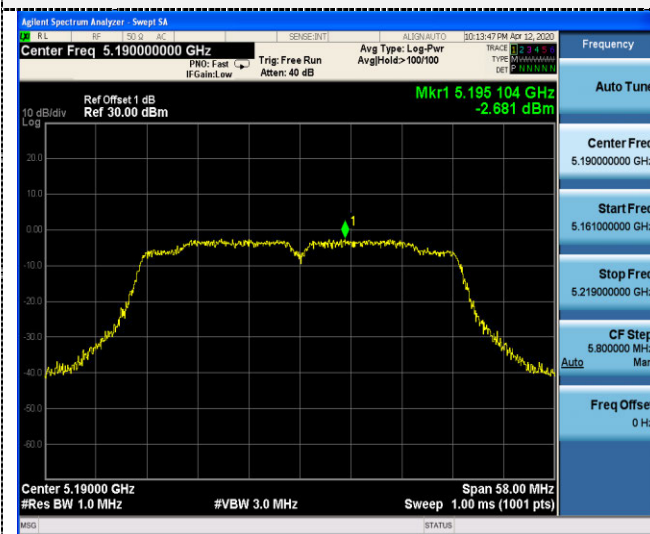
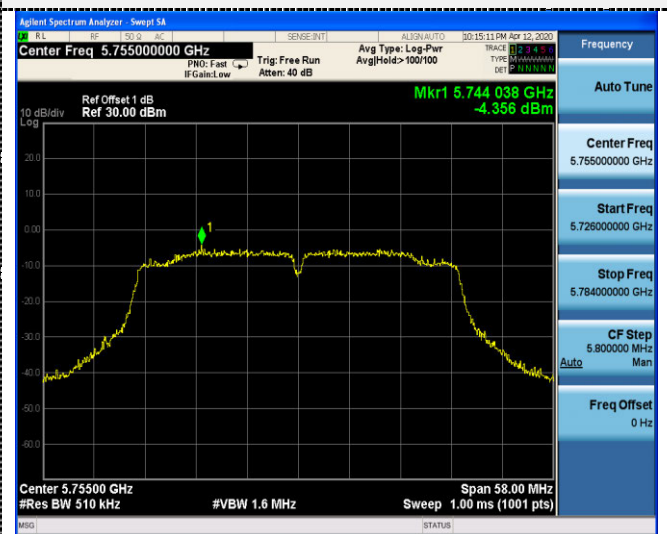


802.11ac(HT40)

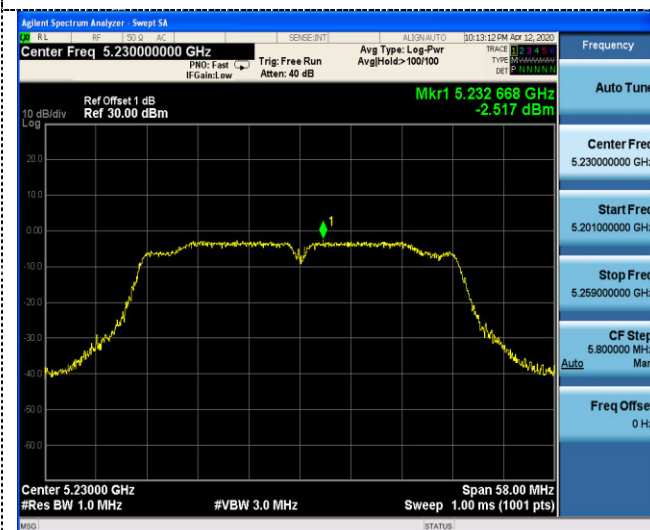
U-NII 1



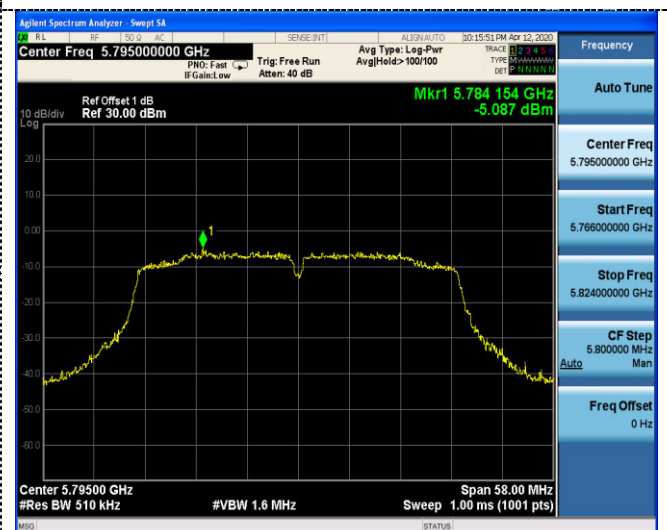
U-NII 3



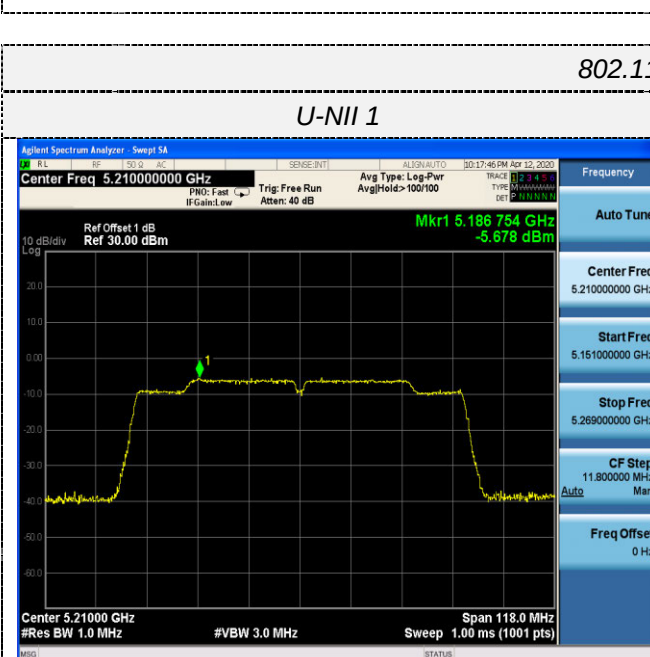
CH38



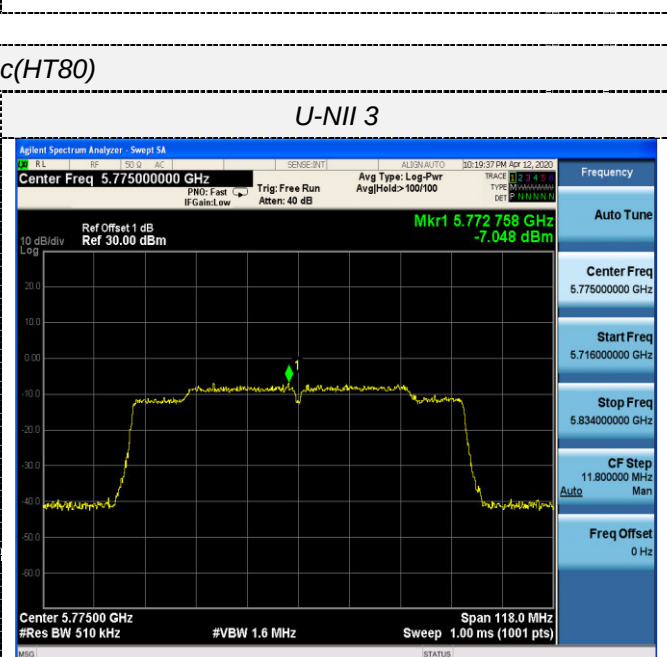
CH151



CH46

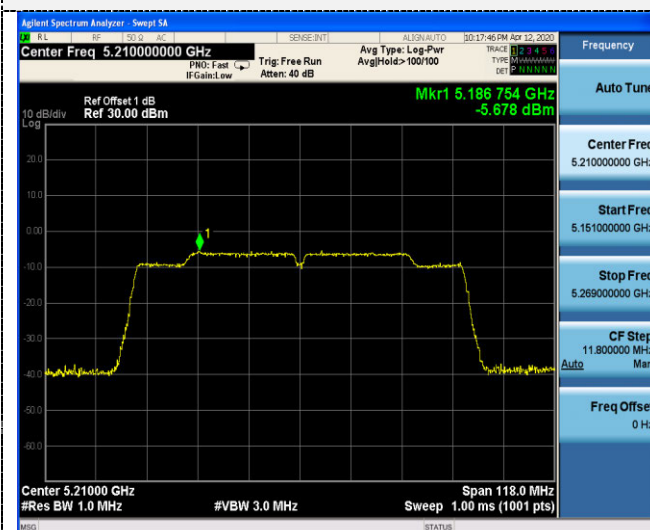


CH159

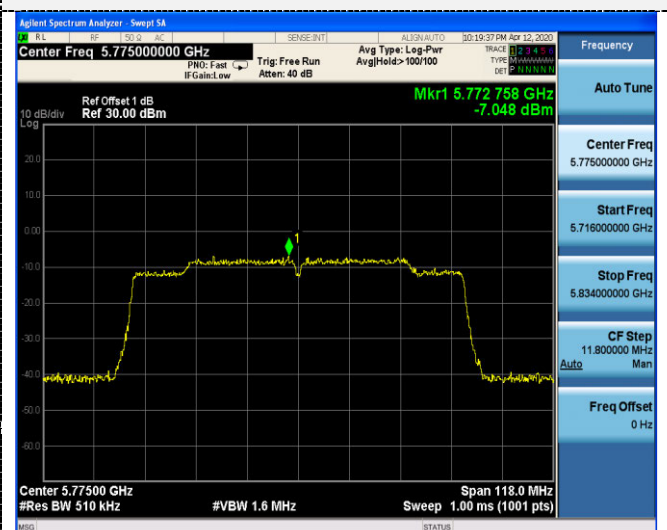


802.11ac(HT80)

U-NII 1



U-NII 3



CH42

CH155

4.5 Emission Bandwidth (26dBm Bandwidth)

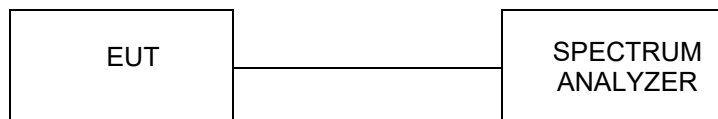
Limit

N/A

Test Procedure

1. Set resolution bandwidth (RBW) = approximately 1 % of the EBW.
2. Set the video bandwidth (VBW) > RBW.
3. Detector = Peak.
4. Trace mode = Max hold.
5. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW / EBW ratio is approximately 1 %.

