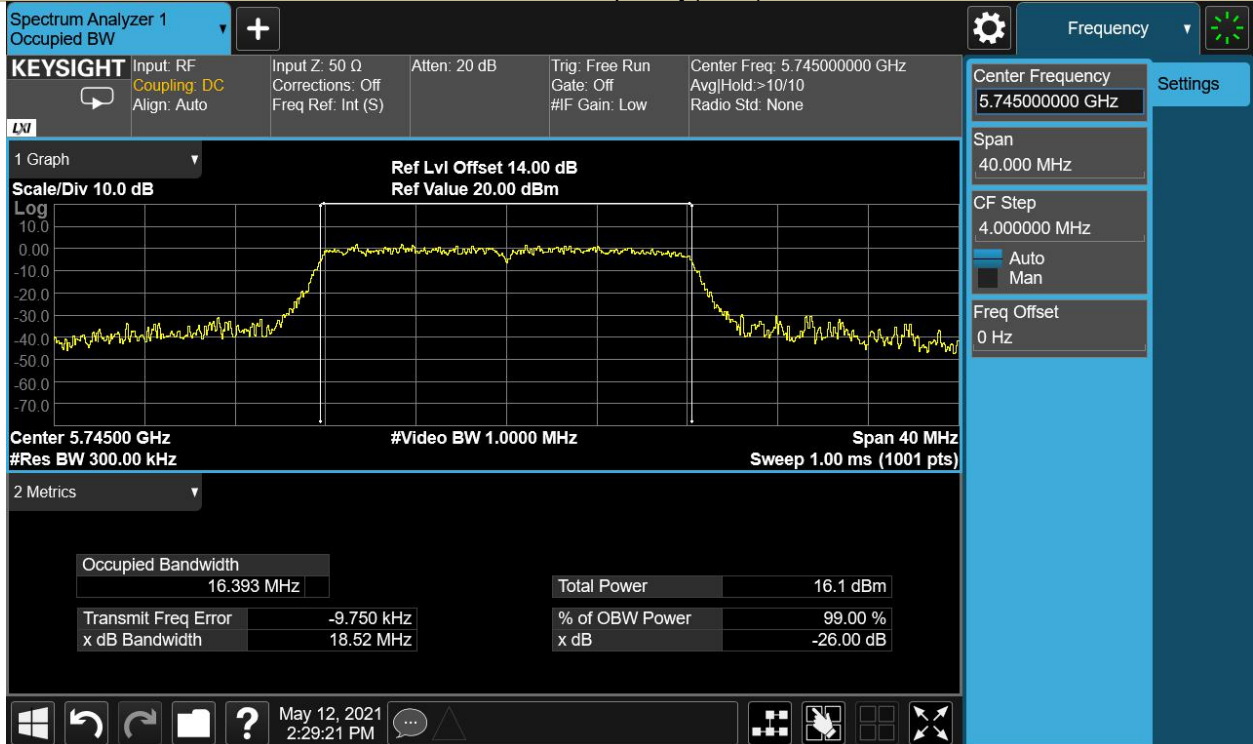
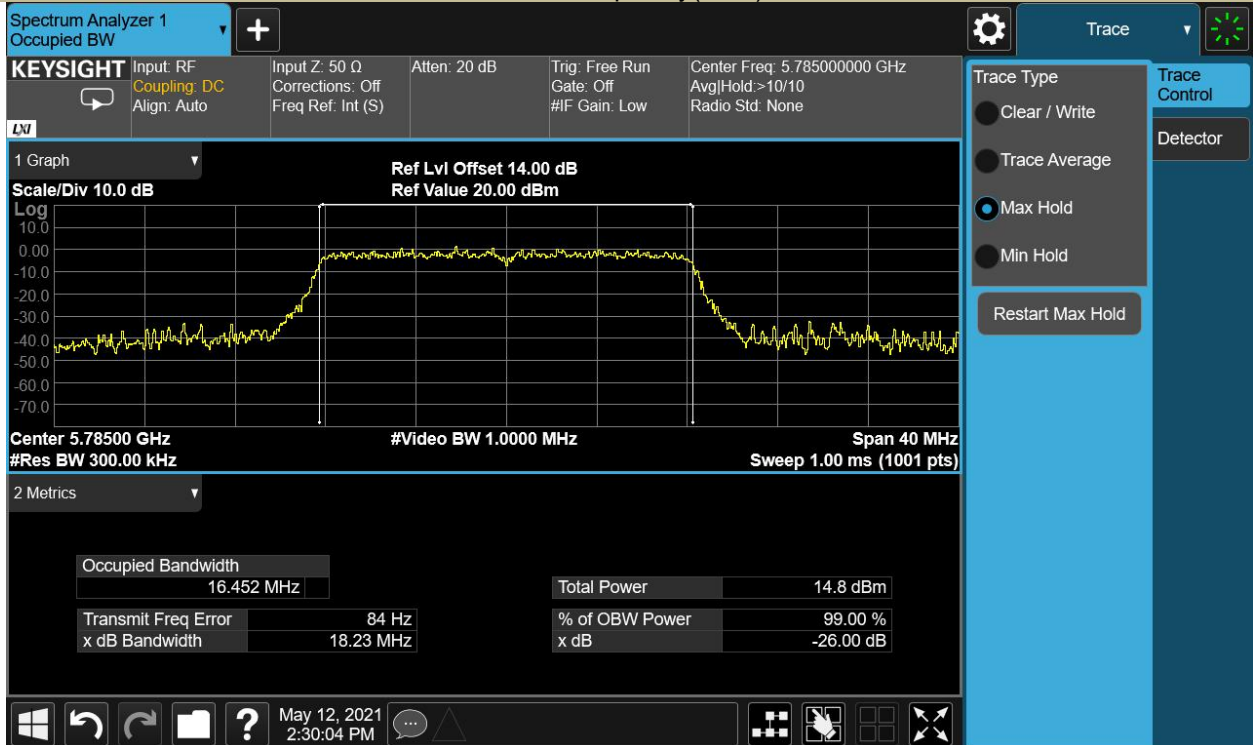


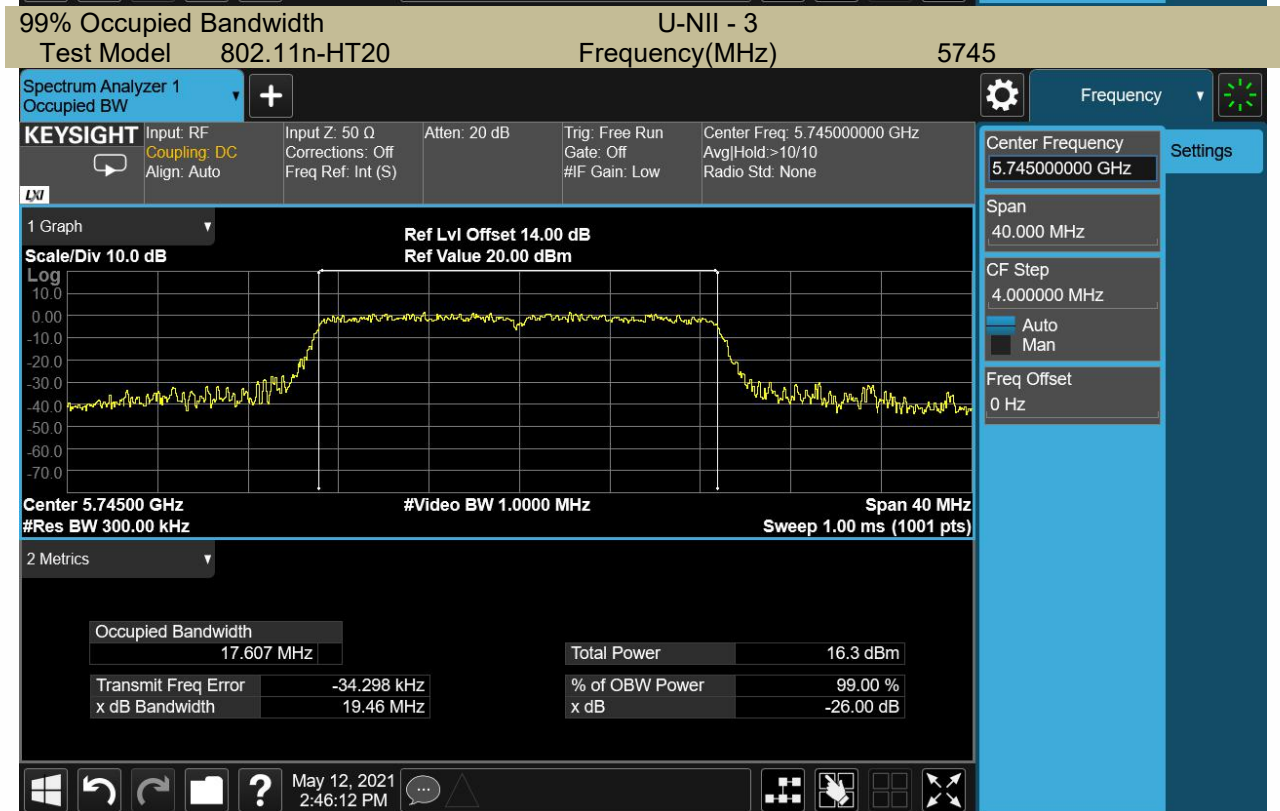
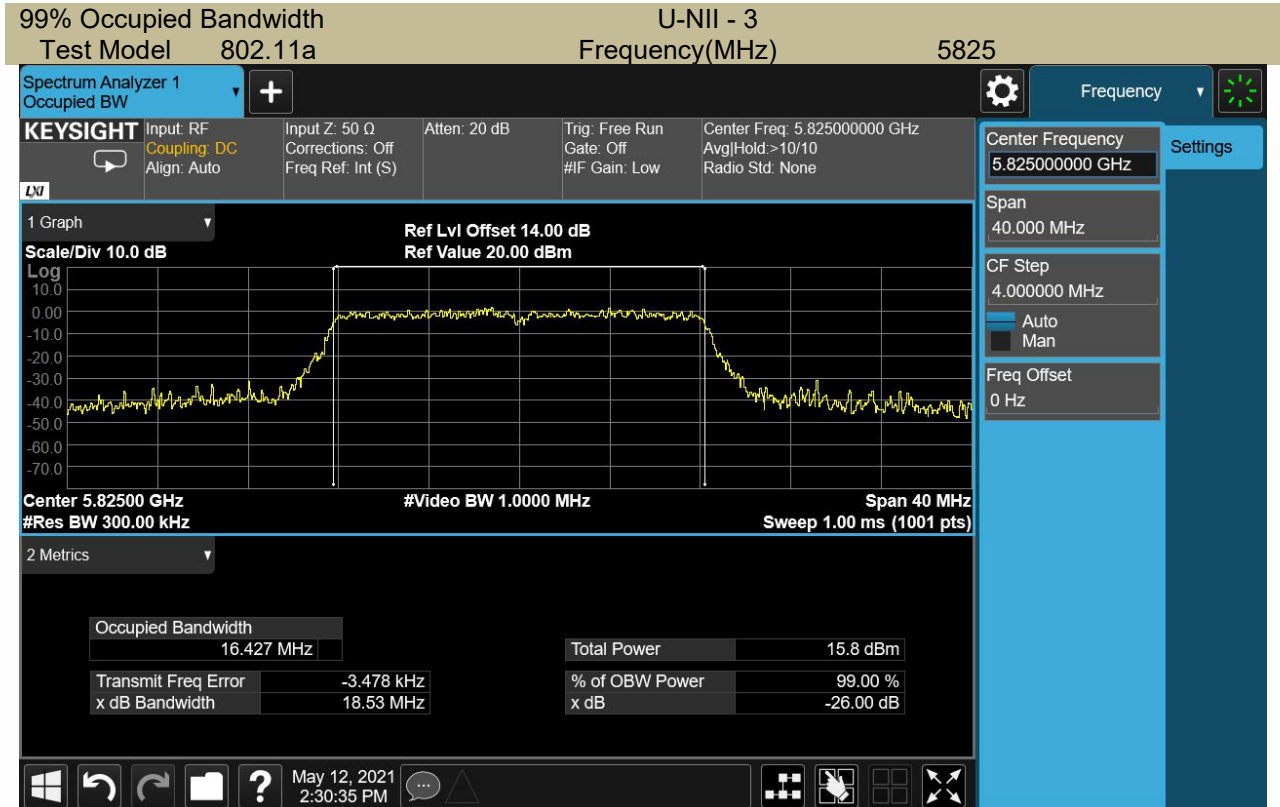
B. 5725-5850MHz Antenna 2

