

APPENDIX A – TEST DATA OF CONDUCTED EMISSION

Output Power Result

In order to find the worst case condition, Pre-tests are needed at the presence of different data rate. Data rate below means worst-case rate of each test item.

Worst-case data rates are shown as following table.

Test Mode	Data Rate
802.11a	6Mbps
802.11n HT20	MCS0(6.5 Mbps)
802.11n HT40	MCS0(13.5 Mbps)
802.11ac VHT20	MCS0(6.5 Mbps)
802.11ac VHT40	MCS0(13.5 Mbps)
802.11ac VHT80	MCS0(29.3 Mbps)

Duty Cycle Result

Mode	Duty Cycle (%)	Correction Factor(dB)
802.11a	96.83	0.140
802.11n HT20	96.62	0.149
802.11n HT40	93.03	0.314
802.11ac VHT20	96.68	0.147
802.11ac VHT40	93.13	0.309
802.11ac VHT80	87.92	0.559

Correction factor = $10 \times \log (1/\text{duty cycle})$

Output Power

Band	Test Mode	Frequency (MHz)	Average Power (dBm)	Limit(dBm)
U-NII-1	802.11a	5180	13.57	24.0
	802.11a	5200	13.61	24.0
	802.11a	5240	13.53	24.0
	802.11n HT20	5180	13.17	24.0
	802.11n HT20	5200	13.60	24.0
	802.11n HT20	5240	13.63	24.0
	802.11n HT40	5190	12.68	24.0
	802.11n HT40	5230	12.63	24.0
	802.11ac VHT20	5180	13.45	24.0
	802.11ac VHT20	5200	13.62	24.0
	802.11ac VHT20	5240	13.51	24.0
	802.11ac VHT40	5190	12.76	24.0
	802.11ac VHT40	5230	12.80	24.0
	802.11ac VHT80	5210	12.03	24.0
U-NII-2A	802.11a	5260	13.41	24.0
	802.11a	5300	13.30	24.0
	802.11a	5320	13.12	24.0
	802.11n HT20	5260	13.17	24.0
	802.11n HT20	5300	13.22	24.0
	802.11n HT20	5320	12.93	24.0
	802.11n HT40	5270	12.37	24.0
	802.11n HT40	5310	12.31	24.0
	802.11ac VHT20	5260	13.62	24.0
	802.11ac VHT20	5300	13.17	24.0
	802.11ac VHT20	5320	13.23	24.0
	802.11ac VHT40	5270	12.37	24.0
	802.11ac VHT40	5310	12.21	24.0
	802.11ac VHT80	5290	11.34	24.0

Band	Test Mode	Frequency (MHz)	Average Power (dBm)	Limit(dBm)
U-NII-2C	802.11a	5500	12.40	24.0
	802.11a	5580	13.12	24.0
	802.11a	5700	12.29	24.0
	802.11n HT20	5500	12.29	24.0
	802.11n HT20	5580	12.91	24.0
	802.11n HT20	5700	12.16	24.0
	802.11n HT40	5510	11.33	24.0
	802.11n HT40	5670	11.79	24.0
	802.11ac VHT20	5500	12.23	24.0
	802.11ac VHT20	5580	12.58	24.0
	802.11ac VHT40	5510	11.32	24.0
	802.11ac VHT40	5590	11.73	24.0
	802.11ac VHT80	5530	10.61	24.0
	802.11ac VHT80	5610	11.37	24.0
U-NII-3	802.11a	5745	12.93	30.0
	802.11a	5785	12.98	30.0
	802.11a	5825	12.25	30.0
	802.11n HT20	5745	12.22	30.0
	802.11n HT20	5785	12.26	30.0
	802.11n HT20	5825	12.18	30.0
	802.11n HT40	5755	11.57	30.0
	802.11n HT40	5795	11.41	30.0
	802.11ac VHT20	5745	12.64	30.0
	802.11ac VHT20	5785	12.52	30.0
	802.11ac VHT20	5825	12.22	30.0
	802.11ac VHT40	5755	11.53	30.0
	802.11ac VHT40	5795	11.58	30.0
	802.11ac VHT80	5775	10.65	30.0

We chose the Worst-modes are shown as following table:

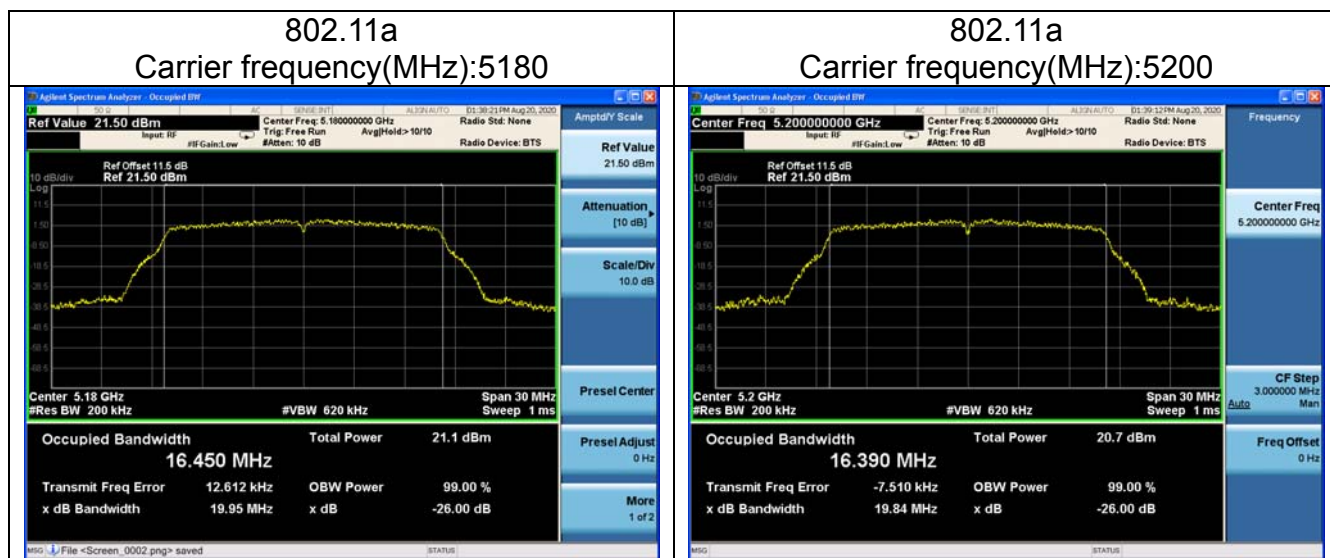
Test Mode	Note
802.11a	---
802.11n HT20	Cover 802.11ac VHT20
802.11n HT40	Cover 802.11ac VHT40
802.11ac VHT80	---

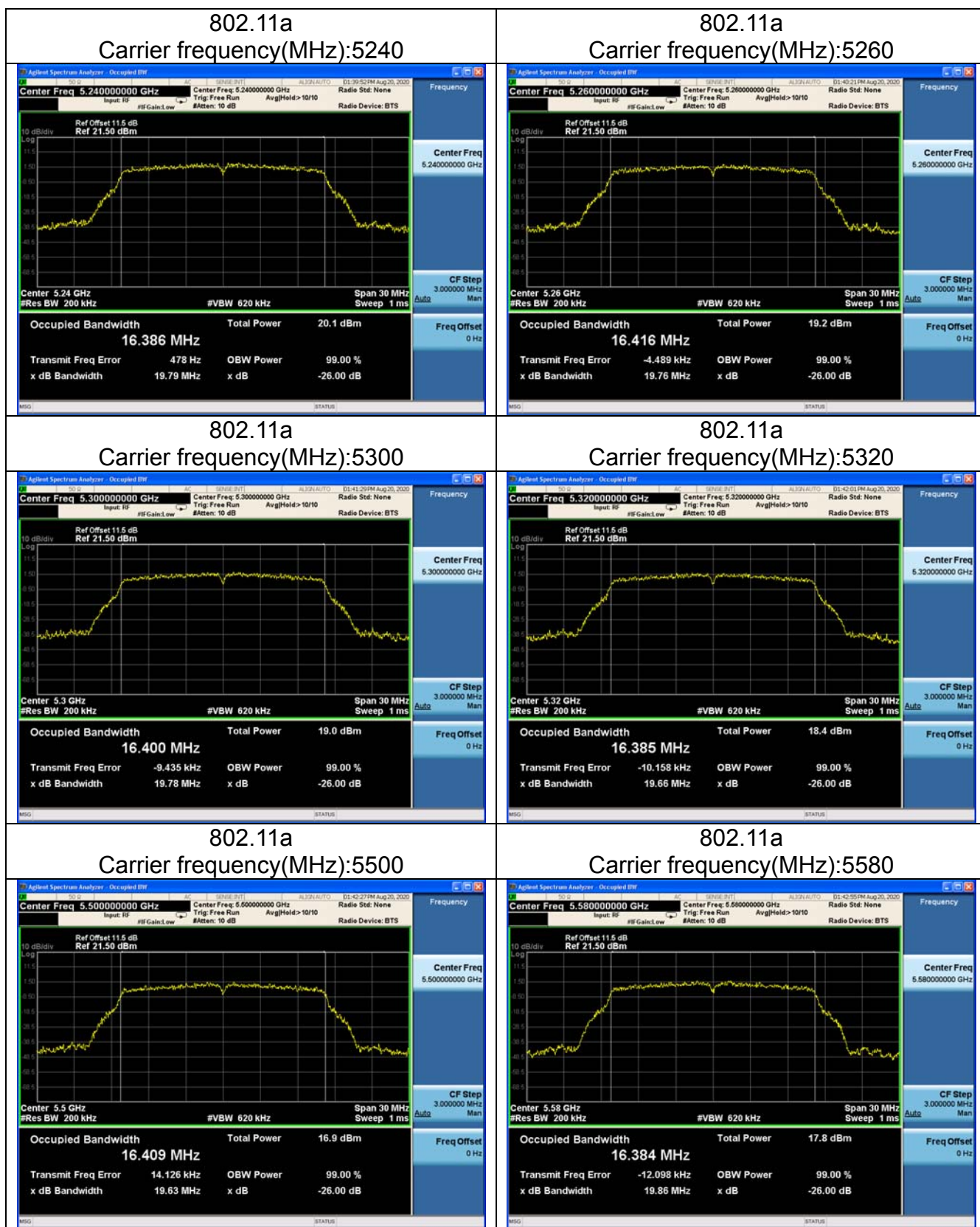
Occupied Bandwidth

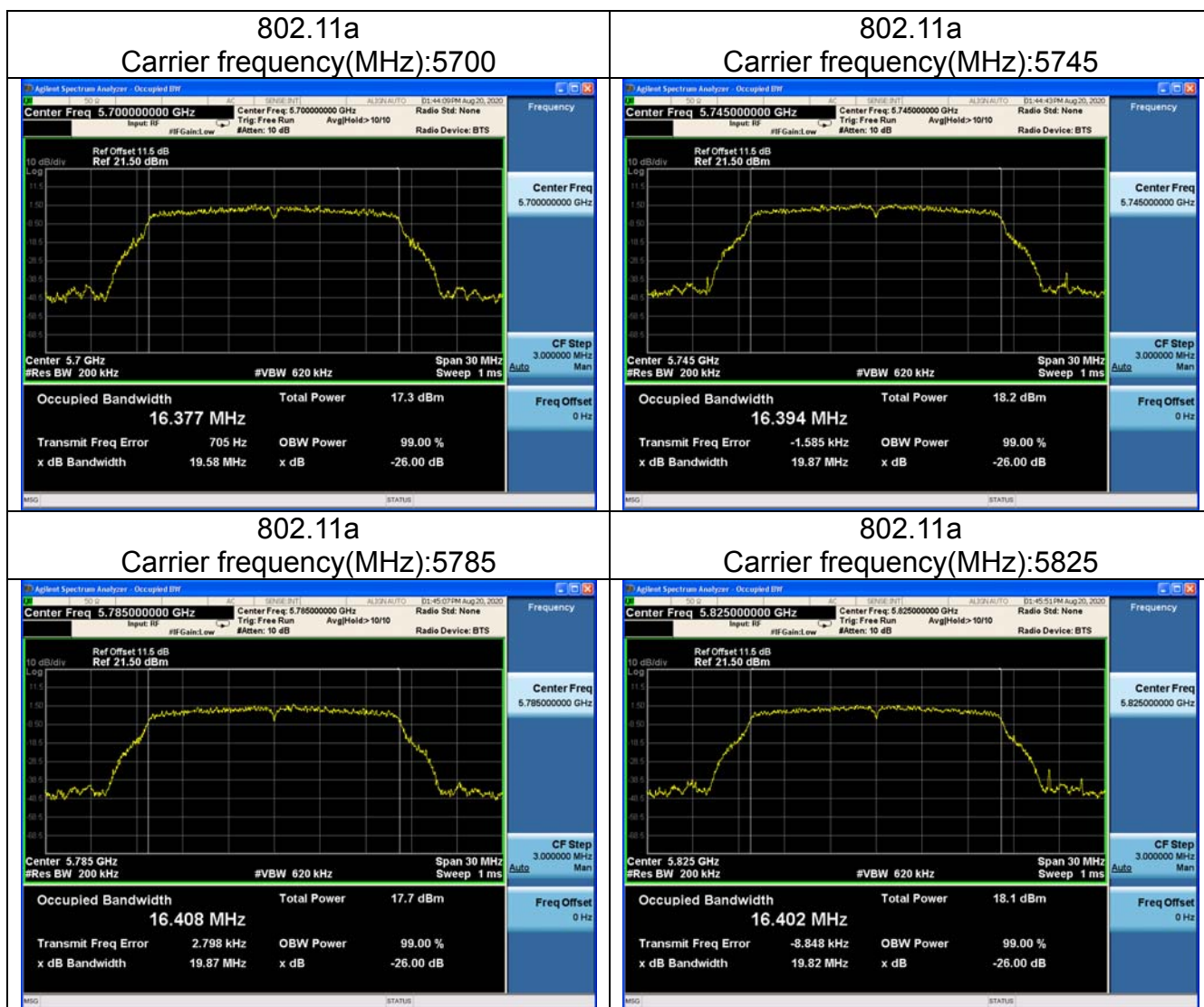
Offset 11.5dB = Attenuator 10dB+ Temporary antenna connector loss 0.2dB+ Cable loss 1.3dB

Test Mode: 802.11a

Carrier frequency (MHz)	99% Bandwidth(MHz)	Minimum 26dB Bandwidth(MHz)	Conclusion
5180	16.450	19.95	pass
5200	16.390	19.84	pass
5240	16.386	19.79	pass
5260	16.416	19.76	pass
5300	16.400	19.78	pass
5320	16.385	19.66	pass
5500	16.409	19.53	pass
5580	16.384	19.86	pass
5700	16.377	19.58	pass
5745	16.394	19.87	pass
5785	16.408	19.87	pass
5825	16.402	19.82	pass







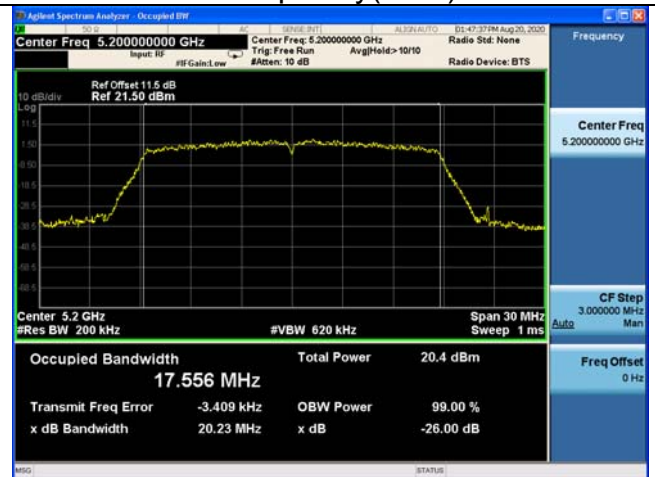
Test Mode: 802.11n HT20

Carrier frequency (MHz)	99% Bandwidth(MHz)	Minimum 26dB Bandwidth(MHz)	Conclusion
5180	17.546	20.09	pass
5200	17.556	20.23	pass
5240	17.532	19.99	pass
5260	17.523	20.09	pass
5300	17.518	20.08	pass
5320	17.520	20.04	pass
5500	17.533	19.81	pass
5580	17.517	20.01	pass
5700	17.512	19.96	pass
5745	17.505	20.00	pass
5785	17.527	19.78	pass
5825	17.544	19.98	pass

