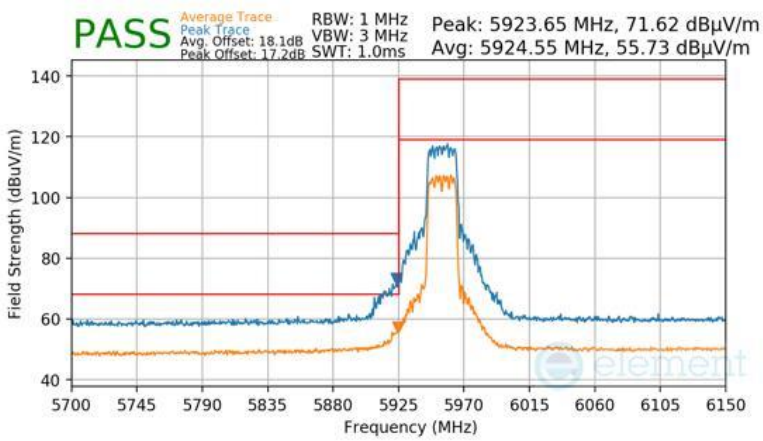
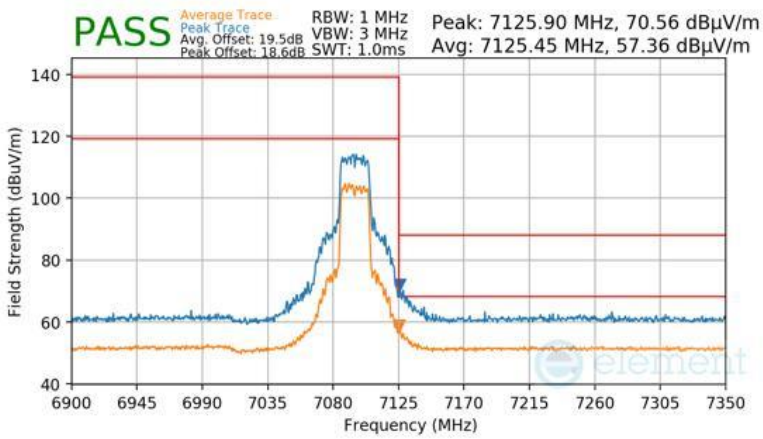
7.7.19 CDD/SDM Diversity Radiated Band Edge Measurements (20MHz BW)

Mode	802.11ax-SU
Data Rate	MCS11
Distance of Measurement	3 Meters
Operating Frequency	5955MHz
Channel	1



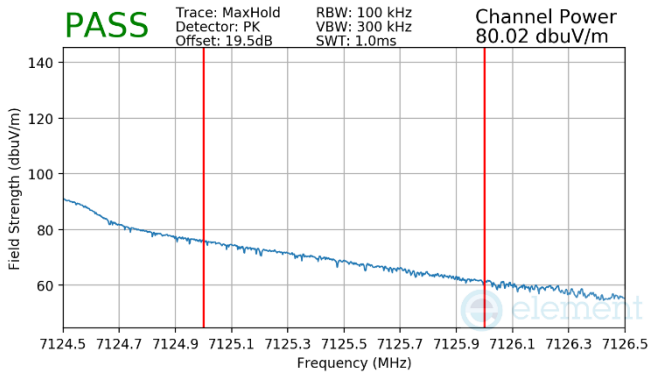
Plot 7-613 CDD/SDM Diversity Radiated Lower Band Edge (Peak & Average – UNII Band 5)

Mode	802.11ax-SU
Data Rate	MCS11
Distance of Measurement	3 Meters
Operating Frequency	7095MHz
Channel	229

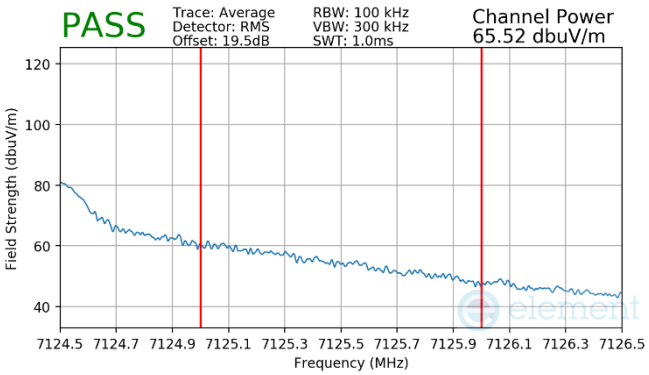


Plot 7-614 CDD/SDM Diversity Radiated Upper Band Edge (Peak & Average – UNII Band 8)

Worst Case Mode:	802.11ax SU
Worst Case Transfer Rate:	MCS11
Distance of Measurements:	3 Meters
Operating Frequency:	7115MHz
Channel:	233



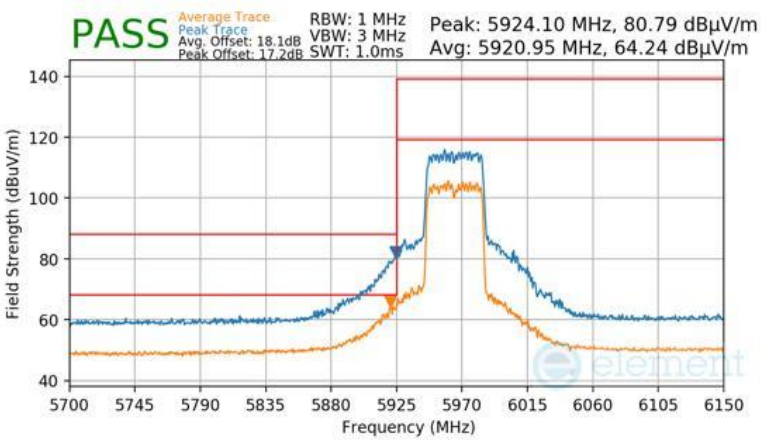
Plot 7-615. CDD/SDM Diversity Radiated Upper Band Edge (Peak – UNII Band 8)



