

EMC Test Report

Client Name : Acrel Co.,Ltd.

Address : No.253, Yulv Road, Jiading District, Shanghai China

Product Name : Three-Phase Four-wire Multi-function Electric Meter

Date : May.05, 2022

Shenzhen Anbotek Compliance Laboratory Limited



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TEST REPORT

Applicant : Acrel Co.,Ltd.

Manufacturer : Jiangsu Acrel Electrical Manufacturing. Co., Ltd.

Product Name : Three-Phase Four-wire Multi-function Electric Meter

Model No. : AEM、AEM96、AEM96/C、AEM96/K、AEM96/F、AEM96/CK、AEM96/CF、
AEM96/KF、AEM96/CKF、AEM72、AEM72/C、AEM72/K、AEM72/F、
AEM72/CK、AEM72/CF、AEM72/KF、AEM72/CKF

Trade Mark : Acrel

Rating(s) : Rating :AC 0...6A,AC 0...400V
Supply Power: AC 85V - 265V
Freq:50Hz
Rated Power:≤5VA

Test Standard(s) : EN 61326-1: 2013;
EN IEC 61000-3-2: 2019;
EN 61000-3-3: 2013+A1:2019;
(IEC 61000-4-2; IEC 61000-4-3; IEC 61000-4-4;
IEC 61000-4-5; IEC 61000-4-6; IEC 61000-4-11)

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the EN 61326-1, EN IEC 61000-3-2 and EN 61000-3-3 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Receipt:

Apr. 13, 2022

Date of Test:

Apr. 14 ~ Apr. 20, 2022

Prepared By:

Yee Huang

(Yee Huang)

Approved & Authorized Signer:

Tom Chen

(Tom Chen)

1. General Information

1.1. Client Information

Applicant	:	Acrel Co.,Ltd.
Address	:	No.253, Yulv Road, Jiading District, Shanghai China
Manufacturer	:	Jiangsu Acrel Electrical Manufacturing. Co., Ltd.
Address	:	No.5, Dongmeng Road, Nanzha Street, Jiangyin City Jiangsu Province, China
Factory	:	Jiangsu Acrel Electrical Manufacturing. Co., Ltd.
Address	:	No.5, Dongmeng Road, Nanzha Street, Jiangyin City Jiangsu Province, China

1.2. Description of Device (EUT)

Product Name	:	Three-Phase Four-wire Multi-function Electric Meter	
Model No.	:	AEM、AEM96、AEM96/C、AEM96/K、AEM96/F、AEM96/CK、AEM96/CF、AEM96/KF、AEM96/CKF、AEM72、AEM72/C、AEM72/K、AEM72/F、AEM72/CK、AEM72/CF、AEM72/KF、AEM72/CKF(Note: All samples are the same except the model number & appearance, so we prepare “AEM” for test only.)	
Trade Mark	:	Acrel	
Test Power Supply	:	AC 230V	
Test Sample No.	:	1-1-1	
Product Description	:	Adapter:	N/A
Remark: (1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.			

1.3. Auxiliary Equipment Used During Test

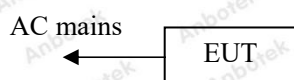
N/A	
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1.4. Description of Test Mode

Pretest Modes	Descriptions
Mode 1	Normal work (Adapter powered)
Mode 2	Normal work (Battery powered)

For Mode 1 Block Diagram of Test Setup



For Mode 2 Block Diagram of Test Setup



1.5. Test Summary

Test Items	Test Mode	Status
Power Line Conducted Emission Test (150KHz To 30MHz)	Mode 1	P
Radiated Emission Test (30MHz To 1000MHz)	Mode 1, Mode 2	P
Harmonic Current Test	/	N
Voltage Fluctuations and Flicker Test	Mode 1	P
Electrostatic Discharge immunity Test	Mode 1, Mode 2	P
RF Field Strength susceptibility Test	Mode 1, Mode 2	P
Electrical Fast Transient/Burst Immunity Test	Mode 1	P
Surge Immunity Test	Mode 1	P
Injected Currents Susceptibility Test	Mode 1	P
Magnetic Field Susceptibility Test	/	N
Voltage Dips and Interruptions Test	Mode 1	P
P) Indicates "PASS".		
N) Indicates "Not applicable".		

1.6. Test Equipment List

Conducted Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	Rohde & Schwarz	ESCI	100990	Sept. 7, 2021	1 Year
2.	L.I.S.N. Artificial Mains Network	Schwarzbeck	NSLK 8127	8127386	Sept. 7, 2021	1 Year
3.	L.I.S.N. Artificial Mains Network	Schwarzbeck	NSLK 8126	8126377	Sept. 7, 2021	1 Year
4.	Software Name	Ferrari Technology	EZ-EMC	EMC-CON 3A1.1	N/A	N/A

Radiated Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Sept. 7, 2021	1 Year
2.	Pre-amplifier	EMtrace	RP01A	50017	Sept. 7, 2021	1 Year
3.	TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	01417	Sept. 7, 2021	2 Year
4.	Software Name	Ferrari Technology	EZ-EMC	Anbo-3A1	N/A	N/A

Harmonic and Flicker Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Programmable AC Power source	IVYTECH	APS-5005A	632734	Oct. 22, 2021	1 Year
2.	Harmonic and Flicker Analyzer	EMC-PARTNER	HMONICS 1000-1P	164	Oct. 22, 2021	1 Year
3.	Harmonics-1000	N/A	Ed.3.0+4.0	N.A	N/A	N/A

Electrostatic Discharge Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Simulators	3Ctest	EDS-30T	ES0131505	Sept.15, 2021	1 Year

Electrical Fast Transient/Burst Immunity Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EFT Burst Simulator	PRIMA	EFT61004B	PR10114282	Sept. 7, 2021	1 Year
2.	EFT-Clamp	PRIMA	EFT-Clamp	/	Oct. 22, 2021	1 Year

R/S Immunity Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal Generator	Agilent	N5181A	MY50143107	Sept. 7, 2021	1 Year
2.	Power Meter	Agilent	E4417A	MY45101384	Sept. 7, 2021	1 Year
3.	Amplifier	Micotop	MPA-80-1000-600	MPA2110318	Sept. 7, 2021	1 Year
4.	Amplifier	Micotop	MPA-1000-6000-100	MPA2110327	Sept. 7, 2021	1 Year
5.	Log.-Per.-Antenna	Schwarzbeck	VULP 9118E	01012	N/A	N/A
6.	Microwave Log.-Per. Antenna	Schwarzbeck	STLP 9149	00788	N/A	N/A
7.	Power Sensor	KEYSIGHT	E9323A	US40410647	Sept. 7, 2021	1 Year
8.	Power Sensor	KEYSIGHT	E9323A	MY53100007	Sept. 7, 2021	1 Year
9.	Electric field Probe	Narda S.T.S /PMM	EP 601	811ZX10351	Sept. 7, 2021	1 Year
10.	Software	EMtrace	EM 3	/	N/A	N/A

Surge Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Surge Generator	EMPEK	LSG-5060G	/	Sept. 7, 2021	1 Year
2.	CDN	EMPEK	CDN-5110G	06110005N	Sept. 7, 2021	1 Year

Injected Currents Susceptibility Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal Generator	Rohde & Schwarz	SML03	101772	Sept. 7, 2021	1 Year
2.	Power Meter	Agilent	E4419B	GB43312730	Sept. 7, 2021	1 Year
3.	Amplifier	Micotop	MPA-0.15-230-110	MPA2110317	Sept. 7, 2021	1 Year
4.	CDN	TESEQ	CDN M016	55157	Sept. 7, 2021	1 Year
5.	EM Clamp	TESEQ	KEMZ 801A	60128	Sept. 7, 2021	1 Year
6.	RF Attenuator	GRENTech	150W 6dB DC-3GHz	/	Sept. 7, 2021	1 Year
7.	Software	EMtrace	EM 6	/	N/A	N/A

Voltage Dips and Interruptions Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Voltage DIPS and Up Generator	3ctest	VDG-1105G	EC0171306	Sept. 7, 2021	1 Year



1.7. Description of Test Facility

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

FCC-Registration No.: 184111

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

Registration No. 184111.

