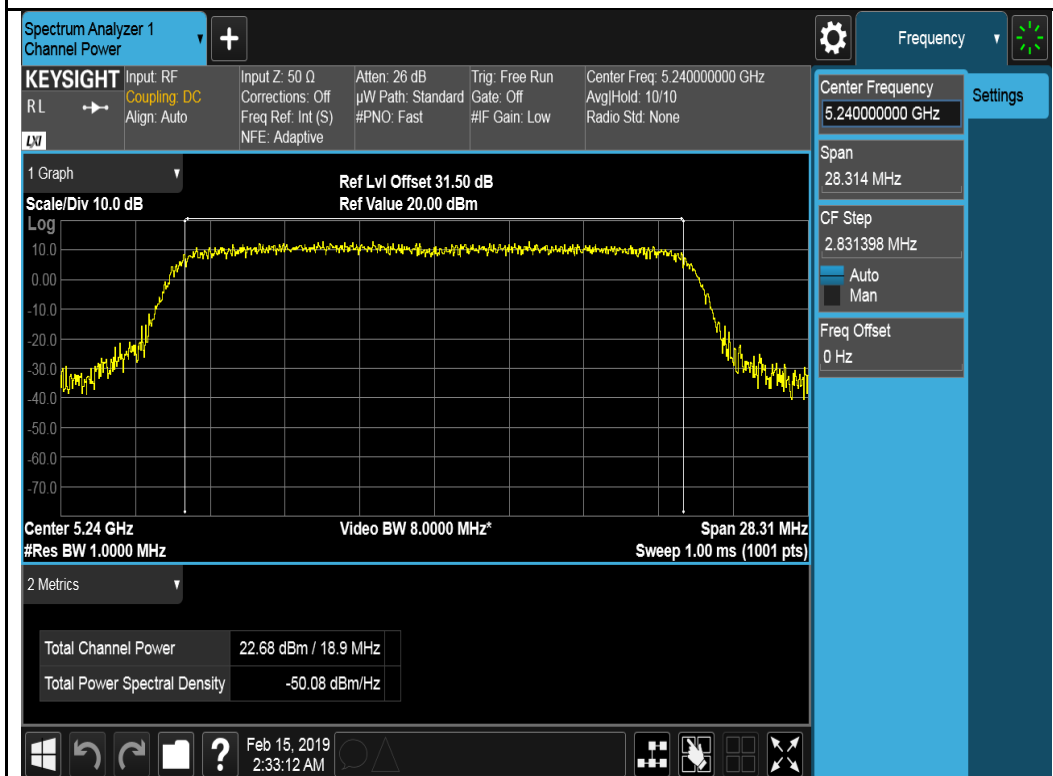
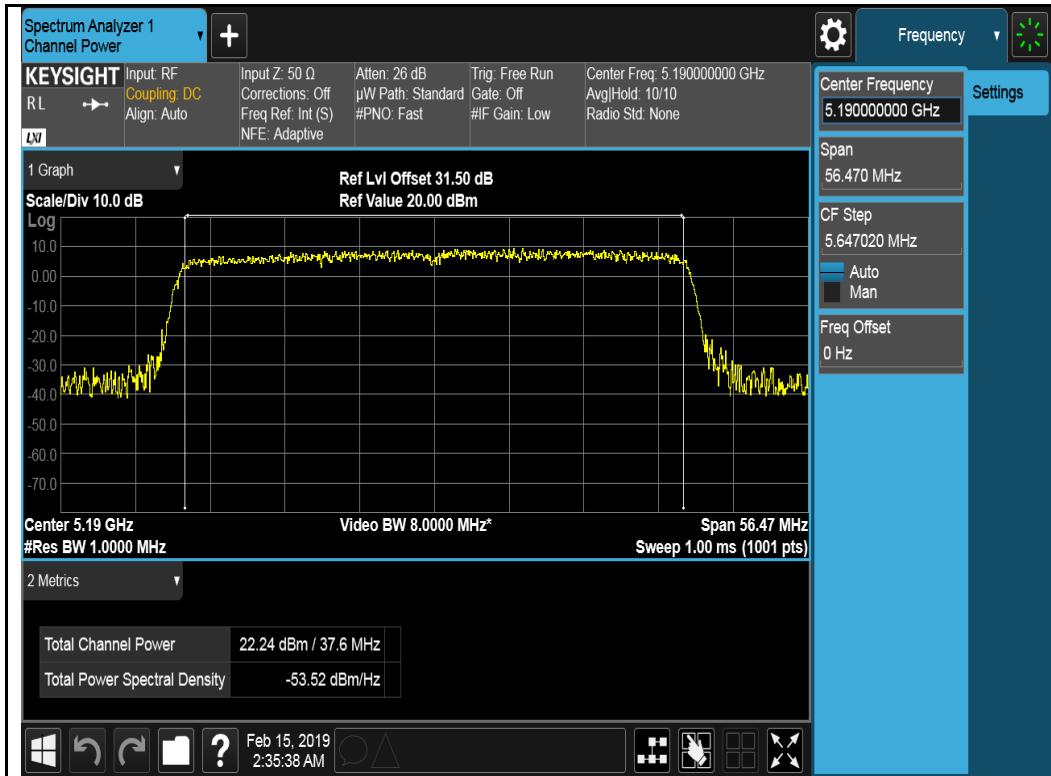


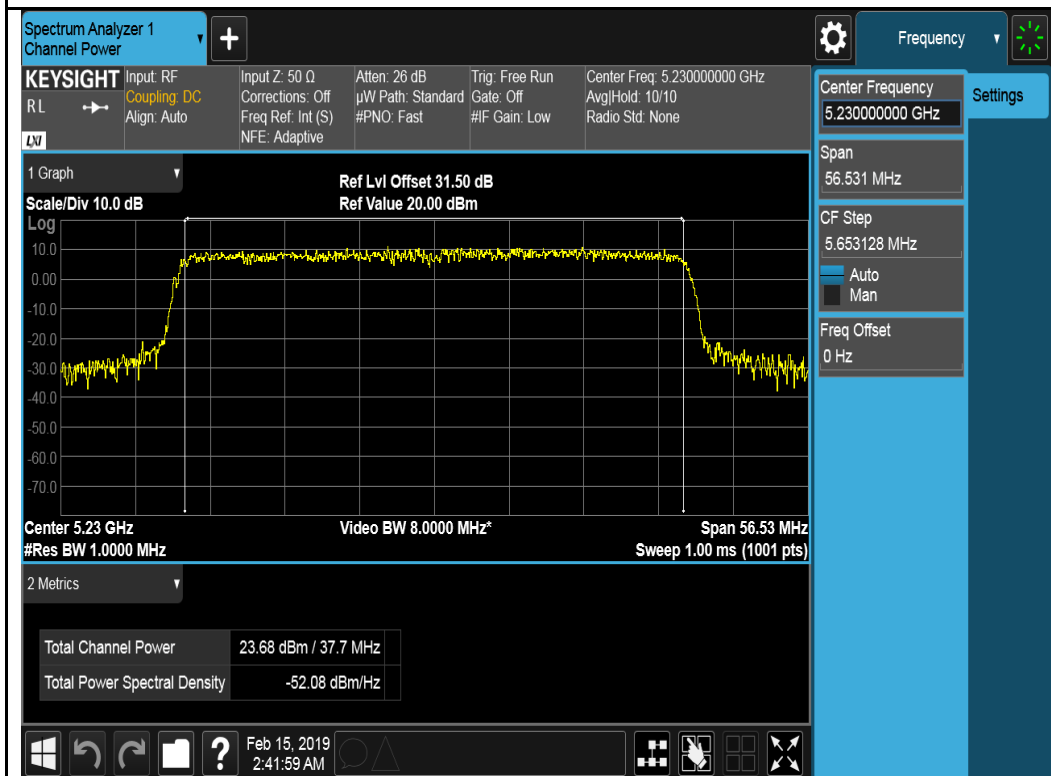
802.11ax-HT20-5200MHz



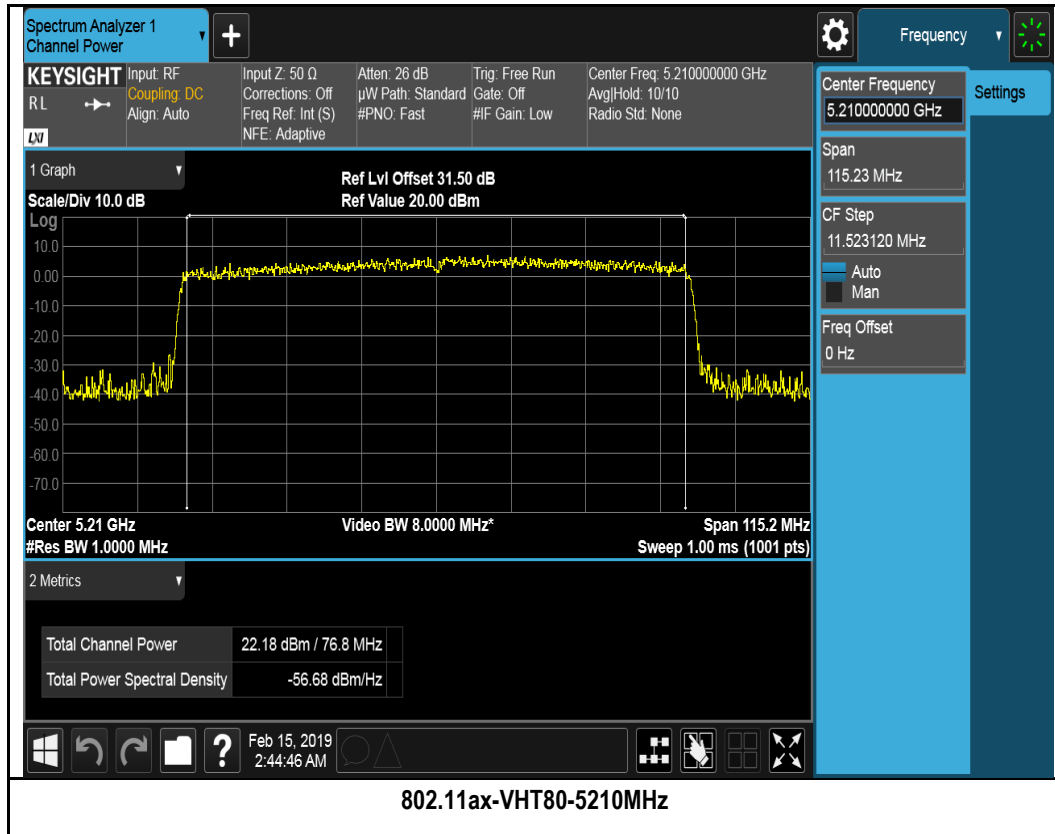
802.11ax-HT20-5240MHz



802.11ax-H420-5190MHz

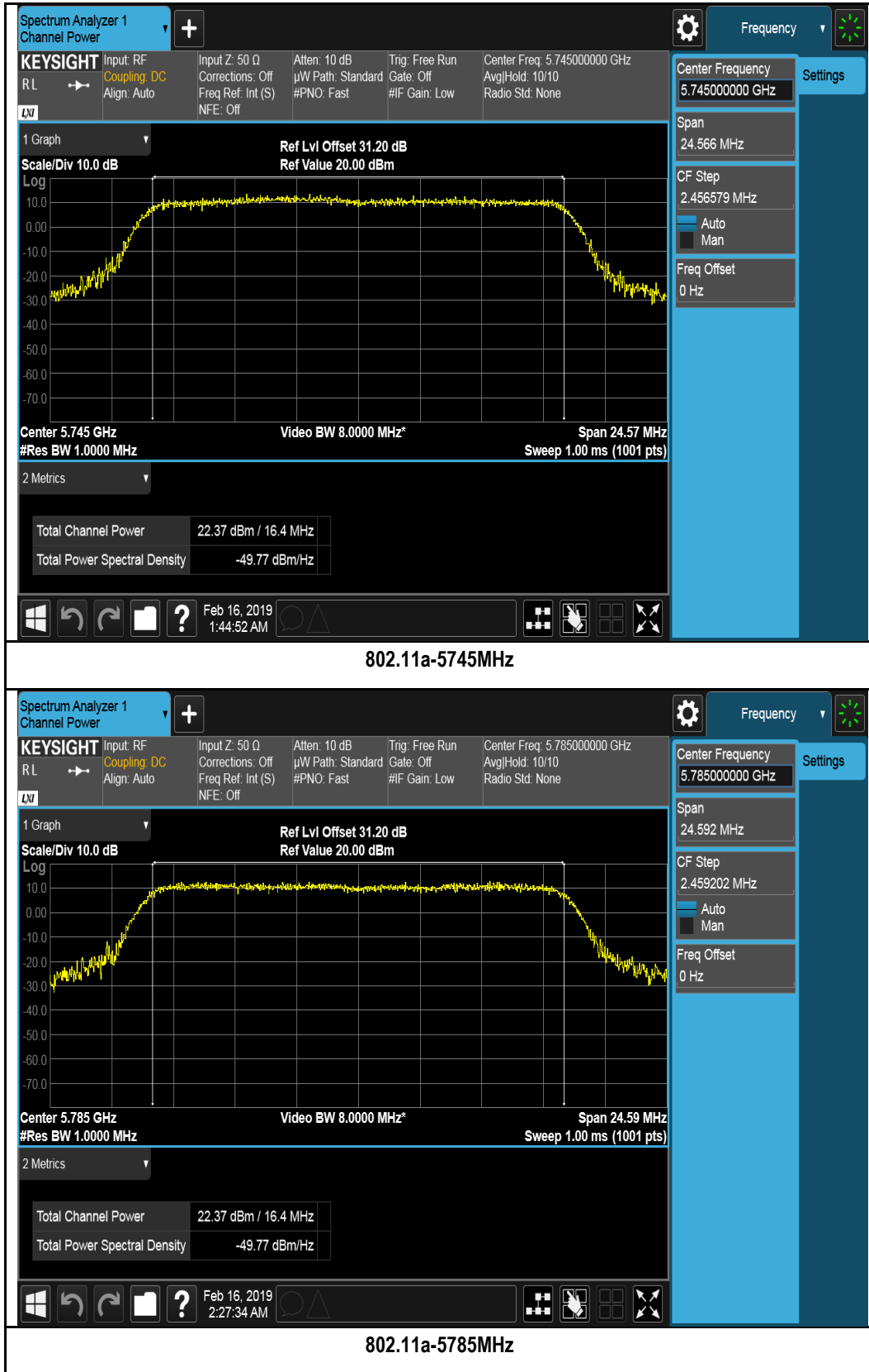


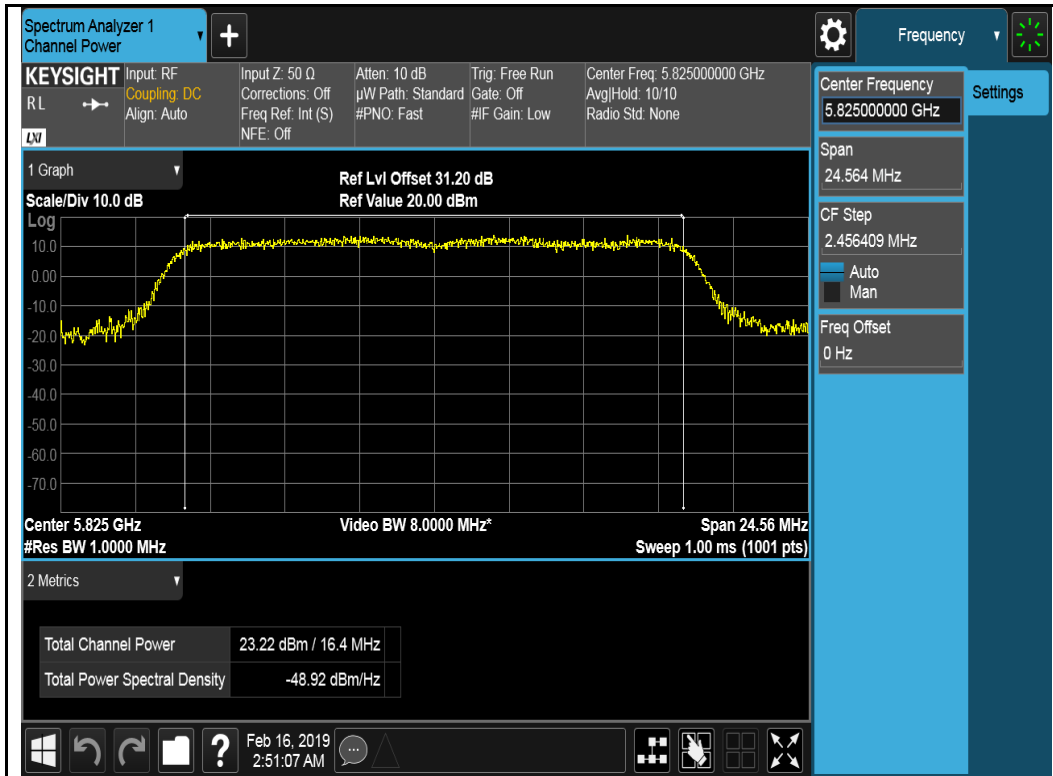
802.11ax-H420-5230MHz



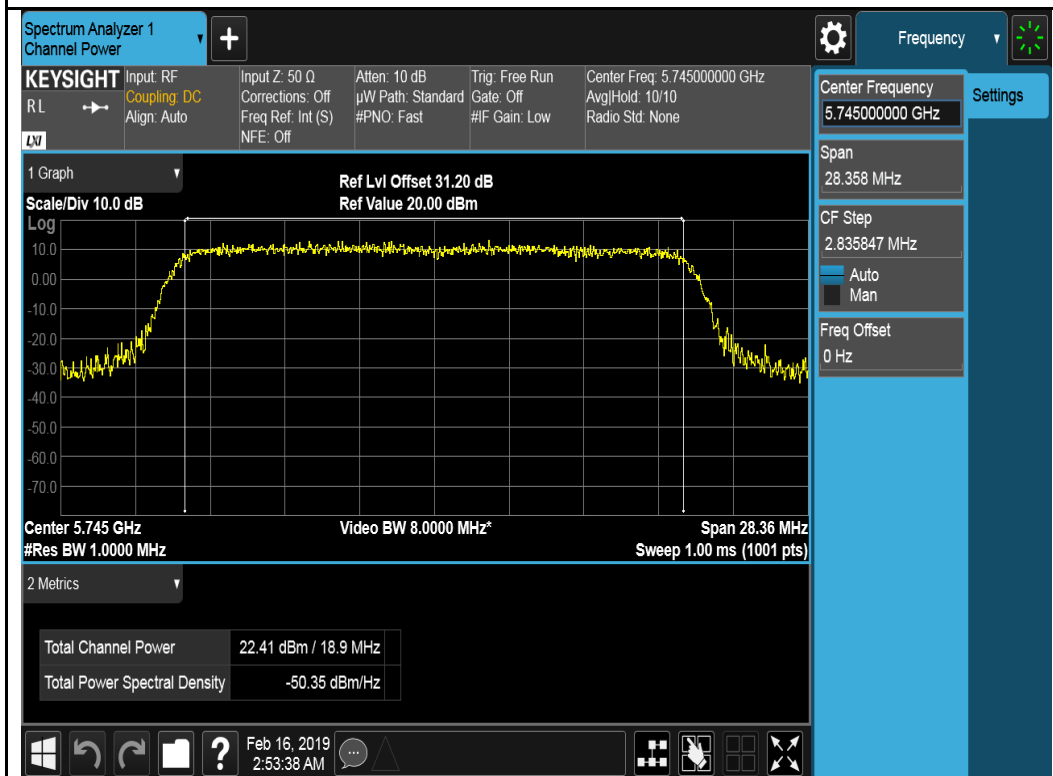
Test Plot for U-NII-3 Band:

Chain 0:

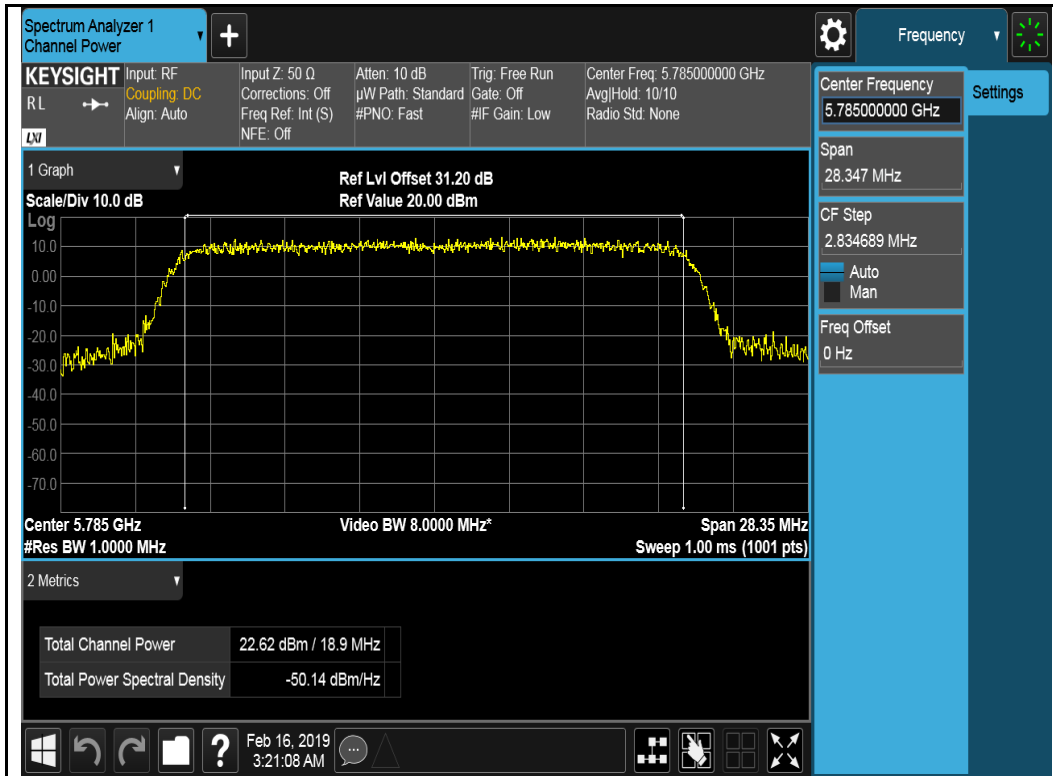




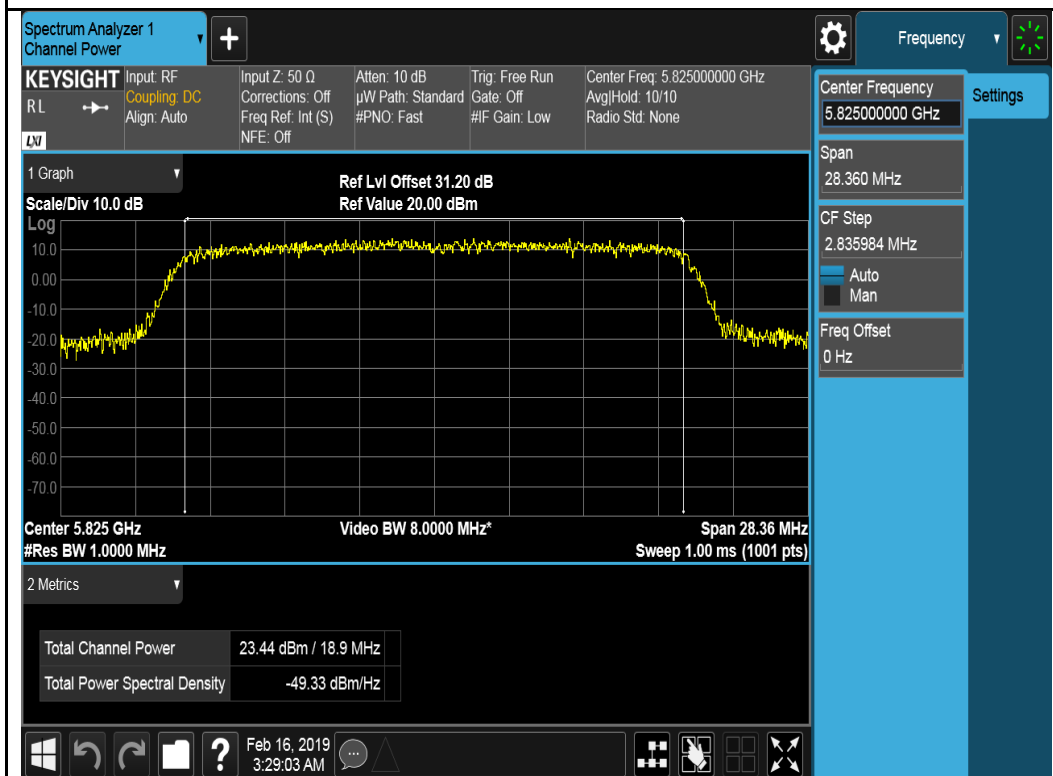
802.11a-5825MHz



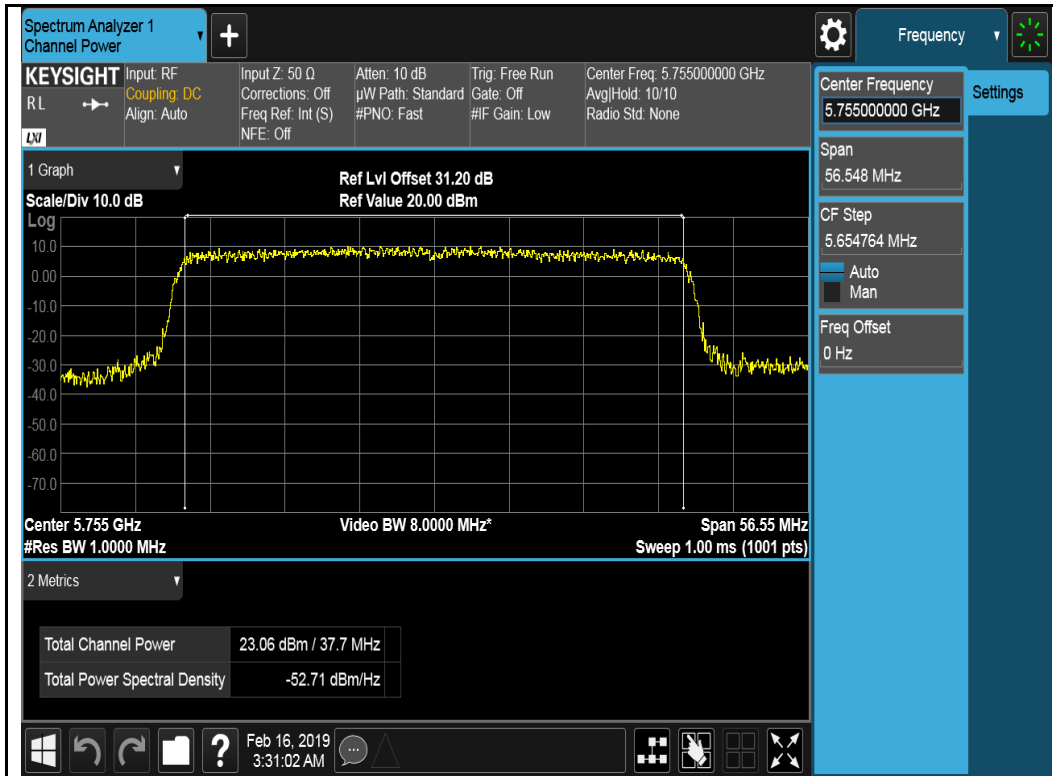
802.11ax-HT20-5745MHz



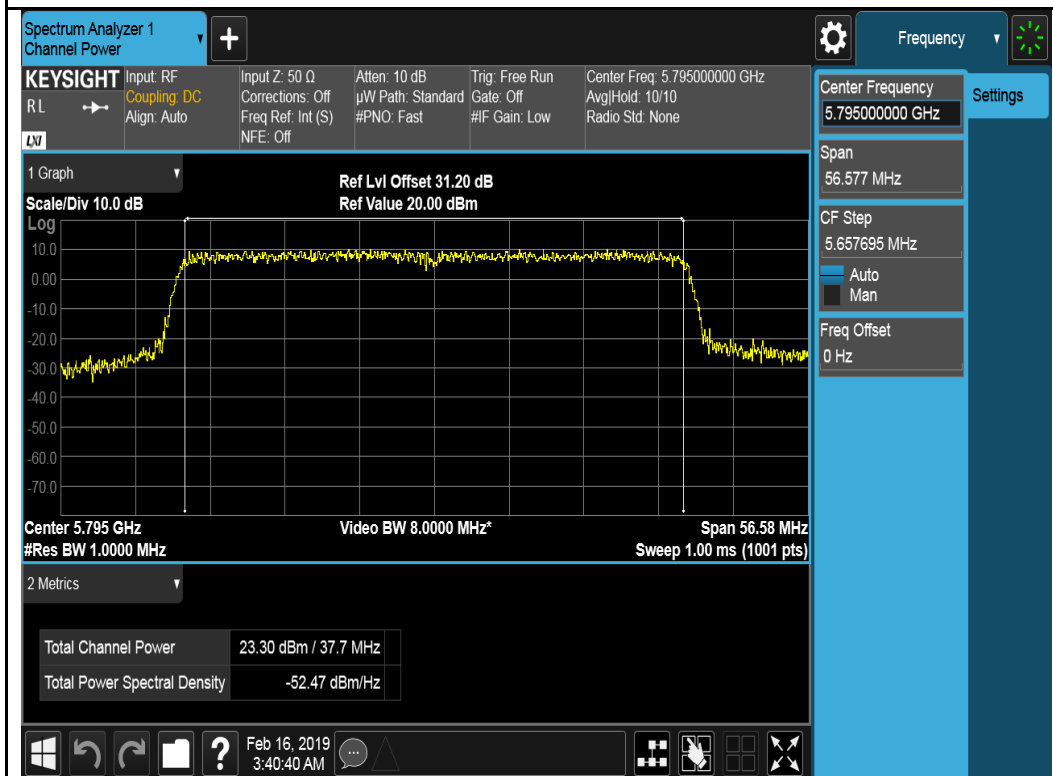
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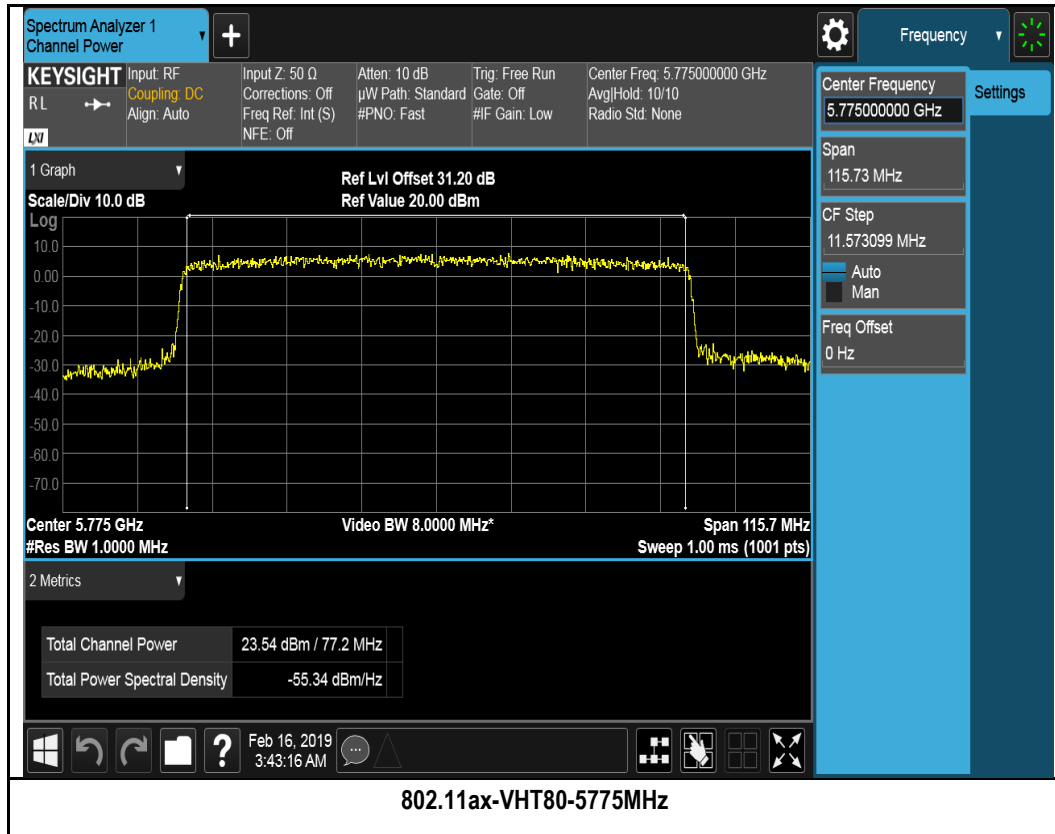
802.11ax-HT20-5825MHz