Test Configuration



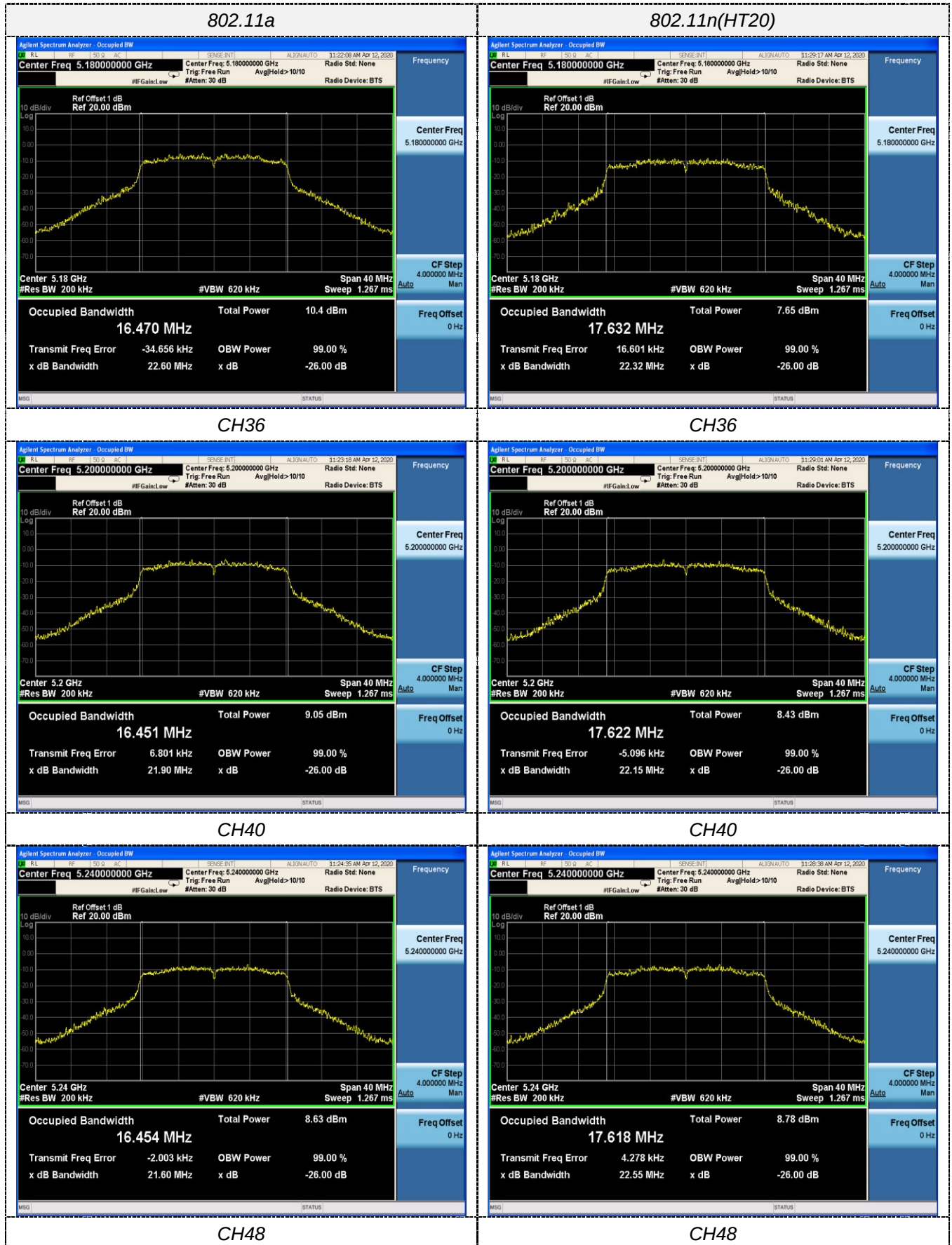
Test Results

Type	Bands	Channel	26dB Bandwidth (MHz)		Limit (MHz)	Result
			Ant. 1	Ant. 2		
802.11a	U-NII 1	36	22.60	22.98	N/A	Pass
		40	21.90	22.14		
		48	21.60	21.63		
802.11n(HT20)	U-NII 1	36	22.32	21.32		
		40	22.15	22.33		
		48	22.55	22.03		
802.11n(HT40)	U-NII 1	38	42.25	42.53		
		46	41.72	41.39		
802.11ac(HT20)	U-NII 1	36	22.24	22.02	N/A	Pass
		40	21.97	21.70		
		48	21.94	22.52		
802.11ac(HT40)	U-NII 1	38	42.17	41.63		
		46	41.74	41.92		
802.11ac(HT80)	U-NII 1	42	80.59	80.42		

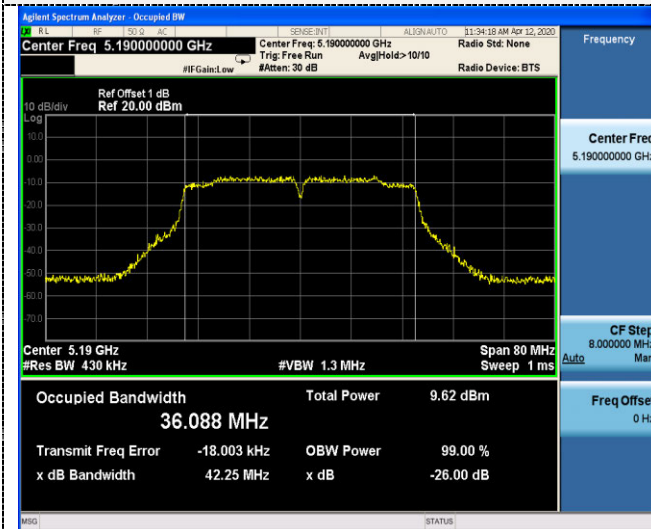
Note:

1. Measured 26dB bandwidth at difference data rate for each mode and recorded worst case for each mode.
2. Test results including cable loss;
3. Worst case data at 6Mbps at IEEE 802.11a; MCS0 at IEEE 802.11n HT20, IEEE 802.11n HT40, IEEE 802.11ac VHT20, IEEE 802.11ac VHT40 and IEEE 802.11ac VHT80;
4. Please refer to following test plots;

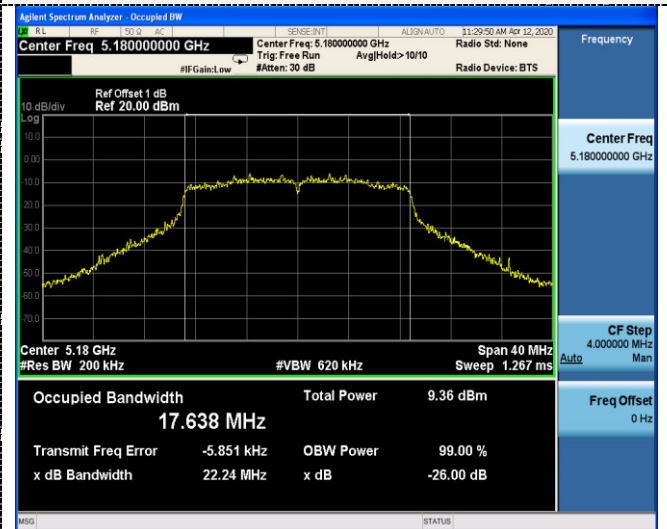
ANT1



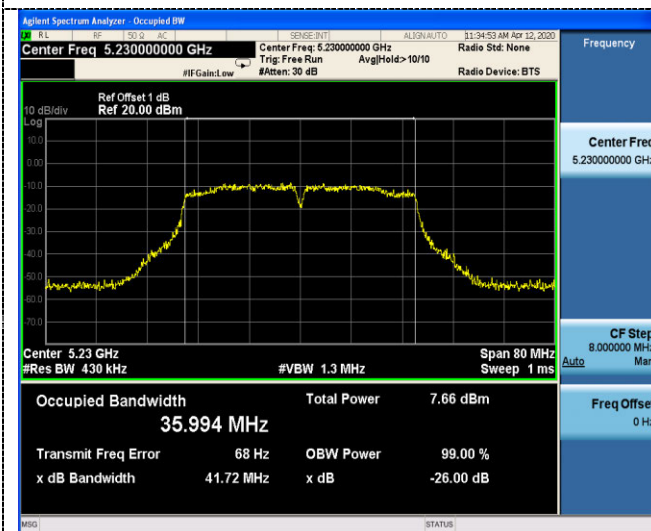
802.11n(HT40)



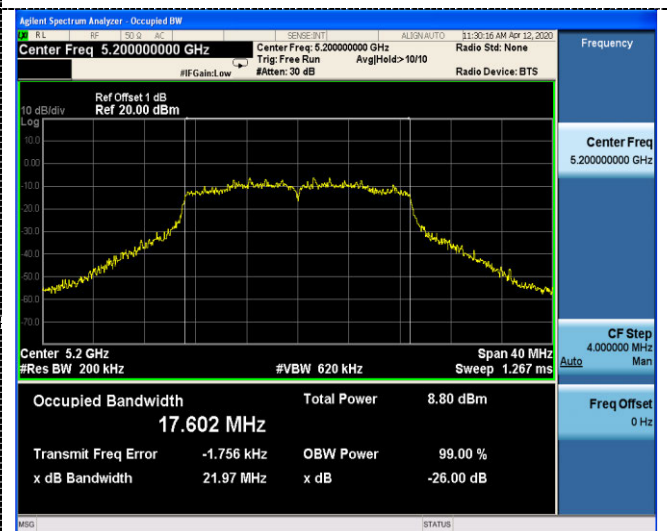
802.11ac(HT20)



