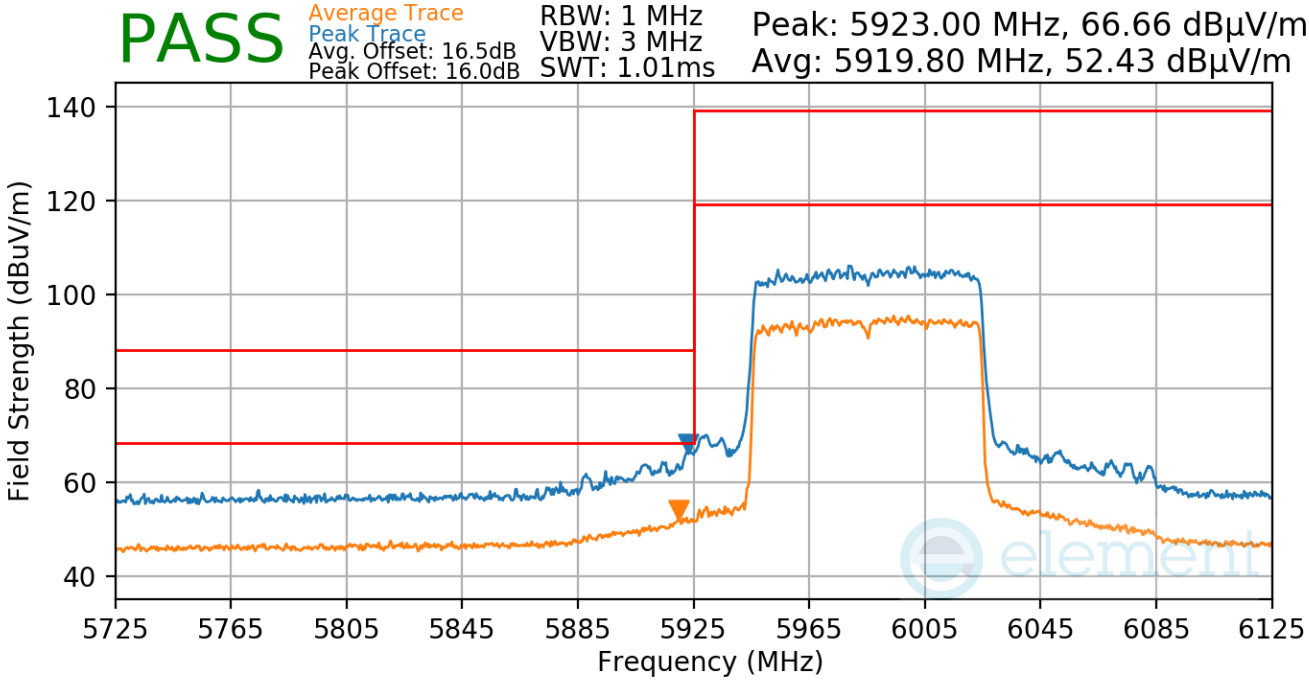
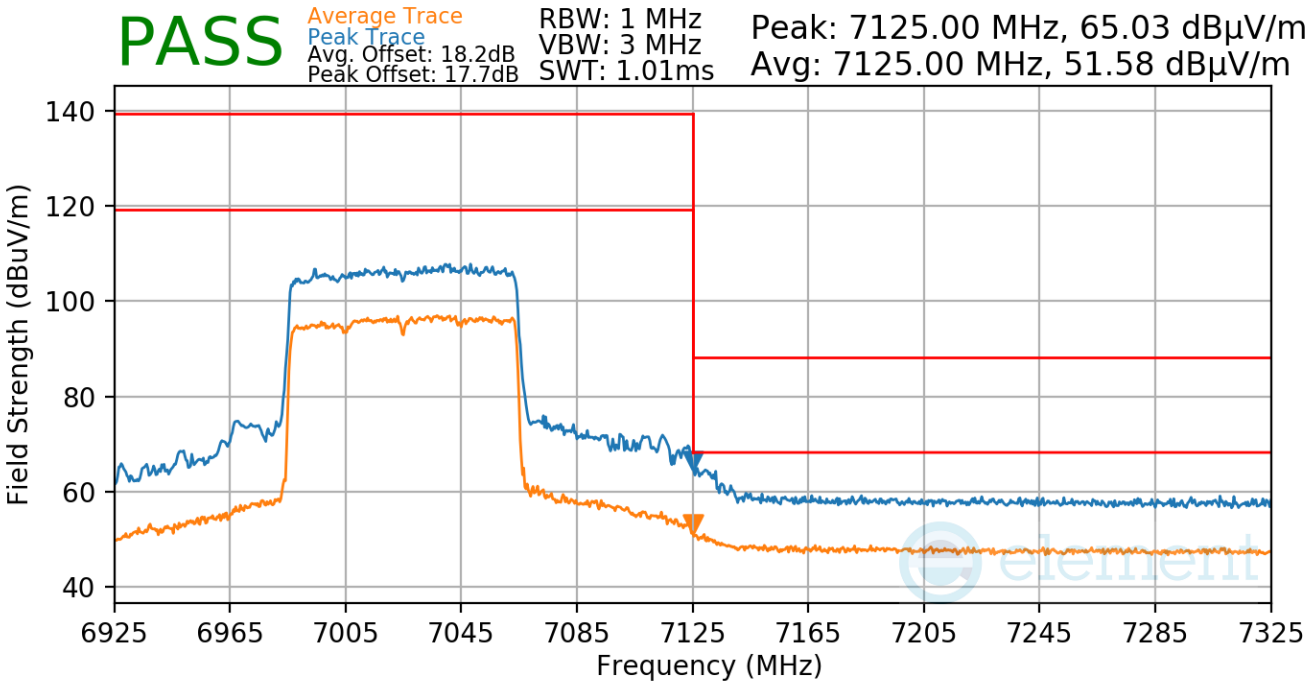
RU996

