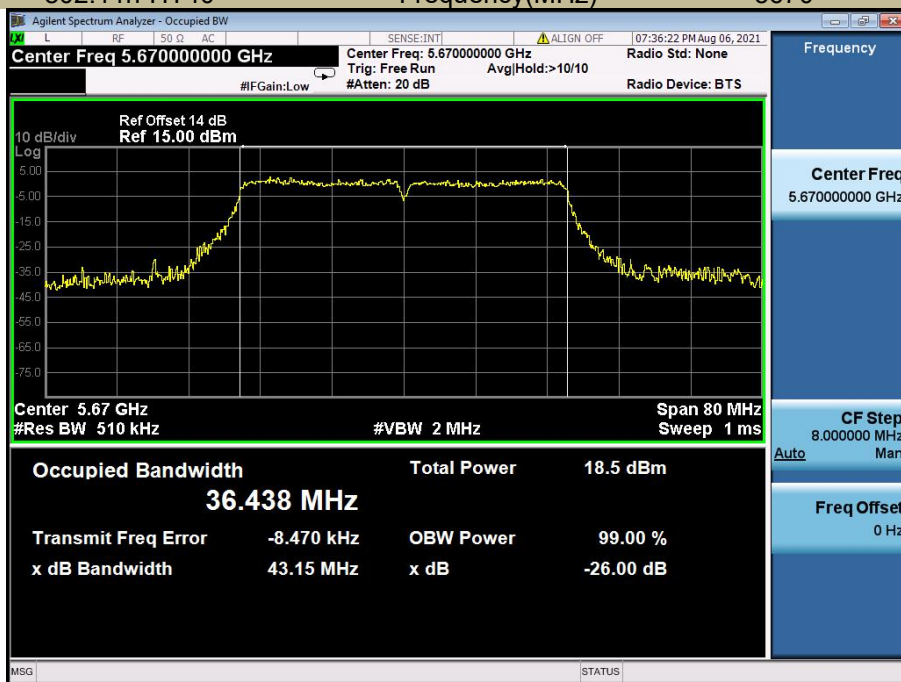


26 dB&99% Emission Bandwidth
Test Model 802.11n-HT40

U-NII – 2C
Frequency(MHz)

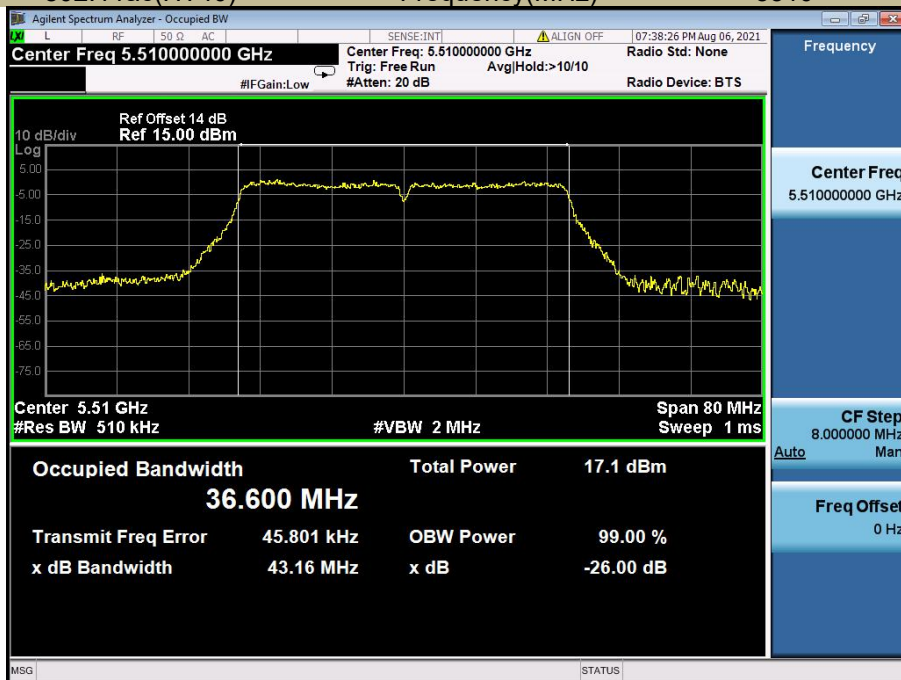
5670



26 dB&99% Emission Bandwidth
Test Model 802.11ac(HT40)

U-NII – 2C
Frequency(MHz)

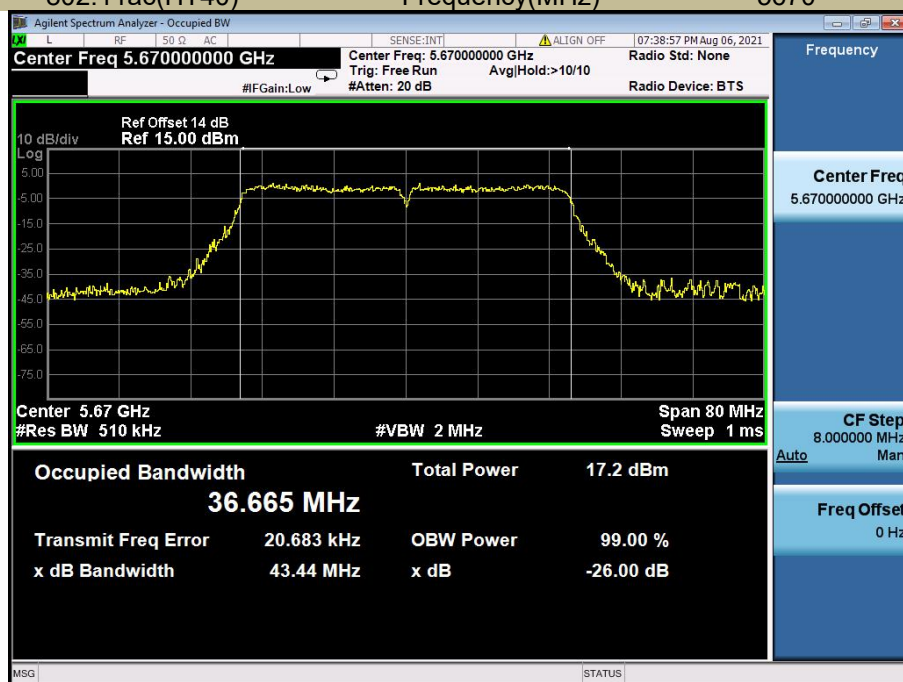
5510



26 dB&99% Emission Bandwidth
Test Model 802.11ac(HT40)

U-NII – 2C
Frequency(MHz)

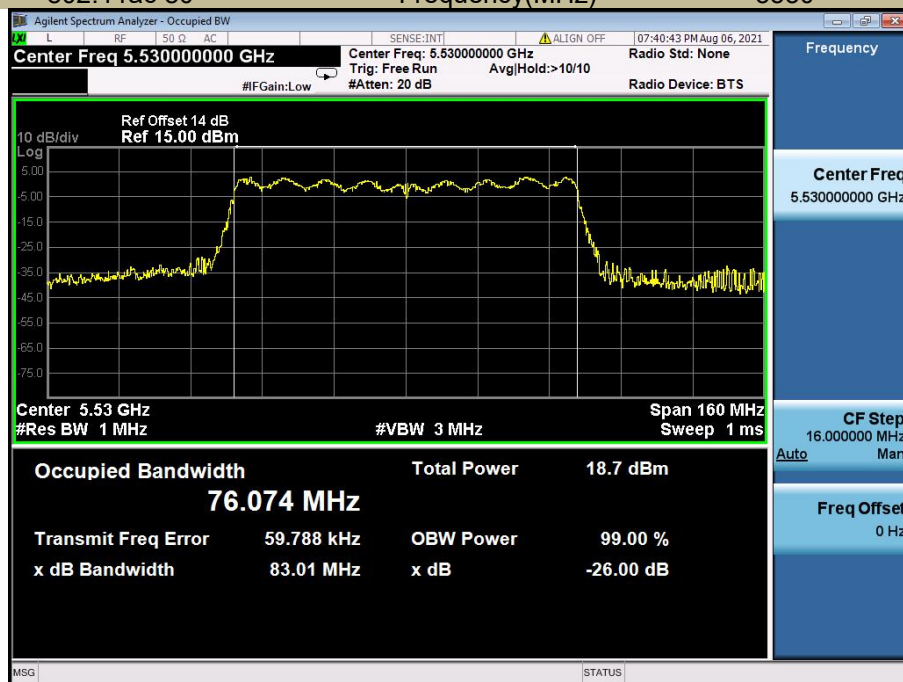
5670



26 dB&99% Emission Bandwidth
Test Model 802.11ac 80

U-NII – 2C
Frequency(MHz)

5530



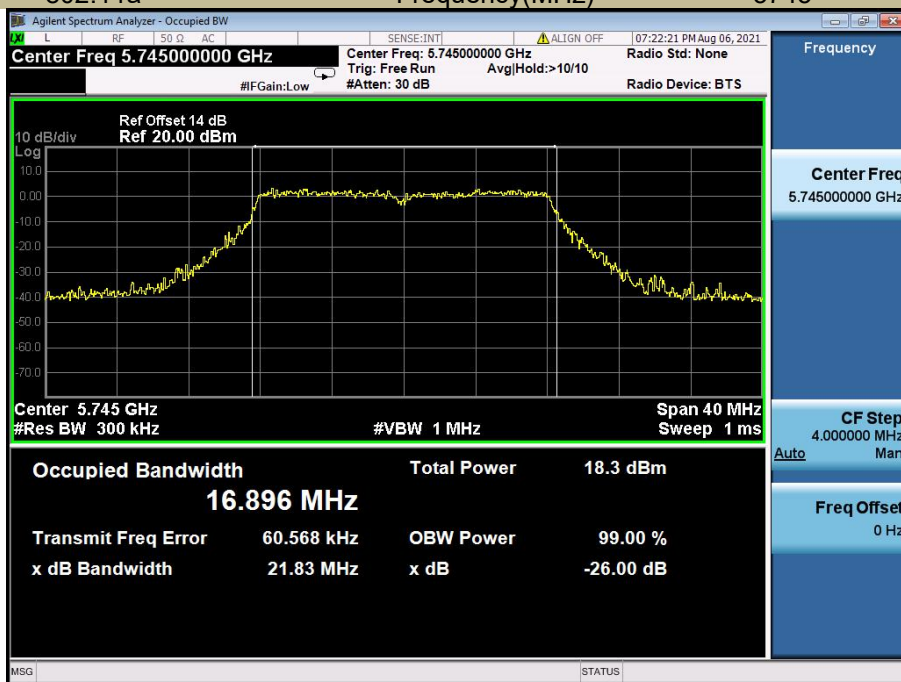
5725-5850MHz

Test Mode	Test Channel MHz		6 dB Bandwidth MHz	99% Bandwidth MHz	Limit kHz
802.11a	CH149	5745	17.55	16.896	≥500
	CH157	5785	17.61	16.896	≥500
	CH165	5825	17.62	16.919	≥500
802.11n-HT20	CH149	5745	17.34	17.896	≥500
	CH157	5785	17.56	17.874	≥500
	CH165	5825	17.56	17.972	≥500
802.11ac(HT20)	CH149	5745	17.55	17.941	≥500
	CH157	5785	17.59	17.980	≥500
	CH165	5825	17.54	17.923	≥500
802.11n-HT40	CH151	5755	35.93	36.543	≥500
	CH159	5795	36.36	36.530	≥500
802.11ac(HT40)	CH151	5755	36.10	36.551	≥500
	CH159	5795	35.77	36.467	≥500
802.11ac(HT80)	CH155	5775	75.48	76.022	≥500

