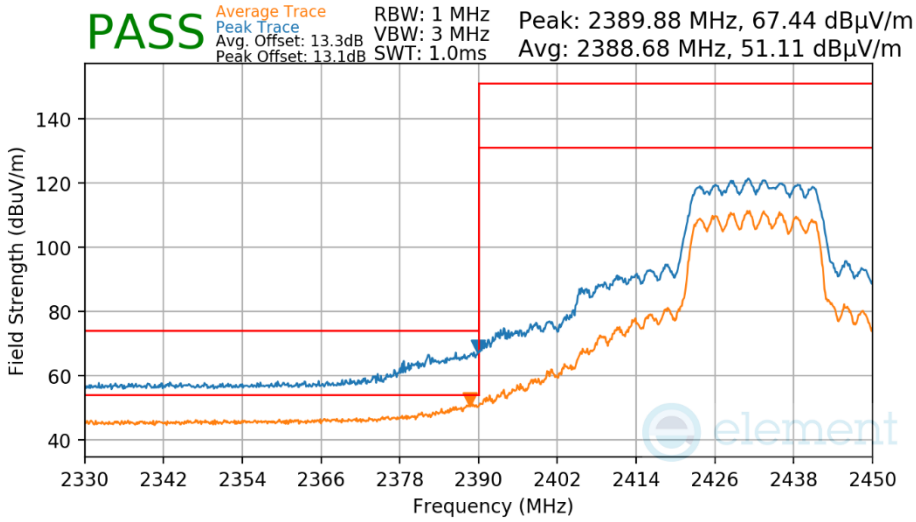
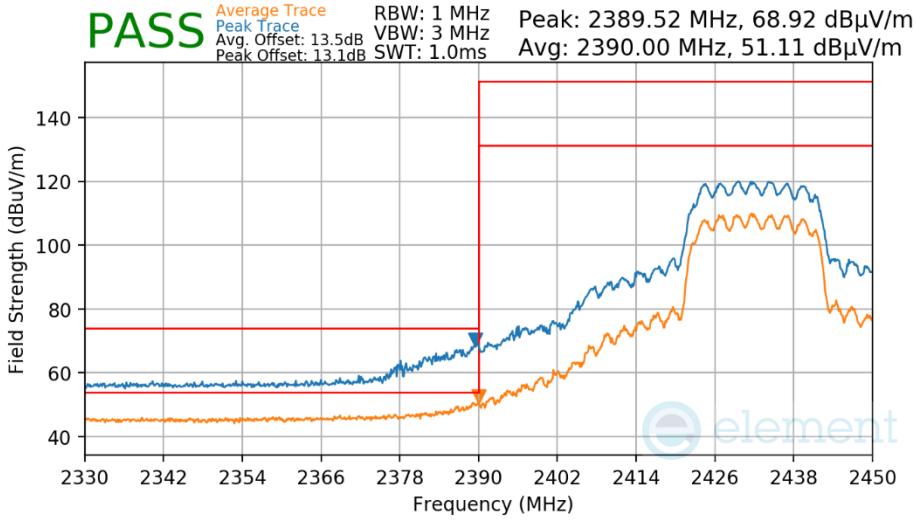
Mode	802.11ax-SU
Data Rate	MCS2
Distance of Measurement	3 Meters
Operating Frequency	2432MHz
Channel	5



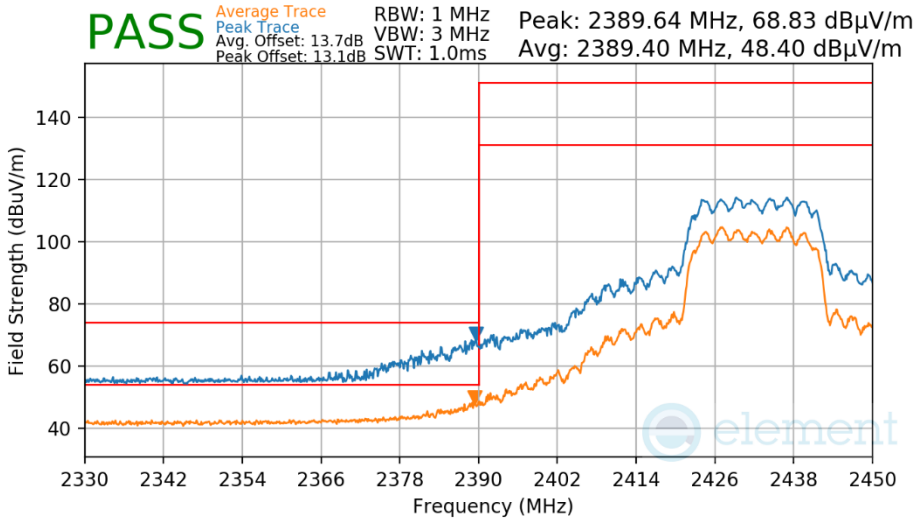
Plot 7-685 Radiated Restricted Lower Band Edge Measurement CDD

Mode	802.11ax-SU
Data Rate	MCS4
Distance of Measurement	3 Meters
Operating Frequency	2432MHz
Channel	5



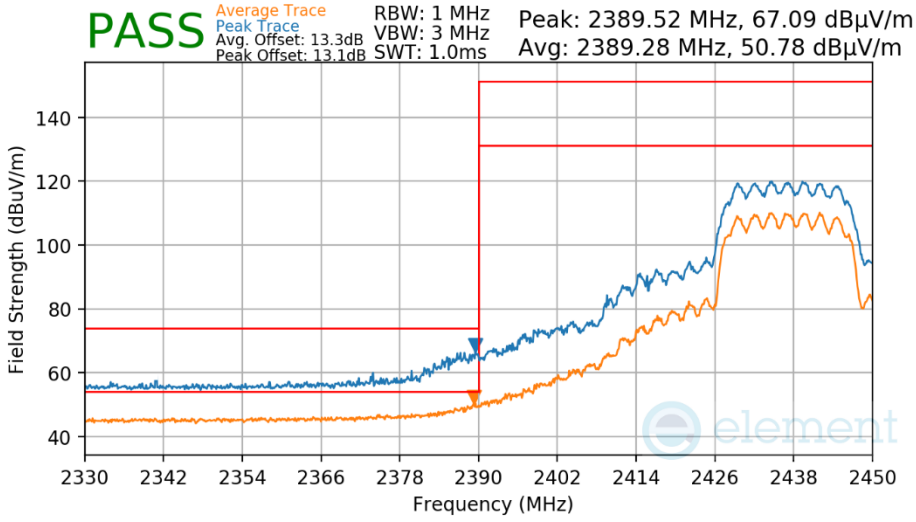
Plot 7-686 Radiated Restricted Lower Band Edge Measurement CDD

Mode	802.11ax-SU
Data Rate	MCS9
Distance of Measurement	3 Meters
Operating Frequency	2432MHz
Channel	5



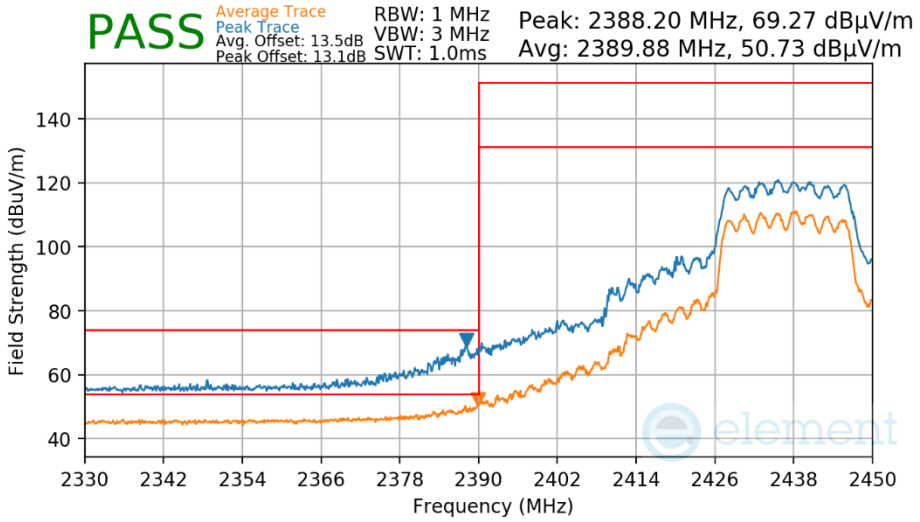
Plot 7-687 Radiated Restricted Lower Band Edge Measurement CDD

Mode	802.11ax-SU
Data Rate	MCS2
Distance of Measurement	3 Meters
Operating Frequency	2437MHz
Channel	6



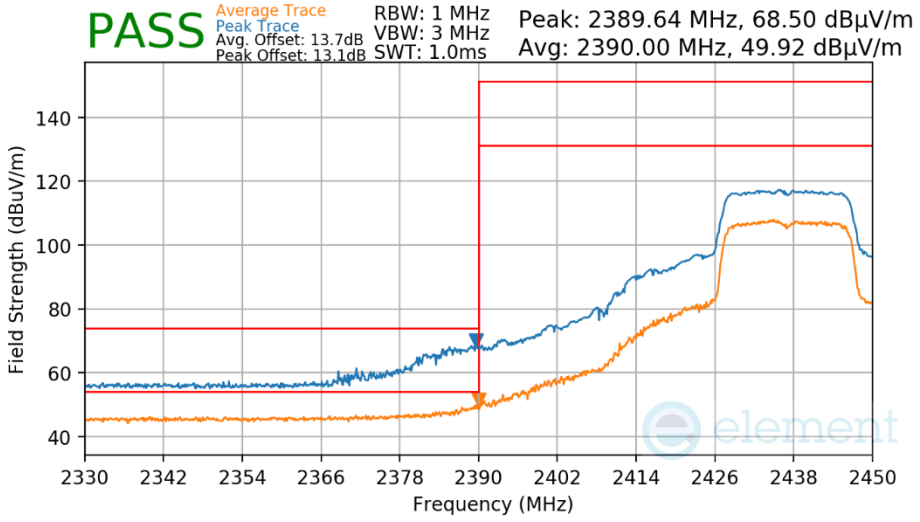
Plot 7-688 Radiated Restricted Lower Band Edge Measurement CDD

