



Emission Bandwidth Measurement_11N20_ CH157 pectrum Analyzer 1 ccupied BW Ö Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) Trig: Free Run Gate: Off #IF Gain: Low Center Freq: 5.785000000 GHz KEYSIGHT Input RF Settings 5.785000000 GHz L)XI Ref LvI Offset 9.79 dB 40.000 MHz Scale/Div 10.0 dB CF Step 4.000000 MHz Auto Man Freq Offset 0 Hz Span 40 MHz Center 5.785 GHz #Res BW 100.00 kHz #Video BW 300,00 kHz Sweep Time 4.27 ms (8001 pts) 2 Metrics Occupied Bandwidth 17.674 MHz Total Power 13.6 dBm % of OBW Power -12.767 kHz 17.32 MHz 99.00 % -6.00 dB Transmit Freq Error x dB Bandwidth x dB 7 Jul 24, 2020 10:16:33 AM # ₩ Emission Bandwidth Measurement_11N20_ CH165 Ö put: RF Input Z: 50 Ω oupling: DC Corrections: Off ign: Auto/No RF Freq Ref: Int (S) Trig: Free Run Gate: Off #IF Gain: Low Center Freq: 5.825000000 GHz KEYSIGHT Input RF Center Frequency Avg|Hold: 10/10 Radio Std: None 5.825000000 GHz LXI 1 Graph 40.000 MHz Ref Lvl Offset 9.67 dB Ref Value 30.00 dBm Scale/Div 10.0 dB CF Step 4.000000 MHz Auto Man Freq Offset enter 5.825 GHz #Video BW 300.00 kHz Span 40 MHz #Res BW 100.00 kHz Sweep Time 4.27 ms (8001 pts) Occupied Bandwidth 17.710 MHz Total Power 13.7 dBm Transmit Freq Error -26.679 kHz % of OBW Power -6.00 dB x dB Bandwidth 17.56 MHz x dB # 1



5.6. MAXIMUM AVERAGE CONDUCTED OUTPUT POWER

LIMITS

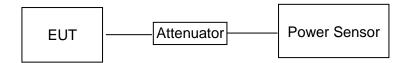
	CFR 47 FCC Part15, Subpart E							
Test Item	Limit	Frequency Range (MHz)						
	250mW (24dBm)	5150-5250						
Conducted Output	250mW (24dBm)	5250-5350						
Power	250mW (24dBm)	5470-5725						
	1 Watt (30dBm)	5725-5850						

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

TEST PROCEDURE

Refer to KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Connect the EUT to the a broadband average(RMS) RF power meter, the power meter shall have a video bandwidth that is greater than or equal to the bandwidth and shall utilize a fast-responding diode detector.

TEST SETUP



TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V



RESULTS

KESULIS	<u> </u>							
Test Mode	Test Channel	Ant	Level [dBm]	10log(1/x) Factor [dB]	Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
11A	36	Ant1	15.40	0.08	15.48	19.06	24	PASS
IIA	30	Ant2	14.66	0.08	14.74	18.32	24	PASS
11A	40	Ant1	14.97	0.08	15.05	18.63	24	PASS
HA	40	Ant2	14.54	0.08	14.62	18.2	24	PASS
11A	48	Ant1	15.02	0.08	15.1	18.68	24	PASS
IIA	40	Ant2	14.58	0.08	14.66	18.24	24	PASS
11A	52	Ant1	15.26	0.08	15.34	18.92	24	PASS
IIA	52	Ant2	15.02	0.08	15.1	18.68	24	PASS
11A	56	Ant1	15.33	0.08	15.41	18.99	24	PASS
IIA	36	Ant2	15.52	0.08	15.6	19.18	24	PASS
11A	64	Ant1	15.63	0.08	15.71	19.29	24	PASS
IIA	64	Ant2	15.79	0.08	15.87	19.45	24	PASS
11A	100	Ant1	14.68	0.08	14.76	18.34	24	PASS
IIA		Ant2	14.69	0.08	14.77	18.35	24	PASS
11 /	116	Ant1	14.26	0.08	14.34	17.92	24	PASS
11A		Ant2	14.05	0.08	14.13	17.71	24	PASS
11A	1.10	Ant1	14.19	0.08	14.27	17.85	24	PASS
IIA	140	Ant2	14.19	0.08	14.27	17.85	24	PASS
11A	149	Ant1	14.52	0.08	14.6	18.18	30	PASS
IIA	149	Ant2	14.43	0.08	14.51	18.09	30	PASS
11A	157	Ant1	14.16	0.08	14.24	17.82	30	PASS
IIA	157	Ant2	13.91	0.08	13.99	17.57	30	PASS
110	165	Ant1	14.63	0.08	14.71	18.29	30	PASS
11A	165	Ant2	14.09	0.08	14.17	17.75	30	PASS
111120	36	Ant1	14.84	0.09	14.93	18.51	24	PASS
11N20	36	Ant2	14.00	0.09	14.09	17.67	24	PASS
111120	40	Ant1	14.32	0.09	14.41	17.99	24	PASS
11N20	40	Ant2	14.30	0.09	14.39	17.97	24	PASS
111100	40	Ant1	14.07	0.09	14.16	17.74	24	PASS
11N20	48	Ant2	14.29	0.09	14.38	17.96	24	PASS
11N20	52	Ant1	14.85	0.09	14.94	18.52	24	PASS



