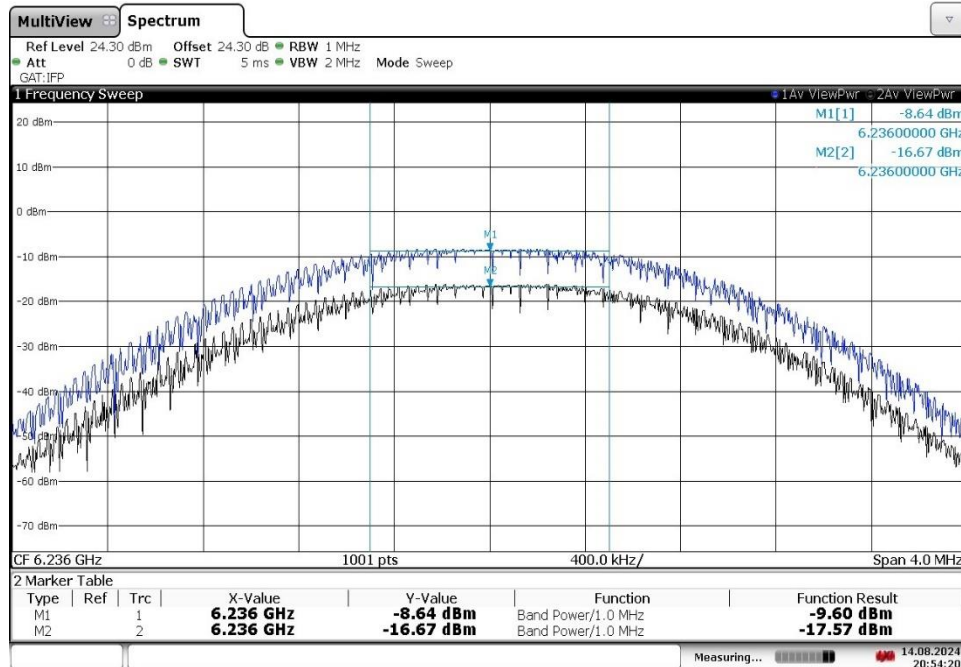


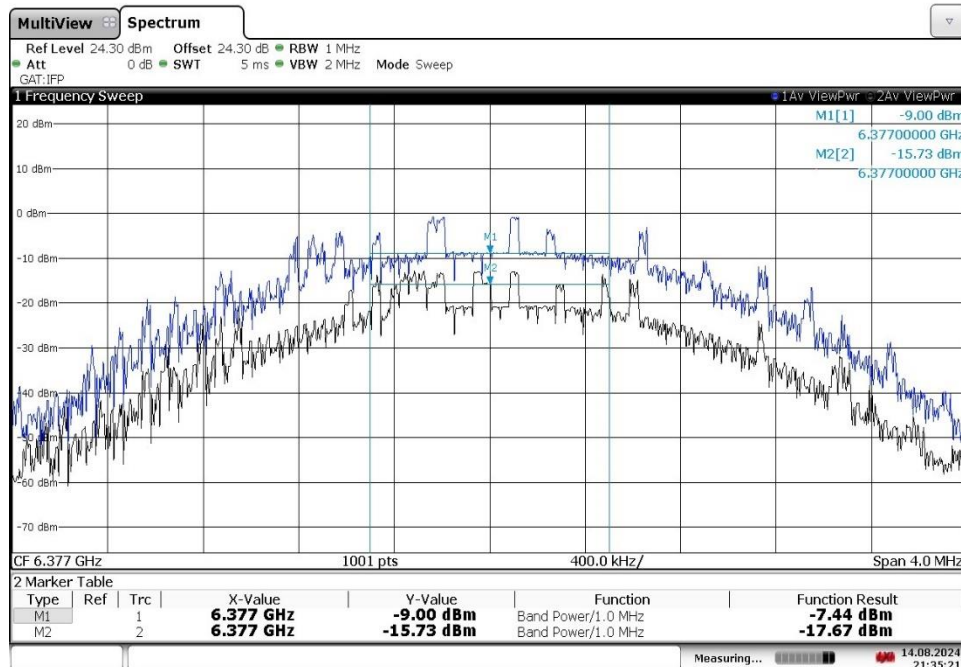
WW2305\_06 F24K244653 UWB ch5 Config 704 Payload 0B 0BW F8 FF.PNG



20:54:20 14.08.2024

Plot 7-60. Power Spectral Density Plot (NB U11 6236MHz)

WW2305\_06 F24K244653 UWB ch5 Config 704 Payload 0B 0BW F8 FF.PNG



21:35:22 14.08.2024

Plot 7-61. Power Spectral Density Plot (NB U11 6377MHz)

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 59 of 95

V 10.6 10/27/2023

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## 7.8 Radiated Spurious Emission – Above 1GHz

§15.407(b) §15.205 §15.209

### 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 its maximum power control level, as defined in ANSI C63.10-2020 and KDB 789033 D02 v02r01, and at the appropriate frequencies. 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 must not exceed the limits shown in Table 7-13 per Section 15.209.***

Frequency	Field Strength [ $\mu\text{V/m}$ ]	Measured Distance [Meters]
Above 960.0 MHz	500	3

**Table 7-10. Radiated Limits**

### Test Procedures Used

ANSI C63.10-2020 – Sections 12.7.7.2, 12.7.6  
KDB 789033 D02 v02r01 – Section G

### 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  $\geq 2 \times \text{span/RBW}$ )
6. Averaging type = power (RMS)
7. Sweep time = auto couple
8. Trace was averaged over 100 sweeps

#### Peak Field Strength Measurements

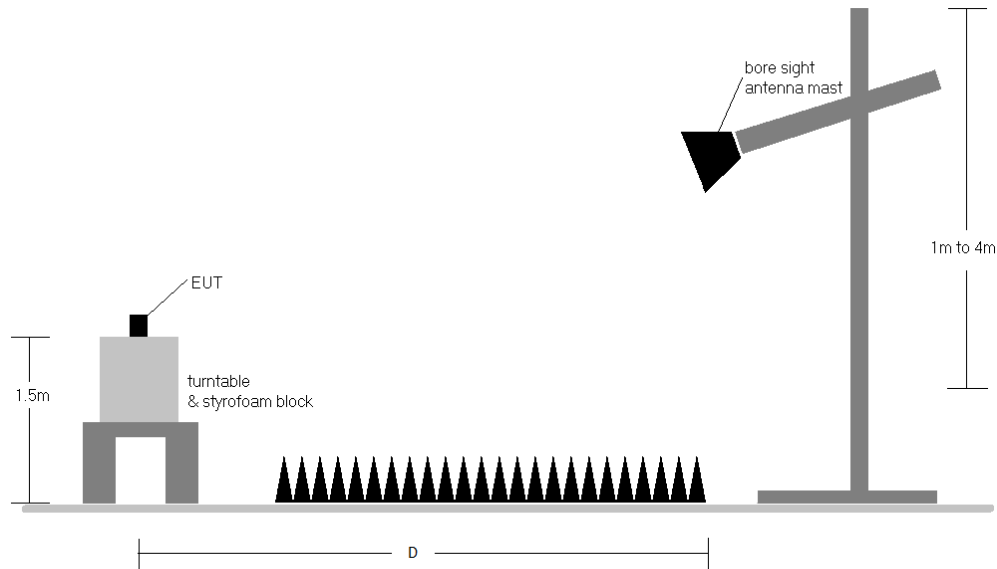
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 60 of 95

V 10.6 10/27/2023

**Test Setup**

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



**Figure 7-8. Test Instrument & Measurement Setup**

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 61 of 95

V 10.6 10/27/2023

## Test Notes

1. All emissions that lie in the restricted bands (denoted by a \* next to the frequency) specified in §15.205 are below the limit shown in Table 7-10.
2. All spurious emissions lying in restricted bands specified in §15.205 are below the limit shown in Table 7-10. All spurious emissions that do not lie in a restricted band are subject to a limit of -27dBm/MHz. At a distance of 3 meters, the field strength limit in dB $\mu$ V/m can be determined by adding a "conversion" factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions of 68.2dB $\mu$ V/m.
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 "-" shown in the following RSE tables are used to denote a noise floor measurement.

## 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]

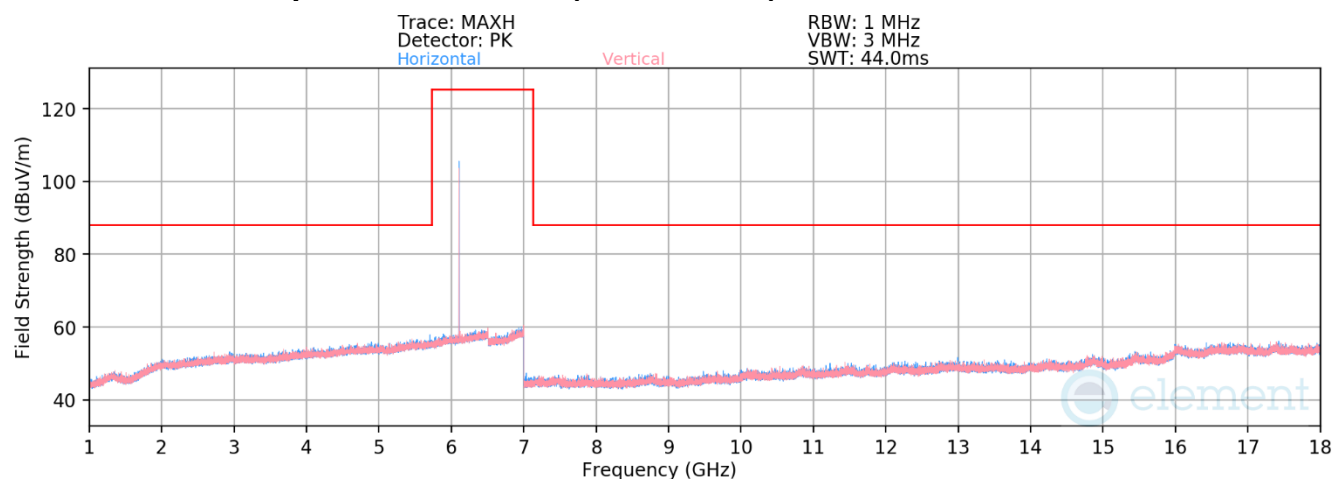
### Radiated Band Edge Measurement Offset

- The amplitude offset shown in the radiated restricted band edge plots in Section 7.8.2 was calculated using the formula:  
Offset (dB) = (Antenna Factor + Cable Loss + Attenuator) – Preamplifier Gain

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 62 of 95

V 10.6 10/27/2023

## 7.8.1 Radiated Spurious Emission (Above 1GHz)



**Plot 7-62. Radiated Spurious Emissions 1-18GHz (NB UNII BDR – 6108MHz)**

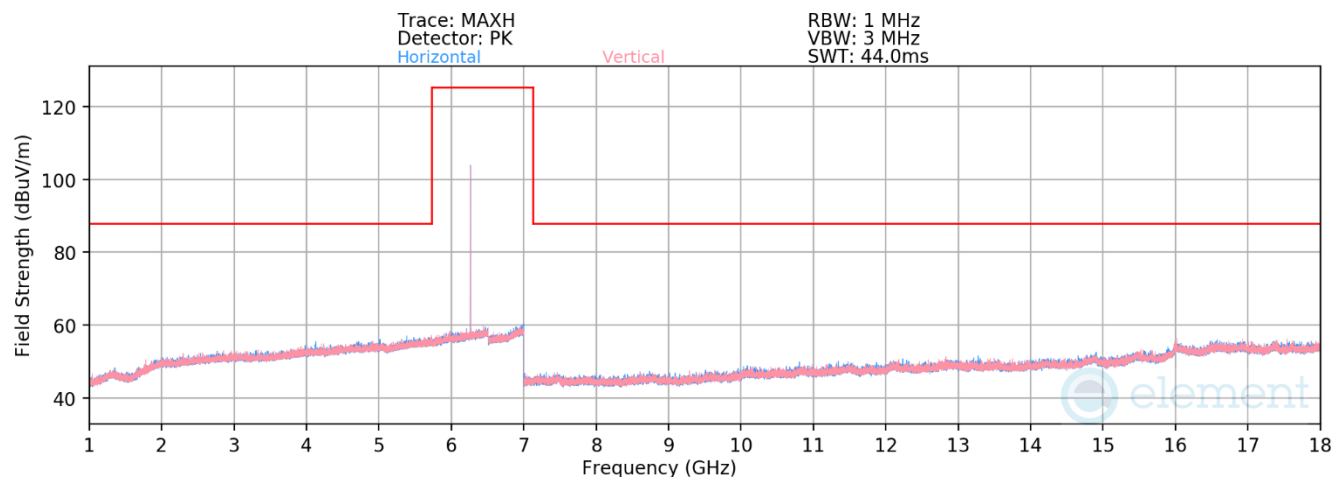
Mode: NB UNII BDR  
Data Rate: 1Mbps  
Distance of Measurements: 3 Meters  
Operating Frequency: 6108MHz

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]
* 12216.00	Avg	V	-	-	-79.19	11.16	38.97	53.98	-15.01
* 12216.00	Peak	V	-	-	-68.19	11.16	49.97	73.98	-24.01

