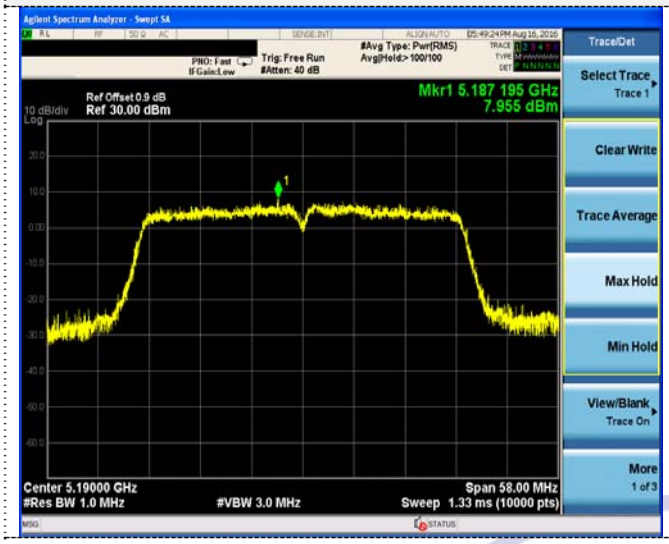
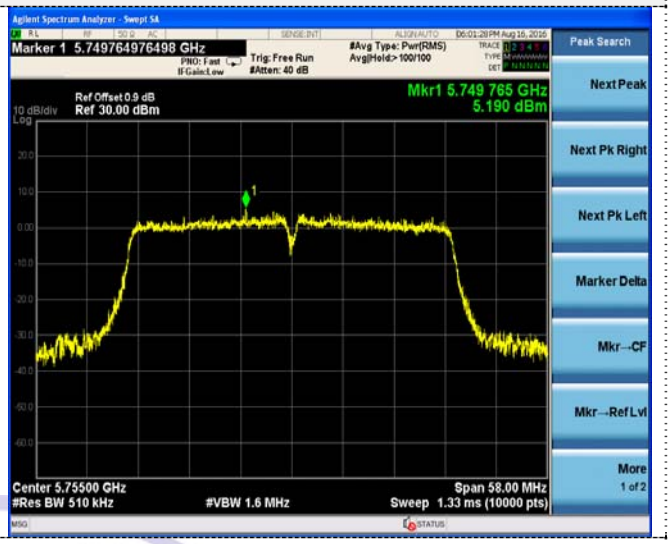
802.11ac(HT40)

U-NII 1

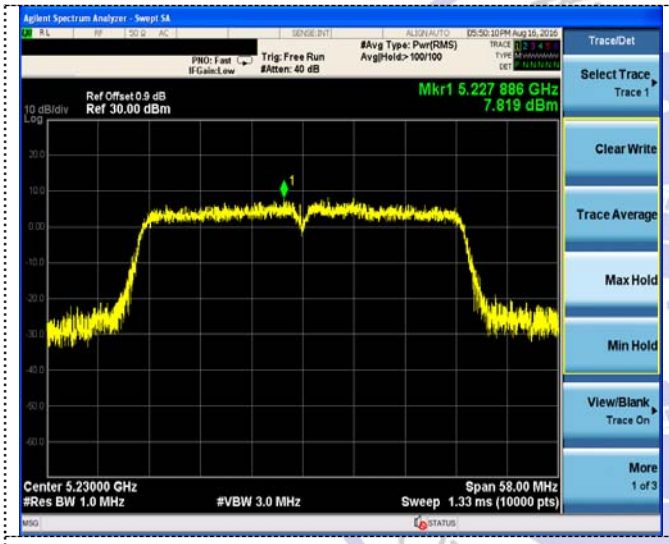


CH38

U-NII 3



CH151

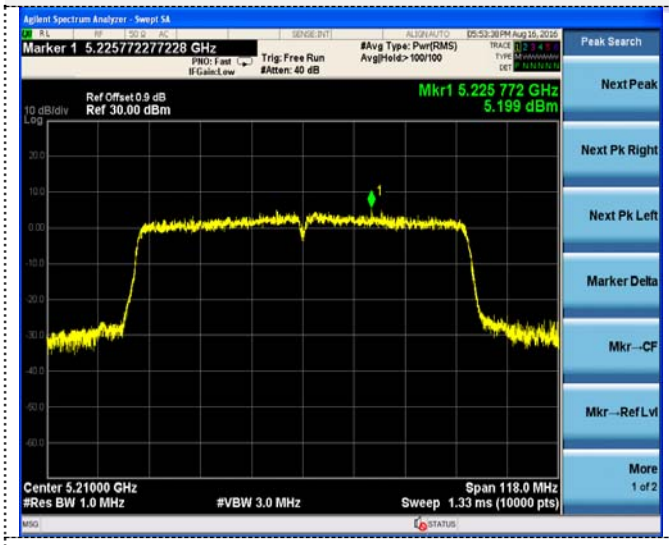


CH46

CH159

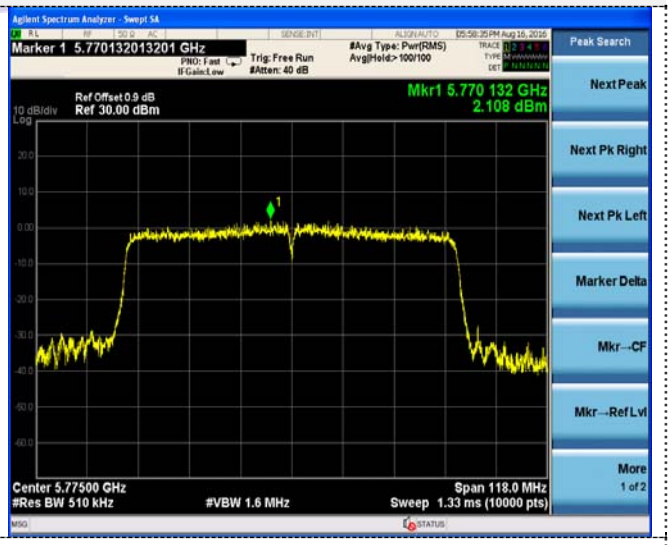
802.11ac(HT80)

U-NII 1



CH42

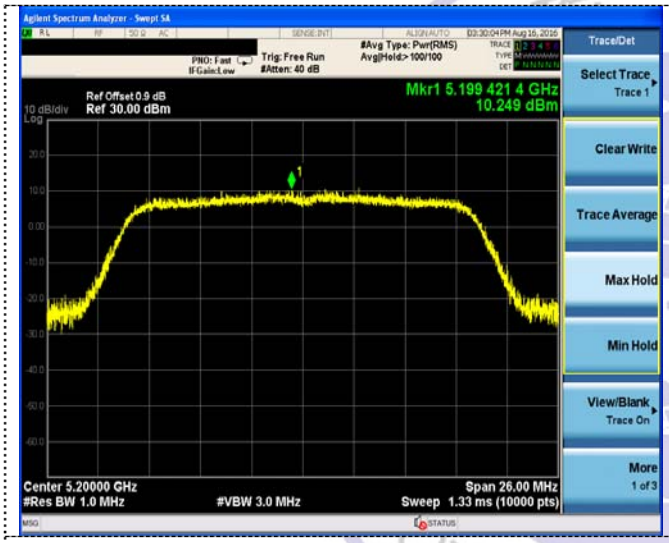
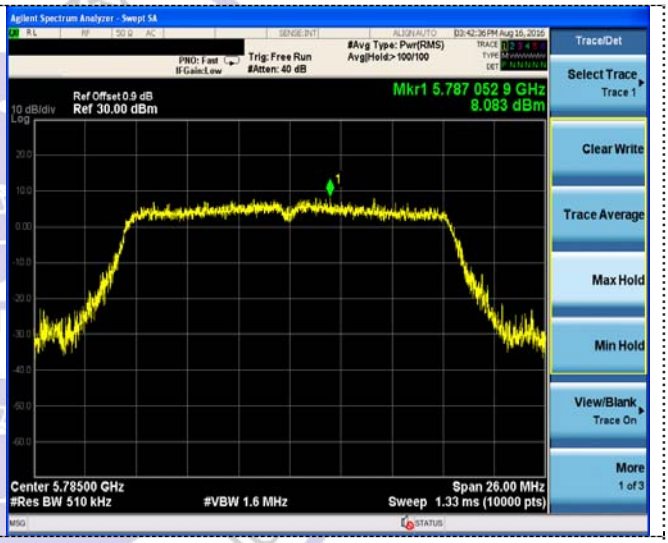
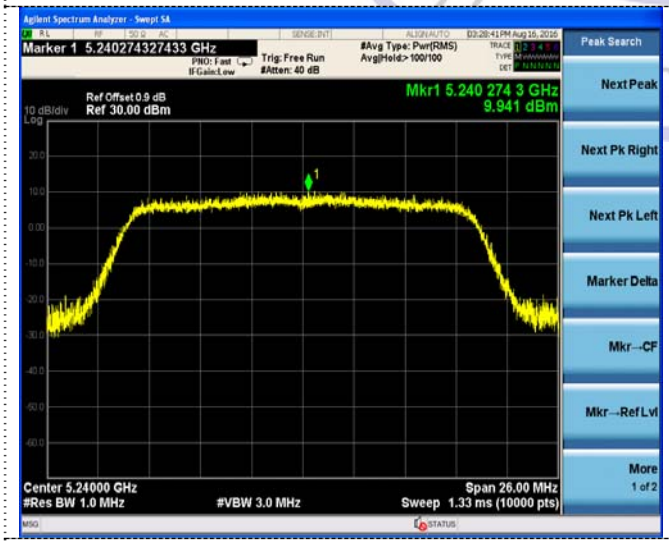
U-NII 3



CH155

ANT2

802.11a

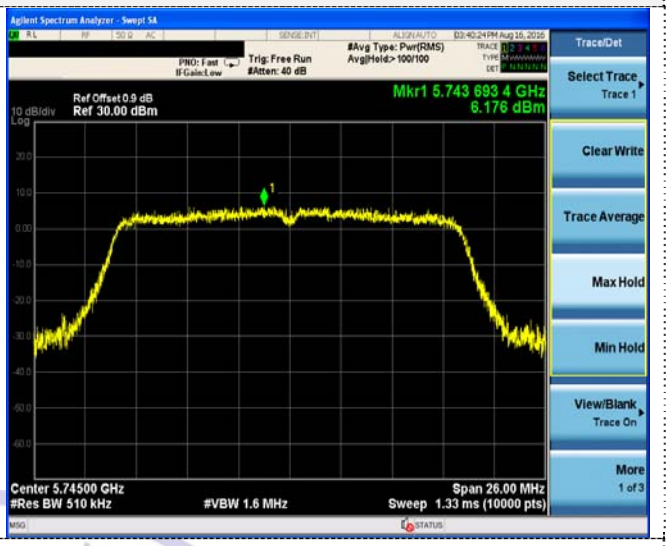
U-NII 1	*U-NII 3*
	
CH36	*CH149*
	
CH40	*CH157*
	
CH48	*CH165*

802.11n(HT20)

