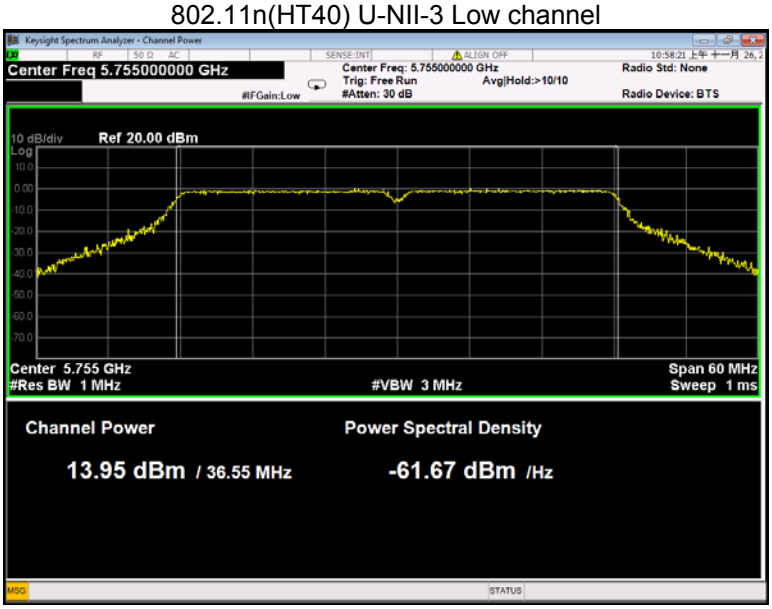
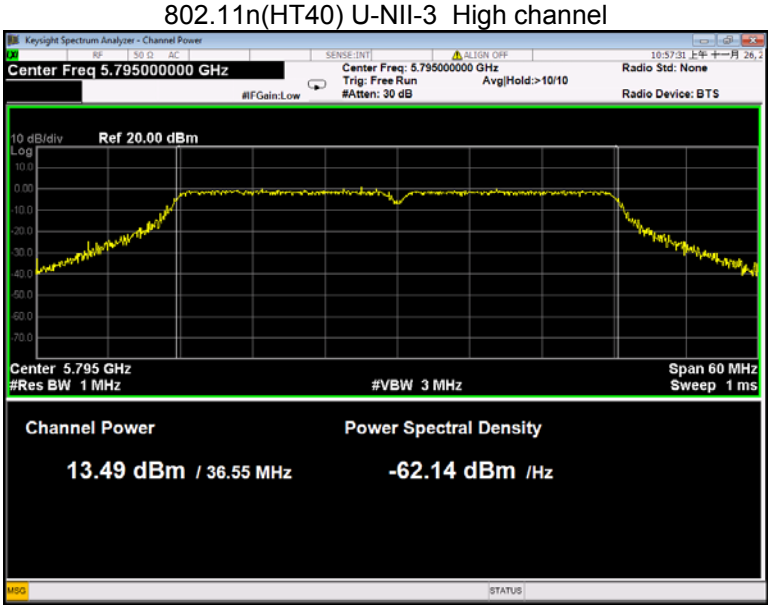
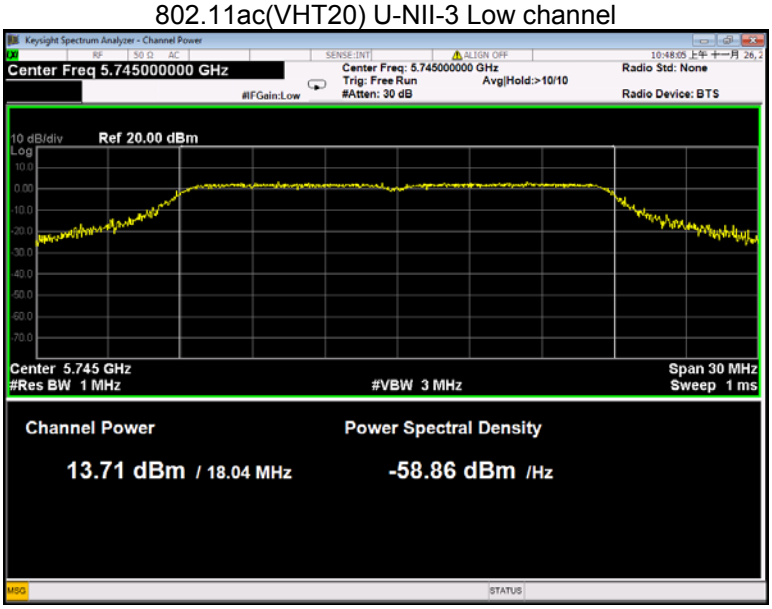
802.11n(HT40) U-NII-3 Low channel



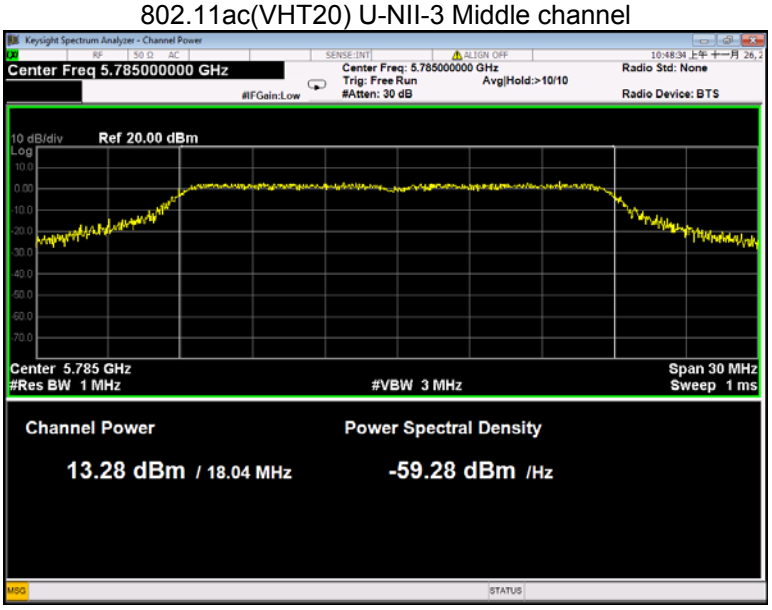
802.11n(HT40) U-NII-3 High channel



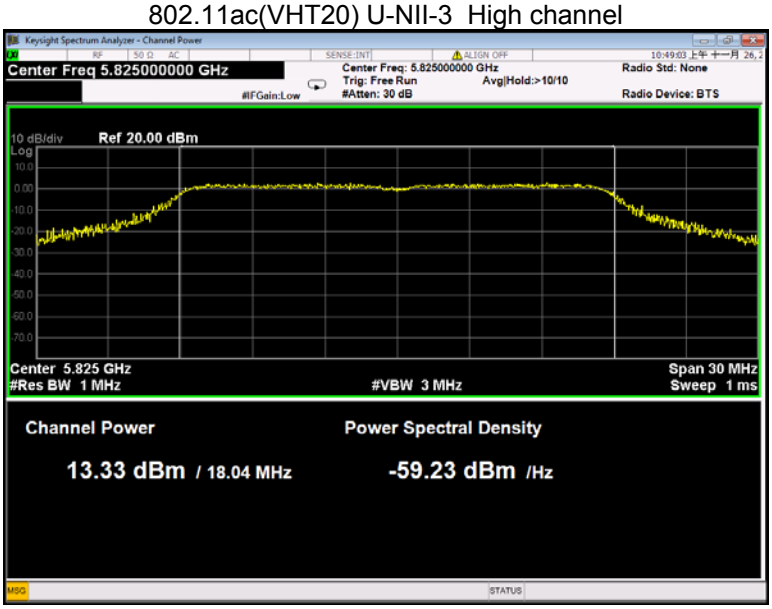
802.11ac(VHT20) U-NII-3 Low channel



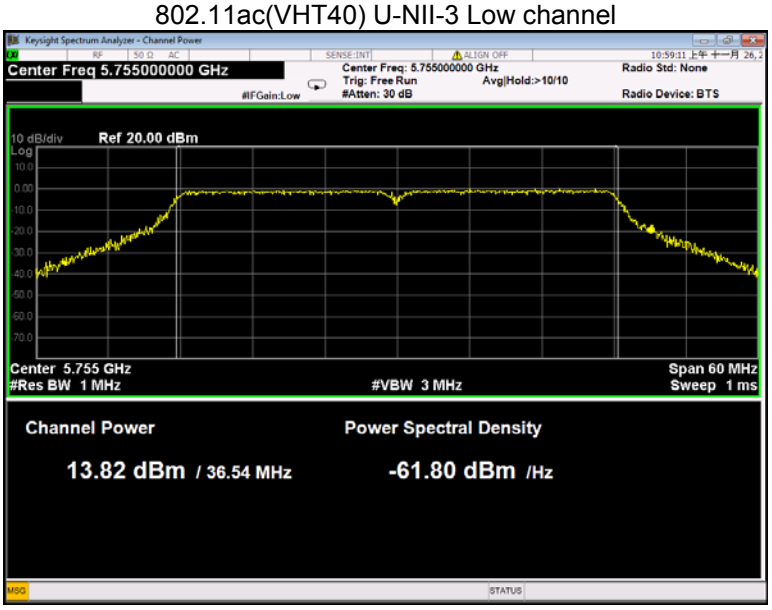
802.11ac(VHT20) U-NII-3 Middle channel



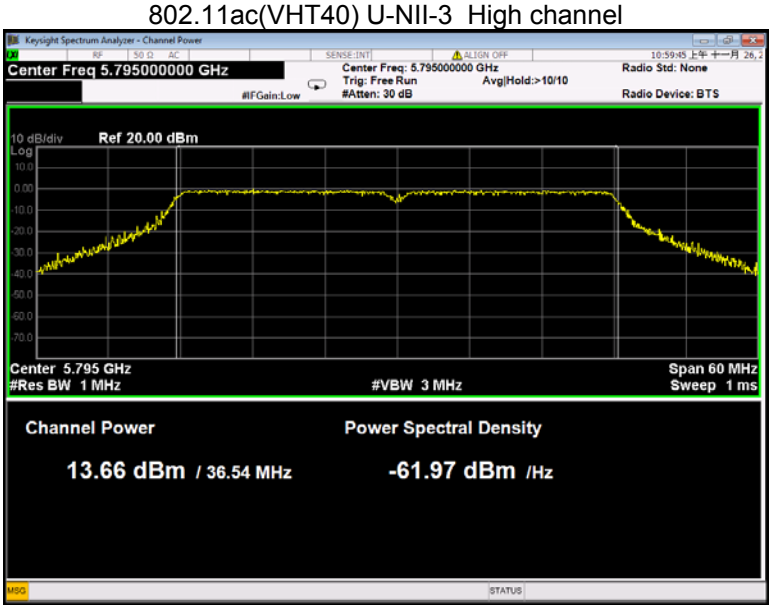
802.11ac(VHT20) U-NII-3 High channel



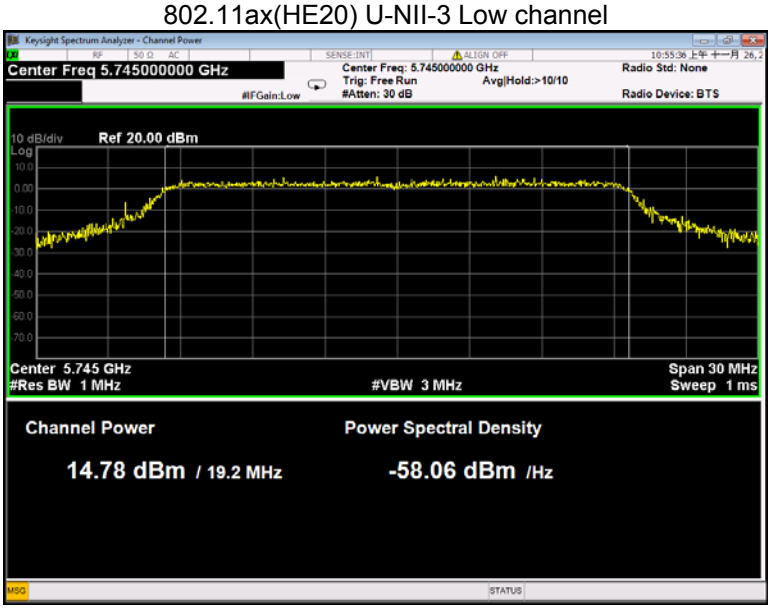
802.11ac(VHT40) U-NII-3 Low channel



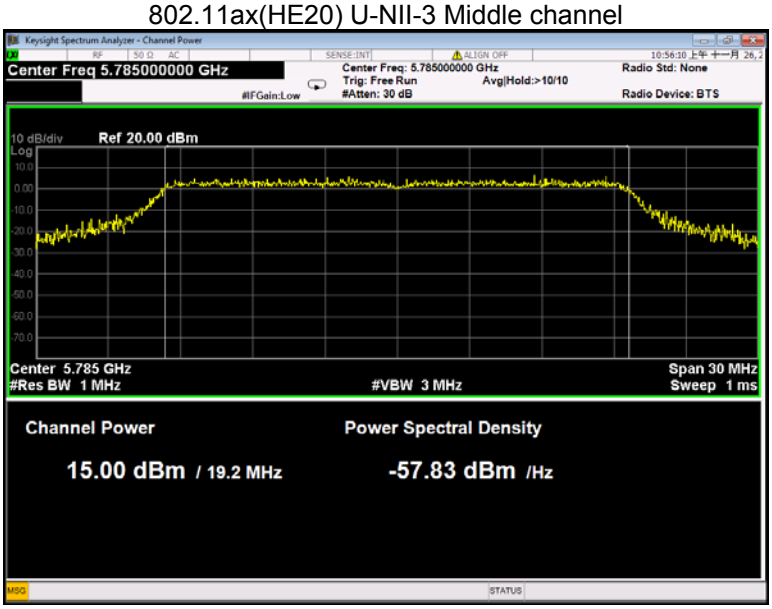
802.11ac(VHT40) U-NII-3 High channel



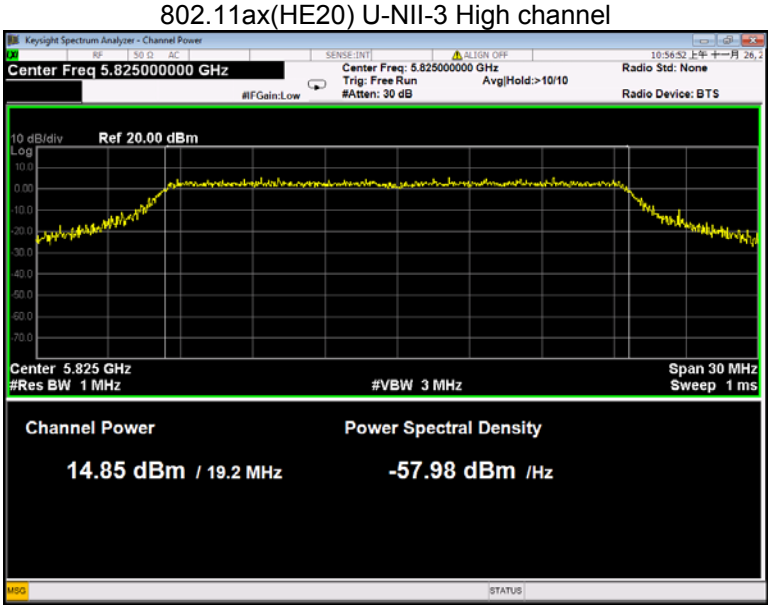
802.11ax(HE20) U-NII-3 Low channel



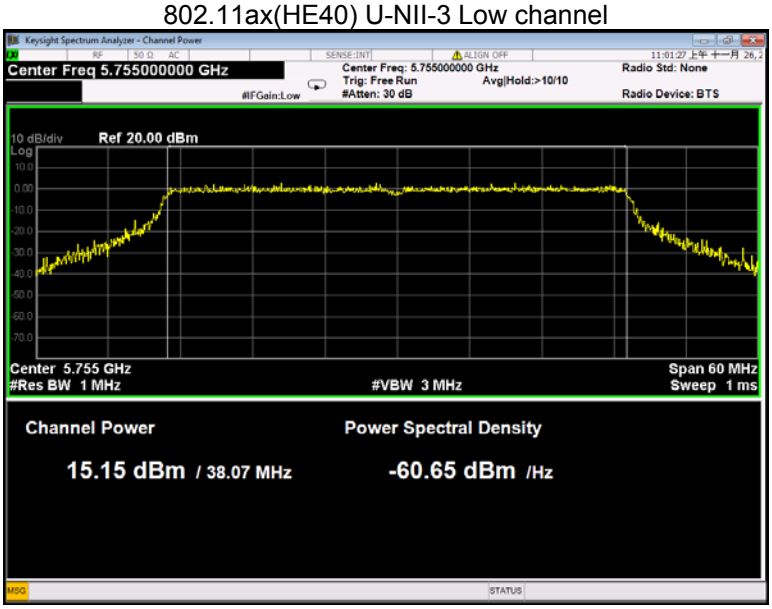
802.11ax(HE20) U-NII-3 Middle channel



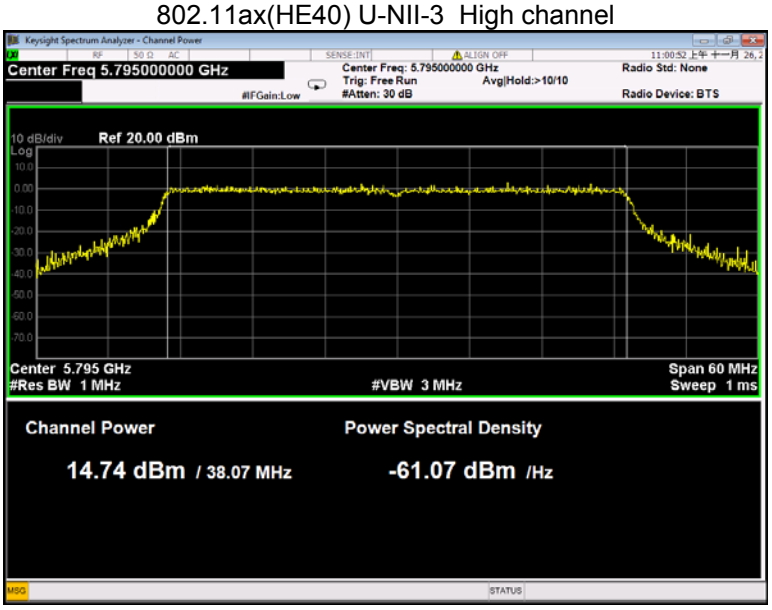
802.11ax(HE20) U-NII-3 High channel



802.11ax(HE40) U-NII-3 Low channel



802.11ax(HE40) U-NII-3 High channel



14 Power Spectral density

Test Requirement:	FCC 47CFR Part 15 Section 15.407(a)
Test Method:	KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Test Limit:	**For the band 5.15-5.25 GHz** For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. For client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. **For the 5.25-5.35 GHz and 5.47-5.725 GHz bands** The maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. **For the band 5.725-5.850 GHz** The maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.
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	Channel	Measurements (dBm/MHz)	Duty Cycle Factor (dB)	Power Spectral Density (dBm/MHz)
U-NII-1	802.11a	Low	1.822	2.42	4.242
		Middle	2.740		5.160
		High	2.516		4.936
	802.11n(HT20)	Low	4.999	0.82	5.819
		Middle	4.900		5.720
		High	6.144		6.964
	802.11n(HT40)	Low	1.971	1.50	3.471
		Middle	/		/
		High	1.850		3.350
	802.11ac(VHT20)	Low	4.489	0.82	5.309
		Middle	5.336		6.156
		High	5.639		6.459
	802.11ac(VHT40)	Low	2.245	1.87	4.115
		Middle	/		/
		High	2.517		4.387
	802.11ax(HE20)	Low	6.051	1.02	7.071
		Middle	6.028		7.048
		High	6.115		7.135
	802.11ax(HE40)	Low	4.245	1.50	5.745
		Middle	/		/
		High	5.230		6.730

