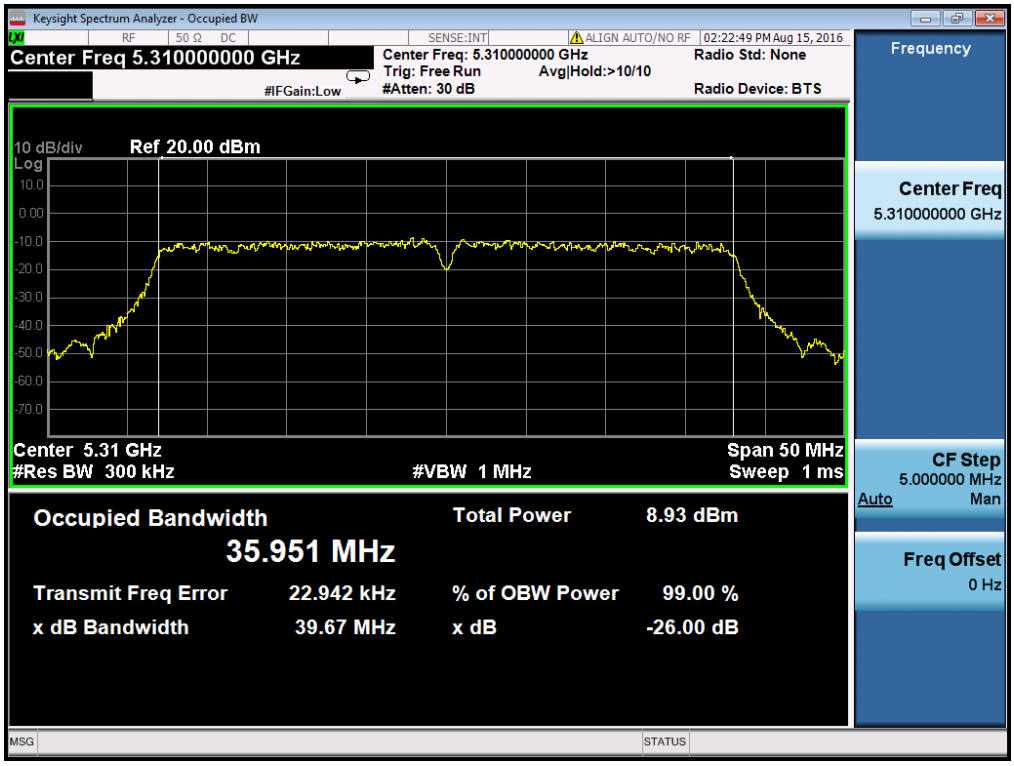
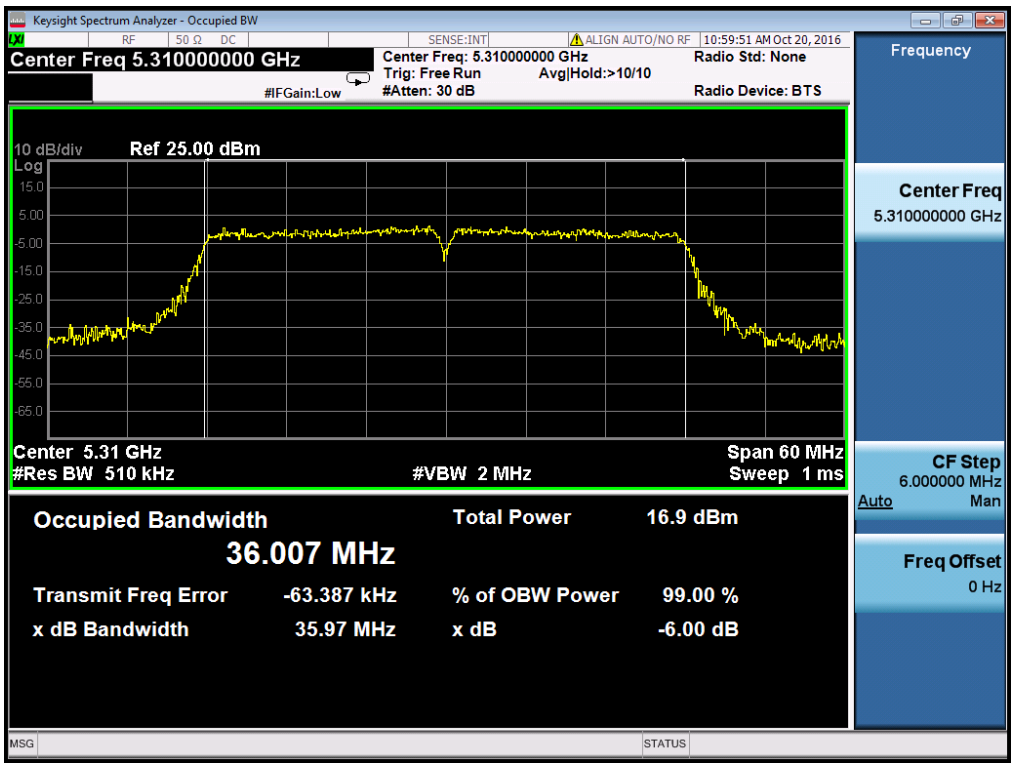
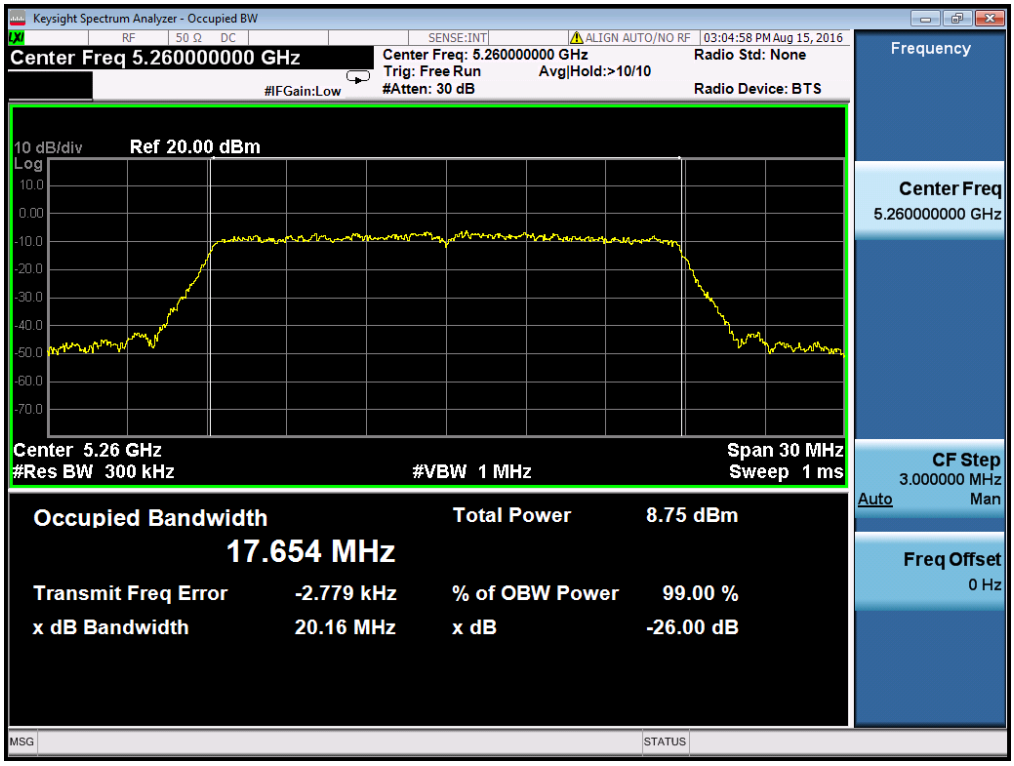


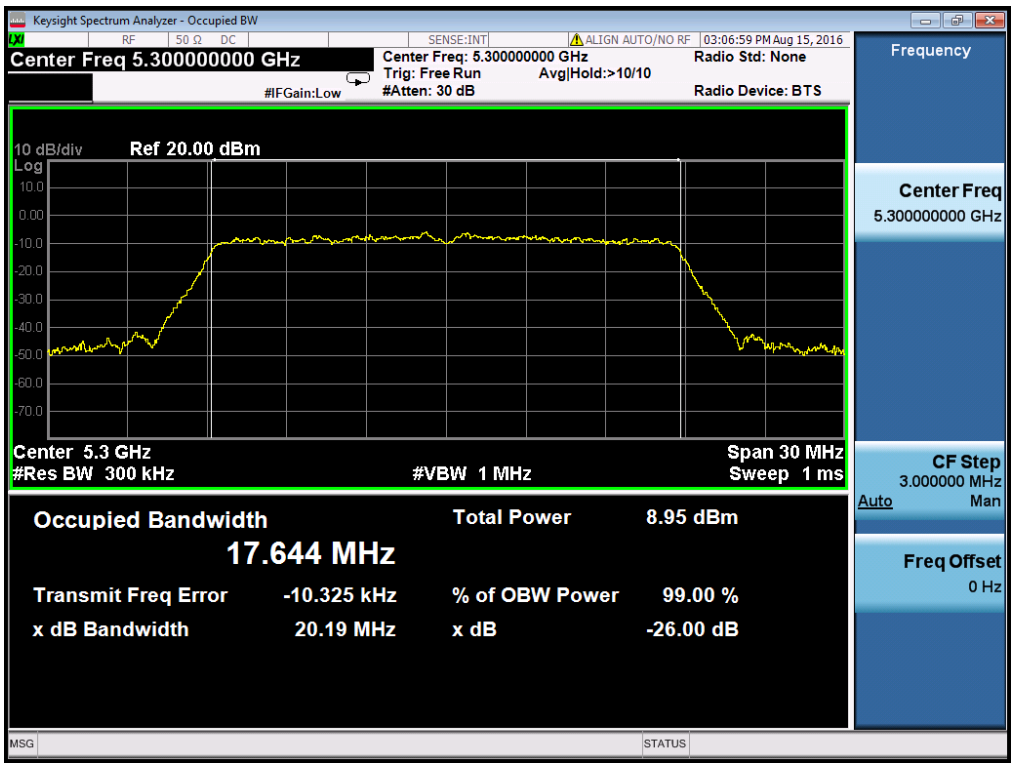
Antenna 1 - 802.11n-HT40 - 26dB Bandwidth– 5310MHz



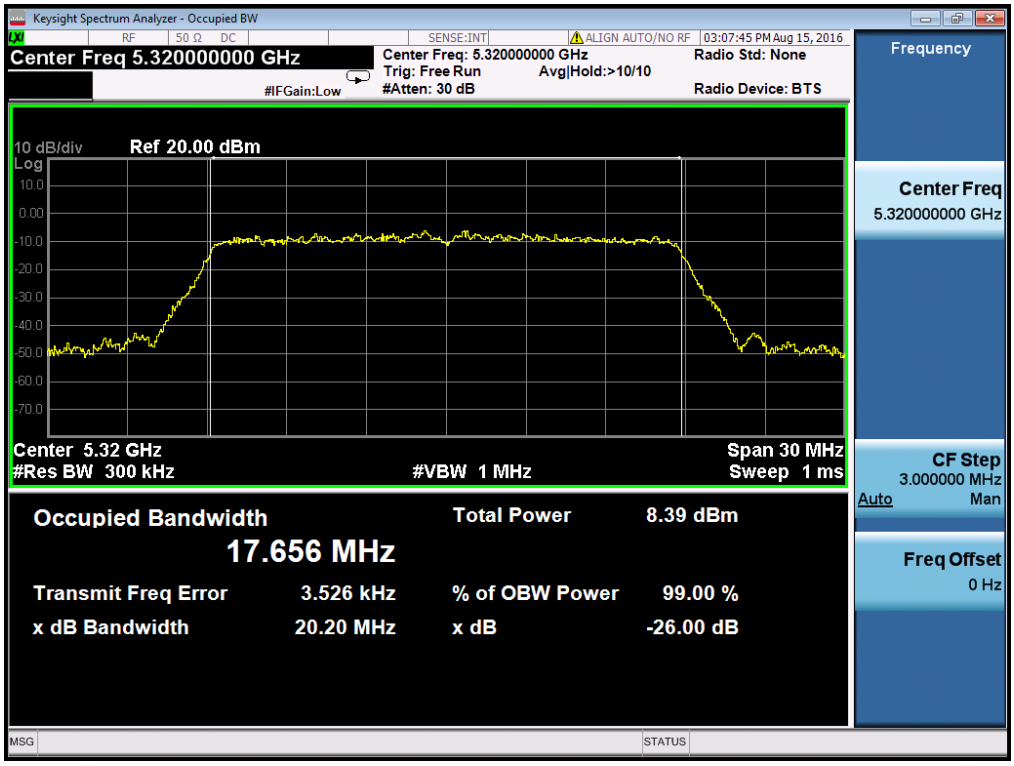
Antenna 1 - 802.11n-HT40 – 99% Bandwidth– 5310MHz



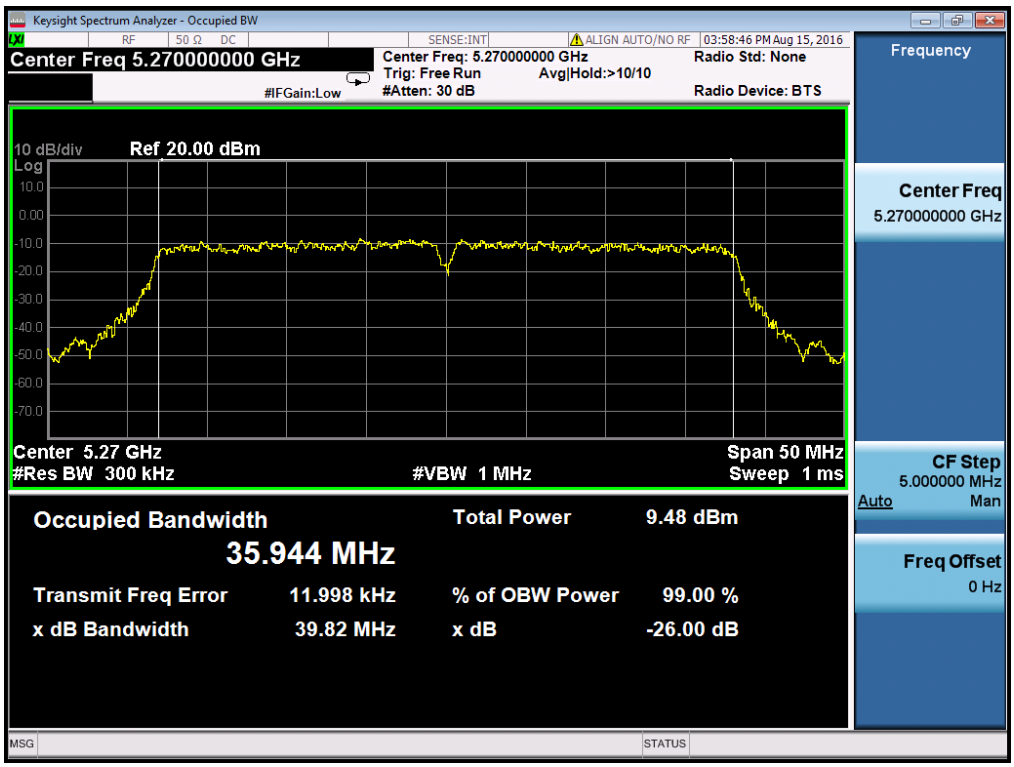
Antenna 1 - 802.11ac-VHT20 – Bandwidth– 5260MHz



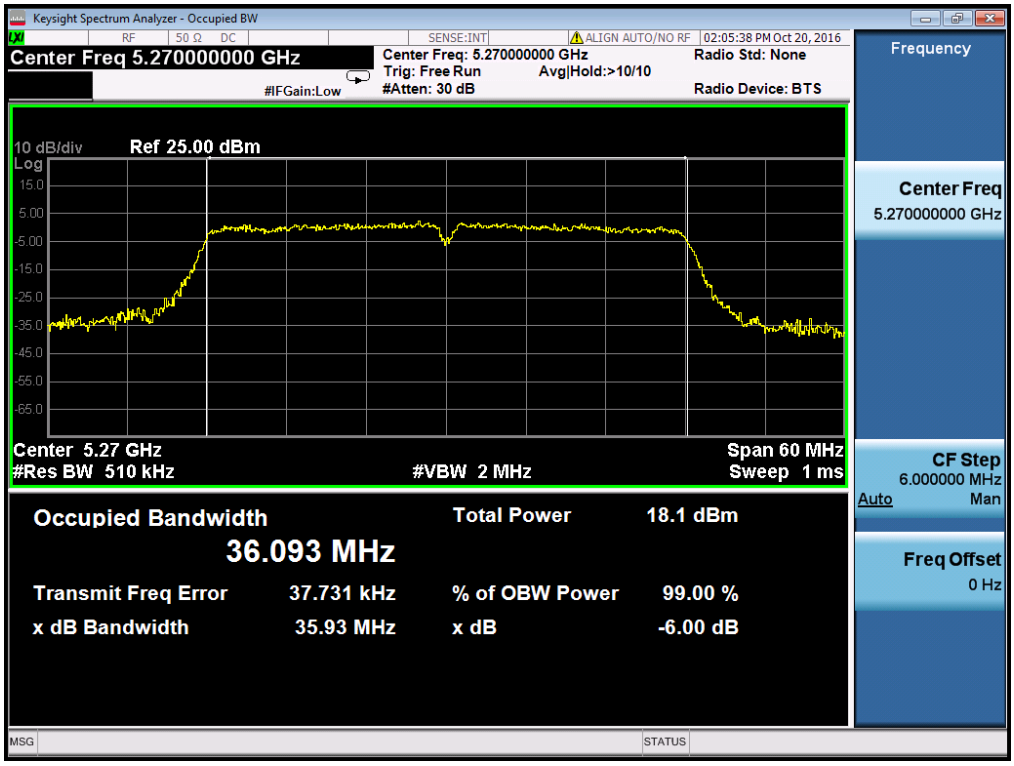
Antenna 1 - 802.11ac-VHT20 – Bandwidth– 5300MHz



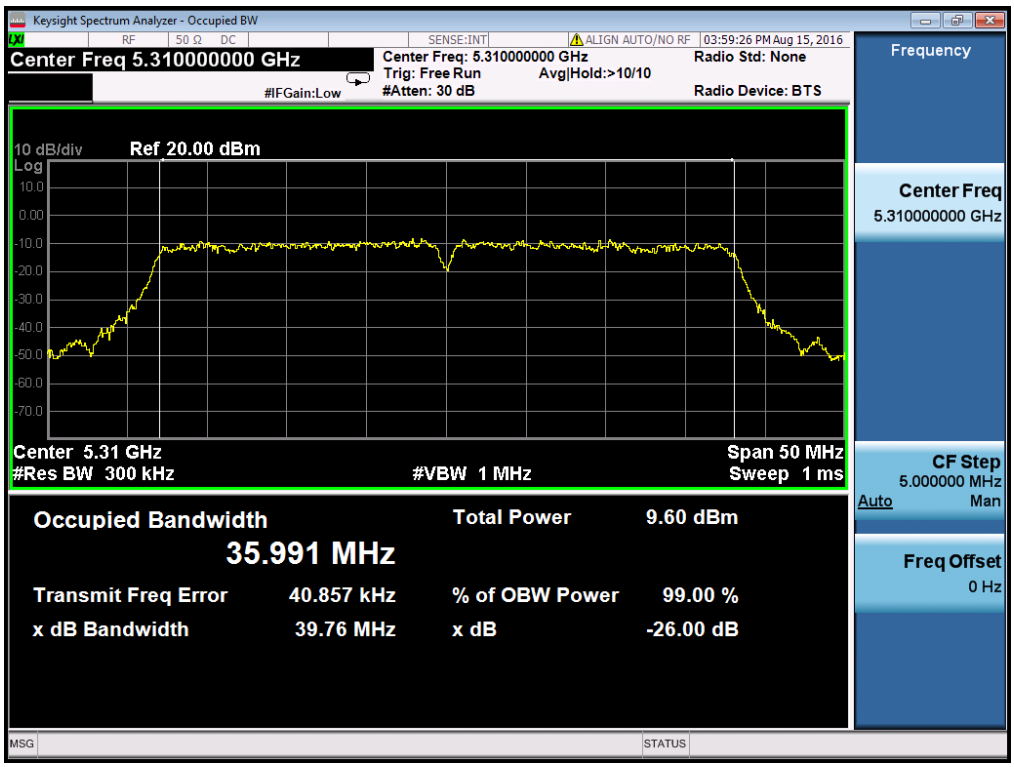
Antenna 1 - 802.11ac-VHT20 – Bandwidth– 5320MHz



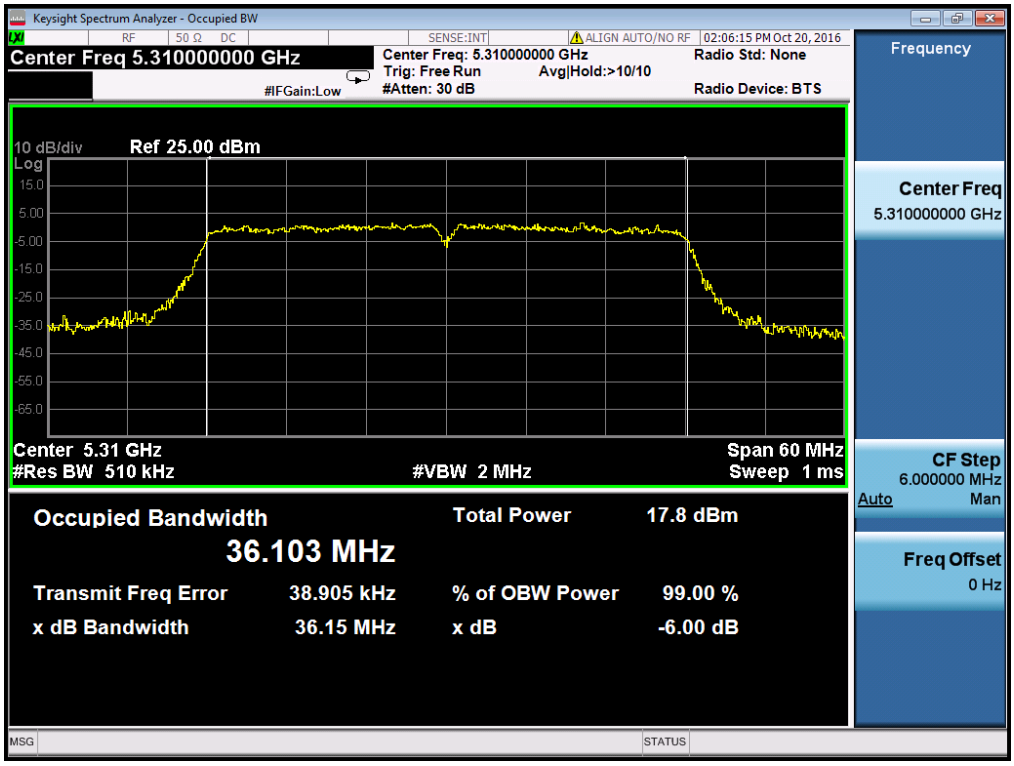
Antenna 1 - 802.11ac-VHT40- 26dB Bandwidth – 5270MHz



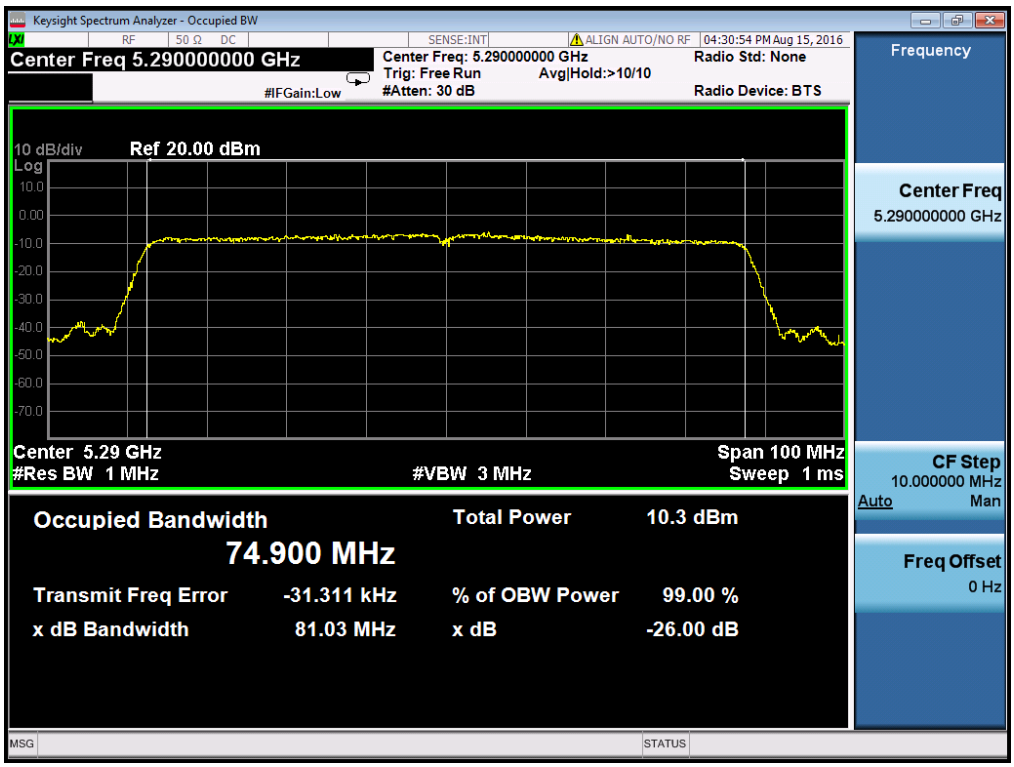
Antenna 1 - 802.11ac-VHT40- 99% Bandwidth – 5270MHz



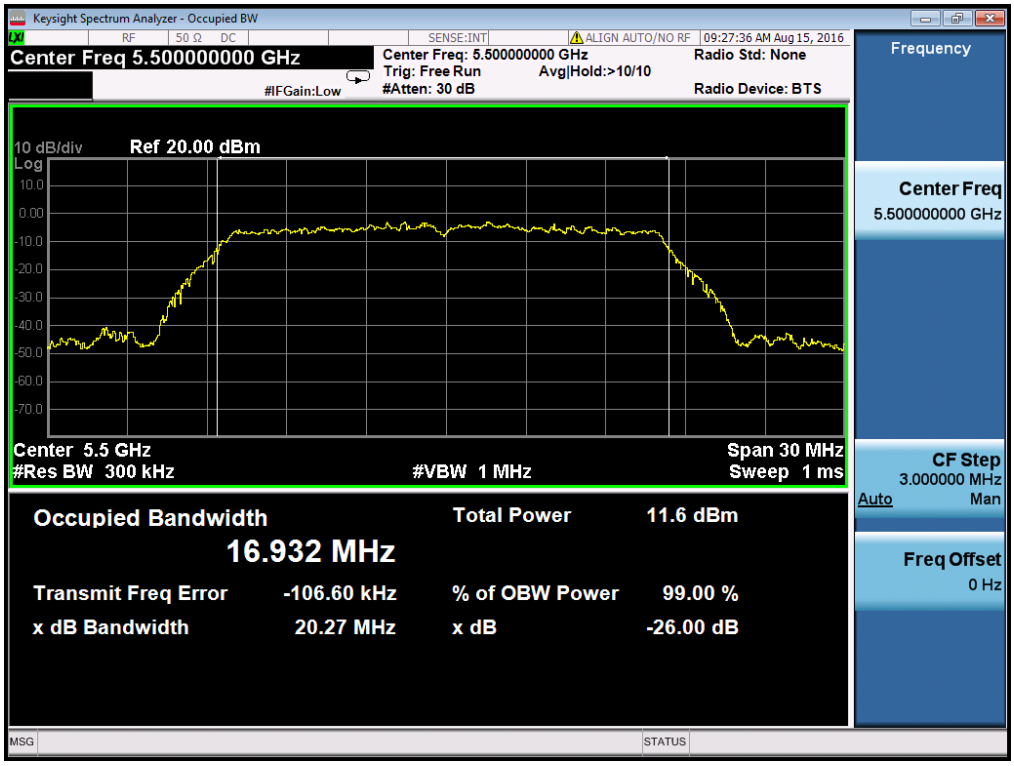
Antenna 1 - 802.11ac-VHT40- 26dB Bandwidth – 5310MHz



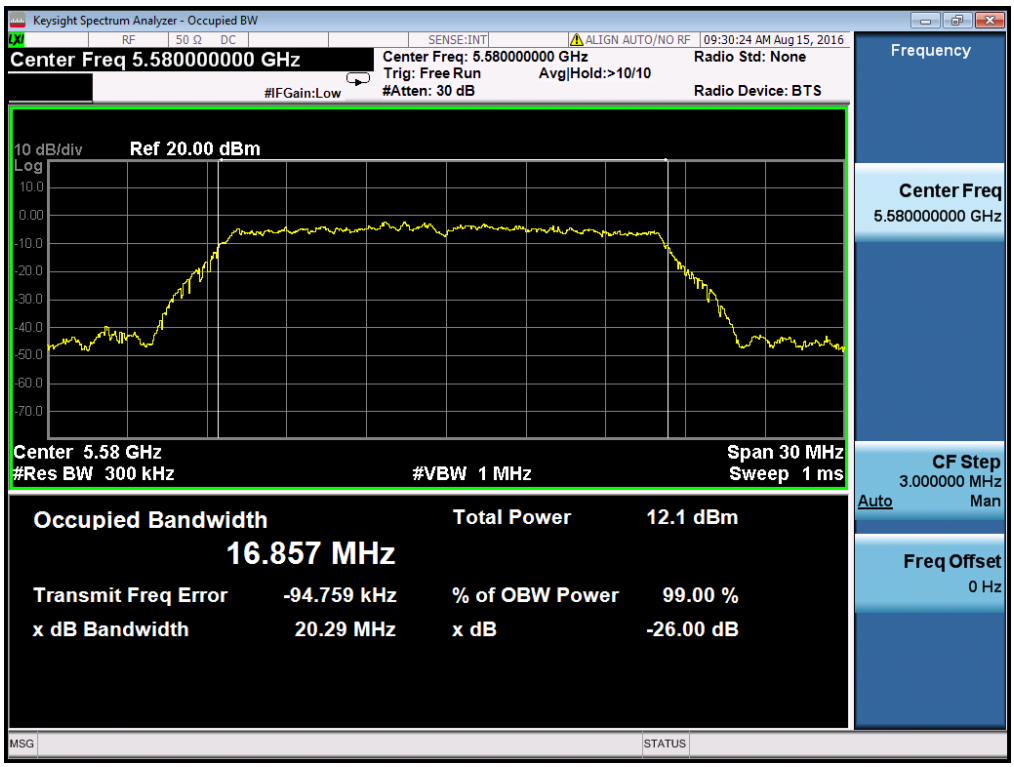
Antenna 1 - 802.11ac-VHT40- 99% Bandwidth – 5310MHz