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							. age	<u> </u>
		Ant2	14.84	0.09	14.93	18.51	24	PASS
111100	50	Ant1	15.14	0.09	15.23	18.81	24	PASS
11N20	56	Ant2	15.41	0.09	15.5	19.08	24	PASS
11N20	64	Ant1	15.32	0.09	15.41	18.99	24	PASS
1111/20	04	Ant2	15.81	0.09	15.9	19.48	24	PASS
11N20	100	Ant1	15.32	0.09	15.41	18.99	24	PASS
1111/20	100	Ant2	14.86	0.09	14.95	18.53	24	PASS
11N20	116	Ant1	15.14	0.09	15.23	18.81	24	PASS
1111/20		Ant2	14.74	0.09	14.83	18.41	24	PASS
111120	140	Ant1	14.40	0.09	14.49	18.07	24	PASS
11N20		Ant2	14.15	0.09	14.24	17.82	24	PASS
11N20	1.40	Ant1	14.61	0.09	14.70	18.28	30	PASS
1111/20	149	Ant2	13.76	0.09	13.85	17.43	30	PASS
11N20	157	Ant1	13.95	0.09	14.04	17.62	30	PASS
TINZU		Ant2	13.32	0.09	13.41	16.99	30	PASS
11N20	165	Ant1	14.24	0.09	14.33	17.91	30	PASS
11N20	165	Ant2	13.38	0.09	13.47	17.05	30	PASS

NOTE: 1.EIRP= Maximum Conducted Output Power + ANT GAIN

- 2. Maximum Conducted Output Power= Conducted Output Power+ Correction Factor
- 3. About correction Factor please refer to section 6.1
- 4. Remark: For this product, it has two antennas, antenna1 and antenna2, but the ant1 and ant2 can't transmitter at the same time under all test modes. That's this product not support MIMO function, just support diversity function.



5.7. POWER SPECTRAL DENSITY

LIMITS

CFR 47 FCC Part15, Subpart E ISED RSS-247							
Test Item	Limit	Frequency Range (MHz)					
	Other than Mobile and portable:17dBm/MHz Mobile and portable:11dBm/MHz	5150-5250					
Power Spectral	11dBm/MHz	5250-5350					
Density	11dBm/MHz	5470-5725					
	30dBm/500kHz	5725-5850					

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

TEST PROCEDURE

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

For U-NII-1.:

1 01 0 1 111 1,.	
Center Frequency	The center frequency of the channel under test
Detector	RMS
RBW	1MHz
VBW	≥3 × 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	300KHz
VBW	≥3 × RBW
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Trace	Max hold



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Sweep time	Auto
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Note:

- 1. For UNII-3, according to KDB publication 789033 D02 General UNII Test Procedures New Rules v01, section II.F.5., it is acceptable to set RBW at 1MHz and VBW at 3MHz if the spectrum analyzer does not have 500kHz RBW.
- 2. Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.

TEST SETUP





TEST RESULTS TABLE

Test Mode	Test Channel	Ant	Level [dBm]	10log(1/x) Factor [dB]	PSD [dBm/MHz]	Limit [dBm/MHz]	Verdict
11A	36	Ant1	6.94	0.08	7.02	17	PASS
	30	Ant2	6.44	0.08	6.52	17	PASS
11A	40	Ant1	6.86	0.08	6.94	17	PASS
IIA	40	Ant2	6.37	0.08	6.45	17	PASS
11A	48	Ant1	6.84	0.08	6.92	17	PASS
IIA	40	Ant2	6.44	0.08	6.52	17	PASS
11A	52	Ant1	7.05	0.08	7.13	11	PASS
IIA	32	Ant2	6.88	0.08	6.96	11	PASS
11A	56	Ant1	7.37	0.08	7.45	11	PASS
IIA	56	Ant2	7.42	0.08	7.50	11	PASS
11A	64	Ant1	7.70	0.08	7.78	11	PASS
IIA	64	Ant2	7.81	0.08	7.89	11	PASS
11A	100	Ant1	6.92	0.08	7.00	11	PASS
IIA		Ant2	6.16	0.08	6.24	11	PASS
11A	116	Ant1	6.82	0.08	6.9	11	PASS
IIA		Ant2	6.23	0.08	6.31	11	PASS
11A	140	Ant1	6.07	0.08	6.15	11	PASS
IIA		Ant2	5.94	0.08	6.02	11	PASS
11A	149	Ant1	2.91	0.08	2.99	30	PASS
IIA		Ant2	2.64	0.08	2.72	30	PASS
11A	157	Ant1	2.48	0.08	2.56	30	PASS
IIA	157	Ant2	2.42	0.08	2.50	30	PASS
11A	165	Ant1	3.03	0.08	3.11	30	PASS
IIA	100	Ant2	2.45	0.08	2.53	30	PASS
11N20	36	Ant1	6.46	0.09	6.55	17	PASS
111120	30	Ant2	5.92	0.09	6.01	17	PASS
11N20	40	Ant1	6.46	0.09	6.55	17	PASS
TINZU	40	Ant2	6.11	0.09	6.20	17	PASS
11N20	48	Ant1	6.21	0.09	6.30	17	PASS
TINZU	48	Ant2	6.11	0.09	6.20	17	PASS
11N20	52	Ant1	6.50	0.09	6.59	11	PASS



