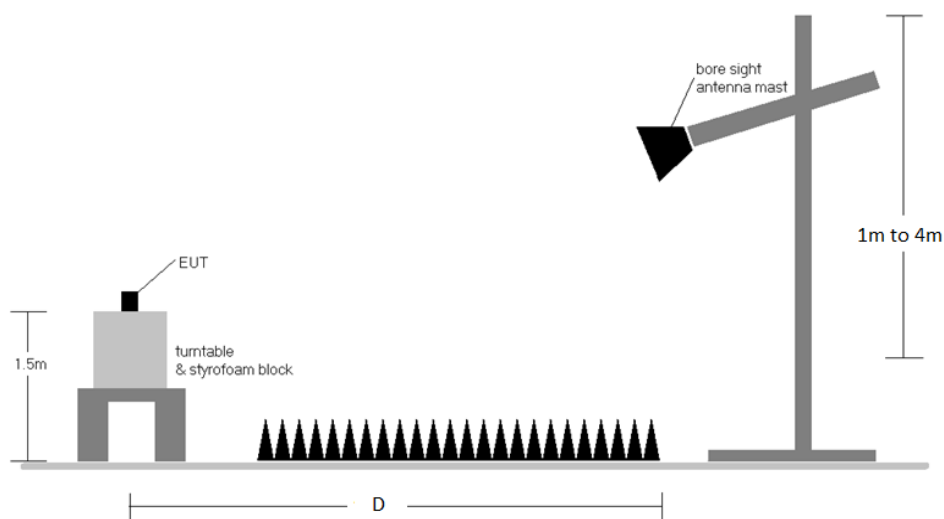


## Test Setup

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 7-6.
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. The unit was tested with all possible modes and only the highest emission is reported.

FCC ID: BCG-A2982 IC: 579C-A2982		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305020012-08.BCG	Test Dates: 6/7/2023 - 8/7/2023	EUT Type: Watch	Page 53 of 75

V 10.5 12/15/2021

## Sample Calculations

### Determining Spurious Emissions Levels

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

### Radiated Band Edge Measurement Offset

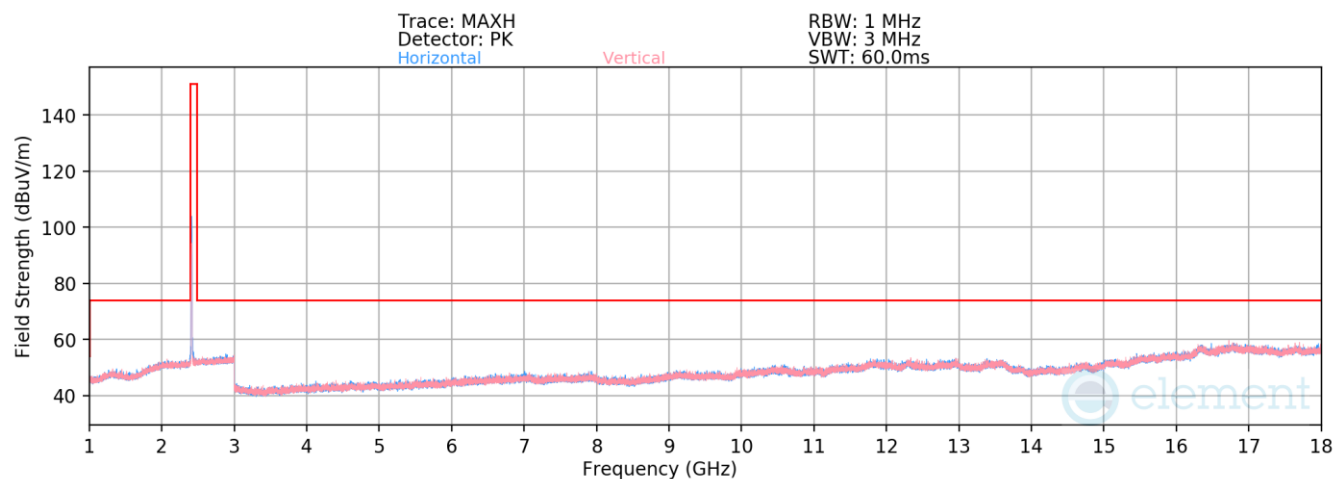
- The amplitude offset shown in the radiated restricted band edge plots in Section 7.7.2 was calculated using the formula:  
Offset (dB) = (Antenna Factor + Cable Loss + Attenuator) – Preamplifier Gain

FCC ID: BCG-A2982 IC: 579C-A2982		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1C2305020012-08.BCG	Test Dates: 6/7/2023 - 8/7/2023	EUT Type: Watch		Page 54 of 75

V 10.5 12/15/2021

## 7.7.1 Radiated Spurious Emission Measurements

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




**Plot 7-55. Radiated Spurious Emissions above 1GHz (802.11b – Ch. 1)**

Mode: 802.11b  
Data Rate: 1Mbps  
Distance of Measurements: 3 Meters  
Operating Frequency: 2412MHz  
Channel: 01

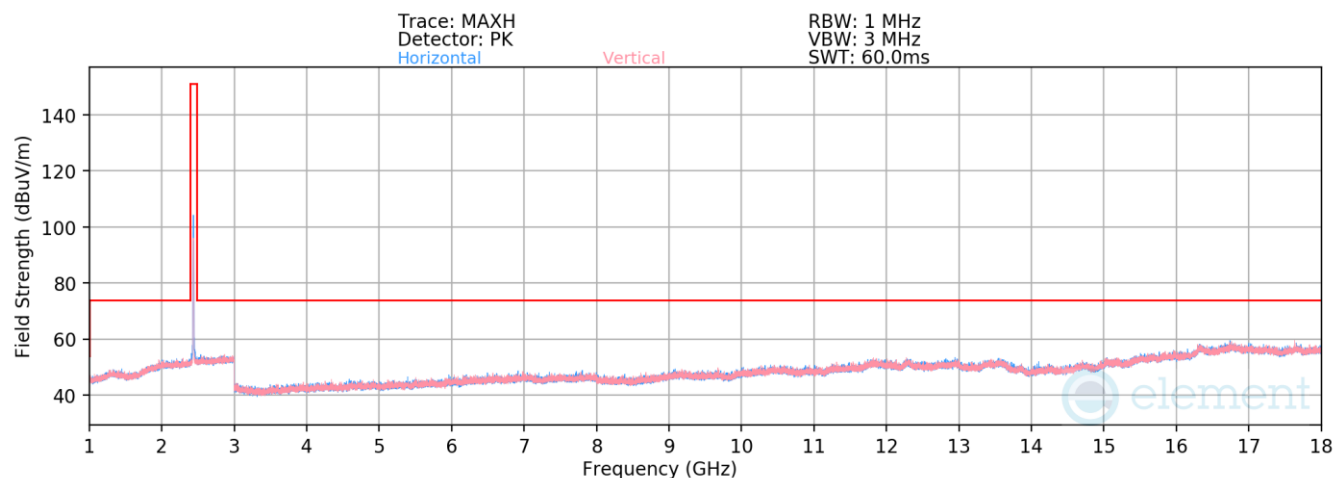
Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBuV/m]	Limit [dBuV/m]	Margin [dB]
4824.00	Avg	H	-	-	-79.60	7.01	34.41	53.98	-19.56
4824.00	Peak	H	-	-	-68.43	7.01	45.58	73.98	-28.39
12060.00	Avg	H	-	-	-83.54	16.93	40.39	53.98	-13.59
12060.00	Peak	H	-	-	-71.78	16.93	52.15	73.98	-21.83

**Table 7-7. Radiated Measurements**

FCC ID: BCG-A2982 IC: 579C-A2982			MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305020012-08.BCG	Test Dates: 6/7/2023 - 8/7/2023	EUT Type: Watch	Page 55 of 75	

V 10.5 12/15/2021

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**Plot 7-56. Radiated Spurious Emissions above 1GHz (802.11b – Ch. 6)**

Mode: 802.11b  
Data Rate: 1Mbps  
Distance of Measurements: 3 Meters  
Operating Frequency: 2437MHz  
Channel: 06

