Abbreviated EN55035 Test Report

Report Reference No. ..... :	24EECS06053 04291
Date Sample(s) Received ..... :	2024-06-18
Date Tested ..... :	2024-06-18 to 2024-06-22
Date of issue ..... :	2024-06-25
Testing Laboratory ..... :	DongGuan ShuoXin Electronic Technology Co., Ltd.
Address ..... :	Zone A, 1F, No. 6, XinGang Road YuanGang Street, XinAn District, ChangAn Town, DongGuan City, GuangDong, China
Applicant's name ..... :	Foshan Luokai Locking Technology Co., Limited
Address ..... :	Room 603, Building 10 of Optoelectronic Industrial Park, Leliu, Shunde District, Foshan City, Guangdong, China
Manufacturer ..... :	Foshan Luokai Locking Technology Co., Limited
Test item description ..... :	Digital door lock
Trade Mark ..... :	/
Model/Type reference ..... :	F702M-S60
Ratings ..... :	DC 4.2~6.4V

Responsible Engineer :

Allen Shi

Authorized Signatory:

King Wang

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1. TEST REPORT DECLARE

Applicant	:	Foshan Luokai Locking Technology Co., Limited
Address	:	Room 603, Building 10 of Optoelectronic Industrial Park, Leliu, Shunde District, Foshan City, Guangdong, China
Equipment Name	:	Digital door lock
Model No	:	F702M-S60
Trade Mark	:	/
Manufacturer	:	Foshan Luokai Locking Technology Co., Limited
Address	:	Room 603, Building 10 of Optoelectronic Industrial Park, Leliu, Shunde District, Foshan City, Guangdong, China
Test Standard	:	EN 55035:2017+A11:2020

We Declare:

The equipment described above is tested by DongGuan ShuoXin Electronic Technology Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and DongGuan ShuoXin Electronic Technology Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

2. SUMMARY OF TEST RESULTS

EN55035, Immunity					
Clause	**Phenomenon**	**Application**	**Basic Standard or Test Method**	**Criteria**	**Judgment**
4.2.2.2	Radio frequency electromagnetic field (80 MHz to 1 000 MHz)	Enclosure	EN 61000-4-3: 2006 +A1:2008 +A2:2010	A	PASS
4.2.2.2	Radio frequency electromagnetic field (1800, 2600, 3500, 5000)	Enclosure	EN 61000-4-3: 2006 +A1:2008 +A2:2010	A	PASS
4.2.1	Electrostatic discharge	Enclosure	EN 61000-4-2: 2009	B	PASS

Note:

(1) ”N/A” denotes test is not applicable to this device.

(2) Criterion A applies for immunity tests with phenomena of a continuous nature. (CT, CR)
Criterion B applies for immunity tests with phenomena of a transient nature. (TT, TR)
Criterion C for immunity tests with power interruptions exceeding a certain time.

2.1 TEST FACILITY

The test facilities used to collect the ESD test data in this report is at the location of Zone A, 1F, No. 6, XinGang Road YuanGang Street, XinAn District, ChangAn Town, DongGuan City, GuangDong, China.

The RS test data is at the location of Room 102, No. 5, Xing'an Road, Chang'an Town, Dongguan City, Guangdong 523850, China (Cerpass Technology (Dong Guan) Co., Ltd.).

2.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2

The reported uncertainty of measurement **y** ± **U**, where expanded uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**, providing a level of confidence of approximately **95**%.