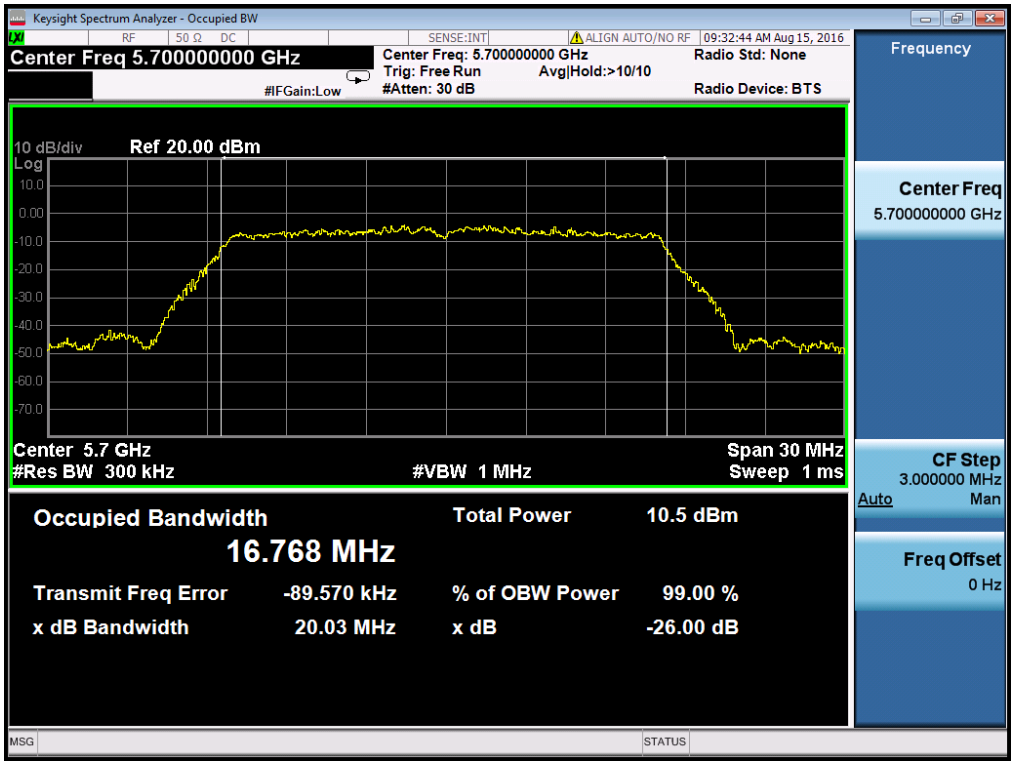
Antenna 1 - 802.11ac-VHT80- 26dB Bandwidth – 5290MHz



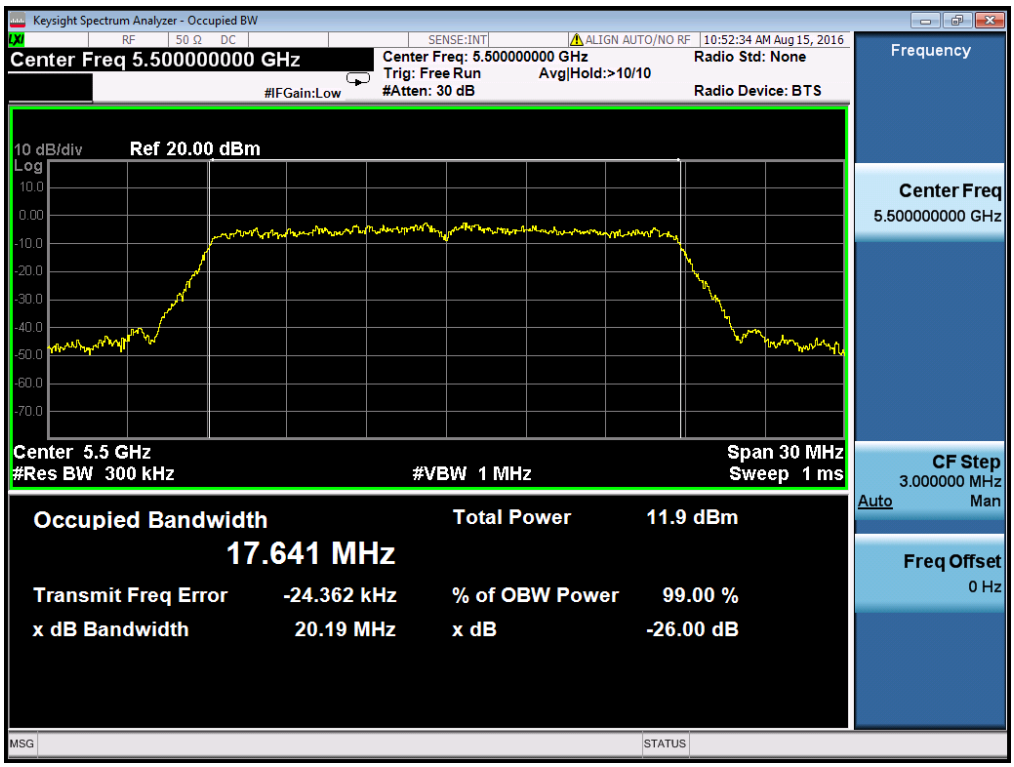
Antenna 1 - 802.11a - Bandwidth– 5500MHz



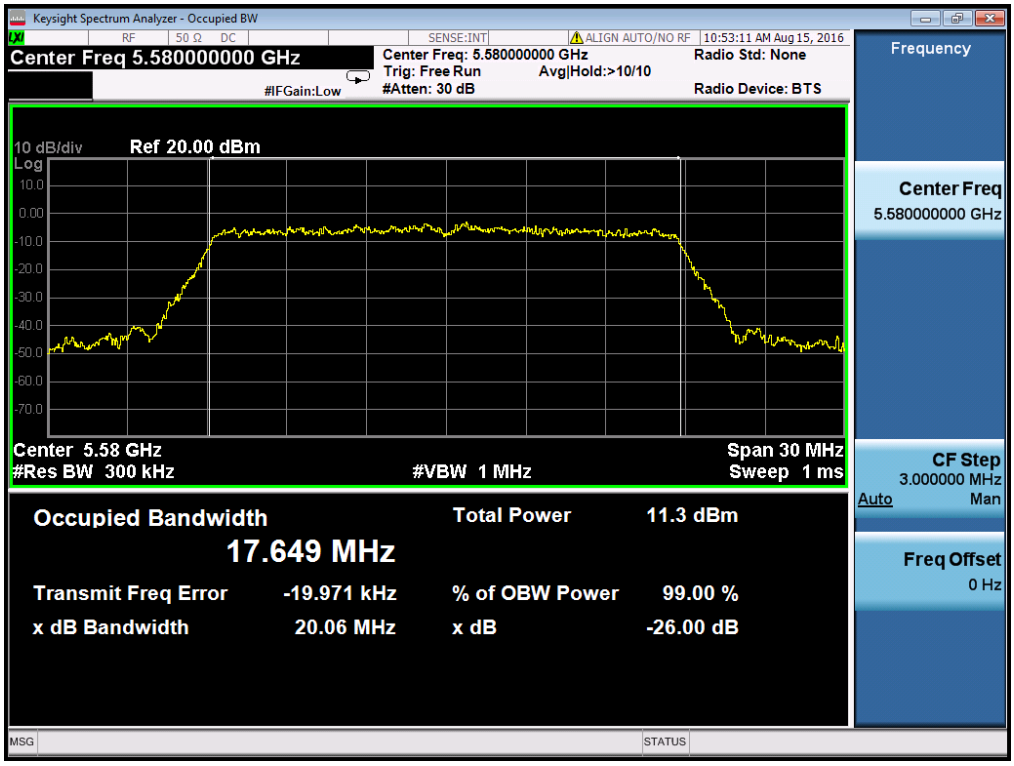
Antenna 1 - 802.11a - Bandwidth– 5580MHz



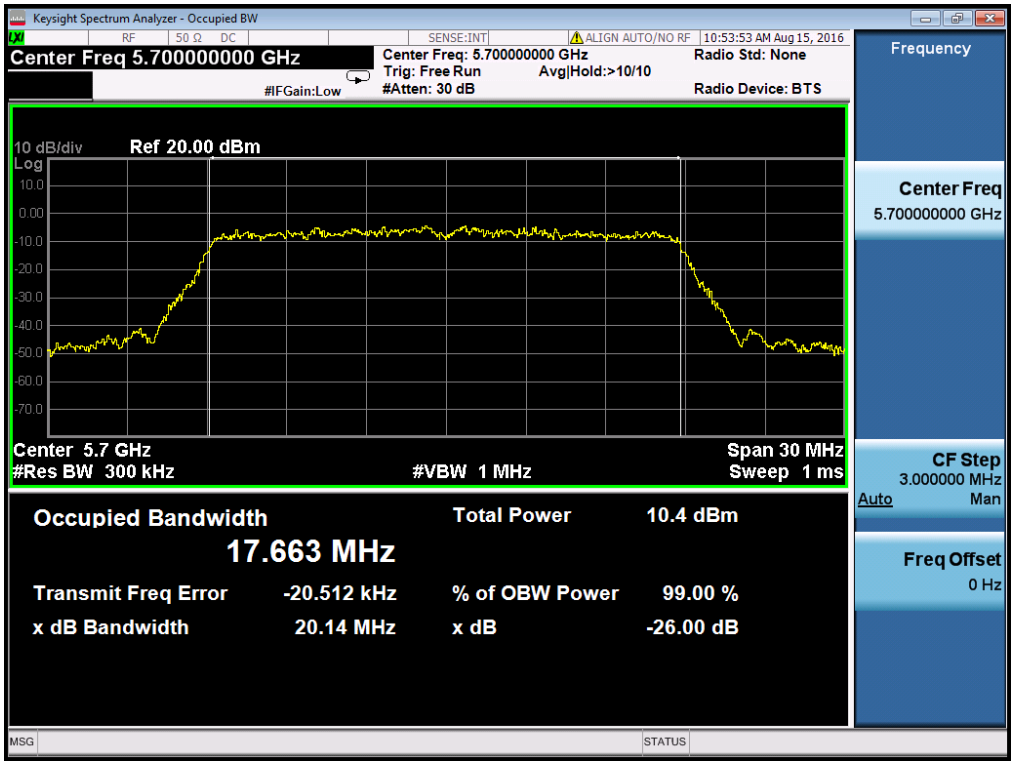
Antenna 1 - 802.11a - Bandwidth– 5700MHz



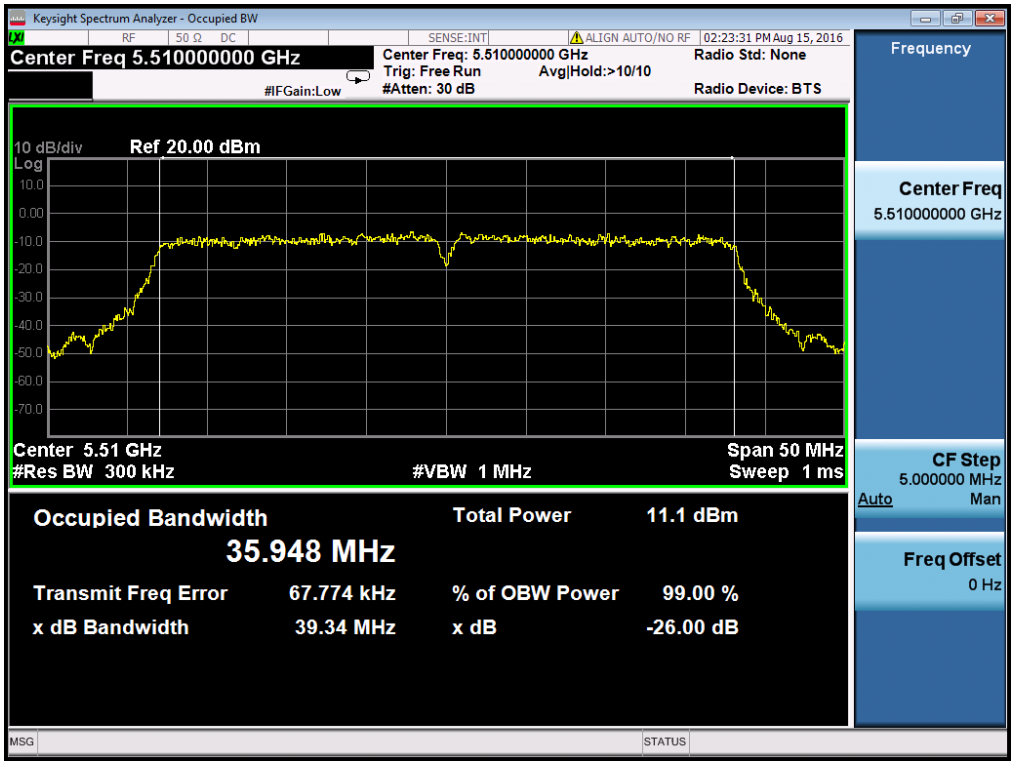
Antenna 1 - 802.11n-HT20 - Bandwidth– 5500MHz



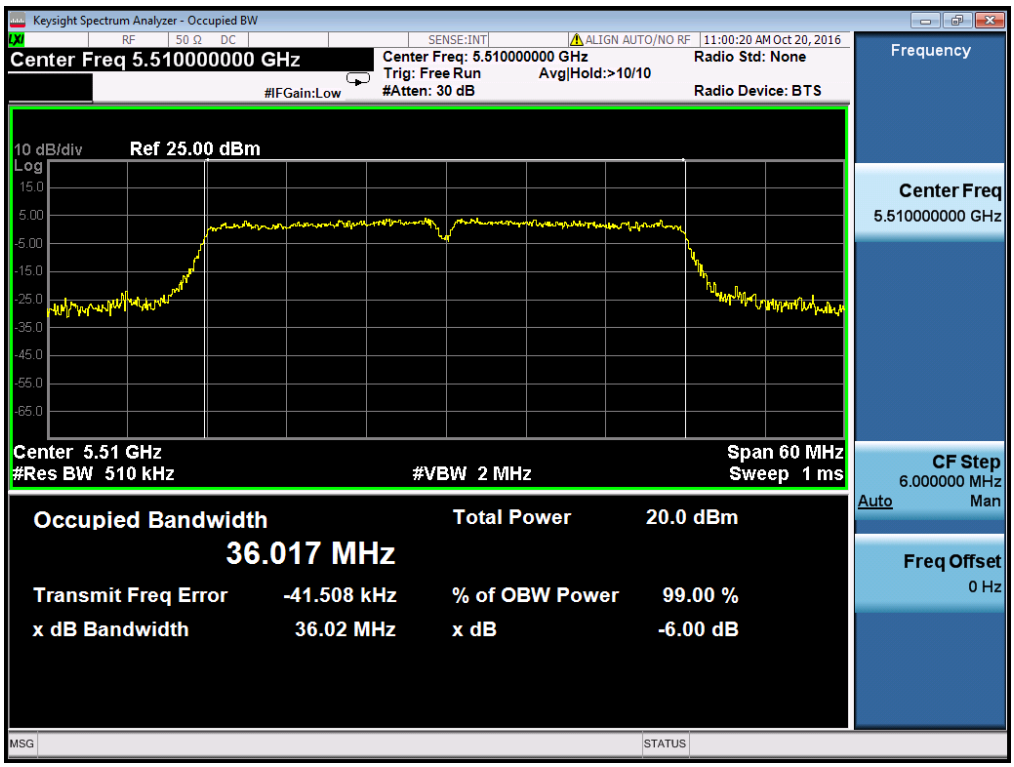
Antenna 1 - 802.11n-HT20 - Bandwidth– 5580MHz



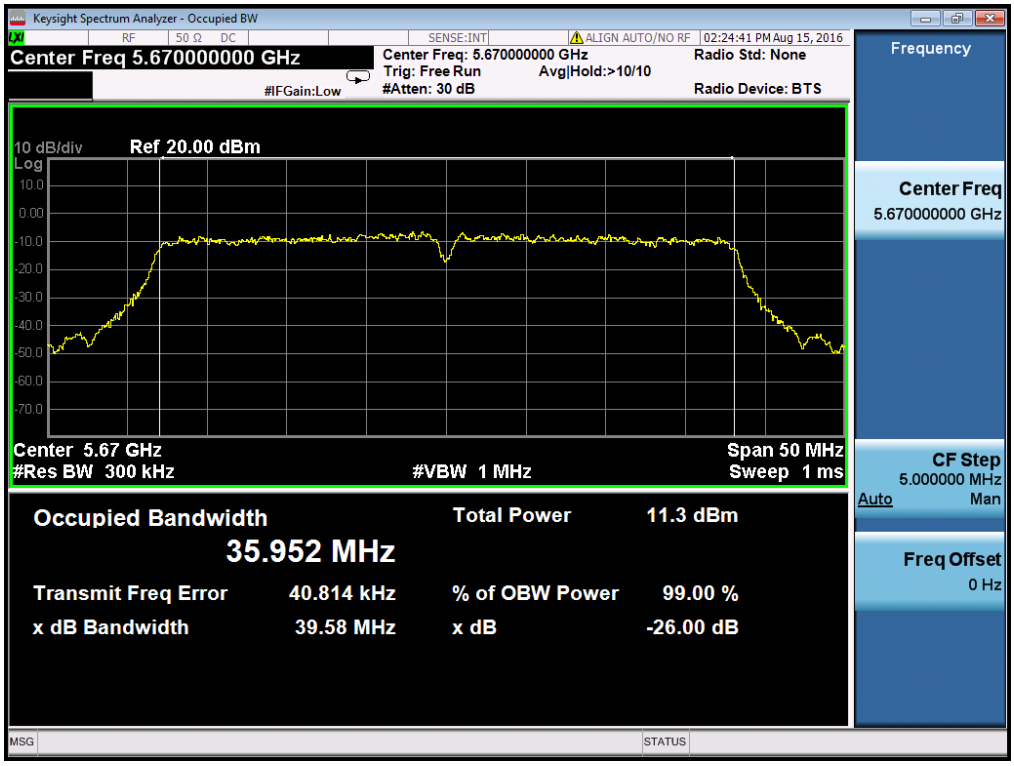
Antenna 1 - 802.11n-HT20 - Bandwidth– 5700MHz



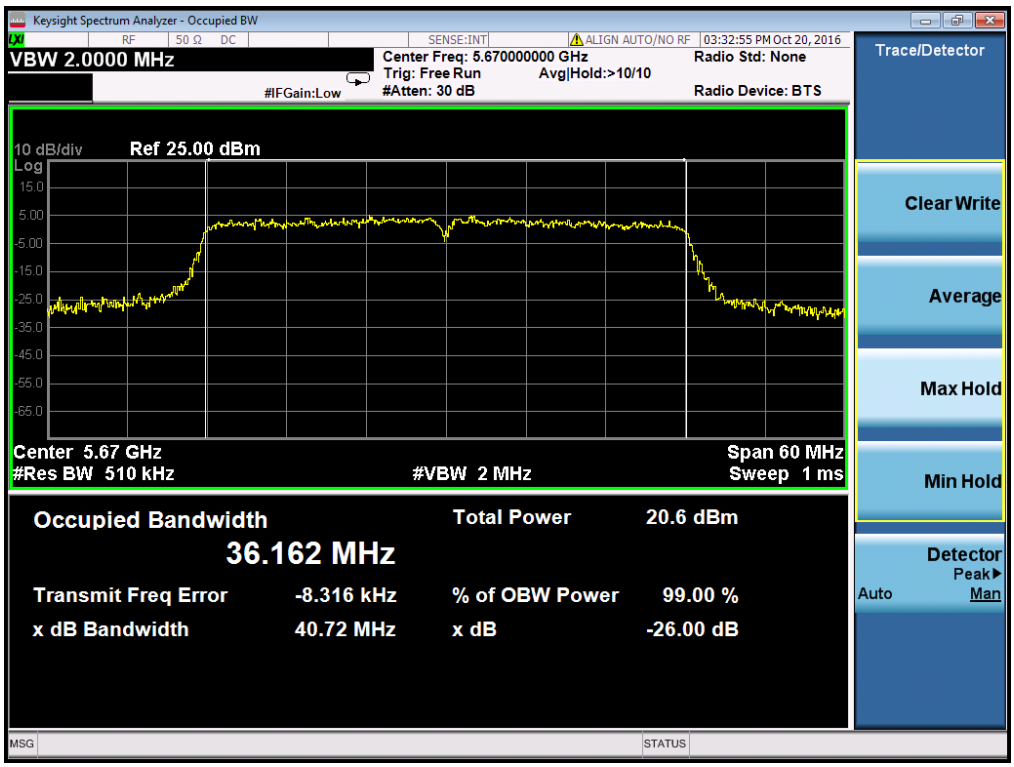
Antenna 1 - 802.11n-HT40 - 26dB Bandwidth– 5510MHz



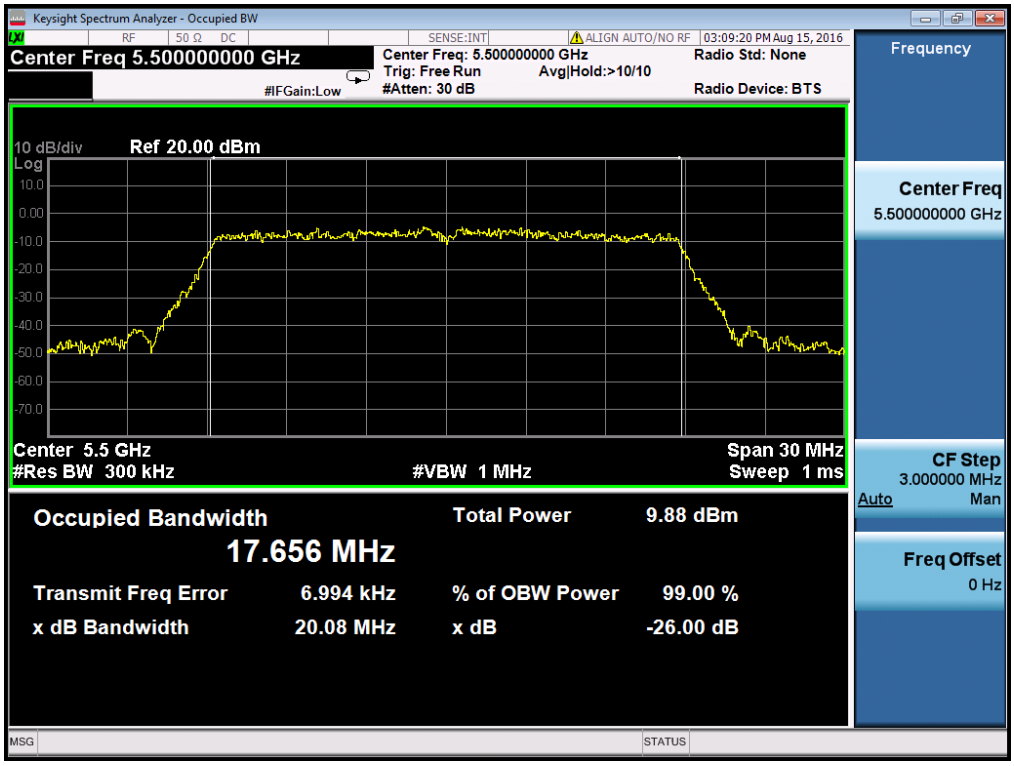
Antenna 1 - 802.11n-HT40 – 99% Bandwidth– 5510MHz



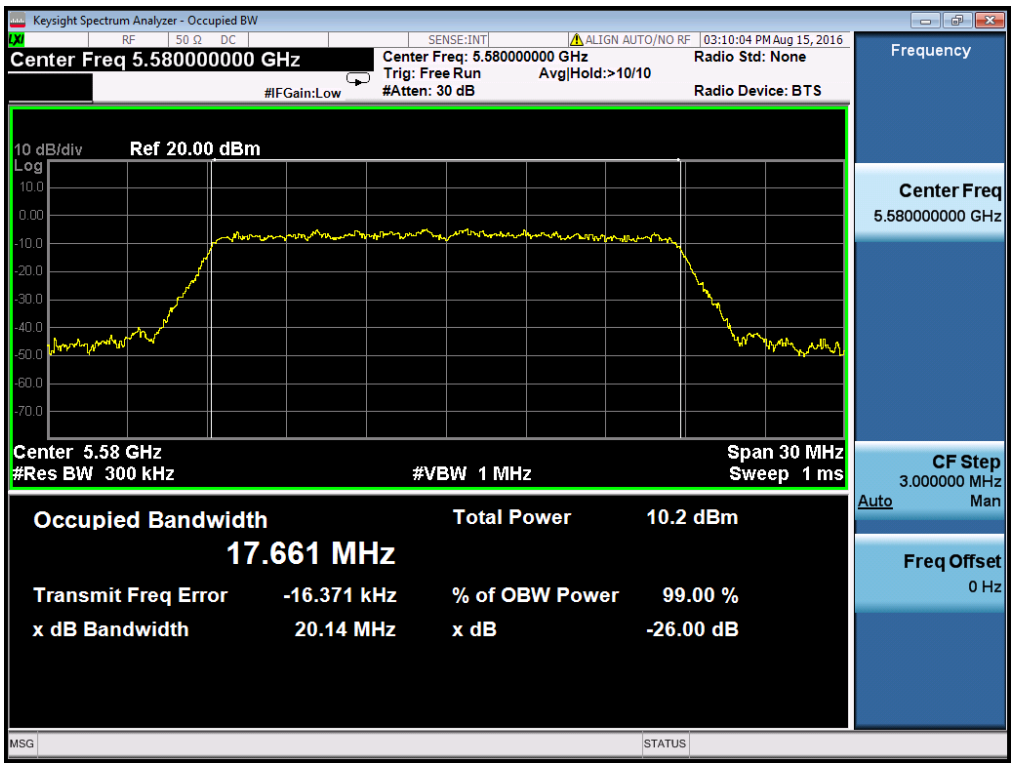
Antenna 1 - 802.11n-HT40 - 26dB Bandwidth– 5670MHz



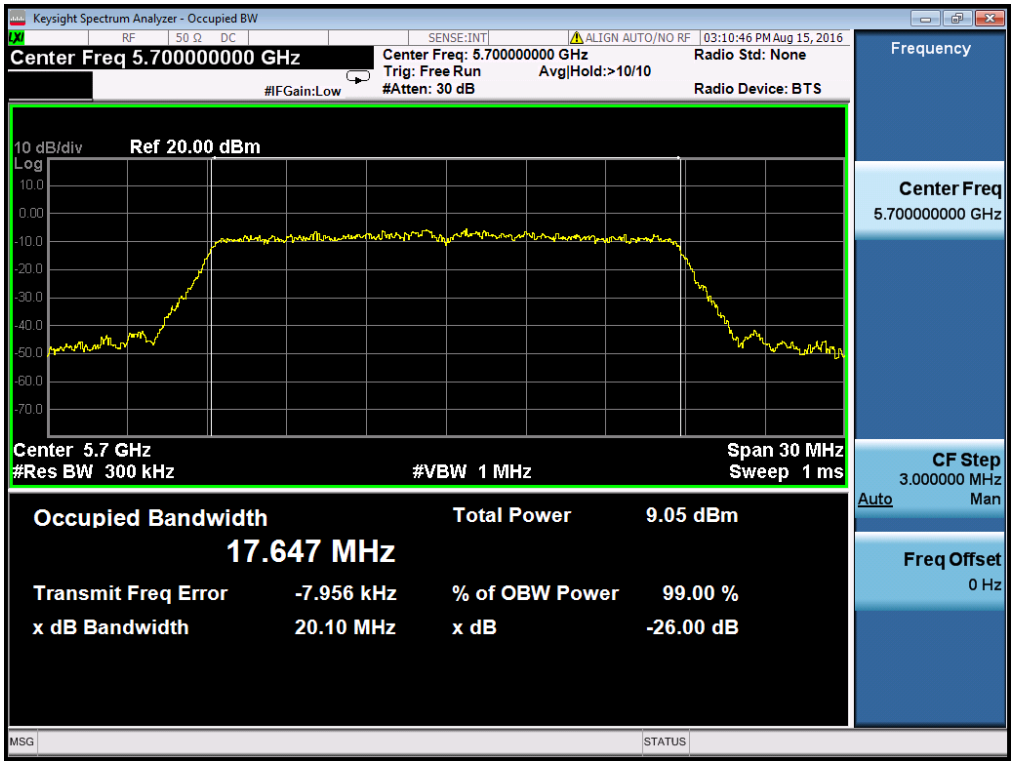
Antenna 1 - 802.11n-HT40 – 99% Bandwidth– 5670MHz



