Radio Test Report

Report No.: STS2403106H01

Issued for

GEMMY INDUSTRIES (HK)LIMITED BVI

Unit No.301 on 3rd Floor, East Ocean Centre, No.98,
Kowloon, Hong Kong

Product Name:	Orchestra of Lights-Hub
Brand Name:	Gemmy
Model Name:	883047
Series Model(s):	N/A
FCC ID:	GPO883047B
Test Standards:	FCC 47CFR §2.1091

TEST REPORT

Applicant's Name..... :	GEMMY INDUSTRIES (HK)LIMITED BVI
Address ..... :	Unit No.301 on 3rd Floor, East Ocean Centre, No.98, Kowloon, Hong Kong
Manufacturer's Name..... :	GEMMY INDUSTRIES (HK)LIMITED BVI
Address ..... :	Unit No.301 on 3rd Floor, East Ocean Centre, No.98, Kowloon, Hong Kong
Factory1.....	ZAIXING ELECTRONIC (SHENZHEN) CO., LTD
Address ..... :	No. 1 and 3, 1st Road Yang Yong, Tangxiayong Community, Yanluo Street, Bao'an District, Shenzhen City, Guangdong Province, China
Factory2.....	YUQI ELECTRONIC (HUAIBEI) CO., LTD
Address	32 fengguan road, xiangshan district, Huaibei city, Anhui province, China
Factory3.....	XINGYU ELECTRONIC (HUIZHOU) CO., LTD
Address	Hengjiangwei Village, Yihe Town, Boluo County, Huizhou City, Guangdong Province, China
Factory4.....	QIYANG TECHNOLOGY (HUAIBEI) CO., LTD
Address	32 Fengguan road, xiangshan district, Huaibei city, Anhui province
Factory5.....	YUAN HONG COMPANY LIMITED
Address	No. 3 Street, My Xuan A Industrial Zone, My Xuan Ward, Phu My Town, Ba Ria-Vung Tau province, Vietnam
Factory6.....	DYNATECH LIGHTING TECHNOLOGY CO., LTD
Address	GIGA RESOURCE SPECIAL ECONOMIC ZONE, NATIONAL ROAD NO.1, DERM POU VILLAGE, KANDIENG REAY COMMUNE, SVAY TEAP DISTRICT, SVAY RIENG PROVINCE, CAMBODIA

Product Description

Product Name..... :	Orchestra of Lights-Hub
Brand ..... :	Gemmy
Model Number ..... : .	883047
Series Model(s)..... :	N/A
Standards..... :	FCC 47CFR §2.1091 447498 D04 Interim General RF Exposure Guidance v01

The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Shenzhen STS Test Services Co., Ltd.

Date of Test..... :	
Date of receipt of test item..... :	07 Mar. 2024
Date (s) of performance of tests..... :	07 Mar. 2024 ~ 29 Apr. 2024
Date of Issue..... :	29 Apr. 2024
Test Result..... :	**Pass**

Testing Engineer : Aaron Bu

(Aaron Bu)

Technical Manager : Chris Chen

(Chris Chen)

Authorized Signatory : Bovey Yang

(Bovey Yang)

SHENZHEN STS TEST SERVICES CO.,LTD. TESTING APPROVAL

TABLE OF CONTENTS

Revision History

Rev.	Issue Date	Report No.	Effect Page	Contents
00	29 Apr. 2024	STS2403106H01	ALL	Initial Issue

