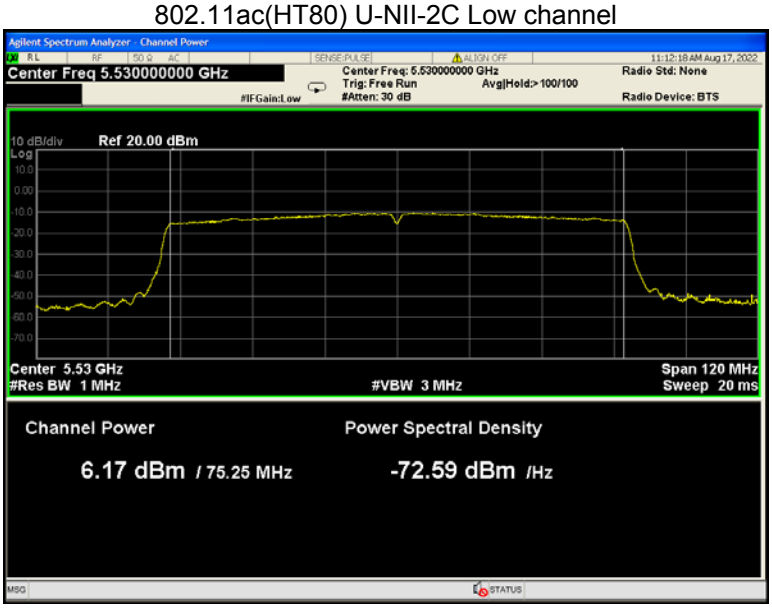
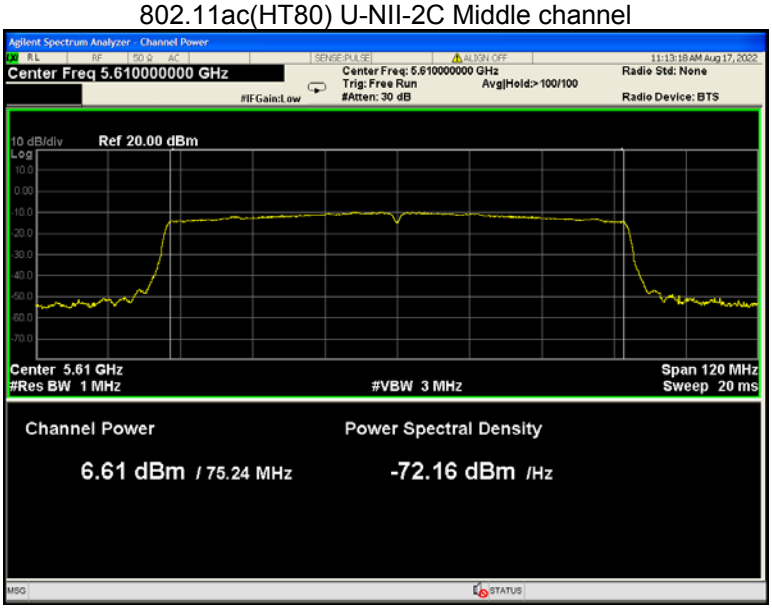
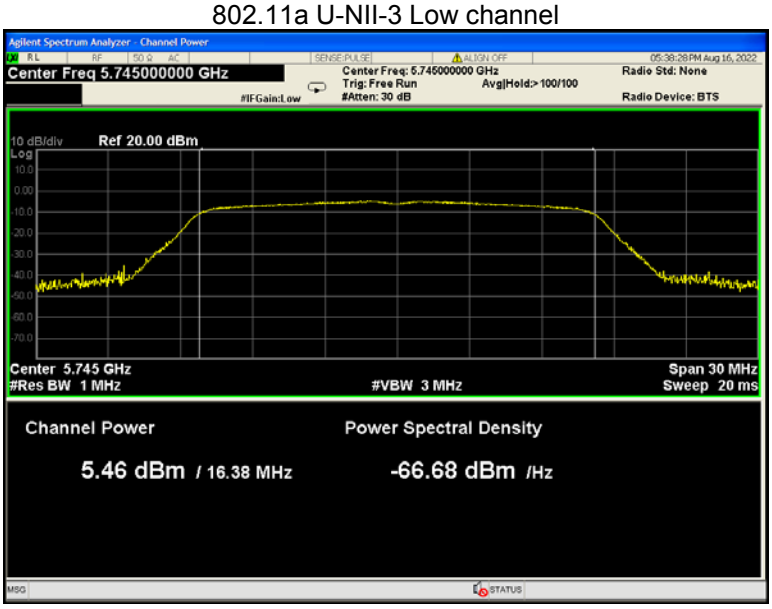
802.11ac(HT80) U-NII-2C Low channel



