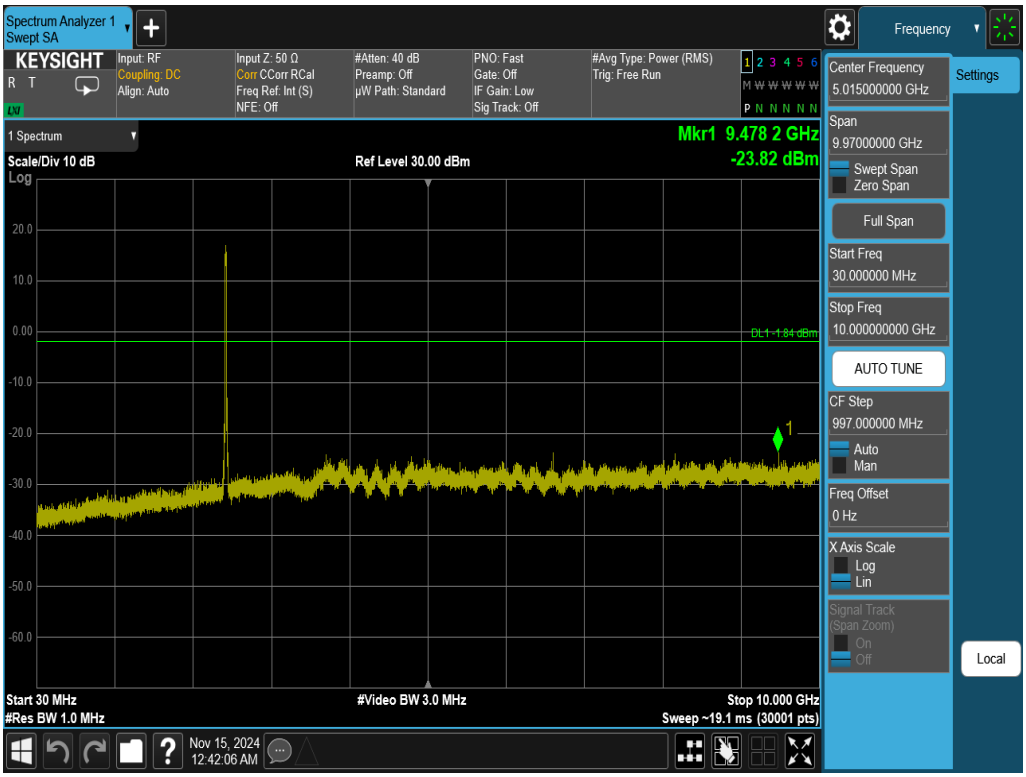
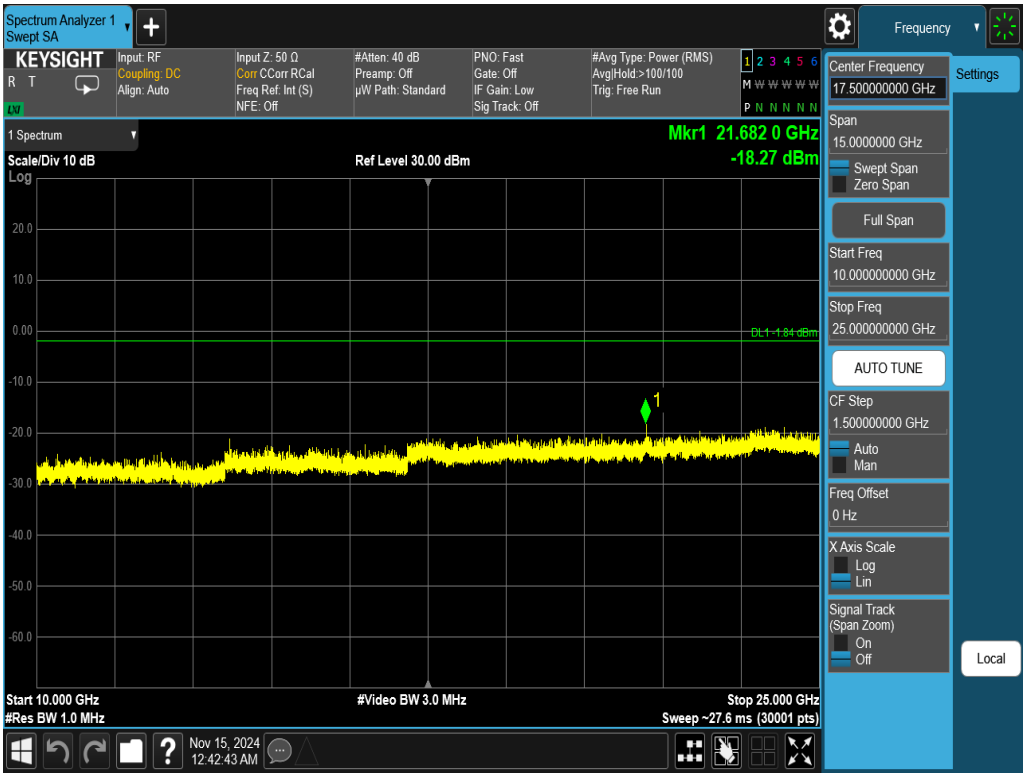
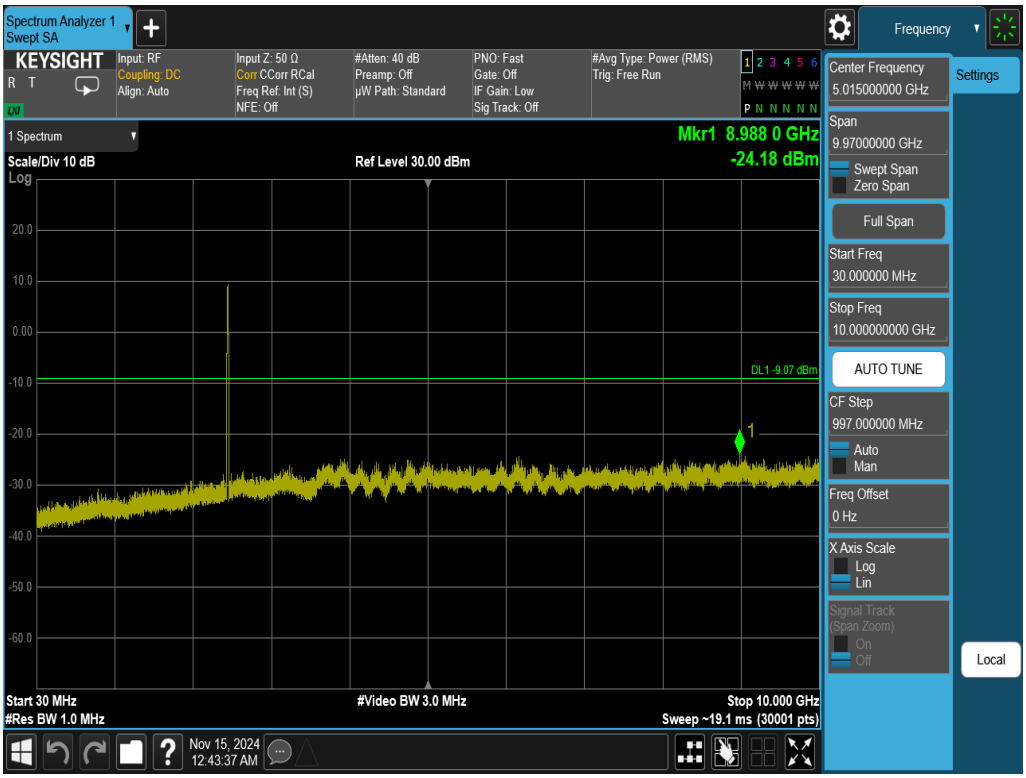


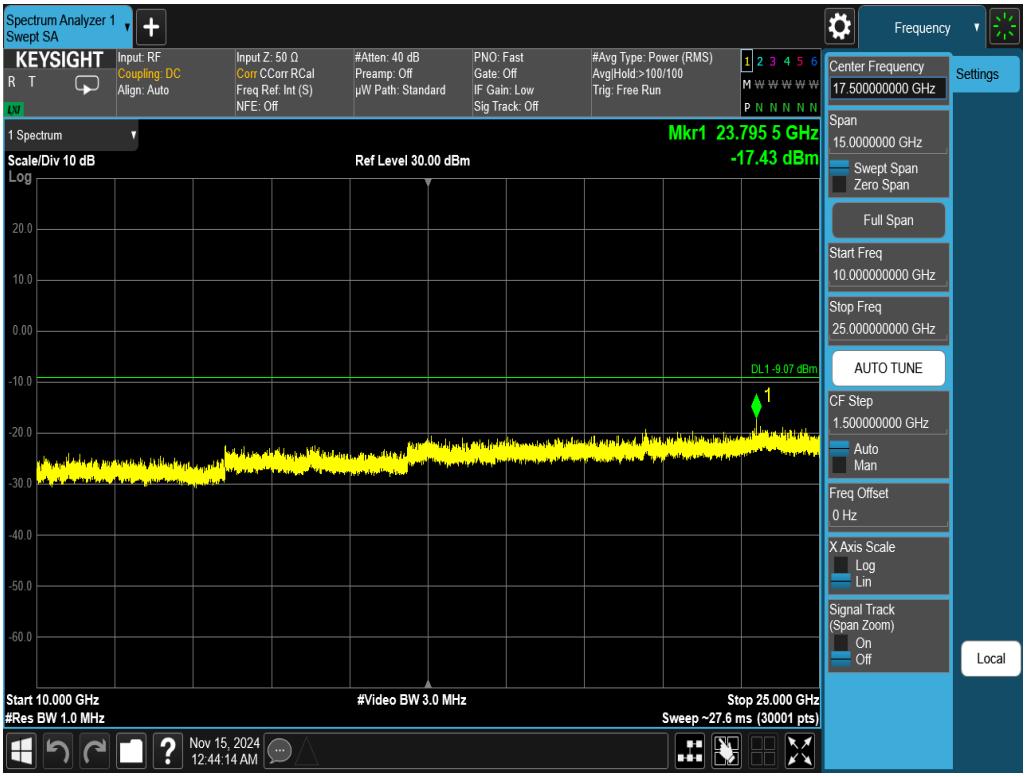
Plot 7-63. Conducted Spurious Plot Antenna WF7b (802.11ax OFDMA – RU242 – Ch. 6)



Plot 7-64. Conducted Spurious Plot Antenna WF7b (802.11ax OFDMA – RU242 – Ch. 6)



Plot 7-65. Conducted Spurious Plot Antenna WF7b (802.11ax OFDMA – RU242 – Ch. 11)



Plot 7-66. Conducted Spurious Plot Antenna WF7b (802.11ax OFDMA – RU242 – Ch. 11)

7.7 Radiated Spurious Emissions – Above 1 GHz

§15.247(d) §15.205 & §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 7-24 per Section 15.209 and RSS-Gen (8.9).

Frequency	Field Strength [µV/m]	Measured Distance [Meters]
Above 960.0 MHz	500	3

Table 7-24. Radiated Limits

Test Procedures Used

ANSI C63.10-2020 – Subclause 6.6.4.3
KDB 558074 D01 v05r02 – Sections 8.6, 8.7

Test Settings

Average Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = power average (RMS)
5. Number of Measurement points = 1001 (Number of points must be ≥ 2 x span/RBW)
6. Sweep time = auto
7. Trace (RMS) averaging was performed over at least 100 traces

Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = 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 diagram below.

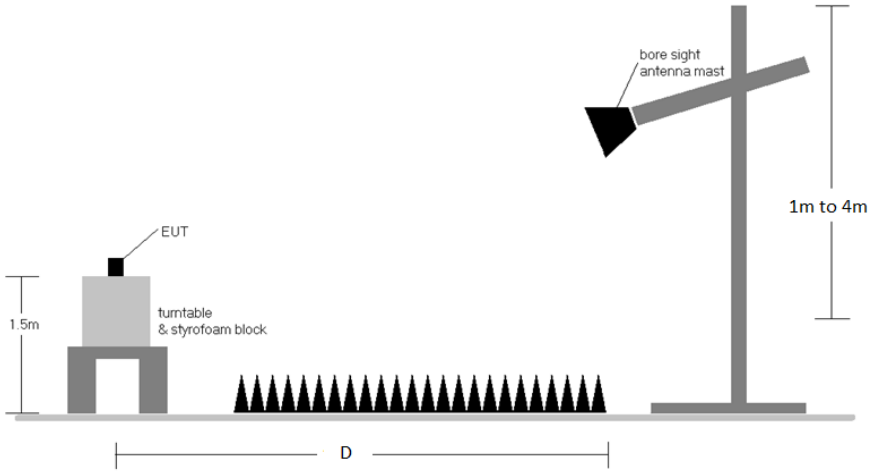


Figure 7-6. Radiated Measurement Setup

Test Notes

1. The optional test procedures for antenna port conducted Measurements of unwanted emissions per the guidance of KDB 558074 D01 v05r02 were not used to evaluate this device for compliance to radiated limits. All Radiated Spurious Emissions levels were measured in a radiated test setup.
2. All emissions lying in restricted bands specified in Section 15.205 and Section 8.10 of RSS-Gen are below the limit shown in Table 7-24.
3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
4. This unit was tested with its standard battery.
5. The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHz. Above 1 GHz, average and peak Measurements were taken using linearly polarized horn antennas.
6. D is the measurement test distance and emissions 1-18GHz were measured at a 3 meters test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
7. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. Any emissions found to be within 20dB of the limit are fully investigated and the results are shown in this section.
8. The "-" shown in the following RSE tables are used to denote a noise floor Measurement.
9. All antenna configurations and data rates were investigated and only the worst case are reported.
10. For radiated Measurements, emissions were investigated for the fully-loaded RU configuration and for all the partially-loaded RU configurations. Among all of the available partially-loaded RU configurations, only the configuration with the worst case emissions is reported.

