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	
5280 MHz	
5320 MHz	

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

Mode 4: IEEE 802.11n 5GHz 40MHz Continuous TX mode_ ANT-0	
5190 MHz	
5230 MHz	

Mode 4: IEEE 802.11n 5GHz 40MHz Continuous TX mode_ ANT-0	
5270 MHz	
5310 MHz	

Mode 4: IEEE 802.11n 5GHz 40MHz Continuous TX mode_ ANT-0	
5510 MHz	
5550 MHz	
5670 MHz	

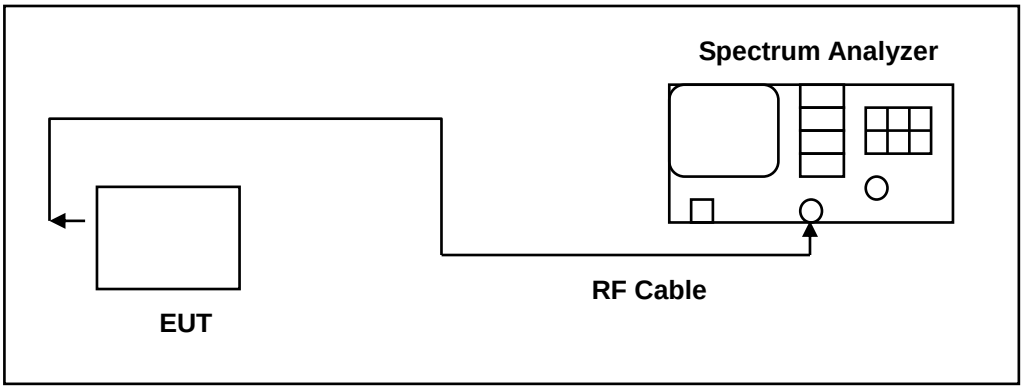
4.6. 6dB RF Bandwidth Measurement

■ **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**

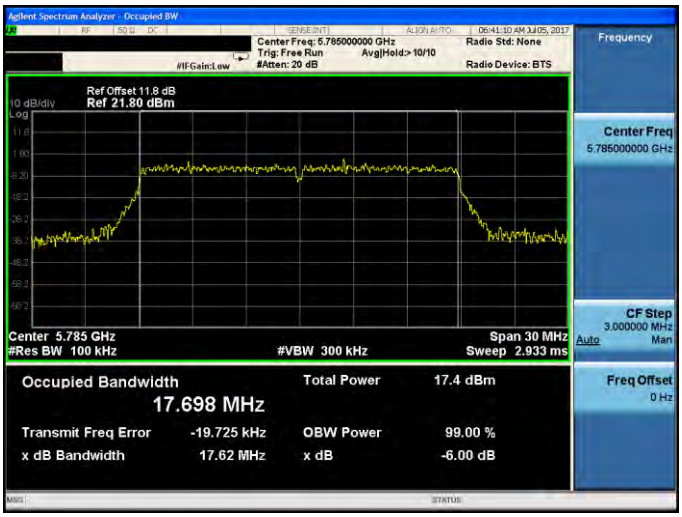
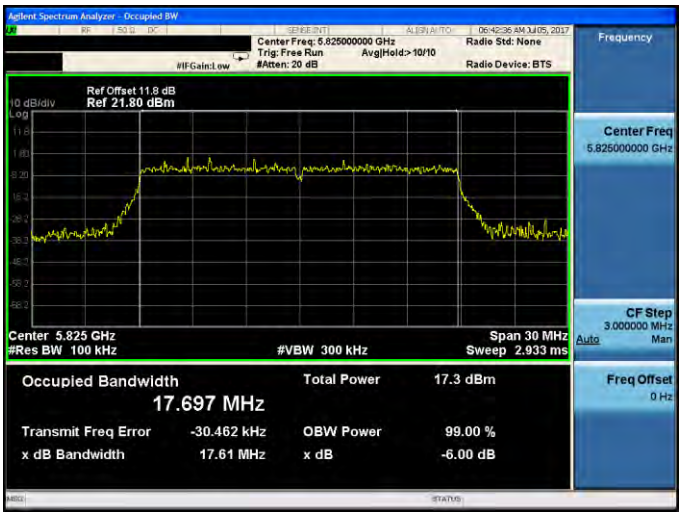
Test Item	6dB RF Bandwidth	
Test Mode	Mode 2: IEEE 802.11a Continuous TX mode	
Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)
	ANT-0	
5745	16380	> 500
5785	16340	> 500
5825	16430	> 500

