



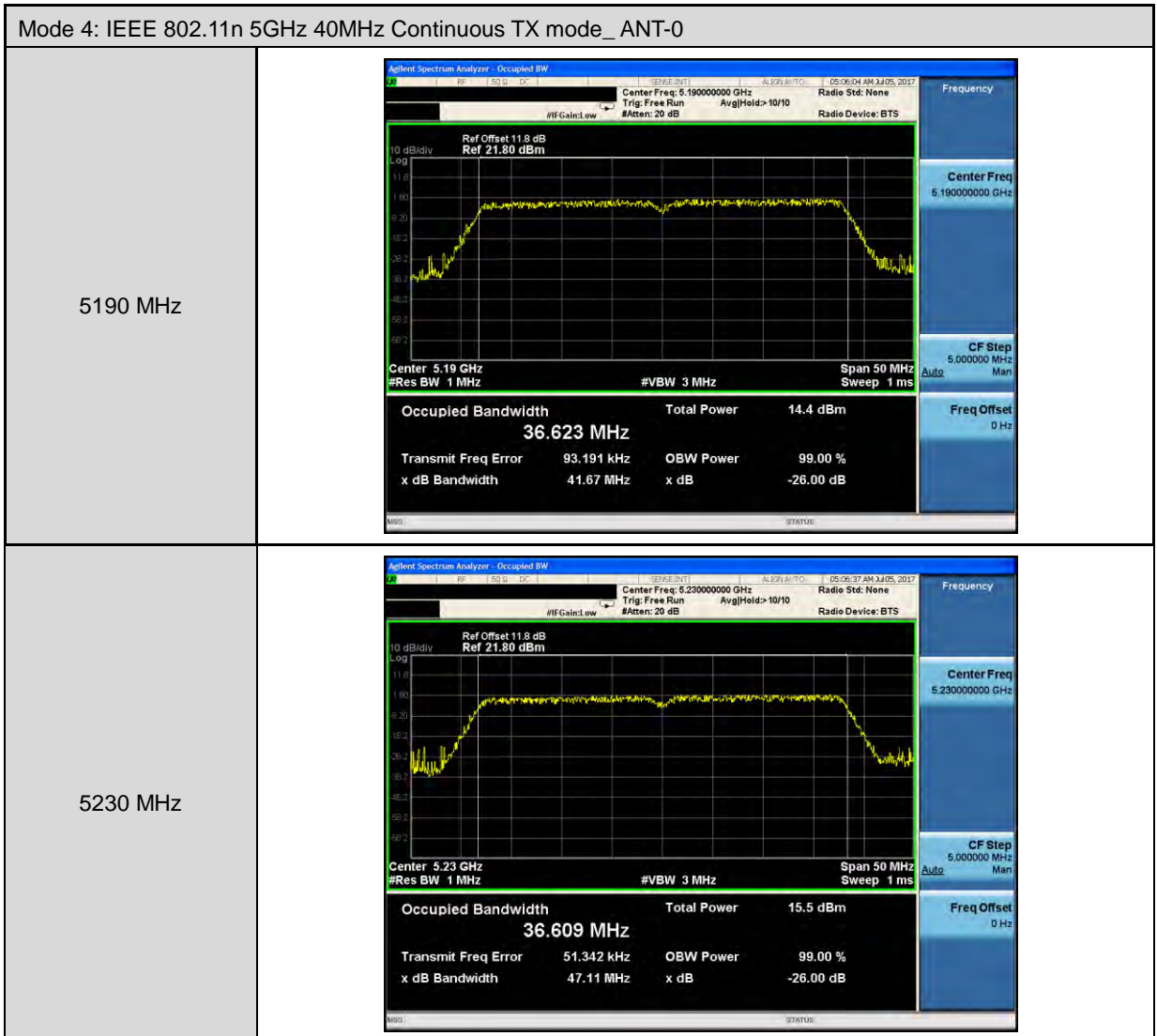
Mode 3: IEEE 802.11n 5GHz 20MHz Continuous TX mode_ ANT-0	
5180 MHz	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq: 5.18000000 GHz</p> <p>Ref Offset 11.8 dB Ref 21.80 dBm</p> <p>Center 5.18 GHz #Res BW 300 kHz</p> <p>Span 25 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 17.886 MHz</p> <p>Total Power 14.2 dBm</p> <p>Transmit Freq Error 32.068 kHz</p> <p>x dB Bandwidth 20.44 MHz</p> <p>OBW Power 99.00 %</p> <p>x dB -26.00 dB</p>
5200 MHz	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq: 5.20000000 GHz</p> <p>Ref Offset 11.8 dB Ref 21.80 dBm</p> <p>Center 5.2 GHz #Res BW 300 kHz</p> <p>Span 25 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 17.885 MHz</p> <p>Total Power 15.3 dBm</p> <p>Transmit Freq Error 9.805 kHz</p> <p>x dB Bandwidth 21.23 MHz</p> <p>OBW Power 99.00 %</p> <p>x dB -26.00 dB</p>
5240 MHz	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq: 5.24000000 GHz</p> <p>Ref Offset 11.8 dB Ref 21.80 dBm</p> <p>Center 5.24 GHz #Res BW 300 kHz</p> <p>Span 25 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 17.850 MHz</p> <p>Total Power 16.2 dBm</p> <p>Transmit Freq Error 9.466 kHz</p> <p>x dB Bandwidth 21.15 MHz</p> <p>OBW Power 99.00 %</p> <p>x dB -26.00 dB</p>

