

RF Exposure Exemption Report

HID Global Corporation (US)
Model: BluFI-UP00

In accordance with FCC CFR 47 Pt 1.1307

Prepared for: HID Global Corporation (US)
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| Matthew Russell | Chief Engineer | Authorised Signatory | 06 September 2023 |

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD document control rules.

FCC Accreditation

90987 Octagon House, Fareham Test Laboratory

EXECUTIVE SUMMARY

The wireless devices described within this report are compliant with the exemption criteria related to human exposure to electromagnetic fields laid out in FCC CFR Title 47 Part 1.1307.



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Contents

| | | |
|----------|---|----------|
| 1 | Report Summary | 2 |
| 1.1 | Report Modification Record..... | 2 |
| 1.2 | Introduction..... | 2 |
| 1.3 | Brief Summary of Results | 3 |
| 1.4 | Product Information | 4 |
| 2 | Assessment Details | 6 |
| 2.1 | Single RF Source options for determination of exemption..... | 6 |
| 2.2 | Multiple RF Sources options for determination of exemption. | 7 |
| 2.3 | Individual Antenna Port Exposure Results..... | 8 |
| 2.4 | Combined Antenna Port RF Exposure Results FCC 1.1307(b)(3)(ii)(B) | 9 |



1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

| Issue | Description of Change | Date of Issue |
|-------|---|-------------------|
| 1 | First Issue | 26-August-2023 |
| 2 | To correct typographical error to units in table 6 and missing value in table 8 | 06-September-2023 |

Table 1

1.2 Introduction

| | |
|--------------------------|---|
| Applicant | HID Global Corporation (US) |
| Manufacturer | HID Global Corporation (US) |
| Model Number(s) | BluFI-UP00 |
| Hardware Version(s) | 1.4 |
| Software Version(s) | WIFI 2015 BLE 451 |
| Specification/Issue/Date | FCC 47 CFR Part 1.1307: 2021 |
| Order Number | 1180900792 |
| Date | 30-November-2022 |
| Related Document(s) | <ul style="list-style-type: none">• KDB 447498 D04 v01• FCC 47 CFR Part 2.1091: 2021 |



1.3 Brief Summary of Results

The wireless devices described within this report are compliant with the exemption criteria related to human exposure to electromagnetic fields laid out in FCC CFR Title 47 Part 1.1307.

The calculations shown in this report were made in accordance with the procedures specified in the applied test specification(s).



1.4 Product Information

1.4.1 Technical Description

IP television and on-demand video

1.4.2 Transmitter Description

The following radio access technologies and frequency bands are supported by the equipment under test.

| Radio Access Technology | Frequency Band (MHz) | Minimum Frequency (MHz) | Output Power (dBm) | Duty Cycle (%) |
|-------------------------|----------------------|-------------------------|--------------------|----------------|
| Bluetooth Low Energy | 2400 - 2483.5 | 2402.0 | 5.0 | 100.0 |
| 2.4 GHz WLAN | 2400 - 2483.5 | 2412.0 | 12.0 | 100.0 |
| 5 GHz WLAN | 5180 - 5825 | 5180.0 | 12.0 | 100.0 |

Table 2 – Transmitter Description

Note: Transmitter power includes upper bounds of uncertainty therefore maximum values are used.

1.4.3 Antenna Description

The following antennas are supported by the equipment under test.

| Radio Access Technology | Antenna Model | Gain (dBi) | Antenna length (cm) | Minimum Separation Distance (cm) |
|-------------------------|---------------------------------|------------|---------------------|----------------------------------|
| Bluetooth Low Energy, | Embedded (PIFA) | 0.0 | 2.1 | 20 |
| Bluetooth Low Energy | Embedded Circular patch antenna | 10.0 | 11.1 | 20 |
| Bluetooth Low Energy | TE 2344654-1 | 2.0 | 3.0 | 20 |
| 2.4 GHz WLAN | Embedded (PIFA) | 0.0 | 2.2 | 20 |
| 5 GHz WLAN | Embedded (PIFA) | 0.0 | 1.3 | 20 |

Table 3 – Antenna Description

In the case of more than one type of antenna being supported by the equipment, the calculation is based on the maximum of the antenna gains. If other antennas can be used that have greater gains, the minimum separation distances will need to be recalculated.

Note: Antenna gain includes upper bounds of uncertainty therefore maximum values are used.



1.4.4 Equipment Configuration

The device supports the following modes:-

- Bluetooth Low Energy with Embedded (PIFA) antenna
- Bluetooth Low Energy with Embedded Circular patch antenna
- Bluetooth Low Energy with TE 2344654-1 antenna
- 2.4GHz WLAN with Embedded (PIFA) antenna
- 5GHz WLAN with Embedded (PIFA) antenna

- Simultaneous operation - Bluetooth Low Energy, Embedded (PIFA) and 5 GHz WLAN
Or
- Simultaneous operation - Bluetooth Low Energy, Embedded Circular patch antenna and 5 GHz WLAN

Worst case configurations for simultaneous transmission was identified as:

- Bluetooth Low Energy, Embedded Circular patch antenna and 5 GHz WLAN



2 Assessment Details

2.1 Single RF Source options for determination of exemption.

| Option | Reference | RF Exposure Test Exemptions for Single Source | | | | | | | | | | | | |
|----------------------------|--|--|---------------------------|-----------------------|----------------|------------------------|---------------|--|--------------|-----------------------|-----------------|--------------------------|---------------------|----------------------|
| A (1-mW Test Exemption) | FCC 1.1307(b)(3)(i)(A) | The available maximum time averaged power is no more than 1 mW, regardless of separation distance. | | | | | | | | | | | | |
| B (SAR-Based Exemption) | FCC 1.1307(b)(3)(i)(B) | <p>The available maximum timeaveraged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by:</p> $P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$ <p>Where</p> $x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$ <p>and</p> $ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$ <p><i>d</i> = the separation distance (cm);</p> | | | | | | | | | | | | |
| C (MPE-Based Exemption) | FCC 1.1307(b)(3)(i)(C) | <p>Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least λ/2π, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of λ/4 or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).</p> <p>TABLE 1 TO § 1.1307(b)(3)(i)(C)—SINGLE RF SOURCES SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION</p> <table border="1"> <thead> <tr> <th>RF Source frequency (MHz)</th> <th>Threshold ERP (watts)</th> </tr> </thead> <tbody> <tr> <td>0.3–1.34</td> <td>1,920 R².</td> </tr> <tr> <td>1.34–30</td> <td>3,450 R²/f².</td> </tr> <tr> <td>30–300</td> <td>3.83 R².</td> </tr> <tr> <td>300–1,500</td> <td>0.0128 R²f.</td> </tr> <tr> <td>1,500–100,000</td> <td>19.2R².</td> </tr> </tbody> </table> | RF Source frequency (MHz) | Threshold ERP (watts) | 0.3–1.34 | 1,920 R ² . | 1.34–30 | 3,450 R ² /f ² . | 30–300 | 3.83 R ² . | 300–1,500 | 0.0128 R ² f. | 1,500–100,000 | 19.2R ² . |
| RF Source frequency (MHz) | Threshold ERP (watts) | | | | | | | | | | | | | |
| 0.3–1.34 | 1,920 R ² . | | | | | | | | | | | | | |
| 1.34–30 | 3,450 R ² /f ² . | | | | | | | | | | | | | |
| 30–300 | 3.83 R ² . | | | | | | | | | | | | | |
| 300–1,500 | 0.0128 R ² f. | | | | | | | | | | | | | |
| 1,500–100,000 | 19.2R ² . | | | | | | | | | | | | | |



2.2 Multiple RF Sources options for determination of exemption.

| Option | Reference | |
|---|----------------------------|--|
| A 1-mW Test Exemption for Multiple Sources | FCC 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). |
| B Simultaneous Transmission with both SAR-based and MPE- Based Test Exemptions | FCC 1.1307(b)(3)(ii)(B) | in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation. $\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$ |



2.3 Individual Antenna Port Exposure Results

2.3.1 Single Source Calculation of Exposure at Specified Separation Distance FCC 1.1307(b)(3)(i)(C) 'Option C' (MPE Based Exemption)

| RAT | Frequency (MHz) | Conducted Power Output (mW) | Duty Cycle % | Time Average Conducted Power Output (mW) | Antenna Gain Ratio | Maximum Power (EIRP) mW | Maximum Power (ERP) mW | Minimum separation distance for MPE evaluation $\lambda/2 \pi$ mm | Actual Distance (mm) | Threshold ERP (mW) | 1.1307(b)(3)(i)(C) Exemption (Yes/No) (300 kHz to 100 GHz) |
|--|-----------------|-----------------------------|--------------|--|--------------------|-------------------------|------------------------|---|----------------------|--------------------|--|
| Bluetooth Low Energy Embedded (PIFA) | 2402 | 3.162 | 100 | 3.162 | 1 | 3.162 | 1.93 | 19.9 | 200 | 768.0 | Yes |
| Bluetooth Low Energy Embedded Circular patch antenna | 2402 | 3.162 | 100 | 3.162 | 10 | 31.623 | 19.28 | 19.9 | 200 | 768.0 | Yes |
| Bluetooth Low Energy TE 2344654-1 | 2402 | 3.162 | 100 | 3.162 | 1.585 | 5.012 | 3.06 | 19.9 | 200 | 768.0 | Yes |
| 2.4 GHz WLAN Embedded (PIFA) | 2412 | 15.849 | 100 | 15.849 | 1 | 15.849 | 9.66 | 19.8 | 200 | 768.0 | Yes |
| 5 GHz WLAN Embedded (PIFA) | 5180 | 15.849 | 100 | 15.849 | 1.000 | 15.849 | 9.66 | 9.2 | 200 | 768.0 | Yes |

Table 4 –Transmitter Result

The calculations show that the individual transmitters comply with FCC 1.1307(b)(3)(i)(C) MPE-based exception at a minimum distance of 20cm.



2.4 Combined Antenna Port RF Exposure Results FCC 1.1307(b)(3)(ii)(B)

2.4.1 Combination 1 – Option B or Option C Summation

| RAT | Frequency (MHz) | Conducted Power Output mW | Duty Cycle % | Time Average Conducted Power Output mW | Antenna Gain Ratio | Maximum Power (EIRP) mW | Maximum Power (ERP) mW | Test Separation Distance (cm) | ERP _j / ERP _{th,j} <or> P _i / P _{th} | Sum of the fractional contributions to the applicable thresholds is less than or equal to 1. Compliant? (Yes/No) |
|---|-----------------|---------------------------|--------------|--|--------------------|-------------------------|------------------------|-------------------------------|--|--|
| Bluetooth Low Energy Embedded Circular patch antenna | 2402 | 3.162 | 100 | 3.162 | 10.000 | 31.623 | 19.28 | 20 | 0.02511 | |
| 5 GHz WLAN Embedded (PIFA) | 5180 | 15.849 | 100 | 15.849 | 1.000 | 15.849 | 9.66 | 20 | 0.01258 | |
| Calculated RF exposure level at minimum compliance boundary of 20 cm as a fraction of the limit | | | | | | | | | 0.03769 | Yes |

Table 5 –Transmitter Result

The calculations show that the multiple transmitters comply with FCC 1.1307(b)(3)(ii)(B) summation-based exemption.