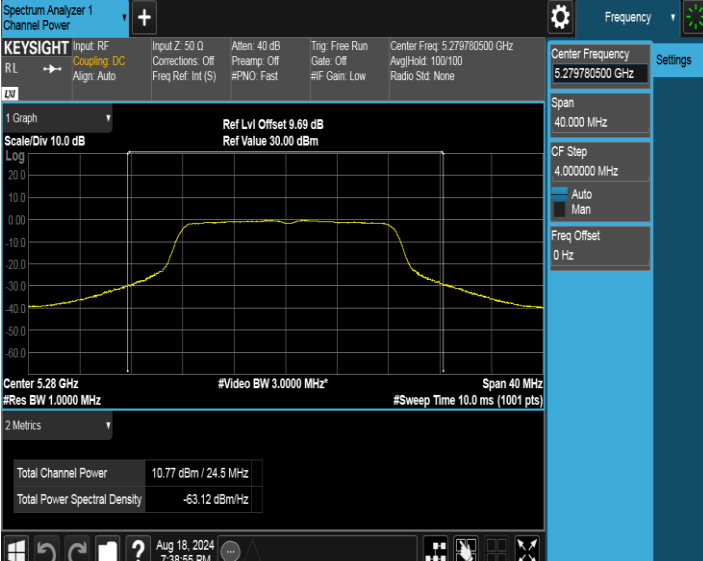
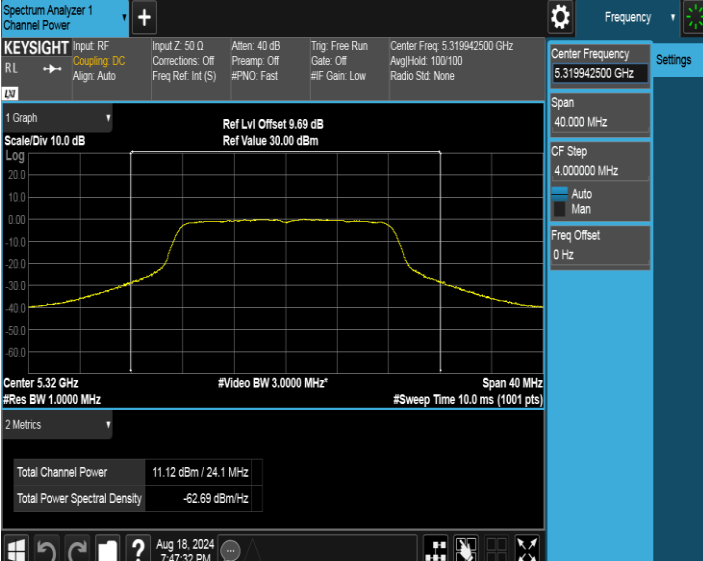
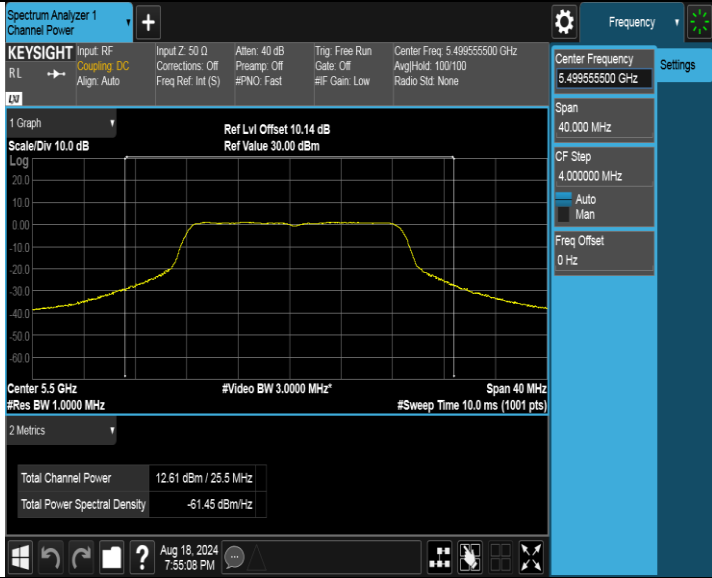
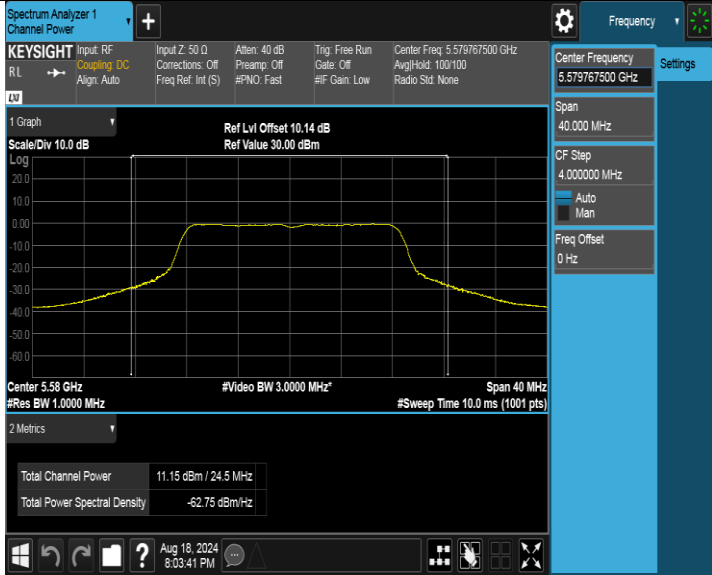
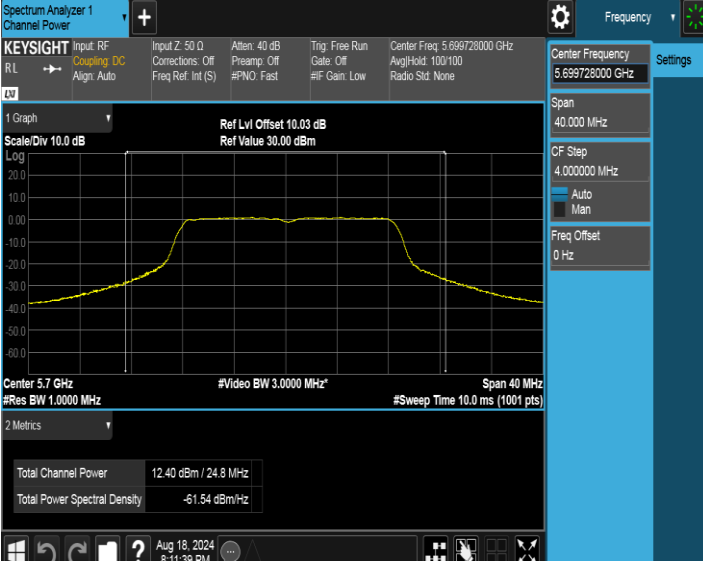


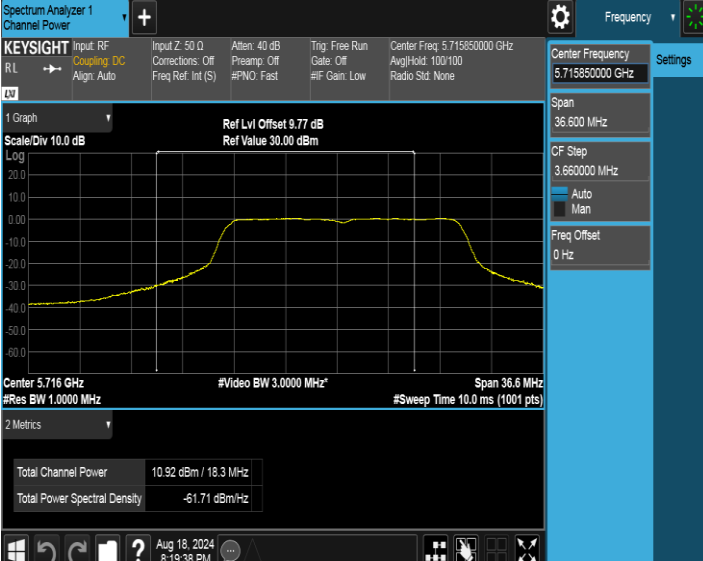
Test Mode	Test Channel	Verdict
11a	5280	PASS
		

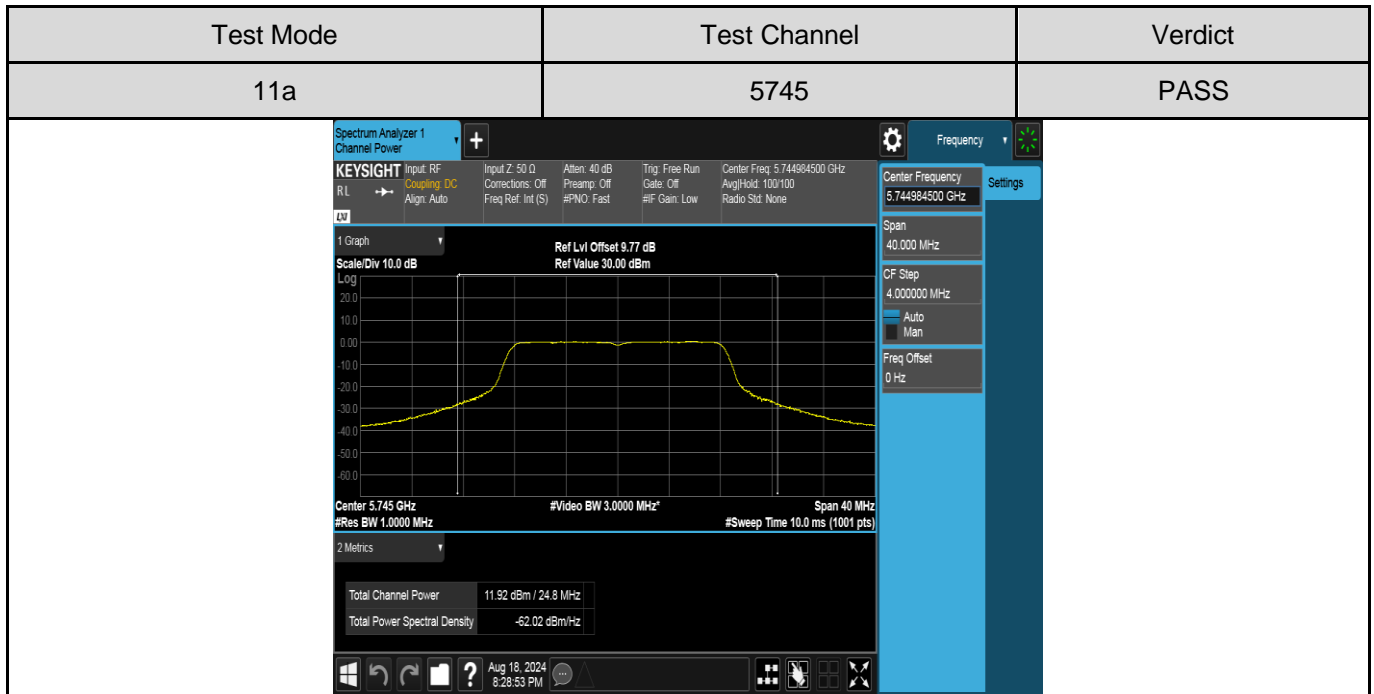
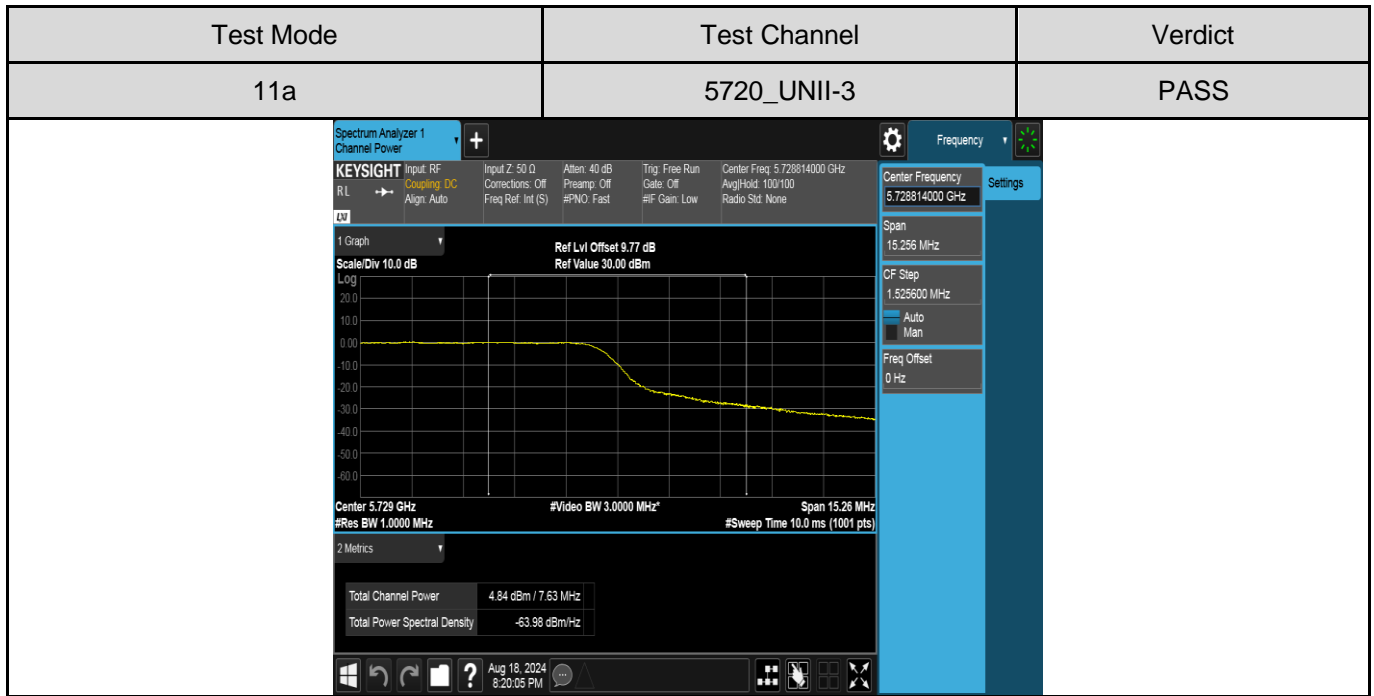
Test Mode	Test Channel	Verdict
11a	5320	PASS
		

