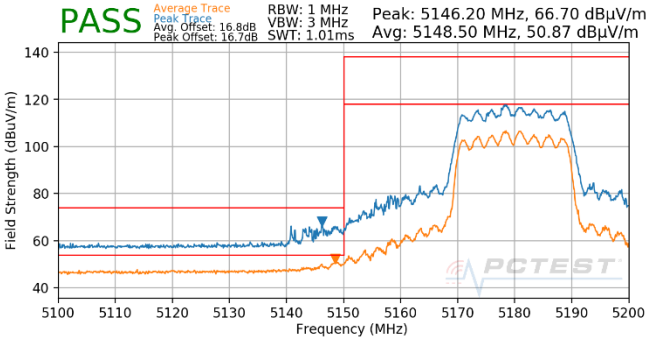
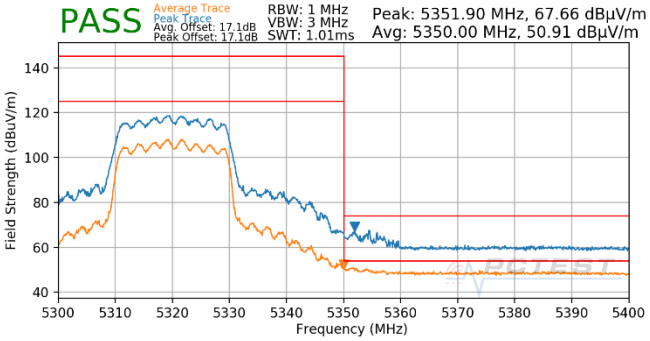
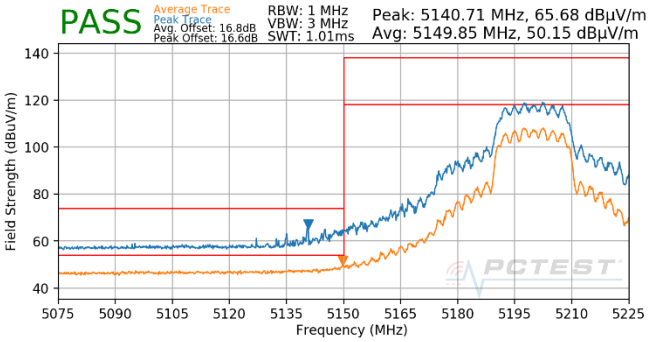
RU242



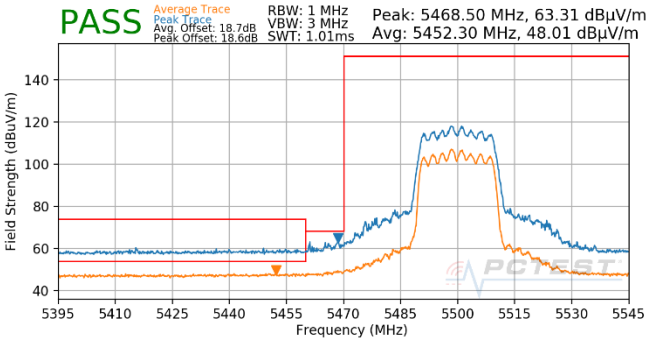
Plot 7-920. CDD Diversity (Pk & Avg, RU242, Index 61, Ch.36, MCS11)



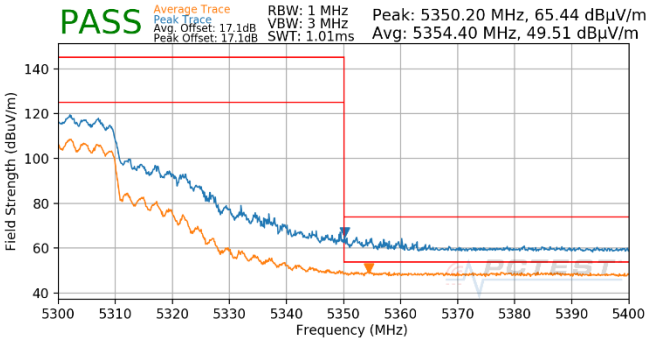
Plot 7-923. CDD Diversity (Pk & Avg, RU242, Index 61, Ch.64, MCS11)



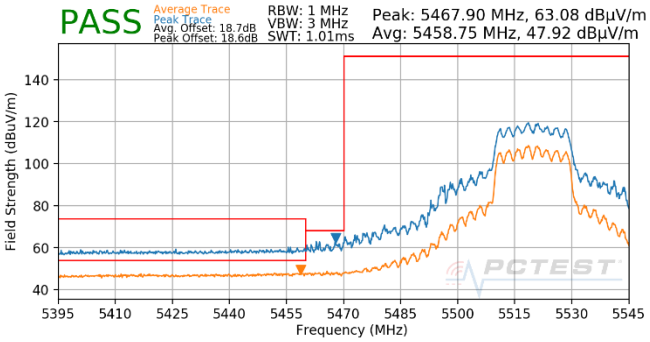
Plot 7-921. SDM Diversity (Pk & Avg, RU242, Index 61, Ch.40, MCS11)



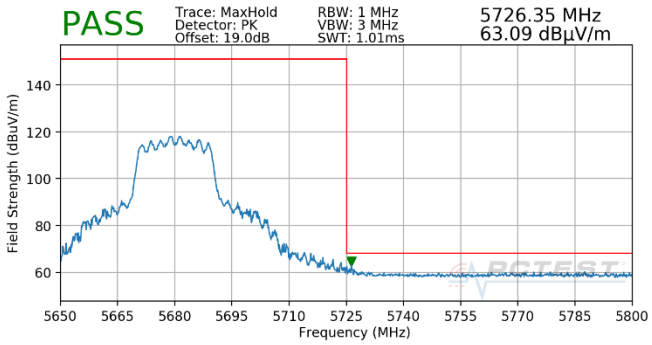
Plot 7-924. CDD Diversity (Pk & Avg, RU242, Index 61, Ch.100, MCS11)



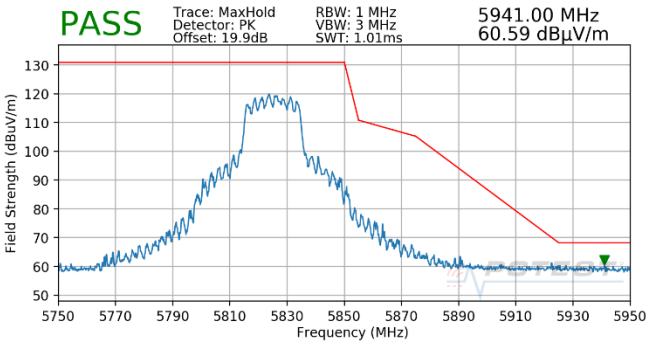
Plot 7-922. SDM Diversity (Pk & Avg, RU242, Index 61, Ch.60, MCS11)



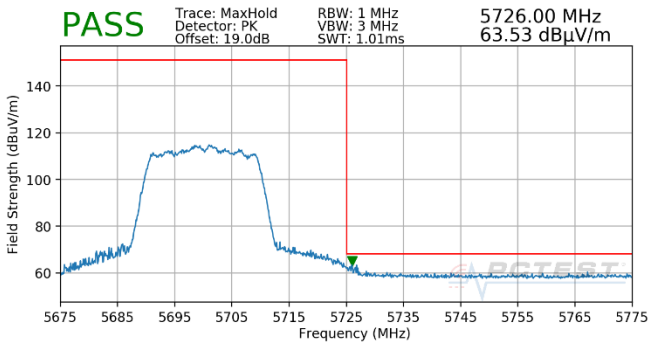
Plot 7-925. CDD Diversity (Pk & Avg, RU242, Index 61, Ch.104, MCS11)



