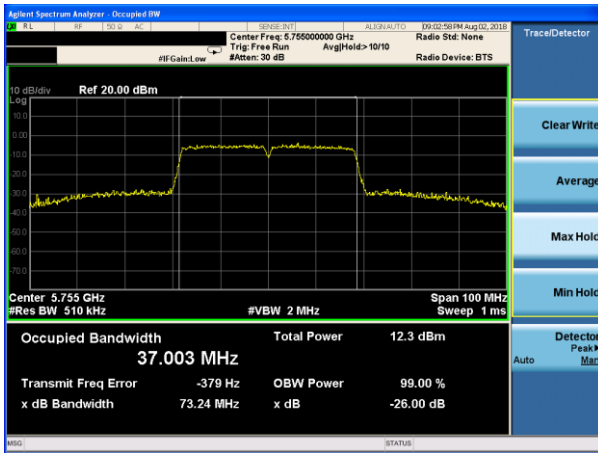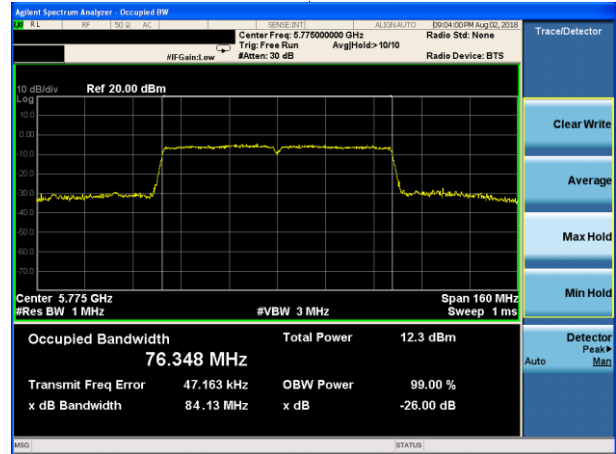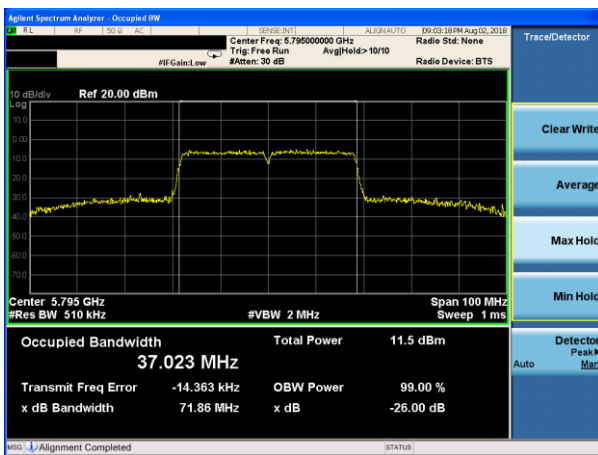**Test plot**

(802.11 ac40) -26dB&99%Bandwidth plot on channel 151

(802.11 ac80) -26dB&99%Bandwidth plot on channel 155

(802.11 ac40) -26dB&99%Bandwidth plot on channel 159

6. MINIMUM 6 DB BANDWIDTH

6.1 APPLIED PROCEDURES / LIMIT

According to FCC §15.407(e)
(e) Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

6.2 TEST PROCEDURE

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

a) Set RBW = 100 kHz.

b) Set the video bandwidth (VBW) ≥ 3 × RBW.

c) Detector = Peak.

d) Trace mode = max hold.

e) Sweep = auto couple.

f) Allow the trace to stabilize.

g) 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.

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP
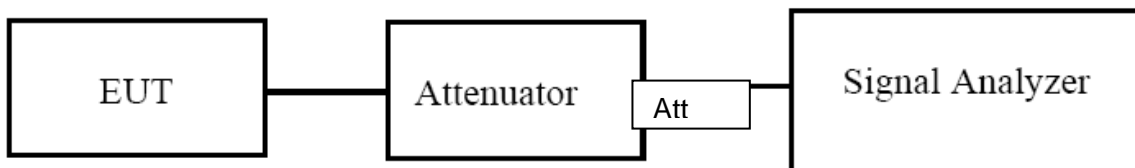
6.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

6.6 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)		

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

| Mode	Channel	Frequency (MHz)	6dB bandwidth (MHz) Antenna A	6dB bandwidth (MHz) Antenna B	Limit (KHz)	Result
802.11a	CH36	5180	16.47	16.38	≧500	Pass
	CH40	5200	16.43	16.41	≧500	Pass
	CH48	5240	16.43	16.43	≧500	Pass
802.11 n20	CH36	5180	17.67	17.64	≧500	Pass
	CH40	5200	17.67	17.66	≧500	Pass
	CH48	5240	17.65	17.66	≧500	Pass
802.11 n40	CH 38	5190	36.46	36.46	≧500	Pass
	CH 46	5230	36.43	36.46	≧500	Pass
802.11 ac20	CH36	5180	17.66	17.65	≧500	Pass
	CH40	5200	17.65	17.66	≧500	Pass
	CH48	5240	17.66	17.67	≧500	Pass
802.11 ac40	CH 38	5190	36.45	36.43	≧500	Pass
	CH 46	5230	36.42	36.43	≧500	Pass
802.11 ac80	CH 42	5210	75.94	75.79	≧500	Pass

