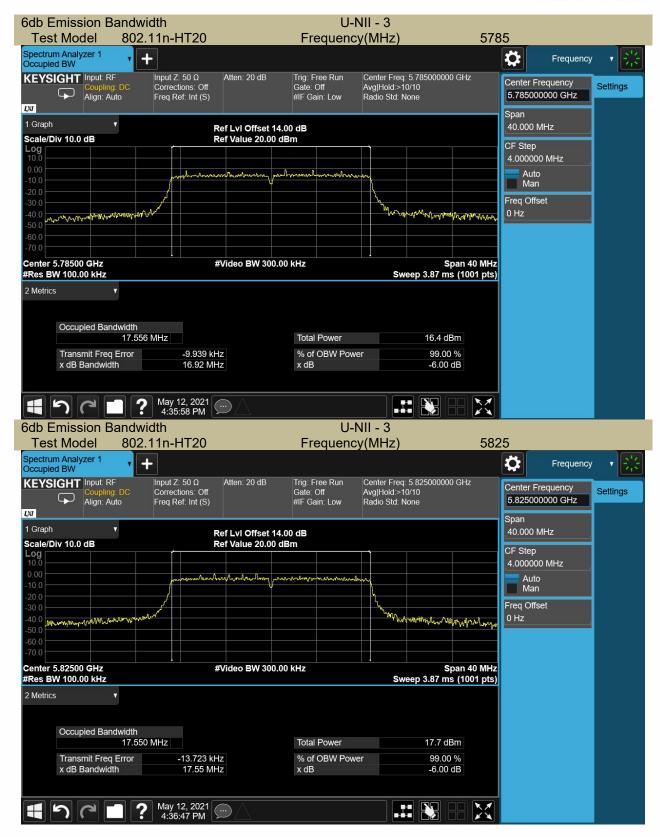
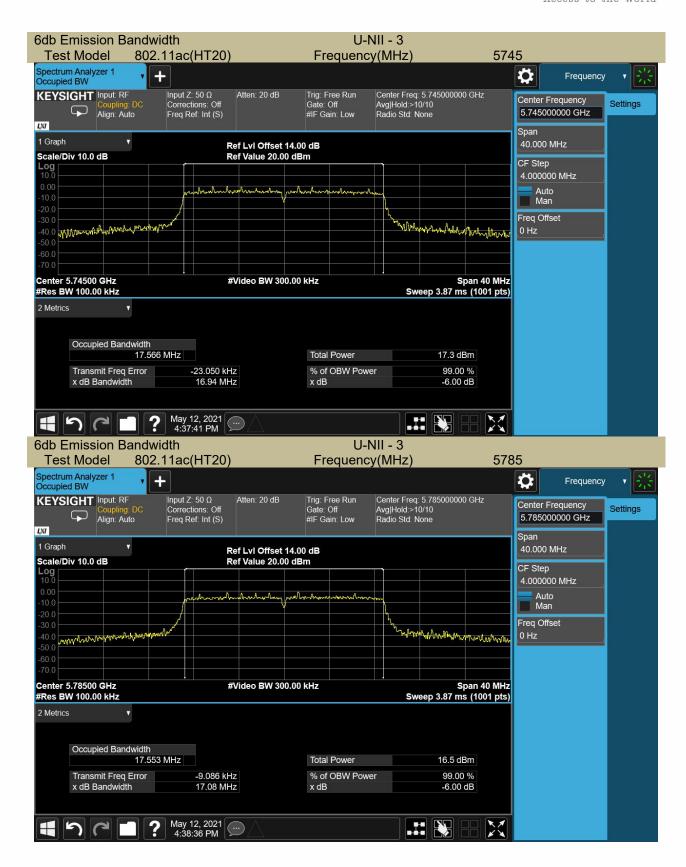