1. GENERAL INFORMATION

1.1 GENERAL DESCRIPTION OF THE EUT

<table>
<tr><td>Product Name</td><td>Orchestra of Lights-Hub</td></tr>
<tr><td>Brand</td><td>Gemmy</td></tr>
<tr><td>Model Number</td><td>883047</td></tr>
<tr><td>Series Model(s)</td><td>N/A</td></tr>
<tr><td>Model Difference</td><td>N/A</td></tr>
<tr><td>Product Description</td><td>The EUT is Orchestra of Lights-Hub
<table>
<tr><td>Operation Frequency:</td><td>2.4G: 2420MHz 2443MHz 2465MHz
Bluetooth: 2402~2480 MHz
2.4GWLAN:802.11b/g/n(20MHz):2412~2472MHz</td></tr>
<tr><td>Modulation Type:</td><td>2.4G: GFSK
BLE : GFSK
2.4GWLAN:
802.11b(DSSS):CCK,DQPSK,DBPSK
802.11g(OFDM):BPSK,QPSK,16-QAM,64-QAM
802.11n(OFDM):BPSK,QPSK,16-QAM,64-QAM</td></tr>
<tr><td>Antenna gain:</td><td>2.4G: 3 dBi
BLE : -1.2 dBi
2.4G WLAN: -1.2 dBi</td></tr>
<tr><td>Antenna Designation:</td><td>2.4G: PCB Antenna
BLE : PCB Antenna
2.4G WLAN: Dual-band glue stick antenna</td></tr>
</table></td></tr>
<tr><td>Adapter</td><td>Input: 100-240V~50/60HZ 0.2A
Output: DC5V 1000mA</td></tr>
<tr><td>Rating</td><td>Input: AC 120V</td></tr>
<tr><td>Hardware Version</td><td>883047-USA（V2）</td></tr>
<tr><td>Software Version</td><td>883047-USA（V2）</td></tr>
</table>

1.2 TEST FACTORY

SHENZHEN STS TEST SERVICES CO., LTD
Add. : 101, Building B, Zhuoke Science Park, No.190 Chongqing Road, ZhanChengShequ, Fuhai Sub-District, Bao'an District, Shenzhen, Guang Dong, China

FCC test Firm Registration Number: 625569

IC test Firm Registration Number: 12108A

A2LA Certificate No.: 4338.01

2. FCC 47CFR §2.1091 REQUIREMENT

2.1 TEST STANDARDS

Follow the maximum permissible exposure (MPE) limits specified in 447498 D04 Interim General Radio Frequency Exposure Guidelines v01. The gain of the antenna used in the product was extracted from the supplied antenna data sheet and the maximum total power input to the antenna was also measured. Calculate the distance from the product to the MPE limit by the formula.

2.2 LIMIT

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

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

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

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

Where

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

and

$$ERP_{20\ cm}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases}$$

d = the separation distance (cm);

(C) Or using below table 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).

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^2f.
1,500-100,000	19.2R^2.

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

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

Where:

a = number of fixed, mobile, or portable RF sources claiming exemption using paragraph (b)(3)(i)(B) of Part 1.1307 for Pth, including existing exempt transmitters and those being added.

b = number of fixed, mobile, or portable RF sources claiming exemption using paragraph (b)(3)(i)(C) of Part 1.1307 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.

Pi = 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).

Pth,i = the exemption threshold power (Pth) according to paragraph (b)(3)(i)(B) of this section for fixed, mobile, or portable RF source i.

ERPj = the ERP of fixed, mobile, or portable RF source j.

ERPth,j = exemption threshold ERP for fixed, mobile, or portable RF source j, at a distance of at least λ/2π according to the applicable formula of paragraph (b)(3)(i)(C) of Part 1.1307.

Evaluatedk = 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 Limitk = 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.

2.3 TEST RESULT

Turn up

Mode	Detector	Turn up Power
2.4G	AV	-9±1dBm
BLE	AV	2±1dBm
2.4GWLAN	AV	13±1dBm

Protocol	Fre. (GHz)	Separation distance (cm)	Max Turn up power (dBm)	ANT Gain (dBi)	Max EIRP (dBm)	Max EIRP (W)	Limit (W)	Ratio	Result
2.4G	2.43	20	-8	0	-8	0.00016	0.768	0.0002	Pass
BLE	2.402	20	3	-1.2	1.8	0.00151	0.768	0.0020	Pass
2.4G WLAN	2.412	20	14	-1.2	12.8	0.01905	0.768	0.0248	Pass

Multiple transmission:

2.4G + 2.4GWLAN =0.0004+0.0248=0.0252＜1

Note: 1. The Maxinum power is less than the limit, complies with the exemption requirements.

2. The Bluetooth and WLAN can’t simultaneous transmission at the same time.

3. Calculated formula: EIRP (dBm)=85.38 (dBuV/m)-95.2

4. ERP=EIRP-2.15

※※※※※END OF THE REPORT※※※※※