

UNI-TREND TECHNOLOGY (CHINA) CO., LTD.

TEST REPORT

SCOPE OF WORK

EMC TESTING—UT309A, UT309C

REPORT NUMBER

160908080GZU-001

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[REVISED DATE]

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TEST REPORT

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Industrial Development Zone, Dongguan City, Guangdong Province,
China
Manufacturing Site : Same as applicant
Intertek Report No: 160908080GZU-001 Amendment 2

Test standards

EN IEC 61326-1:2021
EN IEC 61326-2-3:2021

Sample Description

Product : Professional IR Thermometer
Model No. : UT309A, UT309C
Electrical Rating : 9Vdc battery (type 6F22)
Serial No. : Not Labeled
Date Received : 02 April 2024
Date Test : 02 April 2024 to 30 May 2024
Conducted

Prepared and Checked By



Jed Guo

Project Engineer

Approved By:



Sky Zhu

Team Leader

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Intertek Testing Services Shenzhen Ltd. Guangzhou Branch
Room101/301/401/102/202/302/402/502/602/702/802, No. 7-2, Caipin Road, Huangpu District, Guangzhou, Guangdong,
China

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1. TEST RESULTS SUMMARY

Test Item	Standard	Result
Radiated emission	EN IEC 61326-1, EN IEC 61326-2-3 Reference: EN 55011:2016+A1:2017+A11:2020+A2:2021	Pass
ESD immunity	EN IEC 61326-1, EN IEC 61326-2-3 Reference: EN 61000-4-2:2009	Pass
Radiated EM field immunity	EN IEC 61326-1, EN IEC 61326-2-3 Reference: EN 61000-4-3:2006 +A1:2008+A2:2010	Pass

1. When determining the test results, measurement uncertainty of tests has been considered.
2. The EUT belonging to Class B, Group 1 equipment, as requirement by EN 55011.

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2. EMC RESULTS CONCLUSION

Test result:

It is found that the Professional IR Thermometer, Models: UT309A, UT309C met the requirements of EN IEC 61326-1: 2021 and EN IEC 61326-2-3: 2021 standards.

Report revision reason:

Amendment 1:

This report is the revision of the previous test report 160908080GZU-001 dated 15 December 2016 and shall be used together with it. The report is changed as following:
Add new model UT309D to this report and full test was performed on it.

Amendment 2

This report is the revision of the previous test report 160908080GZU-001, Amendment1 dated 25-January-2018 and replace the previous one.

This report was issued because of the following change:

- (1) Updated the standard from "EN 61326-1: 2013" to "EN IEC 61326-1:2021";
- (2) Updated the standard from "EN 61326-2-3:2013" to "EN IEC 61326-2-3:2021".
- (3) Changed the Applicant name as "UNI-TREND TECHNOLOGY (CHINA) CO., LTD.".
- (4) Deleted model UT309D.
- (5) Updated PCB for all models.

Based on engineering judgement, full tests were performed to UT309A, UT309C.

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

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3. LABORATORY MEASUREMENTS

Configuration Information

Support Equipment:

Equipment	Model No.	Rating	Supplier
High Precision Water Bath	GDH-0520	100-240~, 50/60Hz	Hanon
Thermometer	Hart 1502A	100-240~, 50/60Hz	Fluke
Platinum Resistance Probe	Hart 5626-15-D	-	Fluke
Black body	Φ110*100	-	Fluke

Rated Voltage and frequency under test:

9V

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:

Room101/301/401/102/202/302/402/602/702/802, No. 7-2, Caipin Road, Huangpu District, 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 (9 kHz-30 MHz)	4.24 dB
5	Radiated Emission (30 MHz-1 GHz)	4.80 dB
6	Radiated Emission (1 GHz-6 GHz)	4.97 dB
7	Radiated Emission (6 GHz-18 GHz)	4.89 dB

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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.

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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
SA047-176	Digital Temperature-Humidity Recorder	RS210	YIJIE	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

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Detail of the equipment calibration due date:

Equipment No.	Cal. Due date (DD-MM-YYYY)
Radiated Disturbance (30 MHz-1 GHz)	
EM030-04	09/04/2025
EM031-02	15/11/2024
EM033-01	05/12/2024
EM031-02-01	09/04/2025
EM036-01	17/07/2024
SA047-118	16/07/2024
EM045-01-01	N/A

Equipment No.	Cal. Due date (DD-MM-YYYY)
Electrostatic Discharge (1)	
EM077-04	20/08/2024
SA047-176	04/01/2025

Equipment No.	Cal. Due date (DD-MM-YYYY)
Radiated Susceptibility	
EM030-04	09/04/2025
EM031-01	17/03/2025
EM086-11	12/11/2024
EM086-11-01	12/11/2024
EM046-01	03/03/2025
EM046-03	04/09/2024
EM061-05	09/10/2025
EM061-07	09/10/2025
EM034-01	/
EM045-01-01	/
SA047-118	16/07/2024