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	
5785 MHz	
5825 MHz	

Mode 3: IEEE 802.11n 5GHz 20MHz Continuous TX mode_ANT-0	
5745 MHz	
5785 MHz	
5825 MHz	

Mode 4: IEEE 802.11n 5GHz 40MHz Continuous TX mode_ANT-0	
5755 MHz	
5795 MHz	

4.7. Peak Power Spectral Density Measurement

■ **Limit**

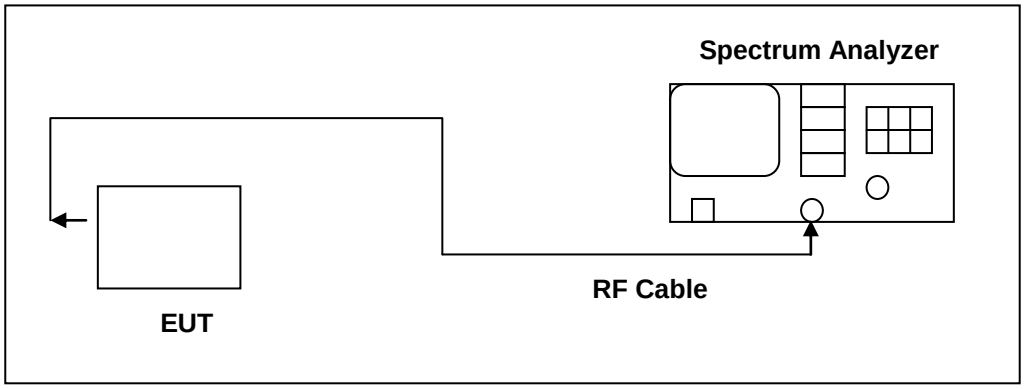
Conducted power spectral density

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 10log(500kHz/100kHz) 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	

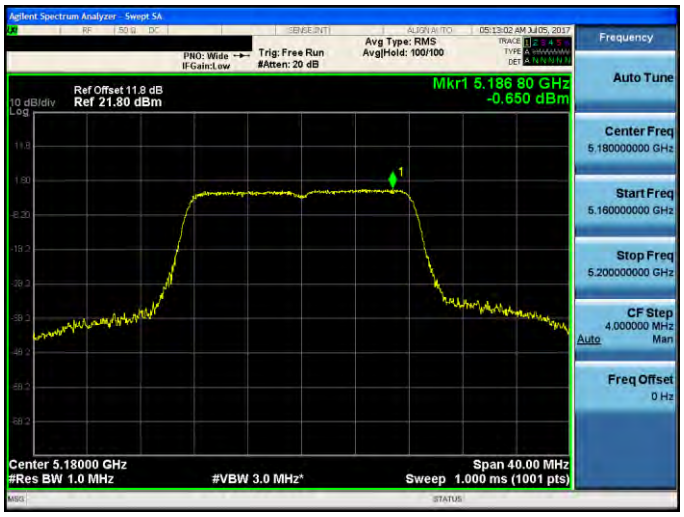
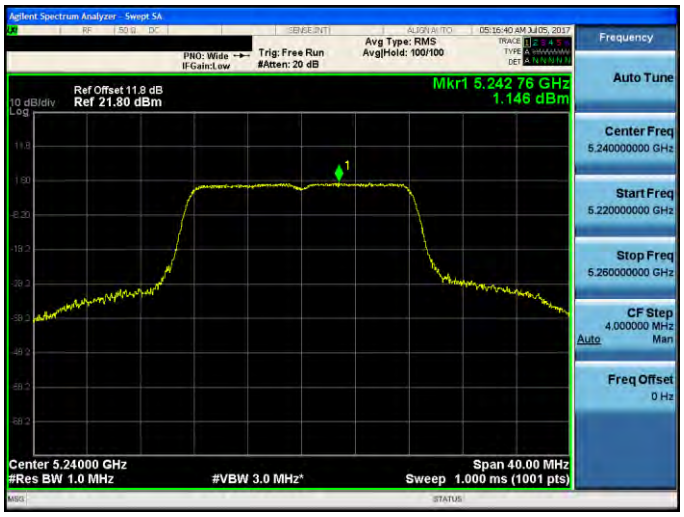
Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

