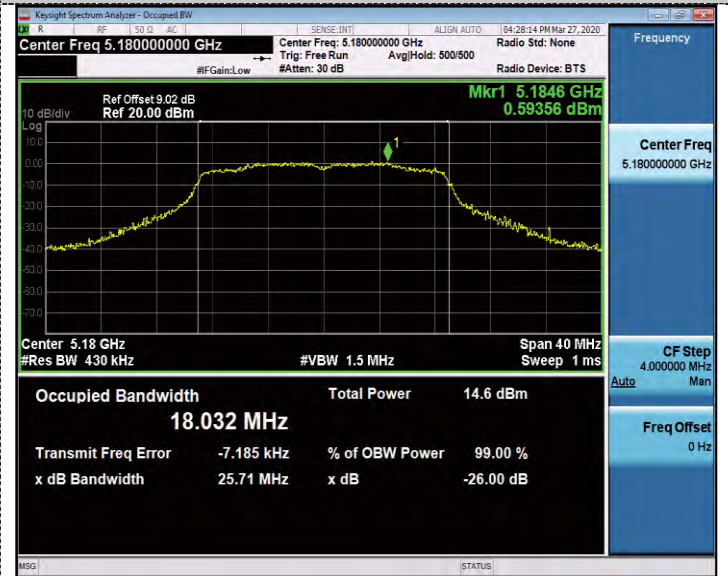


Antenna 1:

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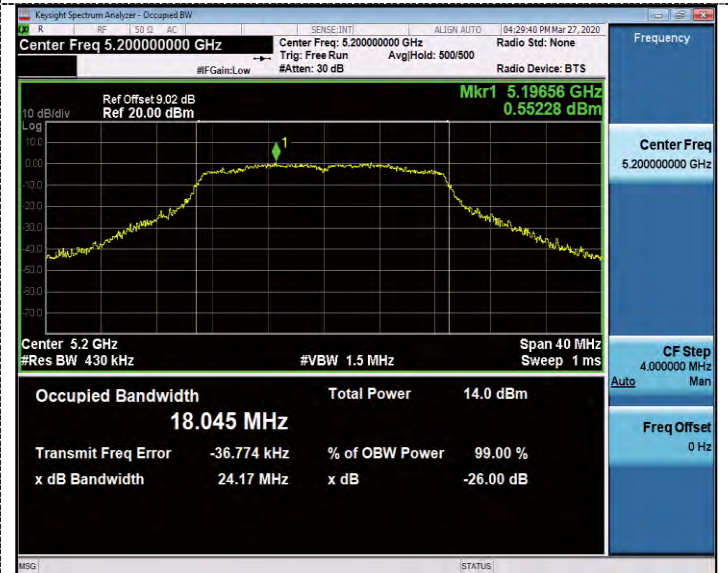
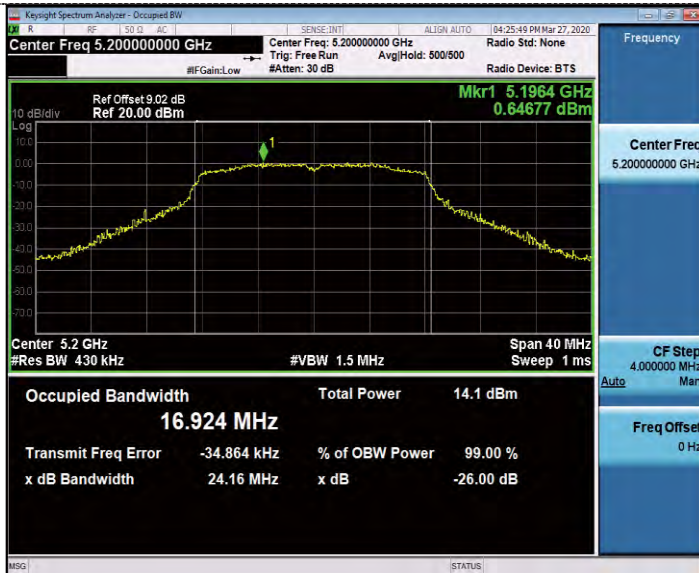
802.11a

802.11n HT20



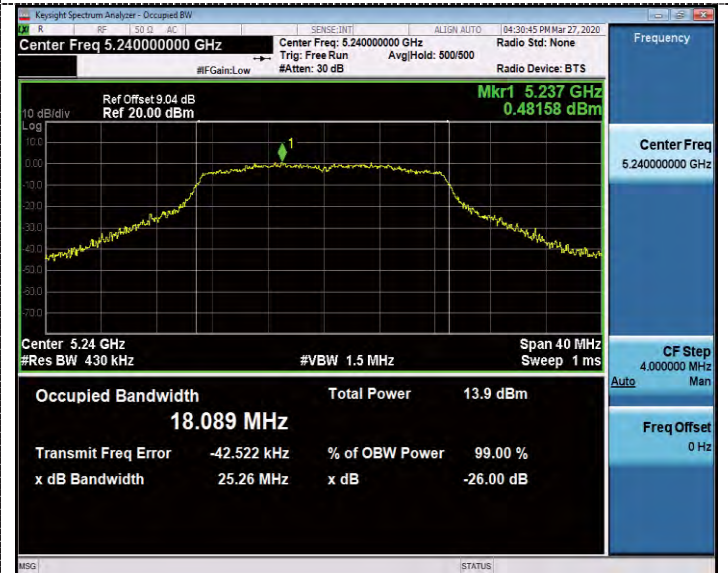
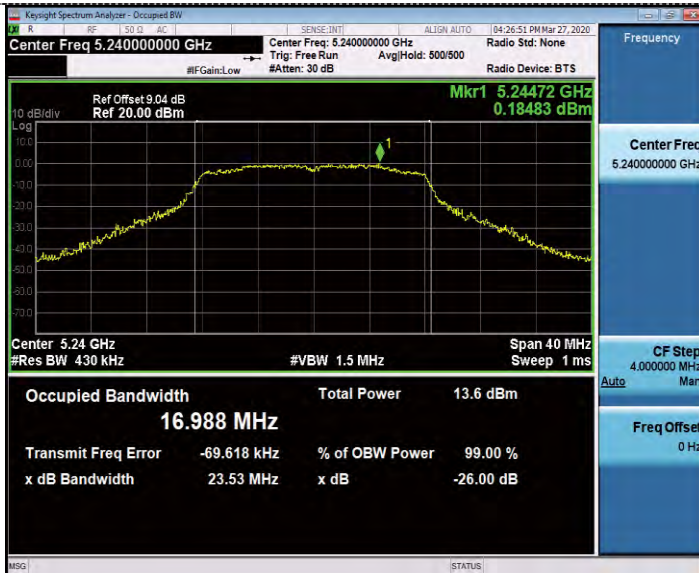
CH36

CH36



CH40

CH40

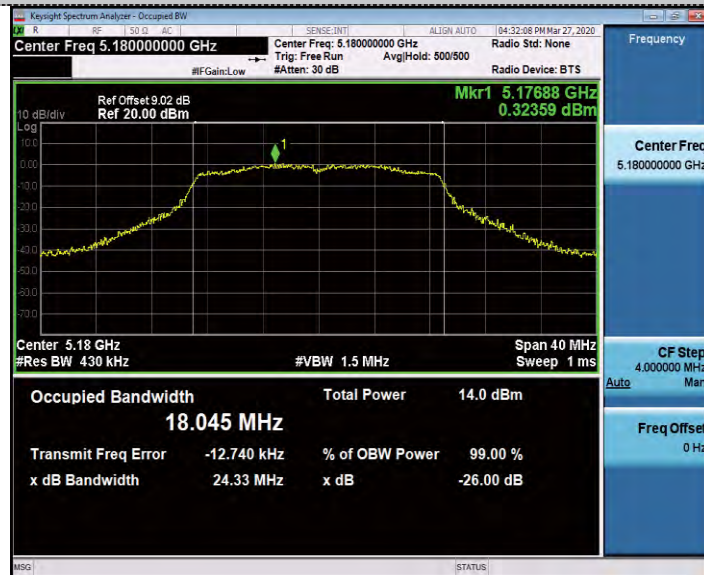


CH48

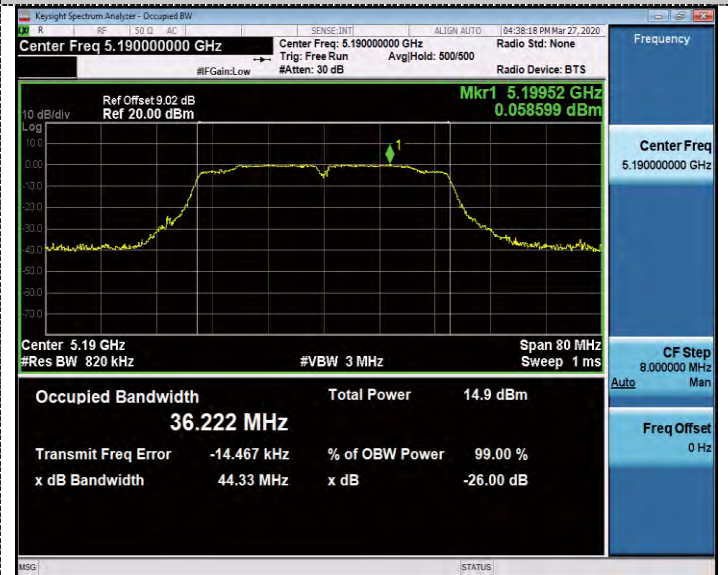
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99%Bandwidth