Band	Operation mode	Channel	Measurements (dBm/MHz)	Duty Cycle Factor (dB)	Power Spectral Density (dBm/MHz)
U-NII-2A	802.11a	Low	4.763	2.38	7.143
		Middle	4.333		6.713
		High	4.575		6.955
	802.11n(HT20)	Low	4.083	0.79	4.873
		Middle	4.458		5.248
		High	5.471		6.261
	802.11n(HT40)	Low	1.368	0.82	2.188
		Middle	/		/
		High	1.464		2.284
	802.11ac(VHT20)	Low	4.589	0.79	5.379
		Middle	4.729		5.519
		High	4.561		5.351
	802.11ac(VHT40)	Low	1.666	0.82	2.486
		Middle	/		/
		High	2.528		3.348
	802.11ax(HE20)	Low	4.313	1.02	5.333
		Middle	4.292		5.312
		High	5.4		6.42
	802.11ax(HE40)	Low	0.596	1.02	1.616
		Middle	/		/
		High	1.931		2.951

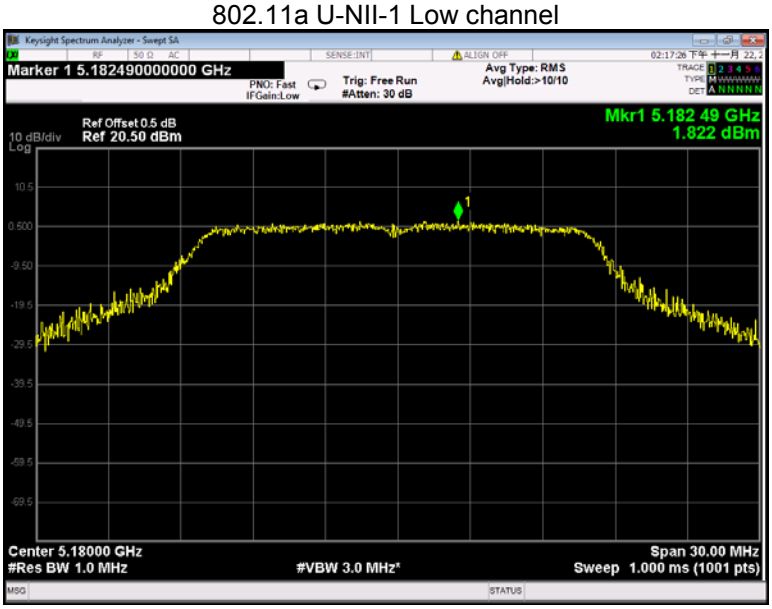
Band	Operation mode	Channel	Measurements (dBm/MHz)	Duty Cycle Factor (dB)	Power Spectral Density (dBm/MHz)
U-NII-2C	802.11a	Low	4.896	2.38	7.276
		Middle	1.731		4.111
		High	1.699		4.079
	802.11n(HT20)	Low	4.159	0.79	4.949
		Middle	1.833		2.623
		High	1.4		2.19
	802.11n(HT40)	Low	1.418	0.82	2.238
		Middle	1.546		2.366
		High	-1.804		-0.984
	802.11ac(VHT20)	Low	4.07	0.79	4.86
		Middle	1.359		2.149
		High	2.28		3.07
	802.11ac(VHT40)	Low	1.79	0.82	2.61
		Middle	2.152		2.972
		High	-2.187		-1.367
	802.11ax(HE20)	Low	6.234	1.01	7.244
		Middle	3.446		4.456
		High	4.446		5.456
	802.11ax(HE40)	Low	3.737	1.02	4.757
		Middle	4.718		5.738
		High	0.959		1.979

Band	Operation mode	Channel	Measurements (dBm/MHz)	Duty Cycle Factor (dB)	Power Spectral Density (dBm/MHz)
U-NII-3	802.11a	Low	3.038	2.38	5.418
		Middle	2.962		5.342
		High	2.08		4.46
	802.11n(HT20)	Low	2.539	0.79	3.329
		Middle	2.345		3.135
		High	2.481		3.271
	802.11n(HT40)	Low	-0.352	0.82	0.468
		Middle	/		/
		High	-0.466		0.354
	802.11ac(VHT20)	Low	2.833	0.80	3.633
		Middle	2.848		3.648
		High	2.066		2.866
	802.11ac(VHT40)	Low	-0.697	0.82	0.123
		Middle	/		/
		High	-0.868		-0.048
	802.11ax(HE20)	Low	5.068	1.02	6.088
		Middle	4.432		5.452
		High	3.837		4.857
	802.11ax(HE40)	Low	1.422	1.01	2.432
		Middle	/		/
		High	1.667		2.677

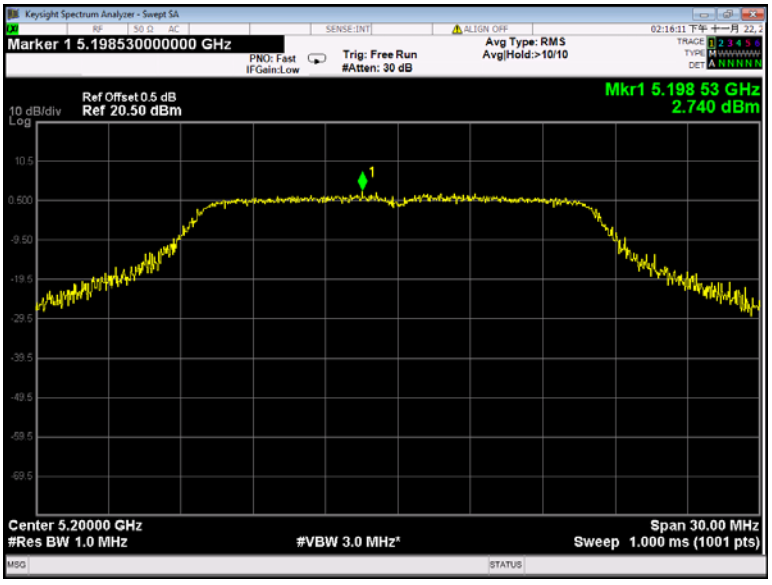
* All transmit signals are completely uncorrelated with each other, Directional gain = G_{ANT} which is less than 6dBi. So the limit does not be reduced.

Test result plots shown as follows:

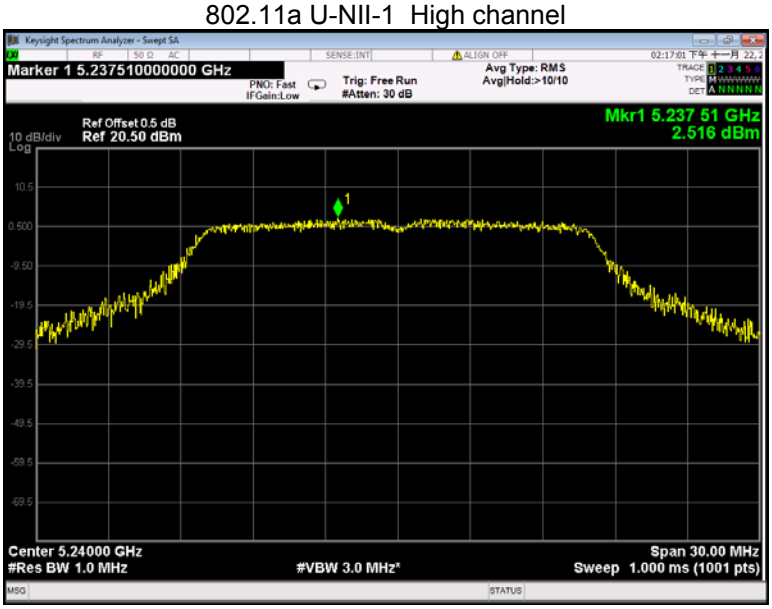
802.11a U-NII-1 Low channel



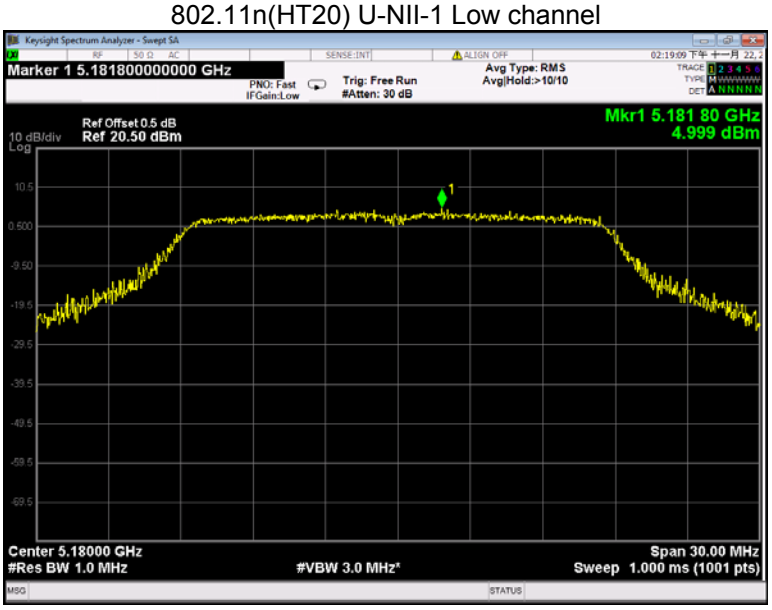
802.11a U-NII-1 Middle channel



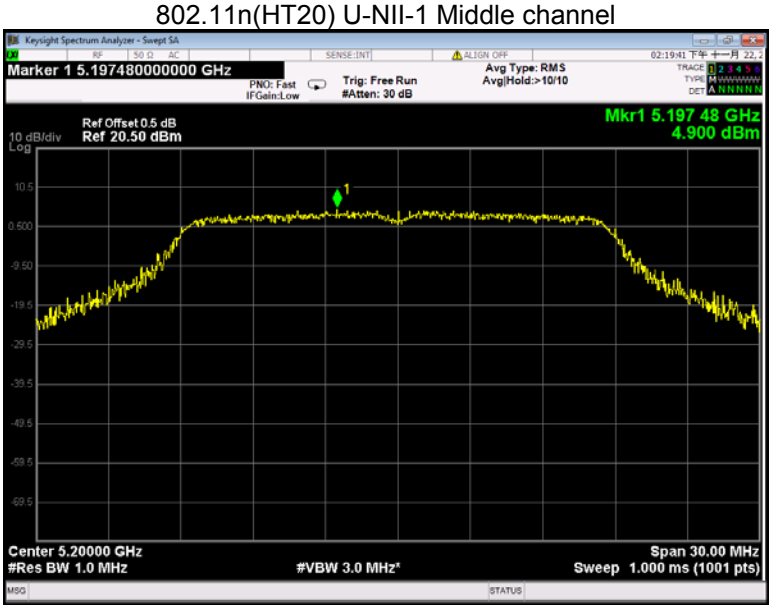
802.11a U-NII-1 High channel



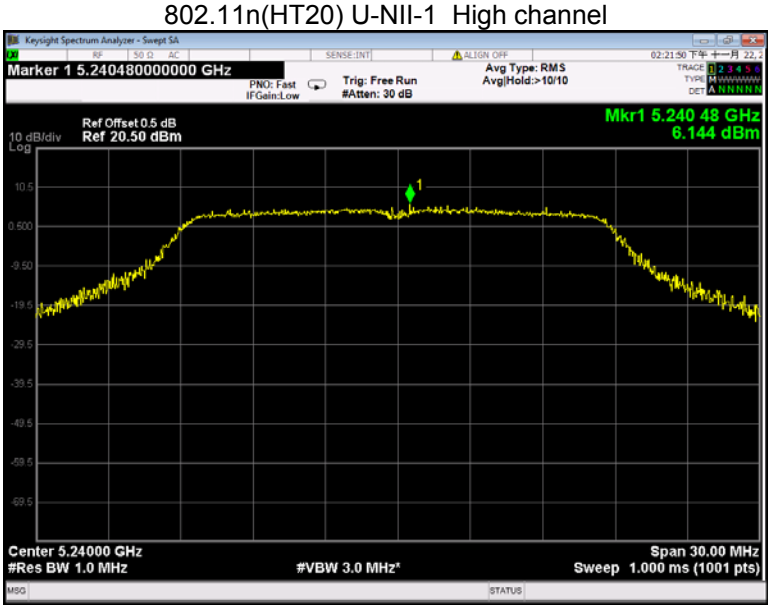
802.11n(HT20) U-NII-1 Low channel



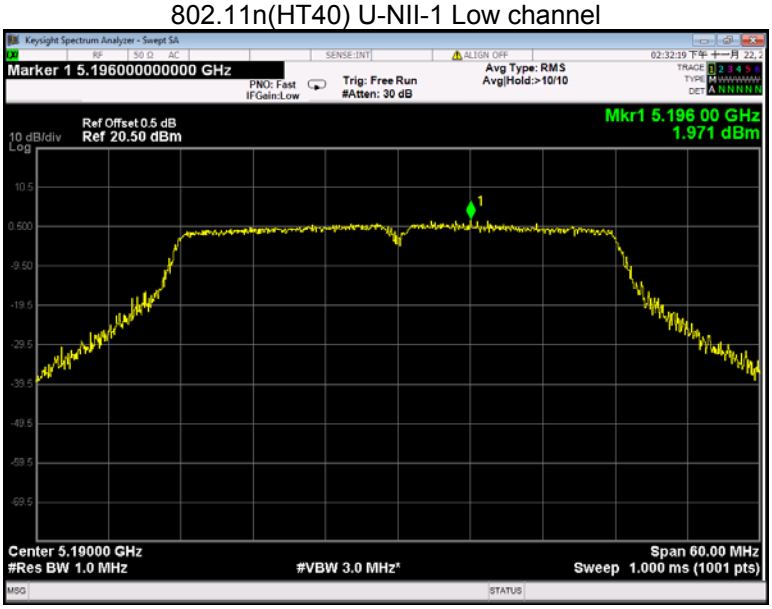
802.11n(HT20) U-NII-1 Middle channel



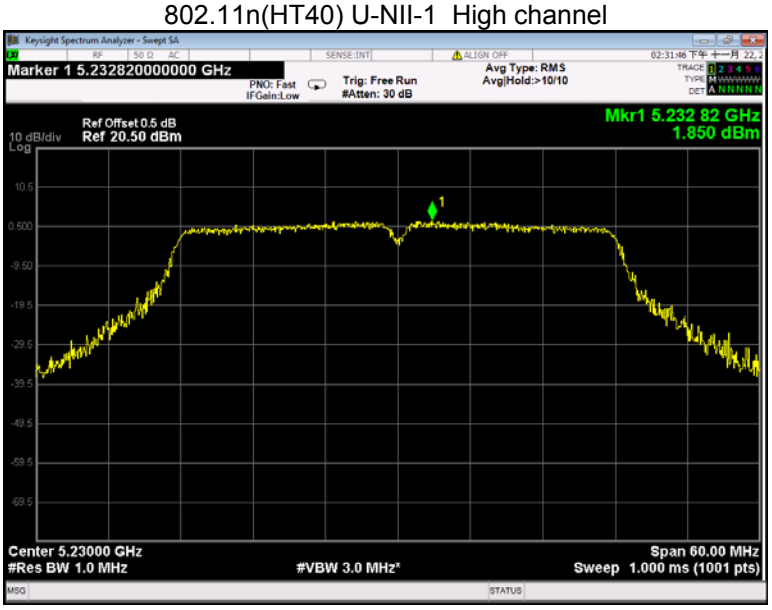
802.11n(HT20) U-NII-1 High channel



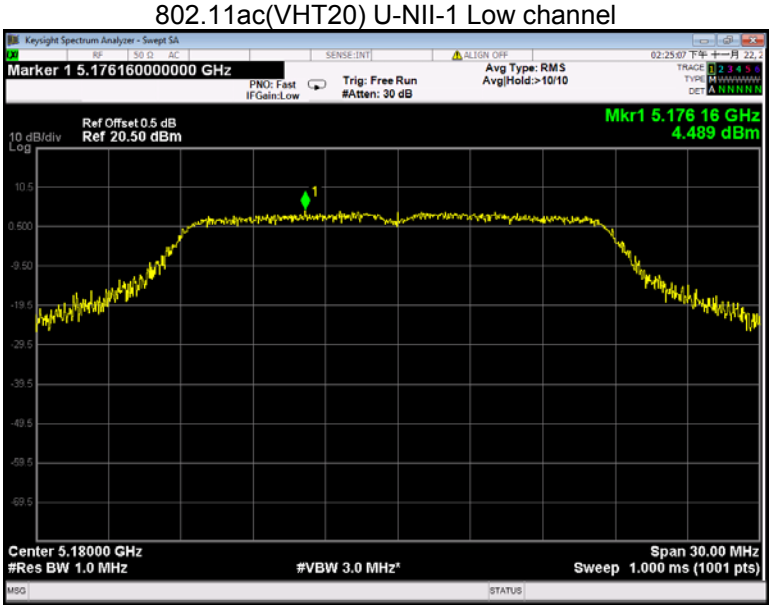
802.11n(HT40) U-NII-1 Low channel



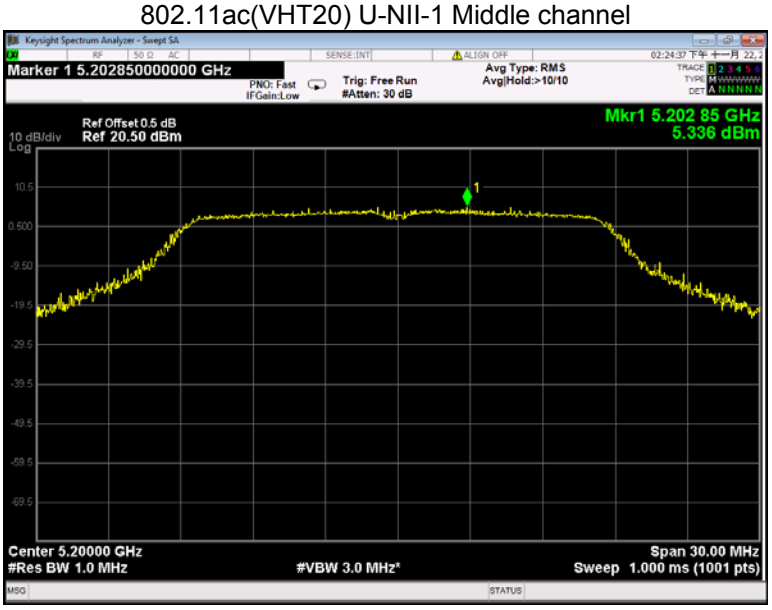
802.11n(HT40) U-NII-1 High channel



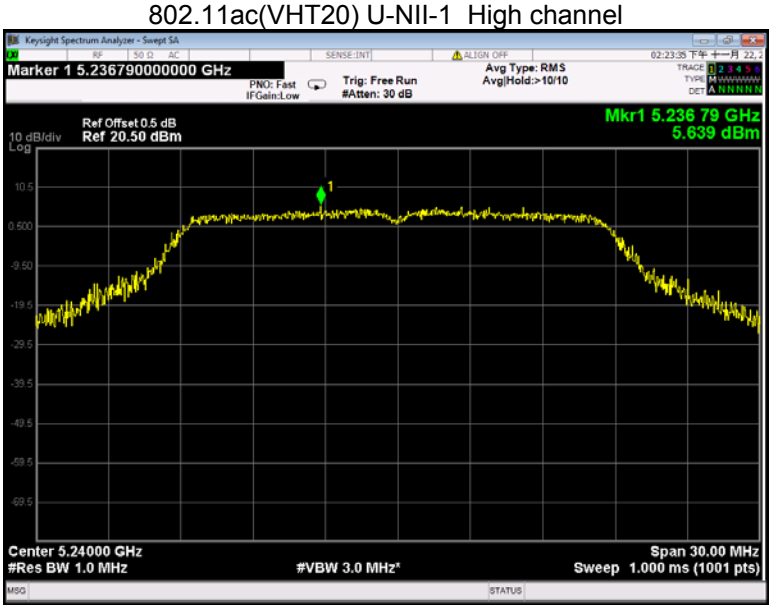
802.11ac(VHT20) U-NII-1 Low channel



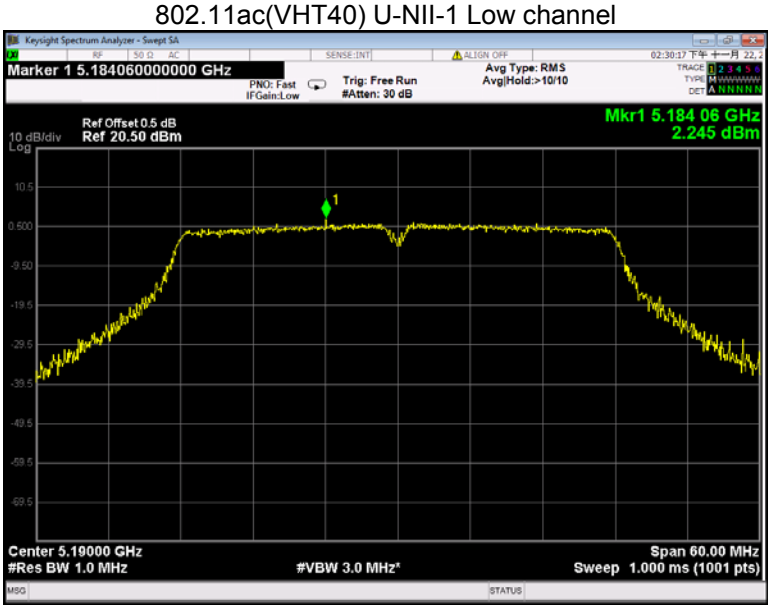
802.11ac(VHT20) U-NII-1 Middle channel



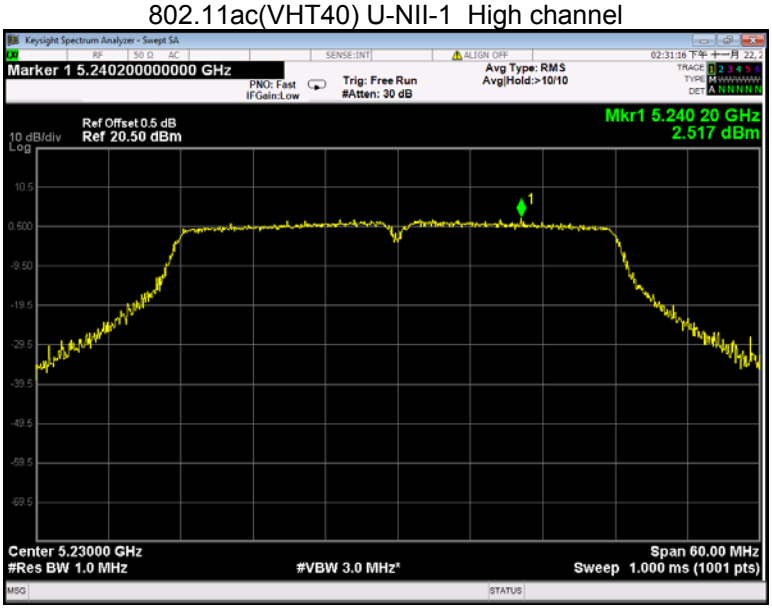
802.11ac(VHT20) U-NII-1 High channel



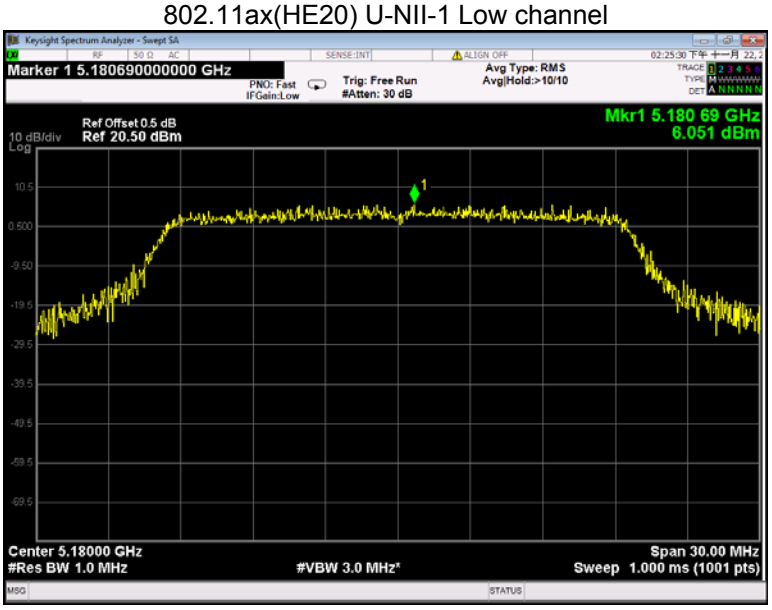
802.11ac(VHT40) U-NII-1 Low channel



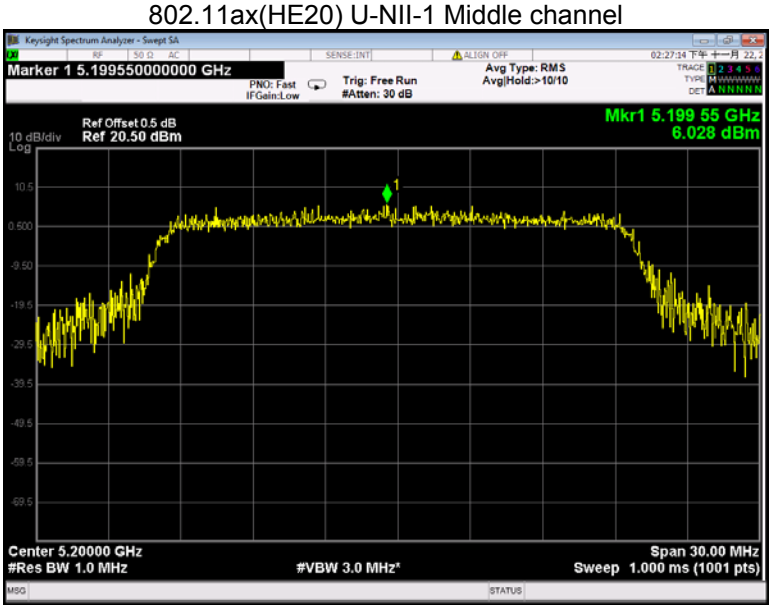
802.11ac(VHT40) U-NII-1 High channel



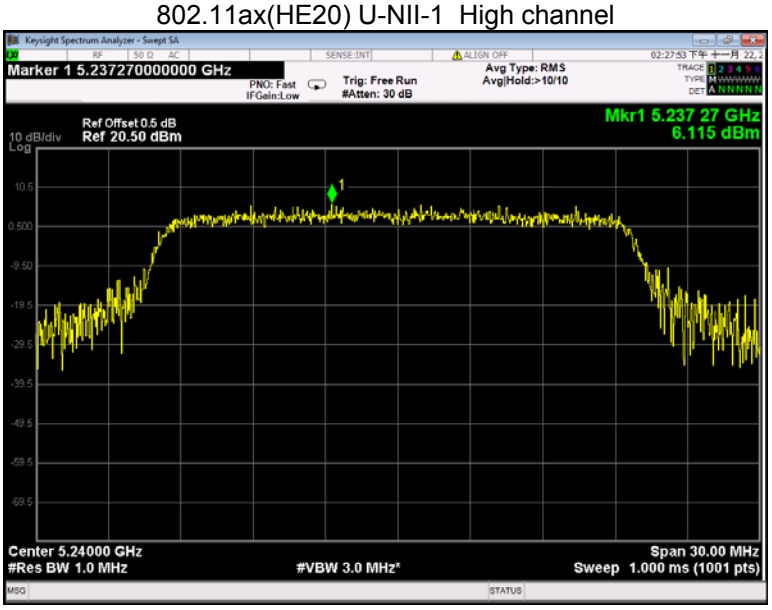
802.11ax(HE20) U-NII-1 Low channel



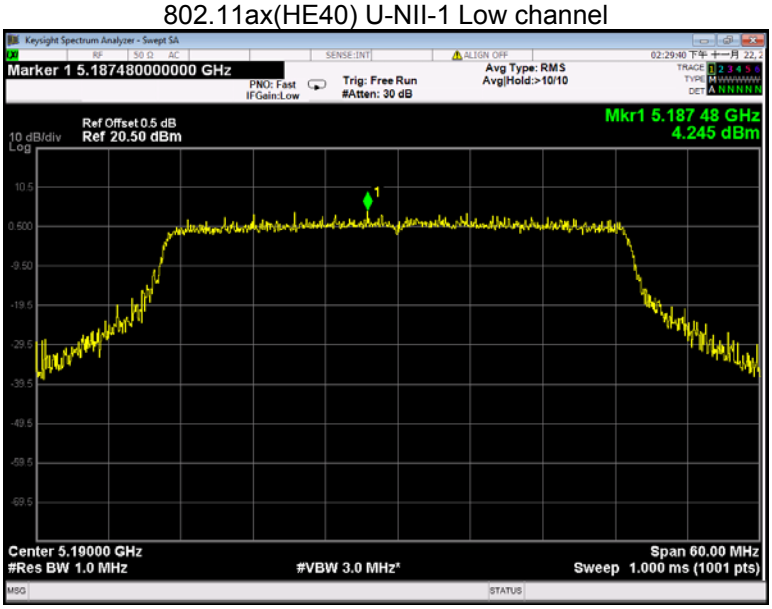
