

5.1.6 Power Spectral Density

RESULT:**Passed**

Test standard : FCC Part 15.407(a)(1),(3); RSS-247 6.2
Kind of test site : Shielded room

Test setup

Test Channel : Refer to the table 19 ~ 22
Operation Mode : A

Limit

For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band.

For 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. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

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

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Table 20: Test result of Power Spectral Density (802.11a)
5150-5350MHz

Channel	Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Limit (dBm/MHz)	Result
36	5180	4.618	4.717	11	Pass
40	5200	4.671	5.419	11	Pass
44	5240	5.123	5.649	11	Pass
56	5280	5.619	5.979	11	Pass
60	5300	4.758	4.947	11	Pass
64	5320	5.532	4.951	11	Pass

5470-5725MHz

Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Limit (dBm/MHz)	Result
100	5500	5.788	4.68	11	Pass
112	5560	5.192	5.145	11	Pass
140	5700	5.476	5.581	11	Pass

5745-5850MHz

Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Limit (dBm/500k Hz)	Result
149	5745	2.404	0.676	30	Pass
157	5785	1.99	0.346	30	Pass
165	5825	2.179	1.955	30	Pass

Note: PSD is equal to measured PSD plus duty factor, where duty factor is $10\log(1/0.88)$.

Table 21: Test result of Power Spectral Density (802.11ac VHT20)
5150-5350MHz

Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Total PSD (dBm)	Limit (dBm/MHz)	Result
36	5180	1.784	4.717	6.5	10.95	Pass
40	5200	2.124	5.419	7.09	10.95	Pass
44	5240	1.504	5.649	7.06	10.95	Pass
56	5280	1.809	5.979	7.39	10.95	Pass
60	5300	1.927	4.947	6.7	10.95	Pass
64	5320	0.996	4.951	6.42	10.95	Pass

5470-5725MHz

Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Total PSD (dBm)	Limit (dBm/MHz)	Result
100	5500	5.788	4.68	8.28	10.95	Pass
112	5560	5.192	5.145	8.18	10.95	Pass
140	5700	5.476	5.581	8.54	10.95	Pass

5745-5850MHz

Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Total PSD (dBm)	Limit (dBm/500k Hz)	Result
149	5745	2.404	0.676	4.64	29.95	Pass
157	5785	1.99	0.346	4.26	29.95	Pass
165	5825	2.179	1.955	5.08	29.95	Pass

Note: PSD is equal to measured PSD plus duty factor, where duty factor is $10\log(1/0.87)$.

Table 22: Test result of Power Spectral Density (802.11ac VHT40)
5150-5350MHz

Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Total PSD (dBm)	Limit (dBm/MHz)	Result
38	5190	-2.762	-3.571	-0.14	10.95	Pass
46	5230	-2.799	-2.856	0.18	10.95	Pass
54	5270	-2.94	-2.877	0.1	10.95	Pass
62	5310	-3.491	-3.64	-0.55	10.95	Pass

5470-5725MHz

Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Total PSD (dBm)	Limit (dBm/MHz)	Result
102	5510	-4.356	-3.84	-1.08	10.95	Pass
118	5590	-3.145	-3.357	-0.24	10.95	Pass
134	5670	-3.491	-3.604	-0.54	10.95	Pass

5745-5850MHz

Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Total PSD (dBm)	Limit (dBm/500k Hz)	Result
151	5755	-6.749	-7.496	-4.10	29.95	Pass
159	5795	-5.921	-7.709	-3.71	29.95	Pass

Note: PSD is equal to measured PSD plus duty factor, where duty factor is $10 \log(1/0.76)$.

Table 23: Test result of Power Spectral Density (802.11ac VHT80)
5150-5350MHz

Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Total PSD (dBm)	Limit (dBm/MHz)	Result
42	5210	-5.353	-5.953	-2.63	10.95	Pass
58	5290	-4.478	-6.187	-2.24	10.95	Pass

5470-5725MHz

Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Total PSD (dBm)	Limit (dBm/MHz)	Result
106	5530	-7.215	-6.41	-3.78	10.95	Pass
122	5610	-6.395	-5.216	-2.76	10.95	Pass

5745-5850MHz

Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Total PSD (dBm)	Limit (dBm/500k Hz)	Result
155	5775	-6.984	-8.699	-4.75	29.95	Pass

Note: PSD is equal to measured PSD plus duty factor, where duty factor is $10\log(1/0.63)$.

Table 24: Test result of Power Spectral Density (Straddle Channel)
U-NII-2C 802.11a

Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Limit (dBm/MHz)	Result
144	5720	5.281	4.459	11	Pass

U-NII-2C 802.11ac20

Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Total PSD (dBm)	Limit (dBm/MHz)	Result
144	5720	0.722	0.781	3.76	10.95	Pass

U-NII-2C 802.11ac40

Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Total PSD (dBm)	Limit (dBm/MHz)	Result
142	5710	-3.712	-2.544	-0.08	10.95	Pass

U-NII-2C 802.11ac80

Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Total PSD (dBm)	Limit (dBm/MHz)	Result
138	5690	-6.53	-4.633	-2.47	10.95	Pass

Table 25: Test result of Power Spectral Density (Straddle Channel)
U-NII-3 802.11a

Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Limit (dBm/MHz)	Result
144	5720	3.955	2.977	11	Pass

U-NII-3 802.11ac20

Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Total PSD (dBm)	Limit (dBm/MHz)	Result
144	5720	0.802	-0.895	3.05	10.95	Pass

U-NII-3 802.11ac40

Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Total PSD (dBm)	Limit (dBm/MHz)	Result
142	5710	-4.49	-5.263	-1.85	10.95	Pass

U-NII-3 802.11ac80

Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Total PSD (dBm)	Limit (dBm/MHz)	Result
138	5690	-8.039	-8.22	-5.12	10.95	Pass

Table 26: Test result of Power Spectral Density (Straddle Channel) for ISED
U-NII-2C 802.11a

Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Limit (dBm/MHz)	Result
144	5720	4.556	4.055	11	Pass

U-NII-2C 802.11ac20

Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Total PSD (dBm)	Limit (dBm/MHz)	Result
144	5720	0.52	0.279	3.41	10.95	Pass

U-NII-2C 802.11ac40

Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Total PSD (dBm)	Limit (dBm/MHz)	Result
142	5710	-3.836	-2.955	-0.36	10.95	Pass

U-NII-2C 802.11ac80

Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Total PSD (dBm)	Limit (dBm/MHz)	Result
138	5690	-7.292	-4.659	-2.77	10.95	Pass

Table 27: Test result of Power Spectral Density (Straddle Channel) for ISED
U-NII-3 802.11a

Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Limit (dBm/MHz)	Result
144	5720	3.681	2.893	11	Pass

U-NII-3 802.11ac20

Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Total PSD (dBm)	Limit (dBm/500k Hz)	Result
144	5720	-0.188	-0.792	2.53	10.95	Pass

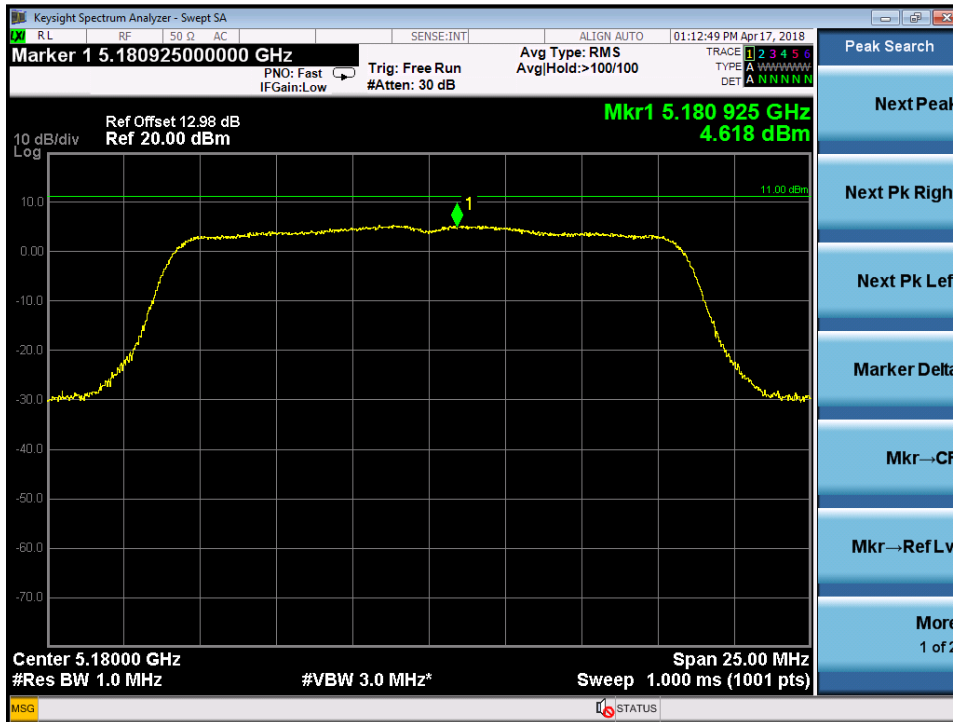
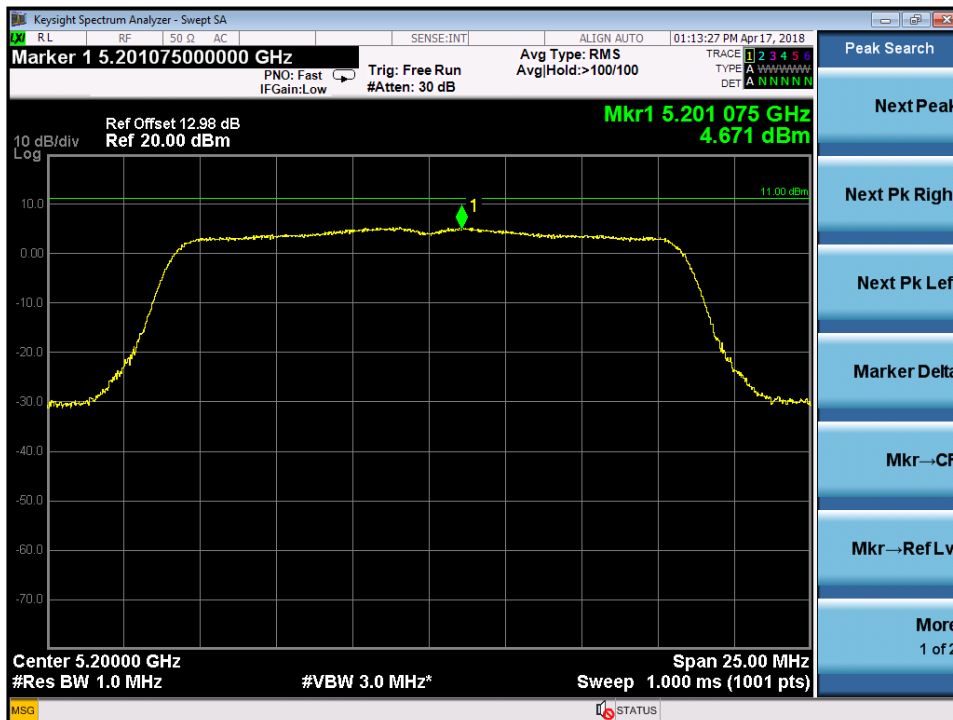
U-NII-3 802.11ac40

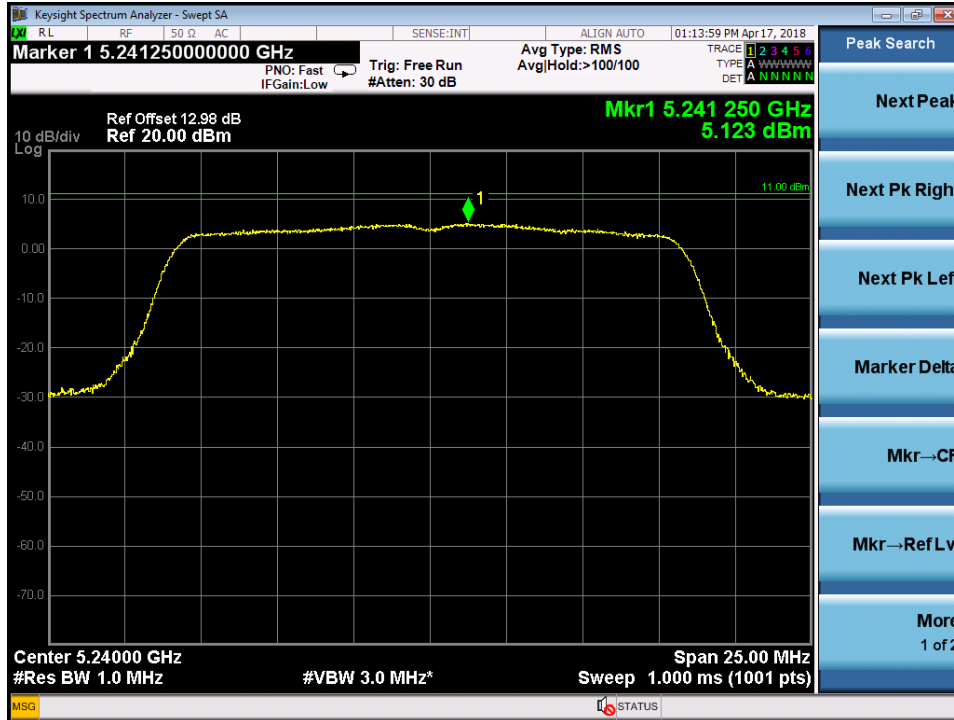
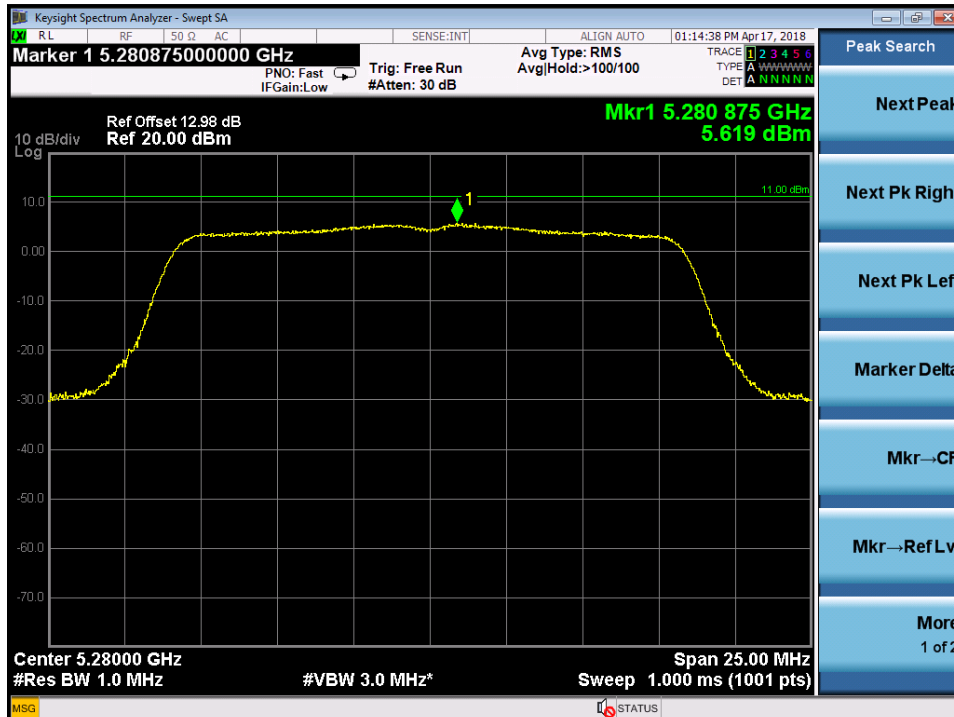
Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Total PSD (dBm)	Limit (dBm/500k Hz)	Result
142	5710	-4.092	-4.951	-1.49	10.95	Pass

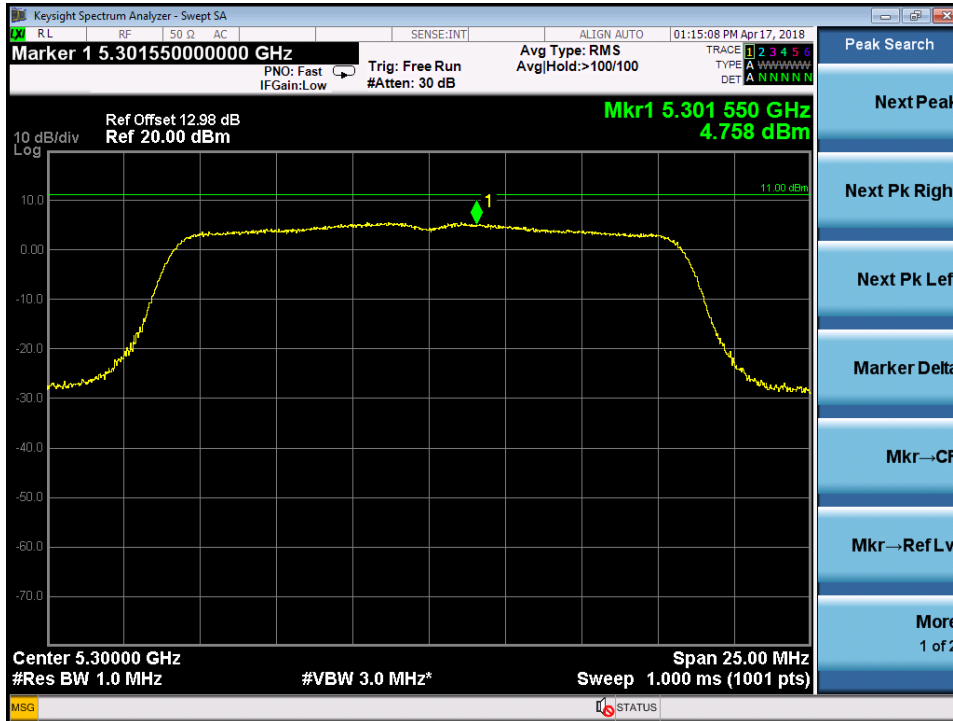
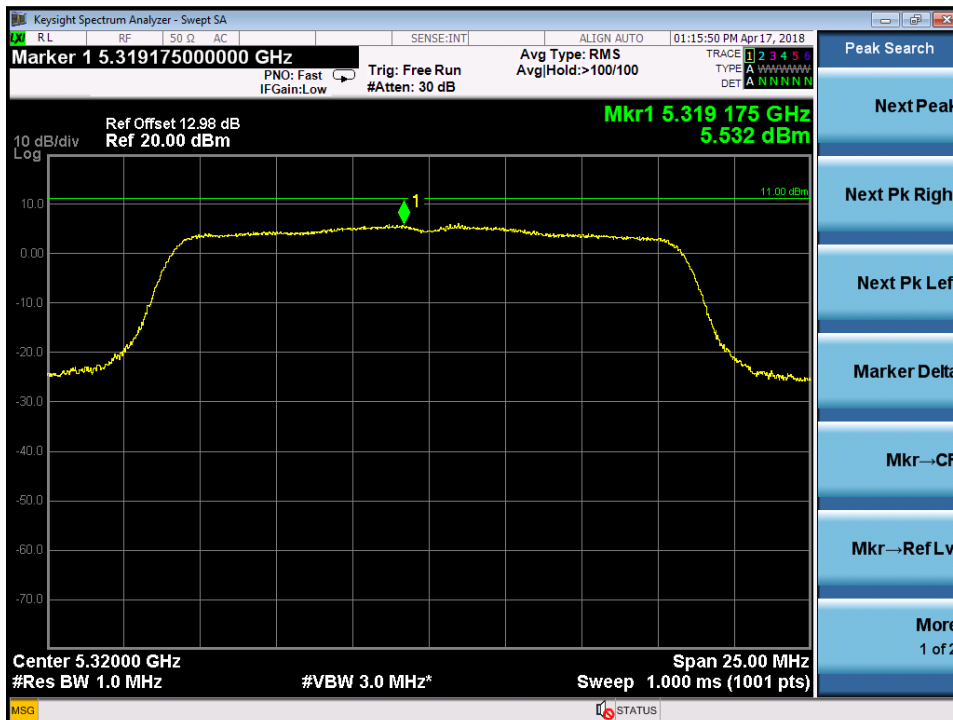
U-NII-3 802.11ac80