Mode	802.11ax-SU
Data Rate	MCS4
Distance of Measurement	3 Meters
Operating Frequency	2437MHz
Channel	6



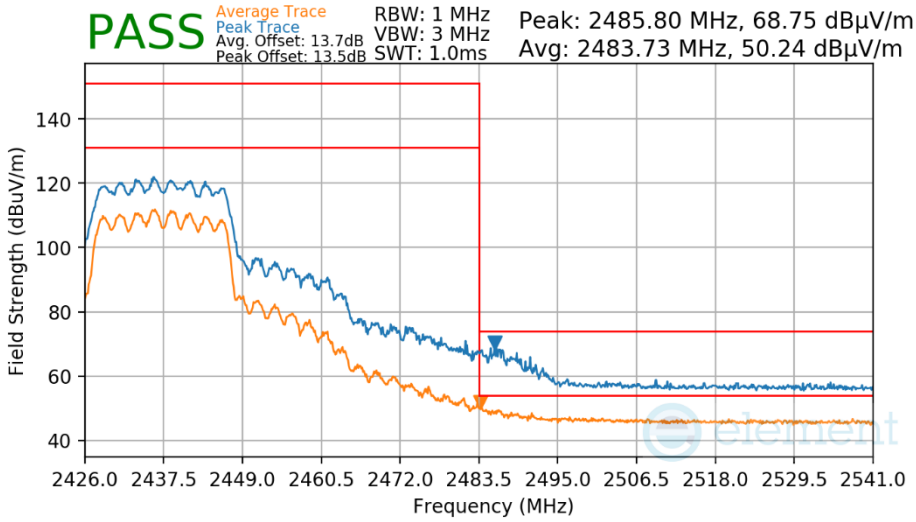
Plot 7-689 Radiated Restricted Lower Band Edge Measurement CDD
802.11ax-SU

Mode	
Data Rate	MCS9
Distance of Measurement	3 Meters
Operating Frequency	2437MHz
Channel	6



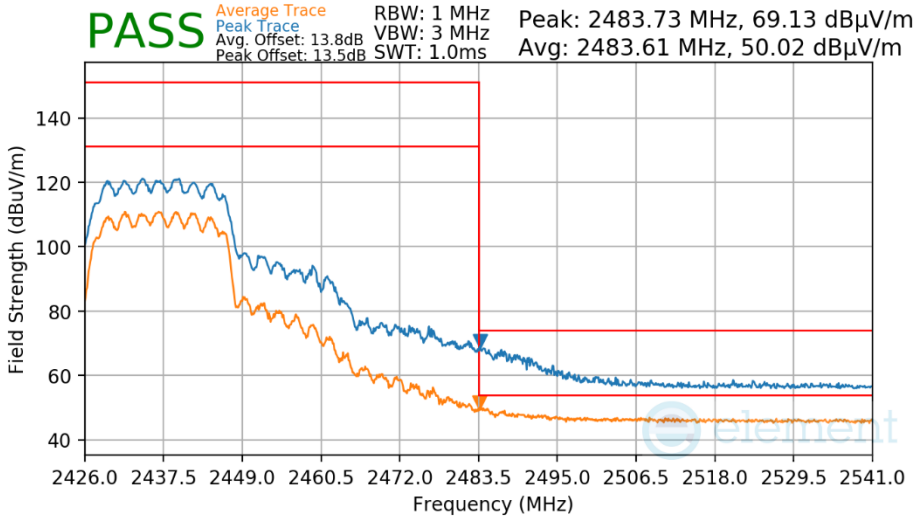
Plot 7-690 Radiated Restricted Lower Band Edge Measurement CDD

Mode	802.11ax-SU
Data Rate	MCS2
Distance of Measurement	3 Meters
Operating Frequency	2437MHz
Channel	6



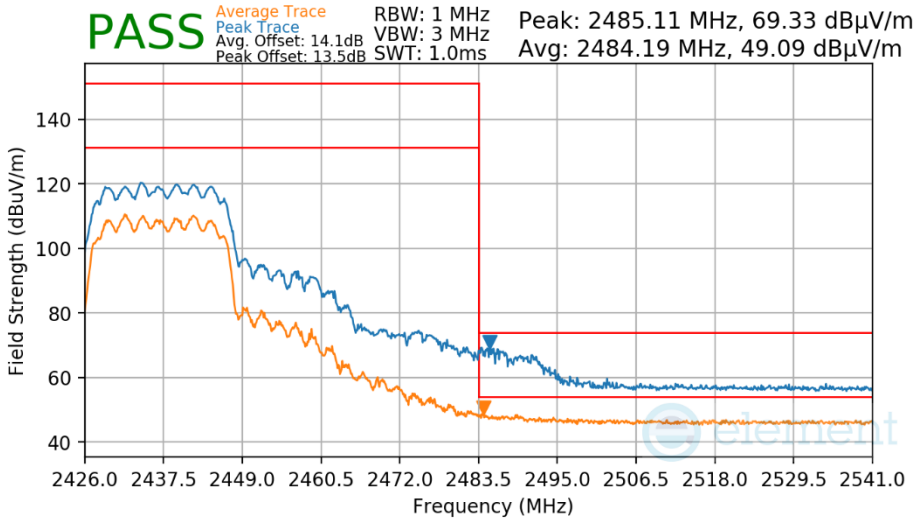
Plot 7-691 Radiated Restricted Upper Band Edge Measurement CDD

Mode	802.11ax-SU
Data Rate	MCS4
Distance of Measurement	3 Meters
Operating Frequency	2437MHz
Channel	6



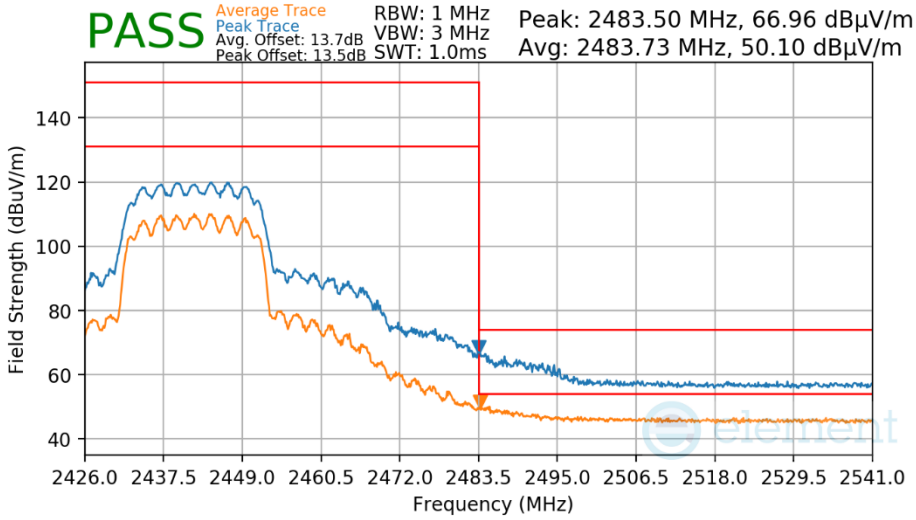
Plot 7-692 Radiated Restricted Upper Band Edge Measurement CDD

Mode	802.11ax-SU
Data Rate	MCS9
Distance of Measurement	3 Meters
Operating Frequency	2437MHz
Channel	6



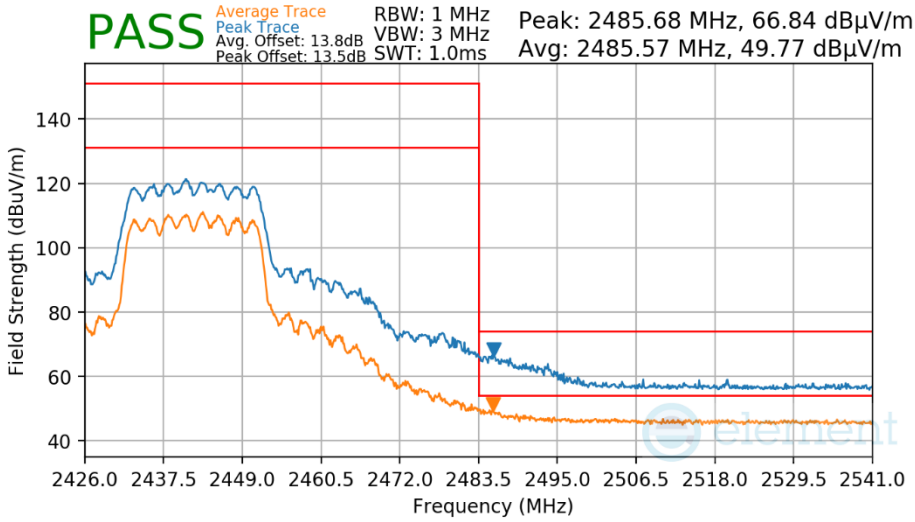
Plot 7-693 Radiated Restricted Upper Band Edge Measurement CDD

Mode	802.11ax-SU
Data Rate	MCS2
Distance of Measurement	3 Meters
Operating Frequency	2442MHz
Channel	7



