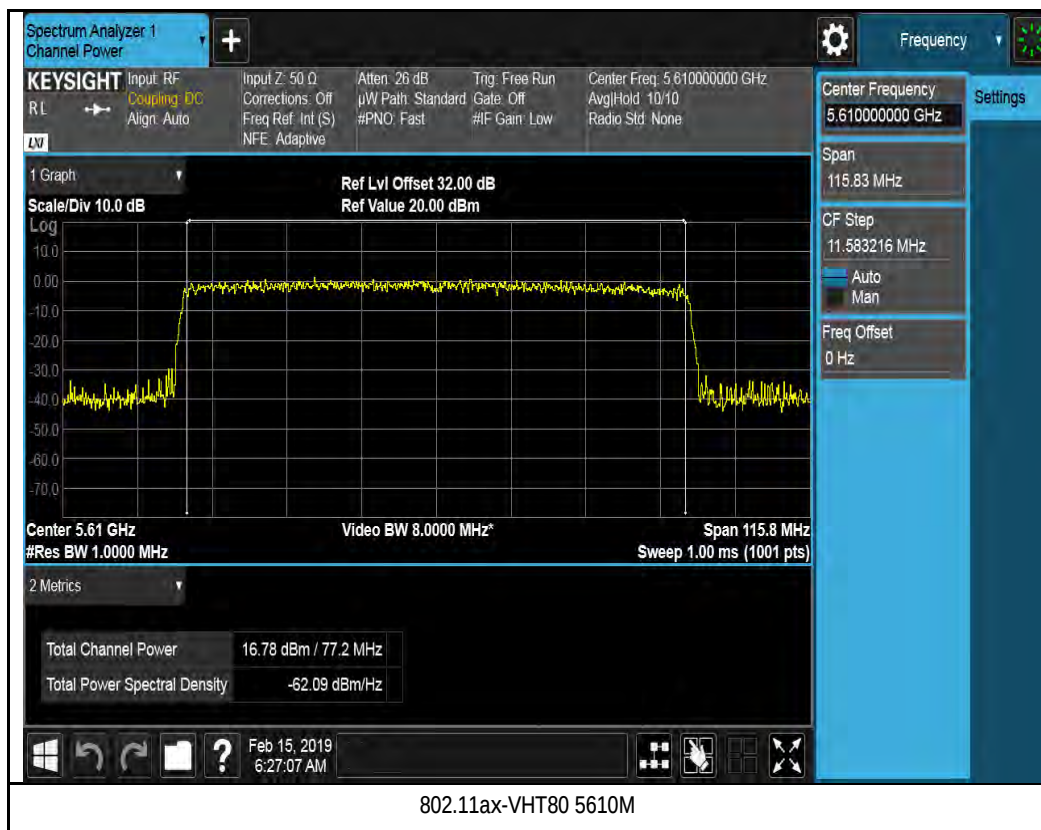




802.11ax-HT40 5670M



802.11ax-VHT80 5530M



Chain 3:





802.11a-5700M



802.11ax-HT20 5500M



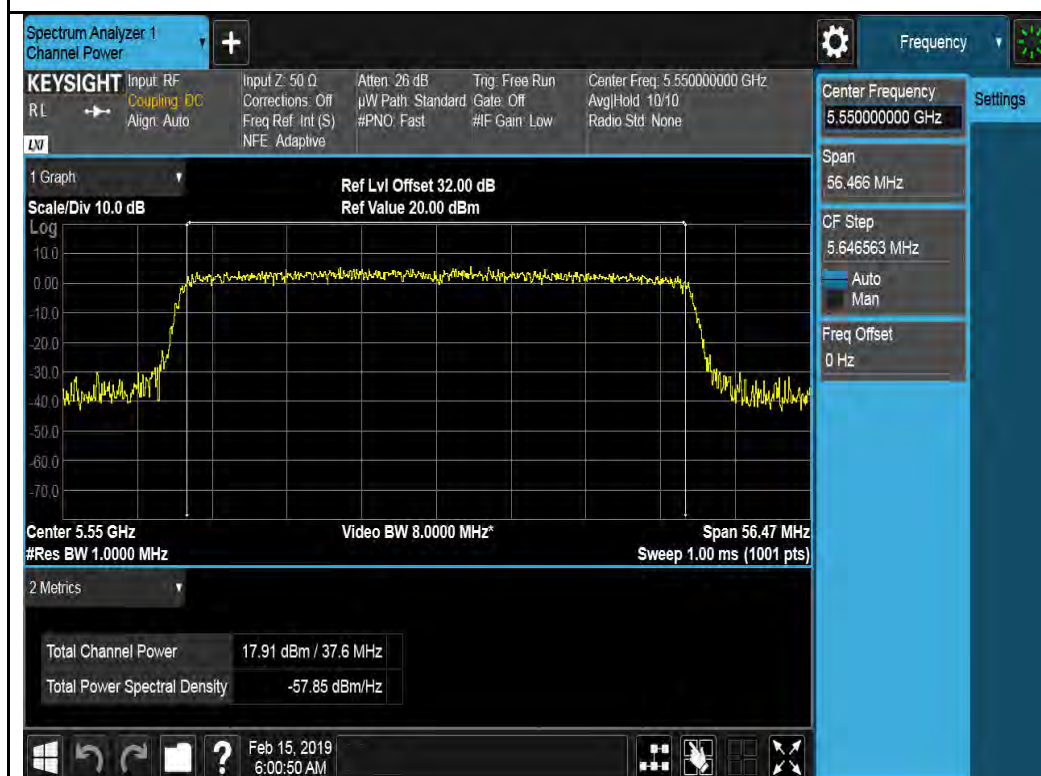
802.11ax-HT20 5580M



802.11ax-HT20 5700M



802.11ax-HT40 5510M



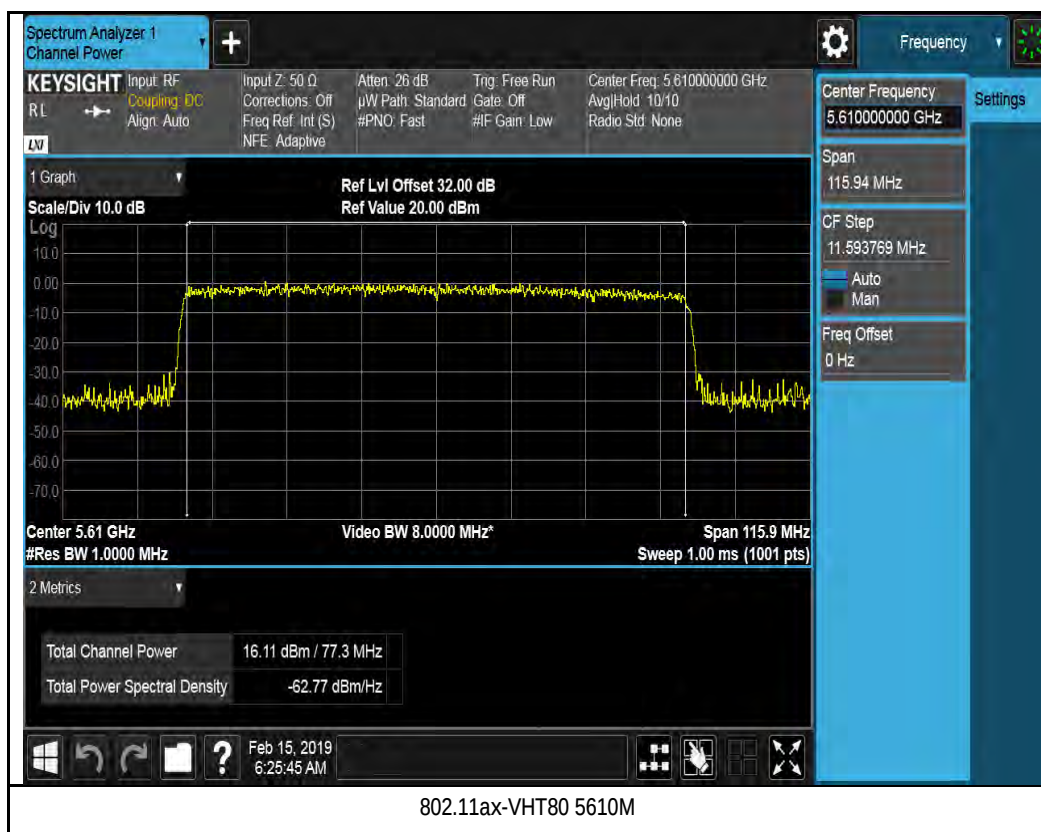
802.11ax-HT40 5550M



802.11ax-HT40 5670M



802.11ax-VHT80 5530M



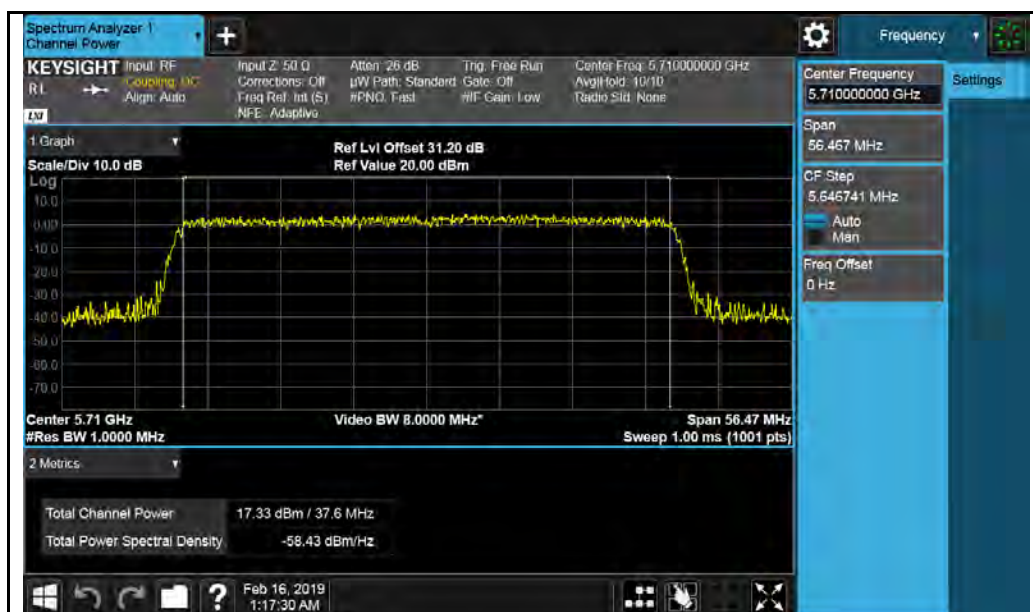
Test Plot for Cross band :
Chain 0:



802.11a-5720M



802.11ax-HT20 5720M



Chain 1:





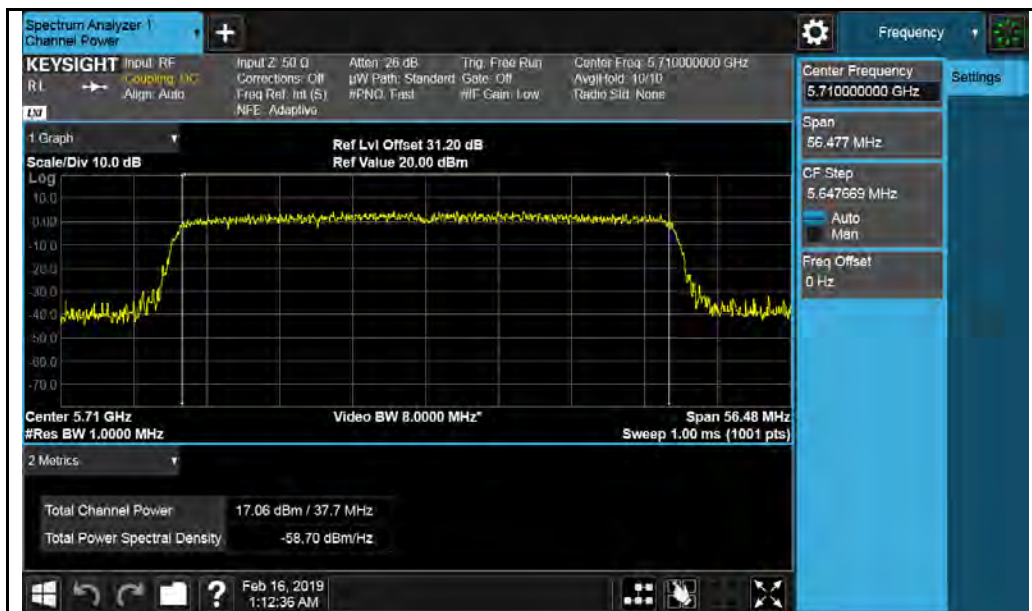
802.11ax-HT40 5710M



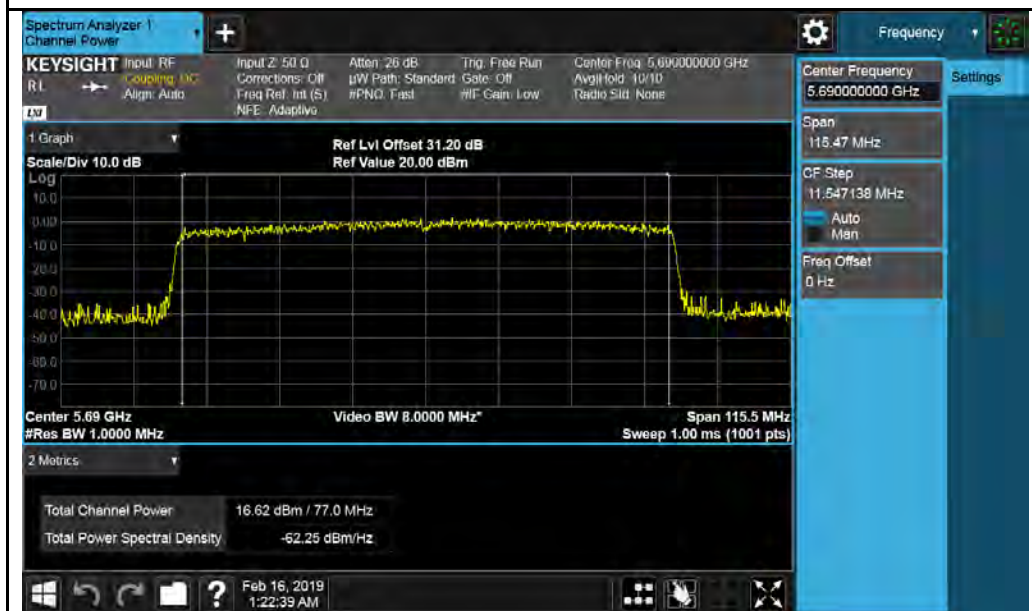
802.11ax-VHT80 5690M

Chain 2:





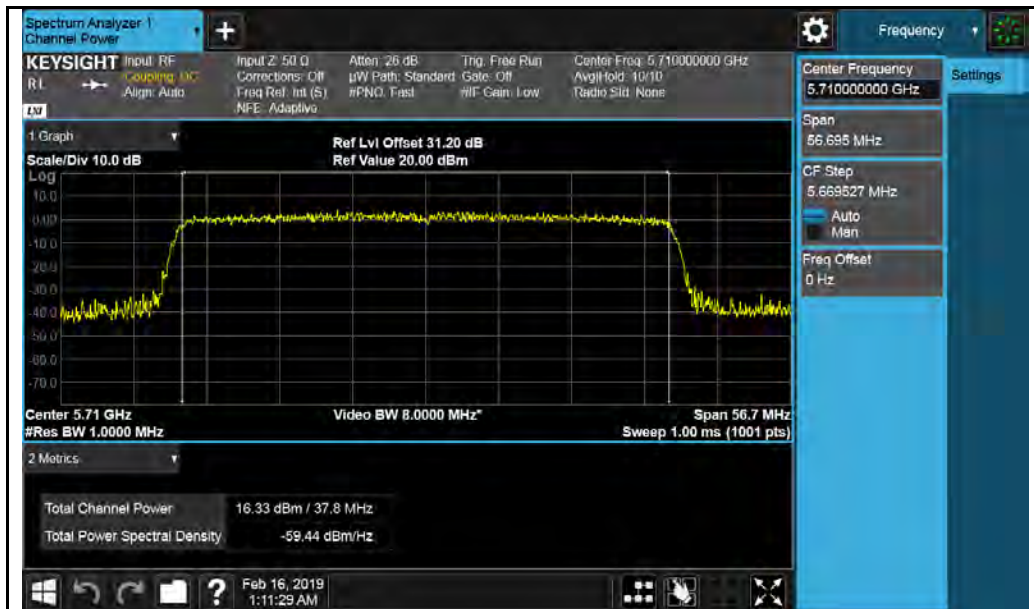
802.11ax-HT40 5710M



802.11ax-VHT80 5690M

Chain 3:





802.11ax-HT40 5710M



802.11ax-VHT80 5690M

TPC Test Plot for U-NII-2A:

Chain 0:



802.11a-5260M



802.11a-5280M







802.11ax-HT40 5270M



802.11ax-HT40 5310M



Chain 1:





802.11a-5320M



802.11ax-HT20 5260M







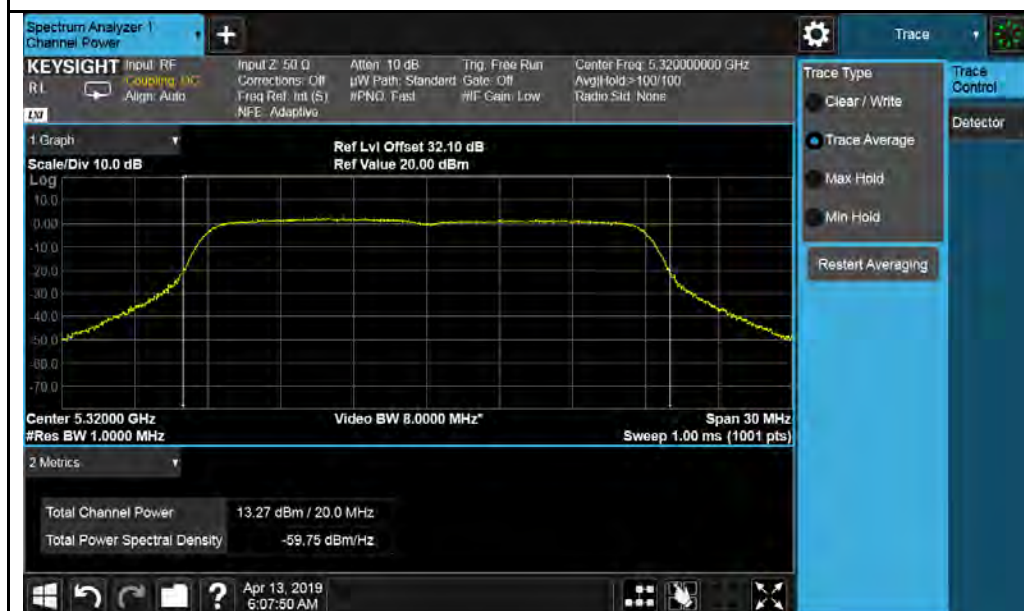
Chain 2:





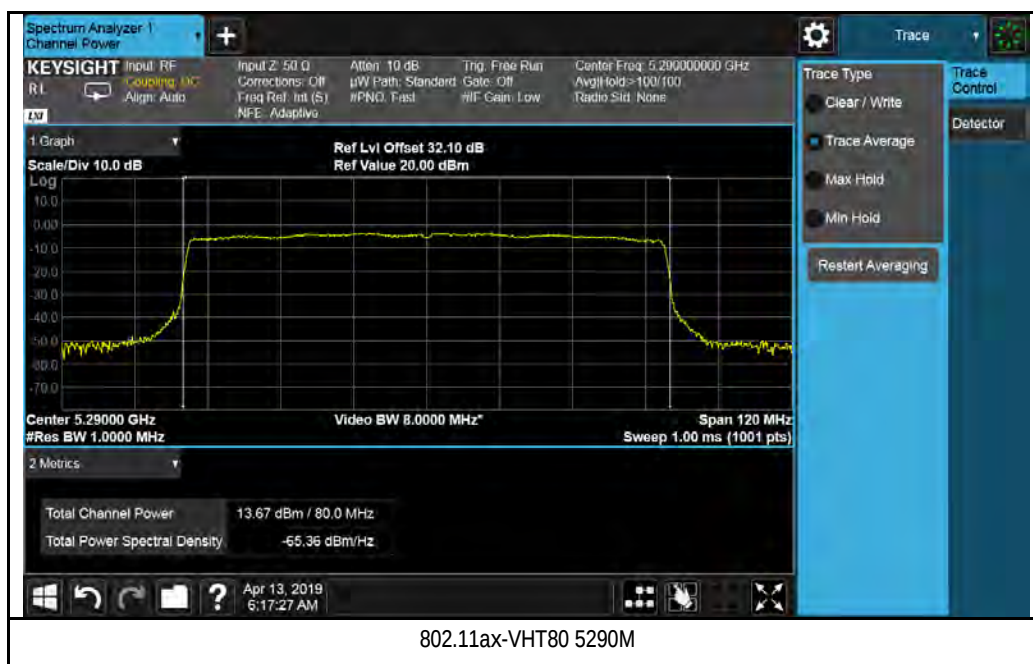


802.11ax-HT20 5280M



802.11ax-HT20 5320M





Chain 3:







802.11ax-HT20 5280M



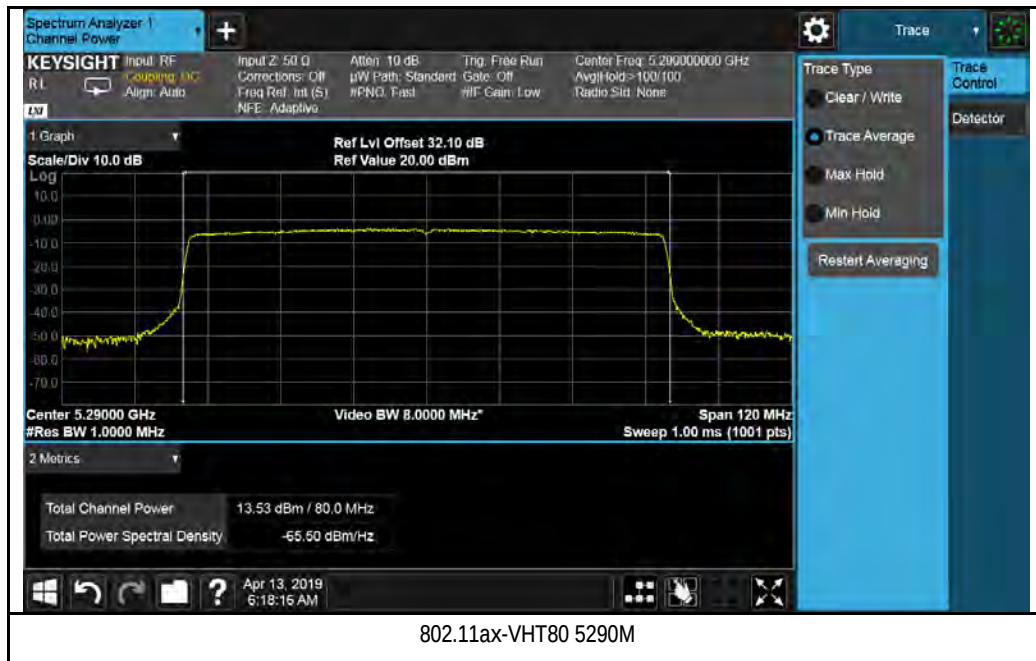
802.11ax-HT20 5320M



802.11ax-HT40 5270M



802.11ax-HT40 5310M



10.5 Maximum Peak Power Spectral Density

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.407	a)(1)(i)	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.	☐
	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)(2)	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.	☒
	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.	☒
RSS 247	6.2.1.1	For the band 5.25-5.35 GHz, the power spectral density shall not exceed 11 dBm in any 1.0 MHz band;	☒
	6.2.3.1	For the bands 5470-5600 MHz and 5650-5725 MHz, the power spectral density shall not exceed 11 dBm in any 1.0 MHz band.	☒

Test Setup



Test Procedure

789033 D02 General U-NII Test Procedures New Rules v02r01,F.

Maximum spectral density measurement procedure

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.