Sample Calculations

Determining Spurious Emissions Levels

- Field Strength Level [dBµV/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 [dBµV/m] – Limit [dBµV/m]

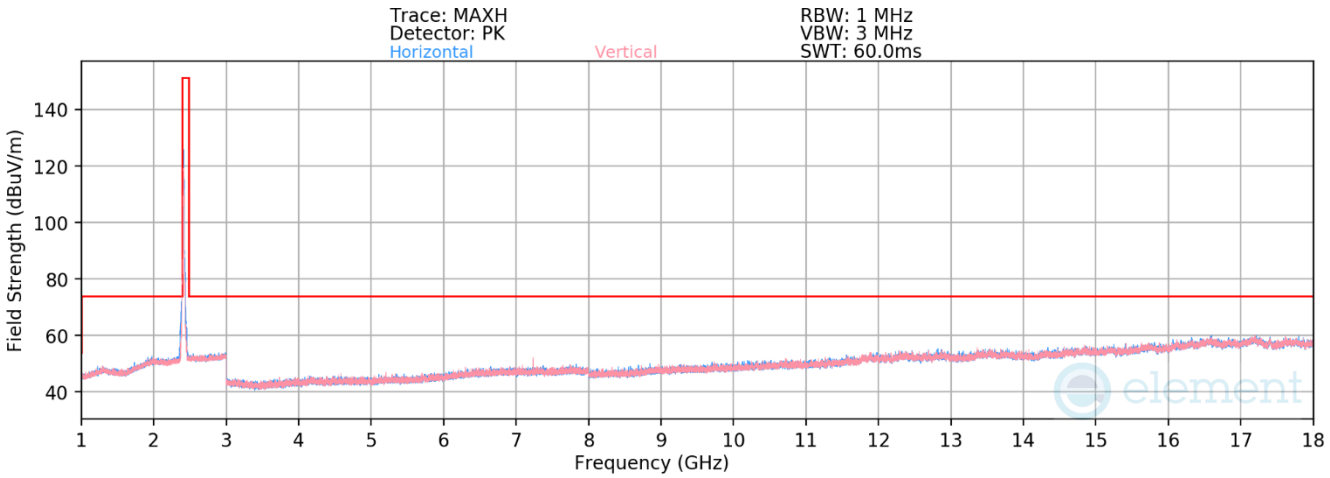
Radiated Band Edge Measurement Offset

- The amplitude offset shown in the radiated restricted band edge plots in Sections 7.7.2 to 7.7.4 was calculated using the formula:

  Offset (dB) = (Antenna Factor + Cable Loss + Attenuator) – Preamplifier Gain

7.7.1 CDD Radiated Spurious Emission Measurements

§15.247(d) §15.205 & §15.209; RSS-Gen [8.9]

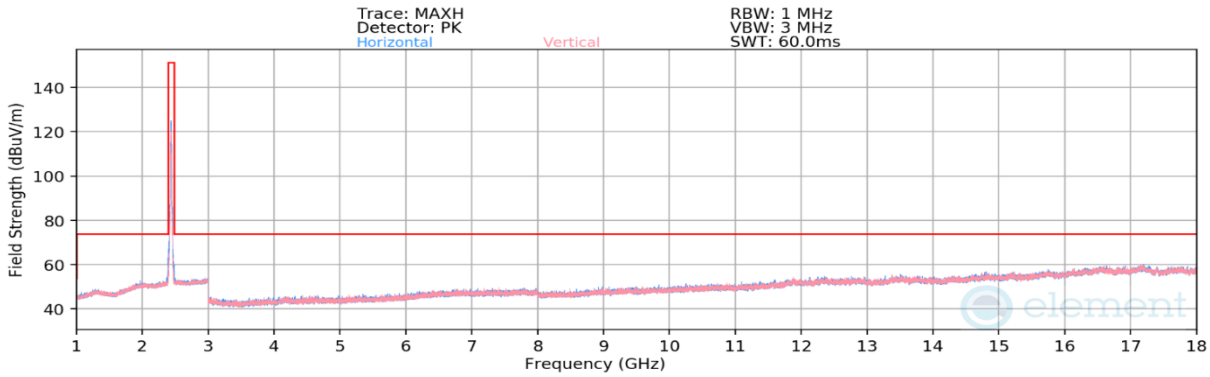


Plot 7-67. Radiated Spurious Emissions above 1GHz CDD (802.11ax OFDMA – RU26 – Ch. 1)

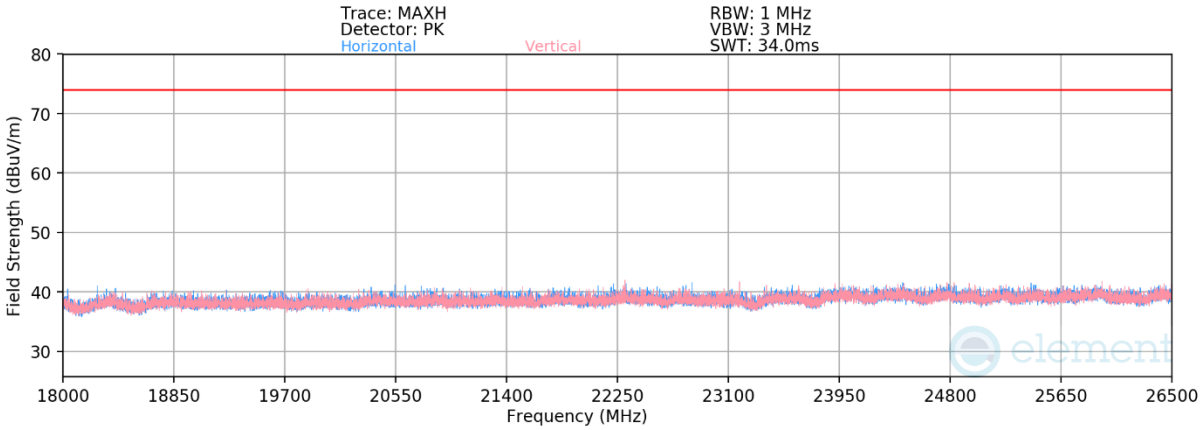
Worst Case Mode:	802.11ax OFDMA
Worst Case Transfer Rate:	MCS0
RU Index:	4
Distance of Measurements:	3 Meters
Operating Frequency:	2412MHz
Channel:	01

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]
4824.00	Average	V	-	-	-79.38	7.06	34.68	53.98	-19.30
4824.00	Peak	V	-	-	-68.01	6.99	45.98	73.98	-28.00
12060.00	Average	V	-	-	-82.64	18.01	42.37	53.98	-11.61
12060.00	Peak	V	-	-	-71.33	17.58	53.24	73.98	-20.74

Table 7-25. Radiated Measurements CDD (RU26)



Plot 7-68. Radiated Spurious Emissions above 1GHz CDD (802.11ax OFDMA – RU26 – Ch. 6)

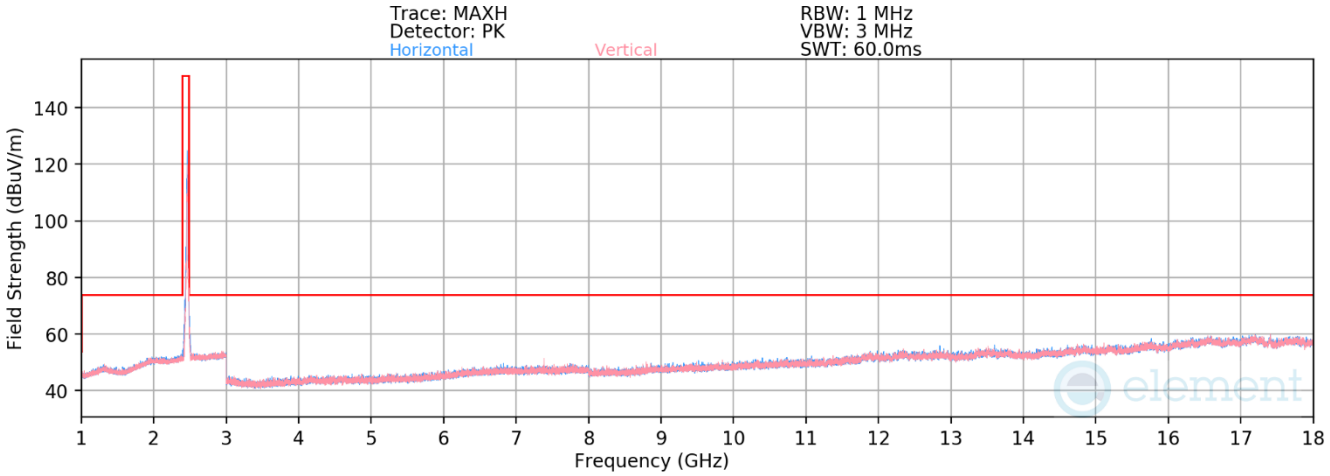


Plot 7-69. Radiated Spurious Emissions above 18GHz CDD (802.11ax OFDMA – RU26 – Ch. 6)

Worst Case Mode:	802.11ax OFDMA
Worst Case Transfer Rate:	MCS0
RU Index:	4
Distance of Measurements:	3 Meters
Operating Frequency:	2437MHz
Channel:	06

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]
4874.00	Average	H	-	-	-79.94	7.57	34.63	53.98	-19.35
4874.00	Peak	H	-	-	-68.62	7.57	45.96	73.98	-28.02
7311.00	Average	V	-	-	-80.01	10.57	37.56	53.98	-16.42
7311.00	Peak	V	-	-	-67.93	10.57	49.64	73.98	-24.34
12185.00	Average	H	-	-	-82.26	17.38	42.12	53.98	-11.86
12185.00	Peak	H	-	-	-71.18	17.38	53.20	73.98	-20.78

Table 7-26. Radiated Measurements CDD (RU26)

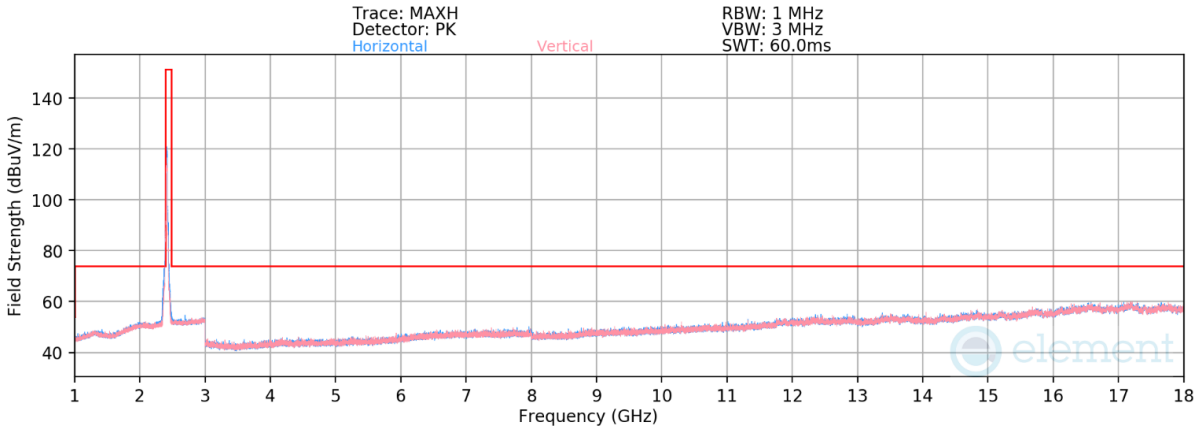


Plot 7-70. Radiated Spurious Emissions above 1GHz CDD (802.11ax OFDMA – RU26 – Ch. 11)

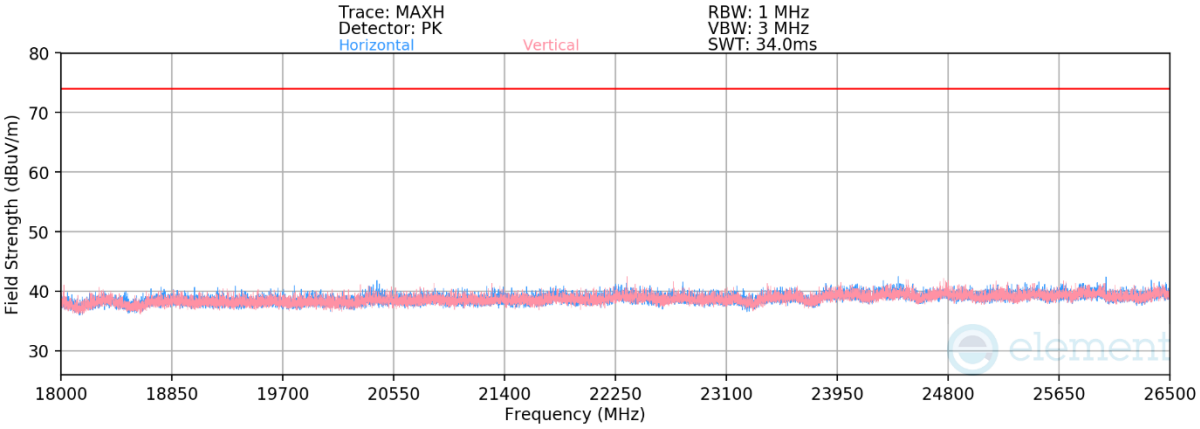
Worst Case Mode:	802.11ax OFDMA
Worst Case Transfer Rate:	MCS0
RU Index:	4
Distance of Measurements:	3 Meters
Operating Frequency:	2462MHz
Channel:	11

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]
4924.00	Average	H	-	-	-79.82	7.47	34.65	53.98	-19.33
4924.00	Peak	H	-	-	-67.89	7.20	46.32	73.98	-27.66
7386.00	Average	V	-	-	-80.46	10.76	37.30	53.98	-16.68
7386.00	Peak	V	-	-	-69.39	10.76	48.36	73.98	-25.62
12310.00	Average	V	-	-	-82.97	18.71	42.74	53.98	-11.24
12310.00	Peak	V	-	-	-71.55	18.71	54.16	73.98	-19.82

Table 7-27. Radiated Measurements CDD (RU26)



Plot 7-71. Radiated Spurious Emissions above 1GHz CDD (802.11ax OFDMA – RU242 – Ch. 1)

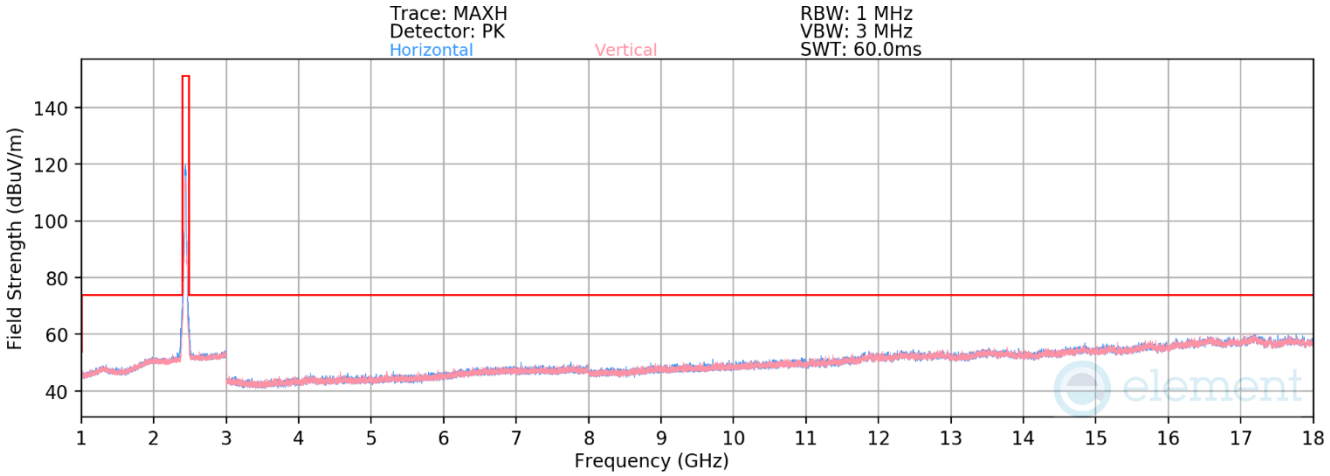


Plot 7-72. Radiated Spurious Emissions above 18GHz CDD (802.11ax OFDMA – RU242 – Ch. 1)

Worst Case Mode:	802.11ax OFDMA
Worst Case Transfer Rate:	MCS0
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2412MHz
Channel:	01

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]
4824.00	Average	V	-	-	-79.39	6.99	34.60	53.98	-19.38
4824.00	Peak	V	-	-	-68.09	7.06	45.97	73.98	-28.01
12060.00	Average	V	-	-	-82.62	18.03	42.41	53.98	-11.57
12060.00	Peak	V	-	-	-70.86	18.01	54.15	73.98	-19.83
14472.00	Average	V	-	-	-83.68	20.65	43.97	53.98	-10.01
14472.00	Peak	V	-	-	-72.26	20.65	55.39	73.98	-18.59

Table 7-28. Radiated Measurements CDD (RU242)