Plot 7-616. CDD/SDM Diversity Radiated Upper Band Edge (Average – UNII Band 8)

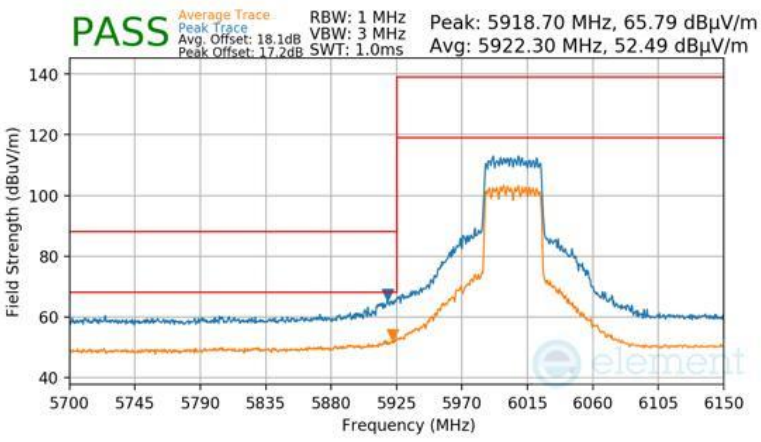
7.7.20 CDD/SDM Diversity Radiated Band Edge Measurements (40MHz BW)

Mode	802.11ax-SU
Data Rate	MCS11
Distance of Measurement	3 Meters
Operating Frequency	5965MHz
Channel	3



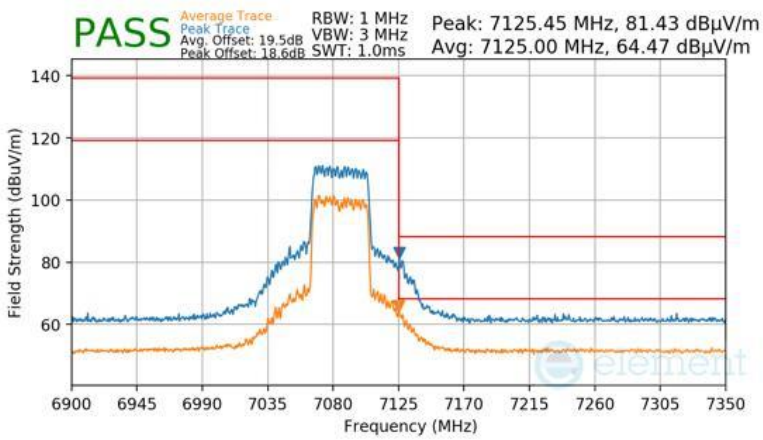
Plot 7-617 CDD/SDM Diversity Radiated Lower Band Edge (Peak & Average – UNII Band 5)

Mode	802.11ax-SU
Data Rate	MCS11
Distance of Measurement	3 Meters
Operating Frequency	6005MHz
Channel	11



Plot 7-618 CDD/SDM Diversity Radiated Lower Band Edge (Peak & Average – UNII Band 5)

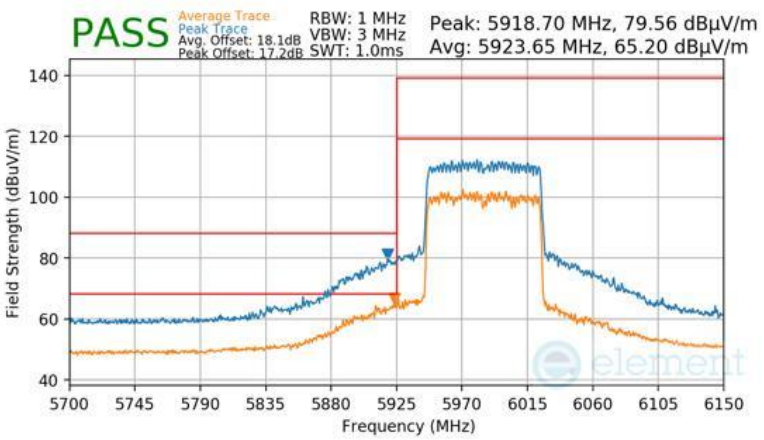
Mode	802.11ax-SU
Data Rate	MCS11
Distance of Measurement	3 Meters
Operating Frequency	7085MHz
Channel	227



Plot 7-619 CDD/SDM Diversity Radiated Upper Band Edge (Peak & Average – UNII Band 8)

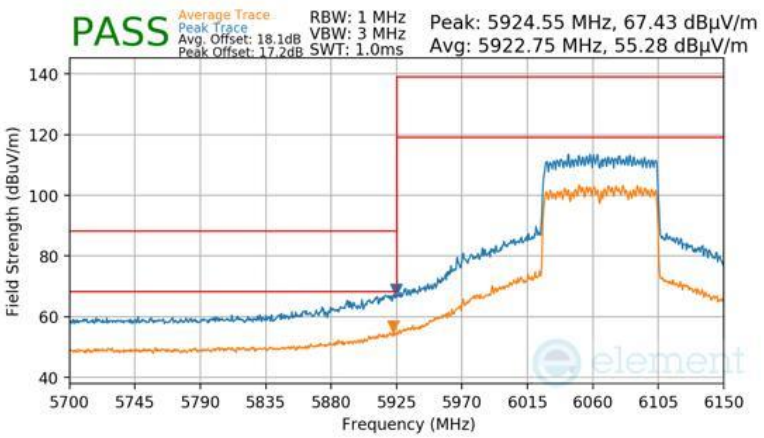
7.7.21 CDD/SDM Diversity Radiated Band Edge Measurements (80MHz BW)

