



## Compliance Certification Services (Kunshan) Inc.

CCSEM-TRF-001 Rev. 02 Sep 01, 2023

Report No.: KSCR230800152406

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### 1 Cover Page

## ***RF Exposure Evaluation Report***

**Application No.:** KSCR2308001524AT  
**FCC ID:** 2AH25K2MINI660  
**IC:** 22621-K2MINI660  
**Applicant:** Shanghai Sunmi Technology Co.,Ltd.  
**Address of Applicant:** Room 505, No.388 Song Hu Road, Yang Pu District, Shanghai, China  
**Manufacturer:** Shanghai Sunmi Technology Co.,Ltd.  
**Address of Manufacturer:** Room 505, No.388 Song Hu Road, Yang Pu District, Shanghai, China  
**Equipment Under Test (EUT):**  
**EUT Name:** Self-Checkout Kiosk  
**Model No.:** F4503,F4504  
**Standard(s) :** FCC Rules 47 CFR §2.1091  
KDB 447498 D04 interim General RF Exposure Guidance v01  
RSS-102 Issue 5 Amendment 1 (February 2, 2021)  
**Date of Receipt:** 2023-08-29  
**Date of Test:** 2023-10-03 to 2023-10-24  
**Date of Issue:** 2023-11-17

|                     |              |
|---------------------|--------------|
| <b>Test Result:</b> | <b>Pass*</b> |
|---------------------|--------------|

\* In the configuration tested, the EUT complied with the standards specified above.

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.



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| Revision Record |             |            |        |
|-----------------|-------------|------------|--------|
| Version         | Description | Date       | Remark |
| 00              | Original    | 2023-11-17 | /      |
|                 |             |            |        |
|                 |             |            |        |

|                          |  |                             |  |  |
|--------------------------|--|-----------------------------|--|--|
| Authorized for issue by: |  |                             |  |  |
| Tested By                |  | Damon Zhou                  |  |  |
|                          |  | Damon_Zhou/Project Engineer |  |  |
| Approved By              |  | Terry Hou                   |  |  |
|                          |  | Terry Hou /Reviewer         |  |  |



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## 3 General Information

### 3.1 General Description of E.U.T.

|                   |                                                                                                                        |
|-------------------|------------------------------------------------------------------------------------------------------------------------|
| Power supply:     | DC 24V,2.5A by AC Adapter<br>Adapter model: CYSE65-240250<br>INPUT:AC 100-240V,50/60Hz,1.7A<br>OUTPUT: DC 24V,2.5A,60W |
| Serial Number:    | KM62D37M40011                                                                                                          |
| Firmware Version: | 1.5.3                                                                                                                  |

### 3.2 Details of E.U.T.

#### 2.4G

|                      |                                                                                                                            |
|----------------------|----------------------------------------------------------------------------------------------------------------------------|
| Operation Frequency: | 802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz                                                    |
| Modulation Type:     | 802.11b: DSSS (CCK, DQPSK, DBPSK);802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)                                               |
| Number of Channels:  | 802.11b/g/n(HT20):11;802.11n(HT40):7                                                                                       |
| Channel Spacing:     | 5MHz                                                                                                                       |
| Antenna Type:        | PIFA Antenna                                                                                                               |
| Antenna Gain:        | Ant 1:2.45dBi; (Provided by the manufacturer)<br>Ant 2:2.45dBi. (Provided by the manufacturer)<br>Directional gain:5.46dBi |

#### BT

|                             |                                         |
|-----------------------------|-----------------------------------------|
| Operation Frequency:        | 2402MHz to 2480MHz                      |
| Bluetooth Version:          | V5.0 Dual mode                          |
| Modulation Type:            | GFSK, pi/4DQPSK, 8DPSK                  |
| Number of Channels:         | 79                                      |
| Channel Spacing:            | 1MHz                                    |
| Spectrum Spread Technology: | Frequency Hopping Spread Spectrum(FHSS) |
| Antenna Type:               | PIFA Antenna                            |
| Antenna Gain:               | 2.45dBi (Provided by the manufacturer)  |

#### BLE

|                      |                                        |
|----------------------|----------------------------------------|
| Operation Frequency: | 2402MHz to 2480MHz                     |
| Bluetooth Version:   | V5.0 Dual mode                         |
| Modulation Type:     | GFSK                                   |
| Number of Channels:  | 40                                     |
| Channel Spacing:     | 2MHz                                   |
| Antenna Type:        | PIFA Antenna                           |
| Antenna Gain:        | 2.45dBi (Provided by the manufacturer) |



