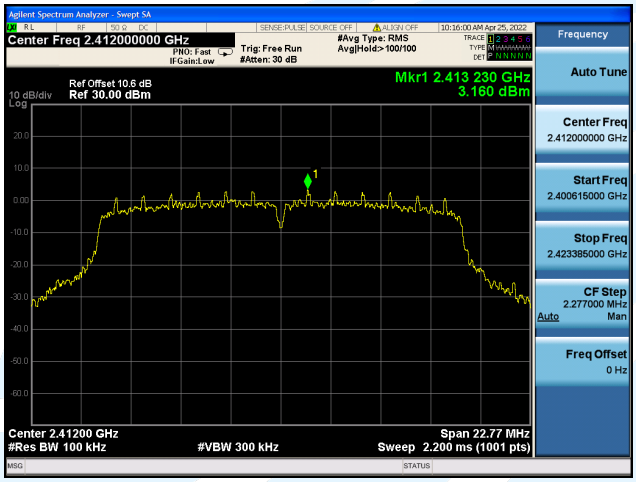
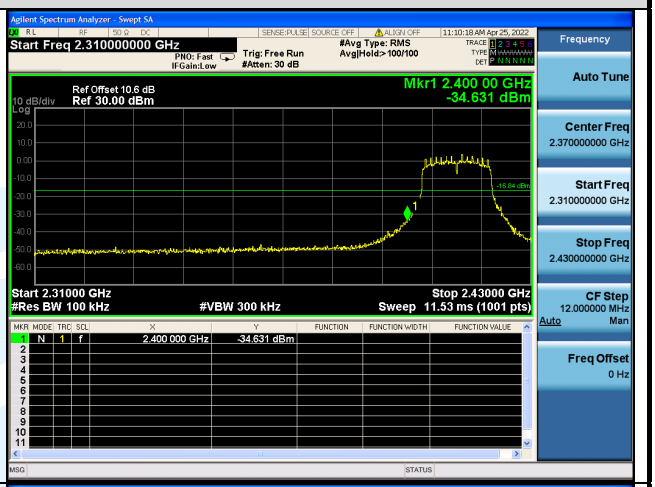
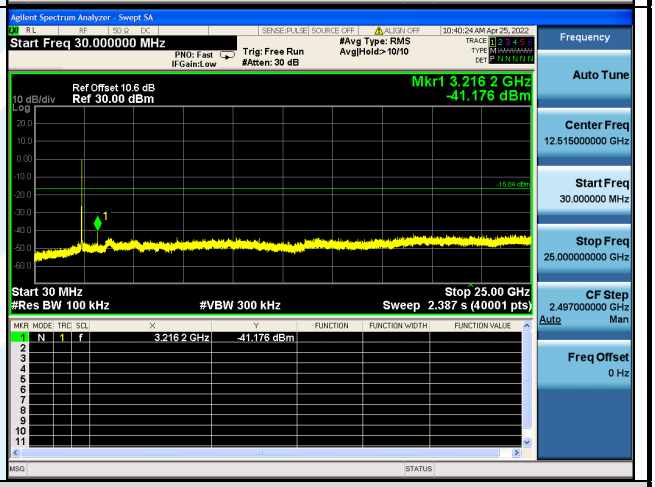
IEEE 802.11g

In-Band Reference Level	Out of Band Emission

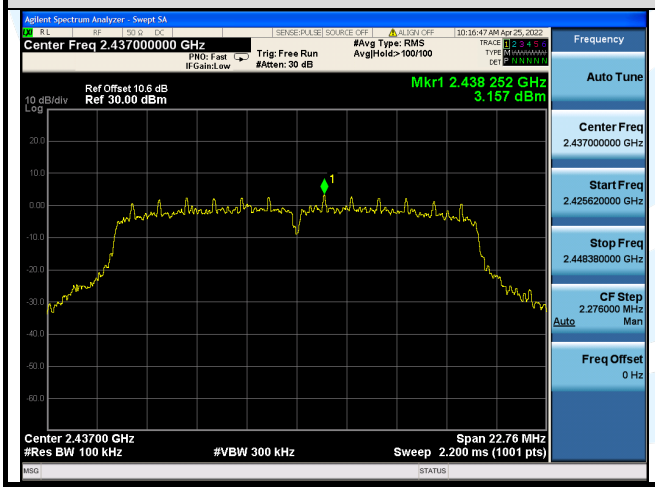
Channel 1

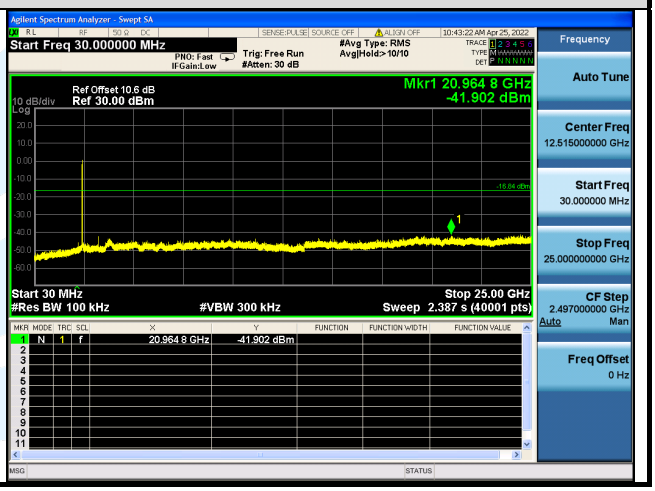






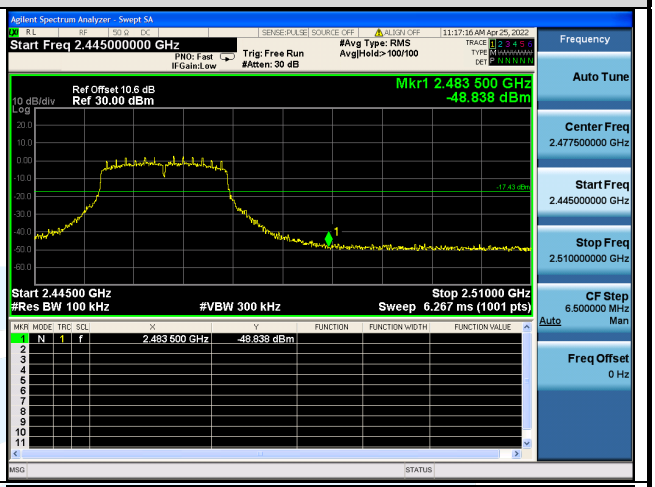
Channel 6

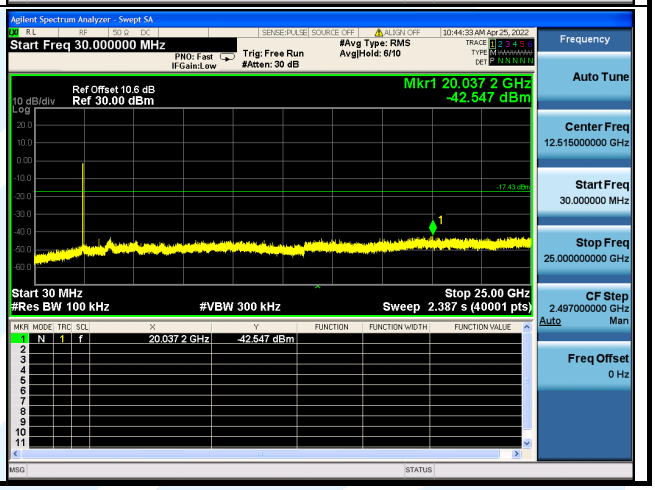




Channel 11

Agilent Spectrum Analyzer - Swept SA
Center Freq 2.462000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold:>100/100
10:17:46 AM Apr 25, 2022
Ref Offset 10.6 dB
10 dB/div
Ref 30.00 dBm
Mkr1 2.463 252 GHz
2.574 dBm
Center 2.46200 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 22.77 MHz
Sweep 2.200 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.462000000 GHz
Start Freq
2.450615000 GHz
Stop Freq
2.473385000 GHz
CF Step
2.277000 MHz
Auto
Man
Freq Offset
0 Hz

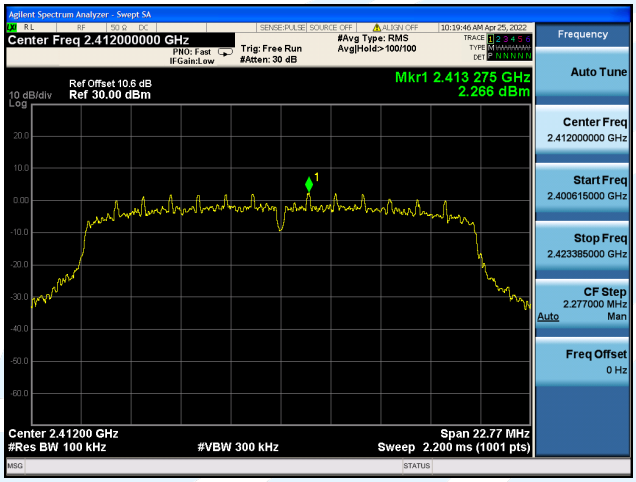

Agilent Spectrum Analyzer - Swept SA
Start Freq 2.445000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold:>100/100
11:17:16 AM Apr 25, 2022
Ref Offset 10.6 dB
10 dB/div
Ref 30.00 dBm
Mkr1 2.483 500 GHz
-48.838 dBm
Start 2.44500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.51000 GHz
Sweep 6.267 ms (1001 pts)
2.483 500 GHz
-48.838 dBm
Frequency
Auto Tune
Center Freq
2.477500000 GHz
Start Freq
2.445000000 GHz
Stop Freq
2.510000000 GHz
CF Step
6.500000 MHz
Auto
Man
Freq Offset
0 Hz

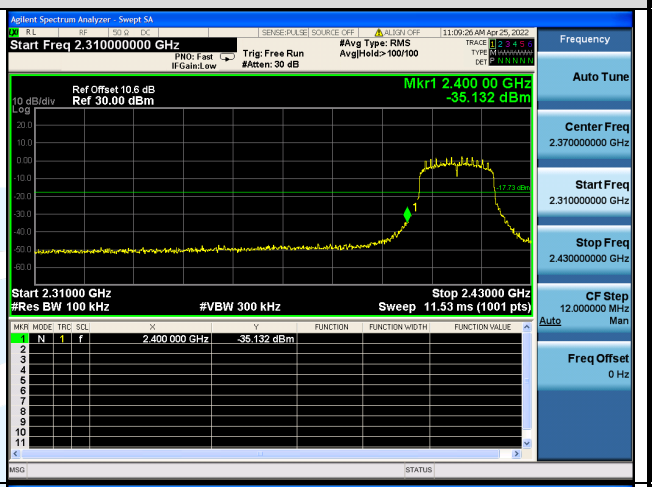

Agilent Spectrum Analyzer - Swept SA
Start Freq 30.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 6/10
10:44:33 AM Apr 25, 2022
Ref Offset 10.6 dB
10 dB/div
Ref 30.00 dBm
Mkr1 20.037 2 GHz
-42.547 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.00 GHz
Sweep 2.387 s (40001 pts)
20.037 2 GHz
-42.547 dBm
Frequency
Auto Tune
Center Freq
12.515000000 GHz
Start Freq
30.000000 MHz
Stop Freq
25.000000000 GHz
CF Step
2.497000000 GHz
Auto
Man
Freq Offset
0 Hz