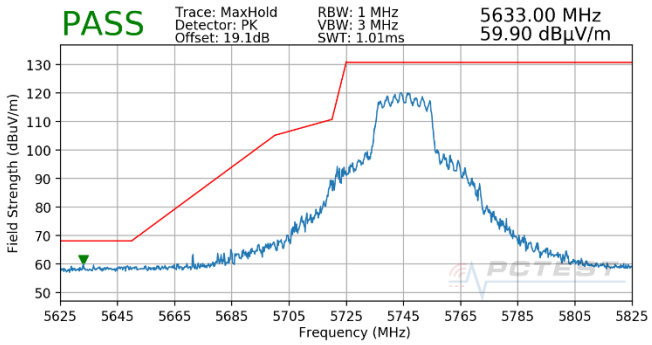
Plot 7-926. CDD Diversity (Pk, RU242, Index 61, Ch.136, MCS11)



Plot 7-929. CDD Diversity (Pk, RU242, Index 61, Ch.165, MCS11)



Plot 7-927. CDD Diversity (Pk, RU242, Index 61, Ch.140, MCS11)

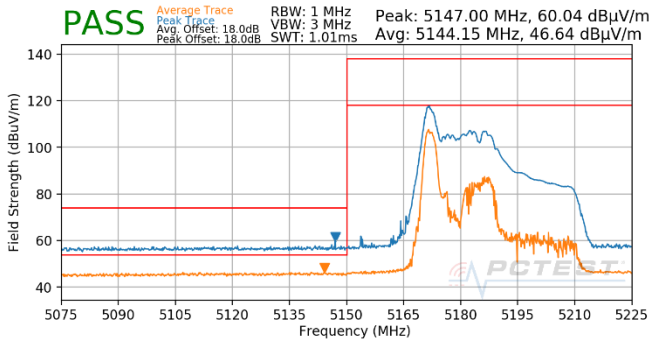


Plot 7-928. CDD Diversity (Pk, RU242, Index 61, Ch.149, MCS11)

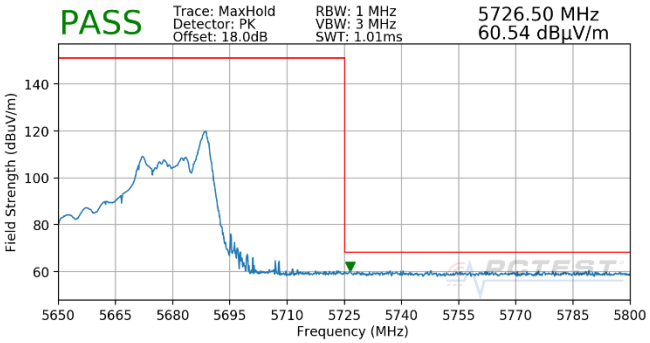
7.6.19 CDD/SDM Diversity Radiated Band Edge Measurements (40MHz BW)

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

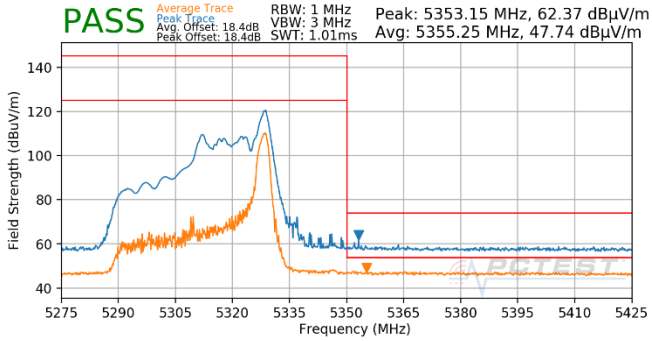
RU26



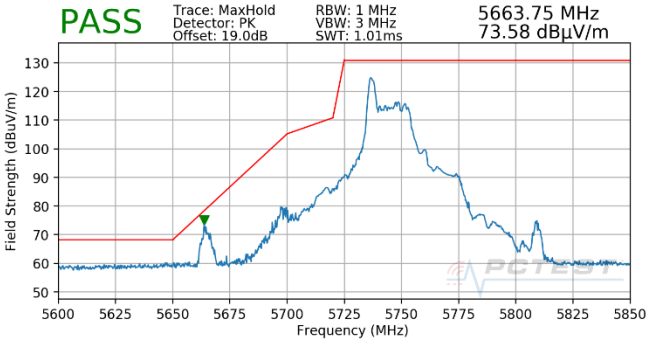
Plot 7-930. SDM Diversity (Pk & Avg, RU26, Index 0, Ch.38, MCS11)



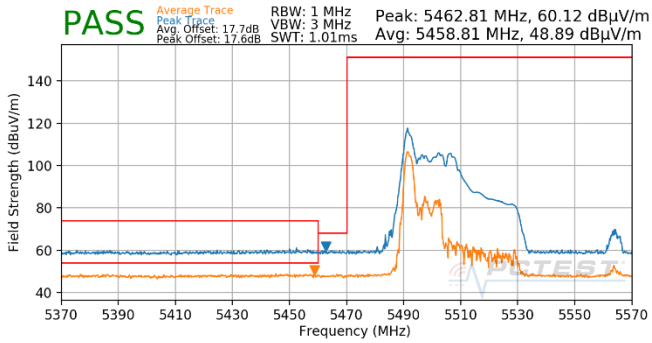
Plot 7-933. CDD Diversity (Pk, RU26, Index 17, Ch.134, MCS11)



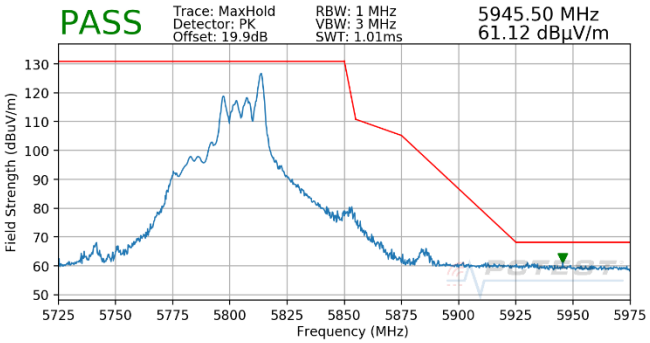
Plot 7-931. SDM Diversity (Pk & Avg, RU26, Index 17, Ch.62, MCS11)



Plot 7-934. CDD Diversity (Pk, RU26, Index 0, Ch.151, MCS11)

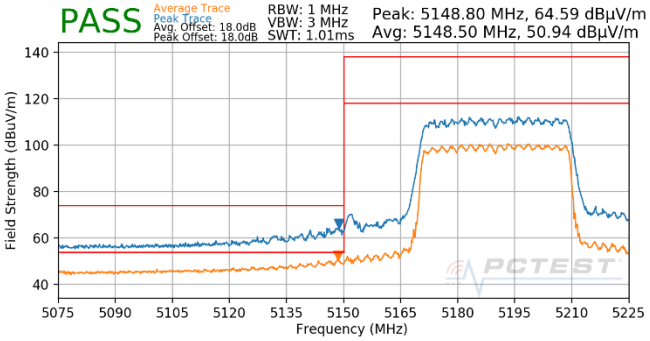


Plot 7-932. CDD Diversity (Pk & Avg, RU26, Index 0, Ch.102, MCS11)

