

7. OUTPUT POWER TEST

7.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	N9030A	MY51380221	Oct.18,15	1Year
2.	Power meter	Anritsu	ML2487A	6K00002472	Apr.28, 15	1Year
3.	Power sensor	Anritsu	MA2491A	0033005	Apr.28, 15	1Year
4.	Attenuator (20dB)	Agilent	8491B	MY39262165	Apr.28, 15	1 Year
5.	RF Cable	Hubersuhner	SUCOFLEX102	28620/2	Apr.28, 15	1 Year

7.2. Limit

For the band 5.15–5.25 GHz.

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz.

For the band 5.725–5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

7.3. Test Procedure

1. Connected the EUT's antenna port to measure device by 26dB attenuator.
2. For IEEE 802.11a and IEEE802.11n HT20 and 802.11ac VHT20 mode, use a PK power meter which's bandwidth is 20MHz and above 26dB bandwidth of signal to measure out each test modes' PK output power.
3. For IEEE802.11n HT40 mode, because the signal's bandwidth is about 40MHz and above 20MHz bandwidth of power sensor ML2491A. So use the test method described in KBD789033 clause E Method SA-1
 - 1) Connect the antenna port to the spectrum analyzer and Set span of the spectrum to encompass the entire emission bandwidth (EBW) of the signal.
 - 2) Set the RBW=1MHz and VBW =3MHz
 - 3) Number of points in sweep $\geq 2 \text{ Span} / \text{RBW}$
 - 4) Detector = RMS
 - 5) Sweep time = auto couple
 - 6) Allow the sweep to "free run" and set the Trace average at least 100 traces in power averaging (i.e., RMS) mode.
 - 7) Compute power by integrating the spectrum across the 26 dB EBW of the signal using the instrument's band power measurement function with band limits set equal to the EBW band edges.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

7.4. Test Results

5180-5240MHz Band:

EUT: Tablet PC					
M/N: AT10-C					
Test date: 2015-11-22		Pressure:101.8±1.0 kpa		Humidity:53.3±3.0%	
Tested by: Alice_Yang		Test site: RF site		Temperature:2.7±0.6 °C	
Test Mode	Frequency (MHz)	Maximum Conducted output power (dBm)			Limit (dBm)
		ANT1	ANT2	Total	
11a	5180	12.39	11.25	N/A	24
	5200	12.45	11.10	N/A	24
	5240	12.58	11.46	N/A	24
11n HT20	5180	12.31	11.10	14.76	24
	5200	12.16	10.95	14.61	24
	5240	12.38	11.60	15.02	24
11n HT40	5190	12.97	12.04	15.54	24
	5230	13.05	12.18	15.65	24
11ac VHT20	5180	11.98	11.67	14.84	24
	5200	11.95	11.67	14.82	24
	5240	12.14	11.82	14.99	24
11ac VHT40	5190	12.40	11.98	15.21	24
	5230	12.67	12.06	15.39	24
11ac VHT80	5210	10.57	10.02	13.31	24
Conclusion: PASS					

5260-5320MHz Band:

EUT: Tablet PC					
M/N: AT10-C					
Test date: 2015-11-22		Pressure: 101.8±1.0 kpa		Humidity: 53.2±3.0%	
Tested by: Alice_Yang		Test site: RF site		Temperature: 22.9±0.6 °C	
Test Mode	Frequency (MHz)	Maximum Conducted output power (dBm)			Limit (dBm)
		ANT1	ANT2	Total	
11a	5260	12.17	11.24	N/A	24
	5300	12.05	11.35	N/A	24
	5320	12.20	11.39	N/A	24
11n HT20	5260	11.90	11.41	14.67	24
	5300	11.84	11.34	14.61	24
	5320	11.90	11.30	14.62	24
11n HT40	5270	12.48	11.84	15.18	24
	5310	12.71	12.05	15.40	24
11ac VHT20	5260	11.68	11.50	14.60	24
	5300	11.99	11.48	14.75	24
	5320	11.99	11.61	14.81	24
11ac VHT40	5270	12.22	11.77	15.01	24
	5310	12.32	11.92	15.14	24
11ac VHT80	5290	10.28	10.14	13.22	24
Conclusion: PASS					

5500-5700MHz Band:

EUT: Tablet PC					
M/N: AT10-C					
Test date: 2015-11-22		Pressure: 101.6±1.0 kpa		Humidity: 53.4±3.0%	
Tested by: Alice_Yang		Test site: RF site		Temperature: 22.1±0.6 °C	
Test Mode	Frequency (MHz)	Maximum Conducted output power (dBm)			Limit (dBm)
		ANT1	ANT2	Total	
11a	5500	11.88	12.10	N/A	24
	5600	11.57	11.88	N/A	24
	5700	10.84	11.28	N/A	24
11n HT20	5500	10.59	12.01	14.82	24
	5600	11.31	11.88	14.61	24
	5700	10.49	11.05	14.62	24
11n HT40	5510	12.22	12.92	15.59	24
	5590	12.08	12.52	15.32	24
	5670	11.37	11.85	14.63	24
11ac VHT20	5500	11.97	12.28	15.14	24
	5600	11.51	12.05	14.80	24
	5700	10.95	11.45	14.22	24
11ac VHT40	5510	12.30	12.57	15.45	24
	5590	12.11	12.37	15.25	24
	5670	11.45	11.72	14.60	24
11ac VHT80	5530	10.37	10.81	13.61	24
Conclusion: PASS					

5745-5825MHz Band:

EUT: Tablet PC					
M/N: AT10-C					
Test date: 2015-11-22		Pressure: 101.6±1.0kpa		Humidity:532.8±3.0%	
Tested by: Alice_Yang		Test site: RF site		Temperature:22.7±0.6 °C	
Test Mode	Frequency (MHz)	Maximum Conducted output power (dBm)			Limit (dBm)
		ANT1	ANT2	Total	
11a	5745	11.27	12.12	N/A	29.86
	5785	11.03	11.82	N/A	29.86
	5825	10.6	11.61	N/A	29.86
11n HT20	5745	11.02	11.77	14.42	29.86
	5785	10.47	11.66	14.12	29.86
	5825	10.44	11.38	13.95	29.86
11n HT40	5755	11.62	12.47	15.08	29.86
	5790	11.08	12.22	14.70	29.86
11ac VHT20	5745	11.32	11.96	14.66	29.86
	5785	11.26	11.76	14.53	29.86
	5825	10.81	11.54	14.20	29.86
11ac VHT40	5755	11.71	12.33	15.04	29.86
	5795	11.73	12.08	14.92	29.86
11ac VHT80	5775	9.89	10.31	13.12	29.86
Conclusion: PASS					

Note: 11ac/n Mode

$$\text{Directional Gain} = 10 \log[(10^{2.84/20} + 10^{3.41/20})^2 / 2] \text{dBi}$$

$$= 6.14 \text{dBi} > 6 \text{dBi}$$

5180-5240MHz Band:

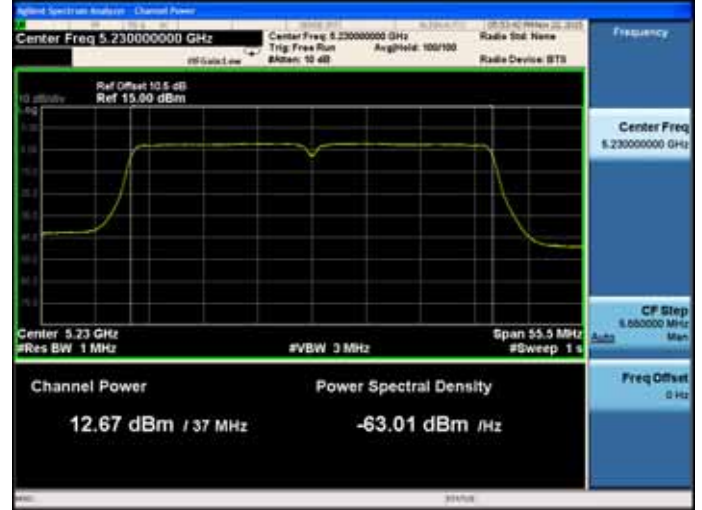
ANT 0

11n HT40

5190MHz

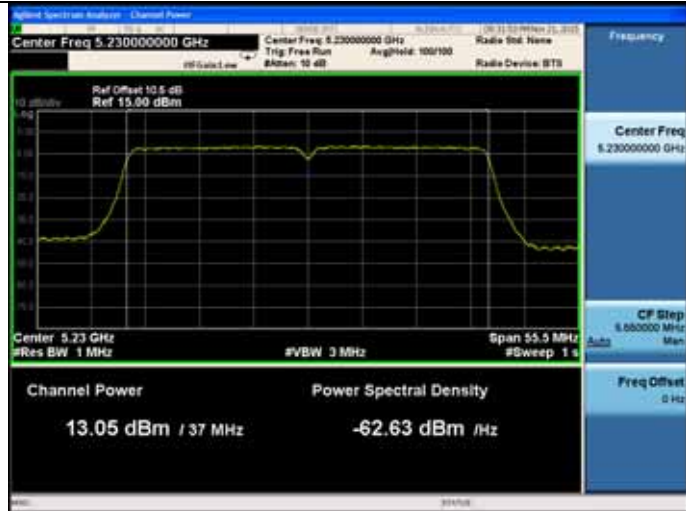


5230MHz

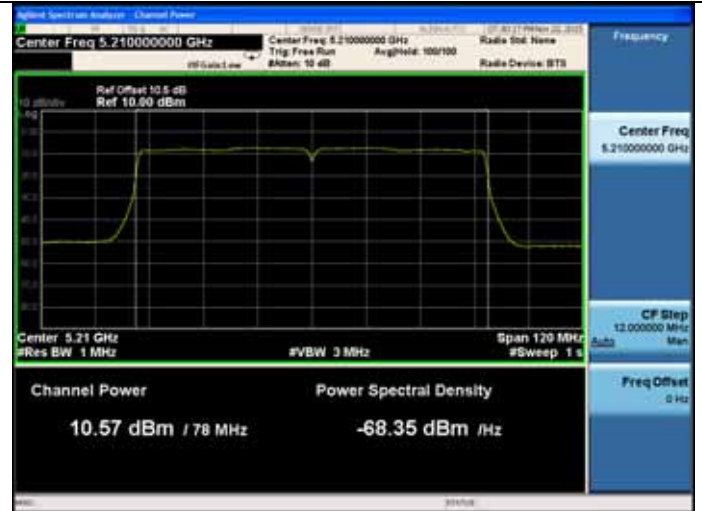


11ac VHT80

5230MHz



5210MHz



11acVHT40

5190MHz



5180-5240MHz Band:

ANT 1

11n HT40

5190MHz

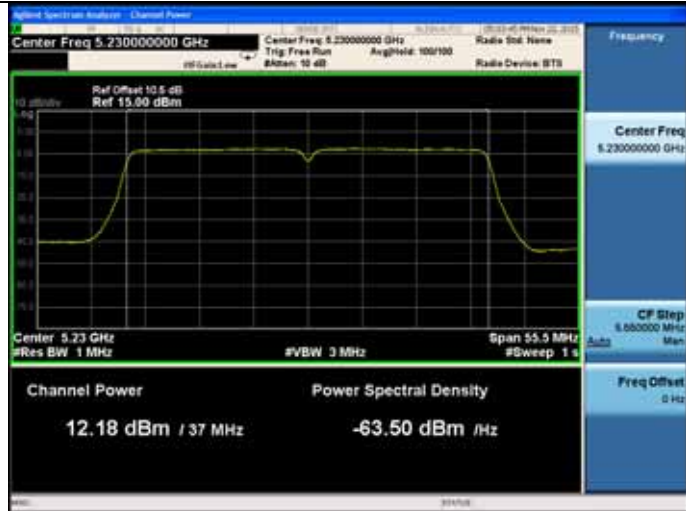


5230MHz

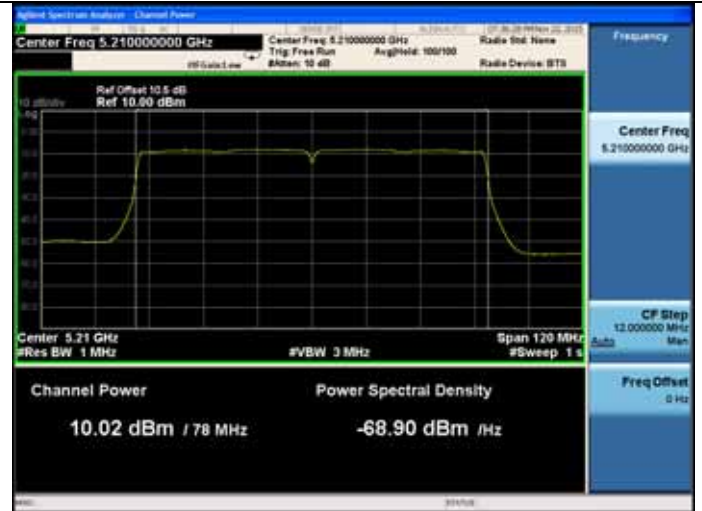


11ac VHT80

5230MHz

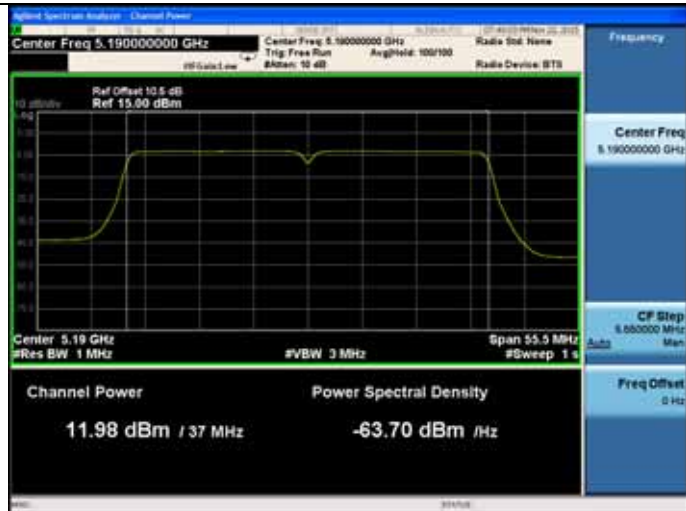


5210MHz



11acVHT40

5190MHz

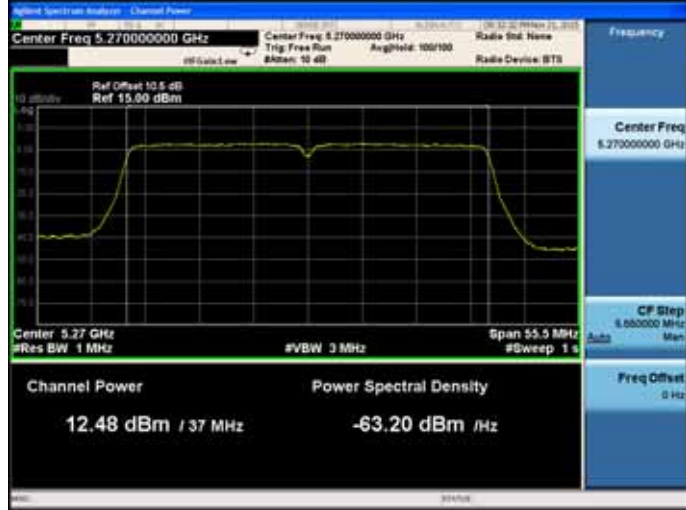


5260-5320MHz Band:

ANT 0

11n HT40

5270MHz



5310MHz

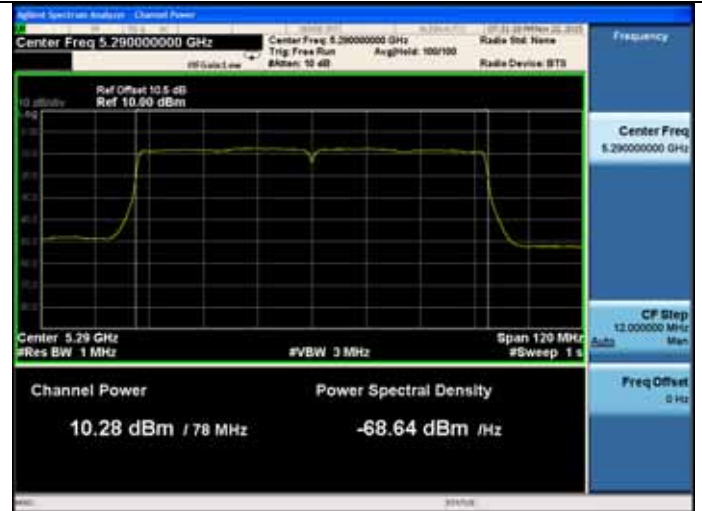


5310MHz



11ac VHT80

5290MHz



11acVHT40

5270MHz



5260-5320MHz Band:

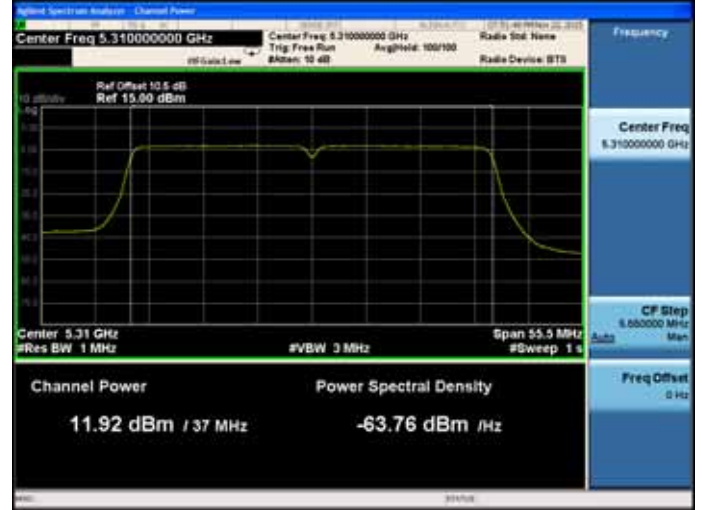
ANT 1

11n HT40

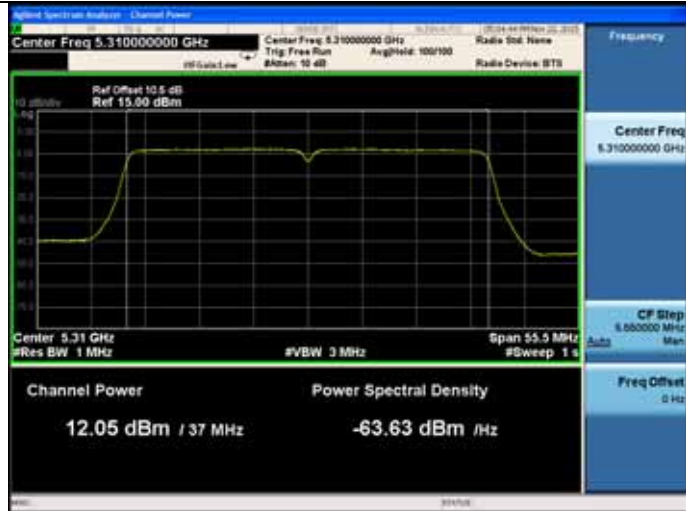
5270MHz



5310MHz

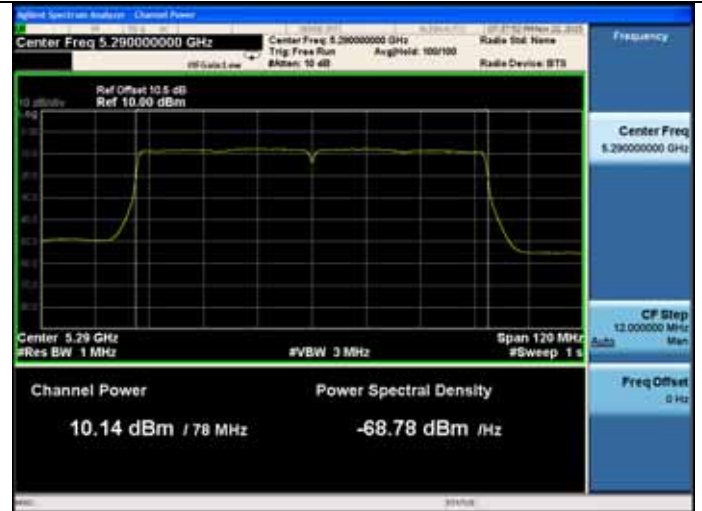


5310MHz



11ac VHT80

5290MHz



11acVHT40

5270MHz



<p>5500-5700MHz Band:</p>	
<p>ANT 0</p>	
<p>11n HT40</p>	<p>11acVHT40</p>
<p>5510MHz</p>	<p>5510MHz</p>
<p>5590MHz</p>	<p>5590MHz</p>
<p>5670MHz</p>	<p>5670MHz</p>

<p>11ac VHT80 5530MHz</p> <p>Channel Power: 10.37 dBm / 78 MHz Power Spectral Density: -68.55 dBm / Hz</p>	<p>5670MHz</p> <p>Channel Power: 11.85 dBm / 37 MHz Power Spectral Density: -63.83 dBm / Hz</p>
<p>ANT 1 11n HT40 5510MHz</p> <p>Channel Power: 12.92 dBm / 37 MHz Power Spectral Density: -62.76 dBm / Hz</p>	<p>11acVHT40 5510MHz</p> <p>Channel Power: 12.57 dBm / 37 MHz Power Spectral Density: -63.11 dBm / Hz</p>
<p>5590MHz</p> <p>Channel Power: 12.52 dBm / 37 MHz Power Spectral Density: -63.16 dBm / Hz</p>	<p>5590MHz</p> <p>Channel Power: 12.37 dBm / 37 MHz Power Spectral Density: -63.31 dBm / Hz</p>

<p>5670MHz</p>	<p>11ac VHT80 5530MHz</p>
<p>Center Freq 5.67000000 GHz</p> <p>Ref Offset 10.5 dB Ref 15.00 dBm</p> <p>Channel Power: 11.72 dBm / 37 MHz</p> <p>Power Spectral Density: -63.97 dBm /Hz</p>	<p>Center Freq 5.53000000 GHz</p> <p>Ref Offset 10.5 dB Ref 10.00 dBm</p> <p>Channel Power: 10.81 dBm / 78 MHz</p> <p>Power Spectral Density: -68.11 dBm /Hz</p>

5745-5825MHz Band:

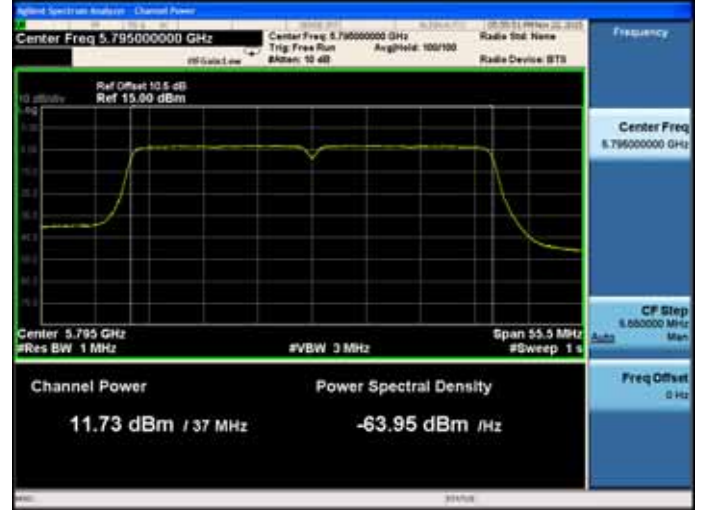
ANT 0

11n HT40

5755MHz



5795MHz

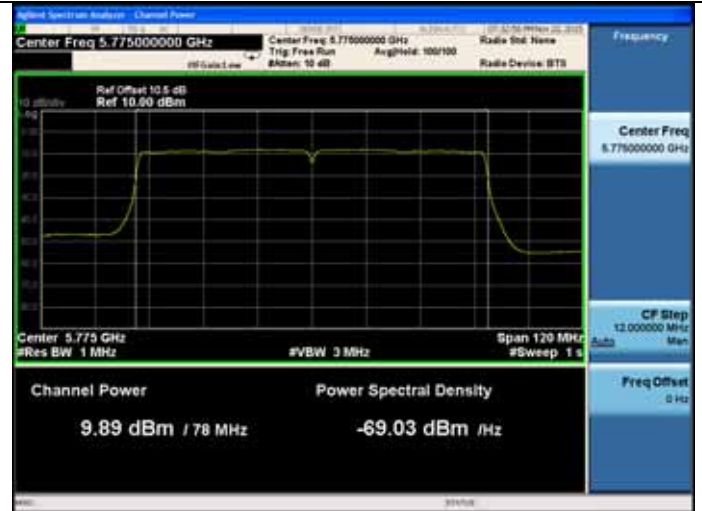


11ac VHT80

5795MHz



5775MHz



11acVHT40

5755MHz

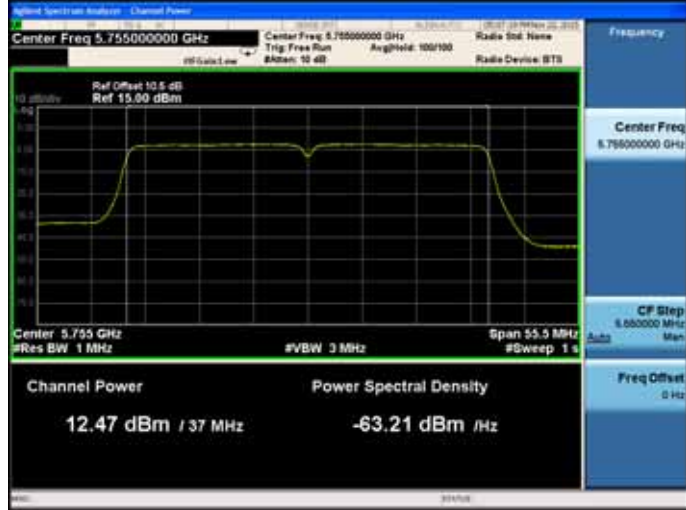


5745-5825MHz Band:

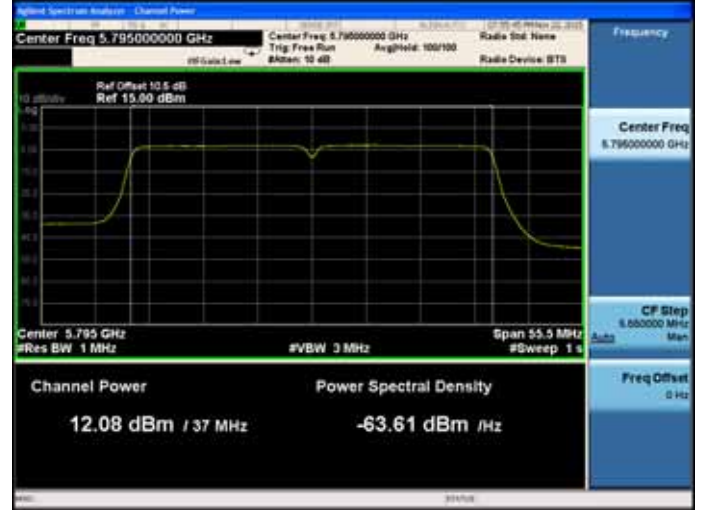
ANT 1

11n HT40

5755MHz

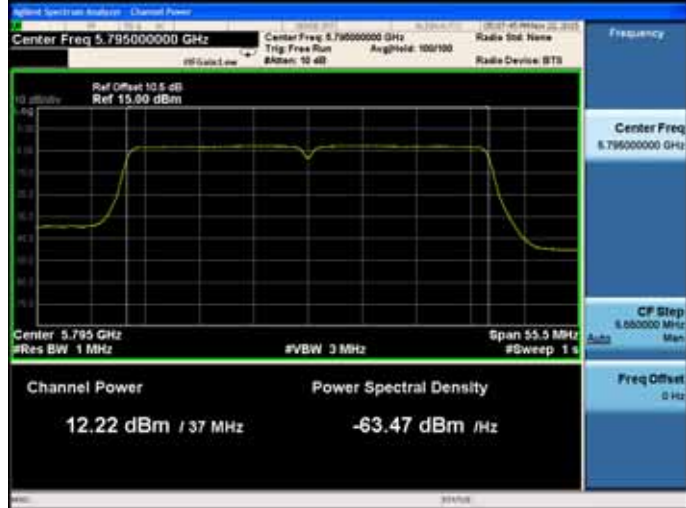


5795MHz



11ac VHT80

5795MHz



5775MHz



11acVHT40

5755MHz



8. SPECTRAL DENSITY TEST

8.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	N9030A	MY51380221	Oct.18,15	1 Year
2.	Attenuator (20dB)	Agilent	8491B	MY39262165	Apr.28, 15	1 Year
3	RF Cable	Hubersuhner	SUCOFLEX102	28610/2	Apr.28, 15	1 Year

8.2. Limit

Band 5150-5250 MHz:

The e.i.r.p spectral density shall not exceed 11 dBm in any 1.0 MHz band.

Band 5250-5350 MHz:

The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

Band 5470-5725 MHz:

The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

Band 5725-5850 MHz:

The power spectral density shall not exceed 30 dBm in any 500 KHz band.

8.3. Test Procedure

For the Band 5.15-5.25GHz:

The transmitter output was connected to a spectrum analyzer. Power density was measured by spectrum analyzer with 1MHz RBW and 3MHz VBW; Detector: RMS mode.

For the band 5.725-5.85 GHz:

The transmitter output was connected to a spectrum analyzer. Power density was measured by spectrum analyzer with 1MHz RBW and 3MHz VBW, RMS Detector.