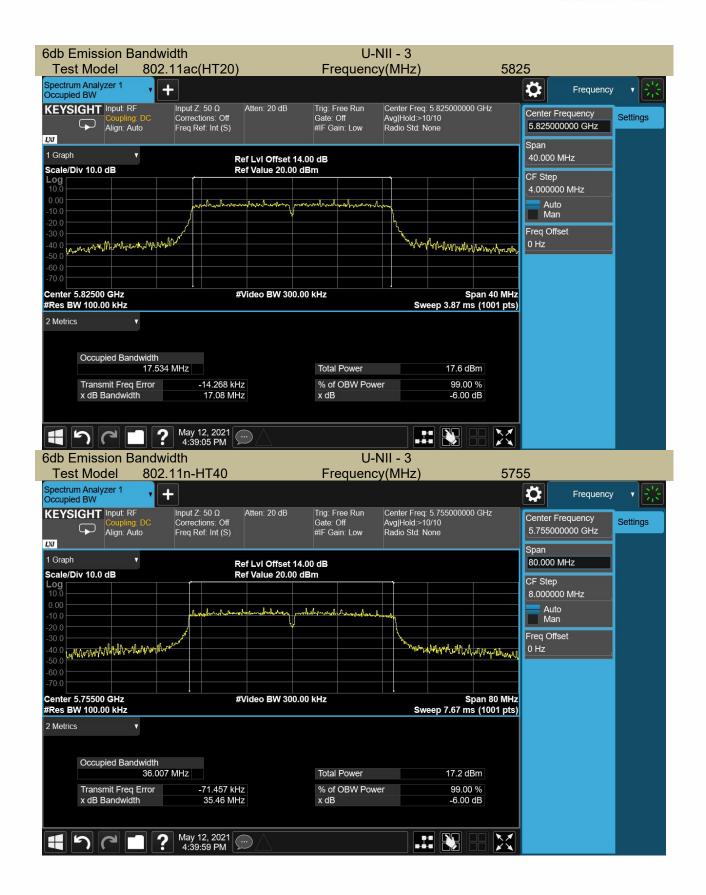
Access to the World



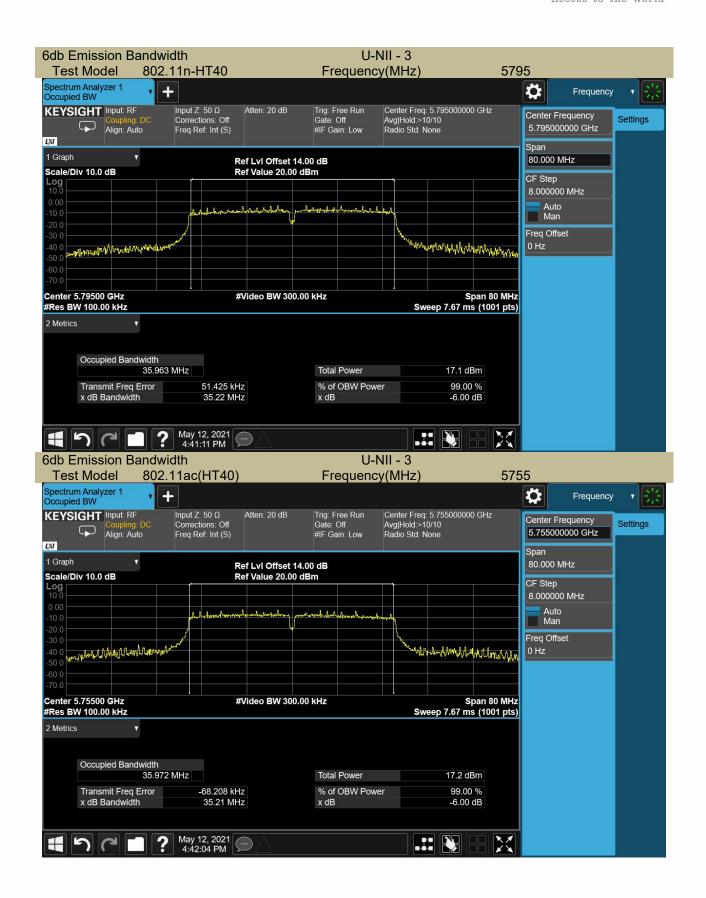




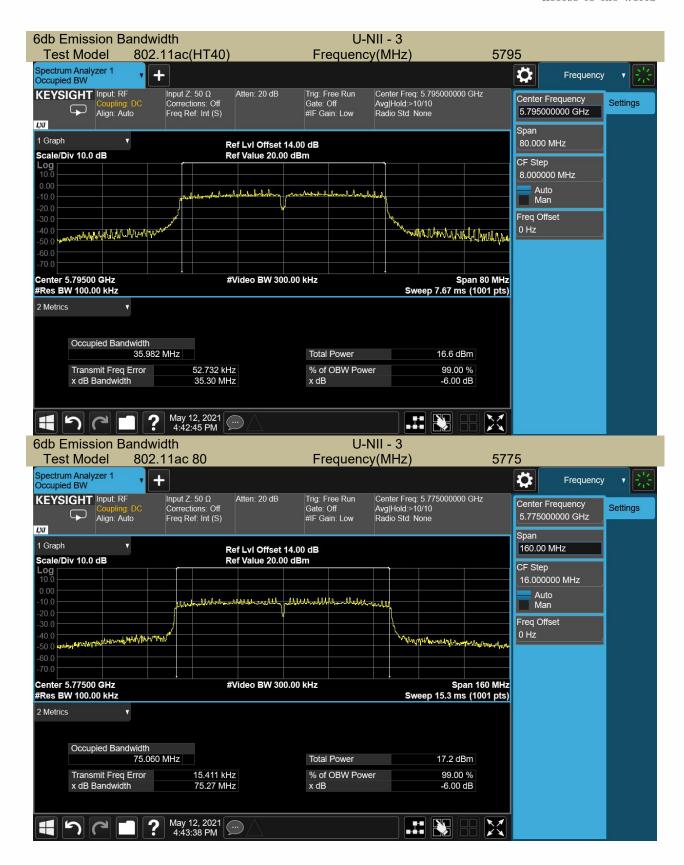














8.2 MAXIMUM CONDUCTED OUTPUT POWER

8.2.1 Applicable Standard

According to FCC Part 15.407(a)(1) for UNII Band I According to FCC Part 15.407(a)(2) for UNII Band II-A and UNII Band II-C According to FCC Part 15.407(a)(3) for UNII Band III According to 789033 D02 Section II(E)

8.2.2 Conformance Limit

■ For the band 5.15-5.25 GHz,

- (a) (1) (i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).
- (a) (1) (ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
- (a) (1) (iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.
- (a) (1) (iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

■ For the 5.25-5.35 GHz and 5.47-5.725 GHz bands

(a) (2) the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

■ For the band 5.725-5.85 GHz

(a) (3)For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

8.2.3 Test Configuration

Test according to clause 6.1 radio frequency test setup



8.2.4 Test Procedure

Method 1 For Normal Bandwidth 20MHz, 40MHz

The maximum average conducted output power can be measured using Method PM-G (Measurement using an RF average power meter):

- a. The Transmitter output (antenna port) was connected to the power meter.
- b. Turn on the EUT and power meter and then record the power value.