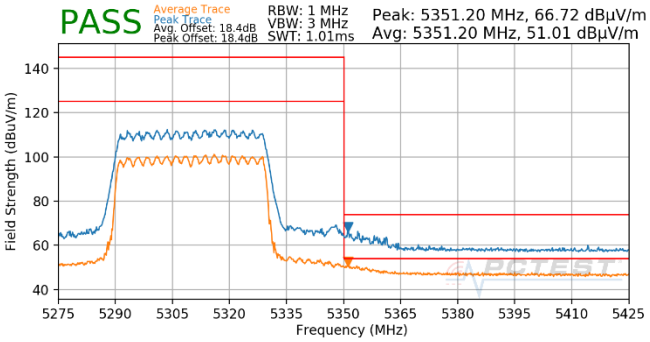


Plot 7-935. CDD Diversity (Pk, RU26, Index 17, Ch.159, MCS11)

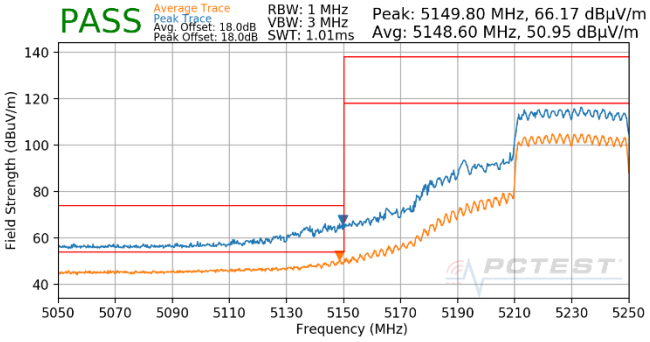
RU484



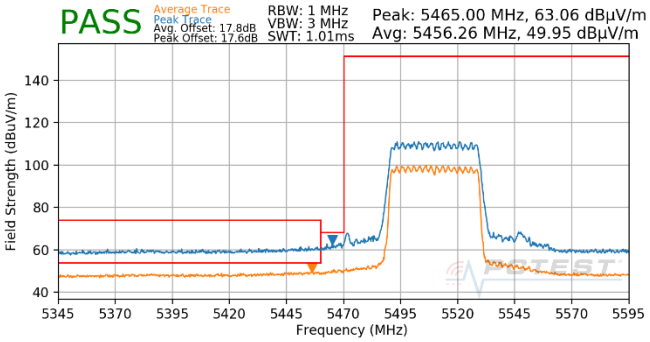
Plot 7-936. CDD Diversity (Pk & Avg, RU484, Index 65, Ch.38, MCS11)



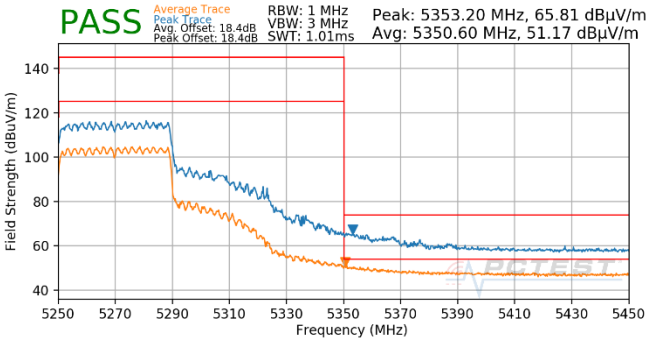
Plot 7-939. CDD Diversity (Pk & Avg, RU484, Index 65, Ch.62, MCS11)



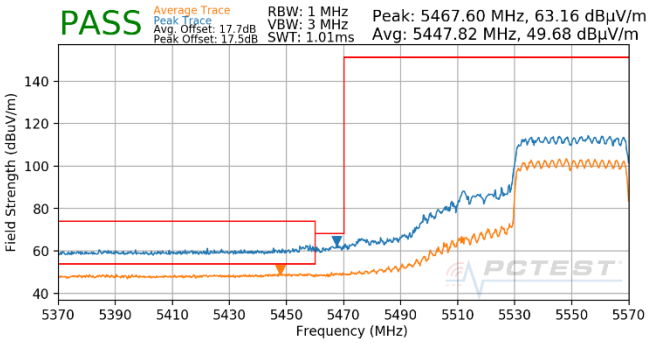
Plot 7-937. CDD Diversity (Pk & Avg, RU484, Index 65, Ch.46, MCS11)



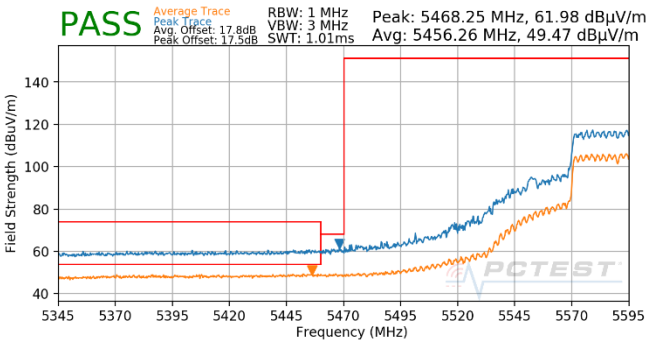
Plot 7-940. CDD Diversity (Pk & Avg, RU484, Index 65, Ch.102, MCS11)



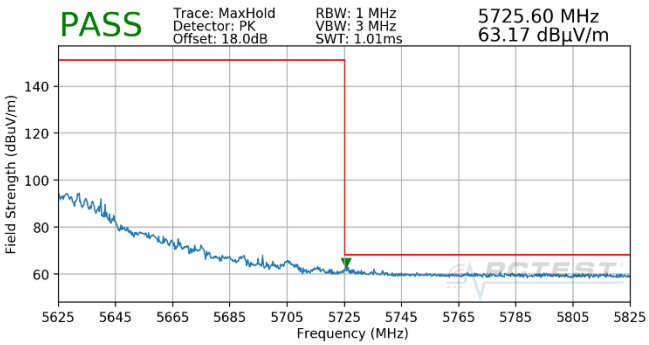
Plot 7-938. CDD Diversity (Pk & Avg, RU484, Index 65, Ch.54, MCS11)



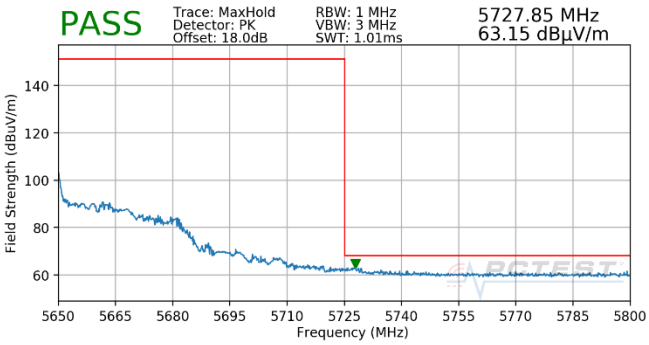
Plot 7-941. CDD Diversity (Pk & Avg, RU484, Index 65, Ch.110, MCS11)



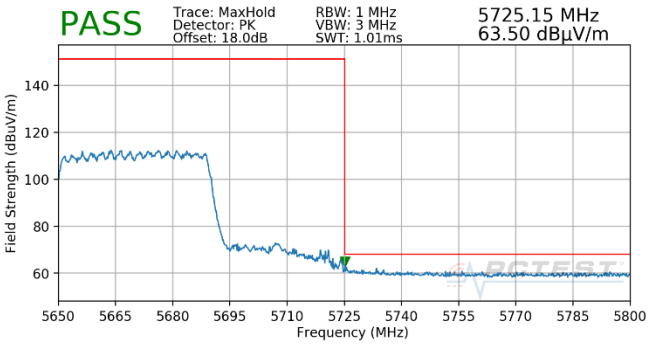
Plot 7-942. (FCC Only) CDD Diversity (Pk & Avg, RU484, Index 65, Ch.118, MCS11)