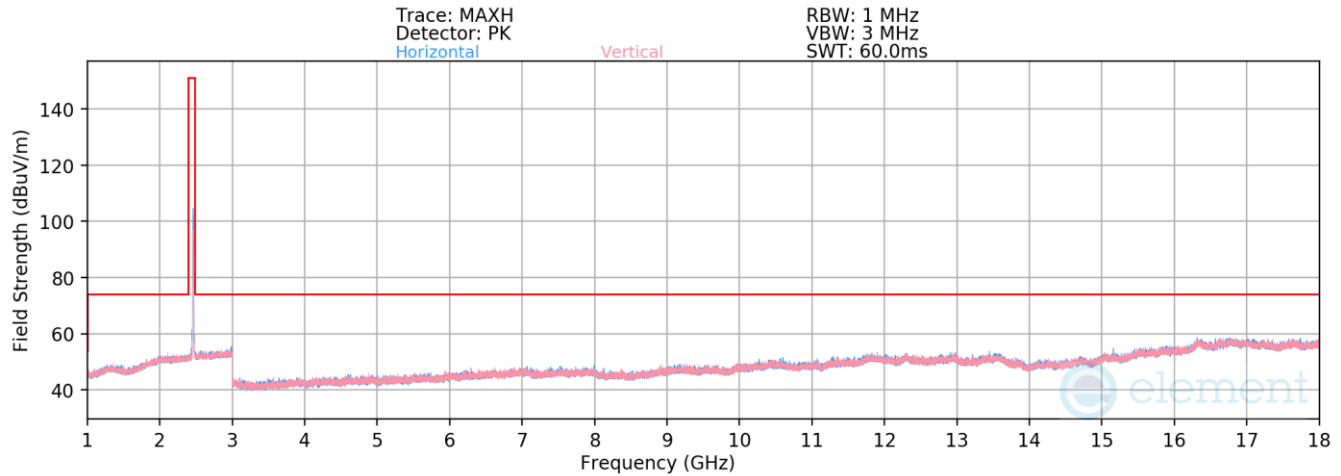
Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4874.00	Avg	H	-	-	-80.11	7.11	34.00	53.98	-19.98
4874.00	Peak	H	-	-	-68.39	7.11	45.72	73.98	-28.26
7311.00	Avg	H	-	-	-81.27	10.30	36.03	53.98	-17.95
7311.00	Peak	H	-	-	-69.79	10.30	47.51	73.98	-26.47
12185.00	Avg	H	-	-	-83.61	16.31	39.70	53.98	-14.28
12185.00	Peak	H	-	-	-72.42	16.31	50.89	73.98	-23.09

**Table 7-8. Radiated Measurements**

FCC ID: BCG-A2982 IC: 579C-A2982		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305020012-08.BCG	Test Dates: 6/7/2023 - 8/7/2023	EUT Type: Watch	Page 56 of 75

V 10.5 12/15/2021

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**Plot 7-57. Radiated Spurious Emissions above 1GHz (802.11b – Ch. 11)**

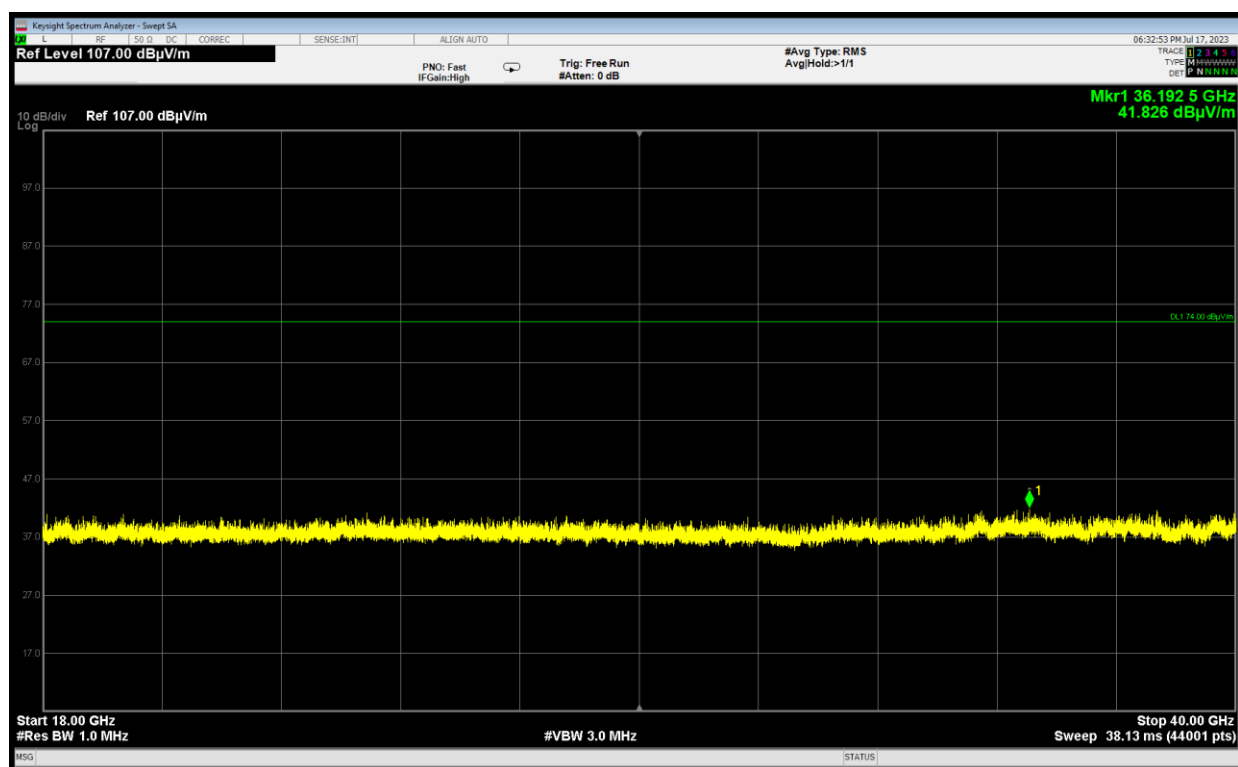
Mode: 802.11b  
Data Rate: 1Mbps  
Distance of Measurements: 3 Meters  
Operating Frequency: 2462MHz  
Channel: 11

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4924.00	Avg	H	-	-	-79.85	7.43	34.58	53.98	-19.40
4924.00	Peak	H	-	-	-68.76	7.43	45.67	73.98	-28.31
7386.00	Avg	H	-	-	-81.51	10.27	35.76	53.98	-18.21
7386.00	Peak	H	-	-	-69.30	10.27	47.97	73.98	-26.00
12310.00	Avg	H	-	-	-84.17	17.61	40.44	53.98	-13.54
12310.00	Peak	H	-	-	-72.51	17.61	52.10	73.98	-21.88

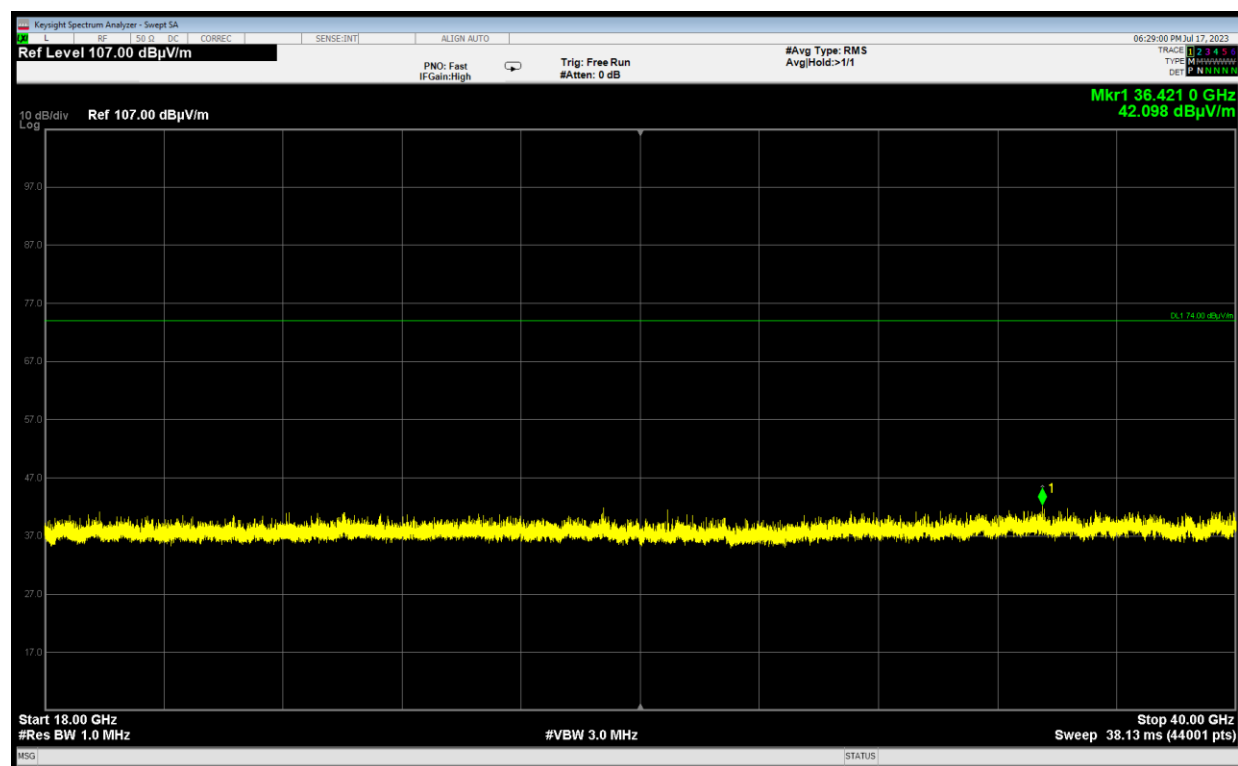
**Table 7-9. Radiated Measurements**

FCC ID: BCG-A2982 IC: 579C-A2982		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305020012-08.BCG	Test Dates: 6/7/2023 - 8/7/2023	EUT Type: Watch	Page 57 of 75