Test plot

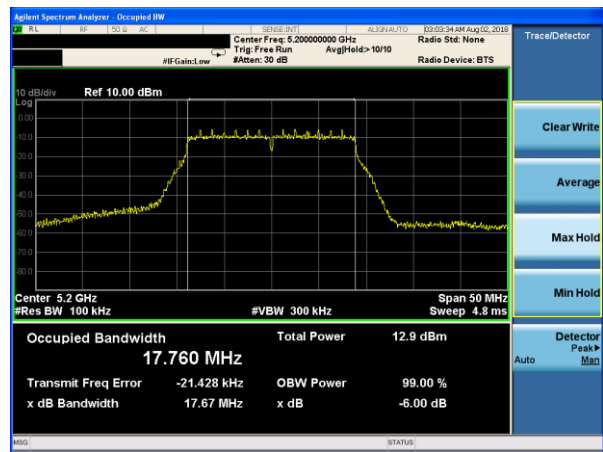(802.11a) 6dB Bandwidth plot on channel 36
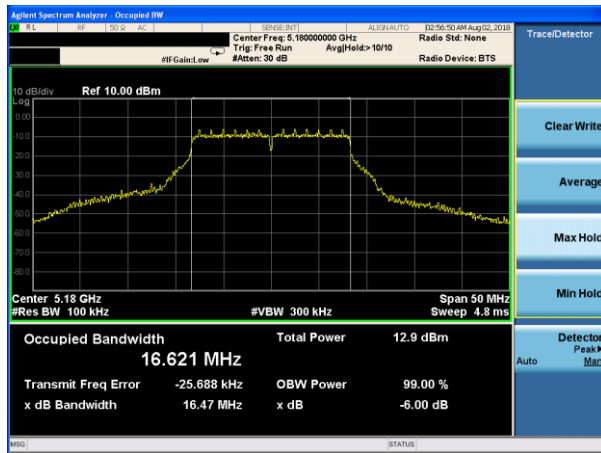
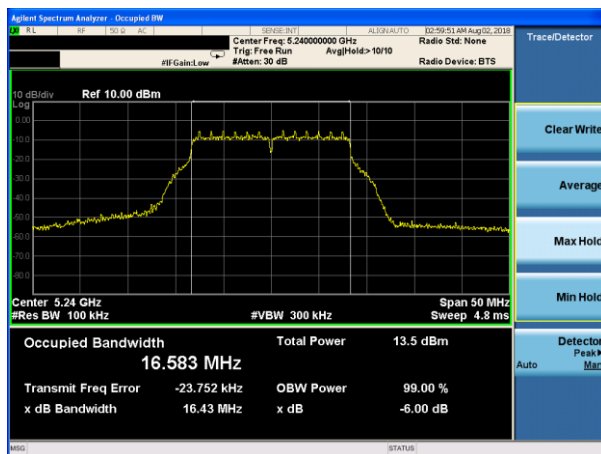(802.11 n20) 6dB Bandwidth plot on channel 36
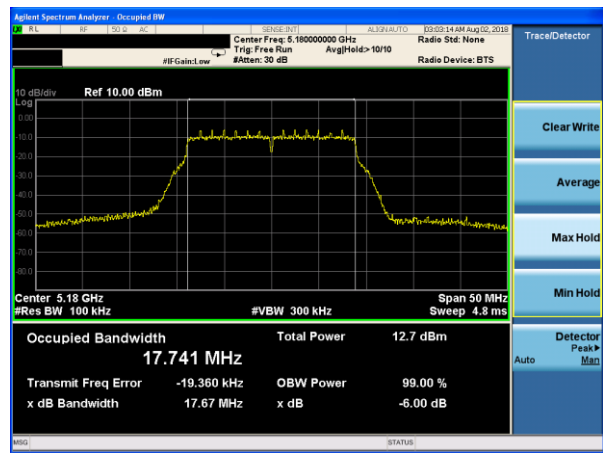
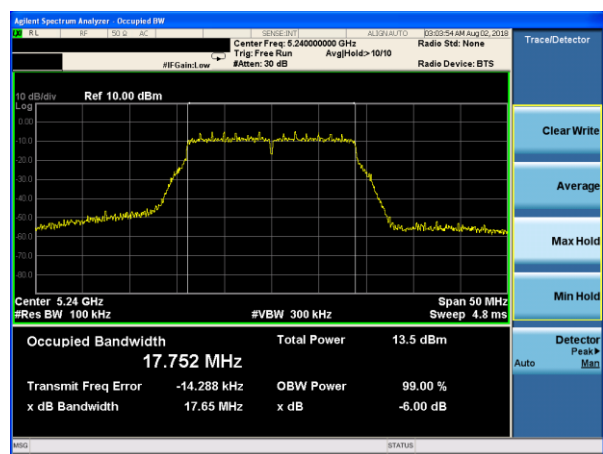(802.11a) 6dB Bandwidth plot on channel 40
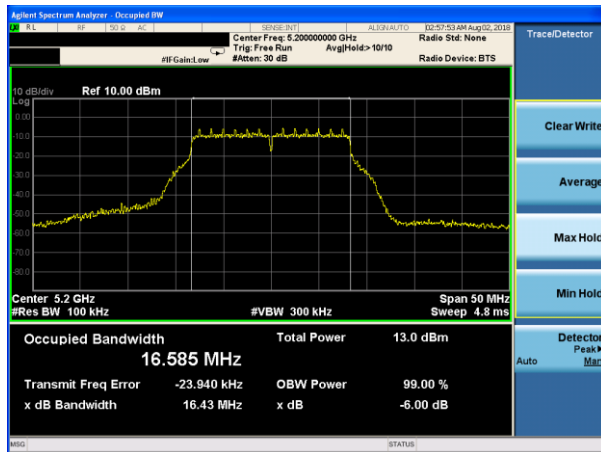
(802.11 n20) 6dB Bandwidth plot on channel 40

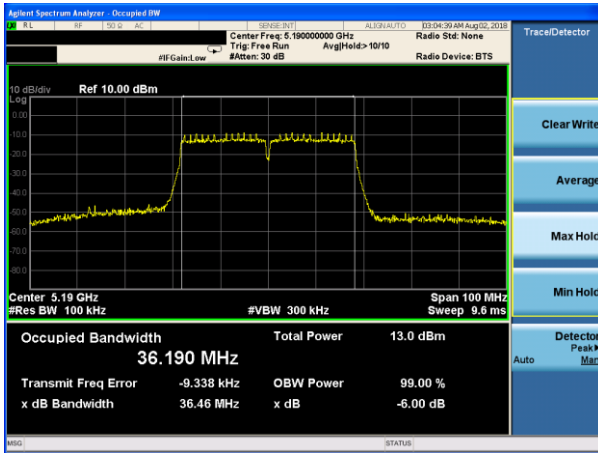

(802.11a) 6dB Bandwidth plot on channel 48

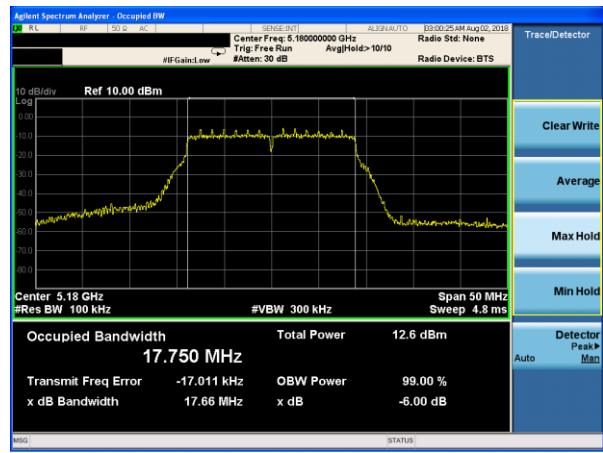(802.11 n20) 6dB Bandwidth plot on channel 48
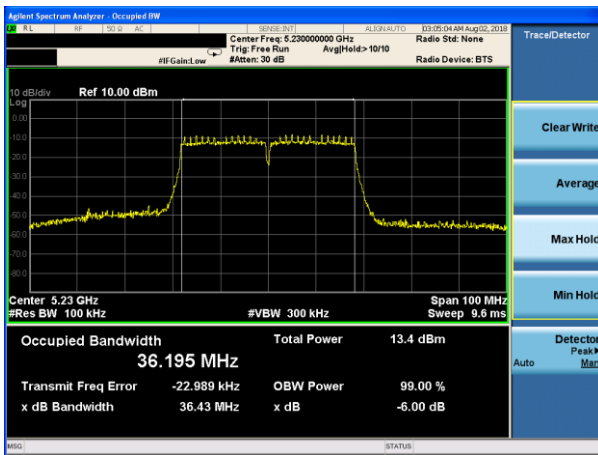
Test plot

(802.11 n40) 6dB Bandwidth plot on channel 38
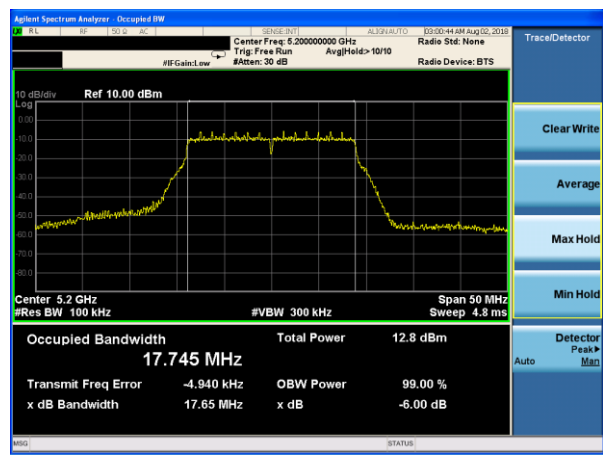

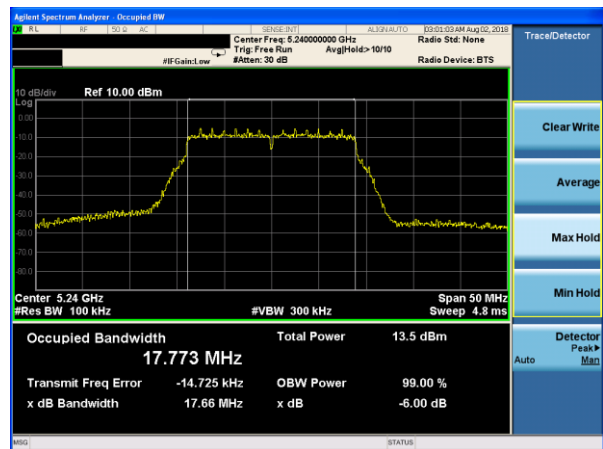(802.11 ac20) 6dB Bandwidth plot on channel 36