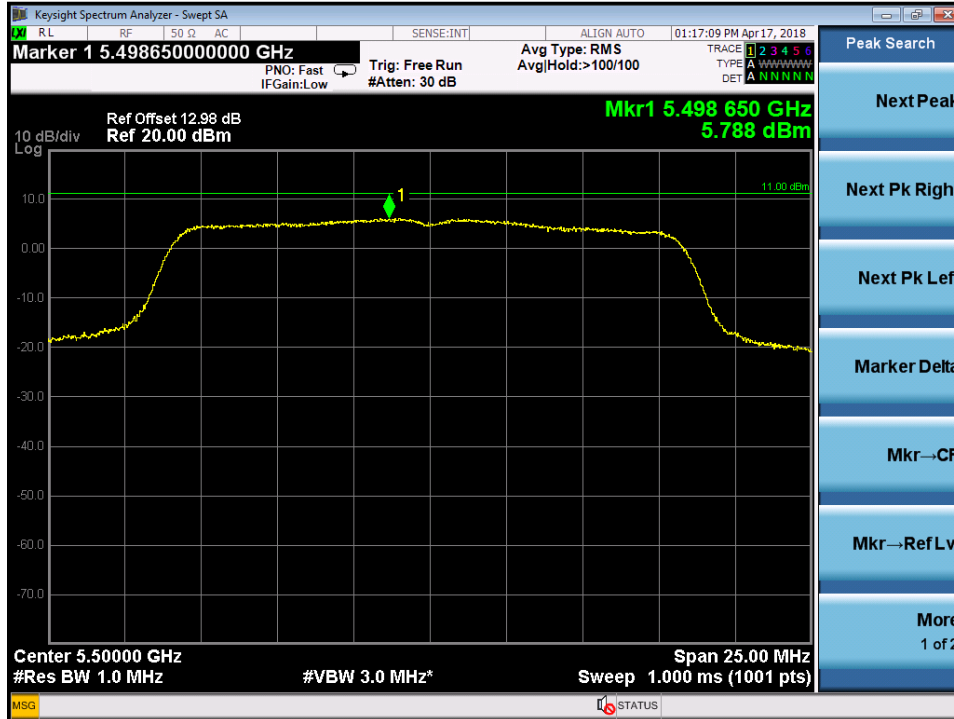
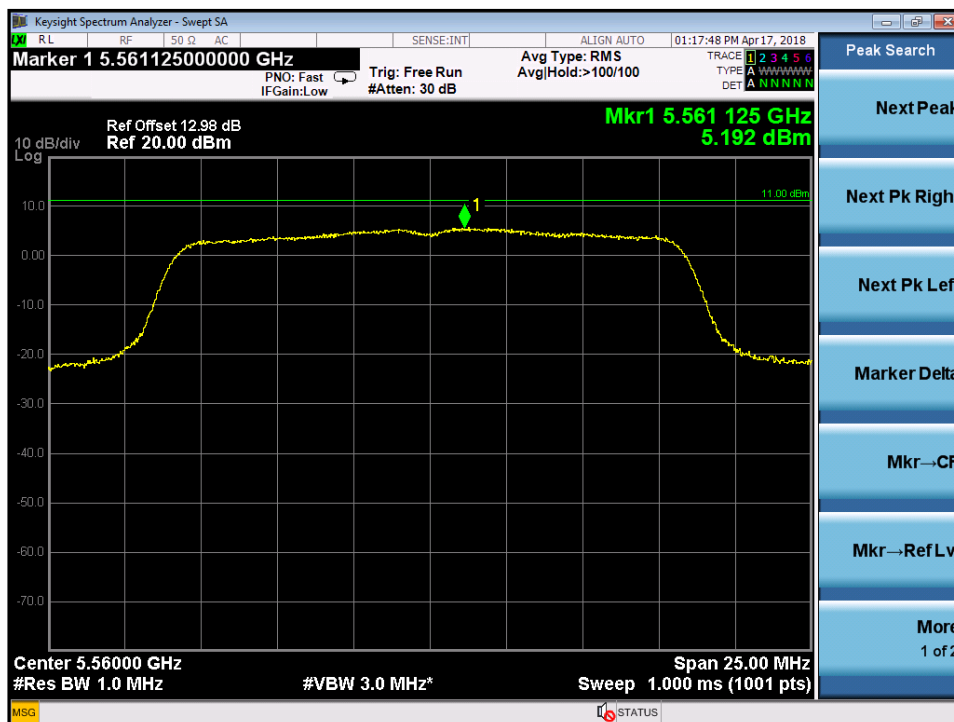
Channel	Channel Frequency (MHz)	PSD ANT1 (dBm)	PSD ANT2 (dBm)	Total PSD (dBm)	Limit (dBm/500k Hz)	Result
138	5690	-7.986	-8.4	-5.18	10.95	Pass

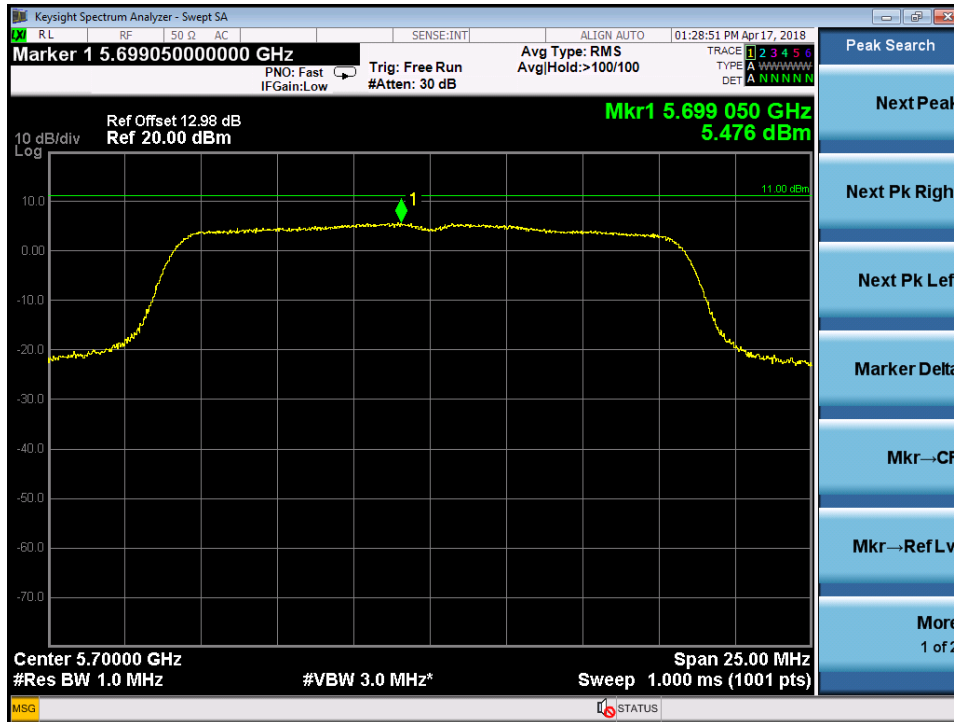
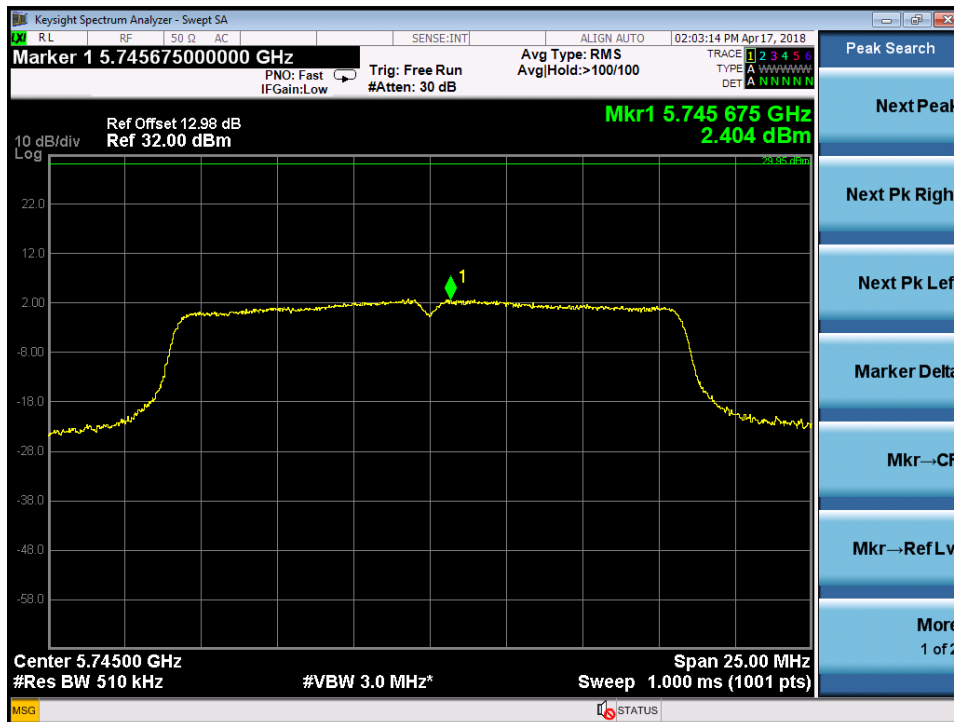
Test Plot of Power Density (802.11a)

Antenna1: (5150-5350MHz)
5180MHz

5200MHz


5240MHz

5280MHz


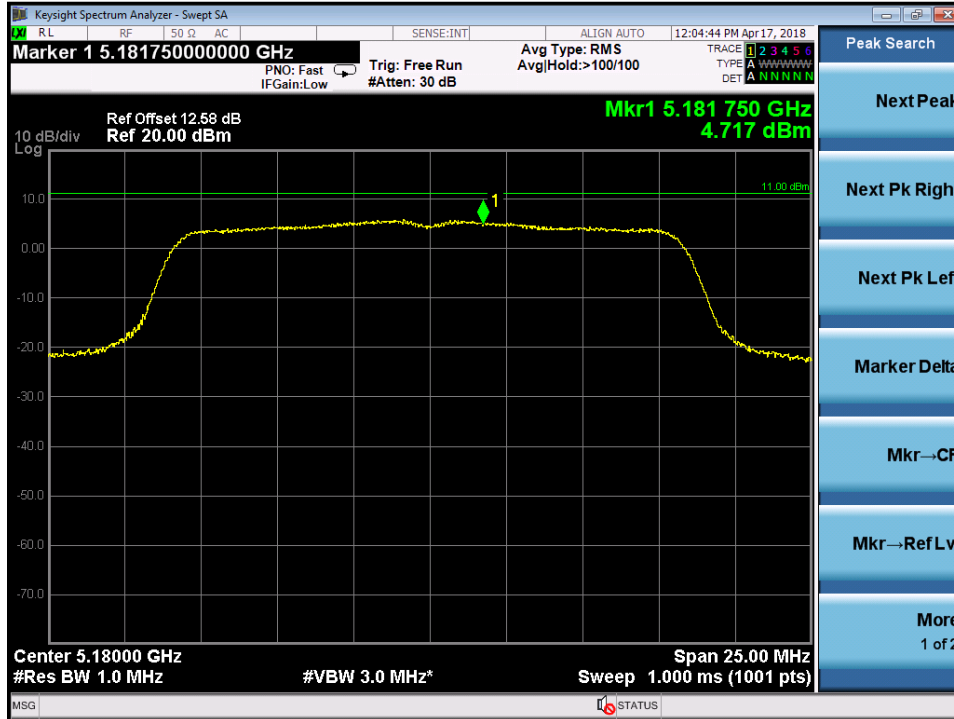
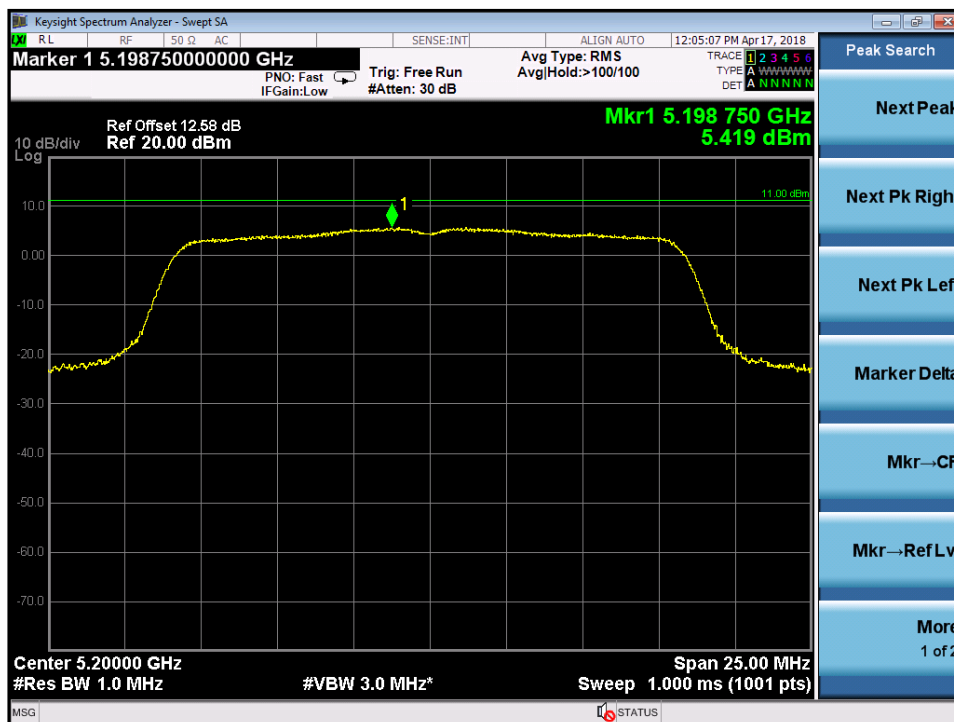
5300MHz

5320MHz


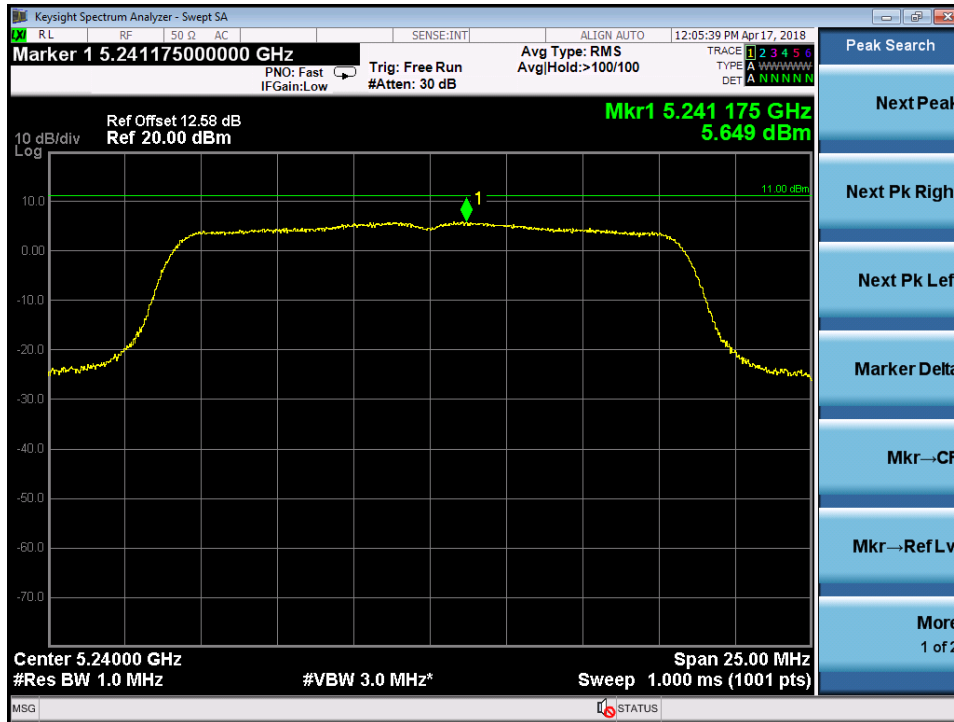
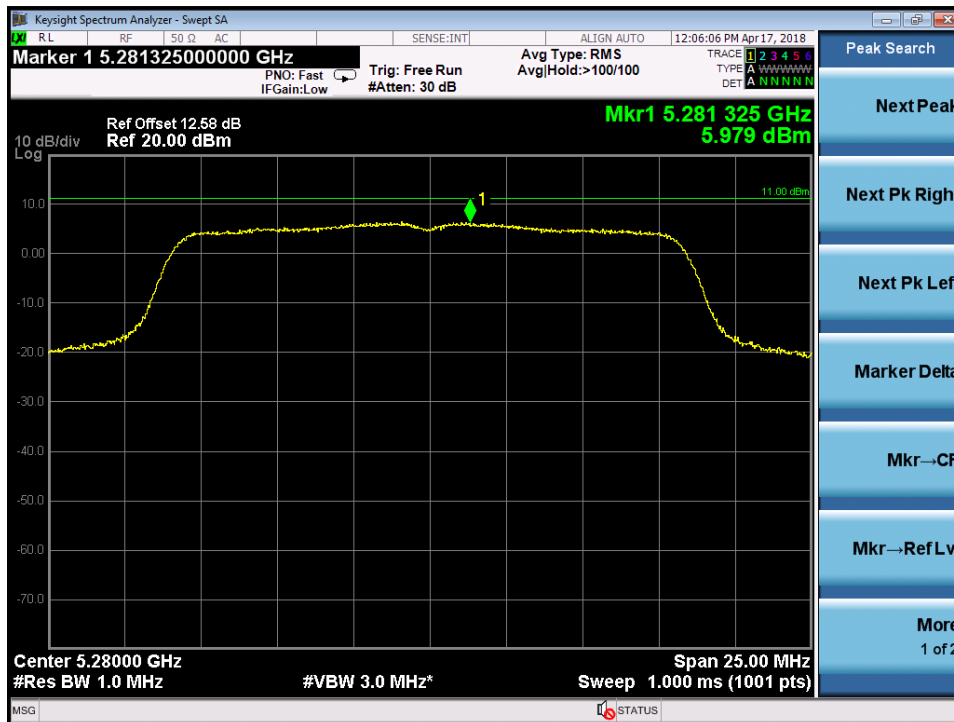
Antenna1: (5470-5825MHz)
5500MHz