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		Ant2	7.28	0.09	7.37	11	PASS
44N20 50	56	Ant1	7.27	0.09	7.36	11	PASS
11N20	50	Ant2	7.77	0.09	7.86	11	PASS
11N20	64	Ant1	7.30	0.09	7.39	11	PASS
TINZU	04	Ant2	7.92	0.09	8.01	11	PASS
111120	100	Ant1	7.79	0.09	7.88	11	PASS
11N20	100	Ant2	6.64	0.09	6.73	11	PASS
11N20	440	Ant1	7.13	0.09	7.22	11	PASS
TINZU	116	Ant2	7.31	0.09	7.40	11	PASS
111120	140	Ant1	6.82	0.09	6.91	11	PASS
11N20	140	Ant2	6.02	0.09	6.11	11	PASS
11N20	149	Ant1	3.52	0.09	3.61	30	PASS
TINZU	149	Ant2	2.82	0.09	2.91	30	PASS
111120	157	Ant1	2.66	0.09	2.75	30	PASS
11N20	157	Ant2	2.25	0.09	2.34	30	PASS
11N20	165	Ant1	2.78	0.09	2.87	30	PASS
IIINZU	165	Ant2	2.14	0.09	2.23	30	PASS

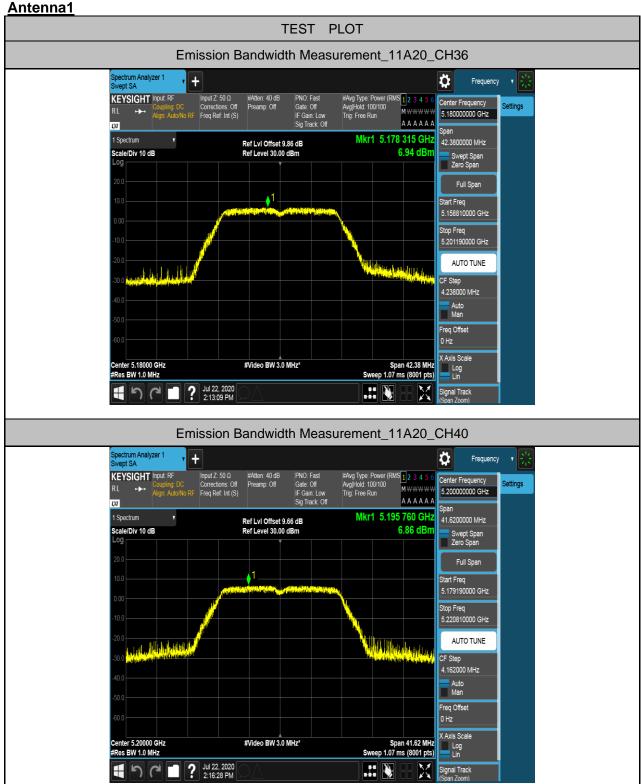
Remark:

- 1. About correction Factor please refer to section 6.1.
- 2. Remark: For this product, it has two antennas, antenna1 and antenna2, but the ant1 and ant2 can't transmitter at the same time under all test modes. That's this product not support MIMO function, just support diversity function.



