

## 26dB Bandwidth

802.11ac20



802.11n HT40



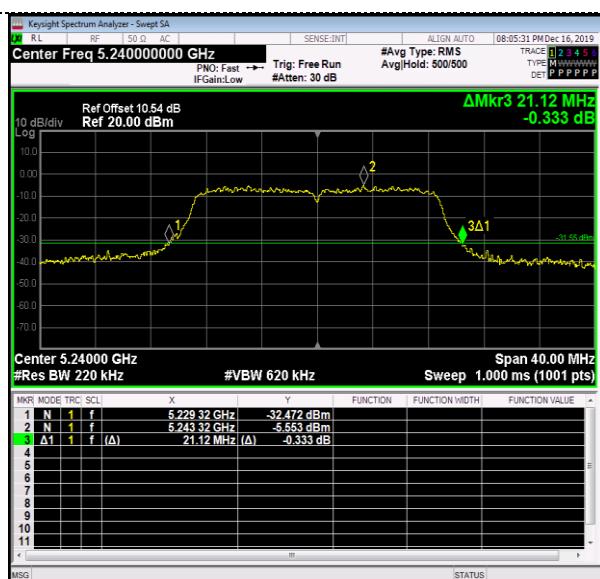
CH36



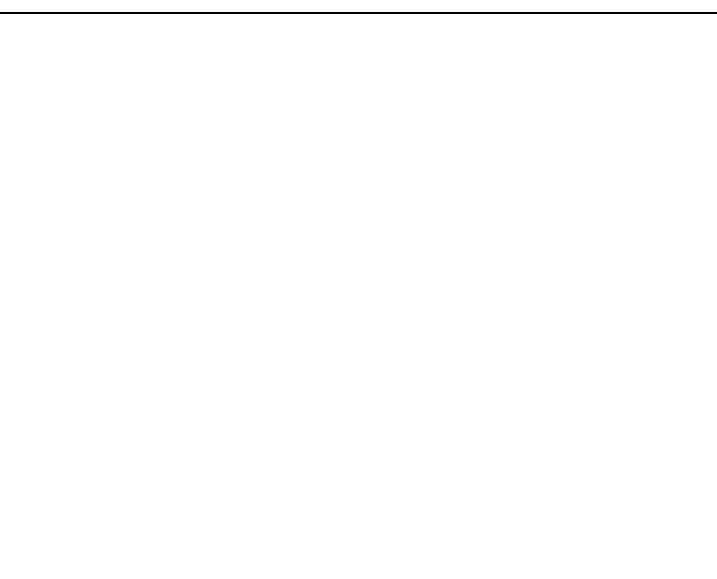
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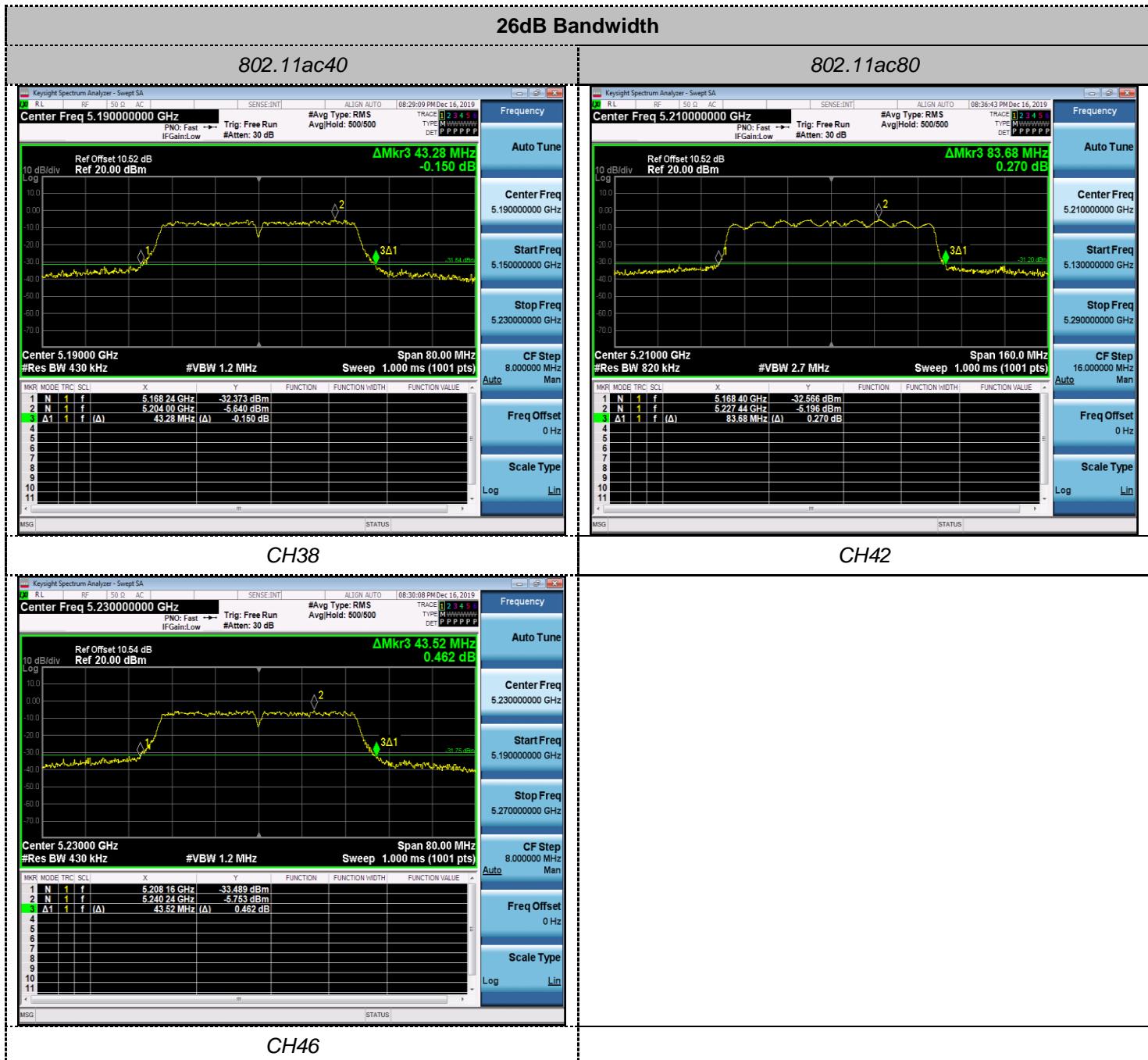
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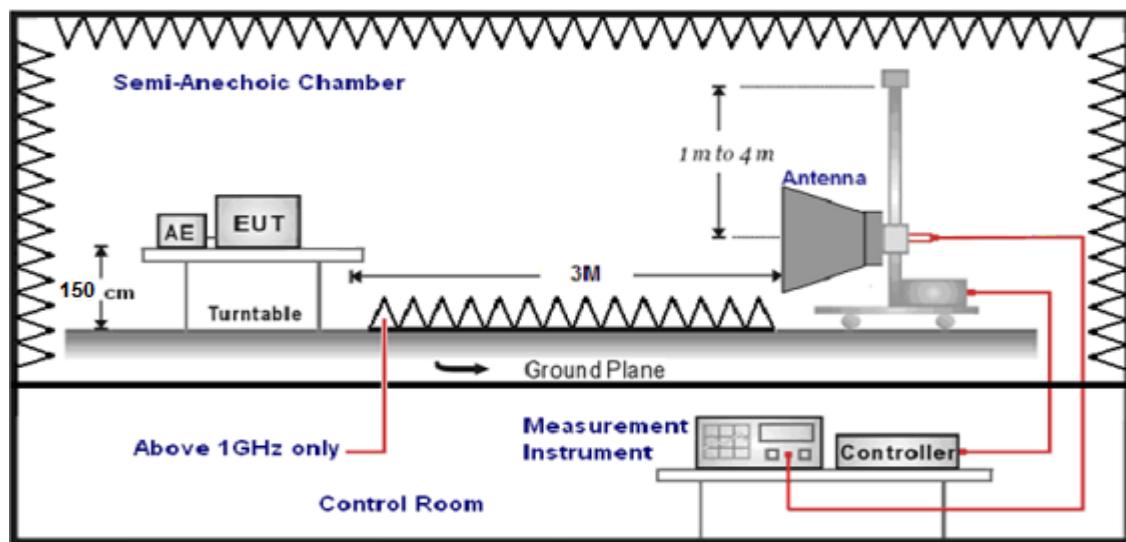


