KALE KILIT VE KALIP SANAYI A.S

TEST REPORT

SCOPE OF WORK
EMC TESTING– KD050/45-106, KD050/45-115

REPORT NUMBER
210420098GZU-001

ISSUE DATE **[REVISED DATE]**

03 June 2021 [----------]

PAGES
31

DOCUMENT CONTROL NUMBER
EN 61000-6-1, 6-3-b
© 2017 INTERTEK



Room 02, & 101/E201/E301/
E401/E501/E601/E701/E801 of
Room 01 1-8/F., No. 7-2. Caipin
Road, Science City, GETDD,
Guangzhou, Guangdong, China
Telephone: +86 20 8213 9688
Facsimile: +86 20 3205 7538
www.intertek.com.cn

TEST REPORT

Applicant Name & Address	:	KALE KILIT VE KALIP SANAYI A.S VADISTANBUL Ayazaga Mah. Azerbaycan Cad. No:3 F/1-E Blok 34396 Sarıyer Istanbul Turkiye
Manufacturing Site	:	Guangdong Be-Tech Security Systems Limited No. 17 Keyuan 3 Road, Ronggui, Shunde High-Tech Zone, Foshan, Guangdong 528305, China
Intertek Report No:		210420098GZU-001

Test standards

EN IEC 61000-6-1: 2019
EN 61000-6-3:2007+A1:2011

Sample Description

Product	:	CABINET LOCK
Model No.	:	KD050/45-106, KD050/45-115
Electrical Rating	:	KD050/45-115: 2X1.5V DC batteries; KD050/45-106: 4X1.5V DC batteries
Serial No.		Not Labeled
Date Received	:	20 April 2021
Date Test Conducted	:	20 April 2021 to 19 May 2021

Prepared and Checked By

Jed Guo

Engineer

Approved By:

Sky Zhu

Team Leader

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

TEST REPORT

CONTENT

TEST REPORT **1**

CONTENT **3**

1. TEST RESULTS SUMMARY **4**

2. EMC RESULTS CONCLUSION **5**

3. LABORATORY MEASUREMENTS **6**

4. EQUIPMENT USED DURING TEST **7**

5. EMI TEST **9**

5.1 EN 61000-6-3 CONTINUOUS CONDUCTED DISTURBANCE VOLTAGE TEST 9
5.2 EN 61000-6-3 DISCONTINUOUS CONDUCTED DISTURBANCE VOLTAGE 9
5.3 EN 61000-6-3 EMISSION AT TELECOMMUNICATIONS/NETWORK PORTS 9
5.4 EN 61000-6-3 RADIATED EMISSION BELOW 1 GHZ 10
5.4.1 Block Diagram of Test Setup *10*
5.4.2 Test Setup and Procedure *10*
5.4.3 Test Data and Curve *11*
5.5 EN 61000-6-3 RADIATED EMISSION ABOVE 1 GHZ 14

6. EMS TEST **15**

6.1 EN 61000-4-2(PURSUANT TO EN 61000-6-1) ELECTROSTATIC DISCHARGE IMMUNITY 16
6.2 EN 61000-4-6(PURSUANT TO EN 61000-6-1) INJECTED CURRENT (0.15 MHZ TO 80 MHZ) 19
6.3 EN 61000-4-4(PURSUANT TO EN 61000-6-1) ELECTRICAL FAST TRANSIENT/BURST 19
6.4 EN 61000-4-5(PURSUANT TO EN 61000-6-1) SURGE IMMUNITY 19
6.5 EN 61000-4-11(PURSUANT TO EN 61000-6-1) VOLTAGE DIPS AND INTERRUPTIONS 19
6.6 EN 61000-4-3(PURSUANT TO EN 61000-6-1) RADIATED ELECTROMAGNETIC FIELD IMMUNITY 20
6.7 EN 61000-4-8(PURSUANT TO EN 61000-6-1) POWER FREQUENCY MAGNETIC FIELD IMMUNITY 22

7. APPENDIX I - PHOTOS OF TEST SETUP **23**

8. APPENDIX II – PHOTOS OF EUT **25**

TEST REPORT

1. TEST RESULTS SUMMARY

Test Item	Standard	Result
Continuous conducted disturbance voltage	EN 61000-6-3:2007+A1:2011 Reference: EN 55016-2-1:2009	N/A
Discontinuous conducted disturbance voltage	EN 61000-6-3:2007+A1:2011 Reference: EN 55014-1:2006+A1:2009	N/A
Emission at Telecommunications / network Ports	EN 61000-6-3:2007+A1:2011 Reference: EN 55022:2010	N/A
Radiated emission (30 MHz–1000 MHz)	EN 61000-6-3:2007+A1:2011 Reference: EN 55016-2-3:2010	Pass
Radiated emission (1 GHz–6 GHz)	EN 61000-6-3:2007+A1:2011 Reference: EN 55016-2-3:2010	N/A
ESD immunity	EN IEC 61000-6-1: 2019 Reference: EN 61000-4-2:2009	Pass
Radiated EM field immunity	EN IEC 61000-6-1: 2019 Reference: EN 61000-4-3:2006 +A1:2008 + A2:2010	Pass
EFT immunity	EN IEC 61000-6-1: 2019 Reference: EN 61000-4-4:2012	N/A
Surge immunity	EN IEC 61000-6-1: 2019 Reference: EN 61000-4-5:2014	N/A
Inject current immunity	EN IEC 61000-6-1: 2019 Reference: EN 61000-4-6:2009	N/A
Power frequency magnetic field immunity	EN IEC 61000-6-1: 2019 Reference: EN 61000-4-8:2010	N/A
Voltage dips and interruption immunity	EN IEC 61000-6-1: 2019 Reference: EN 61000-4-11:2004	N/A

Remark:
1. The symbol “N/A” in above table means Not Applicable.
2. When determining the test results, measurement uncertainty of tests has been considered.

TEST REPORT

2. EMC RESULTS CONCLUSION

RE: EMC Testing Pursuant to EMC Directive 2014/30/EU performed on the CABINET LOCK, Models: KD050/45-106, KD050/45-115.

We tested the CABINET LOCK, Models: KD050/45-106, KD050/45-115 to determine if it was in compliance with the relevant EN standards as marked on the Test Results Summary. We found that the unit met the requirement of EN 61000-6-3, EN 61000-6-1 (EN 61000-4-2), EN 61000-6-1 (EN 61000-4-4), EN 61000-6-1 (EN 61000-4-6), EN 61000-6-1 (EN 61000-4-5), EN 61000-6-1 (EN 61000-4-3), &EN 61000-6-1(EN 61000-4-11) standards when tested as received. The worst case's test data was presented in this test report.

The production units are required to conform to the initial sample as received when the units are placed on the market.

TEST REPORT

3. LABORATORY MEASUREMENTS

Configuration Information

Support Equipment: N/A

Rated Voltage and frequency under test: DC 3V; DC 6V
Condition of Environment: Temperature: 22~28°C
Relative Humidity:35~60%
Atmosphere Pressure:86~106kPa

Notes:
1. The EMI measurements had been made in the operating mode produced the largest emission in the frequency band being investigated consistent with normal applications. An attempt had been made to maximize the emission by varying the configuration of the EUT.