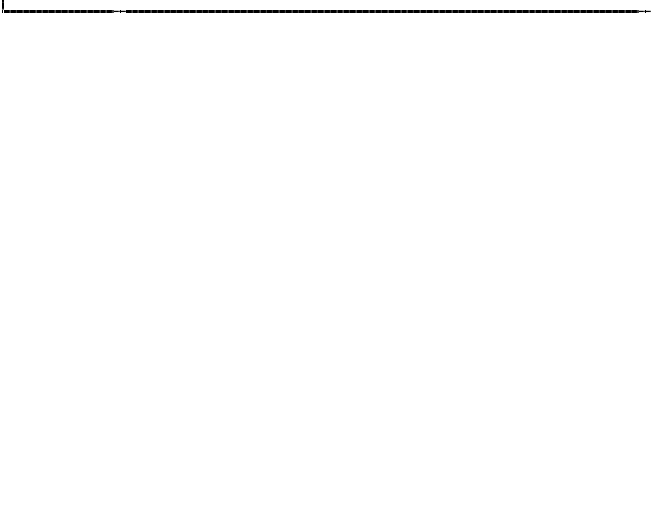
CH38



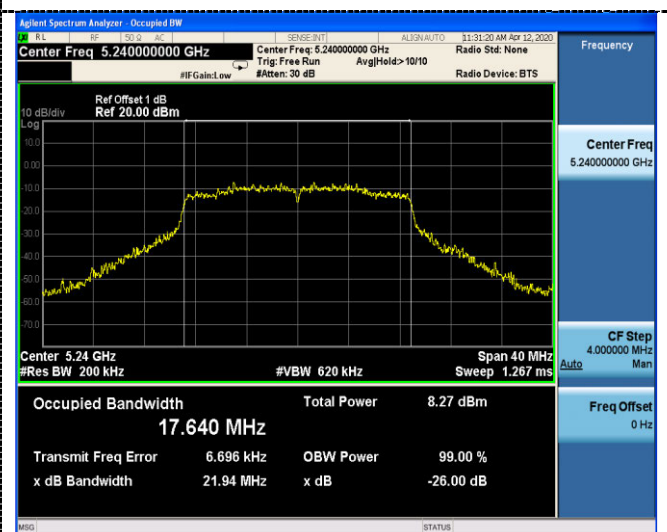
CH36



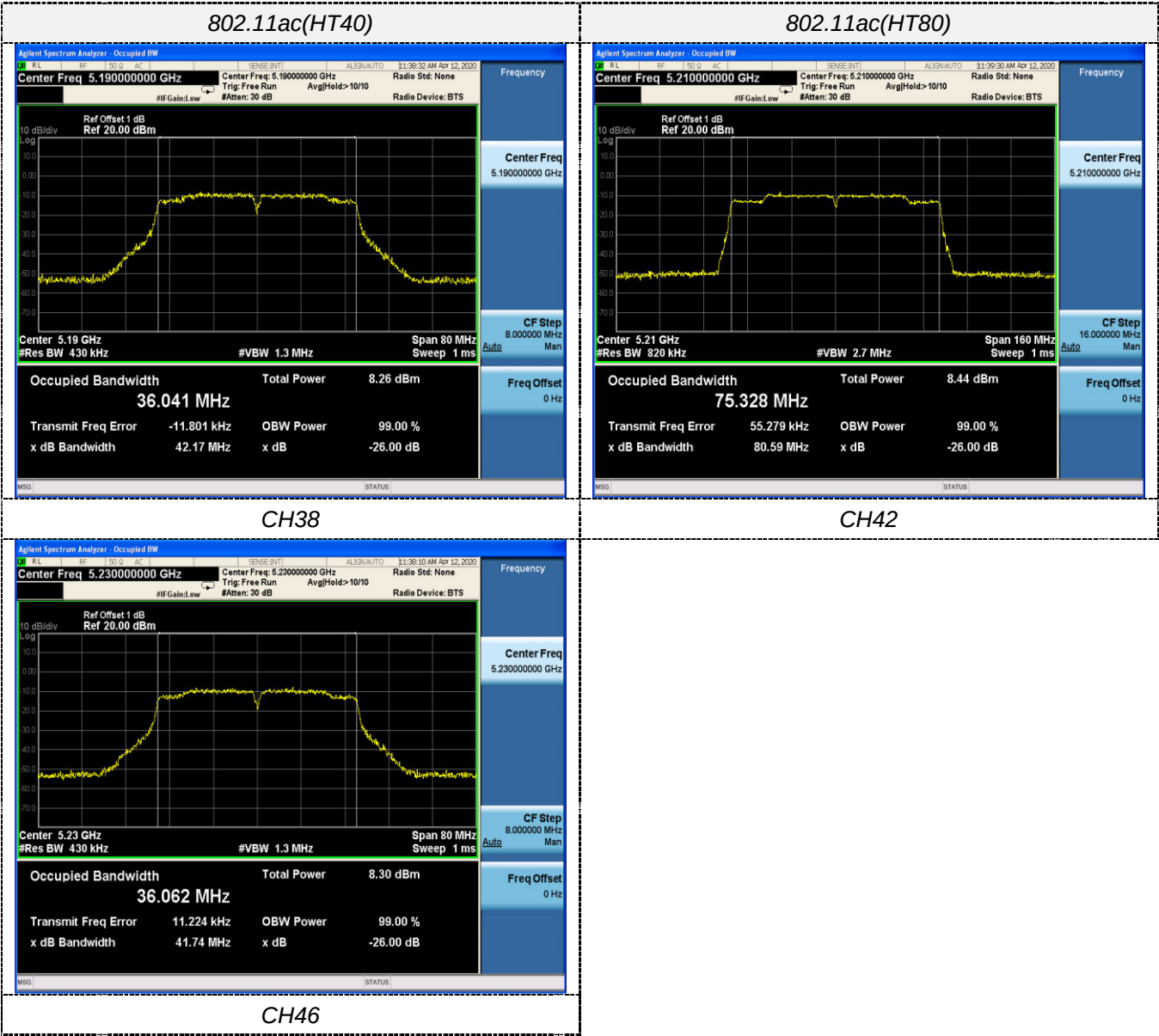
CH46



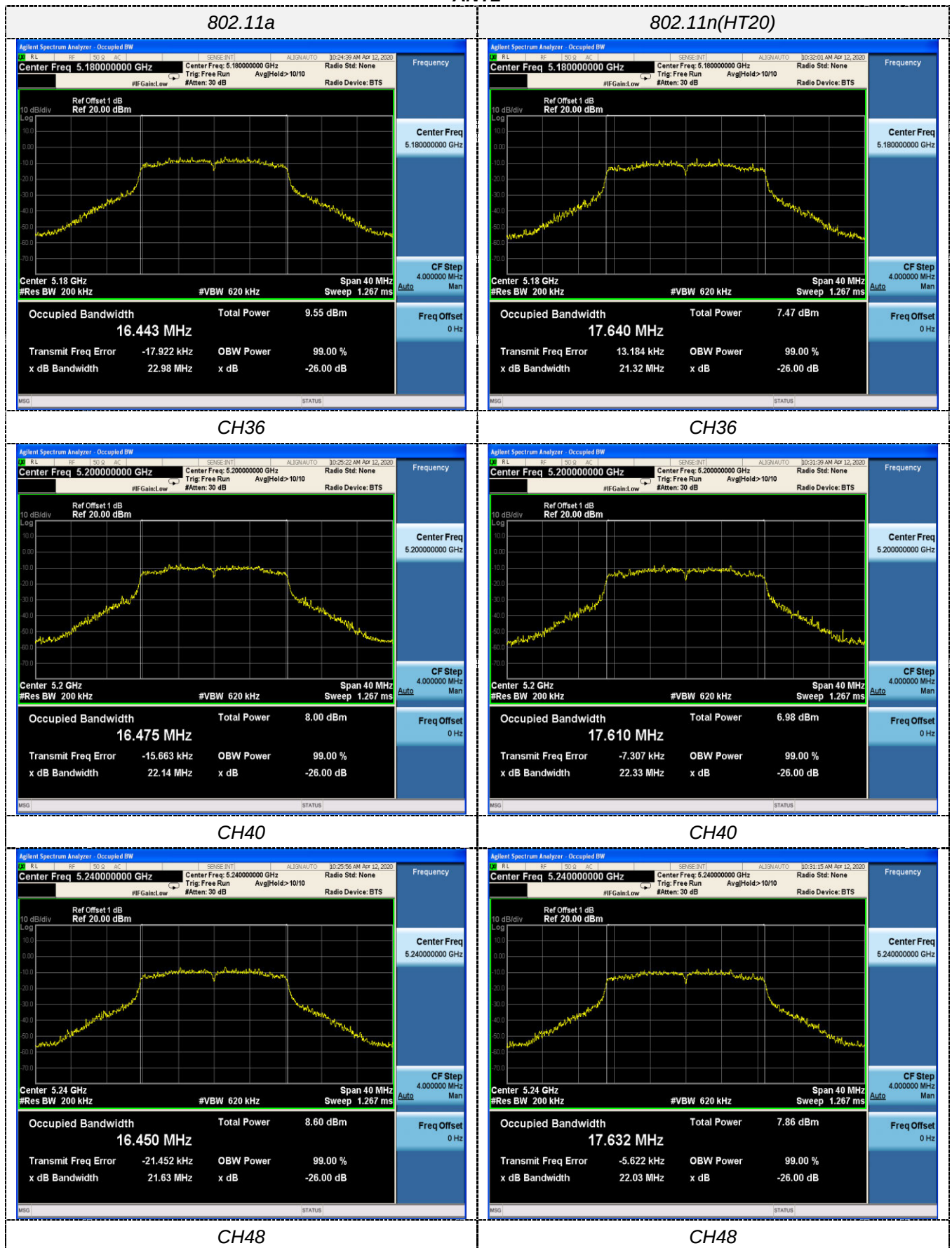
CH40



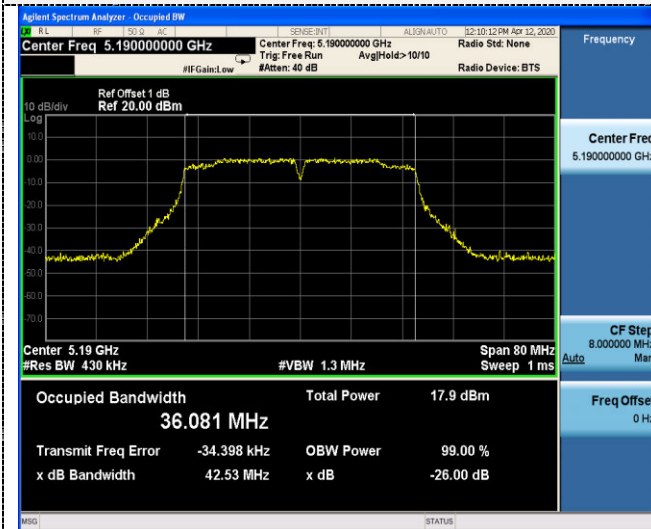
CH48



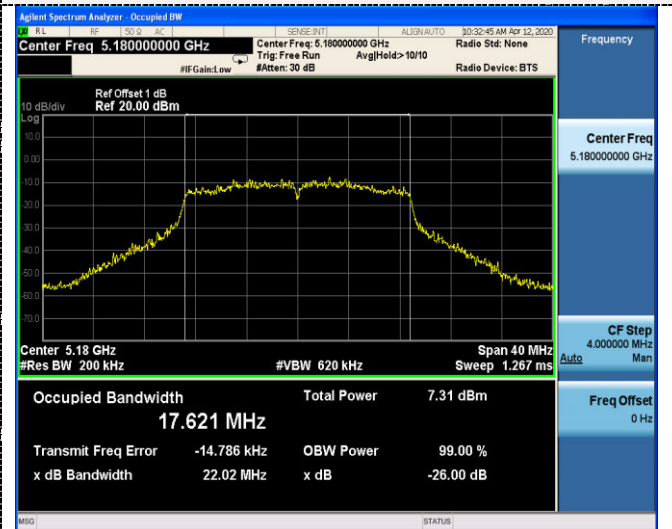
ANT2



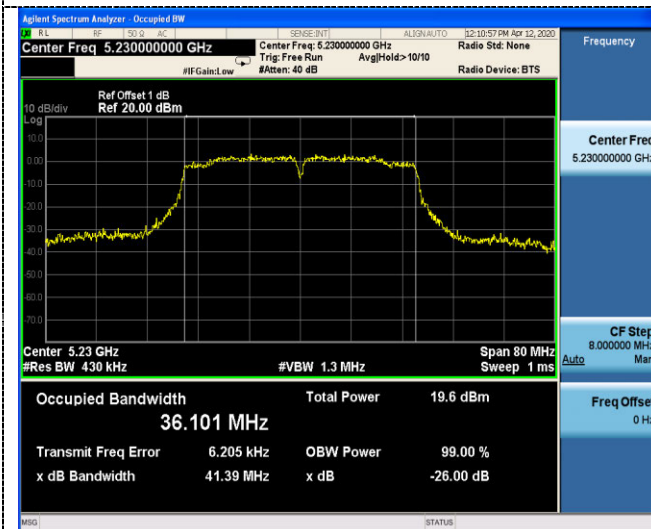
802.11n(HT40)



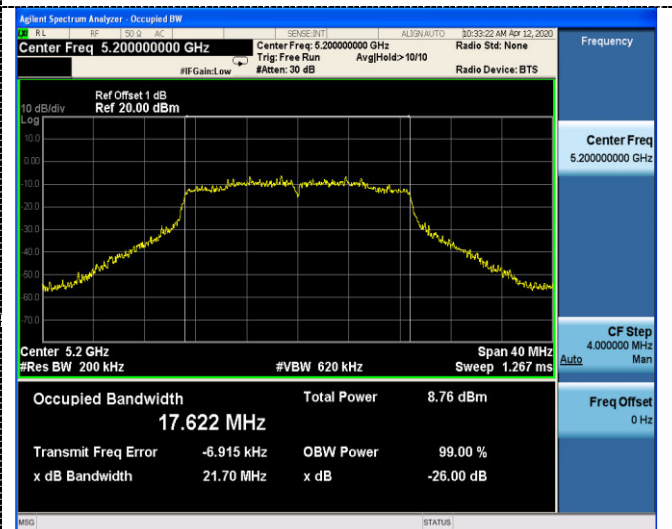
802.11ac(HT20)



