

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	98.72	0.056
802.11n HT20	97.92	0.091
802.11n HT40	95.94	0.180
802.11ac VHT20	97.34	0.117
802.11ac VHT40	95.87	0.183
802.11ac VHT80	92.37	0.345

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

Output Power

Band	Test Mode	Frequency (MHz)	Average Power (dBm)	Limit(dBm)
U-NII-1	802.11a	5180	11.34	24.0
	802.11a	5200	11.41	24.0
	802.11a	5240	11.42	24.0
	802.11n HT20	5180	11.25	24.0
	802.11n HT20	5200	11.21	24.0
	802.11n HT20	5240	11.26	24.0
	802.11n HT40	5190	10.53	24.0
	802.11n HT40	5230	10.55	24.0
	802.11ac VHT20	5180	11.21	24.0
	802.11ac VHT20	5200	11.13	24.0
	802.11ac VHT20	5240	11.22	24.0
	802.11ac VHT40	5190	10.18	24.0
	802.11ac VHT40	5230	10.38	24.0
	802.11ac VHT80	5210	9.38	24.0
U-NII-2A	802.11a	5260	11.67	24.0
	802.11a	5300	11.69	24.0
	802.11a	5320	11.73	24.0
	802.11n HT20	5260	11.55	24.0
	802.11n HT20	5300	11.59	24.0
	802.11n HT20	5320	11.67	24.0
	802.11n HT40	5270	10.89	24.0
	802.11n HT40	5310	10.92	24.0
	802.11ac VHT20	5260	11.12	24.0
	802.11ac VHT20	5300	11.17	24.0
	802.11ac VHT20	5320	11.15	24.0
	802.11ac VHT40	5270	10.32	24.0
	802.11ac VHT40	5310	10.25	24.0
	802.11ac VHT80	5290	9.94	24.0

Band	Test Mode	Frequency (MHz)	Average Power (dBm)	Limit(dBm)
U-NII-2C	802.11a	5500	11.43	24.0
	802.11a	5580	11.38	24.0
	802.11a	5700	11.42	24.0
	802.11n HT20	5500	11.33	24.0
	802.11n HT20	5580	11.37	24.0
	802.11n HT20	5700	11.34	24.0
	802.11n HT40	5510	10.88	24.0
	802.11n HT40	5670	10.84	24.0
	802.11ac VHT20	5500	10.82	24.0
	802.11ac VHT20	5580	11.11	24.0
	802.11ac VHT20	5720	11.10	24.0
	802.11ac VHT40	5510	10.67	24.0
	802.11ac VHT40	5590	10.63	24.0
	802.11ac VHT40	5710	10.63	24.0
	802.11ac VHT80	5530	10.09	24.0
	802.11ac VHT80	5610	10.12	24.0
	802.11ac VHT80	5690	10.14	24.0
U-NII-3	802.11a	5745	11.43	30.0
	802.11a	5785	11.38	30.0
	802.11a	5825	11.42	30.0
	802.11n HT20	5745	11.27	30.0
	802.11n HT20	5785	11.30	30.0
	802.11n HT20	5825	11.31	30.0
	802.11n HT40	5755	10.68	30.0
	802.11n HT40	5795	10.63	30.0
	802.11ac VHT20	5720	10.67	30.0
	802.11ac VHT20	5745	11.13	30.0
	802.11ac VHT20	5785	11.17	30.0
	802.11ac VHT20	5825	11.14	30.0
	802.11ac VHT40	5710	10.33	30.0
	802.11ac VHT40	5755	10.31	30.0
	802.11ac VHT40	5795	10.28	30.0
	802.11ac VHT80	5690	9.87	30.0
	802.11ac VHT80	5775	9.91	30.0

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

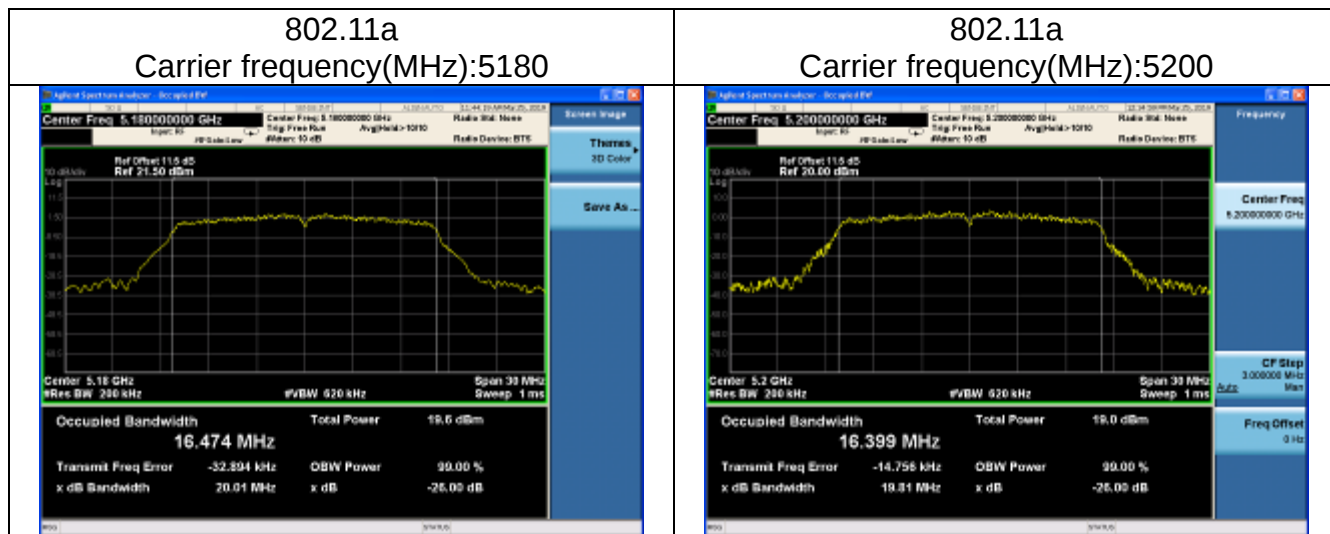
Test Mode	Note
802.11a	---
802.11n HT20	Cover 802.11ac VHT20
802.11n HT40	Cover 802.11ac VHT40
802.11ac VHT80	---

Occupied Bandwidth

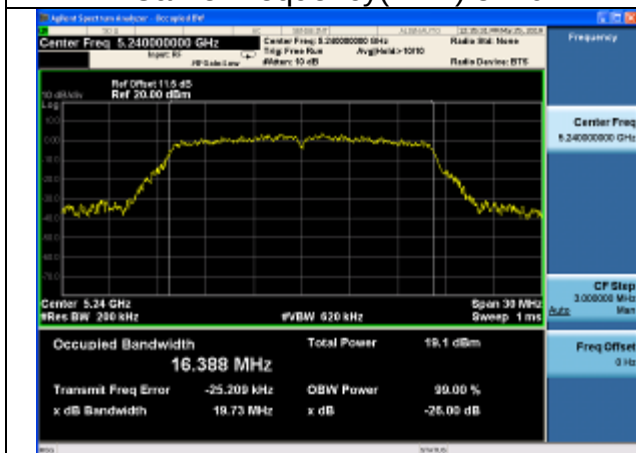
Offset 11.5dB = Attenuator 10dB+ Temporary antenna connector loss 0.2dB+ Cable loss 1.3dB

Test Mode: 802.11a

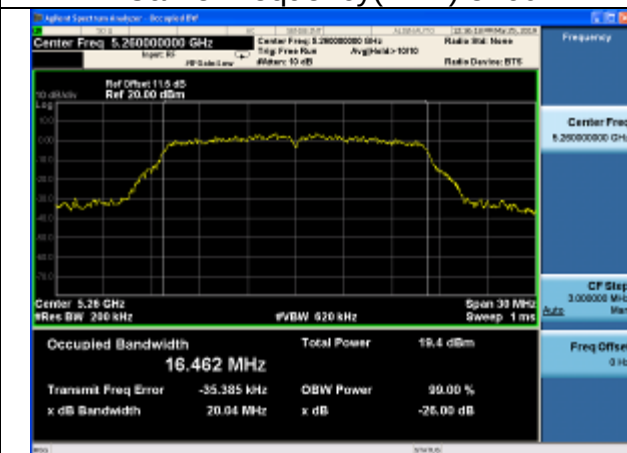
Carrier frequency (MHz)	99% Bandwidth(MHz)	Minimum 26dB Bandwidth(MHz)	Conclusion
5180	16.474	20.01	pass
5200	16.399	19.81	pass
5240	16.388	19.73	pass
5260	16.462	20.04	pass
5300	16.456	20.02	pass
5320	16.437	19.94	pass
5500	16.481	20.08	pass
5580	16.495	19.96	pass
5700	16.504	19.96	pass
5745	16.449	19.93	pass
5785	16.457	19.93	pass
5825	16.438	19.81	pass