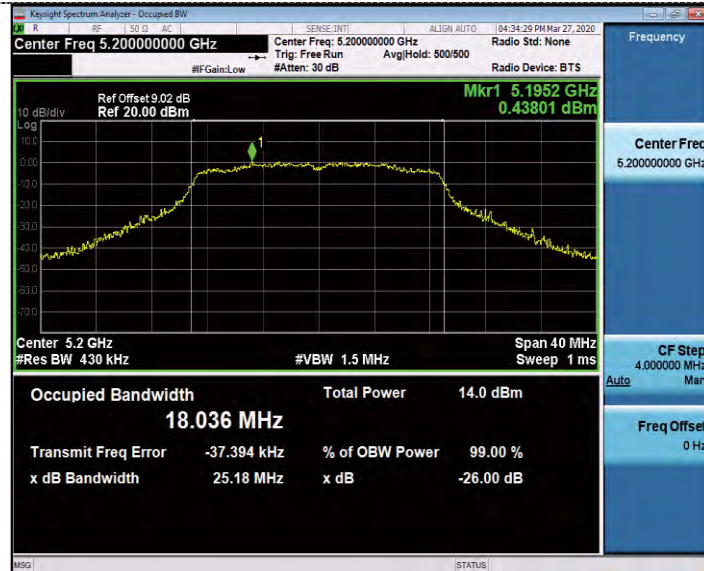
802.11ac20



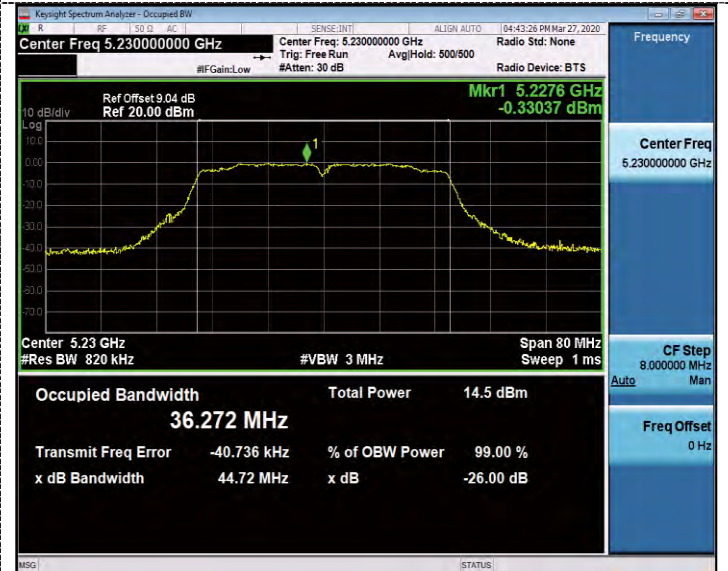
802.11n HT40



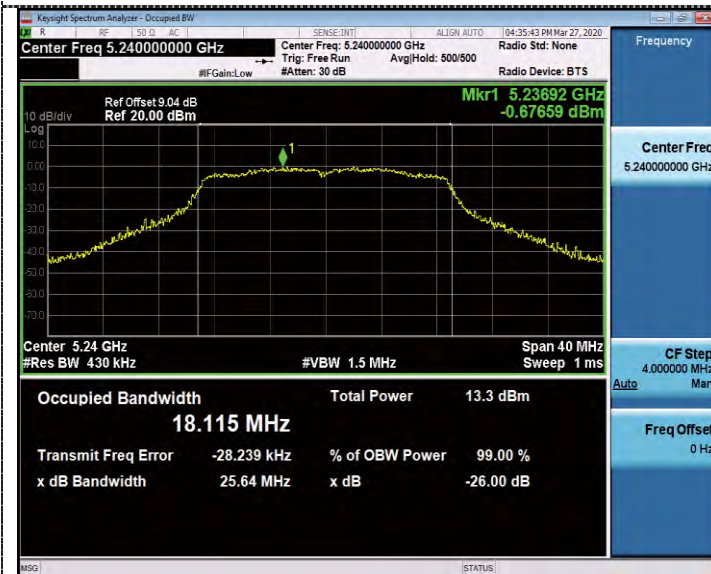
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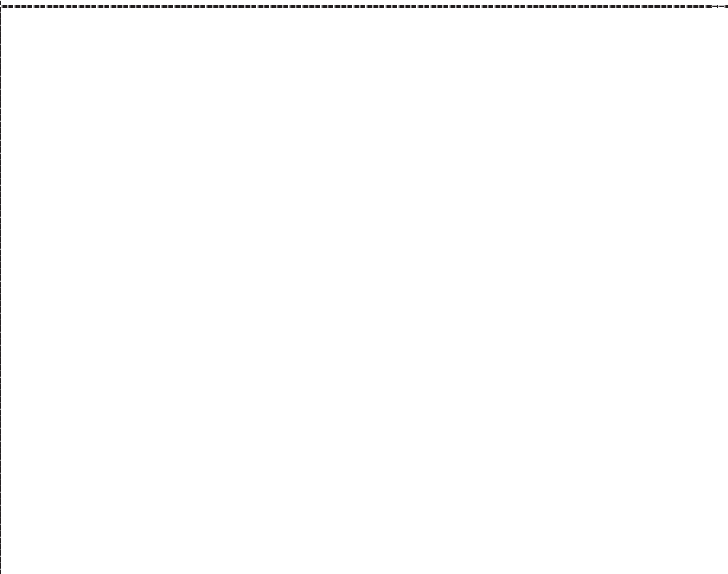
CH38



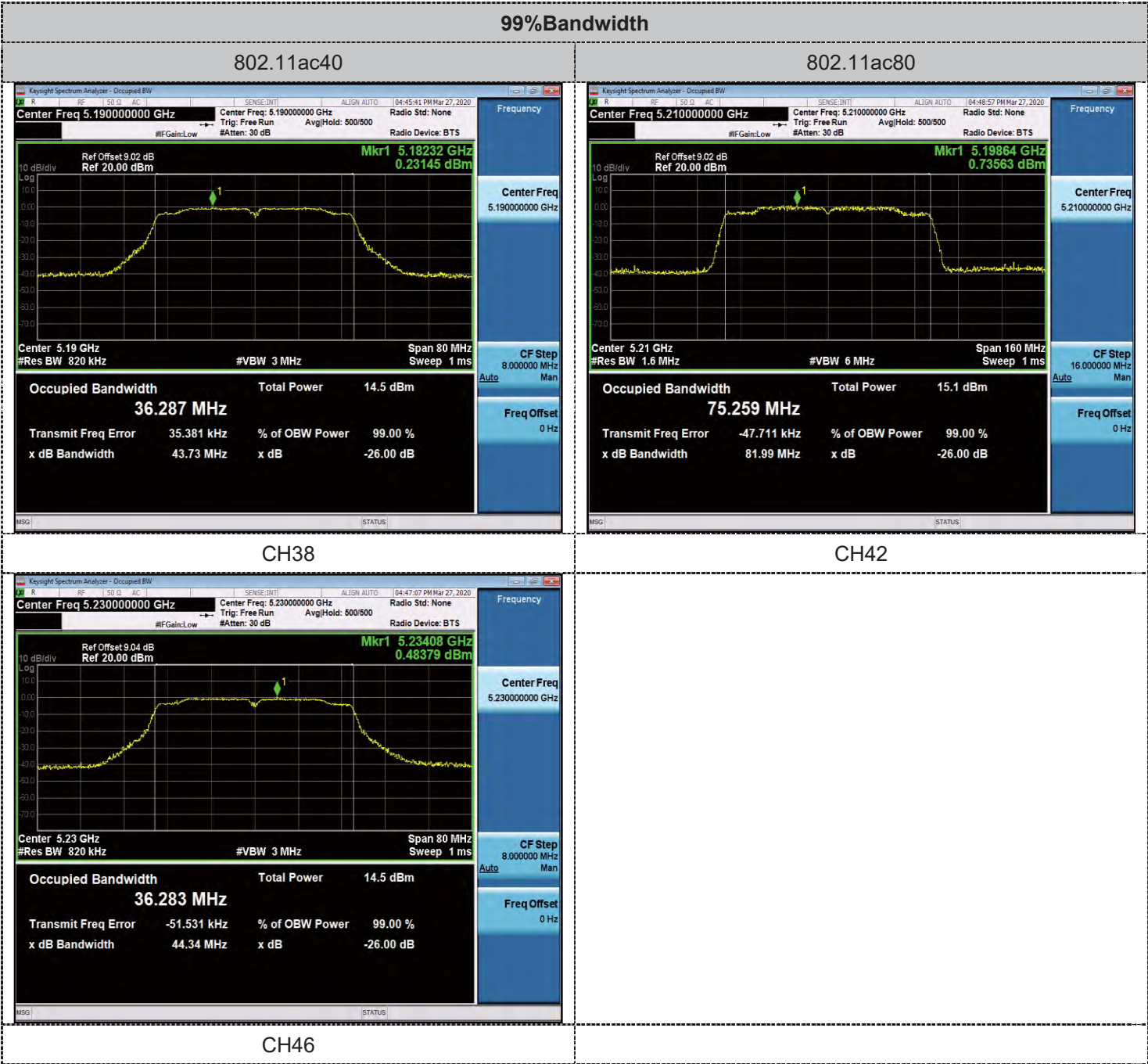
CH40



CH46



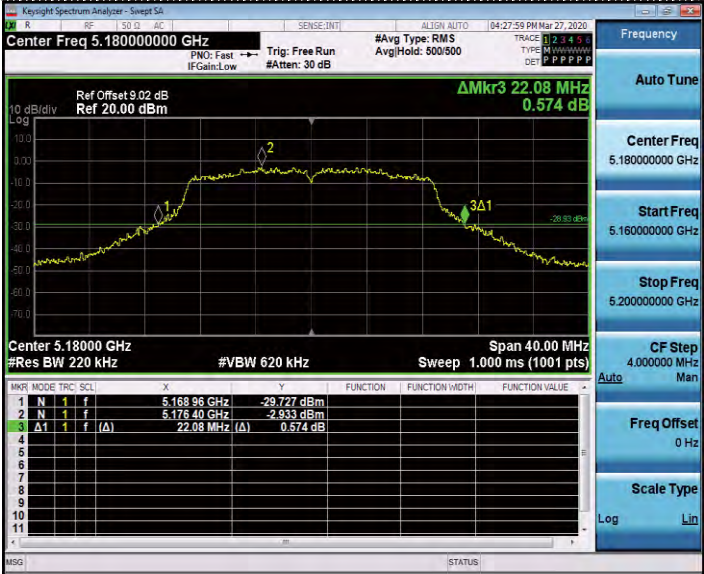
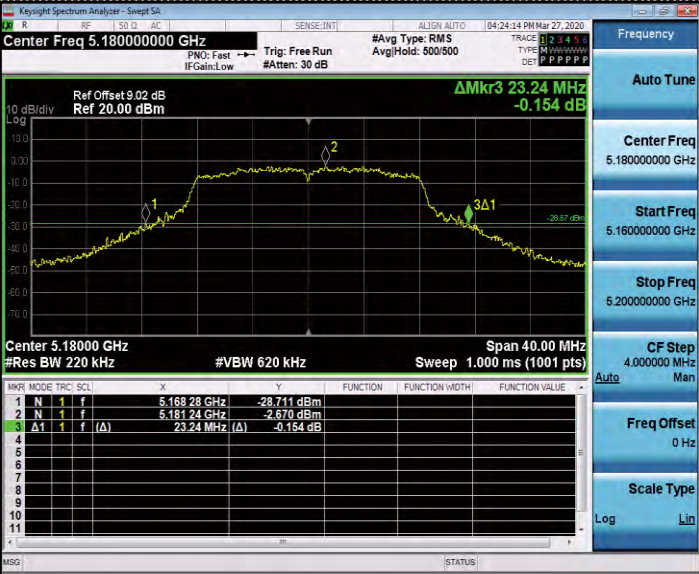
CH48



26dB Bandwidth

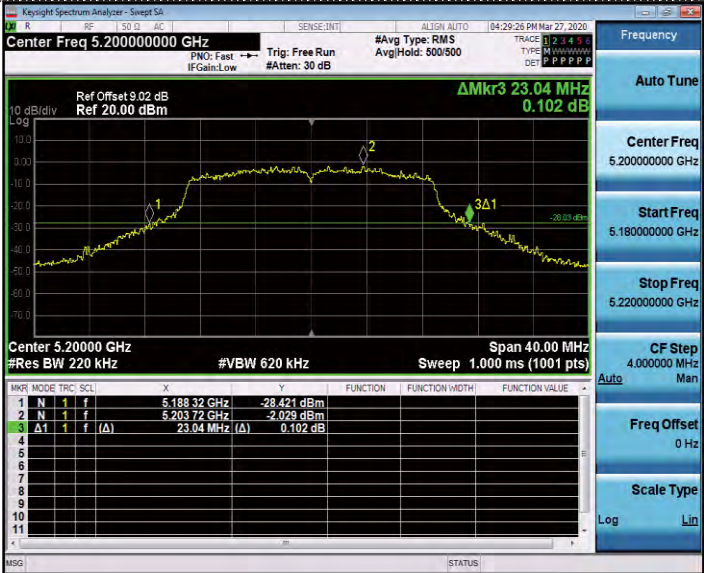
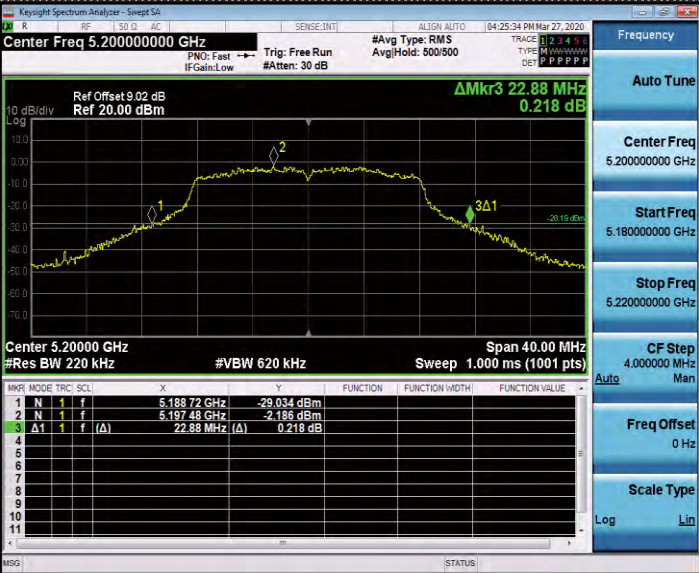
802.11a

