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
Test Result :	**PASS***

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

Keny Xu
EMC Laboratory Manager

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		

3 Contents

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, π/4DQPSK, 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

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.

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 ≤ 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

5.1.3 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:

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

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

SAR requirement:

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

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

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

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

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

SAR requirement:

$S = 3.0$ (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:

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

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

SAR requirement:

$S = 3.0$ (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:

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

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

SAR requirement:

$S = 3.0$ (2)

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

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

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:

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

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

SAR requirement:

$S = 3.0$ (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:

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

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

SAR requirement:

$S = 3.0$ (2)

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

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

- End of the Report -

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