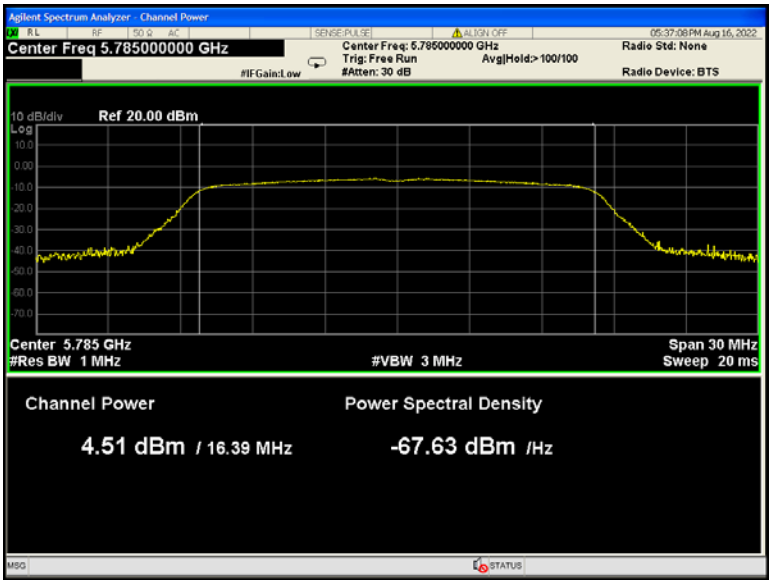
802.11ac(HT80) U-NII-2C Middle channel



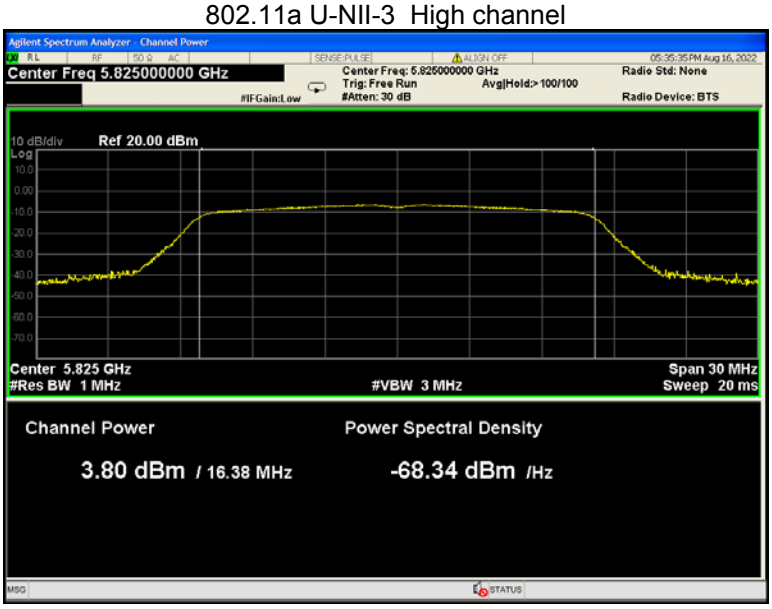
802.11a U-NII-3 Low channel



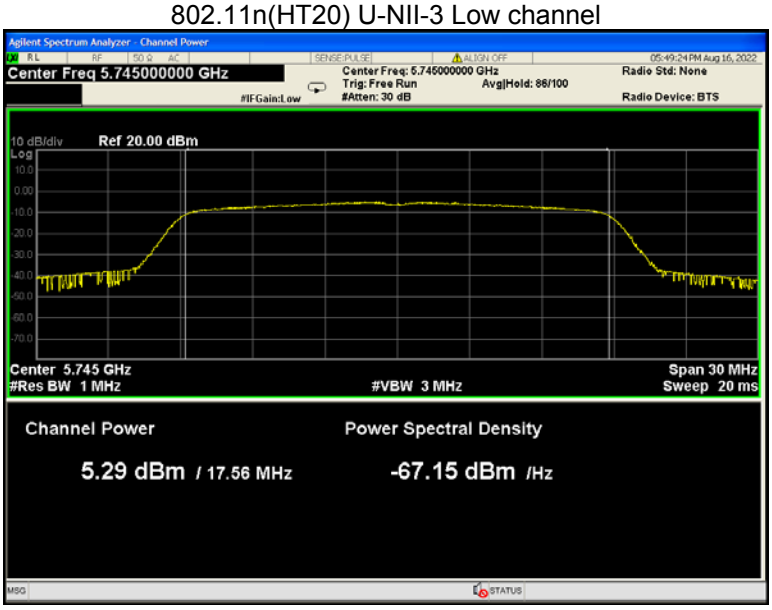
802.11a U-NII-3 Middle channel



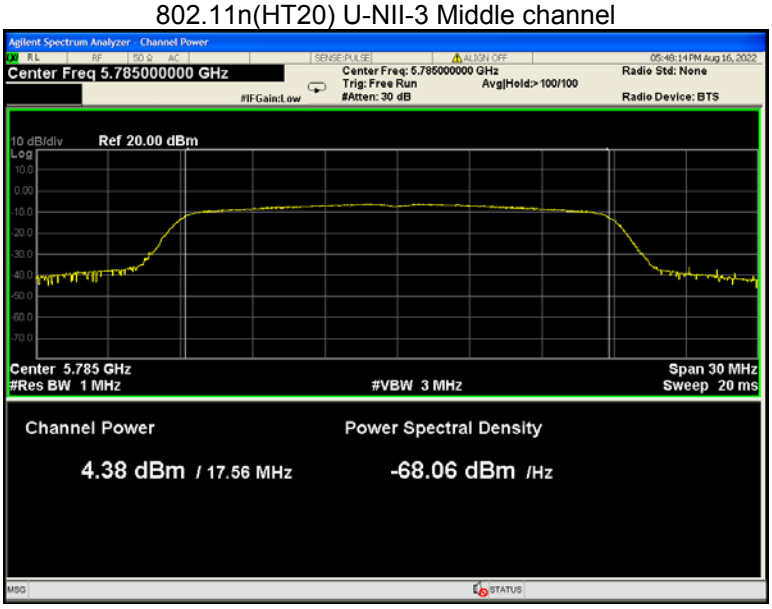
802.11a U-NII-3 High channel



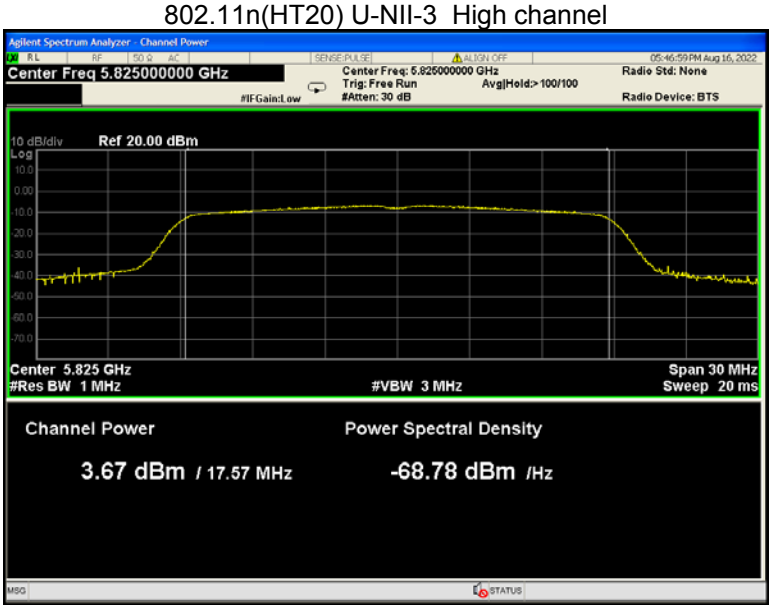
802.11n(HT20) U-NII-3 Low channel



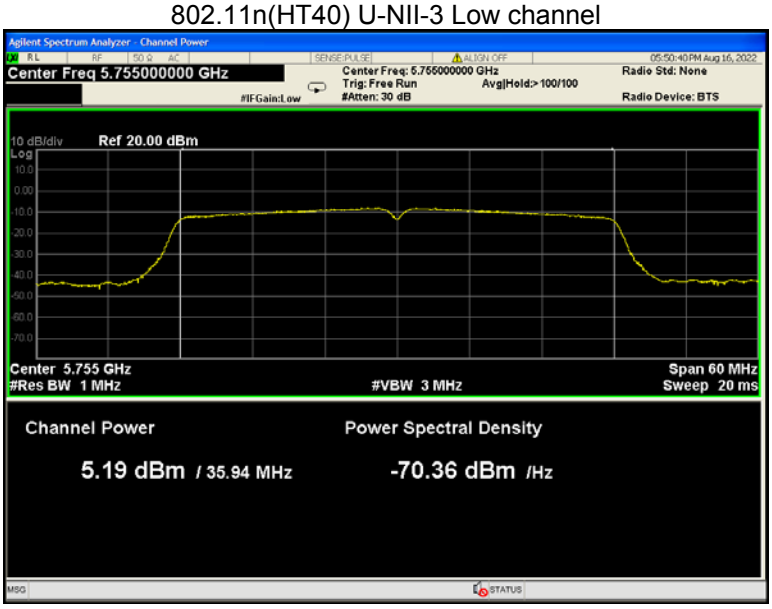
802.11n(HT20) U-NII-3 Middle channel



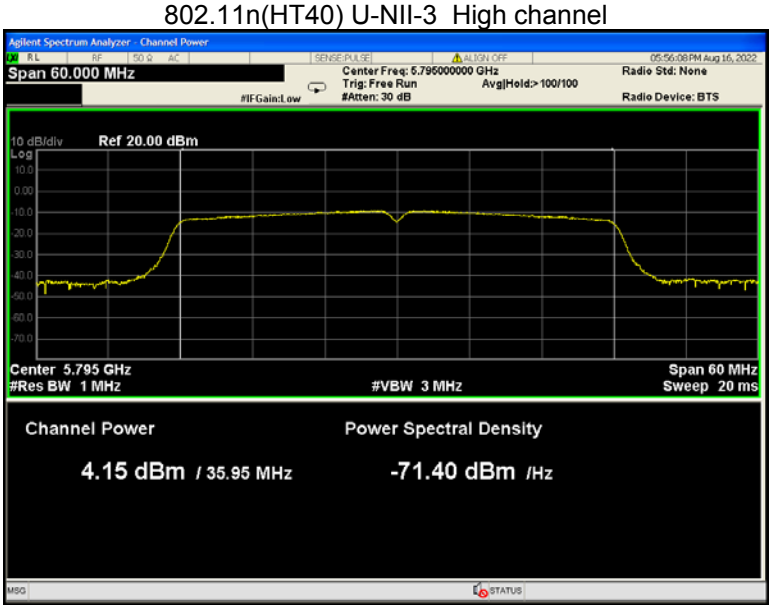
802.11n(HT20) U-NII-3 High channel



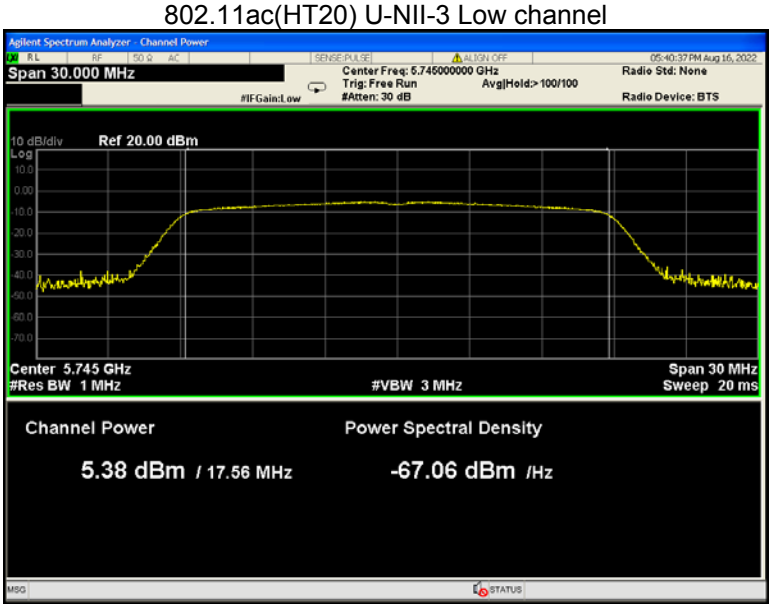
802.11n(HT40) U-NII-3 Low channel



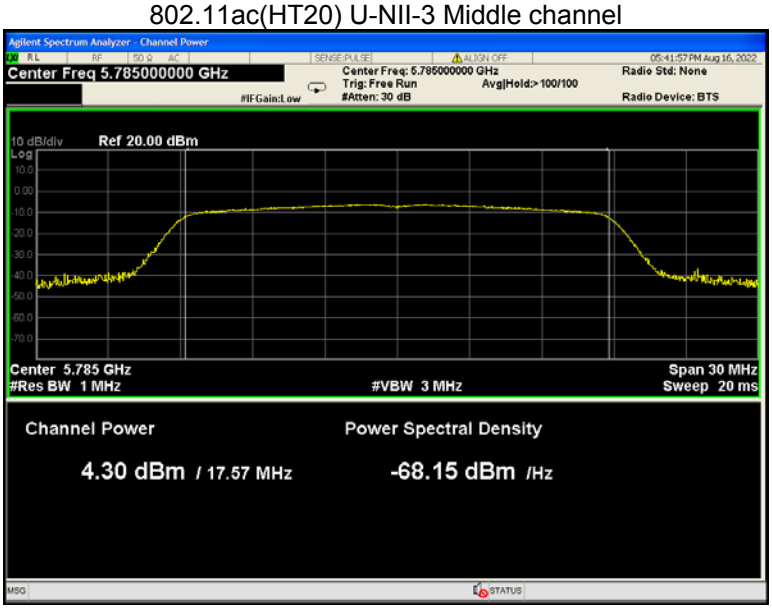
802.11n(HT40) U-NII-3 High channel



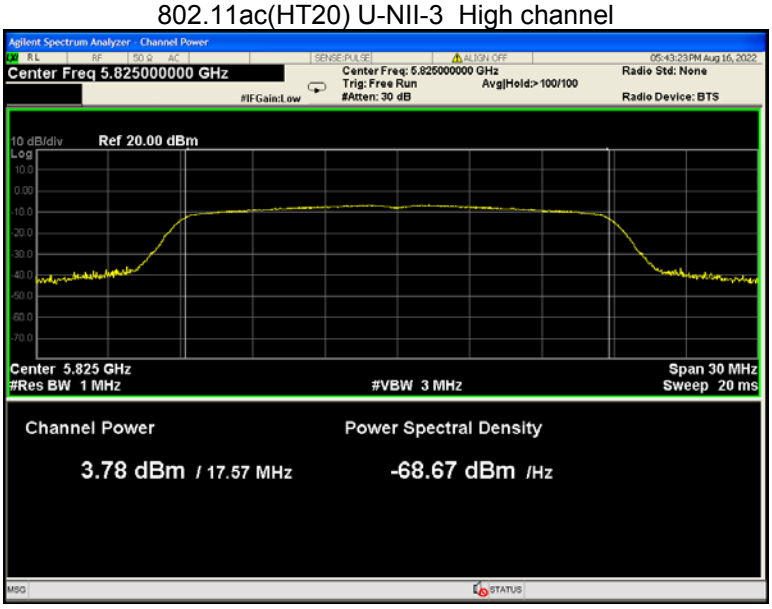
802.11ac(HT20) U-NII-3 Low channel



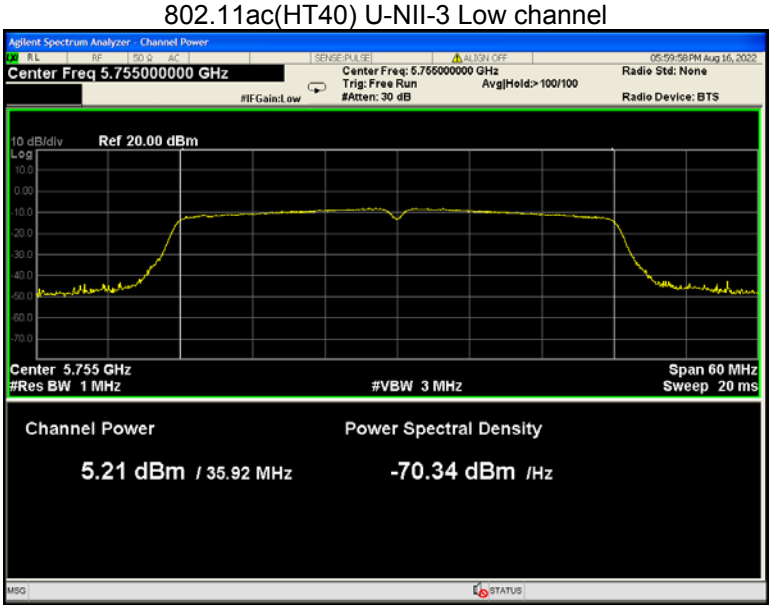
802.11ac(HT20) U-NII-3 Middle channel



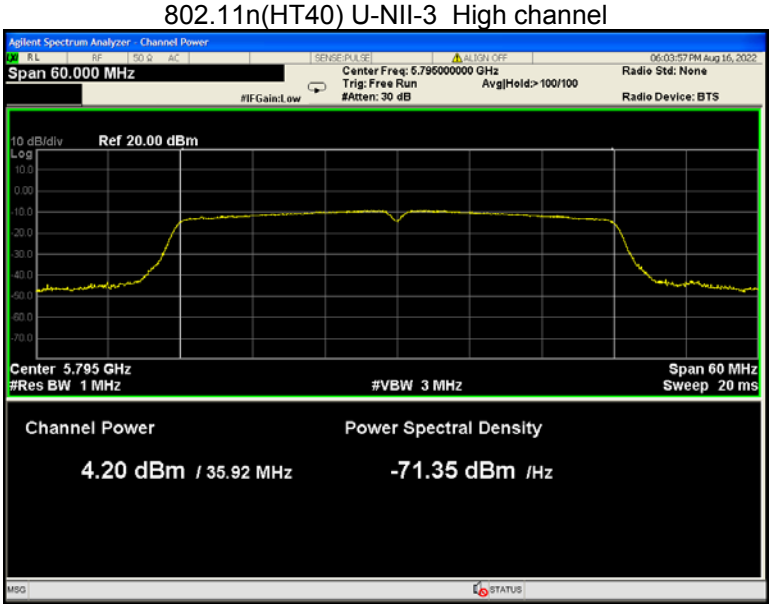
802.11ac(HT20) U-NII-3 High channel



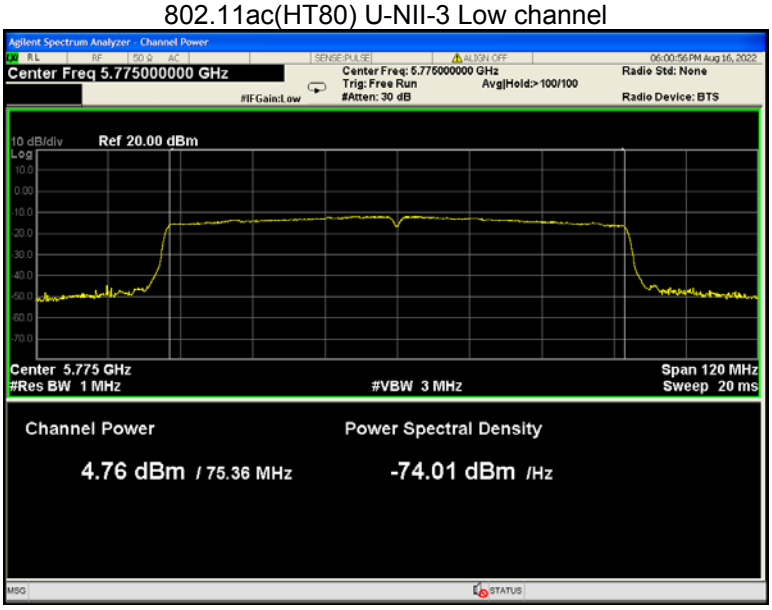
802.11ac(HT40) U-NII-3 Low channel



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



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



14 Power Spectral density

Test Requirement:	FCC CFR47 Part 15 Section 15.407(a)
Test Method:	KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Test Limit:	≤11dBm/MHz for Operation in the U-NII-1(5150MHz-5250MHz,5250-5350MHz and 5470-5725MHz)of device; ≤30dBm/500kHz for Operation in the U-NII-3(5725MHz-5850MHz)of device
Test Result:	PASS

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:

U-NII-1

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

U-NII-3

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

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

14.2 Test Result:

Band	Operation mode	Power Spectral Density (dBm/MHz)		
		Low	Middle	High
U-NII-1	802.11a	1.941	1.441	0.147
	802.11n(HT20)	1.211	0.694	0.058
	802.11n(HT40)	-0.926	/	-2.309
	802.11ac(HT20)	1.057	0.999	-0.247
	802.11ac(HT40)	-2.086	/	-2.179
	802.11ac(HT80)	-4.673	/	/
	Limit	≤11.00dBm/MHz		

Band	Operation mode	Power Spectral Density (dBm/MHz)		
		Low	Middle	High
U-NII-2A	802.11a	-1.539	-2.614	-1.207
	802.11n(HT20)	-2.225	-2.815	-2.749
	802.11n(HT40)	-6.029	/	-5.334
	802.11ac(HT20)	-2.037	-1.983	-1.904
	802.11ac(HT40)	-6.029	/	-5.334
	802.11ac(HT80)	-7.623	/	/
	Limit	≤11.00dBm/MHz		

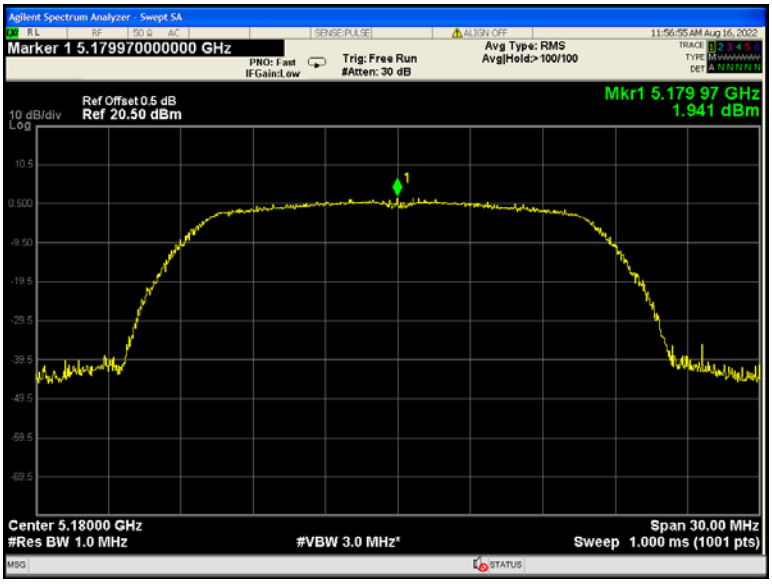
Band	Operation mode	Power Spectral Density (dBm/MHz)		
		Low	Middle	High
U-NII-2C	802.11a	0.197	1.430	0.889
	802.11n(HT20)	0.106	0.837	0.623
	802.11n(HT40)	-2.567	-1.766	-2.382
	802.11ac(HT20)	0.076	1.526	-0.066
	802.11ac(HT40)	-2.122	-2.054	-2.389
	802.11ac(HT80)	-4.870	-4.688	/
	Limit	≤11.00dBm/MHz		

Band	Operation mode	Power Spectral Density (dBm/MHz)		
		Low	Middle	High
U-NII-3	802.11a	-0.104	-0.825	-1.496
	802.11n(HT20)	-0.666	-0.624	-1.482
	802.11n(HT40)	-3.339	/	-4.233
	802.11ac(HT20)	-0.274	-1.097	-1.930
	802.11ac(HT40)	-3.258	/	-4.367
	802.11ac(HT80)	-6.782	/	/
	Limit	≤30.00dBm/500kHz		

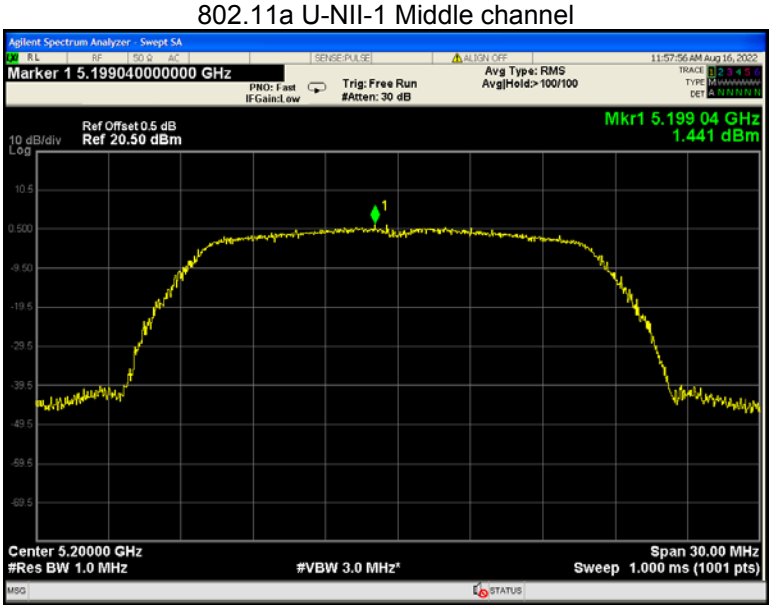
* All transmit signals are completely uncorrelated with each other, Directional gain = G_{ANT} which is less than 6dBi. So the limit does not be reduced.

