

Plot 7-54. Radiated Spurious Emissions above 1GHz (802.11b – Ch. 11)

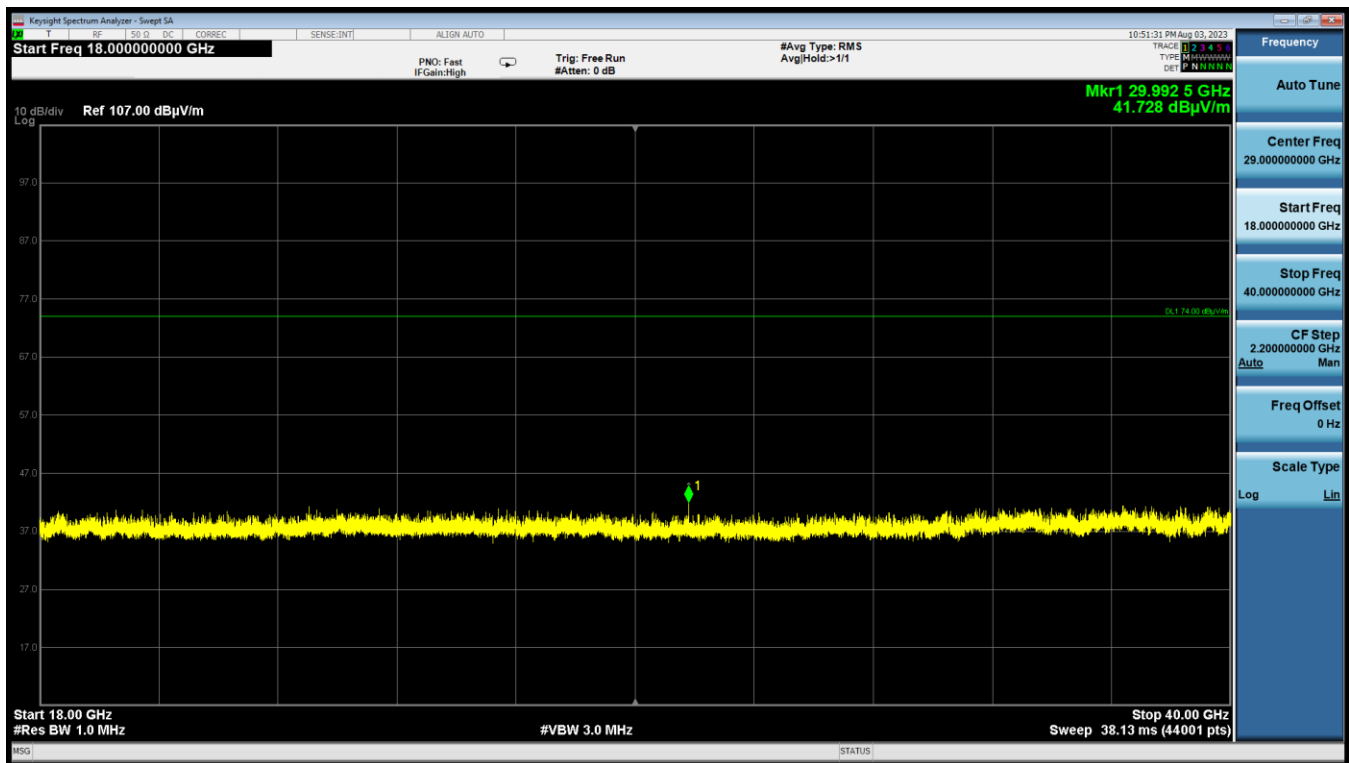
Mode: 802.11b
Data Rate: 1Mbps
Distance of Measurements: 3 Meters
Operating Frequency: 2462MHz
Channel: 11

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBuV/m]	Limit [dBuV/m]	Margin [dB]
4924.00	Avg	H	-	-	-80.31	7.43	34.12	53.98	-19.86
4924.00	Peak	H	-	-	-68.31	7.43	46.12	73.98	-27.86
7386.00	Avg	H	-	-	-81.71	10.27	35.56	53.98	-18.41
7386.00	Peak	H	-	-	-69.10	10.27	48.17	73.98	-25.80
12310.00	Avg	H	-	-	-83.86	17.61	40.75	53.98	-13.23
12310.00	Peak	H	-	-	-72.35	17.61	52.26	73.98	-21.72

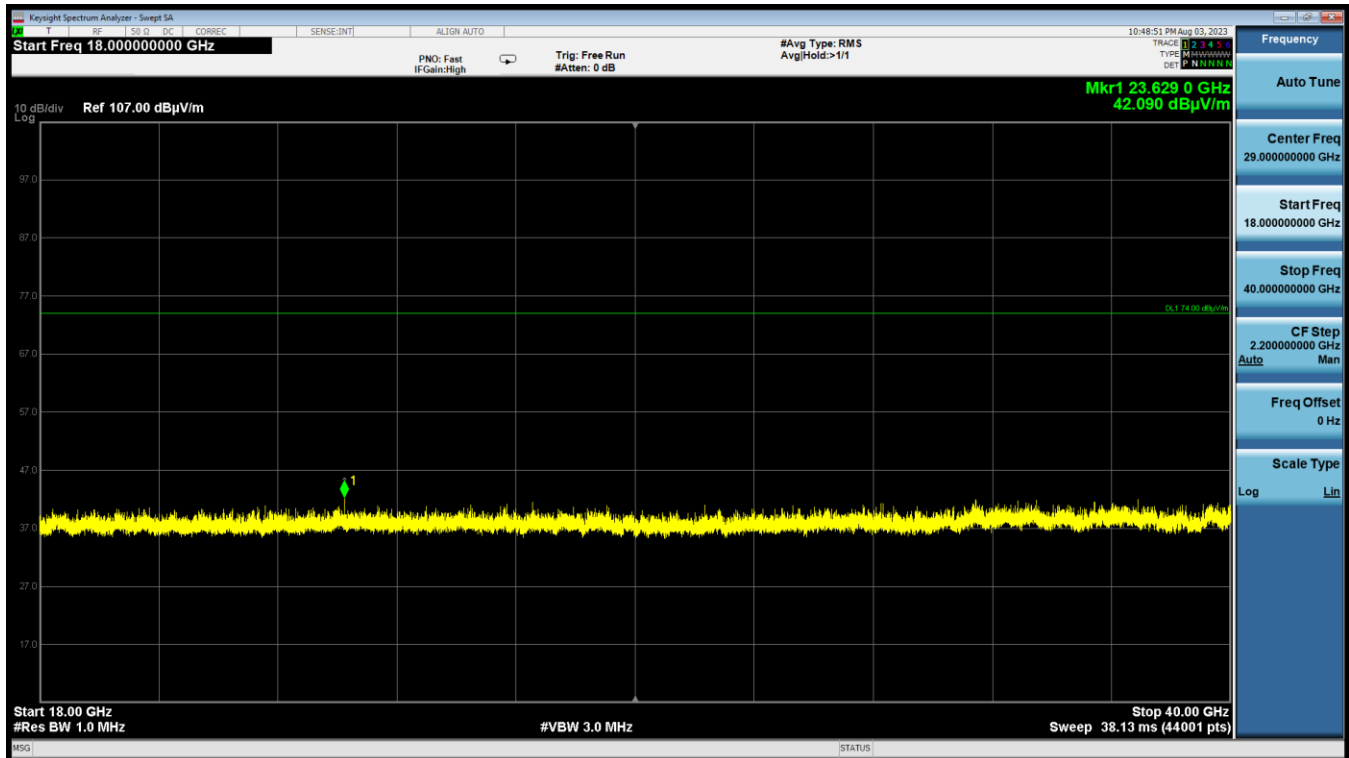
Table 7-9. Radiated Measurements

FCC ID: BCG-A2978 IC: 579C-A2978		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305110021-03.BCG	Test Dates: 6/7/2023 - 8/4/2023	EUT Type: Watch	Page 56 of 74

V 10.5 12/15/2021



Plot 7-55. Radiated Spurious Emissions Above 18GHz (802.11b – Ch. 11 Pol H)