V 10.5 12/15/2021



Plot 7-58. Radiated Spurious Emissions Above 18GHz (802.11b – Ch. 11 Pol H)



Plot 7-59. Radiated Spurious Emissions Above 18GHz (802.11b – Ch. 11 Pol V)

FCC ID: BCG-A2982 IC: 579C-A2982	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>		Approved by: Technical Manager
Test Report S/N: 1C2305020012-08.BCG	Test Dates: 6/7/2023 - 8/7/2023	EUT Type: Watch	Page 58 of 75

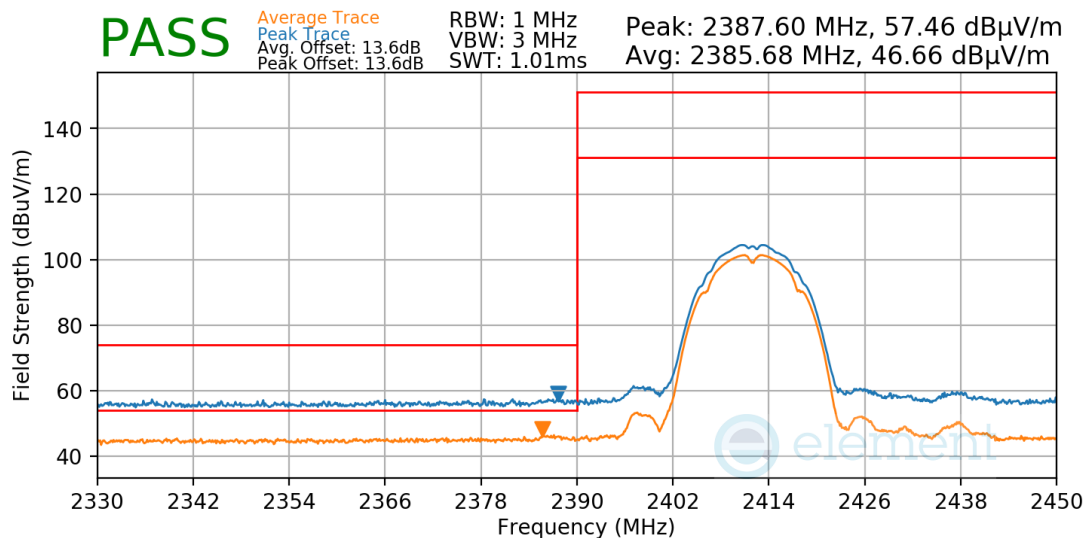
V 10.5 12/15/2021

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## 7.7.2 Radiated Restricted Band Edge Measurements

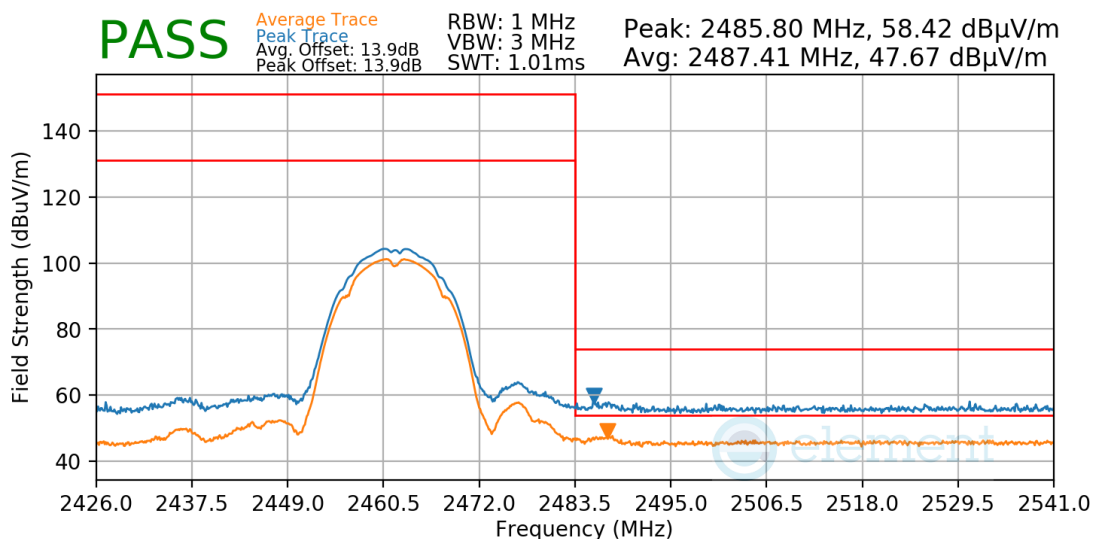
§15.205 §15.209; RSS-Gen [8.9]

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




Plot 7-60. Radiated Restricted Lower Band Edge Measurement

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

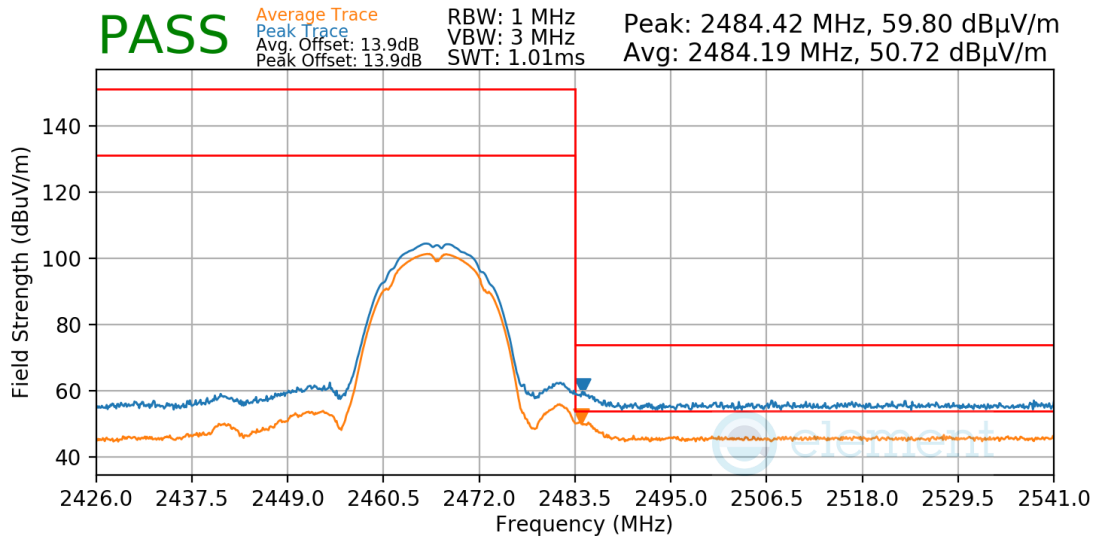


Plot 7-61. Radiated Restricted Upper Band Edge Measurement

FCC ID: BCG-A2982 IC: 579C-A2982		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305020012-08.BCG	Test Dates: 6/7/2023 - 8/7/2023	EUT Type: Watch	Page 59 of 75

