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RF Exposure Evaluation Report

Report No.: CQASZ20210600804E-02
Applicant: Dongguan Hele Electronics Co.,Ltd
Address of Applicant: Dalingya Industrial Zone, Daojiao Town,Dongguan City, Guangdong, China
Equipment Under Test (EUT):
EUT Name: TWS Smart Earbuds
Model No.: In2004A
Brand Name: N/A
FCC ID: RDR-IN2004AR
Standards: 47 CFR Part 1.1307
47 CFR Part 2.1093
KDB447498D01 General RF Exposure Guidance v06
Date of Receipt: 2021-06-02
Date of Test: 2021-06-02 to 2021-07-23
Date of Issue: 2021-07-23
Test Result: PASS*

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

Tested By:

Lewis Zhou

(Lewis Zhou)

Reviewed By:

Jun Li

(Jun Li)

Approved By:

Jack Ai
(Jack Ai)



1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20210600804E-02	Rev.01	Initial report	2021-07-23

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3 General Information

3.1 Client Information

Applicant:	Dongguan Hele Electronics Co.,Ltd
Address of Applicant:	Dalingya Industrial Zone, Daojiao Town,Dongguan City, Guangdong, China
Manufacturer:	Dongguan Hele Electronics Co.,Ltd
Address of Manufacturer:	Dalingya Industrial Zone, Daojiao Town,Dongguan City, Guangdong, China
Factory:	Dongguan Hele Electronics Co.,Ltd
Address of Factory:	Dalingya Industrial Zone, Daojiao Town,Dongguan City, Guangdong, China

3.2 General Description of EUT

Product Name:	TWS Smart Earbuds	
Model No.:	In2004A	
Trade Mark:	N/A	
EUT Supports Radios application:	Bluetooth dual mode: 2402-2480MHz	
Hardware Version:	V5.1	
Software Version:	V5.1	
EUT Power Supply:	Right ear:	lithium battery: DC 3.6V, Charge by DC 5.0V(Right ear)
	Changing Box	Changing Box:Input DC 5V 400mA Capacity:380mAh 1.406Wh lithium battery: DC 3.7V, 380mAh, Charge by DC 5.0V

3.3 General Description of BT

Operation Frequency:	2402MHz~2480MHz	
Bluetooth Version:	V 5.1	
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)	
Modulation Type:	GFSK, $\pi/4$ DQPSK	
Number of Channel:	79	
Transfer Rate:	1Mbps/2Mbps	
Hopping Channel Type:	Adaptive Frequency Hopping systems	
Sample Type:	☐ Mobile ☒ Portable ☐ Fix Location	
Antenna Type:	Integral Antenna	
Antenna Gain:	2.5dBi	

4 SAR Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 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.

4.1.2 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:

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

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

Power and distance are rounded to the nearest mW and mm before calculation¹⁷

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

4.1.3 EUT RF Exposure

1) For BT

Measurement Data

GFSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	-6.930	-7.8±1	-6.5	0.224
Middle(2441MHz)	-4.970	-5.8±1	-4.5	0.355
Highest(2480MHz)	-2.970	-3.8±1	-2.5	0.562
$\pi/4$ DQPSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	-6.150	-7.0±1	-6.0	0.251
Middle(2441MHz)	-4.140	-5.0±1	-4.0	0.398
Highest(2480MHz)	-2.120	-3.0±1	-2.0	0.631

Worst case: $\pi/4$ DQPSK mode						
Channel	Maximum Peak Conducted Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune- up Power		Calculated value	Exclusion threshold
			(dBm)	(mW)		
Lowest (2402MHz)	-6.150	-7.0±1	-6.0	0.251	0.078	3.0
Middle (2441MHz)	-4.140	-5.0±1	-4.0	0.398	0.124	
Highest (2480MHz)	-2.120	-3.0±1	-2.0	0.631	0.199	
Conclusion: the calculated value ≤ 3.0 , SAR is exempted.						

Remark: The Max Conducted Peak Output Power data refer to report. Report No.: CQASZ20210600804E-01