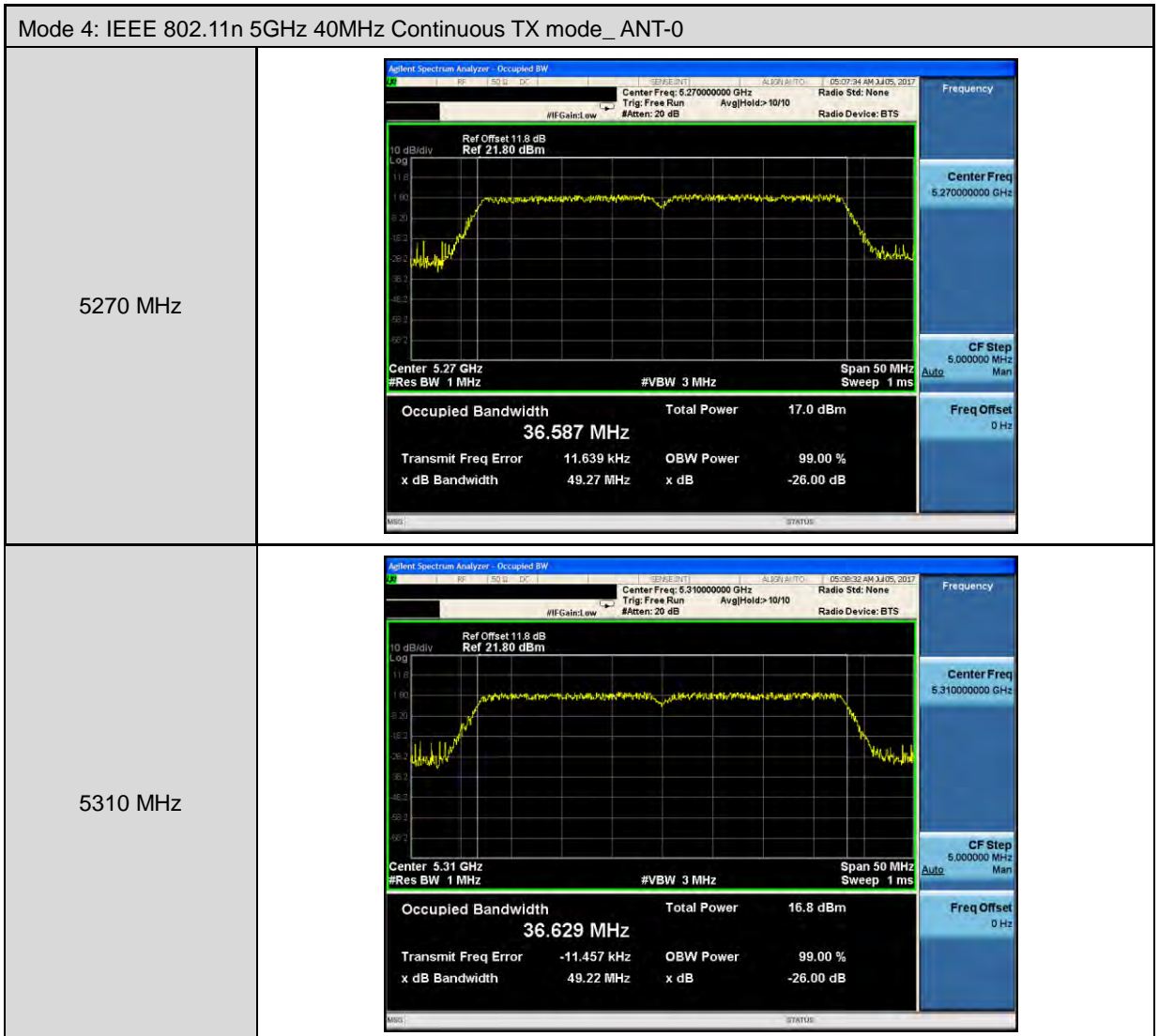


Mode 3: IEEE 802.11n 5GHz 20MHz Continuous TX mode_ ANT-0	
5260 MHz	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq: 5.26000000 GHz</p> <p>Ref Offset 11.8 dB Ref 21.80 dBm</p> <p>Center 5.26 GHz #Res BW 300 kHz</p> <p>Span 25 MHz #VBW 1 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 17.849 MHz</p> <p>Total Power 15.6 dBm</p> <p>Transmit Freq Error 8.255 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 20.45 MHz</p> <p>x dB -26.00 dB</p>
5280 MHz	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq: 5.28000000 GHz</p> <p>Ref Offset 11.8 dB Ref 21.80 dBm</p> <p>Center 5.28 GHz #Res BW 300 kHz</p> <p>Span 25 MHz #VBW 1 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 17.868 MHz</p> <p>Total Power 15.9 dBm</p> <p>Transmit Freq Error 960 Hz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 20.28 MHz</p> <p>x dB -26.00 dB</p>
5320 MHz	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq: 5.32000000 GHz</p> <p>Ref Offset 11.8 dB Ref 21.80 dBm</p> <p>Center 5.32 GHz #Res BW 300 kHz</p> <p>Span 25 MHz #VBW 1 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 17.900 MHz</p> <p>Total Power 16.2 dBm</p> <p>Transmit Freq Error 6.702 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 20.38 MHz</p> <p>x dB -26.00 dB</p>



Mode 3: IEEE 802.11n 5GHz 20MHz Continuous TX mode_ ANT-0	
5500 MHz	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq: 5.500000000 GHz Trig: Free Run #Atten: 20 dB</p> <p>Ref Offset 11.8 dB Ref 21.80 dBm</p> <p>Center 5.5 GHz #Res BW 300 kHz #VBW 1 MHz Span 25 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 17.888 MHz Total Power 14.9 dBm Transmit Freq Error 7.514 kHz x dB Bandwidth 20.45 MHz</p> <p>OBW Power 99.00 % x dB -26.00 dB</p> <p>Center Freq 5.500000000 GHz CF Step 2.500000 MHz Freq Offset 0 Hz</p>
5560 MHz	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq: 5.560000000 GHz Trig: Free Run #Atten: 20 dB</p> <p>Ref Offset 11.8 dB Ref 21.80 dBm</p> <p>Center 5.56 GHz #Res BW 300 kHz #VBW 1 MHz Span 25 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 17.902 MHz Total Power 15.5 dBm Transmit Freq Error 21.008 kHz x dB Bandwidth 20.52 MHz</p> <p>OBW Power 99.00 % x dB -26.00 dB</p> <p>Center Freq 5.560000000 GHz CF Step 2.500000 MHz Freq Offset 0 Hz</p>
5700 MHz	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq: 5.700000000 GHz Trig: Free Run #Atten: 20 dB</p> <p>Ref Offset 11.8 dB Ref 21.80 dBm</p> <p>Center 5.7 GHz #Res BW 300 kHz #VBW 1 MHz Span 25 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 17.900 MHz Total Power 15.5 dBm Transmit Freq Error 625 Hz x dB Bandwidth 20.68 MHz</p> <p>OBW Power 99.00 % x dB -26.00 dB</p> <p>Center Freq 5.700000000 GHz CF Step 2.500000 MHz Freq Offset 0 Hz</p>