Mode	802.11ax-SU
Data Rate	MCS11
Distance of Measurement	3 Meters
Operating Frequency	5985MHz
Channel	7



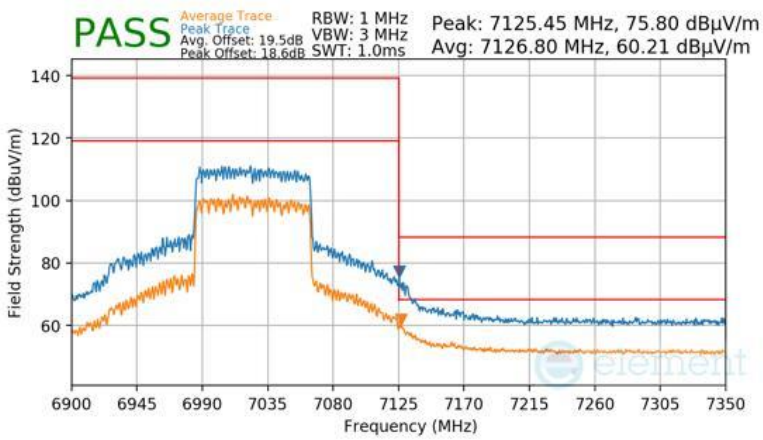
Plot 7-620 CDD/SDM Diversity Radiated Lower Band Edge (Peak & Average – UNII Band 5)

Mode	802.11ax-SU
Data Rate	MCS11
Distance of Measurement	3 Meters
Operating Frequency	6065MHz
Channel	23



Plot 7-621 CDD/SDM Diversity Radiated Lower Band Edge (Peak & Average – UNII Band 5)

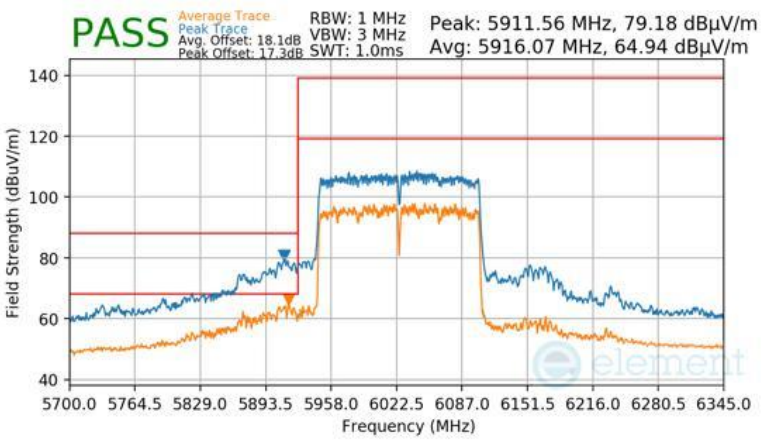
Mode	802.11ax-SU
Data Rate	MCS11
Distance of Measurement	3 Meters
Operating Frequency	7025MHz
Channel	215



Plot 7-622 CDD/SDM Diversity Radiated Upper Band Edge (Peak & Average – UNII Band 8)

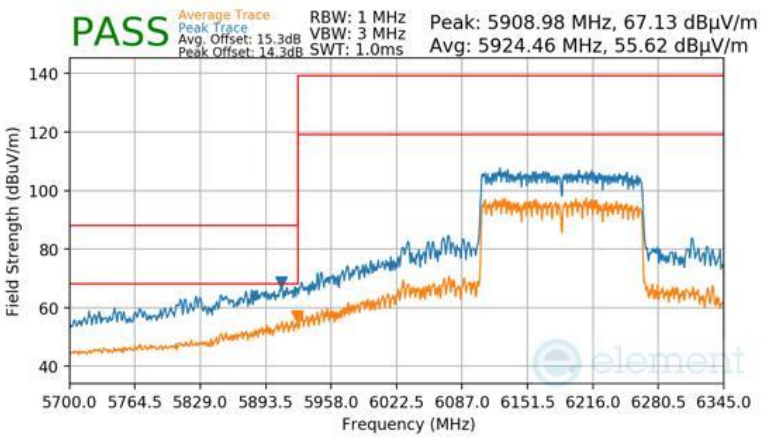
7.7.22 CDD/SDM Diversity Radiated Band Edge Measurements (80MHz BW)

Mode	802.11ax-SU
Data Rate	MCS11
Distance of Measurement	3 Meters
Operating Frequency	6025MHz
Channel	15



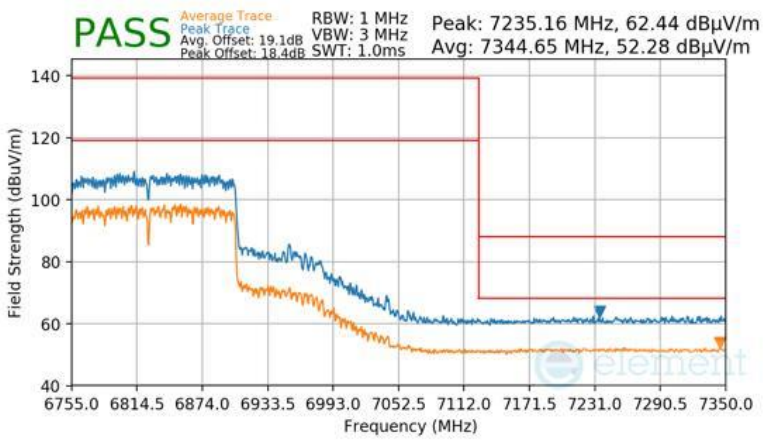
Plot 7-623 CDD/SDM Diversity Radiated Lower Band Edge (Peak & Average – UNII Band 5)

Mode	802.11ax-SU
Data Rate	MCS11
Distance of Measurement	3 Meters
Operating Frequency	6185MHz
Channel	47