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.)
2. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
3. Make the following adjustments to the peak value of the spectrum, if applicable:
 - a). If Method SA-2 or SA-2 Alternative was used, add $10 \log(1/x)$, where x is the duty cycle, to the peak of the spectrum.
 - 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.
4. The result is the Maximum PSD over 1 MHz reference bandwidth.
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 (< 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 II.B.1.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 $RBW (< 500 \text{ kHz})$ 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 $RBW (< 1 \text{ MHz})$ 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 II.F.5.c) and II.F.5.d), since RBW=100 kHz is available on nearly all spectrum analyzers.		
Test Date	02/15/2019-02-28/2019	Environmental condition	Temperature 22°C Relative Humidity 46% Atmospheric Pressure 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. For the Cross band channels, the output power of full bandwidth is compared to the power limit in 5.5G and 5.8G as the worst case. For 5.8GHz band, the PSD measurement on Cross band channel is using 1MHz BW as the worst case.		
Result	☒ Pass ☐ 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-2A

Type	Test mode	Freq (MHz)	CH	Conducted PSD (dBm/MHz)					Limit (dBm)	Result
				Chain0	Chain1	Chain2	Chain3	Combined PSD		
PSD	802.11a	5260	Low	4.09	5.57	3.14	5.06	10.58	11	Pass
	802.11a	5280	Mid	3.90	5.68	2.56	5.01	10.46	11	Pass
	802.11a	5320	High	4.77	5.13	1.91	4.63	10.30	11	Pass
	802.11ax-20M	5260	Low	3.99	5.26	3.10	4.82	10.39	11	Pass
	802.11ax-20M	5280	Mid	3.89	5.00	2.19	4.63	10.07	11	Pass
	802.11ax-20M	5320	High	4.31	4.83	2.99	4.45	10.22	11	Pass
	802.11ax-40M	5270	Low	2.40	3.85	1.01	3.27	8.78	11	Pass
	802.11ax-40M	5310	Mid	2.33	3.63	0.31	3.07	8.52	11	Pass
	802.11ax-80M	5290	High	-0.75	0.48	-2.10	-0.18	5.48	11	Pass

PSD measurement result for U-NII-2C

Type	Test mode	Freq (MHz)	CH	Conducted PSD (dBm/MHz)					Limit (dBm)	Result
				Chain0	Chain1	Chain2	Chain3	Combined PSD		
PSD	802.11a	5500	Low	3.58	4.91	3.84	4.46	10.25	11	Pass
	802.11a	5580	Mid	3.78	3.88	4.39	4.08	10.06	11	Pass
	802.11a	5700	High	5.08	5.18	4.27	3.14	10.51	11	Pass
	802.11ax-20M	5500	Low	4.77	4.68	4.45	4.44	10.61	11	Pass
	802.11ax-20M	5580	Mid	3.27	4.40	4.47	4.14	10.12	11	Pass
	802.11ax-20M	5700	High	4.83	5.48	4.56	3.19	10.61	11	Pass
	802.11ax-40M	5510	Low	2.86	3.01	2.58	2.47	8.76	11	Pass
	802.11ax-40M	5550	Mid	2.23	2.60	2.92	2.97	8.71	11	Pass
	802.11ax-40M	5670	High	2.68	3.61	2.06	1.93	8.64	11	Pass
	802.11ax-80M	5530	Low	-0.41	-0.01	-0.29	0.18	5.89	11	Pass
	802.11ax-80M	5610	High	-1.05	-0.48	-1.57	-2.07	4.77	11	Pass

PSD measurement result for cross channels in U-NII 2C

Type	Test mode	Freq (MHz)	CH	Conducted PSD (dBm/MHz)					Limit (dBm)	Result
				Chain0	Chain1	Chain2	Chain3	Combined PSD		
PSD	802.11a	5720	CROSS	5.34	5.19	4.98	3.36	10.81	11	Pass
	802.11ax-20M	5720	CROSS	4.78	4.82	3.53	3.28	10.18	11	Pass
	802.11ax-40M	5710	CROSS	3.46	2.92	2.22	2.18	8.75	11	Pass
	802.11ax-80M	5690	CROSS	0.25	0.86	-0.79	-0.04	6.13	11	Pass

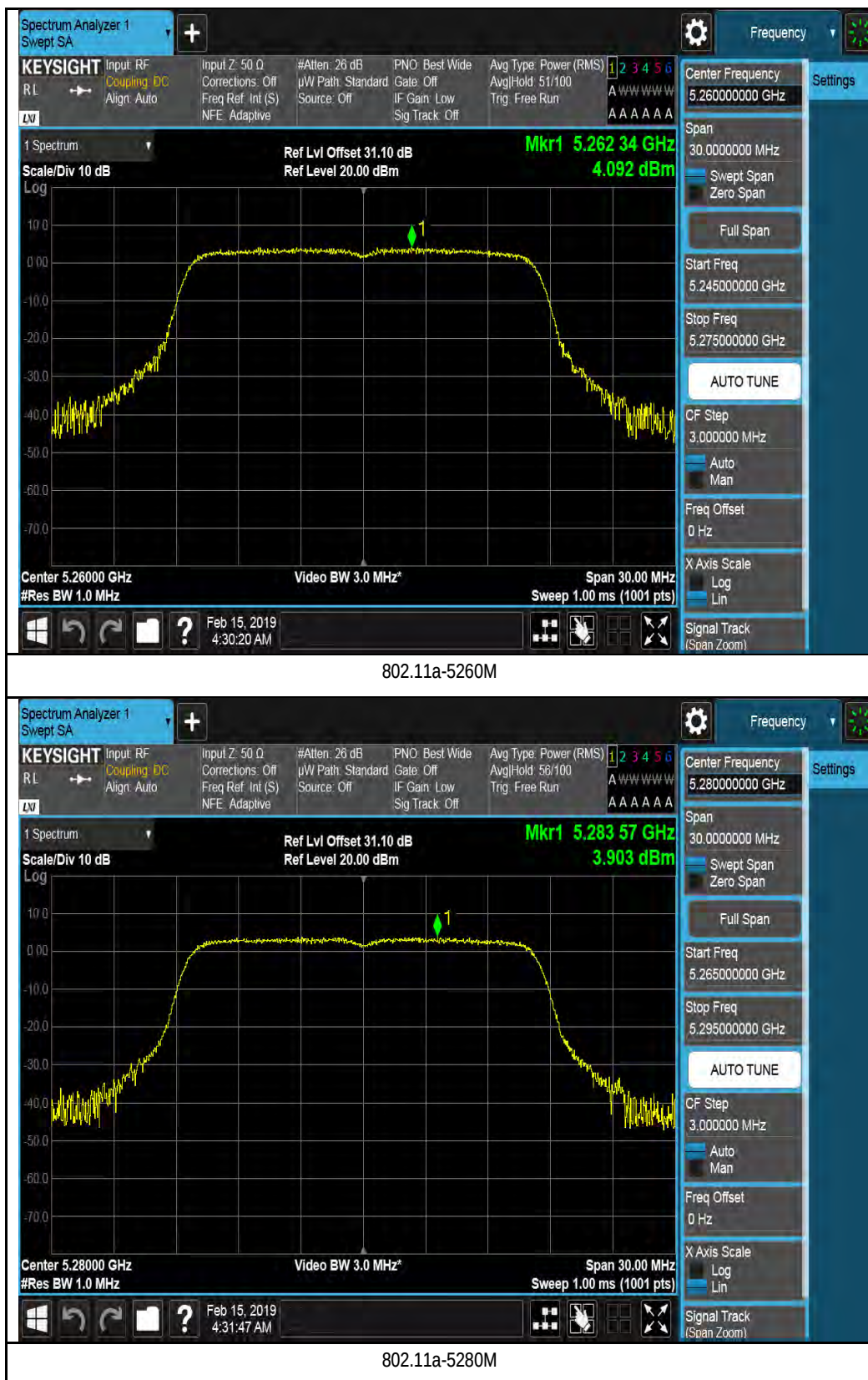
PSD measurement result for cross channels in U-NII 3C