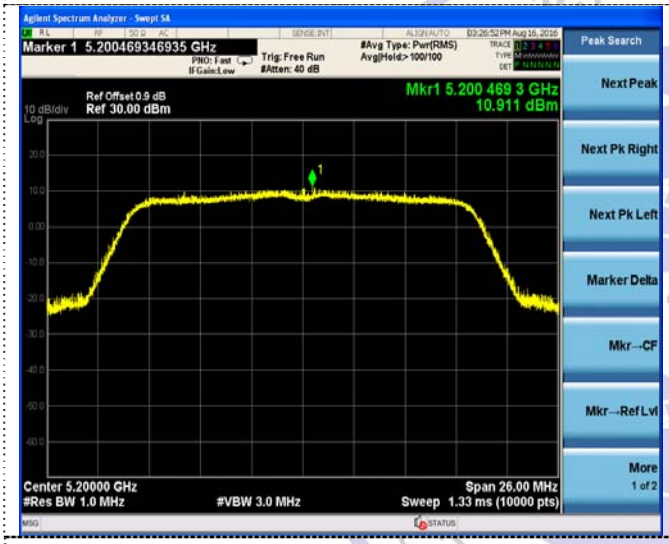
U-NII 1

CH36

U-NII 3

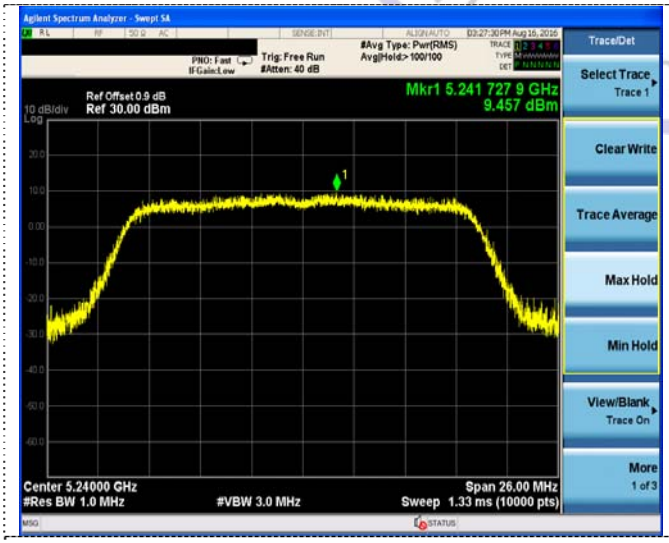


CH149



CH40

CH157



CH48

CH165

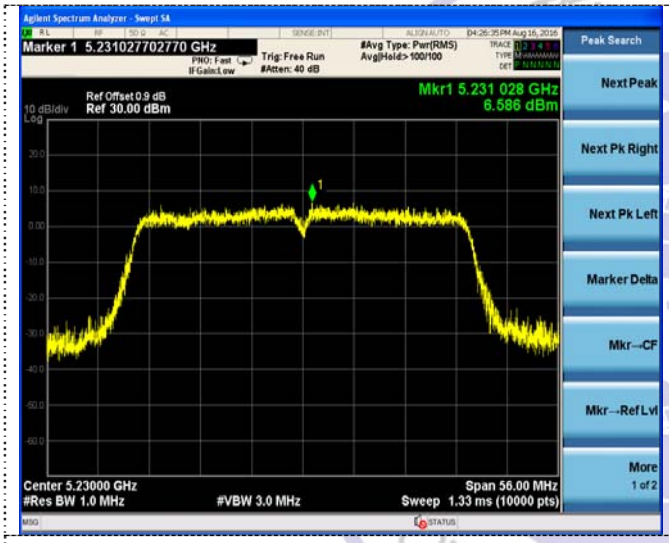
802.11n(HT40)

U-NII 1

CH38

U-NII 3

CH151

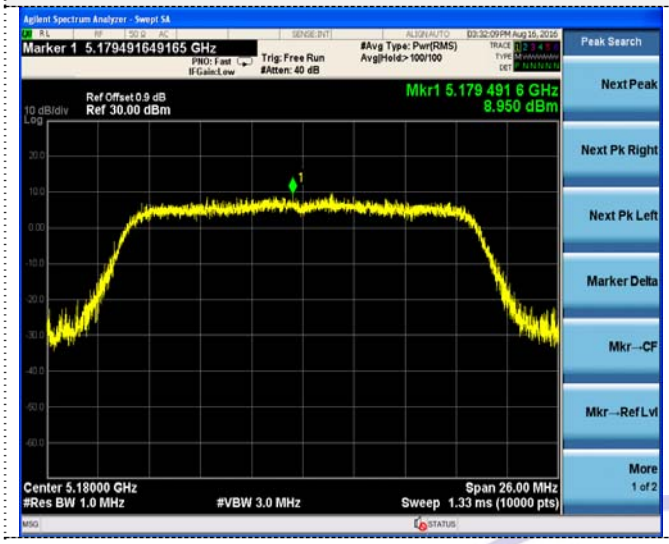


CH46

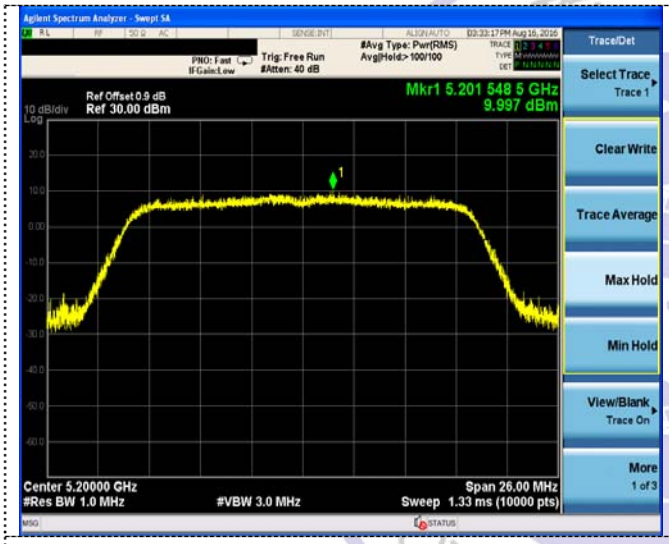
CH159

802.11ac(HT20)

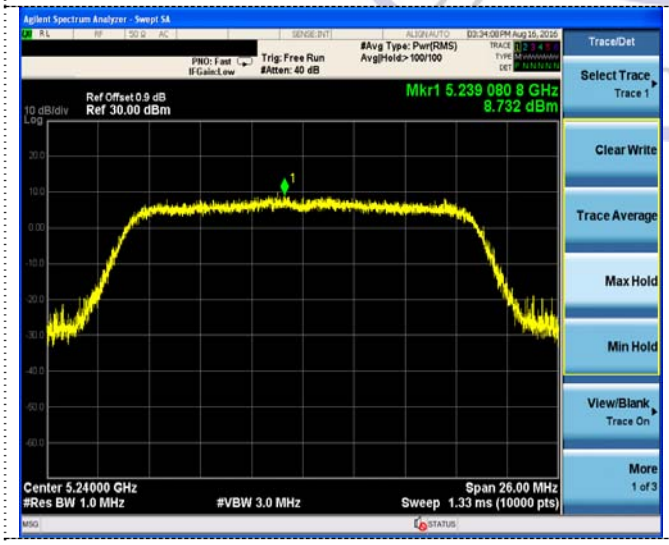
U-NII 1



CH36



CH40



CH48

U-NII 3

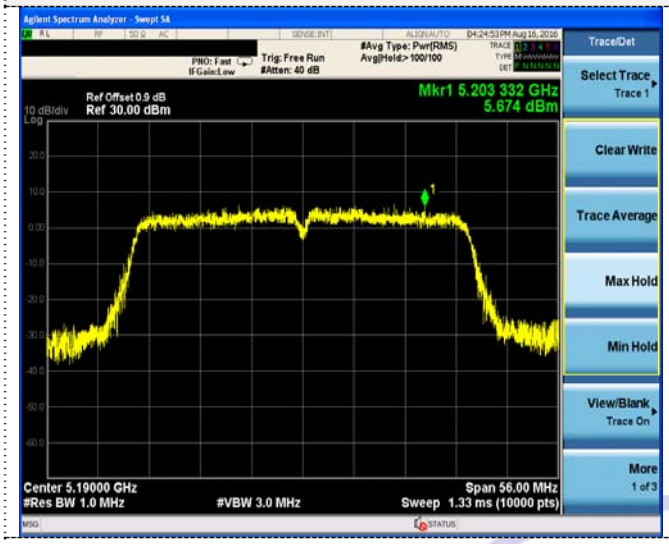
CH149

CH157

CH165

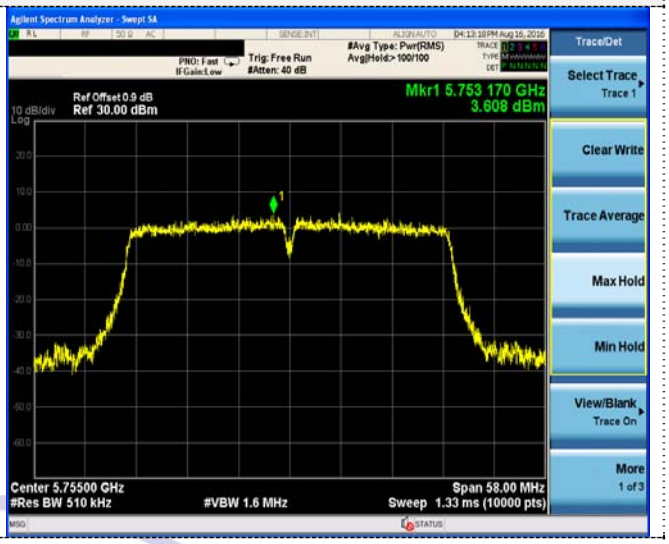
802.11ac(HT40)