5560MHz


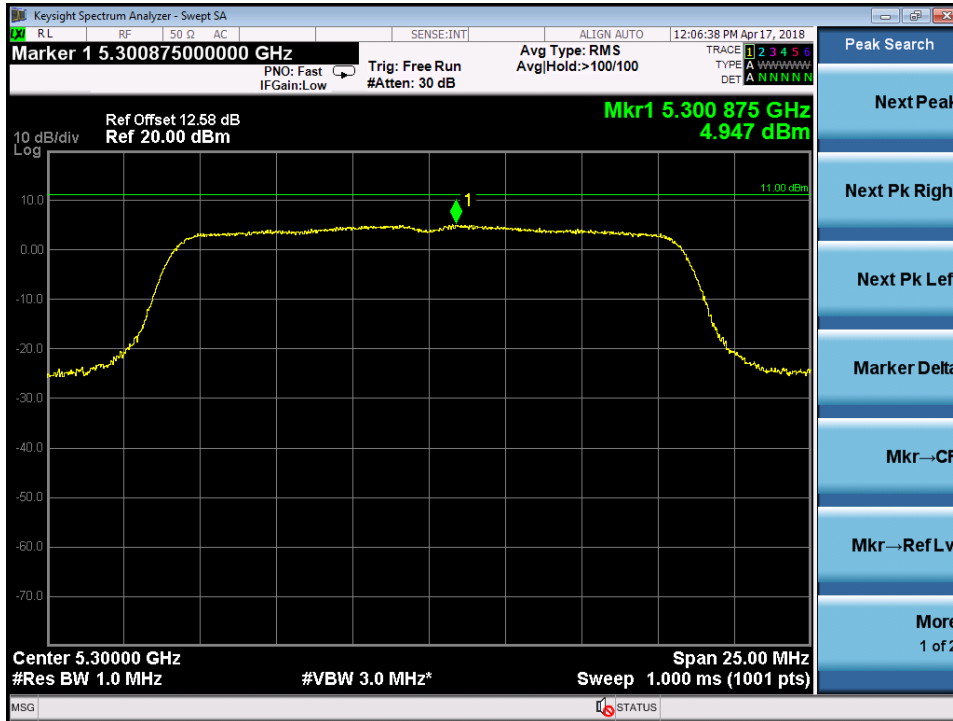
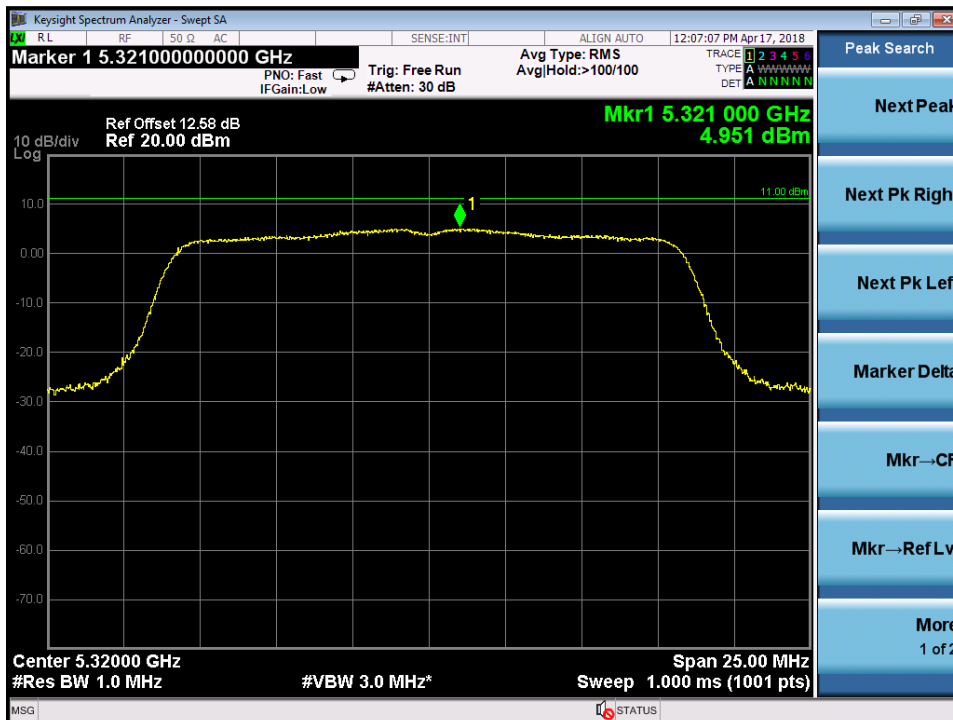
5700MHz

5745MHz


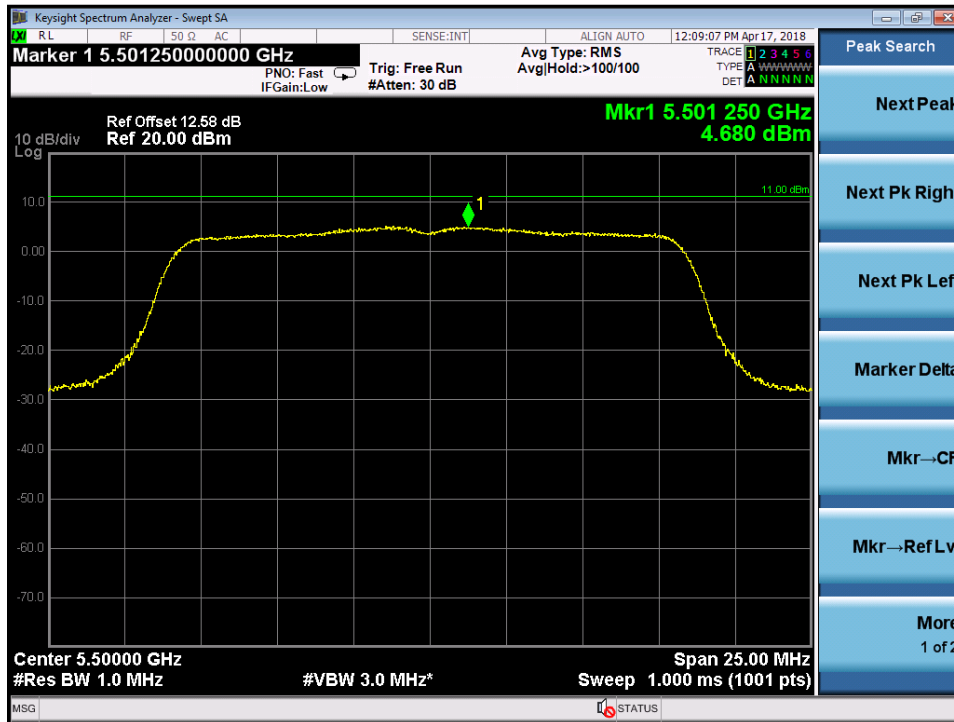
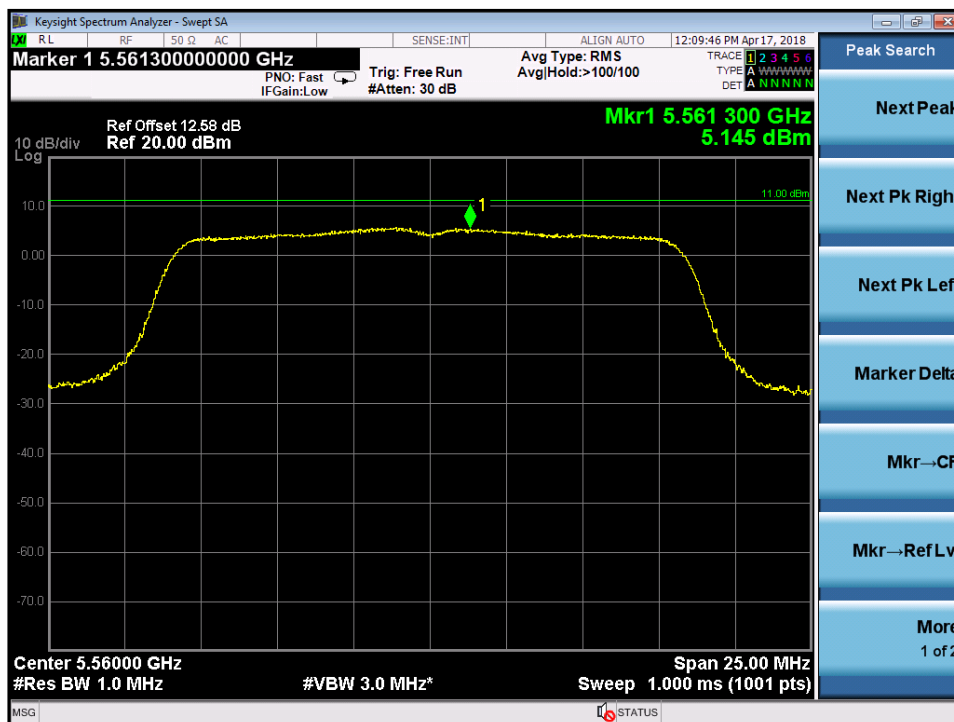
5785MHz

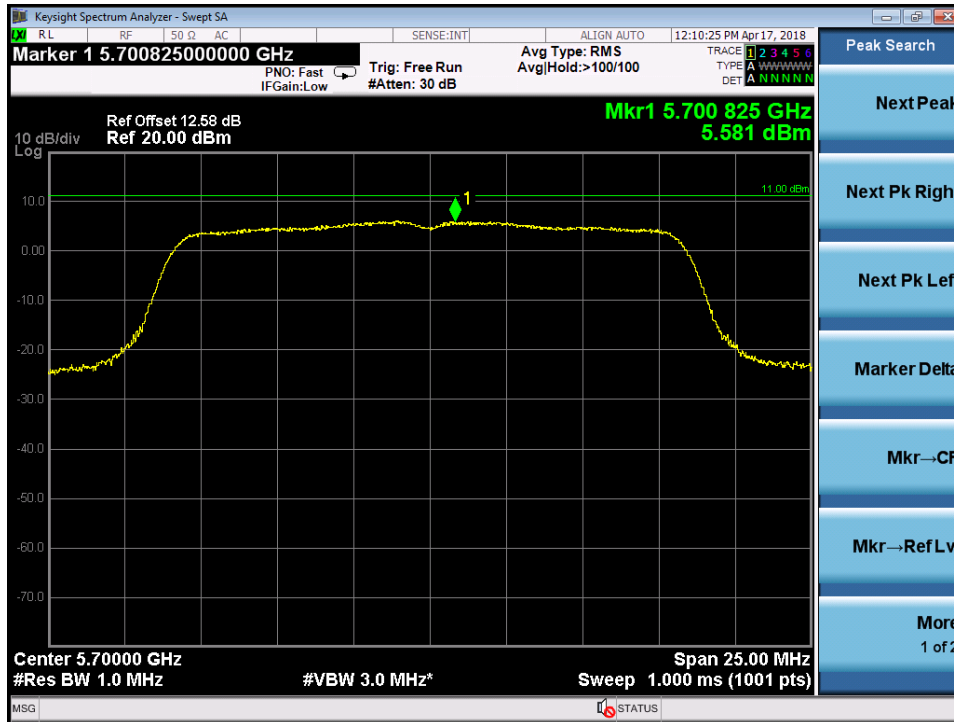
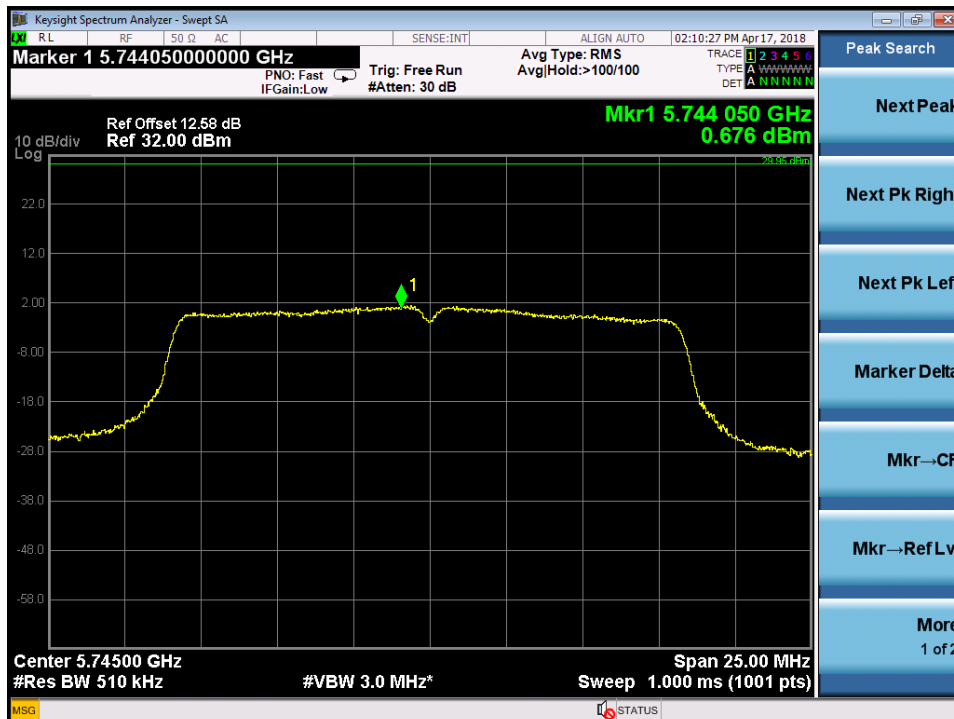
5825MHz

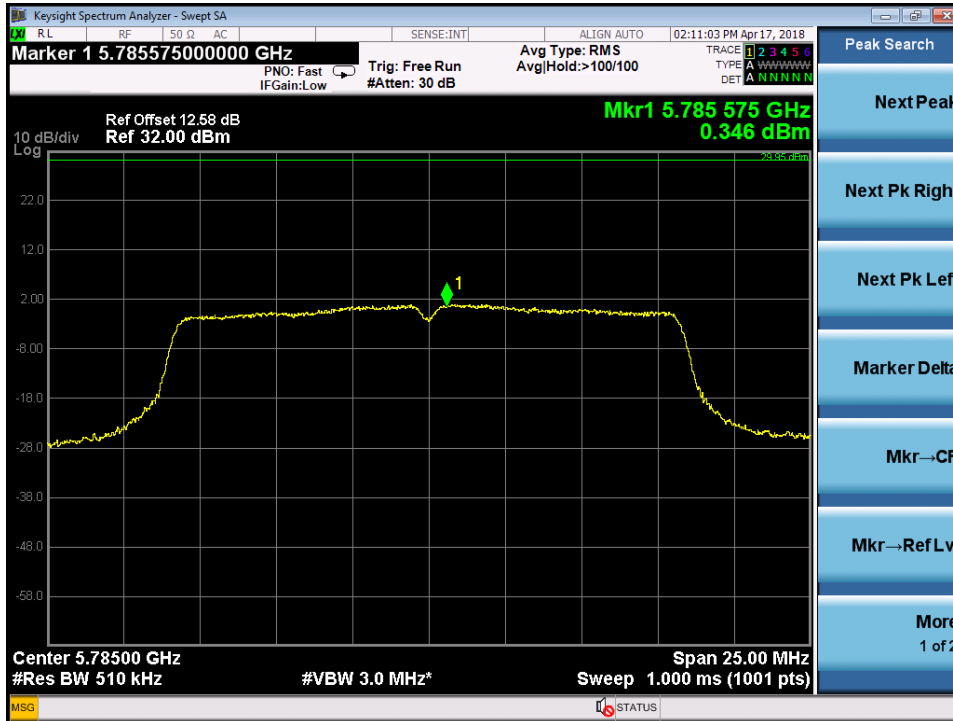
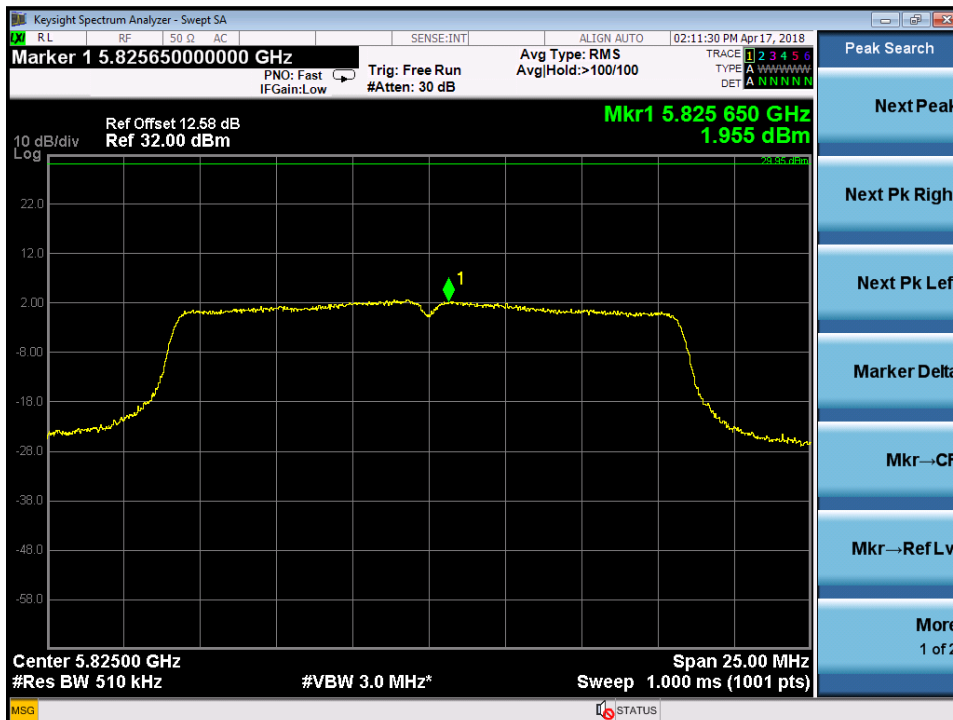