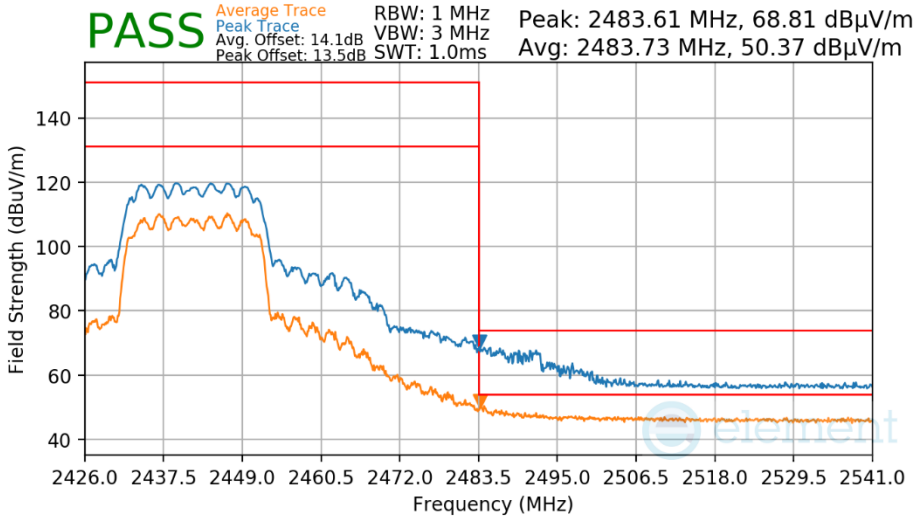
Plot 7-694 Radiated Restricted Upper Band Edge Measurement CDD

Mode	802.11ax-SU
Data Rate	MCS4
Distance of Measurement	3 Meters
Operating Frequency	2442MHz
Channel	7



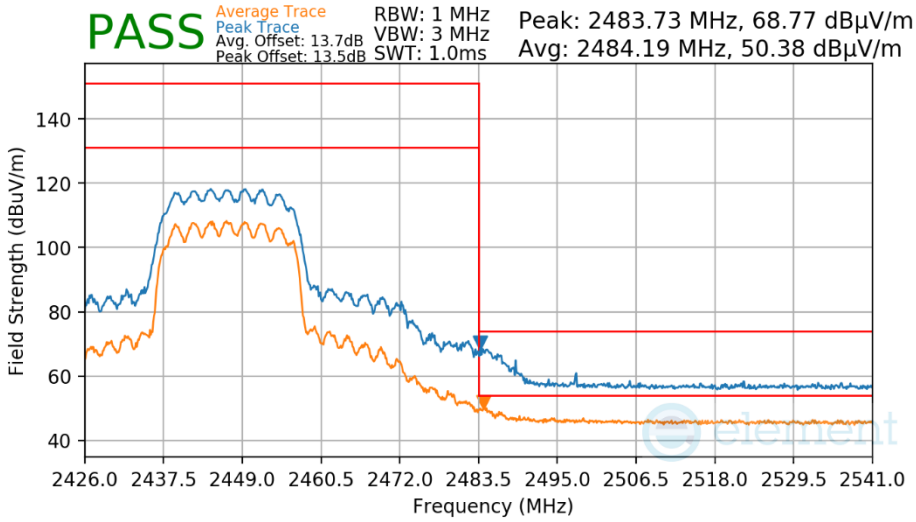
Plot 7-695 Radiated Restricted Upper Band Edge Measurement CDD

Mode	802.11ax-SU
Data Rate	MCS9
Distance of Measurement	3 Meters
Operating Frequency	2442MHz
Channel	7



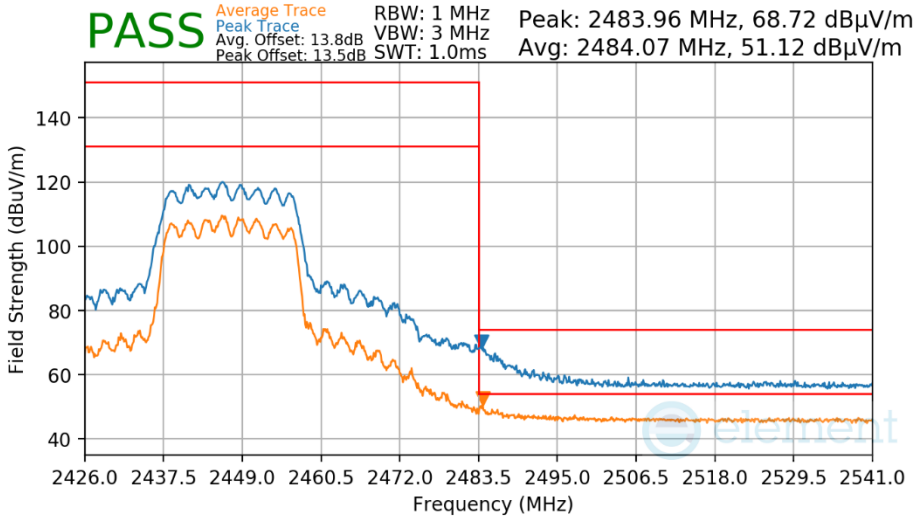
Plot 7-696 Radiated Restricted Upper Band Edge Measurement CDD

Mode	802.11ax-SU
Data Rate	MCS2
Distance of Measurement	3 Meters
Operating Frequency	2447MHz
Channel	8



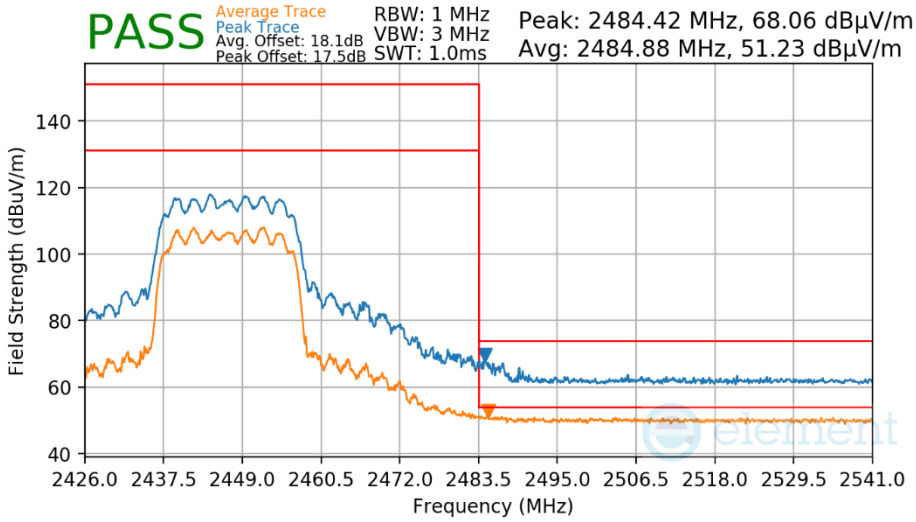
Plot 7-697 Radiated Restricted Upper Band Edge Measurement CDD

Mode	802.11ax-SU
Data Rate	MCS4
Distance of Measurement	3 Meters
Operating Frequency	2447MHz
Channel	8



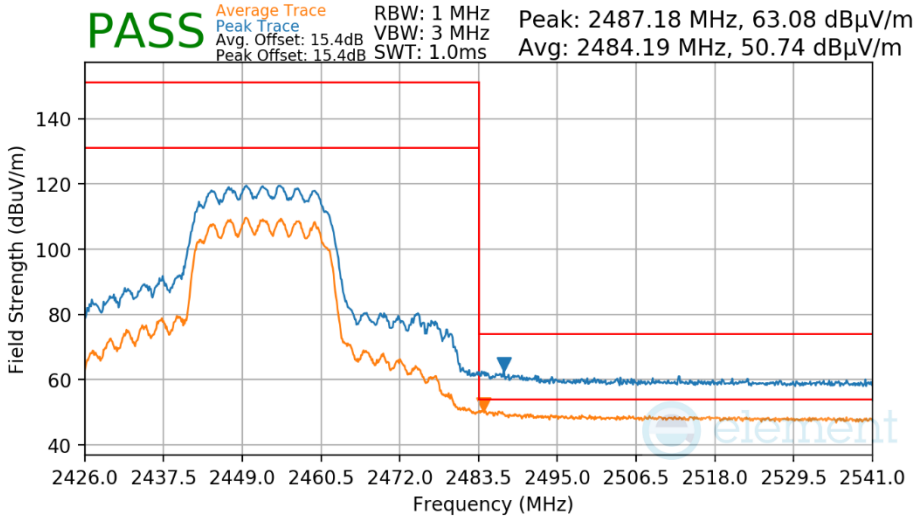
Plot 7-698 Radiated Restricted Upper Band Edge Measurement CDD

Mode	802.11ax-SU
Data Rate	MCS9
Distance of Measurement	3 Meters
Operating Frequency	2447MHz
Channel	8



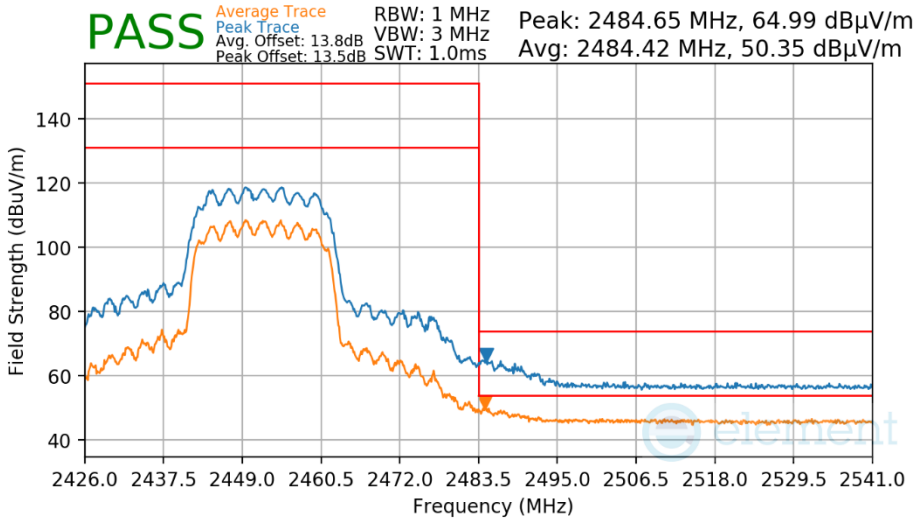
Plot 7-699 Radiated Restricted Upper Band Edge Measurement CDD