U-NII 1

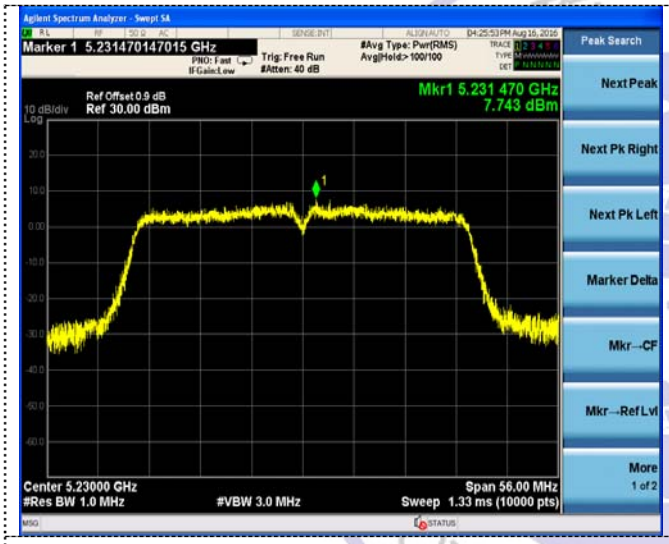


CH38

U-NII 3



CH151

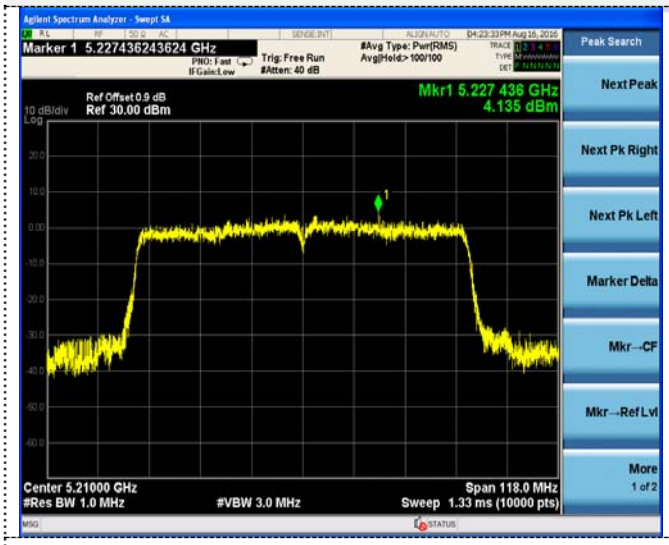


CH46

CH159

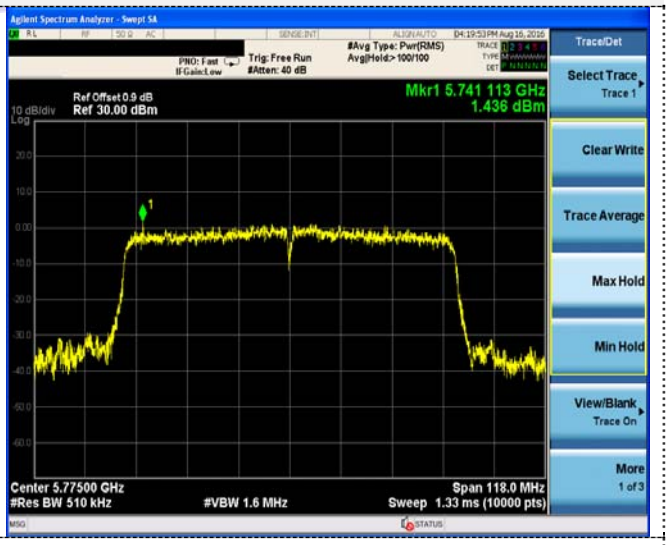
802.11ac(HT80)

U-NII 1



CH42

U-NII 3



CH155

3.5. 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

ANT1

Type	Bands	Channel	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
802.11a	U-NII 1	36	19.530	17.500	N/A	Pass
		40	19.400	17.406		
		48	19.300	17.428		
802.11n(HT20)	U-NII 1	36	19.690	17.442		
		40	19.450	17.482		
		48	19.480	17.517		
802.11n(HT40)	U-NII 1	38	39.340	36.029		
		46	39.920	36.054		
802.11ac(HT20)	U-NII 1	36	19.520	17.467		
		40	19.390	17.528		
		48	19.320	17.435		
802.11ac(HT40)	U-NII 1	38	40.490	36.045		
		46	40.160	35.989		
802.11ac(HT80)	U-NII 1	42	92.500	76.353		

ANT2

Type	Bands	Channel	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
802.11a	U-NII 1	36	19.010	16.407	N/A	Pass
		40	19.070	16.427		
		48	19.040	16.431		
802.11n(HT20)	U-NII 1	36	19.400	17.463		
		40	19.340	17.493		
		48	19.620	17.432		
802.11n(HT40)	U-NII 1	38	40.280	36.160		
		46	39.760	36.055		
802.11ac(HT20)	U-NII 1	36	19.300	17.485		
		40	19.640	17.511		
		48	19.830	17.475		
802.11ac(HT40)	U-NII 1	38	40.190	36.077		
		46	40.200	36.042		
802.11ac(HT80)	U-NII 1	42	92.620	76.315		

Test plot as follows:

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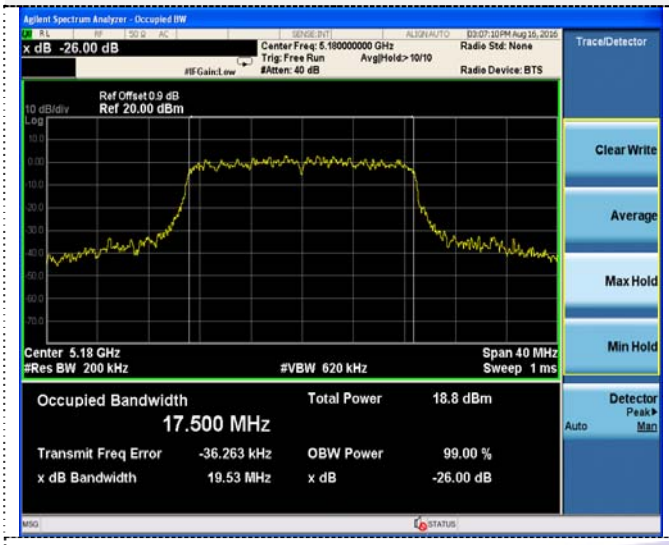
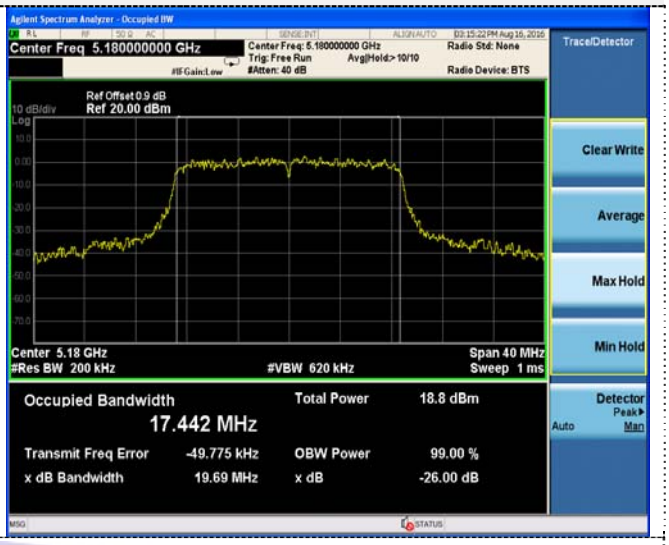
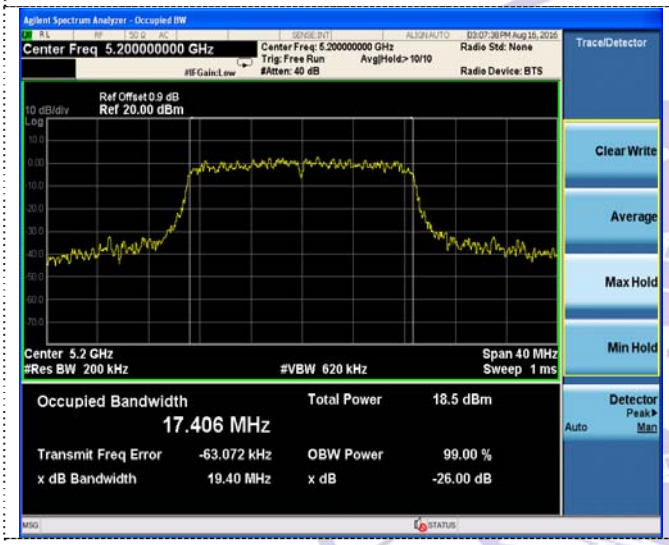
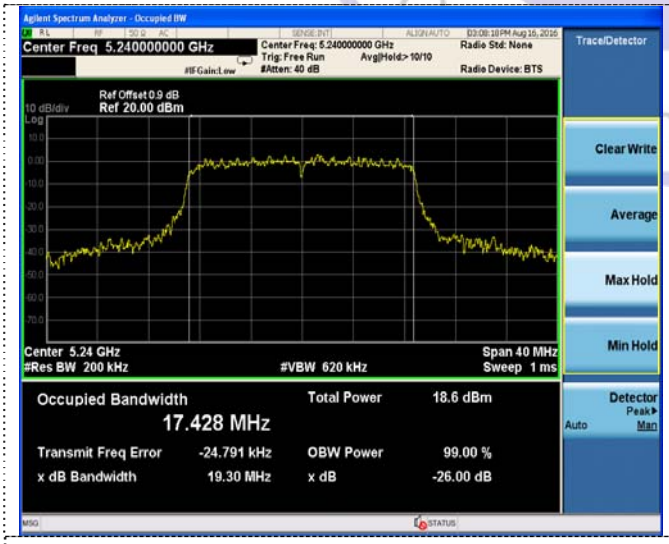
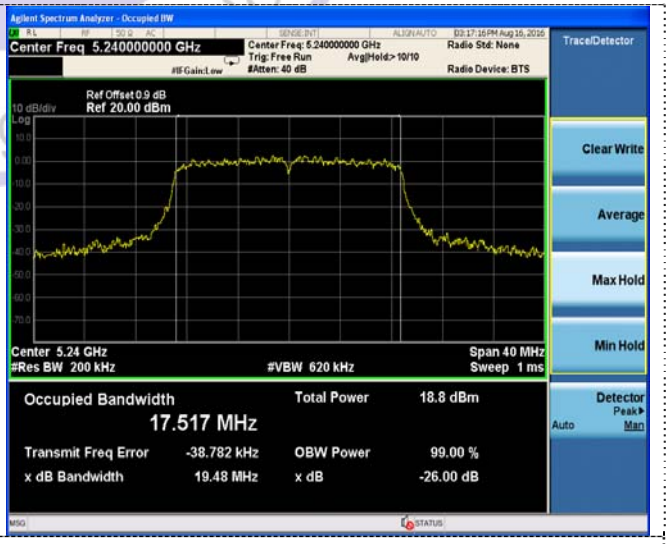
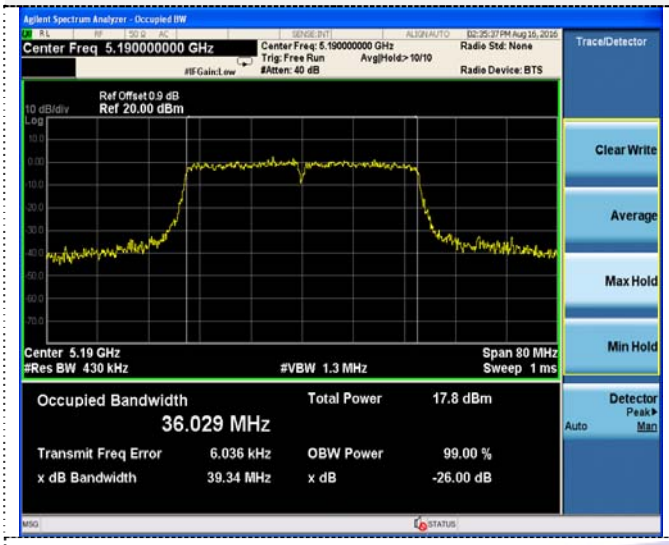
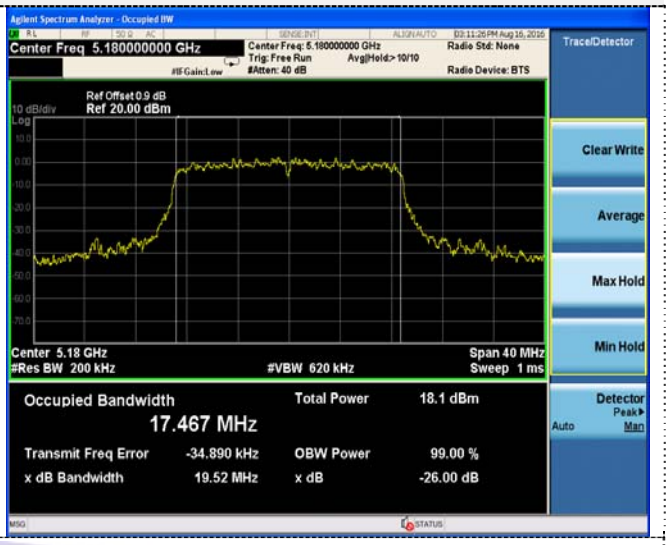
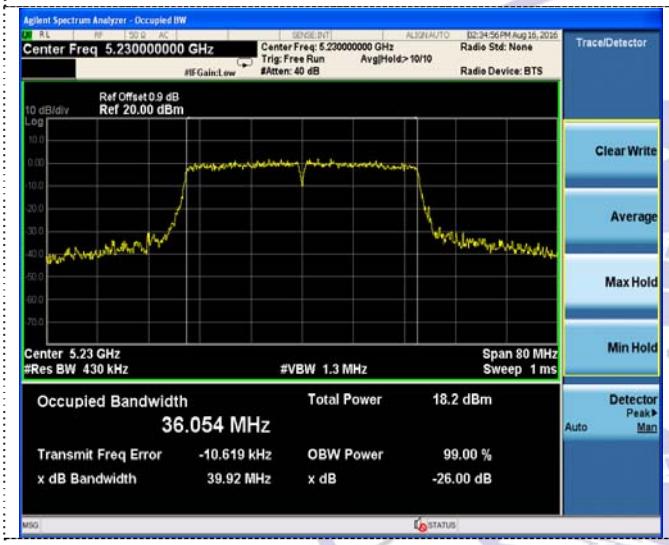
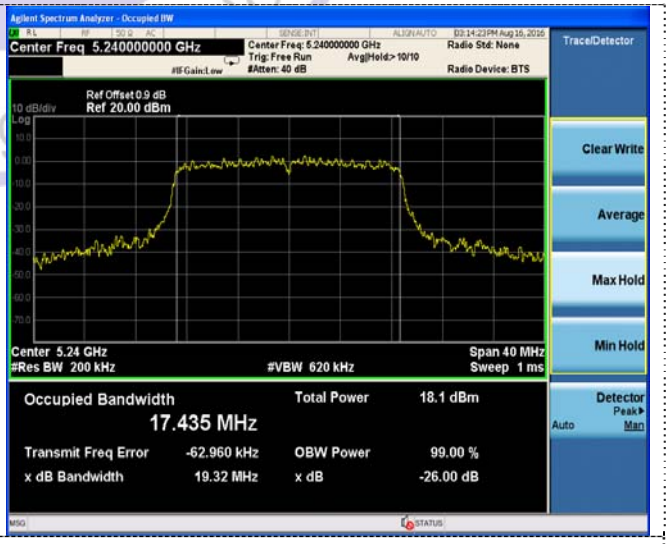
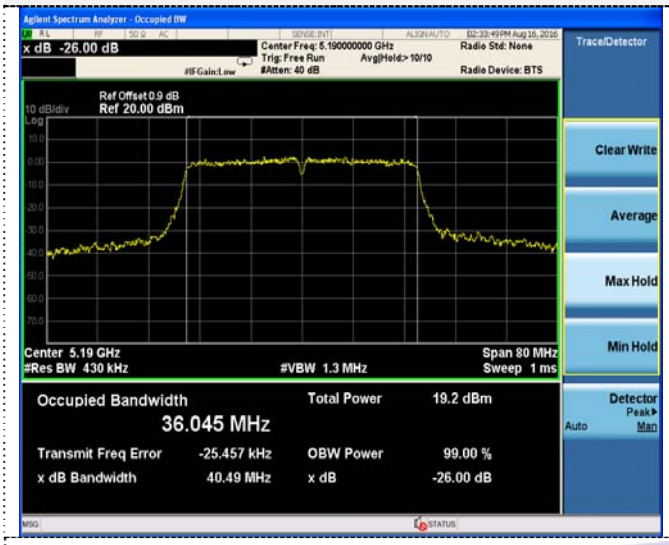
ANT1