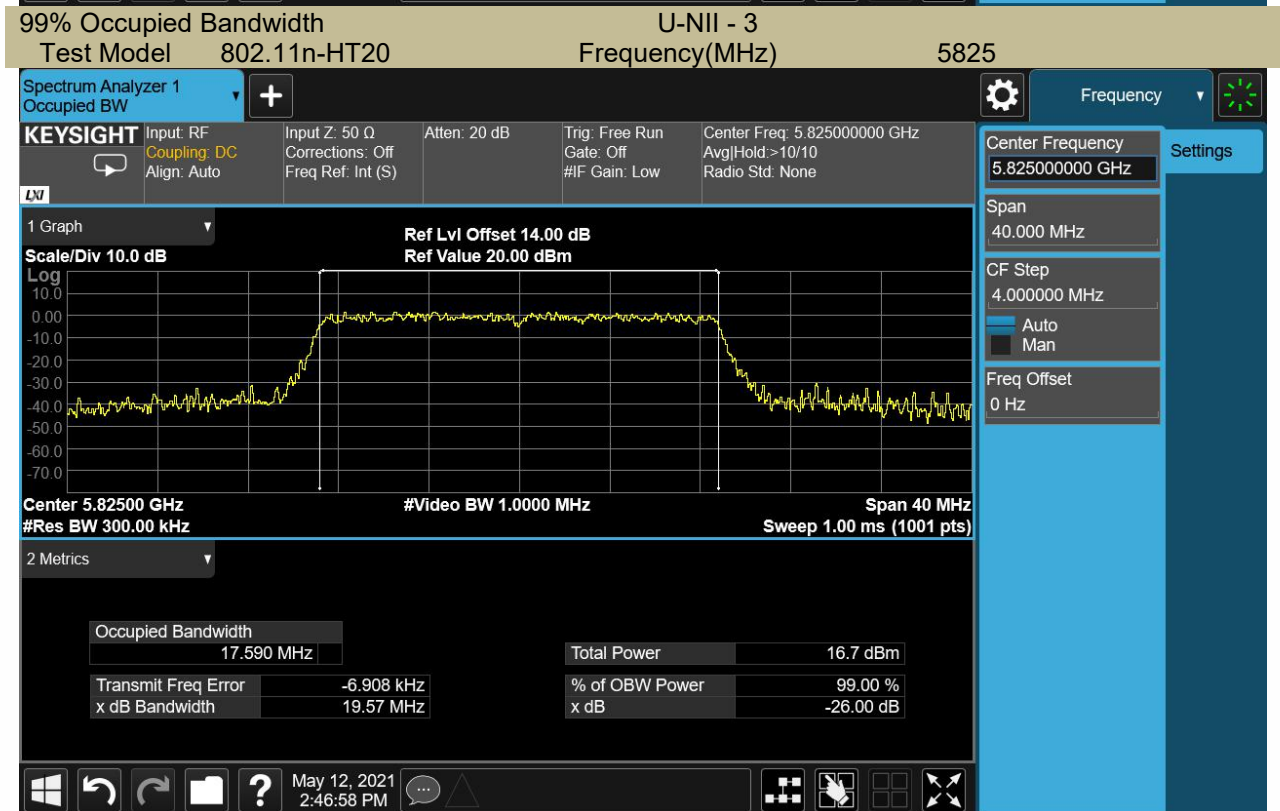
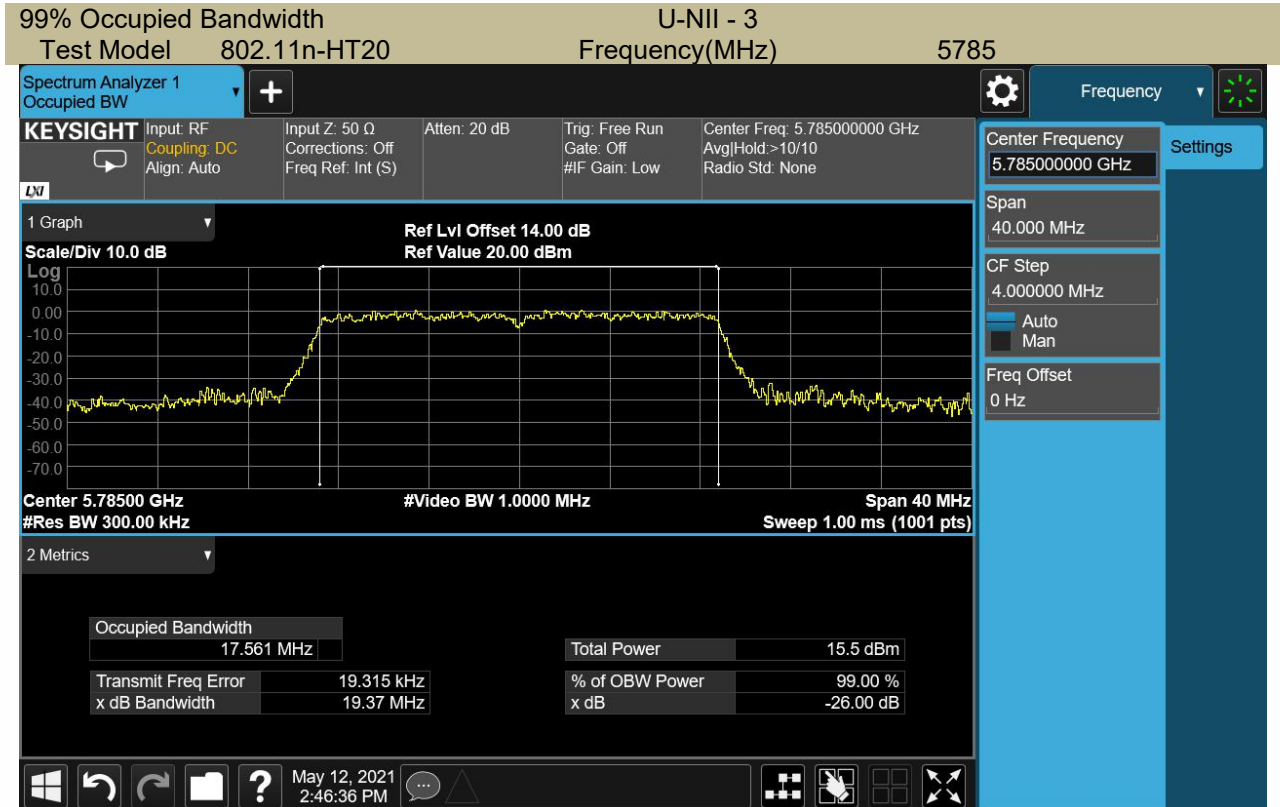
99% Occupied Bandwidth U-NII - 3
 Test Model 802.11a Frequency(MHz) 5745

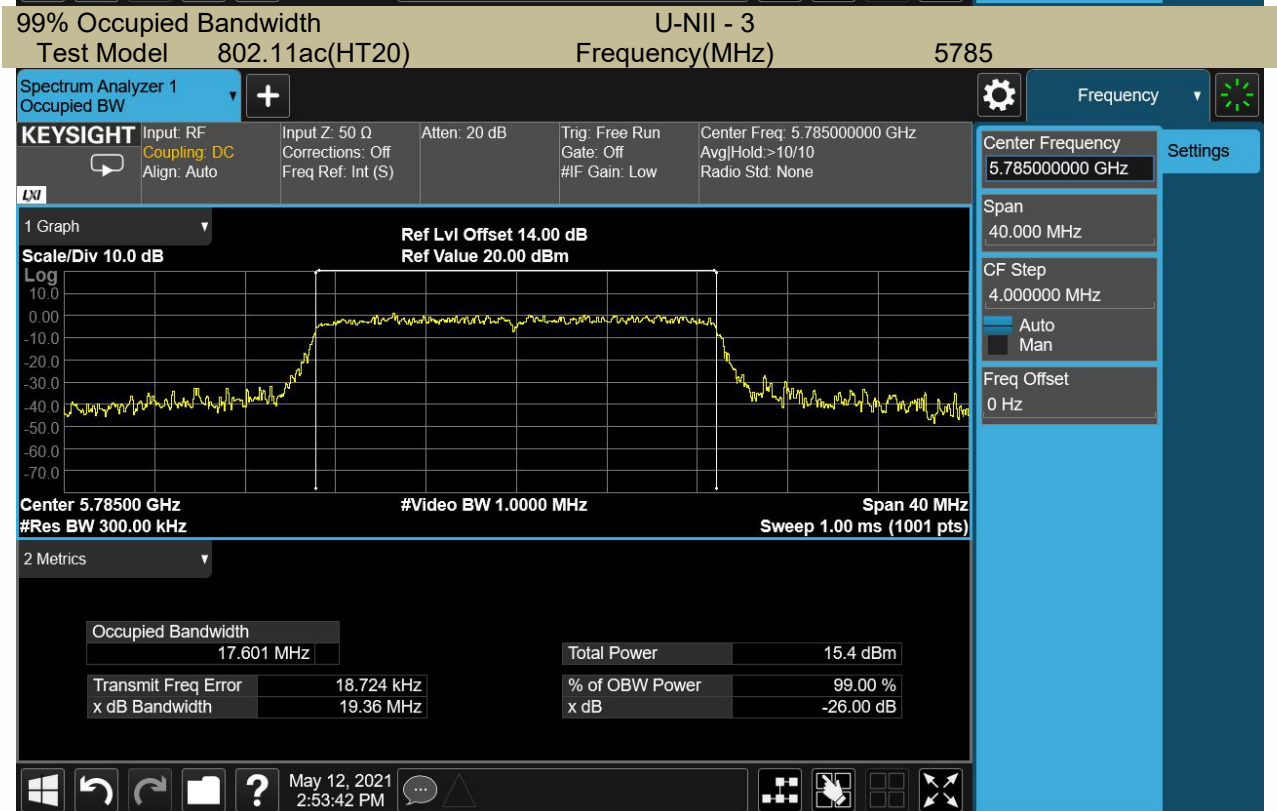
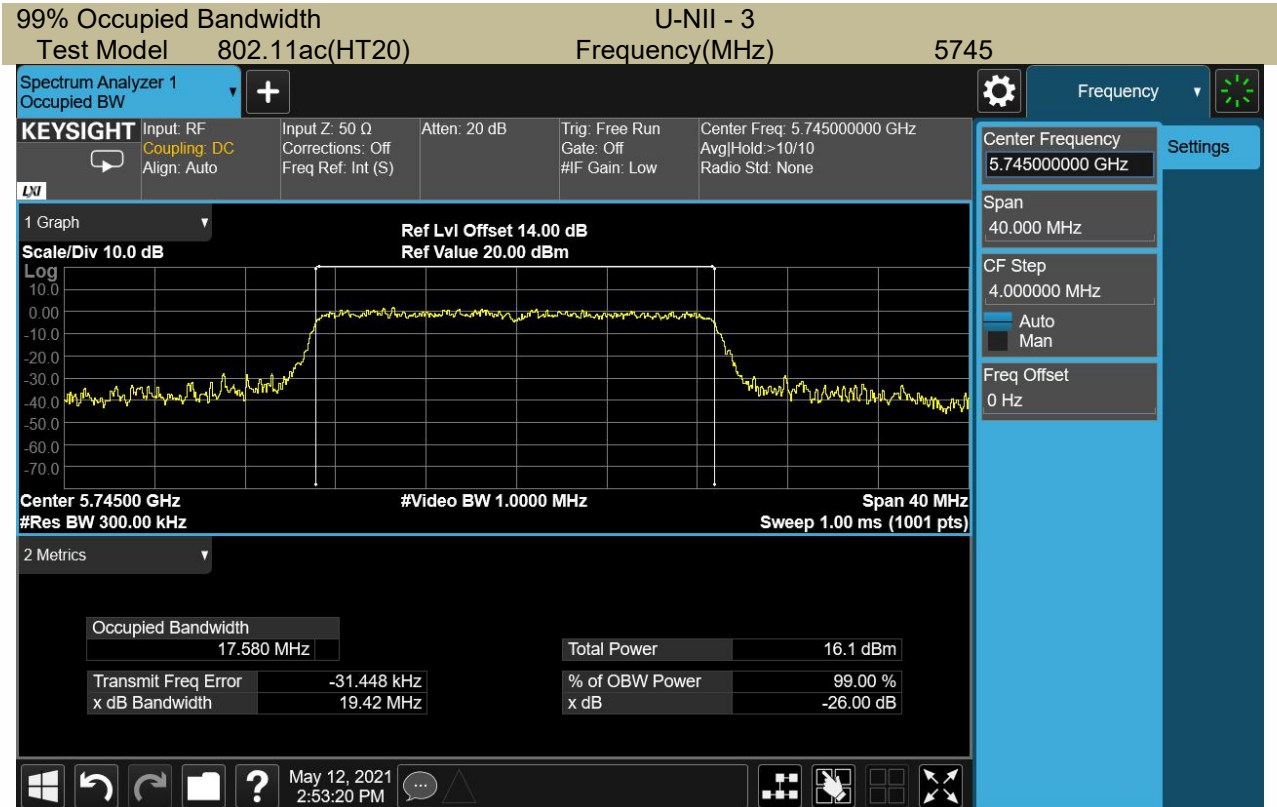