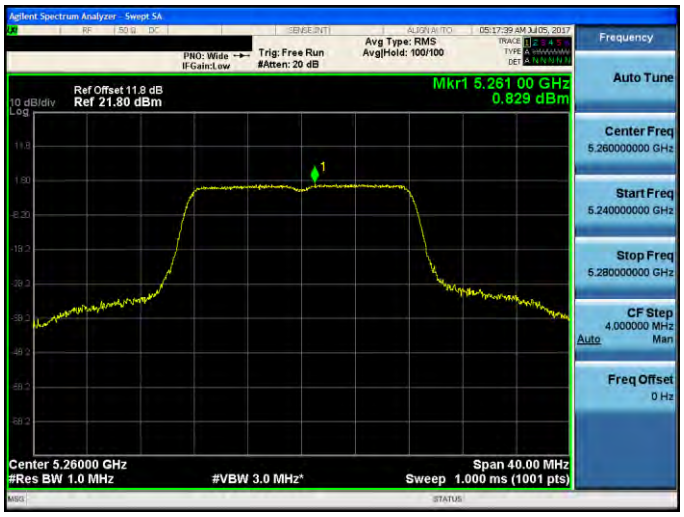
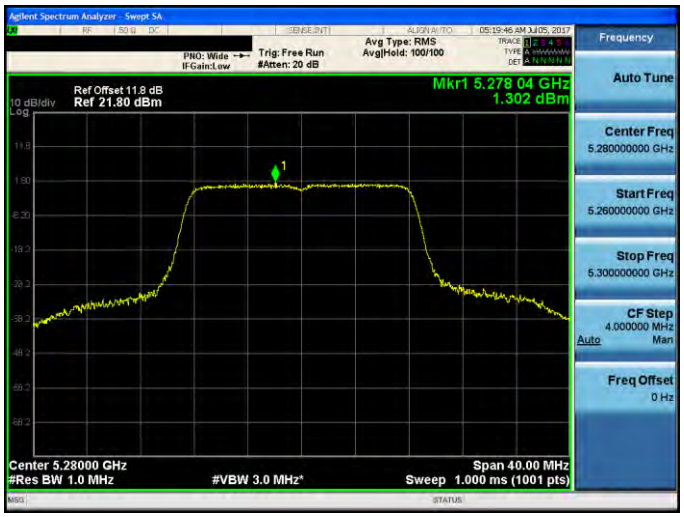
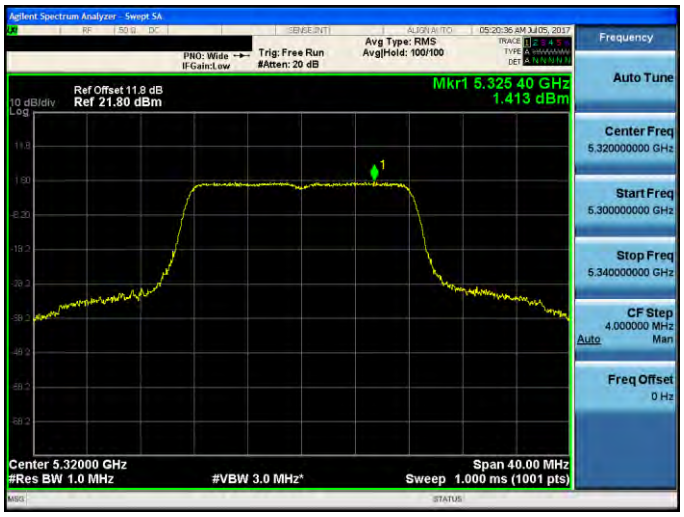
Test Item	Conducted power spectral density			
Test Mode	Mode 4: IEEE 802.11n 5GHz 40MHz Continuous TX mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5755	-12.06	0.310	-4.76	< 29.94
5795	-11.87	0.310	-4.57	

