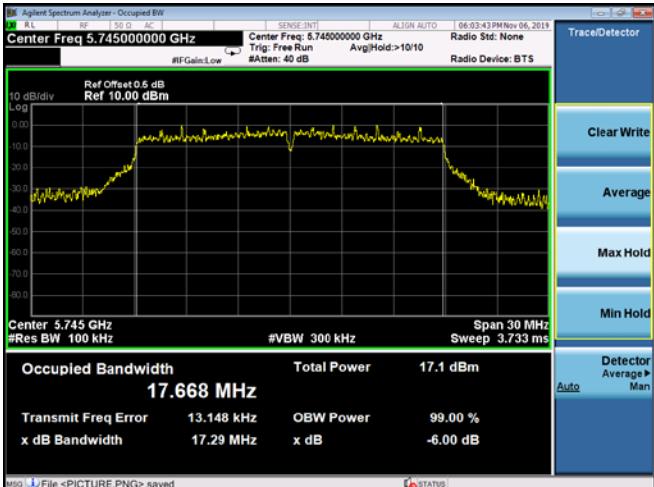
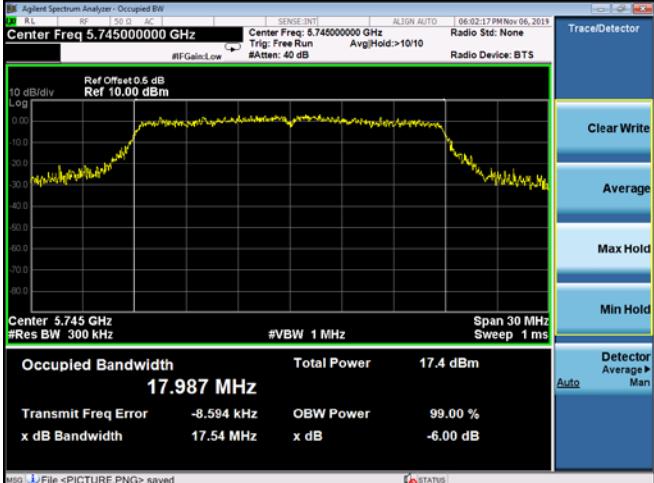
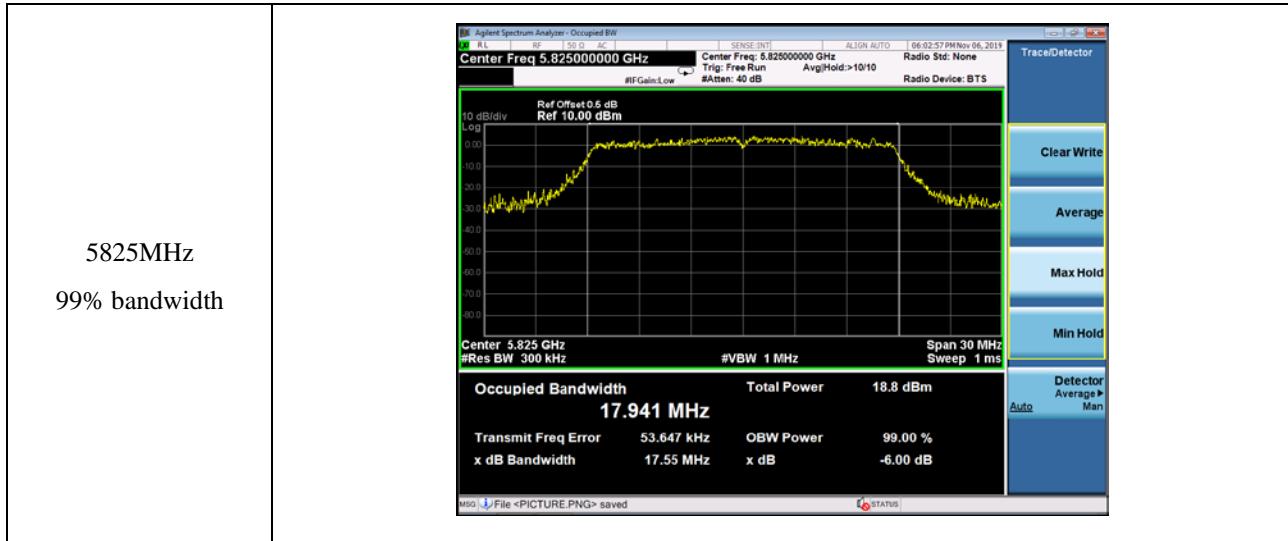




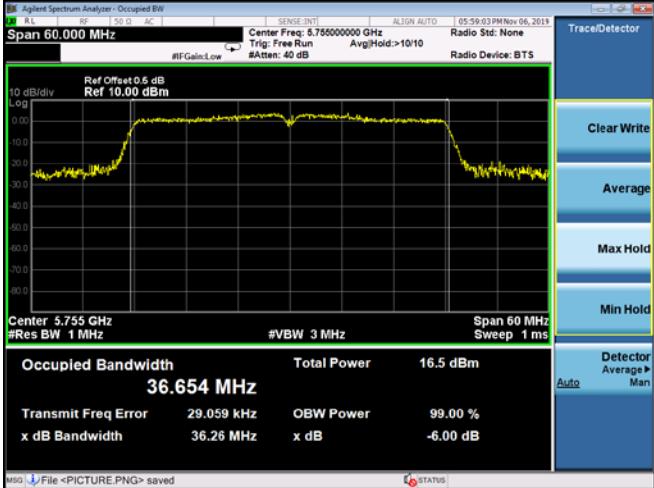
Mode: 802.11ac-HT20	
5745MHz 6dB bandwidth	 <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 5.745000000 GHz</p> <p>Ref Offset 0.5 dB</p> <p>Ref 10.00 dBm</p> <p>10 dB/div</p> <p>Log</p> <p>Center 5.745 GHz</p> <p>#Res BW 100 kHz</p> <p>#VBW 300 kHz</p> <p>Span 30 MHz</p> <p>Sweep 3.733 ms</p> <p>Occupied Bandwidth 17.668 MHz</p> <p>Total Power 17.1 dBm</p> <p>Transmit Freq Error 13.148 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 17.29 MHz</p> <p>x dB -6.00 dB</p> <p>Detector Auto</p> <p>MSG File <PICTURE.PNG> saved</p> <p>STATUS</p>
5745MHz 99% bandwidth	 <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 5.745000000 GHz</p> <p>Ref Offset 0.5 dB</p> <p>Ref 10.00 dBm</p> <p>10 dB/div</p> <p>Log</p> <p>Center 5.745 GHz</p> <p>#Res BW 300 kHz</p> <p>#VBW 1 MHz</p> <p>Span 30 MHz</p> <p>Sweep 1 ms</p> <p>Occupied Bandwidth 17.987 MHz</p> <p>Total Power 17.4 dBm</p> <p>Transmit Freq Error -8.594 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 17.54 MHz</p> <p>x dB -6.00 dB</p> <p>Detector Auto</p> <p>MSG File <PICTURE.PNG> saved</p> <p>STATUS</p>