**Table 7-11. Radiated Spurious Emissions Measurements**

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 63 of 95

V 10.6 10/27/2023



**Plot 7-63. Radiated Spurious Emissions 1-18GHz (NB UNII BDR – 6264MHz)**

Mode: NB UNII BDR

Data Rate: 1Mbps

Distance of Measurements: 3 Meters

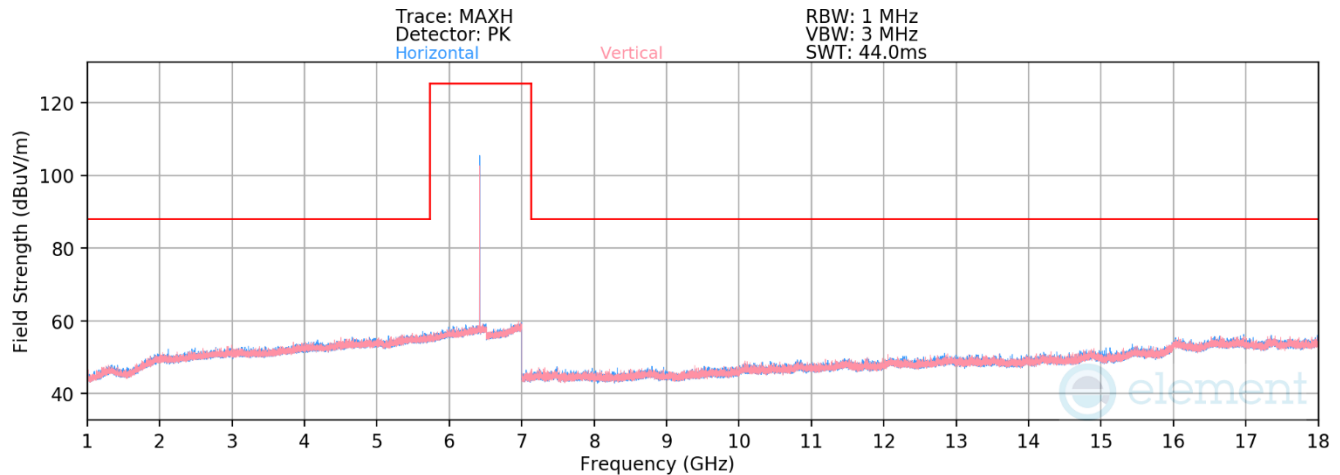
Operating Frequency: 6264MHz

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]
12528.00	Avg	V	-	-	-79.04	11.38	39.34	53.98	-14.64
12528.00	Peak	V	-	-	-68.25	11.38	50.13	73.98	-23.85

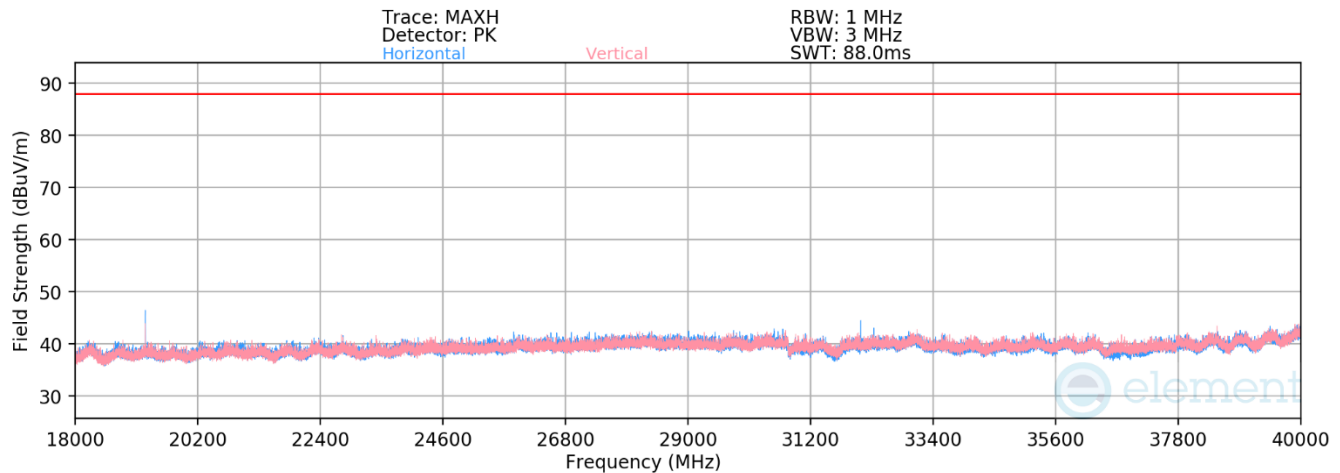
**Table 7-12. Radiated Spurious Emissions Measurements**

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 64 of 95

V 10.6 10/27/2023



**Plot 7-64. Radiated Spurious Emissions 1-18GHz (NB UNII BDR - 6420MHz)**



**Plot 7-65. Radiated Spurious Emissions 18-40GHz (NB UNII BDR - 6420MHz)**

Mode: NB UNII BDR

Data Rate: 1Mbps

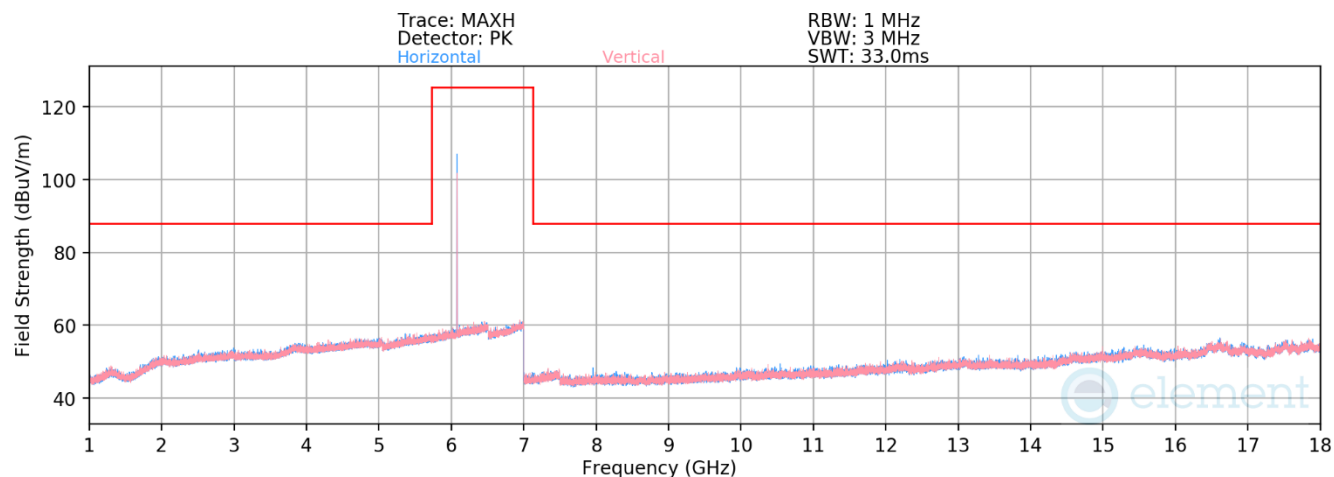
Distance of Measurements: 3 Meters

Operating Frequency: 6420MHz

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Duty Cycle Correction [dB]	Field Strength [dBuV/m]	Limit [dBuV/m]	Margin [dB]
* 12840.00	Avg	H	104	230	-72.56	11.92	1.16	47.52	53.98	-6.46
* 12480.00	Peak	H	104	230	-64.91	11.92	0.00	54.01	73.98	-19.97
* 19260.00	Avg	H	24	266	-58.38	-7.31	1.16	42.47	53.98	-11.51
* 19260.00	Peak	H	24	266	-51.63	-7.31	0.00	48.06	73.98	-25.92
25680.00	Avg	H	267	158	-72.32	-4.97	1.16	30.87	68.23	-37.36
25680.00	Peak	H	267	158	-60.58	-4.97	0.00	41.45	88.23	-46.78
32100.00	Avg	V	356	175	-72.34	-2.20	1.16	33.62	68.23	-34.61
32100.00	Peak	V	356	175	-62.54	-2.20	0.00	42.26	88.23	-45.97
38520.00	Avg	V	61	279	-72.33	-3.21	1.16	32.62	68.23	-35.61
38520.00	Peak	V	61	279	-60.66	-3.21	0.00	43.13	88.23	-45.10

**Table 7-13. Radiated Spurious Emissions Measurements**

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 65 of 95



**Plot 7-66. Radiated Spurious Emissions 1-18GHz (NB UNII (LE2M) – 6108MHz)**

Mode: NB UNII LE

Data Rate: 2Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 6108MHz

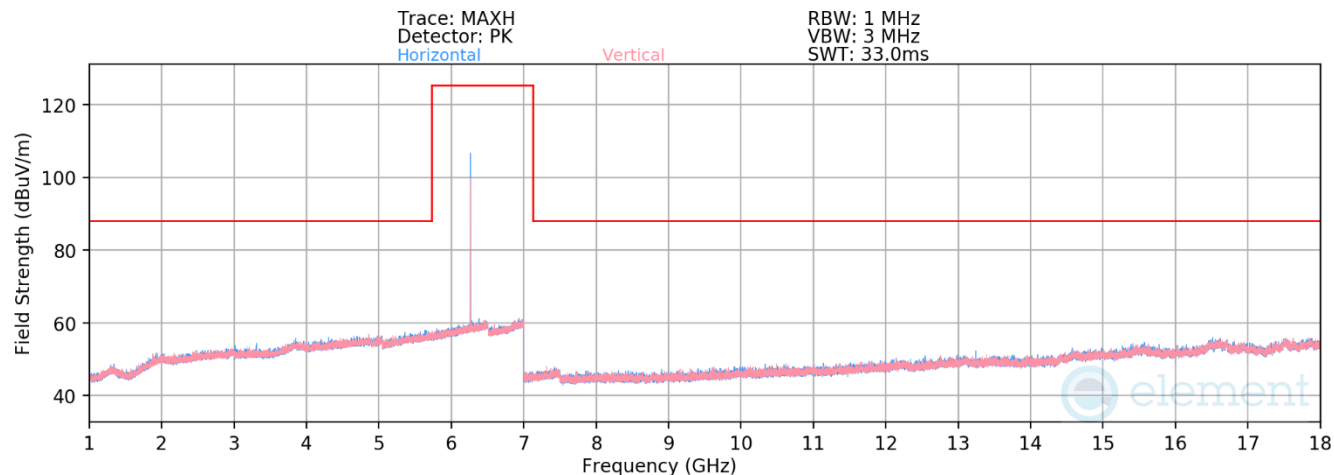
Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBuV/m]	Limit [dBuV/m]	Margin [dB]
* 12216.00	Avg	-	-	-	-79.21	10.70	38.49	53.98	-15.49
* 12216.00	Peak	-	-	-	-67.82	10.70	49.88	73.98	-24.10

**Table 7-14. Radiated Spurious Emissions Measurements**

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 66 of 95

V 10.6 10/27/2023





**Plot 7-67. Radiated Spurious Emissions 1-18GHz (NB UNII (LE2M) – 6264MHz)**

Mode: NB UNII LE

Data Rate: 2Mbps

Distance of Measurements: 3 Meters

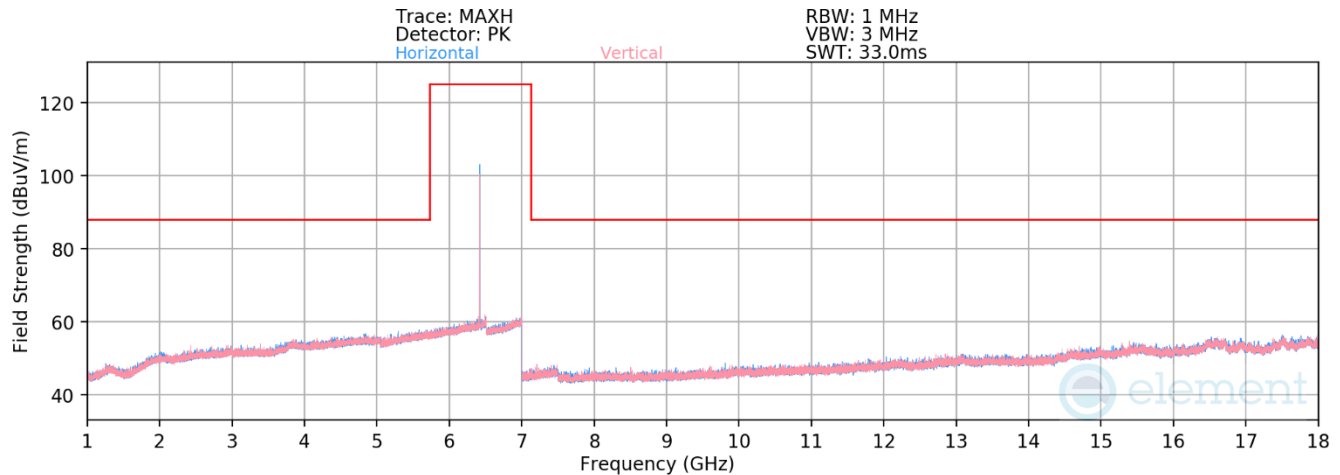
Operating Frequency: 6264MHz

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]
* 12528.00	Avg	-	-	-	-79.13	10.84	38.71	53.98	-15.27
* 12528.00	Peak	-	-	-	-67.94	10.84	49.90	73.98	-24.08

