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CNAS L4595

EMC TEST REPORT

For

Shanghai Panelmate Electronics Co., Ltd.

Firewall eco M

Test Model: eco M

Prepared for	: Shanghai Panelmate Electronics Co., Ltd.
Address	: Building 18 th , No.177 Fulian 2nd Rd. Baoshan District, Shanghai, 201906
Prepared by	: Shenzhen LCS Compliance Testing Laboratory Ltd.
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Date of receipt of test sample	: October 29, 2024
Number of tested samples	: 1
Sample No.	: A241028126001
Date of Test	: October 29, 2024 to November 11, 2024
Date of Report	: November 12, 2024



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EMC TEST REPORT EN IEC 61000-6-4:2019 Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments EN IEC 61000-6-2:2019 Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments	
Report Reference No.:	LCSA10294031E
Date Of Issue	November 12, 2024
Testing Laboratory Name:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address.....:	101, 201 Building A and 301 Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, Guangdong, China
Testing Location/ Procedure ..:	Full application of Harmonised standards ☒ Partial application of Harmonised standards ☐ Other standard testing method ☐
Applicant's Name.....:	Shanghai Panelmate Electronics Co., Ltd.
Address.....:	Building 18 th , No.177 Fulian 2nd Rd. Baoshan District, Shanghai, 201906
Test specification: Standard: EN IEC 61000-6-4:2019 EN IEC 61000-6-2:2019 Test Report Form No.....: LCSEMC-1.0 TRF Originator: Shenzhen LCS Compliance Testing Laboratory Ltd. Master TRF: Dated 2011-03	
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Test Item Description.....:	Firewall eco M
Trade Mark.....:	N/A
Test Model	eco M
Ratings.....:	Please Refer To Page 9
Result	Positive

Compiled by:

Emma wang / File Administrator

Supervised by:

Cary Luo/ Technique principal

Approved by:

Gavin Liang/ Manager



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EMC -- TEST REPORT

Test Report No. : LCSA10294031ENovember 12, 2024

Date of issue

Test Model..... : eco M

EUT..... : Firewall eco M

Applicant..... : Shanghai Panelmate Electronics Co., Ltd.Address..... : Building 18th, No.177 Fulian 2nd Rd. Baoshan District,
Shanghai, 201906

Telephone..... : /

Fax..... : /

Manufacturer..... : Shanghai Panelmate Electronics Co., Ltd.Address..... : Building 18th, No.177 Fulian 2nd Rd. Baoshan District,
Shanghai, 201906

Telephone..... : /

Fax..... : /

Factory..... : Shanghai Panelmate Electronics Co., Ltd.Address..... : Building 18th, No.177 Fulian 2nd Rd. Baoshan District,
Shanghai, 201906

Telephone..... : /

Fax..... : /

Test Result according to the standards on page 6: Positive

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.



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Revision History

Revision	Issue Date	Revisions Content	Revised By
000	November 12, 2024	Initial Issue	--





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1. SUMMARY OF STANDARDS AND RESULTS

1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

EMISSION (EN IEC 61000-6-4:2019)			
Description of Test Item	Standard	Limits	Results
Conducted disturbance at mains terminals	EN IEC 61000-6-4:2019	Class A	N/A
Conducted disturbance at telecommunication port	EN IEC 61000-6-4:2019	Class A	N/A
Radiated disturbance	EN IEC 61000-6-4:2019	Class A	PASS
Harmonic current emissions	EN IEC 61000-3-2:2019+A1: 2021	Class A	N/A
Voltage fluctuations & flicker	EN 61000-3-3: 2013+A1:2019	-----	N/A
IMMUNITY (EN IEC 61000-6-2:2019)			
Description of Test Item	Basic Standard	Performance Criteria	Results
Electrostatic discharge (ESD)	EN 61000-4-2: 2009	B	PASS
Radio-frequency, Continuous radiated disturbance	EN IEC 61000-4-3:2020	A	PASS
Electrical fast transient (EFT)	EN 61000-4-4: 2012	B	PASS
Surge (Input d.c. power ports)	EN 61000-4-5: 2014+A1: 2017	B	N/A
Surge (Telecommunication ports)		B	PASS
Radio-frequency, Continuous conducted disturbance	EN61000-4-6:2014/A1:2015	A	PASS
Power frequency magnetic field	EN 61000-4-8: 2010	A	PASS
Voltage dips, >95% reduction	EN IEC 61000-4-11:2020+AC: 2020	B	N/A
Voltage dips, 30% reduction		C	N/A
Voltage interruptions		C	N/A
N/A is an abbreviation for Not Applicable.			

Test mode:

Mode

Working

Record



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1.2. Description of Performance Criteria

General Performance Criteria

Examples of functions defined by the manufacturer to be evaluated during testing include, but are not limited to, the following:

- essential operational modes and states;
- tests of all peripheral access (hard disks, floppy disks, printers, keyboard, mouse, etc.);
- quality of software execution;
- quality of data display and transmission;
- quality of speech transmission.

1.2.1. Performance criterion A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacture when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. 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 by what the user may reasonably expect from the equipment if used as intended.

1.2.2. Performance criterion B

After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacture, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.

During the test, degradation of performance is allowed. However, no change of operation state or stored data is allowed to persist after the test.

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 by what the user may reasonably expect from the equipment if used as intended.

1.2.3. Performance criterion C

Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacture's instructions.

Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.





2. GENERAL INFORMATION

2.1. Description of Device (EUT)

EUT : Firewall eco M

Trade Mark : N/A

Test Model : eco M

Power Supply : DC 24V

EUT Clock Frequency : $\leq 108\text{MHz}$

2.2. Description of Test Facility

Site Description

EMC Lab. : NVLAP Accreditation Code is 600167-0.
FCC Designation Number is CN5024.
CAB identifier is CN0071.
CNAS Registration Number is L4595.

2.3. Statement of the Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.





2.4.Measurement Uncertainty

Test	Parameters	Expanded uncertainty (Ulab)	Expanded uncertainty (Ucisp)
Coucted Emission	Level accuracy (9kHz to 150kHz) (150kHz to 30MHz)	± 2.63 dB ± 2.35 dB	± 3.8 dB ± 3.4 dB
Power Disturbance	Level accuracynd (30MHz to 300MHz)	± 2.90 dB	± 4.5 dB
Electromagnetic Radiated Emission (3-loop)	Level accuracy (9kHz to 30MHz)	± 3.60 dB	± 3.3 dB
Radiated Emission	Level accuracy (9kHz to 30MHz)	± 3.68 dB	N/A
Radiated Emission	Level accuracy (30MHz to 1000MHz)	± 3.48 dB	± 5.3 dB
Radiated Emission	Level accuracy (above 1000MHz)	± 3.90 dB	± 5.2 dB
Voltage Fluctuations & Flicker	Voltage	$\pm 0.510\%$	N/A
EMF		$\pm 21.59\%$	N/A

- (1) Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus.
- (2) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.





3. MEASURING DEVICES AND TEST EQUIPMENT

Radiated emissions (30MHz-1GHz)				
Equipment	Manufacturer	Model No	Serial No.	Due Date
EMI Test Software	Farad	EZ	/	/
EMI Test Software	AUDIX	E3	/	/
By-log Antenna	SCHWARZBECK	VULB9163	01143	2027-07-19
Horn Antenna	SCHWARZBECK	3115	EABF-018	2027-07-19
EMI Test Receiver	R&S	ESR3	102311	2025-06-05
Broadband Preamplifier	/	BP-01M18G	P190501	2025-06-05
EMI Test Receiver	R&S	ESCI7	101173	2025-10-07
By-log Antenna	SchwarzZBECK	VULB9163	01565	2027-07-12

Electrostatic discharges				
Equipment	Manufacturer	Model No	Serial No.	Due Date
ESD Simulator	SCHLODER	SESD 230	604035	2025-07-14

RF electromagnetic field disturbances				
Equipment	Manufacturer	Model No	Serial No.	Due Date
MXG Vector Signal Generator	Agilent	E4438C	MY42081396(6G)	2025-06-05
RF POWER AMPLIFIER	SKET	HAP_0306G-50 W	/	2025-06-05
RF POWER AMPLIFIER	OPHIR	5225R	1052	2025-06-05
RF POWER AMPLIFIER	OPHIR	5273F	1019	2025-06-05
Stacked Broadband Log Periodic Antenna	SCHWARZBECK	STLP 9128	9128ES-145	/
Stacked Mikrowellen Log.-Per Antenna	SCHWARZBECK	STLP 9149	9149-484	/
RS Electric field probe	narda	EP601	611WX80208	2025-06-05