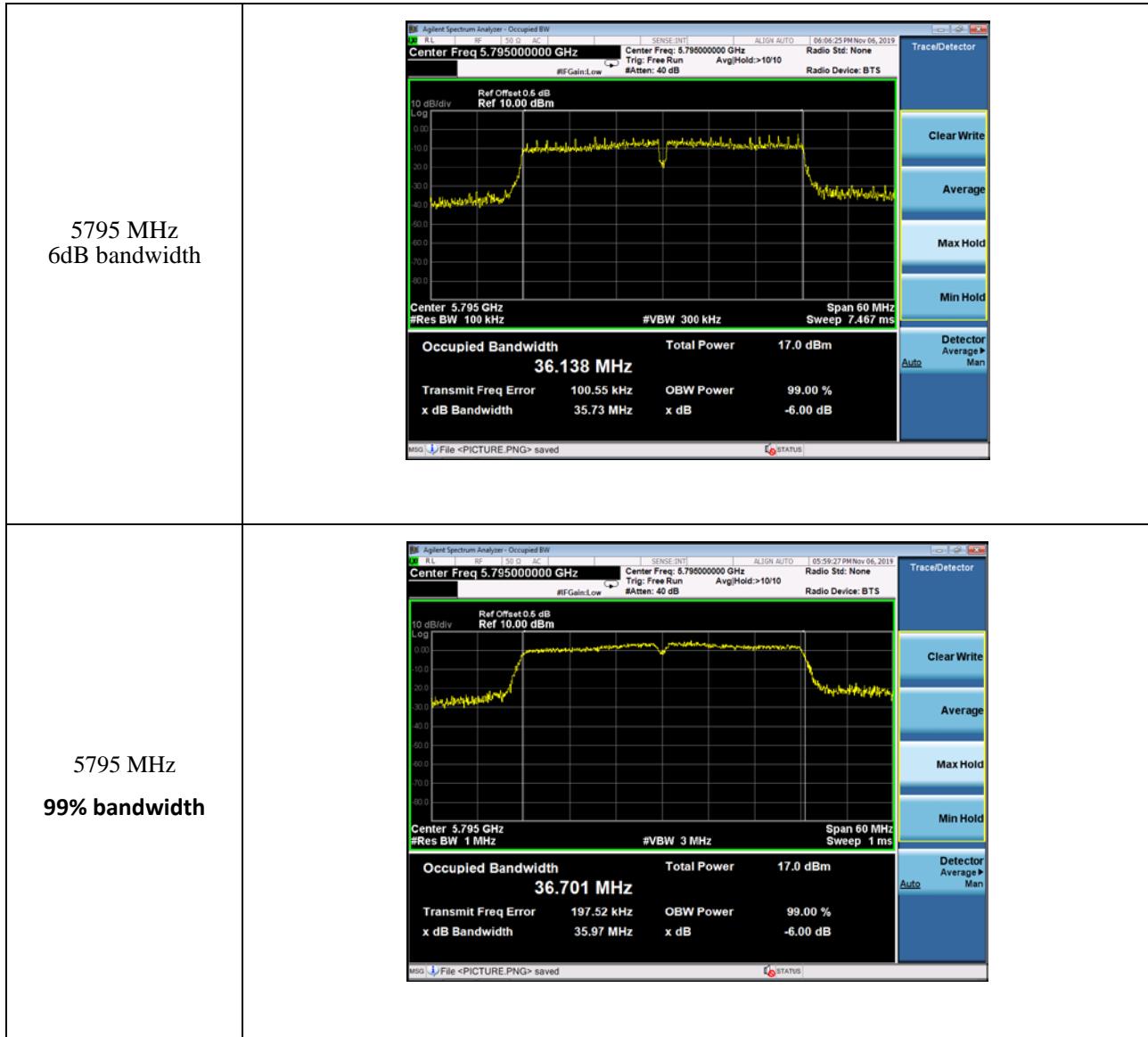


5785MHz 6dB bandwidth	
5785MHz 99% bandwidth	
5825MHz 6dB bandwidth	

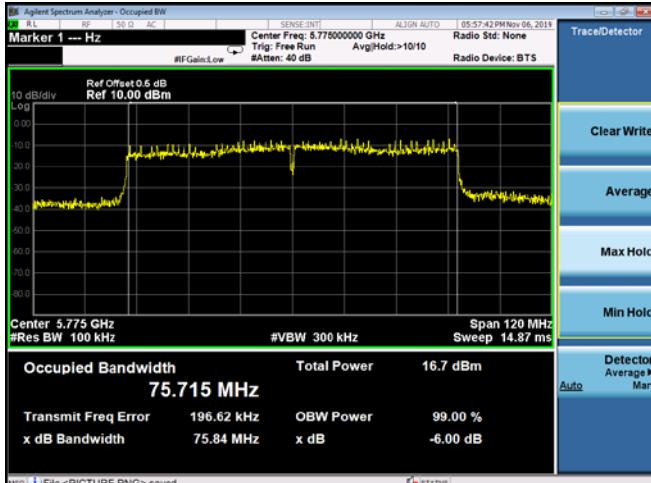
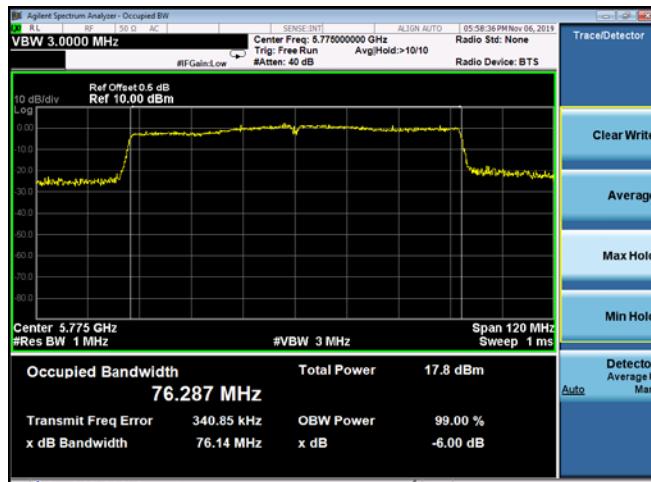




Mode:		802.11ac-HT40
5755 MHz 6dB bandwidth		 <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq: 5.755000000 GHz</p> <p>Ref Offset 0.5 dB</p> <p>Ref 10.00 dBm</p> <p>Span 60 MHz</p> <p>#Res BW 100 kHz</p> <p>#VBW 300 kHz</p> <p>Occupied Bandwidth 36.196 MHz</p> <p>Total Power 16.7 dBm</p> <p>Transmit Freq Error 34.358 kHz</p> <p>x dB Bandwidth 36.34 MHz</p> <p>OBW Power 99.00 %</p> <p>x dB -6.00 dB</p> <p>Detector Auto</p> <p>MSG File <PICTURE.PNG> saved</p>
5755 MHz 99% bandwidth		 <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Span 60.000 MHz</p> <p>Center Freq: 5.755000000 GHz</p> <p>Ref Offset 0.5 dB</p> <p>Ref 10.00 dBm</p> <p>Span 60 MHz</p> <p>#Res BW 1 MHz</p> <p>#VBW 3 MHz</p> <p>Occupied Bandwidth 36.654 MHz</p> <p>Total Power 16.5 dBm</p> <p>Transmit Freq Error 29.059 kHz</p> <p>x dB Bandwidth 36.26 MHz</p> <p>OBW Power 99.00 %</p> <p>x dB -6.00 dB</p> <p>Detector Auto</p> <p>MSG File <PICTURE.PNG> saved</p>





Mode:		802.11ac-HT80
5755 MHz 6dB bandwidth		 <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Marker 1 --- Hz</p> <p>Center Freq: 5.775000000 GHz</p> <p>Align Auto</p> <p>05:57:42 PM Nov 06, 2019</p> <p>Radio Std: None</p> <p>Radio Device: BTS</p> <p>Ref Offset 0.5 dB</p> <p>Ref 10.00 dBm</p> <p>10 dB/div</p> <p>Log</p> <p>Span 120 MHz</p> <p>#Res BW 100 kHz</p> <p>#VBW 300 kHz</p> <p>Sweep 14.87 ms</p> <p>Occupied Bandwidth: 75.715 MHz</p> <p>Total Power: 16.7 dBm</p> <p>Transmit Freq Error: 196.62 kHz</p> <p>OBW Power: 99.00 %</p> <p>x dB Bandwidth: 75.84 MHz</p> <p>x dB: -6.00 dB</p> <p>MSG: File <PICTURE.PNG> saved</p> <p>STATUS</p>
5755 MHz 99% bandwidth		 <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>VBW 3.0000 MHz</p> <p>Center Freq: 5.775000000 GHz</p> <p>Align Auto</p> <p>05:58:36 PM Nov 06, 2019</p> <p>Radio Std: None</p> <p>Radio Device: BTS</p> <p>Ref Offset 0.5 dB</p> <p>Ref 10.00 dBm</p> <p>10 dB/div</p> <p>Log</p> <p>Span 120 MHz</p> <p>#Res BW 1 MHz</p> <p>#VBW 3 MHz</p> <p>Sweep 1 ms</p> <p>Occupied Bandwidth: 76.287 MHz</p> <p>Total Power: 17.8 dBm</p> <p>Transmit Freq Error: 340.85 kHz</p> <p>OBW Power: 99.00 %</p> <p>x dB Bandwidth: 76.14 MHz</p> <p>x dB: -6.00 dB</p> <p>MSG: File <PICTURE.PNG> saved</p> <p>STATUS</p>



6. MAXIMUM CONDUCTED OUTPUT POWER

6.1 APPLIED PROCEDURES / LIMIT

According to FCC §15.407

The maximum conducted output power should not exceed:

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

The maximum e.i.r.p should not exceed:

Frequency Band(MHz)	Limit
5150~5250	200mW or 10dBm +10logB whichever is less
5725~5850	N/A

Note: Where "B" is the 99% emission bandwidth in MHz

6.2 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 \geq 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 \geq 3 MHz.