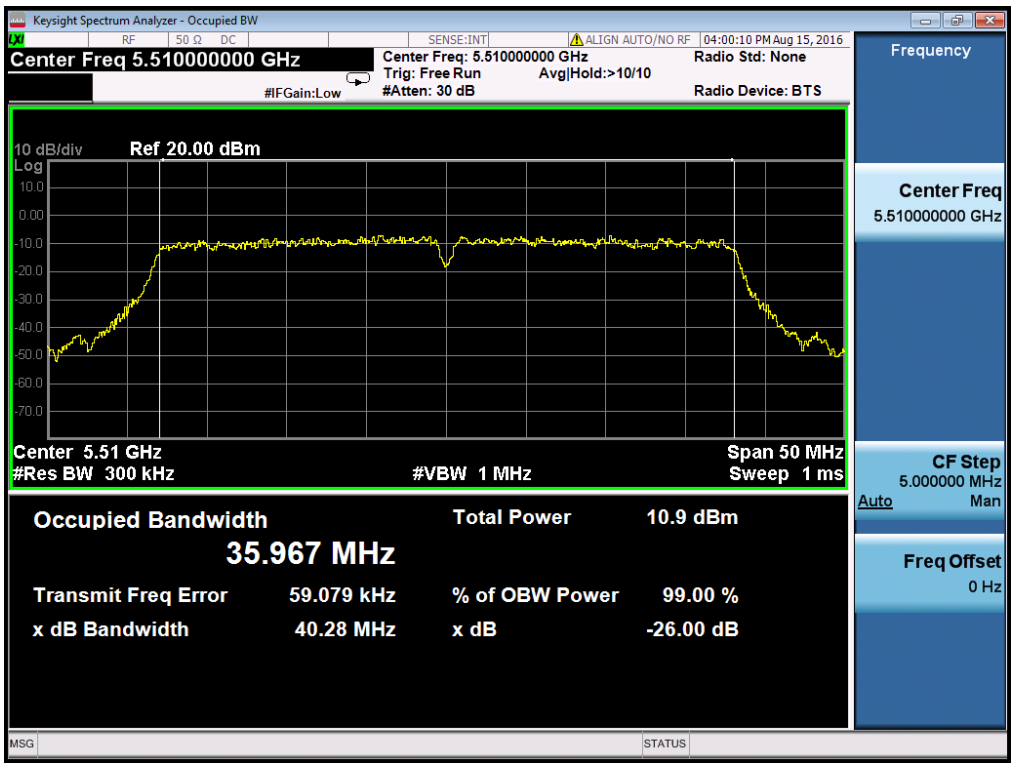
Antenna 1 - 802.11ac-VHT20 - Bandwidth– 5500MHz



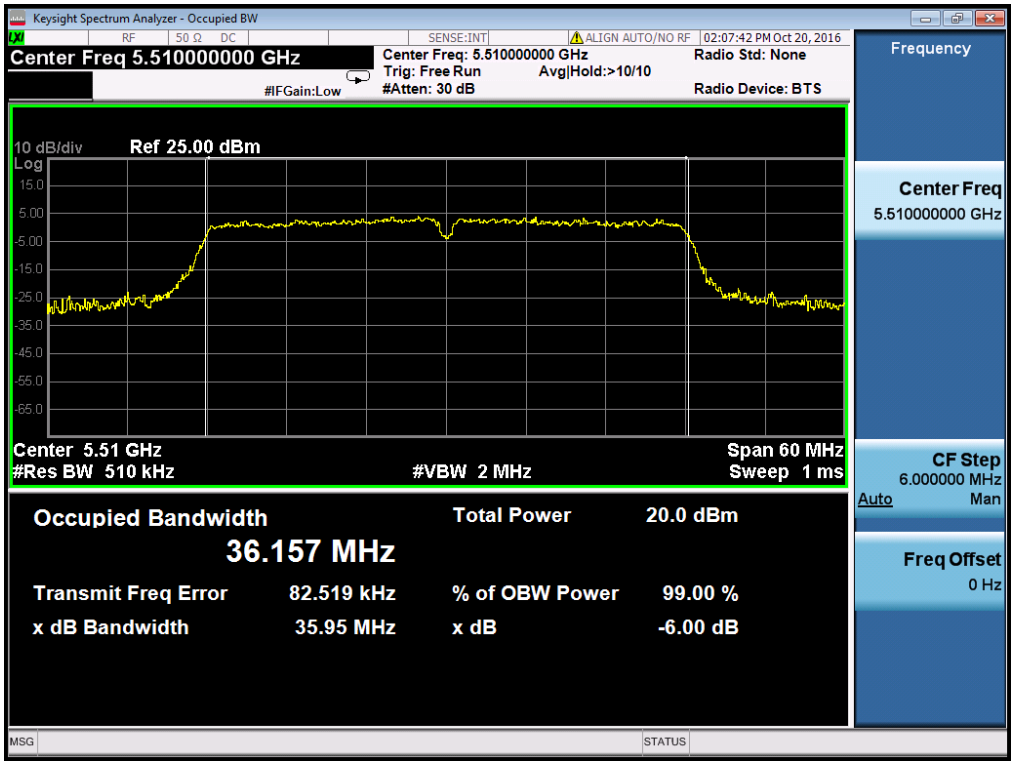
Antenna 1 - 802.11ac-VHT20 - Bandwidth– 5580MHz



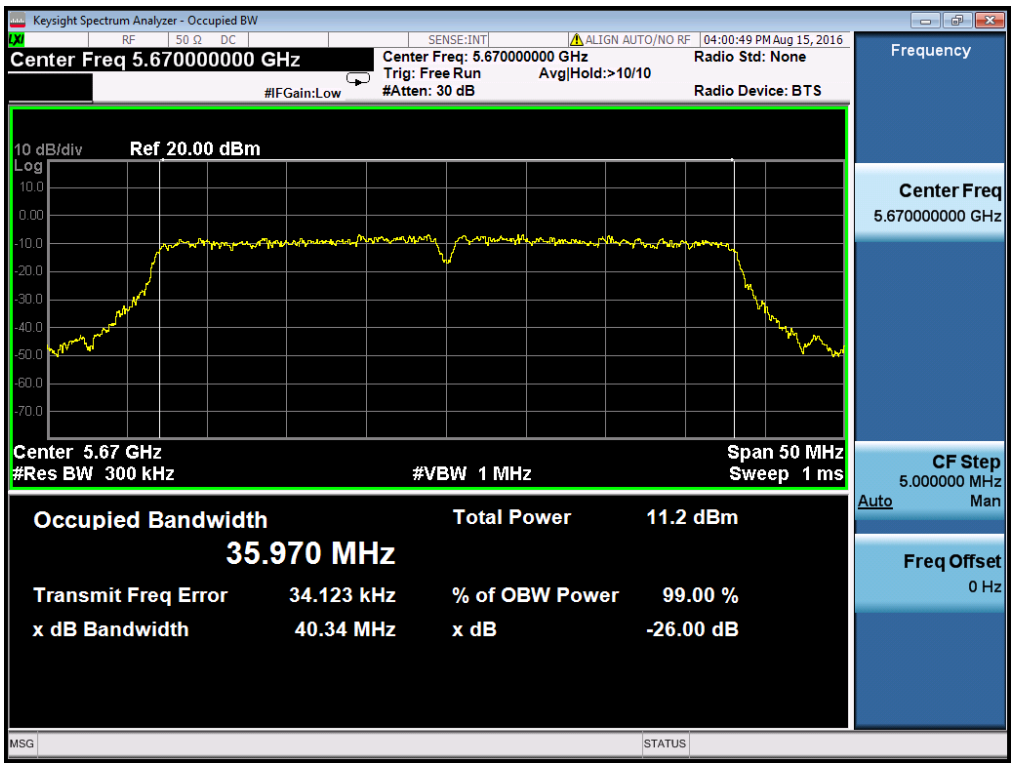
Antenna 1 - 802.11ac-VHT20 - Bandwidth– 5700MHz



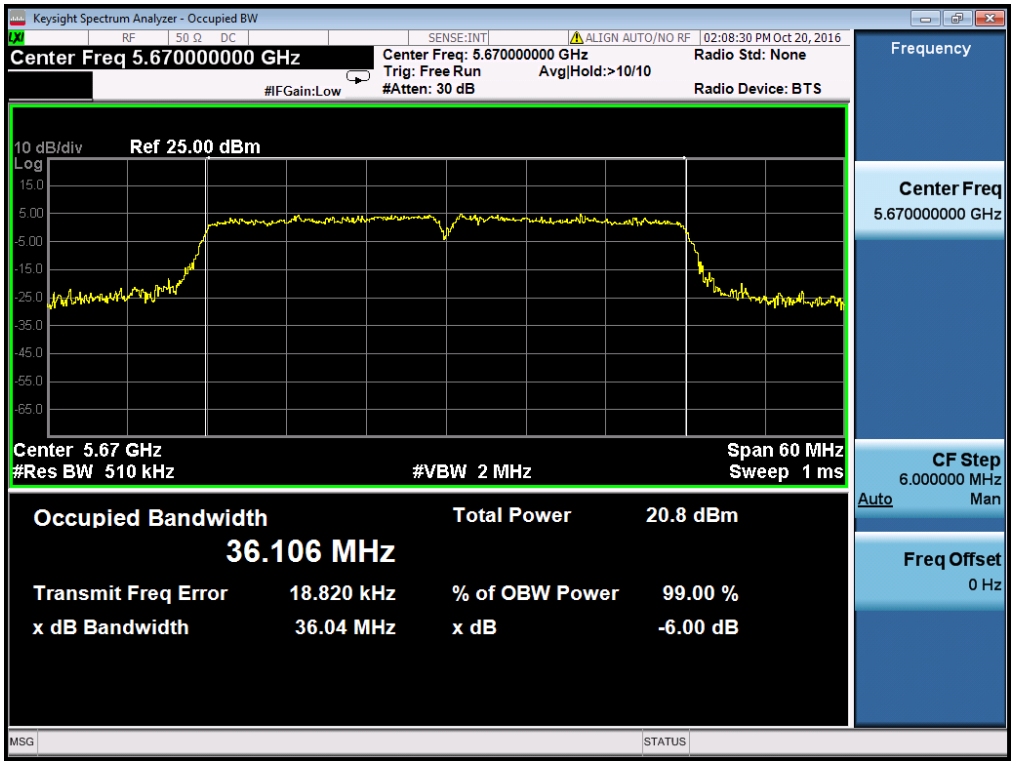
Antenna 1 - 802.11ac-VHT40 - 26dB Bandwidth– 5510MHz



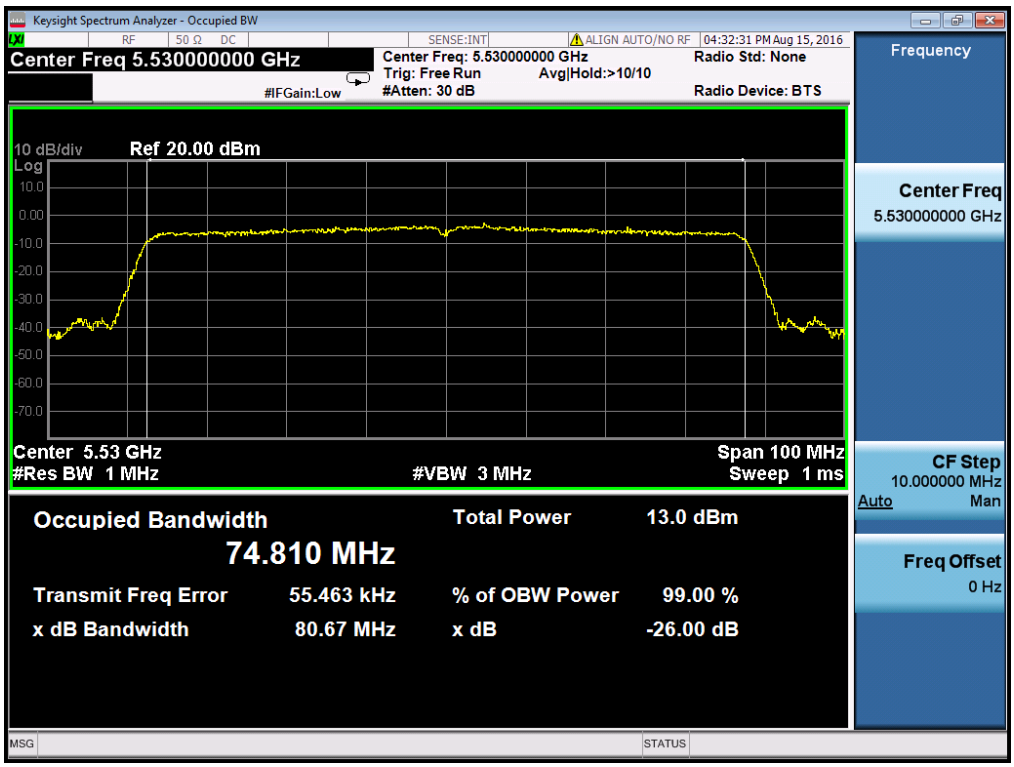
Antenna 1 - 802.11ac-VHT40 – 99% Bandwidth– 5510MHz



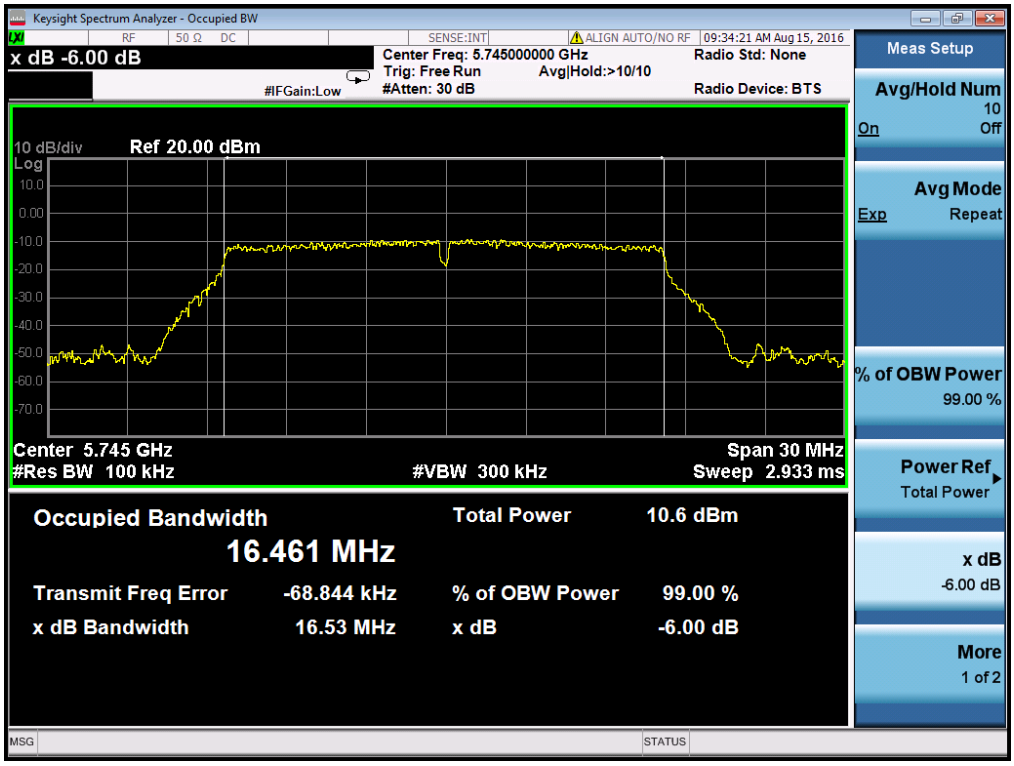
Antenna 1 - 802.11ac-VHT40 - 26dB Bandwidth– 5670MHz



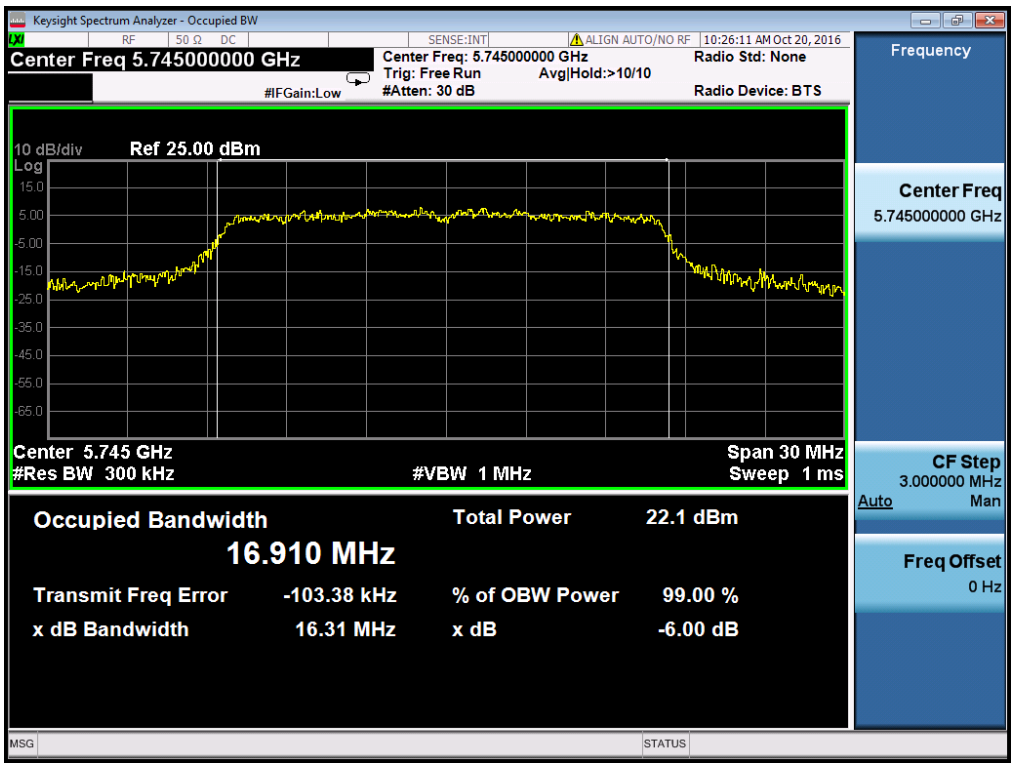
Antenna 1 - 802.11ac-VHT40 – 99% Bandwidth– 5670MHz



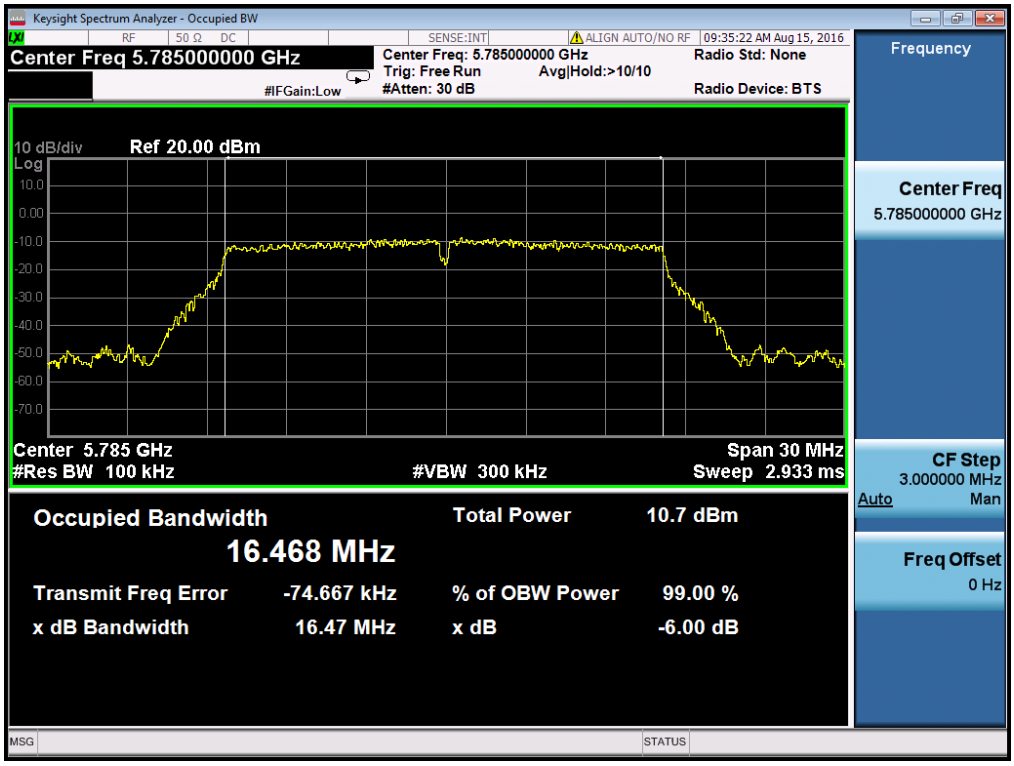
Antenna 1 - 802.11ac-VHT80 - Bandwidth– 5530MHz



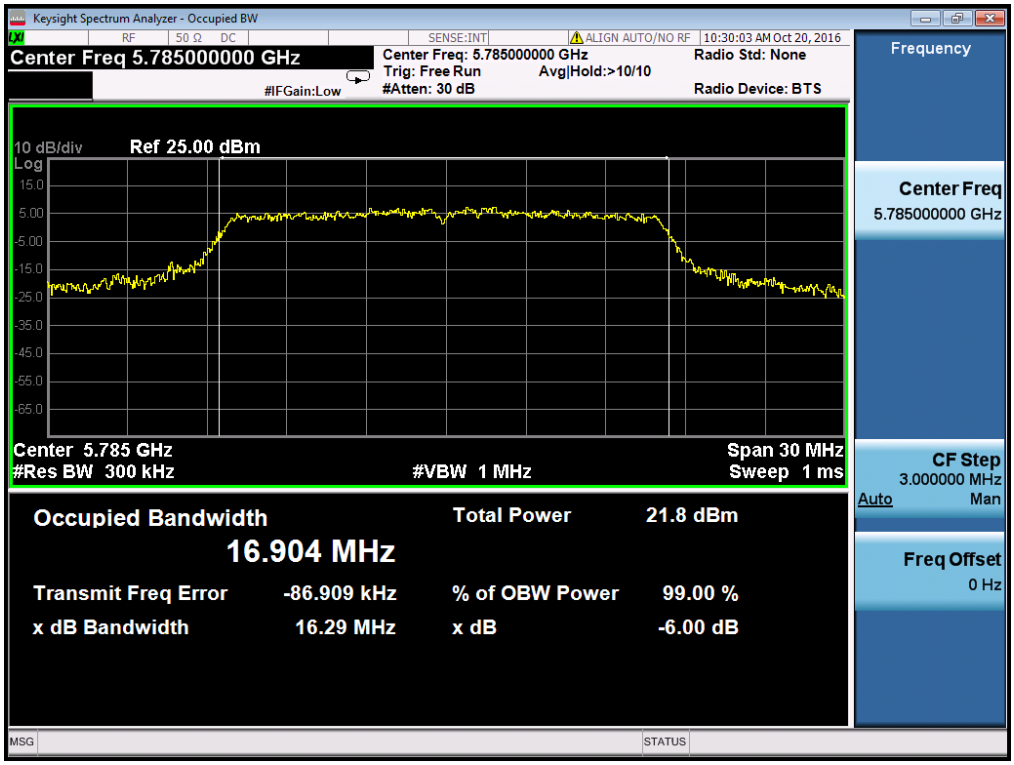
Antenna 1 - 802.11a – 6dB Bandwidth– 5745MHz



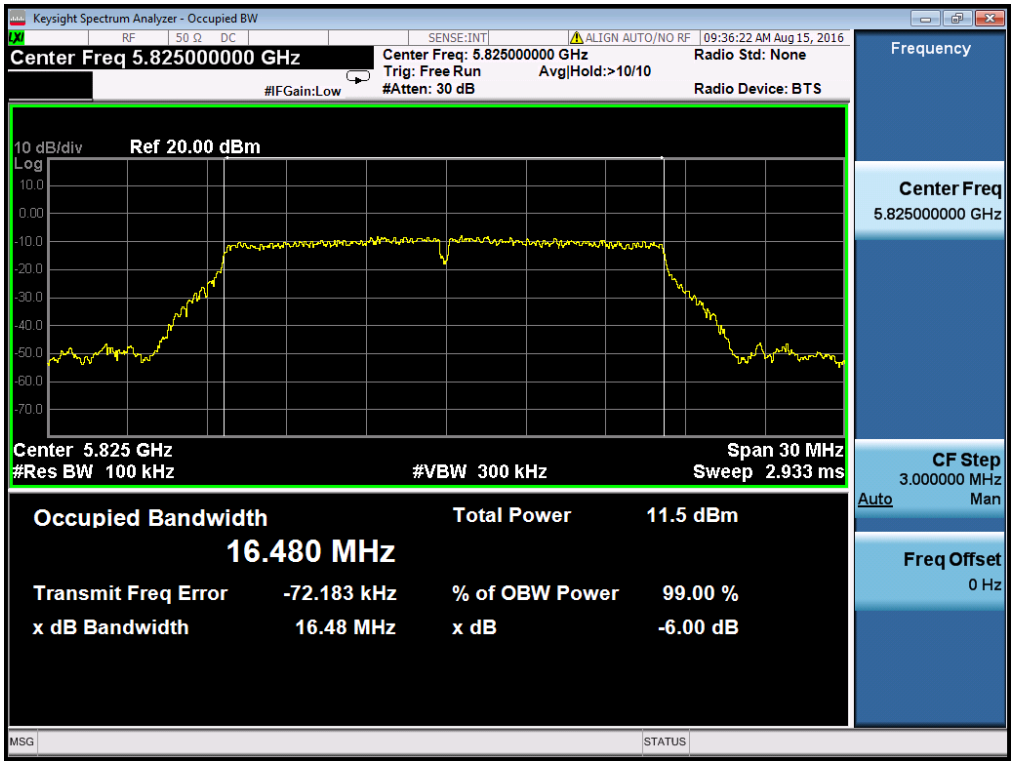
Antenna 1 - 802.11a – 99% Bandwidth– 5745MHz



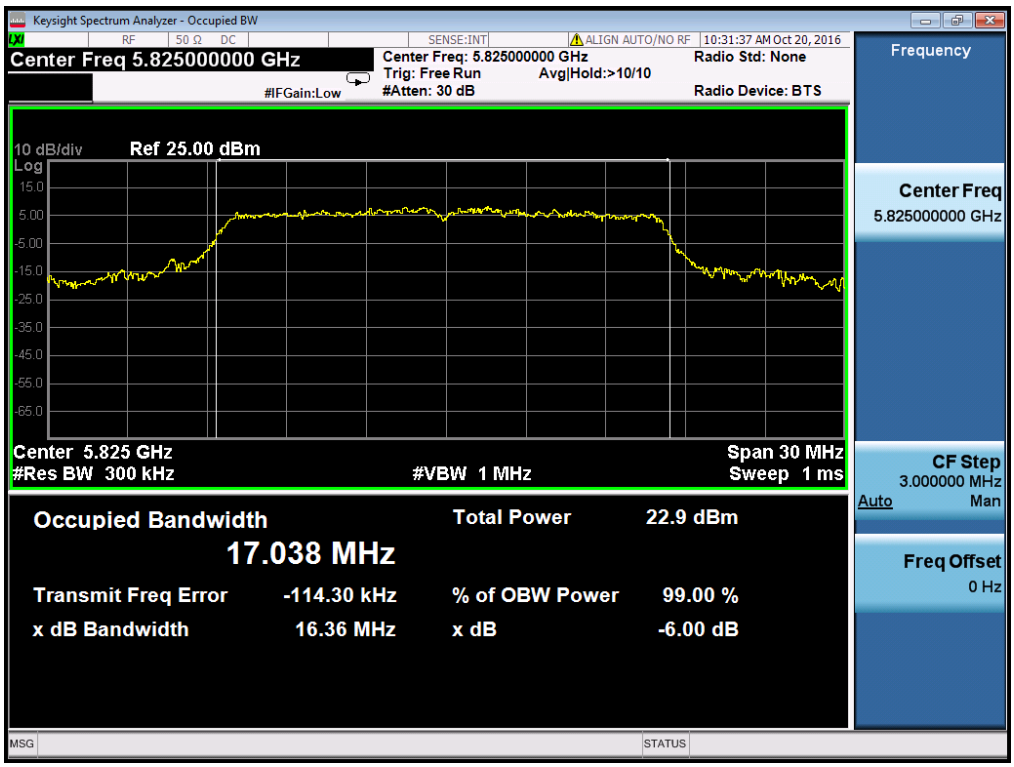
Antenna 1 - 802.11a - 6dB Bandwidth– 5785MHz



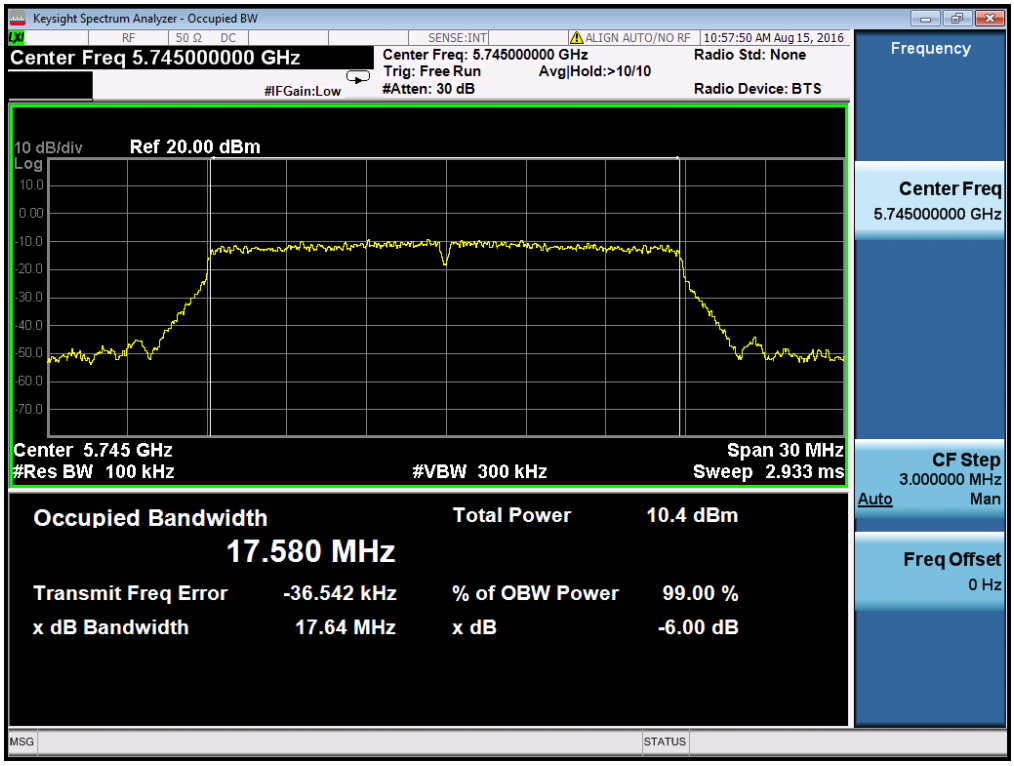
Antenna 1 - 802.11a - 99% Bandwidth– 5785MHz