802.11ax(HE20) U-NII-1 Middle channel



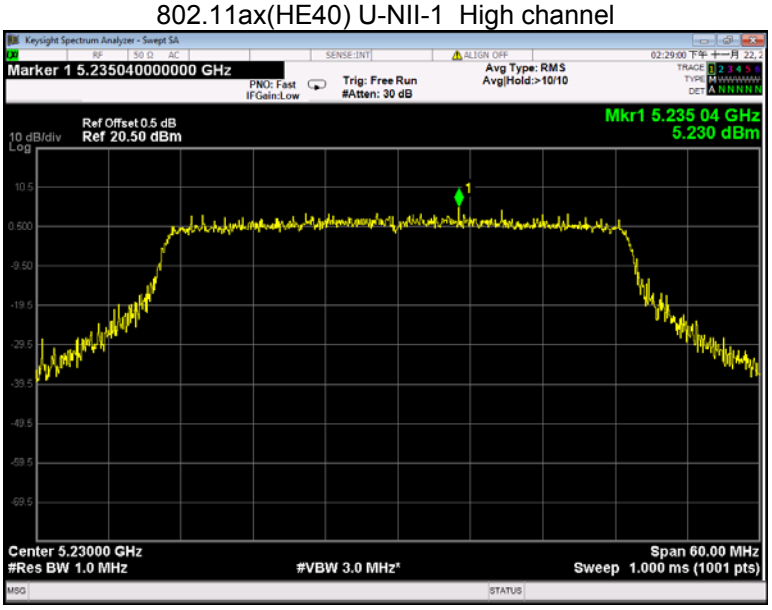
802.11ax(HE20) U-NII-1 High channel



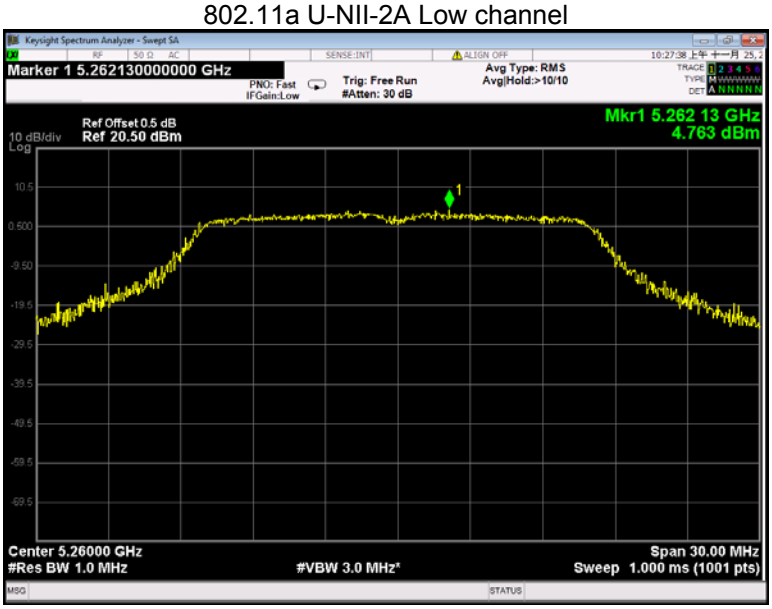
802.11ax(HE40) U-NII-1 Low channel



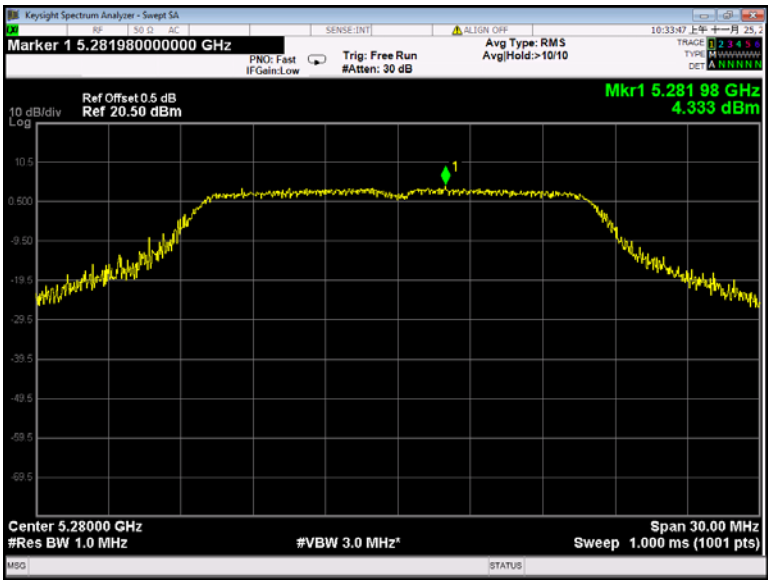
802.11ax(HE40) U-NII-1 High channel



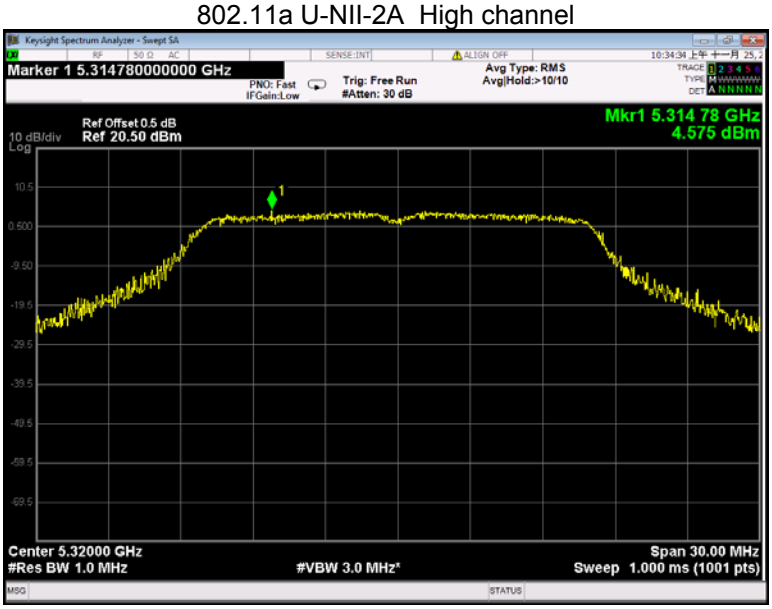
802.11a U-NII-2A Low channel



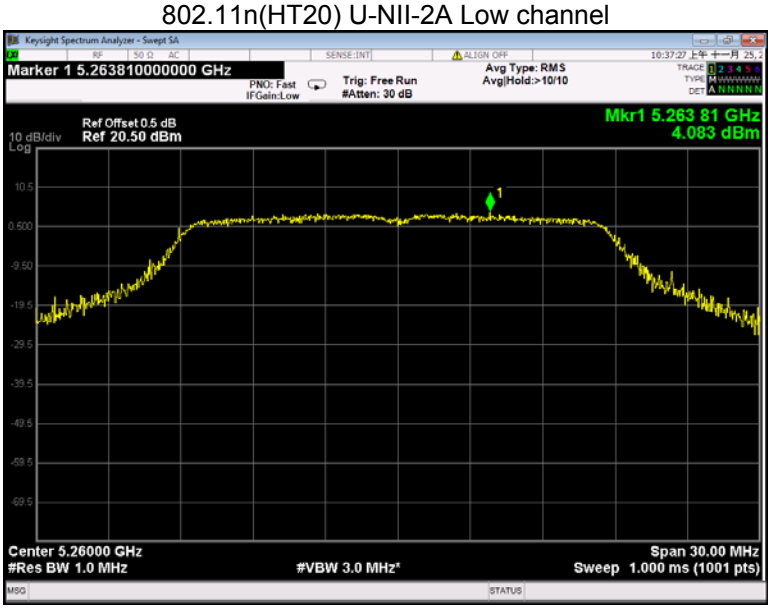
802.11a U-NII-2A Middle channel



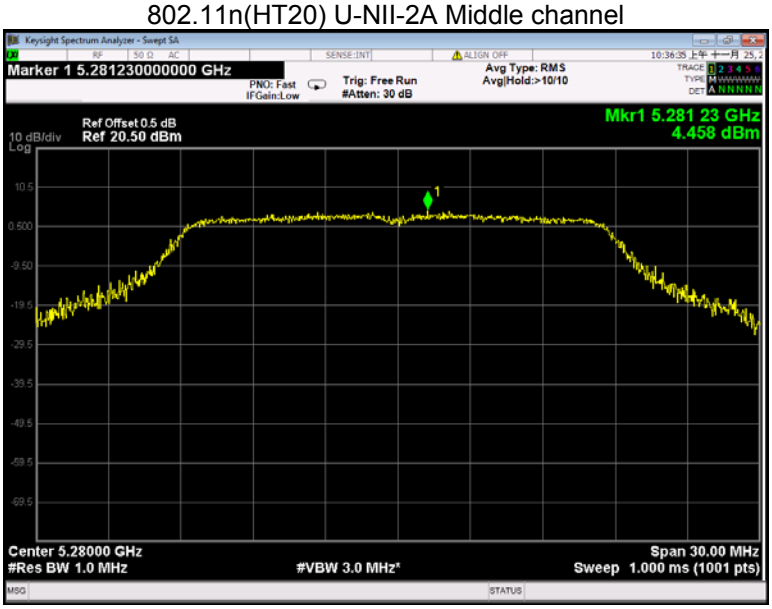
802.11a U-NII-2A High channel



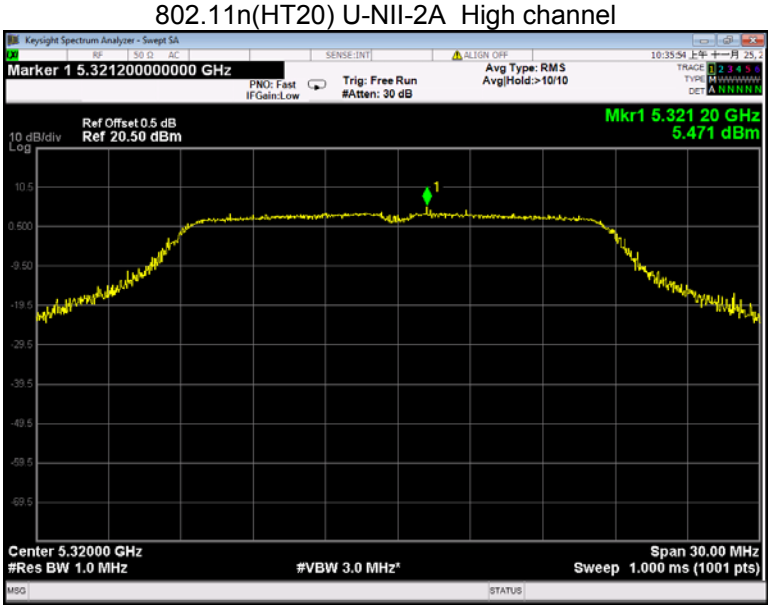
802.11n(HT20) U-NII-2A Low channel



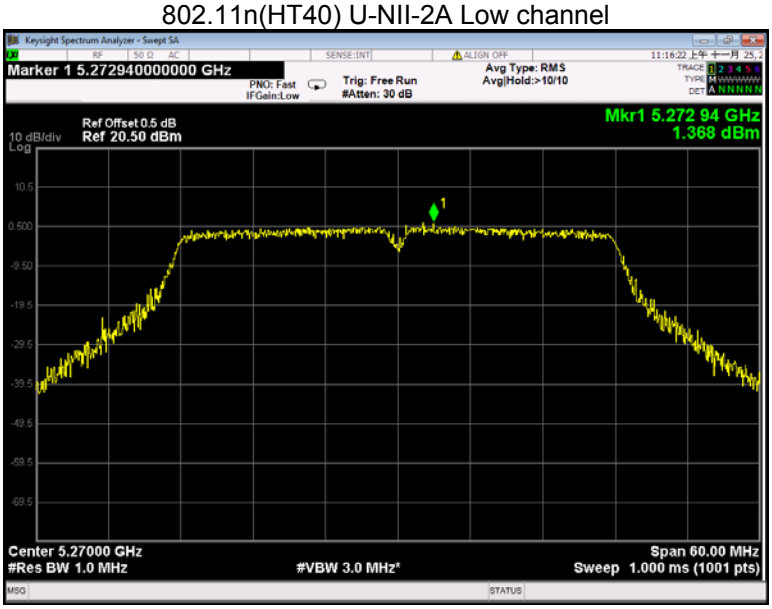
802.11n(HT20) U-NII-2A Middle channel



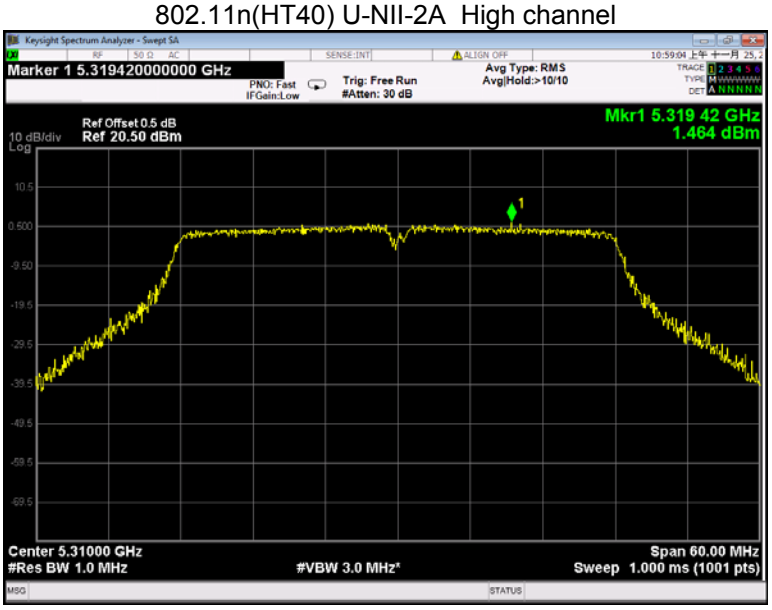
802.11n(HT20) U-NII-2A High channel



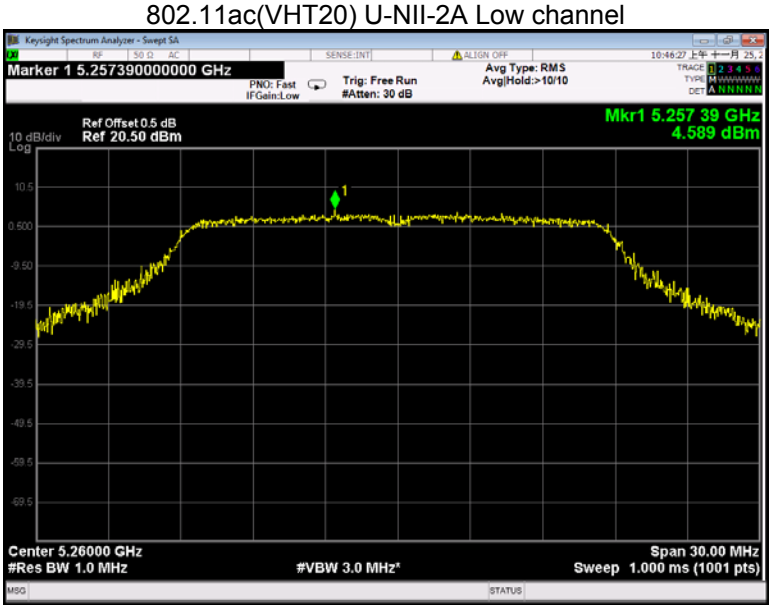
802.11n(HT40) U-NII-2A Low channel



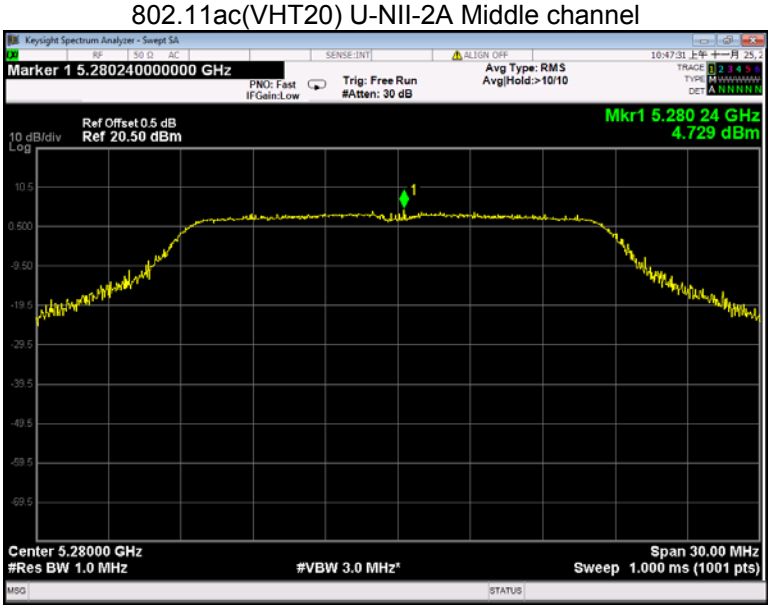
802.11n(HT40) U-NII-2A High channel



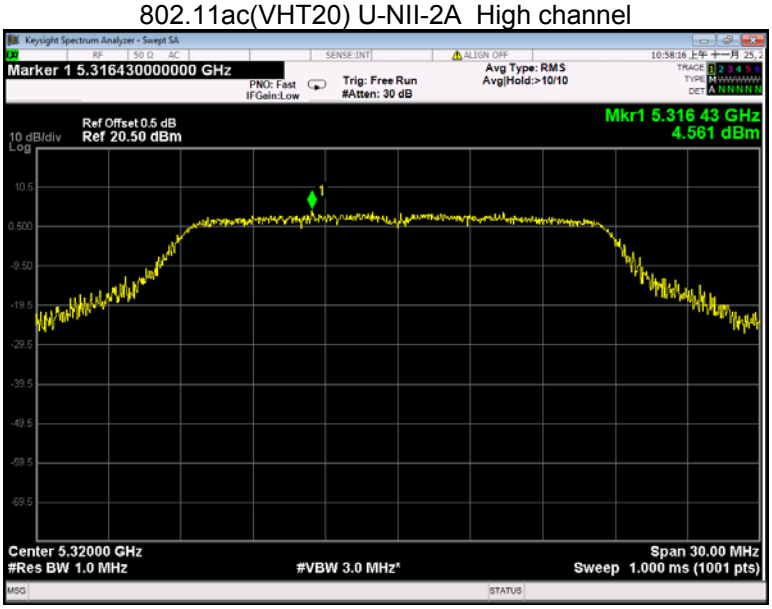
802.11ac(VHT20) U-NII-2A Low channel



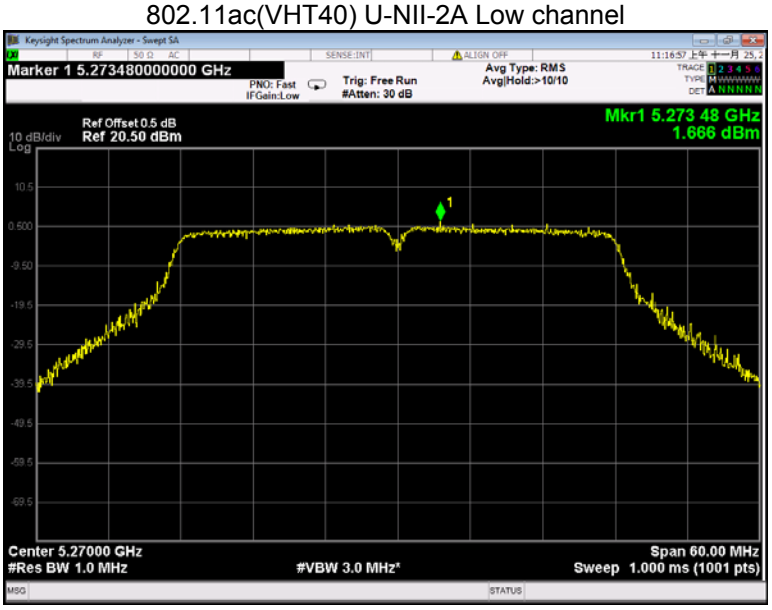
802.11ac(VHT20) U-NII-2A Middle channel



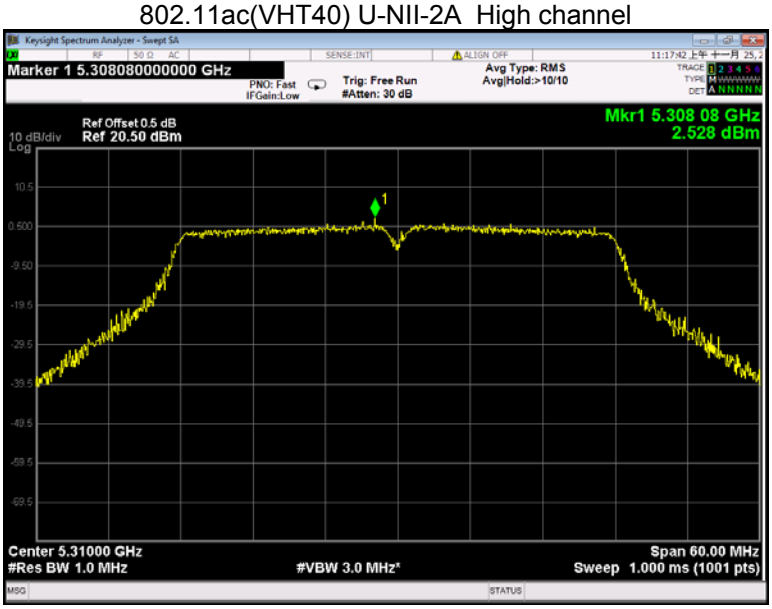