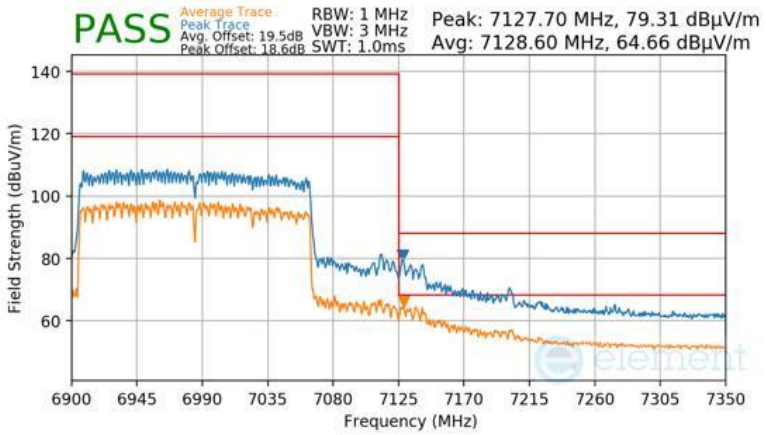
Plot 7-624 CDD/SDM Diversity Radiated Lower Band Edge (Peak & Average – UNII Band 5)

Mode	802.11ax-SU
Data Rate	MCS11
Distance of Measurement	3 Meters
Operating Frequency	6825MHz
Channel	175



Plot 7-625 CDD/SDM Diversity Radiated Upper Band Edge (Peak & Average – UNII Band 7)

Mode	802.11ax-SU
Data Rate	MCS11
Distance of Measurement	3 Meters
Operating Frequency	6985MHz
Channel	207



Plot 7-626 CDD/SDM Diversity Radiated Upper Band Edge (Peak & Average – UNII Band 8)

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 7-96 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 7-96. 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 = quasi-peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Test Setup