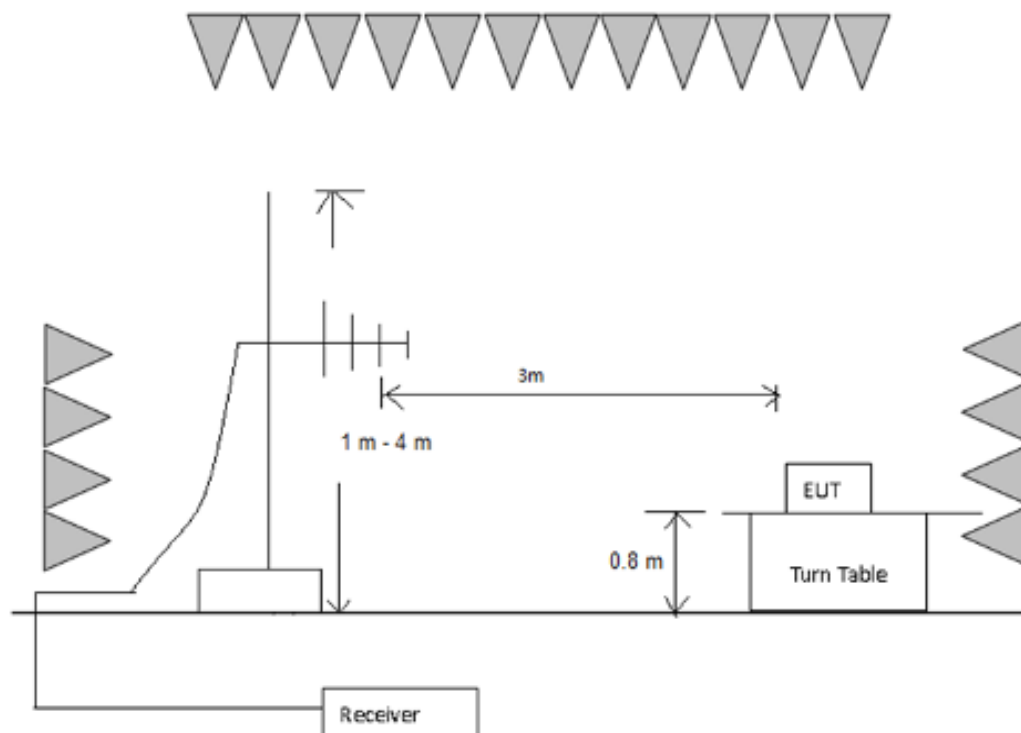
TEST REPORT

5. EMI TEST

5.1 Radiated Emission below 1 GHz

Test Result: Pass

5.1.1 Block Diagram of Test Setup



5.1.2 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 EN 55011 requirement during radiated test. The bandwidth setting on Test Receiver was 120 kHz. The frequency range from 30 MHz to 1000 MHz was checked