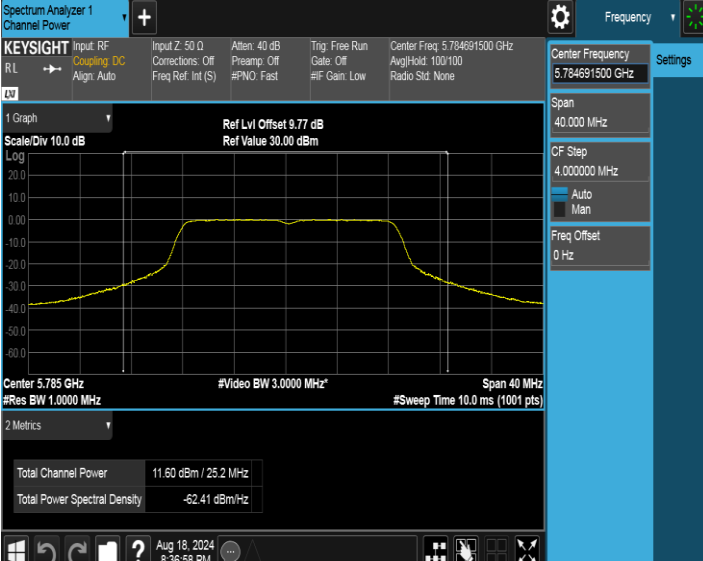
Test Mode	Test Channel	Verdict
11a	5500	PASS
 <p>The screenshot shows the Keysight Spectrum Analyzer 1 Channel Power interface. The center frequency is 5.49955500 GHz. The span is 40.000 MHz. The scale/div is 10.0 dB. The total channel power is 12.61 dBm / 25.5 MHz. The total power spectral density is -61.45 dBm/Hz. The video bandwidth is 3.0000 MHz. The resolution bandwidth is 1.0000 MHz. The sweep time is 10.0 ms (1001 pts). The graph shows a flat signal at approximately 0 dBm across the span.</p>		

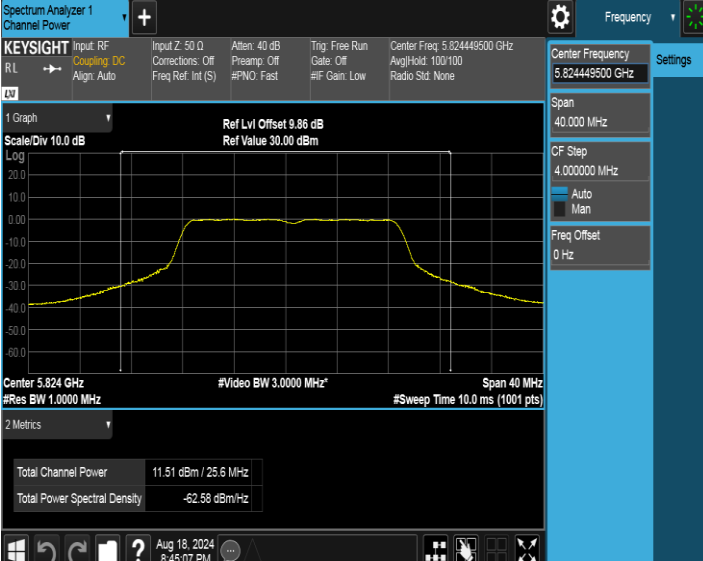
Test Mode	Test Channel	Verdict
11a	5580	PASS
 <p>The screenshot shows the Keysight Spectrum Analyzer 1 Channel Power interface. The center frequency is 5.578767500 GHz. The span is 40.000 MHz. The scale/div is 10.0 dB. The total channel power is 11.15 dBm / 24.5 MHz. The total power spectral density is -62.75 dBm/Hz. The video bandwidth is 3.0000 MHz. The resolution bandwidth is 1.0000 MHz. The sweep time is 10.0 ms (1001 pts). The graph shows a flat signal at approximately 0 dBm across the span.</p>		

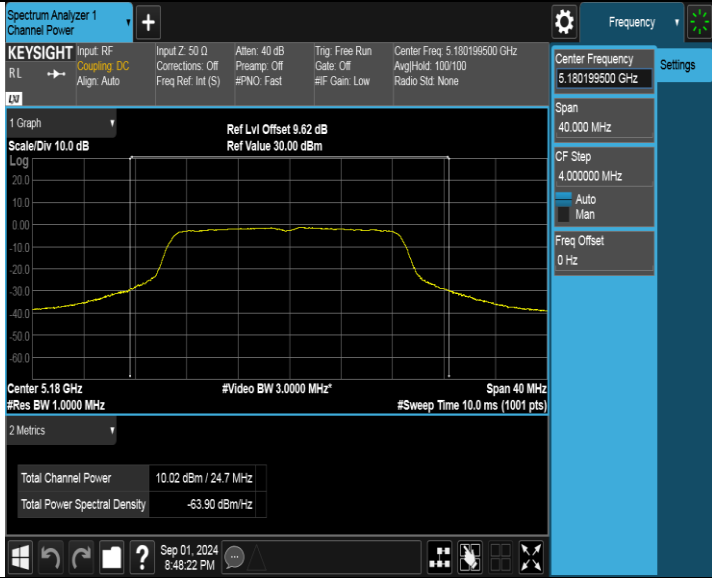
Test Mode	Test Channel	Verdict
11a	5700	PASS
		

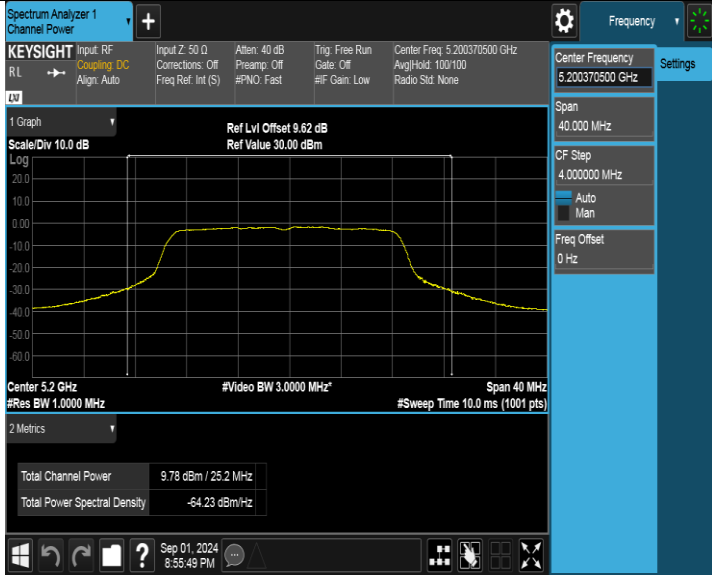
Test Mode	Test Channel	Verdict
11a	5720_UNII-2C	PASS
		

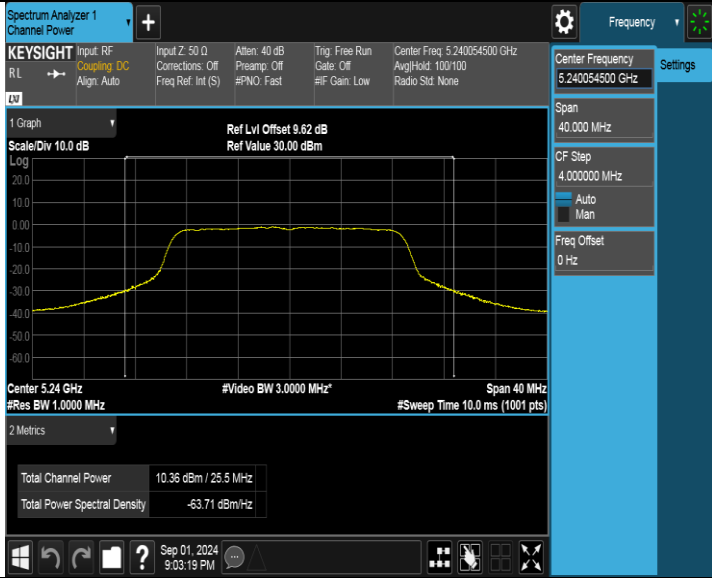


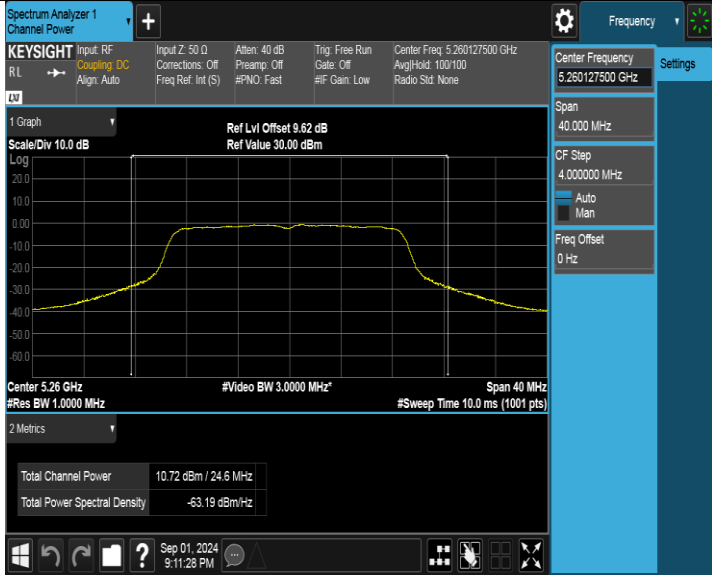
Test Mode	Test Channel	Verdict
11a	5785	PASS
		

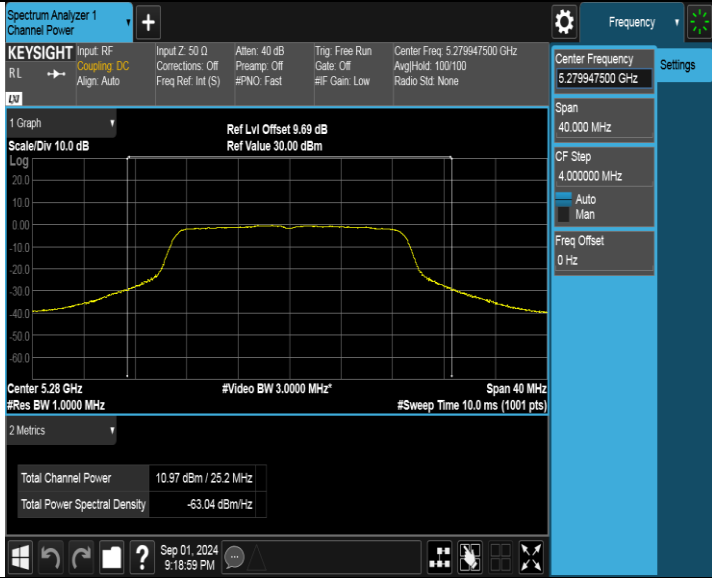
Test Mode	Test Channel	Verdict
11a	5825	PASS
		

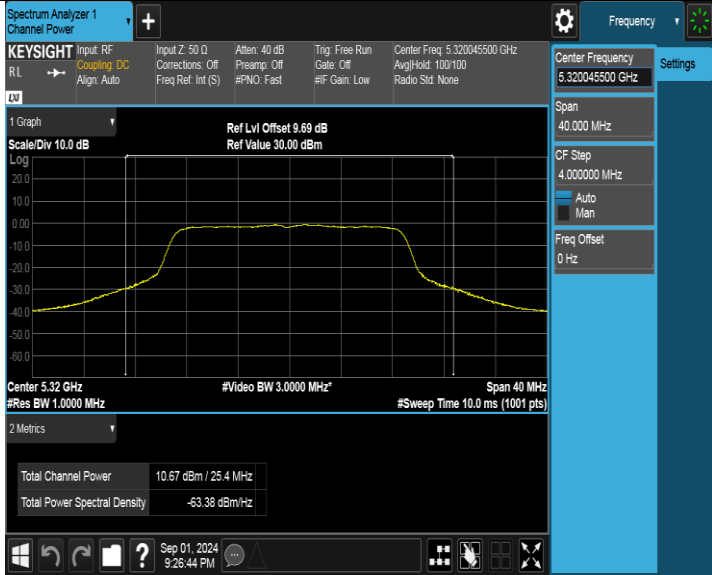
Test Mode	Test Channel	Verdict
11ac VHT20	5180	PASS
		

