



Report No.: SZEM191001913204

Page: 1 of 8

## SAR Evaluation Report

**Application No.:** SZEM1910019132CR  
**Applicant:** Kingstate Electronics(Dongguan)Co., Ltd  
**Address of Applicant:** Shi Chong Industrial Park, Shi Chong Avenue, Xiang Xi Village,  
Shi Pai Town, Dong Guan City, Guang Dong Province, China.  
**Manufacturer:** Kingstate Electronics(Dongguan)Co., Ltd  
**Address of Manufacturer:** Shi Chong Industrial Park, Shi Chong Avenue, Xiang Xi Village,  
Shi Pai Town, Dong Guan City, Guang Dong Province, China.  
**Factory:** Kingstate Electronics(Dongguan)Co., Ltd  
**Address of Factory:** Shi Chong Industrial Park, Shi Chong Avenue, Xiang Xi Village,  
Shi Pai Town, Dong Guan City, Guang Dong Province, China.  
**Equipment Under Test (EUT):**  
**EUT Name:** Truly Wireless Earphones  
**Model No.:** TW-E3A  
**Trade Mark:** YAMAHA  
**FCC ID:** 2AKMBTW-E3A  
**Standards:** 47 CFR Part 1.1307  
47 CFR Part 2.1093  
KDB447498D01 General RF Exposure Guidance v06  
**Date of Receipt:** 2019-10-10  
**Date of Test:** 2019-10-12 to 2019-10-24  
**Date of Issue:** 2019-10-25

<b>Test Result :</b>	<b>PASS*</b>
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\* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu

Keny Xu  
EMC Laboratory Manager



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

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## 2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2019-10-25		Original

Authorized for issue by:				
				
		Harry Wu /Project Engineer		
				
		Eric Fu /Reviewer		



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## 4 General Information

### 4.1 General Description of EUT

Power supply:	Earphone: Lithium Battery: DC3.7V, 60mAh, 0.222Wh Charge Case: DC5V, 0.5A
Cable:	Type-C Cable:30cm, unshielded
Serial No.:	Z010249UW
For BT	
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V5.0
Spectrum Spread Technology:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, $\pi/4$ DQPSK, 8DPSK
Number of Channels:	79
Channel Spacing:	1MHz
Antenna Type:	Integral Antenna
Antenna Gain:	-5dBi
For BLE	
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V5.0
Channel Spacing:	2MHz
Modulation Type:	GFSK
Number of Channels:	40
Antenna Type:	Integral Antenna
Antenna Gain:	-5dBi
Data Rate:	1Mb/s, 2Mb/s



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## 4.2 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China  
518057

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

## 4.3 Test Facility

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

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 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. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 3816.01.

- **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

- **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

## 4.4 Deviation from Standards

None.

## 4.5 Abnormalities from Standard Conditions

None.

## 4.6 Other Information Requested by the Customer

None.



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## 5 SAR Evaluation

### 5.1 RF Exposure Compliance Requirement

#### 5.1.1 Standard Requirement

According to KDB447498D01 General RF Exposure Guidance v06

##### 4.3.1. Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

#### 5.1.2 Limits

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

$$\left[ \frac{(\text{max. power of channel, including tune-up tolerance, mW})}{(\text{min. test separation distance, mm})} \cdot \sqrt{f(\text{GHz})} \right] \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR, where}$$

$f(\text{GHz})$  is the RF channel transmit frequency in GHz

Power and distance are rounded to the nearest mW and mm before calculation<sup>17</sup>

The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is  $\leq 50$  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

#### 5.1.3 EUT RF Exposure

For BT Left:

The Max. power (including tune-up tolerance) is 3.63 dBm on the lowest channel 2.402 GHz (\*)  
3.63 dBm logarithmic terms convert to numeric result is nearly 2.31 mW

According to the formula. calculate the test exclusion thresholds:

$$\text{General RF Exposure} = \frac{(\text{Max. Power of channel, including tune-up tolerance, mW}) * \sqrt{f(\text{GHz})}}{(\text{min. test separation distance, mm})}$$

$$\text{General RF Exposure} = (2.31 \text{ mW} / 5 \text{ mm}) \times \sqrt{2.402 \text{ GHz}} = 0.72 \quad (1)$$

SAR requirement:

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

$$(1) < (2)$$

So the SAR report is not required.