ISED-Registration No.: 8058A

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files.

Registration 8058A.

Test Location

Shenzhen Anbotek Compliance Laboratory Limited.

1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518128

1.8. EMS Performance Criteria

- ✓ A: Normal performance within the specification limits
- ✓ B: Temporary degradation or loss of function or performance which is self-recoverable
- ✓ C: Temporary degradation or loss of function or performance which requires operator intervention or system reset
- ✓ D: Degradation or loss of function which is not recoverable due to damage of equipment (components) or software, or loss of data

Note: The manufacturer's specification may define effects on the EUT which may be considered insignificant, and therefore acceptable.

This classification may be used as a guide in formulating performance criteria, by committees responsible for generic, product and product-family standards, or as a framework for the agreement on performance criteria between the manufacturer and the purchaser, for example where no suitable generic, product or product-family standard exists.



2. Power Line Conducted Emission Test

2.1. Test Standard and Limit

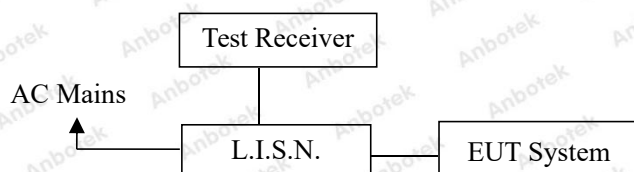
Test Standard	EN 61326-1
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Limits for conducted emissions

Test Limit	Frequency (MHz)	At mains terminals (dBμV)	
		Quasi-peak Level	Average Level
	0.15 ~ 0.50	66.0 ~ 56.0 *	56.0 ~ 46.0 *
	0.50 ~ 5.00	56.0	46.0
	0.50 ~ 30.00	60.0	50.0

Remark: (1) At the transition frequency the lower limit applies.
 (2) * decreasing linearly with logarithm of the frequency.

2.2. Test Setup



2.3. EUT Configuration on Measurement

The following equipments are installed on Conducted Emission Measurement to meet EN 61326-1 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

2.4. Operating Condition of EUT

2.4.1. Setup the EUT as shown in Section 2.2.

2.4.2. Turn on the power of all equipments.

2.4.3. Let the EUT work in test mode and measure it.



2.5. Test Procedure

The EUT is put on the table which is 0.8 meter high above the ground and connected to the AC mains through a Line Impedance Stabilization Network (L.I.S.N.). This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are checked to find out the maximum conducted emission according to the EN 61326-1 regulations during conducted emission measurement. And the voltage probe had been used for the load terminals measurement according to the EN 61326-1 standard.

The bandwidth of the test receiver (ESCI) is set at 9KHz in 150KHz~30MHz.

The frequency range from 150KHz to 30MHz is investigated for AC mains.

All the test results are listed in Section 2.6.

2.6. Test Results

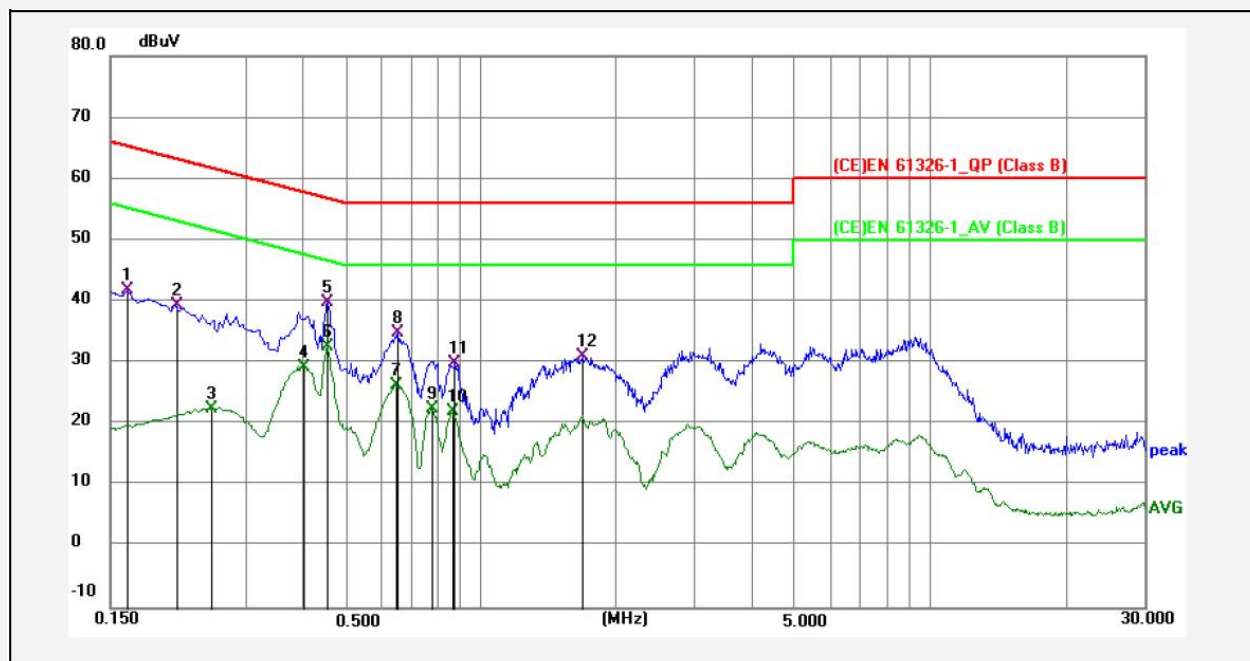
PASS

The test curves are shown in the following pages.



Conducted Emission Test Data

Test Site: 1# Shielded Room
Test Specification: AC 230V
Comment: Live Line
Temp.: 16.4°C Hum.: 50%