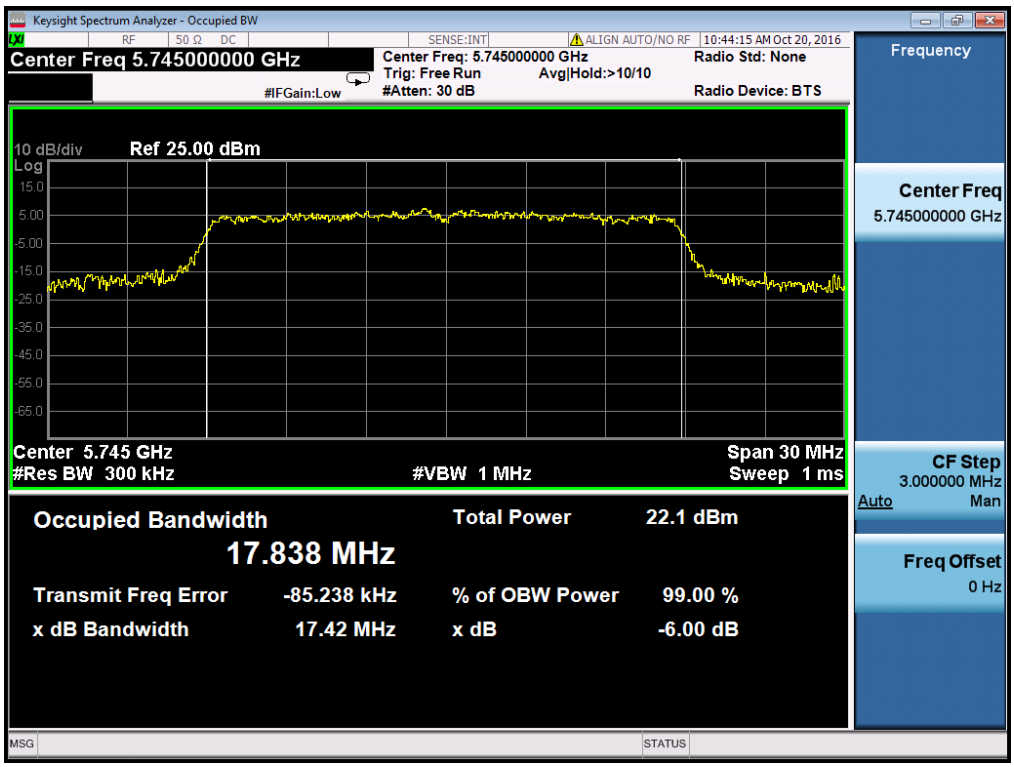
Antenna 1 - 802.11a - 6dB Bandwidth– 5825MHz



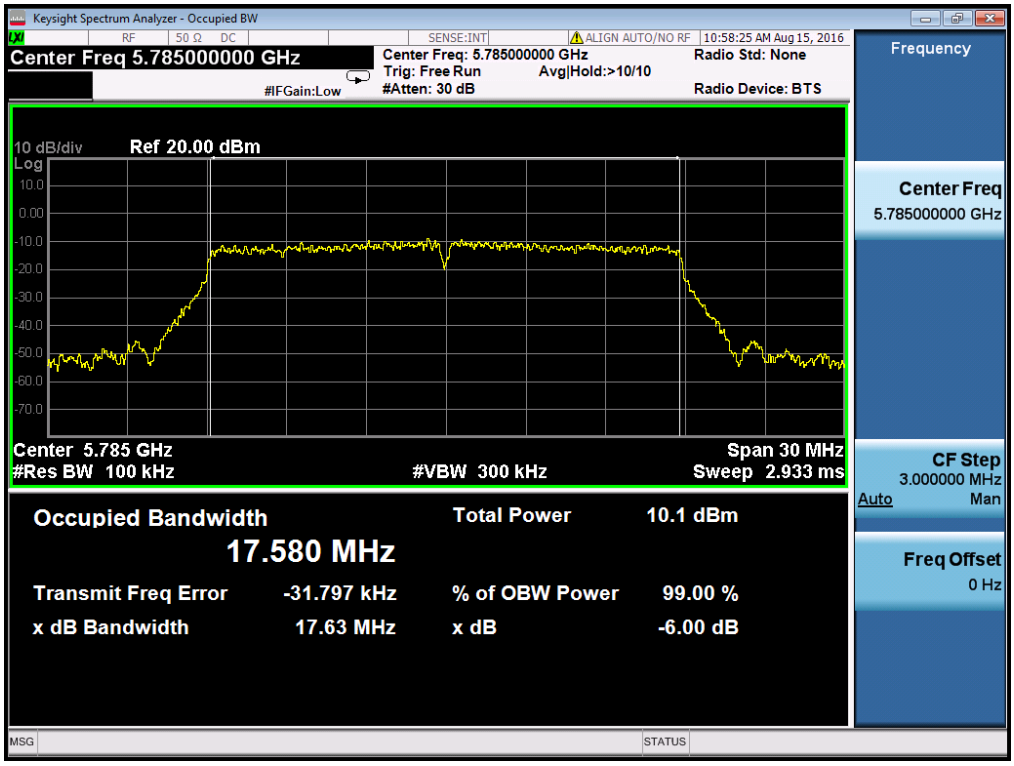
Antenna 1 - 802.11a – 99% Bandwidth– 5825MHz



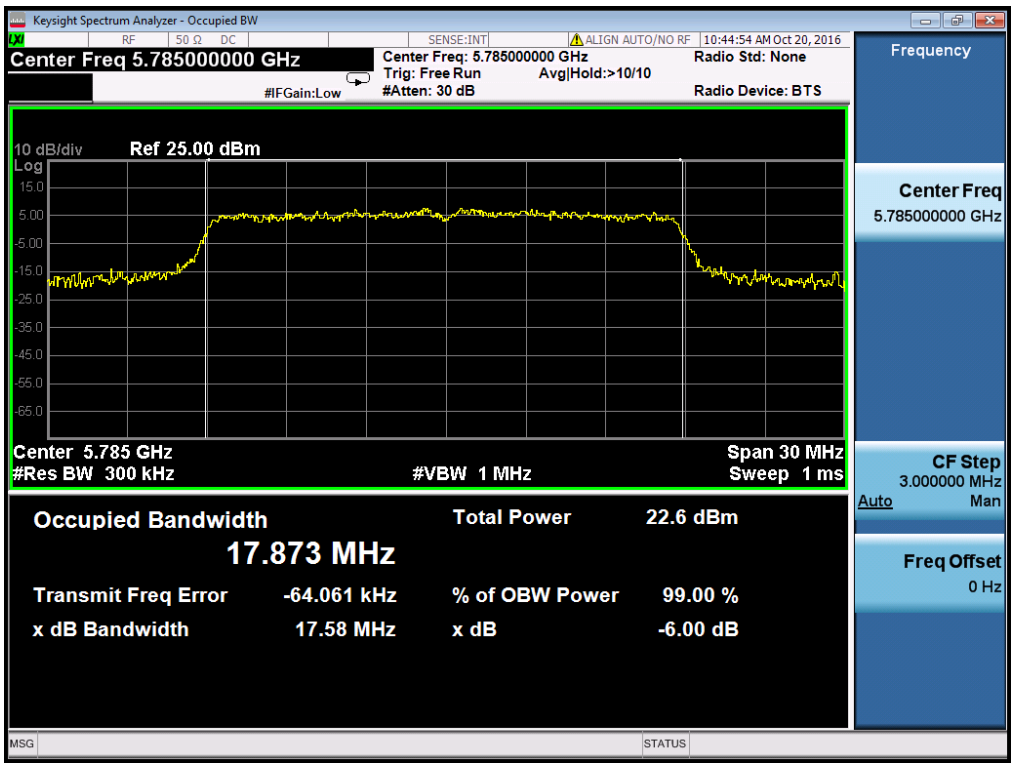
Antenna 1 - 802.11n-HT20 - 6dB Bandwidth– 5745MHz



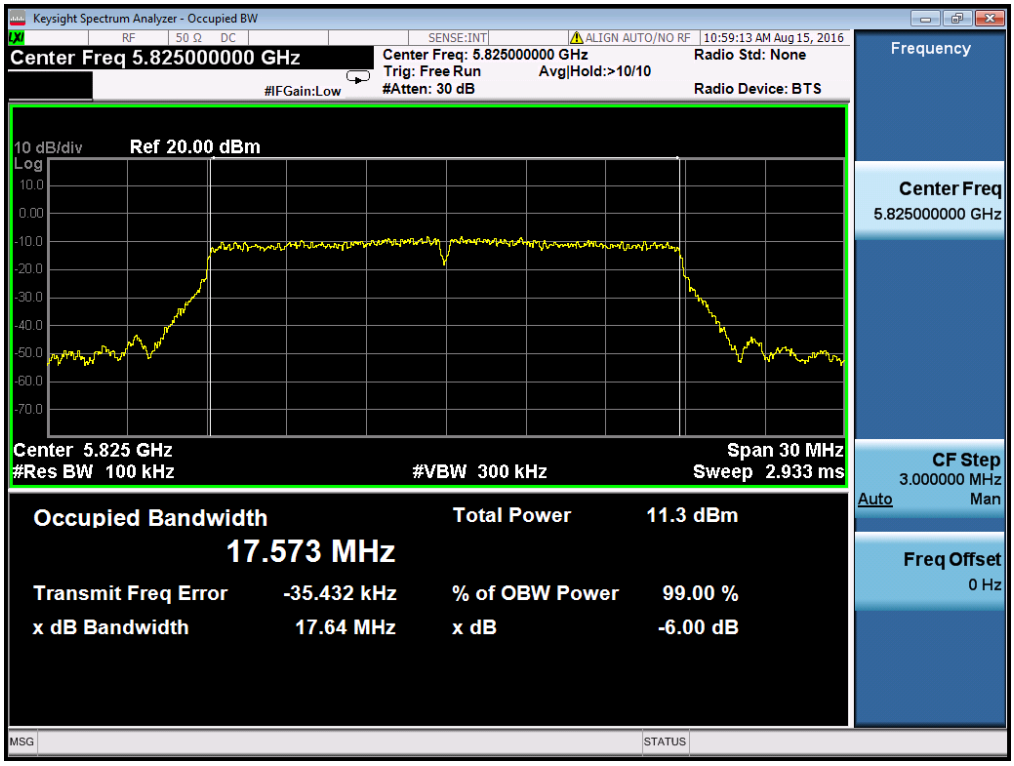
Antenna 1 - 802.11n-HT20 – 99% Bandwidth– 5745MHz



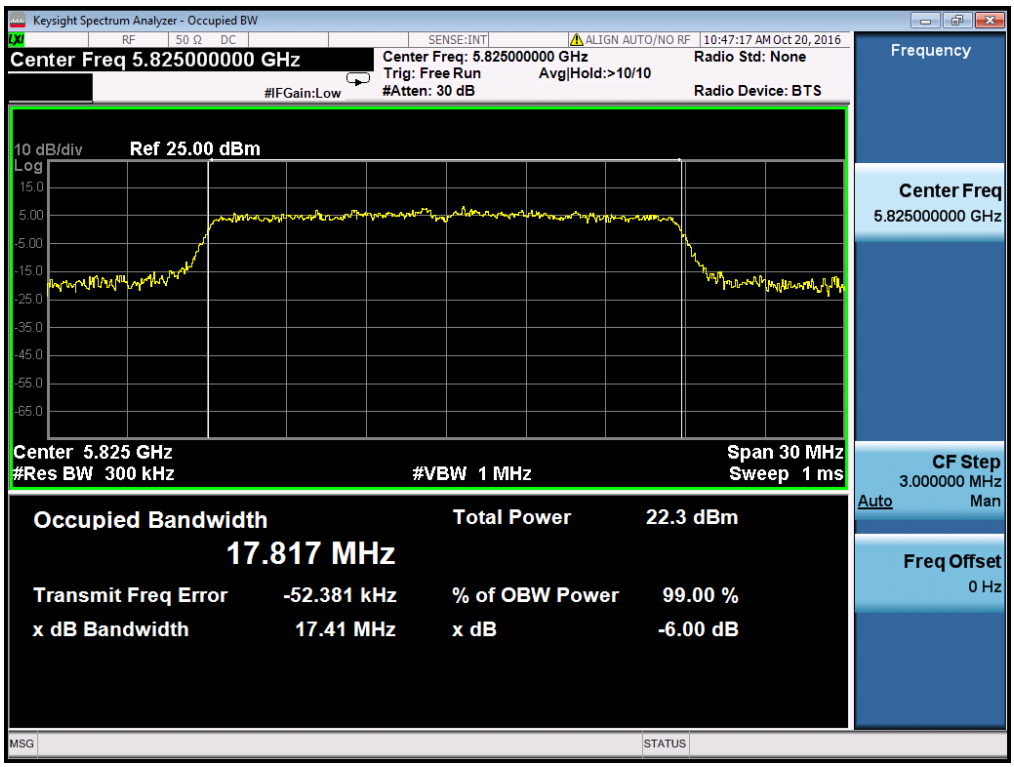
Antenna 1 - 802.11n-HT20 - 6dB Bandwidth– 5785MHz



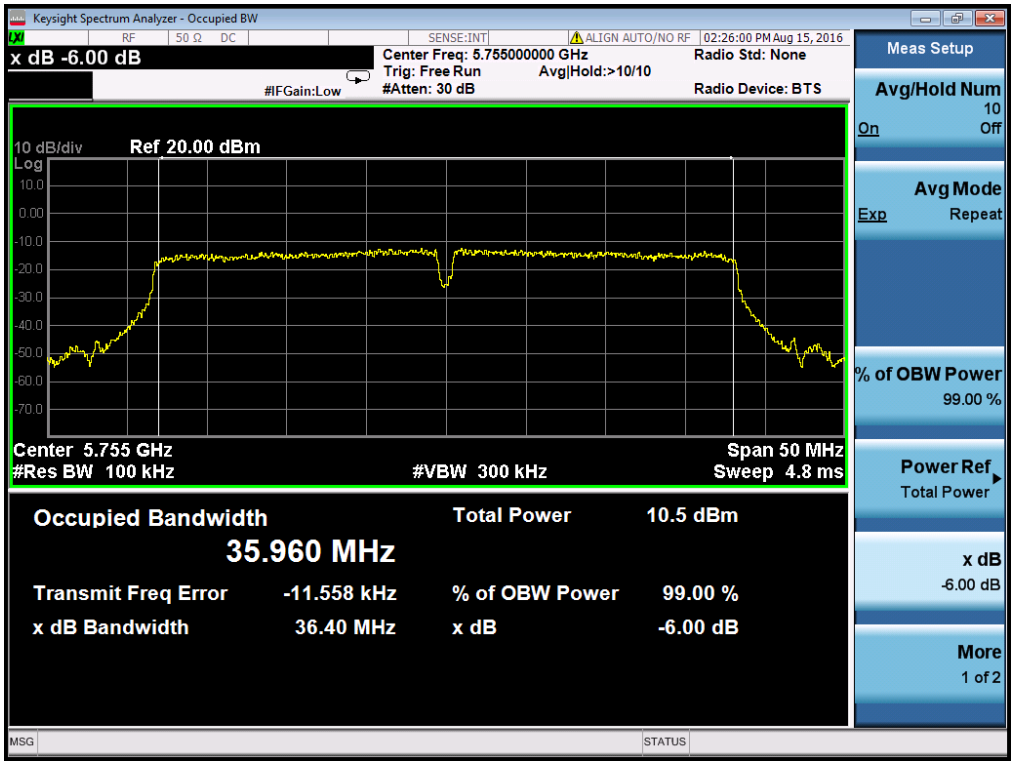
Antenna 1 - 802.11n-HT20 – 99% Bandwidth– 5785MHz



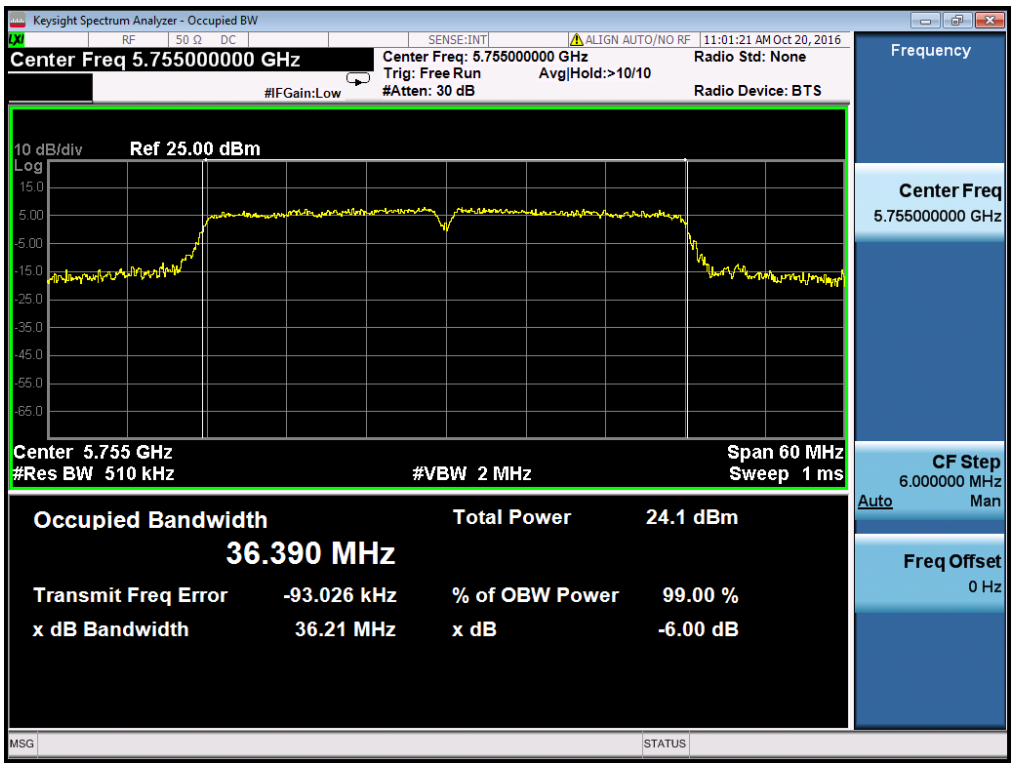
Antenna 1 - 802.11n-HT20 - 6dB Bandwidth– 5825MHz



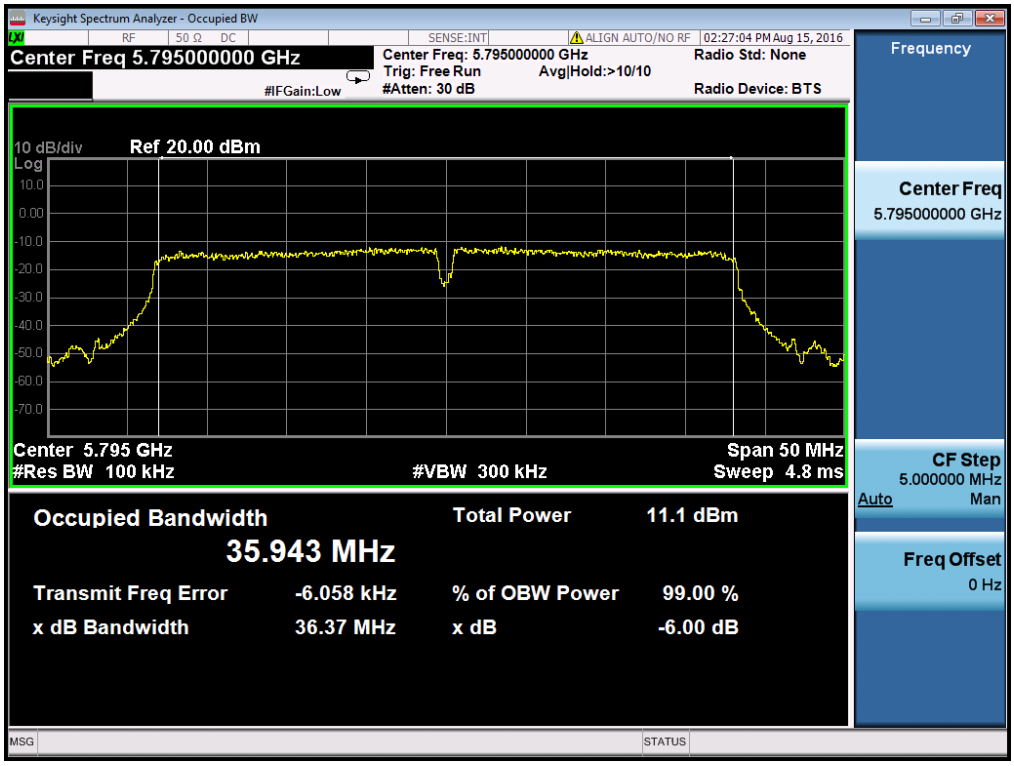
Antenna 1 - 802.11n-HT20 – 99% Bandwidth– 5825MHz



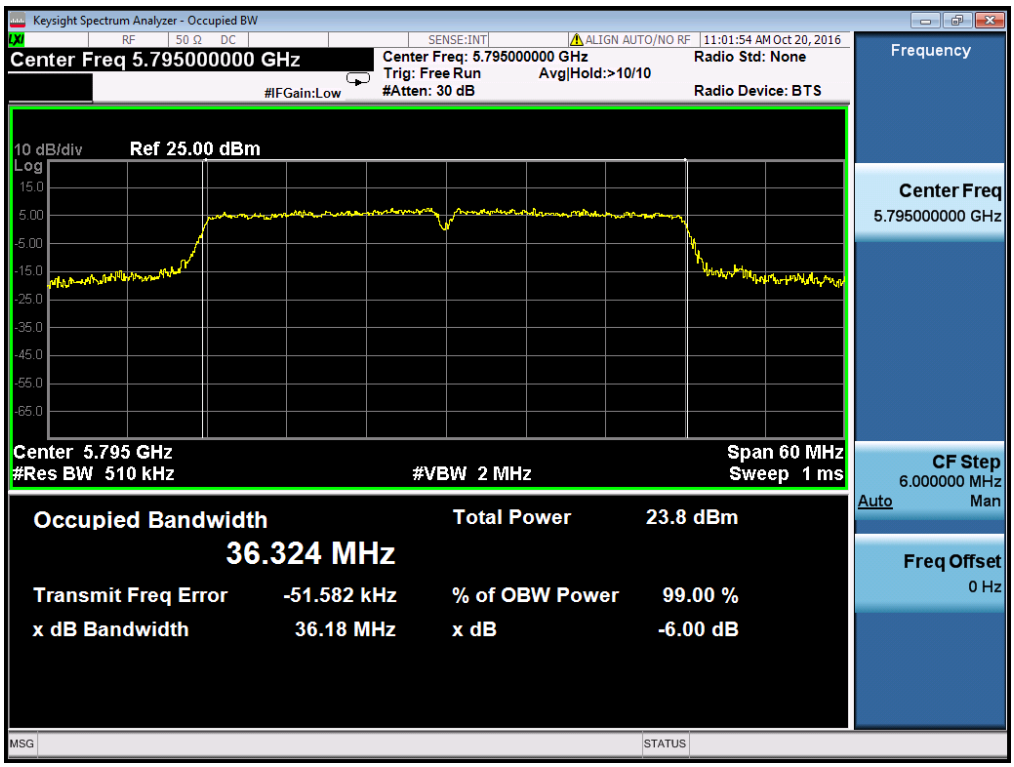
Antenna 1 - 802.11n-HT40 - 6dB Bandwidth– 5755MHz



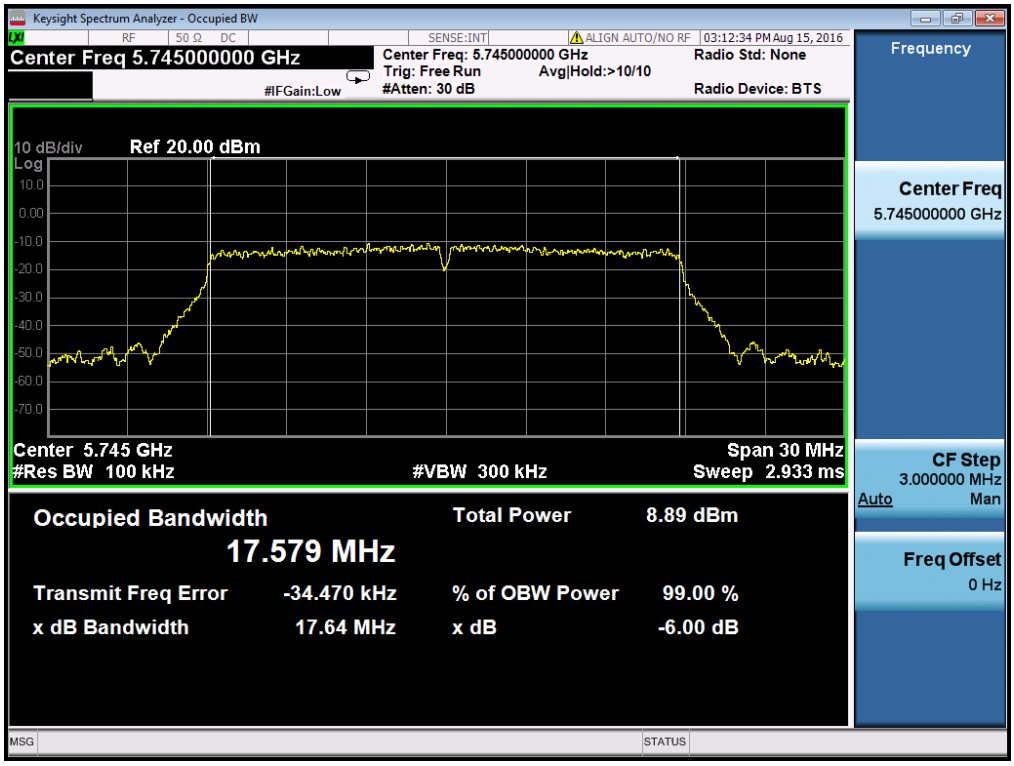
Antenna 1 - 802.11n-HT40 – 99% Bandwidth– 5755MHz



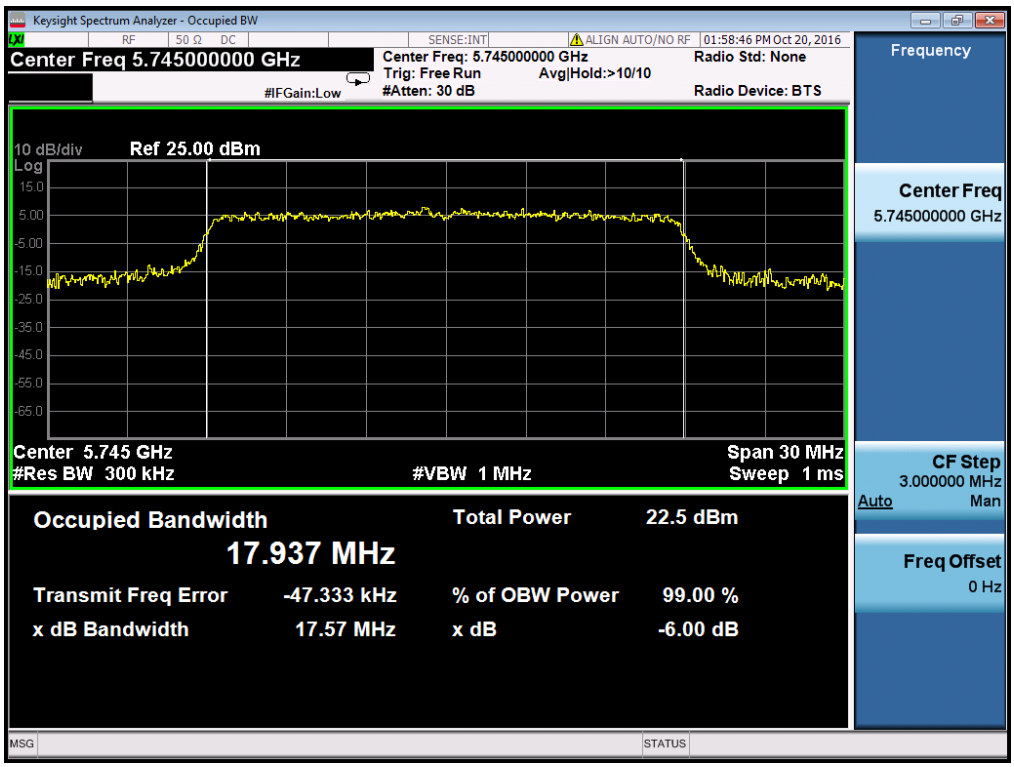
Antenna 1 - 802.11n-HT40 - 6dB Bandwidth– 5795MHz



