9.SPURIOUS RF CONDUCTED EMISSIONS

9.1CONFORMANCE LIMIT

1. Below -20dB of the highest emission level in operating band.
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

9.2MEASURING INSTRUMENTS

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

9.3TEST SETUP

Please refer to Section 6.1 of this test report.

9.4TEST PROCEDURE

The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBW= 300KHz to measure the peak field strength , and mwasure frequeny range from 9KHz to 26.5GHz.

9.5TEST 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.

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

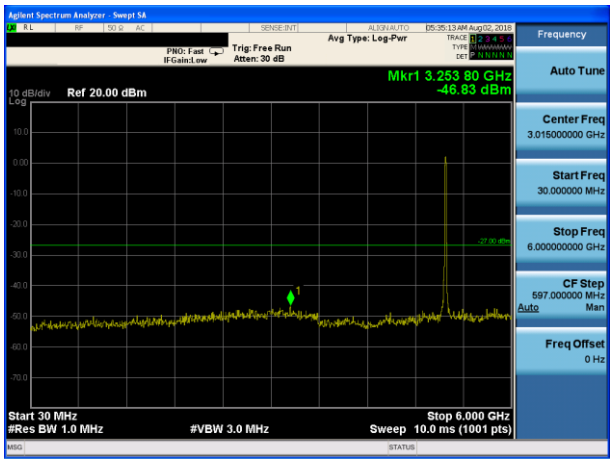
EUT has two antennas, and different modes support different transmit mode what describe as Following form:

Mode	Tx/Rx
802.11a	1Tx, 2Rx
802.11n/ac	1Tx /2Tx, 2Rx

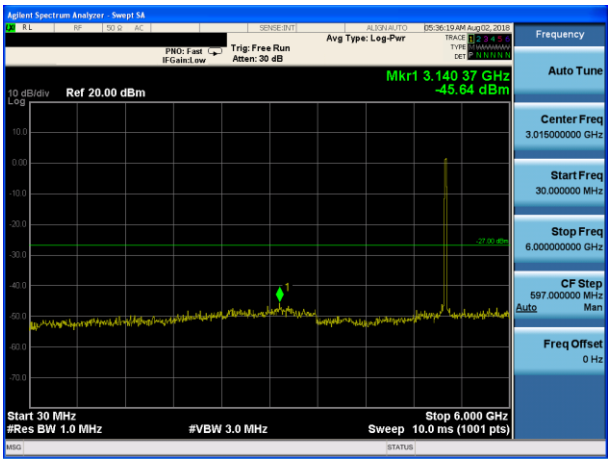
5.2G

Test Plot

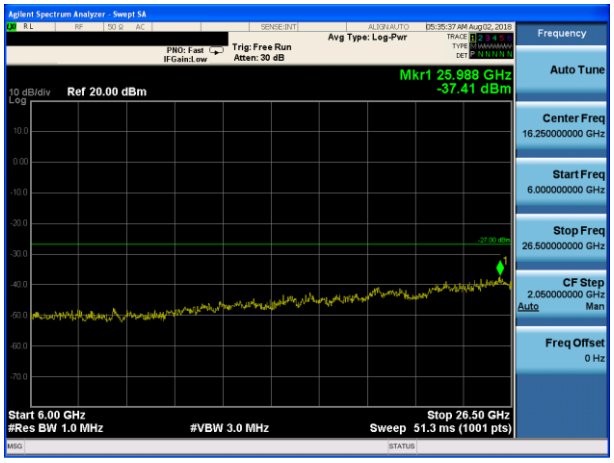
802.11a on channel 36



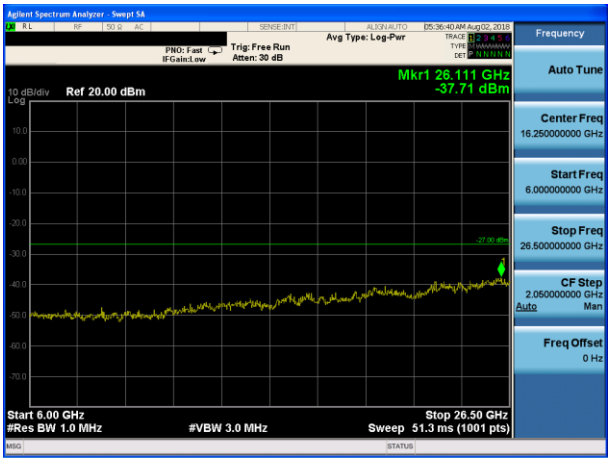
802.11a on channel 40



802.11a on channel 36

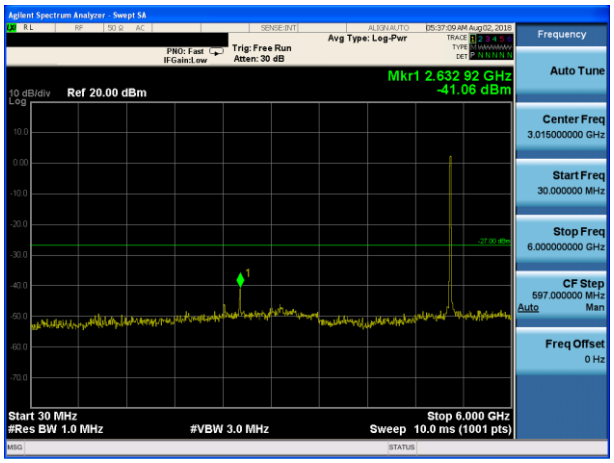


802.11a on channel 40

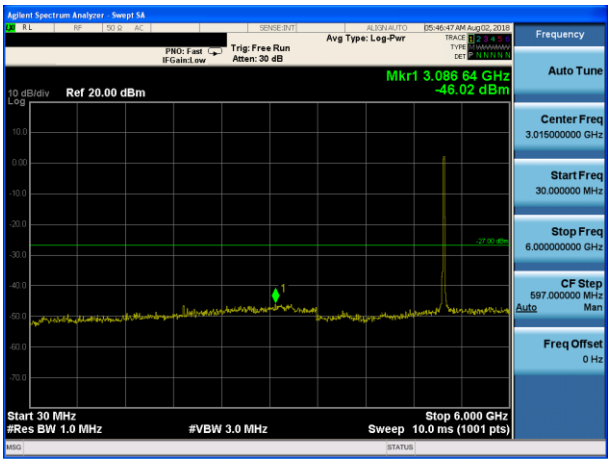


Test Plot

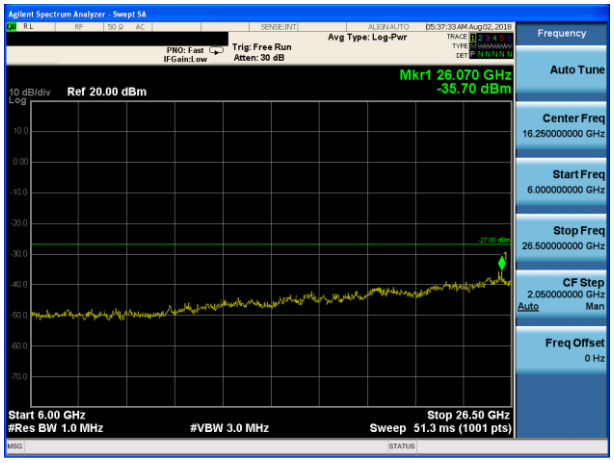
802.11a on channel 48



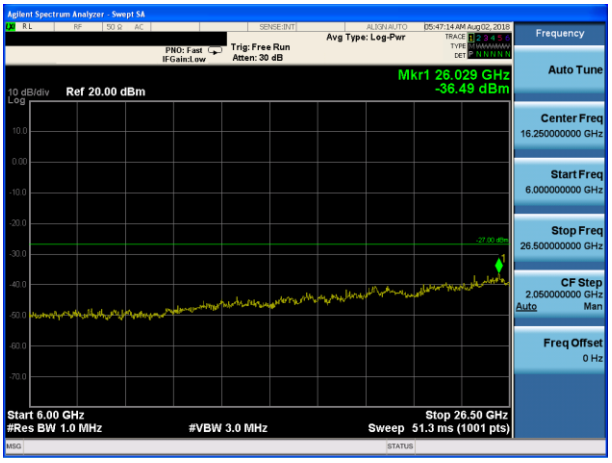
802.11n20 on channel 36



802.11a on channel 48

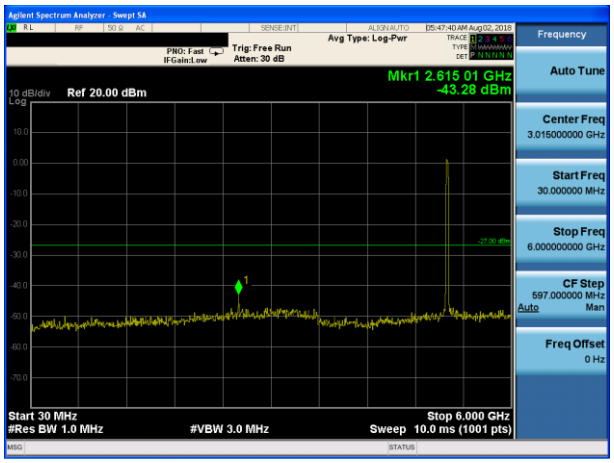


802.11n20 on channel 36

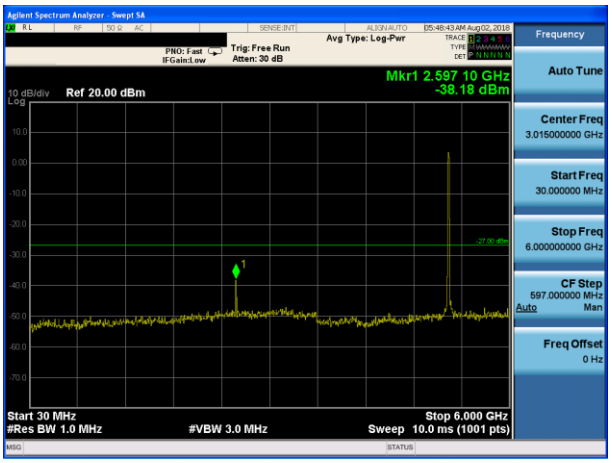


Test Plot

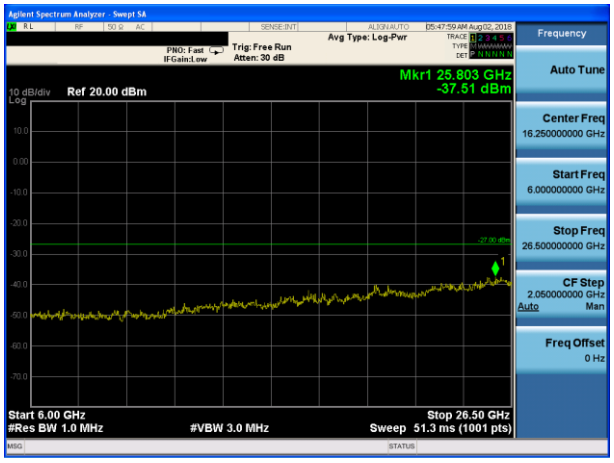