2. The EMS measurements had been made in the frequency bands being investigated, with the EUT in the most susceptible operating mode consistent with normal applications. The configuration of the test sample had been varied to achieve maximum susceptibility.

3. Test Location:
Intertek Testing Services Shenzhen Ltd. Guangzhou Branch
All tests were performed at:
Room 02, & 101/E201/E301/E401/E501/E601/E701/E801 of Room 01 1-8/F., No. 7-2. Caipin Road, Science City, GETDD, Guangzhou, Guangdong, China
Except Radiated Disturbance and Radiated Susceptibility were performed at:
Room102/104, No 203, KeZhu Road, Science City, GETDD Guangzhou, China

4. Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Conducted Emission (9 kHz-150 kHz)	2.79 dB
2	Conducted Emission (150 kHz-30 MHz)	2.55 dB
3	Disturbance Power (30 MHz-300 MHz)	3.04 dB
4	Radiated Emission (30 MHz-1 GHz)	4.80 dB
5	Radiated Emission (1 GHz-6 GHz)	4.97 dB
6	Radiated Emission (6 GHz-18 GHz)	4.89 dB

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.
Measurement uncertainty is calculated in accordance with CISPR16-4-2:2011+A1:2014 +A2:2018.
The measurement uncertainty is given with a confidence of 95%, k=2.
Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.

TEST REPORT

4. EQUIPMENT USED DURING TEST

Radiated Disturbance（30 MHz-1 GHz）

Equipment No.	Equipment	Model	Manufacturer	Calibration Interval
EM030-04	3m Semi-Anechoic Chamber	9×6×6 m3	ETS-LINDGREN	1Y
EM031-02	EMI Test Receiver (9 kHz~7 GHz)	R&S ESR7	R&S	1Y
EM033-01	TRILOG Super Broadband test Antenna（30 MHz-3 GHz）	VULB 9163	SCHWARZBECK	1Y
EM031-02-01	Coaxial cable	/	R&S	1Y
EM036-01	Common-mode absorbing clamp	CMAD 20B	TESEQ	1Y
SA047-118	Digital Temperature-Humidity Recorder	RS210	YIJIE	1Y
EM045-01-01	EMC32 software (RE/RS)	V10.01.00	R&S	N/A

Electrostatic Discharge (1)

Equipment No.	Equipment	Model	Manufacturer	Calibration Interval
EM077-04	ESD Simulator	NSG437	TESEQ	1Y
SA047-143	Digital Temperature-Humidity Recorder	AW5145Y	ASAIR	1Y

Radiated Susceptibility

Equipment No.	Equipment	Model	Manufacturer	Calibration Interval
EM030-04	3m Semi-Anechoic Chamber	9×6×6 m^3	ETS LINDGREN	1Y
EM031-01	Signal generator	SMB100A	R&S	1Y
EM086-11	Power meter	NRP2	R&S	1Y
EM086-11-01	Power sensor	NRP-Z91	R&S	1Y
EM046-01	Power Amplifier	80RF1000-300	MILMEGA	1Y
EM046-03	Power Amplifier	AS0860-75-45	MILMEGA	1Y
EM061-05	Log. - Per. Broadband Antenna	VULP 9118 E	SCHWARZBECK	2Y
EM061-07	Stacked Log.-Per. Broadband Antenna	STLP 9149	SCHWARZBECK	2Y
EM034-01	Open Switch and Control Platform	OSP120/1505.3009K12	R&S	1Y
EM045-01-01	EMC32 software (RE/RS)	V10.01.00	R&S	1Y
SA047-118	Digital Temperature-Humidity Recorder	RS210	YIJIE	1Y

TEST REPORT

Detail of the equipment calibration due date:

Equipment No.	Cal. Due date (DD-MM-YYYY)
Radiated Disturbance (30 MHz-1 GHz)	
EM030-04	06/04/2022
EM031-02	16/10/2021
EM033-01	18/09/2021
EM031-02-01	05/04/2022
EM036-01	21/07/2021
SA047-118	21/07/2021
EM045-01-01	N/A

Equipment No.	Cal. Due date (DD-MM-YYYY)
Electrostatic Discharge (1)	
EM077-04	08/04/2022
SA047-133	16/03/2022
Radiated Susceptibility	
EM030-04	06/04/2022
EM031-01	22/07/2021
EM086-11	15/11/2021
EM086-11-01	15/11/2021
EM046-01	07/03/2022
EM046-03	06/09/2021
EM061-05	11/10/2021
EM061-07	11/10/2021
EM034-01	/
EM045-01-01	/
SA047-118	21/07/2021

TEST REPORT

5. EMI TEST

5.1 EN 61000-6-3 Continuous Conducted Disturbance Voltage Test

Test Result: Not Applicable

5.2 EN 61000-6-3 Discontinuous Conducted Disturbance Voltage

Test Result: Not Applicable

5.3 EN 61000-6-3 Emission at Telecommunications/network Ports

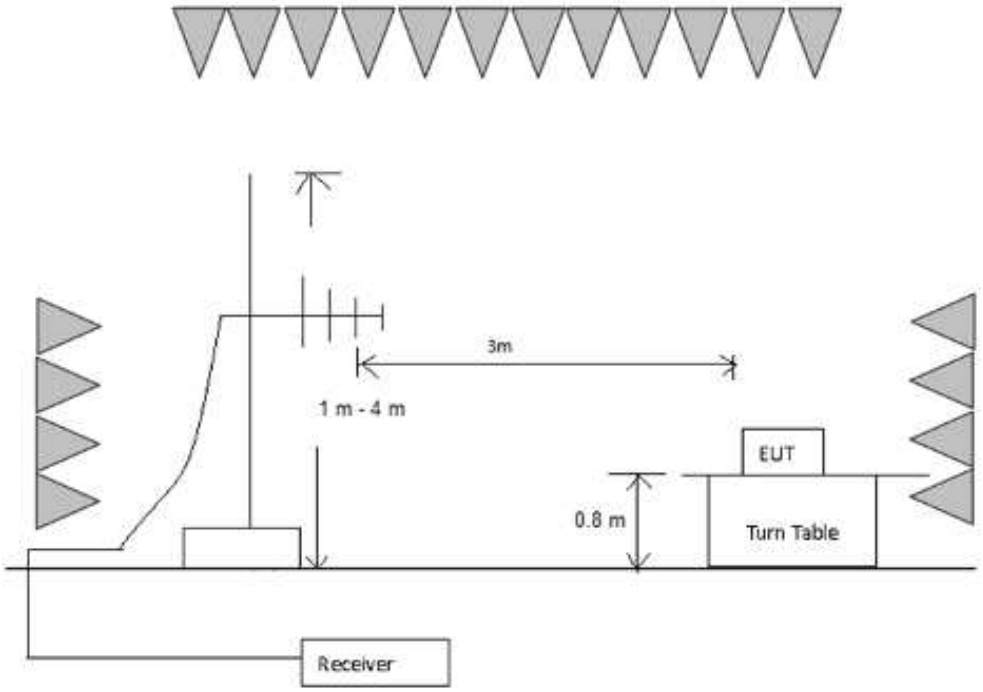
Test Result: Not Applicable
Remark: The test only applies to balanced telecommunication ports intended for connection to unscreened balanced pairs