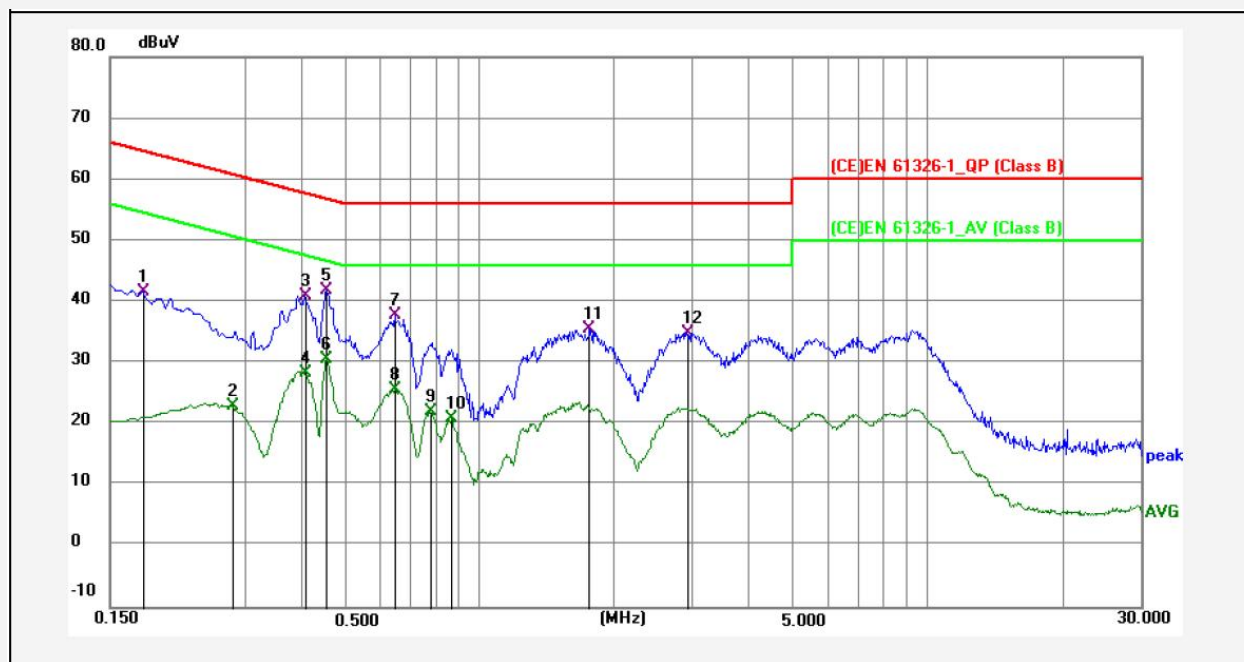


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1635	40.87	0.90	41.77	65.28	-23.51	QP	
2	0.2085	38.46	0.86	39.32	63.26	-23.94	QP	
3	0.2508	21.66	0.89	22.55	51.73	-29.18	AVG	
4	0.4020	28.35	0.88	29.23	47.81	-18.58	AVG	
5	0.4560	39.04	0.87	39.91	56.77	-16.86	QP	
6	0.4560	31.66	0.87	32.53	46.77	-14.24	AVG	
7	0.6495	25.34	0.90	26.24	46.00	-19.76	AVG	
8	0.6540	33.99	0.90	34.89	56.00	-21.11	QP	
9	0.7755	21.50	0.92	22.42	46.00	-23.58	AVG	
10	0.8700	21.16	0.93	22.09	46.00	-23.91	AVG	
11	0.8790	29.12	0.93	30.05	56.00	-25.95	QP	
12	1.6890	30.06	0.93	30.99	56.00	-25.01	QP	

Note: Result=Reading+Factor Over Limit=Result-Limit

Conducted Emission Test Data

Test Site: 1# Shielded Room
Test Specification: AC 230V
Comment: Neutral Line
Temp.: 16.4℃ Hum.: 50%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1770	40.92	0.80	41.72	64.63	-22.91	QP	
2	0.2805	22.18	0.83	23.01	50.80	-27.79	AVG	
3	0.4065	40.14	0.83	40.97	57.72	-16.75	QP	
4	0.4065	27.52	0.83	28.35	47.72	-19.37	AVG	
5	0.4560	41.07	0.83	41.90	56.77	-14.87	QP	
6	0.4560	29.87	0.83	30.70	46.77	-16.07	AVG	
7	0.6495	36.93	0.86	37.79	56.00	-18.21	QP	
8	0.6495	24.86	0.86	25.72	46.00	-20.28	AVG	
9	0.7755	21.24	0.85	22.09	46.00	-23.91	AVG	
10	0.8700	20.02	0.86	20.88	46.00	-25.12	AVG	
11	1.7655	34.68	0.89	35.57	56.00	-20.43	QP	
12	2.9130	34.00	0.94	34.94	56.00	-21.06	QP	

Note: Result=Reading+Factor Over Limit=Result-Limit

3. Radiated Emission Test

3.1. Test Standard and Limit

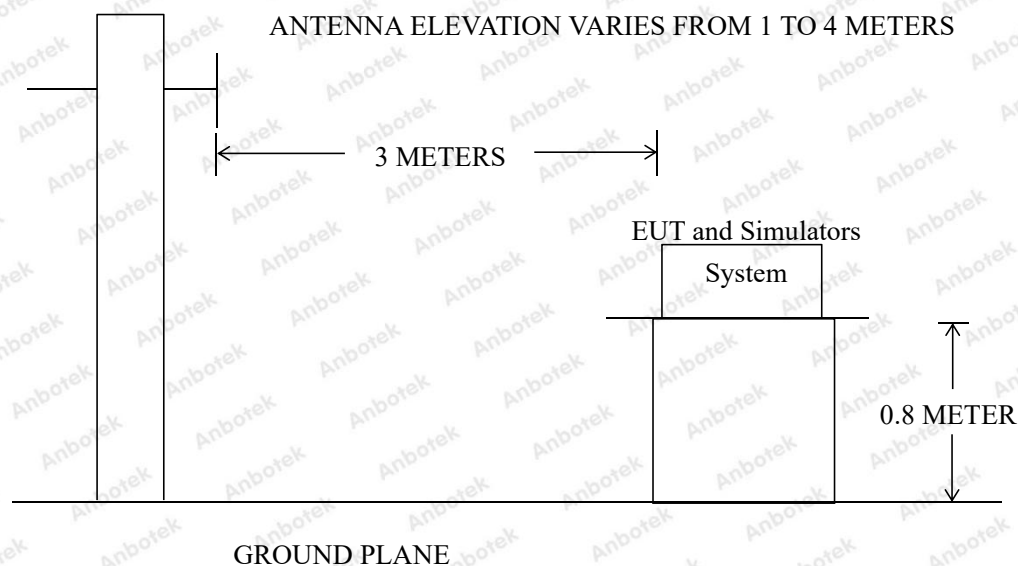
Test Standard	EN 61326-1
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Radiated Emission Test Limit

Test Limit	Frequency (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMIT (dB μ V/m)
	30 ~ 230	3	40
	230 ~ 1000	3	47

Remark: (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.

3.2. Test Setup



3.3. EUT Configuration on Measurement

The EN 61326-1 regulations test method must be used to find the maximum emission during radiated emission measurement.

3.4. Operating Condition of EUT

3.4.1. Setup the EUT as shown in Section 3.2.

3.4.2. Turn on the power of all equipments.

3.4.3. Let the EUT work in test mode and measure it.

3.5. Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table 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. Bilog antenna is used as a receiving antenna. Both horizontal and vertical polarization of the antenna are set on test.

The bandwidth of the Receiver is set at 120kHz.

The EUT is tested in Chamber.

The test results are listed in Section 3.6.

