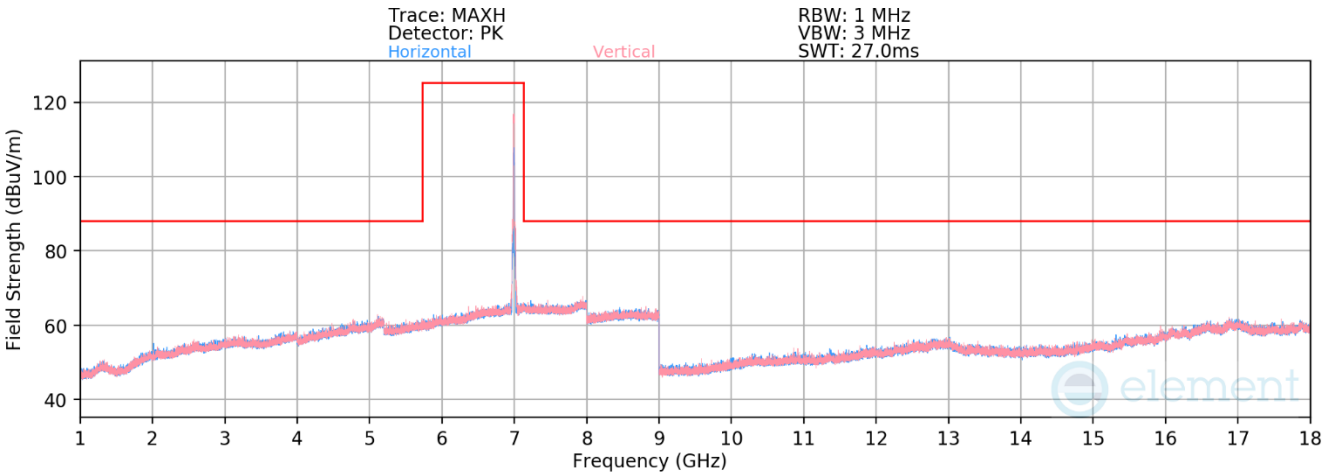
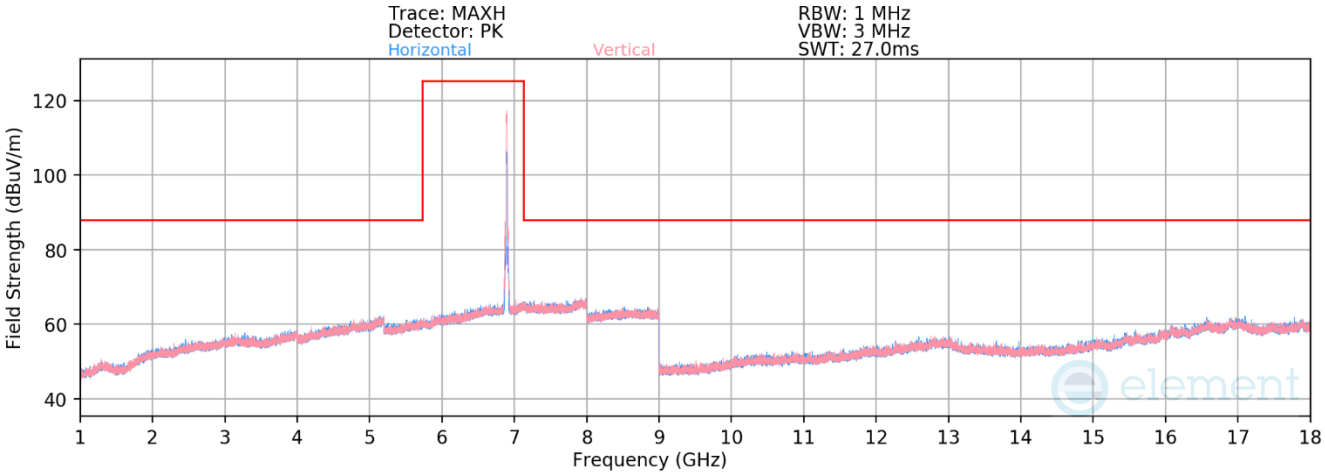


Plot 7-563. Radiated Spurious Emissions above 1GHz SDM Diversity (802.11ax – Ch. 209)

Mode:	802.11ax
Data Rate:	MCS2
Distance of Measurements:	3 Meters
Operating Frequency:	6995MHz
Channel:	209

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]
13990.00	Average	H	-	-	-86.09	22.04	42.95	68.23	-25.28
13990.00	Peak	H	-	-	-74.18	22.04	54.86	88.23	-33.37

Table 7-94. Radiated Spurious Emission Measurements CDD Diversity



Plot 7-564. Radiated Spurious Emissions above 1GHz SDM Diversity (802.11ax – Ch. 233)

Mode:	802.11ax
Data Rate:	MCS2
Distance of Measurements:	3 Meters
Operating Frequency:	7115MHz
Channel:	233

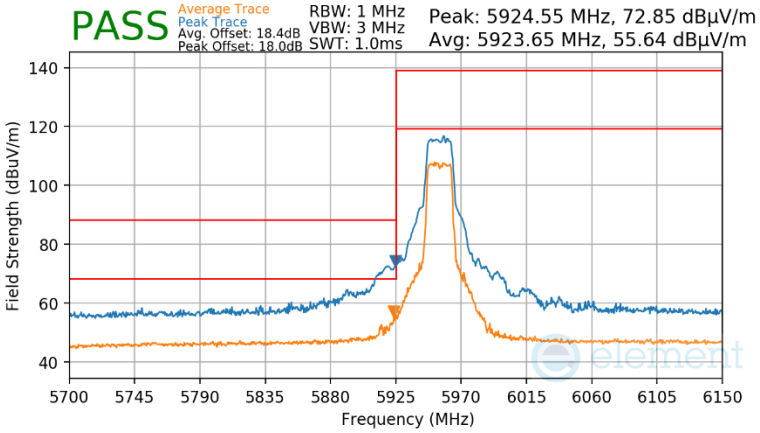
Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
14230.00	Average	H	-	-	-86.36	22.78	43.42	68.23	-24.81
14230.00	Peak	H	-	-	-74.61	22.72	55.11	88.23	-33.12

Table 7-95. Radiated Spurious Emission Measurements CDD Diversity

7.7.3 Antenna 5T Radiated Band Edge Measurements (20MHz BW)

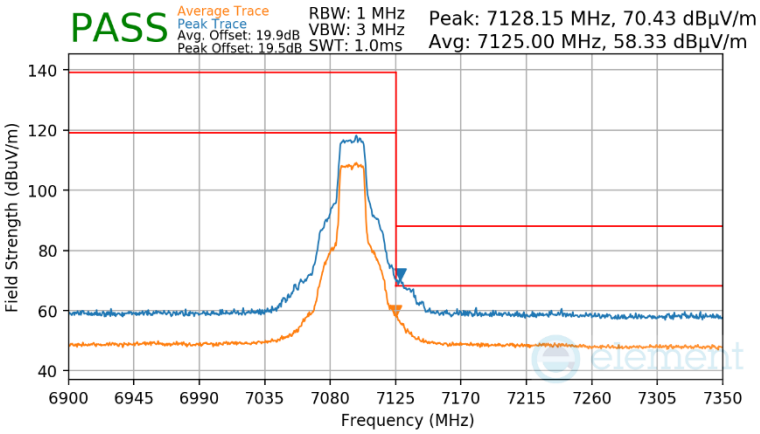
§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]; RSS-Gen [8.9]

Mode	802.11a
Data Rate	54Mbps
Distance of Measurement	3 Meters
Operating Frequency	5955MHz
Channel	1



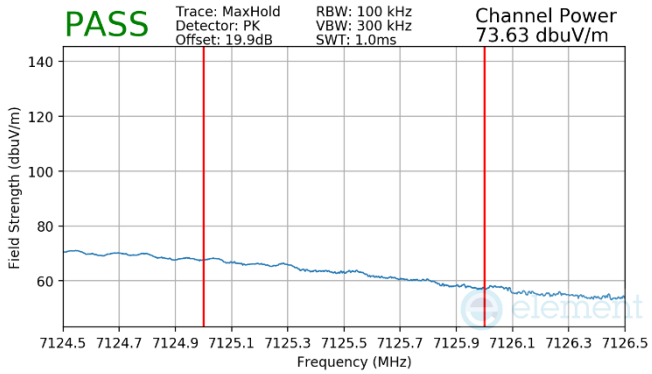
Plot 7-565 Antenna 5T Radiated Lower Band Edge (Peak & Average – UNII Band 5)

Mode	802.11a
Data Rate	54Mbps
Distance of Measurement	3 Meters
Operating Frequency	7095MHz
Channel	229

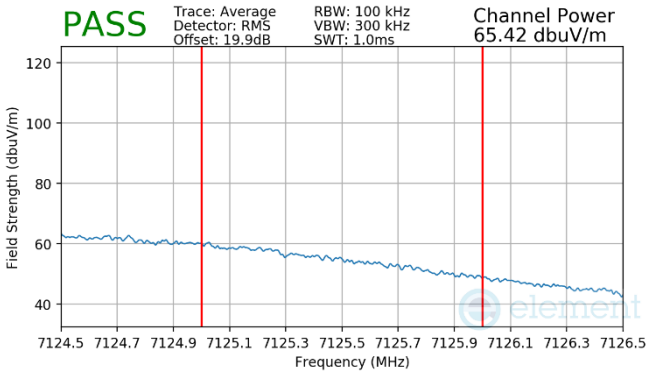


Plot 7-566 Antenna 5T Radiated Upper Band Edge (Peak & Average – UNII Band 8)

Worst Case Mode:	802.11a
Worst Case Transfer Rate:	54Mbps
Distance of Measurements:	3 Meters
Operating Frequency:	7115MHz
Channel:	233

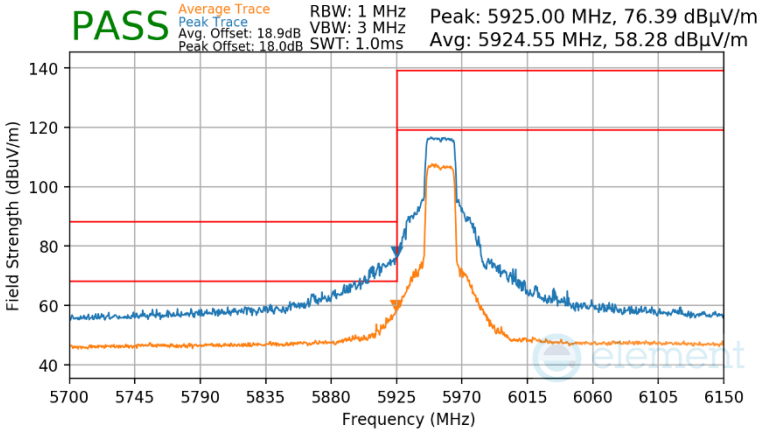


Plot 7-567. Antenna 5T Radiated Upper Band Edge (Peak – UNII Band 8)



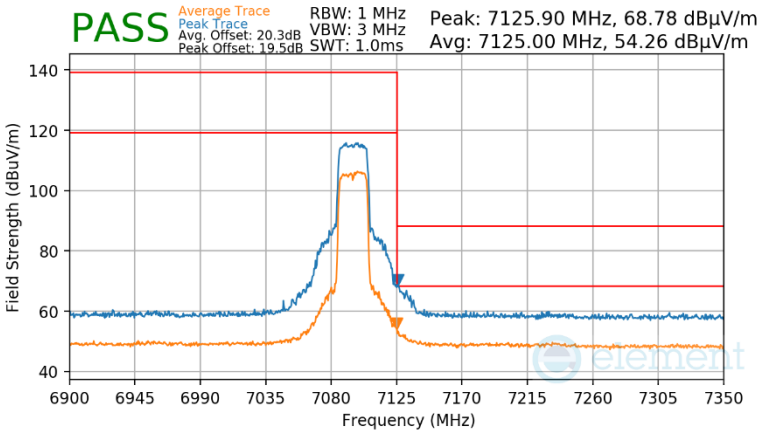
Plot 7-568. Antenna WF7a Radiated Upper Band Edge (Average – UNII Band 8)

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



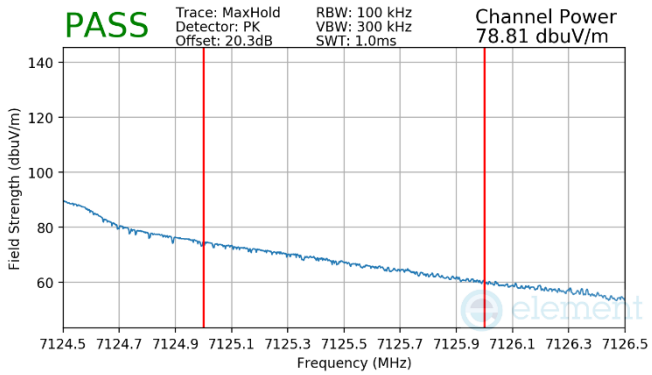
Plot 7-569 Antenna 5T Radiated Lower Band Edge (Peak & Average – UNII Band 5)

