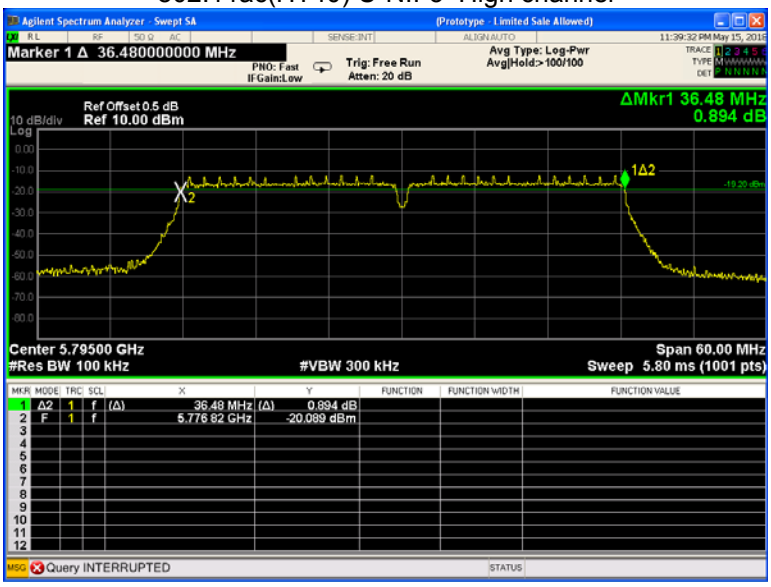
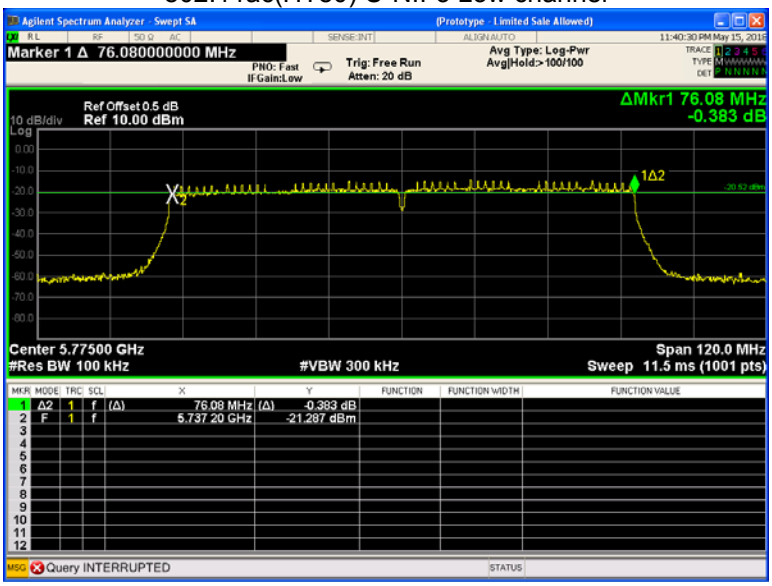
802.11ac(HT40) U-NII-3 High channel



802.11ac(HT80) U-NII-3 Low channel



13 26 dB Bandwidth and 99% Occupied Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.407 (a)
Test Method:	KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section D
Test Limit:	No restriction limits
Test Result:	PASS

13.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;

2. Set the spectrum analyzer:

RBW = approximately 1% of the emission bandwidth,

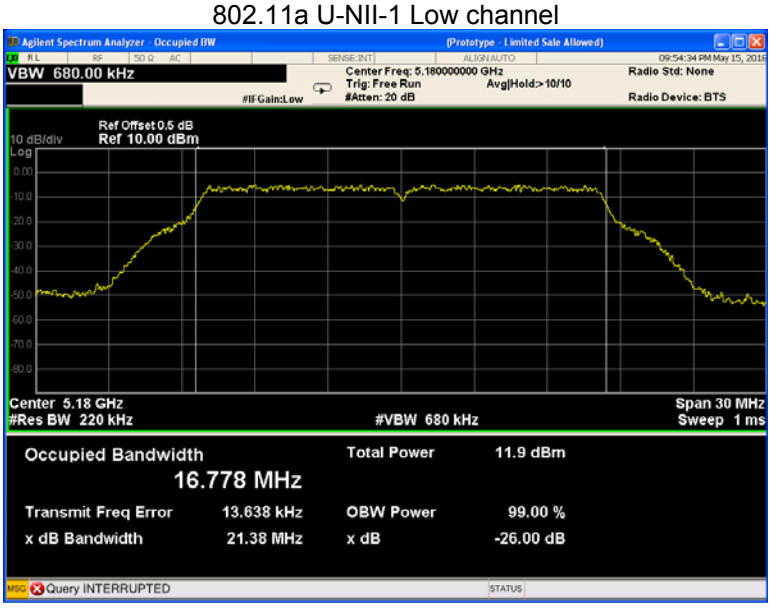
VBW ≥ 3 × RBW

13.2 Test Result:

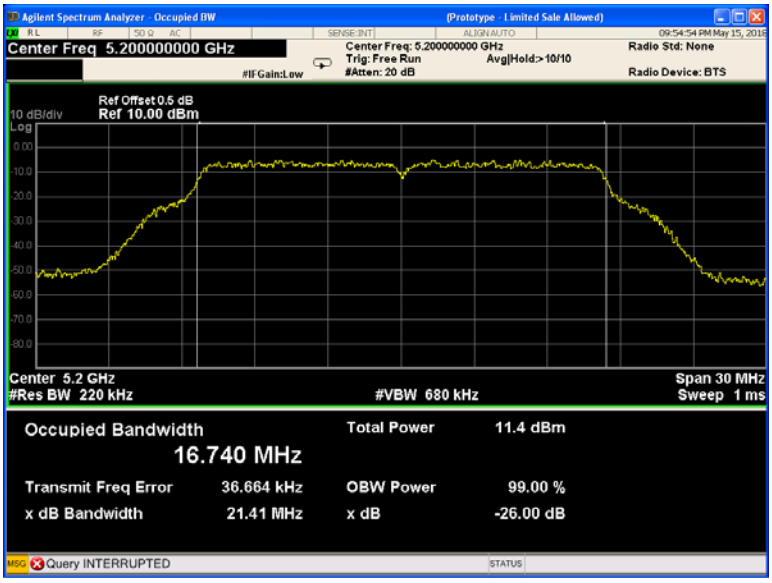
Band	Operation mode	26 dB Bandwidth (MHz)			99% Bandwidth (MHz)		
		Low	Middle	High	Low	Middle	High
U-NII-1	802.11a	21.38	21.41	21.34	16.778	16.740	16.768
	802.11n(HT20)	21.63	21.41	21.51	17.959	17.881	17.899
	802.11n(HT40)	40.15	/	39.89	36.361	/	36.331
	802.11ac(HT20)	21.70	21.77	21.61	17.945	17.929	17.932
	802.11ac(HT40)	40.14	/	39.97	36.376	/	36.331
	802.11ac(HT80)	81.78	/	/	75.816	/	/
U-NII-3	802.11a	21.42	21.22	21.27	16.791	16.794	16.774
	802.11n(HT20)	21.64	21.65	21.57	17.933	17.923	17.993
	802.11n(HT40)	39.94	/	39.80	36.345	/	36.305
	802.11ac(HT20)	21.62	21.79	21.42	17.919	17.976	17.922
	802.11ac(HT40)	40.10	/	39.98	36.350	/	36.316
	802.11ac(HT80)	81.47	/	/	75.725	/	/

Test result plots shown as follows:

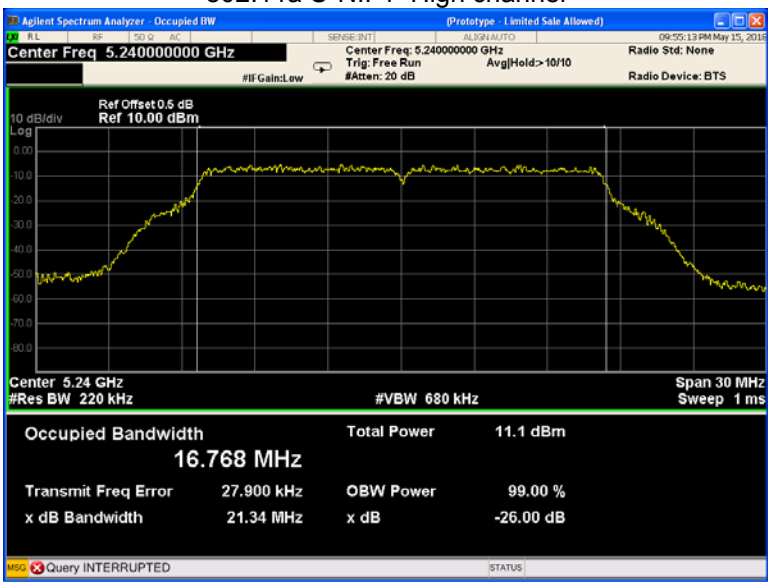
802.11a U-NII-1 Low channel



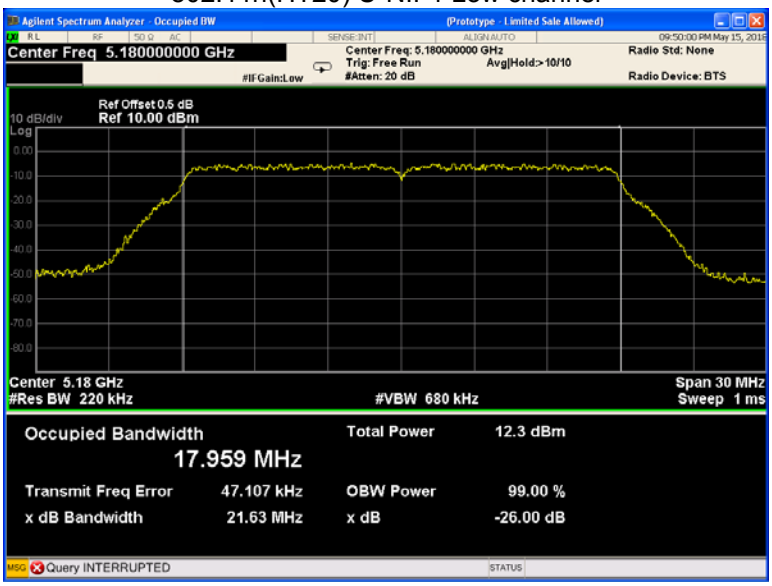
802.11a U-NII-1 Middle channel



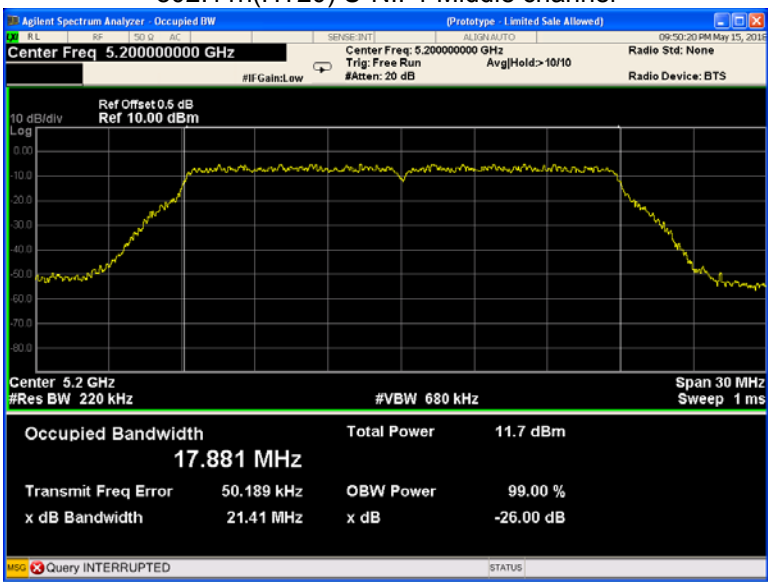
802.11a U-NII-1 High channel



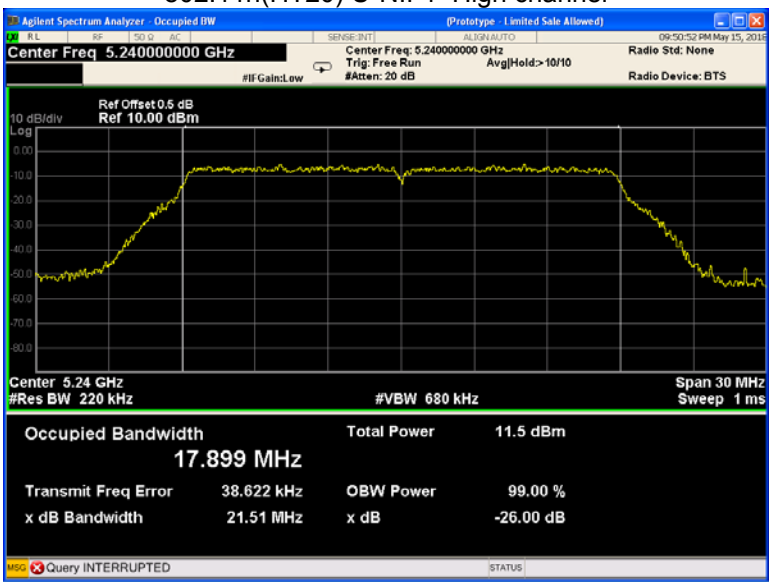
802.11n(HT20) U-NII-1 Low channel



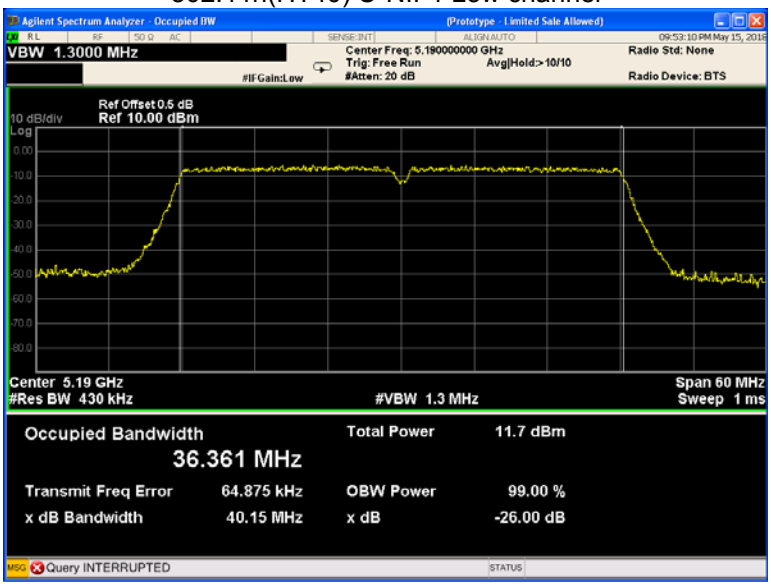
802.11n(HT20) U-NII-1 Middle channel



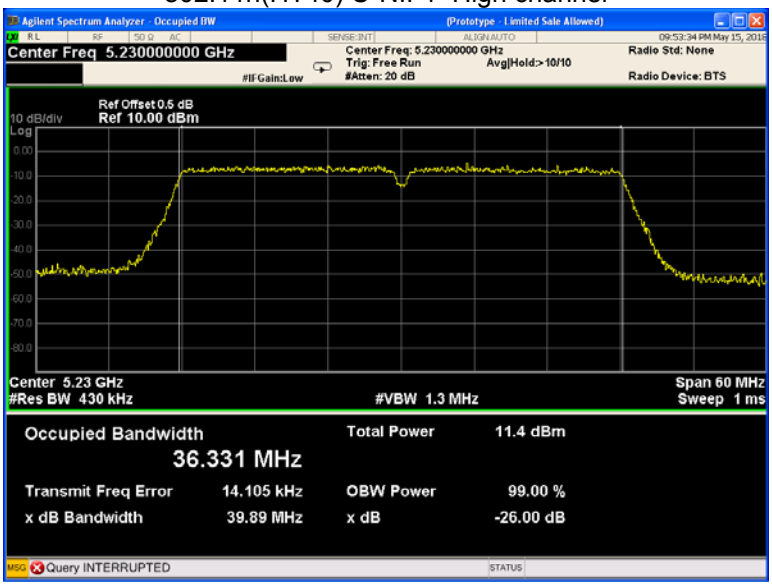
802.11n(HT20) U-NII-1 High channel



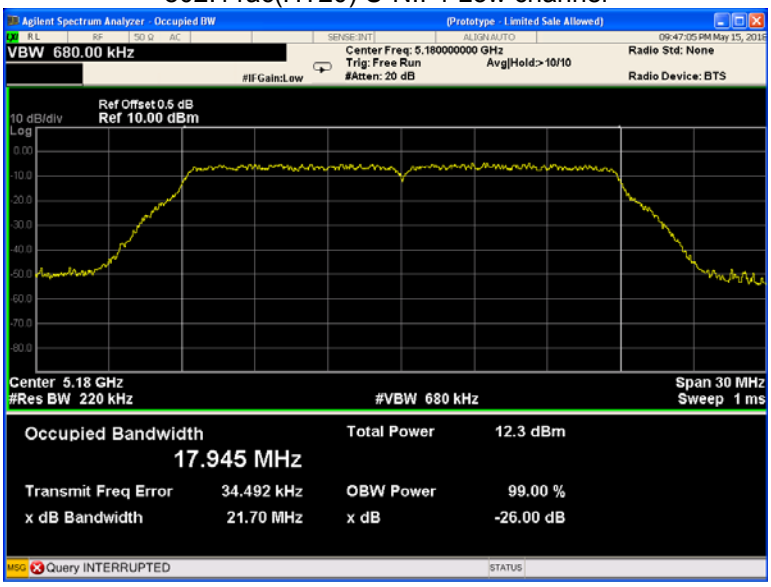
802.11n(HT40) U-NII-1 Low channel



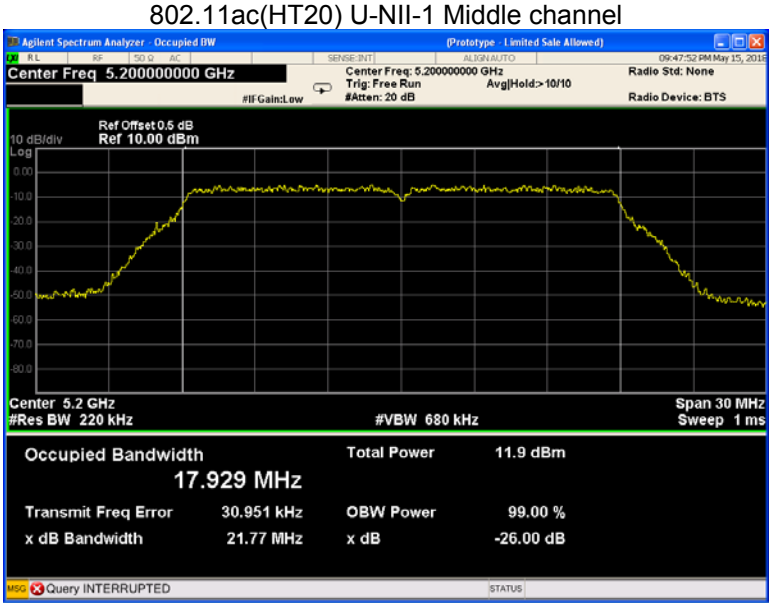
802.11n(HT40) U-NII-1 High channel



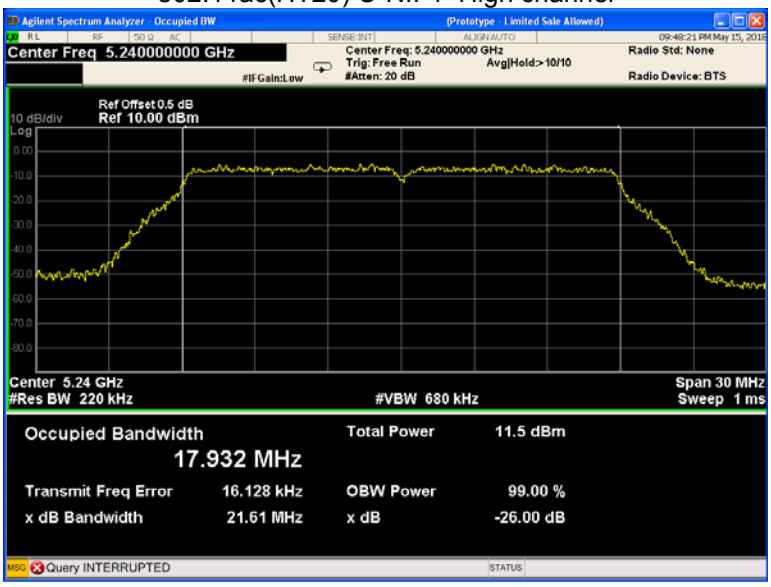
802.11ac(HT20) U-NII-1 Low channel



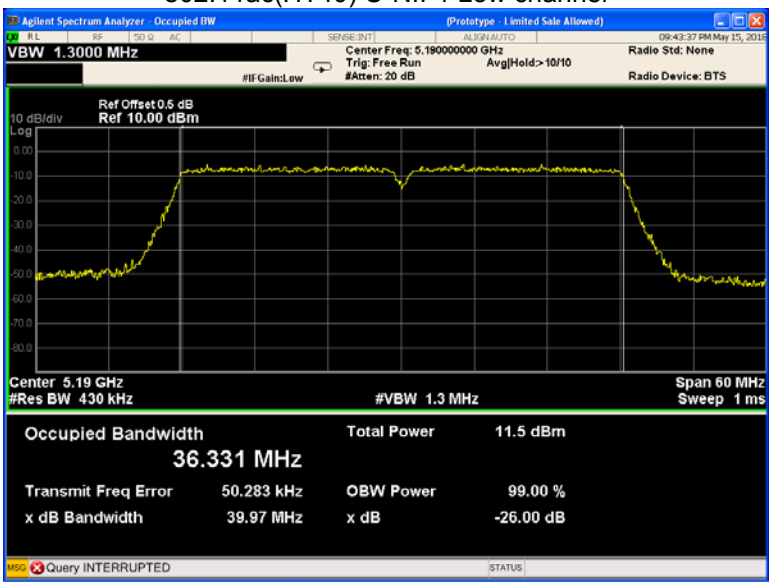
802.11ac(HT20) U-NII-1 Middle channel



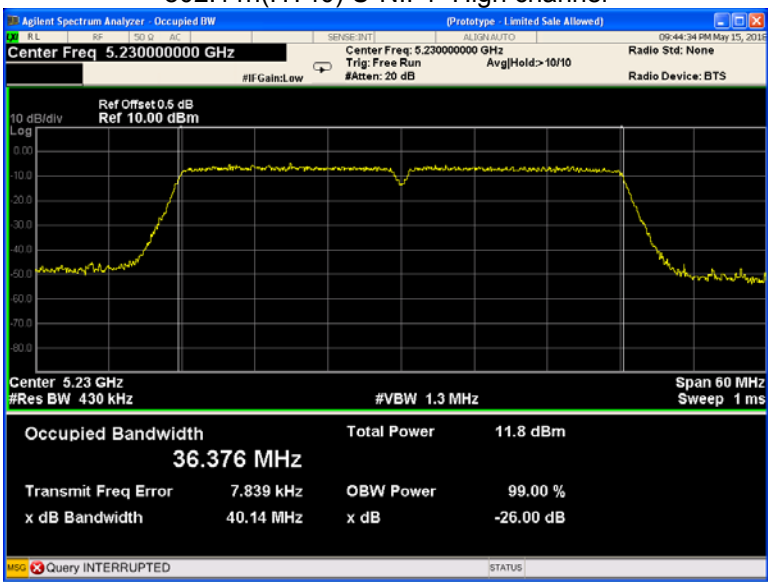
802.11ac(HT20) U-NII-1 High channel



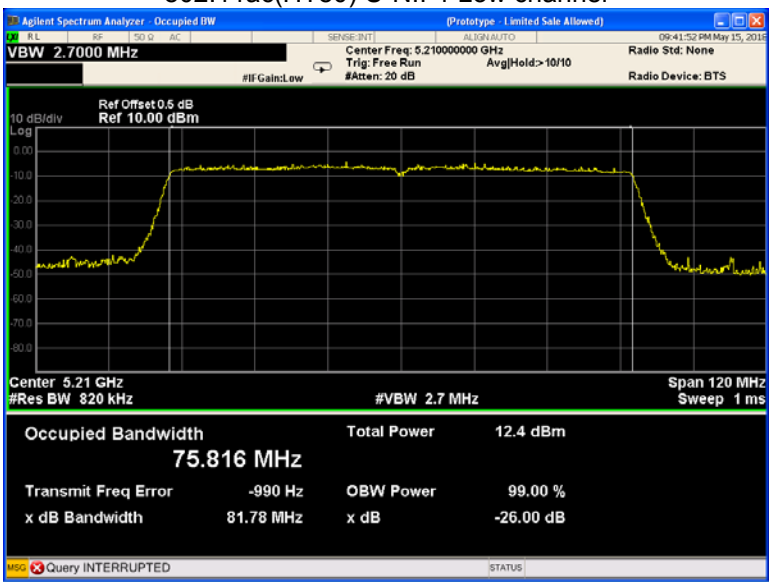
802.11ac(HT40) U-NII-1 Low channel



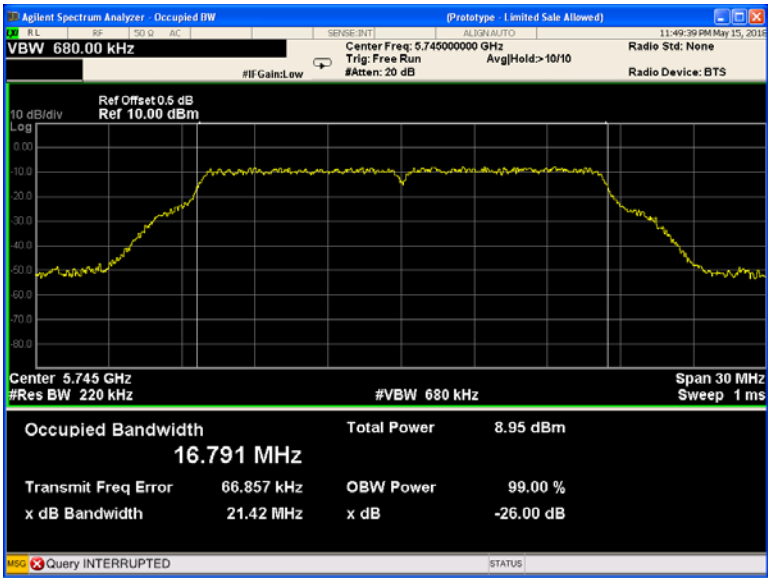
802.11n(HT40) U-NII-1 High channel



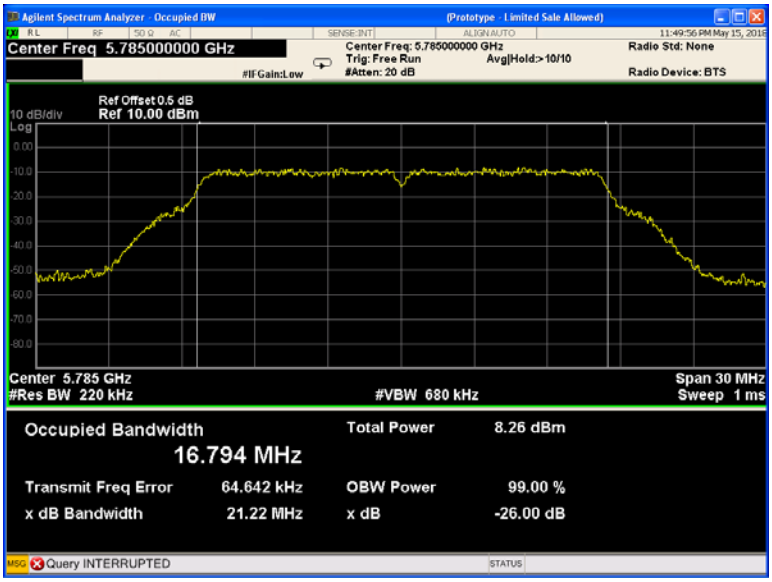
802.11ac(HT80) U-NII-1 Low channel



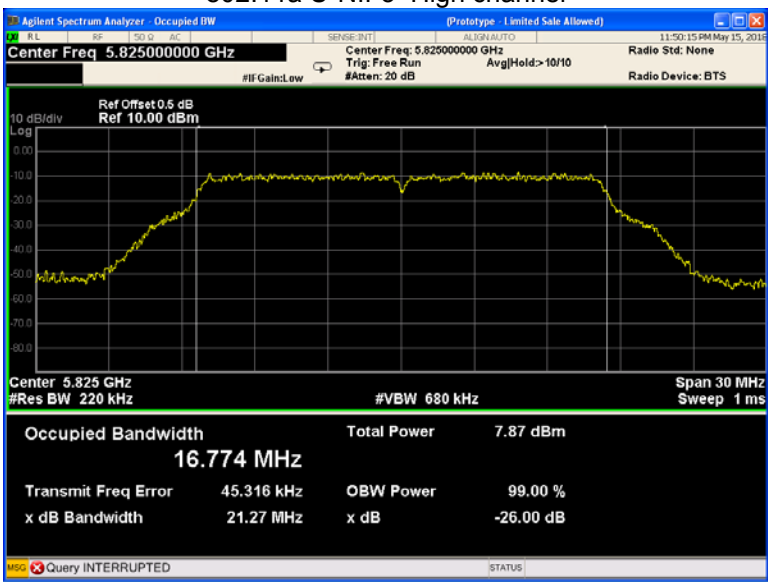