Mode	802.11ax-SU
Data Rate	MCS2
Distance of Measurement	3 Meters
Operating Frequency	2452MHz
Channel	9



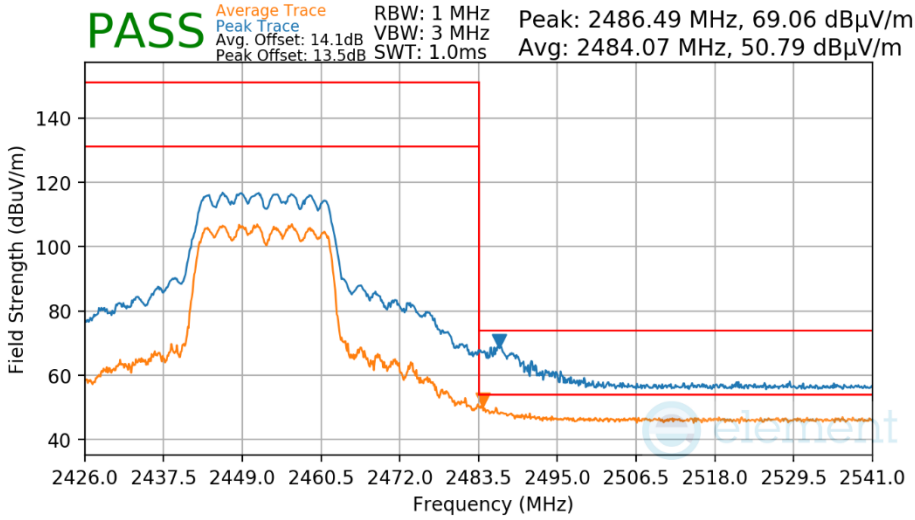
Plot 7-700 Radiated Restricted Upper Band Edge Measurement CDD

Mode	802.11ax-SU
Data Rate	MCS4
Distance of Measurement	3 Meters
Operating Frequency	2452MHz
Channel	9



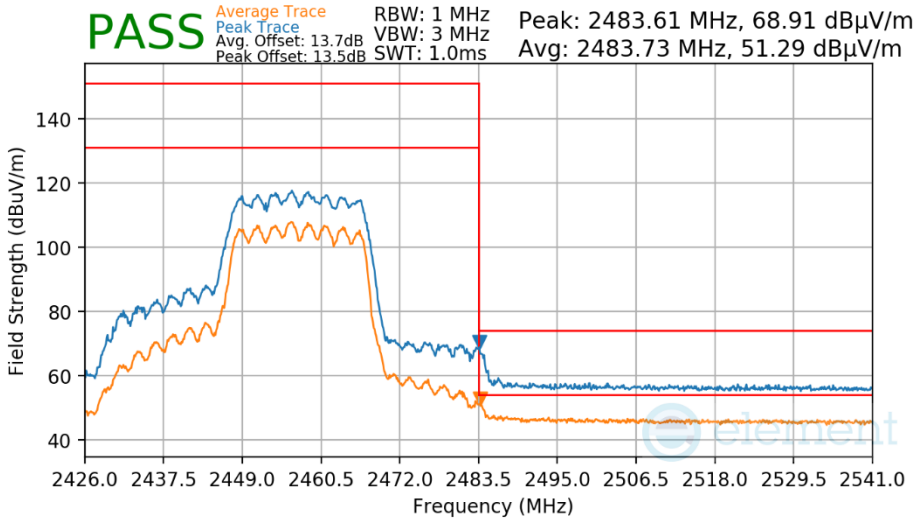
Plot 7-701 Radiated Restricted Upper Band Edge Measurement CDD

Mode	802.11ax-SU
Data Rate	MCS9
Distance of Measurement	3 Meters
Operating Frequency	2452MHz
Channel	9



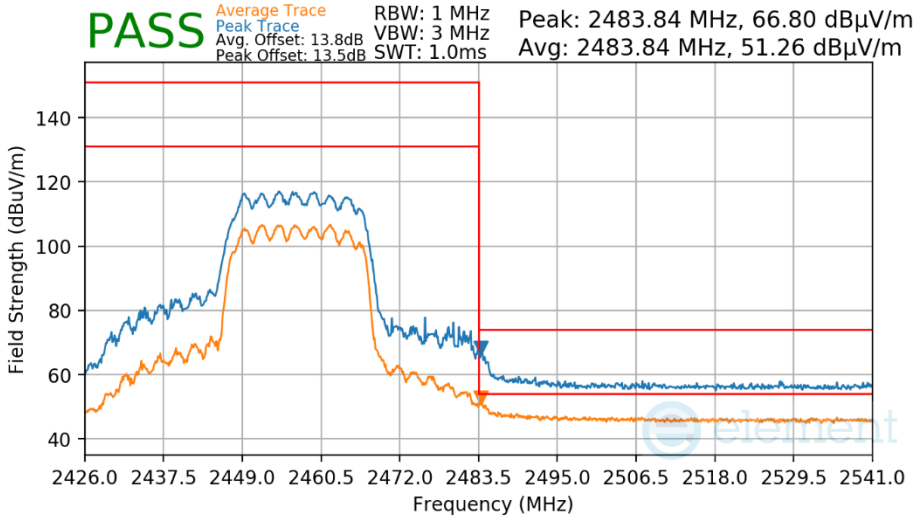
Plot 7-702 Radiated Restricted Upper Band Edge Measurement CDD

Mode	802.11ax-SU
Data Rate	MCS2
Distance of Measurement	3 Meters
Operating Frequency	2457MHz
Channel	10



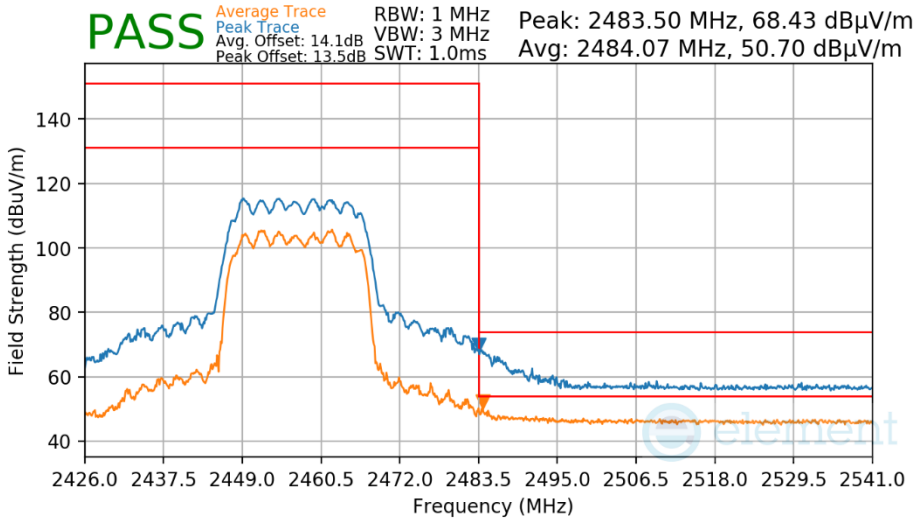
Plot 7-703 Radiated Restricted Upper Band Edge Measurement CDD

Mode	802.11ax-SU
Data Rate	MCS4
Distance of Measurement	3 Meters
Operating Frequency	2457MHz
Channel	10



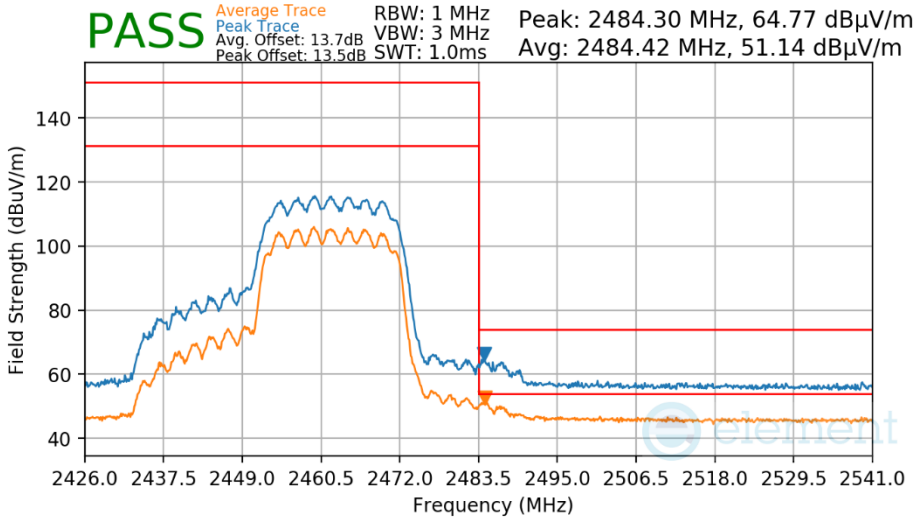
Plot 7-704 Radiated Restricted Upper Band Edge Measurement CDD

Mode	802.11ax-SU
Data Rate	MCS9
Distance of Measurement	3 Meters
Operating Frequency	2457MHz
Channel	10