Mode 4: IEEE 802.11n 5GHz 40MHz Continuous TX mode_ ANT-0	
5510 MHz	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq: 5.510000000 GHz</p> <p>Ref Offset 11.8 dB Ref 21.80 dBm</p> <p>Center 5.51 GHz #Res BW 1 MHz</p> <p>Occupied Bandwidth 36.660 MHz</p> <p>Total Power 16.2 dBm</p> <p>Transmit Freq Error 38.553 kHz</p> <p>x dB Bandwidth 41.48 MHz</p> <p>OBW Power 99.00 %</p> <p>x dB -26.00 dB</p>
5550 MHz	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq: 5.550000000 GHz</p> <p>Ref Offset 11.8 dB Ref 21.80 dBm</p> <p>Center 5.55 GHz #Res BW 1 MHz</p> <p>Occupied Bandwidth 36.634 MHz</p> <p>Total Power 16.5 dBm</p> <p>Transmit Freq Error -4.524 kHz</p> <p>x dB Bandwidth 41.47 MHz</p> <p>OBW Power 99.00 %</p> <p>x dB -26.00 dB</p>
5670 MHz	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq: 5.670000000 GHz</p> <p>Ref Offset 11.8 dB Ref 21.80 dBm</p> <p>Center 5.67 GHz #Res BW 1 MHz</p> <p>Occupied Bandwidth 36.630 MHz</p> <p>Total Power 16.4 dBm</p> <p>Transmit Freq Error -49.158 kHz</p> <p>x dB Bandwidth 47.82 MHz</p> <p>OBW Power 99.00 %</p> <p>x dB -26.00 dB</p>

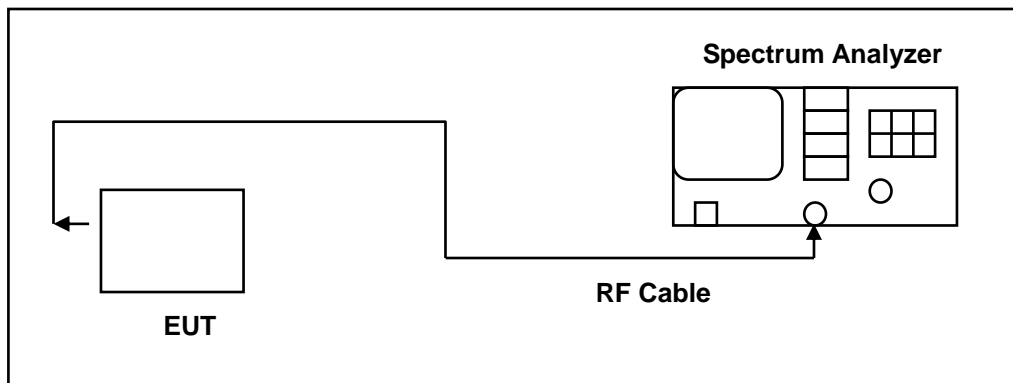
4.6. 6dB RF Bandwidth Measurement

■ **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	
5745	16380	> 500
5785	16340	> 500
5825	16430	> 500

Test Item	6dB RF Bandwidth	
Test Mode	Mode 3: IEEE 802.11n 5GHz 20MHz Continuous TX mode	
Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)
	ANT-0	
5745	17610	> 500
5785	17620	> 500
5825	17610	> 500

Test Item	6dB RF Bandwidth	
Test Mode	Mode 4: IEEE 802.11n 5GHz 40MHz Continuous TX mode	
Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)
	ANT-0	
5755	36370	> 500
5795	36360	> 500



■ Test Graphs

Mode 2: IEEE 802.11a Continuous TX mode_ANT-0	
5745 MHz	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq: 5.74500000 GHz Trig: Free Run #IFGain: Low #Atten: 20 dB</p> <p>Ref Offset 11.8 dB Ref 21.80 dBm</p> <p>Center: 5.745 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms</p> <p>Occupied Bandwidth: 16.490 MHz Total Power: 19.3 dBm Transmit Freq Error: -21.198 kHz x dB Bandwidth: 16.38 MHz OBW Power: 99.00 % x dB: -6.00 dB</p>
5785 MHz	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq: 5.78500000 GHz Trig: Free Run #IFGain: Low #Atten: 20 dB</p> <p>Ref Offset 11.8 dB Ref 21.80 dBm</p> <p>Center: 5.785 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms</p> <p>Occupied Bandwidth: 16.964 MHz Total Power: 21.5 dBm Transmit Freq Error: -20.689 kHz x dB Bandwidth: 16.34 MHz OBW Power: 99.00 % x dB: -6.00 dB</p>
5825 MHz	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq: 5.82500000 GHz Trig: Free Run #IFGain: Low #Atten: 20 dB</p> <p>Ref Offset 11.8 dB Ref 21.80 dBm</p> <p>Center: 5.825 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms</p> <p>Occupied Bandwidth: 16.535 MHz Total Power: 18.7 dBm Transmit Freq Error: -36.367 kHz x dB Bandwidth: 16.43 MHz OBW Power: 99.00 % x dB: -6.00 dB</p>