Electrical fast transients / burst for DC mains power ports				
Electrical fast transients / burst for analogue/digital data ports				
Equipment	Manufacturer	Model No	Serial No.	Due Date
Immunity Simulative Generator	EM TEST	UCS500-M4	0101-34	2025-06-05
Capacitive coupling clamp	3CTEST	EFTC	EC0441098	2025-06-05

Surges for DC mains power ports				
Equipment	Manufacturer	Model No	Serial No.	Due Date
Immunity Simulative Generator	EM TEST	UCS500-M4	0101-34	2025-06-05





Continuous induced RF disturbances for analogue/digital data ports (150kHz-80MHz)				
Equipment	Manufacturer	Model No	Serial No.	Due Date
Simulator	FRANKONIA	CIT-10/75	A126A1195	2025-06-05
CDN	FRANKONIA	CDN-M2+M3	A2210177	2025-06-05
6dB Attenuator	FRANKONIA	DAM25W	1172040	2025-06-05
Electromagnetic coupling injection clamp	ZHINAN	ZN23203	14017	2025-06-05

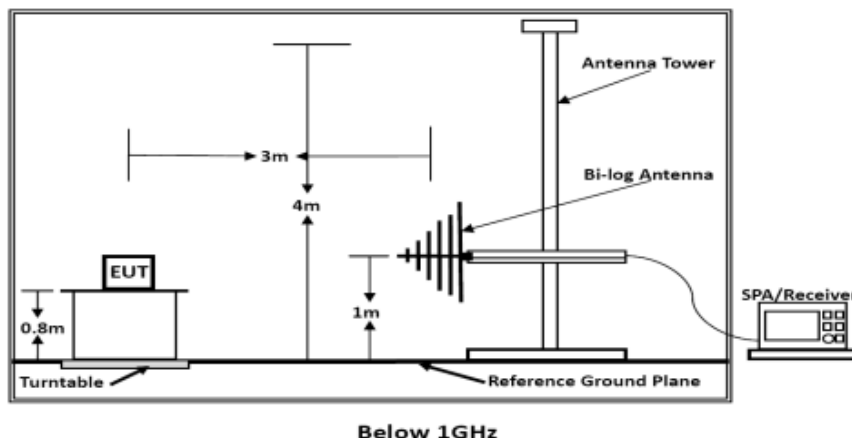
Power frequency magnetic field				
Equipment	Manufacturer	Model No	Serial No.	Due Date
Power frequency mag-field generator System	EVERFINE	EMS61000-8K	906003	2025-06-05





4.1. Radiated Emission Measurement

4.1.1. Block Diagram of Test Setup



4.1.2. Measuring Standard

EN IEC 61000-6-4:2019

4.1.3. Radiated Emission Limits

All emanations from a class device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:

FREQUENCY (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMIT (dB μ V/m)
30 ~ 230	3	50
230 ~ 1000	3	57

- Note: (1) The smaller limit shall apply at the combination point between two frequency bands.
(2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the EUT.

4.1.4. EUT Configuration on Test

The EN IEC 61000-6-4 regulations test method must be used to find the maximum emission during radiated emission measurement.





4.1.5. Operating Condition of EUT

4.1.5.1. Turn on the power.

4.1.5.2. Let the EUT work in test mode (Working) and measure it.

4.1.6. Test Procedure

The EUT is placed on a turntable, which is 0.8 meter high above the ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. By-log antenna (calibrated by Dipole Antenna) is used as a receiving antenna. Both horizontal and vertical polarization of the antenna is set on test.

The bandwidth of the EMI test receiver is set at $RBW/VBW=120\text{kHz}/300\text{kHz}$.
The frequency range from 30MHz to 1000MHz is checked.
The bandwidth of the Spectrum analyzer is set at $RBW/VBW=1\text{MHz}/3\text{MHz}$.

All the scanning waveform is in next page.

4.1.7. Test Results

PASS.

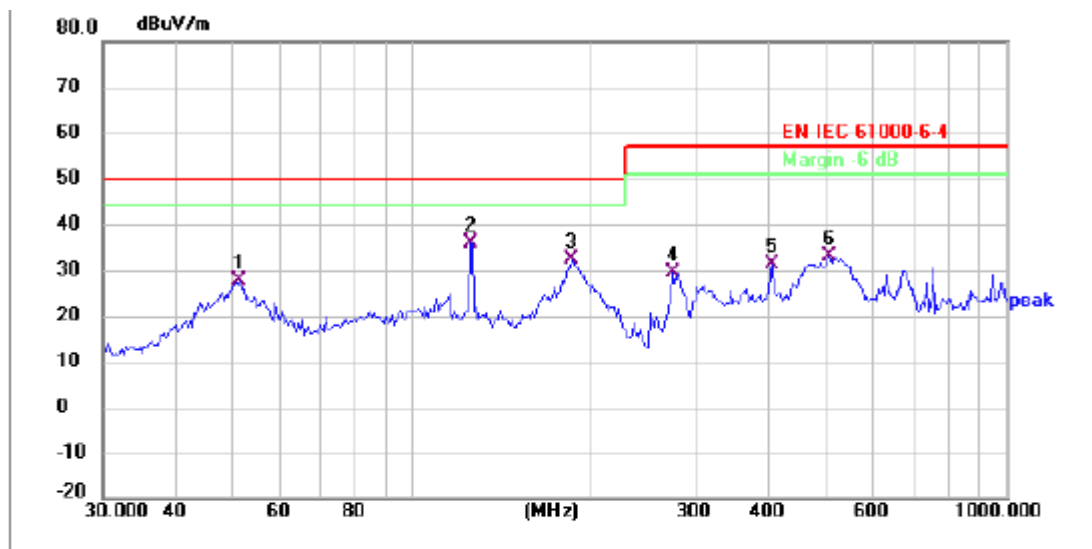
The frequency range from 30MHz to 1000MHz is investigated.

The scanning waveforms is in the next page.





Test Model	eco M	Test Mode	Working
Environmental Conditions	26.4°C, 54.2% RH	Detector Function	Quasi-peak
Pol	Vertical	Distance	3m
Test Engineer	Xing Mo	Test Voltage	DC 24V

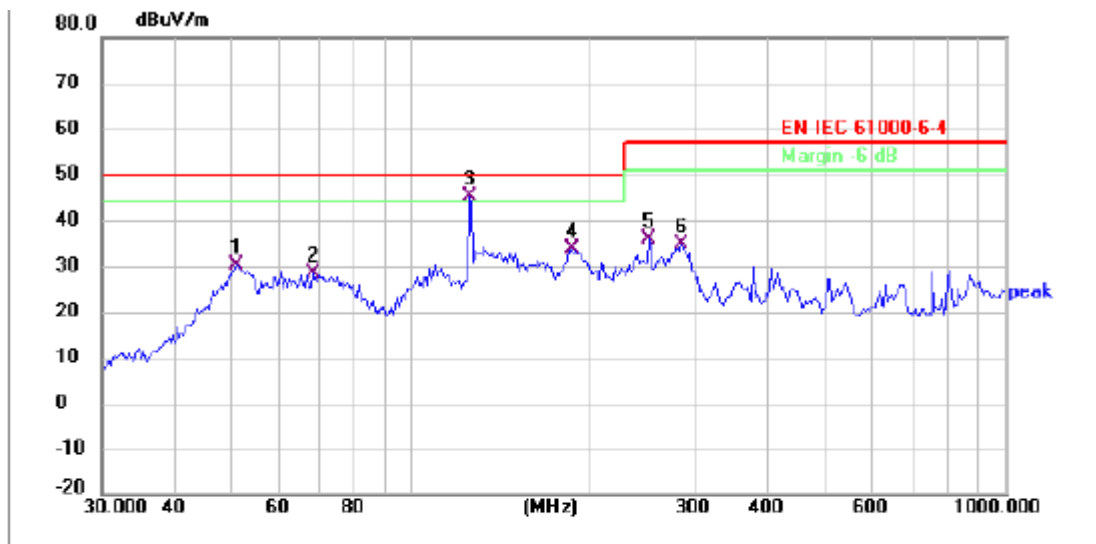


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	50.817	45.32	-17.68	27.64	50.00	-22.36	QP	P	
2 *	124.925	57.02	-21.24	35.78	50.00	-14.22	QP	P	
3	185.163	53.59	-21.32	32.27	50.00	-17.73	QP	P	
4	274.446	46.93	-17.46	29.47	57.00	-27.53	QP	P	
5	403.934	45.25	-13.98	31.27	57.00	-25.73	QP	P	
6	502.247	46.20	-13.17	33.03	57.00	-23.97	QP	P	