99% Occupied Bandwidth
Test Model 802.11a

U-NII - 3
Frequency(MHz)

5745



99% Occupied Bandwidth
Test Model 802.11a

U-NII - 3
Frequency(MHz)

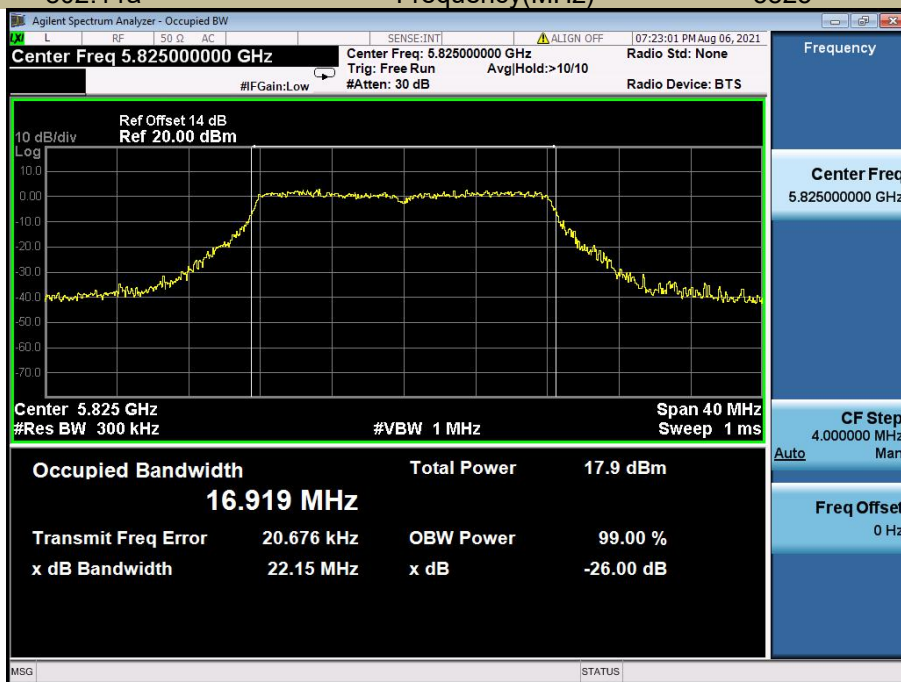
5785



99% Occupied Bandwidth
Test Model 802.11a

U-NII - 3
Frequency(MHz)

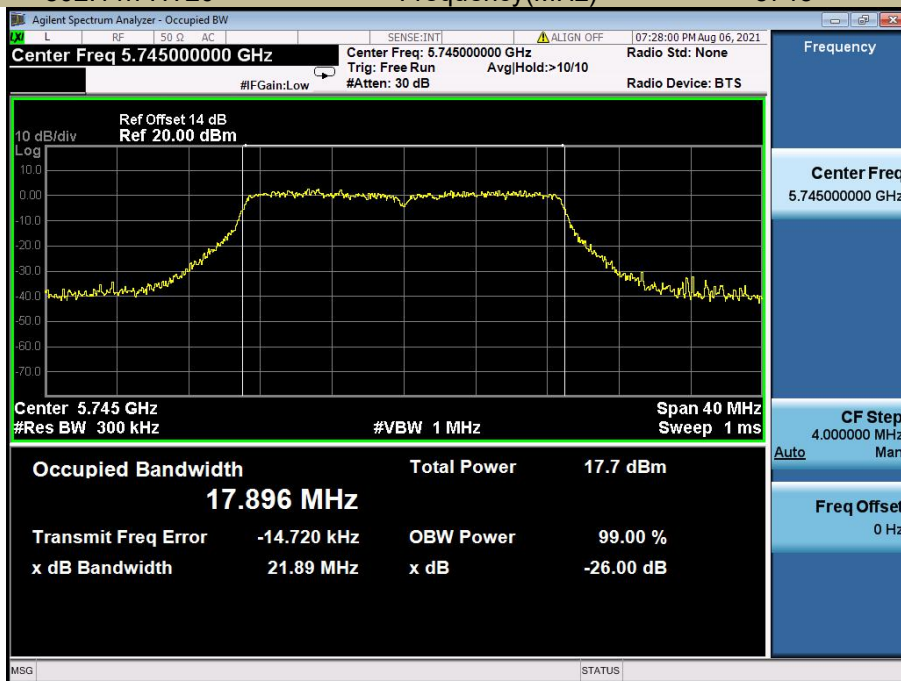
5825



99% Occupied Bandwidth
Test Model 802.11n-HT20

U-NII - 3
Frequency(MHz)

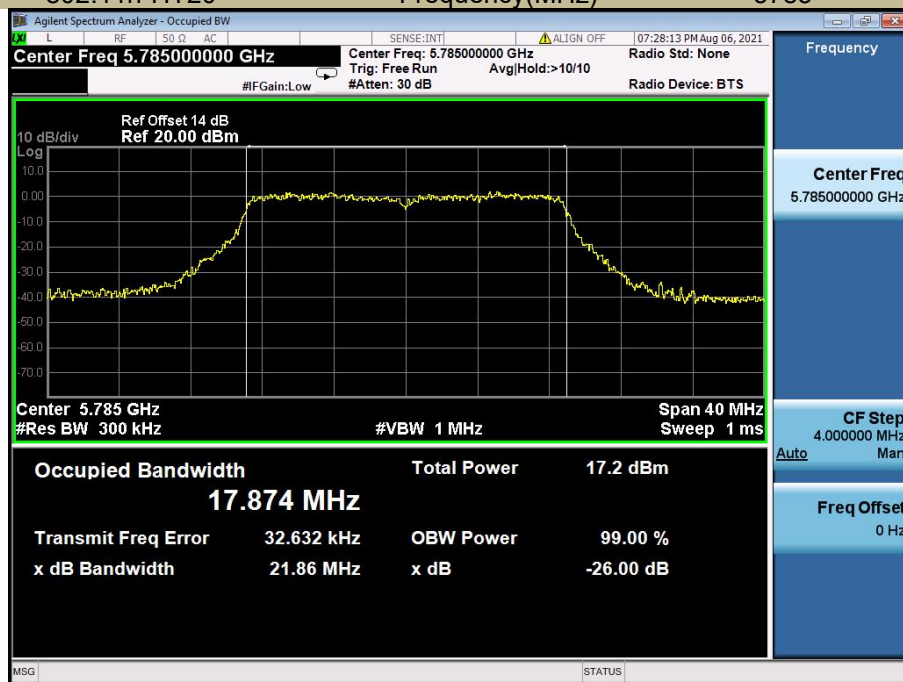
5745



99% Occupied Bandwidth
Test Model 802.11n-HT20

U-NII - 3
Frequency(MHz)

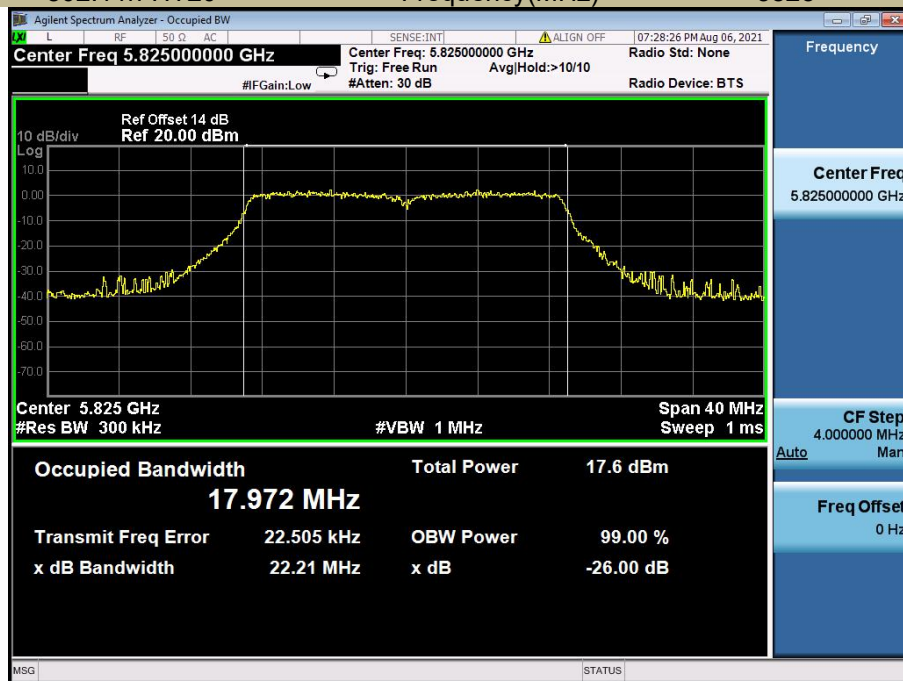
5785



99% Occupied Bandwidth
Test Model 802.11n-HT20

U-NII - 3
Frequency(MHz)

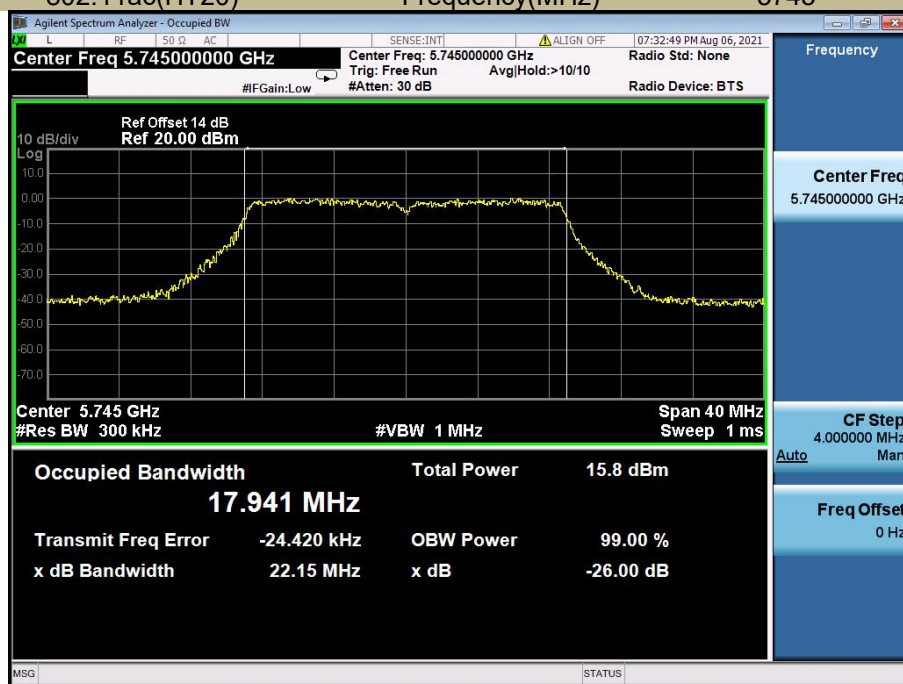
5825



99% Occupied Bandwidth
Test Model 802.11ac(HT20)