Worst Case Mode:	802.11ax
Worst Case Transfer Rate:	MCS11
Distance of Measurements:	3 Meters
Operating Frequency:	5985MHz
Channel:	7



Plot 7-803. SDM Radiated Lower Band Edge (Peak & Average – UNII Band 5 – RU996)

Worst Case Mode:	802.11ax
Worst Case Transfer Rate:	MCS11
Distance of Measurements:	3 Meters
Operating Frequency:	7025MHz
Channel:	215



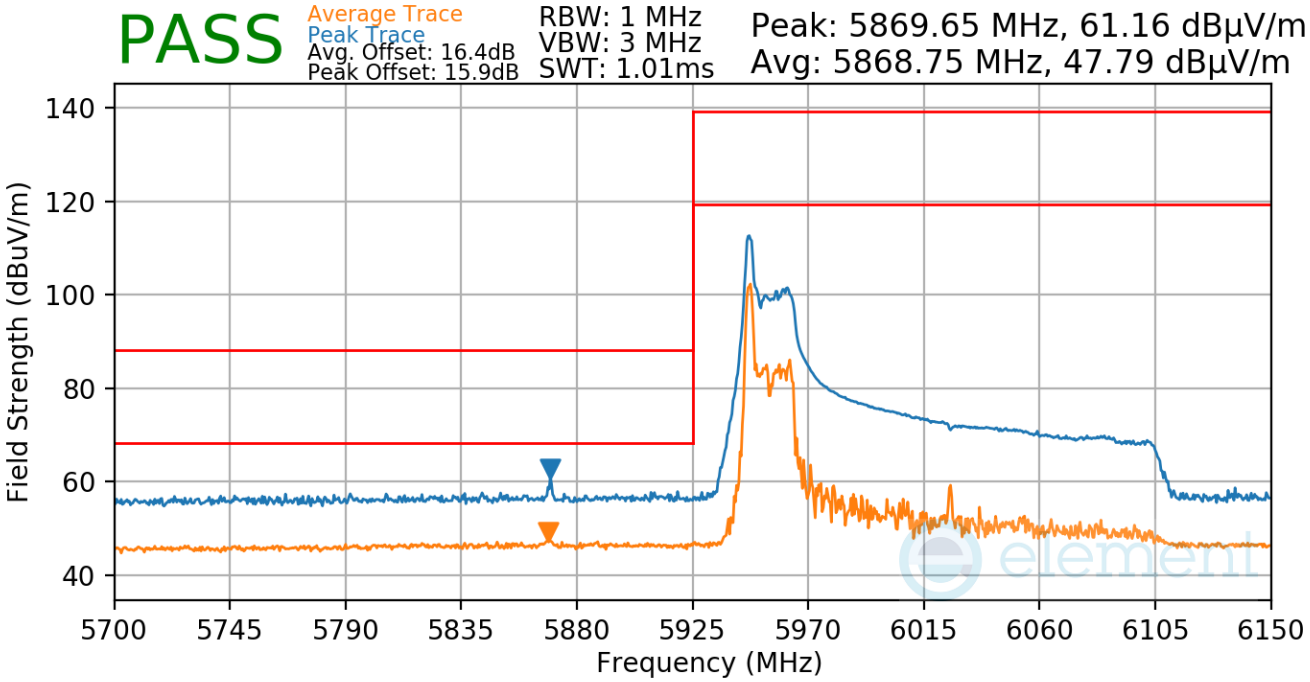
Plot 7-804. SDM Radiated Lower Band Edge (Peak & Average – UNII Band 8 – RU996)