Antenna2: (5150-5350MHz)
5180MHz

5200MHz


5240MHz

5280MHz


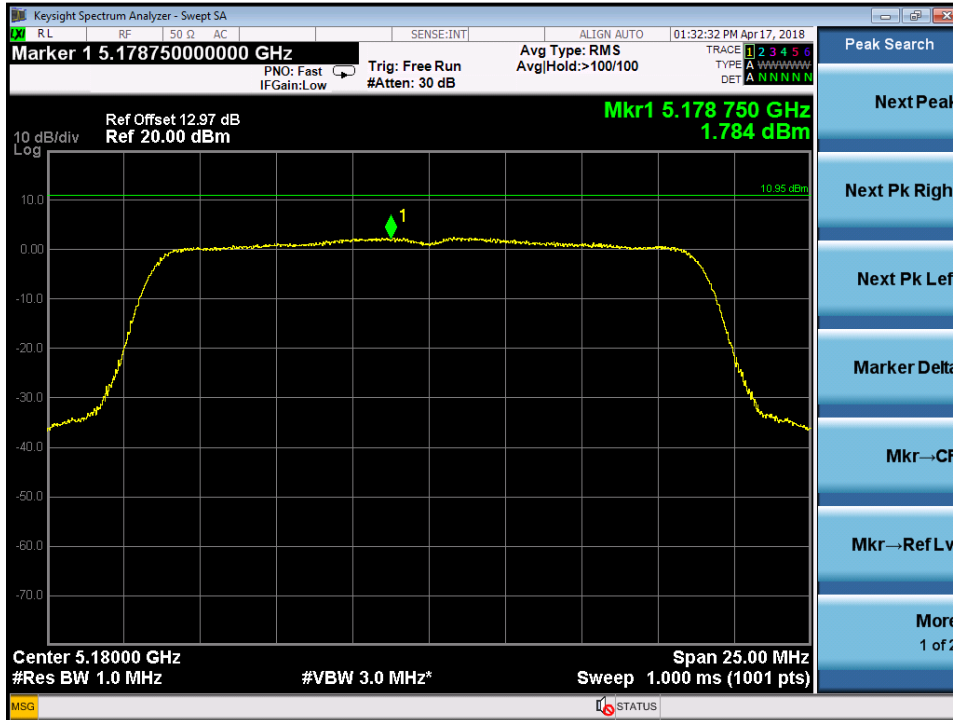
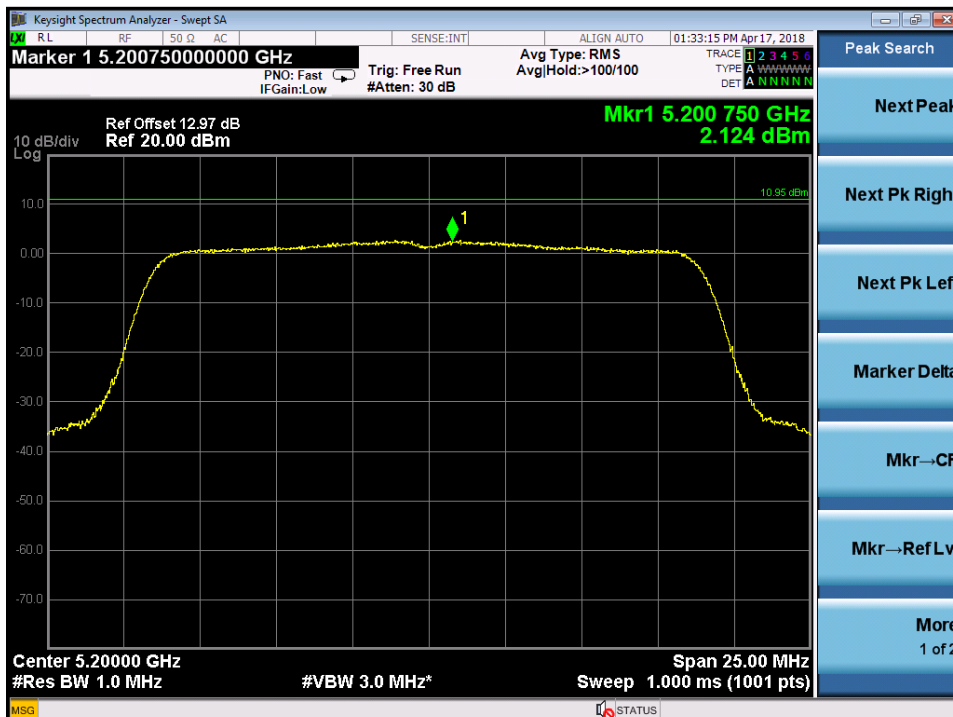
5300MHz

5320MHz


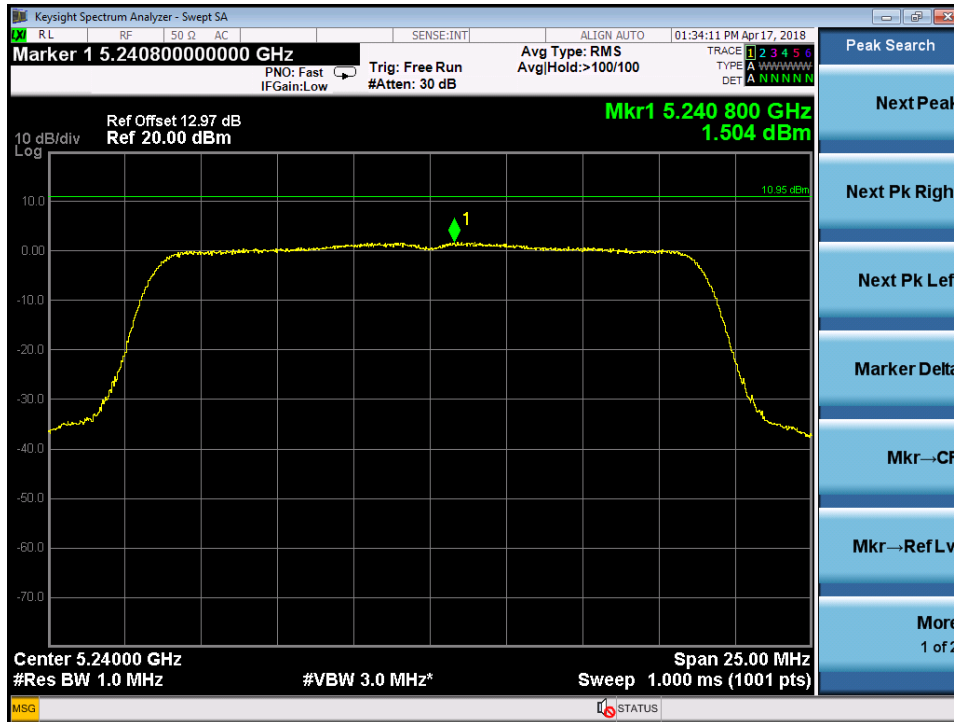
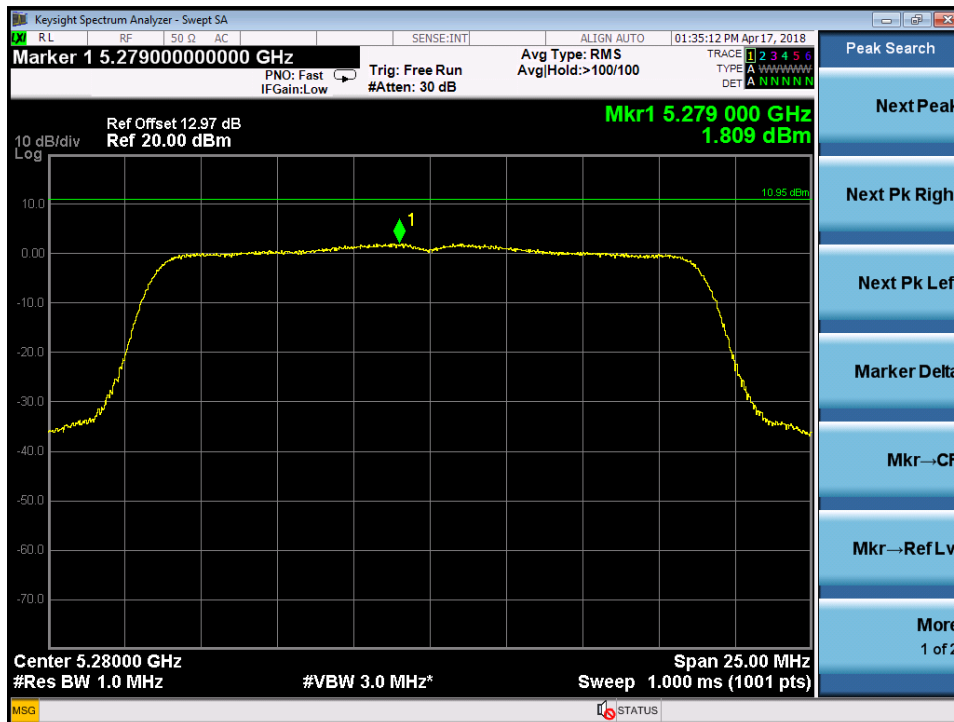
Antenna2: (5470-5825MHz)
5500MHz

5560MHz


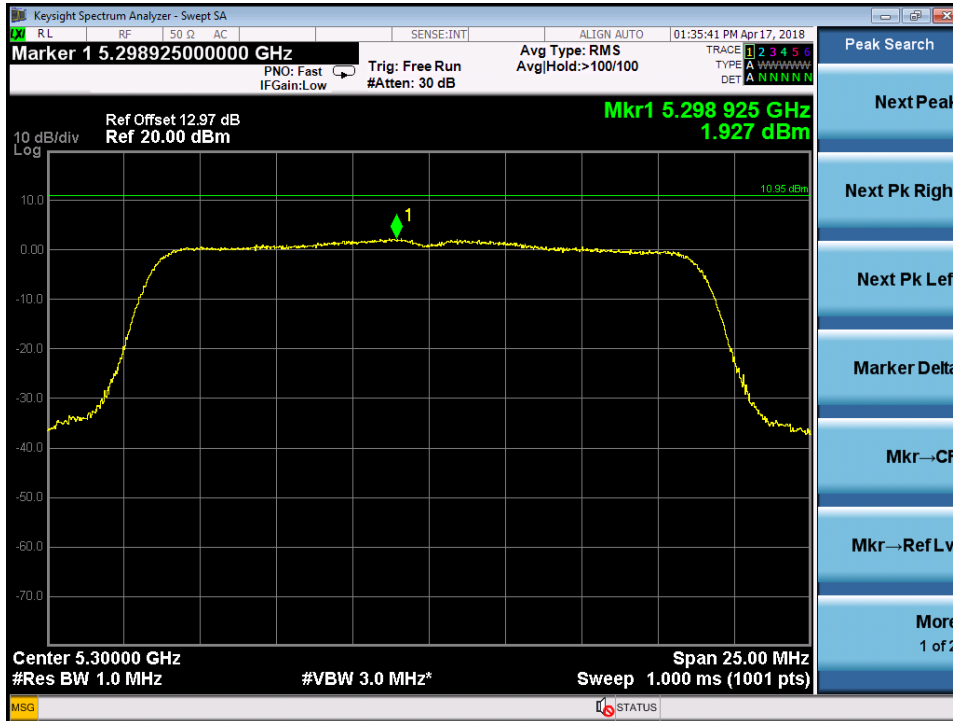
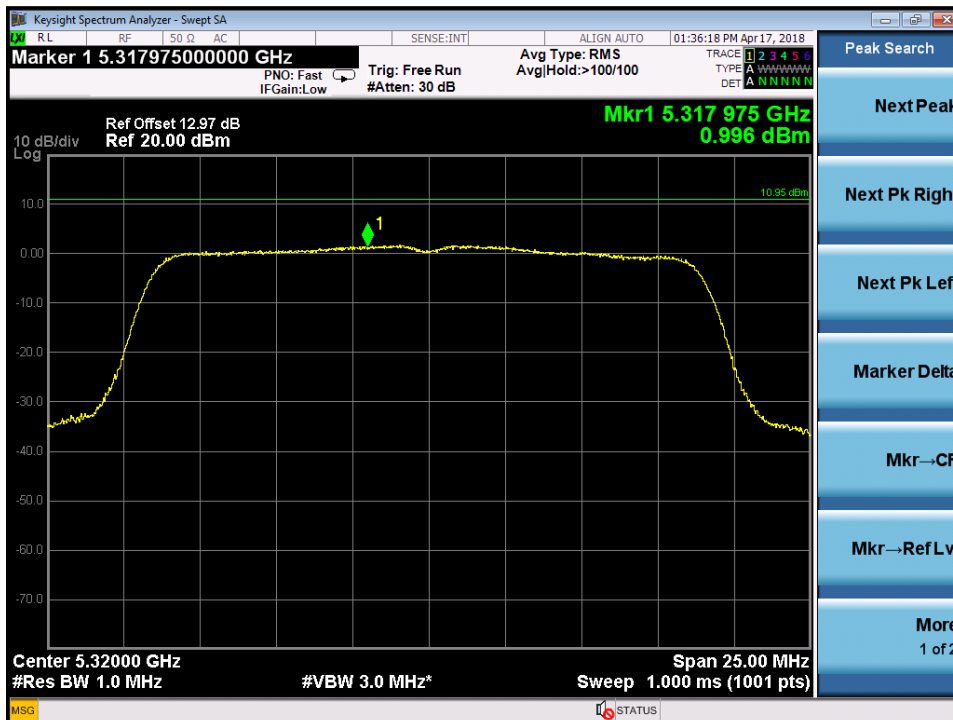
5700MHz

5745MHz


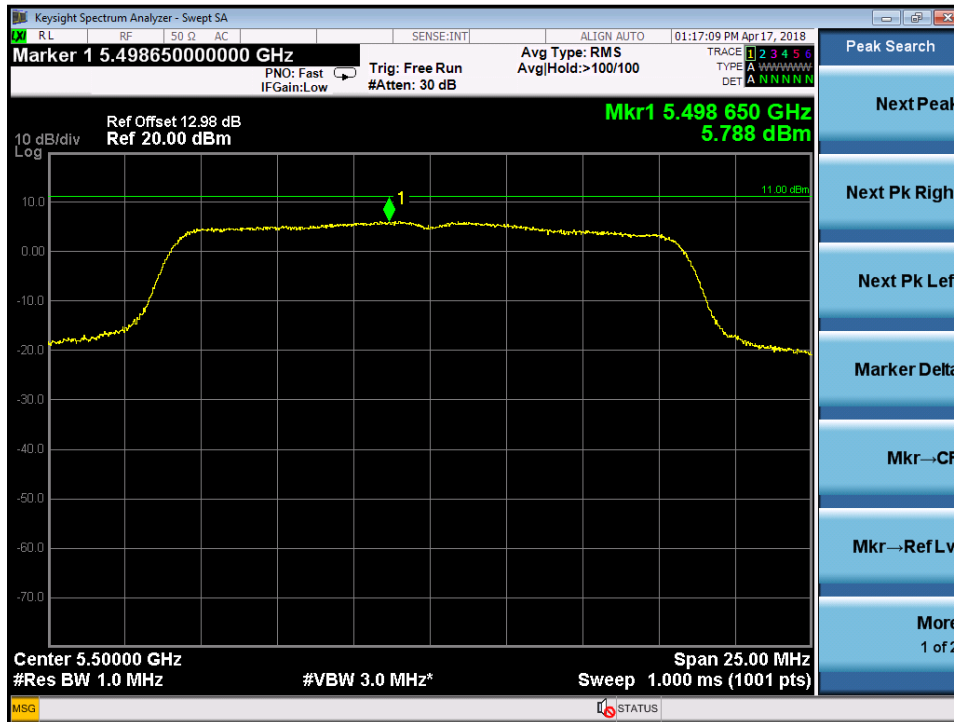
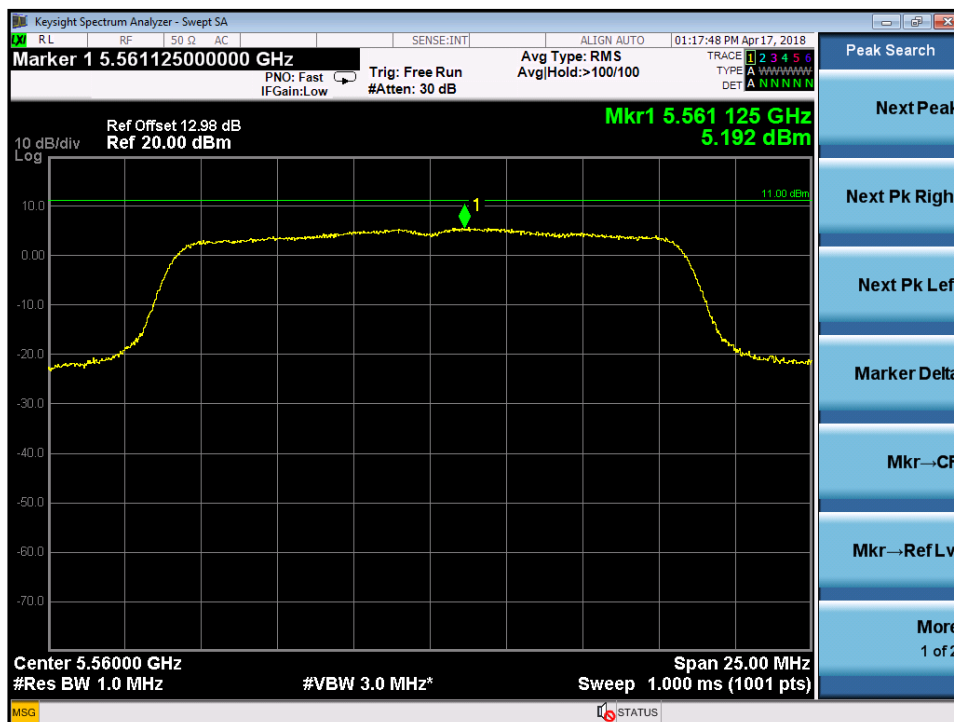
5785MHz

5825MHz


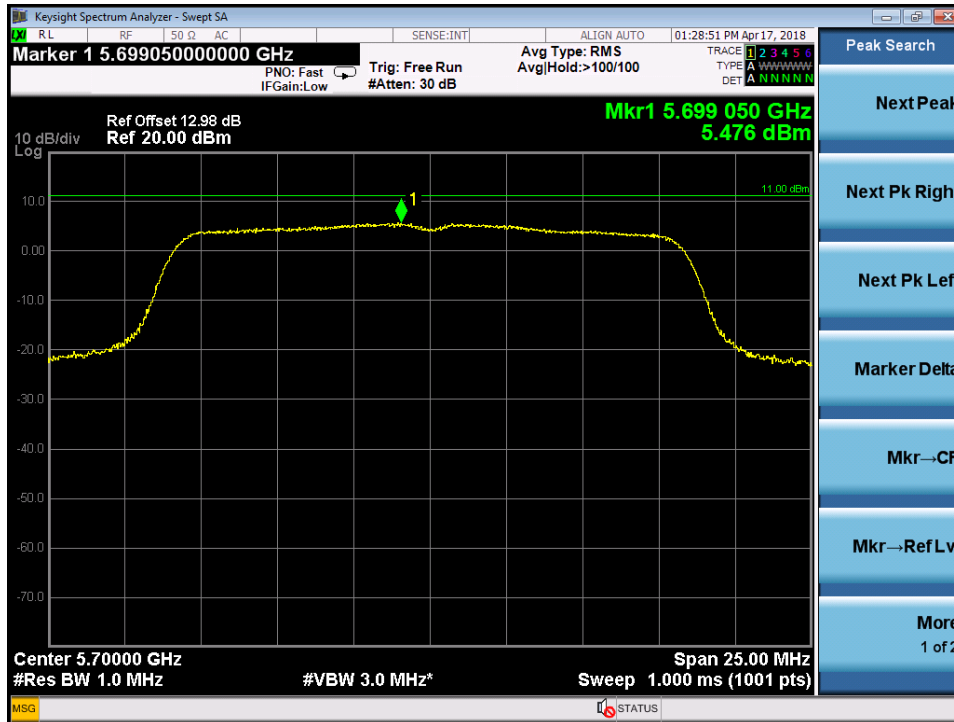
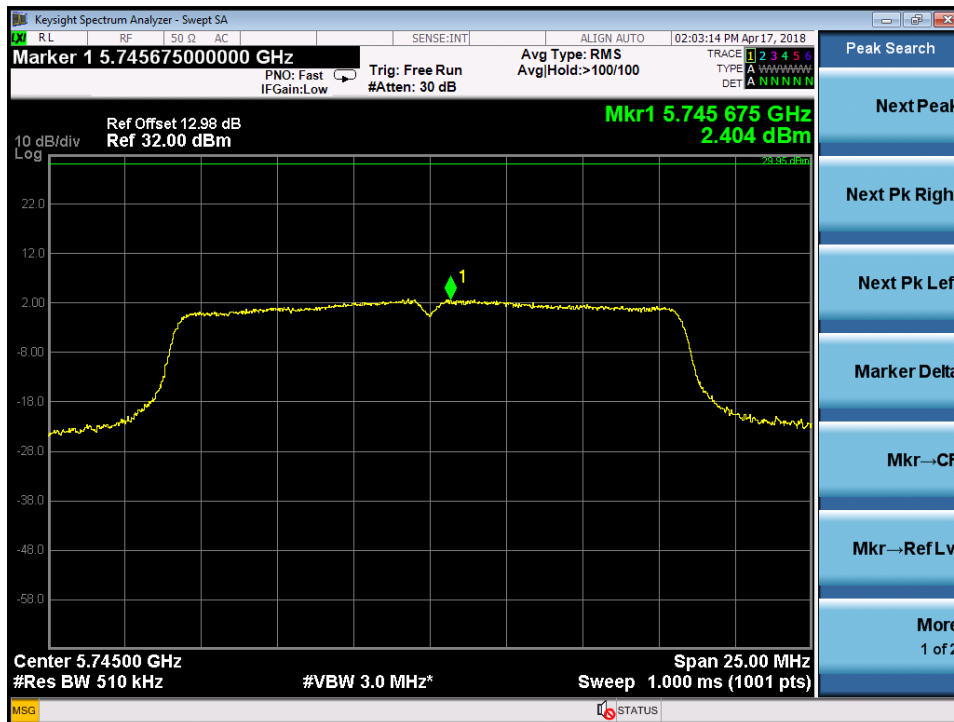
Test Plot of Power Density (802.11ac VHT20)