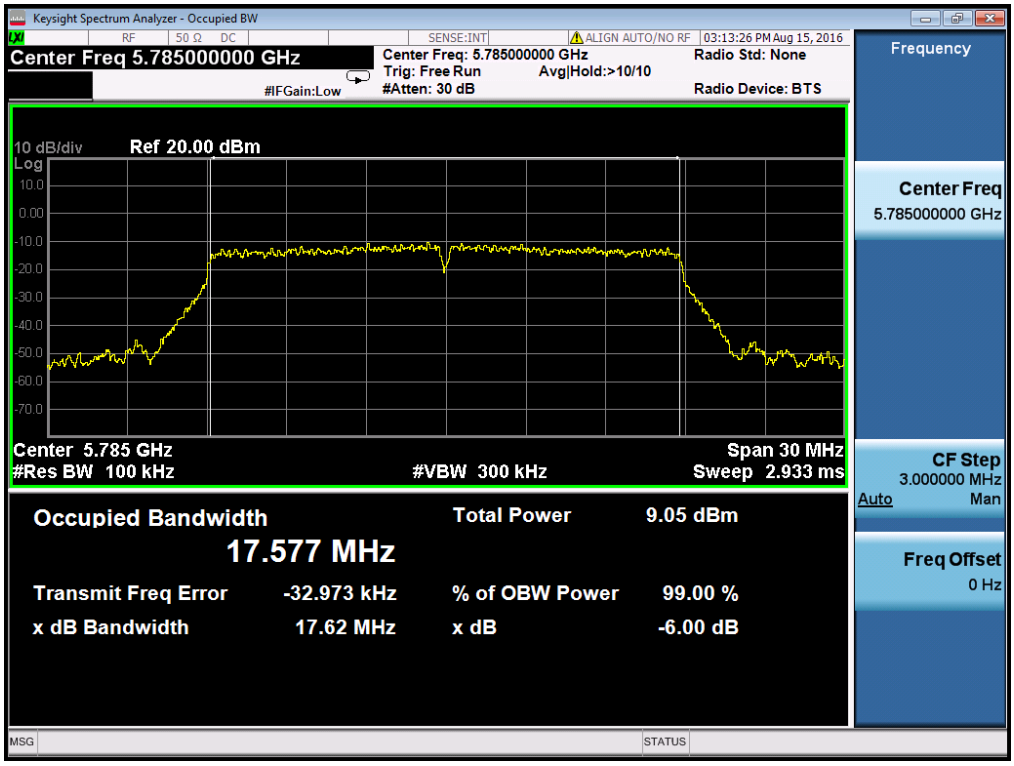
Antenna 1 - 802.11n-HT40 – 99% Bandwidth– 5795MHz



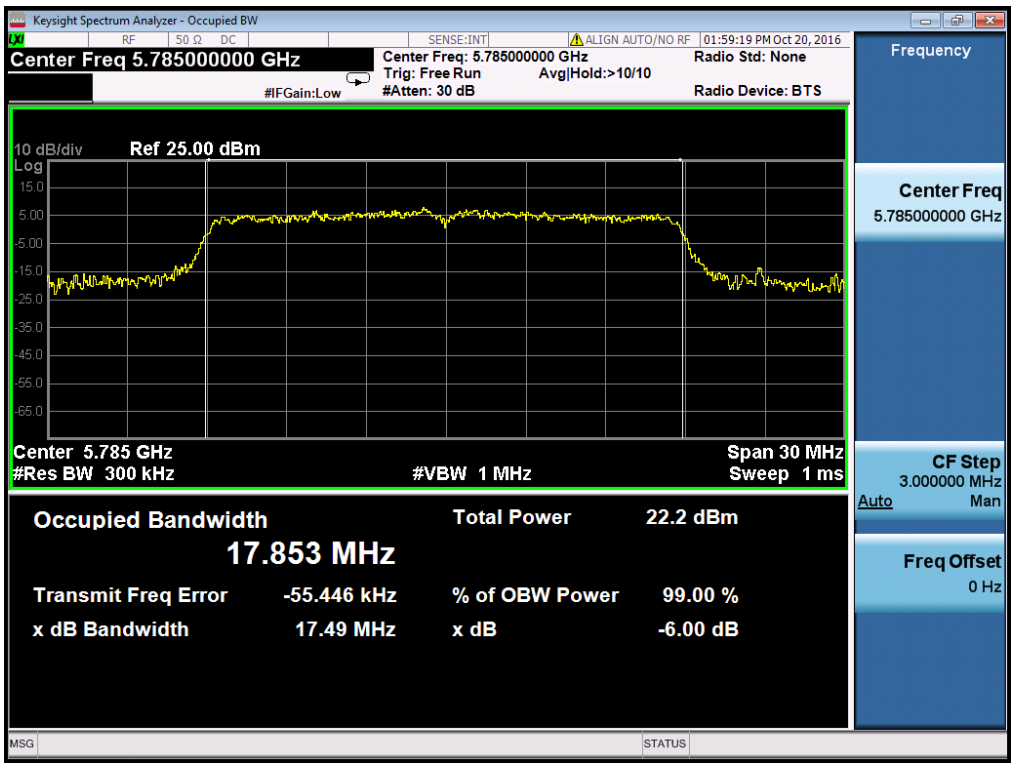
Antenna 1 - 802.11ac-VHT20 - 6dB Bandwidth– 5745MHz



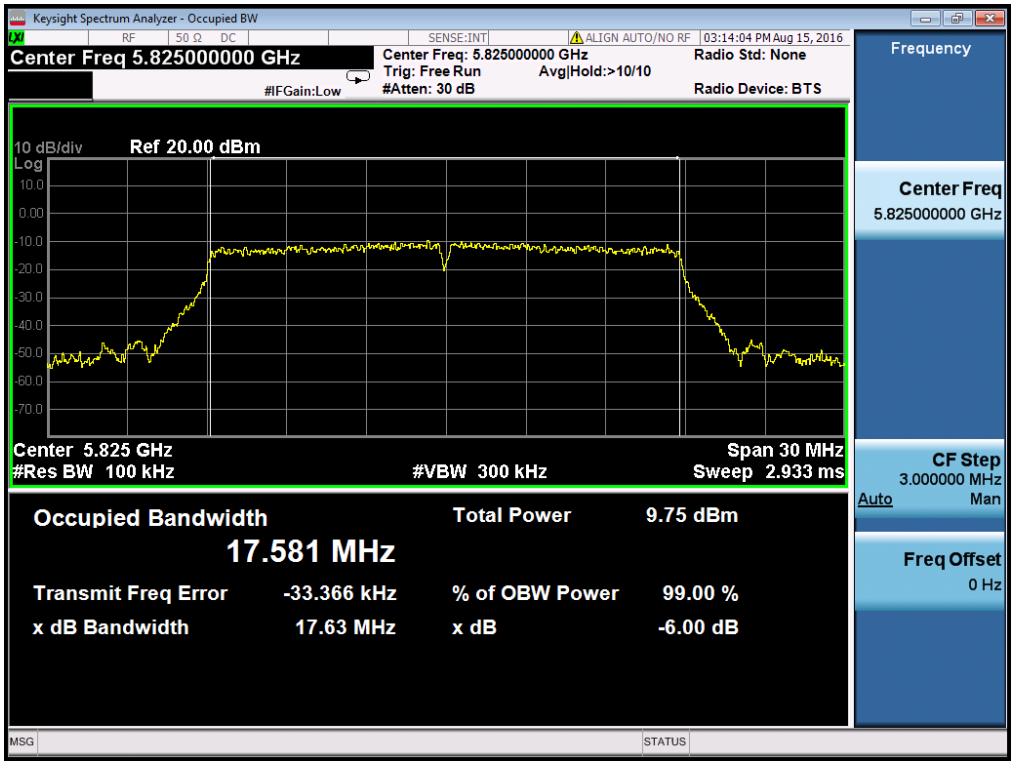
Antenna 1 - 802.11ac-VHT20 – 99% Bandwidth– 5745MHz



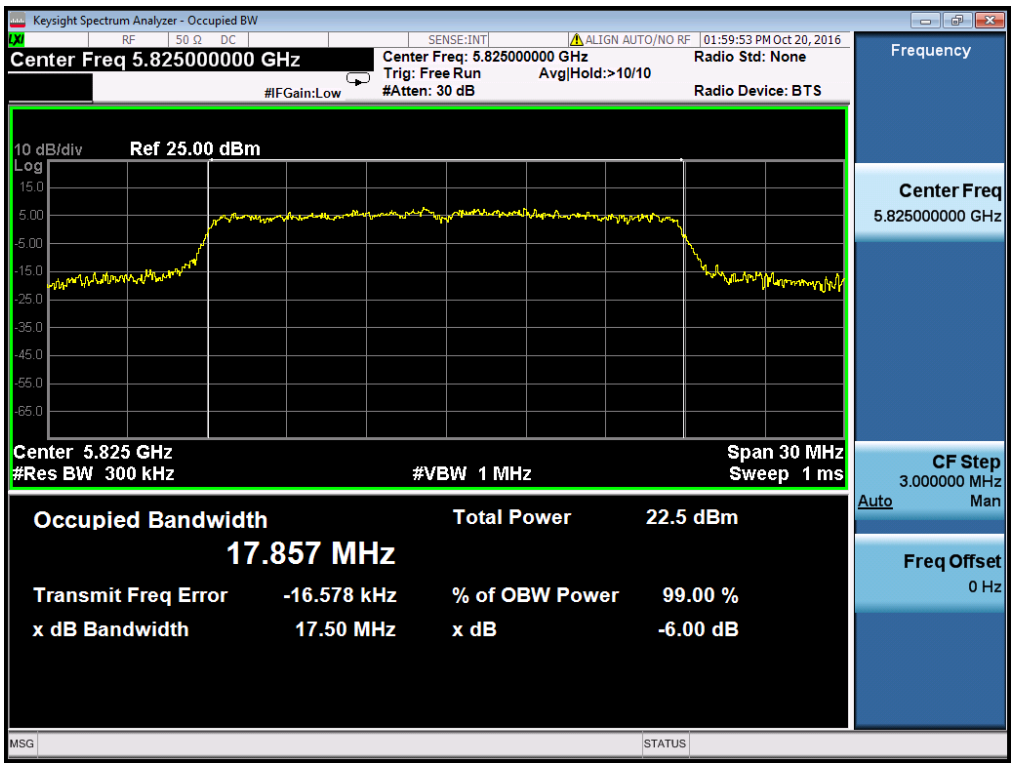
Antenna 1 - 802.11ac-VHT20 - 6dB Bandwidth– 5785MHz



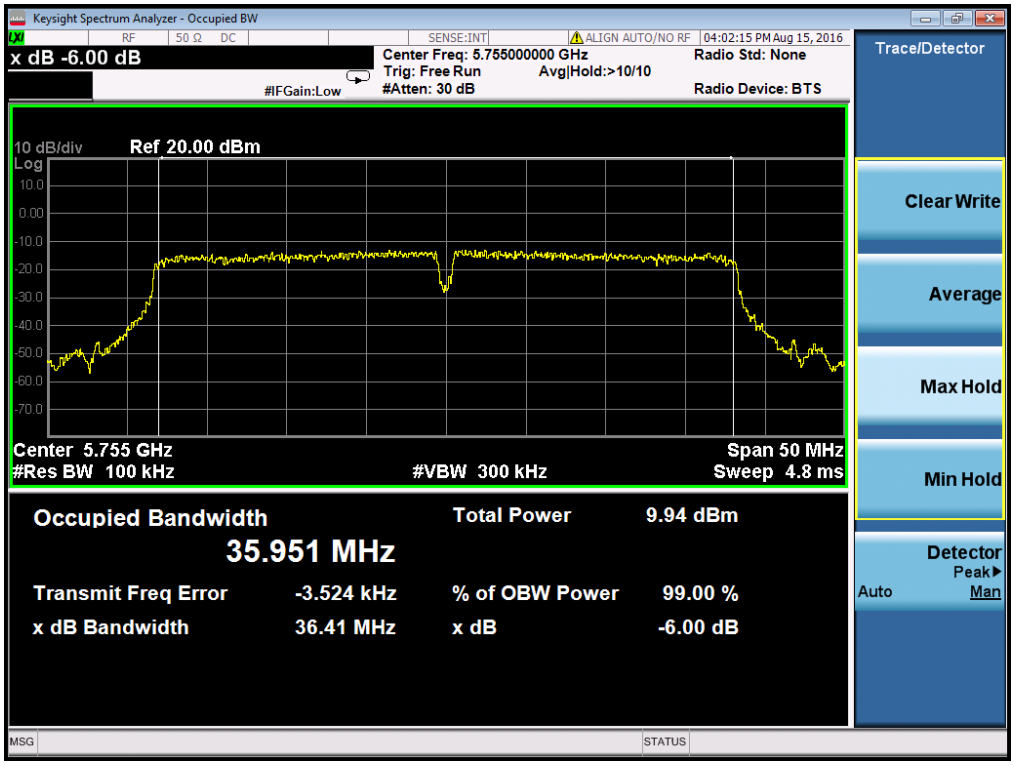
Antenna 1 - 802.11ac-VHT20 – 99% Bandwidth– 5785MHz



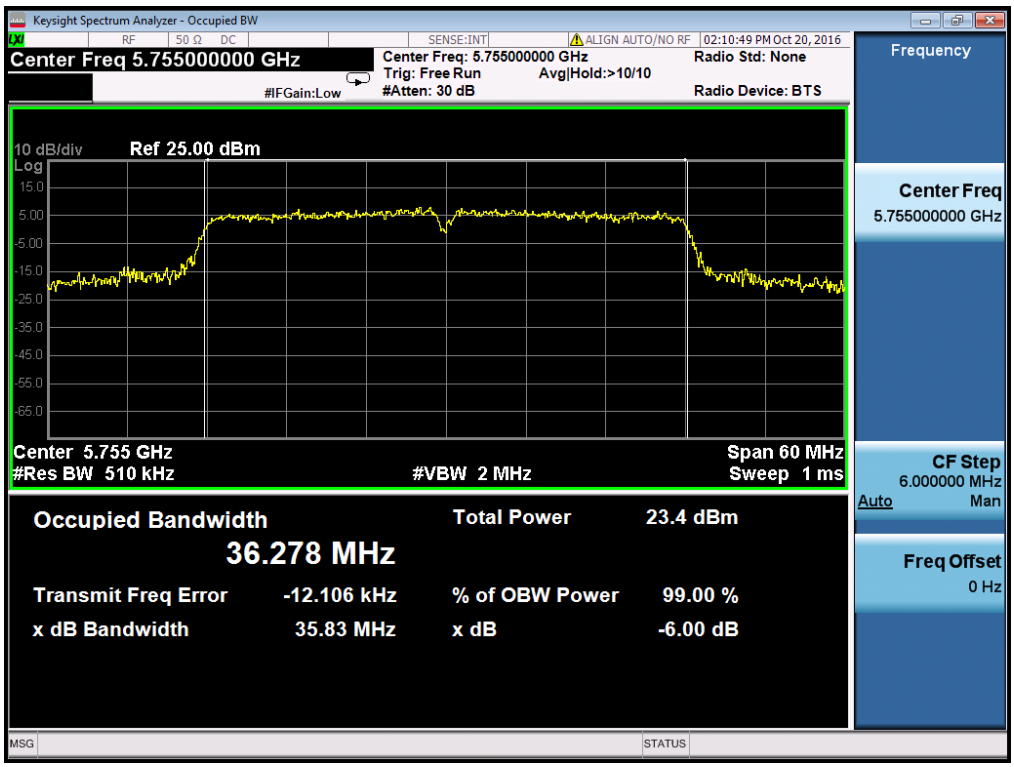
Antenna 1 - 802.11ac-VHT20 - 6dB Bandwidth– 5825MHz



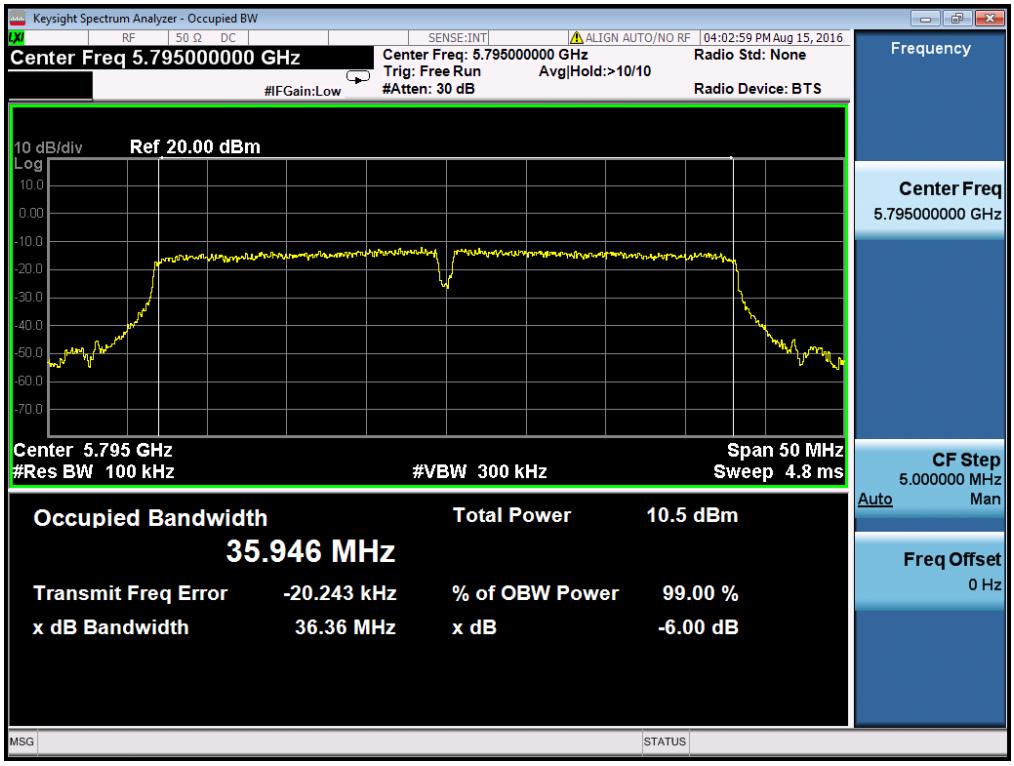
Antenna 1 - 802.11ac-VHT20 – 99% Bandwidth– 5825MHz



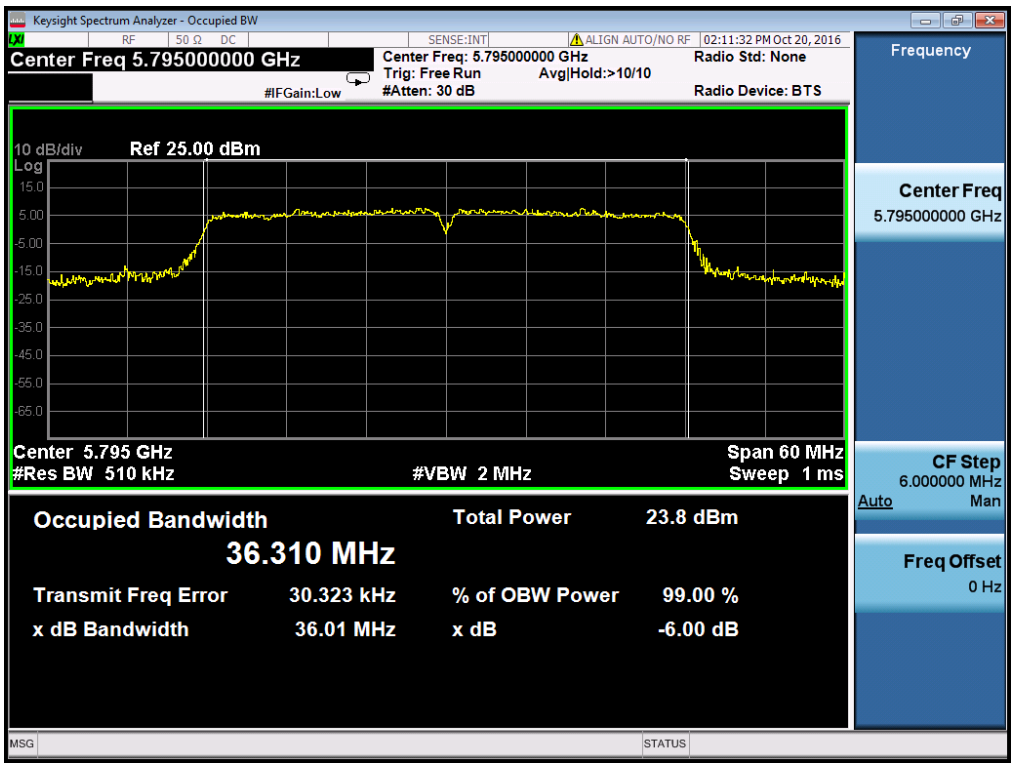
Antenna 1 - 802.11ac-VHT40 - 6dB Bandwidth– 5755MHz



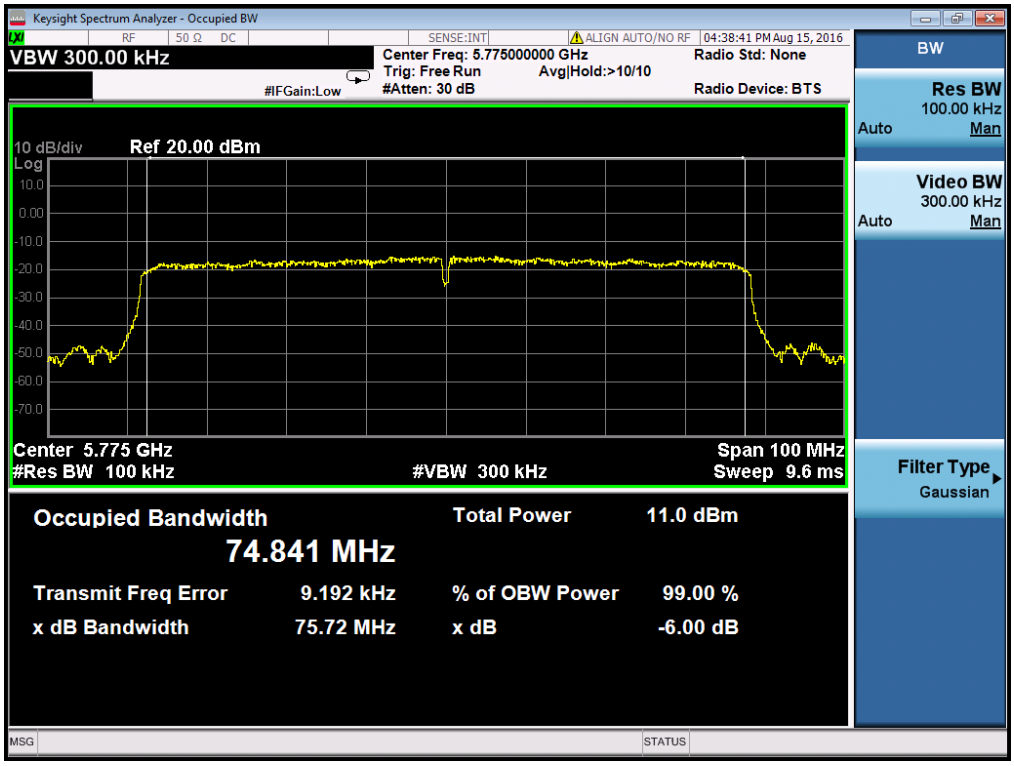
Antenna 1 - 802.11ac-VHT40 – 99% Bandwidth– 5755MHz



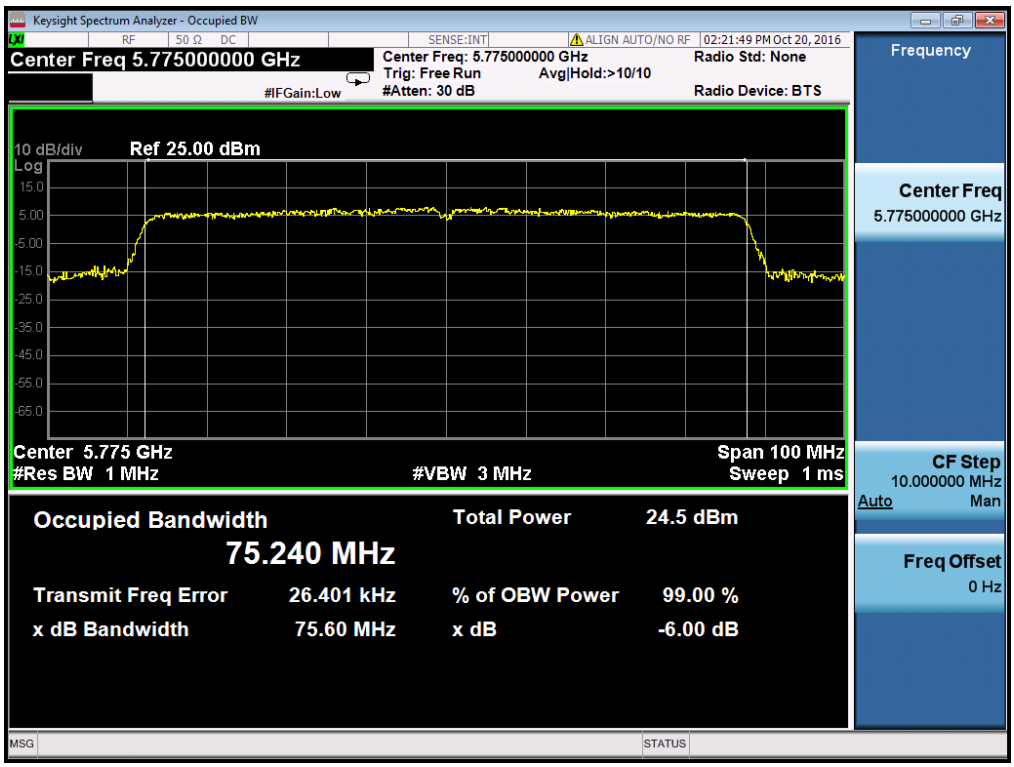
Antenna 1 - 802.11ac-VHT40 - 6dB Bandwidth– 5795MHz



Antenna 1 - 802.11ac-VHT40 – 99% Bandwidth– 5795MHz



Antenna 1 - 802.11ac-VHT80 - 6dB Bandwidth– 5775MHz



Antenna 1 - 802.11ac-VHT80 – 99% Bandwidth– 5775MHz

2.4. Power spectral density (PSD)

2.4.1. Limit of Power Spectral Density

FCC 15.407(a)

The maximum power spectral density should not exceed:

Band	EUT Category	Limit
U-NII-1	☐Access Point (Master device)	17 dBm/MHz
	☐Fixed point-to-point Access device	
	☒Mobile and portable client device	11 dBm/MHz
U-NII-2A	☒	11 dBm/MHz
U-NII-2C	☒	11 dBm/MHz
U-NII-3	☒	30dBm/500kHz

RSS-247, 6.2

The maximum power spectral density should not exceed:

Band	EUT Category	Limit
U-NII-1	☒	N/A
U-NII-2A	☒	11 dBm/MHz
U-NII-2C	☒	11 dBm/MHz
U-NII-3	☒	30 dBm/500kHz

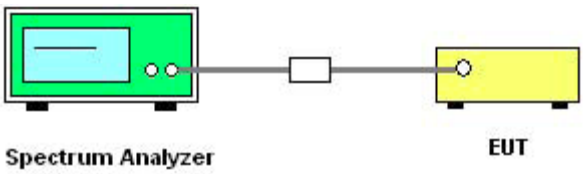
The e.i.r.p. spectral density should not exceed:

Band	EUT Category	Limit
U-NII-1	☒	10 dBm/MHz
U-NII-2A	☒	N/A
U-NII-2C	☒	N/A
U-NII-3	☒	N/A

2.4.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.4.3. Test Setup



2.4.4. Test Procedures

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port

to Spectrum.