802.11ax-H420-5755MHz

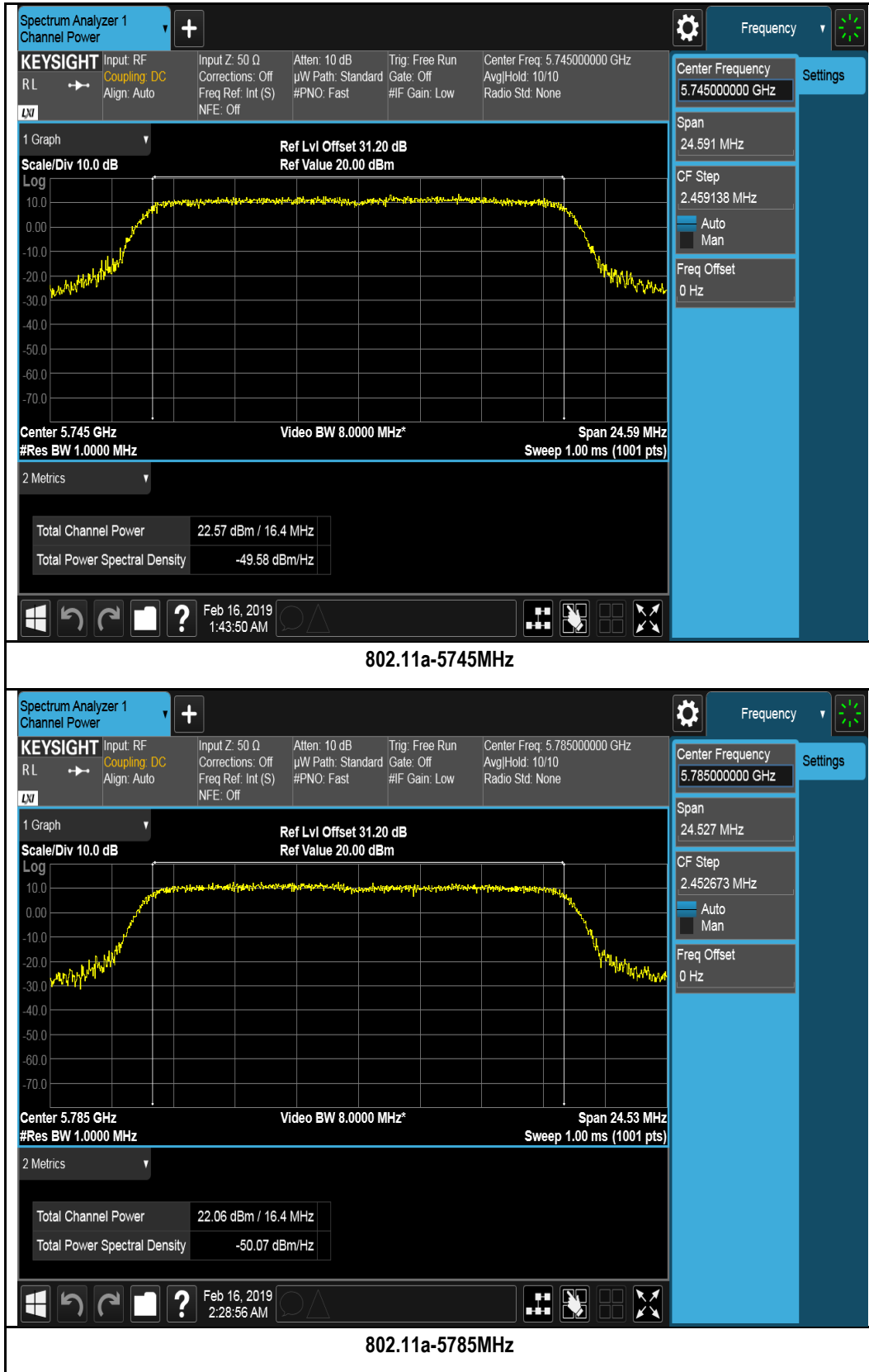


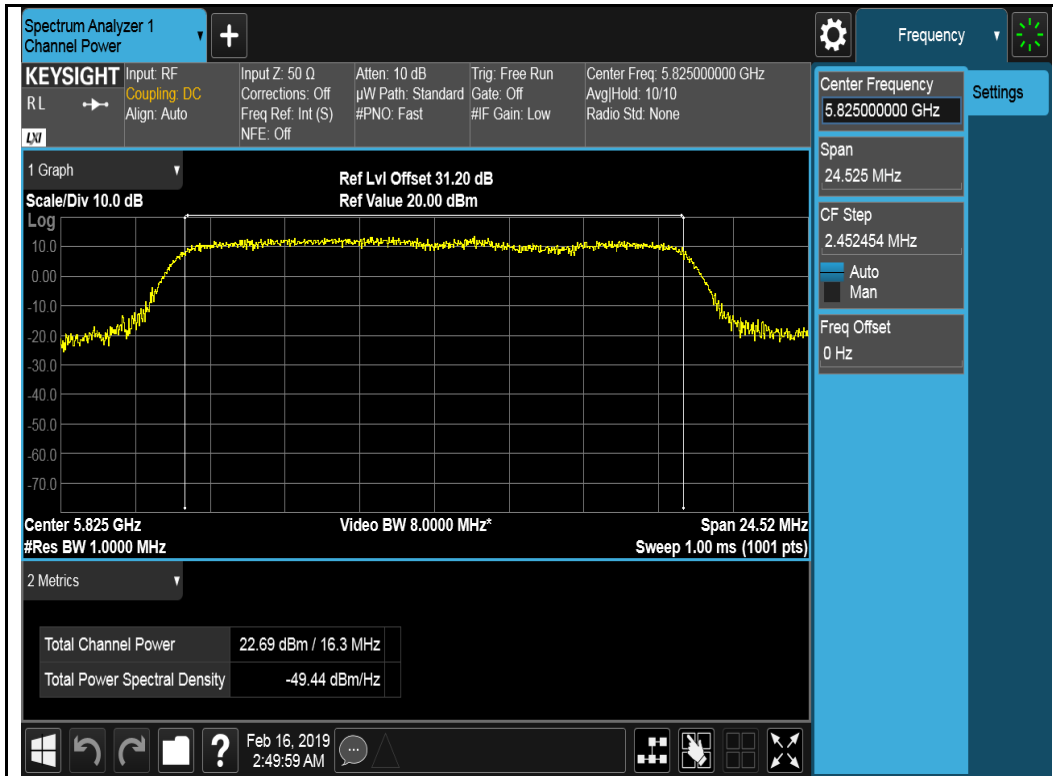
802.11ax-H420-5795MHz



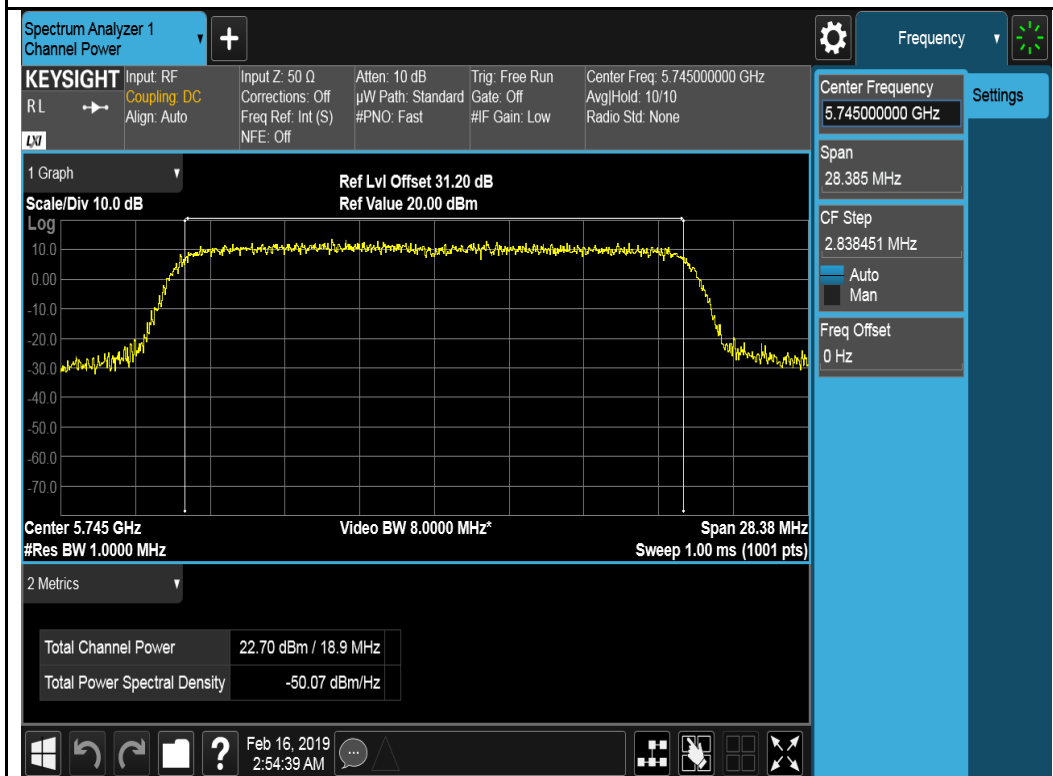


Chain 1:

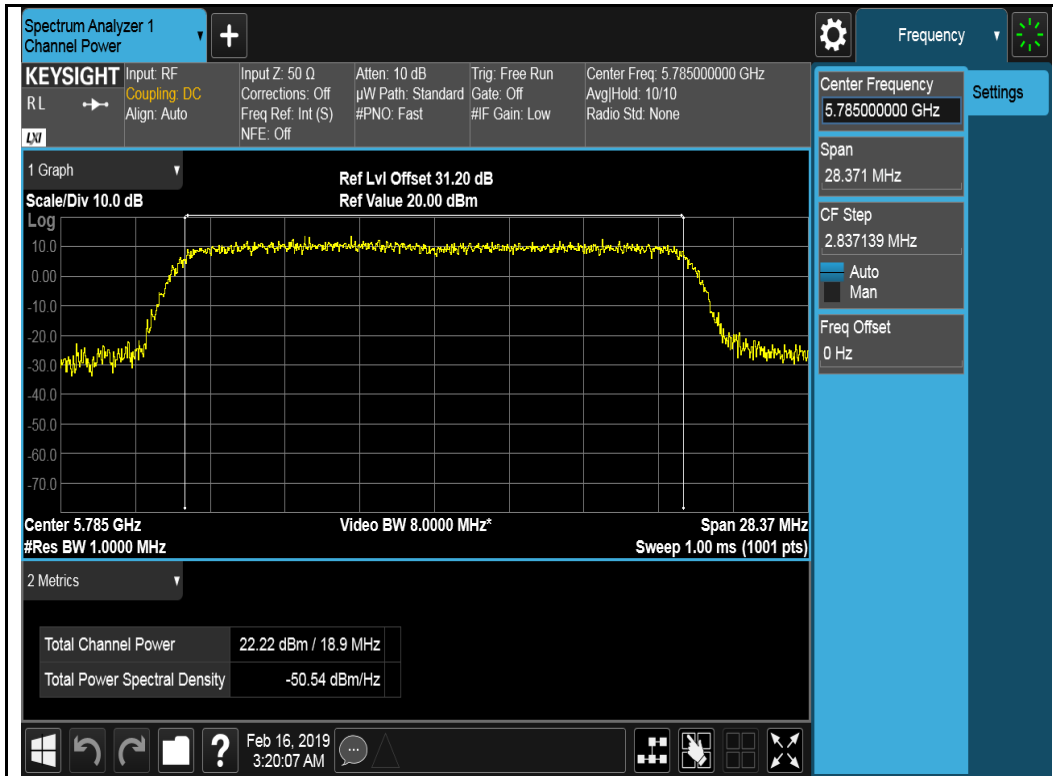




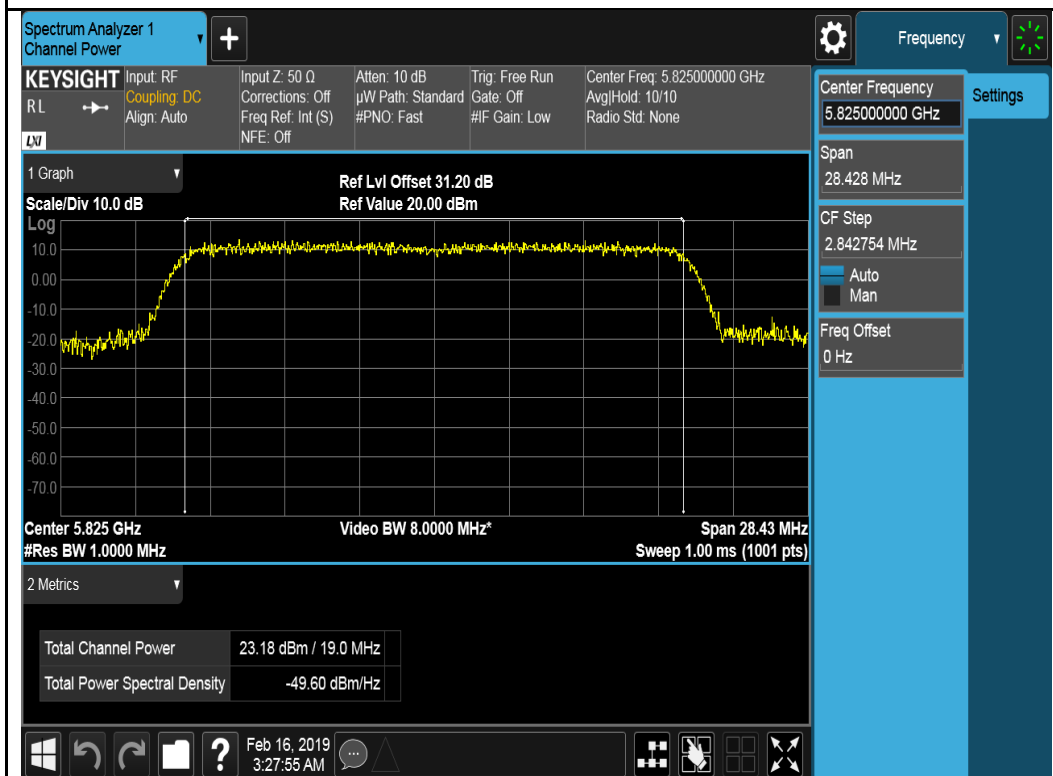
802.11a-5825MHz



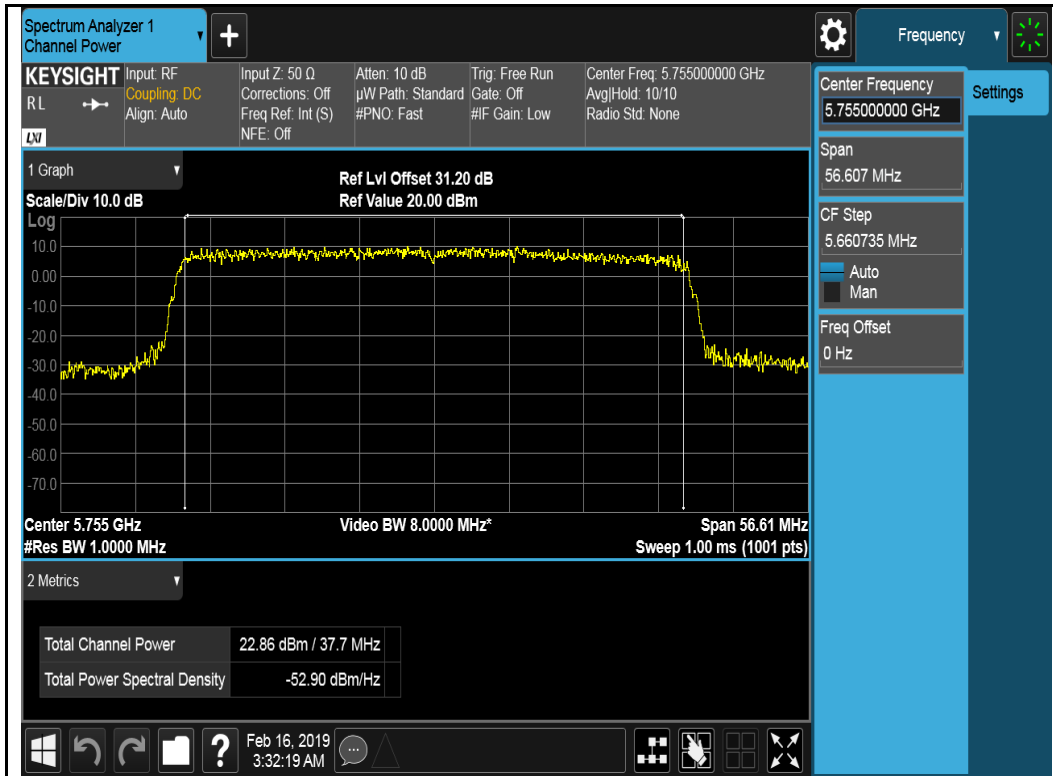
802.11ax-HT20-5745MHz



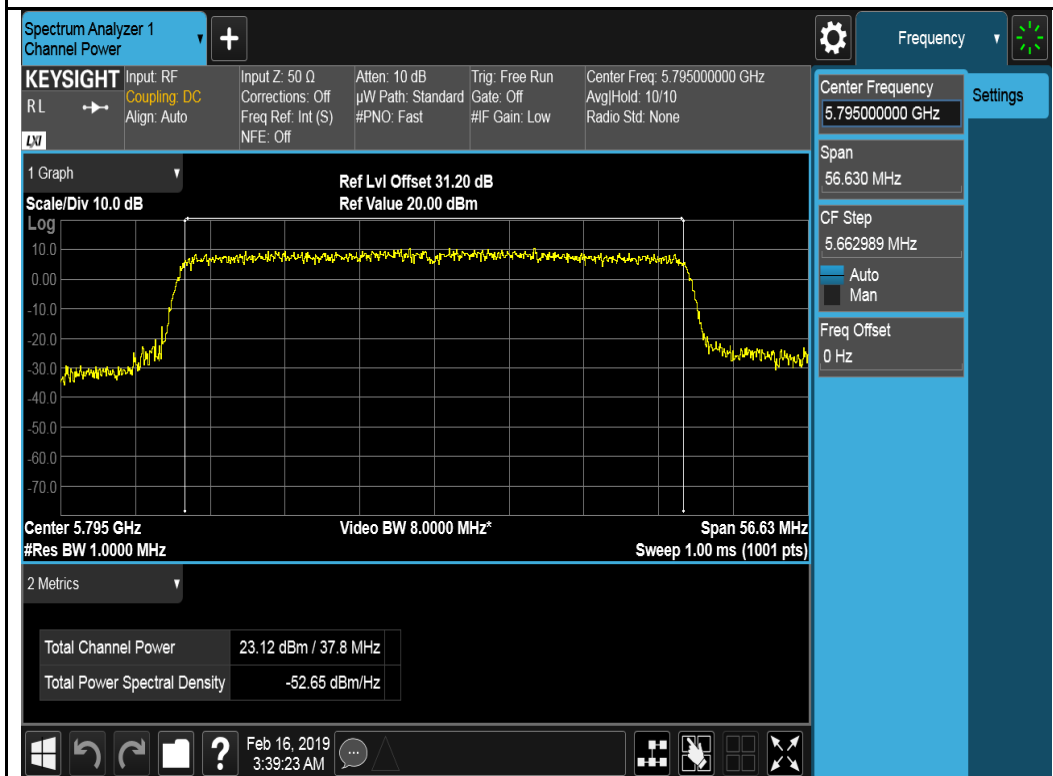
802.11ax-HT20-5785MHz



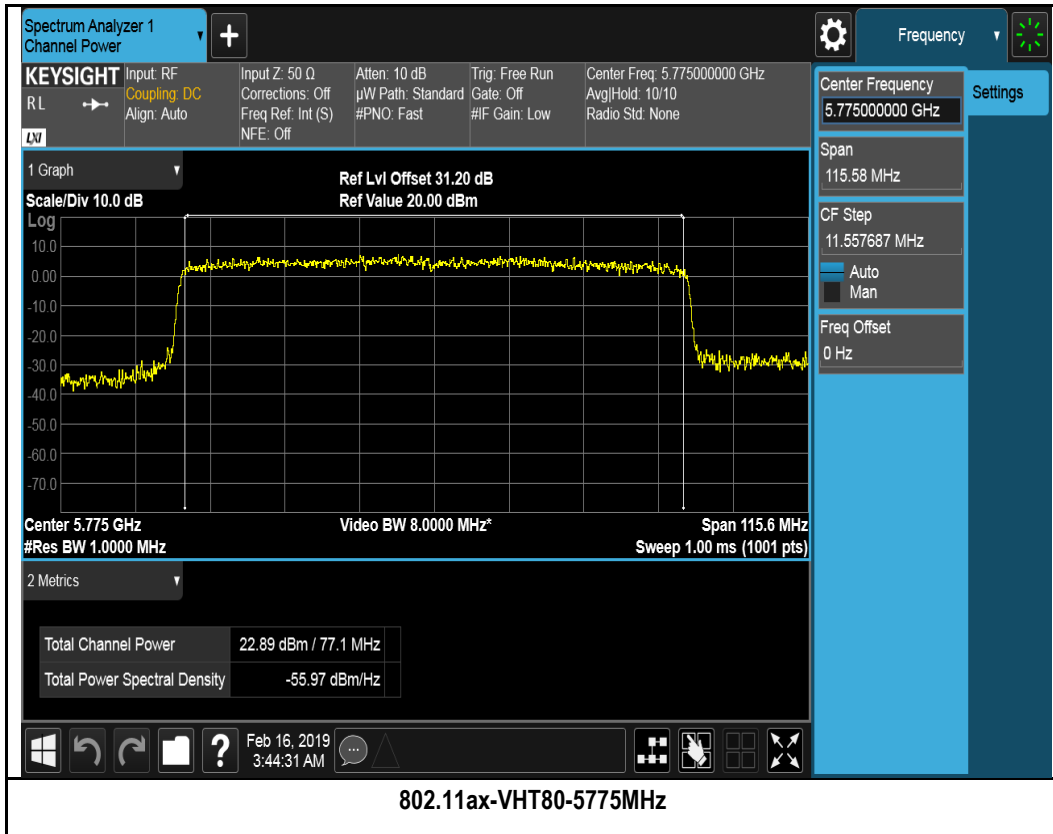
802.11ax-HT20-5825MHz



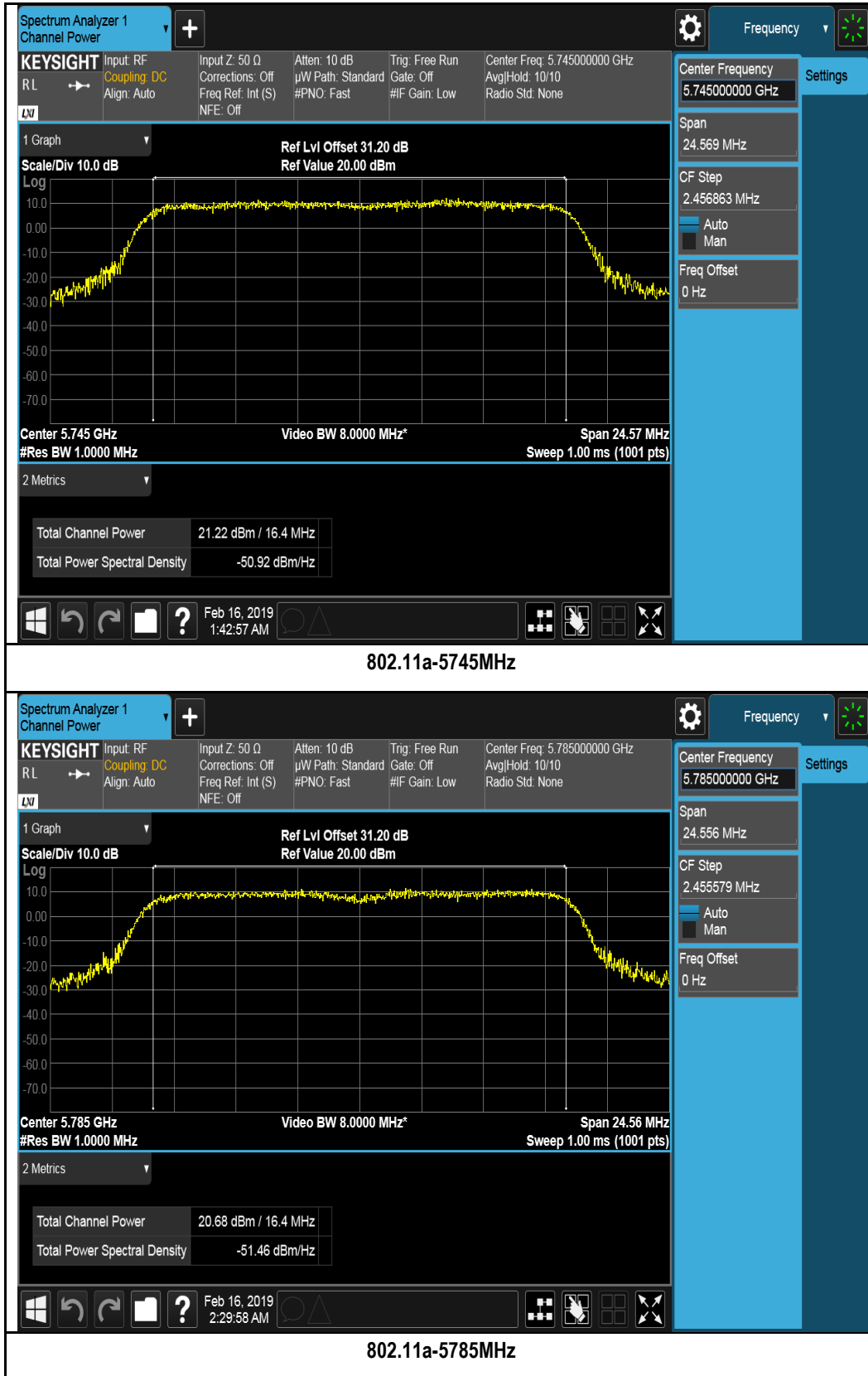
802.11ax-H420-5755MHz

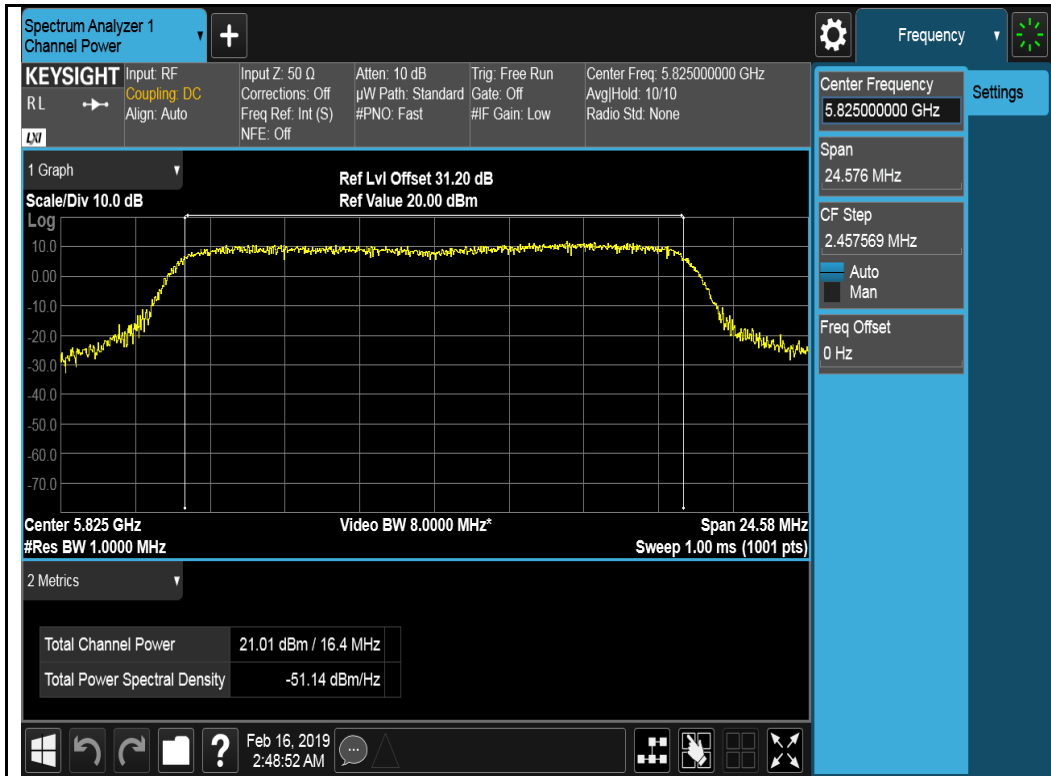


802.11ax-H420-5795MHz

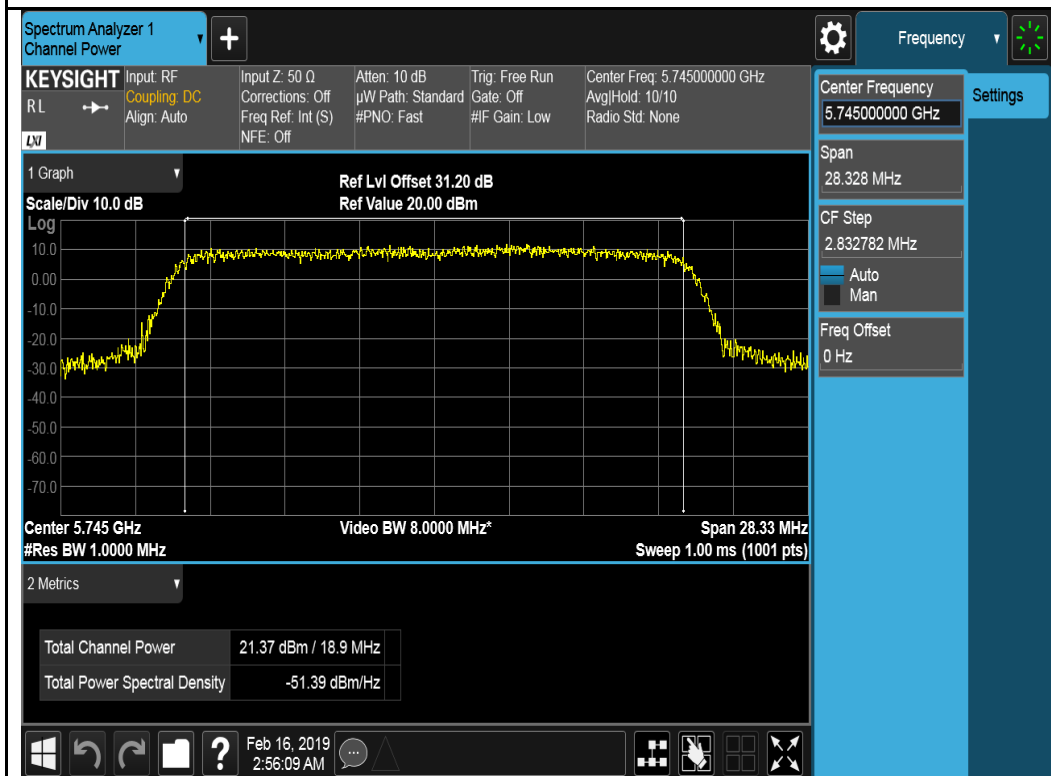


Chain 2:

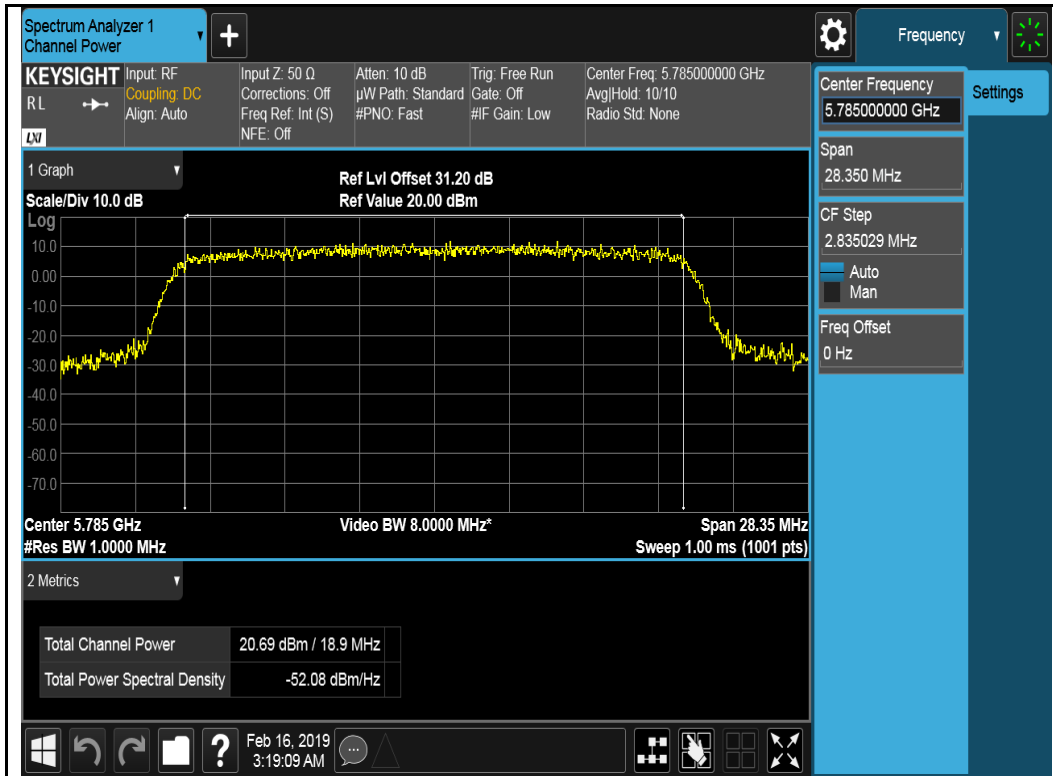




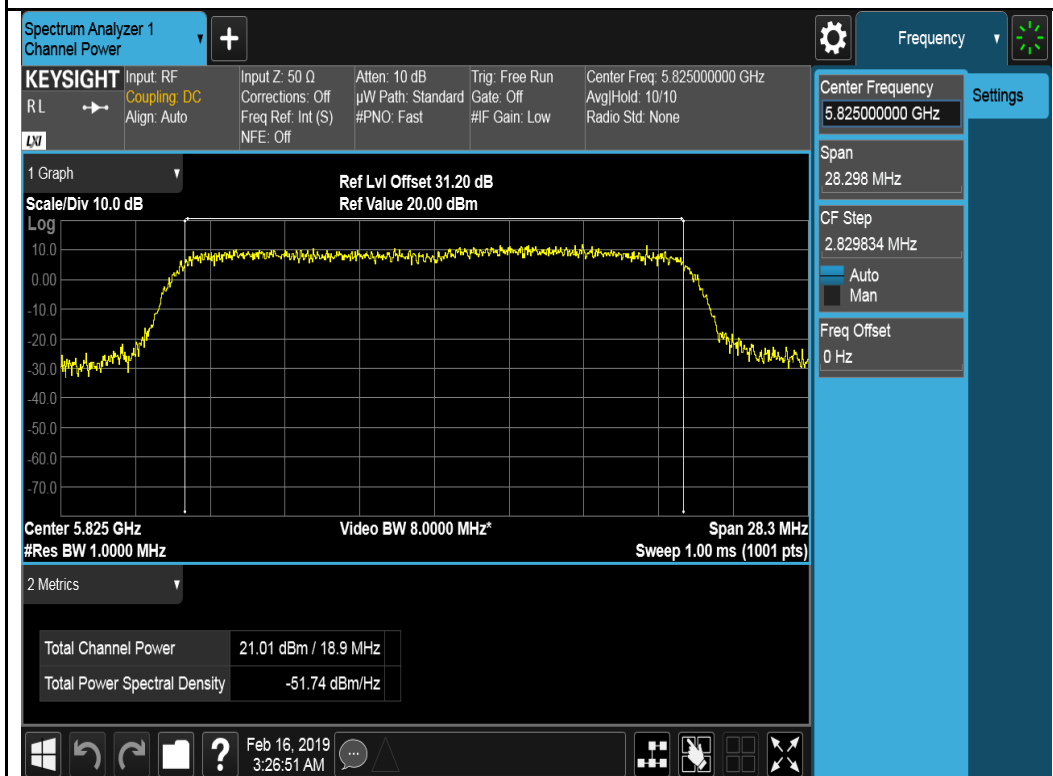
802.11a-5825MHz



802.11ax-HT20-5745MHz

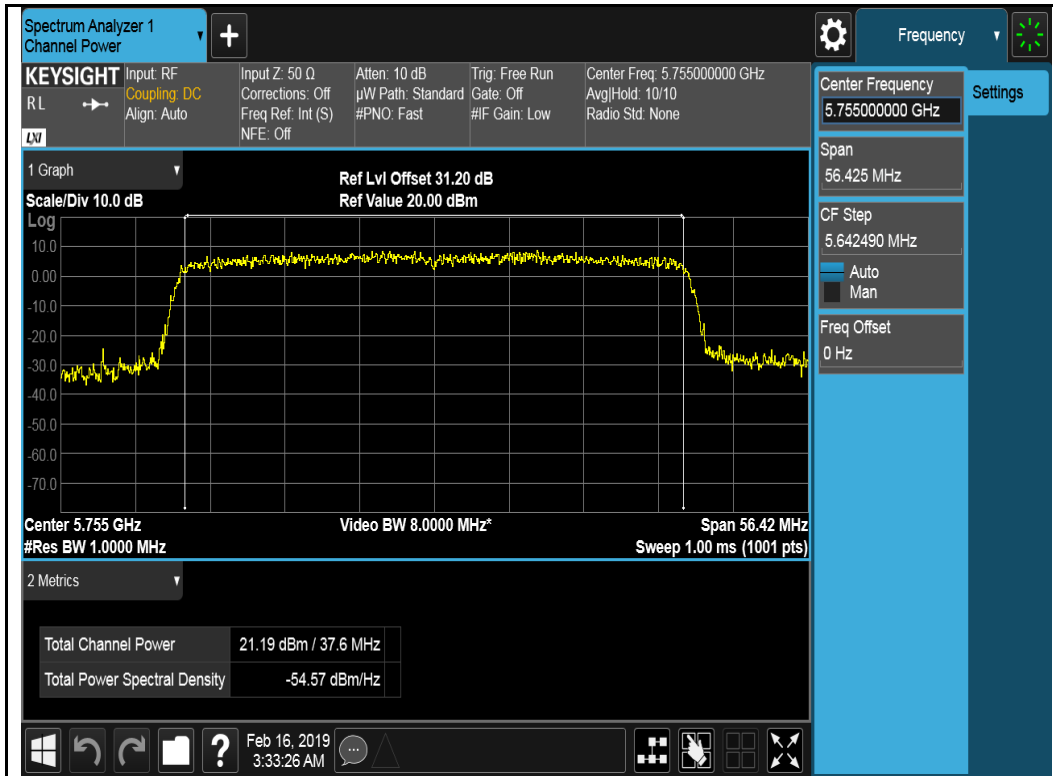


802.11ax-HT20-5785MHz

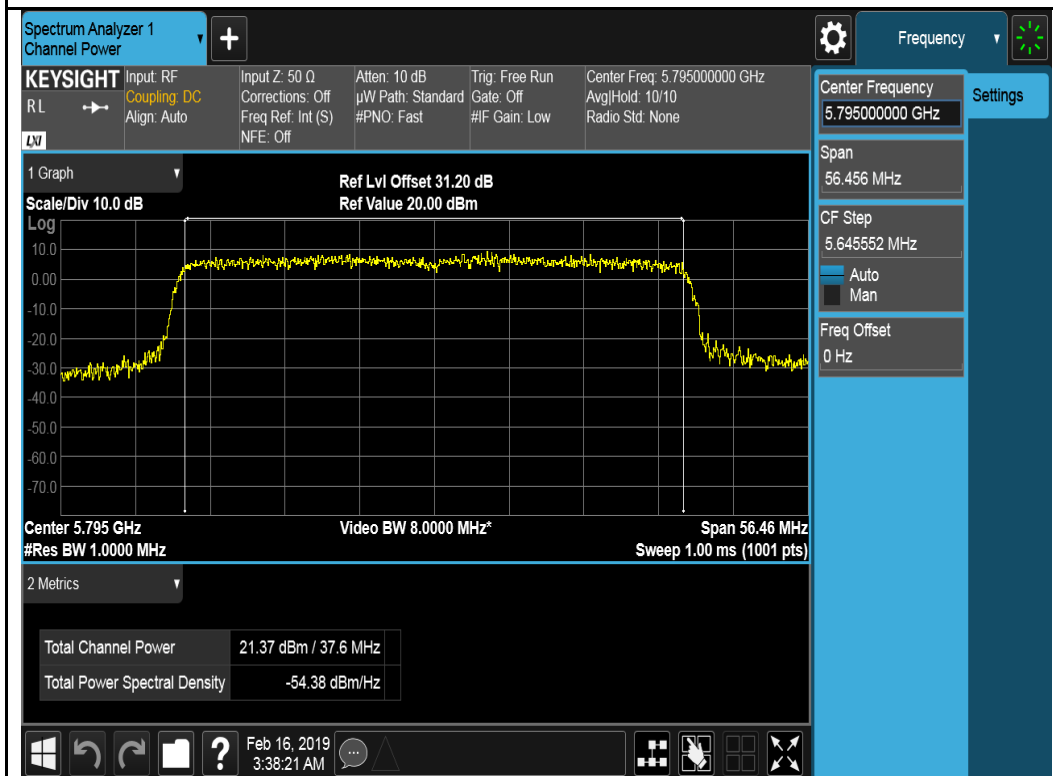


802.11ax-HT20-5825MHz

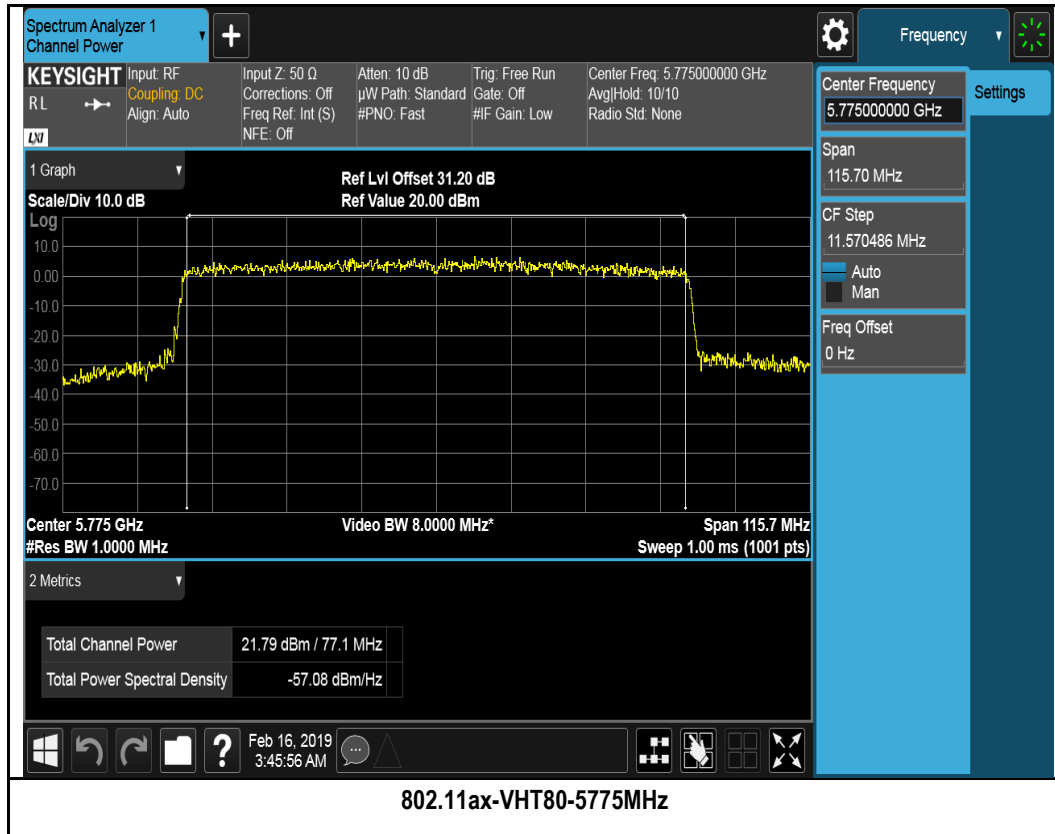




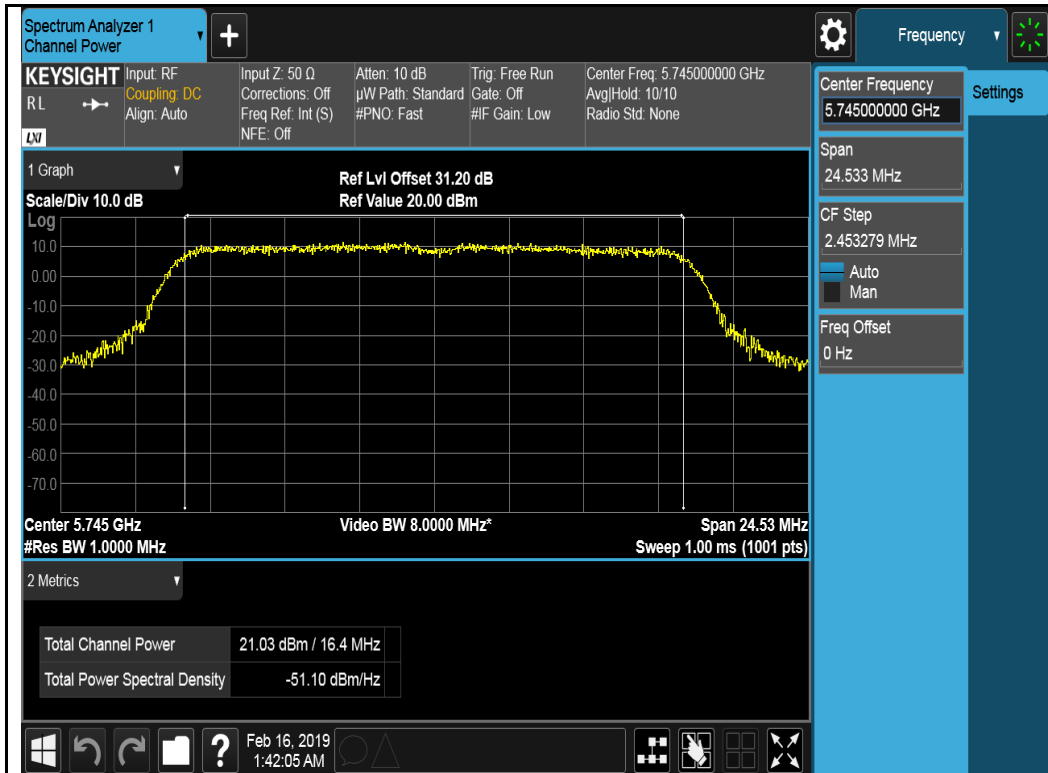
802.11ax-H420-5755MHz



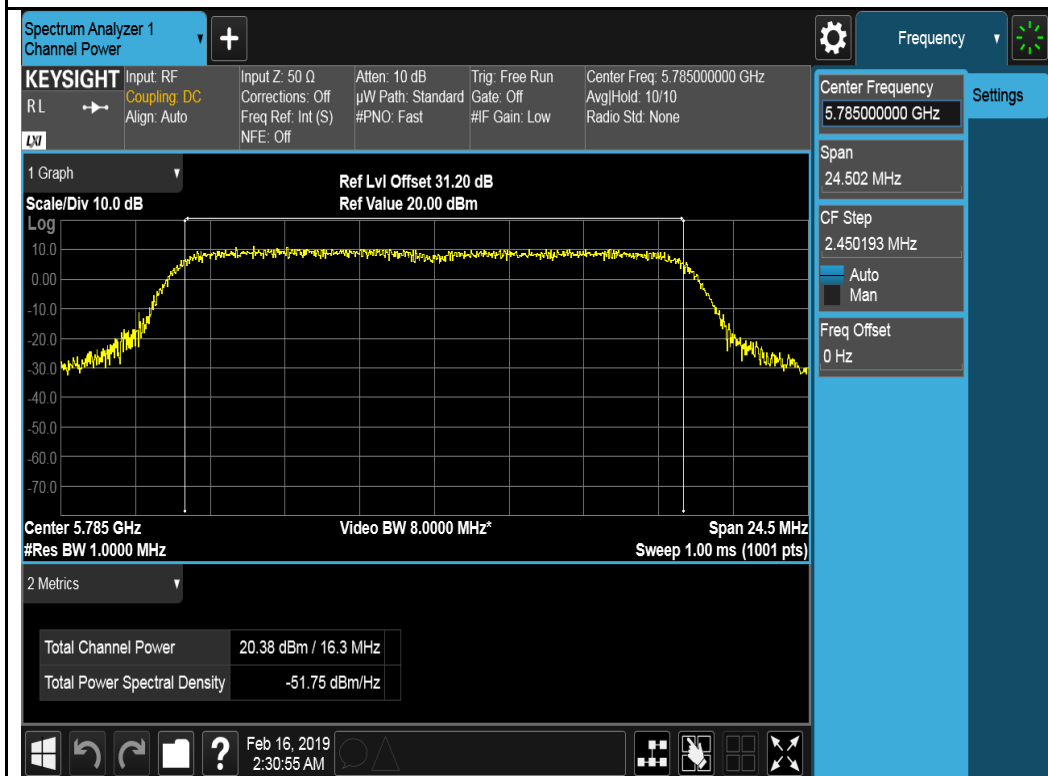
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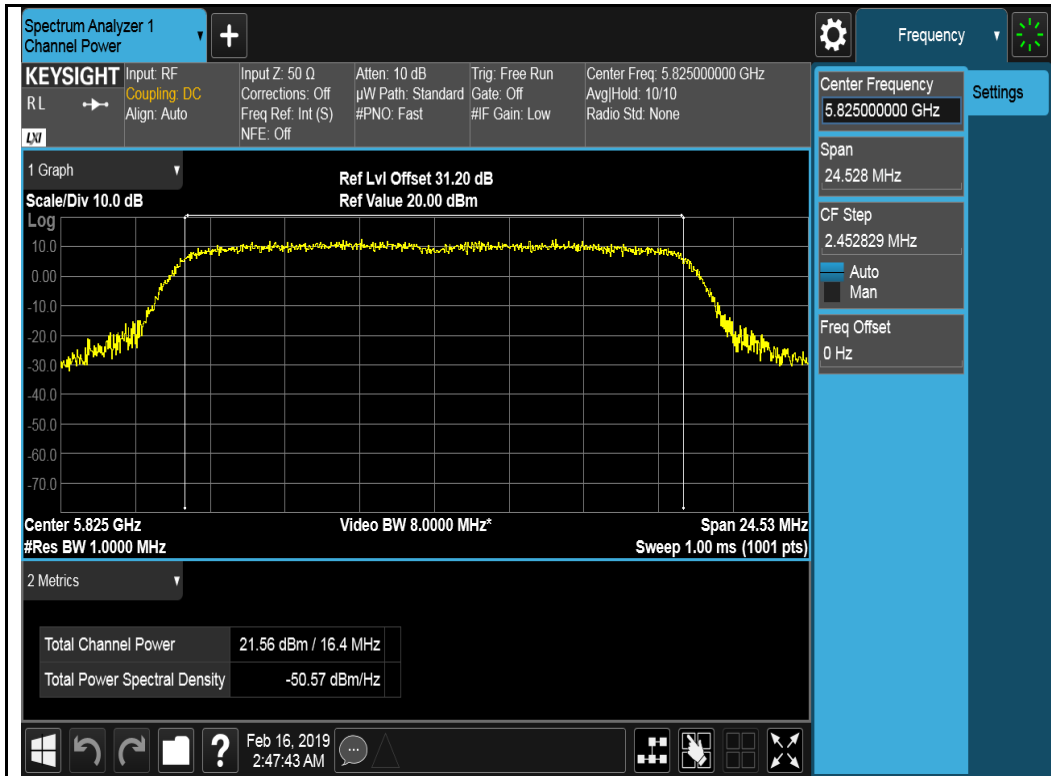
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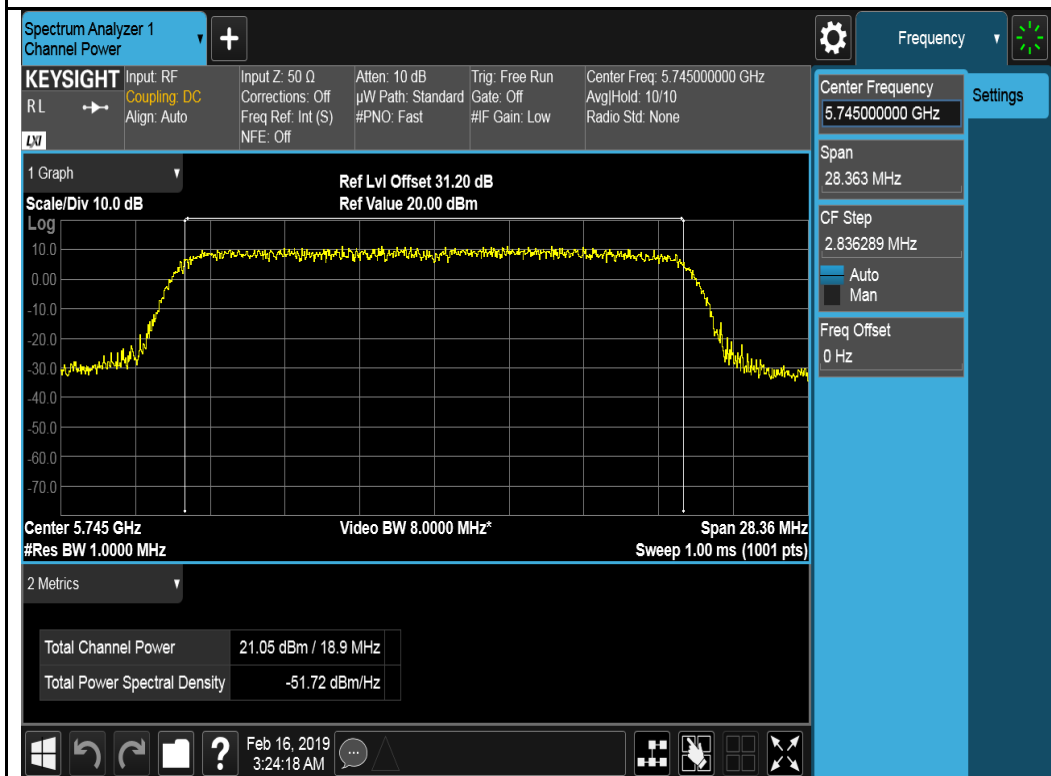
802.11a-5745MHz



