MPE Test Report

Report No.: MTi201225011-09E3

Date of issue: Nov. 05, 2021

Applicant: Cherub Technology Co., Ltd

Product name: Portable Digital Piano

Model(s): NPK-10, NPK-1

FCC ID: 2AOAA-NPK-10

Shenzhen Microtest Co., Ltd.

http://www.mtitest.com

Address: 101, No. 7, Zone 2, Xinxing Industrial Park, Fuhai Avenue, Xinhe Community, Fuhai Street, Bao' an District, Shenzhen, Guangdong, China.
Tel: (86-755)88850135 Fax: (86-755) 88850136 Web:www.mtitest.com E-mail: mti@51mti.com

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TEST RESULT CERTIFICATION	
Applicant's name.....	Cherub Technology Co., Ltd
Address.....	Room507, Block 1, Nanhai E-Cool, No. 6 Xinghua Road, Shekou, Nanshan District, Shenzhen City, Guangdong Province, China, 518067
Manufacturer's Name ..	Cherub Technology Co., Ltd
Address.....	Room507, Block 1, Nanhai E-Cool, No. 6 Xinghua Road, Shekou, Nanshan District, Shenzhen City, Guangdong Province, China, 518067
Factory's Name	Cherub Technology Co., Ltd (Zhuhai High-tech Park)
Address.....	No.10, Keji No.9Rd, Tangjiawan Town, Zhuhai National Hi-tech Industrial Development Zone, Zhuhai City, Guangdong Province, China, 519080
Product description	
Product name.....	Portable Digital Piano
Trademark	NUX
Model Name	NPK-10
Serial Model	NPK-1
Standards.....	N/A
Test procedure	KDB 447498 D01 v06
Date of Test	
Date (s) of performance of tests… :	Oct. 19, 2021 ~Nov. 05, 2021
Test Result.....:	Pass
This device described above has been tested by Shenzhen Microtest Co., Ltd. and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.	

Testing Engineer :

(Danny Xu)

Technical Manager :

(Leon Chen)

Authorized Signatory :

(Tom Xue)

1 RF EXPOSURE EVALUATION

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) Radiation as specified in §1.1307(b)

1.1 Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	$*900/f^2$	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	$*180/f^2$	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz * = Plane-wave equivalent power density

MPE Calculation Method

Friis transmission formula: $Pd= (Pout*G)\ (4*pi*R^2)$

Where

Pd= Power density in mW/cm2

Pout=output power to antenna in mW

G= Numeric gain of the antenna relative to isotropic antenna

Pi=3.1415926

R= distance between observation point and center of the radiator in cm(20cm)

Pd the limit of MPE, 1mW/cm2. If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

1.2 Measurement Result

BT&BLE:

Operation Frequency: BT: GFSK, π/4-DQPSK: 2402-2480MHz;

BLE: GFSK: 2402-2480MHz

Power density limited: 1mW/ cm^2

Antenna Type: BT Antenna: PCB Antenna;

BLE Antenna: Ceramic Antenna;

BT antenna gain: 1.5dBi

BLE antenna gain: 2.5dBi

R=20cm

mW=10^(dBm/10)

BT antenna gain Numeric=10^(dBi/10)= 10^(1.5/10)=1.41

BLE antenna gain Numeric=10^(dBi/10)= 10^(2.5/10)=1.78

BT:

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm2)	Power density Limits (mW/cm2)
				tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
2402	GFSK	2.949	2±1	3	1.995	1.5	1.41	0.0006	1
2441		1.885	2±1	3	1.995	1.5	1.41	0.0006	1
2480		2.141	2±1	3	1.995	1.5	1.41	0.0006	1
2402	π/4-DQPSK	3.775	3±1	4	2.512	1.5	1.41	0.0007	1
2441		2.828	3±1	4	2.512	1.5	1.41	0.0007	1
2480		3.017	3±1	4	2.512	1.5	1.41	0.0007	1

BLE:

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm2)	Power density Limits (mW/cm2)
				tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
2402	GFSK	-4.072	-4±1	-3	0.501	2.5	1.78	0.0002	1
2441		-4.938	-4±1	-3	0.501	2.5	1.78	0.0002	1
2480		-4.652	-4±1	-3	0.501	2.5	1.78	0.0002	1

Conclusion:

For the max result: 0.0007+0.0002=0.0009≤ 1.0 for 1g SAR, No SAR is required.

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