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RF Exposure Evaluation Report

Report No.: CQASZ20210600801E-01
Applicant: Shenzhen Piocreat 3d Technology Co., Ltd.
Address of Applicant: Room 1201, Building 3, Jincheng Industrial Area, Dalang Street, Longhua District, Shenzhen, China 518109
Equipment Under Test (EUT):
EUT Name: 3D Printer
Model No.: DJ89, D133, D128, D150, DJ60, DM89, DJ79、DJ63
Test Model No.: DJ89
Brand Name: PioNext
FCC ID: 2A2DO-DJSE
Standards: 47 CFR Part 1.1307
47 CFR Part 1.1310
KDB447498D01 General RF Exposure Guidance v06
Date of Receipt: 2021-06-02
Date of Test: 2021-06-02 to 2021-07-02
Date of Issue: 2021-07-02
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
CQASZ20210600801E-02	Rev.01	Initial report	2021-07-02

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3 General Information

3.1 Client Information

Applicant:	Shenzhen Piocreat 3d Technology Co., Ltd.
Address of Applicant:	Room 1201, Building 3, Jincheng Industrial Area, Dalang Street, Longhua District, Shenzhen, China 518109
Manufacturer:	Shenzhen Piocreat 3d Technology Co., Ltd.
Address of Manufacturer:	Room 1201, Building 3, Jincheng Industrial Area, Dalang Street, Longhua District, Shenzhen, China 518109
Factory:	Shenzhen Piocreat 3d Technology Co., Ltd.
Address of Factory	156, Huawang Road, Langkou Community, Dalang Street, Longhua Dist., Shenzhen, China

3.2 General Description of EUT

Product Name:	3D Printer
Model No.:	DJ89, D133, D128, D150, DJ60, DM89, DJ79、DJ63
Test Model No.:	DJ89
Trade Mark:	PioNext
Hardware Version:	V1.2
Software Version:	V1.9.2
EUT Power Supply:	AC110~220V

3.3 General Description of 2.4G WIFI

Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels
Channel Separation:	5MHz
Type of Modulation:	IEEE for 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE for 802.11 g/n(HT20) : OFDM
Product Type:	☐ Mobile ☐ Portable ☒ Fix Location
Test Software of EUT:	RF test (manufacturer declare)
Antenna Type:	internal antenna
Antenna Gain:	0dBi
EUT Power Supply:	AC120V, 60HZ

Note:

Model No.: DJ89, D133, D128, D150, DJ60, DM89, DJ79、DJ63

Only the model DJ89 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 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 2.4G WIFI

Antenna Gain: 0 dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.58 and 3.17 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Measurement Data

802.11b mode					
Test Frequency (MHz)	Antenna	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
				(dBm)	(mW)
2412	Ant1	8.27	7.5±1.0	8.5	7.079
2437	Ant1	8.64	8.0±1.0	9.0	7.943
2462	Ant1	9.35	9.0±1.0	10.0	10
802.11g mode					
Test Frequency (MHz)	Antenna	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
				(dBm)	(mW)
2412	Ant1	8.83	8.0±1.0	9.0	7.943
2437	Ant1	9.05	8.5±1.0	9.5	8.913
2462	Ant1	9.56	9.0±1.0	10	10
802.11n(HT20)mode					
Test Frequency (MHz)	Antenna	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
				(dBm)	(mW)
2412	Ant1	8.87	8.0±1.0	9.0	7.943
2437	Ant1	9.65	9.0±1.0	10	10
2462	Ant1	9.74	9.0±1.0	10	10

The worst case:

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
10	0	0.00199	1.0	PASS

Note: 1) Refer to report No. CQASZ20210600801E-01 for EUT test Max Conducted average Output Power value.

2) $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2) = 0.00199$