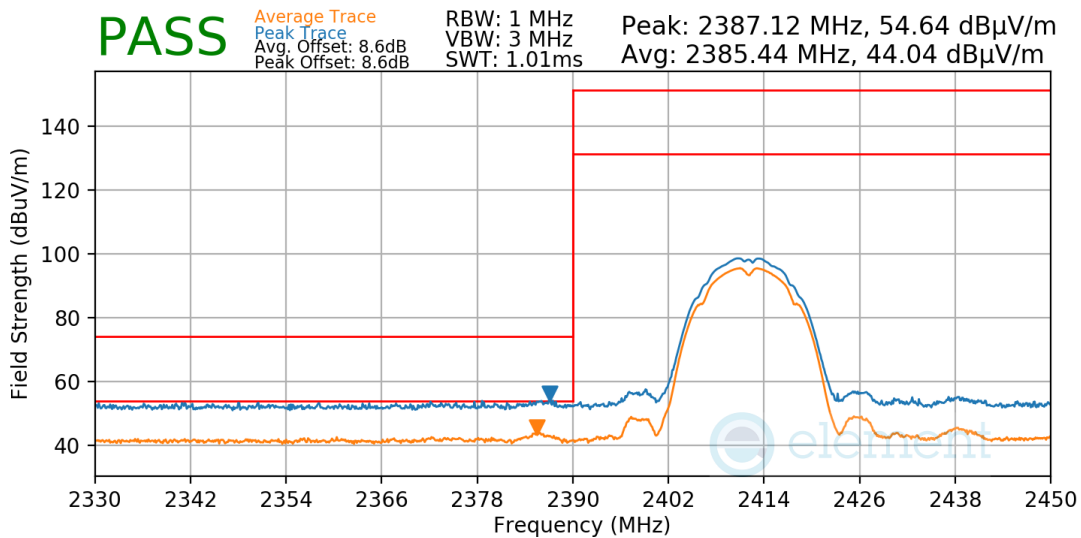
Plot 7-56. Radiated Spurious Emissions Above 18GHz (802.11b – Ch. 11 Pol V)

FCC ID: BCG-A2978 IC: 579C-A2978		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305110021-03.BCG	Test Dates: 6/7/2023 - 8/4/2023	EUT Type: Watch	Page 57 of 74

7.7.2 Radiated Restricted Band Edge Measurements

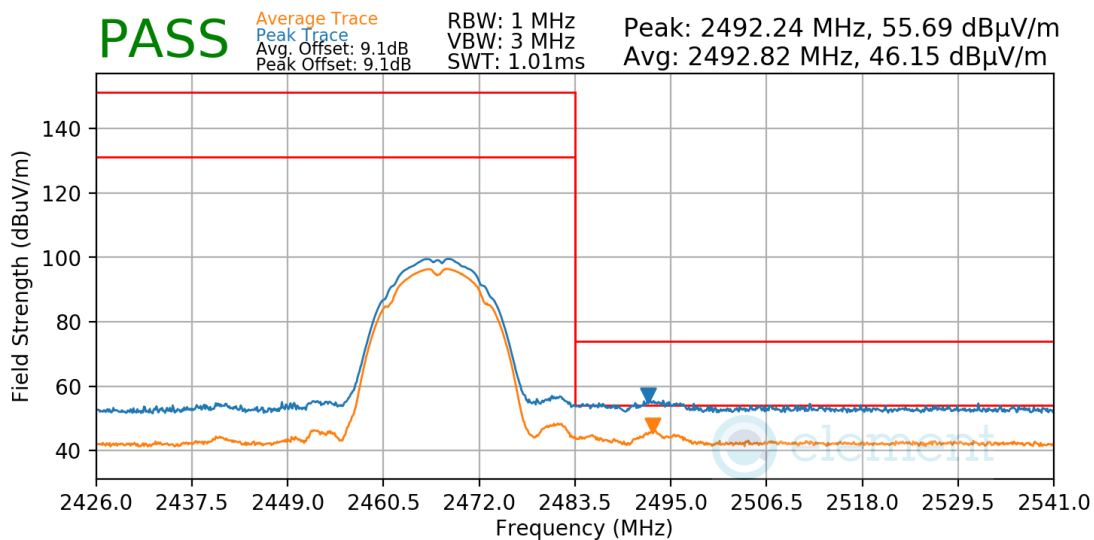
§15.205 §15.209; RSS-Gen [8.9]

Mode: 802.11b
Data Rate: 1Mbps
Distance of Measurements: 3 Meters
Operating Frequency: 2412MHz
Channel: 1




Plot 7-57. Radiated Restricted Lower Band Edge Measurement

Mode: 802.11b
Data Rate: 1Mbps
Distance of Measurements: 3 Meters
Operating Frequency: 2467MHz
Channel: 12

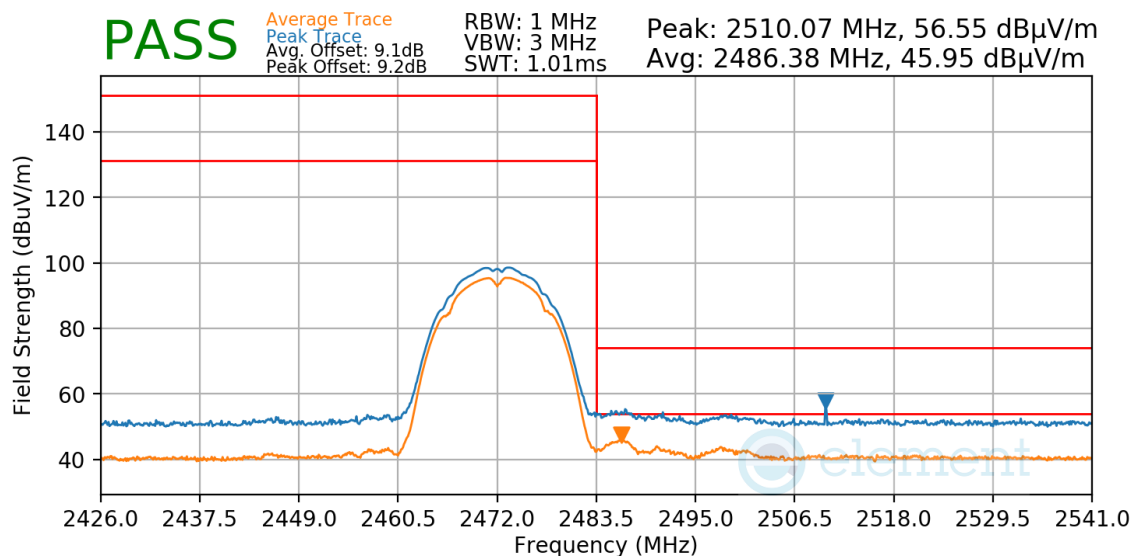


Plot 7-58. Radiated Restricted Upper Band Edge Measurement

FCC ID: BCG-A2978 IC: 579C-A2978		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305110021-03.BCG	Test Dates: 6/7/2023 - 8/4/2023	EUT Type: Watch	Page 58 of 74

V 10.5 12/15/2021

Mode: 802.11b
 Data Rate: 1Mbps
 Distance of Measurements: 3 Meters
 Operating Frequency: 2472MHz
 Channel: 13