TEST REPORT

5.4 EN 61000-6-3 Radiated Emission below 1 GHz

Test Result: Pass

5.4.1 Block Diagram of Test Setup



5.4.2 Test Setup and Procedure

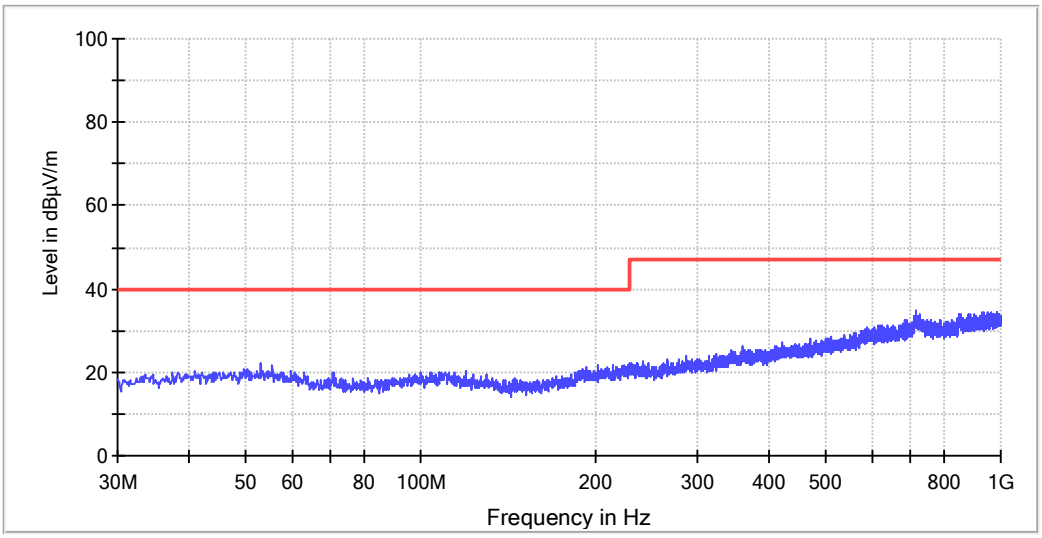
The measurement was applied in a semi-anechoic chamber. The EUT and simulators were placed on a 0.8m high foamed table above the horizontal metal ground plane. The turn table rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mask. The antenna moved up and down between from 1meter to 4 meters to find out the maximum emission level.

Broadband antenna was used as receiving antenna. Both horizontal and vertical polarization of the antenna was set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to EN55032 requirement during radiated test.
The bandwidth setting on R&S Test Receiver was 120 kHz.
The frequency range from 30MHz to 1000MHz was checked

TEST REPORT

5.4.3 Test Data and Curve

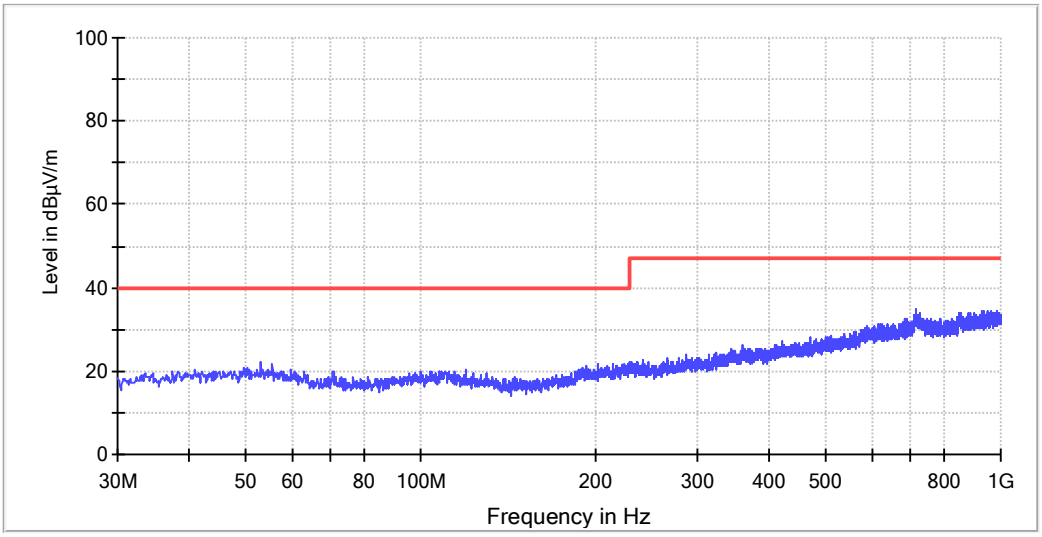
KD050/45-115
Operation Mode: Lock on
Horizontal



All emission levels are more than 6 dB below the limit.

TEST REPORT

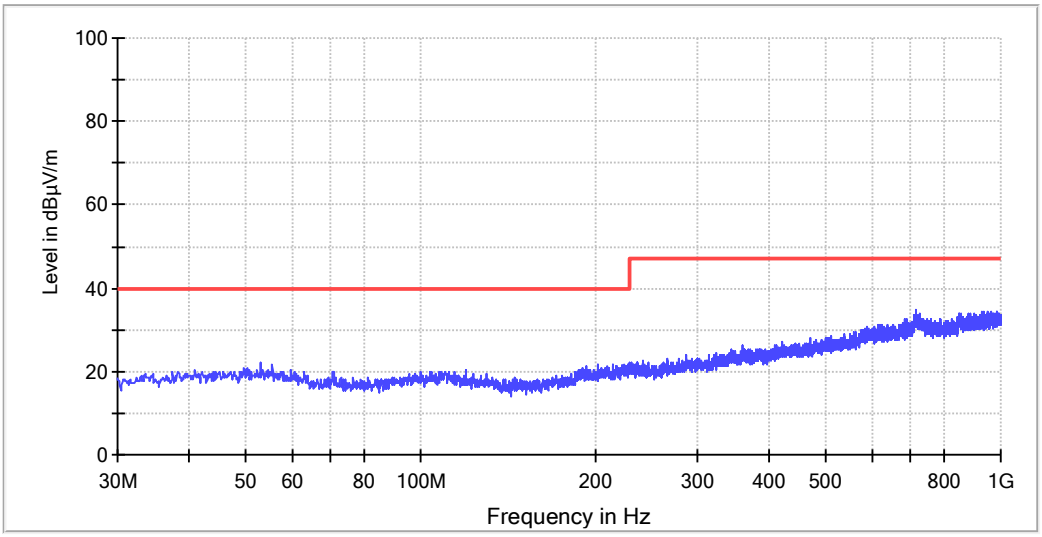
Vertical



All emission levels are more than 6 dB below the limit.