802.11a U-NII-3 Low channel



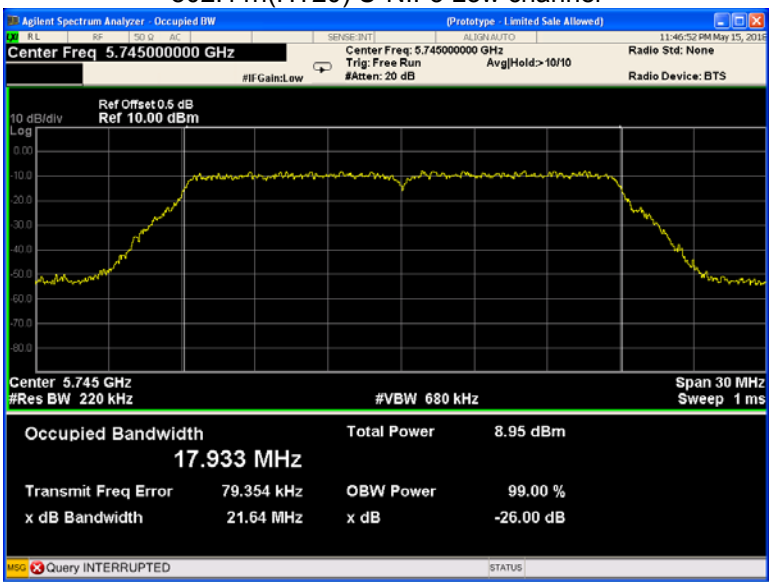
802.11a U-NII-3 Middle channel



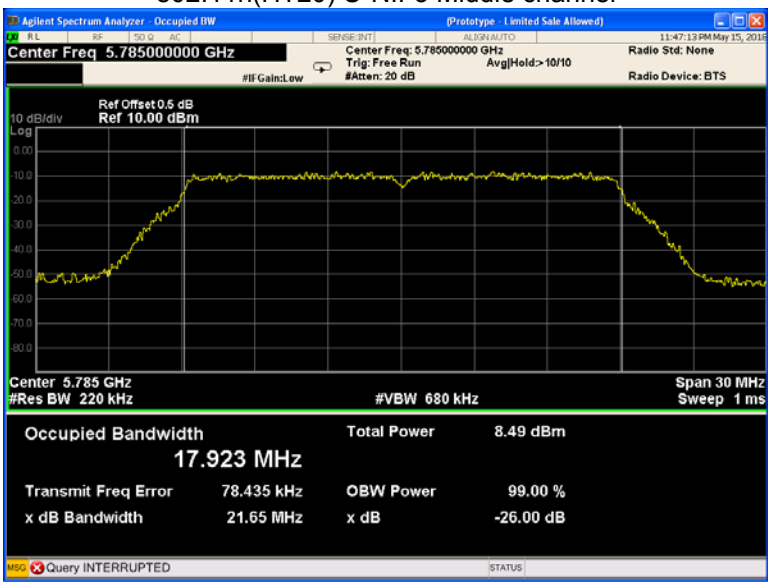
802.11a U-NII-3 High channel



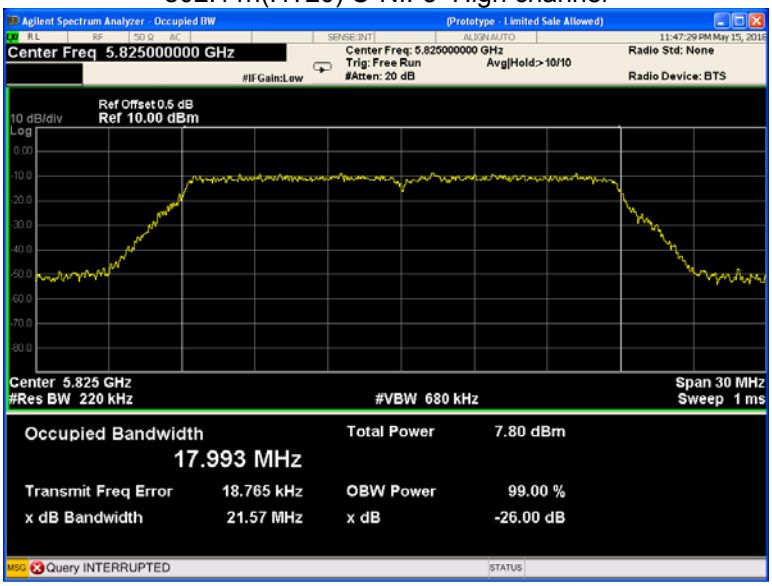
802.11n(HT20) U-NII-3 Low channel



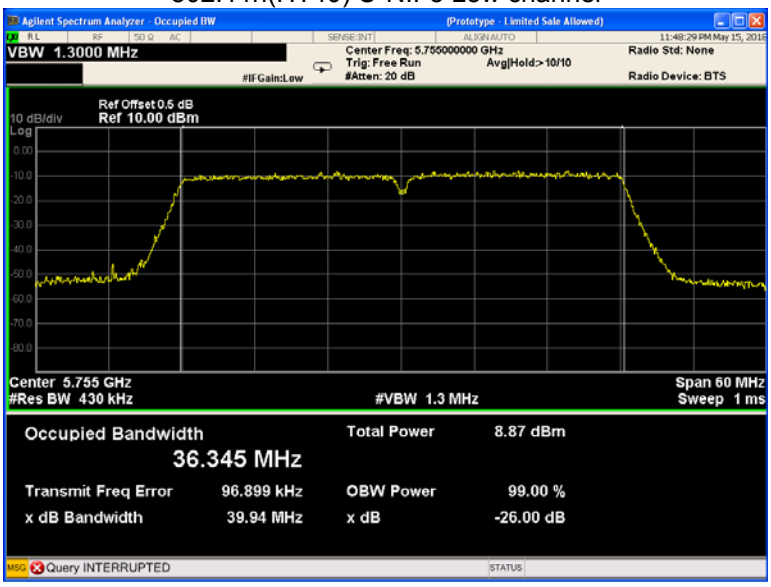
802.11n(HT20) U-NII-3 Middle channel



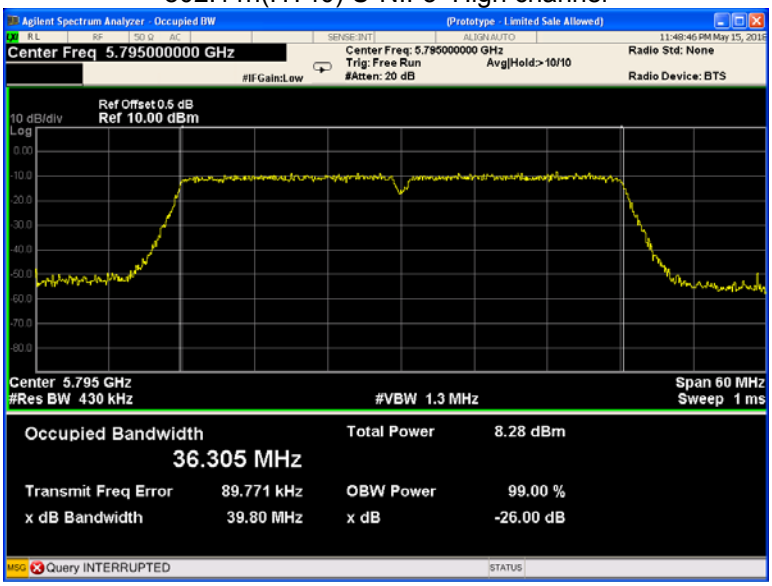
802.11n(HT20) U-NII-3 High channel



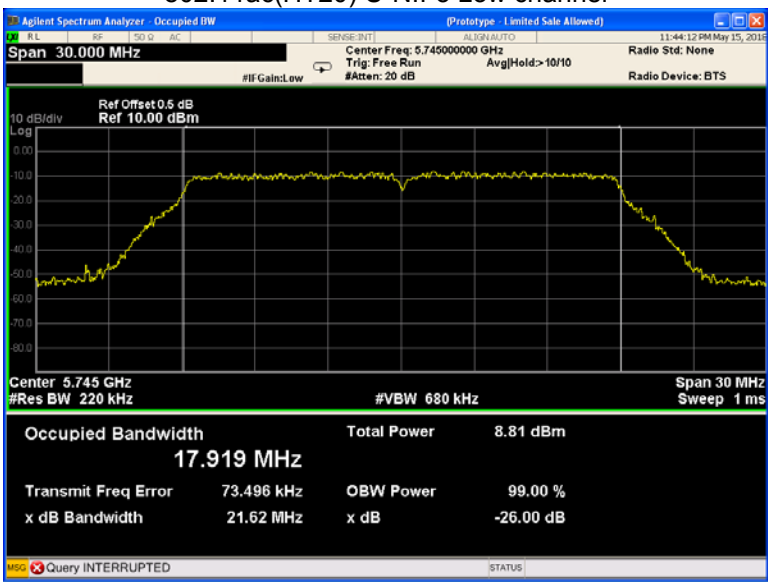
802.11n(HT40) U-NII-3 Low channel



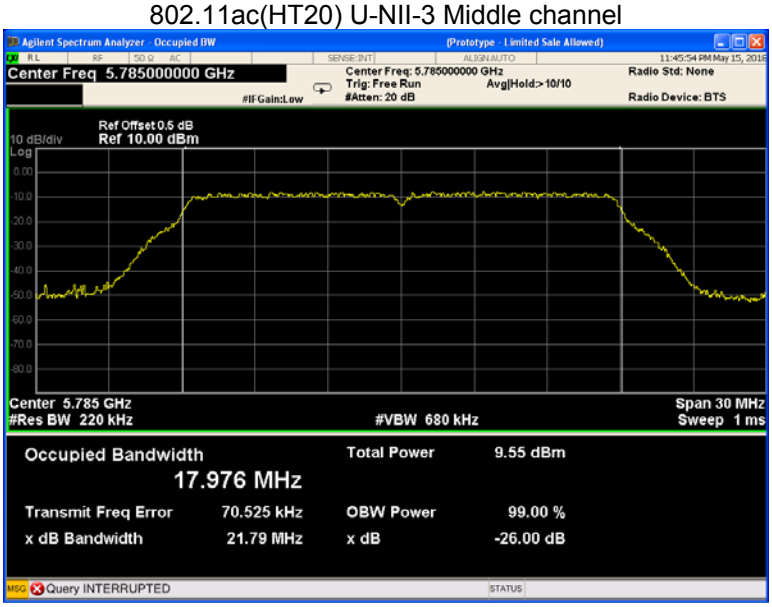
802.11n(HT40) U-NII-3 High channel



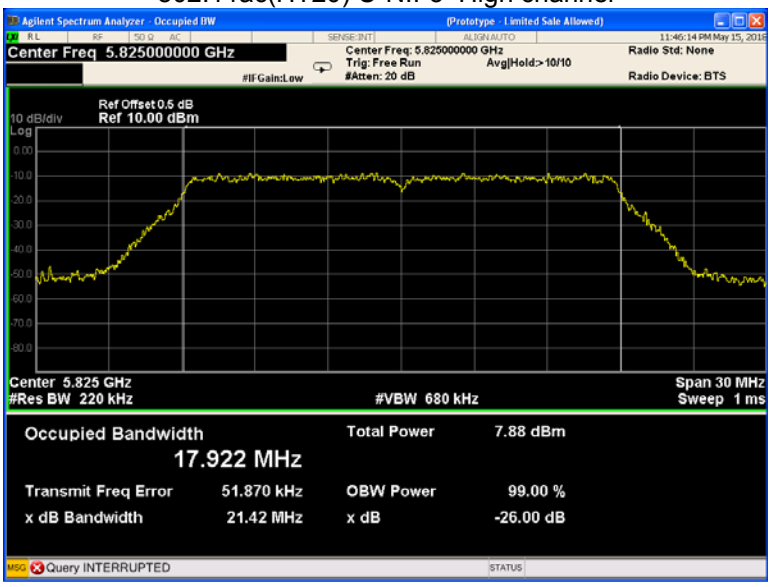
802.11ac(HT20) U-NII-3 Low channel



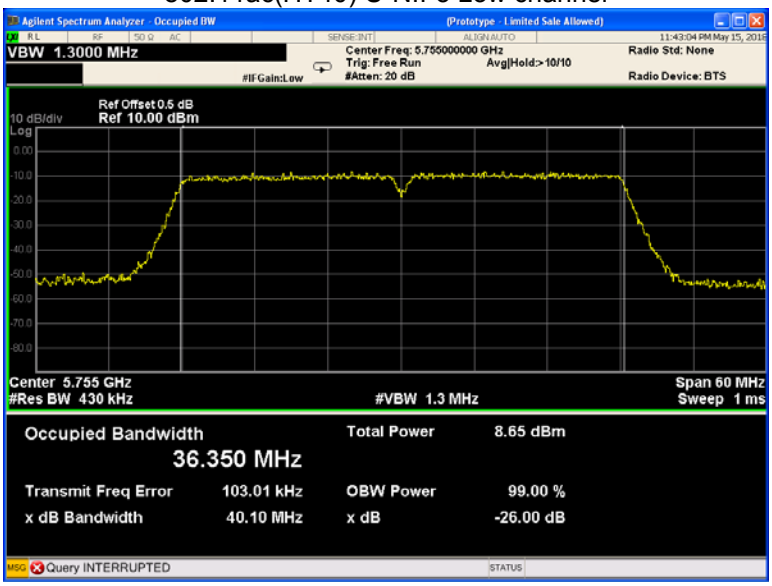
802.11ac(HT20) U-NII-3 Middle channel



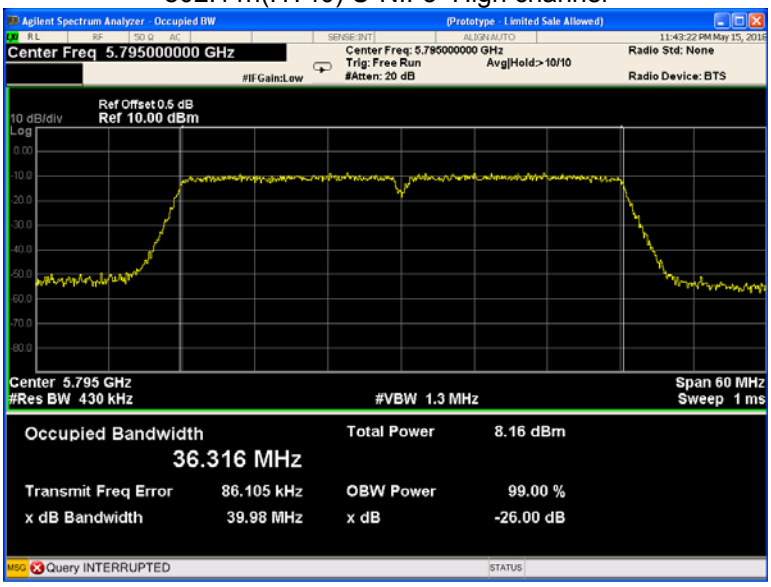
802.11ac(HT20) U-NII-3 High channel



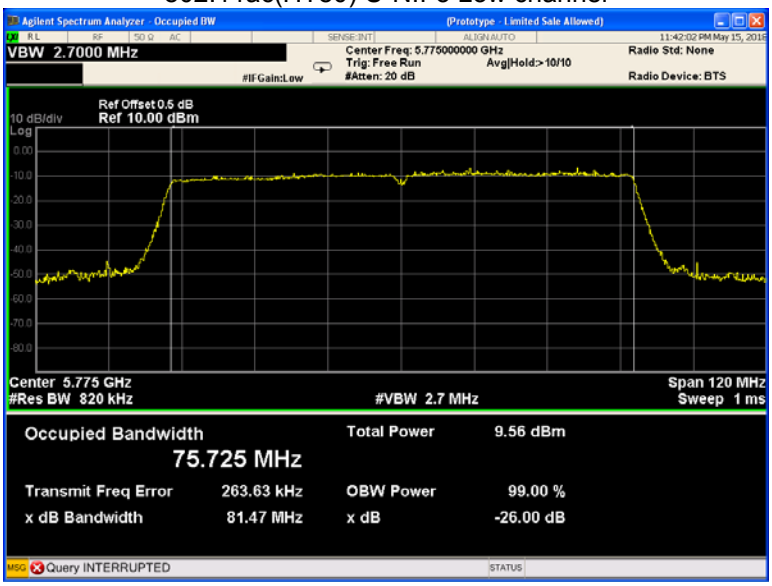
802.11ac(HT40) U-NII-3 Low channel



802.11n(HT40) U-NII-3 High channel



802.11ac(HT80) U-NII-3 Low channel



14 Conducted Output Power

Test Requirement:	FCC CFR47 Part 15 Section 15.407(a)
Test Method:	KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section E
Test Limit:	U-NII-1 250mW(24dBm) U-NII-3 1W(30dBm)