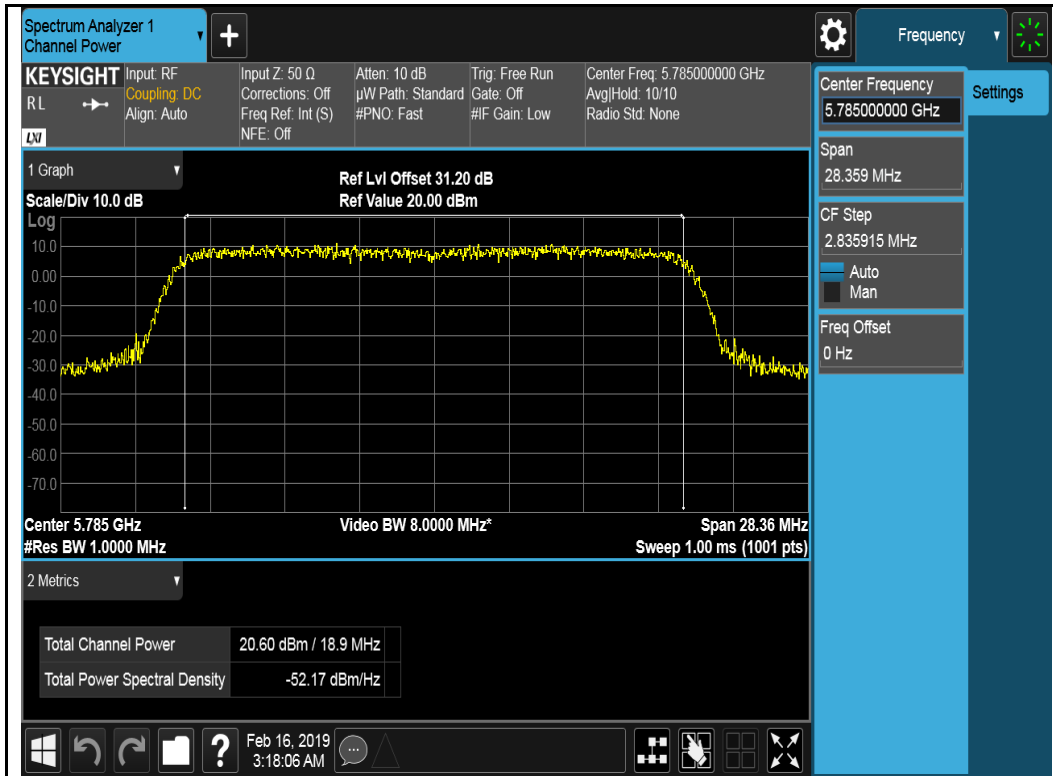
802.11a-5785MHz



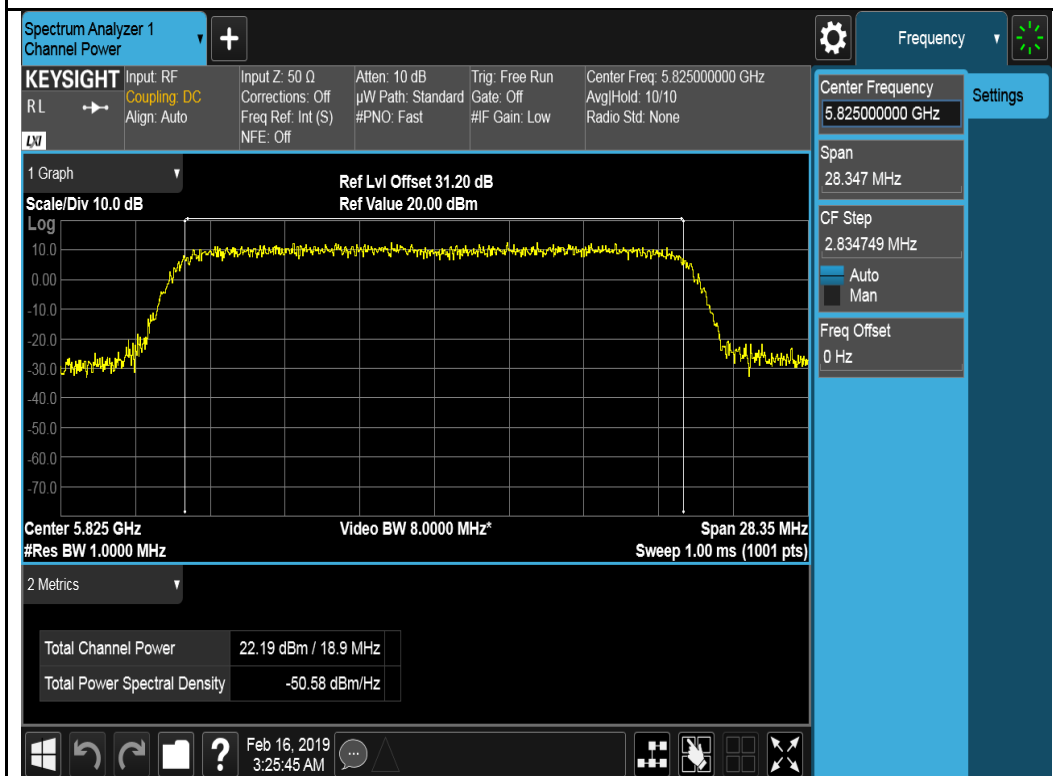
802.11a-5825MHz



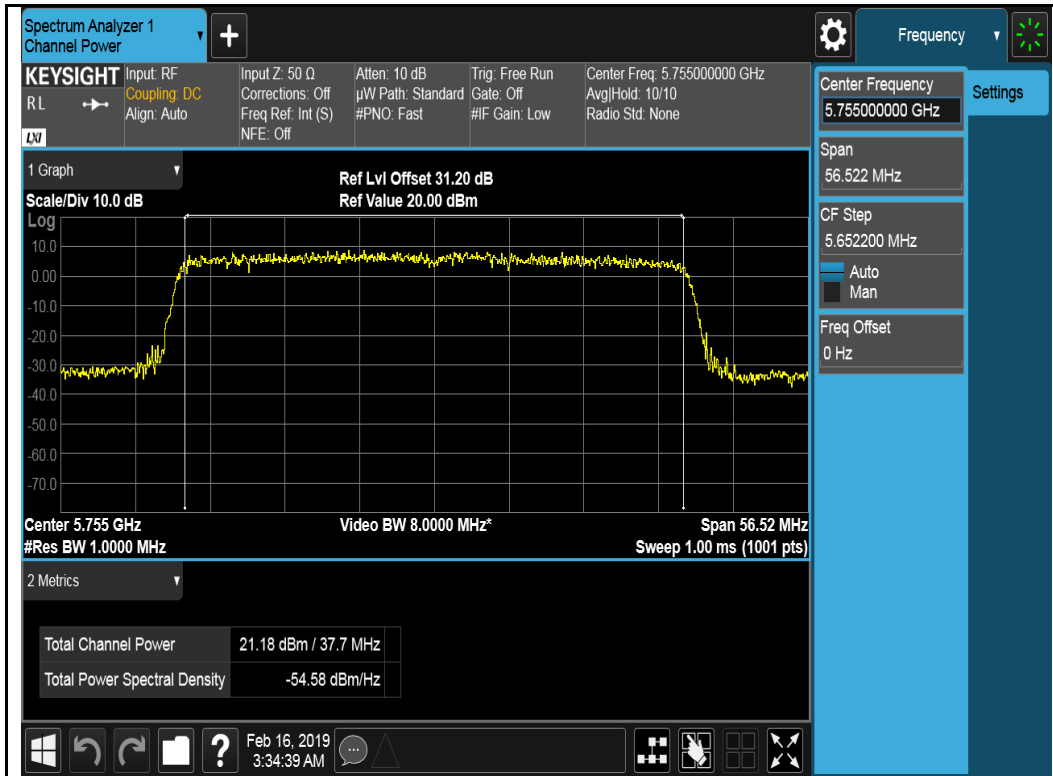
802.11ax-HT20-5745MHz



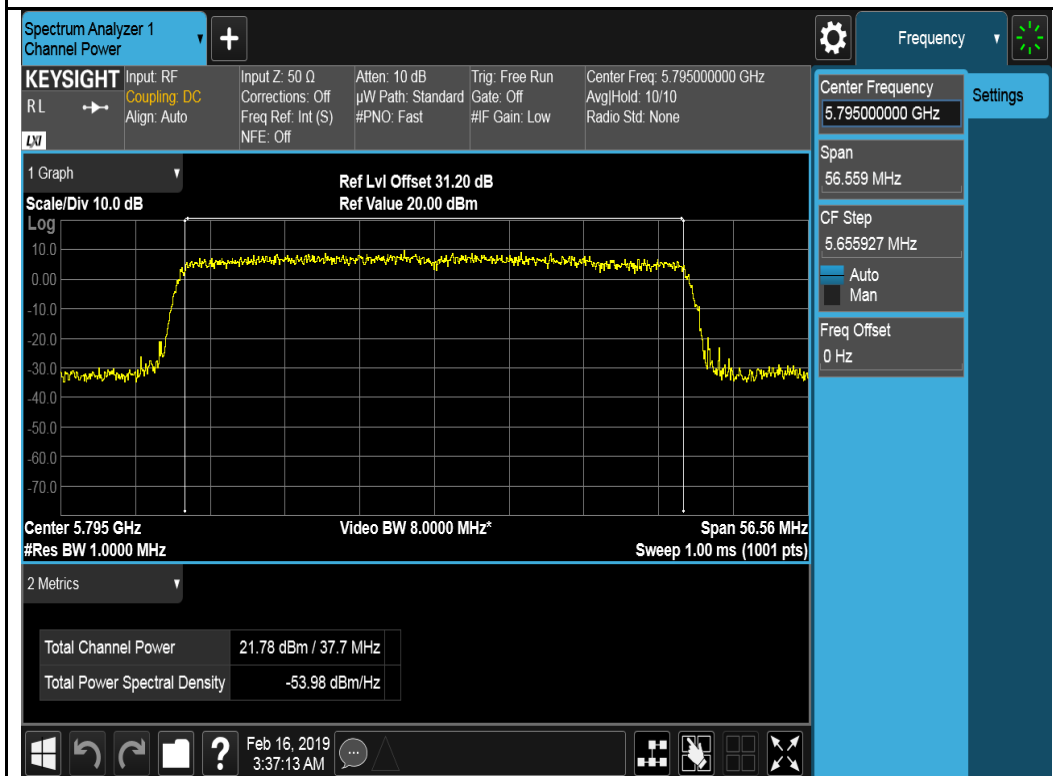
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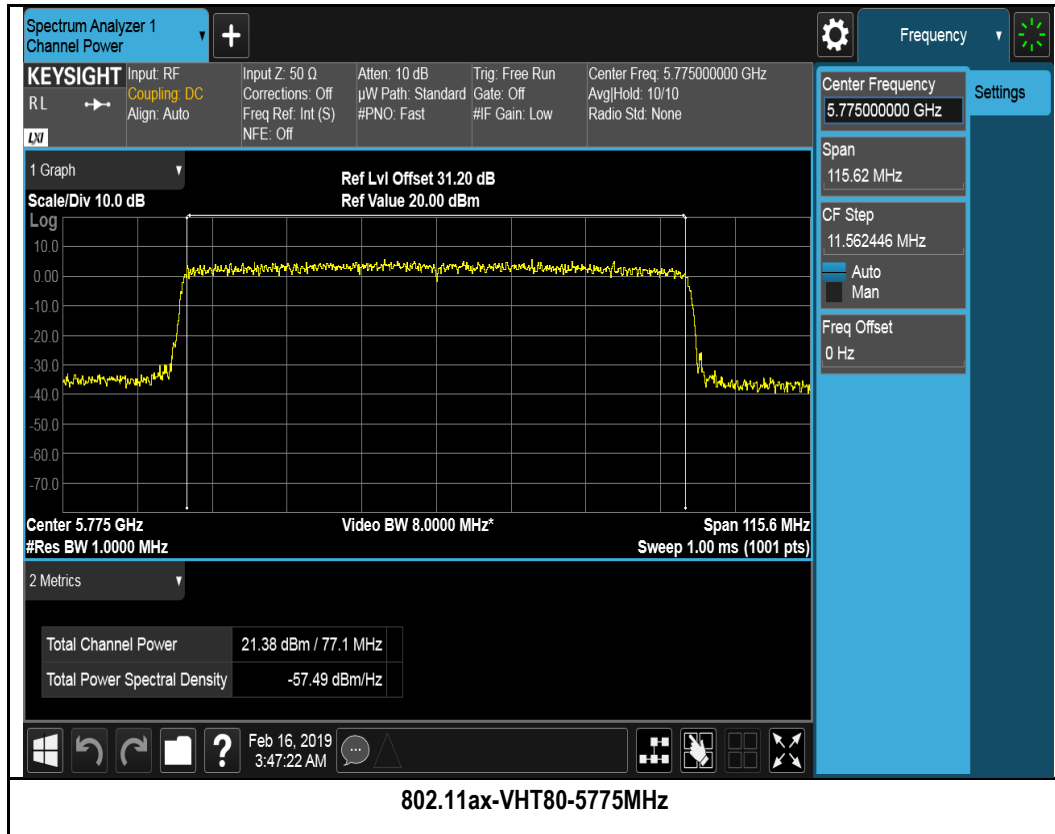
802.11ax-HT20-5825MHz



802.11ax-H420-5755MHz

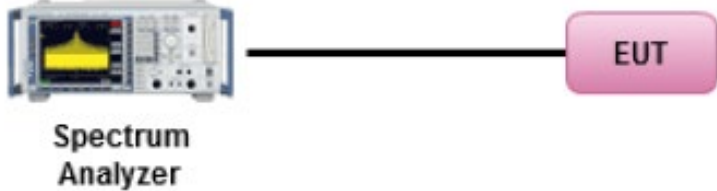


802.11ax-H420-5795MHz



## 10.5 Maximum Power Spectral Density

### Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.407	a)(1)(ii)	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.	☒
	a)(3)	For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.	☒
Test Setup	 <p style="text-align: center;"><b>Spectrum Analyzer</b> ————— <b>EUT</b></p>		
Test Procedure	<p>789033 D02 General U-NII Test Procedures New Rules v02r01,F.</p> <p><u>Maximum spectral density measurement procedure</u></p> <p>The rules requires “maximum power spectral density” measurements where the intent is to measure the maximum value of the time average of the power spectral density measured during a period of continuous transmission. Refer to III.A for additional guidance for devices that use channel aggregation.</p> <ol style="list-style-type: none"> <li>1. Create an average power spectrum for the EUT operating mode being tested by following the instructions in II.E.2. for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, “Compute power...” (This procedure is required even if the maximum conducted output power measurement was performed using a power meter, method PM.)</li> <li>2. Use the peak search function on the instrument to find the peak of the spectrum and record its value.</li> <li>3. Make the following adjustments to the peak value of the spectrum, if applicable:             <ol style="list-style-type: none"> <li>a). If Method SA-2 or SA-2 Alternative was used, add <math>10 \log(1/x)</math>, where x is the duty cycle, to the peak of the spectrum.</li> <li>b). If Method SA-3 Alternative was used and the linear mode was used in II.E.2.g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging.</li> </ol> </li> <li>4. The result is the Maximum PSD over 1 MHz reference bandwidth.</li> <li>5. For devices operating in the bands 5.15–5.25 GHz, 5.25–5.35 GHz, and 5.47–5.725 GHz, the preceding procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in Section 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 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 (&lt; 1 MHz, or &lt; 500 kHz) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:             <ol style="list-style-type: none"> <li>a). Set <math>RBW \geq 1/T</math>, where T is defined in II.B.I.a).</li> <li>b). Set <math>VBW \geq 3 RBW</math>.</li> <li>c). If measurement bandwidth of Maximum PSD is specified in 500 kHz, add <math>10 \log(500 \text{ kHz}/RBW)</math> to the measured result, whereas RBW (&lt;500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.</li> <li>d). If measurement bandwidth of Maximum PSD is specified in 1 MHz, add <math>10 \log(1\text{MHz}/RBW)</math> to the measured result, whereas RBW (&lt; 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.</li> <li>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.</li> </ol> </li> </ol> <p>Note: As a practical matter, it is recommended to use reduced RBW of 100 kHz for the II.F.5.c) and II.F.5.d), since RBW=100 kHz is available on nearly all spectrum analyzers.</p>		



Test Date	02/15/2019-02/28/2019	Environmental condition	Temperature Relative Humidity Atmospheric Pressure	22°C 42% 1020mbar
Remark	Per KDB 662911 D01 Multiple Transmitter Output v02r01, the direction gain for horizontal polarization and vertical polarization is calculated separately. For 5Ghz band, individual gain = 3 dBi, the directional gain = $3+10*\log(2)=6$ dBi. Highest of total directional gain is 6 dBi. No limit adjustment is needed.			
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail			

Test Data     Yes                       N/A

Test Plot     Yes (See below)               N/A

**Test was done by Deon Dai at RF test site.**

### PSD measurement result for U-NII-1 Band

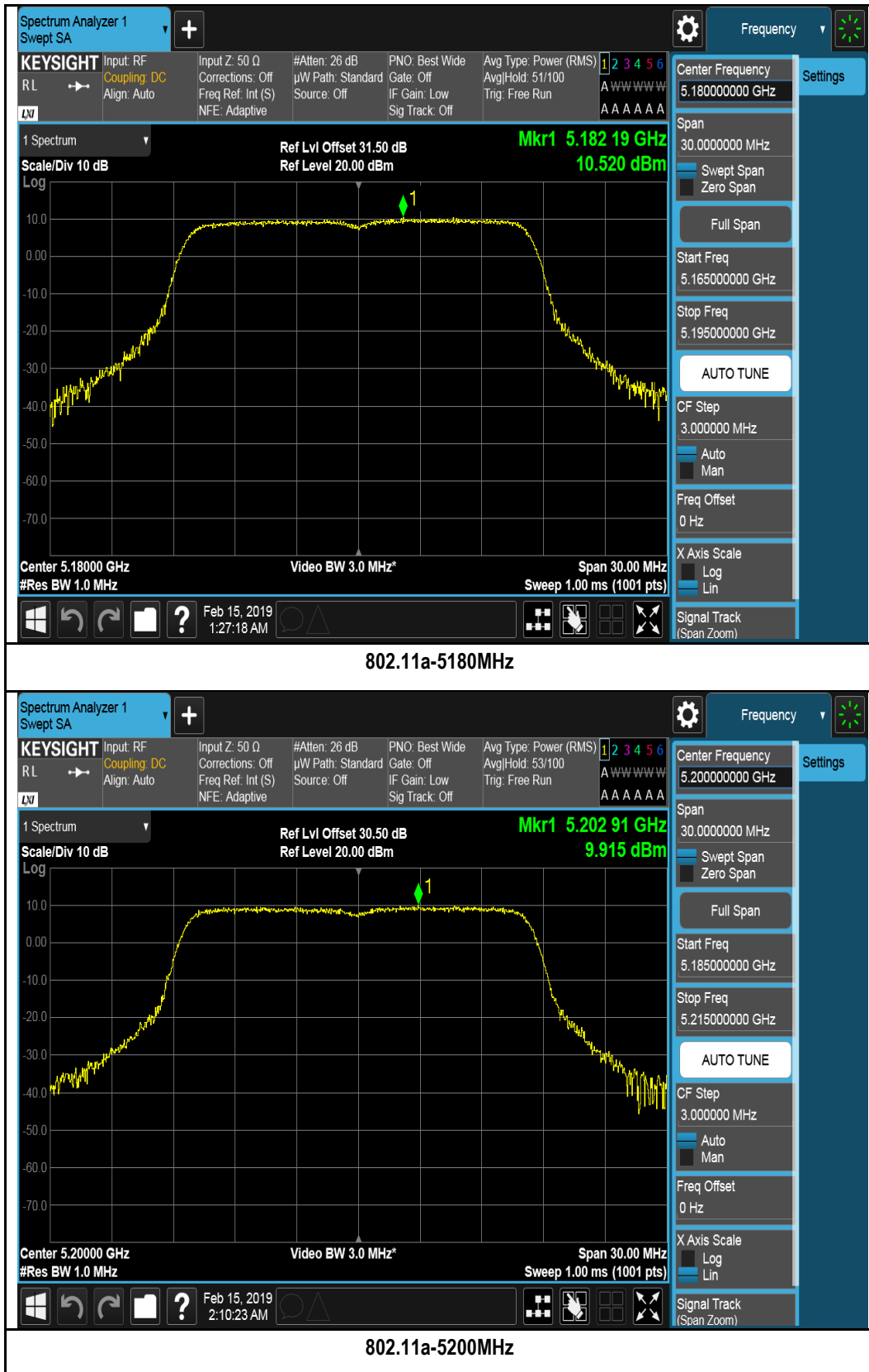
Type	Test mode	Freq (MHz)	CH	Conducted PSD (dBm/MHz)					Limit (dBm/MHz)	Result
				Chain0	Chain1	Chain2	Chain3	Combined		
PSD	802.11a	5180	Low	10.52	10.43	10.66	10.84	16.64	17	Pass
		5200	Mid	9.92	10.46	9.56	10.69	16.20	17	Pass
		5240	High	10.37	11.63	9.21	11.11	16.69	17	Pass
	802.11ax-20	5180	Low	9.93	10.75	10.47	11.03	16.58	17	Pass
		5200	Mid	9.86	10.16	10.15	10.72	16.25	17	Pass
		5240	High	9.75	10.47	8.81	10.35	15.91	17	Pass
	802.11ax-40	5190	Low	6.69	7.11	6.71	7.37	13.00	17	Pass
		5230	High	7.99	8.42	7.62	9.22	14.37	17	Pass
	802.11ax-80	5210	Mid	3.29	4.04	3.48	4.72	9.94	17	Pass

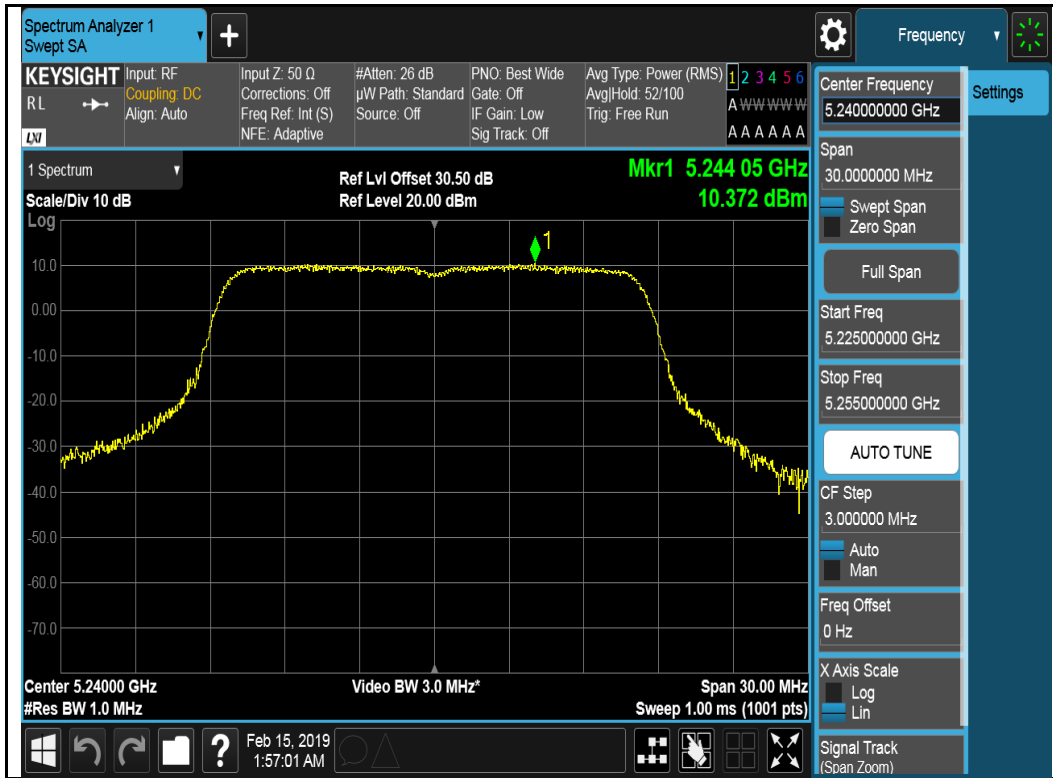
### PSD measurement result for U-NII-3 BAND

Test mode	Freq (MHz)	CH	Conducted PSD (dBm/100kHz)					Correction factor (dB)	PSD (dBm/500kHz)	Limit (dBm/500kHz)	Result
			Chain0	Chain1	Chain2	Chain3	Combined				
802.11a	5745	Low	2.22	2.13	0.94	0.67	7.57	6.99	14.56	30	Pass
	5785	Mid	2.63	2.16	0.84	0.13	7.57	6.99	14.56	30	Pass
	5825	High	3.93	3.30	1.53	1.85	8.79	6.99	15.78	30	Pass
802.11ax-20	5745	Low	1.03	0.80	0.10	-0.95	6.33	6.99	13.32	30	Pass
	5785	Mid	1.43	0.72	-0.19	-1.02	6.35	6.99	13.34	30	Pass
	5825	High	2.69	1.75	0.50	1.42	7.68	6.99	14.67	30	Pass
802.11ax-40	5755	Low	-1.71	-1.89	-3.14	-3.74	3.48	6.99	10.47	30	Pass
	5795	High	-1.15	-1.40	-2.93	-2.95	3.99	6.99	10.98	30	Pass
802.11ax-	5775	Mid	-4.31	-4.56	-5.57	-6.62	0.85	6.99	7.84	30	Pass
Note	BW correction factor = $10\log(500\text{kHz}/\text{RBW})$ , RBW was set to 100kHz during test.										