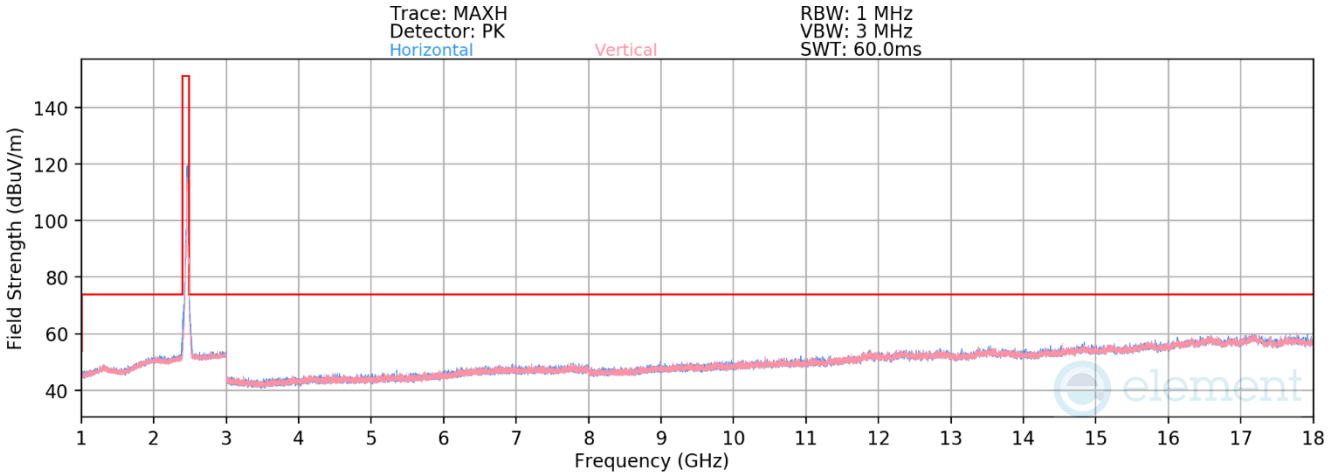


Plot 7-73. Radiated Spurious Emissions above 1GHz CDD (802.11ax OFDMA – RU242 – Ch. 6)

Worst Case Mode:	802.11ax OFDMA
Worst Case Transfer Rate:	MCS0
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2437MHz
Channel:	06

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]
4874.00	Average	H	-	-	-79.91	7.57	34.67	53.98	-19.31
4874.00	Peak	H	-	-	-68.02	7.57	46.55	73.98	-27.43
7311.00	Average	H	-	-	-80.12	10.43	37.31	53.98	-16.67
7311.00	Peak	H	-	-	-68.96	10.57	48.62	73.98	-25.36
12185.00	Average	V	-	-	-82.89	17.90	42.01	53.98	-11.97
12185.00	Peak	V	-	-	-70.54	17.38	53.84	73.98	-20.14

Table 7-29. Radiated Measurements CDD (RU242)



Plot 7-74. Radiated Spurious Emissions above 1GHz CDD (802.11ax OFDMA – RU242 – Ch. 11)

Worst Case Mode:	802.11ax OFDMA
Worst Case Transfer Rate:	MCS0
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2462MHz
Channel:	11

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]
4924.00	Average	H	-	-	-79.56	7.20	34.65	53.98	-19.33
4924.00	Peak	H	-	-	-68.54	7.20	45.67	73.98	-28.31
7386.00	Average	V	-	-	-80.10	10.48	37.38	53.98	-16.60
7386.00	Peak	V	-	-	-68.93	10.48	48.54	73.98	-25.44
12310.00	Average	V	-	-	-82.75	18.71	42.96	53.98	-11.02
12310.00	Peak	V	-	-	-71.16	18.39	54.23	73.98	-19.75

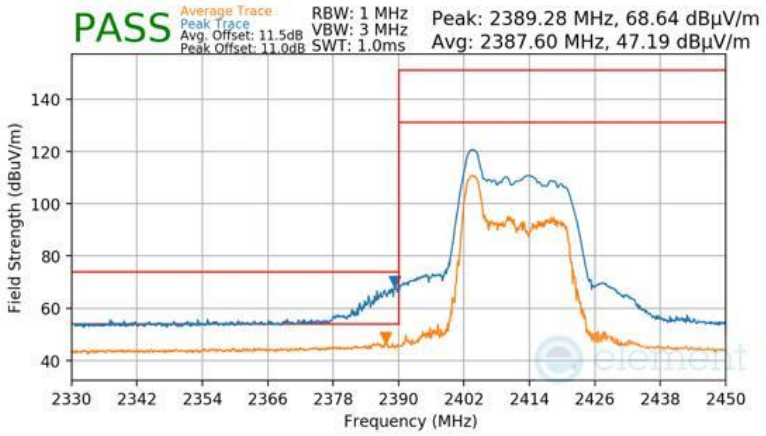
Table 7-30. Radiated Measurements CDD (RU242)

7.7.2 Antenna WF8 Radiated Restricted Band Edge Measurements

§15.205 §15.209; RSS-Gen [8.9]

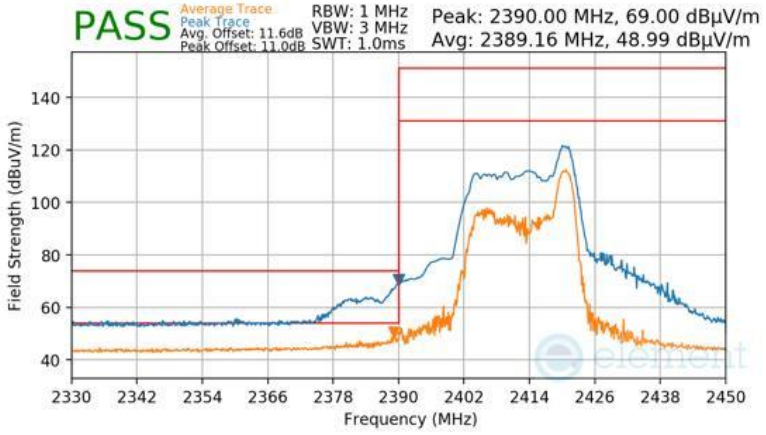
RU26

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	0
Distance of Measurements:	3 Meters
Operating Frequency:	2412MHz
Channel:	1



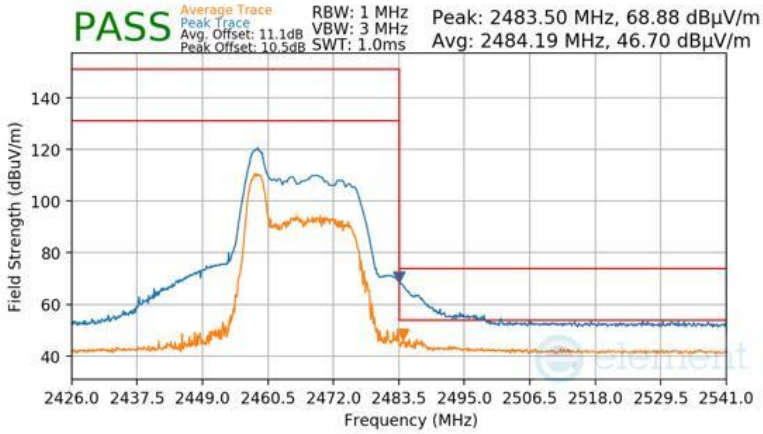
Plot 7-75 Radiated Restricted Lower Band Edge Measurement Antenna WF8 (Peak & Average – RU26)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	8
Distance of Measurements:	3 Meters
Operating Frequency:	2412MHz
Channel:	1



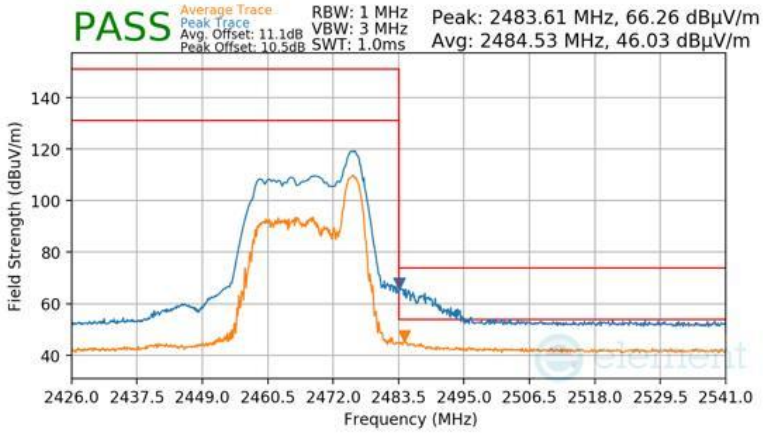
Plot 7-76 Radiated Restricted Lower Band Edge Measurement Antenna WF8 (Peak & Average – RU26)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	0
Distance of Measurements:	3 Meters
Operating Frequency:	2467MHz
Channel:	12



Plot 7-77 Radiated Restricted Upper Band Edge Measurement Antenna WF8 (Peak & Average – RU26)

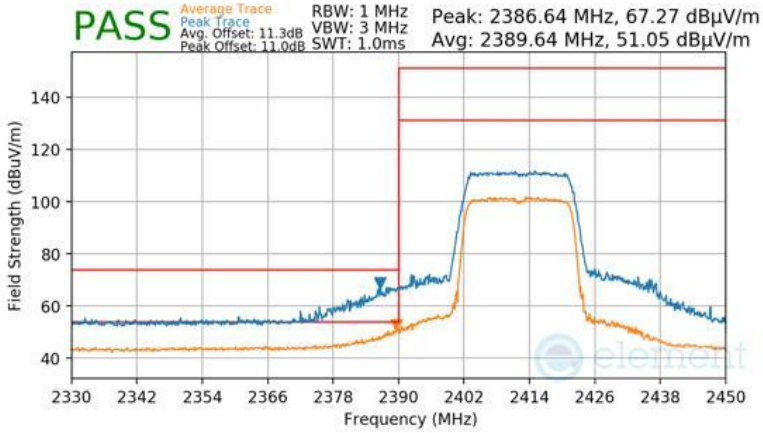
Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	8
Distance of Measurements:	3 Meters
Operating Frequency:	2467MHz
Channel:	12



Plot 7-78 Radiated Restricted Upper Band Edge Measurement Antenna WF8 (Peak & Average – RU26)

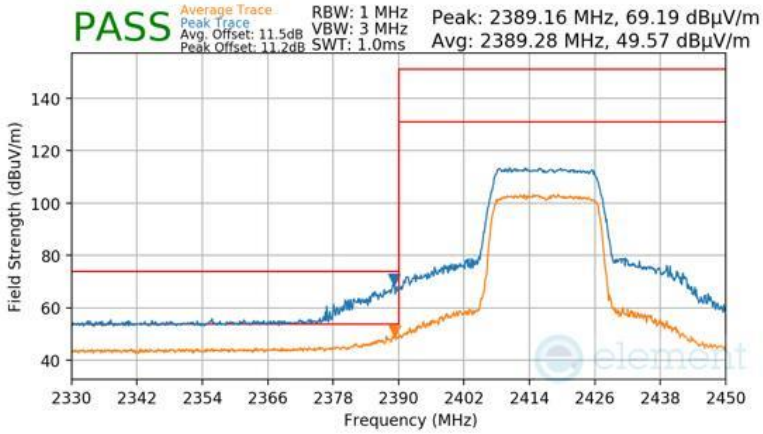
RU242

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2412MHz
Channel:	1



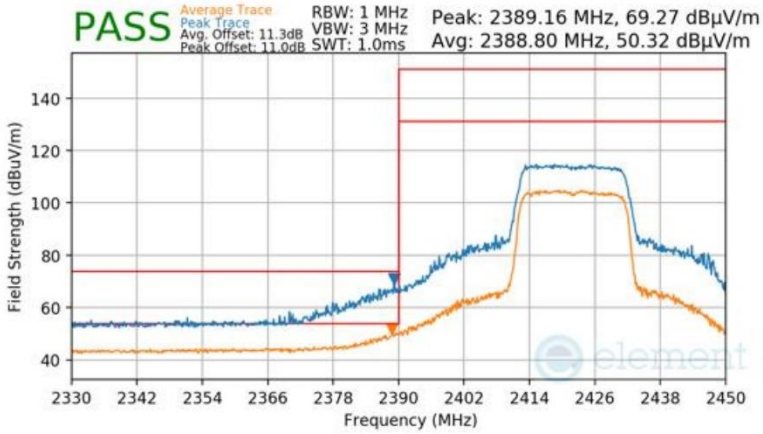
Plot 7-79 Radiated Restricted Lower Band Edge Measurement Antenna WF8 (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2417MHz
Channel:	2



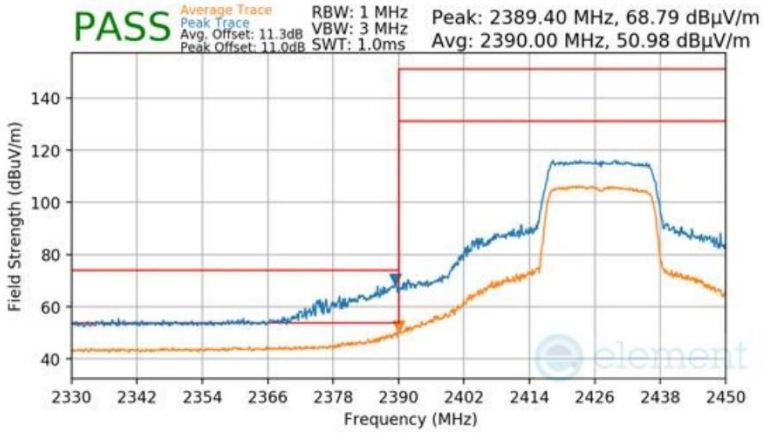
Plot 7-80 Radiated Restricted Lower Band Edge Measurement Antenna WF8 (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2422MHz
Channel:	3



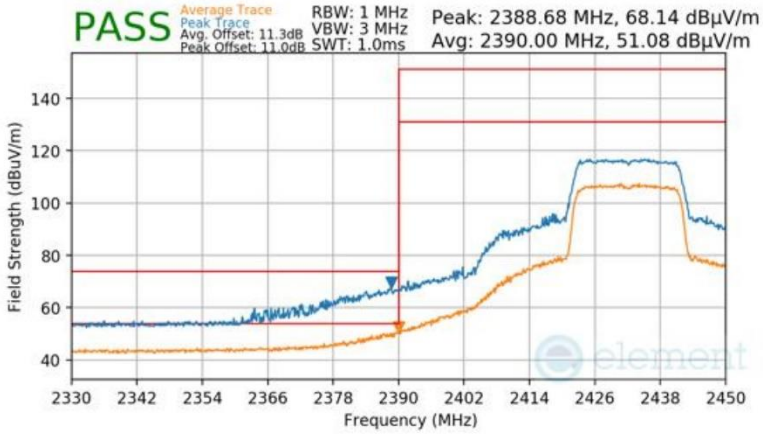
Plot 7-81 Radiated Restricted Lower Band Edge Measurement Antenna WF8 (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2427MHz
Channel:	4



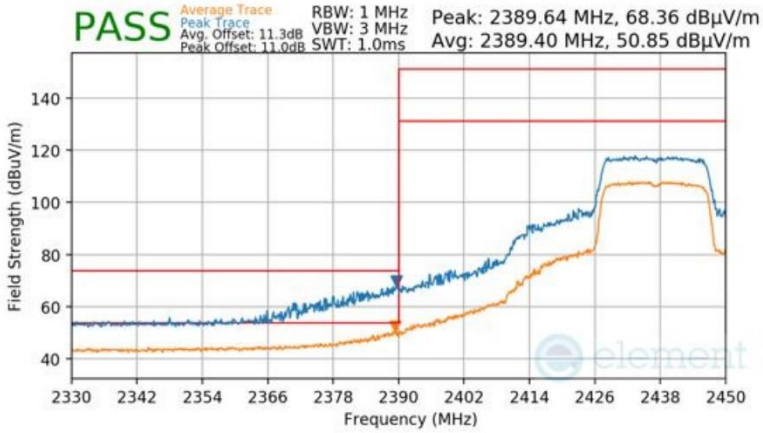
Plot 7-82 Radiated Restricted Lower Band Edge Measurement Antenna WF8 (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2432MHz
Channel:	5