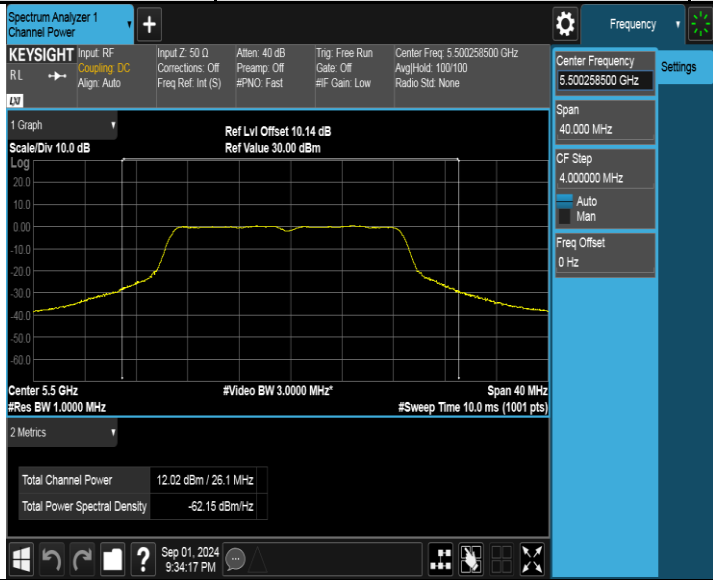
Test Mode	Test Channel	Verdict
11ac VHT20	5200	PASS
		

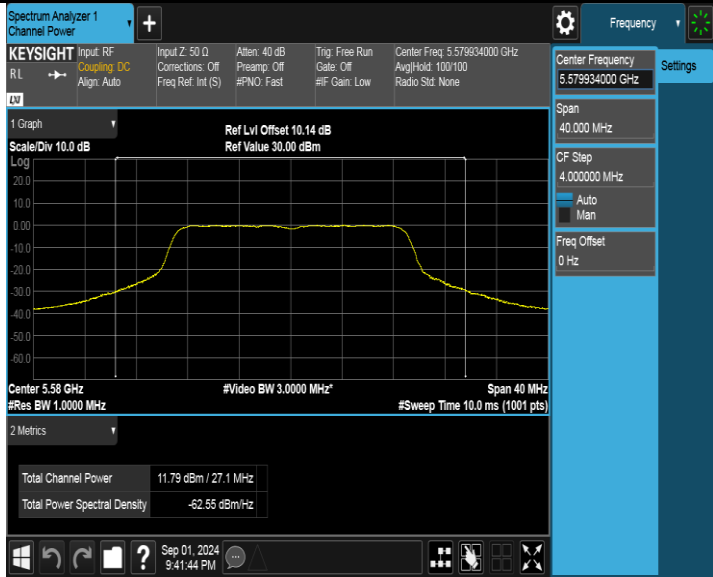
Test Mode	Test Channel	Verdict
11ac VHT20	5240	PASS
		

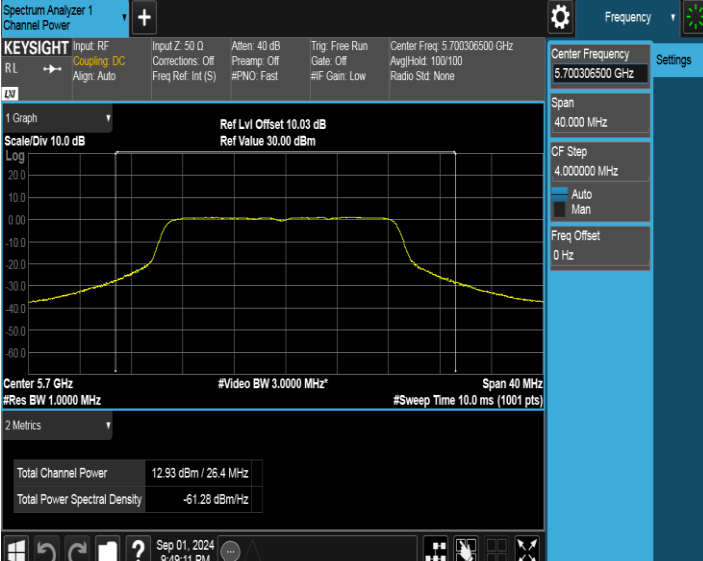
Test Mode	Test Channel	Verdict
11ac VHT20	5260	PASS
		

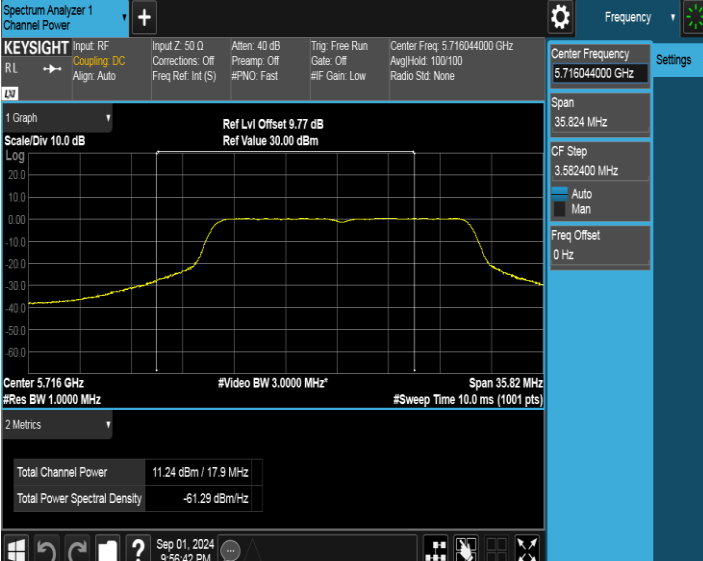
Test Mode	Test Channel	Verdict
11ac VHT20	5280	PASS
		

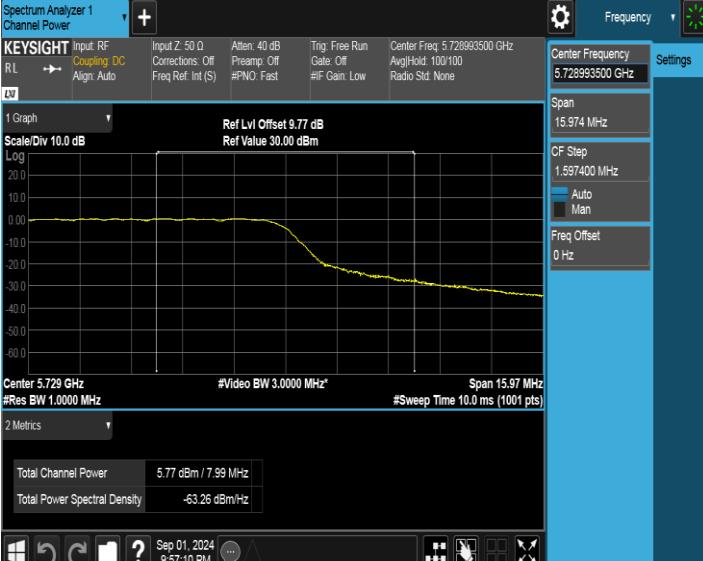
Test Mode	Test Channel	Verdict
11ac VHT20	5320	PASS
		

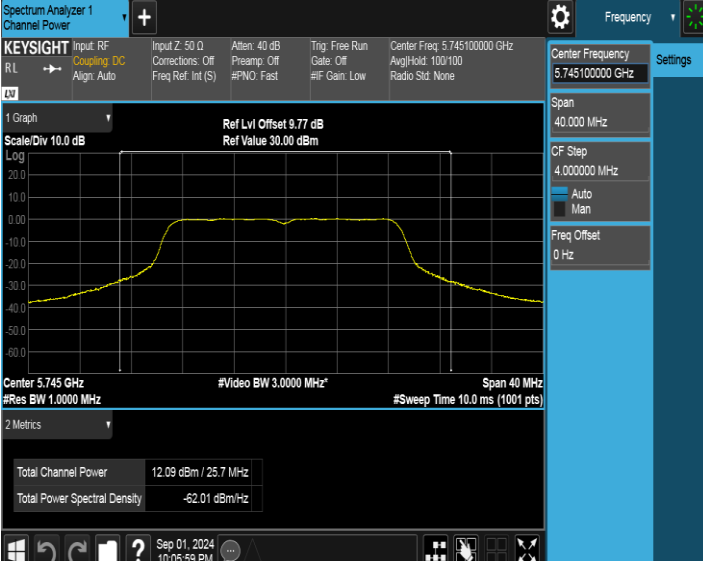
Test Mode	Test Channel	Verdict
11ac VHT20	5500	PASS
 <p>The screenshot displays the Keysight Spectrum Analyzer interface. The main plot shows a signal centered at 5.500258500 GHz with a span of 40 MHz. The signal is a rectangular pulse. The total channel power is 12.02 dBm / 26.1 MHz, and the total power spectral density is -62.15 dBm/Hz. The settings panel on the right shows the center frequency, span, and other parameters.</p>		

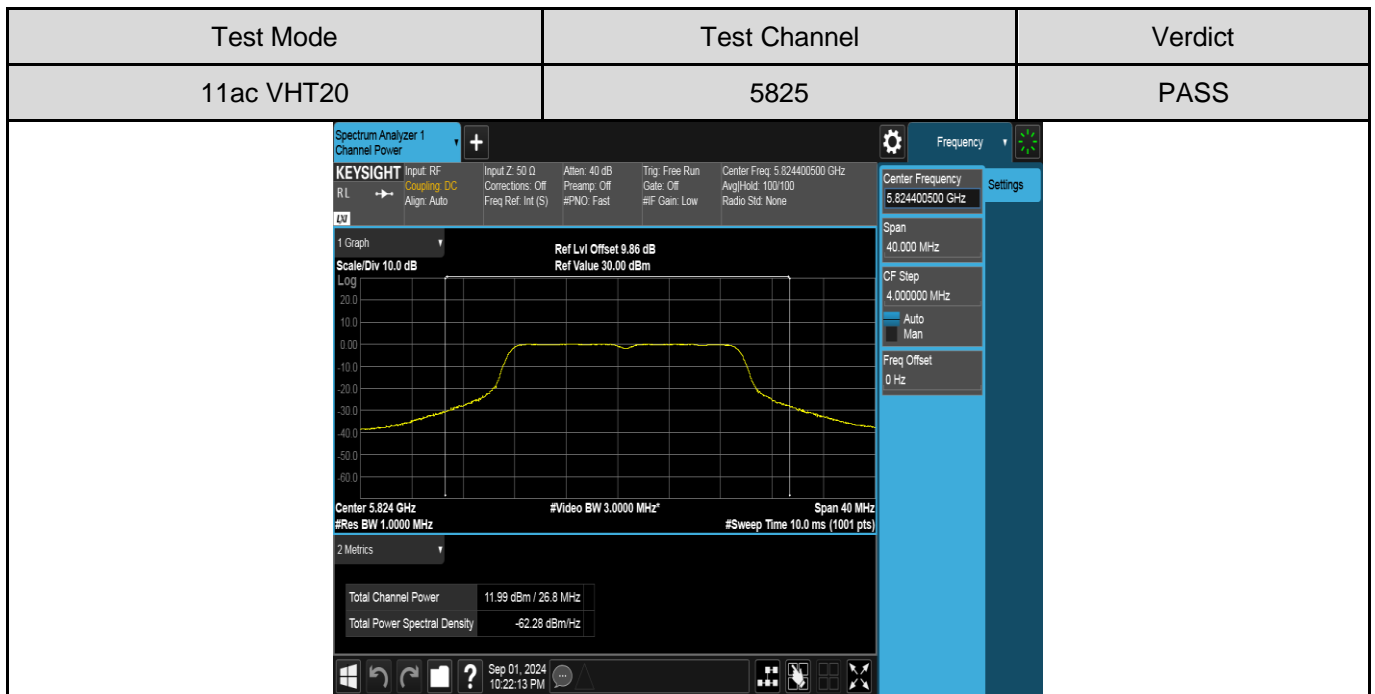
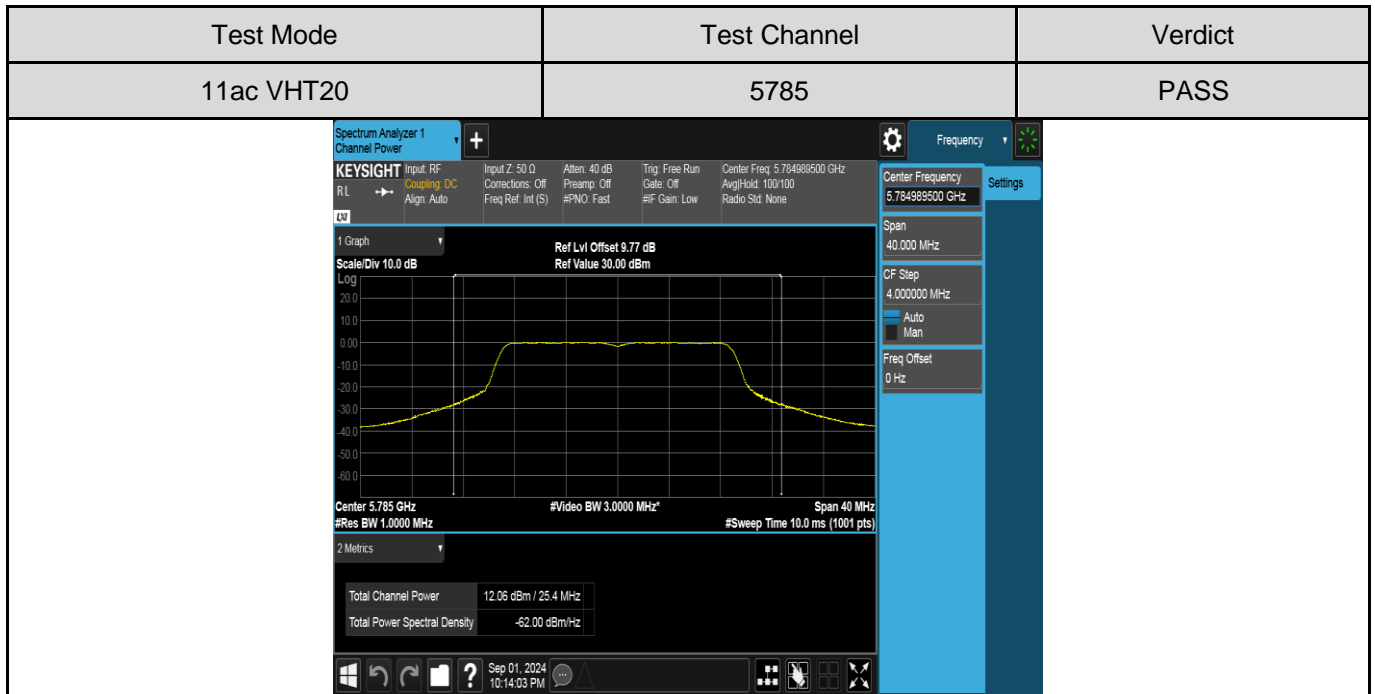
Test Mode	Test Channel	Verdict
11ac VHT20	5580	PASS
 <p>The screenshot displays the Keysight Spectrum Analyzer interface. The main plot shows a signal centered at 5.579934000 GHz with a span of 40 MHz. The signal is a rectangular pulse. The total channel power is 11.79 dBm / 27.1 MHz, and the total power spectral density is -62.55 dBm/Hz. The settings panel on the right shows the center frequency, span, and other parameters.</p>		