4. **For U-NII-1, U-NII-2A, U-NII-2C Band:**

Using method SA-2

Set RBW=1MHz, VBW=3MHz, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)

For U-NII-3 Band:

Set RBW=500 kHz, VBW≥ 3RBW, where span is enough to capture the entire bandwidth, Sweep time = Auto, detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)

5. User the cursor on spectrum to peak search the highest level of trace

6. Record the max. Reading and add 10 log (1/duty cycle).

7. Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where

BWCF = 10log (500 kHz/ 300 kHz) = 2.22

8. Repeat above procedures until all default test channel (low, middle, and high) was complete.

2.4.5. Test Results of Power spectral density

Conducted PSD Test results of band U-NII-1 (5150~5250MHz)

802.11a mode					
Test Frequency (MHz)	Power Spectral Density (dBm/MHz)			FCC Limit (dBm/MHz)	Result
	Antenna 0	Antenna 1			
5180	7.536	7.380		11	PASS
5220	7.707	7.427		11	PASS
5240	7.316	7.550		11	PASS
802.11n-HT20 mode					
Test Frequency (MHz)	Power Spectral Density (dBm/MHz)			FCC Limit (dBm/MHz)	Result
	Antenna 0	Antenna 1	Total		
5180	7.139	6.418	9.80	11	PASS
5220	7.023	6.620	9.84	11	PASS
5240	6.531	6.836	9.70	11	PASS
802.11n-HT40 mode					
Test Frequency (MHz)	Power Spectral Density (dBm/MHz)			FCC Limit (dBm/MHz)	Result
	Antenna 0	Antenna 1	Total		
5190	4.628	4.595	7.62	11	PASS
5230	4.607	4.368	7.50	11	PASS
802.11ac-VHT20 mode					
Test Frequency (MHz)	Power Spectral Density (dBm/MHz)			FCC Limit (dBm/MHz)	Result
	Antenna 0	Antenna 1	Total		
5180	6.544	6.552	9.56	11	PASS
5220	6.866	7.034	9.96	11	PASS
5240	6.776	6.657	9.73	11	PASS
802.11ac-VHT40 mode					
Test Frequency (MHz)	Power Spectral Density (dBm/MHz)			FCC Limit (dBm/MHz)	Result
	Antenna 0	Antenna 1	Total		
5190	5.416	4.471	7.98	11	PASS
5230	4.829	4.400	7.63	11	PASS
802.11n-VHT80 mode					
Test Frequency (MHz)	Power Spectral Density (dBm/MHz)			FCC Limit (dBm/MHz)	Result
	Antenna 0	Antenna 1	Total		
5210	1.384	1.670	4.54	11	PASS

Conducted PSD Test results of band U-NII-2A (5250~5350MHz)

802.11a mode					
Test Frequency (MHz)	Power Spectral Density (dBm/MHz)			FCC/IC Limit (dBm/MHz)	Result
	Antenna 0	Antenna 1			
5260	7.386	7.776		11	PASS
5300	7.611	7.436		11	PASS
5320	7.615	7.675		11	PASS
802.11n-HT20 mode					
Test Frequency (MHz)	Power Spectral Density (dBm/MHz)			FCC/IC Limit (dBm/MHz)	Result
	Antenna 0	Antenna 1	Total		
5260	7.734	7.022	10.40	11	PASS
5300	7.275	7.390	10.34	11	PASS
5320	7.369	7.268	10.33	11	PASS
802.11n-HT40 mode					
Test Frequency (MHz)	Power Spectral Density (dBm/MHz)			FCC/IC Limit (dBm/MHz)	Result
	Antenna 0	Antenna 1	Total		
5270	4.968	5.052	8.02	11	PASS
5310	4.923	4.907	7.93	11	PASS
802.11ac-VHT20 mode					
Test Frequency (MHz)	Power Spectral Density (dBm/MHz)			FCC/IC Limit (dBm/MHz)	Result
	Antenna 0	Antenna 1	Total		
5260	7.419	7.394	10.42	11	PASS
5300	7.589	7.218	10.42	11	PASS
5320	7.452	7.062	10.27	11	PASS
802.11ac-VHT40 mode					
Test Frequency (MHz)	Power Spectral Density (dBm/MHz)			FCC/IC Limit (dBm/MHz)	Result
	Antenna 0	Antenna 1	Total		
5270	4.855	4.957	7.92	11	PASS
5310	4.995	4.928	7.97	11	PASS
802.11n-VHT80 mode					
Test Frequency (MHz)	Power Spectral Density (dBm/MHz)			FCC/IC Limit (dBm/MHz)	Result
	Antenna 0	Antenna 1	Total		
5290	1.690	1.574	4.64	11	PASS

Conducted PSD Test results of band U-NII-2C (5470~5725MHz)

802.11a mode					
Test Frequency (MHz)	Power Spectral Density (dBm/MHz)			FCC/IC Limit (dBm/MHz)	Result
	Antenna 0	Antenna 1			
5500	7.258	7.508		11	PASS
5580	7.243	7.465		11	PASS
5700	7.607	7.089		11	PASS
802.11n-HT20 mode					
Test Frequency (MHz)	Power Spectral Density (dBm/MHz)			FCC/IC Limit (dBm/MHz)	Result
	Antenna 0	Antenna 1	Total		
5500	7.000	7.446	10.24	11	PASS
5580	7.190	7.598	10.41	11	PASS
5700	7.401	7.371	10.40	11	PASS
802.11n-HT40 mode					
Test Frequency (MHz)	Power Spectral Density (dBm/MHz)			FCC/IC Limit (dBm/MHz)	Result
	Antenna 0	Antenna 1	Total		
5510	7.778	7.401	10.60	11	PASS
5670	7.629	7.565	10.61	11	PASS
802.11ac-VHT20 mode					
Test Frequency (MHz)	Power Spectral Density (dBm/MHz)			FCC/IC Limit (dBm/MHz)	Result
	Antenna 0	Antenna 1	Total		
5500	7.192	7.520	10.37	11	PASS
5580	7.587	7.496	10.55	11	PASS
5700	7.680	7.305	10.51	11	PASS
802.11ac-VHT40 mode					
Test Frequency (MHz)	Power Spectral Density (dBm/MHz)			FCC/IC Limit (dBm/MHz)	Result
	Antenna 0	Antenna 1	Total		
5510	7.348	6.967	10.17	11	PASS
5670	7.310	7.219	10.28	11	PASS
802.11n-VHT80 mode					
Test Frequency (MHz)	Power Spectral Density (dBm)			FCC/IC Limit (dBm/MHz)	Result
	Antenna 0	Antenna 1	Total		
5530	5.764	5.380	8.59	11	PASS

Conducted PSD Test results of band U-NII-3 (5725 ~ 5850 MHz)

802.11a mode					
Test Frequency (MHz)	Power Spectral Density (dBm/500kHz)			FCC/IC Limit (dBm/500kHz)	Result
	Antenna 0	Antenna 1			
5745	11.502	11.174		30	PASS
5785	11.409	10.819		30	PASS
5825	11.655	11.733		30	PASS
802.11n-HT20 mode					
Test Frequency (MHz)	Power Spectral Density (dBm/500kHz)			FCC/IC Limit (dBm/500kHz)	Result
	Antenna 0	Antenna 1	Total		
5745	11.138	10.776	13.97	30	PASS
5785	10.940	10.936	13.95	30	PASS
5825	11.323	10.751	14.06	30	PASS
802.11n-HT40 mode					
Test Frequency (MHz)	Power Spectral Density (dBm/500kHz)			FCC/IC Limit (dBm/500kHz)	Result
	Antenna 0	Antenna 1	Total		
5755	8.962	8.604	11.80	30	PASS
5795	8.895	8.614	11.77	30	PASS
802.11ac-VHT20 mode					
Test Frequency (MHz)	Power Spectral Density (dBm/500kHz)			FCC/IC Limit (dBm/500kHz)	Result
	Antenna 0	Antenna 1	Total		
5745	10.702	10.717	13.72	30	PASS
5785	11.474	10.864	14.19	30	PASS
5825	11.537	11.186	14.38	30	PASS
802.11ac-VHT40 mode					
Test Frequency (MHz)	Power Spectral Density (dBm/500kHz)			FCC/IC Limit (dBm/500kHz)	Result
	Antenna 0	Antenna 1	Total		
5755	8.916	8.695	11.82	30	PASS
5795	8.874	8.627	11.76	30	PASS
802.11n-VHT80 mode					
Test Frequency (MHz)	Power Spectral Density (dBm/500kHz)			FCC/IC Limit (dBm/500kHz)	Result
	Antenna 0	Antenna 1	Total		
5775	5.147	5.381	8.28	30	PASS

EIRP PSD Test results of band U-NII-1 (5150~5250MHz)

802.11a mode				
Test Frequency (MHz)	Power Spectral Density (dBm/MHz)		IC Limit (dBm/MHz)	Result
	Antenna 0	Antenna 1		
5180	4.63	4.71	10	PASS
5220	4.93	5.18	10	PASS
5240	5.16	5.85	10	PASS

802.11n-HT20 mode					
Test Frequency (MHz)	Power Spectral Density (dBm/MHz)			IC Limit (dBm/MHz)	Result
	Antenna 0	Antenna 1	Total		
5180	4.07	4.24	7.17	10	PASS
5220	4.99	5.06	8.04	10	PASS
5240	4.72	4.52	7.63	10	PASS

802.11n-HT40 mode					
Test Frequency (MHz)	Power Spectral Density (dBm/MHz)			IC Limit (dBm/MHz)	Result
	Antenna 0	Antenna 1	Total		
5190	3.86	3.31	6.60	10	PASS
5230	3.30	3.65	6.49	10	PASS

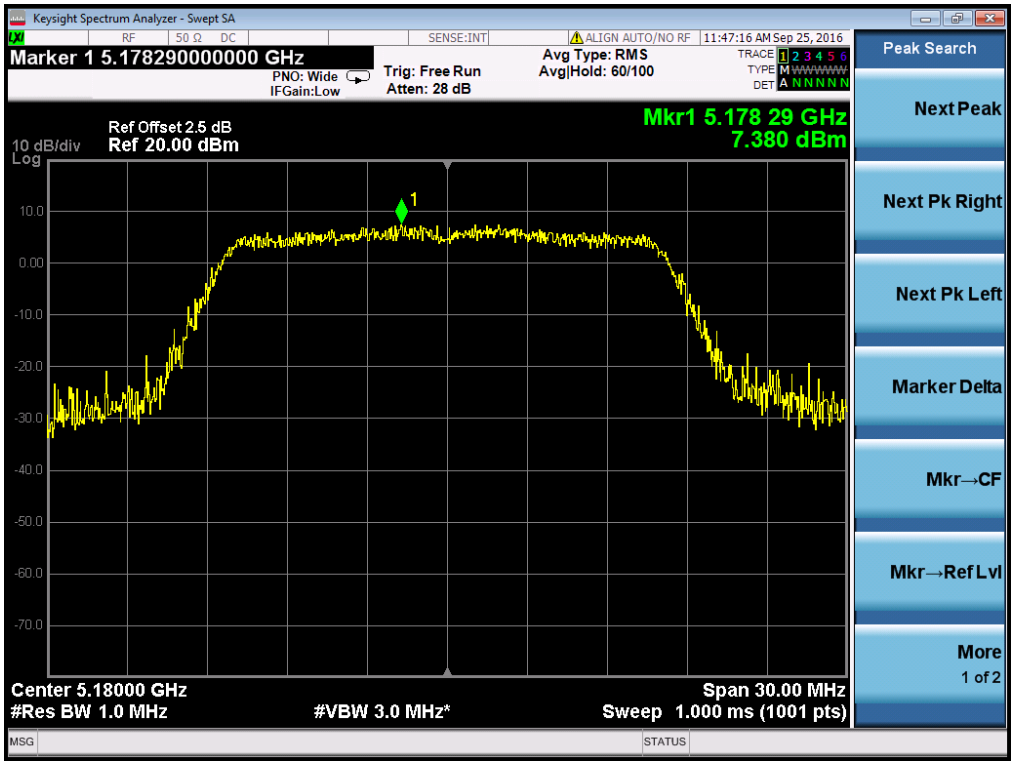
802.11ac-VHT20 mode					
Test Frequency (MHz)	Power Spectral Density (dBm/MHz)			IC Limit (dBm/MHz)	Result
	Antenna 0	Antenna 1	Total		
5180	4.54	4.16	7.36	10	PASS
5220	4.80	4.77	7.80	10	PASS
5240	5.14	5.60	8.39	10	PASS

802.11ac-VHT40 mode					
Test Frequency (MHz)	Power Spectral Density (dBm/MHz)			IC Limit (dBm/MHz)	Result
	Antenna 0	Antenna 1	Total		
5190	2.94	3.33	6.15	10	PASS
5230	3.07	3.81	6.47	10	PASS

802.11n-VHT80 mode					
Test Frequency (MHz)	Power Spectral Density (dBm/MHz)			IC Limit (dBm/MHz)	Result
	Antenna 0	Antenna 1	Total		
5210	3.16	3.05	6.12	10	PASS

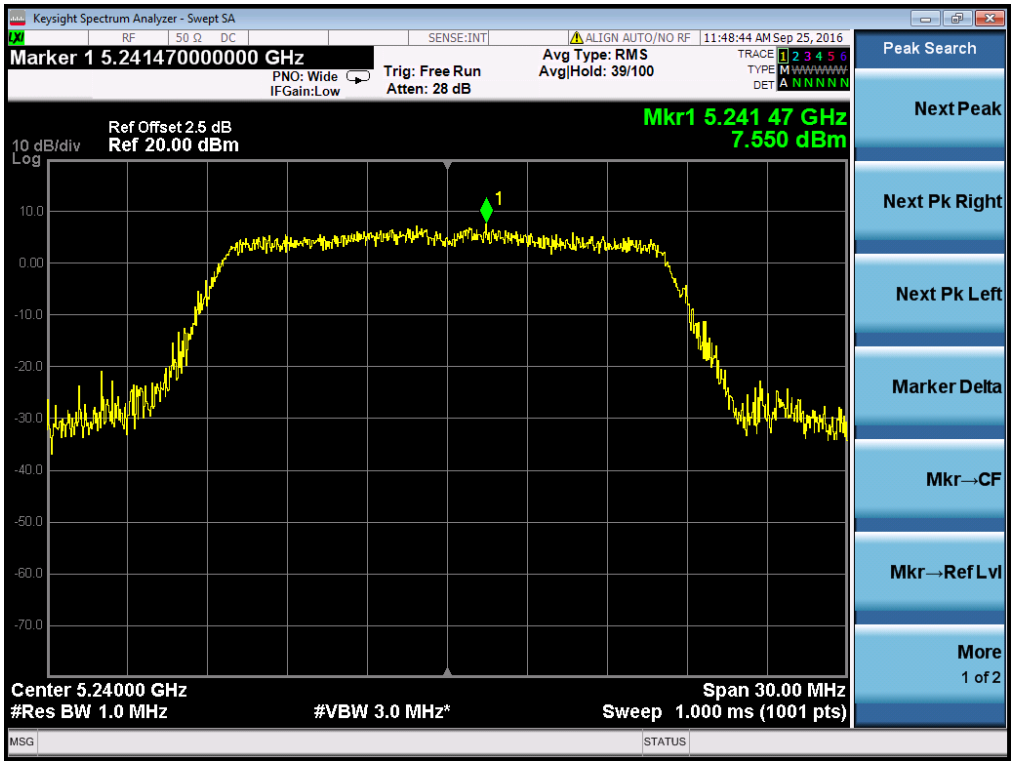
2.4.6. Test Results (plots) of Power spectral density