Test Model	eco M	Test Mode	Working
Environmental Conditions	26.4°C, 54.2% RH	Detector Function	Quasi-peak
Pol	Horizontal	Distance	3m
Test Engineer	Xing Mo	Test Voltage	DC 24V



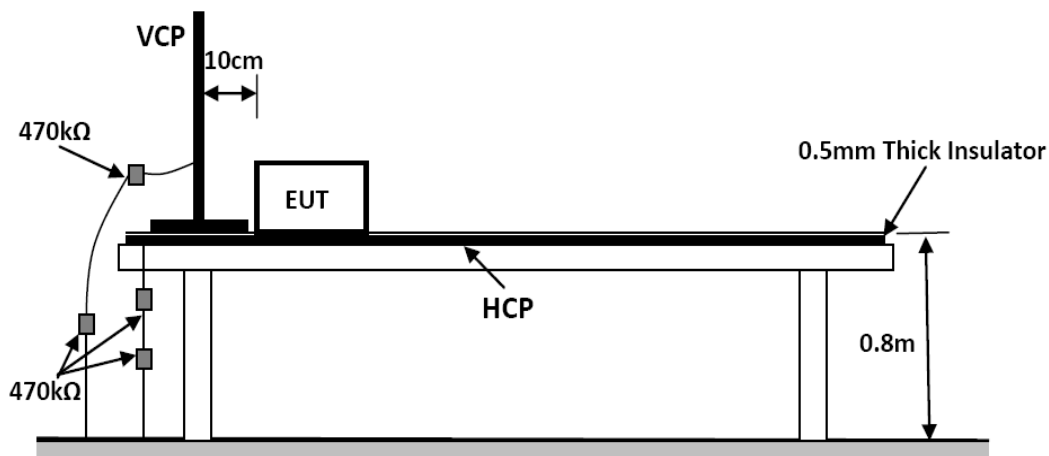
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	50.461	47.84	-17.64	30.20	50.00	-19.80	QP	P	
2	68.264	49.26	-20.81	28.45	50.00	-21.55	QP	P	
3 *	124.925	66.34	-21.24	45.10	50.00	-4.90	QP	P	
4	186.468	55.05	-21.21	33.84	50.00	-16.16	QP	P	
5	250.486	53.77	-18.02	35.75	57.00	-21.25	QP	P	
6	284.261	51.91	-17.24	34.67	57.00	-22.33	QP	P	





4.2. ElectrostaTic Discharge Immunity Test

4.2.1. Block Diagram of Test Setup



4.2.2. Test Standard

EN IEC 61000-6-2:2019 (EN 61000-4-2: 2009,
Severity Level: 3 / Air Discharge: $\pm 8\text{KV}$, Level: 2 / Contact Discharge: $\pm 4\text{KV}$)

4.2.3. Severity Levels and Performance Criterion

4.2.3.1. Severity level

Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1.	± 2	± 2
2.	± 4	± 4
3.	± 6	± 8
4.	± 8	± 15
X	Special	Special

4.2.3.2. Performance Criterion: **B**

4.2.4. EUT Configuration on Test

The configuration of EUT is listed in Section 4.2.1.

4.2.5. Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 4.1.5.
Except the test set up replaced by Section 4.2.1.





4.2.6. Test Procedure

4.2.6.1. Air Discharge

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed

4.2.6.2. Contact Discharge

All the procedure shall be same as Section 4.2.1. Except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

4.2.6.3. Indirect Discharge For Horizontal Coupling Plane

At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit (if applicable) of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

4.2.6.4. Indirect Discharge For Vertical Coupling Plane

At least 10 single discharge (in the most sensitive polarity) shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

4.2.7. Test Results

PASS.

Please refer to the following pages



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Electrostatic Discharge Test Results

Standard	☐ IEC 61000-4-2 ☒ EN 61000-4-2		
Applicant	Shanghai Panelmate Electronics Co., Ltd.		
EUT	Firewall eco M	Temperature	23.5℃
M/N	eco M	Humidity	53.8%
Criterion	B	Pressure	1021mbar
Test Mode	Working	Test Engineer	Xing Mo

Air Discharge

Test Points	Test Levels			Results		
	± 2KV	± 4KV	± 8KV	passed	Fail	Performance Criterion
Front	☒	☒	☒	☒	☐	☐ A ☒ B
Back	☒	☒	☒	☒	☐	☐ A ☒ B
Left	☒	☒	☒	☒	☐	☐ A ☒ B
Right	☒	☒	☒	☒	☐	☐ A ☒ B
Top	☒	☒	☒	☒	☐	☐ A ☒ B
Bottom	☒	☒	☒	☒	☐	☐ A ☒ B

Contact Discharge

Test Points	Test Levels		Results		Performance Criterion
	± 2 KV	± 4 KV	Passed	Fail	
Front	☒	☒	☒	☐	☐ A ☒ B
Back	☒	☒	☒	☐	☐ A ☒ B
Left	☒	☒	☒	☐	☐ A ☒ B
Right	☒	☒	☒	☐	☐ A ☒ B
Top	☒	☒	☒	☐	☐ A ☒ B
Bottom	☒	☒	☒	☐	☐ A ☒ B

Discharge To Horizontal Coupling Plane

Side of EUT	Test Levels		Results		Performance Criterion
	± 2 KV	± 4 KV	Passed	Fail	
Front	☒	☒	☒	☐	☐ A ☒ B
Back	☒	☒	☒	☐	☐ A ☒ B
Left	☒	☒	☒	☐	☐ A ☒ B
Right	☒	☒	☒	☐	☐ A ☒ B

Discharge To Vertical Coupling Plane

Side of EUT	Test Levels		Results		Performance Criterion
	± 2 KV	± 4 kV	Passed	Fail	
Front	☒	☒	☒	☐	☐ A ☒ B
Back	☒	☒	☒	☐	☐ A ☒ B
Left	☒	☒	☒	☐	☐ A ☒ B
Right	☒	☒	☒	☐	☐ A ☒ B