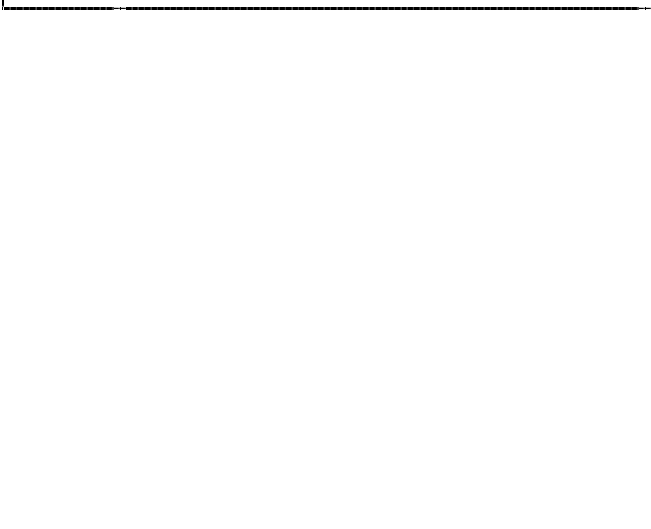
CH38



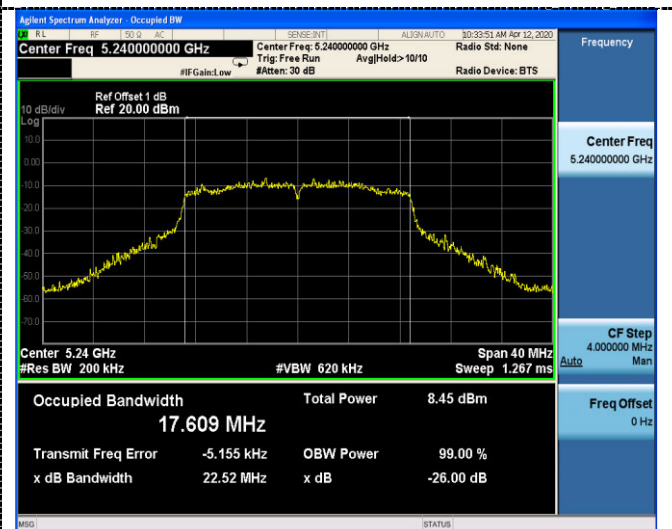
CH36



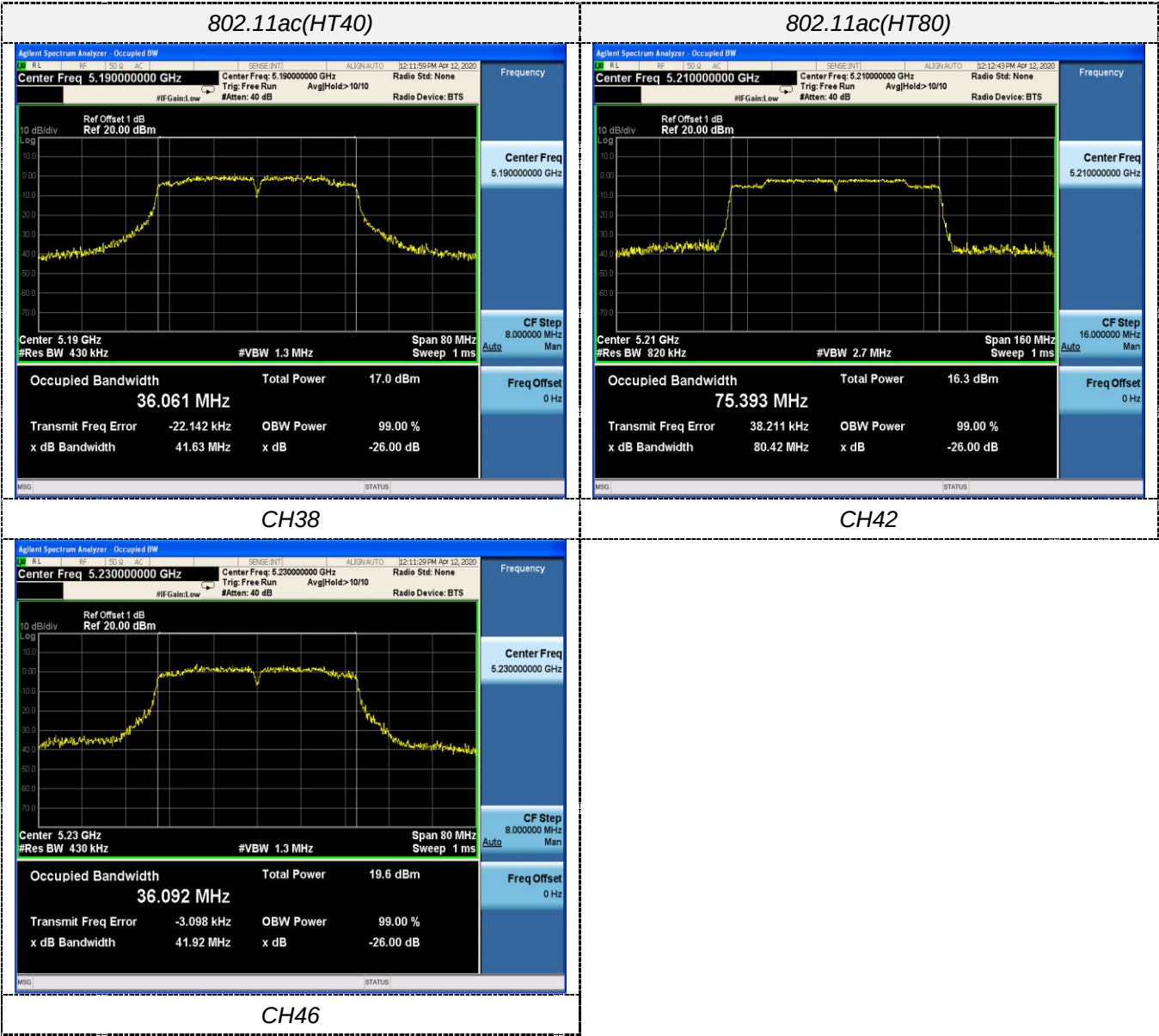
CH46



CH40



CH48



4.6 Minimum Emission Bandwidth (6dBm Bandwidth)

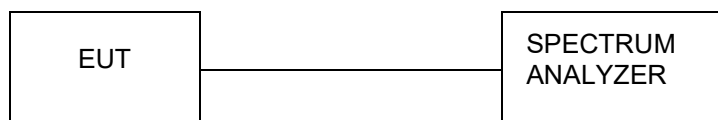
Limit

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Procedure

1. Set resolution bandwidth (RBW) = 100 kHz
2. Set the video bandwidth 3 x RBW.
3. Detector = Peak.
4. Trace mode = Max hold.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Test Configuration



Test Results

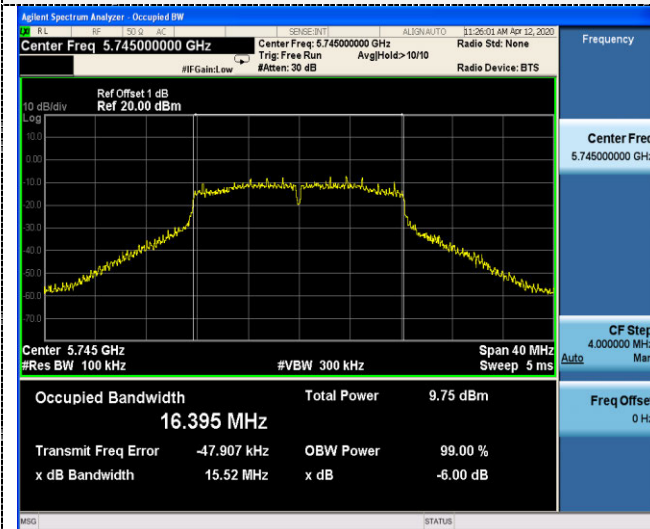
Type	Bands	Channel	6dB Bandwidth (MHz)		Limit (KHz)	Result
			Ant. 1	Ant. 2		
802.11a	U-NII 3	149	15.52	15.65	≥500KHz	Pass
		157	15.70	15.28		
		165	15.55	15.63		
802.11n(HT20)	U-NII 3	149	15.06	21.32		
		157	16.25	22.33		
		165	15.91	22.03		
802.11n(HT40)	U-NII 3	151	35.11	35.11		
		159	35.12	35.13		
802.11ac(HT20)	U-NII 3	149	15.11	15.80		
		157	15.68	14.18		
		165	14.99	15.66		
802.11ac(HT40)	U-NII 3	151	35.08	35.11		
		159	35.10	35.10		
802.11ac(HT80)	U-NII 3	155	75.27	75.27		

Note:

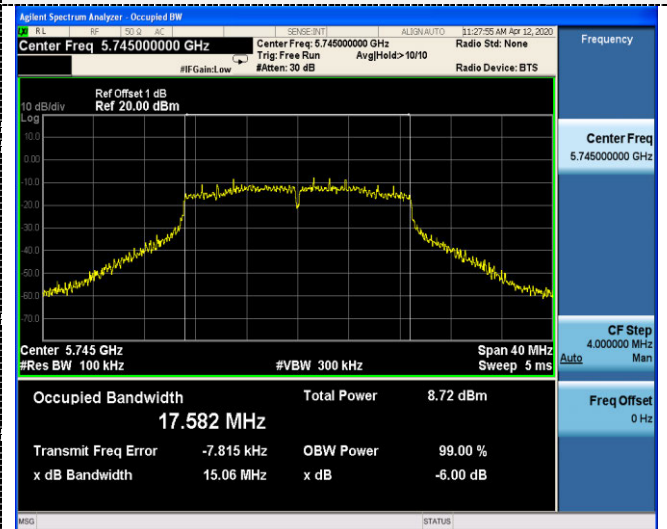
1. Measured 6dB bandwidth at difference data rate for each mode and recorded worst case for each mode.
2. Test results including cable loss;
3. Worst case data at 6Mbps at IEEE 802.11a; MCS0 at IEEE 802.11n HT20, IEEE 802.11n HT40, IEEE 802.11ac VHT20, IEEE 802.11ac VHT40 and IEEE 802.11ac VHT80;
4. Please refer to following test plots;

ANT1

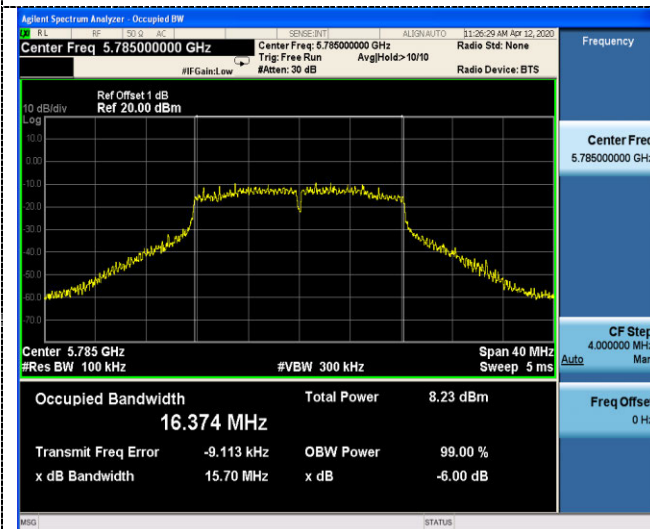
802.11a



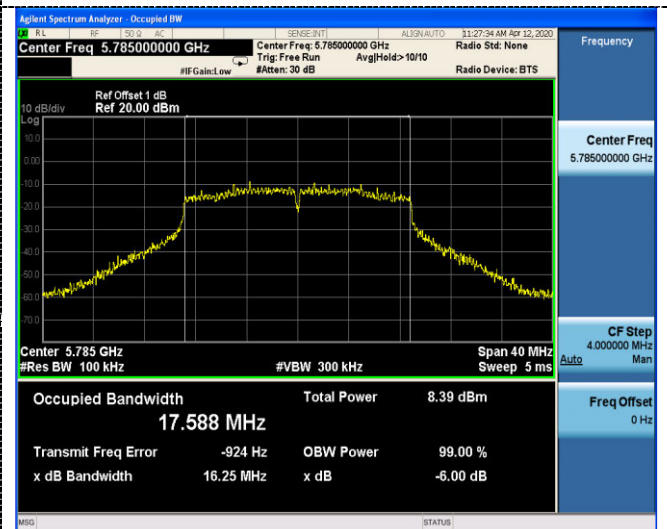
802.11n(HT20)