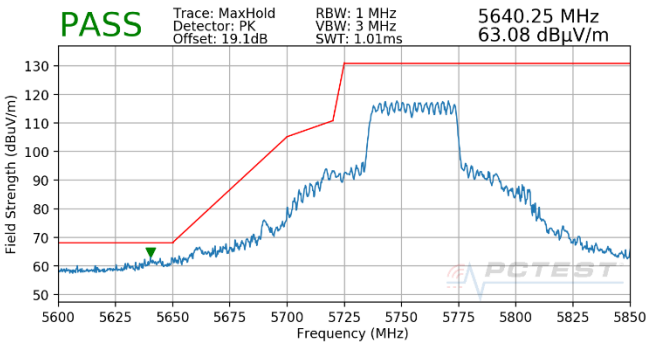
Plot 7-943. (FCC Only) CDD Diversity (Pk, RU484, Index 65, Ch.118, MCS11)



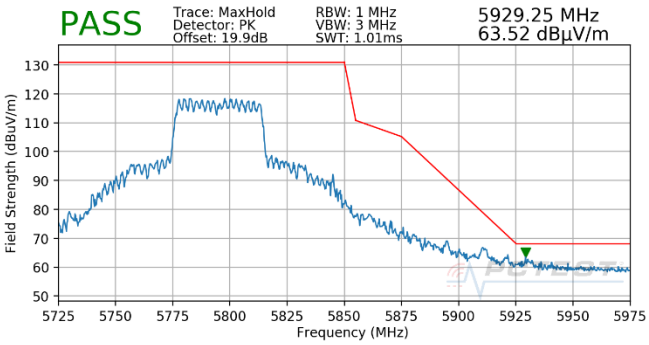
Plot 7-944. (FCC Only) CDD Diversity (Pk, RU484, Index 65, Ch.126, MCS11)



Plot 7-945. CDD Diversity (Pk, RU484, Index 65, Ch.134, MCS11)



Plot 7-946. CDD Diversity (Pk, RU484, Index 65, Ch.151, MCS11)

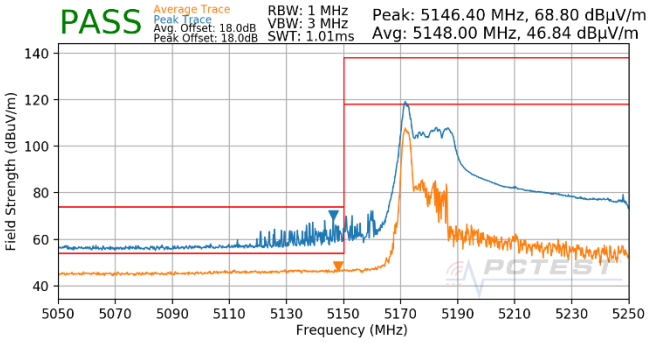


Plot 7-947. CDD Diversity (Pk, RU484, Index 65, Ch.159, MCS11)

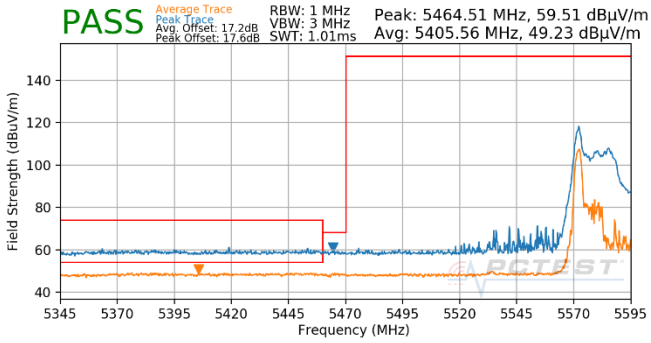
7.6.20 CDD/SDM Diversity Radiated Band Edge Measurements (80MHz BW)

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

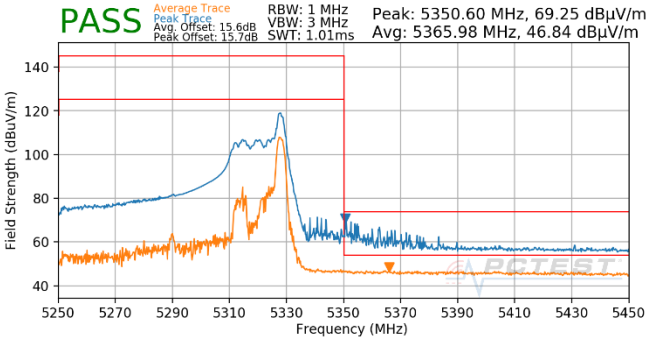
RU26



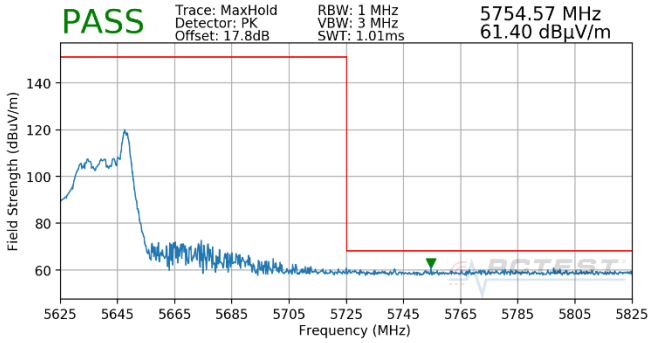
Plot 7-948. SDM Diversity (Pk & Avg, RU26, Index 0, Ch.42, MCS11)



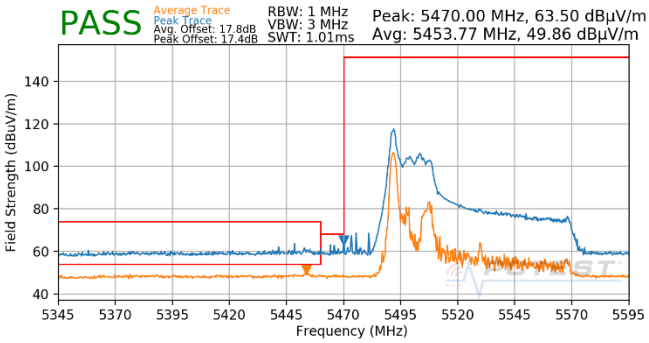
Plot 7-951. (FCC Only) CDD Diversity (Pk & Avg, RU26, Index 0, Ch.122, MCS11)



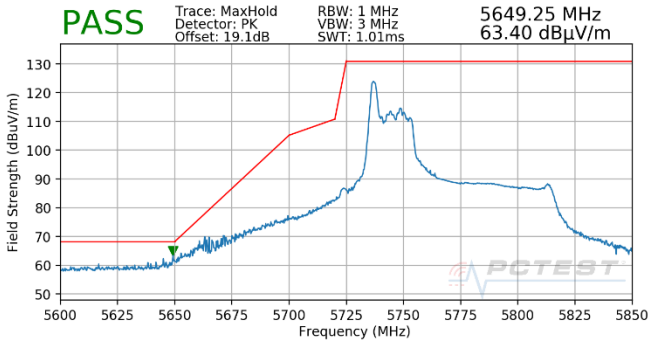
Plot 7-949. SDM Diversity (Pk & Avg, RU26, Index 36, Ch.58, MCS11)