7.7.15 SDM Radiated Band Edge Measurements (160MHz BW)

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

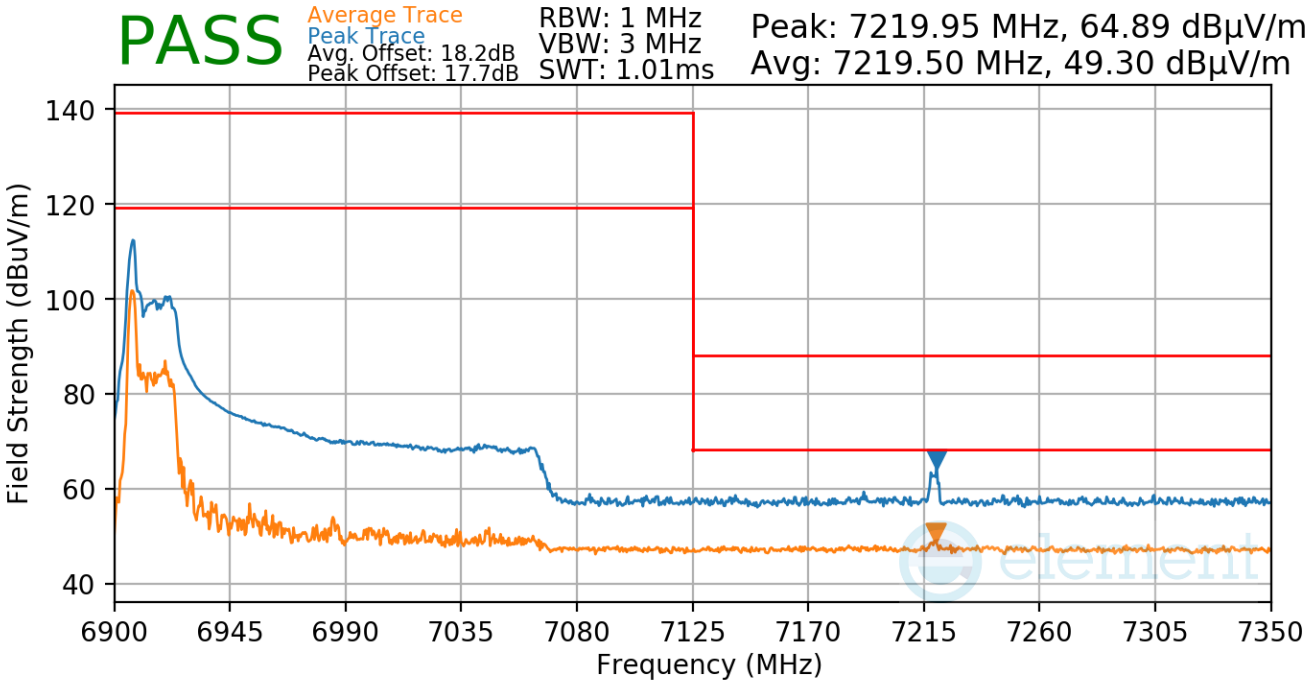
RU26

Worst Case Mode:	802.11ax
Worst Case Transfer Rate:	MCS11
Distance of Measurements:	3 Meters
Operating Frequency:	6025MHz
Channel:	15



Plot 7-805. SDM Radiated Lower Band Edge (Peak & Average – UNII Band 5 – RU26)

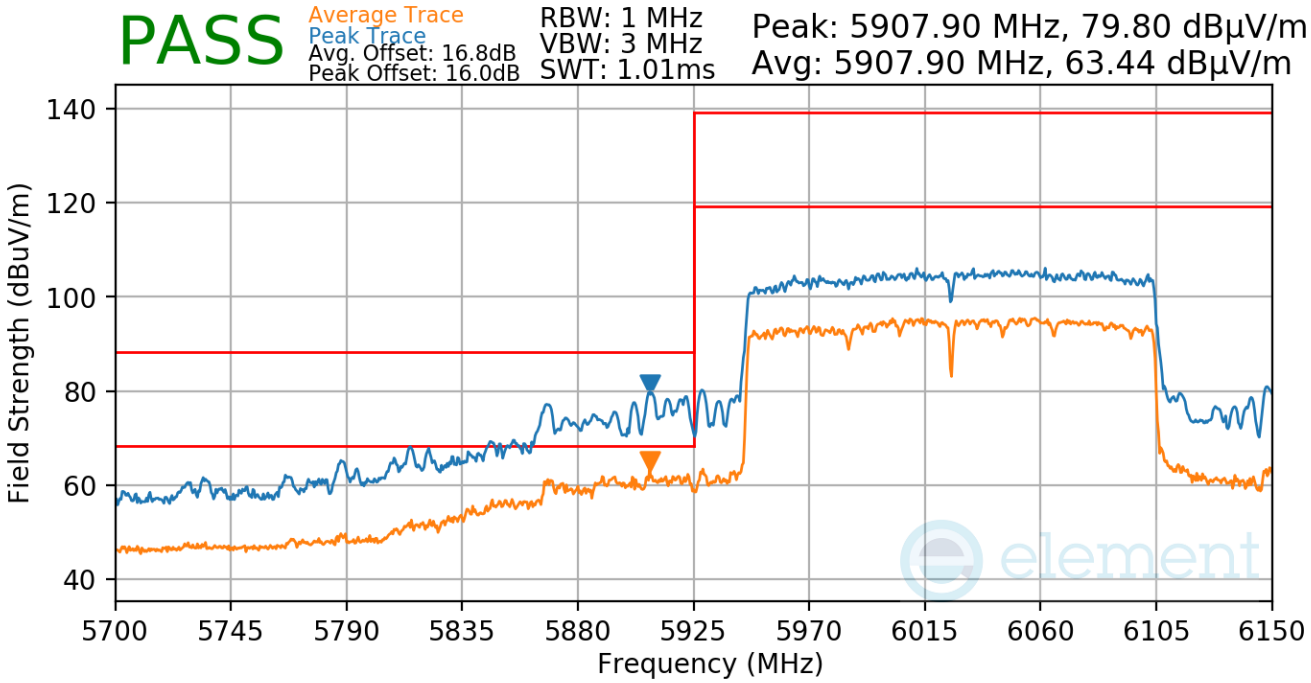
Worst Case Mode:	802.11ax
Worst Case Transfer Rate:	MCS11
Distance of Measurements:	3 Meters
Operating Frequency:	6985MHz
Channel:	207



Plot 7-806. SDM Radiated Lower Band Edge (Peak & Average – UNII Band 8 – RU26)