802.11n20 on channel 40



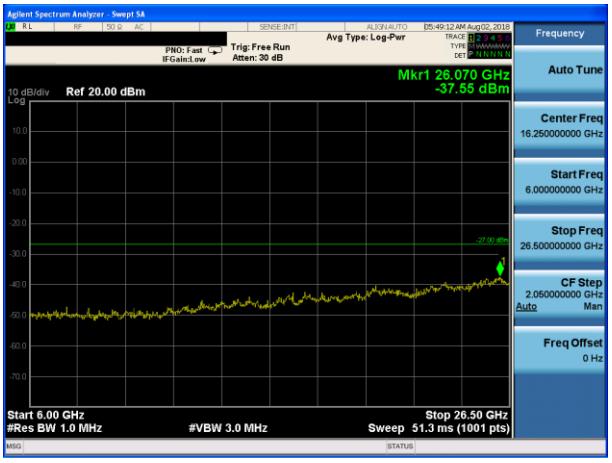
802.11n20 on channel 48



802.11n20 on channel 40

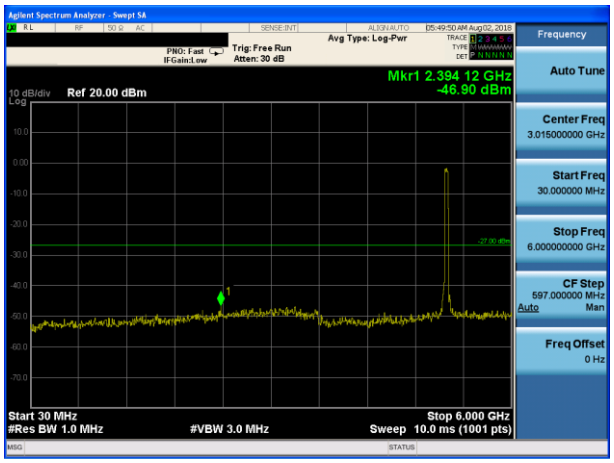


802.11n20 on channel 48

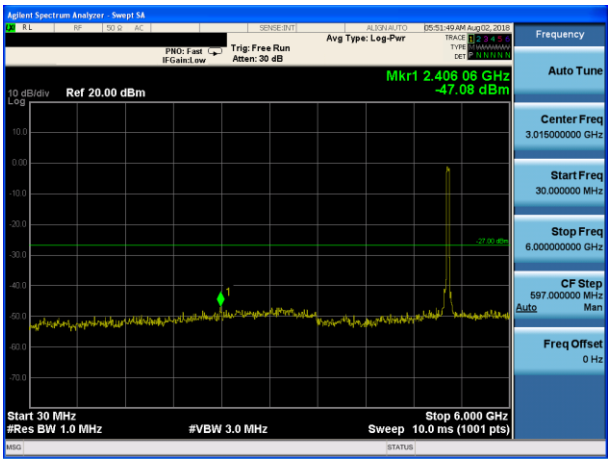


Test Plot

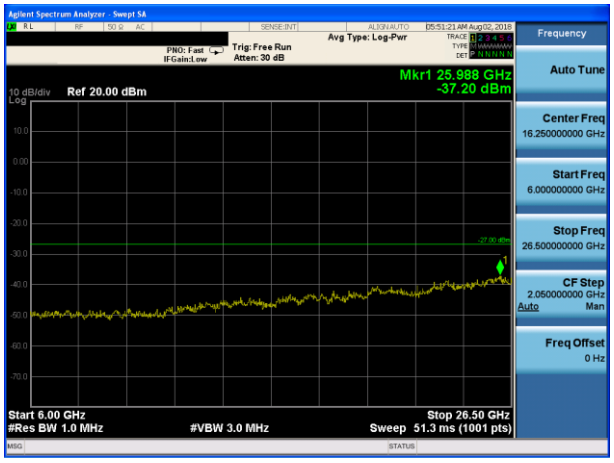
802.11n40 on channel 38



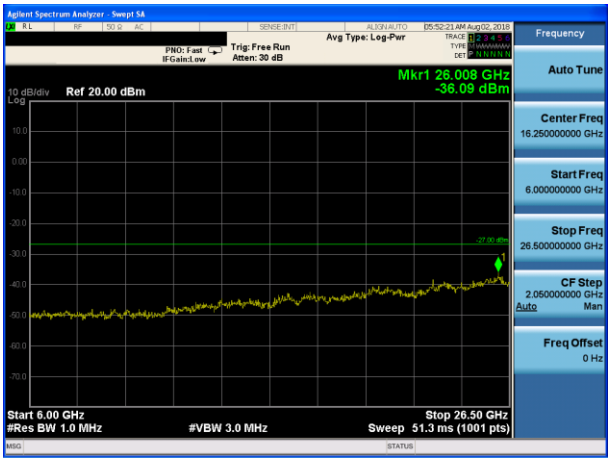
802.11n40 on channel 46



802.11n40 on channel 38

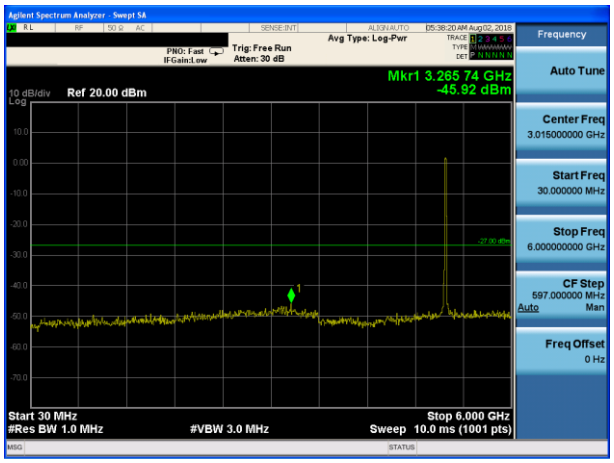


802.11n40 on channel 46

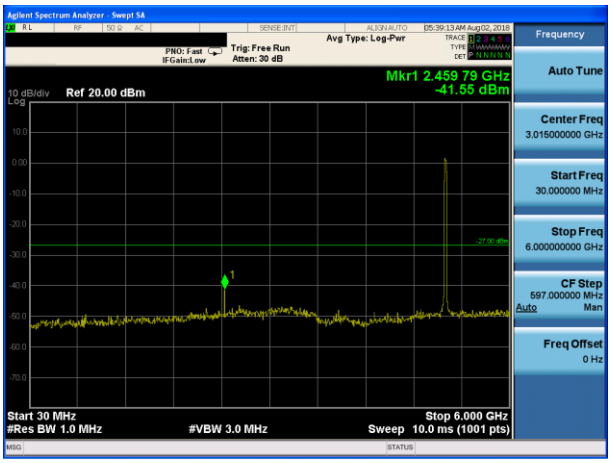


Test Plot

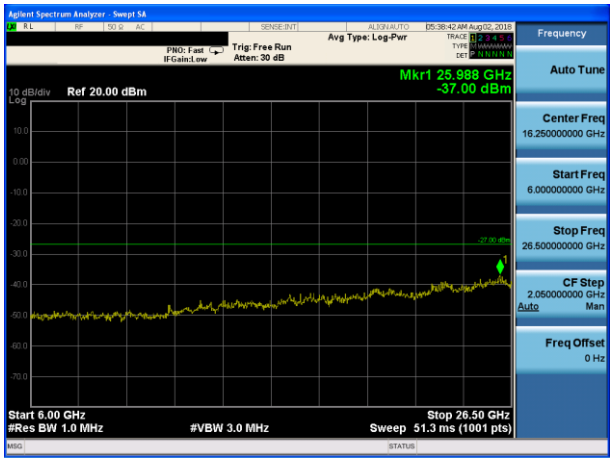
802.11ac20 on channel 36



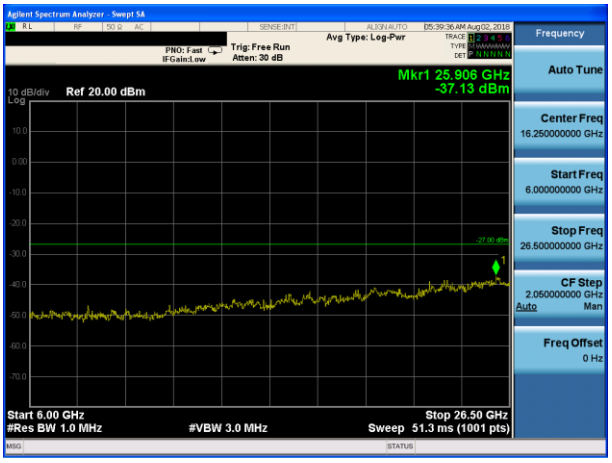
802.11ac20 on channel 40



802.11ac20 on channel 36

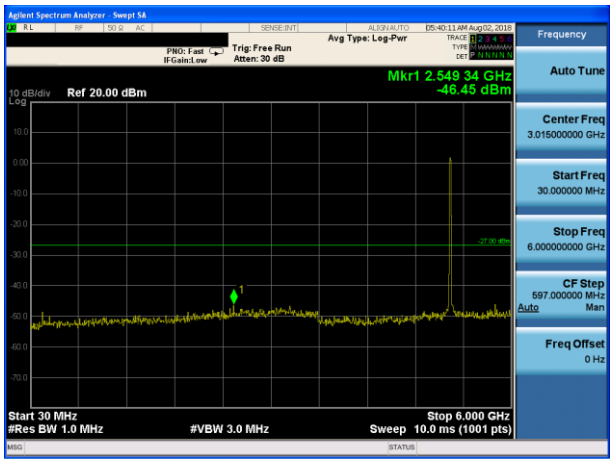


