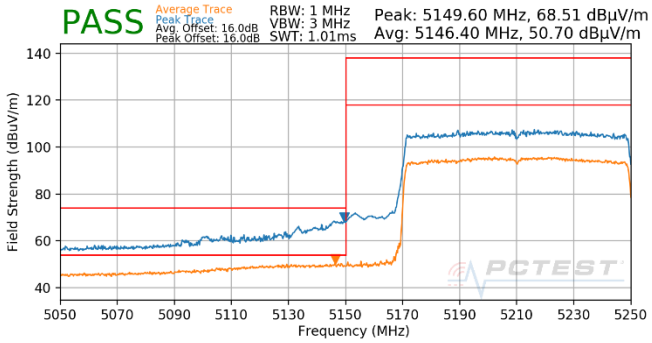
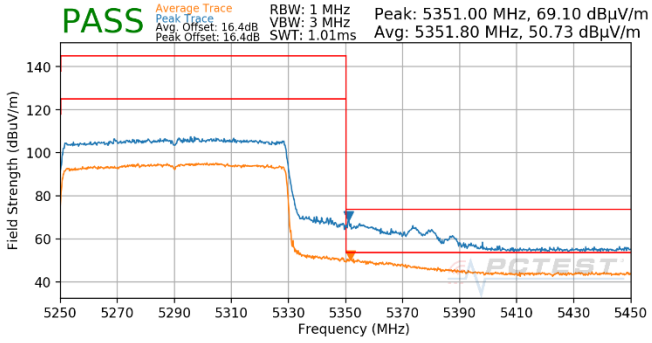
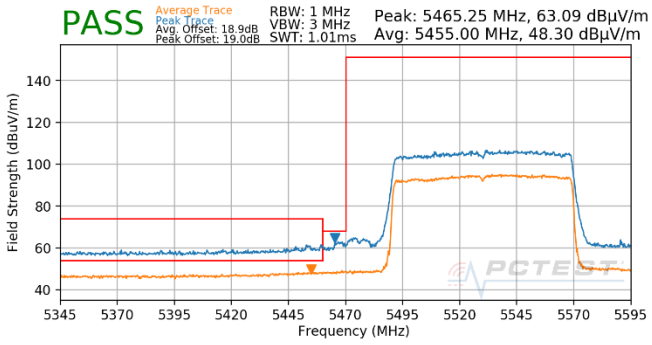
RU996



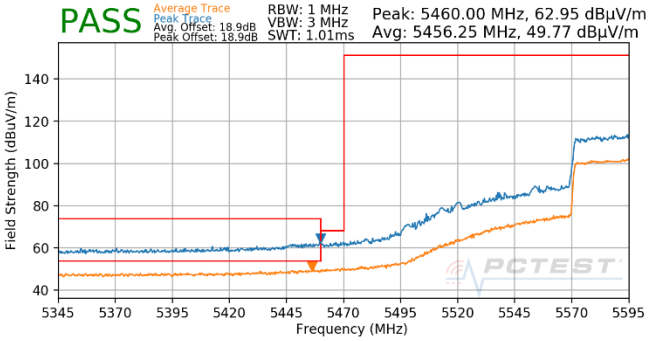
Plot 7-514. Antenna WF7a (Pk & Avg, RU996, Index 67, Ch.42, MCS11)



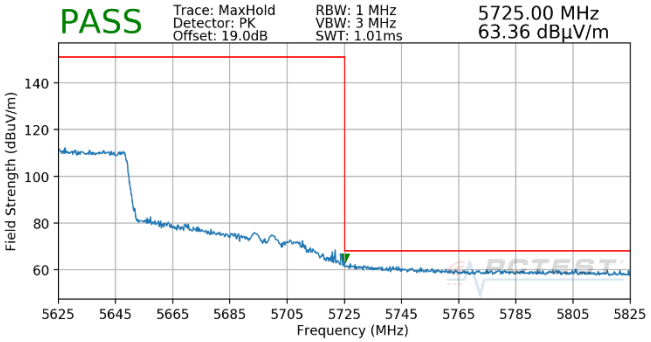
Plot 7-515. Antenna WF7a (Pk & Avg, RU996, Index 67, Ch.58, MCS11)



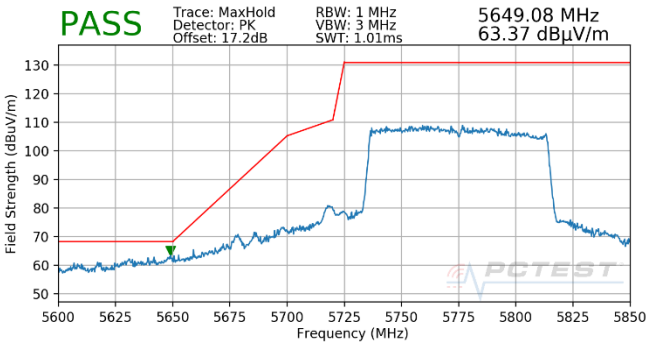
Plot 7-516. Antenna WF7a (Pk & Avg, RU996, Index 67, Ch.106, MCS11)



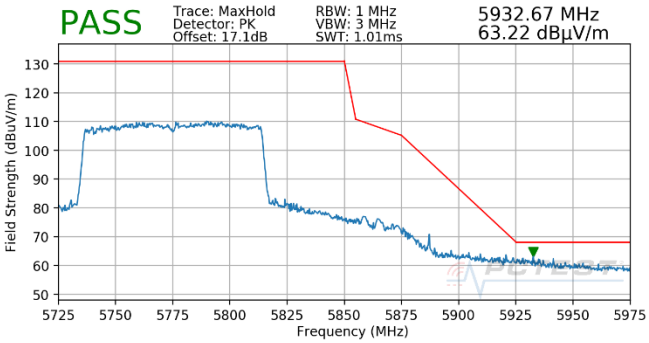
Plot 7-517. (FCC Only) Antenna WF7a (Pk & Avg, RU996, Index 67, Ch.122, MCS11)



Plot 7-518. (FCC Only) Antenna WF7a (Pk, RU996, Index 67, Ch.122, MCS11)



Plot 7-519. Antenna WF7a (Pk, RU996, Index 67, Ch.155, MCS11)

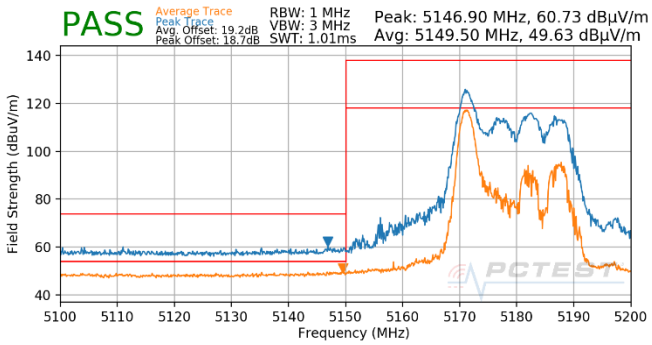


Plot 7-520. Antenna WF7a (Pk, RU996, Index 67, Ch.155, MCS11)

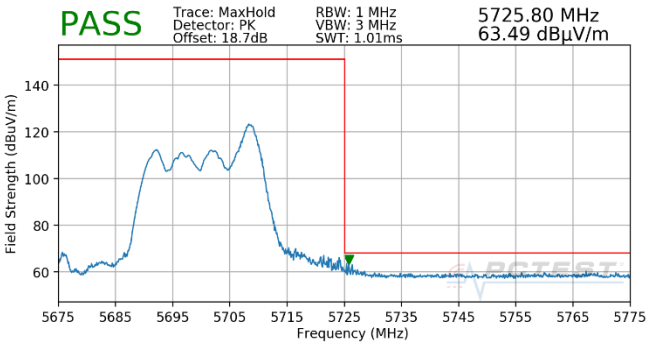
7.6.11 CDD/SDM Radiated Band Edge Measurements (20MHz BW)

§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]

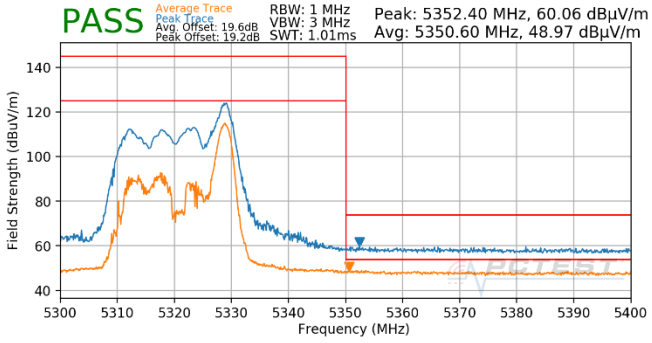
RU26



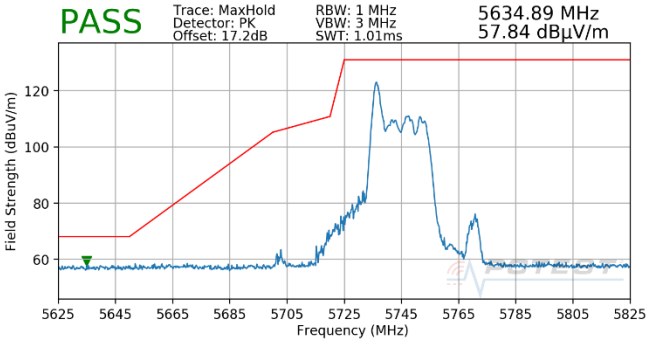
Plot 7-521. SDM (Pk & Avg, RU26, Index 0, Ch.36, MCS11)