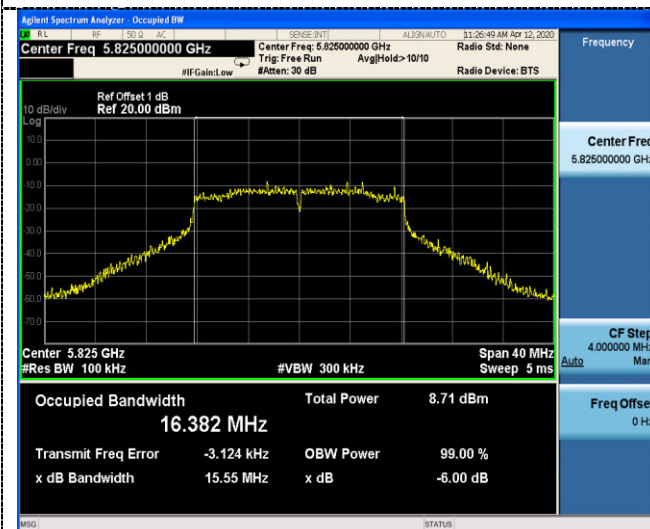
CH149



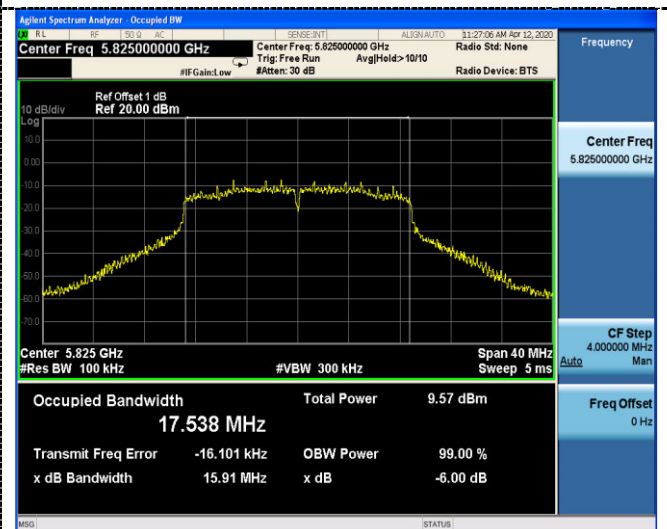
CH149



CH157



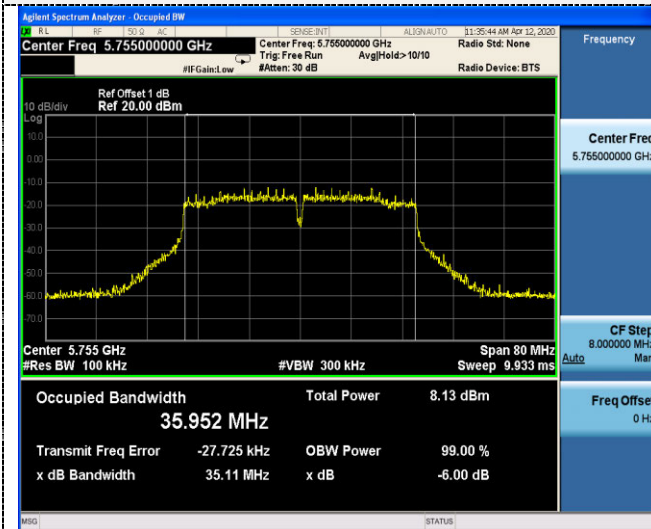
CH157



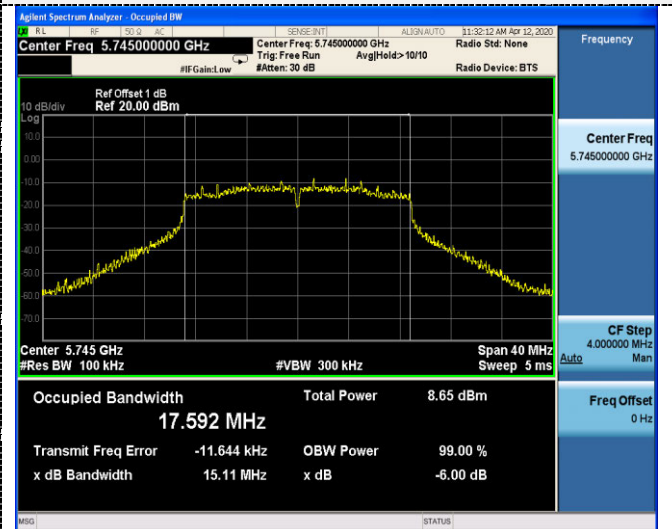
CH165

CH165

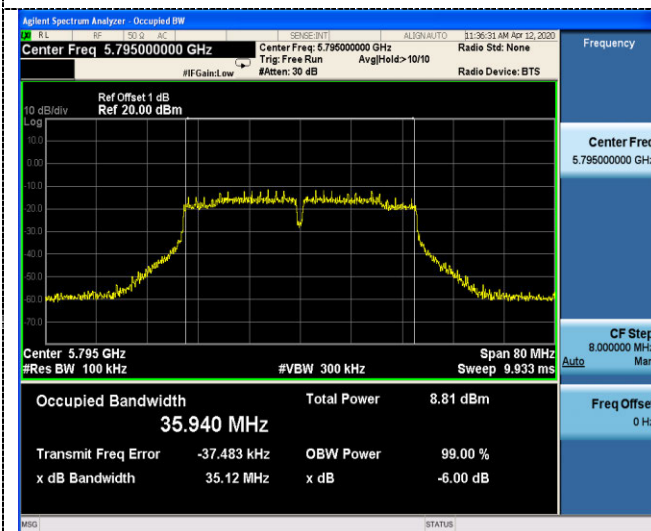
802.11n(HT40)



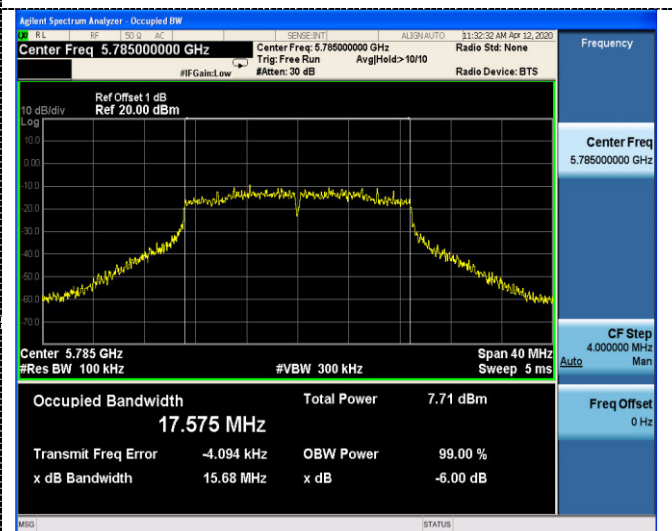
802.11ac(HT20)