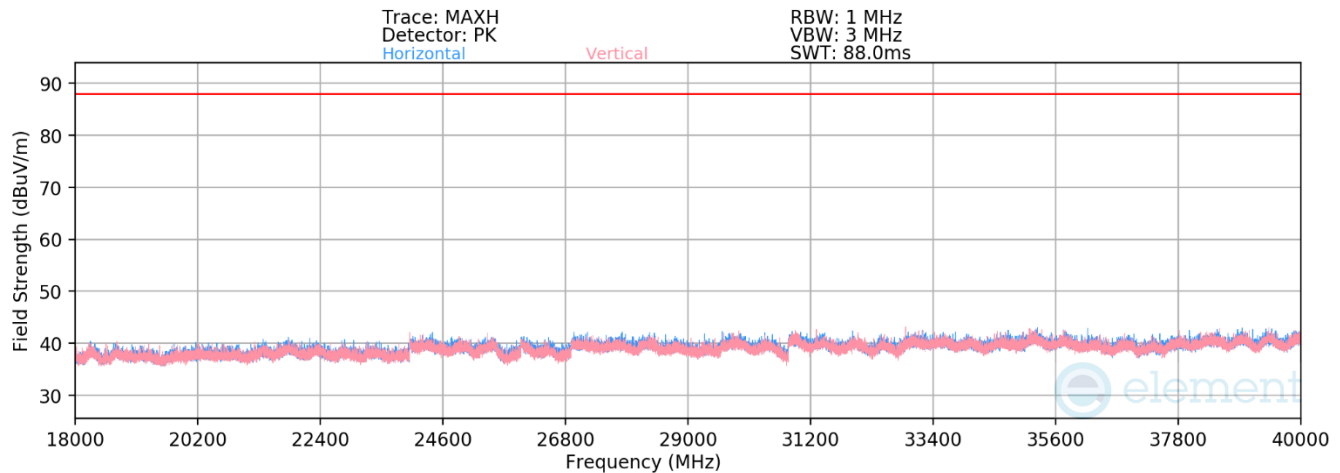
**Table 7-15. Radiated Spurious Emissions Measurements**

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 67 of 95

V 10.6 10/27/2023



**Plot 7-68. Radiated Spurious Emissions 1-18GHz (NB UNII (LE2M) – 6420MHz)**



**Plot 7-69. Radiated Spurious Emissions 18-40GHz (NB UNII (LE2M)– 6420MHz)**

Mode: NB UNII LE

Data Rate: 2Mbps

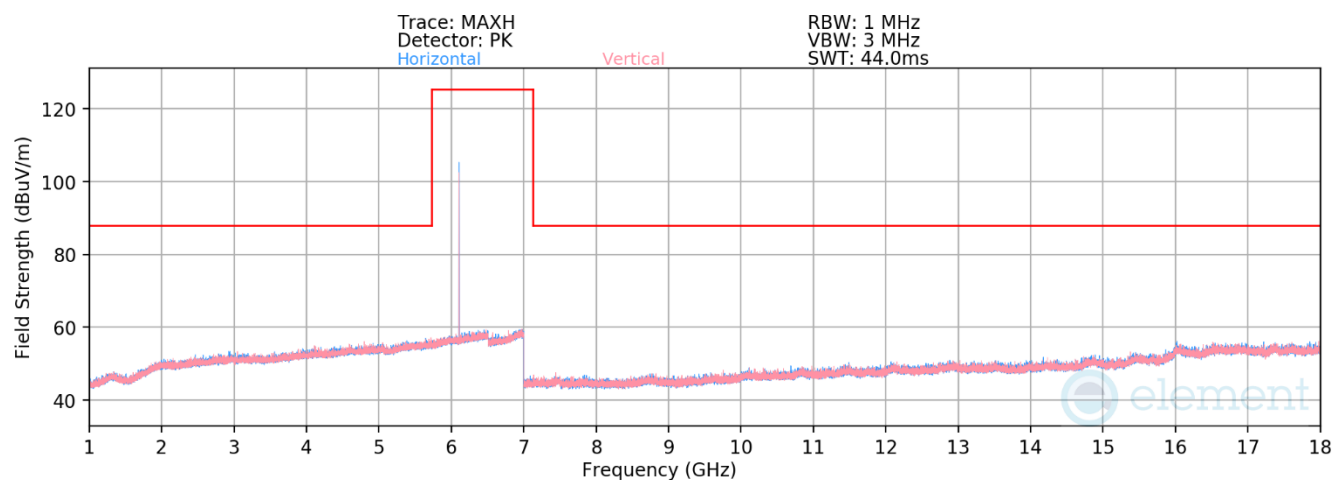
Distance of Measurements: 3 Meters

Operating Frequency: 6420MHz

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Duty Cycle Correction [dB]	Field Strength [dBuV/m]	Limit [dBuV/m]	Margin [dB]
* 12480.00	Avg	H	356	95	-79.35	11.19	0.64	39.47	53.98	-14.51
* 12480.00	Peak	H	3256	95	-68.99	11.19	0.00	49.53	73.98	-24.45
* 19260.00	Avg	-	-	-	-71.46	-7.31	0.00	28.23	53.98	-25.75
* 19260.00	Peak	-	-	-	-59.84	-7.31	0.00	39.85	73.98	-34.13
25680.00	Avg	-	-	-	-73.86	-4.97	0.00	28.17	68.23	-40.06
25680.00	Peak	-	-	-	-61.98	-4.97	0.00	40.05	88.23	-48.18
32100.00	Avg	-	-	-	-74.49	-2.20	0.00	30.31	68.23	-37.92
32100.00	Peak	-	-	-	-62.99	-2.20	0.00	41.81	88.23	-46.42
38520.00	Avg	-	-	-	-72.48	-3.21	0.00	31.31	68.23	-36.92
38520.00	Peak	-	-	-	-60.51	-3.21	0.00	43.28	88.23	-44.95

**Table 7-16. Radiated Spurious Emissions Measurements**

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 68 of 95



**Plot 7-70. Radiated Spurious Emissions 1-18GHz (NB UNII HDR4 – 6108MHz)**

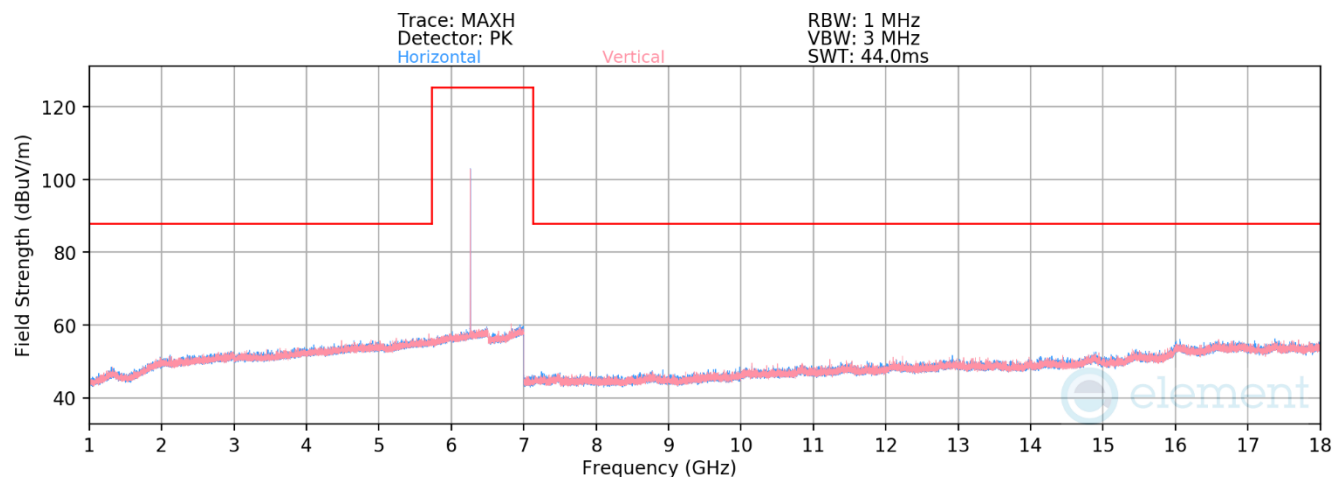
Mode: NB UNII HDR4  
Data Rate: 4Mbps  
Distance of Measurements: 3 Meters  
Operating Frequency: 6108MHz

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]
* 12216.00	Avg	H	-	-	-79.22	11.19	38.97	53.98	-15.01
* 12216.00	Peak	H	-	-	-68.02	11.13	50.11	73.98	-23.87

**Table 7-17. Radiated Spurious Emissions Measurements**

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 69 of 95

V 10.6 10/27/2023



**Plot 7-71. Radiated Spurious Emissions 1-18GHz (NB UNII HDR4 – 6264MHz)**

Mode: NB UNII HDR4

Data Rate: 4Mbps

Distance of Measurements: 3 Meters

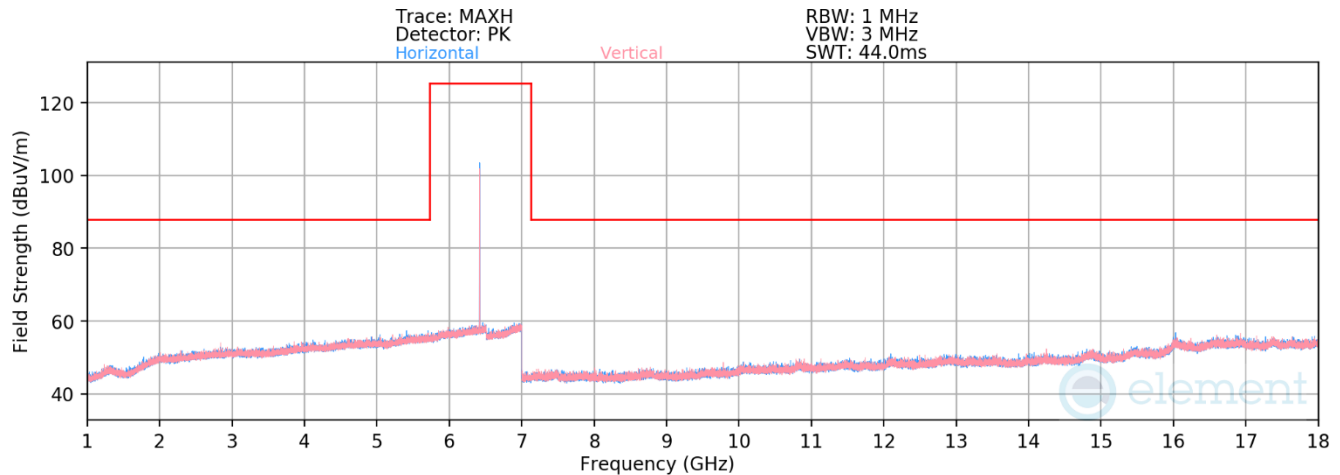
Operating Frequency: 6264MHz

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]
* 12528.00	Avg	H	-	-	-78.98	11.32	39.34	53.98	-14.64
* 12528.00	Peak	H	-	-	-68.06	11.32	50.26	73.98	-23.72

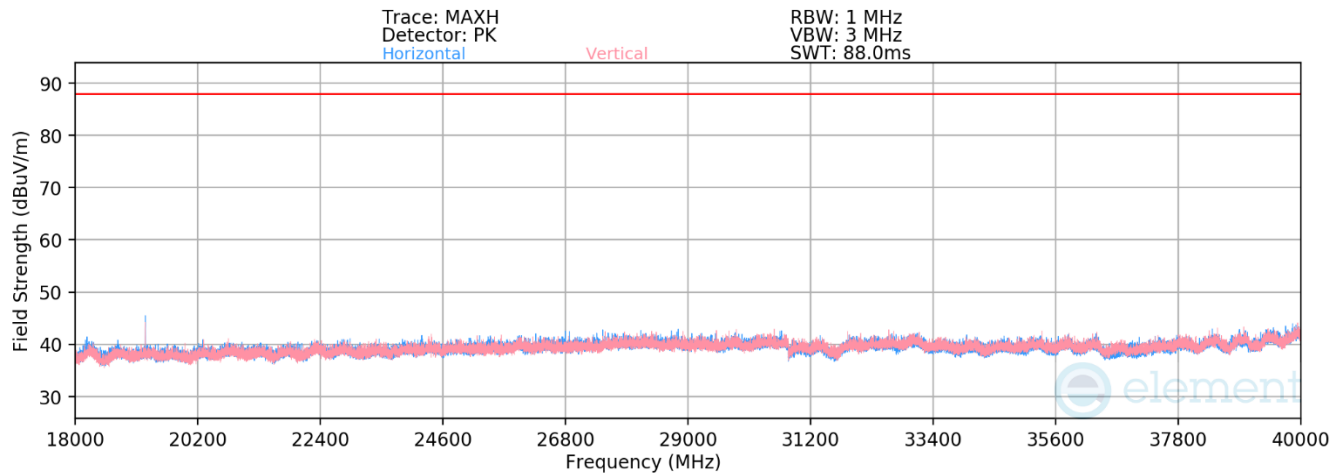
**Table 7-18. Radiated Spurious Emissions Measurements**