CH48



## 4.8. Band Edge Compliance

### TEST CONFIGURATION



### LIMIT

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequency (MHz)	Distance (Meters)	Radiated (dB $\mu$ V/m)	Radiated ( $\mu$ V/m)
0.009-0.49	3	$20\log(2400/F(\text{kHz}))+40\log(300/3)$	$2400/F(\text{kHz})$
0.49-1.705	3	$20\log(24000/F(\text{kHz}))+40\log(30/3)$	$24000/F(\text{kHz})$
1.705-30	3	$20\log(30)+40\log(30/3)$	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

According to §15.407 (b): 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

Frequency (MHz)	EIRP Limit (dBm)	Equivalent Field Strength at 3m (dB $\mu$ V/m)
5150-5250	-27	68.2
5250-5350	-27	68.2
5470-5725	-27	68.2
5725-5850	-27 (beyond 10MHz of the bandedge) -17 (within 10 MHz of band edge)	68.2 78.2

### TEST PROCEDURE

1. The EUT was placed on a turn table which is 1.5m above 1GHz.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed..
5. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
1GHz-18GHz	Double Ridged Horn Antenna	3

6. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
1GHz-18GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

### **Field Strength Calculation**

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$\mathbf{FS = RA + AF + CL - AG}$$

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

### **TEST RESULTS**

Remark:For radiated bandedge We measured at 802.11 a/802.11 ac/802.11 n mode, recorded worst case at 802.11 a mode;

## For Radiated Bandedge Measurement

802.11 a/ Channel 36 :5180 MHz									
Freq (MHz)	Read Level (dB $\mu$ V)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dB $\mu$ V/m)	Limit Line (dB $\mu$ V/m)	Margin (dB)	Detector	Polarization
4500.0	35.08	35.58	29.04	8.28	49.90	68.20	-18.30	Peak	Horizontal
4500.0	30.29	35.58	29.04	8.28	45.11	54.00	-8.89	AV	Horizontal
5150.0	39.27	35.58	29.04	8.28	54.09	68.20	-14.11	Peak	Horizontal
5150.0	30.67	35.58	29.04	8.28	45.49	54.00	-8.51	AV	Horizontal

802.11 a/ Channel 48 :5240 MHz									
Freq (MHz)	Read Level (dB $\mu$ V)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dB $\mu$ V/m)	Limit Line (dB $\mu$ V/m)	Margin (dB)	Detector	Polarization
5350.0	35.08	35.42	29.06	8.39	49.83	68.20	-18.37	Peak	Horizontal
5350.0	30.36	35.42	29.06	8.39	45.11	54.00	-8.89	AV	Horizontal
5460.0	39.20	35.42	29.06	8.39	53.95	68.20	-14.25	Peak	Horizontal
5460.0	30.67	35.42	29.06	8.39	45.42	54.00	-8.58	AV	Horizontal

802.11 a/ Channel 149 :5745 MHz									
Freq (MHz)	Read Level (dB $\mu$ V)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dB $\mu$ V/m)	Limit Line (dB $\mu$ V/m)	Margin (dB)	Detector	Polarization
5650.0	35.14	35.29	29.13	8.65	49.95	68.20	-18.25	Peak	Horizontal
5700.0	30.22	35.29	29.13	8.65	45.03	68.20	-23.17	Peak	Horizontal
5720.0	39.29	35.29	29.13	8.65	54.10	68.20	-14.10	Peak	Horizontal
5725.0	30.67	35.29	29.13	8.65	45.48	68.20	-22.72	Peak	Horizontal