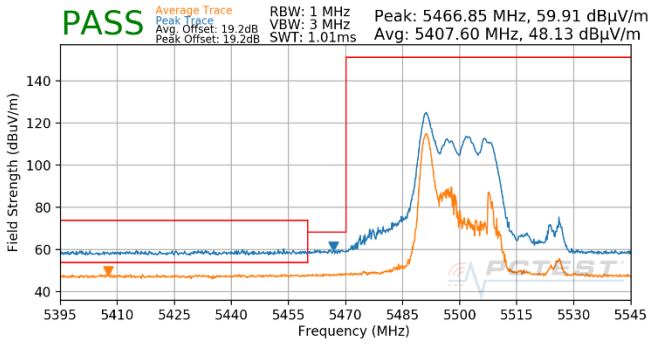
Plot 7-524. SDM (Pk, RU26, Index 8, Ch.140, MCS11)



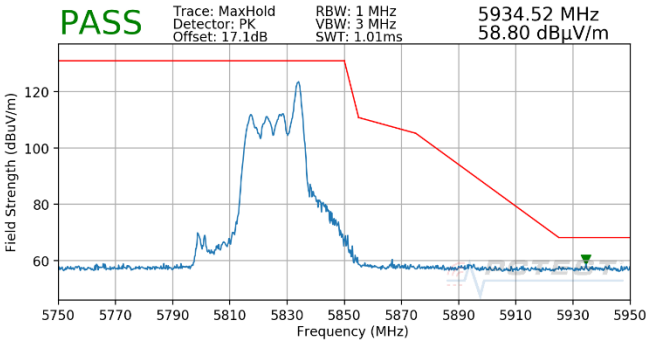
Plot 7-522. CDD (Pk & Avg, RU26, Index 8, Ch.64, MCS11)



Plot 7-525. CDD (Pk, RU26, Index 0, Ch.149, MCS11)

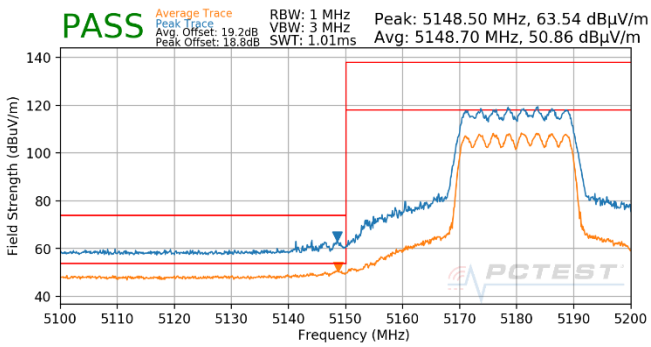


Plot 7-523. SDM (Pk & Avg, RU26, Index 0, Ch.100, MCS11)

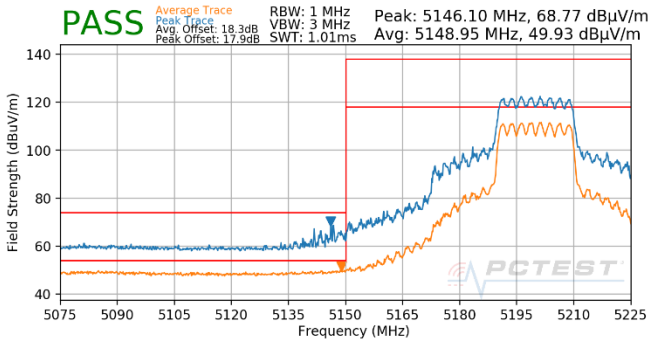


Plot 7-526. CDD (Pk, RU26, Index 8, Ch.165, MCS11)

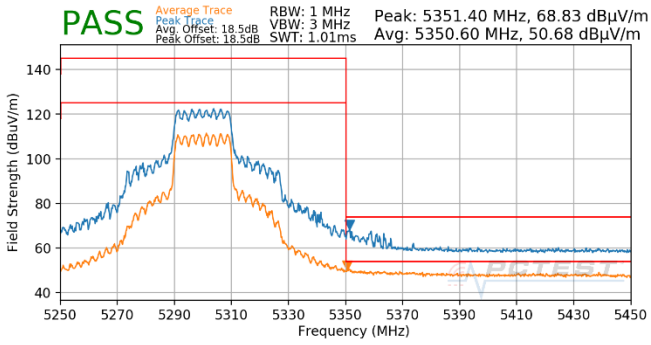
RU242



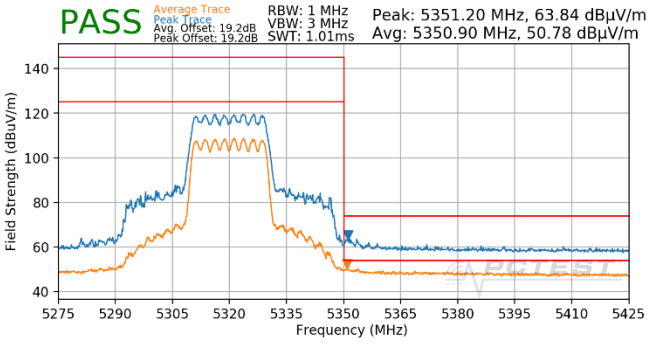
Plot 7-527. CDD (Pk & Avg, RU242, Index 61, Ch.36, MCS11)



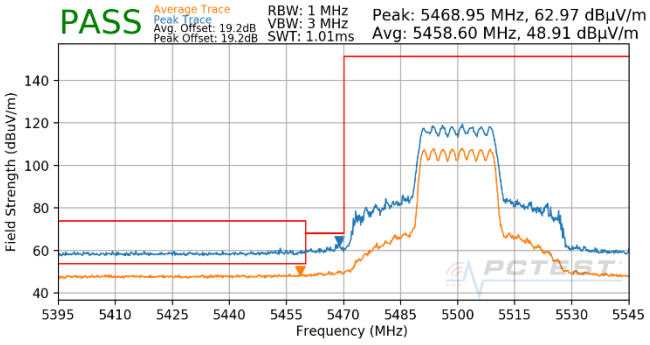
Plot 7-528. SDM (Pk & Avg, RU242, Index 61, Ch.40, MCS11)



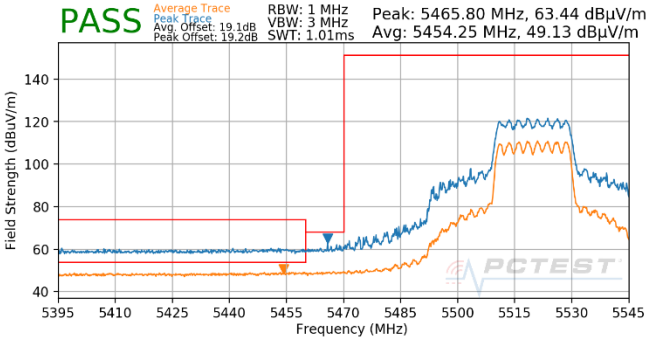
Plot 7-529. SDM (Pk & Avg, RU242, Index 61, Ch.60, MCS11)



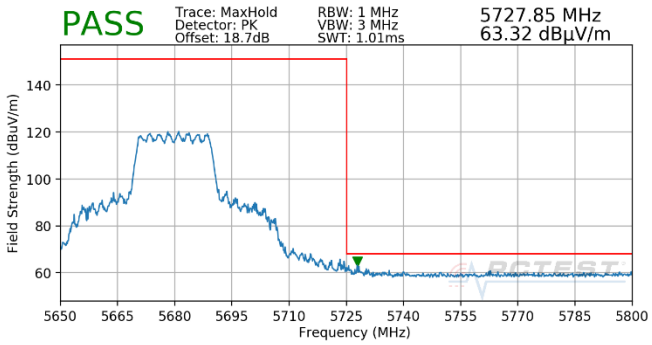
Plot 7-530. CDD (Pk & Avg, RU242, Index 61, Ch.64, MCS11)



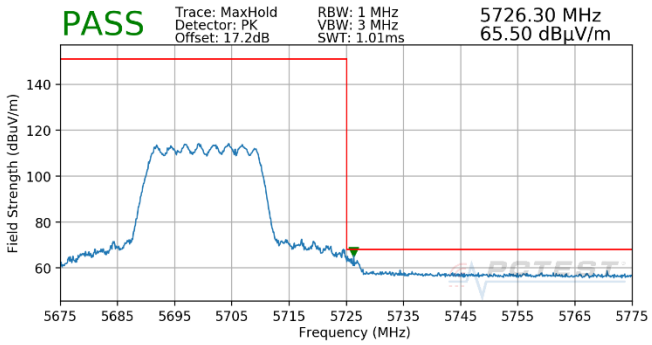
Plot 7-531. CDD (Pk & Avg, RU242, Index 61, Ch.100, MCS11)