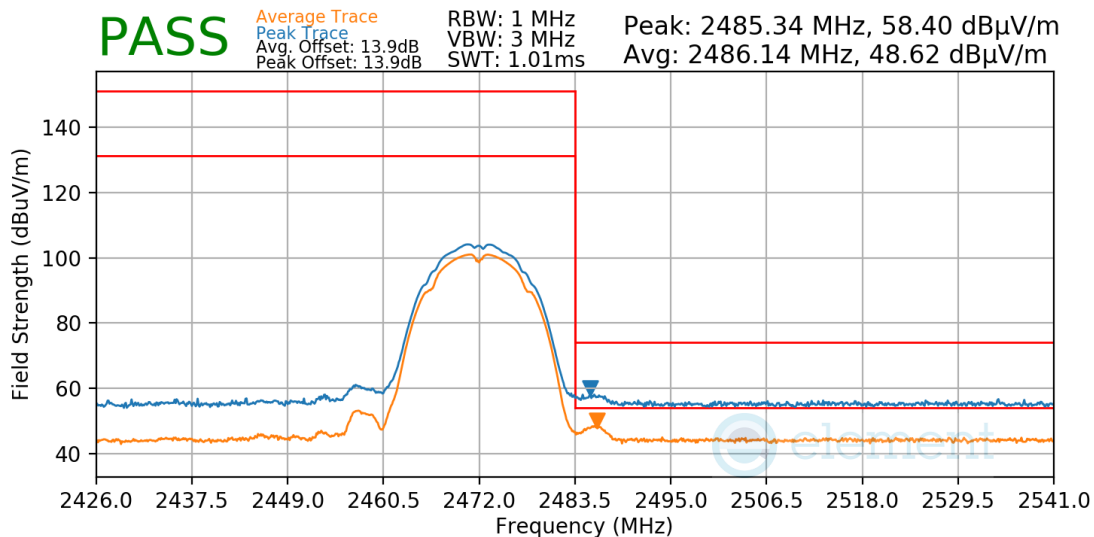
V 10.5 12/15/2021

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



**Plot 7-62. Radiated Restricted Upper Band Edge Measurement**

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



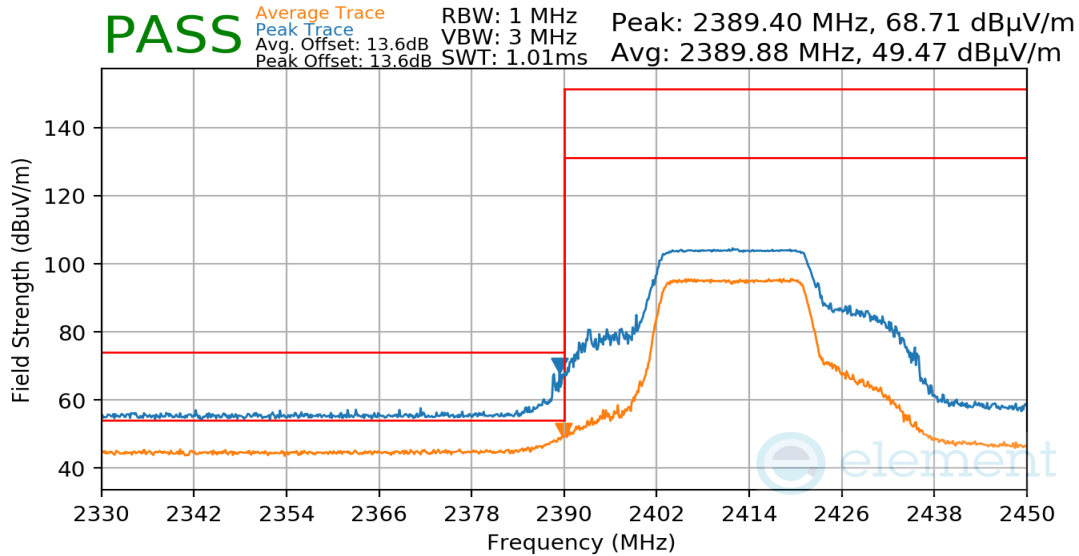
**Plot 7-63. Radiated Restricted Upper Band Edge Measurement**

FCC ID: BCG-A2982 IC: 579C-A2982		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305020012-08.BCG	Test Dates: 6/7/2023 - 8/7/2023	EUT Type: Watch	Page 60 of 75

V 10.5 12/15/2021

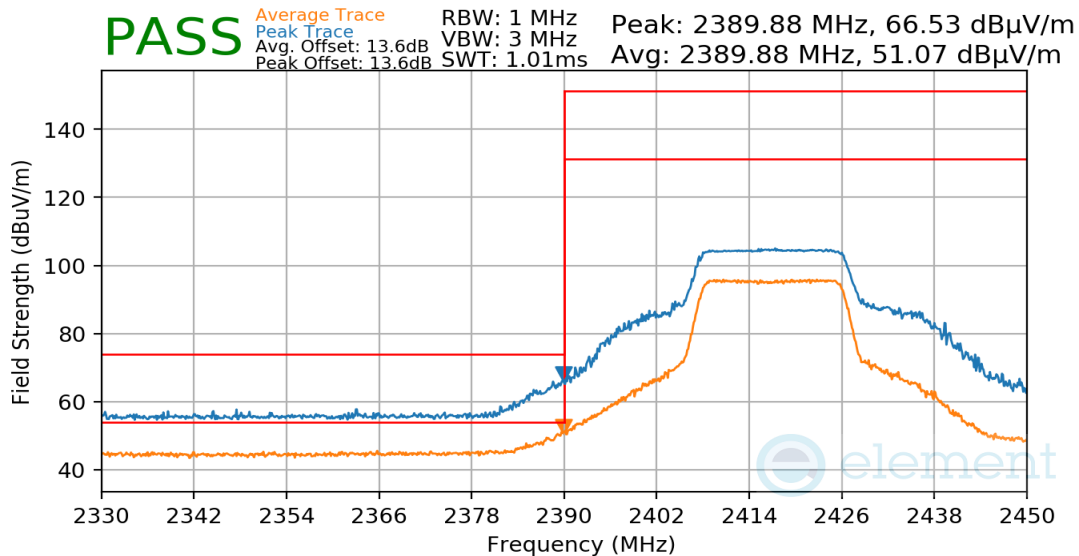


Mode: 802.11n  
 Data Rate: MCS0  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2412MHz  
 Channel: 1



**Plot 7-64. Radiated Restricted Lower Band Edge Measurement**

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

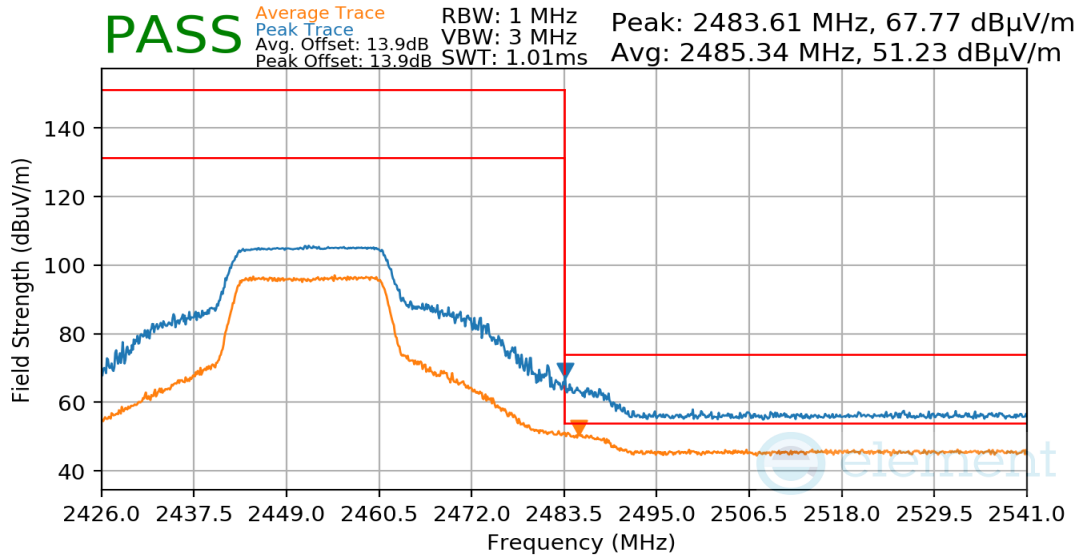


**Plot 7-65. Radiated Restricted Lower Band Edge Measurement**

FCC ID: BCG-A2982 IC: 579C-A2982	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>		Approved by: Technical Manager
Test Report S/N: 1C2305020012-08.BCG	Test Dates: 6/7/2023 - 8/7/2023	EUT Type: Watch	Page 61 of 75

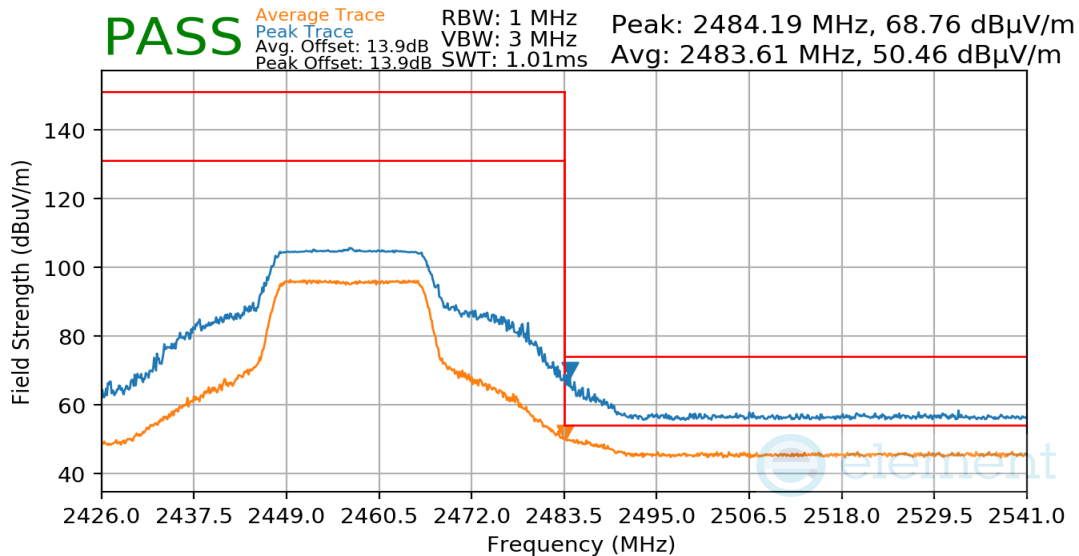
V 10.5 12/15/2021

Mode: 802.11n  
 Data Rate: MCS0  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2452MHz  
 Channel: 9