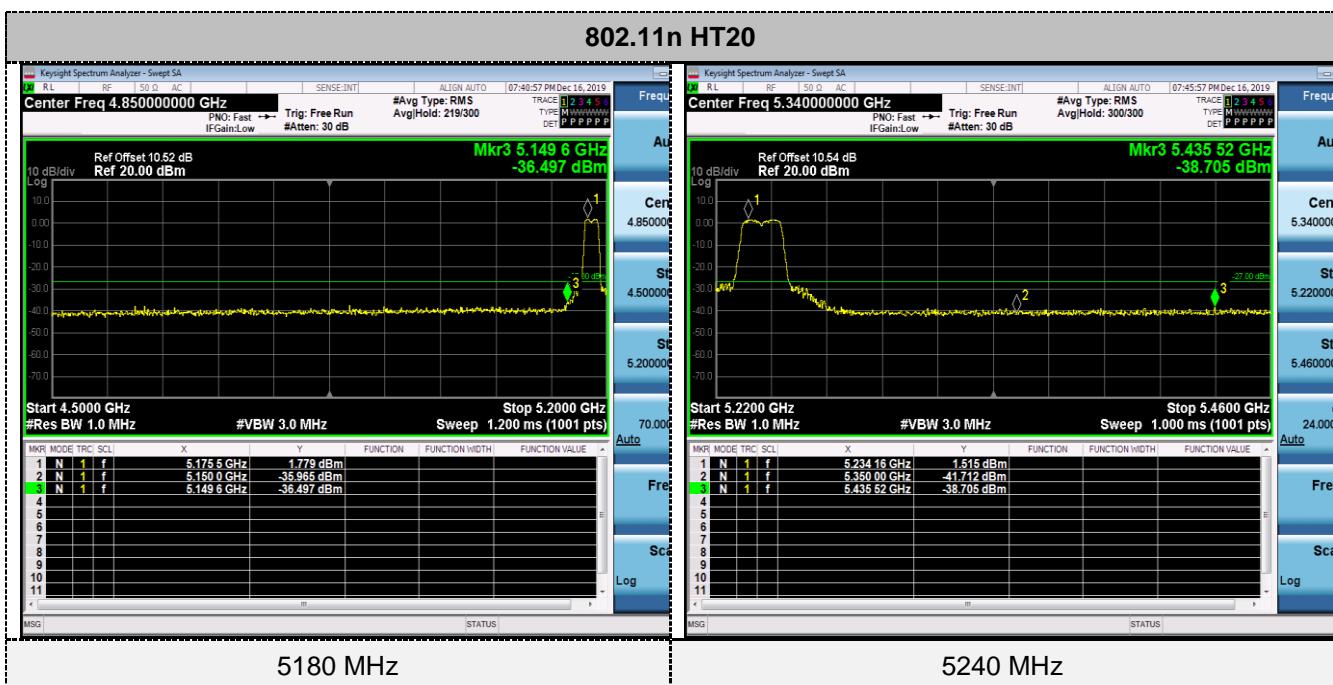
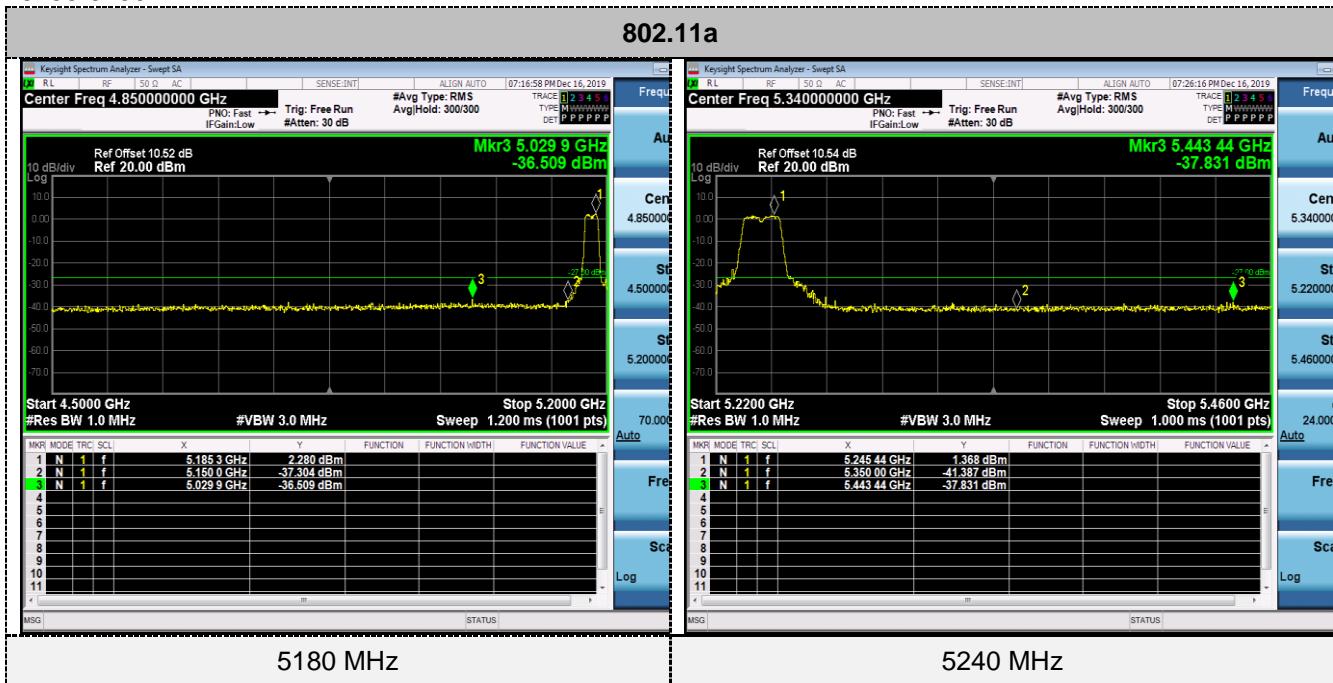
802.11 a/ Channel 165 :5825 MHz									
Freq (MHz)	Read Level (dB $\mu$ V)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dB $\mu$ V/m)	Limit Line (dB $\mu$ V/m)	Margin (dB)	Detector	Polarization
5850.0	35.05	35.29	29.18	8.80	49.96	68.20	-18.24	Peak	Horizontal
5855.0	30.32	35.29	29.18	8.80	45.23	68.20	-22.97	Peak	Horizontal
5875.0	39.08	35.29	29.18	8.80	53.99	68.20	-14.21	Peak	Horizontal
5925.0	30.75	35.29	29.18	8.80	45.66	68.20	-22.54	Peak	Horizontal