Mode 3: IEEE 802.11n 5GHz 20MHz Continuous TX mode_ANT-0																			
5745 MHz	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq: 5.745000000 GHz Trig: Free Run #IFGain: Low #Atten: 20 dB</p> <p>Ref Offset 11.8 dB Ref 21.80 dBm</p> <p>Center 5.745 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>17.5 dBm</td> </tr> <tr> <td>17.690 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>-18.565 kHz</td> <td>x dB</td> <td>-6.00 dB</td> </tr> <tr> <td>x dB Bandwidth</td> <td></td> <td></td> </tr> <tr> <td>17.61 MHz</td> <td></td> <td></td> </tr> </table> <p>Center Freq: 5.74500000 GHz CF Step: 3.000000 MHz Freq Offset: 0 Hz</p>	Occupied Bandwidth	Total Power	17.5 dBm	17.690 MHz			Transmit Freq Error	OBW Power	99.00 %	-18.565 kHz	x dB	-6.00 dB	x dB Bandwidth			17.61 MHz		
Occupied Bandwidth	Total Power	17.5 dBm																	
17.690 MHz																			
Transmit Freq Error	OBW Power	99.00 %																	
-18.565 kHz	x dB	-6.00 dB																	
x dB Bandwidth																			
17.61 MHz																			
5785 MHz	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq: 5.785000000 GHz Trig: Free Run #IFGain: Low #Atten: 20 dB</p> <p>Ref Offset 11.8 dB Ref 21.80 dBm</p> <p>Center 5.785 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>17.4 dBm</td> </tr> <tr> <td>17.698 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>-19.725 kHz</td> <td>x dB</td> <td>-6.00 dB</td> </tr> <tr> <td>x dB Bandwidth</td> <td></td> <td></td> </tr> <tr> <td>17.62 MHz</td> <td></td> <td></td> </tr> </table> <p>Center Freq: 5.78500000 GHz CF Step: 3.000000 MHz Freq Offset: 0 Hz</p>	Occupied Bandwidth	Total Power	17.4 dBm	17.698 MHz			Transmit Freq Error	OBW Power	99.00 %	-19.725 kHz	x dB	-6.00 dB	x dB Bandwidth			17.62 MHz		
Occupied Bandwidth	Total Power	17.4 dBm																	
17.698 MHz																			
Transmit Freq Error	OBW Power	99.00 %																	
-19.725 kHz	x dB	-6.00 dB																	
x dB Bandwidth																			
17.62 MHz																			
5825 MHz	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq: 5.825000000 GHz Trig: Free Run #IFGain: Low #Atten: 20 dB</p> <p>Ref Offset 11.8 dB Ref 21.80 dBm</p> <p>Center 5.825 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>17.3 dBm</td> </tr> <tr> <td>17.697 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>-30.462 kHz</td> <td>x dB</td> <td>-6.00 dB</td> </tr> <tr> <td>x dB Bandwidth</td> <td></td> <td></td> </tr> <tr> <td>17.61 MHz</td> <td></td> <td></td> </tr> </table> <p>Center Freq: 5.82500000 GHz CF Step: 3.000000 MHz Freq Offset: 0 Hz</p>	Occupied Bandwidth	Total Power	17.3 dBm	17.697 MHz			Transmit Freq Error	OBW Power	99.00 %	-30.462 kHz	x dB	-6.00 dB	x dB Bandwidth			17.61 MHz		
Occupied Bandwidth	Total Power	17.3 dBm																	
17.697 MHz																			
Transmit Freq Error	OBW Power	99.00 %																	
-30.462 kHz	x dB	-6.00 dB																	
x dB Bandwidth																			
17.61 MHz																			



Mode 4: IEEE 802.11n 5GHz 40MHz Continuous TX mode_ANT-0																			
5755 MHz	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq: 5.755000000 GHz Trig: Free Run Avg/Hold: 10/10 #IFGain: Low #Atten: 20 dB Radio Std: None Radio Device: BTS</p> <p>Ref Offset 11.8 dB Ref 21.80 dBm</p> <p>Center: 5.755 GHz #Res BW 100 kHz #VBW 300 kHz Span 50 MHz Sweep 4.8 ms</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>17.9 dBm</td> </tr> <tr> <td>36.211 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>-15.092 kHz</td> <td>x dB</td> <td>-6.00 dB</td> </tr> <tr> <td>x dB Bandwidth</td> <td></td> <td></td> </tr> <tr> <td>36.37 MHz</td> <td></td> <td></td> </tr> </table> <p>Center Freq: 5.75500000 GHz CF Step: 5.000000 MHz Freq Offset: 0 Hz</p>	Occupied Bandwidth	Total Power	17.9 dBm	36.211 MHz			Transmit Freq Error	OBW Power	99.00 %	-15.092 kHz	x dB	-6.00 dB	x dB Bandwidth			36.37 MHz		
Occupied Bandwidth	Total Power	17.9 dBm																	
36.211 MHz																			
Transmit Freq Error	OBW Power	99.00 %																	
-15.092 kHz	x dB	-6.00 dB																	
x dB Bandwidth																			
36.37 MHz																			
5795 MHz	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq: 5.795000000 GHz Trig: Free Run Avg/Hold: 10/10 #IFGain: Low #Atten: 20 dB Radio Std: None Radio Device: BTS</p> <p>Ref Offset 11.8 dB Ref 21.80 dBm</p> <p>Center: 5.795 GHz #Res BW 100 kHz #VBW 300 kHz Span 50 MHz Sweep 4.8 ms</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>17.4 dBm</td> </tr> <tr> <td>36.210 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>-27.711 kHz</td> <td>x dB</td> <td>-6.00 dB</td> </tr> <tr> <td>x dB Bandwidth</td> <td></td> <td></td> </tr> <tr> <td>36.36 MHz</td> <td></td> <td></td> </tr> </table> <p>Center Freq: 5.795000000 GHz CF Step: 5.000000 MHz Freq Offset: 0 Hz</p>	Occupied Bandwidth	Total Power	17.4 dBm	36.210 MHz			Transmit Freq Error	OBW Power	99.00 %	-27.711 kHz	x dB	-6.00 dB	x dB Bandwidth			36.36 MHz		
Occupied Bandwidth	Total Power	17.4 dBm																	
36.210 MHz																			
Transmit Freq Error	OBW Power	99.00 %																	
-27.711 kHz	x dB	-6.00 dB																	
x dB Bandwidth																			
36.36 MHz																			