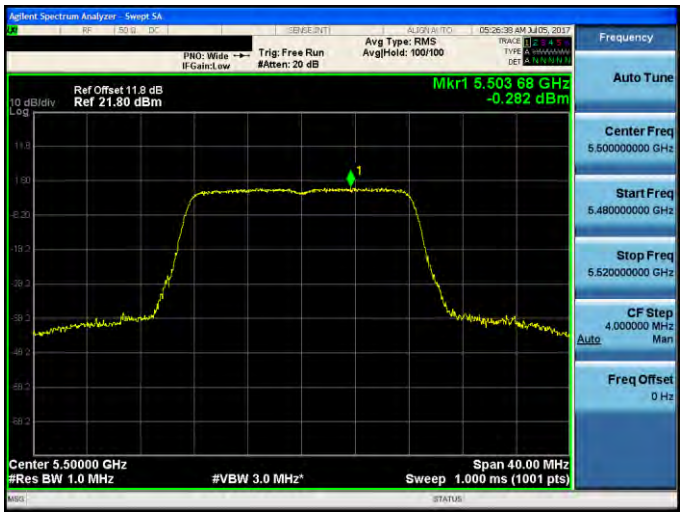
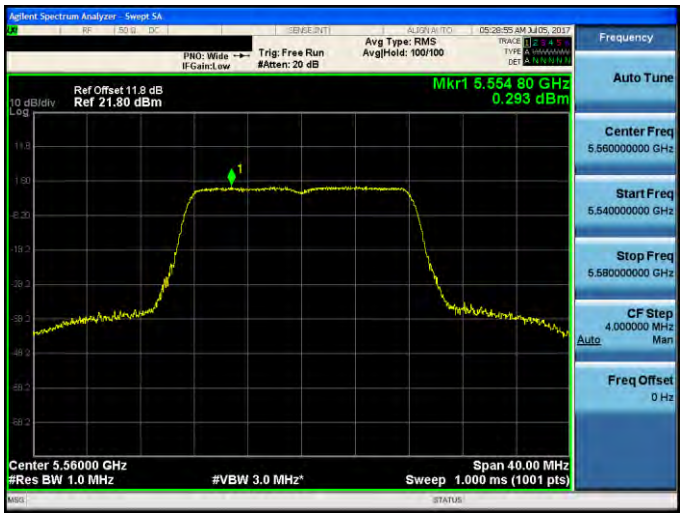
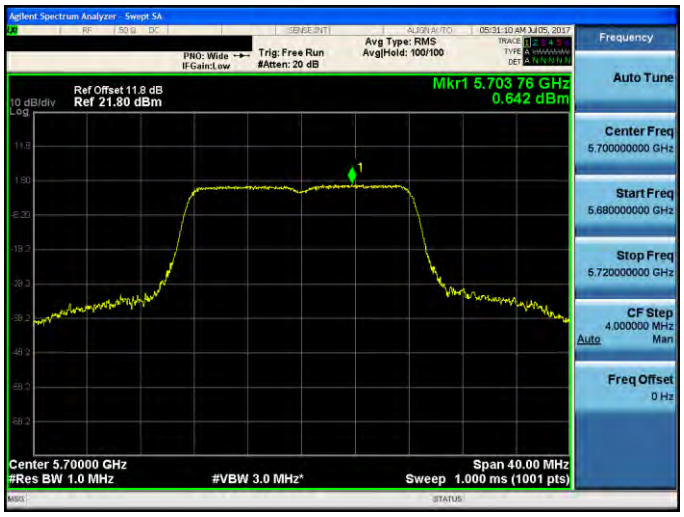
Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