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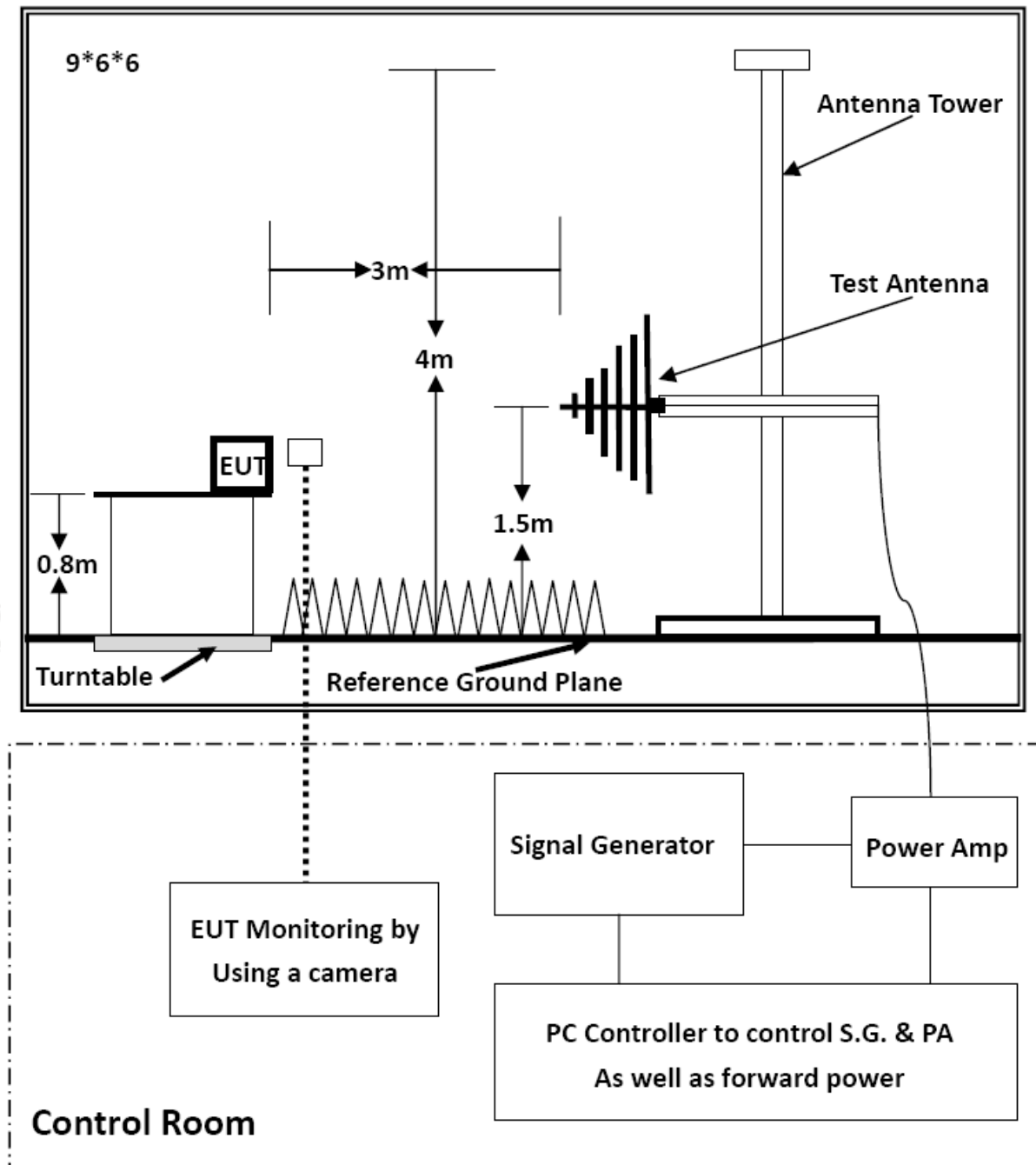
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4.3. RF Field Strength Susceptibility Test

4.3.1. Block Diagram of Test



4.3.2. Test Standard

EN IEC 61000-6-2:2019
(EN IEC 61000-4-3:2020 Severity Level 3: 10V / m)





4.3.3. Severity Levels and Performance Criterion

4.3.3.1. Severity Levels

Level	Field Strength V/m
1.	1
2.	3
3.	10
4.	30
X.	Special

4.3.3.2. Performance Criterion: A

4.3.4. EUT Configuration on Test

The configuration of the EUT is same as Section 4.3.1.

4.3.5. Operating Condition of EUT

Same as radiated emission measurement, which is listed in Section 4.2.4, except the test setup replaced as Section 4.3.1.

4.3.6. Test Procedure

The EUT are placed on a table, which is 0.8 meter high above the ground. The EUT is set 3 meters away from the transmitting antenna, which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna is set on test. Each of the four sides of the EUT must be faced this transmitting antenna and measured individually.

In order to judge the EUT performance, a CCD Recording is used to monitor its screen.

All the scanning conditions are as following:

Condition of Test	Remark
1. Fielded Strength	10V/m (Severity Level 3)
2. Radiated Signal	Unmodulated
3. Scanning Frequency	80-1GHz
4. Sweep time of radiated	0.0015 Decade/s
5. Dwell Time	3 Sec.

4.3.7. Test Results

PASS.

Please refer to the following page





RF Field Strength Susceptibility Test Results

Standard	☐ IEC 61000-4-3 ☒ EN 61000-4-3		
Applicant	Shanghai Panelmate Electronics Co., Ltd.		
EUT	Firewall eco M	Temperature	23.2℃
M/N	eco M	Humidity	53.3%
Test Mode	Working	Criterion	A
Field Strength	10V/m	Field Strength	80 MHz to 1.0 GHz
Test Engineer	Xing Mo		
Modulation	☐ None ☐ Pulse ☒ AM 1KHz 80%		
Steps	1%		

	Horizontal	Vertical
Front	PASS	PASS
Right	PASS	PASS
Rear	PASS	PASS
Left	PASS	PASS

Note:

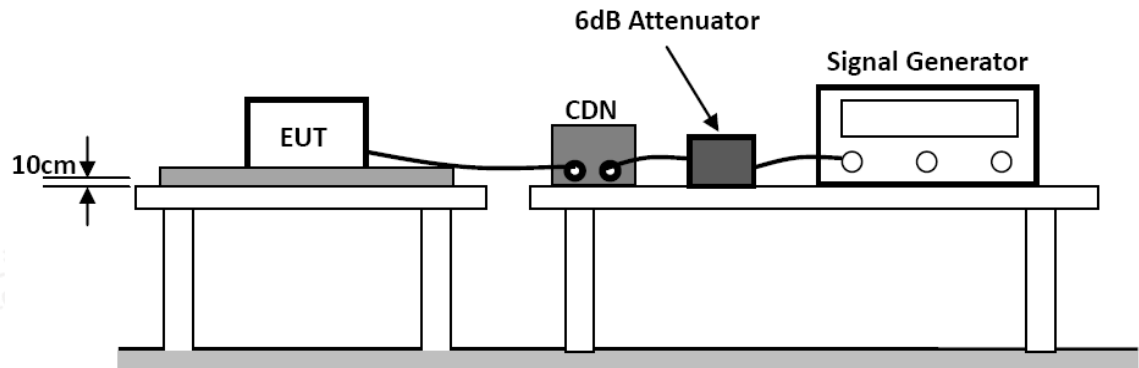


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4.4. Injected Currents Susceptibility Test

4.4.1. Block Diagram of Test Setup



4.4.2. Test Standard

EN 61000-6-2: 2007 (EN61000-4-6:2014/A1:2015, Severity Level: Level 2, (0.15MHz ~ 80MHz)

4.4.3. Severity Levels and Performance Criterion

4.4.3.1. Severity level

Level	Field Strength (V)
1	1
2	3
3	10
4	30
X	Special

4.4.3.2. Performance Criterion: A

4.4.4. EUT Configuration on Test

The configuration of EUT is listed in Section 3





4.4.5. Operating Condition of EUT

- 4.4.5.1. Setup the EUT as shown in Section 4.4.1.
- 4.4.5.2. Turn on the power of all equipments.
- 4.4.5.3. Let the EUT work in test Mode and measure it.

4.4.6. Test Procedure

- 4.4.6.1. Set up the EUT, CDN and test generators as shown on Section 4.4.1.
- 4.4.6.2. Let the EUT work in test mode and measure it.
- 4.4.6.3. The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
- 4.4.6.4. The disturbance signal described below is injected to EUT through CDN.
- 4.4.6.5. The EUT operates within its operational mode(s) under intended climatic conditions after power on.
- 4.4.6.6. The frequency range is swept from 150kHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave.
- 4.4.6.7. The rate of sweep shall not exceed 1.5×10^{-3} decades/s. where the frequency is swept incrementally; the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
- 4.4.6.8. Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

4.4.7. Test Results

PASS.

Please refer to the following page.