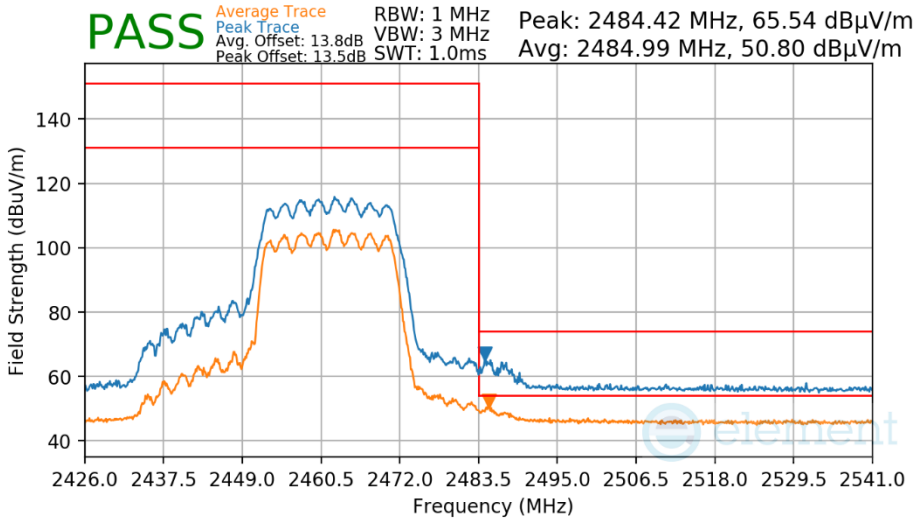
Plot 7-705 Radiated Restricted Upper Band Edge Measurement CDD

Mode	802.11ax-SU
Data Rate	MCS2
Distance of Measurement	3 Meters
Operating Frequency	2462MHz
Channel	11



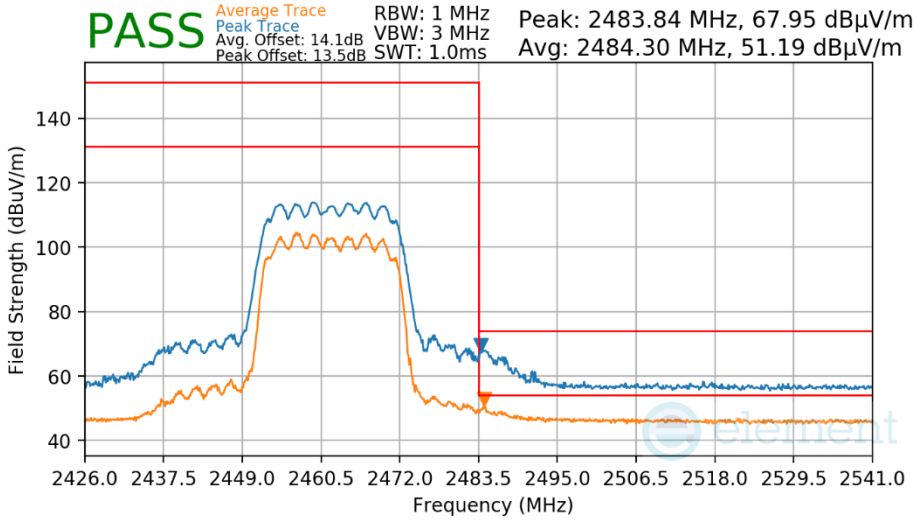
Plot 7-706 Radiated Restricted Upper Band Edge Measurement CDD

Mode	802.11ax-SU
Data Rate	MCS4
Distance of Measurement	3 Meters
Operating Frequency	2462MHz
Channel	11



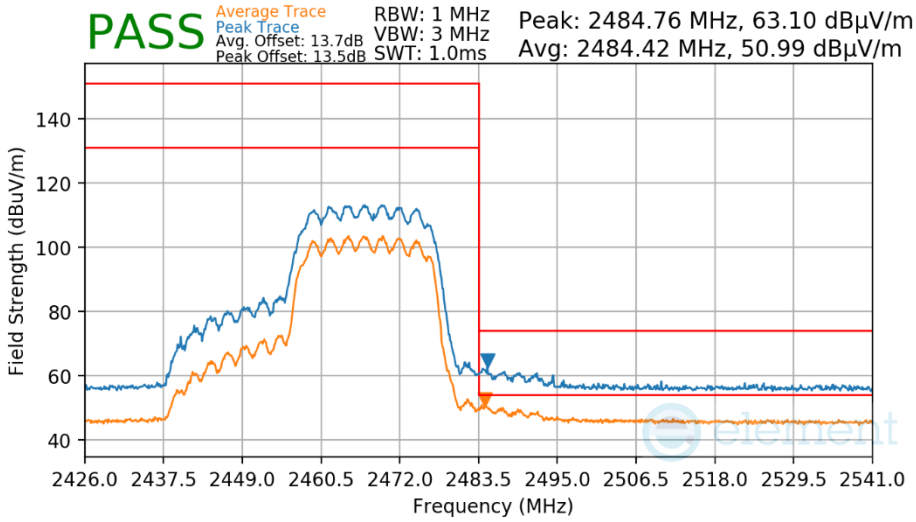
Plot 7-707 Radiated Restricted Upper Band Edge Measurement CDD

Mode	802.11ax-SU
Data Rate	MCS9
Distance of Measurement	3 Meters
Operating Frequency	2462MHz
Channel	11



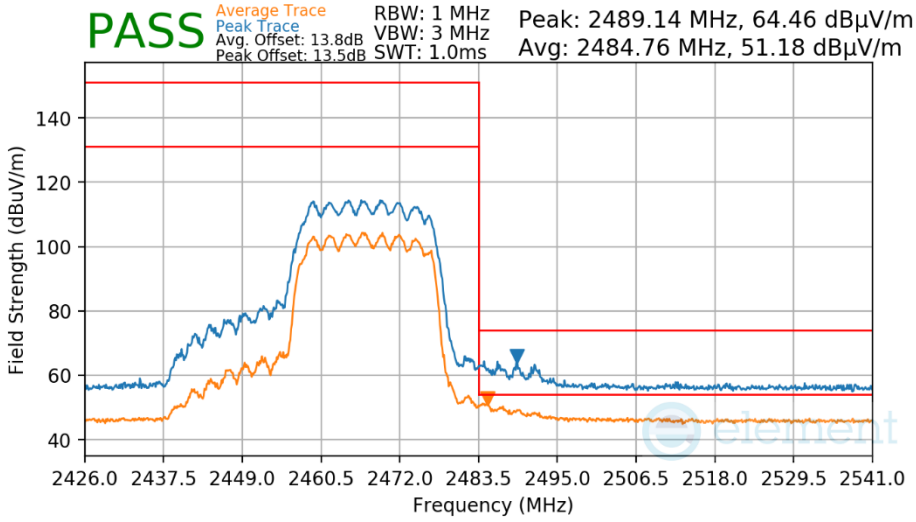
Plot 7-708 Radiated Restricted Upper Band Edge Measurement CDD

Mode	802.11ax-SU
Data Rate	MCS2
Distance of Measurement	3 Meters
Operating Frequency	2467MHz
Channel	12



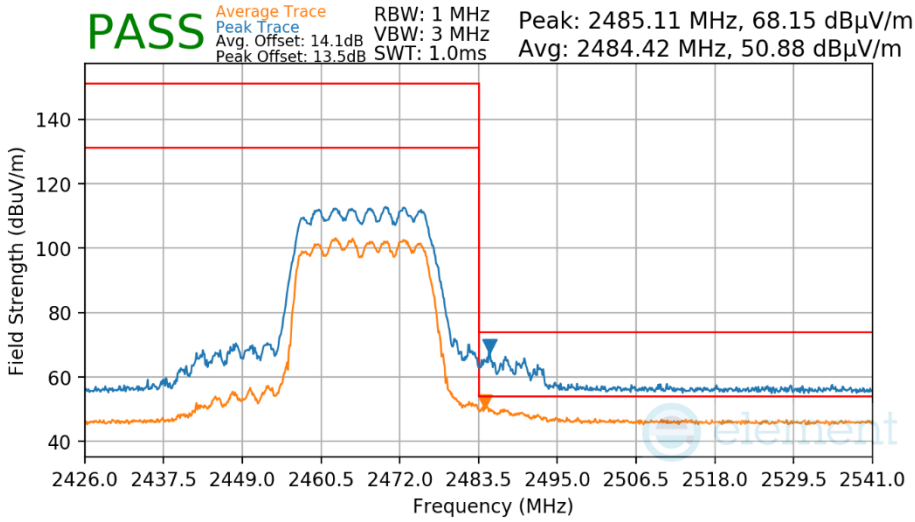
Plot 7-709 Radiated Restricted Upper Band Edge Measurement CDD

Mode	802.11ax-SU
Data Rate	MCS4
Distance of Measurement	3 Meters
Operating Frequency	2467MHz
Channel	12



Plot 7-710 Radiated Restricted Upper Band Edge Measurement CDD

Mode	802.11ax-SU
Data Rate	MCS9
Distance of Measurement	3 Meters
Operating Frequency	2467MHz
Channel	12



Plot 7-711 Radiated Restricted Upper Band Edge Measurement CDD

7.8 Radiated Spurious Emissions – Below 1GHz

§15.209; RSS-Gen [8.9]

Test Overview and Limit

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for radiated spurious emissions. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR and Table 7 of RSS-Gen (8.10) must not exceed the limits shown in Table 7-66 per Section 15.209 and RSS-Gen (8.9).

Frequency	Field Strength [µV/m]	Measured Distance [Meters]
0.009 – 0.490 MHz	2400/F (kHz)	300
0.490 – 1.705 MHz	24000/F (kHz)	30
1.705 – 30.00 MHz	30	30
30.00 – 88.00 MHz	100	3
88.00 – 216.0 MHz	150	3
216.0 – 960.0 MHz	200	3
Above 960.0 MHz	500	3

Table 7-66. Radiated Limits

Test Procedures Used

ANSI C63.10-2020

Test Settings

Quasi-Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 120kHz (for emissions from 30MHz – 1GHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 120kHz (for emissions from 30MHz – 1GHz)
3. VBW = 300kHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold

Test Setup

The EUT and measurement equipment were set up as shown in the diagrams below.