802.11a	*802.11n(HT20)*
	
CH36	*CH36*
	
CH40	*CH40*
	
CH48	*CH48*

802.11n(HT40)	802.11ac(HT20)
	
CH38	CH36
	
CH46	CH40
	
	CH48

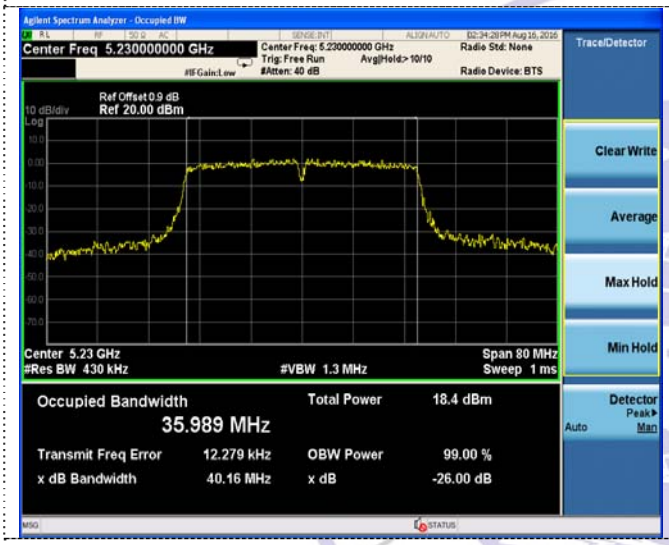
802.11ac(HT40)



CH38

802.11ac(HT80)

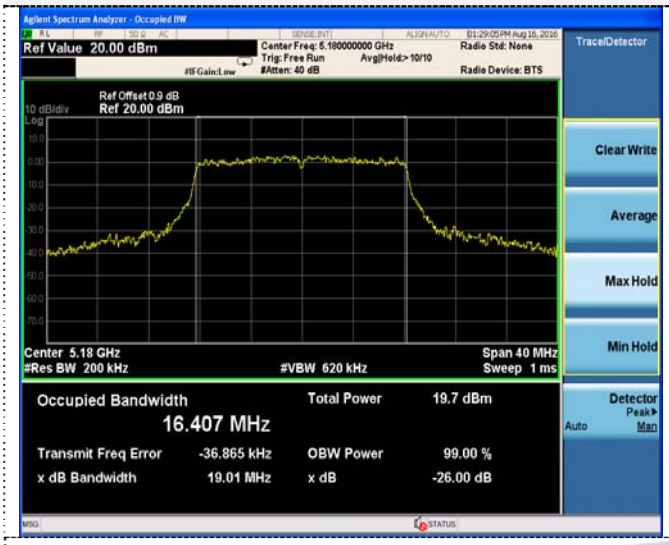
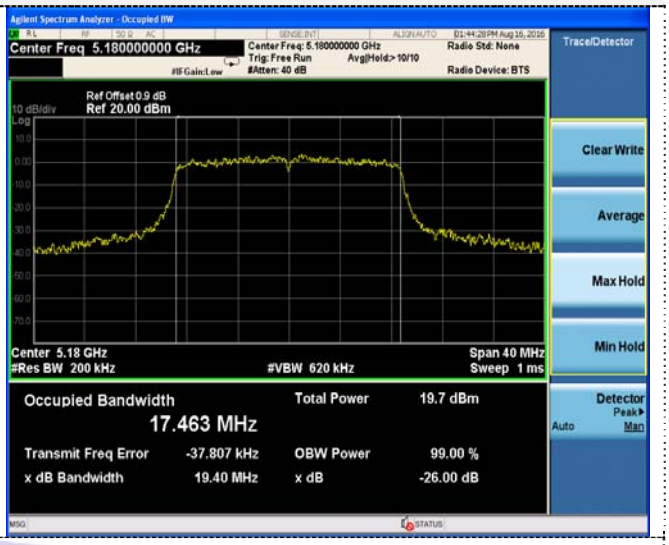
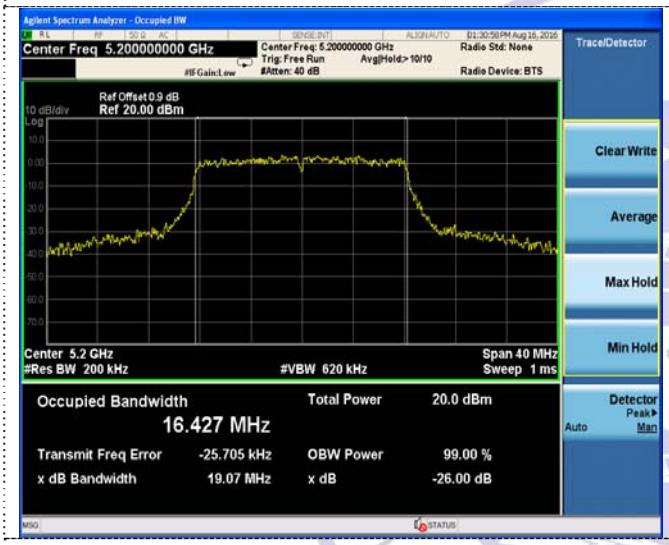
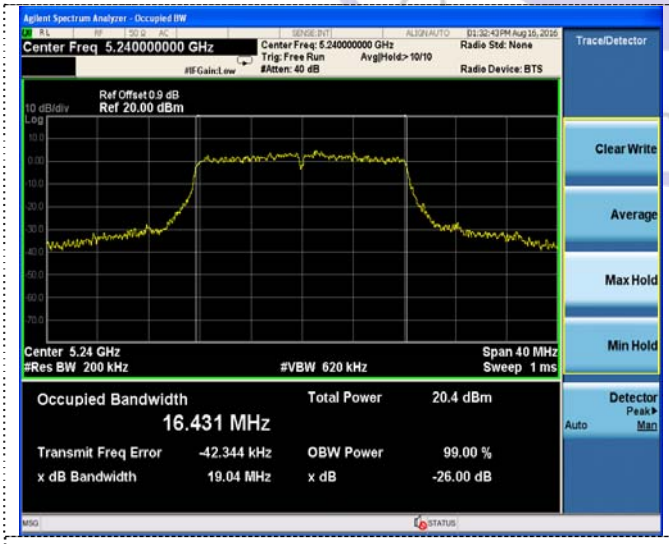
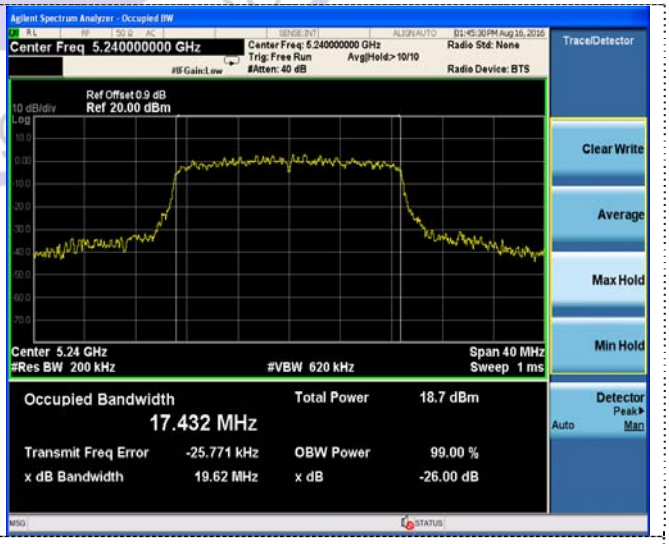
CH42