3.6. Test Results

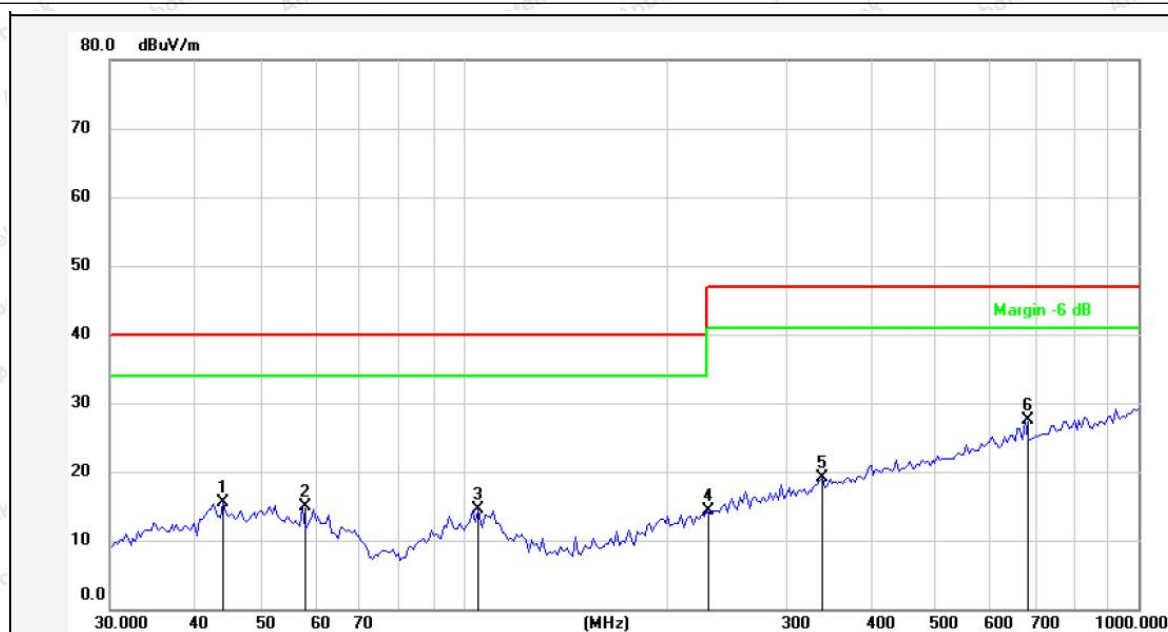
PASS

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

The test curves are shown in the following pages.



Test item: Radiation Test **Polarization:** Horizontal
Standard: (RE)EN61326-1 **Power Source:** AC 230V
Distance: 3m **Temp.(°C)/Hum.(%RH):** 16.8(°C)/48%RH
Test Mode: Normal work (Adapter powered)

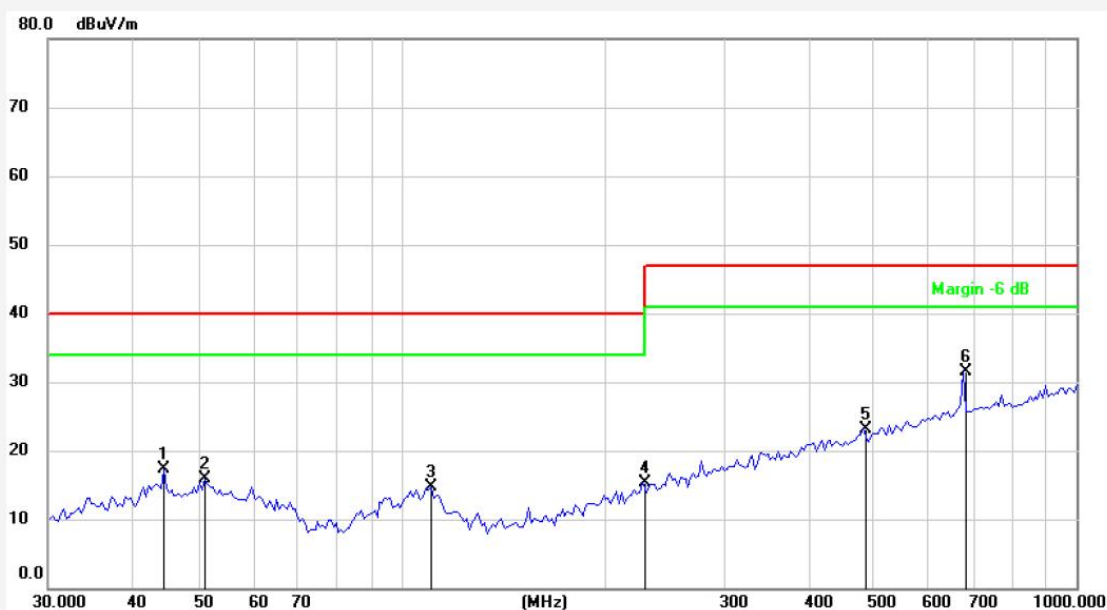


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	44.1202	31.37	-15.83	15.54	40.00	-24.46	peak			
2	57.8977	31.75	-16.90	14.85	40.00	-25.15	peak			
3	105.0873	31.58	-17.05	14.53	40.00	-25.47	peak			
4	229.2931	30.14	-15.74	14.40	40.00	-25.60	peak			
5	340.1847	30.73	-11.67	19.06	47.00	-27.94	peak			
6	679.9600	31.32	-3.76	27.56	47.00	-19.44	peak			

Note: Result=Reading+Factor Over Limit=Result-Limit



Test item: Radiation Test **Polarization:** Vertical
Standard: (RE)EN61326-1 **Power Source:** AC 230V
Distance: 3m **Temp.(°C)/Hum.(%RH):** 16.8(°C)/48%RH
Test Mode: Normal work (Adapter powered)



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	44.5087	33.19	-15.80	17.39	40.00	-22.61	peak			
2	51.2106	31.58	-15.72	15.86	40.00	-24.14	peak			
3	110.7627	32.25	-17.49	14.76	40.00	-25.24	peak			
4	227.2918	31.13	-15.91	15.22	40.00	-24.78	peak			
5	483.0618	31.63	-8.43	23.20	47.00	-23.80	peak			
6	679.9600	35.24	-3.76	31.48	47.00	-15.52	peak			

Note: Result=Reading+Factor Over Limit=Result-Limit



Test item: Radiation Test **Polarization:** Horizontal
Standard: (RE)EN61326-1 **Power Source:** DC 3V
Distance: 3m **Temp.(°C)/Hum.(%RH):** 16.8(°C)/48%RH
Test Mode: Normal work (Battery powered)

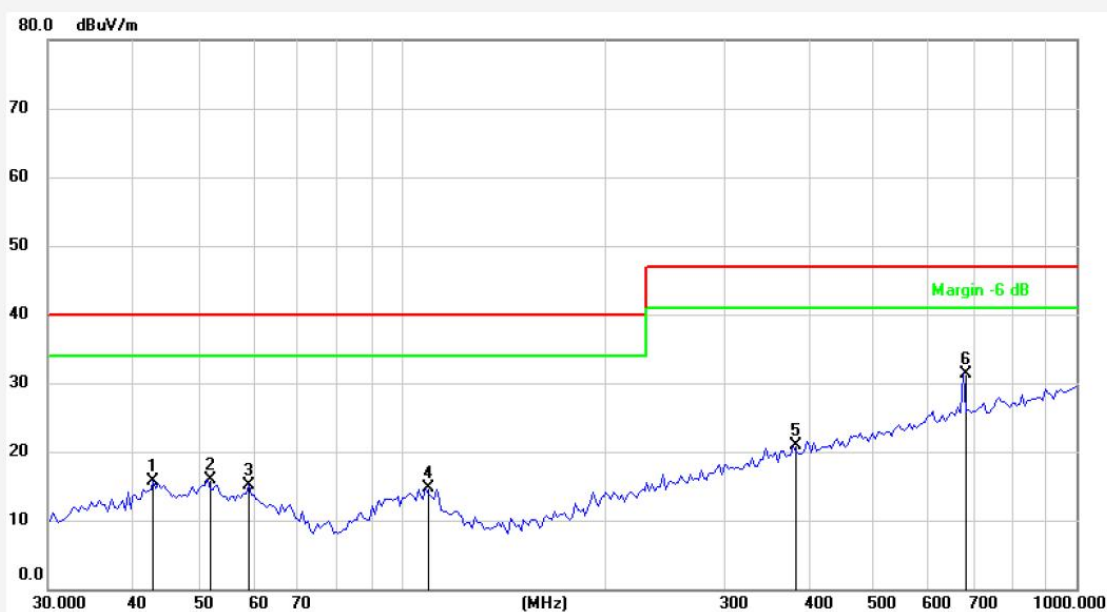


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	42.2281	30.89	-16.00	14.89	40.00	-25.11	peak			
2	44.1202	32.03	-15.83	16.20	40.00	-23.80	peak			
3	52.1164	32.13	-15.73	16.40	40.00	-23.60	peak			
4	105.0873	31.71	-17.05	14.66	40.00	-25.34	peak			
5	199.2855	30.86	-16.80	14.06	40.00	-25.94	peak			
6	331.3546	30.87	-12.15	18.72	47.00	-28.28	peak			