(iv) Number of points in sweep \geq 2 Span / RBW. (This ensures that bin-to-bin spacing is \leq 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 \geq 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



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

Temperature :	26 °C	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	DC3.7V
Test Mode :	TX (5G) Mode Frequency U-NII-1 (5180-5240MHz)		

Test Channel	Frequency	Maximum output power. Antenna port (AV)	LIMIT	Result
	(MHz)	(dBm)		
TX 802.11a Mode				
CH36	5180	15.70	23.98	Pass
CH40	5200	14.56	23.98	Pass
CH48	5240	12.95	23.98	Pass
TX 802.11 n20M Mode				
CH36	5180	15.40	23.98	Pass
CH40	5200	14.89	23.98	Pass
CH48	5240	13.29	23.98	Pass
TX 802.11 n40M Mode				
CH38	5190	13.11	23.98	Pass
CH46	5230	10.94	23.98	Pass
TX 802.11 AC20M Mode				
CH36	5180	15.69	23.98	Pass
CH40	5200	14.97	23.98	Pass
CH48	5240	13.15	23.98	Pass
TX 802.11 AC40M Mode				
CH38	5190	14.13	23.98	Pass
CH46	5230	11.52	23.98	Pass
TX 802.11 AC80M Mode				
CH42	5210	9.70	23.98	Pass



Temperature :	26 °C	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	DC3.7V
Test Mode :	TX (5G) Mode Frequency Band IV (5725-5825MHz)		

Test Channel	Frequency	Maximum output power. Antenna port (AV)	LIMIT	Result
	(MHz)	(dBm)		
TX 802.11a Mode				
CH 149	5745	12.26	30	Pass
CH 157	5785	15.33	30	Pass
CH 165	5825	14.80	30	Pass
TX 802.11 n20M Mode				
CH 149	5745	16.31	30	Pass
CH 157	5785	15.03	30	Pass
CH 165	5825	15.14	30	Pass
TX 802.11 n40M Mode				
CH 151	5755	13.63	30	Pass
CH 159	5795	12.40	30	Pass
TX 802.11 AC20M Mode				
CH 149	5745	16.09	30	Pass
CH 157	5785	15.68	30	Pass
CH 165	5825	14.94	30	Pass
TX 802.11 AC40M Mode				
CH 151	5755	12.63	30	Pass
CH 159	5795	13.30	30	Pass
TX 802.11 AC80M Mode				
CH 155	5775	11.19	30	Pass



7. OUT OF BAND EMISSIONS

7.1 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.

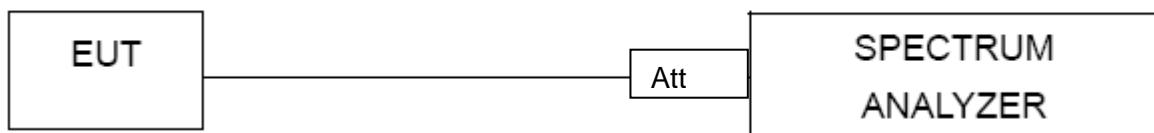
7.2 TEST PROCEDURE

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.

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.