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

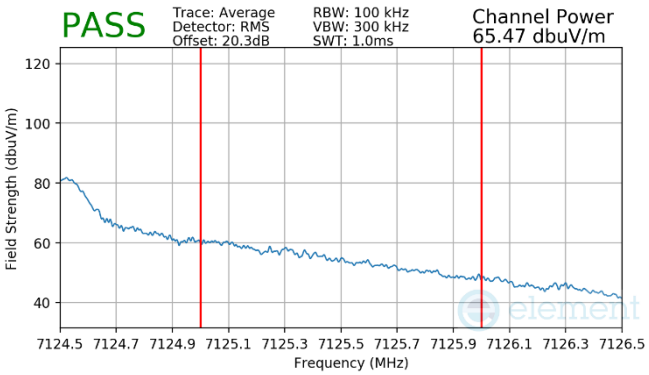


Plot 7-570 Antenna 5T Radiated Upper Band Edge (Peak & Average – UNII Band 8)

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



Plot 7-571. Antenna 5T Radiated Upper Band Edge (Peak – UNII Band 8)

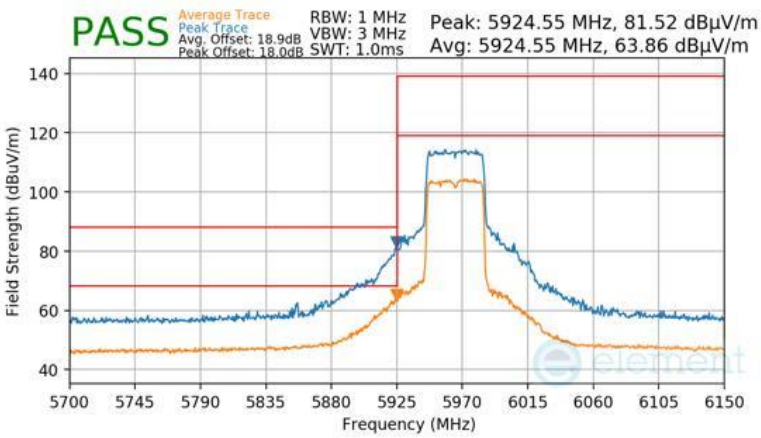


Plot 7-572. Antenna 5T Radiated Upper Band Edge (Average – UNII Band 8)

7.7.4 Antenna 5T Radiated Band Edge Measurements (40MHz BW)

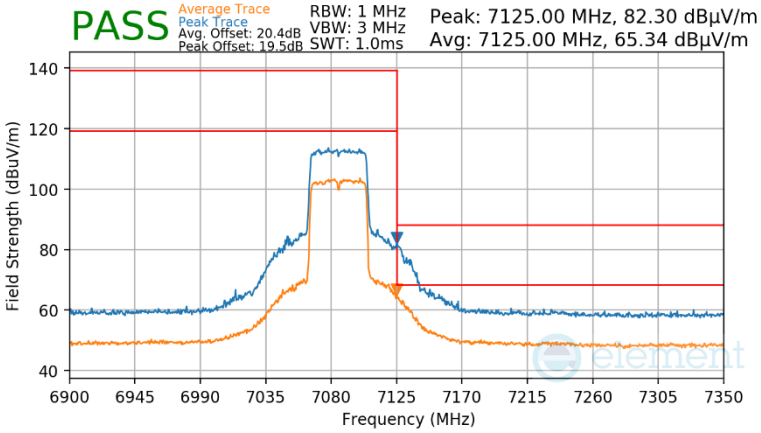
§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]

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



Plot 7-573 Antenna 5T 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

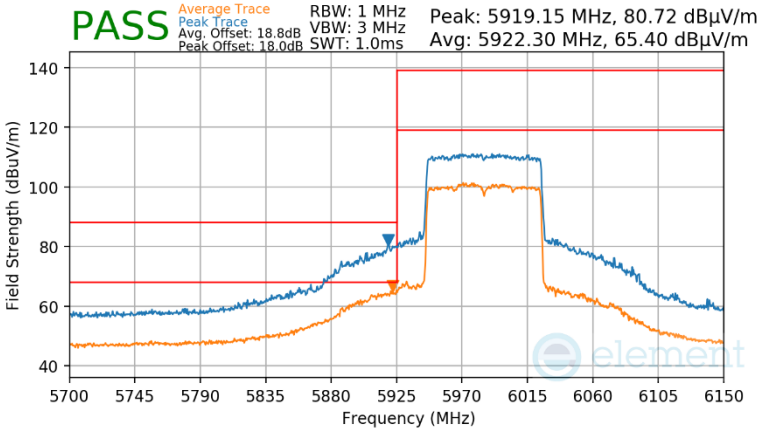


Plot 7-574 Antenna 5T Radiated Upper Band Edge (Peak & Average – UNII Band 8)

7.7.5 Antenna 5T Radiated Band Edge Measurements (80MHz BW)

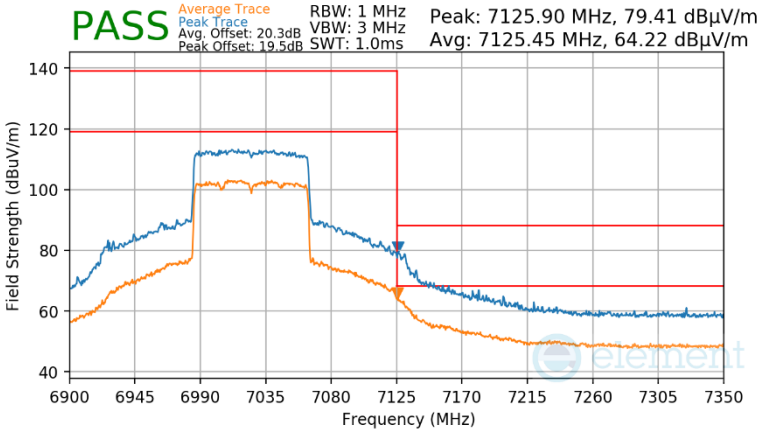
§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]

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



Plot 7-575 Antenna 5T 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

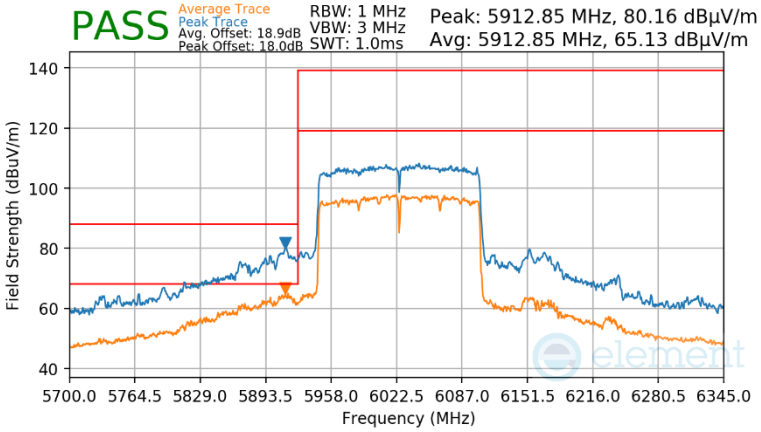


Plot 7-576 Antenna 5T Radiated Upper Band Edge (Peak & Average – UNII Band 8)

7.7.6 Antenna 5T Radiated Band Edge Measurements (160MHz BW)

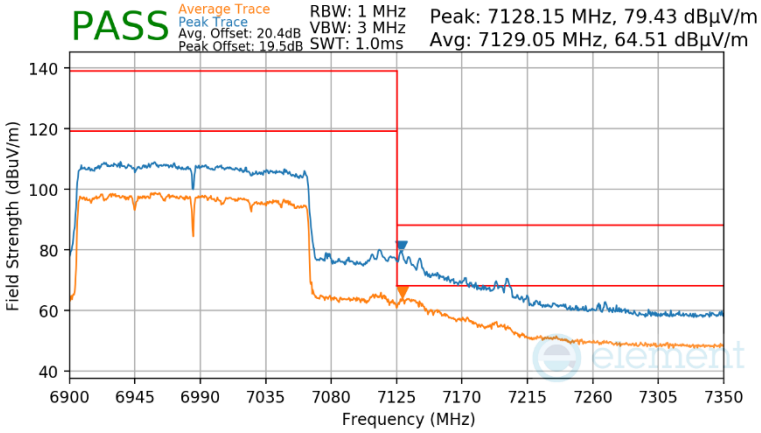
§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]

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



Plot 7-577 Antenna 5T Radiated Lower Band Edge (Peak & Average – UNII Band 5)

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

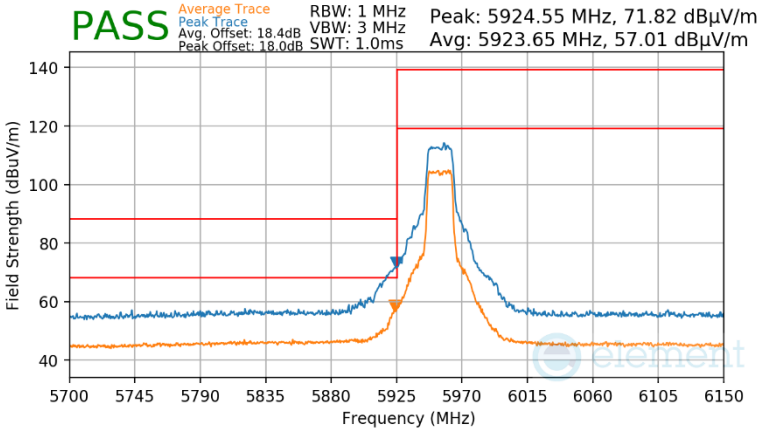


Plot 7-578 Antenna 5T Radiated Upper Band Edge (Peak & Average – UNII Band 8)

7.7.7 Antenna 3b Radiated Band Edge Measurements (20MHz BW)

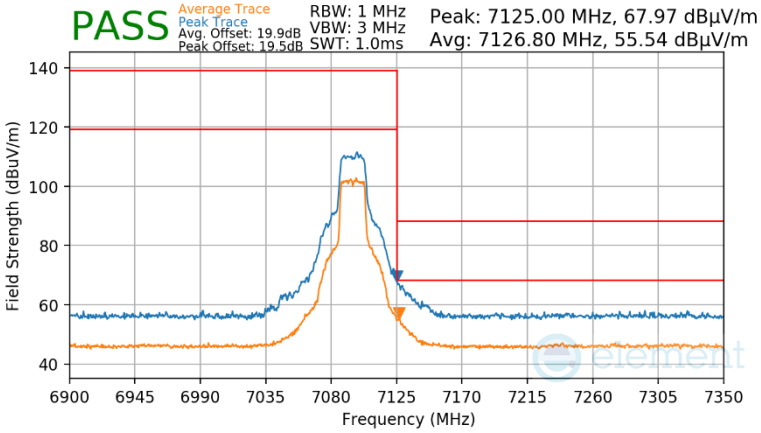
§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]; RSS-Gen [8.9]

Mode	802.11a
Data Rate	54Mbps
Distance of Measurement	3 Meters
Operating Frequency	5955MHz
Channel	1



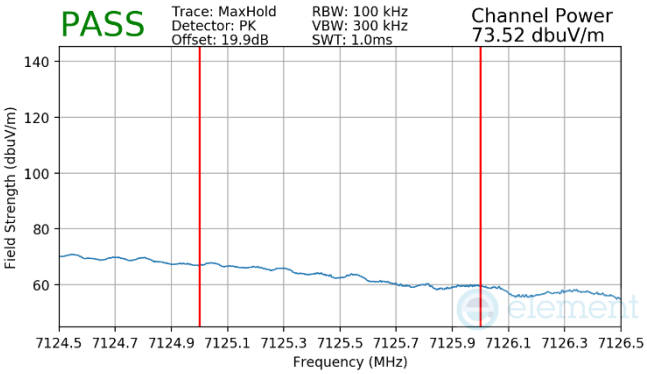
Plot 7-579 Antenna 3b Radiated Lower Band Edge (Peak & Average – UNII Band 5)

Mode	802.11a
Data Rate	54Mbps
Distance of Measurement	3 Meters
Operating Frequency	7095MHz
Channel	229

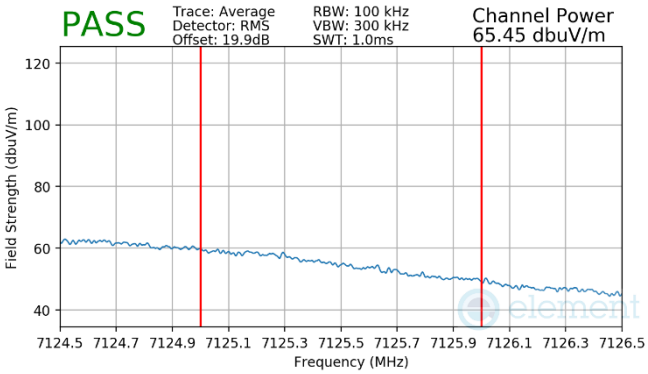


Plot 7-580 Antenna 3b Radiated Upper Band Edge (Peak & Average – UNII Band 8)