Note: Result=Reading+Factor Over Limit=Result-Limit



Test item: Radiation Test **Polarization:** Vertical
Standard: (RE)EN61326-1 **Power Source:** DC 3V
Distance: 3m **Temp.(°C)/Hum.(%RH):** 16.8(°C)/48%RH
Test Mode: Normal work (Battery powered)



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	42.9750	31.60	-15.88	15.72	40.00	-24.28	peak			
2	51.6616	31.69	-15.72	15.97	40.00	-24.03	peak			
3	59.4405	32.19	-17.16	15.03	40.00	-24.97	peak			
4	108.8377	32.09	-17.30	14.79	40.00	-25.21	peak			
5	381.2487	31.71	-10.85	20.86	47.00	-26.14	peak			
6	679.9600	35.03	-3.76	31.27	47.00	-15.73	peak			

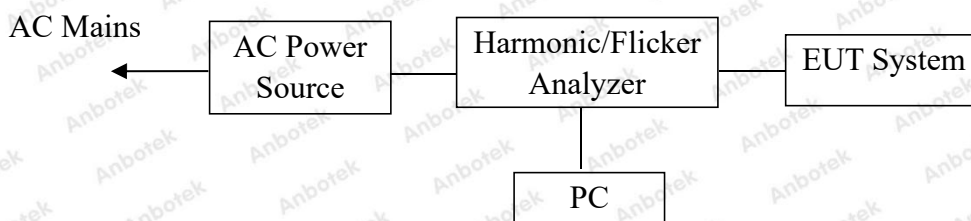
Note: Result=Reading+Factor Over Limit=Result-Limit

4. Harmonic Current Emission Test

4.1. Test Standard

Test Standard	EN IEC 61000-3-2
---------------	------------------

4.2. Test Setup



4.3. Operating Condition of EUT

4.3.1. Setup the EUT as shown on Section 4.2.

4.3.2. Turn on the power of all equipments.

4.3.3. After that, let the EUT work in test mode measure it.

4.4. Test Results

The active input power of the EUT is less than 75W. Therefore, according to EN IEC 61000-3-2, no limits are necessary.

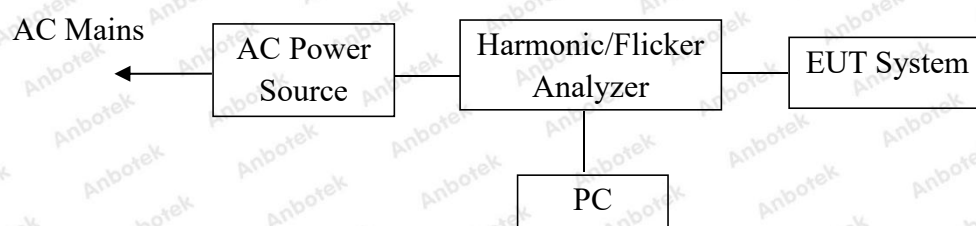


5. Voltage Fluctuations & Flicker Test

5.1. Test Standard

Test Standard	EN 61000-3-3
---------------	--------------

5.2. Test Setup



5.3. Operating Condition of EUT

5.3.1. Setup the EUT as shown on Section 5.2.

5.3.2. Turn on the power of all equipments.

5.3.3. After that, let the EUT work in test mode measure it.

5.4. Test Results

PASS



6. Electrostatic Discharge Immunity Test

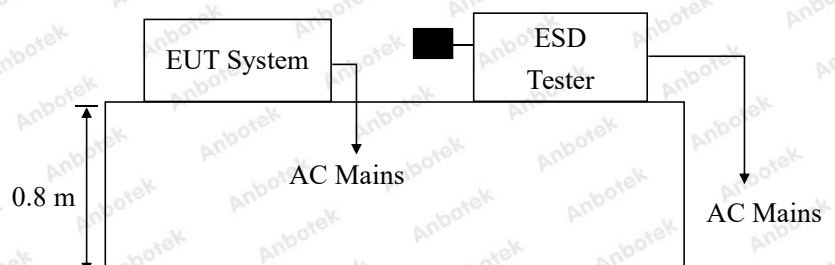
6.1. Test Standard and Level

Test Standard:	EN 61326-1 (IEC 61000-4-2)
Performance Criterion:	B
Severity Level: 3 / Air Discharge: $\pm 8\text{kV}$, Level: 2 / Contact Discharge: $\pm 4\text{kV}$	

Test 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

6.2. Test Setup



6.3. EUT Configuration on Measurement

The following equipments are installed on Electrostatic Discharge immunity Measurement to meet EN 61326-1 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

6.4. Operating Condition of EUT

6.4.1. Setup the EUT as shown on Section 6.2.

6.4.2. Turn on the power of all equipments.

6.4.3. After that, let the EUT work in test mode measure it.

6.5. Test Procedure

6.5.1. 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.

6.5.2. Contact Discharge:

All the procedure shall be same as Section 6.5.1 except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

6.5.3. Indirect discharge for horizontal coupling plane

At least 20 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

6.5.4. Indirect discharge for vertical coupling plane

At least 20 single discharge shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m × 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.

6.6. Test Results

PASS

Please refer to the following page.



Electrostatic Discharge Test Results

Air discharge :	±8.0kV	Temperature :	16.8℃
Contact discharge :	±4.0kV	Humidity :	50%
Power Supply :	AC 230V / DC 3V	Expert conclusion:	A
Test Result :	☒ Pass ☐ Fail		
# For each point positive 10 times and negative 10 times discharge			
Location		Kind A-Air Discharge C-Contact Discharge	Result
Slot	4 points	A	☒ A ☐ B ☐ C ☐ D
Metal	4 points	C	☒ A ☐ B ☐ C ☐ D
Button	4 points	A	☒ A ☐ B ☐ C ☐ D
Screen	4 points	A	☒ A ☐ B ☐ C ☐ D
DC Port	4 points	A	☒ A ☐ B ☐ C ☐ D
HCP	4 points	C	☒ A ☐ B ☐ C ☐ D
VCP of the front	1 points	C	☒ A ☐ B ☐ C ☐ D
VCP of the rear	1 points	C	☒ A ☐ B ☐ C ☐ D
VCP of the left	1 points	C	☒ A ☐ B ☐ C ☐ D
VCP of the right	1 points	C	☒ A ☐ B ☐ C ☐ D
Remark: Discharge should be considered on Contact and Air and Horizontal Coupling Plane (HCP) and Vertical Coupling Plane (VCP).			