TEST REPORT

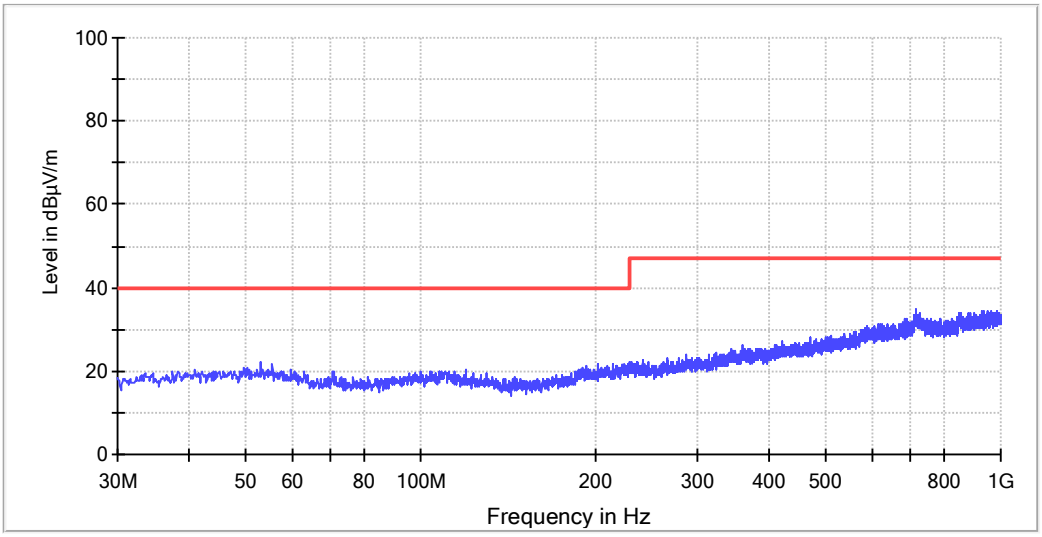
KD050/45-106
Operation Mode: Lock on
Horizontal



All emission levels are more than 6 dB below the limit.

TEST REPORT

Vertical



All emission levels are more than 6 dB below the limit.

5.5 EN 61000-6-3 Radiated Emission above 1 GHz

Test Result: Not Applicable
Remark:
The highest internal source of the EUT is not more than 108 MHz, so the measurement above 1000 MHz is not applicable.

TEST REPORT

6. EMS TEST

Performance Criteria:

Criterion A:	The apparatus shall continue to operate as intended during the test. No degradation of performance or loss of function is allowed below a performance level (or permission loss of performance) specified by the manufacturer, when the apparatus is used as intended. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation and from what the user may reasonably expect from the apparatus if used as intended.
Criterion B:	The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level (or permission loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however, no change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description, and documentation, and from what the user may reasonably expect from the apparatus if used as intended.
Criterion C:	Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls, or by any operation specified in the instruction for use.

Operation mode of EMS test:

Test Item	Operation mode
ESD immunity	Lock on
Radiated EM field immunity	Lock on
EFT immunity	N/A
Surge immunity	N/A
Inject current immunity	N/A
Voltage dips and interruption immunity	N/A

Note: "N/A" means Not Applicable in below text.

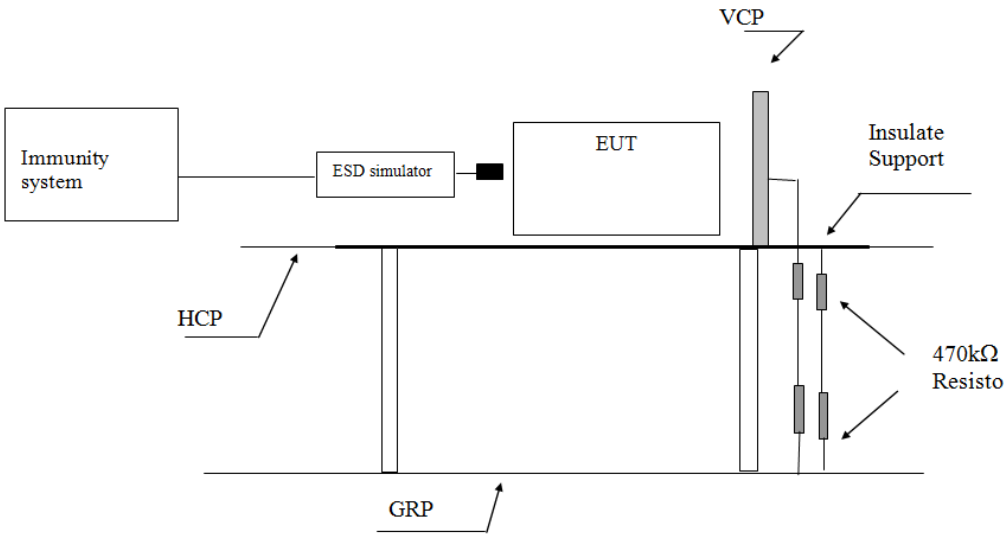
TEST REPORT

6.1 EN 61000-4-2(Pursuant to EN 61000-6-1) Electrostatic Discharge Immunity

Performance criterion: B

Test Result: Pass

6.1.1 Block Diagram of Test Setup



Note: HCP means Horizontal Coupling Plane,

VCP means Vertical Coupling Plane

GRP means Ground Reference Plane

6.1.2 Test Setup and Procedure

The EUT was put on a 0.8m high wooden table 0.1m high for floor standing equipment standing on the ground reference plane (GRP) 3m by 2m in size, made by iron 1.0 mm thick.

A horizontal coupling plane(HCP) 1.6m by 0.8m in size was placed on the table, and the EUT with its cables were isolated from the HCP by an insulating support thick than 0.5mm. The VCP 0.5m by 0.5m in size & HCP were constructed from the same material type & thickness as that of the GRP, and connected to the GRP via a 470kΩ resistor at each end.

The distance between EUT and any of the other metallic surface excepted the GRP, HCP & VCP was greater than 1m.

The EUT was arranged and connected according to its functional requirements.

Direct static electricity discharges were applied only to those points and surface which were accessible to personnel during normal usage.

TEST REPORT

On each preselected points 10 times of each polarity single discharge were applied. The time interval between successive single discharges was at least 1s.

The ESD generator was held perpendicular to the surface to which the discharge was applied. The discharge return cable of the generator was kept at a distance of 0.2m whilst the discharge was being applied. During the contact discharges, the tip of the discharge electrode was touched the EUT before the discharge switch was operated. During the air discharges, the round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT.

Indirect discharge was conducted to objects placed near the EUT, simulated by applying the discharges of the ESD generator to a coupling plane, in the contact discharge mode.

After each discharge, the ESD generator was removed from the EUT, the generator was then retriggered for a new single discharge. For ungrounded product, a grounded carbon fibre brush with bleeder resistors (2×470 kΩ) in the grounding cable was used after each discharge to remove remnant electrostatic voltage.

For air discharge, a minimum of 10 single air discharges were applied to the selected test point for each such area.

