

RF EXPOSURE REPORT

CERTIFICATE OF CONFORMITY

FCC Rule Part: FCC Part 2 (Section 2.1093)

Report No.: MFBEBU-WTW-P22120823

FCC ID: E8HKC-2227

Product: Gaming Keyboard

Brand: ALIENWARE, DELL

Model No.: AW920K

Received Date: 2022/12/28

Test Date: 2023/1/10

Issued Date: 2023/1/30

Applicant: Chicony Electronics Co., Ltd.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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Test Location: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

FCC Registration / 198487 / TW2021

Designation Number:

Approved by: Jeremy Lin, **Date:** 2023/1/30
Jeremy Lin / Project Engineer

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Prepared by : Jessica Cheng / Senior Specialist

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Release Control Record

Issue No.	Description	Date Issued
MFBEBU-WTW-P22120823	Original release.	2023/1/30

1 Certificate

Product: Gaming Keyboard

Brand: ALIENWARE, DELL

Test Model: AW920K

Sample Status: Engineering sample

Applicant: Chicony Electronics Co., Ltd.

Test Date: 2023/1/10

FCC Rule Part: FCC Part 2 (Section 2.1093)

Standard: KDB 447498 D04 Interim General RF Exposure Guidance v01

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

2 Applicable RF Exposure Limit

§ 1.1310 Radiofrequency radiation exposure limits.

(a) Specific absorption rate (SAR) shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in § 1.1307(b) of this part within the frequency range of 100 kHz to 6 GHz (inclusive).

(b) The SAR limits for occupational/controlled exposure are 0.4 W/kg, as averaged over the whole body, and a peak spatial-average SAR of 8 W/kg, averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the parts of the human body treated as extremities, such as hands, wrists, feet, ankles, and pinnae, where the peak spatial-average SAR limit for occupational/controlled exposure is 20 W/kg, averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). Exposure may be averaged over a time period not to exceed 6 minutes to determine compliance with occupational/controlled SAR limits.

(c) The SAR limits for general population/uncontrolled exposure are 0.08 W/kg, as averaged over the whole body, and a peak spatial-average SAR of 1.6 W/kg, averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the parts of the human body treated as extremities, such as hands, wrists, feet, ankles, and pinnae, where the peak spatial-average SAR limit is 4 W/kg, averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). Exposure may be averaged over a time period not to exceed 30 minutes to determine compliance with general population/uncontrolled SAR limits.

(e) Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields

➤ Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (minutes)
Limits For General Population / Uncontrolled Exposure				
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	f/1500	30
1500-100,000	1.0	30

f = frequency in MHz. * = Plane-wave equivalent power density.

➤ Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (minutes)
Limits For General Population / Uncontrolled Exposure				
0.3-3.0	614	1.63	*(100)	≤6
3.0-30	1842/f	4.89/f	*(900/f ²)	<6
30-300	61.4	0.163	1.0	<6
300-1,500			f/300	<6
1,500-100,000			5	<6

f = frequency in MHz. * = Plane-wave equivalent power density.

1 mW Blanket Exemption – §1.1307(b)(3)(i)(A)

- The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in [paragraph \(b\)\(3\)\(ii\)\(A\)](#) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A).

SAR-based Exemption - §1.1307(b)(3)(i)(B)

- The SAR-based exemption formula of §1.1307(b)(3)(i)(B), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold P_{th} (mW). This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz.

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right)$$

and f is in GHz, d is the separation distance (cm)

When 10-g extremity SAR applies, SAR test exemption may be considered by applying a factor of 2.5 to the SAR-based exemption thresholds.

Sum of multiple sources is less than 1 mW during the time-averaging period – §1.1307(b)(3)(ii)(A)

- The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required). This exemption may not be used in conjunction with other exemption criteria other than those is paragraph (b)(3)(i)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(i)(A).

3 Test Results

3.1 RF Exposure

Environmental Conditions:	25°C, 76% RH	Tested By:	Dalen Dai
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For Single RF Source

1 mW Blanket Exemption						
Operation Mode	Frequency Band (MHz)	Average Power (mW)	Antenna Gain (dBi)	Maximum ERP (mW)	Limit (mW)	Test Result
GFSK(KB)	2402-2480	0.005	5.78	0.01153	1	Pass
GFSK(DG)	2402-2480	0.02123	0.9	0.01592	1	Pass

Notes:

- Calculate the ERP of GFSK(KB) from the radiated field strength:

$$\text{ERP (dBm)} = \text{Radiated field strength (dBuV/m)} + 20 \times \text{Log}(d) - 104.77 - 2.15$$
 d is the measurement distance, in 3 m.

$$\text{ERP} = 78 + 20 \times \text{Log}(3) - 104.77 - 2.15 = -19.38 \text{ dBm (0.01153 mW)}$$

$$\text{Average Power} = \text{ERP (dBm)} - \text{Antenna Gain (dBi)} + 2.15 = -23.01 \text{ dBm (0.005 mW)}$$
- Calculate the ERP of GFSK(DG) from the radiated field strength:

$$\text{ERP (dBm)} = \text{Radiated field strength (dBuV/m)} + 20 \times \text{Log}(d) - 104.77 - 2.15$$
 d is the measurement distance, in 3 m.

$$\text{ERP} = 79.4 + 20 \times \text{Log}(3) - 104.77 - 2.15 = -17.98 \text{ dBm (0.01592 mW)}$$

$$\text{Average Power} = \text{ERP (dBm)} - \text{Antenna Gain (dBi)} + 2.15 = -16.73 \text{ dBm (0.02123 mW)}$$

SAR-based Exemption (10-g extremity SAR)							
Operation Mode	Frequency Band (MHz)	Average Power (mW)	Antenna Gain (dBi)	Maximum ERP (mW)	Distance (cm)	Limit Threshold (mW)	Test Result
Bluetooth	2402-2480	1.963	5.78	4.528	0.5	6.793	Pass

For Multiple RF Sources (Simultaneous Operations)

Multiple RF Sources (Less than 1 mW)					
Operation Mode	Frequency Band (MHz)	Maximum Power (mW)	Sum of Maximum Power (mW)	Limit (mW)	Test Result
GFSK(KB)	2402-2480	0.01153	0.03276	1	Pass
GFSK(DG)	2402-2480	0.02123			

4 Conclusion

Source-base time average power is below Exemption Criteria and/or Routine Evaluation MPE thresholds, therefore the device is compliant FCC RF exposure requirement.

5 Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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The address and road map of all our labs can be found in our web site also.

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