(802.11 n40) 6dB Bandwidth plot on channel 46

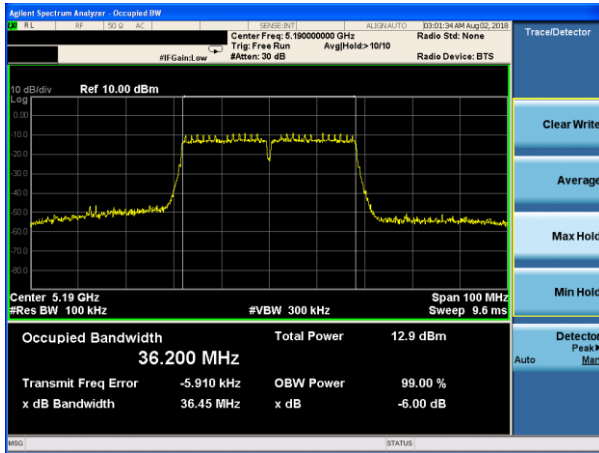(802.11 ac20) 6dB Bandwidth plot on channel 40

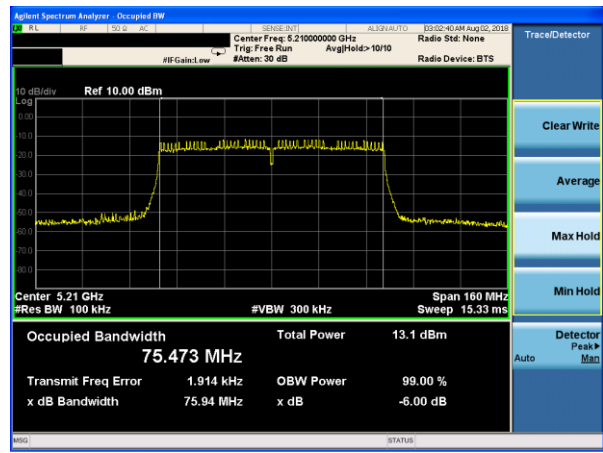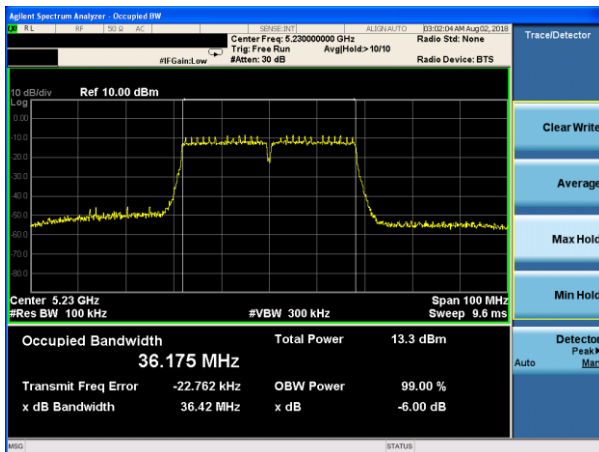(802.11 ac20) 6dB Bandwidth plot on channel 48

Test plot

(802.11 ac40) 6dB Bandwidth plot on channel 38

(802.11 ac80) 6dB Bandwidth plot on channel 42

(802.11 ac40) 6dB Bandwidth plot on channel 46

EUT：	PIQS Virtual Touch Projector	Model Name. ：	Q1
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC 19V
Test Mode ：	TX (5G) Mode Frequency Band IV (5725-5825MHz)		

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

Mode	Channel	Frequency (MHz)	-6dB bandwidth (MHz) Antenna A	-6dB bandwidth (MHz) Antenna B	Limit (KHz)	Result
802.11a	149	5745	16.37	16.40	≧500	Pass
	157	5785	16.40	16.40	≧500	Pass
	165	5825	16.40	16.40	≧500	Pass
802.11 n20	149	5745	17.63	17.59	≧500	Pass
	157	5785	17.65	17.66	≧500	Pass
	165	5825	17.61	17.60	≧500	Pass
802.11 n40	151	5755	36.38	36.36	≧500	Pass
	159	5795	36.08	36.40	≧500	Pass
802.11 ac20	149	5745	17.61	17.62	≧500	Pass
	157	5785	17.63	17.65	≧500	Pass
	165	5825	17.62	17.66	≧500	Pass
802.11 ac40	149	5745	36.38	36.35	≧500	Pass
	157	5785	36.36	36.39	≧500	Pass
802.11 ac80	155	5775	75.50	75.82	≧500	Pass

Test plot

(802.11a) 6dB Bandwidth plot on channel 149
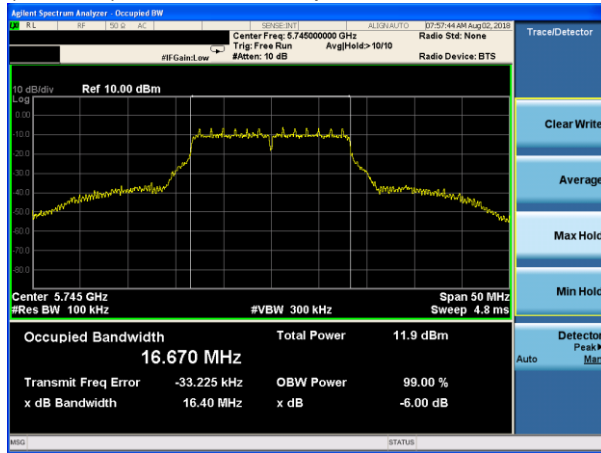
(802.11 n20) 6dB Bandwidth plot on channel 149

(802.11a) 6dB Bandwidth plot on channel 157

(802.11 n20) 6dB Bandwidth plot on channel 157

(802.11a) 6dB Bandwidth plot on channel 165

(802.11 n20) 6dB Bandwidth plot on channel 165

Test plot

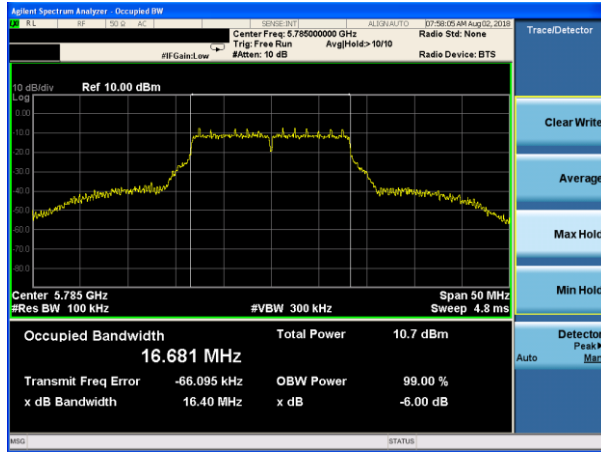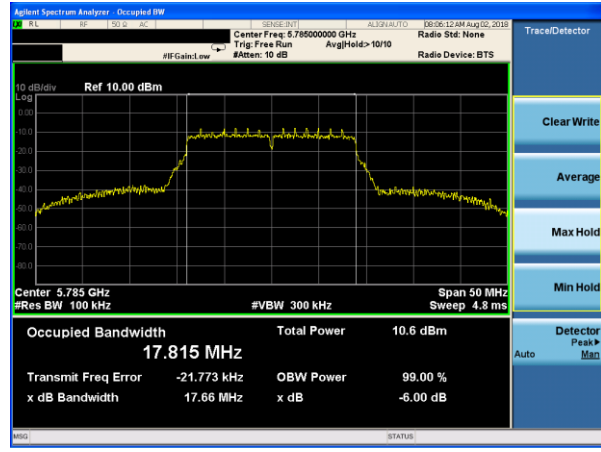(802.11 n40) 6dB Bandwidth plot on channel 151