7. RF Field Strength Susceptibility Test

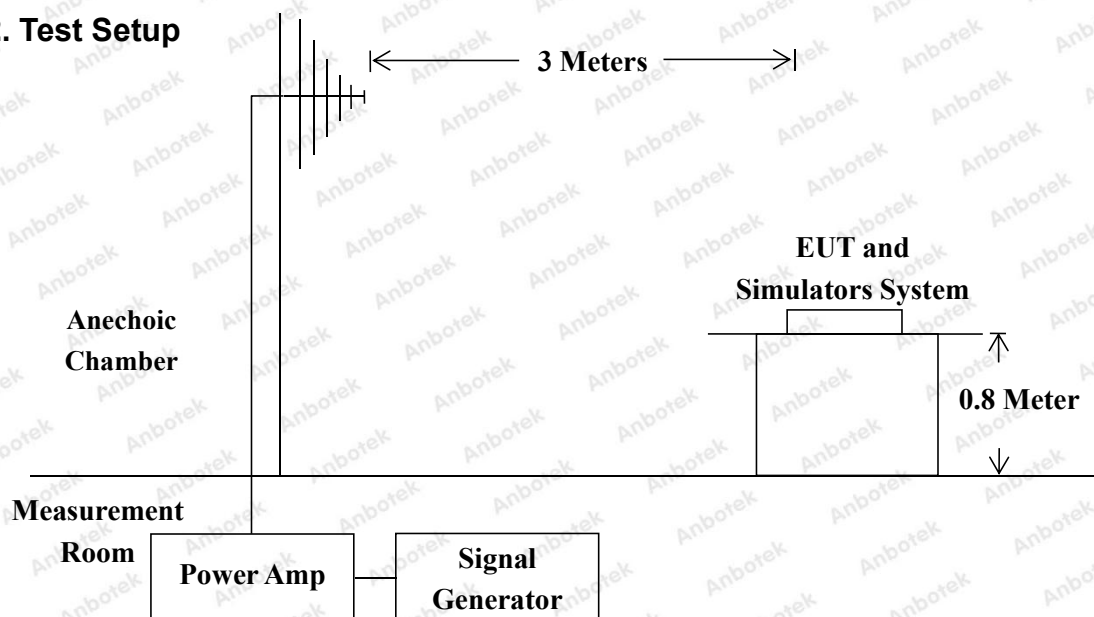
7.1. Test Standard and Level

Test Standard:	EN 61326-1 (IEC 61000-4-3)
Required Performance:	A
Frequency Range:	80MHz to 1000MHz/ 1.4GHz to 2.0GHz/ 2.0GHz to 2.7GHz
Field Strength:	3V/m, 3V/m, 1V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of preceding frequency value
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m
Antenna Height:	1.5 m
Dwell Time:	at least 0.5s

Test Level

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

7.2. Test Setup



7.3. EUT Configuration on Measurement

The following equipments are installed on RF Field Strength susceptibility Measurement to meet EN 61326-1 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

7.4. Operating Condition of EUT

7.4.1. Setup the EUT as shown on Section 7.2.

7.4.2. Turn on the power of all equipments.

7.4.3. After that, let the EUT work in test mode measure it.

7.5. 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.

- 1) 80 MHz to 1000 MHz the field strength level was 3V/m, 1.4 GHz to 2.0 GHz the field strength level was 3V/m, 2.0 GHz to 2.7 GHz the field strength level was 1V/m.
- 2) The frequency range is swept from 80 MHz to 1000 MHz, 1.4 GHz to 2.0 GHz, 2.0 GHz to 2.7 GHz with the signal 80% amplitude modulated with a 1kHz sine wave.
- 3) The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond, but shall in no case be less than 0.5s.
- 4) The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

7.6. Measuring Results

PASS

Please refer to the following page.



RF Field Strength Susceptibility Test Results

Field Strength :	3V/m, 3V/m, 1V/m	Temperature :	16.1℃
Expert conclusion:	A	Humidity :	50%
Power Supply :	AC 230V / DC 3V	Test Result :	☒ Pass ☐ Fail
Dwell Time:	1s		

Frequency Range	Antenna Polarity	R.F. Field Strength	Azimuth	Result
80MHz~1000MHz	H / V	3 V/m (rms)	Front	☒ A ☐ B ☐ C ☐ D
			Rear	
			Left	
			Right	
1.4GHz~2.0GHz	H / V	3 V/m (rms)	Front	☒ A ☐ B ☐ C ☐ D
			Rear	
			Left	
			Right	
2.0GHz~2.7GHz	H / V	1 V/m (rms)	Front	☒ A ☐ B ☐ C ☐ D
			Rear	
			Left	
			Right	



8. Electrical Fast Transient/Burst Immunity Test

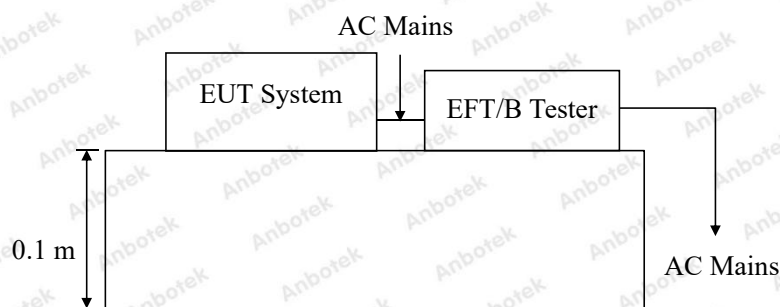
8.1. Test Standard and Level

Test Standard:	EN 61326-1 (IEC 61000-4-4)
Performance criterion:	B
Severity Level 2: 1.00kV	

Test Level

Open Circuit Output Test Voltage $\pm 10\%$		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1.	0.50 kV	0.25 kV
2.	1.00 kV	0.50 kV
3.	2.00 kV	1.00 kV
4.	4.00 kV	2.00 kV
X.	Special	Special

8.2. Test Setup



8.3. EUT Configuration on Measurement

The following equipments are installed on Electrical Fast Transient/Burst Immunity Measurement to meet EN 61326-1 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

8.4. Operating Condition of EUT

8.4.1. Setup the EUT as shown in Section 8.2.

8.4.2. Turn on the power of all equipments.

8.4.3. Let the EUT work in test mode and measure it.



8.5. Test Procedure

The EUT is put on the table which is 0.1 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.

8.5.1. 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 2 mins.

8.5.2. For signal lines and control lines ports:

Select tests based on product characteristics.

8.5.3. For DC output line ports:

Select tests based on product characteristics.

8.6. Test Results

PASS

Please refer to the following page.



Electrical Fast Transient/Burst Test Results

Ambient Condition : 16.8℃ / 50% RH		Expert conclusion: A	
Power Supply : AC 230V		Test Result : ☒ Pass ☐ Fail	
Inject Line : AC Mains		Inject Method: Direct	Inject Time(s): 120
Line	Polarity	Test Voltage (kV)	Result
AC Line	±	1.00kV	☒ A ☐ B ☐ C ☐ D
DC Line			
Signal Line			



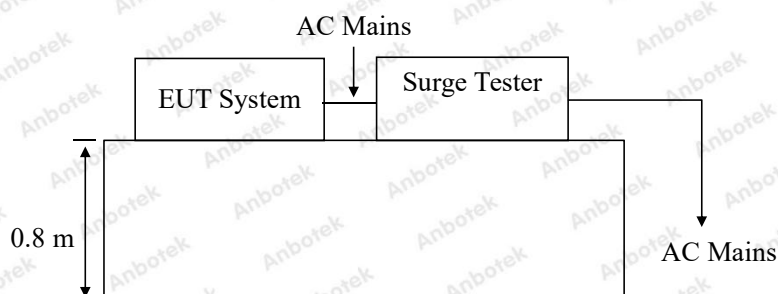
9. Surge Immunity Test

9.1. Test Standard and Level

Test Standard:	EN 61326-1 (IEC 61000-4-5)
Performance criterion:	B
Severity Level: Level 1, Line to Line: 0.5kV	

Test Level	
Severity Level	Open-Circuit Test Voltage (kV)
1.	0.5
2.	1.0
3.	2.0
4.	4.0
X.	Special

9.2. Test Setup



9.3. EUT Configuration on Measurement

The following equipments are installed on Surge immunity Measurement to meet EN 61326-1 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

9.4. Operating Condition of EUT

9.4.1. Setup the EUT as shown in Section 9.2.

9.4.2. Turn on the power of all equipments.

9.4.3. Let the EUT work in test mode and measure it.

9.5. Test Procedure

9.5.1. Set up the EUT and test generator as shown on Section 9.2.

9.5.2. For line to line coupling mode, provide a 0.5 kV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points.

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

9.5.4. Different phase angles are done individually.

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

9.6. Test Results

PASS

Please refer to the following page.