Test result plots shown as follows:

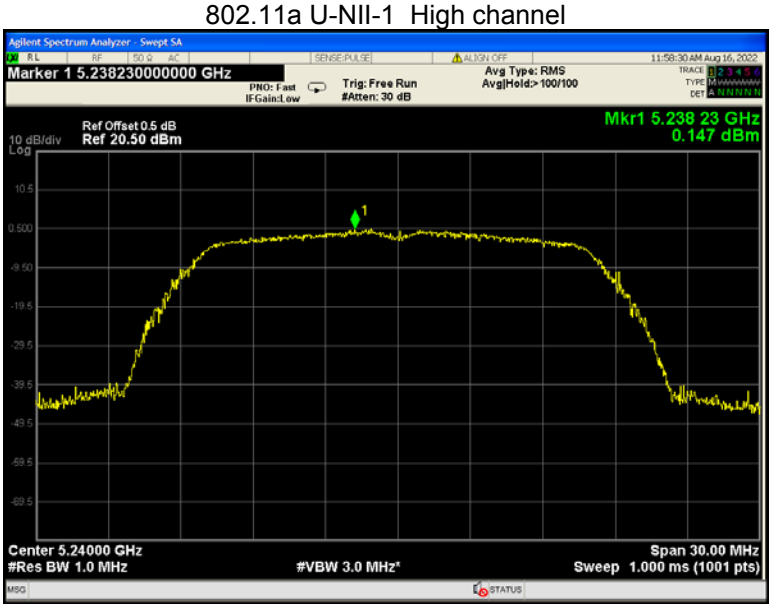
802.11a U-NII-1 Low channel



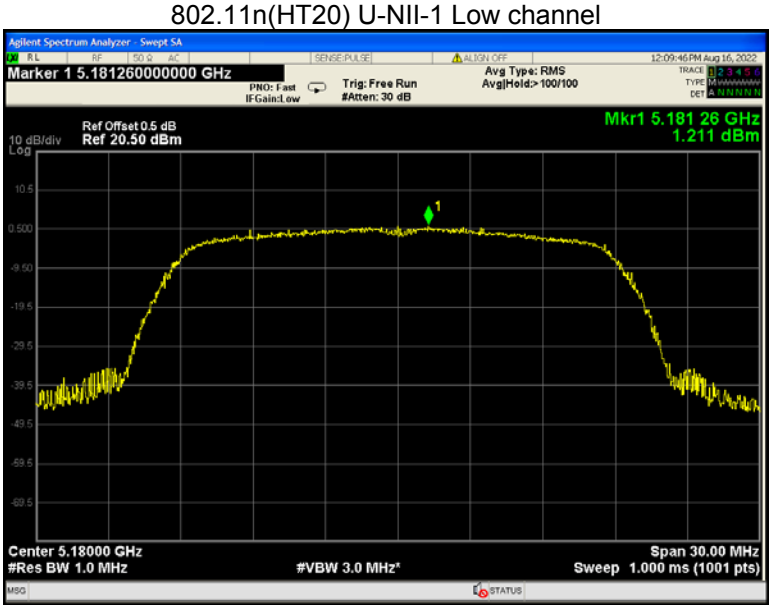
802.11a U-NII-1 Middle channel



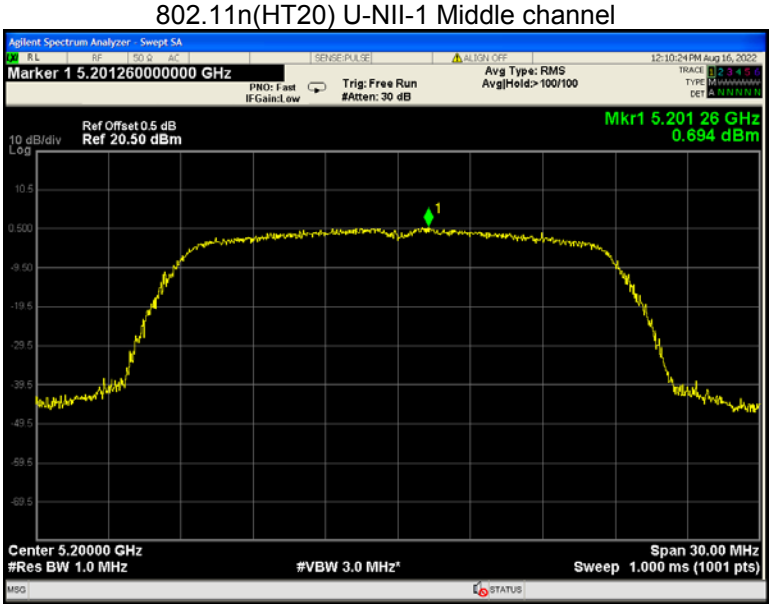
802.11a U-NII-1 High channel



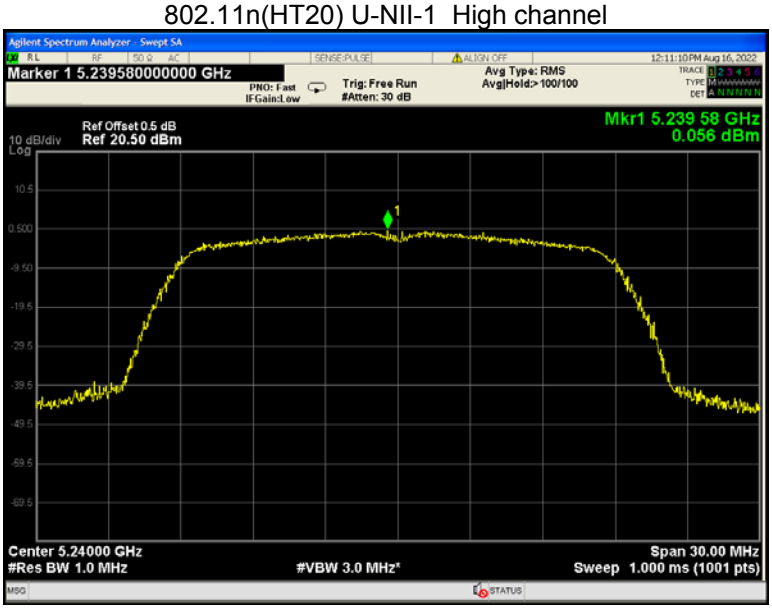
802.11n(HT20) U-NII-1 Low channel



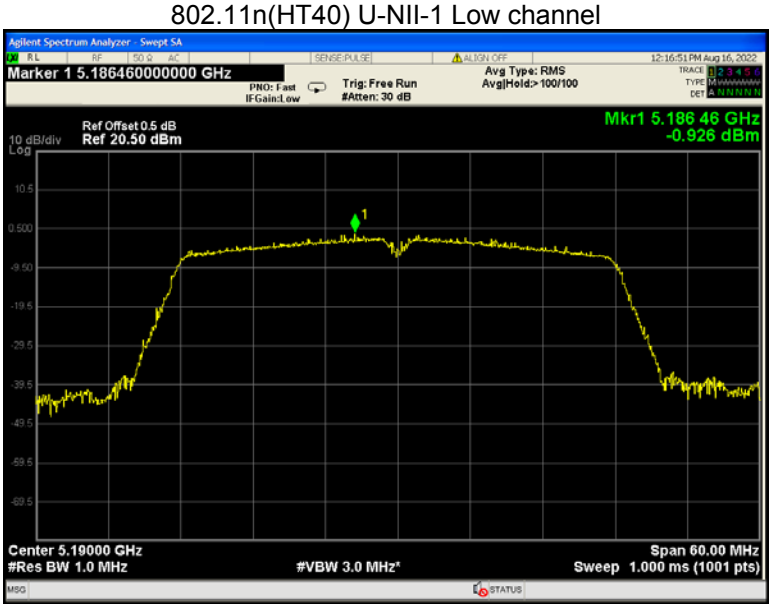
802.11n(HT20) U-NII-1 Middle channel



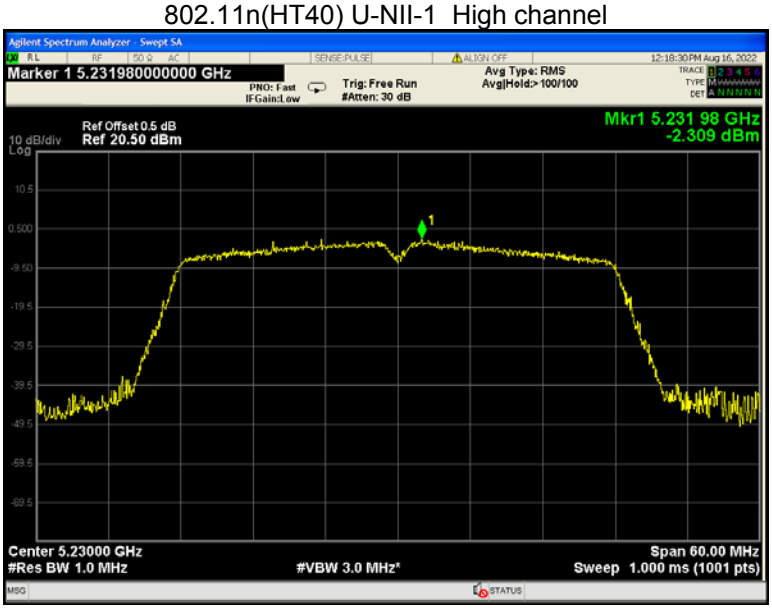
802.11n(HT20) U-NII-1 High channel



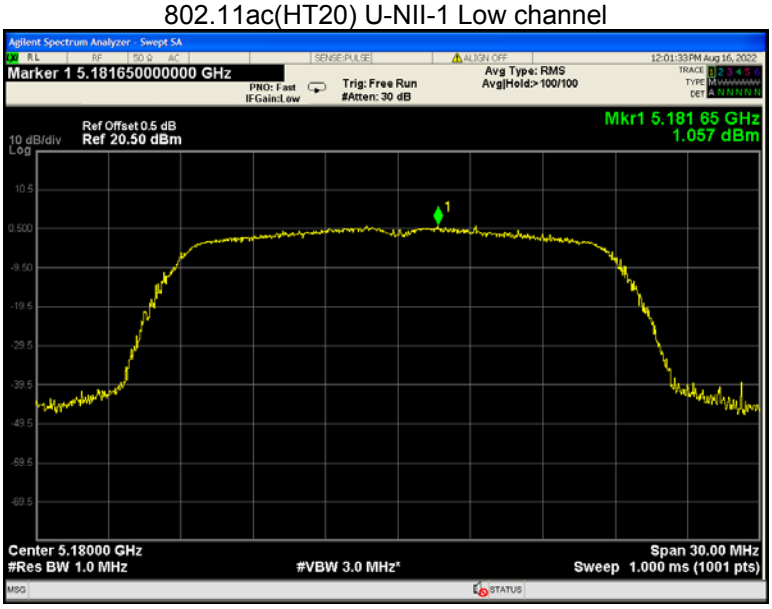
802.11n(HT40) U-NII-1 Low channel



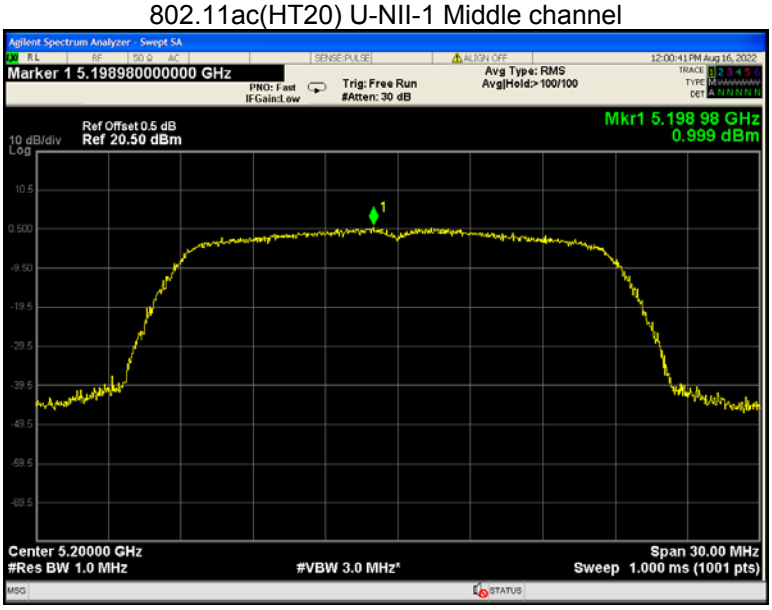
802.11n(HT40) U-NII-1 High channel



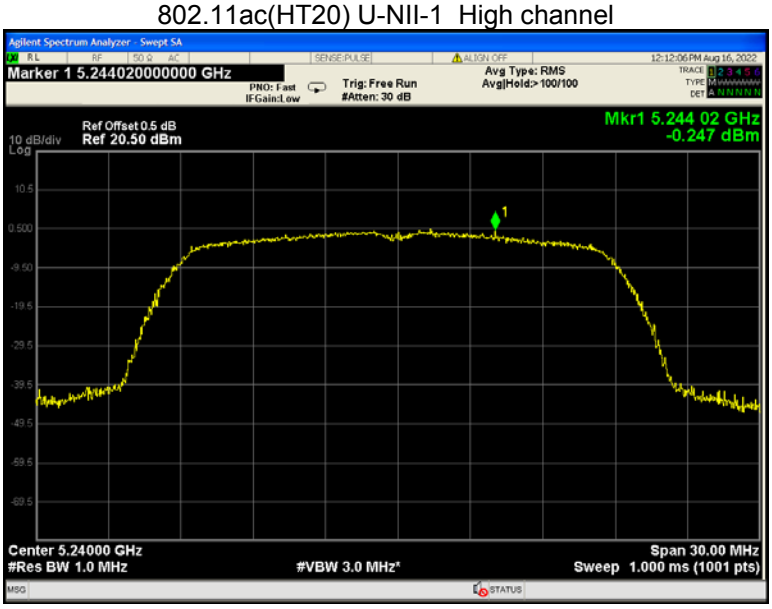
802.11ac(HT20) U-NII-1 Low channel



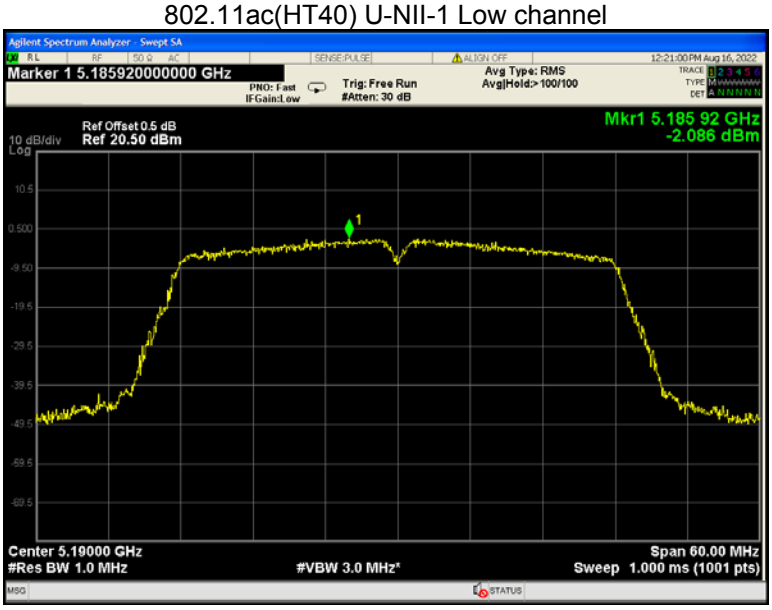
802.11ac(HT20) U-NII-1 Middle channel



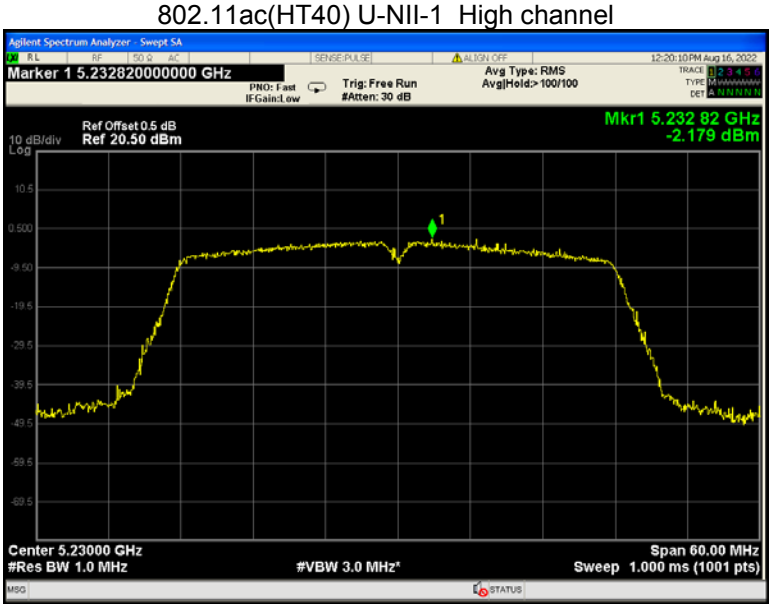
802.11ac(HT20) U-NII-1 High channel



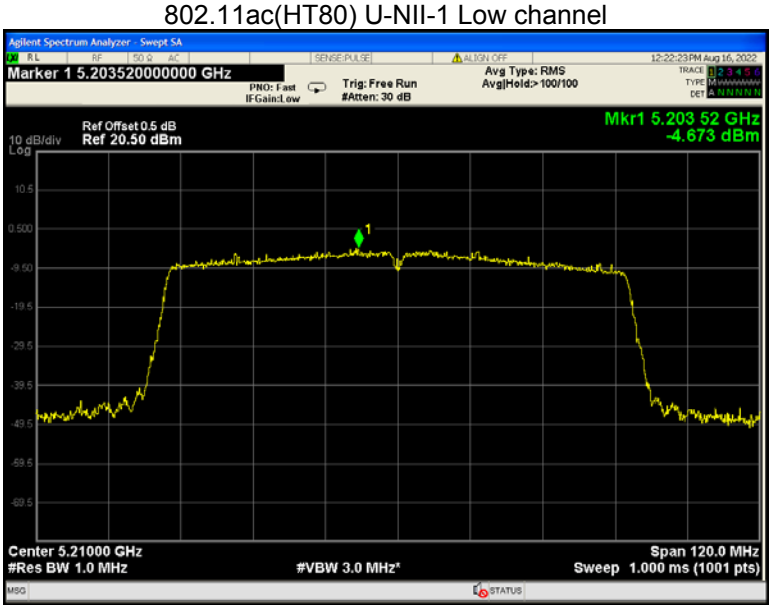
802.11ac(HT40) U-NII-1 Low channel



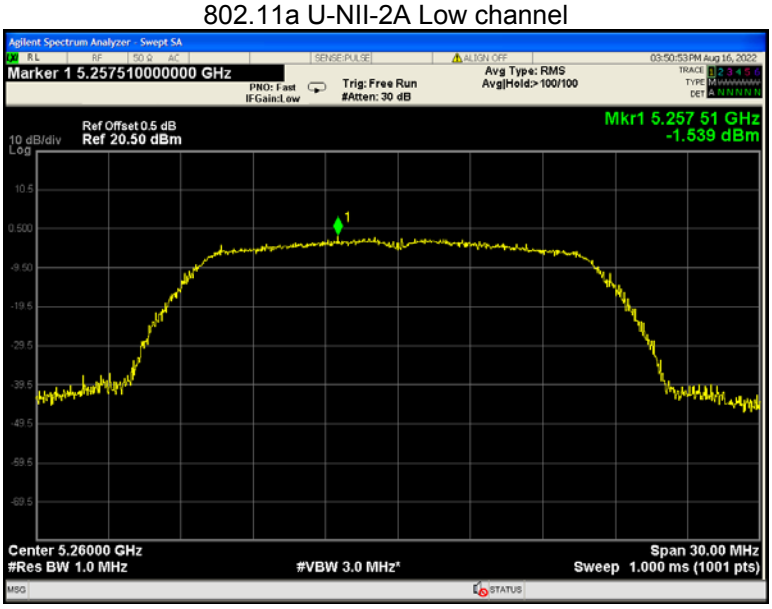
802.11ac(HT40) U-NII-1 High channel



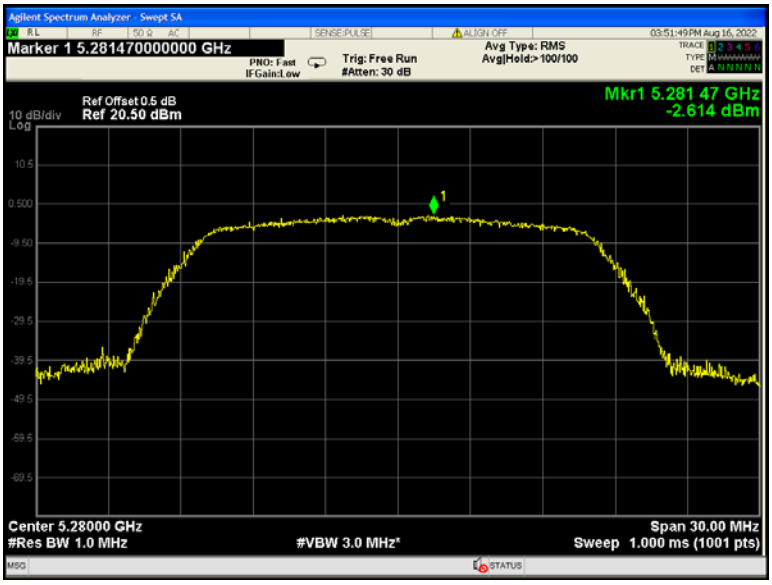
802.11ac(HT80) U-NII-1 Low channel



