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RF Exposure Evaluation Report

Report No.: CQASZ20210500638E-02
Applicant: Wanaka Inc.
Address of Applicant: 857, No.1, Suzhou Street, Haidian District, Beijing, China.
Equipment Under Test (EUT):
EUT Name: The ONE PIANO
Model No.: Play
Test Model No.: Play
Brand Name: THE ONE
FCC ID: 2A2GD-GC861601
Standards: 47 CFR Part 1.1307
47 CFR Part 2.1093
KDB447498D01 General RF Exposure Guidance v06
Date of Test: 2021-05-12 to 2021-05-24
Date of Issue: 2021-06-17
Test Result: PASS*

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

Tested By:

Lewis Zhou

(Lewis Zhou)

Reviewed By:

Timo Lei

(Timo Lei)

Approved By:

Sheek Luo

(Sheek Luo)



1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20210500638E-02	Rev.01	Initial report	2021-06-17

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3 General Information

3.1 Client Information

Applicant:	Wanaka Inc.
Address of Applicant:	857, No.1, SuzhouStreet, HaidianDistrict, Beijing, China.
Manufacturer:	Wanaka Inc.
Address of Manufacturer:	857, No.1, SuzhouStreet, HaidianDistrict, Beijing, China.
Factory	Medeli Musical Instrument (Zhu Hai) Co., Ltd
Factory of Manufacturer:	Medeli Industrial Park, 2 Shuang Lin East Road,Dalinshan Area, Liangang Industrial Zone, Jinwan District, Zhuhai, China.

3.2 General Description of EUT

Product Name:	The ONE PIANO
Model No.:	Play
Test Model No.:	Play
Trade Mark:	THE ONE
Hardware Version:	V01
Software Version:	V1.0
Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	V5.0
Modulation Type:	GFSK
Transfer Rate:	1Mbps
Number of Channel:	40
Product Type:	☐ Mobile ☐ Portable ☒ Fix Location
Antenna Type:	PCB antenna
Antenna Gain:	1.5dBi
EUT Power Supply:	DC 15V

4 SAR Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 Limitst

According to FCC Part1.1310: 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 part1.1307(b)

TABLE 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 Exposures				
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
300–1500			f/300	6
1500–100,000			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
300–1500			f/1500	30
1500–100,000			1.0	30

F= Frequency in MHz

Friis Formula

Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

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

4.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

4.1.3 EUT RF Exposure

1) For BLE Classic

Antenna Gain: 1.5 dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.41in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Measurement Data

GFSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	-0.67	-1±1	0	1
Middle(2440MHz)	0.11	0±1	1	1.259
Highest(2480MHz)	0.19	0±1	1	1.259

The worst case:

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
1.259	1.5	0.00036	1.0	PASS

Note: 1) Refer to report No. CQASZ20210500638E-01 for EUT test Max Conducted Peak Output Power value.

2) $P_d = (P_{out} * G) / (4 * \pi * R^2) = 0.00036$

The RF exposure report also includes SAR exclusions.