



RF Exposure Evaluation Declaration

Report No.: S2025062326390108

Issue Date: **xx-xx-2025**

Applicant: Lumi United Technology Co., Ltd

Address: B1, Chongwen Park, Nanshan iPark, Liuxian Avenue, Taoyuan
Residential District, Nanshan District, Shenzhen, China

FCC ID: 2AKIT-DLD06

Application Type: Certification

Product: Smart Lock U400

Model No.: DL-D06E

Trade Mark: Aqara

Reference Document: CFR 47, FCC Part 2.1093
Radiofrequency radiation exposure evaluation: portable devices.

Item Receipt date: 2025-02-07

Test Date: 2025-02-12 to 2025-07-22

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Engineer Manager

The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in KDB 558074 D01. Test results reported herein relate only to the item(s) tested.

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The test report must not be used by the client to claim product certifications, approval, or endorsement by NVLAP, NIST or any agency of U.S. Government.

Revision History

Report No.	Version	Description	Issue Date
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§2.1033 General Information

Applicant:	Lumi United Technology Co., Ltd
Applicant Address:	B1, Chongwen Park, Nanshan iPark, Liuxian Avenue, Taoyuan Residential District, Nanshan District, Shenzhen, China
Manufacturer:	Lumi United Technology Co., Ltd
Manufacturer Address:	B1, Chongwen Park, Nanshan iPark, Liuxian Avenue, Taoyuan Residential District, Nanshan District, Shenzhen, China
Test Site:	Fanguang Inspection & Testing Co., Ltd.
LAB ID:	CN5037
Test Site Address:	No.8 Ningyun Rd., Xinwu District Wuxi, Jiangsu 214000 China
FCC Rule Part(s):	FCC Part 2.1091
FCC ID:	2AKIT-DLD06
Test Device Serial No.:	S/N.: / ☐ Production ☒ Pre-Production ☐ Engineering

1. PRODUCT INFORMATION

1.1. Equipment Description

Product Name:	Smart Lock U400
Model Name:	DL-D06E
Additional Model:	DL-D06D, DL-D16E, DL-D16D, DL-D17D, DL-D15D
Model difference descriptions:	Refer to section 1.3
Trade Name:	Aqara
Input Voltage Range:	DC 7.3V by battery
Temperature Range:	-35°C ~ +66°C for external lock, -18°C ~ +55°C for Internal lock
Hardware Version:	V1.0.0
Software Version:	3.0.1.7
EUT sample number:	S20250623263901-0001, S20250623263901-0002, S20250623263901-0003

Note: This information is provided by the Customer and its authenticity is the responsibility of the Customer.

1.2. Product Specification Subjective to this Report

Operating Frequency:	Thread: 2405~2480MHz BLE: 2402~2480MHz NFC: 13.56MHz UWB: 7.75GHz ~ 8.25GHz
Antenna Type:	PCB printed antenna with 1.0dBi (Max.) for BLE & Thread, PCB antenna for NFC, Internal antenna for with 3.5dBi (Max.) for UWB
Temperature Range:	-18°C ~ +55°C
Note:	The EUT antenna gain is provided by the applicant. This report is made solely on 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.

1.3. Model difference descriptions

Smart Lock U400	Version 1	Version 2	Version 3	Version 4	Version 5	Version 6
Model	DL-D06E	DL-D16E	DL-D06D	DL-D16D	DL-D17D	DL-D15D
Color	Black	Silver	Black	Silver	Shadow Black	Satin Nickel
Finishing	Matte (Spray Coating)		Matte (Spray Coating)		Matte (Electroplating + Brushed)	
Package content	Li-ion Battery × 1		Li-ion Battery × 1 + Aqara Hub M100 × 1		Li-ion Battery × 2	
External Panel						
Shape	Curved		Flat		Flat	
Main Body Material	Aluminium		Aluminium		Zinc	
Gliding Plate Material	Aluminium		Zinc		Zinc	
Keypad Material	PC + PET		PMMA		PMMA	
Internal Panel						
Main Body Material	Plastic					
Knob	Aluminium		Aluminium		Zinc	

2. RF Exposure Evaluation

2.1. Limits

Exposure category: General population/uncontrolled environment

EUT Type: extremity exposure device

According to the KDB 447498 D04 Interim General RF Exposure Guidance v01:

when 10-g extremity SAR applies, SAR test exemption may be considered by applying a factor of 2.5 to the SAR-based exemption thresholds.

SAR-Based Exemption:

SAR-based thresholds are derived based on frequency, power, and separation distance of the RF source. The formula defines the thresholds in general for either available maximum time averaged power or maximum time-averaged ERP, whichever is greater. If the ERP of a device is not easily determined, such as for a portable device with a small form factor, the applicant may use the available maximum time-averaged power exclusively if the device antenna or radiating structure does not exceed an electrical length of $\lambda/4$. As for devices with antennas of length greater than $\lambda/4$ where the gain is not well defined, but always less than that of a half-wave dipole (length $\lambda/2$), the available maximum time-averaged power generated by the device may be used in place of the maximum time-averaged ERP, where that value is not known. The separation distance is the smallest distance from any part of the antenna or radiating structure for all persons, during operation at the applicable ERP. In the case of mobile or portable devices, the separation distance is from the outer housing of the device where it is closest to the antenna. The SAR-based exemption formula of § 1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold P_{th} (mW). This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by Formula as below:

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}}(d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right)$$

and f is in GHz, d is the separation distance (cm), and $ERP_{20 \text{ cm}}$ is per Formula (B.1). The example values shown in Table B.2 are for illustration only.