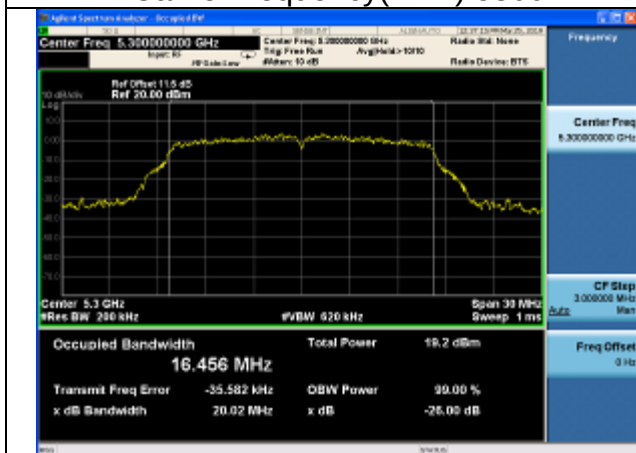
802.11a
Carrier frequency(MHz):5240



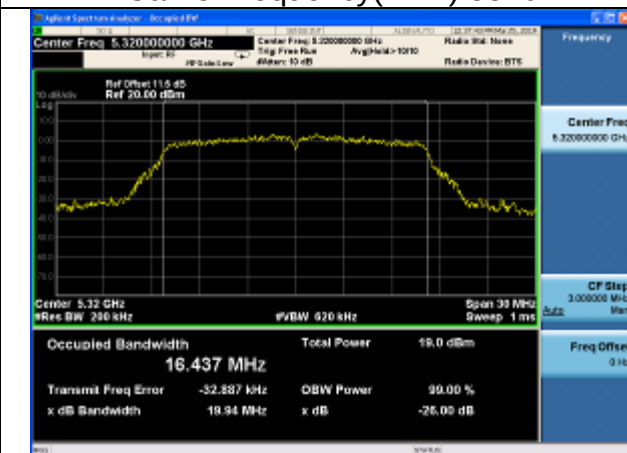
802.11a
Carrier frequency(MHz):5260



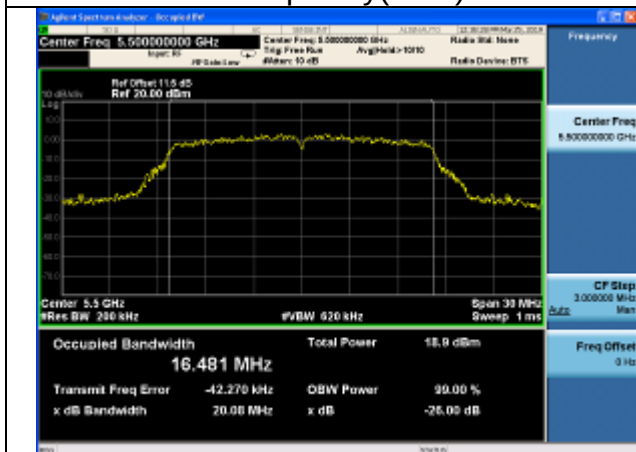
802.11a
Carrier frequency(MHz):5300



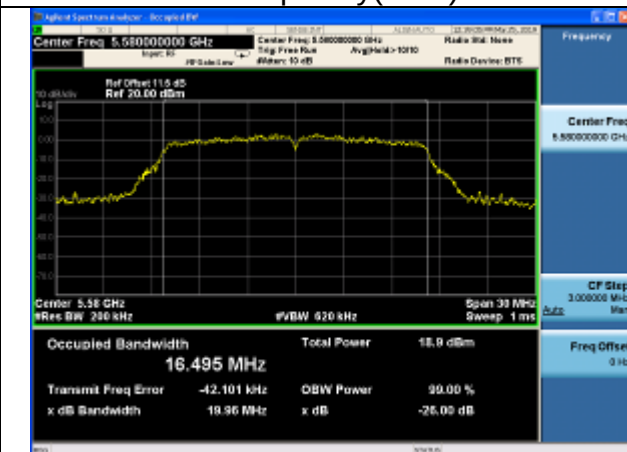
802.11a
Carrier frequency(MHz):5320

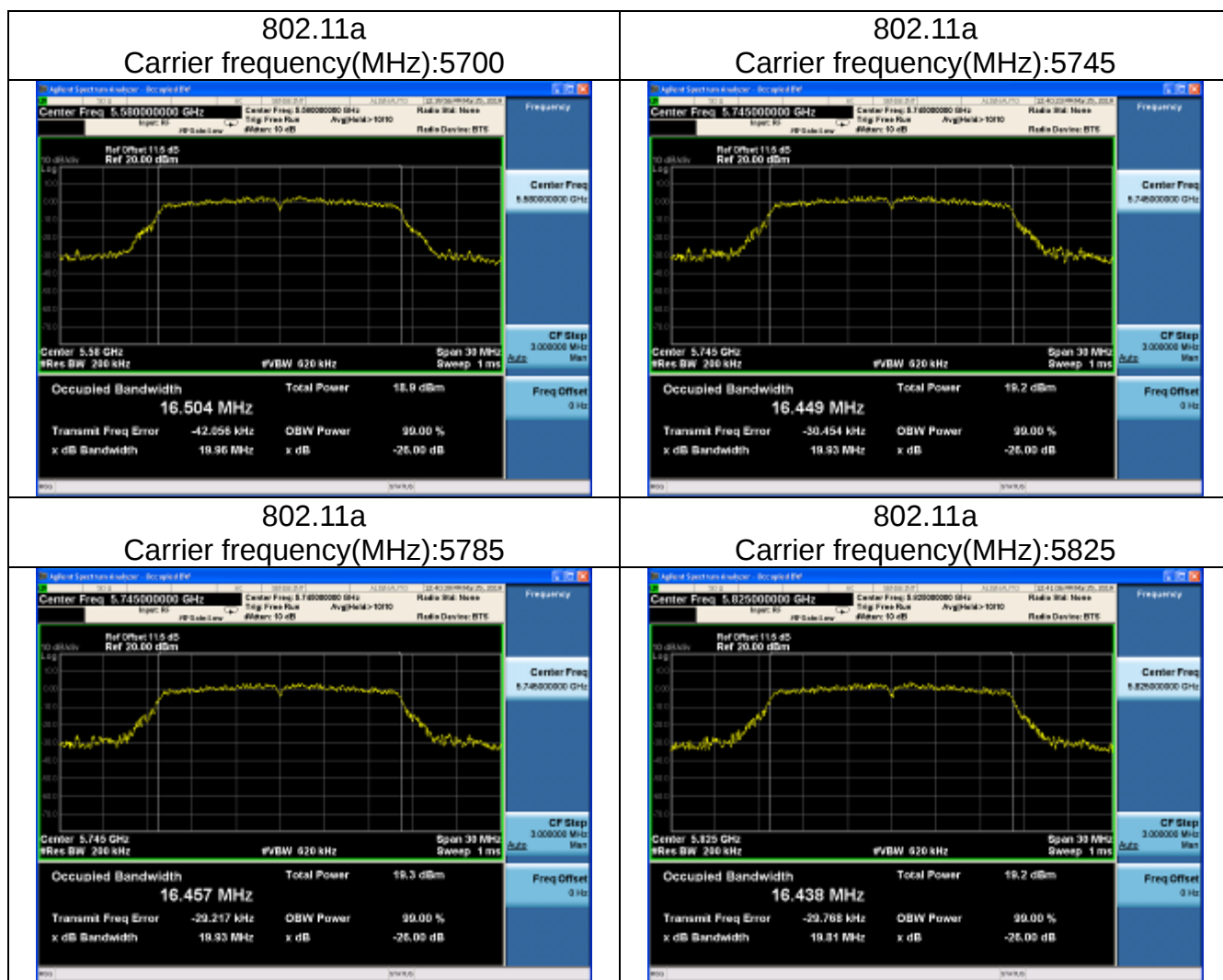


802.11a
Carrier frequency(MHz):5500



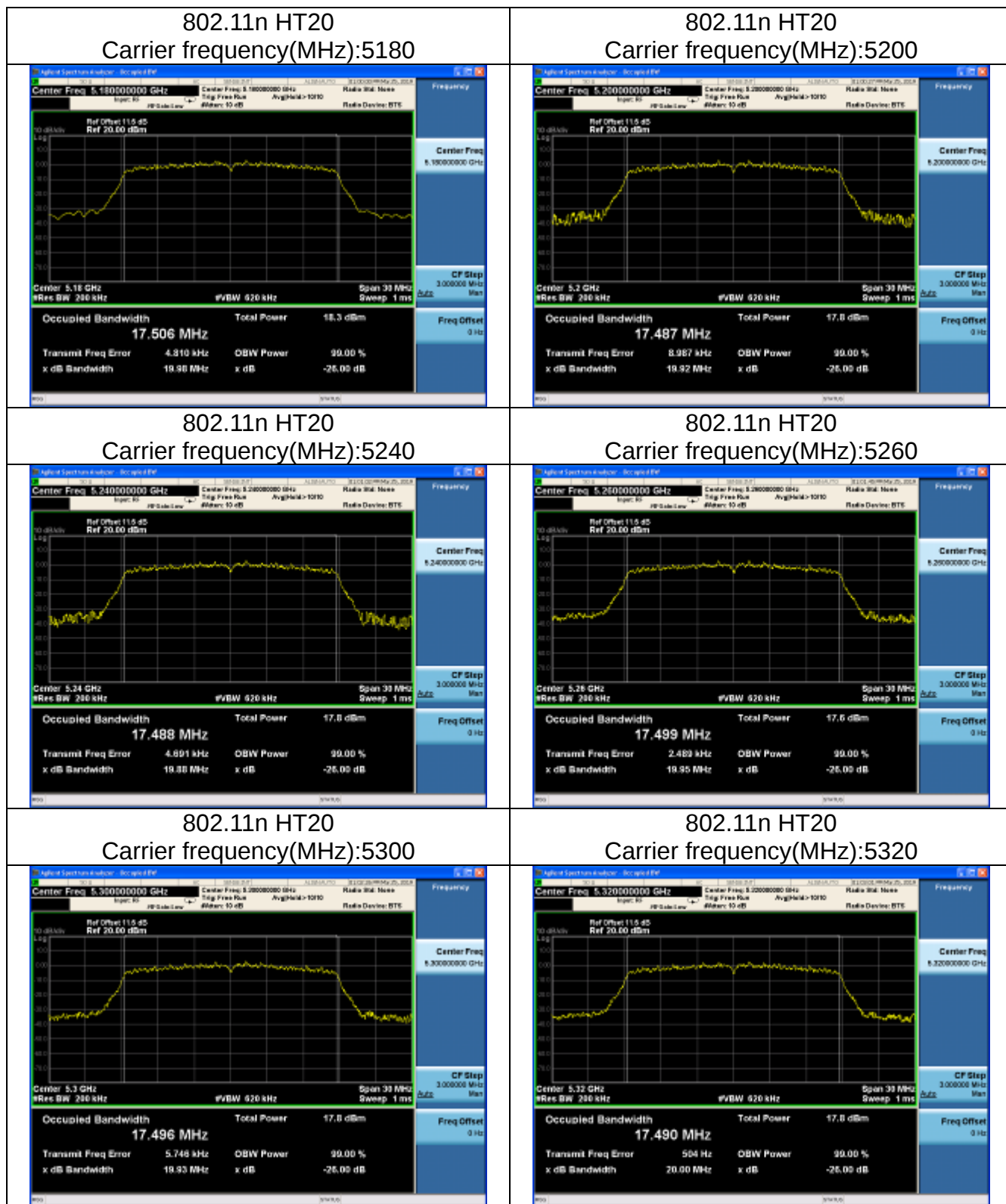
802.11a
Carrier frequency(MHz):5580



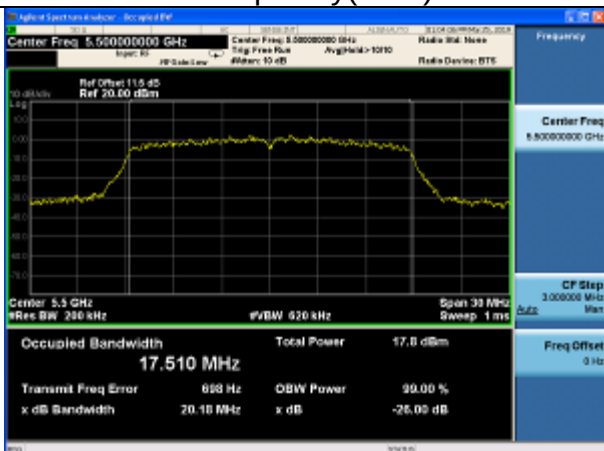


Test Mode: 802.11n HT20

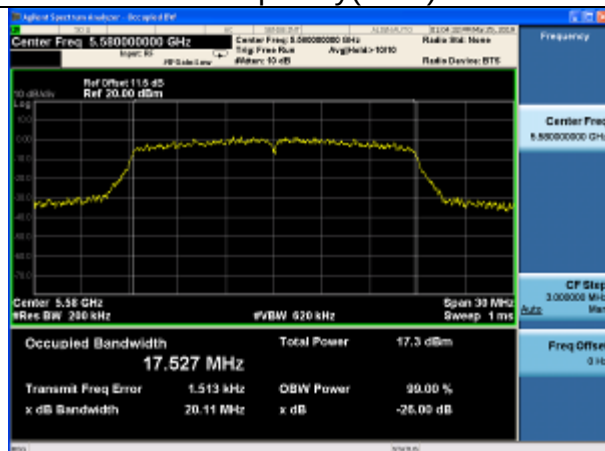
Carrier frequency (MHz)	99% Bandwidth(MHz)	Minimum 26dB Bandwidth(MHz)	Conclusion
5180	17.506	19.98	pass
5200	17.487	19.92	pass
5240	17.488	19.88	pass
5260	17.499	19.95	pass
5300	17.496	19.93	pass
5320	17.490	20.00	pass
5500	17.510	20.18	pass
5580	17.527	20.11	pass
5700	17.501	19.93	pass
5745	17.519	20.08	pass
5785	17.507	19.88	pass
5825	17.570	20.16	pass



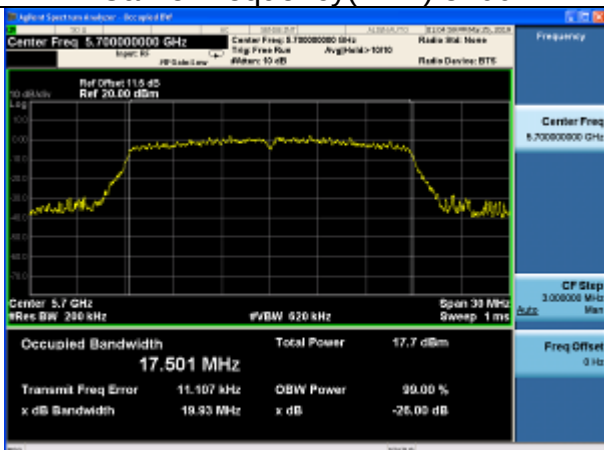
802.11n HT20
Carrier frequency(MHz):5500



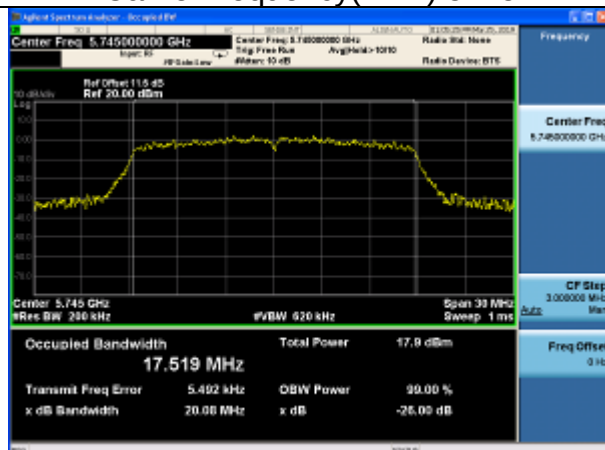
802.11n HT20
Carrier frequency(MHz):5580



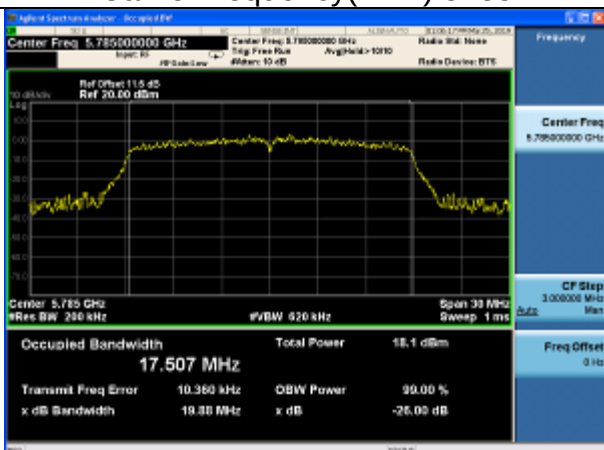
802.11n HT20
Carrier frequency(MHz):5700



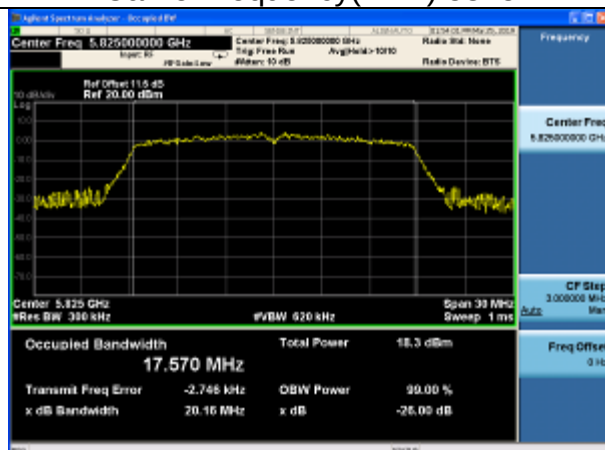
802.11n HT20
Carrier frequency(MHz):5745



802.11n HT20
Carrier frequency(MHz):5785

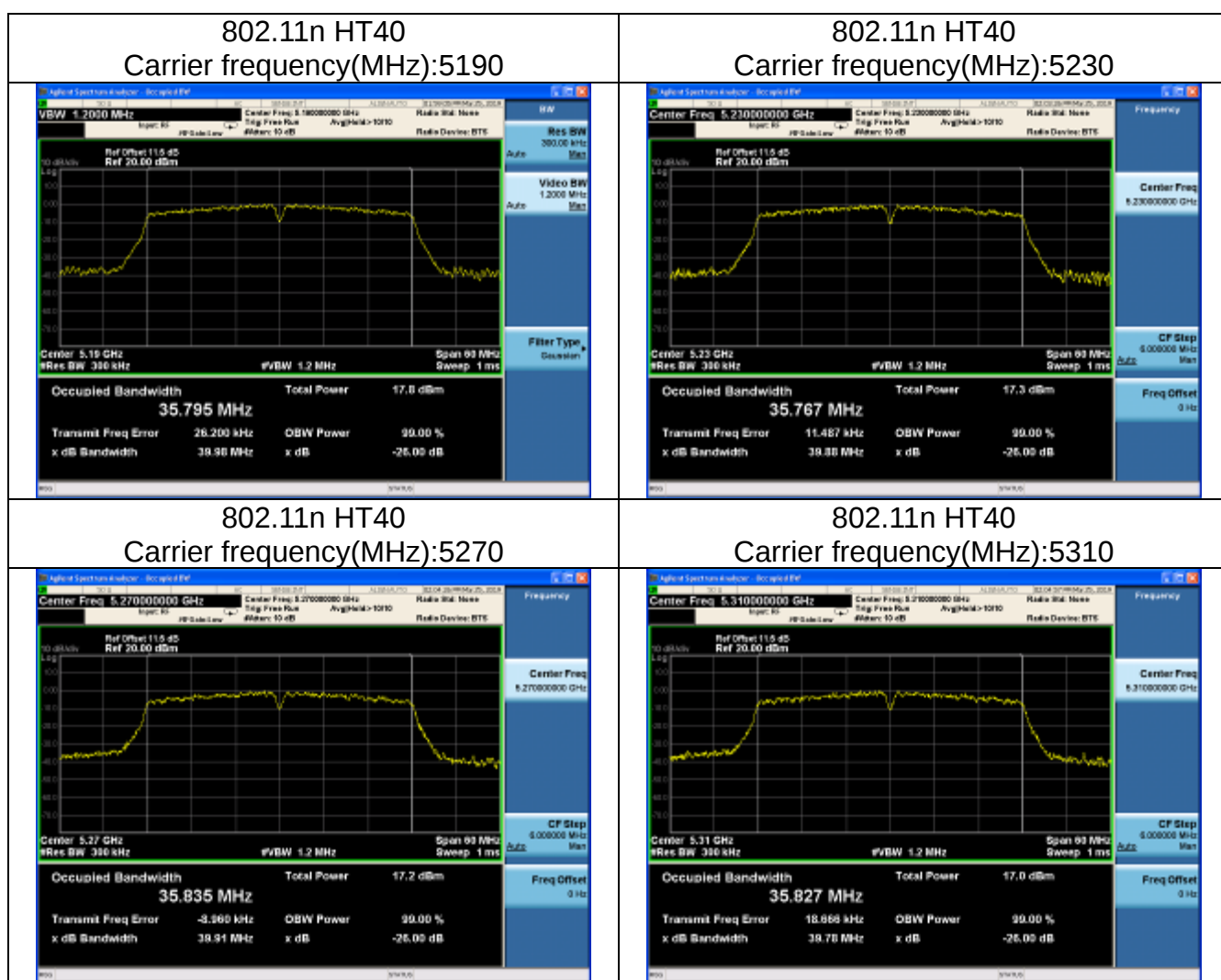


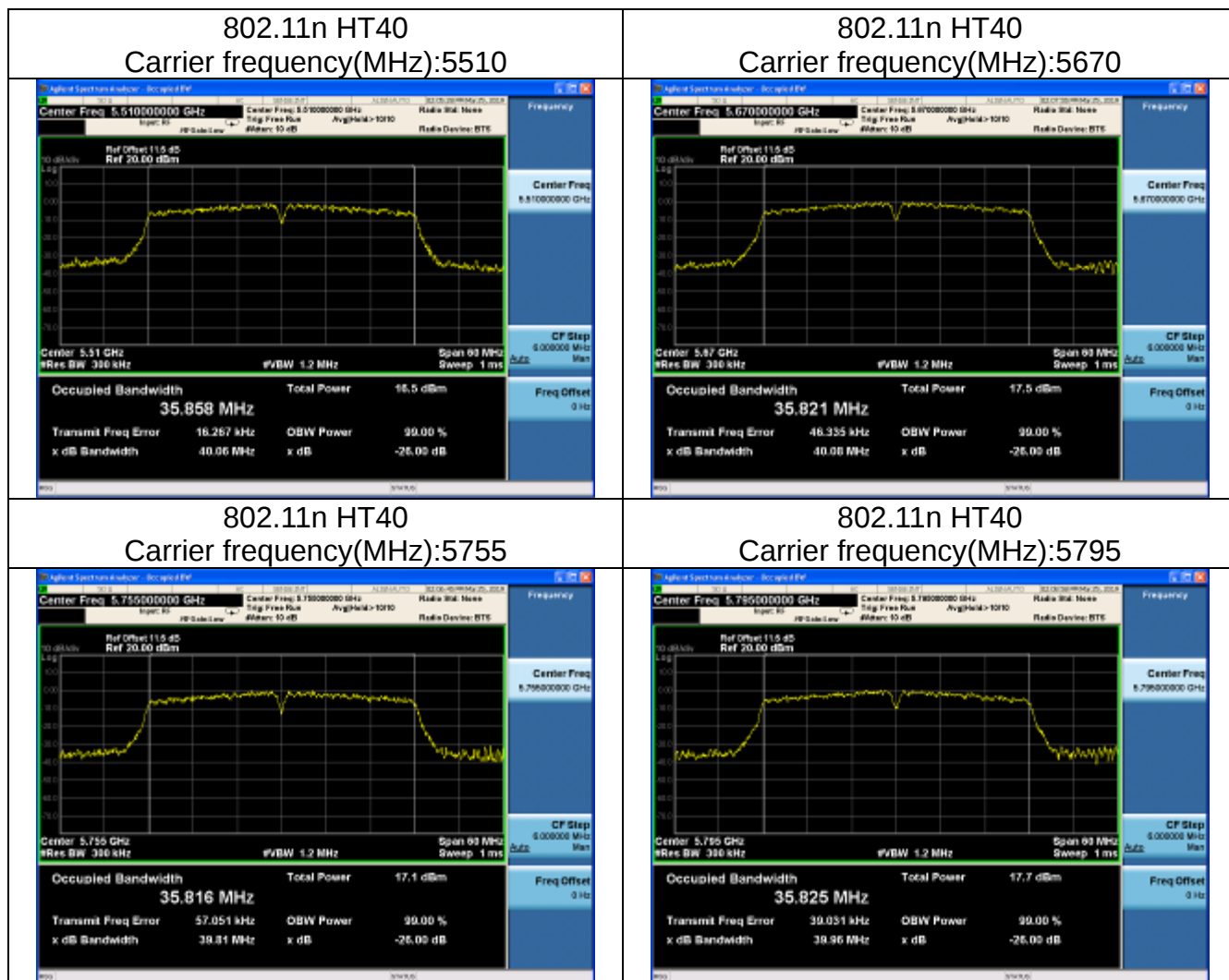
802.11n HT20
Carrier frequency(MHz):5825