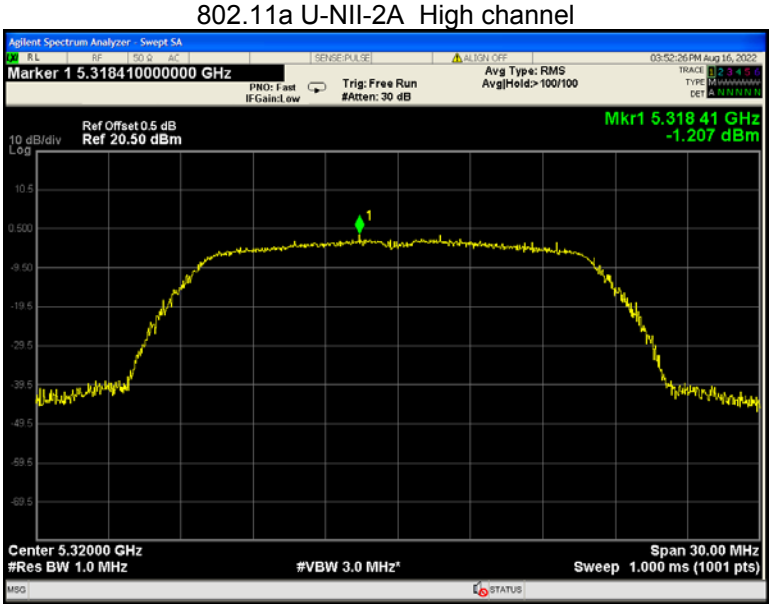
802.11a U-NII-2A Low channel



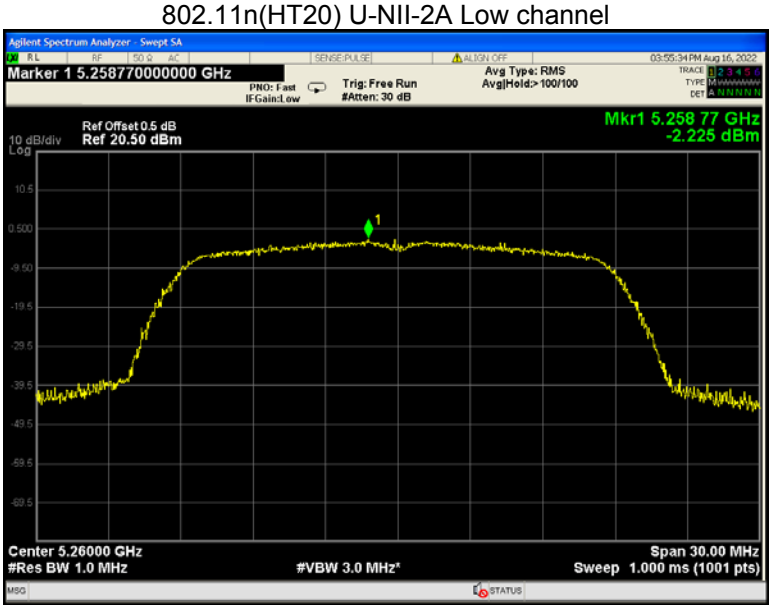
802.11a U-NII-2A Middle channel



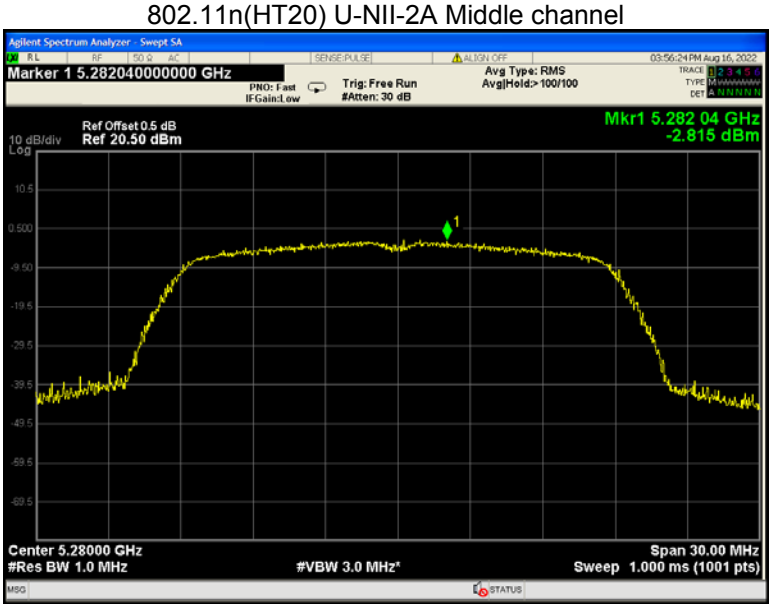
802.11a U-NII-2A High channel



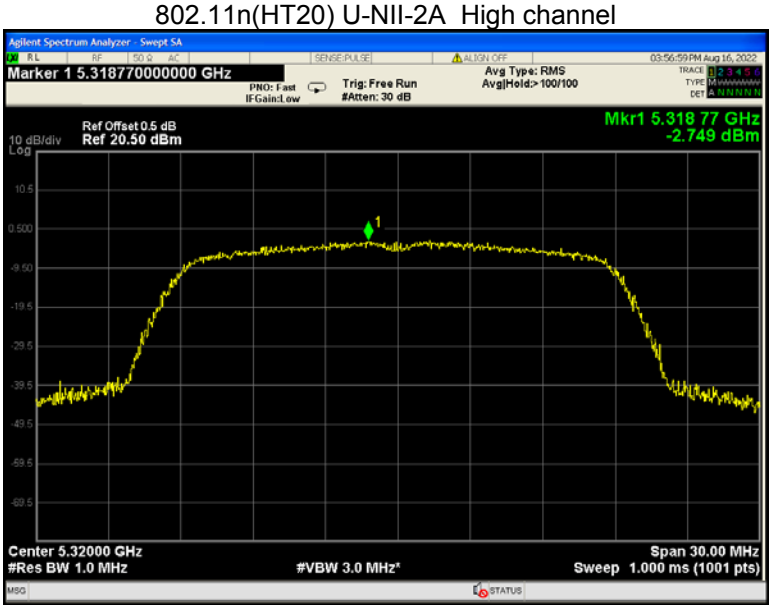
802.11n(HT20) U-NII-2A Low channel



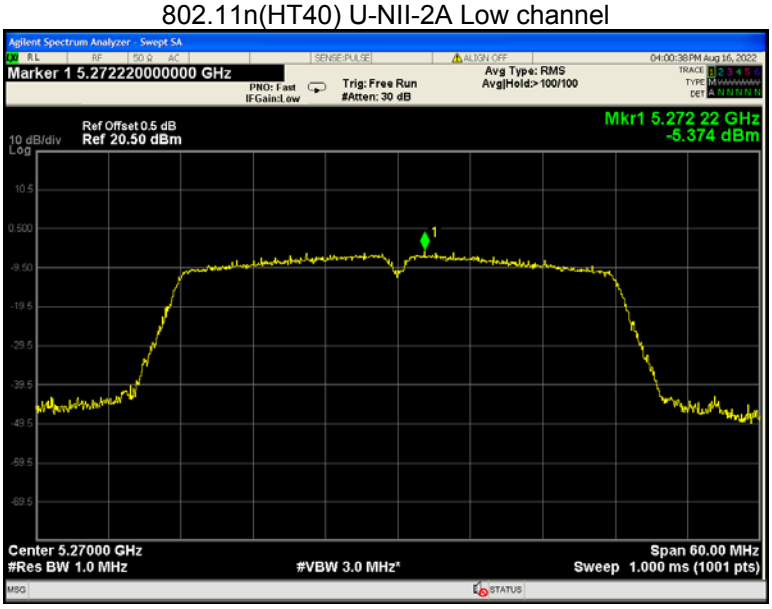
802.11n(HT20) U-NII-2A Middle channel



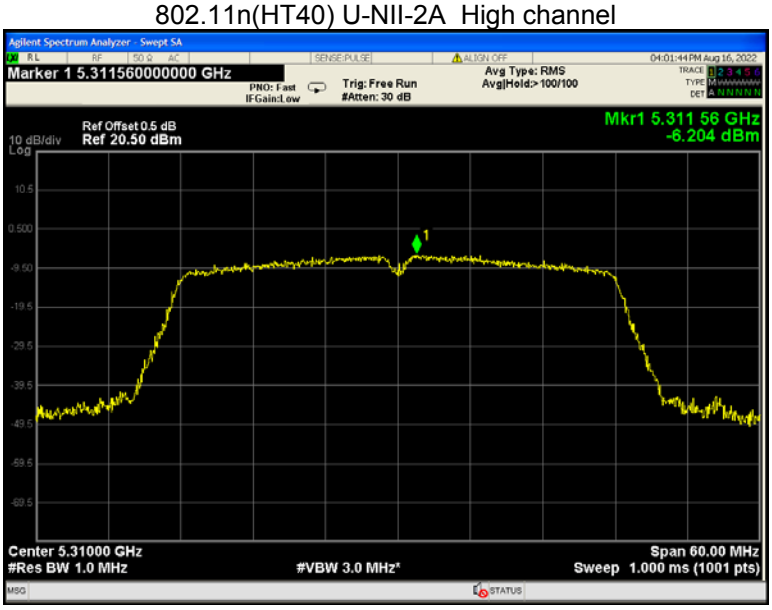
802.11n(HT20) U-NII-2A High channel



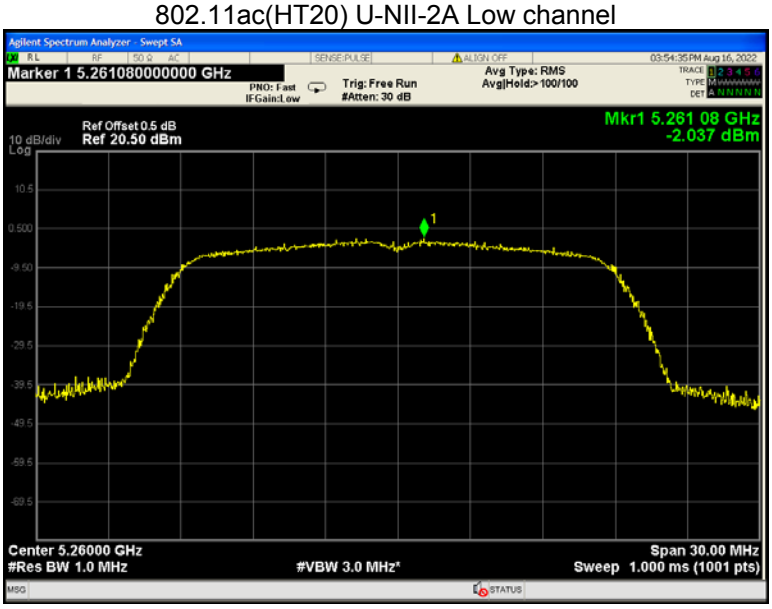
802.11n(HT40) U-NII-2A Low channel



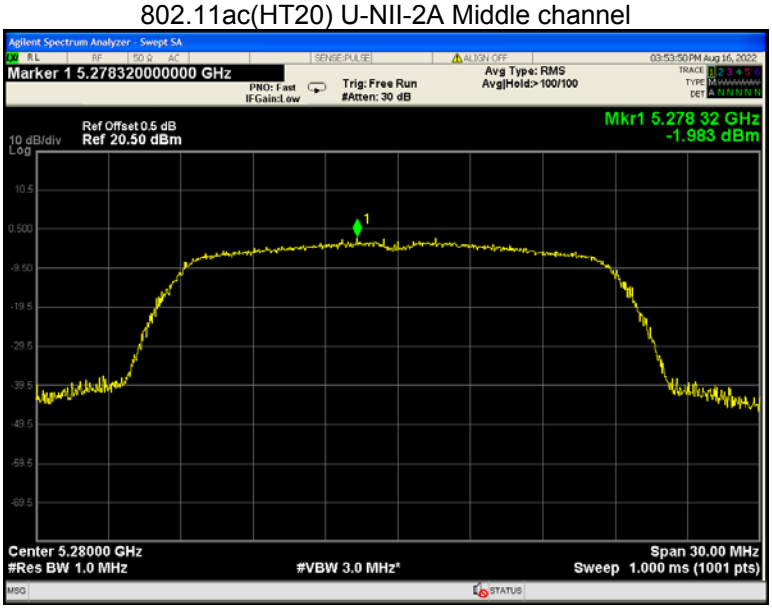
802.11n(HT40) U-NII-2A High channel



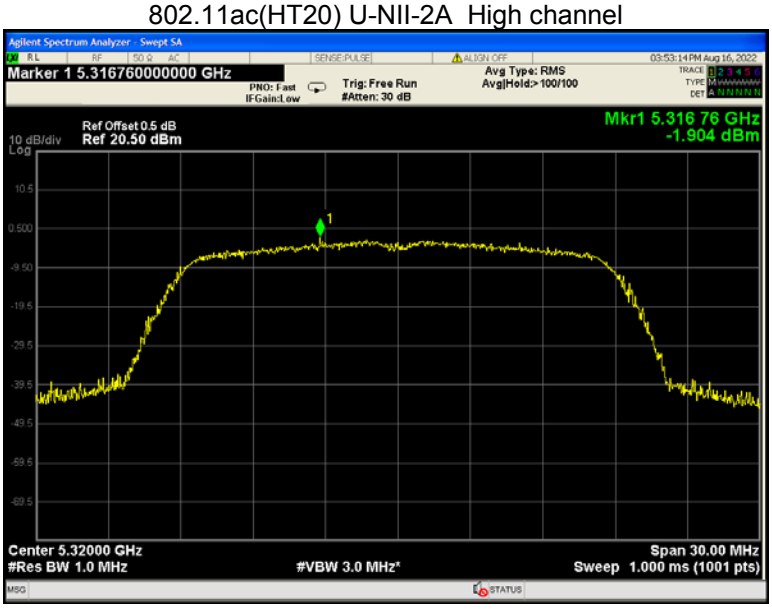
802.11ac(HT20) U-NII-2A Low channel



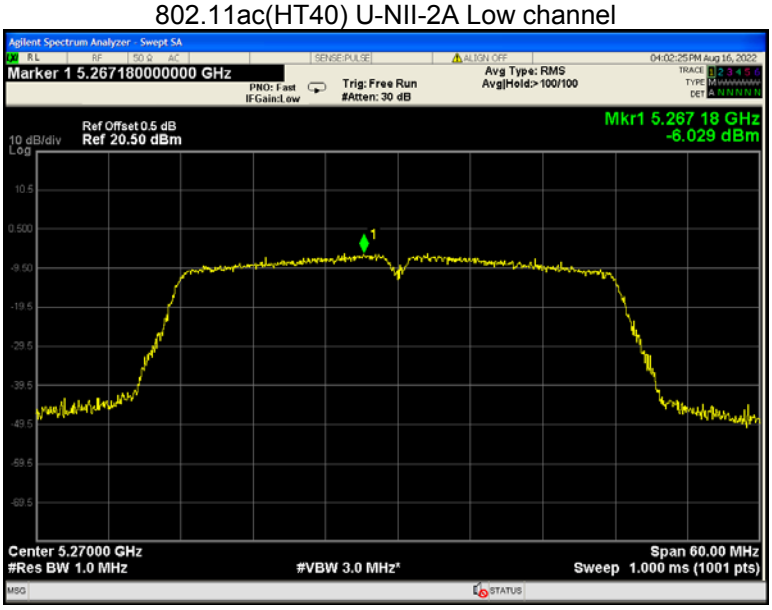
802.11ac(HT20) U-NII-2A Middle channel



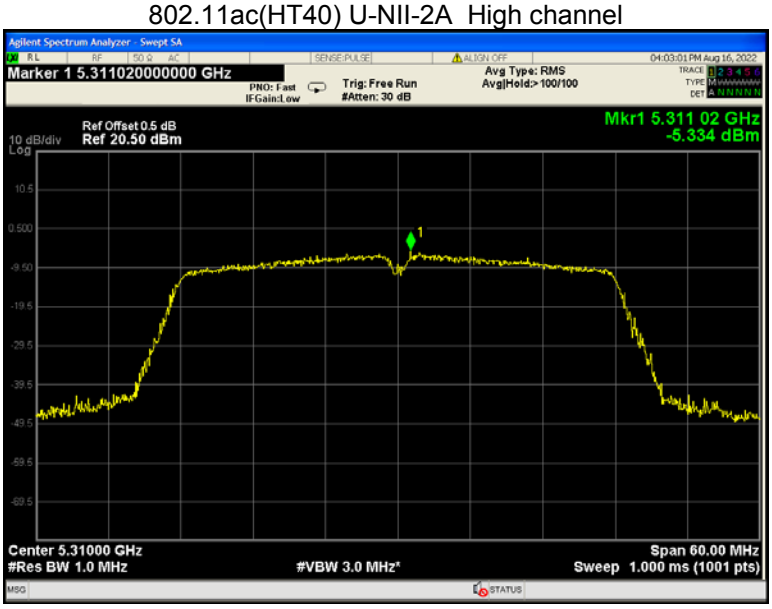
802.11ac(HT20) U-NII-2A High channel



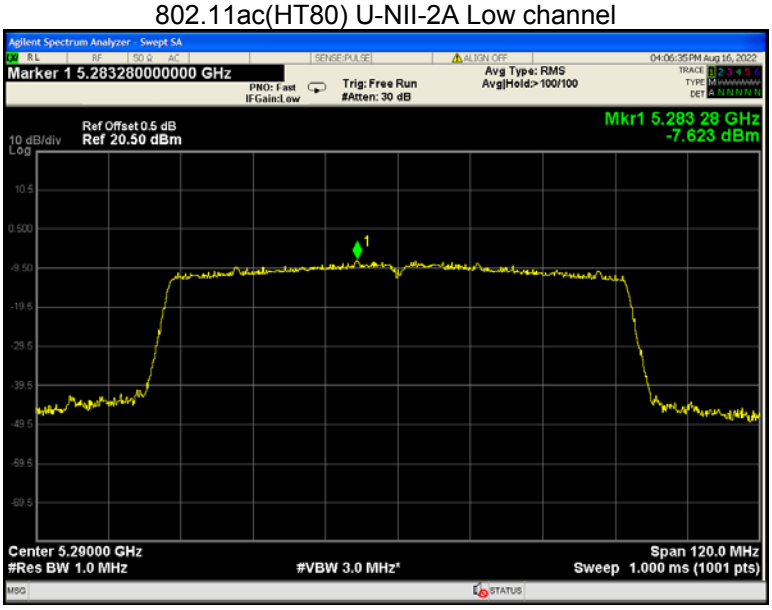
802.11ac(HT40) U-NII-2A Low channel



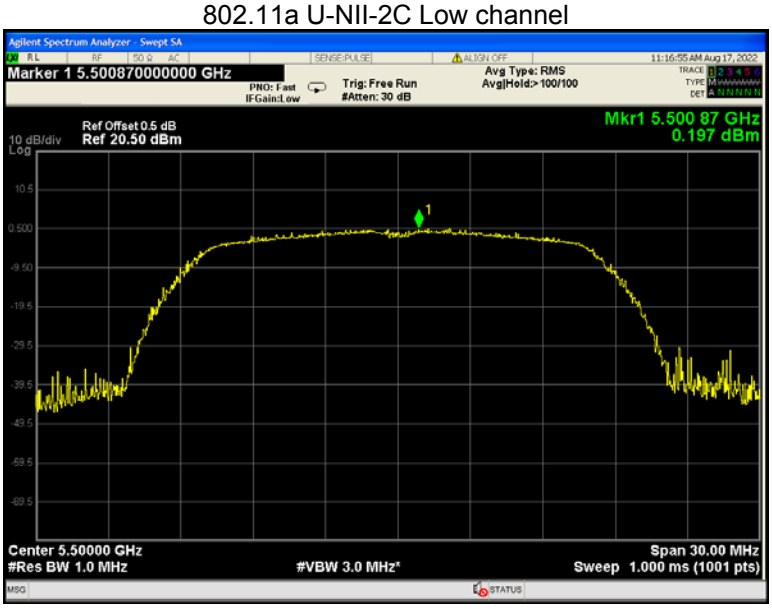
802.11ac(HT40) U-NII-2A High channel



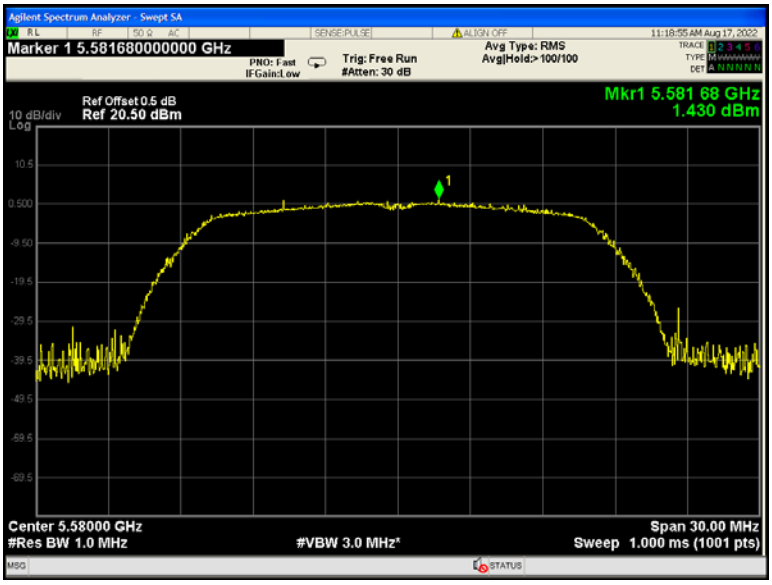
802.11ac(HT80) U-NII-2A Low channel