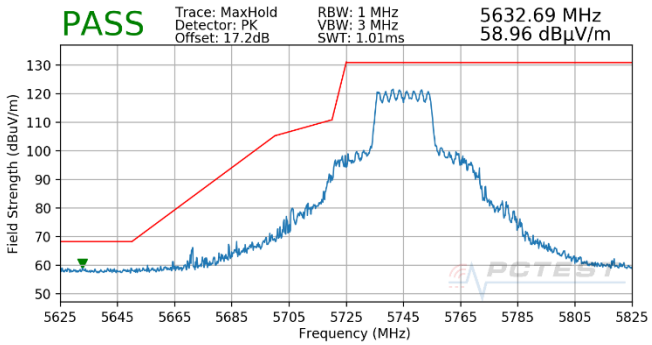
Plot 7-532. SDM (Pk & Avg, RU242, Index 61, Ch.104, MCS11)



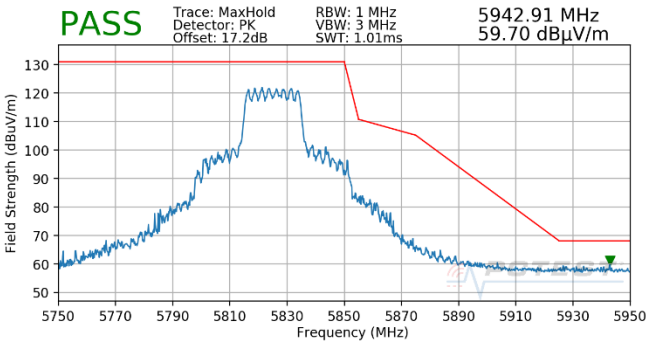
Plot 7-533. SDM (Pk, RU242, Index 61, Ch.136, MCS11)



Plot 7-534. CDD (Pk, RU242, Index 61, Ch.140, MCS11)



Plot 7-535. CDD (Pk, RU242, Index 61, Ch.149, MCS11)

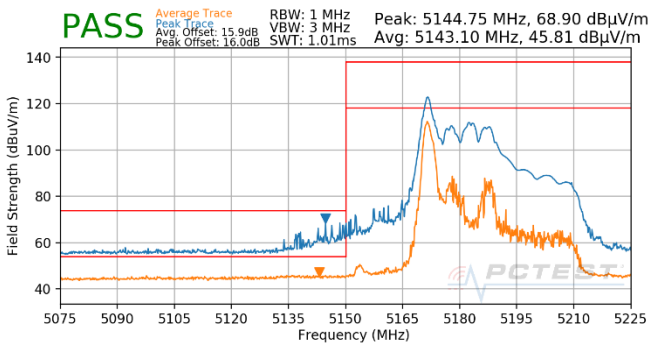


Plot 7-536. CDD (Pk, RU242, Index 61, Ch.165, MCS11)

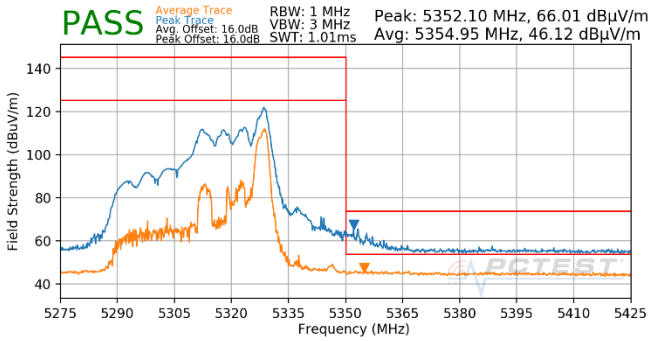
7.6.12 CDD/SDM Radiated Band Edge Measurements (40MHz BW)

§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]

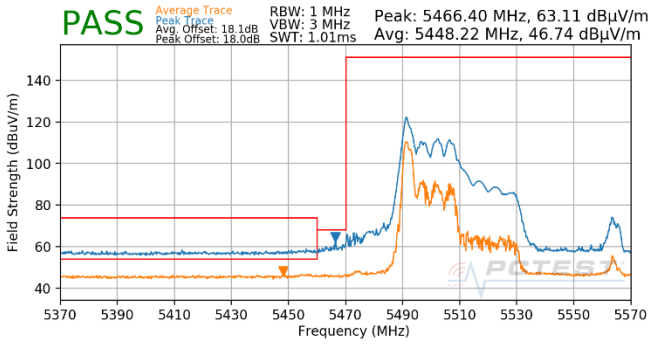
RU26



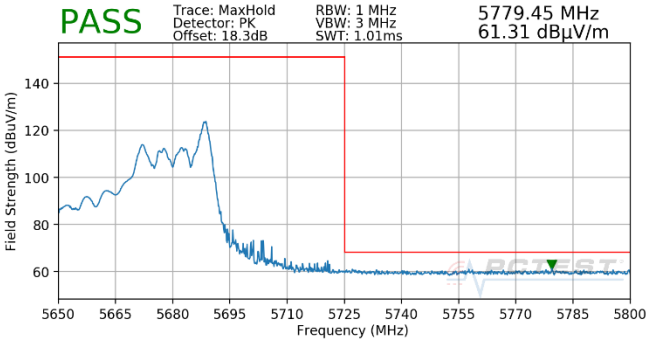
Plot 7-537. SDM (Pk & Avg, RU26, Index 0, Ch.38, MCS11)



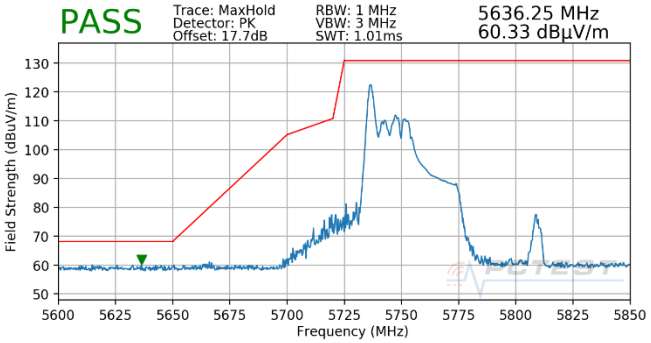
Plot 7-538. CDD (Pk & Avg, RU26, Index 17, Ch.62, MCS11)



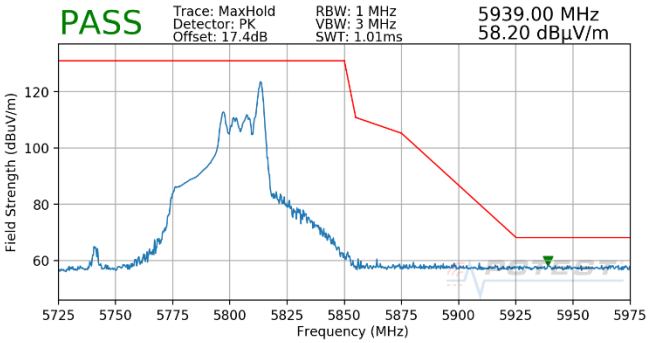
Plot 7-539. SDM (Pk & Avg, RU26, Index 0, Ch.102, MCS11)



Plot 7-540. SDM (Pk, RU26, Index 17, Ch.134, MCS11)

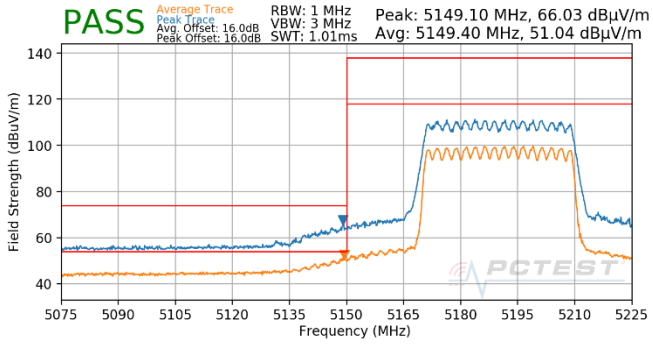


Plot 7-541. CDD (Pk, RU26, Index 0, Ch.151, MCS11)

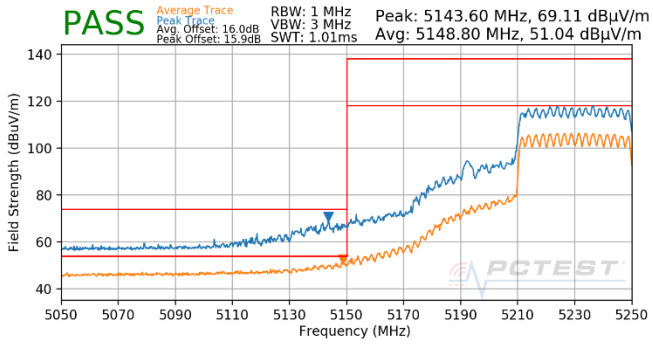


Plot 7-542. CDD (Pk, RU26, Index 17, Ch.159, MCS11)