Worst Case Mode:	802.11a
Worst Case Transfer Rate:	54Mbps
Distance of Measurements:	3 Meters
Operating Frequency:	7115MHz
Channel:	233

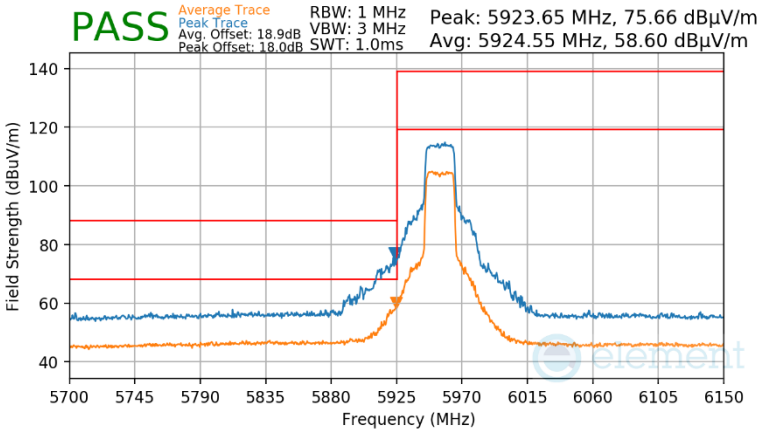


Plot 7-581. Antenna 3b Radiated Upper Band Edge (Peak – UNII Band 8)



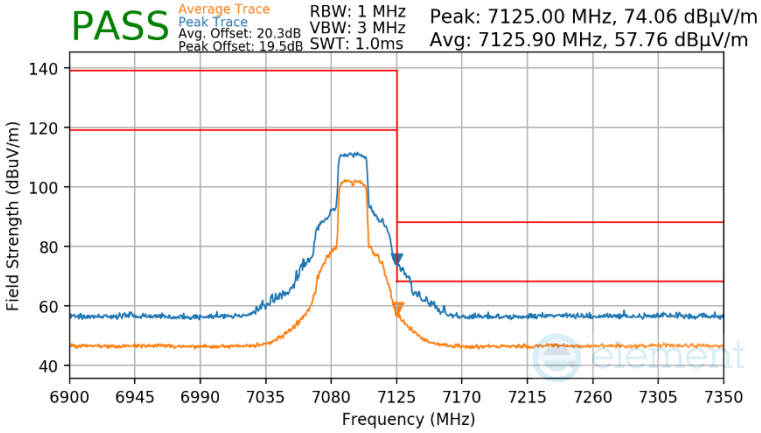
Plot 7-582. Antenna 3b Radiated Upper Band Edge (Average – UNII Band 8)

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



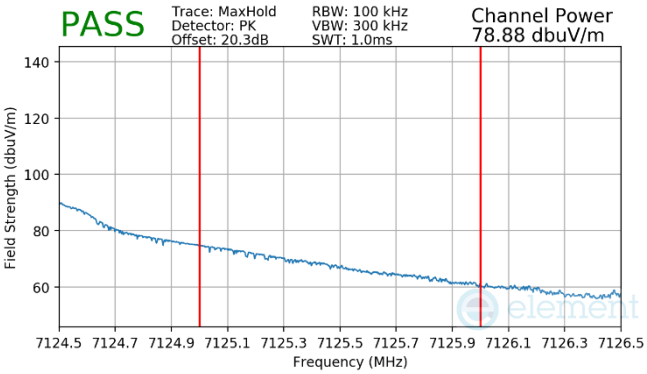
Plot 7-583 Antenna 3b Radiated Lower Band Edge (Peak & Average – UNII Band 5)

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

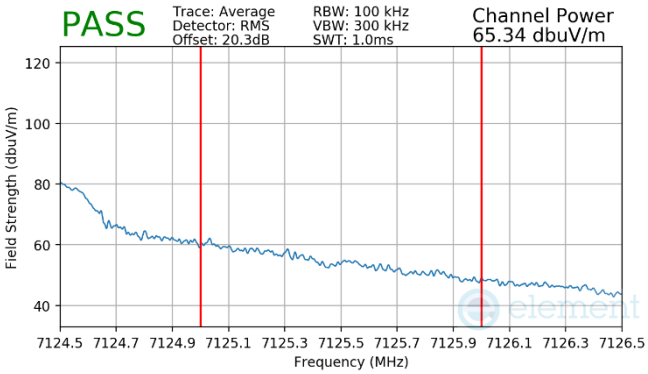


Plot 7-584 Antenna 3b Radiated Upper Band Edge (Peak & Average – UNII Band 8)

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



Plot 7-585. Antenna 5T Radiated Upper Band Edge (Peak – UNII Band 8)

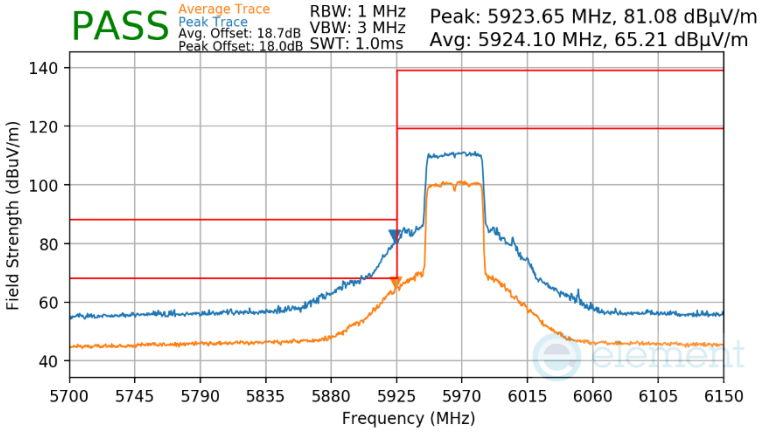


Plot 7-586. Antenna 5T Radiated Upper Band Edge (Average – UNII Band 8)

7.7.8 Antenna 3b Radiated Band Edge Measurements (40MHz BW)

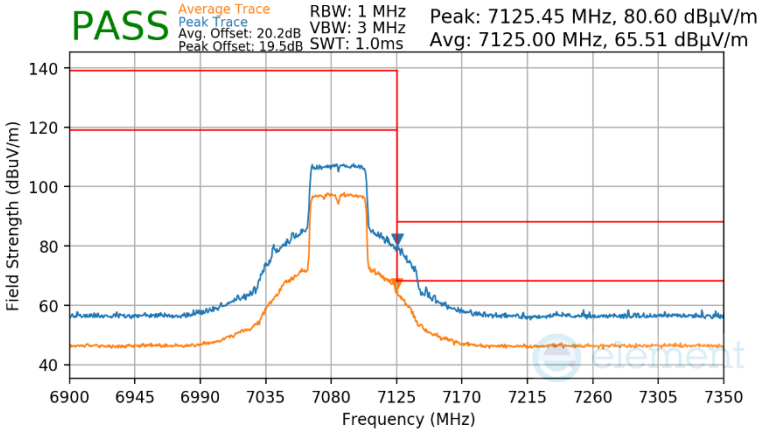
§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]

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



Plot 7-587 Antenna 3b 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

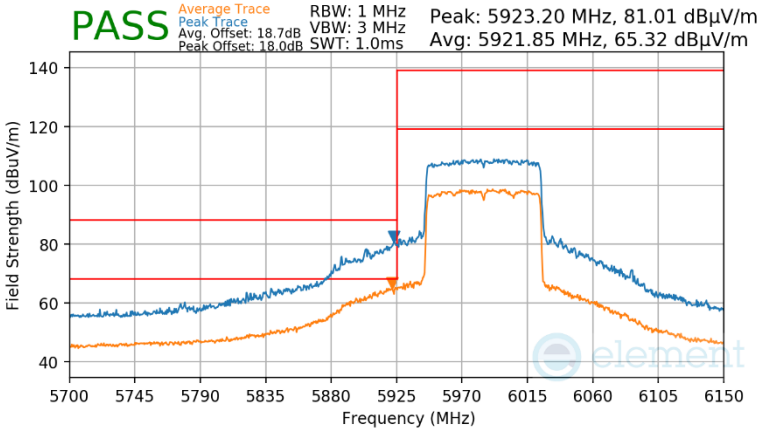


Plot 7-588 Antenna 3b Radiated Upper Band Edge (Peak & Average – UNII Band 8)

7.7.9 Antenna 3b Radiated Band Edge Measurements (80MHz BW)

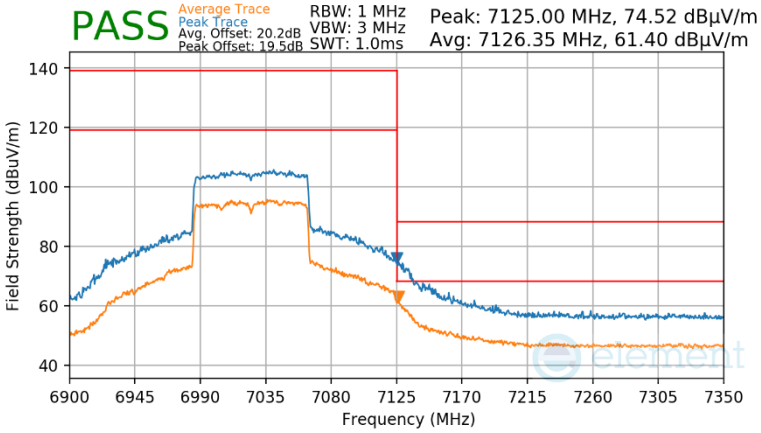
§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]

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



Plot 7-589 Antenna 3b 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

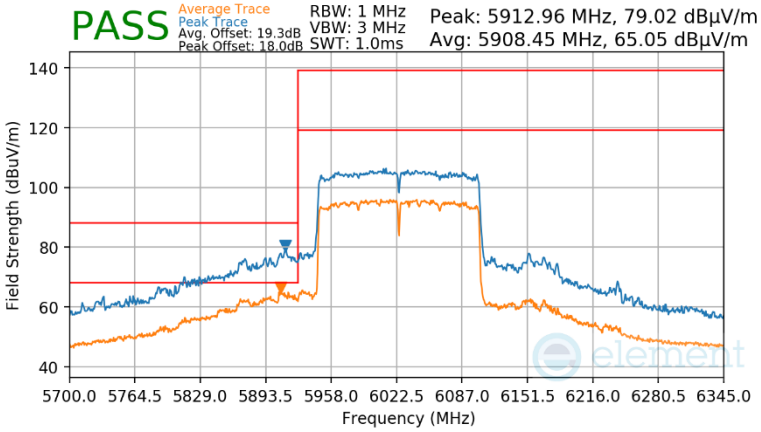


Plot 7-590 Antenna 3b Radiated Upper Band Edge (Peak & Average – UNII Band 8)

7.7.10 Antenna 3b Radiated Band Edge Measurements (160MHz BW)

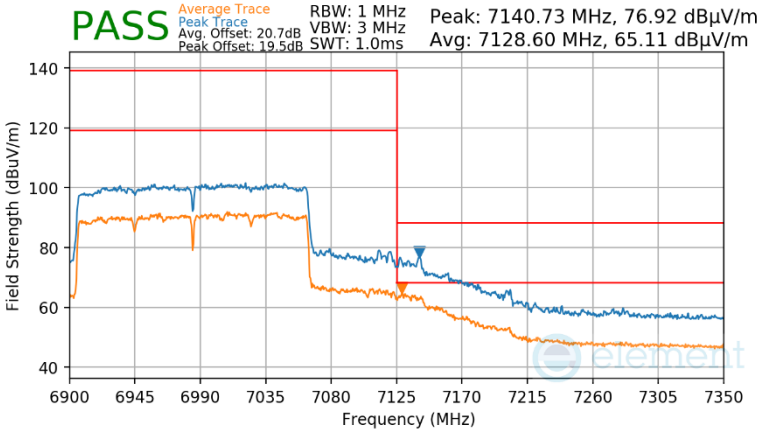
§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]

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



Plot 7-591 Antenna 3b Radiated Lower Band Edge (Peak & Average – UNII Band 5)

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

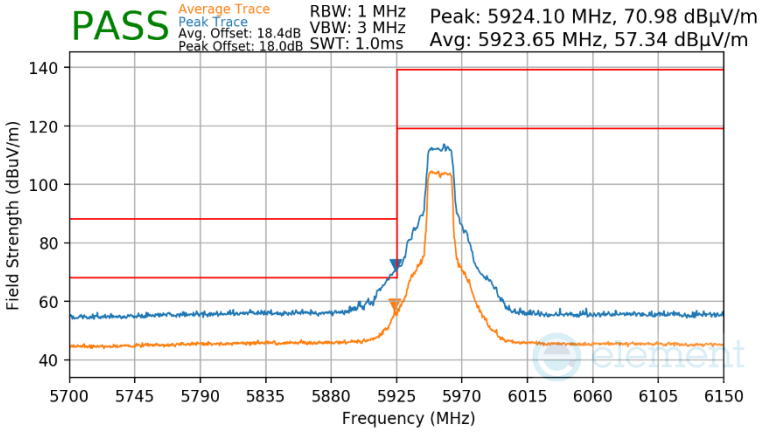


Plot 7-592 Antenna 3b Radiated Upper Band Edge (Peak & Average – UNII Band 8)

