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Report No.: 2305RSU047-U2

# **RF Exposure Evaluation Declaration**

FCC ID: BRWHBZ5303

Horizon Hobby, LLC **Applicant:** 

**Product: Duet RTF** 

Model No.: HBZ5303

HobbyZone **Brand Name:** 

FCC Classification: Digital Transmission System (DTS)

FCC Rule Part(s): FCC Part 2.1091

**Evaluation Date:** 2023-05-27

Result: Complies

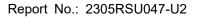
Reviewed By:			
	Kevin Guo	ilac-MRA	
Approved By:		The state of the s	ACCREDITED
	Robin Wu	"Mahahala	TESTING LABORATORY CERTIFICATE #3628.01

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

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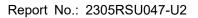
## **Revision History**

Report No.	Version	Description	Issue Date	Note
2305RSU047-U2	V01	Initial Report	2023-08-31	Valid



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## 1. General Information

#### 1.1. Applicant

Horizon Hobby, LLC 2904 Research Road, Champaign, IL, 61822

#### 1.2. Manufacturer

Horizon Hobby, LLC 2904 Research Road, Champaign, IL, 61822

## 1.3. Testing Facility

Test Site - MRT S	Test Site – MRT Suzhou Laboratory						
Laboratory Location (Suzhou - Wuzhong)							
D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China							
Laboratory Locat	tion (Suzhou - SIP	')					
4b Building, Liand	lo U Valley, No.200	Xingpu Rd., Shengpu	ı Town, Suzhou Indu	strial Park, China			
Laboratory Accre	editations						
A2LA: 3628.01		CNAS	S: L10551				
FCC: CN1166		ISED:	CN0001				
Vool	□R-20025	□G-20034	□C-20020	□T-20020			
VCCI:	□R-20141	□G-20134	□C-20103	□T-20104			
Test Site – MRT Shenzhen Laboratory							
Laboratory Locat	tion (Shenzhen)						
1G, Building A, Ju	nxiangda Building,	Zhongshanyuan Roa	ıd West, Nanshan Di	strict, Shenzhen, China			
Laboratory Accreditations							
A2LA: 3628.02		CNAS	: L10551				
FCC: CN1284		ISED:	CN0105				
Test Site – MRT Taiwan Laboratory							
Laboratory Location (Taiwan)							
No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)							
Laboratory Accre	editations						
TAF: 3261							
FCC: 291082, TW	/3261	ISED:	TW3261				



#### 1.4. Product Information

Product Name	Duet RTF
Model No. (PMN/HVIN)	HBZ5303
Wireless Specification	2405 ~ 2475MHz
Power Voltage	3.7VDC

Note: The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.

#### 1.5. Host information

Product Name	Duet RTF
Model No.	HBZ05300
Brand Name	HobbyZone
EUT Identification No.	20230614Accessory#01

Note: The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.

#### 1.6. Electronic Components of EUT

Component Type	Item #	Description	Qty
Clockwise motor	HBZ05301	Clockwise motor: Duet	1
Counter-clockwise motor	HBZ05302	Counter-clockwise motor: Duet	1
Main control board	HBZ5303	Receiver/ESC: Duet	1

#### 1.7. Device Classification

According to the user manual, the antenna of this device is at lease 20cm away from the body of the user, this device is classified as a Mobile Device. So, the RF exposure evaluation requirements of § 2.1091 for portable device exposure conditions subject to MPE limits.

#### 1.8. Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

• FCC Part 2.1091 & KDB 447498 D04 Interim General RF Exposure Guidance v01



## 2. RF Exposure Evaluation

#### 2.1. Limits

According to FCC §1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in §1.1307(b)

Limits For Maximum Permissible Exposure (MPE)

Frequency Range	Electric Field	Magnetic Field	Power Density	Average Time
(MHz)	Strength (V/m)	Strength (A/m)	(mW/cm <sup>2</sup> )	(Minutes)
	(A) Limits fo	r Occupational/ Contro	l Exposures	
0.3-3.0	614	1.63	*(100)	≤6
3.0-30	1842/f	4.89/f	*(900/f <sup>2</sup> )	<6
30-300	61.4	0.163	1.0	<6
300-1,500			f/300	<6
1,500-100,000			5	<6
	(B) Limits for Gen	eral Population/ Uncor	trolled Exposures	
0.3-1.34	614	1.63	*(100)	<30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	<30
30-300	27.5	0.073	0.2	<30
300-1,500			f/1500	<30
1,500-100,000			1.0	<30