4.7. Peak Power Spectral Density Measurement

■ Limit

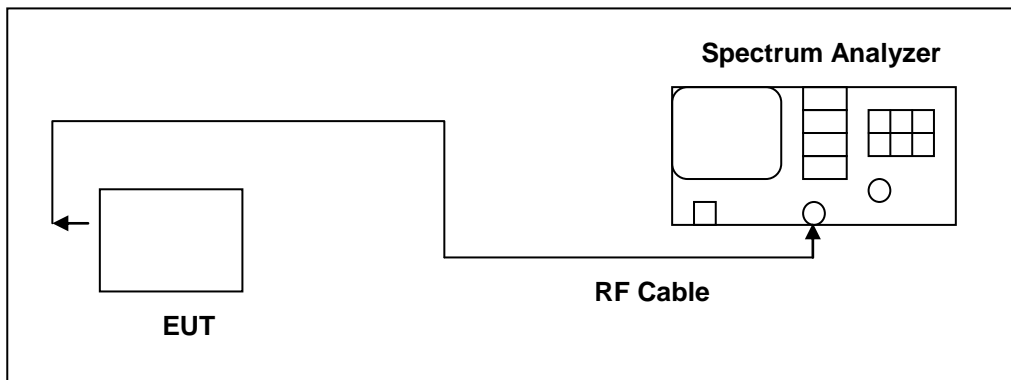
Conducted power spectral density

Frequency Range (MHz)	FCC Limit
	Client
5.150 ~ 5.250 GHz	11 dBm/MHz
5.250 ~ 5.350 GHz	11 dBm/MHz
5.470 ~ 5.725 GHz	11 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,

* Diversity mode for ANT-0 : Max. Gain = 6.06 dBi > 6dBi

■ 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	-0.650	0.133	-0.517	< 10.94
5200	-0.512	0.133	-0.379	
5240	1.146	0.133	1.279	
5260	0.829	0.133	0.962	
5280	1.302	0.133	1.435	
5320	1.413	0.133	1.546	
5500	-0.282	0.133	-0.149	
5560	0.293	0.133	0.426	
5700	0.642	0.133	0.775	

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	-6.74	0.133	0.38	< 29.94
5785	-6.91	0.133	0.21	
5825	-7.08	0.133	0.04	

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 802.11n 5GHz 20MHz Continuous TX mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5180	-2.920	0.142	-2.778	< 10.94
5200	-1.712	0.142	-1.570	
5240	-1.002	0.142	-0.860	
5260	-1.270	0.142	-1.128	
5280	-0.565	0.142	-0.423	
5320	-0.695	0.142	-0.553	
5500	-1.924	0.142	-1.782	
5560	-1.476	0.142	-1.334	
5700	-1.287	0.142	-1.145	

Test Item	Conducted power spectral density			
Test Mode	Mode 3: IEEE 802.11n 5GHz 20MHz Continuous TX mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5745	-8.86	0.142	-1.72	< 29.94
5785	-8.58	0.142	-1.45	
5825	-9.48	0.142	-2.35	

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 802.11n 5GHz 40MHz Continuous TX mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5190	-6.285	0.310	-5.975	< 10.94
5230	-5.442	0.310	-5.132	
5270	-4.049	0.310	-3.739	
5310	-4.228	0.310	-3.918	
5510	-4.724	0.310	-4.414	
5550	-4.567	0.310	-4.257	
5670	-4.705	0.310	-4.395	

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 802.11n 5GHz 40MHz Continuous TX mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5755	-12.06	0.310	-4.76	< 29.94
5795	-11.87	0.310	-4.57	

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

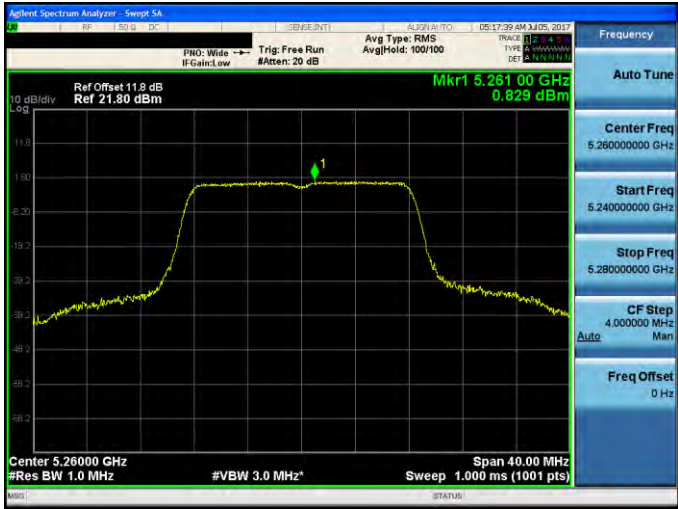
Conversion ratio = 10*Log(500k/100k)



■ 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	
5260 MHz	 <p>Agilent Spectrum Analyzer: Swiqt SA Ref Offset 11.8 dB Ref 21.80 dBm Mkr1 5.261 00 GHz 0.829 dBm Center 5.26000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz* Span 40.00 MHz Sweep 1.000 ms (1001 pts)</p>
5280 MHz	 <p>Agilent Spectrum Analyzer: Swiqt SA Ref Offset 11.8 dB Ref 21.80 dBm Mkr1 5.278 04 GHz 1.302 dBm Center 5.28000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz* Span 40.00 MHz Sweep 1.000 ms (1001 pts)</p>
5320 MHz	 <p>Agilent Spectrum Analyzer: Swiqt SA Ref Offset 11.8 dB Ref 21.80 dBm Mkr1 5.325 40 GHz 1.413 dBm Center 5.32000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz* Span 40.00 MHz Sweep 1.000 ms (1001 pts)</p>