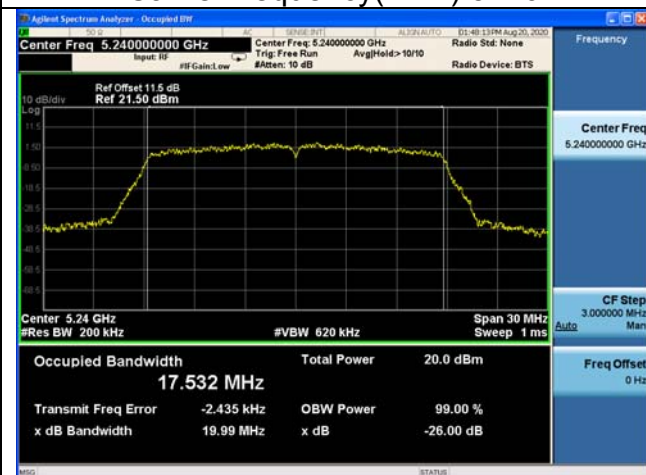
802.11n HT20
Carrier frequency(MHz):5180



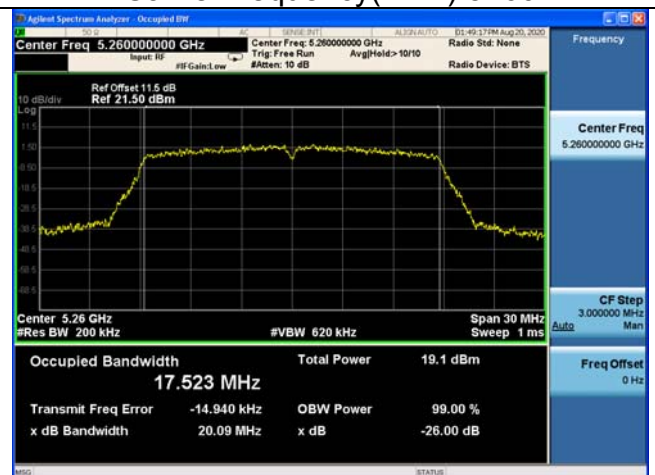
802.11n HT20
Carrier frequency(MHz):5200



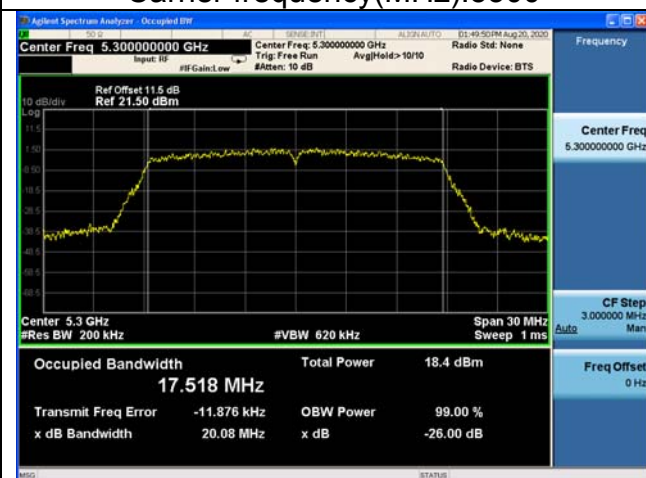
802.11n HT20
Carrier frequency(MHz):5240



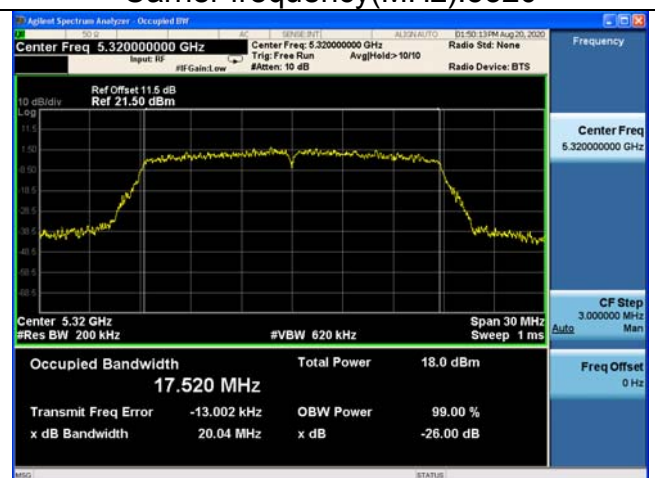
802.11n HT20
Carrier frequency(MHz):5260



802.11n HT20
Carrier frequency(MHz):5300



802.11n HT20
Carrier frequency(MHz):5320



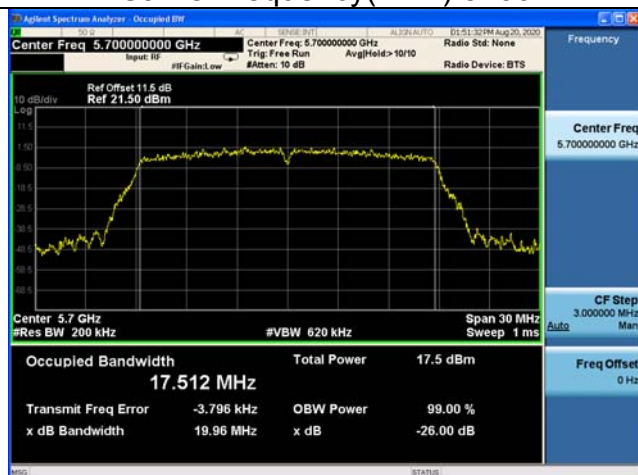
802.11n HT20
Carrier frequency(MHz):5500



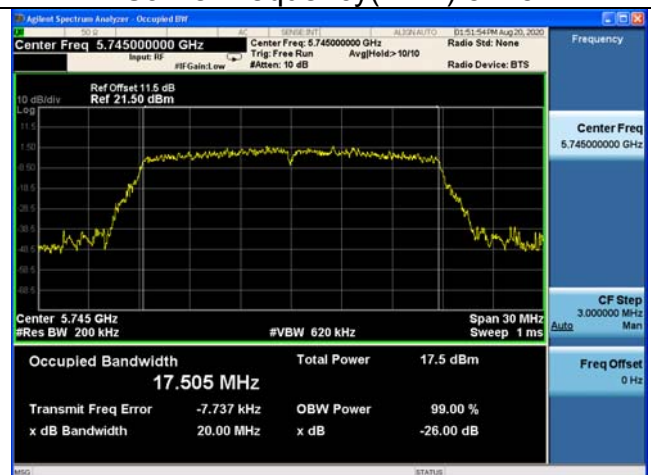
802.11n HT20
Carrier frequency(MHz):5580



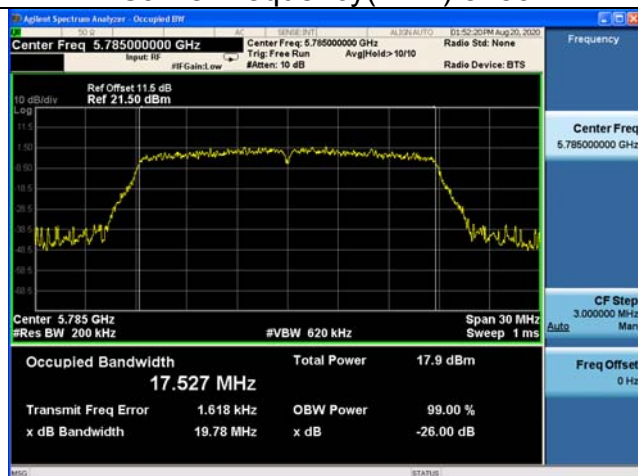
802.11n HT20
Carrier frequency(MHz):5700



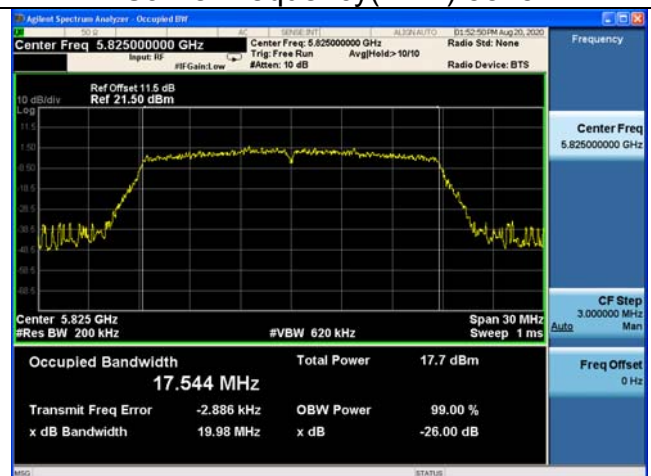
802.11n HT20
Carrier frequency(MHz):5745



802.11n HT20
Carrier frequency(MHz):5785

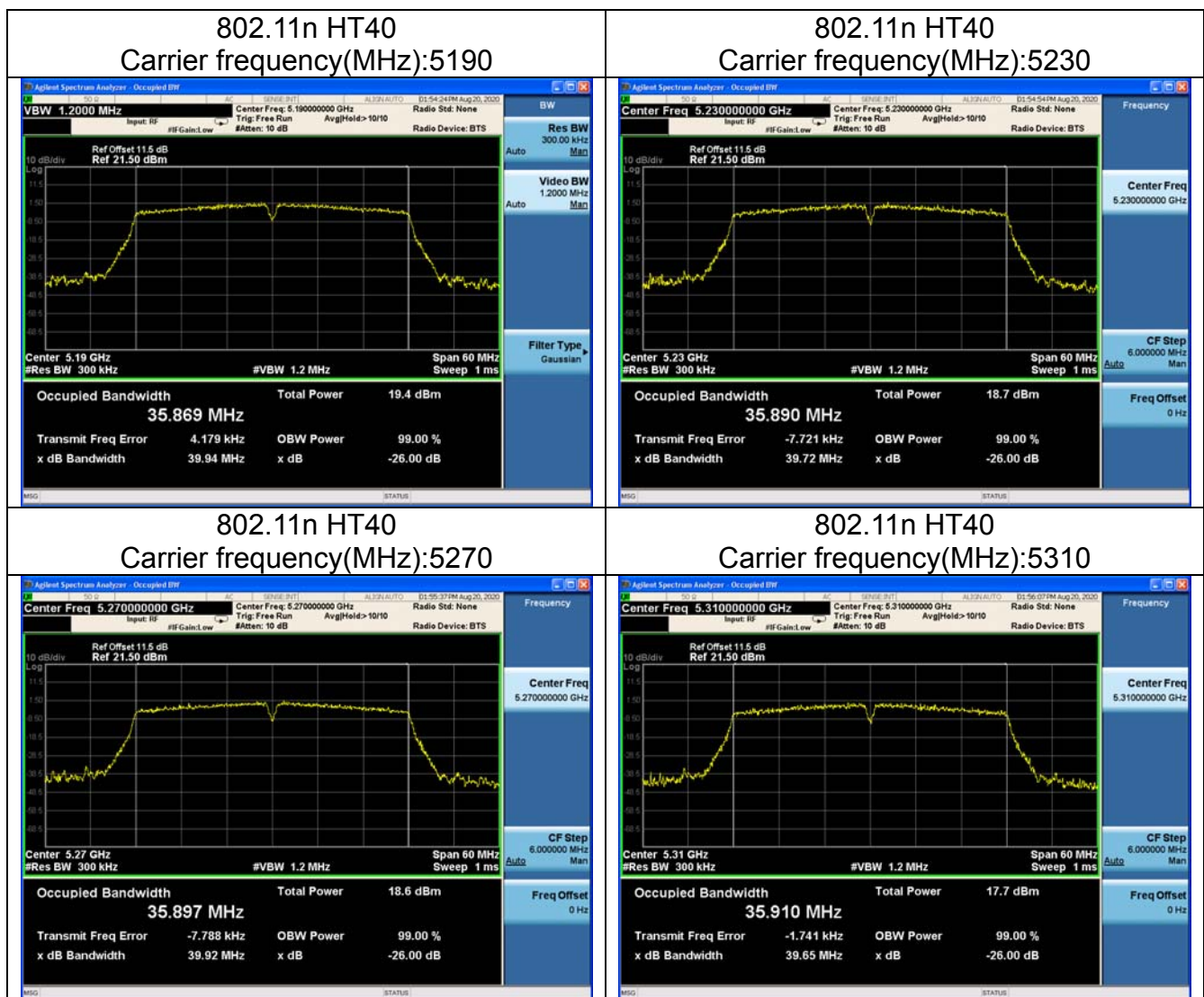


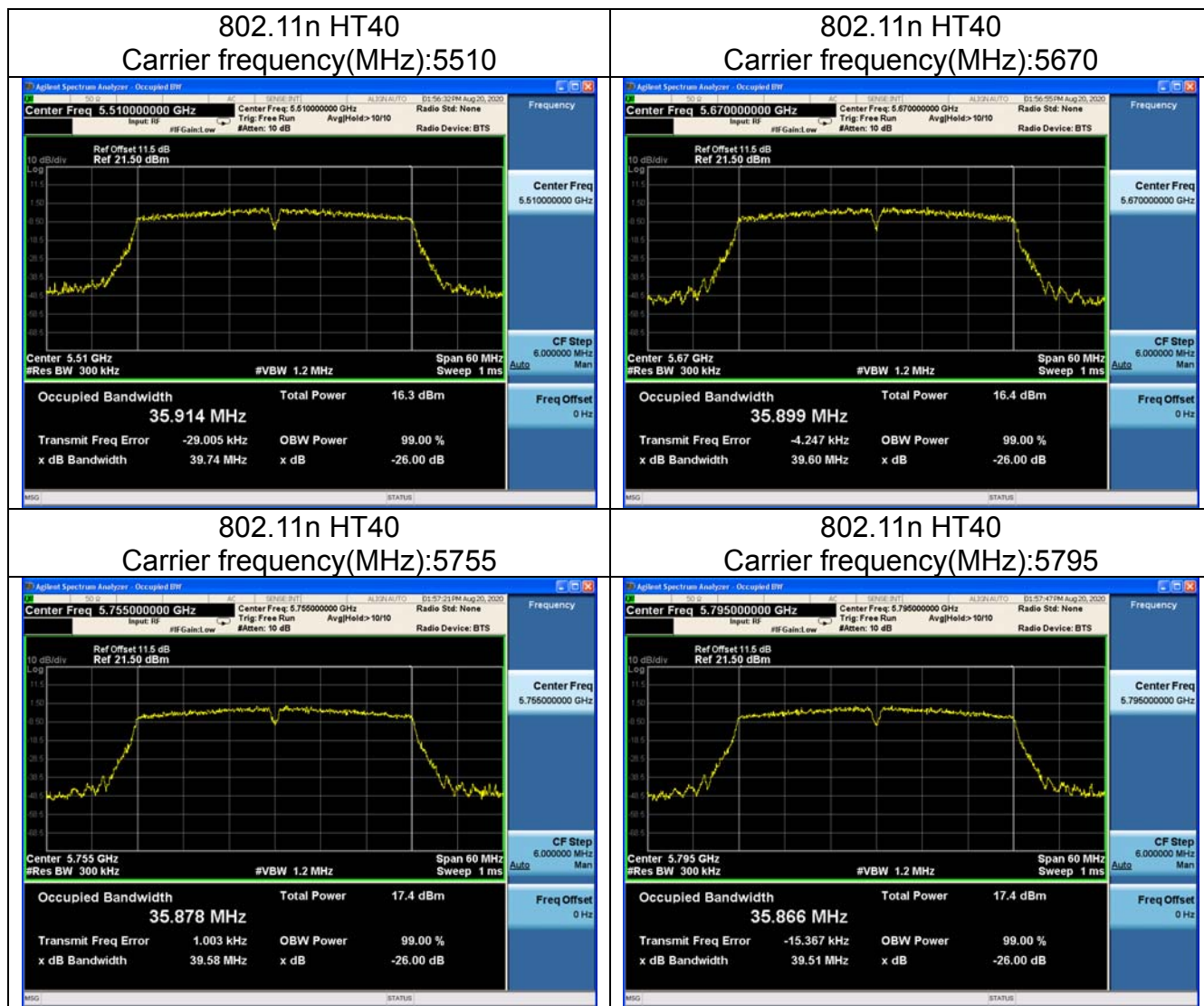
802.11n HT20
Carrier frequency(MHz):5825



Test Mode: 802.11n HT40

Carrier frequency (MHz)	99% Bandwidth(MHz)	Minimum 26dB Bandwidth(MHz)	Conclusion
5190	35.869	39.94	pass
5230	35.890	39.72	pass
5270	35.897	39.92	pass
5310	35.910	39.65	pass
5510	35.914	39.74	pass
5670	35.899	39.60	pass
5755	35.878	39.58	pass
5795	35.866	39.51	pass