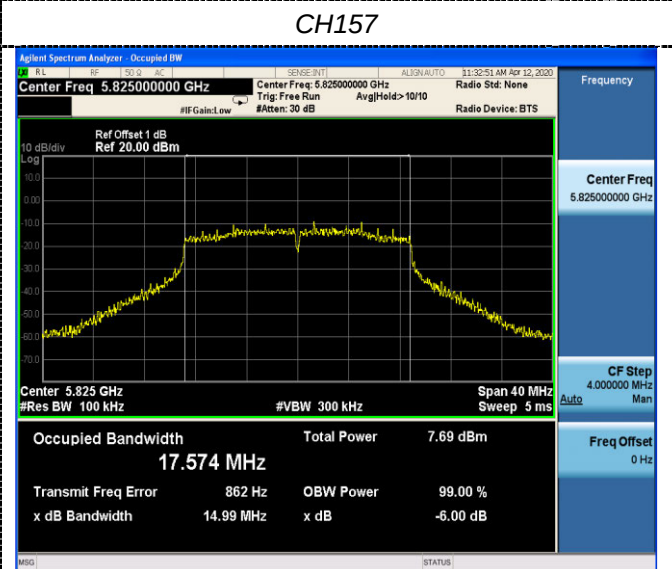
CH151



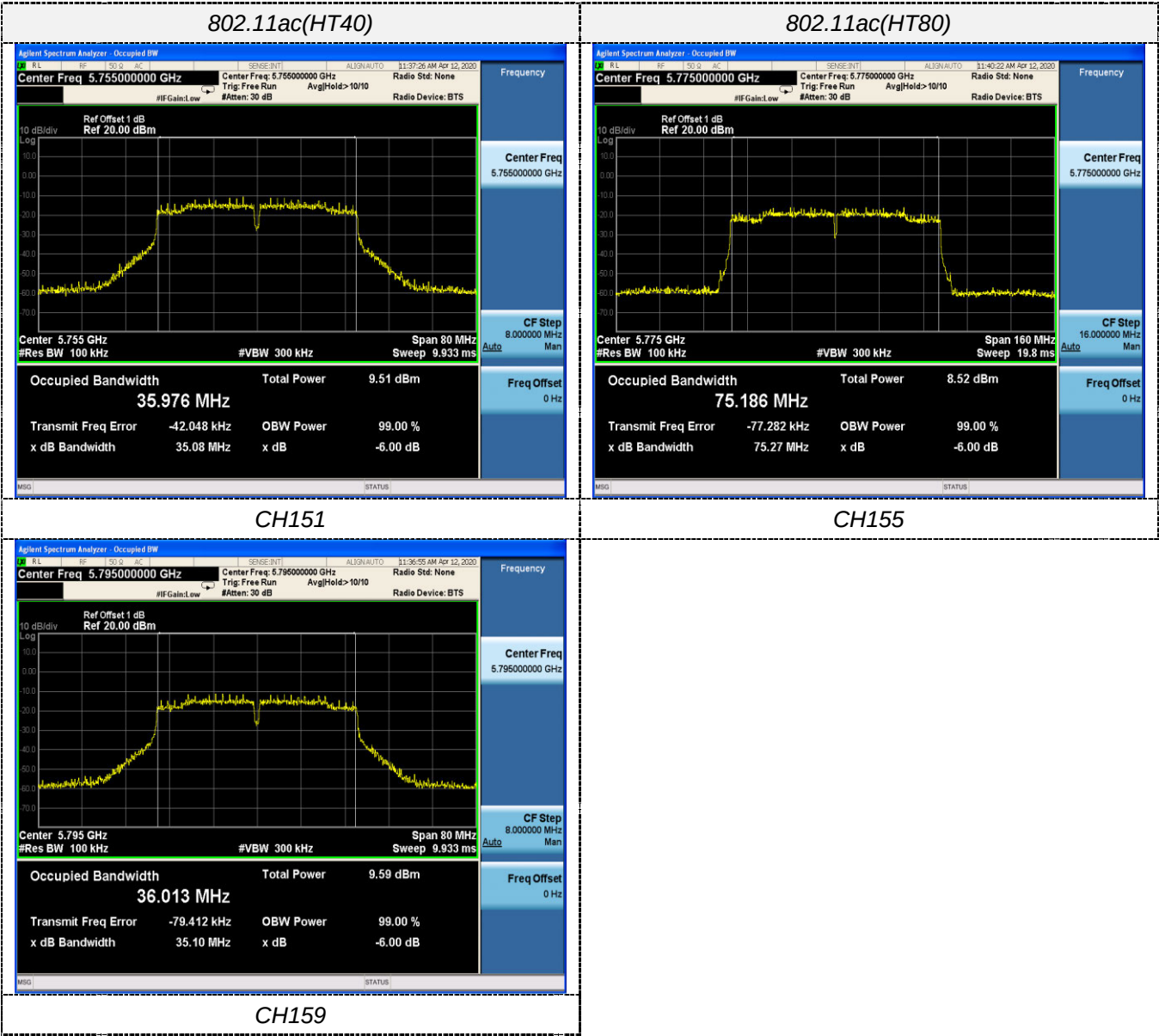
CH149



CH159

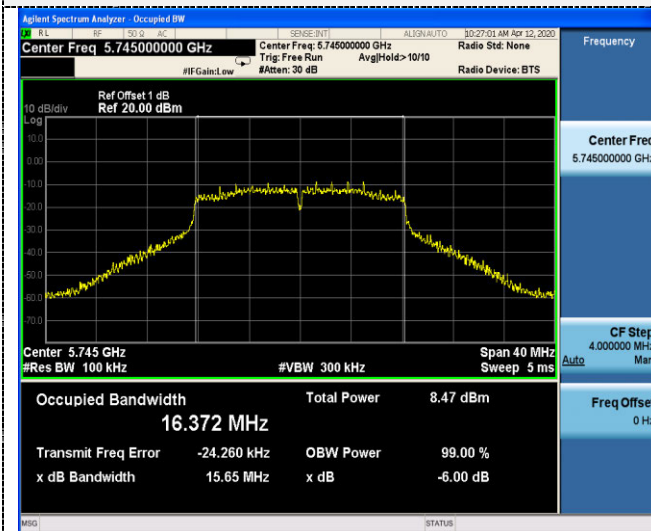


CH165

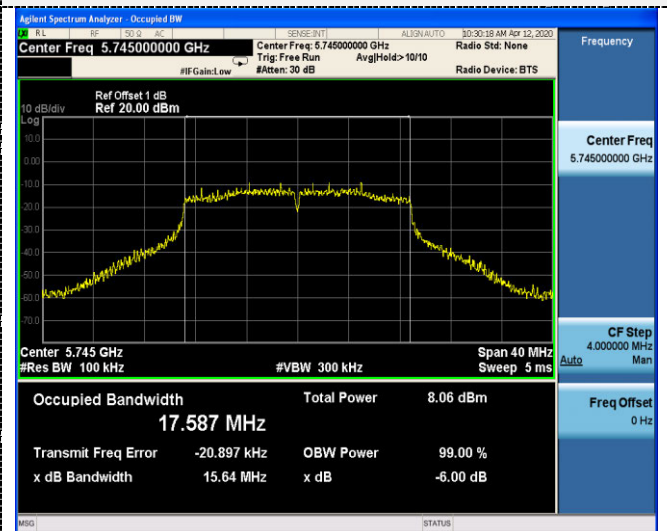


ANT2

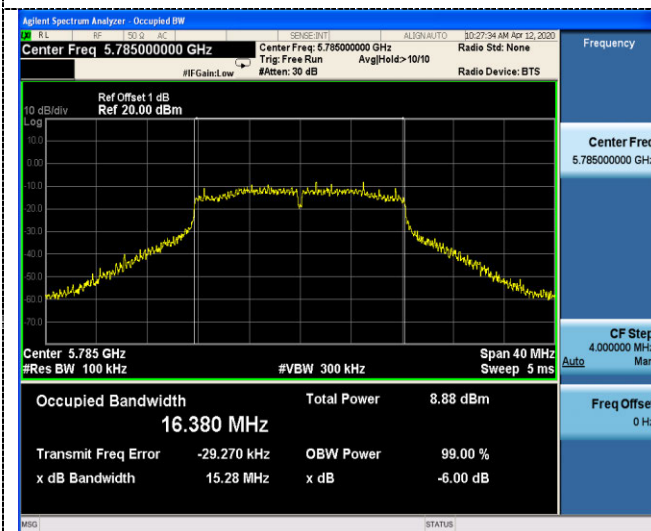
802.11a



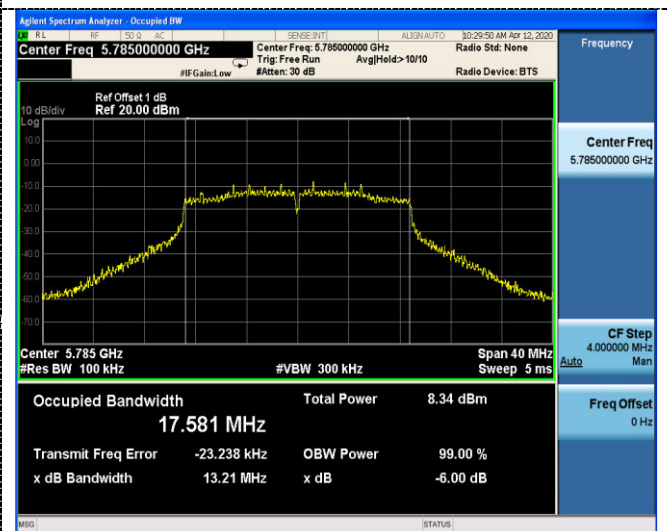