Injected Currents Susceptibility Test Results			
Standard	☐ IEC 61000-4-6 ☒ EN 61000-4-6		
Applicant	Shanghai Panelmate Electronics Co., Ltd.		
EUT	Firewall eco M	Temperature	24.4℃
M/N	eco M	Humidity	52.6%
Test Mode	Working	Criterion	A
Test Engineer	Xing Mo	Test Voltage	DC 24V

Frequency Range (MHz)	Injected Position	Strength (Unmodulated)	Criterion	Result
0.15 ~ 80	Singal Line	3V	A	PASS

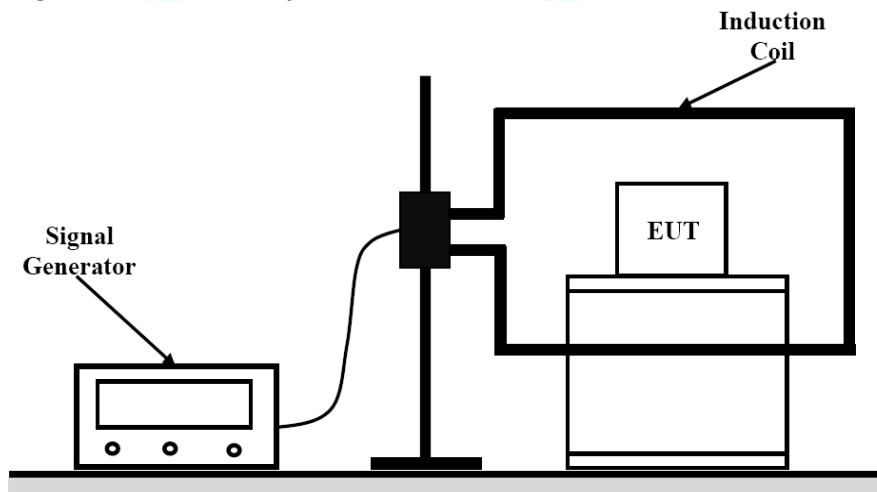
Note:





4.5. Magnetic Field Susceptibility Test

4.5.1. Block Diagram of Test Setup



4.5.2. Test Standard

EN IEC 61000-6-2:2019

(EN 61000-4-8: 2010, Severity Level: Level 4, 30A / m)

4.5.3. Severity Levels and Performance Criterion

4.5.3.1. Severity Levels

Level	Field Strength A/m
1	1
2	3
3	10
4	30
5	100
X	Special

4.5.3.2. Performance Criterion: A

4.5.4. EUT Configuration on Test

The configuration of the EUT is same as Section 4.5.1

4.5.5. Test Procedure

The EUT is placed in the middle of a induction coil (1*1m), under which is a 1*1*0.1m (high) table, this small table is also placed on a larger table, 0.8 m above the ground. Both horizontal and vertical polarization of the induction coil is set on test, so that each side of the EUT is affected by the magnetic field. Also can reach the same aim by change the position of the EUT.



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4.5.6. Test Results

PASS.

Please refer to the following page.





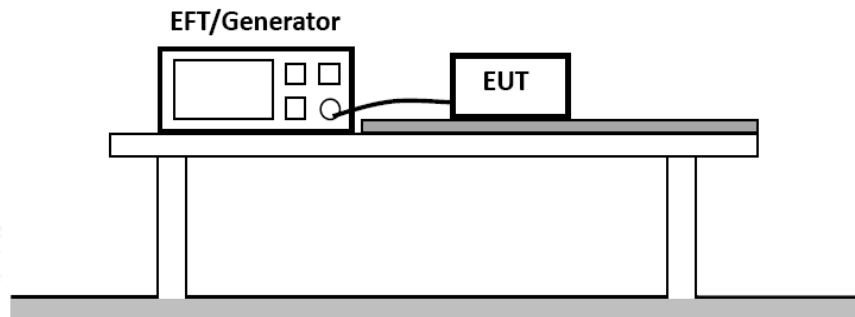
Magnetic Field Immunity Test Result				
Standard	☐ IEC 61000-4-8 ☒ EN 61000-4-8			
Applicant	Shanghai Panelmate Electronics Co., Ltd.			
EUT	Firewall eco M	Temperature	24.8℃	
M/N	eco M	Humidity	53.7%	
Test Mode	Working	Criterion	A	
Test Engineer	Xing Mo	Test Voltage	DC 24V	
Test Level (A/M)	Testing Duration	Coil Orientation	Criterion	Result
30	5 mins	X	A	PASS
30	5 mins	Y	A	PASS
30	5 mins	Z	A	PASS
Note:				





4.6. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

4.6.1. Block Diagram of Test Setup



4.6.2. Test Standard

EN IEC 61000-6-2:2019 (EN 61000-4-4: 2012, Level 3: 1KV)

4.6.3. Severity Levels and Performance Criterion

4.6.3.1. Severity level

Open Circuit Output Test Voltage $\pm 10\%$		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1	0.5 KV	0.25 KV
2	1 KV	0.5 KV
3	2 KV	1 KV
4	4 KV	2 KV
X	Special	Special

4.6.3.2. Performance Criterion

Performance Criterion: B

4.6.4. EUT Configuration on Test

The configuration of EUT is listed in Section 4.6.1.

4.6.5. Operating Condition of EUT

4.6.5.1. Setup the EUT as shown in Section 4.6.1.

4.6.5.2. Turn on the power of all equipments.

4.6.5.3. Let the EUT work in test mode(1) and measure it.



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4.6.6. Test Procedure

The EUT is put on the table, which is 0.8 meter high above the ground. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

4.6.6.1. For input and output AC power ports:

The EUT is connected to the power mains by using a coupling device, which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 1 mins.

4.6.6.2. For signal lines and control lines ports:

The EUT is connected to the power mains by using a coupling device, which couples the EFT interference signal to I/O Cable. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 1 mins.

4.6.6.3. For DC output line ports:

It's unnecessary to test.

4.6.7. Test Results

PASS.

Please refer to the following page.





Electrical Fast Transient/Burst Test Results			
Standard	☐ IEC 61000-4-4 ☒ EN 61000-4-4		
Applicant	Shanghai Panelmate Electronics Co., Ltd.		
EUT	Firewall eco M	Temperature	24.2℃
M/N	eco M	Humidity	53.6%
Test Mode	Working	Criterion	B
Test Engineer	Xing Mo	Test Voltage	DC 24V

Line	Test Voltage	Result (+)	Result (-)
P			
N			
PE			
P,N			
P,PE			
N,PE			
P,N,PE			
Signal Line	1KV	PASS	PASS
I/O Cable			

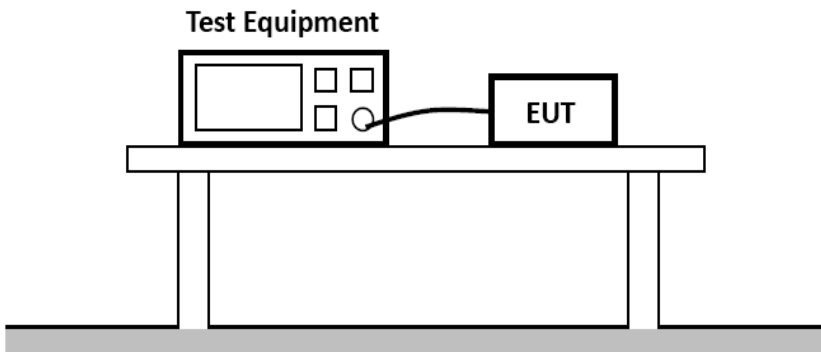
Note: a: P indicates the positive polarity of the power port, N indicates the negative polarity of the power port.





4.7. SURGE IMMUNITY TEST

4.7.1. Block Diagram of Test Setup



4.7.2. Test Standard

EN IEC 61000-6-2:2019 (EN 61000-4-5: 2014+A1: 2017+A1: 2017, Severity Level: Singal Line: Level 3, 1.0KV,)

4.7.3. Severity Levels and Performance Criterion

4.7.3.1. Severity level

Severity Level	Open-Circuit Test Voltage (KV)
1	0.5
2	1.0
3	2.0
4	4.0
*	Special

4.7.3.2. Performance Criterion

Performance Criterion: B

4.7.4. EUT Configuration on Test

The configuration of EUT is listed in Section 4.7.1.

4.7.5. Operating Condition of EUT

4.7.5.1.Setup the EUT as shown in Section 4.7.1.

4.7.5.1.Turn on the power of all equipments.

4.7.5.1.Let the EUT work in test mode (1) and measure it.





4.7.6. Test Procedure

4.7.6.1. Set up the EUT and test generator as shown on Section 4.7.1.

4.7.6.2. For line to line coupling mode, provide a 2.0 KV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points.

4.7.6.3. For I/O ports coupling mode, provide a 1.0 KV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points.

4.7.6.4. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.

4.7.6.5. Different phase angles are done individually.

4.7.6.6. Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

4.7.7. Test Results

PASS.