802.11ac20 on channel 40

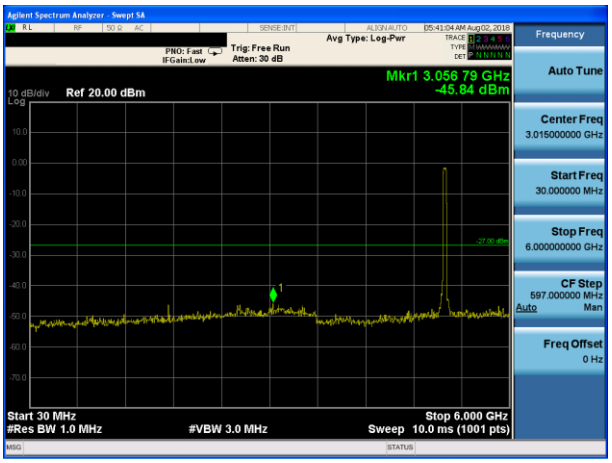


Test Plot

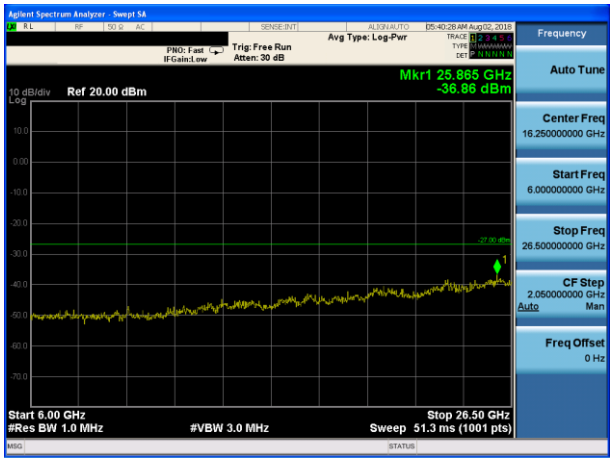
802.11ac20 on channel 48



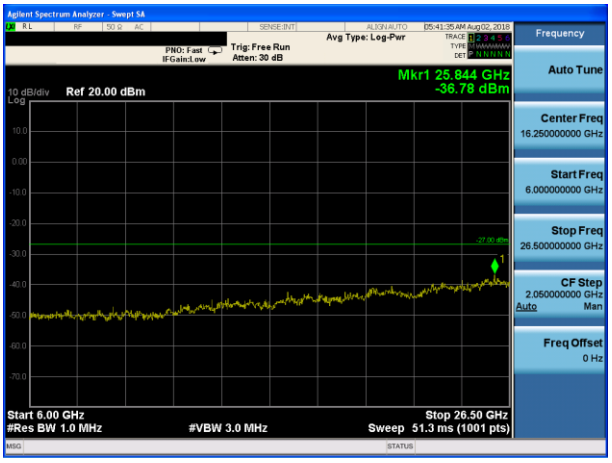
802.11ac40 on channel 38



802.11ac20 on channel 48

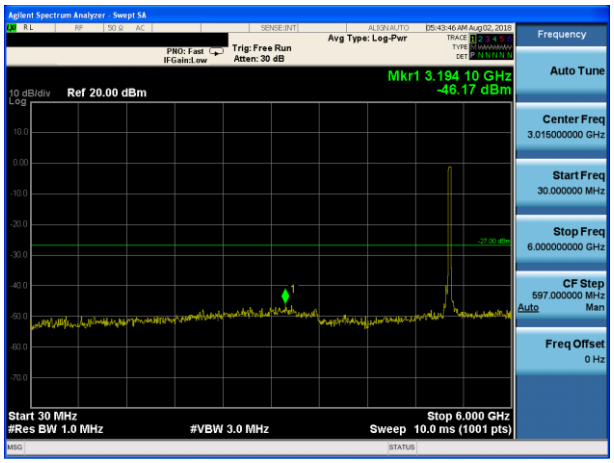


802.11ac40 on channel 38

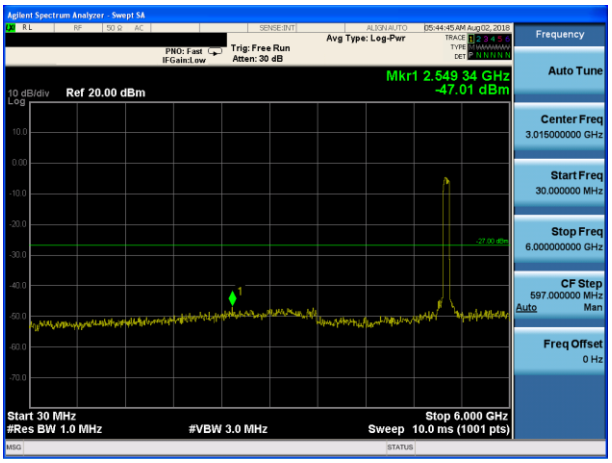


Test Plot

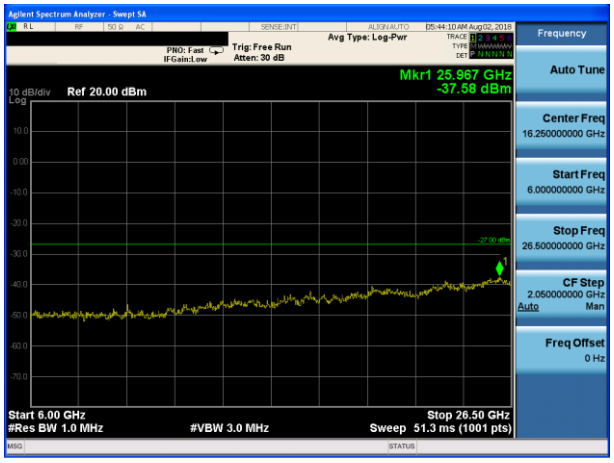
802.11ac40 on channel 46



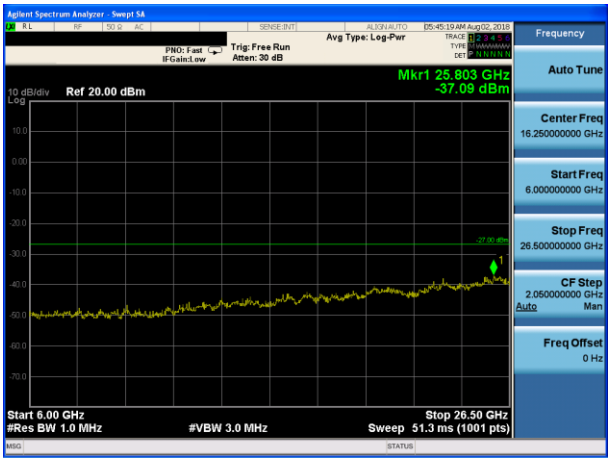
802.11ac80 on channel 42



802.11 ac40 on channel 46



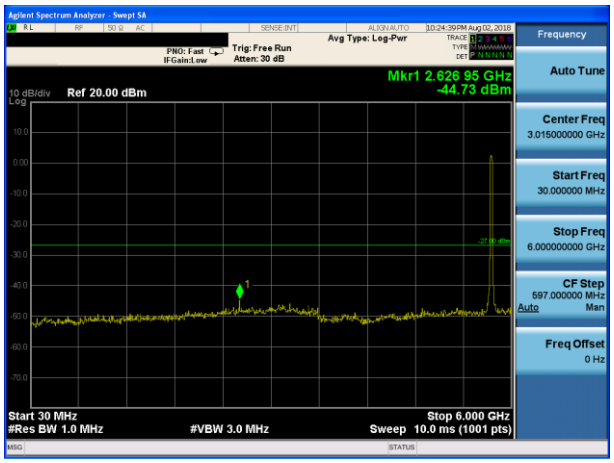
802.11 ac80 on channel 42



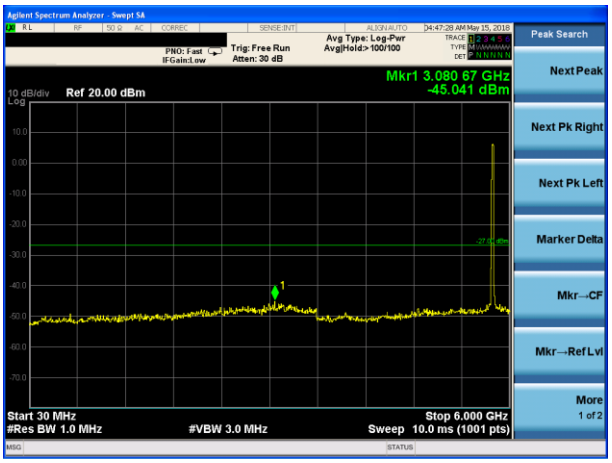
5.8G

Test Plot

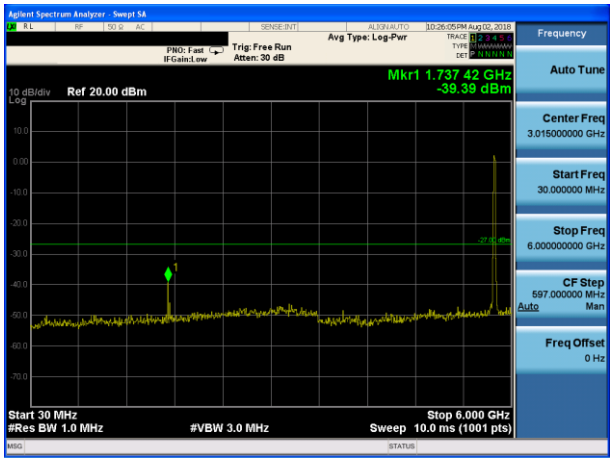
