RF EXPOSURE EVALUATION REPORT

Application No.:	GZCR2109021175AT
Applicant:	Beyerdynamic
Address of Applicant:	56 Central Avenue Farmingdale, New York 11735, United States
Manufacturer:	Beyerdynamic
Address of Manufacturer:	56 Central Avenue Farmingdale, New York 11735, United States
Factory:	Shenzhen Grandsun Electronic Co.,Ltd.
Address of Factory:	East Park,Gaoqiao Industry Zone,Pingdi Street,Longgang,Shenzhen City
Equipment Under Test (EUT):	
EUT Name:	Free BYRD
Model No.:	Free BYRD ♣
♣	Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Trade Mark:	beyerdynamic
Standard(s) :	47 CFR PART 1, Subpart I, Section 1.1310 47 CFR PART 2, Subpart J, Section 2.1093 KDB447498D01 General RF Exposure Guidance v06
Date of Receipt:	2021-09-23
Date of Evaluation:	2021-09-25 to 2021-10-12
Date of Issue:	2021-10-14
Evaluation Result:	**Pass***

* In the configuration evaluated, the EUT complied with the standards specified above.

Kobe Jian
EMC Laboratory Manager

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2021-10-14		Original

Authorized for issue by				
Tested By		 **Curry Wu/Project Engineer**		
Reviewed By		 **Ricky Liu/Reviewer**		

2 Evaluation Summary

Note:

E.U.T./EUT means Equipment Under Test.

Pass means the test result passed the test standard requirement, please find the detailed decision rule in the report relative section.

Declaration of EUT Family Grouping:

Model No.: Free BYRD

For the model Free BYRD which have two color samples :black and white ,Only the black sample was tested, since according to the declaration from the applicant, the electrical circuit design, PCB layout, components used, internal wiring and functions were identical for all the above models, with only difference on color.

3 Contents

4 General Information

4.1 Details of E.U.T.

Power supply:	Left earbuds: Li-Ion Polymer Battery 3.7V 85mAh (Charge by Charging box) Right earbuds: Li-Ion Polymer Battery 3.7V 85mAh (Charge by Charging box) Charging box with backup battery: Li-Ion Polymer Battery 3.7V 500mAh (Charged by type-C port)
Cable(s):	Type-c cable: 60cm unshielded
For BT:	
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V5.2 Dual mode
Modulation Type:	GFSK, pi/4DQPSK, 8DPSK
Number of Channels:	79
Channel Spacing:	1MHz
Spectrum Spread Technology:	Frequency Hopping Spread Spectrum(FHSS)
Antenna Type:	Loop_LDS
Antenna Gain:	-2.6dBi(for left earbud) and -2.5dBi(for Right earbud)
For BLE:	
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V5.2 Dual mode
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Data Rate:	Support 1Mb/s and 2Mb/s
Antenna Type:	Loop_LDS
Antenna Gain:	-2.6dBi(for left earbud) and -2.5dBi(for Right earbud)

4.2 Evaluating Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory,

198 Kezhu Road, Scientech Park, Guangzhou Economic & Technology Development District, Guangzhou, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.

4.3 Facility

The facility is recognized, certified, or accredited by the following organizations:

- **NVLAP (Lab Code: 200611-0)**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

- **ACMA**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian/New Zealand Regulatory Compliance Mark (RCM).

- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

- **CNAS (Lab Code: L0167)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2018 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of Testing Laboratories.

- **FCC Recognized Accredited Test Firm(Registration No.: 486818)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: CN5016, Test Firm Registration Number: 486818.

- **ISED (Registration No.: 4620B, CAB identifier: CN0052)**

SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Innovation Science and Economic Development Canada for Wireless Device Testing laboratories to test to Canadian radio equipment requirements. Registration No. 4620B, CAB identifier: CN0052.

- **VCCI (Registration No.: R-12460, C-12584, G-20107 and T-11179)**

The 10m Semi-anechoic chamber, 966 Anechoic Chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-12460, C-12584, G-20107 and T-11179 respectively.

- **CBTL (Lab Code: TL129)**

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2017, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.