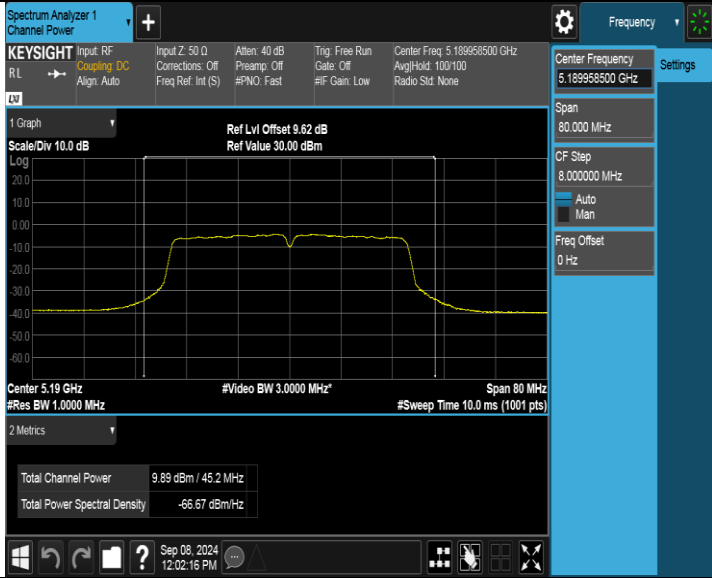
Test Mode	Test Channel	Verdict
11ac VHT20	5700	PASS
		

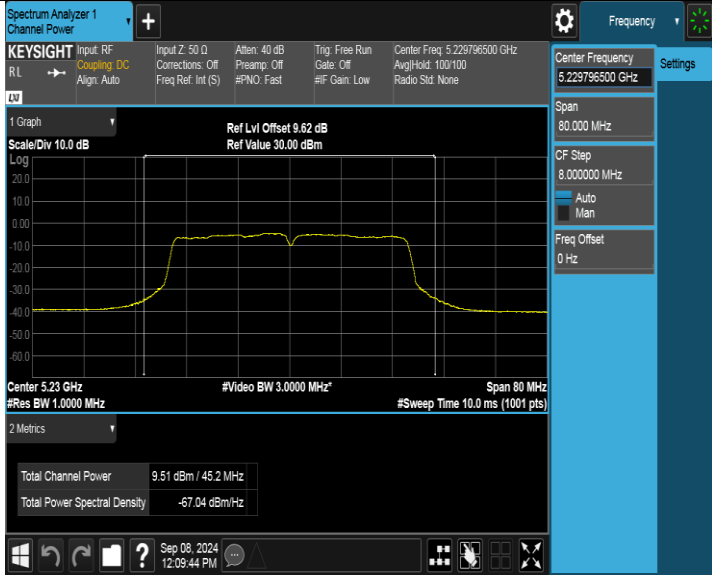
Test Mode	Test Channel	Verdict
11ac VHT20	5720_UNII-2C	PASS
		

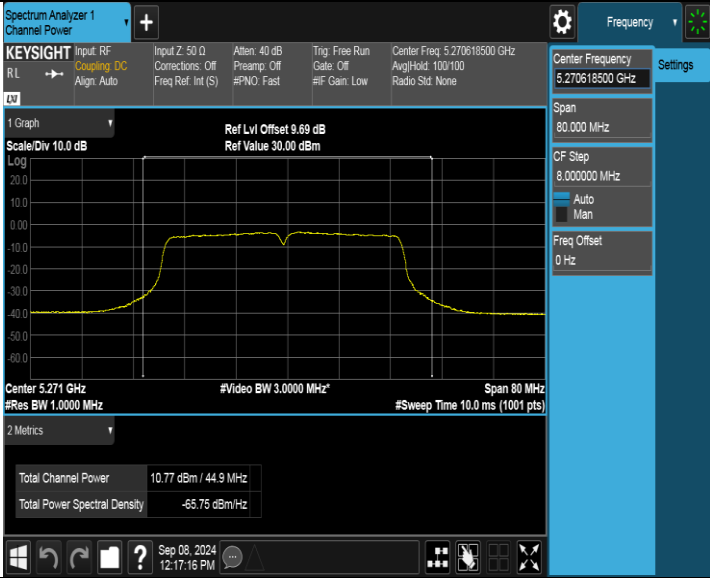
Test Mode	Test Channel	Verdict
11ac VHT20	5720_UNII-3	PASS
		

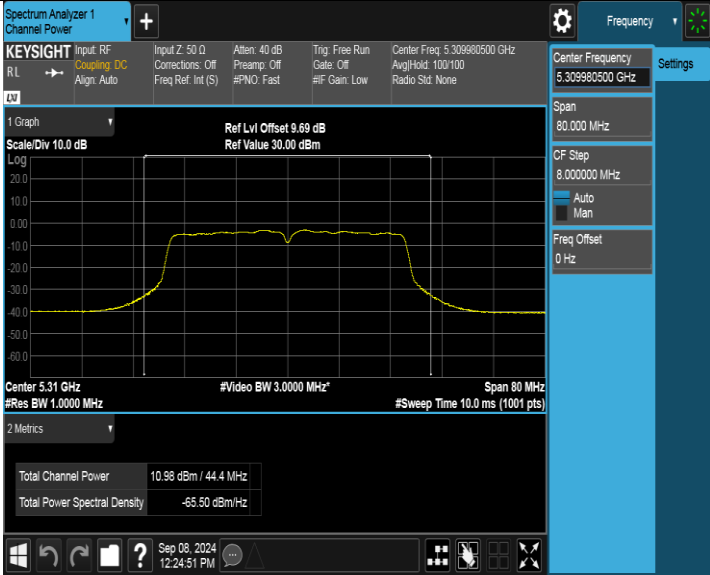
Test Mode	Test Channel	Verdict
11ac VHT20	5745	PASS
		

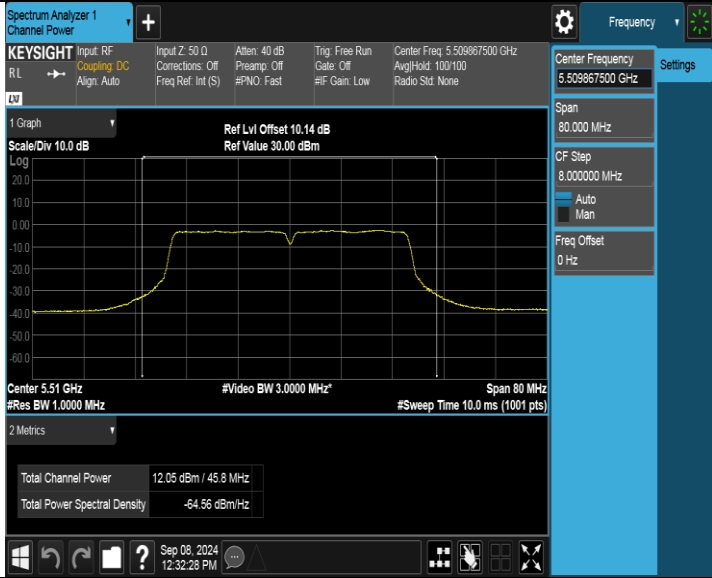


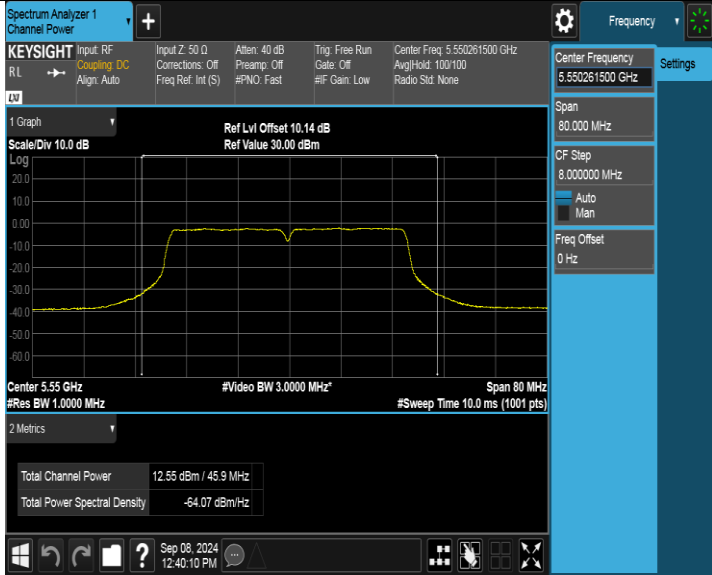
Test Mode	Test Channel	Verdict
11ac VHT40	5190	PASS
		

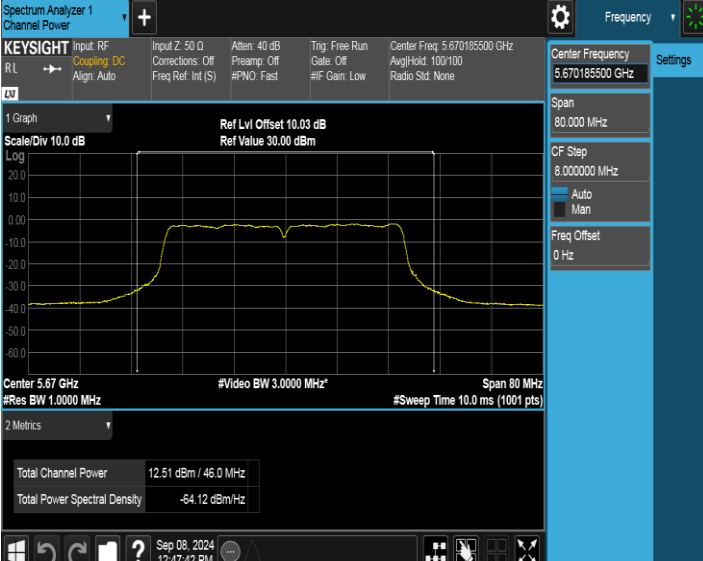
Test Mode	Test Channel	Verdict
11ac VHT40	5230	PASS
		

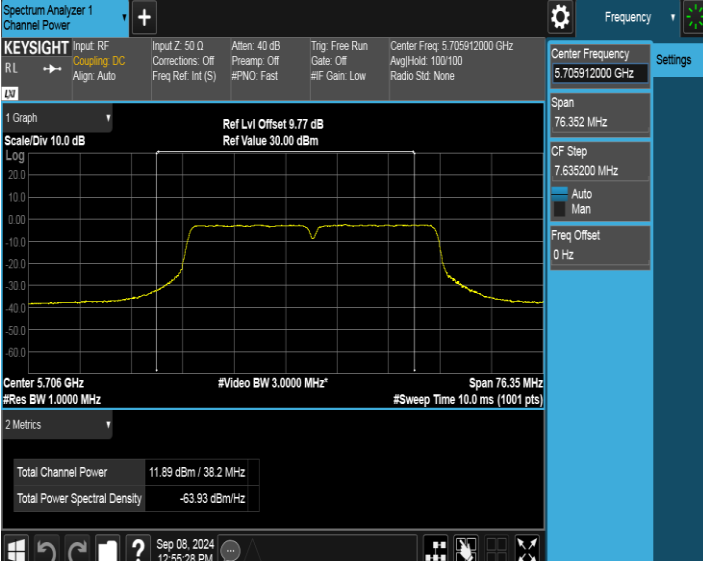
Test Mode	Test Channel	Verdict
11ac VHT40	5270	PASS
		