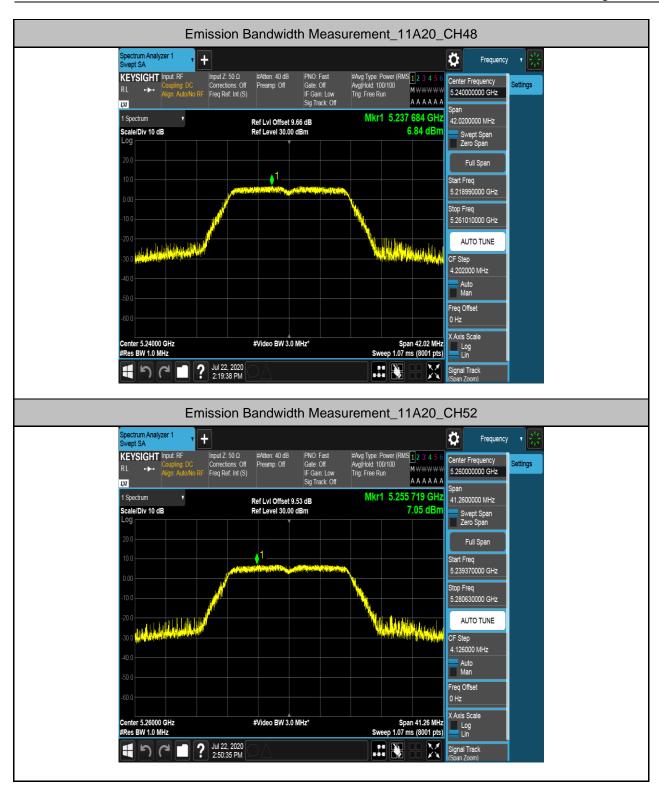
Test Graphs





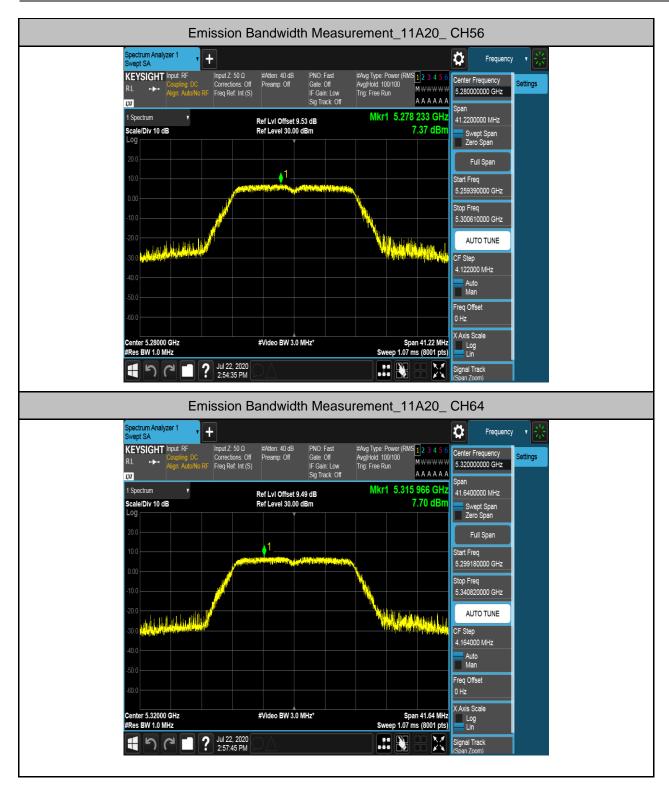


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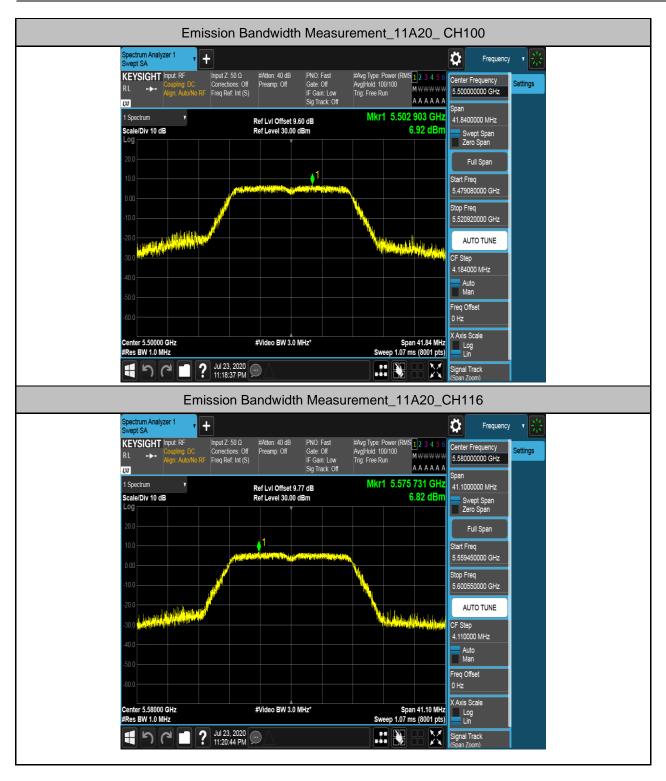


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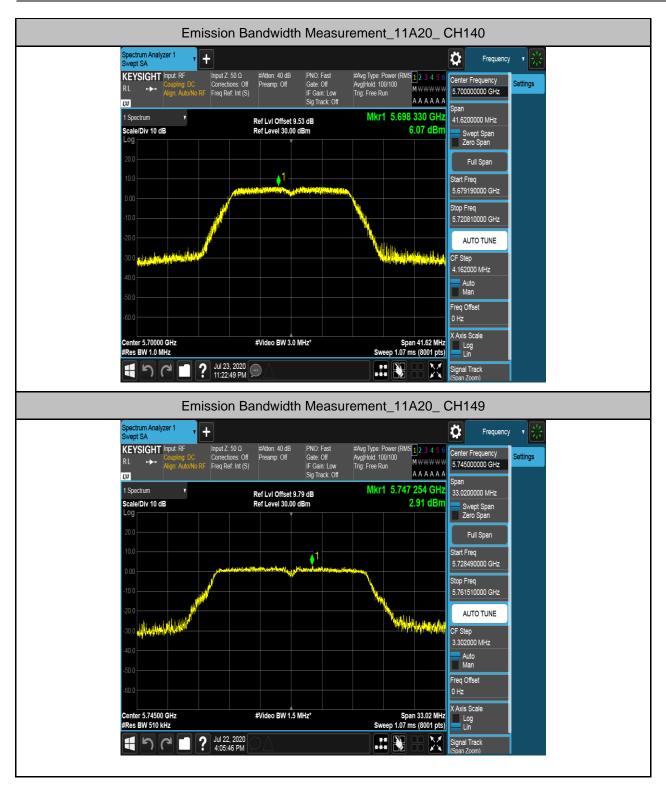