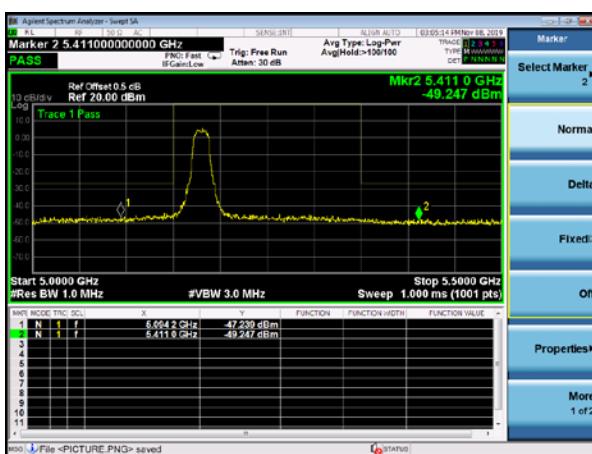
7.6 TEST RESULTS

Temperature :	26 °C	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	DC3.7V

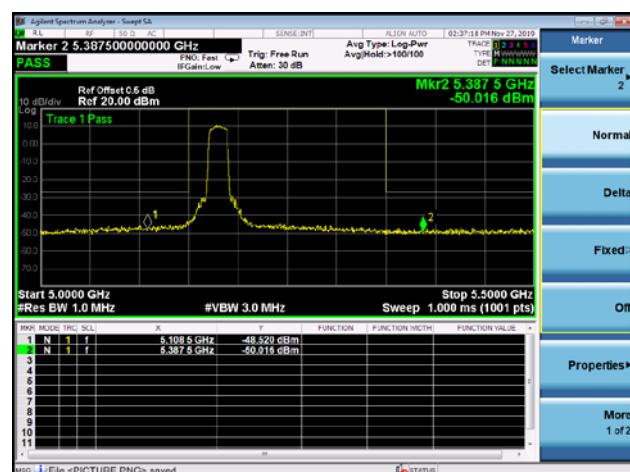
5.2G

5.180~5.240 GHz

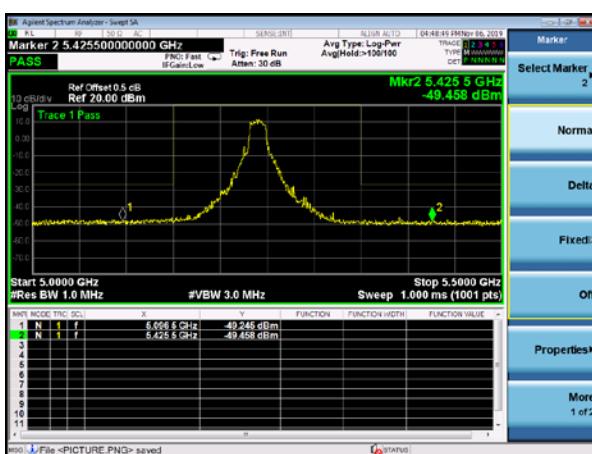
(802.11a) Band Edge, Left Side



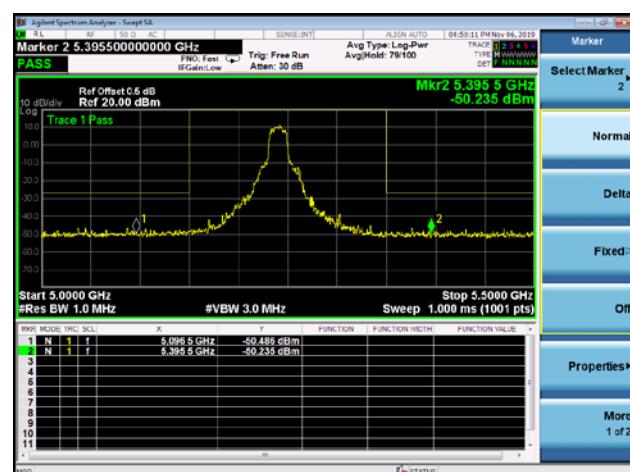
(802.11n20) Band Edge, Left Side



(802.11a) Band Edge, Right Side



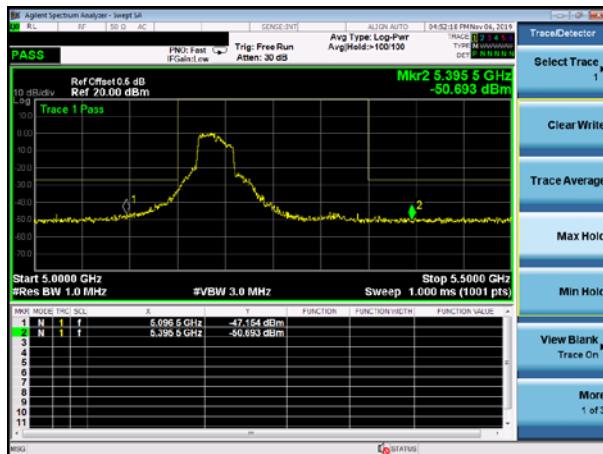
(802.11n20) Band Edge, Right Side



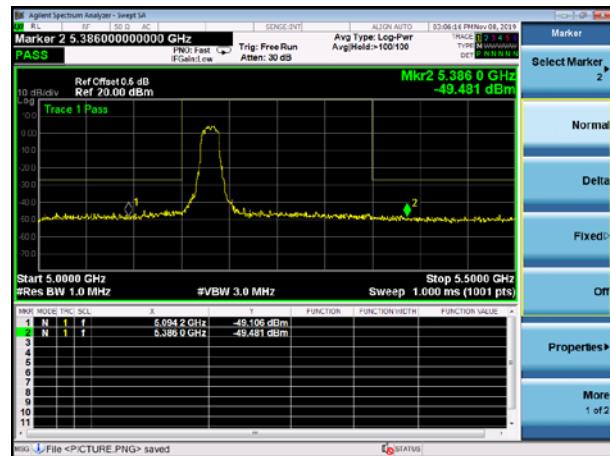


5.180~5.240 GHz

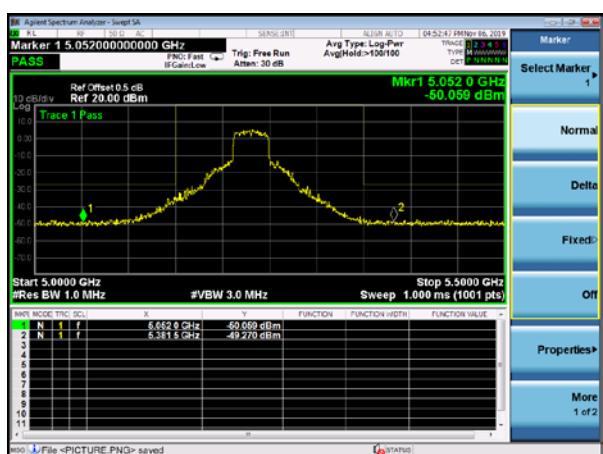
(802.11n40) Band Edge, Left Side



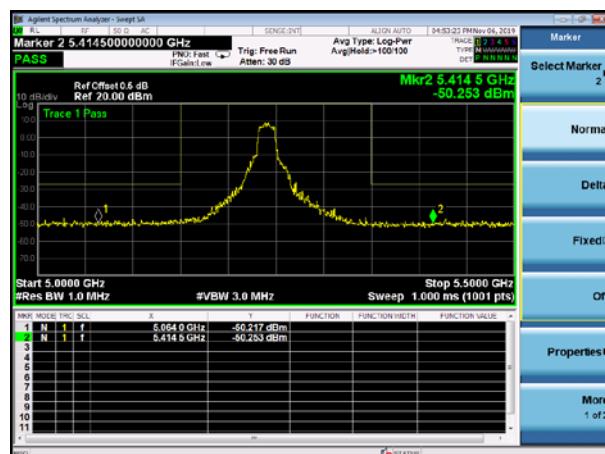
(802.11ac20) Band Edge, Left Side



(802.11n40) Band Edge, Right Side



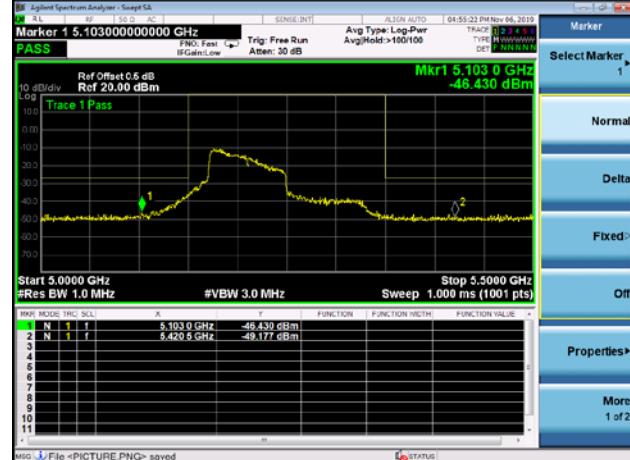
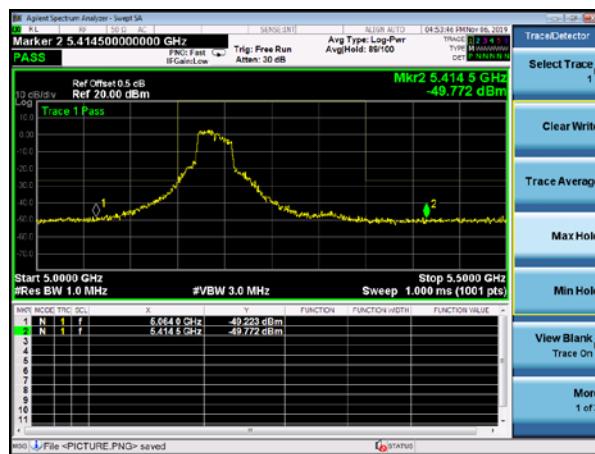
(802.11ac20) Band Edge, Right Side