802.11ac(VHT20) U-NII-2A High channel



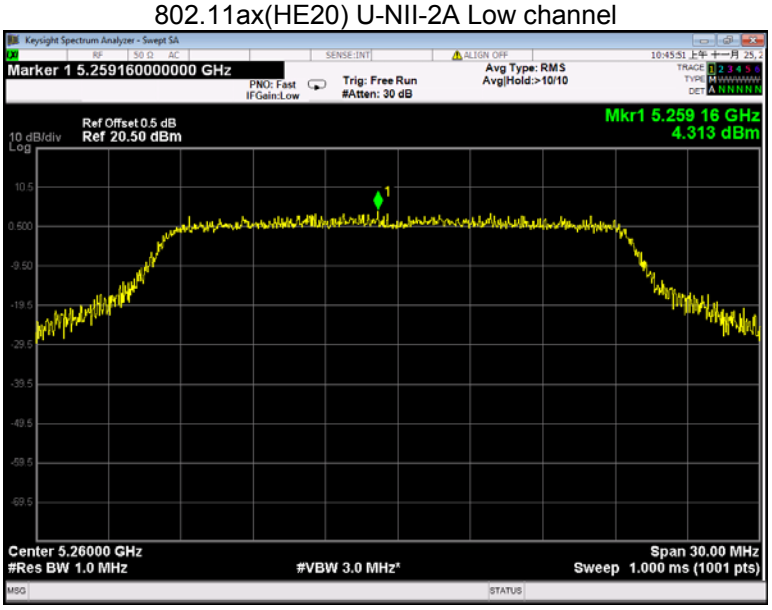
802.11ac(VHT40) U-NII-2A Low channel



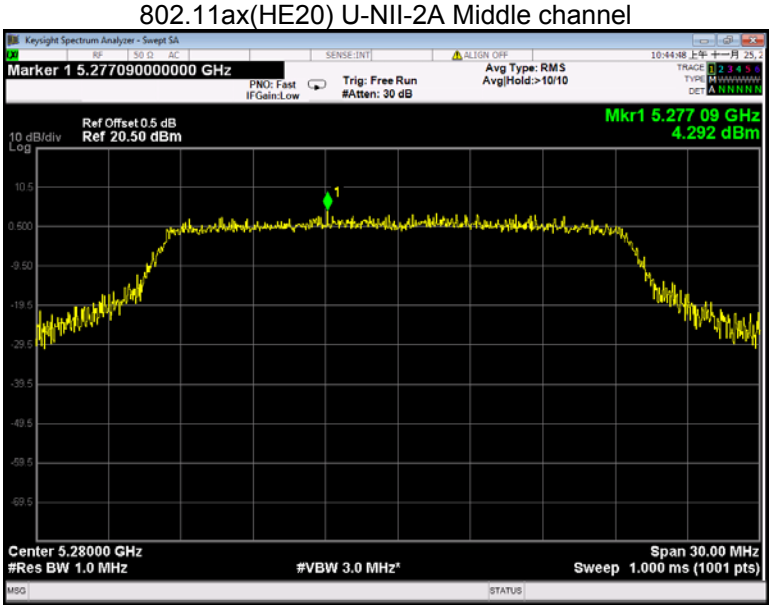
802.11ac(VHT40) U-NII-2A High channel



802.11ax(HE20) U-NII-2A Low channel



802.11ax(HE20) U-NII-2A Middle channel



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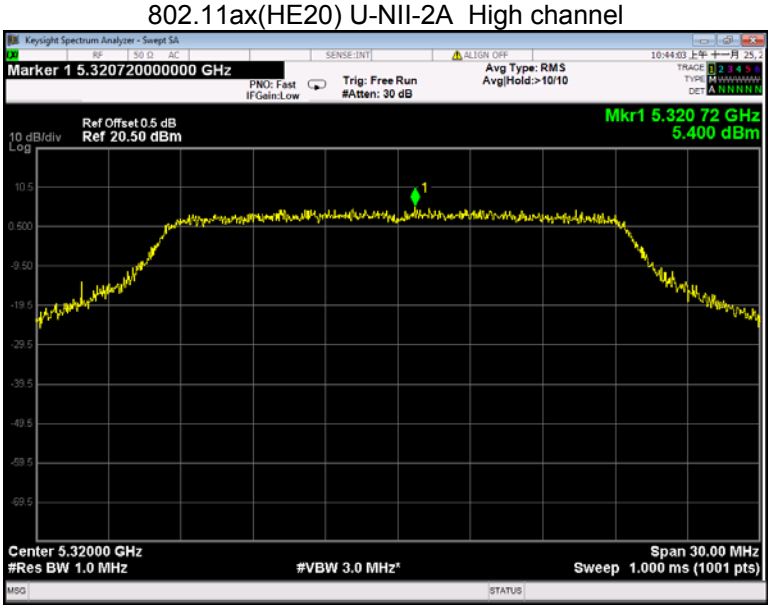
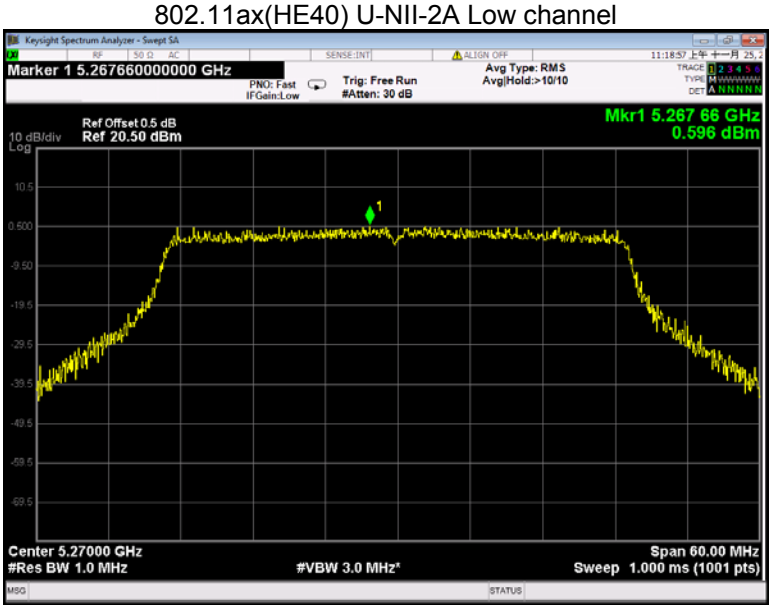


802.11ax(HE40) U-NII-2A Low channel



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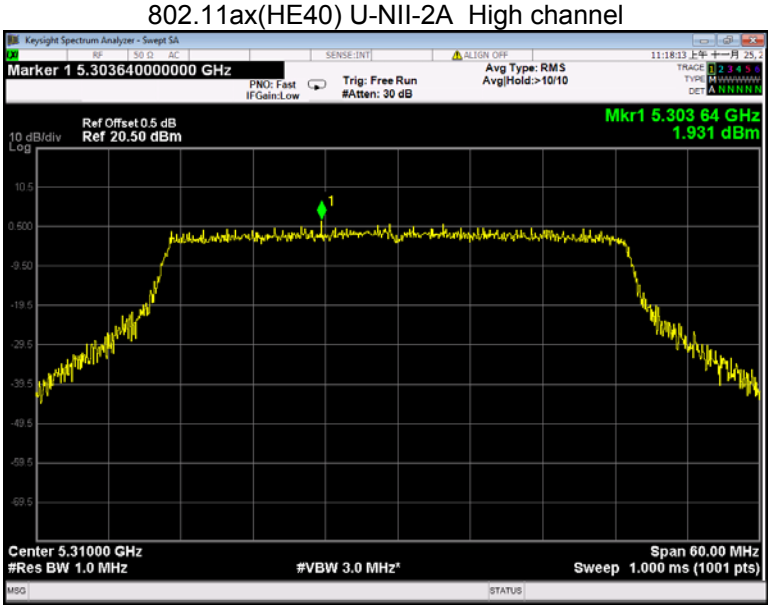
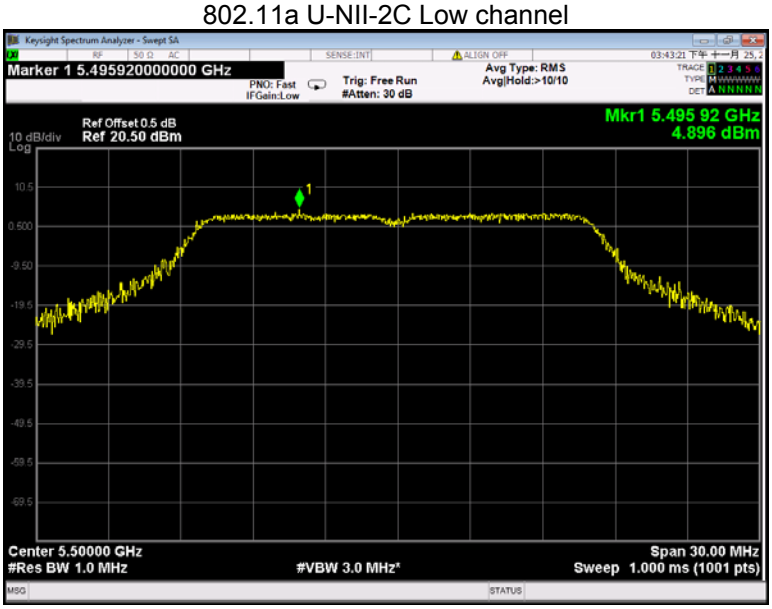
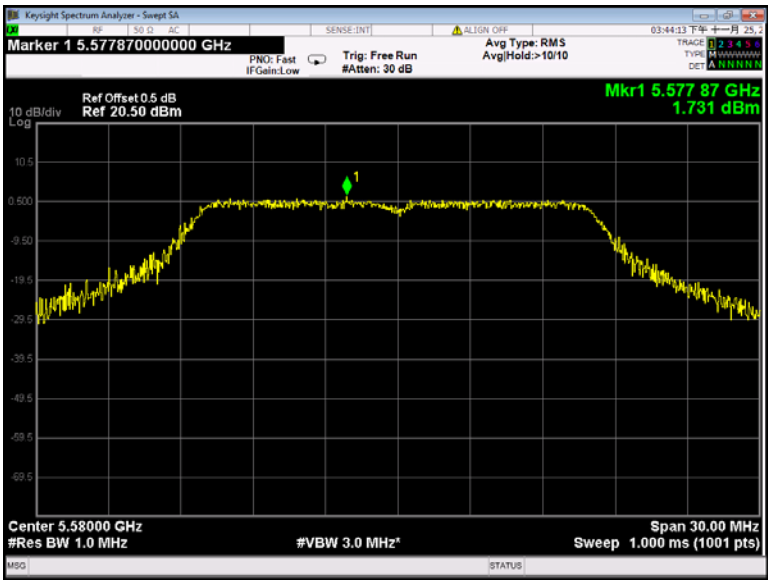


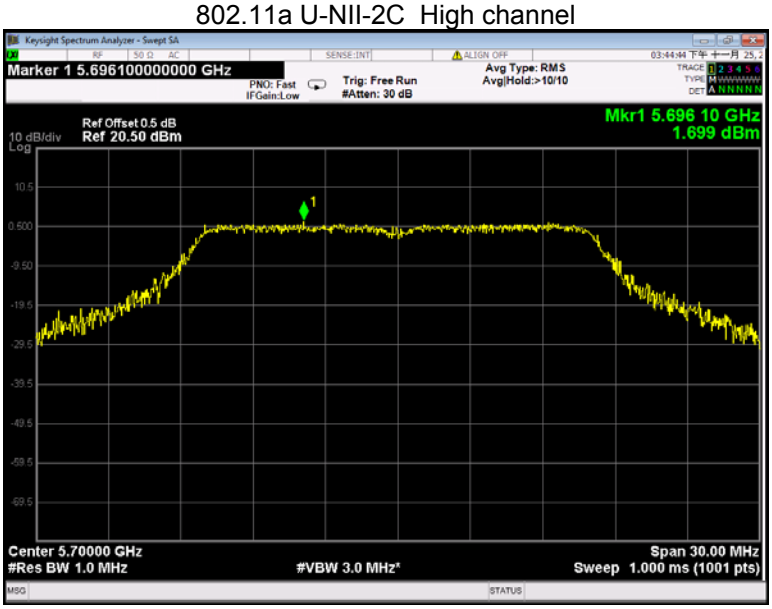
802.11a U-NII-2C Low channel



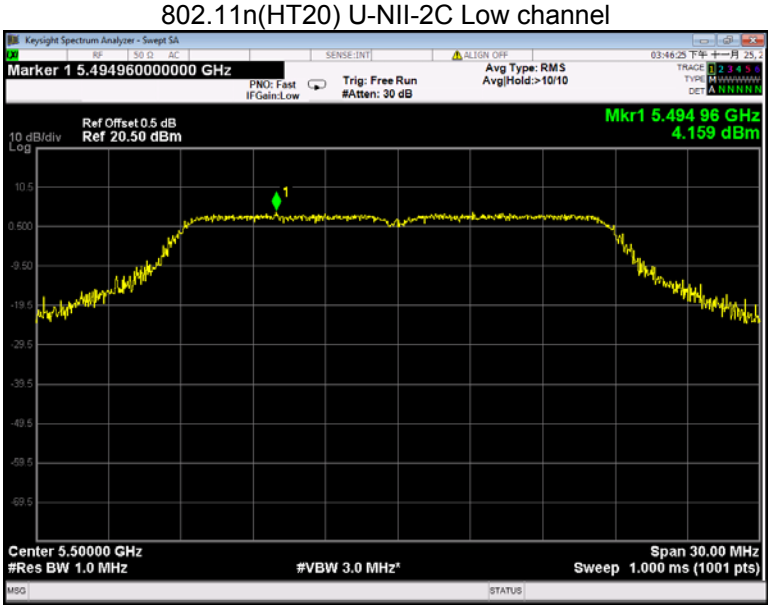
802.11a U-NII-2C Middle channel



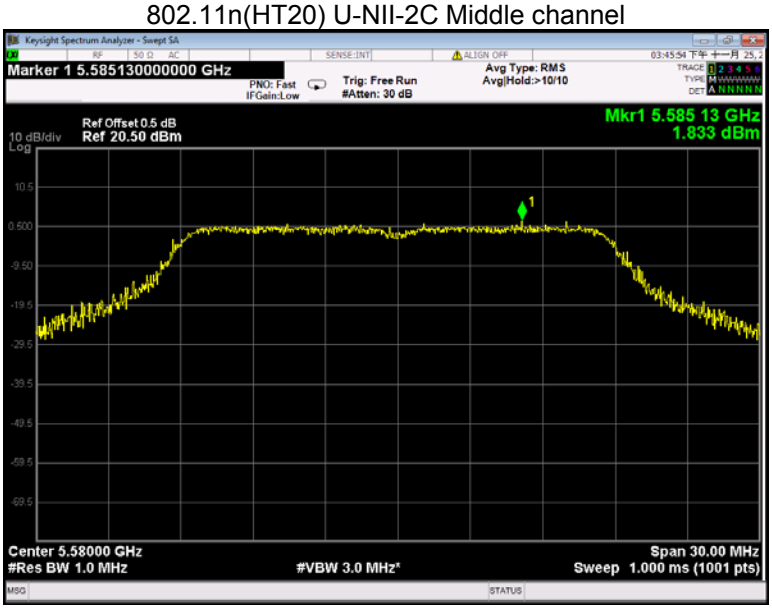
802.11a U-NII-2C High channel



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



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



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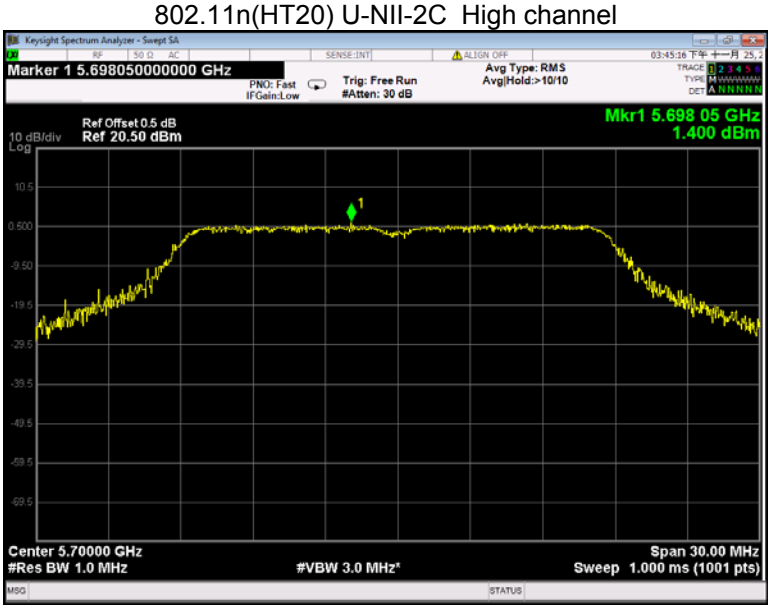
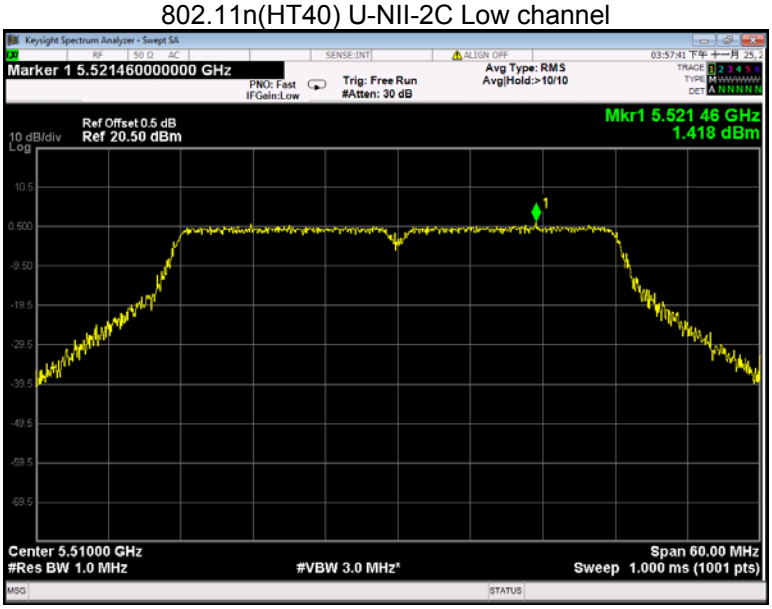
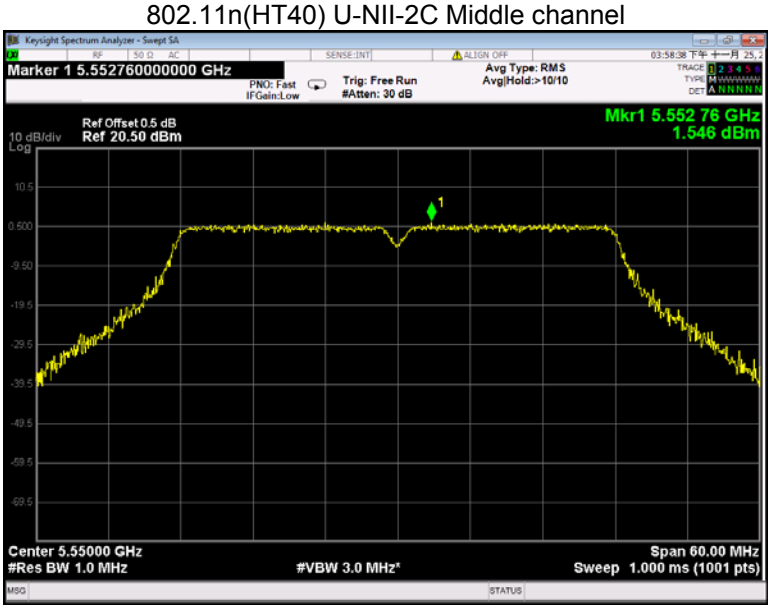


