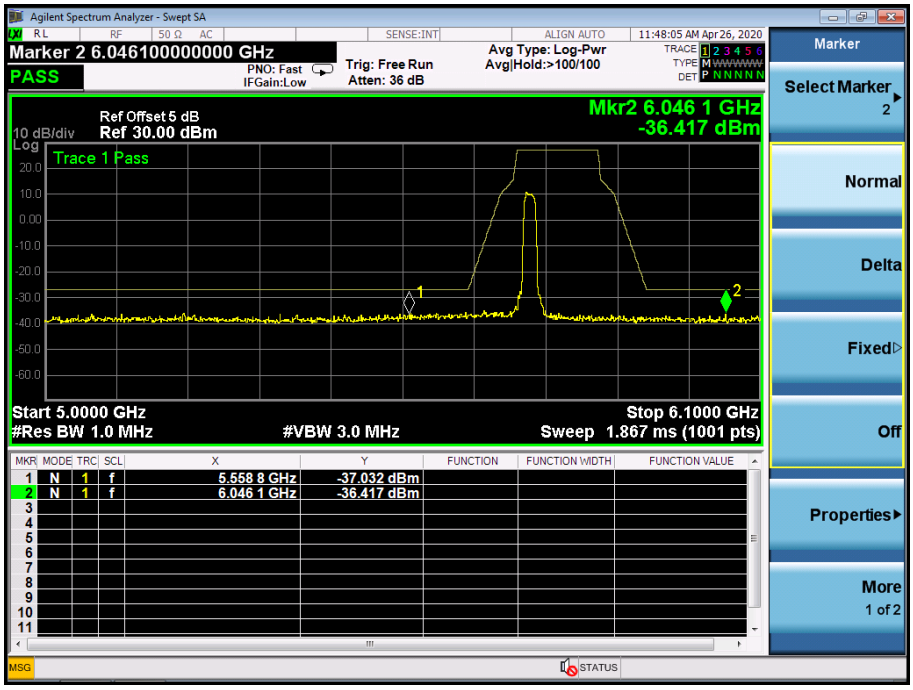
Antenna A: 5745-58250MHz

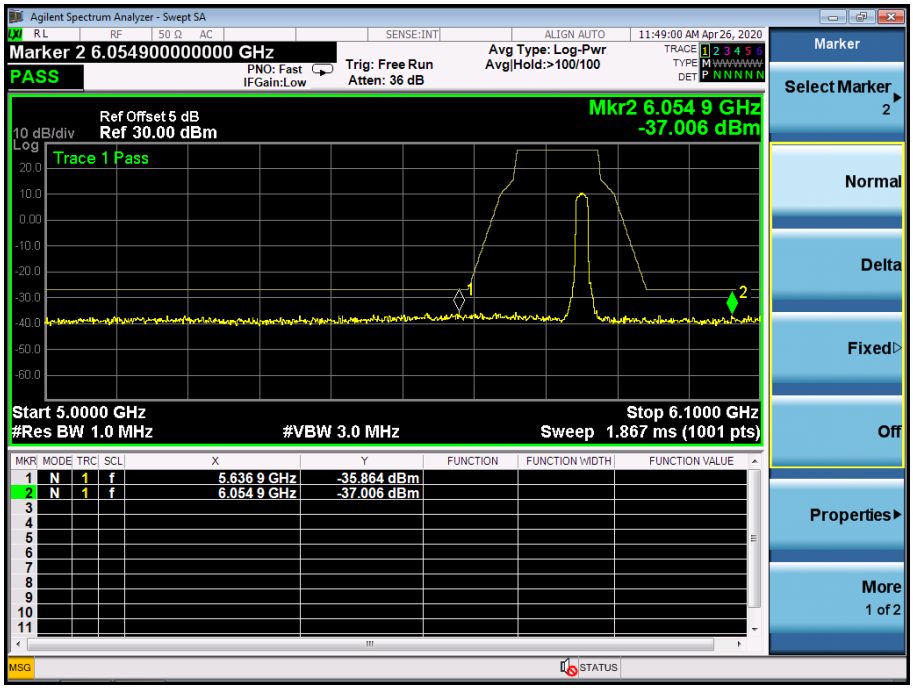
5.8G

5.745~5.825 GHz

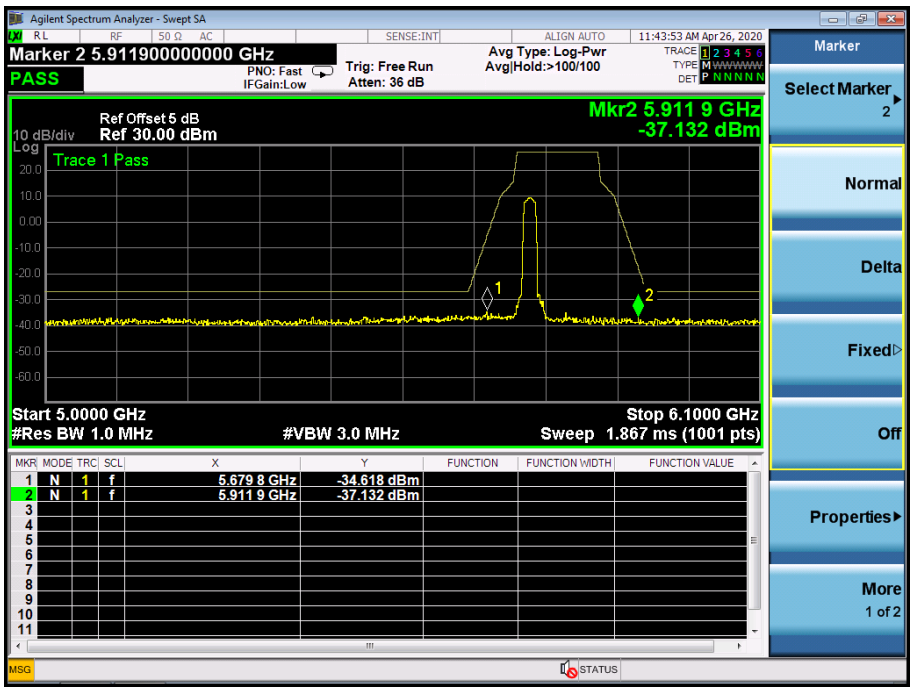
(802.11a) Band Edge, Left Side



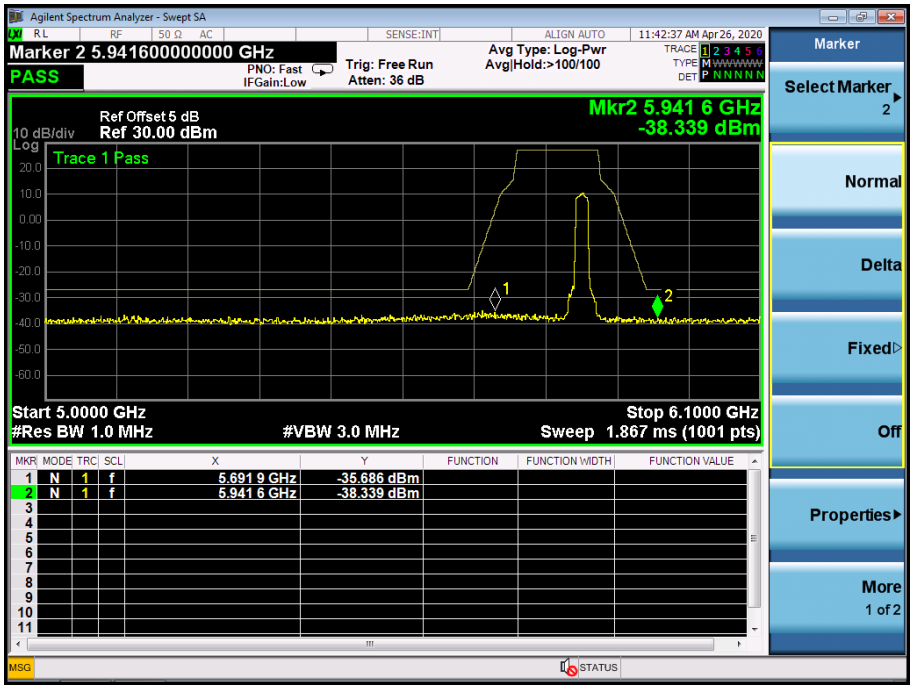
(802.11a) Band Edge, Right Side



(802.11 n20) Band Edge, Left Side

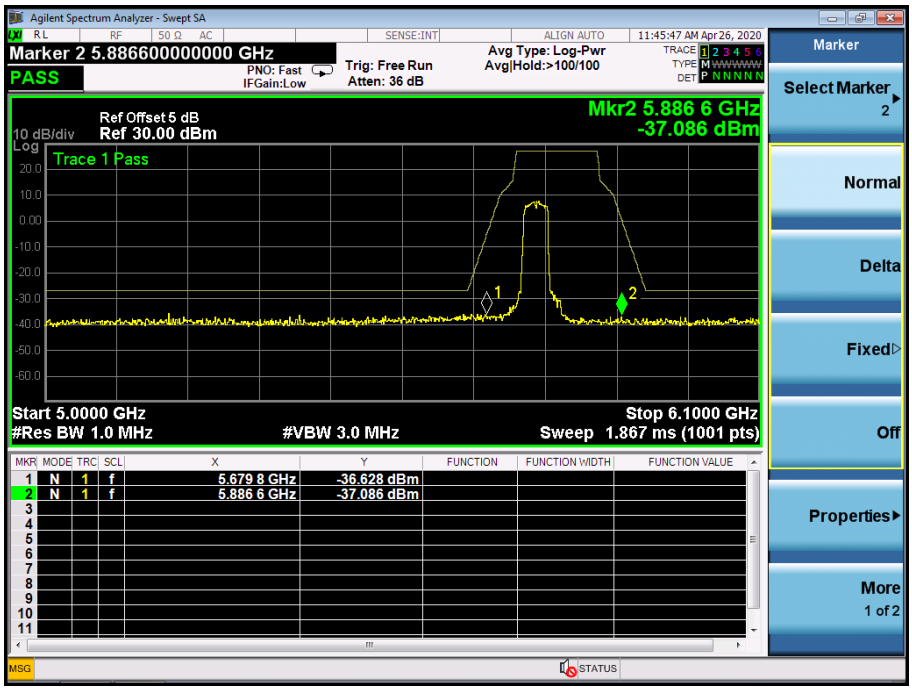


(802.11n20) Band Edge, Right Side

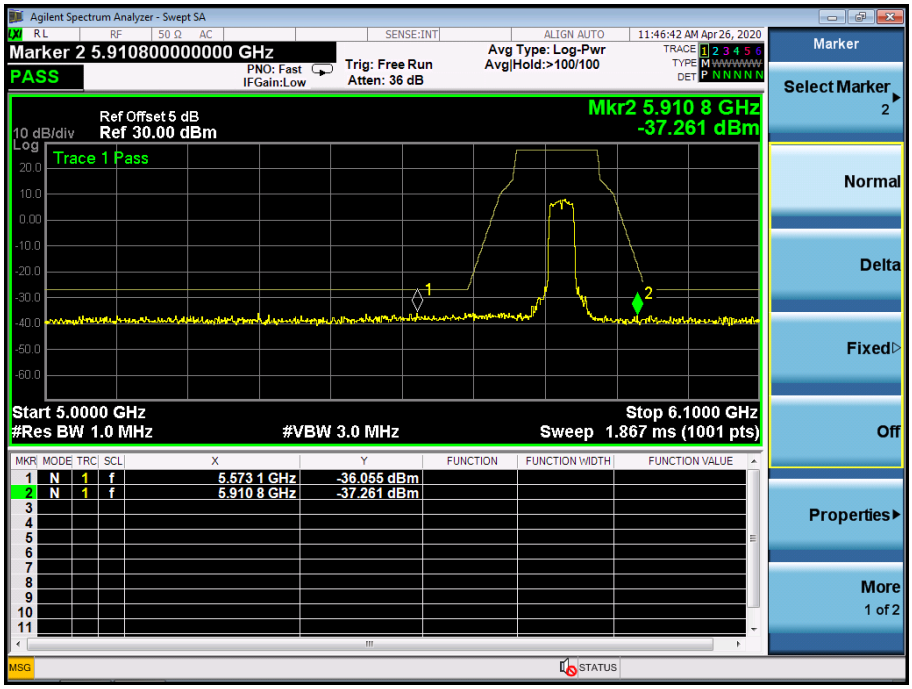


5.745~5.825 GHz

(802.11n40) Band Edge, Left Side

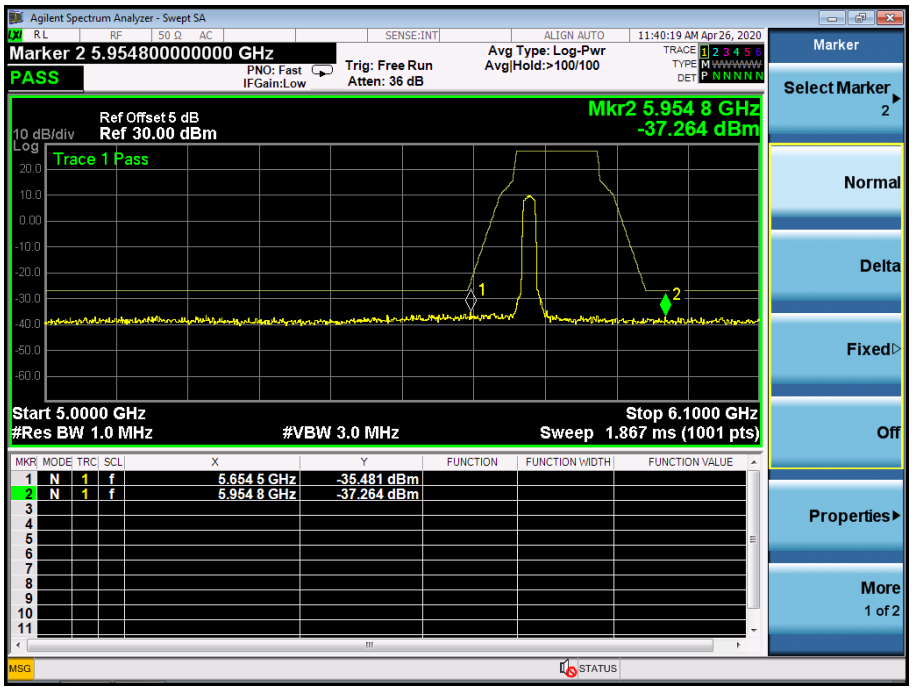


(802.11n40) Band Edge, Right Side

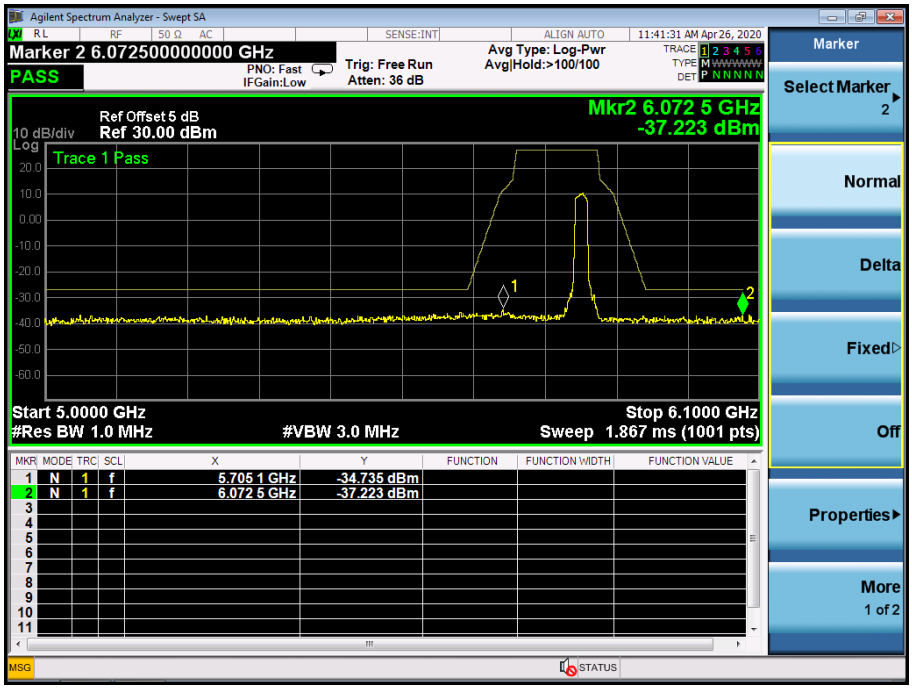


5.745~5.825 GHz

(802.11ac20) Band Edge, Left Side