802.11a on channel 149



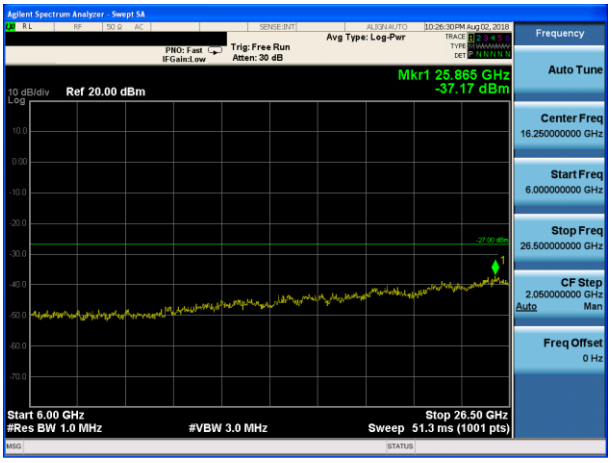
802.11a on channel 157



802.11a on channel 149

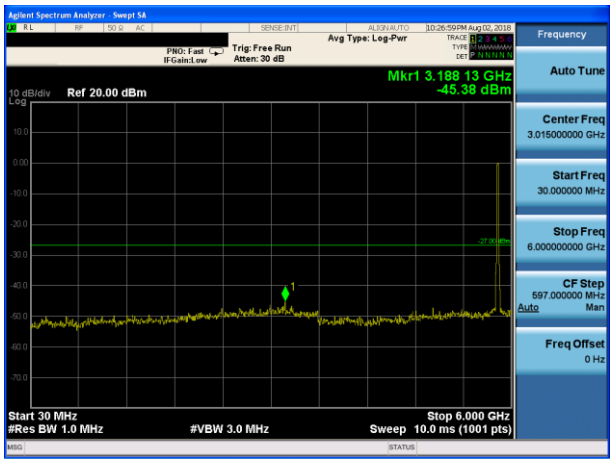


802.11a on channel 157

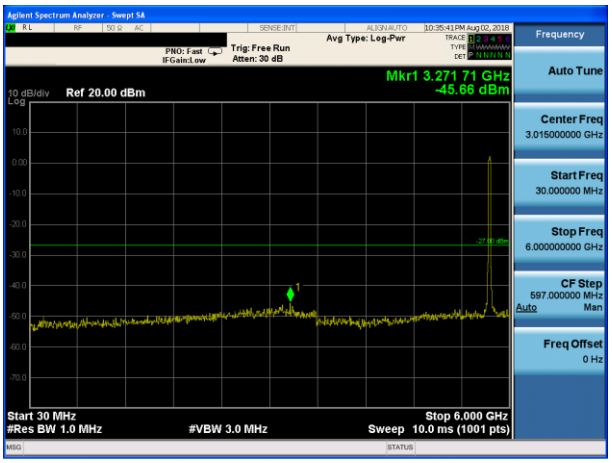


Test Plot

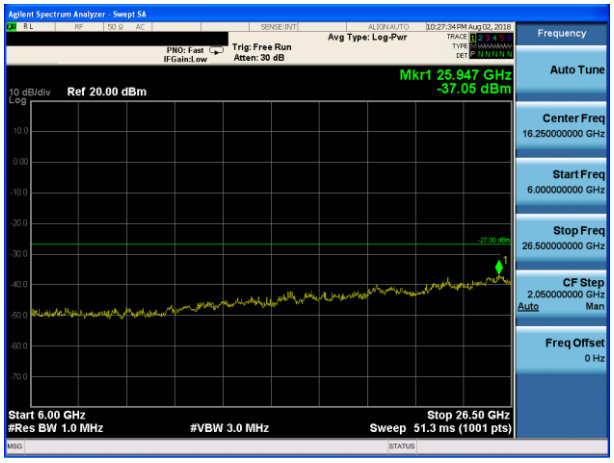
802.11a on channel 165



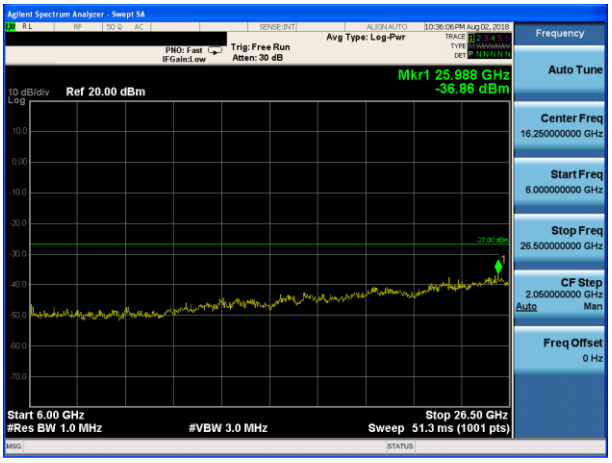
802.11n20 on channel 149



802.11a on channel 165

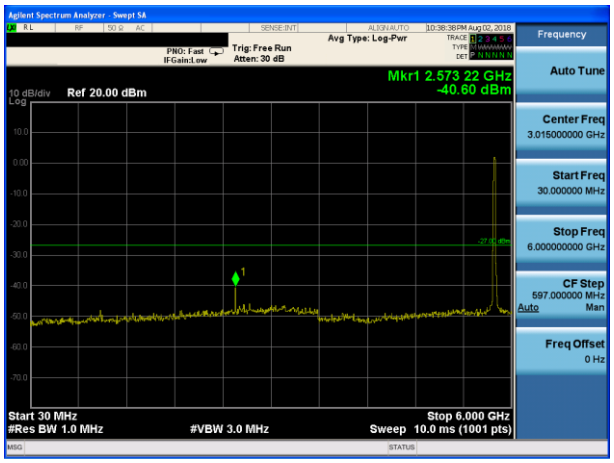


802.11n20 on channel 149

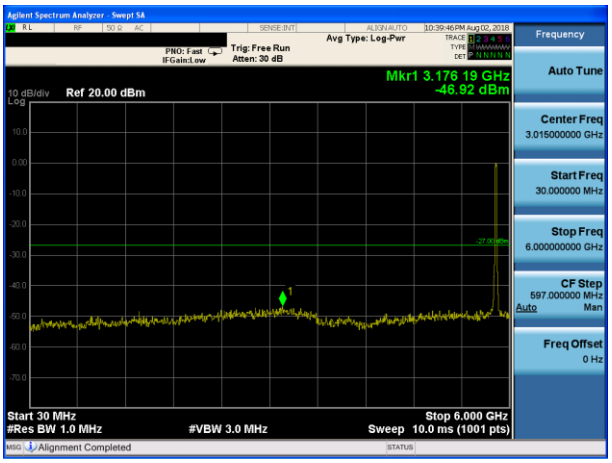


Test Plot

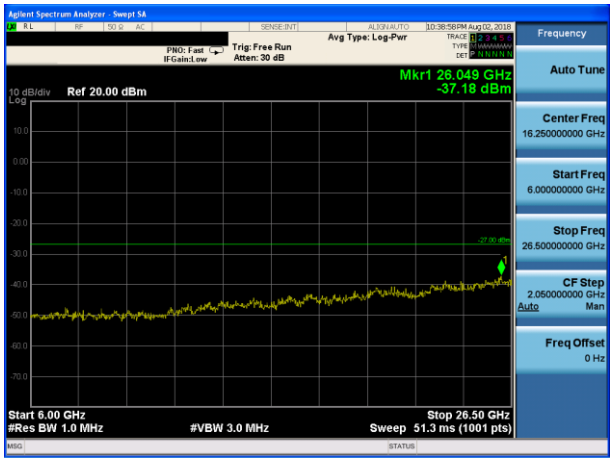
802.11n20 on channel 157



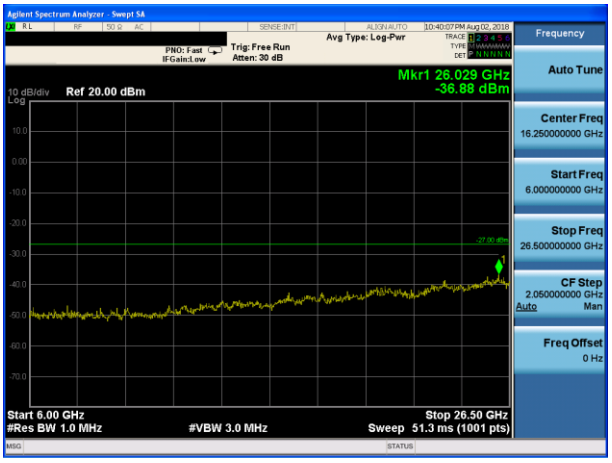
802.11n20 on channel 165



802.11n20 on channel 157

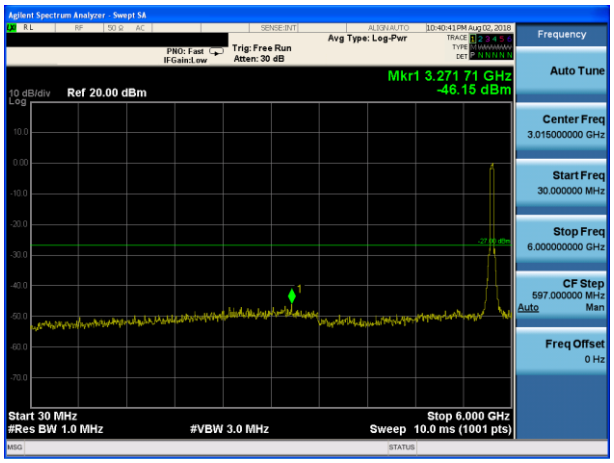


