

Dates of Tests: July 9, 2024
Test Report S/N: LR500112407E
Test Site : LTA CO., LTD.

CERTIFICATION OF COMPLIANCE

FCC ID.

2AQAV-FX400TWR

APPLICANT

SMARTeLock CO., LTD.

Equipment Class	:	Digital Transmission System (DTS)
Manufacturing Description	:	LOCKER LOCK
Manufacturer	:	SMARTeLock CO., LTD.
Model name	:	FX400TWR
Variant Model name	:	SL200TWR, SL200, SL200WR, SL200TW, SL200M, FX400, FX400WR, FX400TW, SL400, SL400A, SL400B, SL400C
Test Device Serial No.:	:	Identical prototype
Rule Part(s)	:	FCC Part 15.247 Subpart C ; ANSI C63.10 - 2013
Frequency Range	:	2402 ~ 2480 MHz - BLE 2405 ~ 2480 MHz - Zigbee
Max. Output Power	:	Max -9.19 dBm - Conducted
Data of issue	:	July 9, 2024

This test report is issued under the authority of:



Ja-Beom Koo, Manager

The test was supervised by:



Jae-hum Yun, Test Engineer

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1. General information

1-1 Test Performed

Company name : LTA Co., Ltd.
Address : 243, Jubug-ri, Yangji-Myeon, Youngin-Si, Kyunggi-Do, Korea. 449-822
Web site : <http://www.ltalab.com>
E-mail : chahn@ltalab.com
Telephone : +82-31-323-6008
Facsimile : +82-31-323-6010

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the “General requirements for the competents of calibration and testing laboratory”.

1-2 Accredited agencies

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

Agency	Country	Accreditation No.	Validity	Reference
RRA	KOREA		-	RRA accredited Lab.
	U.S.A	KR0049	2025-03-29	
	CANADA		2024-08-15	
VCCI	JAPAN	C-14948	2026-09-10	VCCI registration
		T-12416	2026-09-10	
		R-14483	2026-10-15	
		G-10847	2024-12-13	
KOLAS	KOREA	KT551	2025-10-12	KOLAS accredited Lab.

2. Information about test item

2-1 Client & Manufacturer

Client Company name : SMARTeLock CO., LTD.

Address : B402, Geumgang Penterium IT Tower, 215, Galmachiro, Jungwon gu,
Seongnam-si, Gyeonggi-do South Korea 13217

Tel / Fax : TEL No : +82-010-3673-7884/ FAX No : +82-031-743-7276

Manufacturer : SMARTeLock CO., LTD.

Address : B402, Geumgang Penterium IT Tower, 215, Galmachiro, Jungwon gu,
Seongnam-si, Gyeonggi-do South Korea 13217

Tel / Fax : TEL No : +82-010-3673-7884/ FAX No : +82-031-743-7276

2-2 Equipment Under Test (EUT)

Model name : FX400TWR

Serial number : Identical prototype

Date of receipt : June 13, 2024

EUT condition : Pre-production, not damaged

Antenna type : Chip antenna (Gain : 3.5i)

Frequency Range : 2402 ~ 2480 MHz - BLE
2405 ~ 2480 MHz - Zigbee

RF output power : Max -9.19 dBm – BLE, Conducted
Max -10.16 dBm –Zigbee, Conducted

Type of Modulation : GFSK, O-QPSK

Power Source : DC 6 V

2-3 Tested frequency

	LOW	MID	HIGH
Frequency (MHz) BLE	2402	2440	2480
Frequency (MHz) Zigbee	2405	2440	2480

2-4 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
Notebook	-	MS-1736	MSI

3. Test Report

3.1 Summary of tests

FCC Part Section(s)	Parameter	Limit	Test Condition	Status (note 1)
§ 1.1310 and §2.1091	RF EXPOSURE EVULATION	-	-	C

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

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3.2 RF EXPOSURE EVULATION

1.1 Limit

According to §1.1310 and §2.1091 RF exposure is calculated.

(B) Limits for General Population/Uncontrolled Exposures

Frequency range (MHz)	Electric field Strength	Magnetic field Strength	Power density (mW/cm ²)	Averaging time
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
* = Plane-wave equivalent power density

1.2 MAXIMUM PERMISSIBLE EXPOSURE Prediction

Prediction of MPE limit at a given distance

Power density at the specific separation:

$S = PG/(4R^2\pi)$ $S = (0.1 * 2.24) / (4 * 20^2 * \pi)$ $S = 0.002 \text{ mW/cm}^2$	Where, S = Maximum power density (mW/cm ²) P = Power input to the antenna (mW) G = Numeric power gain of the antenna R = Distance to the center of the radiation of the antenna (20 cm = limit for MPE)
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1.3 MAXIMUM PERMISSIBLE EXPOSURE Prediction

- Calculated under the worst-case conditions of each mode.

(Measured power 3 dBm $\pm$ 0.5dB)

2.4GHz Mode

Max Peak output Power at antenna input terminal	-9.19	dBm
Max Peak output Power at antenna input terminal	0.1	mW
Prediction distance	0.5	cm
Prediction frequency	2440	MHz
Antenna Gain(typical)	3.5	dBi
Antenna Gain(numeric)	2.24	-

SAR Test exclusion thresholds for 100MHz to 6GHz at test separation distance $\leq$ 50 mm = **Used**

$[(\text{max.power of channel, including tune-up torelance, mW})/(\text{min. test separation distance, mm})] * [\sqrt{f}(\text{GHz})]$

$= [0.1 / 5] * [\sqrt{2.440}] = 0.03 \leq 3.0$, for 1g SAR

Thus, SAR for this device is not required.

Max Peak output Power at antenna input terminal	-10.16	dBm
Max Peak output Power at antenna input terminal	0.1	mW
Prediction distance	0.5	cm
Prediction frequency	2440	MHz
Antenna Gain(typical)	3.5	dBi
Antenna Gain(numeric)	2.24	-

SAR Test exclusion thresholds for 100MHz to 6GHz at test separation distance $\leq$ 50 mm = **Used**

$[(\text{max.power of channel, including tune-up torelance, mW})/(\text{min. test separation distance, mm})] * [\sqrt{f}(\text{GHz})]$

$= [0.1 / 5] * [\sqrt{2.440}] = 0.03 \leq 3.0$, for 1g SAR

Thus, SAR for this device is not required.

RFID Mode

According to the calculation formula of power

$$E.I.R.P [dBm] = E[dBuV/m] + 20\log(d[m]) - 104.77$$

E is electric field strength in dBuV/m;

d is measurement distance in meters (m);

E.I.R.P.[dBm] is the equivalent isotropically radiated power in dBm(above 1GHz);

Modulation	Channel Freq. (MHz)	Maximum Field strenath @3m (dBuv/m)	Calculated E.I.R.P. (dBm)	Maximum Output power (mW)
FSK	13.56	55.67	-39.55	0.0001

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Number of concurrent transfers

2.4 GHz + RFID

Conditions for Simultaneous Transmission

$$2.4GHz + RFID = 0.03 + 0.03 + 0.01 = 0.21 \leq 3.0, \text{ for } 1g \text{ SAR}$$