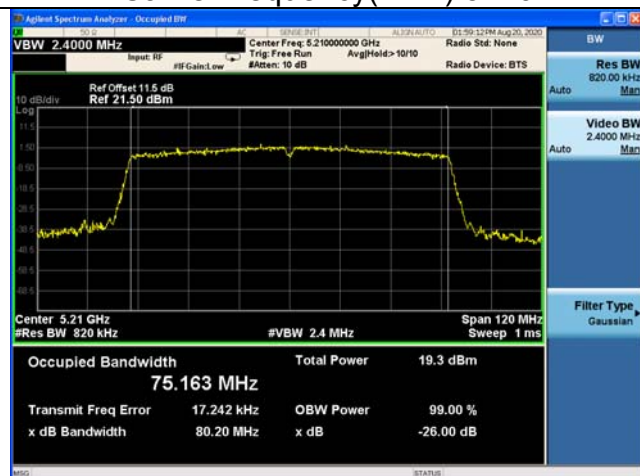




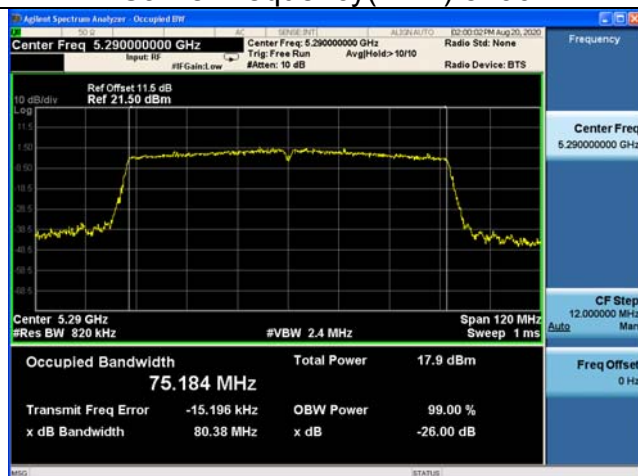
Test Mode: 802.11ac VHT80

Carrier frequency (MHz)	99% Bandwidth(MHz)	Minimum 26dB Bandwidth(MHz)	Conclusion
5210	75.163	80.20	pass
5290	75.184	80.38	pass
5530	75.259	79.75	pass
5610	75.287	79.94	pass
5690	75.188	80.60	pass
5775	75.134	80.29	pass

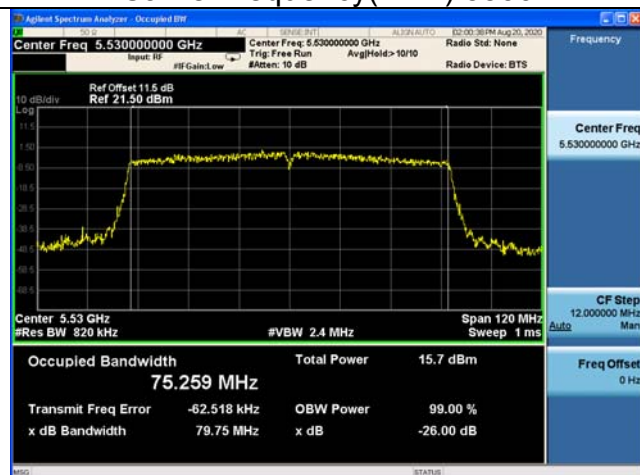
802.11ac VHT80
Carrier frequency(MHz):5210



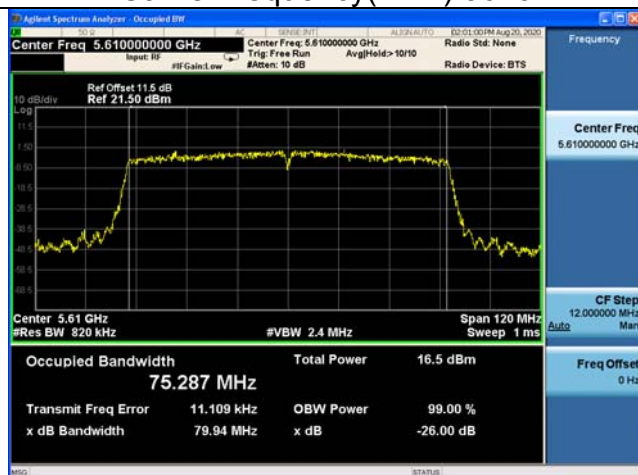
802.11ac VHT80
Carrier frequency(MHz):5290



802.11ac VHT80
Carrier frequency(MHz):5530



802.11ac VHT80
Carrier frequency(MHz):5610



802.11ac VHT80
Carrier frequency(MHz):5690



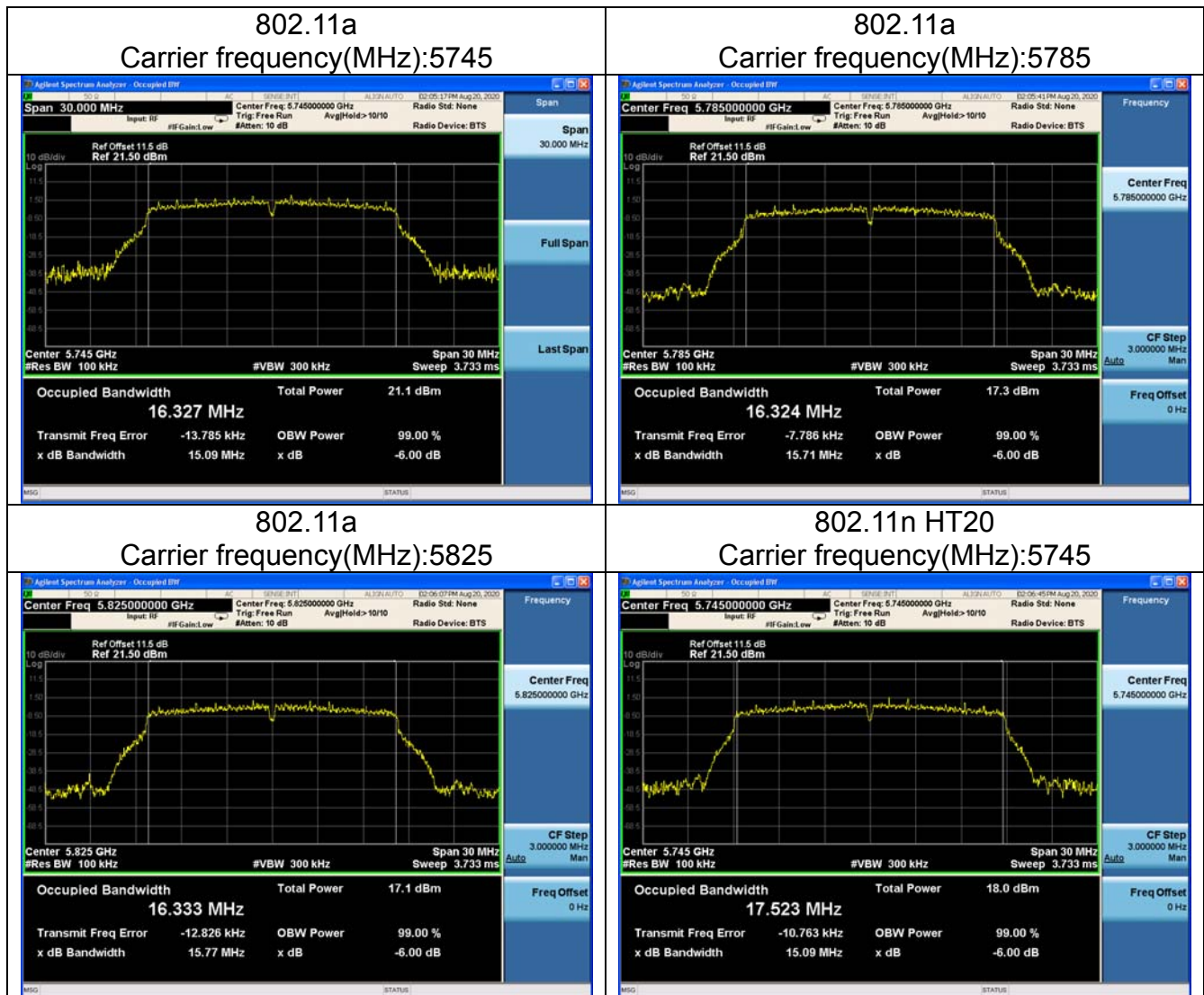
802.11ac VHT80
Carrier frequency(MHz):5775



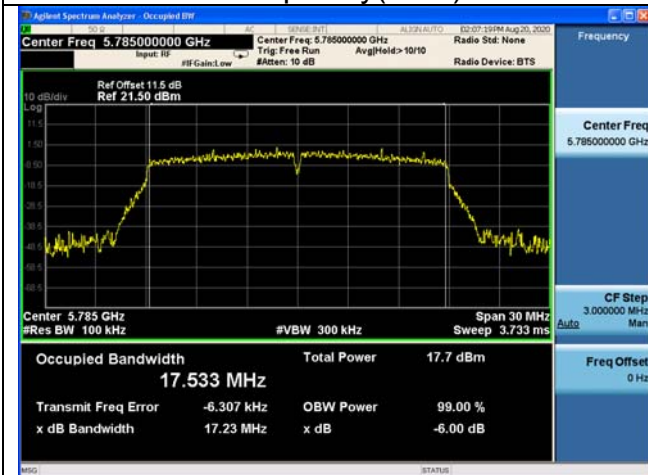
6dB Bandwidth

Test Mode: 802.11a

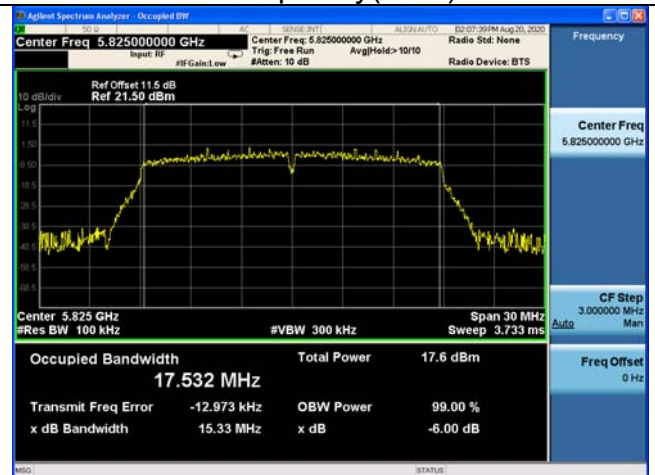
Test Mode	Carrier frequency (MHz)	6dB Bandwidth(MHz)	Minimum Limit (MHz)	Conclusion
802.11a	5745	15.09	0.5	pass
802.11a	5785	15.71	0.5	pass
802.11a	5825	15.77	0.5	pass
802.11n HT20	5745	15.09	0.5	pass
802.11n HT20	5785	17.23	0.5	pass
802.11n HT20	5825	15.33	0.5	pass
802.11n HT40	5755	33.82	0.5	pass
802.11n HT40	5795	35.10	0.5	pass
802.11ac VHT80	5775	75.14	0.5	pass



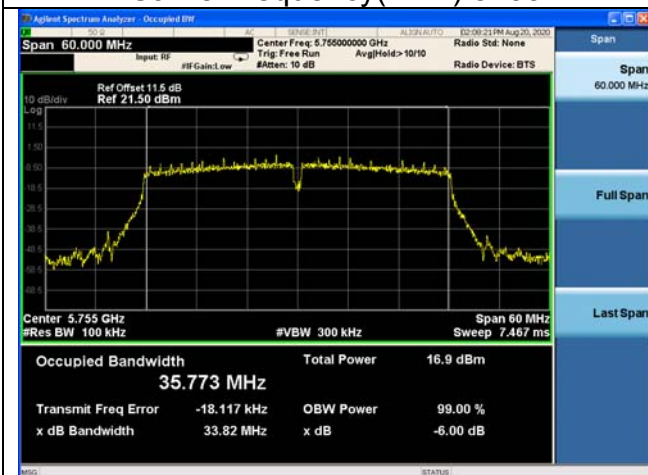
802.11n HT20
Carrier frequency(MHz):5785



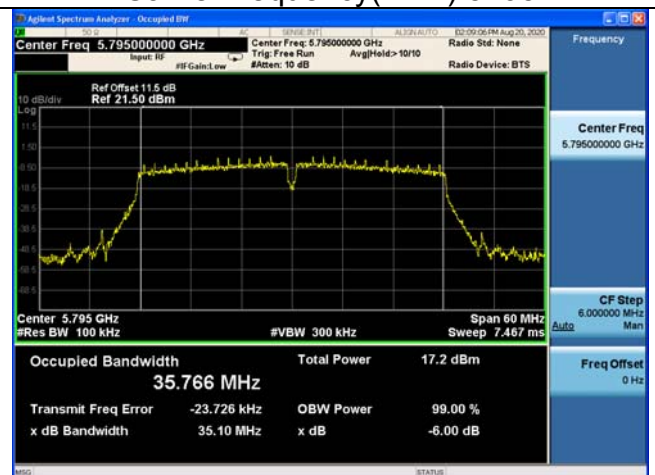
802.11n HT20
Carrier frequency(MHz):5825



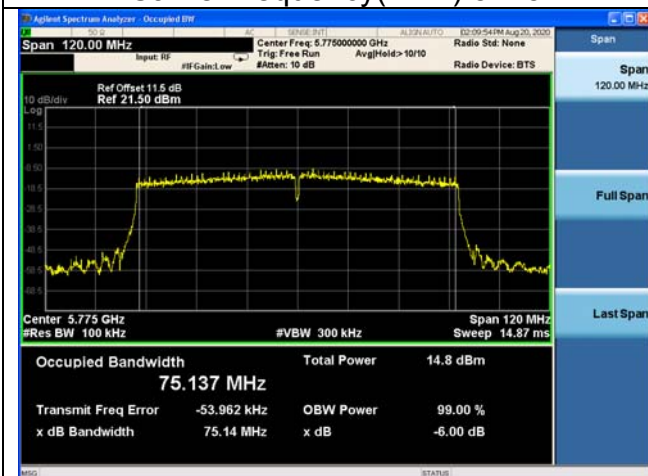
802.11n HT40
Carrier frequency(MHz):5755