802.11n(HT20)



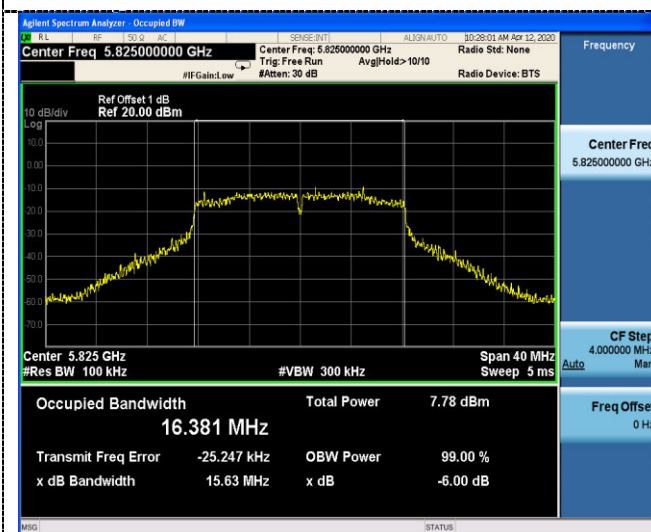
CH149



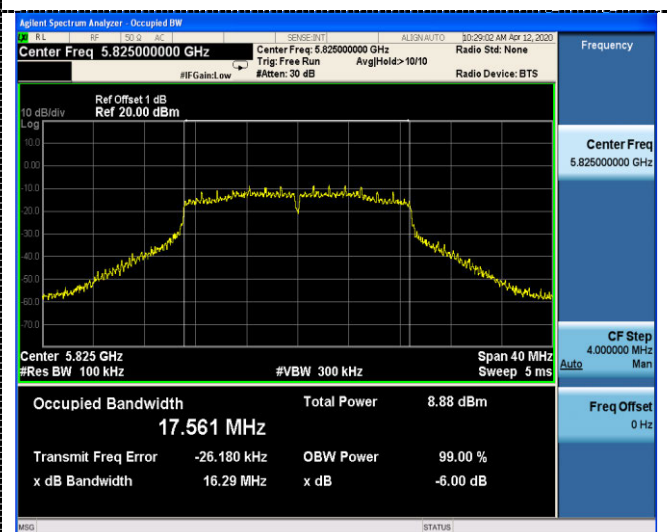
CH149



CH157



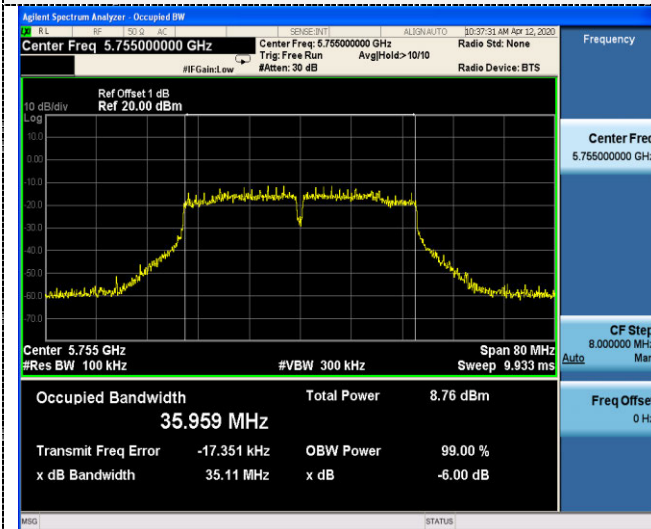
CH157



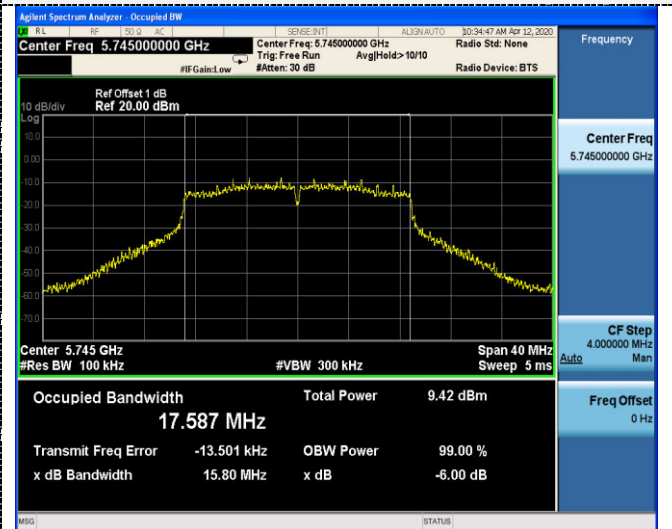
CH165

CH165

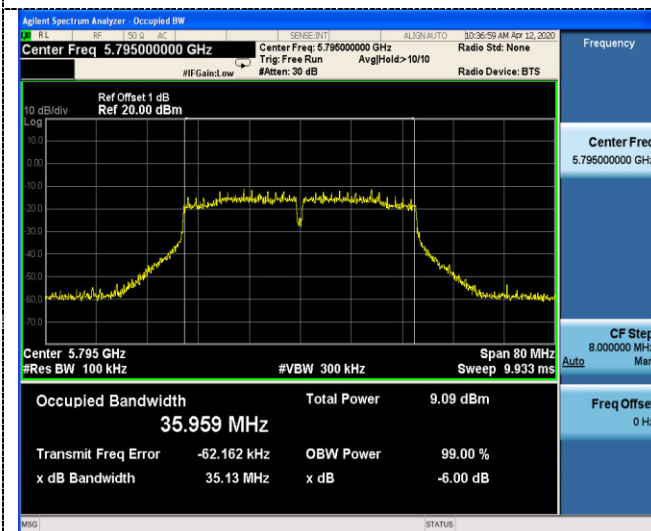
802.11n(HT40)