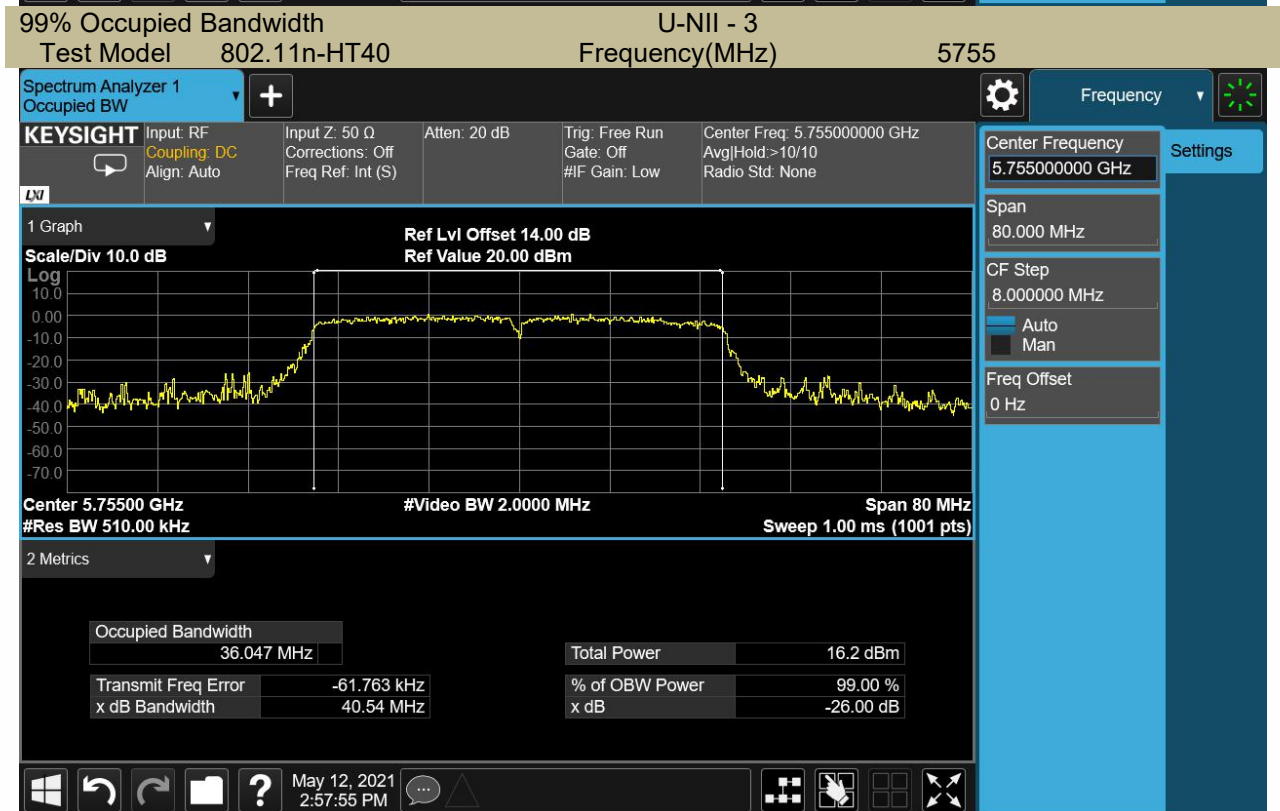
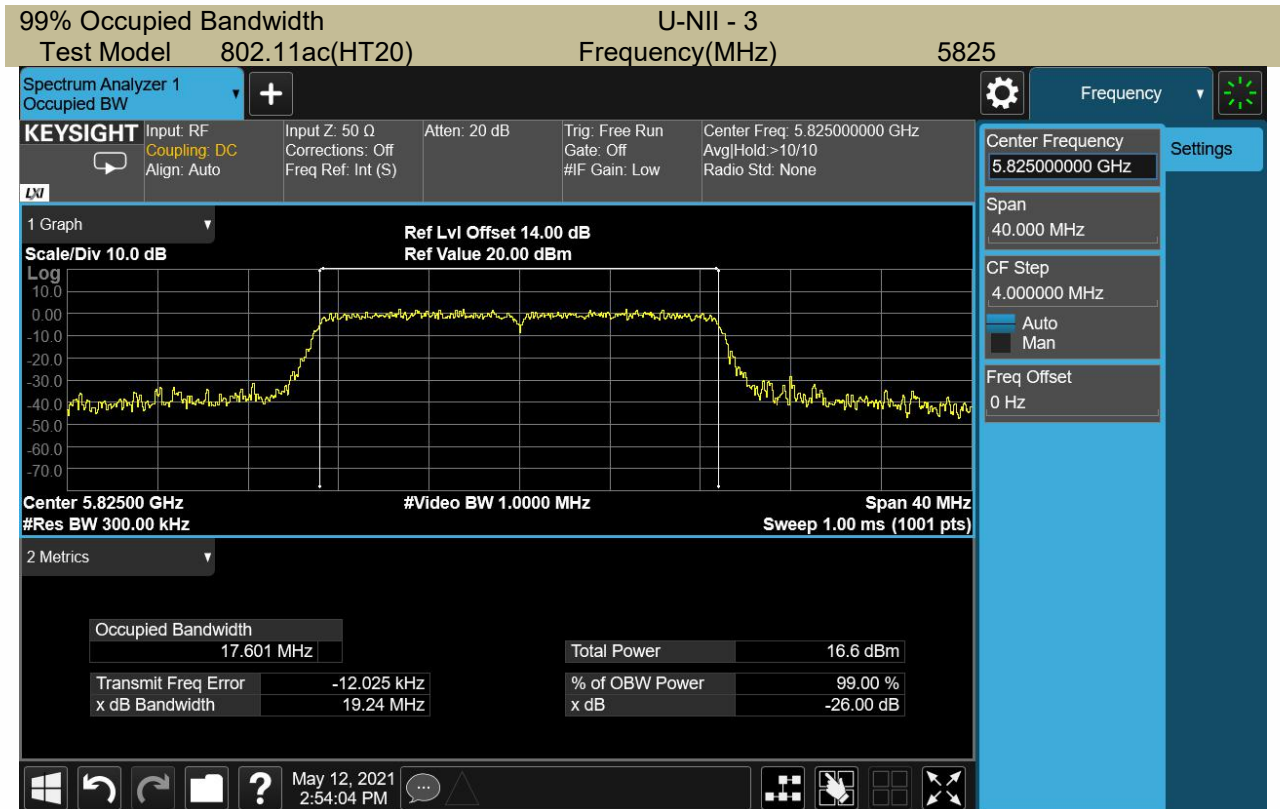
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 Test Model 802.11a Frequency(MHz) 5785

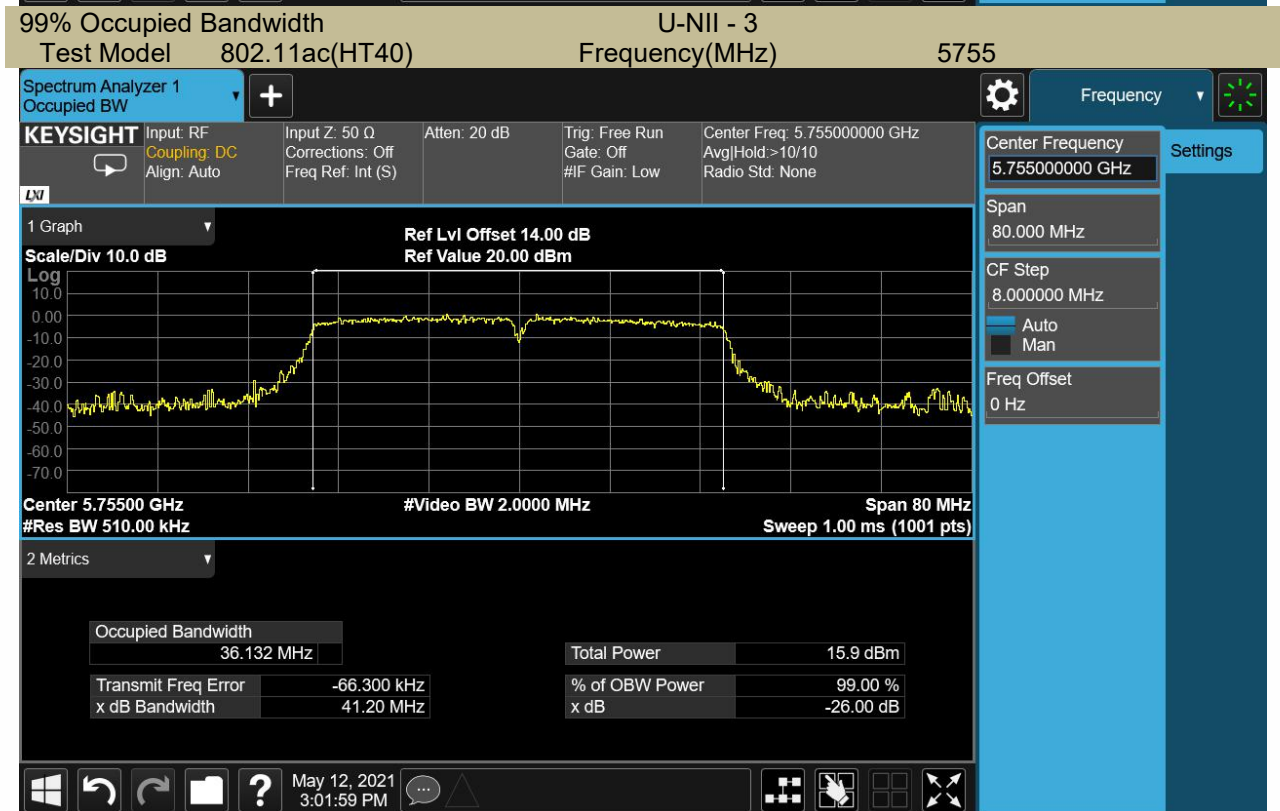
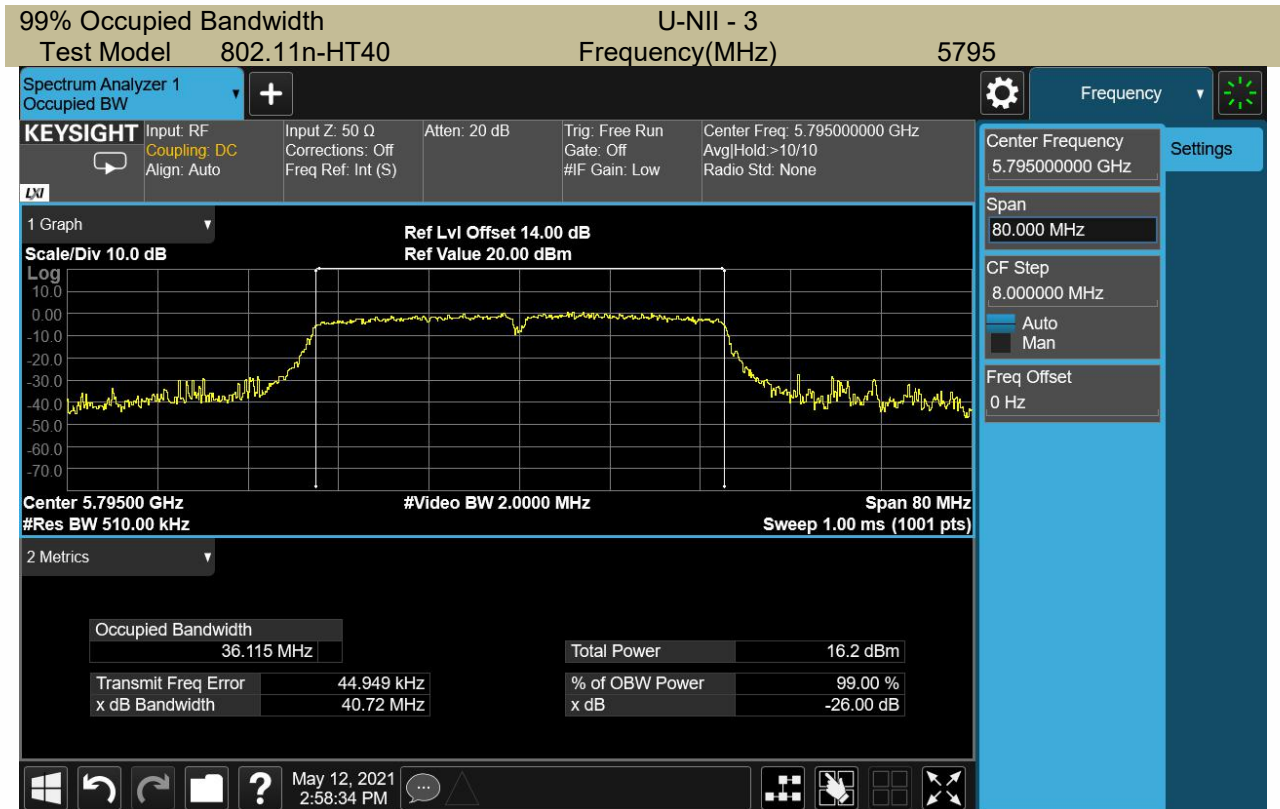