802.11n20 on channel 165

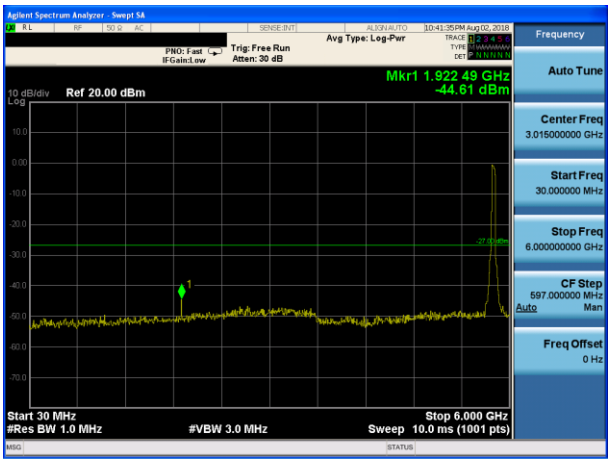


Test Plot

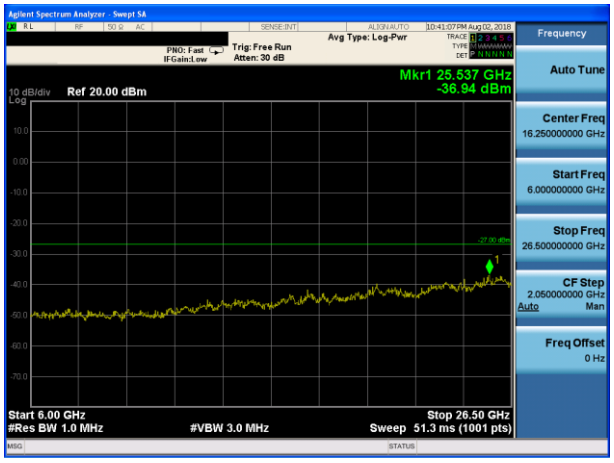
802.11n40 on channel 151



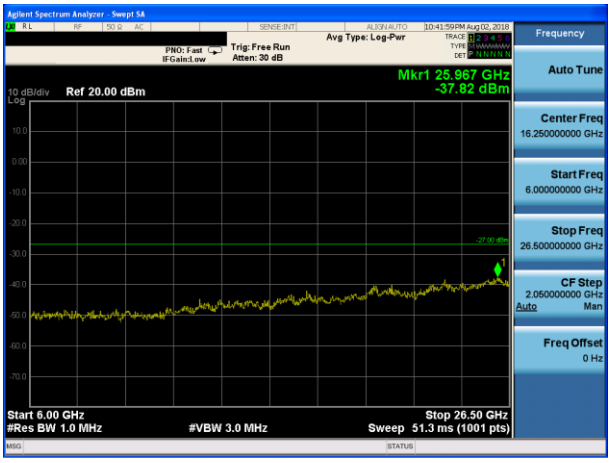
802.11n40 on channel 159



802.11n40 on channel 151

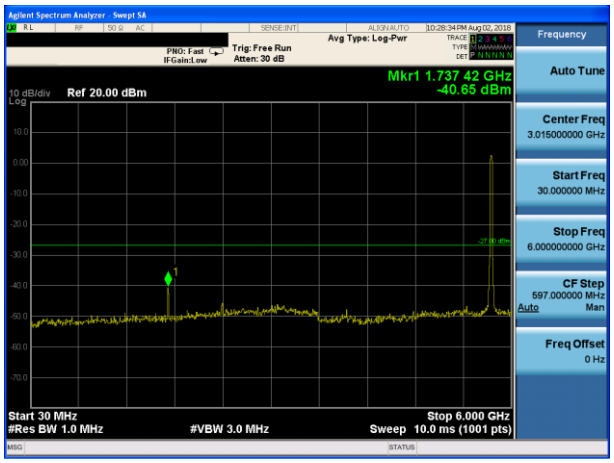


802.11n40 on channel 159

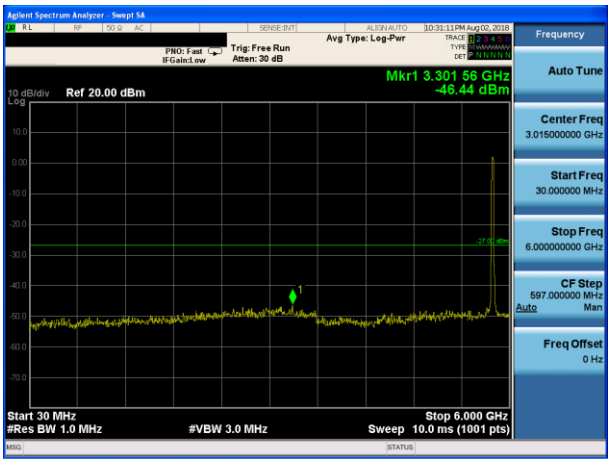


Test Plot

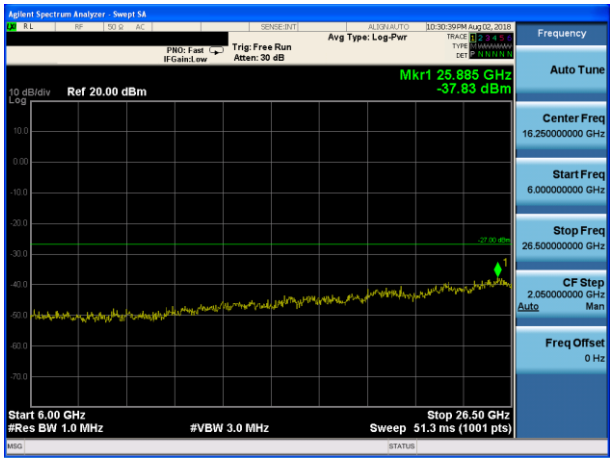
802.11ac20 on channel 149



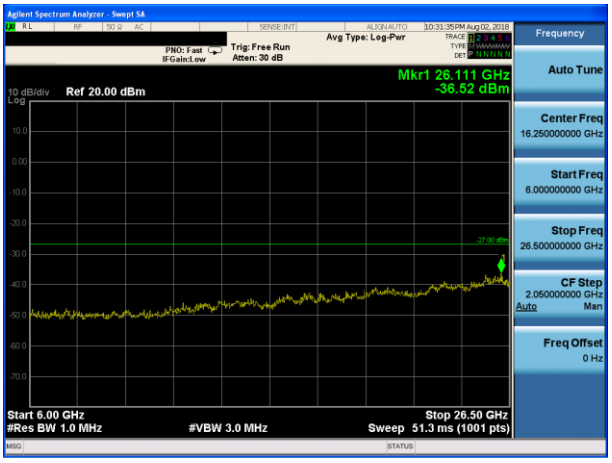
802.11ac20 on channel 157



802.11ac20 on channel 149

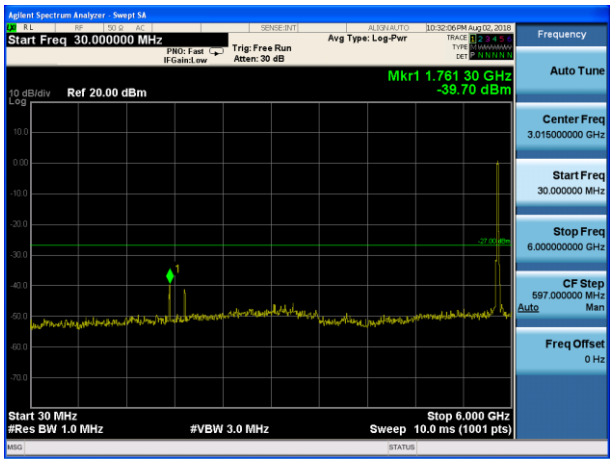


802.11ac20 on channel 157

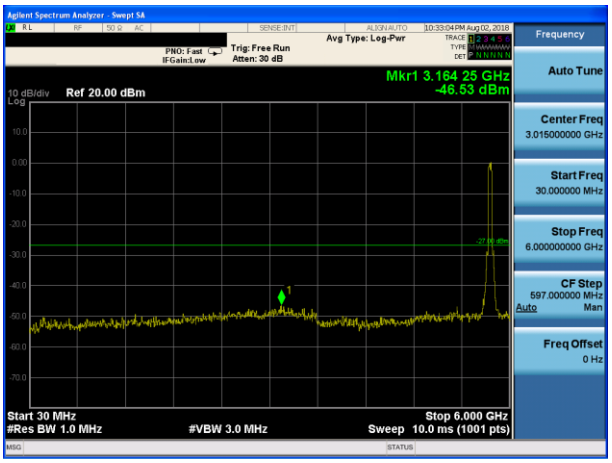


Test Plot

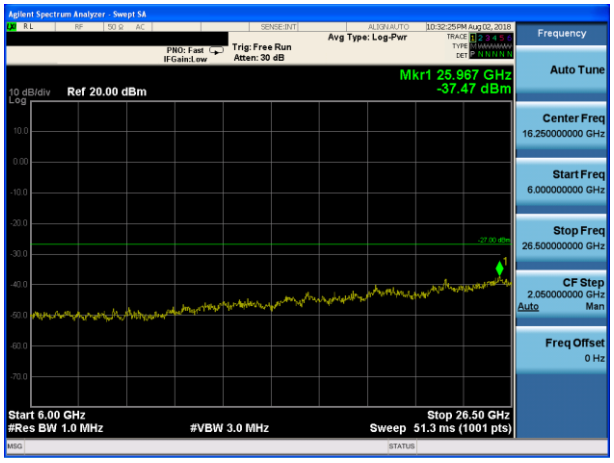