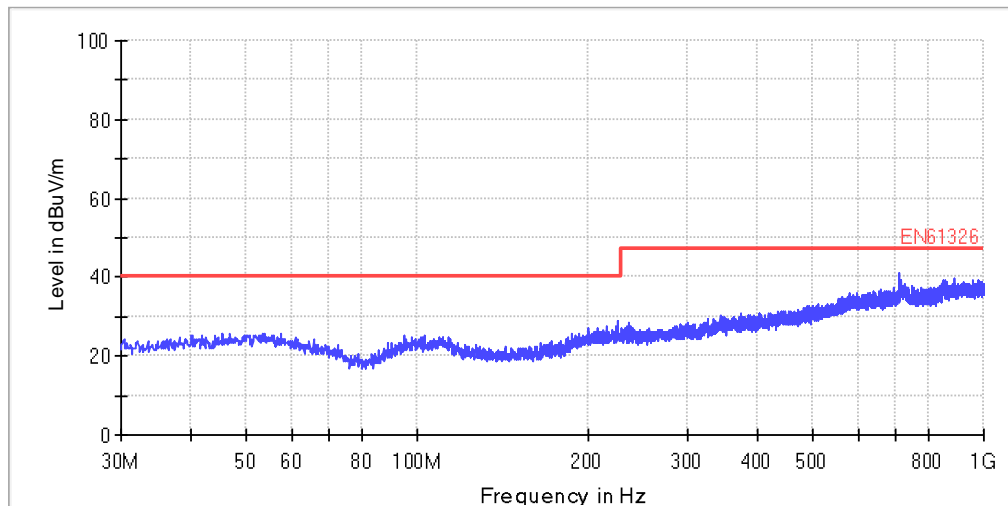
TEST REPORT

5.1.3 Test Data and Curve

UT309A

Operation Mode: temp. measuring

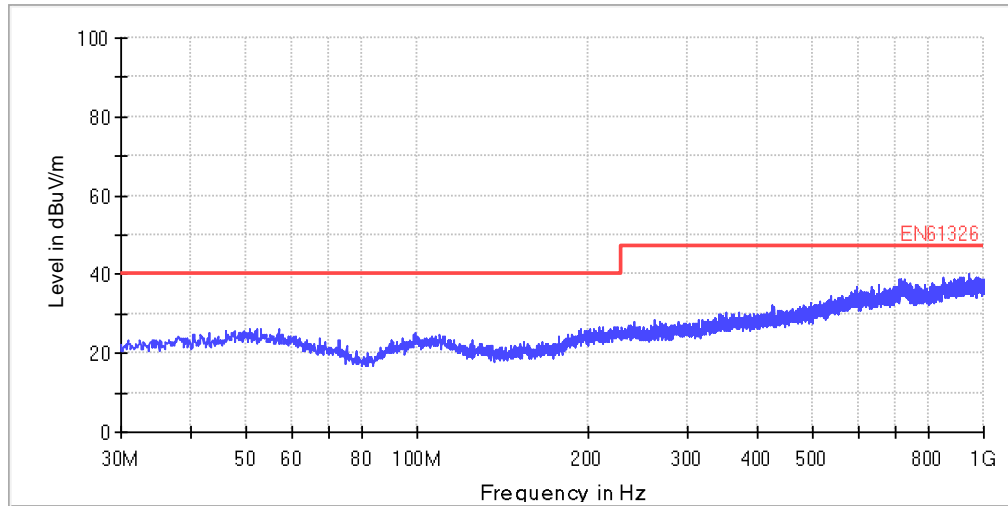
Horizontal



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

TEST REPORT

Vertical



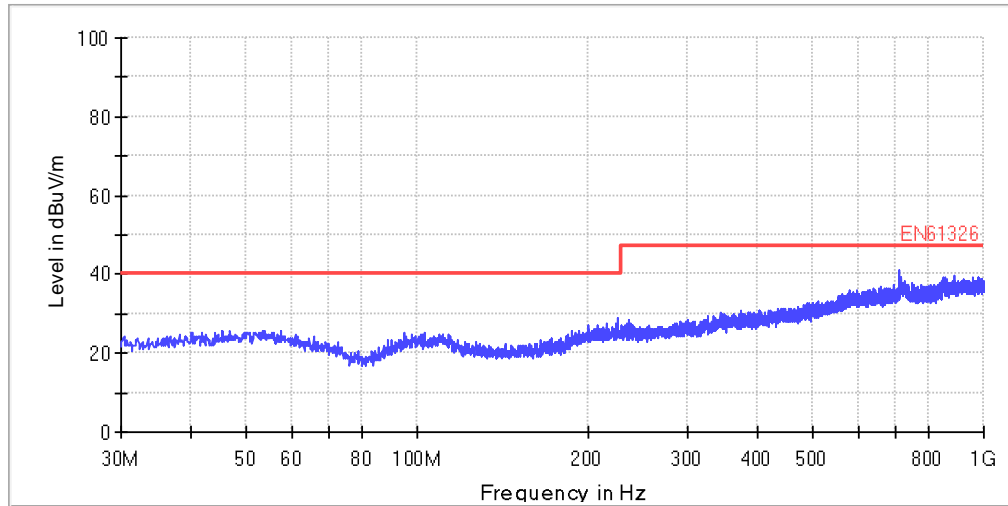
All emission levels are more than 6 dB below the limit.

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UT309C

Operation Mode: temp. measuring

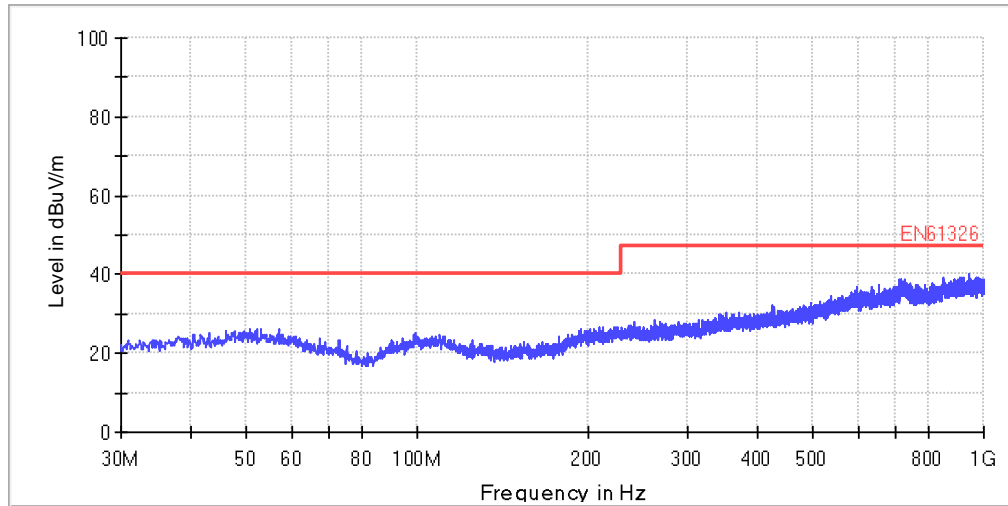
Horizontal



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

6. EMS TEST

Performance Criteria:

- Criterion A: The equipment shall continue to operate as intended during and after the test. No DEGRADATION OF PERFORMANCE or LOSS OF FUNCTION is allowed below a PERFORMANCE LEVEL specified in the user documentation, when the equipment is used as intended. In the case of applying immunity tests with continuous electromagnetic phenomena, the PERFORMANCE LEVEL may be replaced by a permissible LOSS OF PERFORMANCE which shall recover, without user intervention. A permissible LOSS OF PERFORMANCE is allowed within the PERFORMANCE LEVEL only when this information is clearly provided to the end user via documentation, such as the product user manual. No change in the operating state is allowed nor is loss of data.
- Criterion B: The equipment shall continue to operate as intended after the test. No DEGRADATION OF PERFORMANCE or LOSS OF FUNCTION is allowed below a PERFORMANCE LEVEL specified in the user documentation, when the equipment is used as intended. During the test, the equipment PERFORMANCE LEVEL may be replaced by a permissible LOSS OF PERFORMANCE if such LOSS OF PERFORMANCE is detailed in the EMC test plan. A permissible LOSS OF PERFORMANCE is allowed within the PERFORMANCE LEVEL only when this information is clearly provided to the end user via documentation, such as the product user manual. An unintended change of the operating state is allowed if self-recoverable. No loss of stored data is allowed.
- Criterion C: LOSS OF FUNCTION is allowed, provided the function is self-recoverable or can be restored by the operation of the controls. Recovery procedure shall be included in the user documentation. No permanent damage to the equipment is allowed.