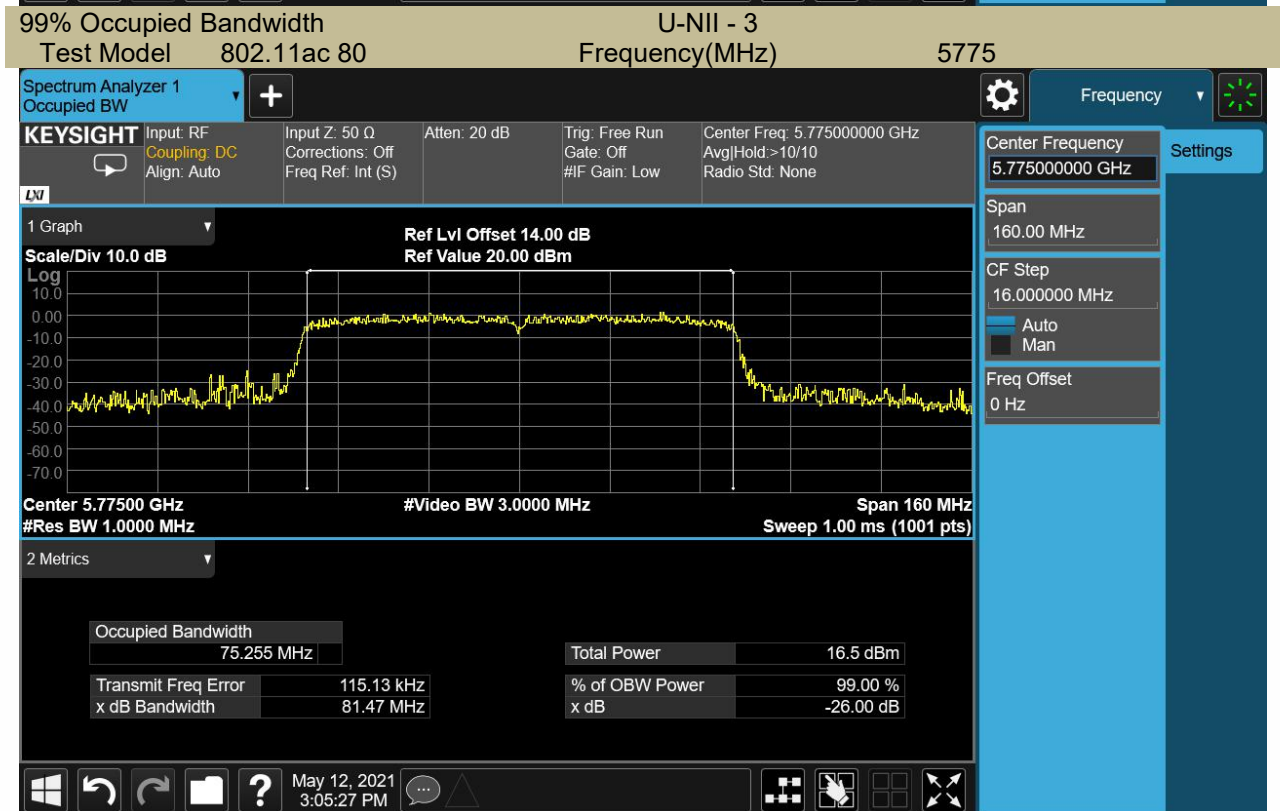
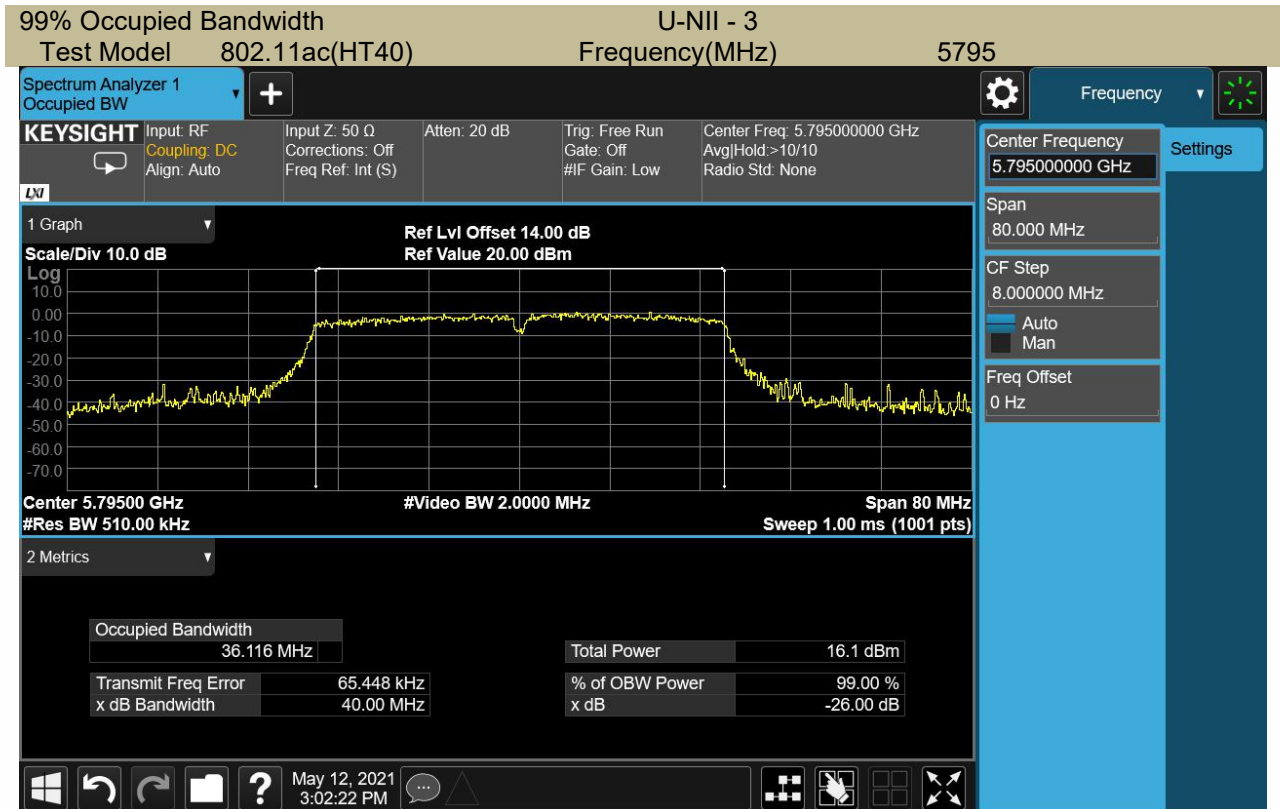