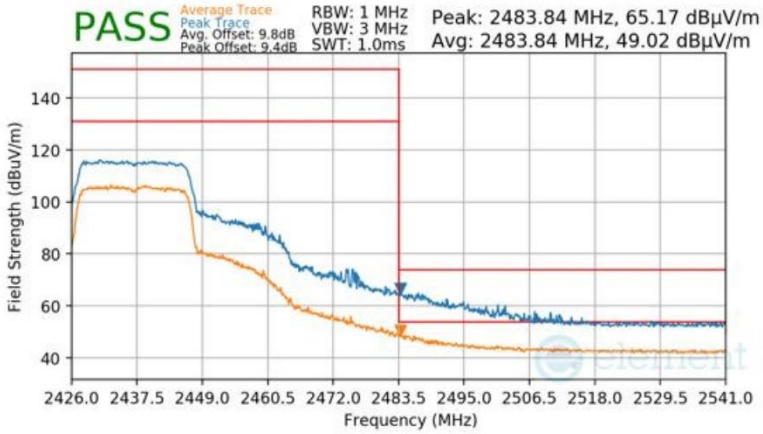
Plot 7-83 Radiated Restricted Lower Band Edge Measurement Antenna WF8 (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2437MHz
Channel:	6 Low



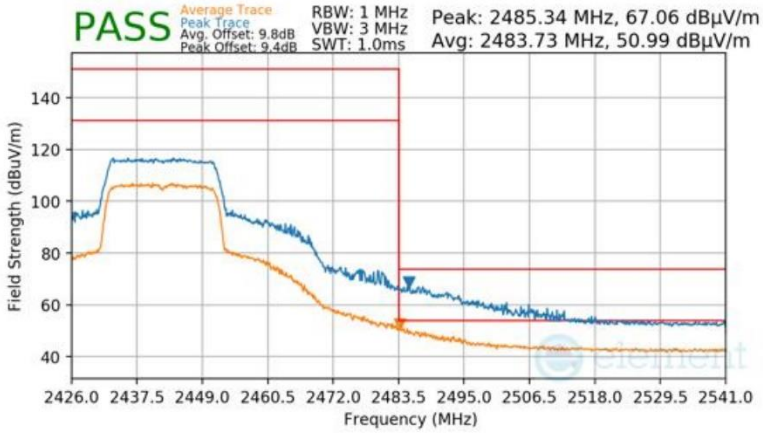
Plot 7-84 Radiated Restricted Lower Band Edge Measurement Antenna WF8 (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2437MHz
Channel:	6 High



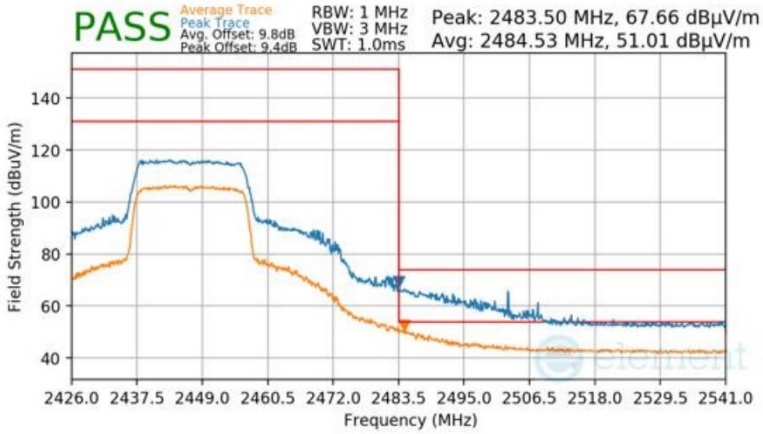
Plot 7-85 Radiated Restricted Upper Band Edge Measurement Antenna WF8 (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2442MHz
Channel:	7



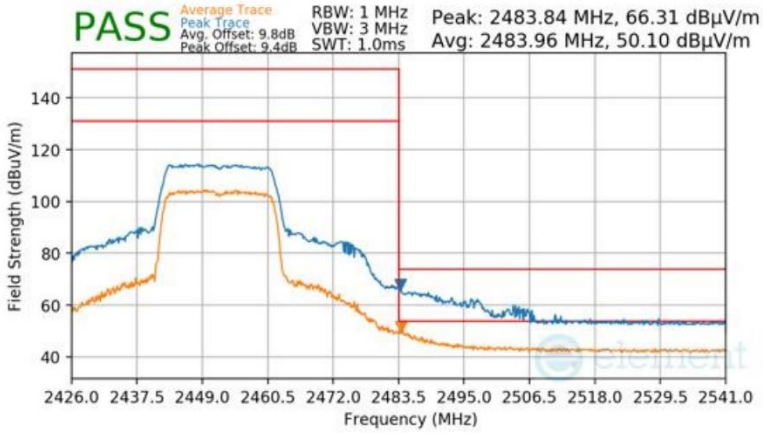
Plot 7-86 Radiated Restricted Upper Band Edge Measurement Antenna WF8 (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2447MHz
Channel:	8



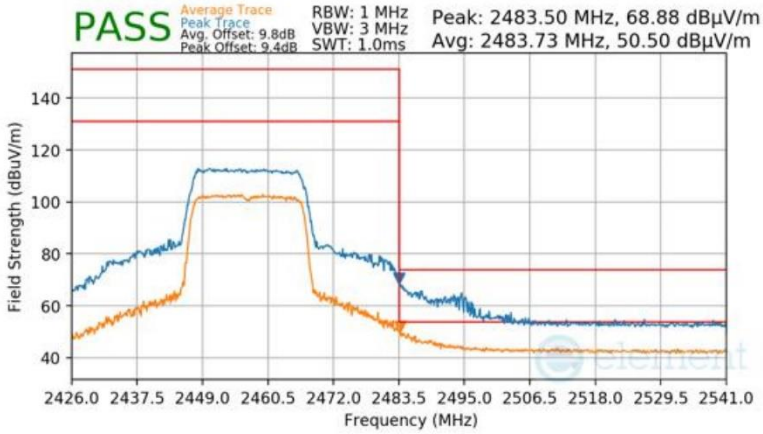
Plot 7-87 Radiated Restricted Upper Band Edge Measurement Antenna WF8 (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2452MHz
Channel:	9



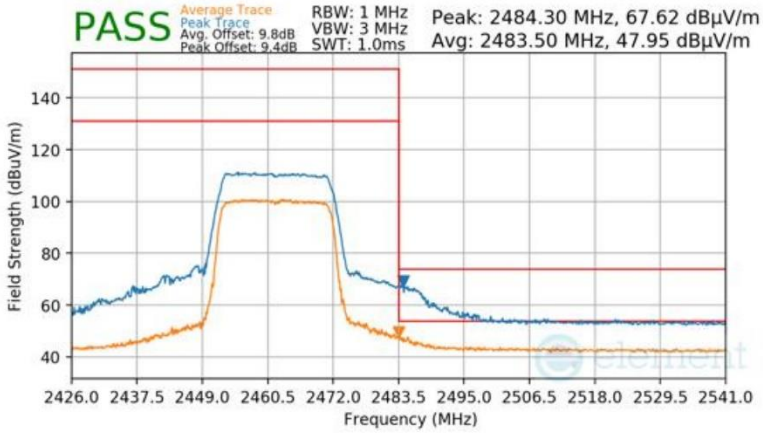
Plot 7-88 Radiated Restricted Upper Band Edge Measurement Antenna WF8 (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2457MHz
Channel:	10



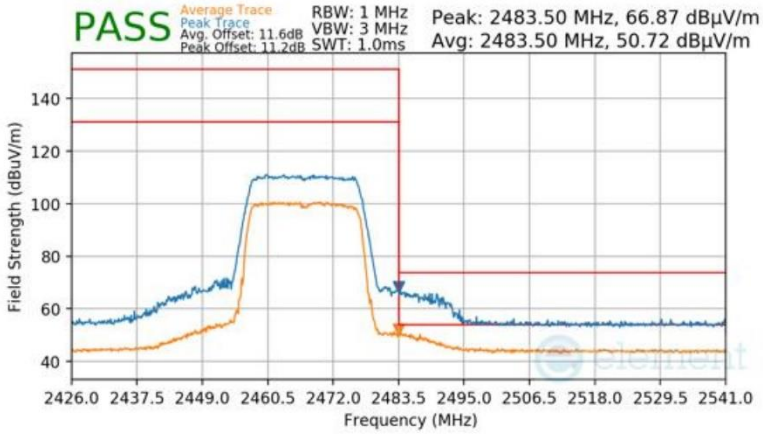
Plot 7-89 Radiated Restricted Upper Band Edge Measurement Antenna WF8 (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2462MHz
Channel:	11



Plot 7-90 Radiated Restricted Upper Band Edge Measurement Antenna WF8 (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2467MHz
Channel:	12



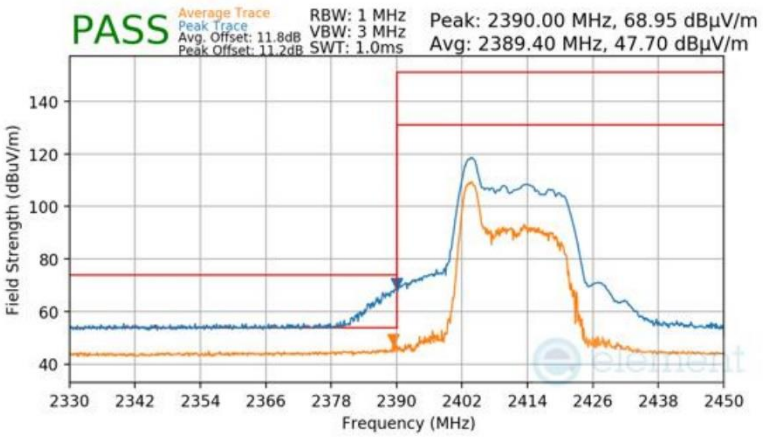
Plot 7-91 Radiated Restricted Upper Band Edge Measurement Antenna WF8 (Peak & Average – RU242)

7.7.3 Antenna WF7b Radiated Restricted Band Edge Measurements

§15.205 §15.209; RSS-Gen [8.9]

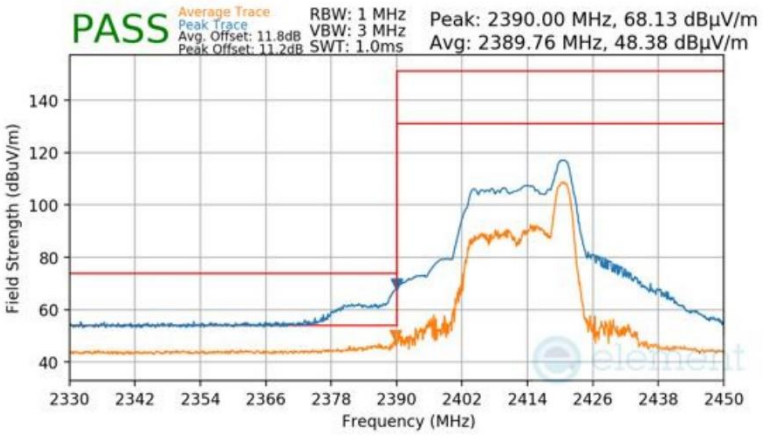
RU26

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	0
Distance of Measurements:	3 Meters
Operating Frequency:	2412MHz
Channel:	1



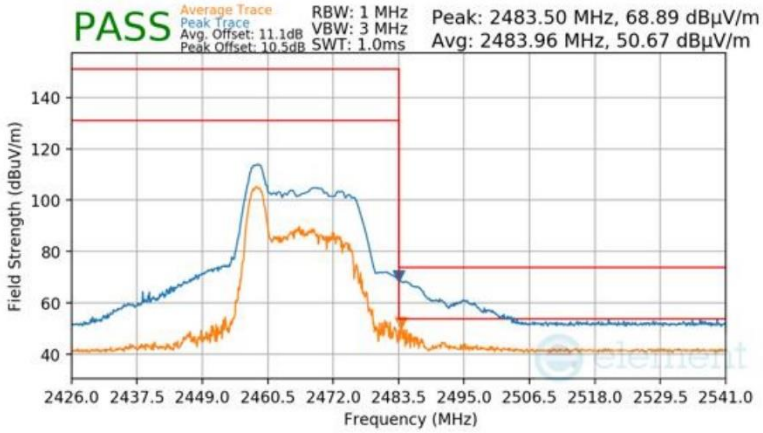
Plot 7-92 Radiated Restricted Lower Band Edge Measurement Antenna WF7b (Peak & Average – RU26)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	8
Distance of Measurements:	3 Meters
Operating Frequency:	2412MHz
Channel:	1



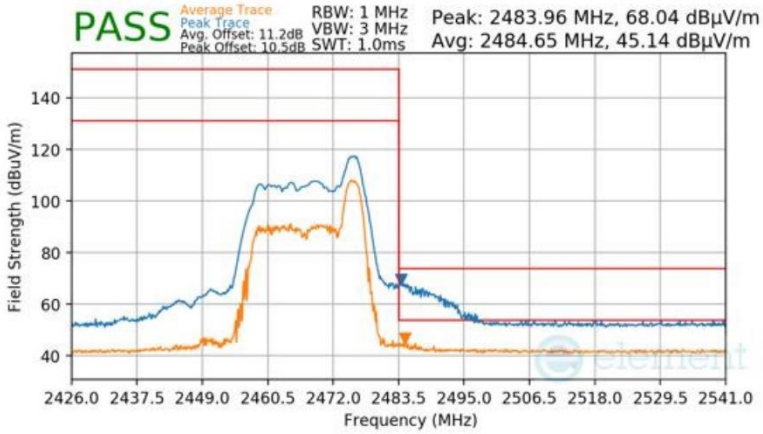
Plot 7-93 Radiated Restricted Lower Band Edge Measurement Antenna WF7b (Peak & Average – RU26)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	0
Distance of Measurements:	3 Meters
Operating Frequency:	2467MHz
Channel:	12



Plot 7-94 Radiated Restricted Upper Band Edge Measurement Antenna WF7b (Peak & Average – RU26)

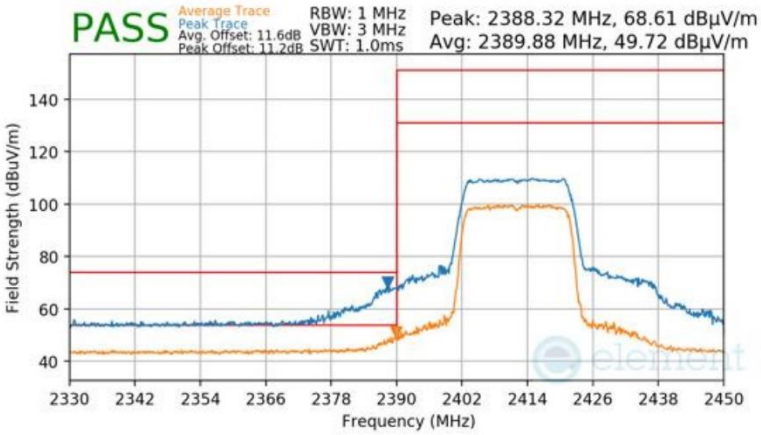
Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	8
Distance of Measurements:	3 Meters
Operating Frequency:	2467MHz
Channel:	12



Plot 7-95 Radiated Restricted Upper Band Edge Measurement Antenna WF7b (Peak & Average – RU26)