U-NII - 3
Frequency(MHz)

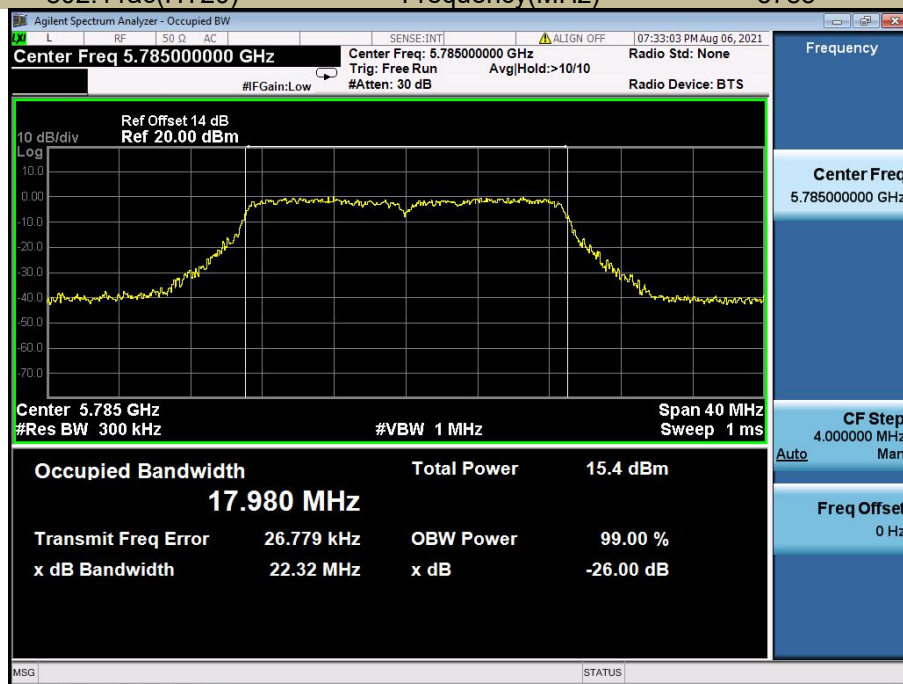
5745



99% Occupied Bandwidth
Test Model 802.11ac(HT20)

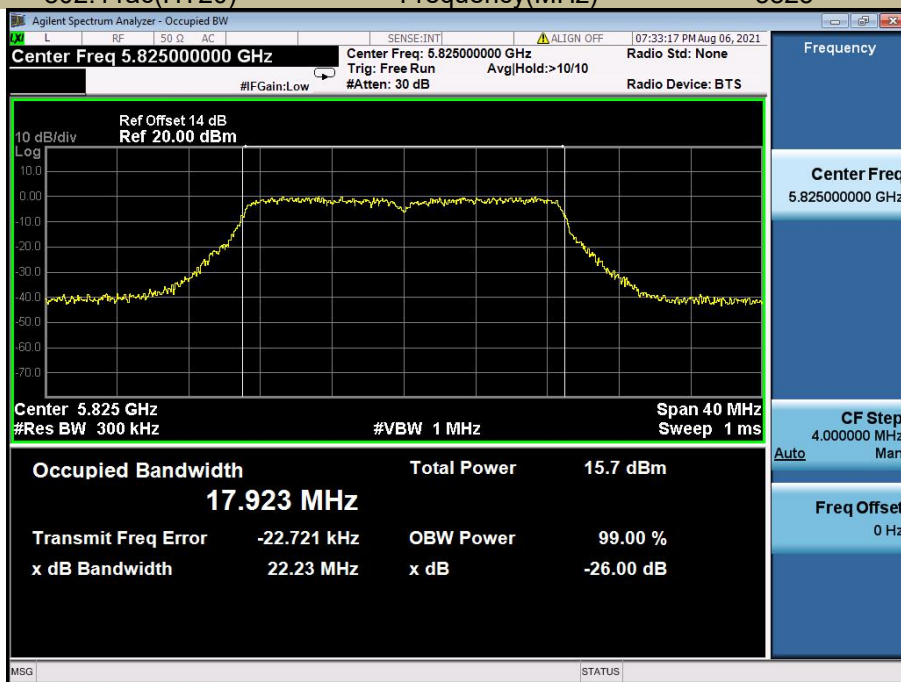
U-NII - 3
Frequency(MHz)

5785



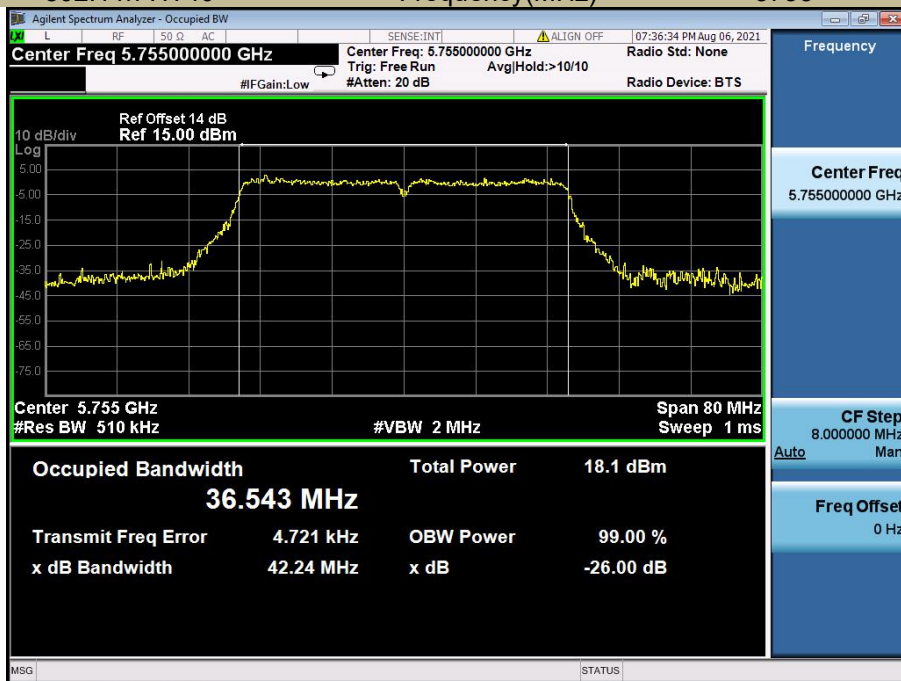
99% Occupied Bandwidth
Test Model 802.11ac(HT20)

U-NII - 3
Frequency(MHz) 5825



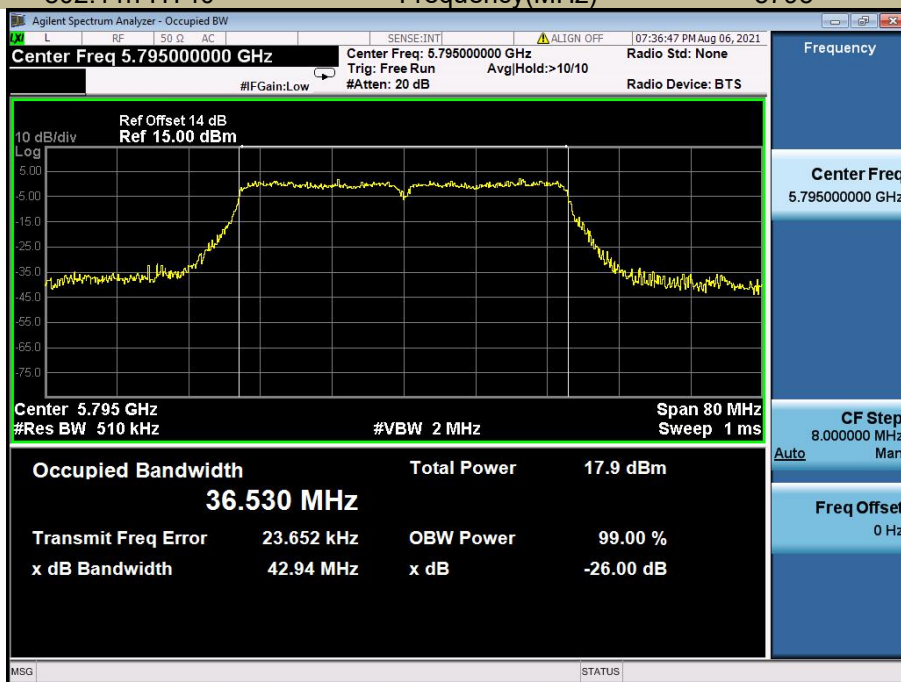
99% Occupied Bandwidth
Test Model 802.11n-HT40

U-NII - 3
Frequency(MHz) 5755



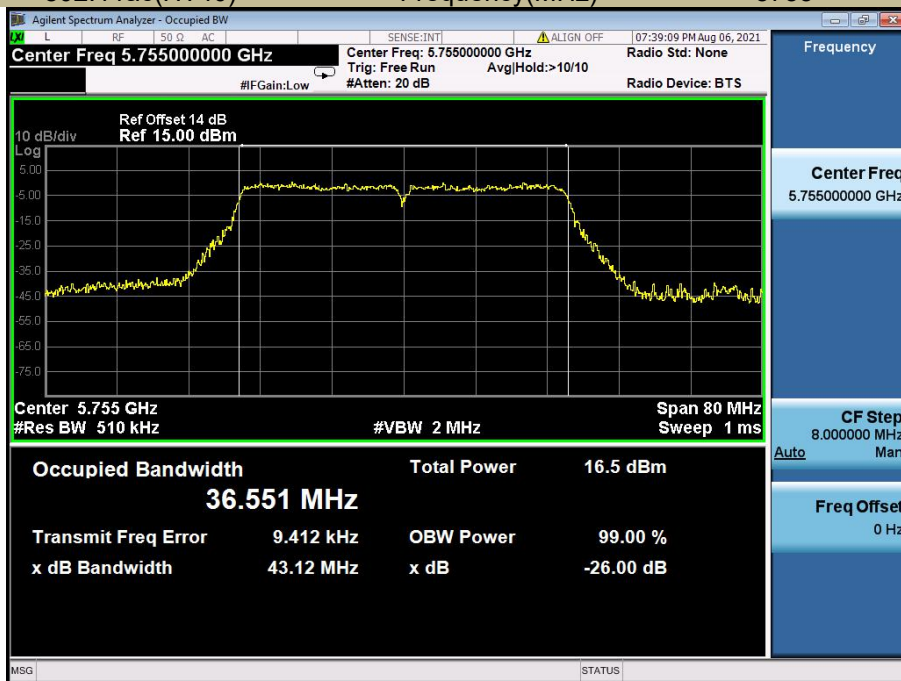
99% Occupied Bandwidth
Test Model 802.11n-HT40