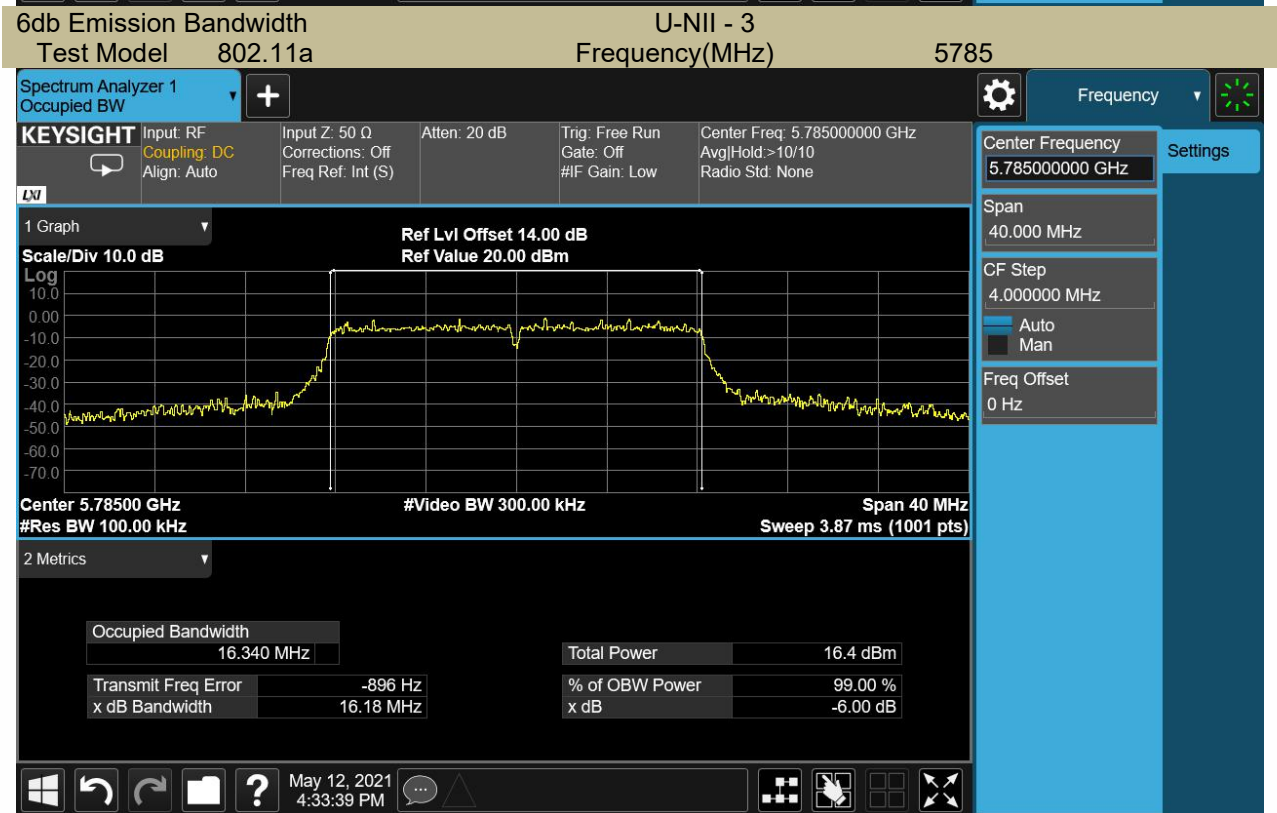
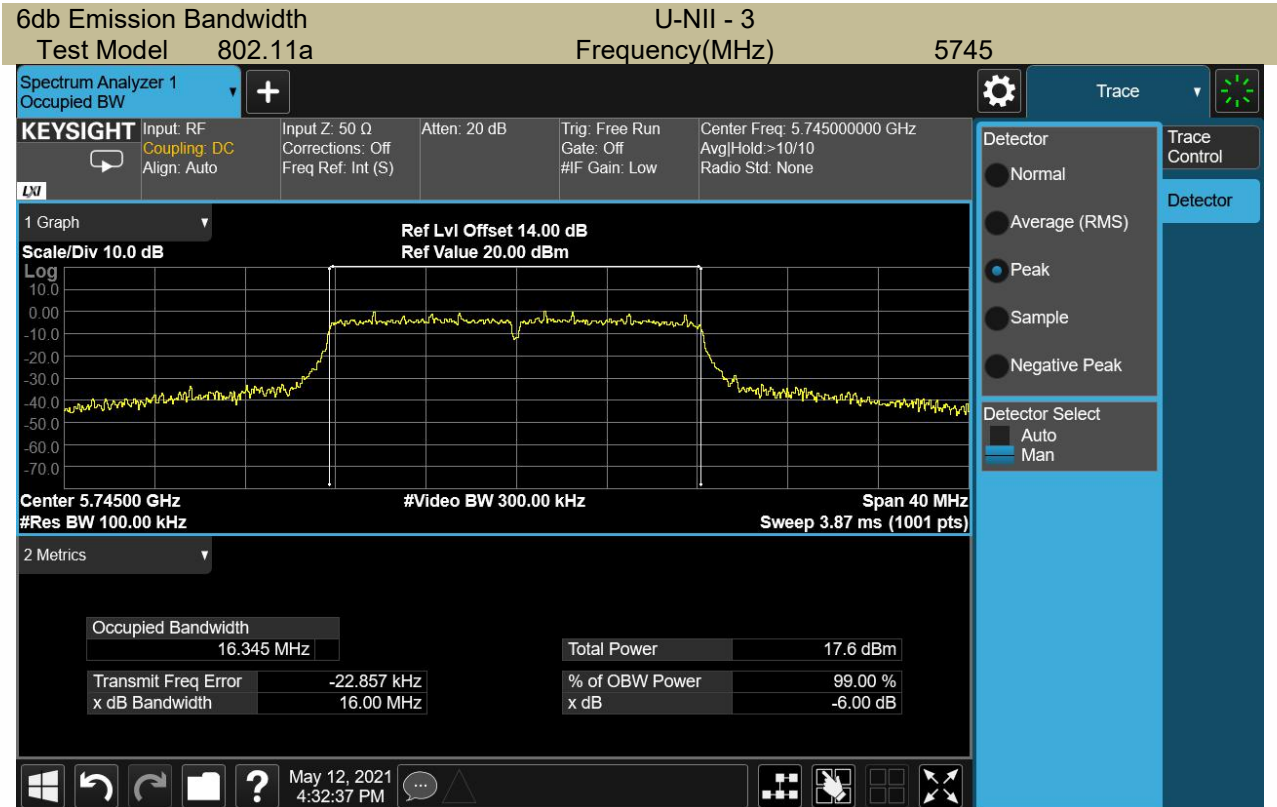


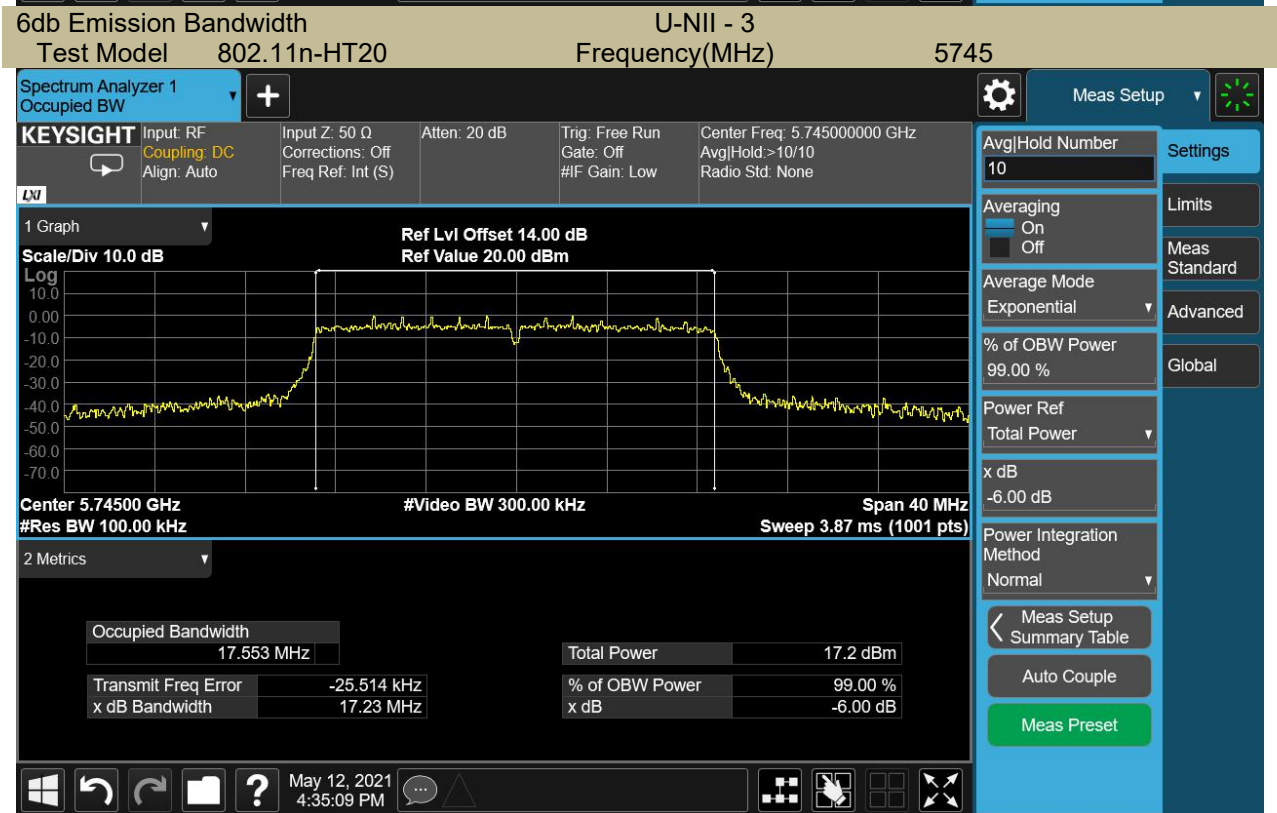
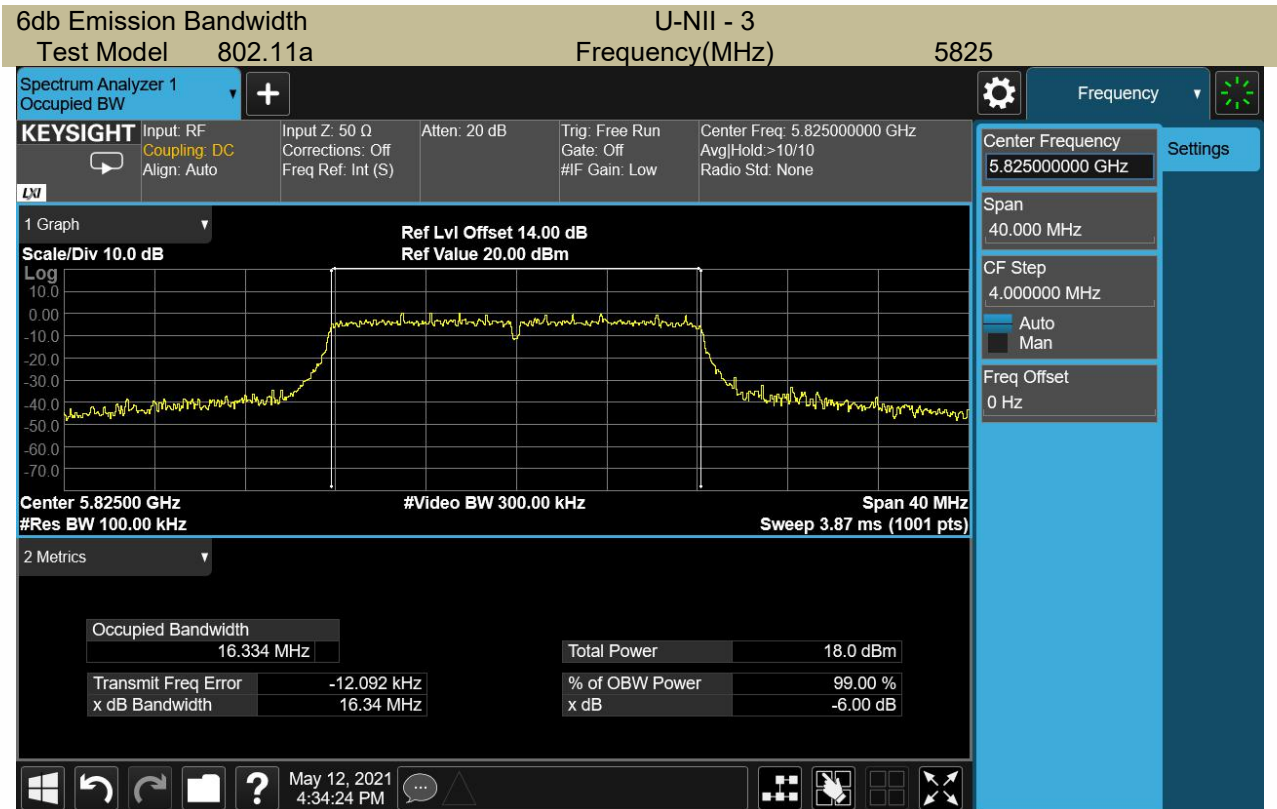