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 70 of 95

V 10.6 10/27/2023



**Plot 7-72. Radiated Spurious Emissions 1-18GHz (NB UNII HDR4 – 6420MHz)**



**Plot 7-73. Radiated Spurious Emissions Above 18GHz (NB UNII HDR4 – 6420MHz)**

Mode: NB UNII HDR4

Data Rate: 4Mbps

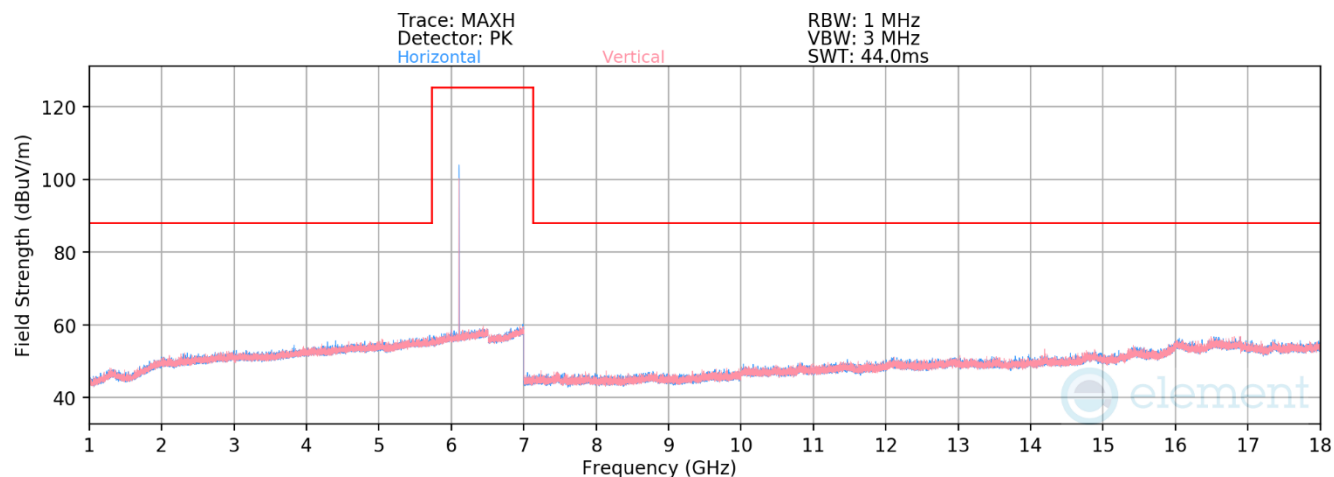
Distance of Measurements: 3 Meters

Operating Frequency: 6420MHz

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Duty Cycle Correction [dB]	Field Strength [dBuV/m]	Limit [dBuV/m]	Margin [dB]
* 12840.00	Avg	H	112	5	-78.97	11.99	1.09	41.11	53.98	-12.87
* 12840.00	Peak	H	112	5	-67.64	11.86	0.00	51.22	73.98	-22.76
* 19260.00	Avg	V	18	199	-63.48	-7.31	1.09	37.30	53.98	-16.68
* 19260.00	Peak	V	18	199	-51.97	-7.31	0.00	47.72	73.98	-26.26
25680.00	Avg	H	-	-	-72.33	-4.97	0.00	29.70	68.23	-38.53
25680.00	Peak	H	-	-	-60.41	-4.97	0.00	41.62	88.23	-46.61
32100.00	Avg	V	102	117	-70.84	-2.20	1.09	35.06	68.23	-33.17
32100.00	Peak	V	102	117	-60.29	-2.20	0.00	44.51	88.23	-43.72
38520.00	Avg	V	-	-	-71.94	-3.21	0.00	31.85	68.23	-36.38
38520.00	Peak	V	-	-	-59.75	-3.21	0.00	44.04	88.23	-44.19

**Table 7-19. Radiated Spurious Emissions Measurements**

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 71 of 95



**Plot 7-74. Radiated Spurious Emissions 1-18GHz (NB UNII HDRp4 – 6108MHz)**

Mode: NB UNII HDRp4

Data Rate: 4Mbps

Distance of Measurements: 3 Meters

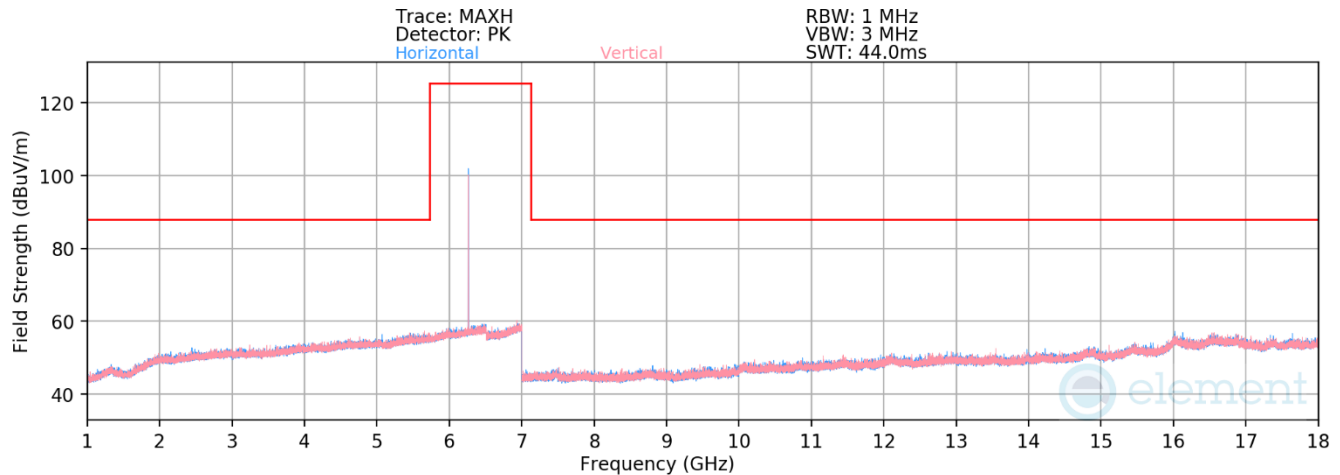
Operating Frequency: 6108MHz

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]
12216.00	Avg	-	-	-	-79.24	11.16	38.92	53.98	-15.06
12216.00	Peak	-	-	-	-68.19	11.16	49.97	73.98	-24.01

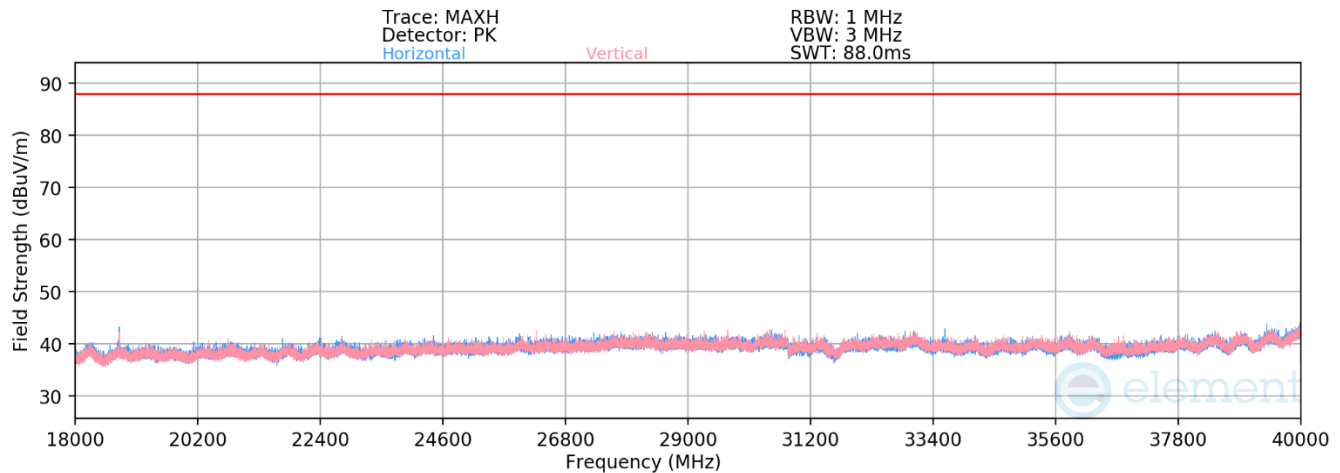
**Table 7-20. Radiated Spurious Emissions Measurements**

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 72 of 95

V 10.6 10/27/2023



**Plot 7-75. Radiated Spurious Emissions 1-18GHz (NB UNII HDRp4 – 6264MHz)**



**Plot 7-76. Radiated Spurious Emissions Above 18GHz (NB UNII HDRp4 – 6264MHz)**

Mode: NB UNII HDRp4

Data Rate: 4Mbps

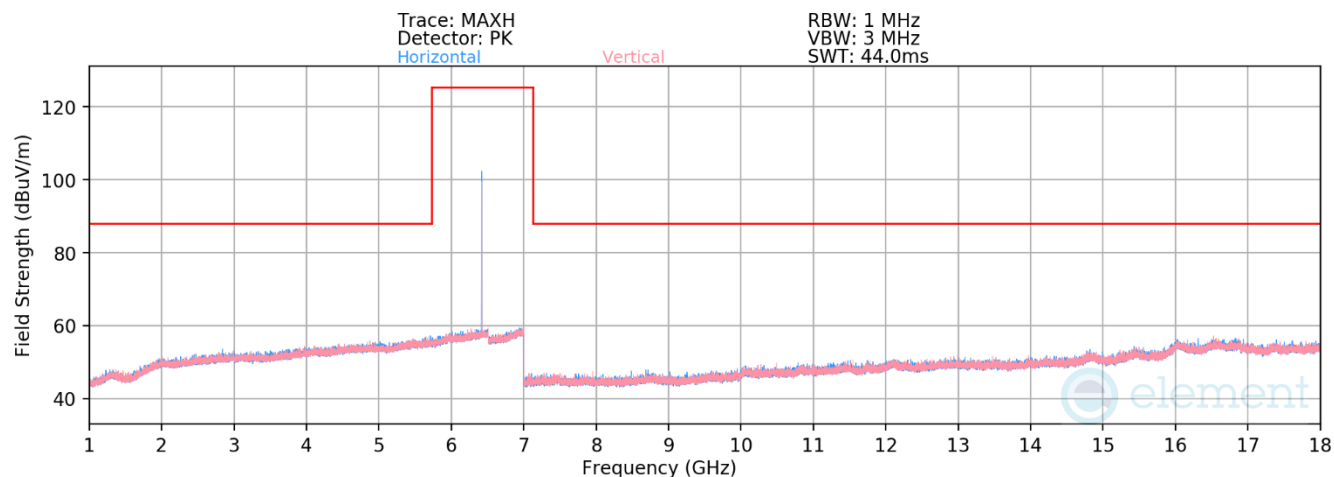
Distance of Measurements: 3 Meters

Operating Frequency: 6264MHz

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Duty Cycle Correction [dB]	Field Strength [dBuV/m]	Limit [dBuV/m]	Margin [dB]
* 12528.00	Avg	H	-	-	-78.72	11.38	0.00	39.65	53.98	-14.327
* 12528.00	Peak	H	-	-	-67.82	11.38	0.00	50.56	73.98	-23.42
* 18792.00	Avg	V	351	72	-62.76	-7.31	0.59	37.52	53.98	-16.46
* 18792.00	Peak	V	351	72	-53.89	-7.31	0.00	45.80	73.98	-28.19
25056.00	Avg	H	-	-	-71.83	-4.97	0.00	30.20	68.23	-38.03
25056.00	Peak	H	-	-	-60.18	-4.97	0.00	41.85	88.23	-46.39
31320.00	Avg	V	205	181	-70.51	-2.20	0.59	34.88	68.23	-33.35
31320.00	Peak	V	205	181	-59.73	-2.20	0.00	45.08	88.23	-43.16
37584.00	Avg	V	-	-	-73.30	-3.21	0.00	30.49	68.23	-37.74
37584.00	Peak	V	-	-	-61.51	-3.21	0.00	42.28	88.23	-45.95

**Table 7-21. Radiated Spurious Emissions Measurements**

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 73 of 95



**Plot 7-77. Radiated Spurious Emissions 1-18GHz (NB UNII HDRp4 – 6420MHz)**

Mode: NB UNII HDRp4  
Data Rate: 4Mbps  
Distance of Measurements: 3 Meters  
Operating Frequency: 6420MHz

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]
* 12840.00	Avg	-	-	-	-78.73	11.92	40.20	53.98	-13.78
* 12840.00	Peak	-	-	-	-68.41	11.92	50.51	73.98	-23.47

**Table 7-22. Radiated Spurious Emissions Measurements**

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud		Page 74 of 95

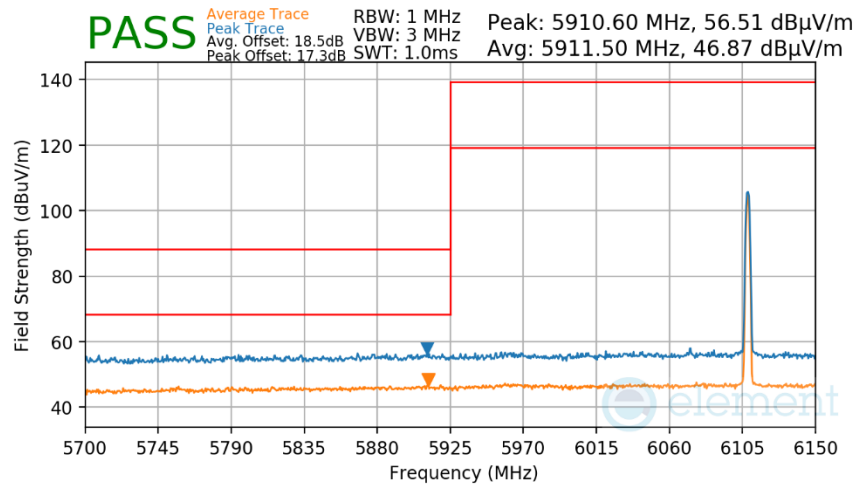
V 10.6 10/27/2023



## 7.8.2 Radiated Band Edge Measurements

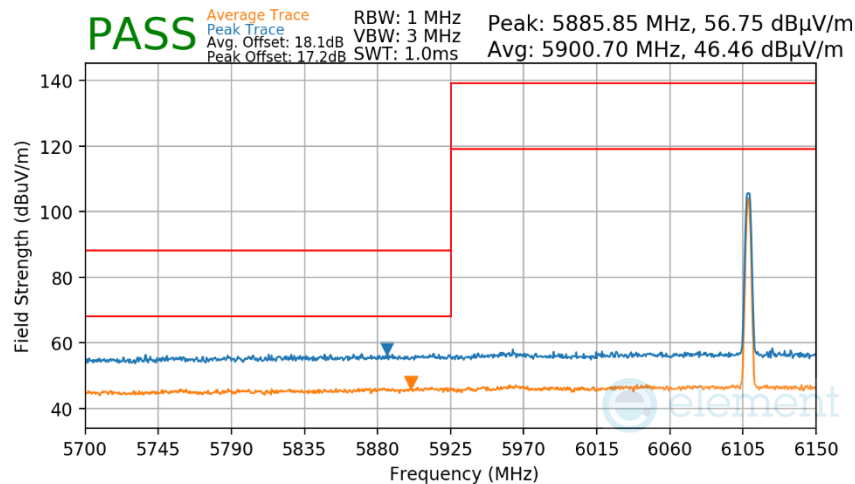
§15.407(b) §15.205 §15.209

Mode: NB UNII BDR  
 Measurement Distance: 3 Meters  
 Operating Frequency: 6108MHz