802.11n HT20



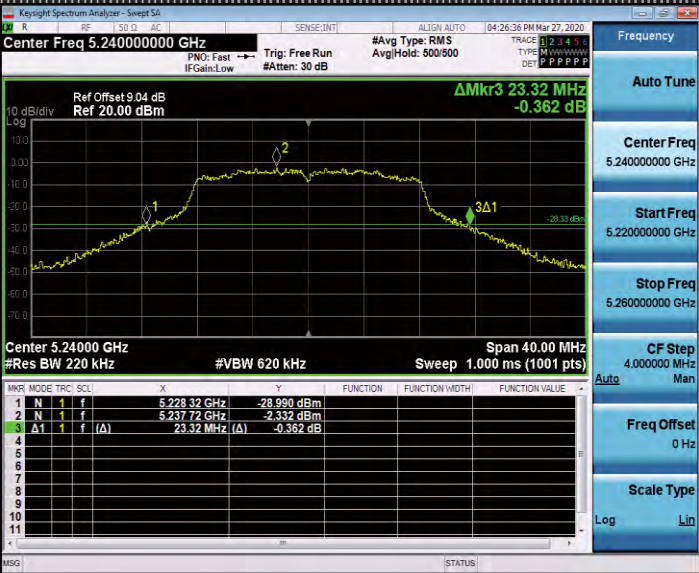
CH36

CH36



CH40

CH40



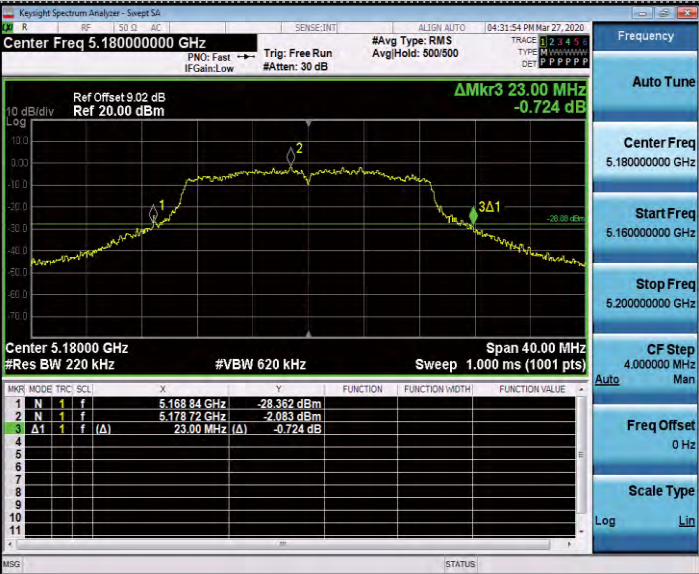
CH48

CH48

26dB Bandwidth

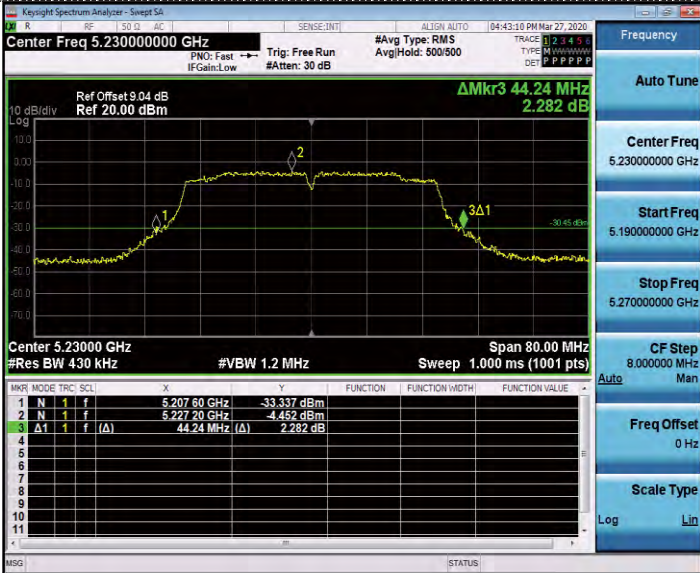
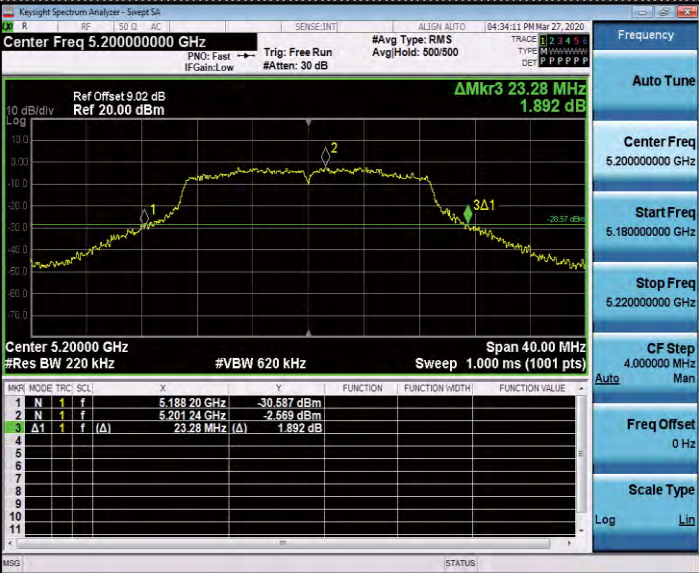
802.11ac20

802.11n HT40



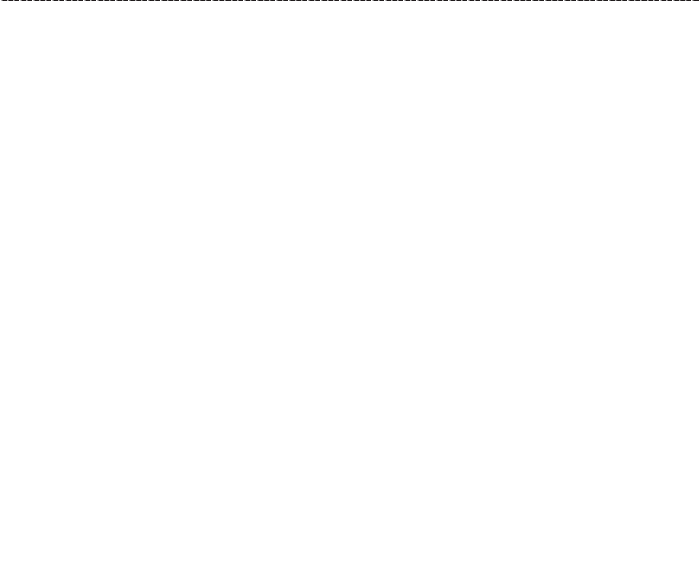
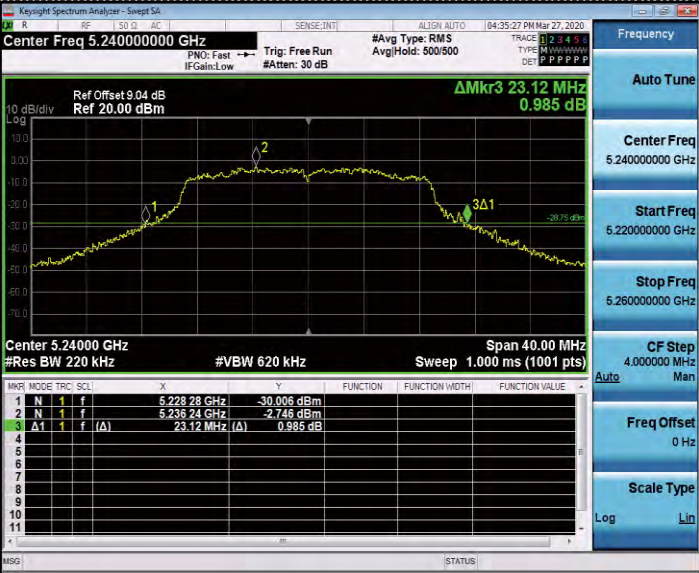
CH36

CH38



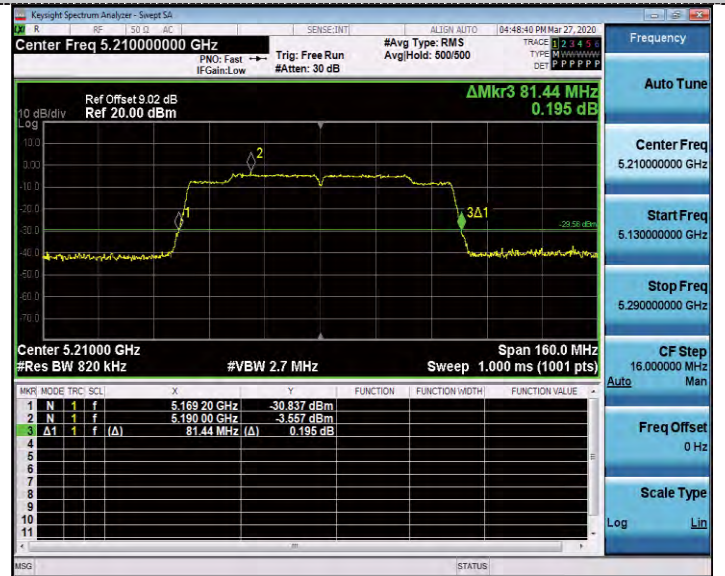
CH40

CH46



CH48

802.11ac80



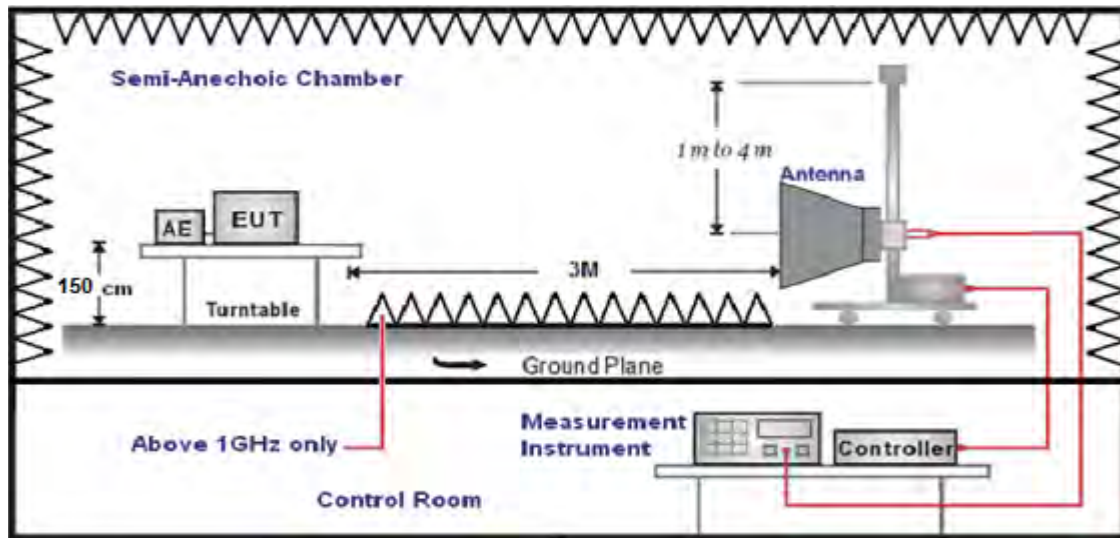
CH42



CH46

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 (dBμV/m)	Radiated (μV/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 (dBμV/m)
5150-5250	-27	68.2
5250-5350	-27	68.2
5470-5725	-27	68.2
5725-5850	-27 (beyond 10MHz of the bandedge)	68.2
	-17 (within 10 MHz of band edge)	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:

$$FS = RA + AF + CL - AG$$

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

TEST RESULTS

NOTE: We measured Radiated Emission at Antenna 0& Antenna 1 mode from 1GHz to 25GHz and the worst case was recorded(Antenna 0).