Operation mode of EMS test:

Test Item	Operation mode
Radiated EM field immunity	Temp. measuring mode
ESD immunity	Temp. measuring mode

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

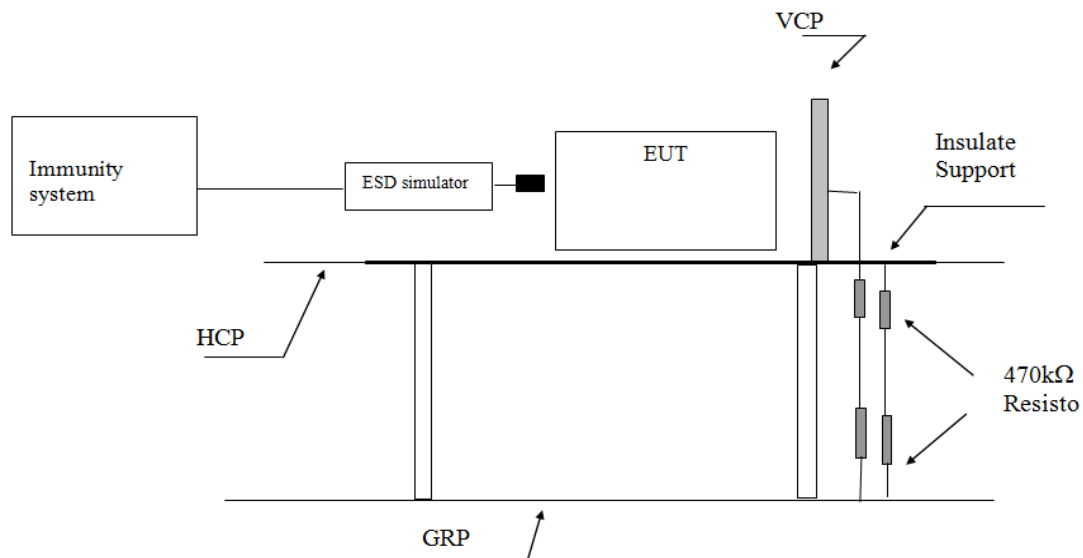
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6.1 EN 61000-4-2(Pursuant to EN IEC 61326-1) Electrostatic Discharge Immunity

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.

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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 ($2 \times 470 \text{ k}\Omega$) 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.

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6.1.3 Test Result

Direct Application of ESD

Direct Contact Discharge

Applied Voltage (kV)	No. of Discharge for each point per polarity	Result	Discharged Points
±4	10	N/A	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 per polarity	Result	Discharged Points
±2,±4,±8	10	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 per polarity	Result	Discharged Point
±4	10	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 per polarity	Result	Discharged Point
±4	10	Pass	The centre of the vertical edge of the coupling plane

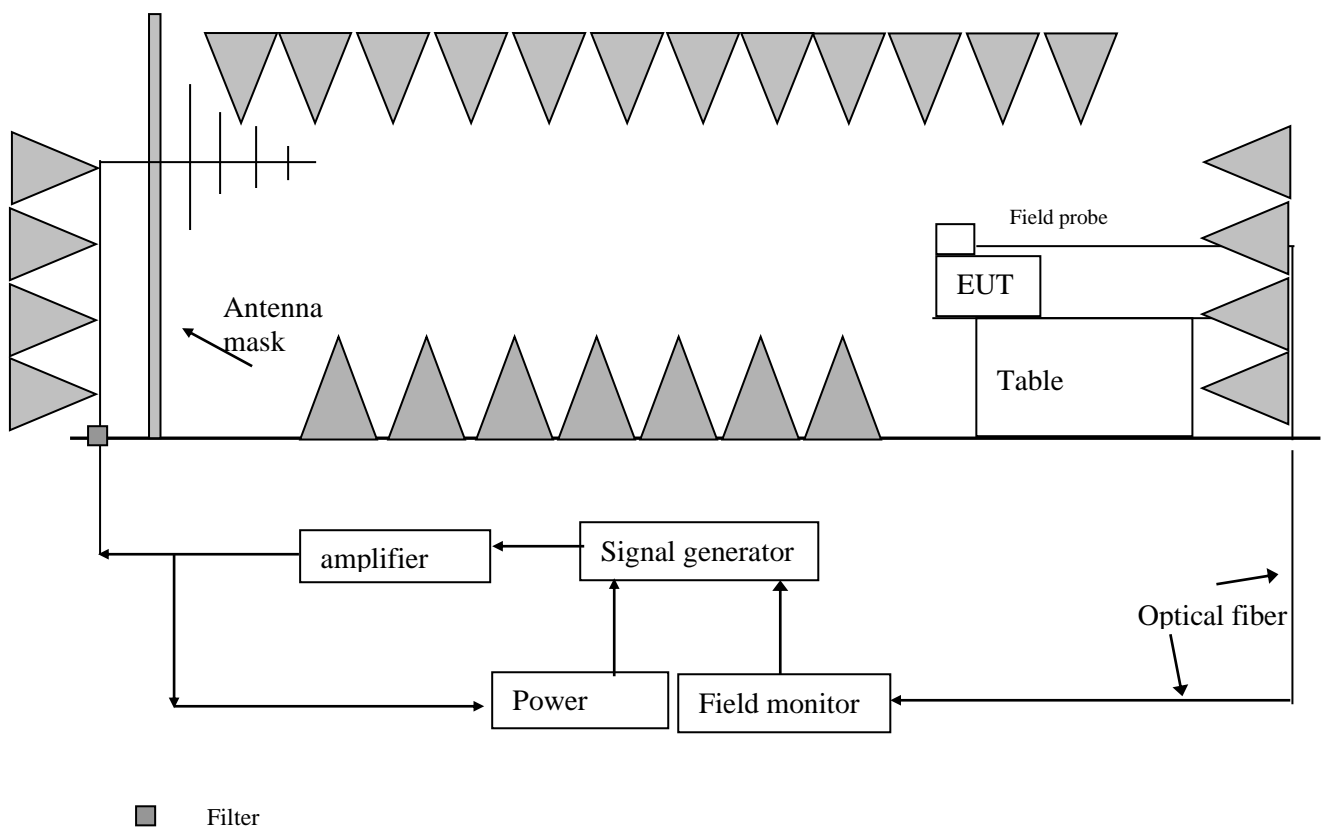
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6.2 EN 61000-4-3(Pursuant to EN IEC 61326-1) Radiated Electromagnetic Field Immunity