**Plot 7-78. Radiated Lower Band Edge Measurement**

Mode: NB UNII LE  
 Data Rate: 2Mbps  
 Measurement Distance: 3 Meters  
 Operating Frequency: 6108MHz

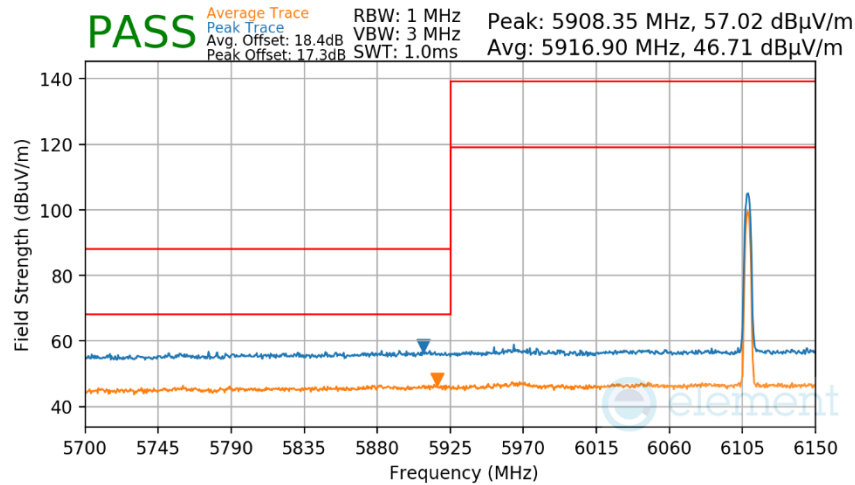


**Plot 7-79. Radiated Lower Band Edge Measurement**

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 75 of 95

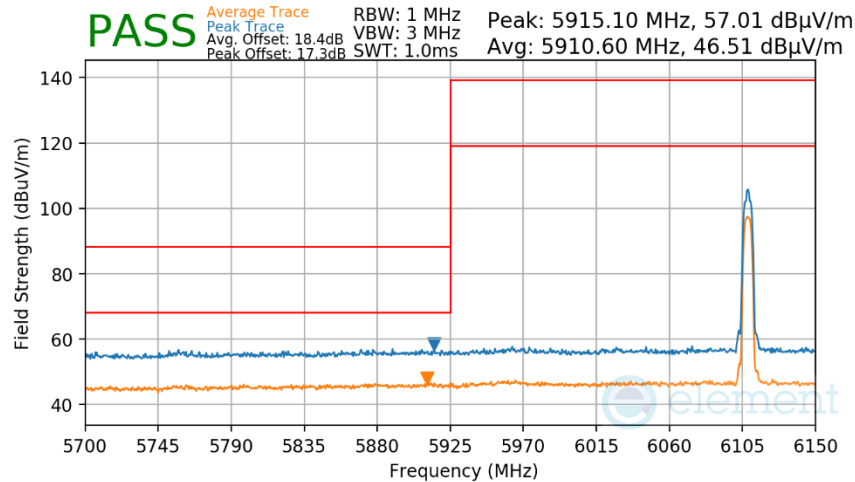
V 10.6 10/27/2023

Mode: NB UNII HDR4  
 Measurement Distance: 3 Meters  
 Operating Frequency: 6108MHz



**Plot 7-80. Radiated Lower Band Edge Measurement**

Mode: NB UNII HDR8  
 Measurement Distance: 3 Meters  
 Operating Frequency: 6108MHz

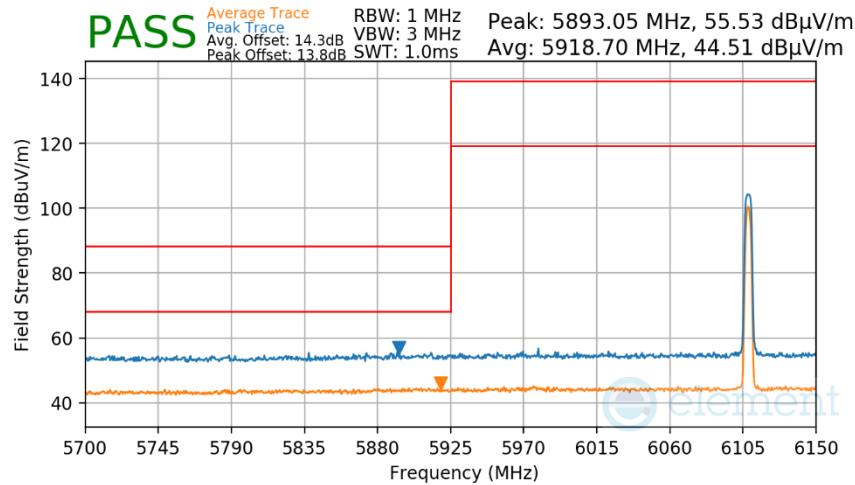


**Plot 7-81. Radiated Lower Band Edge Measurement**

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 76 of 95

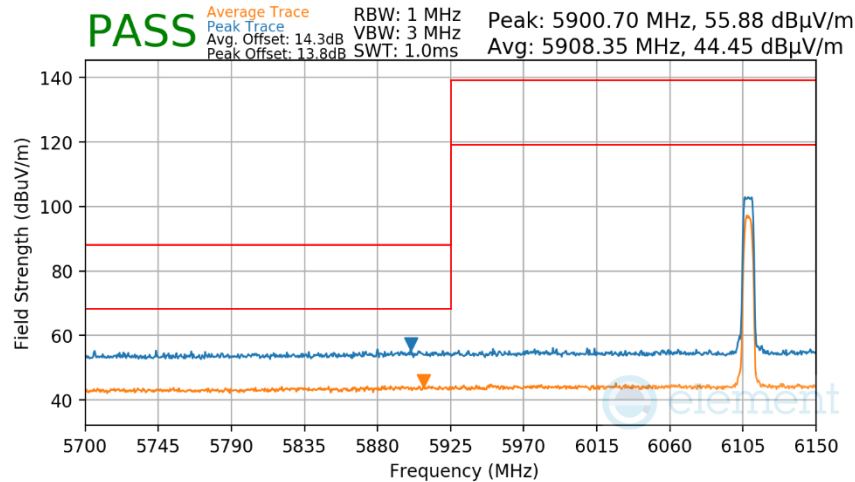
V 10.6 10/27/2023

Mode: NB UNII HDRp4  
 Measurement Distance: 3 Meters  
 Operating Frequency: 6108MHz



**Plot 7-82. Radiated Lower Band Edge Measurement**

Mode: NB UNII HDRp8  
 Measurement Distance: 3 Meters  
 Operating Frequency: 6108MHz



**Plot 7-83. Radiated Lower Band Edge Measurement**

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 77 of 95

V 10.6 10/27/2023

## 7.9 Radiated Spurious Emissions – Below 1GHz

### §15.209

#### 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 must not exceed the limits shown in Table 7-23 per Section 15.209.***

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 7-23. 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

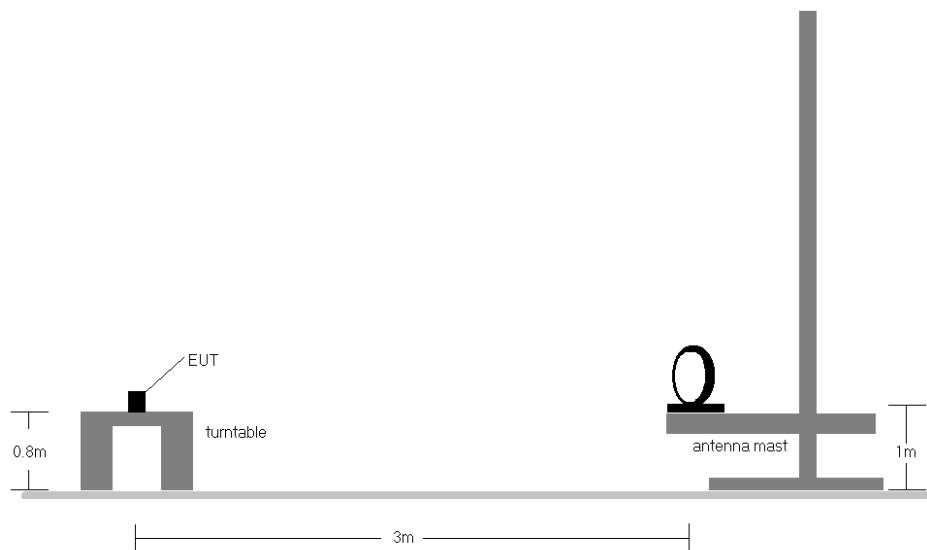
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 120kHz (for emissions from 30MHz – 1GHz)
3. VBW = 300kHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 78 of 95

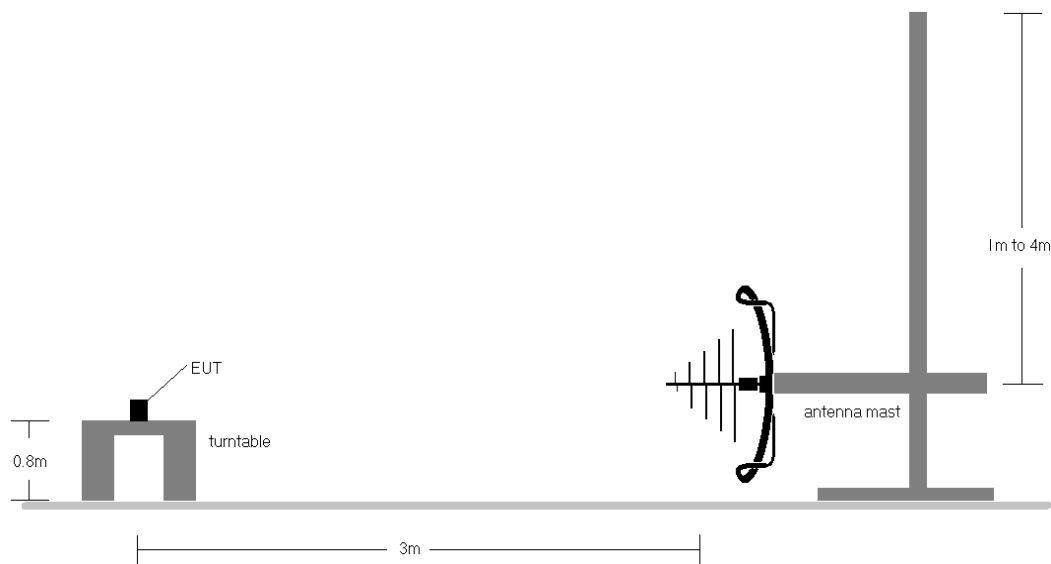
V 10.6 10/27/2023

## Test Setup

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



**Figure 7-9. Radiated Test Setup < 30MHz**



**Figure 7-10. Radiated Test Setup < 1GHz**

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 79 of 95

V 10.6 10/27/2023

## Test Notes

1. All emissions lying in restricted bands specified in §15.205 are below the limit shown in Table 7-23.
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. Both configurations below were investigated, and the worst case has been reported.
  - a. EUT charged by charging case and powered by AC/DC adaptor with USB-C cable.
  - b. EUT charged by charging case and powered by with Laptop and USB-C Cable.

## Sample Calculations

### Determining Spurious Emissions Levels

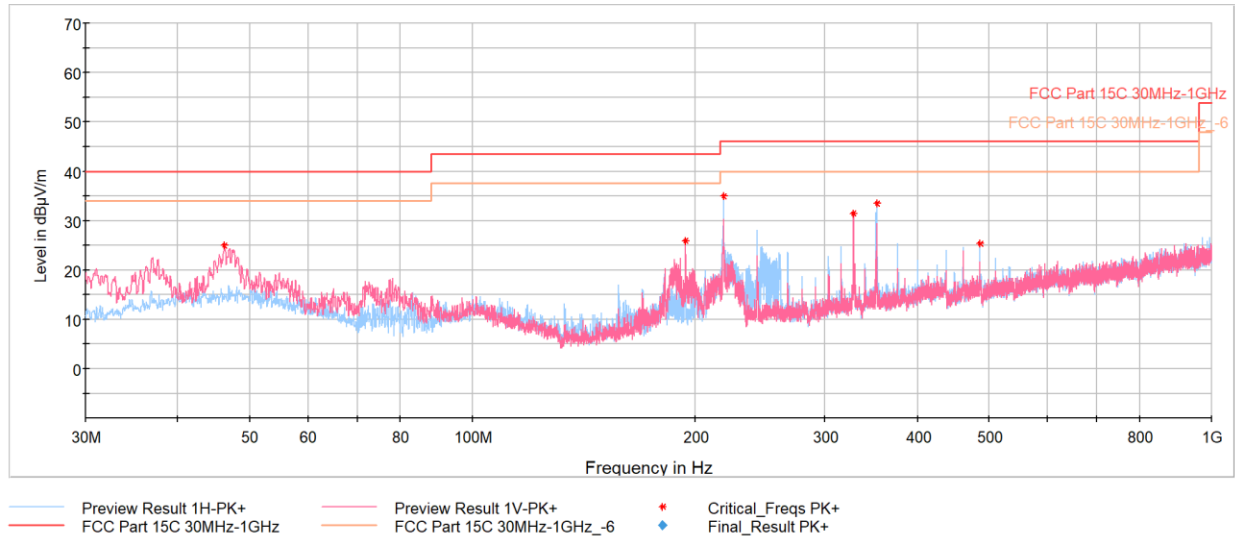
- Field Strength Level  $_{[dB_{\mu V/m}]}$  = Analyzer Level  $_{[dBm]} + 107 + AFCL_{[dB/m]}$
- $AFCL_{[dB/m]} = Antenna\ Factor_{[dB/m]} + Cable\ Loss_{[dB]} - Preamplifier\ Gain_{[dB]}$
- Margin  $_{[dB]} = Field\ Strength\ Level_{[dB_{\mu V/m}]} - Limit_{[dB_{\mu V/m}]}$