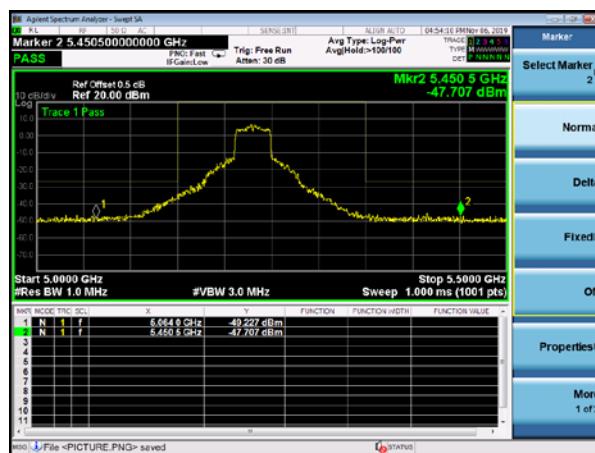


5.180~5.240 GHz

(802.11ac40) Band Edge, Left Side



(802.11ac40) Band Edge, Right Side

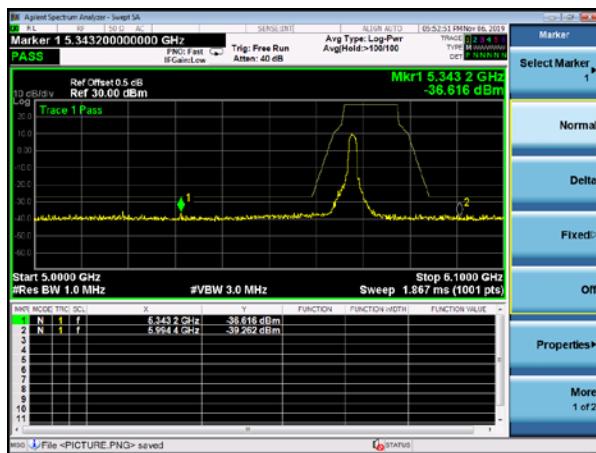




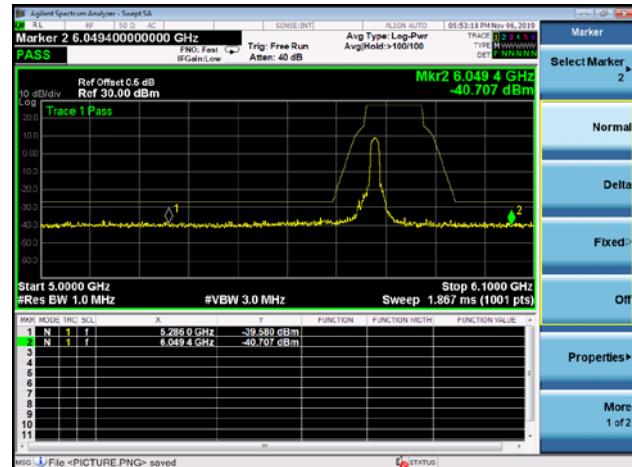
5.8G

5.745~5.825 GHz

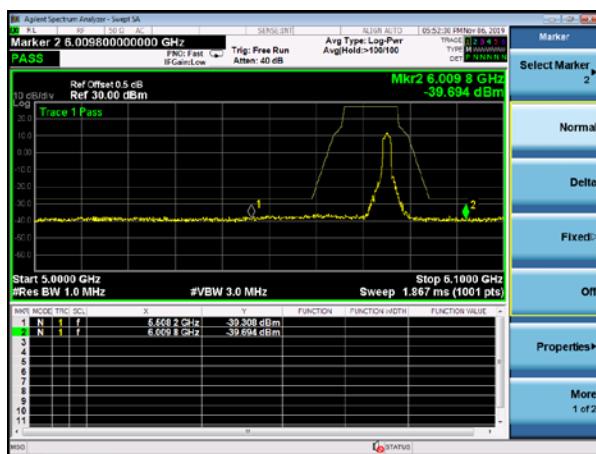
(802.11a) Band Edge, Left Side



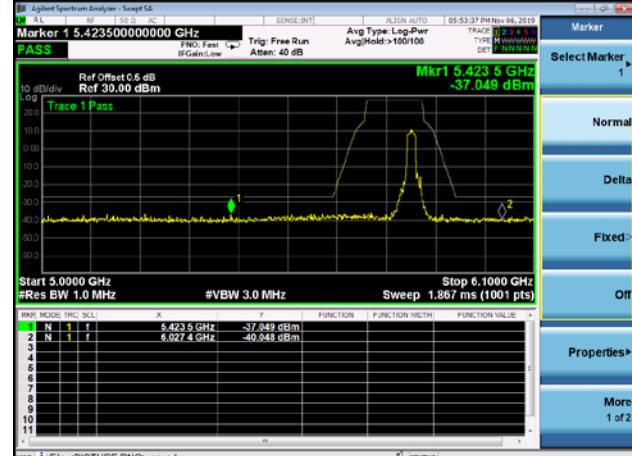
(802.11n20) Band Edge, Left Side



(802.11a) Band Edge, Right Side



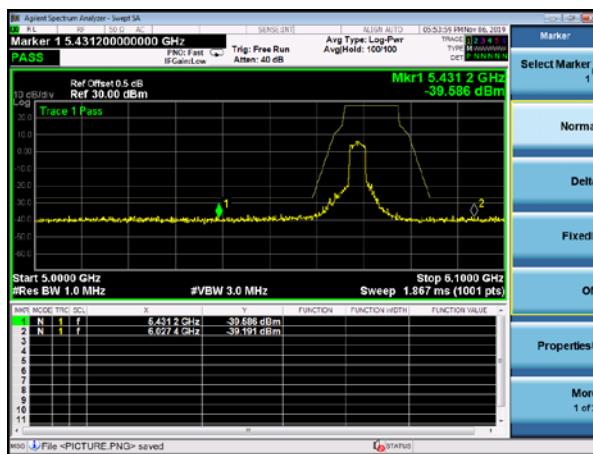
(802.11n20) Band Edge, Right Side



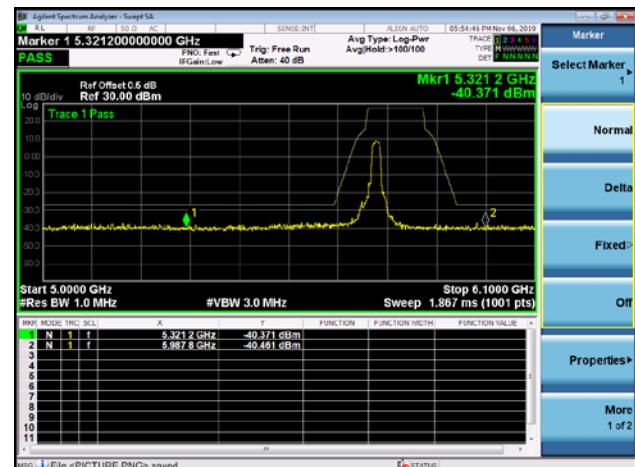


5.745~5.825 GHz

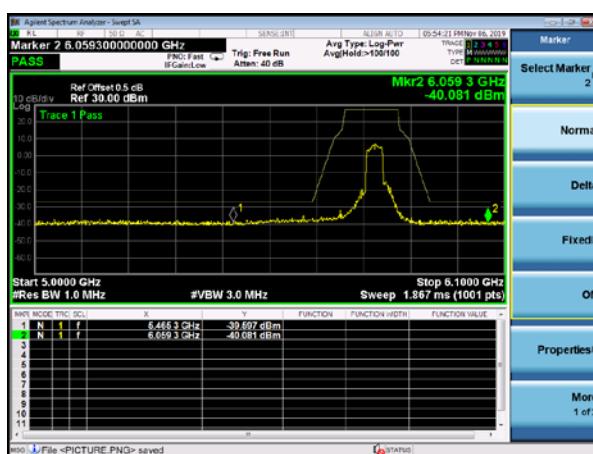
(802.11n40) Band Edge, Left Side



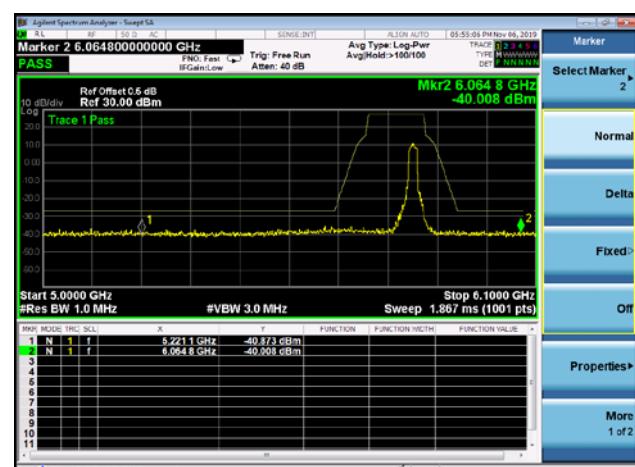
(802.11ac20) Band Edge, Left Side