Surge Immunity Test Results

Humidity :	50%		Temperature :	16.8℃	
Power Supply :	AC 230V		Criterion required:	A	
Test Result :	☒ Pass ☐ Fail				
Location	Polarity	Phase Angle	Number of Pulse	Pulse Voltage (kV)	Performance Criterion
L-N	±	☒ 0° ☒ 90° ☒ 180° ☒ 270°	5	0.5 kV	☒ A ☐ B ☐ C ☐ D
L-GND					
N-GND					



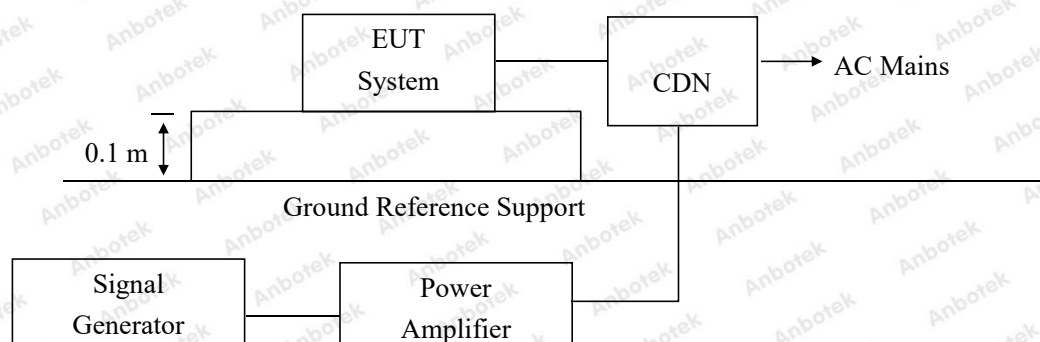
10. Injected Currents Susceptibility Test

10.1. Test Standard and Level

Test Standard	EN 61326-1 (IEC 61000-4-6)
Performance criterion	A
Severity Level 2: 3V (rms), (0.15MHz ~80MHz)	

Test Level	
Level	Field Strength V
1.	1
2.	3
3.	10
X.	Special

10.2. Test Setup



10.3. EUT Configuration

The following equipments are installed on currents susceptibility Measurement to meet EN 61326-1 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

10.4. Operating Condition of EUT

- 10.4.1. Setup the EUT as shown in Section 10.2.
- 10.4.2. Turn on the power of all equipments.
- 10.4.3. Let the EUT work in test mode and measure it.



10.5. Test Procedure

- 1) Set up the EUT, CDN and test generators as shown on Section 10.2.
- 2) Let the EUT work in test mode and measure it.
- 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) The disturbance signal described below is injected to EUT through CDN.
- 5) The EUT operates within its operational mode(s) under intended climatic conditions after power on.
- 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.
- 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.
- 8) Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

10.6. Test Results

PASS

Please refer to the following page.



Injected Currents Susceptibility Test Results

Humidity : 50%		Temperature : 16.8℃	
Power Supply : AC 230V		Criterion required: A	
Test Result : ☒ Pass ☐ Fail			
Frequency Range (MHz)	Injected Position	Strength (Unmodulated)	Result
0.15 ~ 80	AC Mains	3V	☒ A ☐ B ☐ C ☐ D
Remark : 1. Modulation Signal:1KHz 80% AM			



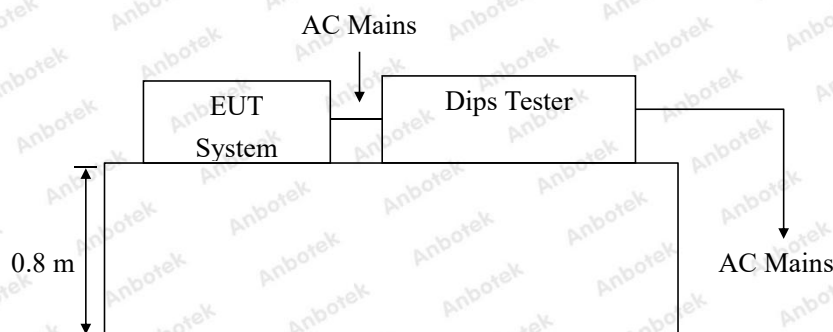
11. Voltage Dips And Interruptions Test

11.1. Test Standard and Level

Test Standard:	EN 61326-1 (IEC 61000-4-11)
Performance Criterion:	B&C

Test Level		
Test Level %UT	Voltage dip and short interruptions %UT	Duration (in period)
0	100	0.5
0	100	1
0	100	5
70	30	10
0	100	25
0	100	50
0	100	*

11.2. Test Setup



11.3. EUT Configuration on Measurement

The following equipments are installed on Voltage dips and interruptions Measurement to meet EN 61326-1 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

11.4. Operating Condition of EUT

11.4.1. Setup the EUT as shown in Section 11.2.

11.4.2. Turn on the power of all equipments.

11.4.3. Let the EUT work in test mode and measure it.

11.5. Test Procedure

- 1) Set up the EUT and test generator as shown on Section 11.2.
- 2) The interruptions is introduced at selected phase angles with specified duration.
- 3) Record any degradation of performance.

11.6. Test Results

PASS

Please refer to the following page.



Voltage Dips and Interruptions Test Results

Temperature : 16.8℃		Humidity : 50%	
Power Supply : AC 230V		Expert conclusion: B&C	
Test Result : ☒ Pass ☐ Fail			
Test Level % UT	Voltage Dips & Short Interruptions % UT	Duration (in periods)	Result
0	100	0.5P	☐ A ☒ B ☐ C ☐ D
0	100	1.0P	☐ A ☒ B ☐ C ☐ D
70	30	25P	☐ A ☐ B ☒ C ☐ D
0	100	250P	☐ A ☐ B ☒ C ☐ D
Test Level % UT	Voltage Dips & Short Interruptions % UT	Duration (in periods)	Result