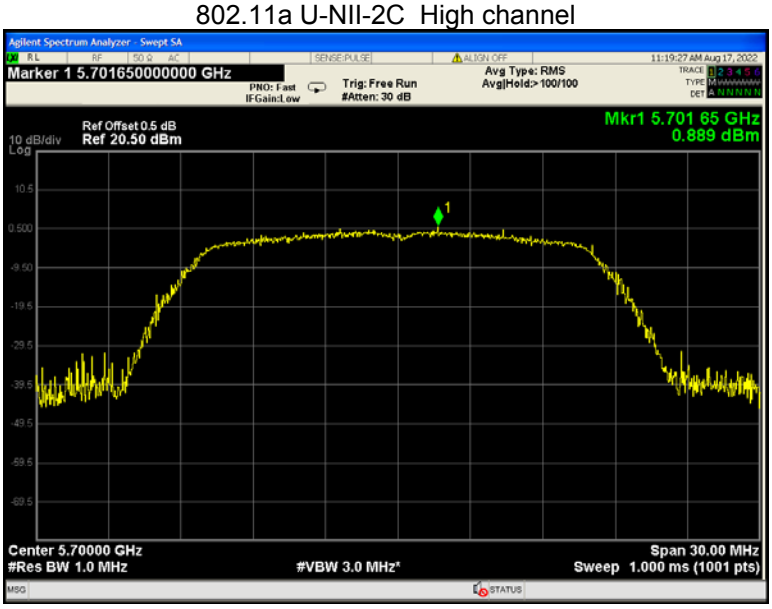
802.11a U-NII-2C Low channel



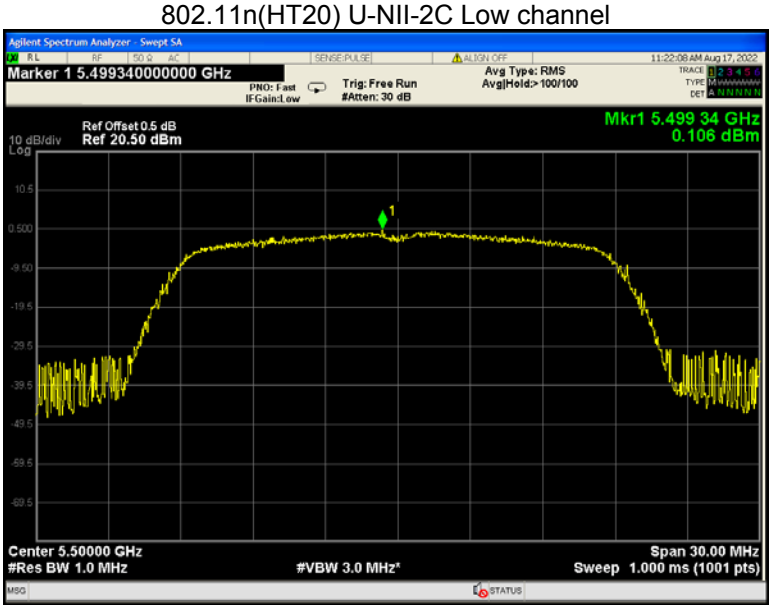
802.11a U-NII-2C Middle channel



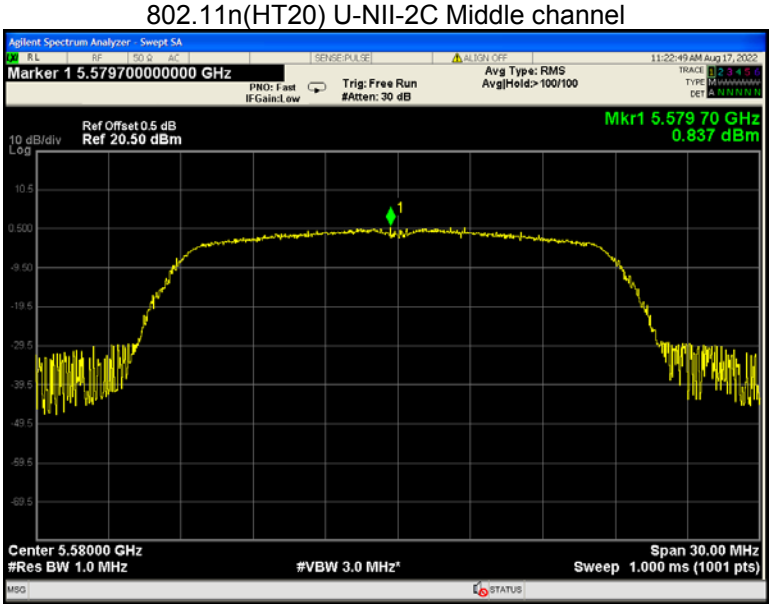
802.11a U-NII-2C High channel



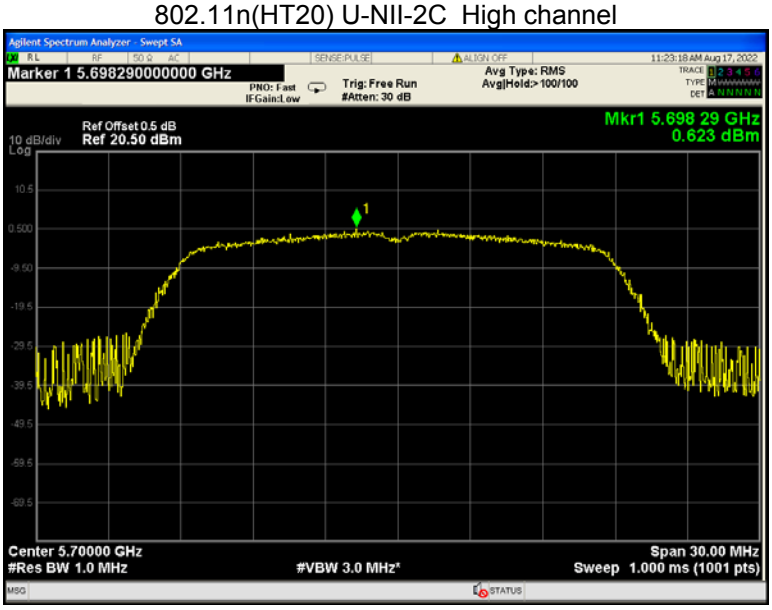
802.11n(HT20) U-NII-2C Low channel



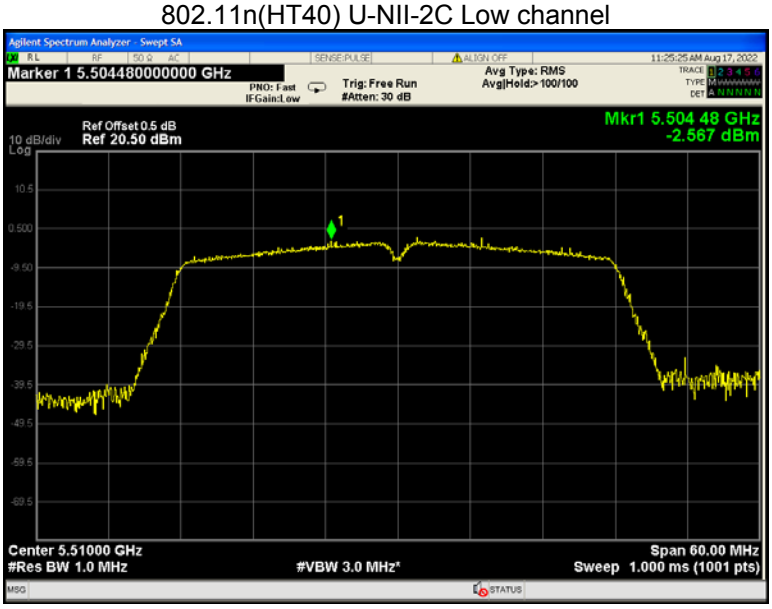
802.11n(HT20) U-NII-2C Middle channel



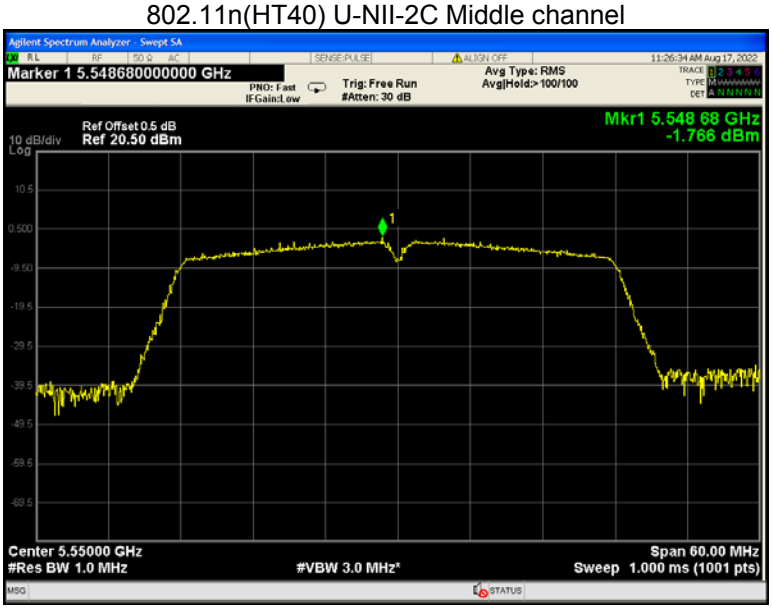
802.11n(HT20) U-NII-2C High channel



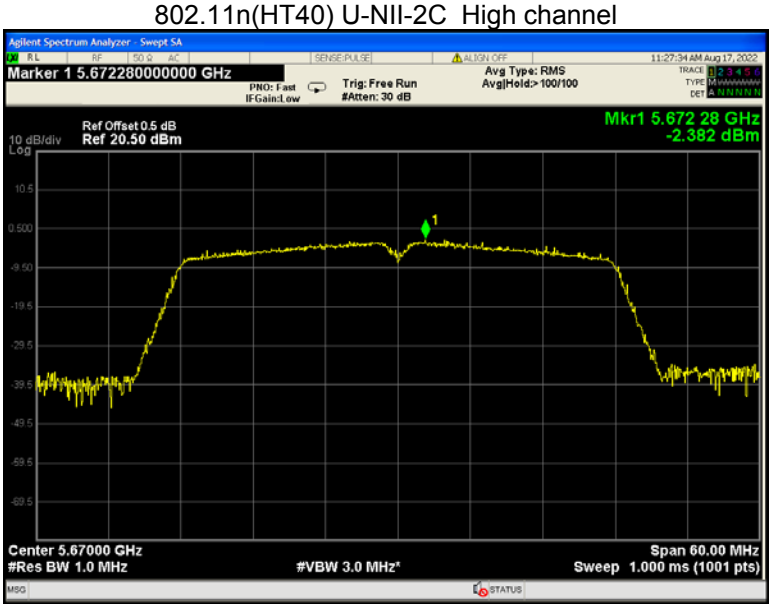
802.11n(HT40) U-NII-2C Low channel



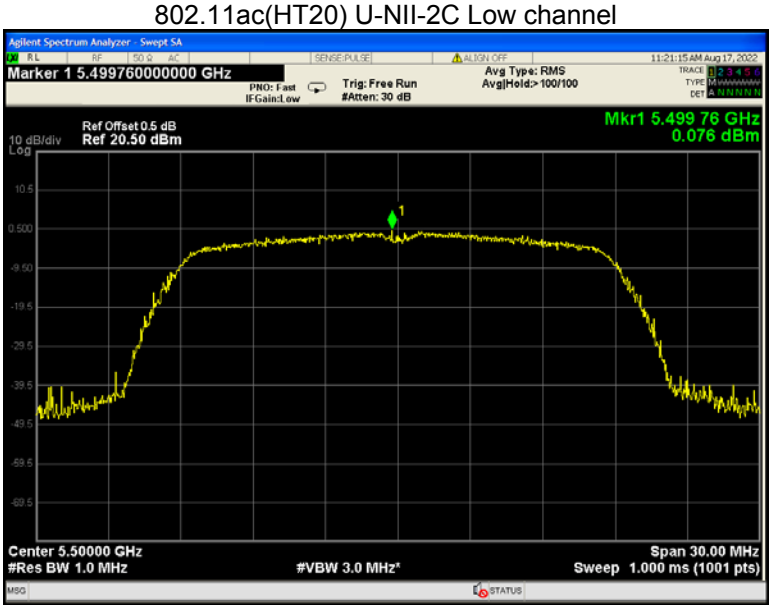
802.11n(HT40) U-NII-2C Middle channel



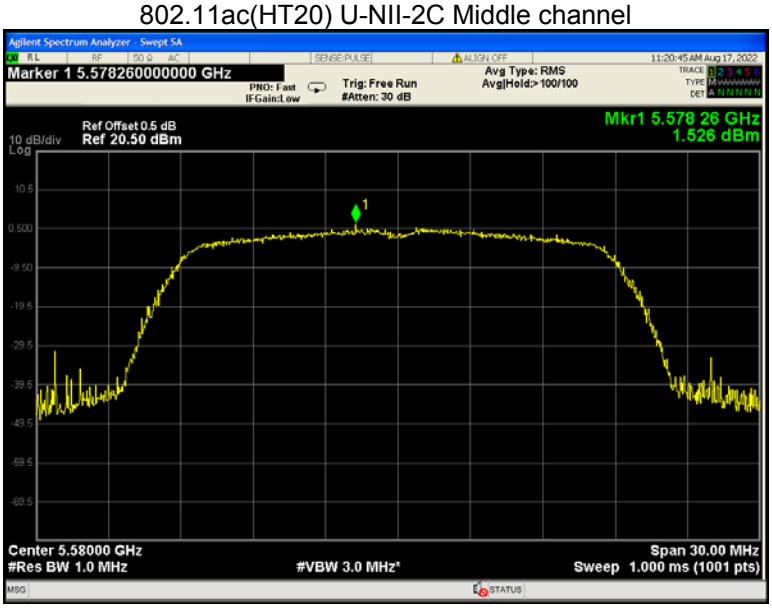
802.11n(HT40) U-NII-2C High channel



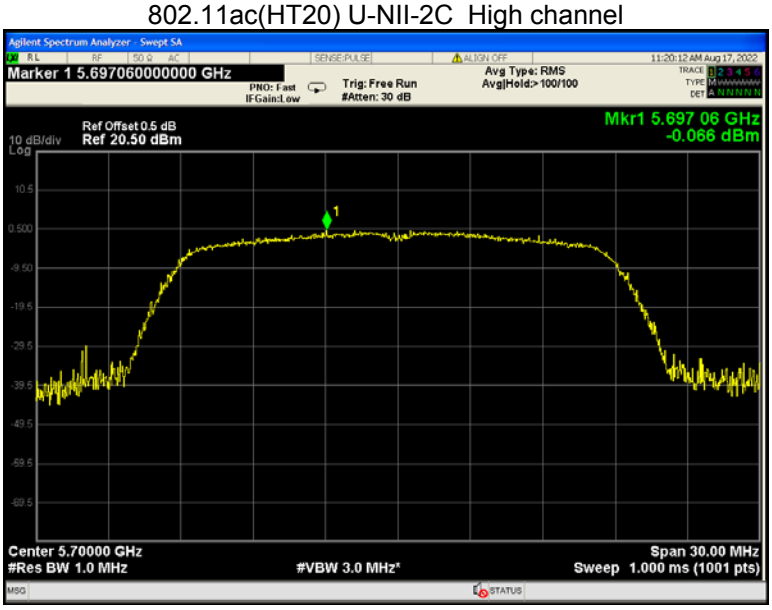
802.11ac(HT20) U-NII-2C Low channel



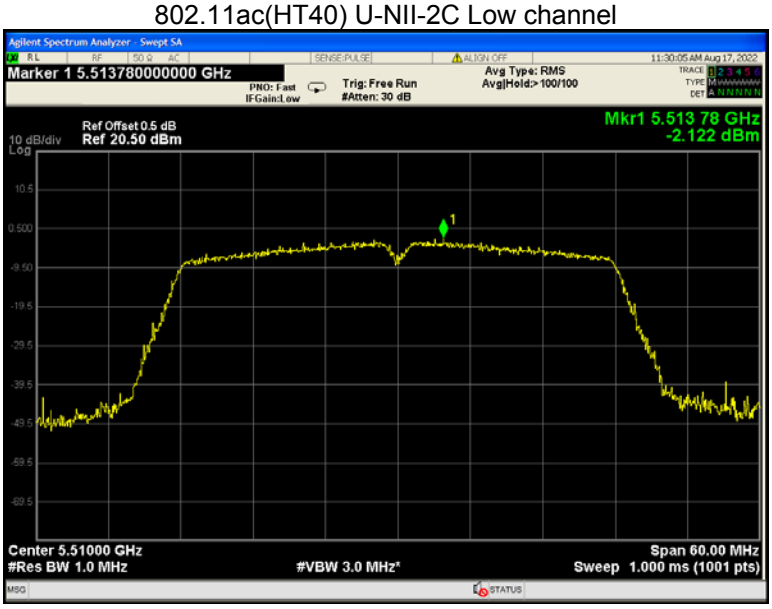
802.11ac(HT20) U-NII-2C Middle channel



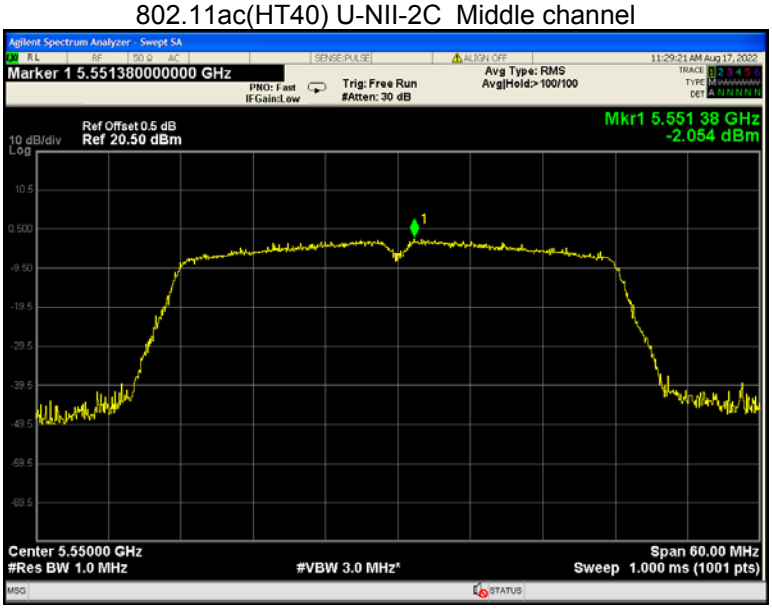
802.11ac(HT20) U-NII-2C High channel



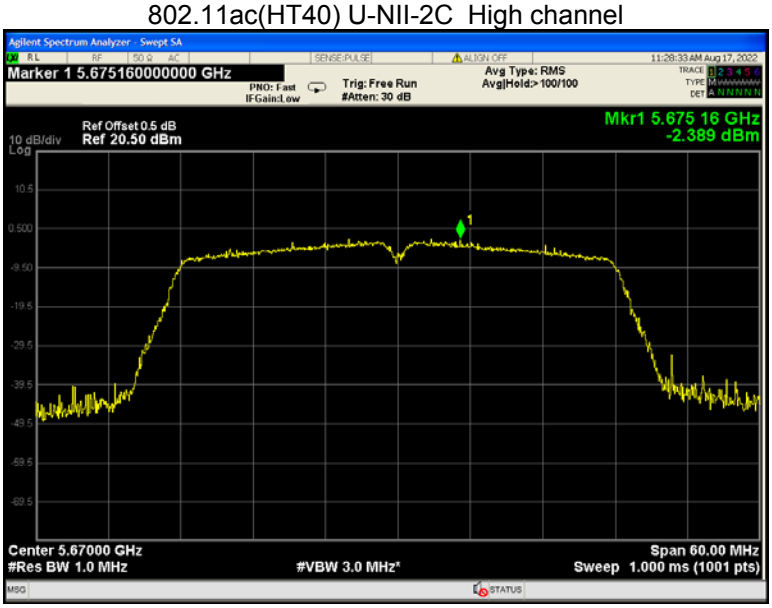
802.11ac(HT40) U-NII-2C Low channel



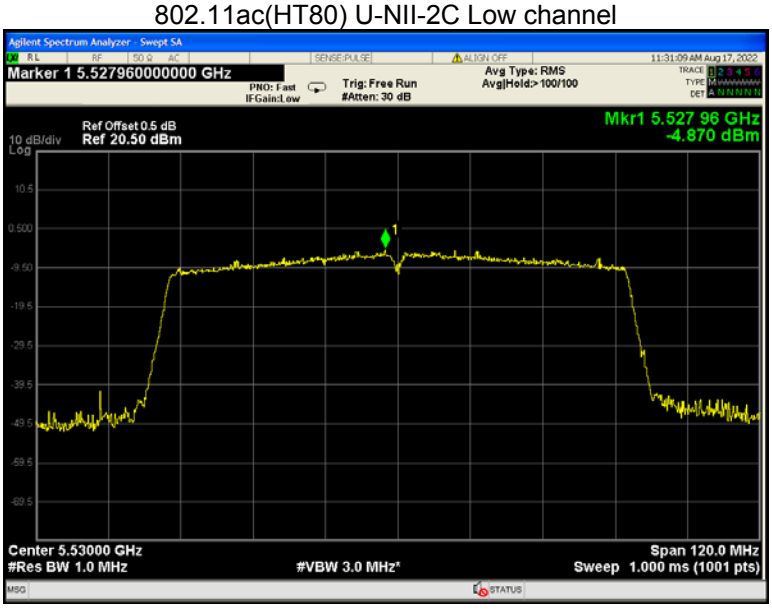
802.11ac(HT40) U-NII-2C Middle channel