TEST REPORT

6.1.3 Test Result

Direct Application of ESD

Direct Contact Discharge

Applied Voltage (kV)	No. of Discharge for each point	Result	Discharged Points
4	20	Pass	Accessible metal parts of the EUT Conductive substrate with coating which is not declared to be insulating

Direct Air Discharge

Applied Voltage (kV)	No. of Discharge for each point	Result	Discharged Points
2, 4, 8	20	Pass	All accessible points where contact discharge cannot be applied such as Displays, Indicators light, Keyboard, Button, Switch, Knob, Air gap, Slots, Hole and so on

Indirect Application of ESD

Horizontal Coupling Plane under the EUT

Applied Voltage (kV)	No. of Discharge for each point	Result	Discharged Point
4	20	Pass	At the front edge of each HCP opposite the centre point of each unit of the EUT

Vertical Coupling Plane beside the EUT

Applied Voltage (kV)	No. of Discharge for each point	Result	Discharged Point
4	20	Pass	The centre of the vertical edge of the coupling plane

TEST REPORT

6.2 EN 61000-4-6(Pursuant to EN 61000-6-1) Injected Current (0.15 MHz to 80 MHz)

Tested Port: ☒ AC power ☐ DC power ☐Functional earth ☐Signal/Control

Performance criterion: A

Test Result: N/A

6.3 EN 61000-4-4(Pursuant to EN 61000-6-1) Electrical Fast Transient/Burst

Tested Port: ☒ AC power ☐ DC power ☐Functional earth ☐Signal/Control

Performance criterion: B

Test Result: N/A

6.4 EN 61000-4-5(Pursuant to EN 61000-6-1) Surge Immunity

Tested Port: ☒ AC power ☐ DC power

Performance criterion: B
Test Result: N/A

6.5 EN 61000-4-11(Pursuant to EN 61000-6-1) Voltage Dips and Interruptions

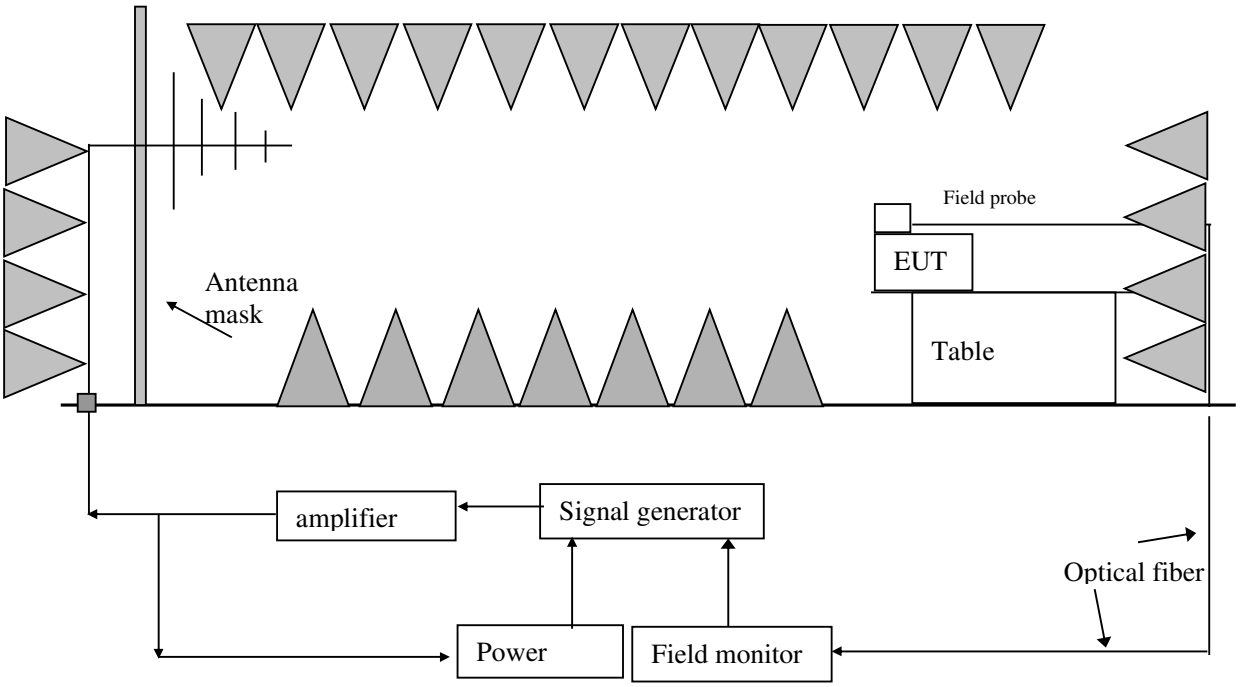
Tested Port: AC power
Performance criterion: B (only for test level of 70%Ut with 0.5 cycle), C
Test Result: N/A

TEST REPORT

6.6 EN 61000-4-3(Pursuant to EN 61000-6-1) Radiated Electromagnetic Field Immunity

Performance criterion: A
Test Result: Pass

6.6.1 Block Diagram of Test Setup



Filter

6.6.2 Test Setup and Procedure

The test was conducted in a fully anechoic chamber to maintain a uniform field of sufficient dimensions with respect to the EUT, and also in order to comply with various national and international laws prohibiting interference to radio communications.

The equipment was placed in the test facility on a non-conducting table 0.8m high (for floor standing EUT, is placed on a non-conducting support 0.1m height).

The EUT was placed on the uniform calibrated plane which is 3V/m and 1V/m EM field.

For all ports connected to EUT, manufacturer specified cable type and length was used, for those cables no specification, unshielded cable applied. Wire was left exposed to the electromagnetic field for a distance of 1 m from the EUT.

The EUT was arranged and connected according to its functional requirements

TEST REPORT

Before testing, the intensity of the established field strength had been checked by placing the field sensor at a calibration grid point, and with the field generating antenna and cables in the same positions as used for the calibration, the forward power needed to give the calibrated field strength was measured. Spot checks was made at a number of calibration grid points over the frequency range 80 to 1000 MHz and 1.4 to 2.7 GHz, both polarizations was checked. After calibration, the EUT was initially placed with one face coincident with the calibration plane.

The frequency range was swept from 80 to 1000MHz and 1.4 to 2.7 GH, with the signal 80% amplitude modulated with a 1 kHz sinewave, pausing to adjust the r.f. signal level.
The dwell time at each frequency was 3s so as that the EUT to be exercised and be able to respond.

The step size was 1% of the fundamental with linear interpolation between calibrated points.
Test was performed with the generating antenna facing each of the four sides of the EUT.