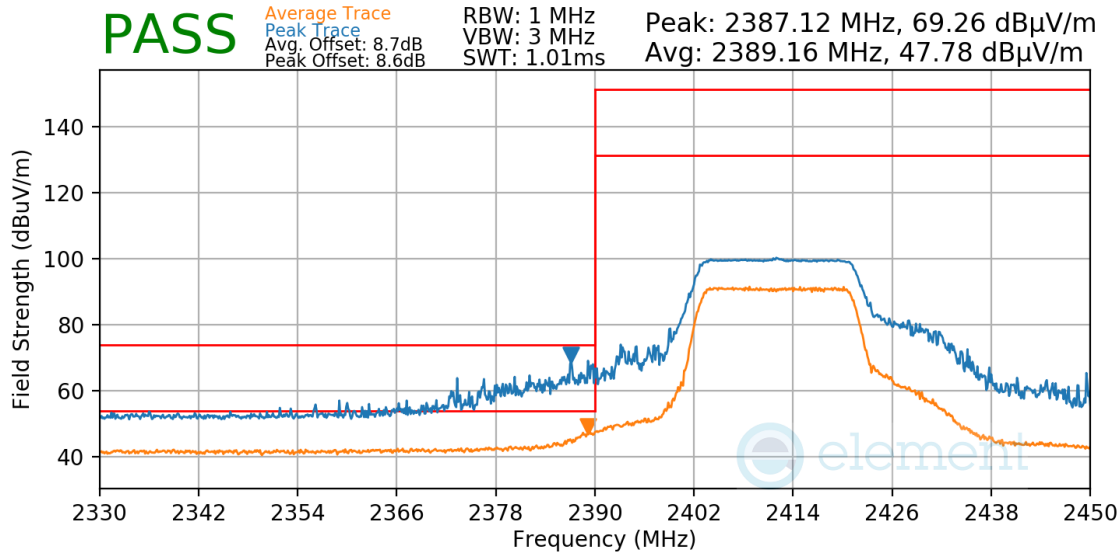


Plot 7-59. Radiated Restricted Upper Band Edge Measurement

FCC ID: BCG-A2978 IC: 579C-A2978		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305110021-03.BCG	Test Dates: 6/7/2023 - 8/4/2023	EUT Type: Watch	Page 59 of 74

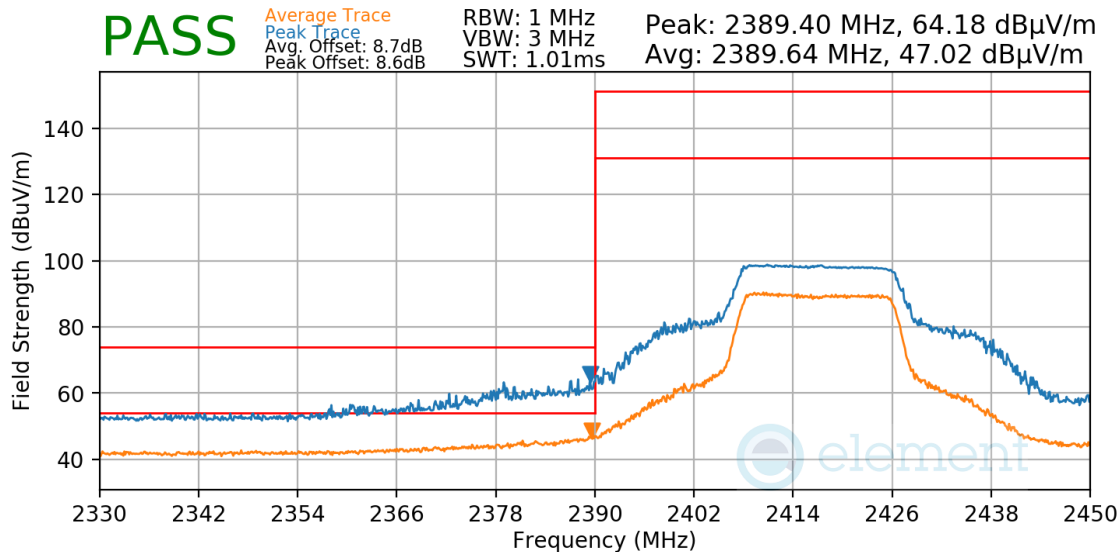
V 10.5 12/15/2021

Mode: 802.11n
 Data Rate: MCS0
 Distance of Measurements: 3 Meters
 Operating Frequency: 2412MHz
 Channel: 1



Plot 7-60. Radiated Restricted Lower Band Edge Measurement

Mode: 802.11n
 Data Rate: MCS0
 Distance of Measurements: 3 Meters
 Operating Frequency: 2417MHz
 Channel: 2

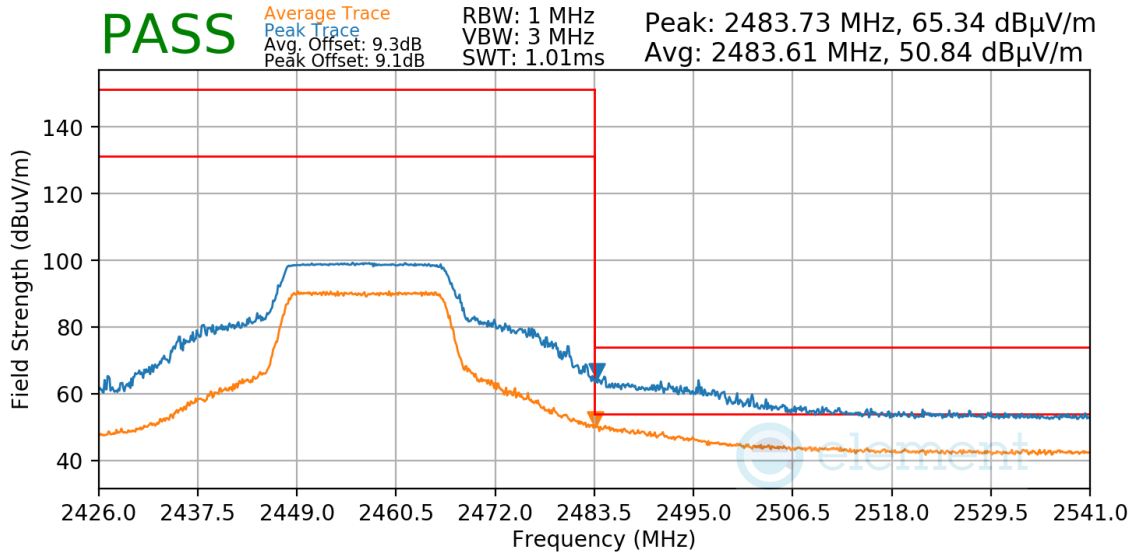


Plot 7-61. Radiated Restricted Lower Band Edge Measurement

FCC ID: BCG-A2978 IC: 579C-A2978		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305110021-03.BCG	Test Dates: 6/7/2023 - 8/4/2023	EUT Type: Watch	Page 60 of 74

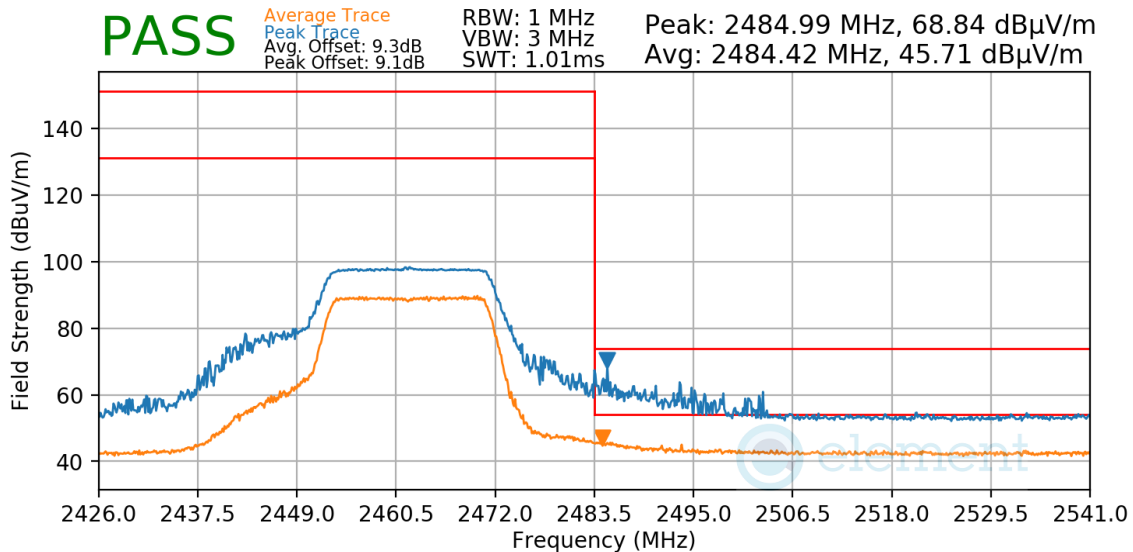
V 10.5 12/15/2021

Mode: 802.11n
 Data Rate: MCS0
 Distance of Measurements: 3 Meters
 Operating Frequency: 2457MHz
 Channel: 10