Please refer to the following page.





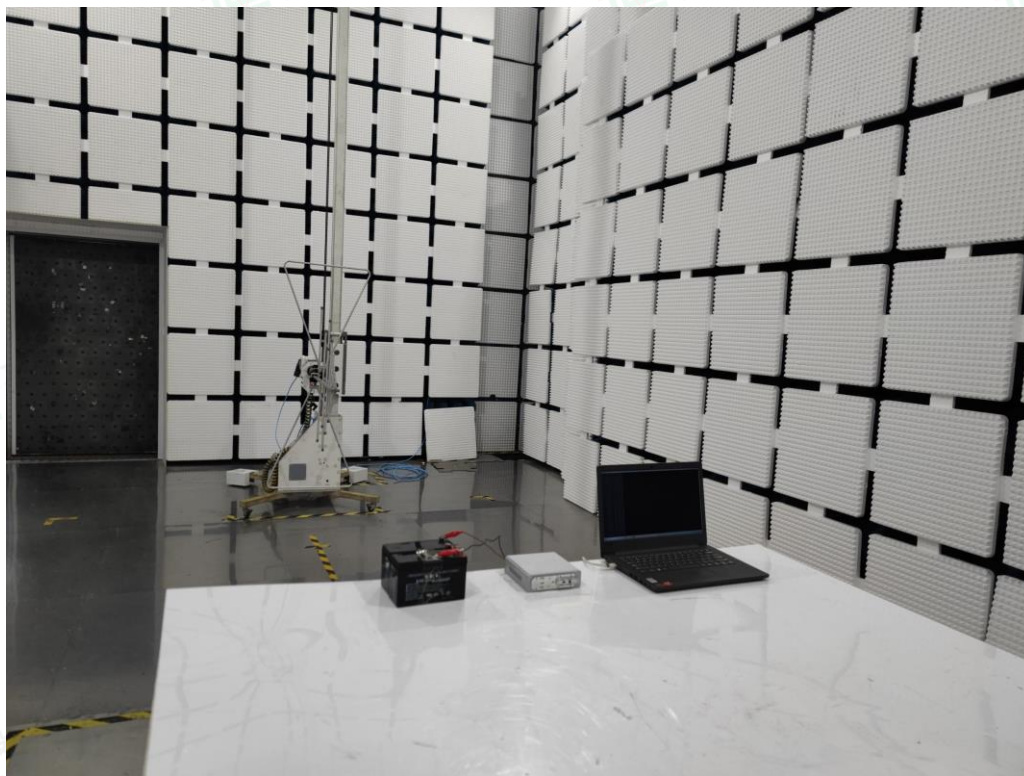
Surge Immunity Test Result			
Standard	☐ IEC 61000-4-5 ☒ EN 61000-4-5		
Applicant	Shanghai Panelmate Electronics Co., Ltd.		
EUT	Firewall eco M	Temperature	24.4℃
M/N	eco M	Humidity	53.5%
Test Mode	Working	Criterion	B
Test Engineer	Xing Mo	Test Voltage	DC 24V

Location	Polarity	Number of Pulse	Pulse Voltage (KV)	Result
P-N				
P-PE				
N-PE				
Signal Line	+	/	1.0	PASS
	-	/	1.0	PASS
I/O Cable				
Note	a: P indicates the positive polarity of the power port, N indicates the negative polarity of the power port.			





5. PHOTOGRAPHS OF TEST SETUP



Test Setup Photo of Radiated Measurement (30MHz~1GHz)



Test Setup Photo of Electrostatic Discharge Test





Test Setup Photo of RF Field Strength Susceptibility Test



Photo of Electrical Fast Transient/Burst Test & Surge Immunity Test

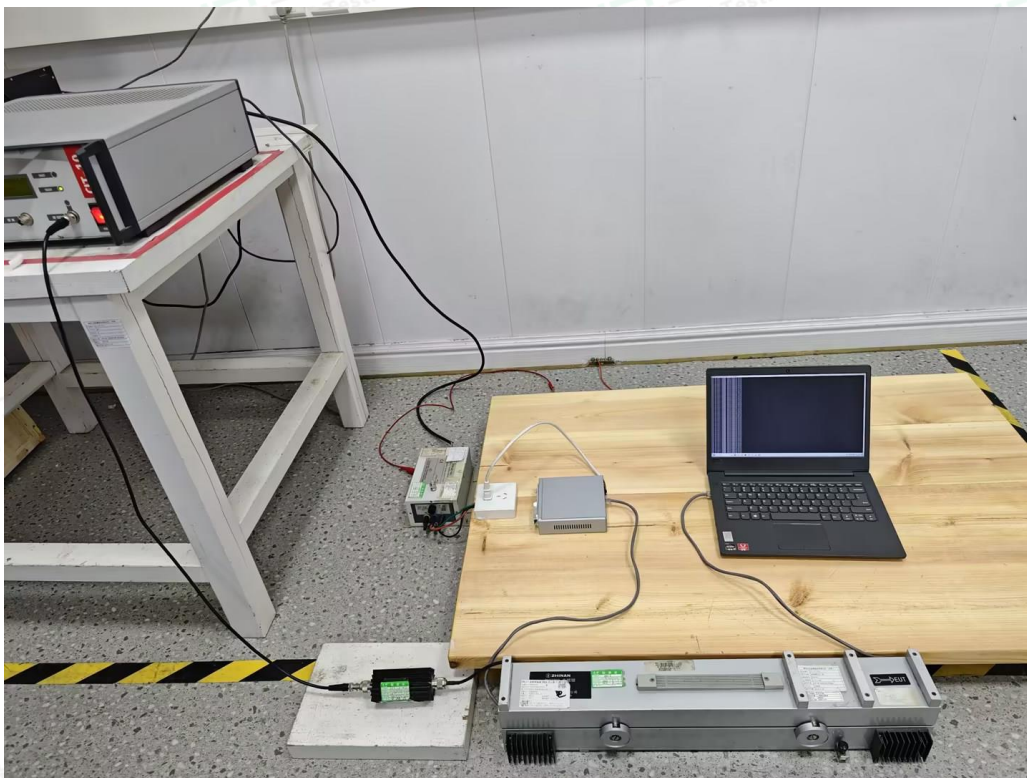


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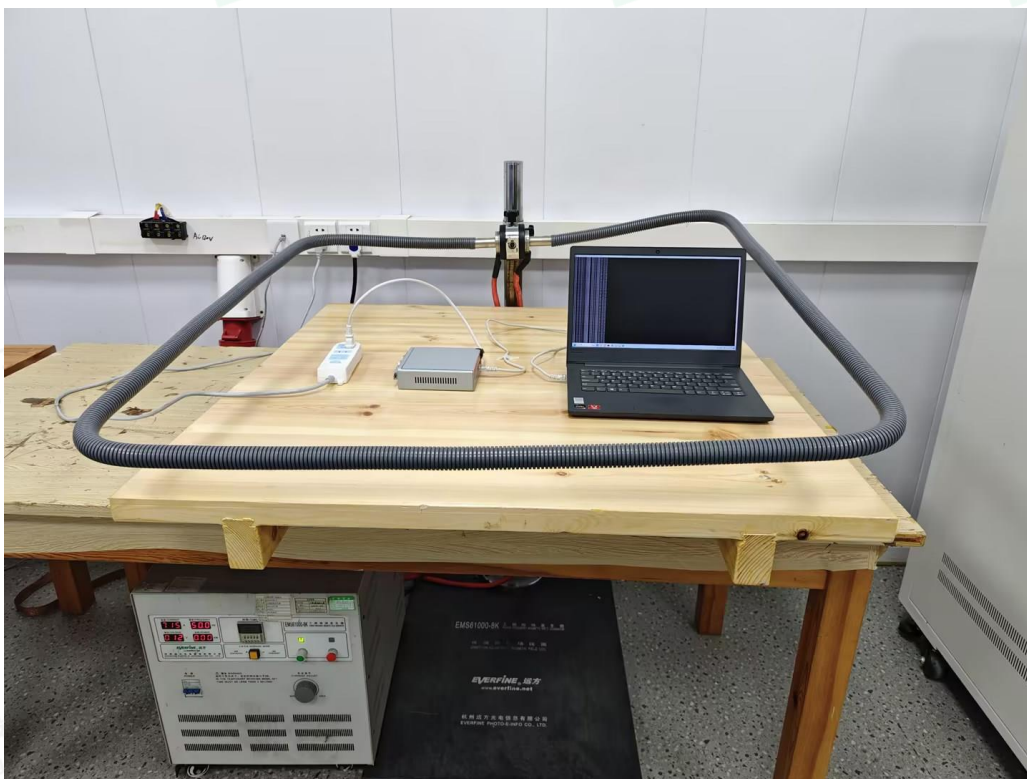
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Test Setup Photo of Injected Currents Susceptibility Test(I/O Cable)