Test Mode: 802.11n HT40

Carrier frequency (MHz)	99% Bandwidth(MHz)	Minimum 26dB Bandwidth(MHz)	Conclusion
5190	35.795	39.98	pass
5230	35.765	39.88	pass
5270	35.835	39.91	pass
5310	35.825	19.78	pass
5510	35.858	40.06	pass
5670	35.821	40.08	pass
5755	35.816	39.81	pass
5795	35.825	39.96	pass

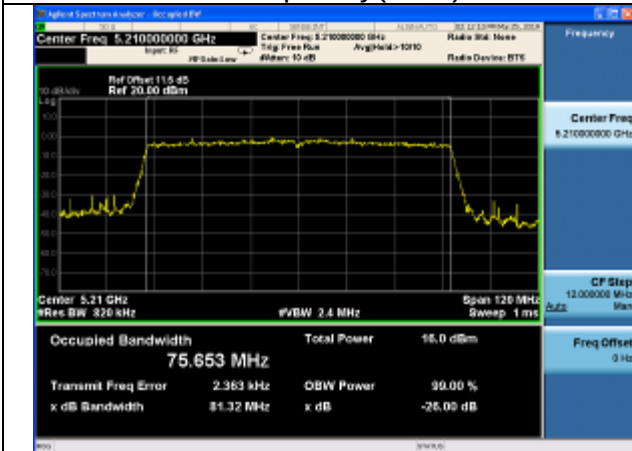




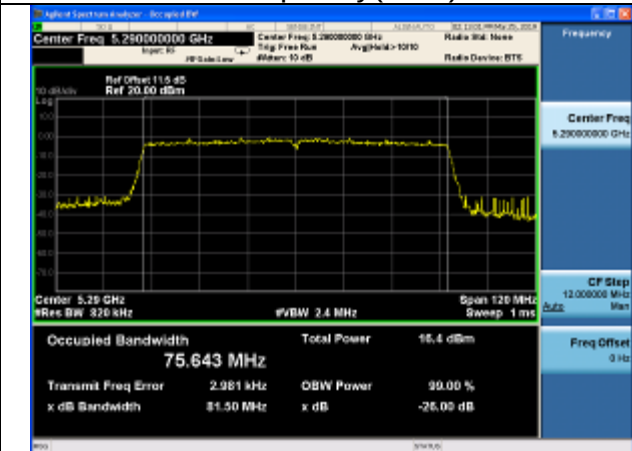
Test Mode: 802.11ac VHT80

Carrier frequency (MHz)	99% Bandwidth(MHz)	Minimum 26dB Bandwidth(MHz)	Conclusion
5210	75.653	81.32	pass
5290	75.643	81.50	pass
5530	75.696	81.37	pass
5610	75.751	81.50	pass
5690	75.626	81.25	pass
5775	75.643	81.20	pass

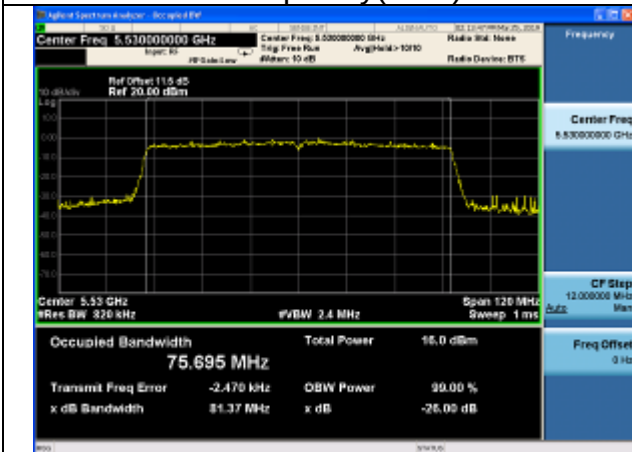
802.11ac VHT80
Carrier frequency(MHz):5210



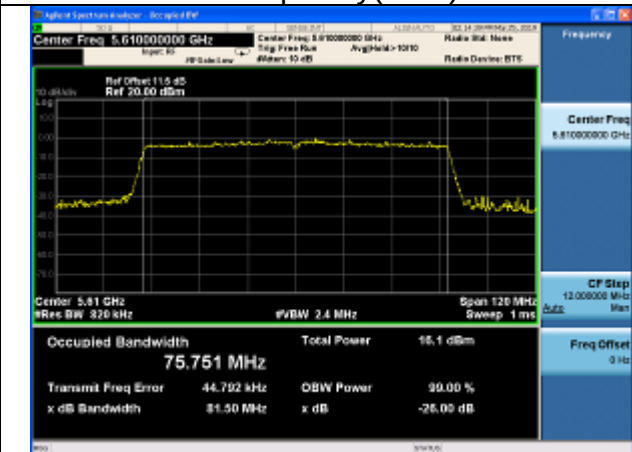
802.11ac VHT80
Carrier frequency(MHz):5290



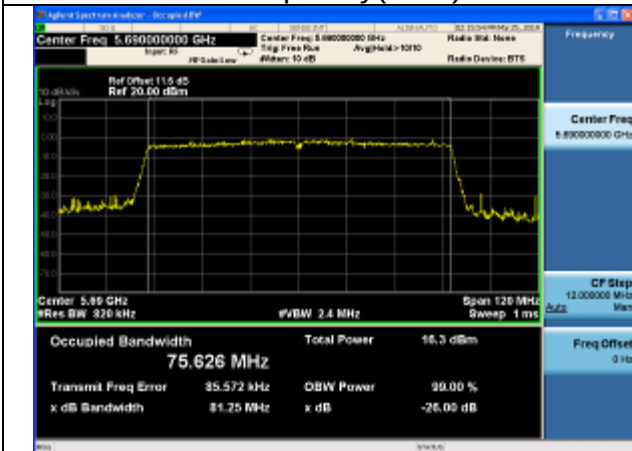
802.11ac VHT80
Carrier frequency(MHz):5530



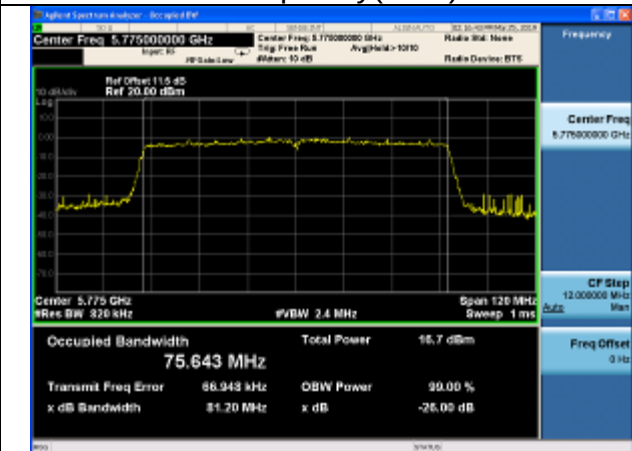
802.11ac VHT80
Carrier frequency(MHz):5610



802.11ac VHT80
Carrier frequency(MHz):5690



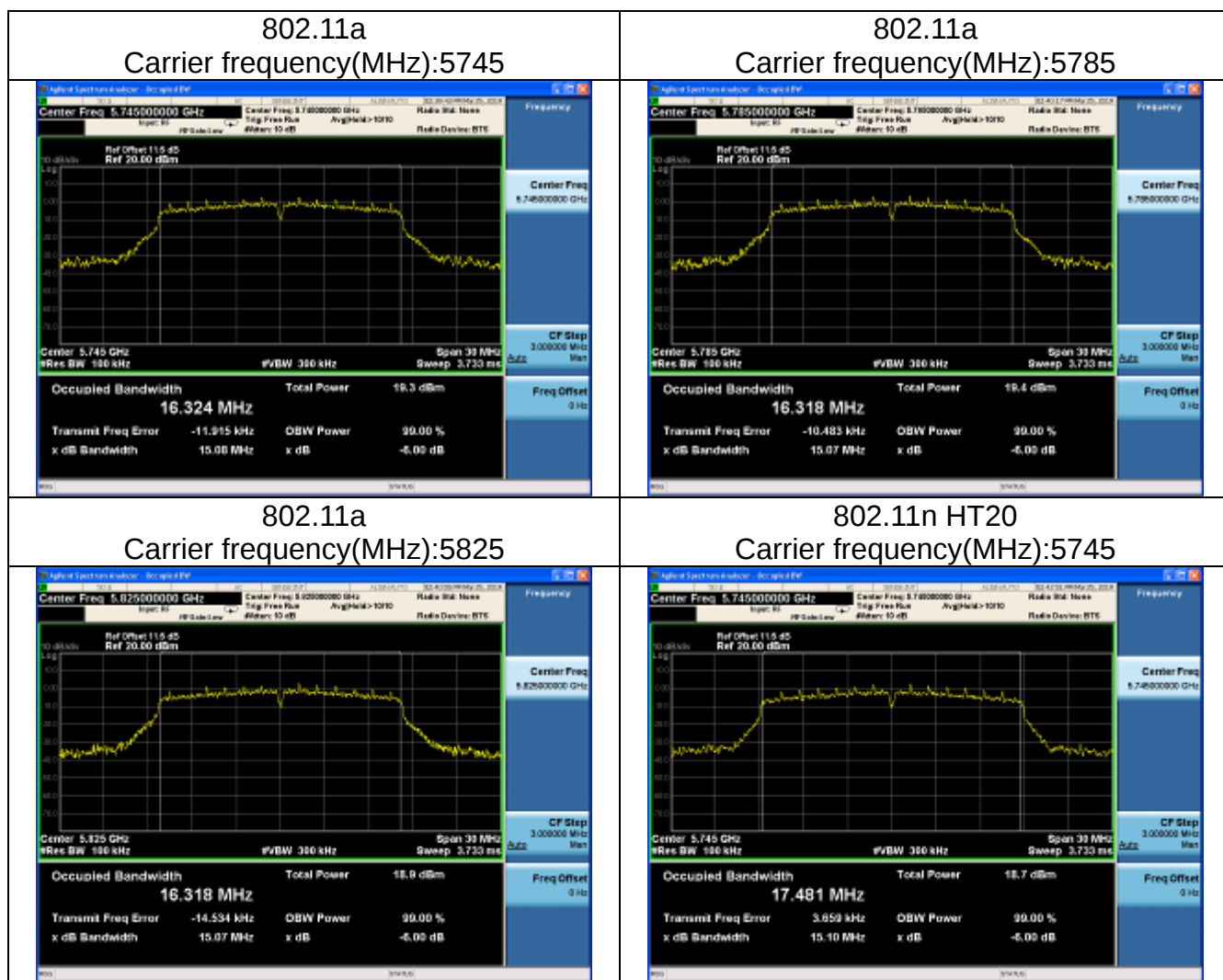
802.11ac VHT80
Carrier frequency(MHz):5775



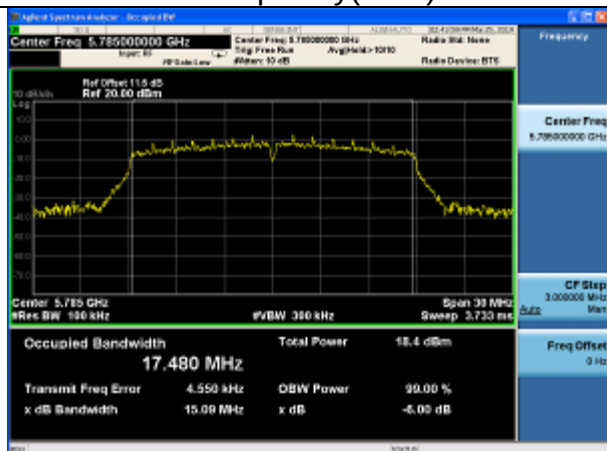
6dB Bandwidth

Test Mode: 802.11a

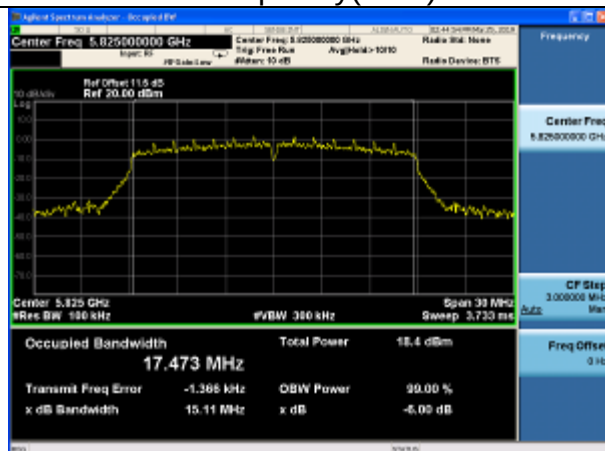
Test Mode	Carrier frequency (MHz)	6dB Bandwidth(MHz)	Minimum Limit (MHz)	Conclusion
802.11a	5745	15.08	0.5	pass
802.11a	5785	15.07	0.5	pass
802.11a	5825	15.07	0.5	pass
802.11n HT20	5745	15.10	0.5	pass
802.11n HT20	5785	15.09	0.5	pass
802.11n HT20	5825	15.11	0.5	pass
802.11n HT40	5755	35.09	0.5	pass
802.11n HT40	5795	35.08	0.5	pass
802.11ac VHT80	5775	75.98	0.5	pass



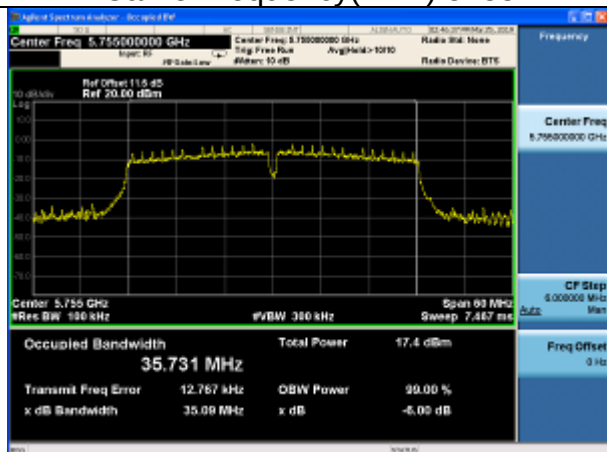
802.11n HT20
Carrier frequency(MHz):5785



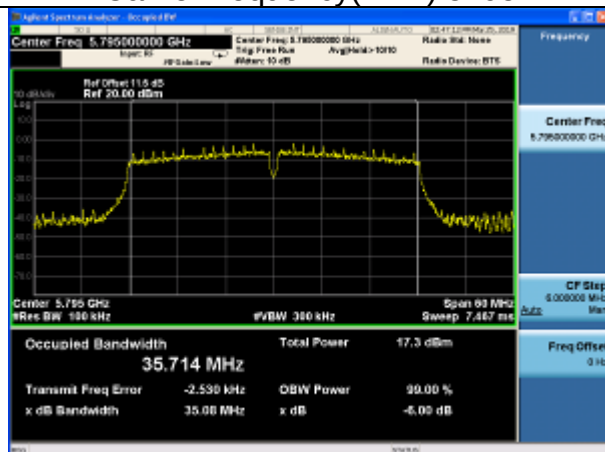
802.11n HT20
Carrier frequency(MHz):5825