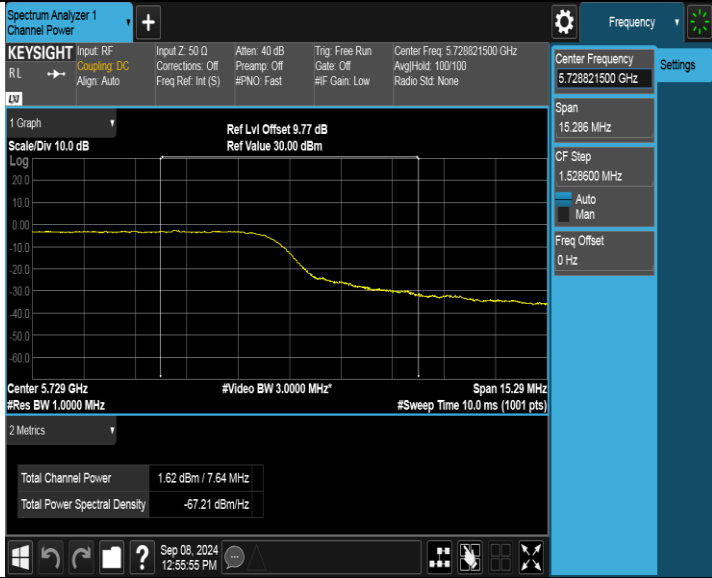
Test Mode	Test Channel	Verdict
11ac VHT40	5310	PASS
		

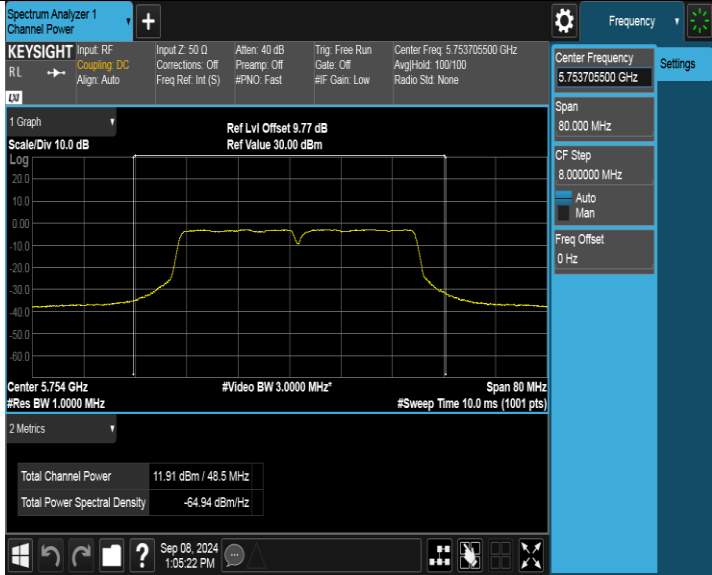
Test Mode	Test Channel	Verdict
11ac VHT40	5510	PASS
 <p>The screenshot displays the Keysight Spectrum Analyzer interface. The main plot shows a signal at 5.51 GHz with a total channel power of 12.05 dBm / 45.8 MHz. The reference level is set to 10.14 dB and the reference value is 30.00 dBm. The span is 80 MHz and the resolution bandwidth is 3.0000 MHz. The sweep time is 10.0 ms (1001 pts). The metrics section shows the total channel power and total power spectral density.</p>		

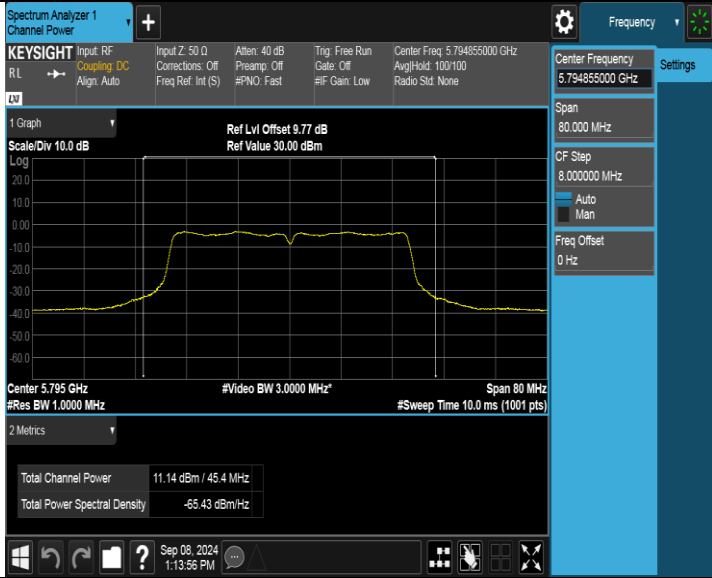
Test Mode	Test Channel	Verdict
11ac VHT40	5550	PASS
 <p>The screenshot displays the Keysight Spectrum Analyzer interface. The main plot shows a signal at 5.55 GHz with a total channel power of 12.55 dBm / 45.9 MHz. The reference level is set to 10.14 dB and the reference value is 30.00 dBm. The span is 80 MHz and the resolution bandwidth is 3.0000 MHz. The sweep time is 10.0 ms (1001 pts). The metrics section shows the total channel power and total power spectral density.</p>		

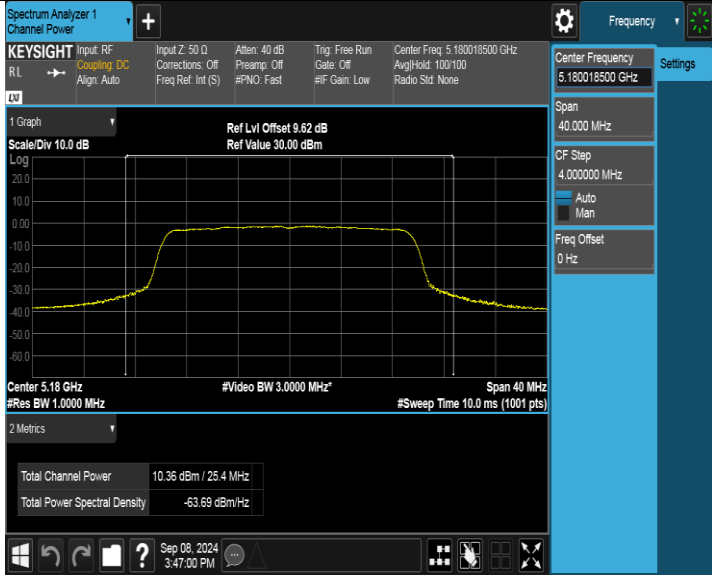
Test Mode	Test Channel	Verdict
11ac VHT40	5670	PASS
		

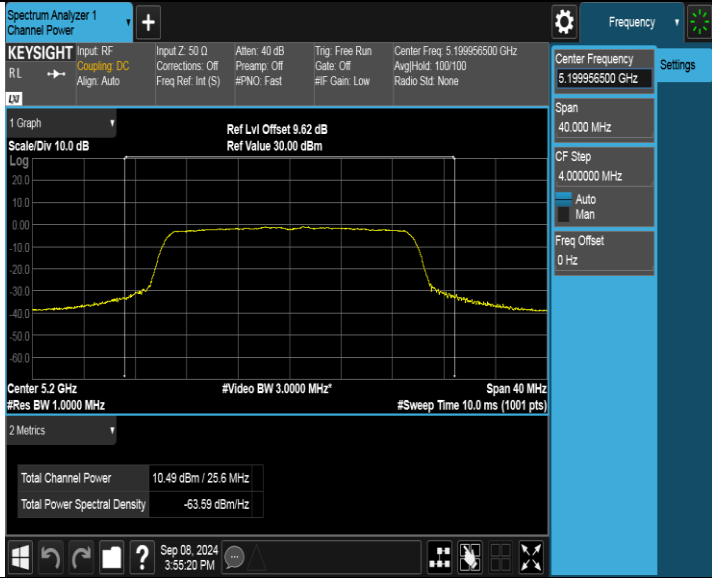
Test Mode	Test Channel	Verdict
11ac VHT40	5710_UNII-2C	PASS
		

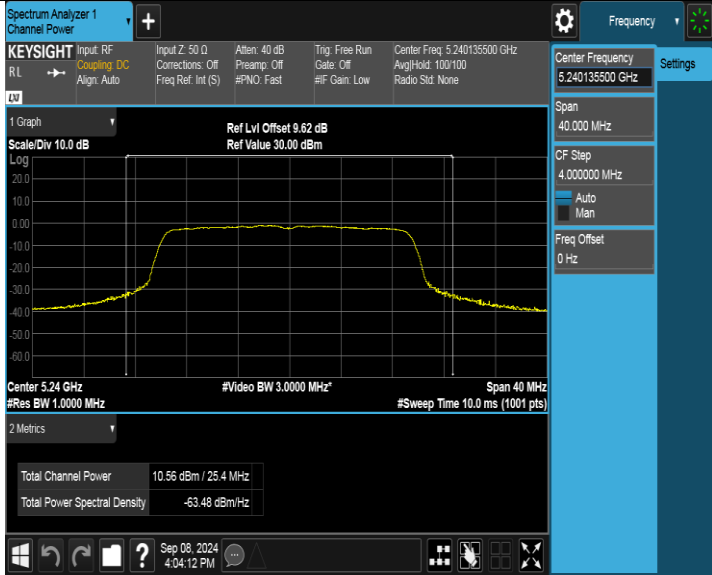
Test Mode	Test Channel	Verdict
11ac VHT40	5710_UNII-3	PASS
 <p>The screenshot displays the Keysight Spectrum Analyzer interface. The main plot shows a signal at 5.729 GHz with a total channel power of 1.62 dBm / 7.64 MHz. The plot is set to a scale of 10.0 dB and a span of 15.29 MHz. The center frequency is 5.72821500 GHz. The plot shows a signal with a peak at 5.729 GHz and a total channel power of 1.62 dBm / 7.64 MHz. The plot also shows the total power spectral density at -67.21 dBm/Hz.</p>		

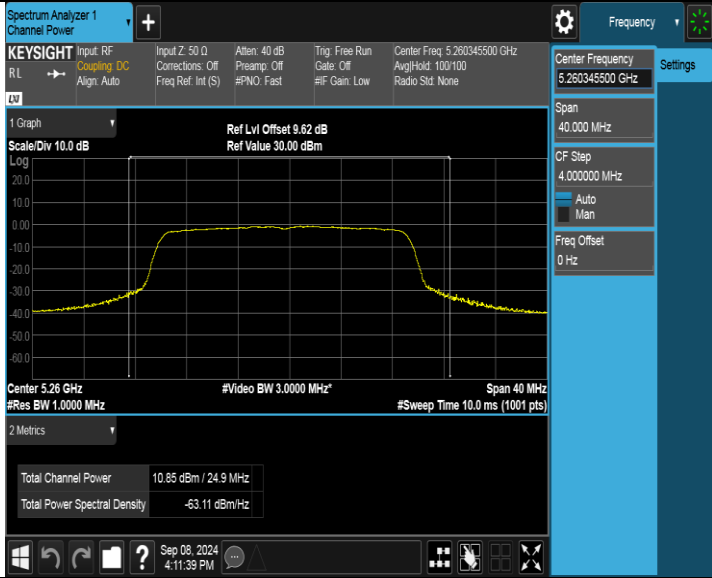
Test Mode	Test Channel	Verdict
11ac VHT40	5755	PASS
 <p>The screenshot displays the Keysight Spectrum Analyzer interface. The main plot shows a signal at 5.754 GHz with a total channel power of 11.91 dBm / 48.5 MHz. The plot is set to a scale of 10.0 dB and a span of 80 MHz. The center frequency is 5.753705500 GHz. The plot shows a signal with a peak at 5.754 GHz and a total channel power of 11.91 dBm / 48.5 MHz. The plot also shows the total power spectral density at -64.94 dBm/Hz.</p>		

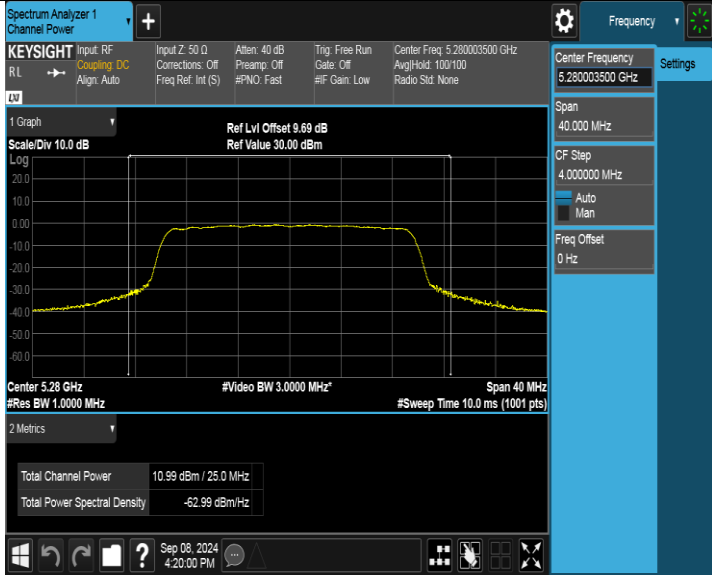
Test Mode	Test Channel	Verdict
11ac VHT40	5795	PASS
		