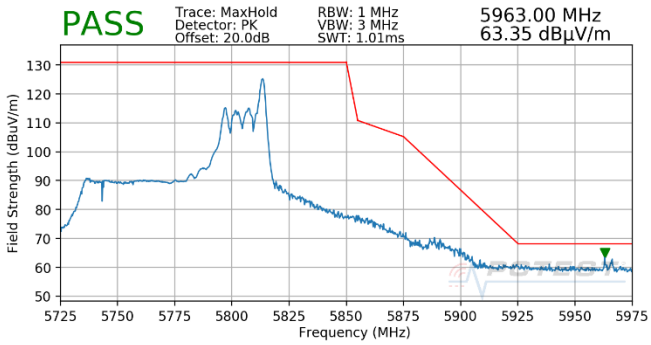
Plot 7-952. (FCC Only) CDD Diversity (Pk, RU26, Index 36, Ch.122, MCS11)



Plot 7-950. CDD Diversity (Pk & Avg, RU26, Index 0, Ch.106, MCS11)

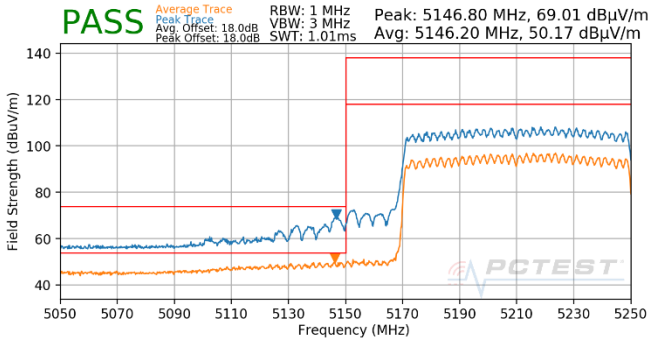


Plot 7-953. CDD Diversity (Pk, RU26, Index 0, Ch.155, MCS11)

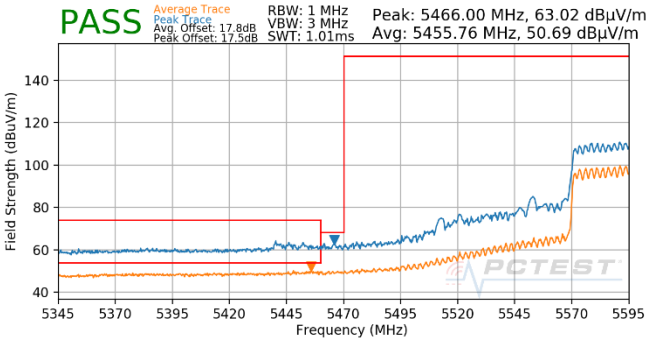


Plot 7-954. CDD Diversity (Pk, RU26, Index 36, Ch.155, MCS11)

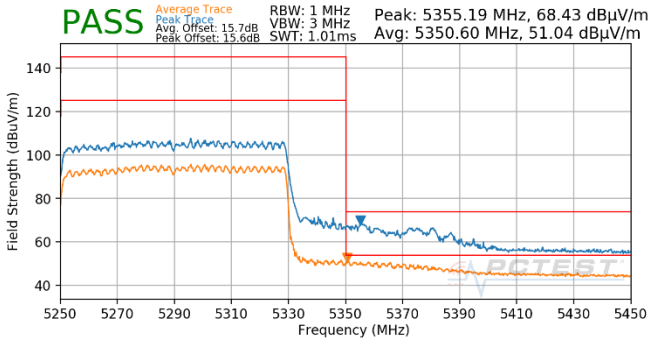
RU996



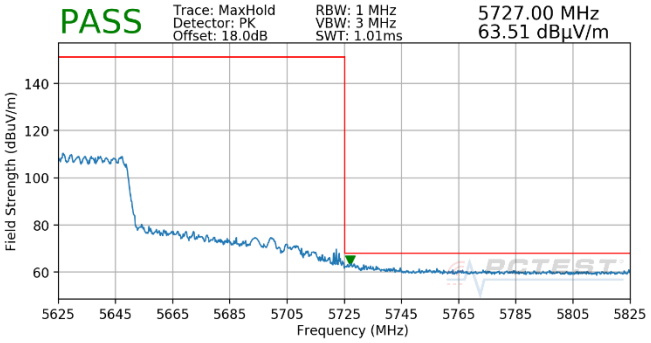
Plot 7-955. CDD Diversity (Pk & Avg, RU996, Index 67, Ch.42, MCS11)



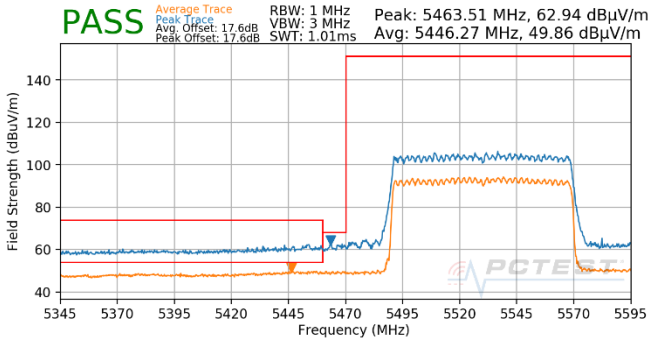
Plot 7-958. (FCC Only) CDD Diversity (Pk & Avg, RU996, Index 67, Ch.122, MCS11)



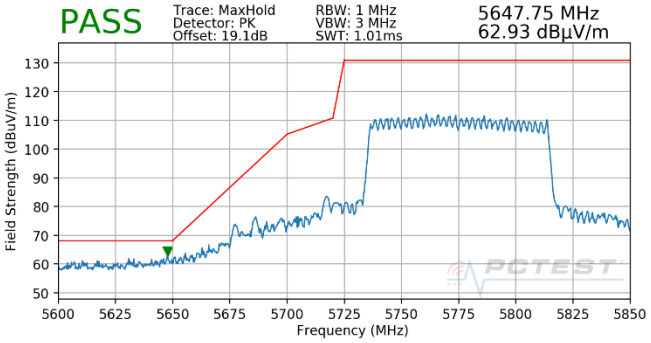
Plot 7-956. CDD Diversity (Pk & Avg, RU996, Index 67, Ch.58, MCS11)



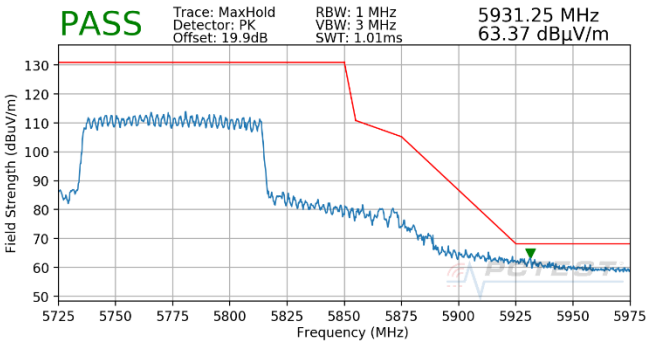
Plot 7-959. (FCC Only) CDD Diversity (Pk, RU996, Index 67, Ch.122, MCS11)



Plot 7-957. CDD Diversity (Pk & Avg, RU996, Index 67, Ch.106, MCS11)



Plot 7-960. CDD Diversity (Pk, RU996, Index 67, Ch.155, MCS11)



Plot 7-961. CDD Diversity (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 7-255 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 7-255. 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 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 diagrams below.