802.11n HT40
Carrier frequency(MHz):5795



802.11ac VHT80
Carrier frequency(MHz):5775

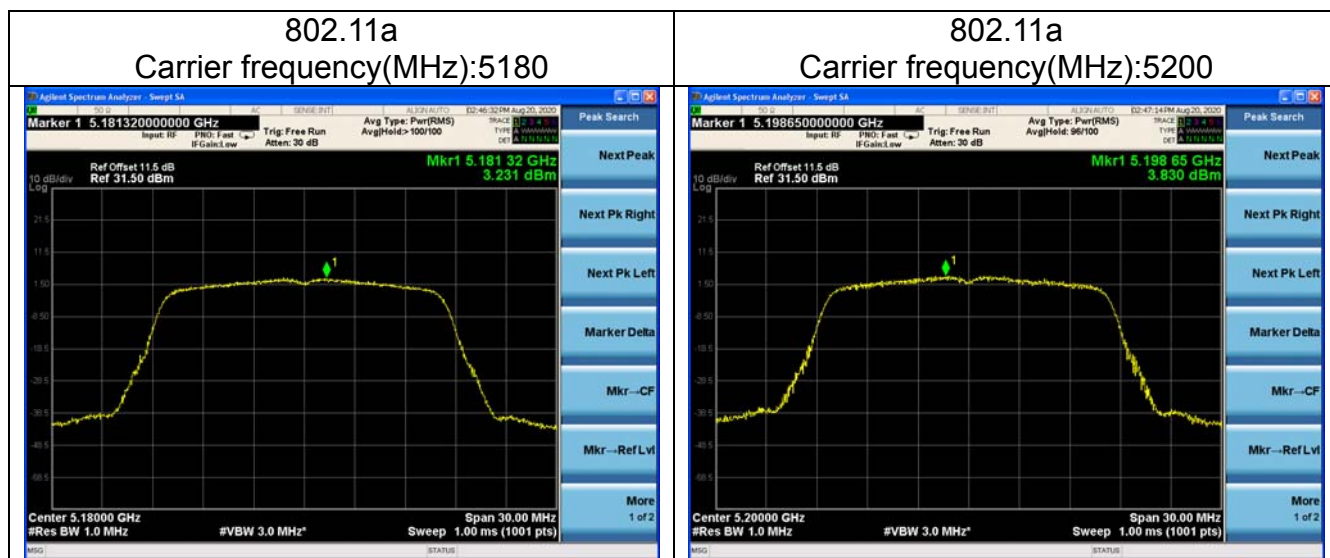


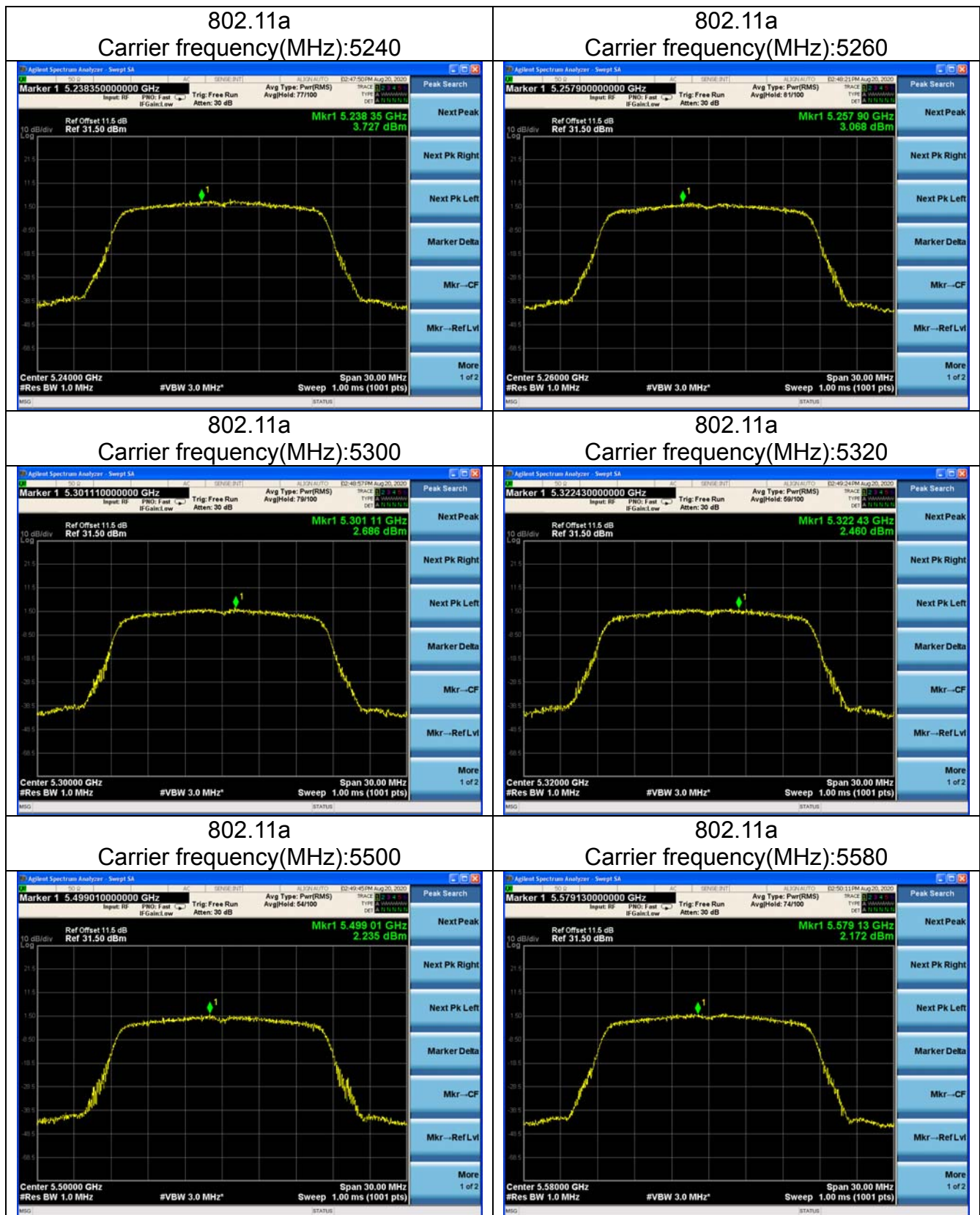
Transmitter Power Spectral Density

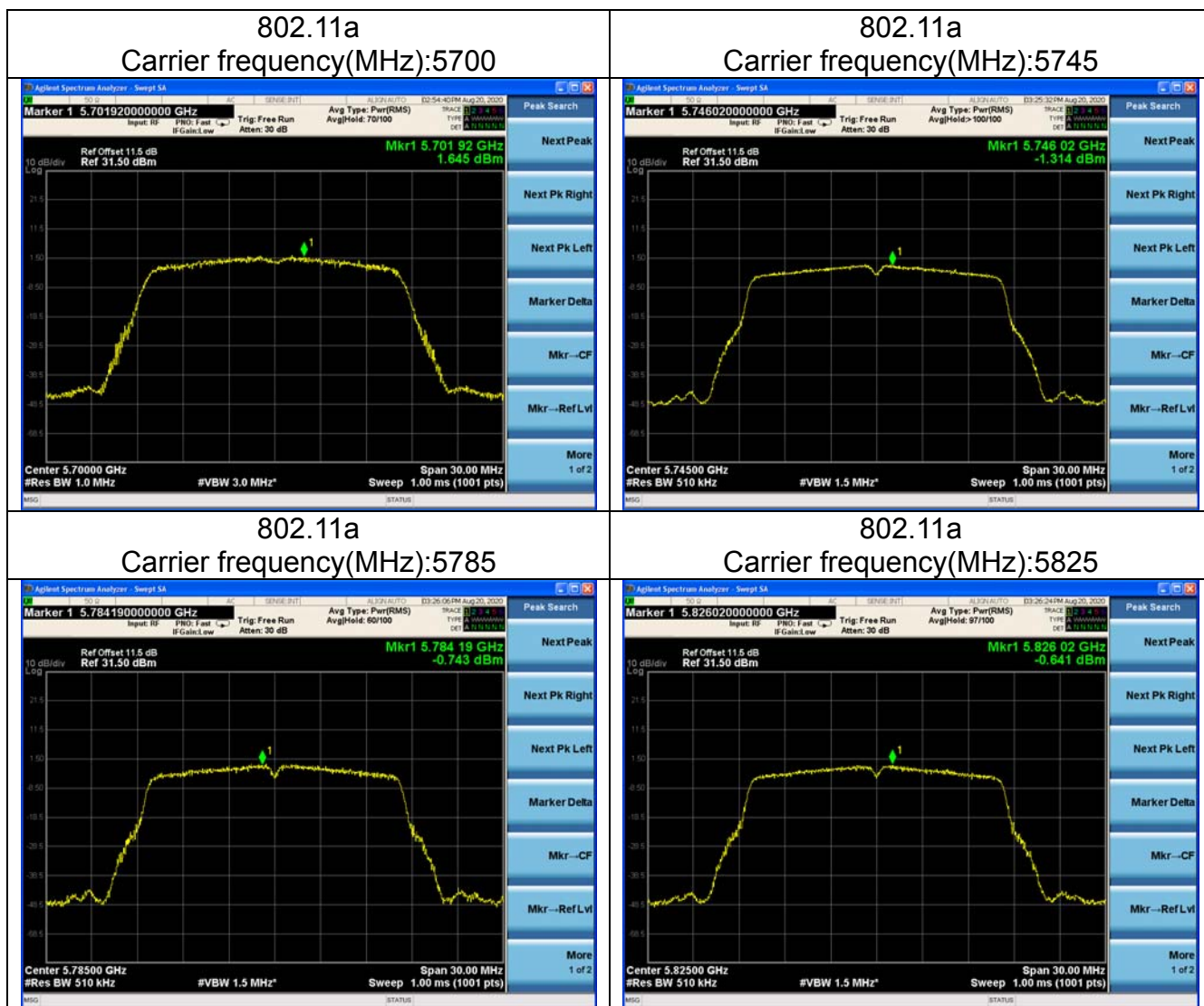
Offset 11.5dB = Attenuator 10dB+ Temporary antenna connector loss 0.2dB+ Cable loss 1.3dB

Test Mode: 802.11a

Carrier frequency (MHz)	Duty Cycle Correction Factor(dB)	Power Spectral Density (dBm/MHz)	Limit	Conclusion
5180	0.140	3.371	11.0 dBm/MHz	pass
5200	0.140	3.970	11.0 dBm/MHz	pass
5240	0.140	3.867	11.0 dBm/MHz	pass
5260	0.140	3.208	11.0 dBm/MHz	pass
5300	0.140	2.826	11.0 dBm/MHz	pass
5320	0.140	2.600	11.0 dBm/MHz	pass
5500	0.140	2.375	11.0 dBm/MHz	pass
5580	0.140	2.312	11.0 dBm/MHz	pass
5700	0.140	1.785	11.0 dBm/MHz	pass
5745	0.140	-1.174	30.0 dBm/500kHz	pass
5785	0.140	-0.603	30.0 dBm/500kHz	pass
5825	0.140	-0.501	30.0 dBm/500kHz	pass



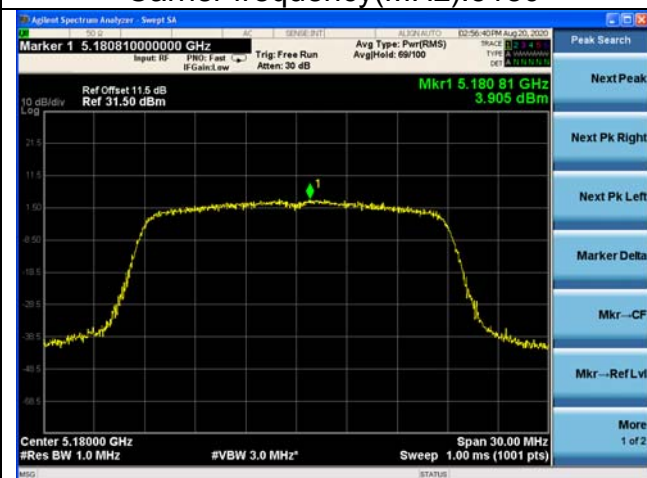




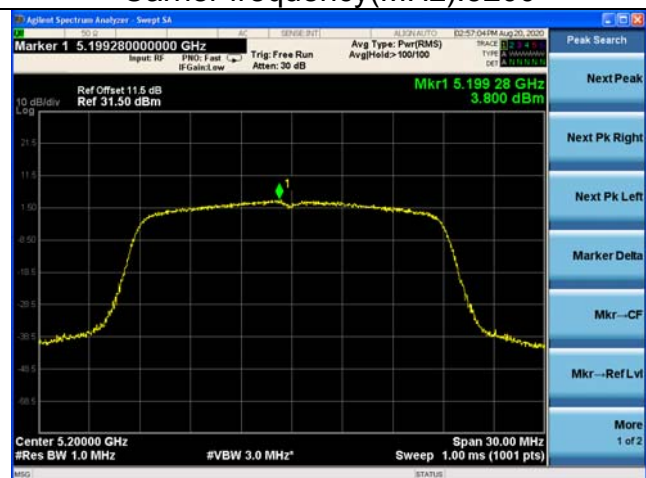
Test Mode: 802.11n HT20

Carrier frequency (MHz)	Duty Cycle Correction Factor(dB)	Power Spectral Density (dBm/MHz)	Limit	Conclusion
5180	0.149	4.054	11.0 dBm/MHz	pass
5200	0.149	3.949	11.0 dBm/MHz	pass
5240	0.149	3.896	11.0 dBm/MHz	pass
5260	0.149	2.915	11.0 dBm/MHz	pass
5300	0.149	2.609	11.0 dBm/MHz	pass
5320	0.149	1.975	11.0 dBm/MHz	pass
5500	0.149	1.340	11.0 dBm/MHz	pass
5580	0.149	1.948	11.0 dBm/MHz	pass
5700	0.149	2.400	11.0 dBm/MHz	pass
5745	0.149	-1.314	30.0 dBm/500kHz	pass
5785	0.149	-3.852	30.0 dBm/500kHz	pass
5825	0.149	-3.348	30.0 dBm/500kHz	pass

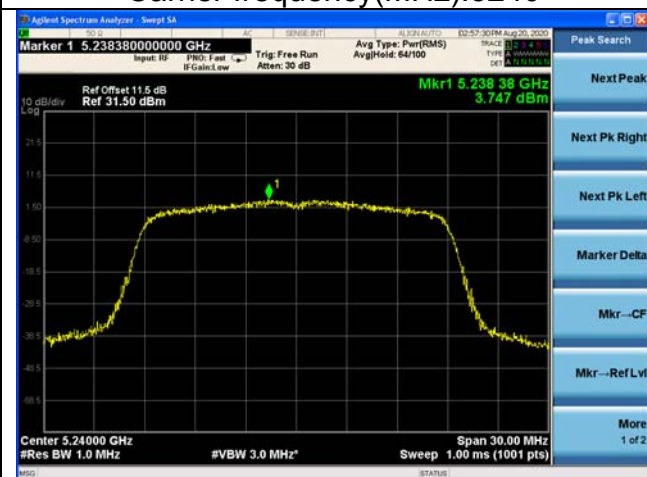
802.11n HT20
Carrier frequency(MHz):5180



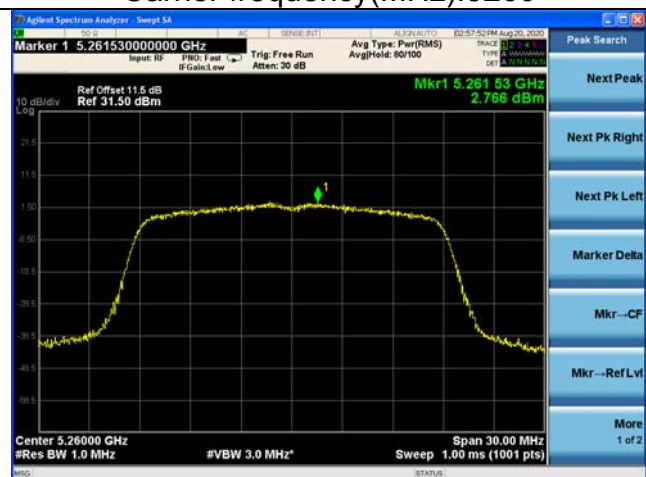
802.11n HT20
Carrier frequency(MHz):5200



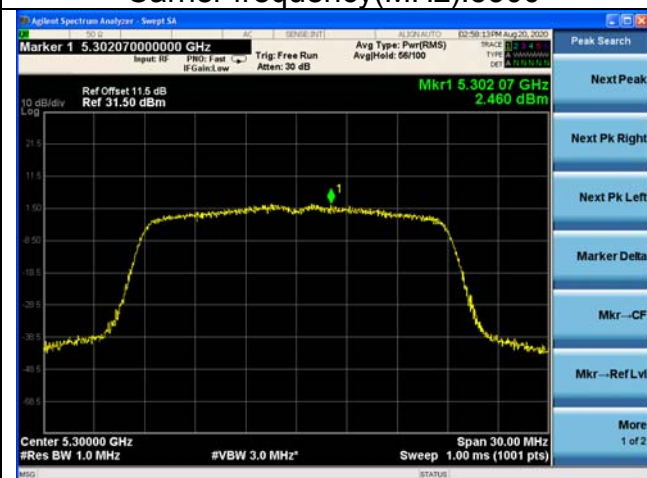
802.11n HT20
Carrier frequency(MHz):5240



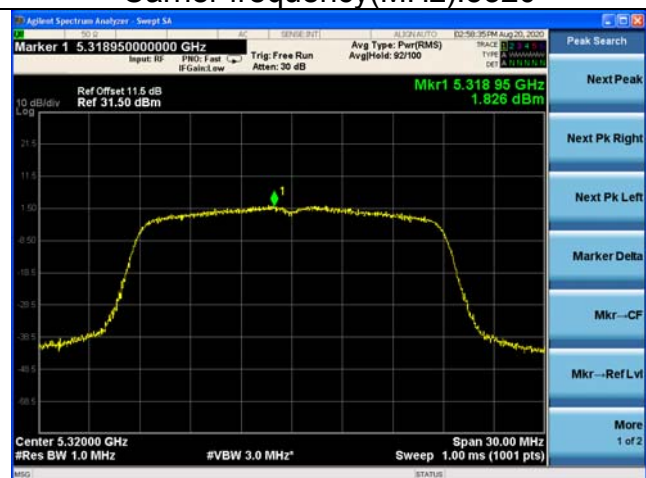
802.11n HT20
Carrier frequency(MHz):5260