Plot 7-66. Radiated Restricted Upper Band Edge Measurement

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

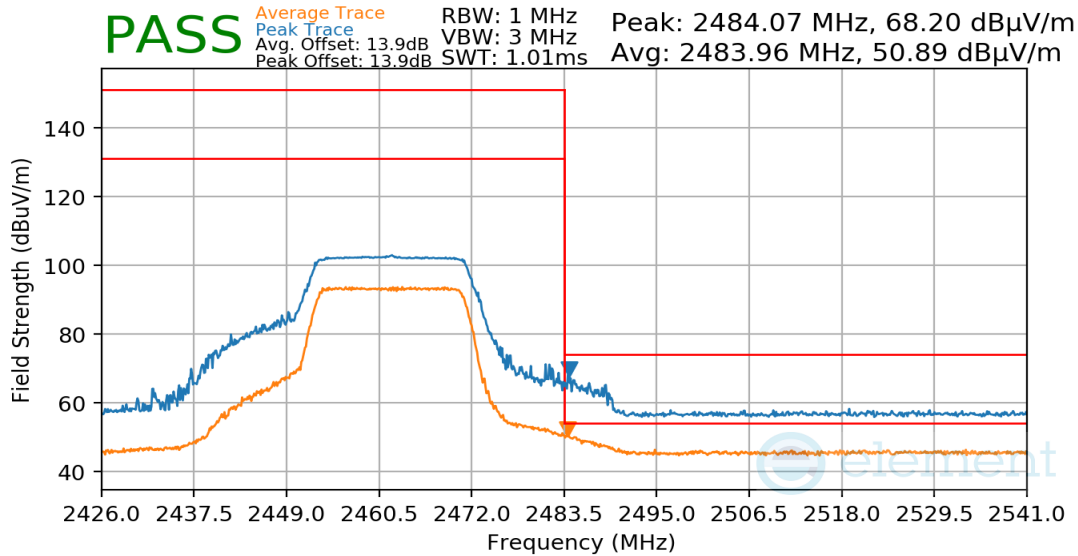


Plot 7-67. Radiated Restricted Upper Band Edge Measurement

FCC ID: BCG-A2982 IC: 579C-A2982		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305020012-08.BCG	Test Dates: 6/7/2023 - 8/7/2023	EUT Type: Watch	Page 62 of 75

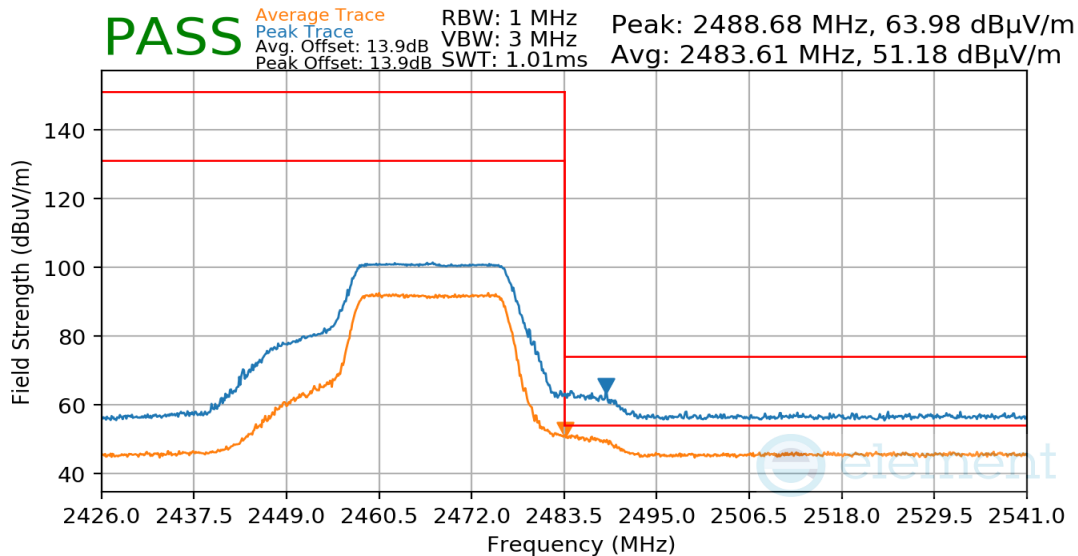
V 10.5 12/15/2021

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



**Plot 7-68. Radiated Restricted Upper Band Edge Measurement**

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

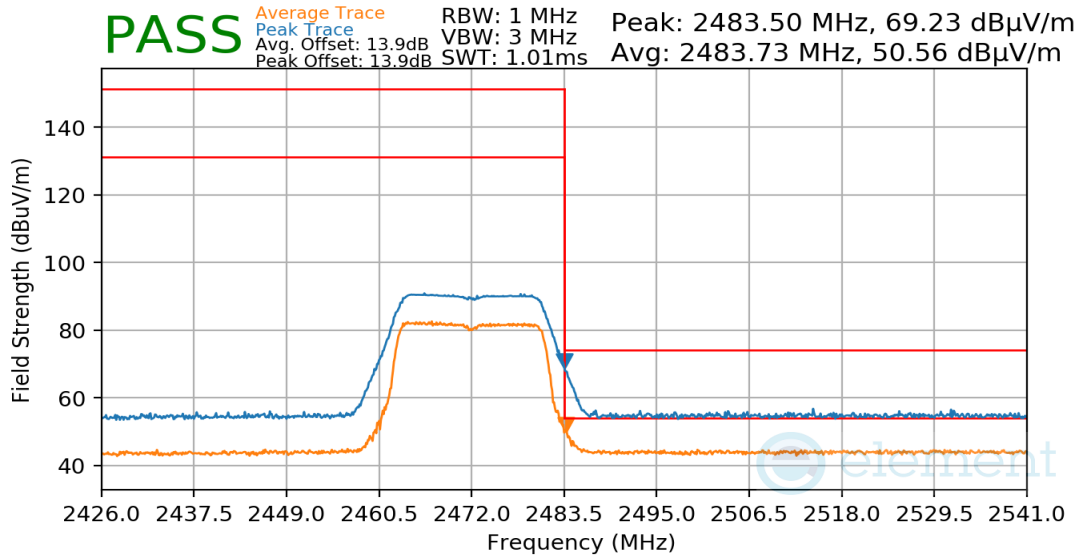


**Plot 7-69. Radiated Restricted Upper Band Edge Measurement**

FCC ID: BCG-A2982 IC: 579C-A2982		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305020012-08.BCG	Test Dates: 6/7/2023 - 8/7/2023	EUT Type: Watch	Page 63 of 75

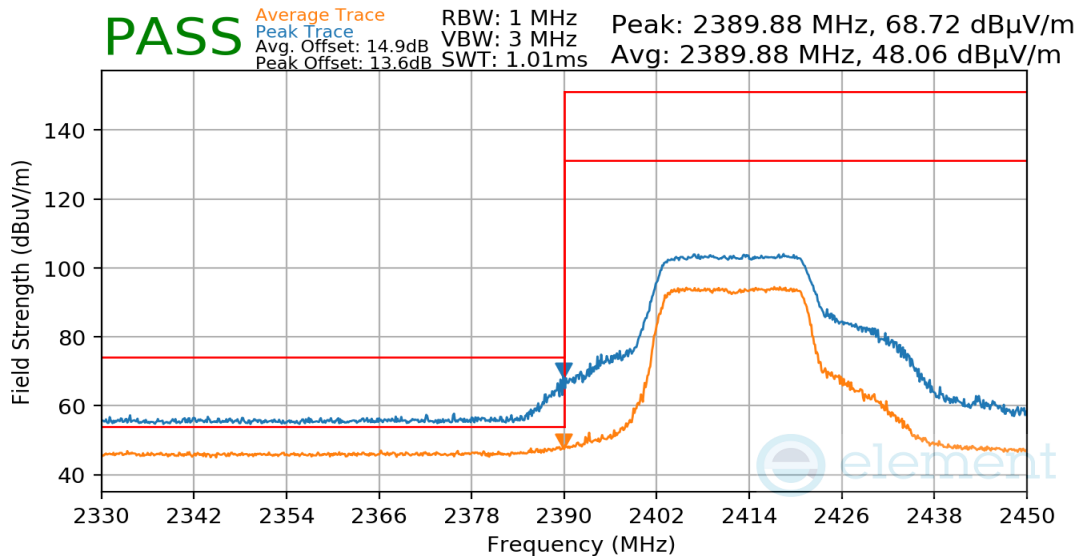
V 10.5 12/15/2021

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



**Plot 7-70. Radiated Restricted Upper Band Edge Measurement**

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

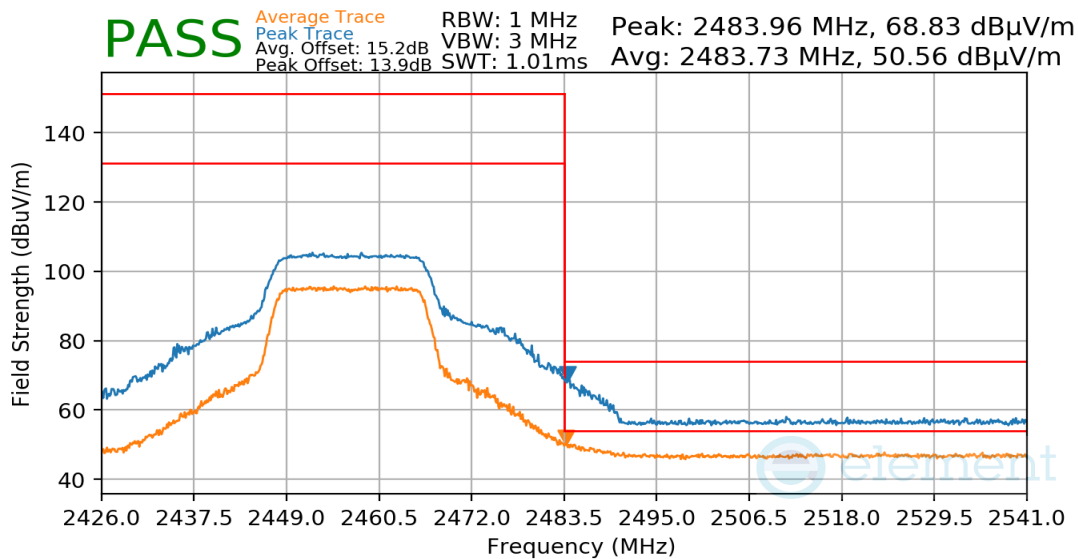


**Plot 7-71. Radiated Restricted Lower Band Edge Measurement**

FCC ID: BCG-A2982 IC: 579C-A2982		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305020012-08.BCG	Test Dates: 6/7/2023 - 8/7/2023	EUT Type: Watch	Page 64 of 75