Plot 7-62. Radiated Restricted Upper Band Edge Measurement

Mode: 802.11n
 Data Rate: MCS0
 Distance of Measurements: 3 Meters
 Operating Frequency: 2462MHz
 Channel: 11

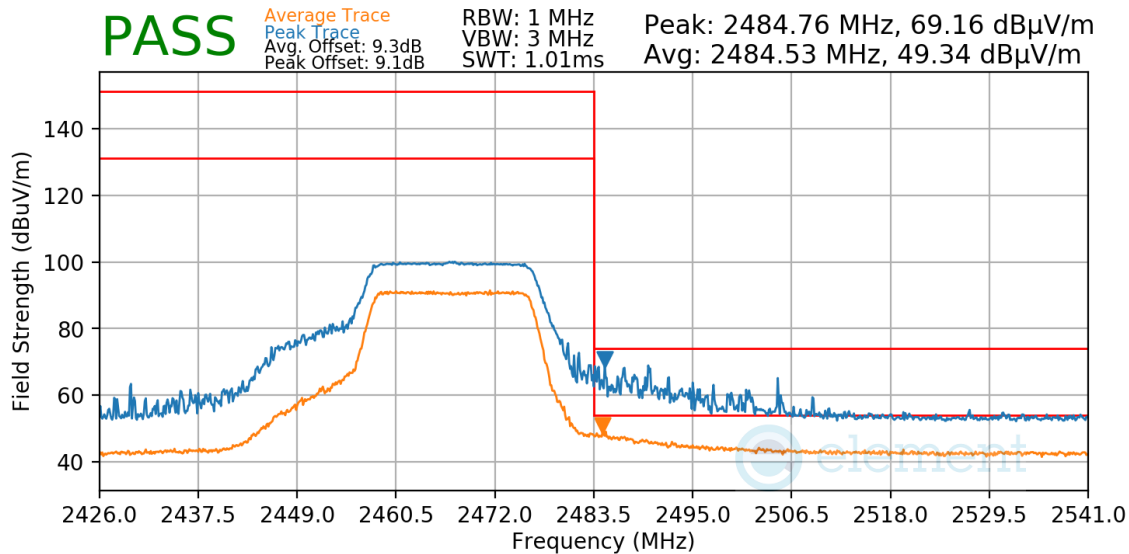


Plot 7-63. Radiated Restricted Upper Band Edge Measurement

FCC ID: BCG-A2978 IC: 579C-A2978		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305110021-03.BCG	Test Dates: 6/7/2023 - 8/4/2023	EUT Type: Watch	Page 61 of 74

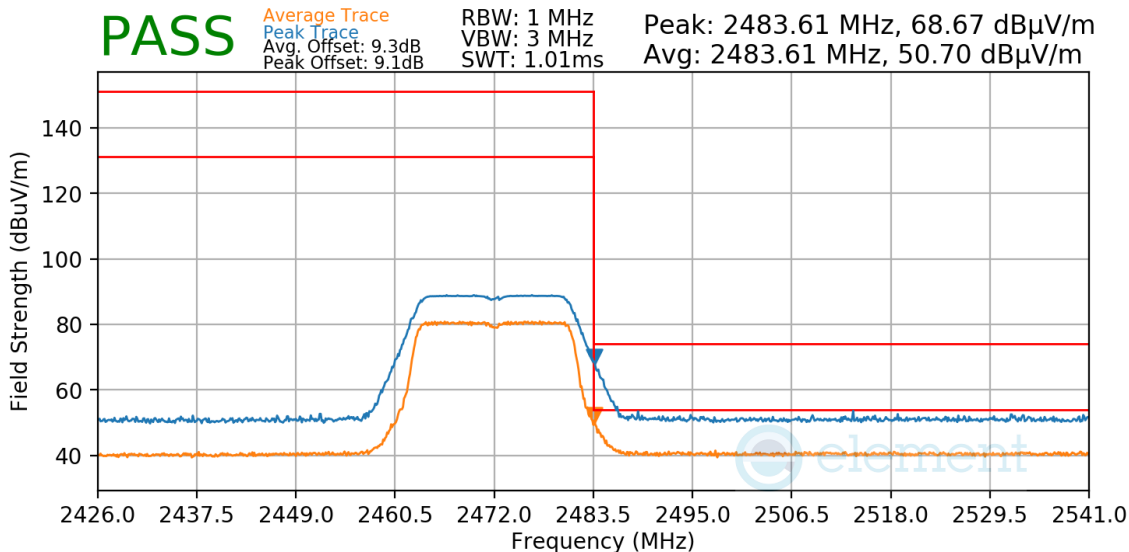
V 10.5 12/15/2021

Mode: 802.11n
 Data Rate: MCS0
 Distance of Measurements: 3 Meters
 Operating Frequency: 2467MHz
 Channel: 12



Plot 7-64. Radiated Restricted Upper Band Edge Measurement

Mode: 802.11n
 Data Rate: MCS0
 Distance of Measurements: 3 Meters
 Operating Frequency: 2472MHz
 Channel: 13

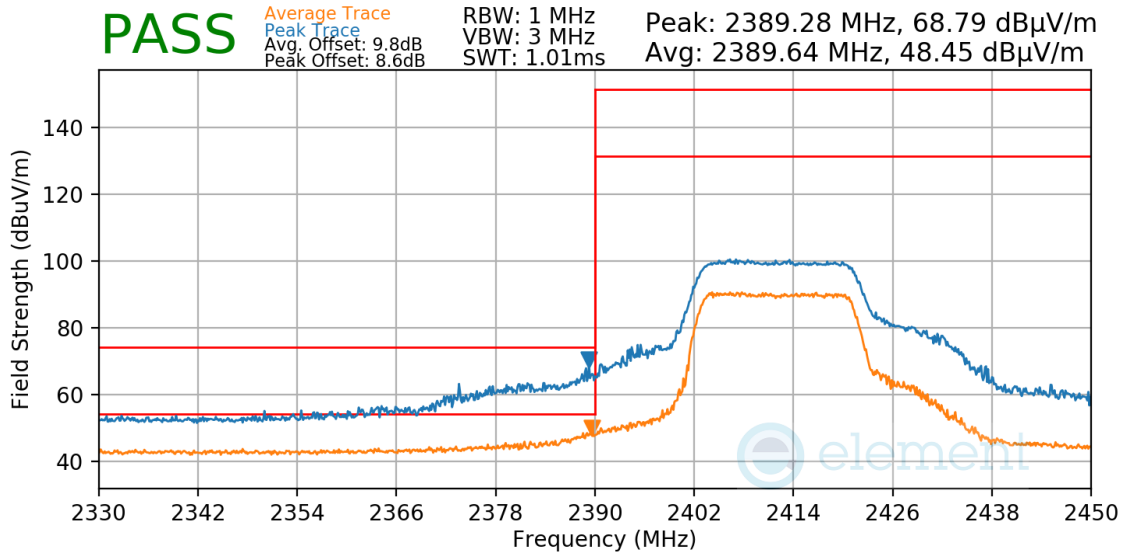


Plot 7-65. Radiated Restricted Upper Band Edge Measurement

FCC ID: BCG-A2978 IC: 579C-A2978	 MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1C2305110021-03.BCG	Test Dates: 6/7/2023 - 8/4/2023	EUT Type: Watch	Page 62 of 74