TEST REPORT

6.6.3 Test Result

Frequency (MHz)	Exposed Side	Field Strength (V/m)	Result
80 to 1000	Front	3 V/m (r.m.s.)	Pass
80 to 1000	Left	3 V/m (r.m.s.)	Pass
80 to 1000	Rear	3 V/m (r.m.s.)	Pass
80 to 1000	Right	3 V/m (r.m.s.)	Pass

Frequency (GHz)	Exposed Side	Field Strength (V/m)	Result
1.4 to 6.0	Front	3 V/m (r.m.s.)	Pass
1.4 to 6.0	Left	3 V/m (r.m.s.)	Pass
1.4 to 6.0	Rear	3 V/m (r.m.s.)	Pass
1.4 to 6.0	Right	3 V/m (r.m.s.)	Pass

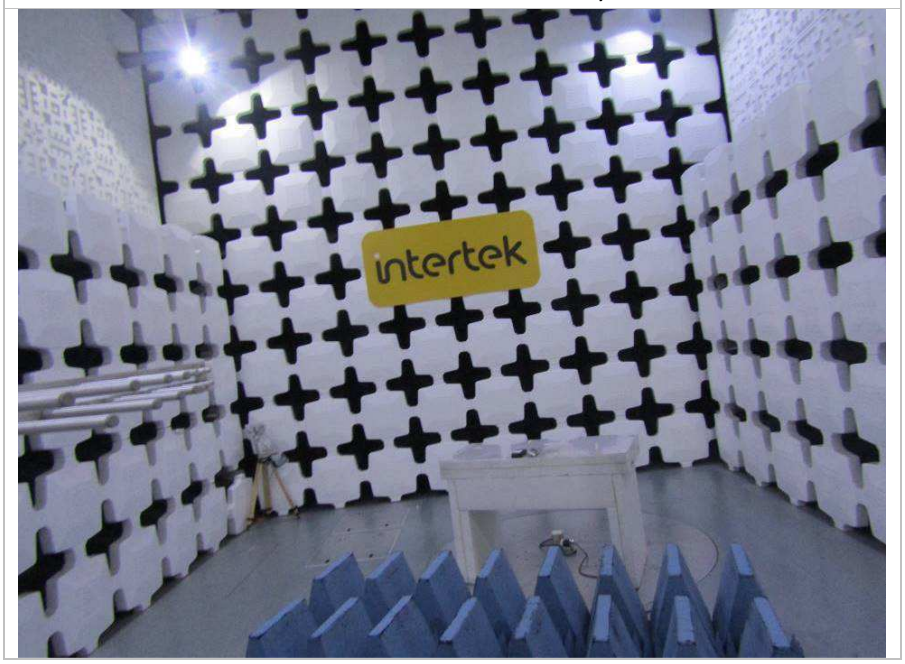
6.7 EN 61000-4-8(Pursuant to EN 61000-6-1) Power Frequency Magnetic Field Immunity

Tested Port: Enclosure
Performance criterion: A
Test Result: Not Applicable
Remark: Equipment containing no Hall elements or magnetic field sensors is not susceptible to magnetic field. Hence, this equipment is deemed to fulfil the magnetic field test.

TEST REPORT

7. APPENDIX I - PHOTOS OF TEST SETUP

Radiated emission (30 MHz–1000 MHz)

Radiated EM field immunity


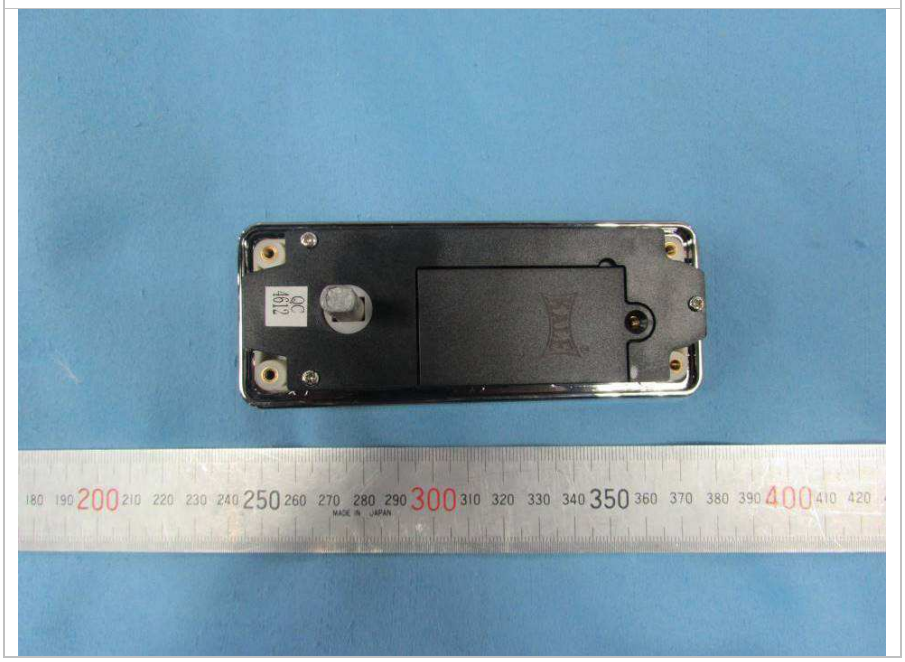
TEST REPORT

ESD Immunity

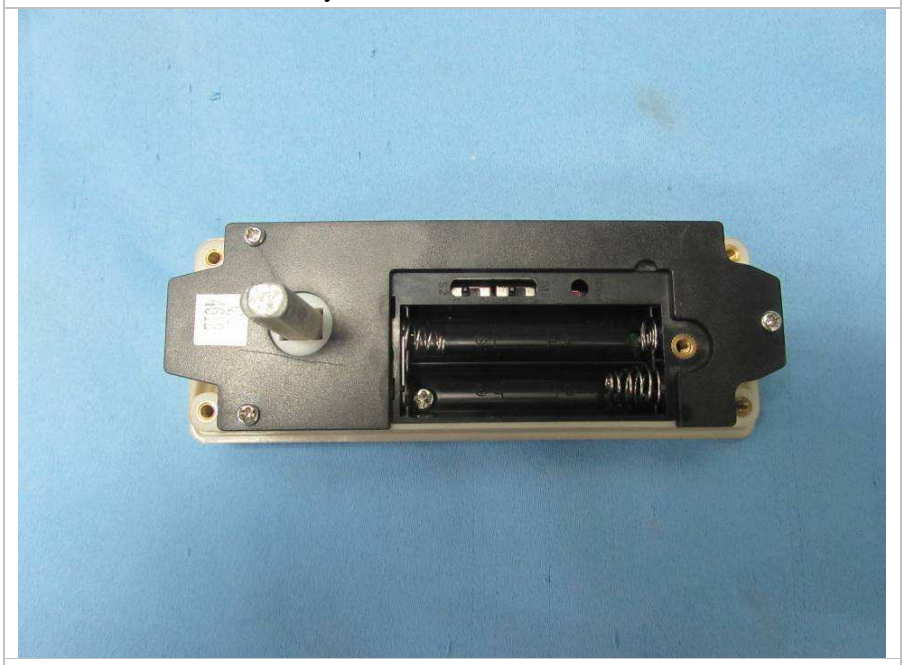
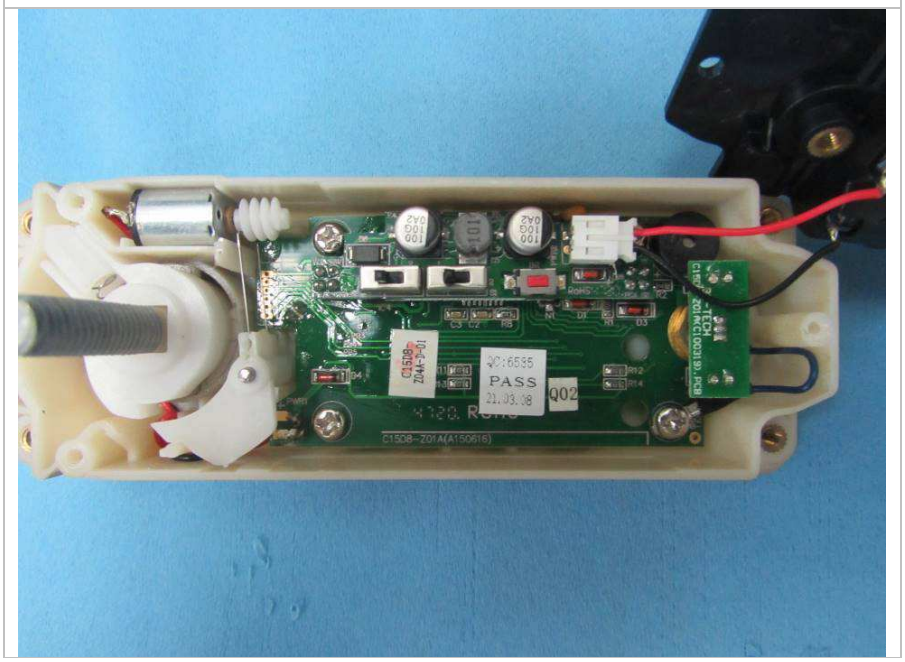