For Radiated Bandedge Measurement

802.11 ac20/ Channel 36 :5180 MHz									
Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
4500.0	35.15	35.58	29.04	8.28	49.97	68.20	-18.23	Peak	Horizontal
4500.0	30.41	35.58	29.04	8.28	45.23	54.00	-8.77	AV	Horizontal
5150.0	39.13	35.58	29.04	8.28	53.95	68.20	-14.25	Peak	Horizontal
5150.0	30.63	35.58	29.04	8.28	45.45	54.00	-8.55	AV	Horizontal

802.11 ac20/ Channel 48 :5240 MHz									
Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
5350.0	35.26	35.42	29.06	8.39	50.01	68.20	-18.19	Peak	Horizontal
5350.0	30.20	35.42	29.06	8.39	44.95	54.00	-9.05	AV	Horizontal
5460.0	39.17	35.42	29.06	8.39	53.92	68.20	-14.28	Peak	Horizontal
5460.0	30.71	35.42	29.06	8.39	45.46	54.00	-8.54	AV	Horizontal

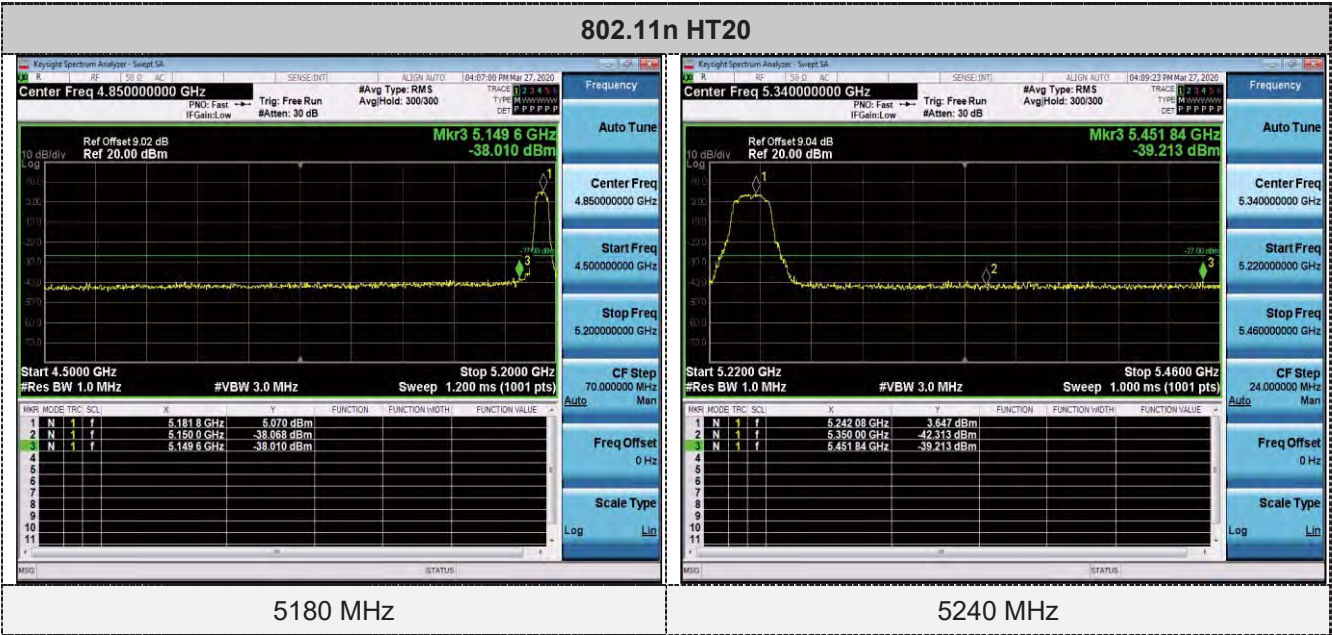
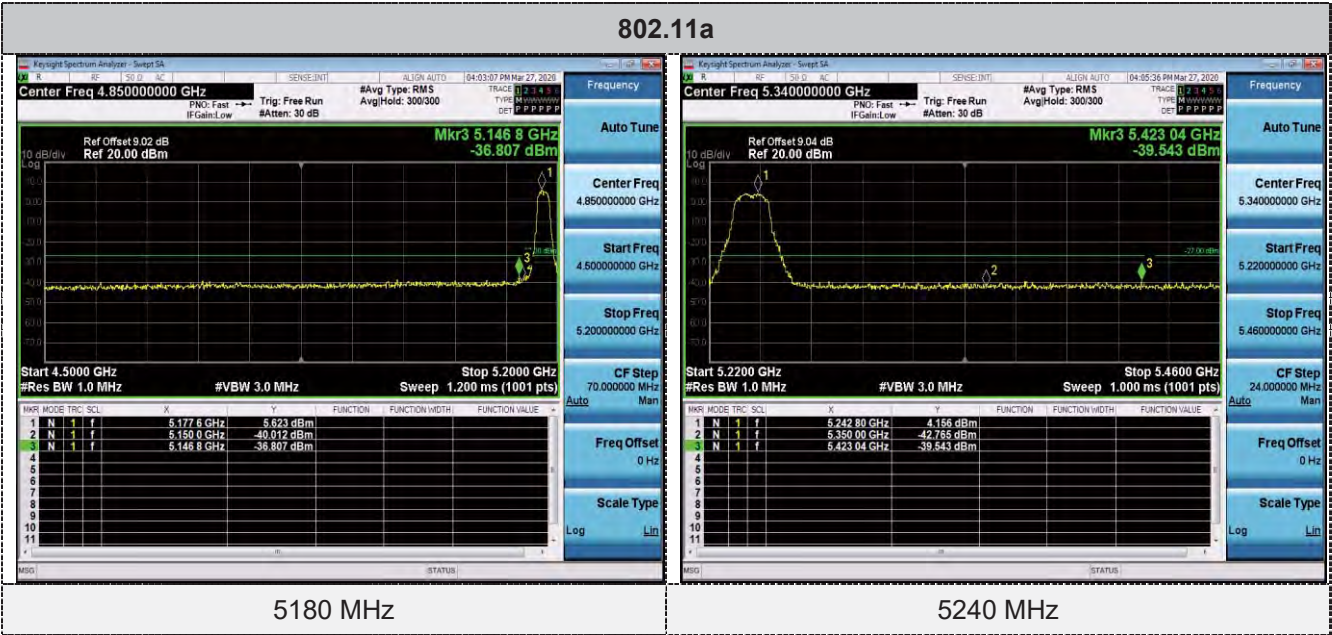
802.11 ac20/ Channel 149 :5745 MHz									
Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
5650.0	35.04	35.29	29.13	8.65	49.85	68.20	-18.35	Peak	Horizontal
5700.0	30.23	35.29	29.13	8.65	45.04	68.20	-23.16	Peak	Horizontal
5720.0	39.01	35.29	29.13	8.65	53.82	68.20	-14.38	Peak	Horizontal
5725.0	30.50	35.29	29.13	8.65	45.31	68.20	-22.89	Peak	Horizontal

802.11 ac20/ Channel 165 :5825 MHz									
Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
5850.0	35.14	35.29	29.18	8.80	50.05	68.20	-18.15	Peak	Horizontal
5855.0	30.28	35.29	29.18	8.80	45.19	68.20	-23.01	Peak	Horizontal
5875.0	38.99	35.29	29.18	8.80	53.90	68.20	-14.30	Peak	Horizontal
5925.0	30.61	35.29	29.18	8.80	45.52	68.20	-22.68	Peak	Horizontal

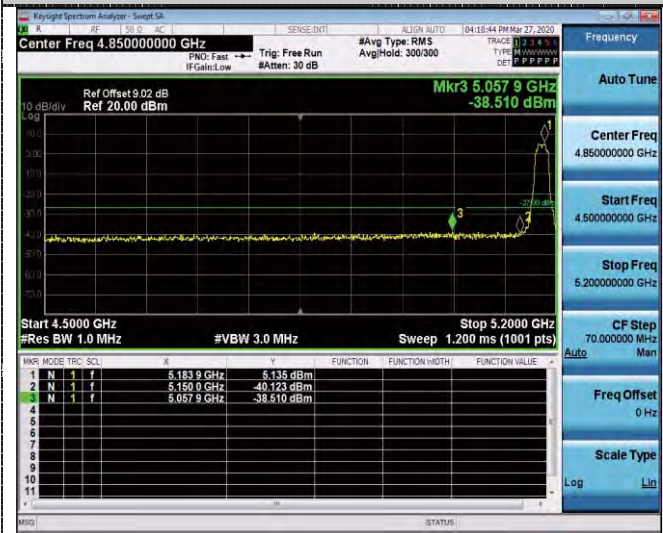
REMARKS:

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;

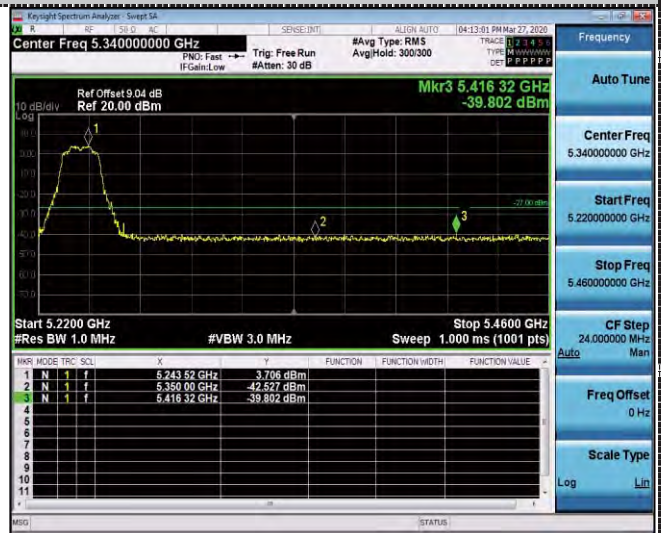
For Conducted Band edge Measurement
The test results have included the antenna gain
Antenna 0:
5150-5250MHz:



802.11ac20

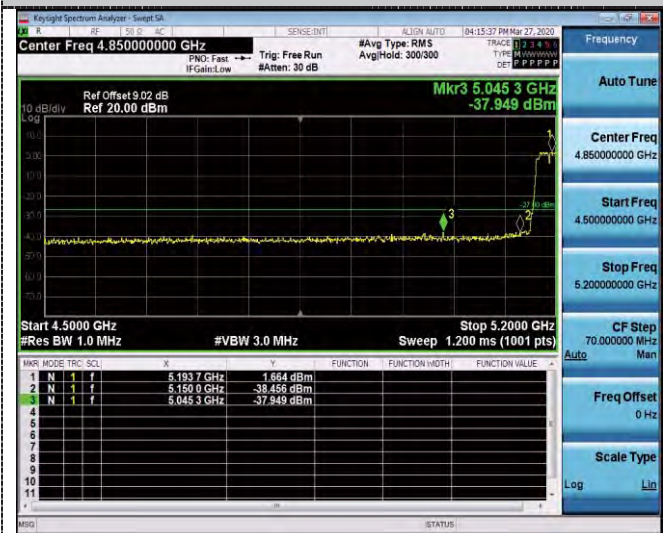


5180 MHz

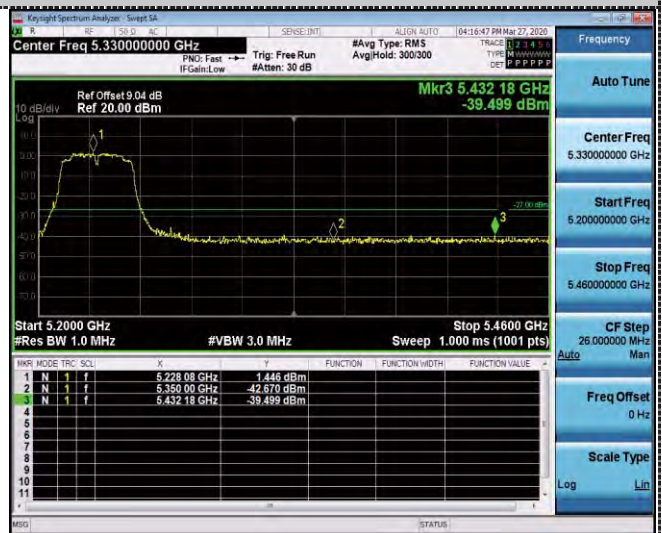


5240 MHz

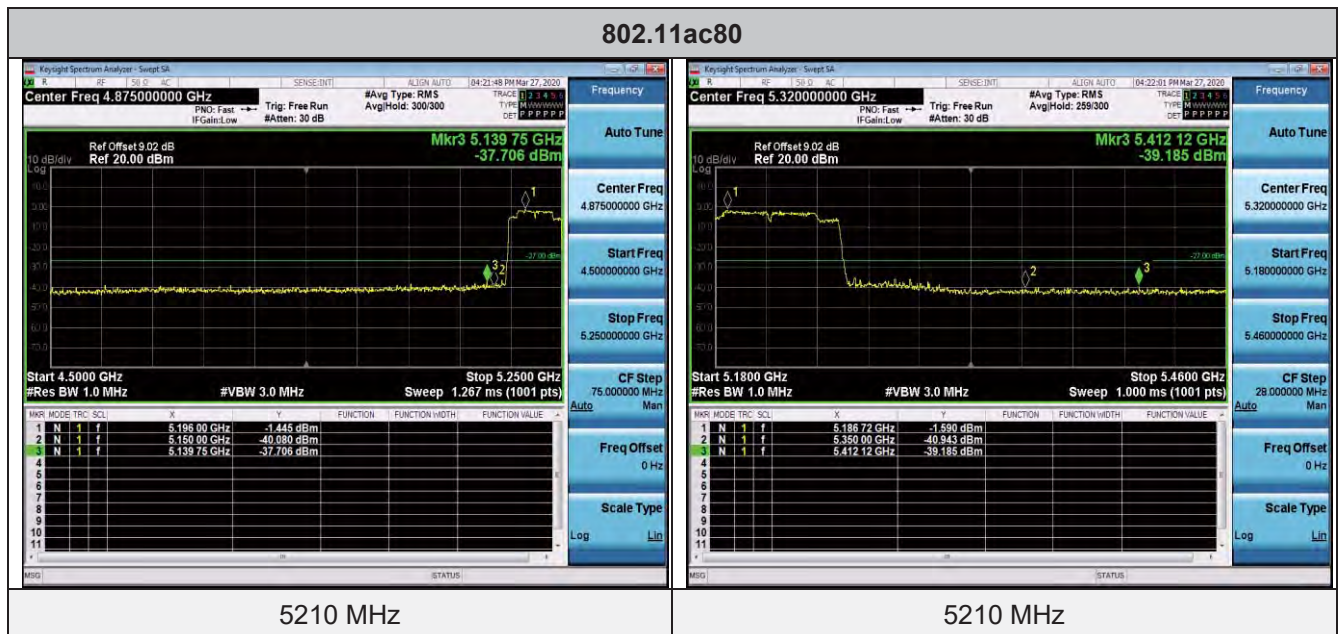
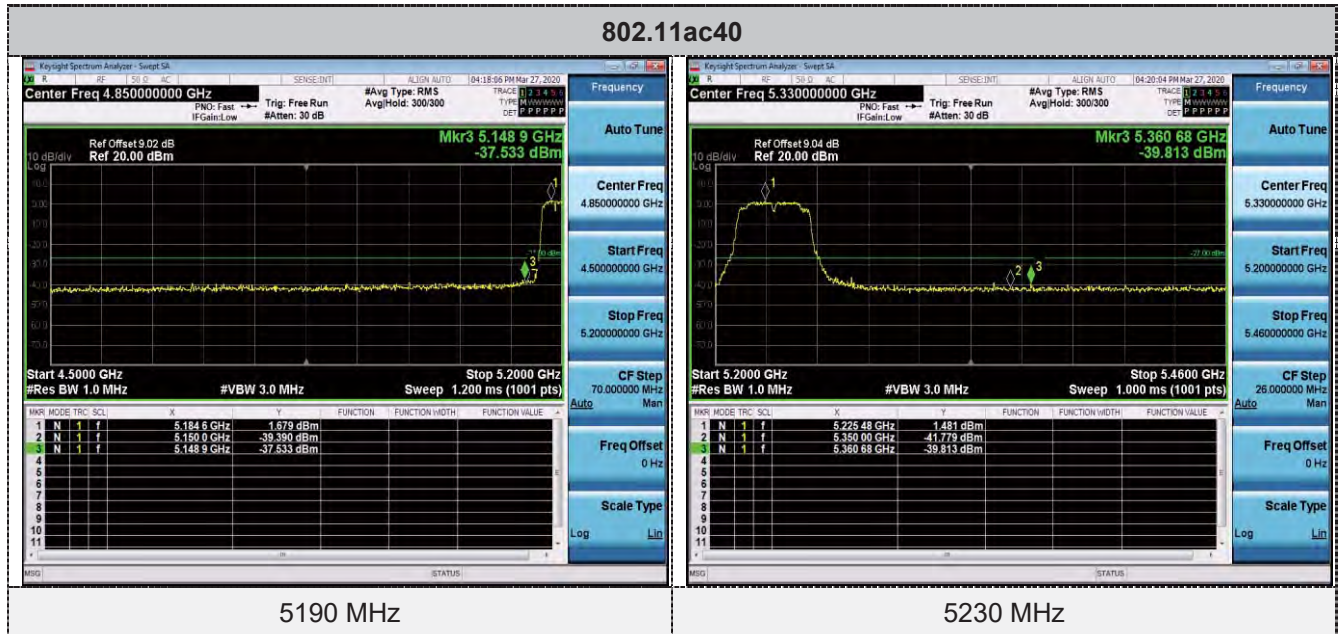
802.11n HT40



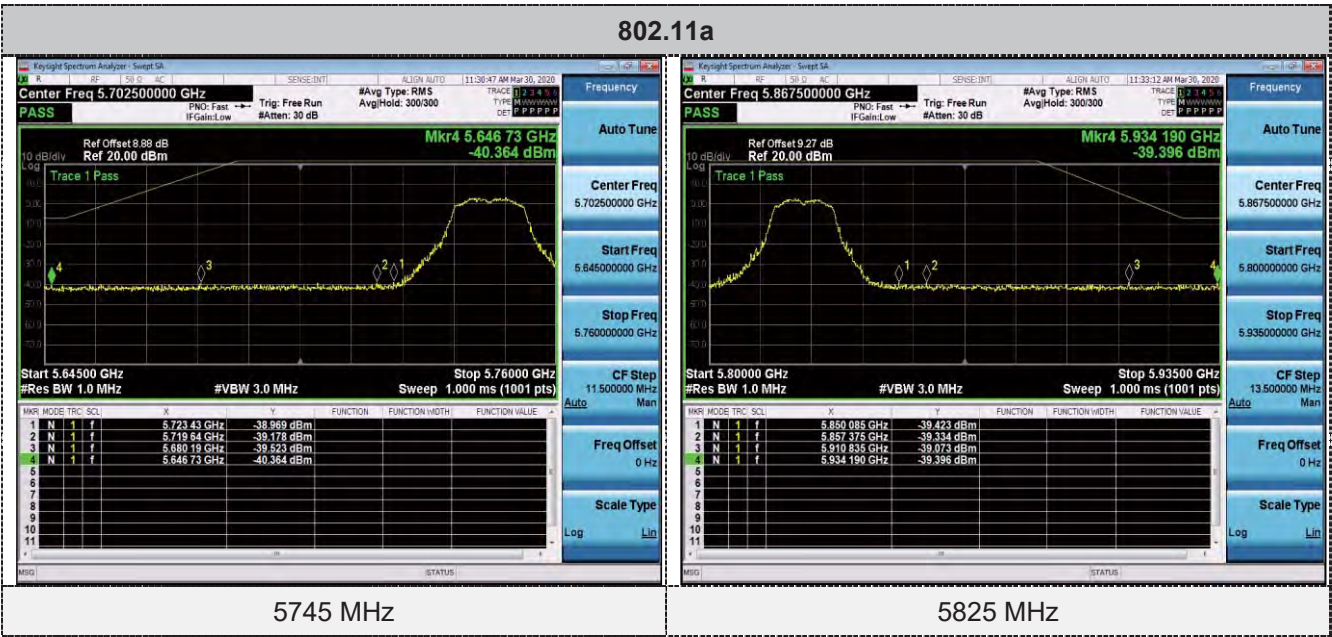
5190 MHz



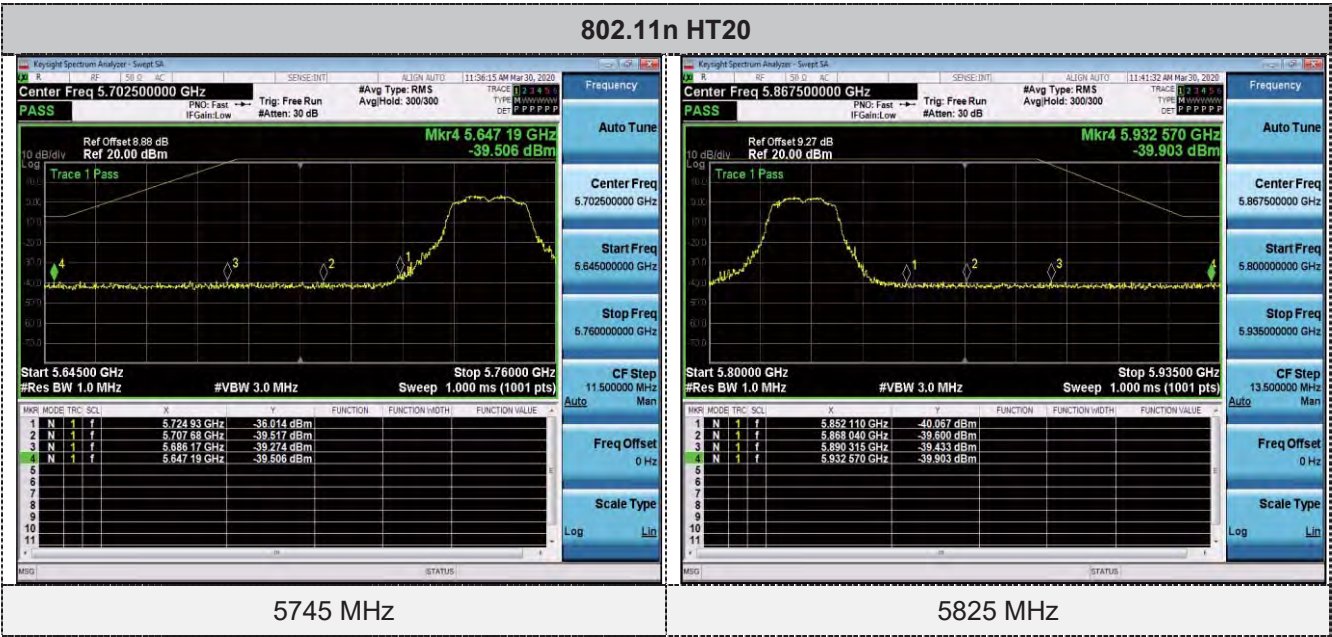
5230 MHz



5725-5850MHz:



5825 MHz



5745 MHz

Keylight Spectrum Analyzer - Sweep SA

Center Freq 5.867500000 GHz

PASS

Ref Offset 9.27 dB
Ref 20.00 dBm

Mkr4 5.932 570 GHz
-39.903 dBm

Trace 1 Pass

Start 5.80000 GHz
#Res BW 1.0 MHz

#VBW 3.0 MHz

Stop 5.93500 GHz
Sweep 1.000 ms (1001 pts)