7.7.11 Antenna 1b Radiated Band Edge Measurements (20MHz BW)

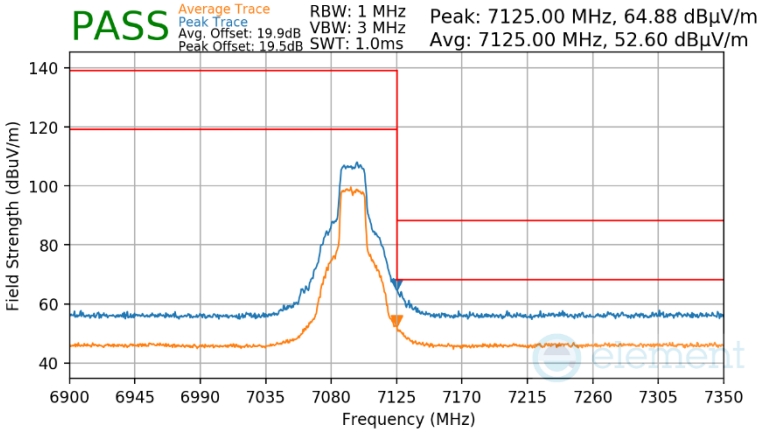
§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]

Mode	802.11a
Data Rate	54Mbps
Distance of Measurement	3 Meters
Operating Frequency	5955MHz
Channel	1



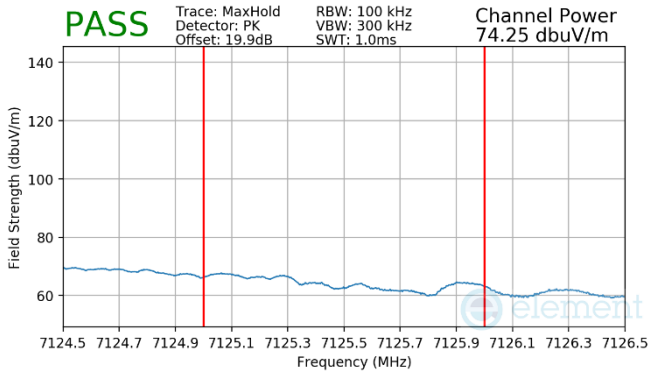
Plot 7-593 Antenna 1b Radiated Lower Band Edge (Peak & Average – UNII Band 5)

Mode	802.11a
Data Rate	54Mbps
Distance of Measurement	3 Meters
Operating Frequency	7095MHz
Channel	229

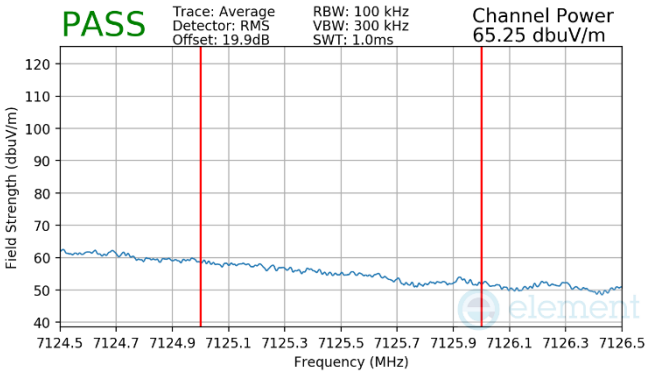


Plot 7-594 Antenna 1b Radiated Upper Band Edge (Peak & Average – UNII Band 8)

Worst Case Mode:	802.11a
Worst Case Transfer Rate:	54Mbps
Distance of Measurements:	3 Meters
Operating Frequency:	7115MHz
Channel:	233

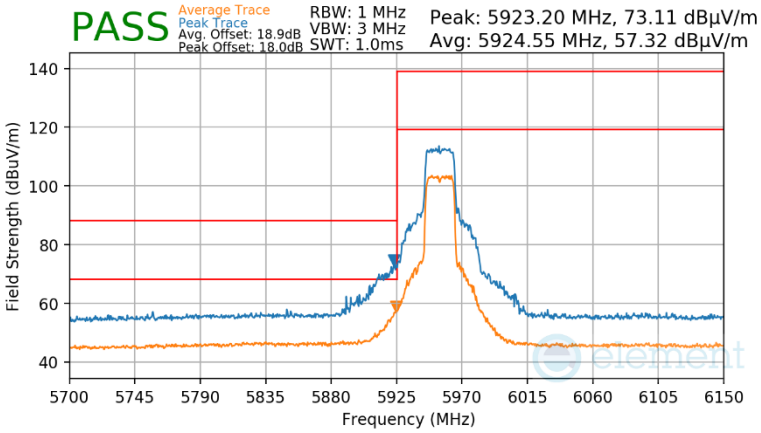


Plot 7-595. Antenna 1b Radiated Upper Band Edge (Peak – UNII Band 8)



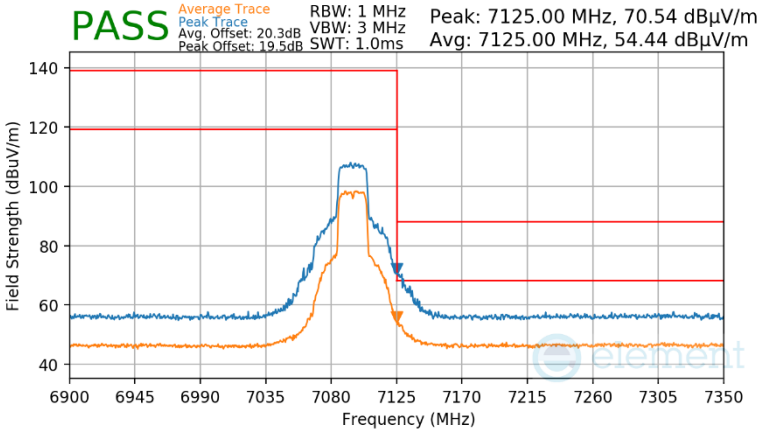
Plot 7-596. Antenna 1b Radiated Upper Band Edge (Average – UNII Band 8)

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



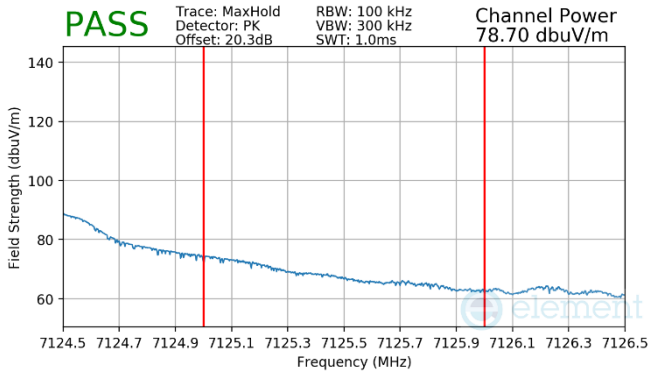
Plot 7-597 Antenna 1b Radiated Lower Band Edge (Peak & Average – UNII Band 5)

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

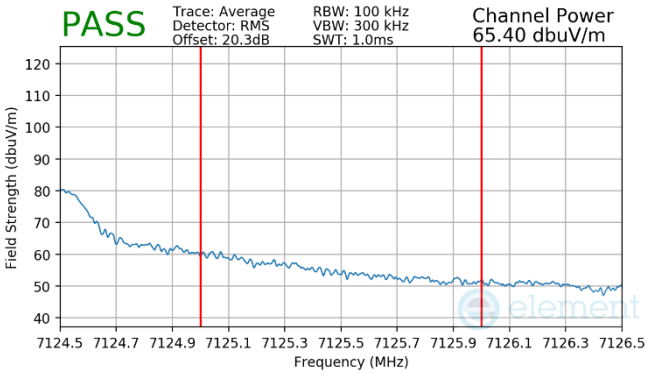


Plot 7-598 Antenna 1b Radiated Upper Band Edge (Peak & Average – UNII Band 8)

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



Plot 7-599. Antenna 1b Radiated Upper Band Edge (Peak – UNII Band 8)

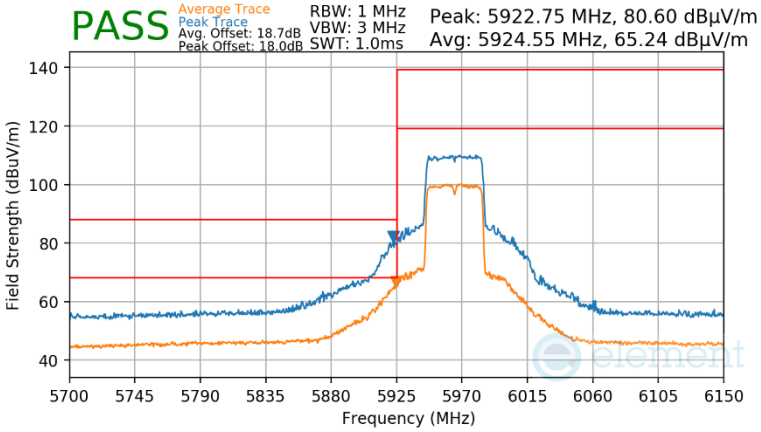


Plot 7-600. Antenna 1b Radiated Upper Band Edge (Average – UNII Band 8)

7.7.12 Antenna 1b Radiated Band Edge Measurements (40MHz BW)

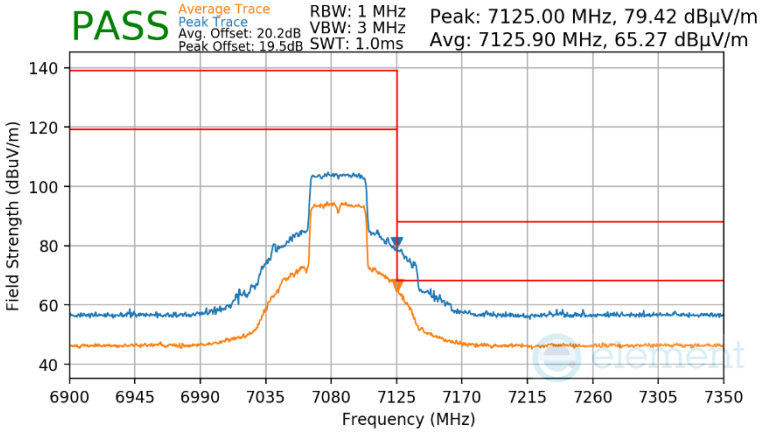
§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]

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



Plot 7-601 Antenna 1b 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

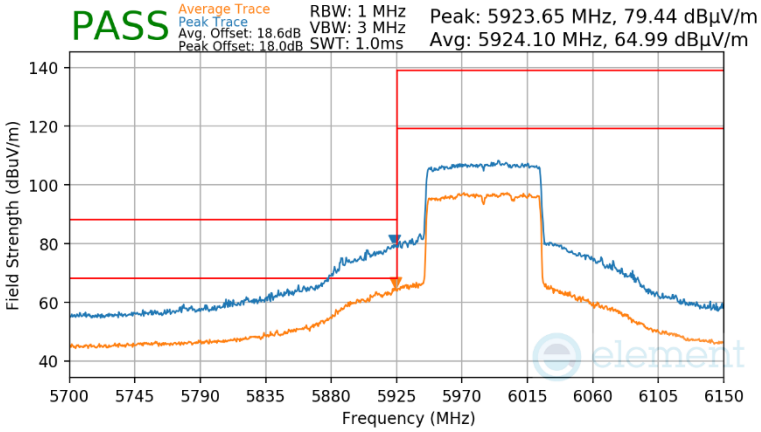


Plot 7-602 Antenna 1b Radiated Upper Band Edge (Peak & Average – UNII Band 8)

7.7.13 Antenna 1b Radiated Band Edge Measurements (80MHz BW)

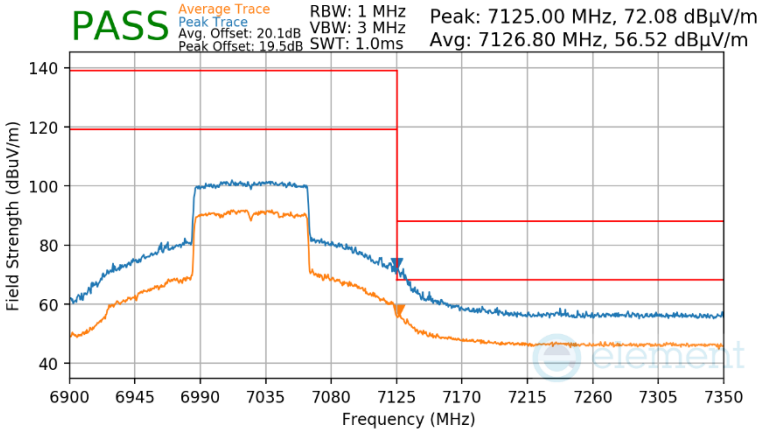
§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]