- c. Repeat above procedures on all channels needed to be tested.

Method 2 For Normal Bandwidth 80MHz

Measurement of maximum conducted output power using a spectrum analyzer (Method SA-1 from KDB 789033)

- a. Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.
- b. Set RBW = 1 MHz.
- c. Set VBW \geq 3 MHz.
- d. Number of points in sweep $\geq 2 \times \text{span} / \text{RBW}$. (This ensures that bin-to-bin spacing is $\leq \text{RBW}/2$, so that narrowband signals are not lost between frequency bins.)
- e. Sweep time = auto.
- f. Detector = power averaging (rms)
- g. Trace average at least 100 traces in power averaging (rms) mode.
- h. Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

8.2.5 Test Results



UNII Band I Temperature: Test By: 28℃

Humidity: 56%

Antenna 1

Band	Channel Number	Channel Freq. (MHz)	Conducted Power dBm	Limit (dBm)	Verdict
	CH36	5180	13.13	24	Pass
802.11a	CH40	5200	14.41	24	Pass
	CH48	5240	14.74	24	Pass
000.44=	CH36	5180	12.22	24	Pass
802.11n	CH40	5200	12.55	24	Pass
(HT20)	CH48	5240	11.16	24	Pass
902 1140	CH36	5180	11.77	24	Pass
802.11AC	CH40	5200	12.11	24	Pass
(VHT20)	CH48	5240	11.30	24	Pass
802.11n	CH38	5190	12.70	24	Pass
(HT40)	CH46	5230	11.82	24	Pass
802.11AC	CH38	5190	12.08	24	Pass
(VHT40)	CH46	5230	12.46	24	Pass
802.11AC (VHT80)	CH42	5210	12.57	24	Pass

UNII Band I Temperature: 28℃

Humidity: 56%

Antenna 2

TOM Test By:

TOM

Band	Channel Number	Channel Freq. (MHz)	Conducted Power dBm	Limit (dBm)	Verdict
	CH36	5180	11.88	24	Pass
802.11a	CH40	5200	11.04	24	Pass
	CH48	5240	11.46	24	Pass
802.11n	CH36	5180	11.74	24	Pass
	CH40	5200	11.29	24	Pass
(HT20)	CH48	5240	11.66	24	Pass
802.11AC	CH36	5180	12.16	24	Pass
(VHT20)	CH40	5200	12.80	24	Pass
(٧Π120)	CH48	5240	12.15	24	Pass
802.11n	CH38	5190	12.60	24	Pass
(HT40)	CH46	5230	11.85	24	Pass
802.11AC	CH38	5190	12.18	24	Pass
(VHT40)	CH46	5230	12.20	24	Pass
802.11AC (VHT80)	CH42	5210	12.52	24	Pass



UNII Band I Temperature: Test By: 28℃

Humidity : Antenna 1+2 56%

Band	Channel Number	Channel Freq. (MHz)	Conducted Power dBm	Limit (dBm)	Verdict
000 445	CH36	5180	15.00	23.6	Pass
802.11n (HT20)	CH40	5200	14.98	23.6	Pass
(П120)	CH48	5240	14.43	23.6	Pass
000 1110	CH36	5180	14.98	23.6	Pass
802.11AC (VHT20)	CH40	5200	15.48	23.6	Pass
(VIIIZU)	CH48	5240	14.76	23.6	Pass
802.11n	CH38	5190	15.66	23.6	Pass
(HT40)	CH46	5230	14.85	23.6	Pass
802.11AC	CH38	5190	15.14	23.6	Pass
(VHT40)	CH46	5230	15.34	23.6	Pass
802.11AC (VHT80)	CH42	5210	15.56	23.6	Pass

TOM



UNII Band II-A Temperature : 28°C Test By:

Humidity: 56%

Antenna 1

Band	Channel Number	Channel Freq. (MHz)	Conducted Power dBm	Limit (dBm)	Verdict
	CH52	5260	11.11	24	Pass
802.11a	CH56	5280	11.68	24	Pass
	CH64	5320	12.08	24	Pass
900 11p	CH52	5260	11.61	24	Pass
802.11n	CH56	5280	11.97	24	Pass
(HT20)	CH64	5320	12.01	24	Pass
902 1140	CH52	5260	11.64	24	Pass
802.11AC	CH56	5280	11.79	24	Pass
(VHT20)	CH64	5320	11.70	24	Pass
802.11n	CH54	5270	11.79	24	Pass
(HT40)	CH62	5310	12.39	24	Pass
802.11AC	CH54	5270	11.16	24	Pass
(VHT40)	CH62	5310	11.70	24	Pass
802.11AC (VHT80)	CH42	5290	12.24	24	Pass

TOM

TOM

UNII Band II-A Temperature : 28℃ Test By:

Humidity: 56%

Antenna 2

Band	Channel Number	Channel Freq. (MHz)	Conducted Power dBm	Limit (dBm)	Verdict
	CH52	5260	11.85	24	Pass
802.11a	CH56	5280	12.04	24	Pass
	CH64	5320	11.86	24	Pass
802.11n	CH52	5260	12.12	24	Pass
	CH56	5280	11.81	24	Pass
(HT20)	CH64	5320	11.72	24	Pass
802.11AC	CH52	5260	11.54	24	Pass
(VHT20)	CH56	5280	11.85	24	Pass
(11120)	CH64	5320	12.37	24	Pass
802.11n	CH54	5270	12.27	24	Pass
(HT40)	CH62	5310	12.27	24	Pass
802.11AC	CH54	5270	11.73	24	Pass
(VHT40)	CH62	5310	12.86	24	Pass
802.11AC (VHT80)	CH42	5290	12.00	24	Pass



Pass

Pass

Pass

Pass

Pass

UNII Band II-A

Temperature : 28° Test By: TOM

Humidity: 56% Antenna 1+2

802.11n

(HT40)

802.11AC

(VHT40)

802.11AC

(VHT80)