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	Digital door lock
Brand Name	/
Test Model	F702M-S60
Power Rating	DC 4.2~6.4V
Connecting I/O Port(s)	N/A

Note : For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

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3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Swiping Card

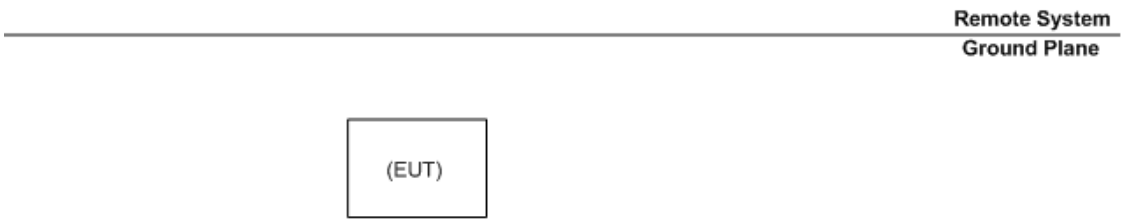
Immunity	
Final Test Mode	Description
Mode 1	Swiping Card

3.3 EUT OPERATING CONDITIONS

The EUT exercise program used during radiated and/or conducted emission measurement was designed to exercise the various system components in a manner similar to a typical use.

3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Mode 1



3.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.
A	N/A	N/A	N/A	N/A
Item	Shielded Type	Ferrite Core	Length	Note
1	N/A	N/A	N/A	N/A

4. EMC IMMUNITY TEST

4.1 STANDARD COMPLIANCE/SEVERITY LEVEL/CRITERIA

Test Standard No.	Test Specification Level	Test Mode Test Port	Performance Criteria
Radio frequency electromagnetic Field Clause 4.2.2.2 EN 61000-4-3 (RS)	80 MHz to 6000 MHz 10 V/m/30 V/m (unmodulated, r.m.s), 1000 Hz or 400 Hz, 80%, AM modulated **(NOTE 1)**	Enclosure	A
Electrostatic discharge Clause 4.2.1 EN 61000-4-2 (ESD)	± 15 kV air discharge ± 8 kV contact discharge	Direct Mode	A
	± 8 kV HCP discharge ± 8 kV VCP discharge	Indirect Mode	A

Note:

(1) If the wanted signal is modulated at 1000 Hz, then an audio signal of 400 Hz shall be used.

4.2 GENERAL PERFORMANCE CRITERIA

1.	Performance criteria for continuous phenomena applied to transmitters (CT)
2.	Performance criteria for transient phenomena applied to transmitters (TT)
3.	Performance criteria for continuous phenomena applied to receivers (CR)
4.	Performance criteria for transient phenomena applied to receivers (TR)

According to EN55035 standard, the general performance criteria as following:

Criteria	During Test	After Test
A	Shall operate as intended. (see note 1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 3). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.
B	May show loss of function (one or more). May show degradation of performance (see note 2). Shall be no unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3).

NOTE 1: Operate as intended during the test allows a level of degradation not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 2: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 3: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

Note:

Criterion A applies for immunity tests with phenomena of a continuous nature. (CT, CR)

Criterion B applies for immunity tests with phenomena of a transient nature. (TT, TR)

Criteria C for immunity tests with power interruptions exceeding a certain time.

4.3 GENERAL PERFORMANCE CRITERIA TEST SETUP

The EUT tested system was configured as the related operation mode otherwise a special operating condition is specified in the follows during the testing.

4.4 ELECTROSTATIC DISCHARGE (ESD)

4.4.1 TEST SPECIFICATION

Clause:	4.2.1
Test Method:	EN 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Required Performance	B
Discharge Voltage:	Air Discharge: ± 2 kV/± 4 kV/± 8 kV/± 15 kV (Direct) Contact Discharge: ± 2 kV/± 4 Kv/± 8 kV (Indirect)
Polarity:	Positive & Negative
Number of Discharge:	Air Discharge: min. 20 times at each test point Contact Discharge: min. 20 times at each test point, 200 times in total
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum

4.4.2 TEST PROCEDURE

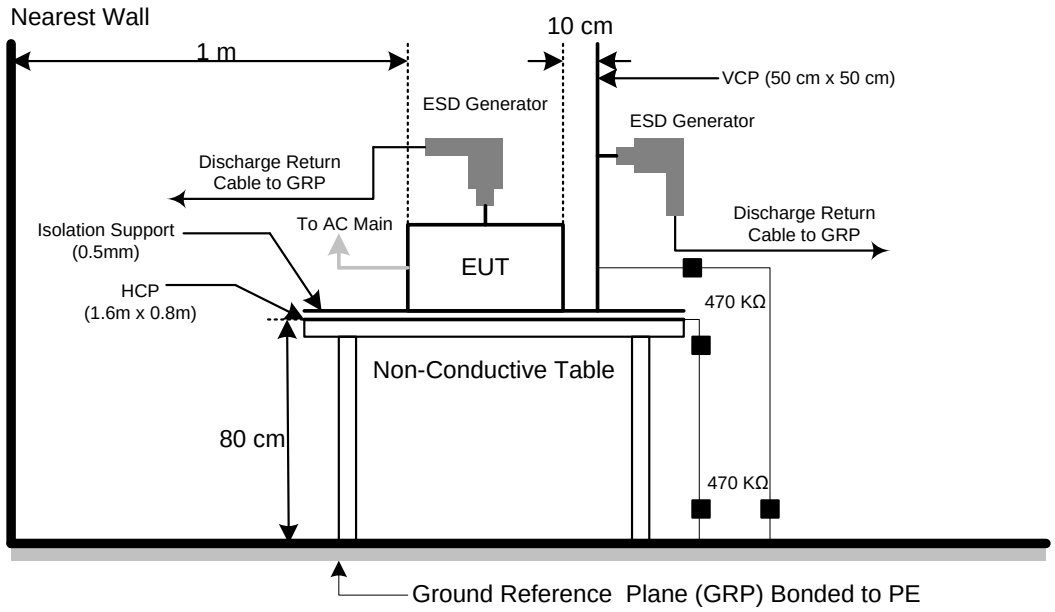
The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

a. The test shall be performed with single discharges. On each pre-selected point at least 10 single discharges (in the most sensitive polarity) shall be applied.
   NOTE 1 The minimum number of discharges applied is depending on the EUT; for products with synch ronized
   circuits the number of discharges should be larger.
   For the time interval between successive single discharges an initial value of 1 s is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.
   NOTE 2 The points to which the discharges should be applied may be selected by means of an explor ation
   carried out at a repetition rate of 20 discharges per second, or more.
   Vertical Coupling Plane (VCP):
   The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to, and positioned at a distance 0.1m from, the EUT, with the Discharge Electrode touching the coupling plane.
   The four faces of the EUT will be performed with electrostatic discharge.
   Horizontal Coupling Plane (HCP):
   The coupling plane is placed under to the EUT. The generator shall be positioned vertically at a distance of 0.1m from the EUT, with the Discharge Electrode touching the coupling plane.
   The four faces of the EUT will be performed with electrostatic discharge.
b. Air discharges at insulation surfaces of the EUT.
   It was at least ten single discharges with positive and negative at the same selected point.

4.4.3 DEVIATION FROM TEST STANDARD

No deviation

4.4.4 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A Horizontal Coupling Plane (1.6m x 0.8m) was placed on the table and attached to the GRP by means of a cable with 940k total impedance. The equipment under test, was installed in a representative system as described in section 7 of EN 61000-4-2, and its cables were placed on the HCP and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of EN 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

4.4.5 EUT TEST CONDITIONS

Temperature: 25.3°C Relative Humidity: 51% Test Pressure: 101 kPa

4.4.6 TEST RESULTS

Test Power :	DC 4.2~6.4V
Test Mode:	Mode 1
Note:	

Test Model	Test point	Testing Level(unit: kV)				Result Level
HCP/VCP	HCP	+	4	-	4	A
	VCP	+	4	-	4	A
Air	Slot	+	15	-	15	A
Contact	Metal	+	8	-	8	A
		+		-		

Note:

1) Test condition:
   Direct/Indirect(HCP/VCP) discharges: Minimum 20 times (Positive/Negative) at each point.
   Air discharges: Minimum 20 times (Positive/Negative) at each point.
2) Test location(s) in which discharge (Air and contact discharge) to be applied illustrated by photos shown in next page(s).
3) The Indirect (HCP/VCP) discharges description of test point as following:
   1. left side, 2.right side, 3.front side, 4.rear side.
4) N/A - denotes test is not applicable to this device.