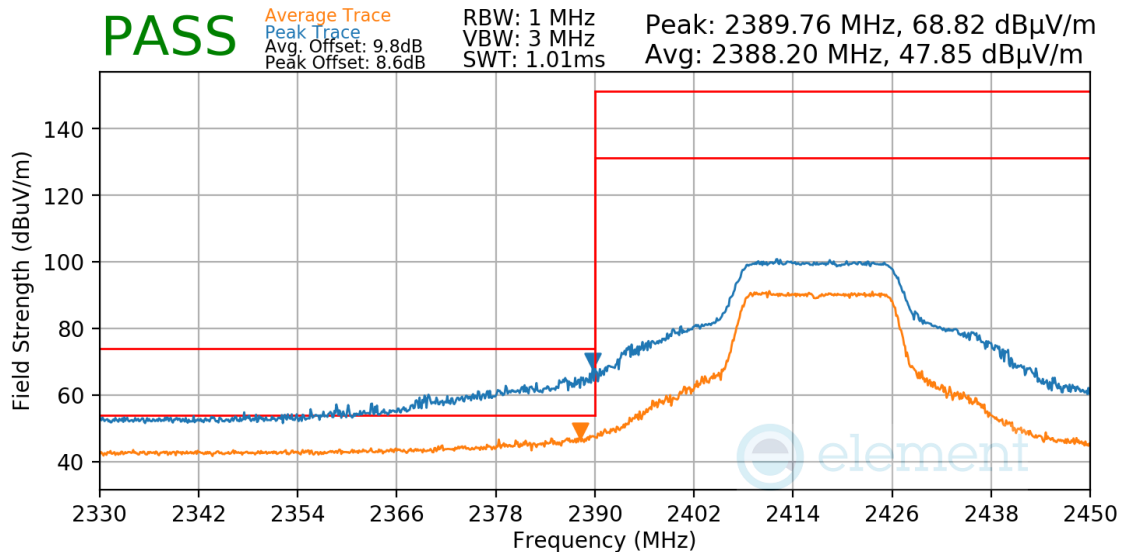
V 10.5 12/15/2021

Mode: 802.11n
 Data Rate: MCS7
 Distance of Measurements: 3 Meters
 Operating Frequency: 2412MHz
 Channel: 1



Plot 7-66. Radiated Restricted Lower Band Edge Measurement

Mode: 802.11n
 Data Rate: MCS7
 Distance of Measurements: 3 Meters
 Operating Frequency: 2417MHz
 Channel: 2

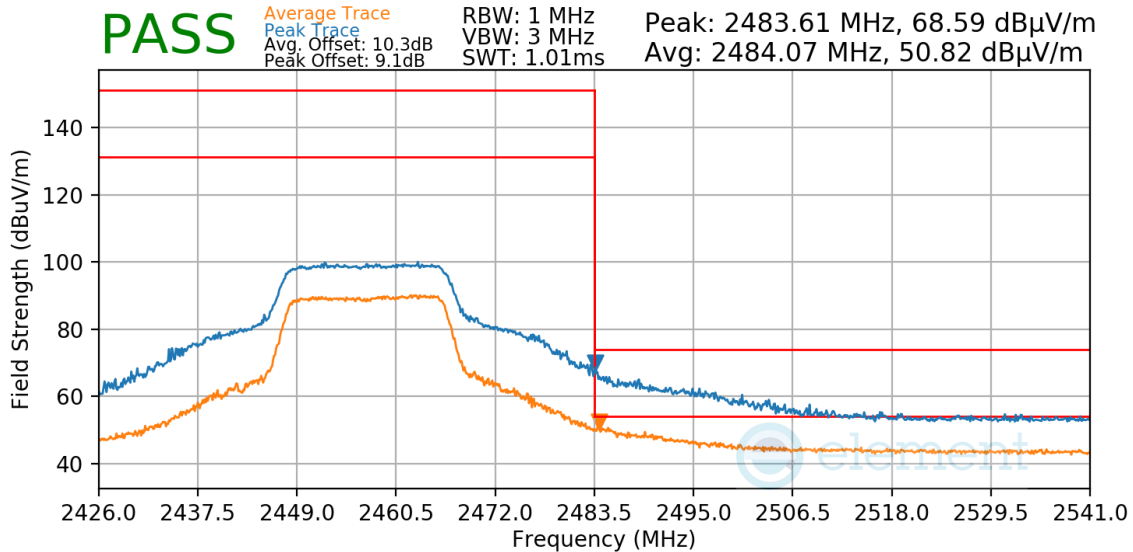


Plot 7-67. Radiated Restricted Lower Band Edge Measurement

FCC ID: BCG-A2978 IC: 579C-A2978			MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305110021-03.BCG	Test Dates: 6/7/2023 - 8/4/2023	EUT Type: Watch	Page 63 of 74	

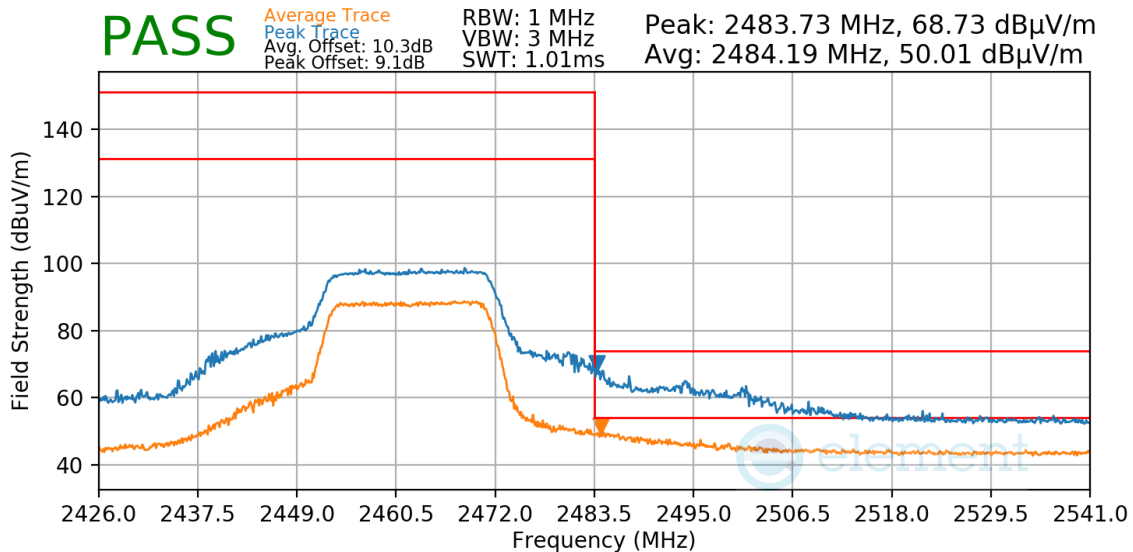
V 10.5 12/15/2021

Mode: 802.11n
 Data Rate: MCS7
 Distance of Measurements: 3 Meters
 Operating Frequency: 2457MHz
 Channel: 10



Plot 7-68. Radiated Restricted Upper Band Edge Measurement

Mode: 802.11n
 Data Rate: MCS7
 Distance of Measurements: 3 Meters
 Operating Frequency: 2462MHz
 Channel: 11

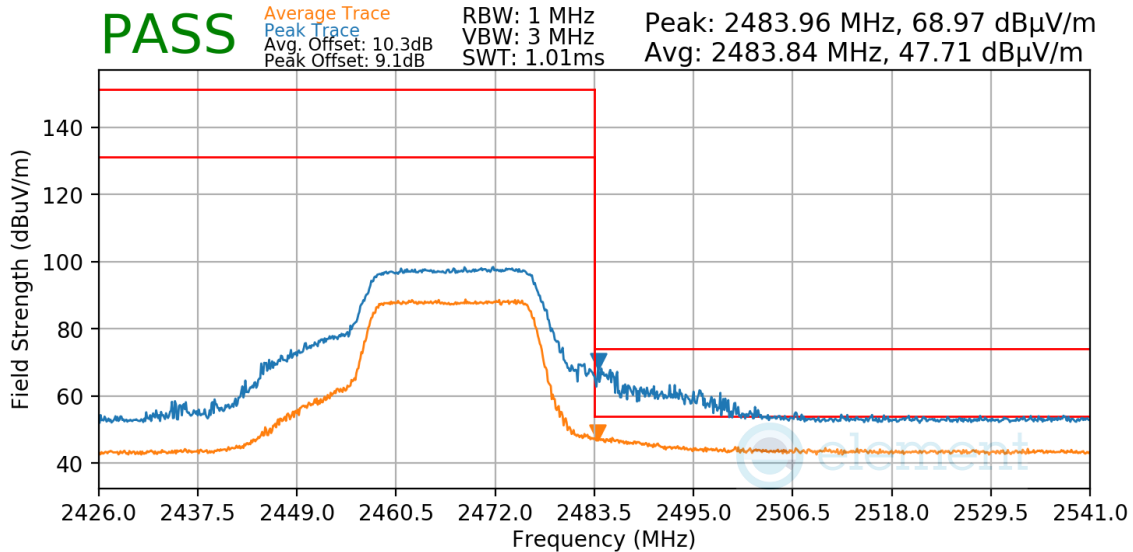


Plot 7-69. Radiated Restricted Upper Band Edge Measurement

FCC ID: BCG-A2978 IC: 579C-A2978		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305110021-03.BCG	Test Dates: 6/7/2023 - 8/4/2023	EUT Type: Watch	Page 64 of 74