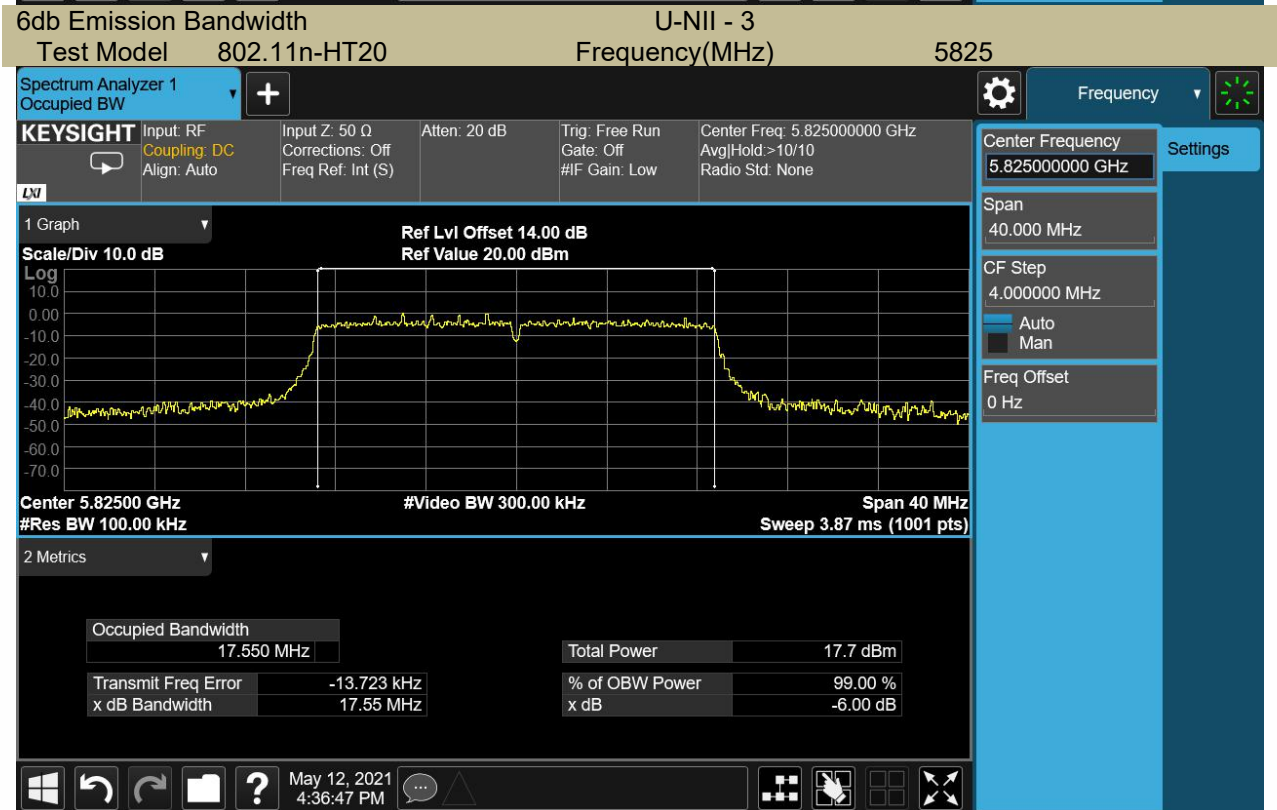
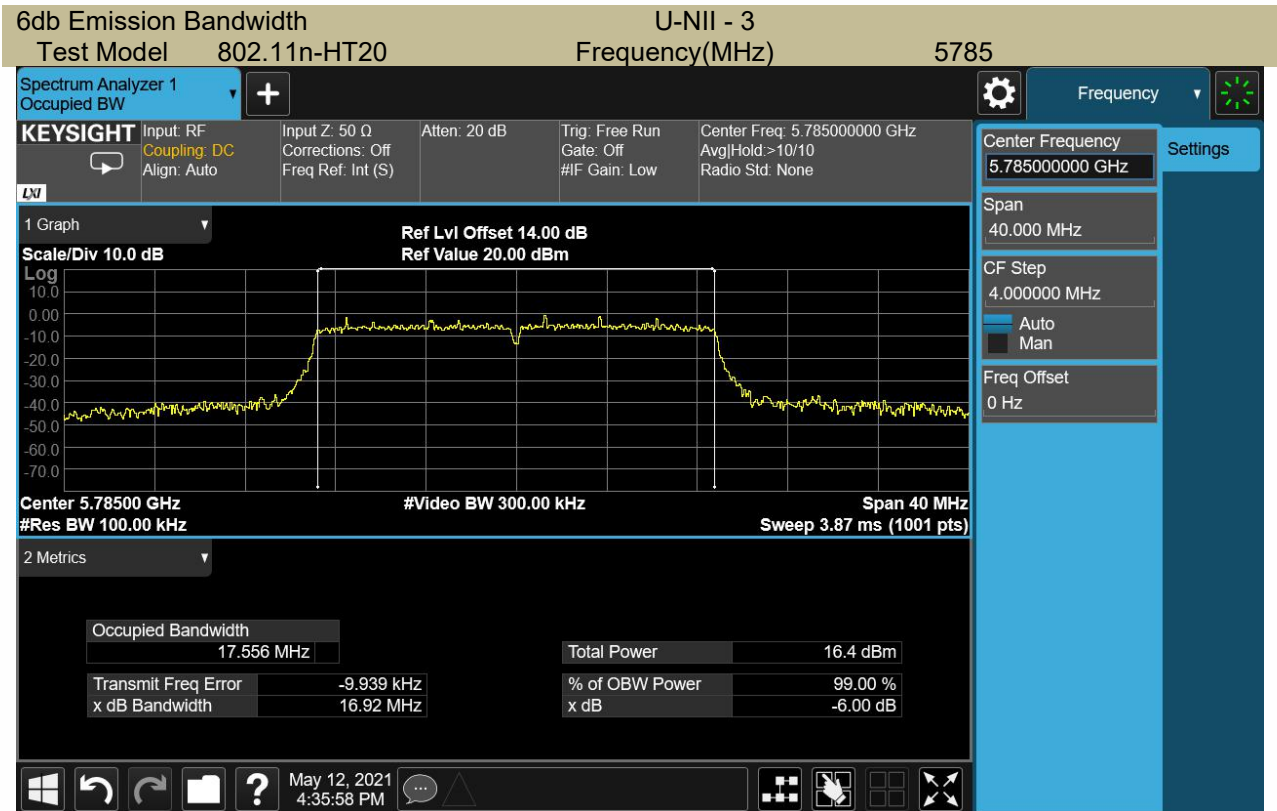


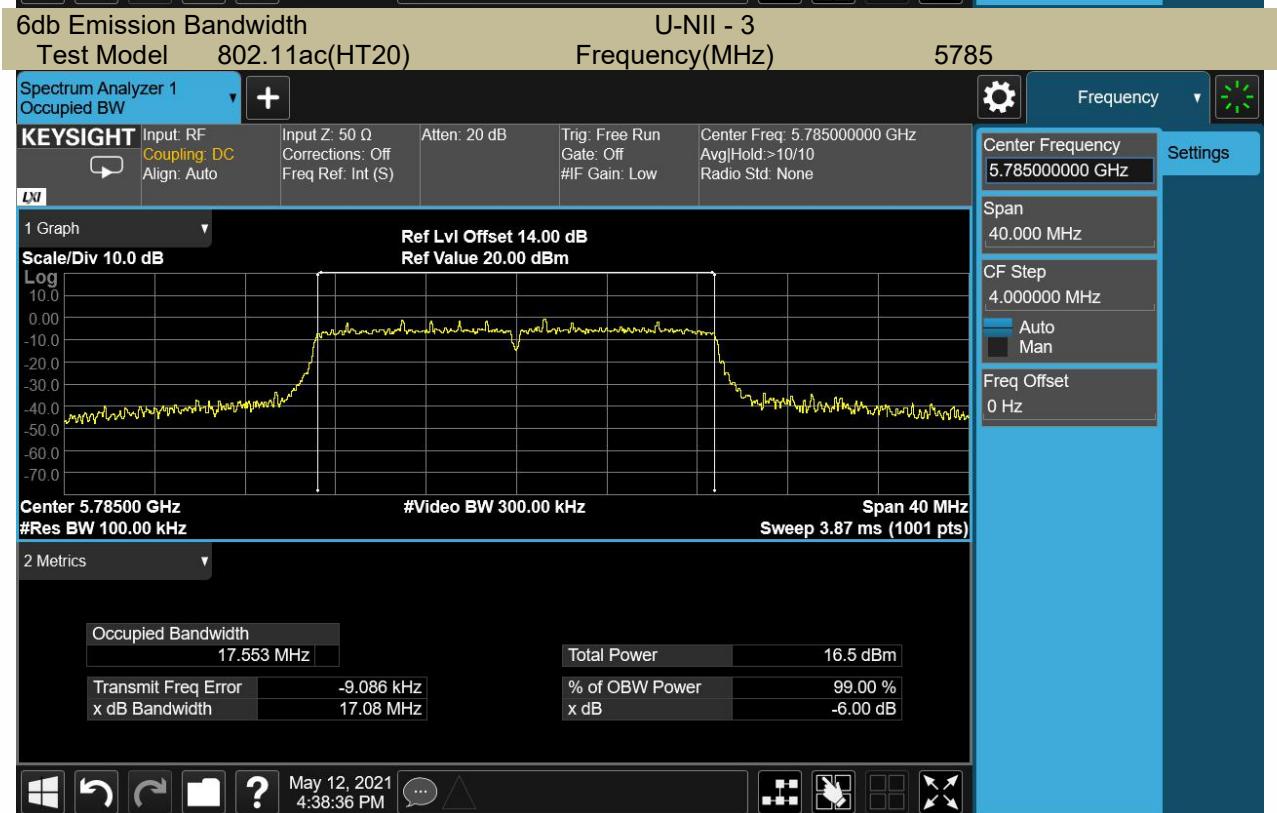
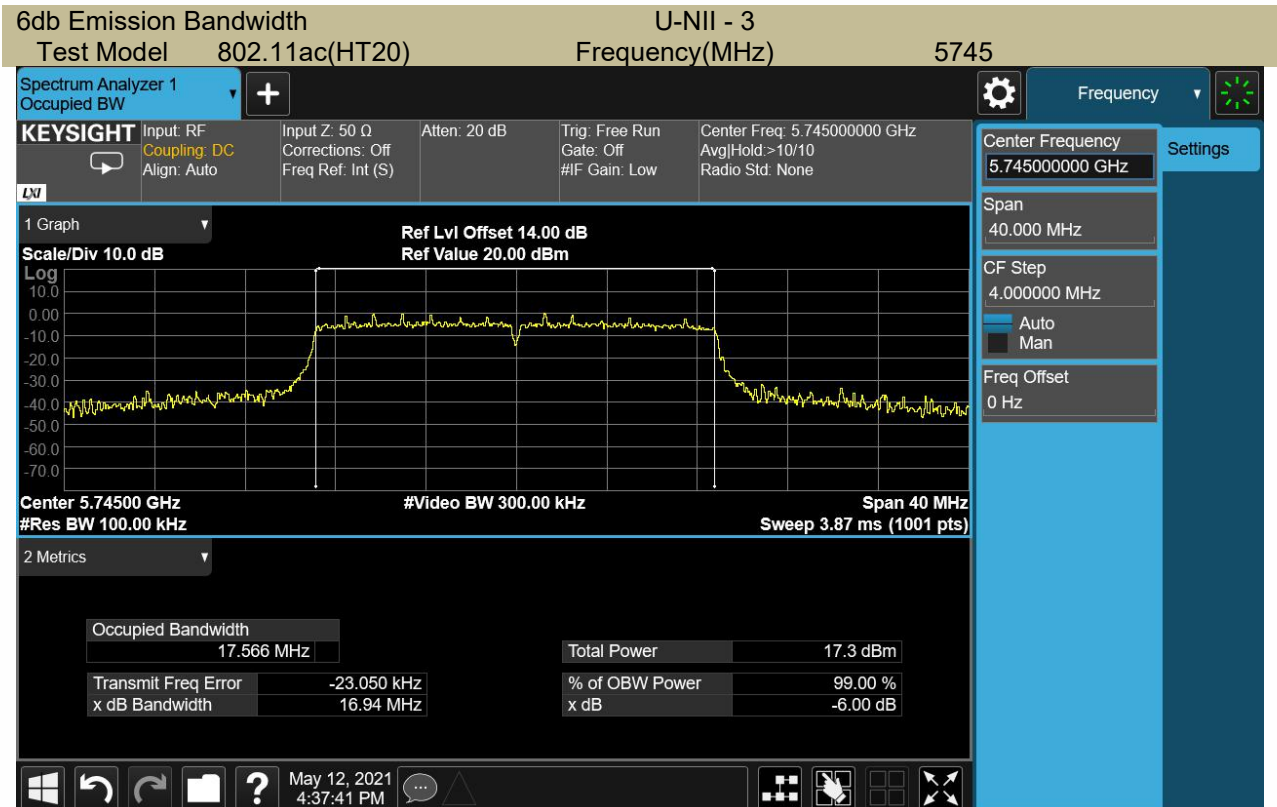