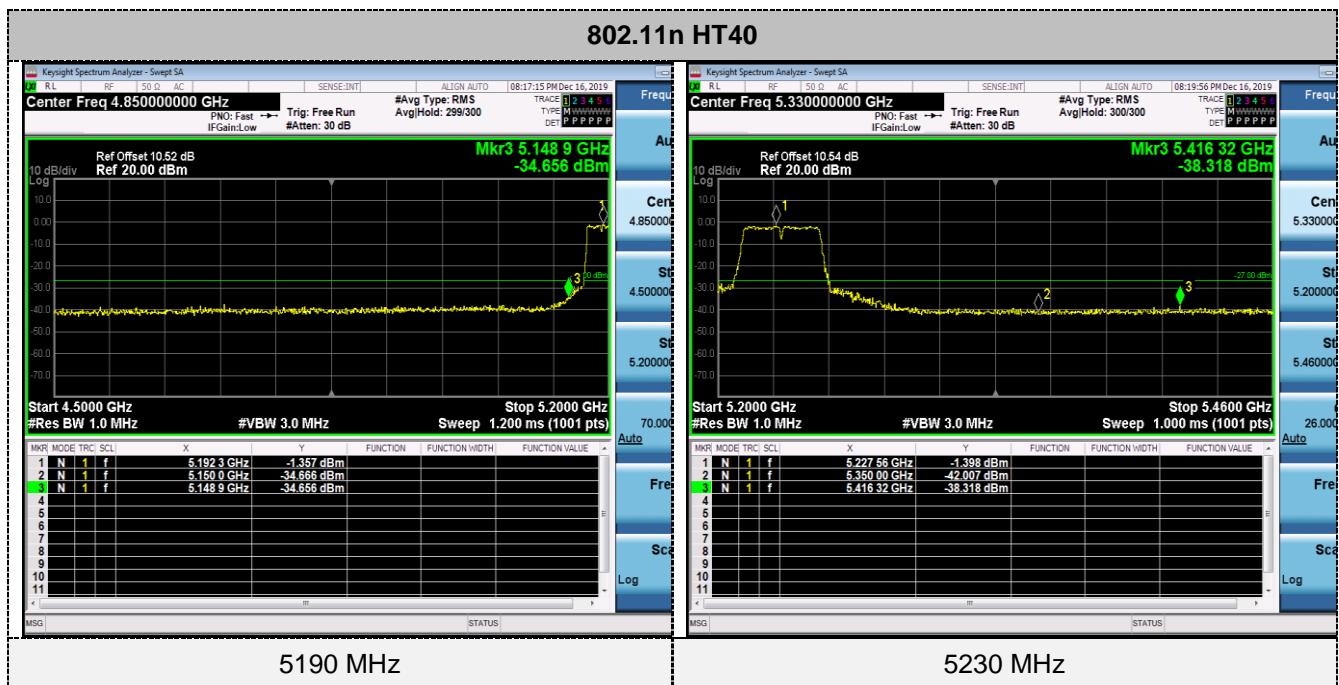
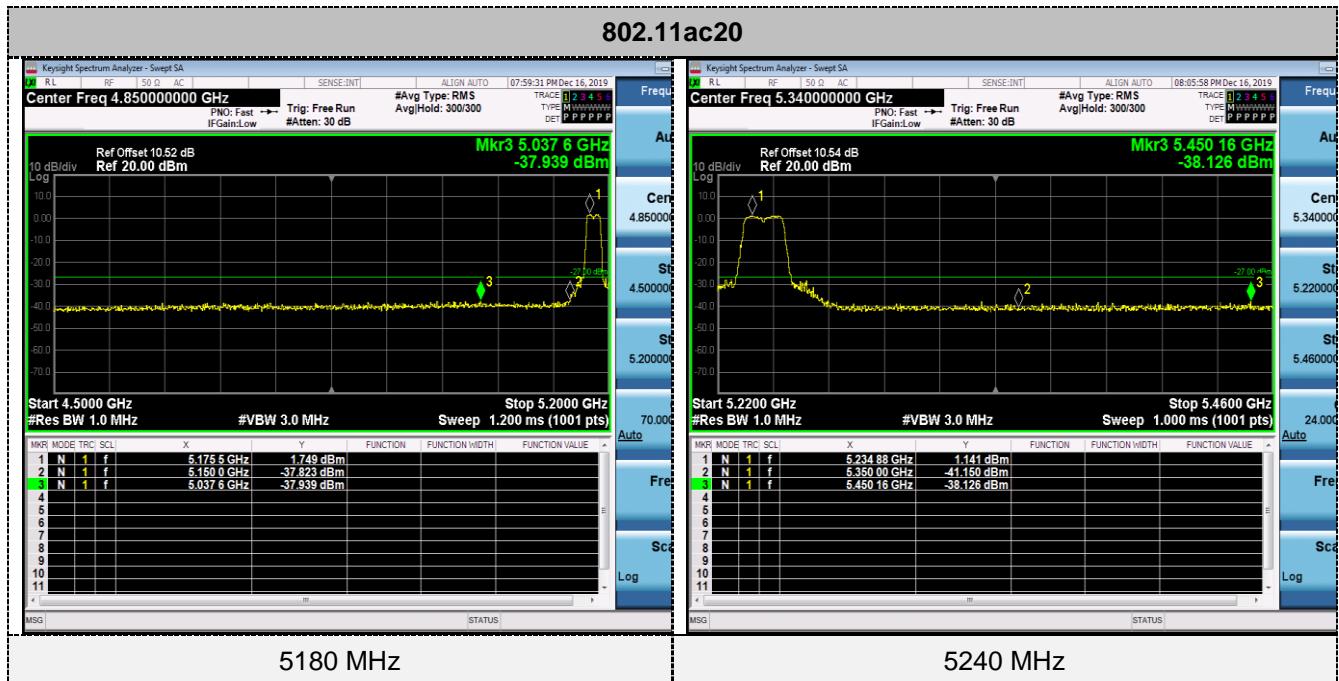
## REMARKS:

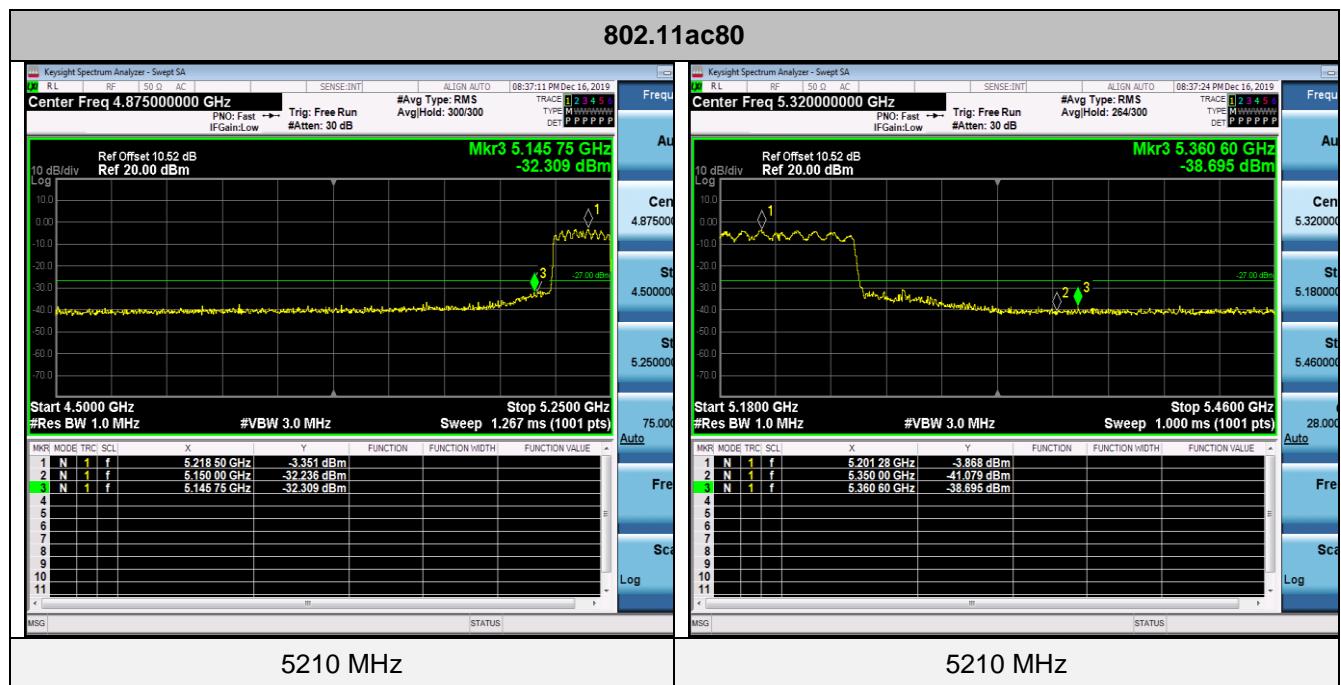
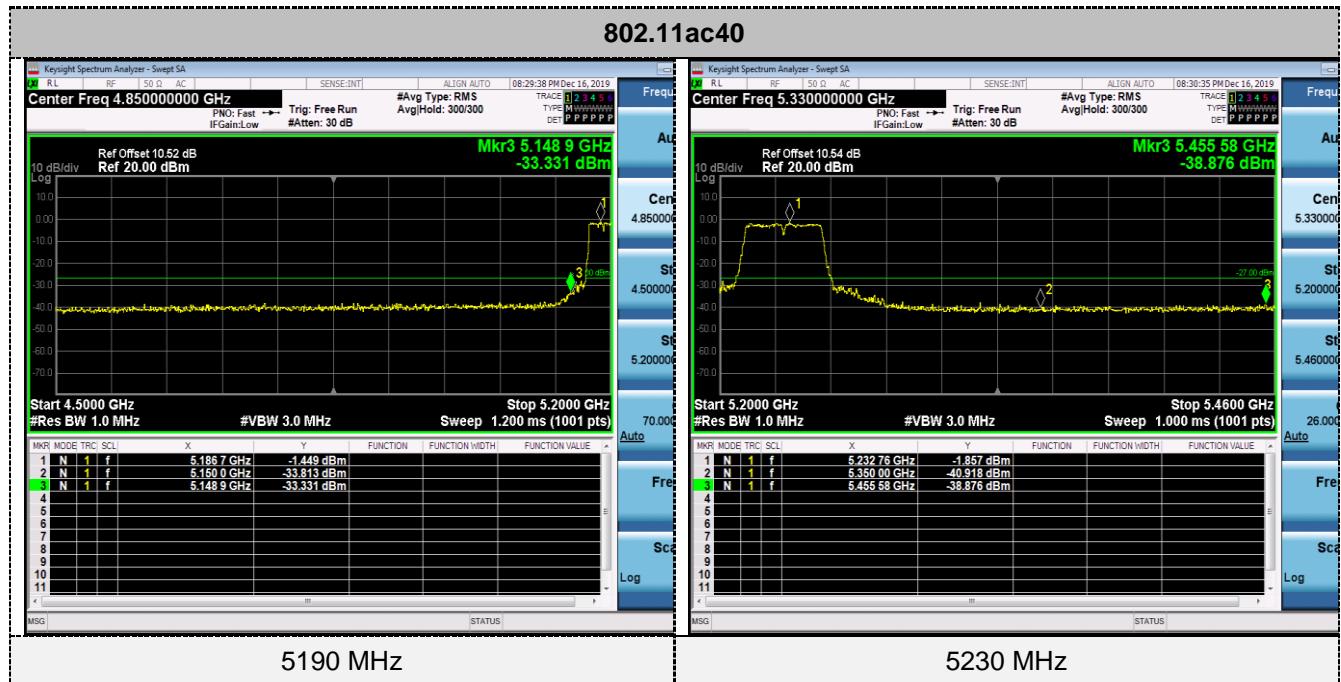
1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. The other emission levels were very low against the limit.
3. The average measurement was not performed when the peak measured data under the limit of average detection.
4. Detector AV is setting spectrum/receiver. RBW=1MHz/VBW=10Hz/Sweep time=Auto/Detector=Peak;