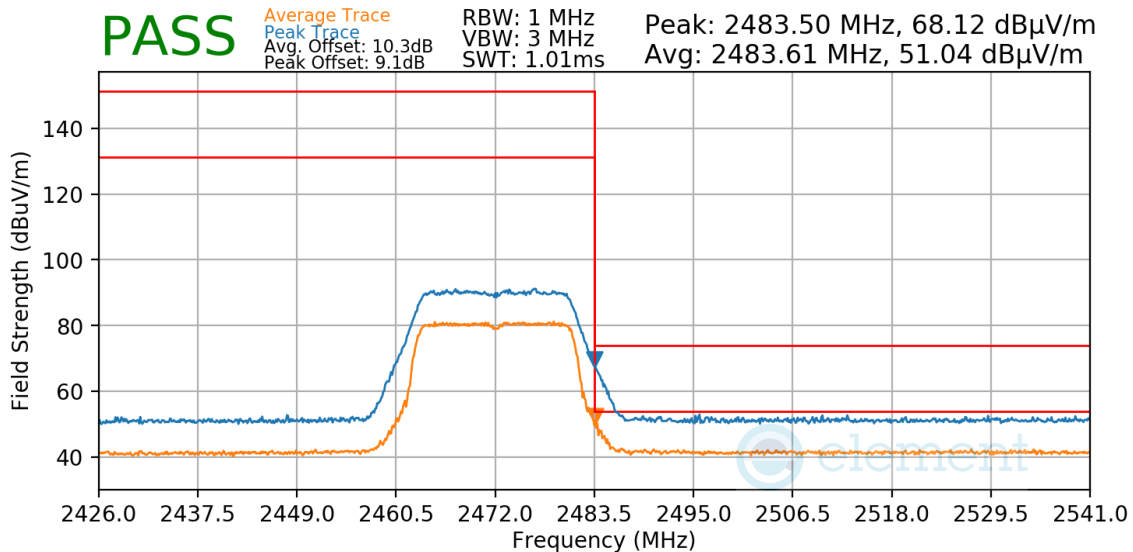
V 10.5 12/15/2021

Mode: 802.11n
Data Rate: MCS7
Distance of Measurements: 3 Meters
Operating Frequency: 2467MHz
Channel: 12



Plot 7-70. Radiated Restricted Upper Band Edge Measurement

Mode: 802.11n
Data Rate: MCS7
Distance of Measurements: 3 Meters
Operating Frequency: 2472MHz
Channel: 13



Plot 7-71. Radiated Restricted Upper Band Edge Measurement

FCC ID: BCG-A2978 IC: 579C-A2978		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305110021-03.BCG	Test Dates: 6/7/2023 - 8/4/2023	EUT Type: Watch	Page 65 of 74

V 10.5 12/15/2021

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 7-10 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 7-10. Radiated Limits

Test Procedures Used

ANSI C63.10-2013

Test Settings

Quasi-Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 120kHz (for emissions from 30MHz – 1GHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 120kHz (for emissions from 30MHz – 1GHz)
3. VBW = 300kHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold

FCC ID: BCG-A2978 IC: 579C-A2978		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305110021-03.BCG	Test Dates: 6/7/2023 - 8/4/2023	EUT Type: Watch	Page 66 of 74

V 10.5 12/15/2021

Test Setup

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

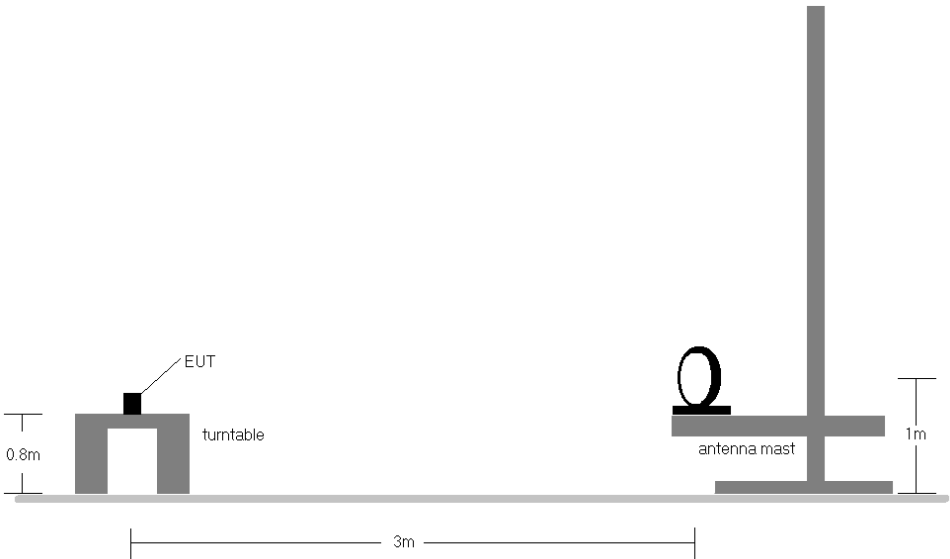


Figure 7-7. Radiated Test Setup < 30Mhz

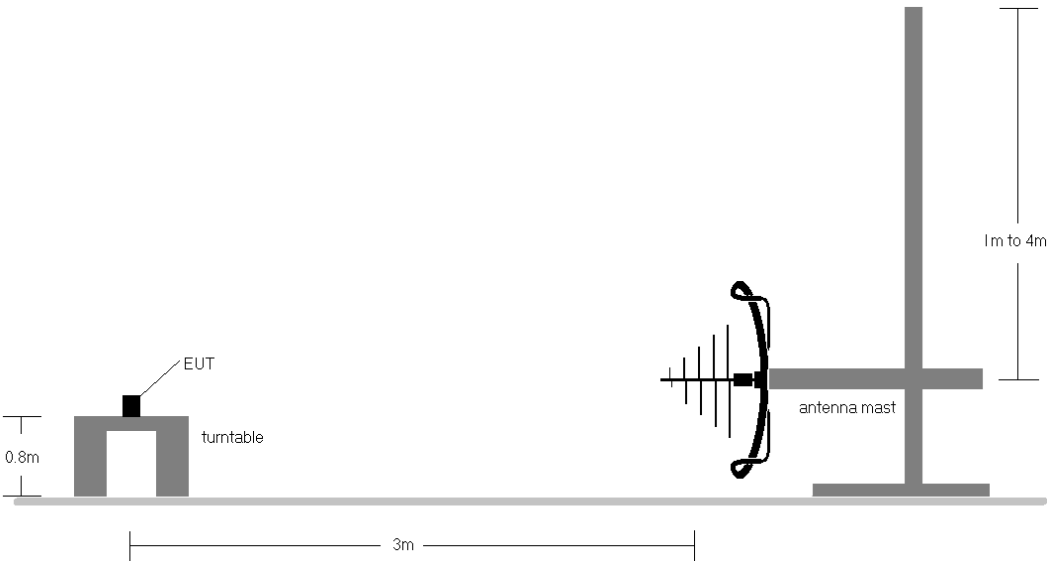



Figure 7-8. Radiated Test Setup < 1GHz

FCC ID: BCG-A2978 IC: 579C-A2978		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305110021-03.BCG	Test Dates: 6/7/2023 - 8/4/2023	EUT Type: Watch	Page 67 of 74

V 10.5 12/15/2021

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 7-10.
2. The broadband receive antenna is manipulated through vertical and horizontal polarizations during the tests. The EUT is manipulated through three orthogonal planes. For below 30MHz the loop antenna was positioned in 3 orthogonal planes (X front, Y side, Z top) to determine the orientation resulting in the worst case emissions.
3. This unit was tested with its standard battery.
4. The spectrum is investigated using a peak detector and final measurements are recorded using CISPR quasi peak detector for emissions within 6dB of the limit.
5. Emissions were measured at a 3 meter test distance.
6. Emissions are investigated while operating on the center channel of the mode, band, and modulation that produced the worst case results during the transmitter spurious emissions testing.
7. No spurious emissions were detected within 20dB of the limit below 30MHz.
8. Both configurations below were investigated, and the worst case has been reported.
 - a. EUT powered by AC/DC adaptor via USB-C cable with magnetic charger
 - b. EUT powered by host PC via USB-C cable with magnetic charger
9. The results recorded using the broadband antenna is known to correlate with the results obtained by using a tuned dipole with an acceptable degree of accuracy. The VSWR for the measurement antenna was found to be less than 2:1.
10. The unit was tested with all possible modes and only the highest emission is reported.