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



Plot 7-603 Antenna 1b 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

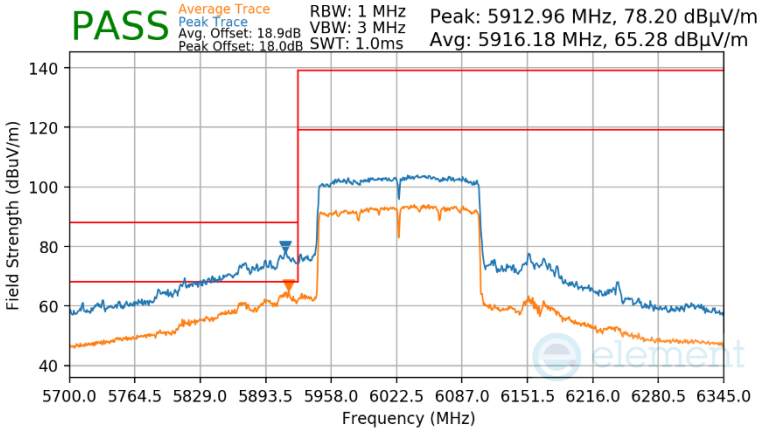


Plot 7-604 Antenna 1b Radiated Upper Band Edge (Peak & Average – UNII Band 8)

7.7.14 Antenna 1b Radiated Band Edge Measurements (160MHz BW)

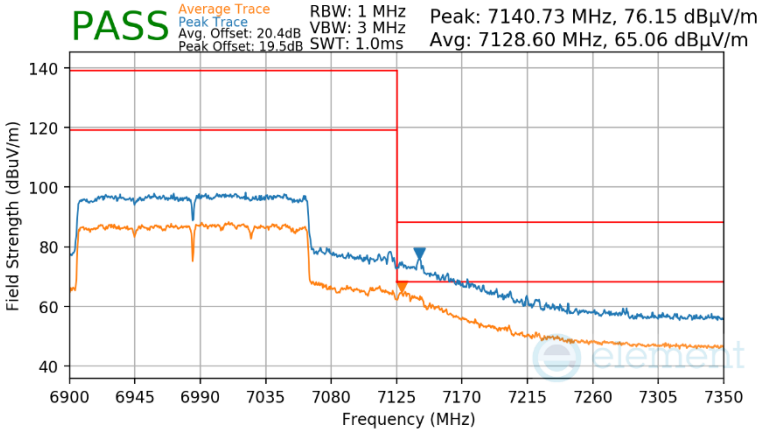
§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]

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



Plot 7-605 Antenna 1b Radiated Lower Band Edge (Peak & Average – UNII Band 5)

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

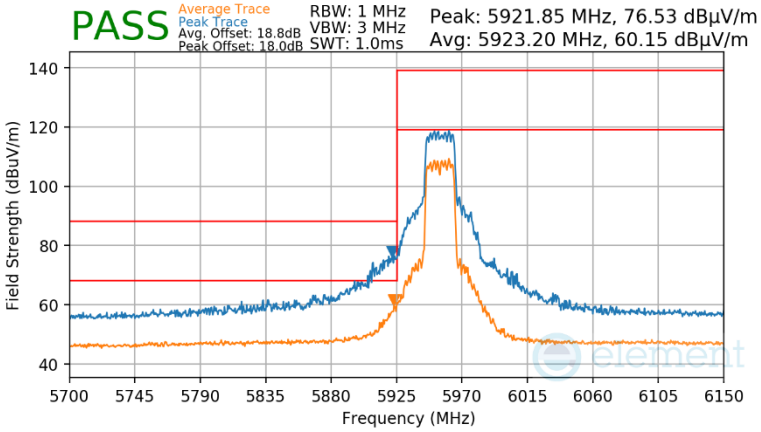


Plot 7-606 Antenna 1b Radiated Upper Band Edge (Peak & Average – UNII Band 8)

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

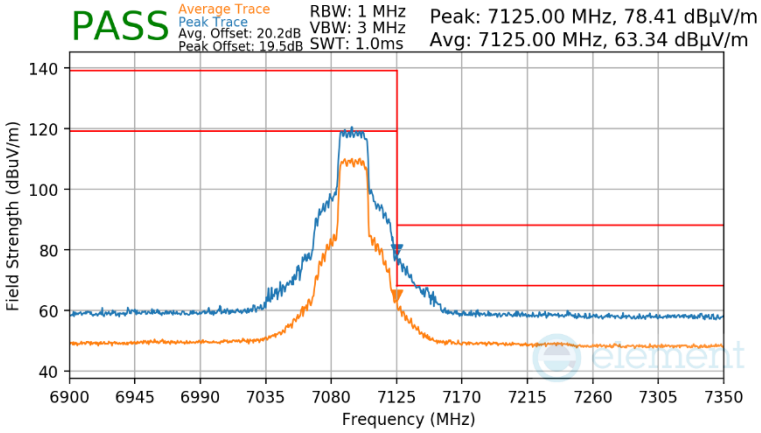
§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]; RSS-Gen [8.9]

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



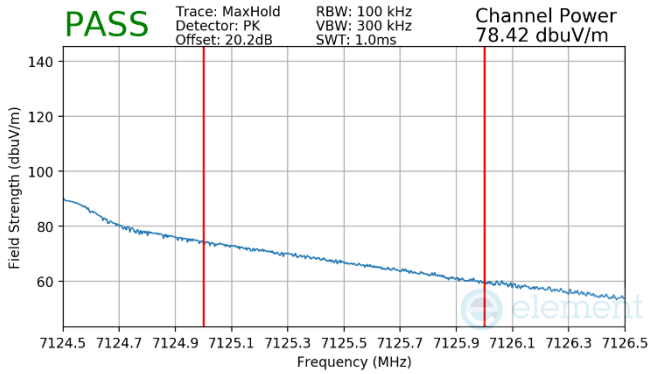
Plot 7-607 SDM Primary Radiated Lower Band Edge (Peak & Average – UNII Band 5)

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

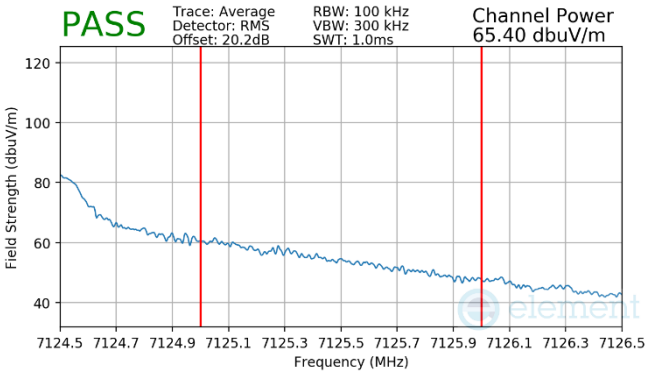


Plot 7-608 CDD Primary Radiated Upper Band Edge (Peak & Average – UNII Band 8)

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



Plot 7-609. SDM Primary Radiated Upper Band Edge (Peak – UNII Band 8)

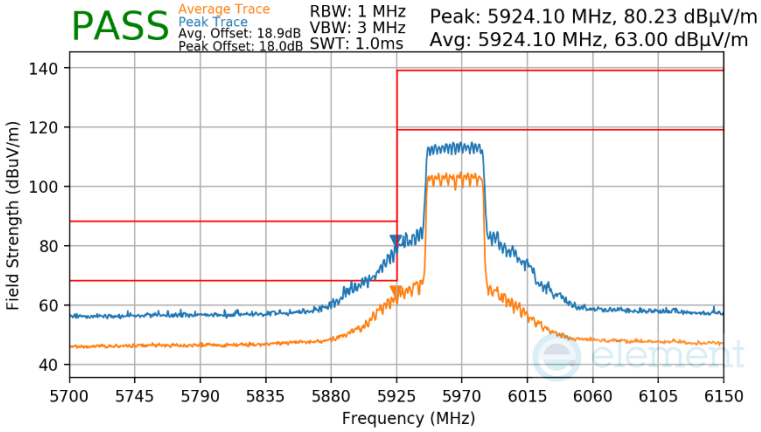


Plot 7-610. SDM Primary Radiated Upper Band Edge (Average – UNII Band 8)

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

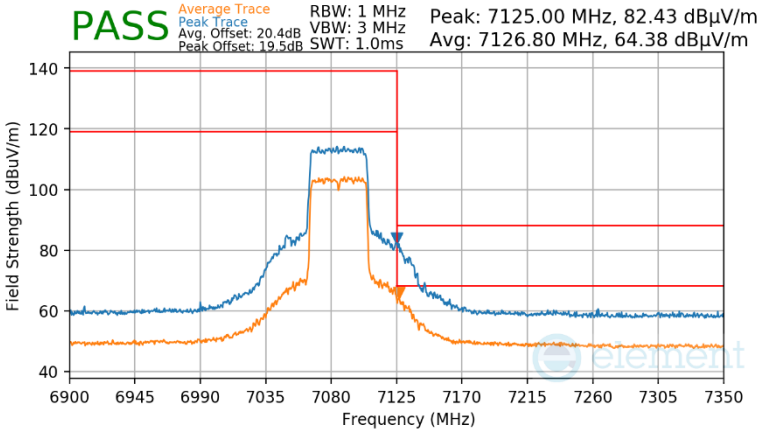
§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]

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



Plot 7-611 CDD Primary 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

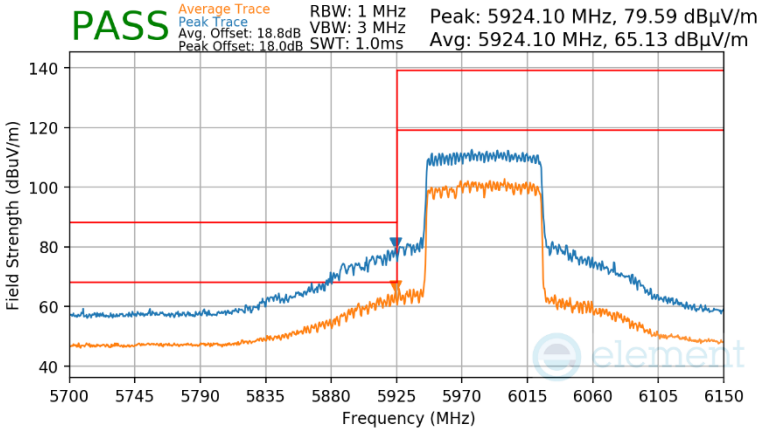


Plot 7-612 SDM Primary Radiated Upper Band Edge (Peak & Average – UNII Band 8)

7.7.17 CDD Primary Radiated Band Edge Measurements (80MHz BW)

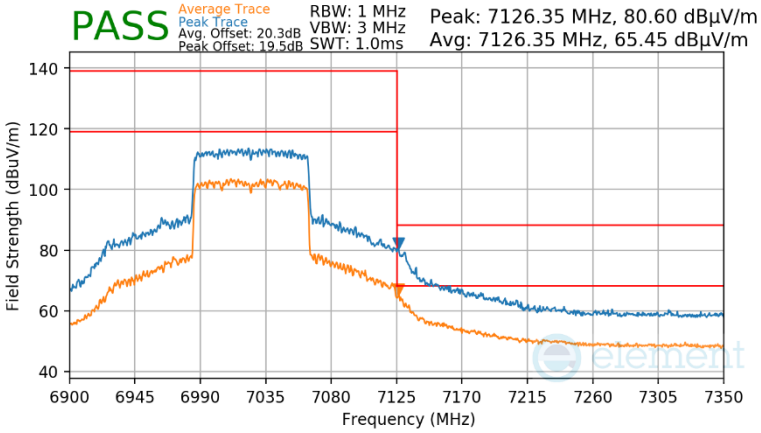
§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]

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



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

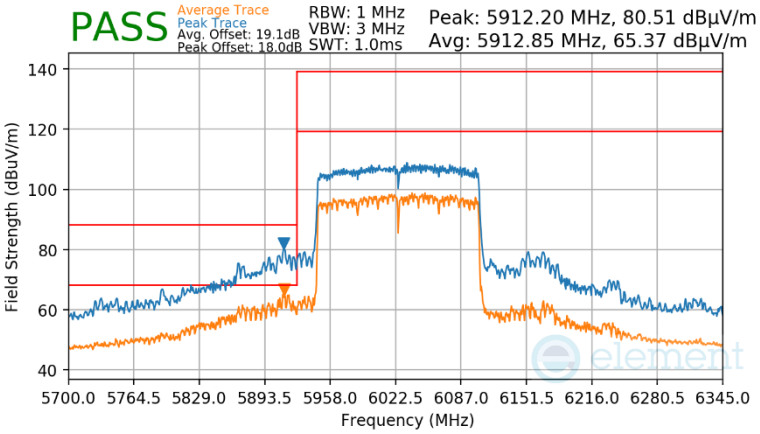
Mode	802.11ax-SU
Data Rate	MCS11
Distance of Measurement	3 Meters
Operating Frequency	7025MHz
Channel	215