**For Conducted Band edge Measurement**  
**The test results have included the antenna gain**

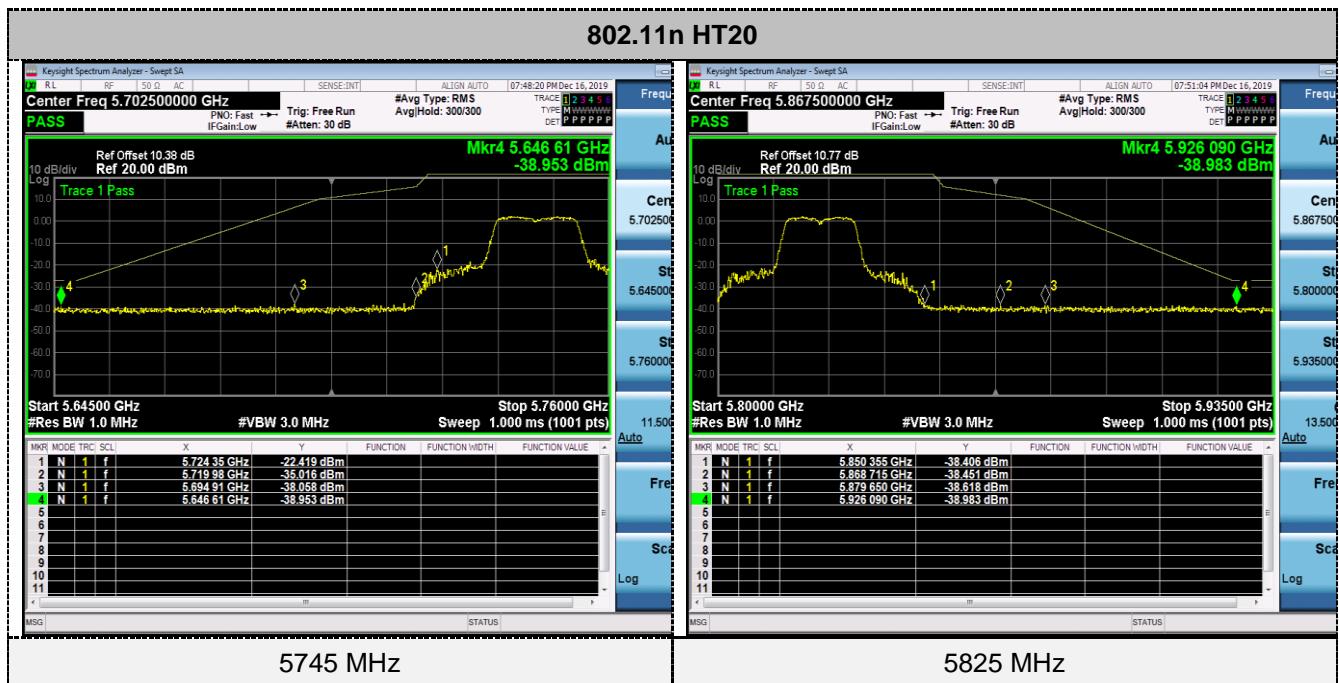
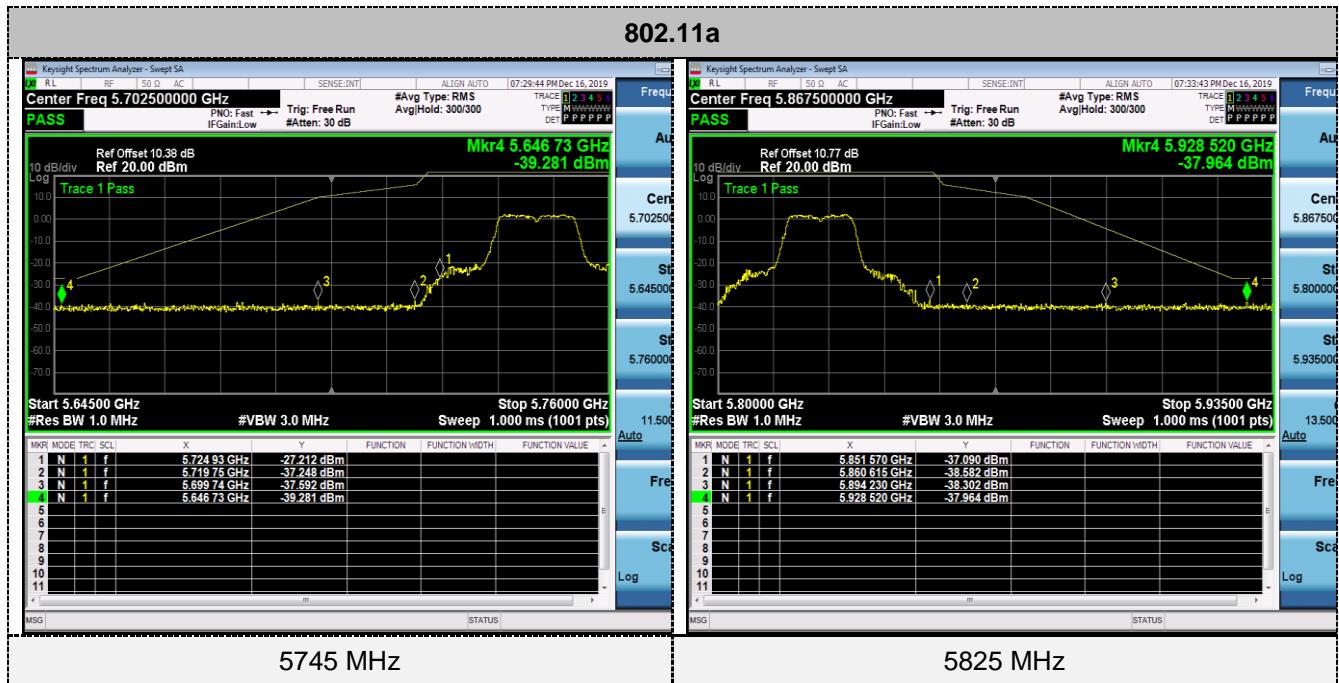
**5150-5250MHz:**