(802.11 ac20) 6dB Bandwidth plot on channel 149

(802.11 n40) 6dB Bandwidth plot on channel 159

(802.11 ac20) 6dB Bandwidth plot on channel 157

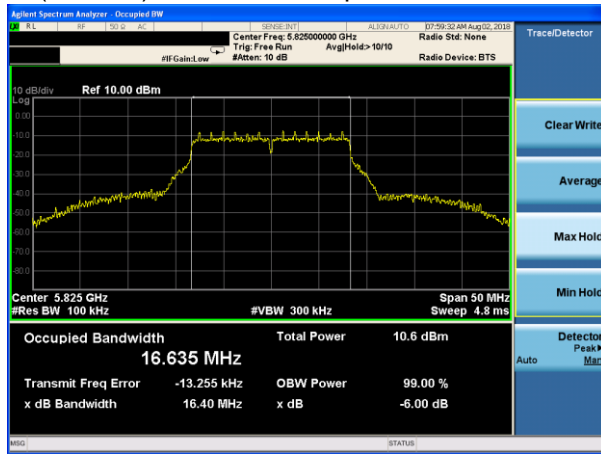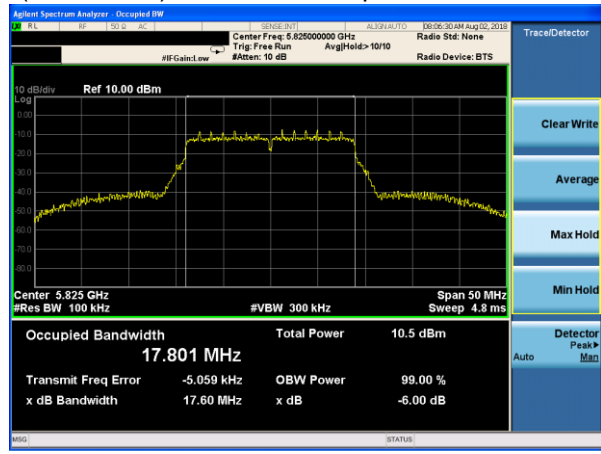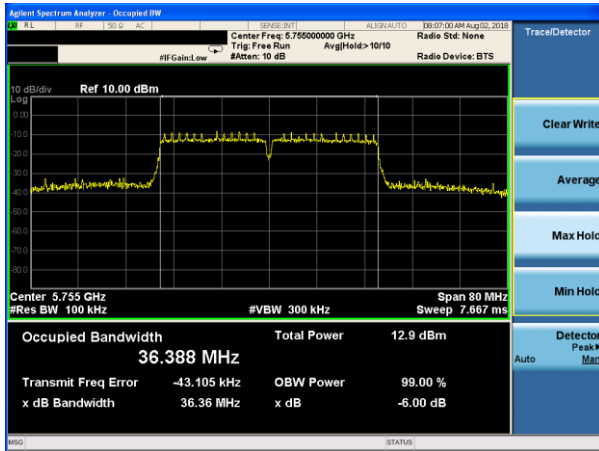(802.11 ac20) 6dB Bandwidth plot on channel 165
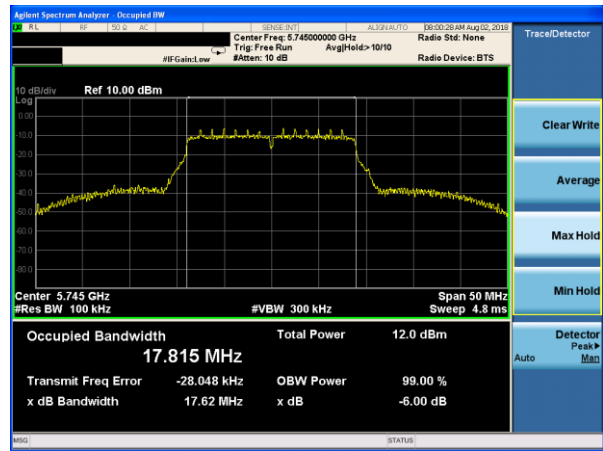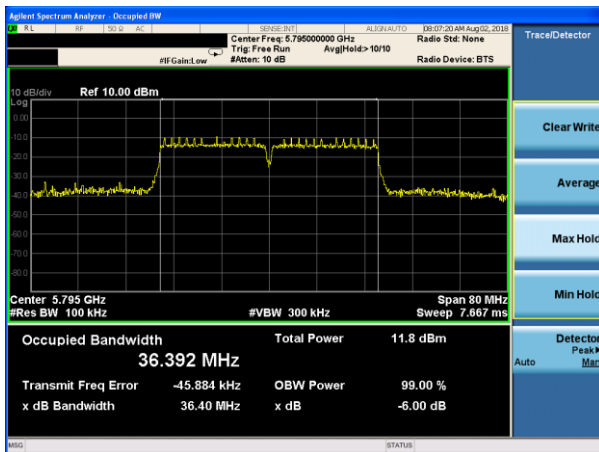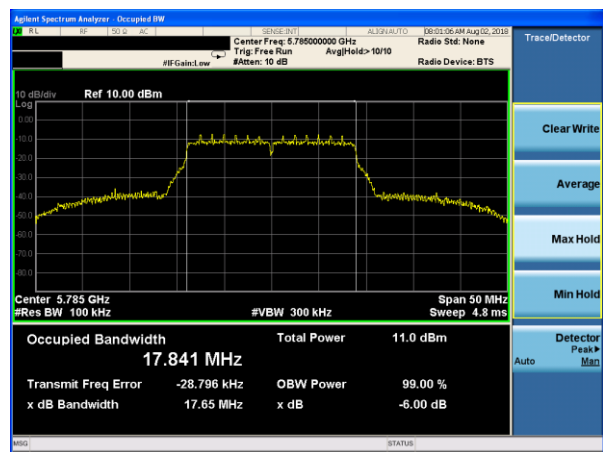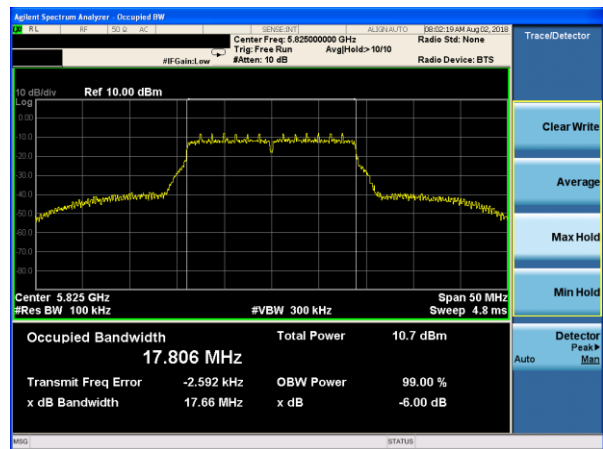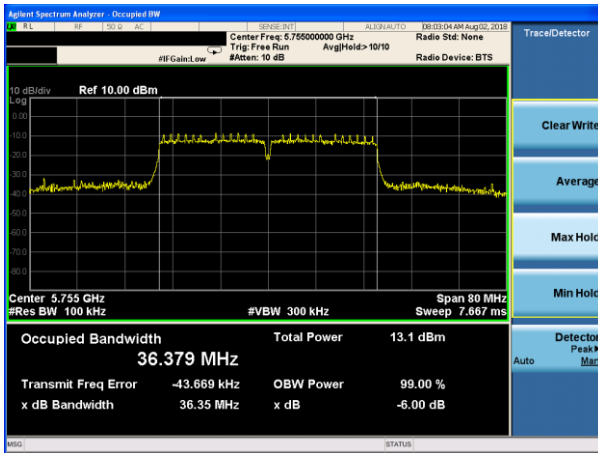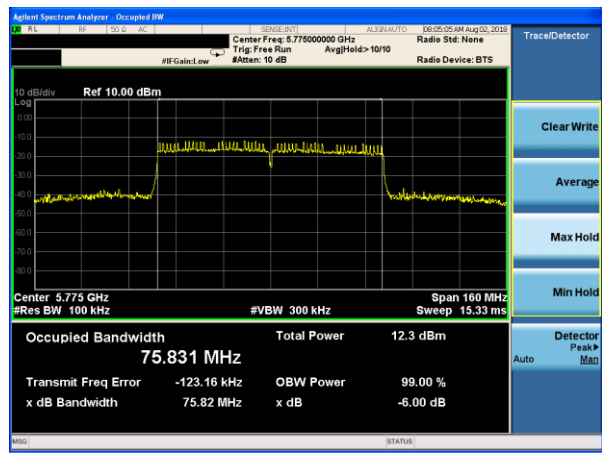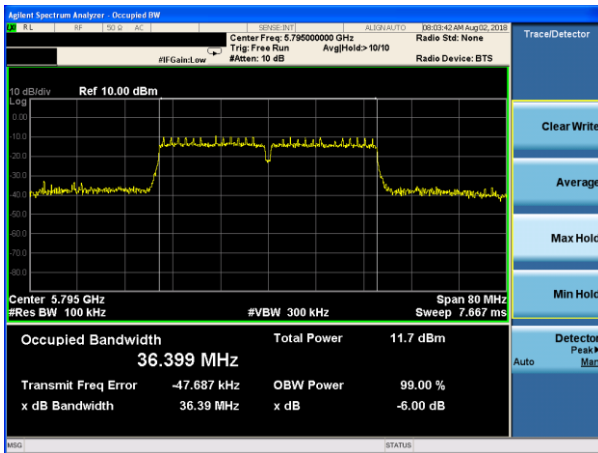
Test plot