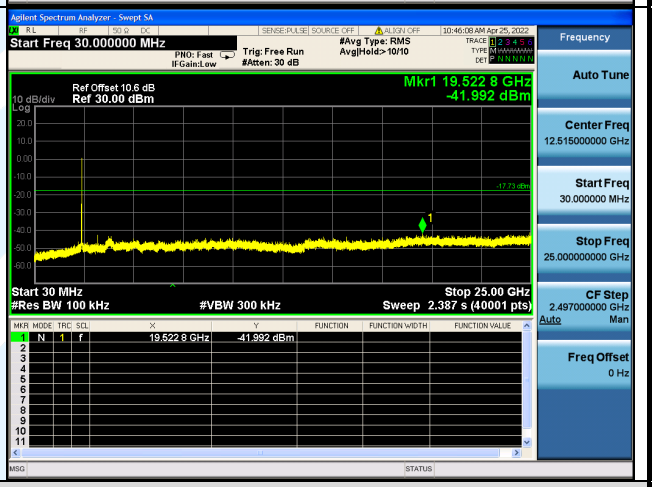
IEEE 802.11n-HT20

In-Band Reference Level	Out of Band Emission

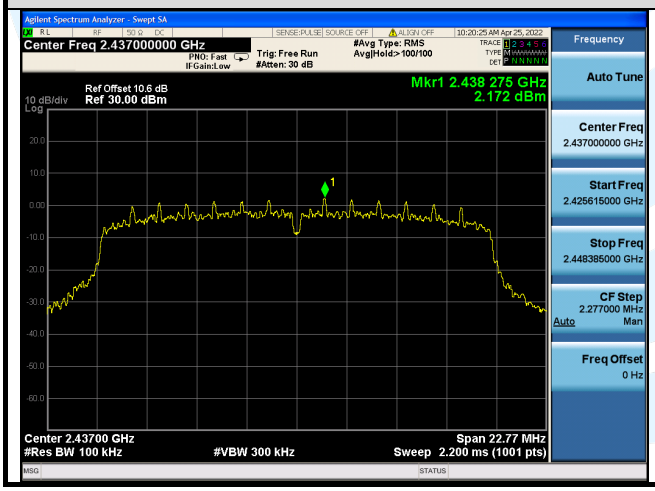
Channel 1

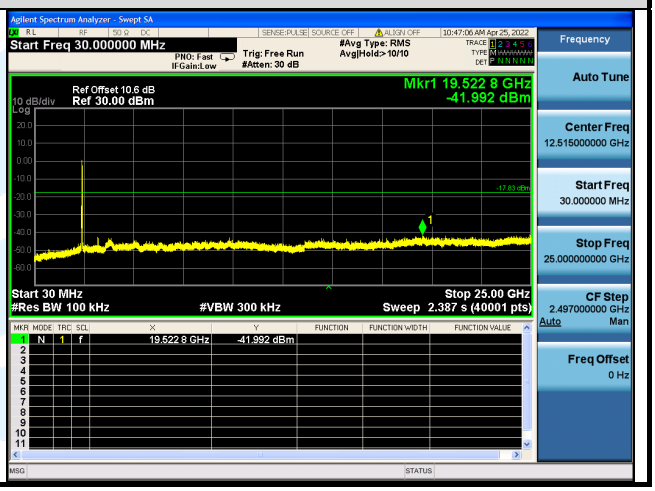






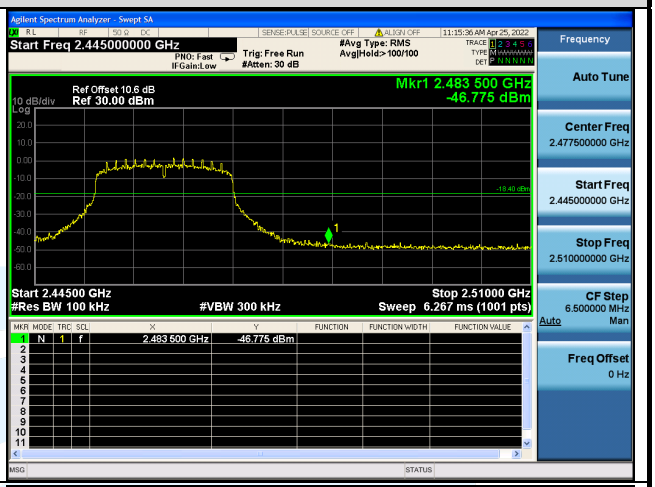
Channel 6

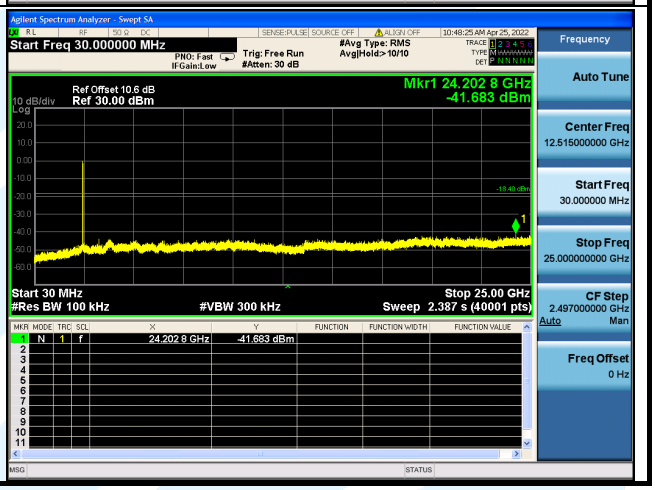




Channel 11

Agilent Spectrum Analyzer - Swept SA
Center Freq 2.462000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold:>100/100
10:21:03 AM Apr 25, 2022
Ref Offset 10.6 dB
10 dB/div
Ref 30.00 dBm
Mkr1 2.463 252 GHz
1.601 dBm
Center 2.46200 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 22.77 MHz
Sweep 2.200 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.462000000 GHz
Start Freq
2.450615000 GHz
Stop Freq
2.473385000 GHz
CF Step
2.277000 MHz
Auto
Man
Freq Offset
0 Hz

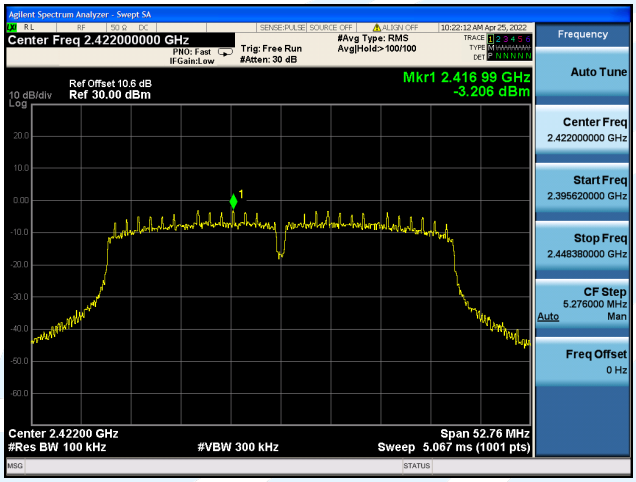

Agilent Spectrum Analyzer - Swept SA
Start Freq 2.445000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold:>100/100
11:15:36 AM Apr 25, 2022
Ref Offset 10.6 dB
10 dB/div
Ref 30.00 dBm
Mkr1 2.483 500 GHz
-46.775 dBm
Start 2.44500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.51000 GHz
Sweep 6.267 ms (1001 pts)
1 N 1 f 2.483 500 GHz -46.775 dBm
Frequency
Auto Tune
Center Freq
2.477500000 GHz
Start Freq
2.445000000 GHz
Stop Freq
2.510000000 GHz
CF Step
6.500000 MHz
Auto
Man
Freq Offset
0 Hz

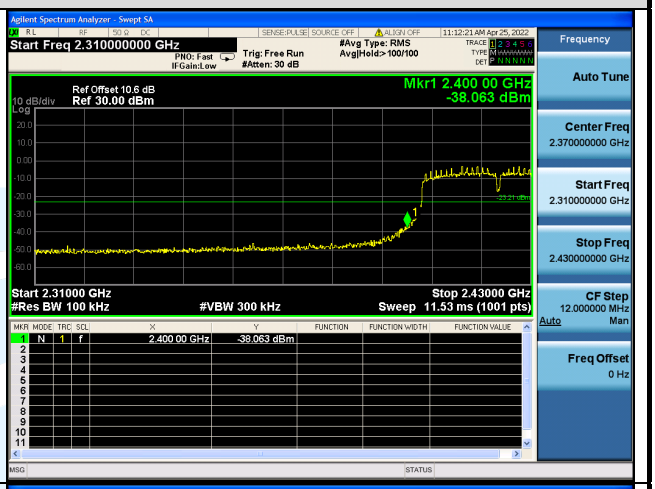

Agilent Spectrum Analyzer - Swept SA
Start Freq 30.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold:>10/10
10:48:25 AM Apr 25, 2022
Ref Offset 10.6 dB
10 dB/div
Ref 30.00 dBm
Mkr1 24.202 8 GHz
-41.683 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.00 GHz
Sweep 2.387 s (40001 pts)
1 N 1 f 24.202 8 GHz -41.683 dBm
Frequency
Auto Tune
Center Freq
12.515000000 GHz
Start Freq
30.000000 MHz
Stop Freq
25.000000000 GHz
CF Step
2.497000000 GHz
Auto
Man
Freq Offset
0 Hz

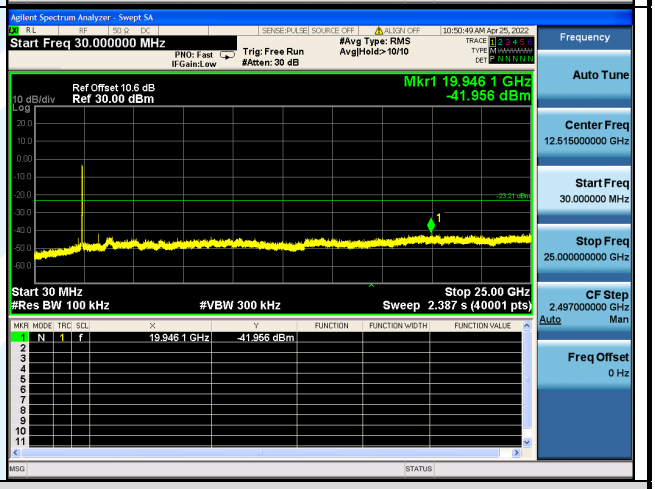
IEEE 802.11n-HT40

In-Band Reference Level	Out of Band Emission

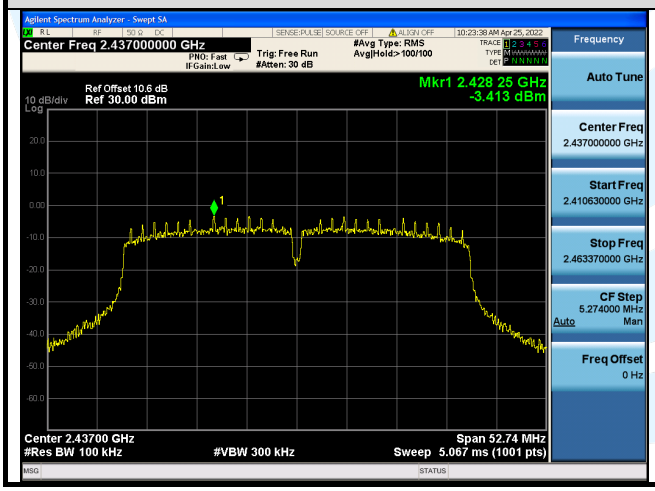
Channel 3

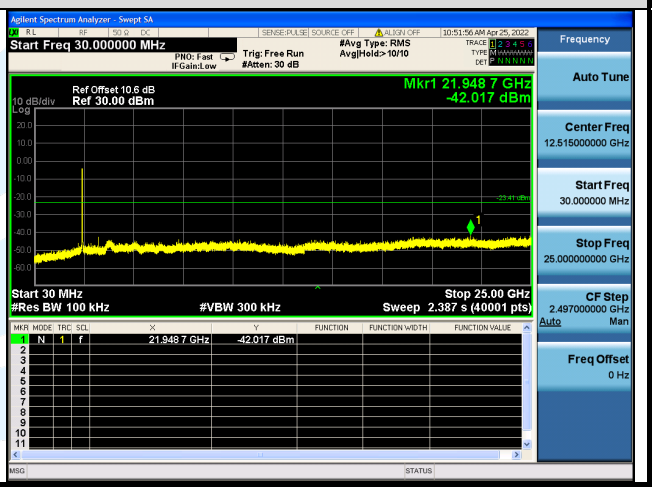




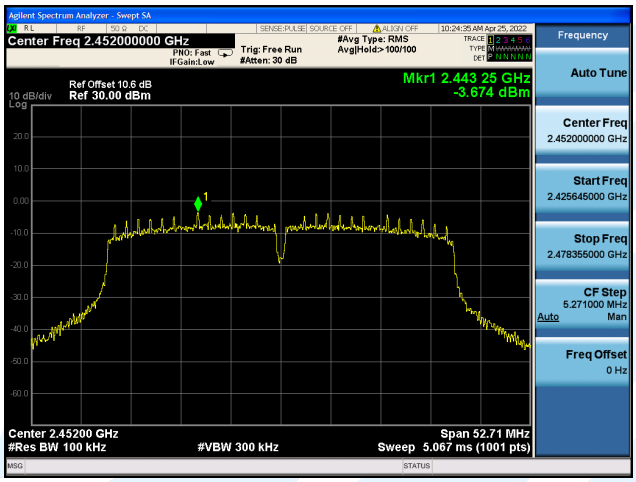


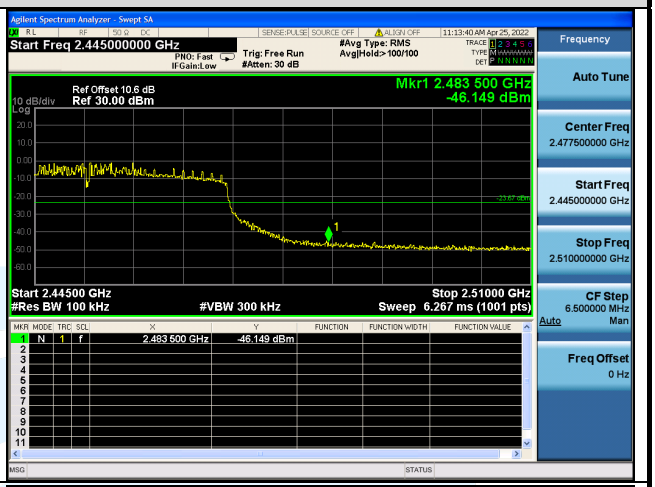
Channel 6

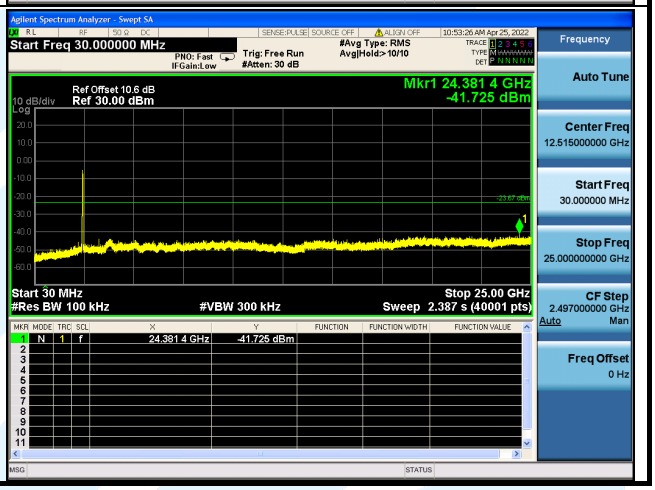




Channel 9


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.452000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold:>100/100
10:24:35 AM Apr 25, 2022
Ref Offset 10.6 dB
10 dB/div
Ref 30.00 dBm
Mkr1 2.443 25 GHz
-3.674 dBm
Center 2.45200 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 52.71 MHz
Sweep 5.067 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.452000000 GHz
Start Freq
2.425645000 GHz
Stop Freq
2.478355000 GHz
CF Step
5.271000 MHz
Auto
Man
Freq Offset
0 Hz