Mode 2: IEEE 802.11a Continuous TX mode_ ANT-0	
5500 MHz	
5560 MHz	
5700 MHz	



Mode 2: IEEE 802.11a Continuous TX mode_ ANT-0	
5745 MHz	<p>Agilent Spectrum Analyzer: Swi5pt 5A AL221 A170: 06:59:52 AM 11/05/2017 PNO: Wide IF Gain: Low Trig: Free Run Avg Type: RMS #Atten: 20 dB AvgHold: 100/100 Mkr1 5.75247 GHz -6.741 dBm Ref Offset 11.8 dB Ref 21.80 dBm 10 dB/div Log Center 5.74500 GHz Span 30.00 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 3.733 ms (1001 pts)</p>
5785 MHz	<p>Agilent Spectrum Analyzer: Swi5pt 5A AL221 A170: 07:00:48 AM 11/05/2017 PNO: Wide IF Gain: Low Trig: Free Run Avg Type: RMS #Atten: 20 dB AvgHold: 100/100 Mkr1 5.78185 GHz -6.913 dBm Ref Offset 11.8 dB Ref 21.80 dBm 10 dB/div Log Center 5.78500 GHz Span 30.00 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 3.733 ms (1001 pts)</p>
5825 MHz	<p>Agilent Spectrum Analyzer: Swi5pt 5A AL221 A170: 07:02:32 AM 11/05/2017 PNO: Wide IF Gain: Low Trig: Free Run Avg Type: RMS #Atten: 20 dB AvgHold: 100/100 Mkr1 5.82626 GHz -7.088 dBm Ref Offset 11.8 dB Ref 21.80 dBm 10 dB/div Log Center 5.82500 GHz Span 30.00 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 3.733 ms (1001 pts)</p>



Mode 3: IEEE 802.11n 5GHz 20MHz Continuous TX mode_ ANT-0	
5180 MHz	
5200 MHz	
5240 MHz	



Mode 3: IEEE 802.11n 5GHz 20MHz Continuous TX mode_ ANT-0	
5260 MHz	<p>Agilent Spectrum Analyzer: Swi5pt SA Frequency: 5.26000000 GHz Center Freq: 5.26000000 GHz Start Freq: 5.24000000 GHz Stop Freq: 5.28000000 GHz CF Step: 4.000000 MHz Freq Offset: 0 Hz Mkr1 5.26136 GHz -1.270 dBm Ref Offset 11.8 dB Ref 21.80 dBm Center 5.26000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Span 40.00 MHz Sweep 1.000 ms (1001 pts)</p>
5280 MHz	<p>Agilent Spectrum Analyzer: Swi5pt SA Frequency: 5.28000000 GHz Center Freq: 5.28000000 GHz Start Freq: 5.26000000 GHz Stop Freq: 5.30000000 GHz CF Step: 4.000000 MHz Freq Offset: 0 Hz Mkr1 5.28184 GHz -0.565 dBm Ref Offset 11.8 dB Ref 21.80 dBm Center 5.28000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Span 40.00 MHz Sweep 1.000 ms (1001 pts)</p>
5320 MHz	<p>Agilent Spectrum Analyzer: Swi5pt SA Frequency: 5.32000000 GHz Center Freq: 5.32000000 GHz Start Freq: 5.30000000 GHz Stop Freq: 5.34000000 GHz CF Step: 4.000000 MHz Freq Offset: 0 Hz Mkr1 5.31632 GHz -0.695 dBm Ref Offset 11.8 dB Ref 21.80 dBm Center 5.32000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Span 40.00 MHz Sweep 1.000 ms (1001 pts)</p>