Antenna1: (5150-5350MHz)
5180MHz

5200MHz


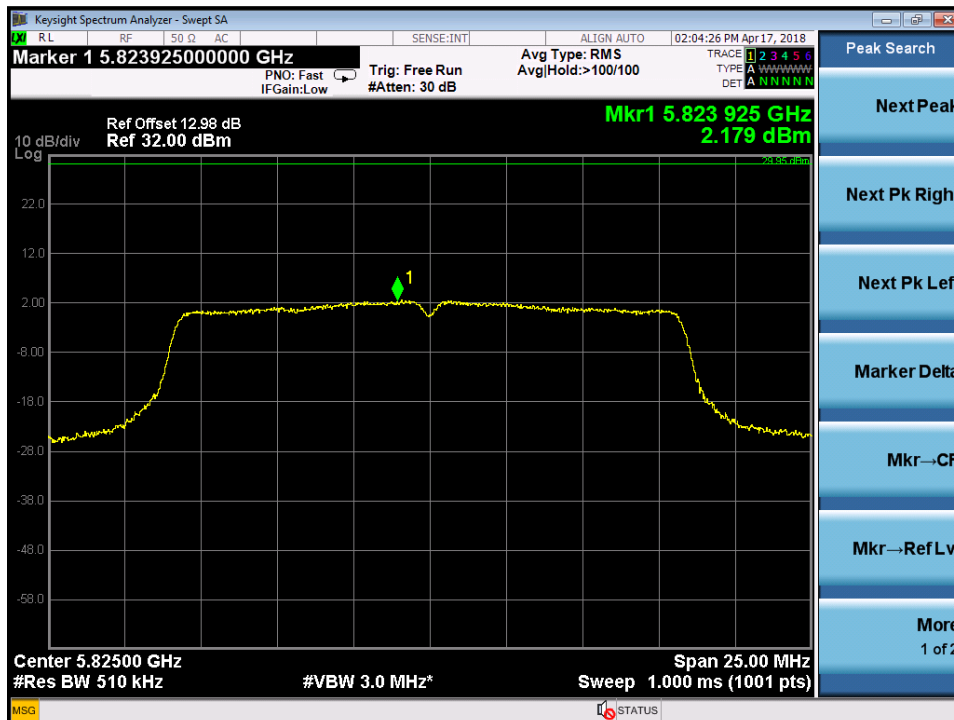
5240MHz

5280MHz


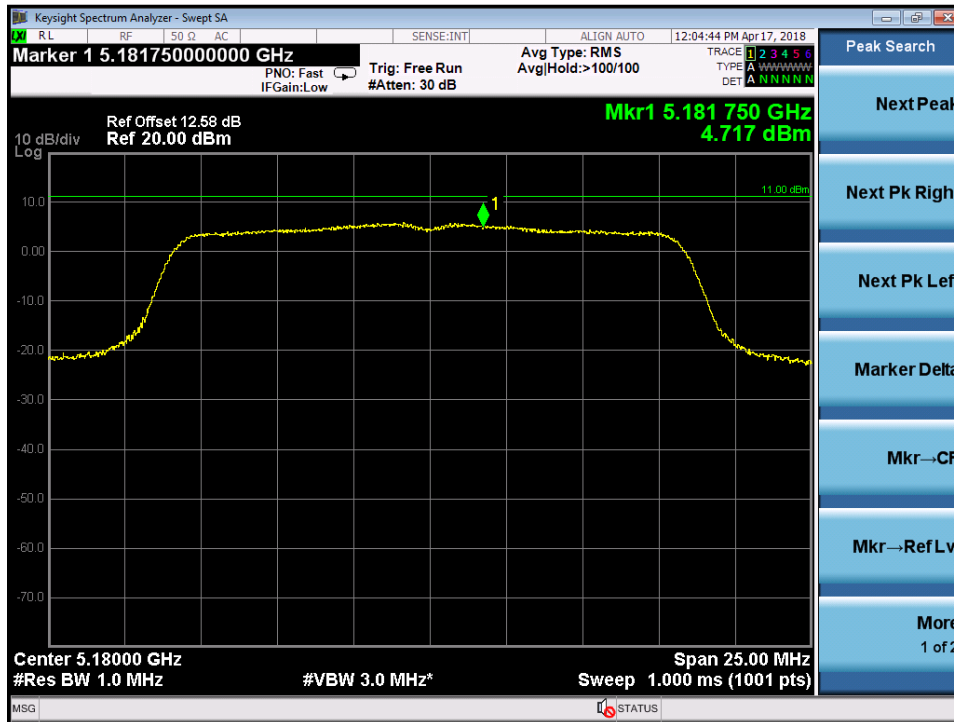
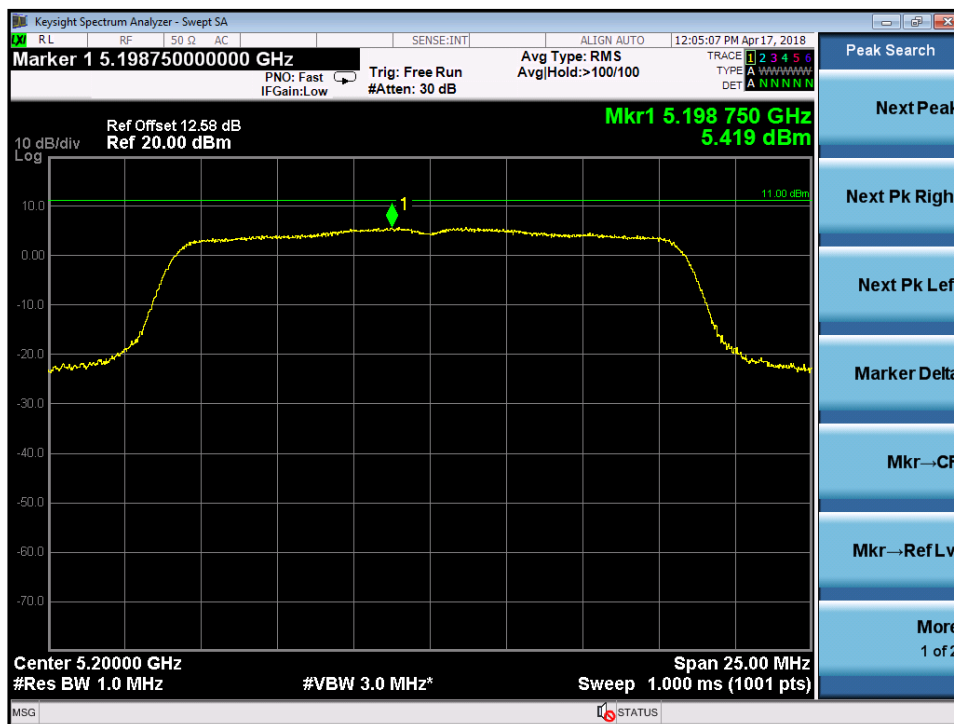
5300MHz

5320MHz


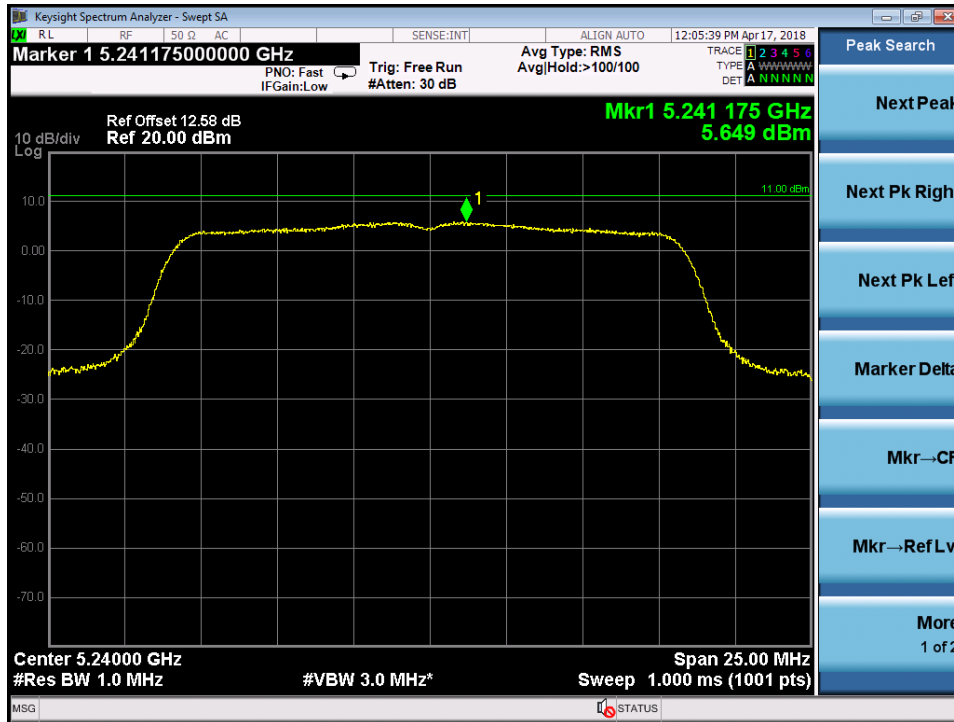
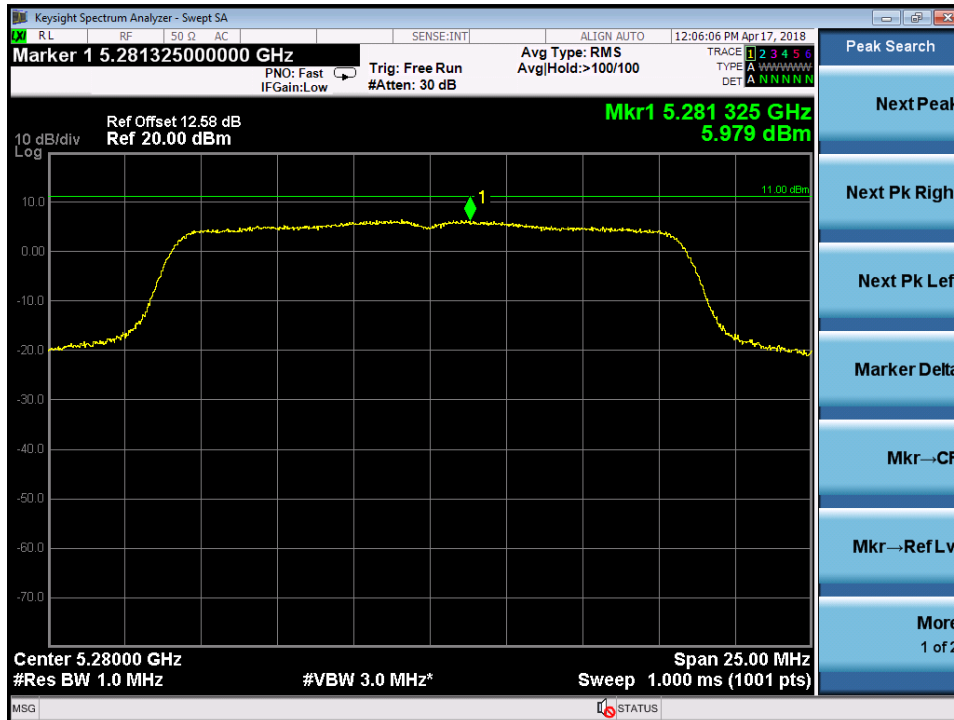
Antenna1: (5470-5825MHz)
5500MHz

5560MHz


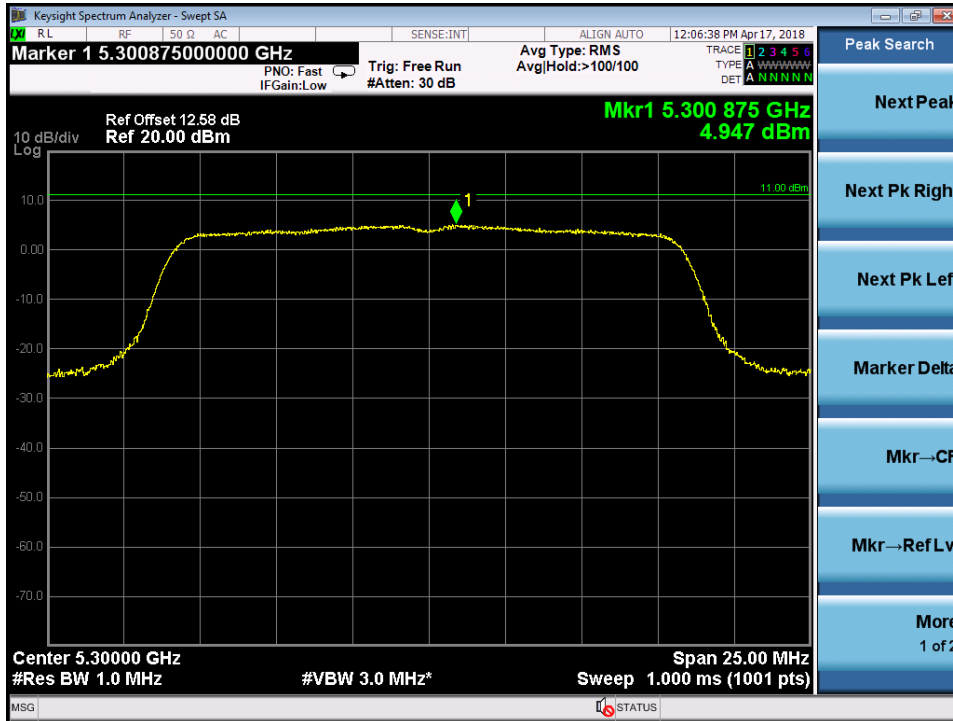
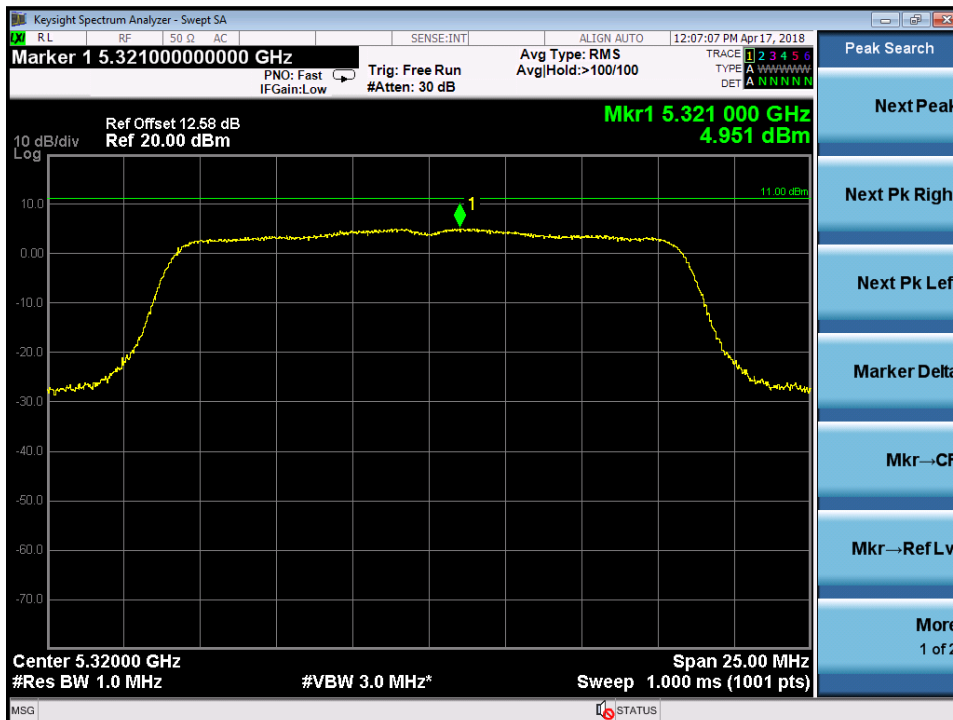
5700MHz