U-NII - 3
Frequency(MHz) 5795



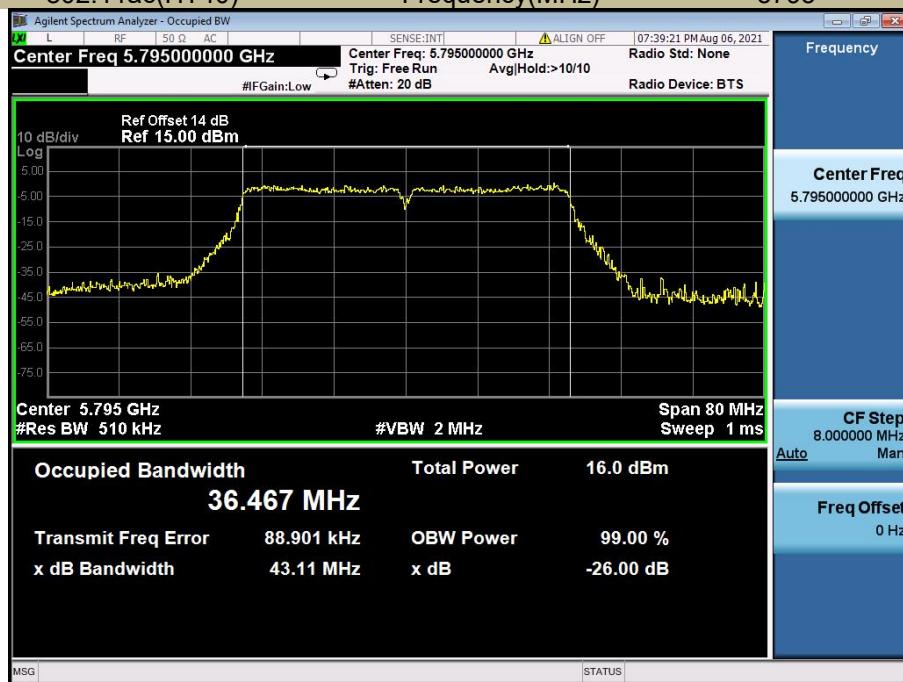
99% Occupied Bandwidth
Test Model 802.11ac(HT40)

U-NII - 3
Frequency(MHz) 5755



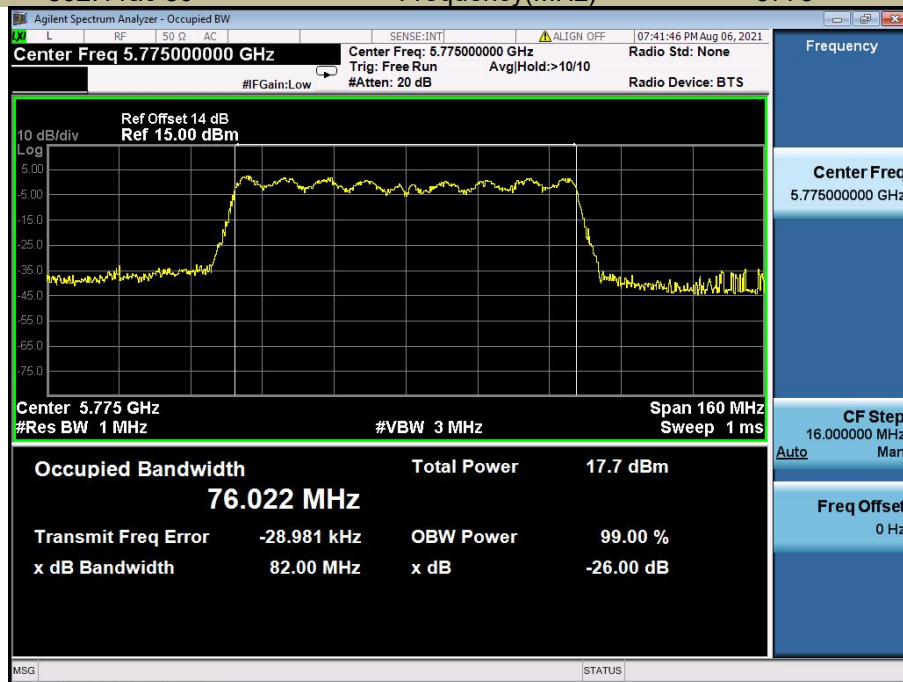
99% Occupied Bandwidth
Test Model 802.11ac(HT40)

U-NII - 3
Frequency(MHz) 5795



99% Occupied Bandwidth
Test Model 802.11ac 80

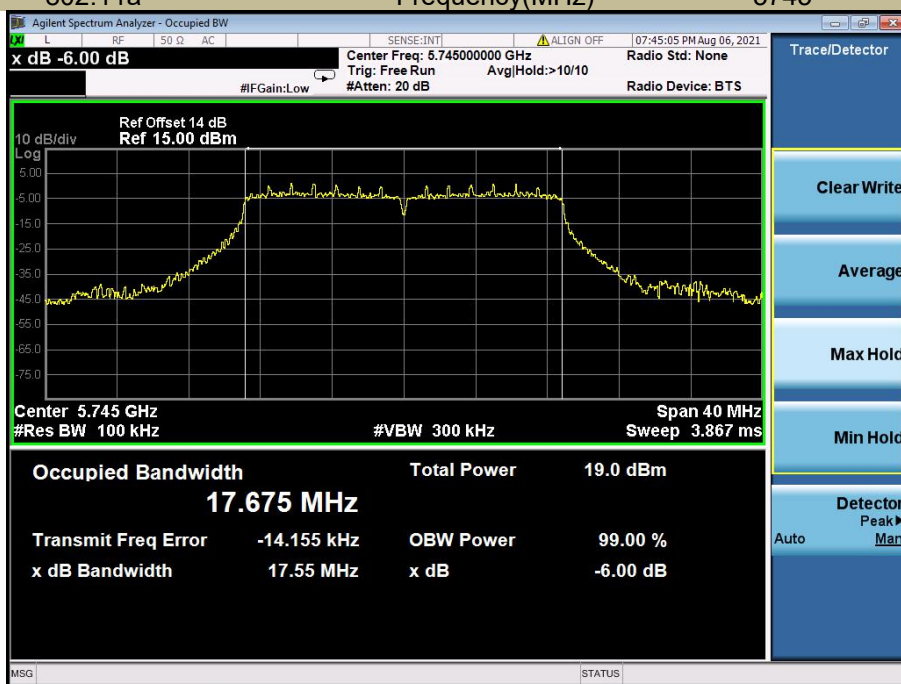
U-NII - 3
Frequency(MHz) 5775



-6 dB Emission Bandwidth
Test Model 802.11a

U-NII - 3
Frequency(MHz)

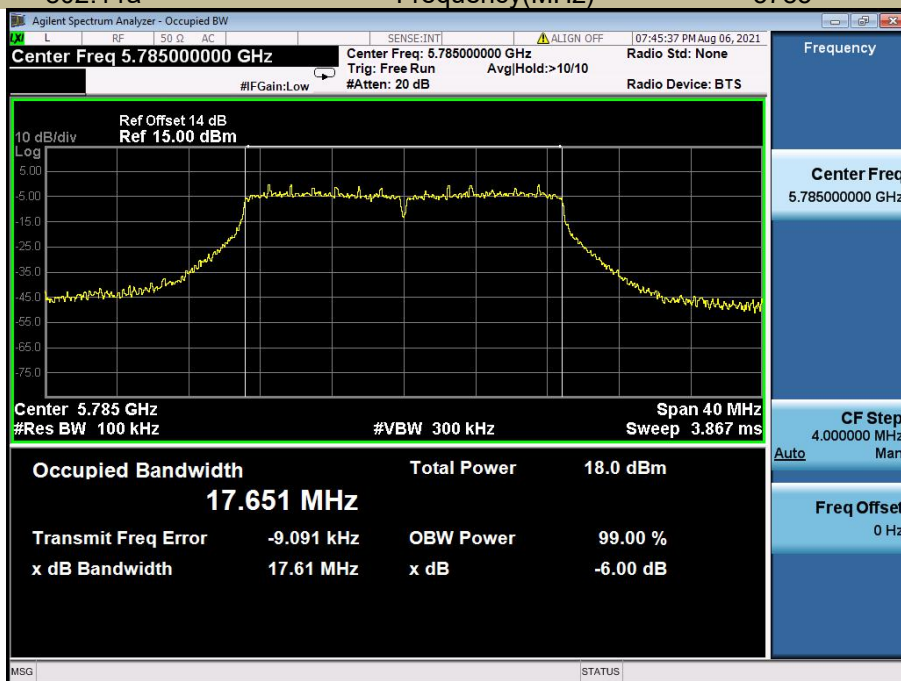
5745



-6 dB Emission Bandwidth
Test Model 802.11a

U-NII - 3
Frequency(MHz)

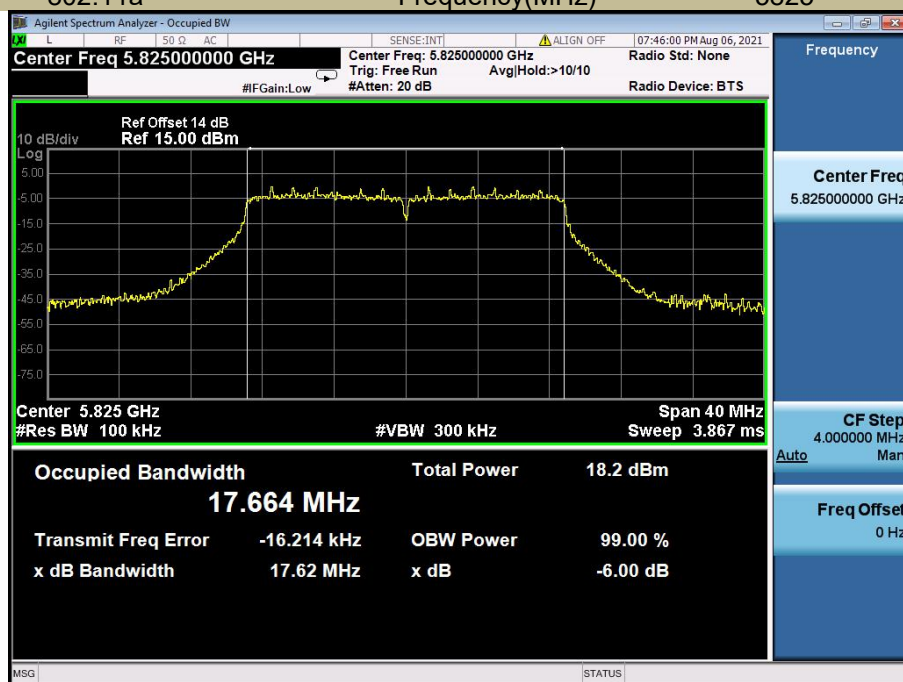
5785



-6 dB Emission Bandwidth
Test Model 802.11a

U-NII - 3
Frequency(MHz)