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 80 of 95

V 10.6 10/27/2023

## Radiated Spurious Emissions (Below 1GHz)

§15.209



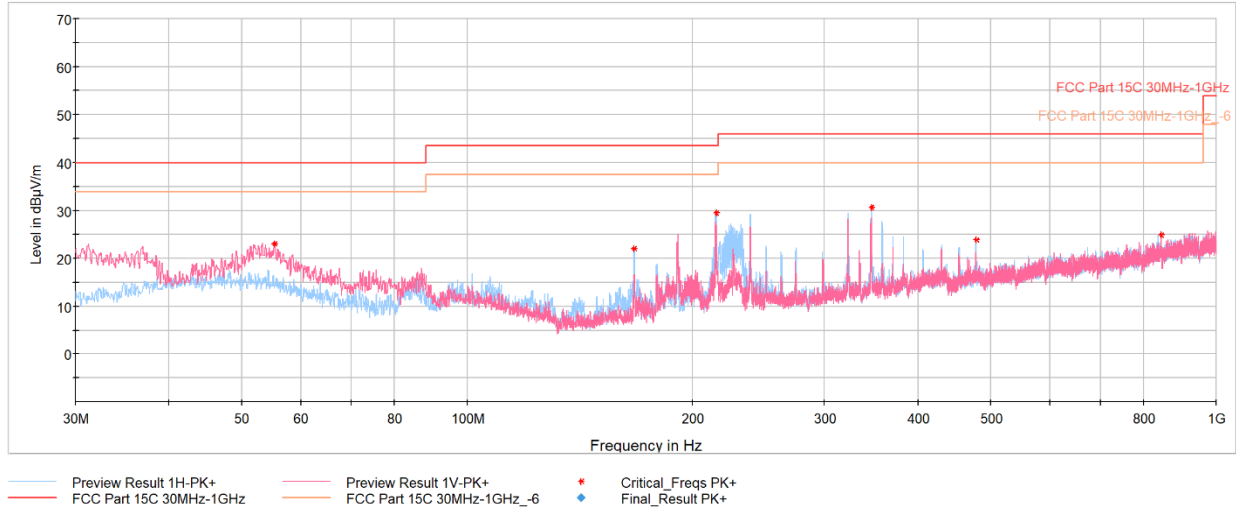
**Plot 7-84. Radiated Spurious Emissions Below 1GHz (NB UNII BDR – 6420MHz), with AC/DC Adapter and USB-C Cable**

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]
46.25	Max Peak	V	100	352	-68.43	-13.52	25.05	40.00	-14.95
194.22	Max Peak	V	100	92	-63.48	-17.55	25.97	43.52	-17.55
218.47	Max Peak	H	100	321	-54.72	-17.34	34.94	46.02	-11.08
327.74	Max Peak	V	100	275	-61.26	-14.22	31.52	46.02	-14.50
352.09	Max Peak	H	100	134	-60.03	-13.51	33.46	46.02	-12.56
485.80	Max Peak	H	200	241	-70.86	-10.81	25.33	46.02	-20.69

**Table 7-24. Radiated Spurious Emissions Below 1GHz (NB UNII BDR – 6420MHz), with AC/DC Adapter and USB-C Cable**

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 81 of 95

V 10.6 10/27/2023



**Plot 7-85. Radiated Spurious Emissions Below 1GHz (NB UNII (LE2M) – 6420MHz), with AC/DC Adapter and USB-C Cable**

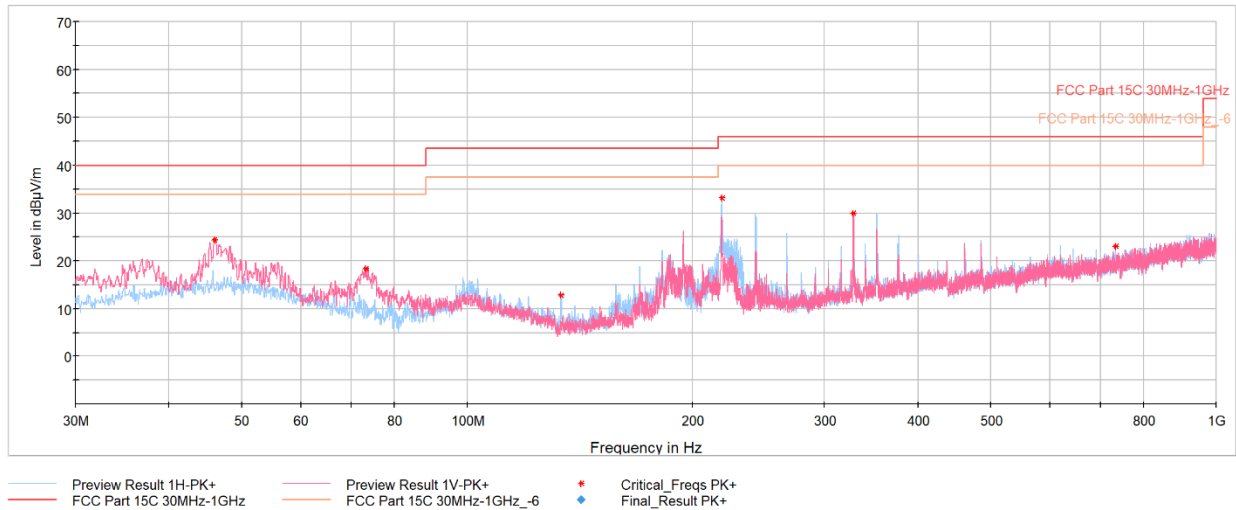
Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
55.32	Max Peak	V	100	11	-69.34	-14.59	23.07	40.00	-16.93
167.11	Max Peak	H	200	207	-65.12	-19.83	22.05	43.52	-21.47
214.88	Max Peak	H	200	314	-60.00	-17.55	29.45	43.52	-14.07
346.22	Max Peak	H	100	133	-63.08	-13.39	30.53	46.02	-15.49
477.75	Max Peak	H	100	158	-72.21	-10.91	23.88	46.02	-22.14
843.73	Max Peak	V	100	264	-77.73	-4.43	24.84	46.02	-21.18

**Table 7-25. Radiated Spurious Emissions Below 1GHz (NB UNII (LE2M) – 6420MHz), with AC/DC Adapter and USB-C Cable**

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud		Page 82 of 95

V 10.6 10/27/2023





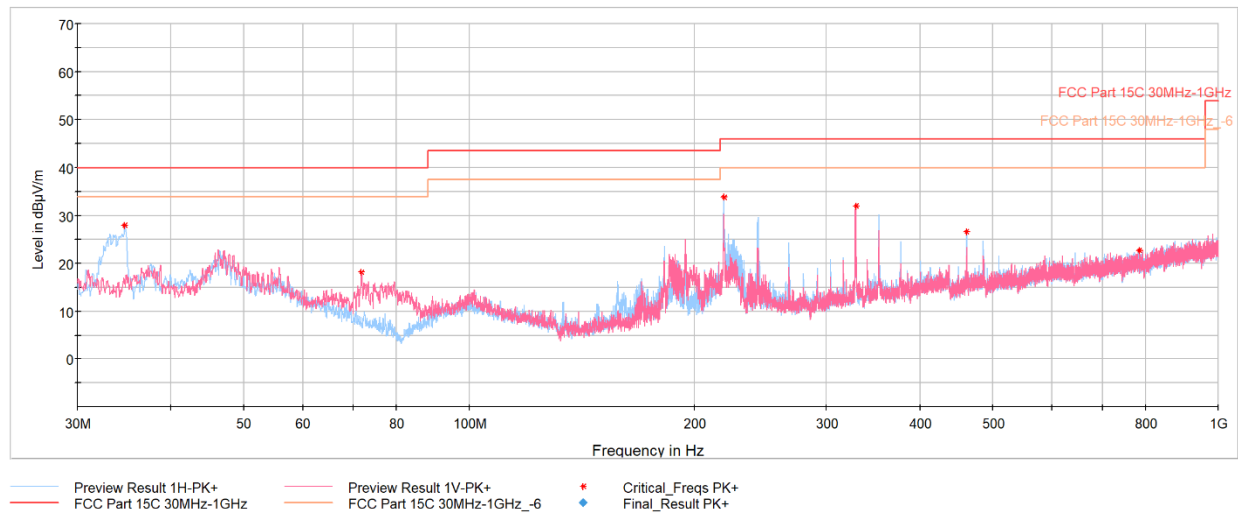
**Plot 7-86. Radiated Spurious Emissions Below 1GHz (NB UNII HDR4 – 6420MHz), with AC/DC Adapter and USB-C Cable**

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]
46.01	Max Peak	V	100	0	-69.03	-13.51	24.46	40.00	-15.54
73.17	Max Peak	V	100	0	-68.16	-20.45	18.39	40.00	-21.61
133.55	Max Peak	H	200	0	-73.67	-20.53	12.80	43.52	-30.72
218.52	Max Peak	H	100	312	-56.56	-17.34	33.10	46.02	-12.92
327.64	Max Peak	V	100	261	-62.78	-14.23	29.99	46.02	-16.03
734.27	Max Peak	H	100	90	-77.39	-6.55	23.06	46.02	-22.96

**Table 7-26. Radiated Spurious Emissions Below 1GHz (NB UNII HDR4 – 6420MHz), with AC/DC Adapter and USB-C Cable**

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud		Page 83 of 95

V 10.6 10/27/2023



**Plot 7-87. Radiated Spurious Emissions Below 1GHz (NB UNII HDRp4 – 6264MHz), with AC/DC Adapter and USB-C Cable**

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]
34.70	Max Peak	H	200	99	-63.06	-16.12	27.82	40.00	-12.18
71.86	Max Peak	V	200	221	-69.00	-19.82	18.18	40.00	-21.82
218.57	Max Peak	H	100	312	-55.93	-17.34	33.73	46.02	-12.29
327.94	Max Peak	V	100	266	-60.82	-14.20	31.98	46.02	-14.04
461.41	Max Peak	H	100	131	-68.92	-11.57	26.51	46.02	-19.51
783.16	Max Peak	V	200	312	-78.33	-6.04	22.63	46.02	-23.39

**Table 7-27. Radiated Spurious Emissions Below 1GHz (NB UNII HDRp4 – 6264MHz), with AC/DC Adapter and USB-C Cable**

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud		Page 84 of 95

V 10.6 10/27/2023

## 7.10 AC Line Conducted Emissions Measurement

### §15.207

#### 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. All data rates and modes were investigated for AC Line conducted spurious emissions.

***All conducted emissions must not exceed the limits shown in the table below, per Section 15.207.***

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 7-28. Conducted Limits**

\*Decreases with the logarithm of the frequency.

#### Test Procedures Used

ANSI C63.10-2020, Section 6.2

#### Test Settings

##### Quasi-Peak Measurements

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

##### Average Measurements

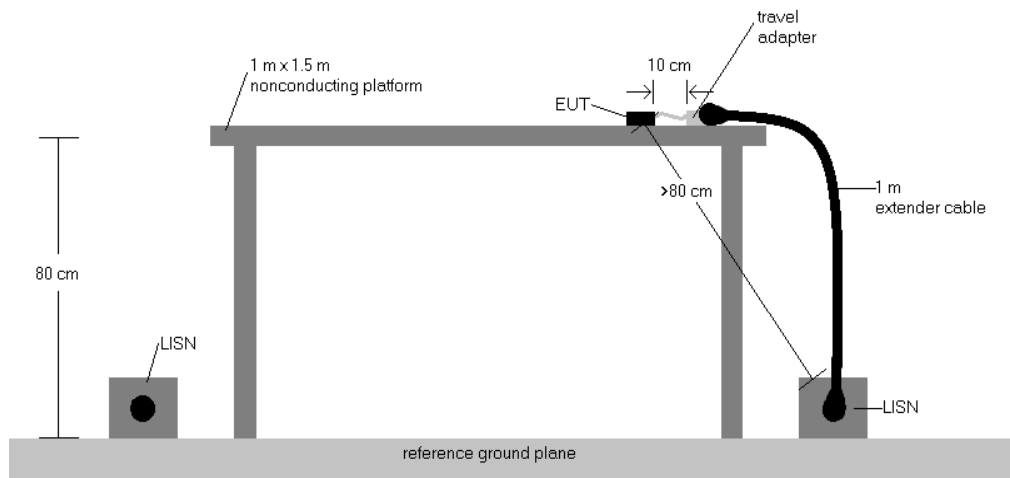
1. Analyzer center frequency was set to the frequency of the spurious emission of interest
2. RBW = 9kHz (for emissions from 150kHz – 30MHz)
3. Detector = RMS
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 85 of 95

