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RF Exposure REPORT

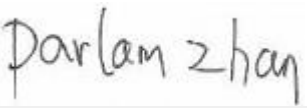
Application No.:	SHEM2103002435CR
FCC ID:	2AMIN-TWSEJ01ZM
IC:	26993-TWSEJ01ZM
Applicant:	ZIMI CORPORATION
Address of Applicant:	A913, No.159 Chengjiang Road, Jiangyin City, Jiangsu Province, 214431, P.R.C
Manufacturer:	ZIMI CORPORATION
Address of Manufacturer:	A913, No.159 Chengjiang Road, Jiangyin City, Jiangsu Province, 214431, P.R.C
Factory:	HUIZHOU LYAND ACOUSTIC TECHNOLOGY CO.,LTD
Address of Factory:	NO.73,Jinfu Road, Xiaojinkou, Hui zhou City, Guangdong Province
Equipment Under Test (EUT):	
EUT Name:	Wireless Earphones
Model No.:	TWSEJ01ZM
Standard(s) :	FCC Rules 47 CFR §2.1093 KDB447498 D01 General RF Exposure Guidance v06 RSS-102 Issue 5 Amendment 1 (February 2, 2021)
Date of Receipt:	2021-03-29
Date of Test:	2021-03-29 to 2021-04-21
Date of Issue:	2021-04-23
Test Result:	**Pass***

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

Parlam Zhan
E&E Section Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

Revision Record			
Version	**Description**	**Date**	**Remark**
00	Original	2021-04-23	/

Authorized for issue by:				
				
		Micheal Niu / Project Engineer		
				
		Parlam Zhan / Reviewer		

2 Contents

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3 General Information

3.1 General Description of E.U.T.

Power supply:	DC 3.85V by Rechargeable Lithium-ion Coin Cell
Serial Number:	34719,34263/BYAEWF12100001
Firmware Version:	V1.0
HVIN:	TWSEJ01ZM-L TWSEJ01ZM-R

3.2 Details of E.U.T.

BT

Antenna Gain:	ANT L:-1.57dBi (Provided by manufacturer) ANT R:-1.69dBi (Provided by manufacturer)
Antenna Type:	PIFA Antenna
Bluetooth Version:	V5.2 Dual mode
Channel Spacing:	1MHz
Modulation Type:	GFSK, π/4DQPSK, 8DPSK
Number of Channels:	79
Operation Frequency:	2402MHz to 2480MHz
Spectrum Spread Technology:	Frequency Hopping Spread Spectrum(FHSS)

BLE

Antenna Gain:	ANT L:-1.57dBi (Provided by manufacturer) ANT R:-1.69dBi (Provided by manufacturer)
Antenna Type:	PIFA Antenna
Bluetooth Version:	V5.2 Dual mode
Data Rate:	1Mbps&2Mbps
Channel Spacing:	2MHz
Modulation Type:	GFSK
Number of Channels:	40
Operation Frequency:	2402MHz to 2480MHz

3.3 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

3.4 Test Facility

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

• CNAS (No. CNAS L4354)

CNAS has accredited Compliance Certification Services (Kunshan) Inc. to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• A2LA (Certificate No. 2541.01)

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

• FCC (Designation Number: CN1172)

Compliance Certification Services Inc. has been recognized as an accredited testing laboratory. Designation Number: CN1172.

• ISED (CAB identifier: CN0072)

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.

Company Number: 2324E

• VCCI (Member No.: 1938)

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-1600, C-1707, T-1499, G-10216 respectively.

4 Test Standards and Limits

4.1 FCC Radiofrequency radiation exposure limits

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)/(min test separation distance)]*[√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

• The result is rounded to one decimal place for comparison

• 3.0 and 7.5 are referred to as the numeric thresholds

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 according to 4.1 f) is applied to determine SAR test exclusion.

For 2.4G band device, the limit of worse case is

$P_{max} \leq 3.0 * D_{min} / \sqrt{f} = 3.0 * 5 / \sqrt{2.480} = 9.525 mW$

4.2 IC Radiofrequency radiation exposure limits

According to RSS-102 section 2.5.1, SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance

MHz	5	10	15	20	25	30	35	40	45	50	mm
≤300	71	101	132	162	193	223	254	284	315	345	
450	52	70	88	106	123	141	159	177	195	213	
835	17	30	42	55	67	80	92	105	117	130	
1900	7	10	18	34	60	99	153	225	316	431	mW
2450	4	7	15	30	52	83	123	173	235	309	
3500	2	6	16	32	55	86	124	170	225	290	
5800	1	6	15	27	41	56	71	85	97	106	

Output power level shall be the higher of the maximum conducted or equivalent isotropically radiated power (e.i.r.p.) source-based, time-averaged output power. For controlled use devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for routine evaluation are multiplied by a factor of 5. For limb-worn devices where the 10 gram value applies, the exemption limits for routine evaluation in Table 1 are multiplied by a factor of 2.5. If the operating frequency of the device is between two frequencies located in Table 1, linear interpolation shall be applied for the applicable separation distance. For test separation distance less than 5 mm, the exemption limits for a separation distance of 5 mm can be applied to determine if a routine evaluation is required.

The practical use condition for this device can be as a body-worn accessories. So the applicable limit is 1-g SAR

For 2.4G band device, the limit is P_{max}≤ 4mW

5 Measurement and Calculation

5.1 Maximum transmit power

The Power Data is based on the RF Test Report SHEM210300243501; SHEM2103002435012

Test Data:

BT-Left Ear

Test Mode	Frequency (MHz)	Power (dBm)	Power (mW)
GFSK	2402	4.65	2.92
	2441	4.79	3.01
	2480	5.34	3.42
Pi/4DQPSK	2402	4.64	2.91
	2441	4.78	3.01
	2480	5.32	3.40
8DPSK	2402	4.81	3.03
	2441	4.94	3.12
	2480	5.49	**3.54**

BT-Right Ear

Test Mode	Frequency (MHz)	Power (dBm)	Power (mW)
GFSK	2402	4.64	2.91
	2441	4.62	2.90
	2480	5.24	3.34
Pi/4DQPSK	2402	4.63	2.90
	2441	4.60	2.88
	2480	5.24	3.34
8DPSK	2402	4.59	2.88
	2441	4.59	2.88
	2480	5.23	3.33

BLE-Left Ear

Test Mode	Frequency (MHz)	Power (dBm)	Power (mW)
1M	2402	4.47	2.80
	2440	4.59	2.88
	2480	5.20	3.31
2M	2402	4.57	2.86
	2440	4.68	2.94
	2480	4.86	3.06

BLE-Right Ear

Test Mode	Frequency (MHz)	Power (dBm)	Power (mW)
1M	2402	4.98	3.15
	2440	4.91	3.10
	2480	5.56	3.60
2M	2402	5.02	3.18
	2440	4.95	3.13
	2480	5.62	**3.65**

5.2 RF Exposure Calculation

The Max Conducted Peak Output Power of Left Earphone and Right Earphone are 3.54mW and 3.65mW. The best case gain of the antenna is -1.57dBi.

-1.57dBi logarithmic terms convert to numeric result is nearly 0.7.

Max conducted output power(Left Earphone) = 3.54mW < 4mW < 9.525mW

Max conducted output power(Right Earphone)= 3.65mW < 4mW < 9.525mW

So the SAR report is not required.

--End of the Report--