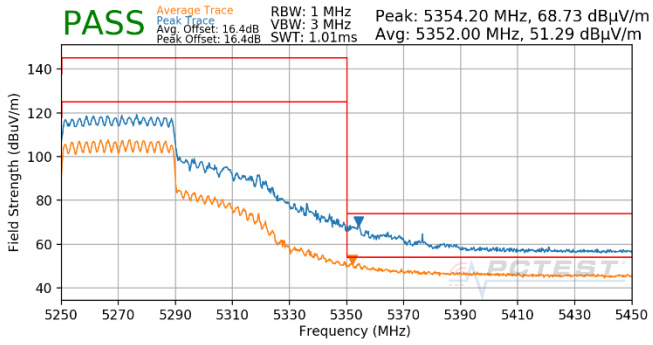
RU484



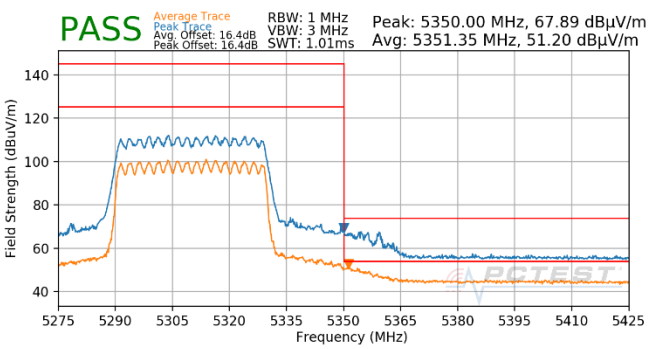
Plot 7-543. CDD (Pk & Avg, RU484, Index 65, Ch.38, MCS11)



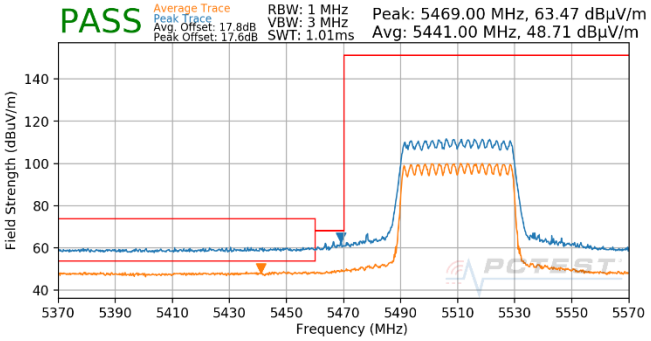
Plot 7-544. SDM (Pk & Avg, RU484, Index 65, Ch.46, MCS11)



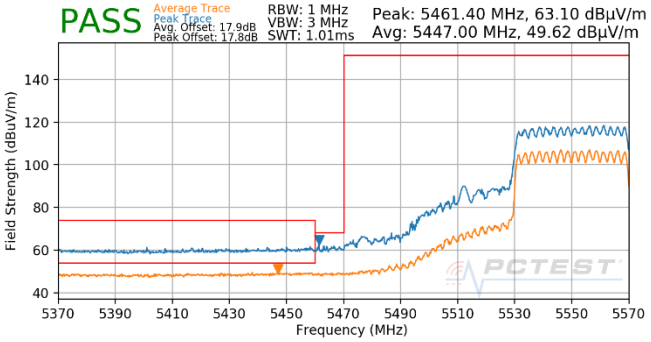
Plot 7-545. SDM (Pk & Avg, RU484, Index 65, Ch.54, MCS11)



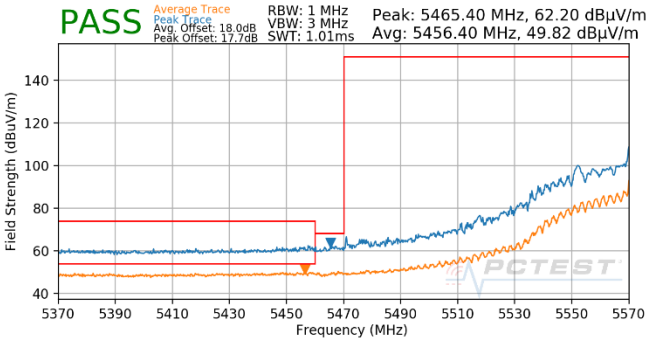
Plot 7-546. CDD (Pk & Avg, RU484, Index 65, Ch.62, MCS11)



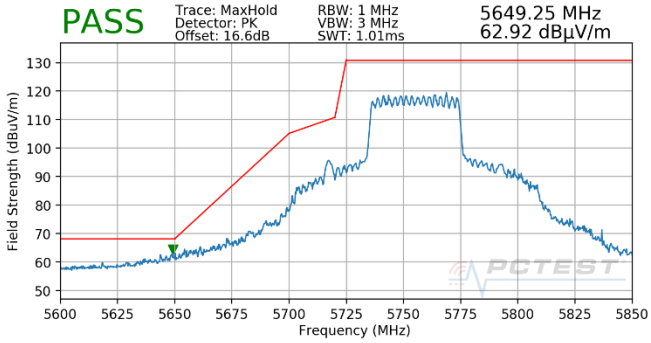
Plot 7-547. CDD (Pk & Avg, RU484, Index 65, Ch.102, MCS11)



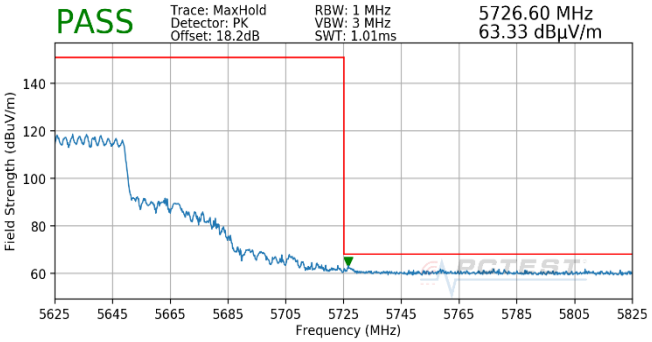
Plot 7-548. CDD (Pk & Avg, RU484, Index 65, Ch.110, MCS11)



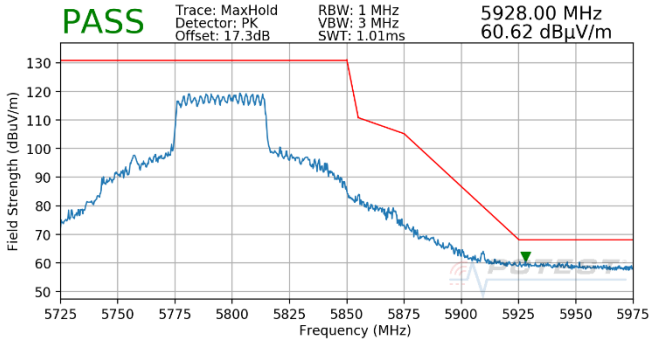
Plot 7-549. (FCC Only) SDM (Pk & Avg, RU484, Index 65, Ch.118, MCS11)



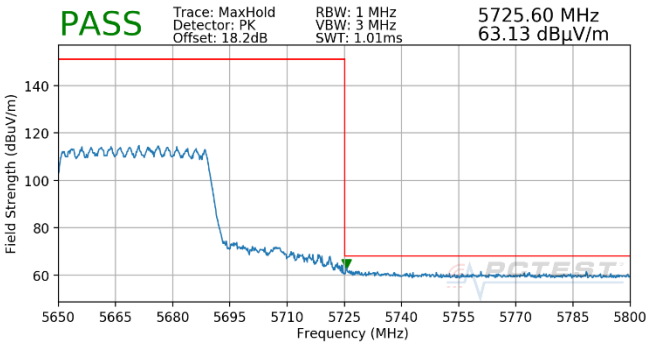
Plot 7-552. CDD (Pk, RU484, Index 65, Ch.151, MCS11)



Plot 7-550. (FCC Only) SDM (Pk, RU484, Index 65, Ch.126, MCS11)



Plot 7-553. CDD (Pk, RU484, Index 65, Ch.159, MCS11)

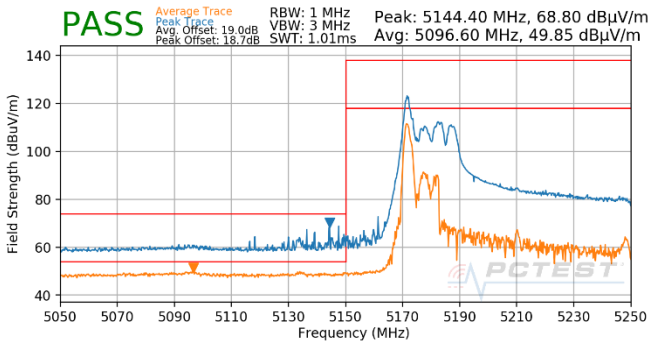


Plot 7-551. CDD (Pk, RU484, Index 65, Ch.134, MCS11)