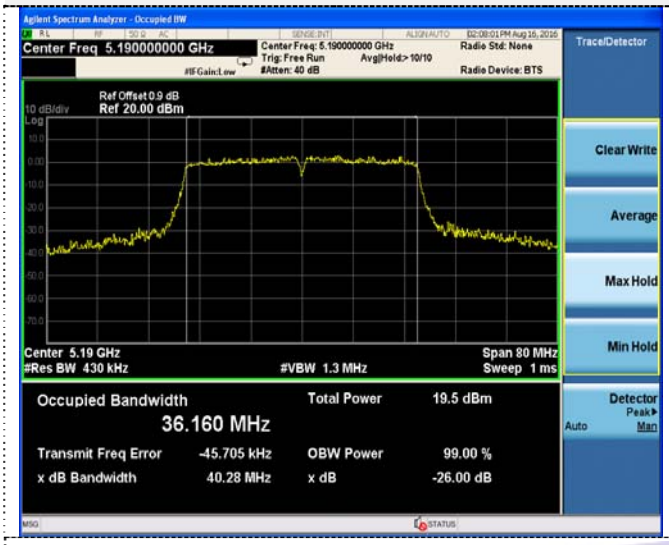
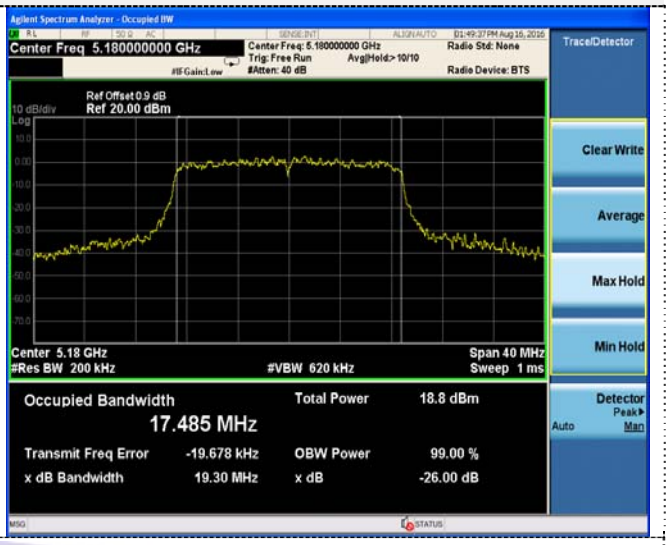
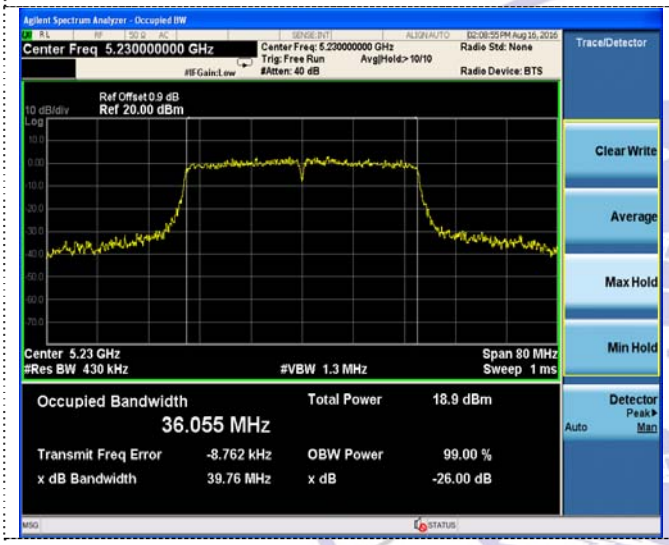


CH46

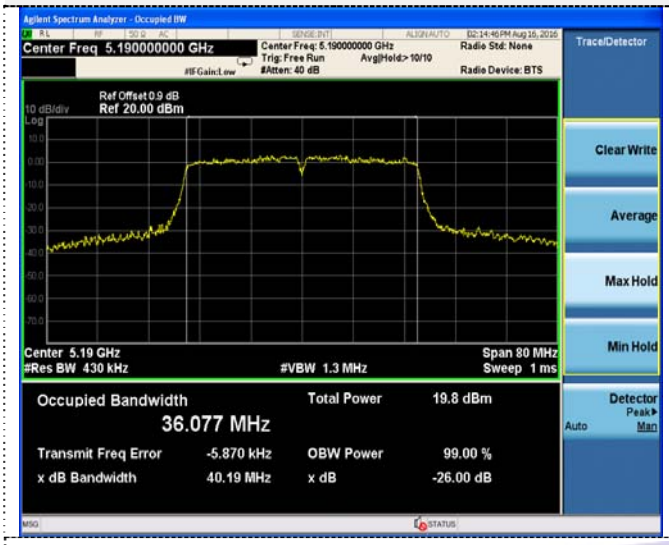
CTL Testing Technology

ANT2

802.11a	*802.11n(HT20)*
	
CH36	*CH36*
	
CH40	*CH40*
	
CH48	*CH48*

802.11n(HT40)	802.11ac(HT20)
	
CH38	CH36
	
CH46	CH40
	
	CH48

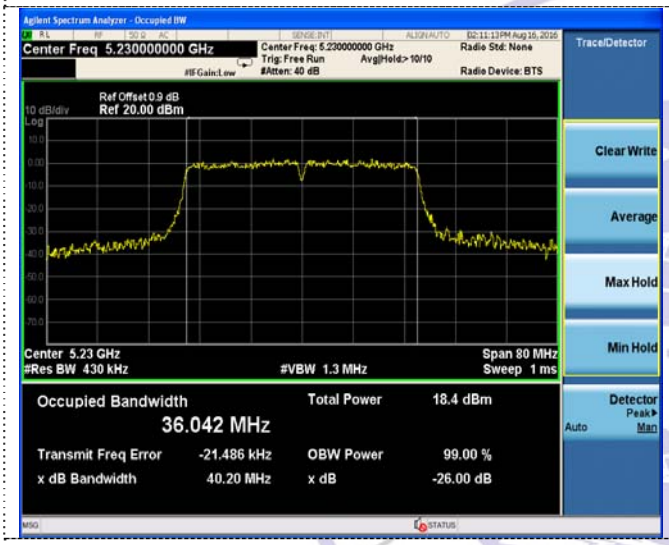
802.11ac(HT40)



CH38

802.11ac(HT80)

CH42



CH46

CTL Testing Technology

3.6. 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

ANT1

Type	Bands	Channel	6dB Bandwidth (MHz)	Limit (KHz)	Result
802.11a	U-NII 3	149	16.05	≥500KHz	Pass
		157	15.78		
		165	15.39		
802.11n(HT20)	U-NII 3	149	16.29		
		157	16.09		
		165	16.33		
802.11n(HT40)	U-NII 3	151	35.37		
		159	35.46		
802.11ac(HT20)	U-NII 3	149	16.96		
		157	16.32		
		165	16.49		
802.11ac(HT40)	U-NII 3	151	35.55		
		159	35.20		
802.11ac(HT80)	U-NII 3	155	75.17		

ANT2

Type	Bands	Channel	6dB Bandwidth (MHz)	Limit (KHz)	Result
802.11a	U-NII 3	149	16.32	≥500KHz	Pass
		157	16.22		
		165	16.34		
802.11n(HT20)	U-NII 3	149	16.94		
		157	16.05		
		165	16.73		
802.11n(HT40)	U-NII 3	151	36.37		
		159	35.51		
802.11ac(HT20)	U-NII 3	149	16.64		
		157	16.23		
		165	16.00		
802.11ac(HT40)	U-NII 3	151	35.77		
		159	36.03		
802.11ac(HT80)	U-NII 3	155	75.17		

Test plot as follows:

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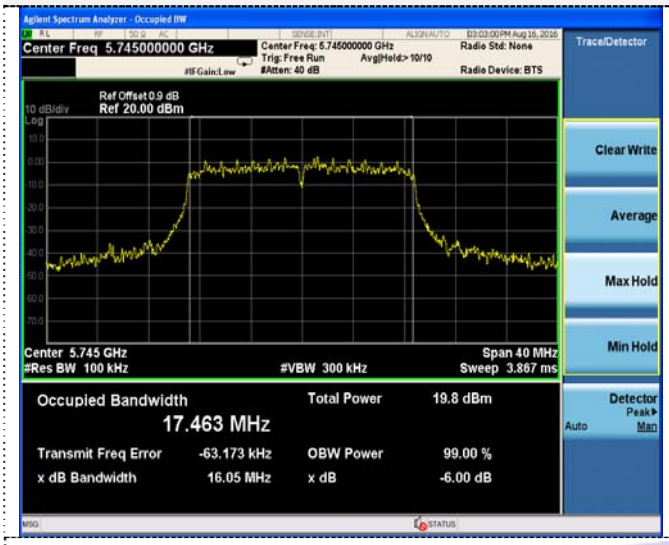
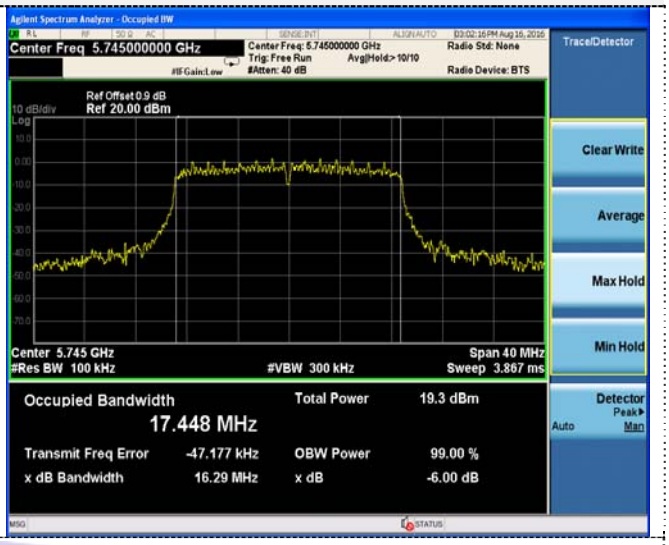
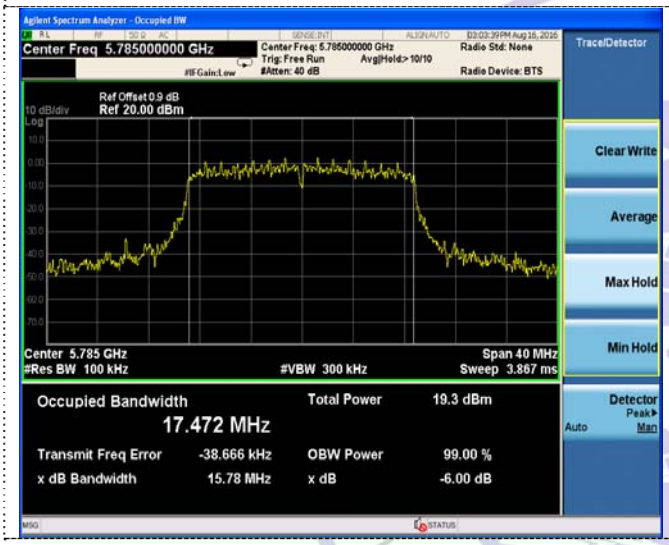
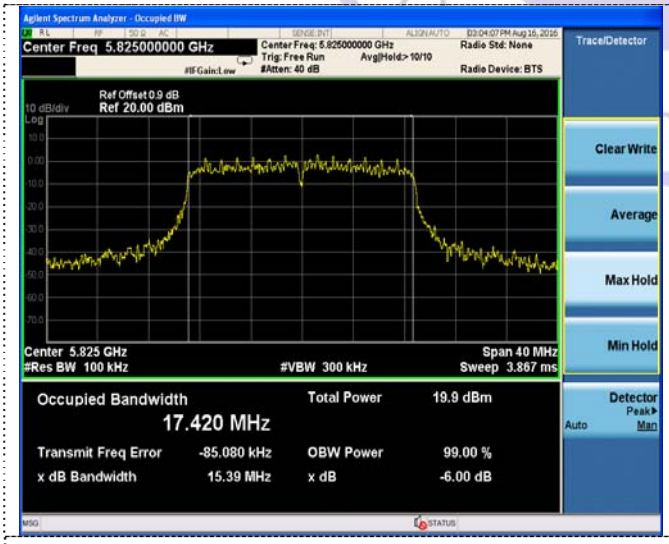
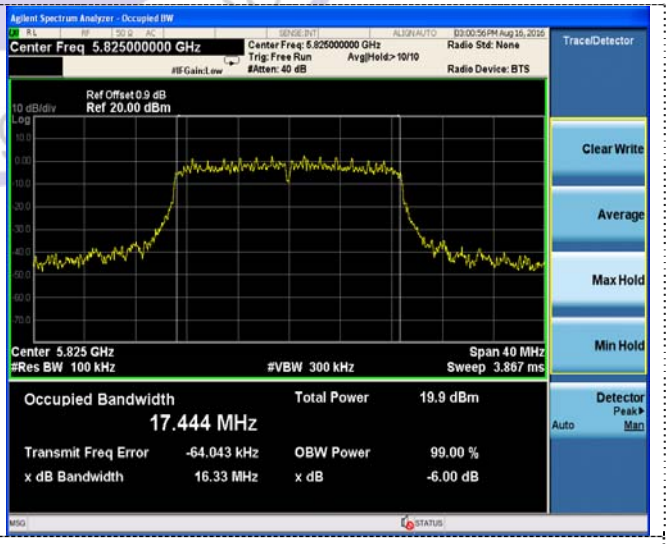
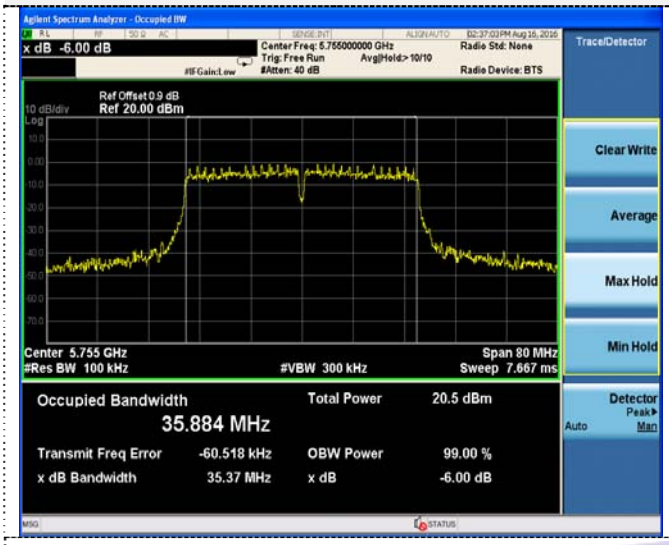
ANT1

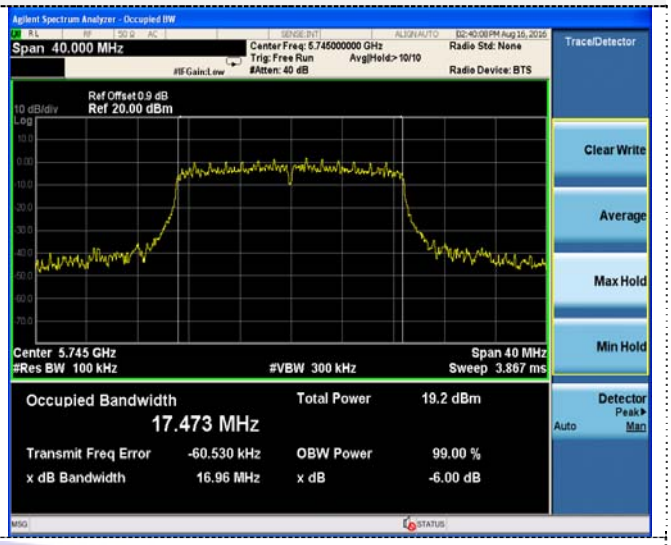
802.11a	*802.11n(HT20)*
	
CH149	*CH149*
	
CH157	*CH157*
	
CH165	*CH165*

802.11n(HT40)

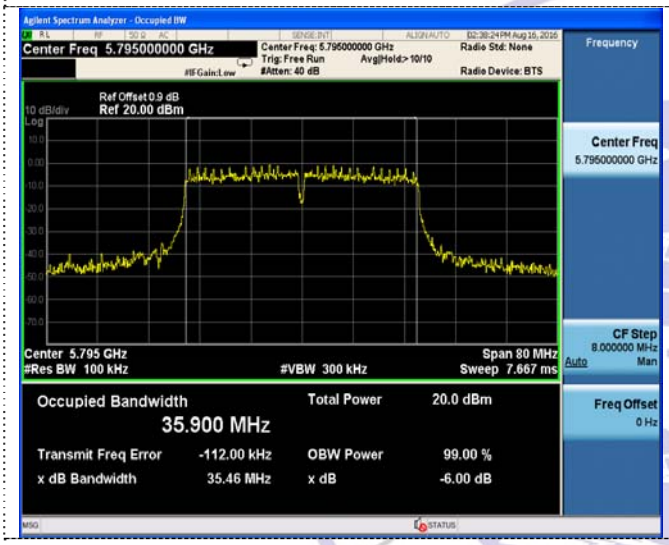


CH151

802.11ac(HT20)

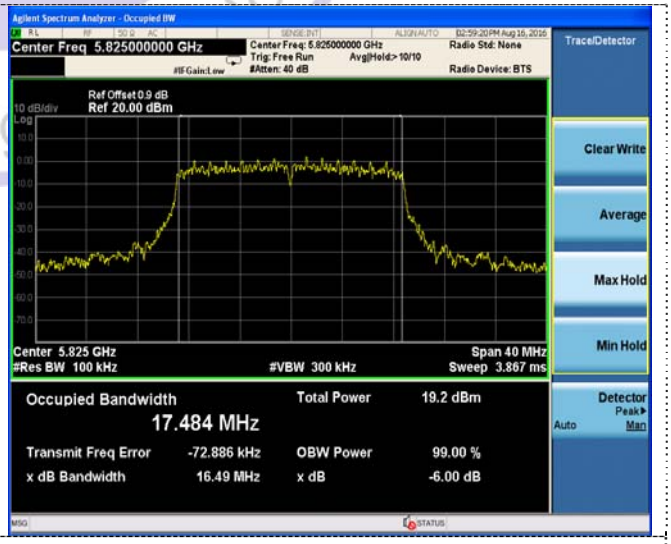


CH149



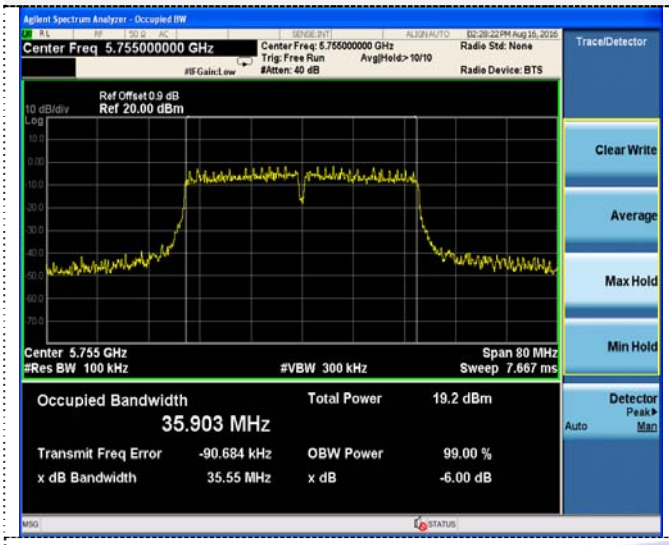
CH159

CH157



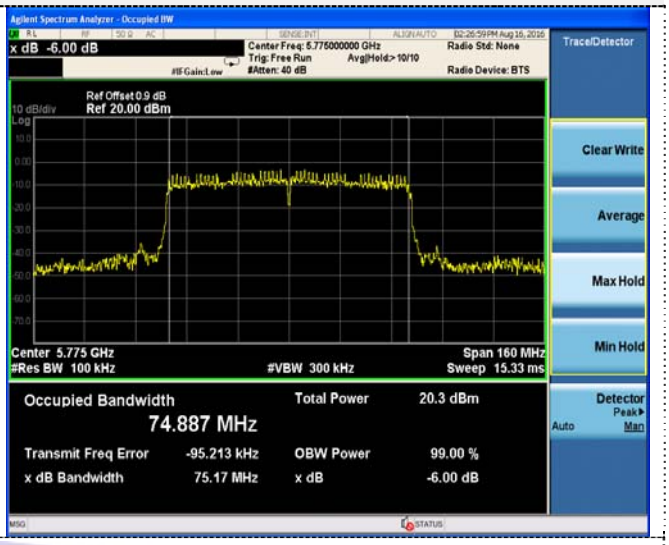
CH165

802.11ac(HT40)

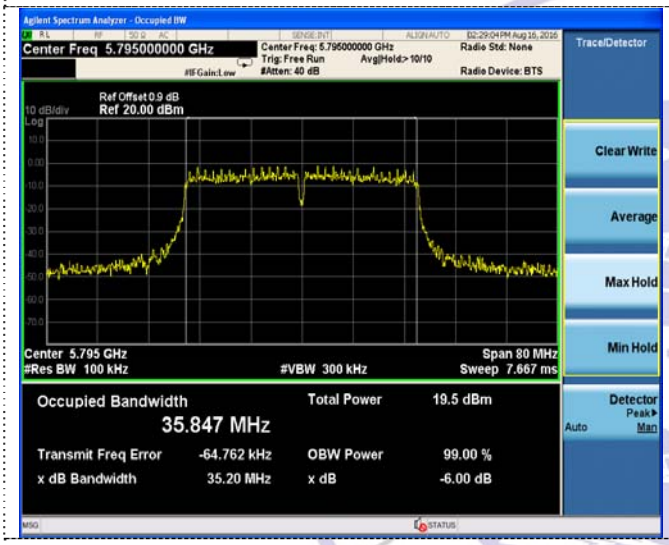


CH151

802.11ac(HT80)