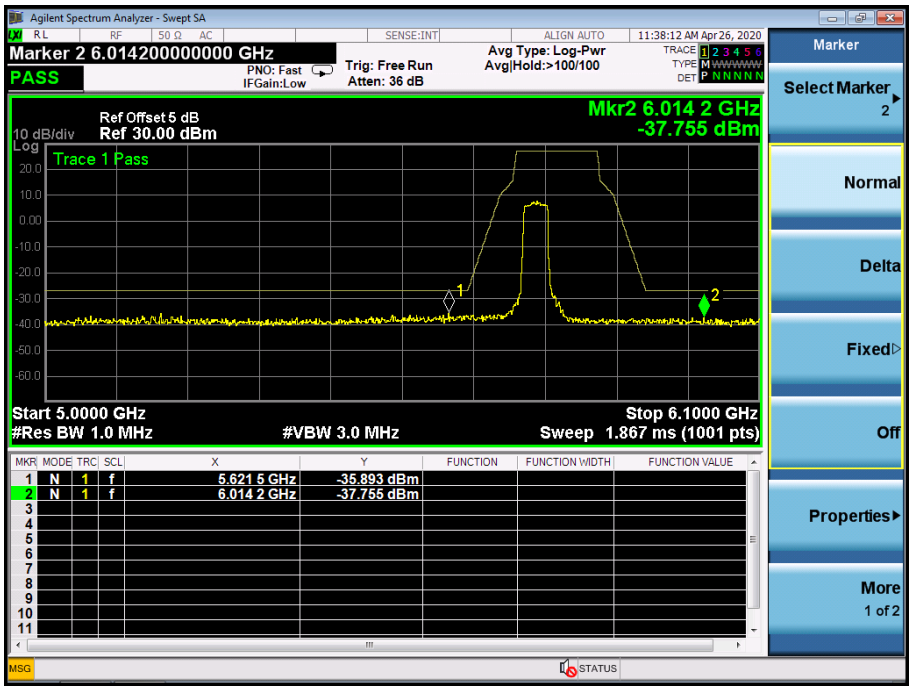


(802.11 ac20) Band Edge, Right Side

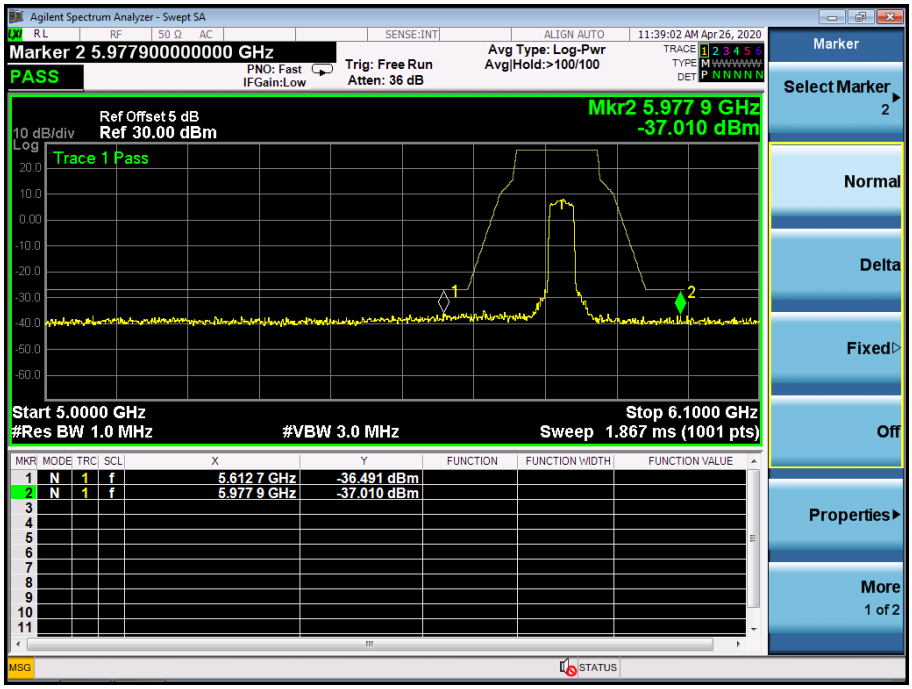


5.745~5.825 GHz

(802.11ac40) Band Edge, Left Side

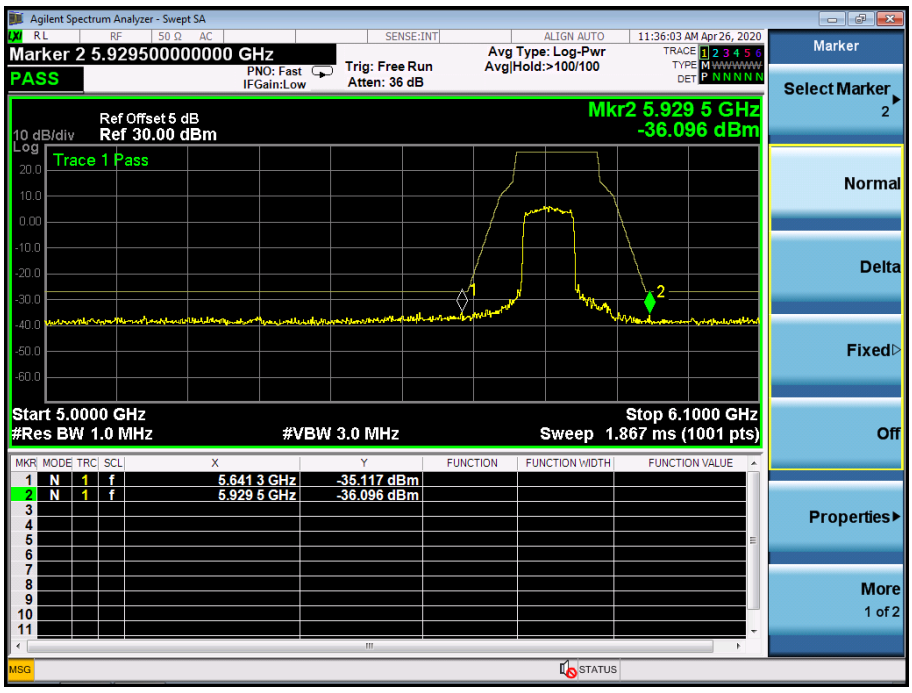


(802.11ac40) Band Edge, Right Side

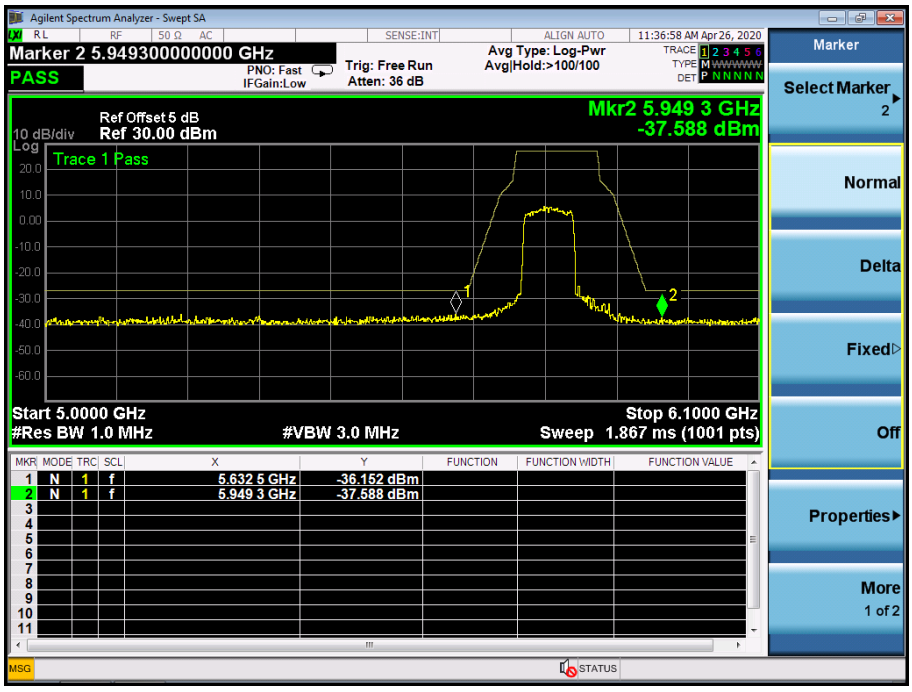


5.745~5.825 GHz

(802.11ac80) Band Edge, Left Side



(802.11ac80) Band Edge, Right Side



8.SPURIOUS RF CONDUCTED EMISSIONS

8.1CONFORMANCE LIMIT

Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(2) For transmitters operating in the 5.725-5.85 GHz band(i) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

.