Agilent Spectrum Analyzer - Swept SA
Start Freq 2.445000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold:>100/100
11:13:40 AM Apr 25, 2022
Ref Offset 10.6 dB
10 dB/div
Ref 30.00 dBm
Mkr1 2.483 500 GHz
-46.149 dBm
Start 2.44500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.51000 GHz
Sweep 6.267 ms (1001 pts)
1 N 1 f 2.483 500 GHz -46.149 dBm
Frequency
Auto Tune
Center Freq
2.477500000 GHz
Start Freq
2.445000000 GHz
Stop Freq
2.510000000 GHz
CF Step
6.500000 MHz
Auto
Man
Freq Offset
0 Hz


Agilent Spectrum Analyzer - Swept SA
Start Freq 30.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold:>10/10
10:53:26 AM Apr 25, 2022
Ref Offset 10.6 dB
10 dB/div
Ref 30.00 dBm
Mkr1 24.381 4 GHz
-41.725 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.00 GHz
Sweep 2.387 s (40001 pts)
1 N 1 f 24.381 4 GHz -41.725 dBm
Frequency
Auto Tune
Center Freq
12.515000000 GHz
Start Freq
30.000000 MHz
Stop Freq
25.000000000 GHz
CF Step
2.497000000 GHz
Auto
Man
Freq Offset
0 Hz

5.7 RADIATED SPURIOUS EMISSIONS

Test Requirement: FCC 47 CFR Part 15 Subpart C Section 15.205/15.209
RSS-Gen Issue 5, Section 6.13/8.9/8.10

Test Method: ANSI C63.10-2013 Clause 11.11 & Clause 11.12

Receiver Setup:

Frequency	RBW
0.009 MHz-0.150 MHz	200/300 kHz
0.150 MHz -30 MHz	9/10 kHz
30 MHz-1 GHz	100/120 kHz
Above 1 GHz	1 MHz

Limits:

Spurious Emissions

Frequency	Field strength (microvolt/meter)	Limit (dBμV/m)	Remark	Measurement distance (m)
0.009 MHz-0.490 MHz	2400/F(kHz)	--	--	300
0.490 MHz-1.705 MHz	24000/F(kHz)	--	--	30
1.705 MHz-30 MHz	30	--	--	30
30 MHz-88 MHz	100	40.0	Quasi-peak	3
88 MHz-216 MHz	150	43.5	Quasi-peak	3
216 MHz-960 MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1 GHz	500	54.0	Average	3

Remark:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

Test Setup: Refer to section 4.4.1 for details.

Test Procedures:

1. From 30 MHz to 1GHz test procedure as below:

1) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3) The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rota table table was turned from 0 degrees to 360 degrees to find the maximum reading.
5) The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6) If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

2. Above 1GHz test procedure as below:

1) Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter (Above 18GHz the distance is 1 meter and table is 1.5 meter).

2) Test the EUT in the lowest channel, middle channel, the Highest channel
3) The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the Y axis positioning which it is worse case.
4) Repeat above procedures until all frequencies measured was complete.

Equipment Used: Refer to section 3 for details.

Test Result: Pass

The measurement data as follows:

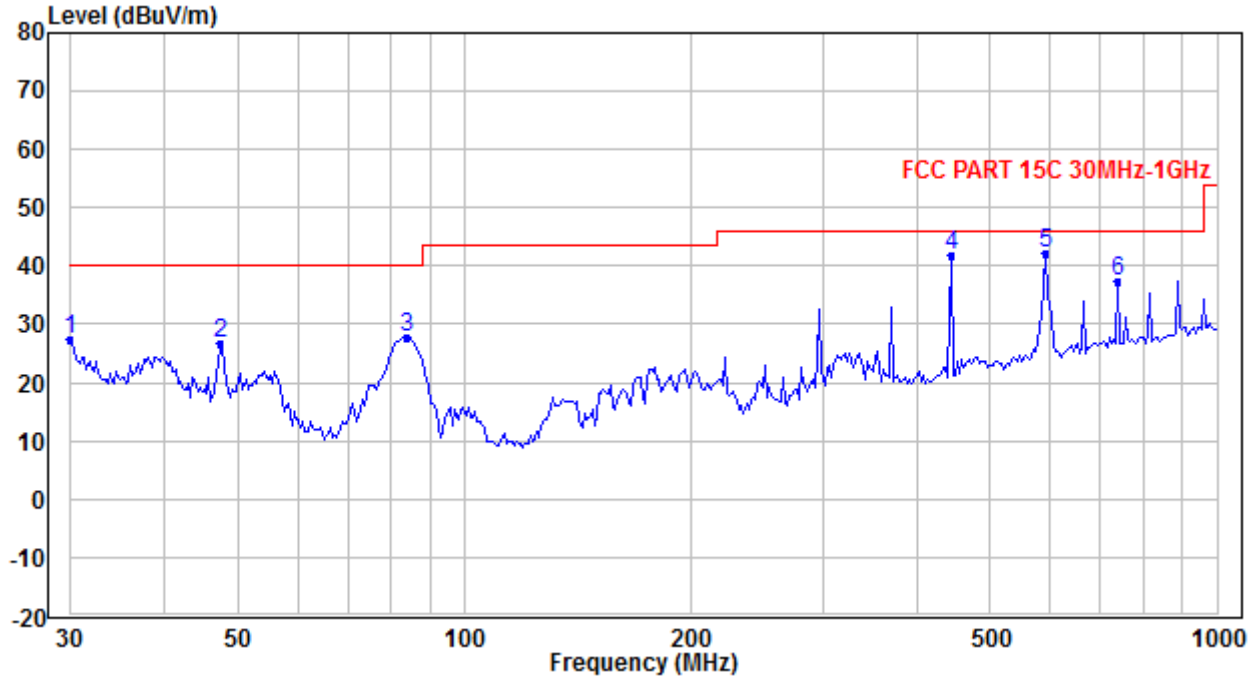
Radiated Emission Test Data (9 kHz ~ 30 MHz):

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

Radiated Emission Test Data (30 MHz ~ 1 GHz):

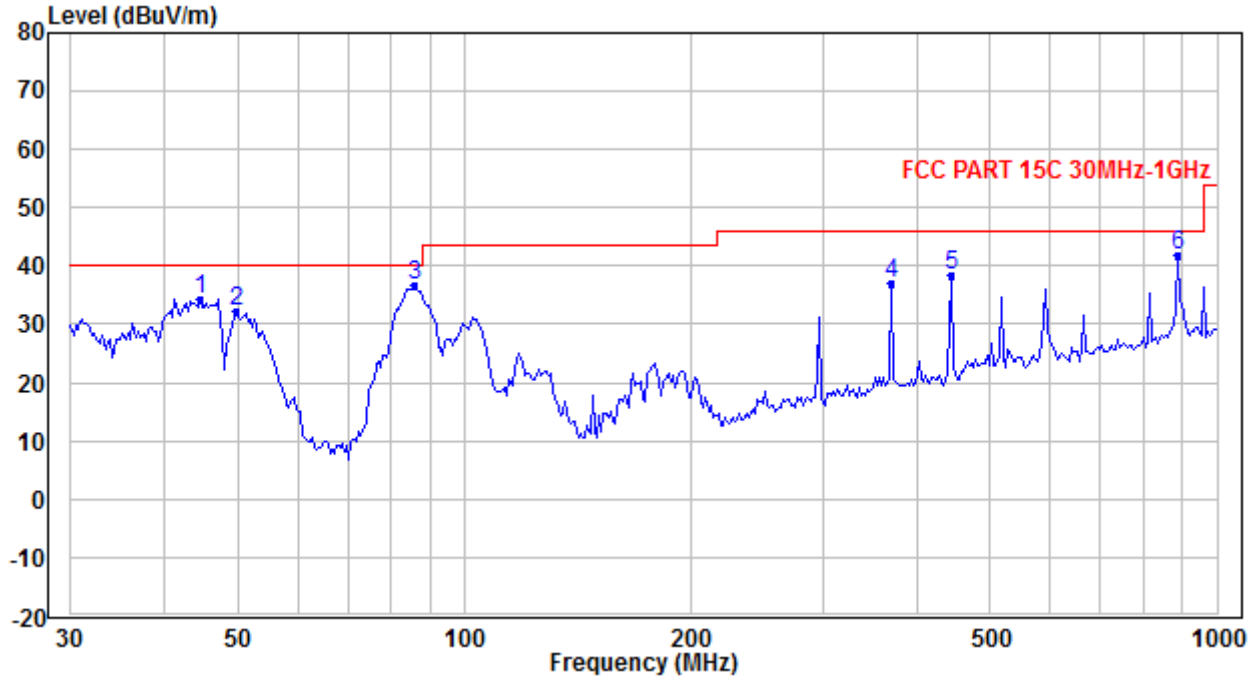
Worst-Case Configuration

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	30.000	31.76	-4.40	27.36	40.00	-12.64	QP
2	47.369	39.49	-12.68	26.81	40.00	-13.19	QP
3	83.694	44.72	-16.92	27.80	40.00	-12.20	QP
4	442.572	46.04	-4.30	41.74	46.00	-4.26	QP
5	590.351	43.12	-1.08	42.04	46.00	-3.96	QP
6	739.214	35.45	2.00	37.45	46.00	-8.55	QP

Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	44.466	45.33	-10.88	34.45	40.00	-5.55	QP
2	49.757	46.81	-14.44	32.37	40.00	-7.63	QP
3	86.080	52.87	-16.33	36.54	40.00	-3.46	QP
4	368.668	42.29	-5.38	36.91	46.00	-9.09	QP
5	442.572	42.75	-4.30	38.45	46.00	-7.55	QP
6	887.398	37.85	4.12	41.97	46.00	-4.03	QP

Radiated Emission Test Data (Above 1GHz):

IEEE 802.11b_ Channel 1:

No.	Frequency (MHz)	Reading (dBμV/m)	Correction factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4824.00	38.31	-2.33	35.98	74.00	-38.02	Peak	Horizontal
2	4824.00	30.58	-2.33	28.25	54.00	-25.75	Average	Horizontal
3	7236.00	37.29	1.47	38.76	74.00	-35.24	Peak	Horizontal
4	7236.00	27.63	1.47	29.10	54.00	-24.90	Average	Horizontal
5	4824.00	40.91	-2.33	38.58	74.00	-35.42	Peak	Vertical
6	4824.00	29.31	-2.33	26.98	54.00	-27.02	Average	Vertical
7	7236.00	38.17	1.47	39.64	74.00	-34.36	Peak	Vertical
8	7236.00	27.92	1.47	29.39	54.00	-24.61	Average	Vertical

IEEE 802.11b_ Channel 6:

No.	Frequency (MHz)	Reading (dBμV/m)	Correction factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4874.00	43.33	-2.29	41.04	74.00	-32.96	Peak	Horizontal
2	4874.00	29.63	-2.29	27.34	54.00	-26.66	Average	Horizontal
3	7311.00	40.50	1.60	42.10	74.00	-31.90	Peak	Horizontal
4	7311.00	29.61	1.60	31.21	54.00	-22.79	Average	Horizontal
5	4874.00	41.24	-2.29	38.95	74.00	-35.05	Peak	Vertical
6	4874.00	29.70	-2.29	27.41	54.00	-26.59	Average	Vertical
7	7311.00	41.97	1.60	43.57	74.00	-30.43	Peak	Vertical
8	7311.00	29.46	1.60	31.06	54.00	-22.94	Average	Vertical

IEEE 802.11b_ Channel 11:

No.	Frequency (MHz)	Reading (dBμV/m)	Correction factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4924.00	44.00	-2.26	41.74	74.00	-32.26	Peak	Horizontal
2	4924.00	30.25	-2.26	27.99	54.00	-26.01	Average	Horizontal
3	7386.00	41.79	1.72	43.51	74.00	-30.49	Peak	Horizontal
4	7386.00	27.99	1.72	29.71	54.00	-24.29	Average	Horizontal
5	4924.00	40.86	-2.26	38.60	74.00	-35.40	Peak	Vertical
6	4924.00	30.70	-2.26	28.44	54.00	-25.56	Average	Vertical
7	7386.00	40.21	1.72	41.93	74.00	-32.07	Peak	Vertical
8	7386.00	27.70	1.72	29.42	54.00	-24.58	Average	Vertical

IEEE 802.11g_ Channel 1:

No.	Frequency (MHz)	Reading (dBμV/m)	Correction factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4824.00	40.33	-2.33	38.00	74.00	-36.00	Peak	Horizontal
2	4824.00	29.52	-2.33	27.19	54.00	-26.81	Average	Horizontal
3	7236.00	39.92	1.47	41.39	74.00	-32.61	Peak	Horizontal
4	7236.00	28.55	1.47	30.02	54.00	-23.98	Average	Horizontal
5	4824.00	40.48	-2.33	38.15	74.00	-35.85	Peak	Vertical
6	4824.00	29.24	-2.33	26.91	54.00	-27.09	Average	Vertical
7	7236.00	39.79	1.47	41.26	74.00	-32.74	Peak	Vertical
8	7236.00	27.63	1.47	29.10	54.00	-24.90	Average	Vertical

IEEE 802.11g_ Channel 6:

No.	Frequency (MHz)	Reading (dBμV/m)	Correction factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4874.00	42.42	-2.29	40.13	74.00	-33.87	Peak	Horizontal
2	4874.00	29.56	-2.29	27.27	54.00	-26.73	Average	Horizontal
3	7311.00	41.39	1.60	42.99	74.00	-31.01	Peak	Horizontal
4	7311.00	29.54	1.60	31.14	54.00	-22.86	Average	Horizontal
5	4874.00	41.69	-2.29	39.40	74.00	-34.60	Peak	Vertical
6	4874.00	29.33	-2.29	27.04	54.00	-26.96	Average	Vertical
7	7311.00	39.78	1.60	41.38	74.00	-32.62	Peak	Vertical
8	7311.00	29.84	1.60	31.44	54.00	-22.56	Average	Vertical

IEEE 802.11g_ Channel 11:

No.	Frequency (MHz)	Reading (dBμV/m)	Correction factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4924.00	43.00	-2.26	40.74	74.00	-33.26	Peak	Horizontal
2	4924.00	30.07	-2.26	27.81	54.00	-26.19	Average	Horizontal
3	7386.00	38.65	1.72	40.37	74.00	-33.63	Peak	Horizontal
4	7386.00	27.99	1.72	29.71	54.00	-24.29	Average	Horizontal
5	4924.00	42.05	-2.26	39.79	74.00	-34.21	Peak	Vertical
6	4924.00	30.89	-2.26	28.63	54.00	-25.37	Average	Vertical
7	7386.00	39.14	1.72	40.86	74.00	-33.14	Peak	Vertical
8	7386.00	27.64	1.72	29.36	54.00	-24.64	Average	Vertical

IEEE 802.11n-HT20_ Channel 1:

No.	Frequency (MHz)	Reading (dBμV/m)	Correction factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4824.00	41.45	-2.33	39.12	74.00	-34.88	Peak	Horizontal
2	4824.00	29.58	-2.33	27.25	54.00	-26.75	Average	Horizontal
3	7236.00	37.99	1.47	39.46	74.00	-34.54	Peak	Horizontal
4	7236.00	29.63	1.47	31.10	54.00	-22.90	Average	Horizontal
5	4824.00	42.24	-2.33	39.91	74.00	-34.09	Peak	Vertical
6	4824.00	29.38	-2.33	27.05	54.00	-26.95	Average	Vertical
7	7236.00	40.95	1.47	42.42	74.00	-31.58	Peak	Vertical
8	7236.00	27.63	1.47	29.10	54.00	-24.90	Average	Vertical

IEEE 802.11n-HT20_ Channel 6:

No.	Frequency (MHz)	Reading (dBμV/m)	Correction factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4874.00	41.07	-2.29	38.78	74.00	-35.22	Peak	Horizontal
2	4874.00	26.70	-2.29	24.41	54.00	-29.59	Average	Horizontal
3	7311.00	40.17	1.60	41.77	74.00	-32.23	Peak	Horizontal
4	7311.00	25.61	1.60	27.21	54.00	-26.79	Average	Horizontal
5	4874.00	40.27	-2.29	37.98	74.00	-36.02	Peak	Vertical
6	4874.00	29.29	-2.29	27.00	54.00	-27.00	Average	Vertical
7	7311.00	40.77	1.60	42.37	74.00	-31.63	Peak	Vertical
8	7311.00	28.76	1.60	30.36	54.00	-23.64	Average	Vertical

IEEE 802.11n-HT20_ Channel 11:

No.	Frequency (MHz)	Reading (dBμV/m)	Correction factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4924.00	43.23	-2.26	40.97	74.00	-33.03	Peak	Horizontal
2	4924.00	30.16	-2.26	27.90	54.00	-26.10	Average	Horizontal
3	7386.00	38.65	1.72	40.37	74.00	-33.63	Peak	Horizontal
4	7386.00	28.05	1.72	29.77	54.00	-24.23	Average	Horizontal
5	4924.00	39.97	-2.26	37.71	74.00	-36.29	Peak	Vertical
6	4924.00	29.16	-2.26	26.90	54.00	-27.10	Average	Vertical
7	7386.00	38.75	1.72	40.47	74.00	-33.53	Peak	Vertical
8	7386.00	27.94	1.72	29.66	54.00	-24.34	Average	Vertical

IEEE 802.11n-HT40_ Channel 3:

No.	Frequency (MHz)	Reading (dBμV/m)	Correction factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4844.00	40.53	-2.32	38.21	74.00	-35.79	Peak	Horizontal
2	4844.00	25.10	-2.32	22.78	54.00	-31.22	Average	Horizontal
3	7266.00	37.63	1.52	39.15	74.00	-34.85	Peak	Horizontal
4	7266.00	28.41	1.52	29.93	54.00	-24.07	Average	Horizontal
5	4844.00	40.18	-2.32	37.86	74.00	-36.14	Peak	Vertical
6	4844.00	29.30	-2.32	26.98	54.00	-27.02	Average	Vertical
7	7266.00	39.28	1.52	40.80	74.00	-33.20	Peak	Vertical
8	7266.00	28.58	1.52	30.10	54.00	-23.90	Average	Vertical

IEEE 802.11n-HT40_ Channel 6:

No.	Frequency (MHz)	Reading (dBμV/m)	Correction factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4874.00	42.48	-2.29	40.19	74.00	-33.81	Peak	Horizontal
2	4874.00	30.43	-2.29	28.14	54.00	-25.86	Average	Horizontal
3	7311.00	40.61	1.60	42.21	74.00	-31.79	Peak	Horizontal
4	7311.00	29.61	1.60	31.21	54.00	-22.79	Average	Horizontal
5	4874.00	42.49	-2.29	40.20	74.00	-33.80	Peak	Vertical
6	4874.00	29.22	-2.29	26.93	54.00	-27.07	Average	Vertical
7	7311.00	41.20	1.60	42.80	74.00	-31.20	Peak	Vertical
8	7311.00	28.91	1.60	30.51	54.00	-23.49	Average	Vertical

IEEE 802.11n-HT40_ Channel 9:

No.	Frequency (MHz)	Reading (dBμV/m)	Correction factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4904.00	41.38	-2.28	39.10	74.00	-34.90	Peak	Horizontal
2	4904.00	29.00	-2.28	26.72	54.00	-27.28	Average	Horizontal
3	7356.00	40.85	1.67	42.52	74.00	-31.48	Peak	Horizontal
4	7356.00	27.99	1.67	29.66	54.00	-24.34	Average	Horizontal
5	4904.00	41.73	-2.28	39.45	74.00	-34.55	Peak	Vertical
6	4904.00	29.81	-2.28	27.53	54.00	-26.47	Average	Vertical
7	7356.00	38.53	1.67	40.20	74.00	-33.80	Peak	Vertical
8	7356.00	27.93	1.67	29.60	54.00	-24.40	Average	Vertical

Remark:

1. Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result – Limit

5.8 BAND EDGE MEASUREMENTS (RADIATED)

Test Requirement: FCC 47 CFR Part 15 Subpart C Section 15.205/15.209
RSS-247 Issue 2, Section 5.5

Test Method: ANSI C63.10-2013 Clause 11.13

Limits:

Radiated emissions which fall in the restricted bands, as defined in section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a).

Frequency	Limit (dBμV/m @3m)	Remark
30 MHz-88 MHz	40.0	Quasi-peak Value
88 MHz-216 MHz	43.5	Quasi-peak Value
216 MHz-960 MHz	46.0	Quasi-peak Value
960 MHz-1 GHz	54.0	Quasi-peak Value
Above 1 GHz	54.0	Average Value
	74.0	Peak Value

Test Setup: Refer to section 4.4.1 for details.

Test Procedures:

Radiated band edge measurements at 2390 MHz and 2483.5 MHz were made with the unit transmitting in the low end of the channel range and the high end closest to the restricted bands respectively. The emissions were made on the 966 Semi-Chamber. Use (resolution bandwidth (RBW) = 1 MHz, video bandwidth (VBW) = 3 MHz for peak levels and RBW = 1 MHz and VBW = 10 Hz or 1/T for average levels).

1. Use radiated spurious emission test procedure described in clause 5.10. The transmitter output (antenna port) was connected to the test receiver.
2. Set the PK and AV limit line.
3. Record the fundamental emission and emissions out of the band-edge.
4. Determine band-edge compliance as required.

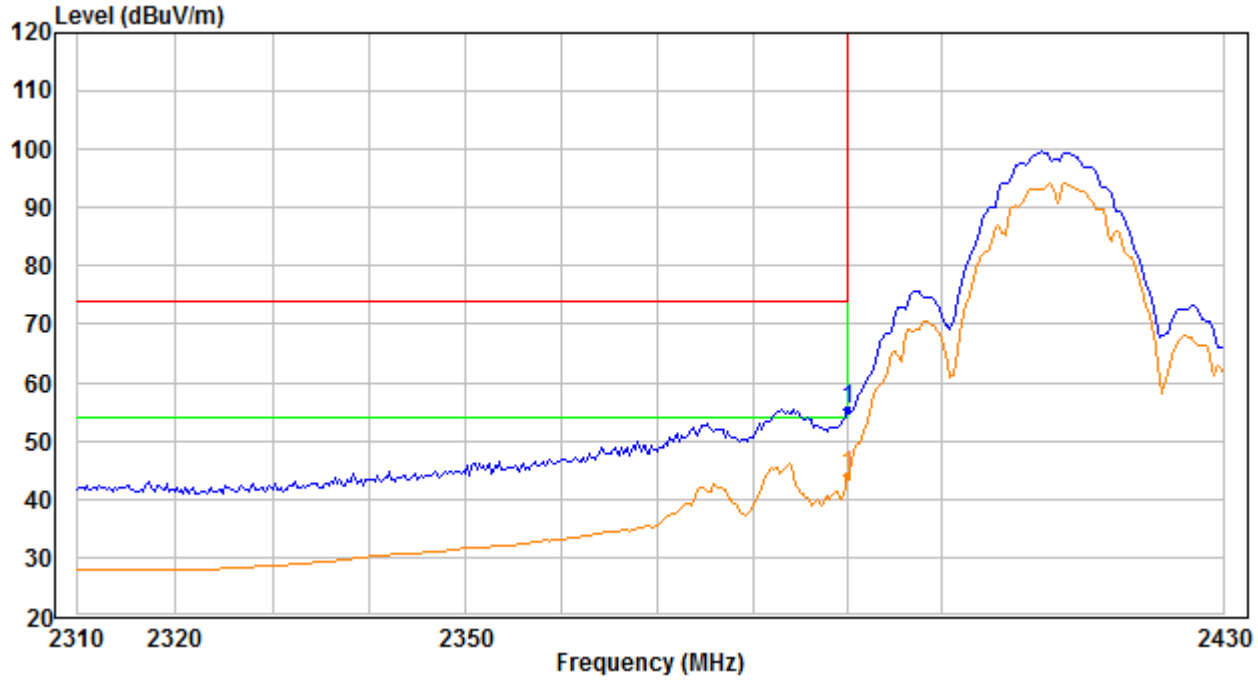
Equipment Used: Refer to section 3 for details.