5745MHz


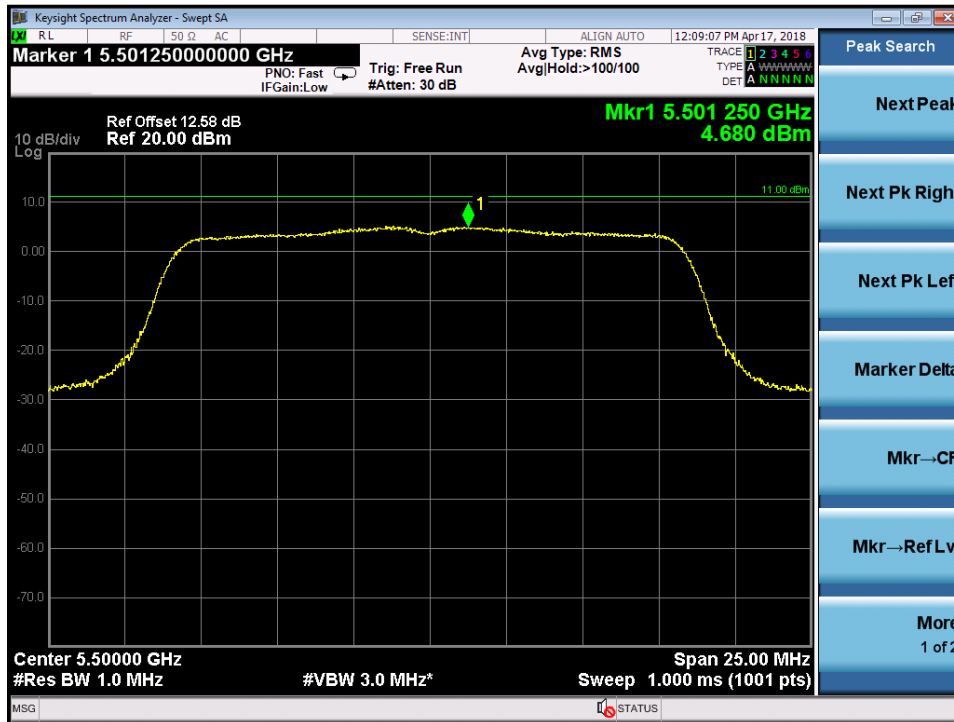
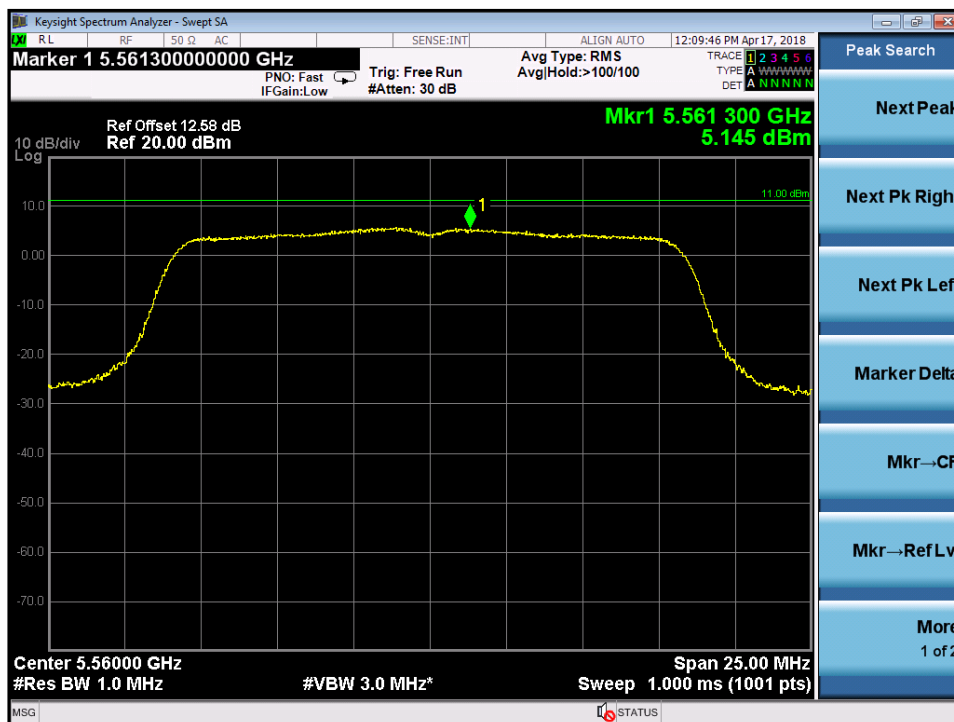
5785MHz

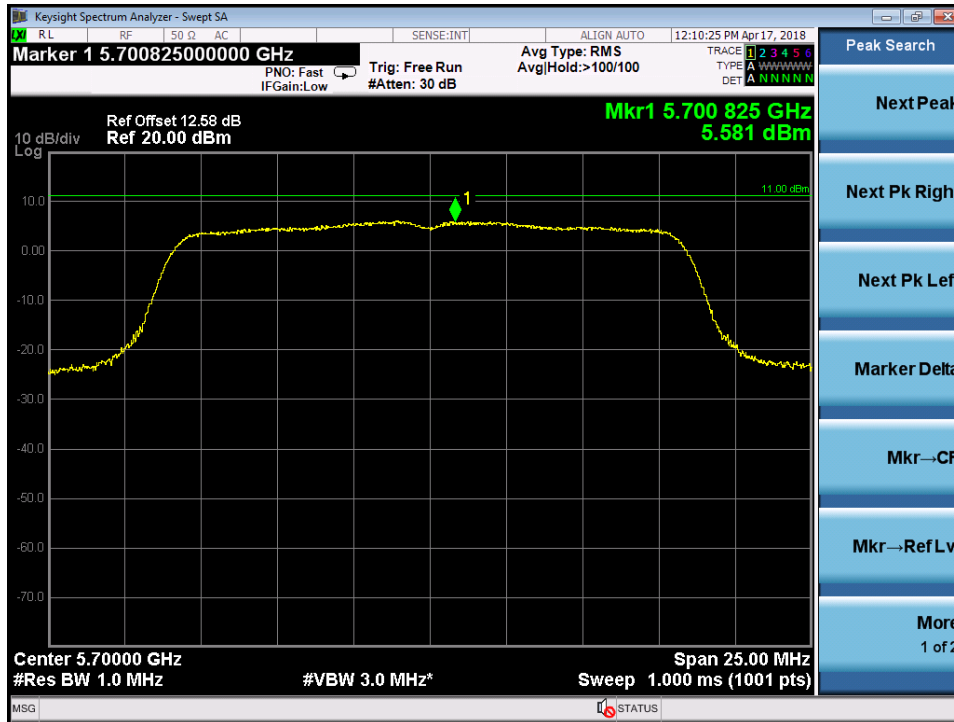
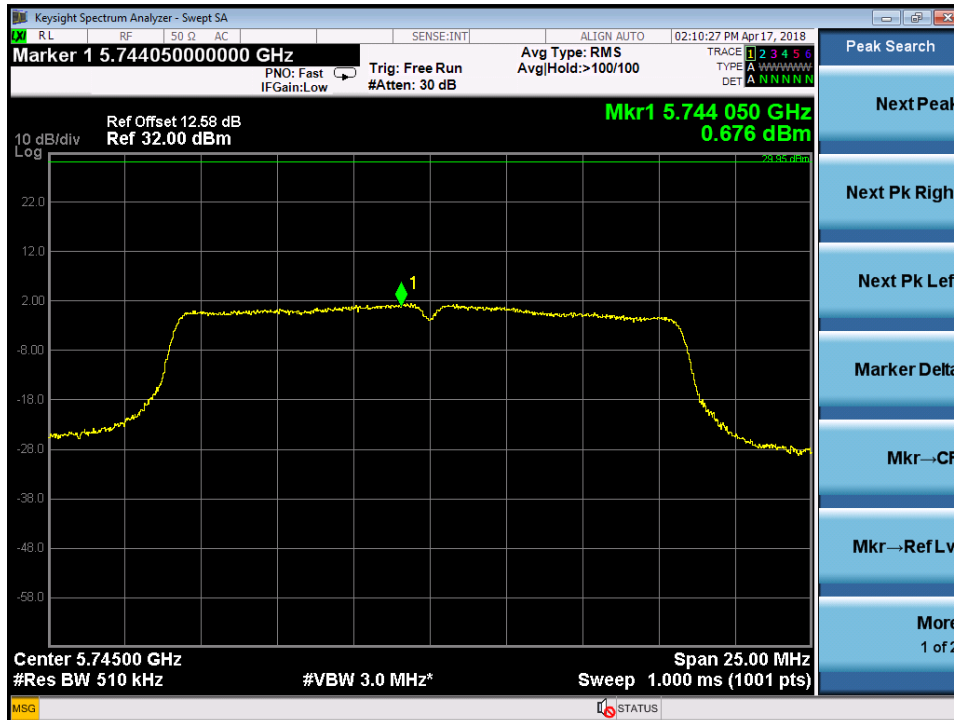
5825MHz


Antenna2: (5150-5350MHz)
5180MHz

5200MHz


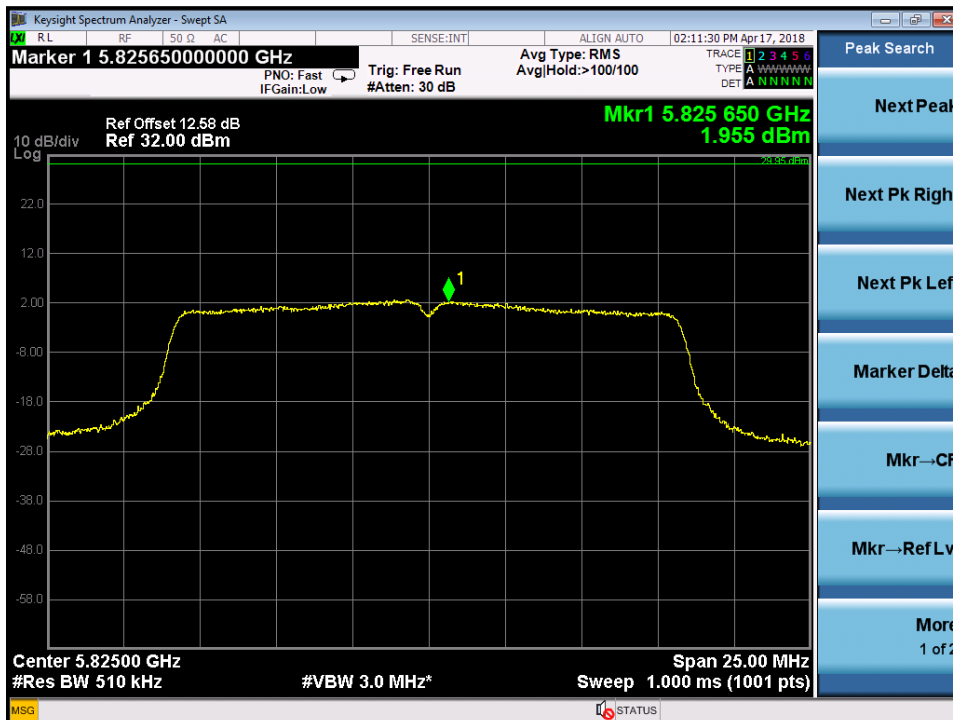
5240MHz

5280MHz


5300MHz

5320MHz


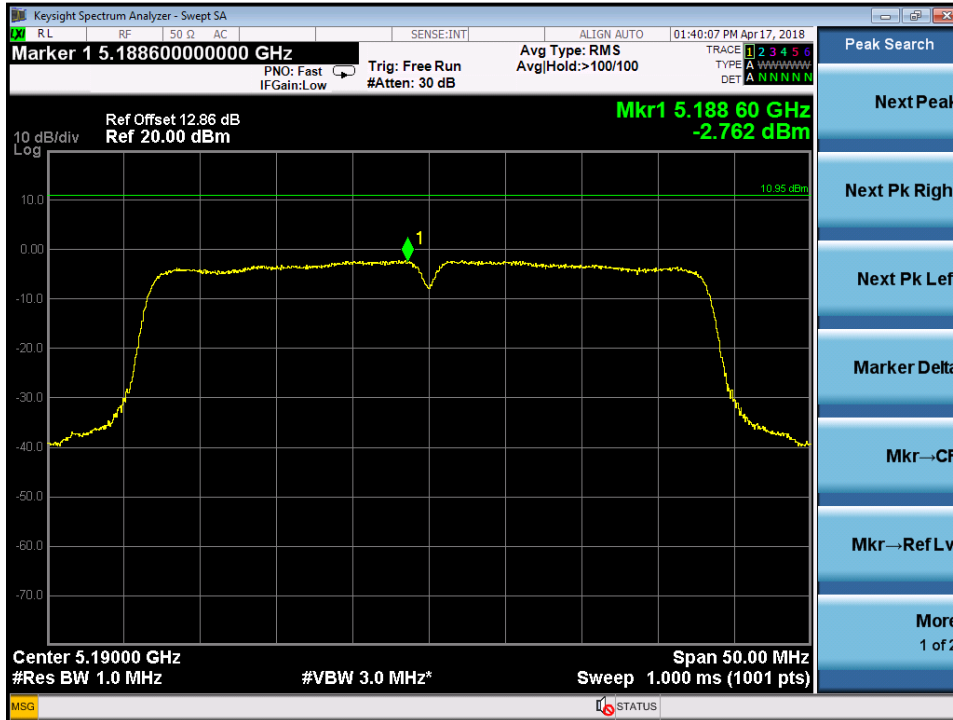
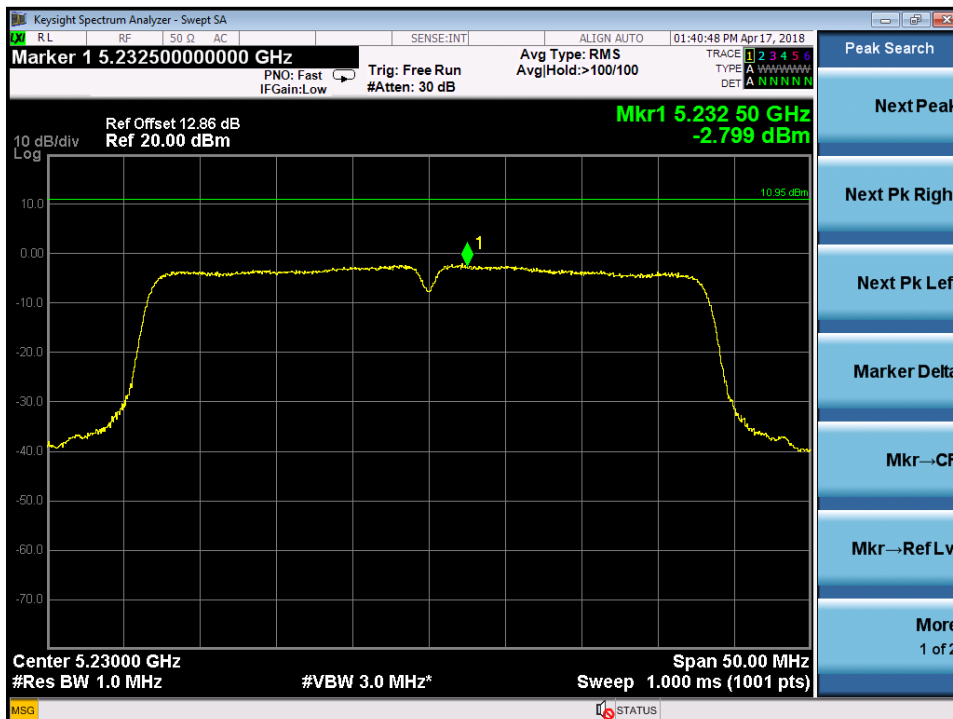
Antenna2: (5470-5825MHz)
5500MHz

5560MHz


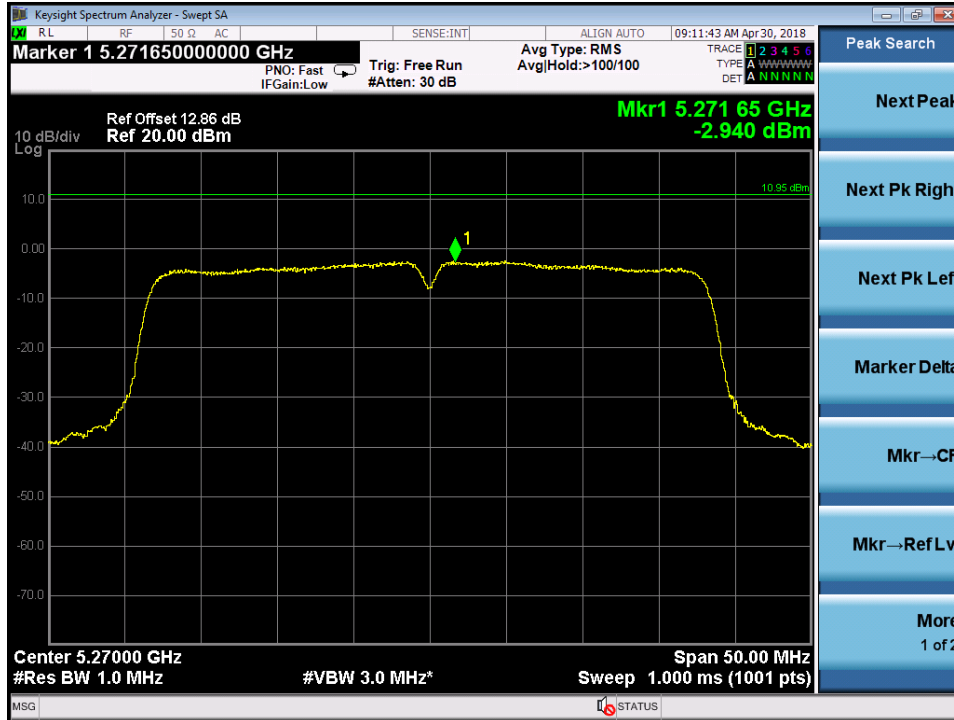
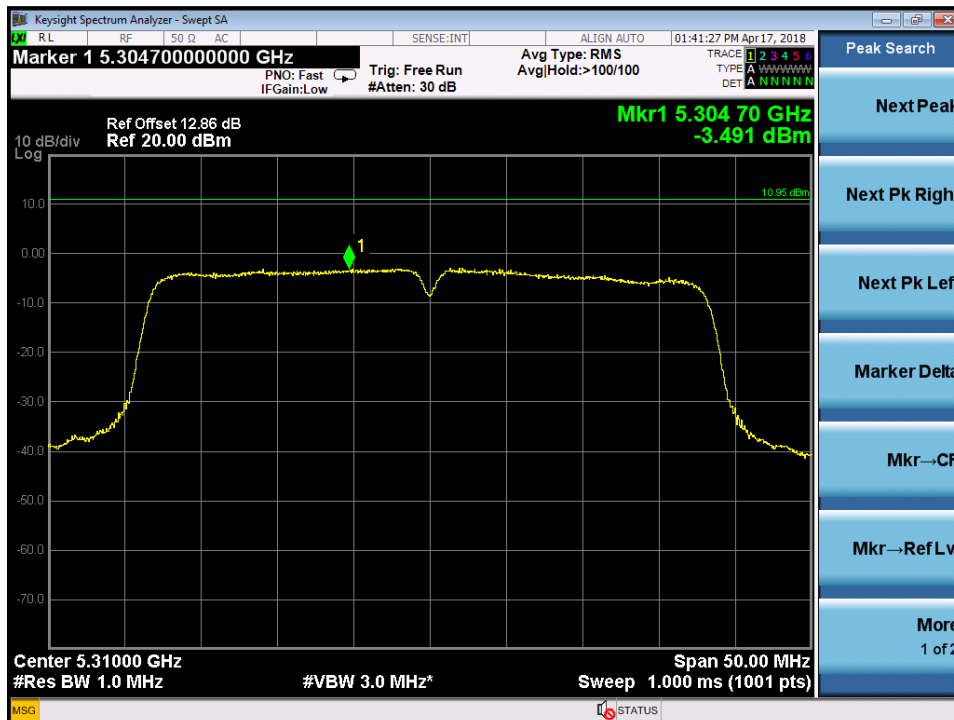
5700MHz