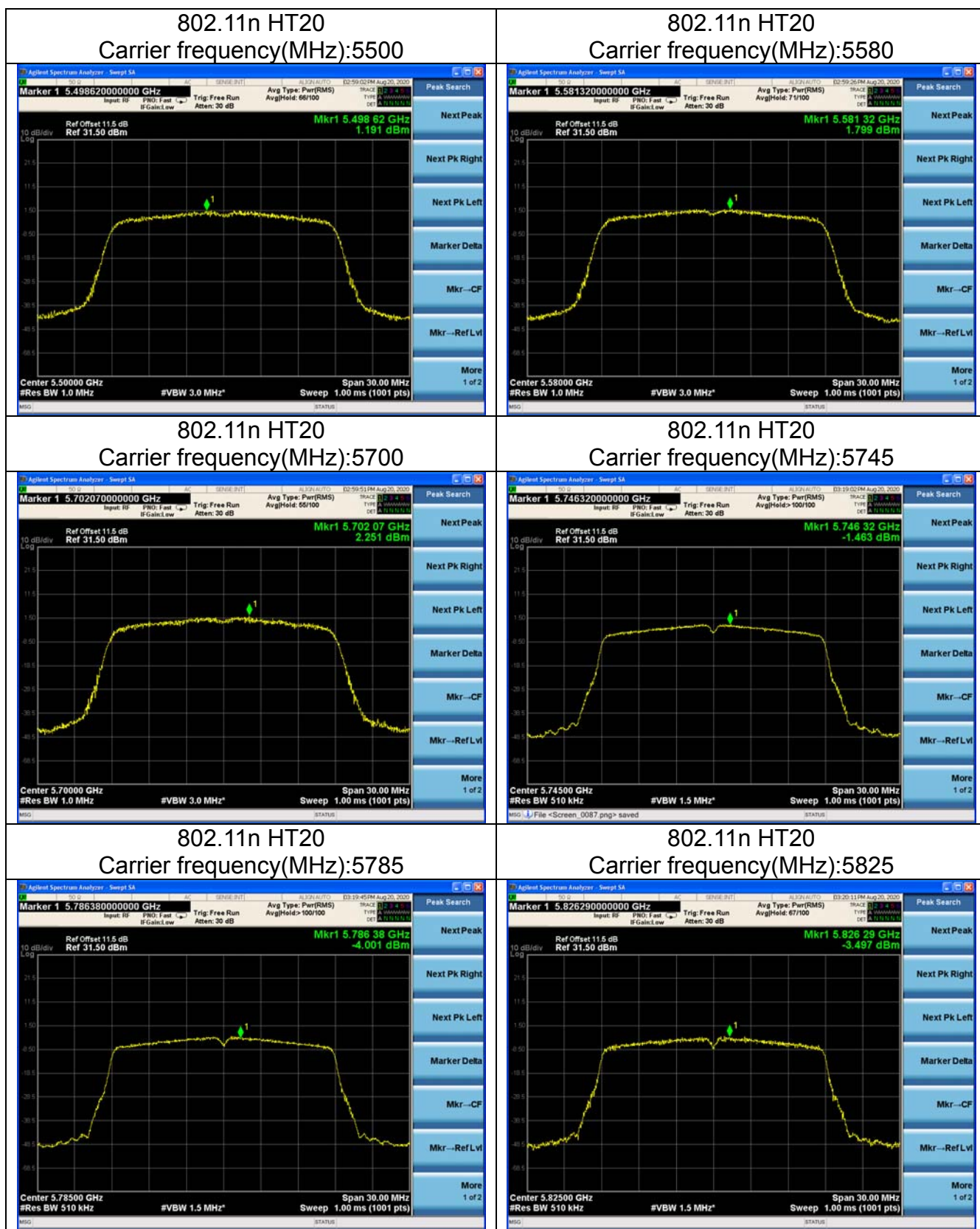


802.11n HT20
Carrier frequency(MHz):5300



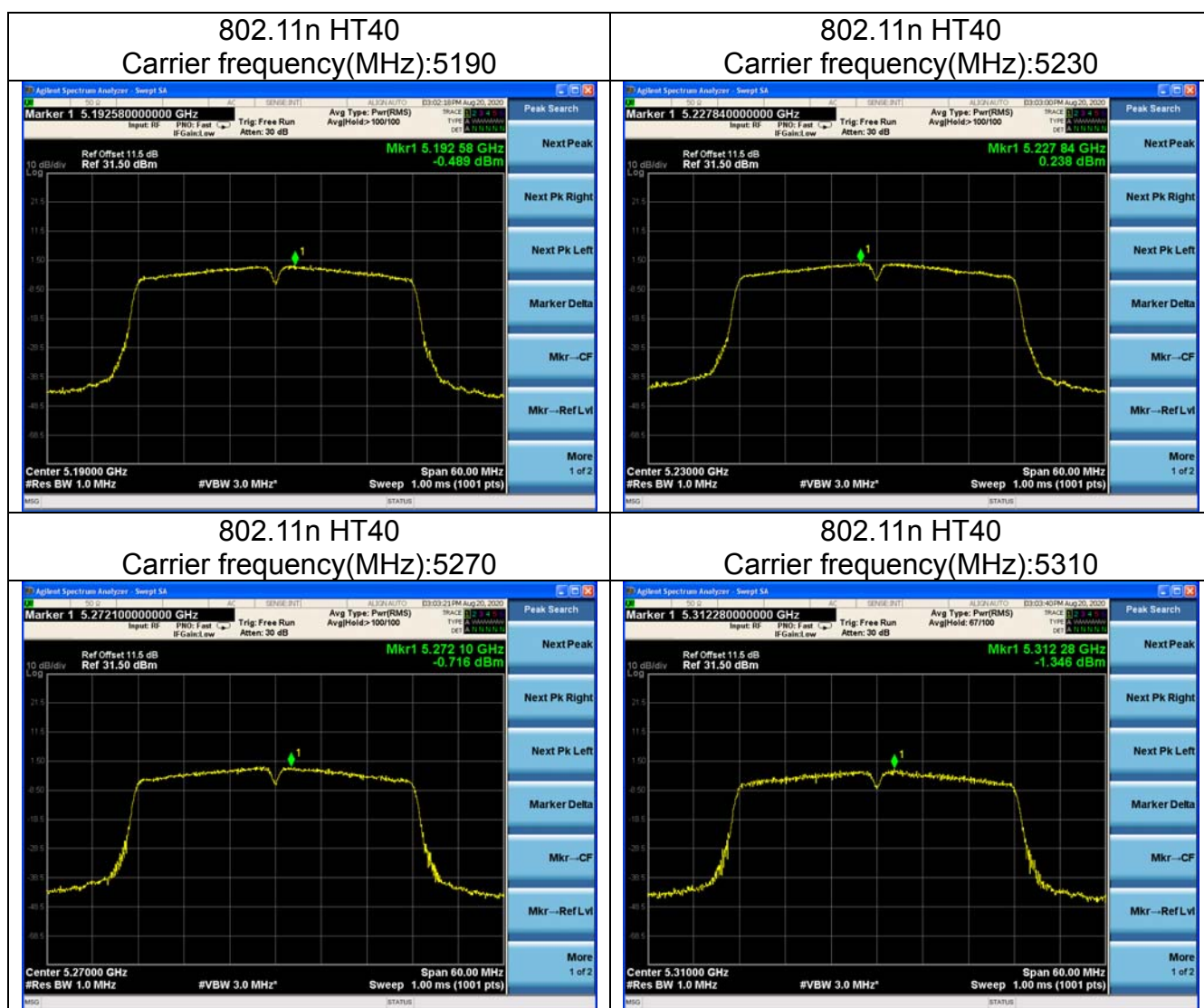
802.11n HT20
Carrier frequency(MHz):5320

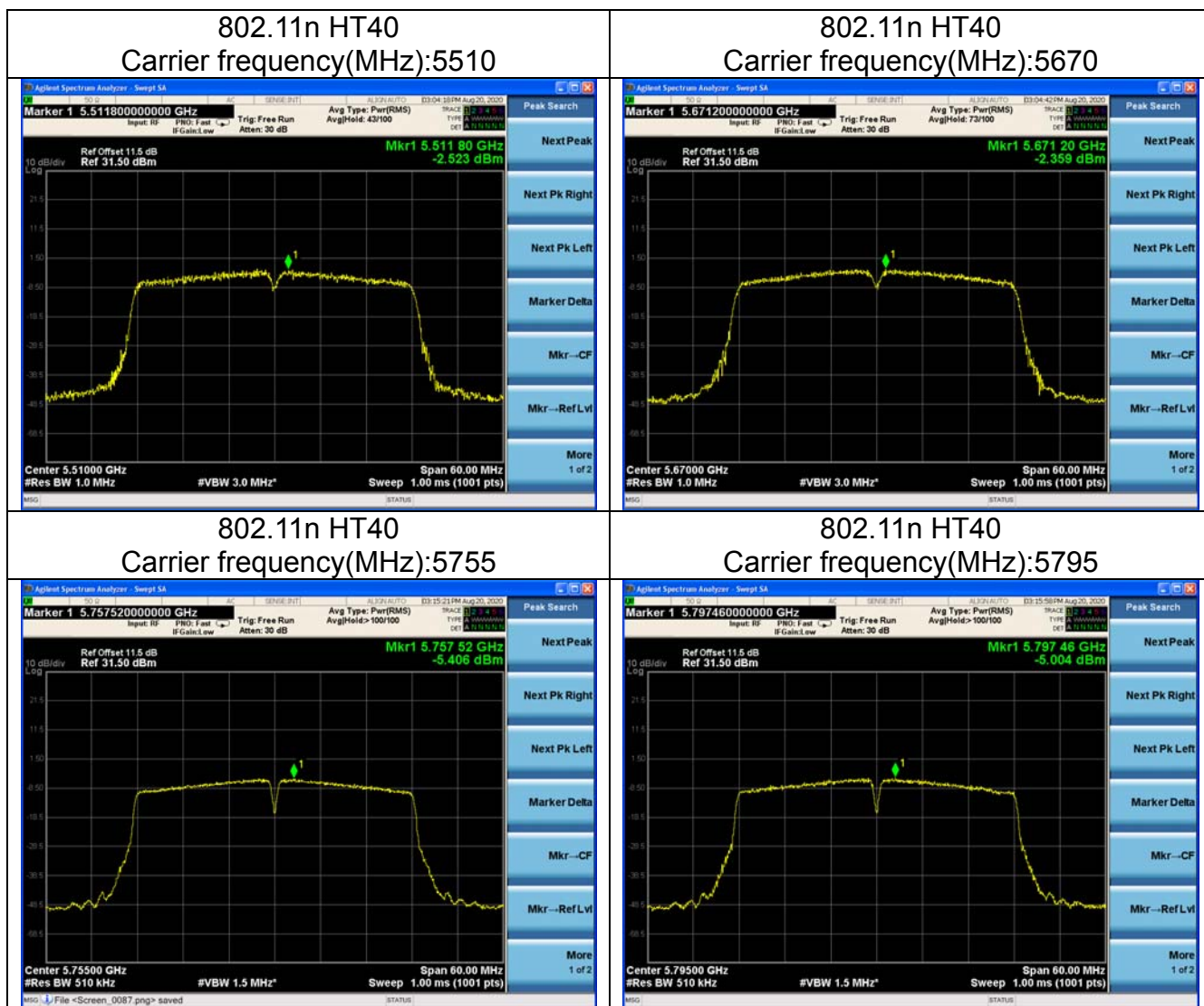




Test Mode: 802.11n HT40

Carrier frequency (MHz)	Duty Cycle Correction Factor(dB)	Power Spectral Density (dBm/MHz)	Limit	Conclusion
5190	0.314	-0.175	11.0 dBm/MHz	pass
5230	0.314	0.552	11.0 dBm/MHz	pass
5270	0.314	-0.402	11.0 dBm/MHz	pass
5310	0.314	-1.032	11.0 dBm/MHz	pass
5510	0.314	-2.209	11.0 dBm/MHz	pass
5670	0.314	-2.045	11.0 dBm/MHz	pass
5755	0.314	-5.092	30.0 dBm/500kHz	pass
5795	0.314	-4.690	30.0 dBm/500kHz	pass

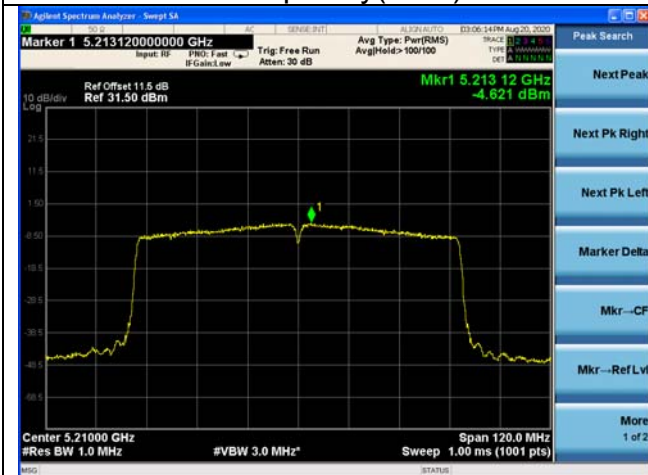




Test Mode: 802.11ac VHT80

Carrier frequency (MHz)	Duty Cycle Correction Factor(dB)	Power Spectral Density (dBm/MHz)	Limit	Conclusion
5210	0.559	-4.062	11.0 dBm/MHz	pass
5290	0.559	-4.988	11.0 dBm/MHz	pass
5530	0.559	-6.064	11.0 dBm/MHz	pass
5610	0.559	-5.600	11.0 dBm/MHz	pass
5690	0.559	-5.657	11.0 dBm/MHz	pass
5690	0.559	-9.498	30.0 dBm/500kHz	pass
5775	0.559	-8.761	30.0 dBm/500kHz	pass

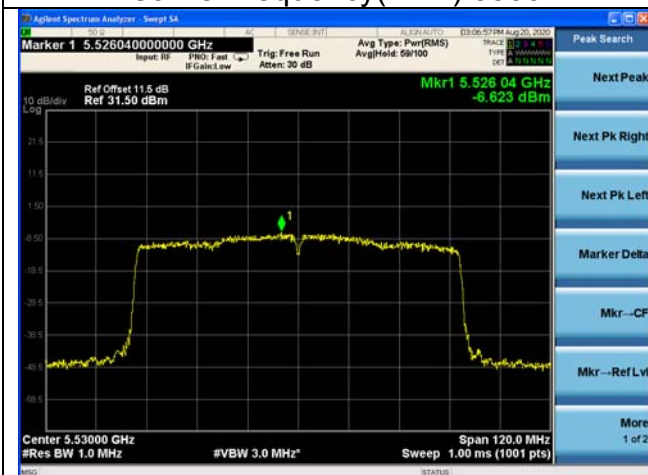
802.11ac HT80
Carrier frequency(MHz):5210



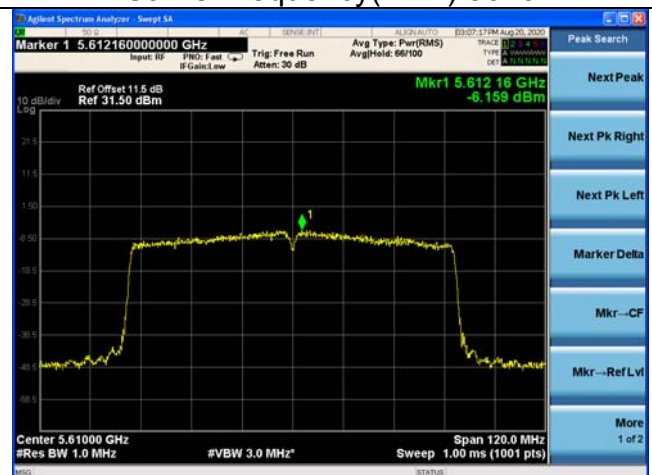
802.11ac HT80
Carrier frequency(MHz):5290



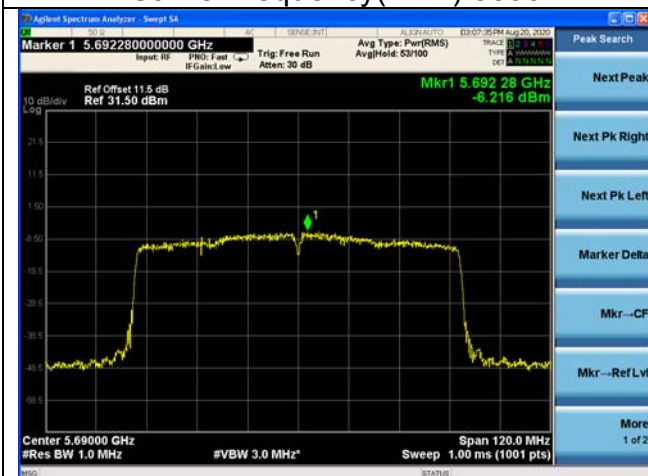
802.11ac HT80
Carrier frequency(MHz):5530