4.5 RADIO FREQUENCY ELECTROMAGNETIC FIELD (RS)

4.5.1 TEST SPECIFICATION

Clause:	4.2.2.2
Test Method:	EN 61000-4-3
Required Performance	A
Frequency Range:	80 MHz - 6000 MHz
Field Strength:	10/30 V/m (unmodulated, r.m.s)
Modulation:	1000 Hz Sine Wave, 80%, AM Modulation If the wanted signal is modulated at 1000 Hz, then an audio signal of 400 Hz shall be used.
Frequency Step:	1% of fundamental
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m
Antenna Height:	1.55 m
Dwell Time:	at least 3 seconds

4.5.2 TEST PROCEDURE

The EUT and support equipment, which are placed on a table that is 0.8 meter above ground and the testing was performed in a fully-anechoic chamber.
The testing distance from antenna to the EUT was 3 meters.
The other condition as following manner:

a. The field strength level was 3 V/m (unmodulated, r.m.s).

b. The test level shall be 3 V/m (measured unmodulated). The test signal shall be amplitude modulated to a depth of 80 % by a sinusoidal audio signal of 1000 Hz. If the wanted signal is modulated at 1000 Hz, then an audio signal of 400 Hz shall be used,
The test shall be performed over the frequency range 80 MHz to 6000 MHz with the exception of the exclusion band for transmitters, receivers and duplex transceivers (see clause 4), as appropriate,
For receivers and transmitters the stepped frequency increments shall be 1 % frequency increment of the momentary used frequency, unless specified otherwise in the part of EN 301 489 series [i.13] dealing with the relevant type of radio equipment.

c. The exclusion band for immunity testing of equipment operating in the 2,4 GHz band shall be:
• Lower limit of exclusion band = lowest allocated band edge frequency -120 MHz, i.e. 2280MHz;
• Upper limit of exclusion band = highest allocated band edge frequency +120 MHz, i.e. 2603.5 MHz.
The exclusion band for immunity testing of equipment operating in the 5 GHz Wi-Fi band shall be:
• Lower limit of exclusion band = lowest allocated band edge frequency -270 MHz, i.e. 4880MHz;
• Upper limit of exclusion band = highest allocated band edge frequency +270 MHz, i.e. 5995MHz.
The exclusion band for immunity testing of equipment operating in the 5,8 GHz band shall be:
• Lower limit of exclusion band = lowest allocated band edge frequency -270 MHz, i.e. 5455 MHz;
• As the immunity requirements have an upper frequency range of 6 GHz and any upper edge exclusion band Would be greater than this for the 5,8 GHz band. The above frequency shall also be regarded as the upper end of the test range.