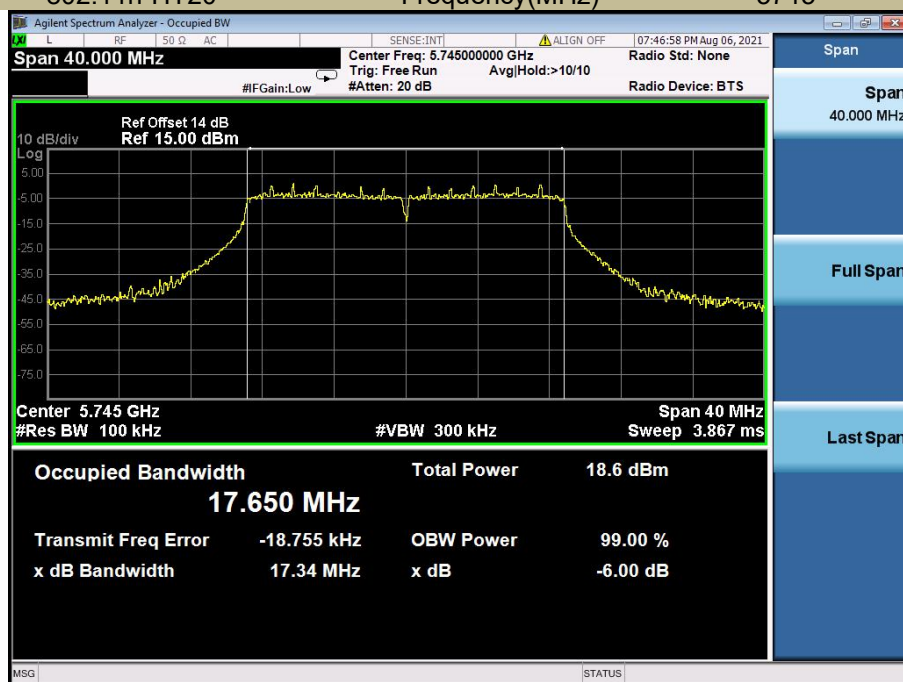
5825



-6 dB Emission Bandwidth
Test Model 802.11n-HT20

U-NII - 3
Frequency(MHz)

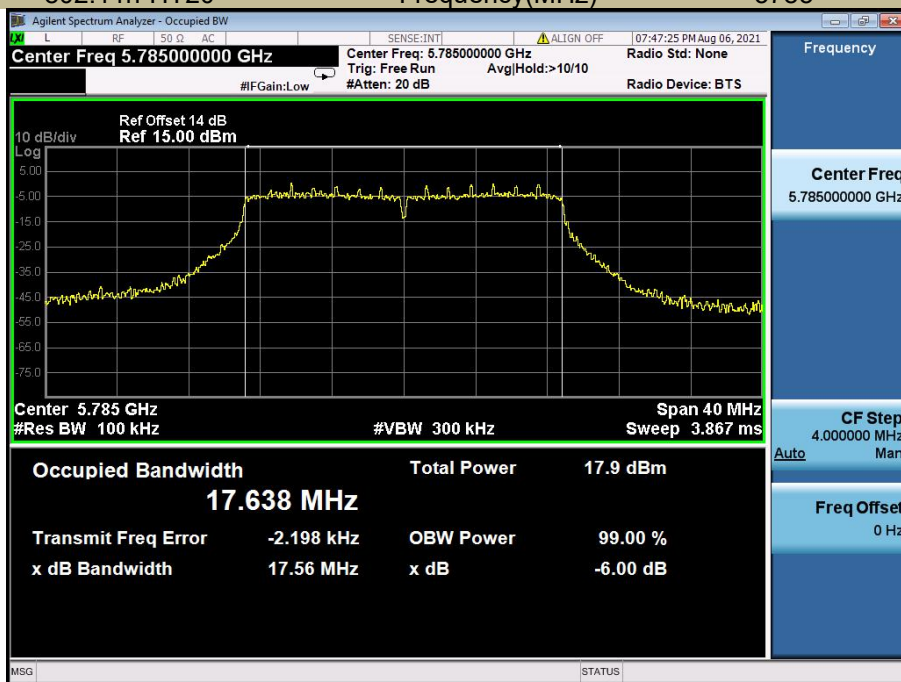
5745



-6 dB Emission Bandwidth
Test Model 802.11n-HT20

U-NII - 3
Frequency(MHz)

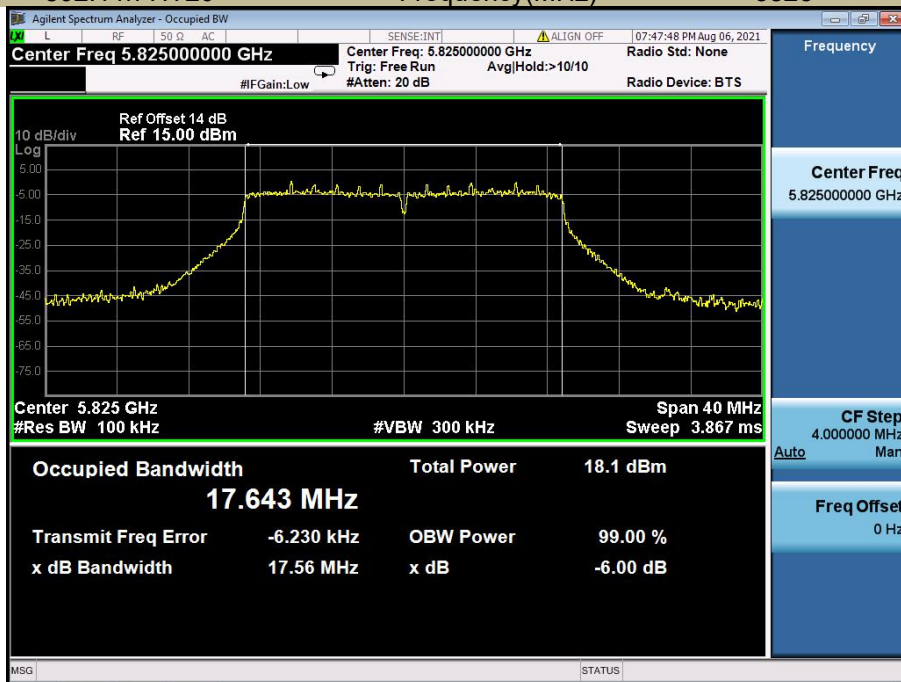
5785



-6 dB Emission Bandwidth
Test Model 802.11n-HT20

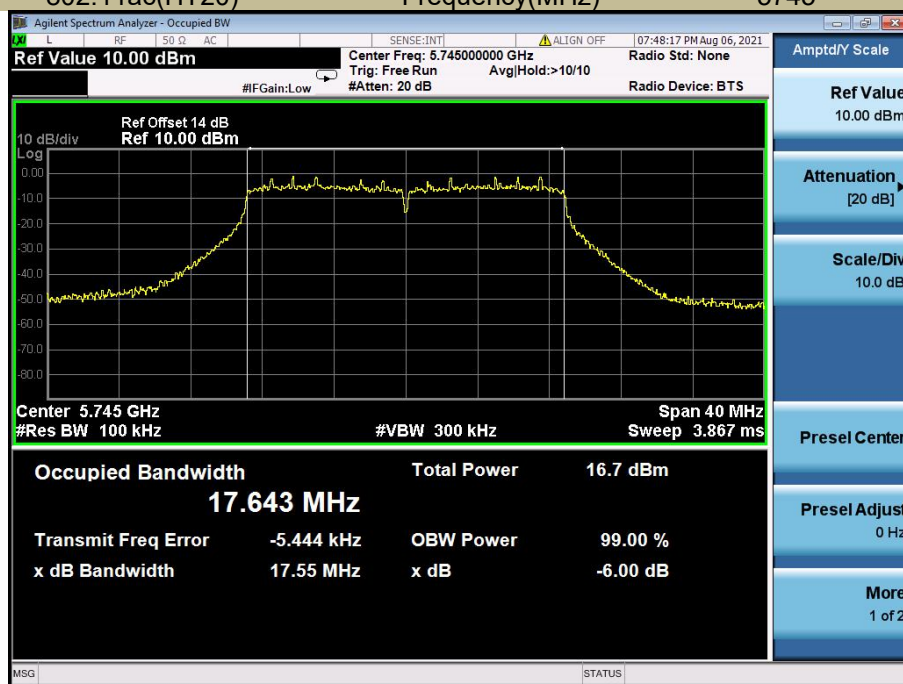
U-NII - 3
Frequency(MHz)

5825



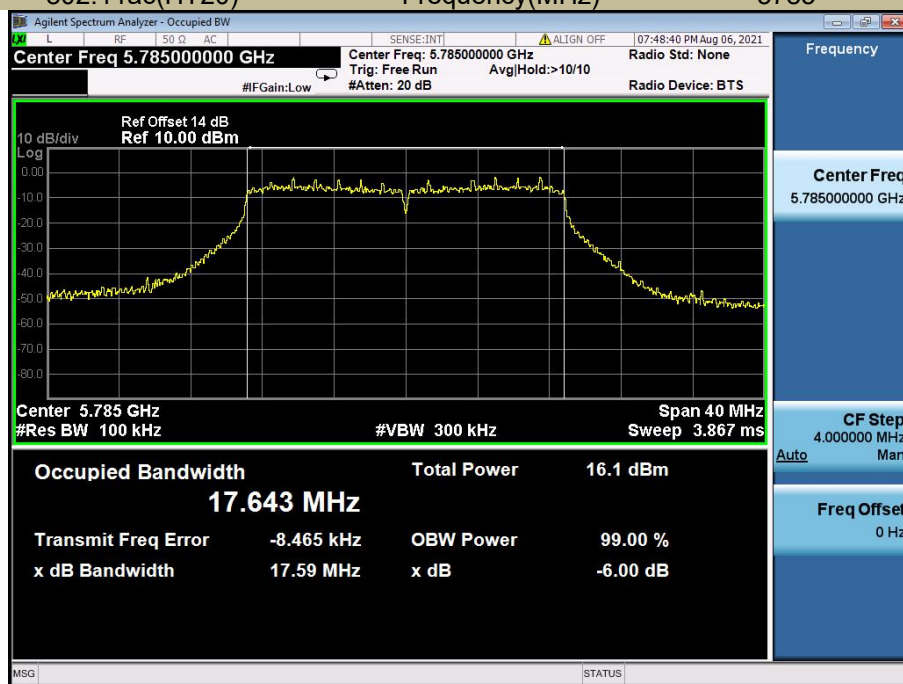
-6 dB Emission Bandwidth
Test Model 802.11ac(HT20)