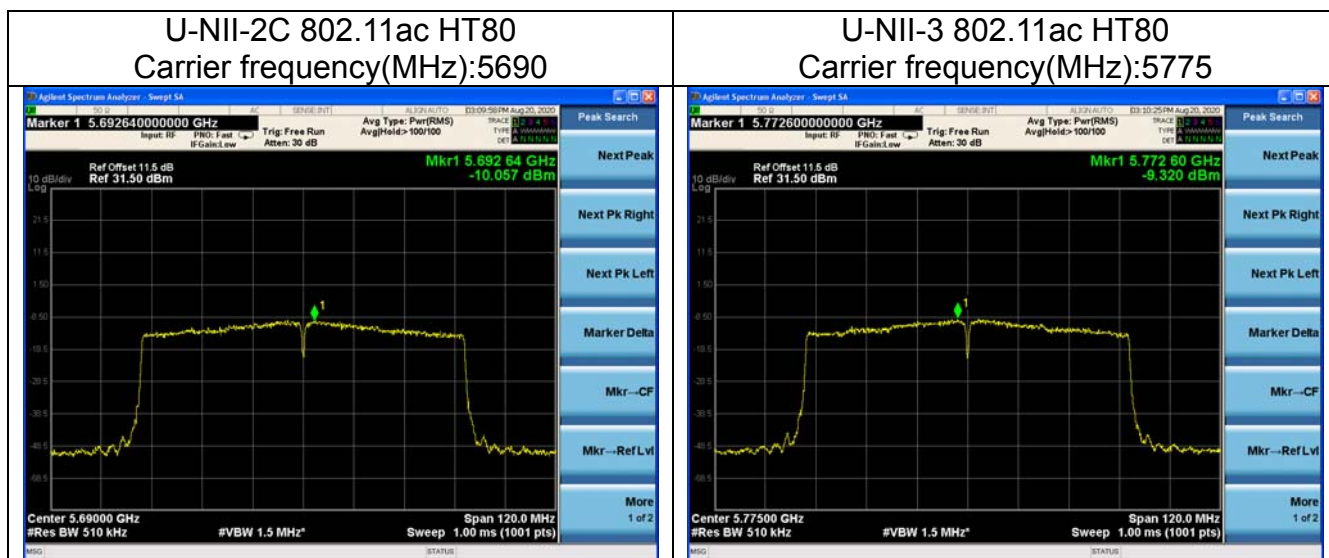


802.11ac HT80
Carrier frequency(MHz):5610



802.11ac HT80
Carrier frequency(MHz):5690

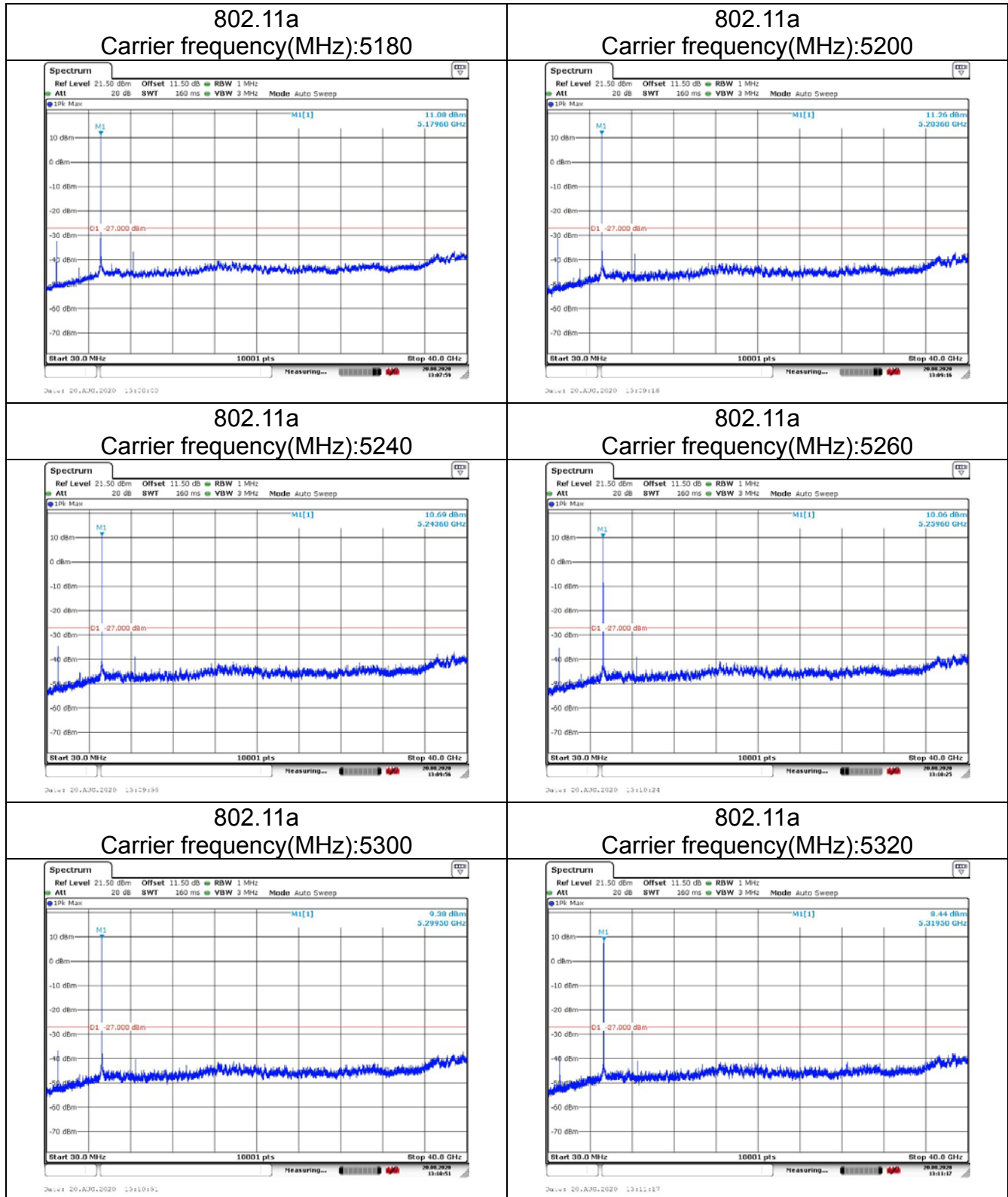




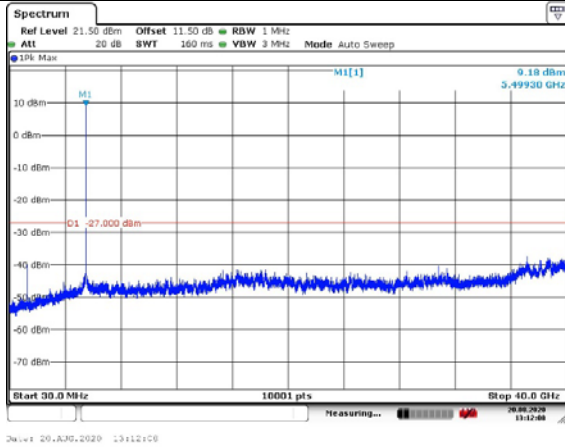
Unwanted Conducted Emission Measurement

Offset 11.5dB = Attenuator 10dB+ Temporary antenna connector loss 0.2dB+ Cable loss 1.3dB

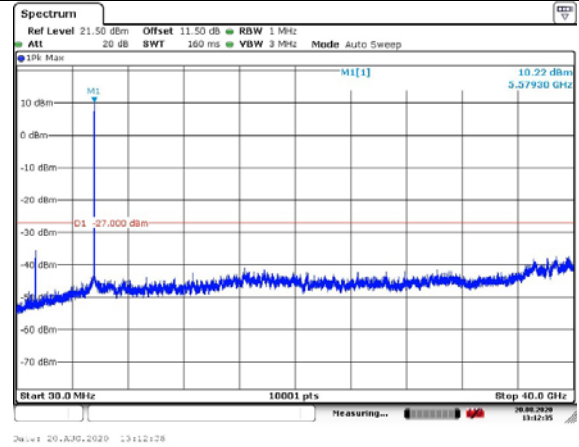
Test Mode: 802.11a



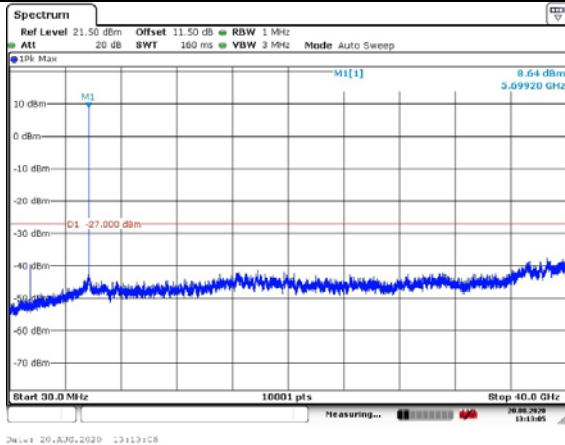
802.11a
Carrier frequency(MHz):5500



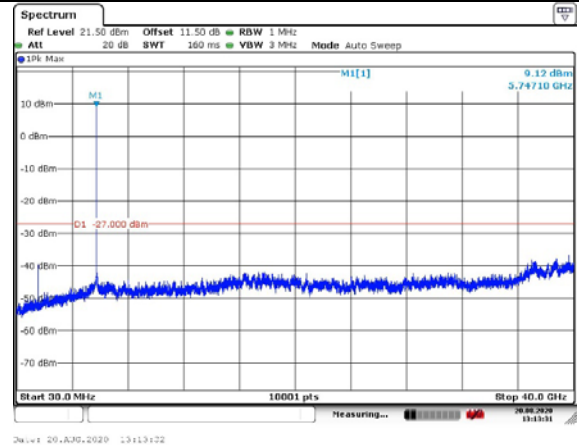
802.11a
Carrier frequency(MHz):5580



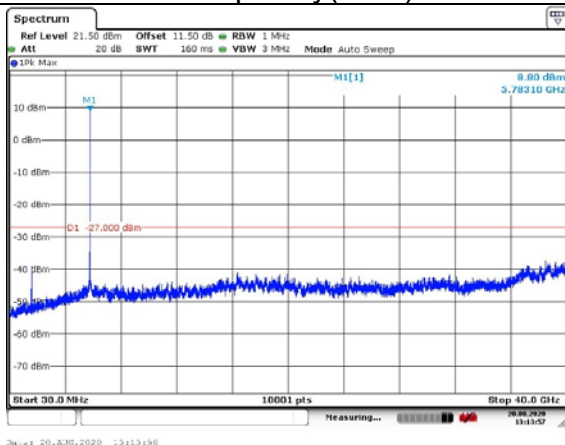
802.11a
Carrier frequency(MHz):5700



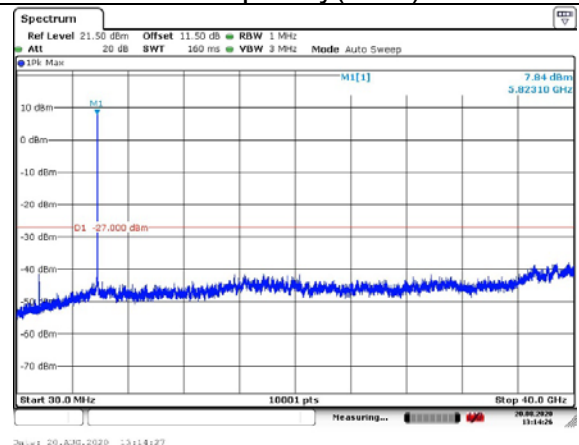
802.11a
Carrier frequency(MHz):5745



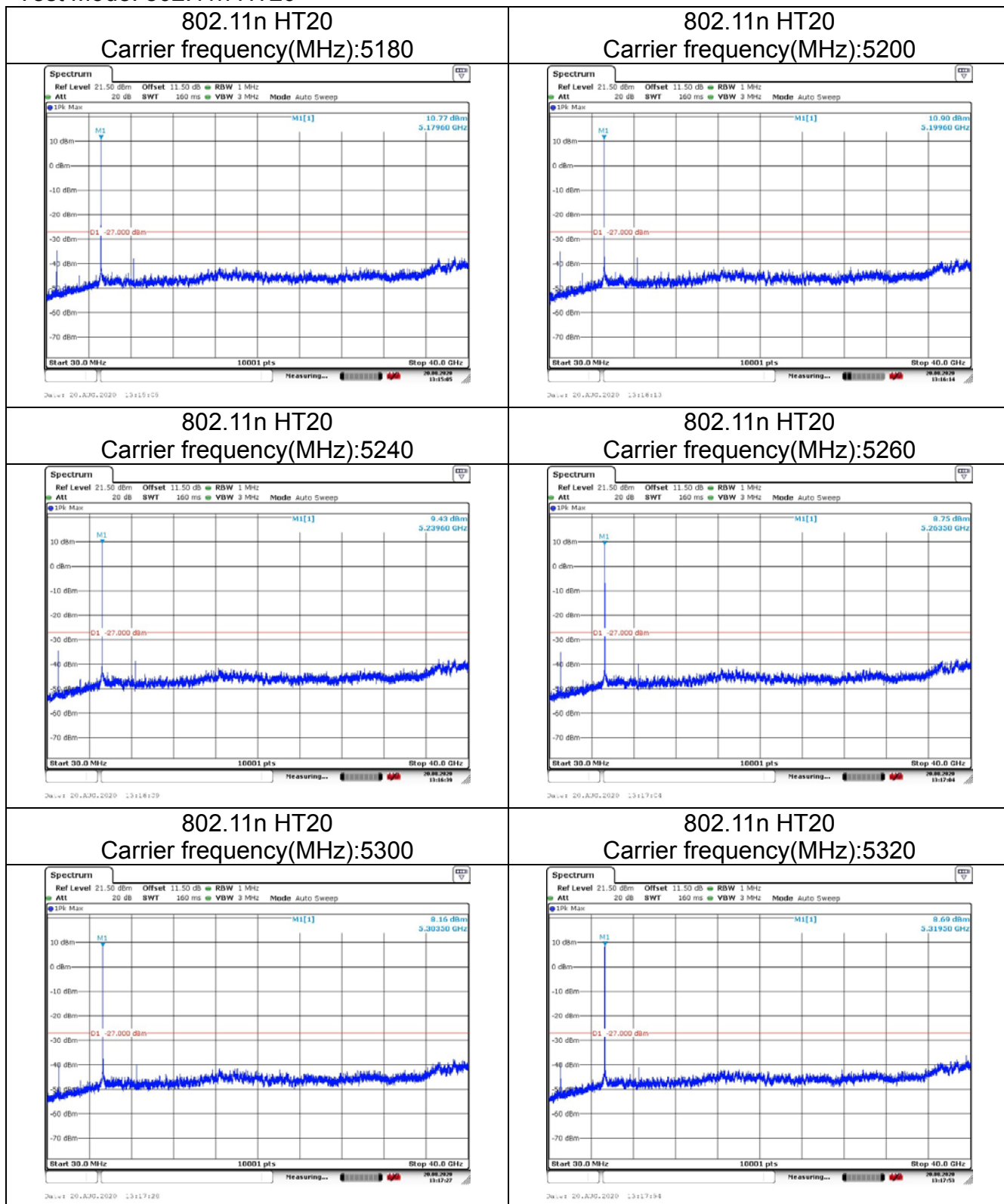
802.11a
Carrier frequency(MHz):5785



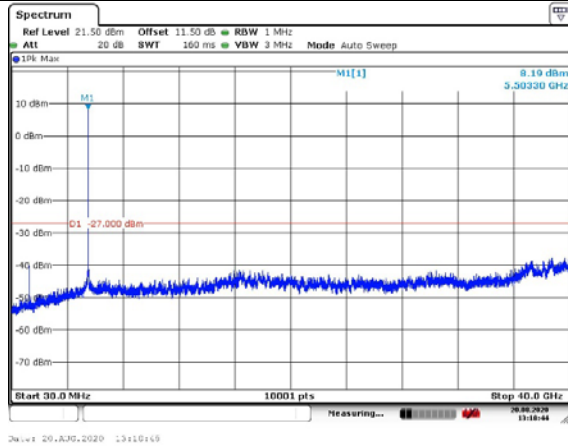
802.11a
Carrier frequency(MHz):5825



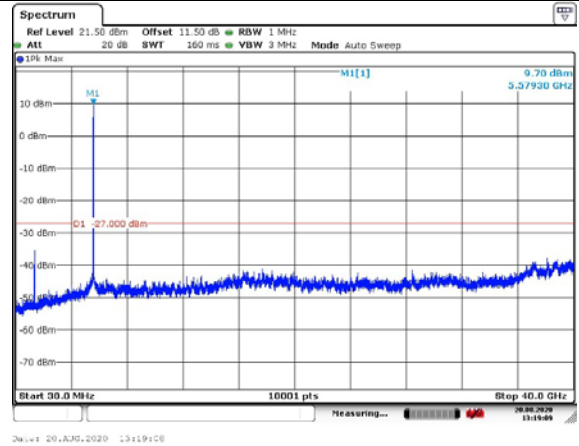
Test Mode: 802.11n HT20



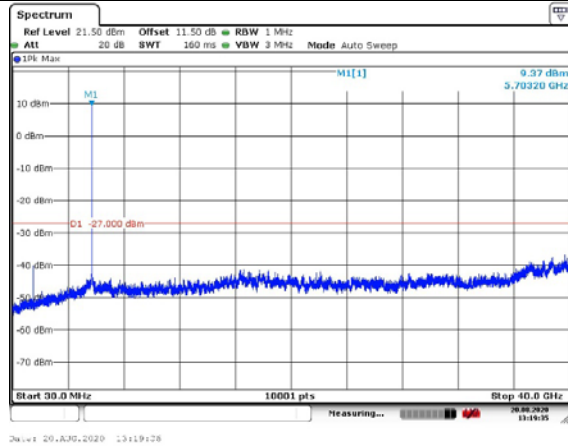
802.11n HT20
Carrier frequency(MHz):5500



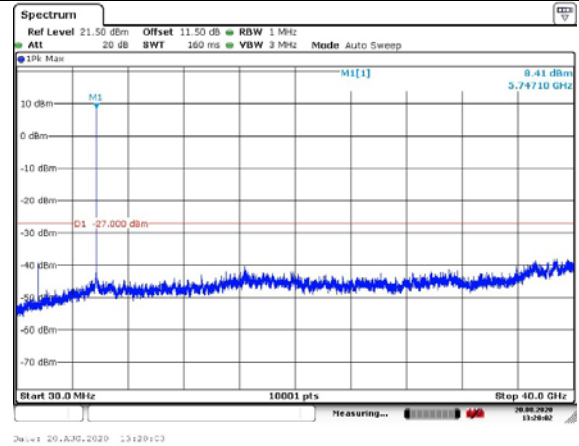
802.11n HT20
Carrier frequency(MHz):5580