(802.11 ac40) 6dB Bandwidth plot on channel 151

(802.11 ac80) 6dB Bandwidth plot on channel 155

(802.11 ac40) 6dB Bandwidth plot on channel 159

7. MAXIMUM CONDUCTED OUTPUT POWER

7.1 PPLIED PROCEDURES / LIMIT
According to FCC §15.407
The maximum conduced output power should not exceed:

Frequency Band(MHz)	Limit
5150~5250	250mW
5725~5850	1W

7.2 TEST PROCEDURE

· Maximum conducted output power may be measured using a spectrum analyzer/EMI receiver or an RF power meter.

1. Device Configuration

If possible, configure or modify the operation of the EUT so that it transmits continuously at its maximum power control level (see section II.B.).

a) The intent is to test at 100 percent duty cycle; however a small reduction in duty cycle (to no lower than 98 percent) is permitted if required by the EUT for amplitude control purposes. Manufacturers are expected to provide software to the test lab to permit such continuous operation.

b) If continuous transmission (or at least 98 percent duty cycle) cannot be achieved due to hardware limitations (e.g., overheating), the EUT shall be operated at its maximum power control level with the transmit duration as long as possible and the duty cycle as high as possible.

2. Measurement using a Spectrum Analyzer or EMI Receiver (SA)

Measurement of maximum conducted output power using a spectrum analyzer requires integrating the spectrum across a frequency span that encompasses, at a minimum, either the EBW or the 99-percent occupied bandwidth of the signal.1 However, the EBW must be used to determine bandwidth dependent limits on maximum conducted output power in accordance with § 15.407(a).

a) The test method shall be selected as follows: (i) Method SA-1 or SA-1 Alternative (averaging with the EUT transmitting at full power throughout each sweep) shall be applied if either of the following conditions can be satisfied:

• The EUT transmits continuously (or with a duty cycle ≥ 98 percent).

• Sweep triggering or gating can be implemented in a way that the device transmits at the maximum power control level throughout the duration of each of the instrument sweeps to be averaged. This condition can generally be achieved by triggering the instrument's sweep if the duration of the sweep (with the analyzer configured as in Method SA-1, below) is equal to or shorter than the duration T of each transmission from the EUT and if those transmissions exhibit full power throughout their durations.

(ii) Method SA-2 or SA-2 Alternative (averaging across on and off times of the EUT transmissions, followed by duty cycle correction) shall be applied if the conditions of (i) cannot be achieved and the transmissions exhibit a constant duty cycle during the measurement duration. Duty cycle will be considered to be constant if variations are less than ± 2 percent.

(iii) Method SA-3 (RMS detection with max hold) or SA-3 Alternative (reduced VBW with max hold) shall be applied if the conditions of (i) and (ii) cannot be achieved.

b) Method SA-1 (trace averaging with the EUT transmitting at full power throughout each sweep): (i) Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.

(ii) Set RBW = 1 MHz.

(iii) Set VBW ≥ 3 MHz.

(iv) Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)

(v) Sweep time = auto.

(vi) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.

(vii) If transmit duty cycle < 98 percent, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 percent, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run".

(viii) Trace average at least 100 traces in power averaging (i.e., RMS) mode.

(ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP
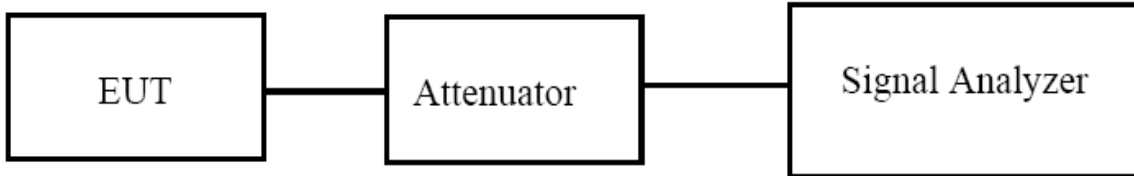
7.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

7.6 TEST RESULTS

EUT：	PIQS Virtual Touch Projector	Model Name. ：	Q1
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC 19V
Test Mode ：	TX (5G) Mode Frequency Band I (5150-5250MHz)		

Note:

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

Test Channel	Frequency	Maximum output power. Antenna port (AV) (dBm)		Total Power (AV)	LIMIT	Result
	(MHz)	ANT A	ANT B	dBm	dBm	
TX 802.11a Mode						
CH36	5180	9.3	8.7	－	23.98	Pass
CH40	5200	9.1	8.6	－	23.98	Pass
CH48	5240	8.7	8.1	－	23.98	Pass
TX 802.11 n20M Mode						
CH36	5180	8.9	8.6	11.76	23.98	Pass
CH40	5200	9.0	8.5	11.77	23.98	Pass
CH48	5240	8.5	8.0	11.27	23.98	Pass
TX 802.11 n40M Mode						
CH38	5190	8.3	8.0	11.16	23.98	Pass
CH46	5230	8.1	7.6	10.87	23.98	Pass
TX 802.11 ac20M Mode						
CH36	5180	9.1	8.6	11.87	23.98	Pass
CH40	5200	9.0	8.5	11.77	23.98	Pass
CH48	5240	8.8	8.1	11.47	23.98	Pass
TX 802.11 ac40M Mode						
CH38	5190	8.3	8.0	11.16	23.98	Pass
CH46	5230	8.2	7.6	10.92	23.98	Pass
TX 802.11 ac80M Mode						
CH42	5210	7.3	7.1	10.21	23.98	Pass

Note: For 802.11n/ac 5GHz has MIMO mode. Directional gain=5.01dbi

5.01dbi＜6.0 dbi so power density limit= 23.98

EUT：	PIQS Virtual Touch Projector	Model Name. ：	Q1
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC 19V
Test Mode ：	TX (5G) Mode Frequency Band IV (5725-5825MHz)		

Note:
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

| Test Channel	Frequency	Maximum output power. Antenna port		Total Power	LIMIT	Result
		(AV) (dBm)		(AV)		
	(MHz)	ANT A	ANT B	dBm	dBm	
TX 802.11a Mode						
CH 149	5745	9.0	8.7	–	30	Pass
CH 157	5785	8.4	7.5	–	30	Pass
CH 165	5825	7.4	6.4	–	30	Pass
TX 802.11 n20M Mode						
CH 149	5745	8.8	8.8	11.81	30	Pass
CH 157	5785	8.4	7.5	10.98	30	Pass
CH 165	5825	7.5	6.3	9.95	30	Pass
TX 802.11 n40M Mode						
CH 151	5755	9.3	9.2	12.26	30	Pass
CH 159	5795	8.6	7.9	11.27	30	Pass
TX 802.11 ac20M Mode						
CH 149	5745	8.9	8.7	11.81	30	Pass
CH 157	5785	8.4	7.6	11.03	30	Pass
CH 165	5825	7.4	6.3	9.90	30	Pass
TX 802.11 ac40M Mode						
CH 151	5755	9.5	9.1	12.31	30	Pass
CH 159	5795	8.8	7.8	11.34	30	Pass
TX 802.11 ac80M Mode						
CH 155	5775	8.2	7.6	10.92	30	Pass

Note: For 802.11n/ac 5GHz has MIMO mode. Directional gain=5.01dbi

5.01 dbi＜6.0 dbi so power density limit= 30

8. OUT OF BAND EMISSIONS

8.1 APPLICABLE STANDARD

According to FCC §15.407(b)

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: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.