CF Step 13.500000 MHz

Auto

Man

Frequency

Auto Tune

Center Freq 5.867500000 GHz

Start Freq 5.800000000 GHz

Stop Freq 5.935000000 GHz

Freq Offset 0 Hz

Scale Type Log

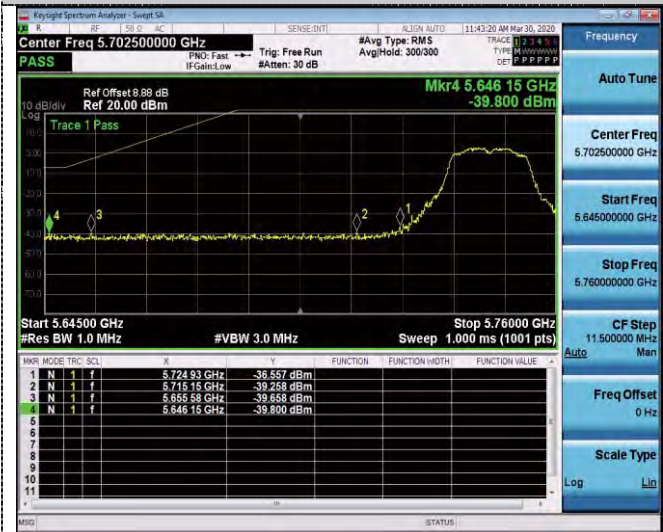
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MSO

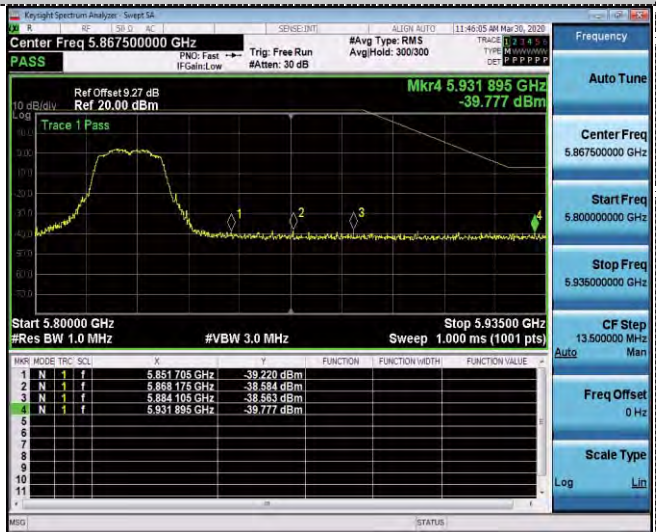
STATUS

5825 MHz

802.11ac20



5745 MHz



5825 MHz

802.11n HT40



5755 MHz

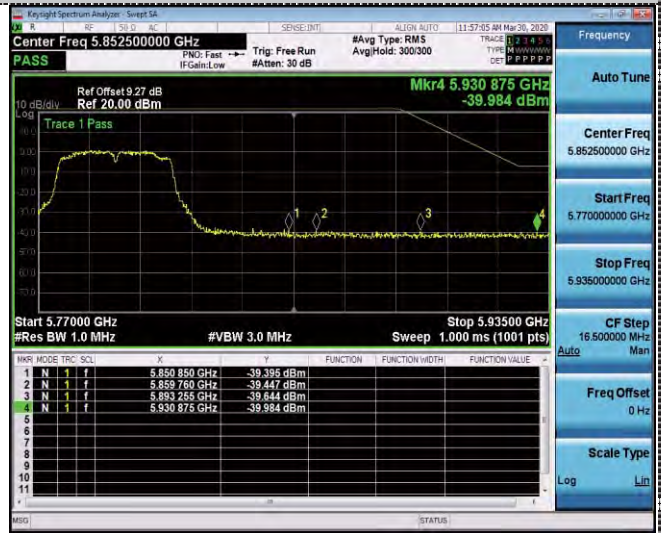


5795 MHz

802.11ac40

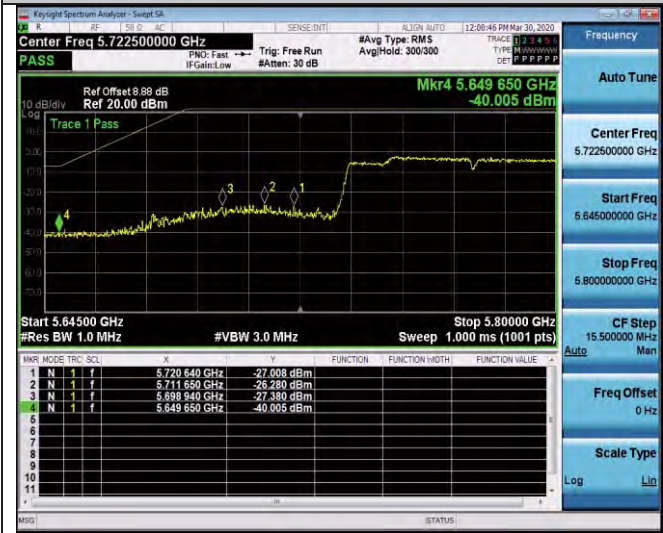


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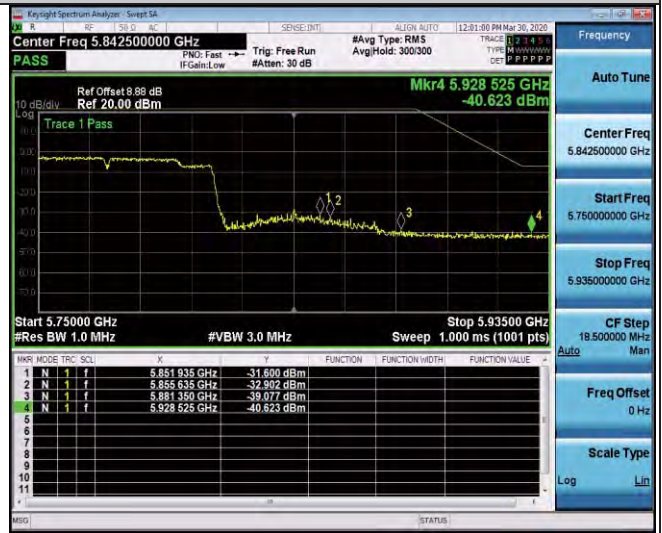


5795 MHz

802.11ac80

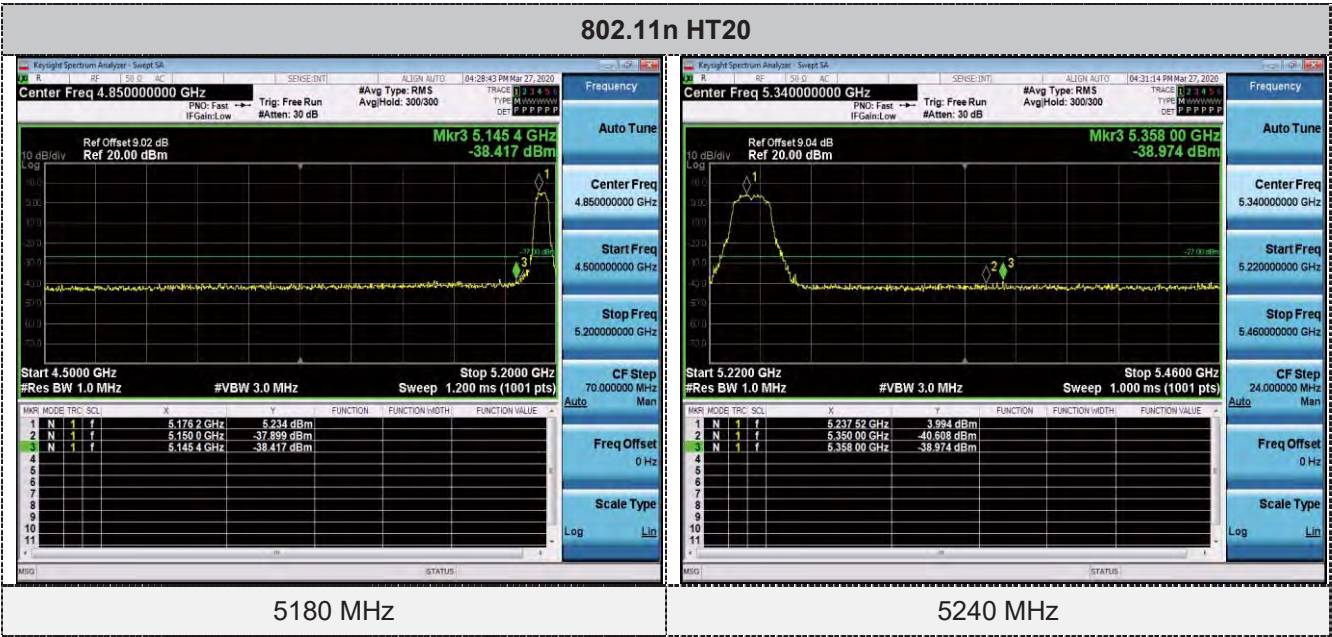
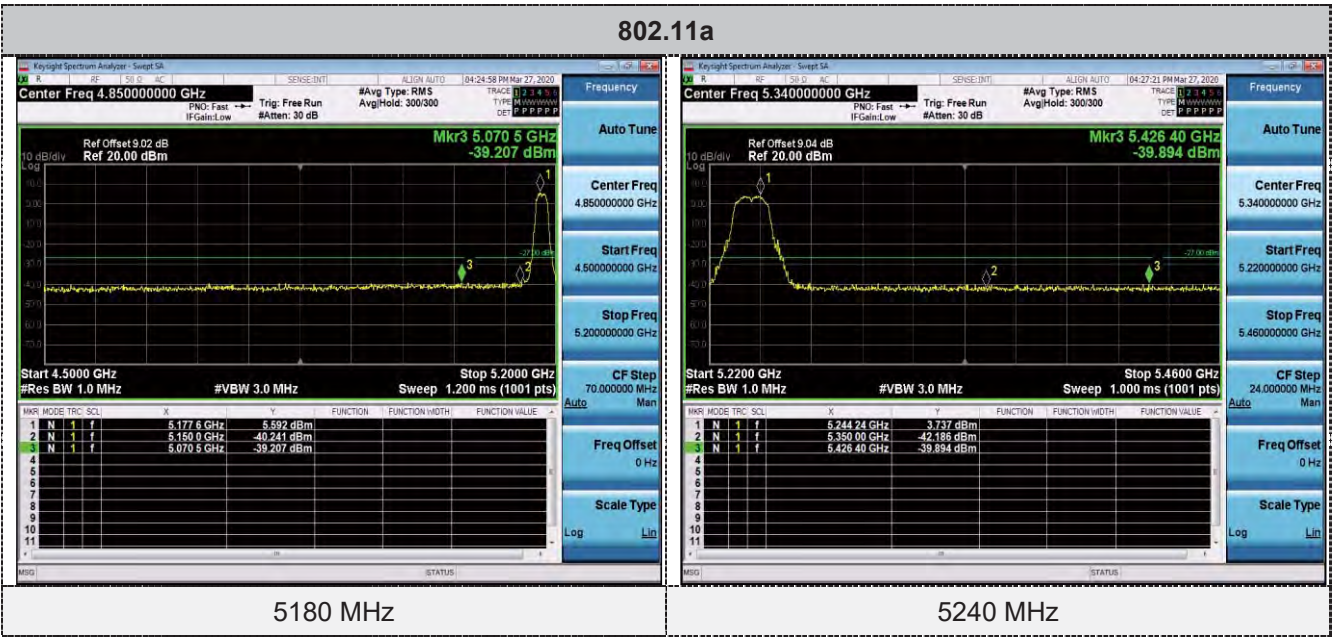


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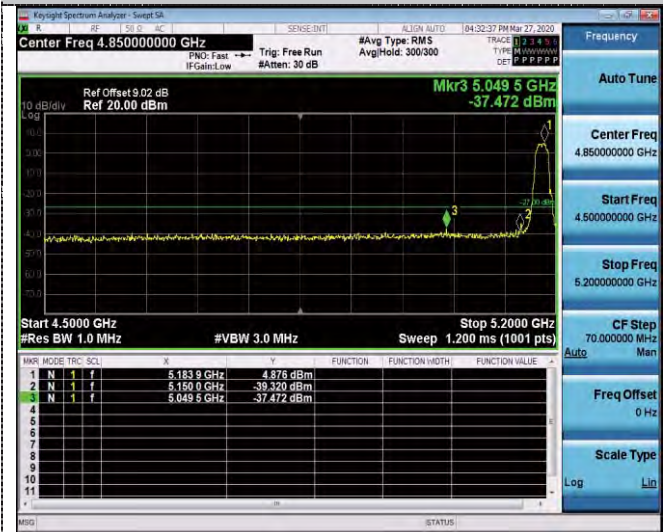