(\*) Max. power refer to Report No.:SZEM191001913202



For BT Right:

The Max. power (including tune-up tolerance) is 3.69 dBm on the highest channel 2.48 GHz (\*)

3.69 dBm logarithmic terms convert to numeric result is nearly 2.34 mW

According to the formula. calculate the test exclusion thresholds:

$$\text{General RF Exposure} = \frac{(\text{Max. Power of channel, including tune-up tolerance, mW}) * \sqrt{f \text{ (GHz)}}}{(\text{min. test separation distance, mm})}$$

$$\text{General RF Exposure} = (2.34 \text{ mW} / 5 \text{ mm}) * \sqrt{2.48 \text{ GHz}} = 0.74 \quad (1)$$

SAR requirement:

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

$$(1) < (2)$$

So the SAR report is not required.

(\*) Max. power refer to Report No.:SZEM191001913202

For BLE Left-1Mb/s:

The Max. power (including tune-up tolerance) is 1.53 dBm on the lowest channel 2.402 GHz (\*)

1.53 dBm logarithmic terms convert to numeric result is nearly 1.42 mW

According to the formula. calculate the test exclusion thresholds:

$$\text{General RF Exposure} = \frac{(\text{Max. Power of channel, including tune-up tolerance, mW}) * \sqrt{f \text{ (GHz)}}}{(\text{min. test separation distance, mm})}$$

$$\text{General RF Exposure} = (1.42 \text{ mW} / 5 \text{ mm}) * \sqrt{2.402 \text{ GHz}} = 0.44 \quad (1)$$

SAR requirement:

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

$$(1) < (2)$$

So the SAR report is not required.

(\*) Max. power refer to Report No.:SZEM191001913203

For BLE Right-1Mb/s:

The Max. power (including tune-up tolerance) is 1.31 dBm on the lowest channel 2.402 GHz (\*)

1.31 dBm logarithmic terms convert to numeric result is nearly 1.35 mW

According to the formula. calculate the test exclusion thresholds:

$$\text{General RF Exposure} = \frac{(\text{Max. Power of channel, including tune-up tolerance, mW}) * \sqrt{f \text{ (GHz)}}}{(\text{min. test separation distance, mm})}$$

$$\text{General RF Exposure} = (1.35 \text{ mW} / 5 \text{ mm}) * \sqrt{2.402 \text{ GHz}} = 0.42 \quad (1)$$

SAR requirement:

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

$$(1) < (2)$$

So the SAR report is not required.

(\*) Max. power refer to Report No.:SZEM191001913203



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For BLE Left-2Mb/s:

The Max. power (including tune-up tolerance) is 1.45 dBm on the lowest channel 2.402 GHz (\*)

1.45 dBm logarithmic terms convert to numeric result is nearly 1.40 mW

According to the formula. calculate the test exclusion thresholds:

$$\text{General RF Exposure} = \frac{(\text{Max. Power of channel, including tune-up tolerance, mW}) * \sqrt{f \text{ (GHz)}}}{(\text{min. test separation distance, mm})}$$

$$\text{General RF Exposure} = (1.40 \text{ mW} / 5 \text{ mm}) * \sqrt{2.402 \text{ GHz}} = 0.43 \quad (1)$$

SAR requirement:

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

$$(1) < (2)$$

So the SAR report is not required.

(\*) Max. power refer to Report No.:SZEM191001913203

For BLE Right-2Mb/s:

The Max. power (including tune-up tolerance) is 1.45 dBm on the lowest channel 2.402 GHz (\*)

1.45 dBm logarithmic terms convert to numeric result is nearly 1.40 mW

According to the formula. calculate the test exclusion thresholds:

$$\text{General RF Exposure} = \frac{(\text{Max. Power of channel, including tune-up tolerance, mW}) * \sqrt{f \text{ (GHz)}}}{(\text{min. test separation distance, mm})}$$

$$\text{General RF Exposure} = (1.40 \text{ mW} / 5 \text{ mm}) * \sqrt{2.402 \text{ GHz}} = 0.43 \quad (1)$$

SAR requirement:

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

$$(1) < (2)$$

So the SAR report is not required.

(\*) Max. power refer to Report No.:SZEM191001913203

- End of the Report -