Sample Calculations

Determining Spurious Emissions Levels

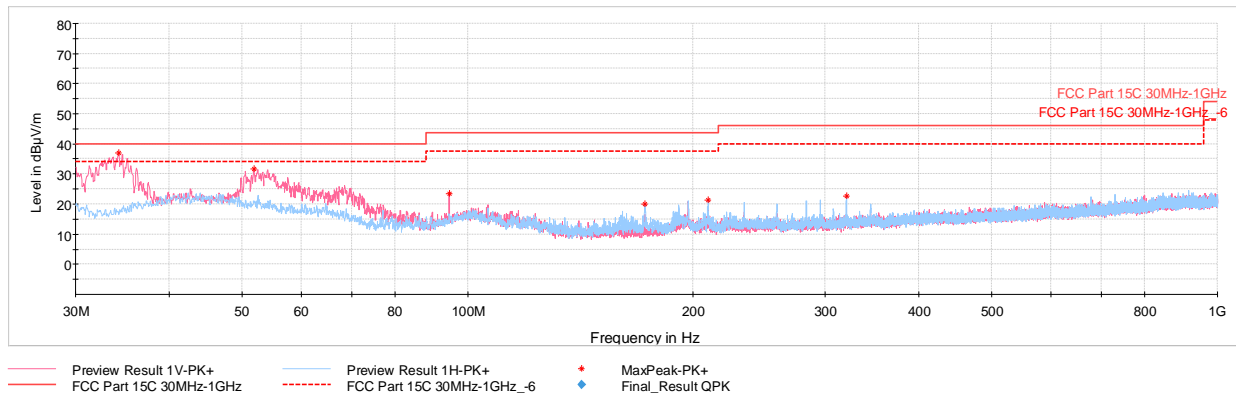
- Field Strength Level $_{[dB\mu V/m]} = \text{Analyzer Level }_{[dBm]} + 107 + \text{AFCL }_{[dB/m]}$
- $\text{AFCL }_{[dB/m]} = \text{Antenna Factor }_{[dB/m]} + \text{Cable Loss }_{[dB]} - \text{Preamplifier Gain }_{[dB]}$
- $\text{Margin }_{[dB]} = \text{Field Strength Level }_{[dB\mu V/m]} - \text{Limit }_{[dB\mu V/m]}$

FCC ID: BCG-A2978 IC: 579C-A2978		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1C2305110021-03.BCG	Test Dates: 6/7/2023 - 8/4/2023	EUT Type: Watch		Page 68 of 74

V 10.5 12/15/2021

Radiated Spurious Emissions Measurements (Below 1GHz)

§15.209; RSS-Gen [8.9]



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]
34.27	Quasi-Peak	V	100	23	-54.24	-19.09	33.67	40.00	-6.33
51.92	Max-Peak	V	100	7	-59.54	-15.65	31.81	40.00	-8.19
94.51	Max-Peak	V	100	16	-64.68	-18.85	23.47	43.52	-20.05
172.20	Max-Peak	H	200	169	-67.05	-20.05	19.90	43.52	-23.62
209.16	Max-Peak	H	100	175	-67.47	-18.16	21.37	43.52	-22.15
319.98	Max-Peak	H	100	105	-69.55	-14.85	22.60	46.02	-23.42

Table 7-11. Radiated Spurious Emissions below 1GHz 11b Ch.11, AC/DC Adapter with and Magnetic Charger

FCC ID: BCG-A2978 IC: 579C-A2978		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305110021-03.BCG	Test Dates: 6/7/2023 - 8/4/2023	EUT Type: Watch	Page 69 of 74

V 10.5 12/15/2021

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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 7-12. Conducted Limits

*Decreases with the logarithm of the frequency.

Test Procedures Used

ANSI C63.10-2013, 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

FCC ID: BCG-A2978 IC: 579C-A2978		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305110021-03.BCG	Test Dates: 6/7/2023 - 8/4/2023	EUT Type: Watch	Page 70 of 74