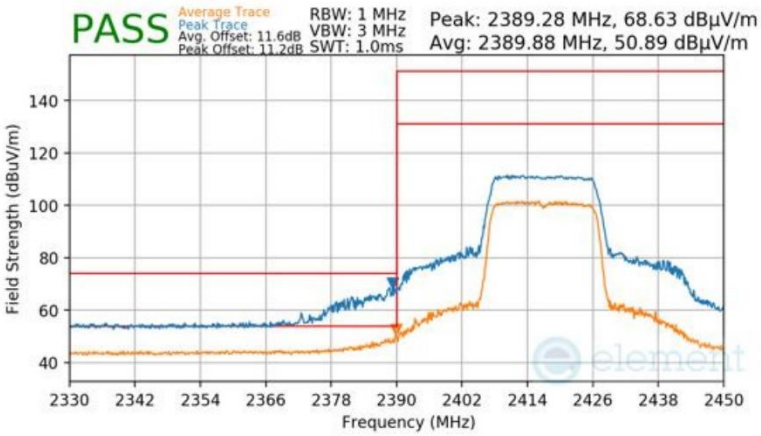
RU242

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2412MHz
Channel:	1



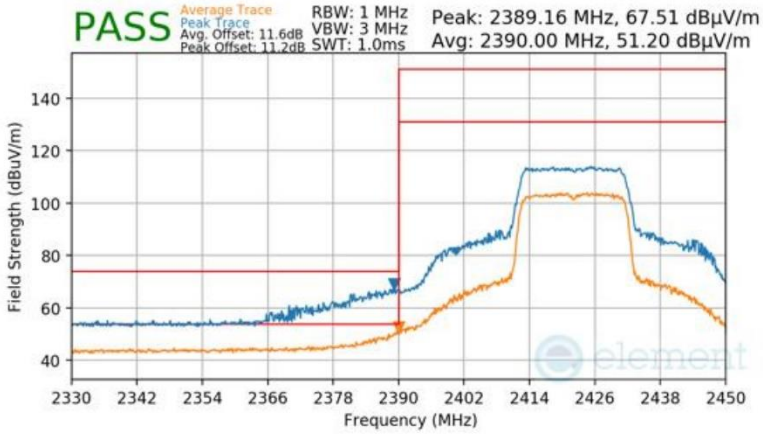
Plot 7-96 Radiated Restricted Lower Band Edge Measurement Antenna WF7b (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2417MHz
Channel:	2



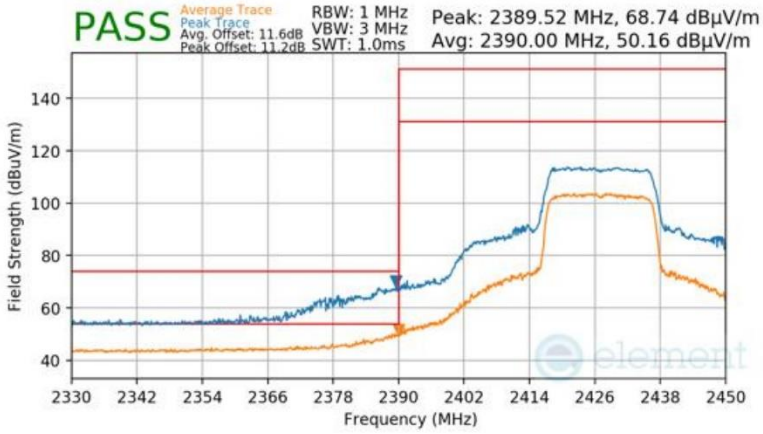
Plot 7-97 Radiated Restricted Lower Band Edge Measurement Antenna WF7b (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2422MHz
Channel:	3



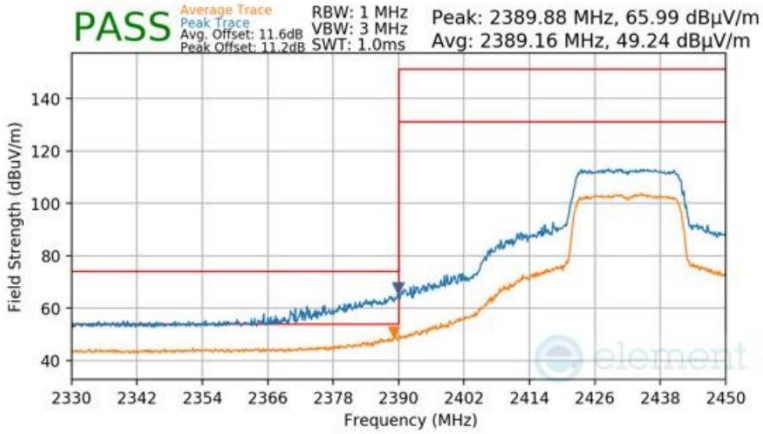
Plot 7-98 Radiated Restricted Lower Band Edge Measurement Antenna WF7b (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2427MHz
Channel:	4



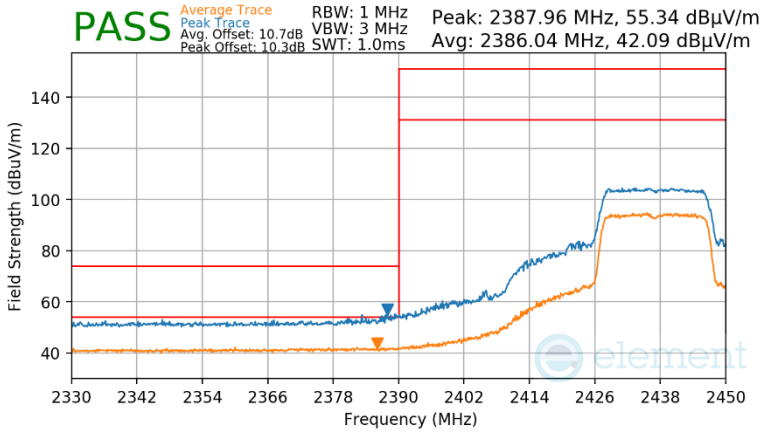
Plot 7-99 Radiated Restricted Lower Band Edge Measurement Antenna WF7b (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2432MHz
Channel:	5



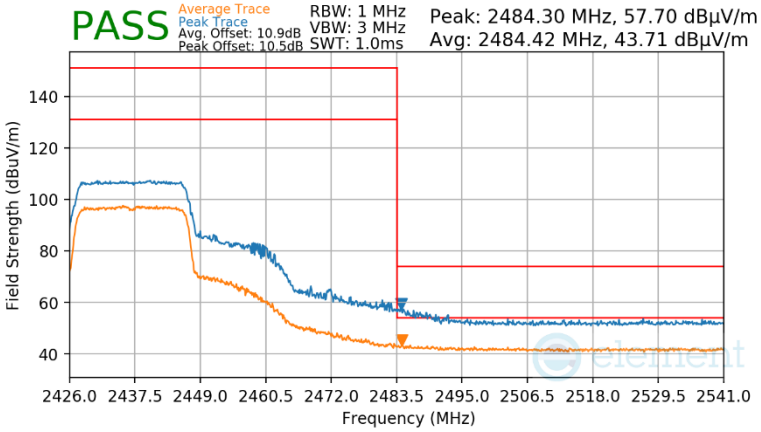
Plot 7-100 Radiated Restricted Lower Band Edge Measurement Antenna WF7b (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2437MHz
Channel:	6 Low



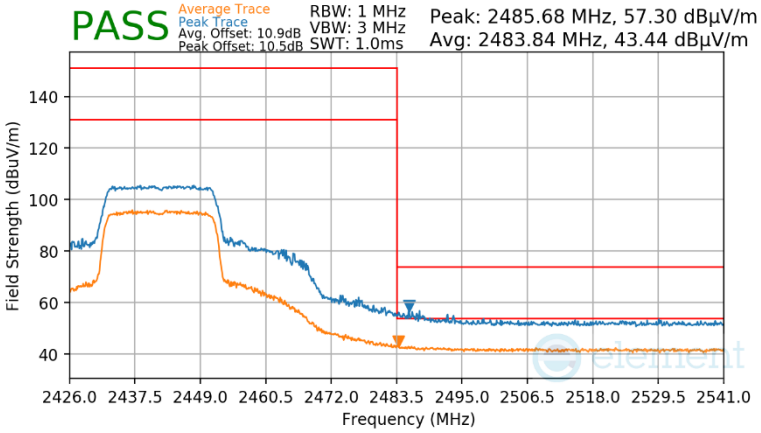
Plot 7-101 Radiated Restricted Lower Band Edge Measurement Antenna WF7b (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2437MHz
Channel:	6 High



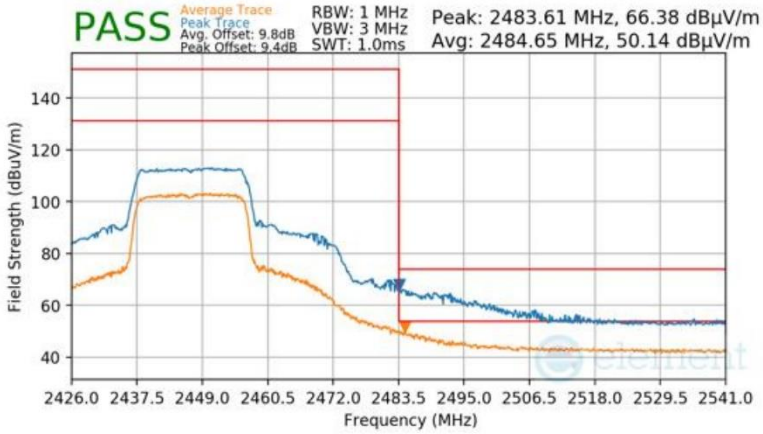
Plot 7-102 Radiated Restricted Upper Band Edge Measurement Antenna WF7b (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2442MHz
Channel:	7



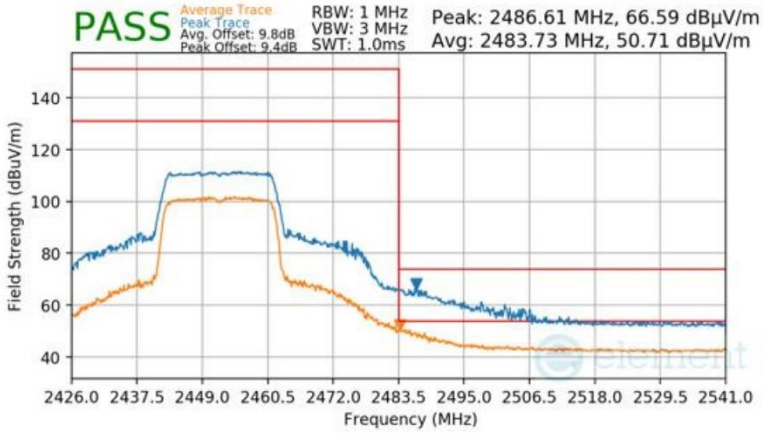
Plot 7-103 Radiated Restricted Upper Band Edge Measurement Antenna WF7b (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2447MHz
Channel:	8



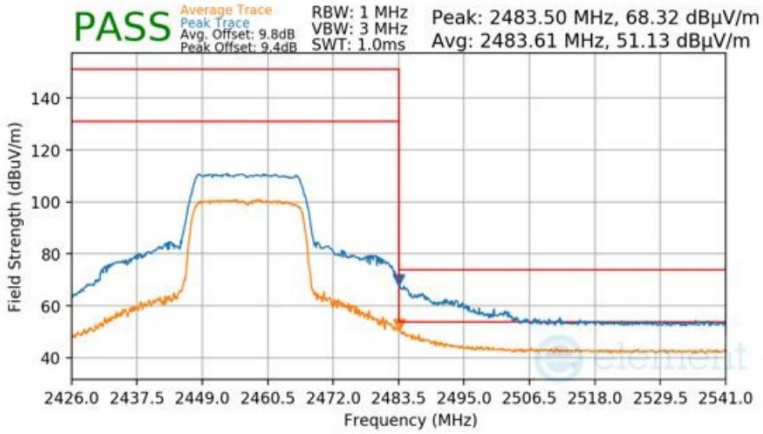
Plot 7-104 Radiated Restricted Upper Band Edge Measurement Antenna WF7b (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2452MHz
Channel:	9



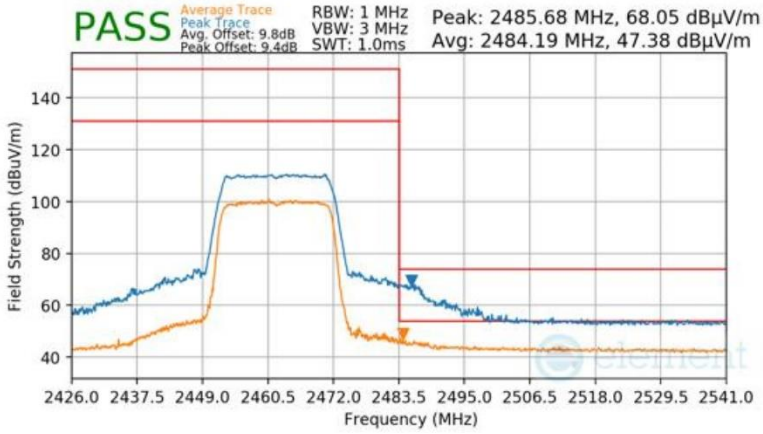
Plot 7-105 Radiated Restricted Upper Band Edge Measurement Antenna WF7b (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2457MHz
Channel:	10



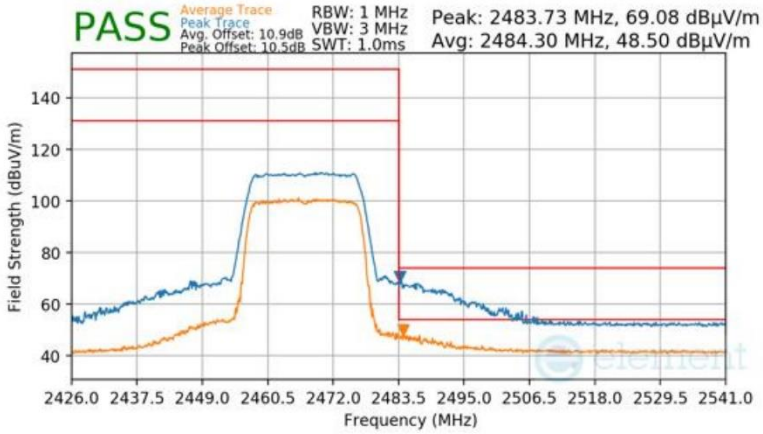
Plot 7-106 Radiated Restricted Upper Band Edge Measurement Antenna WF7b (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2462MHz
Channel:	11



Plot 7-107 Radiated Restricted Upper Band Edge Measurement Antenna WF7b (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2467MHz
Channel:	12



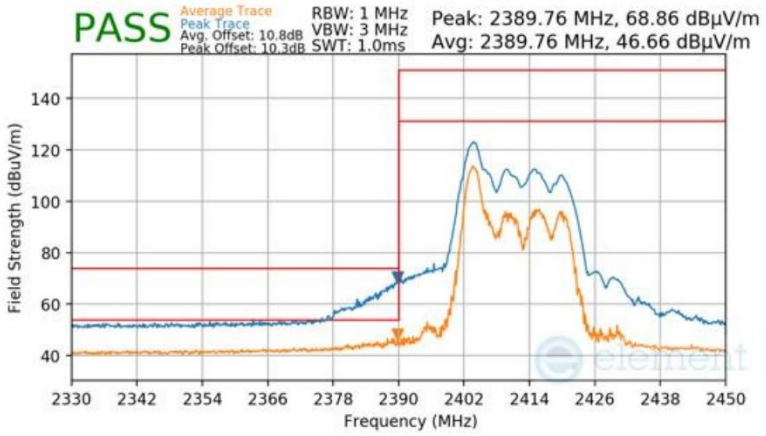
Plot 7-108 Radiated Restricted Upper Band Edge Measurement Antenna WF7b (Peak & Average – RU242)

7.7.4 CDD Radiated Restricted Band Edge Measurements

§15.205 §15.209; RSS-Gen [8.9]