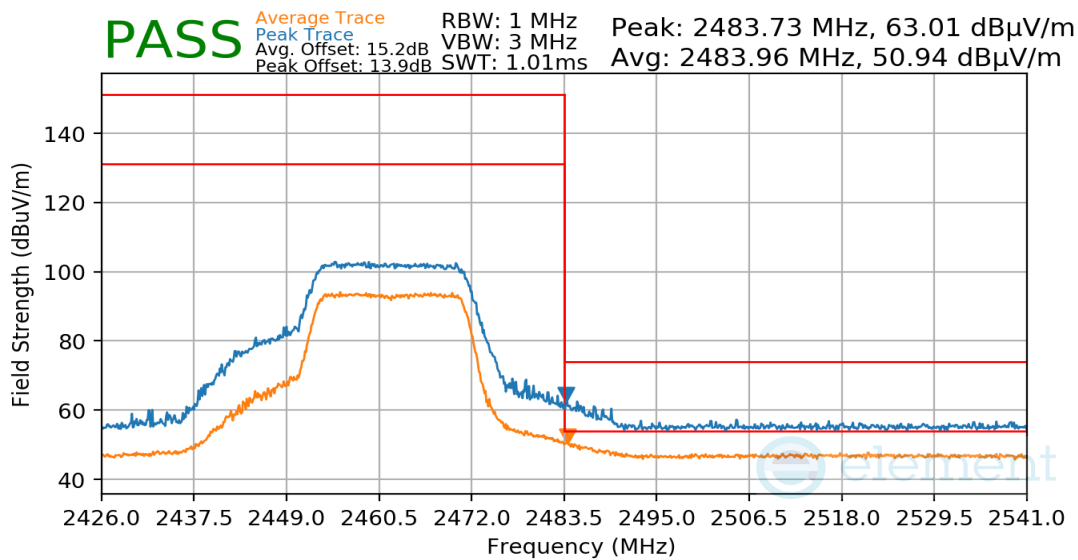
V 10.5 12/15/2021

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



**Plot 7-72. Radiated Restricted Upper Band Edge Measurement**

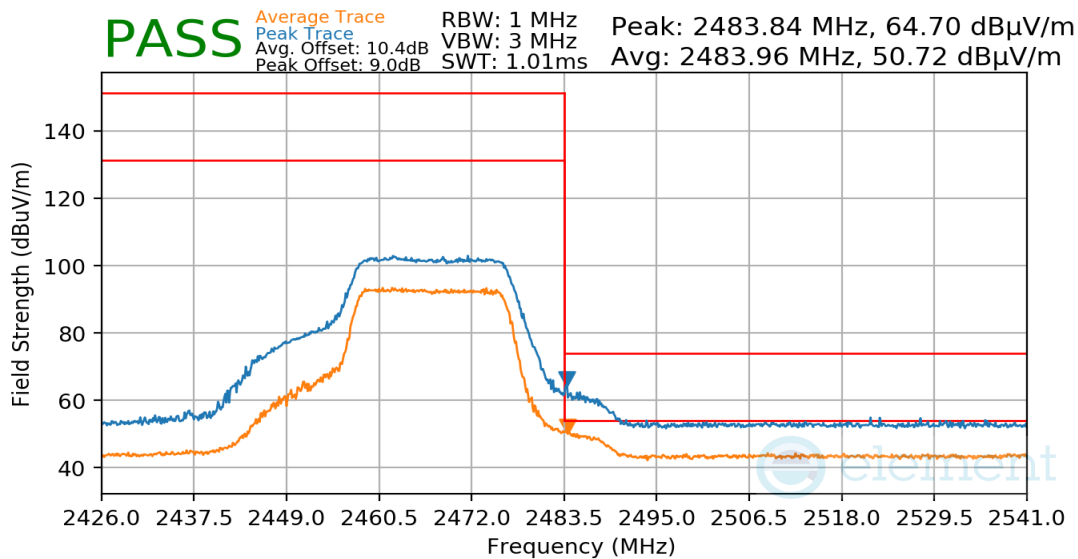
Mode: 802.11n  
 Data Rate: MCS7  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2462MHz  
 Channel: 11



**Plot 7-73. Radiated Restricted Upper Band Edge Measurement**

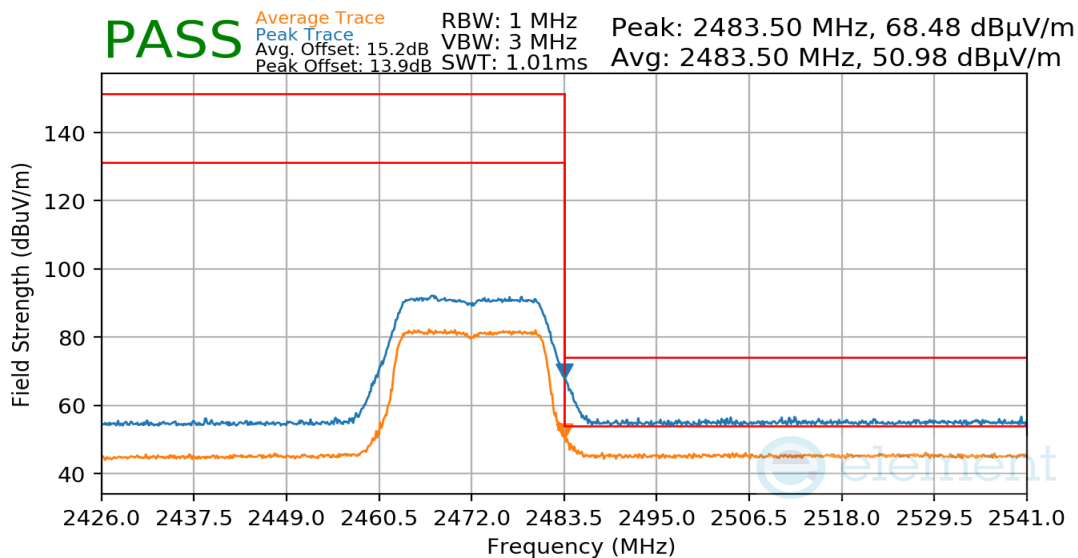
FCC ID: BCG-A2982 IC: 579C-A2982	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>		Approved by: Technical Manager
Test Report S/N: 1C2305020012-08.BCG	Test Dates: 6/7/2023 - 8/7/2023	EUT Type: Watch	Page 65 of 75

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



**Plot 7-74. Radiated Restricted Upper Band Edge Measurement**

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



**Plot 7-75. Radiated Restricted Upper Band Edge Measurement**

FCC ID: BCG-A2982 IC: 579C-A2982	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>		Approved by: Technical Manager
Test Report S/N: 1C2305020012-08.BCG	Test Dates: 6/7/2023 - 8/7/2023	EUT Type: Watch	Page 66 of 75

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

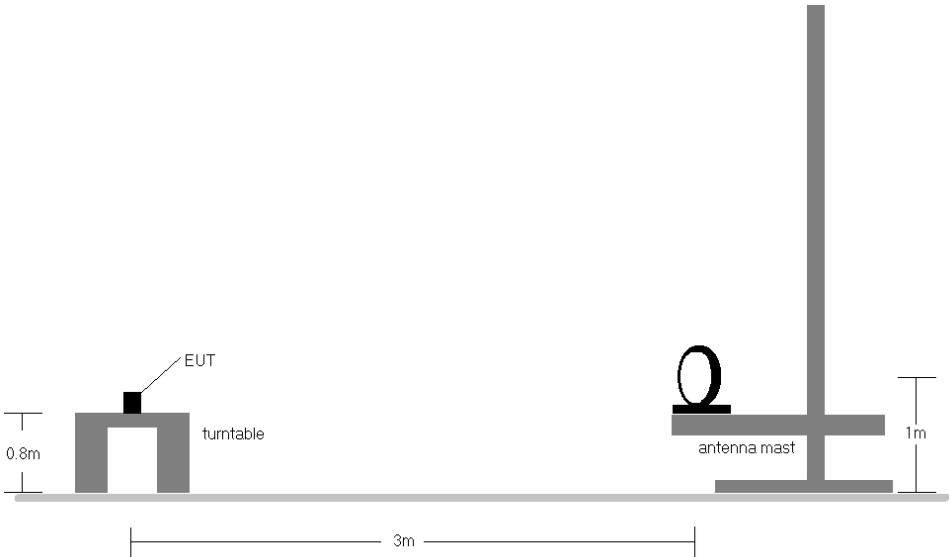
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 120kHz (for emissions from 30MHz – 1GHz)
3. VBW = 300kHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold

FCC ID: BCG-A2982 IC: 579C-A2982		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305020012-08.BCG	Test Dates: 6/7/2023 - 8/7/2023	EUT Type: Watch	Page 67 of 75

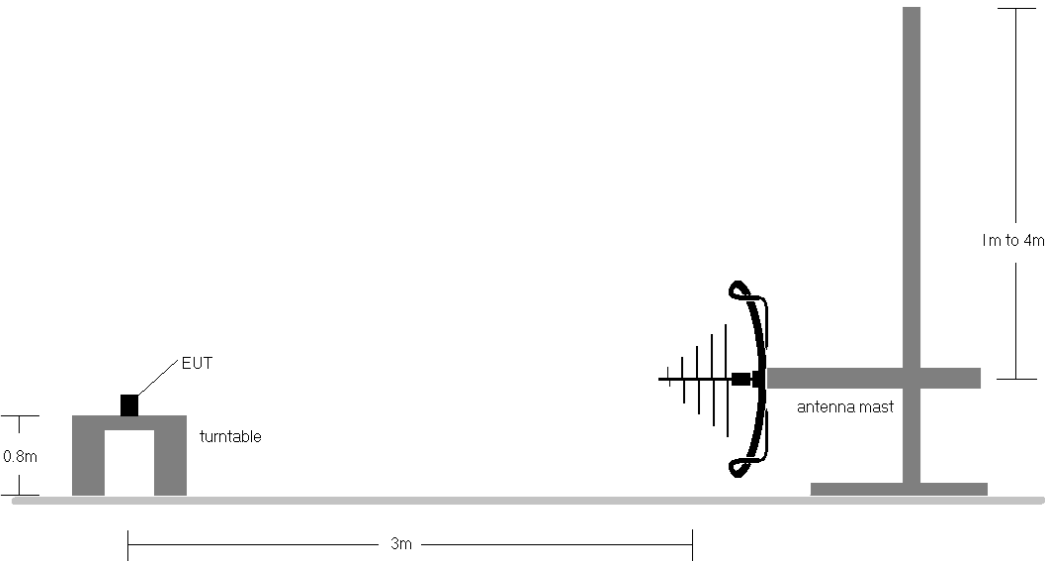
V 10.5 12/15/2021

**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-A2982 IC: 579C-A2982		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1C2305020012-08.BCG	Test Dates: 6/7/2023 - 8/7/2023	EUT Type: Watch		Page 68 of 75

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**

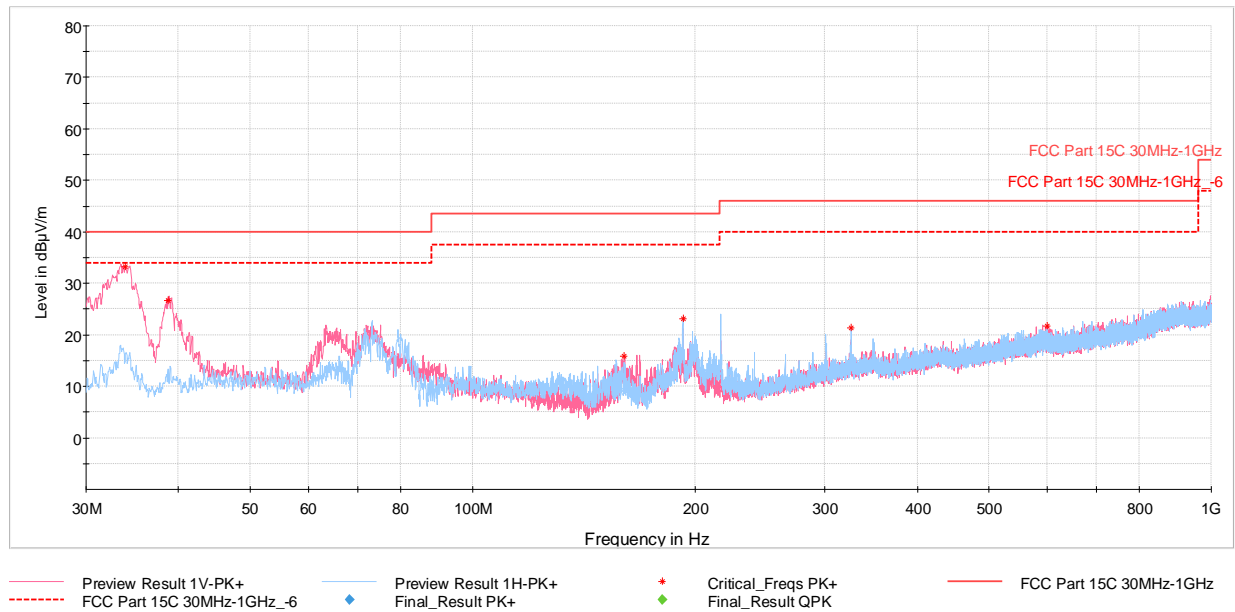
- Field Strength Level  $_{[dB\mu V/m]} = \text{Analyzer Level }_{[dBm]} + 107 + \text{AFCL }_{[dB/m]}$
- $\text{AFCL }_{[dB/m]} = \text{Antenna Factor }_{[dB/m]} + \text{Cable Loss }_{[dB]} - \text{Preamplifier Gain }_{[dB]}$
- $\text{Margin }_{[dB]} = \text{Field Strength Level }_{[dB\mu V/m]} - \text{Limit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

FCC ID: BCG-A2982 IC: 579C-A2982		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1C2305020012-08.BCG	Test Dates: 6/7/2023 - 8/7/2023	EUT Type: Watch		Page 69 of 75

V 10.5 12/15/2021

## Radiated Spurious Emissions Measurements (Below 1GHz)

§15.209; RSS-Gen [8.9]



**Plot 7-76. Radiated Spurious Emissions below 1GHz 11b Ch.11, with AC/DC Adapter and Magnetic 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]
33.93	Max-Peak	V	100	319	-58.92	-14.90	33.18	40.00	-6.82
38.78	Max-Peak	V	100	35	-67.12	-13.20	26.68	40.00	-13.32
160.61	Max-Peak	V	100	29	-75.62	-15.52	15.86	43.52	-27.66
192.72	Max-Peak	H	100	302	-70.95	-12.92	23.13	43.52	-20.39
325.22	Max-Peak	H	100	0	-76.24	-9.40	21.36	46.02	-24.66
600.41	Max-Peak	V	300	178	-81.59	-3.65	21.76	46.02	-24.26

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

FCC ID: BCG-A2982 IC: 579C-A2982		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305020012-08.BCG	Test Dates: 6/7/2023 - 8/7/2023	EUT Type: Watch	Page 70 of 75

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

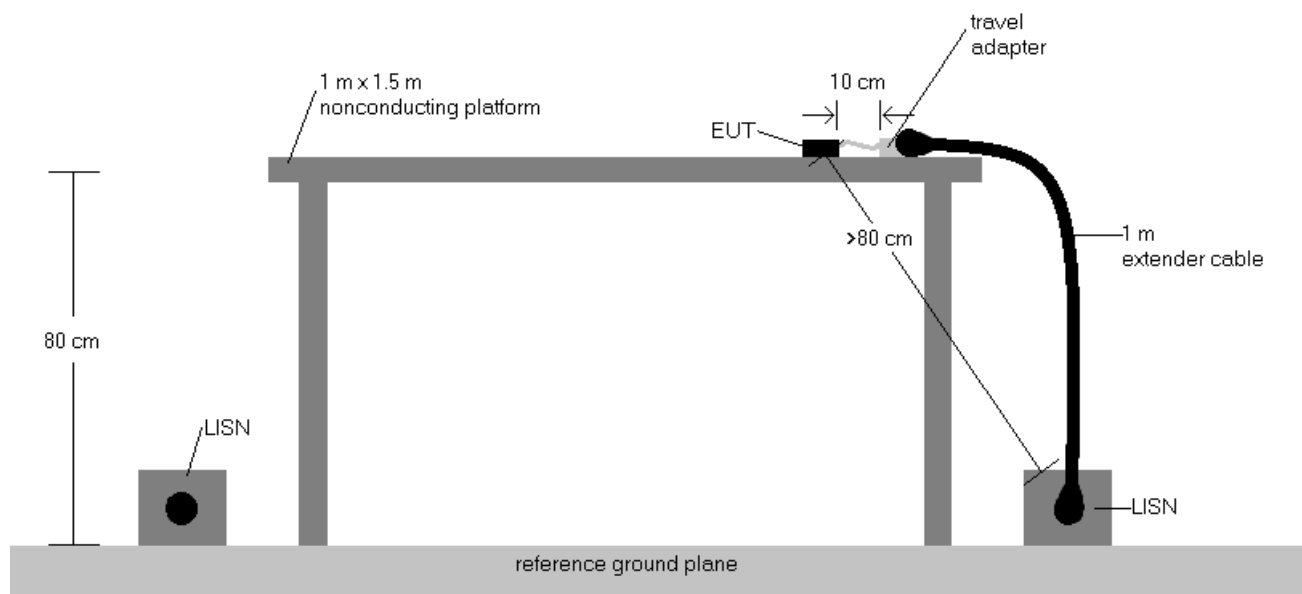
1. Analyzer center frequency was set to the frequency of the spurious emission of interest
2. RBW = 9kHz (for emissions from 150kHz – 30MHz)
3. Detector = RMS
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