8.2MEASURING INSTRUMENTS

The Measuring equipment is listed in the section 6.3 of this test report.

8.3TEST SETUP

Please refer to Section 6.1 of this test report.

8.4TEST PROCEDURE

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

8.5TEST RESULTS

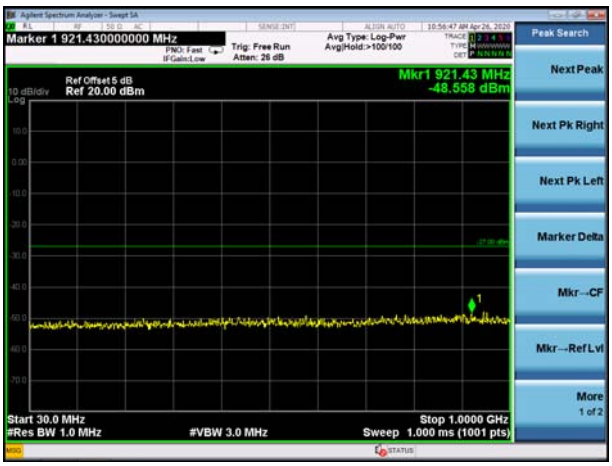
Remark: The measurement frequency range is from 9KHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandege measurement data.

About:26.5GHz-40GHz, The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

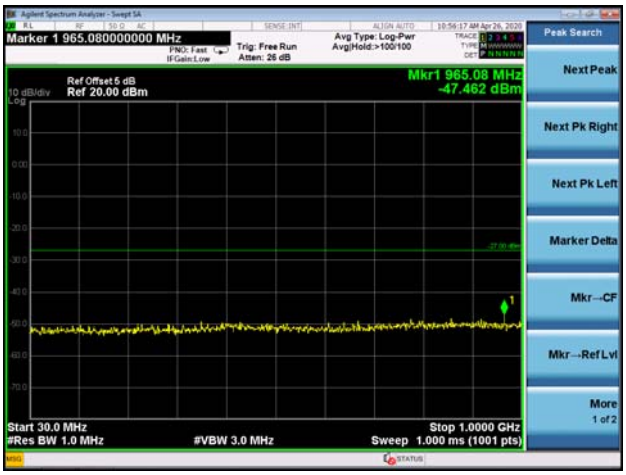
Note: A(B) Represent the value of antenna A and B, The worst data is Antenna A ,only shown Antenna A Plot.