(802.11n40) Band Edge, Right Side



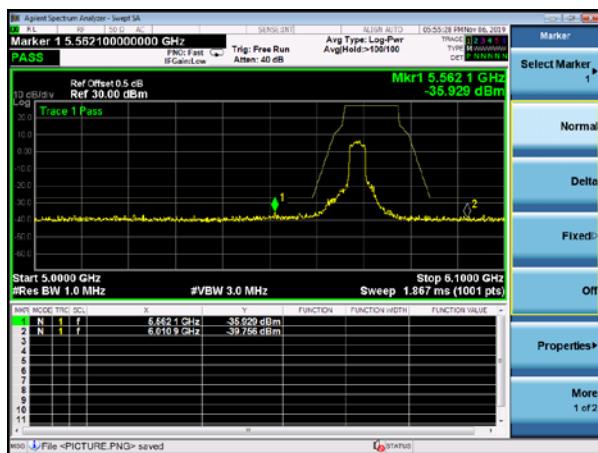
(802.11ac20) Band Edge, Right Side



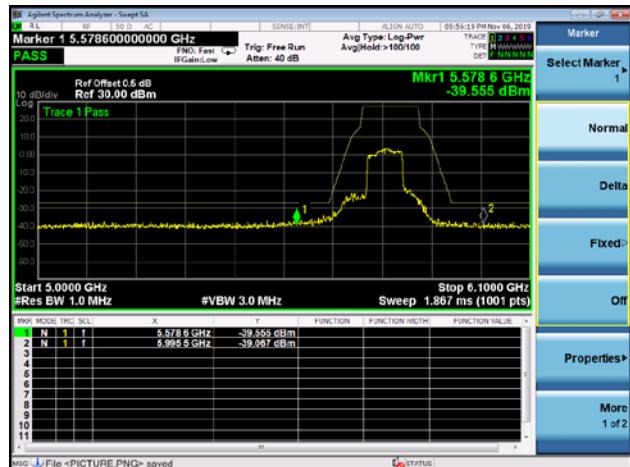


5.745~5.825 GHz

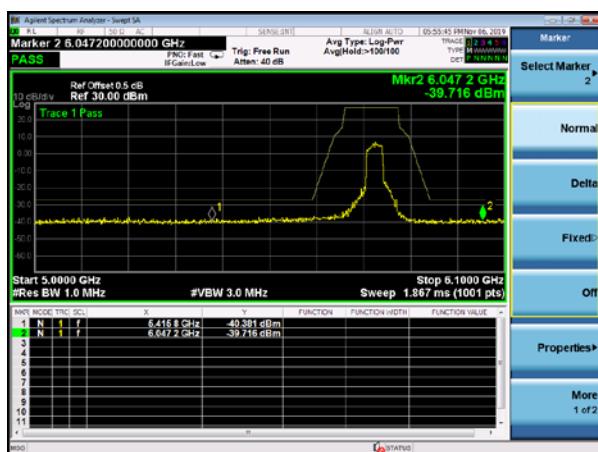
(802.11ac40) Band Edge, Left Side



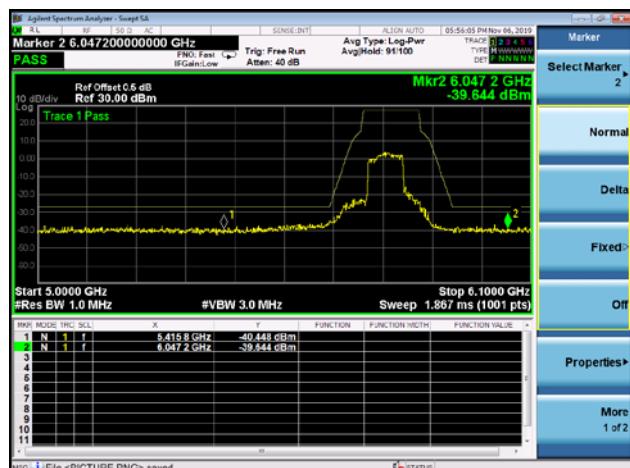
(802.11ac80) Band Edge, Left Side



(802.11ac40) Band Edge, Right Side



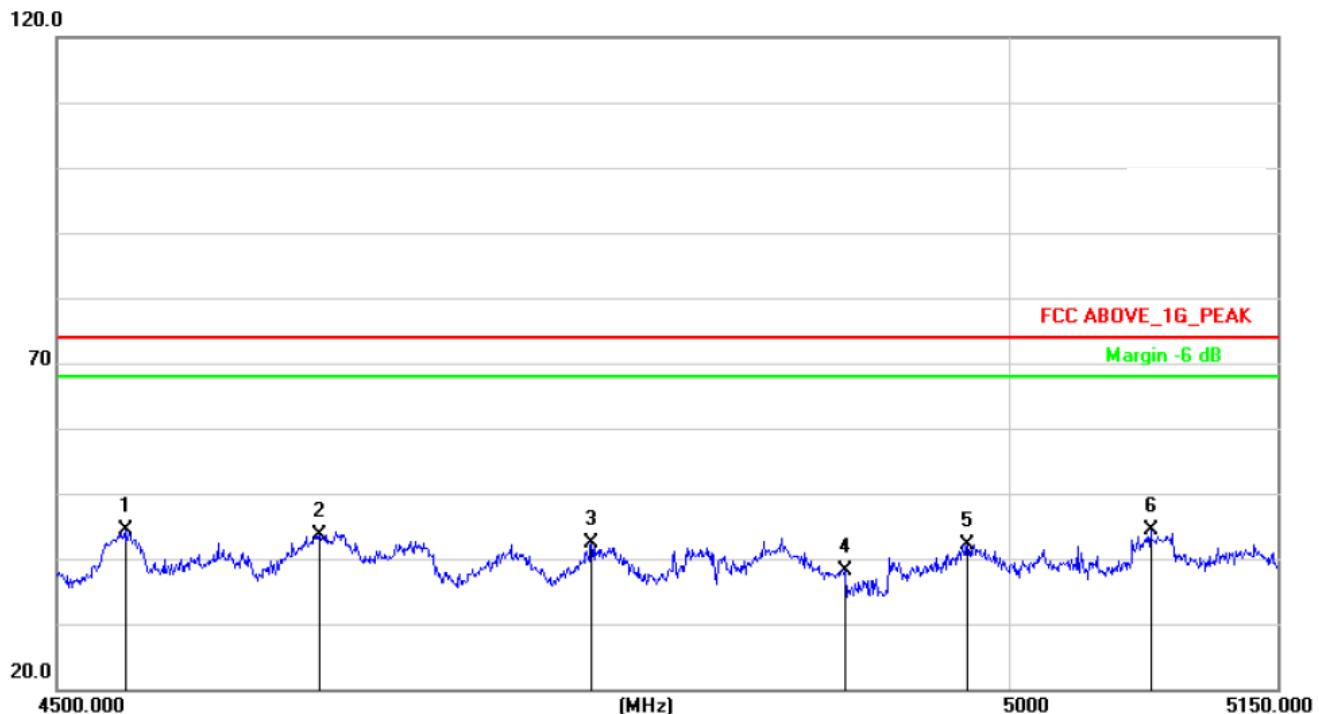
(802.11ac80) Band Edge, Right Side



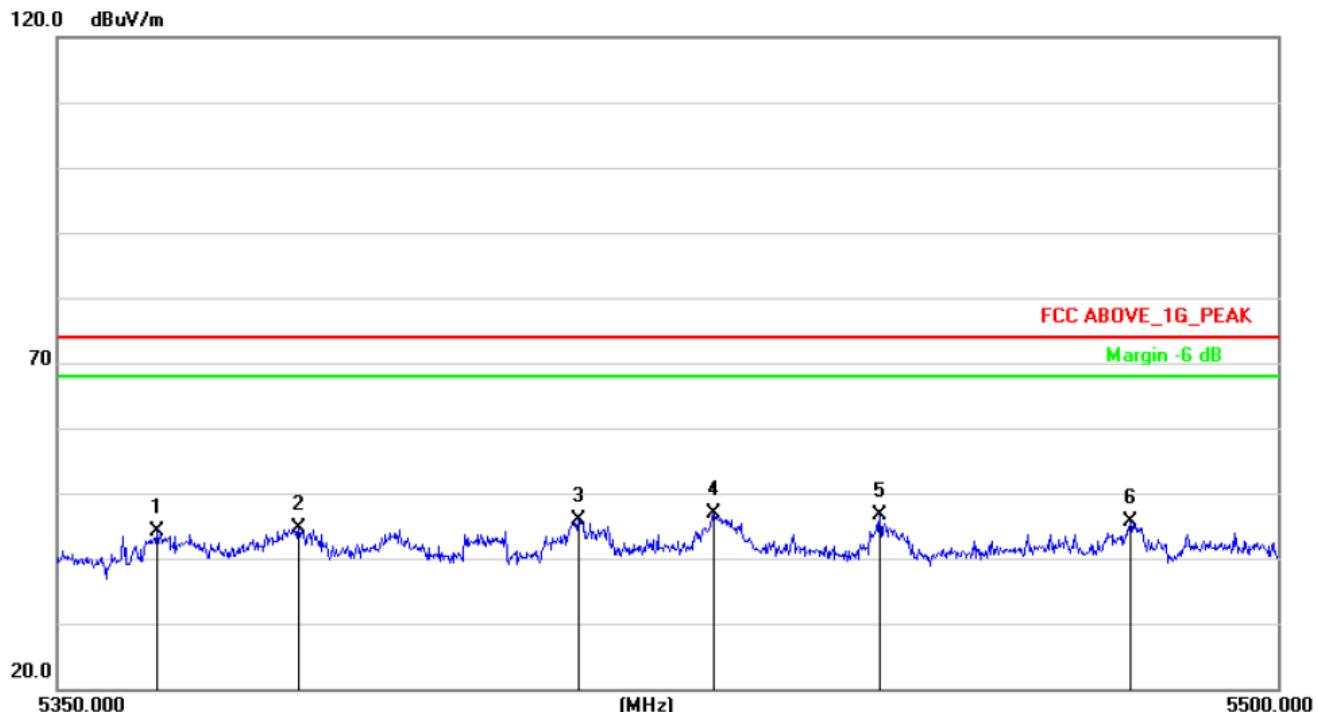


Radiated bandedge

802.11 a
For the frequency band 5150-5250MHz



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4535.100	45.11	-0.62	44.49	74.00	-29.51	peak
2	4632.600	44.23	-0.55	43.68	74.00	-30.32	peak