8.2 TEST 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.

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP
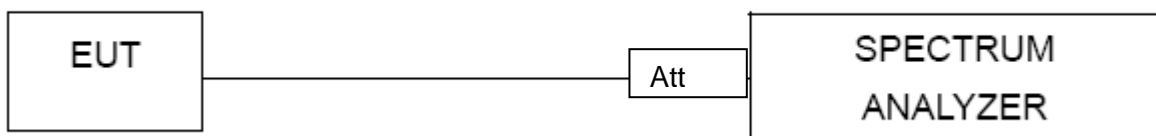
8.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

8.6 TEST RESULTS

EUT :	PIQS Virtual Touch Projector	Model Name. :	Q1
Temperature :	25 ℃	Relative Humidity :	56%
Pressure :	1012 hPa	Test Voltage :	DC 19V

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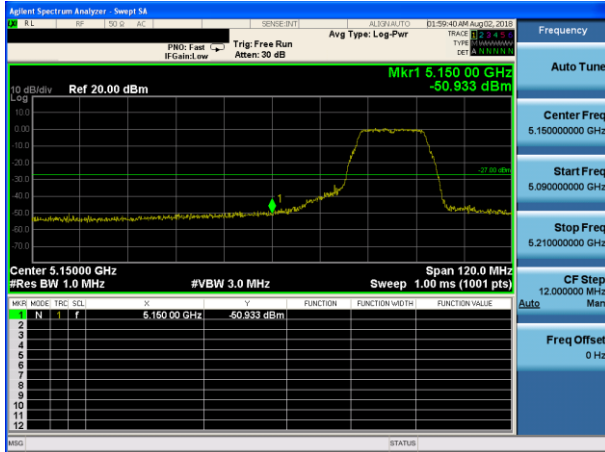
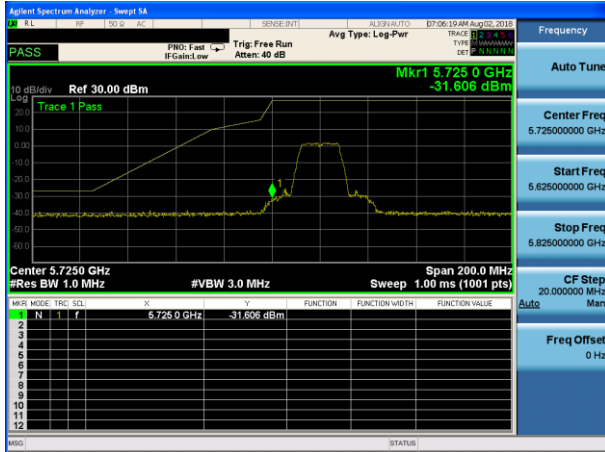| Mode	Tx/Rx
802.11a	1Tx, 2Rx
802.11n/ac	1Tx /2Tx, 2Rx

5.2G

5.15~5.25 GHz

(802.11a) Band Edge, Left Side
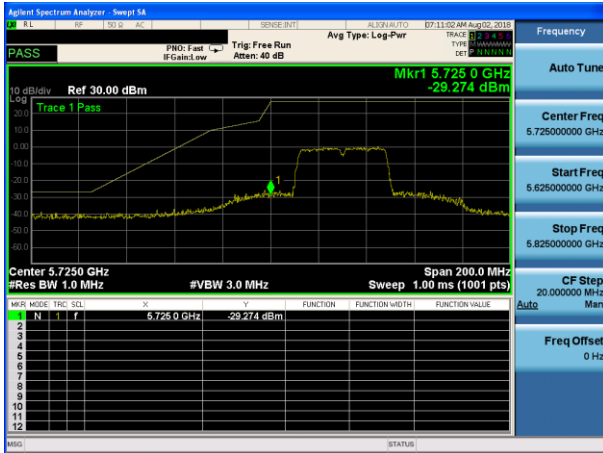
(802.11n20) Band Edge, Left Side
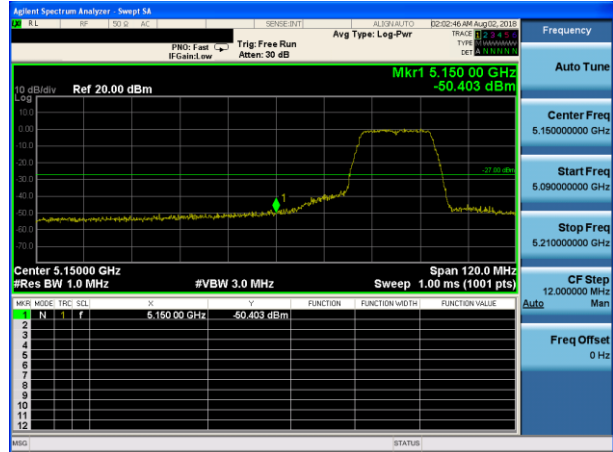
(802.11a) Band Edge, Right Side

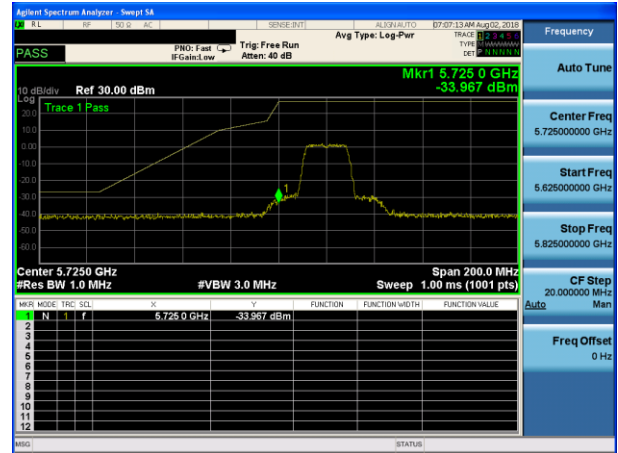(802.11n20) Band Edge, Right Side
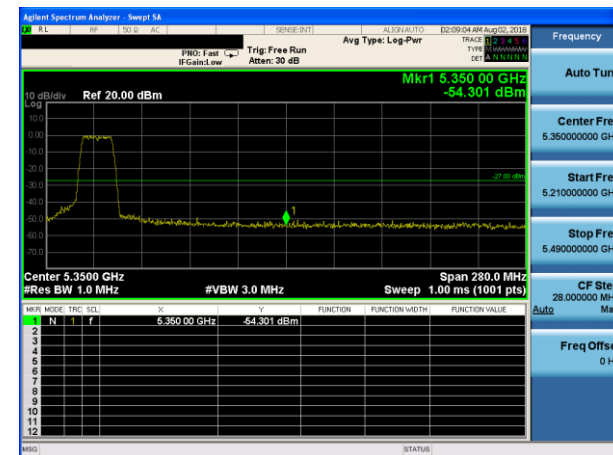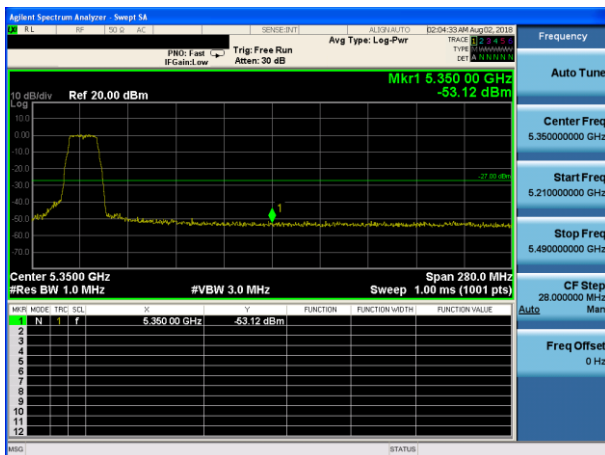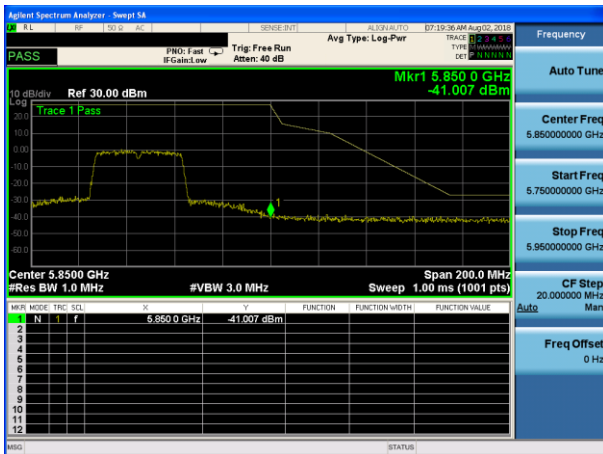
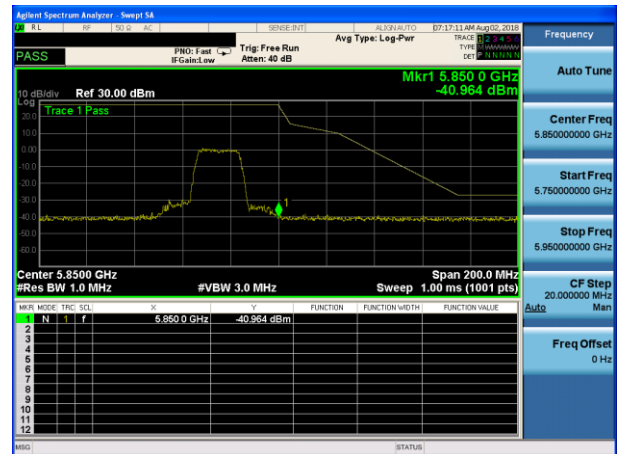## 5.15~5.25 GHz