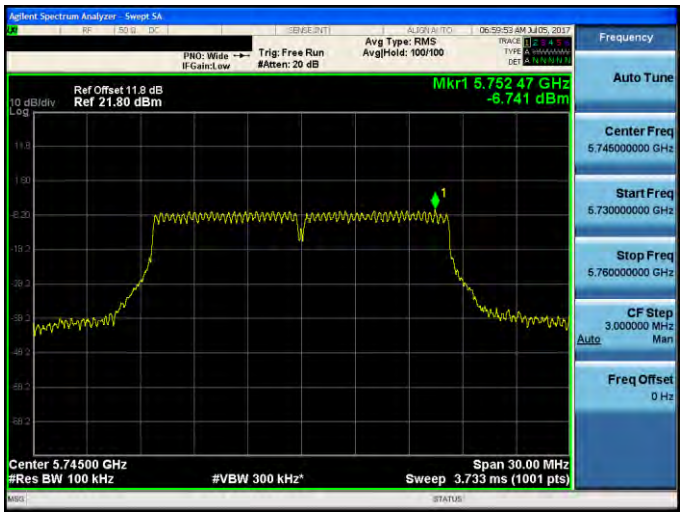
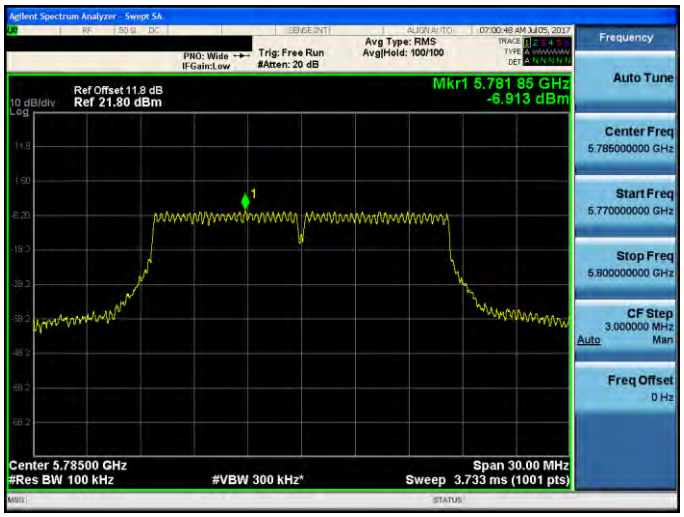
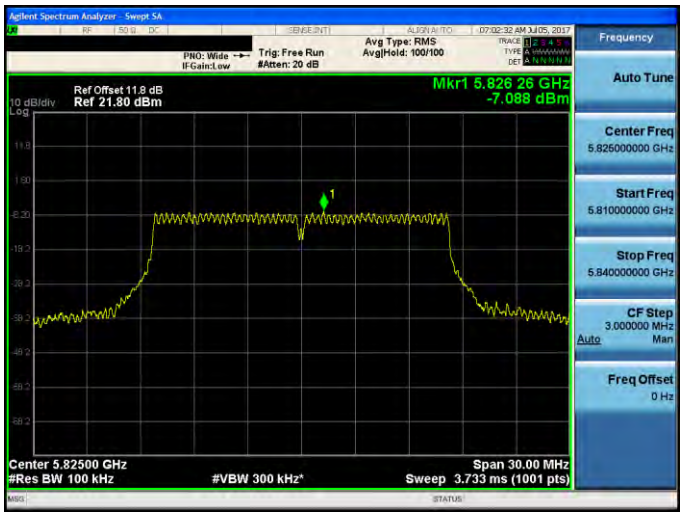
Conversion ratio = 10*Log(500k/100k)