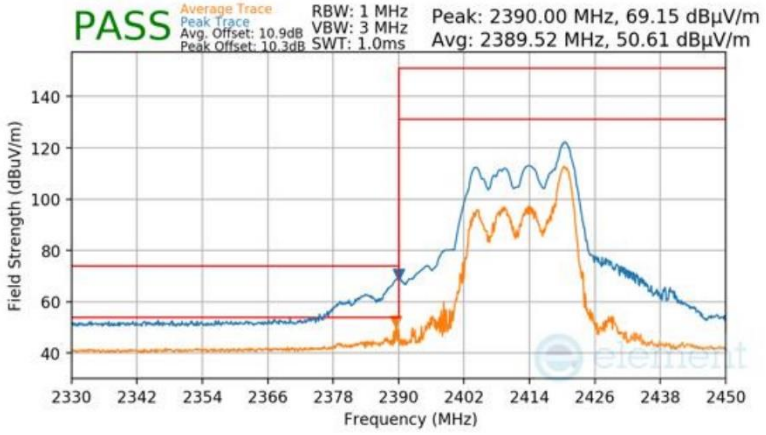
RU26

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	0
Distance of Measurements:	3 Meters
Operating Frequency:	2412MHz
Channel:	1



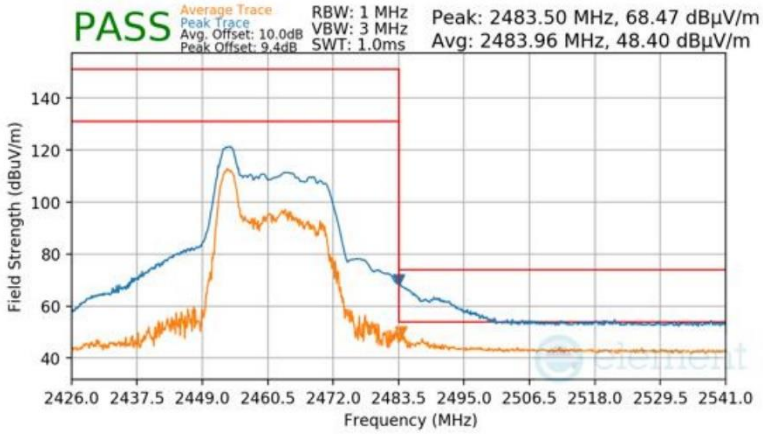
Plot 7-109 Radiated Restricted Lower Band Edge Measurement CDD (Peak & Average – RU26)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	8
Distance of Measurements:	3 Meters
Operating Frequency:	2412MHz
Channel:	1



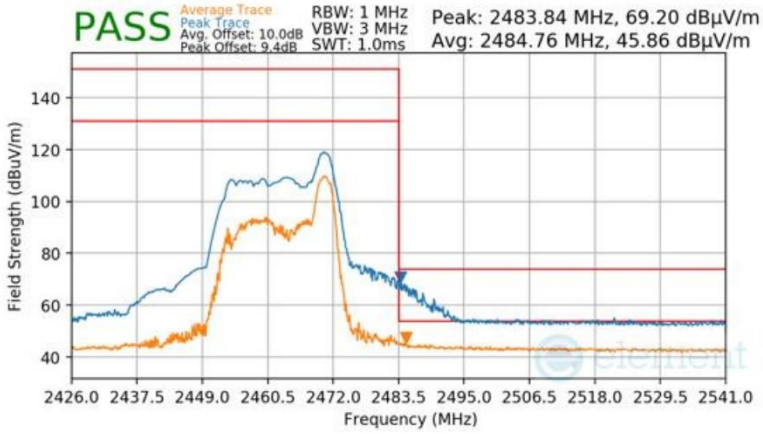
Plot 7-110 Radiated Restricted Lower Band Edge Measurement CDD (Peak & Average – RU26)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	0
Distance of Measurements:	3 Meters
Operating Frequency:	2462MHz
Channel:	11



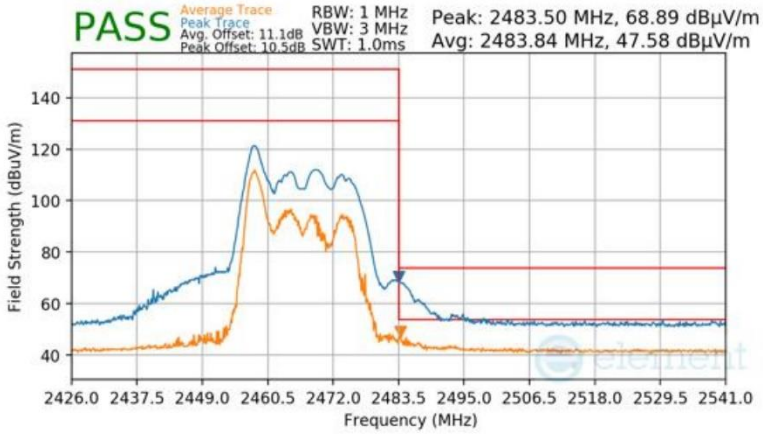
Plot 7-111 Radiated Restricted Upper Band Edge Measurement CDD (Peak & Average – RU26)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	8
Distance of Measurements:	3 Meters
Operating Frequency:	2462MHz
Channel:	11



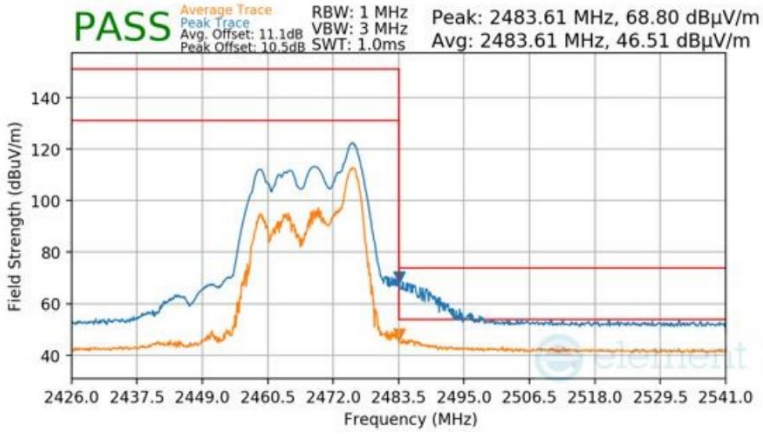
Plot 7-112 Radiated Restricted Upper Band Edge Measurement CDD (Peak & Average – RU26)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	0
Distance of Measurements:	3 Meters
Operating Frequency:	2467MHz
Channel:	12



Plot 7-113 Radiated Restricted Upper Band Edge Measurement CDD (Peak & Average – RU26)

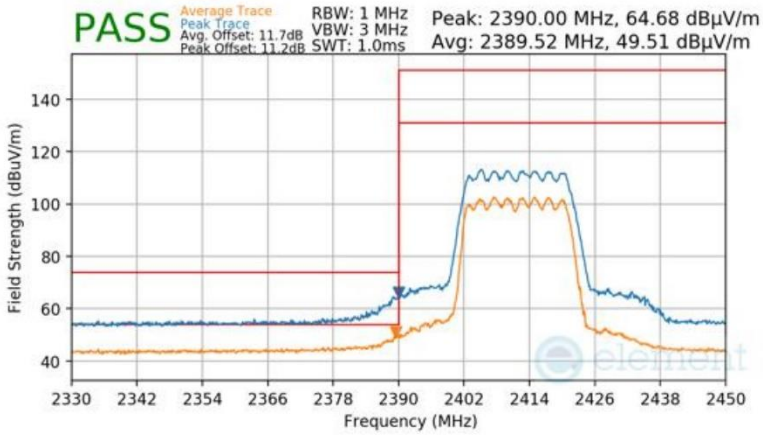
Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	8
Distance of Measurements:	3 Meters
Operating Frequency:	2467MHz
Channel:	12



Plot 7-114 Radiated Restricted Upper Band Edge Measurement CDD (Peak & Average – RU26)

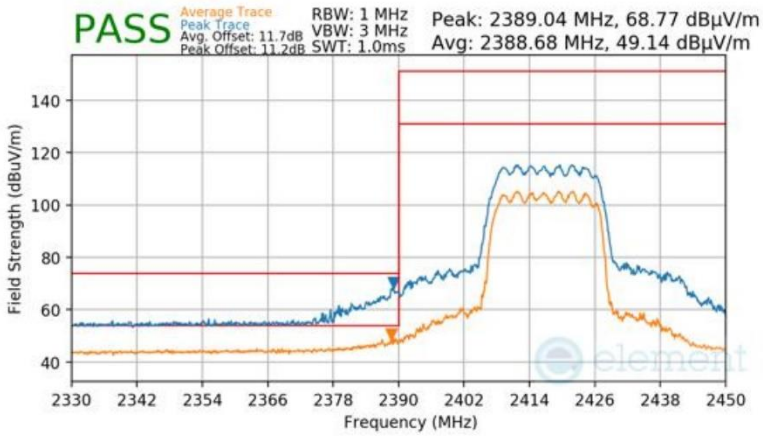
RU242

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2412MHz
Channel:	1



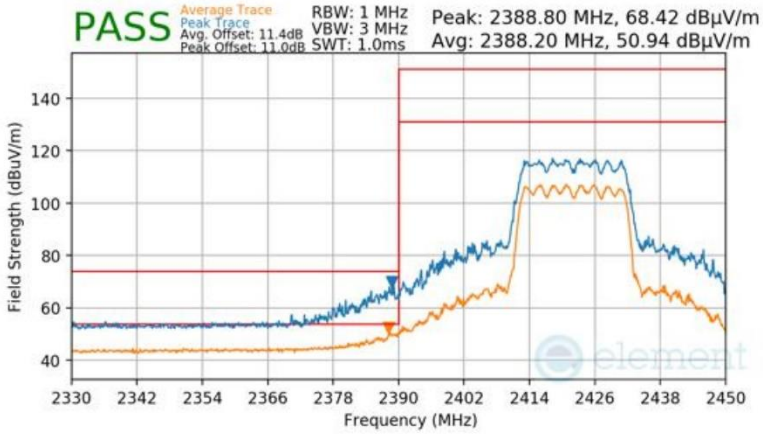
Plot 7-115 Radiated Restricted Lower Band Edge Measurement CDD (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2417MHz
Channel:	2



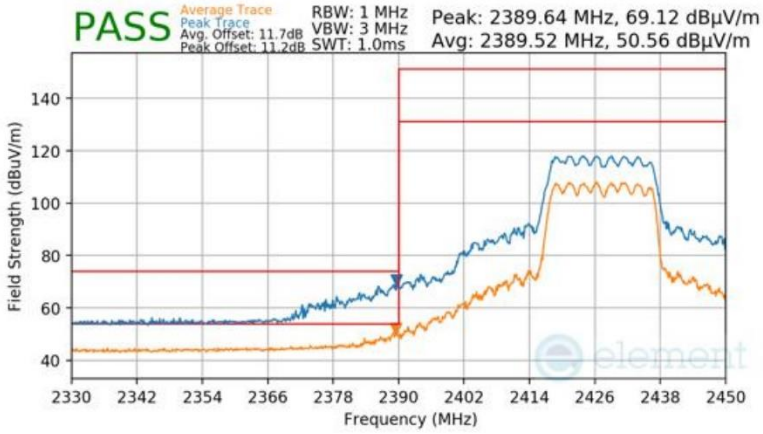
Plot 7-116 Radiated Restricted Lower Band Edge Measurement CDD (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2422MHz
Channel:	3



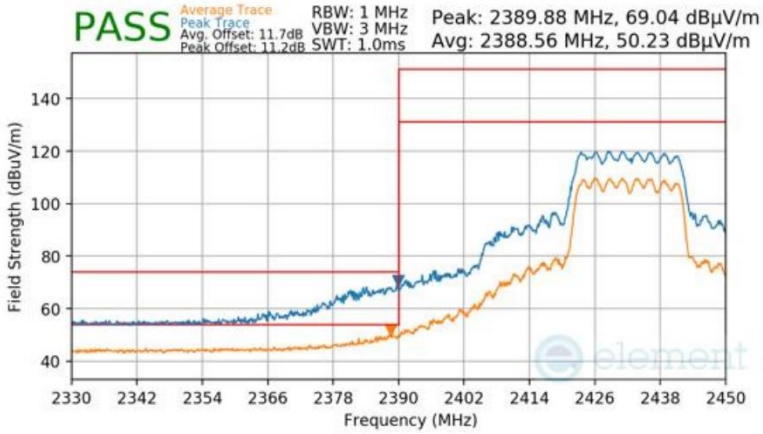
Plot 7-117 Radiated Restricted Lower Band Edge Measurement CDD (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2427MHz
Channel:	4



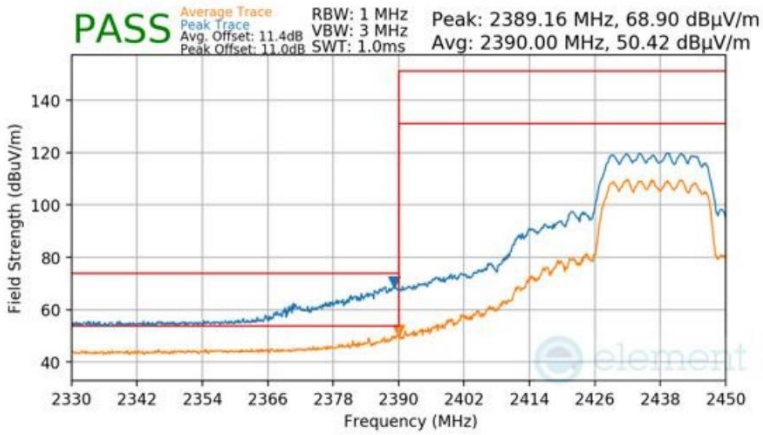
Plot 7-118 Radiated Restricted Lower Band Edge Measurement CDD (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2432MHz
Channel:	5



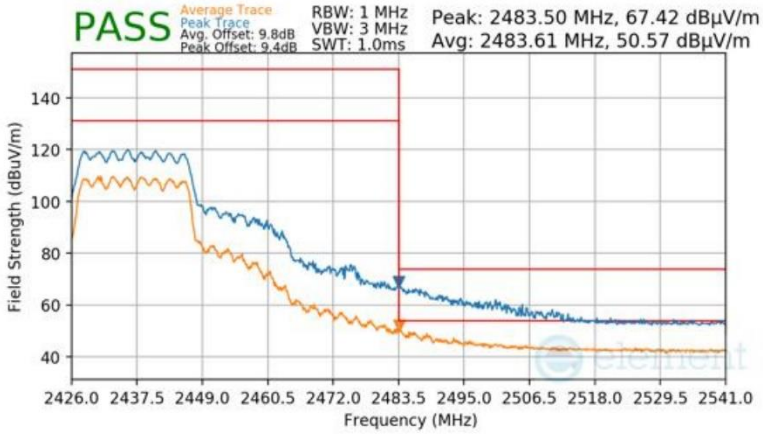
Plot 7-119 Radiated Restricted Lower Band Edge Measurement CDD (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2437MHz
Channel:	6 Low



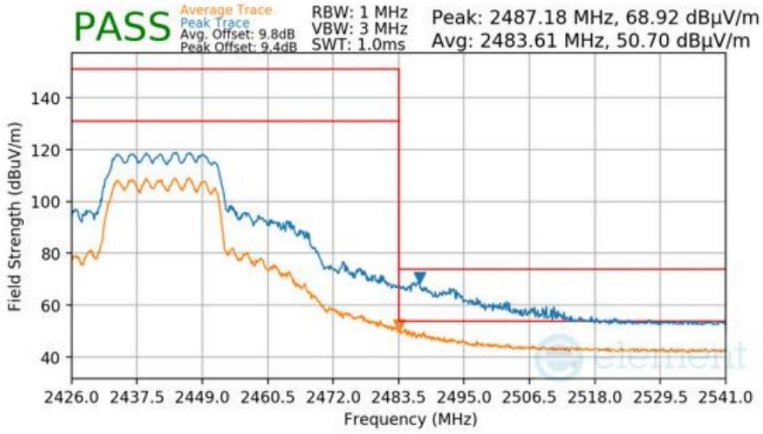
Plot 7-120 Radiated Restricted Lower Band Edge Measurement CDD (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2437MHz
Channel:	6 High