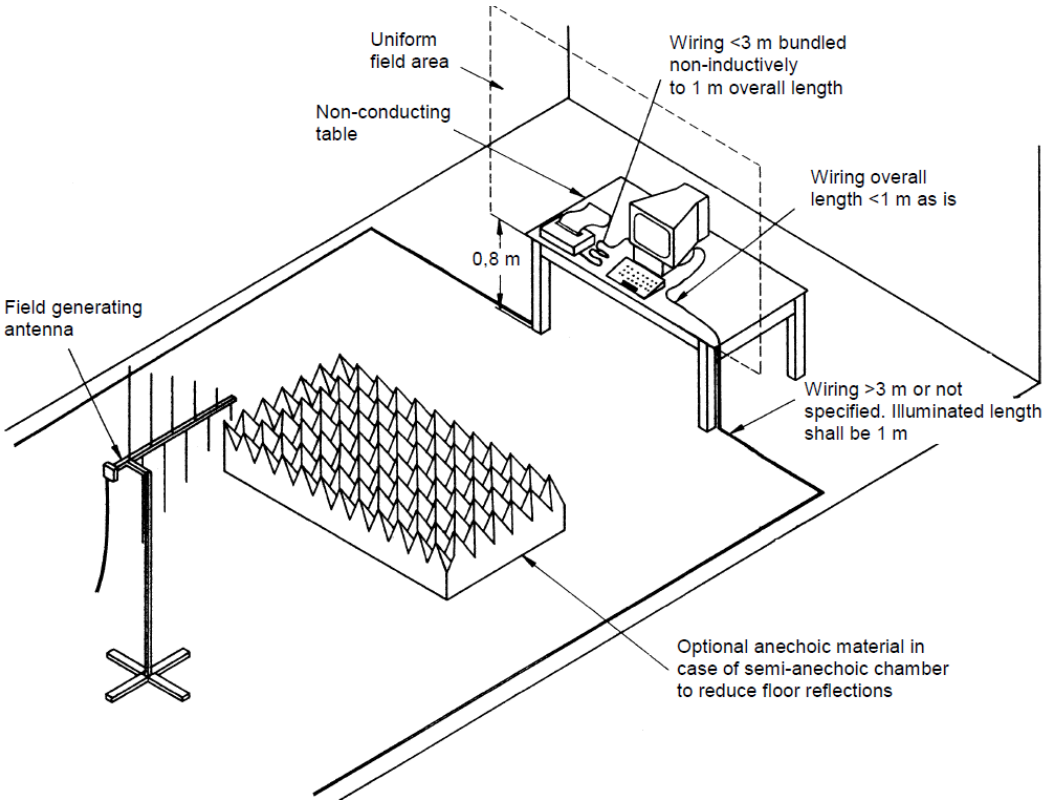
d. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.

e. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

4.5.3 DEVIATION FROM TEST STANDARD

No deviation

4.5.4 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of EN 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of EN 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

4.5.5 EUT TEST CONDITIONS

Temperature: 23°C Relative Humidity: 54%

4.5.6 TEST RESULTS

Test Power :	DC 4.2~6.4V
Test Mode:	Mode 1
Note:	

Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Azimuth	Criteria	Results	Judgment
80 - 1000	V/H	10/30 V/m (unmodulated, r.m.s) AM Modulated 1000 Hz, 80%	0	A	A	PASS
			90			
			180			
			270			
1000-6000	V/H	10/30 V/m (unmodulated, r.m.s) AM Modulated 1000 Hz, 80%	0	A	A	PASS
			90			
			180			
			270			

Note:

1) N/A - denotes test is not applicable to this device.