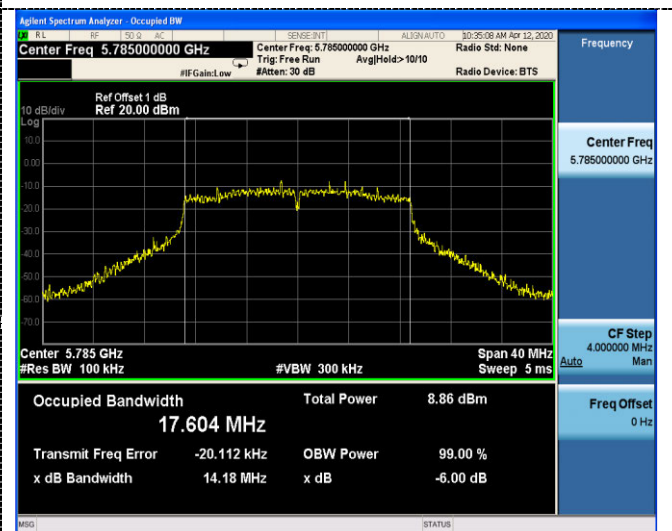
802.11ac(HT20)



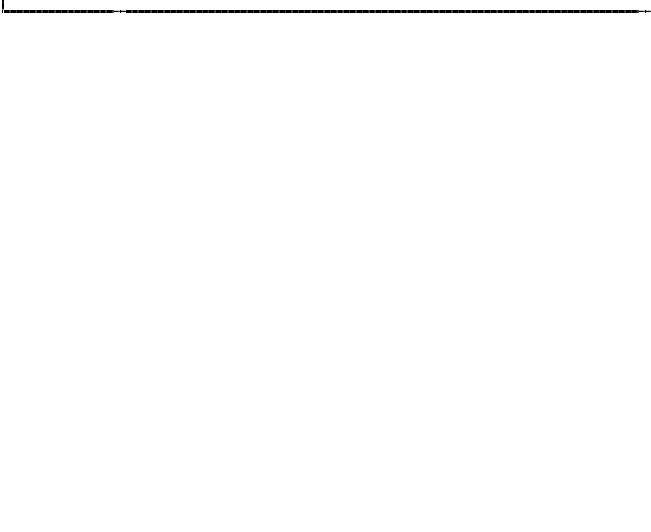
CH151



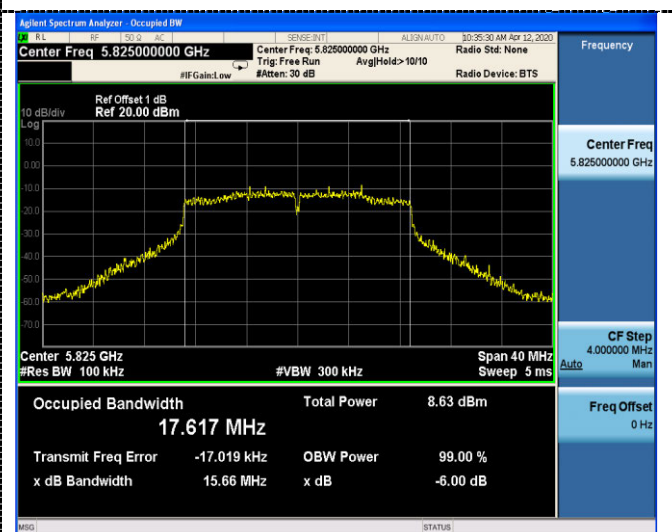
CH149



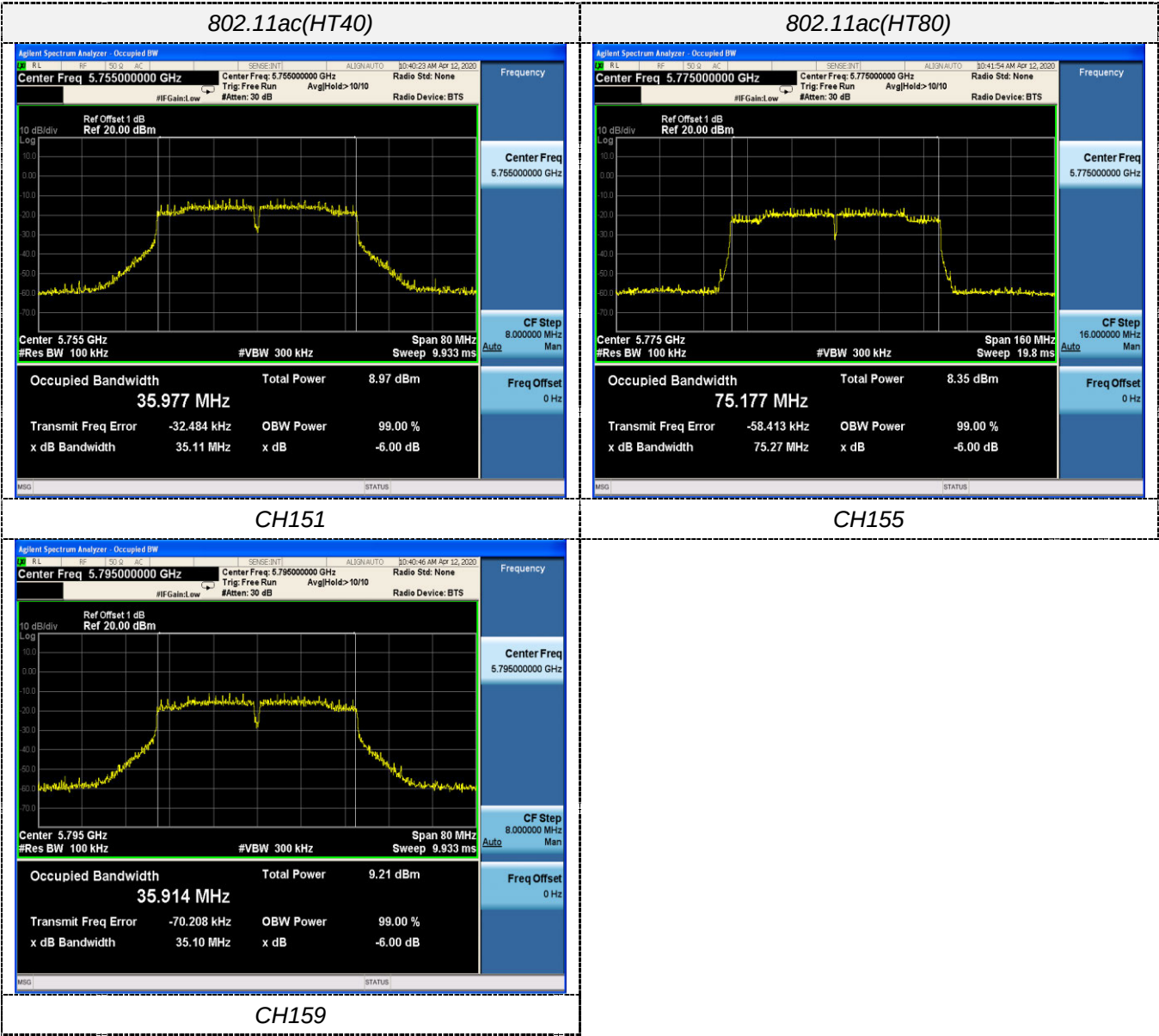
CH159



CH157



CH165

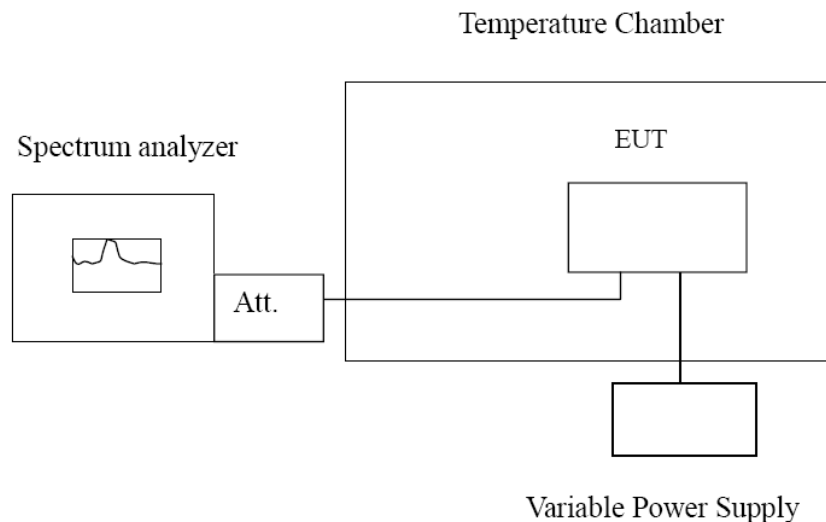


4.7 Frequency Stability

LIMIT

Manufacturers 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 users manual.

TEST CONFIGURATION



TEST PROCEDURE

Frequency Stability under Temperature Variations:

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

Frequency Stability under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation ($\pm 15\%$) and endpoint, record the maximum frequency change.

TEST RESULTS

Record worst case (802.11a) as below:

Reference Frequency: 802.11a channel=36 frequency=5180MHz					
Voltage (V)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
120	-30	70.26	0.014	Within the band of operation	Pass
	-20	96.54	0.019		
	-10	75.37	0.015		
	0	90.70	0.018		
	10	84.49	0.016		
	20	98.78	0.019		
	30	69.90	0.013		
	40	68.64	0.013		
	50	51.21	0.010		
138	25	56.64	0.011	Within the band of operation	Pass
102	25	35.15	0.007		

Reference Frequency: 802.11a channel=149 frequency=5745MHz					
Voltage (V)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
120	-30	82.65	0.014	Within the band of operation	Pass
	-20	70.12	0.012		
	-10	94.80	0.017		
	0	49.21	0.009		
	10	81.31	0.014		
	20	80.68	0.014		
	30	83.72	0.015		
	40	36.60	0.006		
	50	56.88	0.010		
138	25	78.57	0.014	Within the band of operation	Pass
102	25	98.76	0.017		

5 Test Setup Photos of the EUT



6 Photos of the EUT

Reference to the test report No. GTS20200327007-1-5-1

***** End of Report *****