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RF Exposure Evaluation Report

Report No. : CQASZ20200500431E-03
Applicant: Dongguan Liesheng Electronic Co., Ltd.
Address of Applicant: 13/F, Project Phrase 2 of GaoshengTechTower, No.5 Longxi Road, Nancheng, Dongguan, Guangdong, China
Equipment Under Test (EUT):
EUT Name: Haylou GT1 True Wireless Earbuds
Model No.: Haylou GT1
Brand Name: Haylou
FCC ID: 2AMQ6-GT01
Standards: 47 CFR Part 1.1307
47 CFR Part 2.1093
KDB447498D01 General RF Exposure Guidance v06
Date of Receipt: 2020-05-25
Date of Test: 2020-05-25 to 2020-05-29
Date of Issue: 2020-05-29
Test Result : PASS*

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

Tested By:

Tom Chen

(Tom Chen)

Reviewed By:

Sheek, Luo

(Sheek Luo)

Approved By:

Jack Ai

(Jack Ai)



1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20200500431E-03	Rev.01	Initial report	2020-05-29

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3 General Information

3.1 Client Information

Applicant:	Dongguan Liesheng Electronic Co., Ltd.
Address of Applicant:	13/F, Project Phrase 2 of GaoshengTechTower, No.5 Longxi Road, Nancheng, Dongguan, Guangdong, China
Manufacturer:	Dongguan Liesheng Electronic Co., Ltd.
Address of Manufacturer:	13/F, Project Phrase 2 of GaoshengTechTower, No.5 Longxi Road, Nancheng, Dongguan, Guangdong, China
Factory:	Dongguan Liesheng Electronic Co., Ltd.
Address of Factory:	13/F, Project Phrase 2 of GaoshengTechTower, No.5 Longxi Road, Nancheng, Dongguan, Guangdong, China

3.2 General Description of EUT

Product Name:	Haylou GT1 True Wireless Earbuds	
Model No.:	Haylou GT1	
Trade Mark:	Haylou	
EUT Supports Radios application:	Bluetooth Dual mode 2402-2480MHz	
Hardware Version:	V1.0	
Software Version:	V1.0	
Sample Type:	☐ Mobile ☒ Portable ☐ Fix Location	
Power Supply:	Left ear:	lithium battery: DC 3.7V, 0.16Wh, Charge by DC 5.0V
	Right ear:	lithium battery: DC 3.7V, 0.16Wh, Charge by DC 5.0V
	The earphone box:	lithium battery: DC 3.7V, 310mAh, Charge by DC 5.0V

3.3 General Description of BT

Operation Frequency:	2402MHz~2480MHz
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, $\pi/4$ DQPSK, 8DPSK
Number of Channel:	79
Transfer Rate:	1Mbps/2Mbps/3Mbps
Hopping Channel Type:	Adaptive Frequency Hopping systems
Test Software of EUT:	Bluetooth RF Test Tool (manufacturer declare)
Antenna Type:	Chip antenna
Antenna Gain:	2.2dBi

3.4 General Description of BLE

Operation Frequency:	2402MHz~2480MHz
Modulation Type:	GFSK
Transfer Rate:	1Mbps, 2Mbps
Number of Channel:	40

Test Software of EUT:	Bluetooth RF Test Tool (manufacturer declare)
Antenna Type:	Chip antenna
Antenna Gain:	2.2dBi

Note: Since the left and right earbuds have identical RF parameter, only the left ear was tested.

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

Measurement Data

GFSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	-1.680	-2.5±1	-1.5	0.708
Middle(2441MHz)	-1.140	-2.0±1	-1.0	0.794
Highest(2480MHz)	0.240	-0.5±1	0.5	1.122
π/4DQPSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	0.950	0±1	1.0	1.259
Middle(2441MHz)	1.480	0.5±1	1.5	1.413
Highest(2480MHz)	2.760	2.0±1	3.0	1.995
8DPSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	1.510	1.0±1	2.0	1.585
Middle(2441MHz)	2.100	1.5±1	2.5	1.778
Highest(2480MHz)	3.410	2.5±1	3.5	2.239

Worst case: 8DPSK

Channel	Maximum Peak Conducted Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune- up Power		Calculated value	Exclusion threshold
			(dBm)	(mW)		
Lowest (2402MHz)	1.510	1.0±1	2.0	1.585	0.491	3.0
Middle (2441MHz)	2.100	1.5±1	2.5	1.778	0.556	
Highest (2480MHz)	3.410	2.5±1	3.5	2.239	0.705	
Conclusion: the calculated value ≤3.0, SAR is exempted.						

Remark: The Max Conducted Peak Output Power data refer to report Report No.: CQASZ20200500431E-01

2) For BLE

Measurement Data

GFSK(1Mbps) mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	-1.73	-2.5±1	-1.5	0.708
Middle(2440MHz)	3.01	2.5±1	3.5	2.239
Highest(2480MHz)	0.05	-0.5±1	0.5	1.122
GFSK(2Mbps) mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	-1.45	-2.0±1	-1.0	0.794
Middle(2440MHz)	3.24	2.5±1	3.5	2.239
Highest(2480MHz)	0.29	-0.5±1	0.5	1.122

Worst case: GFSK(2Mbps)						
Channel	Maximum Peak Conducted Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune- up Power		Calculated value	Exclusion threshold
			(dBm)	(mW)		
Lowest (2402MHz)	-1.45	-2.0±1	-1.0	0.794	0.246	3.0
Middle (2440MHz)	3.24	2.5±1	3.5	2.239	0.700	
Highest (2480MHz)	0.29	-0.5±1	0.5	1.122	0.353	
Conclusion: the calculated value ≤3.0, SAR is exempted.						

Remark: The Max Conducted Peak Output Power data refer to report Report No.: CQASZ20200500431E-02

BDR, EDR and BLE can not simultaneous transmitting at same time.