V 10.6 10/27/2023

## Test Setup

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



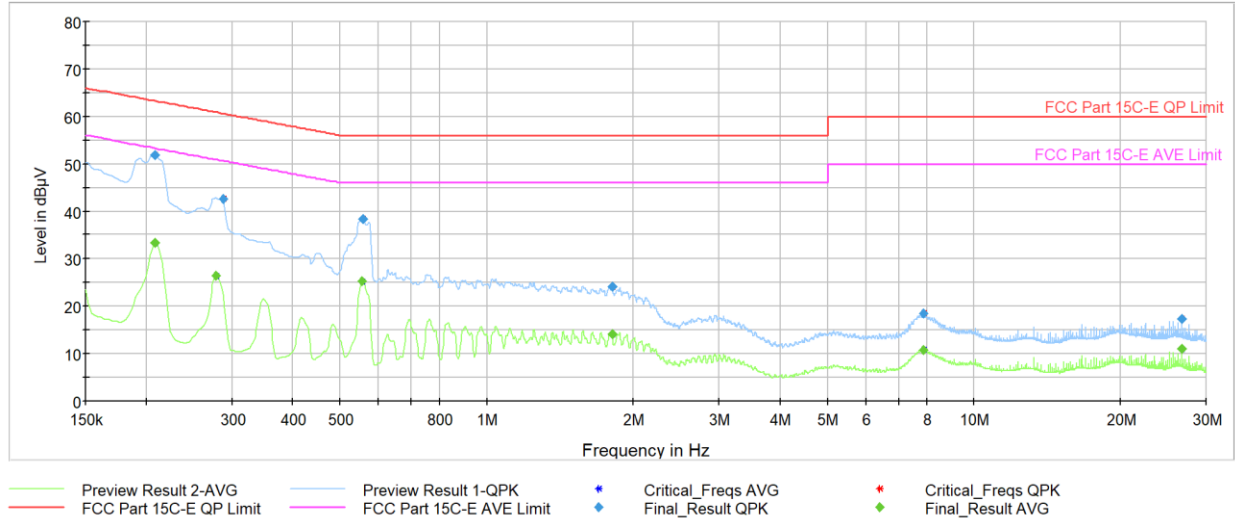
**Figure 7-11. Test Instrument & Measurement Setup**

## 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 charged by charging case and powered by AC/DC adaptor with USB-C cable.
  - b. EUT charged by charging case and powered by with Laptop and USB-C Cable.
3. The limit for an intentional radiator from 150kHz to 30MHz are specified in 15.207.
4.  $\text{Corr. (dB)} = \text{Cable loss (dB)} + \text{LISN insertion factor (dB)}$
5.  $\text{QP/AV Level (dB}\mu\text{V)} = \text{QP/AV Analyzer/Receiver Level (dB}\mu\text{V)} + \text{Correction Factor (dB)}$
6.  $\text{Margin (dB)} = \text{QP/AV Level (dB}\mu\text{V)} - \text{QP/AV Limit (dB}\mu\text{V)}$
7. Traces shown in plots are made using quasi-peak and average detectors.
8. Deviations to the Specifications: None.

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 86 of 95

V 10.6 10/27/2023



**Plot 7-88. AC Line Conducted Plot (NB UNII BDR – 6420MHz) (L1) with Laptop and USB-C Cable**

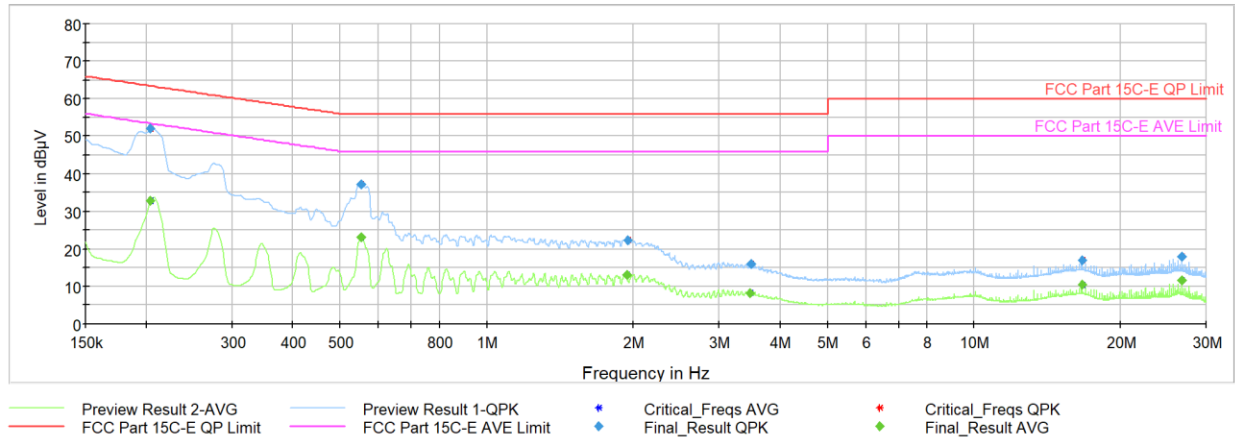
Frequency [MHz]	Process State	QuasiPeak [dBμV]	Average [dBμV]	Limit [dBμV]	Margin [dB]	Line	PE
0.209	FINAL	—	33.34	53.27	-19.93	L1	GND
0.209	FINAL	51.8	—	63.27	-11.43	L1	GND
0.278	FINAL	—	26.36	50.87	-24.50	L1	GND
0.287	FINAL	42.6	—	60.60	-18.04	L1	GND
0.555	FINAL	—	25.24	46.00	-20.76	L1	GND
0.557	FINAL	38.4	—	56.00	-17.60	L1	GND
1.808	FINAL	—	14.15	46.00	-31.85	L1	GND
1.811	FINAL	24.1	—	56.00	-31.90	L1	GND
7.868	FINAL	—	10.75	50.00	-39.25	L1	GND
7.870	FINAL	18.5	—	60.00	-41.54	L1	GND
26.671	FINAL	—	11.00	50.00	-39.00	L1	GND
26.671	FINAL	17.4	—	60.00	-42.62	L1	GND

**Table 7-29. AC Line Conducted Data (NB UNII BDR – 6420MHz) (L1) with Laptop and USB-C Cable**

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 87 of 95

V 10.6 10/27/2023

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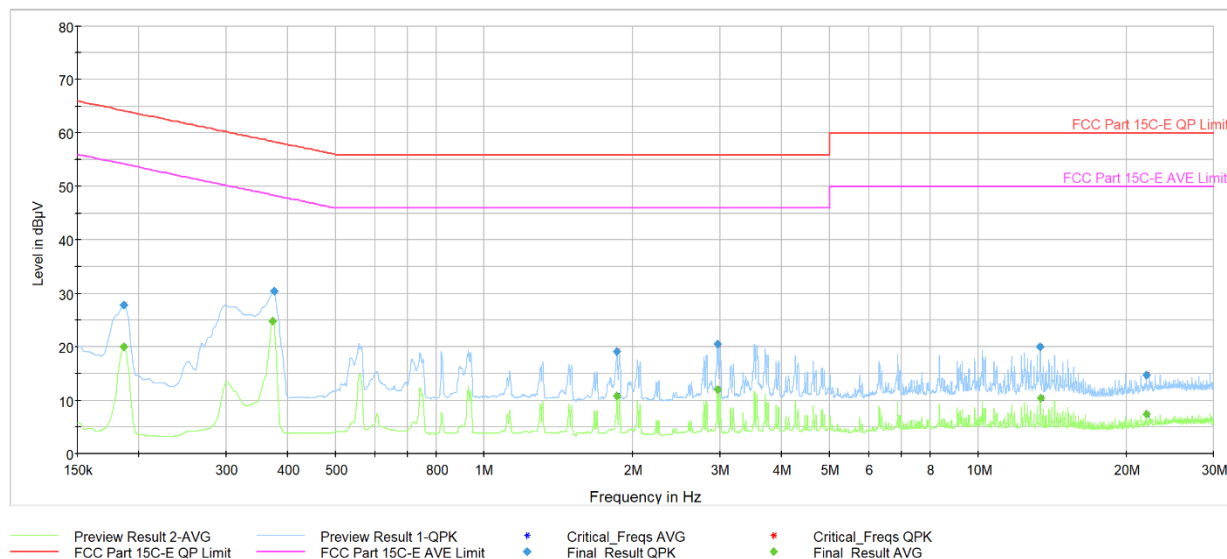
Plot 7-89. AC Line Conducted Plot (NB UNII BDR – 6420MHz) (N) with Laptop and USB-C Cable

Frequency [MHz]	Process State	QuasiPeak [dBμV]	Average [dBμV]	Limit [dBμV]	Margin [dB]	Line	PE
0.204	FINAL	—	32.79	53.45	-20.65	N	GND
0.204	FINAL	52.1	—	63.45	-11.32	N	GND
0.553	FINAL	—	23.04	46.00	-22.96	N	GND
0.553	FINAL	37.3	—	56.00	-18.68	N	GND
1.941	FINAL	—	13.02	46.00	-32.98	N	GND
1.943	FINAL	22.4	—	56.00	-33.63	N	GND
3.476	FINAL	—	8.32	46.00	-37.68	N	GND
3.480	FINAL	16.0	—	56.00	-40.05	N	GND
16.708	FINAL	16.9	—	60.00	-43.09	N	GND
16.708	FINAL	—	10.36	50.00	-39.64	N	GND
26.671	FINAL	—	11.64	50.00	-38.36	N	GND
26.671	FINAL	18.0	—	60.00	-41.96	N	GND

Table 7-30. AC Line Conducted Data (NB UNII BDR – 6420MHz) (N) with Laptop and USB-C Cable

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 88 of 95

V 10.6 10/27/2023



**Plot 7-90. AC Line Conducted Plot (NB UNII (LE2M) – 6420MHz) (L1) with Laptop and USB-C Cable**

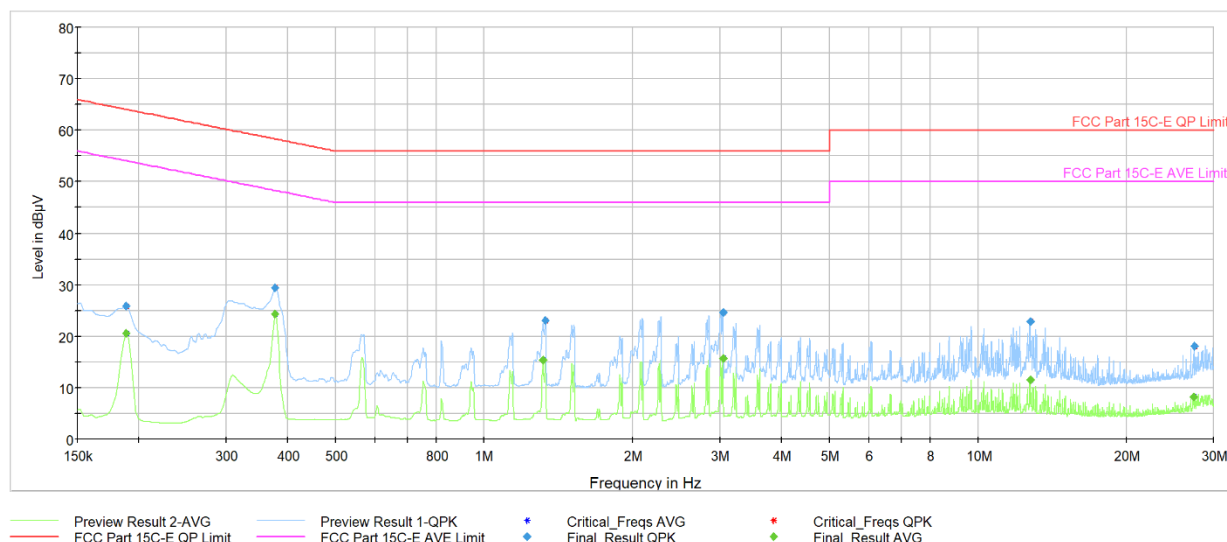
Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.186	FINAL	—	20.06	54.21	-34.15	L1	GND
0.186	FINAL	27.8	—	64.21	-36.41	L1	GND
0.373	FINAL	—	24.87	48.44	-23.57	L1	GND
0.375	FINAL	30.4	—	58.39	-27.96	L1	GND
1.856	FINAL	—	10.88	46.00	-35.12	L1	GND
1.858	FINAL	19.0	—	56.00	-36.97	L1	GND
2.972	FINAL	20.4	—	56.00	-35.57	L1	GND
2.972	FINAL	—	11.96	46.00	-34.04	L1	GND
13.371	FINAL	19.9	—	60.00	-40.07	L1	GND
13.376	FINAL	—	10.41	50.00	-39.59	L1	GND
21.923	FINAL	14.8	—	60.00	-45.20	L1	GND
21.926	FINAL	—	7.31	50.00	-42.69	L1	GND

**Table 7-31. AC Line Conducted Data (NB UNII (LE2M) – 6420MHz) (L1) with Laptop and USB-C Cable**

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 89 of 95

V 10.6 10/27/2023

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Plot 7-91. AC Line Conducted Data (NB UNII (LE2M) – 6420MHz) (N) with Laptop and USB-C Cable

Frequency [MHz]	Process State	QuasiPeak [dBμV]	Average [dBμV]	Limit [dBμV]	Margin [dB]	Line	PE
0.188	FINAL	—	20.55	54.11	-33.57	N	GND
0.188	FINAL	25.9	—	64.11	-38.17	N	GND
0.377	FINAL	—	24.26	48.34	-24.08	N	GND
0.377	FINAL	29.5	—	58.34	-28.87	N	GND
1.318	FINAL	—	15.48	46.00	-30.52	N	GND
1.331	FINAL	23.1	—	56.00	-32.93	N	GND
3.041	FINAL	24.6	—	56.00	-31.38	N	GND
3.041	FINAL	—	15.78	46.00	-30.22	N	GND
12.743	FINAL	—	11.54	50.00	-38.46	N	GND
12.748	FINAL	22.9	—	60.00	-37.09	N	GND
27.377	FINAL	—	8.24	50.00	-41.76	N	GND
27.400	FINAL	18.1	—	60.00	-41.95	N	GND