V 10.5 12/15/2021

Test Setup

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

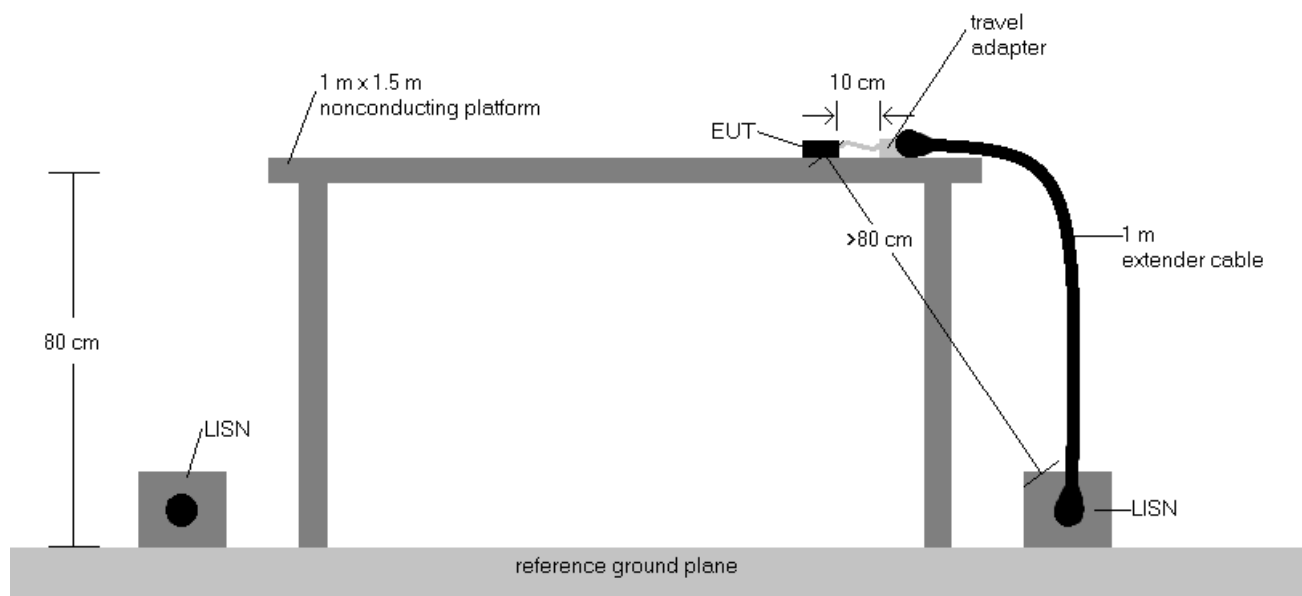


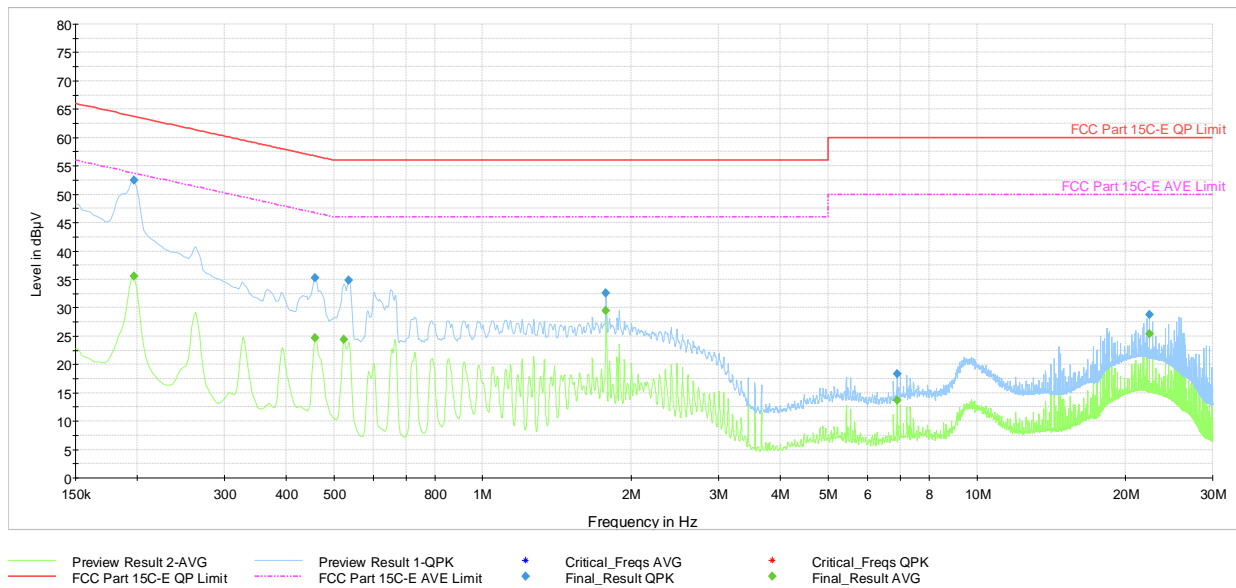
Figure 7-9. Test Instrument & Measurement Setup

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 magnetic charger
 - b. EUT powered by host PC via USB-C cable with magnetic charger
3. The limit for an intentional radiator from 150kHz to 30MHz are specified in Part 15.207 and RSS-Gen(8.8).
4. $\text{Corr. (dB)} = \text{Cable loss (dB)} + \text{LISN insertion factor (dB)}$
5. $\text{QP/AV Level (dB}\mu\text{V)} = \text{QP/AV Analyzer/Receiver Level (dB}\mu\text{V)} + \text{Corr. (dB)}$
6. $\text{Margin (dB)} = \text{QP/AV Level (dB}\mu\text{V)} - \text{QP/AV Limit (dB}\mu\text{V)}$
7. Traces shown in plot are made using quasi peak and average detectors.
8. Deviations to the Specifications: None.

FCC ID: BCG-A2978 IC: 579C-A2978		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305110021-03.BCG	Test Dates: 6/7/2023 - 8/4/2023	EUT Type: Watch	Page 71 of 74

V 10.5 12/15/2021



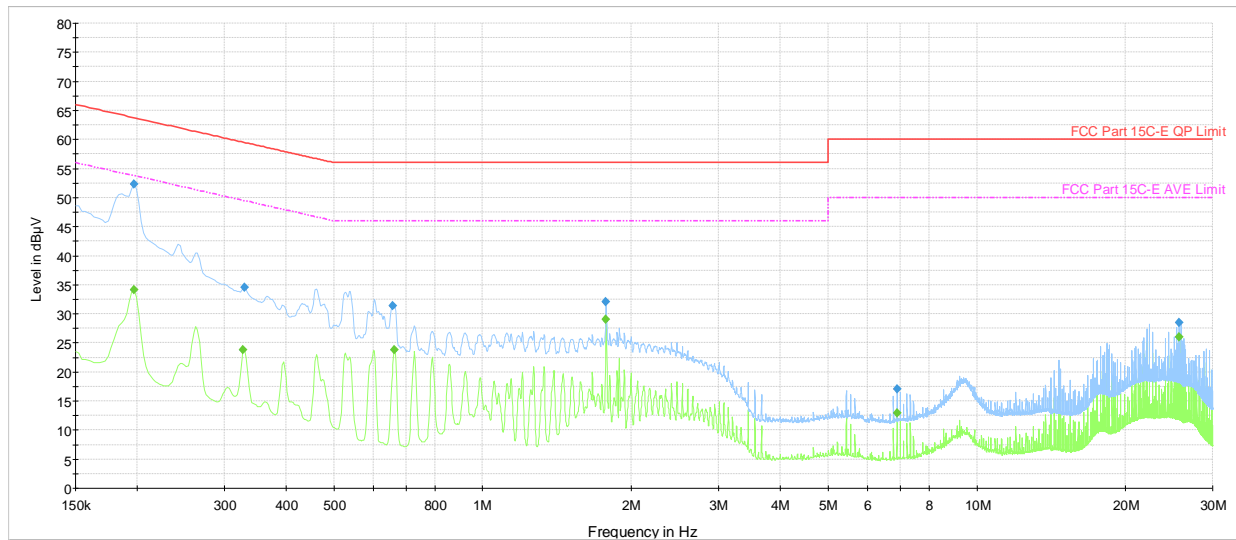
Plot 7-73. AC Line Conducted Plot 802.11b - Ch.11 (L1, with host PC and Magnetic charger)

Frequency [MHz]	Process State	QuasiPeak [dBμV]	Average [dBμV]	Limit [dBμV]	Margin [dB]	Line	PE
0.197	FINAL	---	35.54	53.73	-18.19	L1	GND
0.197	FINAL	52.5	---	63.73	-11.20	L1	GND
0.458	FINAL	---	24.69	46.72	-22.03	L1	GND
0.458	FINAL	35.3	---	56.72	-21.43	L1	GND
0.524	FINAL	---	24.41	46.00	-21.59	L1	GND
0.535	FINAL	34.8	---	56.00	-21.19	L1	GND
1.777	FINAL	32.6	---	56.00	-23.44	L1	GND
1.777	FINAL	---	29.55	46.00	-16.45	L1	GND
6.889	FINAL	18.3	---	60.00	-41.66	L1	GND
6.889	FINAL	---	13.68	50.00	-36.32	L1	GND
22.333	FINAL	---	25.37	50.00	-24.63	L1	GND
22.333	FINAL	28.8	---	60.00	-31.23	L1	GND

Table 7-13. AC Line Conducted Data 802.11b - Ch.11 (L1, with host PC and Magnetic charger)

FCC ID: BCG-A2978 IC: 579C-A2978			MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305110021-03.BCG	Test Dates: 6/7/2023 - 8/4/2023	EUT Type: Watch	Page 72 of 74	

V 10.5 12/15/2021



— Preview Result 2-AVG — Preview Result 1-QPK ♦ Critical_Freqs AVG ♦ Critical_Freqs QPK
— FCC Part 15C-E QP Limit - - - FCC Part 15C-E AVE Limit ♦ Final_Result QPK ♦ Final_Result AVG

Plot 7-74. AC Line Conducted Plot 802.11b - Ch.11 (N, with host PC and Magnetic charger)

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.197	FINAL	---	34.17	53.73	-19.56	N	GND
0.197	FINAL	52.4	---	63.73	-11.35	N	GND
0.328	FINAL	---	23.85	49.51	-25.66	N	GND
0.330	FINAL	34.6	---	59.45	-24.86	N	GND
0.656	FINAL	31.4	---	56.00	-24.62	N	GND
0.663	FINAL	---	23.86	46.00	-22.14	N	GND
1.777	FINAL	32.1	---	56.00	-23.94	N	GND
1.777	FINAL	---	29.03	46.00	-16.97	N	GND
6.889	FINAL	17.0	---	60.00	-42.97	N	GND
6.889	FINAL	---	12.92	50.00	-37.08	N	GND
25.667	FINAL	---	26.09	50.00	-23.91	N	GND
25.667	FINAL	28.5	---	60.00	-31.48	N	GND

Table 7-14. AC Line Conducted Data 802.11b - Ch.11 (N, with host PC and Magnetic charger)

FCC ID: BCG-A2978 IC: 579C-A2978	 MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1C2305110021-03.BCG	Test Dates: 6/7/2023 - 8/4/2023	EUT Type: Watch	Page 73 of 74

V 10.5 12/15/2021

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8.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Apple Watch FCC ID: BCG-A2978, IC: 579C-A2978** 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.

FCC ID: BCG-A2978 IC: 579C-A2978		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305110021-03.BCG	Test Dates: 6/7/2023 - 8/4/2023	EUT Type: Watch	Page 74 of 74

V 10.5 12/15/2021

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