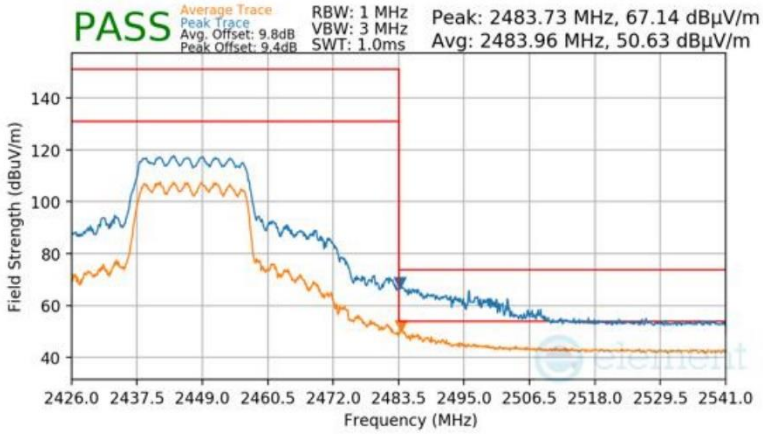
Plot 7-121 Radiated Restricted Upper Band Edge Measurement CDD (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2442MHz
Channel:	7



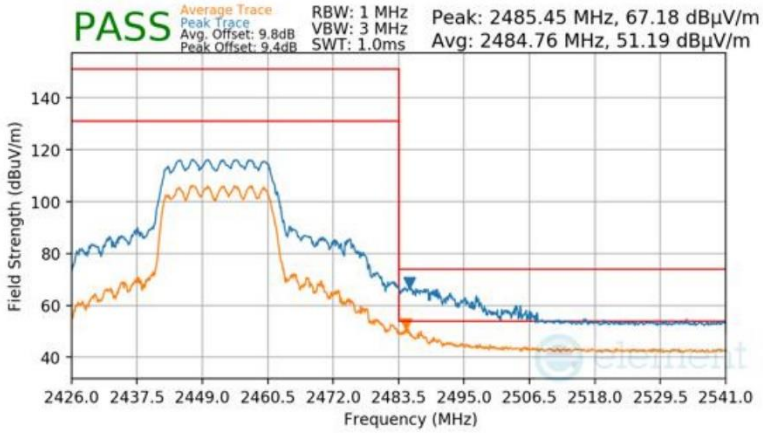
Plot 7-122 Radiated Restricted Upper Band Edge Measurement CDD (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2447MHz
Channel:	8



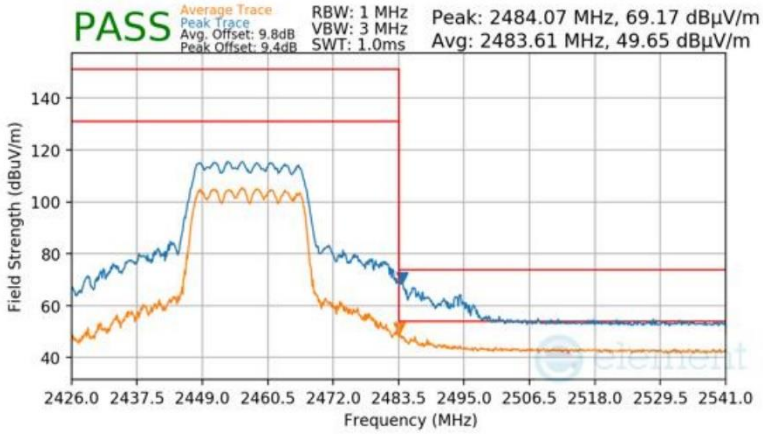
Plot 7-123 Radiated Restricted Upper Band Edge Measurement CDD (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2452MHz
Channel:	9



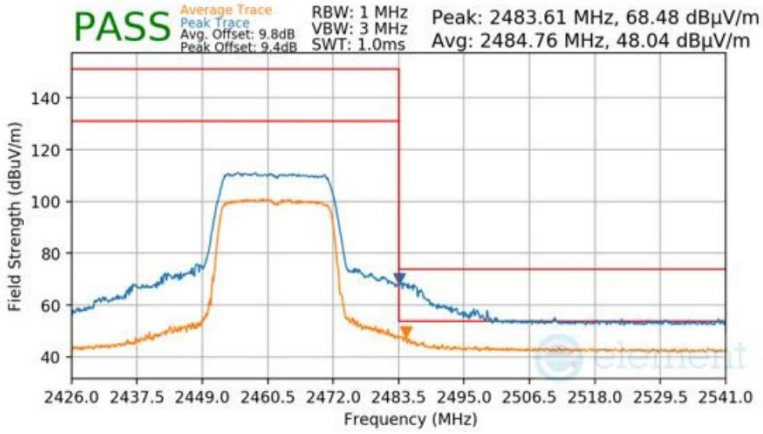
Plot 7-124 Radiated Restricted Upper Band Edge Measurement CDD (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2457MHz
Channel:	10



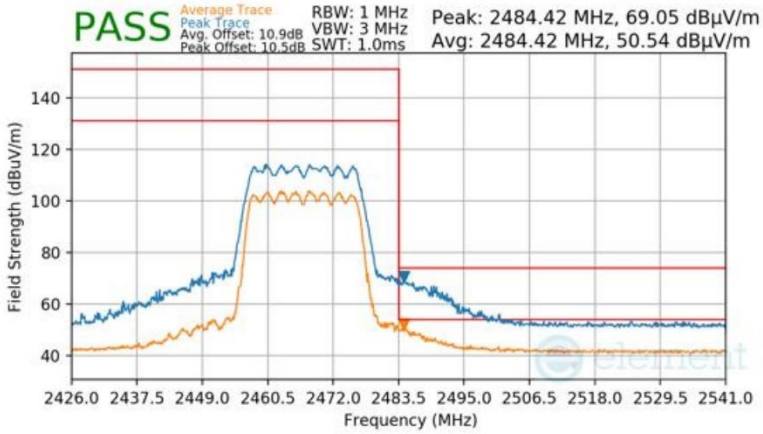
Plot 7-125 Radiated Restricted Upper Band Edge Measurement CDD (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2462MHz
Channel:	11



Plot 7-126 Radiated Restricted Upper Band Edge Measurement CDD (Peak & Average – RU242)

Mode:	802.11ax OFDMA
Transfer Rate:	MCS9
RU Index:	61
Distance of Measurements:	3 Meters
Operating Frequency:	2467MHz
Channel:	12



Plot 7-127 Radiated Restricted Upper Band Edge Measurement CDD (Peak & Average – RU242)

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 7-31 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 7-31. 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 = 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.

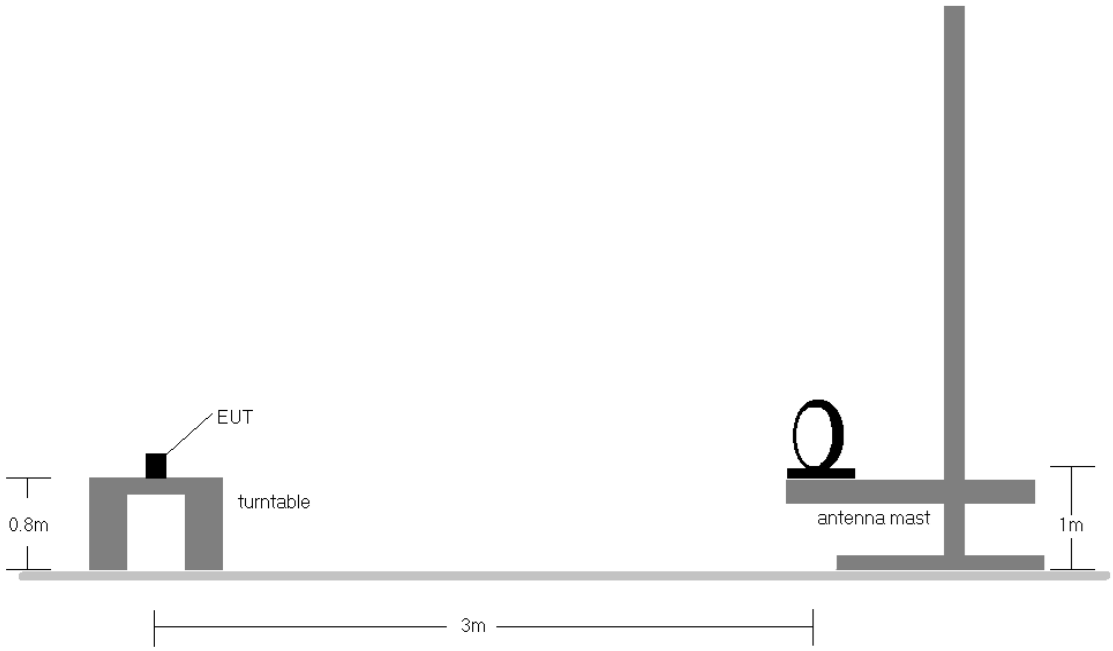


Figure 7-7. Radiated Test Setup < 30MHz

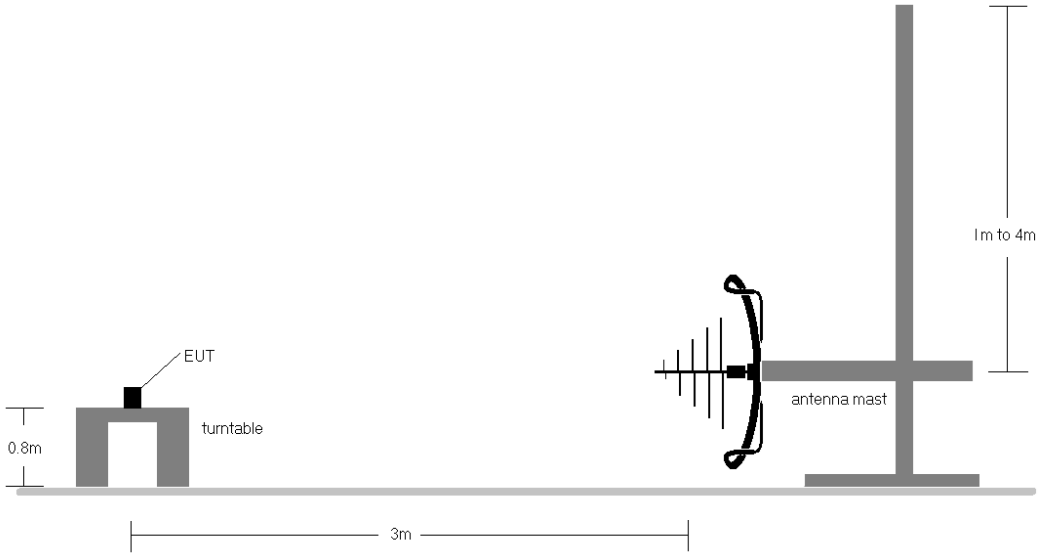


Figure 7-8. Radiated Test Setup < 1GHz

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 7-31.
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. For radiated Measurements, emissions were investigated for the fully-loaded RU configuration and for all the partially-loaded RU configurations. Among all of the available partially-loaded RU configurations, only the configuration with the worst case emissions is reported.
11. 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

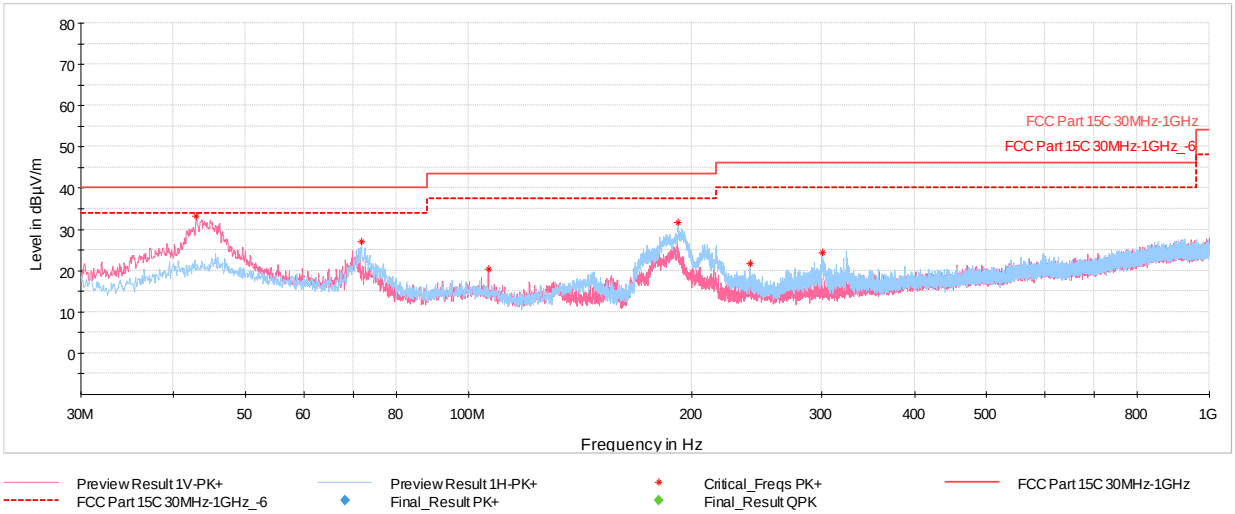
Sample Calculations

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 Radiated Spurious Emissions Measurements (Below 1GHz)

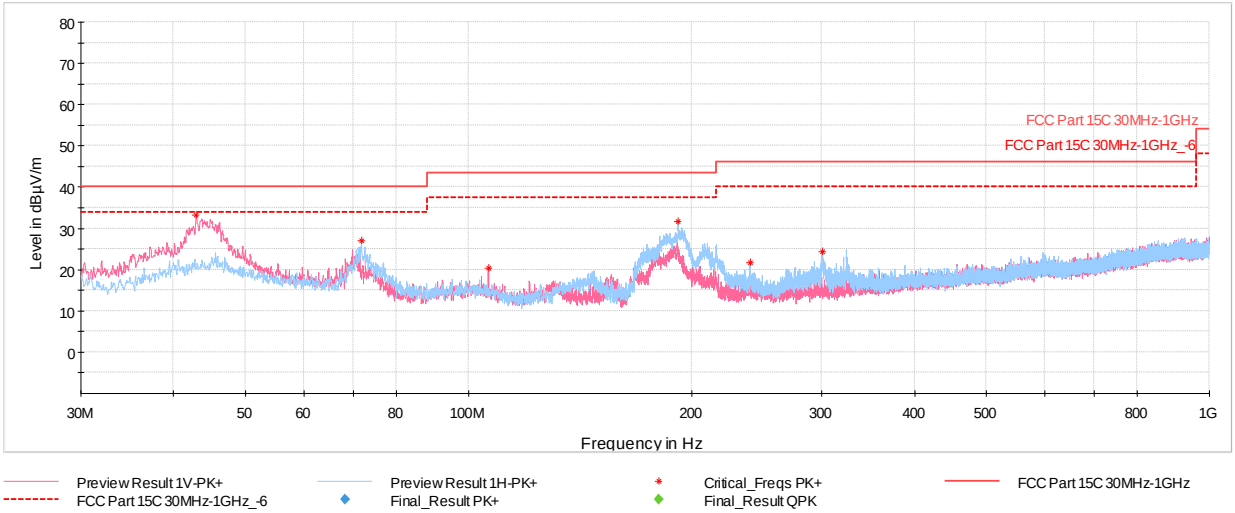
§15.209; RSS-Gen [8.9]



Plot 7-128. Radiated Spurious Emissions below 1GHz CDD Ch.6 (RU26), 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]
42.95	Max Peak	V	100.00	4.00	-58.91	-14.94	33.15	40.00	-6.85
71.76	Max Peak	H	300.00	251.00	-60.24	-19.71	27.05	40.00	-12.95
106.49	Max Peak	V	100.00	211.00	-70.11	-16.61	20.28	43.52	-23.24
191.99	Max Peak	H	100.00	332.00	-58.98	-16.28	31.74	43.52	-11.78
239.86	Max Peak	H	100.00	321.00	-70.50	-14.74	21.76	46.02	-24.26
300.82	Max Peak	H	100.00	179.00	-69.21	-13.34	24.45	46.02	-21.57

Table 7-32. Radiated Spurious Emissions below 1GHz CDD Ch.6 (RU26), with AC/DC adaptor via USB-C cable with wire charger



Plot 7-129. Radiated Spurious Emissions below 1GHz CDD Ch.6 (RU242), 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]
43.77	Max Peak	V	100.00	357.00	-60.48	-14.78	31.74	40.00	-8.26
70.11	Max Peak	V	100.00	196.00	-62.64	-19.10	25.26	40.00	-14.74
106.44	Max Peak	V	100.00	12.00	-68.84	-16.60	21.56	43.52	-21.96
191.85	Max Peak	H	200.00	355.00	-60.67	-16.32	30.01	43.52	-13.51
323.57	Max Peak	H	100.00	356.00	-69.53	-12.58	24.89	46.02	-21.13
911.97	Max Peak	H	100.00	174.00	-77.52	-1.36	28.12	46.02	-17.90

Table 7-33. Radiated Spurious Emissions below 1GHz CDD Ch.6 (RU242), with AC/DC adaptor via USB-C cable with wire charger

7.9 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. 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 7-34. Conducted Limits

*Decreases with the logarithm of the frequency.