Performance criterion: A

Test Result: Pass

6.2.1 Block Diagram of Test Setup



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6.2.2 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).

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 1m from the EUT. The EUT was arranged and connected according to its functional requirements

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 80MHz to 6000MHz, 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 MHz to 1000 MHz at 3V/m EM field, 1.4 GHz to 2 GHz at 3V/m EM field and 2.0 GHz to 6 GHz at 3V/m EM field, with the signal 80% amplitude modulated with a 1 kHz sine-wave, 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.

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6.2.3 Test Result

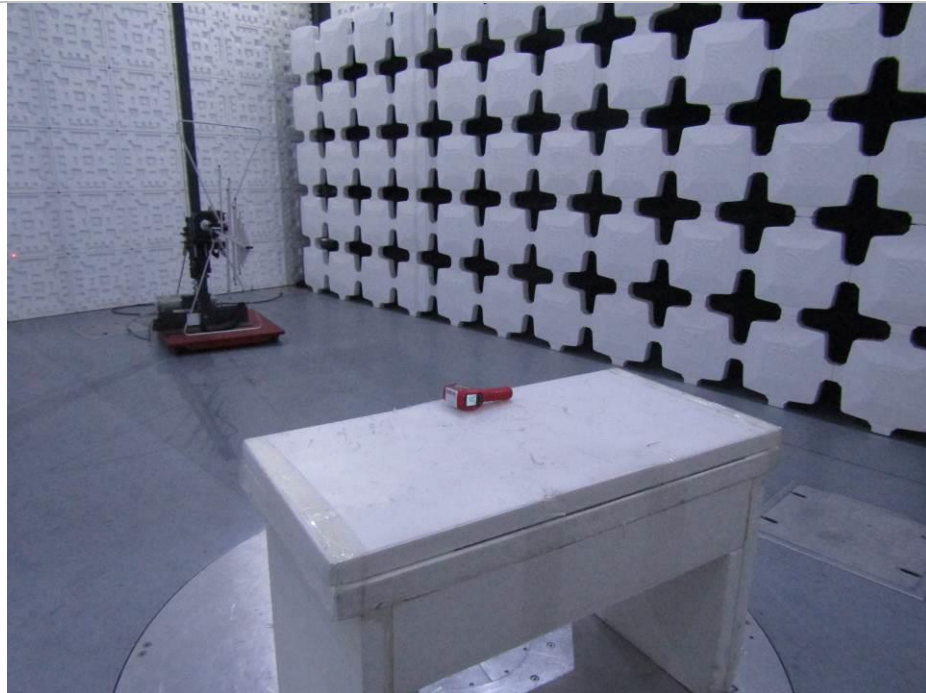
Frequency (MHz)	Exposed Side	Field Strength (V/m)	Result
80 to 1000, 1400-2000	Front	3V/m (r.m.s.)	Pass
80 to 1000, 1400-2000	Left	3V/m (r.m.s.)	Pass
80 to 1000, 1400-2000	Rear	3V/m (r.m.s.)	Pass
80 to 1000, 1400-2000	Right	3V/m (r.m.s.)	Pass

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

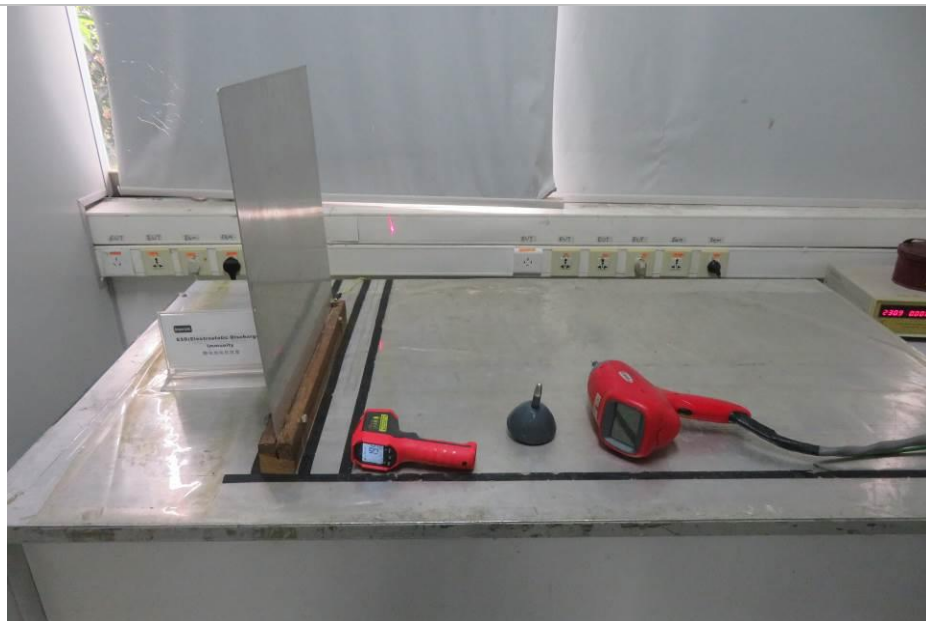
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7. APPENDIX I - PHOTOS OF TEST SETUP