Test Result: Pass

The measurement data as follows:

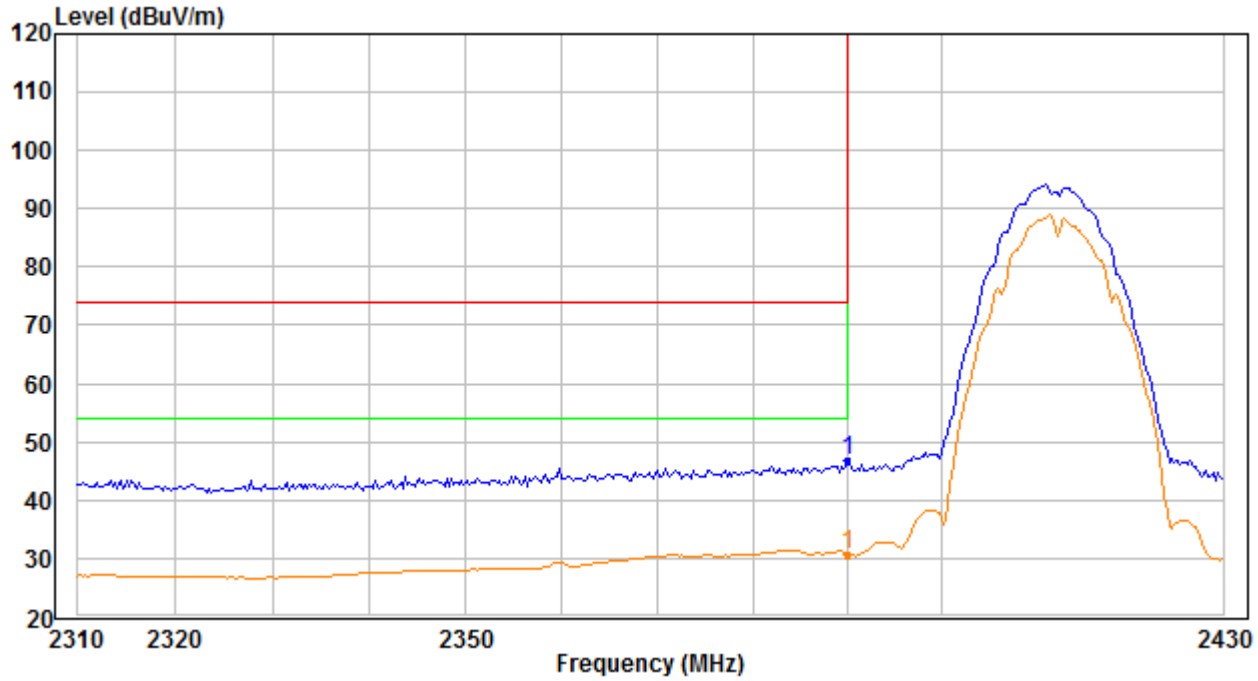
IEEE 802.11b

Test Channel:	Channel 1	Ant. Polar. :	Horizontal



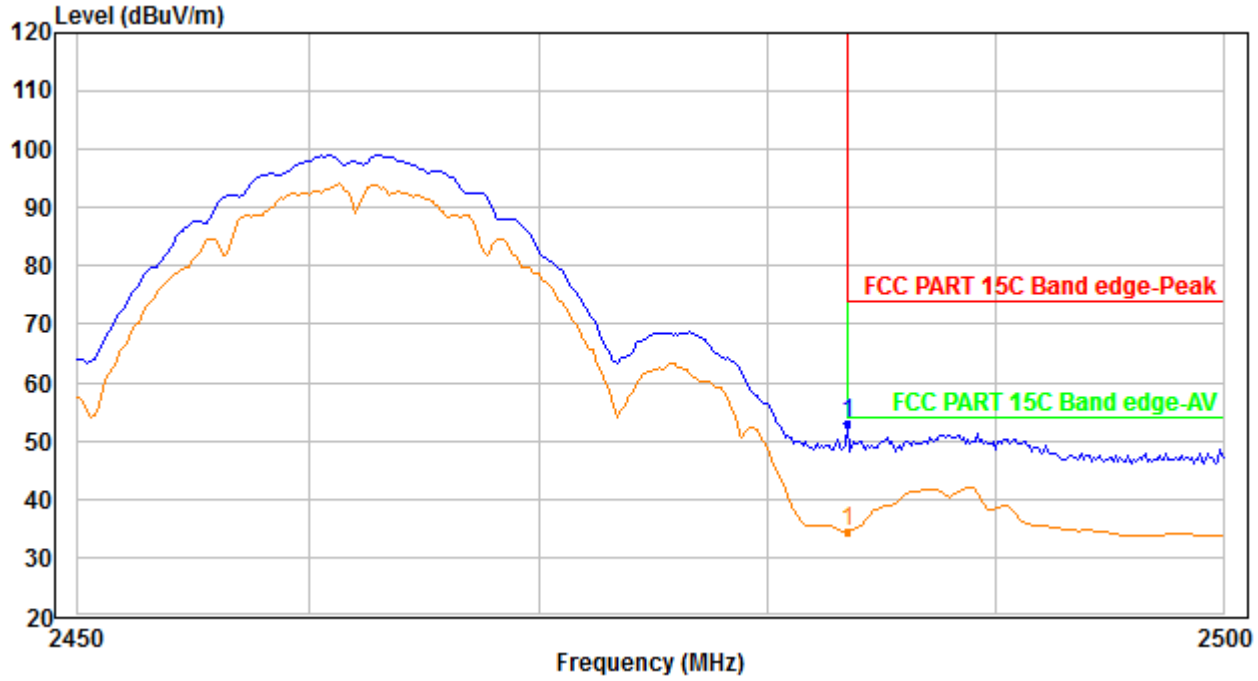
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2390.0000	55.44	74.00	44.04	54.00	Pass

Test Channel:	Channel 1	Ant. Polar. :	Vertical



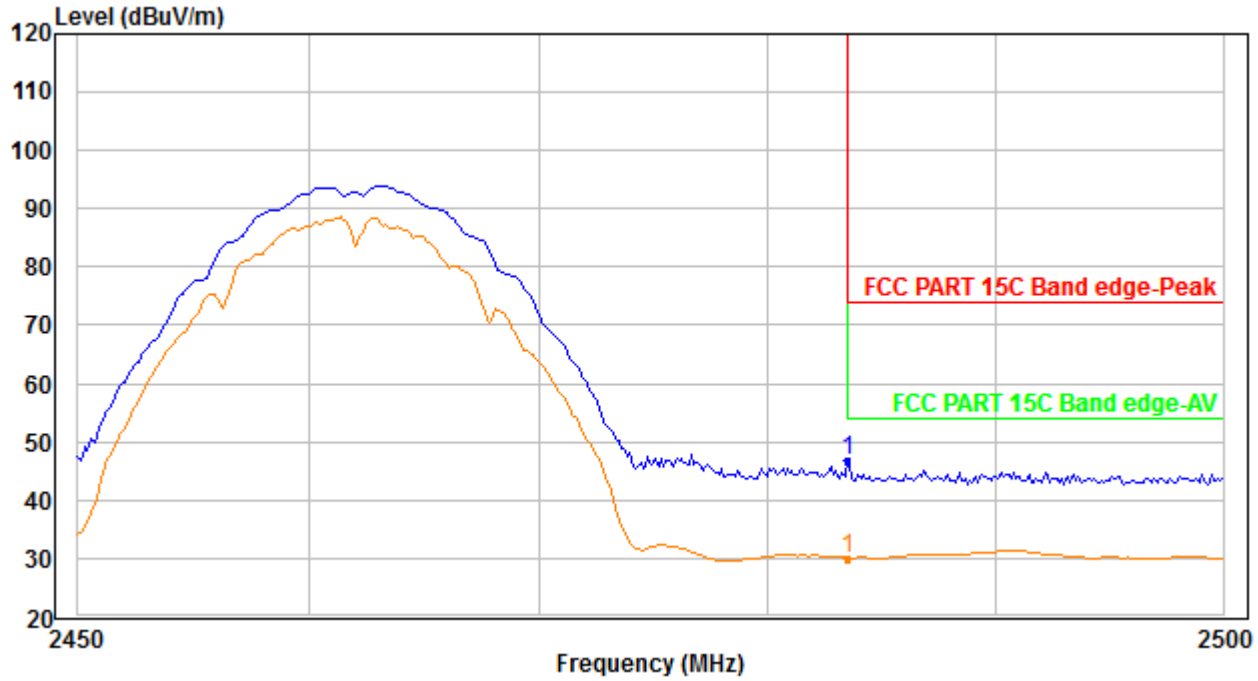
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2390.0000	46.69	74.00	30.77	54.00	Pass

Test Channel:	Channel 11	Ant. Polar. :	Horizontal



Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2483.5000	53.05	74.00	34.44	54.00	Pass

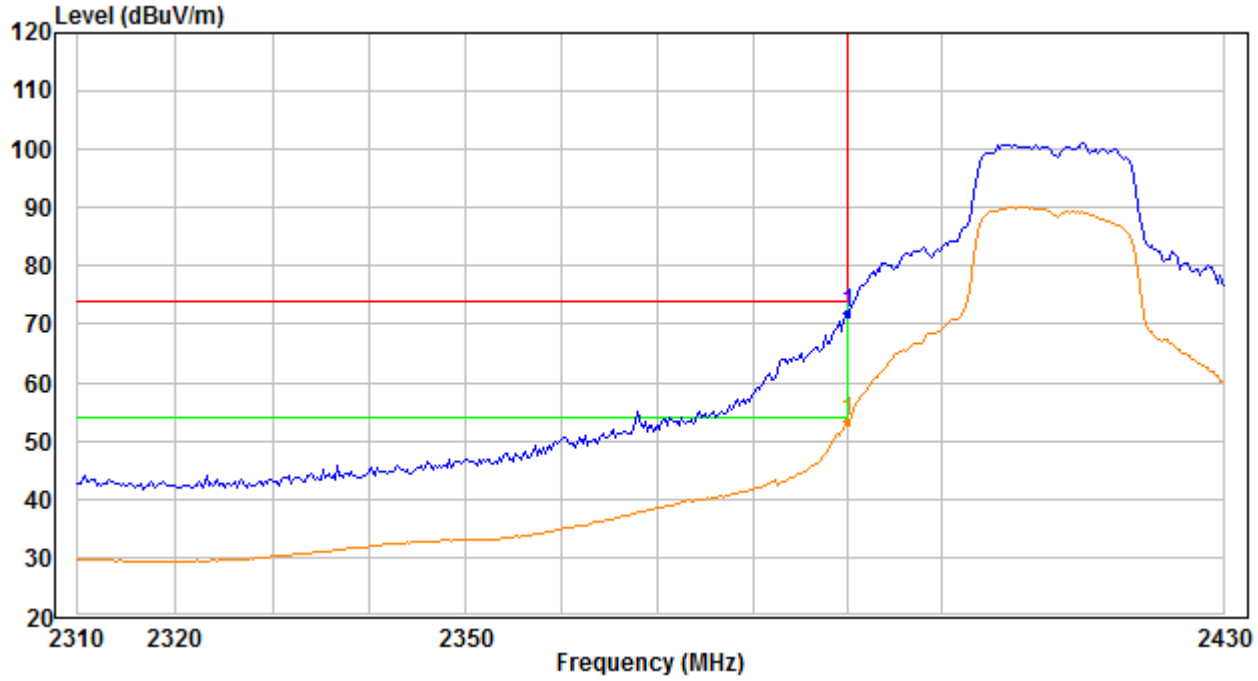
Test Channel:	Channel 11	Ant. Polar. :	Vertical



Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2483.5000	46.88	74.00	30.12	54.00	Pass