802.11ac20 on channel 165



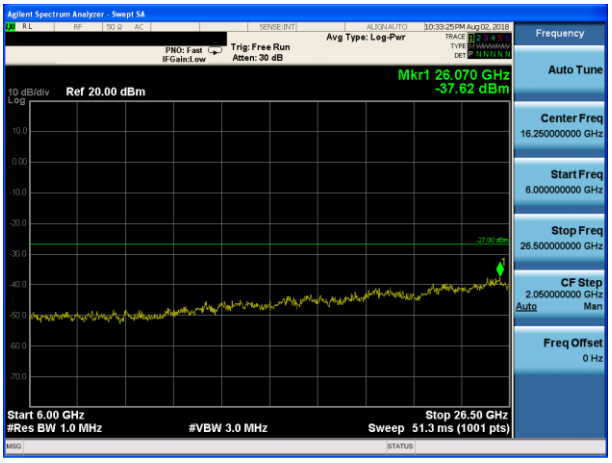
802.11ac40 on channel 151



802.11ac20 on channel 165

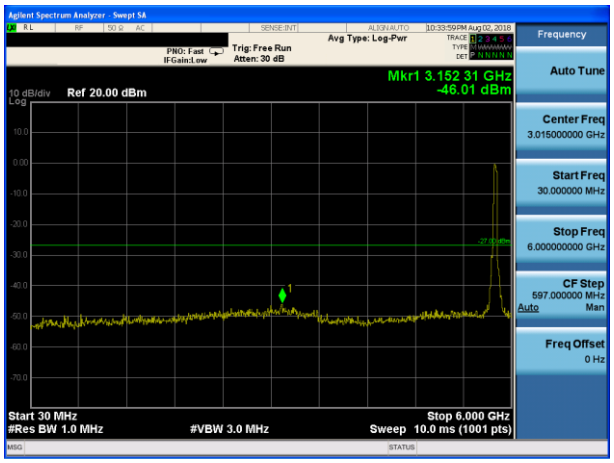


802.11ac40 on channel 151

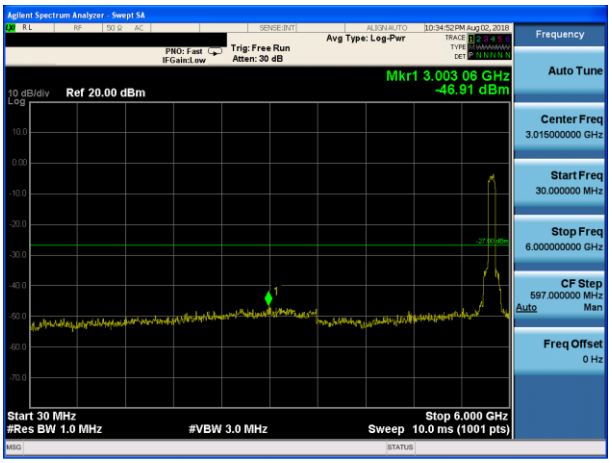


Test Plot

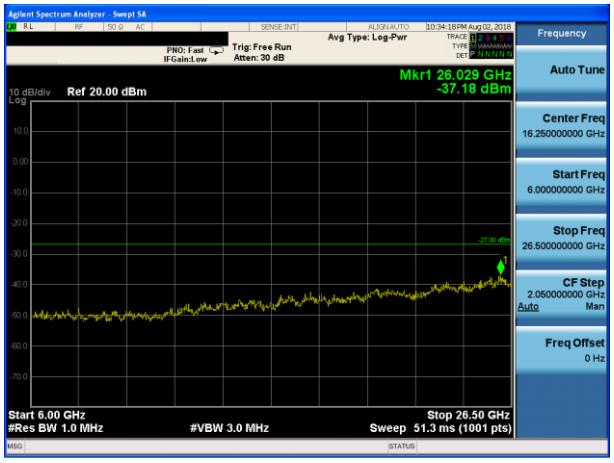
802.11ac40 on channel 159



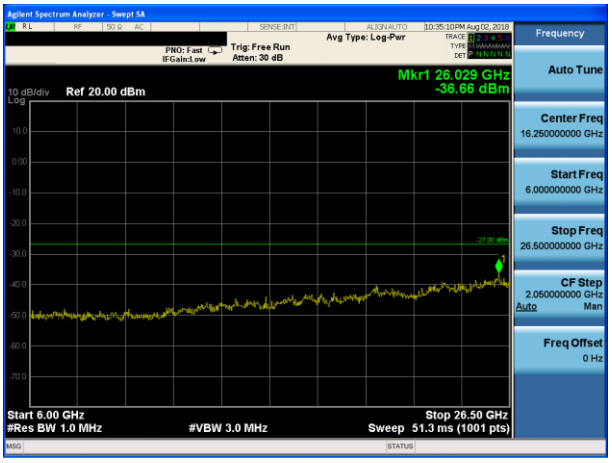
802.11ac80 on channel 155



802.11 ac40 on channel 159



802.11 ac80 on channel 155



10. Frequency Stability Measurement

10.1 LIMIT

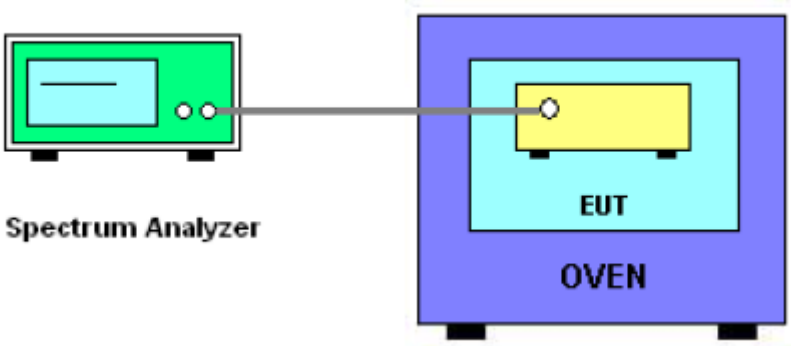
Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

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

10.2 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.