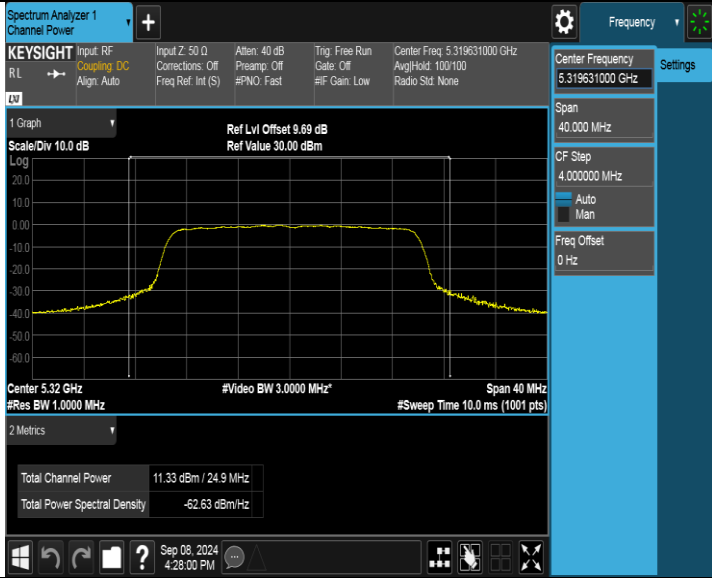
Test Mode	Test Channel	Verdict
11ax HE20	5180	PASS
		

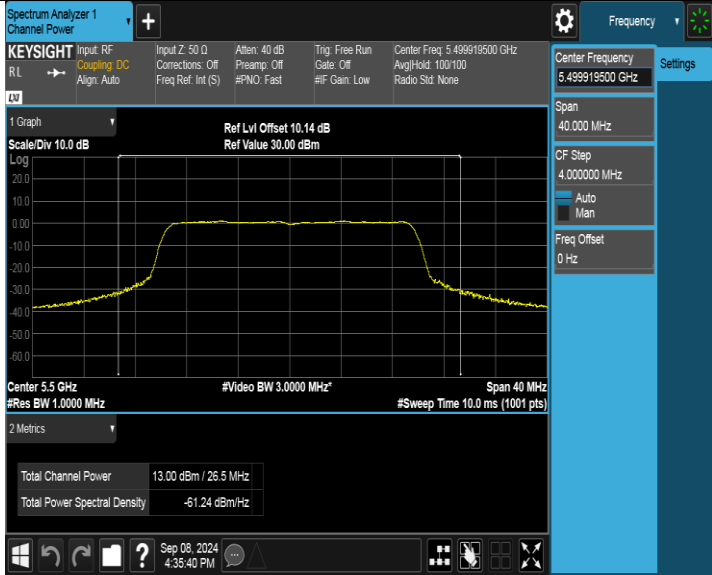
Test Mode	Test Channel	Verdict
11ax HE20	5200	PASS
 <p>The screenshot displays the Keysight Spectrum Analyzer interface. The main plot shows a signal centered at 5.2 GHz with a span of 40 MHz. The signal is a rectangular pulse. The y-axis is labeled 'Scale/Div 10.0 dB' and ranges from -60.0 to 20.0 dB. The x-axis is labeled 'Center 5.2 GHz' and ranges from 5.199956500 GHz to 5.200043500 GHz. The plot shows a signal level of approximately 10.49 dBm/25.6 MHz. The right-hand side of the screen shows the 'Settings' panel with various parameters like Center Frequency, Span, CF Step, and Freq Offset. The bottom status bar shows the date and time as Sep 08, 2024, 3:55:20 PM.</p>		

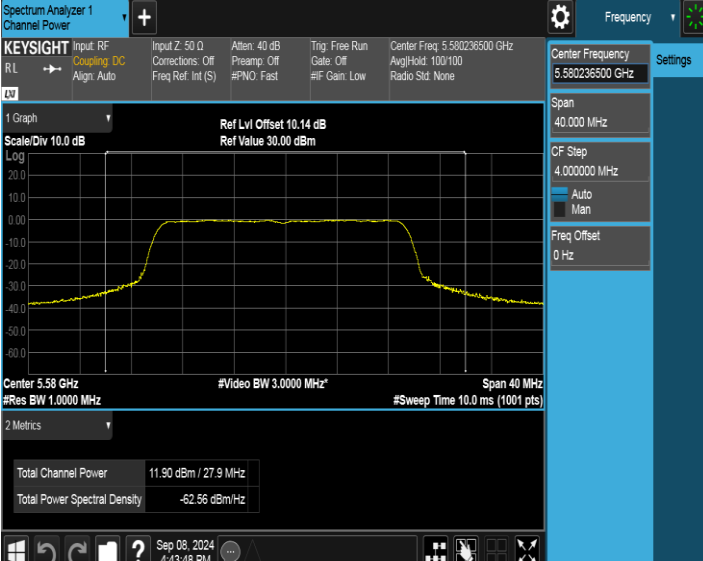
Test Mode	Test Channel	Verdict
11ax HE20	5240	PASS
 <p>The screenshot displays the Keysight Spectrum Analyzer interface. The main plot shows a signal centered at 5.24 GHz with a span of 40 MHz. The signal is a rectangular pulse. The y-axis is labeled 'Scale/Div 10.0 dB' and ranges from -60.0 to 20.0 dB. The x-axis is labeled 'Center 5.24 GHz' and ranges from 5.240135500 GHz to 5.240164500 GHz. The plot shows a signal level of approximately 10.56 dBm/25.4 MHz. The right-hand side of the screen shows the 'Settings' panel with various parameters like Center Frequency, Span, CF Step, and Freq Offset. The bottom status bar shows the date and time as Sep 08, 2024, 4:04:12 PM.</p>		

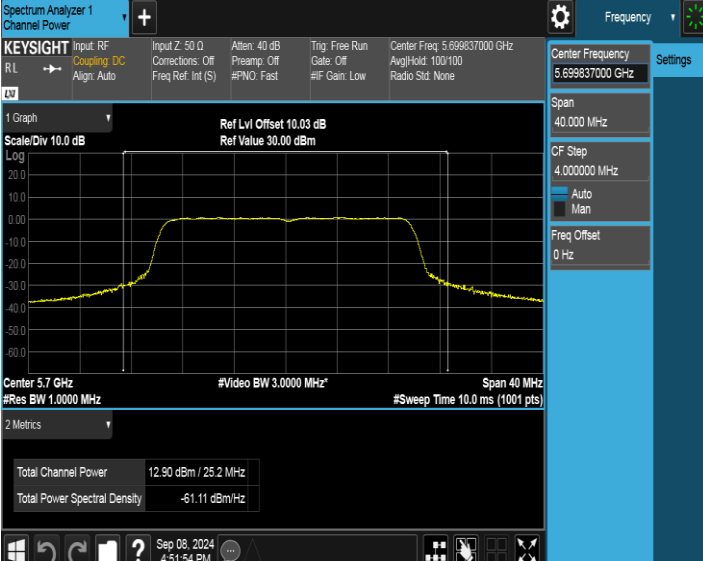
Test Mode	Test Channel	Verdict
11ax HE20	5260	PASS
		

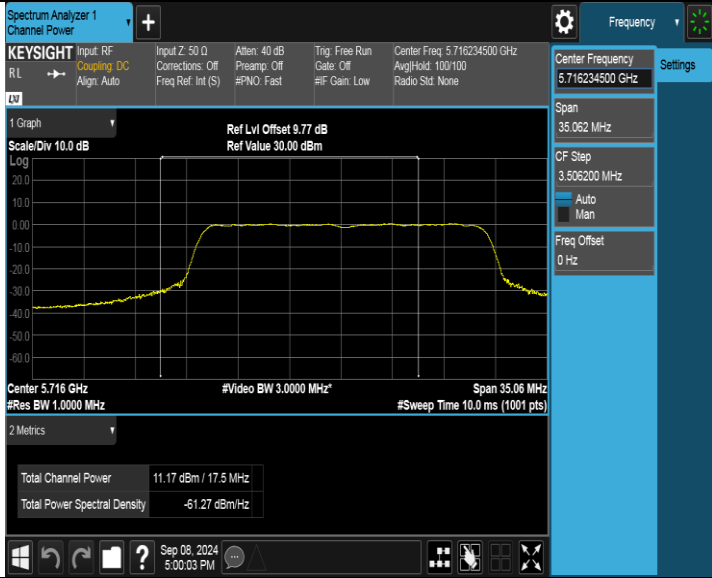
Test Mode	Test Channel	Verdict
11ax HE20	5280	PASS
		

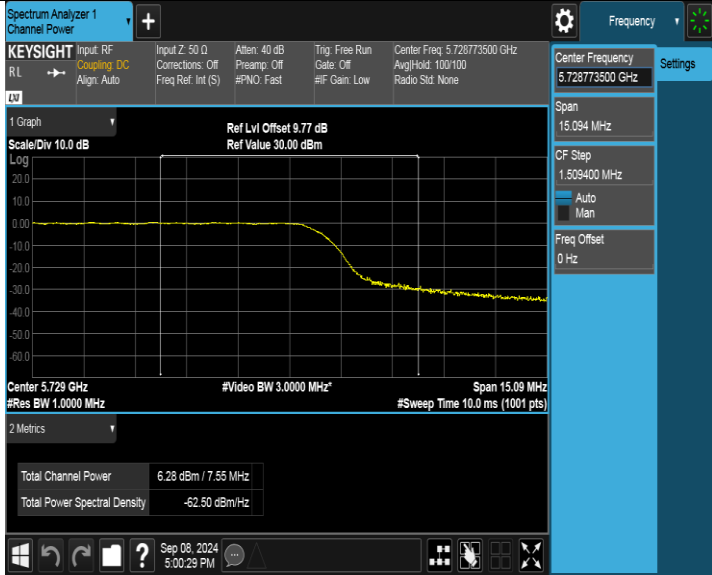
Test Mode	Test Channel	Verdict
11ax HE20	5320	PASS
		

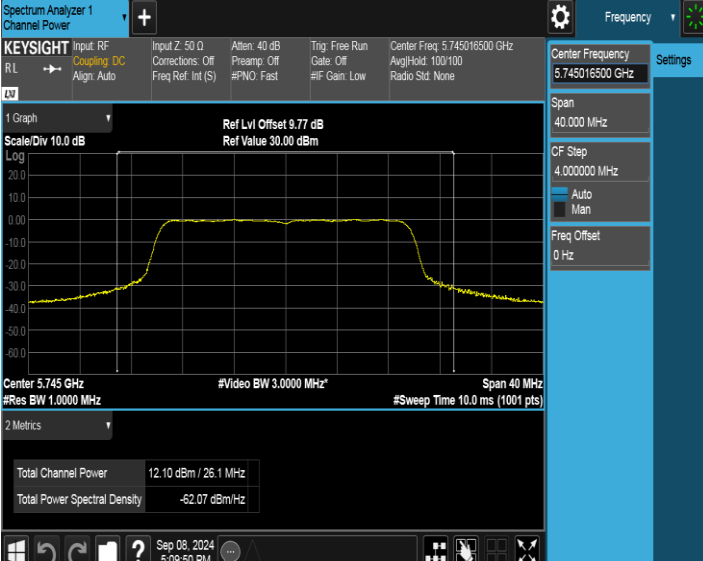
Test Mode	Test Channel	Verdict
11ax HE20	5500	PASS
		

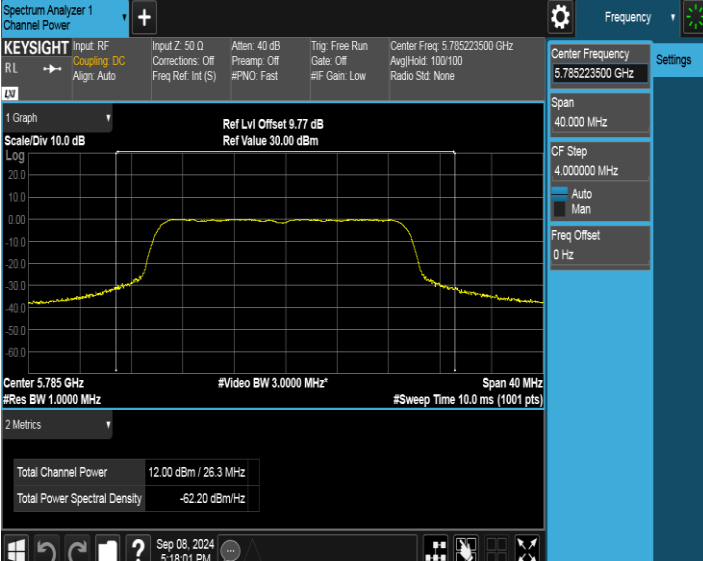
Test Mode	Test Channel	Verdict
11ax HE20	5580	PASS
		

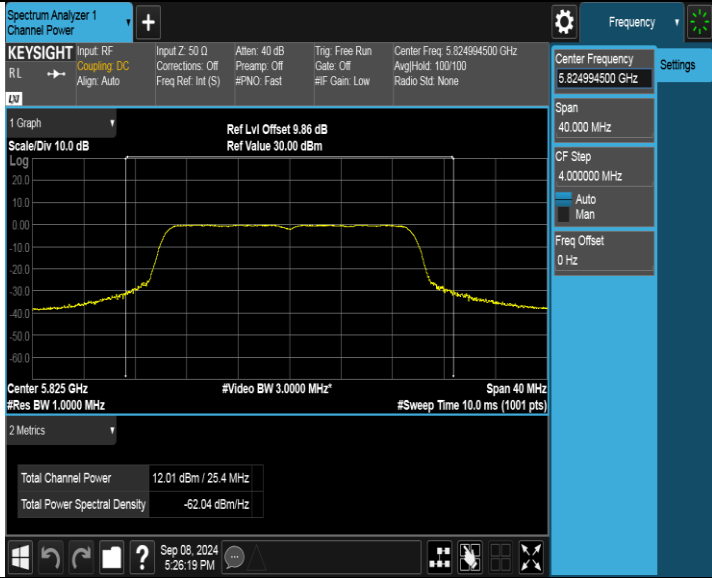
Test Mode	Test Channel	Verdict
11ax HE20	5700	PASS
		