5775 MHz

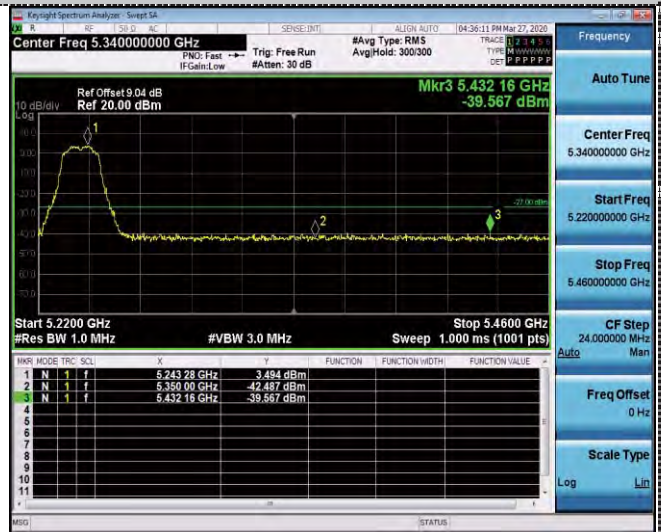
Antenna 1:
5150-5250MHz:



802.11ac20

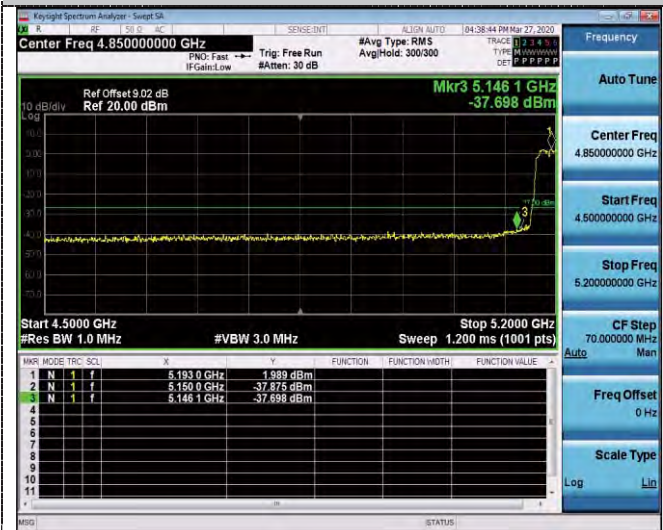


5180 MHz

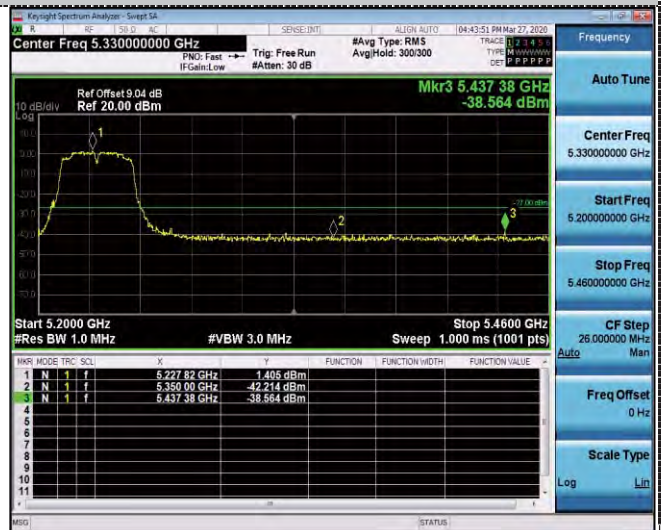


5240 MHz

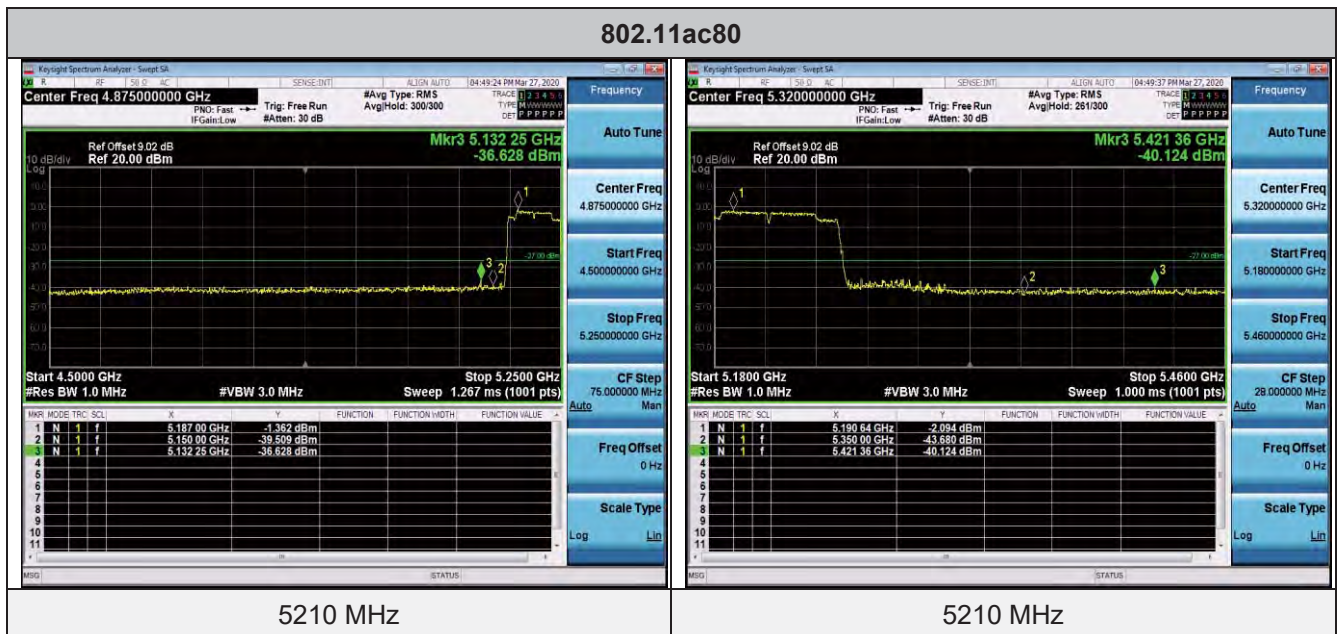
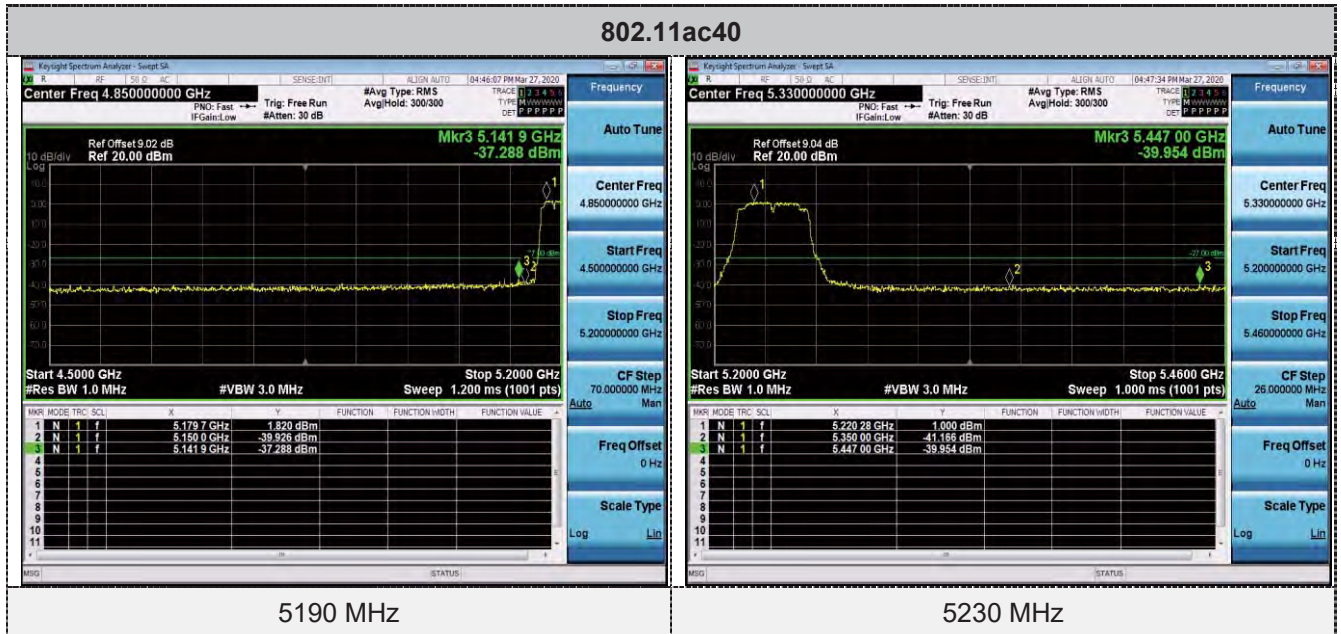
802.11n HT40



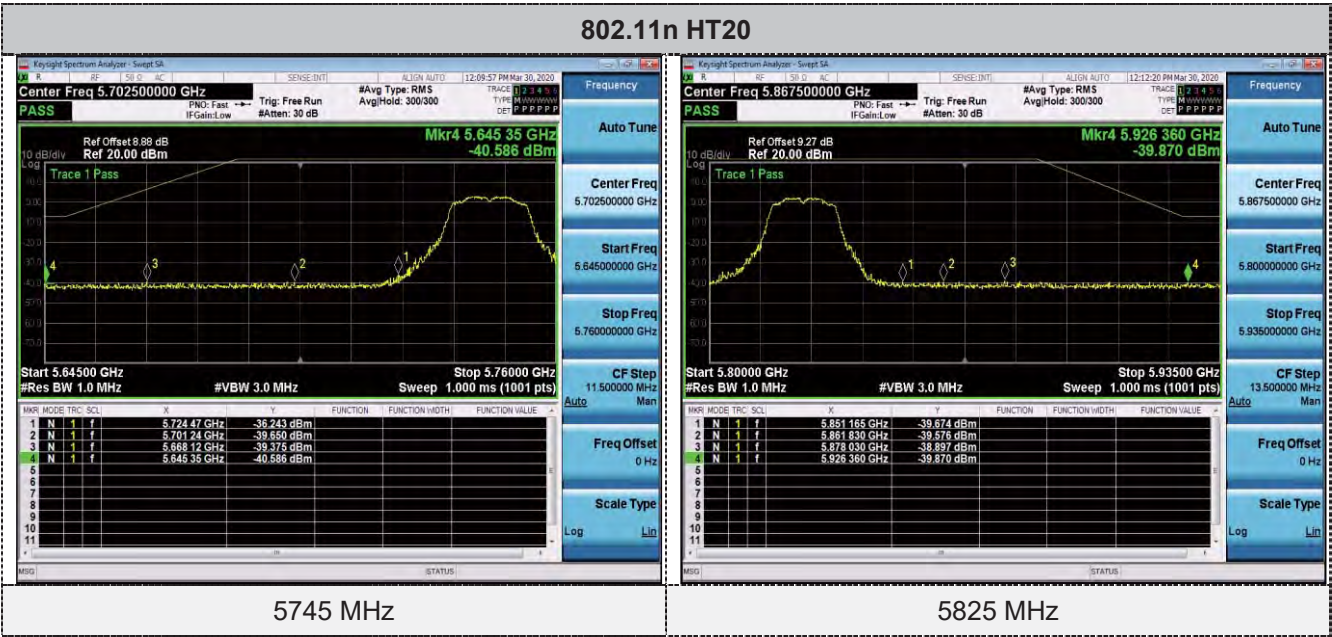
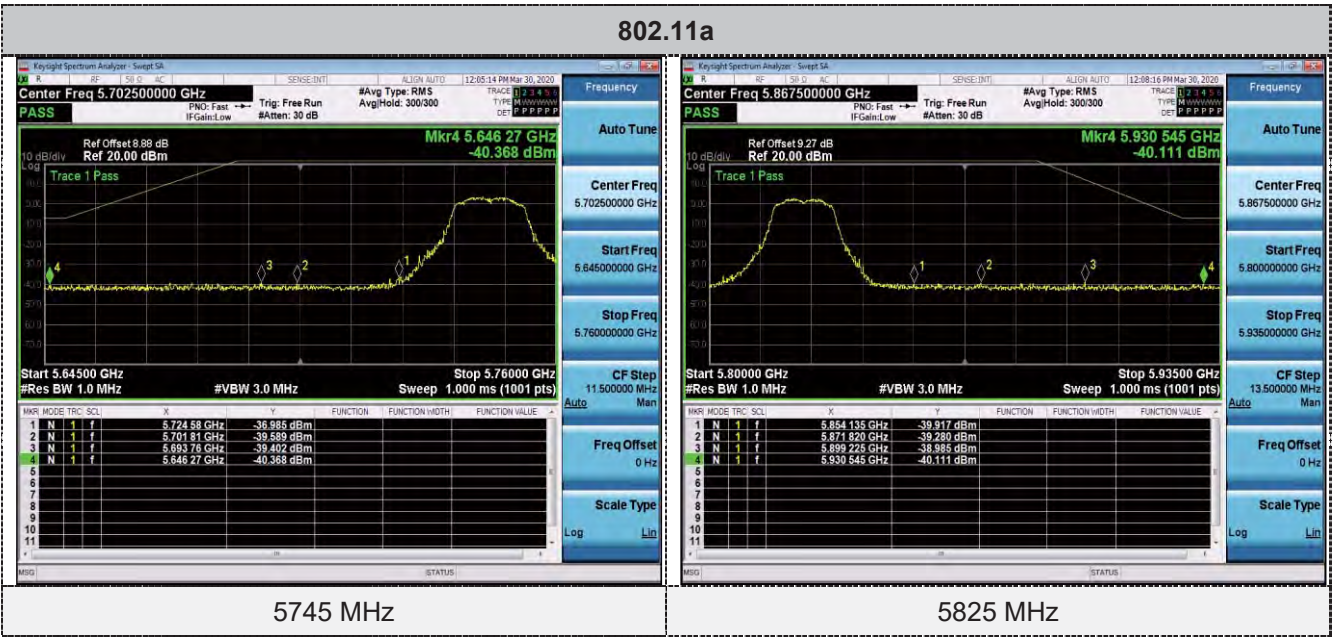
5190 MHz