Test mode	Freq (MHz)	CH	Conducted PSD (dBm/MHz)					Corrected Level (dBm/500kHz)	Limit (dBm/500kHz)	Result
			Chain0	Chain1	Chain2	Chain3	Combined PSD			
802.11a	5720	CROSS	-3.45	-3.38	-4.15	-4.74	2.13	9.12	30	Pass
802.11ax-20M	5720	CROSS	-4.27	-4.14	-5.37	-6.05	1.13	8.12	30	Pass
802.11ax-40M	5710	CROSS	-5.75	-5.81	-7.10	-7.69	-0.49	6.50	30	Pass
802.11ax-80M	5690	CROSS	-9.14	-8.45	-10.22	-9.39	-3.23	3.76	30	Pass

Note: Corrected Level = Combined PSD + Correction factor,
Correction factor = $10 \cdot \log(500/100) = 6.99$

Test Plot for U-NII-2A:

Chain 0:





802.11a-5320M



802.11ax-HT20 5260M



802.11ax-HT20 5280M



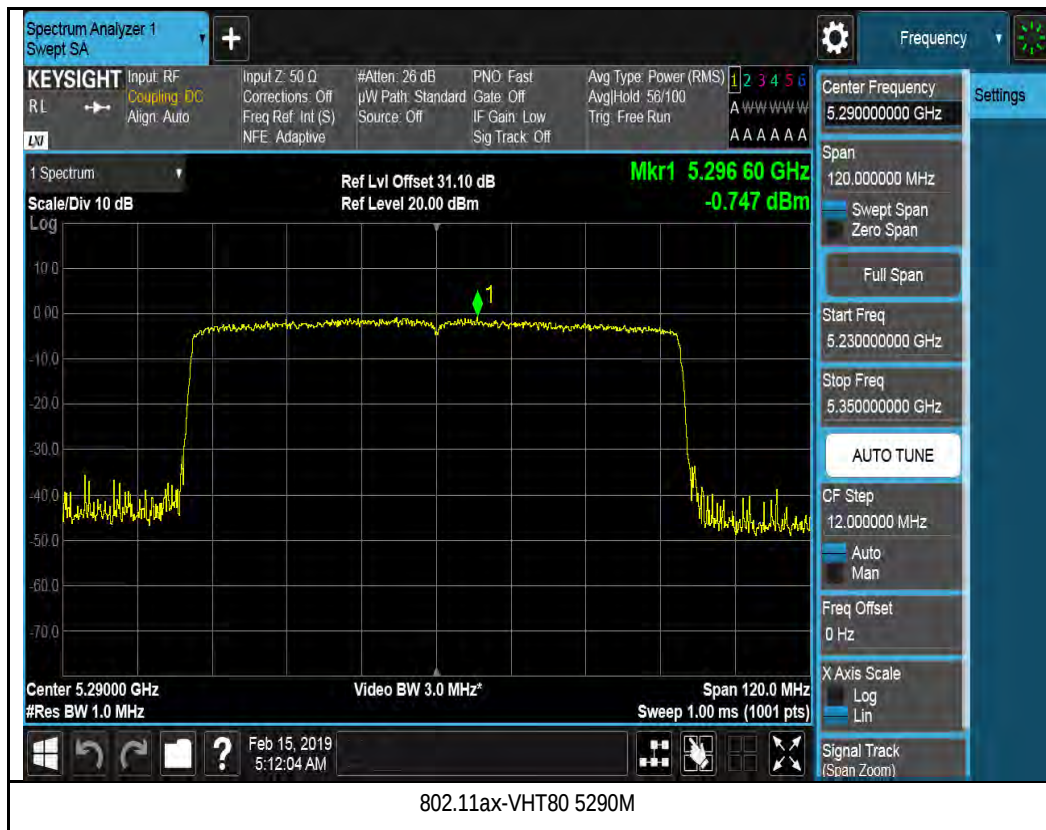
802.11ax-HT20 5320M



802.11ax-HT40 5270M



802.11ax-HT40 5310M



Chain 1:



802.11a-5260M



802.11a-5280M



802.11a-5320M



802.11ax-HT20 5260M



802.11ax-HT20 5280M



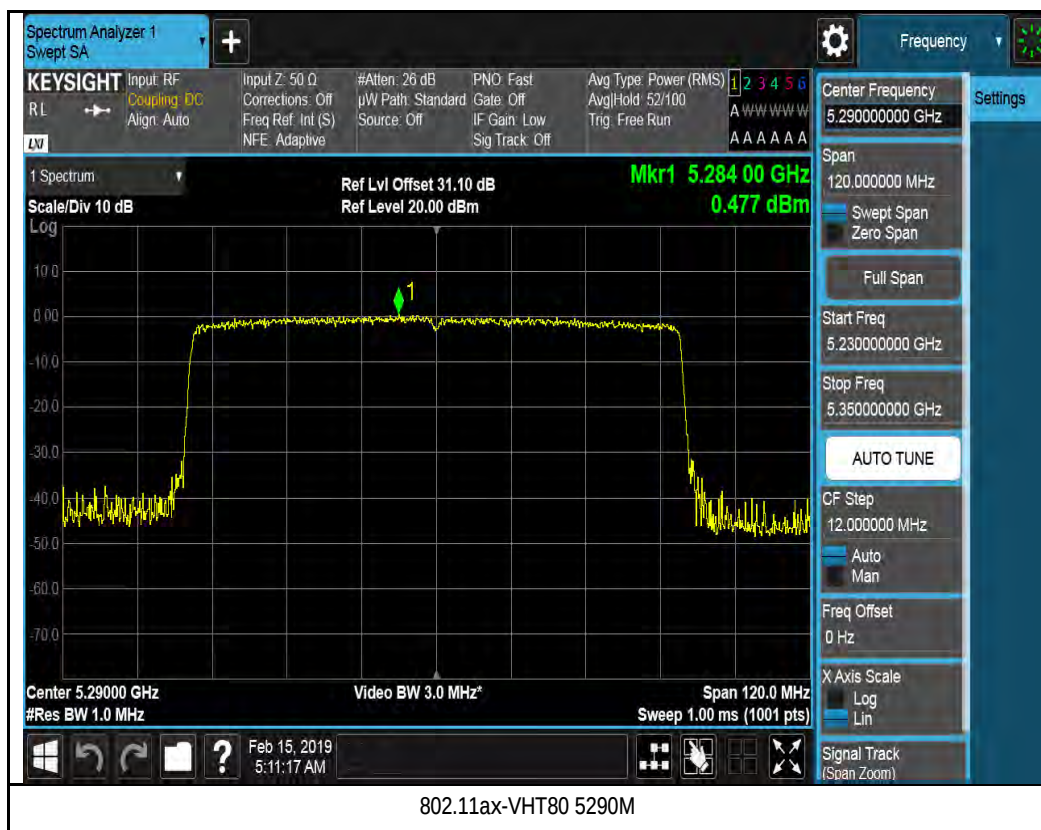
802.11ax-HT20 5320M



802.11ax-HT40 5270M



802.11ax-HT40 5310M



Chain 2:



802.11a-5260M



802.11a-5280M



802.11a-5320M



802.11ax-HT20 5260M



802.11ax-HT20 5280M



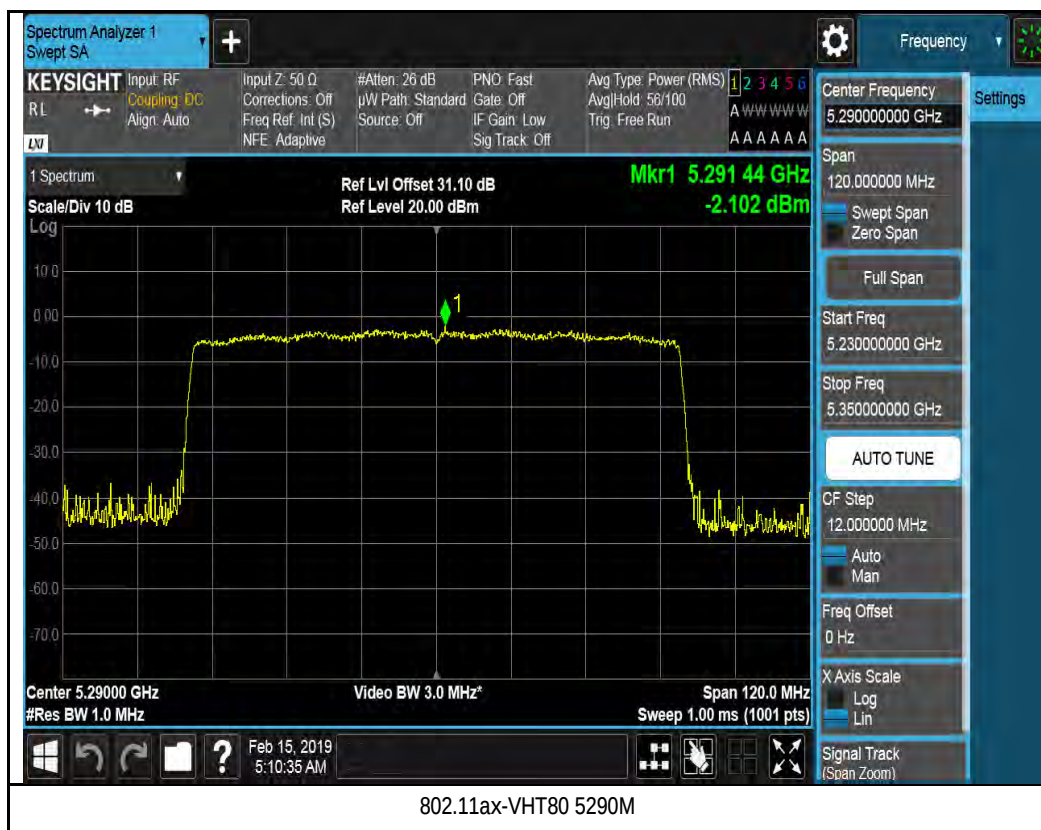
802.11ax-HT20 5320M



802.11ax-HT40 5270M



802.11ax-HT40 5310M



Chain 3:



802.11a-5260M



802.11a-5280M



802.11a-5320M



802.11ax-HT20 5260M



802.11ax-HT20 5280M



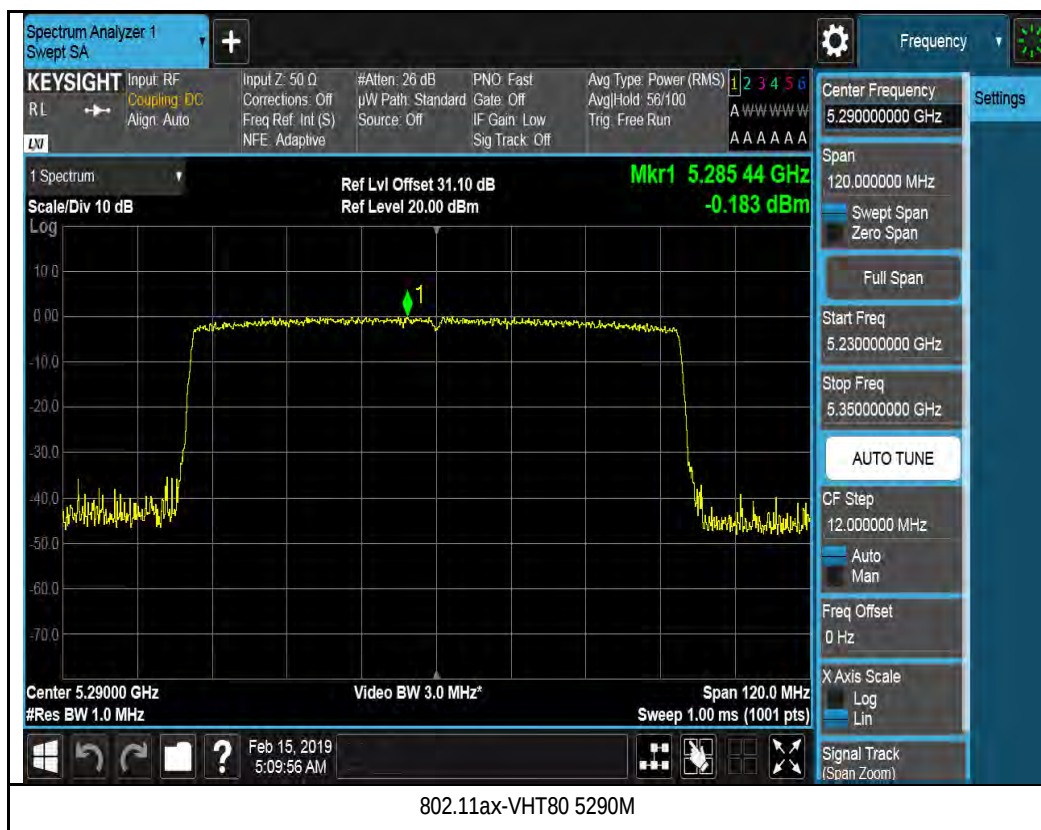
802.11ax-HT20 5320M



802.11ax-HT40 5270M

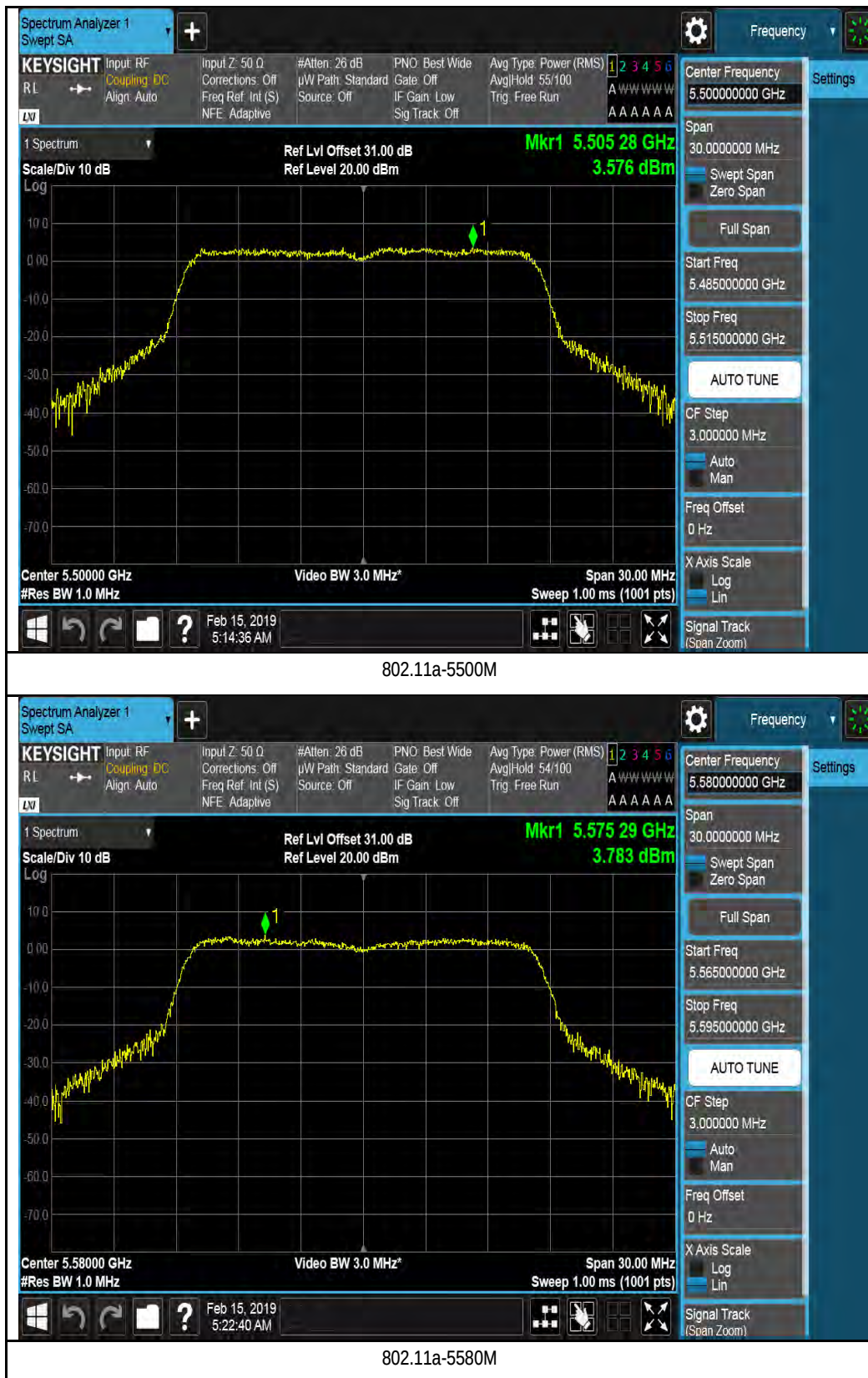


802.11ax-HT40 5310M



Test Plot for U-NII-2C:

Chain 0:





802.11a-5700M



802.11ax-HT20 5500M



802.11ax-HT20 5580M



802.11ax-HT20 5700M



802.11ax-HT40 5510M



802.11ax-HT40 5550M



802.11ax-HT40 5670M



802.11ax-VHT80 5530M



802.11ax-VHT80 5610M

Chain 1:



802.11a-5500M



802.11a-5580M



802.11a-5700M



802.11ax-HT20 5500M



802.11ax-HT20 5580M



802.11ax-HT20 5700M



802.11ax-HT40 5510M



802.11ax-HT40 5550M



802.11ax-HT40 5670M



802.11ax-VHT80 5530M