Radiated emission (30 MHz–1000 MHz)



ESD Immunity



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8. APPENDIX II – PHOTOS OF EUT

UT309A

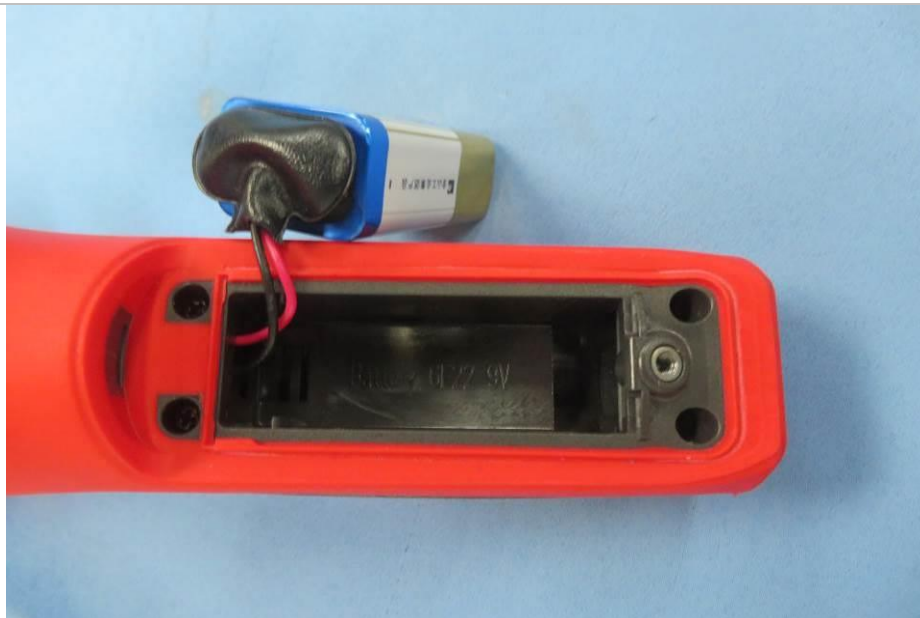


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UT309A

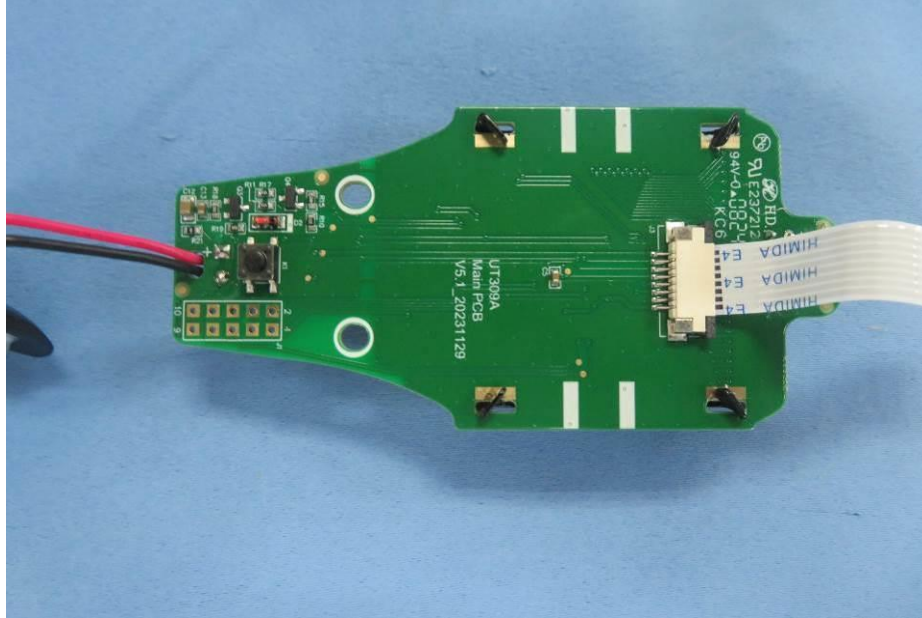


UT309A

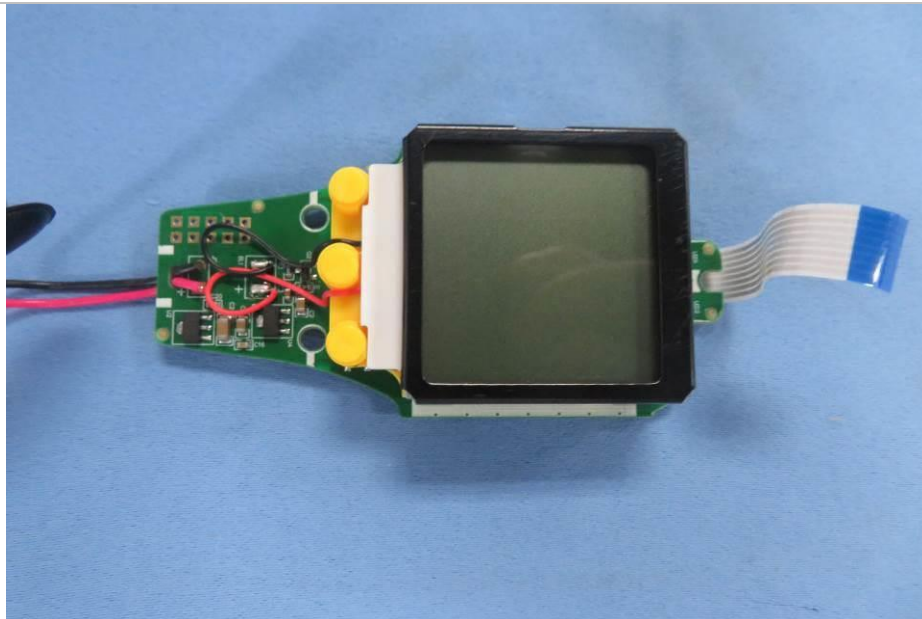


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PCB view of UT309A