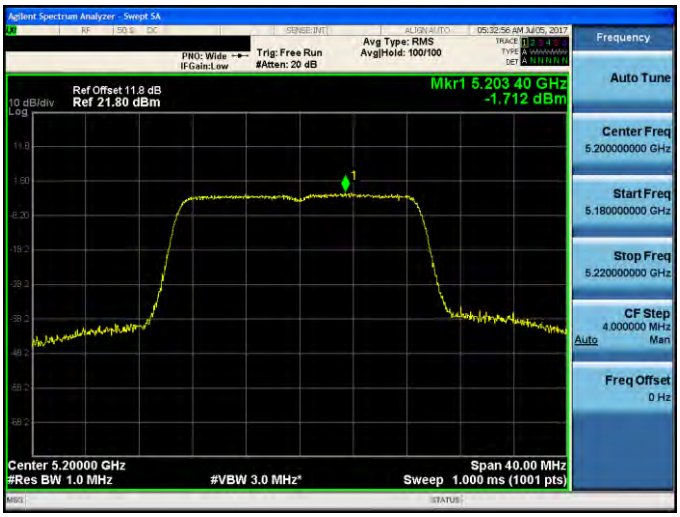
■ **Test Graphs**

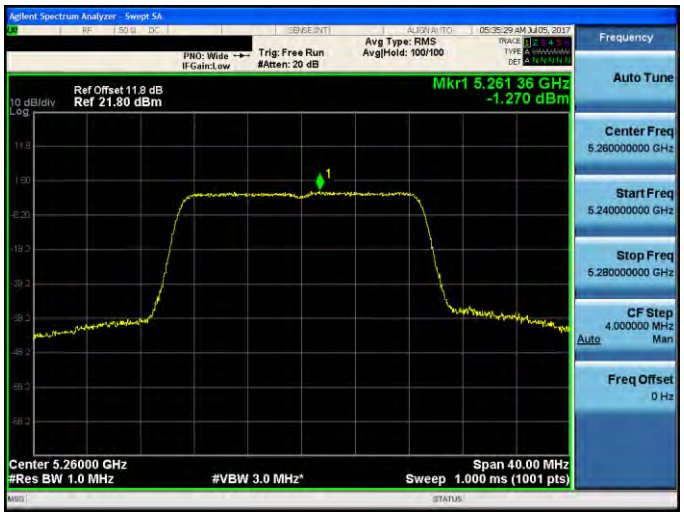
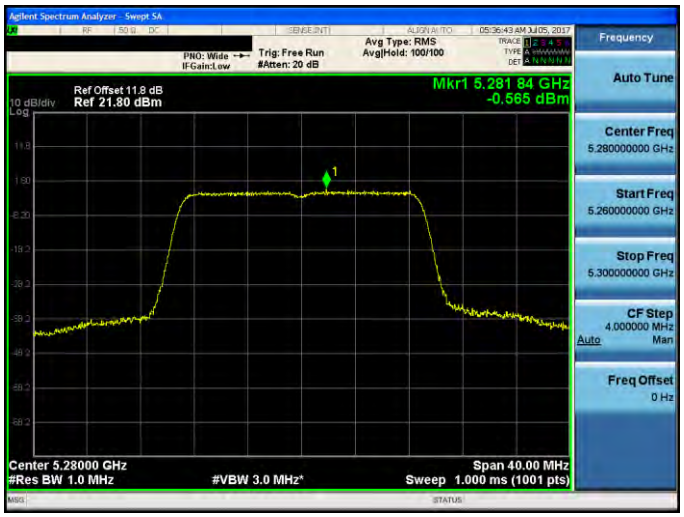
Mode 2: IEEE 802.11a Continuous TX mode_ ANT-0	
5180 MHz	
5200 MHz	
5240 MHz	