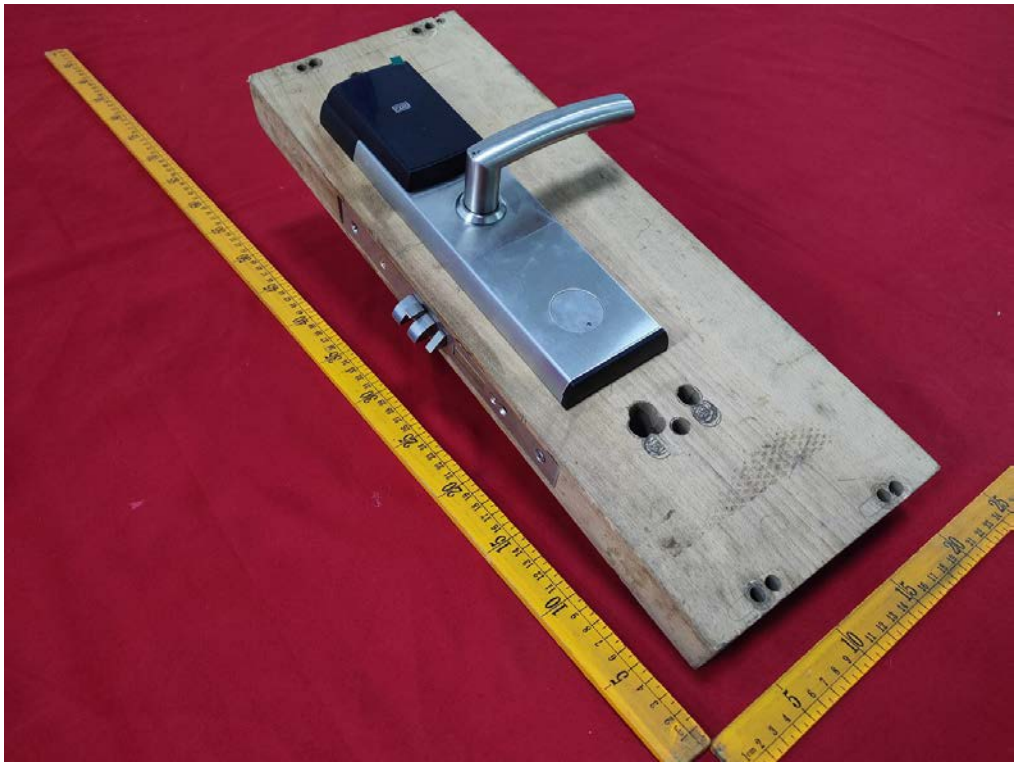
5. MEASUREMENT INSTRUMENTS LIST

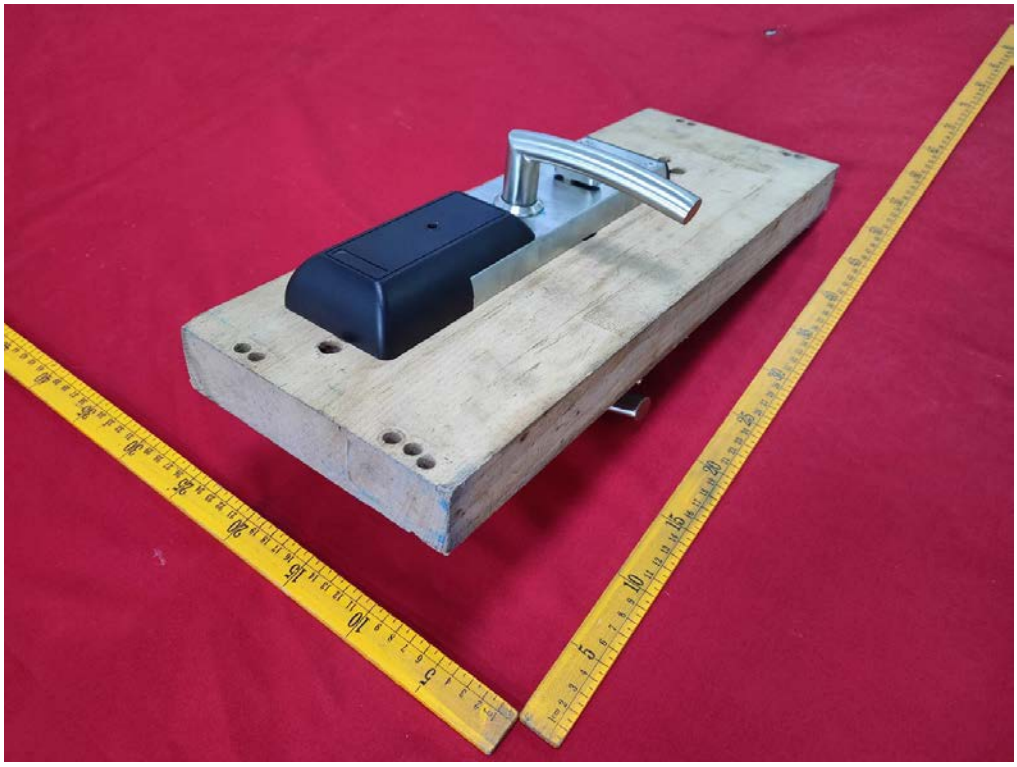
Electrostatic discharge					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Electrostatic discharge generator	Prima	ESD61002TC	PRI180321867	05/22/2025