CH54

CH62

CH54

CH62

CH42

Conducted Channel Channel Freq. Limit Band Power Verdict Number (dBm) (MHz) dBm 5260 14.88 23.6 CH52 Pass 802.11n 14.90 CH56 5280 23.6 **Pass** (HT20) CH64 5320 14.88 23.6 **Pass** CH52 5260 14.60 23.6 **Pass** 802.11AC **CH56** 14.83 23.6 Pass 5280 (VHT20) 15.06 CH64 5320 23.6 Pass

15.05

15.34

14.46

15.33

15.13

23.6

23.6

23.6

23.6

23.6

5270

5310

5270

5310

5290



UNII Band II-C Temperature : 28°C Test By:

Humidity: 56%

Antenna 1

Band	Channel Number	Channel Freq. (MHz)	Conducted Power dBm	Limit (dBm)	Verdict
	CH100	5500	12.51	24	Pass
802.11a	CH116	5580	12.45	24	Pass
	CH140	5700	12.91	24	Pass
802.11n	CH100	5500	12.41	24	Pass
	CH116	5580	12.40	24	Pass
(HT20)	CH140	5700	13.32	24	Pass
802.11AC	CH100	5500	12.15	24	Pass
	CH116	5580	12.38	24	Pass
(VHT20)	CH140	5700	13.43	24	Pass
802.11n	CH102	5510	12.48	24	Pass
(HT40)	CH134	5670	12.59	24	Pass
802.11AC	CH102	5510	12.74	24	Pass
(VHT40)	CH134	5670	12.45	24	Pass
802.11AC (VHT80)	CH106	5530	12.56	24	Pass

TOM

TOM

UNII Band II-C re : 28℃ Test By:

Temperature : 28° C Humidity : 56%

Antenna 2

Band	Channel Number	Channel Freq. (MHz)	Conducted Power dBm	Limit (dBm)	Verdict
	CH100	5500	12.99	24	Pass
802.11a	CH116	5580	12.15	24	Pass
	CH140	5700	13.08	24	Pass
802.11n	CH100	5500	12.65	24	Pass
(HT20)	CH116	5580	12.17	24	Pass
(11120)	CH140	5700	13.42	24	Pass
802.11AC	CH100	5500	12.78	24	Pass
(VHT20)	CH116	5580	12.44	24	Pass
(VIII20)	CH140	5700	13.32	24	Pass
802.11n	CH102	5510	12.26	24	Pass
(HT40)	CH134	5670	12.55	24	Pass
802.11AC	CH102	5510	12.79	24	Pass
(VHT40)	CH134	5670	12.29	24	Pass
802.11AC (VHT80)	CH106	5530	12.74	24	Pass



UNII Band II-C

Temperature : 28° C Test By: TOM

Humidity: 56% Antenna 1+2

Band	Channel Number	Channel Freq. (MHz)	Conducted Power dBm	Limit (dBm)	Verdict
000 445	CH100	5500	15.54	23.6	Pass
802.11n	CH116	5580	15.30	23.6	Pass
(HT20)	CH140	5700	16.38	23.6	Pass
000 1110	CH100	5500	15.49	23.6	Pass
802.11AC	CH116	5580	15.42	23.6	Pass
(VHT20)	CH140	5700	16.39	23.6	Pass
802.11n	CH102	5510	15.38	23.6	Pass
(HT40)	CH134	5670	15.58	23.6	Pass
802.11AC	CH102	5510	15.78	23.6	Pass
(VHT40)	CH134	5670	15.38	23.6	Pass
802.11AC (VHT80)	CH106	5530	15.66	23.6	Pass



UNII Band III

Temperature : 28° C Test By: TOM

Humidity: 56%

Antenna 1

Band	Channel Number	Channel Freq. (MHz)	Conducted Power dBm	Limit (dBm)	Verdict
	CH149	5745	12.28	30.00	Pass
802.11a	CH157	5785	12.57	30.00	Pass
	CH165	5825	13.08	30.00	Pass
000.44=	CH149	5745	12.50	30.00	Pass
802.11n	CH157	5785	12.15	30.00	Pass
(HT20)	CH165	5825	12.60	30.00	Pass
000 4440	CH149	5745	12.73	30.00	Pass
802.11AC	CH157	5785	12.98	30.00	Pass
(VHT20)	CH165	5825	12.84	30.00	Pass
802.11n	CH151	5755	12.84	30.00	Pass
(HT40)	CH159	5795	12.57	30.00	Pass
802.11AC	CH151	5755	12.82	30.00	Pass
(VHT40)	CH159	5795	12.42	30.00	Pass
802.11AC (VHT80)	CH155	5775	12.52	30.00	Pass