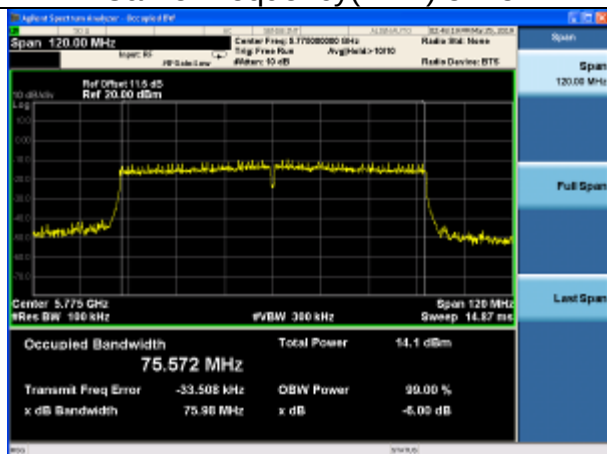
802.11n HT40
Carrier frequency(MHz):5755



802.11n HT40
Carrier frequency(MHz):5795



802.11ac VHT80
Carrier frequency(MHz):5775

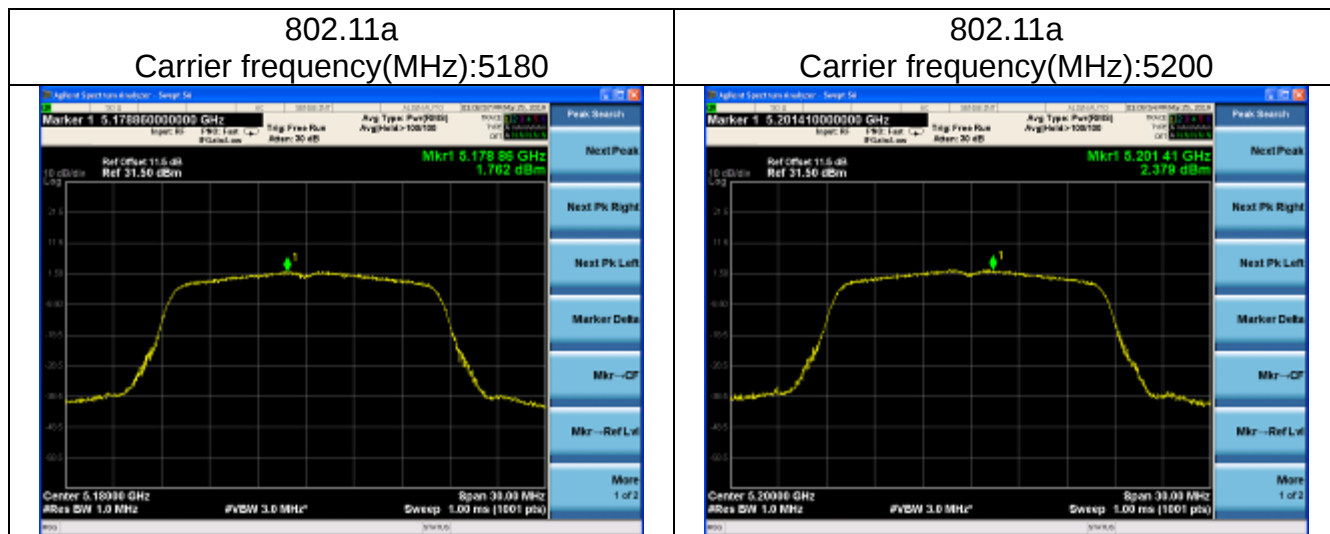


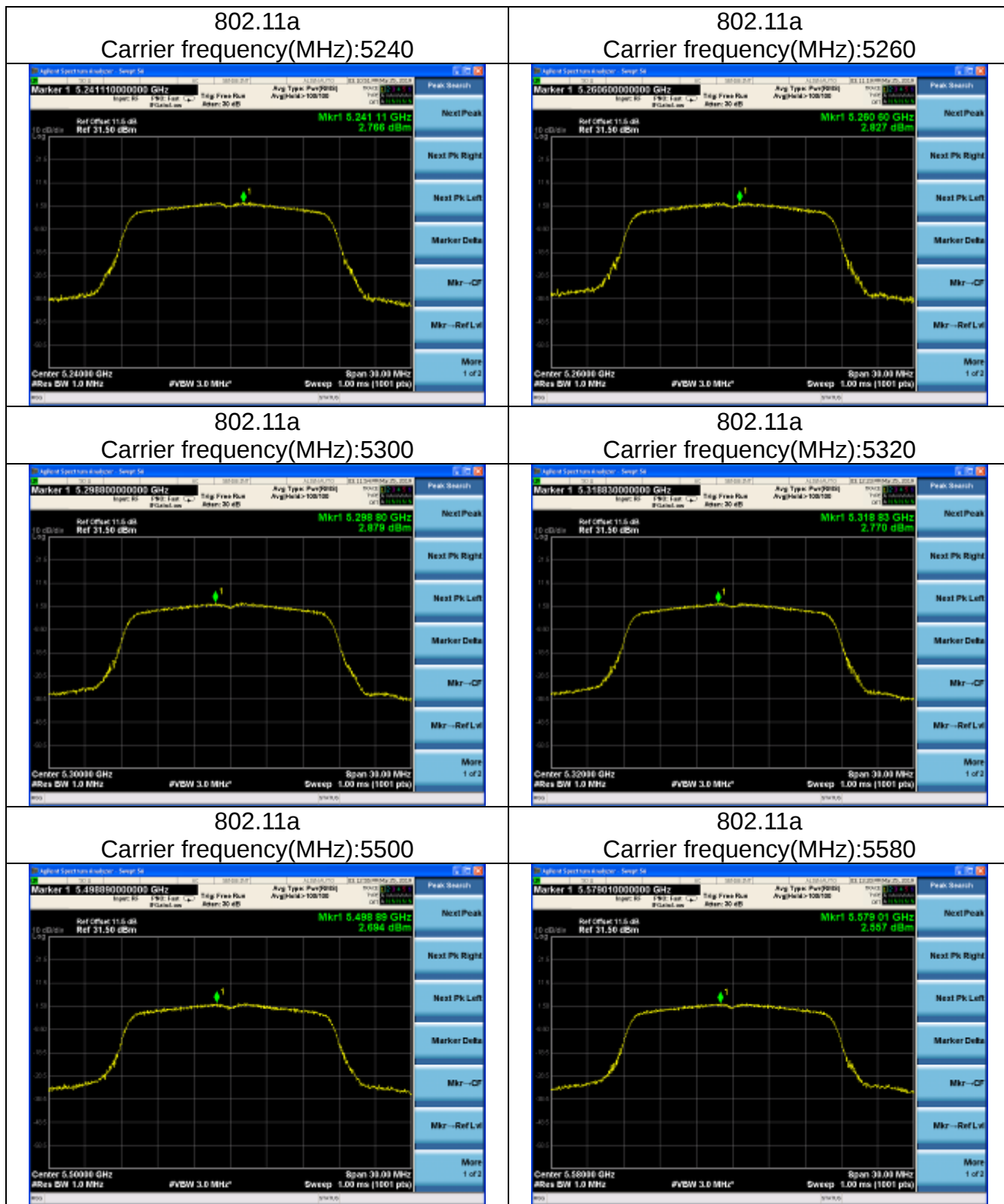
Transmitter Power Spectral Density

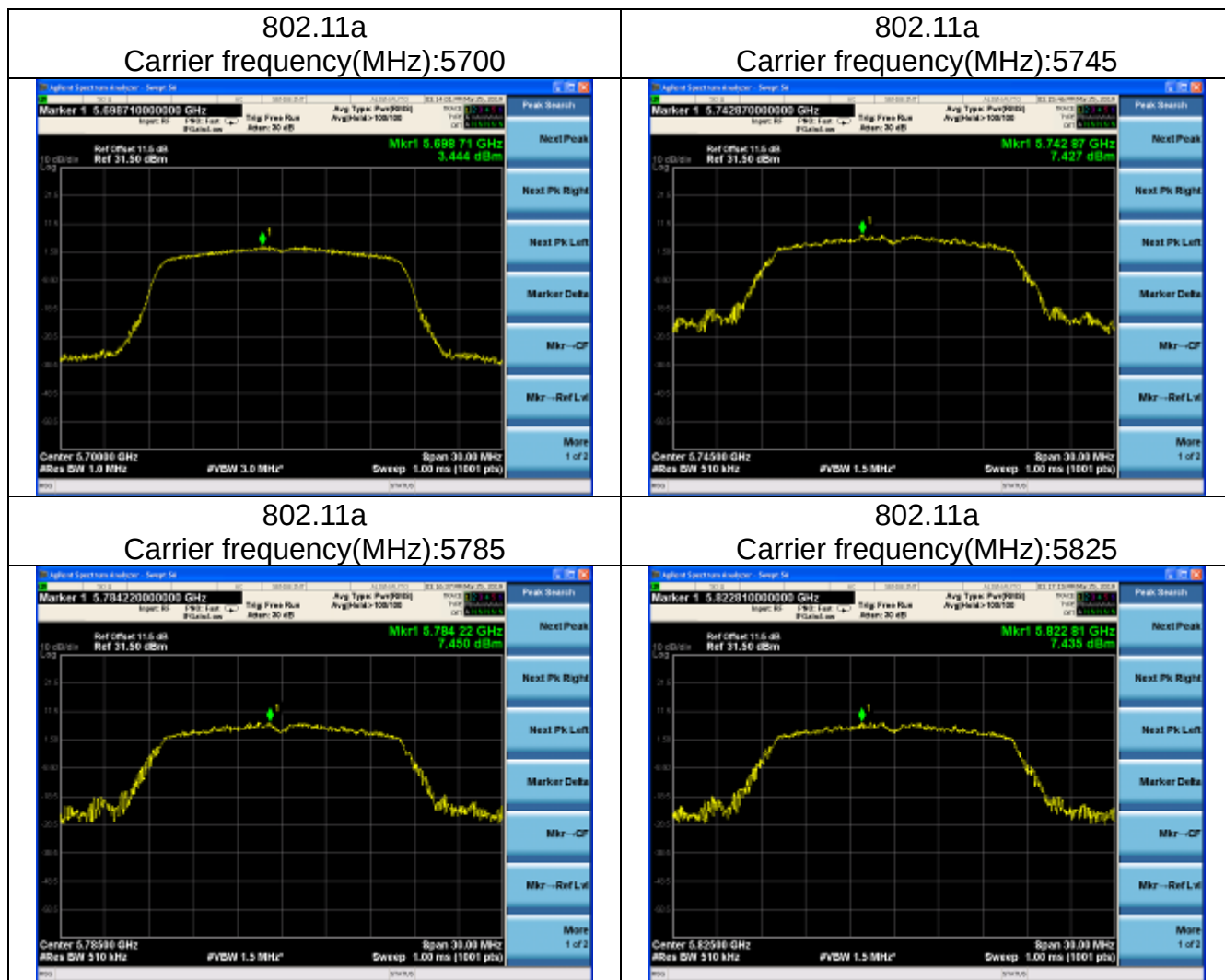
Offset 11.5dB = Attenuator 10dB+ Temporary antenna connector loss 0.2dB+ Cable loss 1.3dB

Test Mode: 802.11a

Carrier frequency (MHz)	Duty Cycle Correction Factor(dB)	Power Spectral Density (dBm/MHz)	Limit	Conclusion
5180	0.056	1.762	11.0 dBm/MHz	pass
5200	0.055	2.379	11.0 dBm/MHz	pass
5240	0.056	2.766	11.0 dBm/MHz	pass
5260	0.056	2.827	11.0 dBm/MHz	pass
5300	0.054	2.879	11.0 dBm/MHz	pass
5320	0.055	2.770	11.0 dBm/MHz	pass
5500	0.055	2.694	11.0 dBm/MHz	pass
5580	0.055	2.557	11.0 dBm/MHz	pass
5700	0.056	3.444	11.0 dBm/MHz	pass
5745	0.056	7.427	30.0 dBm/500kHz	pass
5785	0.055	7.450	30.0 dBm/500kHz	pass
5825	0.056	7.435	30.0 dBm/500kHz	pass



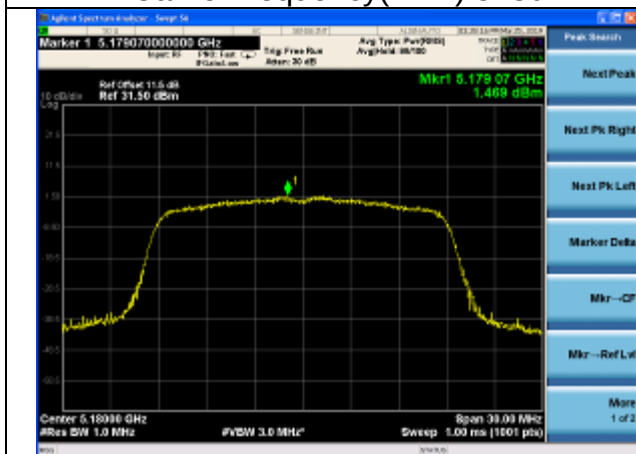




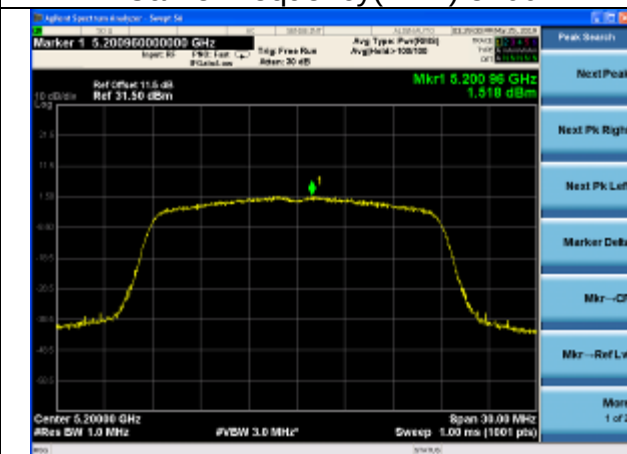
Test Mode: 802.11n HT20

Carrier frequency (MHz)	Duty Cycle Correction Factor(dB)	Power Spectral Density (dBm/MHz)	Limit	Conclusion
5180	0.091	1.469	11.0 dBm/MHz	pass
5200	0.090	1.518	11.0 dBm/MHz	pass
5240	0.091	2.202	11.0 dBm/MHz	pass
5260	0.088	2.241	11.0 dBm/MHz	pass
5300	0.089	1.519	11.0 dBm/MHz	pass
5320	0.089	1.280	11.0 dBm/MHz	pass
5500	0.090	1.492	11.0 dBm/MHz	pass
5580	0.089	2.308	11.0 dBm/MHz	pass
5700	0.091	1.415	11.0 dBm/MHz	pass
5745	0.087	-0.718	30.0 dBm/500kHz	pass
5785	0.089	-0.039	30.0 dBm/500kHz	pass
5825	0.091	0.010	30.0 dBm/500kHz	pass

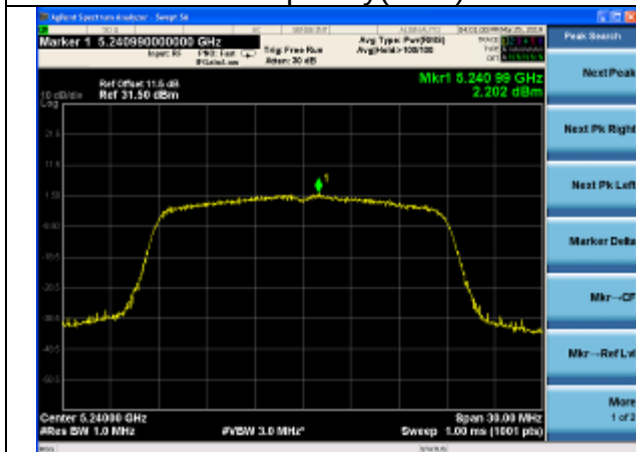
802.11n HT20
Carrier frequency(MHz):5180



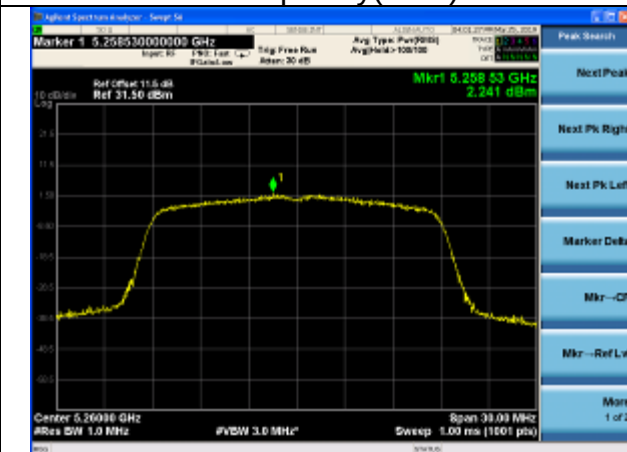
802.11n HT20
Carrier frequency(MHz):5200