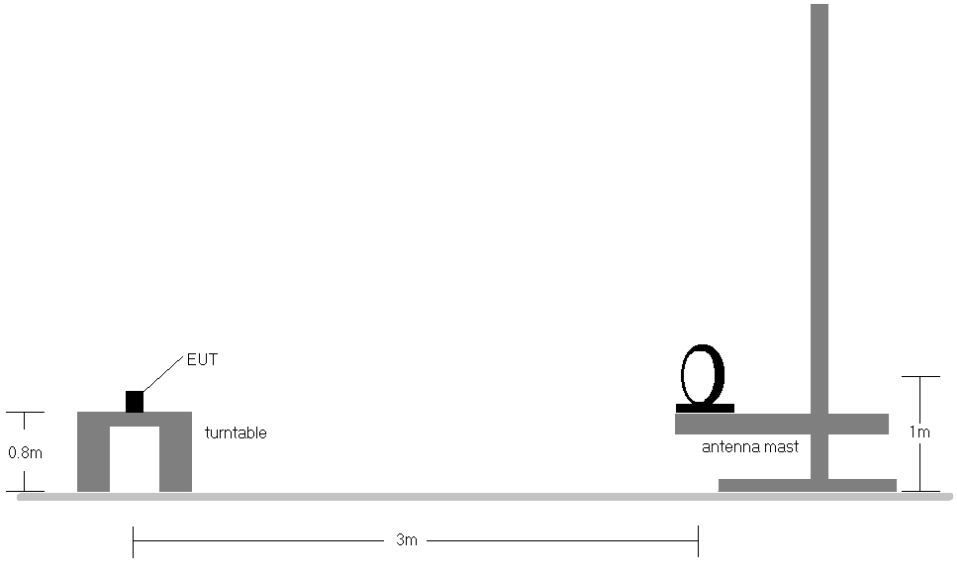


Figure 7-6. Radiated Test Setup < 30MHz

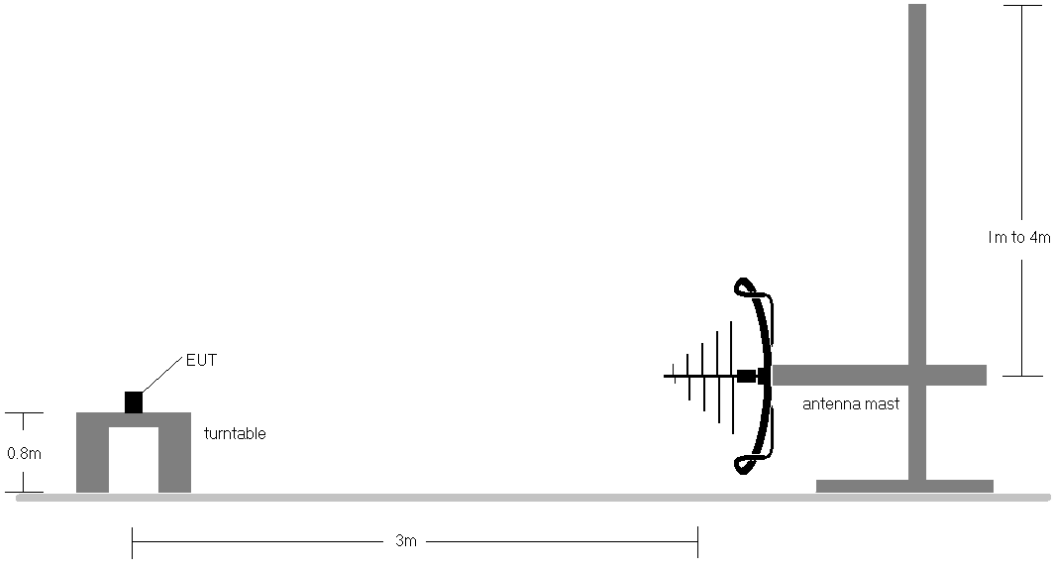


Figure 7-7. Radiated Test Setup < 1GHz

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 7-255.
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. 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
9. 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.
10. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. There were no emissions detected in the 30MHz – 1GHz frequency range, as shown in the subsequent plots.
11. All antenna configurations and data rates were investigated and only the worst case are reported.

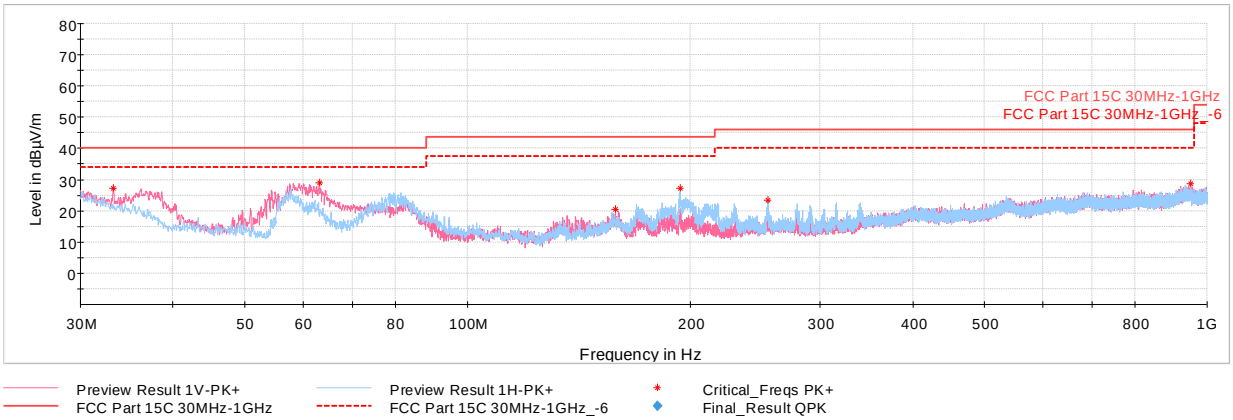
Sample Calculations

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

SDM Primary Radiated Spurious Emissions (Below 1GHz)

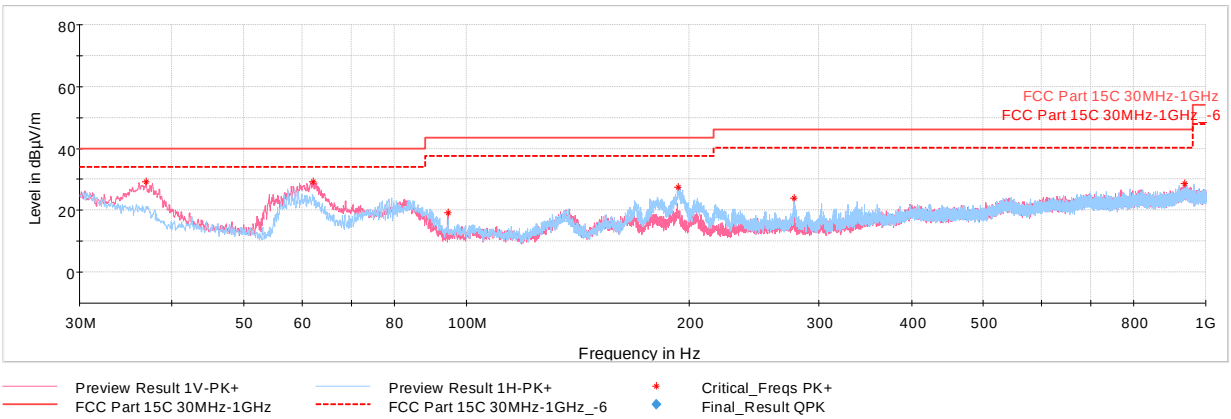
§15.209; RSS-Gen [8.9]