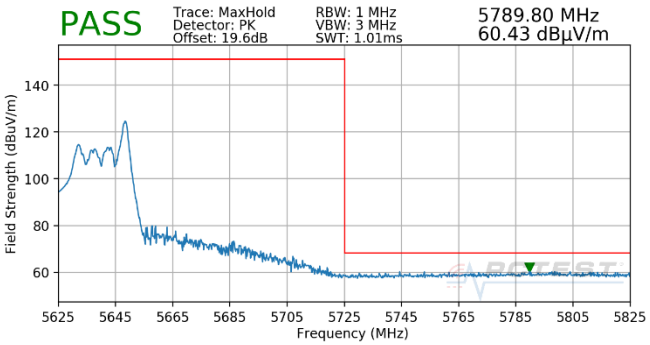
7.6.13 CDD/SDM Radiated Band Edge Measurements (80MHz BW)

§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]

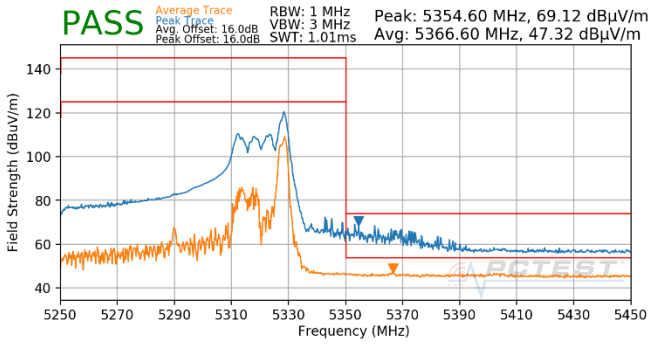
RU26



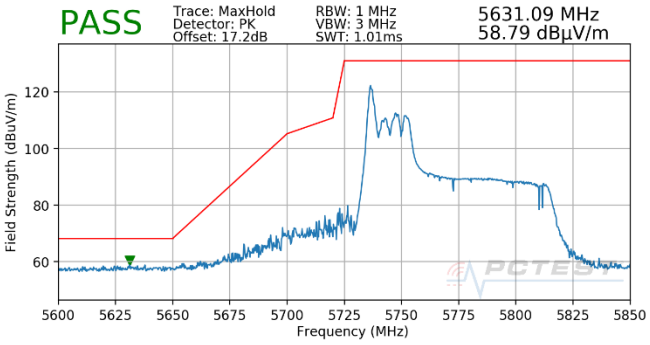
Plot 7-554. SDM (Pk & Avg, RU26, Index 0, Ch.42, MCS11)



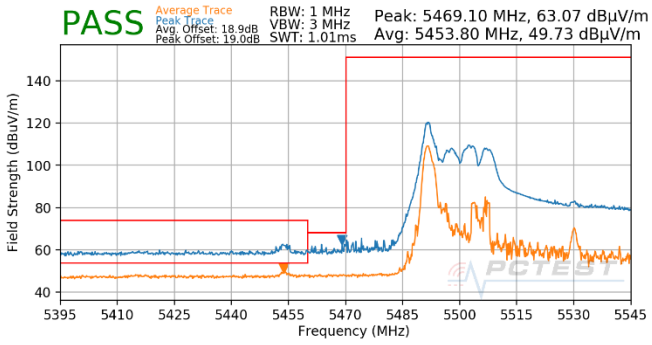
Plot 7-557. (FCC Only) SDM (Pk, RU26, Index 36, Ch.122, MCS11)



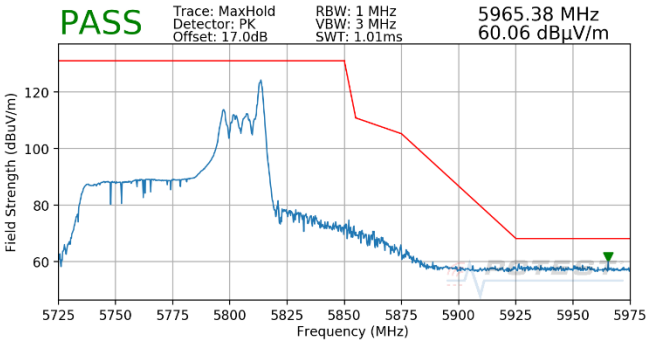
Plot 7-555. CDD (Pk & Avg, RU26, Index 36, Ch.58, MCS11)



Plot 7-558. CDD (Pk, RU26, Index 0, Ch.155, MCS11)

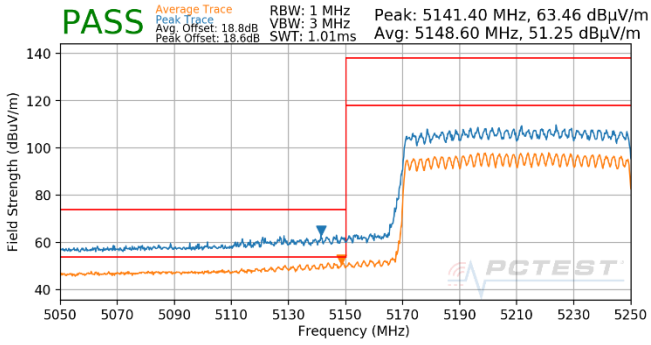


Plot 7-556. SDM (Pk & Avg, RU26, Index 0, Ch.106, MCS11)

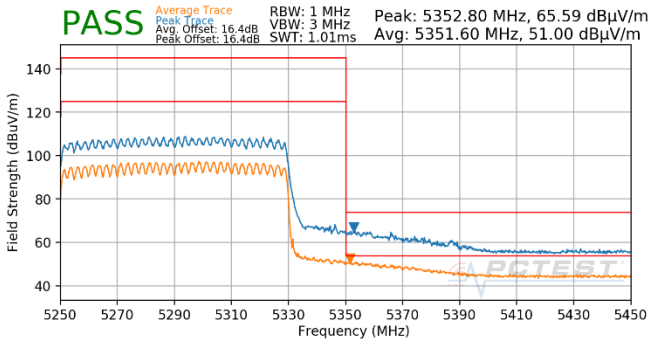


Plot 7-559. CDD (Pk, RU26, Index 36, Ch.155, MCS11)

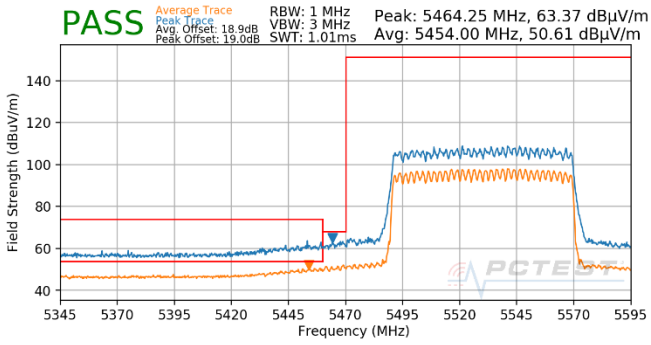
RU996



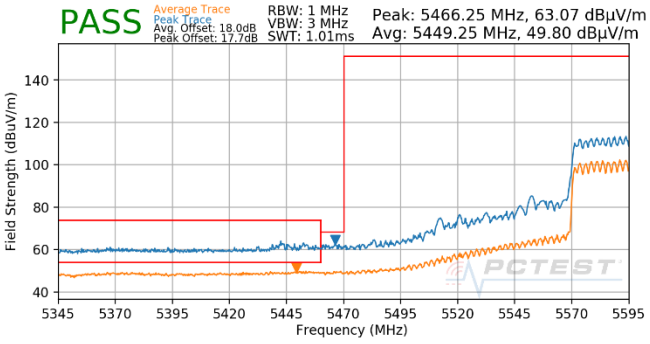
Plot 7-560. CDD (Pk & Avg, RU996, Index 67, Ch.42, MCS11)



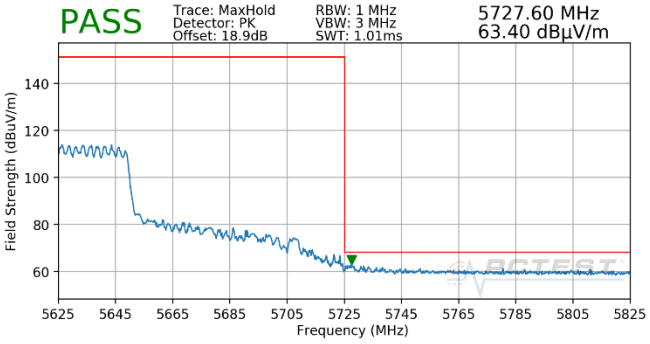
Plot 7-561. CDD (Pk & Avg, RU996, Index 67, Ch.58, MCS11)



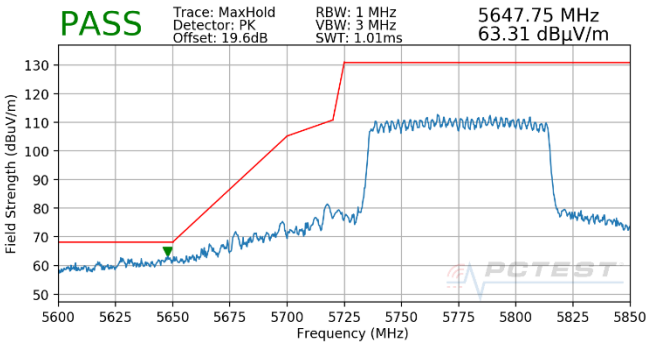
Plot 7-562. CDD (Pk & Avg, RU996, Index 67, Ch.106, MCS11)