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases} \quad (\text{B. 1})$$

Table B.2—Example Power Thresholds (mW)

Frequency (MHz)	Distance (mm)									
	5	10	15	20	25	30	35	40	45	50
300	39	65	88	110	129	148	166	184	201	217
450	22	44	67	89	112	135	158	180	203	226
835	9	25	44	66	90	116	145	175	207	240
1900	3	12	26	44	66	92	122	157	195	236
2450	3	10	22	38	59	83	111	143	179	219
3600	2	8	18	32	49	71	96	125	158	195
5800	1	6	14	25	40	58	80	106	136	169

1-mW test exemption:

Per § 1.1307(b)(3)(i)(A), a single RF source is exempt RF device (from the requirement to show data demonstrating compliance to RF exposure limits, as previously mentioned) if the available maximum time-averaged power is no more than 1 mW, regardless of separation distance.

This exemption applies to all operating configurations and exposure conditions, for the frequency range 100 kHz to 100 GHz, regardless of fixed, mobile, or portable device exposure conditions. This is a standalone exemption, and it cannot be applied in conjunction with any other test exemption.

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2.2. Calculation Method

Table 1 Antenna Specification

Mode	Antenna type	Maximum antenna gain
BLE	PCB printed antenna	1.0dBi
Thread	PCB printed antenna	1.0dBi
UWB	Internal antenna	3.5dBi

Table 2 Transmit Power

Mode	Peak Conducted Output Power (dBm)	EIRP (dBm)	Target EIRP (dBm)	Tolerance ±(dB)
BLE	7.83	8.83	8.00	1.0
Thread	8.63	9.63	9.00	1.0

Note: EIRP= Maximum Conducted Output peak Power + antenna gain.

Mode	EIRP (dBm)	Target (dBm)	Tolerance ±(dB)
UWB	-24.07	-24.00	1.0

STANDALONE MPE

For BLE & thread:

Mode	Frequency (MHz)	Maximum Tune-up ERP (dBm)	Maximum Tune-up ERP (mW)	Exemption Limit (mW)	Verdict
BLE	2402-2480	6.85	4.84	6.92	PASS
Thread	2405-2480	7.85	6.10	6.92	PASS

Remark:

1. ERP=EIRP-2.15.

2.Threshold ERP(mW)=(0.5/20)^{-log(60/3060/√f)} = (0.5/20)^{-log(60/3060/√2.480)}=2.77mW.

3.The EUT is extremity exposure device, the Exemption limit =Threshold ERP(mW)*2.5 = 2.77*2.5 =6.92mW.

4.For BLE & Thread refer to report S2025062326390105, S2025062326390106, S2025062326390107.

For UWB:

Mode	Frequency (GHz)	Maximum Tune-up EIRP (dBm)	Maximum Tune-up EIRP (mW)	Exemption Limit (mW)	Verdict
UWB	7.75GHz to 8.25GHz	-23.00	0.005	1.00	PASS

Note: For UWB EIRP refer to report GJW2025-0581-RF by CVC Testing Technology(Shenzhen) Co., Ltd.

For NFC:

Maximum E-Field at 3m (dBμV/m)	Output power (dBm)	Output power (mW)	Limit (mW)
69.69	-25.54	0.0030	1

Note:

- 1.EIRP=E(dBμV/m)@3m+20log(d)-104.77 =69.69+20log(3)-104.77= -25.54dBm;
- 2.mW=10^(EIRP/10)= 10^(-25.54/10)= 0.0030mW;
- 3.The Maximum E-Field please refer to the report S2025062326390107.

Simultaneous transmission

The BLE, UWB & NFC can simultaneously transmit.

The Thread,UWB & NFC can simultaneously transmit.

Maximum Simultaneous transmission MPE Ratio for BLE, UWB & NFC:

Maximum MPE ratio BLE	Maximum MPE ratio NFC	Maximum MPE ratio UWB	Σ MPEratios	Limit	Results
0.699	0.003	0.005	0.707	1.000	Pass

Maximum Simultaneous transmission MPE Ratio for Thread, UWB & NFC:

Maximum MPE ratio Thread	Maximum MPE ratio NFC	Maximum MPE ratio UWB	Σ MPEratios	Limit	Results
0.882	0.003	0.005	0.890	1.000	Pass

Remark:

Σof MPE ratios≤ 1.0

CONCULISON:

The measurement results comply with the FCC Limit per CFR 47, FCC Part 2.1093

Radiofrequency radiation exposure evaluation: portable devices.

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Statement

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7. Information about laboratory sites involved in our company:

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Building G9, China Sensor Network International Innovation Park, No.200, Linghu Avenue, Wuxi, Jiangsu, China (Wuxi Innovation Park Laboratory)

Building 3, Maoxuan Industrial Park, No.81, Jinma Road, Hongshan Subdistrict, Xinwu District, Wuxi, Jiangsu, China (Maoxuan Industrial Park Laboratory)

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