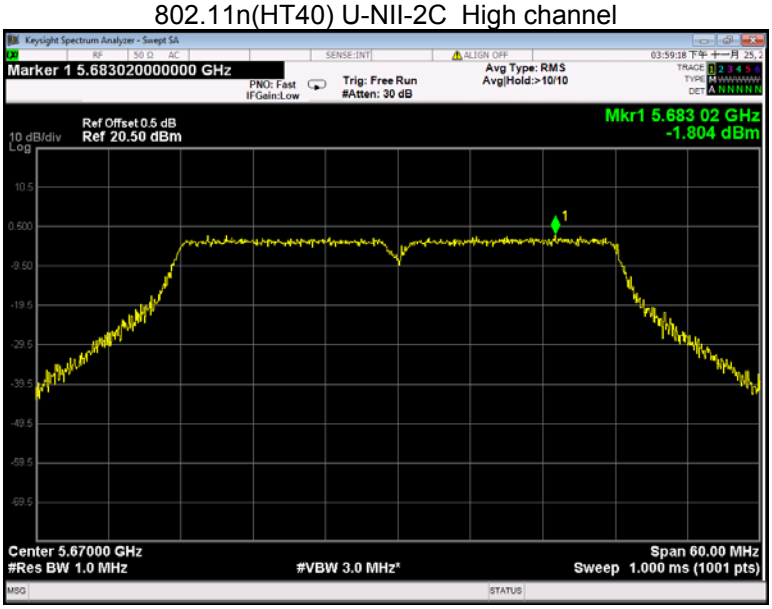
802.11n(HT40) U-NII-2C Low channel



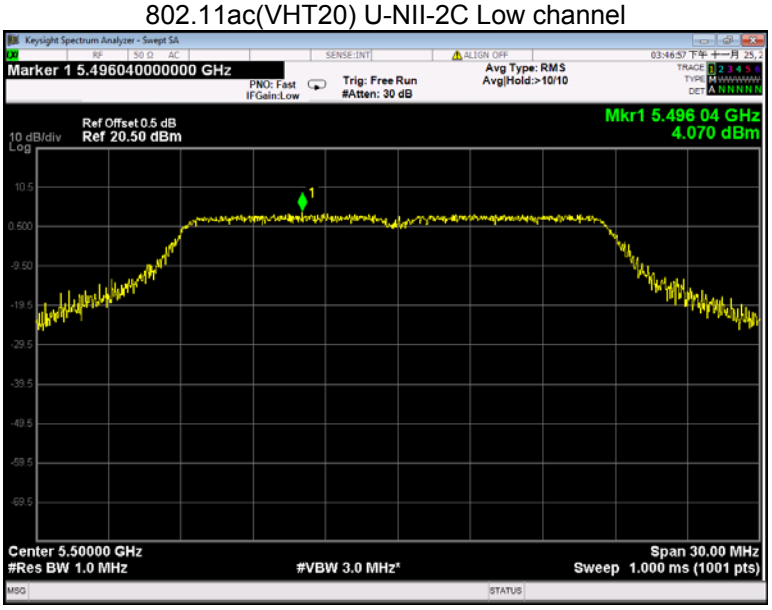
802.11n(HT40) U-NII-2C Middle channel



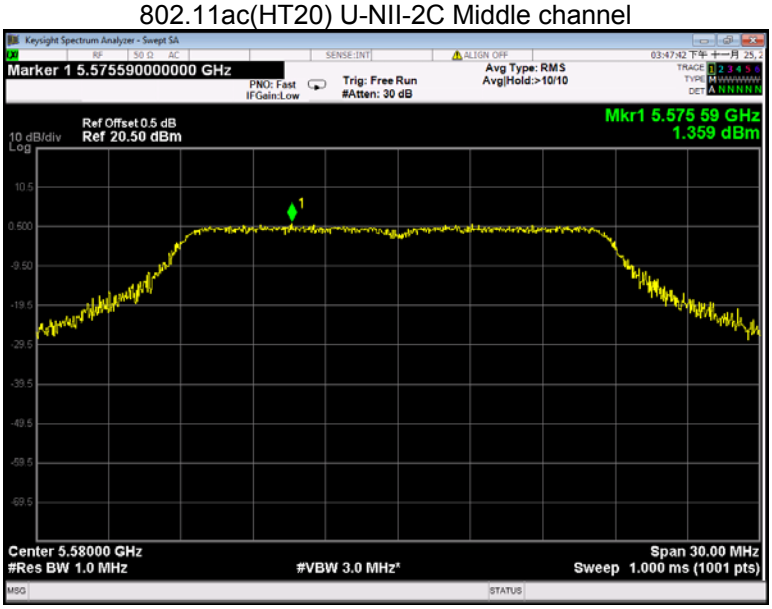
802.11n(HT40) U-NII-2C High channel



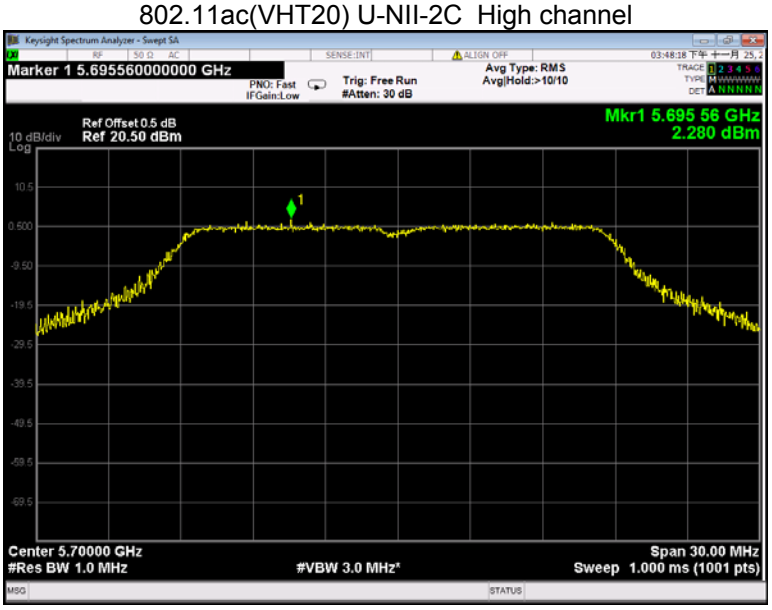
802.11ac(VHT20) U-NII-2C Low channel



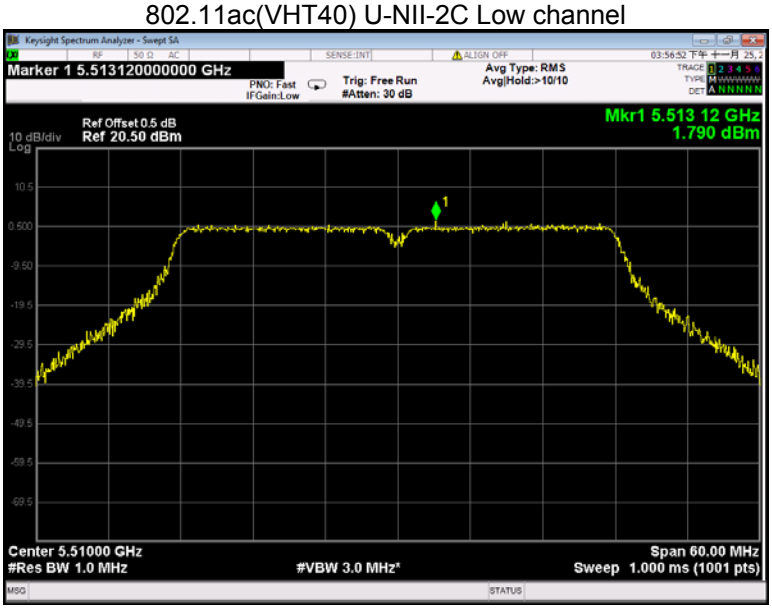
802.11ac(HT20) U-NII-2C Middle channel



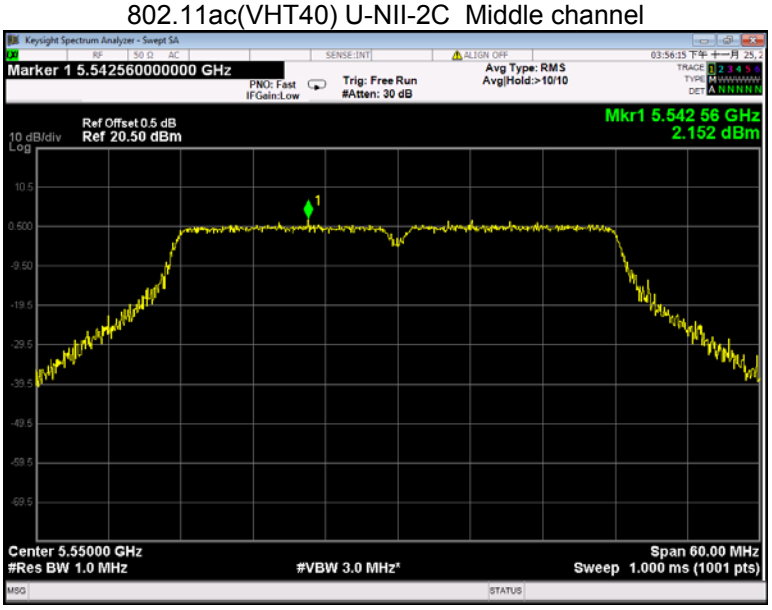
802.11ac(VHT20) U-NII-2C High channel



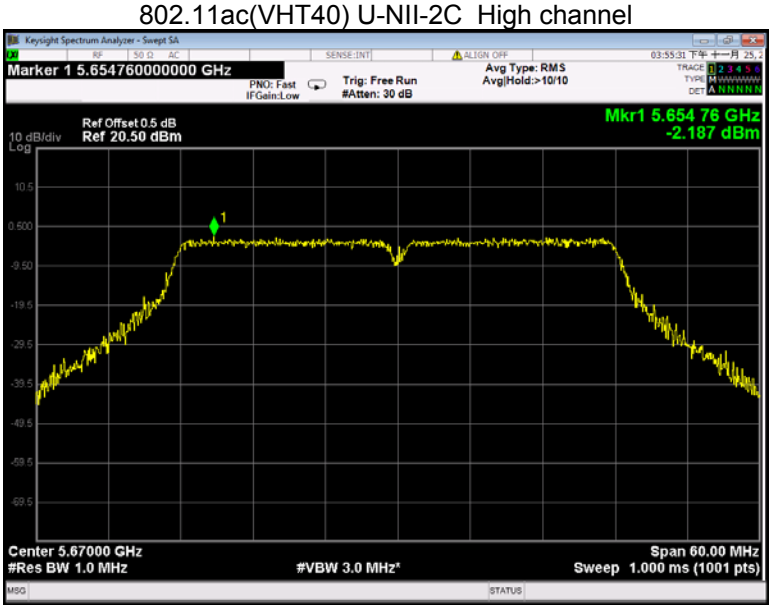
802.11ac(VHT40) U-NII-2C Low channel



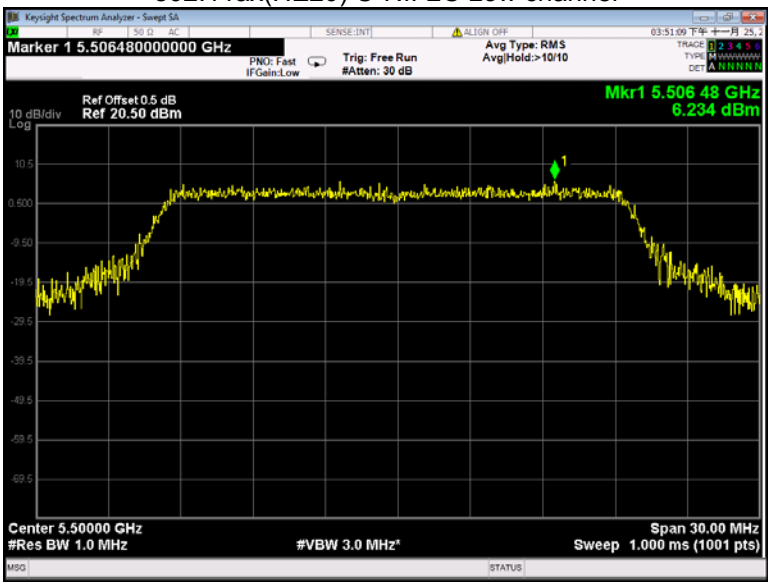
802.11ac(VHT40) U-NII-2C Middle channel



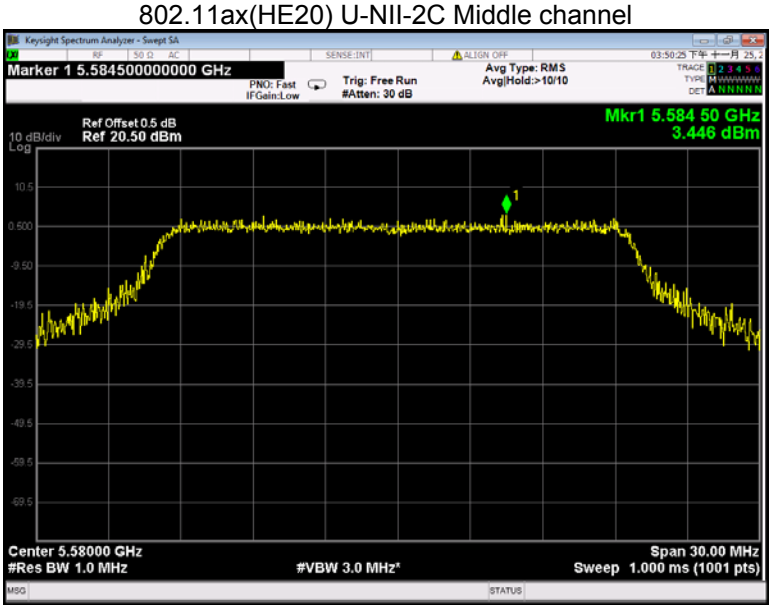
802.11ac(VHT40) U-NII-2C High channel



802.11ax(HE20) U-NII-2C Low channel



802.11ax(HE20) U-NII-2C Middle channel



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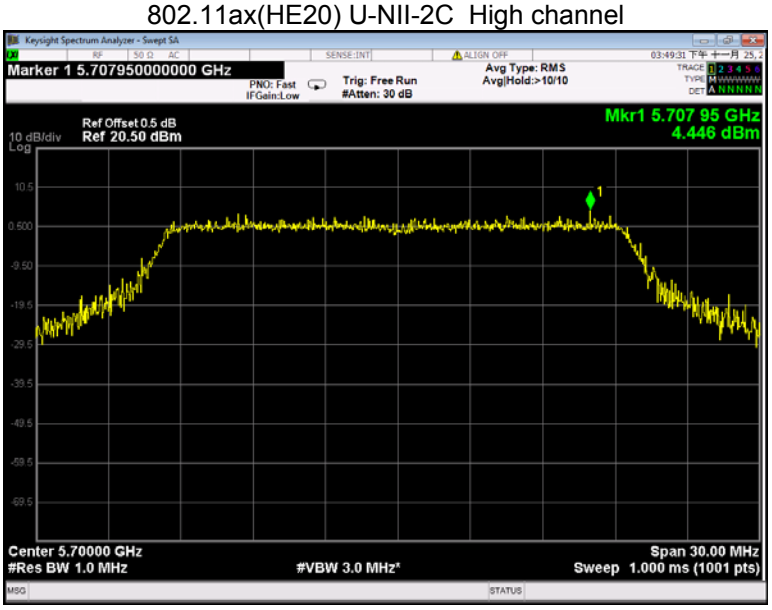
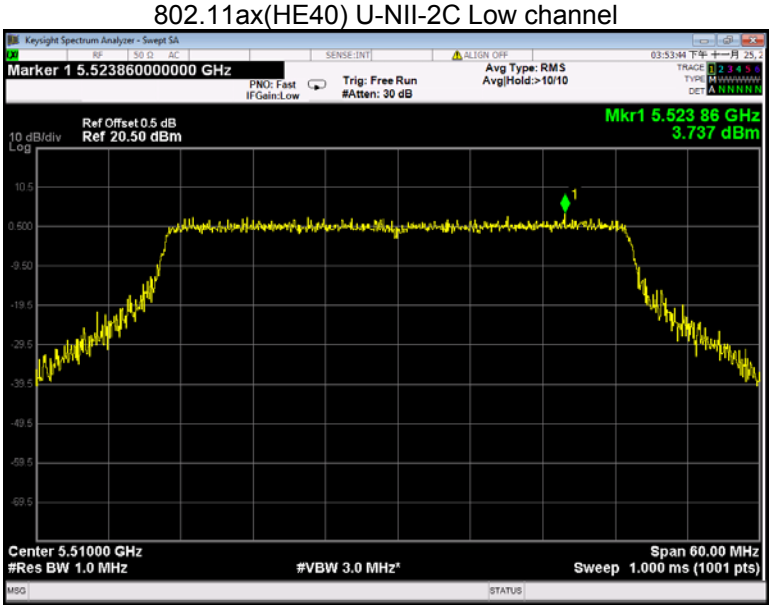
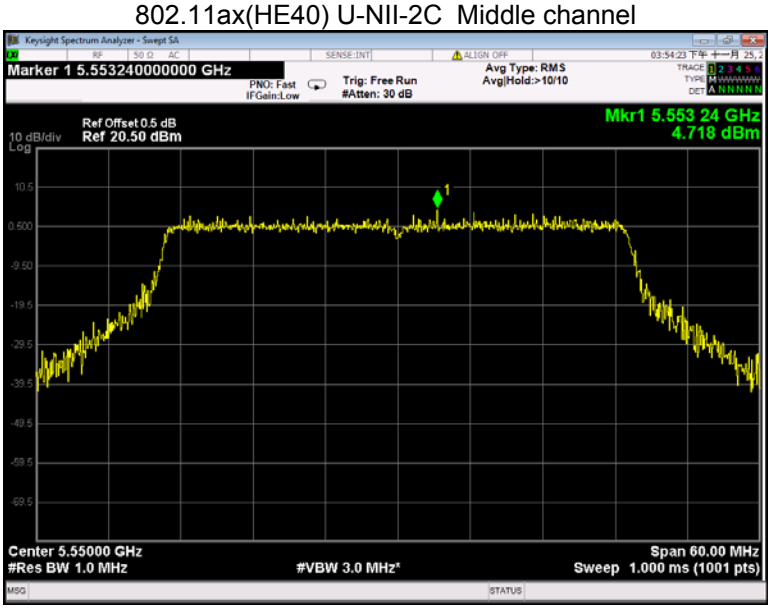