5745MHz


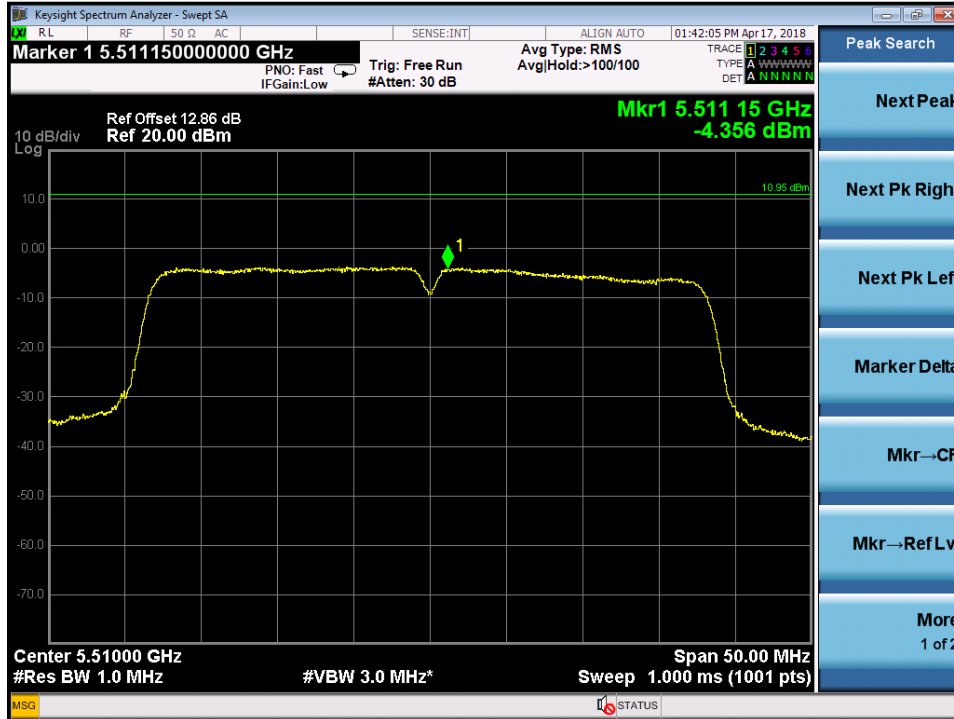
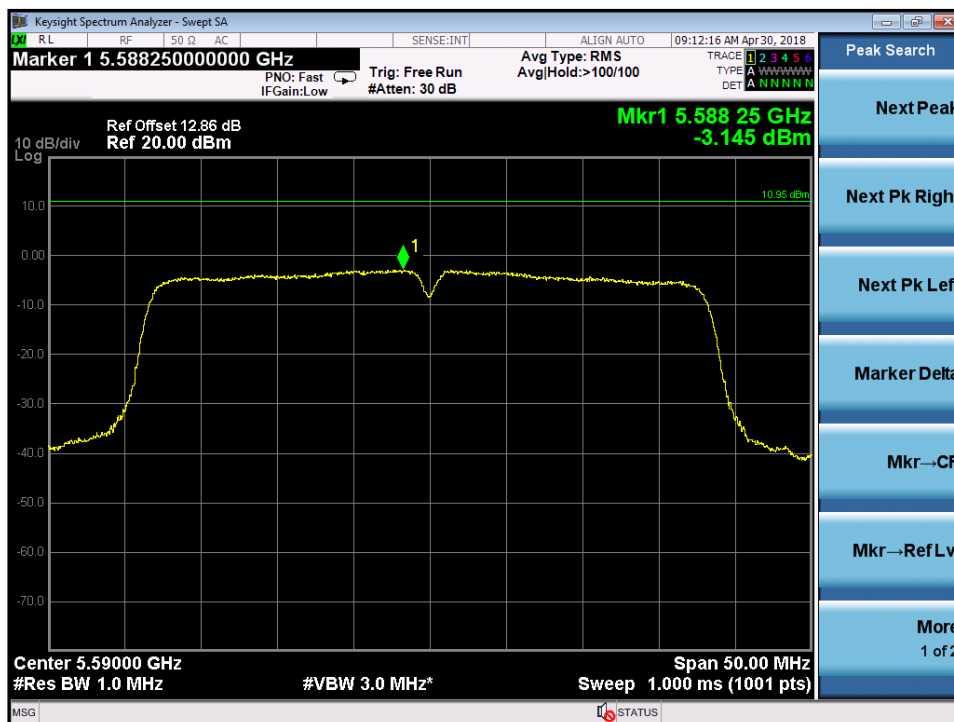
5785MHz

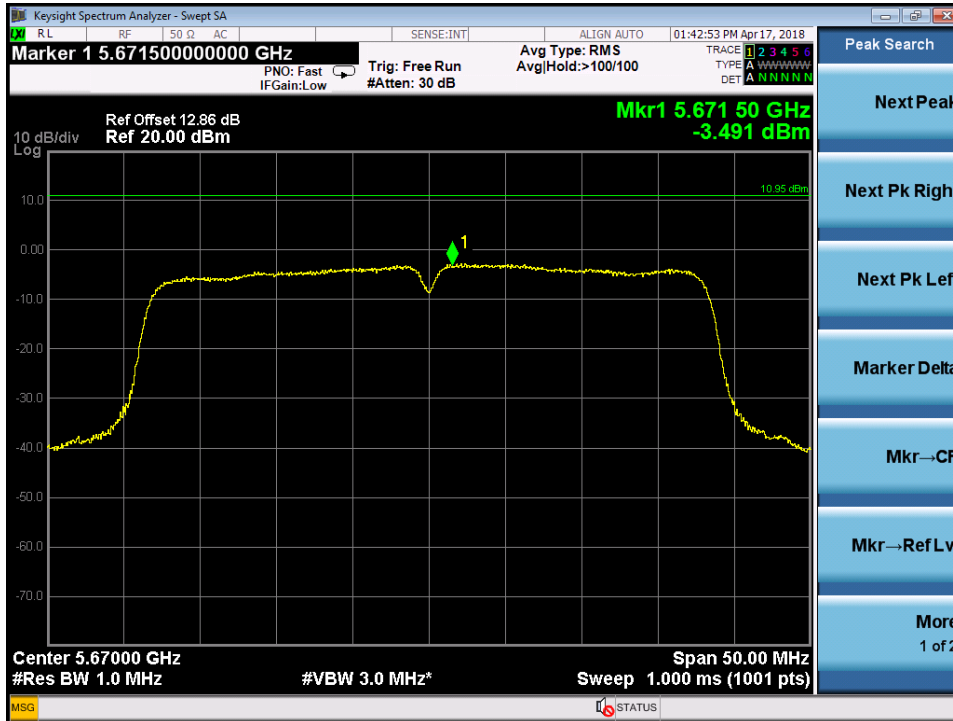
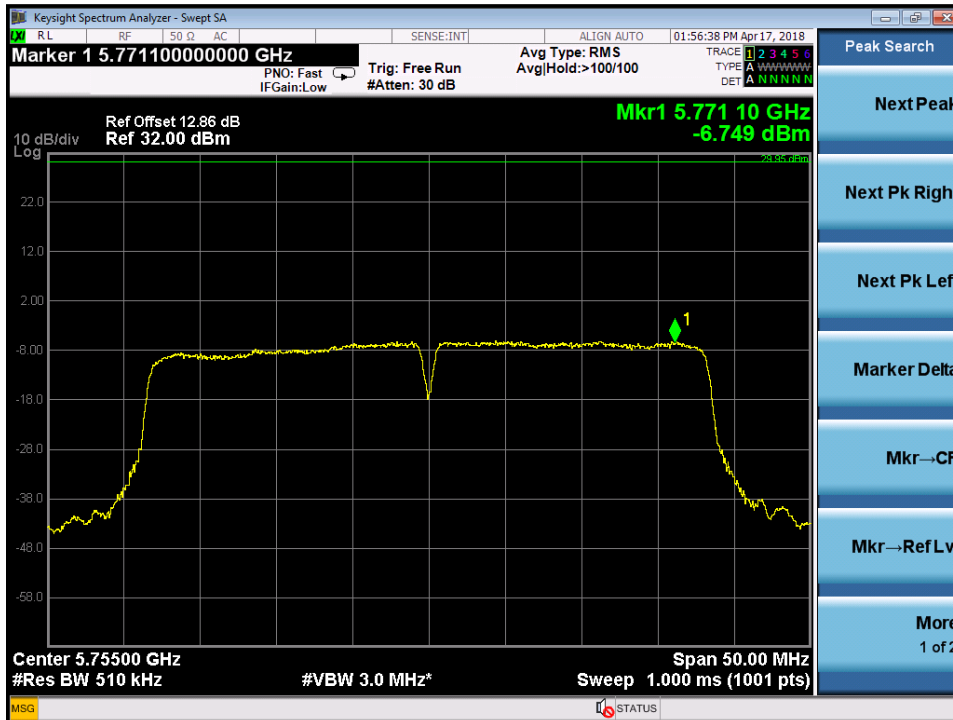
5825MHz


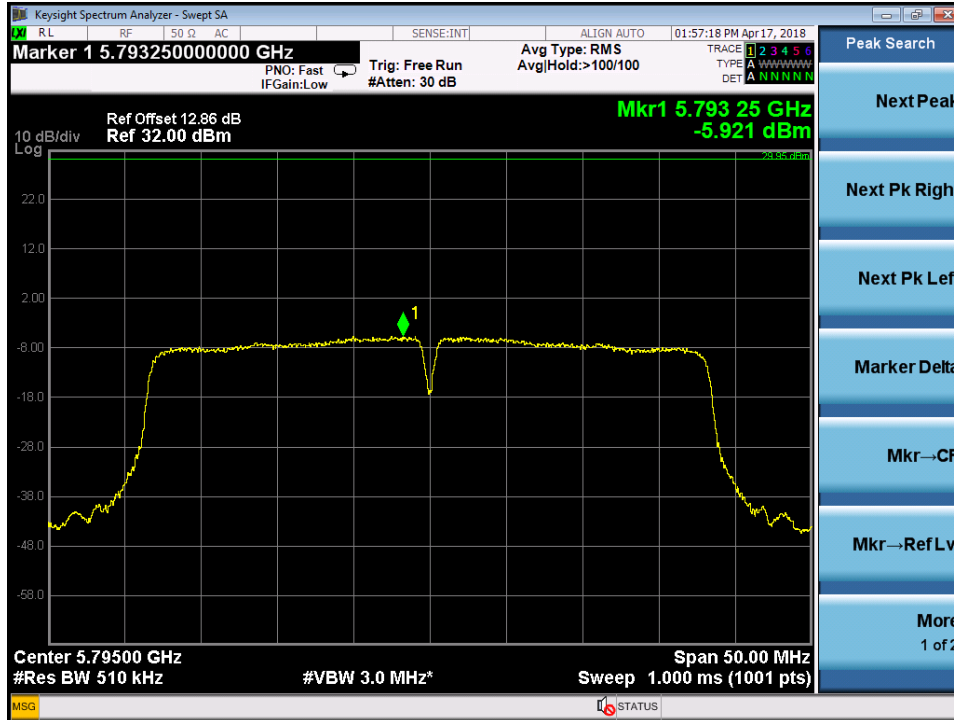
Test Plot of Power Density (802.11ac VHT40)

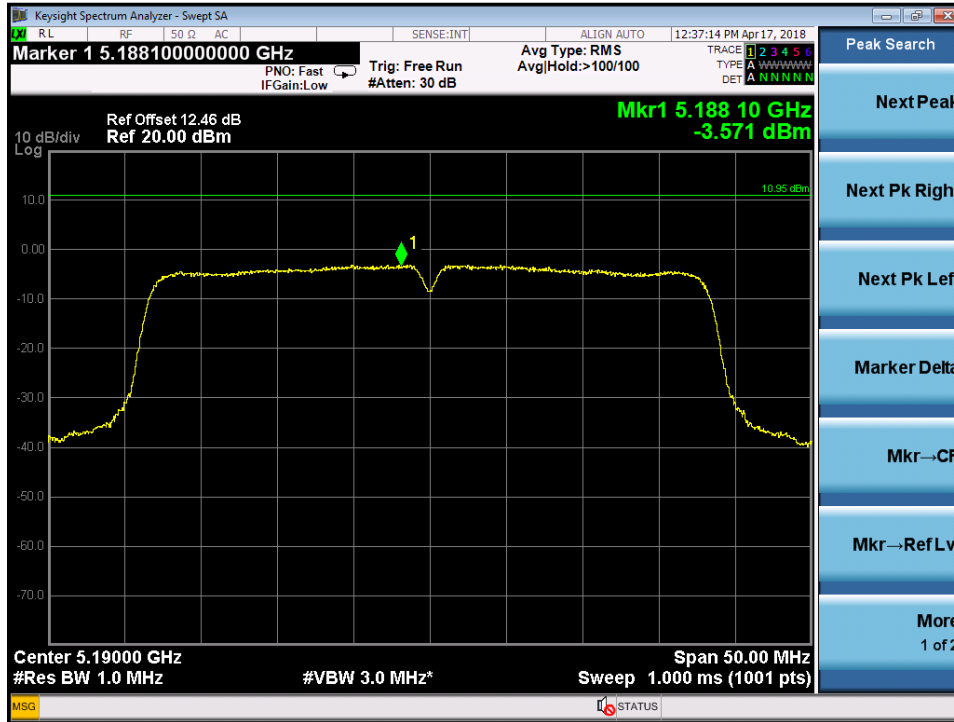
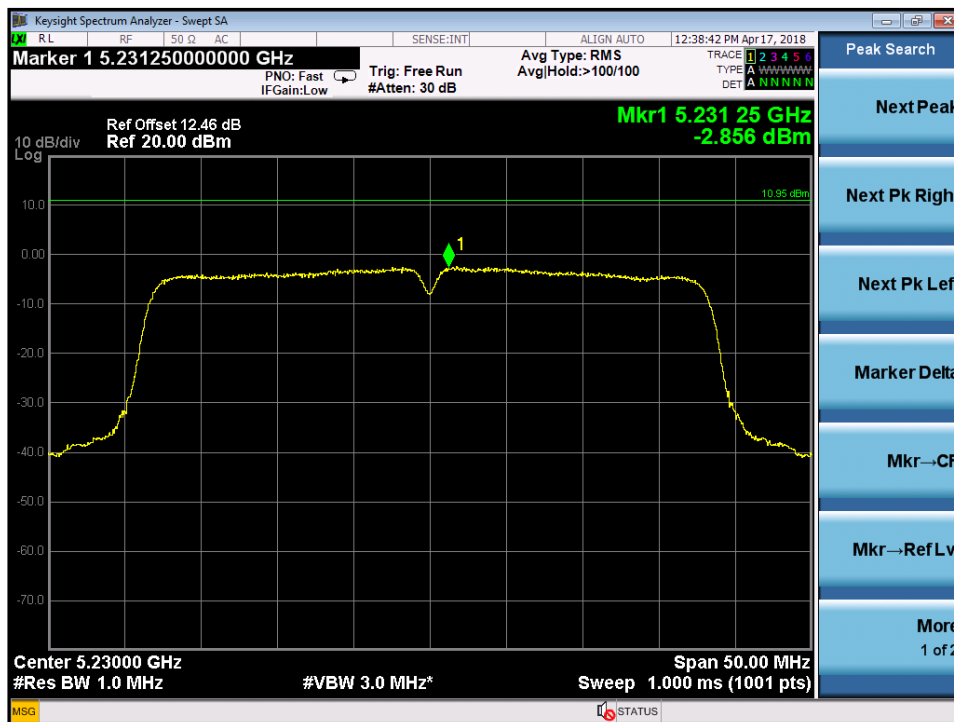
Antenna1: (5150-5350MHz)
5190MHz

5230MHz


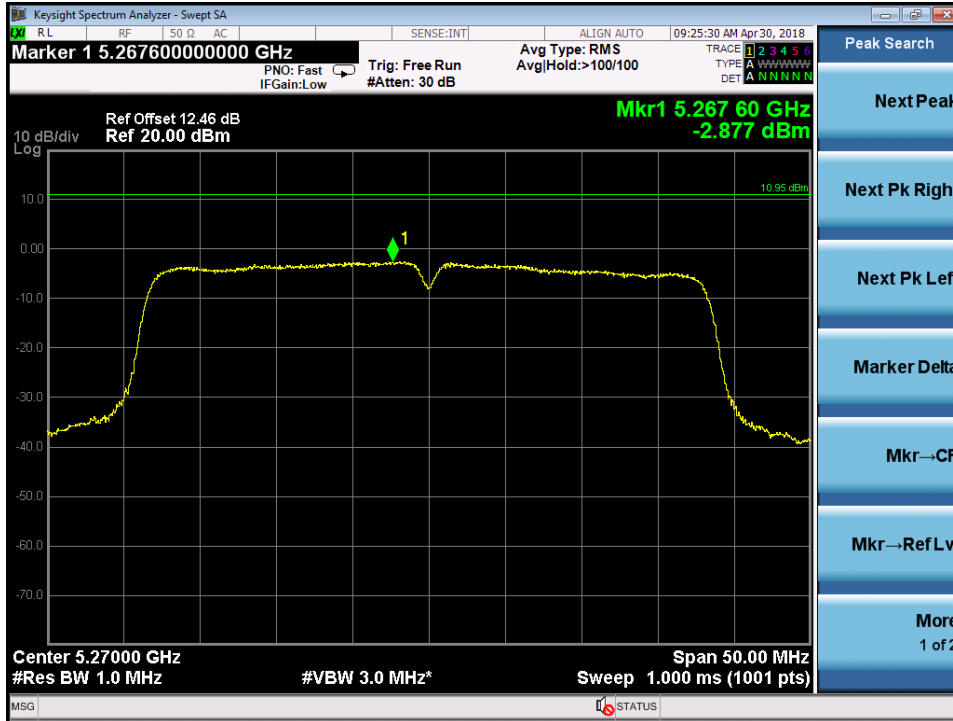
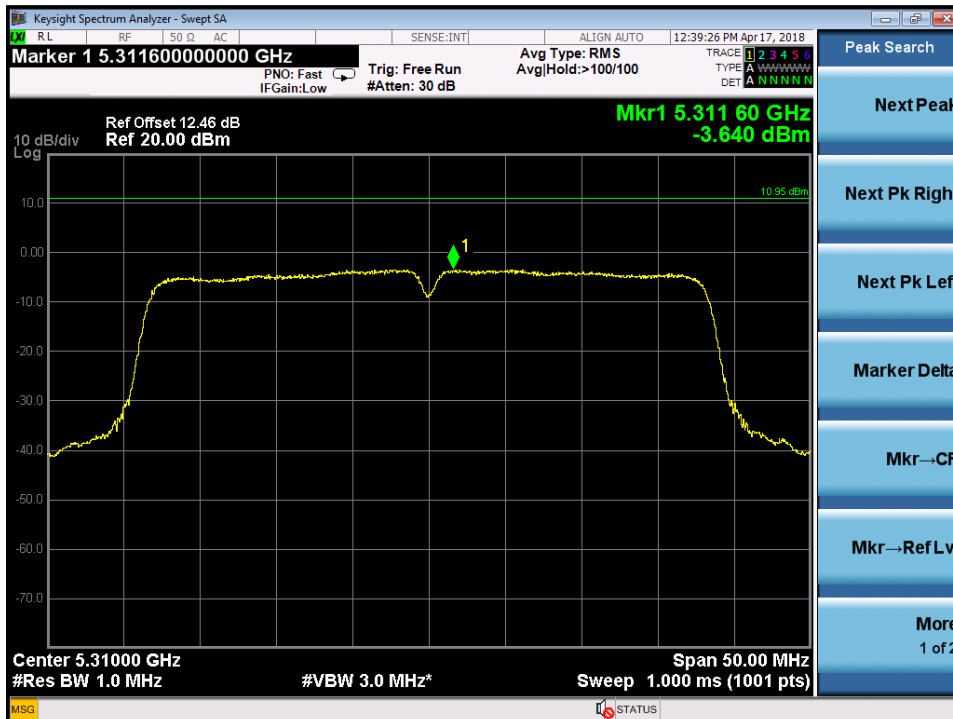
5270MHz