Plot 7-962. RSE below 1GHz SDM Primary (RU26 – Ch.40), 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]
33.20	Max Peak	V	100	26	-65.92	-13.89	27.19	40.00	-12.81
63.08	Max Peak	V	100	15	-57.53	-20.56	28.91	40.00	-11.09
158.62	Max Peak	V	100	29	-70.67	-15.94	20.39	43.52	-23.13
194.12	Max Peak	H	100	251	-62.54	-17.26	27.20	43.52	-16.32
254.94	Max Peak	H	100	276	-69.66	-13.99	23.35	46.02	-22.67
948.93	Max Peak	H	100	39	-78.79	0.48	28.69	46.02	-17.33

Table 7-256. RSE below 1GHz SDM Primary (RU26 – Ch.40), with AC/DC Adapter



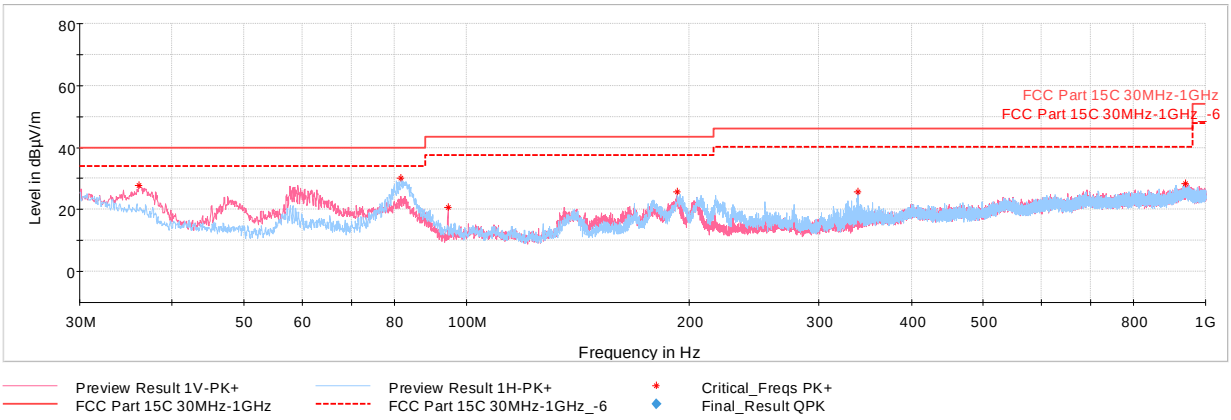
Plot 7-963. RSE below 1GHz SDM Primary (RU242 – Ch.40), with AC/DC Adapter

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]
36.89	Max Peak	V	100	15	-62.51	-15.34	29.15	40.00	-10.85
62.16	Max Peak	V	100	15	-56.99	-20.73	29.28	40.00	-10.72
94.46	Max Peak	V	100	177	-67.35	-20.42	19.23	43.52	-24.29
193.40	Max Peak	H	100	246	-61.96	-17.43	27.61	43.52	-15.91
277.50	Max Peak	H	100	282	-69.39	-13.71	23.90	46.02	-22.12
937.24	Max Peak	V	250	111	-79.25	0.79	28.54	46.02	-17.48

Table 7-257. RSE below 1GHz SDM Primary (RU242– Ch.40), with AC/DC Adapter

SDM Diversity Radiated Spurious Emissions (Below 1GHz)

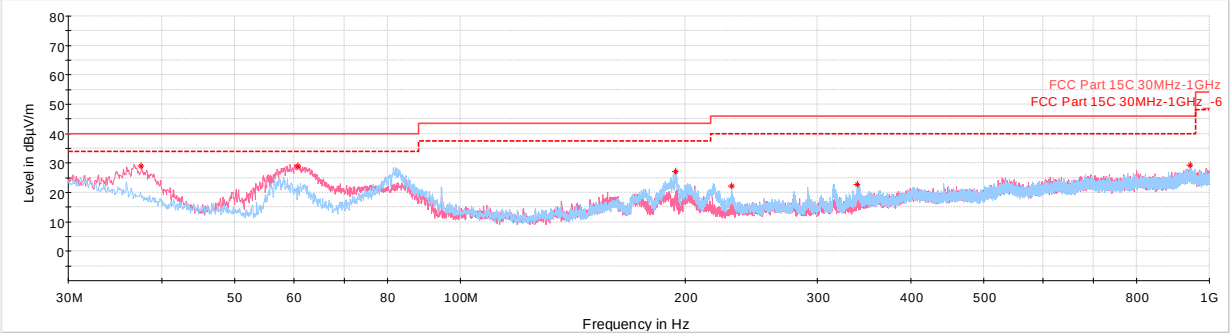
§15.209; RSS-Gen [8.9]



Plot 7-964. RSE below 1GHz SDM Diversity (RU26 – Ch.40), 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]
36.06	Max Peak	V	100	21	-64.63	-14.74	27.63	40.00	-12.37
81.65	Max Peak	H	250	142	-55.80	-20.96	30.24	40.00	-9.76
94.51	Max Peak	V	100	232	-65.78	-20.39	20.83	43.52	-22.69
193.06	Max Peak	H	100	174	-63.88	-17.48	25.64	43.52	-17.88
338.61	Max Peak	H	100	121	-69.18	-12.17	25.65	46.02	-20.37
938.31	Max Peak	V	100	15	-79.47	0.73	28.26	46.02	-17.76

Table 7-258. RSE below 1GHz SDM Diversity (RU26 – Ch.40), with AC/DC Adapter



Plot 7-965. RSE below 1GHz SDM Diversity (RU242 – Ch.40), 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]
37.57	Max Peak	V	100	18	-62.21	-15.87	28.92	40.00	-11.08
60.70	Max Peak	V	250	174	-56.94	-21.03	29.03	40.00	-10.97
193.88	Max Peak	H	100	237	-62.47	-17.32	27.21	43.52	-16.31
230.31	Max Peak	H	100	260	-69.65	-15.22	22.13	46.02	-23.89
339.33	Max Peak	H	100	14	-72.12	-12.14	22.74	46.02	-23.28
941.70	Max Peak	V	250	95	-78.44	0.81	29.37	46.02	-16.65

Table 7-259. RSE below 1GHz SDM Diversity (RU242– Ch.40), with AC/DC Adapter

7.8 AC Line Conducted Emission 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 7-260. 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

7. Analyzer center frequency was set to the frequency of the spurious emission of interest
8. RBW = 9kHz (for emissions from 150kHz – 30MHz)
9. Detector = RMS
10. Sweep time = auto couple
11. Trace mode = max hold
12. Trace was allowed to stabilize