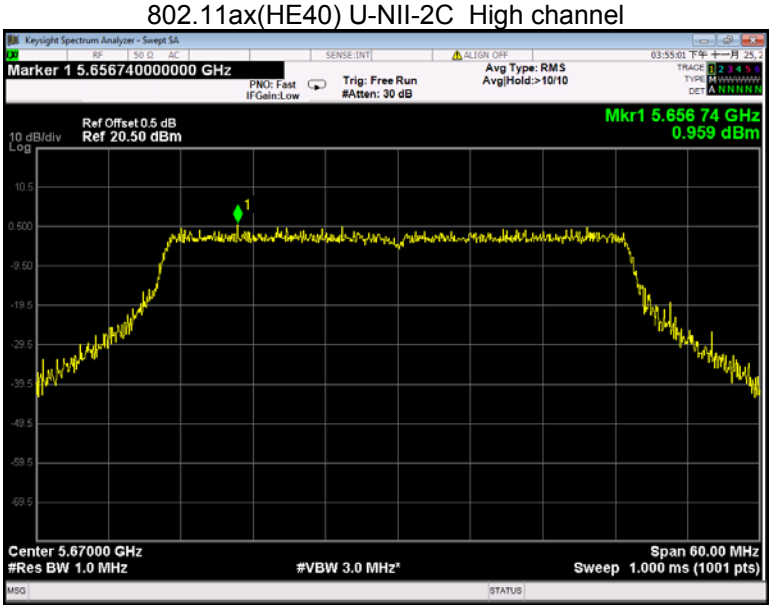
802.11ax(HE40) U-NII-2C Low channel



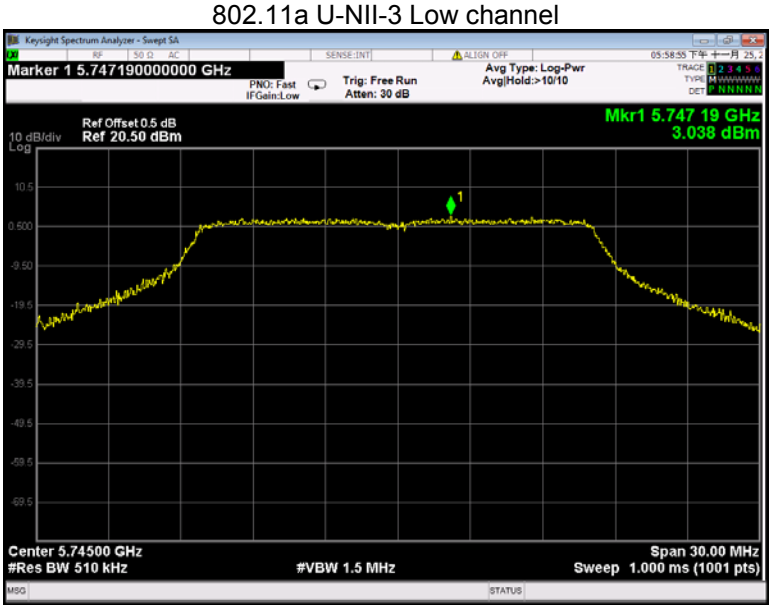
802.11ax(HE40) U-NII-2C Middle channel



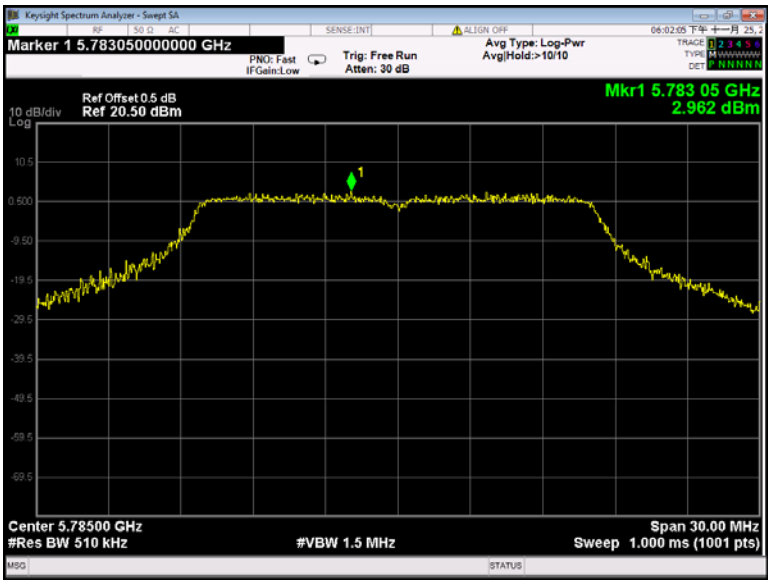
802.11ax(HE40) U-NII-2C High channel



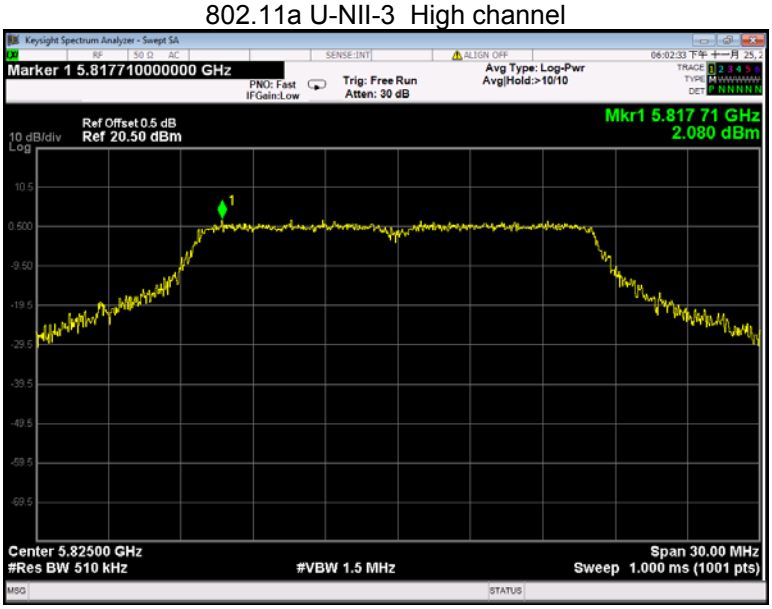
802.11a U-NII-3 Low channel



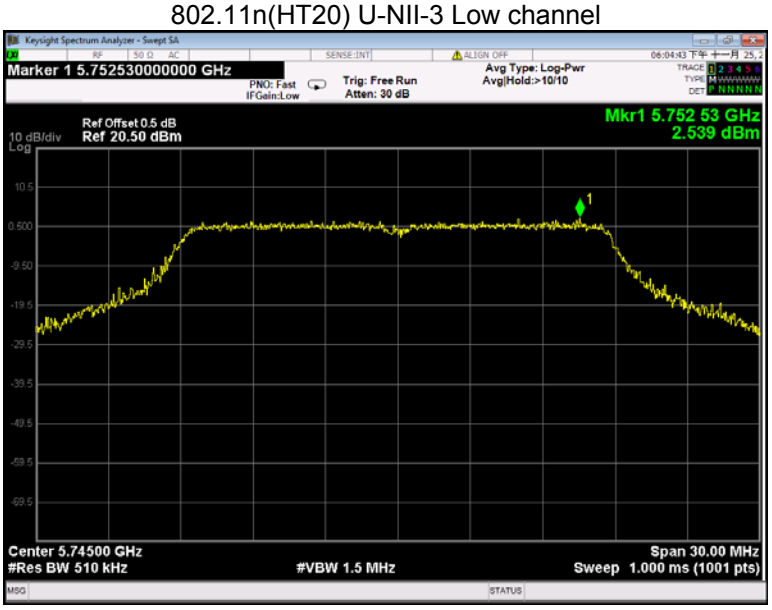
802.11a U-NII-3 Middle channel



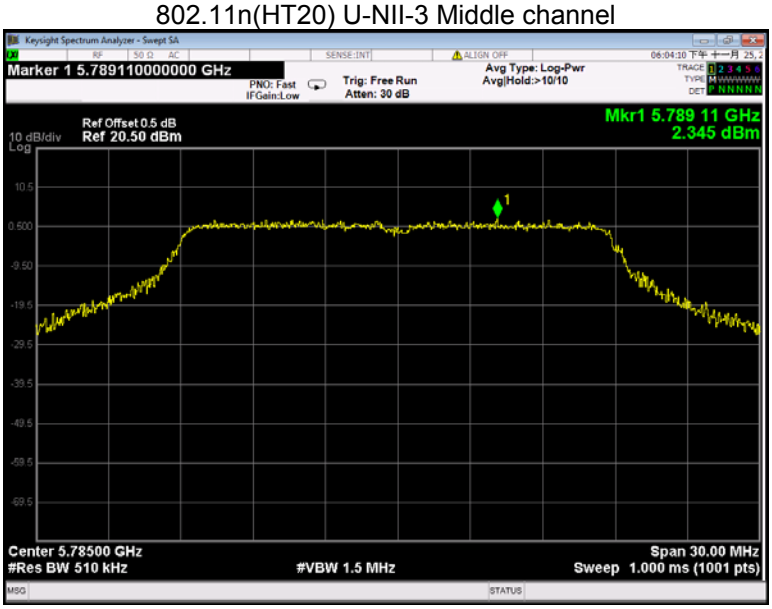
802.11a U-NII-3 High channel



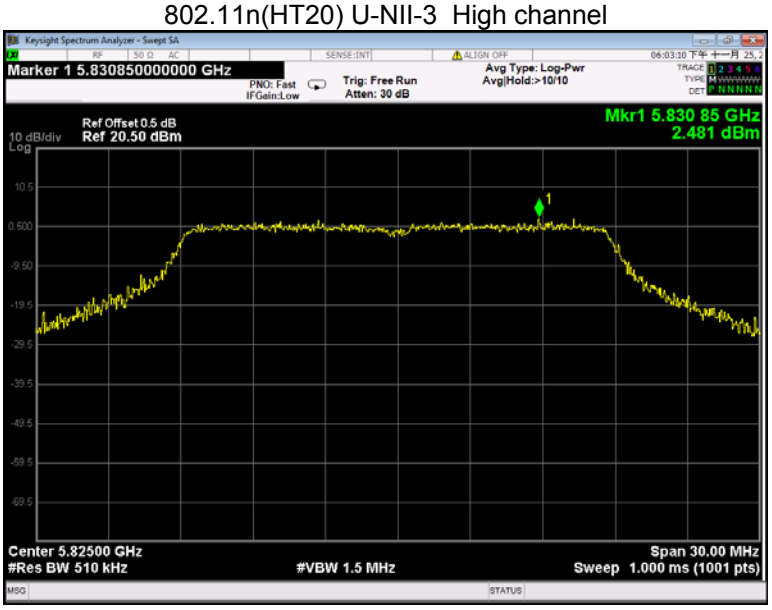
802.11n(HT20) U-NII-3 Low channel



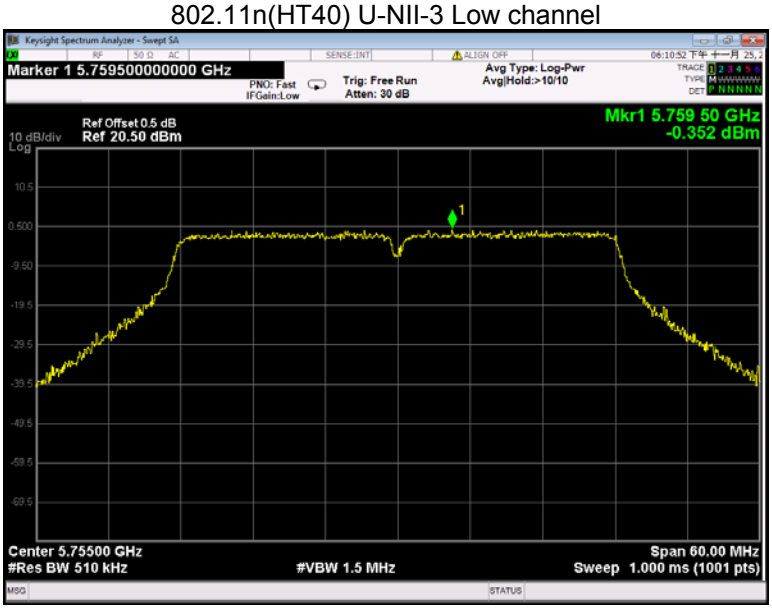
802.11n(HT20) U-NII-3 Middle channel



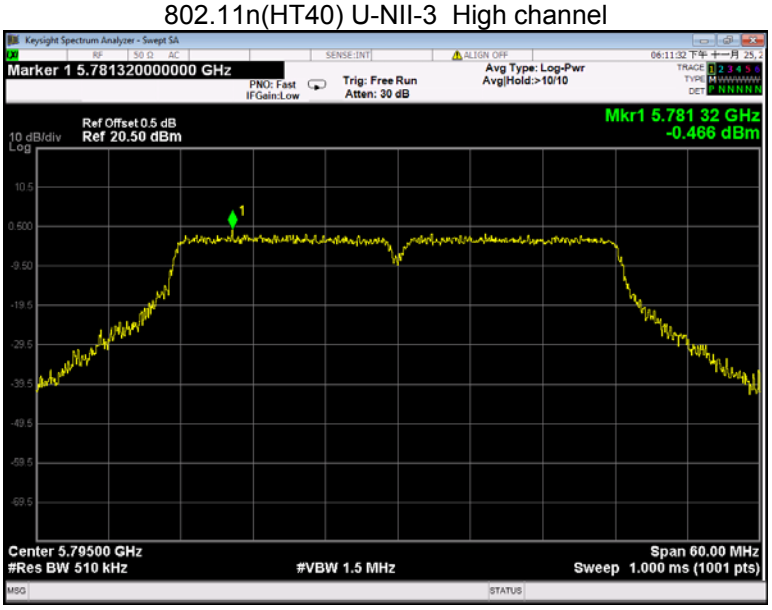
802.11n(HT20) U-NII-3 High channel



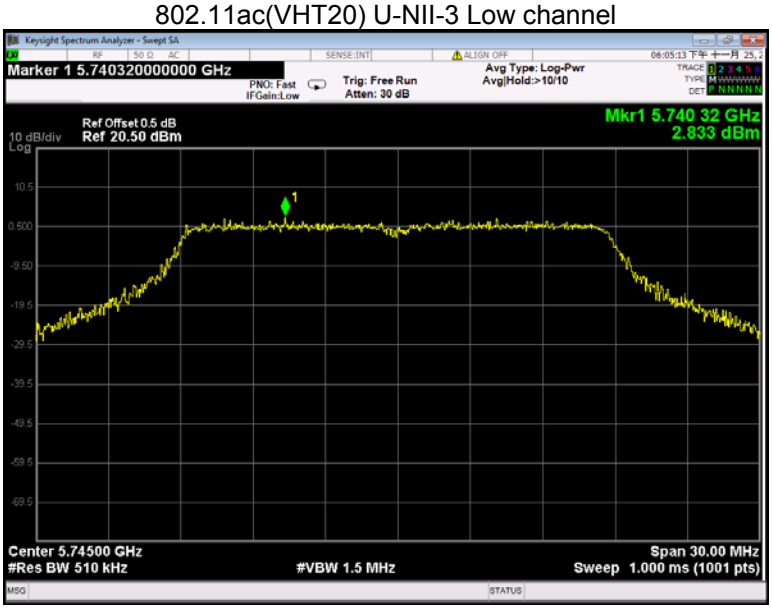
802.11n(HT40) U-NII-3 Low channel



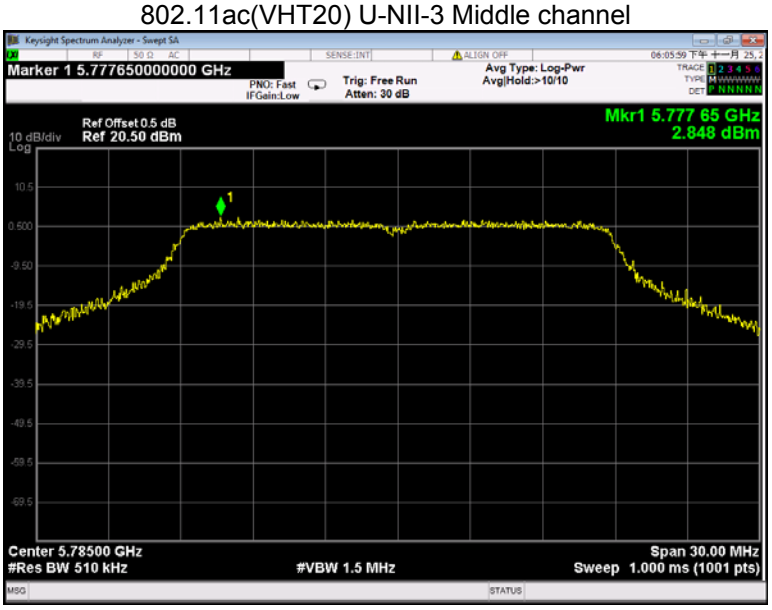
802.11n(HT40) U-NII-3 High channel



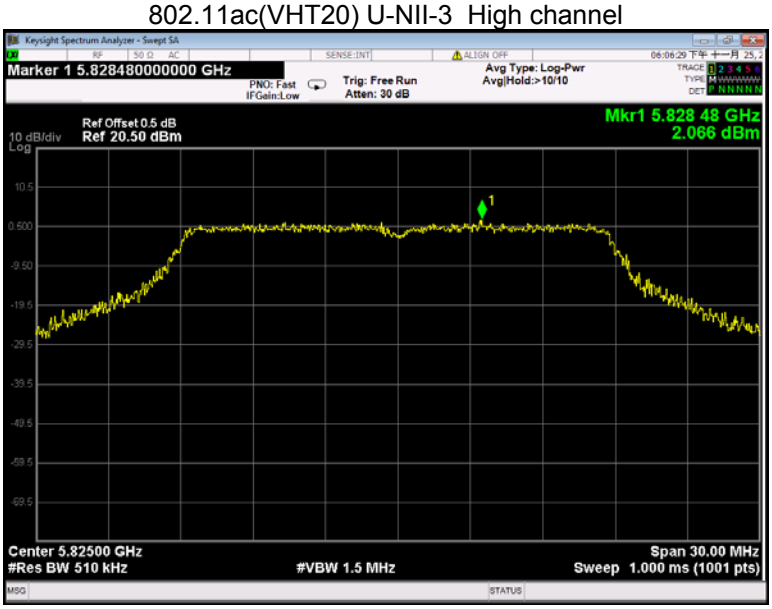
802.11ac(VHT20) U-NII-3 Low channel



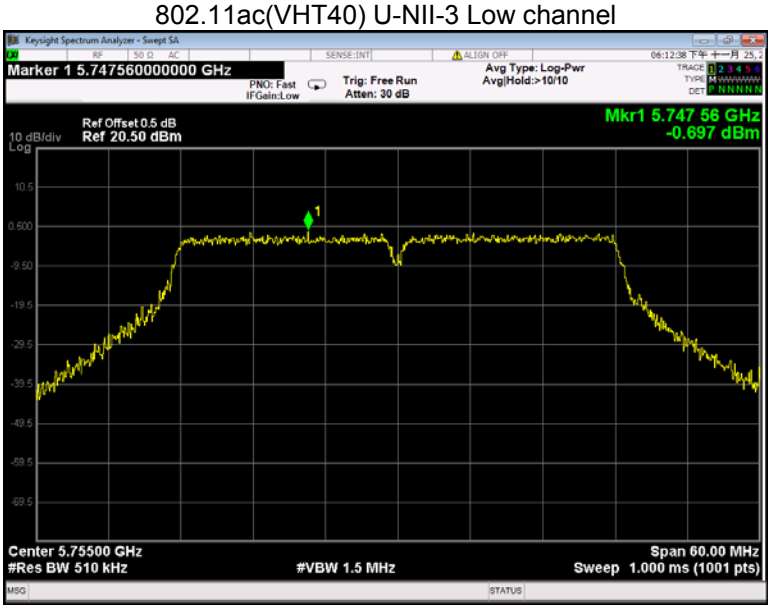
802.11ac(VHT20) U-NII-3 Middle channel



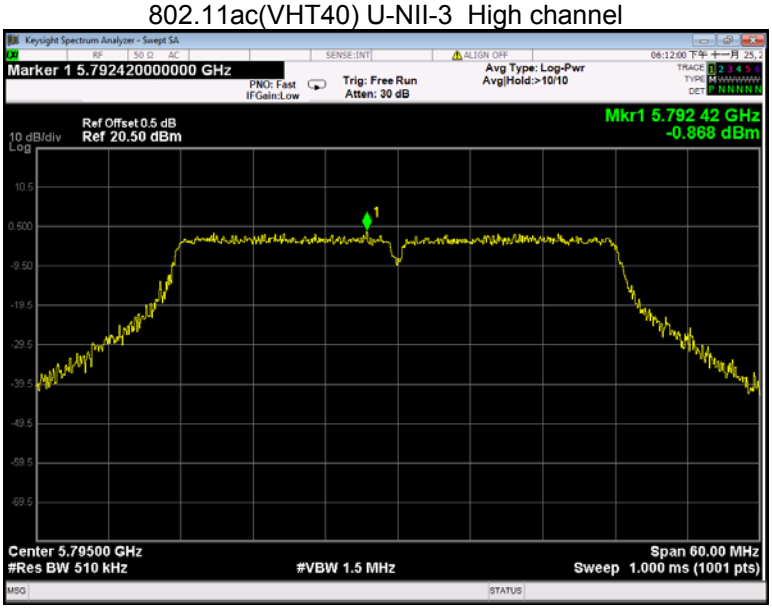
802.11ac(VHT20) U-NII-3 High channel



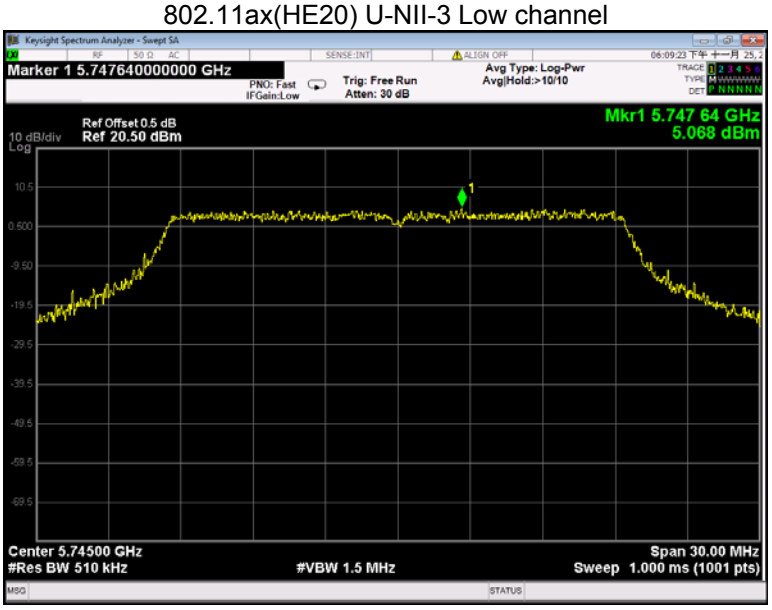
802.11ac(VHT40) U-NII-3 Low channel



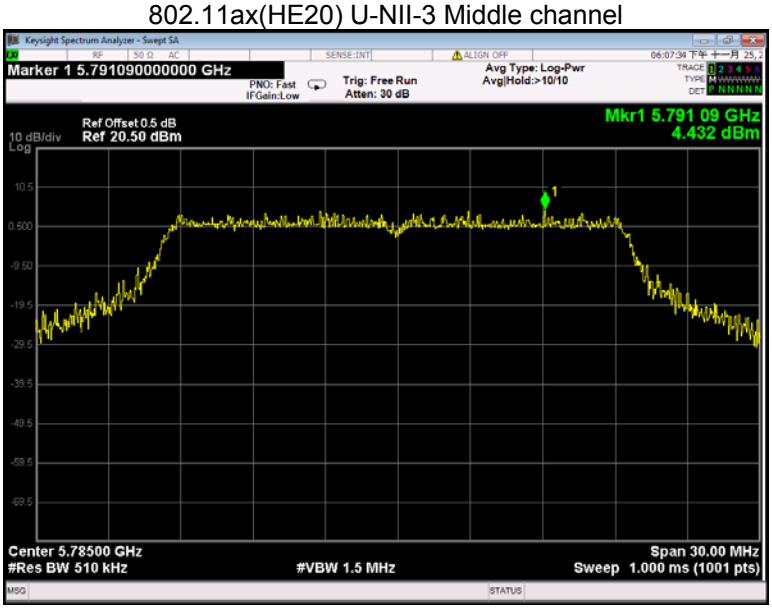
802.11ac(VHT40) U-NII-3 High channel



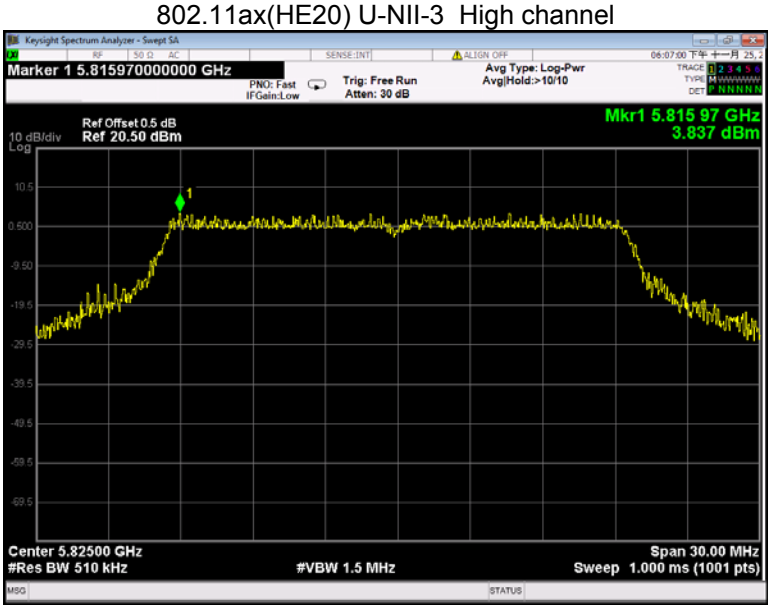
802.11ax(HE20) U-NII-3 Low channel



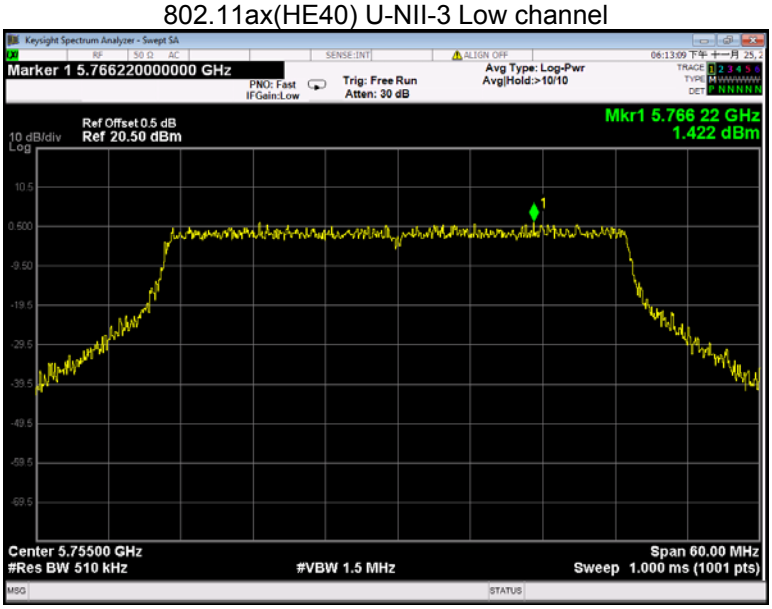
802.11ax(HE20) U-NII-3 Middle channel



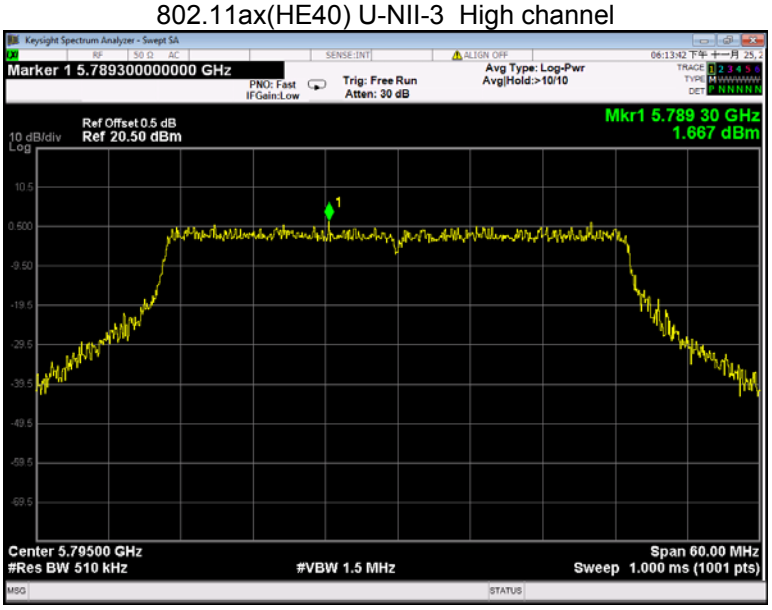
802.11ax(HE20) U-NII-3 High channel



802.11ax(HE40) U-NII-3 Low channel



802.11ax(HE40) U-NII-3 High channel



15 Frequency Stability

Test Requirement:	FCC 47CFR 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~ 50°C.

15.2 Test Result