3	4774.300	42.94	-0.45	42.49	74.00	-31.51	peak
4	4910.150	38.39	-0.35	38.04	74.00	-35.96	peak
5	4977.100	42.42	-0.31	42.11	74.00	-31.89	peak
6	5078.500	44.22	0.04	44.26	74.00	-29.74	peak



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5362.150	42.79	1.25	44.04	74.00	-29.96	peak
2	5379.400	43.34	1.32	44.66	74.00	-29.34	peak
3	5413.600	44.32	1.47	45.79	74.00	-28.21	peak
4	5430.250	45.28	1.54	46.82	74.00	-27.18	peak
5	5450.650	45.03	1.63	46.66	74.00	-27.34	peak
6	5481.700	43.77	1.76	45.53	74.00	-28.47	peak

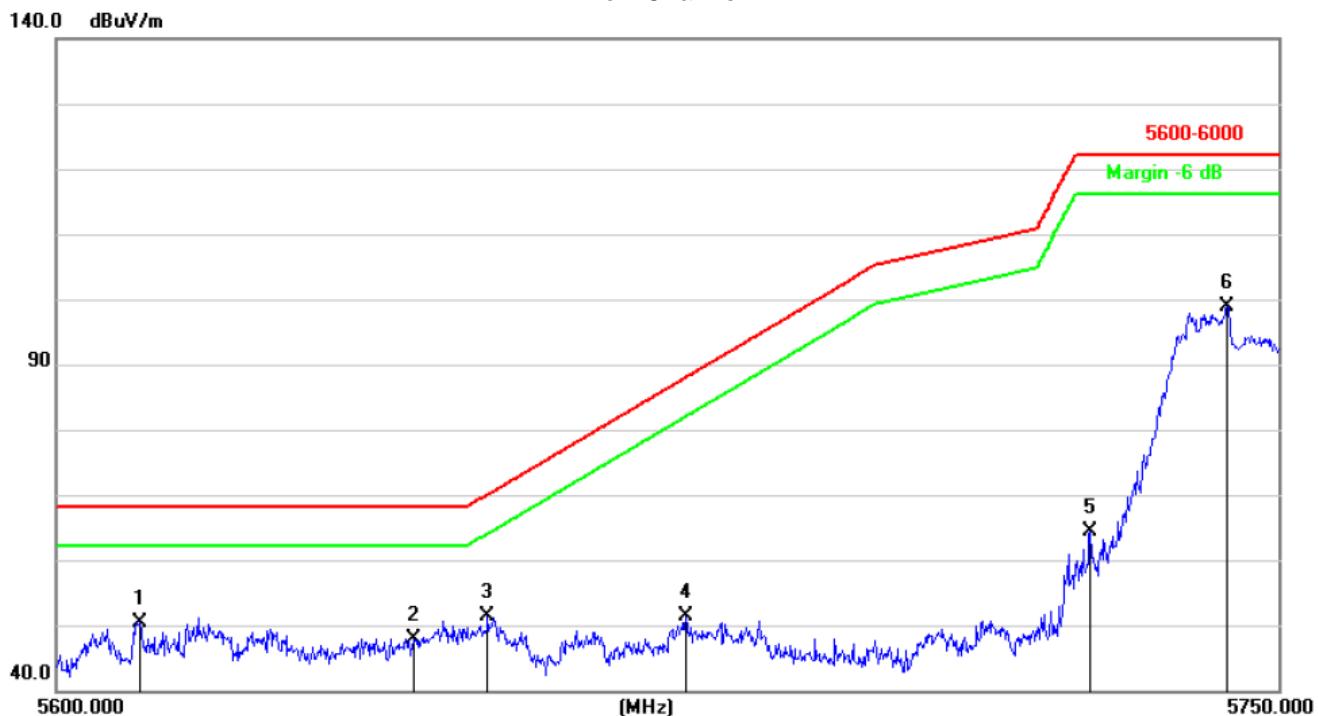
Note:

1. This EUT was tested in 802.11a/n(HT20), n(HT40), ac20, ac40, AC80 mode and 802.11a the worst case position data was reported.



