

Dates of Tests: November 17, 2023

Test Report S/N: LR500112311F

Test Site : LTA CO., LTD.

CERTIFICATION OF COMPLIANCE

FCC ID.

2AQAV-ECU100-02W

APPLICANT

SMART eLOCK Co., LTD.

Equipment Class	:	Digital Transmission System (DTS)
Manufacturing Description	:	Energy Control Unit
Manufacturer	:	SMART eLOCK Co., LTD.
Model name	:	ECU100-02W
Variant Model name	:	ECU100-00, ECU100-02, ECU100-00W, ECU100-00WA, ECU100-01W, ECU100-02WA
Test Device Serial No.:	:	Identical prototype
Rule Part(s)	:	FCC Part 15.247 Subpart C ; ANSI C63.10 - 2013
Frequency Range	:	2412 ~ 2462 MHz 802.11 b
Max. Output Power	:	Max 18.09 dBm - Conducted
Data of issue	:	November 17, 2023

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 : SMART eLOCK 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 : ECU100-02W
 Serial number : Identical prototype
 Date of receipt : September 12, 2023
 EUT condition : Pre-production, not damaged
 Antenna type : Chip Antenna (Max Gain : 3.5 dBi)
 Frequency Range : 2412 ~ 2462 MHz – 802.11 b
 RF output power : Max 18.09 dBm – Conducted
 Type of Modulation : DSSS
 Power Source : AC 120 V

2-3 Tested frequency

Bluetooth	LOW	MID	HIGH
Frequency (MHz) – 900 MHz RFID	2412	2437	2462

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

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:

$S = PG/(4R^2\pi)$ $S = (64.41 * 1.58) / (4 * 5^2 * \pi)$ $S = 0.32 \text{ mW/cm}^2$	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 18.09 dBm $\pm$ 0.5dB)

WIFI 2.4GHz Mode

Max Peak output Power at antenna input terminal	18.09	dBm
Max Peak output Power at antenna input terminal	64.41	mW
Prediction distance	5	cm
Prediction frequency	2437	MHz
Antenna Gain(typical)	2	dBi-
Antenna Gain(numeric)	1.58	

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

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] * [\sqrt{f(\text{GHz})}] \leq 3.0$

$= [(64.41/50) * \sqrt{2.437}] = 2.0 \leq 3.0$, for 1g SAR

Thus, SAR for this device is not required.

Zigbee Mode

Max Peak output Power at antenna input terminal	4.81	dBm
Max Peak output Power at antenna input terminal	3.02	mW
Prediction distance	5	cm
Prediction frequency	2480	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**

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] * [\sqrt{f(\text{GHz})}] \leq 3.0$

$= [(3.02/50) * \sqrt{2.480}] = 0.09 \leq 3.0$, for 1g SAR

Thus, SAR for this device is not required.

RFID Mode

According to the calculation formula of power

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

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	51.38	-43.85	0.000041

Number of concurrent transfers

WIFI+Zigbee + RFID

Conditions for Simultaneous Transmission

$$\text{WIFI+Zigbee+ RFID} = 2.0 + 0.09 + 0.01 = 2.1 \leq 3.0, \text{ for } 1\text{g SAR}$$