Test Procedures Used

ANSI C63.10-2020, Subclause 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.

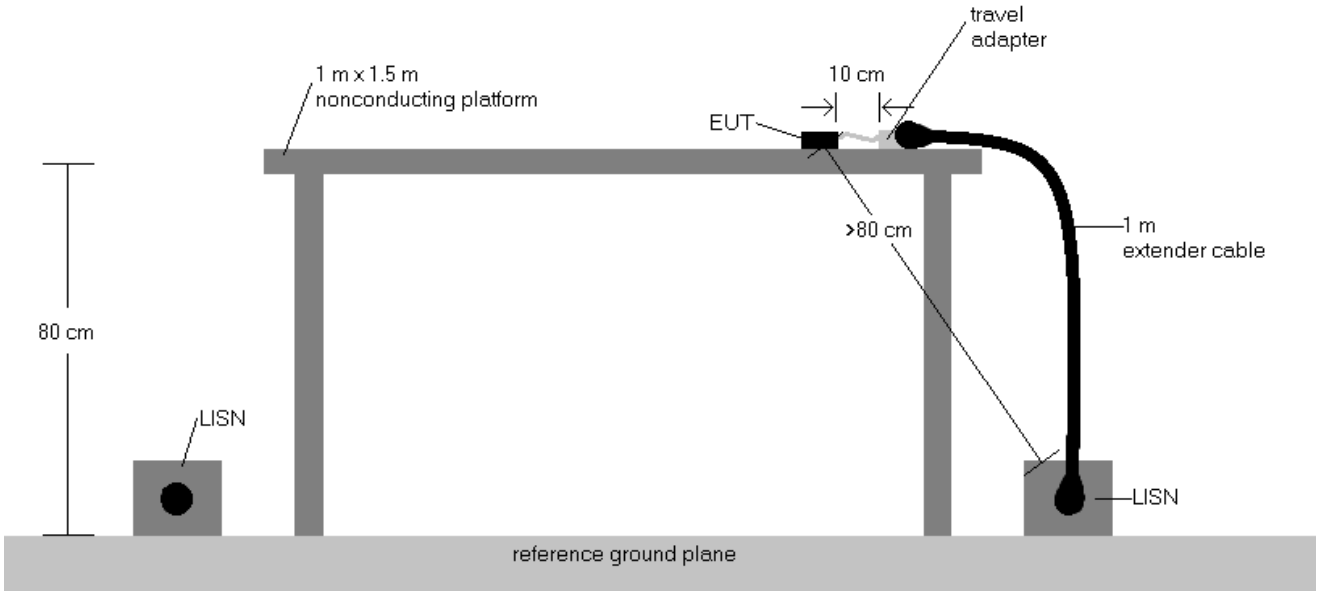
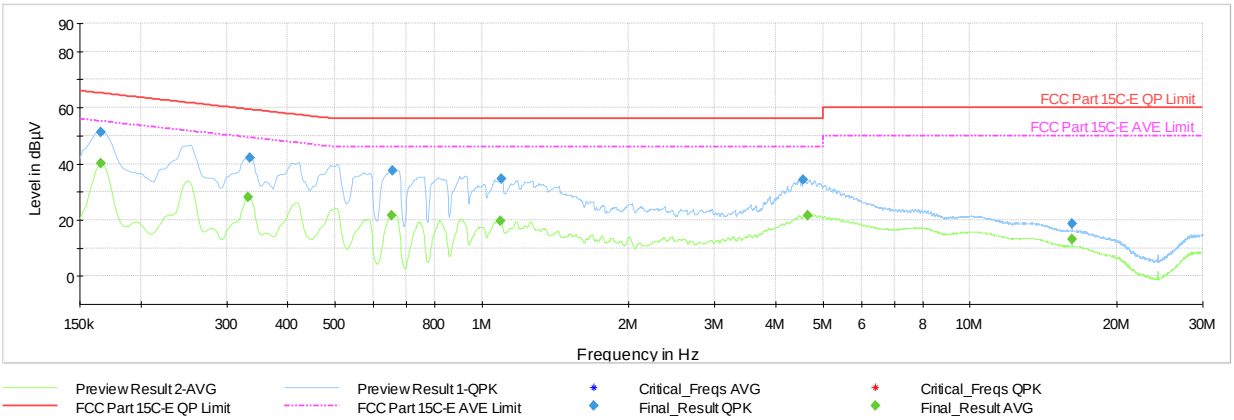


Figure 7-9. Test Instrument & Measurement Setup

Test Notes

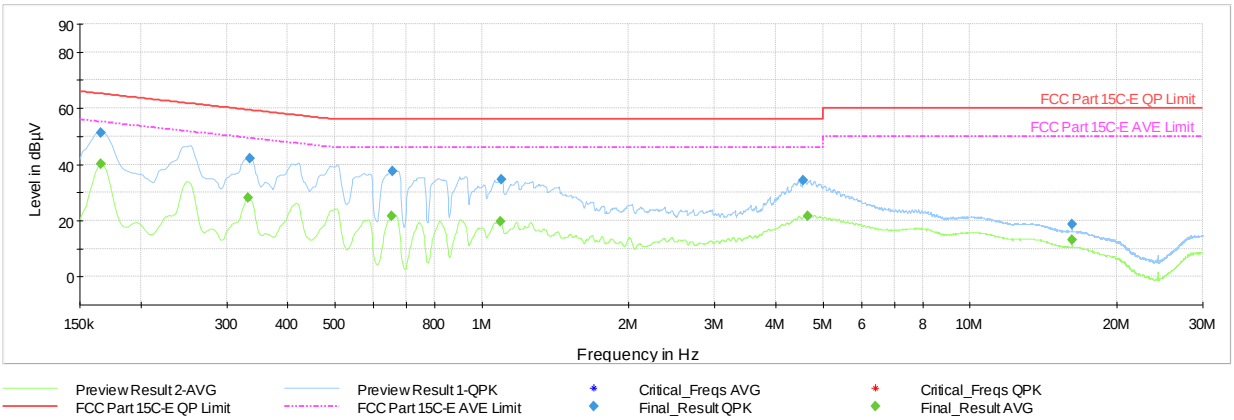
1. All modes of operation were investigated and the worst-case emissions are reported. The emissions found were not affected by the choice of channel used during testing.
2. Both configurations below were investigated, and the worst case has been reported.
   a. EUT powered by AC/DC adaptor via USB-C 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 Part 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 Factore (dB)
6. Margin (dB) = QP/AV Level (dBμV) - QP/AV Limit (dBμV)
7. Traces shown in plot are made using quasi peak and average detectors.
8. Deviations to the Specifications: None.
9. All RU's were investigated and only worst case partially-loaded and fully-loaded RU's are reported.



Plot 7-130. AC Line Conducted Emissions with 802.11ax (RU26) Ch.6 (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	---	40.21	55.17	-14.96	L1	GND
0.17	FINAL	51.08	---	65.17	-14.09	L1	GND
0.33	FINAL	---	28.15	49.40	-21.25	L1	GND
0.34	FINAL	41.99	---	59.34	-17.35	L1	GND
0.65	FINAL	---	21.54	46.00	-24.46	L1	GND
0.66	FINAL	37.57	---	56.00	-18.43	L1	GND
1.09	FINAL	---	19.58	46.00	-26.42	L1	GND
1.10	FINAL	34.68	---	56.00	-21.32	L1	GND
4.56	FINAL	34.17	---	56.00	-21.83	L1	GND
4.65	FINAL	---	21.44	46.00	-24.56	L1	GND
16.18	FINAL	---	13.24	50.00	-36.76	L1	GND
16.18	FINAL	18.56	---	60.00	-41.44	L1	GND

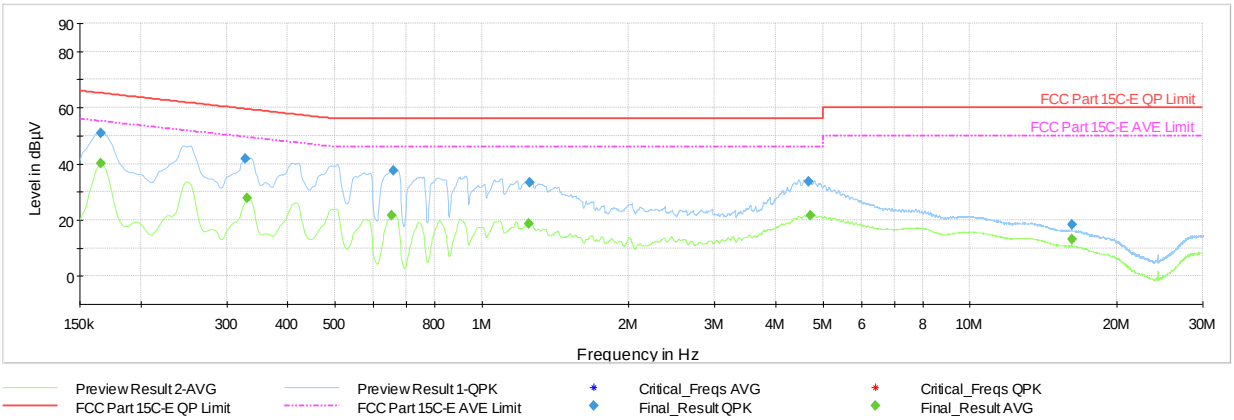
Table 7-35. AC Line Conducted Data with 802.11ax (RU26) Ch.6 (L1, with AC/DC adaptor via USB-C cable with wire charger)



Plot 7-131. AC Line Conducted Emissions with 802.11ax (RU26) Ch.6 (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
0.16	FINAL	52.62	---	65.28	-12.66	N	GND
0.17	FINAL	---	41.45	55.17	-13.72	N	GND
0.34	FINAL	---	29.30	49.34	-20.04	N	GND
0.34	FINAL	43.13	---	59.28	-16.15	N	GND
0.59	FINAL	---	21.27	46.00	-24.73	N	GND
0.59	FINAL	37.26	---	56.00	-18.74	N	GND
1.26	FINAL	32.53	---	56.00	-23.47	N	GND
1.26	FINAL	---	18.61	46.00	-27.39	N	GND
4.47	FINAL	32.70	---	56.00	-23.30	N	GND
4.47	FINAL	---	17.88	46.00	-28.12	N	GND
16.18	FINAL	---	7.32	50.00	-42.68	N	GND
16.18	FINAL	12.05	---	60.00	-47.95	N	GND

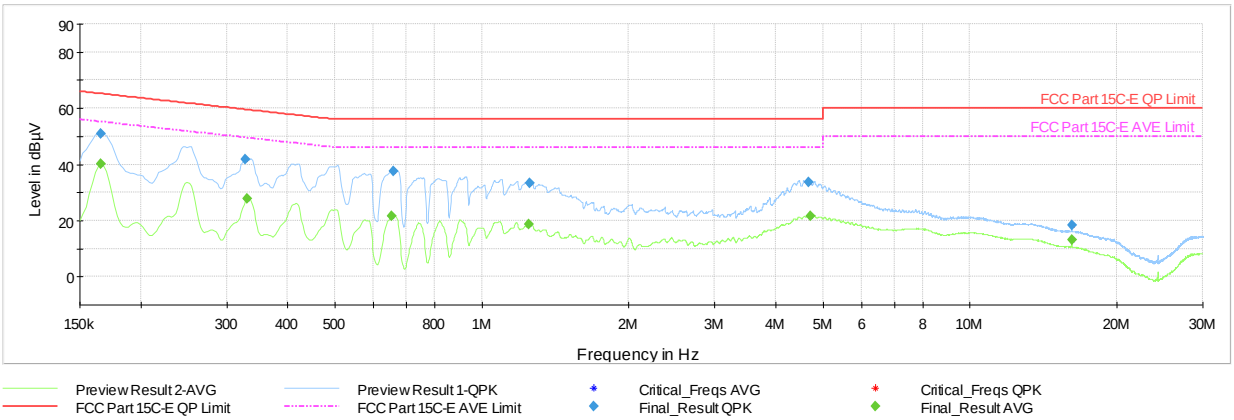
Table 7-36. AC Line Conducted Data with 802.11ax (RU26) Ch.6 (N, with AC/DC adaptor via USB-C cable with wire charger)



Plot 7-132. AC Line Conducted Emissions with 802.11ax (RU242) Ch.6 (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	---	40.01	55.17	-15.16	L1	GND
0.17	FINAL	50.79	---	65.17	-14.38	L1	GND
0.33	FINAL	41.71	---	59.51	-17.80	L1	GND
0.33	FINAL	---	27.68	49.45	-21.77	L1	GND
0.65	FINAL	---	21.68	46.00	-24.32	L1	GND
0.66	FINAL	37.58	---	56.00	-18.42	L1	GND
1.25	FINAL	---	18.64	46.00	-27.36	L1	GND
1.25	FINAL	33.41	---	56.00	-22.59	L1	GND
4.66	FINAL	33.74	---	56.00	-22.26	L1	GND
4.72	FINAL	---	21.73	46.00	-24.27	L1	GND
16.16	FINAL	---	13.12	50.00	-36.88	L1	GND
16.16	FINAL	18.34	---	60.00	-41.66	L1	GND

Table 7-37. AC Line Conducted Data with 802.11ax (RU242) Ch.6 (L1, with AC/DC adaptor via USB-C cable with wire charger)



Plot 7-133. AC Line Conducted Emissions with 802.11ax (RU242) Ch.6 (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	---	40.90	55.17	-14.27	N	GND
0.17	FINAL	51.88	---	65.17	-13.29	N	GND
0.34	FINAL	---	28.97	49.34	-20.37	N	GND
0.34	FINAL	42.73	---	59.28	-16.55	N	GND
0.59	FINAL	---	21.36	46.00	-24.64	N	GND
0.59	FINAL	36.97	---	56.00	-19.03	N	GND
1.26	FINAL	32.65	---	56.00	-23.35	N	GND
1.27	FINAL	---	17.96	46.00	-28.04	N	GND
4.57	FINAL	32.49	---	56.00	-23.51	N	GND
4.57	FINAL	---	17.58	46.00	-28.42	N	GND
16.17	FINAL	---	7.17	50.00	-42.83	N	GND
16.17	FINAL	11.81	---	60.00	-48.19	N	GND

Table 7-38. AC Line Conducted Data with 802.11ax (RU242) Ch.6 (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: BCGA3266, IC: 579C-A3266** is in compliance with Part 15 Subpart C (15.247) of the FCC Rules and RSS-247 of the Innovation, Science and Economic Development Canada Rules.