UNII Band III

Temperature : 28℃ Test By: TOM

Humidity: 56%

Antenna 2

Band	Channel Number	Channel Freq. (MHz)	Conducted Power dBm	Limit (dBm)	Verdict
	CH149	5745	13.14	30.00	Pass
802.11a	CH157	5785	12.89	30.00	Pass
	CH165	5825	13.19	30.00	Pass
000 11=	CH149	5745	12.61	30.00	Pass
802.11n	CH157	5785	12.66	30.00	Pass
(HT20)	CH165	5825	12.92	30.00	Pass
802.11AC	CH149	5745	13.47	30.00	Pass
	CH157	5785	12.57	30.00	Pass
(VHT20)	CH165	5825	12.62	30.00	Pass
802.11n	CH151	5755	13.31	30.00	Pass
(HT40)	CH159	5795	13.59	30.00	Pass
802.11AC	CH151	5755	13.20	30.00	Pass
(VHT40)	CH159	5795	13.45	30.00	Pass
802.11AC (VHT80)	CH155	5775	12.60	30.00	Pass



UNII Band III Temperature: Test By: 28℃

Humidity : Antenna 1+2 56%

Band	Channel Number	Channel Freq.	Conducted	Limit	
		(MHz)	Power	(dBm)	Verdict
			dBm		
802.11n	CH149	5745	15.57	29.6	Pass
(HT20)	CH157	5785	15.42	29.6	Pass
(11120)	CH165	5825	15.77	29.6	Pass
802.11AC	CH149	5745	16.13	29.6	Pass
(VHT20)	CH157	5785	15.79	29.6	Pass
(VIII20)	CH165	5825	15.74	29.6	Pass
802.11n	CH151	5755	16.09	29.6	Pass
(HT40)	CH159	5795	16.12	29.6	Pass
802.11AC	CH151	5755	16.02	29.6	Pass
(VHT40)	CH159	5795	15.98	29.6	Pass
802.11AC (VHT80)	CH155	5775	15.57	29.6	Pass

TOM



8.3 MAXIMUM PEAK POWER DENSITY

8.3.1 Applicable Standard

According to FCC Part 15.407(a)(1) for UNII Band I
According to FCC Part 15.407(a)(2) for UNII Band II-A and UNII Band II-C
According to FCC Part 15.407(a)(3) for UNII Band III
According to 789033 D02 Section II(F)

8.3.2 Conformance Limit

■ For the band 5.15-5.25 GHz,

- (a) (1) (i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).
- (a) (1) (ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
- (a) (1) (iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.
- (a) (1) (iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

■ For the 5.25-5.35 GHz and 5.47-5.725 GHz bands

(b) (2) the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

■ For the band 5.725-5.85 GHz

(a) (3)For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

8.3.3 Test Configuration

Test according to clause 6.1 radio frequency test setup



8.3.4 Test Procedure

Methods refer to FCC KDB 789033

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, "provided that the measured power is integrated over the full reference bandwidth" to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 KHz bandwidth, the following adjustments to the procedures apply:

- a) Set RBW \geq 1/T, where T is defined in section II.B.l.a).
- b) Set $VBW \ge 3 RBW$.
- c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 KHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
- d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10log(1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
- e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100 KHz for the sections

5.c) and 5.d) above, since RBW=100 KHZ is available on nearly all spectrum analyzers.



8.3.5 Test Results

1T1R - Antenna 1

5150-5250MHz

Operating mode	Test Channel	Power Spectral Density dBm/MHz	Limit (dBm/MHz)
	5180	2.69	11
802.11a	5200	3.87	11
	5240	4.02	11
	5180	1.15	11
802.11n-HT20	5200	2.49	11
	5240	3.41	11
	5180	1.04	11
802.11ac(HT20)	5200	2.74	11
	5240	3.14	11
802.11n-HT40	5190	-2.12	11
002.11II-H140	5230	-0.51	11
802.11ac(HT40)	5190	-2.42	11
002.114С(П140)	5230	-0.60	11
802.11ac(HT80)	5210	-5.78	11