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

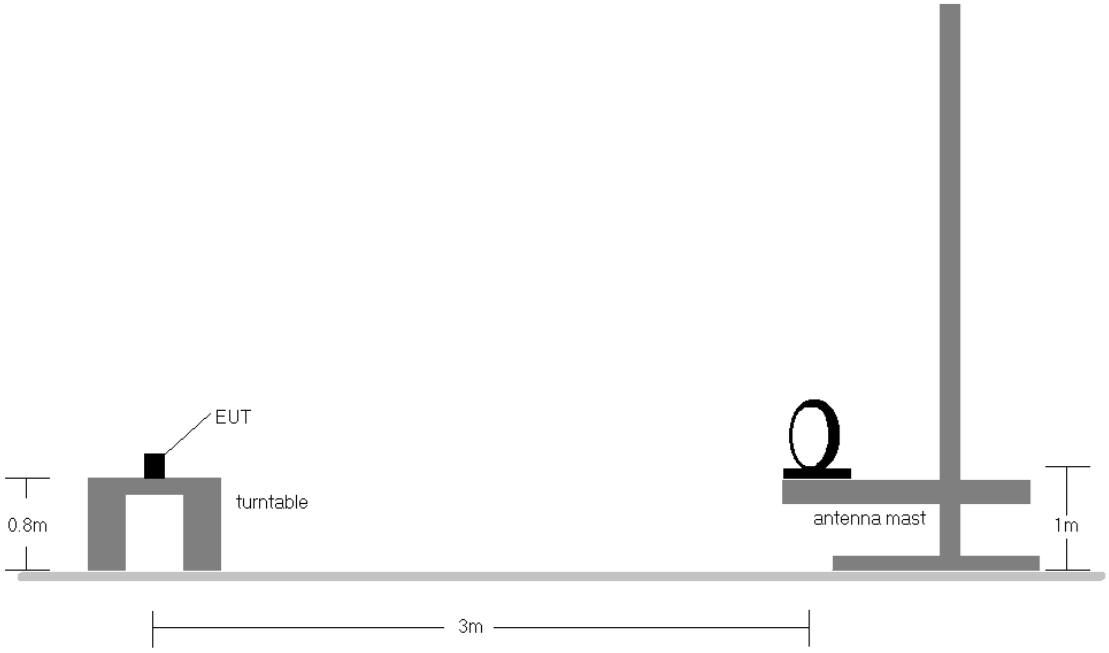


Figure 7-7. Radiated Test Setup < 30MHz

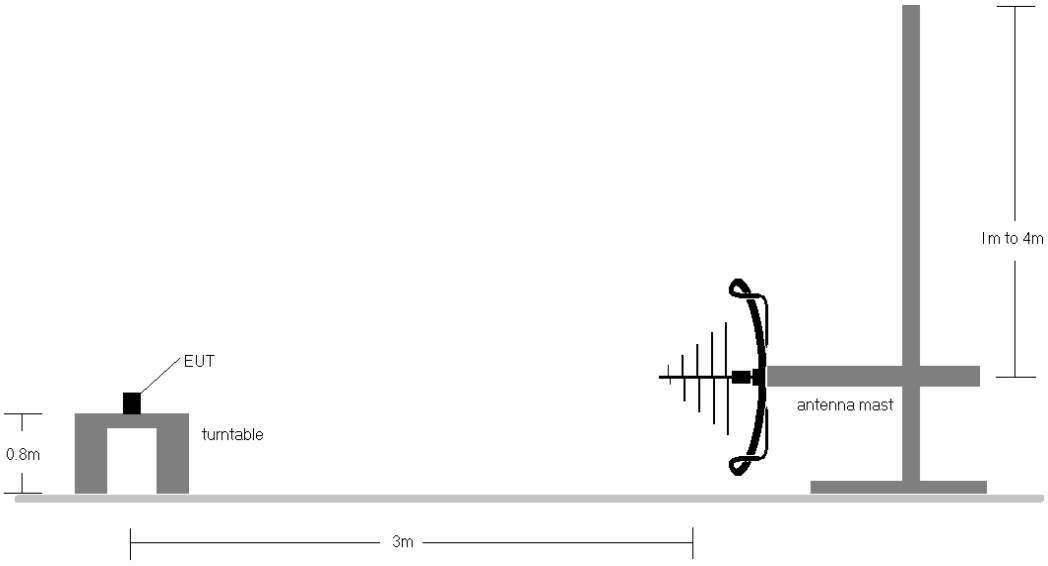


Figure 7-8. Radiated Test Setup < 1GHz

Test Notes

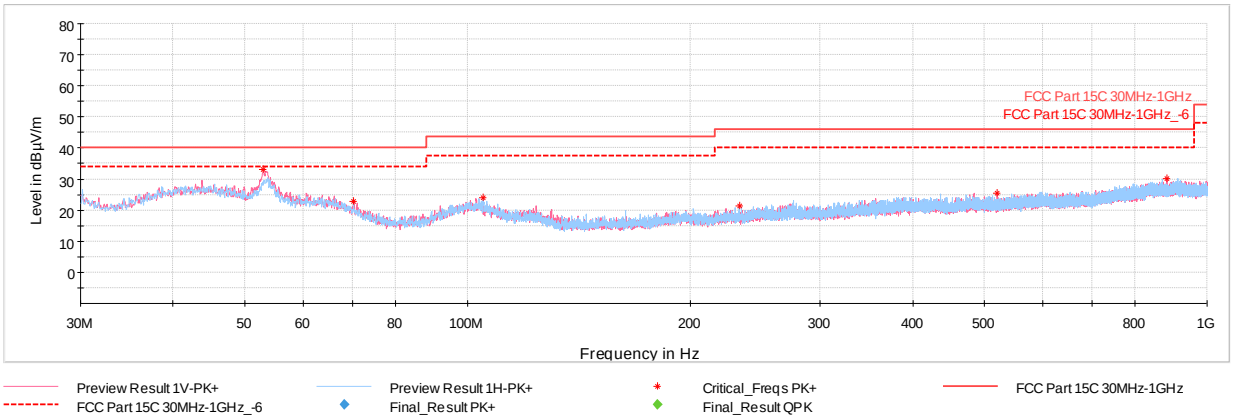
1. All emissions lying in restricted bands specified in §15.205 and RSS-Gen (8.10) are below the limit shown in Table 7-96.
2. The broadband receive antenna is manipulated through vertical and horizontal polarizations during the tests. The EUT is manipulated through three orthogonal planes. For below 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 on emissions that were 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. No spurious emissions were detected within 20dB of the limit below 30MHz.
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. 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
10. All antenna configurations were investigated and only the worst case is reported.
11. The unit was tested with all possible modes and only the highest emission is reported.

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 $_{[dB]}$ - Preamp Gain $_{[dB]}$
- Margin $_{[dB]}$ = Field Strength Level $_{[dB\mu V/m]}$ – Limit $_{[dB\mu V/m]}$

7.8.1 CDD/SDM Primary Radiated Spurious Emissions Measurements (Below 1GHz)

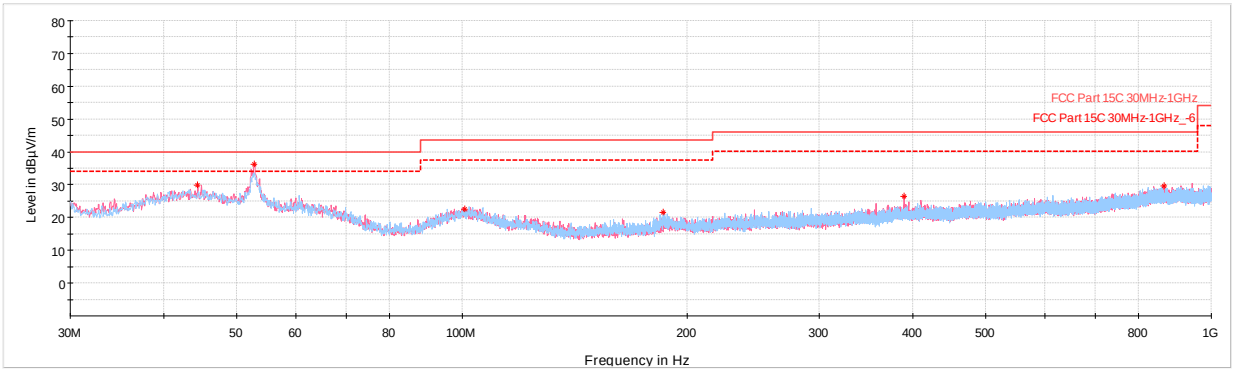


Plot 7-627. Radiated Spurious Emissions below 1GHz CDD/SDM Primary, 802.11ax, Ch.1 with host PC via USB-C cable with wire charger

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]
47.99	Max Peak	V	100	62	-62.21	-14.36	30.43	40.00	-9.57
66.28	Max Peak	V	200	345	-62.79	-17.74	26.47	40.00	-13.53
106.63	Max Peak	V	100	186	-66.04	-16.61	24.35	43.52	-19.17
156.68	Max Peak	H	200	309	-64.48	-19.18	23.34	46.02	-22.68
241.32	Max Peak	H	100	220	-66.44	-14.72	25.84	46.02	-20.18
325.85	Max Peak	H	100	198	-67.20	-12.48	27.32	46.02	-18.70

Table 7-97. Radiated Spurious Emissions Measurement below 1GHz CDD/SDM Primary, 802.11ax, Ch.1 with host PC via USB-C cable with wire charger