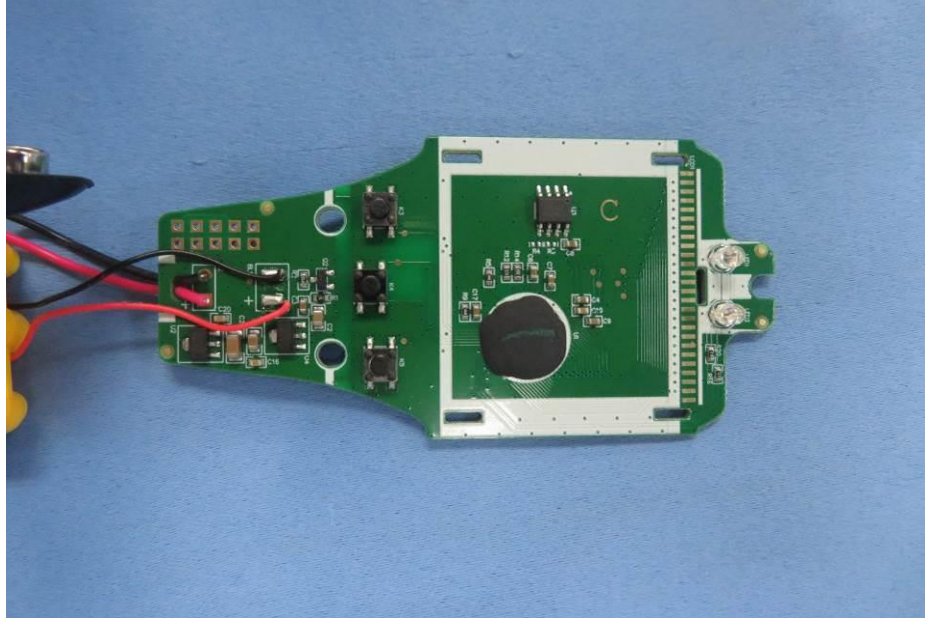


PCB view of UT309A

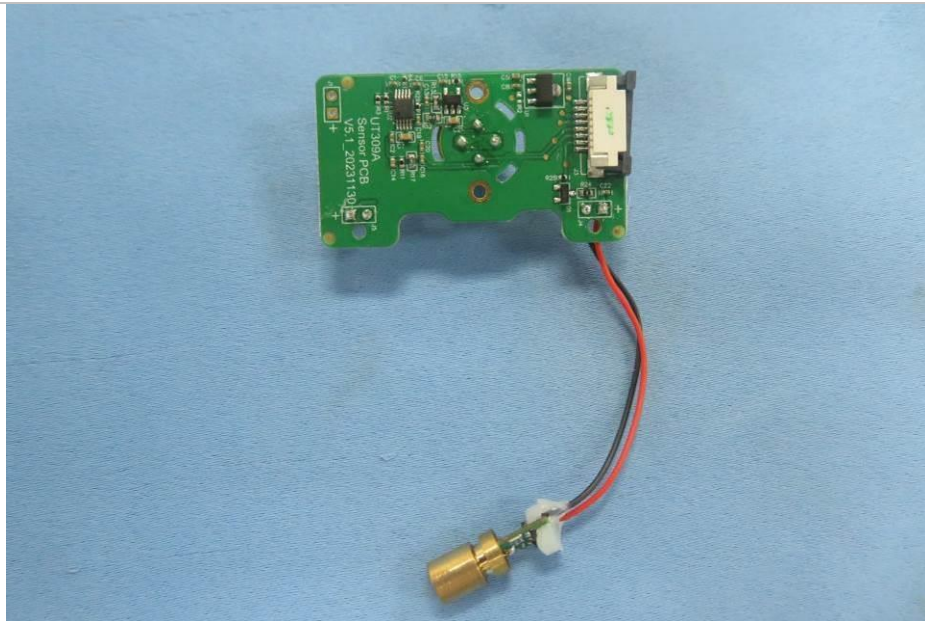


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PCB view of UT309A

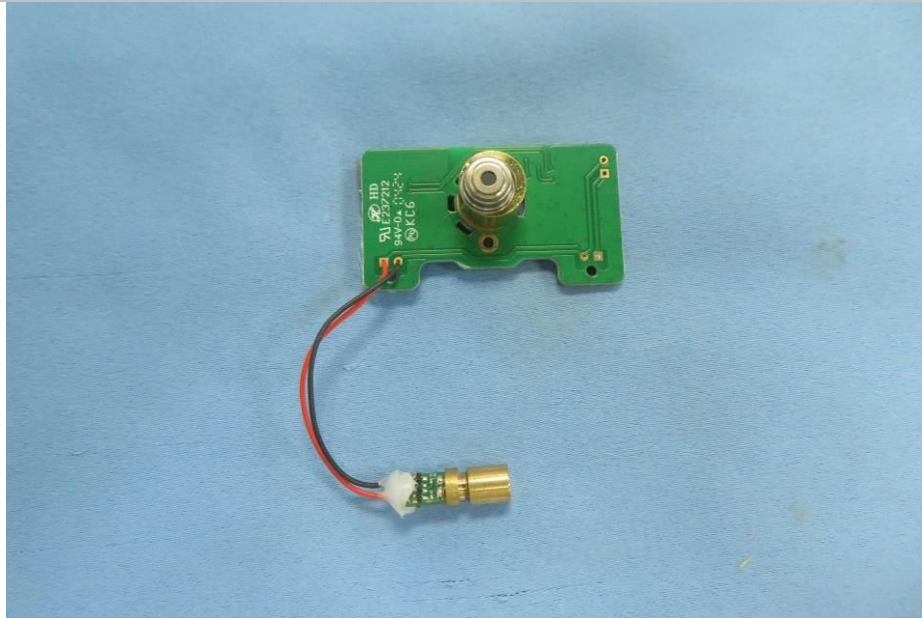


PCB view of UT309A



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PCB view of UT309A



UT309C



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UT309C