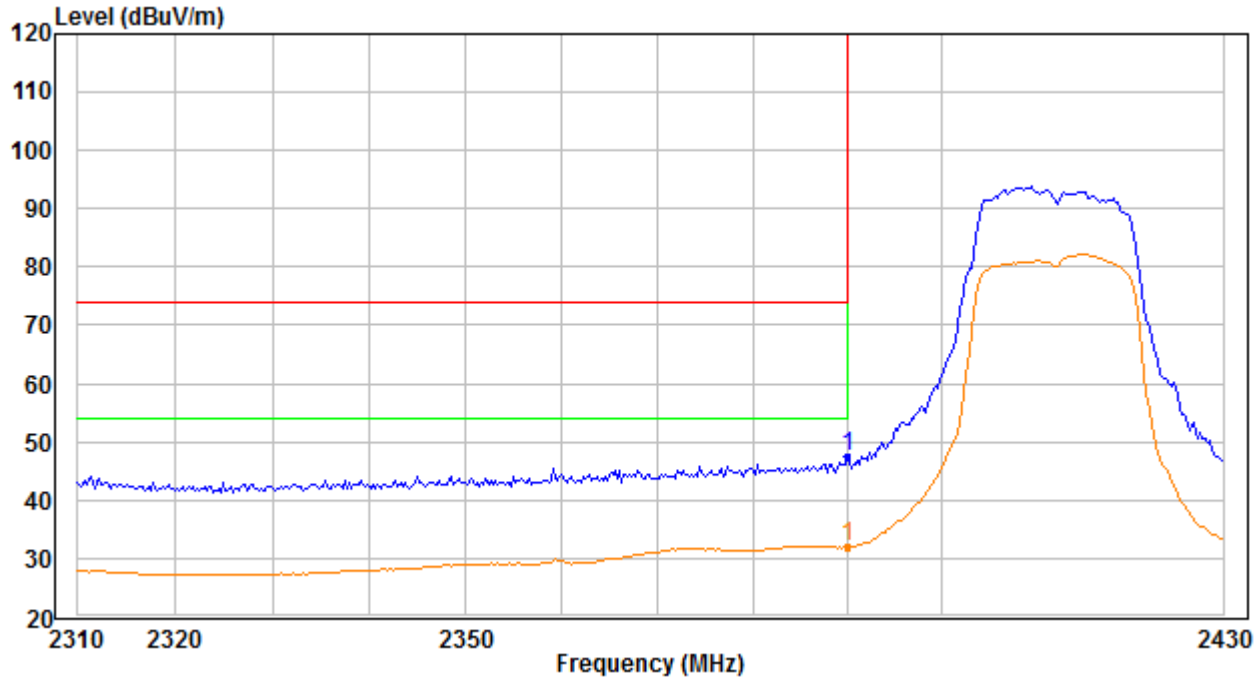
IEEE 802.11g

Test Channel:	Channel 1	Ant. Polar. :	Horizontal



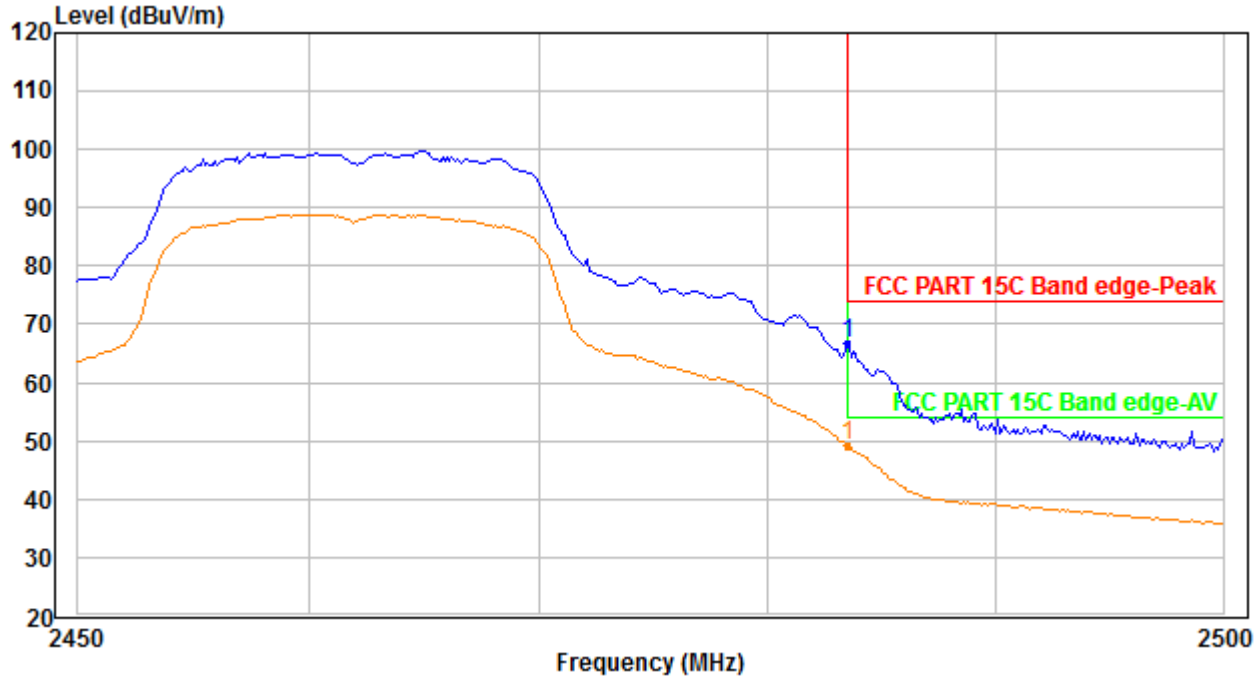
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2390.0000	71.95	74.00	53.45	54.00	Pass

Test Channel:	Channel 1	Ant. Polar. :	Vertical



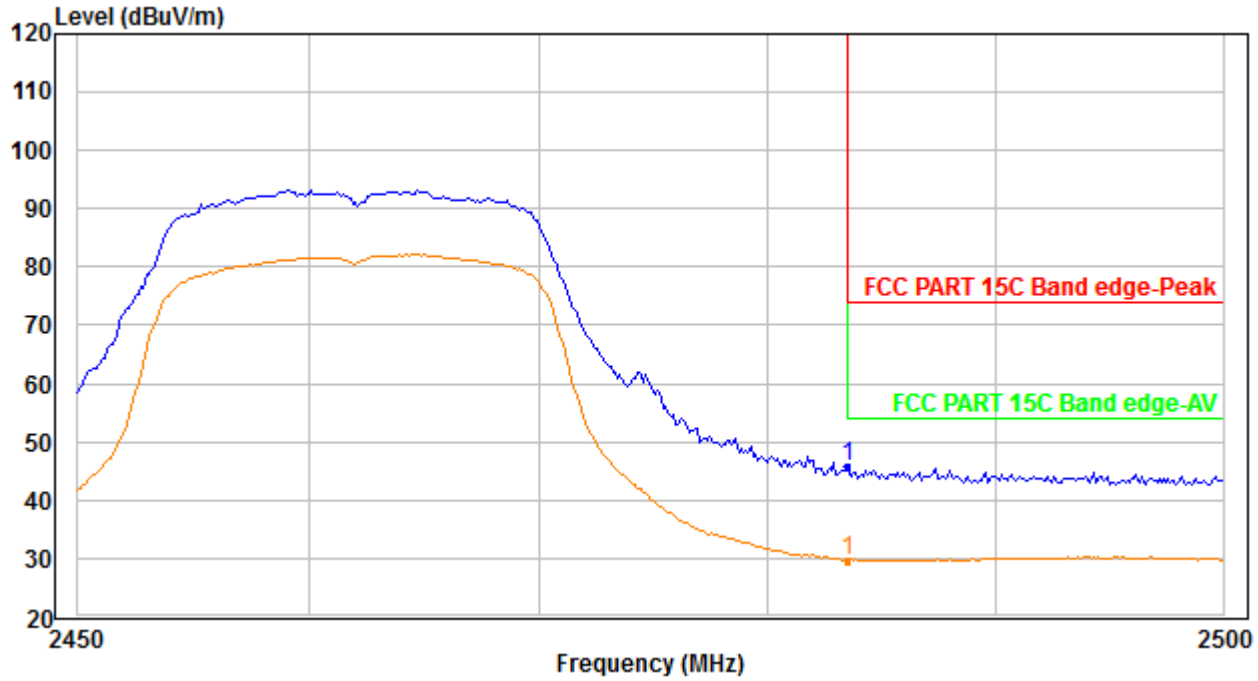
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2390.0000	47.63	74.00	31,92	54.00	Pass

Test Channel:	Channel 11	Ant. Polar. :	Horizontal



Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2483.5000	66.67	74.00	49.32	54.00	Pass

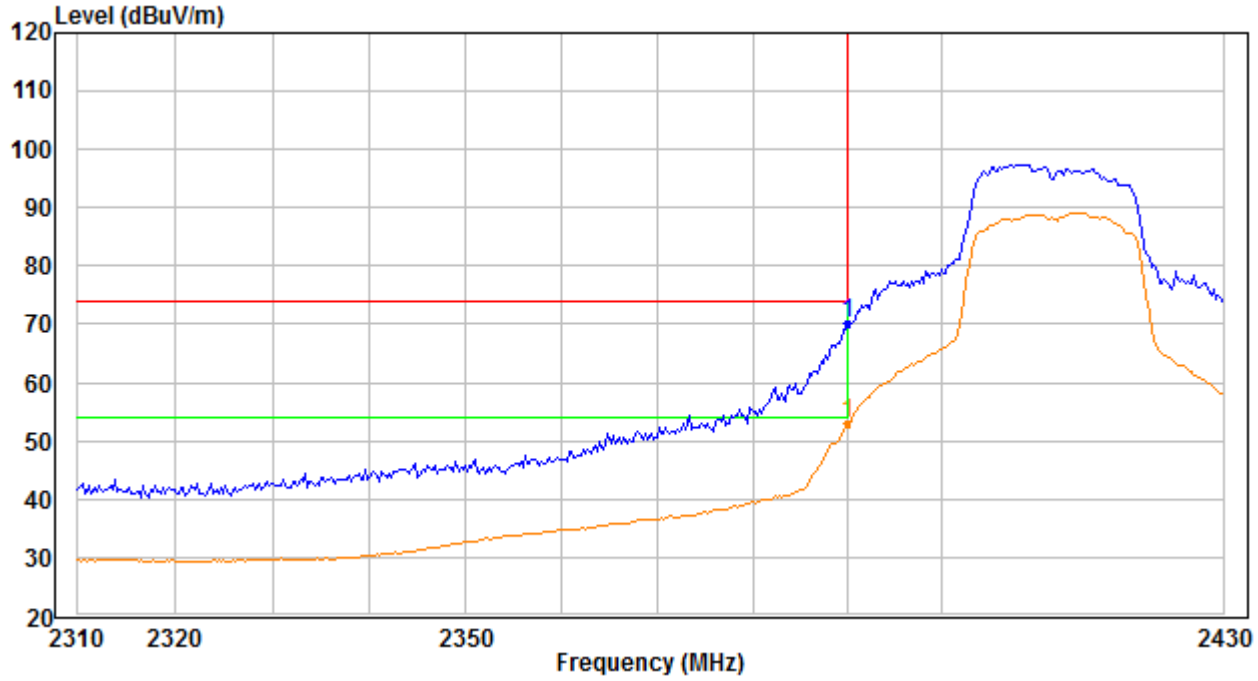
Test Channel:	Channel 11	Ant. Polar. :	Vertical



Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2483.5000	45.66	74.00	29.79	54.00	Pass