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### 5G

|                                                 |                                                                                                                                                   |
|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Operation Frequency/Number of channels (20MHz): | U-NII-1: 5180-5240MHz (4 Channels); U-NII-2A: 5260-5320MHz (4 Channels); U-NII-2C: 5500-5700MHz (11 Channels); U-NII-3: 5745-5825MHz (5 Channels) |
| Operation Frequency/Number of channels/(40MHz): | U-NII-1: 5190-5230MHz (2 Channels); U-NII-2A: 5270-5310MHz (2 Channels); U-NII-2C: 5510-5670MHz (5 Channels); U-NII-3: 5755-5795MHz (2 Channels)  |
| Operation Frequency/Number of channels (80MHz): | U-NII-1: 5210MHz (1 Channel); U-NII-2A: 5290MHz (1 Channels); U-NII-2C: 5530-5610MHz (2 Channels); U-NII-3: 5775MHz (1 Channel)                   |
| Modulation Type:                                | 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK);<br>802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM);<br>802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM);      |
| Channel Spacing:                                | 802.11a/n/ac 20: 20MHz; 802.11n/ac 40: 40MHz; 802.11ac 80: 80MHz                                                                                  |
| DFS Function:                                   | Slave without Radar detection                                                                                                                     |
| Antenna Type:                                   | PIFA Antenna                                                                                                                                      |
| Antenna Gain:                                   | Ant 1:2.71dBi; (Provided by the manufacturer)<br>Ant 2:2.19dBi (Provided by the manufacturer)<br>Directional gain:5.46dBi                         |

### 13.56MHz

|                      |              |
|----------------------|--------------|
| Operation Frequency: | 13.56MHz     |
| Modulation Type:     | ASK          |
| Antenna Type:        | Loop Antenna |



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### 3.3 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

Note:

- 1.SGS is not responsible for wrong test results due to incorrect information (e.g. max. clock frequency, highest internal frequency, antenna gain, cable loss, etc ) is provided by the applicant. (if applicable).
- 2.SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (if applicable).
3. Sample source: sent by customer.

### 3.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **A2LA**

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

- **FCC**

Compliance Certification Services (Kunshan) Inc. has been recognized as an accredited testing laboratory. Designation Number: CN1172.

- **ISED**

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory. Company Number: 2324E

- **VCCI**

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600, C-11707, T-11499, G-10216 respectively.

## 4 FCC Radiofrequency radiation exposure limits

According to §1.1310, 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 part 1.1307(b)

| Frequency range (MHz)                                    | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm <sup>2</sup> ) | Averaging time (minutes) |
|----------------------------------------------------------|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| (i) Limits for Occupational/Controlled Exposure          |                               |                               |                                     |                          |
| 0.3–3.0                                                  | 614                           | 1.63                          | *(100)                              | ≤6                       |
| 3.0–30                                                   | 1842/f                        | 4.89/f                        | *(900/f <sup>2</sup> )              | <6                       |
| 30–300                                                   | 61.4                          | 0.163                         | 1.0                                 | <6                       |
| 300–1,500                                                |                               |                               | f/300                               | <6                       |
| 1,500–100,000                                            |                               |                               | 5                                   | <6                       |
| (ii) 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 <sup>2</sup> )              | <30                      |
| 30–300                                                   | 27.5                          | 0.073                         | 0.2                                 | <30                      |
| 300–1,500                                                |                               |                               | f/1500                              | <30                      |
| 1,500–100,000                                            |                               |                               | 1.0                                 | <30                      |

## 5 IC Radiofrequency radiation exposure limits:

According to RSS-102 section 2.5.2, RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);

- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $4.49/f^{0.5}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $1.31 \times 10^{-2} f^{0.6834}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

For 2.4G device, the limit of worse case is 2.68 W

For 5G device, the limit of worse case is 4.53W

## 6 Measurement and Calculation

### 6.1 Maximum transmit power

The Power Data is based on the RF Test Report KSCR230800152401, KSCR230800152402, KSCR230800152403, KSCR230800152404, KSCR230800152405.

### 6.2 MPE Calculation

According to the formula  $S = P / 4\pi R^2$ , we can calculate S which is MPE.

Note:

- 1) P (mW)
- 2) R = distance to the center of radiation of antenna (in centimeter)

| Test Mode | Max EIRP (dBm) | Operation Distance R(cm) | Power Density (mW/cm <sup>2</sup> ) | Limit of Power Density S(mW/cm <sup>2</sup> ) for FCC | Result |
|-----------|----------------|--------------------------|-------------------------------------|-------------------------------------------------------|--------|
| Bluetooth | 6.41           | 20                       | 0.001                               | 1                                                     | Pass   |
| 2.4G WLAN | 19.28          | 20                       | 0.017                               | 1                                                     | Pass   |
| 5G WLAN   | 21.27          | 20                       | 0.027                               | 1                                                     | Pass   |

13.56MHz: 69.37dBuV/m@3m=0.003mW

For FCC:

The 2.4GHz WLAN,BT,5GHz WLAN and 13.56MHz can transmit simultaneously, but the maximum rate of MPE is  $0.017/1+0.001/1+0.027/1+0.003/1=0.048 \leq 1$ .

So the device is exclusion from SAR test.

For IC:

The 2.4GHz WLAN,BT,5GHz WLAN and 13.56MHz can transmit simultaneously, but the maximum rate of MPE is  $0.085/2.68+0.004/2.68+0.134/4.53+0.003/1000=0.063 \leq 1$ .

So the device is exclusion from SAR test.

**--End of the Report--**