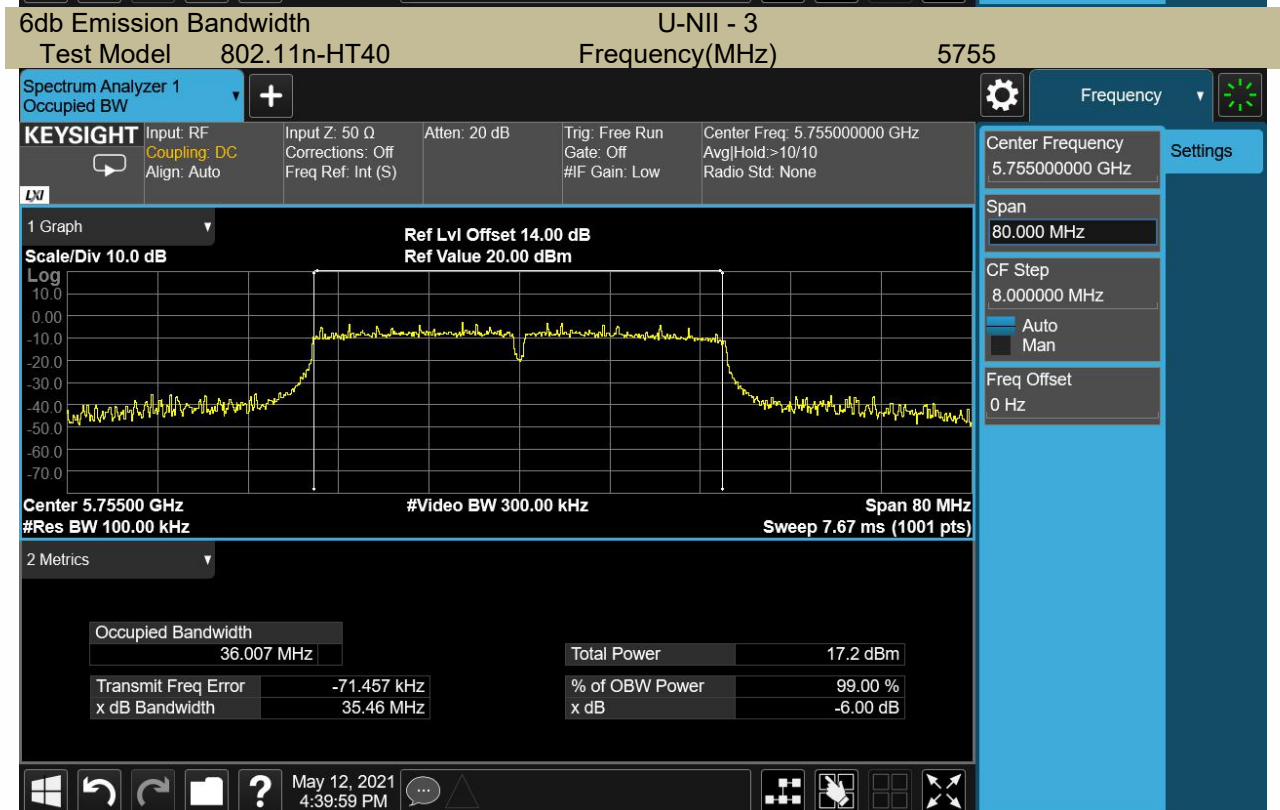
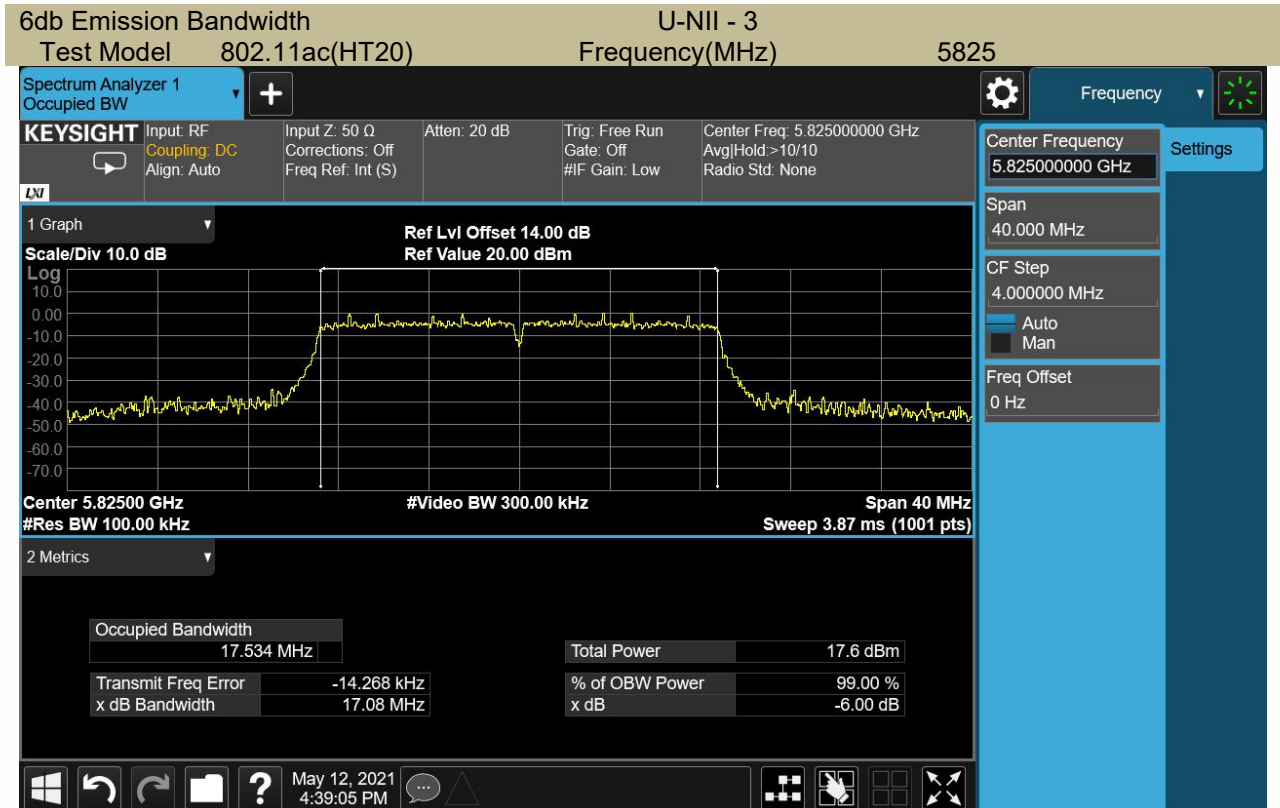


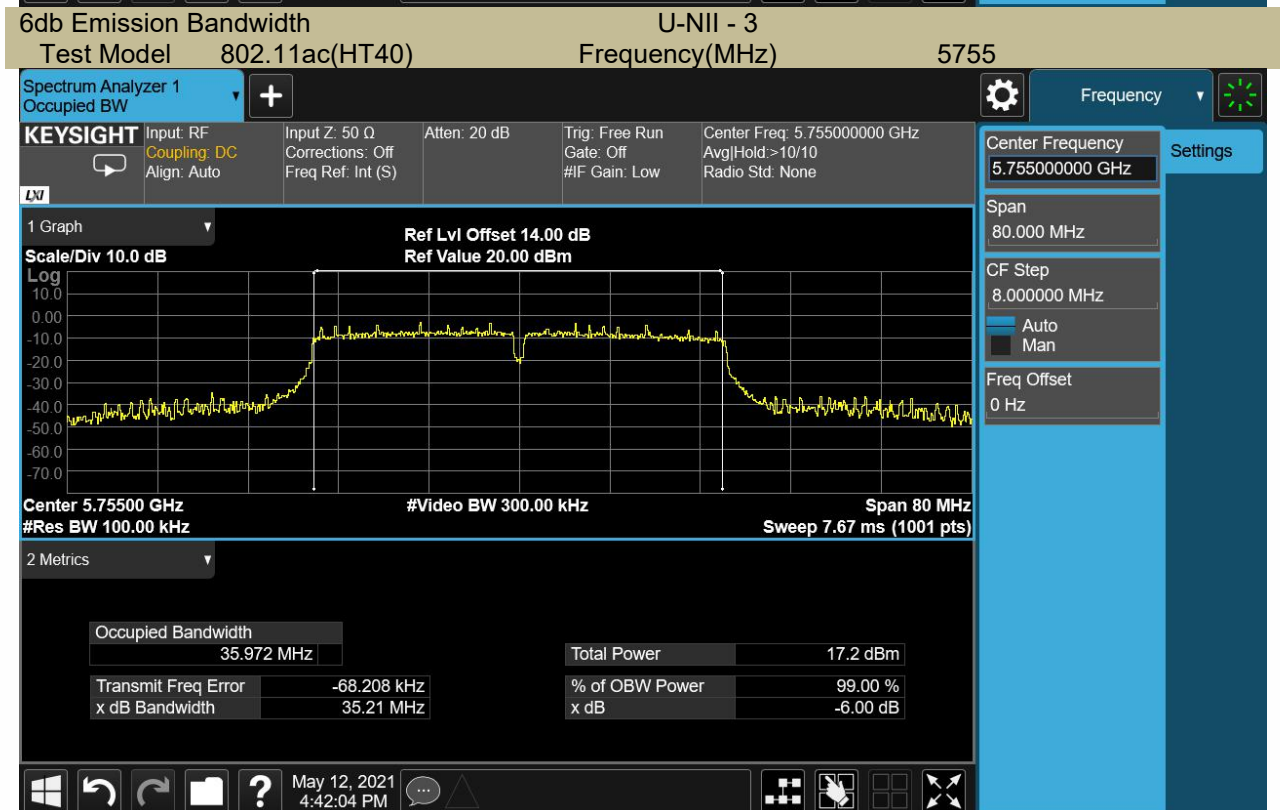
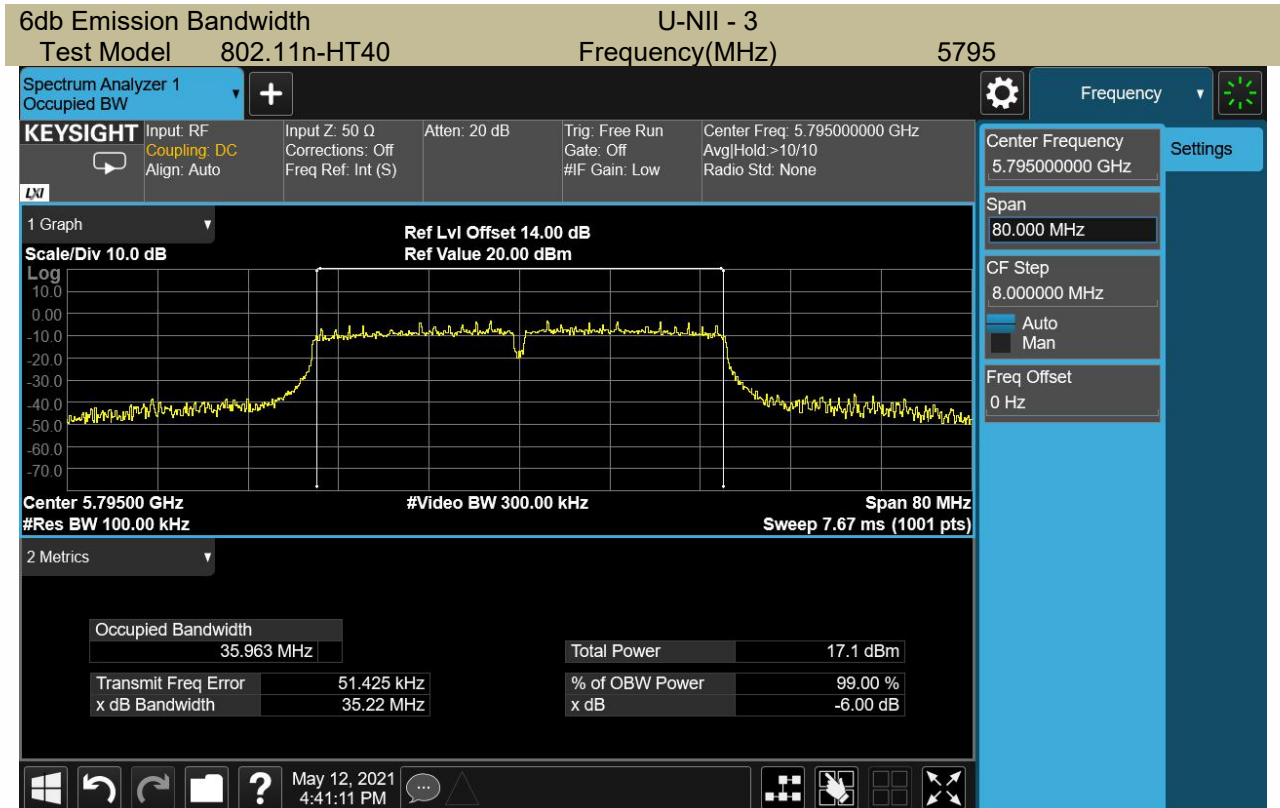