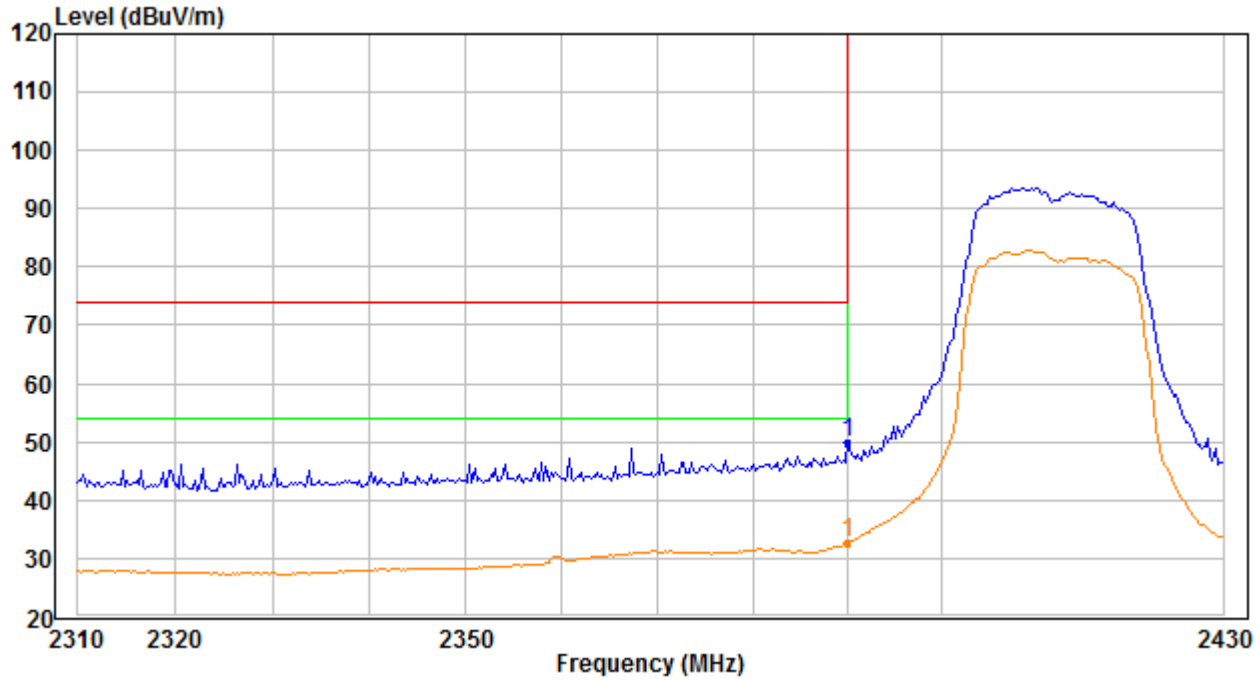
IEEE 802.11n-HT20

Test Channel:	Channel 1	Ant. Polar. :	Horizontal



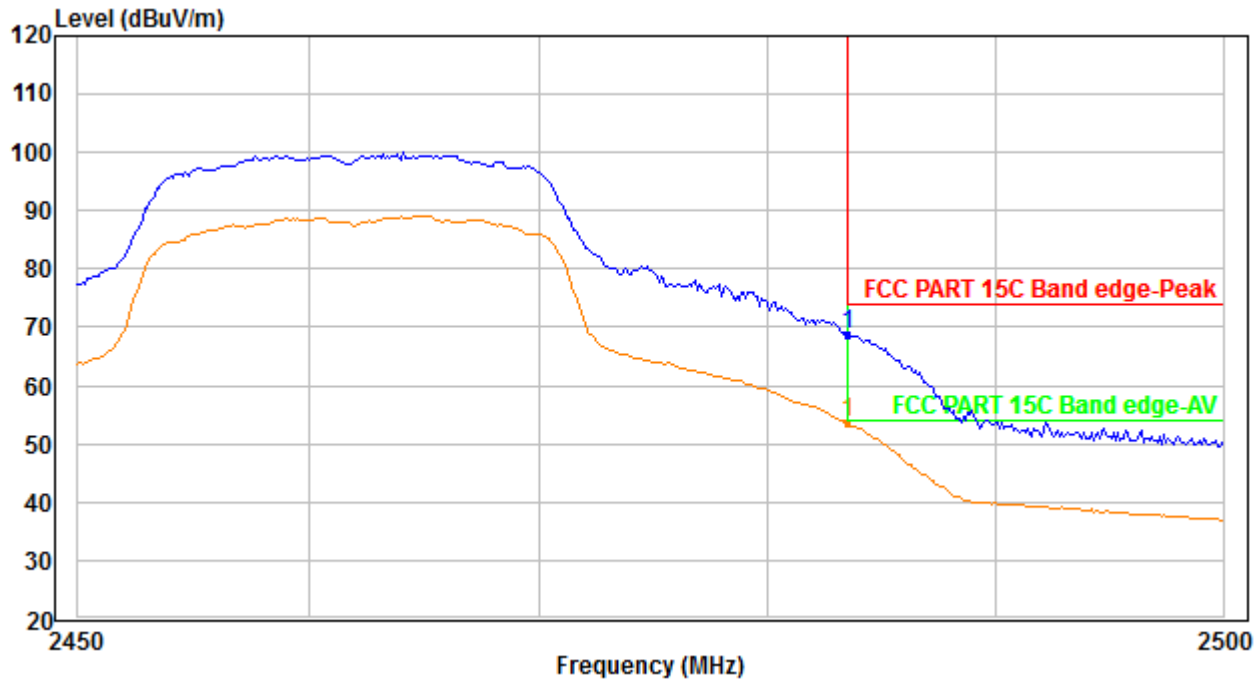
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2390.0000	70.02	74.00	52.89	54.00	Pass

Test Channel:	Channel 1	Ant. Polar. :	Vertical



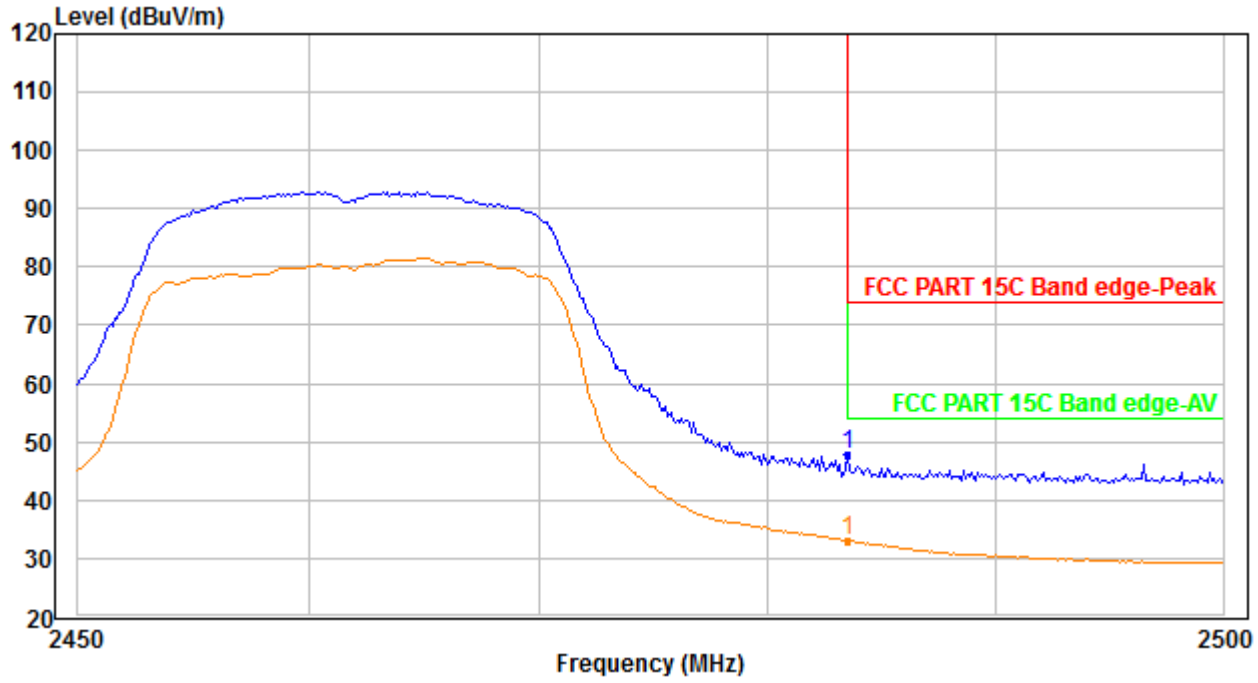
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2390.0000	49.78	74.00	32.80	54.00	Pass

Test Channel:	Channel 11	Ant. Polar. :	Horizontal



Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2483.5000	68.65	74.00	53.55	54.00	Pass

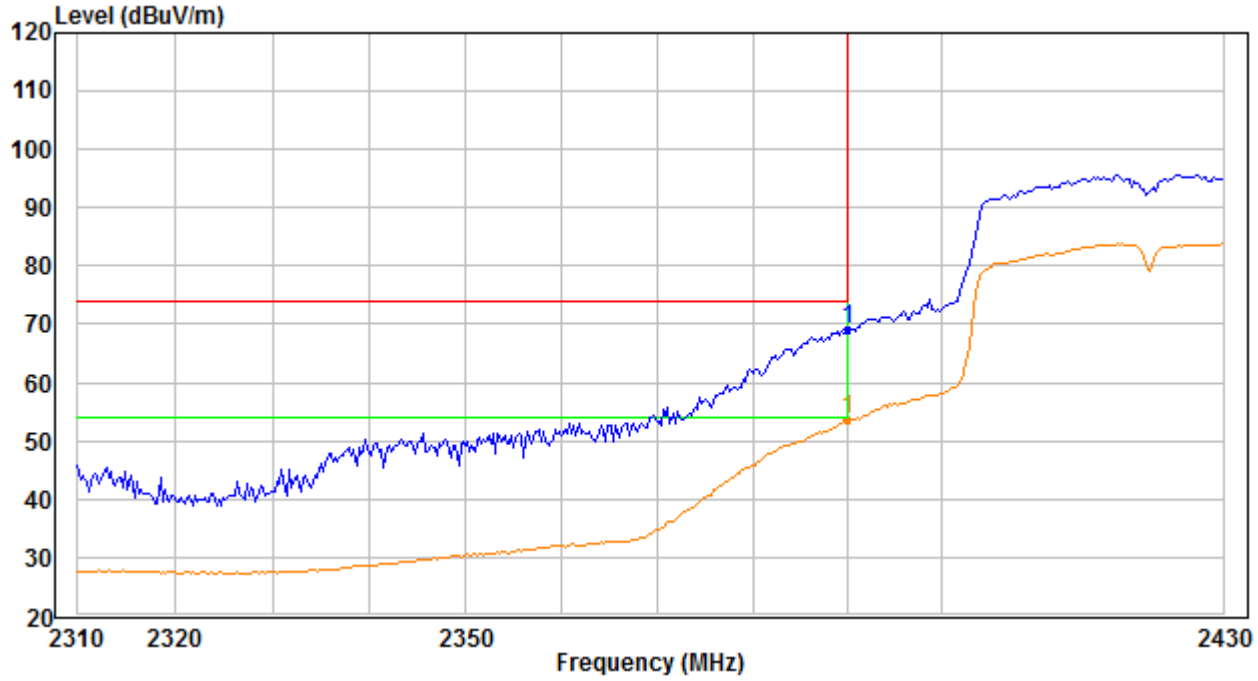
Test Channel:	Channel 11	Ant. Polar. :	Vertical



Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2483.5000	47.94	74.00	32.96	54.00	Pass

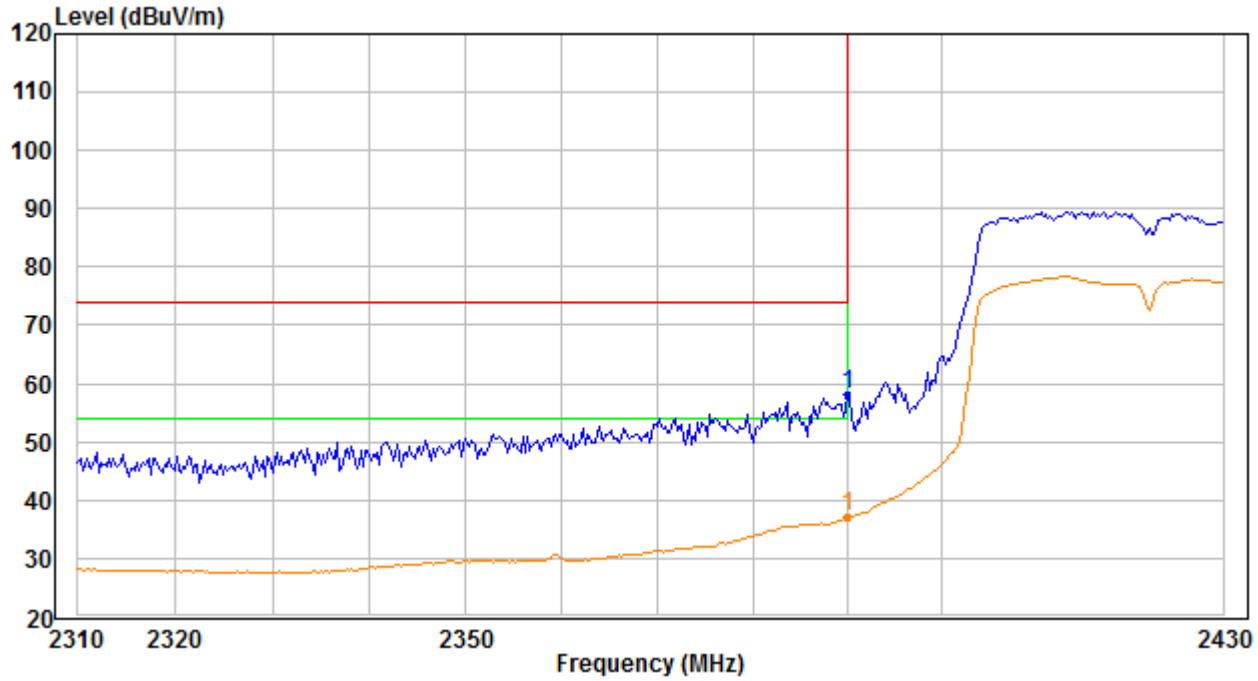
IEEE 802.11n-HT40

Test Channel:	Channel 3	Ant. Polar. :	Horizontal



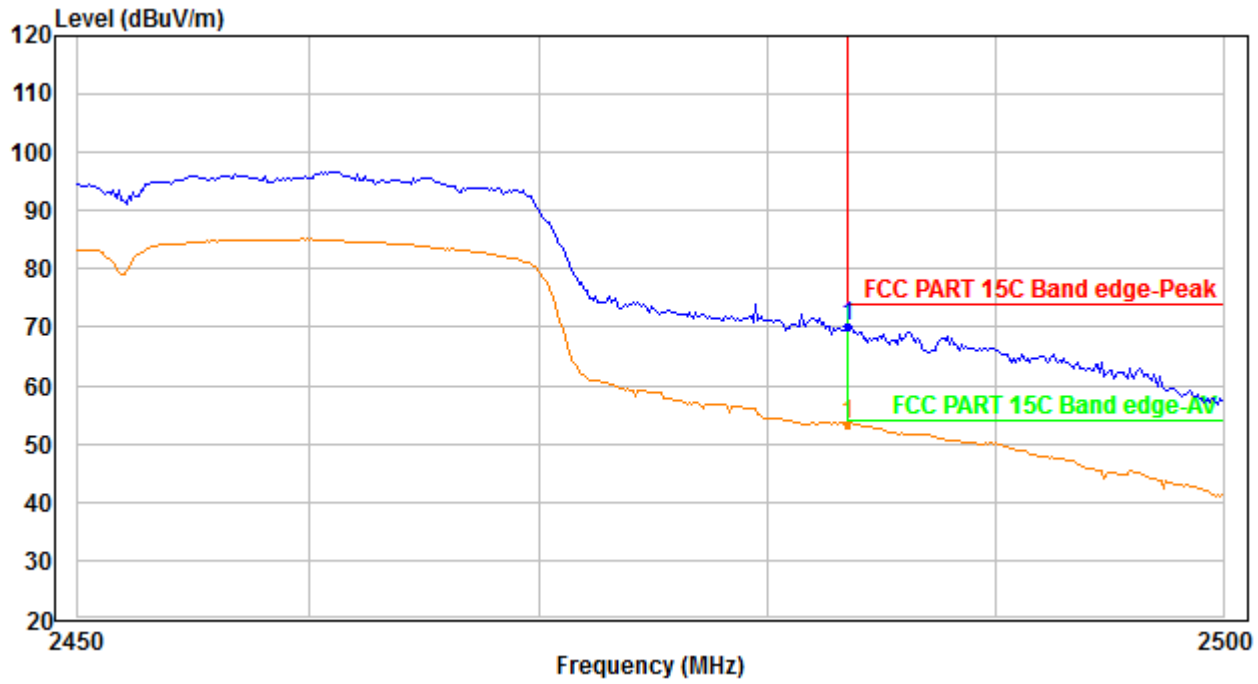
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2390.0000	69.13	74.00	53.63	54.00	Pass