4.4 Deviation from Standards

None

4.5 Abnormalities from Standard Conditions

None

5 Technical Requirements Specification

5.1 RF Exposure Evaluation

5.1.1 Limit & Test Method

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation[17]
- The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion

5.1.2 Conclusion

For BT:

Right earbud:

The Max. power (including tune-up tolerance) is 8.96 dBm on the lowest channe 2.48 GHz (*)
8.96 dBm logarithmic terms convert to numeric result is nearly 7.87 mW
According to the formula. calculate the test exclusion thresholds:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)]

$$General\ RF\ Exposure = (7.87\ mW / 5\ mm)\ x\ \sqrt{2.48\ GHz} = 2.48 \quad (1)$$

SAR requirement:

$$S = 3.0 \quad (2)$$

(1) < (2)
So the SAR report is not required.

(*) Max. power refer to Report No.:GZCR210902117501

For BT:

left earbud:

The Max. power (including tune-up tolerance) is 8.61 dBm on the lowest channe 2.48 GHz (*)
8.61 dBm logarithmic terms convert to numeric result is nearly 7.26 mW
According to the formula. calculate the test exclusion thresholds:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)]

$$General\ RF\ Exposure = (7.26\ mW / 5\ mm)\ x\ \sqrt{2.48\ GHz} = 2.29 \quad (1)$$

SAR requirement:

$$S = 3.0 \quad (2)$$

(1) < (2)
So the SAR report is not required.

(*) Max. power refer to Report No.:GZCR210902117501

For BLE:
Right earbud:
Data Rate:1Mb/s

The Max. power (including tune-up tolerance) is 3.51 dBm on the lowest channe 2.402 GHz (*)
3.51 dBm logarithmic terms convert to numeric result is nearly 2.24 mW
According to the formula. calculate the test exclusion thresholds:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)]

$$General\ RF\ Exposure = (2.24\ mW / 5\ mm)\ x\ \sqrt{2.402\ GHz} = 0.69 \quad (1)$$

SAR requirement:

$$S = 3.0 \quad (2)$$

(1) < (2)
So the SAR report is not required.

(*) Max. power refer to Report No.:GZCR210902117502

For BLE:
Right earbud:
Data Rate:2Mb/s

The Max. power (including tune-up tolerance) is 3.54 dBm on the lowest channe 2.402 GHz (*)
3.54 dBm logarithmic terms convert to numeric result is nearly 2.26 mW
According to the formula. calculate the test exclusion thresholds:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)]

$$General\ RF\ Exposure = (2.26\ mW / 5\ mm)\ x\ \sqrt{2.402\ GHz} = 0.70 \quad (1)$$

SAR requirement:

$$S = 3.0 \quad (2)$$

(1) < (2)
So the SAR report is not required.

(*) Max. power refer to Report No.:GZCR210902117502

For BLE:
Left earbud:
Data Rate:1Mb/s

The Max. power (including tune-up tolerance) is 3.67 dBm on the lowest channe 2.402 GHz (*)
3.67 dBm logarithmic terms convert to numeric result is nearly 2.33 mW
According to the formula. calculate the test exclusion thresholds:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)]

$$General\ RF\ Exposure = (2.33\ mW / 5\ mm) \times \sqrt{2.402\ GHz} = 0.72 \quad (1)$$

SAR requirement:

$$S = 3.0 \quad (2)$$

(1) < (2)
So the SAR report is not required.

(*) Max. power refer to Report No.:GZCR210902117502

For BLE:
Left earbud:
Data Rate:2Mb/s

The Max. power (including tune-up tolerance) is 3.74 dBm on the lowest channe 2.402 GHz (*)
3.74 dBm logarithmic terms convert to numeric result is nearly 2.37 mW
According to the formula. calculate the test exclusion thresholds:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)]

$$General\ RF\ Exposure = (2.37\ mW / 5\ mm) \times \sqrt{2.402\ GHz} = 0.73 \quad (1)$$

SAR requirement:

$$S = 3.0 \quad (2)$$

(1) < (2)
So the SAR report is not required.

(*) Max. power refer to Report No.:GZCR210902117502

6 EUT Constructional Details (EUT Photos)

Refer to appendix - external and internal photos for GZCR2109021175AT

- End of the Report -