5310MHz


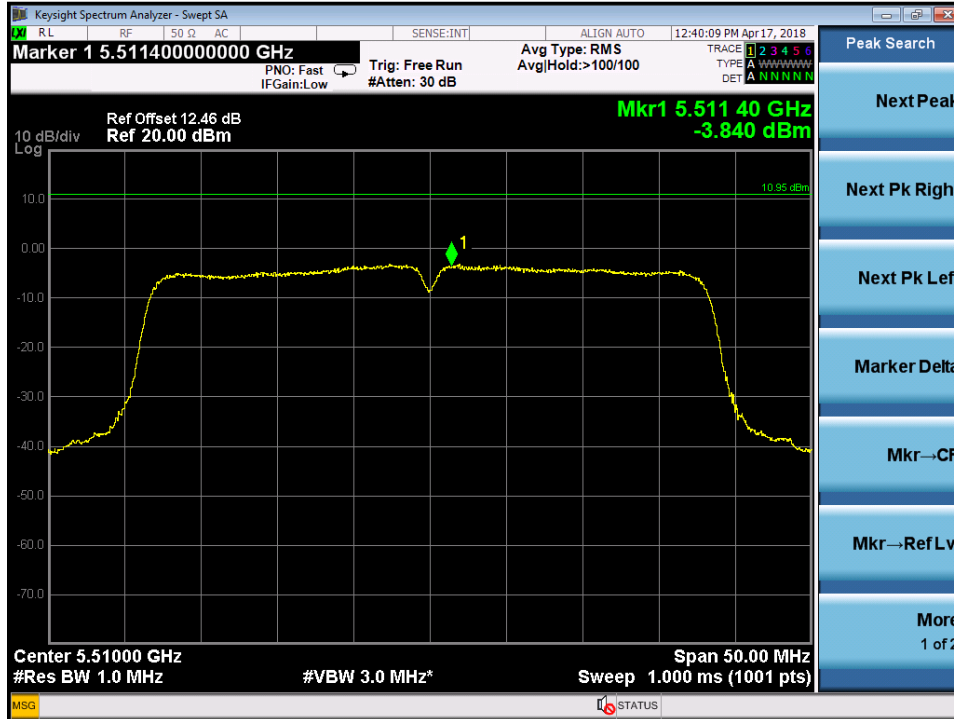
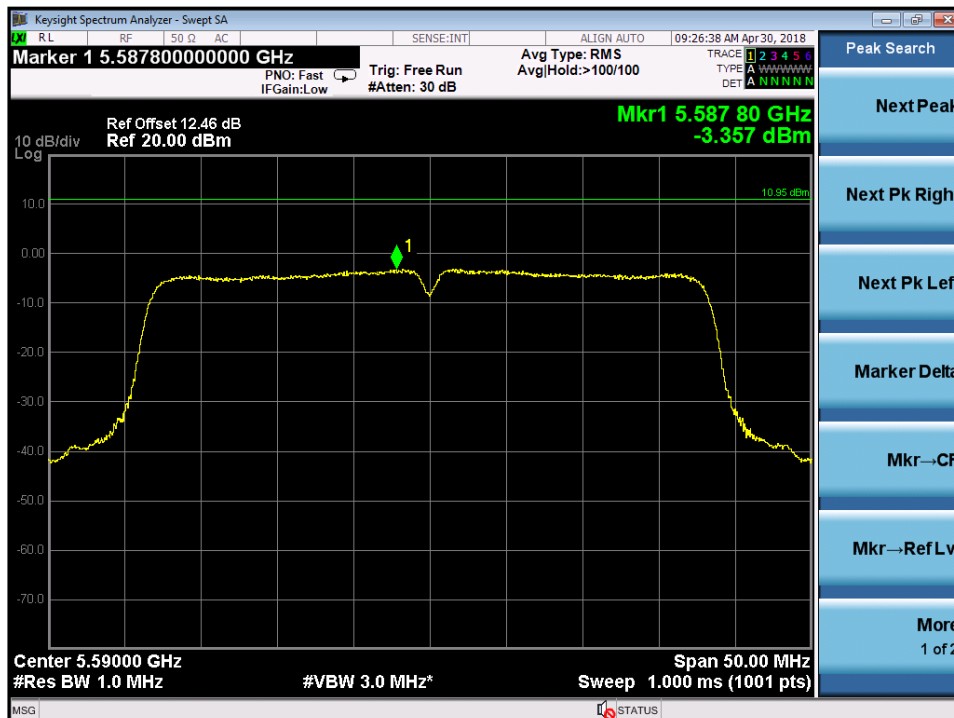
Antenna1: (5470-5825MHz)
5510MHz

5590MHz


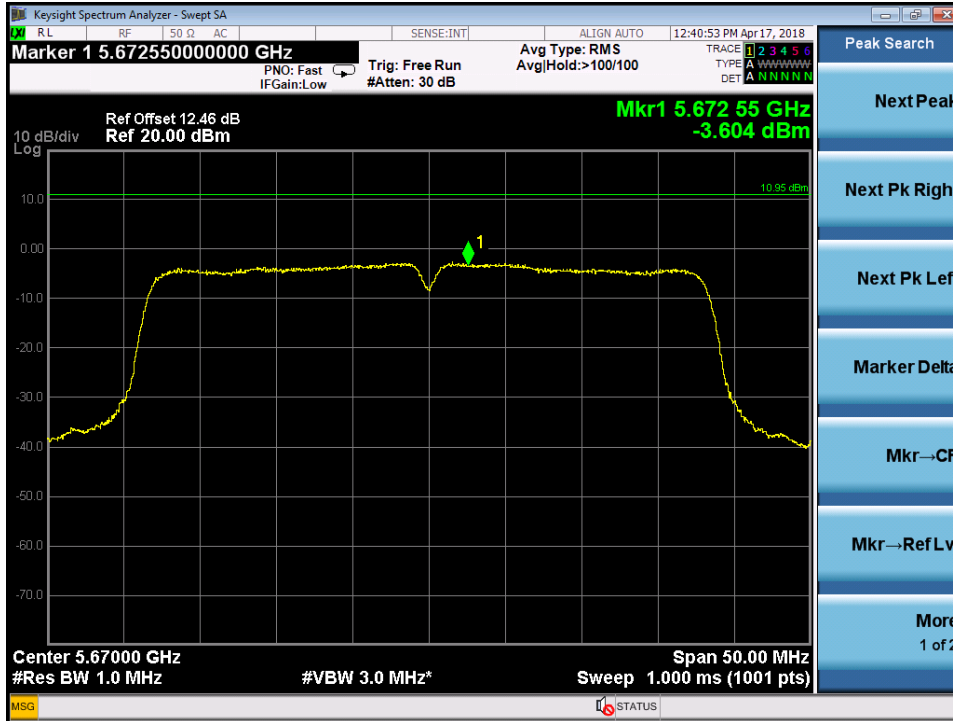
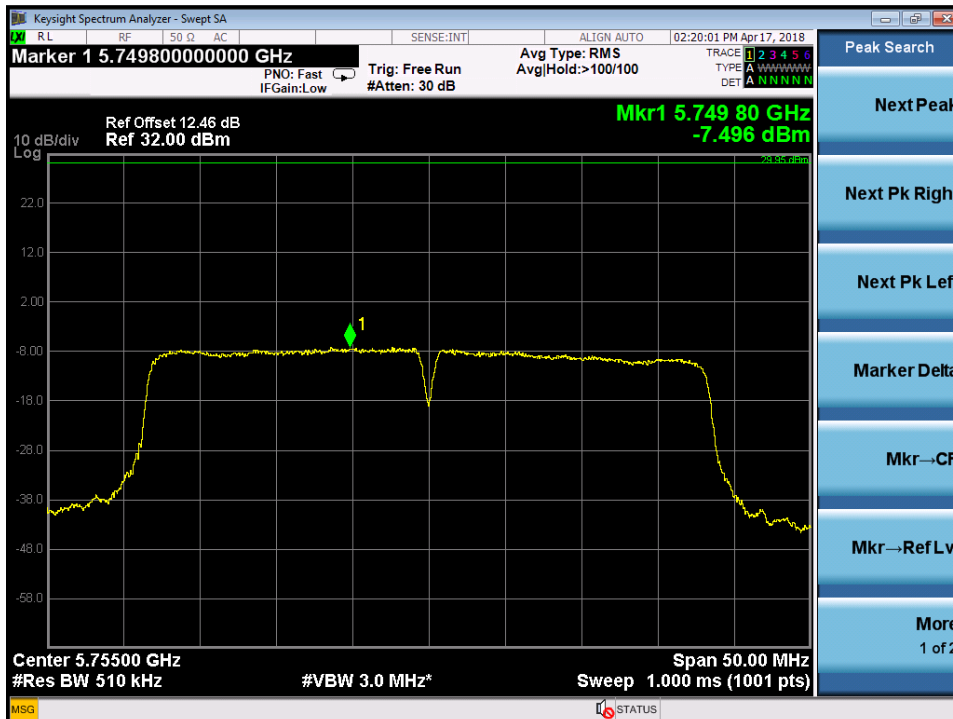
5670MHz

5755MHz


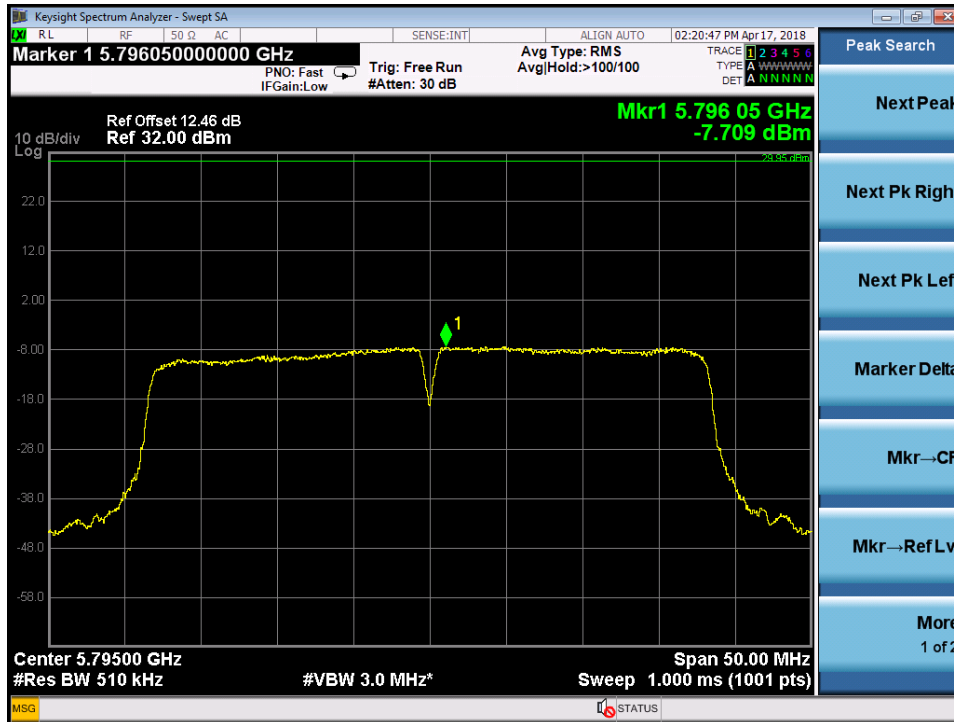
5795MHz


Antenna2: (5150-5350MHz)
5190MHz

5230MHz


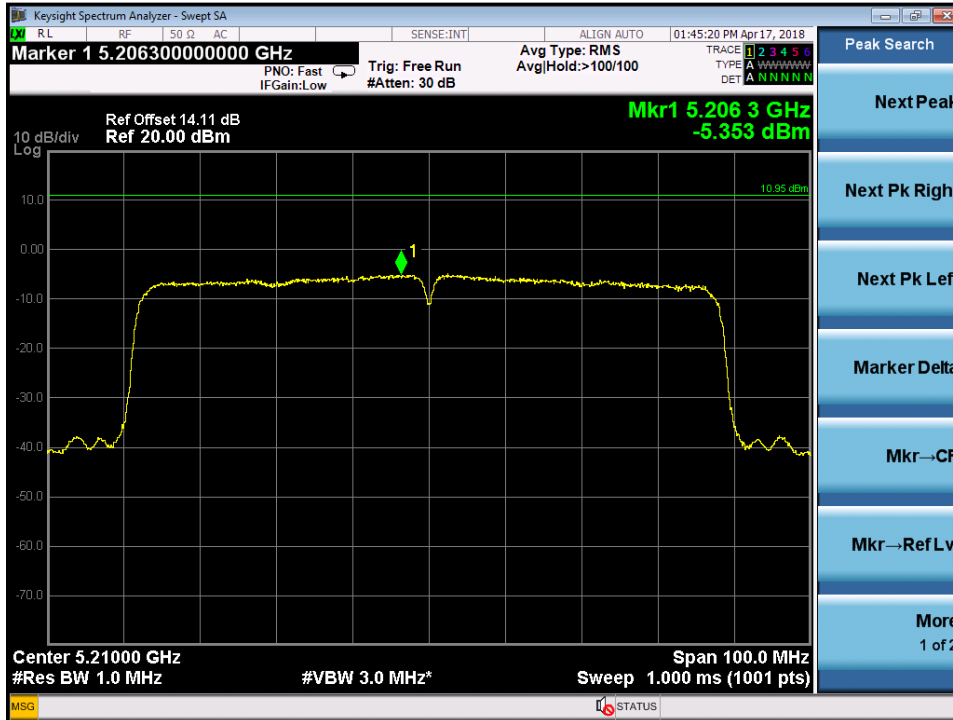
5270MHz

5310MHz


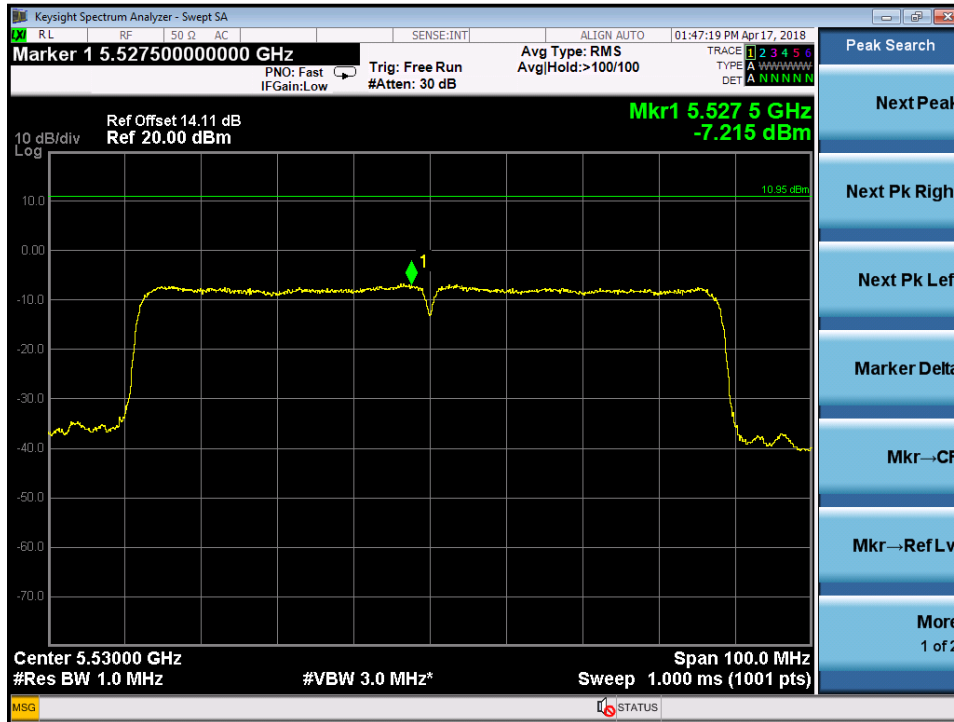
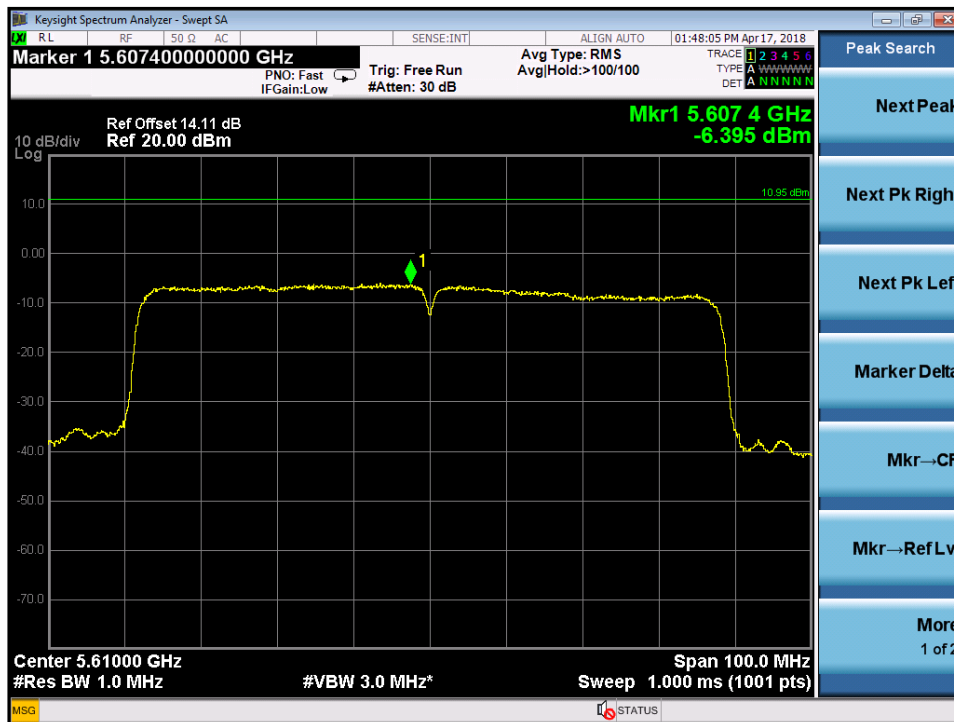
Antenna2: (5470-5825MHz)
5510MHz

5590MHz


5670MHz

5755MHz


5795MHz


Test Plot of Power Density (802.11ac VHT80)

Antenna1: (5150-5350MHz)
5210MHz

5290MHz


Antenna1: (5470-5825MHz)
5530MHz

5610MHz


5775MHz