5.2G

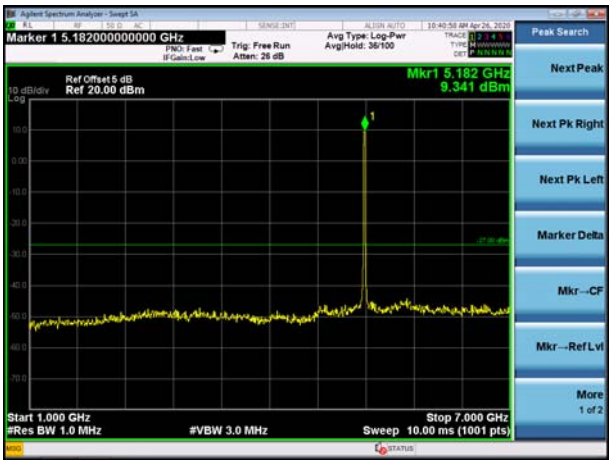
802.11a on channel 36



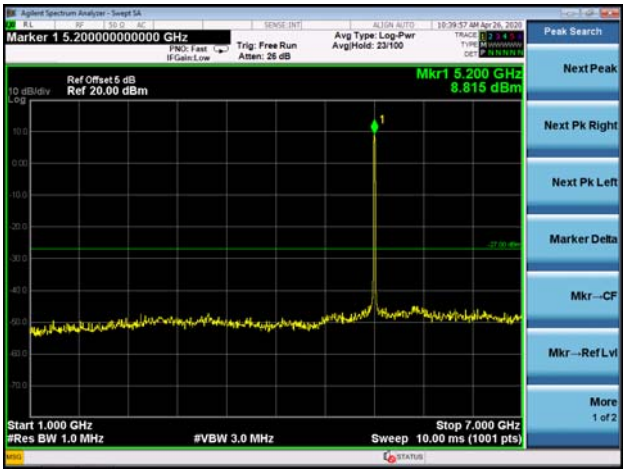
802.11a on channel 40



802.11a on channel 36



802.11a on channel 40

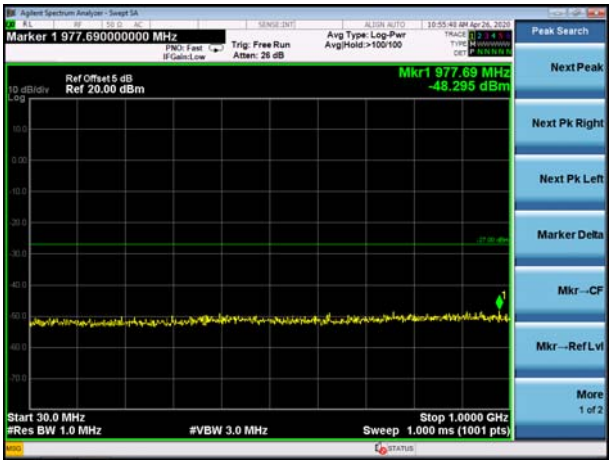


802.11a on channel 36

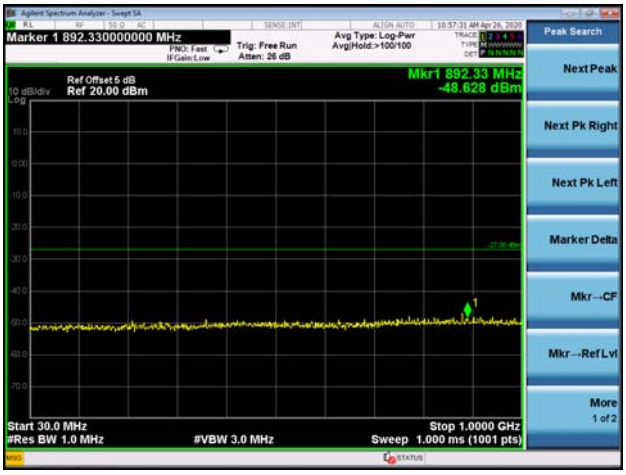
802.11a on channel 40

Test Plot

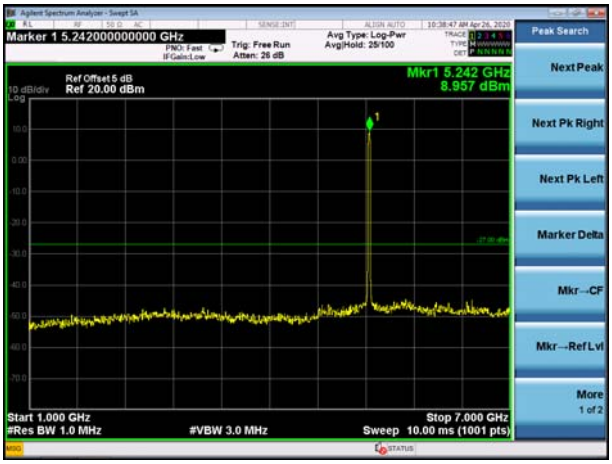
802.11a on channel 48



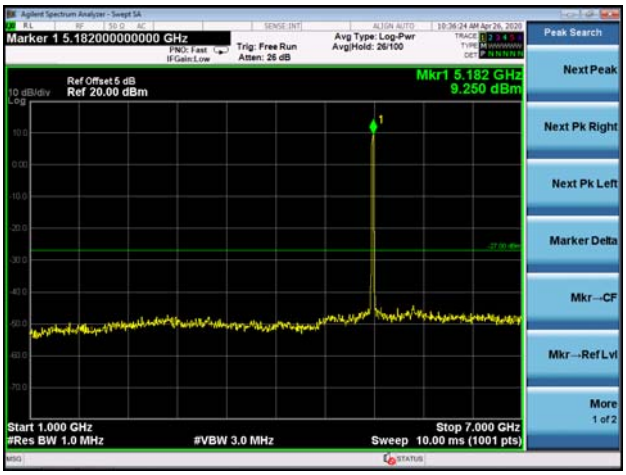
802.11n20 on channel 36



802.11a on channel 48



802.11n20 on channel 36

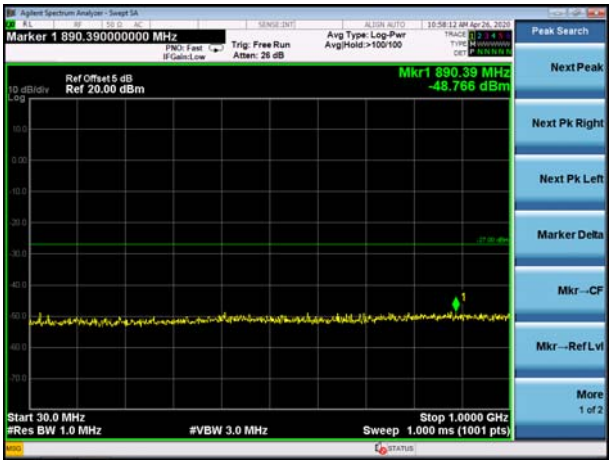


802.11a on channel 48

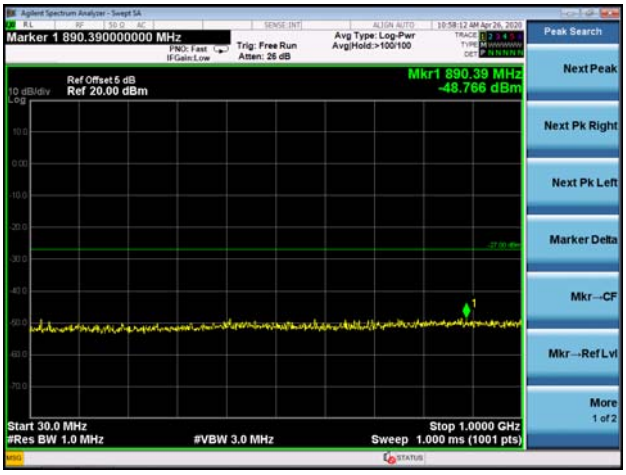
802.11n20 on channel 36

Test Plot

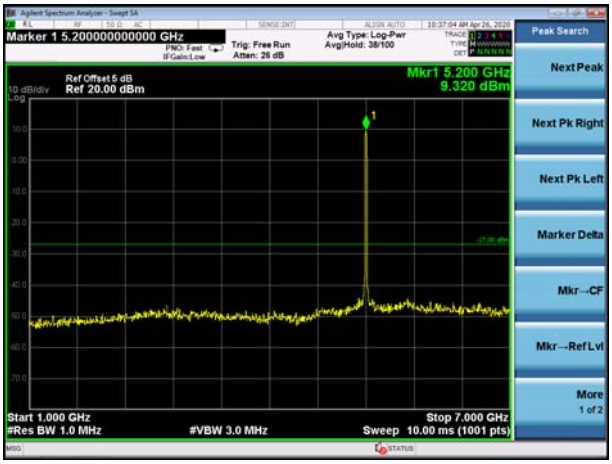
802.11n20 on channel 40



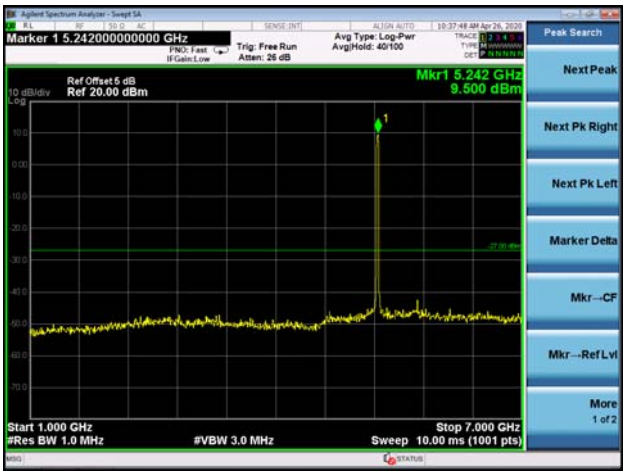
802.11n20 on channel 48



802.11n20 on channel 40



802.11n20 on channel 48

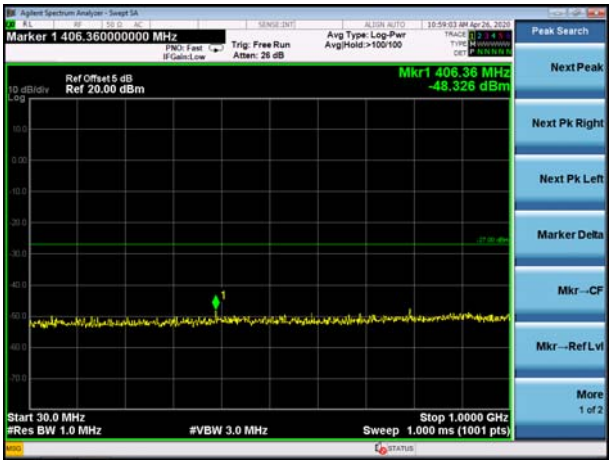


802.11n20 on channel 40

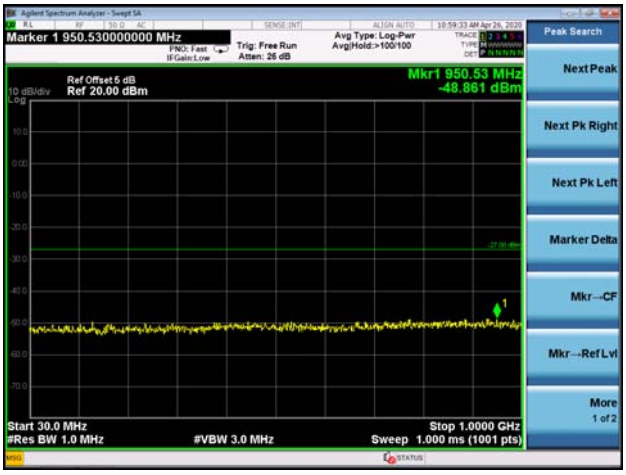
802.11n20 on channel 48

Test Plot

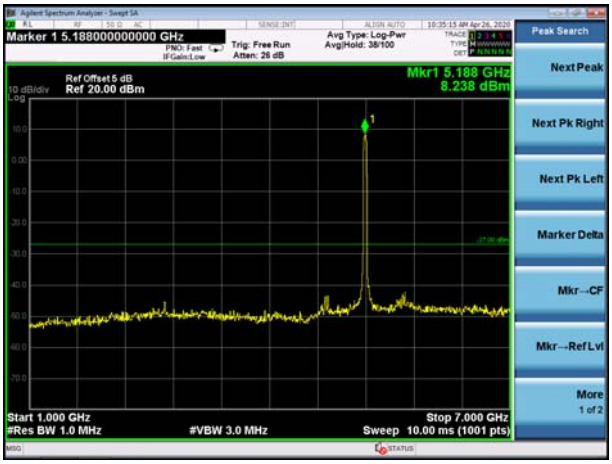
802.11n40 on channel 38



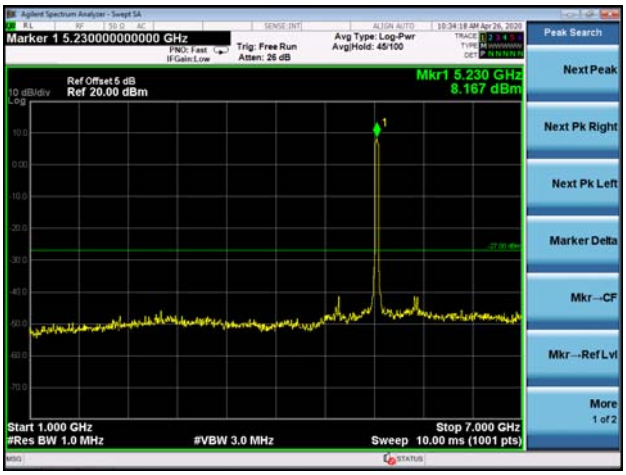