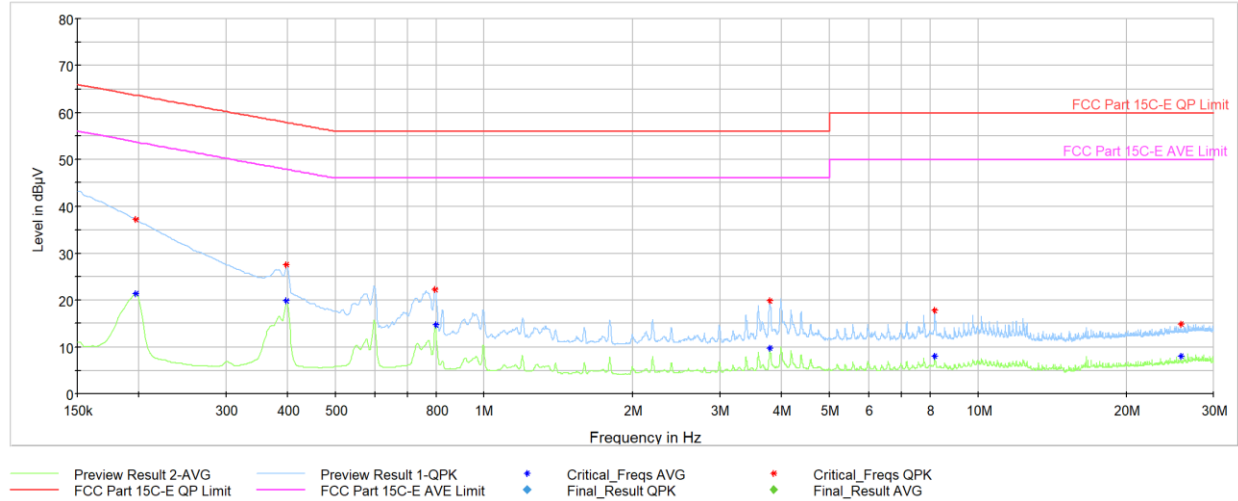
Table 7-32. AC Line Conducted Data (NB UNII (LE2M) – 6420MHz) (N) with Laptop and USB-C Cable

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 90 of 95

V 10.6 10/27/2023

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**Plot 7-92. AC Line Conducted Plot (NB UNII HDR4 – 6420MHz) (L1) with Laptop and USB-C Cable**

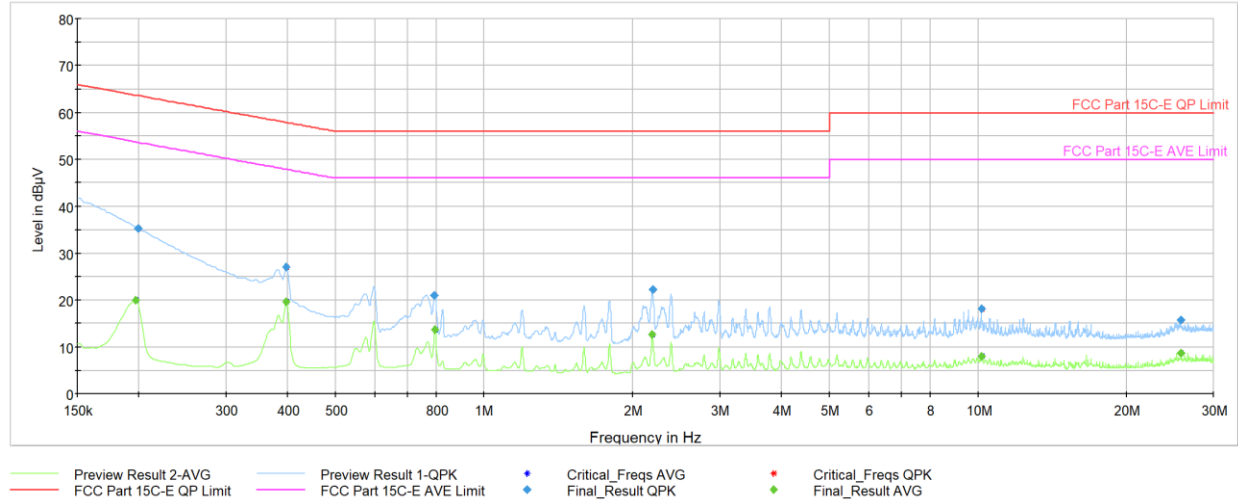
Frequency [MHz]	Process State	QuasiPeak [dBμV]	Average [dBμV]	Limit [dBμV]	Margin [dB]	Line	PE
0.197	FINAL	—	21.39	53.73	-32.33	L1	GND
0.197	FINAL	37.2	—	63.73	-26.50	L1	GND
0.398	FINAL	27.5	—	57.91	-30.36	L1	GND
0.398	FINAL	—	19.92	47.91	-27.98	L1	GND
0.796	FINAL	22.3	—	56.00	-33.72	L1	GND
0.798	FINAL	—	14.79	46.00	-31.21	L1	GND
3.784	FINAL	19.9	—	56.00	-36.09	L1	GND
3.786	FINAL	—	9.76	46.00	-36.24	L1	GND
8.171	FINAL	—	8.05	50.00	-41.95	L1	GND
8.171	FINAL	17.8	—	60.00	-42.22	L1	GND
25.712	FINAL	15.0	—	60.00	-45.01	L1	GND
25.724	FINAL	—	7.98	50.00	-42.02	L1	GND

**Table 7-33. AC Line Conducted Data (NB UNII HDR4 – 6420MHz) (L1) with Laptop and USB-C Cable**

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 91 of 95

V 10.6 10/27/2023

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**Plot 7-93. AC Line Conducted Plot (NB UNII HDR4 – 6420MHz) (N) with Laptop and USB-C Cable**

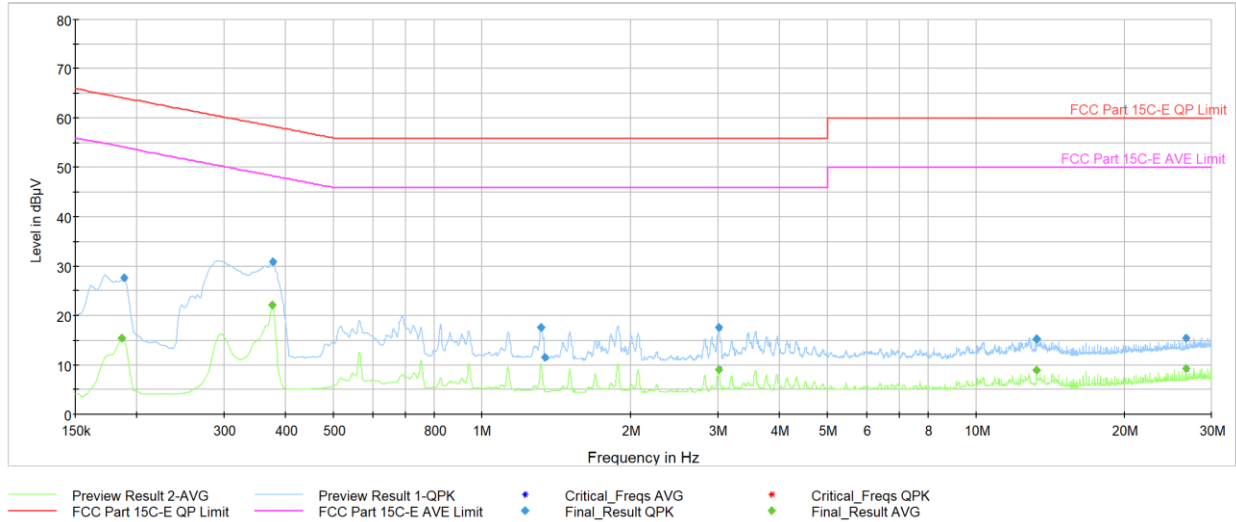
Frequency [MHz]	Process State	QuasiPeak [dBμV]	Average [dBμV]	Limit [dBμV]	Margin [dB]	Line	PE
0.197	FINAL	—	20.10	53.73	-33.62	N	GND
0.200	FINAL	35.3	—	63.63	-28.33	N	GND
0.398	FINAL	—	19.73	47.91	-28.17	N	GND
0.398	FINAL	27.1	—	57.91	-30.80	N	GND
0.794	FINAL	21.0	—	56.00	-35.00	N	GND
0.796	FINAL	—	13.74	46.00	-32.26	N	GND
2.189	FINAL	—	12.64	46.00	-33.36	N	GND
2.193	FINAL	22.2	—	56.00	-33.77	N	GND
10.172	FINAL	18.2	—	60.00	-41.77	N	GND
10.174	FINAL	—	8.00	50.00	-42.00	N	GND
25.721	FINAL	—	8.66	50.00	-41.34	N	GND
25.721	FINAL	15.7	—	60.00	-44.28	N	GND

**Table 7-34. AC Line Conducted Data (NB UNII HDR4 – 6420MHz) (N) with Laptop and USB-C Cable**

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 92 of 95

V 10.6 10/27/2023

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**Plot 7-94. AC Line Conducted Plot (NB UNII HDRp4 – 6264MHz) (L1) with Laptop and USB-C Cable**

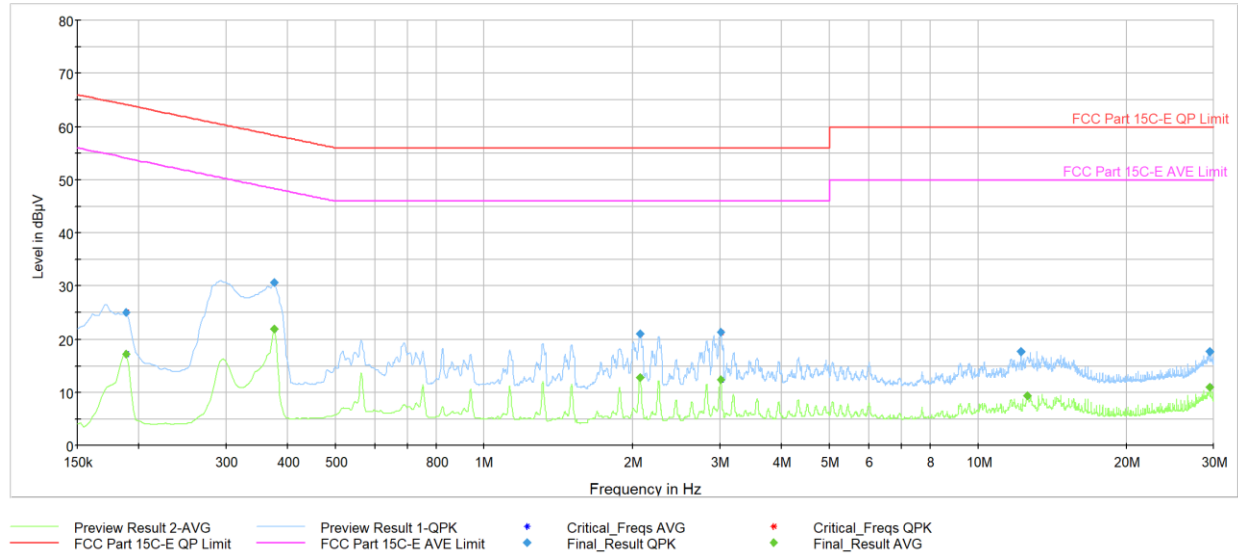
Frequency [MHz]	Process State	QuasiPeak [dBμV]	Average [dBμV]	Limit [dBμV]	Margin [dB]	Line	PE
0.186	FINAL	—	15.38	54.21	-38.83	L1	GND
0.188	FINAL	27.6	—	64.11	-36.49	L1	GND
0.375	FINAL	—	22.12	48.39	-26.27	L1	GND
0.377	FINAL	30.8	—	58.34	-27.51	L1	GND
1.318	FINAL	17.6	—	56.00	-38.45	L1	GND
1.340	FINAL	11.6	—	56.00	-44.44	L1	GND
3.010	FINAL	17.5	—	56.00	-38.46	L1	GND
3.017	FINAL	—	9.16	46.00	-36.84	L1	GND
13.272	FINAL	—	8.96	50.00	-41.04	L1	GND
13.272	FINAL	15.3	—	60.00	-44.73	L1	GND
26.669	FINAL	—	9.31	50.00	-40.69	L1	GND
26.671	FINAL	15.5	—	60.00	-44.50	L1	GND

**Table 7-35. AC Line Conducted Data (NB UNII HDRp4 – 6264MHz) (L1) with Laptop and USB-C Cable**

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 93 of 95

V 10.6 10/27/2023

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Plot 7-95. AC Line Conducted Plot (NB UNII HDRp4 – 6264MHz) (N) with Laptop and USB-C Cable

Frequency [MHz]	Process State	QuasiPeak [dBμV]	Average [dBμV]	Limit [dBμV]	Margin [dB]	Line	PE
0.188	FINAL	—	17.16	54.11	-36.95	N	GND
0.188	FINAL	25.1	—	64.11	-39.01	N	GND
0.375	FINAL	—	21.94	48.39	-26.45	N	GND
0.375	FINAL	30.6	—	58.39	-27.81	N	GND
2.065	FINAL	—	12.76	46.00	-33.24	N	GND
2.067	FINAL	20.9	—	56.00	-35.07	N	GND
3.008	FINAL	21.3	—	56.00	-34.73	N	GND
3.010	FINAL	—	12.40	46.00	-33.60	N	GND
12.226	FINAL	17.7	—	60.00	-42.28	N	GND
12.561	FINAL	—	9.33	50.00	-40.67	N	GND
29.396	FINAL	—	10.95	50.00	-39.05	N	GND
29.396	FINAL	17.6	—	60.00	-42.36	N	GND

Table 7-36. AC Line Conducted Data (NB UNII HDRp4 – 6264MHz) (N) with Laptop and USB-C Cable

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 94 of 95

V 10.6 10/27/2023

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## 8.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Apple Wireless Left Earbud FCC ID: BCG-A3053** is in compliance with Part 15 Subpart E (15.407) of the FCC Rules.

FCC ID: BCG-A3053		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2405230024-07.BCG	Test Dates: 6/26/2024 - 8/5/2024	EUT Type: Wireless Earbud	Page 95 of 95

V 10.6 10/27/2023

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