Test Result:	PASS
Remark:	Conducted output power= measurement power+10log(1/x) X is duty cycle=1, so 10log(1/1)=0 Conducted output power= measurement power

14.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 1 MHz. VBW = 3 MHz. Sweep = auto; Detector Function = Peak, Set the span to fully encompass the DTS bandwidth.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

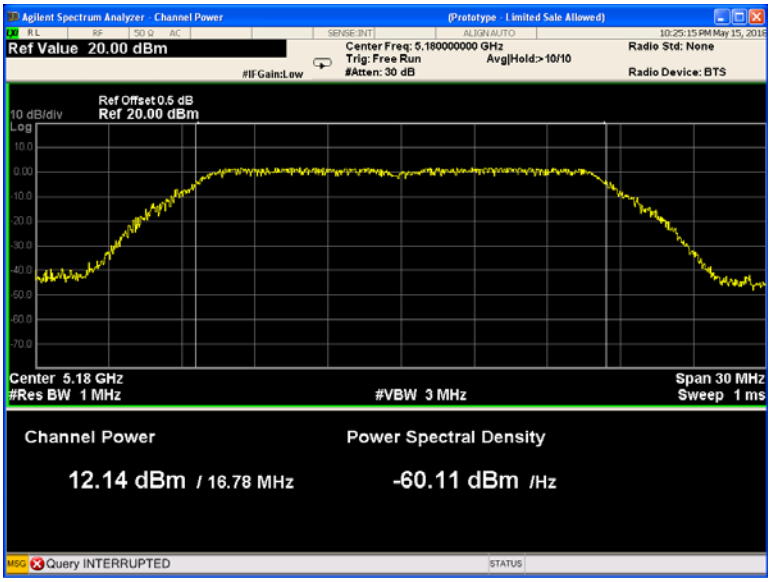
14.2 Test Result :

Band	Operation mode	CH	Conducted Output Power (dBm)
U-NII-1	802.11a	Low	12.14
		Middle	11.74
		High	11.80
	802.11n(HT20)	Low	11.96
		Middle	12.27
		High	11.71
	802.11n(HT40)	Low	11.65
		Middle	/
		High	11.94
	802.11ac(HT20)	Low	11.91
		Middle	11.99
		High	11.94
	802.11ac(HT40)	Low	11.63
		Middle	/
		High	11.84
	802.11ac(HT80)	Low	11.35
		Middle	/
		High	/
U-NII-3	802.11a	Low	9.36
		Middle	9.85
		High	9.27
	802.11n(HT20)	Low	9.87
		Middle	9.82
		High	9.66
	802.11n(HT40)	Low	9.71
		Middle	/
		High	9.40
	802.11ac(HT20)	Low	9.67
		Middle	9.52
		High	9.16
	802.11ac(HT40)	Low	9.76
		Middle	/
		High	9.45
	802.11ac(HT80)	Low	9.30
		Middle	/
		High	/

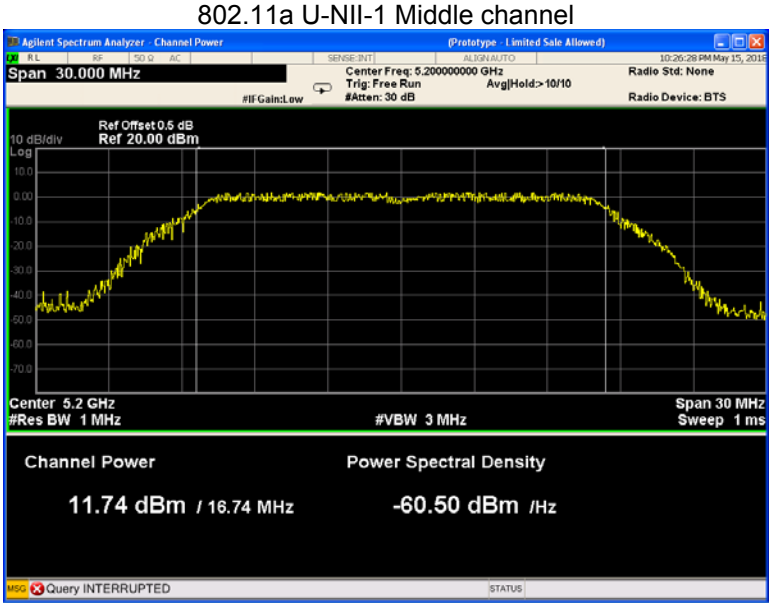
.