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

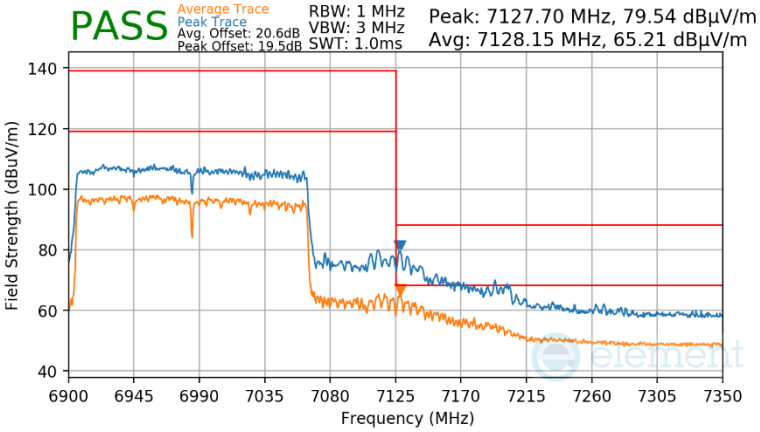
7.7.18 CDD Primary Radiated Band Edge Measurements (160MHz BW)

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



Plot 7-615 CDD Primary Radiated Lower Band Edge (Peak & Average – UNII Band 5)

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

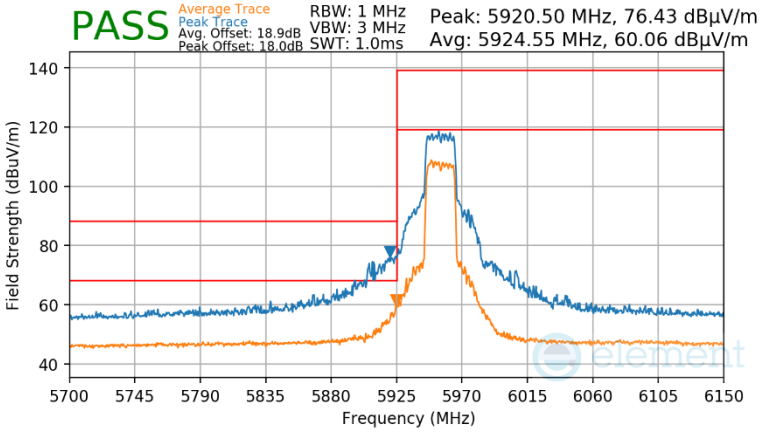


Plot 7-616 CDD Primary Radiated Upper Band Edge (Peak & Average – UNII Band 8)

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

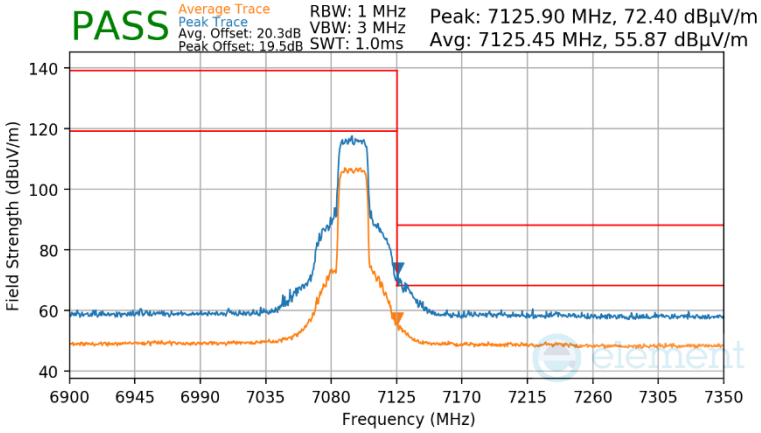
§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]; RSS-Gen [8.9]

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



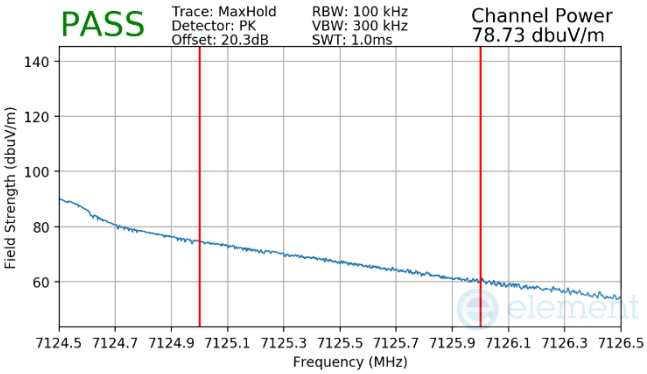
Plot 7-617 SDM Diversity Radiated Lower Band Edge (Peak & Average – UNII Band 5)

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

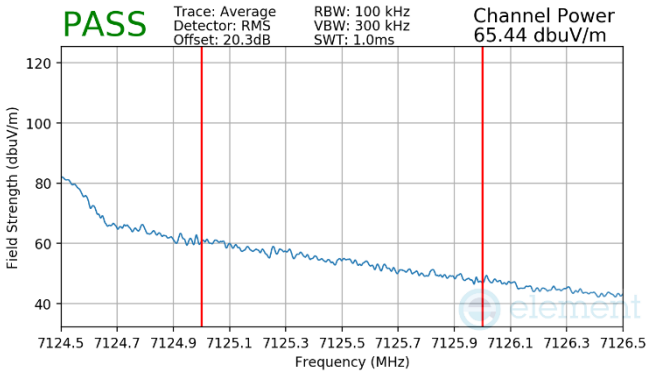


Plot 7-618 CDD Diversity Radiated Upper Band Edge (Peak & Average – UNII Band 8)

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



Plot 7-619. SDM Diversity Radiated Upper Band Edge (Peak – UNII Band 8)

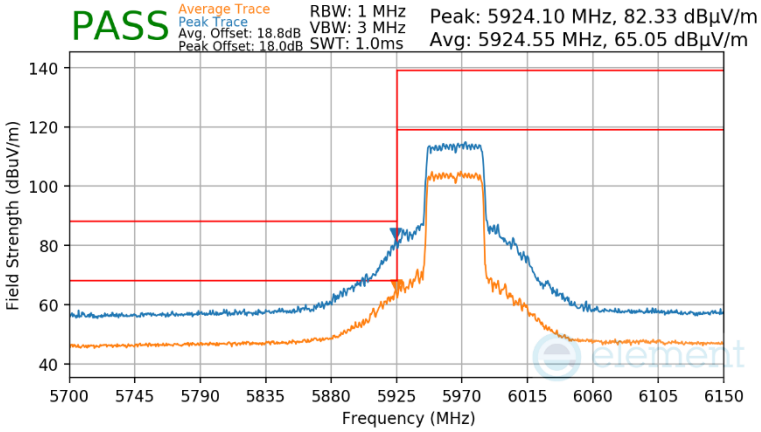


Plot 7-620. SDM Diversity Radiated Upper Band Edge (Average – UNII Band 8)

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

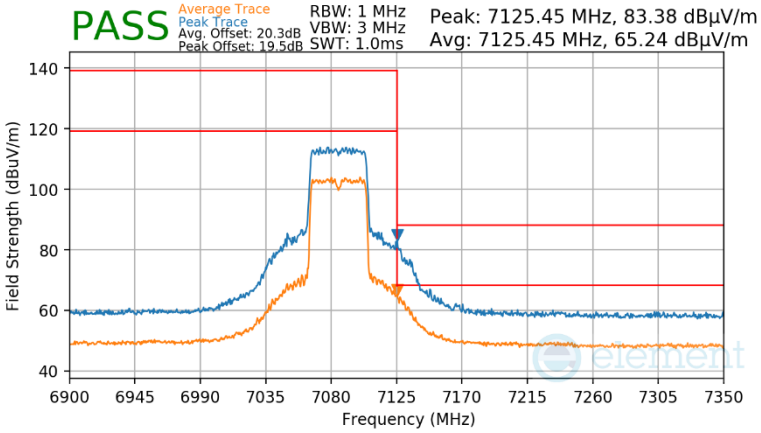
§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]; RSS-Gen [8.9]

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



Plot 7-621 CDD 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

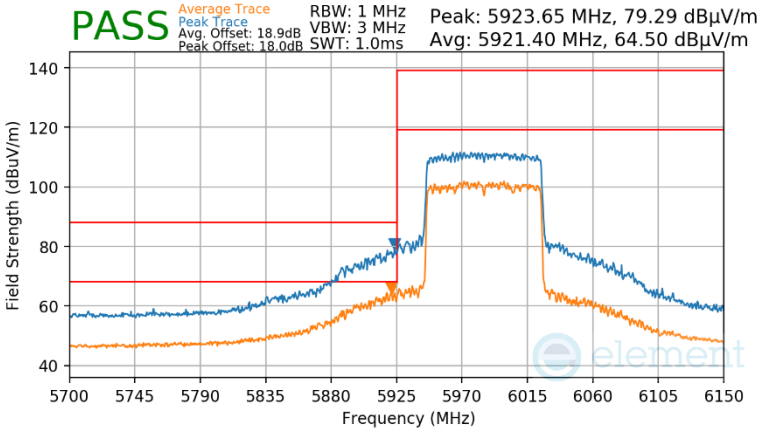


Plot 7-622 SDM Diversity Radiated Upper Band Edge (Peak & Average – UNII Band 8)

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

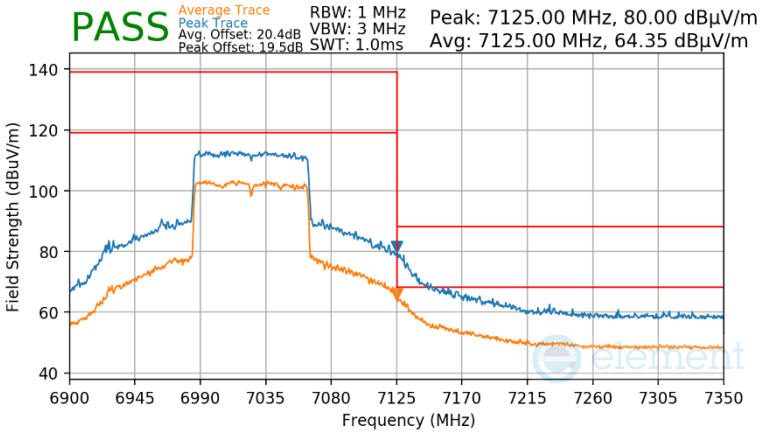
§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]; RSS-Gen [8.9]

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



Plot 7-623 CDD 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

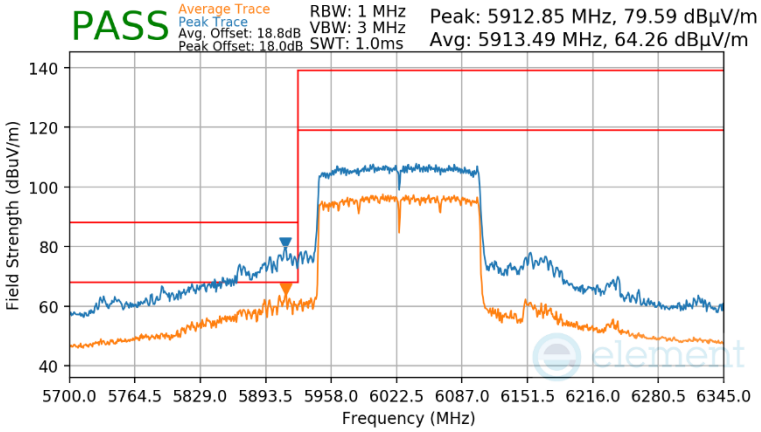


Plot 7-624 SDM Diversity Radiated Upper Band Edge (Peak & Average – UNII Band 8)

7.7.22 CDD Diversity Radiated Band Edge Measurements (160MHz BW)

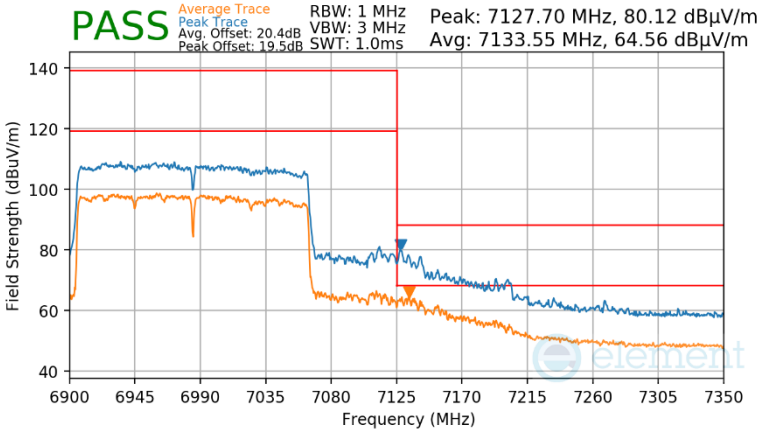
§15.407(b.1)(b.2) §15.205 §15.209; RSS-Gen [8.9]; RSS-Gen [8.9]

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



Plot 7-625 CDD Diversity Radiated Lower Band Edge (Peak & Average – UNII Band 5)

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



Plot 7-626 CDD 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.