7.8.2 CDD/SDM Diversity Radiated Spurious Emissions Measurements (Below 1GHz)



Plot 7-628. Radiated Spurious Emissions below 1GHz CDD/SDM Diversity, 802.11ax, Ch.1 with host PC 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]
44.40	Max Peak	V	200	205	-62.58	-14.66	29.76	40.00	-10.24
52.80	QuasiPeak	V	100	206	-58.92	-14.00	36.21	40.00	-3.79
100.71	Max Peak	V	100	357	-67.92	-16.52	22.56	43.52	-20.96
185.54	Max Peak	H	100	224	-68.25	-17.25	21.50	43.52	-22.02
389.00	Max Peak	V	100	117	-70.00	-10.66	26.34	46.02	-19.68
865.90	Max Peak	V	300	266	-75.32	-2.04	29.64	46.02	-16.38

Table 7-98. Radiated Spurious Emissions Measurement below 1GHz CDD/SDM Diversity, 802.11ax, Ch.1 with host PC via USB-C cable with wire charger

7.9 AC Line-Conducted Emissions Measurement

§15.407; 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 7-99. Conducted Limits

*Decreases with the logarithm of the frequency.

Test Procedures Used

ANSI C63.10-2020, Section 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.

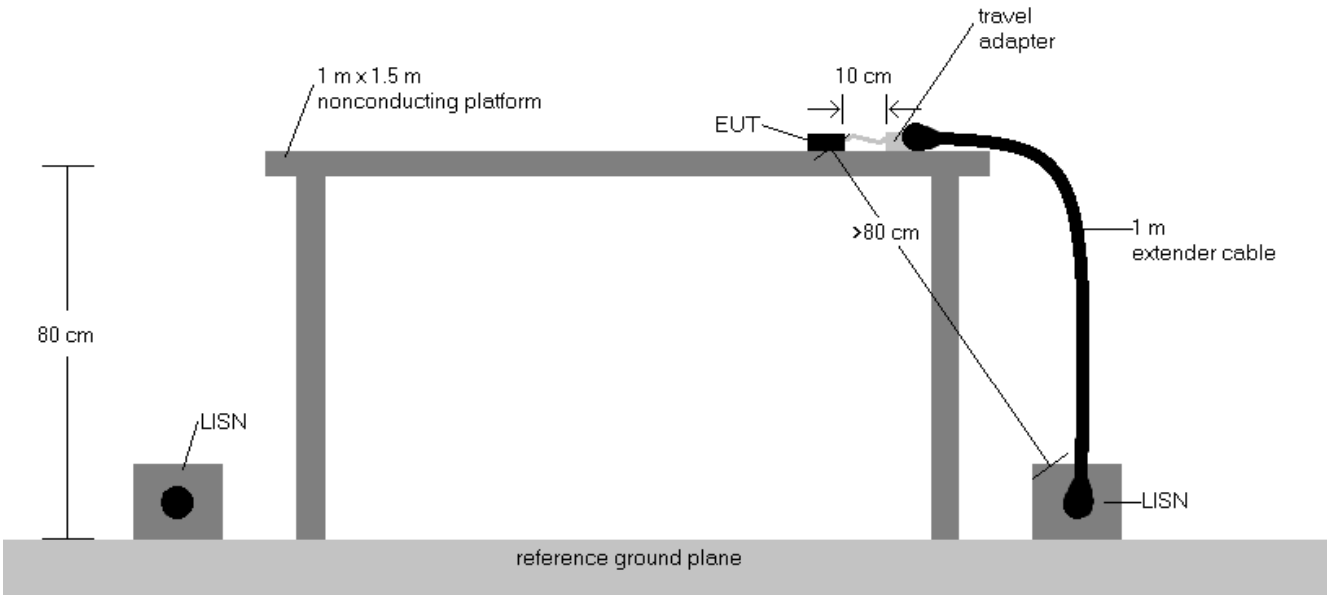
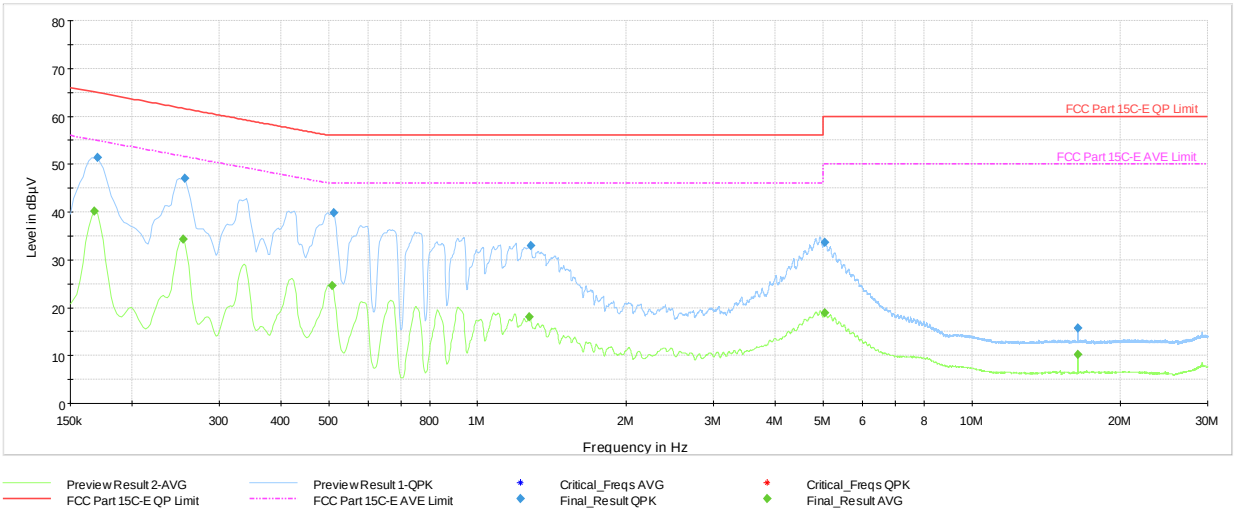