CH155



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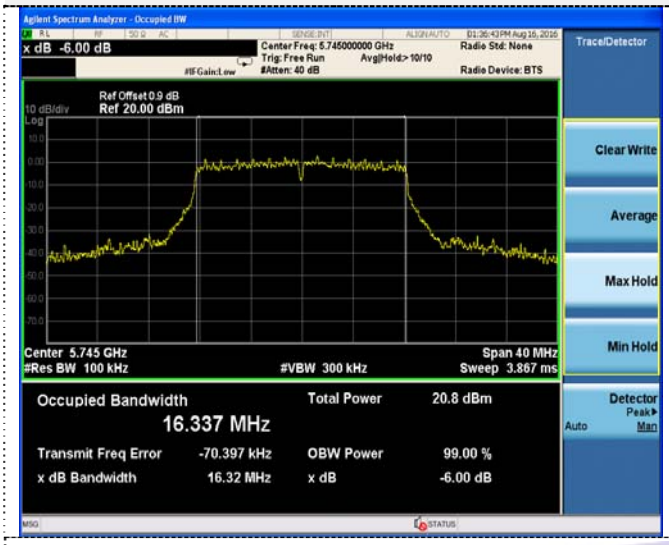
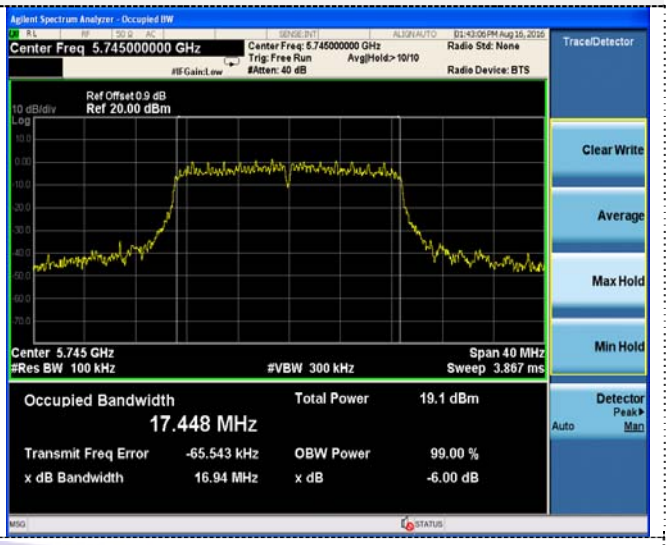
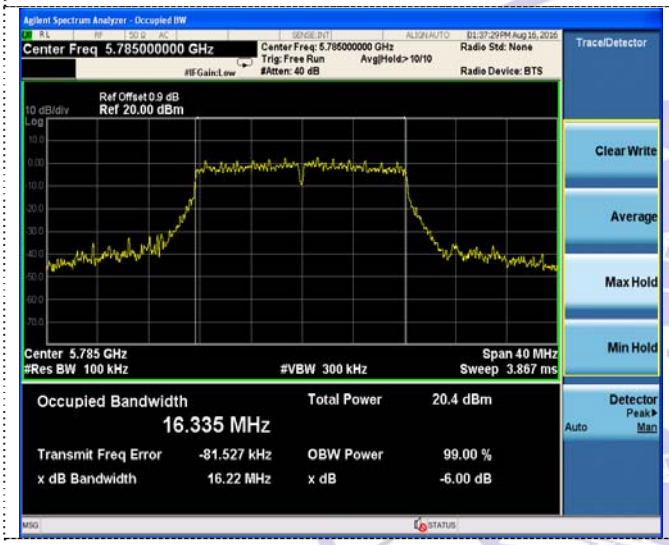
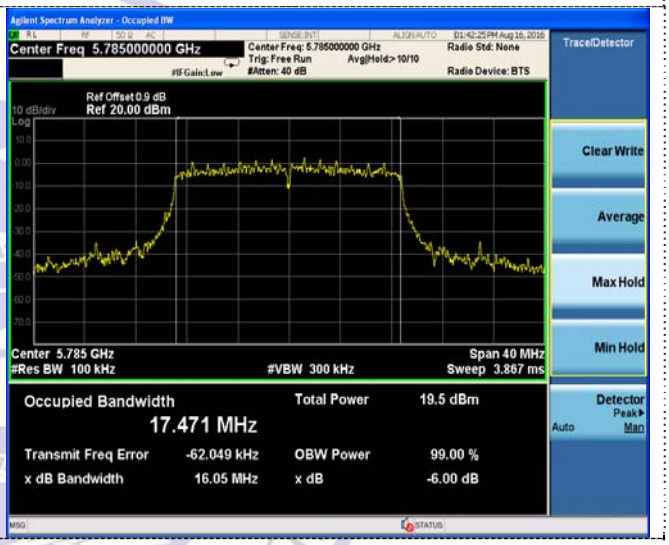
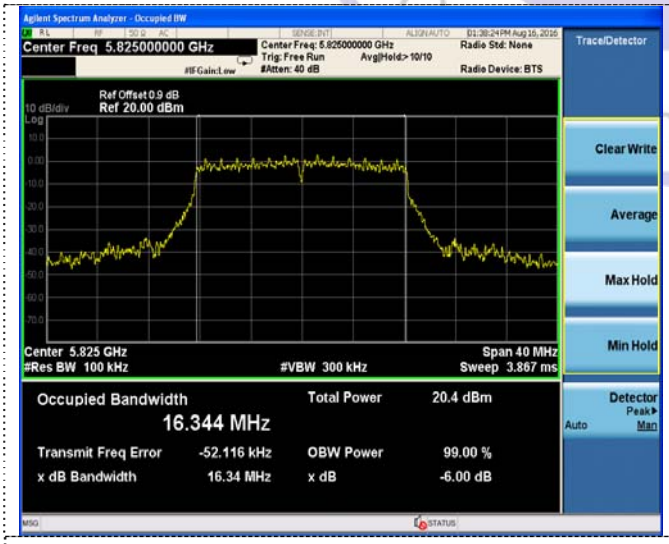
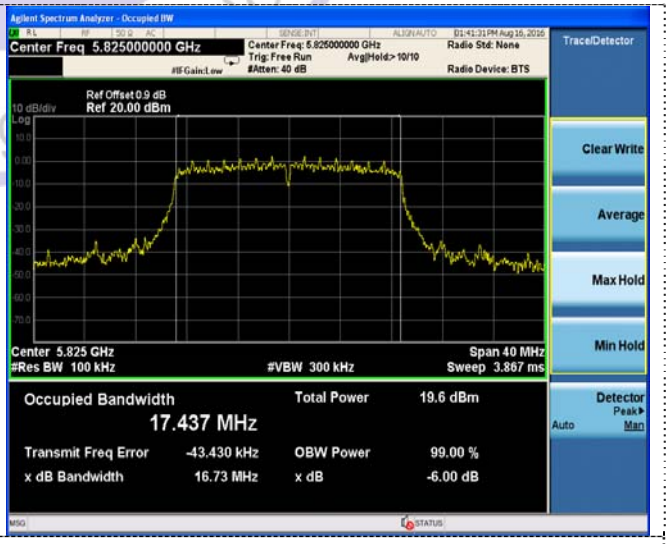
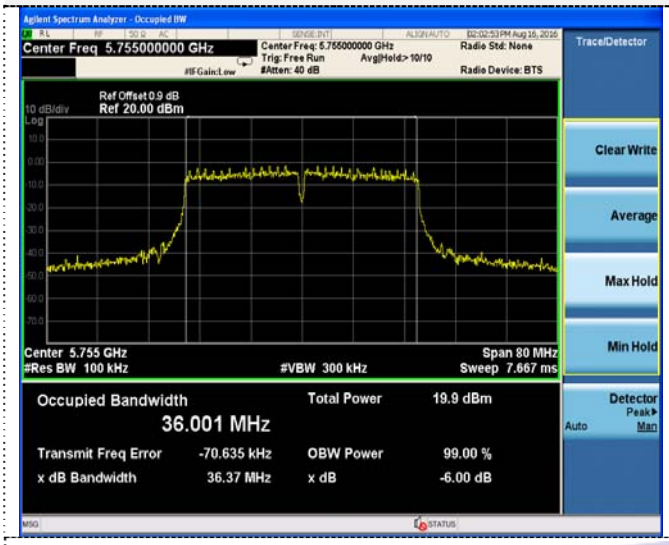
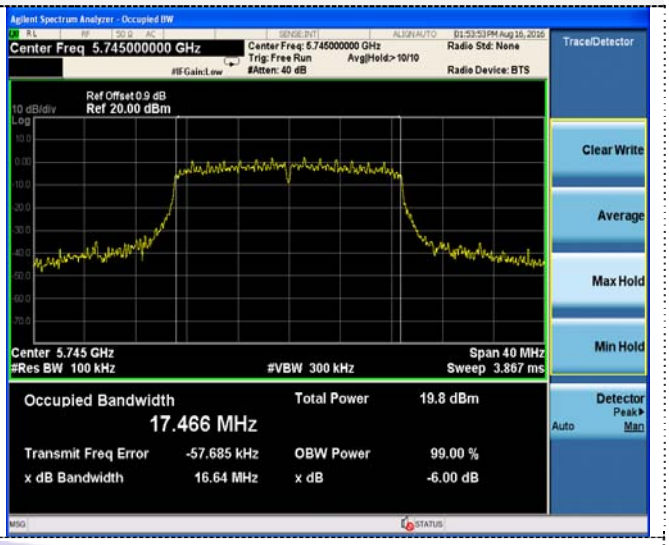
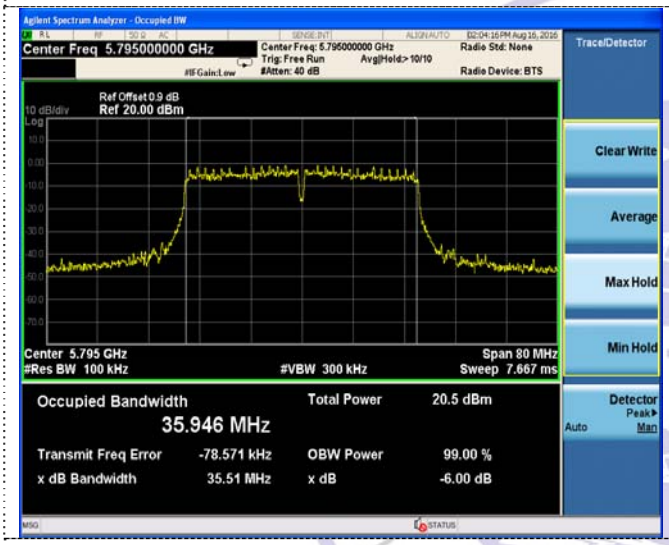
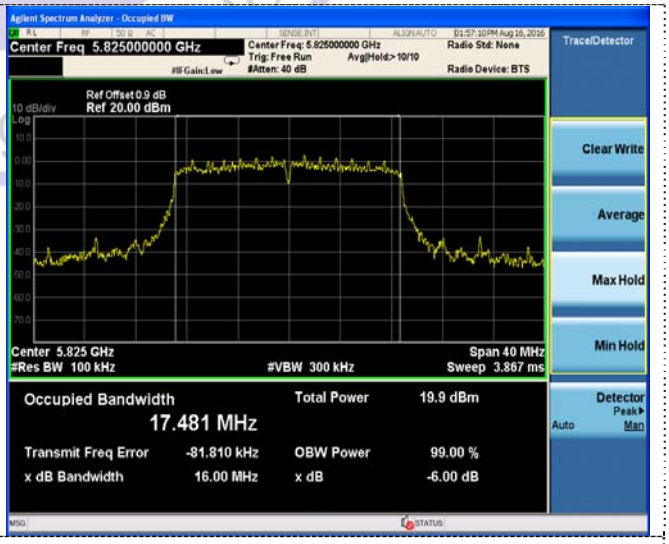
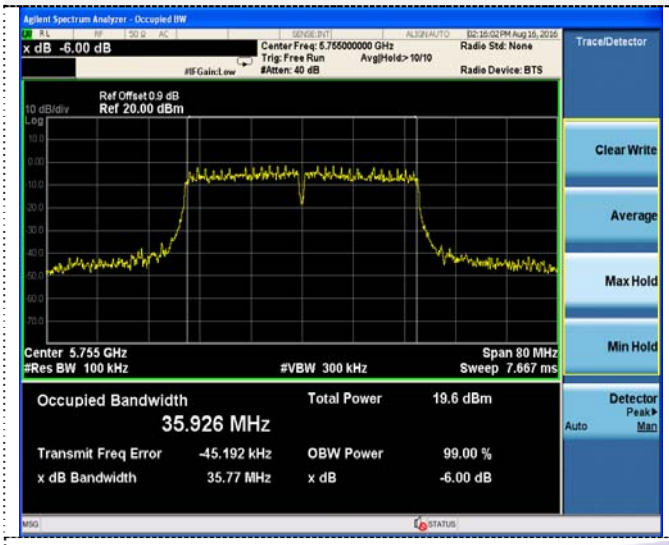
ANT2