10.3 TEST SETUP LAYOUT



10.4 EUT OPERATION DURING TEST

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

10.5 TEST RESULTS

EUT：	PIQS Virtual Touch Projector	Model Name. ：	Q1
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 19V
Test Mode ：	TX Frequency Band I (5150-5250MHz)		

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	19.00	5180.0118	5180	0.0118	-2.2780
		V max (V)	21.85	5180.0168	5180	0.0168	-3.2347
		V min (V)	16.15	5180.0088	5180	0.0088	-1.6988
Limits				± 20 ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	19	T (°C)	-20	5180.0104	5180	0.0104	-2.0077
		T (°C)	-10	5180.0100	5180	0.0100	-1.9305
		T (°C)	0	5180.0101	5180	0.0101	-1.9498
		T (°C)	10	5180.0116	5180	0.0116	-2.2394
		T (°C)	20	5180.0111	5180	0.0111	-2.1429
		T (°C)	30	5180.0119	5180	0.0119	-2.2973
		T (°C)	40	5180.0164	5180	0.0164	-3.1660
		T (°C)	50	5180.0130	5180	0.0130	-2.5097
		T (°C)	60	5180.0125	5180	0.0125	-2.4131
		T (°C)	70	5180.0101	5180	0.0101	-1.9498
Limits				± 20 ppm			
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)	19.00	5200.0135	5200	0.0135	-2.5962
		V max (V)	21.85	5200.0120	5200	0.0120	-2.3077
		V min (V)	16.15	5200.0116	5200	0.0116	-2.2308
Limits				± 20 ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	19	T (°C)	-20	5200.0104	5200	0.0104	-2.0000
		T (°C)	-10	5200.0167	5200	0.0167	-3.2115
		T (°C)	0	5200.0147	5200	0.0147	-2.8269
		T (°C)	10	5200.0135	5200	0.0135	-2.5962
		T (°C)	20	5200.0123	5200	0.0123	-2.3654
		T (°C)	30	5200.0111	5200	0.0111	-2.1346
		T (°C)	40	5200.0150	5200	0.0150	-2.8846
		T (°C)	50	5200.0128	5200	0.0128	-2.4615
		T (°C)	60	5200.0116	5200	0.0116	-2.2308
		T (°C)	70	5200.0154	5200	0.0154	-2.9615
Limits				± 20 ppm			
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)	19.00	5240.0141	5240	0.0141	-2.6908
		V max (V)	21.85	5240.0157	5240	0.0157	-2.9962
		V min (V)	16.15	5240.0135	5240	0.0135	-2.5763
Limits				± 20 ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	19	T (°C)	-20	5240.0114	5240	0.0114	-2.1756
		T (°C)	-10	5240.0126	5240	0.0126	-2.4046
		T (°C)	0	5240.0148	5240	0.0148	-2.8244
		T (°C)	10	5240.0132	5240	0.0132	-2.5191
		T (°C)	20	5240.0126	5240	0.0126	-2.4046
		T (°C)	30	5240.0113	5240	0.0113	-2.1565
		T (°C)	40	5240.0091	5240	0.0091	-1.7366
		T (°C)	50	5240.0133	5240	0.0133	-2.5382
		T (°C)	60	5240.0114	5240	0.0114	-2.1756
		T (°C)	70	5240.0166	5240	0.0166	-3.1679
Limits				± 20 ppm			
Result				Complies			

EUT：	PIQS Virtual Touch Projector	Model Name. ：	Q1
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 19V
Test Mode ：	TX Frequency(5745-5850MHz)		

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (° C)	20	V nom (V)	19.00	5745.00840	5745	0.00840	-1.4622
		V max (V)	21.85	5745.00635	5745	0.00635	-1.1055
		V min (V)	16.15	5745.01116	5745	0.01116	-1.9434
Limits				± 20 ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	19	T (°C)	-20	5745.00309	5745	0.00309	-0.5384
		T (°C)	-10	5745.00925	5745	0.00925	-1.6098
		T (°C)	0	5745.00795	5745	0.00795	-1.3843
		T (°C)	10	5745.00575	5745	0.00575	-1.0005
		T (°C)	20	5745.00692	5745	0.00692	-1.2045
		T (°C)	30	5745.00974	5745	0.00974	-1.6959
		T (°C)	40	5745.00308	5745	0.00308	-0.5357
		T (°C)	50	5745.01230	5745	0.01230	-2.1414
		T (°C)	60	5745.00551	5745	0.00551	-0.9589
		T (°C)	70	5745.00861	5745	0.00861	-1.4991
Limits				± 20 ppm			
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)	19.00	5785.01036	5785	0.01036	-1.7904
		V max (V)	21.85	5785.00253	5785	0.00253	-0.4379
		V min (V)	16.15	5785.00760	5785	0.00760	-1.3130
Limits				± 20 ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5785MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	19	T (°C)	-20	5785.00993	5785	0.00993	-1.7167
		T (°C)	-10	5785.00562	5785	0.00562	-0.9720
		T (°C)	0	5785.00820	5785	0.00820	-1.4171
		T (°C)	10	5785.01206	5785	0.01206	-2.0849
		T (°C)	20	5785.00585	5785	0.00585	-1.0114
		T (°C)	30	5785.00376	5785	0.00376	-0.6500
		T (°C)	40	5785.00609	5785	0.00609	-1.0529
		T (°C)	50	5785.00148	5785	0.00148	-0.2561
		T (°C)	60	5785.00721	5785	0.00721	-1.2459
		T (°C)	70	5785.00369	5785	0.00369	-0.6378
Limits				± 20 ppm			
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)	19.00	5825.00962	5825	0.00962	-1.6514
		V max (V)	21.85	5825.00437	5825	0.00437	-0.7507
		V min (V)	16.15	5825.01217	5825	0.01217	-2.0888
Limits				± 20 ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	19	T (°C)	-20	5825.01214	5825	0.01214	-2.0849
		T (°C)	-10	5825.00329	5825	0.00329	-0.5649
		T (°C)	0	5825.00414	5825	0.00414	-0.7101
		T (°C)	10	5825.01300	5825	0.01300	-2.2320
		T (°C)	20	5825.00259	5825	0.00259	-0.4445
		T (°C)	30	5825.01096	5825	0.01096	-1.8816
		T (°C)	40	5825.00995	5825	0.00995	-1.7075
		T (°C)	50	5825.00405	5825	0.00405	-0.6952
		T (°C)	60	5825.00516	5825	0.00516	-0.8853
		T (°C)	70	5825.00990	5825	0.00990	-1.6993
Limits				± 20 ppm			
Result				Complies			

11. ANTENNA REQUIREMENT

11.1 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.

11.2 EUT ANTENNA

Antenna	Brand	Model Name (P/N)	Antenna Type	Connector	Antenna Gain(dBi)	
					5.2G	5.8G
A(main)	N/A	N/A	FPCB	I-PEX	2	2
B(aux)	N/A	N/A	FPCB	I-PEX	2	2

The EUT antenna is permanent attached antenna. It comply with the standard requirement.

END OF REPORT