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



#### 2.2. MPE Exemptions

**For single RF sources** (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph §1.1307(b)(2) of this section): A single RF source is exempt if:

**(Option 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 §1.1307(b)(3)(ii)(A) of this section.

Medical implant devices may only use this exemption and that in paragraph §1.1307(b)(3)(ii)(A);

**(Option B)** Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P (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 is given by:

$$Pth(mW) = \{ERP_{20cm}(d / 20cm)^x d \le 20cm\}$$

$$P th(mW) = \{ERP_{20cm} 20cm < d \le 40cm\}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20cm}\sqrt{f}}\right)$$
 and f is in GHz;

and

$$ERP_{20cm}(mW) = \{2040f \ 0.3GHz \le f < 1.5GHz\}$$

$$ERP_{20cm}(mW) = \{3060 \ 1.5GHz \le f \le 6GHz \$$

(Option C) 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  $\lambda/2\pi$ , where  $\lambda$  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  $\lambda/4$  or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).



RF Source Frequency (MHz)	Threshold ERP (watts)
0.3-1.34	1920R <sup>2</sup>
1.34-30	3450R <sup>2</sup> /f <sup>2</sup>
30-300	3.83R <sup>2</sup>
300-1,500	0.0128R <sup>2</sup> f
1,500-100,000	19.2R <sup>2</sup>

For multiple RF sources: Multiple RF sources are exempt if:

(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 §1.1307(b)(3)(i)(A) of this section. Medical implant devices may only use this exemption and that in paragraph §1.1307(b)(3)(i)(A).

(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.

$$\sum_{i=1}^{a} \frac{P_i}{P_{th,i}} + \sum_{j=1}^{b} \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^{c} \frac{Evaluated_k}{Exposure\ Limit_k} \le 1$$

Where:

**a** = number of fixed, mobile, or portable RF sources claiming exemption using paragraph  $\S1.1307(b)(3)(i)(B)$  of this section for  $P_{th}$ , including existing exempt transmitters and those being added.

b = number of fixed, mobile, or portable RF sources claiming exemption using paragraph §1.1307(b)(3)(i)(C) of this section for Threshold ERP, including existing exempt transmitters and those being added.

**c** = number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance including existing evaluated transmitters.

 $P_i$  = the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source i at a distance between 0.5 cm and 40 cm (inclusive).

 $P_{th,i}$  = the exemption threshold power ( $P_{th}$ ) according to paragraph §1.1307(b)(3)(i)(B) of this section for fixed, mobile, or portable RF source i.

**ERP**<sub>i</sub> = the ERP of fixed, mobile, or portable RF source j.

**ERP**<sub>th,j</sub> = exemption threshold ERP for fixed, mobile, or portable RF source j, at a distance of at least  $\lambda/2\pi$ 



according to the applicable formula of paragraph §1.1307(b)(3)(i)(C) of this section.

**Evaluated**<sub>k</sub> = the maximum reported SAR or MPE of fixed, mobile, or portable RF source k either in the device or at the transmitter site from an existing evaluation at the location of exposure.

**Exposure Limit**<sub>k</sub> = either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable RF source k, as applicable from §1.1310 of this chapter.



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#### 2.3. Calculated Result

Product	DUET RTF
Test Item	RF Exposure Evaluation

## For single RF source, Option B

Frequency Range (MHz)	Max. Conducted Power (dBm)	R (m)	Tune-up Conducted Power (dBm)	Tune-up Conducted Power (mW)	Exemption Thresholds (mW)
2405 ~ 2475	9.25	0.20	11	12.59	3060

#### Notes:

- 1. Tune-up power is from the operation description.
- 2. Antenna gain is 2.11dBi. So, the time average conducted power is used for calculation.
- 3. R is from the user manual.

Therefore, the device qualifies for RF exposure test exemption.

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