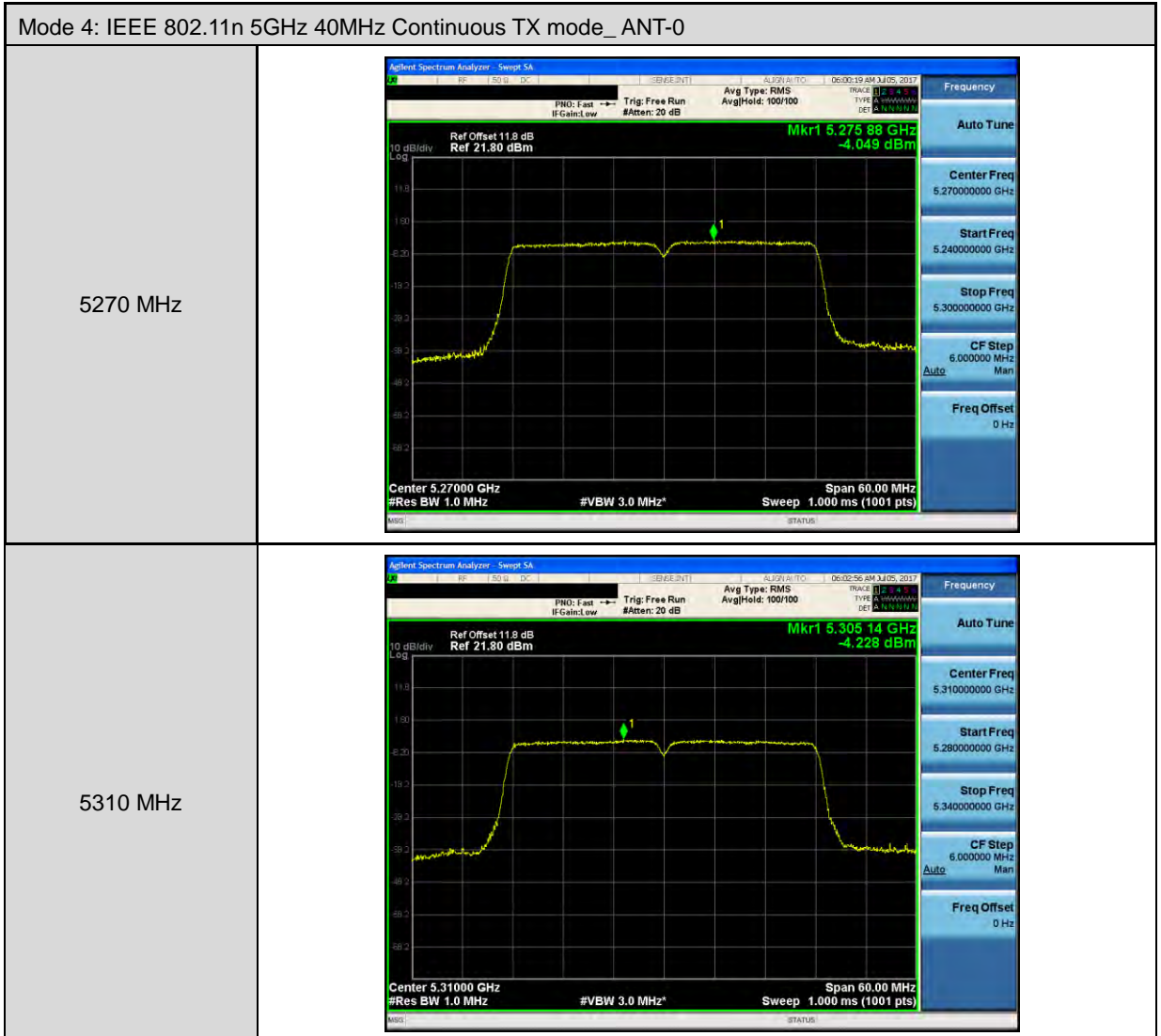


Mode 3: IEEE 802.11n 5GHz 20MHz Continuous TX mode_ ANT-0	
5500 MHz	
5560 MHz	
5700 MHz	



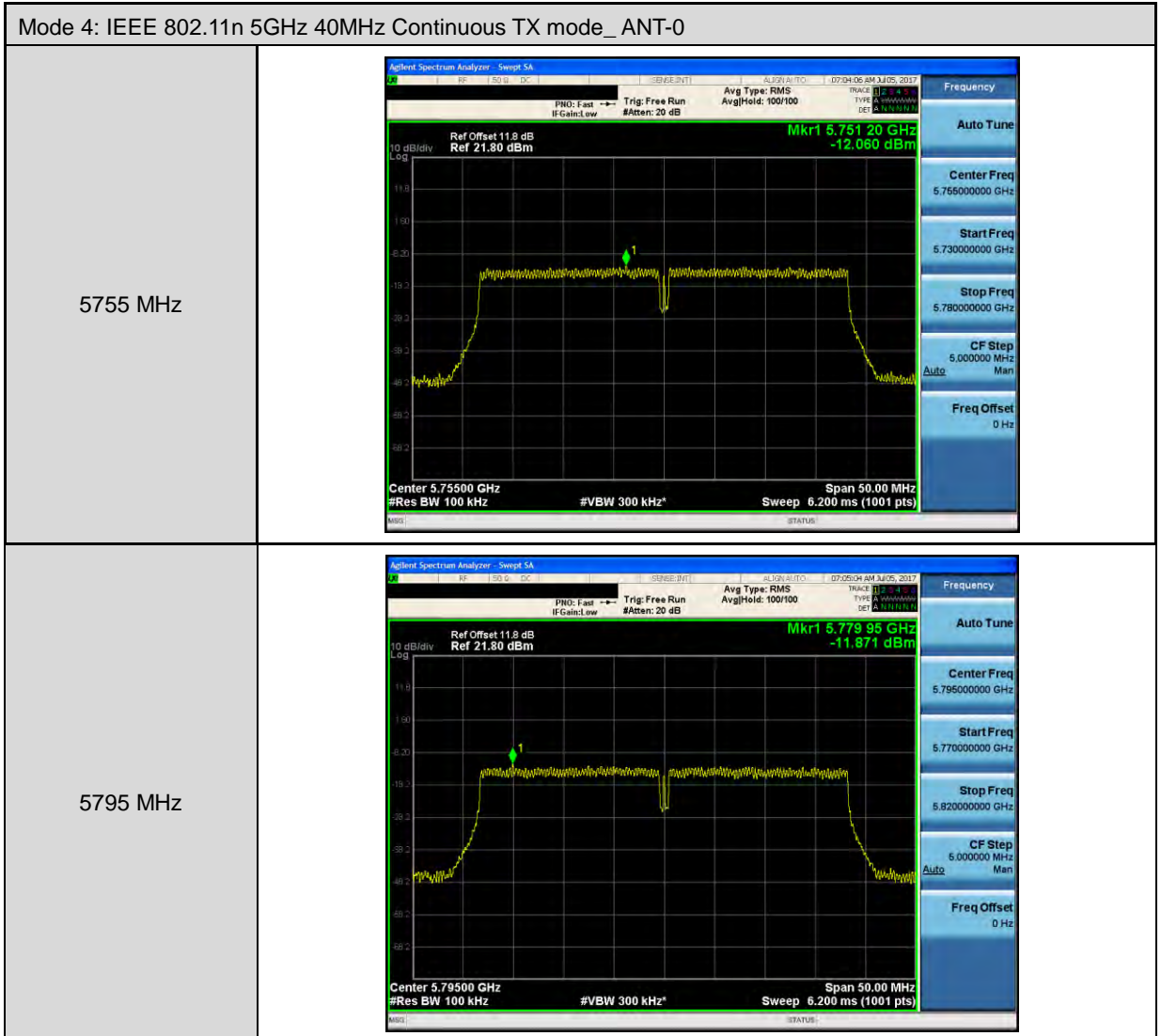
Mode 3: IEEE 802.11n 5GHz 20MHz Continuous TX mode_ ANT-0	
5745 MHz	<p>Agilent Spectrum Analyzer - Swi5pt SA</p> <p>Ref Offset 11.8 dB Ref 21.80 dBm</p> <p>Mkr1 5.748 75 GHz -8.856 dBm</p> <p>Center 5.74500 GHz #Res BW 100 kHz</p> <p>Span 30.00 MHz #VBW 300 kHz* Sweep 3.733 ms (1001 pts)</p> <p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 5.745000000 GHz</p> <p>Start Freq 5.730000000 GHz</p> <p>Stop Freq 5.760000000 GHz</p> <p>CF Step 3.000000 MHz Auto Man</p> <p>Freq Offset 0 Hz</p>
5785 MHz	<p>Agilent Spectrum Analyzer - Swi5pt SA</p> <p>Ref Offset 11.8 dB Ref 21.80 dBm</p> <p>Mkr1 5.779 36 GHz -8.581 dBm</p> <p>Center 5.78500 GHz #Res BW 100 kHz</p> <p>Span 30.00 MHz #VBW 300 kHz* Sweep 3.733 ms (1001 pts)</p> <p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 5.785000000 GHz</p> <p>Start Freq 5.770000000 GHz</p> <p>Stop Freq 5.800000000 GHz</p> <p>CF Step 3.000000 MHz Auto Man</p> <p>Freq Offset 0 Hz</p>
5825 MHz	<p>Agilent Spectrum Analyzer - Swi5pt SA</p> <p>Ref Offset 11.8 dB Ref 21.80 dBm</p> <p>Mkr1 5.821 25 GHz -9.482 dBm</p> <p>Center 5.82500 GHz #Res BW 100 kHz</p> <p>Span 30.00 MHz #VBW 300 kHz* Sweep 3.733 ms (1001 pts)</p> <p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 5.825000000 GHz</p> <p>Start Freq 5.810000000 GHz</p> <p>Stop Freq 5.840000000 GHz</p> <p>CF Step 3.000000 MHz Auto Man</p> <p>Freq Offset 0 Hz</p>