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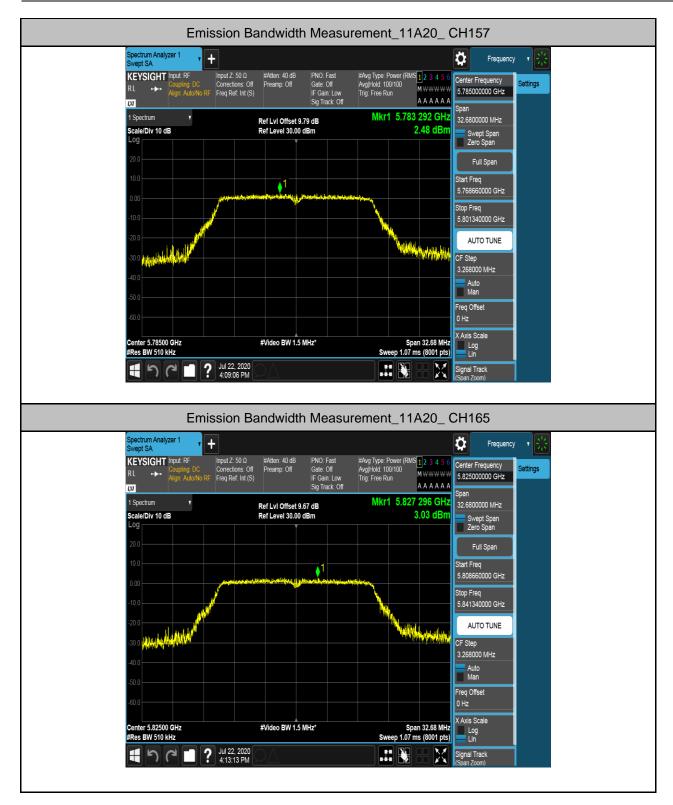


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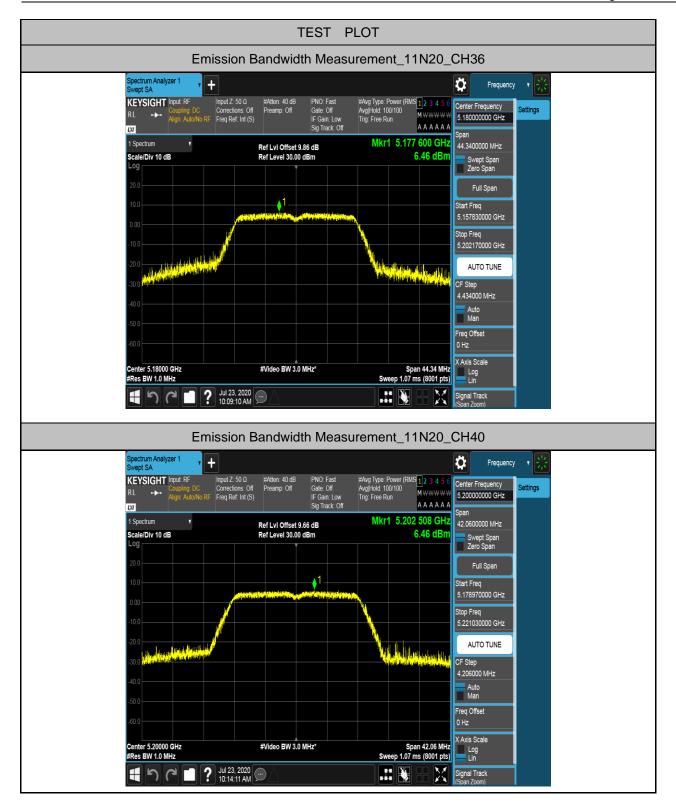


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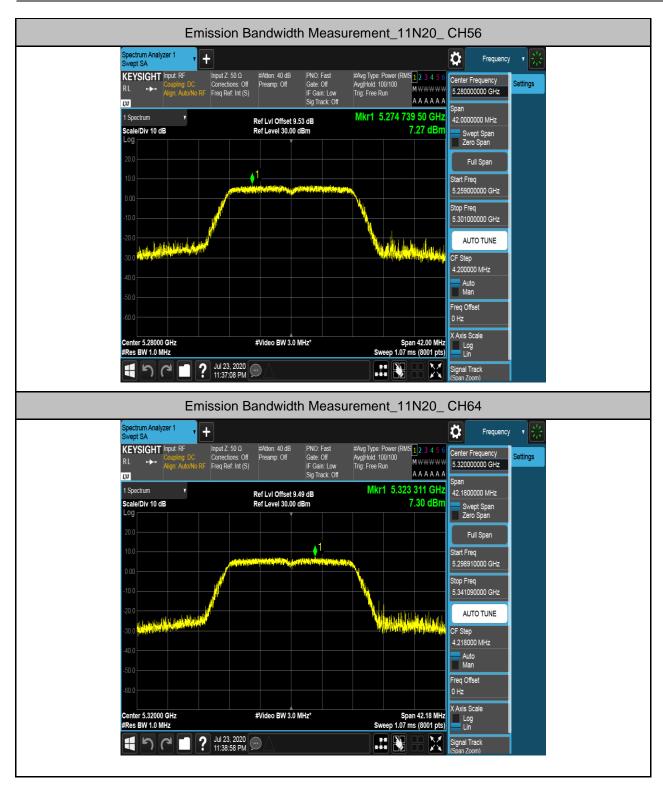