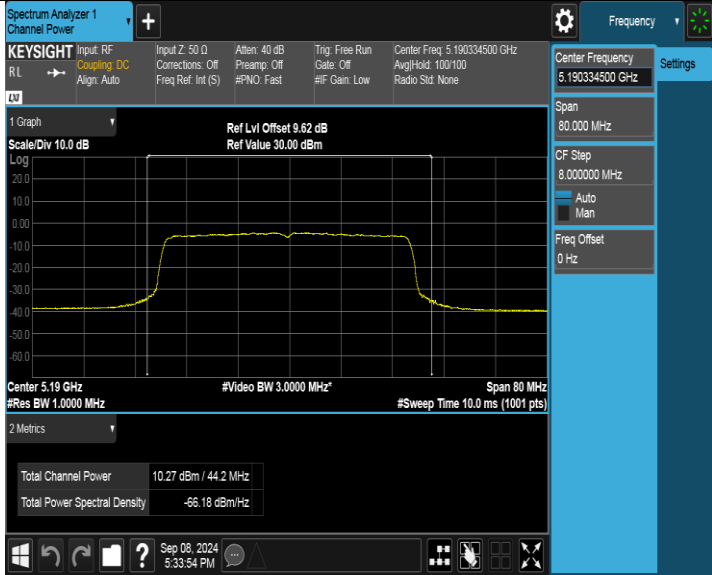
Test Mode	Test Channel	Verdict
11ax HE20	5720_UNII-2C	PASS
		

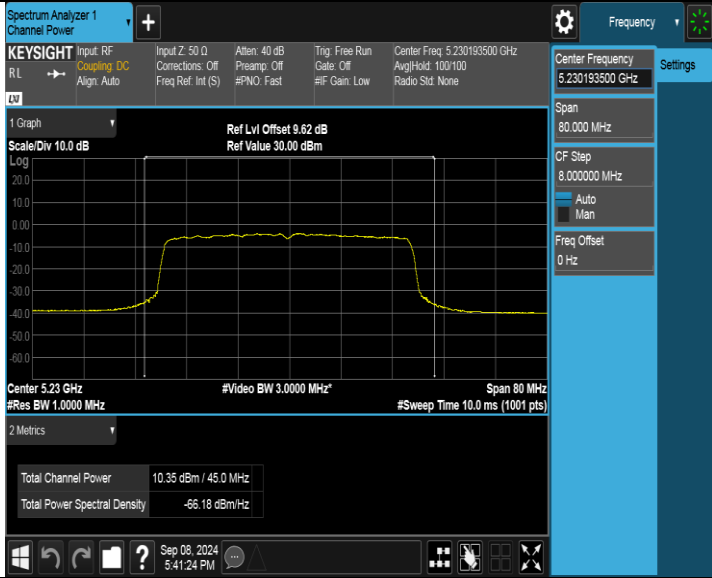
Test Mode	Test Channel	Verdict
11ax HE20	5720_UNII-3	PASS
		

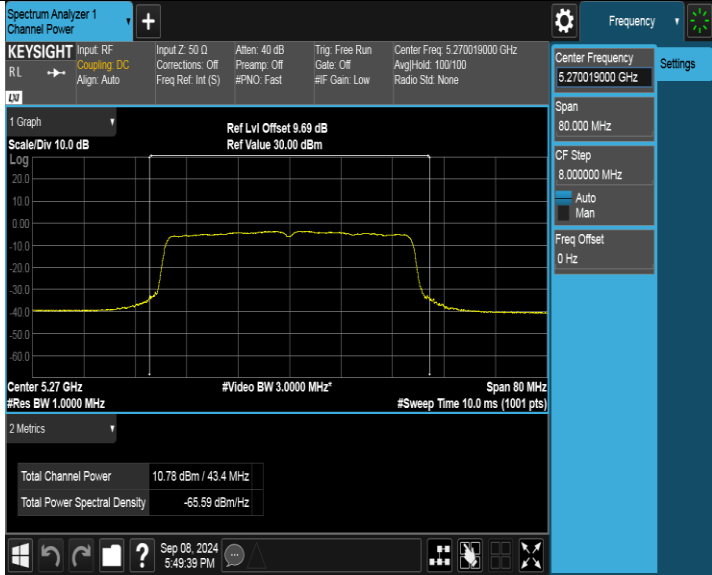
Test Mode	Test Channel	Verdict
11ax HE20	5745	PASS
		

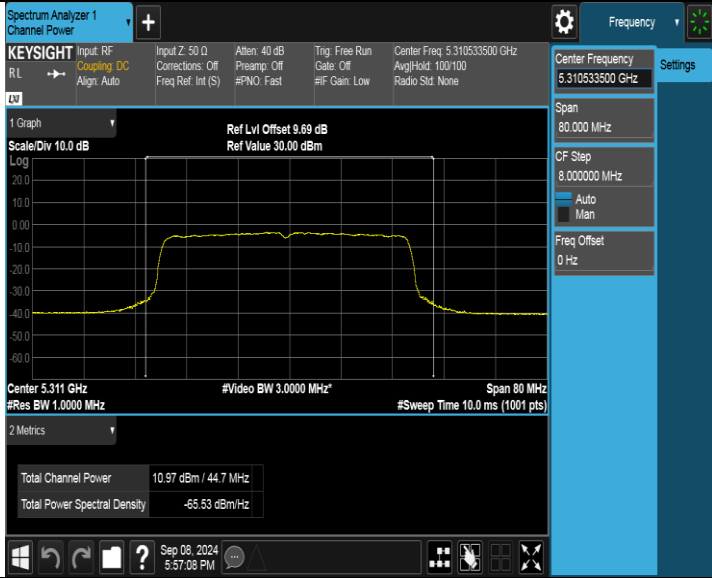
Test Mode	Test Channel	Verdict
11ax HE20	5785	PASS
		

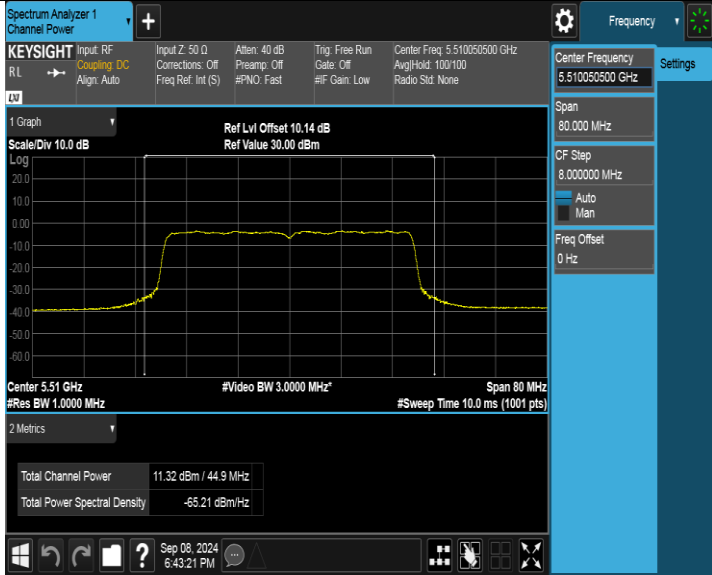
Test Mode	Test Channel	Verdict
11ax HE20	5825	PASS
		

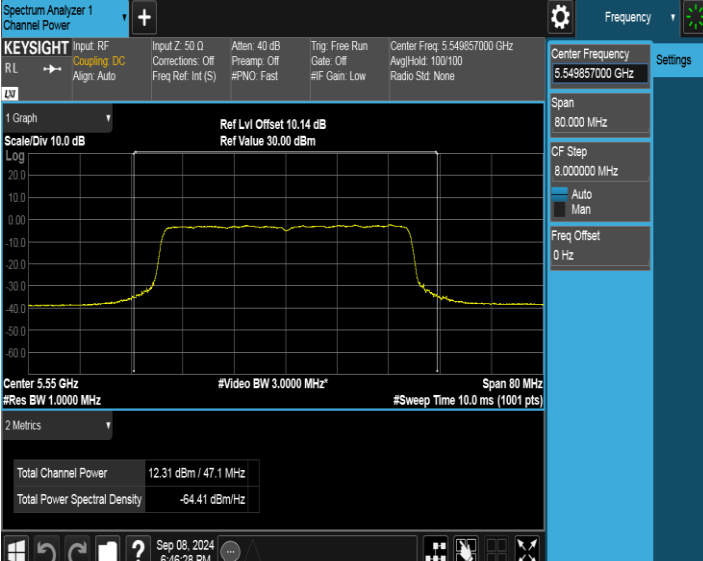
Test Mode	Test Channel	Verdict
11ax HE40	5190	PASS
		

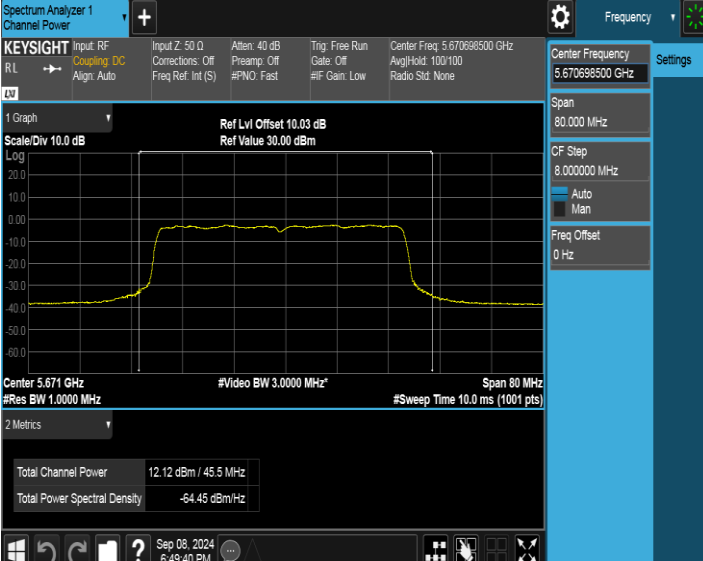
Test Mode	Test Channel	Verdict
11ax HE40	5230	PASS
		

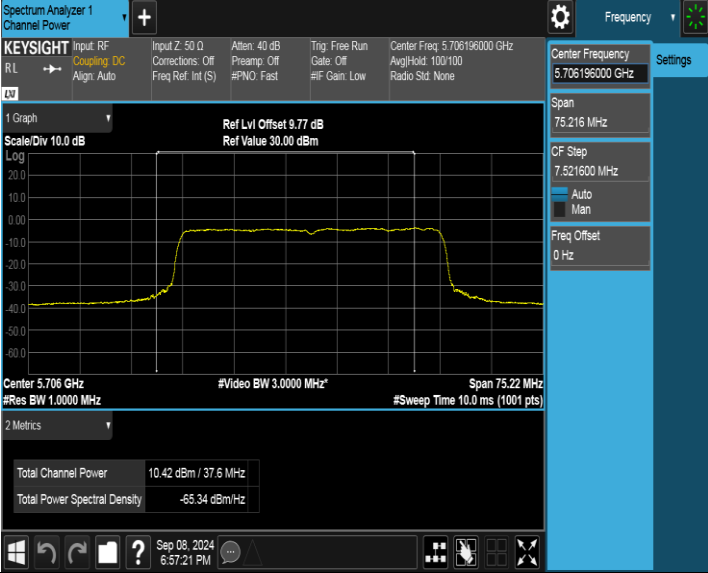
Test Mode	Test Channel	Verdict
11ax HE40	5270	PASS
		

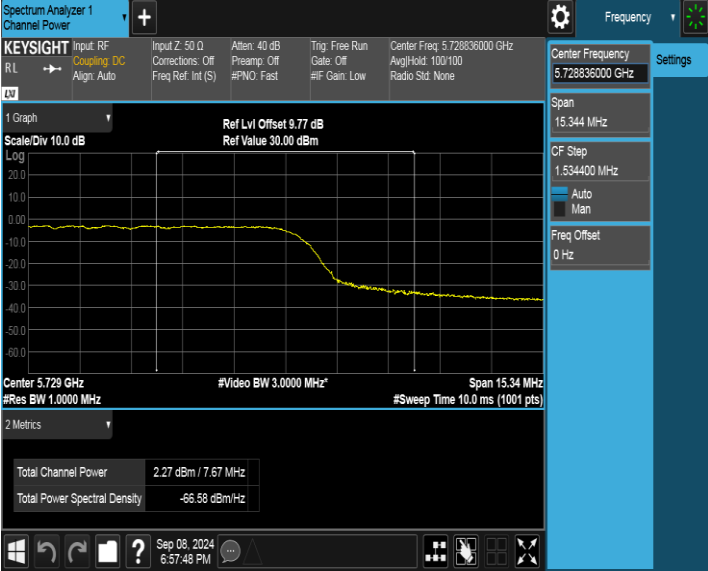
Test Mode	Test Channel	Verdict
11ax HE40	5310	PASS
		