802.11n(HT20)
For the frequency band 5725-5850MHz

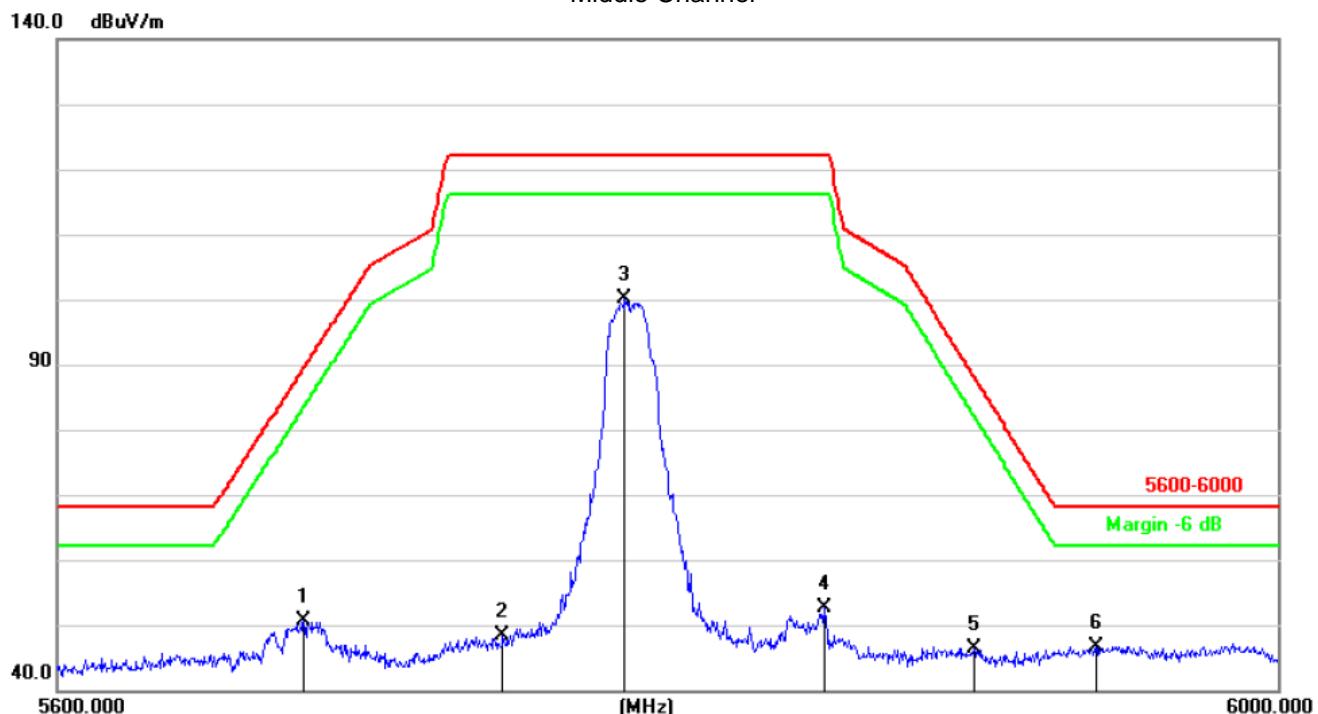
Low Channel



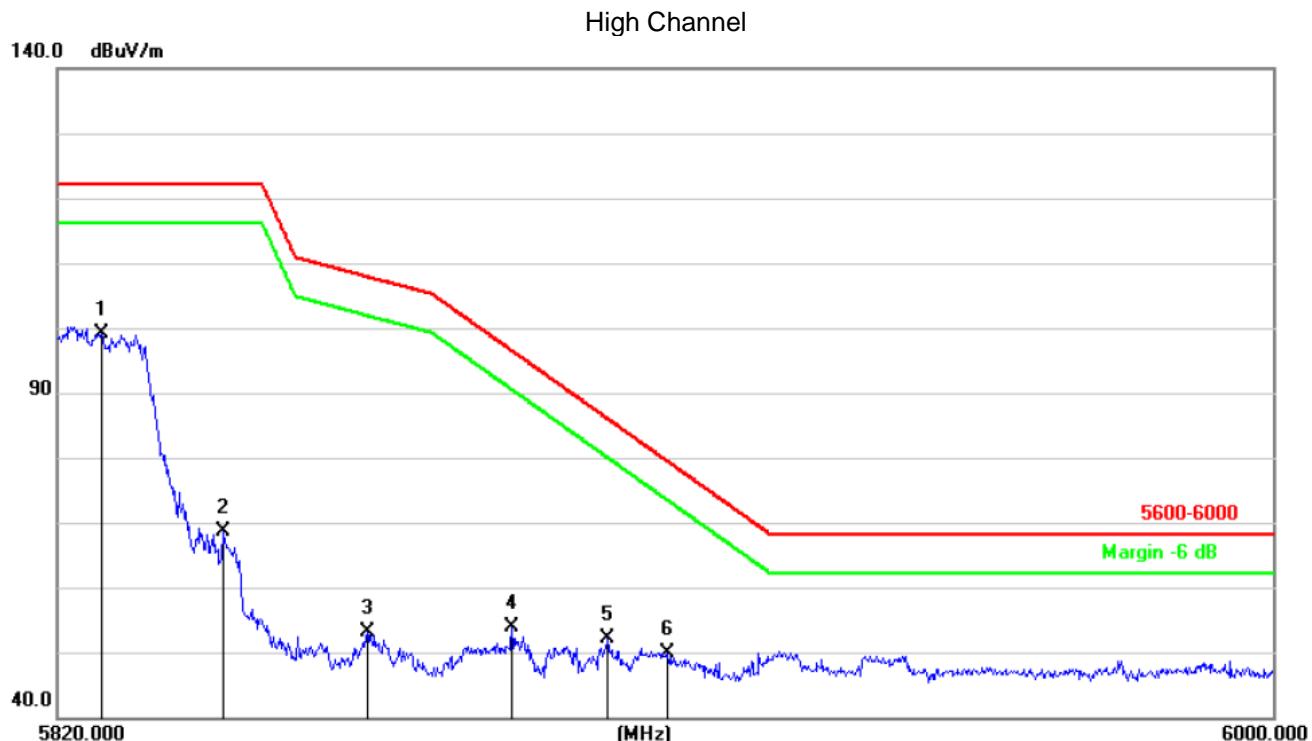
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5610.350	48.10	2.30	50.40	68.20	-17.80	peak
2	5643.650	45.50	2.45	47.95	68.20	-20.25	peak
3	5652.500	48.88	2.48	51.36	70.06	-18.70	peak
4	5676.800	48.86	2.59	51.45	88.07	-36.62	peak
5	5726.750	61.57	2.80	64.37	122.20	-57.83	peak
6	5743.700	96.05	2.87	98.92	122.20	-23.28	peak



Middle Channel



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5678.800	48.12	2.59	50.71	89.55	-38.84	peak
2	5743.200	45.50	2.87	48.37	122.20	-73.83	peak
3	5782.800	97.04	3.04	100.08	122.20	-22.12	peak
4	5848.000	49.41	3.31	52.72	122.20	-69.48	peak
5	5898.000	42.73	3.53	46.26	88.14	-41.88	peak
6	5938.800	43.03	3.70	46.73	68.20	-21.47	peak



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5826.660	95.95	3.22	99.17	122.20	-23.03	peak
2	5844.300	65.38	3.30	68.68	122.20	-53.52	peak
3	5865.540	49.64	3.39	53.03	107.85	-54.82	peak
4	5886.780	50.43	3.48	53.91	96.45	-42.54	peak
5	5901.000	48.52	3.54	52.06	85.92	-33.86	peak
6	5909.820	46.22	3.58	49.80	79.40	-29.60	peak

Note:

1. This EUT was tested in 802.11a/n/ac(HT20), n/ac(HT40), ac(HT80) mode and 802.11n(HT20) the worst case position data was reported.



8.SPURIOUS RF CONDUCTED EMISSIONS

8.1 CONFORMANCE 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: 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 MEASURING INSTRUMENTS

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

8.3 TEST SETUP

Please refer to Section 6.1 of this test report.

8.4 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.

8.5 TEST RESULTS

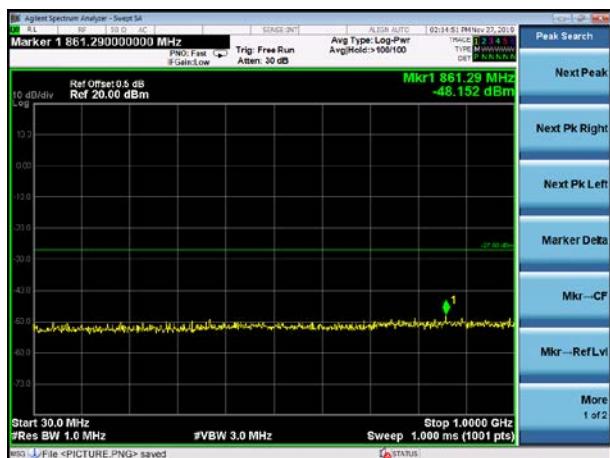
Remark: The measurement frequency range is from 9KHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandege measurement data.



5.2G

Test Plot

802.11a on channel 36



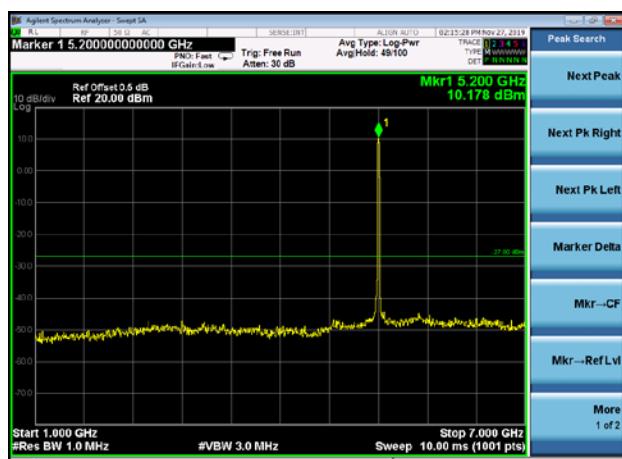
802.11a on channel 40



802.11a on channel 36



802.11a on channel 40



802.11a on channel 36



802.11a on channel 40