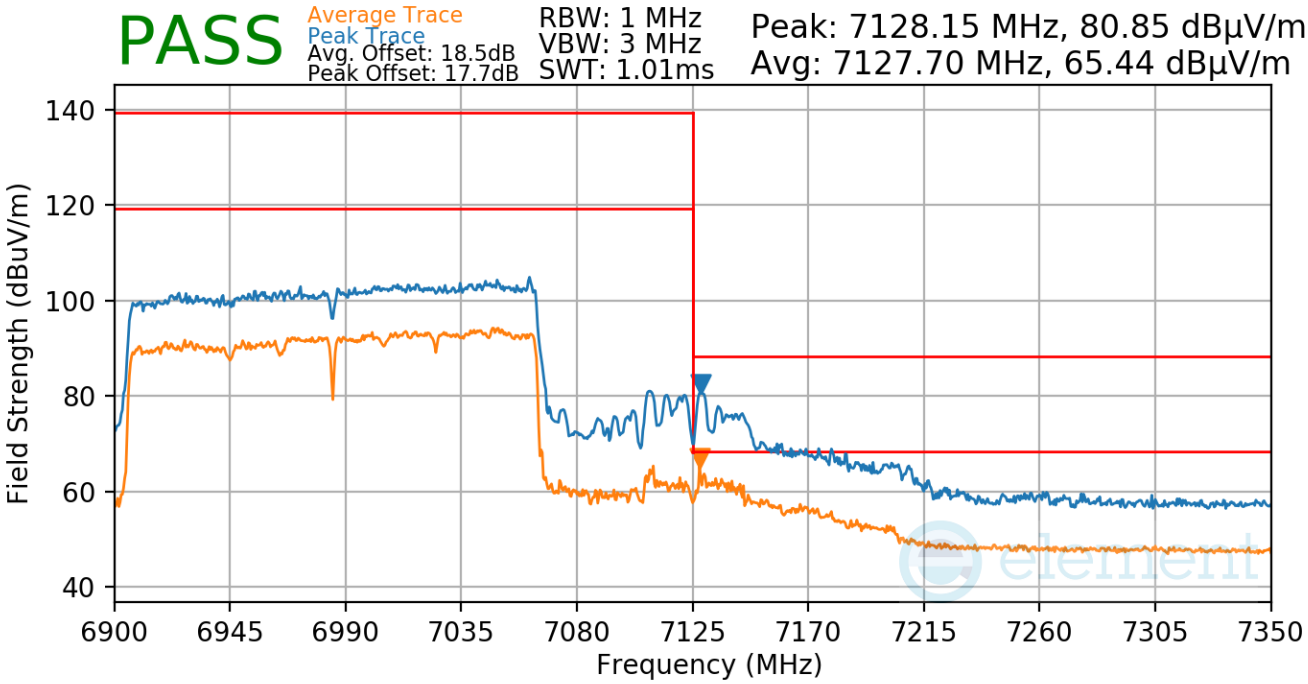
RU996x2

Worst Case Mode:	802.11ax
Worst Case Transfer Rate:	MCS11
Distance of Measurements:	3 Meters
Operating Frequency:	6025MHz
Channel:	15



Plot 7-807. SDM Radiated Lower Band Edge (Peak & Average – UNII Band 5 – RU996x2)

Worst Case Mode:	802.11ax
Worst Case Transfer Rate:	MCS11
Distance of Measurements:	3 Meters
Operating Frequency:	6985MHz
Channel:	207



Plot 7-808. SDM Radiated Lower Band Edge (Peak & Average – UNII Band 8 – RU996x2)

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 7-124 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 7-124. 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

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.