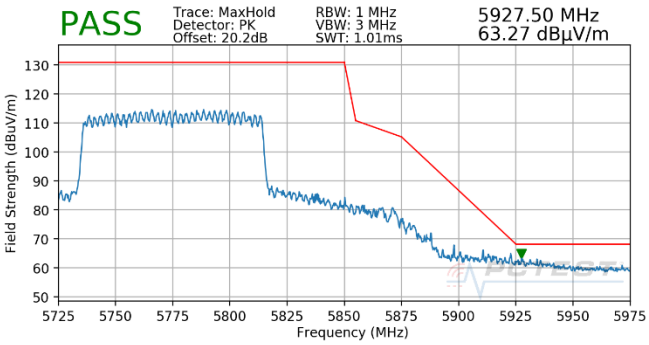
Plot 7-563. (FCC Only) CDD (Pk & Avg, RU996, Index 67, Ch.122, MCS11)



Plot 7-564. (FCC Only) CDD (Pk, RU996, Index 67, Ch.122, MCS11)



Plot 7-565. CDD (Pk, RU996, Index 67, Ch.155, MCS11)



Plot 7-566. CDD (Pk, RU996, Index 67, Ch.155, MCS11)

7.7 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 7-155 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 7-155. Radiated Limits

Test Procedures Used

ANSI C63.10-2013

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

Average Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 9kHz (for emissions from 9kHz – 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 diagrams below.

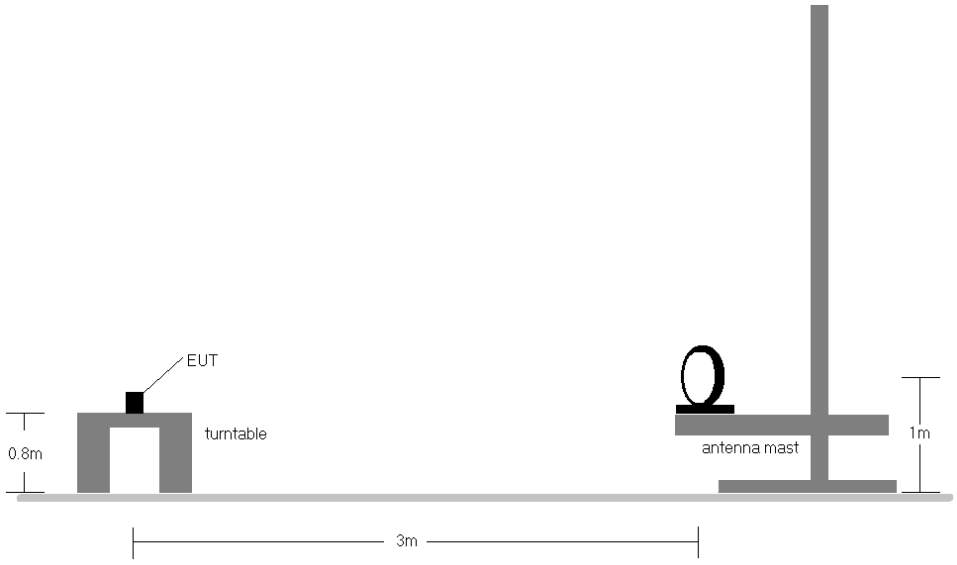


Figure 7-6. Radiated Test Setup < 30MHz

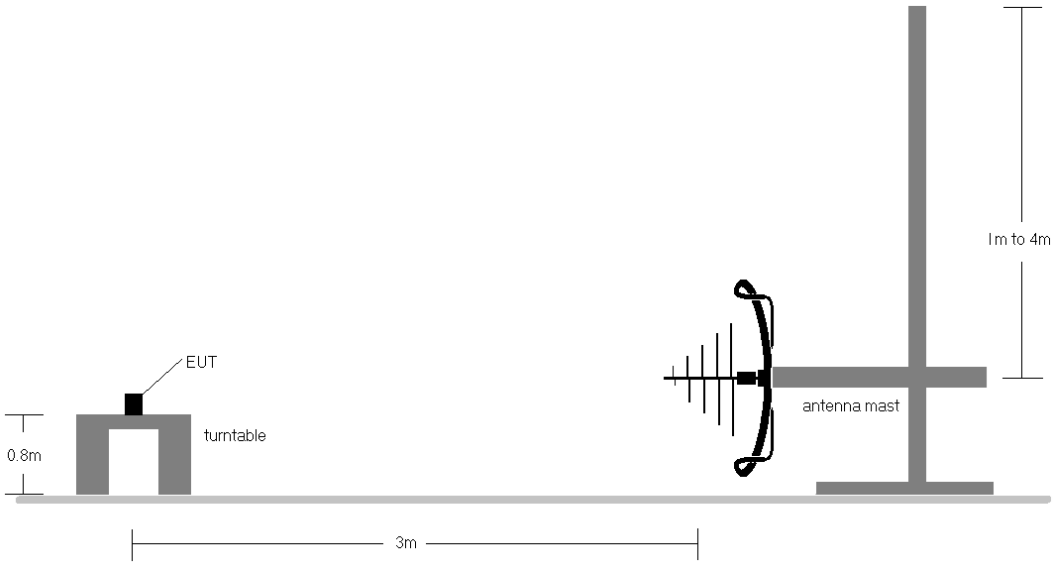


Figure 7-7. Radiated Test Setup < 1GHz

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 7-155.
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. 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. All antenna configurations and data rates were investigated and only the worst case are reported.
10. 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

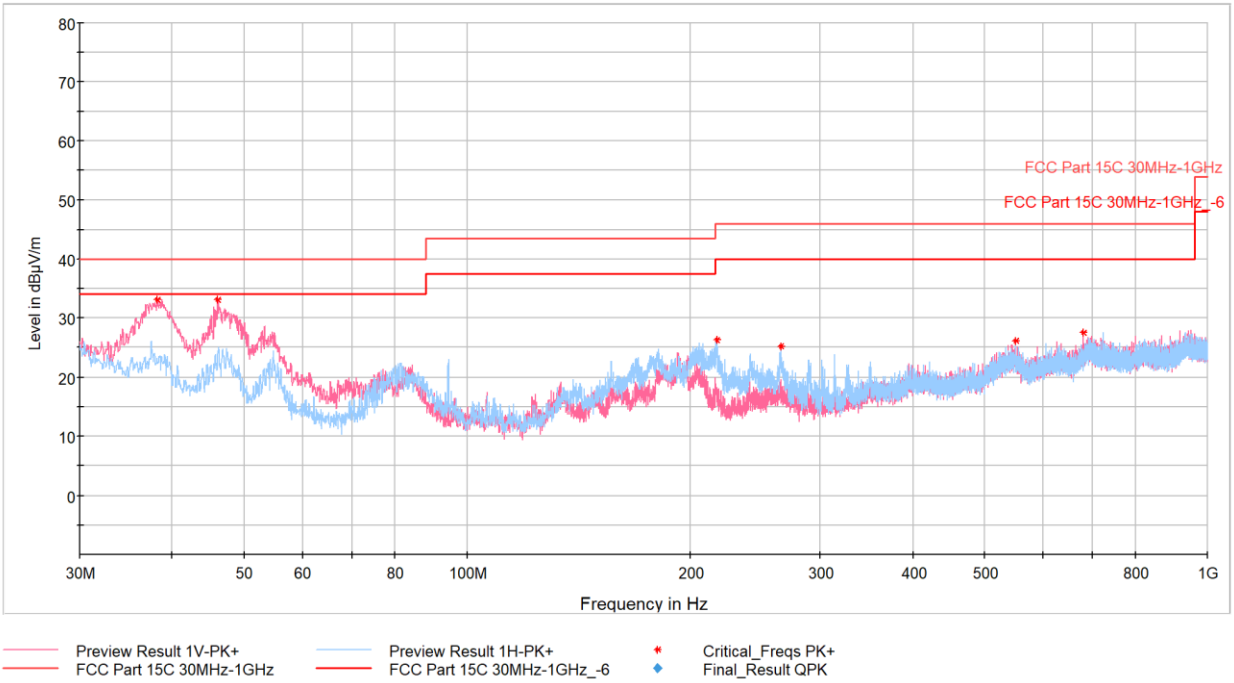
Sample Calculations

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/SDM Radiated Spurious Emissions (Below 1GHz)