Test result plots shown as follows:

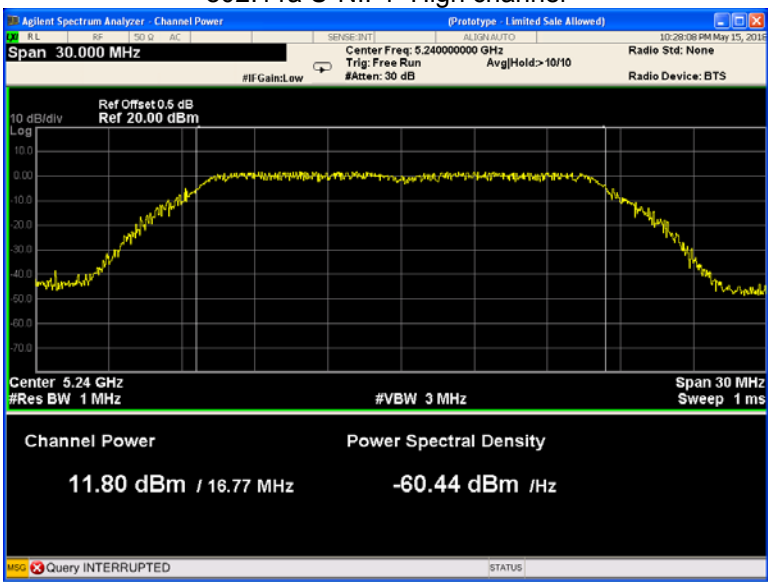
802.11a U-NII-1 Low channel



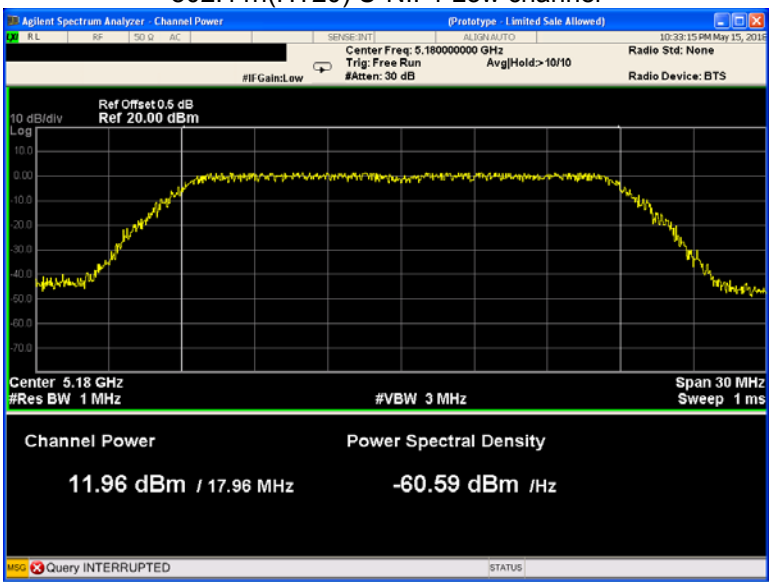
802.11a U-NII-1 Middle channel



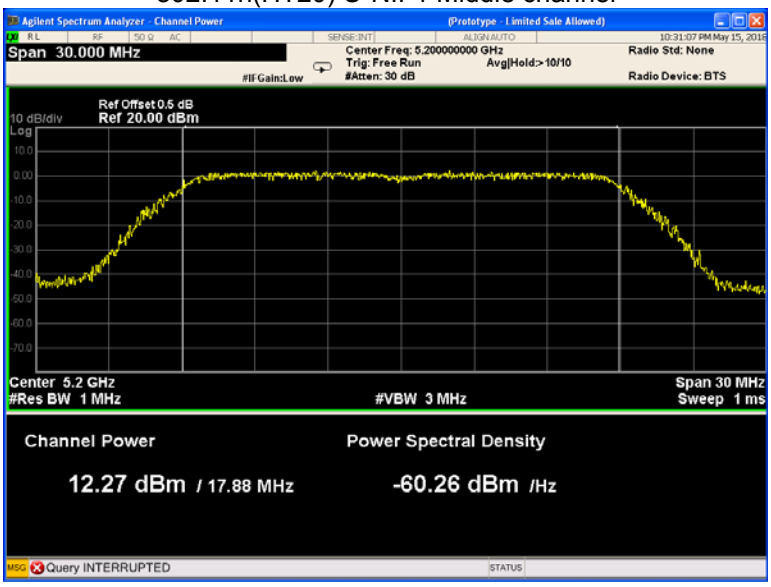
802.11a U-NII-1 High channel



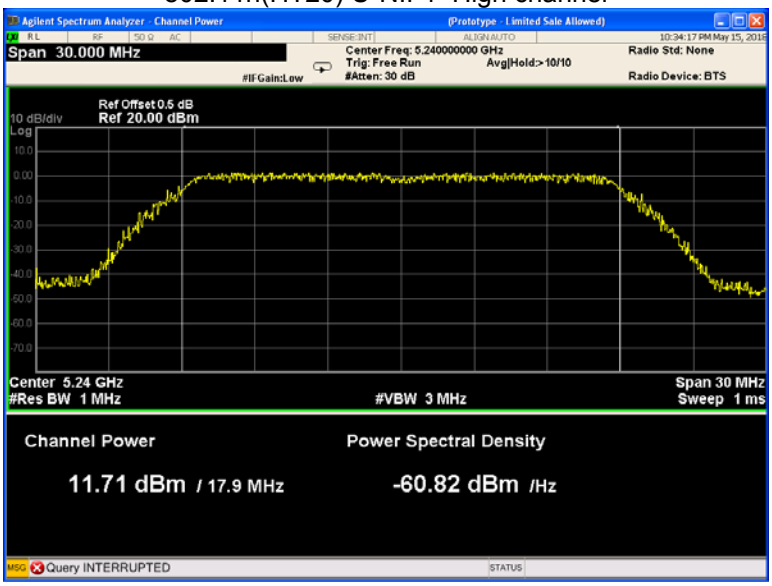
802.11n(HT20) U-NII-1 Low channel



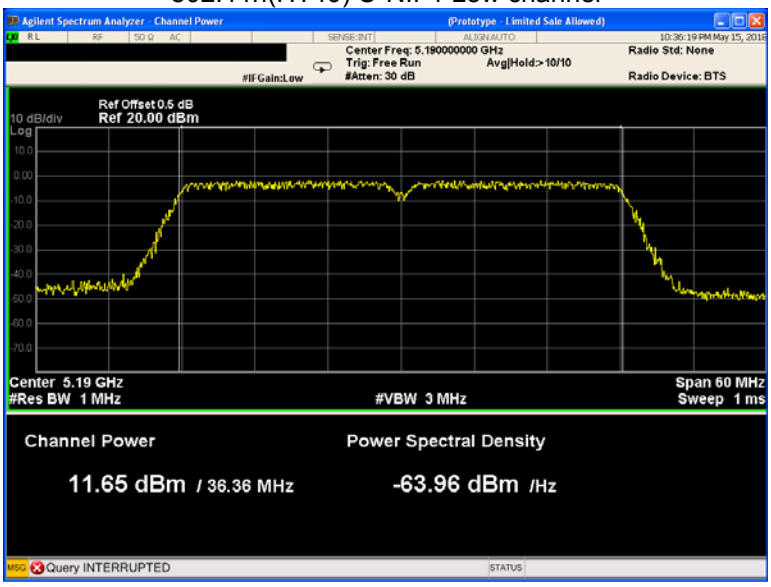
802.11n(HT20) U-NII-1 Middle channel



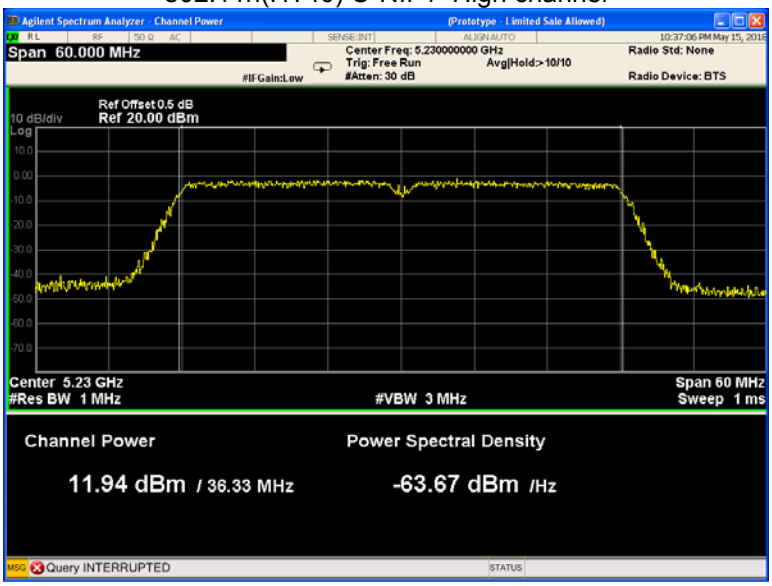
802.11n(HT20) U-NII-1 High channel



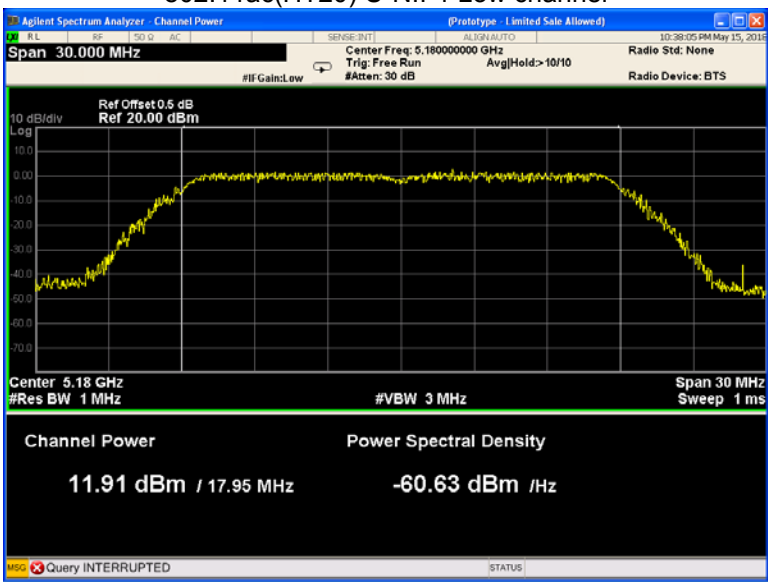
802.11n(HT40) U-NII-1 Low channel



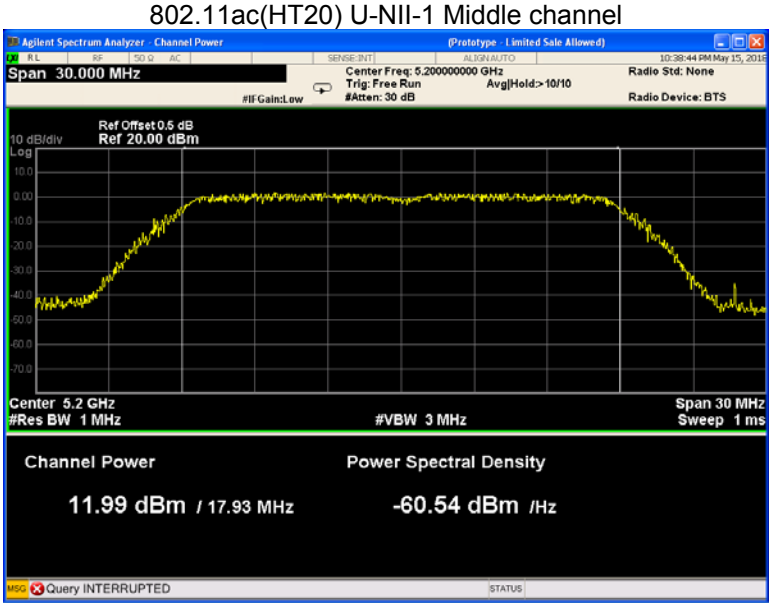
802.11n(HT40) U-NII-1 High channel



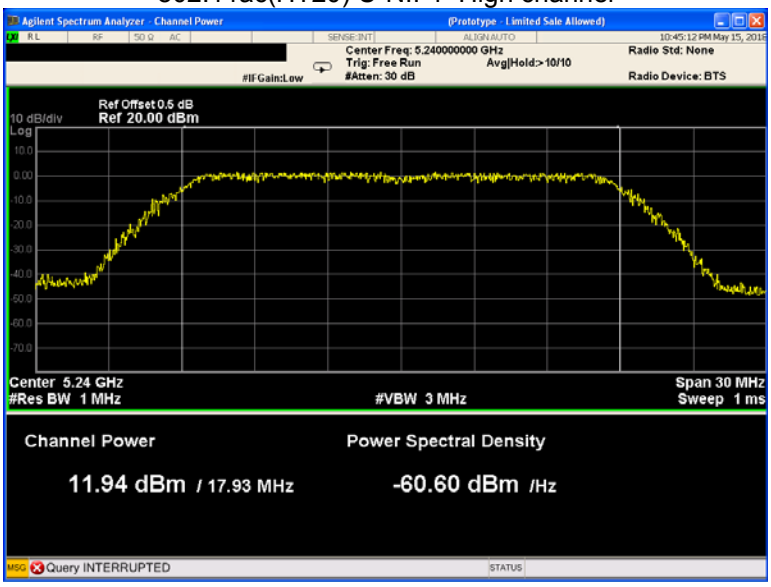
802.11ac(HT20) U-NII-1 Low channel



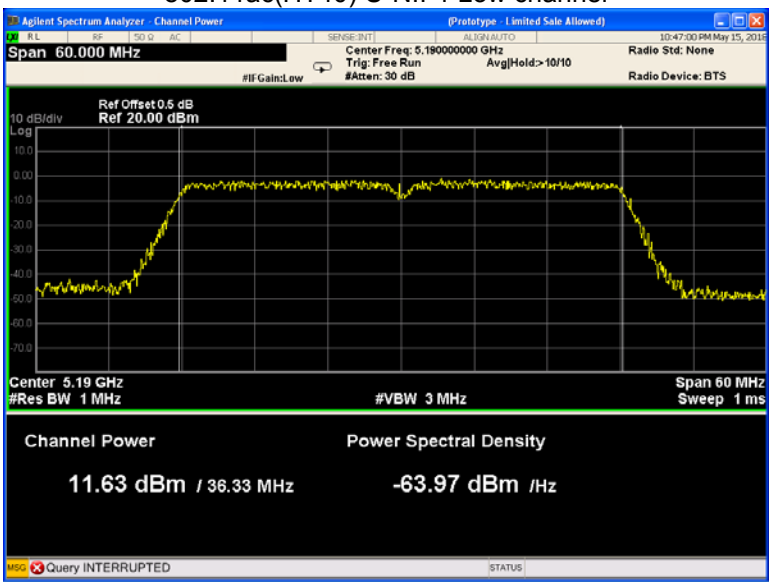
802.11ac(HT20) U-NII-1 Middle channel



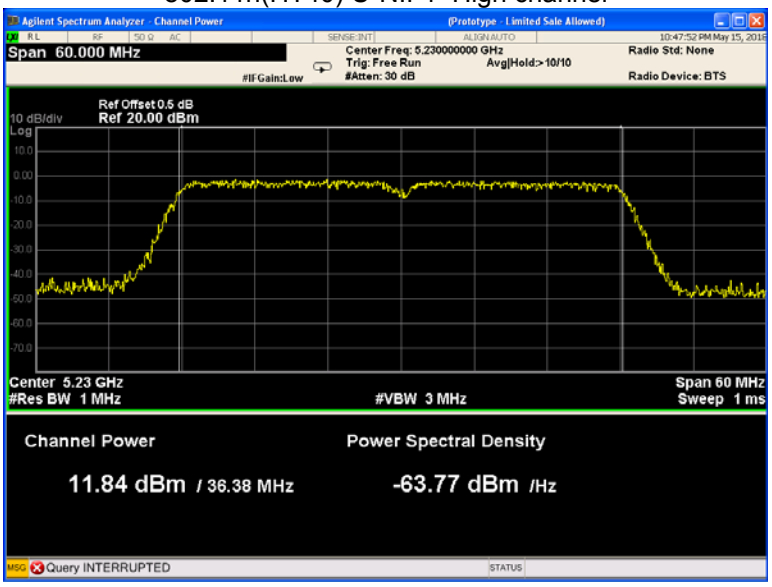
802.11ac(HT20) U-NII-1 High channel



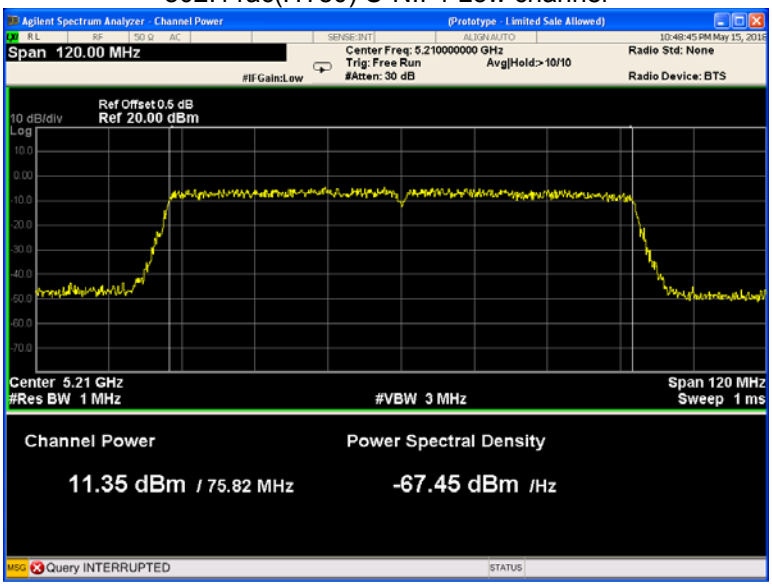
802.11ac(HT40) U-NII-1 Low channel



802.11n(HT40) U-NII-1 High channel

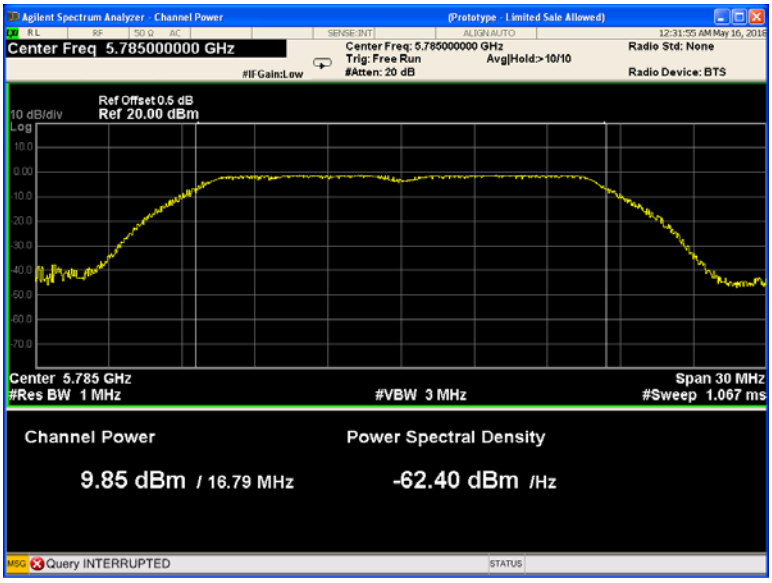


802.11ac(HT80) U-NII-1 Low channel

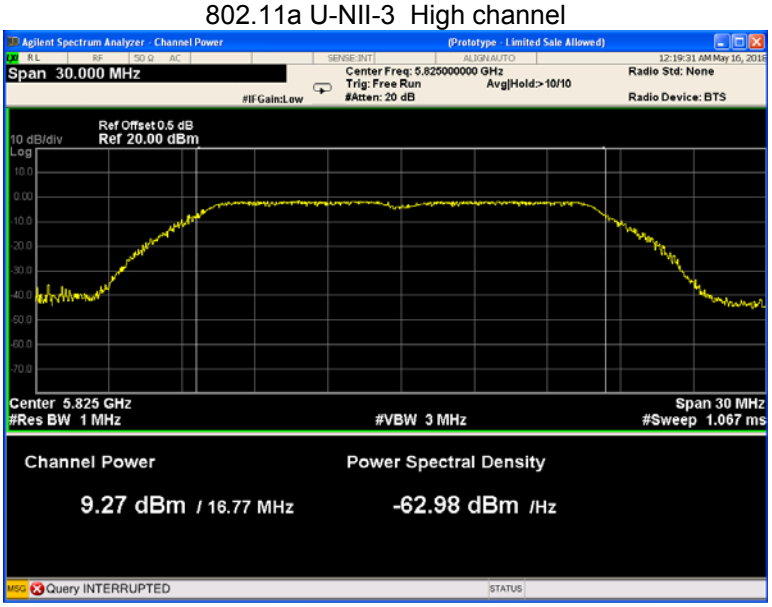


802.11a U-NII-3 Low channel

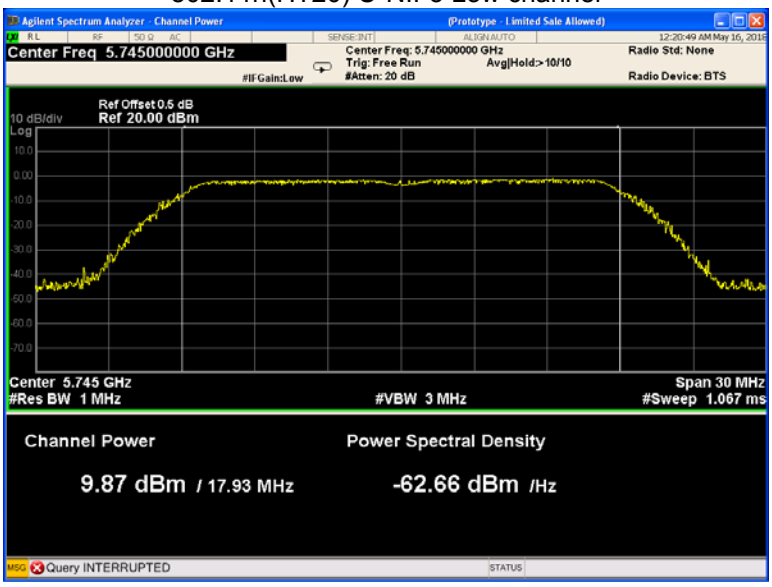
802.11a U-NII-3 Middle channel



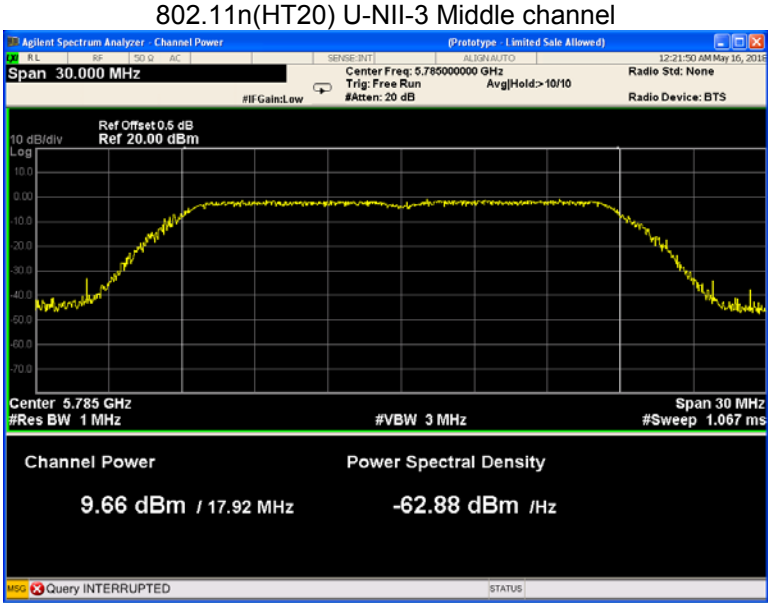
802.11a U-NII-3 High channel



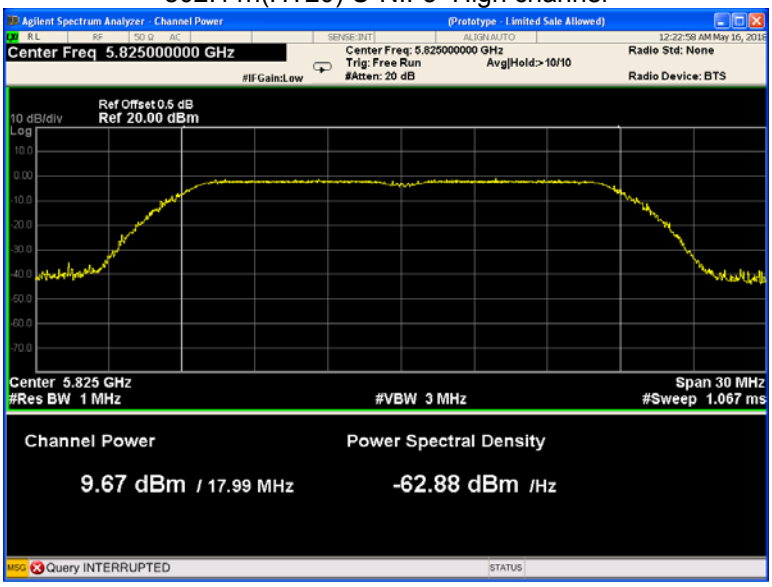
802.11n(HT20) U-NII-3 Low channel



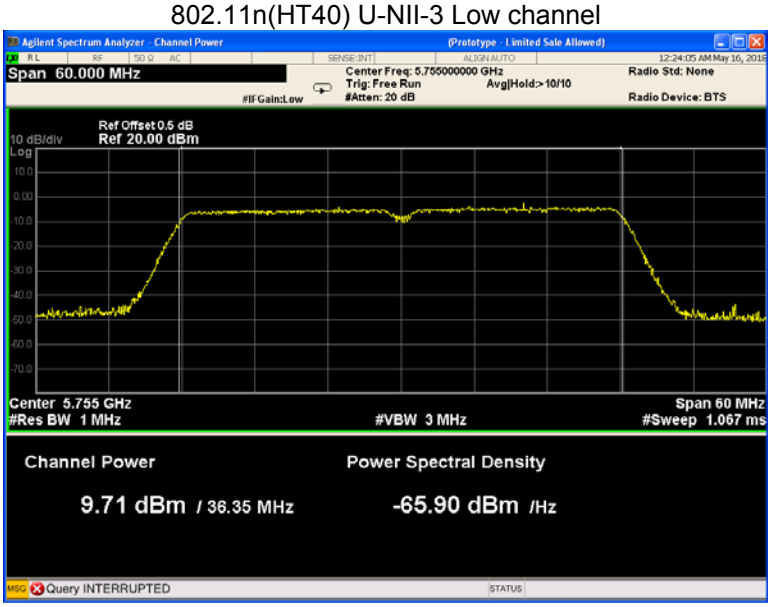
802.11n(HT20) U-NII-3 Middle channel



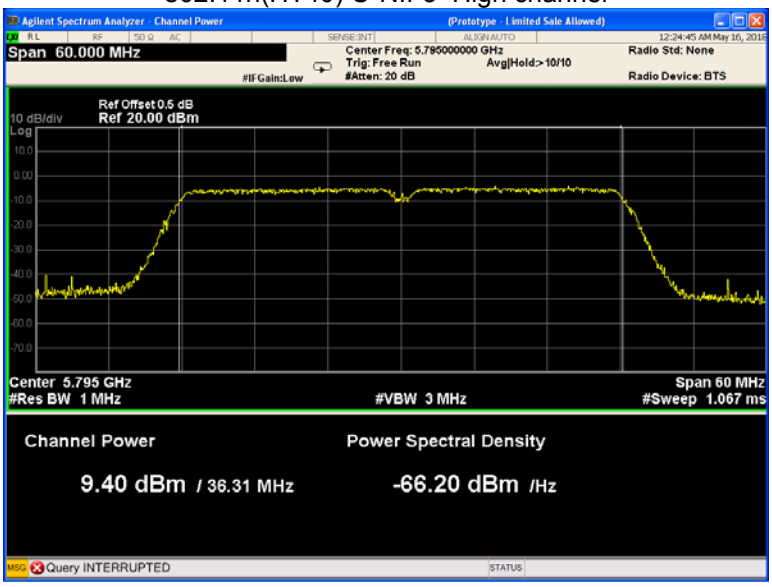
802.11n(HT20) U-NII-3 High channel



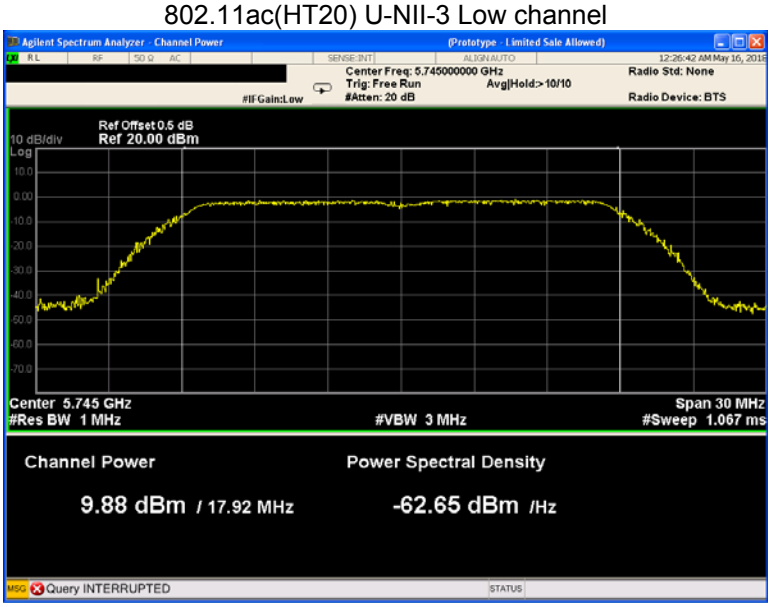
802.11n(HT40) U-NII-3 Low channel



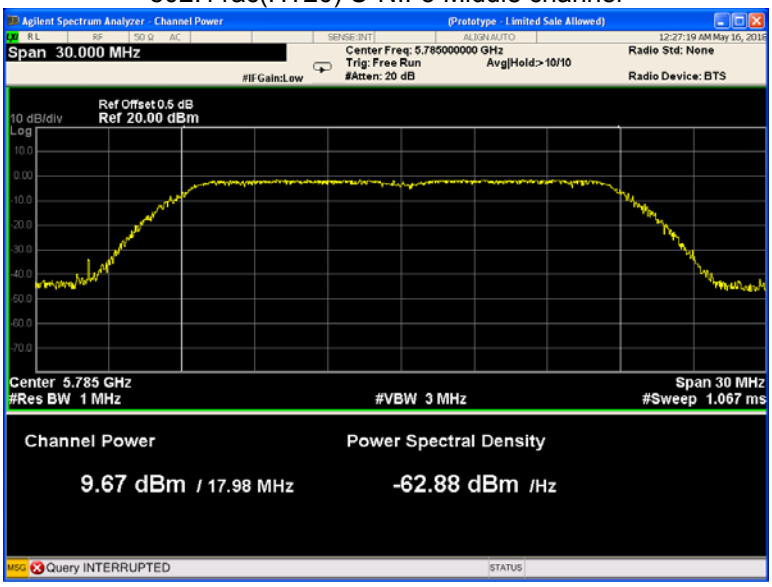
802.11n(HT40) U-NII-3 High channel



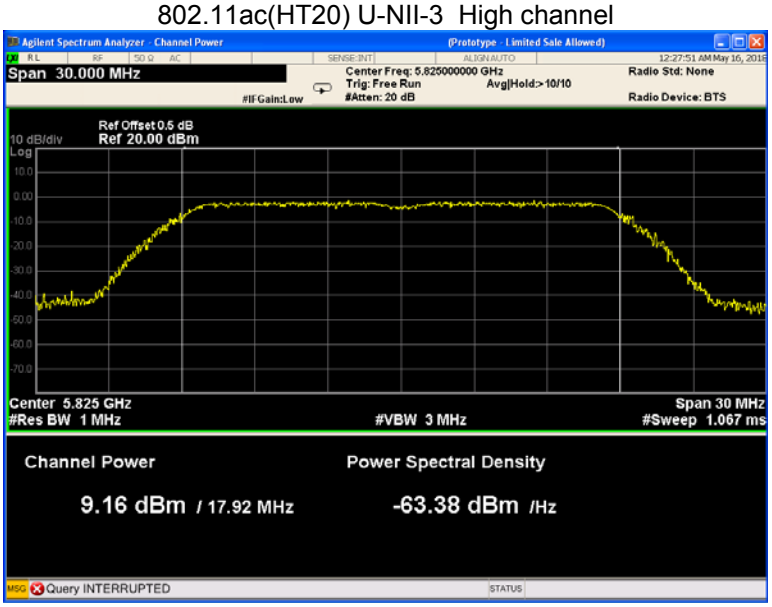
802.11ac(HT20) U-NII-3 Low channel



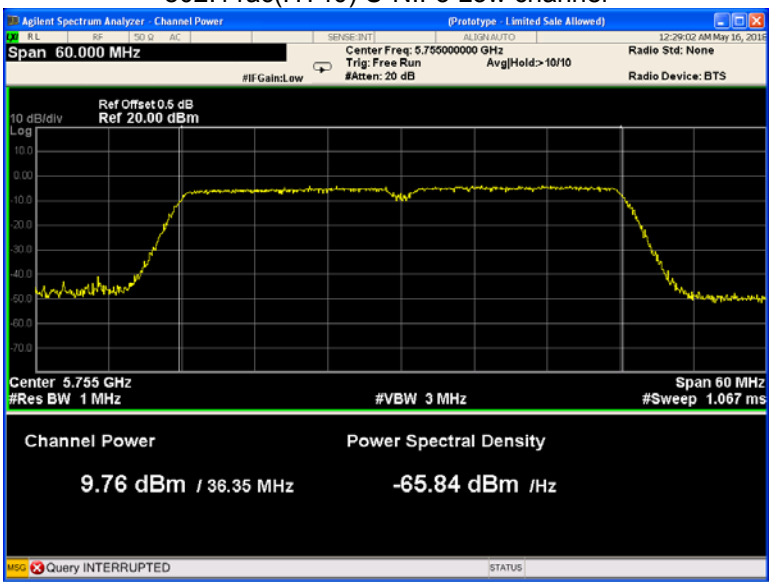
802.11ac(HT20) U-NII-3 Middle channel



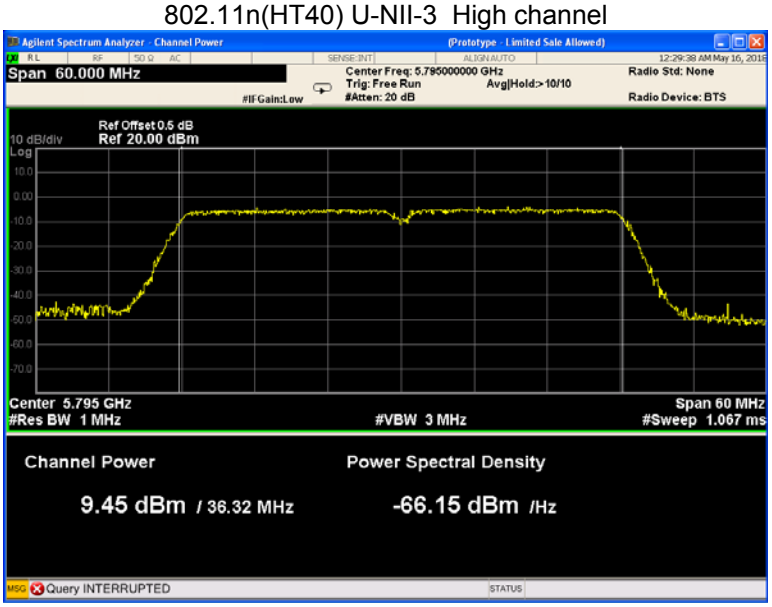