Mode 2: IEEE 802.11a Continuous TX mode_ ANT-0	
5260 MHz	
5280 MHz	
5320 MHz	

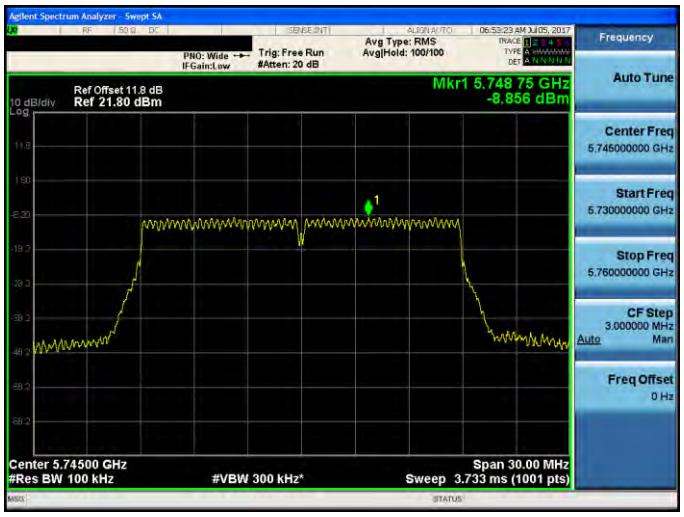
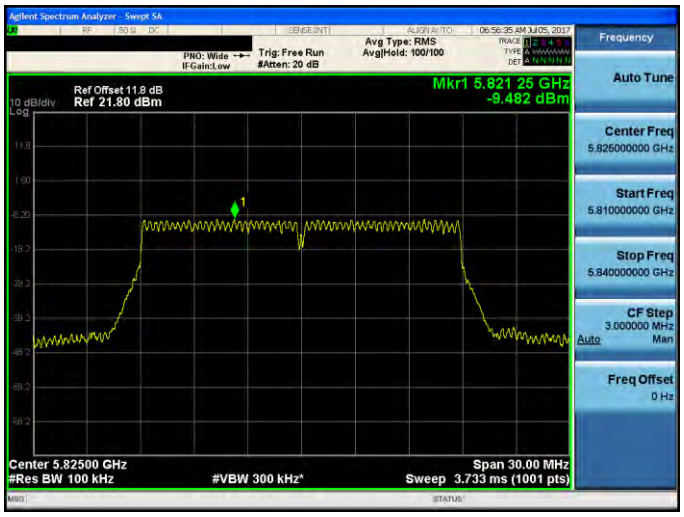
Mode 2: IEEE 802.11a Continuous TX mode_ ANT-0	
5500 MHz	
5560 MHz	
5700 MHz	

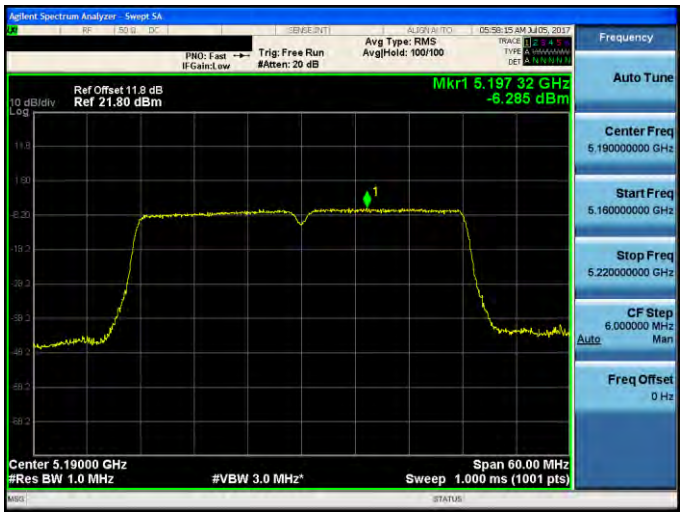
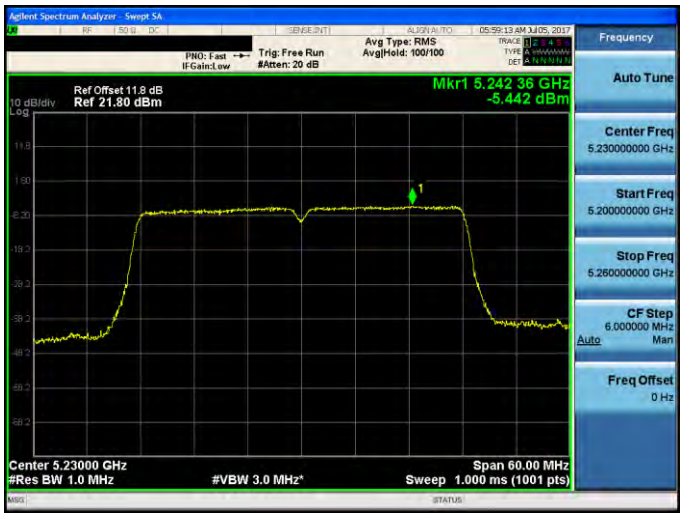
Mode 2: IEEE 802.11a Continuous TX mode_ ANT-0	
5745 MHz	
5785 MHz	
5825 MHz	