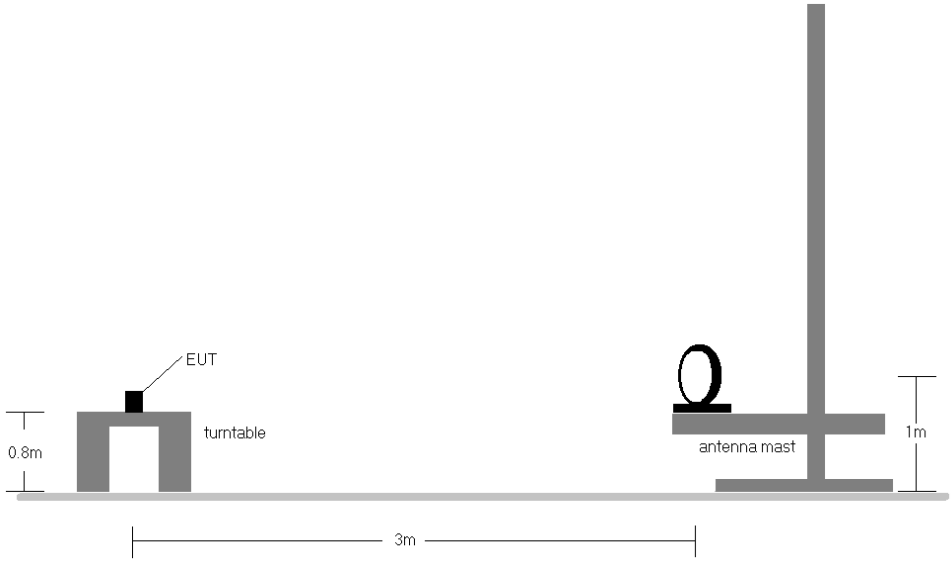


Figure 7-6. Radiated Test Setup < 30MHz

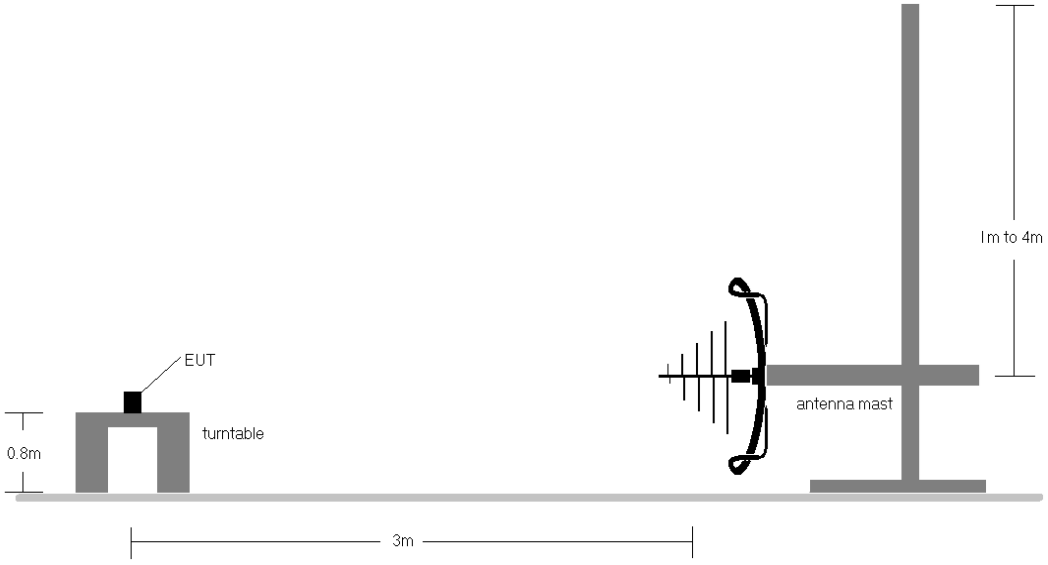


Figure 7-7. Radiated Test Setup < 1GHz

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 7-124.
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.

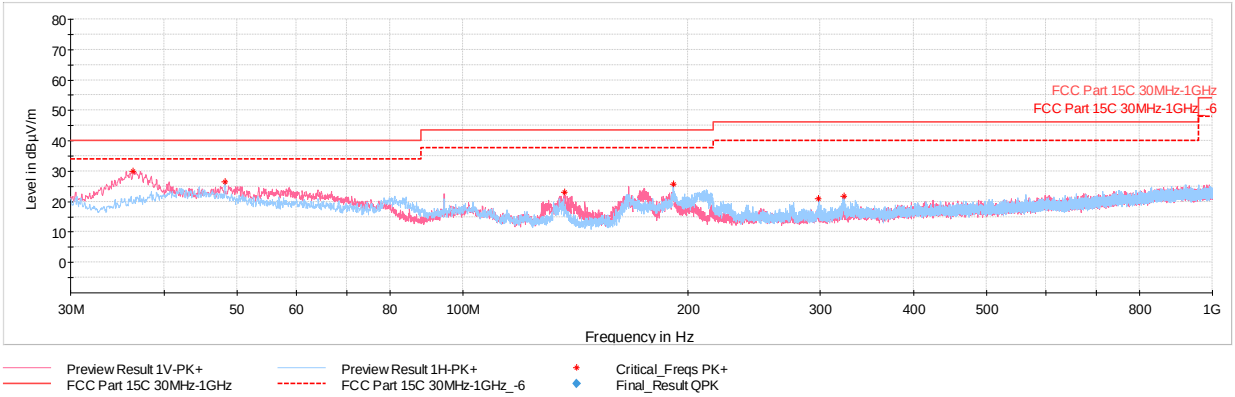
Sample Calculations

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 SDM Primary Radiated Spurious Emissions Measurements (Below 1GHz)

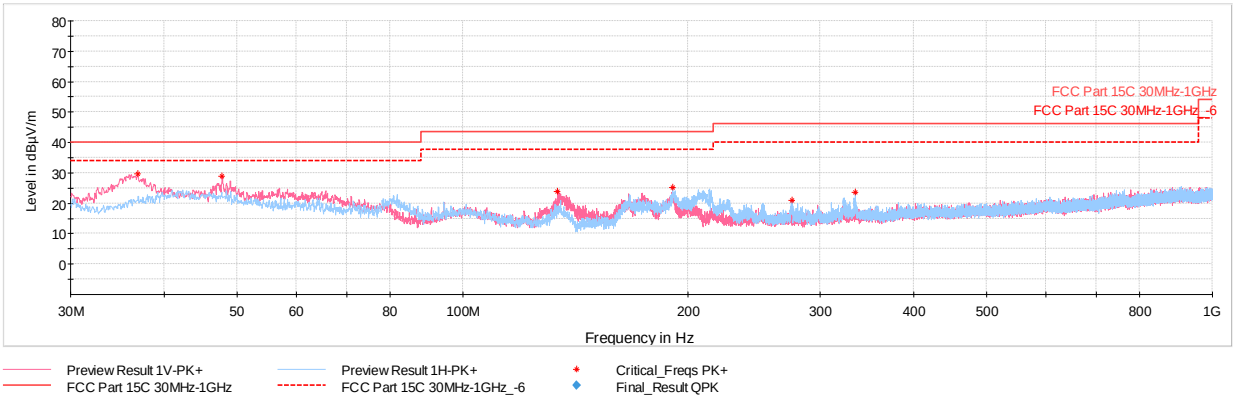
§15.209; RSS-Gen [8.9]



Plot 7-809. Radiated Spurious Emissions below 1GHz SDM (802.11ax – Ch.1 – RU26) 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]
36.35	Max-Peak	V	100	15	-58.73	-18.37	29.90	40.00	-10.10
48.19	Max-Peak	H	300	55	-65.08	-15.45	26.47	40.00	-13.53
136.65	Max-Peak	V	100	345	-62.43	-21.59	22.98	43.52	-20.54
191.07	Max-Peak	H	100	182	-63.07	-18.27	25.66	43.52	-17.86
298.40	Max-Peak	H	100	145	-70.44	-15.46	21.10	46.02	-24.92
322.79	Max-Peak	H	100	122	-70.68	-14.49	21.83	46.02	-24.19