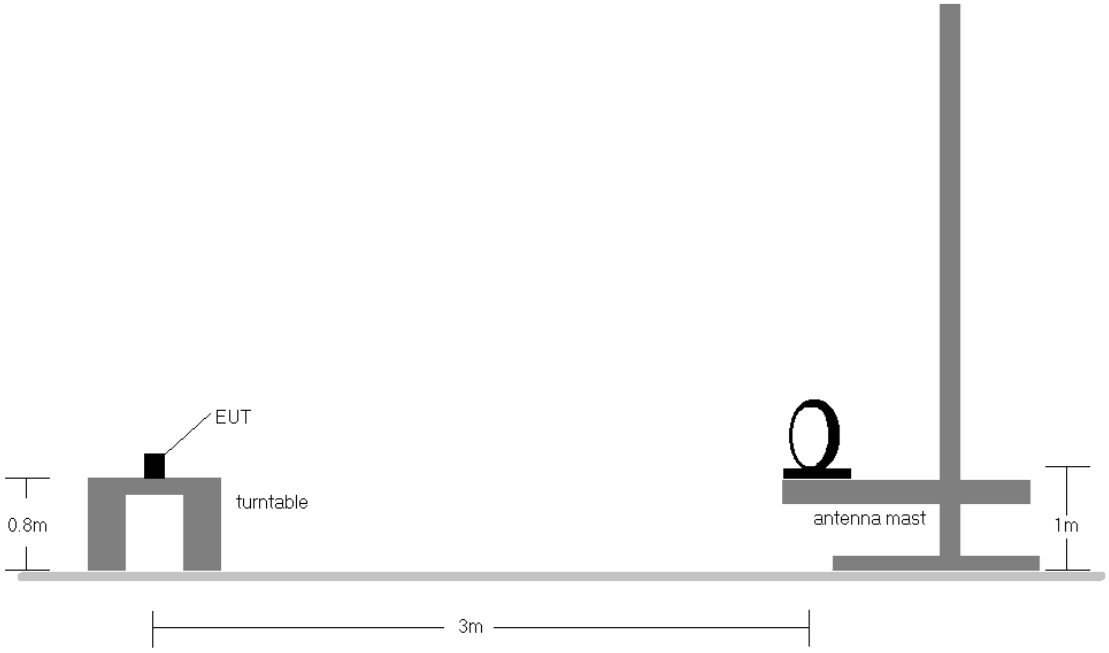


Figure 7-7. Radiated Test Setup < 30MHz

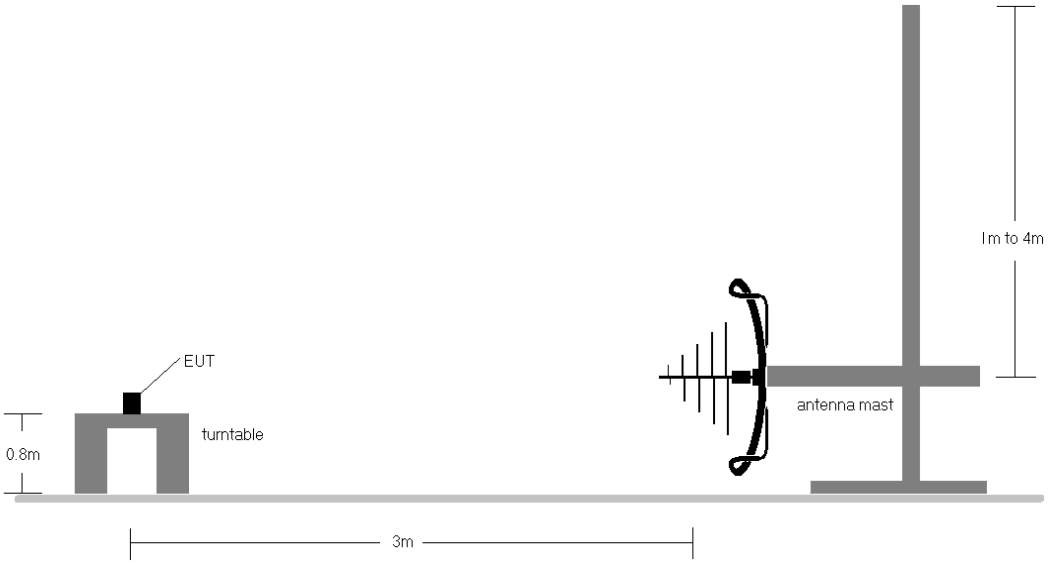


Figure 7-8. Radiated Test Setup < 1GHz

Test Notes

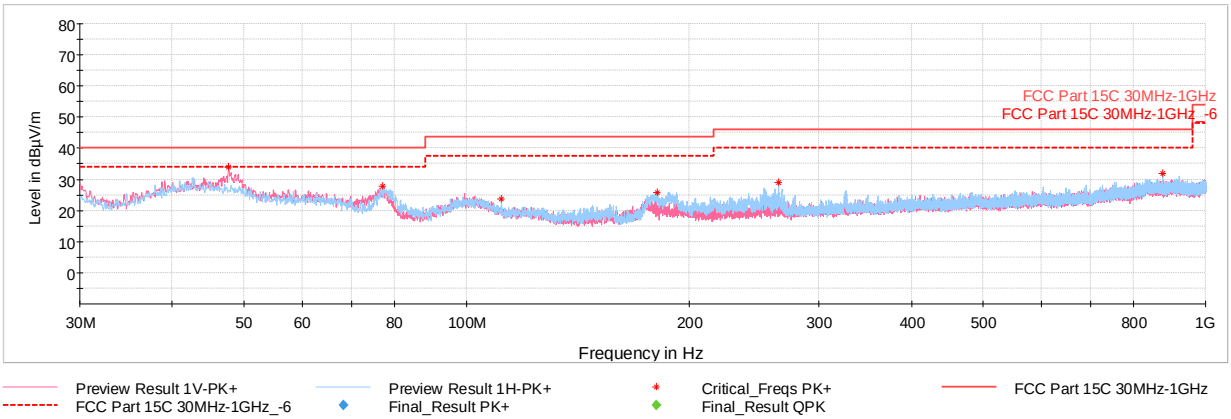
1. All emissions lying in restricted bands specified in §15.205 and RSS-Gen (8.10) are below the limit shown in Table 7-96.
2. The broadband receive antenna is manipulated through vertical and horizontal polarizations during the tests. The EUT is manipulated through three orthogonal planes. For below 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 SDM Primary Radiated Spurious Emissions Measurements (Below 1GHz)

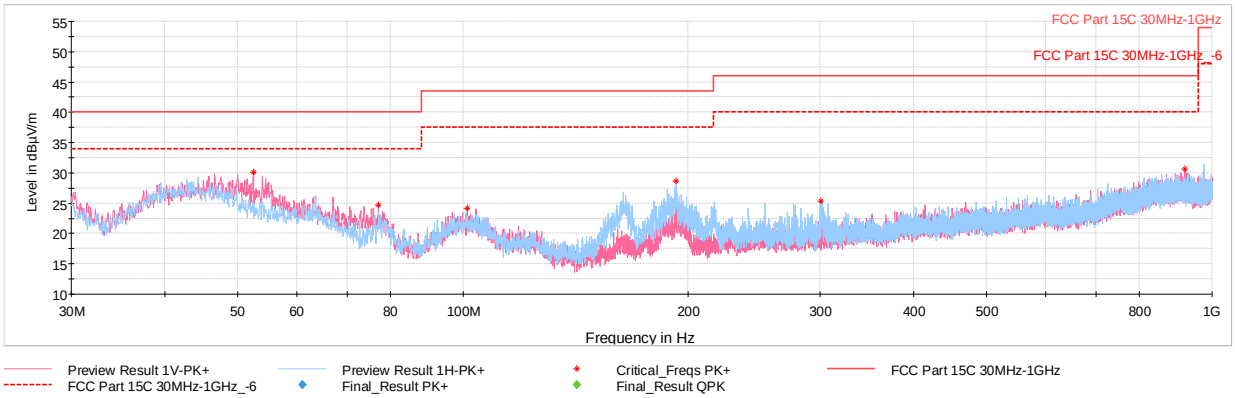


Plot 7-627. Radiated Spurious Emissions below 1GHz SDM Primary, 802.11ax, Ch.1 with AC/DC adaptor via USB-C cable with wire charger

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
47.70	Max Peak	V	100	276	-58.80	-14.36	33.84	40.00	-6.16
77.00	Max Peak	H	300	110	-57.94	-21.36	27.70	40.00	-12.30
111.58	Max Peak	H	100	334	-66.11	-17.04	23.85	43.52	-19.67
181.22	Max Peak	H	200	347	-63.39	-17.71	25.90	43.52	-17.62
264.45	Max Peak	H	100	266	-63.96	-14.17	28.87	46.02	-17.15
875.50	Max Peak	H	100	273	-73.09	-2.11	31.80	46.02	-14.22

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

7.8.2 SDM Primary Radiated Spurious Emissions Measurements (Below 1GHz)



Plot 7-628. Radiated Spurious Emissions below 1GHz SDM Diversity, 802.11ax, Ch.1 with AC/DC adaptor via USB-C cable with wire charger

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
52.50	Max Peak	V	100	41	-62.52	-14.36	30.12	40.00	-9.88
77.09	Max Peak	V	200	15	-60.96	-21.38	24.66	40.00	-15.34
101.39	Max Peak	V	200	1	-66.44	-16.46	24.10	43.52	-19.42
192.48	Max Peak	H	100	178	-62.07	-16.22	28.71	43.52	-14.81
300.58	Max Peak	H	100	276	-68.28	-13.34	25.38	46.02	-20.64
919.44	Max Peak	V	300	146	-75.05	-1.36	30.59	46.02	-15.43

Table 7-98. Radiated Spurious Emissions Measurement below 1GHz SDM Diversity, 802.11ax, Ch.1 with AC/DC adaptor 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.

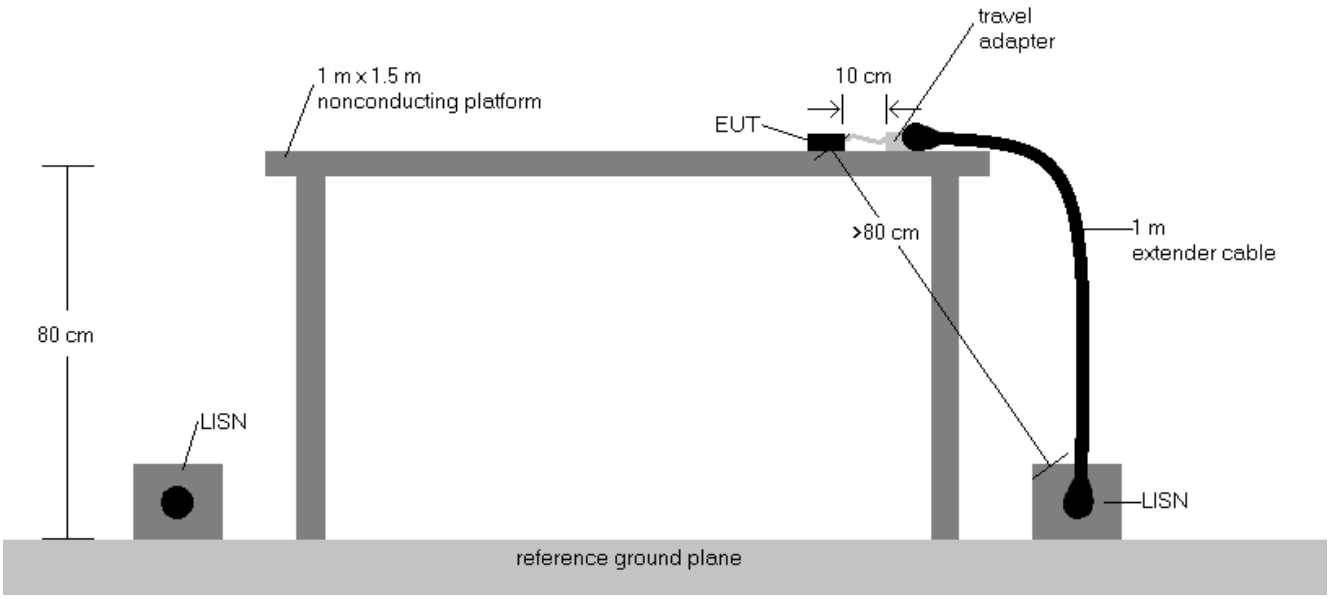
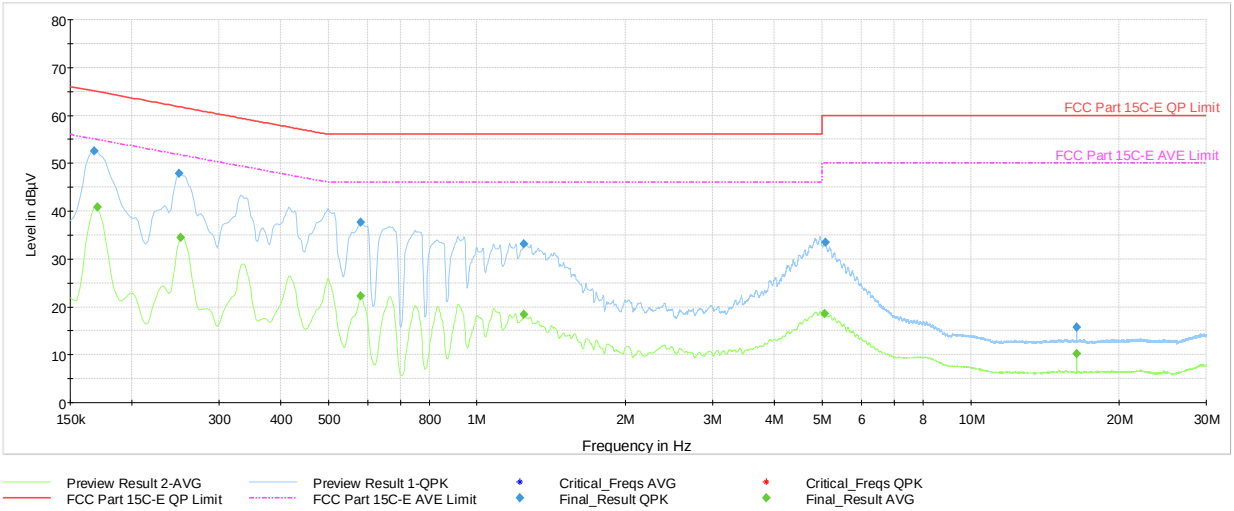