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

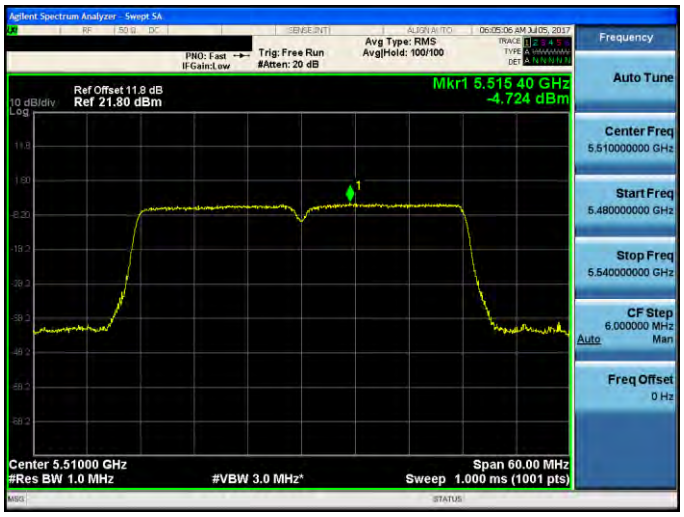
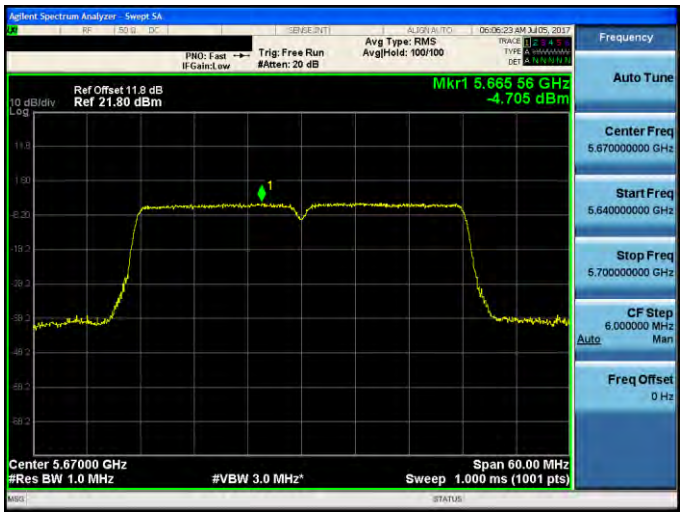
Mode 3: IEEE 802.11n 5GHz 20MHz Continuous TX mode_ ANT-0	
5260 MHz	
5280 MHz	
5320 MHz	

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	
5785 MHz	
5825 MHz	

Mode 4: IEEE 802.11n 5GHz 40MHz Continuous TX mode_ ANT-0	
5190 MHz	
5230 MHz	

Mode 4: IEEE 802.11n 5GHz 40MHz Continuous TX mode_ ANT-0	
5270 MHz	
5310 MHz	

Mode 4: IEEE 802.11n 5GHz 40MHz Continuous TX mode_ ANT-0	
5510 MHz	
5550 MHz	
5670 MHz	

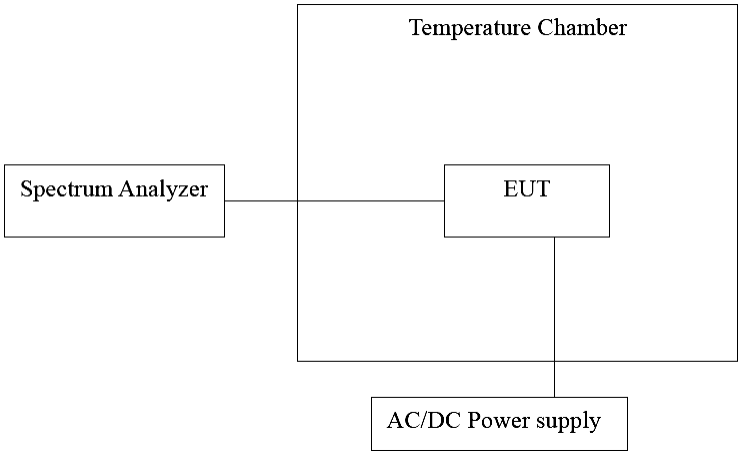
Mode 4: IEEE 802.11n 5GHz 40MHz Continuous TX mode_ ANT-0	
5755 MHz	
5795 MHz	

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	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 then 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 then 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.