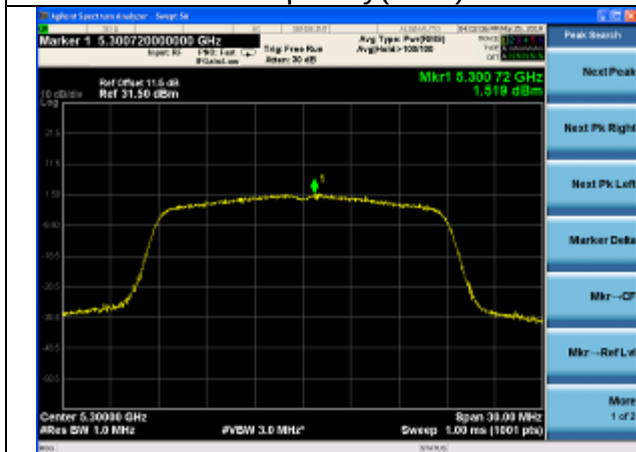
802.11n HT20
Carrier frequency(MHz):5240



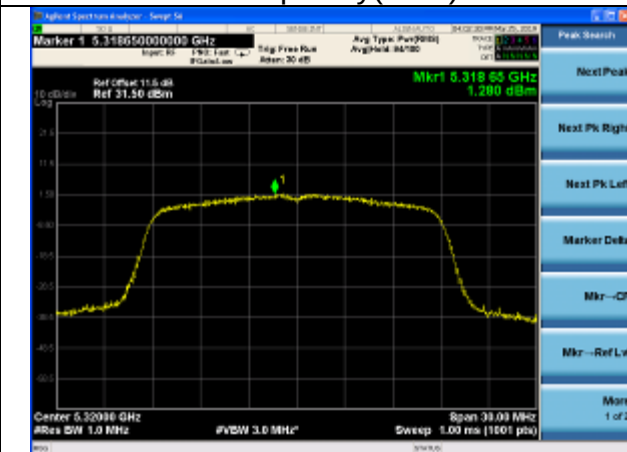
802.11n HT20
Carrier frequency(MHz):5260



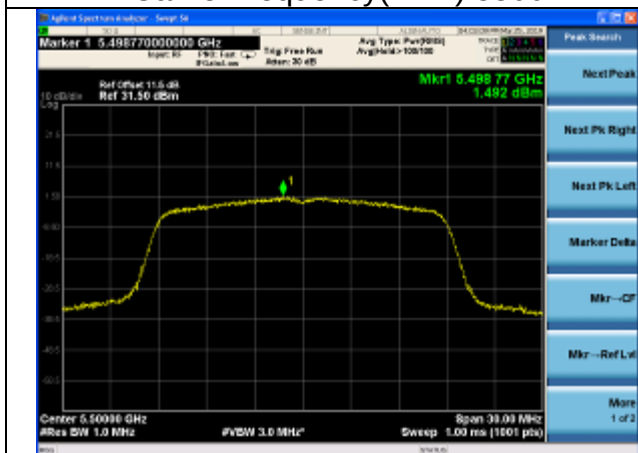
802.11n HT20
Carrier frequency(MHz):5300



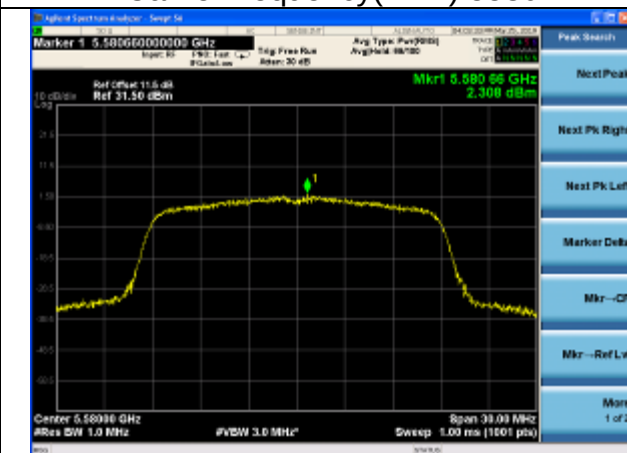
802.11n HT20
Carrier frequency(MHz):5320



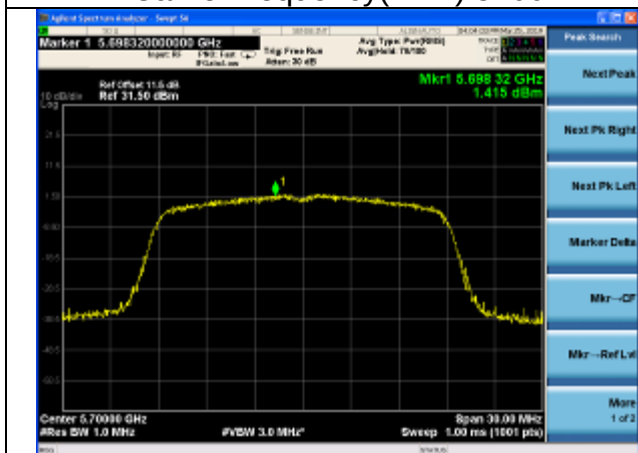
802.11n HT20
Carrier frequency(MHz):5500



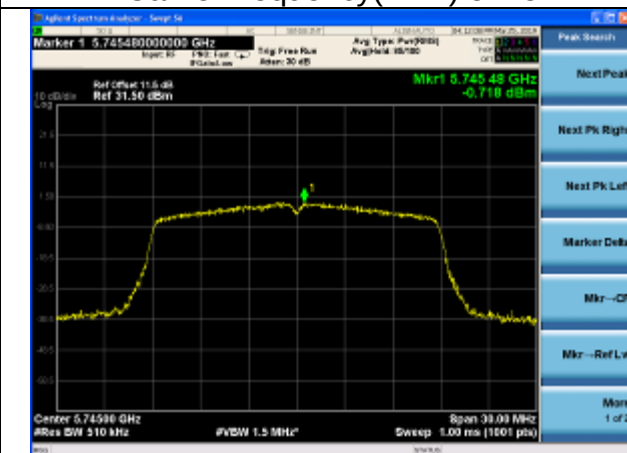
802.11n HT20
Carrier frequency(MHz):5580



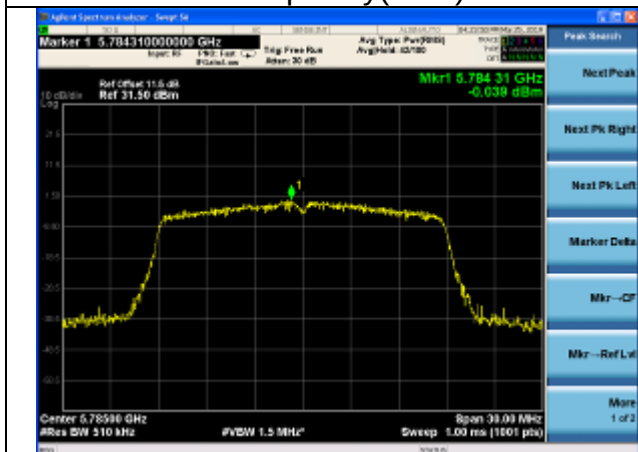
802.11n HT20
Carrier frequency(MHz):5700



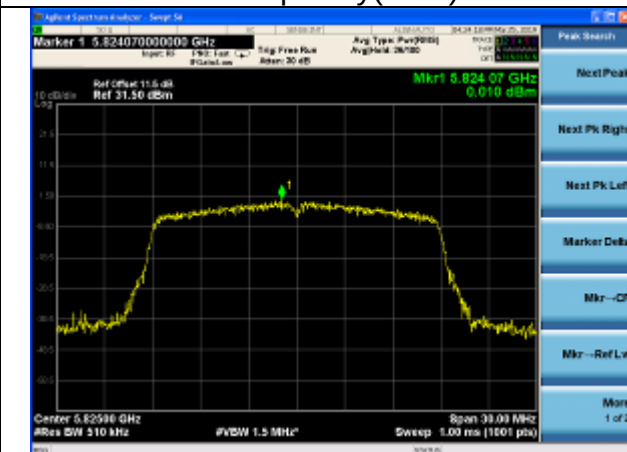
802.11n HT20
Carrier frequency(MHz):5745



802.11n HT20
Carrier frequency(MHz):5785

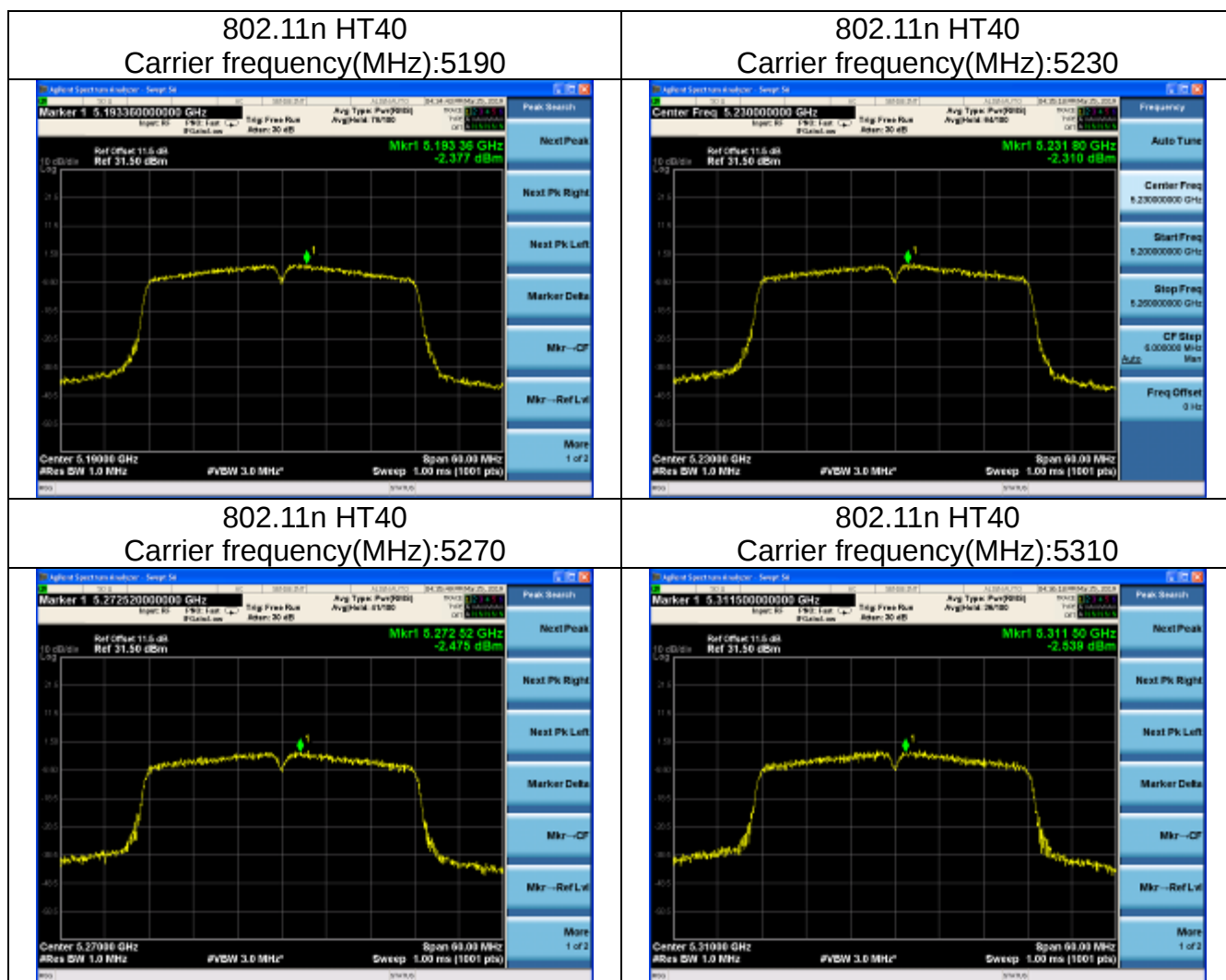


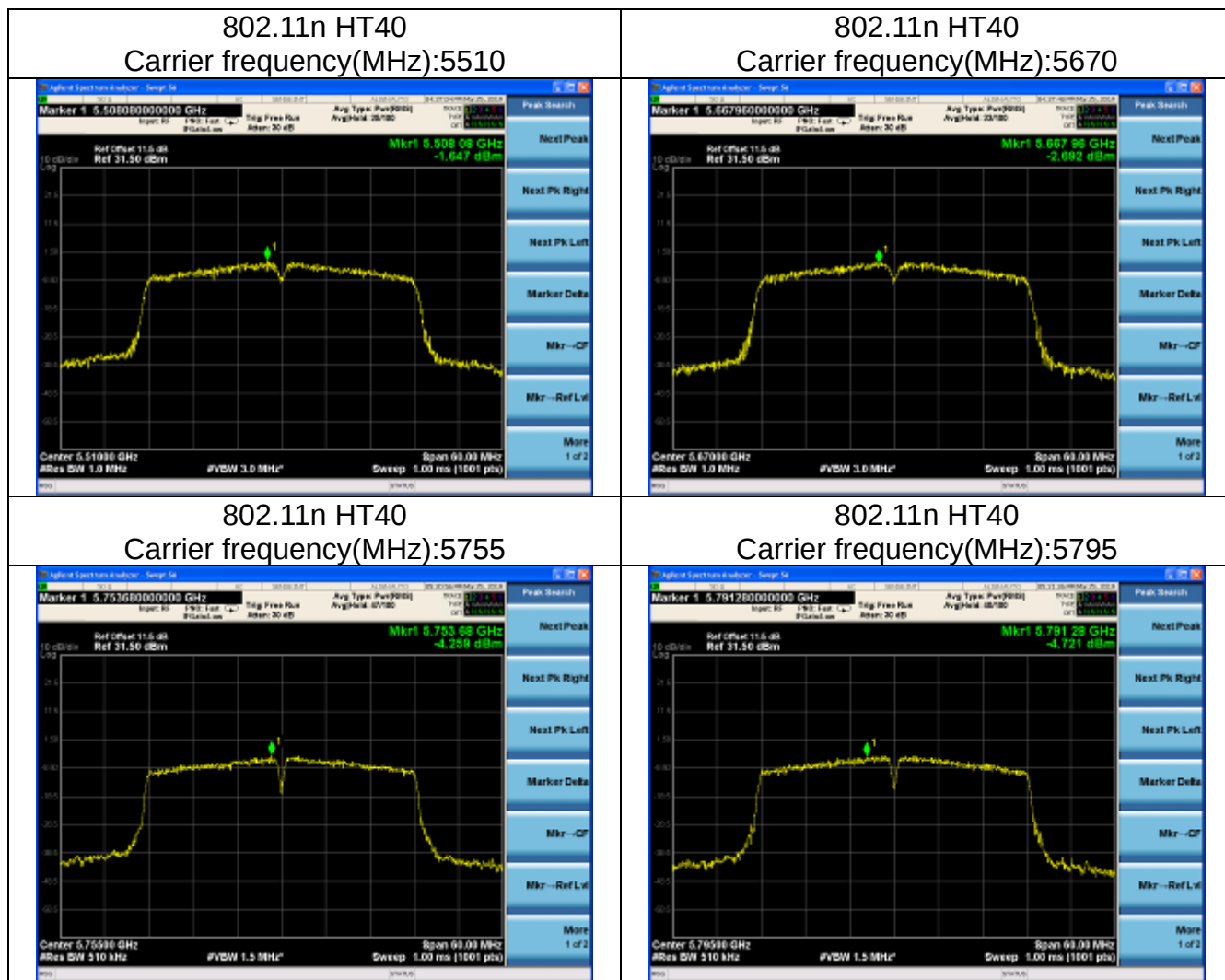
802.11n HT20
Carrier frequency(MHz):5825