802.11n40 on channel 46



802.11n40 on channel 38



802.11n40 on channel 46

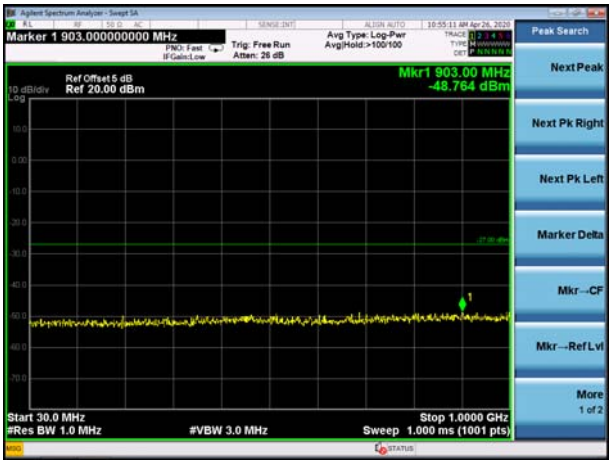


802.11n40 on channel 38

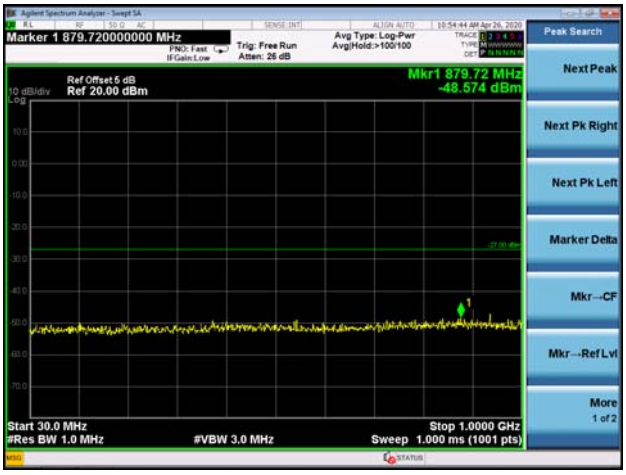
802.11n40 on channel 46

Test Plot

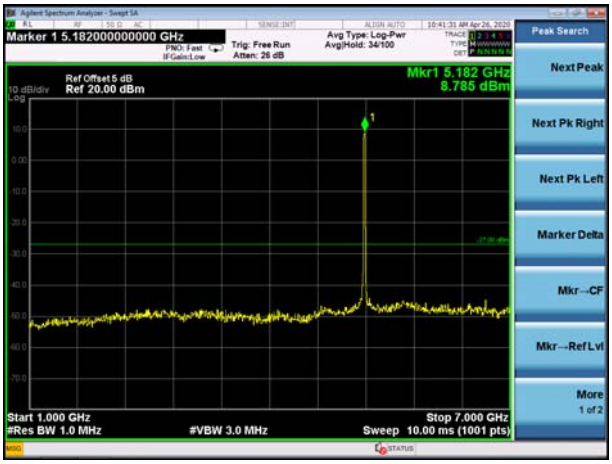
802.11ac20 on channel 36



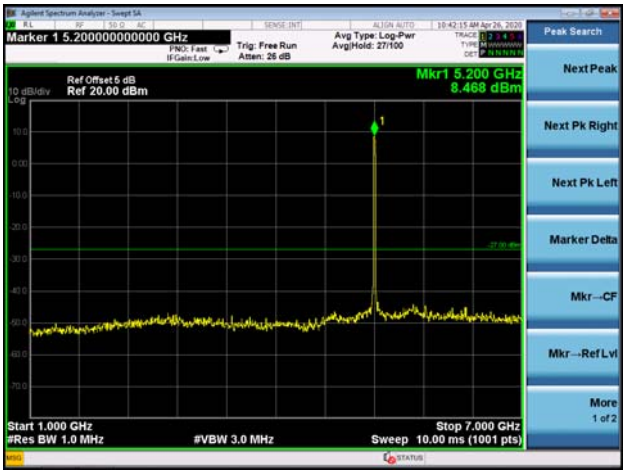
802.11ac20 on channel 40



802.11ac20 on channel 36



802.11ac20 on channel 40

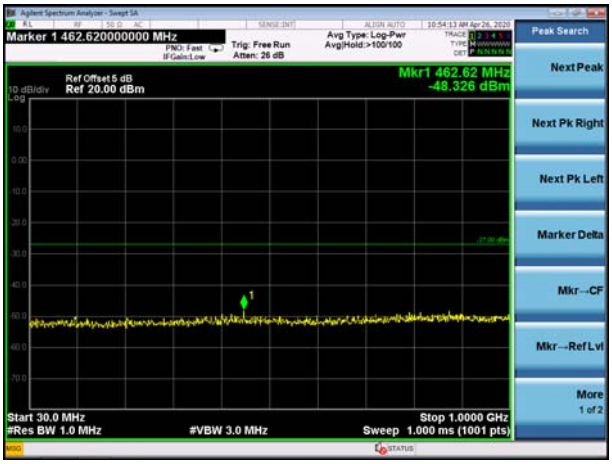


802.11ac20 on channel 36

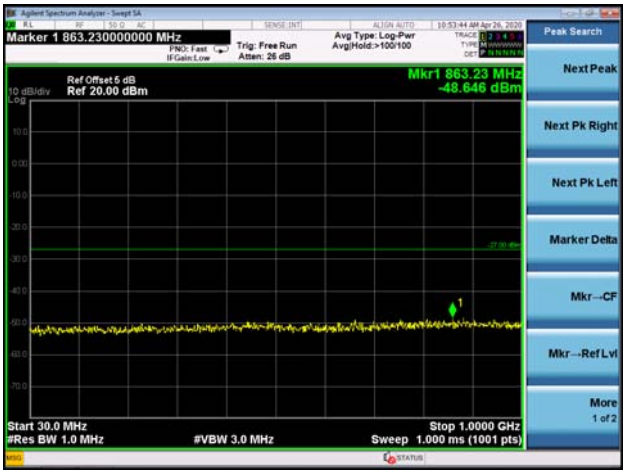
802.11ac20 on channel 40

Test Plot

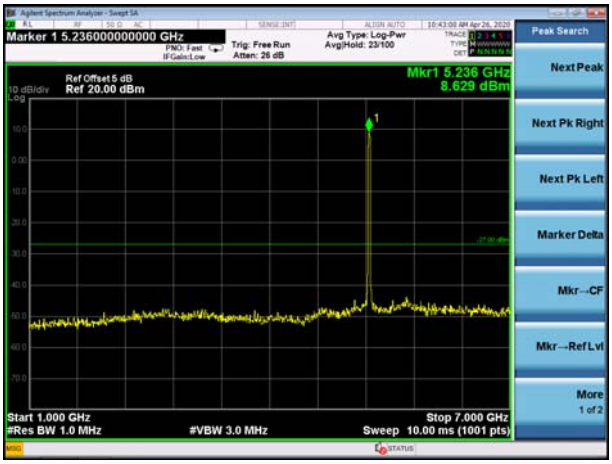
802.11ac20 on channel 48



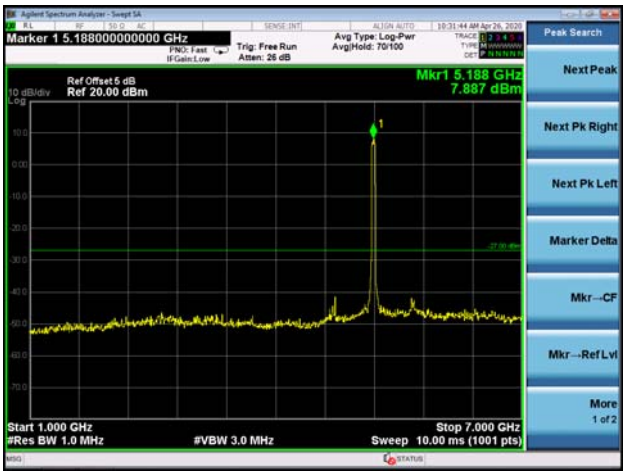
802.11ac40 on channel 38



802.11ac20 on channel 48



802.11ac40 on channel 38

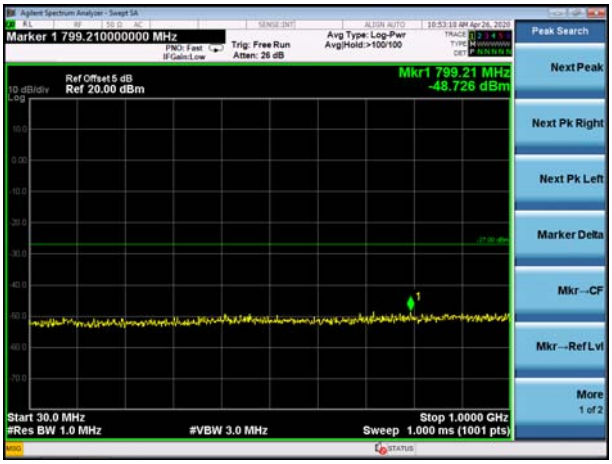


802.11ac20 on channel 48

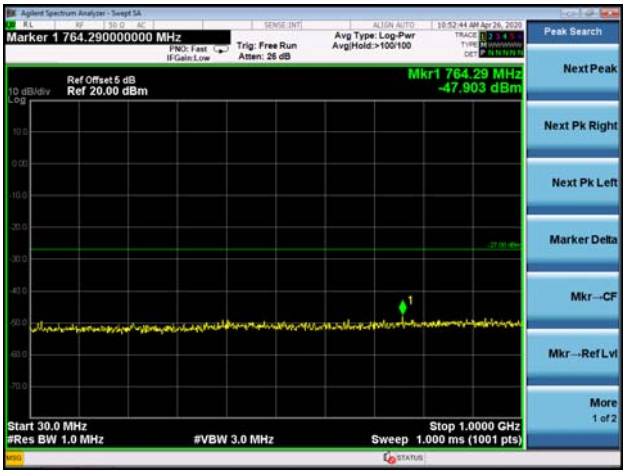
802.11ac40 on channel 38

Test Plot

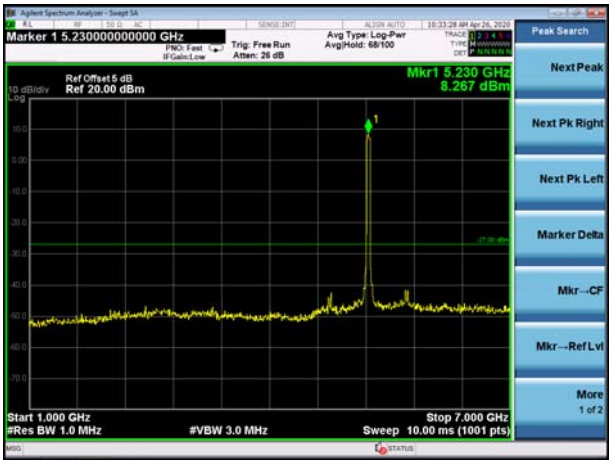
802.11ac40 on channel 46



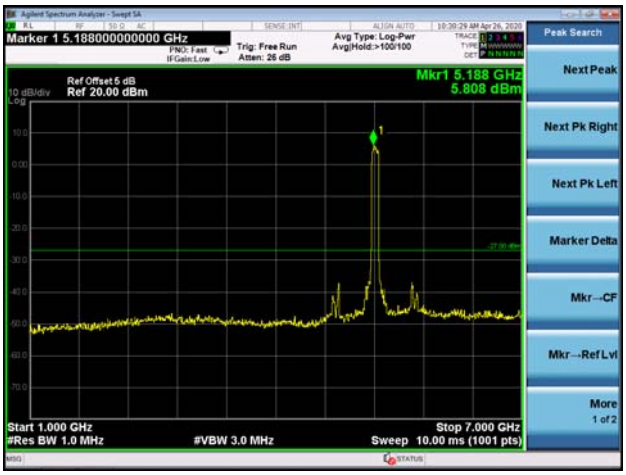
802.11ac80 on channel 42



802.11 ac40 on channel 46



802.11 ac80 on channel 42



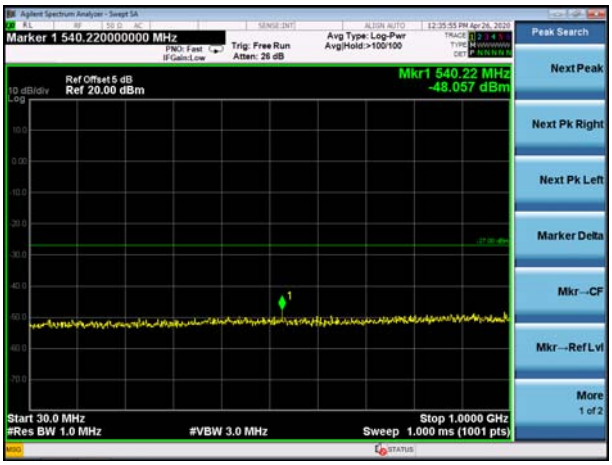