Figure 7-9. Test Instrument & Measurement Setup

Test Notes

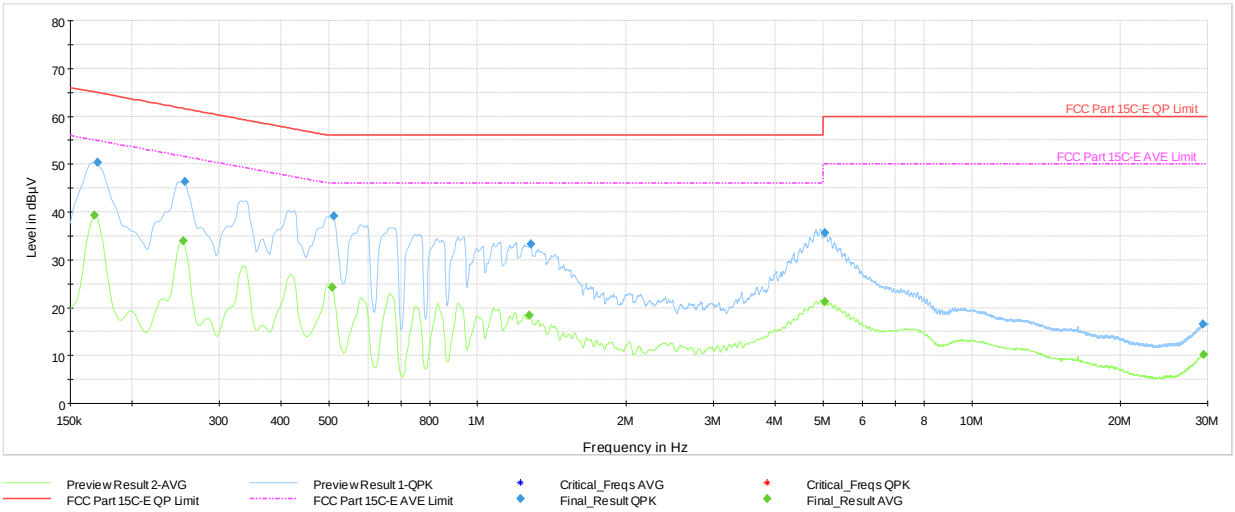
1. All modes of operation were investigated and the worst-case emissions are reported. The emissions found were not affected by the choice of channel used during testing.
2. Both configurations below were investigated, and the worst case has been reported.
    a. EUT powered by AC/DC adaptor via USB-C 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 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) + Correction Factor (dB)
6. Margin (dB) = QP/AV Level (dBμV) - QP/AV Limit (dBμV)
7. Traces shown in plots 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 7-629. AC Line Conducted Plot with 802.11ax CDD/SDM Primary – Ch.1 (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
0.168	FINAL	—	40.09	55.06	-14.97	L1	GND
0.170	FINAL	51.4	—	64.95	-13.52	L1	GND
0.254	FINAL	—	34.38	51.64	-17.26	L1	GND
0.256	FINAL	47.1	—	61.57	-14.51	L1	GND
0.508	FINAL	—	24.57	46.00	-21.43	L1	GND
0.512	FINAL	39.9	—	56.00	-16.13	L1	GND
1.273	FINAL	—	18.09	46.00	-27.91	L1	GND
1.284	FINAL	32.9	—	56.00	-23.06	L1	GND
5.035	FINAL	33.7	—	60.00	-26.31	L1	GND
5.042	FINAL	—	18.83	50.00	-31.17	L1	GND
16.395	FINAL	—	10.24	50.00	-39.76	L1	GND
16.395	FINAL	15.7	—	60.00	-44.34	L1	GND

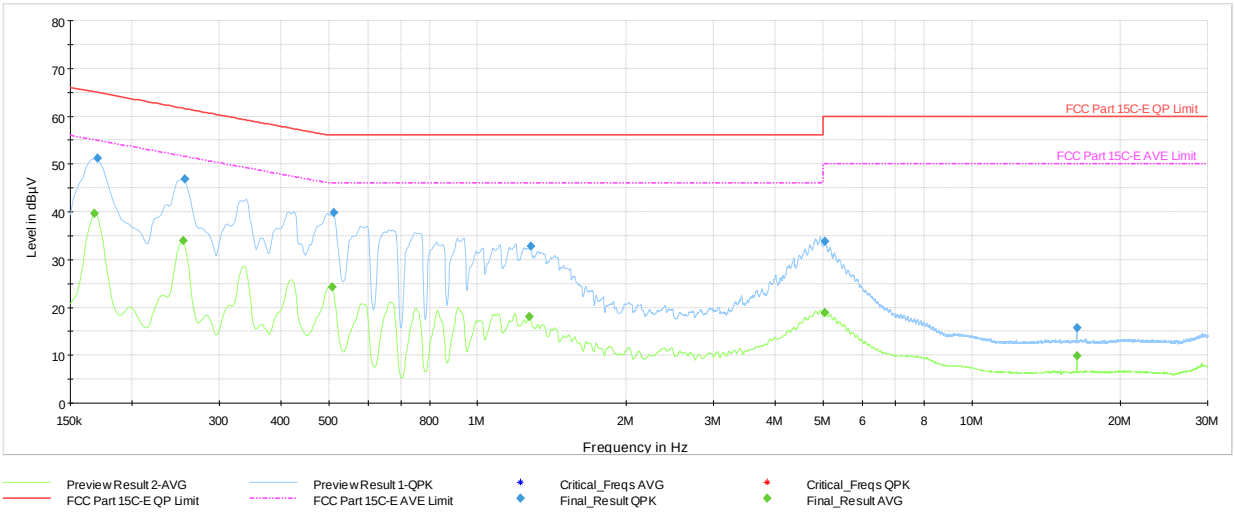
Table 7-100. AC Line Conducted Data with 802.11ax CDD/SDM Primary – Ch. 1 (L1) with AC/DC adaptor via USB-C cable with wire charger