U-NII - 3
Frequency(MHz) 5745



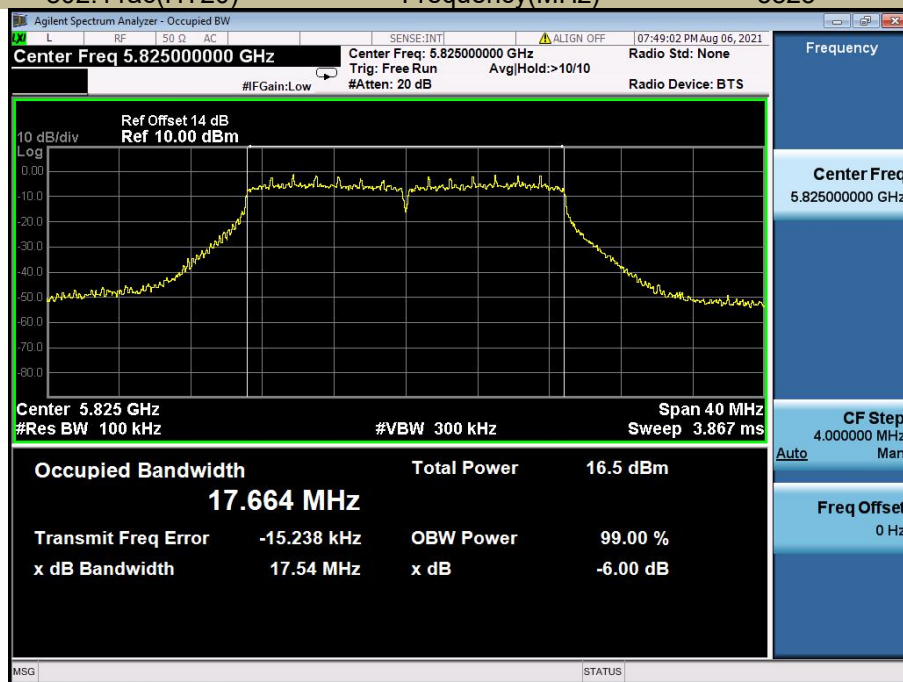
-6 dB Emission Bandwidth
Test Model 802.11ac(HT20)

U-NII - 3
Frequency(MHz) 5785



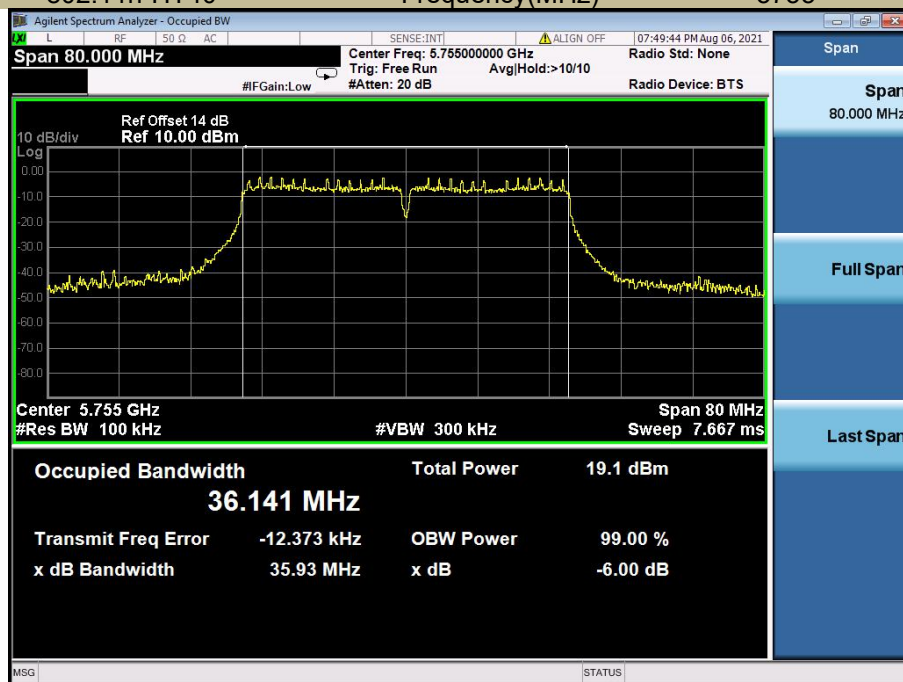
-6 dB Emission Bandwidth
Test Model 802.11ac(HT20)

U-NII - 3
Frequency(MHz) 5825



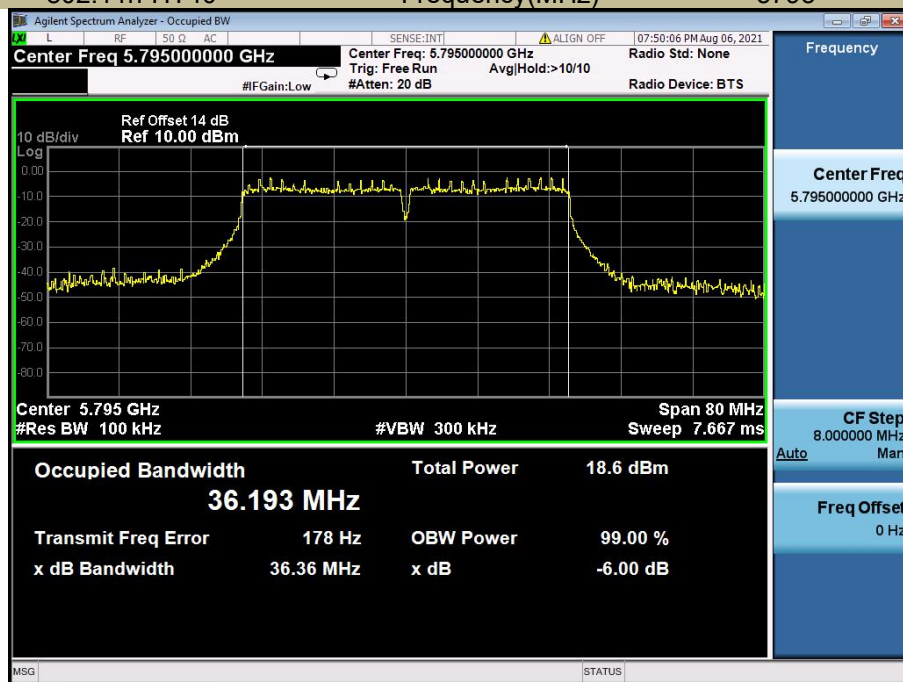
-6 dB Emission Bandwidth
Test Model 802.11n-HT40

U-NII - 3
Frequency(MHz) 5755



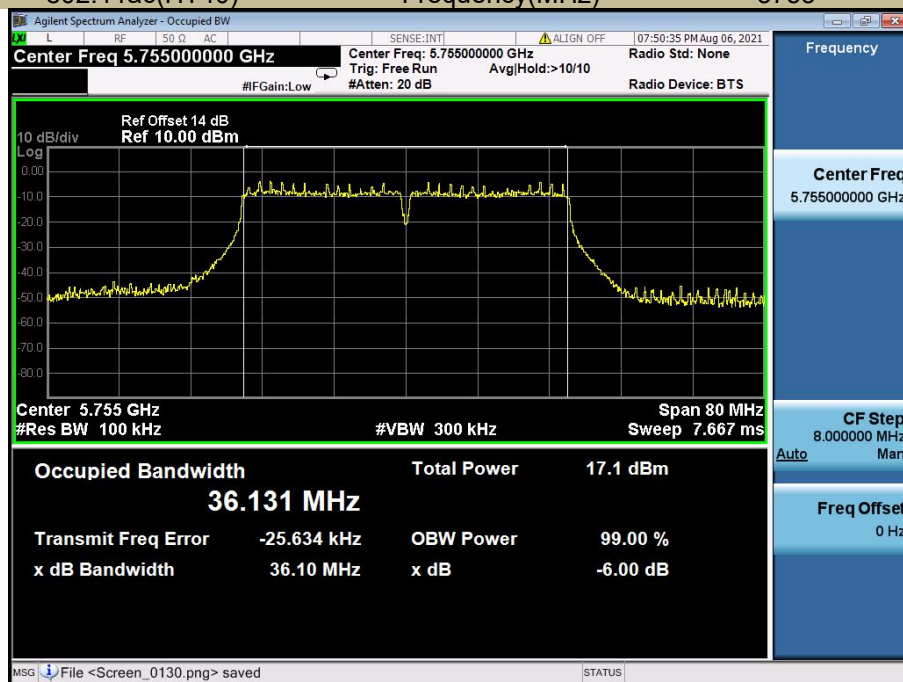
-6 dB Emission Bandwidth
Test Model 802.11n-HT40

U-NII - 3
Frequency(MHz) 5795



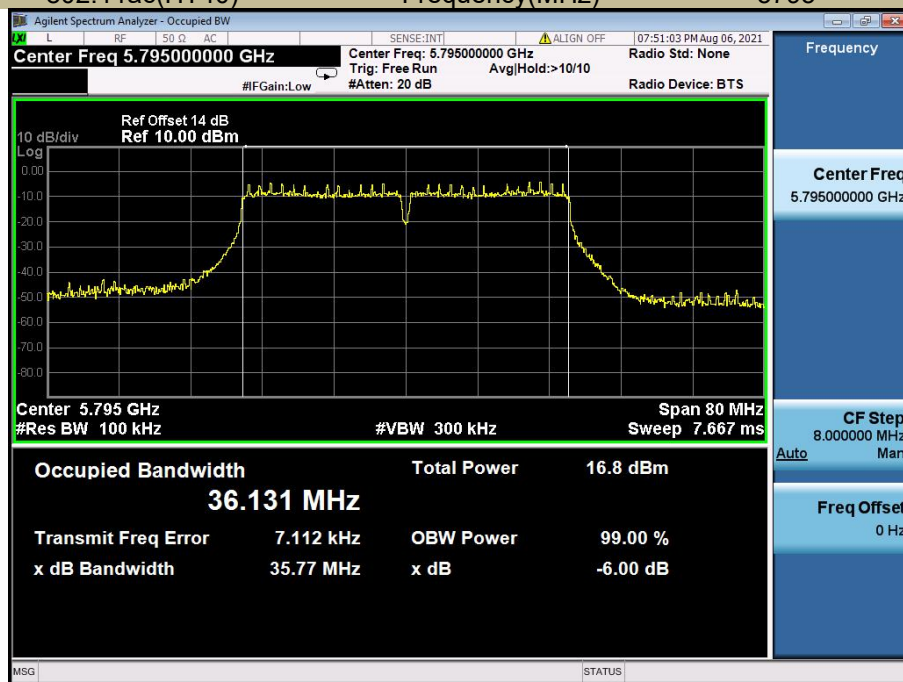
-6 dB Emission Bandwidth
Test Model 802.11ac(HT40)

