Test Report

Verified code: 192480

Report No.: E20240605493601-4

Customer:	Lumi United Technology Co., Ltd
Address:	B1, Chongwen Park, Nanshan iPark, Liuxian Avenue, Taoyuan Residential District, Nanshan District, Shenzhen, China
Sample Name:	Valve Controller T1
Sample Model:	VC-X01E
Receive Sample Date:	Jun.06,2024
Test Date:	Jun.07,2024 ~ Jun.15,2024
Reference Document:	CFR 47, FCC Part 2.1091 Radio frequency radiation exposure evaluation: mobile devices.
Test Result:	Pass

Prepared by: Wen Wenwen Reviewed by: Wu Haoting Approved by: Xiao Liang

GRG METROLOGY & TEST GROUP CO., LTD

Issued Date: 2024-07-10

GRG METROLOGY & TEST GROUP CO., LTD
Address: No.163, Pingyun Road, West of Huangpu Avenue, Guangzhou, Guangdong, China
Tel：（+86）400-602-0999 FAX：（+86）020-38698685 Web：http://www.grgtest.com

Statement

1. The report is invalid without "special seal for inspection and testing"; some copies are invalid; The report is invalid if it is altered or missing; The report is invalid without the signature of the person who prepared, reviewed and approved it.

2. The sample information is provided by the client and responsible for its authenticity; The content of the report is only valid for the samples sent this time.

3. When there are reports in both Chinese and English, the Chinese version will prevail when the language problems are inconsistent.

4. If there is any objection concerning the report, please inform us within 15 days from the date of receiving the report.

5. Without the agreement of the laboratory, the client is not authorized to use the test results for unapproved propaganda.

6. The test report without CMA approval mark is only used for scientific research, teaching, internal quality cont rol and other purposes.

---------- **The following blanks** ----------

Table of Contents

---------- The following blanks ----------

REPORT ISSUED HISTORY

Report Version	Report No.	Description	Compile Date
1.0	E20240605493601-4	Original Issue	2024-07-08

---------- The following blanks ----------

1. GENERAL DESCRIPTION OF EUT

1.1. APPLICANT

Name:	Lumi United Technology Co., Ltd
Address:	B1, Chongwen Park, Nanshan iPark, Liuxian Avenue, Taoyuan Residential District, Nanshan District, Shenzhen, China

1.2. MANUFACTURER

Name:	Lumi United Technology Co., Ltd
Address:	B1, Chongwen Park, Nanshan iPark, Liuxian Avenue, Taoyuan Residential District, Nanshan District, Shenzhen, China

1.3. BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Equipment:	Valve Controller T1
Model No.:	VC-X01E
Adding Model:	VC-X01D
Model difference descriptions:	They have the same technical construction including circuit diagram, PCB layout, hardware version and software version identical, only the model name is different.
Trade Name:	Aqara
Power Supply:	6V DC power by battery(AA*4)
Battery Specification:	AA LR6 1.5V No.3151B
FCC ID:	2AKIT-VCX01
Frequency Range:	ZigBee: 2405MHz-2480MHz
Conducted maximum output Power:	8.08dBm
Modulation type:	O-QPSK
Antenna Specification:	FPC antenna 3.08dBi gain (Max.)
Temperature Range:	-10℃ ~ +50℃
Hardware Version:	V32
Software Version:	4.2.8
Sample No:	E20240605493601-0001, E20240605493601-0004
Note:	The basic description of the EUT is provided by the applicant. This report is made Solely yon the basis of such data and/or information.We accept no

responsibility for the authenticity and completeness of the above data and information and the validity of the results and/or conclusions.The test model is VC-X01E.

---------- **The following blanks** ----------

2. LABORATORY AND ACCREDITATIONS

2.1. LABORATORY

The tests & measurements refer to this report were performed by Shenzhen EMC Laboratory of GRG METROLOGY & TEST GROUP CO., LTD.

Add	:	Address: No.1301 Guanguang Road Xinlan Community, Guanlan Street, Longhua District Shenzhen, 518110, People's Republic of China
P.C.	:	518110
Tel	:	0755-61180008
Fax	:	0755-61180008

2.2. ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

USA	A2LA(Certificate #2861.01)

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada	ISED (Company Number: 24897，CAB identifier:CN0069)
USA	FCC (Registration Number: 759402，Designation Number:CN1198)

Copies of granted accreditation certificates are available for downloading from our web site, http://www.grgtest.com

---------- **The following blanks** ----------

3. LIMITS FOR GENERAL POPULATION/UNCONTROLLEDEXPOSURE

According to the KDB 447498 D04 Interim General RF Exposure Guidance v01,General frequency and separation-distance dependent MPE-based effective radiated power (ERP) thresholds are in Table 4.1 to support an exemption from further evaluation from 300 kHz through 100 GHz.

TABLE 4.1—THRESHOLDS FOR SINGLE RF SOURCES SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION

RF Source Frequency			**Minimum Distance**			**Threshold ERP**
f_L MHz		f_H MHz	$\lambda_L / 2\pi$		$\lambda_H / 2\pi$	W
0.3	–	1.34	159 m	–	35.6 m	1,920 R^2
1.34	–	30	35.6 m	–	1.6 m	3,450 R^2/f^2
30	–	300	1.6 m	–	159 mm	3.83 R^2
300	–	1,500	159 mm	–	31.8 mm	0.0128 R^2f
1,500	–	100,000	31.8 mm	–	0.5 mm	19.2R^2
Subscripts L and H are low and high; λ is wavelength. From § 1.1307(b)(3)(i)(C), modified by adding Minimum Distance columns.						

For mobile devices that are not exempt per Table 4.1 at distances from 20 cm to 40 cm and in 0.3 GHz to 6 GHz, evaluation of compliance with the exposure limits in §1.1310 is necessary if the ERP of the device is greater than ERP_{20cm} in Formula (4.1).

Formula (4.1):

$$P_{th}\ (\text{mW}) = ERP_{20\ cm}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases}$$

4. CALCULATION METHOD

Predication of MPE limit at a given distance

EIRP(dBm)=Maximum Tune-up Output power (dBm)+Maximum antenna gain(dBi)

ERP(dBm)=EIRP(dBm)-2.15

R=minimum distance to the center of radiation of the antenna

From the EUT RF output power, the minimum mobile separation distance, d=20cm, as well as the maximum gain of the used as following information, the RF power ERP can be obtained.

Table 1 Antenna Specification

Mode	Antenna type	Maximum antenna gain
ZigBee	Internal antenna	3.08dBi

Table 2 Transmit Power

Mode	Frequency(MHz)	Peak Conducted Output Power (dBm)	Target (dBm)	Tolerance ±(dB)
ZigBee	2405	8.08	9.00	1.0
	2440	7.80	8.00	1.0
	2480	7.44	8.00	1.0

---------- The following blanks ----------

5. ESTIMATION RESULT

5.1 MEASUREMENT RESULTS

STANDALONE MPE

Mode	Frequency (MHz)	Maximum Tune-up Output power (dBm)	Antenna Gain (dBi)	Maximum Tune-up EIRP (dBm)	ERP (dBm)	Maximum Tune-up ERP (W)	Threshold ERP(W)
ZigBee	2405- 2480	9.0	3.08	12.08	9.93	0.010	0.768

Remark:

1. RF Exposure use distance is 20cm from manufacturer declaration of user manual.
2. Threshold ERP(W)= 19.2R ²(W)=19.2*0.2*0.2(W)=0.768(W).
3. ERP(dBm)=EIRP(dBm)-2.15.

6. CONCLUSION

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

---------- End of Report ----------