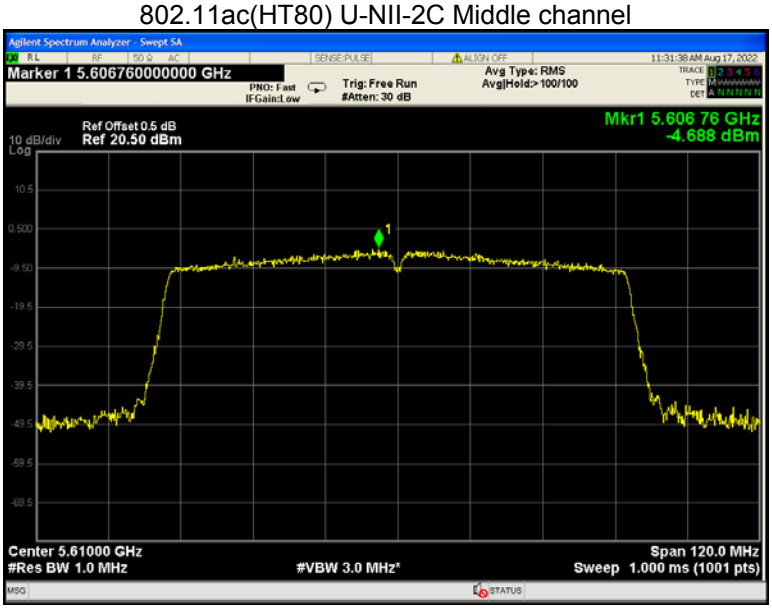
802.11ac(HT40) U-NII-2C High channel



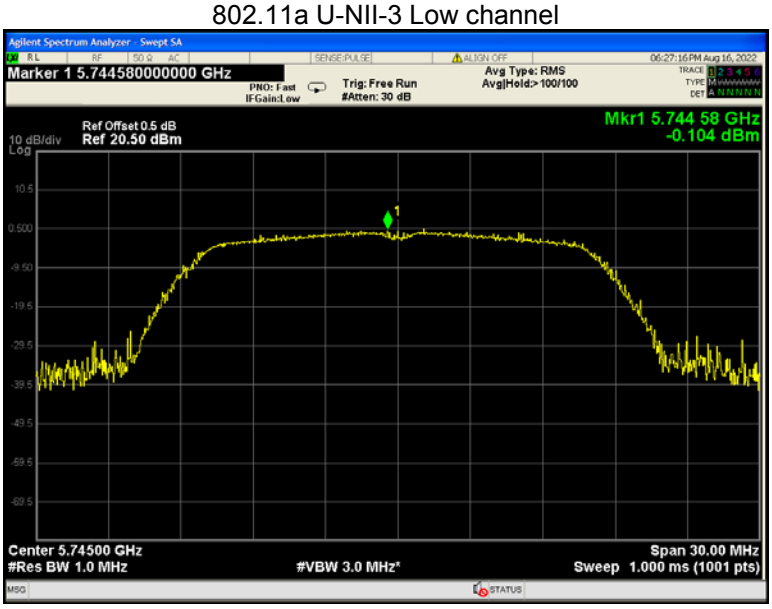
802.11ac(HT80) U-NII-2C Low channel



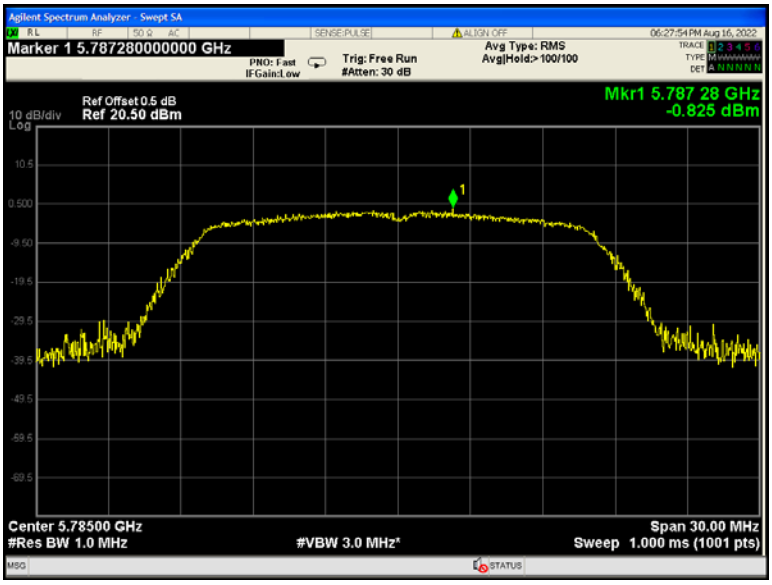
802.11ac(HT80) U-NII-2C Middle channel



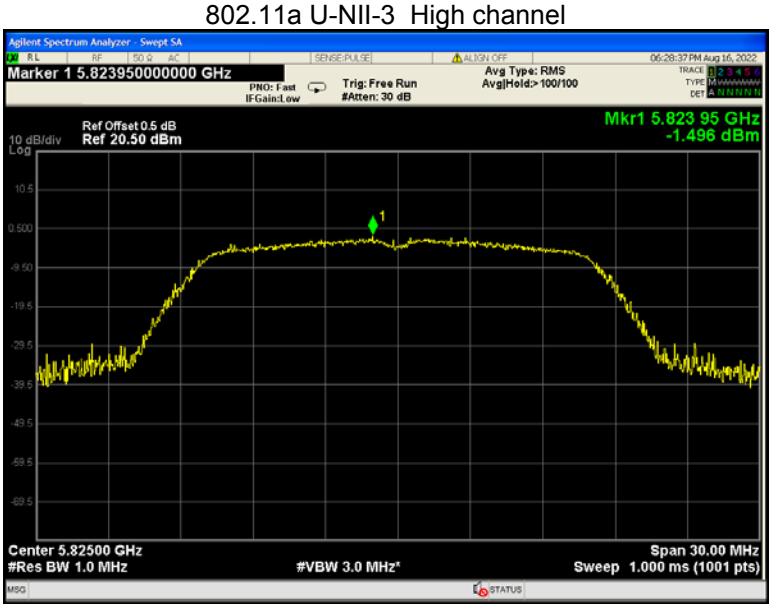
802.11a U-NII-3 Low channel



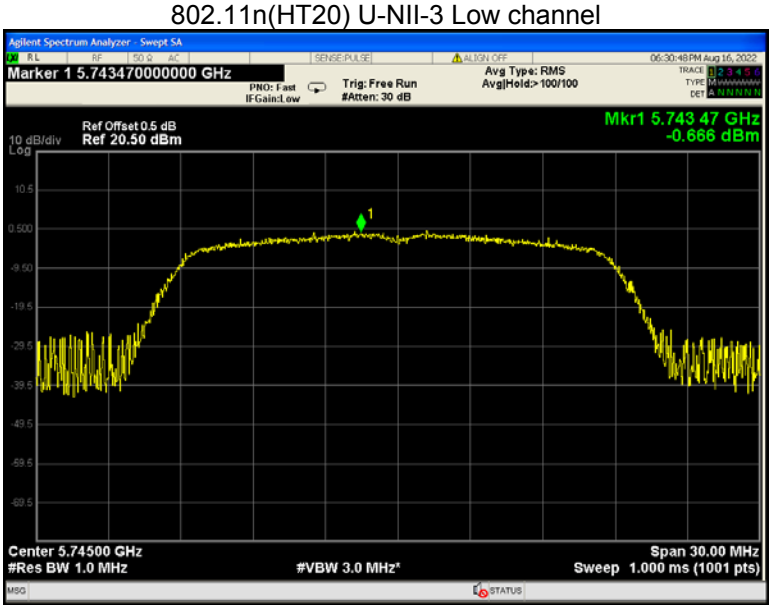
802.11a U-NII-3 Middle channel



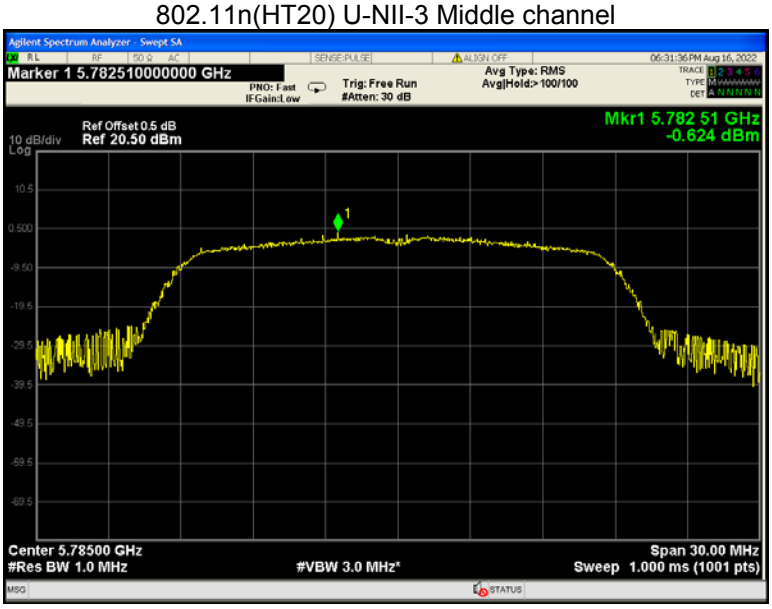
802.11a U-NII-3 High channel



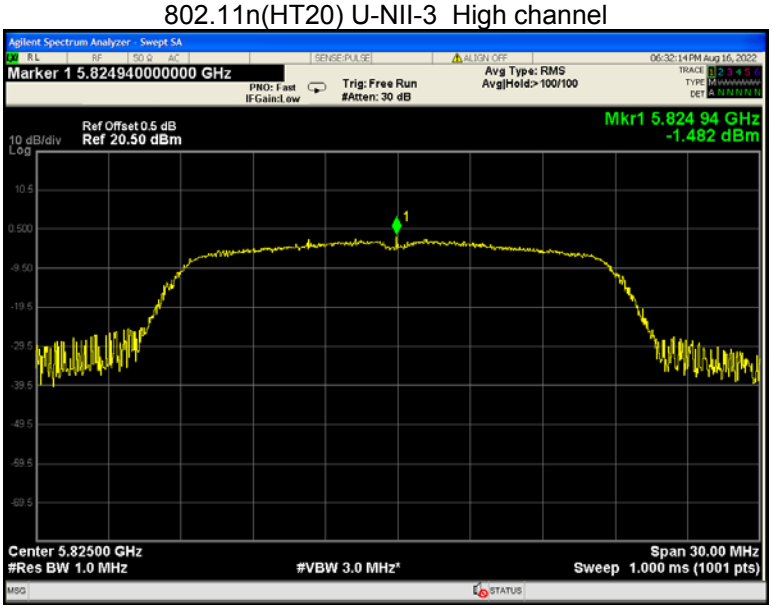
802.11n(HT20) U-NII-3 Low channel



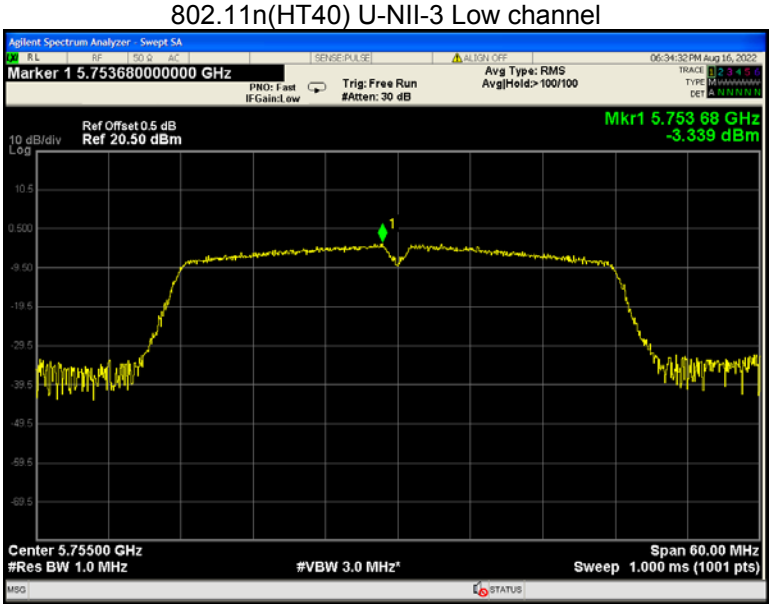
802.11n(HT20) U-NII-3 Middle channel



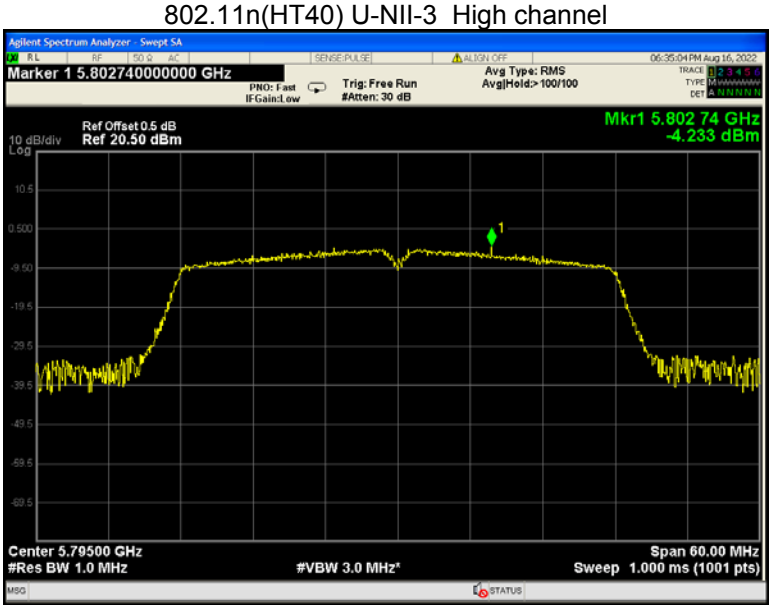
802.11n(HT20) U-NII-3 High channel



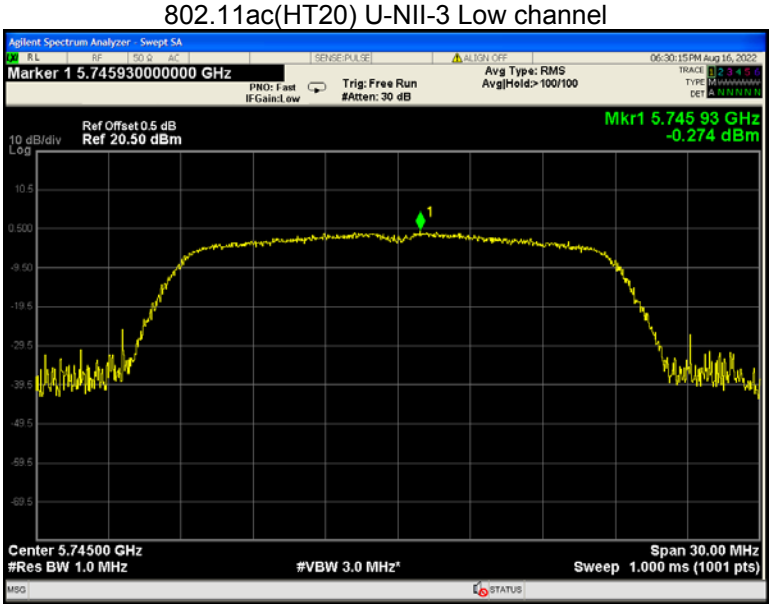
802.11n(HT40) U-NII-3 Low channel



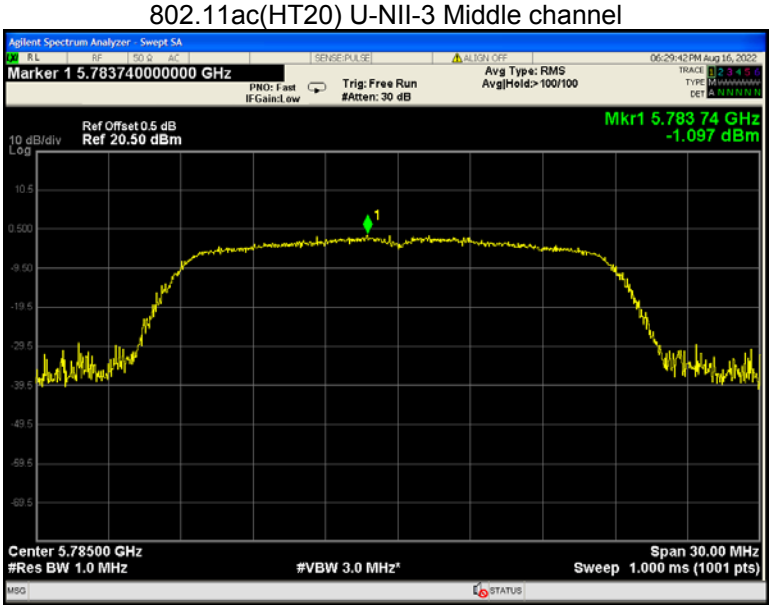
802.11n(HT40) U-NII-3 High channel



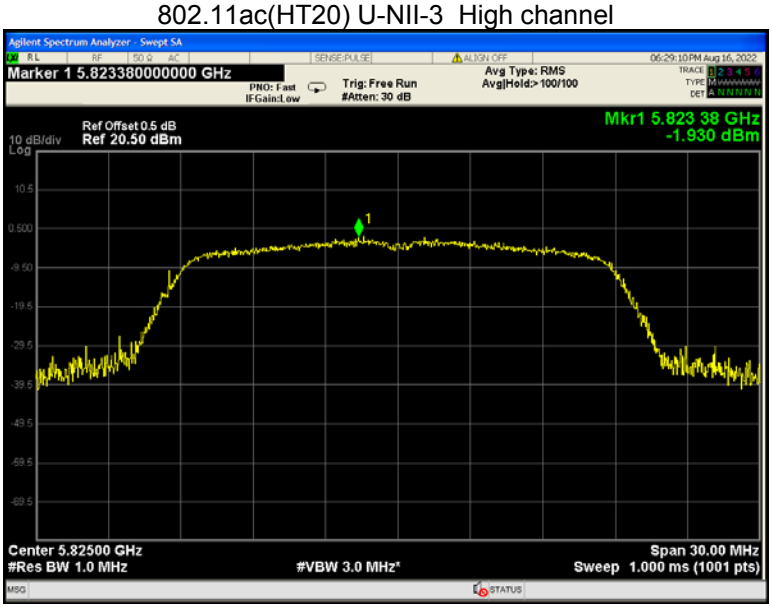
802.11ac(HT20) U-NII-3 Low channel



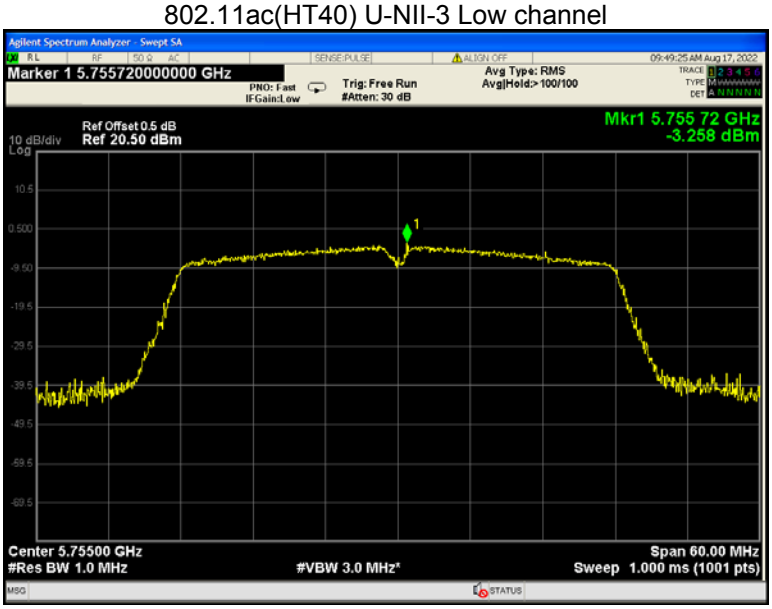
802.11ac(HT20) U-NII-3 Middle channel



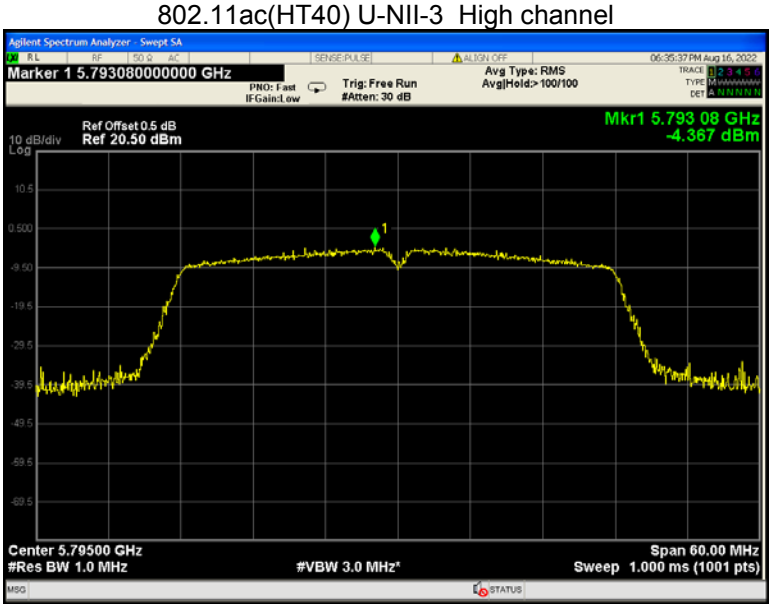
802.11ac(HT20) U-NII-3 High channel



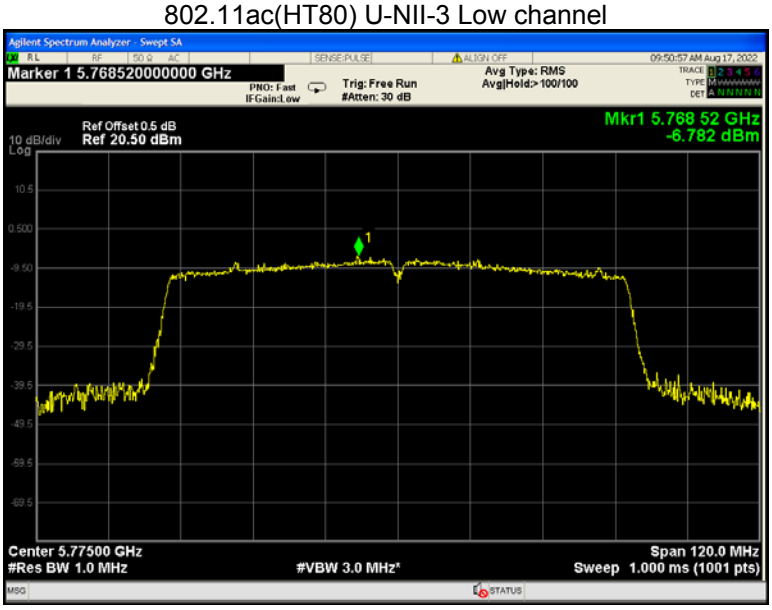