Plot 7-630. AC Line Conducted Plot with 802.11ax CDD/SDM Primary – Ch. 1 (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
0.168	FINAL	—	39.25	55.06	-15.81	N	GND
0.170	FINAL	50.4	—	64.95	-14.60	N	GND
0.254	FINAL	—	33.90	51.64	-17.74	N	GND
0.256	FINAL	46.3	—	61.57	-15.25	N	GND
0.508	FINAL	—	24.31	46.00	-21.69	N	GND
0.512	FINAL	39.1	—	56.00	-16.92	N	GND
1.273	FINAL	—	18.44	46.00	-27.56	N	GND
1.284	FINAL	33.3	—	56.00	-22.72	N	GND
5.039	FINAL	—	21.20	50.00	-28.80	N	GND
5.042	FINAL	35.6	—	60.00	-24.38	N	GND
29.371	FINAL	16.6	—	60.00	-43.42	N	GND
29.474	FINAL	—	10.25	50.00	-39.75	N	GND

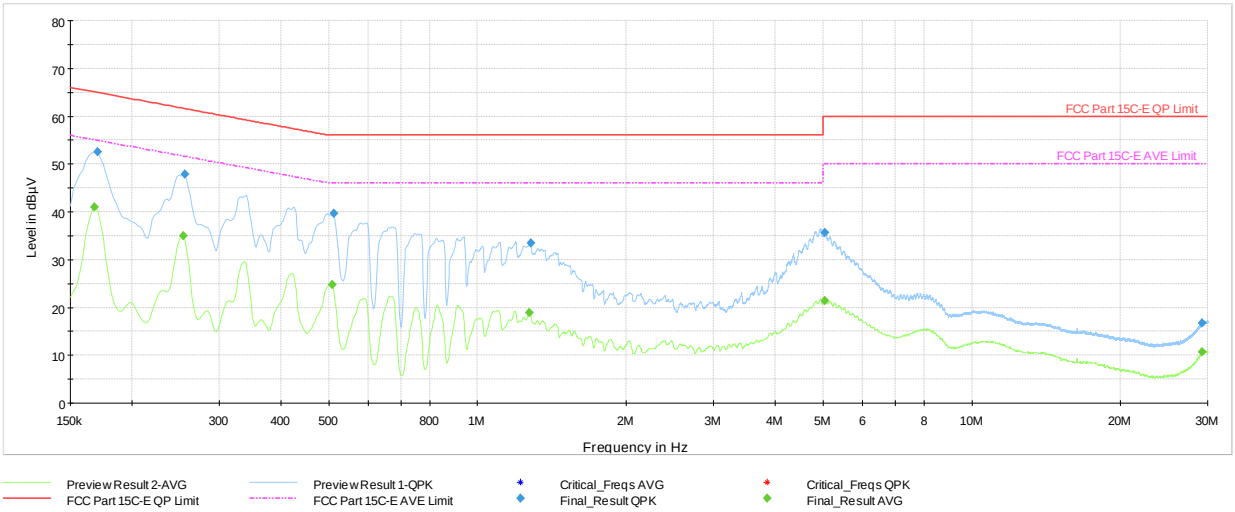
Table 7-101. AC Line Conducted Data with 802.11ax CDD/SDM Primary – Ch. 1 (N), with AC/DC adaptor via USB-C cable with wire charger



Plot 7-631. AC Line Conducted Plot with 802.11ax CDD/SDM Diversity – Ch.1 (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
0.168	FINAL	—	39.62	55.06	-15.44	L1	GND
0.170	FINAL	51.2	—	64.95	-13.74	L1	GND
0.254	FINAL	—	33.94	51.64	-17.70	L1	GND
0.256	FINAL	46.9	—	61.57	-14.68	L1	GND
0.508	FINAL	—	24.21	46.00	-21.79	L1	GND
0.512	FINAL	39.8	—	56.00	-16.24	L1	GND
1.273	FINAL	—	18.08	46.00	-27.92	L1	GND
1.284	FINAL	32.8	—	56.00	-23.23	L1	GND
5.039	FINAL	33.8	—	60.00	-26.16	L1	GND
5.039	FINAL	—	18.97	50.00	-31.03	L1	GND
16.303	FINAL	—	9.94	50.00	-40.06	L1	GND
16.303	FINAL	15.7	—	60.00	-44.27	L1	GND

Table 7-102. AC Line Conducted Data with 802.11ax CDD/SDM Diversity – Ch. 1 (L1) with AC/DC adaptor via USB-C cable with wire charger



Plot 7-632. AC Line Conducted Plot with 802.11ax CDD/SDM Diversity – Ch. 1 (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
0.168	FINAL	—	40.98	55.06	-14.08	N	GND
0.170	FINAL	52.5	—	64.95	-12.42	N	GND
0.254	FINAL	—	35.04	51.64	-16.60	N	GND
0.256	FINAL	47.8	—	61.57	-13.72	N	GND
0.508	FINAL	—	24.85	46.00	-21.15	N	GND
0.512	FINAL	39.7	—	56.00	-16.27	N	GND
1.271	FINAL	—	18.83	46.00	-27.17	N	GND
1.282	FINAL	33.5	—	56.00	-22.47	N	GND
5.046	FINAL	35.7	—	60.00	-24.31	N	GND
5.046	FINAL	—	21.38	50.00	-28.62	N	GND
29.236	FINAL	—	10.69	50.00	-39.31	N	GND
29.236	FINAL	16.8	—	60.00	-43.25	N	GND

Table 7-103. AC Line Conducted Data with 802.11ax CDD/SDM Diversity – Ch. 1 (N), with AC/DC adaptor 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: BCGA3268** and **IC: 579C-A3268** is in compliance with Part 15 Subpart E (15.407) of the FCC Rules and RSS-248 of the Innovation, Science and Economic Development Canada Rules.