Conducted PSD



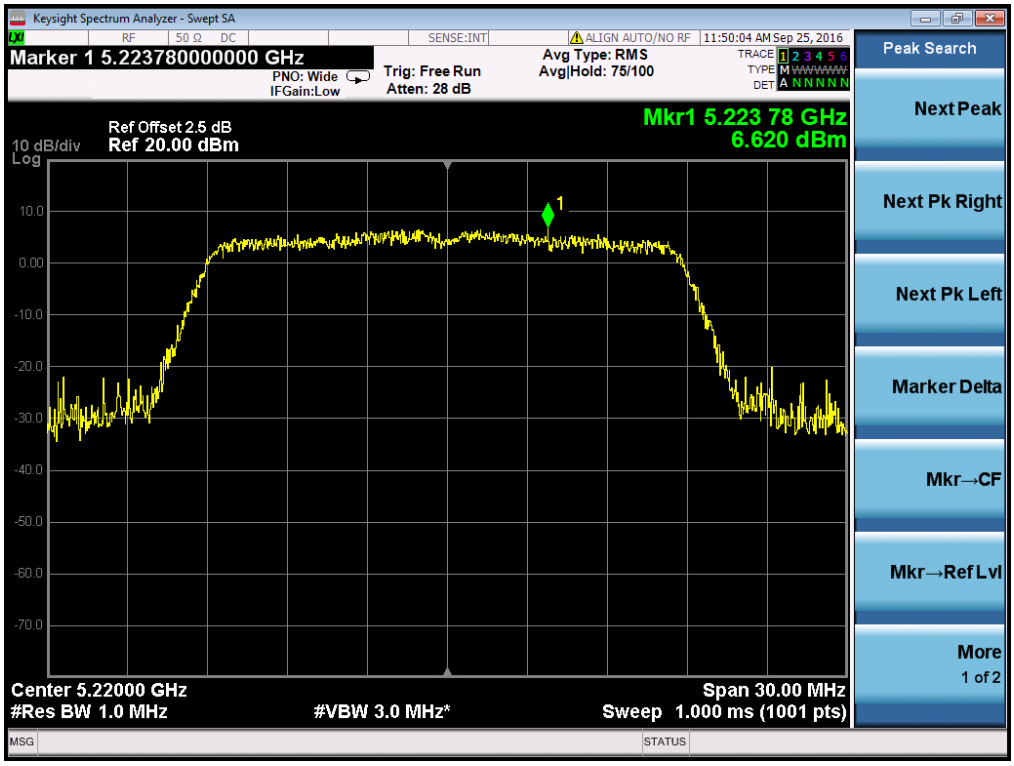
Antenna 0 - 802.11a – 5180MHz

Antenna 0 - 802.11a – 5220MHz

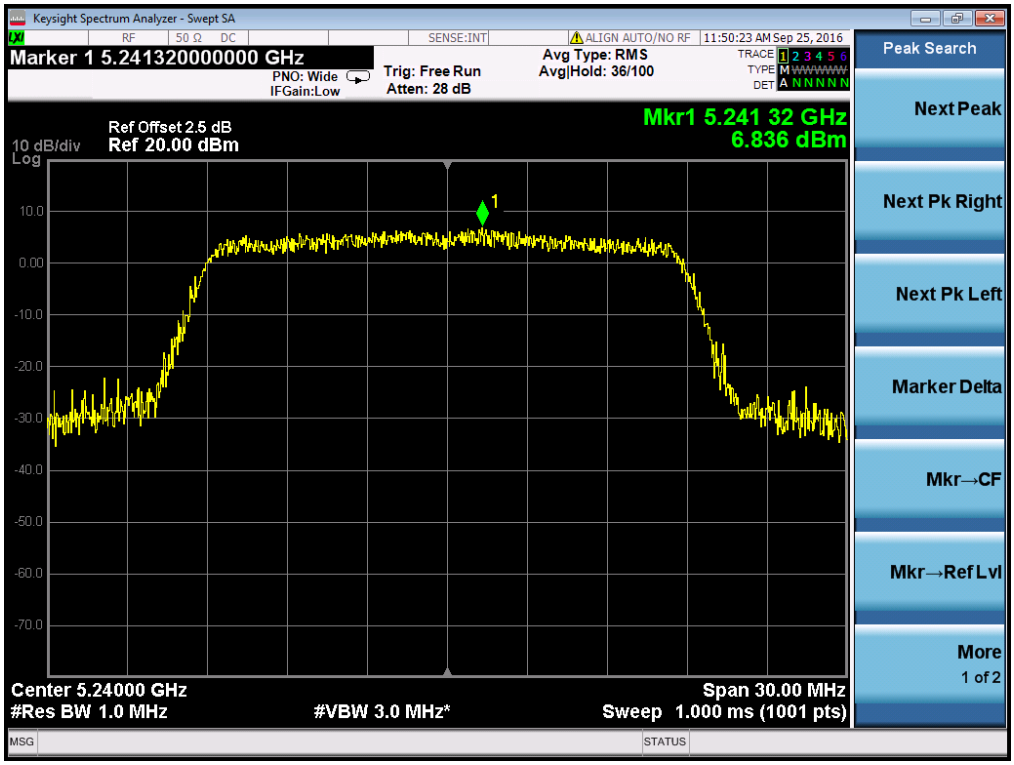


Antenna 0 - 802.11a – 5240MHz

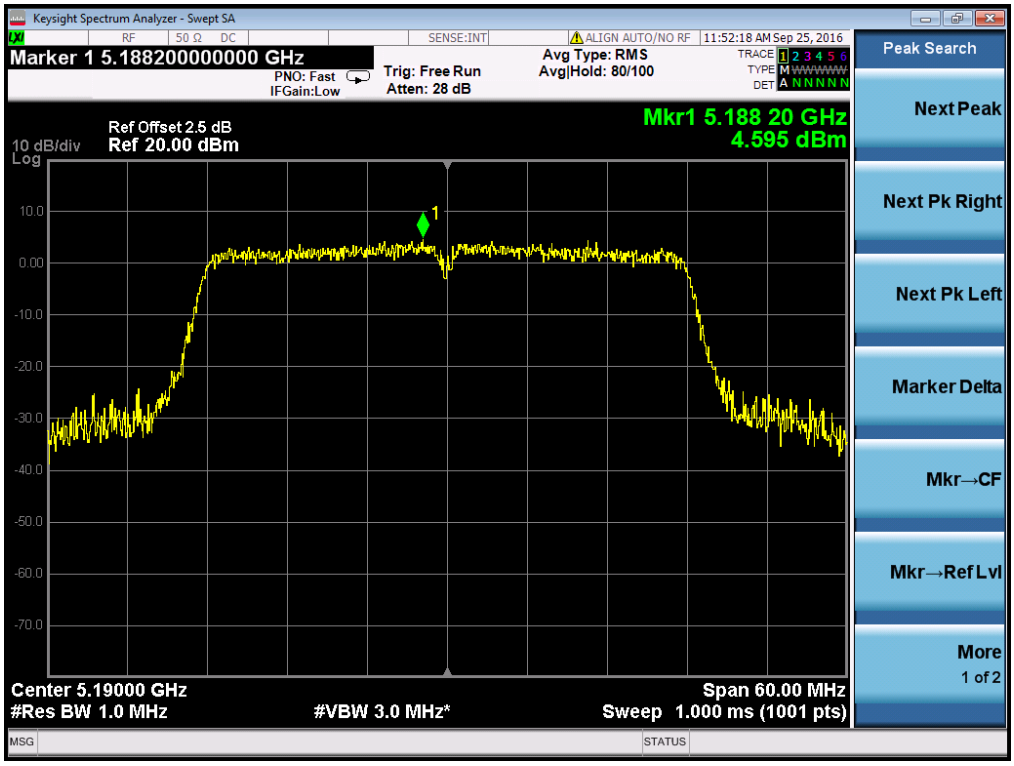
Antenna 0 - 802.11n-HT20 – 5180MHz



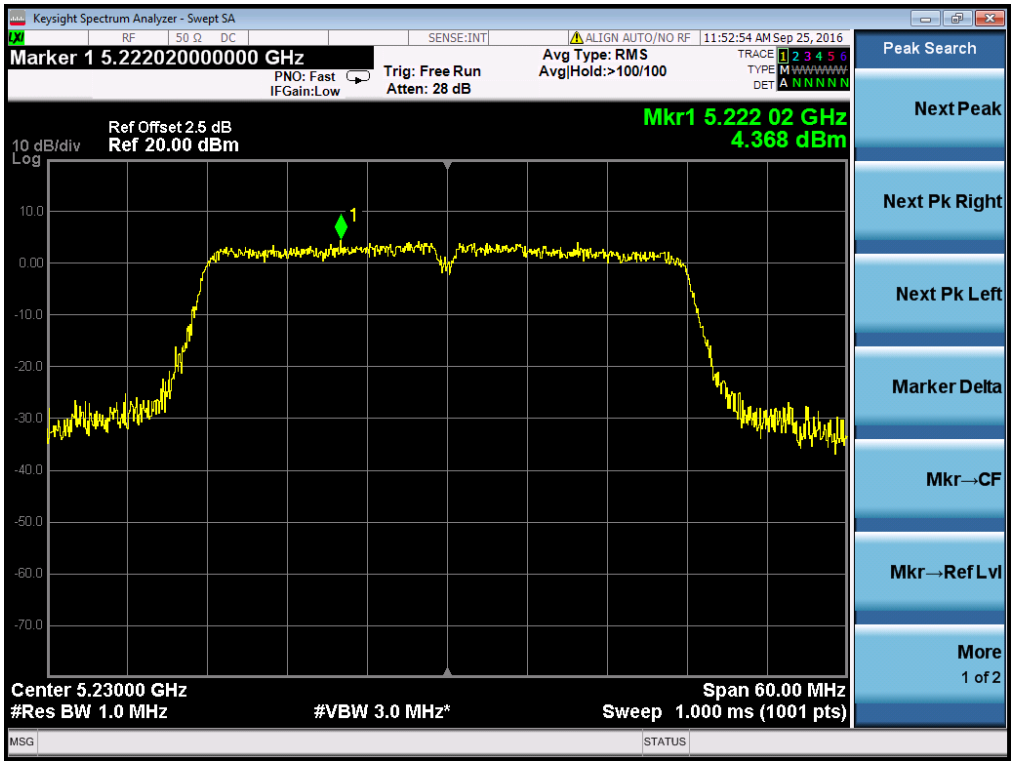
Antenna 0 - 802.11n-HT20 – 5220MHz



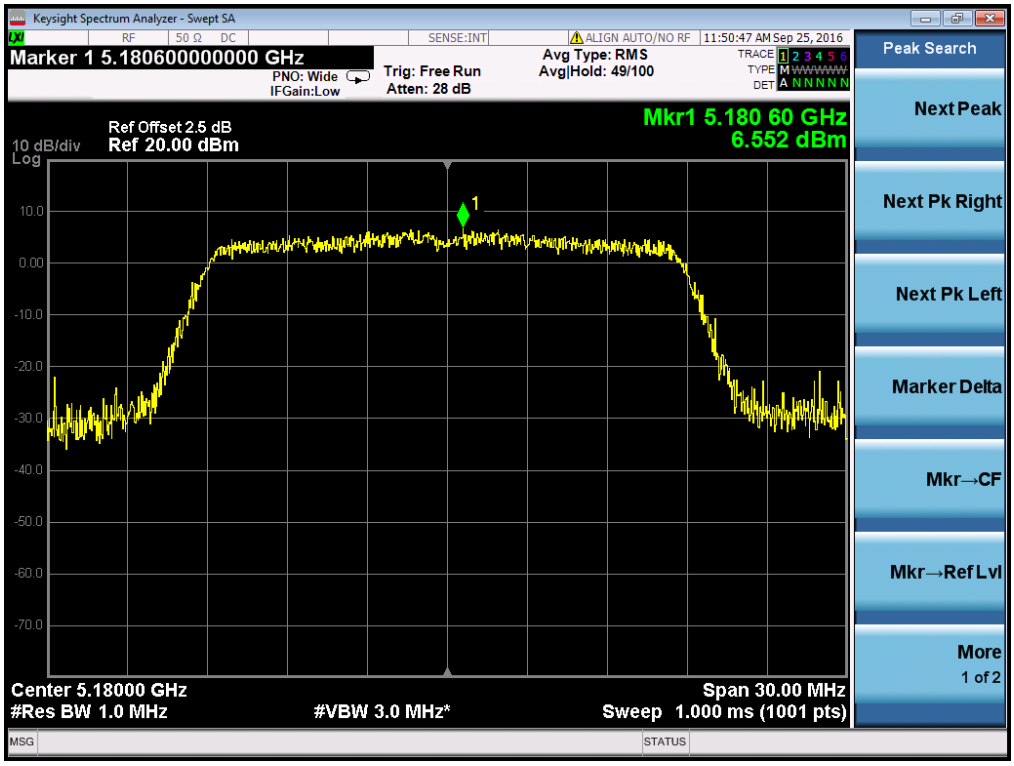
Antenna 0 - 802.11n-HT20 – 5240MHz



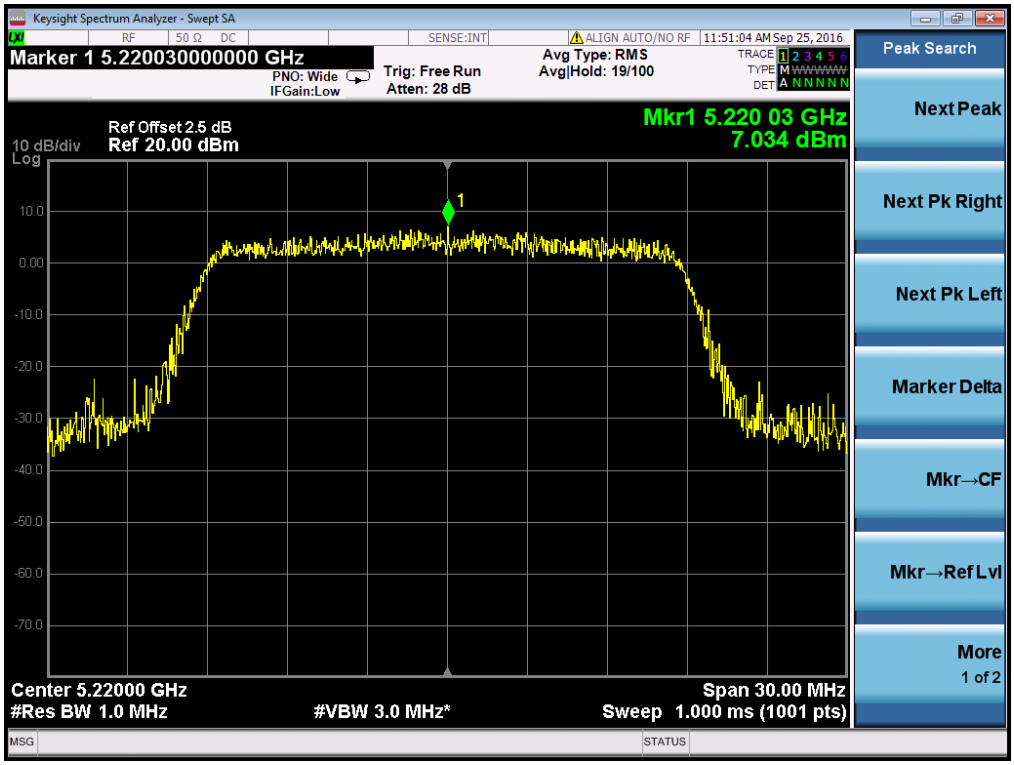
Antenna 0 - 802.11n-HT40 – 5190MHz



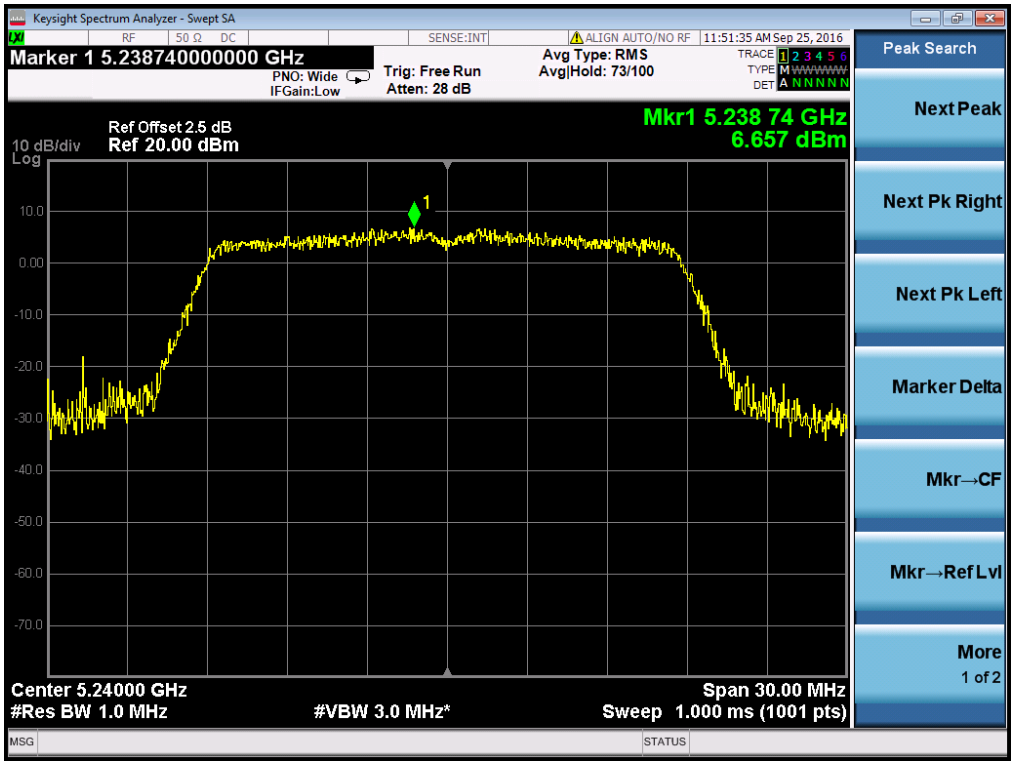
Antenna 0 - 802.11n-HT40 – 5230MHz



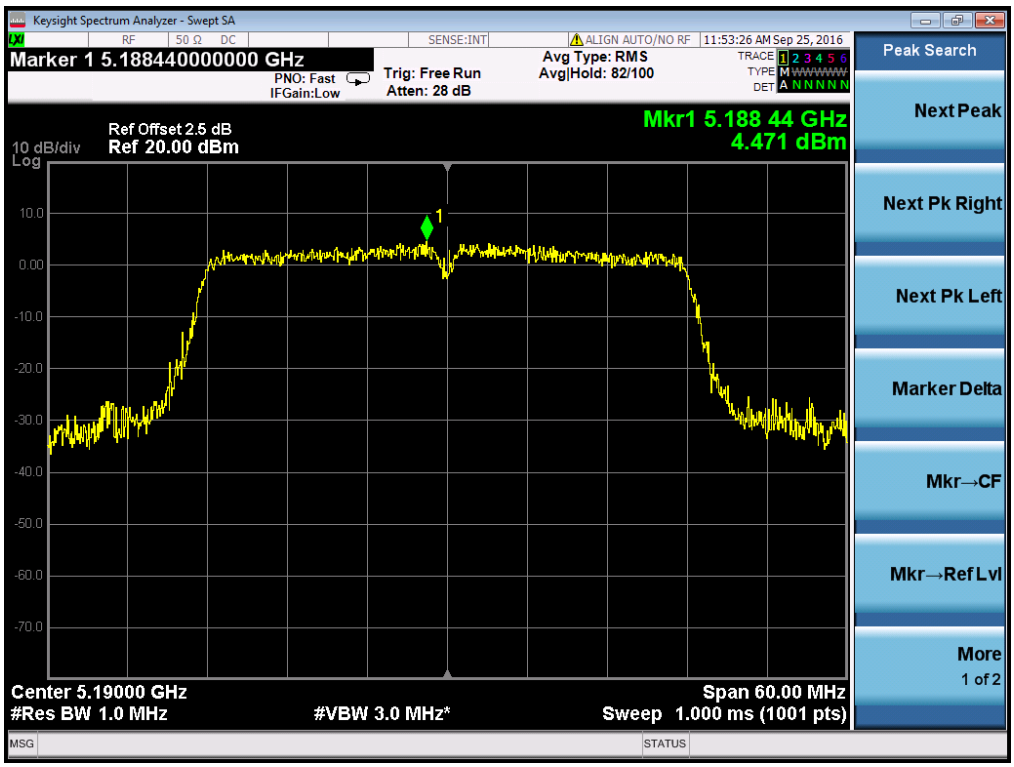
Antenna 0 - 802.11ac-VHT20 – 5180MHz



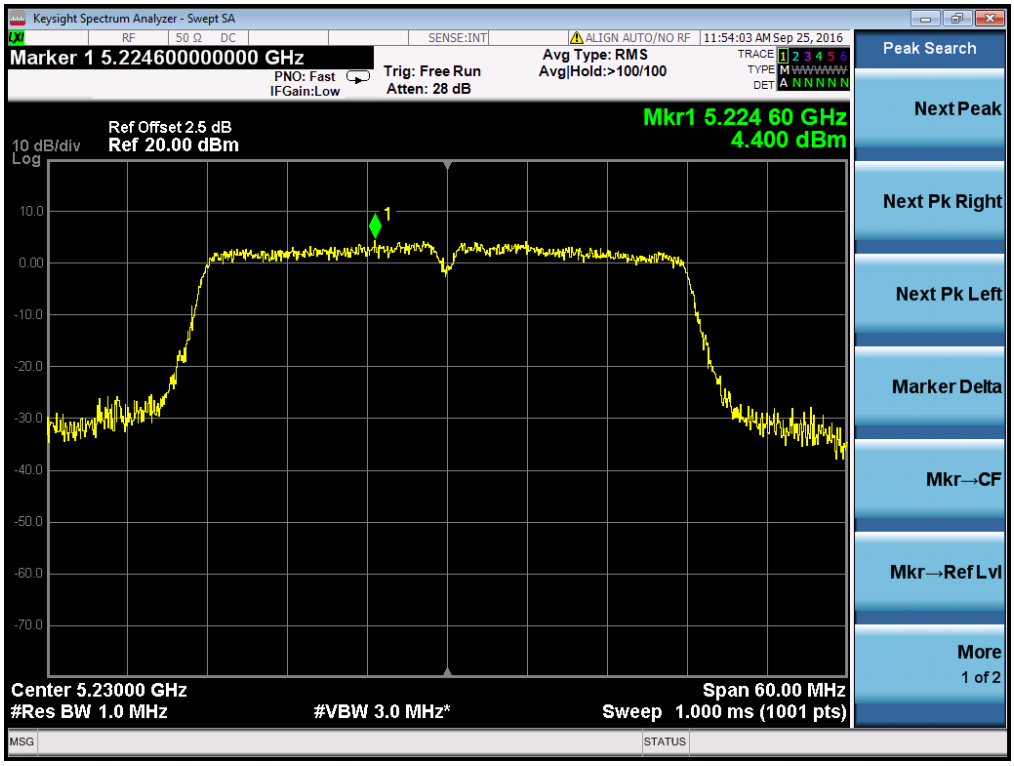
Antenna 0 - 802.11ac-VHT20 – 5220MHz



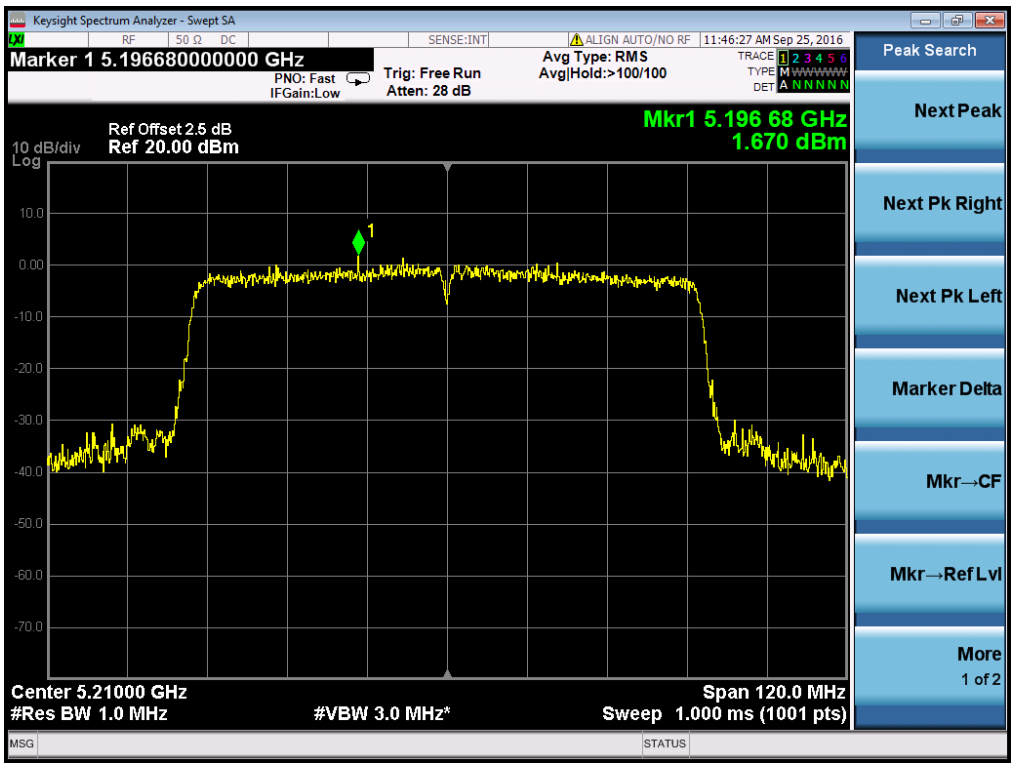
Antenna 0 - 802.11ac-VHT20 – 5240MHz



Antenna 0 - 802.11ac-VHT40 – 5190MHz



Antenna 0 - 802.11ac-VHT40 – 5230MHz

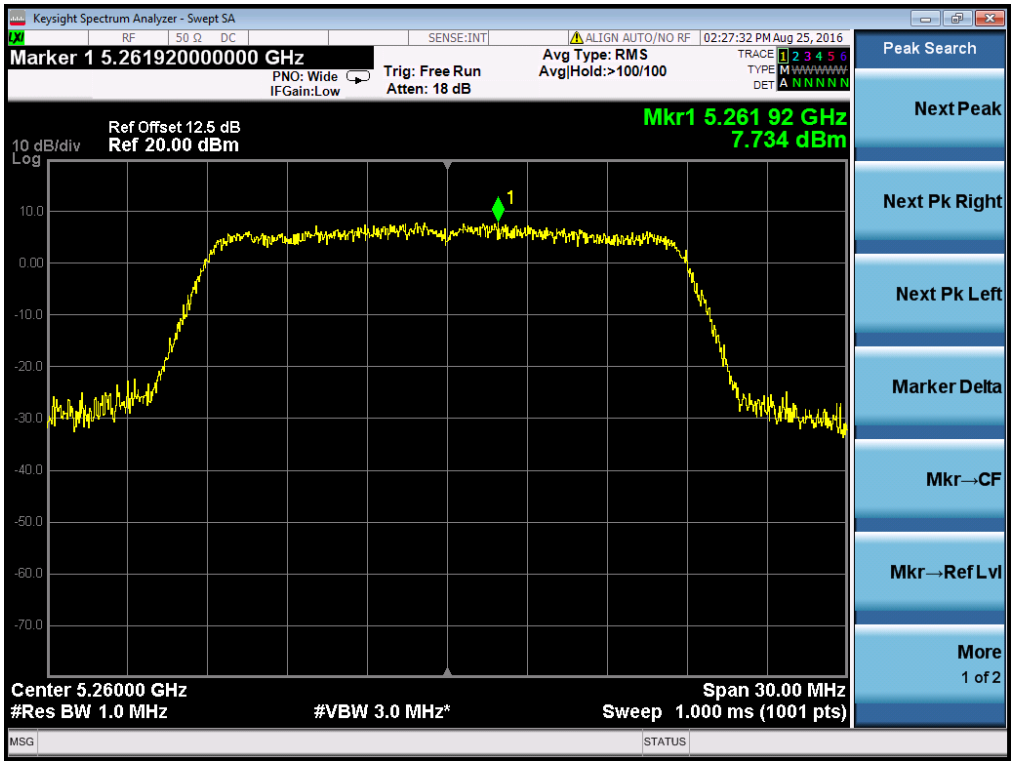


Antenna 0 - 802.11ac-VHT80 – 5210MHz

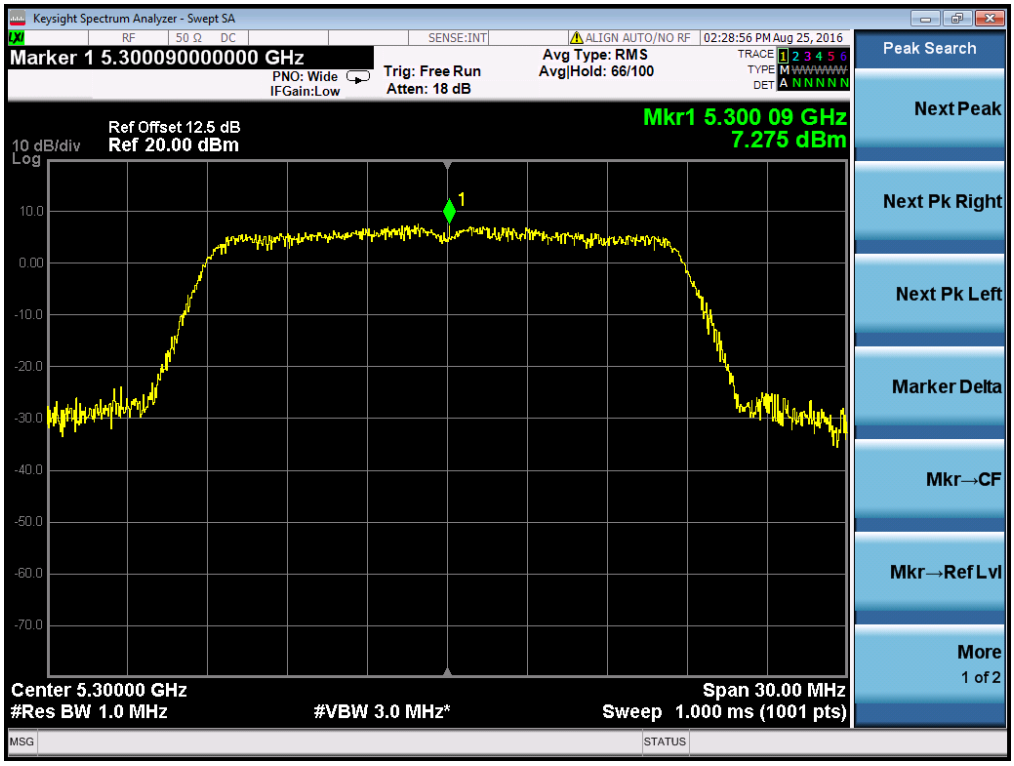
Antenna 0 - 802.11a – 5260MHz

Antenna 0 - 802.11a – 5300MHz

Antenna 0 - 802.11a – 5320MHz

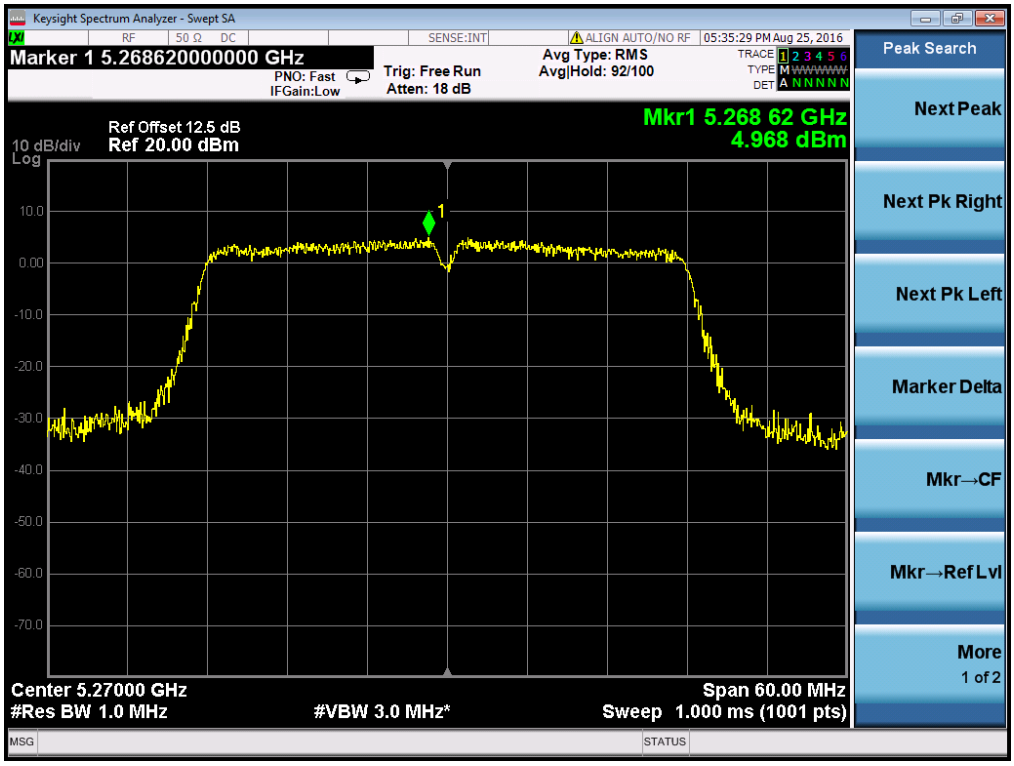


Antenna 0 - 802.11n-HT20 – 5260MHz

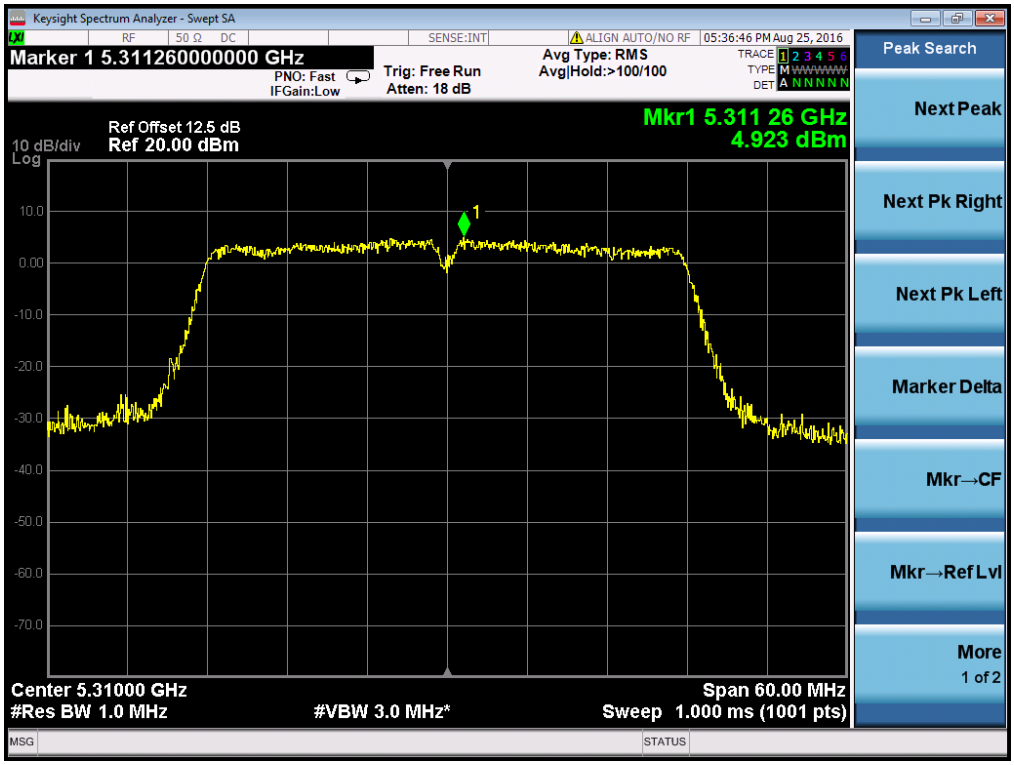


Antenna 0 - 802.11n-HT20 – 5300MHz

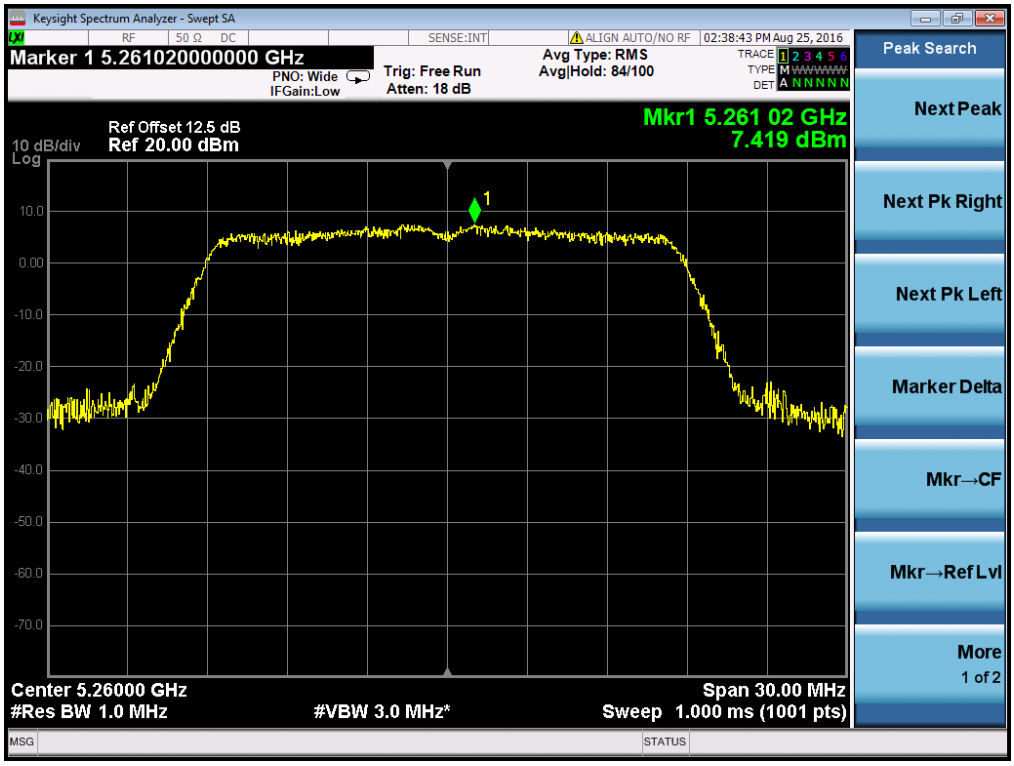
Antenna 0 - 802.11n-HT20 – 5320MHz



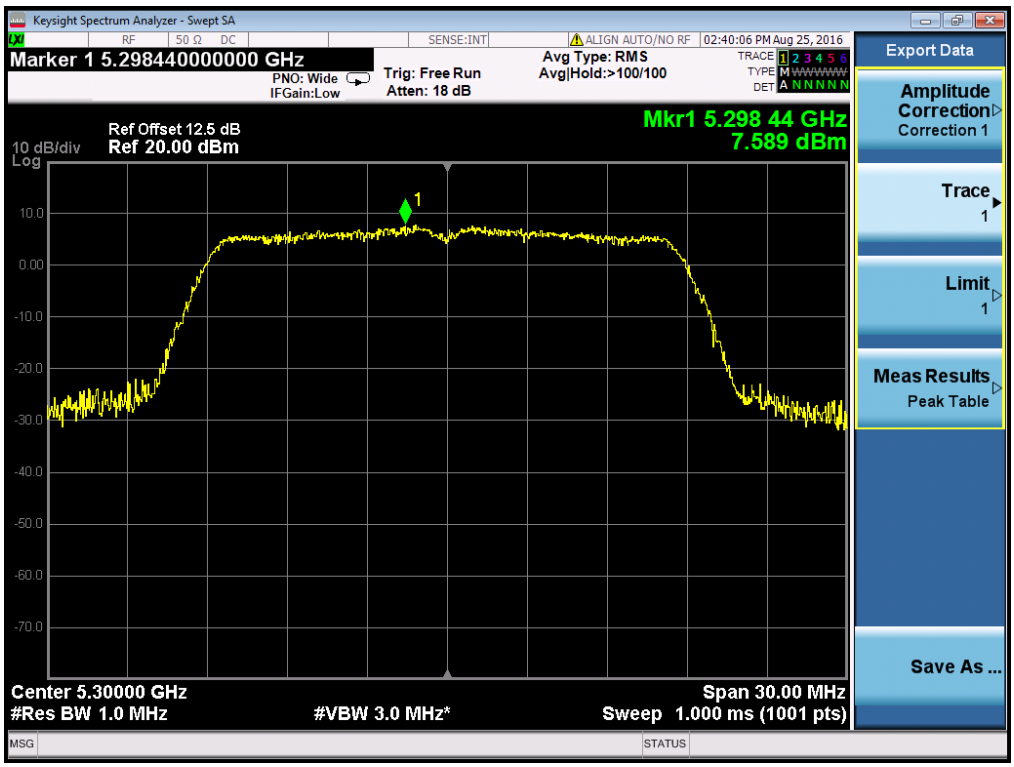
Antenna 0 - 802.11n-HT40 – 5270MHz



Antenna 0 - 802.11n-HT40 – 5310MHz



Antenna 0 - 802.11ac-VHT20 – 5260MHz

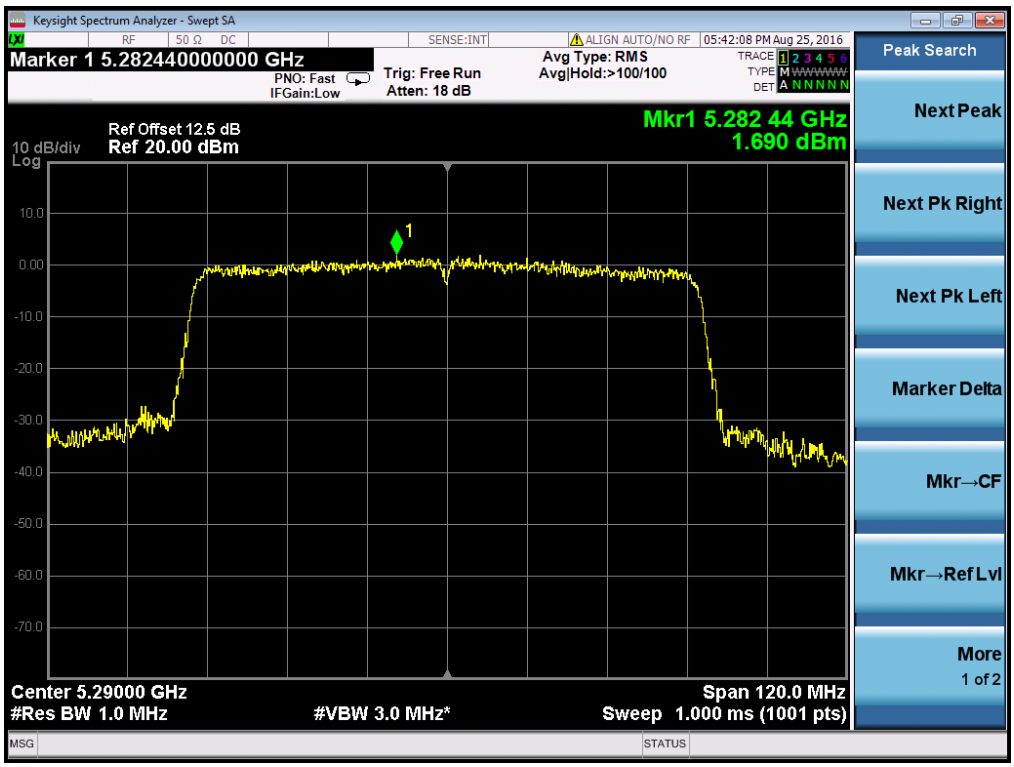


Antenna 0 - 802.11ac-VHT20 – 5300MHz

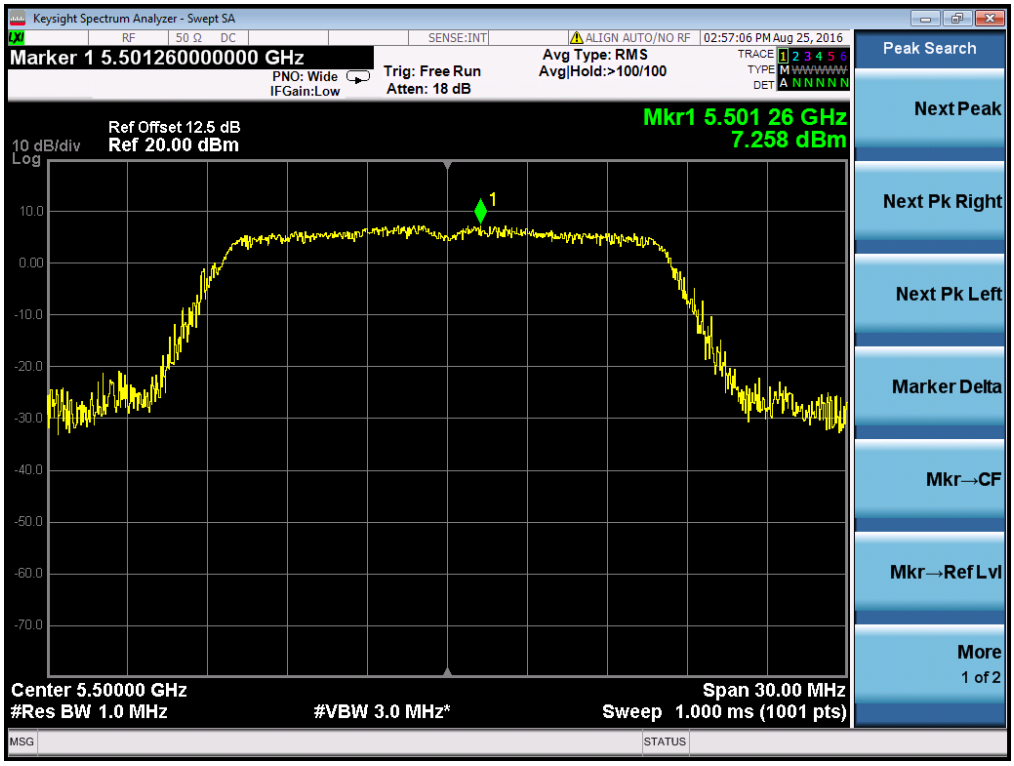