802.11ac(HT40) U-NII-3 Low channel



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



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



15 Frequency Stability

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

15.1 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 × 106 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 -15°C~ 45°C.

15.2 Test Result:

U-NII-1 Test Frequency:5180MHz				
Temperature (℃)	**Power Supply (VAC)**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
50	120	/	/	/
45		1792	0.3459	20
30		1799	0.3473	20
20		1800	0.3475	20
10		1793	0.3461	20
0		1802	0.3479	20
-10		1797	0.3469	20
-15		1796	0.3467	20
-30		/	/	/
20	108	1805	0.3485	20
20	132	1808	0.3490	20

U-NII-2A Test Frequency:5260MHz				
Temperature (℃)	**Power Supply (VAC)**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
50	120	/	/	/
45		1804	0.3430	20
30		1795	0.3413	20
20		1800	0.3422	20
10		1801	0.3424	20
0		1803	0.3428	20
-10		1807	0.3435	20
-15		1801	0.3424	20
-30		/	/	/
20	108	1808	0.3437	20
20	132	1792	0.3407	20

U-NII-2C Test Frequency:5500MHz				
Temperature (℃)	**Power Supply (VAC)**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
50	120	/	/	/
45		1800	0.3273	20
30		1796	0.3265	20
20		1800	0.3273	20
10		1807	0.3285	20
0		1806	0.3284	20
-10		1797	0.3267	20
-15		1808	0.3287	20
-30		/	/	/
20	108	1794	0.3262	20
20	132	1797	0.3267	20

U-NII-3 Test Frequency:5785MHz				
Temperature (℃)	**Power Supply (VAC)**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
50	120	/	/	/
45		1794	0.3101	20
30		1793	0.3099	20
20		1800	0.3111	20
10		1797	0.3106	20
0		1803	0.3117	20
-10		1802	0.3115	20
-15		1792	0.3098	20
-30		/	/	/
20	108	1804	0.3118	20
20	132	1806	0.3122	20

16 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 attached 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 manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack 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 accordance 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.

17 RF Exposure

Remark: refer to SAR test report: WTD22X07139033W.

18 Photographs of test setup and EUT.

Note: Please refer to appendix: Appendix- Black Z-Photos.

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