Test Mode: 802.11n HT40

Carrier frequency (MHz)	Duty Cycle Correction Factor(dB)	Power Spectral Density (dBm/MHz)	Limit	Conclusion
5190	0.180	-2.377	11.0 dBm/MHz	pass
5230	0.177	-2.310	11.0 dBm/MHz	pass
5270	0.179	-2.475	11.0 dBm/MHz	pass
5310	0.178	-2.539	11.0 dBm/MHz	pass
5510	0.180	-1.647	11.0 dBm/MHz	pass
5670	0.179	-2.692	11.0 dBm/MHz	pass
5755	0.179	-4.259	30.0 dBm/500kHz	pass
5795	0.180	-4.721	30.0 dBm/500kHz	pass

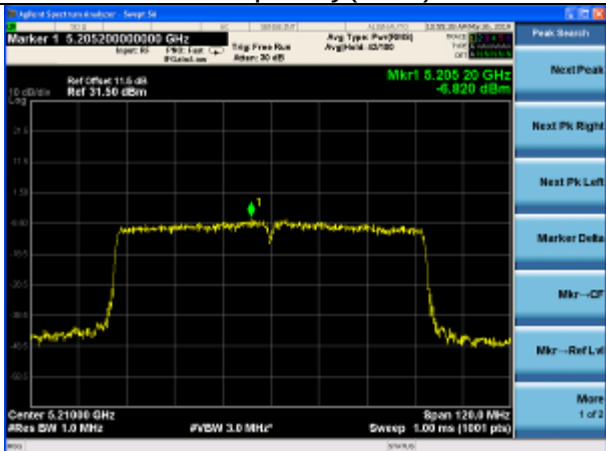




Test Mode: 802.11ac VHT80

Carrier frequency (MHz)	Duty Cycle Correction Factor(dB)	Power Spectral Density (dBm/MHz)	Limit	Conclusion
5210	0.339	-6.820	11.0 dBm/MHz	pass
5290	0.343	-8.115	11.0 dBm/MHz	pass
5530	0.341	-8.483	11.0 dBm/MHz	pass
5610	0.345	-7.119	11.0 dBm/MHz	pass
5690	0.339	-6.829	11.0 dBm/MHz	pass
5690	0.340	-10.026	30.0 dBm/500kHz	pass
5775	0.343	-10.261	30.0 dBm/500kHz	pass

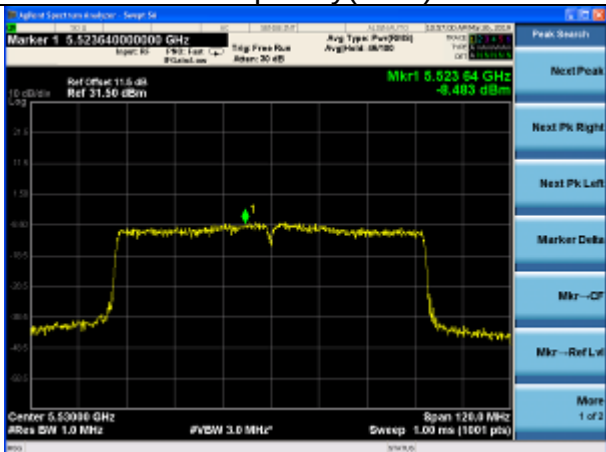
802.11ac HT80
Carrier frequency(MHz):5210



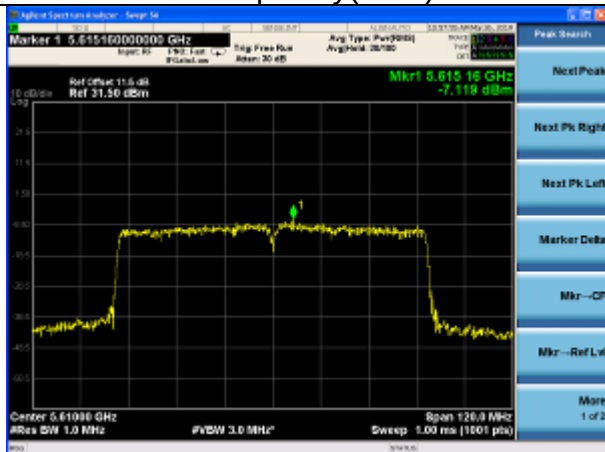
802.11ac HT80
Carrier frequency(MHz):5290



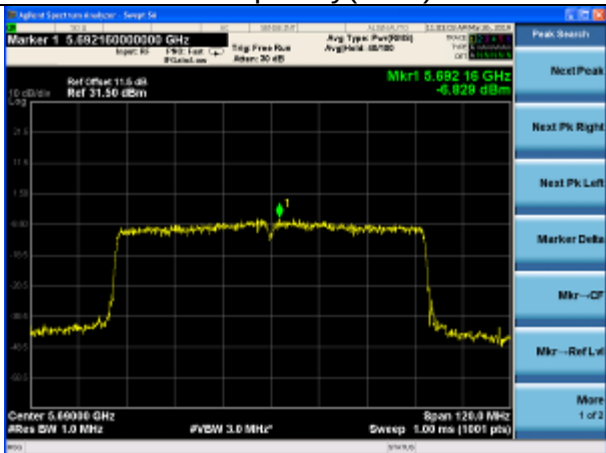
802.11ac HT80
Carrier frequency(MHz):5530



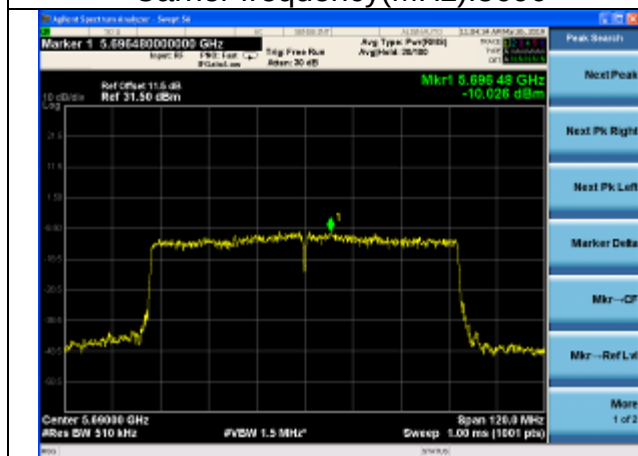
802.11ac HT80
Carrier frequency(MHz):5610



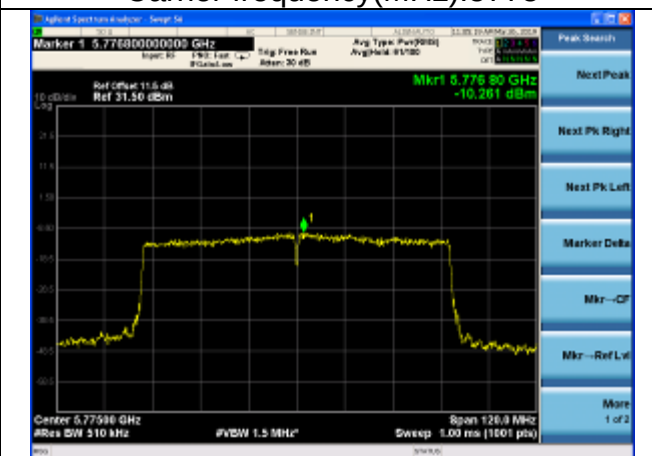
802.11ac HT80
Carrier frequency(MHz):5690



U-NII-2C 802.11ac HT80
Carrier frequency(MHz):5690



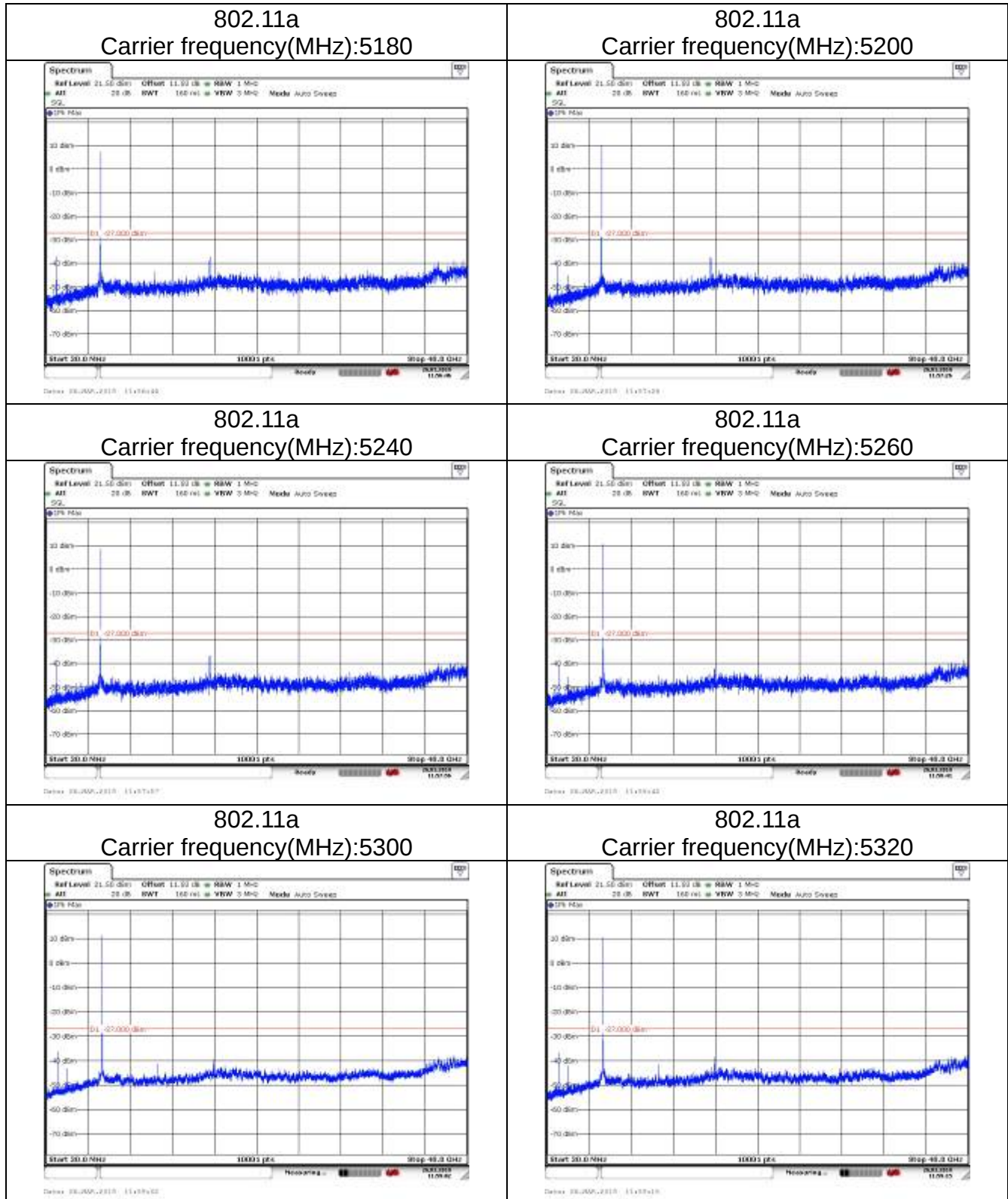
U-NII-3 802.11ac HT80
Carrier frequency(MHz):5775



