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Report Template Version: V04
Report Template Revision Date: 2018-07-06

RF Exposure Evaluation Report

Report No.: CQASZ20201100036EX-04
Applicant: Dongguan Lingjie Electronics & Technology Co., Ltd
Address of Applicant: Building A(Floor 1-4) and B(Floor 1-5), No. 16 Zhenxing North Road, Taiyuan Community, Xiegang Town, Dongguan City, Guangdong Province, 523590, P.R.C
Equipment Under Test (EUT):
EUT Name: 3-mode single keyboard
Model No.: K573T, DKA2KB
Test Model No.: K573T
Brand Name: N/A
FCC ID: 2ANBU-K573T
Standards: 47 CFR Part 1.1307
47 CFR Part 2.1093
KDB447498D01 General RF Exposure Guidance v06
Date of Receipt: 2020-11-11
Date of Test: 2020-11-11 to 2020-11-24
Date of Issue: 2020-11-24
Test Result: **PASS***

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

Tested By: Jun Li
(Jun Li)
Reviewed By: Sheek Luo
(Sheek Luo)
Approved By: Jack Ai
(Jack Ai)



1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20201100036EX-04	Rev.01	Initial report	2020-11-24

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3 General Information

3.1 Client Information

Applicant:	Dongguan Lingjie Electronics & Technology Co., Ltd
Address of Applicant:	Building A(Floor 1-4) and B(Floor 1-5), No. 16 Zhenxing North Road, Taiyuan Community, Xiegang Town, Dongguan City, Guangdong Province, 523590, P.R.C
Manufacturer:	Dongguan Lingjie Electronics & Technology Co., Ltd
Address of Manufacturer:	Building A(Floor 1-4) and B(Floor 1-5), No. 16 Zhenxing North Road, Taiyuan Community, Xiegang Town, Dongguan City, Guangdong Province, 523590, P.R.C

3.2 General Description of EUT

Product Name:	3-mode single keyboard
Model No.:	K573T, DKA2KB
Test Model No.:	K573T
Trade Mark:	N/A
Hardware Version:	V3.0
Software Version:	V1.8
Test sample No:	CQASZ20201100036EX-04
Power Supply:	battery: 3.0V(2*1.5V)

3.3 General Description of BT

Operation Frequency:	2402MHz~2480MHz
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, $\pi/4$ DQPSK
Transfer Rate:	1Mbps/2Mbps
Number of Channel:	79
Hopping Channel Type:	Adaptive Frequency Hopping systems
Product Type:	<input type="checkbox"/> Mobile <input checked="" type="checkbox"/> Portable <input type="checkbox"/> Fix Location
Antenna Type:	PCB antenna
Antenna Gain:	0dBi

3.4 General Description of BLE

Operation Frequency:	2402MHz~2480MHz
Modulation Type:	GFSK
Transfer Rate:	1Mbps
Number of Channel:	40
Product Type:	<input type="checkbox"/> Mobile <input checked="" type="checkbox"/> Portable <input type="checkbox"/> Fix Location
Antenna Type:	PCB antenna
Antenna Gain:	0dBi

3.5 General Description of 2.4G

Frequency Range:	2402-2480MHz
Modulation Type:	GFSK
Number of Channels:	16
Product Type:	<input type="checkbox"/> Mobile <input checked="" type="checkbox"/> Portable <input type="checkbox"/> Fix Location
Antenna Type:	PCB antenna
Antenna Gain:	0dBi

Note:

Model No.: K573T, DKA2KB

Only the model K573T was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, with difference being color of appearance and model name.

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:

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

f(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)	-4.354	-5.0±1	-4.0	0.398
Middle(2441MHz)	-4.559	-5.0±1	-4.0	0.398
Highest(2480MHz)	-4.559	-5.0±1	-4.0	0.398
π/4DQPSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	-3.487	-4±1	-3	0.501
Middle(2441MHz)	-3.515	-4±1	-3	0.501
Highest(2480MHz)	-3.719	-4±1	-3	0.501

Worst case: π/4DQPSK						
Channel	Maximum Peak Conducted Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune- up Power		Calculated value	Exclusion threshold
			(dBm)	(mW)		
Lowest (2402MHz)	-3.487	-4±1	-3	0.501	0.155	3.0
Middle (2441MHz)	-3.515	-4±1	-3	0.501	0.157	
Highest (2480MHz)	-3.719	-4±1	-3	0.501	0.158	
Conclusion: the calculated value ≤3.0, SAR is exempted.						

Remark: The Max Conducted Peak Output Power data refer to report Report No.: CQASZ20201100036EX-02

2) For BLE

Measurement Data

GFSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	-6.251	-7±1	-6	0.251
Middle(2440MHz)	-6.679	-7±1	-6	0.251
Highest(2480MHz)	-7.419	-8±1	-7	0.200

Worst case: GFSK mode						
Channel	Maximum Peak Conducted Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune- up Power		Calculated value	Exclusion threshold
			(dBm)	(mW)		
Lowest (2402MHz)	-6.251	-7±1	-6	0.251	0.078	3.0
Middle (2440MHz)	-6.679	-7±1	-6	0.251	0.078	
Highest (2480MHz)	-7.419	-8±1	-7	0.200	0.063	
Conclusion: the calculated value ≤ 3.0 , SAR is exempted.						

Remark: The Max Conducted Peak Output Power data refer to report Report No.: CQASZ20201100036EX-03
BDR and BLE can not simultaneous transmitting at same time.

3) For 2.4G

Measurement Data

GFSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	-4.945	-5±1	-4	0.398
Middle(2440MHz)	-5.342	-6±1	-5	0.316
Highest(2480MHz)	-5.595	-6±1	-5	0.316

Worst case: GFSK mode						
Channel	Maximum Peak Conducted Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune- up Power		Calculated value	Exclusion threshold
			(dBm)	(mW)		
Lowest (2402MHz)	-4.945	-5±1	-4	0.398	0.123	3.0
Middle (2440MHz)	-5.342	-6±1	-5	0.316	0.099	
Highest (2480MHz)	-5.595	-6±1	-5	0.316	0.100	
Conclusion: the calculated value ≤ 3.0 , SAR is exempted.						

Remark: The Max Conducted Peak Output Power data refer to report Report No.: CQASZ20201100036EX-01