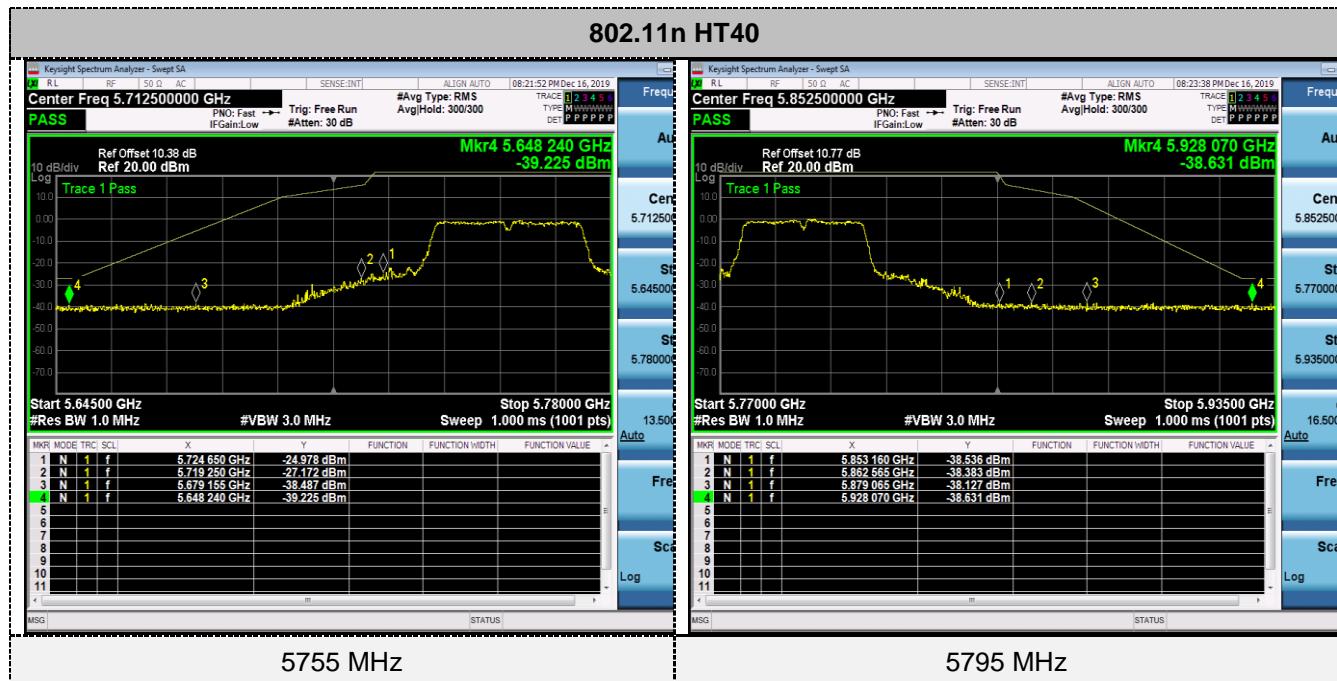
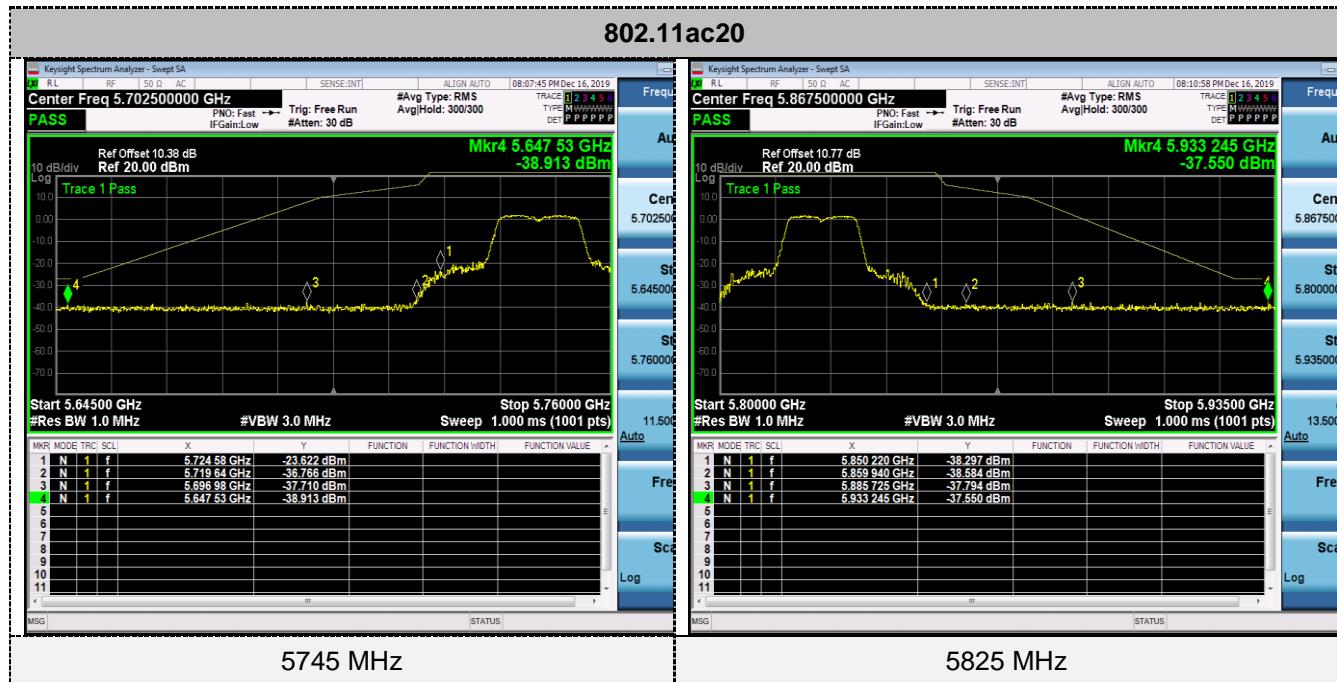