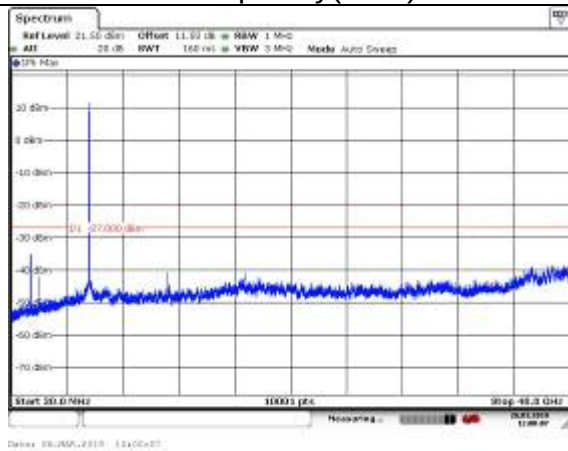
Unwanted Conducted Emission Measurement

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

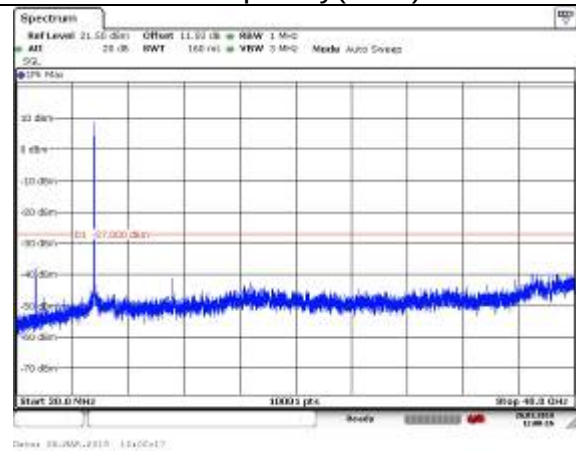
Test Mode: 802.11a



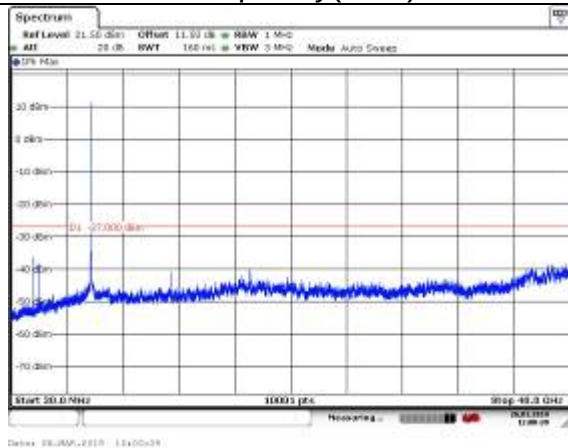
802.11a
Carrier frequency(MHz):5500



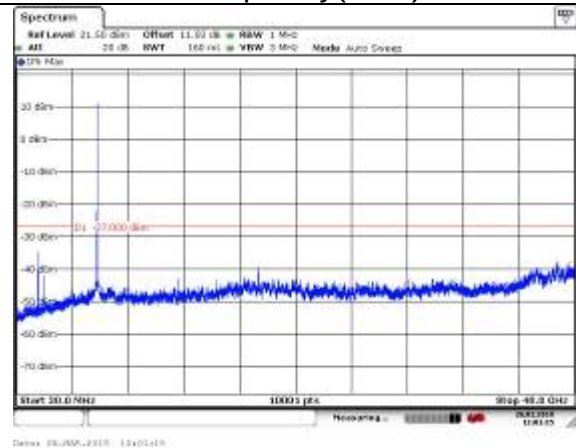
802.11a
Carrier frequency(MHz):5580



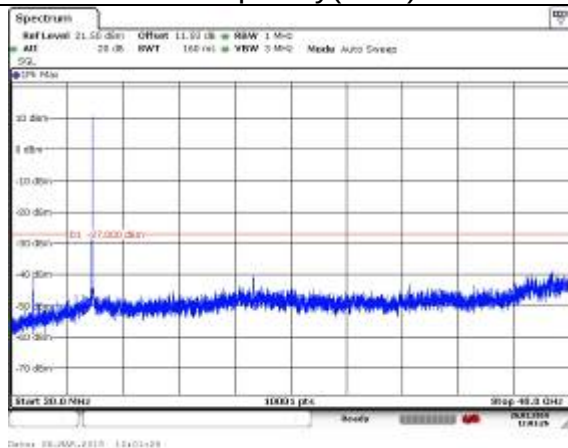
802.11a
Carrier frequency(MHz):5700



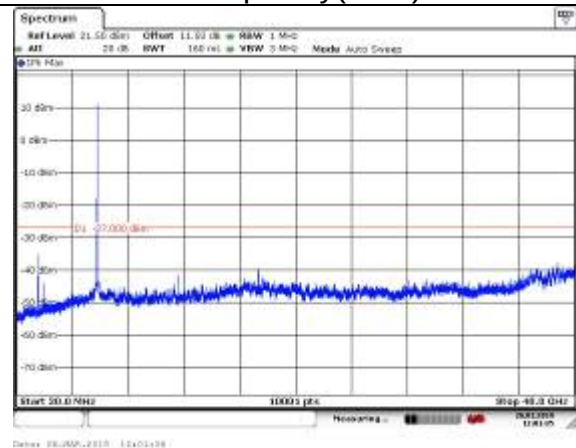
802.11a
Carrier frequency(MHz):5745



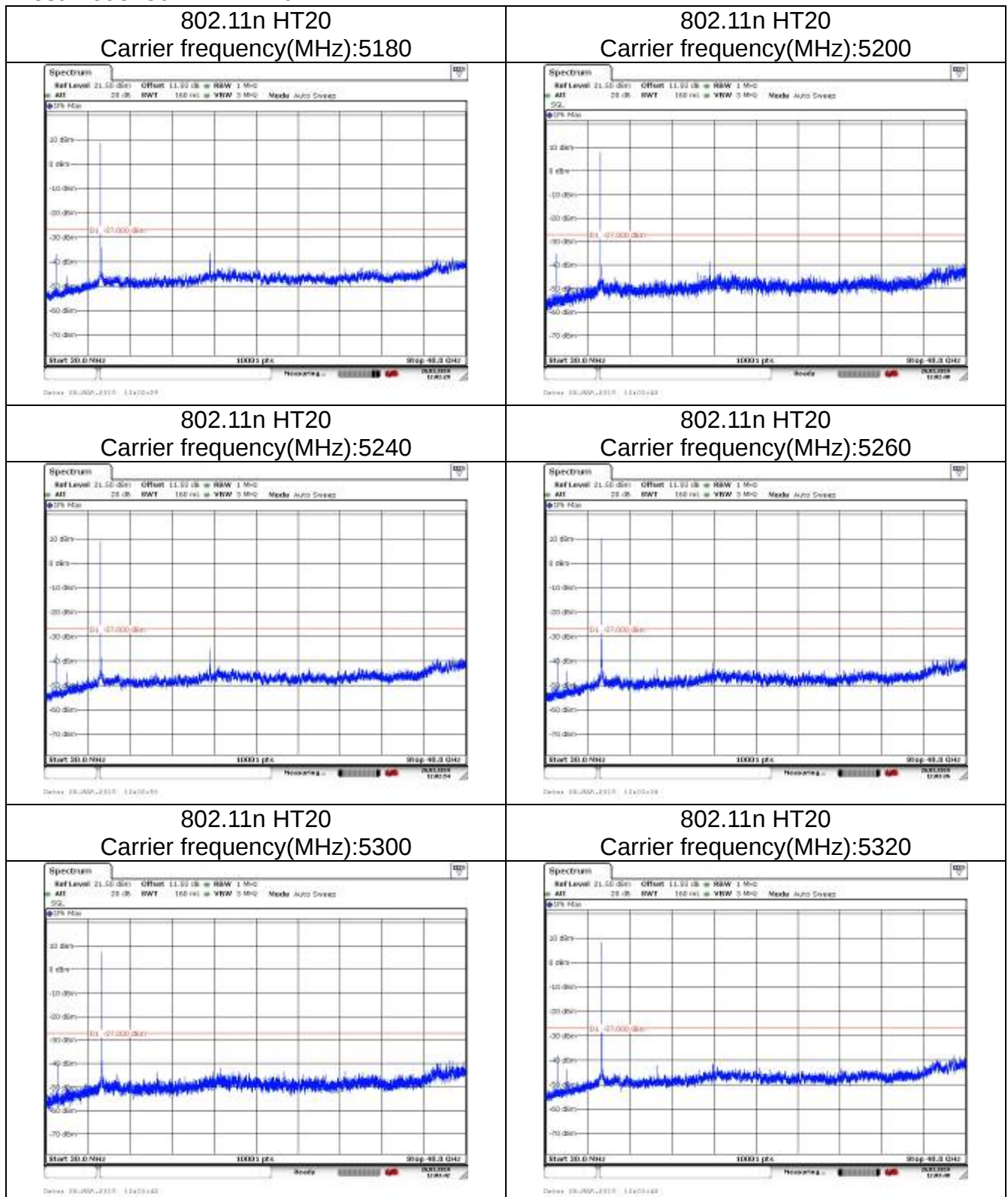
802.11a
Carrier frequency(MHz):5785



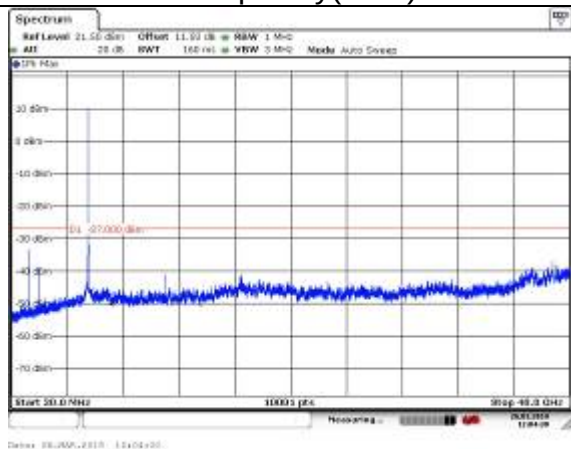
802.11a
Carrier frequency(MHz):5825



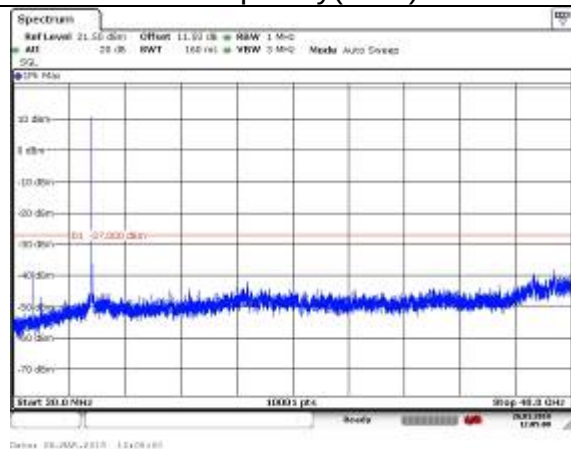
Test Mode: 802.11n HT20



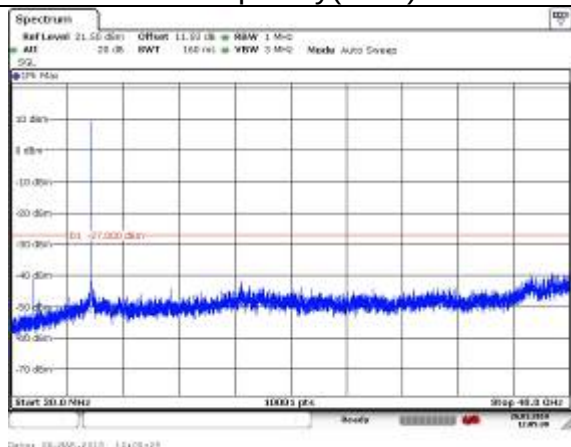
802.11n HT20
Carrier frequency(MHz):5500



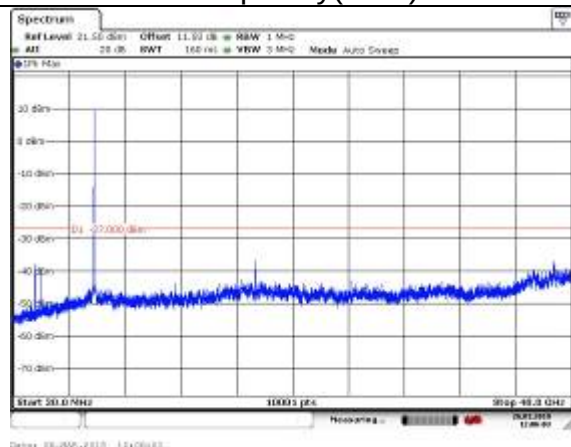
802.11n HT20
Carrier frequency(MHz):5580



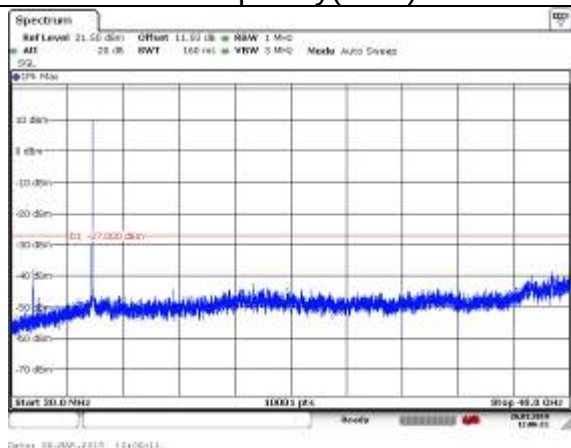
802.11n HT20
Carrier frequency(MHz):5700



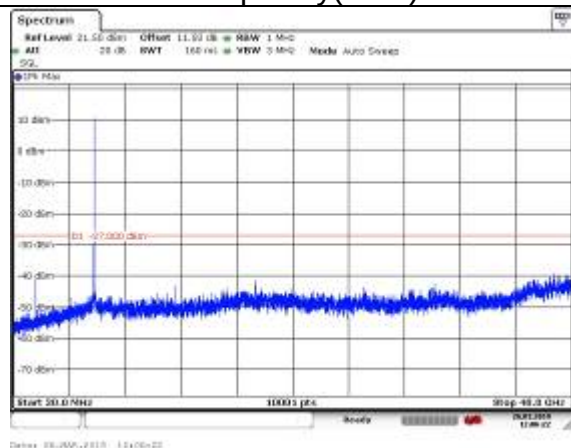
802.11n HT20
Carrier frequency(MHz):5745



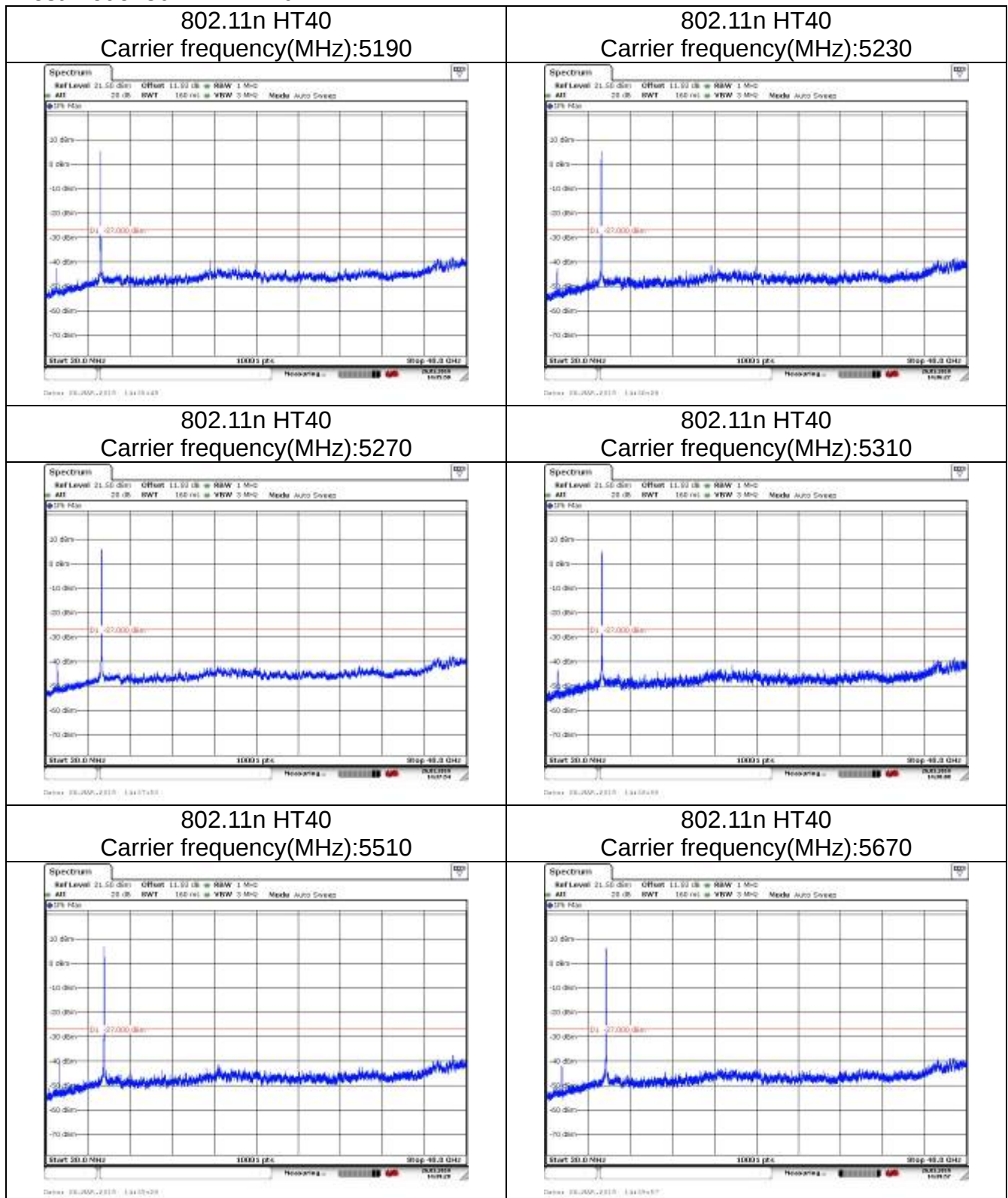
802.11n HT20
Carrier frequency(MHz):5785



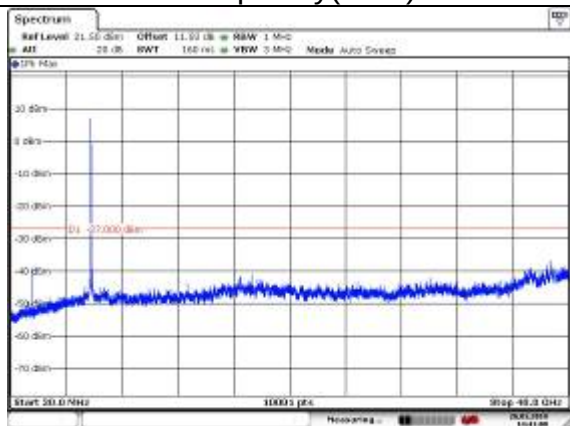
802.11n HT20
Carrier frequency(MHz):5825



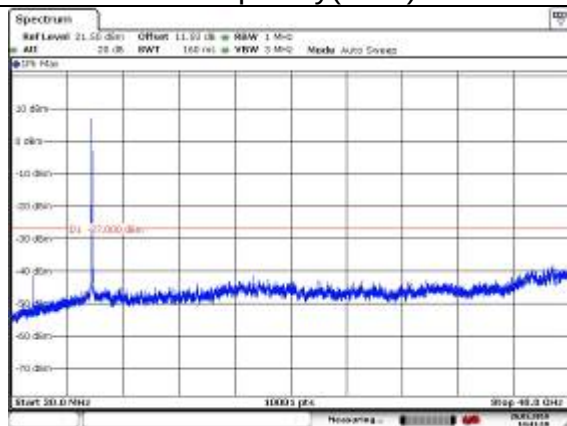
Test Mode: 802.11n HT40



802.11n HT40
Carrier frequency(MHz):5755

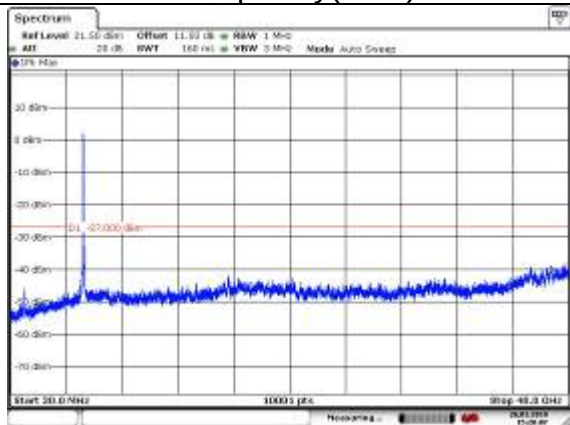


802.11n HT40
Carrier frequency(MHz):5795

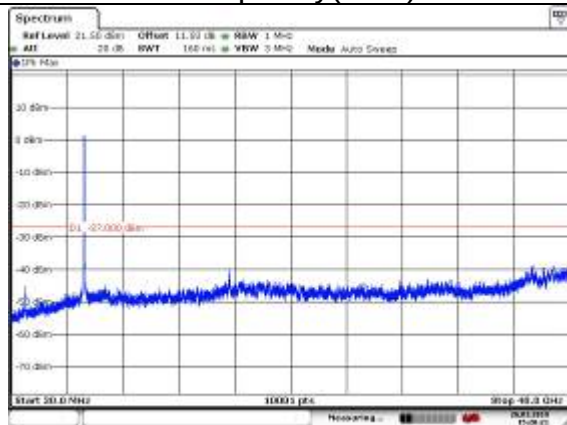


Test Mode: 802.11ac VHT80

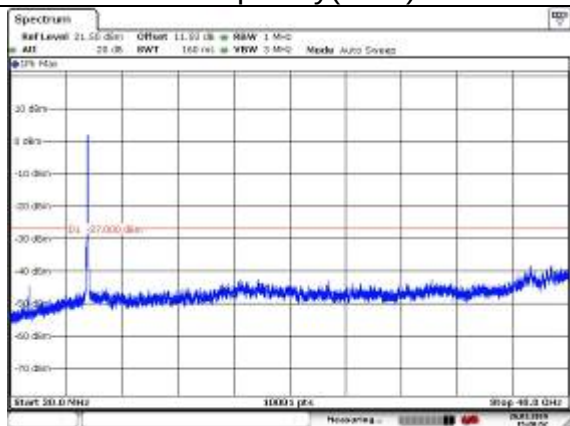
802.11ac VHT80
Carrier frequency(MHz):5210