FCC ID: BCG-A2982 IC: 579C-A2982		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305020012-08.BCG	Test Dates: 6/7/2023 - 8/7/2023	EUT Type: Watch	Page 71 of 75

V 10.5 12/15/2021

## Test Setup

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



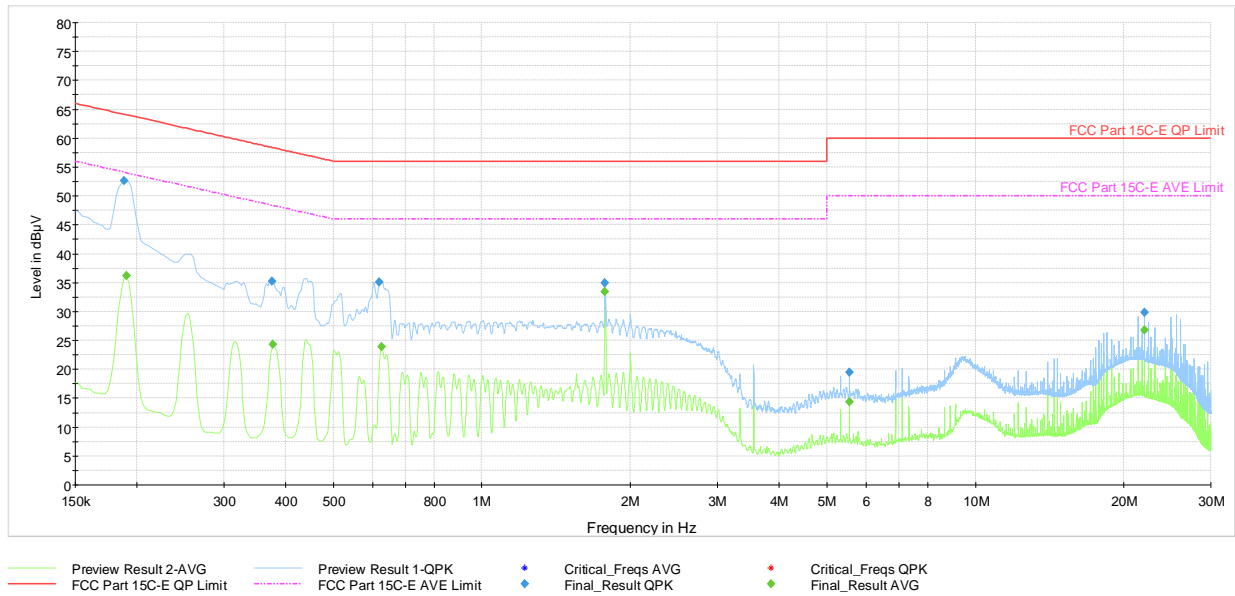
**Figure 7-9. Test Instrument & Measurement Setup**

## 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-A2982 IC: 579C-A2982		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305020012-08.BCG	Test Dates: 6/7/2023 - 8/7/2023	EUT Type: Watch	Page 72 of 75

V 10.5 12/15/2021



**Plot 7-77. AC Line Conducted Plot 802.11b - Ch.11 (L1, with host PC and Magnetic charger)**

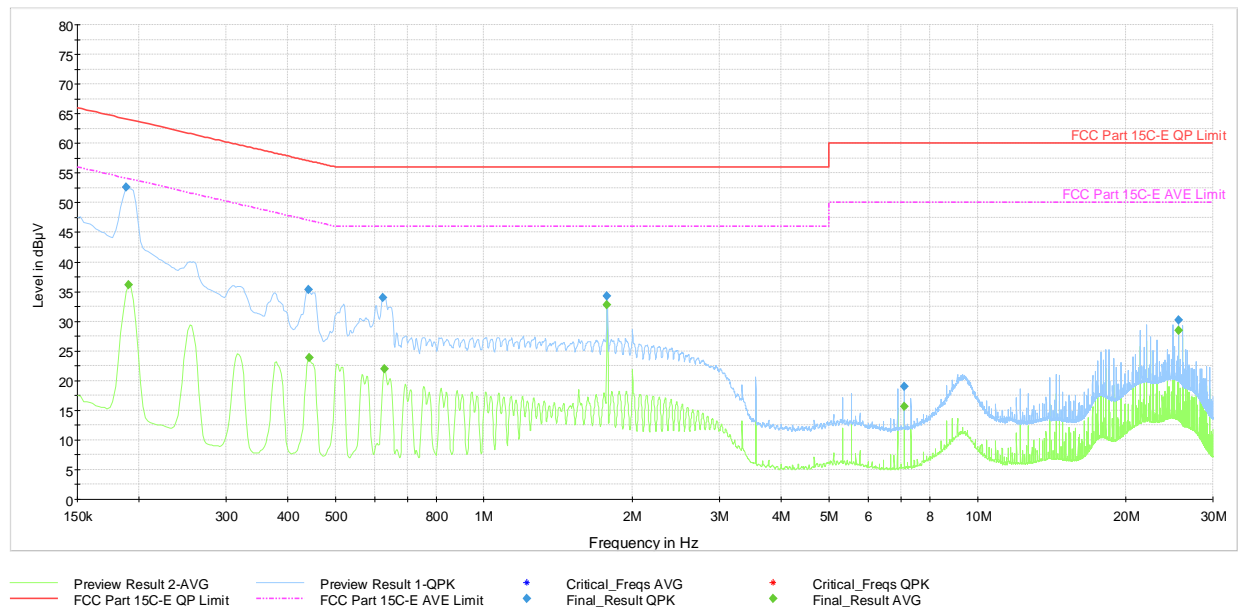
Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.188	FINAL	52.6	---	64.11	-11.48	L1	GND
0.191	FINAL	---	36.21	54.02	-17.81	L1	GND
0.375	FINAL	35.3	---	58.39	-23.13	L1	GND
0.377	FINAL	---	24.29	48.34	-24.05	L1	GND
0.620	FINAL	35.1	---	56.00	-20.88	L1	GND
0.627	FINAL	---	23.91	46.00	-22.09	L1	GND
1.777	FINAL	35.0	---	56.00	-21.00	L1	GND
1.777	FINAL	---	33.39	46.00	-12.61	L1	GND
5.555	FINAL	19.5	---	60.00	-40.49	L1	GND
5.555	FINAL	---	14.43	50.00	-35.57	L1	GND
22.000	FINAL	---	26.74	50.00	-23.26	L1	GND
22.000	FINAL	29.8	---	60.00	-30.16	L1	GND

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

FCC ID: BCG-A2982 IC: 579C-A2982		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2305020012-08.BCG	Test Dates: 6/7/2023 - 8/7/2023	EUT Type: Watch	Page 73 of 75

V 10.5 12/15/2021

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**Plot 7-78. 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
0.188	FINAL	52.6	---	64.11	-11.55	N	GND
0.191	FINAL	---	36.15	54.02	-17.86	N	GND
0.440	FINAL	35.4	---	57.06	-21.70	N	GND
0.443	FINAL	---	23.89	47.02	-23.12	N	GND
0.625	FINAL	34.0	---	56.00	-21.96	N	GND
0.629	FINAL	---	22.02	46.00	-23.98	N	GND
1.777	FINAL	34.3	---	56.00	-21.70	N	GND
1.777	FINAL	---	32.75	46.00	-13.25	N	GND
7.112	FINAL	19.1	---	60.00	-40.95	N	GND
7.112	FINAL	---	15.69	50.00	-34.31	N	GND
25.555	FINAL	---	28.43	50.00	-21.57	N	GND
25.555	FINAL	30.2	---	60.00	-29.84	N	GND

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

FCC ID: BCG-A2982 IC: 579C-A2982	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>		Approved by: Technical Manager
Test Report S/N: 1C2305020012-08.BCG	Test Dates: 6/7/2023 - 8/7/2023	EUT Type: Watch	Page 74 of 75

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-A2982, IC: 579C-A2982** 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.

<b>FCC ID:</b> BCG-A2982 <b>IC:</b> 579C-A2982		<b>MEASUREMENT REPORT (CERTIFICATION)</b>	<b>Approved by:</b> Technical Manager
<b>Test Report S/N:</b> 1C2305020012-08.BCG	<b>Test Dates:</b> 6/7/2023 - 8/7/2023	<b>EUT Type:</b> Watch	Page 75 of 75

V 10.5 12/15/2021

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