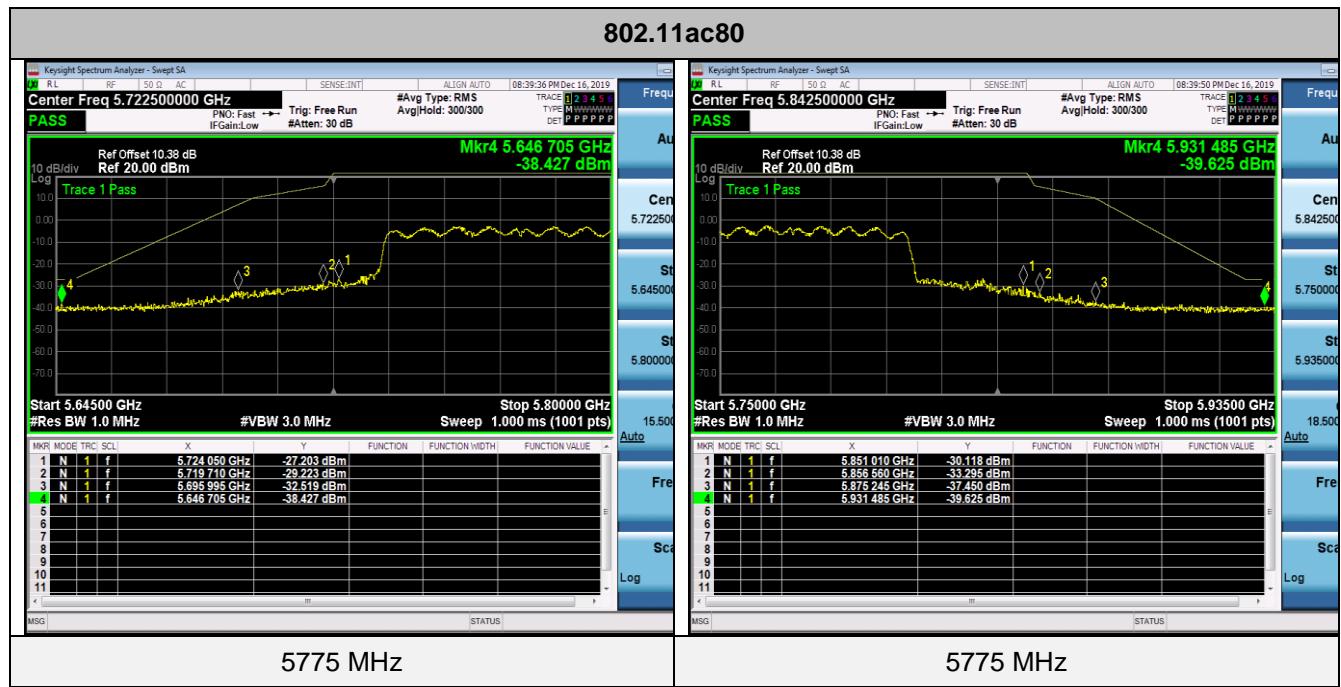
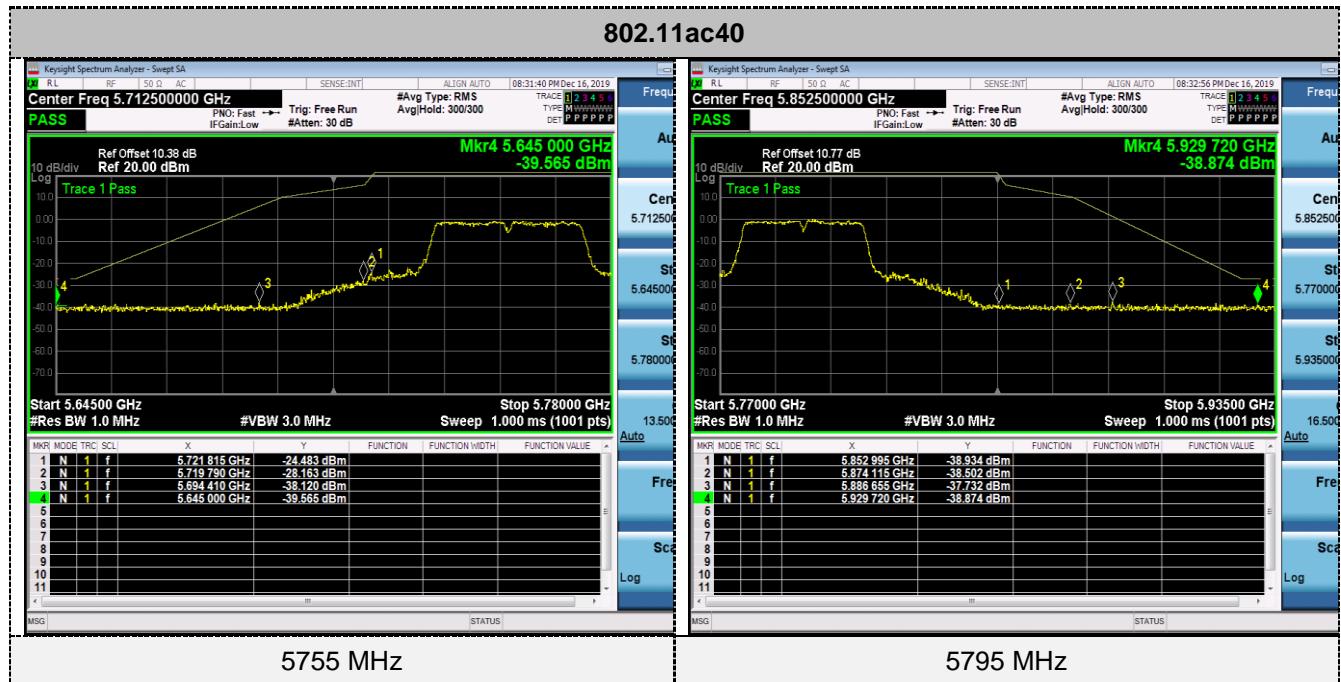




5725-5850MHz:







## 4.9. Antenna Requirement

### Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.407 (a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### **Antenna Information**

The antenna is External Antenna, through the buckle stretched out, The directional gains of antenna used for transmitting is 2.0Bi.

Reference to the test report No. **GTS20191209006-2-22**

## **5. TEST SETUP PHOTOS OF THE EUT**

Reference to the Test Report NO. GTS20191209006-2-22

## **6. EXTERNAL AND INTERNAL PHOTOS OF THE EUT**

Reference to the Test Report NO. GTS20191209006-2-22

.....End of Report.....