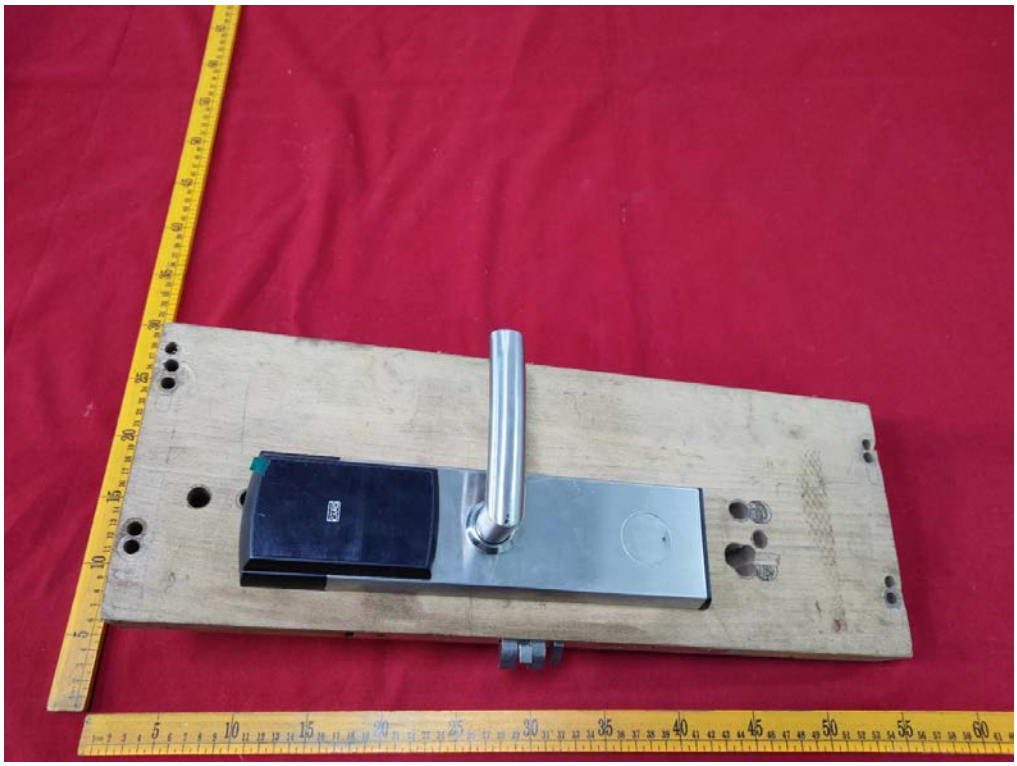
Radio frequency electromagnetic Field					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Signal Generator	R&S	SML03	103287	08/02/2024
2	Signal Generator	R&S	SMR30	100049	08/02/2024
3	Power Sensor	R&S	NRP-Z11	106374	04/10/2025
4	Power Amplifer	BONN	BLWA0830-160/100/40D	76659	08/02/2024
5	Preamplifier	MILMEGA	AS1860-30	10040456	08/02/2024
6	Istropic Electric Field Probe	EST.LINDGREN	HI-6105	137445	08/02/2024
7	EMS Antenna	R&S	HL046E	100028	N/A
8	Broad-Band Horn Antenna	Schwarzbeck	BBHA9120 E	475	01/06/2025
9	Temperature/ Humidity Meter	mingle	ETH529	N/A	01/02/2025

Remark: “N/A” denotes no model name, serial no. or calibration specified.
All calibration period of equipment list is one year.

EUT Photos







End of Test Report