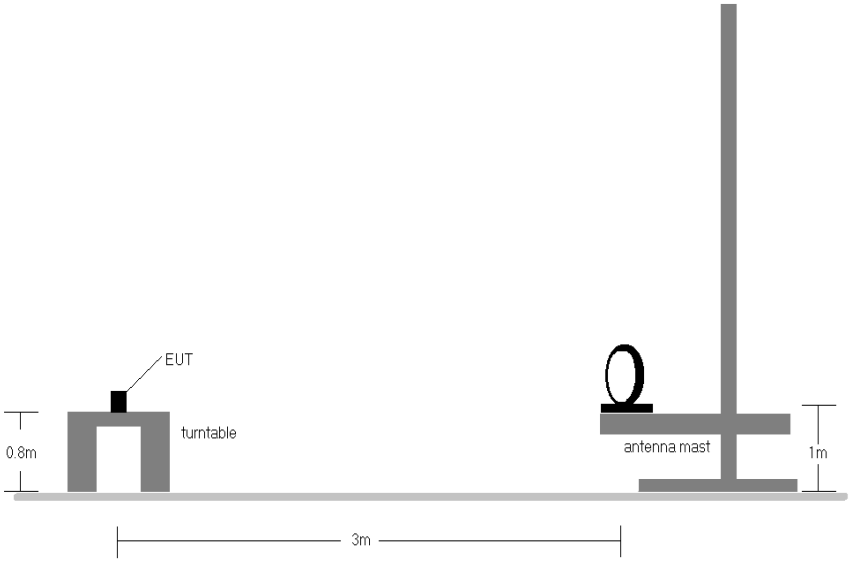


Figure 7-7. Radiated Test Setup < 30Mhz

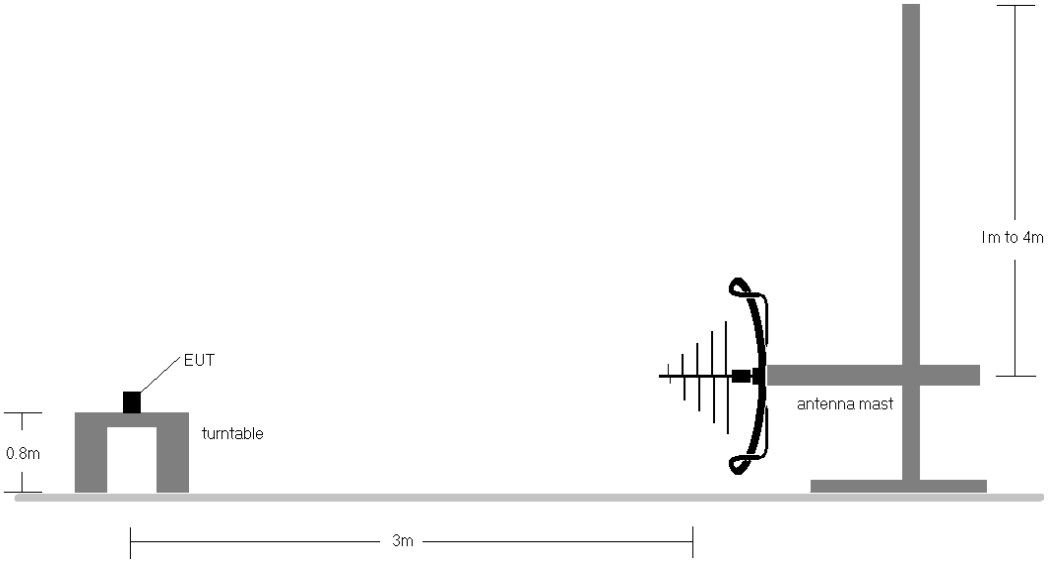


Figure 7-8. Radiated Test Setup < 1GHz

Test Notes

1. All emissions lying in restricted bands specified in §15.205 and RSS-Gen(8.10) are below the limit shown in Table 7-66.
2. The broadband receive antenna is manipulated through vertical and horizontal polarizations during the tests. The EUT is manipulated through three orthogonal planes. For below 30MHz the loop antenna was positioned in 3 orthogonal planes (X front, Y side, Z top) to determine the orientation resulting in the worst case emissions.
3. This unit was tested with its standard battery.
4. The spectrum is investigated using a peak detector and final measurements are recorded using CISPR quasi peak detector for emissions within 6dB of the limit.
5. Emissions were measured at a 3 meter test distance.
6. Emissions are investigated while operating on the center channel of the mode, band, and modulation that produced the worst case results during the transmitter spurious emissions testing.
7. Both configurations below were investigated, and the worst case has been reported.
    a. EUT powered by AC/DC adaptor via USB-C cable with wire charger
    b. EUT powered by host PC via USB-C cable with wire charger
8. The results recorded using the broadband antenna is known to correlate with the results obtained by using a tuned dipole with an acceptable degree of accuracy. The VSWR for the measurement antenna was found to be less than 2:1.
9. The unit was tested with all possible modes and only the highest emission is reported.
10. All antenna configurations were investigated and only the worst case is reported.
11. No spurious emissions were detected within 20dB of the limit below 30MHz.

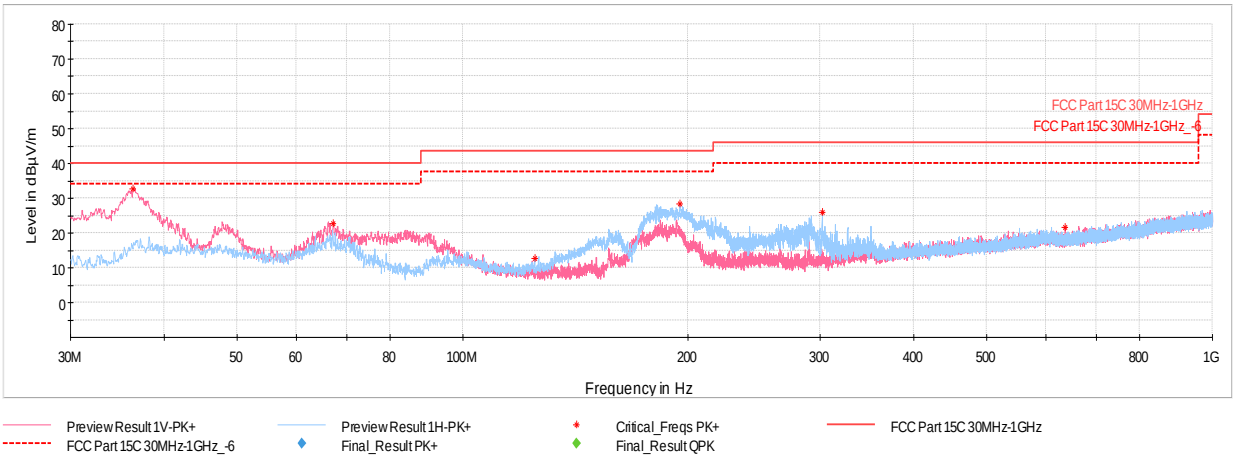
Sample Calculations

Determining Spurious Emissions Levels

- Field Strength Level $_{[dB\mu V/m]}$ = Analyzer Level $_{[dBm]}$ + 107 + AFCL $_{[dB/m]}$
- AFCL $_{[dB/m]}$ = Antenna Factor $_{[dB/m]}$ + Cable Loss $_{[dB]}$ – Preamplifier Gain $_{[dB]}$
- Margin $_{[dB]}$ = Field Strength Level $_{[dB\mu V/m]}$ – Limit $_{[dB\mu V/m]}$

CDD Radiated Spurious Emissions Measurements (Below 1GHz)

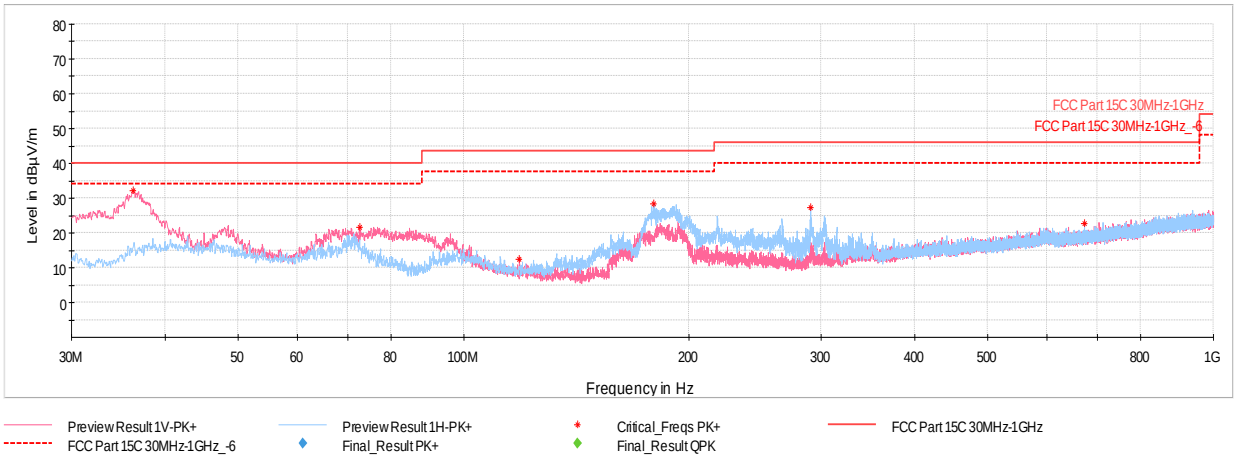
§15.209; RSS-Gen [8.9]



Plot 7-712. Radiated Spurious Emissions below 1GHz CDD 11n Ch.6, with AC/DC adaptor via USB-C cable with wire charger