Emission Bandwidth Measurement_11N20_CH48 pectrum Analyzer 1 wept SA ø Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) PNO: Fast Gate: Off IF Gain: Low Sig Track: Off #Avg Type: Power (RMS 1 2 3 4 5 Avg|Hold: 100/100 Trig. Free Run KEYSIGHT Input RF Center Frequency Settings 5.240000000 GHz AAAAAA ĻXI Mkr1 5.245 404 GHz 1 Spectrum Ref LvI Offset 9.66 dB 42.3000000 MHz 6.21 dBn Scale/Div 10 dB Ref Level 30.00 dBm Full Span Start Freq 5.218850000 GHz 5.261150000 GHz AUTO TUNE 4.230000 MHz Auto Man Freq Offset #Video BW 3.0 MHz* Span 42.30 MHz Log Lin #Res BW 1.0 MHz Sweep 1.07 ms (8001 pts) Emission Bandwidth Measurement_11N20_CH52 oectrum Analyzer 1 vept SA Ö #Avg Type: Power (RMS 1 2 3 4 5 6 Avg|Hold: 100/100 Trig: Free Run Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) PNO: Fast Gate: Off IF Gain: Low Sig Track: Off KEYSIGHT Input RF Center Frequency Settings 5.260000000 GHz AAAAAA LXI Mkr1 5.258 191 GHz Ref LvI Offset 9.53 dB Ref Level 30.00 dBm 42.8200000 MHz 6.50 dBn Scale/Div 10 dB Swept Span Zero Span Full Span 5.238590000 GHz Stop Freq 5.281410000 GHz AUTO TUNE 4.282000 MHz Freq Offset X Axis Scale Span 42.82 MHz Sweep 1.07 ms (8001 pts) #Video BW 3.0 MHz* enter 5.26000 GHz #Res BW 1.0 MHz **?** Jul 23, 2020 11:35:07 PM



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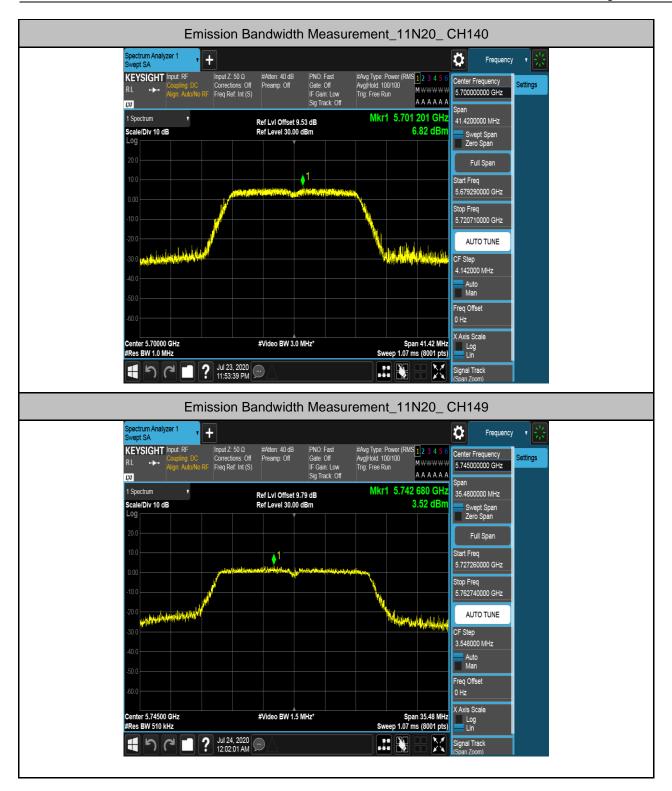




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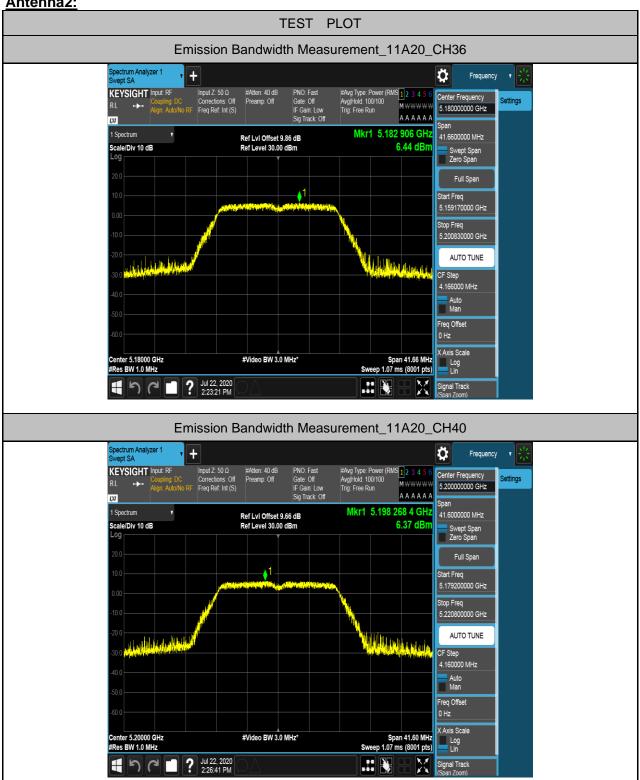