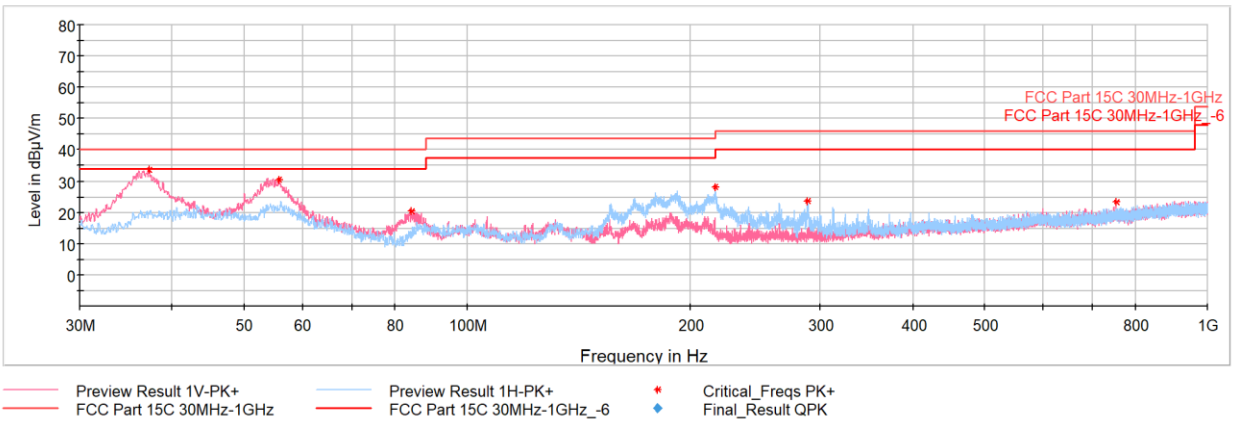
§15.209; RSS-Gen [8.9]



Plot 7-567. RSE below 1GHz CDD (RU26 – Ch.56), with AC/DC Adapter

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]
38.25	Max Peak	V	100	324	-57.93	-15.89	33.18	40.00	-6.82
46.10	Max Peak	V	100	214	-53.99	-19.87	33.14	40.00	-6.86
217.31	Max Peak	H	100	265	-65.31	-15.39	26.30	46.02	-19.72
265.37	Max Peak	H	100	297	-69.42	-12.40	25.18	46.02	-20.84
551.08	Max Peak	H	200	33	-76.94	-3.86	26.20	46.02	-19.82
678.79	Max Peak	V	300	119	-77.16	-2.27	27.57	46.02	-18.45

Table 7-156. RSE below 1GHz CDD (RU26 – Ch.56), with AC/DC Adapter



Plot 7-568. RSE below 1GHz SDM (RU242 – Ch.56), with AC/DC Adapter

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]
37.23	Max Peak	V	100	18	-55.67	-17.59	33.74	40.00	-6.26
55.75	Max Peak	V	100	44	-60.53	-16.15	30.32	40.00	-9.68
84.08	Max Peak	V	100	146	-64.96	-21.49	20.55	40.00	-19.45
216.09	Max Peak	H	100	9	-61.24	-17.67	28.09	46.02	-17.93
287.97	Max Peak	H	100	251	-67.72	-15.49	23.79	46.02	-22.23
752.99	Max Peak	V	200	97	-77.56	-6.14	23.30	46.02	-22.72

Table 7-157. RSE below 1GHz SDM (RU242– Ch.56), with AC/DC Adapter

7.8 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. All data rates and modes were investigated for AC Line conducted spurious emissions.

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 7-158. Conducted Limits

*Decreases with the logarithm of the frequency.

Test Procedures Used

ANSI C63.10-2013, 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.

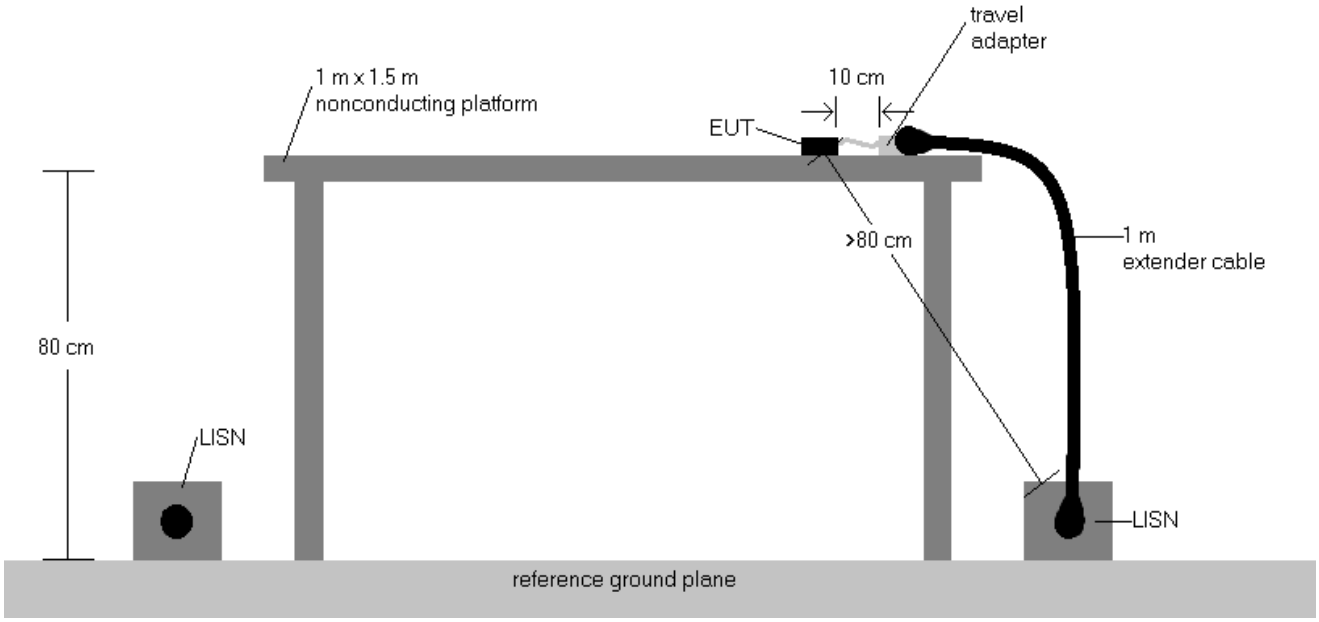
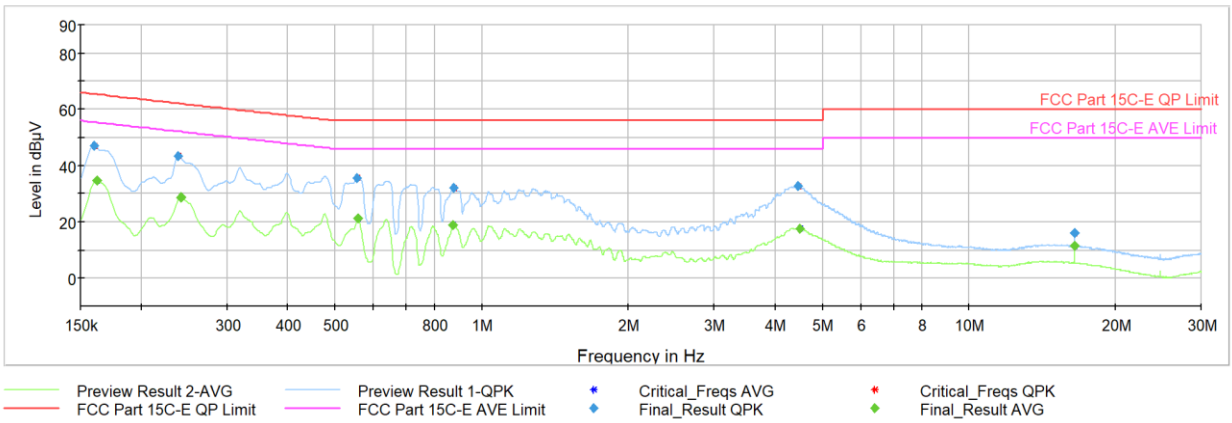


Figure 7-8. Test Instrument & Measurement Setup

Test Notes

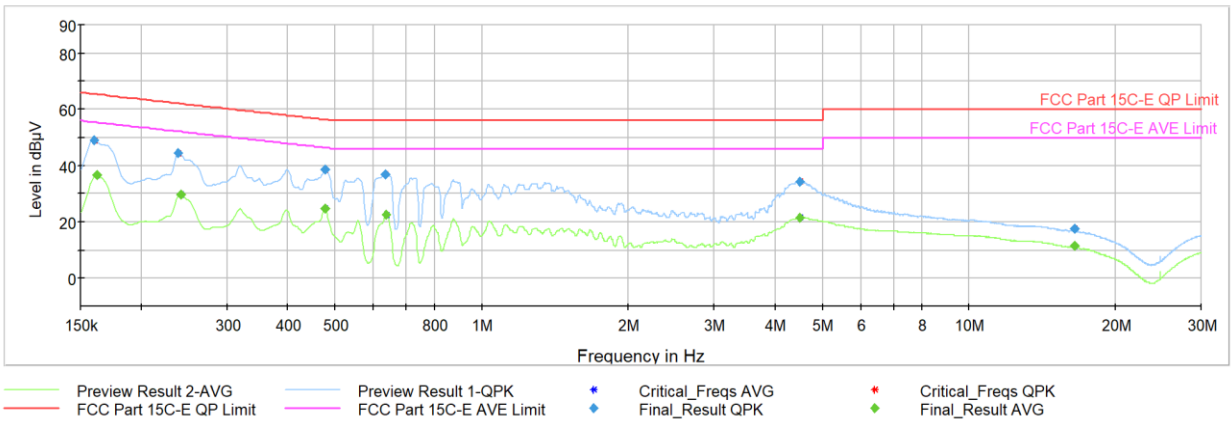
1. All modes of operation were investigated and the worst-case emissions are reported. The emissions found were not affected by the choice of channel used during testing.
2. Both configurations below were investigated, and the worst case has been reported.
    a. EUT powered by AC/DC adaptor via USB-C 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.