Table 7-125. Radiated Spurious Emissions below 1GHz SDM (802.11ax – Ch.1 – RU26) with AC/DC Adapter



Plot 7-810. Radiated Spurious Emissions below 1GHz SDM (802.11ax – Ch.1 – RU242) 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]
36.84	Max-Peak	V	100	358	-58.91	-18.25	29.84	40.00	-10.16
47.80	Max-Peak	V	100	22	-62.59	-15.44	28.97	40.00	-11.03
133.94	Max-Peak	V	100	223	-62.22	-20.89	23.89	43.52	-19.63
190.73	Max-Peak	H	100	174	-63.43	-18.33	25.24	43.52	-18.28
274.83	Max-Peak	H	100	273	-70.04	-15.99	20.97	46.02	-25.05
333.90	Max-Peak	H	100	305	-69.42	-14.09	23.49	46.02	-22.53

Table 7-126. Radiated Spurious Emissions below 1GHz SDM (802.11ax – Ch.1 – RU242) with AC/DC Adapter

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 7-127. 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.

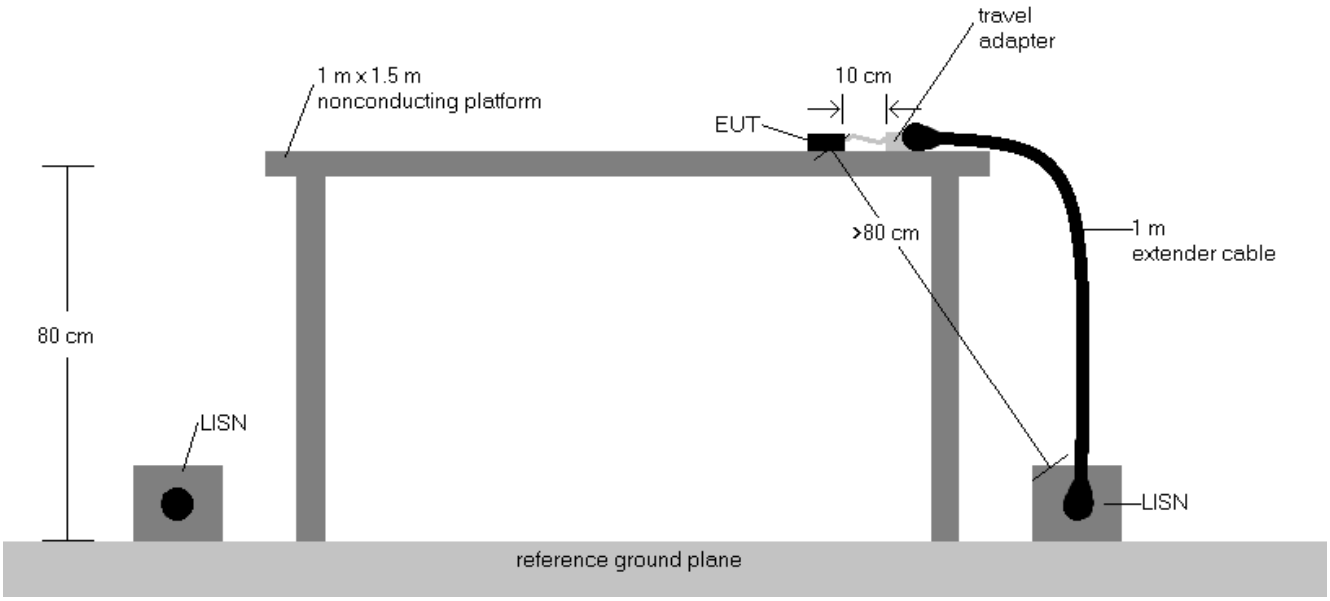
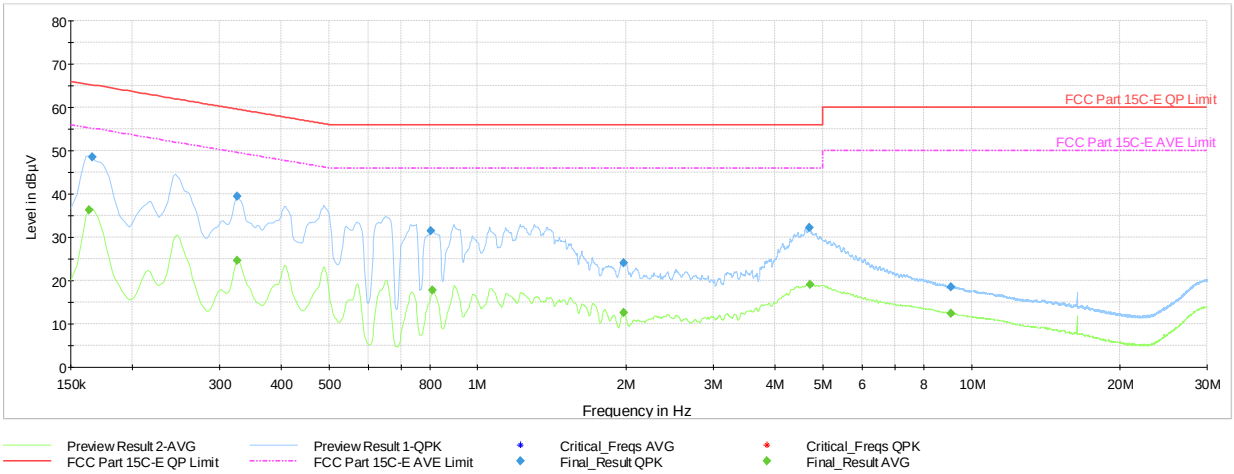