Mode 4: IEEE 802.11n 5GHz 40MHz Continuous TX mode_ ANT-0	
5510 MHz	<p>Agilent Spectrum Analyzer: Swi5p1 SA Ref Offset: 11.8 dB Ref: 21.80 dBm Mkr1: 5.515 40 GHz -4.724 dBm Center: 5.510000 GHz #Res BW: 1.0 MHz #VBW: 3.0 MHz* Span: 60.00 MHz Sweep: 1.000 ms (1001 pts)</p>
5550 MHz	<p>Agilent Spectrum Analyzer: Swi5p1 SA Ref Offset: 11.8 dB Ref: 21.80 dBm Mkr1: 5.547 66 GHz -4.567 dBm Center: 5.550000 GHz #Res BW: 1.0 MHz #VBW: 3.0 MHz* Span: 60.00 MHz Sweep: 1.000 ms (1001 pts)</p>
5670 MHz	<p>Agilent Spectrum Analyzer: Swi5p1 SA Ref Offset: 11.8 dB Ref: 21.80 dBm Mkr1: 5.665 56 GHz -4.705 dBm Center: 5.670000 GHz #Res BW: 1.0 MHz #VBW: 3.0 MHz* Span: 60.00 MHz Sweep: 1.000 ms (1001 pts)</p>

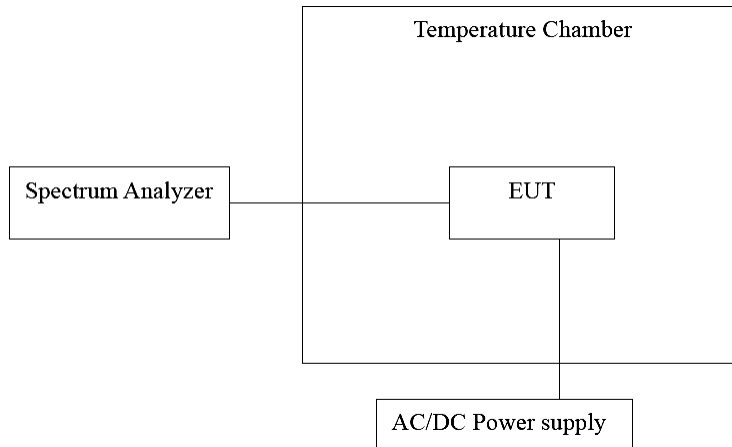


4.8. Frequency Stability Measurement

■ 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	5200.0200	20000	3.846	Pass
	10		5199.9920	-8000	-1.538	Pass
	20		5199.9880	-12000	-2.308	Pass
	30		5199.9850	-15000	-2.885	Pass
	40		5199.9820	-18000	-3.462	Pass
5280 MHz	0	120	5280.0210	21000	3.977	Pass
	10		5280.0160	16000	3.030	Pass
	20		5279.9950	-5000	-0.947	Pass
	30		5279.9930	-7000	-1.326	Pass
	40		5279.9890	-11000	-2.083	Pass
5560 MHz	0	120	5560.0230	23000	4.137	Pass
	10		5560.0170	17000	3.058	Pass
	20		5559.9940	-6000	-1.079	Pass
	30		5559.9930	-7000	-1.259	Pass
	40		5559.9900	-10000	-1.799	Pass
5785 MHz	0	120	5785.0210	21000	3.630	Pass
	10		5785.0020	2000	0.346	Pass
	20		5784.9910	-9000	-1.556	Pass
	30		5784.9830	-17000	-2.939	Pass
	40		5784.9750	-25000	-4.322	Pass

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

**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	5199.9920	-8000	-1.538	Pass
		120.00	5199.9980	-2000	-0.385	Pass
		102.00	5199.9997	-300	-0.058	Pass
5280 MHz	20	138.00	5279.9935	-6500	-1.231	Pass
		120.00	5279.9950	-5000	-0.947	Pass
		102.00	5280.0010	1000	0.189	Pass
5560 MHz	20	138.00	5559.9830	-17000	-3.058	Pass
		120.00	5559.9940	-6000	-1.079	Pass
		102.00	5560.0010	1000	0.180	Pass
5785 MHz	20	138.00	5784.9850	-15000	-2.593	Pass
		120.00	5784.9910	-9000	-1.556	Pass
		102.00	5785.0020	2000	0.346	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.