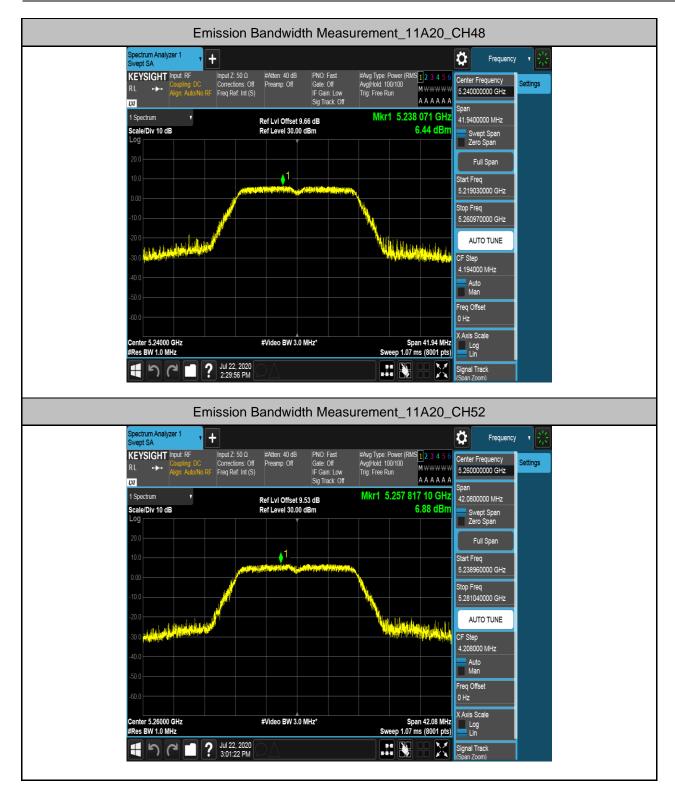




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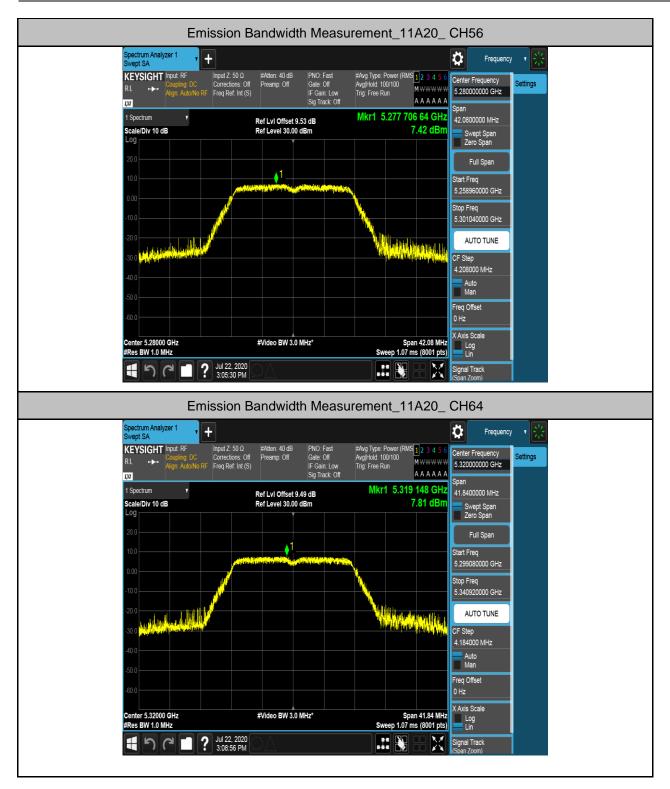