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
36.35	Max-Peak	V	100	359	-59.43	-14.79	32.78	40.00	-7.22
67.25	Max-Peak	V	100	235	-66.91	-17.31	22.78	40.00	-17.22
124.82	Max-Peak	H	300	128	-75.57	-18.61	12.82	43.52	-30.70
194.80	Max-Peak	H	100	208	-62.36	-16.15	28.49	43.52	-15.03
301.65	Max-Peak	H	100	85	-67.19	-13.85	25.96	46.02	-20.06
636.74	Max-Peak	V	200	130	-78.77	-6.61	21.62	46.02	-24.40

Table 7-67. Radiated Spurious Emissions below 1GHz CDD 11n Ch.6, with AC/DC adaptor via USB-C cable with wire charger



Plot 7-713. Radiated Spurious Emissions below 1GHz CDD 11ax - SU Ch.6, with AC/DC adaptor via USB-C cable with wire charger

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
36.26	Max-Peak	V	100	358	-59.95	-14.82	32.23	40.00	-7.77
72.63	Max-Peak	V	100	225	-65.99	-19.44	21.57	40.00	-18.43
118.71	Max-Peak	V	200	283	-76.75	-17.69	12.56	43.52	-30.96
179.28	Max-Peak	H	200	160	-60.37	-18.12	28.51	43.52	-15.01
290.35	Max-Peak	H	100	250	-65.57	-14.09	27.34	46.02	-18.68
673.55	Max-Peak	H	100	267	-78.38	-6.00	22.62	46.02	-23.40

Table 7-68. Radiated Spurious Emissions below 1GHz CDD 11ax - SU Ch.6, with AC/DC adaptor via USB-C cable with wire charger

7.9 AC Line-Conducted Emissions Measurement

§15.207; RSS-Gen [8.8]

Test Overview and Limit

All AC line conducted spurious emissions are measured with a receiver connected to a grounded LISN while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for AC Line conducted spurious emissions. Only the conducted emissions of the configuration that produced the worst case emissions are reported in this section.

All conducted emissions must not exceed the limits shown in the table below, per Section 15.207 and RSS-Gen (8.8).

Frequency of emission (MHz)	Conducted Limit (dBµV)	
	Quasi-peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50

Table 7-69. Conducted Limits

*Decreases with the logarithm of the frequency.

Test Procedures Used

ANSI C63.10-2020, Subclause 6.2

Test Settings

Quasi-Peak Measurements

1. Analyzer center frequency was set to the frequency of the spurious emission of interest
2. RBW = 9kHz (for emissions from 150kHz – 30MHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

Average Measurements

1. Analyzer center frequency was set to the frequency of the spurious emission of interest
2. RBW = 9kHz (for emissions from 150kHz – 30MHz)
3. Detector = RMS
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

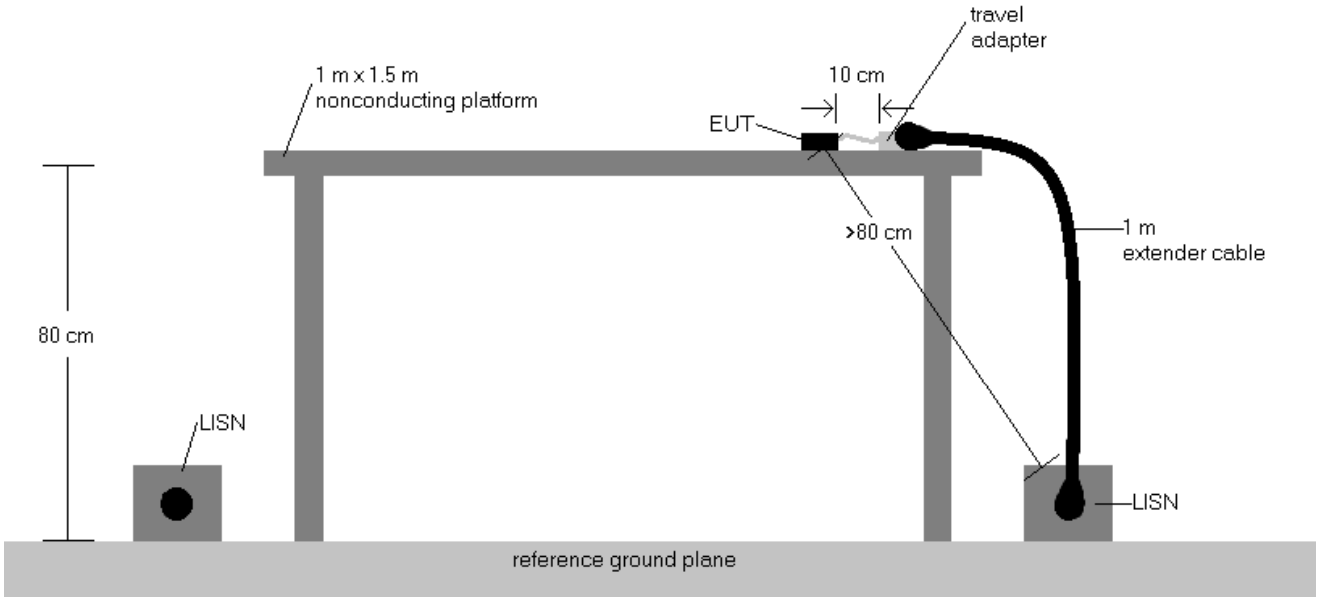
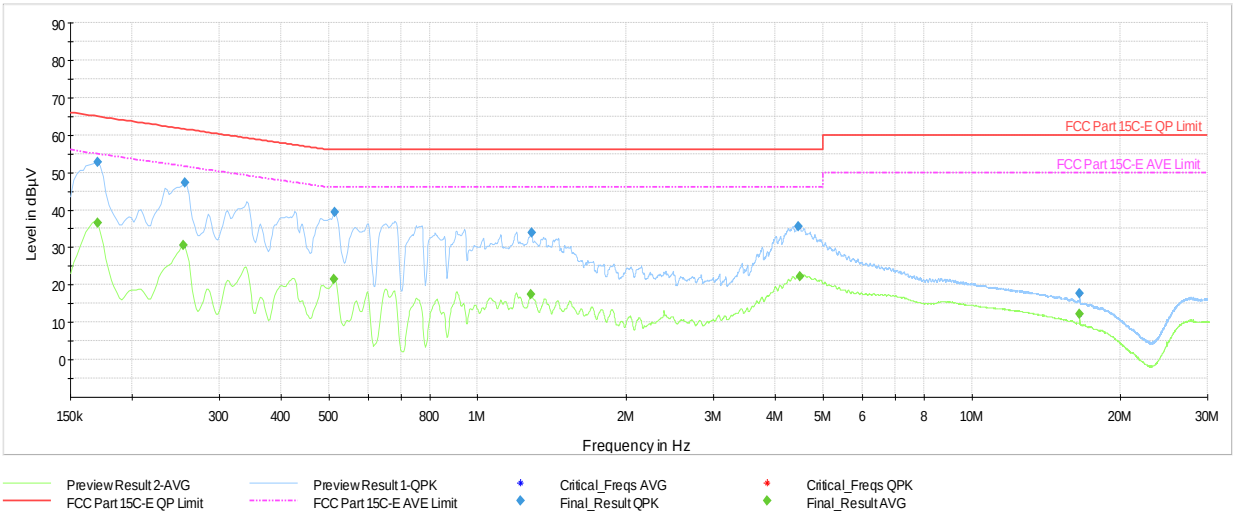


Figure 7-9. Test Instrument & Measurement Setup

Test Notes

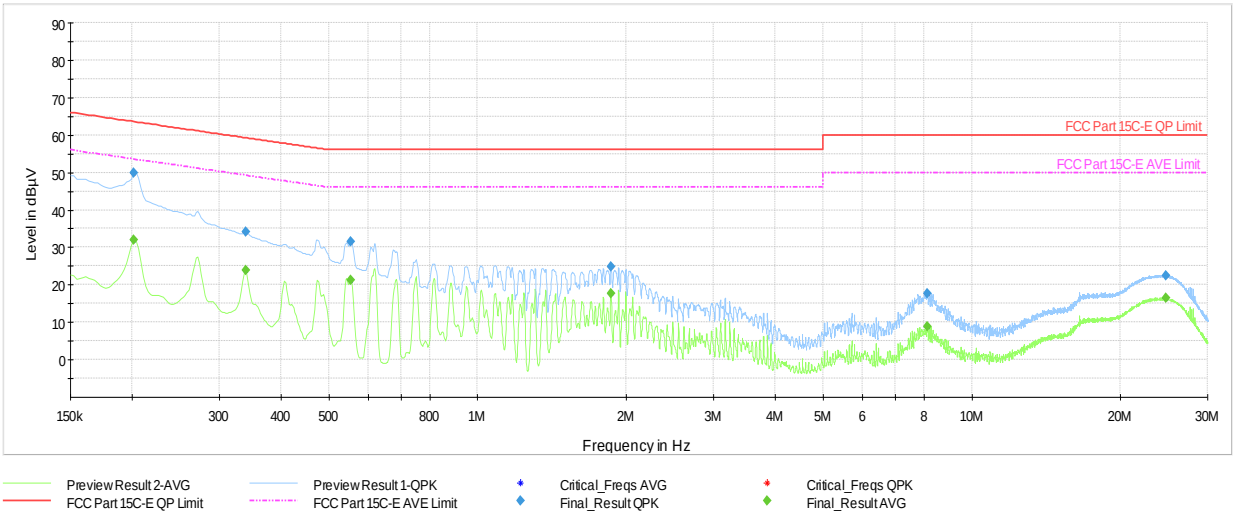
1. All modes of operation were investigated and the worst-case emissions are reported. The emissions found were not affected by the choice of channel used during testing.
2. Both configurations below were investigated, and the worst case has been reported.
   a. EUT powered by AC/DC adaptor via USB-C cable with wire charger
   b. EUT powered by host PC via USB-C cable with wire charger
3. The limit for an intentional radiator from 150kHz to 30MHz are specified in Part 15.207 and RSS-Gen(8.8).
4. Corr. (dB) = Cable loss (dB) + LISN insertion factor (dB)
5. QP/AV Level (dBµV) = QP/AV Analyzer/Receiver Level (dBµV) + Corr. (dB)
6. Margin (dB) = QP/AV Level (dBµV) - QP/AV Limit (dBµV)
7. Traces shown in plot are made using quasi peak and average detectors.
8. Deviations to the Specifications: None.
9. The unit was tested with all possible modes and only the highest emission is reported.