Plot 7-569. AC Line Conducted Plot with 11ax UNII Band 2A CDD RU26 – Ch.56 (L1) with AC/DC Adapter

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.160	FINAL	46.9	—	65.48	-18.60	L1	GND
0.162	FINAL	—	34.70	55.36	-20.66	L1	GND
0.239	FINAL	43.3	—	62.15	-18.86	L1	GND
0.241	FINAL	—	28.65	52.07	-23.43	L1	GND
0.554	FINAL	35.5	—	56.00	-20.54	L1	GND
0.556	FINAL	—	21.16	46.00	-24.84	L1	GND
0.873	FINAL	—	18.85	46.00	-27.15	L1	GND
0.875	FINAL	32.1	—	56.00	-23.93	L1	GND
4.453	FINAL	32.5	—	56.00	-23.48	L1	GND
4.487	FINAL	—	17.55	46.00	-28.45	L1	GND
16.470	FINAL	—	11.62	50.00	-38.38	L1	GND
16.470	FINAL	16.0	—	60.00	-43.96	L1	GND

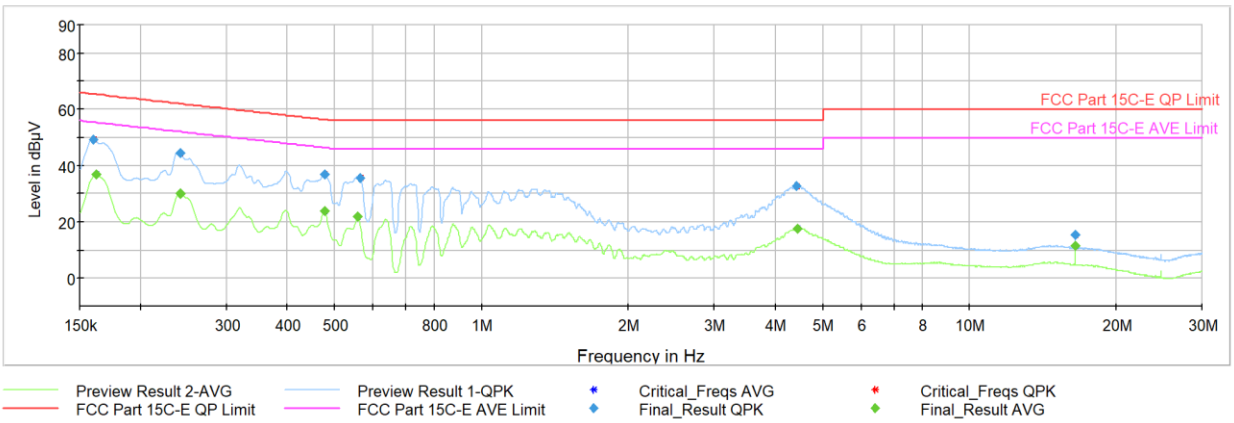
Table 7-159. AC Line Conducted with 11ax UNII Band 2A CDD RU26 – Ch.56 (L1) with AC/DC Adapter



Plot 7-570. AC Line Conducted Plot with 11ax UNII Band 2A CDD RU26 – Ch.56 (N) with AC/DC Adapter

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.160	FINAL	48.9	—	65.48	-16.58	N	GND
0.162	FINAL	—	36.70	55.36	-18.66	N	GND
0.239	FINAL	44.4	—	62.15	-17.79	N	GND
0.241	FINAL	—	29.85	52.07	-22.22	N	GND
0.477	FINAL	—	24.83	46.39	-21.56	N	GND
0.477	FINAL	38.4	—	56.39	-17.99	N	GND
0.635	FINAL	36.9	—	56.00	-19.06	N	GND
0.637	FINAL	—	22.43	46.00	-23.57	N	GND
4.489	FINAL	34.3	—	56.00	-21.69	N	GND
4.502	FINAL	—	21.52	46.00	-24.48	N	GND
16.479	FINAL	—	11.57	50.00	-38.43	N	GND
16.481	FINAL	17.7	—	60.00	-42.29	N	GND

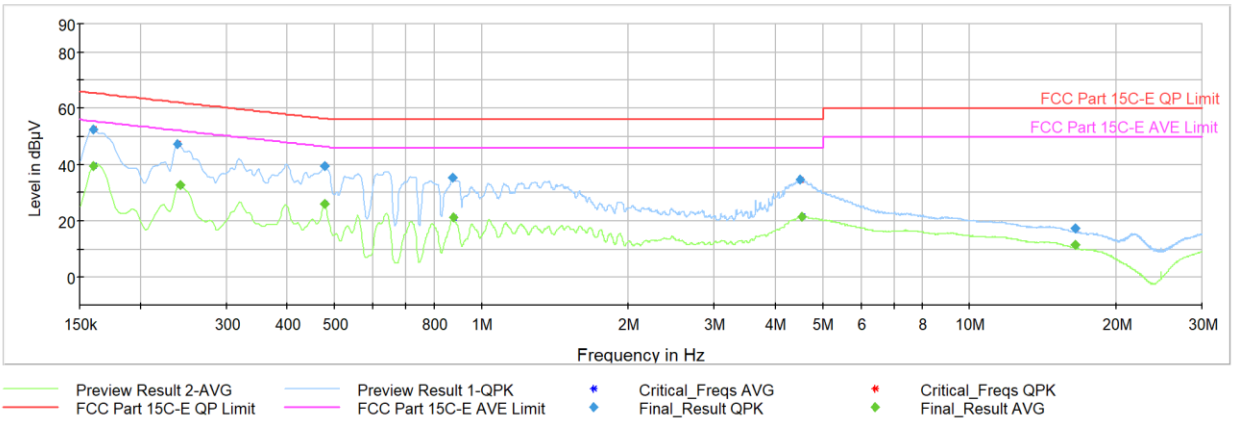
Table 7-160. AC Line Conducted with 11ax UNII Band 2A CDD RU26 – Ch.56 (N) with AC/DC Adapter



Plot 7-571. AC Line Conducted Plot with 11ax UNII Band 2A SDM RU242 – Ch.56 (L1) with AC/DC Adapter

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.160	FINAL	49.2	—	65.48	-16.23	L1	GND
0.162	FINAL	—	36.86	55.36	-18.50	L1	GND
0.241	FINAL	—	30.21	52.07	-21.86	L1	GND
0.241	FINAL	44.4	—	62.07	-17.69	L1	GND
0.477	FINAL	—	23.93	46.39	-22.46	L1	GND
0.477	FINAL	37.0	—	56.39	-19.42	L1	GND
0.558	FINAL	—	21.77	46.00	-24.23	L1	GND
0.565	FINAL	35.5	—	56.00	-20.47	L1	GND
4.408	FINAL	32.7	—	56.00	-23.34	L1	GND
4.428	FINAL	—	17.59	46.00	-28.41	L1	GND
16.470	FINAL	—	11.56	50.00	-38.44	L1	GND
16.472	FINAL	15.4	—	60.00	-44.56	L1	GND

Table 7-161. AC Line Conducted Plot with 11ax UNII Band 2A SDM RU242 – Ch.56 (L1) with AC/DC Adapter



Plot 7-572. AC Line Conducted Plot with 11ax UNII Band 2A SDM RU242 – Ch.56 (N) with AC/DC Adapter

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.160	FINAL	—	39.57	55.48	-15.91	N	GND
0.160	FINAL	52.5	—	65.48	-12.96	N	GND
0.239	FINAL	47.2	—	62.15	-14.93	N	GND
0.241	FINAL	—	32.71	52.07	-19.36	N	GND
0.477	FINAL	—	26.17	46.39	-20.22	N	GND
0.477	FINAL	39.5	—	56.39	-16.87	N	GND
0.873	FINAL	35.2	—	56.00	-20.84	N	GND
0.875	FINAL	—	21.13	46.00	-24.88	N	GND
4.493	FINAL	34.5	—	56.00	-21.51	N	GND
4.536	FINAL	—	21.43	46.00	-24.57	N	GND
16.481	FINAL	—	11.64	50.00	-38.36	N	GND
16.481	FINAL	17.4	—	60.00	-42.63	N	GND

Table 7-162. AC Line Conducted Plot with 11ax UNII Band 2A SDM RU242 – Ch.56 (N) with AC/DC Adapter

8.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Apple Tablet Device FCC ID: BCGA2588** and **IC: 579C-A2588** is in compliance with is in compliance with Part 15 Subpart E (15.407) of the FCC Rules and RSS-247 of the Innovation, Science and Economic Development Canada Rules.