TEST REPORT

8. APPENDIX II – PHOTOS OF EUT

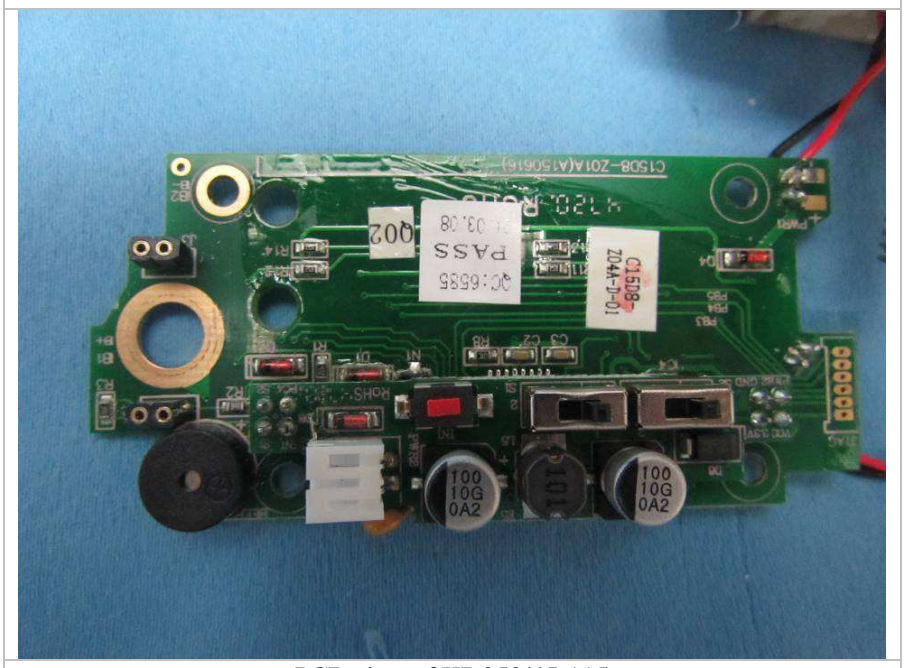
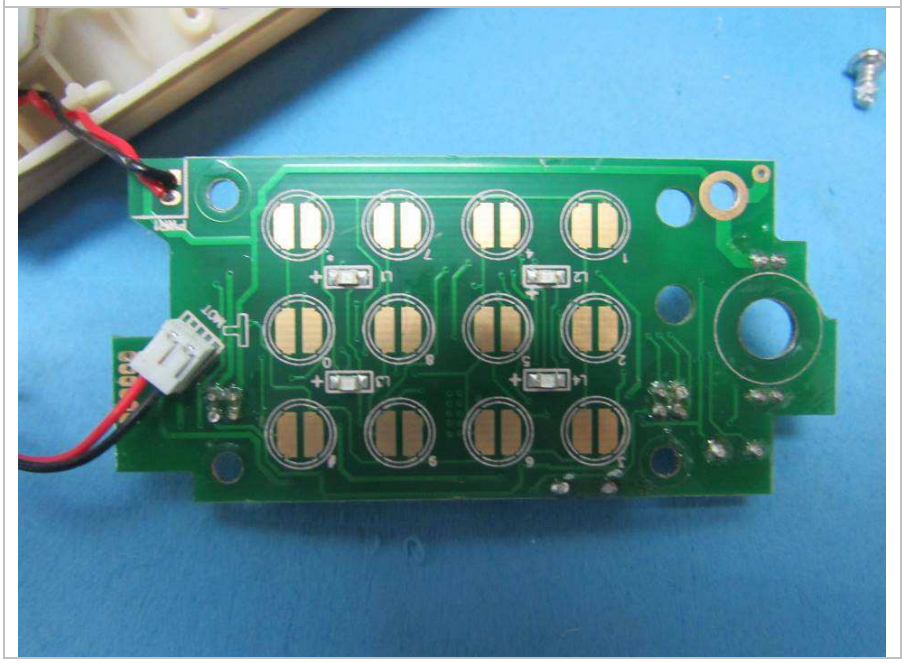
KD050/45-115