Plot 7-714. AC Line Conducted Plot with CDD 11n Ch.6 (L1, with AC/DC adaptor via USB-C cable with wire charger)

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.170	FINAL	—	36.52	54.95	-18.42	L1	GND
0.170	FINAL	52.9	—	64.95	-12.09	L1	GND
0.254	FINAL	—	30.50	51.64	-21.14	L1	GND
0.256	FINAL	47.4	—	61.57	-14.22	L1	GND
0.512	FINAL	—	21.48	46.00	-24.52	L1	GND
0.515	FINAL	39.4	—	56.00	-16.58	L1	GND
1.280	FINAL	—	17.56	46.00	-28.44	L1	GND
1.286	FINAL	33.8	—	56.00	-22.21	L1	GND
4.450	FINAL	35.6	—	56.00	-20.38	L1	GND
4.486	FINAL	—	22.33	46.00	-23.67	L1	GND
16.541	FINAL	—	12.12	50.00	-37.88	L1	GND
16.541	FINAL	17.6	—	60.00	-42.43	L1	GND

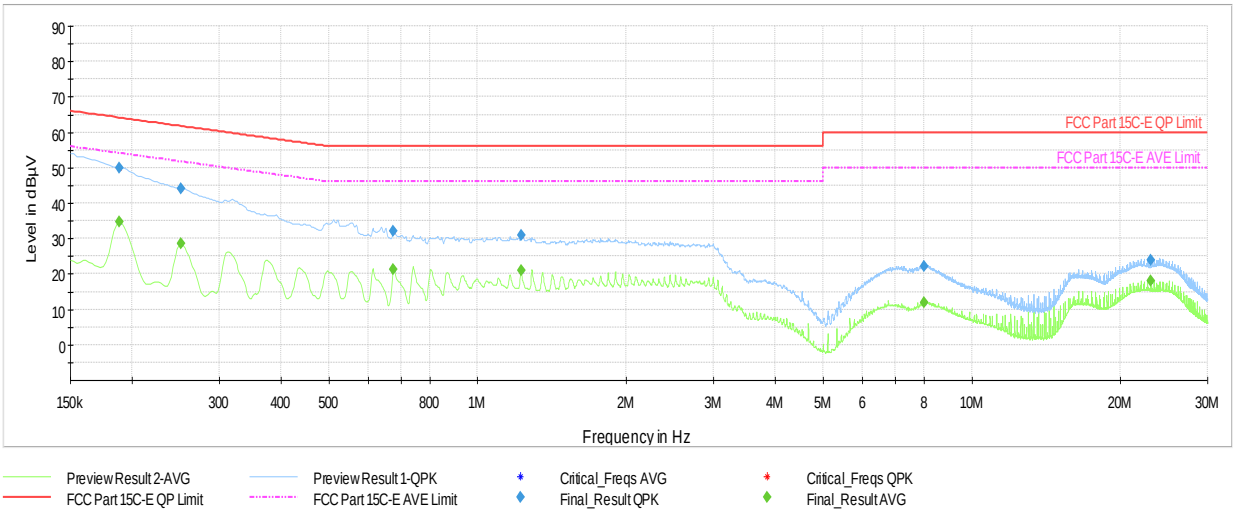
Table 7-70. AC Line Conducted Data with CDD 11n Ch.6 (L1, with AC/DC adaptor via USB-C cable with wire charger)



Plot 7-715. AC Line Conducted Plot with CDD 11n Ch.6 (N, with AC/DC adaptor via USB-C cable with wire charger)

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.202	FINAL	—	31.97	53.54	-21.57	N	GND
0.202	FINAL	49.8	—	63.54	-13.72	N	GND
0.339	FINAL	—	23.87	49.23	-25.36	N	GND
0.339	FINAL	34.2	—	59.23	-25.07	N	GND
0.553	FINAL	—	21.15	46.00	-24.85	N	GND
0.553	FINAL	31.5	—	56.00	-24.46	N	GND
1.860	FINAL	—	17.59	46.00	-28.41	N	GND
1.862	FINAL	24.8	—	56.00	-31.21	N	GND
8.133	FINAL	17.7	—	60.00	-42.32	N	GND
8.133	FINAL	—	8.95	50.00	-41.05	N	GND
24.684	FINAL	—	16.44	50.00	-33.56	N	GND
24.684	FINAL	22.6	—	60.00	-37.45	N	GND

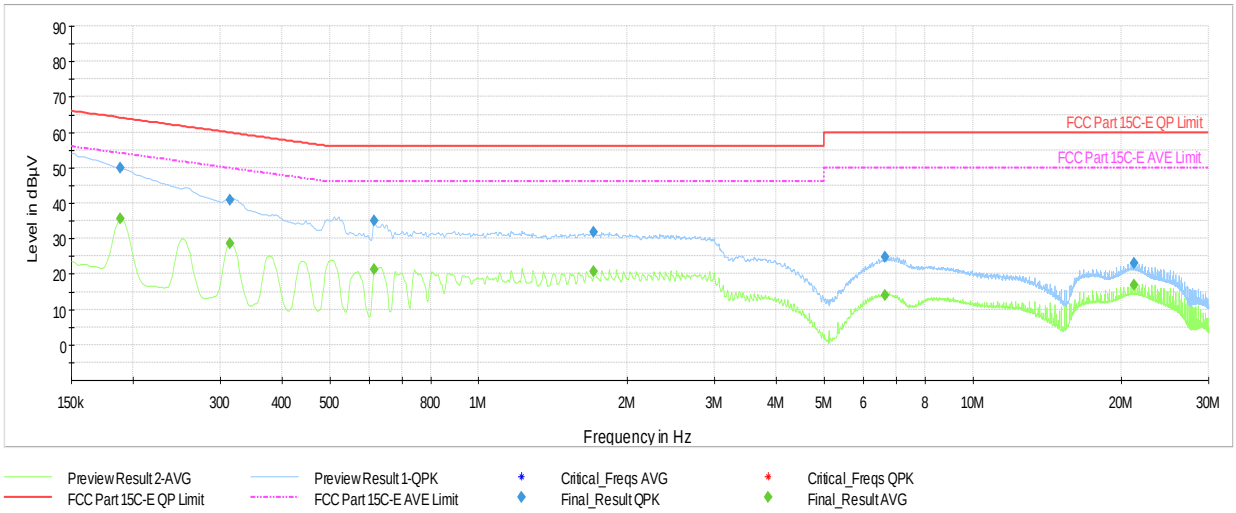
Table 7-71. AC Line Conducted Data with CDD 11n Ch.6 (N, with AC/DC adaptor via USB-C cable with wire charger)



Plot 7-716. AC Line Conducted Plot with CDD 11ax - SU Ch.6 (L1, with host PC via USB-C cable with wire charger)

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.188	FINAL	—	34.83	54.11	-19.29	L1	GND
0.188	FINAL	50.0	—	64.11	-14.13	L1	GND
0.251	FINAL	—	28.50	51.72	-23.22	L1	GND
0.251	FINAL	44.2	—	61.72	-17.57	L1	GND
0.674	FINAL	—	21.42	46.00	-24.58	L1	GND
0.674	FINAL	32.1	—	56.00	-23.95	L1	GND
1.226	FINAL	30.8	—	56.00	-25.17	L1	GND
1.226	FINAL	—	20.95	46.00	-25.05	L1	GND
7.998	FINAL	22.1	—	60.00	-37.94	L1	GND
7.998	FINAL	—	11.78	50.00	-38.22	L1	GND
23.001	FINAL	—	18.11	50.00	-31.89	L1	GND
23.001	FINAL	24.0	—	60.00	-36.01	L1	GND

Table 7-72. AC Line Conducted Data with CDD 11ax - SU Ch.6 (L1, with host PC via USB-C cable with wire charger)



Plot 7-717. AC Line Conducted Plot with CDD 11ax - SU Ch.6 (N, with host PC via USB-C cable with wire charger)

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.188	FINAL	—	35.75	54.11	-18.37	N	GND
0.188	FINAL	49.8	—	64.11	-14.28	N	GND
0.314	FINAL	—	28.60	49.86	-21.26	N	GND
0.314	FINAL	40.8	—	59.86	-19.08	N	GND
0.614	FINAL	—	21.41	46.00	-24.59	N	GND
0.614	FINAL	35.1	—	56.00	-20.94	N	GND
1.712	FINAL	31.7	—	56.00	-24.26	N	GND
1.712	FINAL	—	20.57	46.00	-25.43	N	GND
6.646	FINAL	24.9	—	60.00	-35.13	N	GND
6.646	FINAL	—	13.97	50.00	-36.03	N	GND
21.224	FINAL	—	16.95	50.00	-33.05	N	GND
21.224	FINAL	23.1	—	60.00	-36.89	N	GND

Table 7-73. AC Line Conducted Data with CDD 11ax - SU Ch.6 (N, with host PC via USB-C cable with wire charger)

8.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Apple Tablet Device FCC ID: BCGA2993, IC: 579C-A2993** is in compliance with Part 15 Subpart C (15.247) of the FCC Rules and RSS-247 of the Innovation, Science and Economic Development Canada Rules.