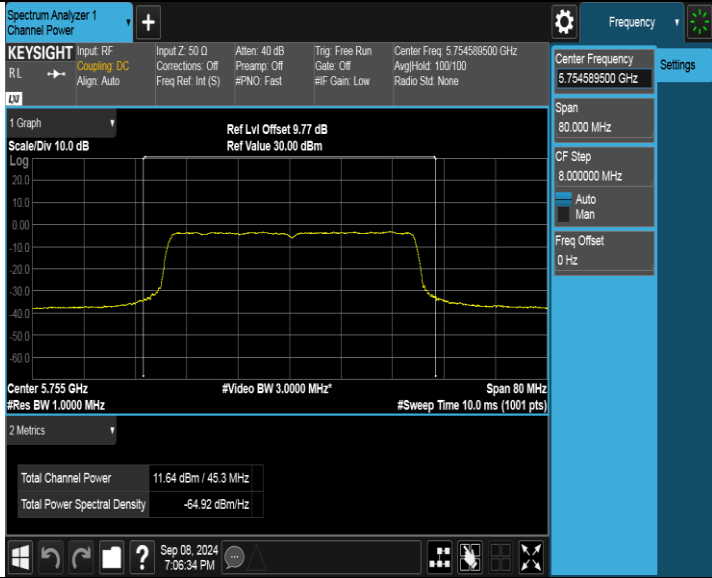
Test Mode	Test Channel	Verdict
11ax HE40	5510	PASS
		

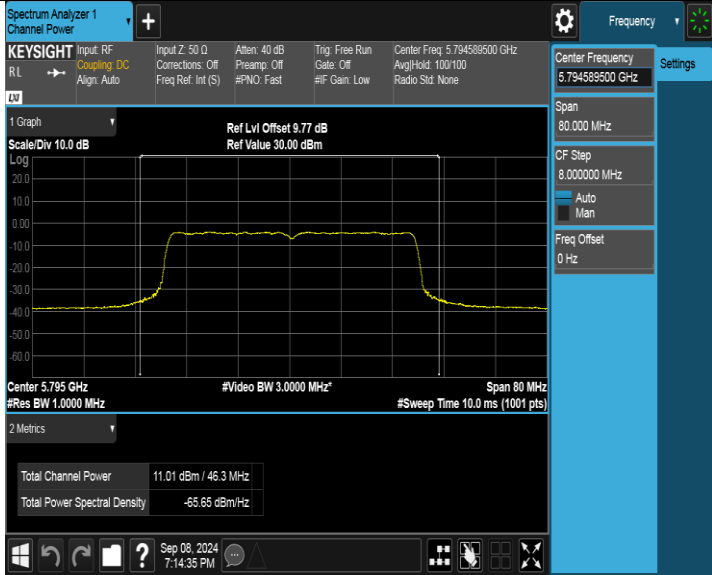
Test Mode	Test Channel	Verdict
11ax HE40	5550	PASS
		

Test Mode	Test Channel	Verdict
11ax HE40	5670	PASS
		

Test Mode	Test Channel	Verdict
11ax HE40	5710_UNII-2C	PASS
		

Test Mode	Test Channel	Verdict
11ax HE40	5710_UNII-3	PASS
		

Test Mode	Test Channel	Verdict
11ax HE40	5755	PASS
		

Test Mode	Test Channel	Verdict
11ax HE40	5795	PASS
		

6.4. POWER SPECTRAL DENSITY

LIMITS

CFR 47 FCC Part15, Subpart E		
Test Item	Limit	Frequency Range (MHz)
Power Spectral Density	<input type="checkbox"/> Outdoor Access Point: 17 dBm/MHz <input type="checkbox"/> Indoor Access Point: 17 dBm/MHz <input type="checkbox"/> Fixed Point-To-Point Access Points: 17 dBm/MHz <input checked="" type="checkbox"/> Client Devices: 11 dBm/MHz	5150 ~ 5250
	11 dBm/MHz	5250 ~ 5350 5470 ~ 5725
	30 dBm/500kHz	5725 ~ 5850

ISED RSS-247 ISSUE 3		
Test Item	Limit	Frequency Range (MHz)
Power Spectral Density	The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.	5150 ~ 5250
	The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.	5250 ~ 5350 5470 ~ 5600 5650 ~ 5725
	30 dBm / 500 kHz	5725 ~ 5850

Note:

The above limits are based upon the maximum antenna gain does not exceed 6 dBi.

If transmitting antennas of directional gain greater than 6 dBi are used, maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

Refer to KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 section II.F.

Connect the EUT to the spectrum analyser and use the following settings:

For U-NII-1, U-NII-2A and U-NII-2C band:

Center Frequency	The center frequency of the channel under test
Detector	RMS
RBW	1 MHz
VBW	$\geq 3 \times \text{RBW}$
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Trace	Max hold
Sweep time	Auto

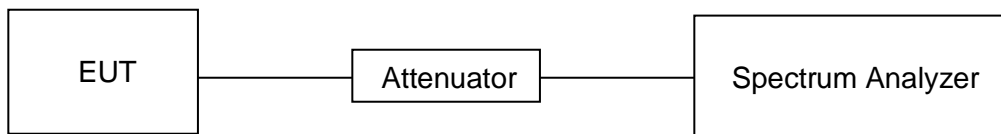
For U-NII-3:

Center Frequency	The center frequency of the channel under test
Detector	RMS
RBW	500 kHz
VBW	$\geq 3 \times \text{RBW}$
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Trace	Max hold
Sweep time	Auto

Allow trace to fully stabilize and Use the peak search function on the instrument to find the peak of the spectrum and record its value.

Add $10 \log (1/x)$, where x is the duty cycle, to the peak of the spectrum, the result is the Maximum PSD over 1 MHz / 500 kHz reference bandwidth.

TEST SETUP



TEST ENVIRONMENT

Environment Parameter	Selected Values During Tests
Relative Humidity	60%
Atmospheric Pressure:	101kPa
Temperature	22.2°C
Test Voltage	AC 120V
Test Date	08/18/2024 - 09/08/2024

RESULTS

Band 1 & Band 2:

Mode	Frequency	Measurement Value	Duty Cycle Correction Factor	PSD /MHz	FCC PSD Limit	ISED PSD Limit	Antenna Gain	EIRP PSD	ISED EIRP PSD Limit
	MHz	dBm	dB	dBm	dBm	dBm	dBi	dBm	dBm
11a	5180	0.61	0.34	0.95	11	/	3.40	4.35	10
	5200	-0.73	0.34	-0.39	11	/	3.40	3.01	10
	5240	-0.12	0.34	0.22	11	/	3.40	3.62	10
	5260	-0.02	0.34	0.32	11	11	3.40	3.72	/
	5280	0.53	0.34	0.87	11	11	3.40	4.27	/
	5320	0.61	0.34	0.95	11	11	3.40	4.35	/
	5500	2.22	0.34	2.56	11	11	3.40	5.96	/
	5580	0.50	0.34	0.84	11	11	3.40	4.24	/
	5700	1.45	0.34	1.79	11	11	3.40	5.19	/
	5720_ UNII-2C	1.48	0.34	1.82	11	11	3.40	5.22	/

Mode	Frequency	Measurement Value	Duty Cycle Correction Factor	PSD /MHz	FCC PSD Limit	ISED PSD Limit	Antenna Gain	EIRP PSD	ISED EIRP PSD Limit
	MHz	dBm	dB	dBm	dBm	dBm	dBi	dBm	dBm
11ac VHT20	5180	-0.96	0.23	-0.73	11	/	3.40	2.67	10
	5200	-0.88	0.23	-0.65	11	/	3.40	2.75	10
	5240	-0.21	0.23	0.02	11	/	3.40	3.42	10
	5260	0.60	0.23	0.83	11	11	3.40	4.23	/
	5280	0.45	0.23	0.68	11	11	3.40	4.08	/
	5320	0.32	0.23	0.55	11	11	3.40	3.95	/
	5500	1.34	0.23	1.57	11	11	3.40	4.97	/
	5580	0.51	0.23	0.74	11	11	3.40	4.14	/
	5700	1.86	0.23	2.09	11	11	3.40	5.49	/
	5720_ UNII-2C	1.00	0.23	1.23	11	11	3.40	4.63	/

Mode	Frequency	Measurement Value	Duty Cycle Correction Factor	PSD /MHz	FCC PSD Limit	ISED PSD Limit	Antenna Gain	EIRP PSD	ISED EIRP PSD Limit
	MHz	dBm	dB	dBm	dBm	dBm	dB	dBm	dBm
11ac VHT40	5190	-3.35	0.45	-2.90	11	/	3.40	0.50	10
	5230	-3.34	0.45	-2.89	11	/	3.40	0.51	10
	5270	-2.19	0.45	-1.74	11	/	3.40	1.66	/
	5310	-1.87	0.45	-1.42	11	11	3.40	1.98	/
	5510	-1.04	0.45	-0.59	11	11	3.40	2.81	/
	5550	-1.94	0.45	-1.49	11	11	3.40	1.91	/
	5670	-0.98	0.45	-0.53	11	11	3.40	2.87	/
	5710_ UNII-2C	-0.25	0.45	0.20	11	11	3.40	3.60	/

Mode	Frequency	Measurement Value	Duty Cycle Correction Factor	PSD /MHz	FCC PSD Limit	ISED PSD Limit	Antenna Gain	EIRP PSD	ISED EIRP PSD Limit
	MHz	dBm	dB	dBm	dBm	dBm	dB	dBm	dBm
11ax HE20	5180	-0.26	0.29	0.03	11	/	3.40	3.43	10
	5200	-0.07	0.29	0.22	11	/	3.40	3.62	10
	5240	-0.17	0.29	0.12	11	/	3.40	3.52	10
	5260	0.10	0.29	0.39	11	11	3.40	3.79	/
	5280	0.44	0.29	0.73	11	11	3.40	4.13	/
	5320	0.82	0.29	1.11	11	11	3.40	4.51	/
	5500	2.15	0.29	2.44	11	11	3.40	5.84	/
	5580	0.53	0.29	0.82	11	11	3.40	4.22	/
	5700	1.87	0.09	1.96	11	11	3.40	5.36	/
	5720_ UNII-2C	1.35	0.29	1.64	11	11	3.40	5.04	/

Mode	Frequency	Measurement Value	Duty Cycle Correction Factor	PSD /MHz	FCC PSD Limit	ISED PSD Limit	Antenna Gain	EIRP PSD	ISED EIRP PSD Limit
	MHz	dBm	dB	dBm	dBm	dBm	dBi	dBm	dBm
11ax HE40	5190	-2.69	0.54	-2.15	11	/	3.40	1.25	10
	5230	-2.69	0.54	-2.15	11	/	3.40	1.25	10
	5270	-2.15	0.54	-1.61	11	/	3.40	1.79	/
	5310	-1.85	0.54	-1.31	11	11	3.40	2.09	/
	5510	0.03	0.54	0.57	11	11	3.40	3.97	/
	5550	-2.29	0.54	-1.75	11	11	3.40	1.65	/
	5670	-1.69	0.54	-1.15	11	11	3.40	2.25	/
	5710_UNII-2C	-1.27	0.54	-0.73	11	11	3.40	2.67	/

Band 3:

Mode	Frequency	Measurement Value	Duty Cycle Correction Factor	PSD/300 kHz	Correct Factor	PSD/500 kHz	Limit
	MHz	dBm	dBm	dBm	dB	dBm	dBm
11a	5720_UNII-3	-1.37	0.34	-1.03	3.40	2.37	30
	5745	-1.82	0.34	-1.48	3.40	1.92	30
	5785	-2.22	0.34	-1.88	3.40	1.52	30
	5825	-2.18	0.34	-1.84	3.40	1.56	30

Mode	Frequency	Measurement Value	Duty Cycle Correction Factor	PSD/300 kHz	Correct Factor	PSD/500 kHz	Limit
	MHz	dBm	dBm	dBm	dB	dBm	dBm
11ac VHT20	5720_UNII-3	-1.67	0.23	-1.44	3.40	1.96	30
	5745	-1.86	0.23	-1.63	3.40	1.77	30
	5785	-1.82	0.23	-1.59	3.40	1.81	30
	5825	-1.70	0.23	-1.47	3.40	1.93	30

Mode	Frequency	Measurement Value	Duty Cycle Correction Factor	PSD/300 kHz	Correct Factor	PSD/500 kHz	Limit
	MHz	dBm	dBm	dBm	dB	dBm	dBm
11ac VHT40	5710_UNII-3	-2.86	0.45	-2.41	3.40	0.99	30
	5755	-3.21	0.45	-2.76	3.40	0.64	30
	5795	-3.43	0.45	-2.98	3.40	0.42	30

Mode	Frequency	Measurement Value	Duty Cycle Correction Factor	PSD/300 kHz	Correct Factor	PSD/500 kHz	Limit
	MHz	dBm	dBm	dBm	dB	dBm	dBm
11ax HE20	5720_UNII-3	-1.51	0.29	-1.22	3.40	2.18	30
	5745	-1.55	0.29	-1.26	3.40	2.14	30
	5785	-1.65	0.29	-1.36	3.40	2.04	30
	5825	-1.65	0.29	-1.36	3.40	2.04	30

Mode	Frequency	Measurement Value	Duty Cycle Correction Factor	PSD/300 kHz	Correct Factor	PSD/500 kHz	Limit
	MHz	dBm	dBm	dBm	dB	dBm	dBm
11ax HE40	5710_UNII-3	-4.42	0.54	-3.88	3.40	-0.48	30
	5755	-4.50	0.54	-3.96	3.40	-0.56	30
	5795	-3.90	0.54	-3.36	3.40	0.04	30

Note:

1. The Result and Limit Unit is dBm/500 kHz in the band 5.725 - 5.85 GHz.
2. $\text{PSD/500 kHz} = 10 \cdot \log \left(10^{\left(\frac{\text{PSD/300 kHz}}{10} \right) / 300 \cdot 500} \right)$
 $= \text{PSD/300 kHz} + 2.2 \text{ dB}$