802.11 ac40 on channel 46

802.11 ac80 on channel 42

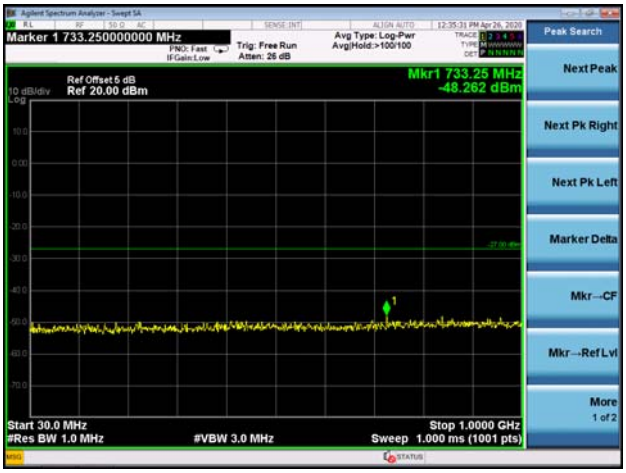
5.8G

Test Plot

802.11a on channel 149

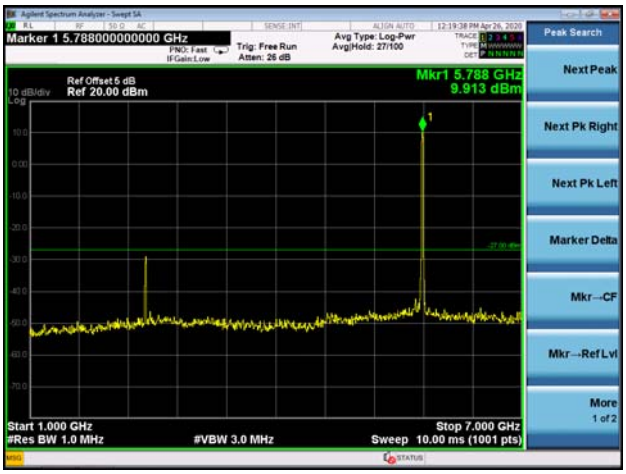


802.11a on channel 157



802.11a on channel 149

802.11a on channel 157

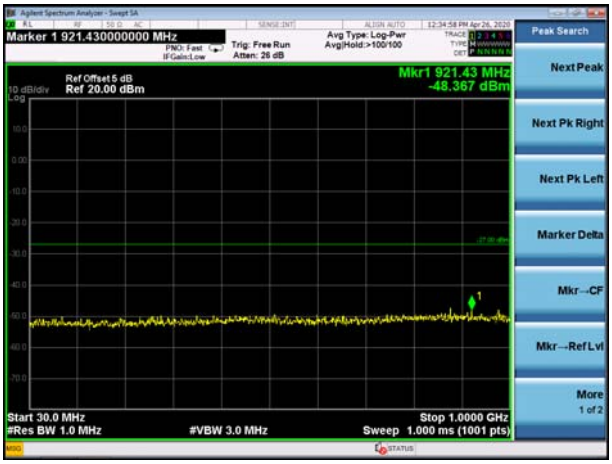


802.11a on channel 149

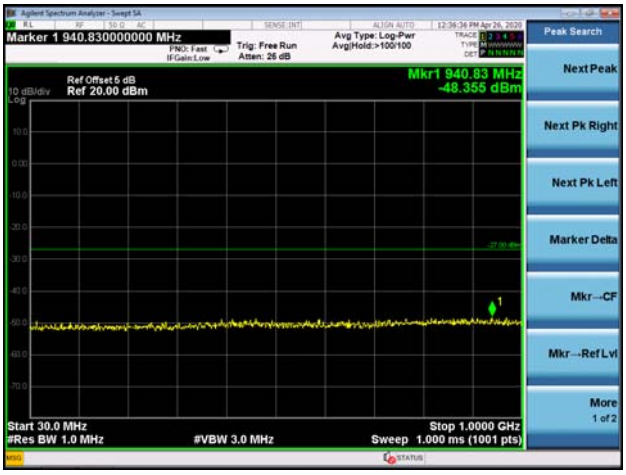
802.11a on channel 157

Test Plot

802.11a on channel 165

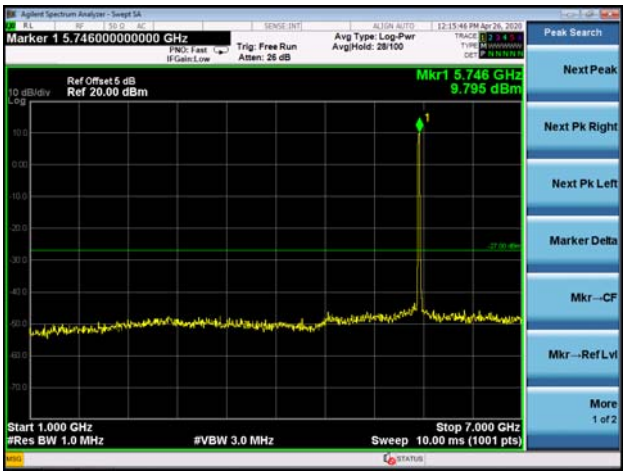


802.11n20 on channel 149



802.11a on channel 165

802.11n20 on channel 149

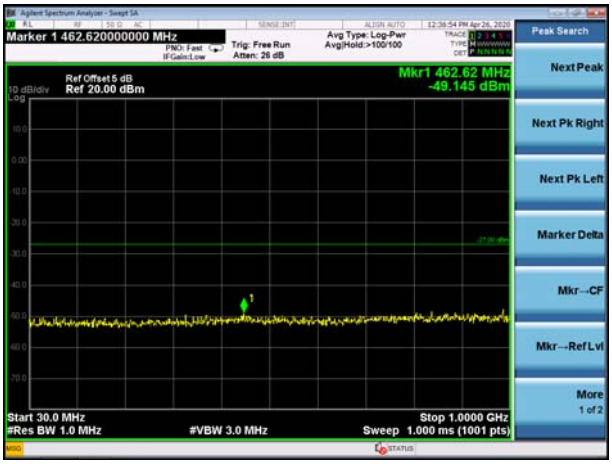


802.11a on channel 165

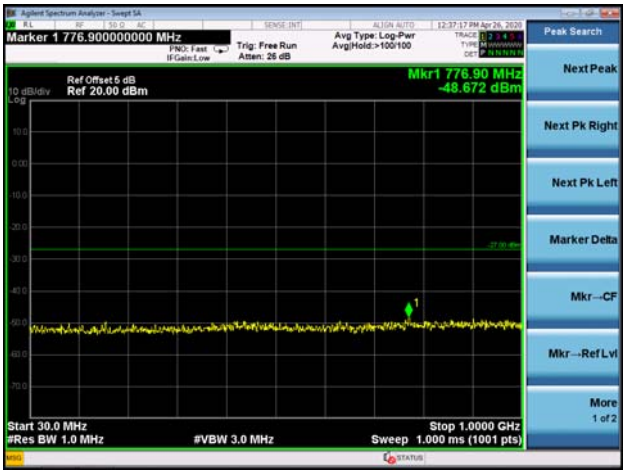
802.11n20 on channel 149

Test Plot

802.11n20 on channel 157



802.11n20 on channel 165



802.11n20 on channel 157

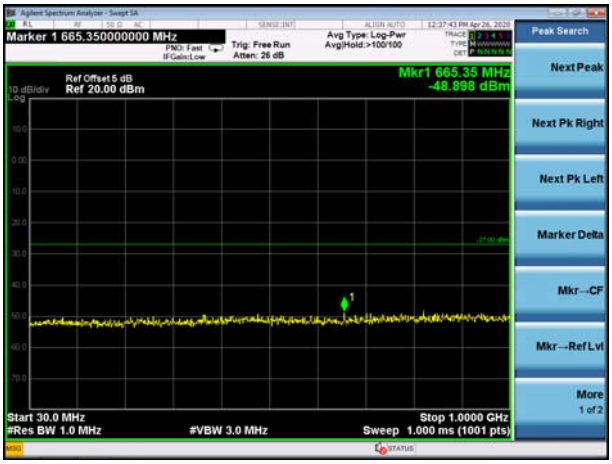
802.11n20 on channel 165

802.11n20 on channel 157

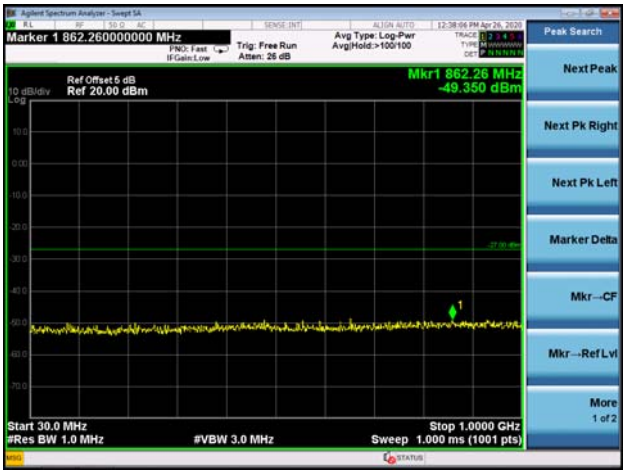
802.11n20 on channel 165

Test Plot

802.11n40 on channel 151

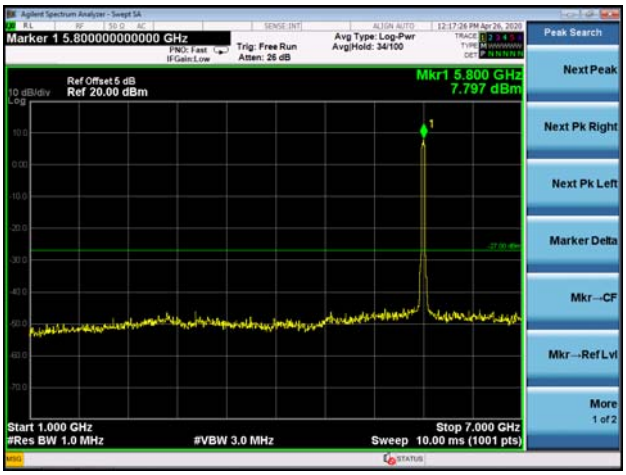


802.11n40 on channel 159



802.11n40 on channel 151

802.11n40 on channel 159