Figure 7-8. Test Instrument & Measurement Setup

Test Notes

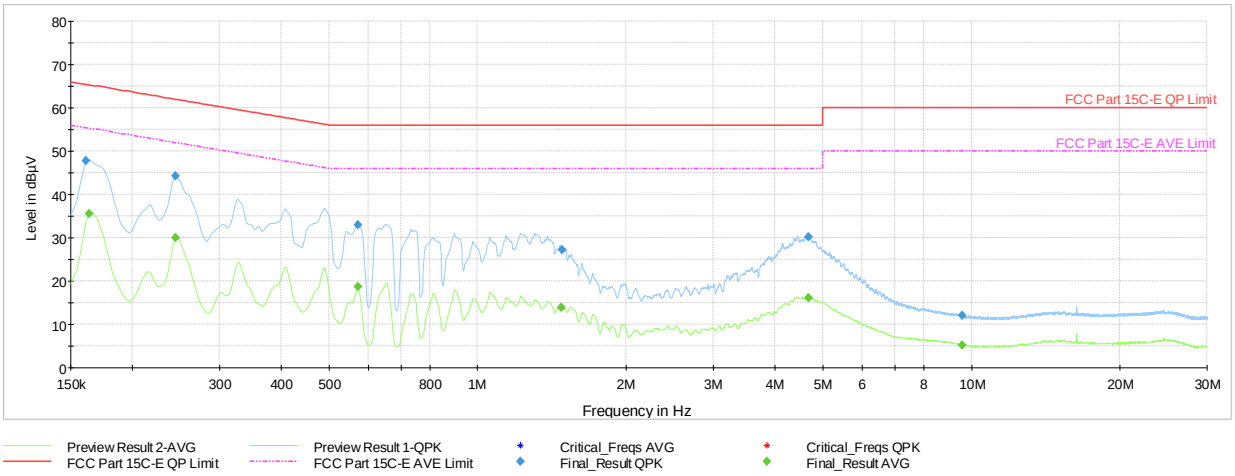
1. All modes of operation were investigated and the worst-case emissions are reported. The emissions found were not affected by the choice of channel used during testing.
2. Both configurations below were investigated, and the worst case has been reported.
    a. EUT powered by AC/DC adaptor via USB-C 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.
9. The unit was tested with all possible modes and only the highest emission is reported.



Plot 7-811. AC Line Conducted Plot with 11ax UNII Band 5 – RU26 – Ch.1 (L1) with AC/DC Adapter

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.164	FINAL	---	36.37	55.28	-18.92	L1	GND
0.166	FINAL	48.4	---	65.17	-16.74	L1	GND
0.326	FINAL	---	24.68	49.57	-24.88	L1	GND
0.326	FINAL	39.4	---	59.57	-20.18	L1	GND
0.805	FINAL	31.5	---	56.00	-24.48	L1	GND
0.812	FINAL	---	17.74	46.00	-28.26	L1	GND
1.973	FINAL	24.2	---	56.00	-31.83	L1	GND
1.977	FINAL	---	12.66	46.00	-33.34	L1	GND
4.688	FINAL	32.1	---	56.00	-23.86	L1	GND
4.722	FINAL	---	19.11	46.00	-26.89	L1	GND
9.078	FINAL	---	12.48	50.00	-37.52	L1	GND
9.087	FINAL	18.6	---	60.00	-41.45	L1	GND

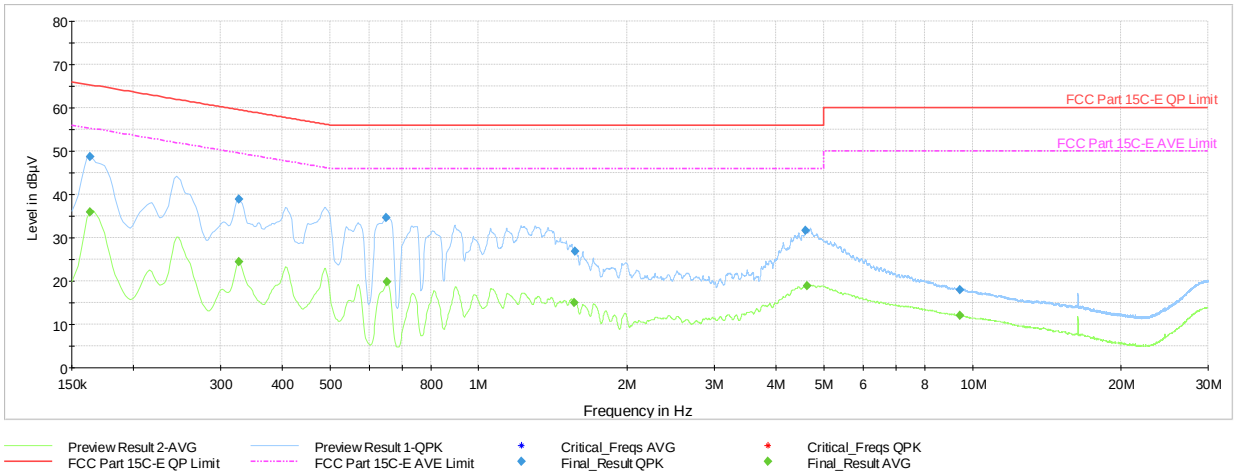
Table 7-128. AC Line Conducted Data with 11ax UNII Band 5 – RU26 – Ch.1 (L1) with AC/DC Adapter