Test Channel:	Channel 3	Ant. Polar. :	Vertical



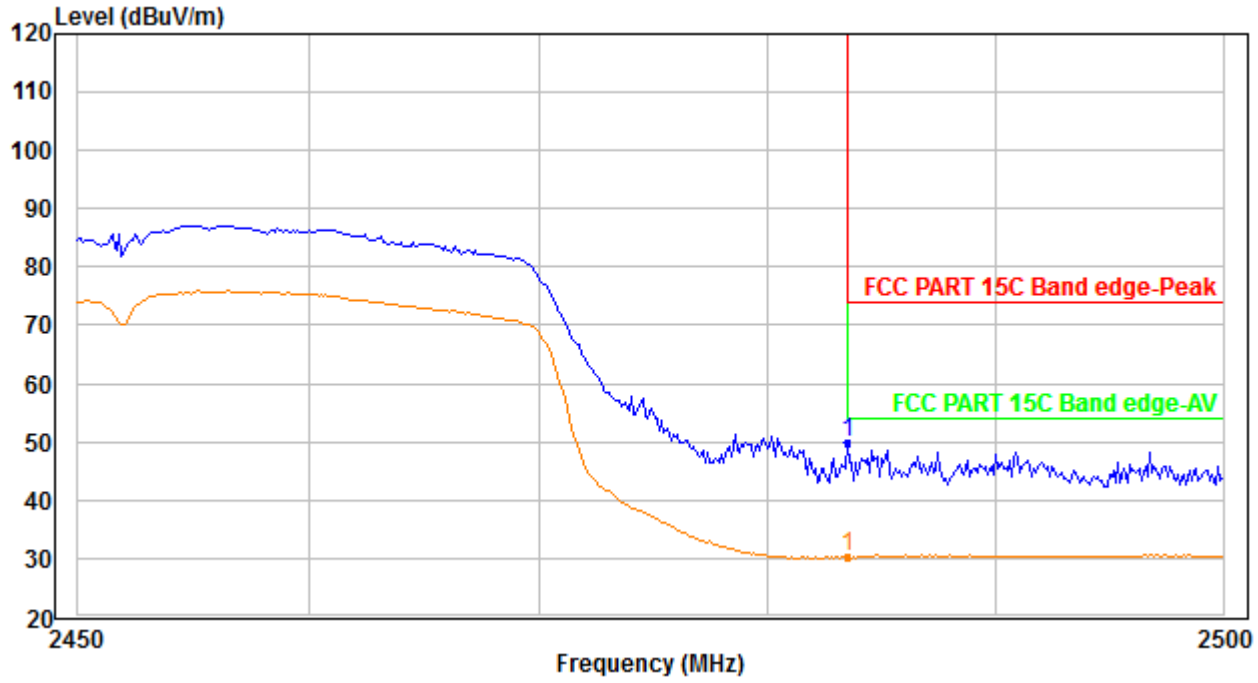
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2390.0000	58.25	74.00	37.09	54.00	Pass

Test Channel:	Channel 9	Ant. Polar. :	Horizontal



Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2483.5000	70.11	74.00	53.43	54.00	Pass

Test Channel:	Channel 9	Ant. Polar. :	Vertical



Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2483.5000	49.94	74.00	30.14	54.00	Pass

5.9 CONDUCTED EMISSION

Test Requirement: 47 CFR Part 15C Section 15.207
RSS-Gen Issue 5, Section 8.8

Test Method: ANSI C63.10-2013 Section 6.2

Limits:

Frequency range (MHz)	Limits (dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

Remark:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz.

Test Setup: Refer to section 4.4.2 for details.

Test Procedures:

Test frequency range :150KHz-30MHz

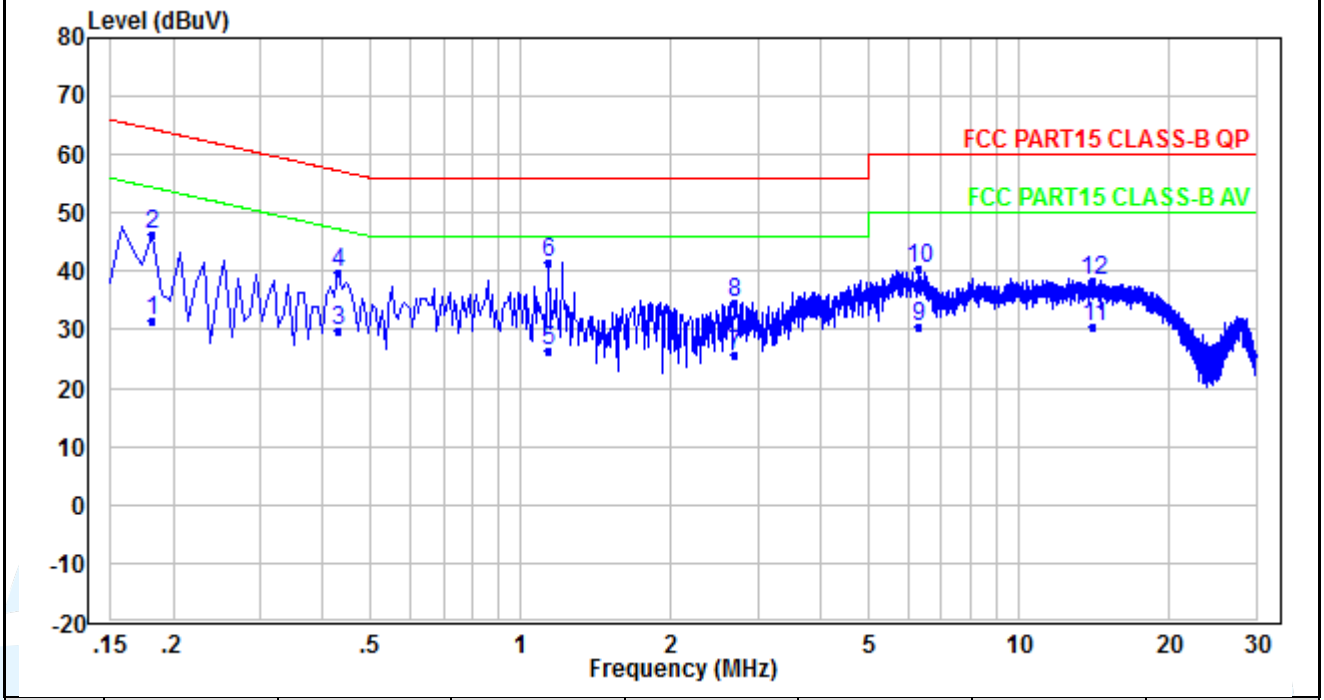
1) The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Equipment Used: Refer to section 3 for details.

Test Result: Pass

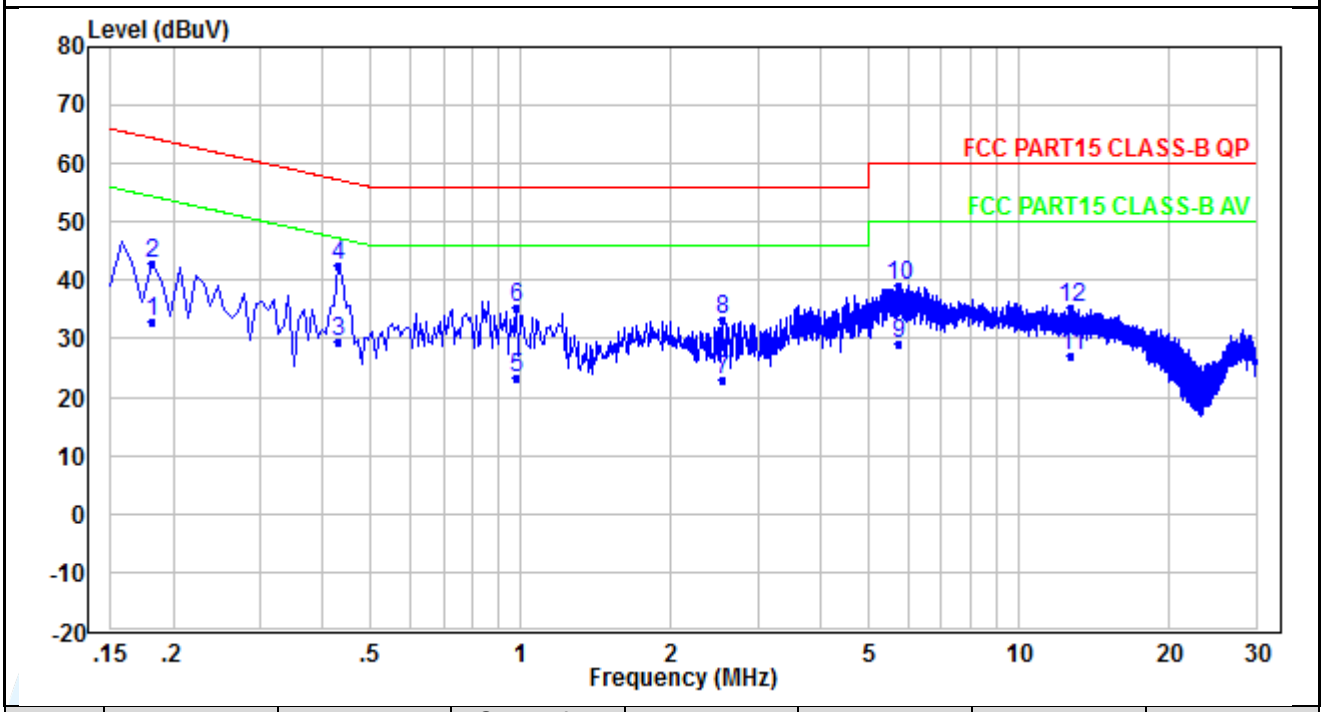
The measurement data as follows:
Quasi Peak and Average:
Mode: WIFI Link

Live Line



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.182	21.37	10.12	31.49	54.39	-22.90	Average
2	0.182	36.37	10.12	46.49	64.39	-17.90	QP
3	0.430	19.74	10.13	29.87	47.25	-17.38	Average
4	0.430	29.74	10.13	39.87	57.25	-17.38	QP
5	1.134	16.20	10.22	26.42	46.00	-19.58	Average
6	1.134	31.20	10.22	41.42	56.00	-14.58	QP
7	2.693	15.44	10.26	25.70	46.00	-20.30	Average
8	2.693	24.44	10.26	34.70	56.00	-21.30	QP
9	6.317	20.05	10.41	30.46	50.00	-19.54	Average
10	6.317	30.05	10.41	40.46	60.00	-19.54	QP
11	14.147	19.76	10.83	30.59	50.00	-19.41	Average
12	14.147	27.76	10.83	38.59	60.00	-21.41	QP

Neutral Line



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.182	22.75	10.11	32.86	54.39	-21.53	Average
2	0.182	32.75	10.11	42.86	64.39	-21.53	QP
3	0.430	19.38	10.12	29.50	47.25	-17.75	Average
4	0.430	32.38	10.12	42.50	57.25	-14.75	QP
5	0.982	13.25	10.15	23.40	46.00	-22.60	Average
6	0.982	25.25	10.15	35.40	56.00	-20.60	QP
7	2.542	12.89	10.23	23.12	46.00	-22.88	Average
8	2.542	22.89	10.23	33.12	56.00	-22.88	QP
9	5.741	18.88	10.40	29.28	50.00	-20.72	Average
10	5.741	28.88	10.40	39.28	60.00	-20.72	QP
11	12.787	16.48	10.73	27.21	50.00	-22.79	Average
12	12.787	24.48	10.73	35.21	60.00	-24.79	QP

Remark:

1. Correct Factor = LISN Factor + Cable Loss + Pulse Limiter Factor, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result - Limit
4. An initial pre-scan was performed on the Phase and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

APPENDIX 1 PHOTOS OF TEST SETUP

See test photos attached in Appendix 1 for the actual connections between Product and support equipment.

APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal photos.

*** End of Report ***

The test report is effective only with both signature and specialized stamp. The result(s) shown in this report refer only to the sample(s) tested. Without written approval of UnionTrust, this report can't be reproduced except in full.