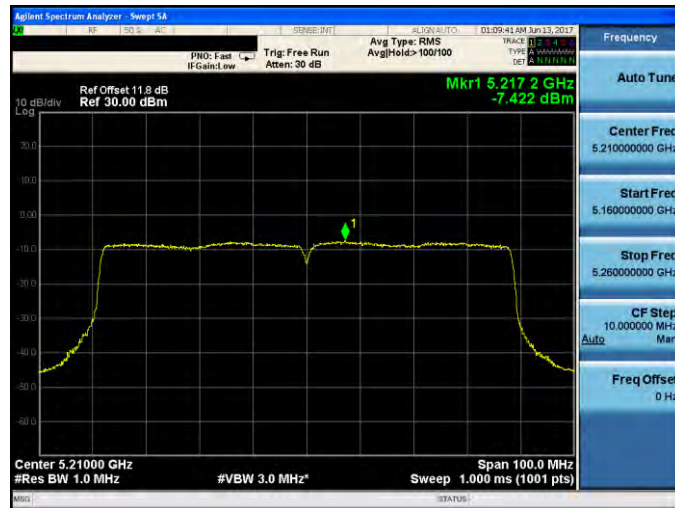
Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ ANT-1





Mode 5: IEEE 802.11ac 80MHz Continuous TX mode _ANT-1

5210 MHz



Mode 5: IEEE 802.11ac 80MHz Continuous TX mode _ANT-1

5775 MHz

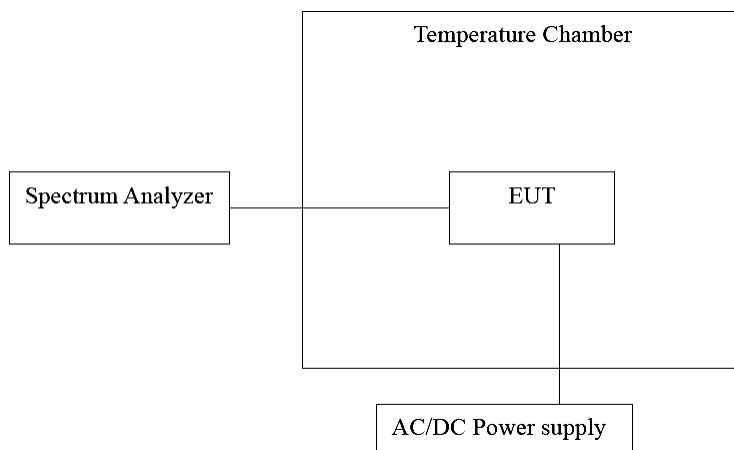


4.8. Frequency Stability Measurement

■ Limit

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

■ Test Setup



■ Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4408B	MY45107753	08/08/2016	1 year
Temperature & Humidity Chamber	TAICHY	MHU-225LA	980729	04/17/2017	1 year
Test Site	ATL	TE05	TE05	N.C.R.	-----

Note: N.C.R. = No Calibration Request.

■ Test Procedure

1. The EUT was placed inside the environmental test chamber and powered by nominal AC/DC voltage.
2. Turn the EUT on and couple its output to a spectrum analyzer.
3. Turn the EUT off and set the chamber to the highest temperature specified.
4. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize.
5. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
6. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.



■ Test Result

Temperature Variations

Test Item	Frequency Stability					
Frequency	Temp. (°C)	Voltage (Vac)	Measured Freq. (MHz)	Delta Freq. (Hz)	Tolerance (ppm)	Result (Pass/Fail)
5200 MHz	0	120	5199.992	-8000	-1.538	Pass
	10		5199.9835	-16500	-3.173	Pass
	20		5199.9792	-20800	-4.000	Pass
	30		5199.9601	-39900	-7.673	Pass
	40		5199.9675	-32500	-6.250	Pass
5785 MHz	0	120	5784.9953	-4700	-0.812	Pass
	10		5784.9938	-6200	-1.072	Pass
	20		5784.9814	-18600	-3.215	Pass
	30		5784.9699	-30100	-5.203	Pass
	40		5784.9668	-33200	-5.739	Pass

Voltage Variations

Test Item	Frequency Stability					
Frequency	Temp. (°C)	Voltage (Vac)	Measured Freq. (MHz)	Delta Freq. (Hz)	Tolerance (ppm)	Result (Pass/Fail)
5200 MHz	20	138.00	5199.9812	-18800	-3.615	Pass
		120.00	5199.9792	-20800	-4.000	Pass
		102.00	5199.9725	-27500	-5.288	Pass
5785 MHz	20	138.00	5784.9889	-11100	-1.919	Pass
		120.00	5784.9814	-18600	-3.215	Pass
		102.00	5784.97	-30000	-5.186	Pass

Note: The manufacturer's frequency stability specification is better than 20ppm.



Beamforming on

Temperature Variations

Test Item	Frequency Stability					
Frequency	Temp. (°C)	Voltage (Vac)	Measured Freq. (MHz)	Delta Freq. (Hz)	Tolerance (ppm)	Result (Pass/Fail)
5200 MHz	0	120	5199.992	-8000	-1.538	Pass
	10		5199.9835	-16500	-3.173	Pass
	20		5199.9792	-20800	-4.000	Pass
	30		5199.9601	-39900	-7.673	Pass
	40		5199.9675	-32500	-6.250	Pass
5785 MHz	0	120	5784.9953	-4700	-0.812	Pass
	10		5784.9938	-6200	-1.072	Pass
	20		5784.9814	-18600	-3.215	Pass
	30		5784.9699	-30100	-5.203	Pass
	40		5784.9668	-33200	-5.739	Pass

Voltage Variations

Test Item	Frequency Stability					
Frequency	Temp. (°C)	Voltage (Vac)	Measured Freq. (MHz)	Delta Freq. (Hz)	Tolerance (ppm)	Result (Pass/Fail)
5200 MHz	20	138.00	5199.9812	-18800	-3.615	Pass
		120.00	5199.9792	-20800	-4.000	Pass
		102.00	5199.9725	-27500	-5.288	Pass
5785 MHz	20	138.00	5784.9889	-11100	-1.919	Pass
		120.00	5784.9814	-18600	-3.215	Pass
		102.00	5784.97	-30000	-5.186	Pass

Note: The manufacturer's frequency stability specification is better than 20ppm.



4.9. Antenna Requirement

■ Limit

For intentional device, according to 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And According to 15.407 (a), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

■ Antenna Connector Construction

See section 2 – antenna information.

■ Directional Gain Calculated

Directional Gain = $10 \cdot \log\{[10^{(G1/20)} + 10^{(G2/20)} + \dots + 10^{(Gn/20)}]^2 / NANT\}$ = 7.36 dBi > 6dBi

Operate Freq. Band		Directional Gain (dBi)
IEEE 802.11a	U-NII Band I	7.36
	U-NII Band III	7.36
IEEE 802.11ac 20MHz	U-NII Band I	7.36
	U-NII Band III	7.36
IEEE 802.11ac 40MHz	U-NII Band I	7.36
	U-NII Band III	7.36
IEEE 802.11ac 80MHz	U-NII Band I	7.36
	U-NII Band III	7.36