Plot 7-812. AC Line Conducted Plot with 11ax UNII Band 5 – RU26 – Ch.1 (N) with AC/DC Adapter

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.161	FINAL	47.8	---	65.40	-17.58	N	GND
0.164	FINAL	---	35.49	55.28	-19.79	N	GND
0.245	FINAL	---	30.05	51.94	-21.89	N	GND
0.245	FINAL	44.2	---	61.94	-17.70	N	GND
0.573	FINAL	---	18.61	46.00	-27.39	N	GND
0.573	FINAL	32.9	---	56.00	-23.06	N	GND
1.480	FINAL	---	13.82	46.00	-32.18	N	GND
1.482	FINAL	27.3	---	56.00	-28.75	N	GND
4.673	FINAL	30.2	---	56.00	-25.85	N	GND
4.682	FINAL	---	16.06	46.00	-29.94	N	GND
9.566	FINAL	12.0	---	60.00	-47.99	N	GND
9.587	FINAL	---	5.21	50.00	-44.79	N	GND

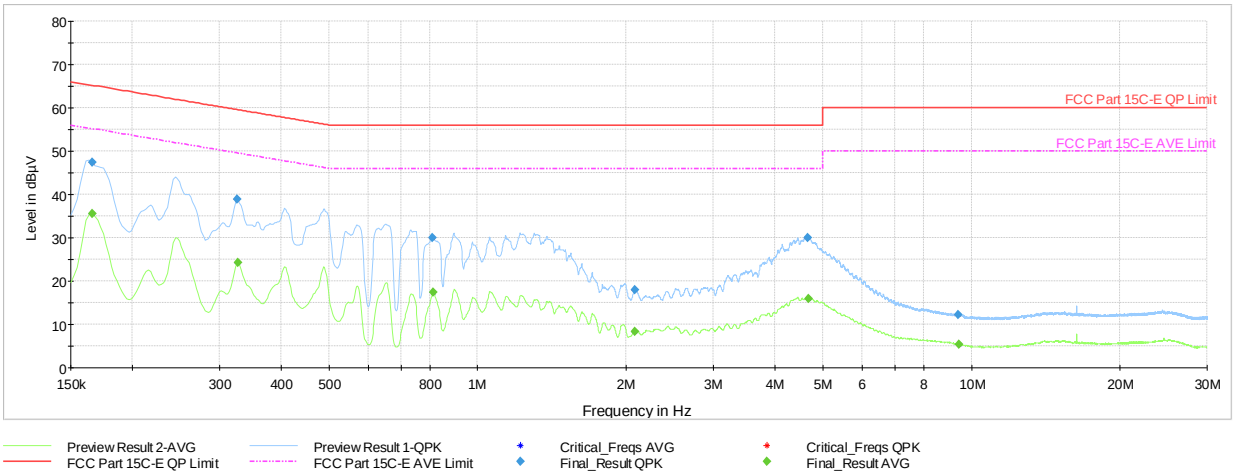
Table 7-129. AC Line Conducted Data with 11ax UNII Band 5 – RU26 – Ch.1 (N) with AC/DC Adapter



Plot 7-813. AC Line Conducted Plot with 11ax UNII Band 5 – RU242 – Ch.1 (L1) with AC/DC Adapter

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.164	FINAL	---	35.99	55.28	-19.30	L1	GND
0.164	FINAL	48.7	---	65.28	-16.63	L1	GND
0.328	FINAL	---	24.48	49.51	-25.03	L1	GND
0.328	FINAL	38.8	---	59.51	-20.68	L1	GND
0.650	FINAL	34.7	---	56.00	-21.30	L1	GND
0.652	FINAL	---	19.88	46.00	-26.12	L1	GND
1.561	FINAL	---	14.94	46.00	-31.06	L1	GND
1.565	FINAL	26.8	---	56.00	-29.18	L1	GND
4.596	FINAL	31.7	---	56.00	-24.35	L1	GND
4.625	FINAL	---	18.90	46.00	-27.10	L1	GND
9.438	FINAL	18.0	---	60.00	-42.00	L1	GND
9.449	FINAL	---	11.96	50.00	-38.04	L1	GND

Table 7-130. AC Line Conducted Data with 11ax UNII Band 5 – RU242 – Ch.1 (L1) with AC/DC Adapter



Plot 7-814. AC Line Conducted Plot with 11ax UNII Band 5 – RU242 – Ch.1 (N) with AC/DC Adapter

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.166	FINAL	---	35.65	55.17	-19.52	N	GND
0.166	FINAL	47.4	---	65.17	-17.73	N	GND
0.326	FINAL	38.8	---	59.57	-20.74	N	GND
0.328	FINAL	---	24.32	49.51	-25.19	N	GND
0.812	FINAL	30.0	---	56.00	-26.00	N	GND
0.814	FINAL	---	17.35	46.00	-28.65	N	GND
2.085	FINAL	17.9	---	56.00	-38.07	N	GND
2.085	FINAL	---	8.34	46.00	-37.66	N	GND
4.668	FINAL	30.0	---	56.00	-26.00	N	GND
4.677	FINAL	---	16.01	46.00	-29.99	N	GND
9.418	FINAL	12.2	---	60.00	-47.84	N	GND
9.425	FINAL	---	5.42	50.00	-44.58	N	GND

Table 7-131. AC Line Conducted Data with 11ax UNII Band 5 – RU242 – Ch.1 (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: BCGA2764** and **IC: 579C-A2764** 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.