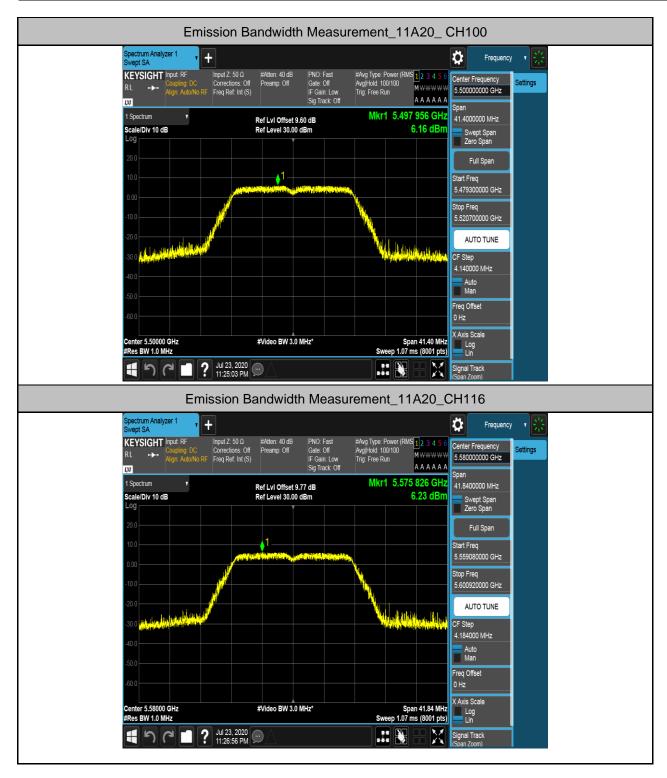


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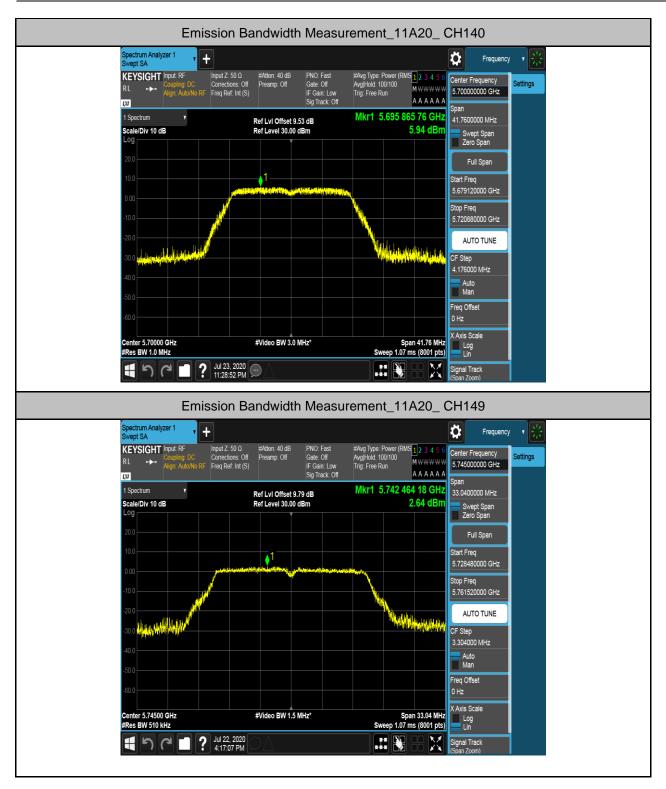


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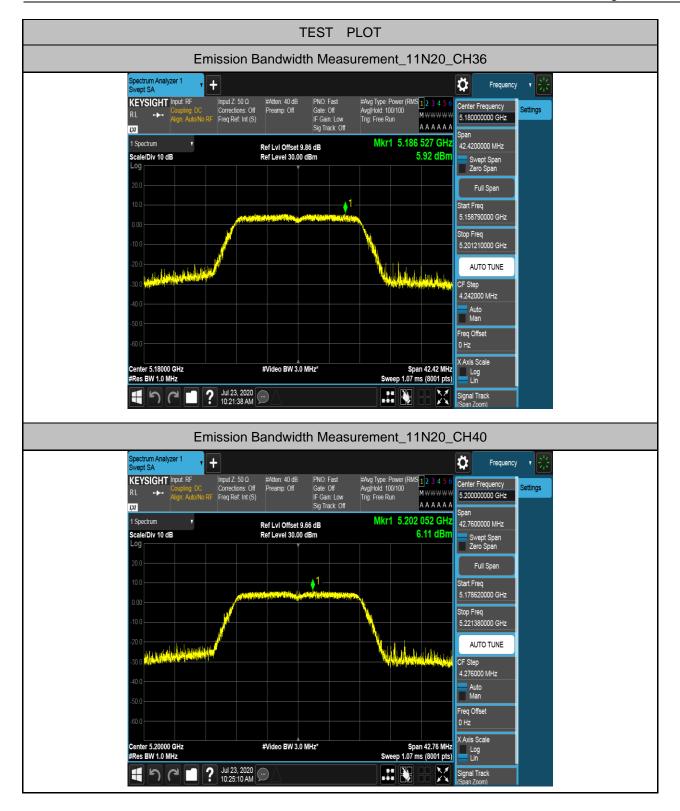








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Emission Bandwidth Measurement_11N20_CH48 pectrum Analyzer 1 wept SA ø Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) PNO: Fast Gate: Off IF Gain: Low Sig Track: Off #Avg Type: Power (RMS 1 2 3 4 5 Avg|Hold: 100/100 Trig. Free Run KEYSIGHT Input RF Center Frequency Settings 5.240000000 GHz AAAAAA ĻXI Mkr1 5.243 664 GHz 1 Spectrum Ref LvI Offset 9.66 dB 41.7000000 MHz Scale/Div 10 dB Ref Level 30.00 dBm 6.11 dBn Full Span 5.219150000 GHz Stop Freq 5.260850000 GHz AUTO TUNE 4.170000 MHz Auto Man Freq Offset #Video BW 3.0 MHz* Span 41.70 MHz Log Lin #Res BW 1.0 MHz Sweep 1.07 ms (8001 pts) Emission Bandwidth Measurement_11N20_CH52 oectrum Analyzer 1 vept SA Ö #Avg Type: Power (RMS 1 2 3 4 5 6 Avg|Hold: 100/100 Trig: Free Run Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) PNO: Fast Gate: Off IF Gain: Low Sig Track: Off KEYSIGHT Input RF Center Frequency Settings 5.260000000 GHz AAAAAA LXI Mkr1 5.261 812 GHz 43.4000000 MHz Ref LvI Offset 9.53 dB Ref Level 30.00 dBm 7.28 dBr Scale/Div 10 dB Swept Span Zero Span Full Span 5.238300000 GHz Stop Freq 5.281700000 GHz AUTO TUNE 4.340000 MHz Freq Offset X Axis Scale #Video BW 3.0 MHz* Span 43.40 MHz Sweep 1.07 ms (8001 pts) enter 5.26000 GHz #Res BW 1.0 MHz **?** Jul 23, 2020 # 1



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