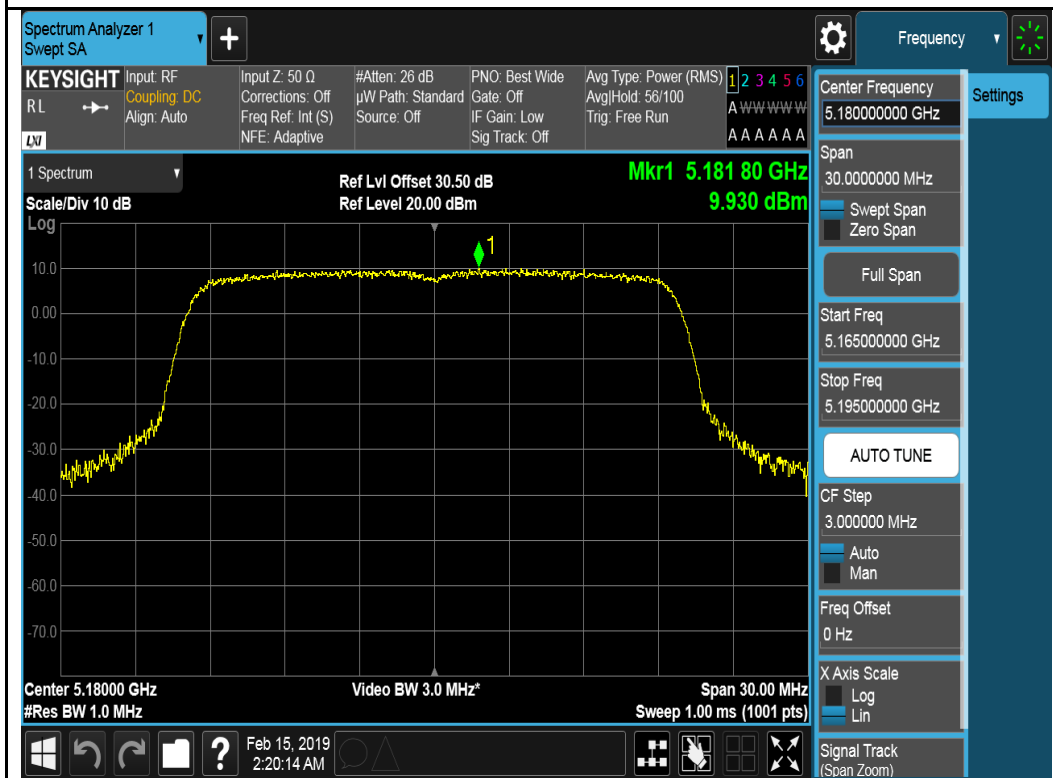
Test Plot for U-NII-1 Band:

Chain 0:

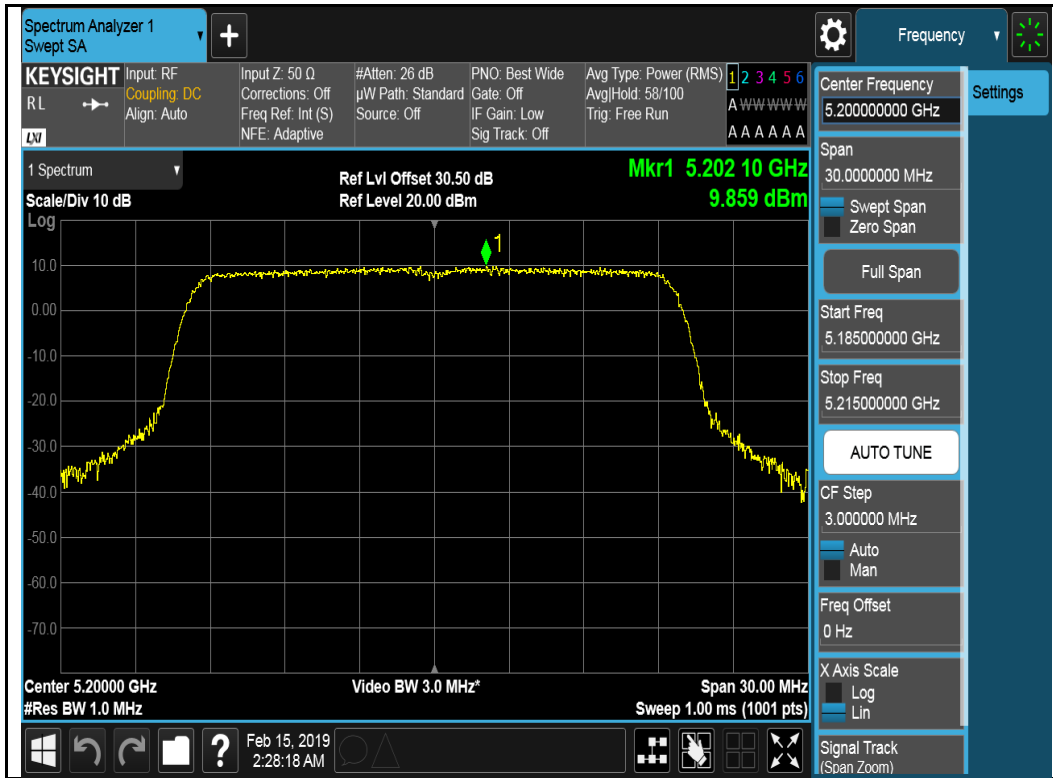




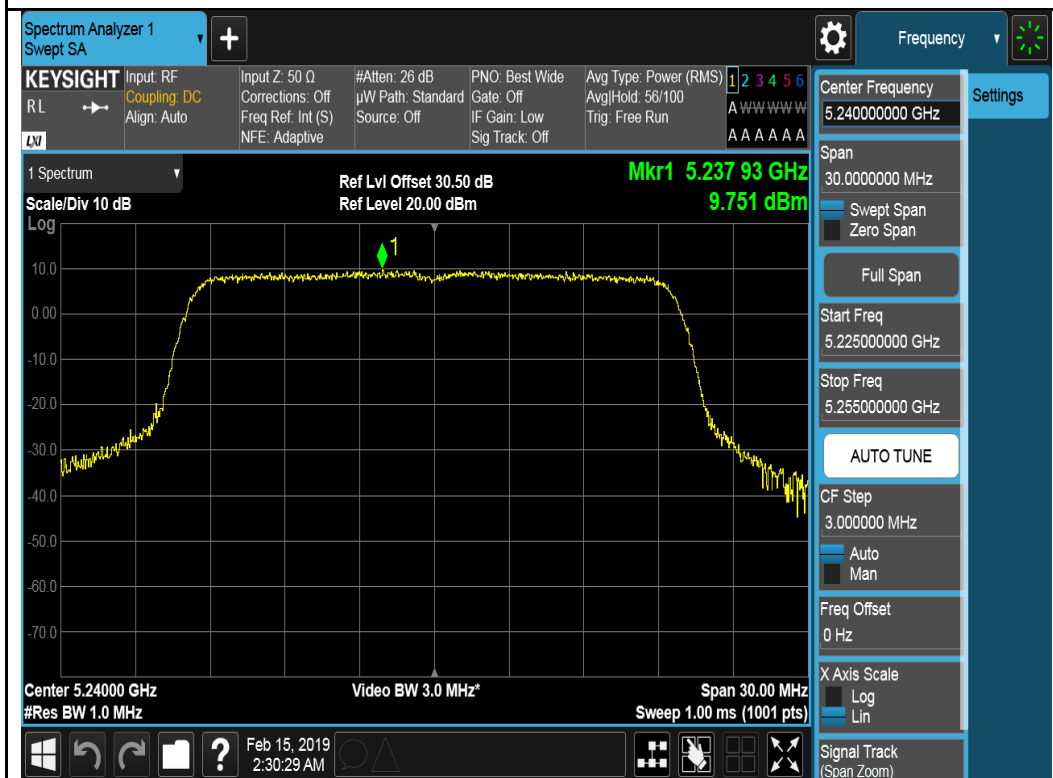
802.11a-5240MHz



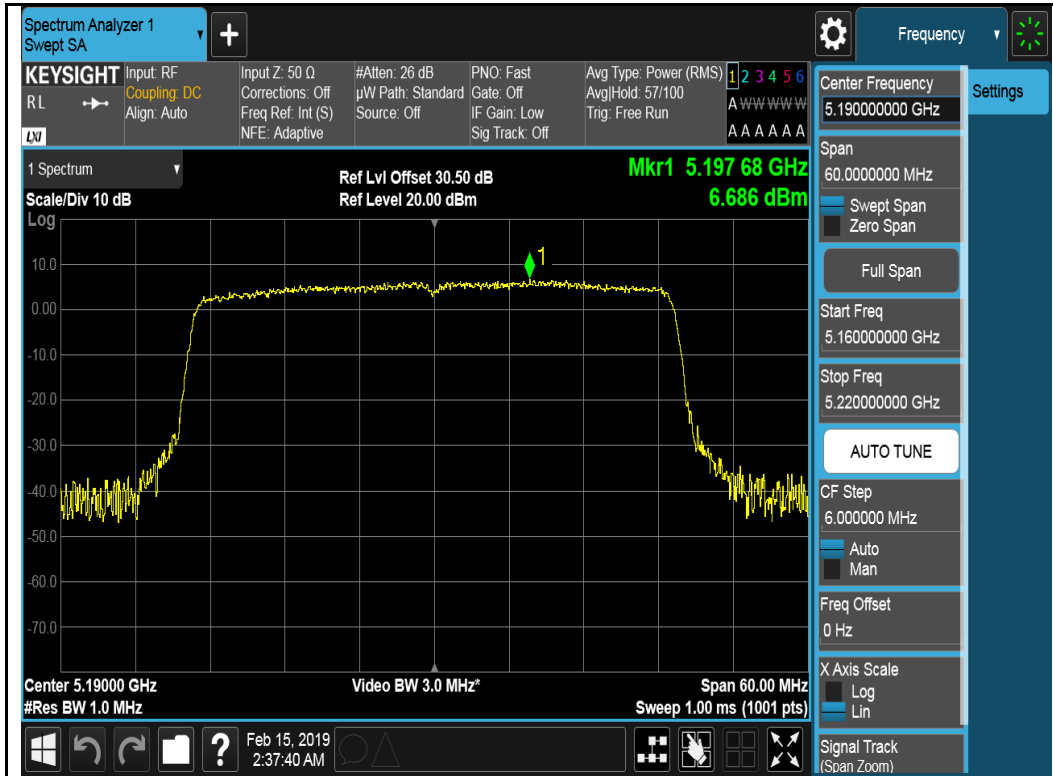
802.11ax-HT20-5180MHz



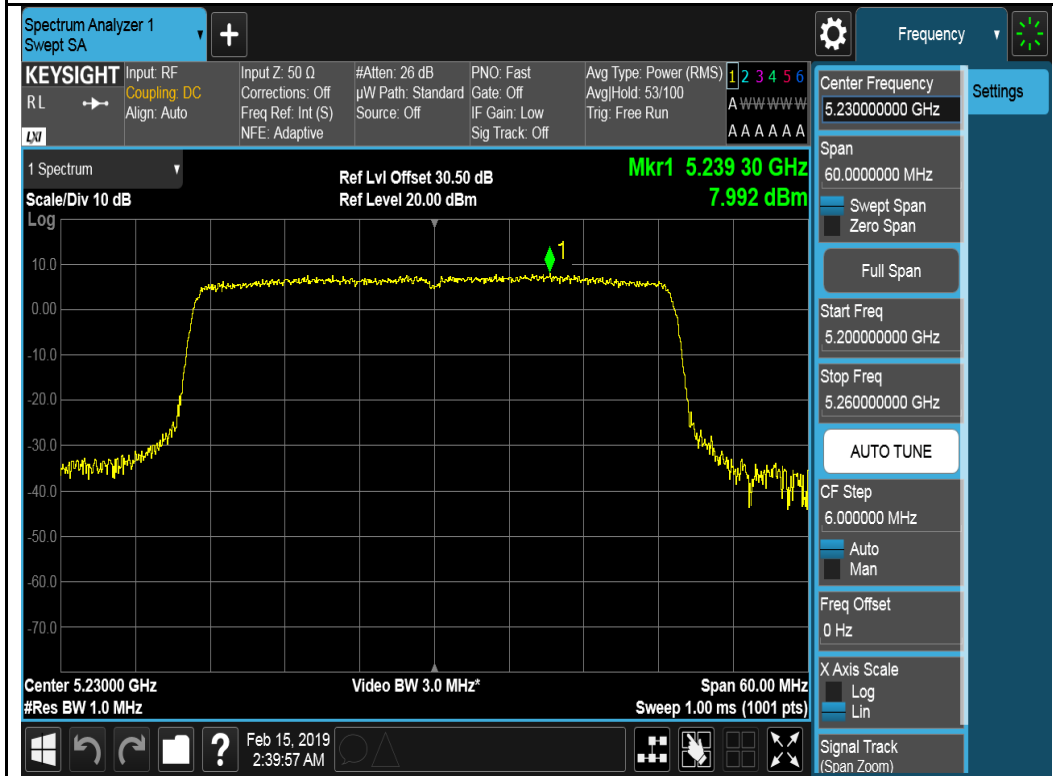
802.11ax-HT20-5200MHz



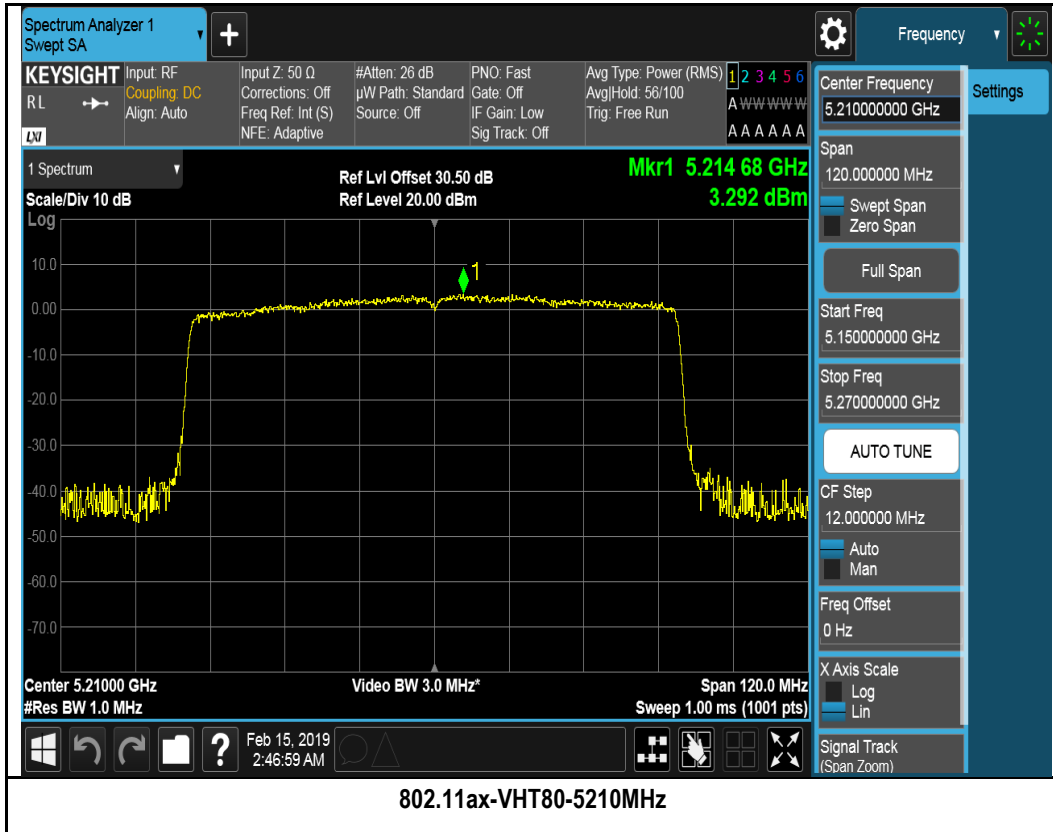
802.11ax-HT20-5240MHz



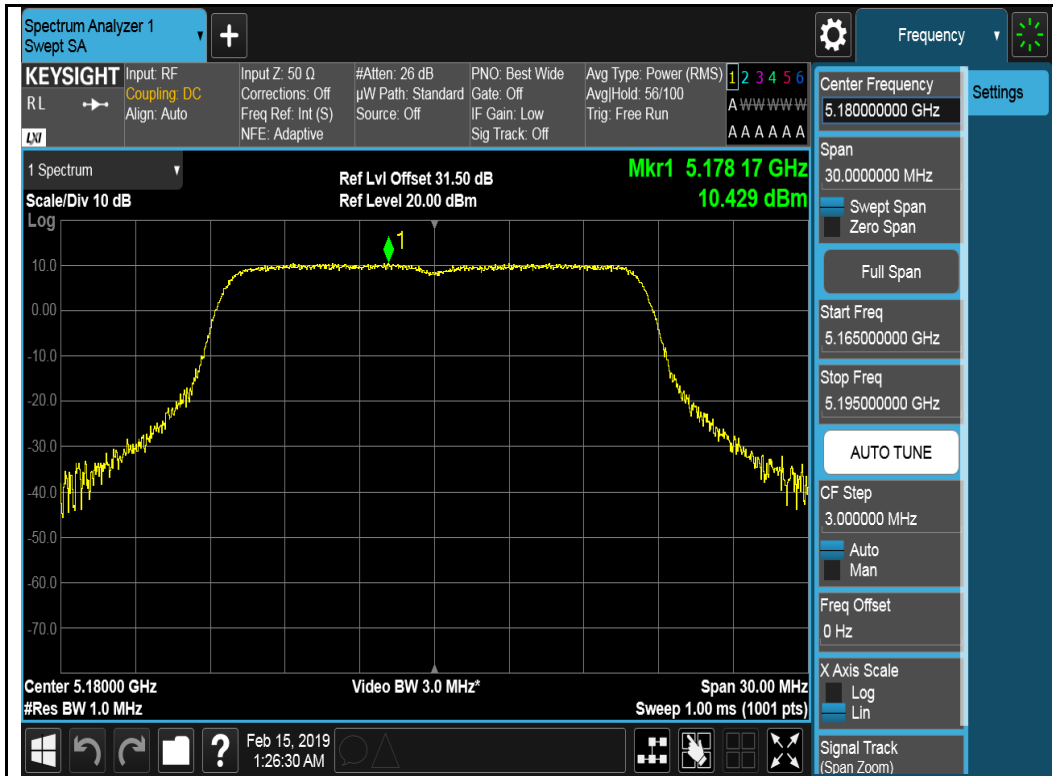
802.11ax-H420-5190MHz



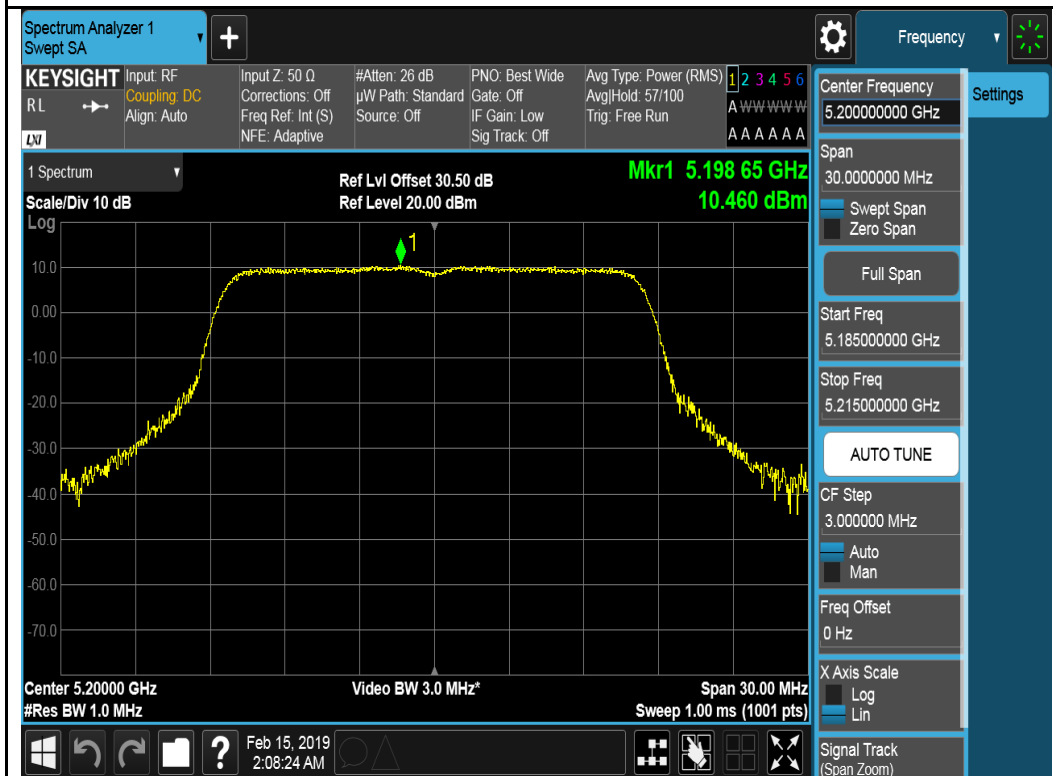
802.11ax-H420-5230MHz



Chain 1:

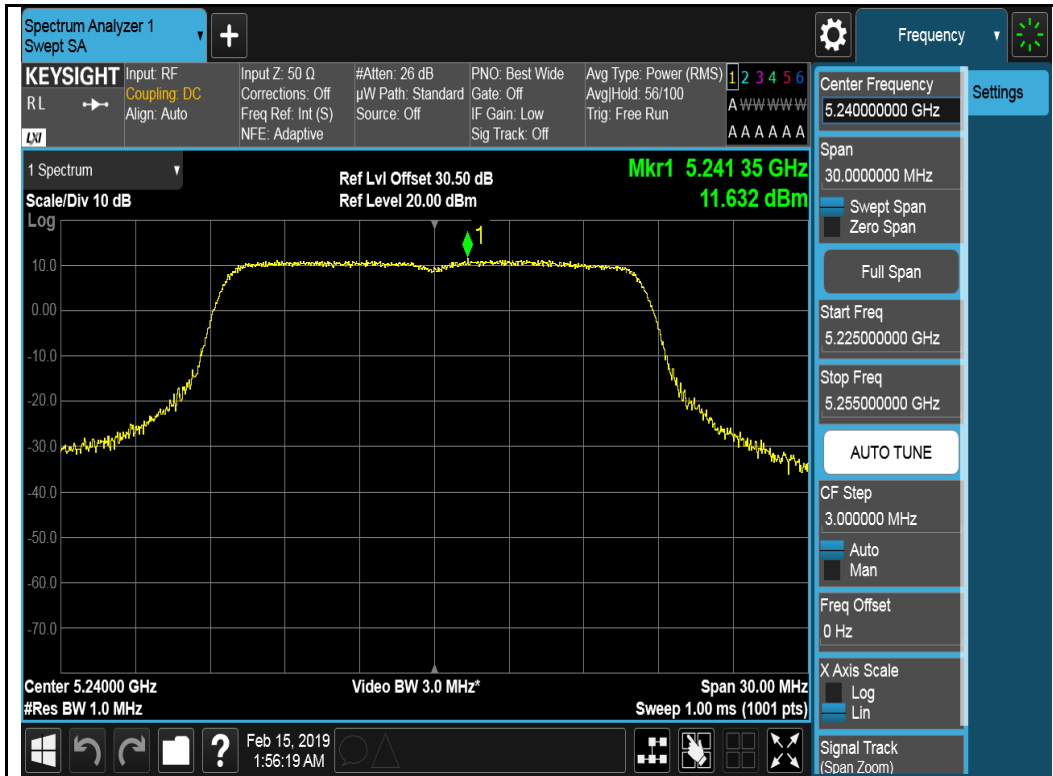


802.11a-5180MHz

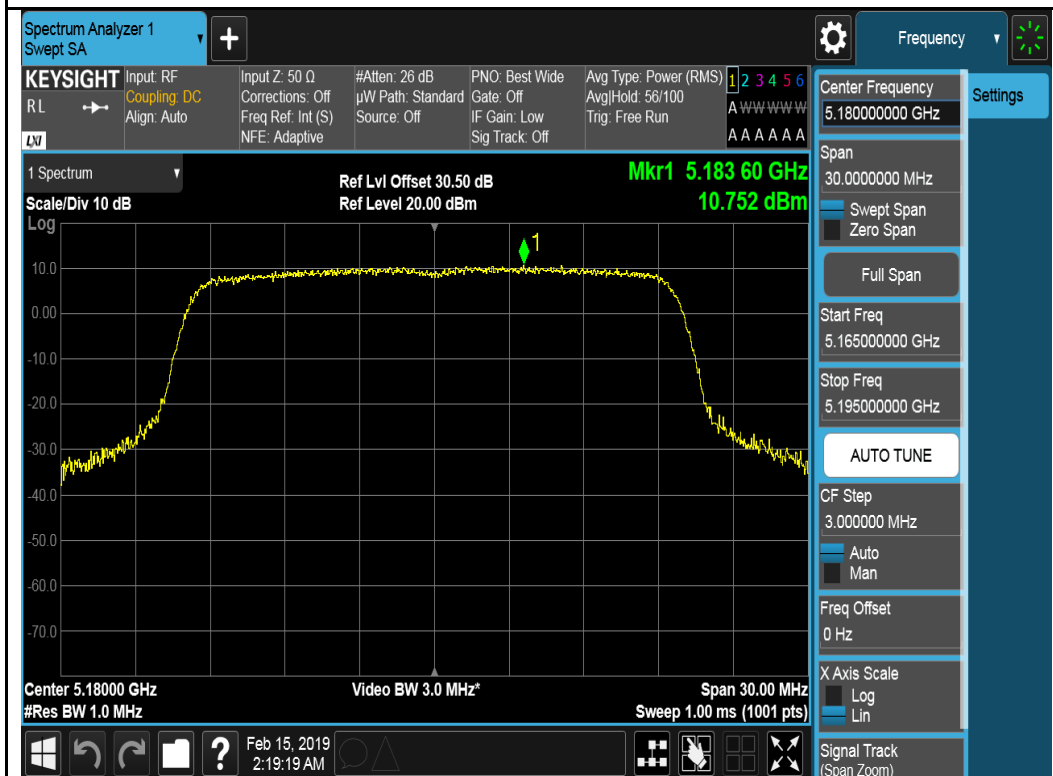


802.11a-5200MHz





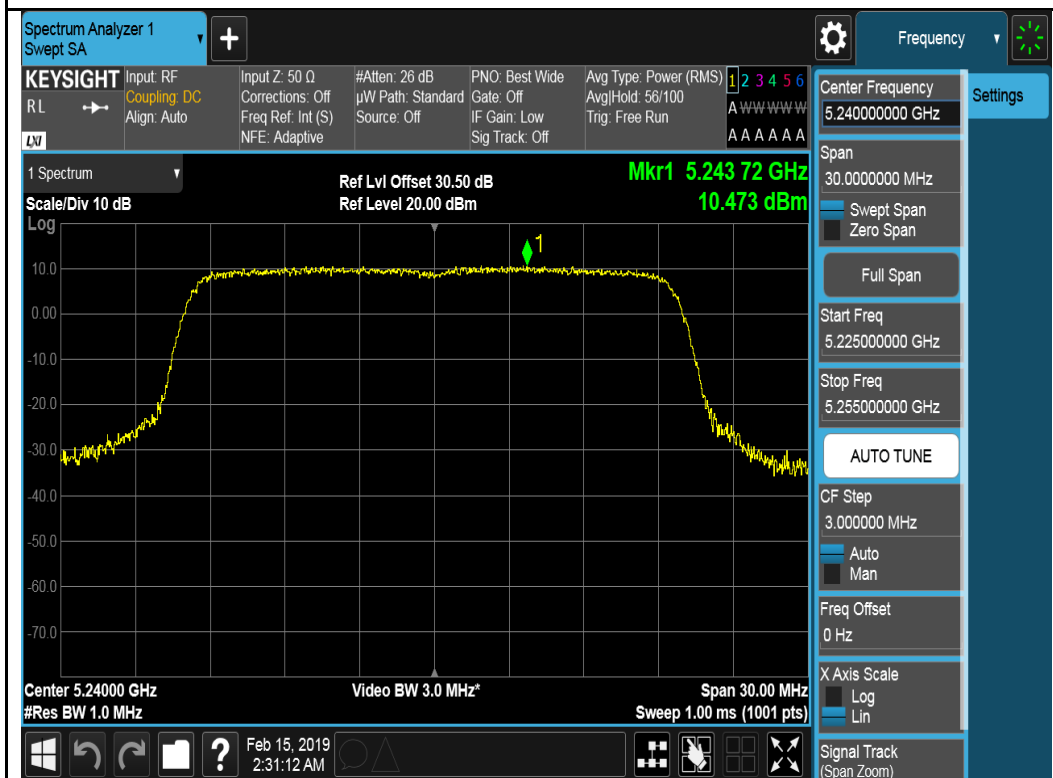
802.11a-5240MHz



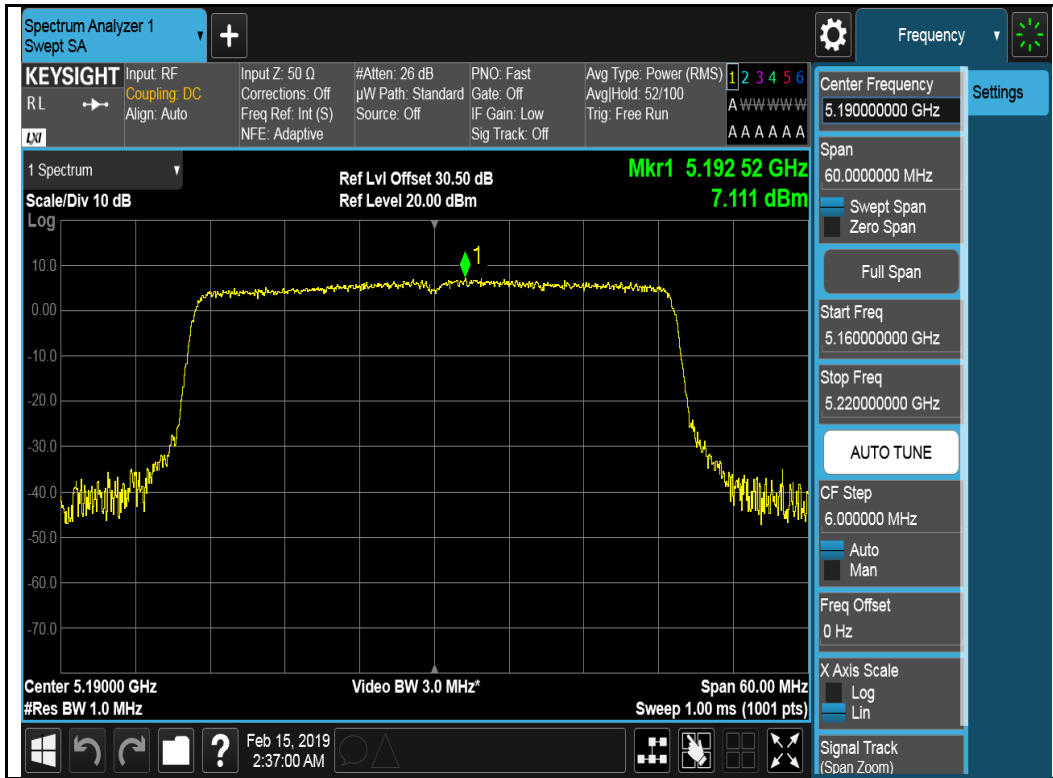
802.11ax-HT20-5180MHz



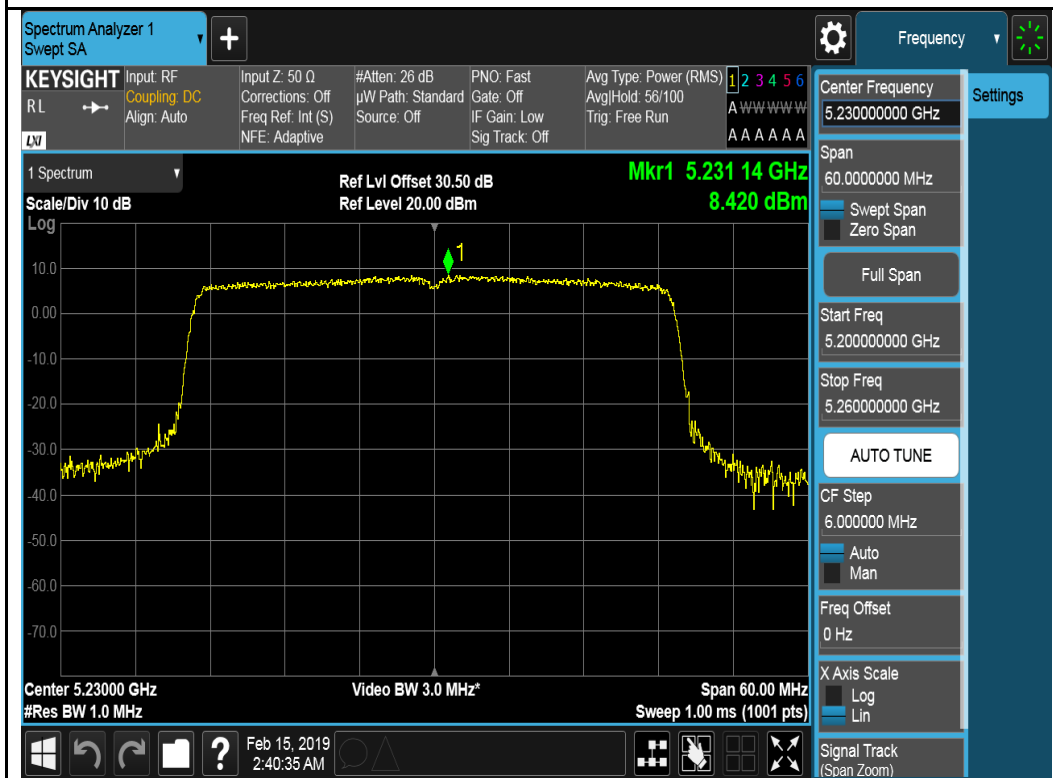
802.11ax-HT20-5200MHz



802.11ax-HT20-5240MHz



802.11ax-H420-5190MHz



802.11ax-H420-5230MHz