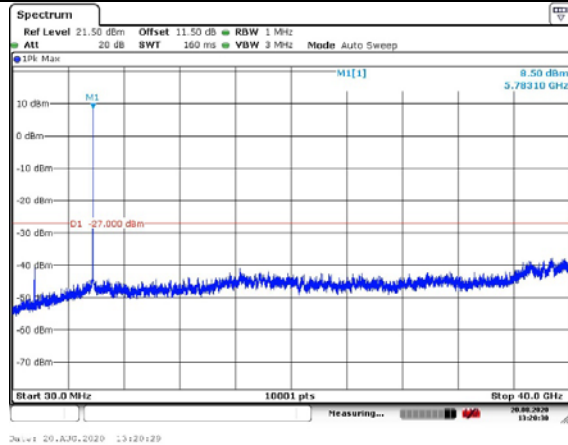
802.11n HT20
Carrier frequency(MHz):5700



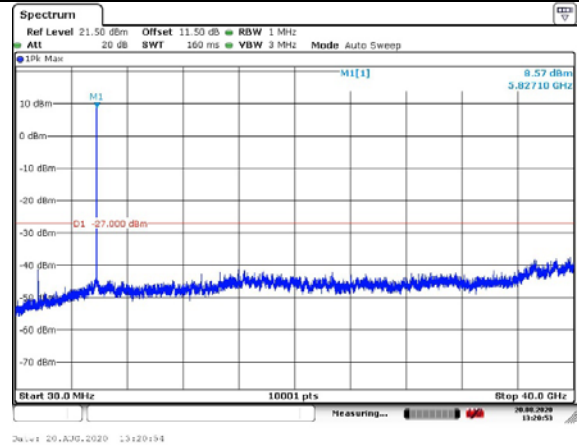
802.11n HT20
Carrier frequency(MHz):5745



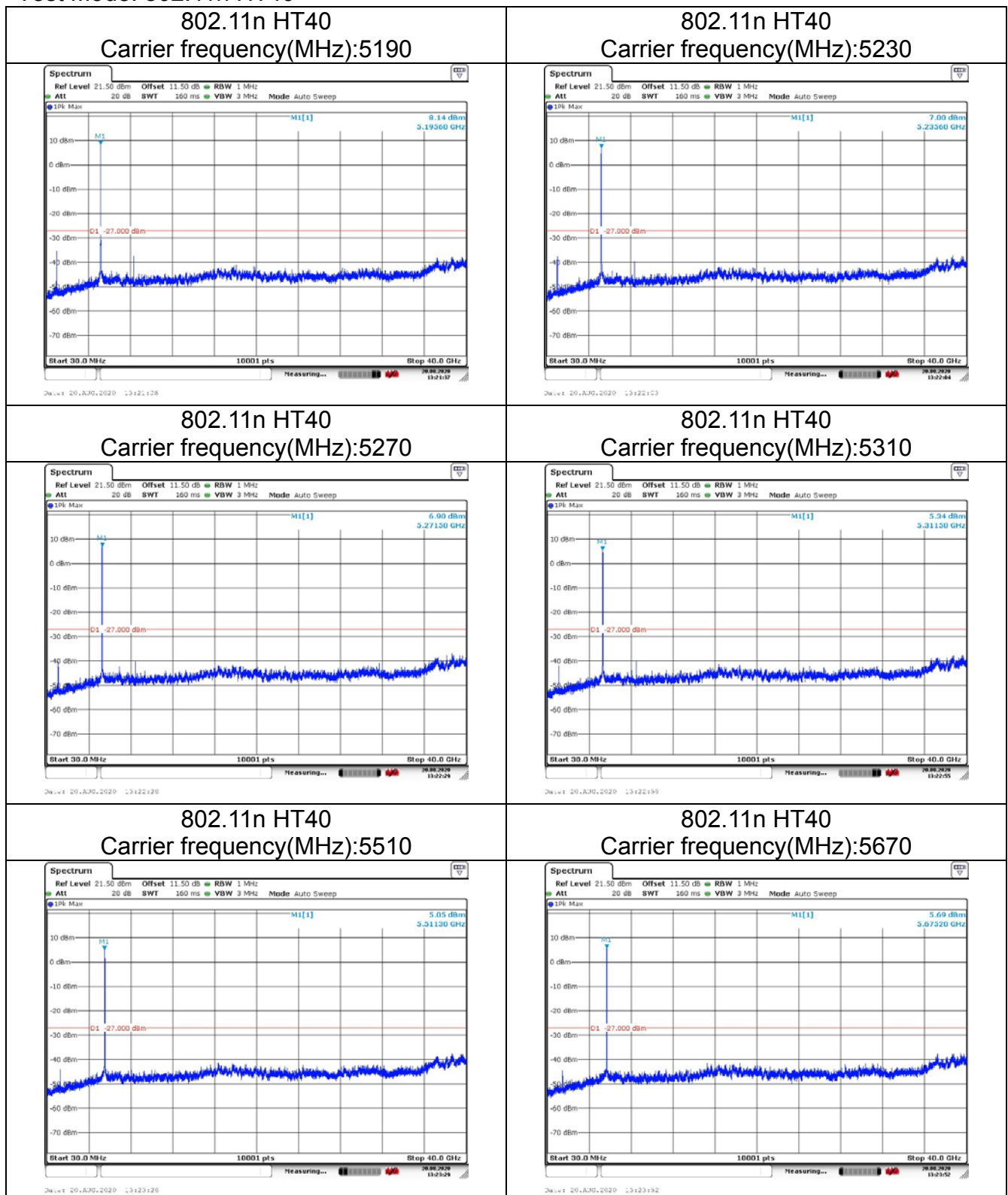
802.11n HT20
Carrier frequency(MHz):5785



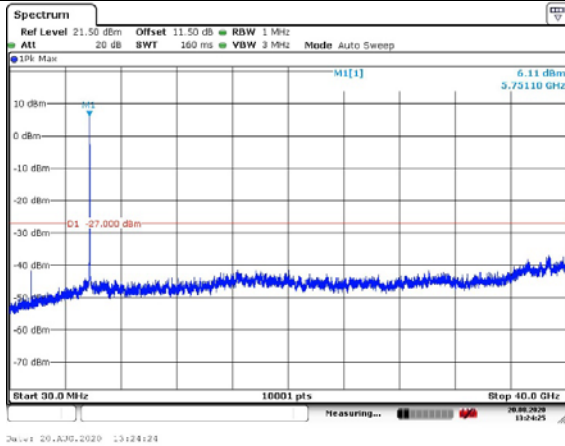
802.11n HT20
Carrier frequency(MHz):5825



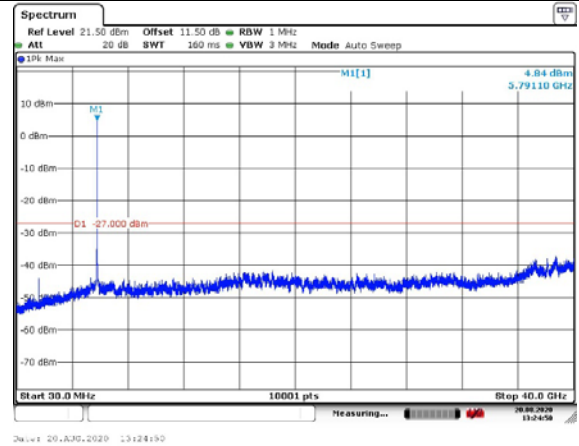
Test Mode: 802.11n HT40



802.11n HT40
Carrier frequency(MHz):5755

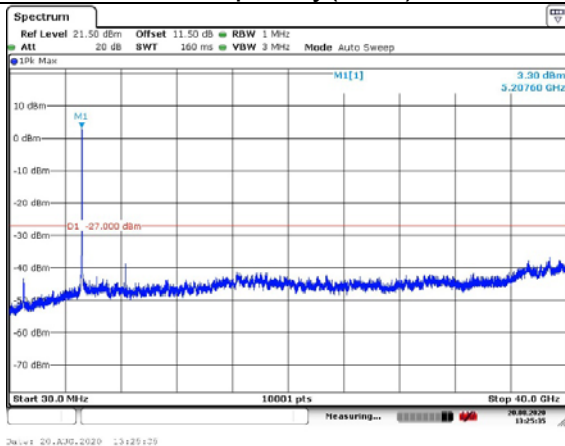


802.11n HT40
Carrier frequency(MHz):5795

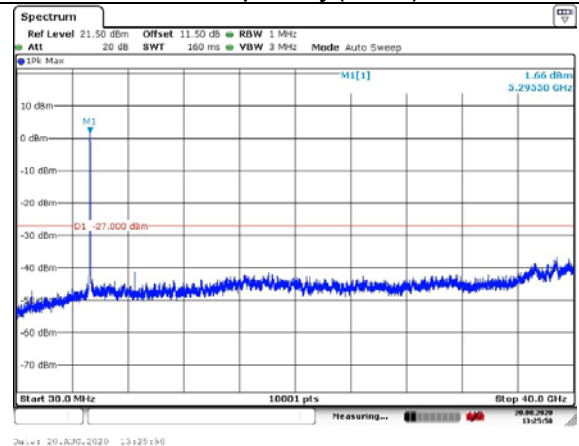


Test Mode: 802.11ac VHT80

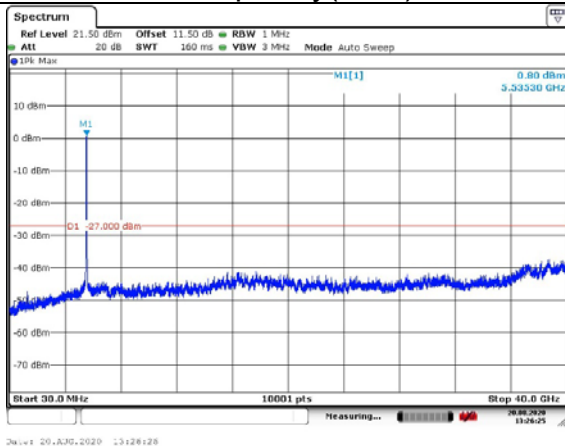
802.11ac VHT80
Carrier frequency(MHz):5210



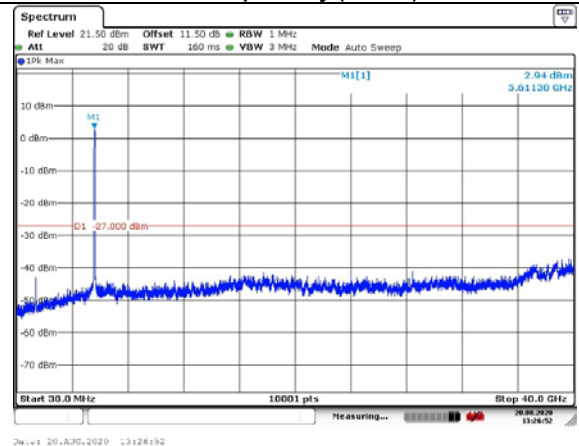
802.11ac VHT80
Carrier frequency(MHz):5290

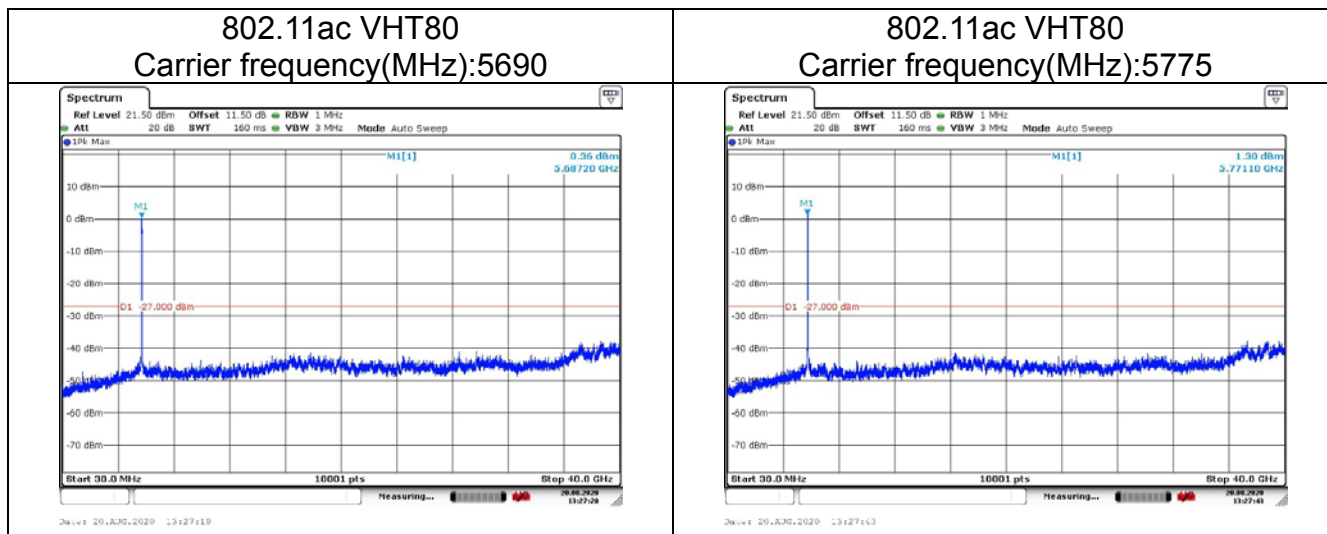


802.11ac VHT80
Carrier frequency(MHz):5530



802.11ac VHT80
Carrier frequency(MHz):5610





Frequency Stability

Band	Mode	Data Rate	Frequency (MHz)	Frequency Stability(ppm)	Voltage(V)	Temperature(°C)
U-NII-1	11a	6Mbps	5180	1.24	NV	-10
	11a	6Mbps	5180	-1.09	NV	0
	11a	6Mbps	5180	0.88	NV	+10
	11a	6Mbps	5180	-0.29	HV	+20
	11a	6Mbps	5180	1.28	LV	+20
	11a	6Mbps	5180	1.33	NV	+20
	11a	6Mbps	5180	1.25	NV	+30
	11a	6Mbps	5180	-0.96	NV	+40
	11a	6Mbps	5180	0.24	NV	+50
	11a	6Mbps	5180	1.24	NV	+55
U-NII-2A	11a	6Mbps	5320	1.31	NV	-10
	11a	6Mbps	5320	-1.16	NV	0
	11a	6Mbps	5320	-1.73	NV	+10
	11a	6Mbps	5320	1.88	HV	+20
	11a	6Mbps	5320	-1.08	LV	+20
	11a	6Mbps	5320	1.33	NV	+20
	11a	6Mbps	5320	-0.29	NV	+30
	11a	6Mbps	5320	1.28	NV	+40
	11a	6Mbps	5320	-1.24	NV	+50
	11a	6Mbps	5320	-1.10	NV	+55
U-NII-2C	11a	6Mbps	5500	-0.41	NV	-10
	11a	6Mbps	5500	-0.27	NV	0
	11a	6Mbps	5500	-1.00	NV	+10
	11a	6Mbps	5500	0.60	HV	+20
	11a	6Mbps	5500	0.40	LV	+20
	11a	6Mbps	5500	-0.58	NV	+20
	11a	6Mbps	5500	-0.30	NV	+30
	11a	6Mbps	5500	-1.28	NV	+40
	11a	6Mbps	5500	-0.29	NV	+50
	11a	6Mbps	5500	-1.98	NV	+55
U-NII-3	11a	6Mbps	5825	-0.65	NV	-10
	11a	6Mbps	5825	-0.89	NV	0
	11a	6Mbps	5825	-1.43	NV	+10
	11a	6Mbps	5825	0.88	HV	+20
	11a	6Mbps	5825	-0.30	LV	+20
	11a	6Mbps	5825	-1.16	NV	+20
	11a	6Mbps	5825	-2.04	NV	+30
	11a	6Mbps	5825	-0.56	NV	+40
	11a	6Mbps	5825	0.42	NV	+50
	11a	6Mbps	5825	1.32	NV	+55

Dynamic Frequency Selection

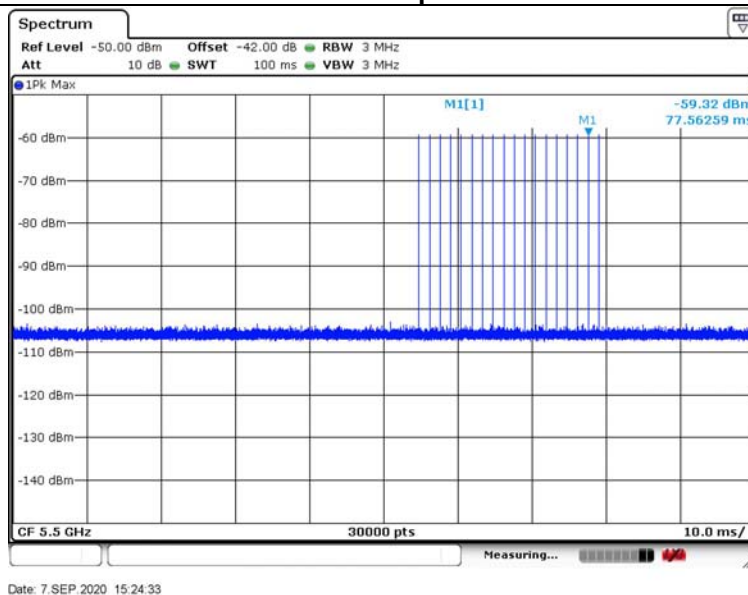
DESCRIPTION OF Master Device

The Master Device is a SKSpruce Technologies Co., Ltd., Indoor Access Point, FCC ID: 2AHKT-WIA3300-20. The rated output power of the Master unit is > 23dBm (EIRP). Therefore the required interference threshold level is -64 dBm.