802.11ac(HT20) U-NII-3 High channel



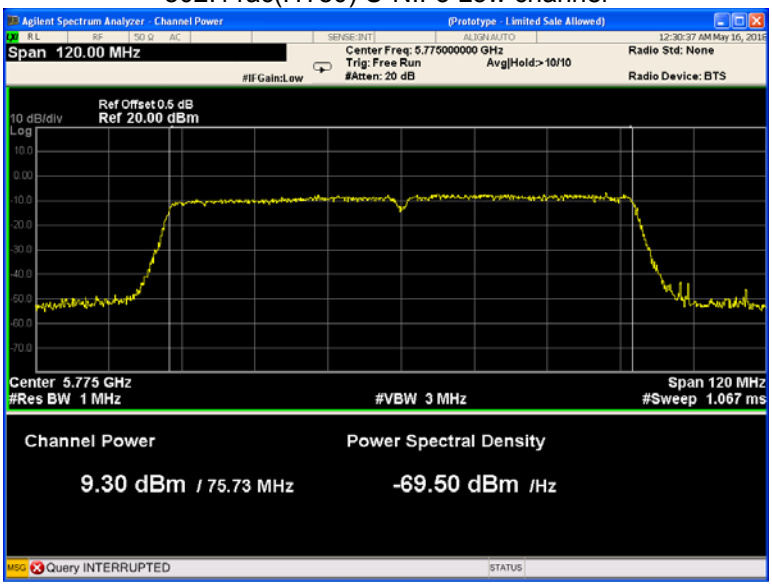
802.11ac(HT40) U-NII-3 Low channel



802.11n(HT40) U-NII-3 High channel



802.11ac(HT80) U-NII-3 Low channel



15 Power Spectral density

Test Requirement:	FCC CFR47 Part 15 Section 15.407(a)
Test Method:	789033 D02 General UNII Test Procedures New Rules v02r01, Section F
Test Limit:	≤11.00dBm/MHz for Operation in the U-NII-1(5150MHz-5250MHz)of mobile device ≤30.00dBm/500KHz for Operation in the U-NII-3(5725MHz-5850MHz)of device
Test Result:	PASS

15.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set the spectrum analyzer:

U-NII-1

RBW = 1MHz, VBW ⩾3* RBW Sweep = auto; Detector Function = Peak. Trae = Max hold.

U-NII-3

RBW = 510KHz, VBW ⩾3* RBW Sweep = auto; Detector Function = Peak. Trae = Max hold.

3. Allow the trae to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjaent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

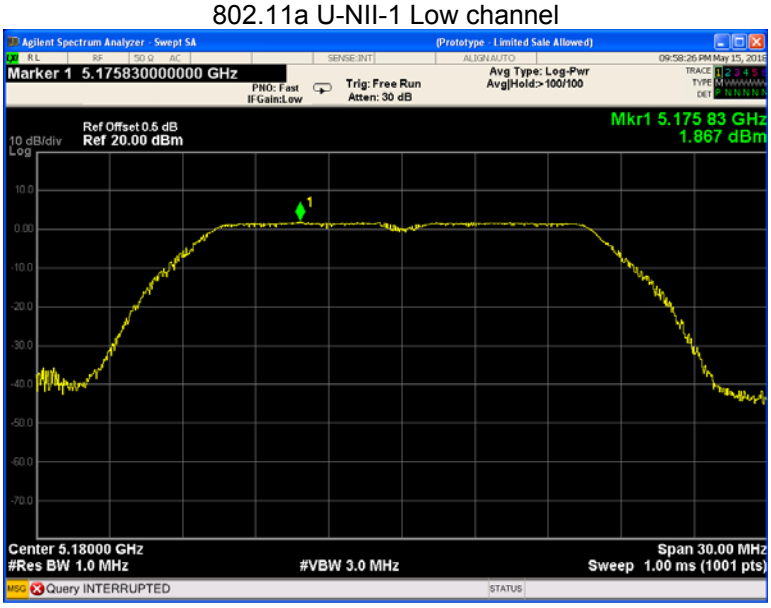
15.2 Test Result:

Band	Operation mode	CH	Power Spectral Density (dBm/MHz)
U-NII-1	802.11a	Low	1.867
		Middle	1.810
		High	1.627
	802.11n(HT20)	Low	2.334
		Middle	2.225
		High	1.951
	802.11n(HT40)	Low	-1.329
		Middle	/
		High	-0.930
	802.11ac(HT20)	Low	2.393
		Middle	1.661
		High	1.912
	802.11ac(HT40)	Low	-0.749
		Middle	/
		High	-0.879
	802.11ac(HT80)	Low	-3.660
		Middle	/
		High	/
	Limit	≤11.00dBm/MHz	

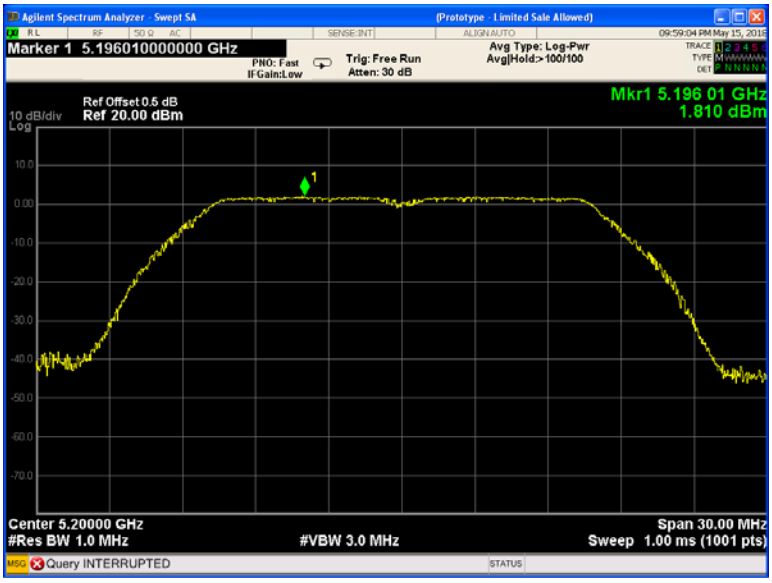
Band	Operation mode	CH	Power Spectral Density (dBm/MHz)
U-NII-3	802.11a	Low	-4.586
		Middle	-4.863
		High	-5.845
	802.11n(HT20)	Low	-5.040
		Middle	-4.666
		High	-5.163
	802.11n(HT40)	Low	-7.797
		Middle	/
		High	-7.891
	802.11ac(HT20)	Low	-4.306
		Middle	-4.649
		High	-5.299
	802.11ac(HT40)	Low	-7.795
		Middle	/
		High	-7.710
	802.11ac(HT80)	Low	-10.326
		Middle	/
		High	/
	Limit	≤30.00dBm/500KHz	

Test result plots shown as follows:

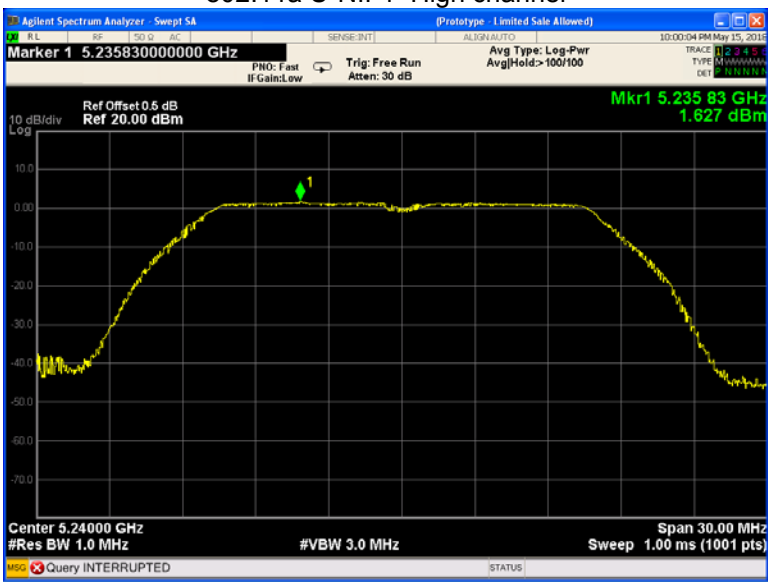
802.11a U-NII-1 Low channel



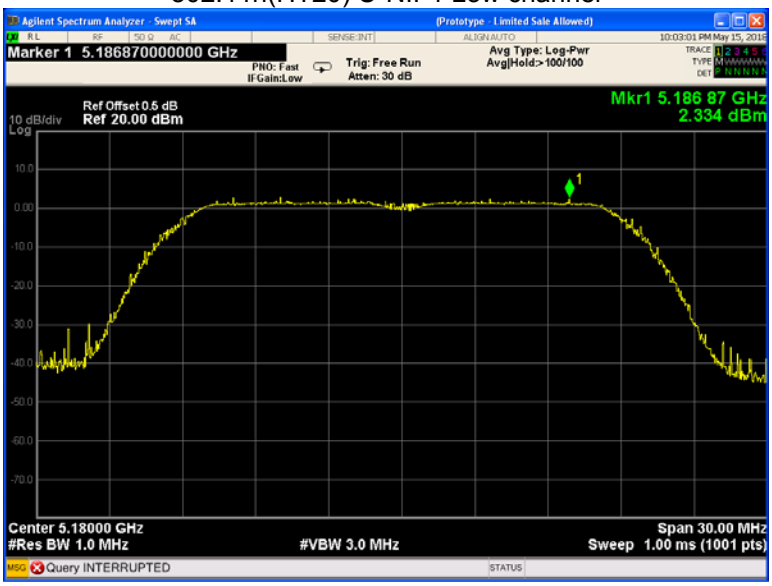
802.11a U-NII-1 Middle channel



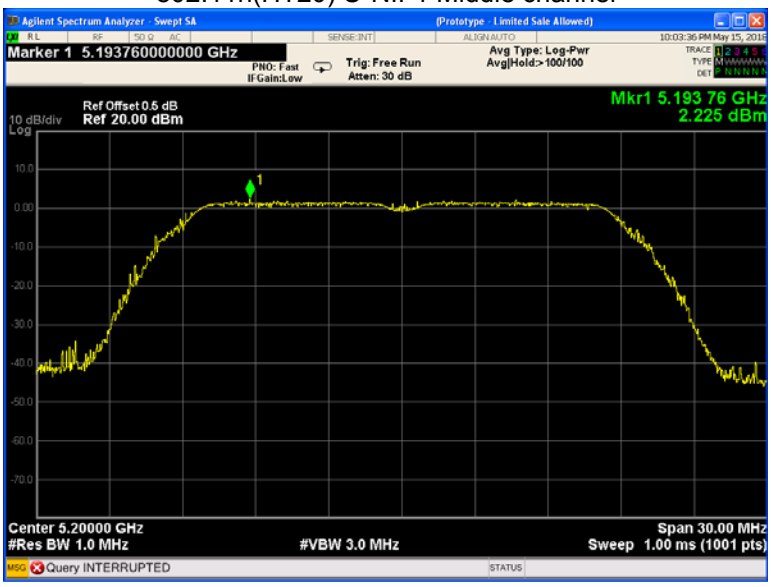
802.11a U-NII-1 High channel



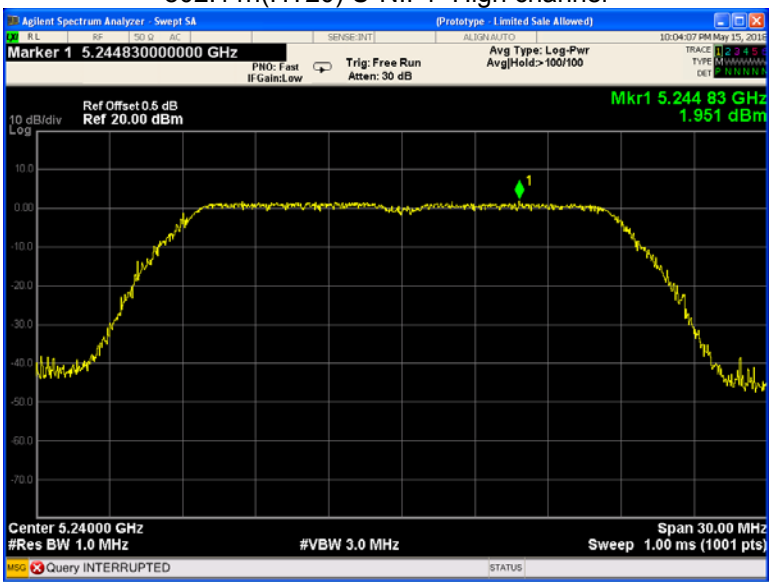
802.11n(HT20) U-NII-1 Low channel



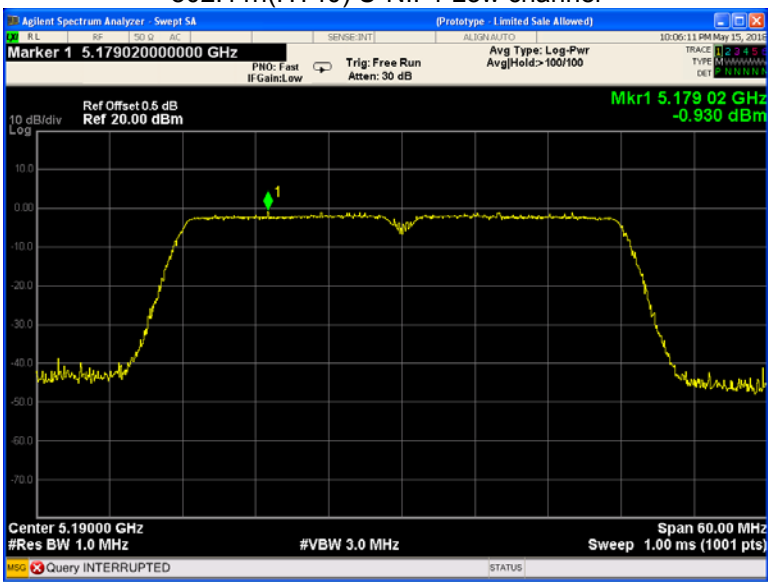
802.11n(HT20) U-NII-1 Middle channel



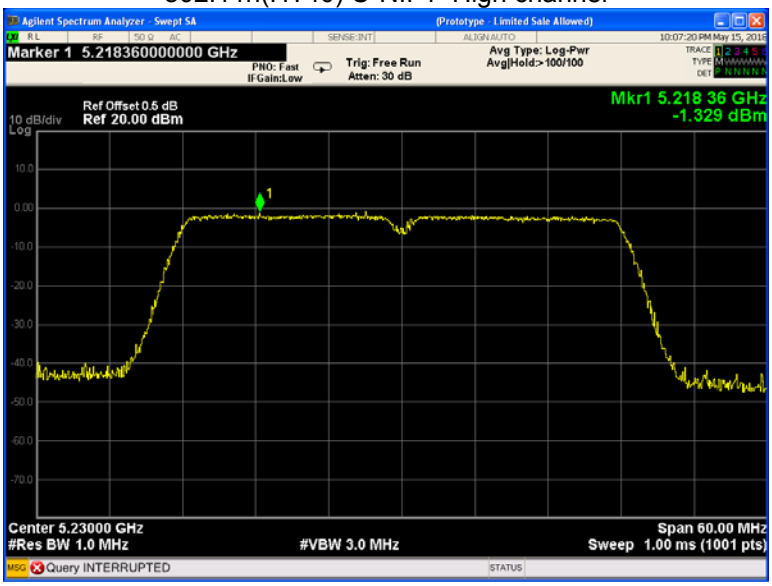
802.11n(HT20) U-NII-1 High channel



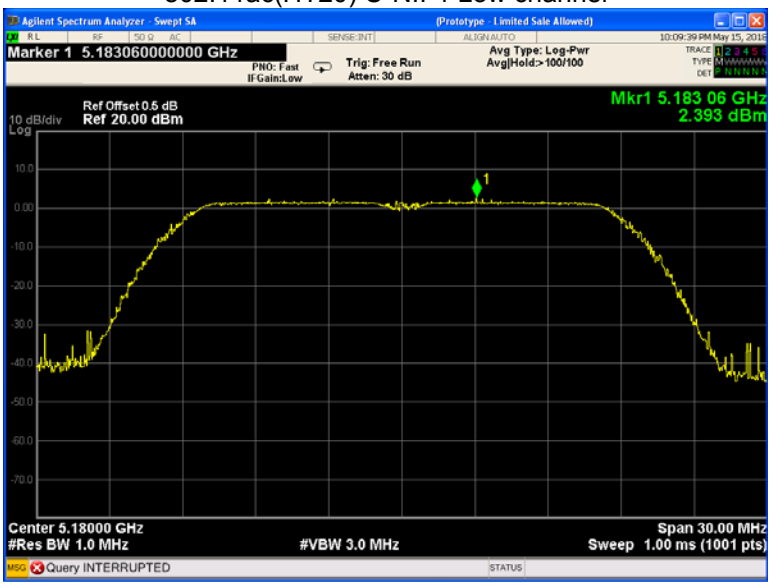
802.11n(HT40) U-NII-1 Low channel



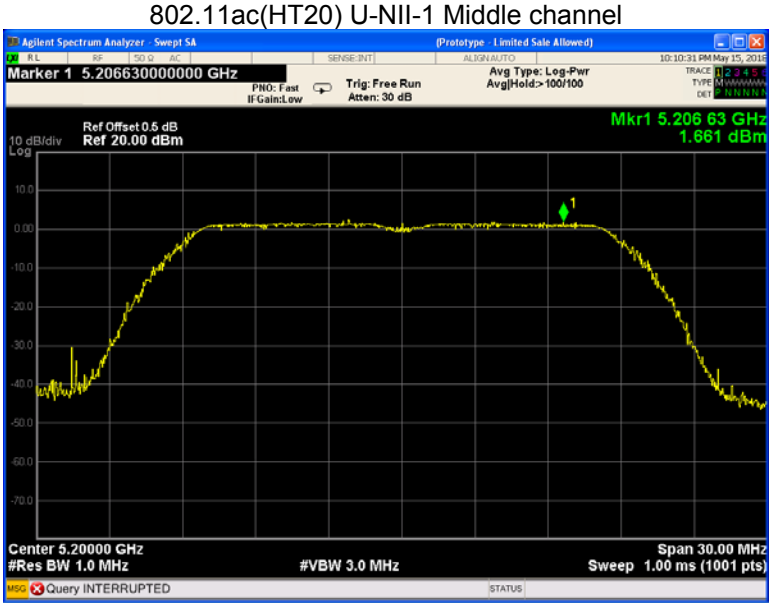
802.11n(HT40) U-NII-1 High channel



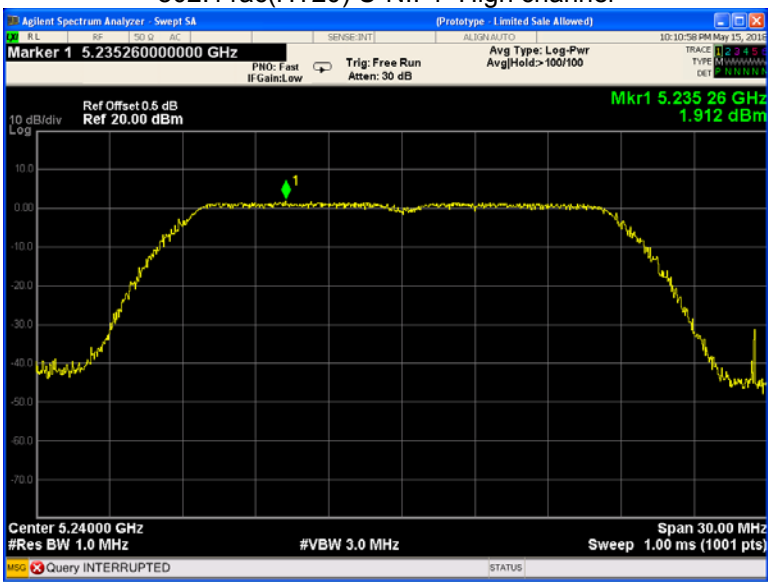
802.11ac(HT20) U-NII-1 Low channel



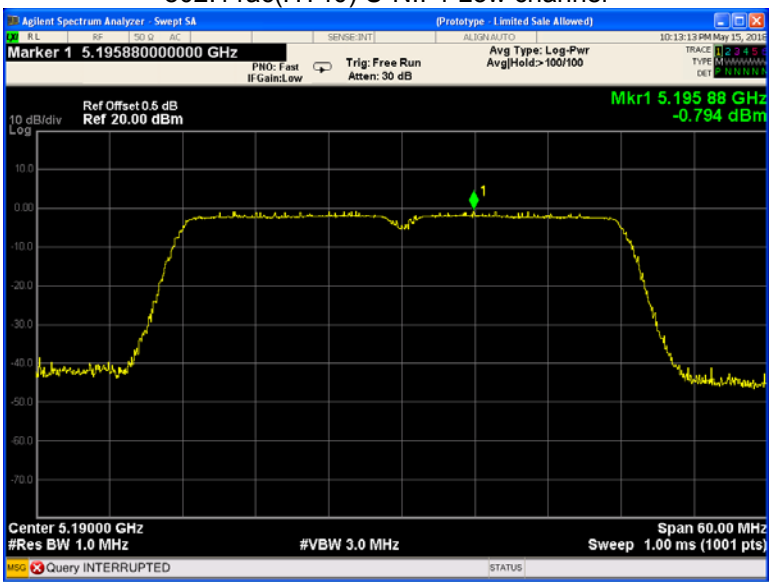
802.11ac(HT20) U-NII-1 Middle channel



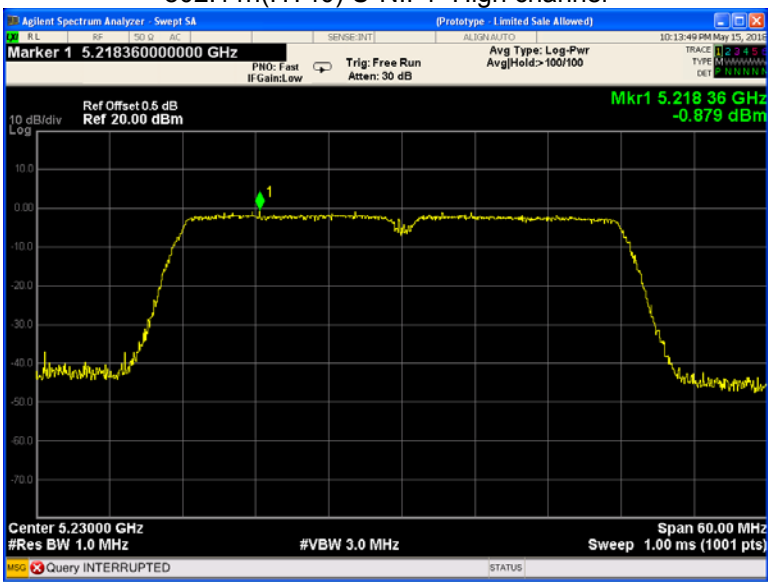
802.11ac(HT20) U-NII-1 High channel



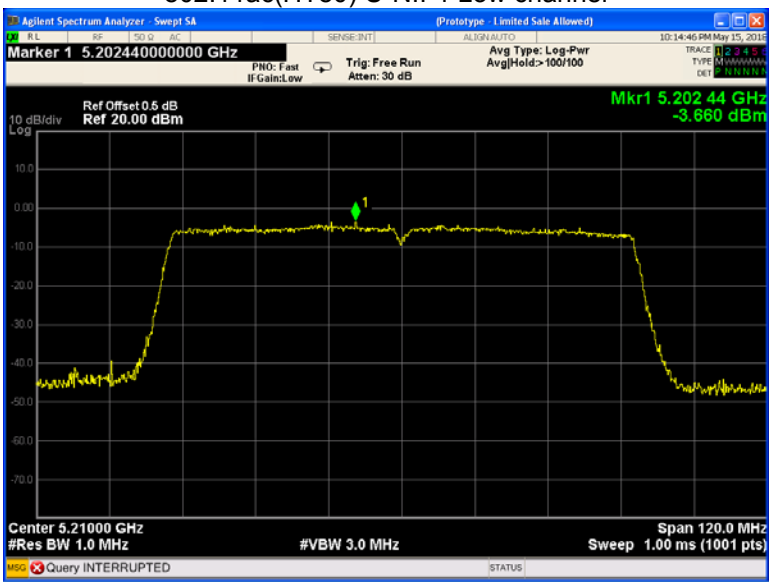
802.11ac(HT40) U-NII-1 Low channel



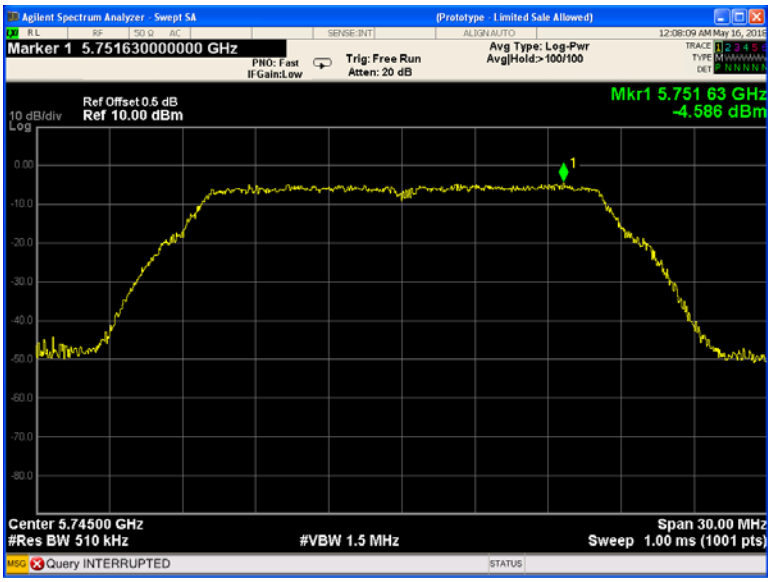
802.11n(HT40) U-NII-1 High channel



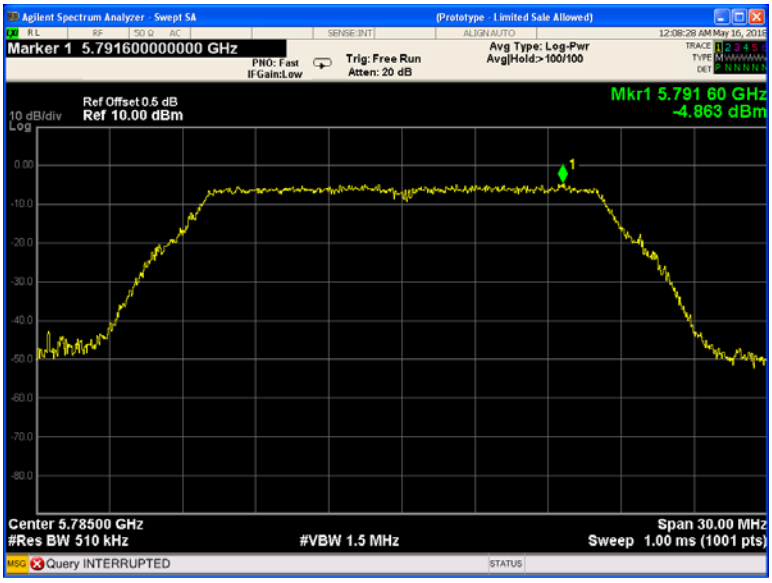
802.11ac(HT80) U-NII-1 Low channel



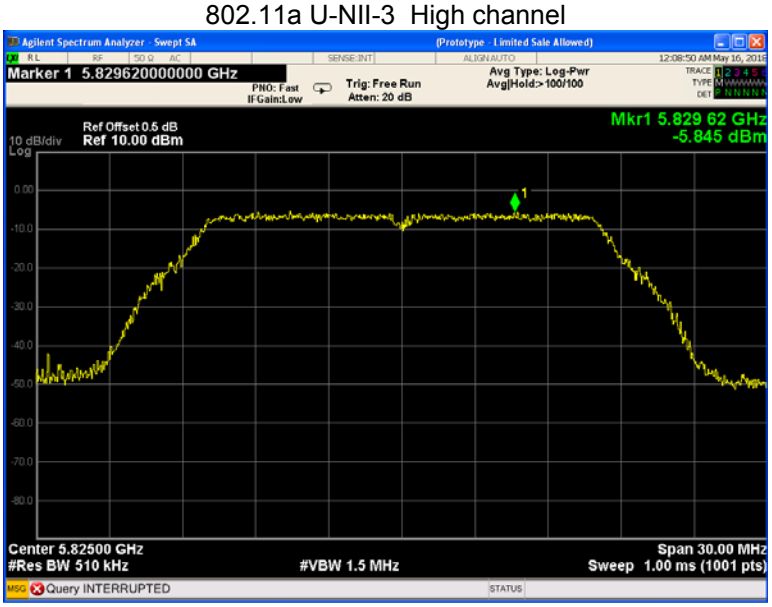
802.11a U-NII-3 Low channel



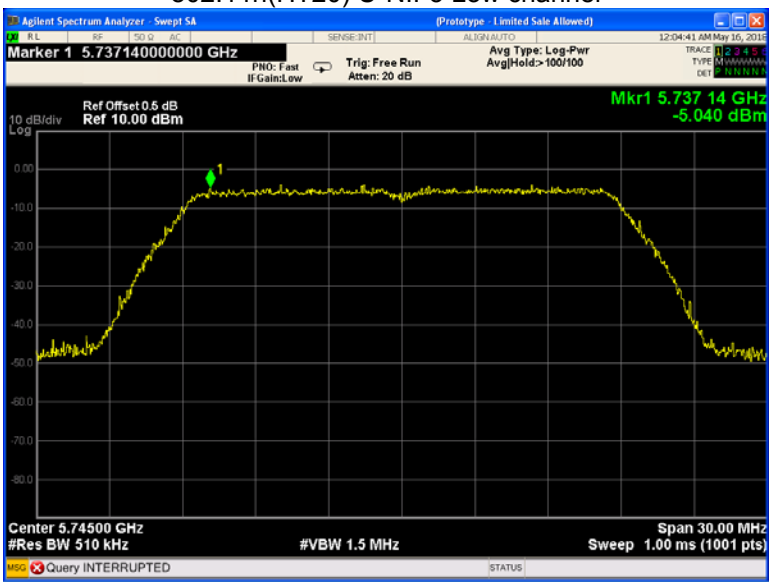
802.11a U-NII-3 Middle channel



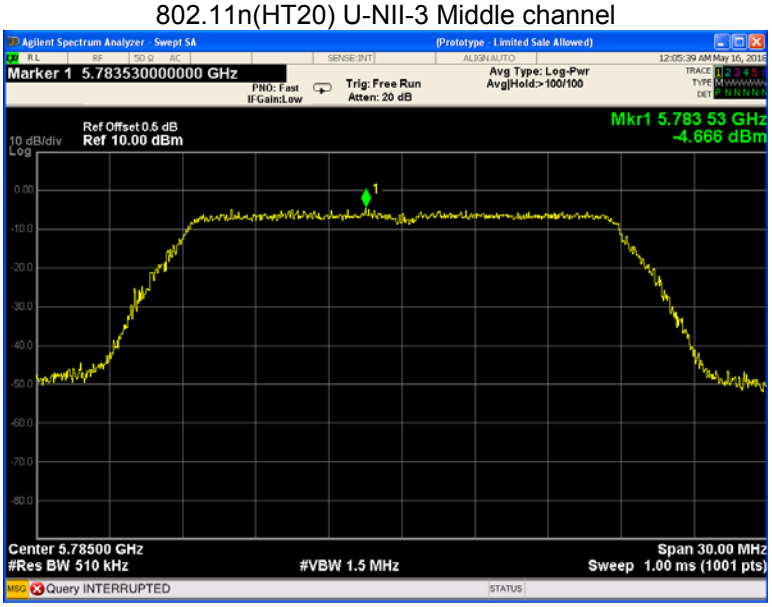
802.11a U-NII-3 High channel



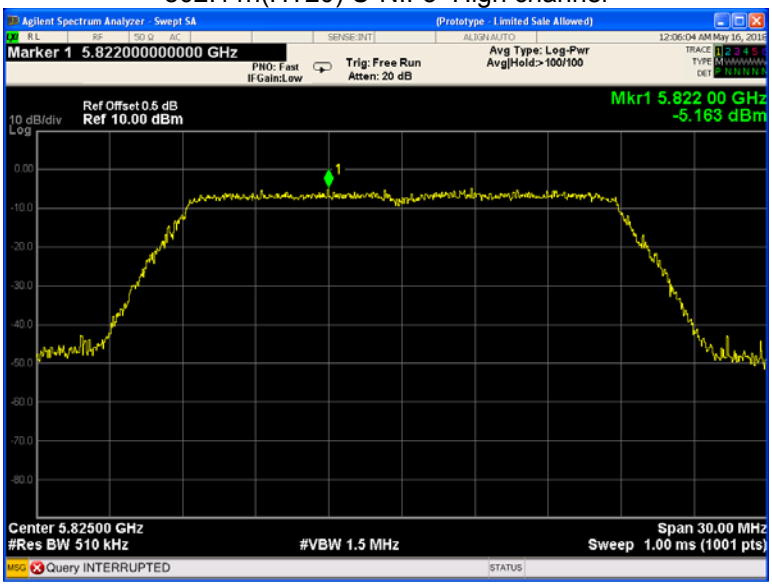
802.11n(HT20) U-NII-3 Low channel



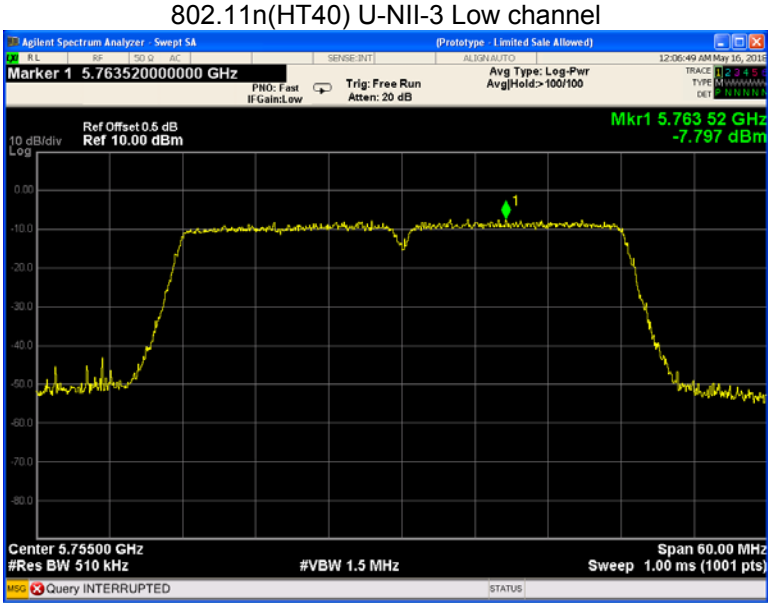
802.11n(HT20) U-NII-3 Middle channel



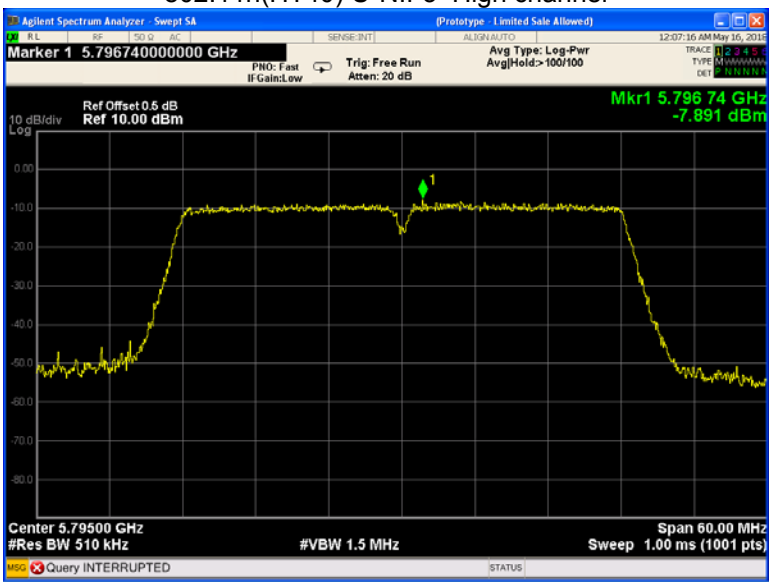
802.11n(HT20) U-NII-3 High channel



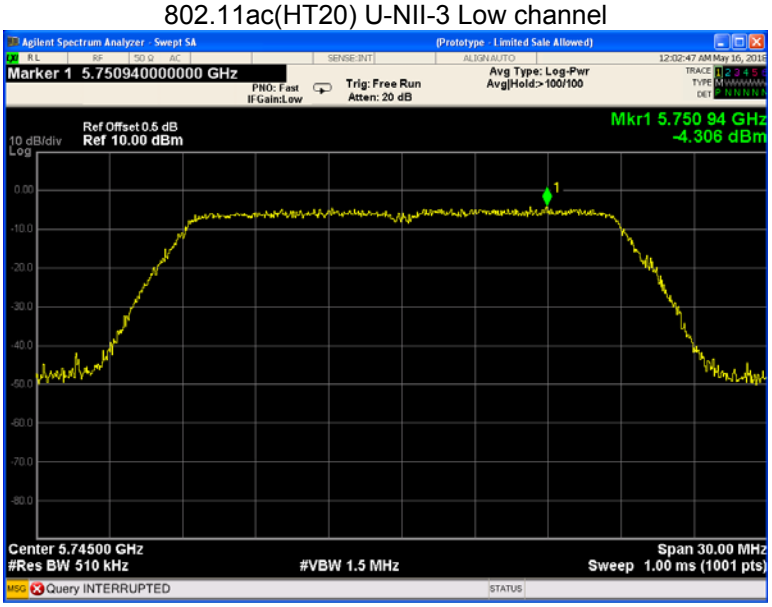
802.11n(HT40) U-NII-3 Low channel



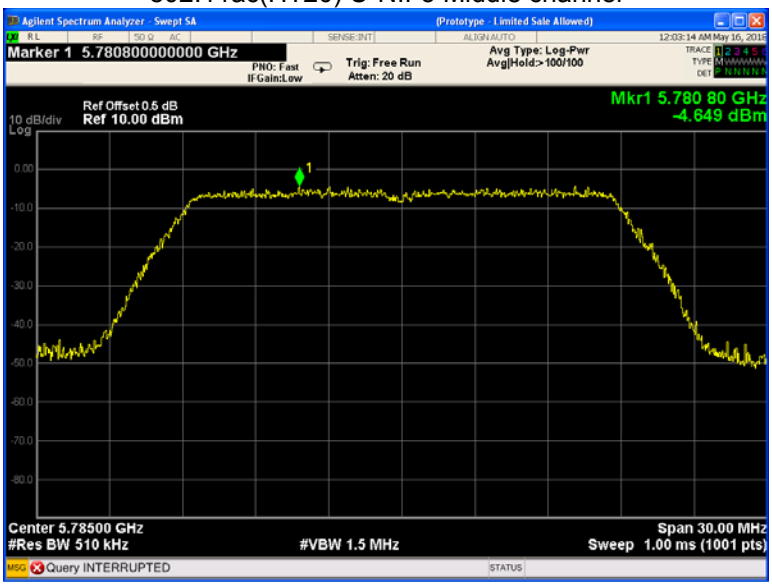
802.11n(HT40) U-NII-3 High channel



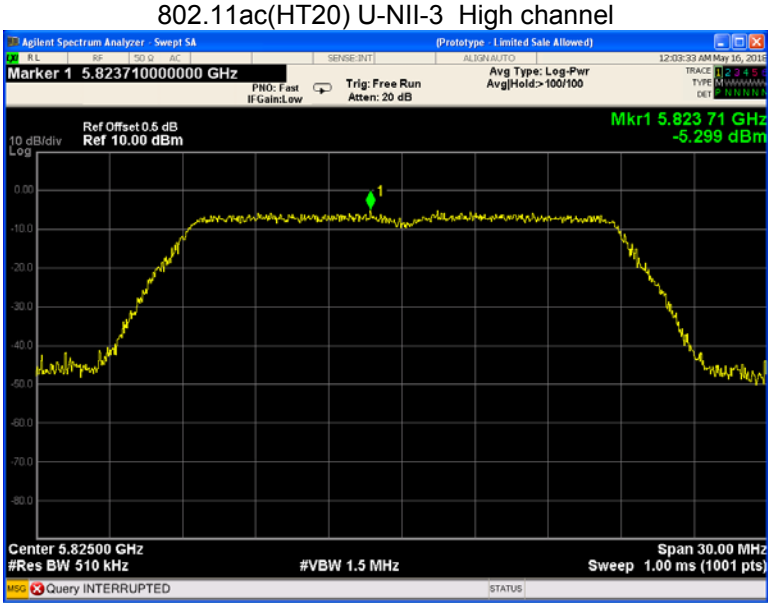
802.11ac(HT20) U-NII-3 Low channel



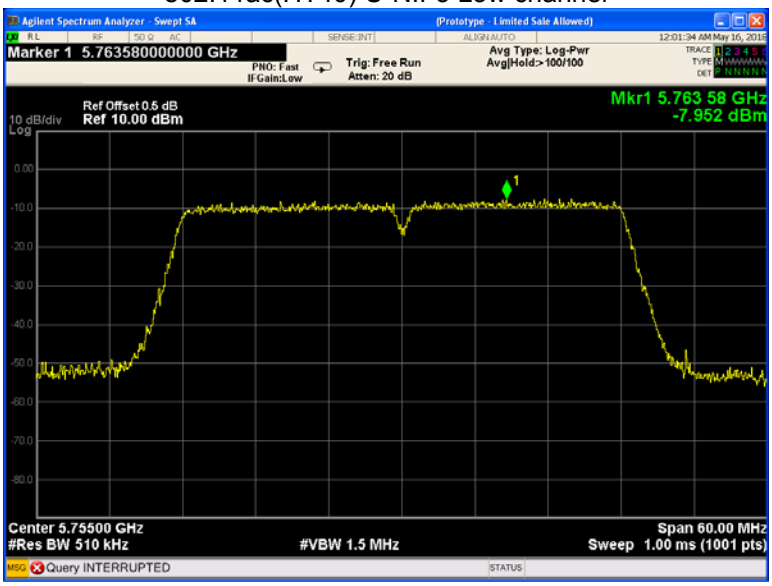
802.11ac(HT20) U-NII-3 Middle channel



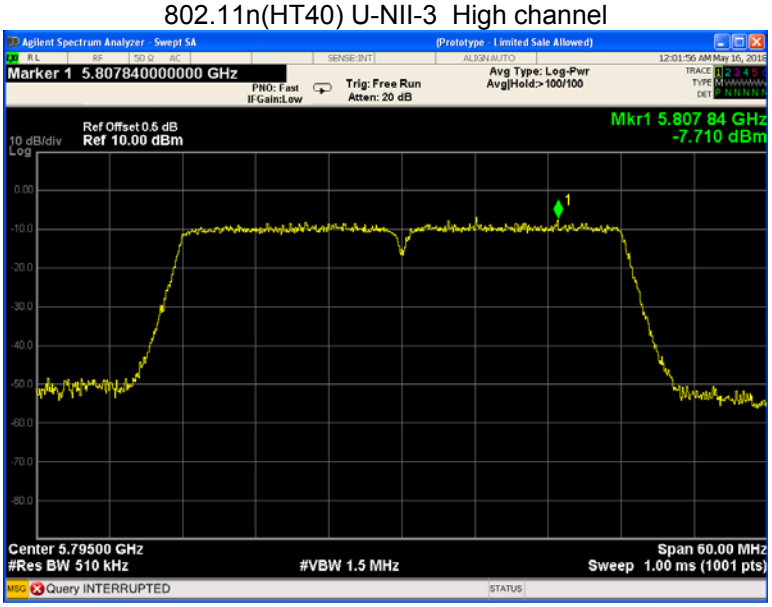
802.11ac(HT20) U-NII-3 High channel



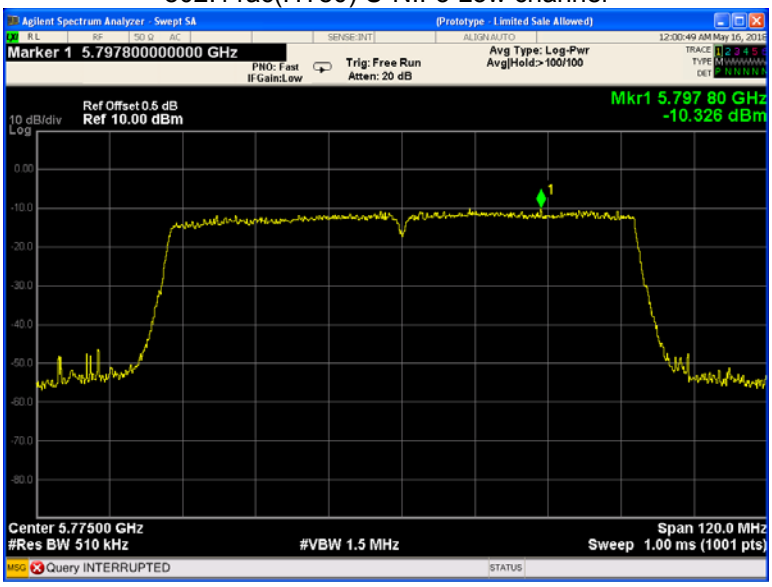
802.11ac(HT40) U-NII-3 Low channel



802.11n(HT40) U-NII-3 High channel



802.11ac(HT80) U-NII-3 Low channel