U-NII - 3
Frequency(MHz) 5755



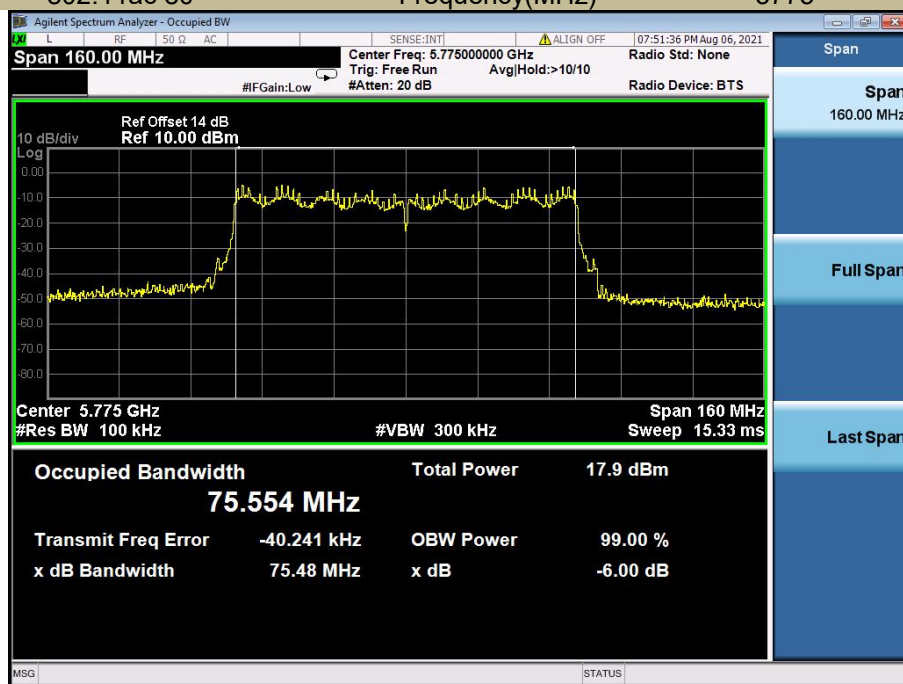
-6 dB Emission Bandwidth
Test Model 802.11ac(HT40)

U-NII - 3
Frequency(MHz) 5795



-6 dB Emission Bandwidth
Test Model 802.11ac 80

U-NII - 3
Frequency(MHz) 5775



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. In addition, the maximum power spectral density shall not exceed 17 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. 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. In addition, the maximum power spectral density shall not exceed 17 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.

(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. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. 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 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. 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 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 $11 \text{ dBm} + 10 \log B$, 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. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. 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

8.2.3 Test Configuration

Test according to clause 6.1 radio frequency test setup

8.2.4 Test Procedure

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

Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

- 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.

8.2.5 Test Results

Band	Operating mode	Channel Number	Channel Freq. (MHz)	Conducted Output Power(dBm)	Limit (dBm)	Verdict
U-NII – 1	802.11a	CH36	5180	10.41	24	Pass
		CH40	5200	10.54	24	Pass
		CH48	5240	11.48	24	Pass
	802.11n-HT20	CH36	5180	9.43	24	Pass
		CH40	5200	9.84	24	Pass
		CH48	5240	10.78	24	Pass
	802.11ac(HT20)	CH36	5180	9.55	24	Pass
		CH40	5200	9.57	24	Pass
		CH48	5240	10.66	24	Pass
	802.11n-HT40	CH38	5190	9.53	24	Pass
		CH46	5230	10.44	24	Pass
	802.11ac(HT40)	CH38	5190	9.77	24	Pass
		CH46	5230	10.68	24	Pass
	802.11ac(HT80)	CH42	5210	10.27	24	Pass

Band	Operating mode	Channel Number	Channel Freq. (MHz)	Conducted Output Power(dBm)	Limit (dBm)	Verdict
U-NII – 2A	802.11a	CH52	5260	11.95	24	Pass
		CH56	5280	11.89	24	Pass
		CH64	5320	12.05	24	Pass
	802.11n-HT20	CH52	5260	11.33	24	Pass
		CH56	5280	11.47	24	Pass
		CH64	5320	12.20	24	Pass
	802.11ac(HT20)	CH52	5260	11.11	24	Pass
		CH56	5280	11.00	24	Pass
		CH64	5320	11.11	24	Pass
	802.11n-HT40	CH54	5270	11.04	24	Pass
		CH62	5310	11.45	24	Pass
	802.11ac(HT40)	CH54	5270	11.38	24	Pass
		CH62	5310	11.60	24	Pass
	802.11ac(HT80)	CH58	5290	11.55	24	Pass

Band	Operating mode	Channel Number	Channel Freq. (MHz)	Conducted Output Power(dBm)	Limit (dBm)	Verdict
U-NII – 2C	802.11a	CH100	5500	12.77	24	Pass
		CH120	5600	12.68	24	Pass
		CH140	5700	12.24	24	Pass
	802.11n-HT20	CH100	5500	11.39	24	Pass
		CH120	5600	11.51	24	Pass
		CH140	5700	11.07	24	Pass
	802.11ac(HT20)	CH100	5500	11.76	24	Pass
		CH120	5600	11.92	24	Pass
		CH140	5700	11.54	24	Pass
	802.11n-HT40	CH102	5510	11.82	24	Pass
		CH134	5670	11.95	24	Pass
	802.11ac(HT40)	CH102	5510	12.26	24	Pass
		CH134	5670	12.13	24	Pass
	802.11ac(HT80)	CH106	5530	12.13	24	Pass

Band	Operating mode	Channel Number	Channel Freq. (MHz)	Conducted Output Power(dBm)	Limit (dBm)	Verdict
U-NII – 3	802.11a	CH149	5745	12.34	30	Pass
		CH157	5785	11.49	30	Pass
		CH165	5825	11.32	30	Pass
	802.11n-HT20	CH149	5745	11.39	30	Pass
		CH157	5785	11.51	30	Pass
		CH165	5825	11.07	30	Pass
	802.11ac(HT20)	CH149	5745	11.53	30	Pass
		CH157	5785	10.92	30	Pass
		CH165	5825	10.94	30	Pass
	802.11n-HT40	CH151	5755	11.47	30	Pass
		CH159	5795	11.20	30	Pass
	802.11ac(HT40)	CH151	5755	11.57	30	Pass
		CH159	5795	11.23	30	Pass
	802.11ac(HT80)	CH155	5775	11.35	30	Pass

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. In addition, the maximum power spectral density shall not exceed 17 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. 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. In addition, the maximum power spectral density shall not exceed 17 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.

(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. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. 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 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. 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 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 $11 \text{ dBm} + 10 \log B$, 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. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. 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

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.I.a).
- b) Set $VBW \geq 3 RBW$.
- c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10\log(500\text{kHz}/RBW)$ 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 $10\log(1\text{MHz}/RBW)$ 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

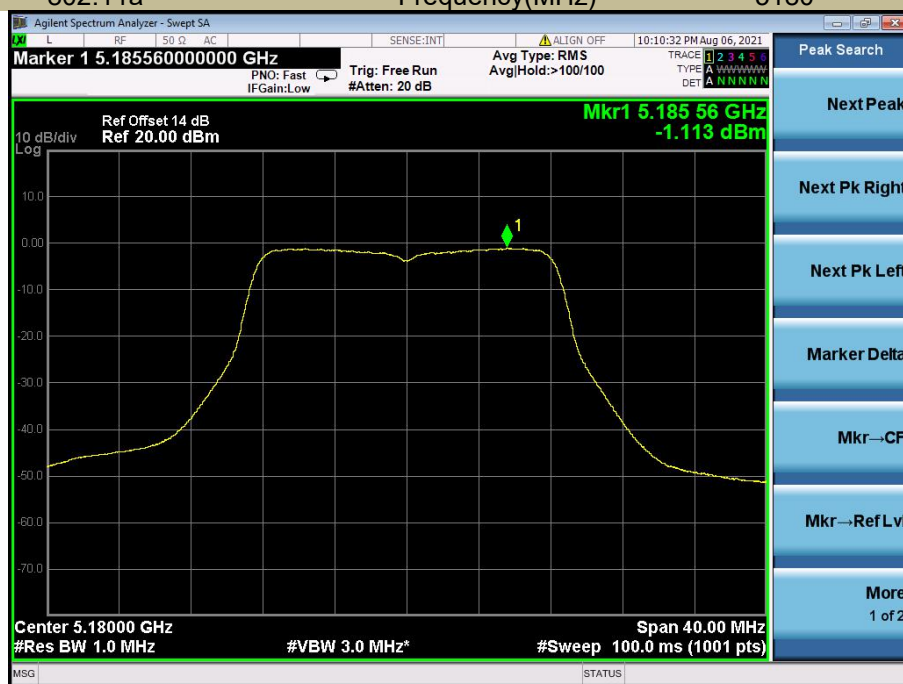
5150-5250MHz

Operating mode	Test Channel	Power Spectral Density dBm/MHz	Limit (dBm/MHz)
802.11a	5180	-1.113	11
	5200	-1.105	11
	5240	-0.528	11
802.11n-HT20	5180	-1.955	11
	5200	-1.648	11
	5240	-0.911	11
802.11ac(HT20)	5180	-1.964	11
	5200	-1.535	11
	5240	-0.723	11
802.11n-HT40	5190	-4.341	11
	5230	-3.668	11
802.11ac(HT40)	5190	-4.342	11
	5230	-3.413	11
802.11ac(HT80)	5210	-5.180	11

Power Spectral Density
Test Model 802.11a

U-NII - 1
Frequency(MHz)

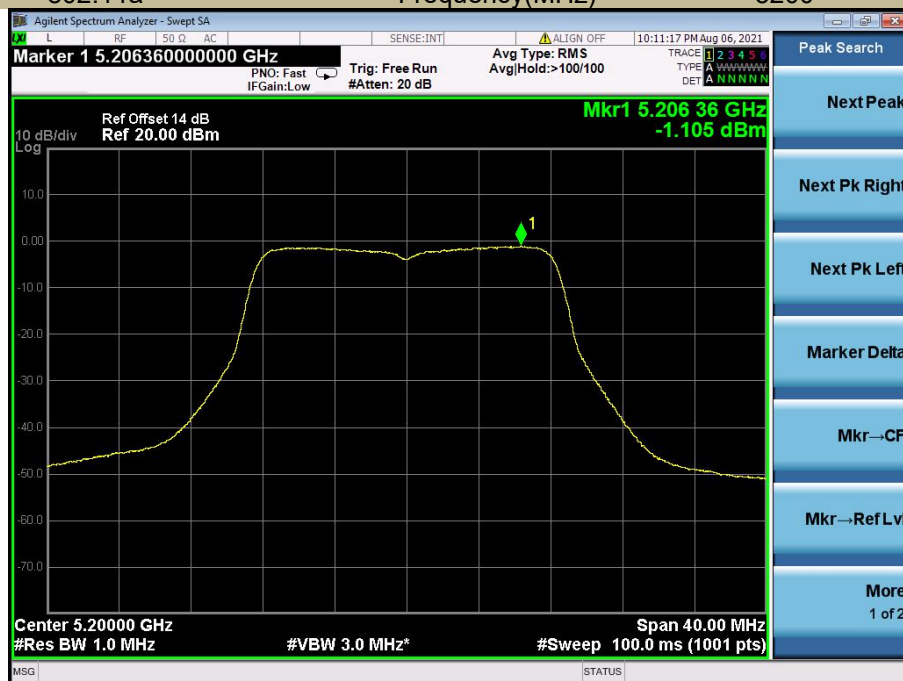
5180



Power Spectral Density
Test Model 802.11a

U-NII - 1
Frequency(MHz)