Antenna 0 - 802.11ac-VHT20 – 5320MHz

Antenna 0 - 802.11ac-VHT40 – 5270MHz

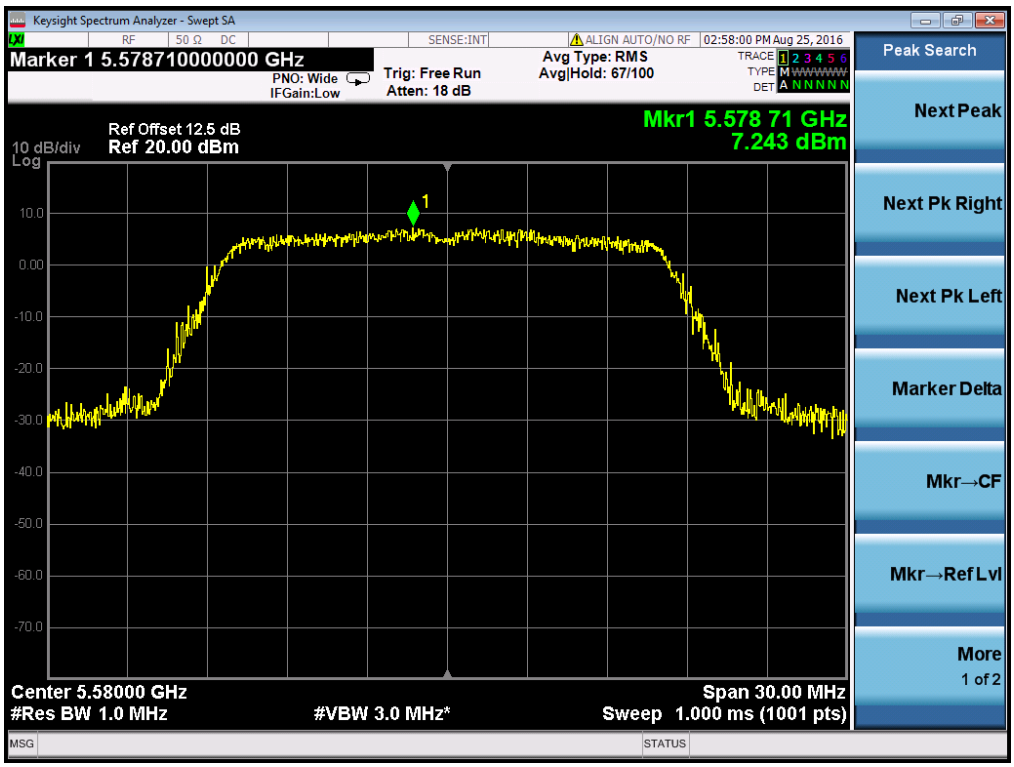
Antenna 0 - 802.11ac-VHT40 – 5310MHz



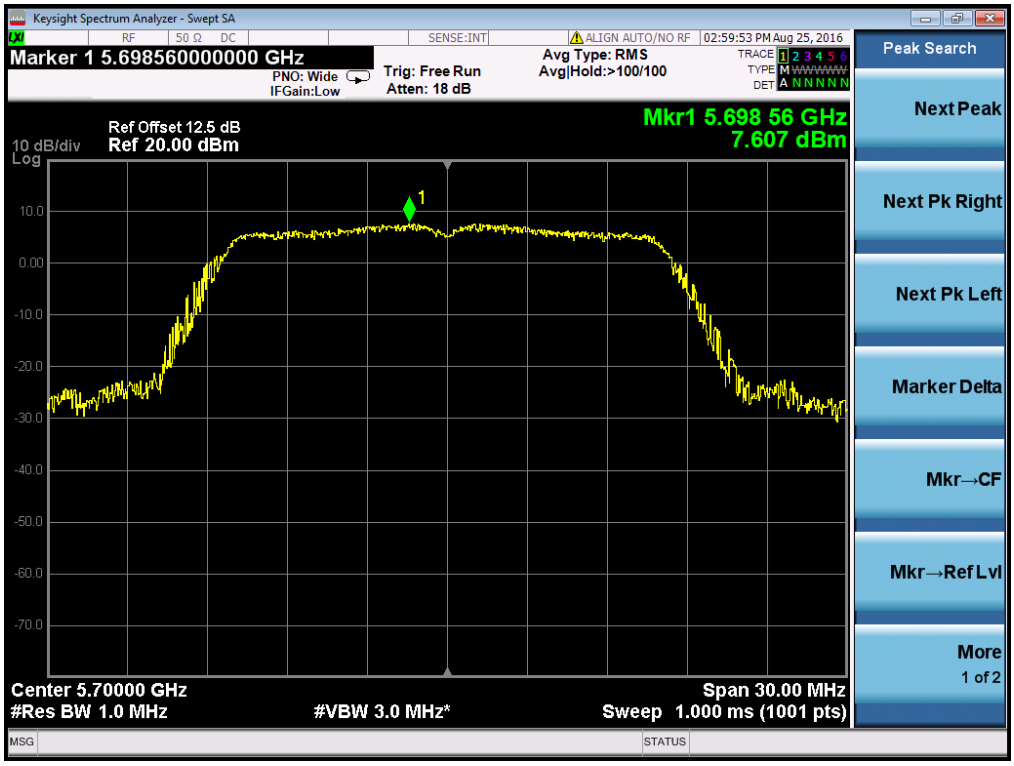
Antenna 0 - 802.11ac-VHT80 – 5290MHz



Antenna 0 - 802.11a – 5500MHz

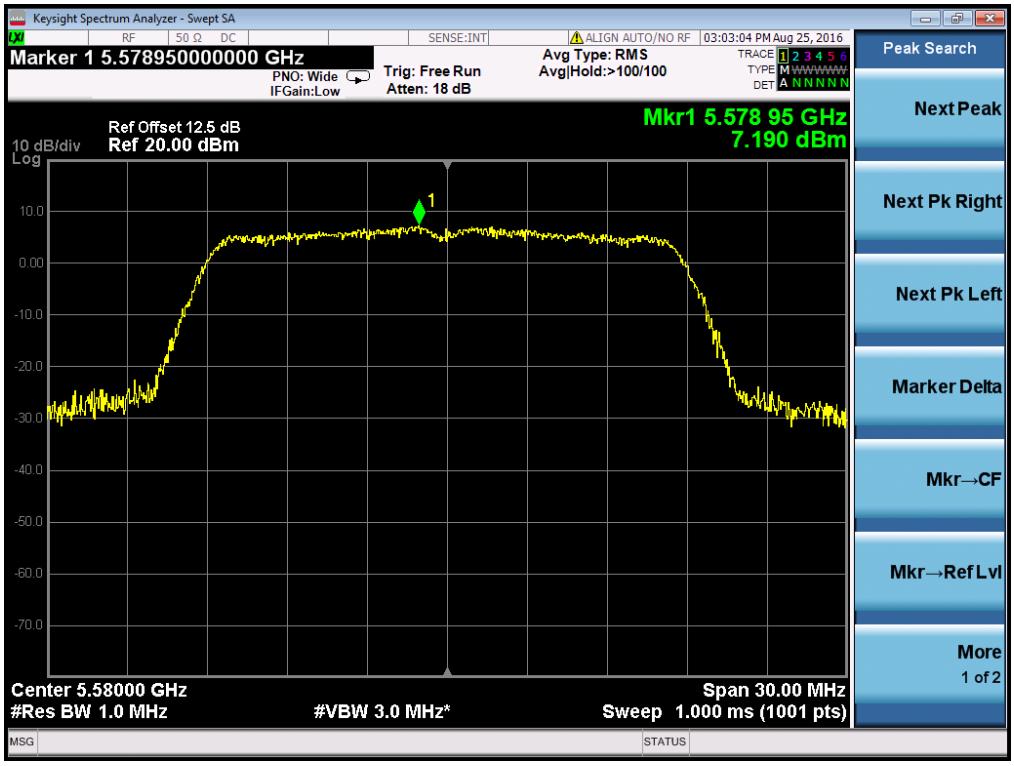


Antenna 0 - 802.11a – 5580MHz

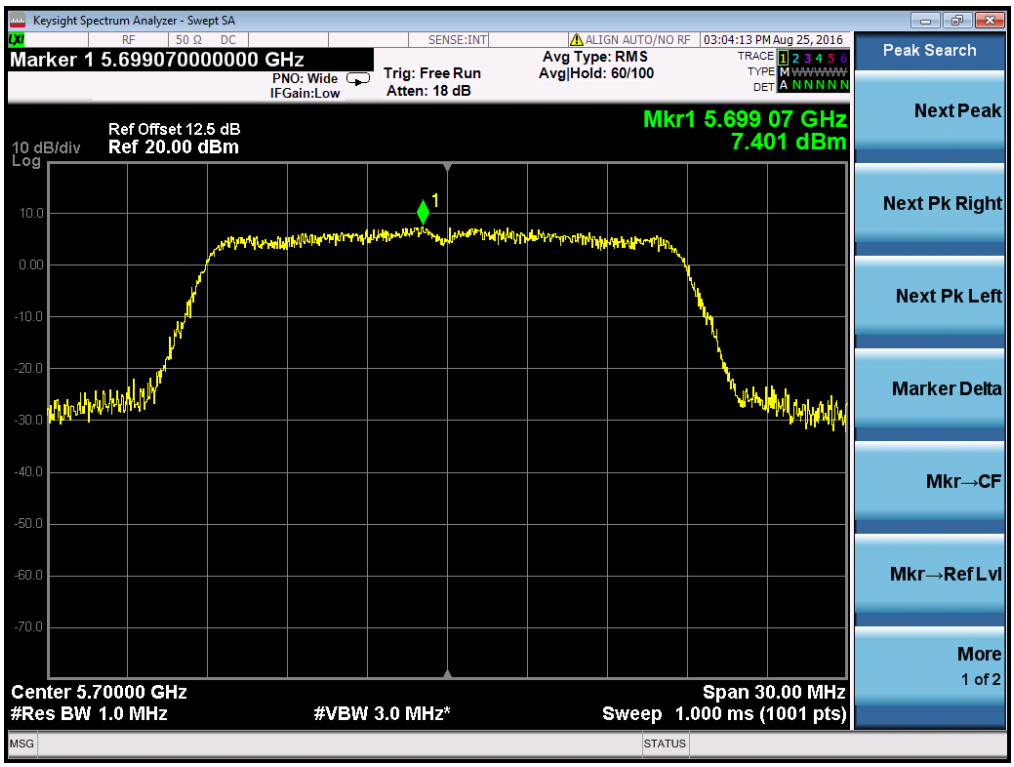


Antenna 0 - 802.11a – 5700MHz

Antenna 0 - 802.11n-HT20 – 5500MHz



Antenna 0 - 802.11n-HT20 – 5580MHz

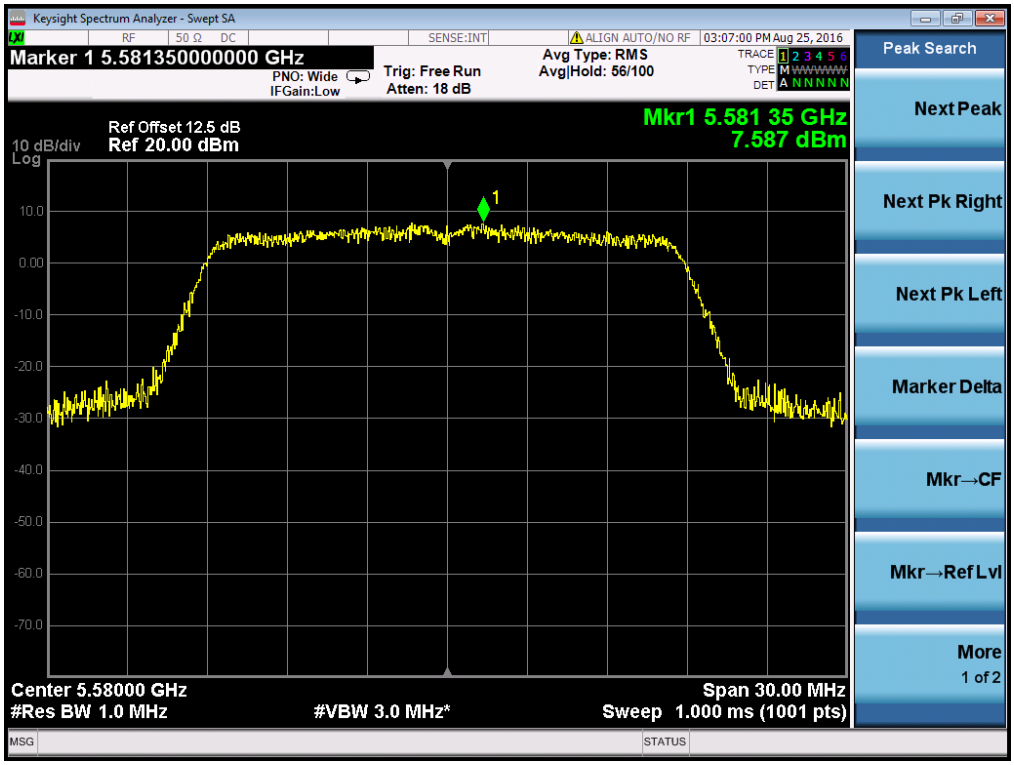


Antenna 0 - 802.11n-HT20 – 5700MHz

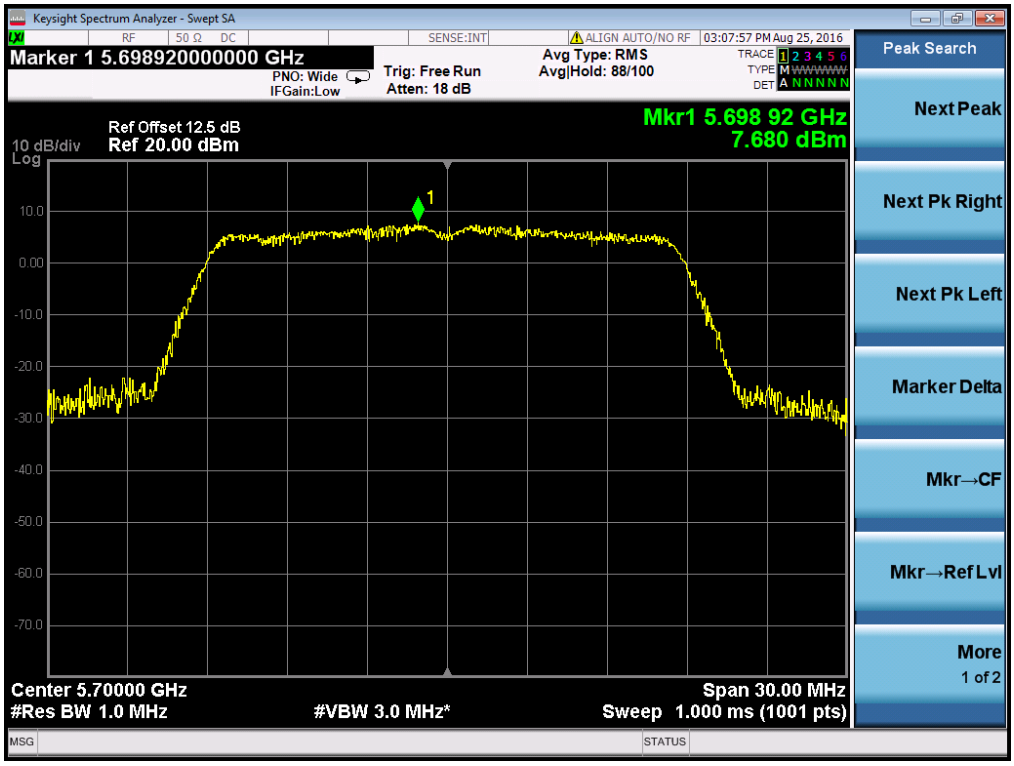
Antenna 0 - 802.11n-HT40 – 5510MHz

Antenna 0 - 802.11n-HT40 – 5670MHz

Antenna 0 - 802.11ac-VHT20 – 5500MHz



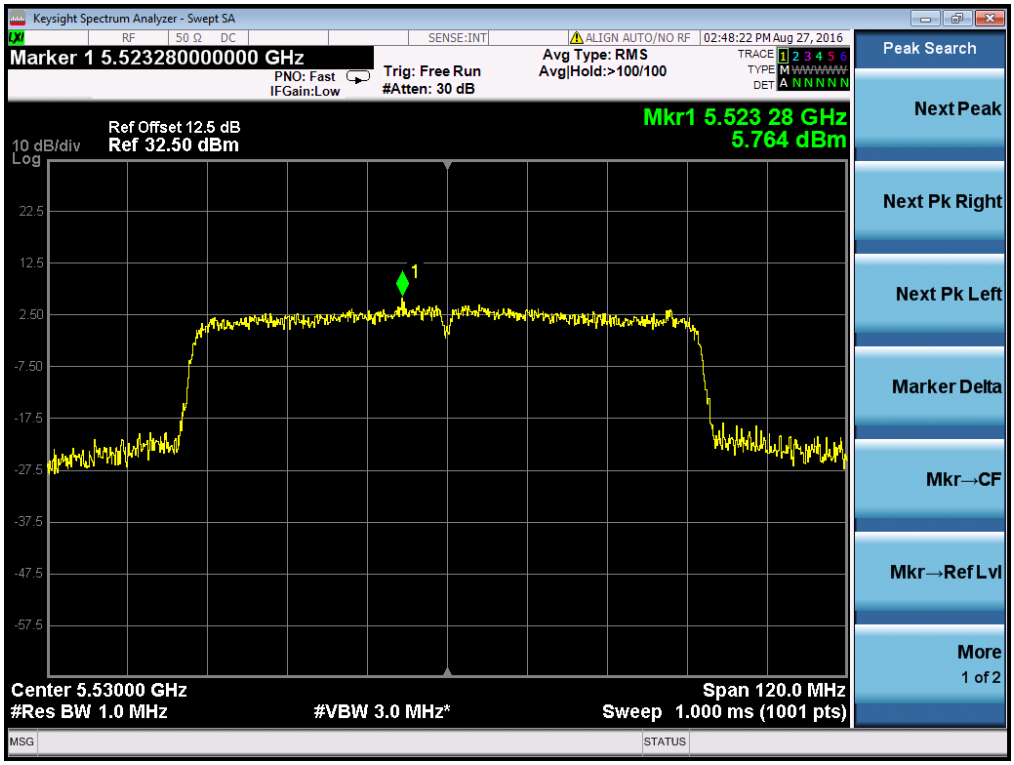
Antenna 0 - 802.11ac-VHT20 – 5580MHz



Antenna 0 - 802.11ac-VHT20 – 5700MHz

Antenna 0 - 802.11ac-VHT40 – 5510MHz

Antenna 0 - 802.11ac-VHT40 – 5670MHz



Antenna 0 - 802.11ac-VHT80 – 5530MHz

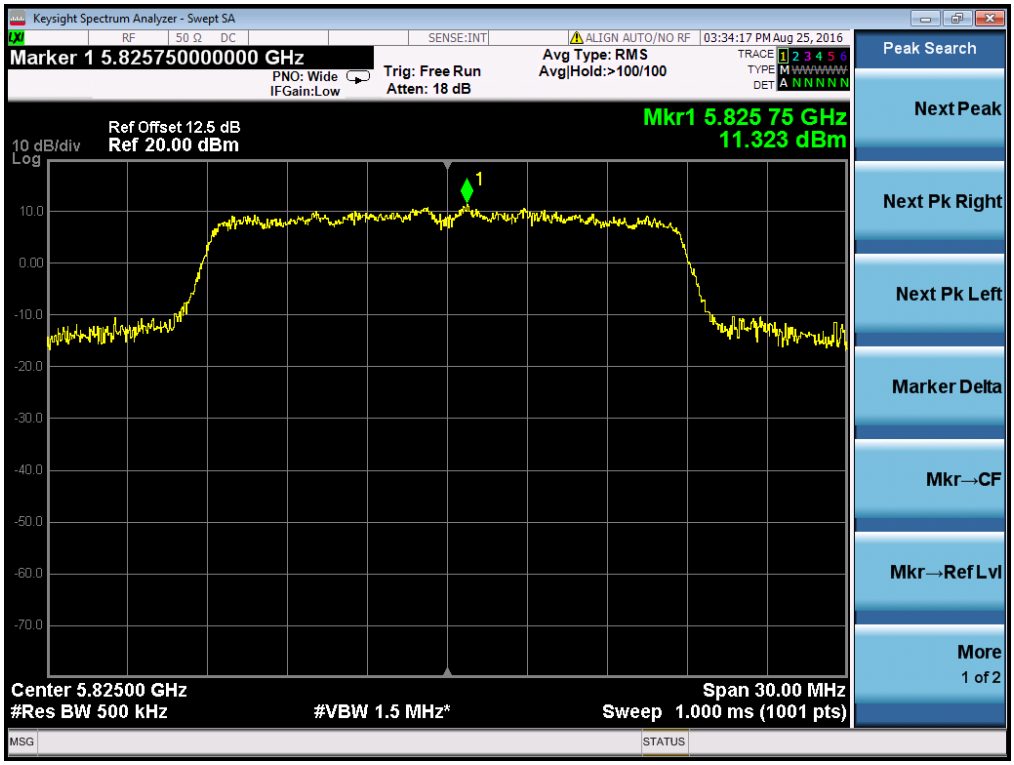
Antenna 0 - 802.11a – 5745MHz

Antenna 0 - 802.11a – 5785MHz

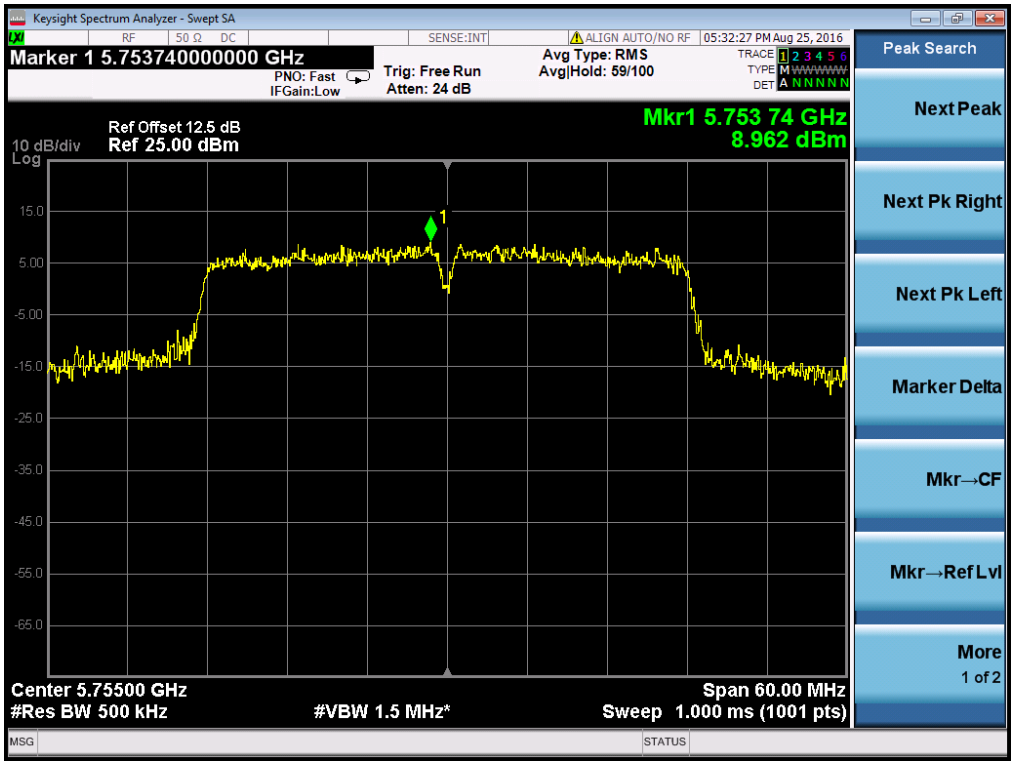
Antenna 0 - 802.11a – 5825MHz

Antenna 0 - 802.11n-HT20 – 5745MHz

Antenna 0 - 802.11n-HT20 – 5785MHz



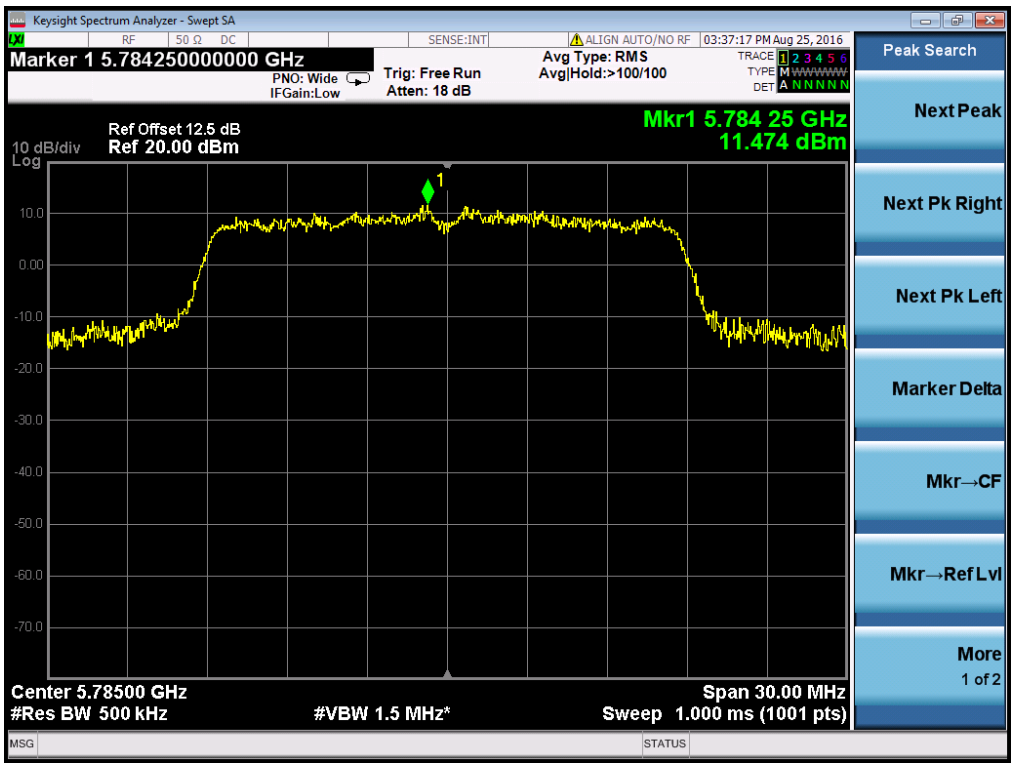
Antenna 0 - 802.11n-HT20 – 5825MHz



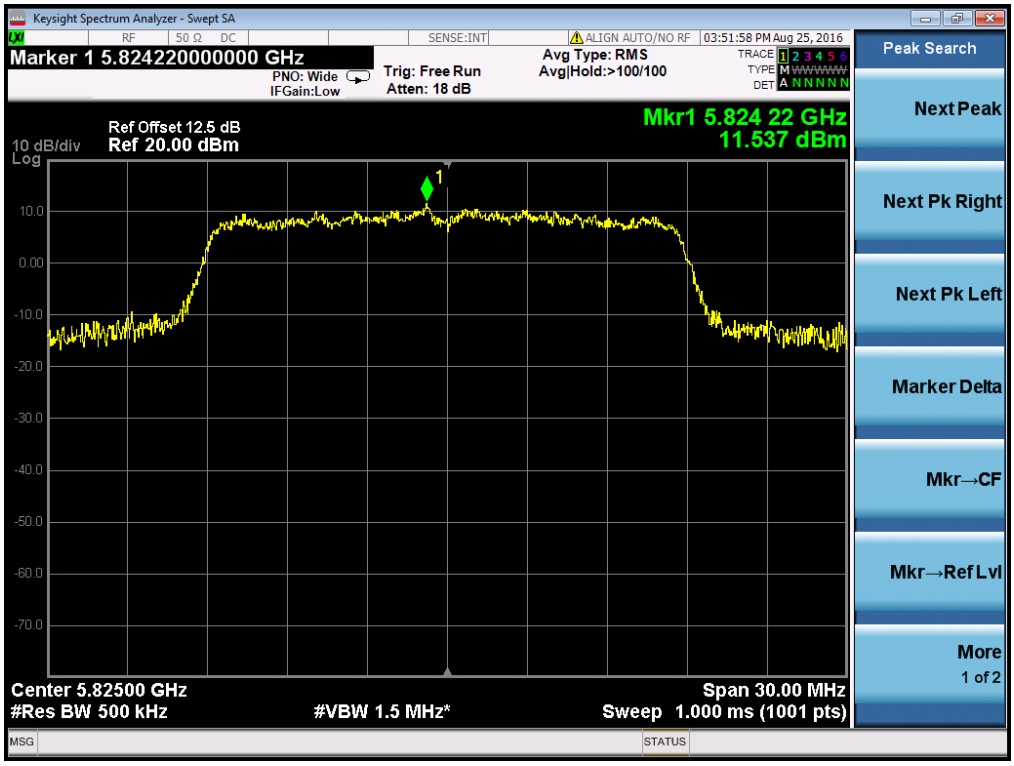
Antenna 0 - 802.11n-HT40 – 5755MHz

Antenna 0 - 802.11n-HT40 – 5795MHz

Antenna 0 - 802.11ac-VHT20 – 5745MHz



Antenna 0 - 802.11ac-VHT20 – 5785MHz



Antenna 0 - 802.11ac-VHT20 – 5825MHz

Antenna 0 - 802.11ac-VHT40 – 5755MHz

Antenna 0 - 802.11ac-VHT40 – 5795MHz

Antenna 0 - 802.11ac-VHT80 – 5775MHz