16 Frequency Stability

Test Requirement:	FCC CFR47 Part 15 Section 15.407(g)
Test Method:	ANSI C63.10:2013
Test Limit:	Manufaturers 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 or 20ppm.
Test Result:	PASS

16.1 Test Procedure:

1. The transmitter output (antenna port) was connected to the spectrum analyzer. EUT have transmitted absence of unmodulation signal and fixed channelise. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 10^6 ppm and the limit is less than ±20ppm The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value.

2. Extreme temperature rule is 5°C~ 35°C.

16.2 Test Result:

U-NII-1 Test Frequency:5180MHz				
Temperature (℃)	Power Supply (VAC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
35	120	1752	0.3382	20
30		1789	0.3454	20
25		1778	0.3432	20
20		1732	0.3344	20
15		1764	0.3405	20
10		1766	0.3409	20
5		1744	0.3367	20
20	108	1774	0.3425	20
20	132	1780	0.3436	20

U-NII-3 Test Frequency:5785MHz				
Temperature (℃)	Power Supply (VAC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
35		1854	0.3156	20
30		1862	0.3169	20
25		1853	0.3154	20
20		1836	0.3125	20
15		1842	0.3135	20
10		1846	0.3142	20
5		1852	0.3152	20
20	108	1903	0.3239	20
20	132	1902	0.3237	20

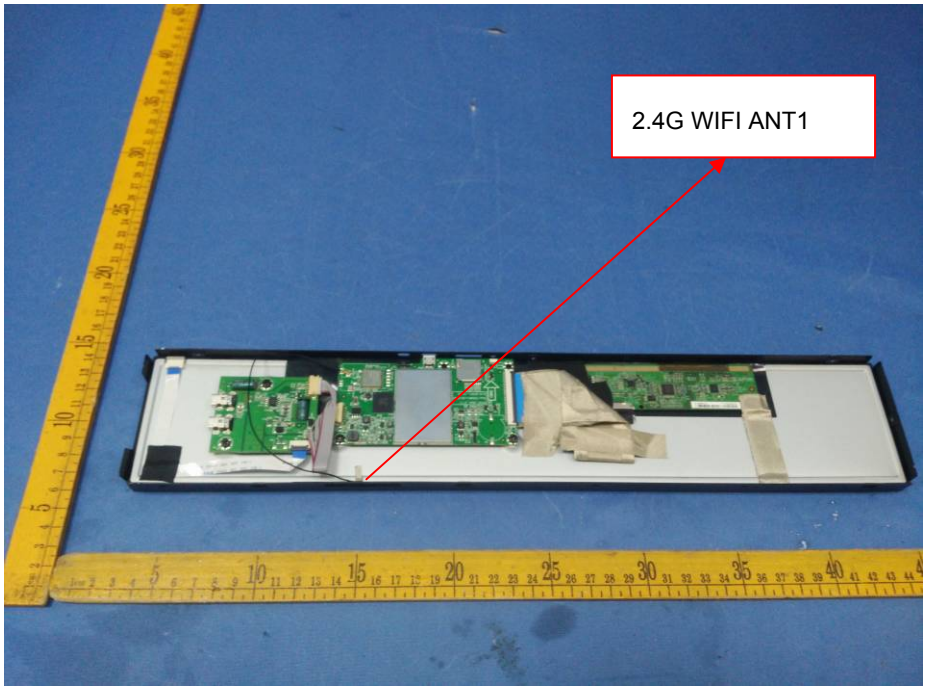
17 Antenna Requirement

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. The use of a permanently attahed antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufaturer may design the unit so that a broken antenna can be replaed by the user, but the use of a standard antenna jak or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in acordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

This device uses of two antennas that uses a specified coupling to the intentional radiator. Antenna connectors complied with the requirement.

Result:

The EUT have one Internal Antenna, meets the requirements of FCC 15.203.



18 SAR Evaluation

Please refer to SAR report.

19 Photographs – Test Setup and EUT Photos

Refer to the file EL161WLBC0HWWW_Ext Photos, EL161WLBC0HWWW_Int Photos and EL161WLBC0HWWW_Tsup Photos.

======End of Report======