U-NII-1 Test Frequency:5180MHz				
Temperature (℃)	Power Supply (VAC)	Frequency Error (MHz)	Frequency Error (ppm)	Limit (ppm)
50	120	0.0029	0.56	20
45		-0.0029	-0.57	20
30		0.0034	0.65	20
20		0.0000	0.00	20
10		-0.0050	-0.96	20
0		-0.0060	-1.16	20
-10		-0.0039	-0.75	20
-15		-0.0032	-0.62	20
20	108	0.0028	0.54	20
20	132	-0.0014	-0.27	20

U-NII-2A Test Frequency:5260MHz				
Temperature (℃)	Power Supply (VAC)	Frequency Error (MHz)	Frequency Error (ppm)	Limit (ppm)
50	120	0.0008	0.16	20
45		0.0027	0.51	20
30		-0.0047	-0.90	20
20		0.0000	0.00	20
10		-0.0004	-0.08	20
0		-0.0093	-1.78	20
-10		-0.0027	-0.52	20
-15		0.0058	1.11	20
20	108	0.0040	0.77	20
20	132	-0.0017	-0.33	20

U-NII-2C Test Frequency:5500MHz				
Temperature (℃)	**Power Supply (VAC)**	**Frequency Error (MHz)**	**Frequency Error (ppm)**	**Limit (ppm)**
50	120	0.0042	0.77	20
45		-0.0054	-0.99	20
30		0.0002	0.04	20
20		0.0010	0.18	20
10		0.0052	0.95	20
0		-0.0081	-1.47	20
-10		-0.0042	-0.77	20
-15		-0.0018	-0.33	20
20	108	0.0016	0.30	20
20	132	-0.0027	-0.48	20

U-NII-3 Test Frequency:5785MHz				
Temperature (℃)	**Power Supply (VAC)**	**Frequency Error (MHz)**	**Frequency Error (ppm)**	**Limit (ppm)**
50	120	0.0020	0.34	20
45		0.0047	0.81	20
30		0.0013	0.23	20
20		0.0005	0.09	20
10		-0.0018	-0.31	20
0		0.0028	0.48	20
-10		0.0034	0.59	20
-15		-0.0009	-0.15	20
20	108	0.0076	1.32	20
20	132	0.0003	0.05	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 has a FPC Antenna fulfil the requirement.

17 RF Exposure

Remark: refer to MPE test report: WTD24D11265347W005.

18 Photographs of test setup and EUT.

Note: Please refer to appendix: Appendix-AI VISION,HB570AI-Photos.

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