UT309C

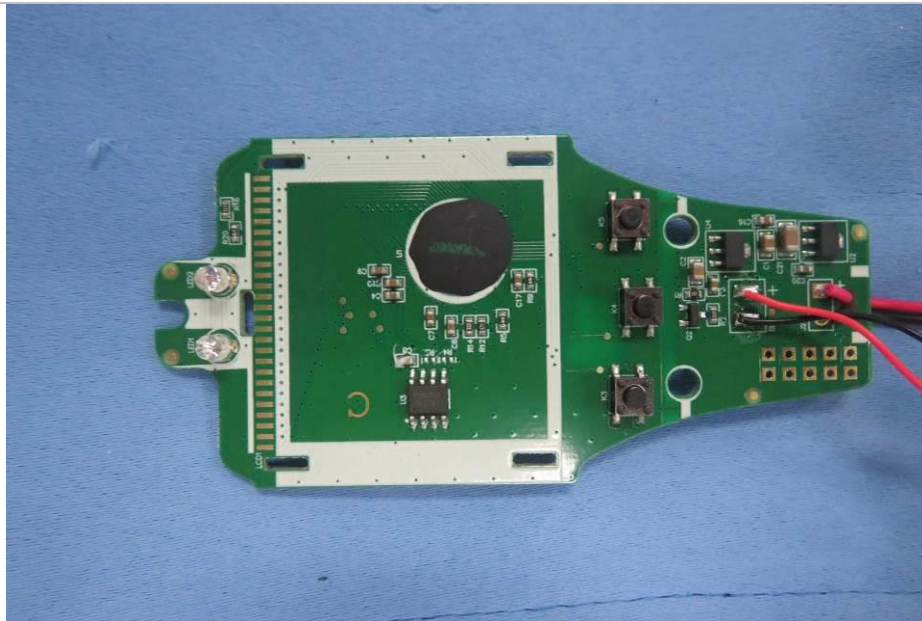


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UT309C

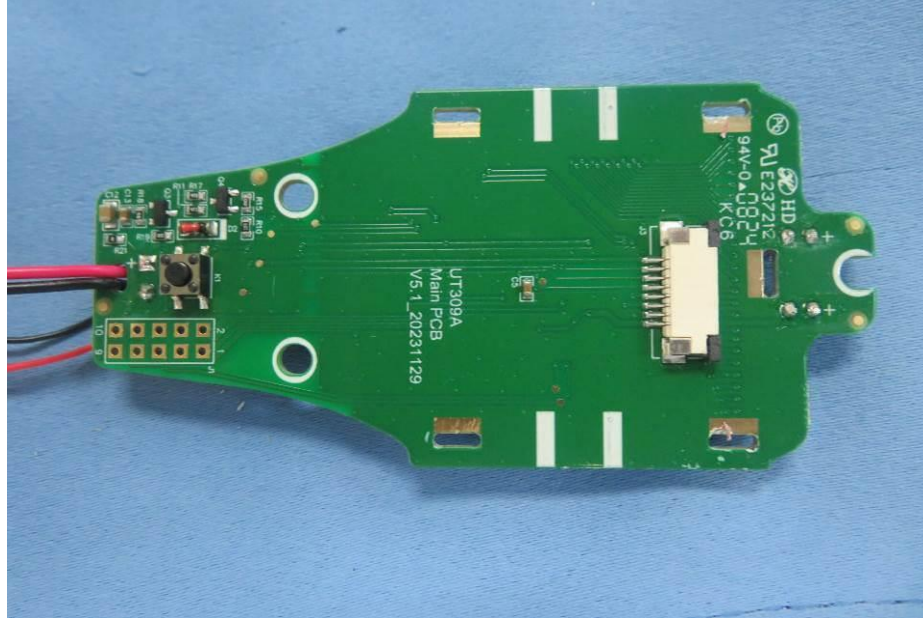


PCB view of UT309C



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PCB view of UT309C



PCB view of UT309C



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PCB view of UT309C



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