Radar Waveform Calibration Result

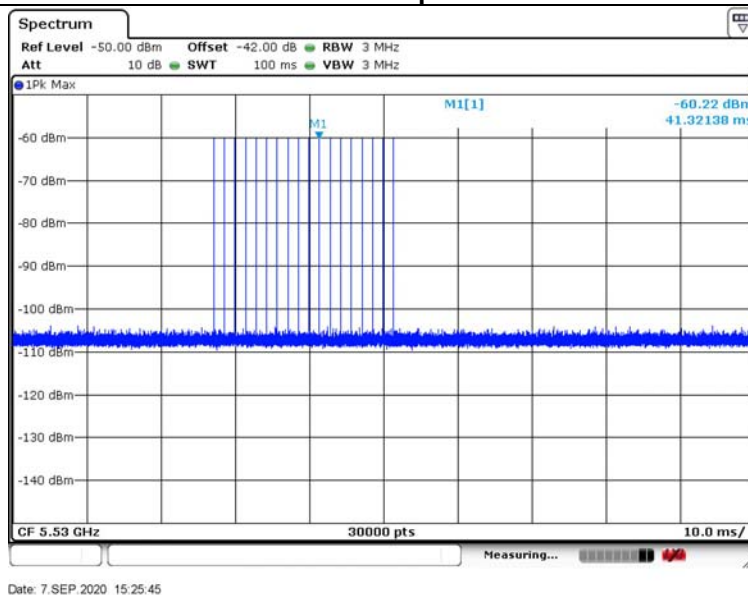
<20MHz / 5500 MHz> Radar Type 0

Radar / DFS detection threshold level and the burst of pulses on the Channel frequency

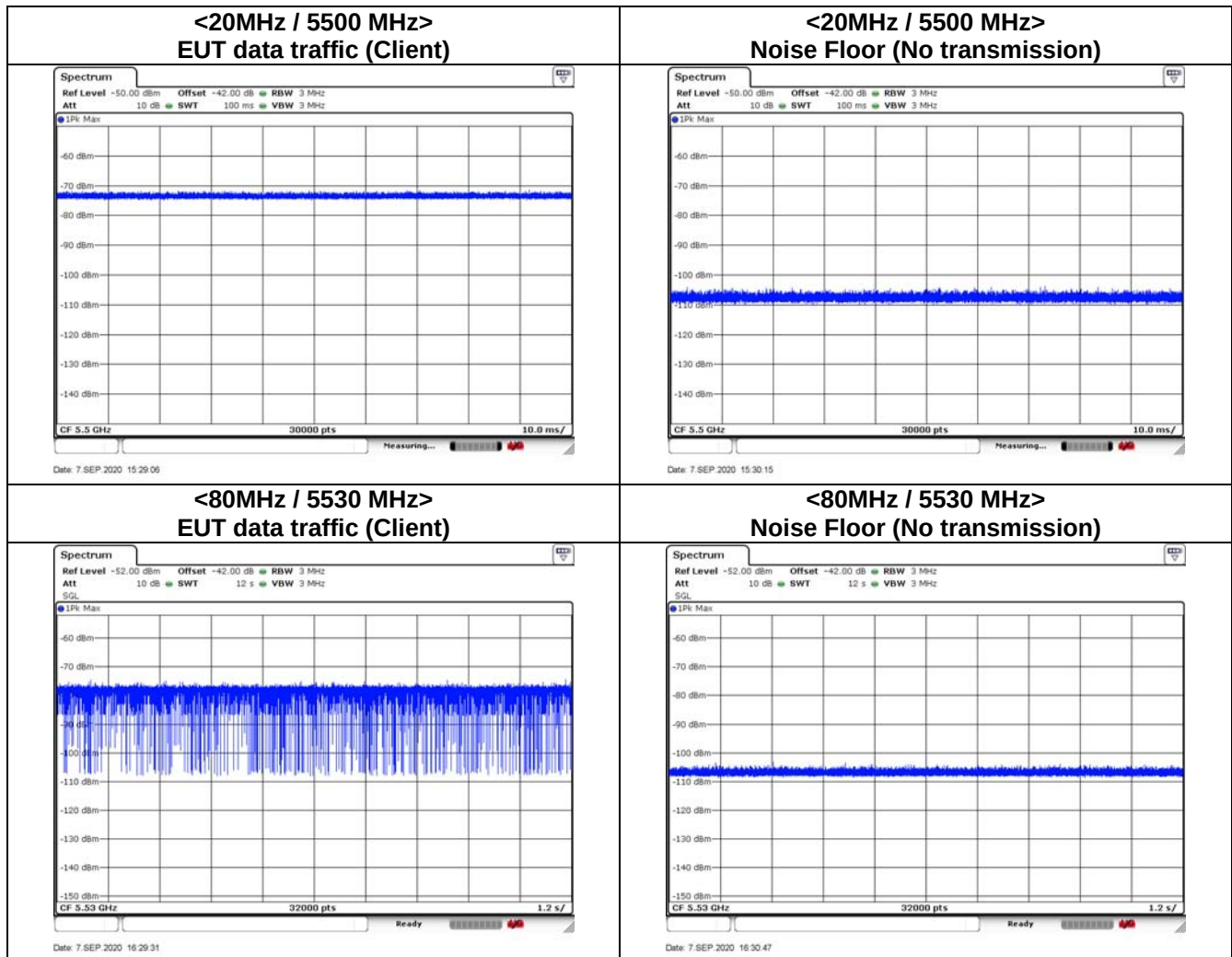


<80MHz / 5530 MHz> Radar Type 0

Radar / DFS detection threshold level and the burst of pulses on the Channel frequency



Data Traffic and Noise Floor Plots

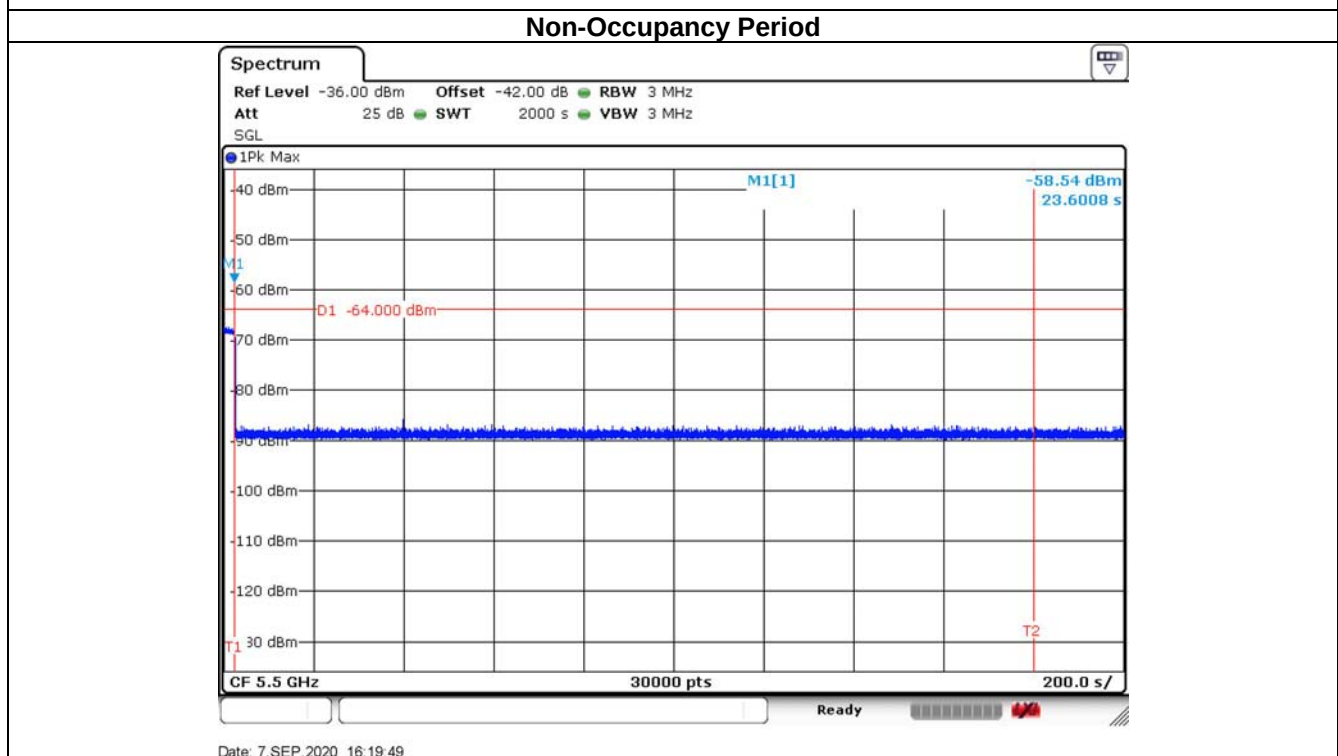
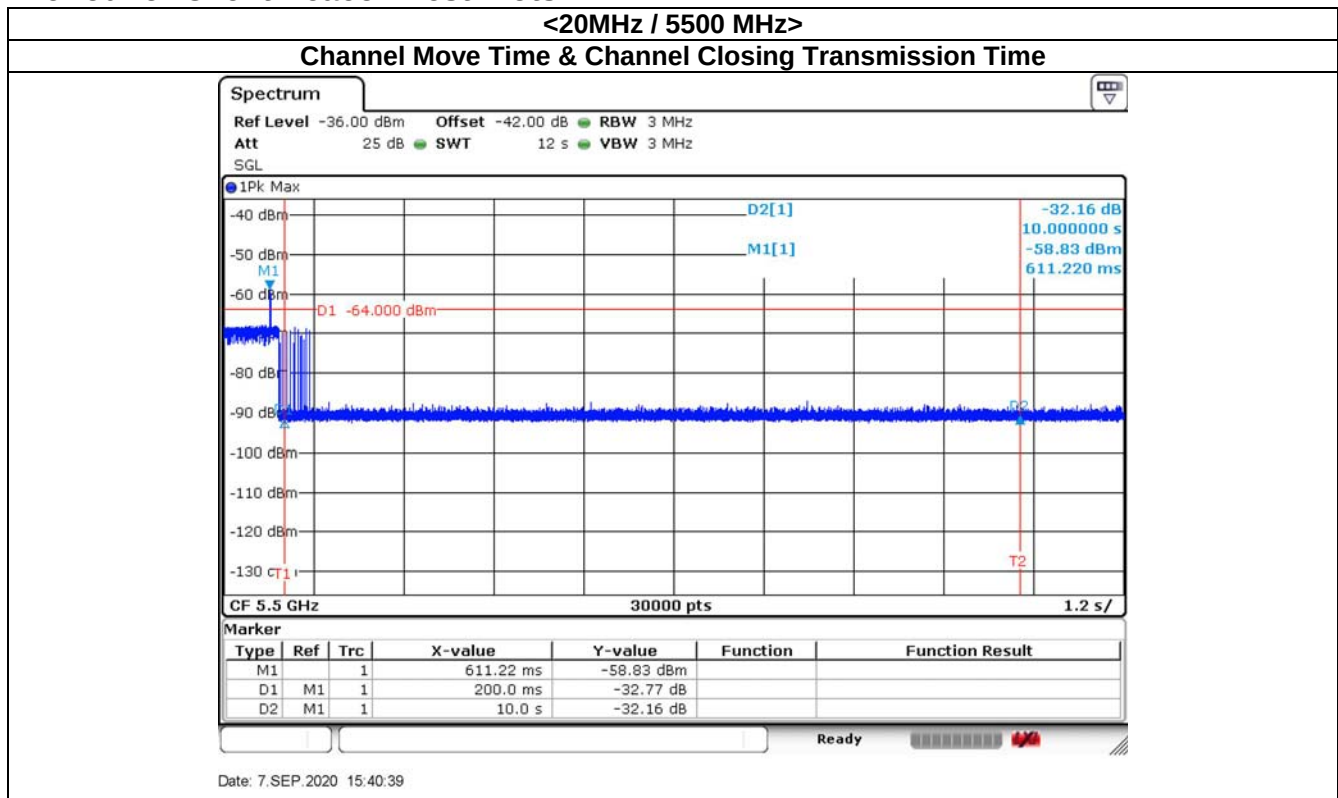


Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period for Client Beacon Test

Frequency	Test Item	Test Result	Limit	Pass/Fail
5500MHz	Channel Move Time	< 10s*	< 10s	Pass
	Channel Closing Transmission Time	200ms +4ms	< 260ms	Pass
	Non-Occupancy Period	≥ 30	≥ 30 min	Pass
5530MHz	Channel Move Time	< 10s*	< 10s	Pass
	Channel Closing Transmission Time	200ms +2.4ms	< 260ms	Pass
	Non-Occupancy Period	≥ 30	≥ 30 min	Pass

Note*: We notice clearly that “Channel Move Time” is less than 10s from the figure. The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 seconds period. The aggregate duration of control signals will not count quiet periods in between transmissions.

Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period for Client Beacon Test Plots

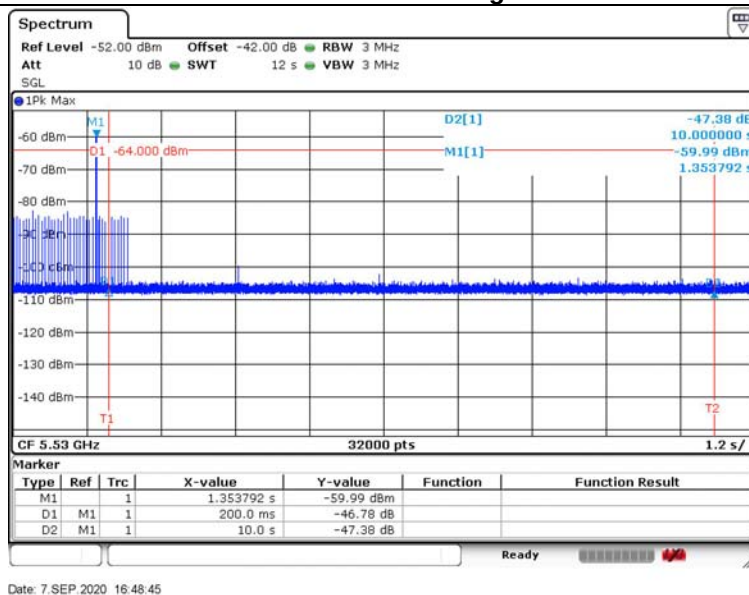


Note:

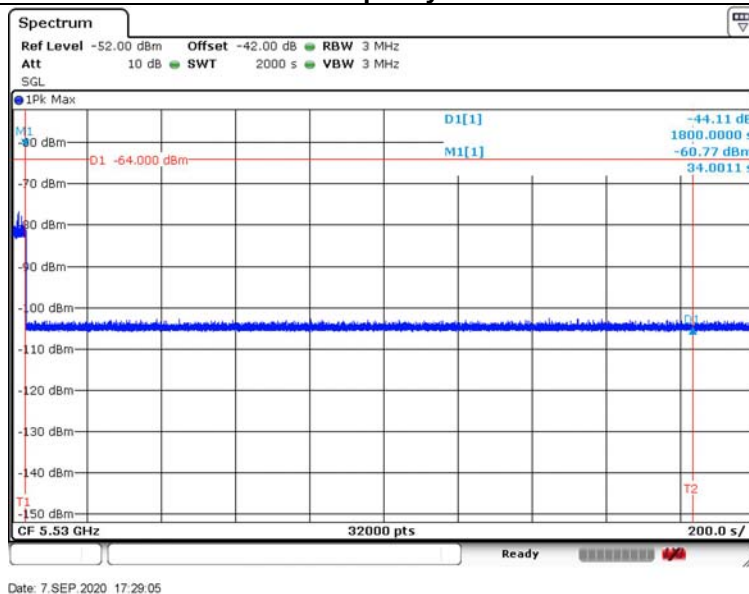
Dwell (0.4 ms) = Sweep Time (12000 ms) / Sweep Point Bins (30000)
Channel Closing Transmission Time (200 + 4 ms) = 200 + Number of beacon after 200ms(10) X Dwell (0.4 ms)
< 260ms

<80MHz / 5530MHz>

Channel Move Time & Channel Closing Transmission Time



Non-Occupancy Period



Note:

Dwell (0.4 ms)= Sweep Time (12000 ms) / Sweep Point Bins (30000)

Channel Closing Transmission Time (200 + 2.4 ms) = 200 + Number of beacon after 200ms(6) X Dwell (0.4 ms) < 260ms