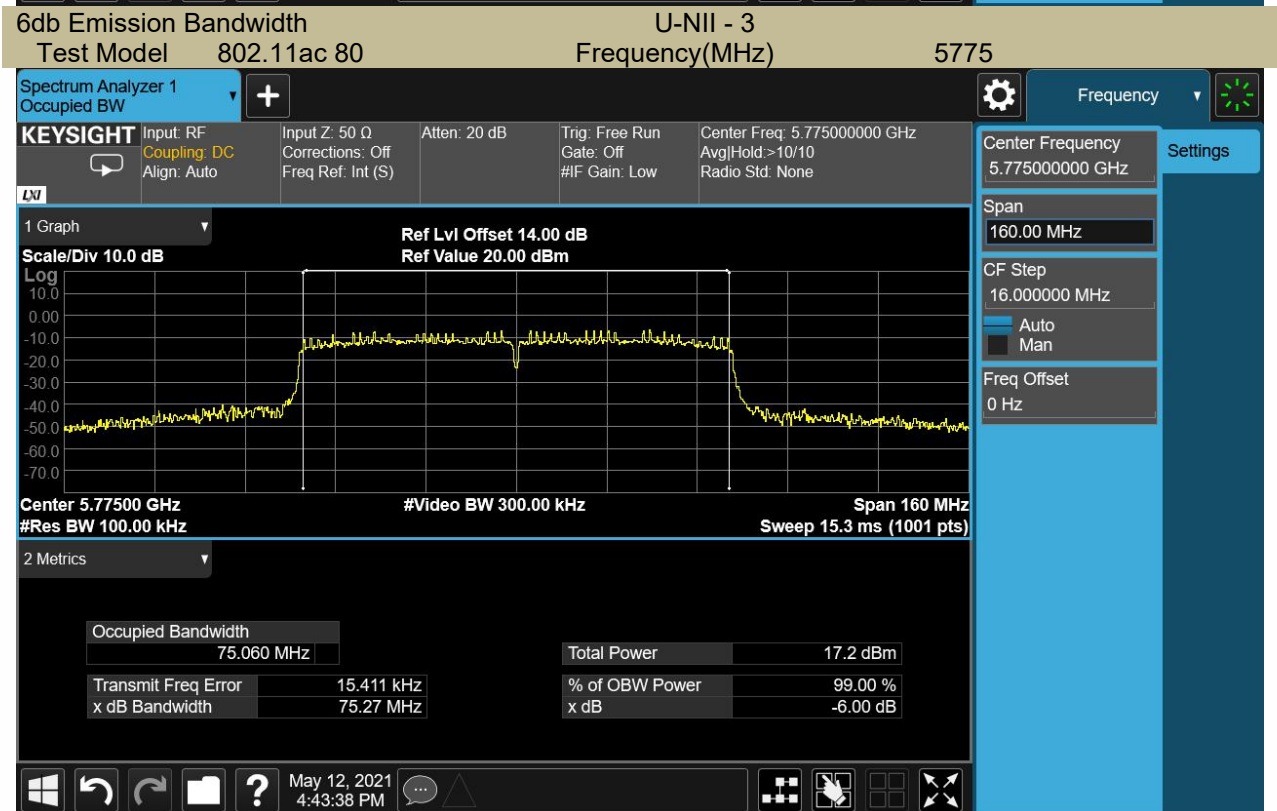
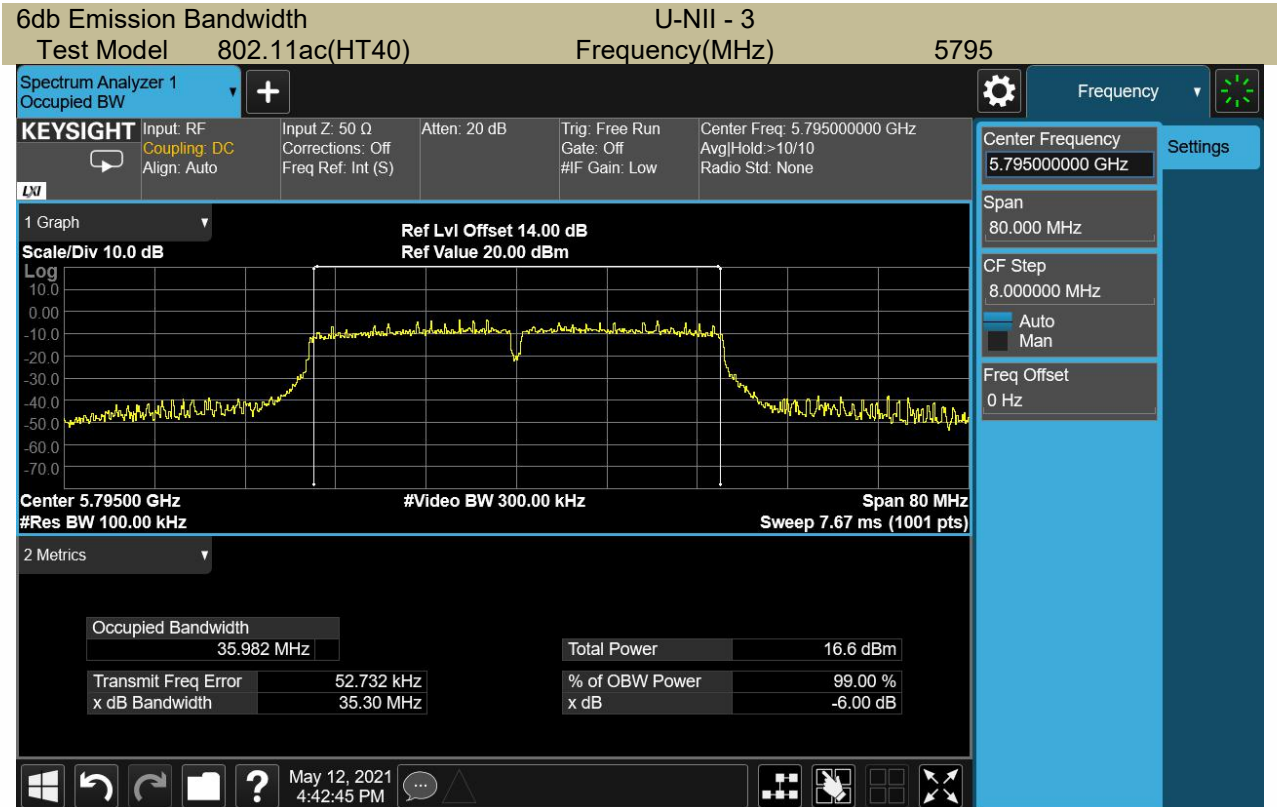












8.2 MAXIMUM CONDUCTED OUTPUT POWER

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 $11 \text{ dBm} + 10 \log B$, 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.

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 :	28°C
Humidity :	56%
Antenna 1	Test By: TOM

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

UNII Band I	
Temperature :	28°C
Humidity :	56%
Antenna 2	Test By: TOM

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

Temperature :	28℃	UNII Band II-A	Test By:	TOM
Humidity :	56%			
Antenna 1				

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

Temperature :	28℃	UNII Band II-A	Test By:	TOM
Humidity :	56%			
Antenna 2				

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

UNII Band II-A
 Temperature : 28°C Test By: TOM
 Humidity : 56%
 Antenna 1+2

Band	Channel Number	Channel Freq. (MHz)	Conducted Power dBm	Limit (dBm)	Verdict
802.11n (HT20)	CH52	5260	14.88	23.6	Pass
	CH56	5280	14.90	23.6	Pass
	CH64	5320	14.88	23.6	Pass
802.11AC (VHT20)	CH52	5260	14.60	23.6	Pass
	CH56	5280	14.83	23.6	Pass
	CH64	5320	15.06	23.6	Pass
802.11n (HT40)	CH54	5270	15.05	23.6	Pass
	CH62	5310	15.34	23.6	Pass
802.11AC (VHT40)	CH54	5270	14.46	23.6	Pass
	CH62	5310	15.33	23.6	Pass
802.11AC (VHT80)	CH42	5290	15.13	23.6	Pass

Temperature :	28℃	UNII Band II-C	Test By:	TOM
Humidity :	56%			
Antenna 1				

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

Temperature :	28℃	UNII Band II-C	Test By:	TOM
Humidity :	56%			
Antenna 2				

Band	Channel Number	Channel Freq. (MHz)	Conducted Power dBm	Limit (dBm)	Verdict
802.11a	CH100	5500	12.99	24	Pass
	CH116	5580	12.15	24	Pass
	CH140	5700	13.08	24	Pass
802.11n (HT20)	CH100	5500	12.65	24	Pass
	CH116	5580	12.17	24	Pass
	CH140	5700	13.42	24	Pass
802.11AC (VHT20)	CH100	5500	12.78	24	Pass
	CH116	5580	12.44	24	Pass
	CH140	5700	13.32	24	Pass
802.11n (HT40)	CH102	5510	12.26	24	Pass
	CH134	5670	12.55	24	Pass
802.11AC (VHT40)	CH102	5510	12.79	24	Pass
	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
802.11n (HT20)	CH100	5500	15.54	23.6	Pass
	CH116	5580	15.30	23.6	Pass
	CH140	5700	16.38	23.6	Pass
802.11AC (VHT20)	CH100	5500	15.49	23.6	Pass
	CH116	5580	15.42	23.6	Pass
	CH140	5700	16.39	23.6	Pass
802.11n (HT40)	CH102	5510	15.38	23.6	Pass
	CH134	5670	15.58	23.6	Pass
802.11AC (VHT40)	CH102	5510	15.78	23.6	Pass
	CH134	5670	15.38	23.6	Pass
802.11AC (VHT80)	CH106	5530	15.66	23.6	Pass

Temperature :	28°C	UNII Band III	Test By:	TOM
Humidity :	56%			
Antenna 1				

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

Temperature :	28°C	UNII Band III	Test By:	TOM
Humidity :	56%			
Antenna 2				

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

Temperature :	28°C	UNII Band III	
Humidity :	56%	Test By:	TOM
Antenna 1+2			

Band	Channel Number	Channel Freq. (MHz)	Conducted Power dBm	Limit (dBm)	Verdict
802.11n (HT20)	CH149	5745	15.57	29.6	Pass
	CH157	5785	15.42	29.6	Pass
	CH165	5825	15.77	29.6	Pass
802.11AC (VHT20)	CH149	5745	16.13	29.6	Pass
	CH157	5785	15.79	29.6	Pass
	CH165	5825	15.74	29.6	Pass
802.11n (HT40)	CH151	5755	16.09	29.6	Pass
	CH159	5795	16.12	29.6	Pass
802.11AC (VHT40)	CH151	5755	16.02	29.6	Pass
	CH159	5795	15.98	29.6	Pass
802.11AC (VHT80)	CH155	5775	15.57	29.6	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. 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 $11 \text{ dBm} + 10 \log B$, 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.

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

1T1R - Antenna 1

5150-5250MHz

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