(802.11n40) Band Edge, Left Side
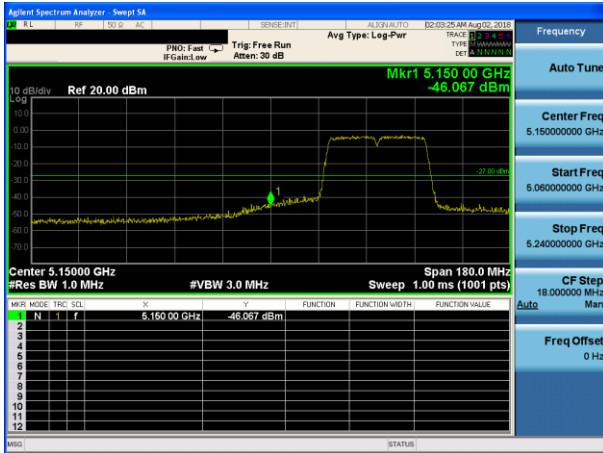
(802.11ac20) Band Edge, Left Side
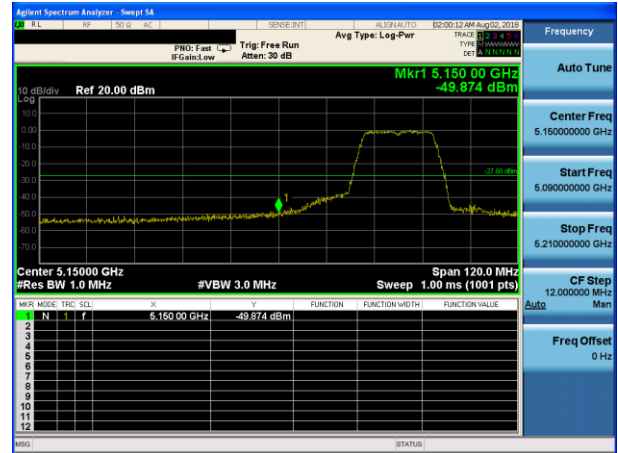
(802.11n40) Band Edge, Right Side
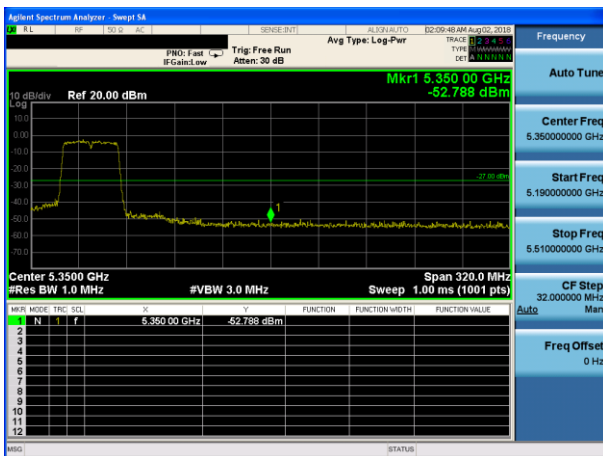
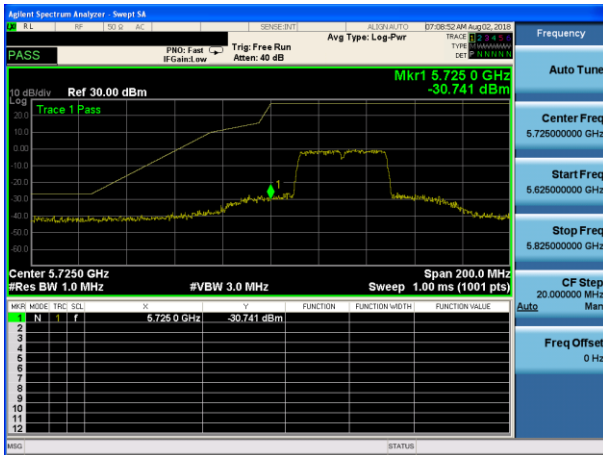(802.11ac20) Band Edge, Right Side
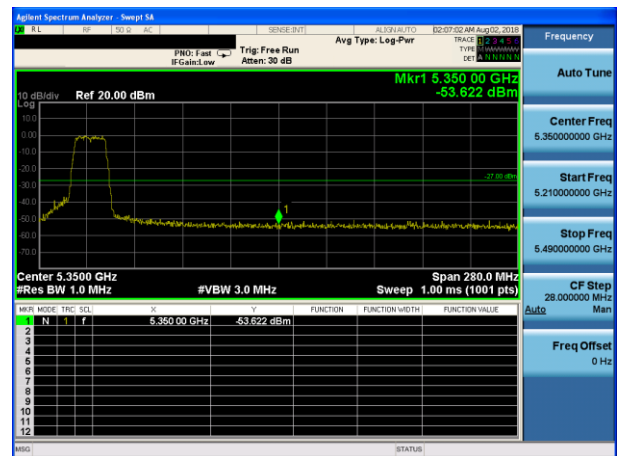
5.15~5.25 GHz