Test Setup Photo of Magnetic Field Immunity Test





6. EXTERNAL AND INTERNAL PHOTOS OF THE EUT

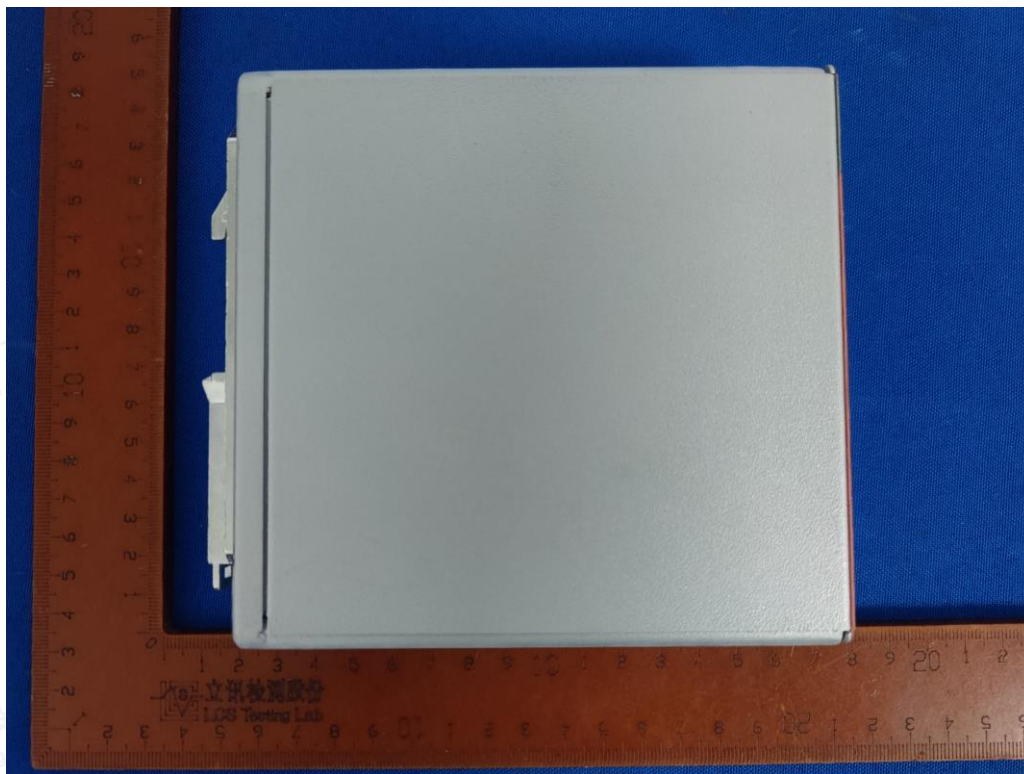


Fig. 1



Fig. 2



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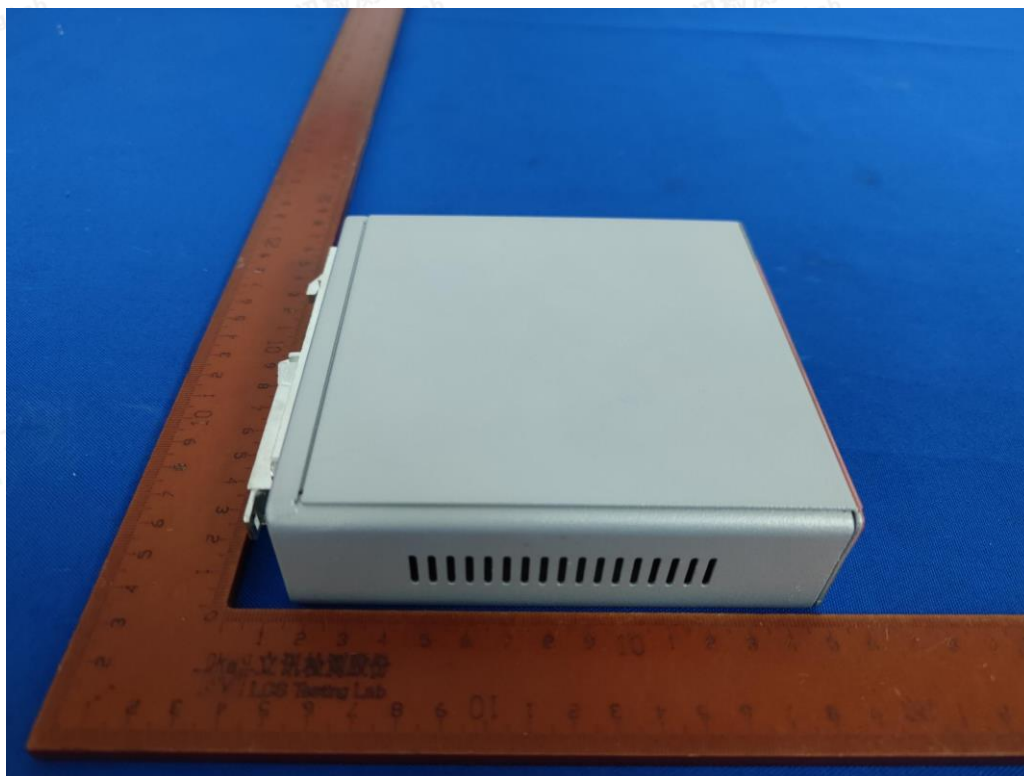