KD050/45-115


TEST REPORT

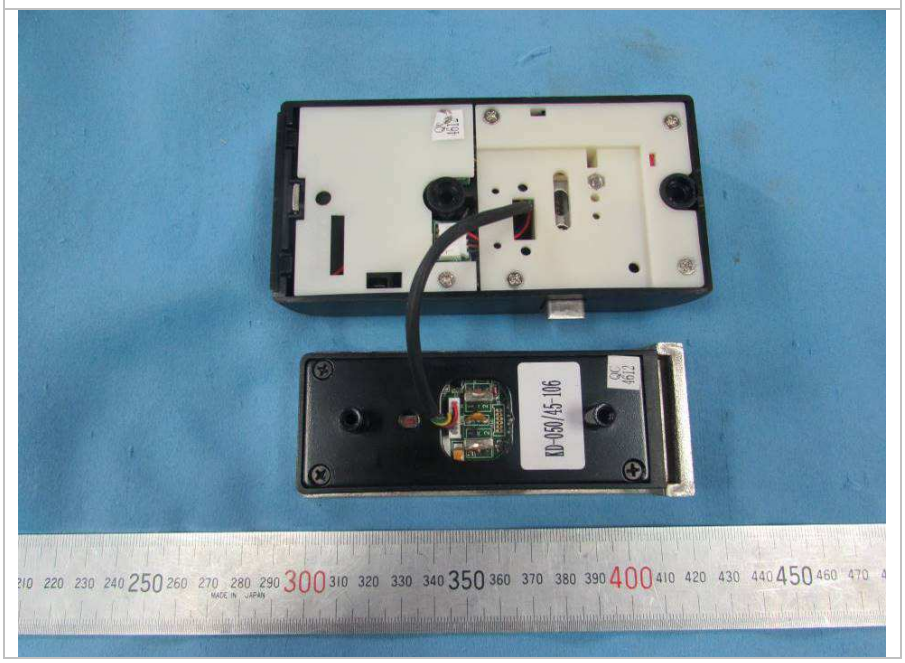
Battery box view of KD050/45-115

Internal view of KD050/45-115


TEST REPORT

PCB view of KD050/45-115

PCB view of KD050/45-115


TEST REPORT

KD050/45-106

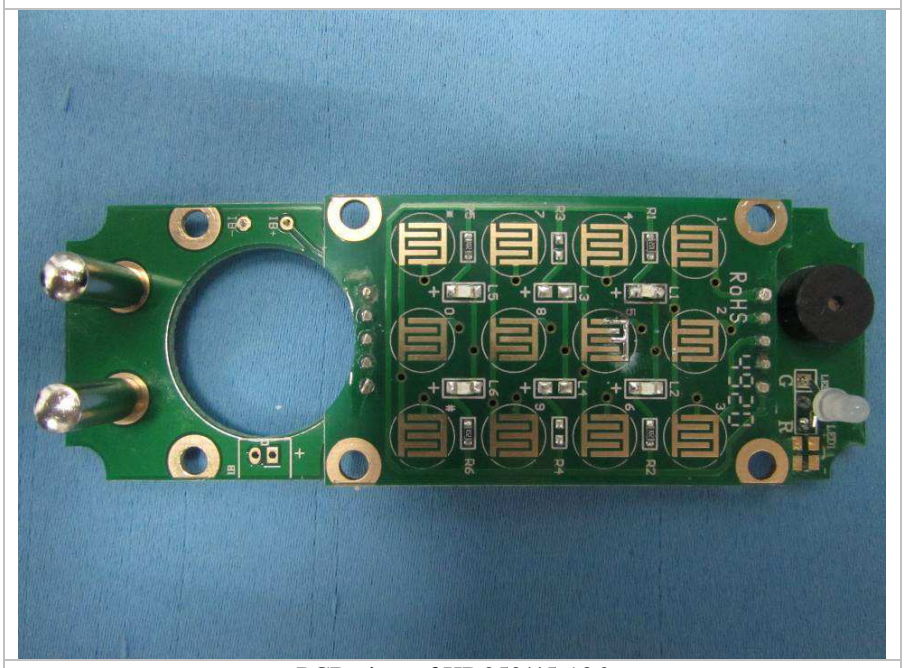
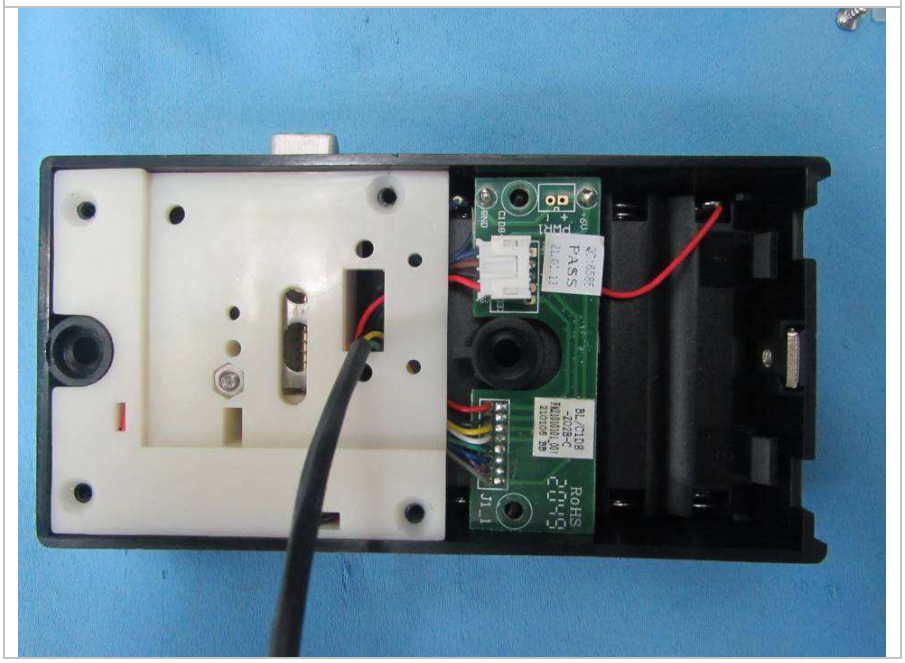
KD050/45-106


TEST REPORT

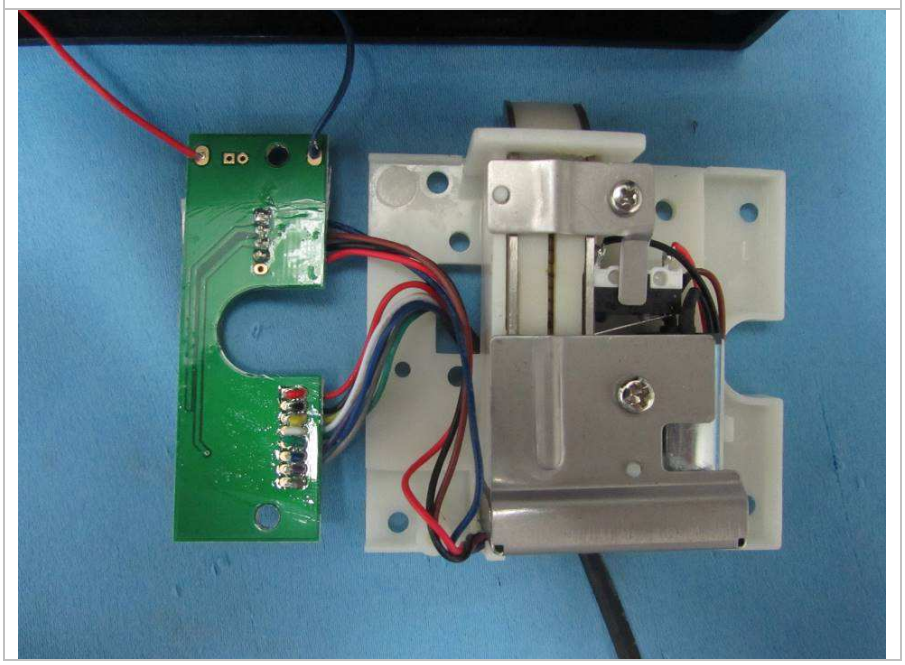
Battery box view of KD050/45-106

PCB view of KD050/45-106


TEST REPORT

PCB view of KD050/45-106

PCB view of KD050/45-106


TEST REPORT

PCB view of KD050/45-106


**********End of Report**********