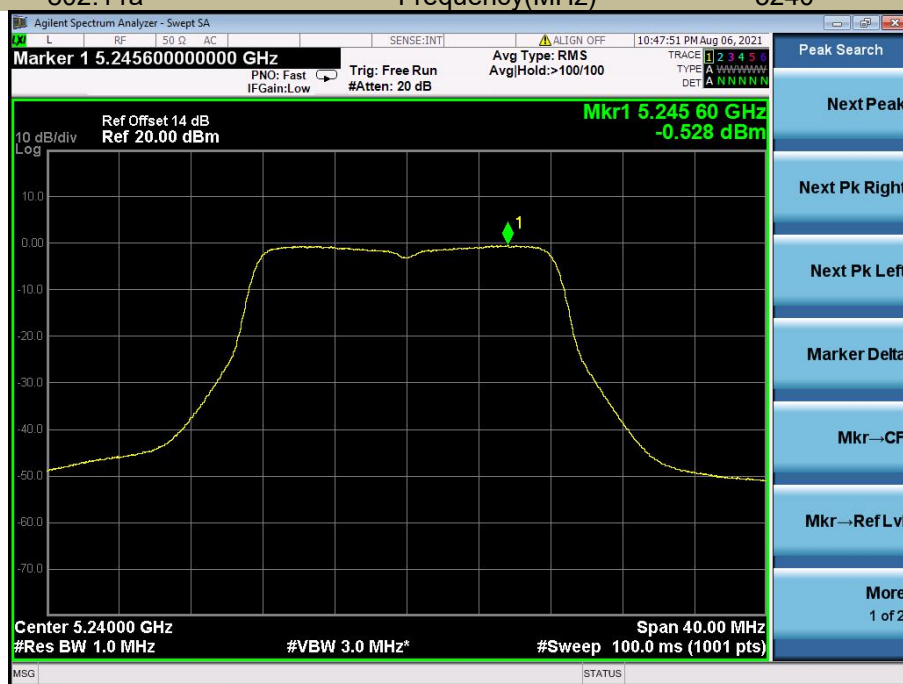
5200



Power Spectral Density
Test Model 802.11a

U-NII - 1
Frequency(MHz)

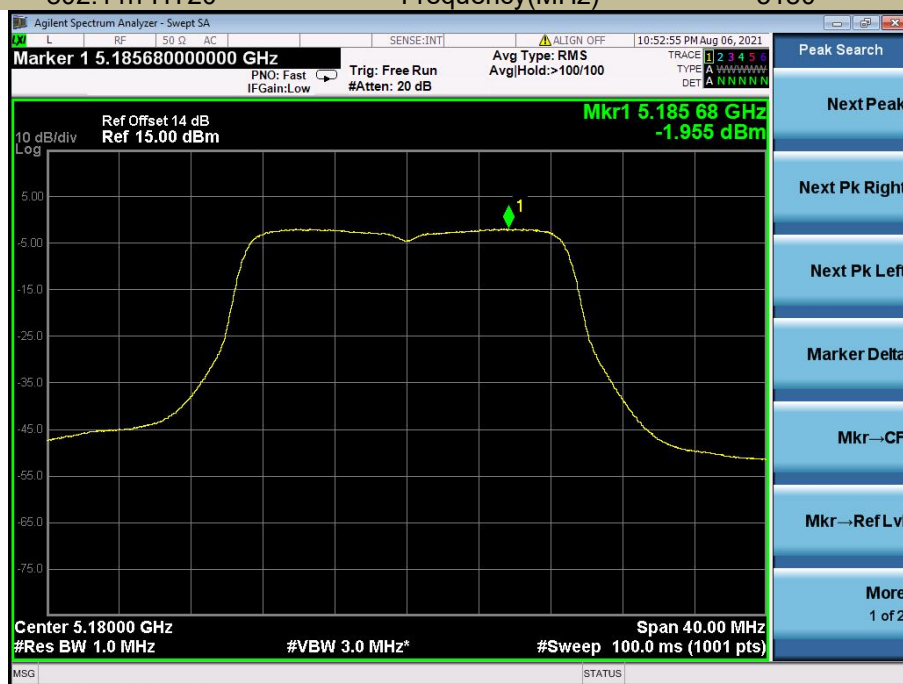
5240



Power Spectral Density
Test Model 802.11n-HT20

U-NII - 1
Frequency(MHz)

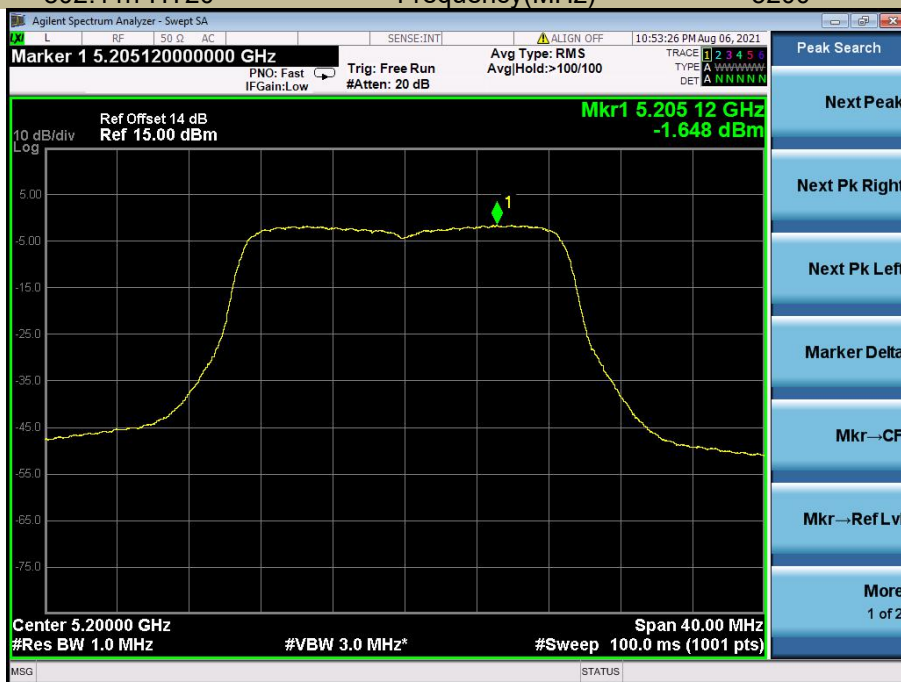
5180



Power Spectral Density
Test Model 802.11n-HT20

U-NII - 1
Frequency(MHz)

5200



Power Spectral Density
Test Model 802.11n-HT20

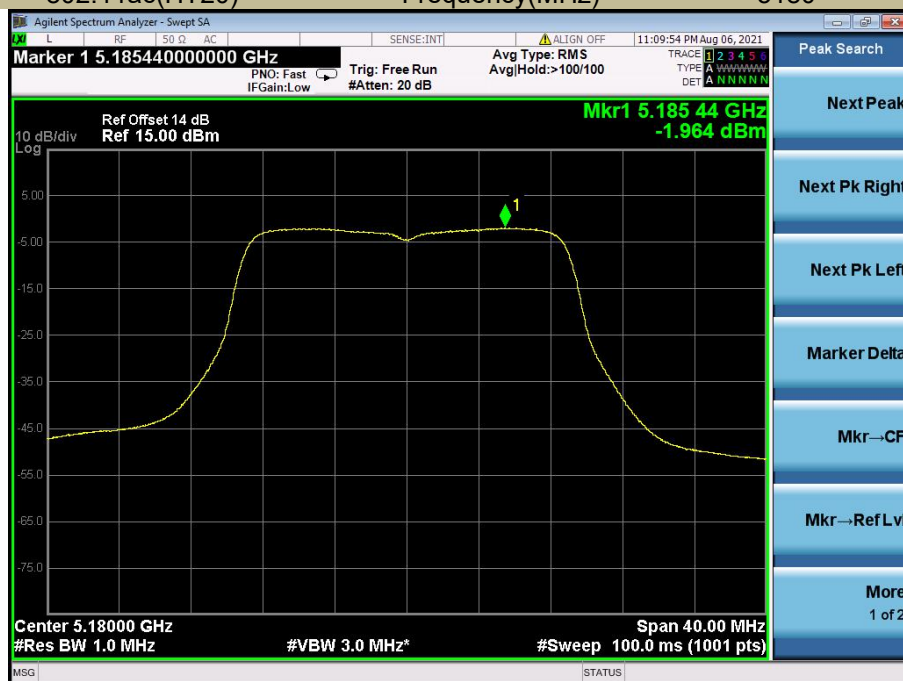
U-NII - 1
Frequency(MHz)

5240



Power Spectral Density
Test Model 802.11ac(HT20)

U-NII - 1
Frequency(MHz) 5180



Power Spectral Density
Test Model 802.11ac(HT20)

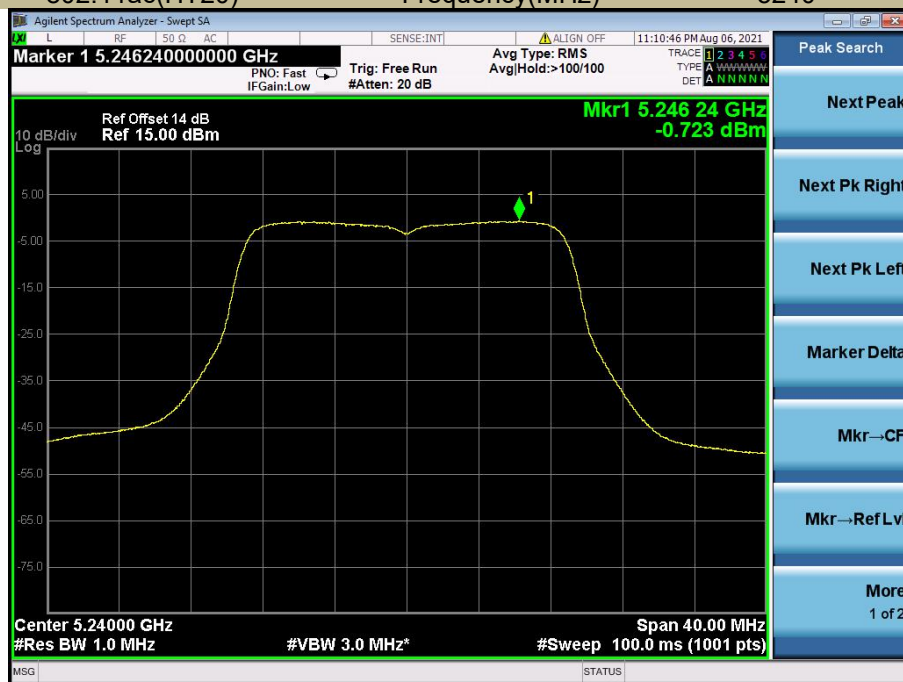
U-NII - 1
Frequency(MHz) 5200



Power Spectral Density
Test Model 802.11ac(HT20)

U-NII - 1
Frequency(MHz)

5240



Power Spectral Density
Test Model 802.11n-HT40

U-NII - 1
Frequency(MHz)

5190