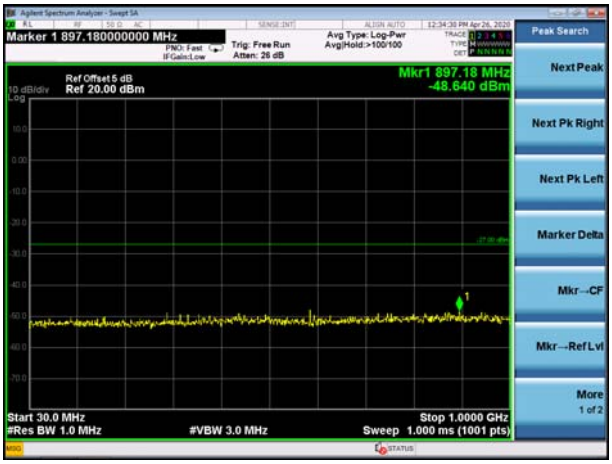


802.11n40 on channel 151

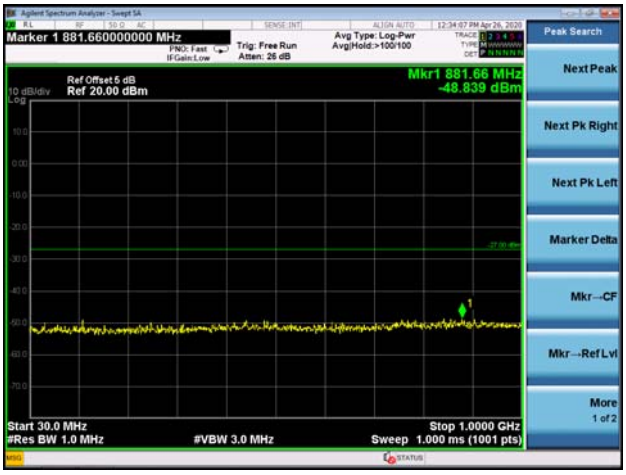
802.11n40 on channel 159

Test Plot

802.11ac20 on channel 149



802.11ac20 on channel 157



802.11ac20 on channel 149

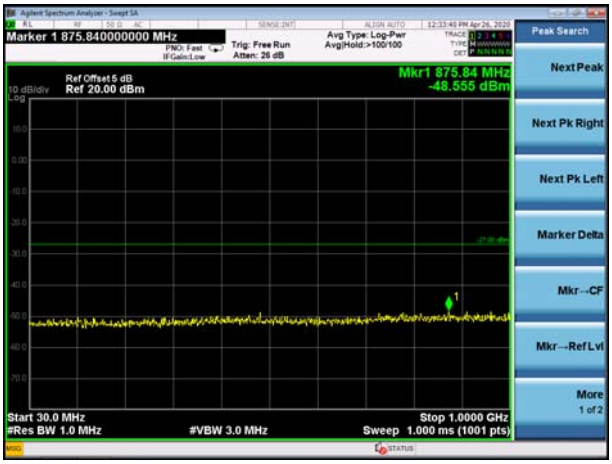
802.11ac20 on channel 157

802.11ac20 on channel 149

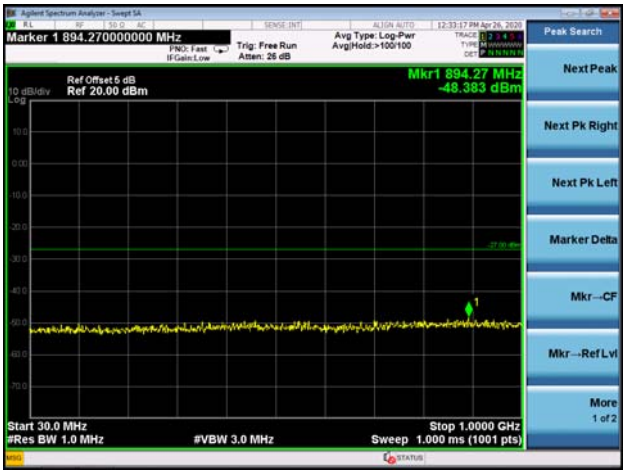
802.11ac20 on channel 157

Test Plot

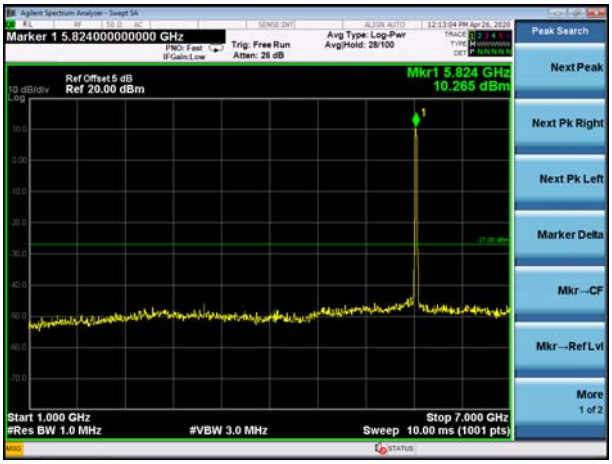
802.11ac20 on channel 165



802.11ac40 on channel 151



802.11ac20 on channel 165



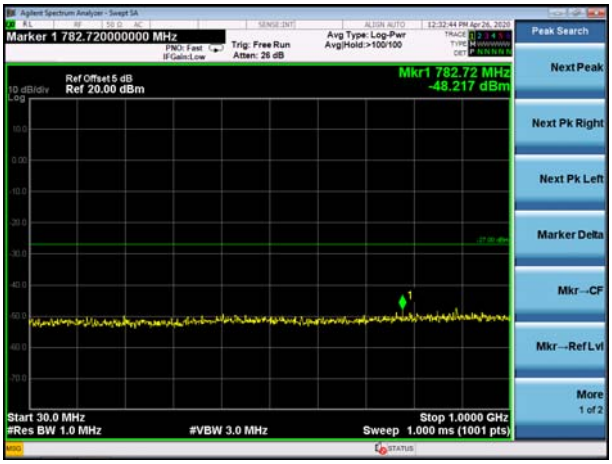
802.11ac40 on channel 151

802.11ac20 on channel 165

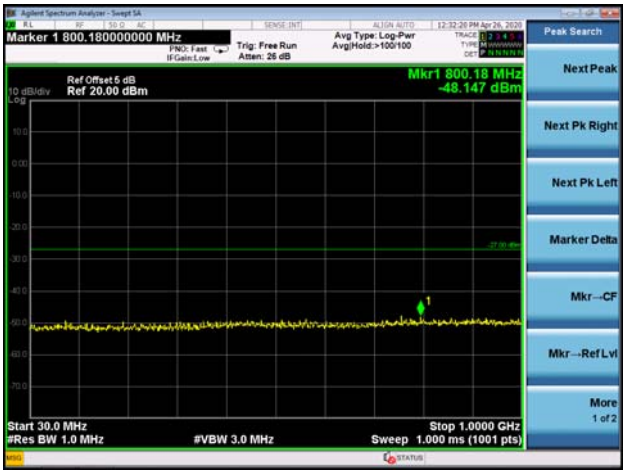
802.11ac40 on channel 151

Test Plot

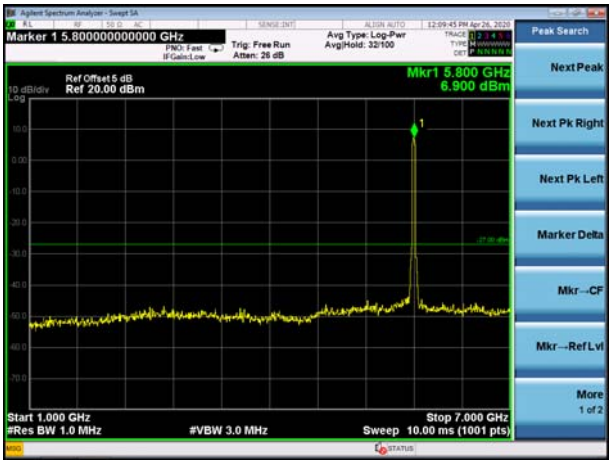
802.11ac40 on channel 159



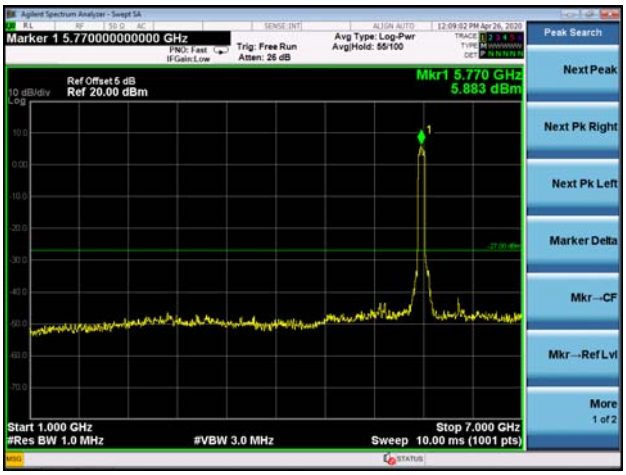
802.11ac80 on channel 155



802.11 ac40 on channel 159



802.11 ac80 on channel 155



802.11 ac40 on channel 159

802.11 ac80 on channel 155

9. Frequency Stability Measurement

9.1 LIMIT

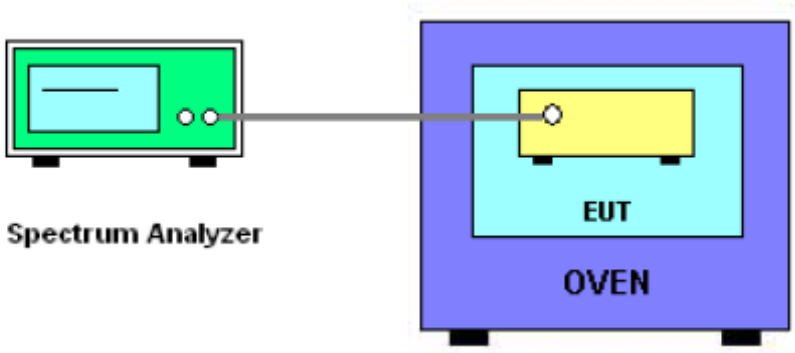
Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

The transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band (IEEE 802.11n specification).

9.2 TEST PROCEDURES

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 10_6 ppm and the limit is less than ±20ppm (IEEE 802.11nspecification).
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature is -20°C~70°C.

9.3 TEST SETUP LAYOUT



9.4 EUT OPERATION DURING TEST

The EUT was programmed to be in continuously un-modulation transmitting mode.

9.5 TEST RESULTS

Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	101kPa	Test Voltage ：	DC 12V
Test Mode ：	TX Frequency U-NII-1 (5180-5240MHz)		

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	12.00	5180.0525	5180	0.0525	10.1351
		V max (V)	13.80	5180.0324	5180	0.0324	6.2548
		V min (V)	10.20	5180.0243	5180	0.0243	4.6911
Limits				5150-5250 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	-20	5180.0055	5180	0.0055	1.0618
		T (°C)	-10	5180.0102	5180	0.0102	1.9691
		T (°C)	0	5180.0325	5180	0.0325	6.2741
		T (°C)	10	5180.0383	5180	0.0383	7.3938
		T (°C)	20	5180.0294	5180	0.0294	5.6757
		T (°C)	30	5180.0215	5180	0.0215	4.1506
		T (°C)	40	5180.0128	5180	0.0128	2.4710
		T (°C)	50	5180.0092	5180	0.0092	1.7761
		T (°C)	60	5180.0417	5180	0.0417	8.0502
		T (°C)	70	5180.0695	5180	0.0695	13.4170
Limits				5150-5250 MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	12.00	5200.0253	5200	0.0253	4.8654
		V max (V)	13.80	5200.0427	5200	0.0427	8.2115
		V min (V)	10.20	5200.0698	5200	0.0698	13.4231
Limits				5150-5250 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	-20	5200.0632	5200	0.0632	12.1538
		T (°C)	-10	5200.0524	5200	0.0524	10.0769
		T (°C)	0	5200.0432	5200	0.0432	8.3077
		T (°C)	10	5200.0925	5200	0.0925	17.7885
		T (°C)	20	5200.0634	5200	0.0634	12.1923
		T (°C)	30	5200.0128	5200	0.0128	2.4615
		T (°C)	40	5200.0732	5200	0.0732	14.0769
		T (°C)	50	5200.0413	5200	0.0413	7.9423
		T (°C)	60	5200.0324	5200	0.0324	6.2308
		T (°C)	70	5200.0425	5200	0.0425	8.1731
Limits				5150-5250 MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	12.00	5240.0132	5240	0.0132	2.5191
		V max (V)	13.80	5240.0414	5240	0.0414	7.9008
		V min (V)	10.20	5240.0093	5240	0.0093	1.7748
Limits				5150-5250 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	-20	5240.0093	5240	0.0093	1.7748
		T (°C)	-10	5240.0031	5240	0.0031	0.5916
		T (°C)	0	5240.0145	5240	0.0145	2.7672
		T (°C)	10	5240.0854	5240	0.0854	16.2977
		T (°C)	20	5240.0116	5240	0.0116	2.2137
		T (°C)	30	5240.0122	5240	0.0122	2.3282
		T (°C)	40	5240.0068	5240	0.0068	1.2977
		T (°C)	50	5240.0074	5240	0.0074	1.4122
		T (°C)	60	5240.0088	5240	0.0088	1.6794
		T (°C)	70	5240.0103	5240	0.0103	1.9656
Limits				5150-5250 MHz			
Result				Complies			

Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	101kPa	Test Voltage ：	DC 12V
Hzst Mode ：	TX Frequency(5745-5825MHz)		

Voltage vs. Frequency Stabilit

TEST CONDITIONS				Reference Frequency：5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	12.00	5745.01098	5745	0.01098	1.9112
		V max (V)	13.80	5745.00743	5745	0.00743	1.2938
		V min (V)	10.20	5745.00807	5745	0.00807	1.4055
Limits				5725-5850 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	-20	5745.00908	5745	0.00908	1.5803
		T (°C)	-10	5745.00388	5745	0.00388	0.6762
		T (°C)	0	5745.01087	5745	0.01087	1.8919
		T (°C)	10	5745.00030	5745	0.00030	0.0518
		T (°C)	20	5745.00449	5745	0.00449	0.7813
		T (°C)	30	5745.01339	5745	0.01339	2.3314
		T (°C)	40	5745.00435	5745	0.00435	0.7573
		T (°C)	50	5745.00134	5745	0.00134	0.2341
		T (°C)	60	5745.01142	5745	0.01142	1.9872
		T (°C)	70	5745.00332	5745	0.00332	0.5777
Limits				5725-5850 MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5785MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	12.00	5785.00945	5785	0.00945	1.6334
		V max (V)	13.80	5785.00068	5785	0.00068	0.1181
		V min (V)	10.20	5785.00606	5785	0.00606	1.0472
Limits				5725-5850 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5785MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	-20	5785.01254	5785	0.01254	2.1681
		T (°C)	-10	5785.00272	5785	0.00272	0.4707
		T (°C)	0	5785.00143	5785	0.00143	0.2464
		T (°C)	10	5785.00830	5785	0.00830	1.4347
		T (°C)	20	5785.00610	5785	0.00610	1.0541
		T (°C)	30	5785.00518	5785	0.00518	0.8958
		T (°C)	40	5785.00464	5785	0.00464	0.8015
		T (°C)	50	5785.00877	5785	0.00877	1.5162
		T (°C)	60	5785.00047	5785	0.00047	0.0812
		T (°C)	70	5785.00761	5785	0.00761	1.3159
Limits				5725-5850 MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	12.00	5825.00252	5825	0.00252	0.4328
		V max (V)	13.80	5825.00188	5825	0.00188	0.3227
		V min (V)	10.20	5825.01302	5825	0.01302	2.2357
Limits				5725-5850 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	-20	5825.01020	5825	0.01020	1.7510
		T (°C)	-10	5825.00221	5825	0.00221	0.3790
		T (°C)	0	5825.00528	5825	0.00528	0.9068
		T (°C)	10	5825.00004	5825	0.00004	0.0062
		T (°C)	20	5825.00353	5825	0.00353	0.6060
		T (°C)	30	5825.00201	5825	0.00201	0.3449
		T (°C)	40	5825.00287	5825	0.00287	0.4920
		T (°C)	50	5825.01172	5825	0.01172	2.0114
		T (°C)	60	5825.00917	5825	0.00917	1.5741
		T (°C)	70	5825.01177	5825	0.01177	2.0209
Limits				5725-5850 MHz			
Result				Complies			

10. ANTENNA REQUIREMENT

10.1 STANDARD REQUIREMENT

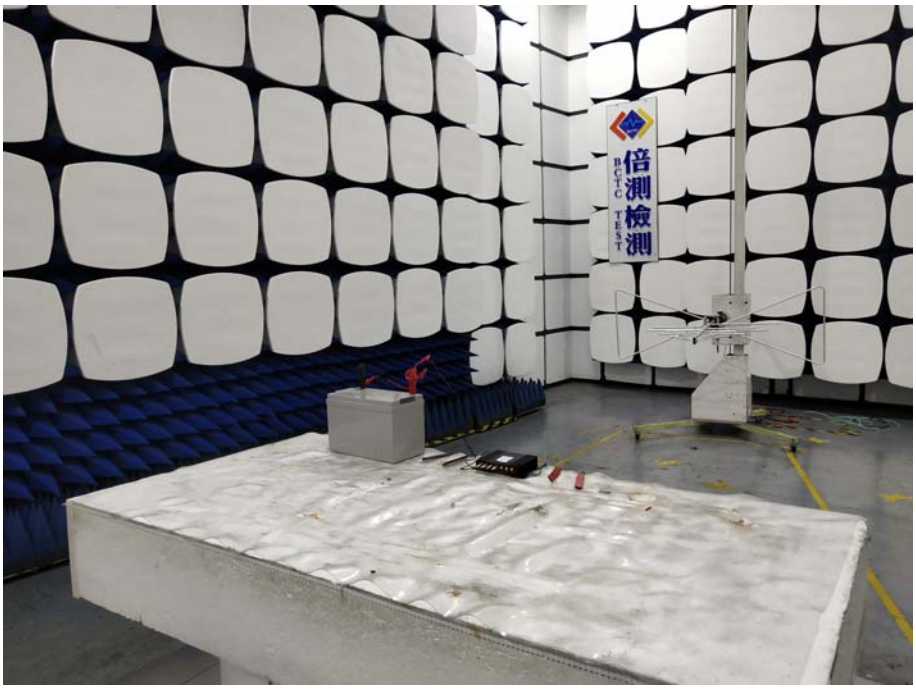
15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

10.2 EUT ANTENNA

The EUT antenna is External antenna (antenna gain : 5dBi), It comply with the standard requirement.

11. EUT TEST PHOTO

Radiated Measurement Photos



12. EUT PHOTO

EUT Photo 1

EUT Photo 2

EUT Photo 3

※※※※ END OF REPORT ※※※※※