Test Setup

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

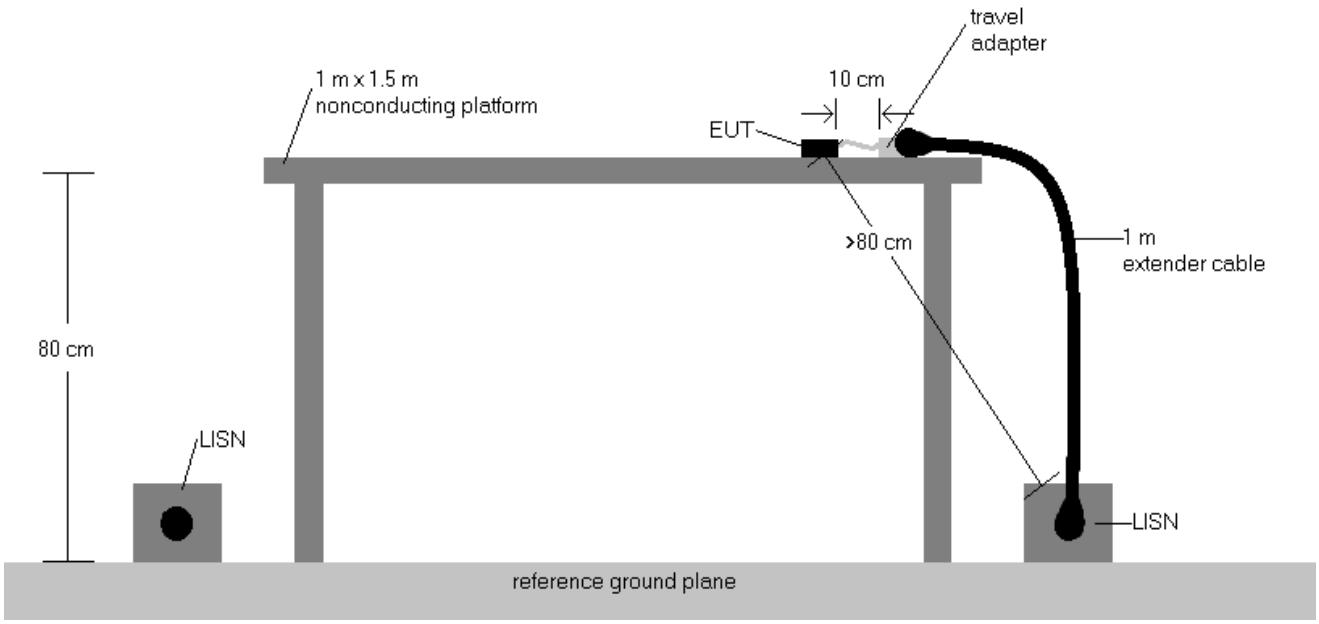
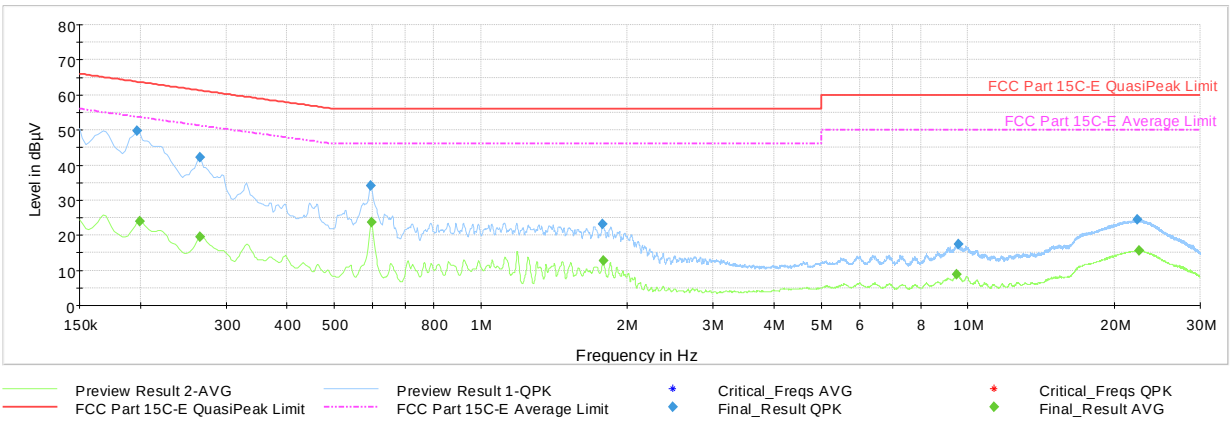


Figure 7-8. Test Instrument & Measurement Setup

Test Notes

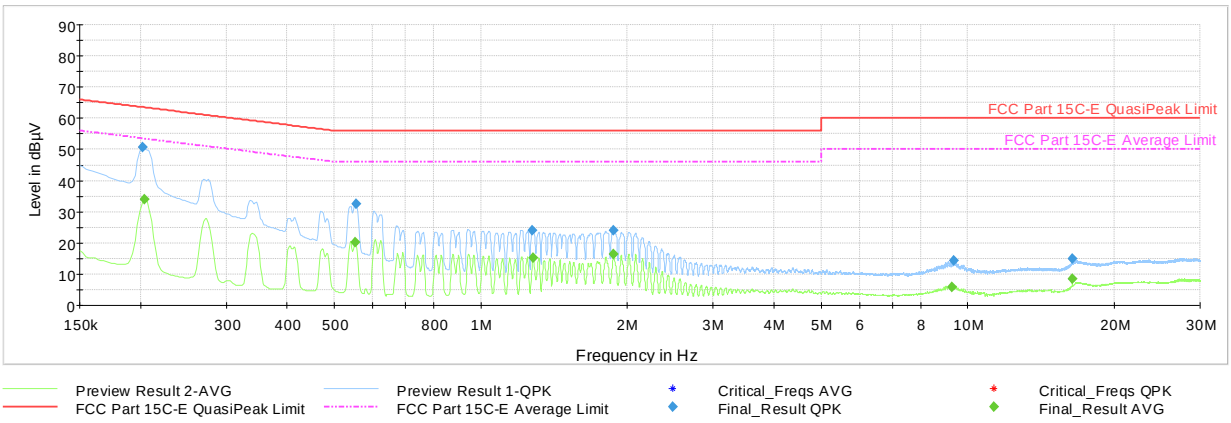
1. All modes of operation were investigated and the worst-case emissions are reported. The emissions found were not affected by the choice of channel used during testing.
2. Both configurations below were investigated, and the worst case has been reported.
    a. EUT powered by AC/DC adaptor via USB-C 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 7-966. AC Line Conducted Plot with 11ax UNII Band 1 – RU26 – Ch.40 (L1) with Laptop

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.197	FINAL	49.8	—	63.73	-13.91	L1	GND
0.200	FINAL	—	23.94	53.63	-29.69	L1	GND
0.265	FINAL	42.1	—	61.28	-19.15	L1	GND
0.265	FINAL	—	19.55	51.28	-31.73	L1	GND
0.593	FINAL	34.3	—	56.00	-21.75	L1	GND
0.596	FINAL	—	23.78	46.00	-22.22	L1	GND
1.779	FINAL	23.1	—	56.00	-32.86	L1	GND
1.781	FINAL	—	12.81	46.00	-33.19	L1	GND
9.467	FINAL	—	8.91	50.00	-41.09	L1	GND
9.544	FINAL	17.5	—	60.00	-42.47	L1	GND
22.272	FINAL	24.4	—	60.00	-35.63	L1	GND
22.508	FINAL	—	15.63	50.00	-34.37	L1	GND

Table 7-261. AC Line Conducted with 11ax UNII Band 1 – RU26 – Ch.40 (L1) with Laptop



Plot 7-967. AC Line Conducted Plot with 11ax UNII Band 1 – RU26 – Ch.40 (N) with Laptop

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.202	FINAL	50.7	—	63.54	-12.84	N	GND
0.204	FINAL	—	34.12	53.45	-19.32	N	GND
0.553	FINAL	—	20.21	46.00	-25.79	N	GND
0.555	FINAL	32.5	—	56.00	-23.53	N	GND
1.275	FINAL	24.0	—	56.00	-32.04	N	GND
1.282	FINAL	—	15.11	46.00	-30.89	N	GND
1.874	FINAL	24.0	—	56.00	-31.98	N	GND
1.876	FINAL	—	16.31	46.00	-29.69	N	GND
9.285	FINAL	—	5.93	50.00	-44.07	N	GND
9.377	FINAL	14.3	—	60.00	-45.72	N	GND
16.384	FINAL	14.8	—	60.00	-45.16	N	GND
16.386	FINAL	—	8.43	50.00	-41.57	N	GND

Table 7-262. AC Line Conducted with 11ax UNII Band 1 – RU26 – Ch.40 (N) with Laptop

8.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Apple Tablet Device FCC ID: BCGA2568** and **IC: 579C-A2568** 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.

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