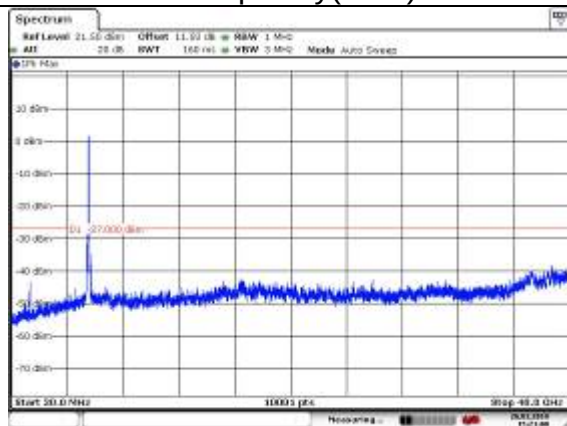
802.11ac VHT80
Carrier frequency(MHz):5290



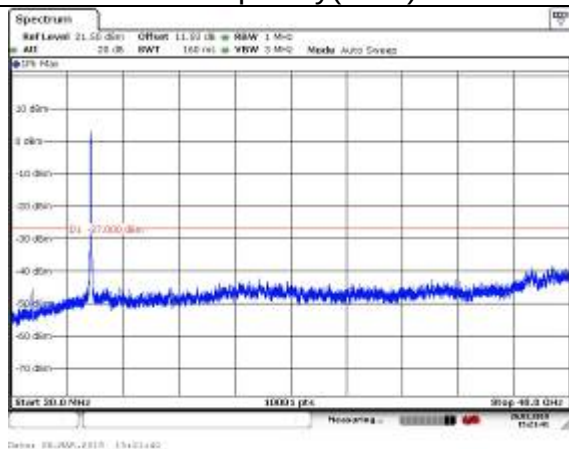
802.11ac VHT80
Carrier frequency(MHz):5530



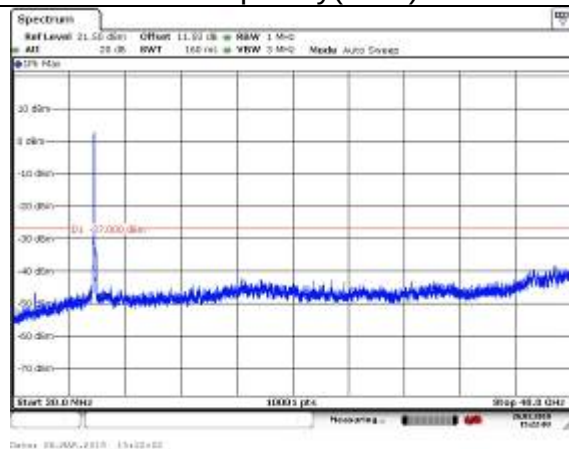
802.11ac VHT80
Carrier frequency(MHz):5610



802.11ac VHT80
Carrier frequency(MHz):5690



802.11ac VHT80
Carrier frequency(MHz):5775



Frequency Stability

Band	Mode	Data Rate	Frequency (MHz)	Frequency Stability(ppm)	Voltage(V)	Temperature(°C)
U-NII-1	11a	6Mbps	5180	1.67	NV	-10
	11a	6Mbps	5180	2.22	NV	0
	11a	6Mbps	5180	-2.15	NV	+10
	11a	6Mbps	5180	-2.53	HV	+20
	11a	6Mbps	5180	0.41	LV	+20
	11a	6Mbps	5180	1.93	NV	+20
	11a	6Mbps	5180	0.38	NV	+30
	11a	6Mbps	5180	-0.08	NV	+40
	11a	6Mbps	5180	-0.76	NV	+50
	11a	6Mbps	5180	1.67	NV	+55
U-NII-2A	11a	6Mbps	5320	0.50	NV	-10
	11a	6Mbps	5320	-1.74	NV	0
	11a	6Mbps	5320	-1.66	NV	+10
	11a	6Mbps	5320	-0.97	HV	+20
	11a	6Mbps	5320	-0.39	LV	+20
	11a	6Mbps	5320	-0.76	NV	+20
	11a	6Mbps	5320	-0.73	NV	+30
	11a	6Mbps	5320	2.46	NV	+40
	11a	6Mbps	5320	-0.73	NV	+50
	11a	6Mbps	5320	0.50	NV	+55
U-NII-2C	11a	6Mbps	5500	1.95	NV	-10
	11a	6Mbps	5500	-2.64	NV	0
	11a	6Mbps	5500	0.31	NV	+10
	11a	6Mbps	5500	1.67	HV	+20
	11a	6Mbps	5500	-1.00	LV	+20
	11a	6Mbps	5500	-0.79	NV	+20
	11a	6Mbps	5500	2.14	NV	+30
	11a	6Mbps	5500	1.95	NV	+40
	11a	6Mbps	5500	2.76	NV	+50
	11a	6Mbps	5500	1.95	NV	+55
U-NII-3	11a	6Mbps	5825	-0.24	NV	-10
	11a	6Mbps	5825	-1.59	NV	0
	11a	6Mbps	5825	-2.66	NV	+10
	11a	6Mbps	5825	2.04	HV	+20
	11a	6Mbps	5825	1.65	LV	+20
	11a	6Mbps	5825	1.93	NV	+20
	11a	6Mbps	5825	-1.44	NV	+30
	11a	6Mbps	5825	2.87	NV	+40
	11a	6Mbps	5825	-2.02	NV	+50
	11a	6Mbps	5825	-0.24	NV	+55

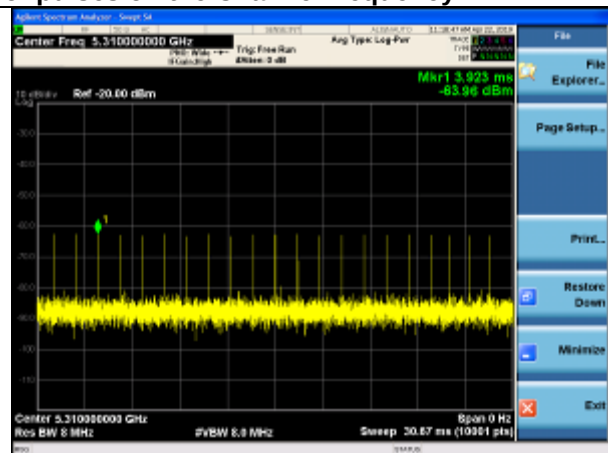
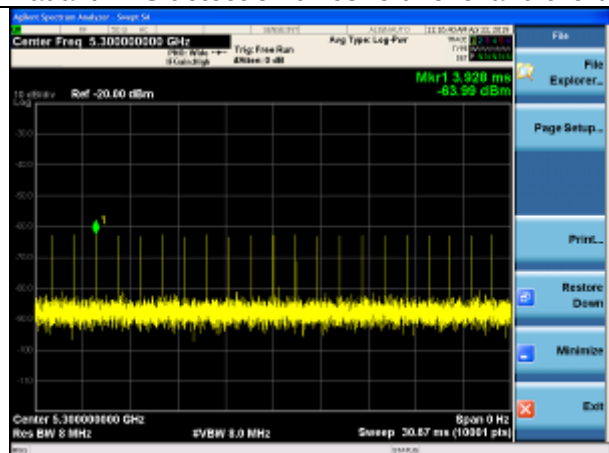
Dynamic Frequency Selection

Radar Waveform Calibration Result

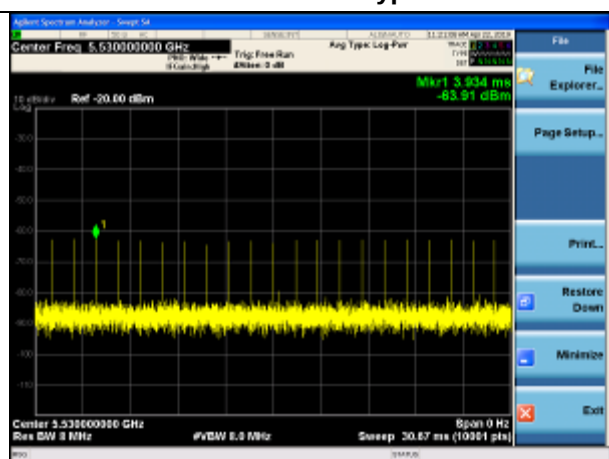
<20MHz / 5300 MHz> Radar Type 0

<40MHz / 5310 MHz> Radar Type 0

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



<80MHz / 5530 MHz> Radar Type 0



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

BW / Channel	Test Item	Test Result	Limit	Pass/Fail
20MHz / 5300MHz	Channel Move Time	0.5665 s	< 10s	Pass
	Channel Closing Transmission Time	200ms + 0.4 ms	< 260ms	Pass
	Non-Occupancy Period	≥ 30	≥ 30 min	Pass
40MHz / 5310MHz	Channel Move Time	0.5555 s	< 10s	Pass
	Channel Closing Transmission Time	200ms + 0.4 ms	< 260ms	Pass
	Non-Occupancy Period	≥ 30	≥ 30 min	Pass
80MHz/5530MHz	Channel Move Time	0.5635 s	< 10s	Pass
	Channel Closing Transmission Time	200ms + 0.4 ms	< 260ms	Pass
	Non-Occupancy Period	≥ 30	≥ 30 min	Pass

Note: 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.

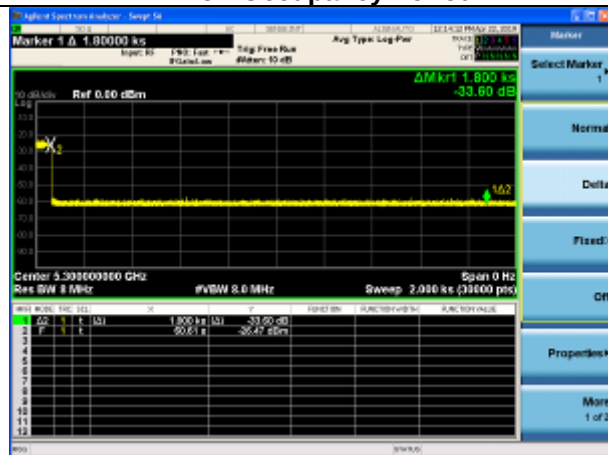
Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period for Client Beacon Test Plots

<20MHz / 5300 MHz>

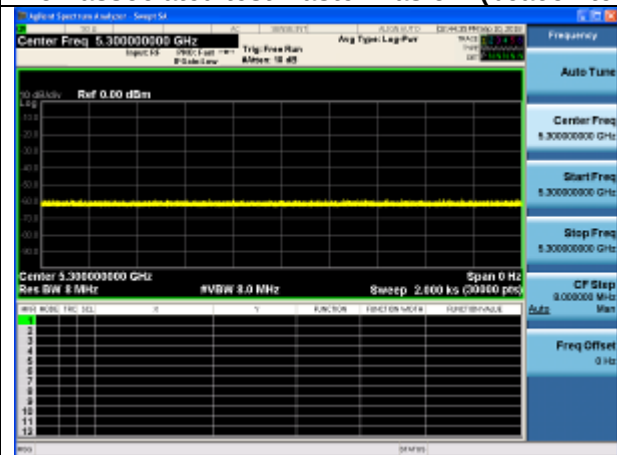
Channel Move Time & Channel Closing Transmission Time



Non-Occupancy Period



Non-associated test Master was off. (beacon test)



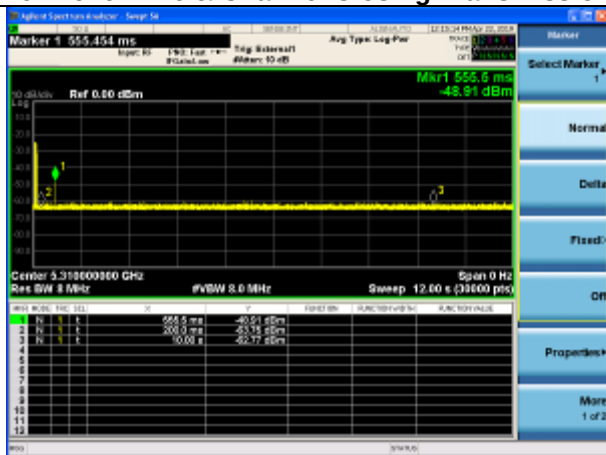
Note:

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

Channel Closing Transmission Time (200 + 0.4 ms) = 200 + Number (1) X Dwell (0.4 ms) < 260ms

<40MHz / 5310 MHz>

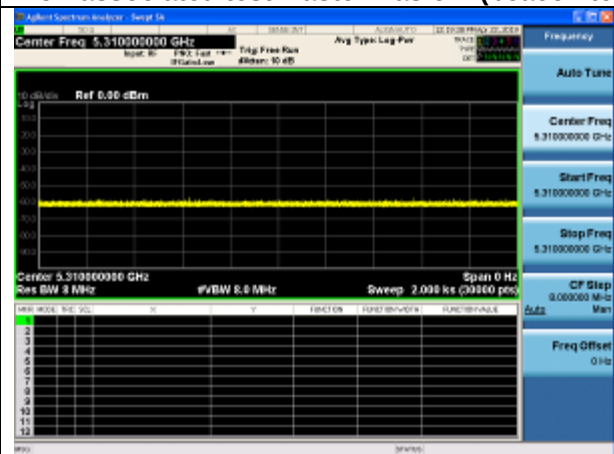
Channel Move Time & Channel Closing Transmission Time



Non-Occupancy Period



Non-associated test Master was off. (beacon test)



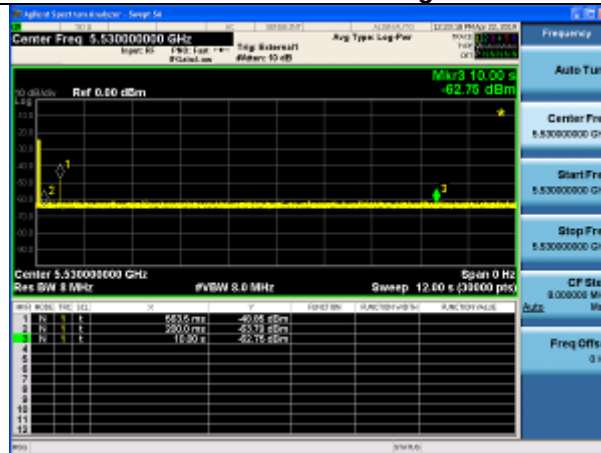
Note:

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

Channel Closing Transmission Time (200 + 0.4 ms) = 200 + Number (1) X Dwell (0.4 ms) < 260ms

<80MHz / 5530 MHz>

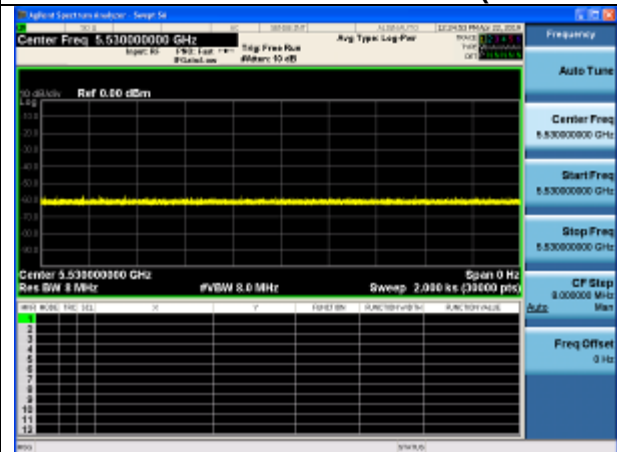
Channel Move Time & Channel Closing Transmission Time



Non-Occupancy Period



Non-associated test Master was off. (beacon test)



Note:

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

Channel Closing Transmission Time (200 + 0.4 ms) = 200 + Number (1) X Dwell (0.4 ms) < 260ms

Data Traffic and Noise Floor Plots