Fig. 3

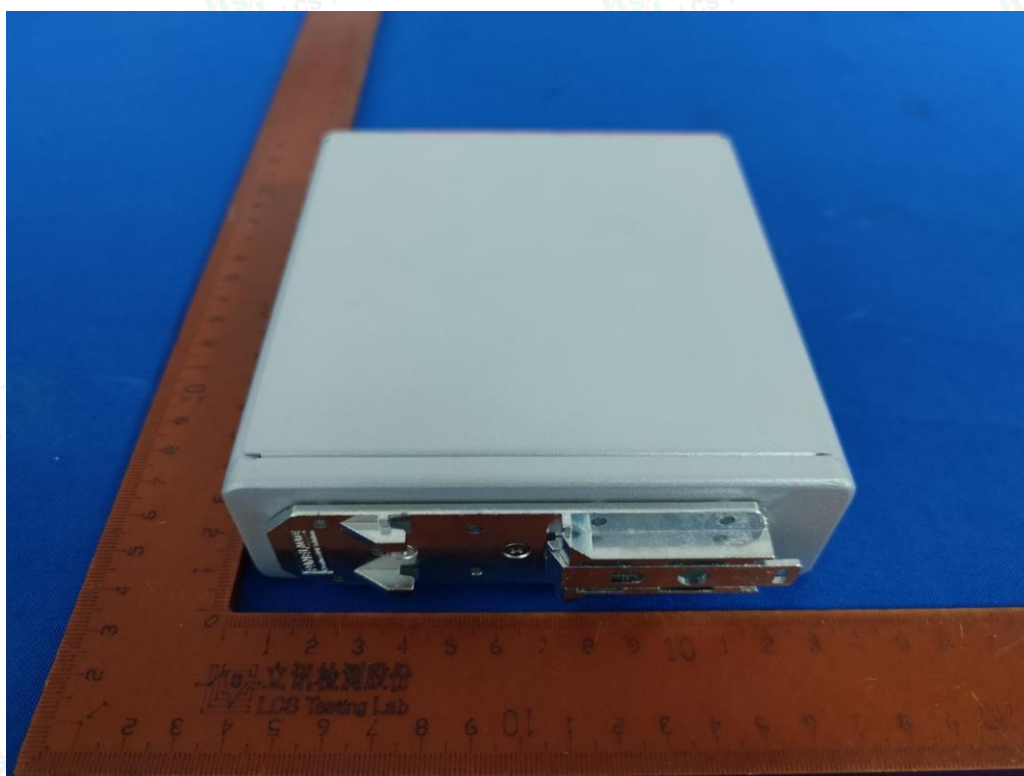


Fig. 4



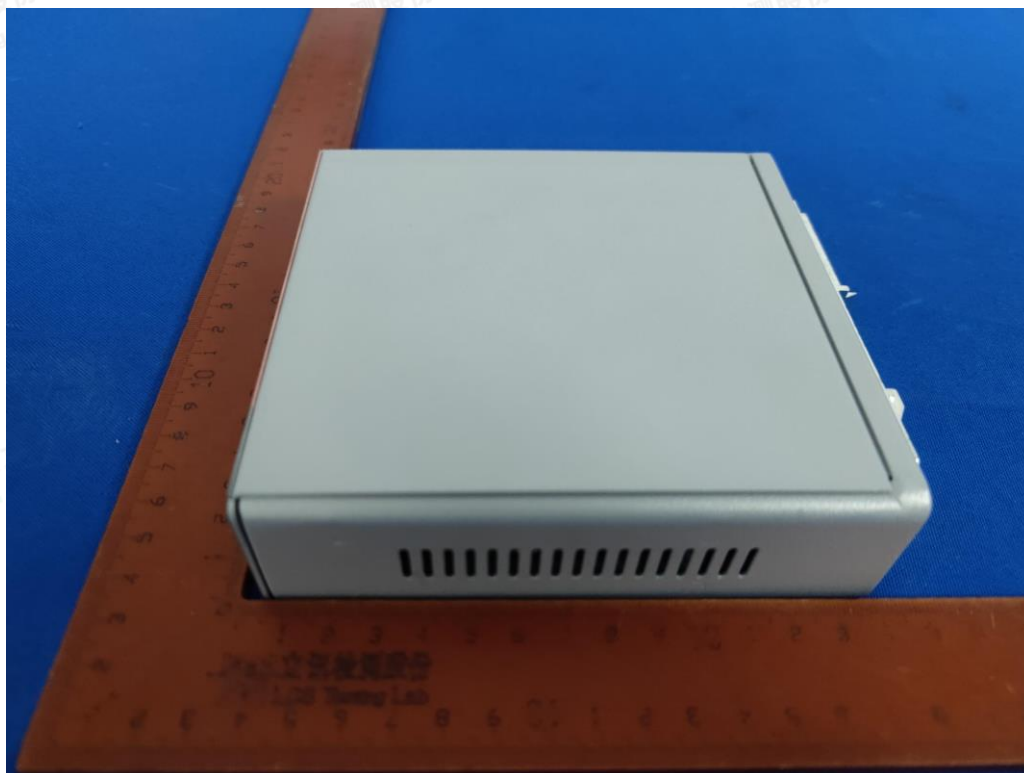


Fig. 5

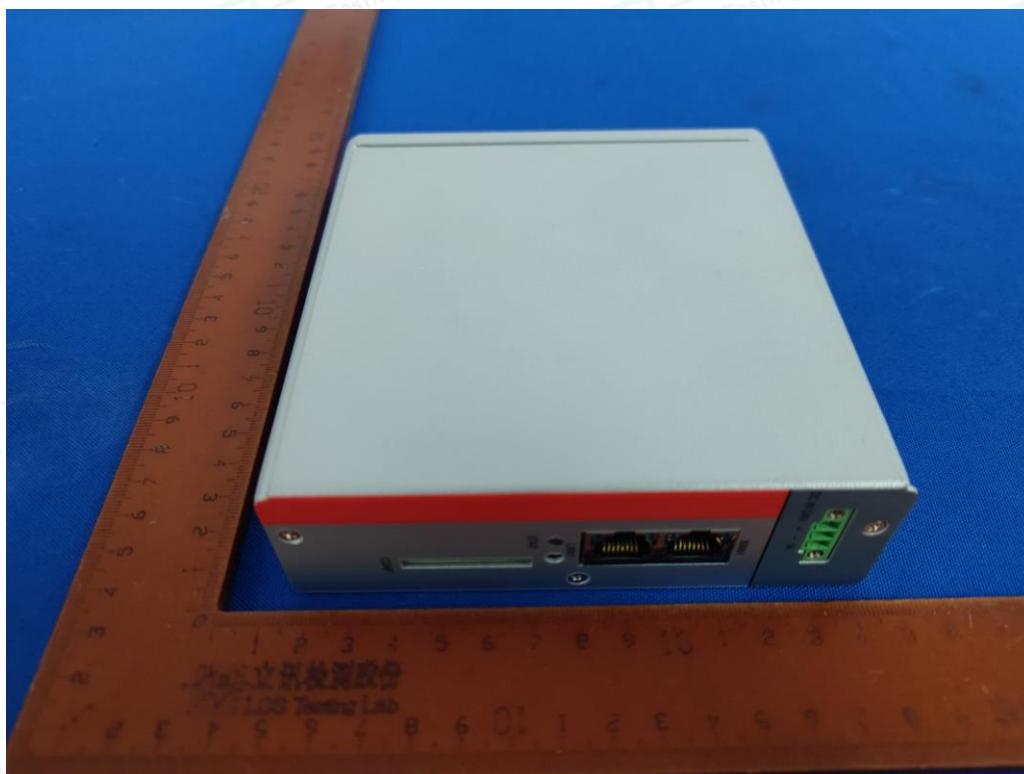


Fig. 6





Fig. 7



Fig. 8



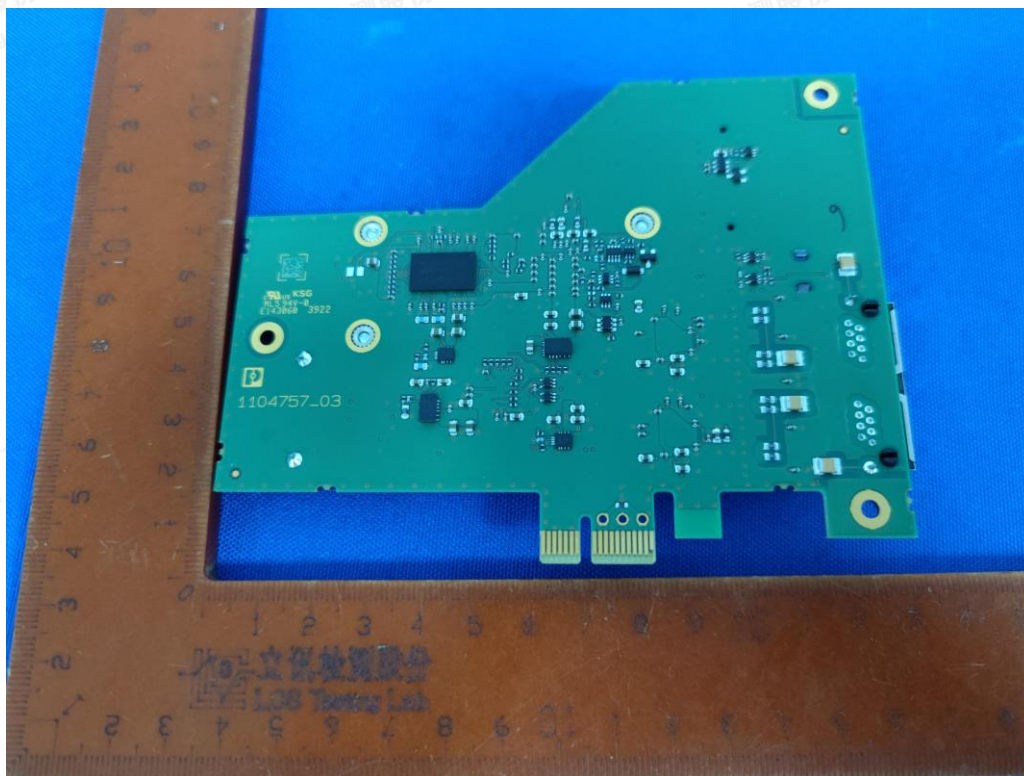


Fig. 9

-----THE END OF TEST REPORT-----