5230 MHz



5725-5850MHz:



Keylight Spectrum Analyzer - Sweep SA

Center Freq 5.867500000 GHz

PASS

Ref Offset 9.27 dB
Ref 20.00 dBm

Trace 1 Pass

Mkr4 5.926 360 GHz
-39.870 dBm

Start 5.80000 GHz
#Res BW 1.0 MHz

#VBW 3.0 MHz

Sweep 1.000 ms (1001 pts)

CF Step 13.500000 MHz

Auto

Man

Frequency

Auto Tune

Center Freq 5.867500000 GHz

Start Freq 5.800000000 GHz

Stop Freq 5.935000000 GHz

Freq Offset 0 Hz

Scale Type Log

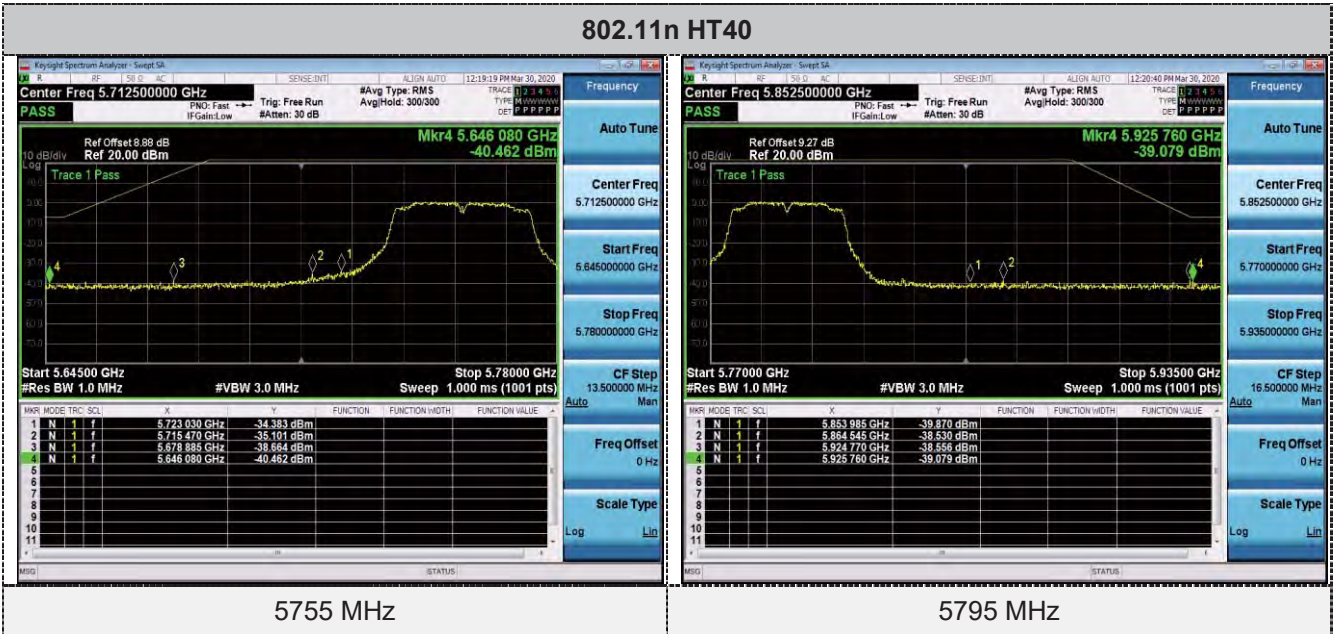
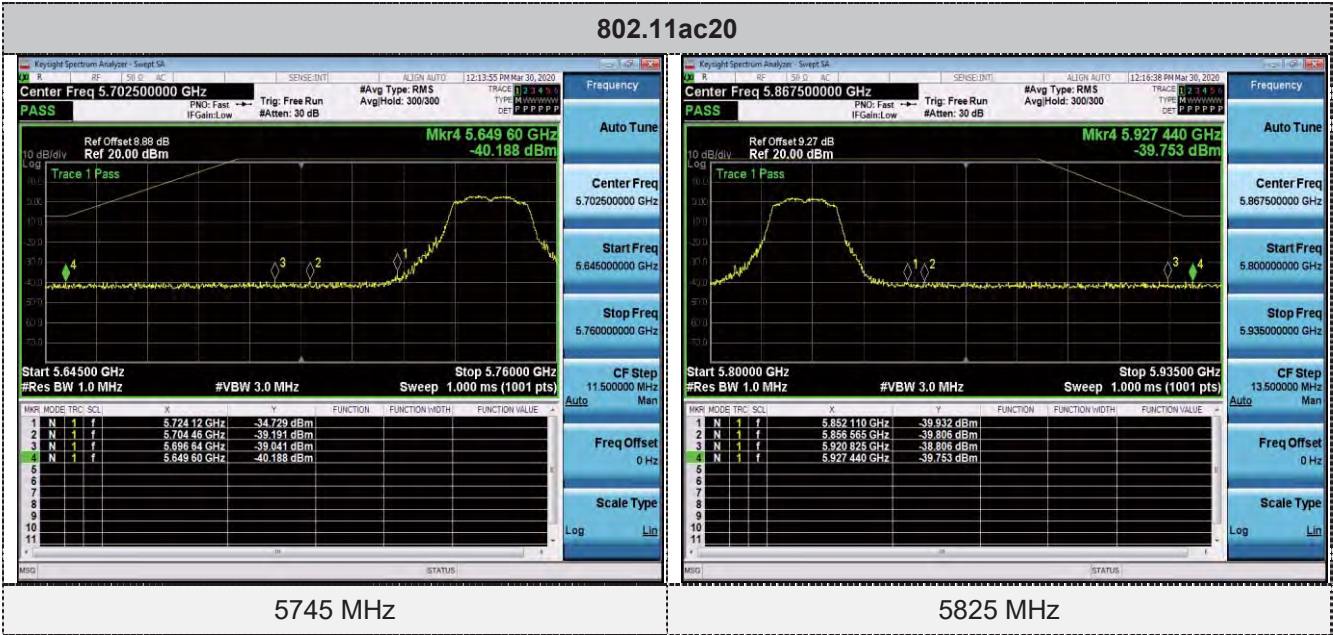
Lin

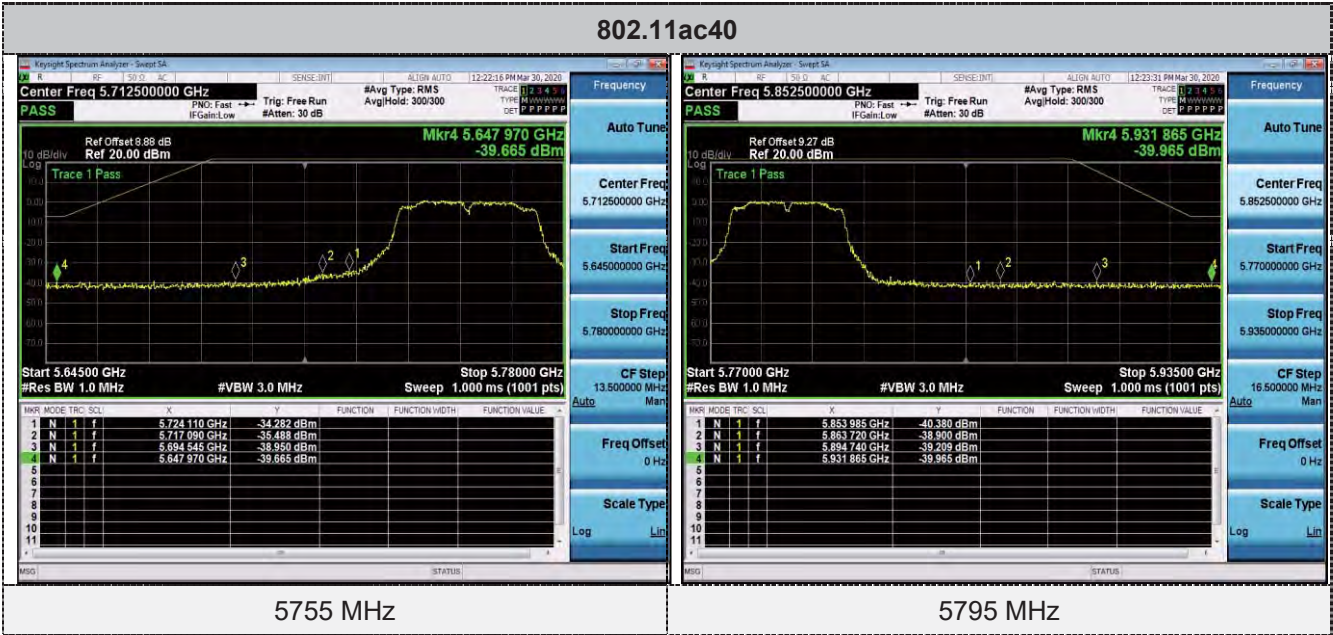
MSO

STATUS

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	5.851 185 GHz	-39.674 dBm			
2	N	1	f	5.881 830 GHz	-39.576 dBm			
3	N	1	f	5.878 030 GHz	-38.897 dBm			
4	N	1	f	5.926 360 GHz	-39.870 dBm			

5825 MHz





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 FPC antenna, through the buckle stretched out, The directional gains of antenna used for transmitting is 1.98dBi.

Reference to the Test Report: **GTS20200303006-1-1**

5. TEST SETUP PHOTOS OF THE EUT

Reference to the test report No. GTS20200303006-1-1

6. EXTERNAL AND INTERNAL PHOTOS OF THE EUT

Reference to the test report No. GTS20200303006-1-1

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