Figure 7-9. Test Instrument & Measurement Setup

Test Notes

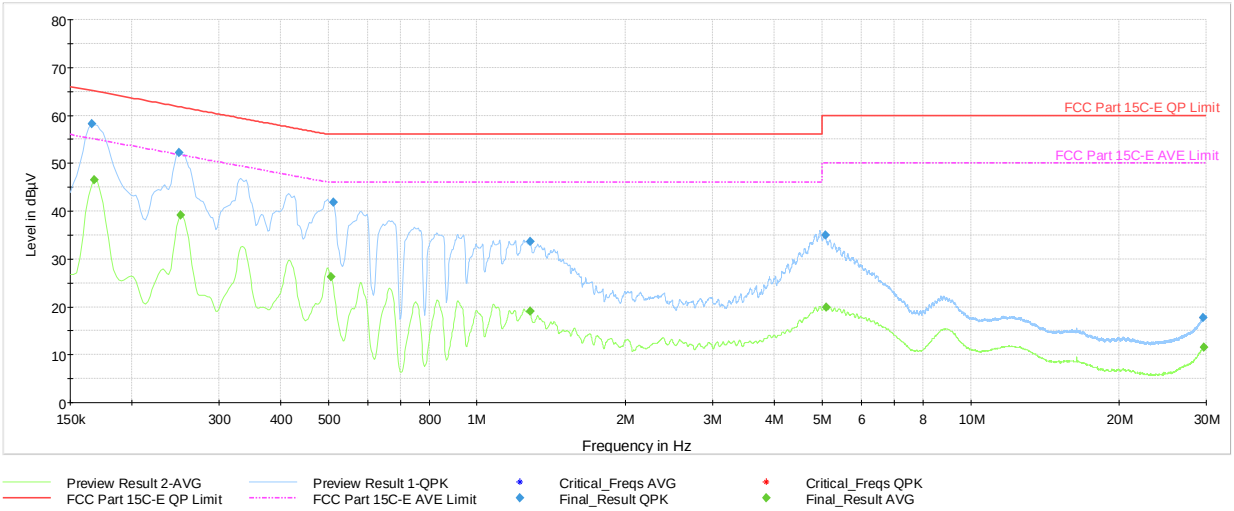
1. All modes of operation were investigated and the worst-case emissions are reported. The emissions found were not affected by the choice of channel used during testing.
2. Both configurations below were investigated, and the worst case has been reported.
    a. EUT powered by AC/DC adaptor via USB-C 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 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
0.17	FINAL	52.55	---	65.06	-12.51	L1	GND
0.17	FINAL	---	40.90	54.95	-14.05	L1	GND
0.25	FINAL	47.85	---	61.79	-13.94	L1	GND
0.25	FINAL	---	34.50	51.72	-17.22	L1	GND
0.58	FINAL	37.71	---	56.00	-18.29	L1	GND
0.58	FINAL	---	22.31	46.00	-23.69	L1	GND
1.25	FINAL	33.15	---	56.00	-22.85	L1	GND
1.25	FINAL	---	18.39	46.00	-27.61	L1	GND
5.06	FINAL	---	18.65	50.00	-31.35	L1	GND
5.08	FINAL	33.51	---	60.00	-26.49	L1	GND
16.40	FINAL	---	10.21	50.00	-39.79	L1	GND
16.40	FINAL	15.66	---	60.00	-44.34	L1	GND

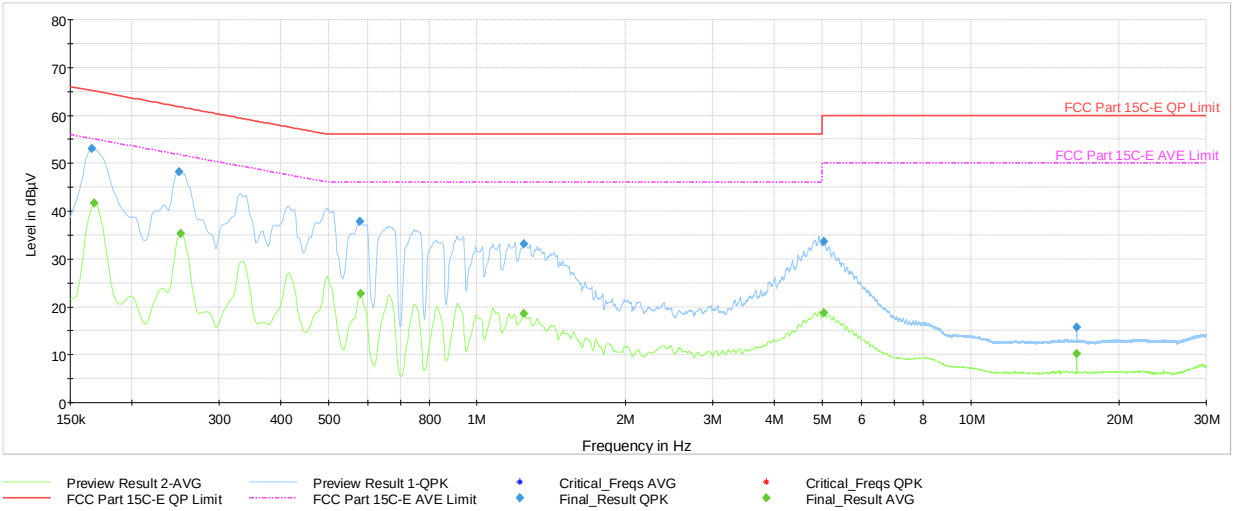
Table 7-100. AC Line Conducted Data with 802.11ax SDM Primary – Ch. 1 (L1) with AC/DC adaptor via USB-C cable with wire charger



Plot 7-630. AC Line Conducted Plot with 802.11ax 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
0.17	FINAL	58.26	---	65.17	-6.91	N	GND
0.17	FINAL	---	46.57	55.06	-8.49	N	GND
0.25	FINAL	52.27	---	61.79	-9.52	N	GND
0.25	FINAL	---	39.09	51.72	-12.63	N	GND
0.51	FINAL	---	26.33	46.00	-19.67	N	GND
0.51	FINAL	41.82	---	56.00	-14.18	N	GND
1.28	FINAL	---	19.01	46.00	-26.99	N	GND
1.28	FINAL	33.63	---	56.00	-22.37	N	GND
5.07	FINAL	35.05	---	60.00	-24.95	N	GND
5.09	FINAL	---	19.92	50.00	-30.08	N	GND
29.61	FINAL	17.70	---	60.00	-42.30	N	GND
29.64	FINAL	---	11.46	50.00	-38.54	N	GND

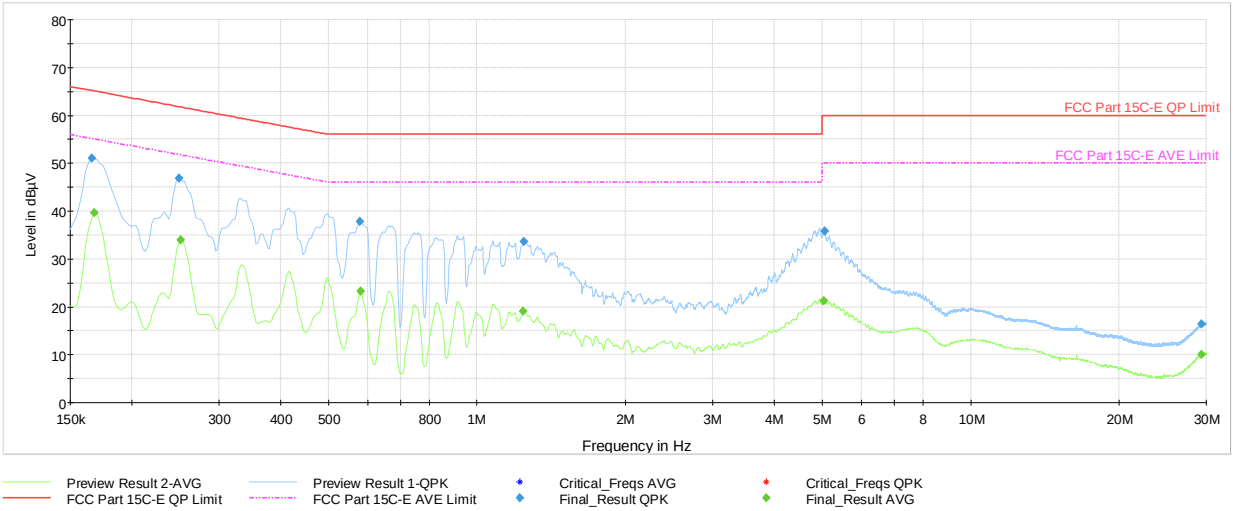
Table 7-101. AC Line Conducted Data with 802.11ax SDM Primary – Ch. 1 (N), with AC/DC adaptor via USB-C cable with wire charger



Plot 7-631. AC Line Conducted Plot with 802.11ax 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
0.17	FINAL	53.07	---	65.17	-12.10	L1	GND
0.17	FINAL	---	41.67	55.06	-13.39	L1	GND
0.25	FINAL	48.28	---	61.79	-13.51	L1	GND
0.25	FINAL	---	35.31	51.72	-16.41	L1	GND
0.58	FINAL	37.89	---	56.00	-18.11	L1	GND
0.58	FINAL	---	22.81	46.00	-23.19	L1	GND
1.24	FINAL	33.10	---	56.00	-22.90	L1	GND
1.24	FINAL	---	18.54	46.00	-27.46	L1	GND
5.04	FINAL	33.72	---	60.00	-26.28	L1	GND
5.04	FINAL	---	18.68	50.00	-31.32	L1	GND
16.40	FINAL	---	10.17	50.00	-39.83	L1	GND
16.40	FINAL	15.75	---	60.00	-44.25	L1	GND

Table 7-102. AC Line Conducted Data with 802.11ax 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 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
0.17	FINAL	51.04	---	65.17	-14.13	N	GND
0.17	FINAL	---	39.63	55.06	-15.43	N	GND
0.25	FINAL	46.86	---	61.79	-14.93	N	GND
0.25	FINAL	---	33.97	51.72	-17.75	N	GND
0.58	FINAL	37.77	---	56.00	-18.23	N	GND
0.58	FINAL	---	23.27	46.00	-22.73	N	GND
1.24	FINAL	---	19.00	46.00	-27.00	N	GND
1.24	FINAL	33.56	---	56.00	-22.44	N	GND
5.05	FINAL	---	21.25	50.00	-28.75	N	GND
5.06	FINAL	35.76	---	60.00	-24.24	N	GND
29.33	FINAL	---	9.99	50.00	-40.01	N	GND

Table 7-103. AC Line Conducted Data with 802.11ax 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: BCGA3269** and **IC: 579C-A3269** 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.