802.11a	*802.11n(HT20)*
	
CH149	*CH149*
	
CH157	*CH157*
	
CH165	*CH165*

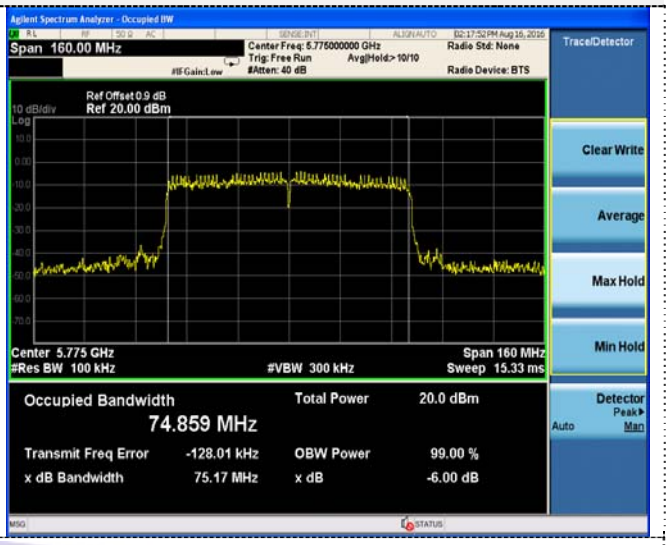
802.11n(HT40)	802.11ac(HT20)
	
CH151	CH149
	
CH159	CH157
	
	CH165

802.11ac(HT40)

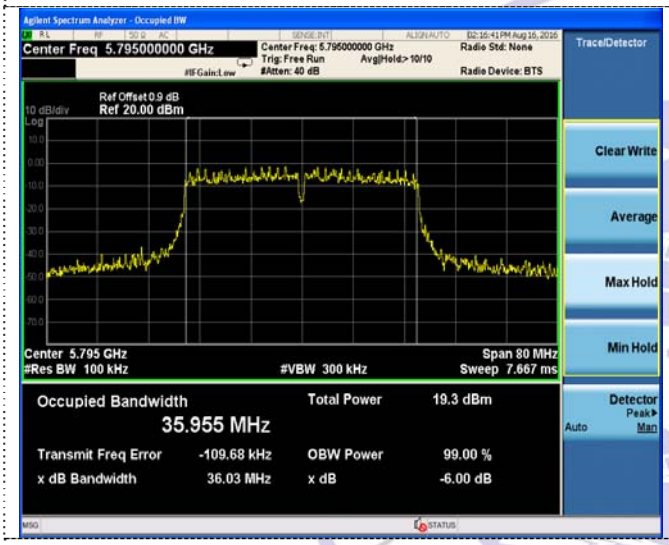


CH151

802.11ac(HT80)



CH155



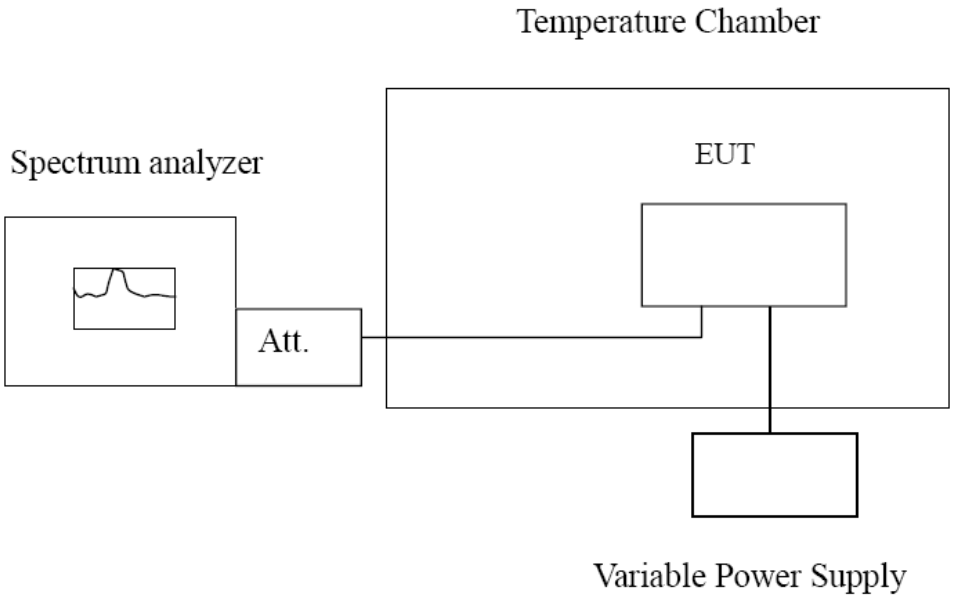
CH159

3.7. 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℃ operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30℃. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃ reached.

Frequency Stability under Voltage Variations:
Set chamber temperature to 20℃. 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 (±15%) and endpoint, record the maximum frequency change.

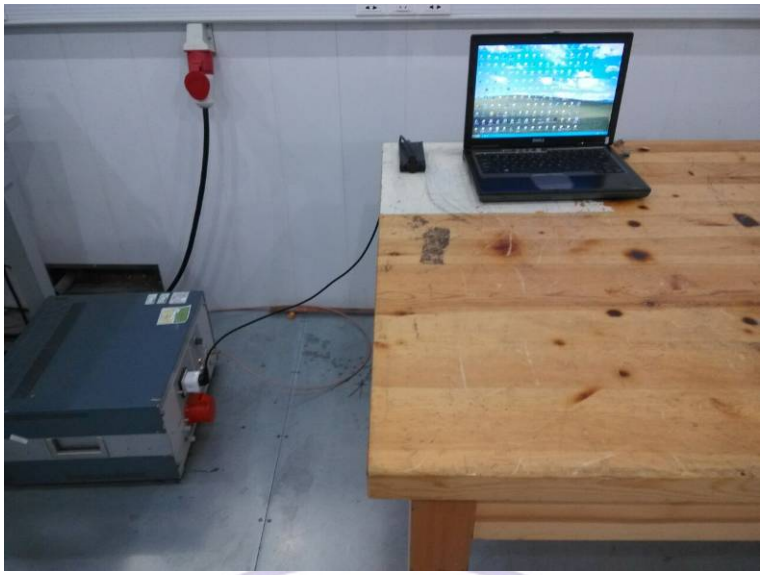
TEST RESULTS

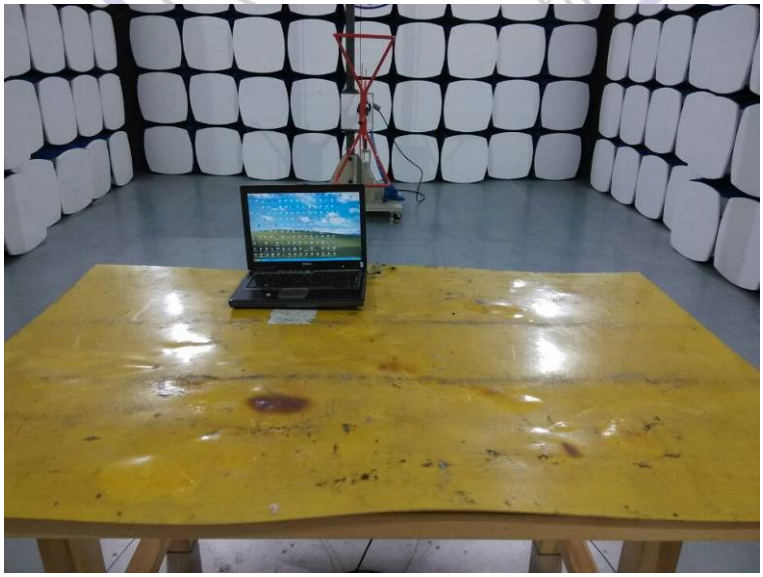
Record worst case as below:

Reference Frequency: 802.11ac channel=36 frequency=5180MHz					
Voltage (V)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.30	-30	898	0.17	Within the band of operation	Pass
	-20	874	0.17		
	-10	795	0.15		
	0	885	0.17		
	10	621	0.12		
	20	526	0.10		
	30	398	0.08		
	40	685	0.13		
	50	614	0.12		
3.80	25	652	0.13		
2.80	25	845	0.16		

Reference Frequency: 802.11ac channel=149 frequency=5745MHz					
Voltage (V)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.30	-30	789	0.14	Within the band of operation	Pass
	-20	665	0.12		
	-10	547	0.10		
	0	685	0.12		
	10	687	0.12		
	20	674	0.12		
	30	496	0.09		
	40	833	0.14		
	50	575	0.10		
3.80	25	746	0.13		
2.80	25	889	0.15		

4. Test Setup Photos of the EUT



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5. Photos of the EUT

Reference to the test report No. CTL1607252810-WF-01

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

Shenzhen CTL Testing Technology Co.,Ltd.