So use the test method described in KDB789033 clause E

- 1) Set the RBW=100kHz and VBW =3MHz
- 2) Number of points in sweep ≥ 2 Span / RBW.(This ensures that bin-to-bin spacing is \leq RBW/2, so that narrowband signals are not lost between frequency bins.)
- 3) Sweep time = auto
- 4) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
- 5) Use the "peak search" function of spectrum analyzer find the max value, then add $10\log(500\text{kHz}/\text{RBW})$ to the measured result.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

8.4. Test Results

5180-5240MHz Band:

EUT: Tablet PC		
M/N: AT10-C		
Test date: 2015-11-26	Pressure: 101.8±1.0kpa	Humidity:52.7±3.0%
Tested by: Alice_Yang	Test site: RF site	Temperature:22.8±0.6 °C

Test Mode	Frequency (MHz)	Power density (dBm/MHz)			Limit (dBm/MHz)
		ANT0	ANT1	Total	
11a	5180	0.897	0.318	N/A	11
	5200	0.618	0.093	N/A	11
	5240	0.828	0.255	N/A	11
11n HT20	5180	0.328	-0.184	3.09	11
	5200	0.268	-0.158	3.071	11
	5240	0.346	-0.050	3.163	11
11n HT40	5190	-1.930	-2.753	0.688	11
	5230	-1.916	-2.508	0.808	11
11ac VHT20	5180	0.274	-0.094	3.104	11
	5200	0.152	-0.272	2.955	11
	5240	0.385	-0.161	3.131	11
11ac VHT40	5190	-2.146	-2.689	0.601	11
	5230	-1.783	-2.524	0.873	11
11ac VHT80	5210	-6.627	-7.433	-4.001	11
Conclusion: PASS					

5260-5320MHz Band:

EUT: Tablet PC		
M/N: AT10-C		
Test date: 2015-11-26	Pressure: 101.8±1.0 kpa	Humidity:52.7±3.0%
Tested by: Alice_Yang	Test site: RF site	Temperature:22.8±0.6 °C

Test Mode	Frequency (MHz)	Power density (dBm/MHz)			Limit (dBm/MHz)
		ANT1	ANT2	Total	
11a	5260	0.218	-0.324	N/A	11
	5300	0.335	-0.270	N/A	11
	5320	0.519	-0.037	N/A	11
11n HT20	5260	-0.147	-0.486	2.697	11
	5300	0.089	-0.517	2.807	11
	5320	0.142	-0.245	2.963	11
11n HT40	5270	-2.290	-2.486	0.623	11
	5310	-2.223	-2.807	0.505	11
11ac VHT20	5260	-0.227	-0.332	2.731	11
	5300	-0.099	-0.280	2.822	11
	5320	0.013	-0.131	2.952	11
11ac VHT40	5270	-2.489	-2.592	0.47	11
	5310	-2.307	-2.740	0.492	11
11ac VHT80	5290	-6.992	-7.211	-4.09	11
Conclusion: PASS					

5500-5700MHz Band:

EUT: Tablet PC		
M/N: AT10-C		
Test date: 2015-11-26	Pressure: 101.6±1.0 kpa	Humidity:52.7±3.0%
Tested by: Alice_Yang	Test site: RF site	Temperature:22.8±0.6 °C

Test Mode	Frequency (MHz)	Power density (dBm/MHz)			Limit (dBm/MHz)
		ANT0	ANT1	Total	
11a	5500	0.379	0.618	N/A	11
	5600	0.036	0.417	N/A	11
	5700	-0.221	-0.253	N/A	11
11n HT20	5500	-0.058	0.280	3.125	11
	5600	-0.095	0.195	3.063	11
	5700	-0.776	-0.474	2.388	11
11n HT40	5510	-2.558	-2.012	0.734	11
	5590	-2.640	-2.031	0.685	11
	5670	-3.123	-2.825	0.039	11
11ac VHT20	5500	-0.155	0.336	3.108	11
	5600	-0.295	0.144	2.94	11
	5700	-0.820	-0.465	2.371	11
11ac VHT40	5510	-2.629	-2.051	0.68	11
	5590	-2.589	-2.133	0.655	11
	5670	-2.971	-2.999	0.025	11
11ac VHT80	5530	-6.903	-6.575	-3.726	11

Conclusion: PASS

5745-5825MHz Band:

EUT: Tablet PC		
M/N: AT10-C		
Test date: 2015-11-26	Pressure: 101.5±1.0kpa	Humidity:52.7±3.0%
Tested by: Alice_Yang	Test site: RF site	Temperature:22.8±0.6 °C

Test Mode	Frequency (MHz)	Power density (dBm/500KHz)			Limit (dBm/500KHz)
		ANT1	ANT2	Total	
11a	5745	-1.766	-1.185	N/A	29.86
	5785	-1.772	-1.185	N/A	29.86
	5825	-2.214	-1.368	N/A	29.86
11n HT20	5745	-2.296	-1.504	1.13	29.86
	5785	-2.508	-2.007	0.76	29.86
	5825	-2.576	-1.893	0.79	29.86
11n HT40	5755	-4.259	-3.917	-1.07	29.86
	5790	-5.104	-4.228	-1.63	29.86
11ac VHT20	5745	-2.228	-1.304	1.27	29.86
	5785	-2.449	-1.886	0.85	29.86
	5825	-2.40	-2.247	0.69	29.86
11ac VHT40	5755	-4.546	-3.965	-1.24	29.86
	5790	-4.635	-4.396	-1.50	29.86
11ac VHT80	5775	-9.285	-9.047	-6.15	29.86
Conclusion: PASS					

Note: 11ac/n Mode

$$\text{Directional Gain} = 10 \log[(10^{2.84/20} + 10^{3.41/20})^2 / 2] \text{dBi}$$

$$= 6.14 \text{dBi} > 6 \text{dBi}$$

Note 2:

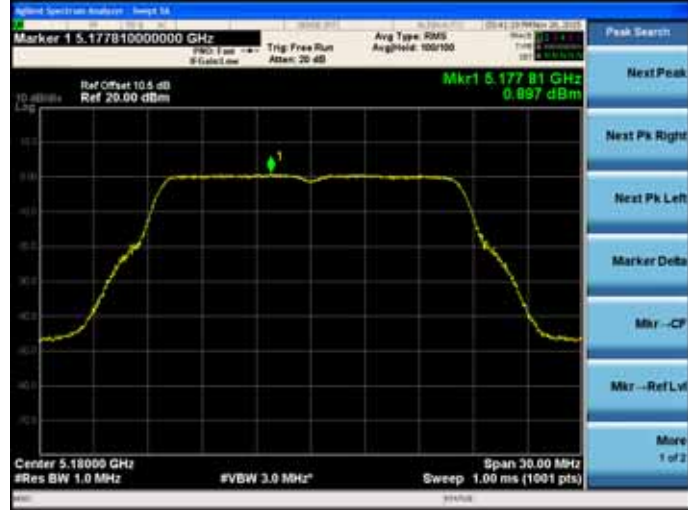
1. Correction factor = $10 \log(500 \text{kHz} / 100 \text{kHz}) = 6.9897$
2. Result = Reading value + Correction factor

5180-5240MHz Band:

ANT 0

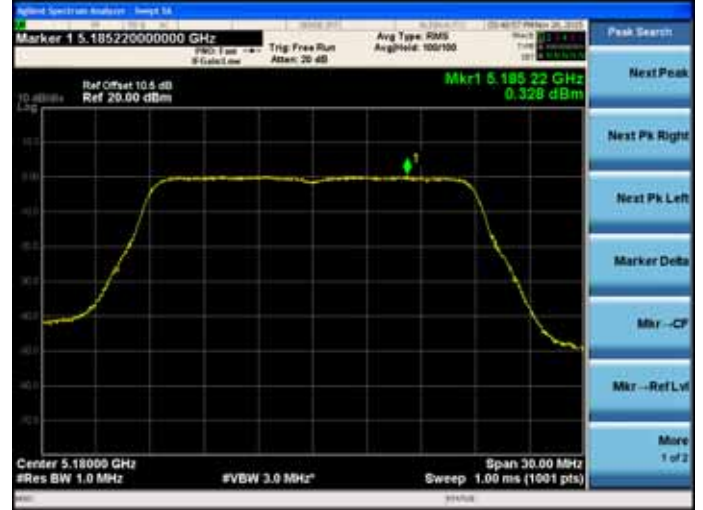
11a

5180MHz

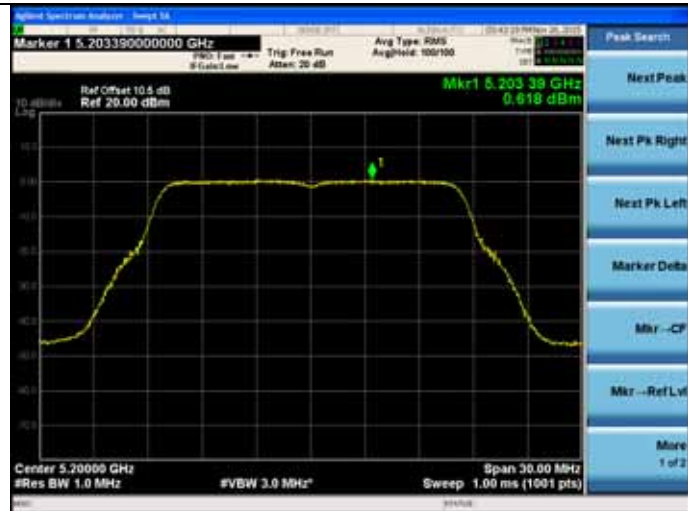


11n HT20

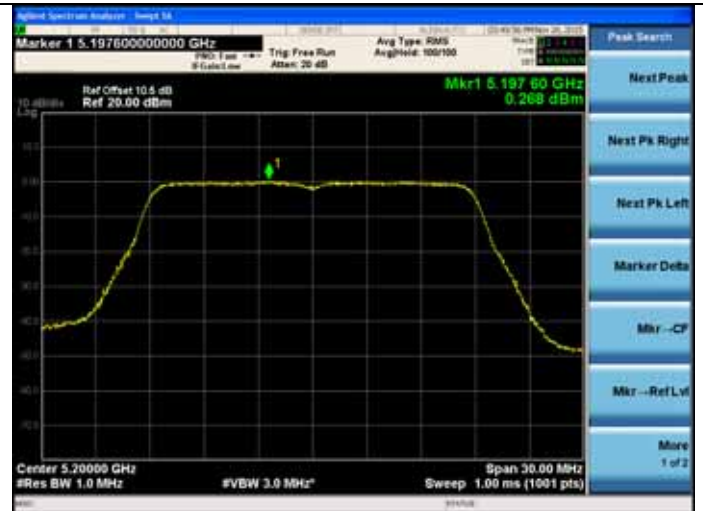
5180MHz



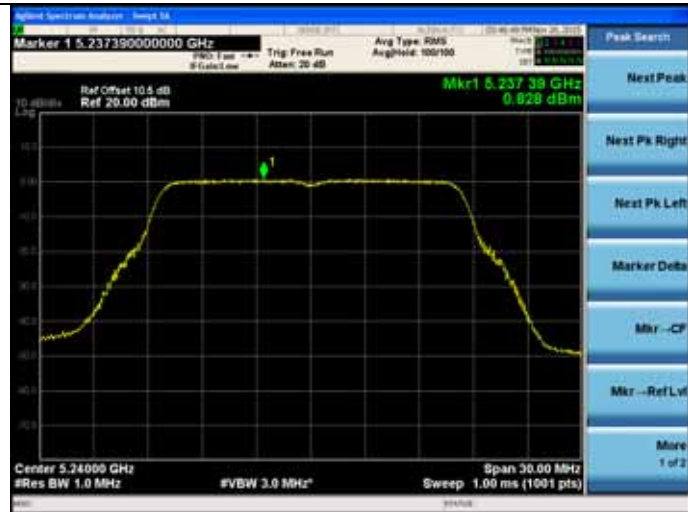
5200MHz



5200MHz



5240MHz

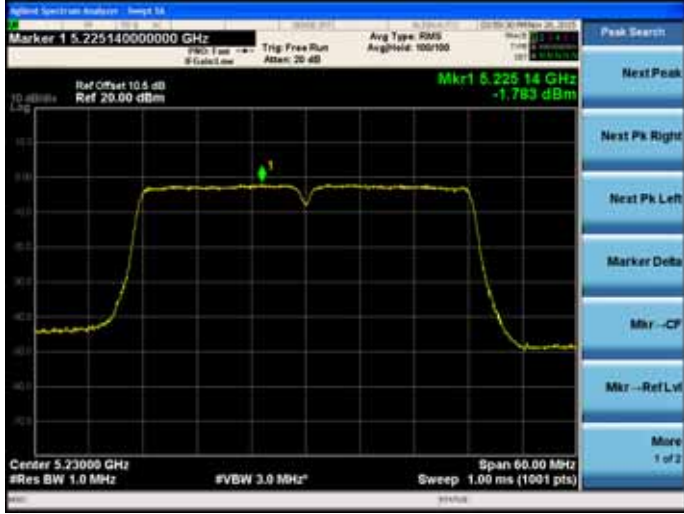


5240MHz



<p>11n HT40 5190MHz</p>	<p>5200MHz</p>
<p>5230MHz</p>	<p>5240MHz</p>
<p>11ac VHT20 5180MHz</p>	<p>11ac VHT40 5190MHz</p>

5230MHz



11ac VHT80
5210MHz

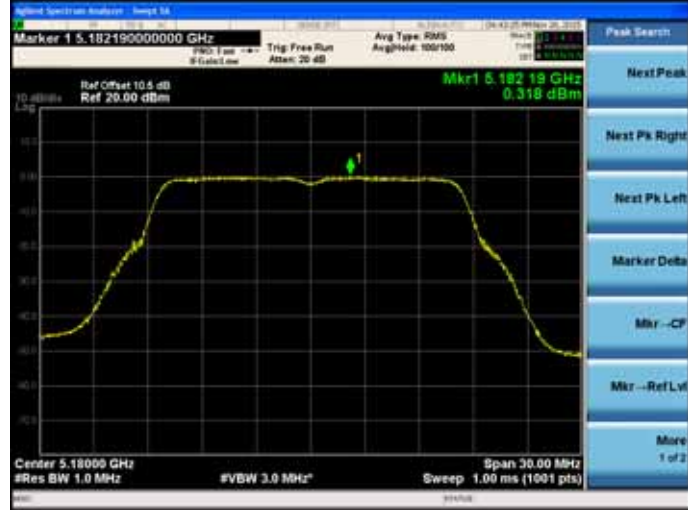


5180-5240MHz Band:

ANT 1

11a

5180MHz

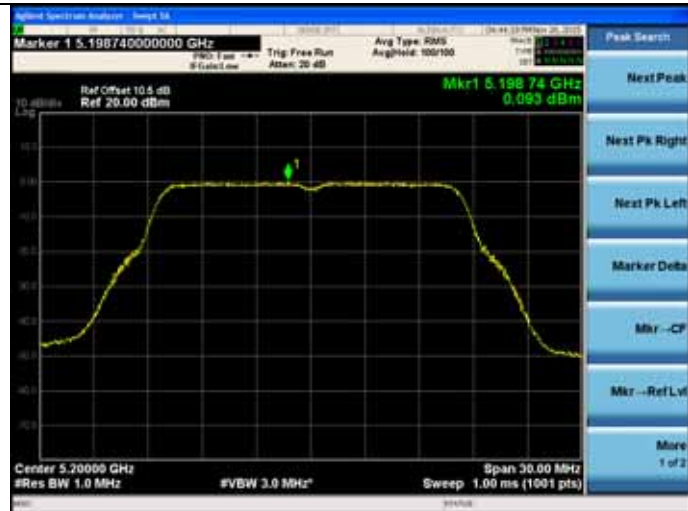


11n HT20

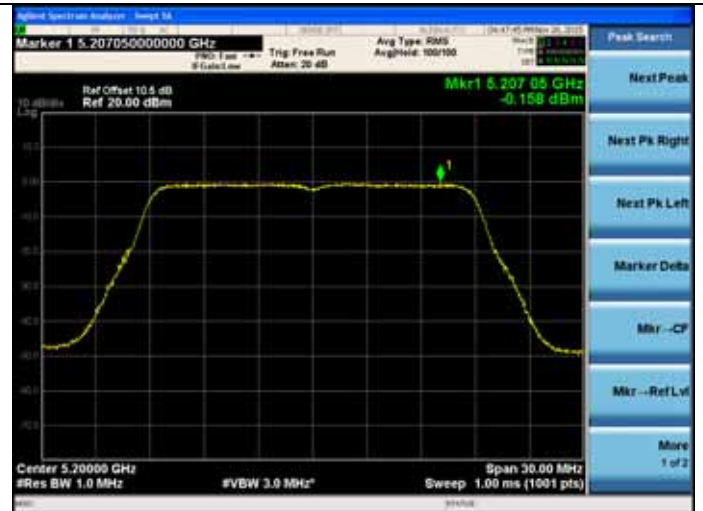
5180MHz



5200MHz



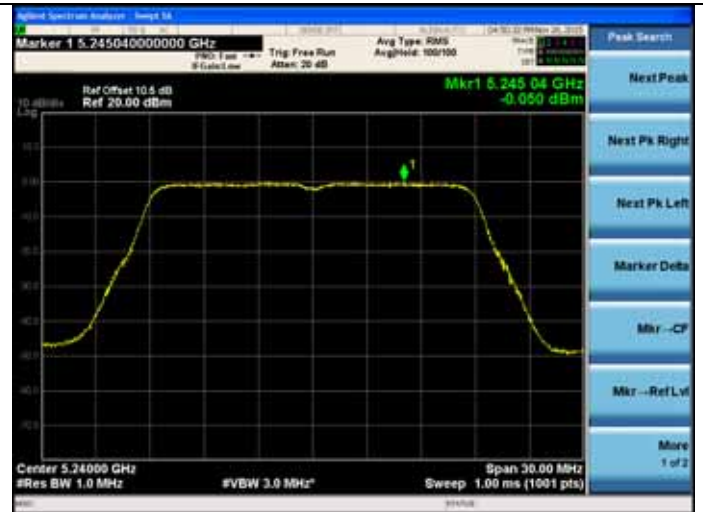
5200MHz

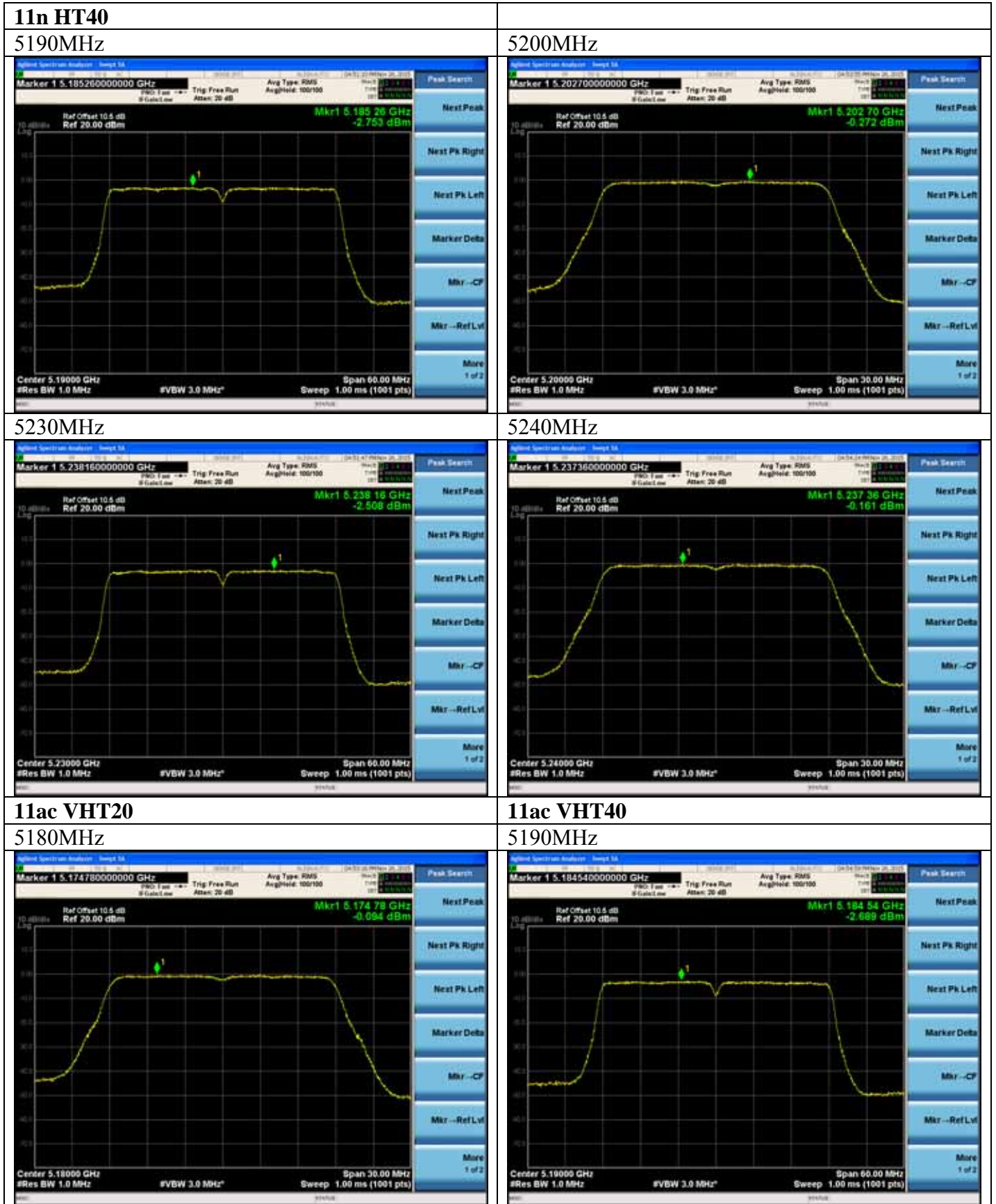


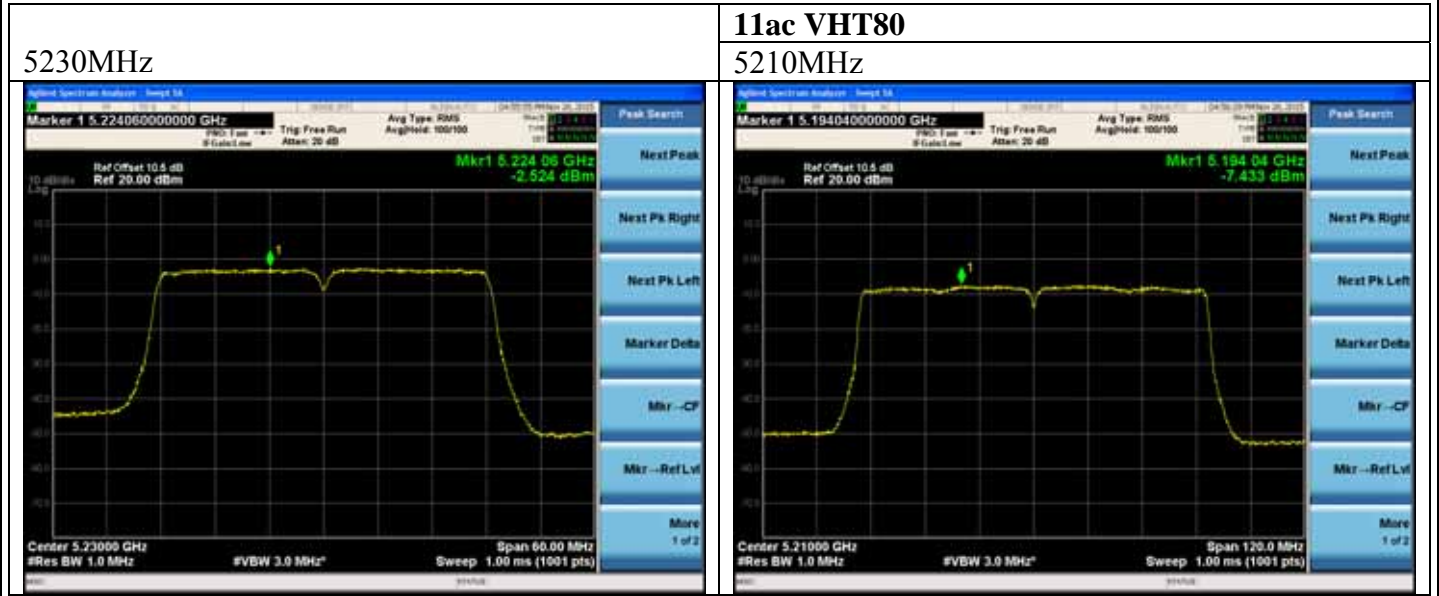
5240MHz



5240MHz







5260-5320MHz Band:

ANT 0

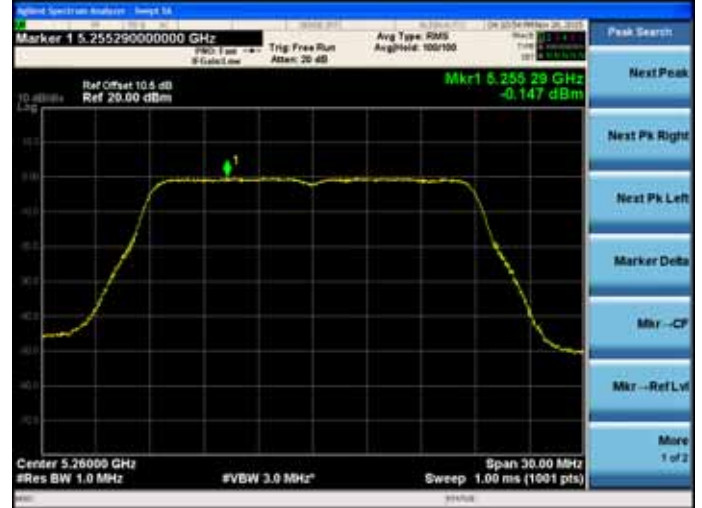
11a

5260MHz



11n HT20

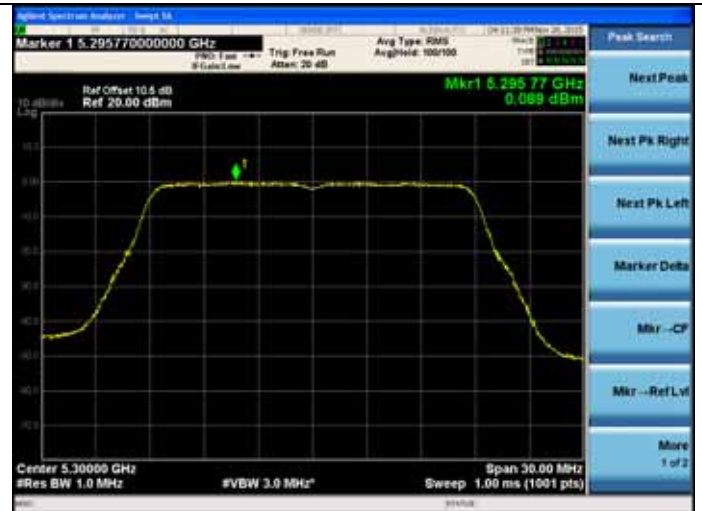
5260MHz



5300MHz



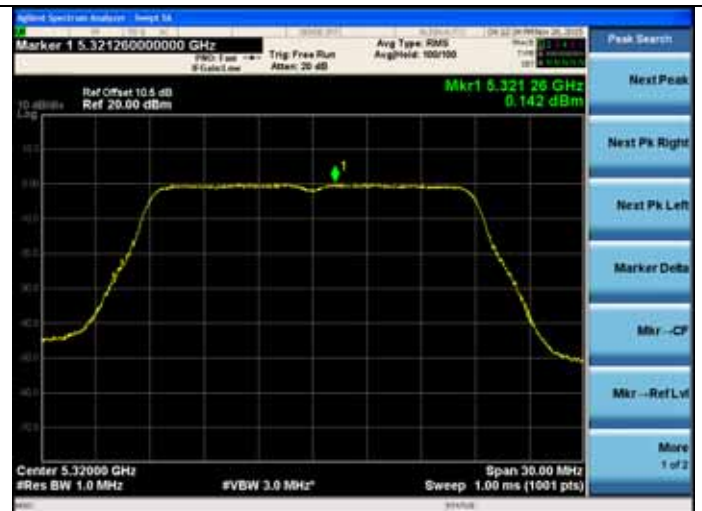
5300MHz

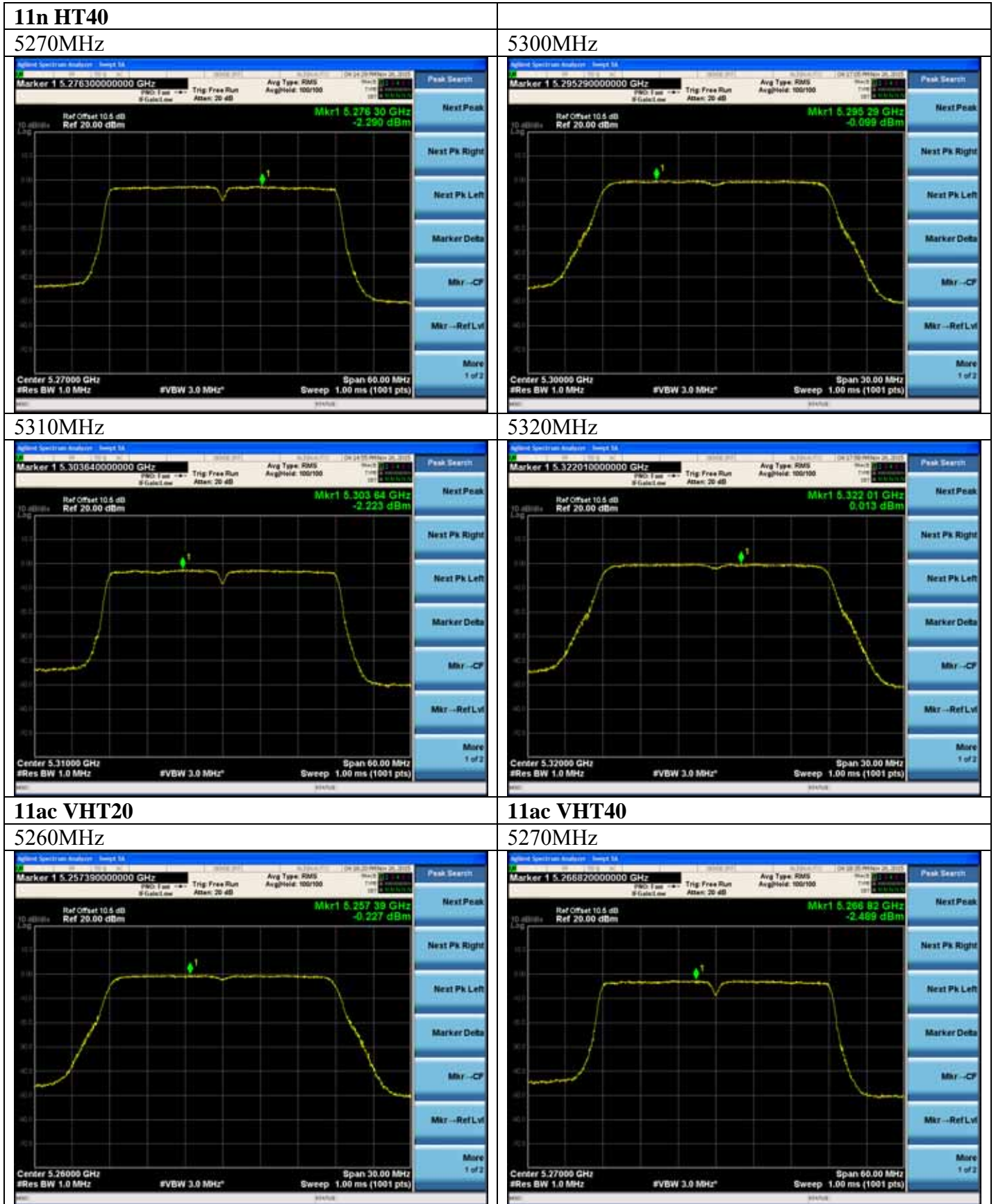


5320MHz

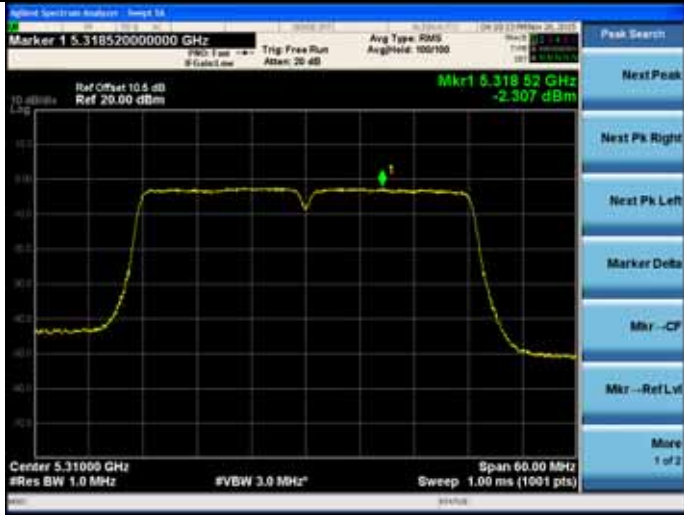


5320MHz





5310MHz

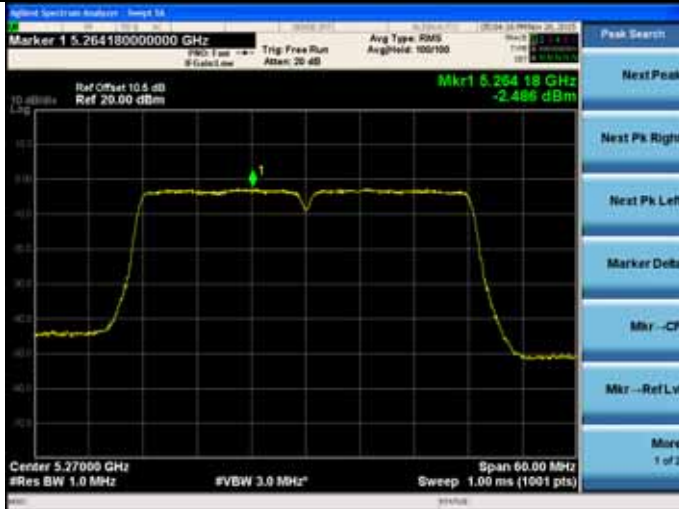


11ac VHT80
5290MHz



11n HT40

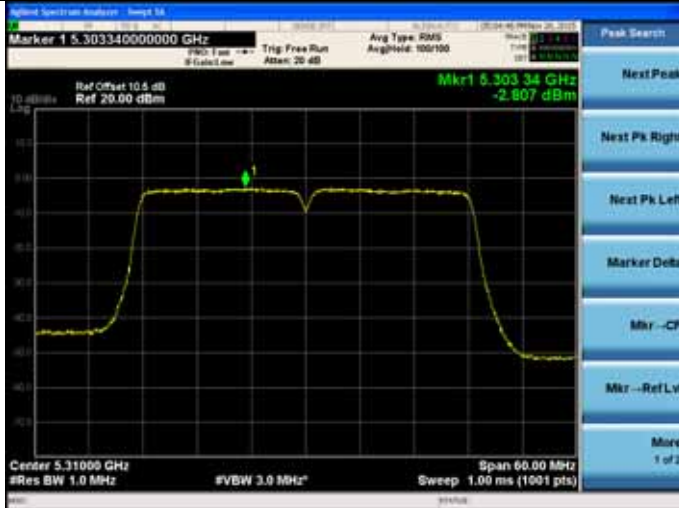
5270MHz



5300MHz



5310MHz



5320MHz



11ac VHT20

5260MHz

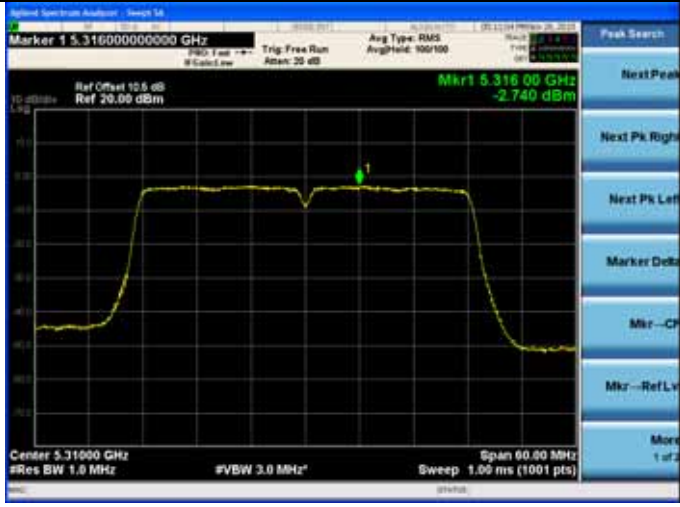


11ac VHT40

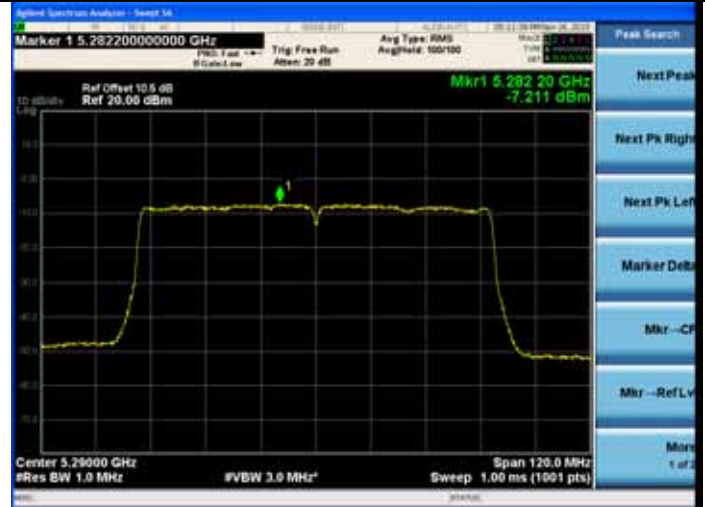
5270MHz



5310MHz



11ac VHT80
5290MHz



5500-5700MHz Band:

ANT 0

11a

5500MHz

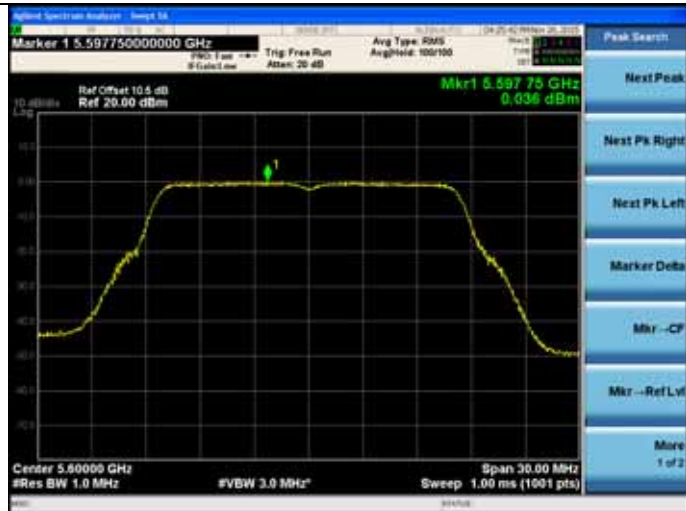


11n HT20

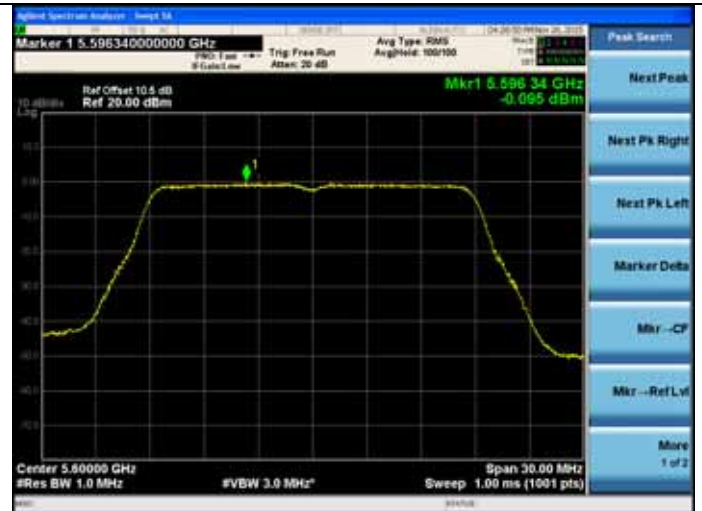
5500MHz



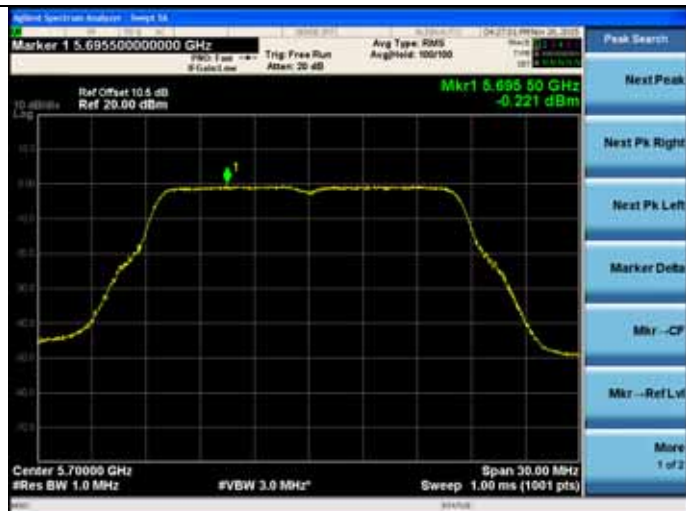
5600MHz



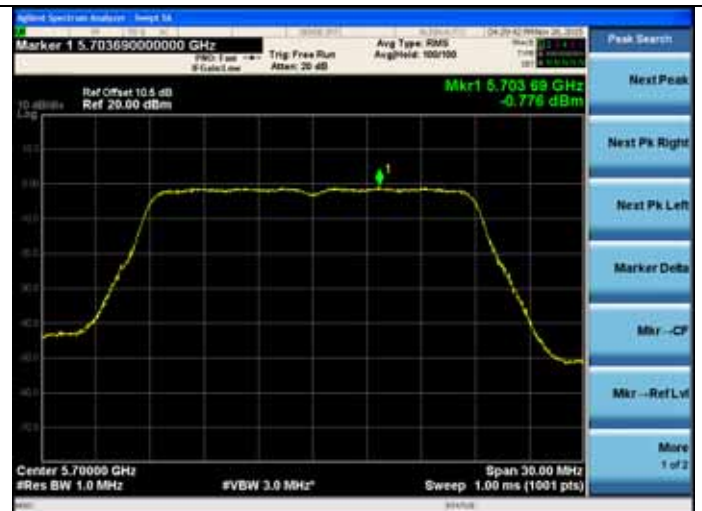
5600MHz

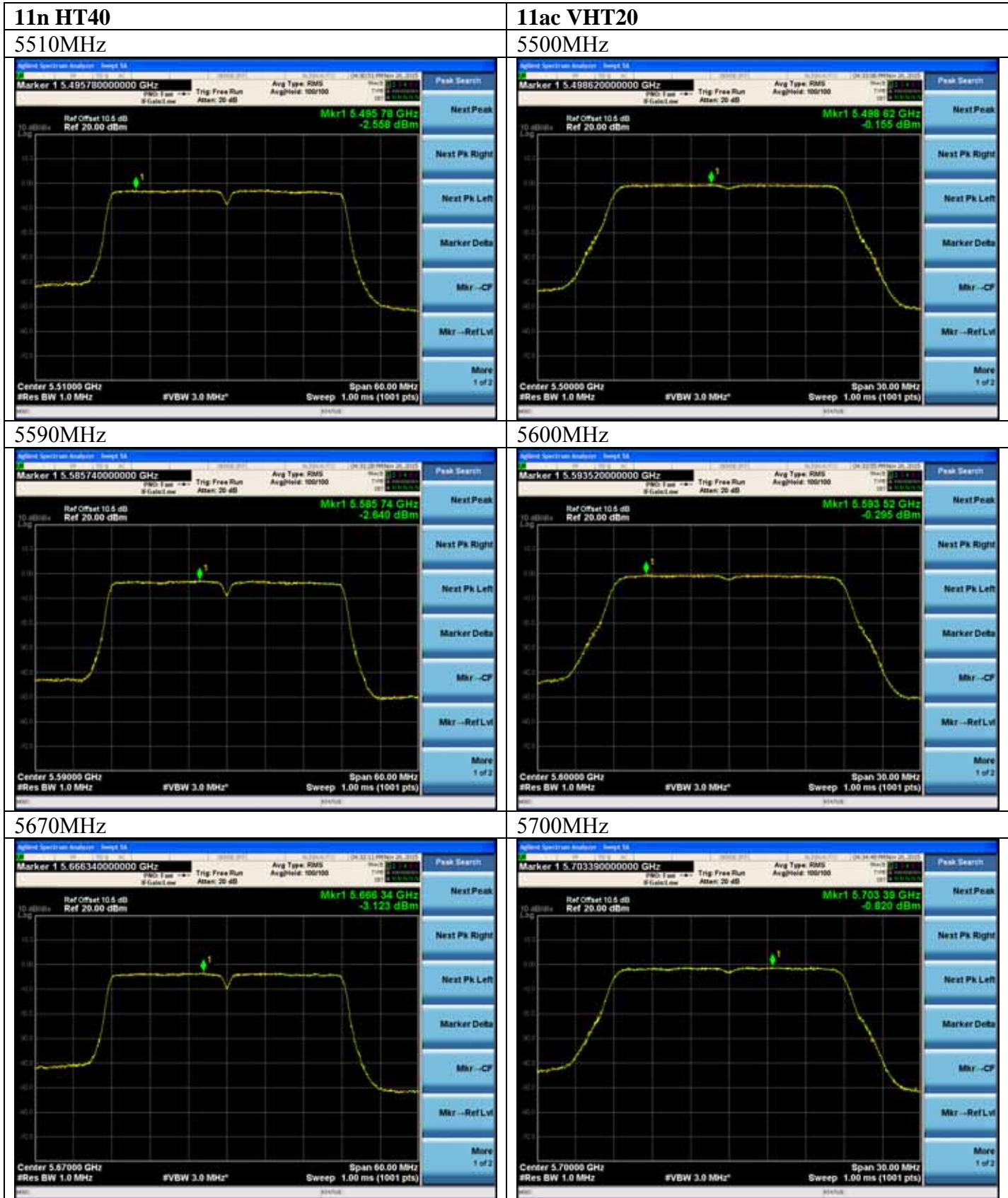


5700MHz



5700MHz





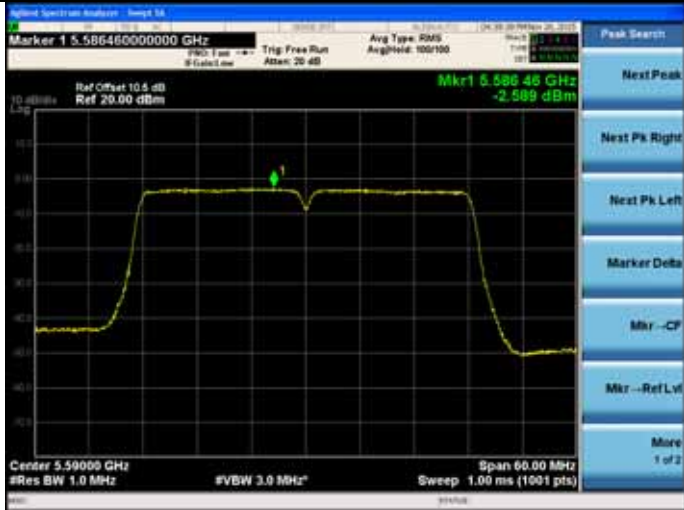
11ac VHT40
5510MHz



5670MHz



5590MHz



11ac VHT80

5530MHz



5500-5700MHz Band:

ANT 1

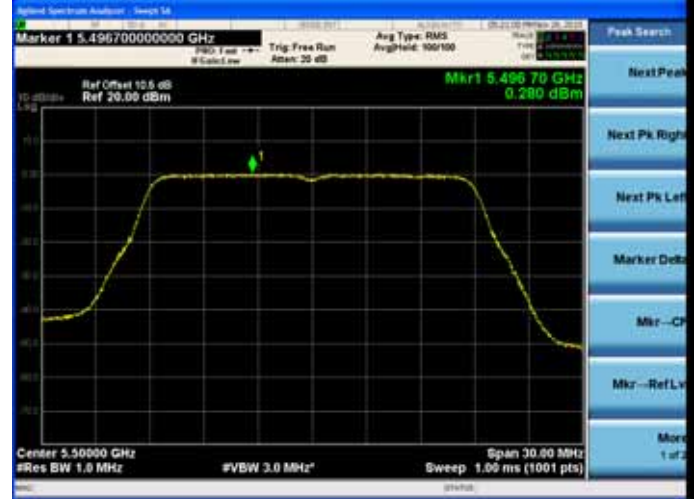
11a

5500MHz



11n HT20

5500MHz



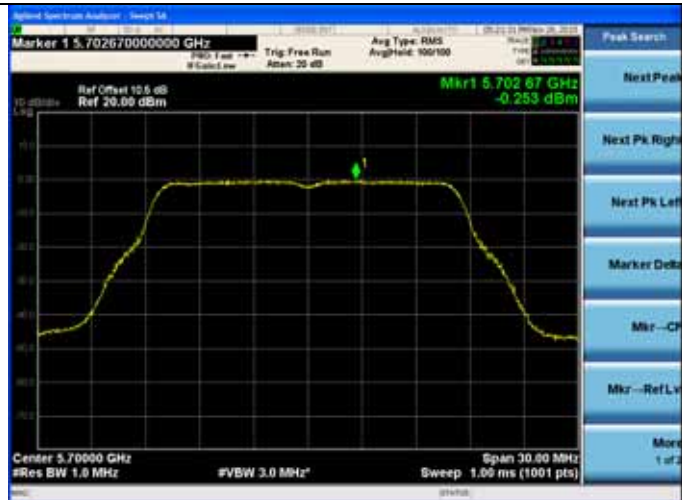
5600MHz



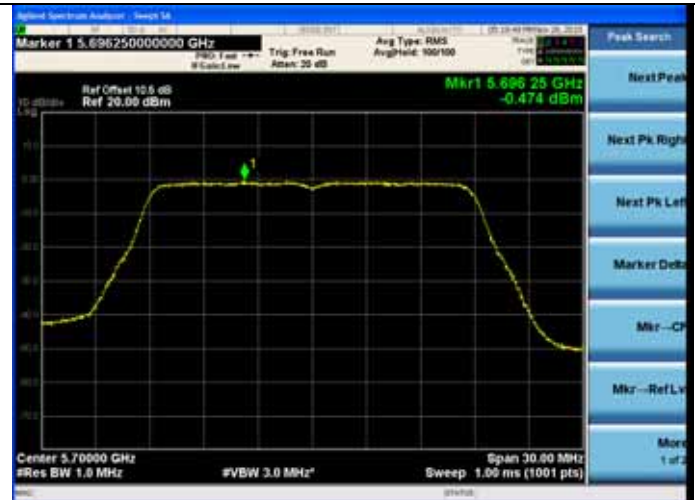
5600MHz

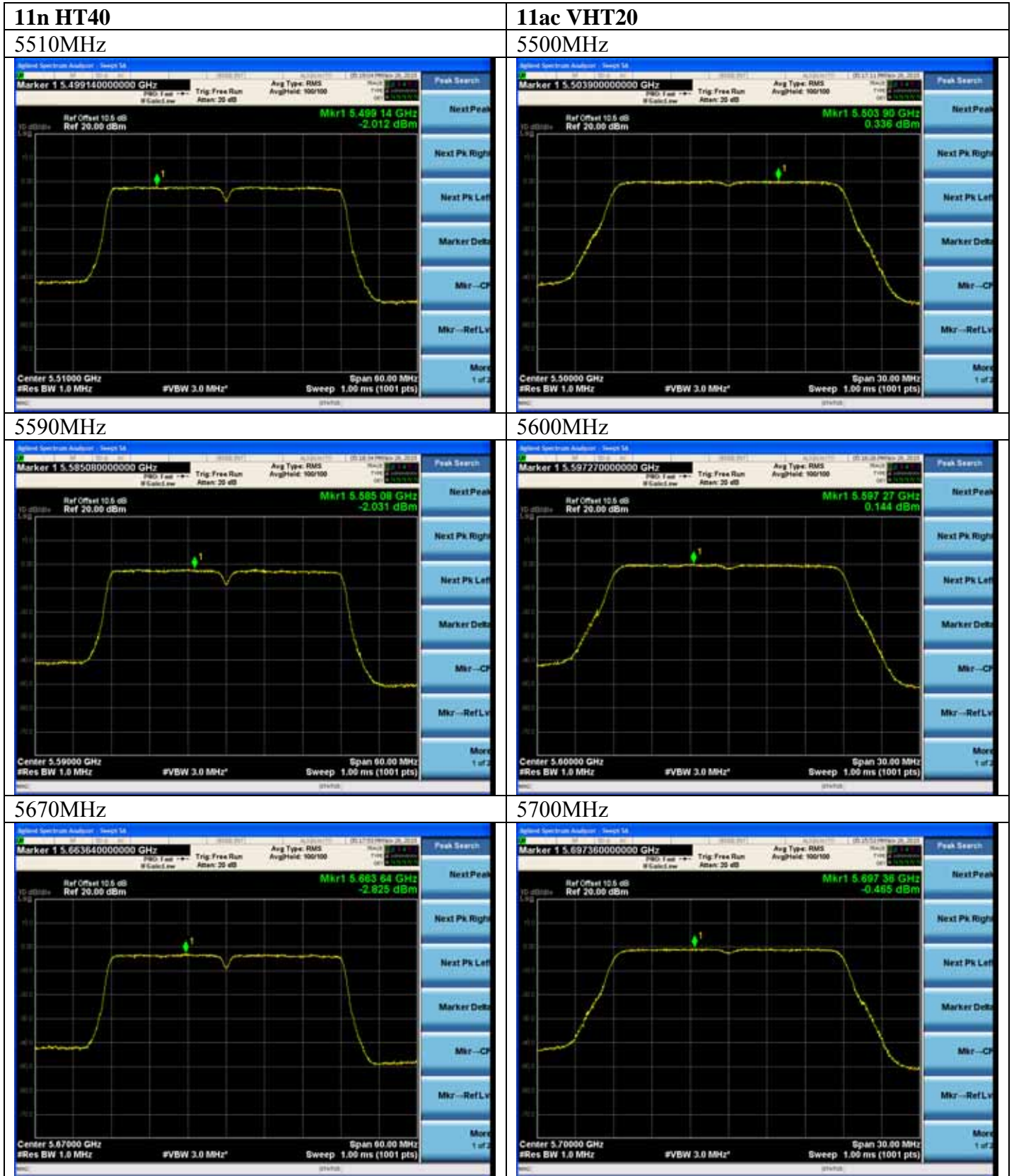


5700MHz

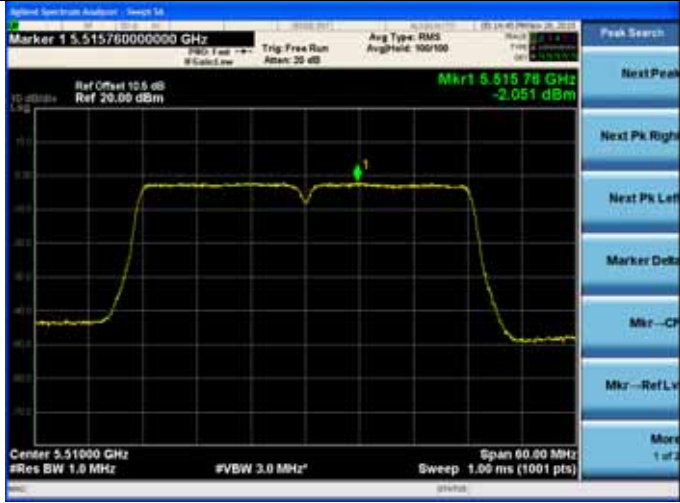


5700MHz

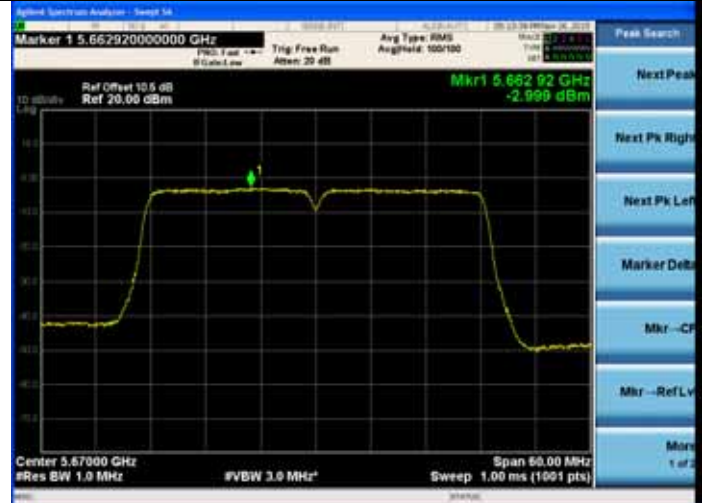




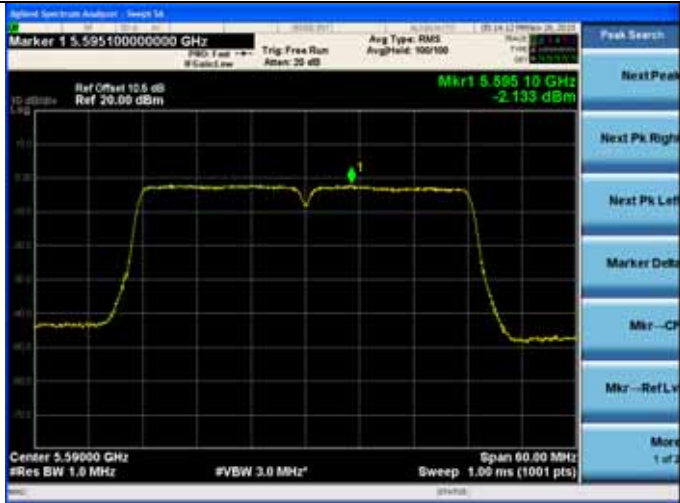
11ac VHT40
5510MHz



5670MHz

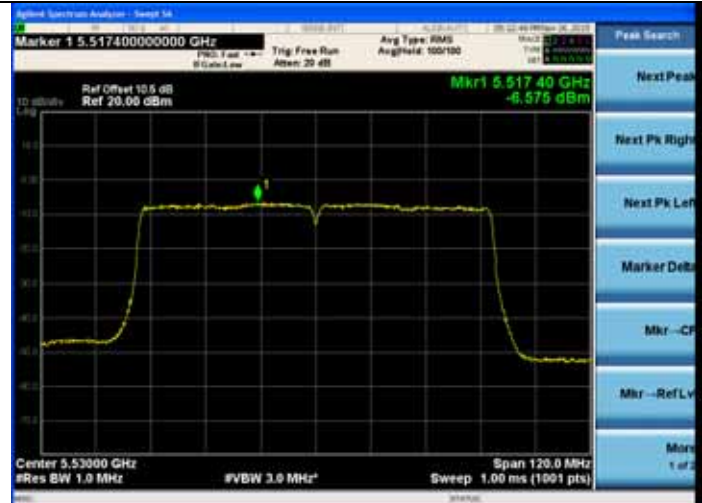


5590MHz



11ac VHT80

5530MHz

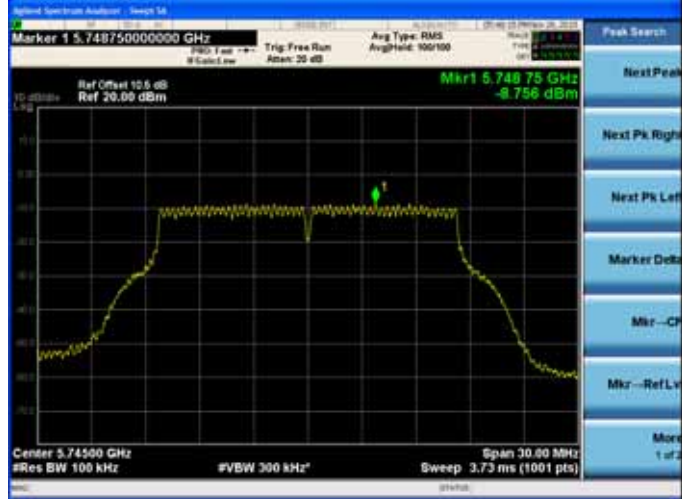


5745-5825MHz Band:

ANT 0

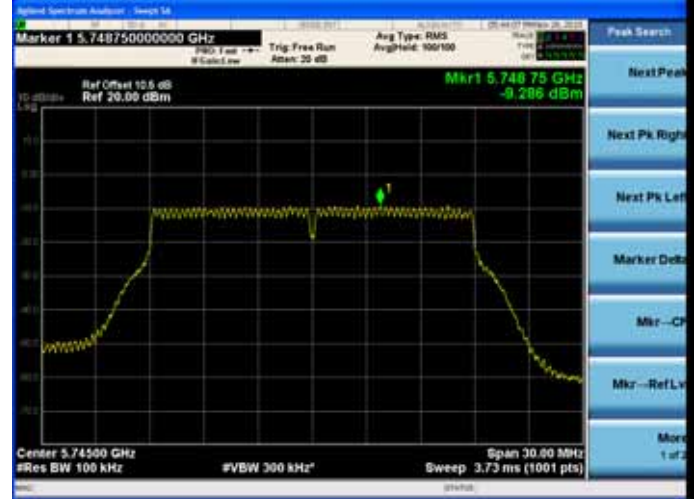
11a

5745MHz

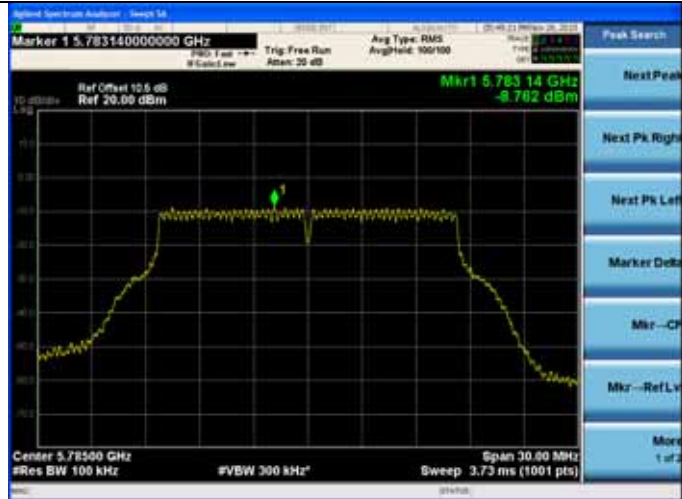


11n HT20

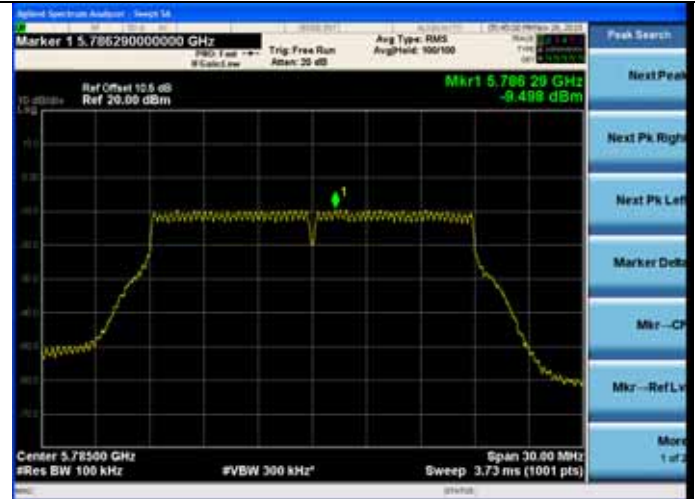
5745MHz



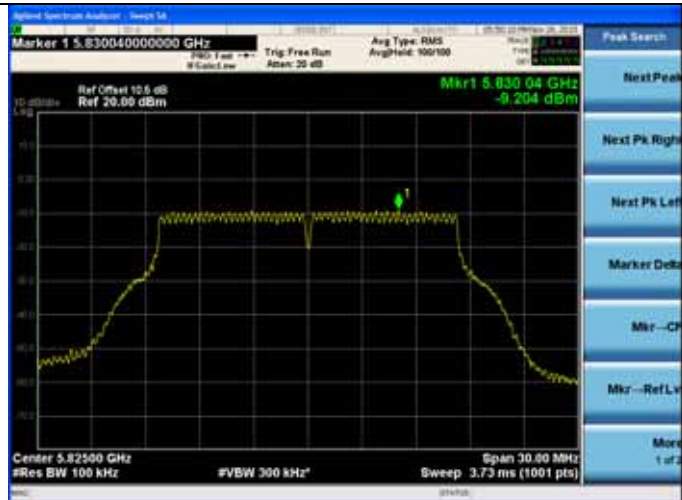
5785MHz



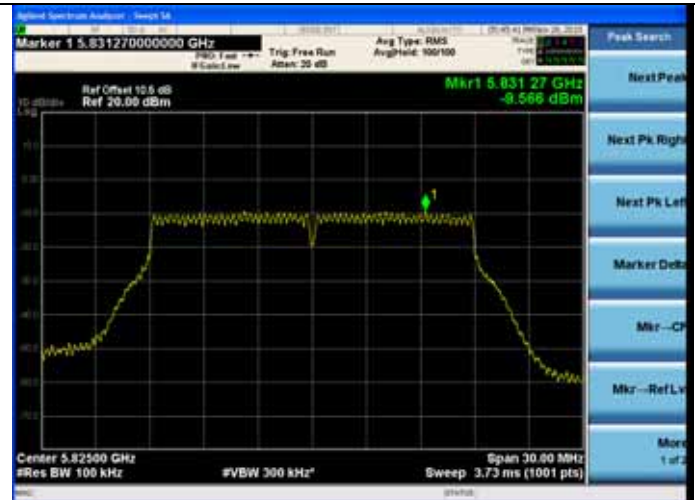
5785MHz

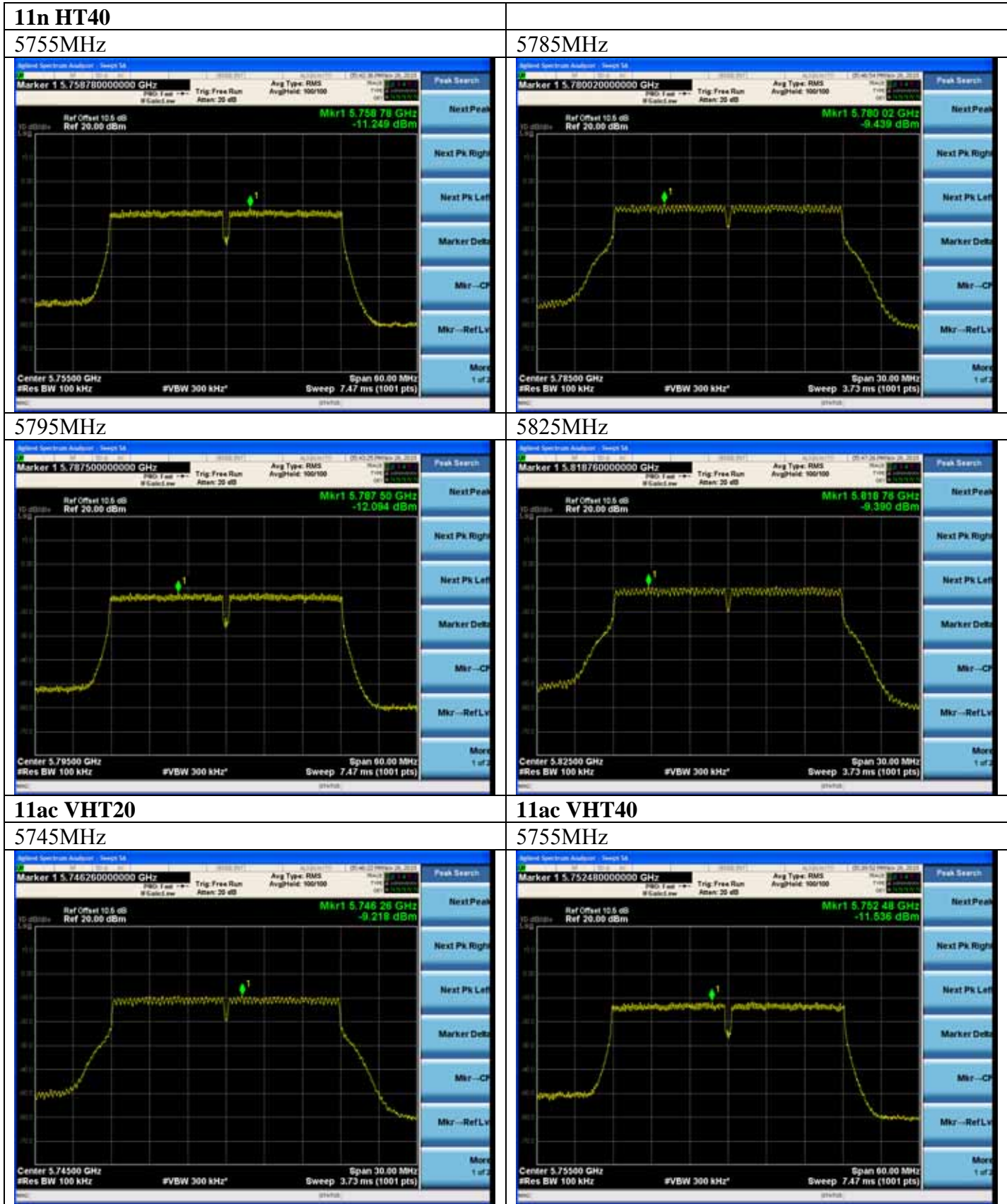


5825MHz

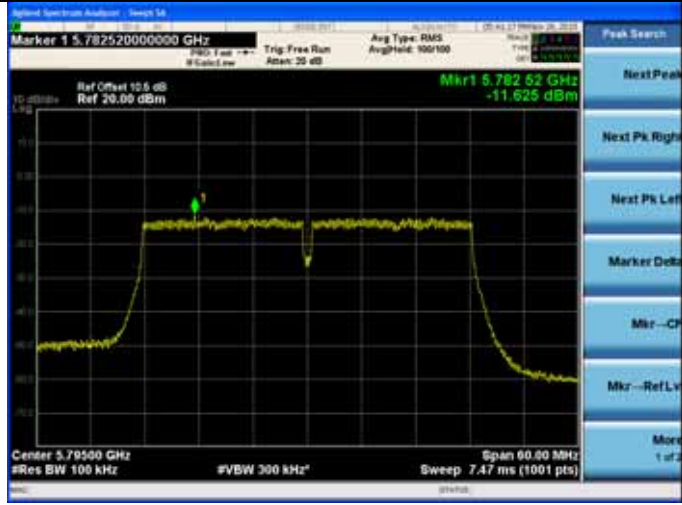


5825MHz

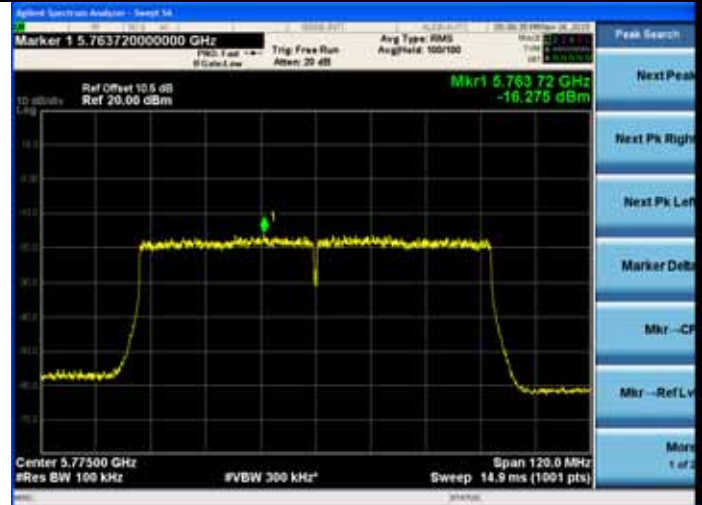




5795MHz



11ac VHT80
5775MHz

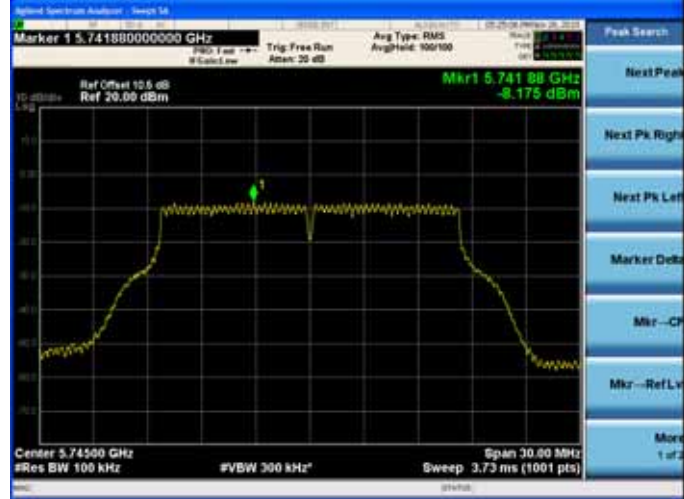


5745-5825MHz Band:

ANT 1

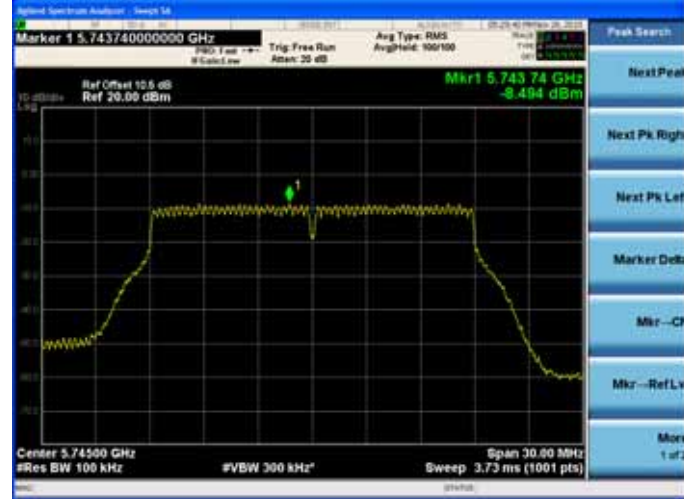
11a

5745MHz

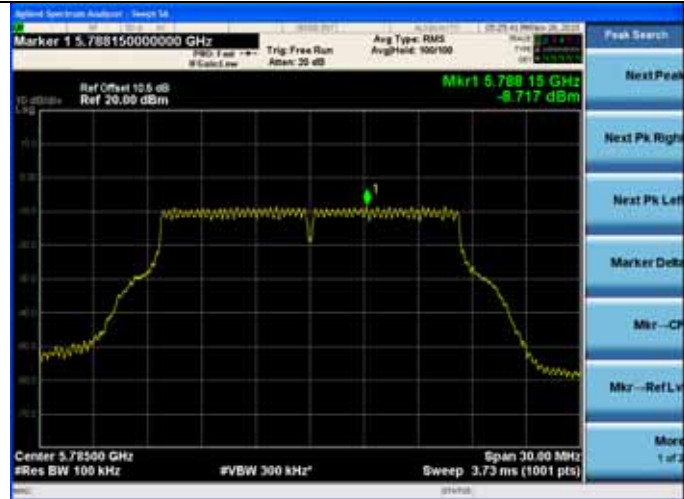


11n HT20

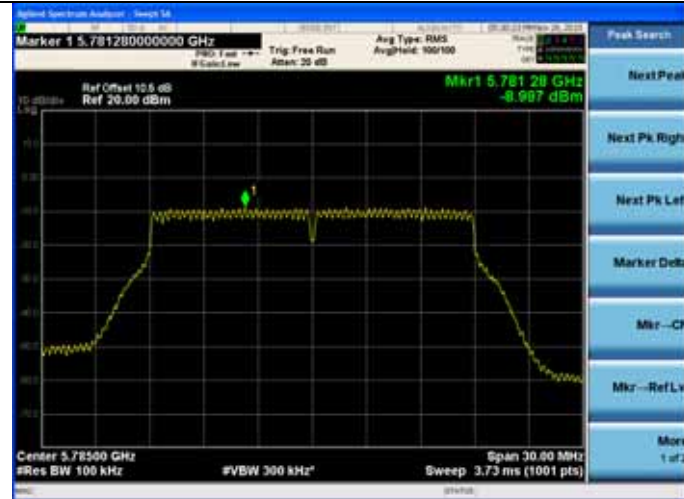
5745MHz



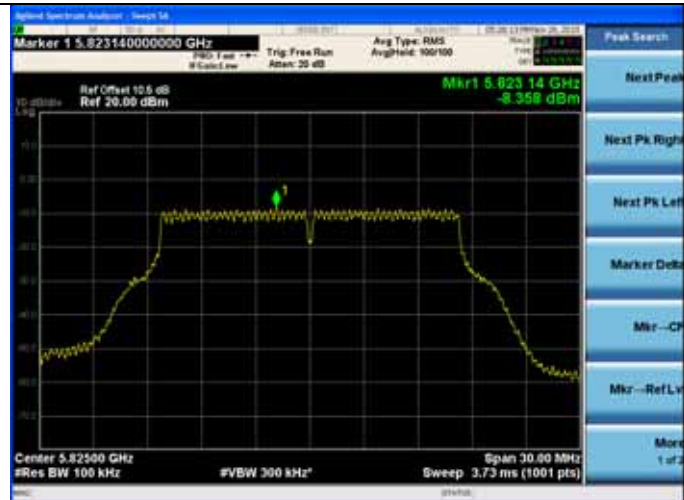
5785MHz



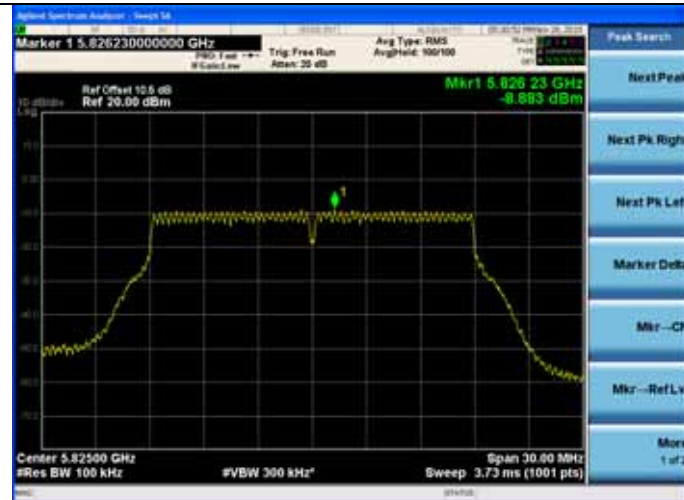
5785MHz



5825MHz

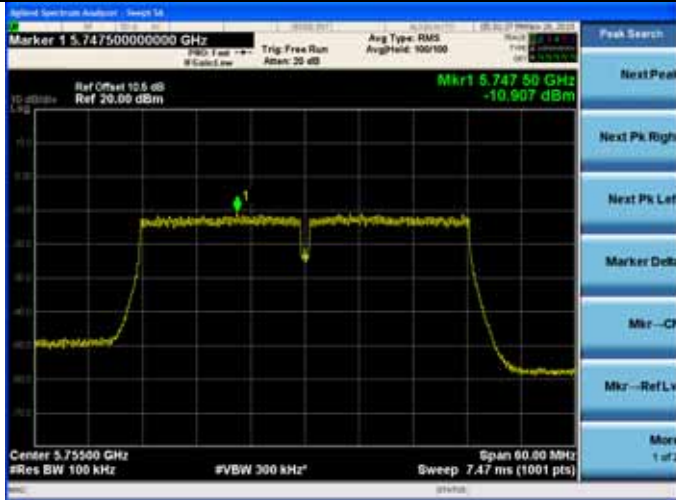


5825MHz

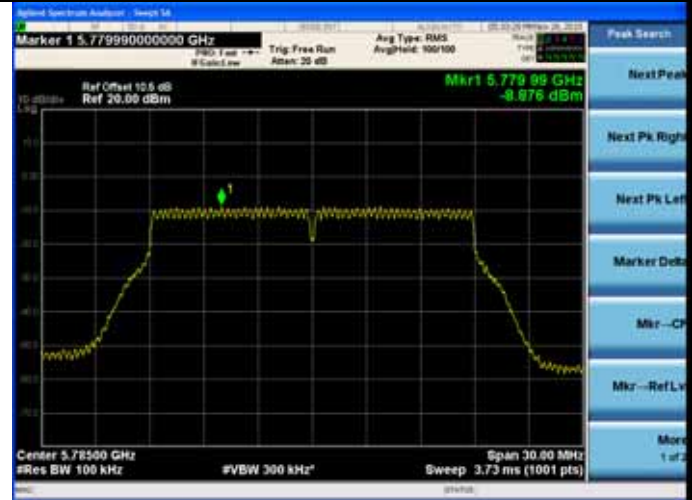


11n HT40

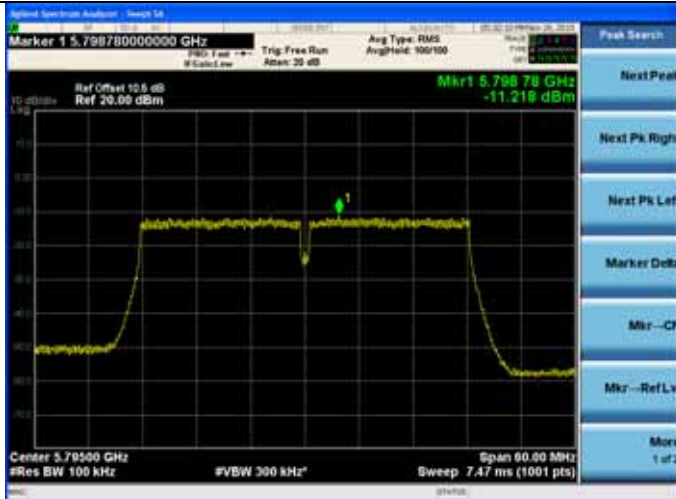
5755MHz



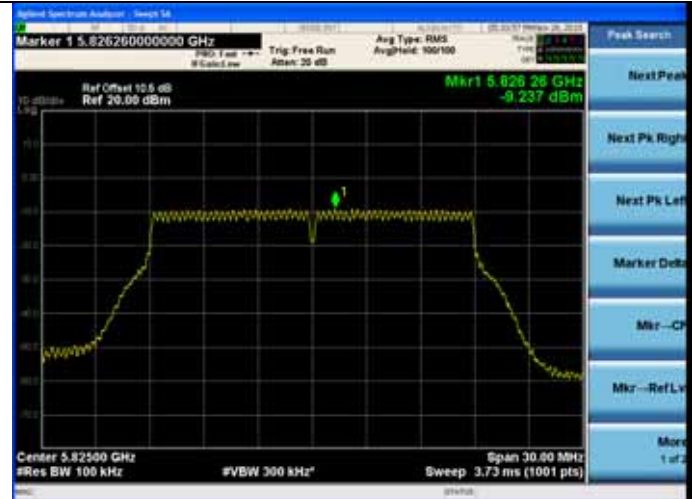
5785MHz



5795MHz

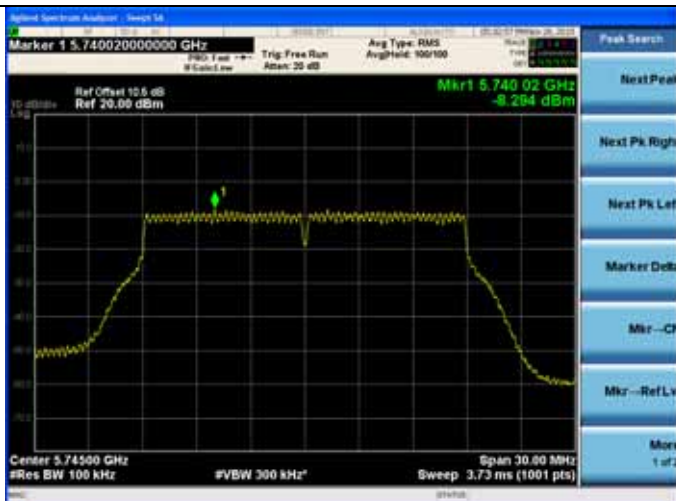


5825MHz



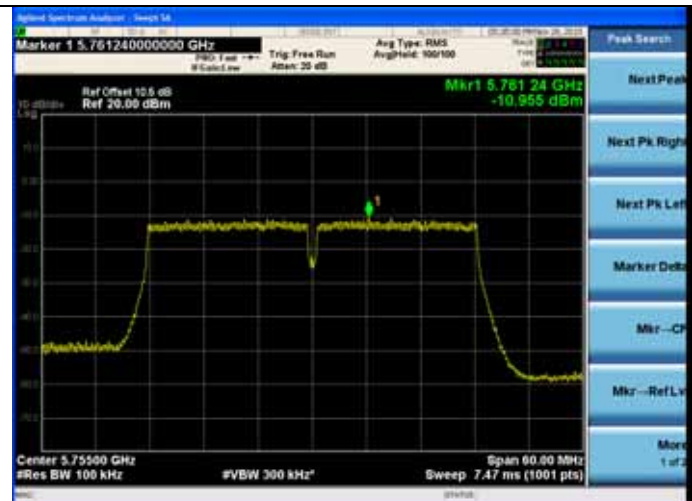
11ac VHT20

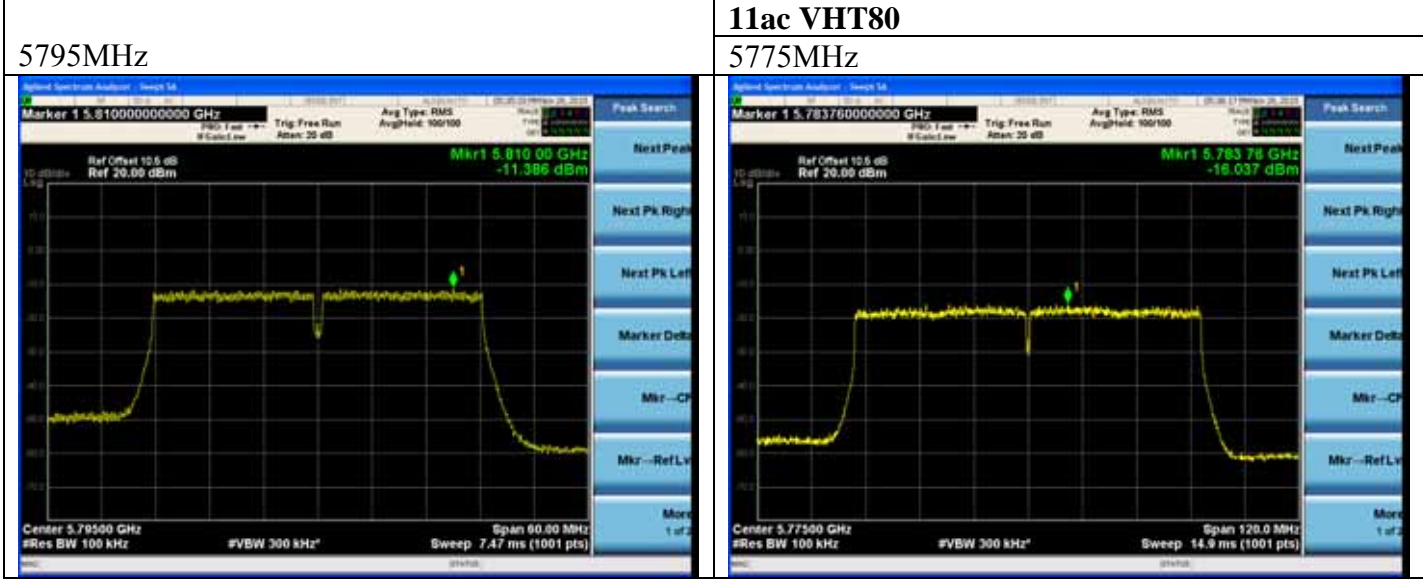
5745MHz



11ac VHT40

5755MHz





9. ANTENNA REQUIREMENT

9.1. Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.407 (a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

9.2. Antenna Connected Construction

The antennas used for this product are PIFA antenna that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is 3.41dBi.

10. DEVIATION TO TEST SPECIFICATIONS

[NONE]