(802.11ac40) Band Edge, Left Side   (802.11ac80) Band Edge, Left Side
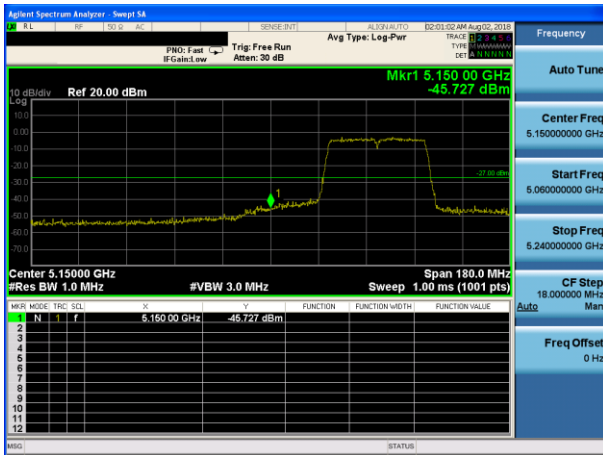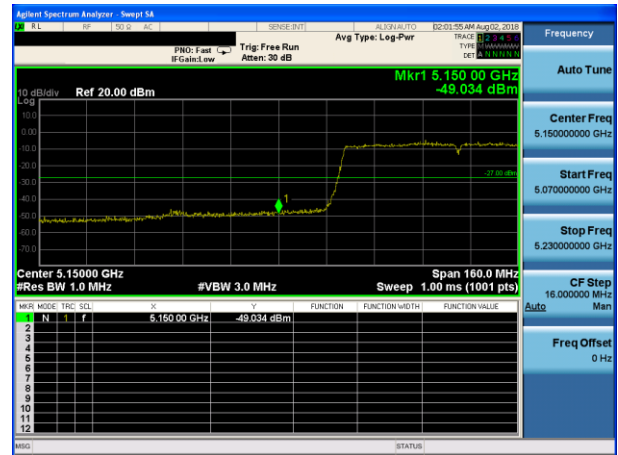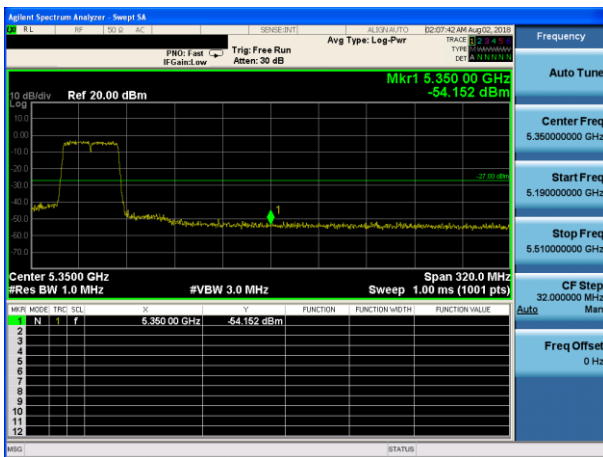
(802.11ac40) Band Edge, Right Side   (802.11ac80) Band Edge, Right Side
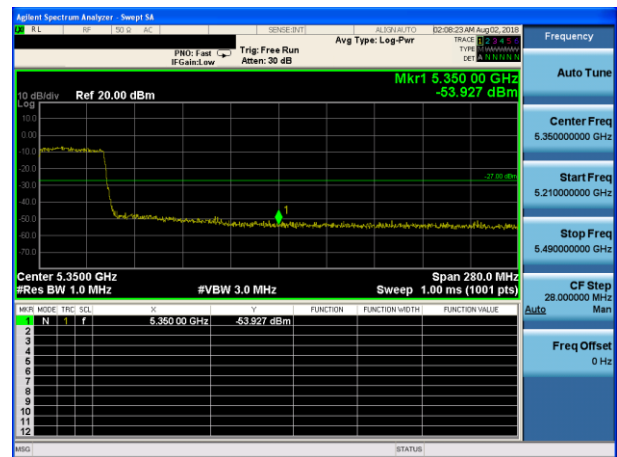
5.8G

5.75~5.85 GHz

(802.11a) Band Edge, Left Side

(802.11n20) Band Edge, Left Side
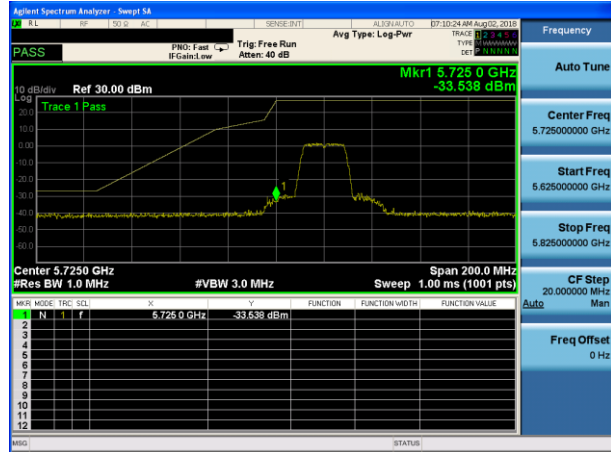
(802.11a) Band Edge, Right Side

(802.11n20) Band Edge, Right Side
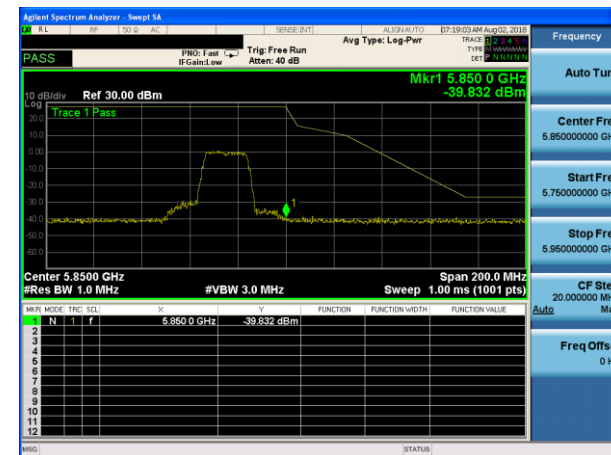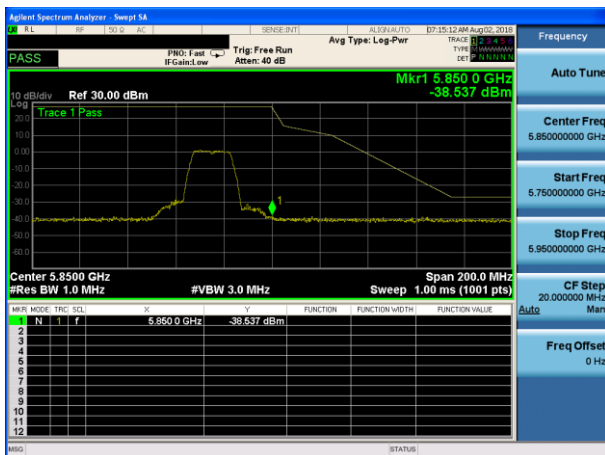
5.75~5.85 GHz

(802.11n40) Band Edge, Left Side

(802.11ac20) Band Edge, Left Side

(802.11n40) Band Edge, Right Side
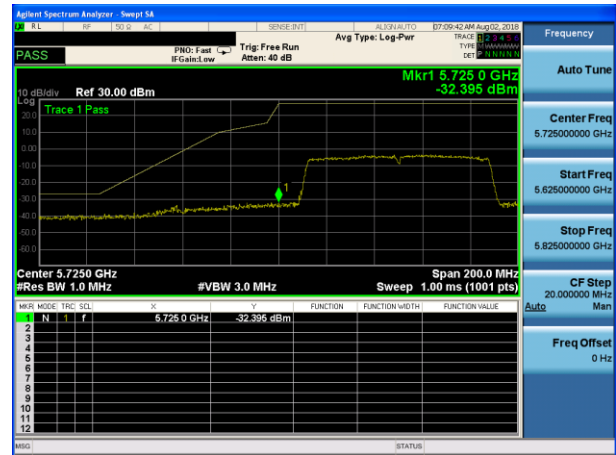
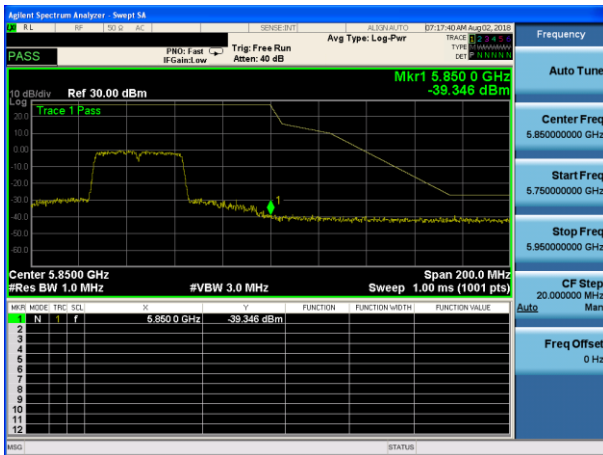(802.11ac20) Band Edge, Right Side

5.75~5.83 GHz

(802.11ac40) Band Edge, Left Side

(802.11ac80) Band Edge, Left Side

(802.11ac40) Band Edge, Right Side

(802.11ac80) Band Edge, Right Side