APPENDIX I -- TEST SETUP PHOTOGRAPH

Photo of Power Line Conducted Emission Test

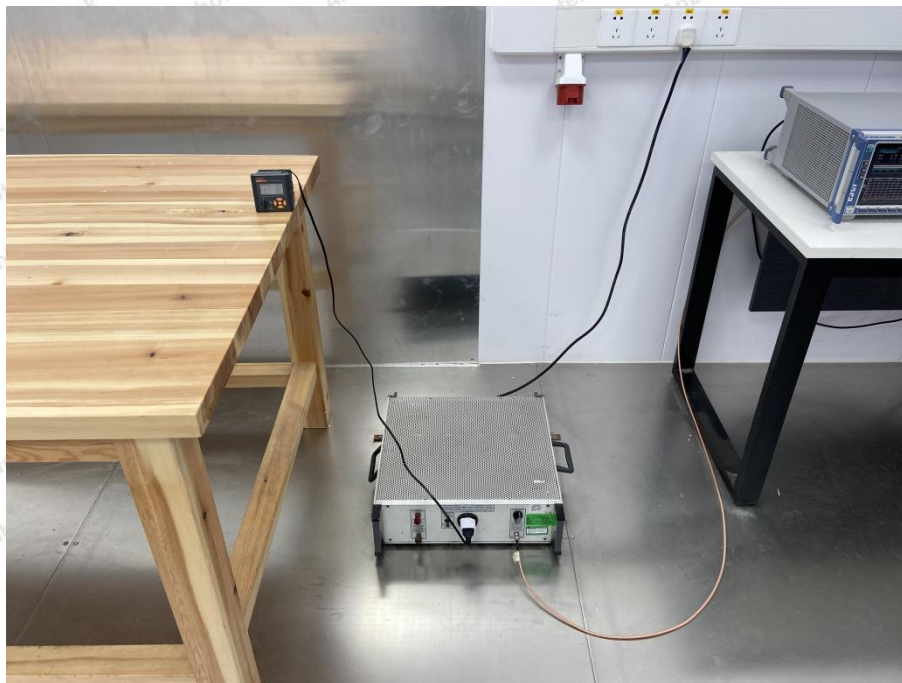


Photo of Radiated Emission Test

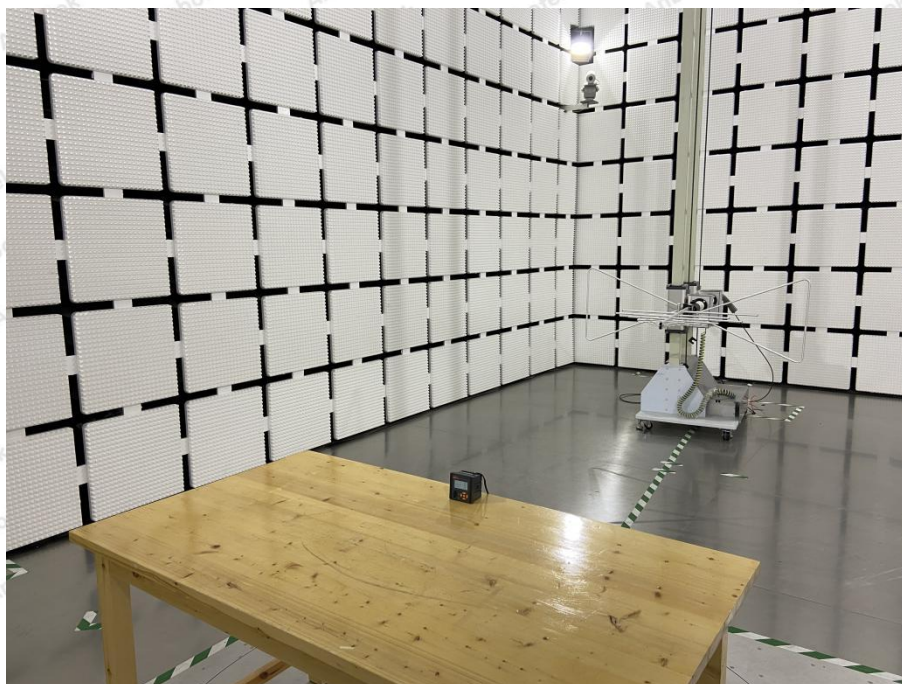


Photo of Electrostatic Discharge Immunity Test

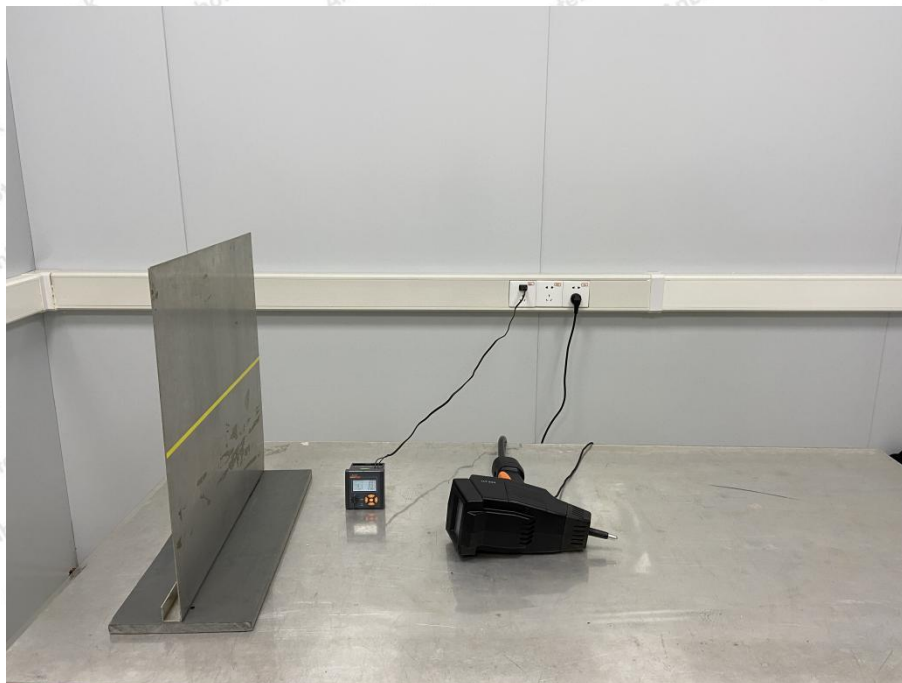


Photo of RF Field Strength susceptibility Test



Photo of Electrical Fast Transient/Burst Immunity Test

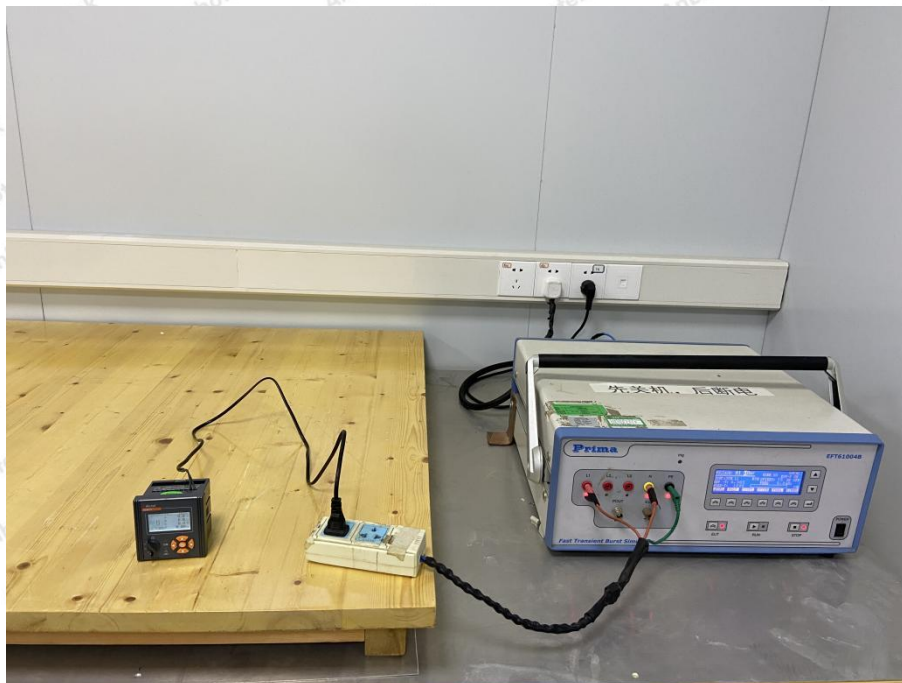


Photo of Surge Immunity Test

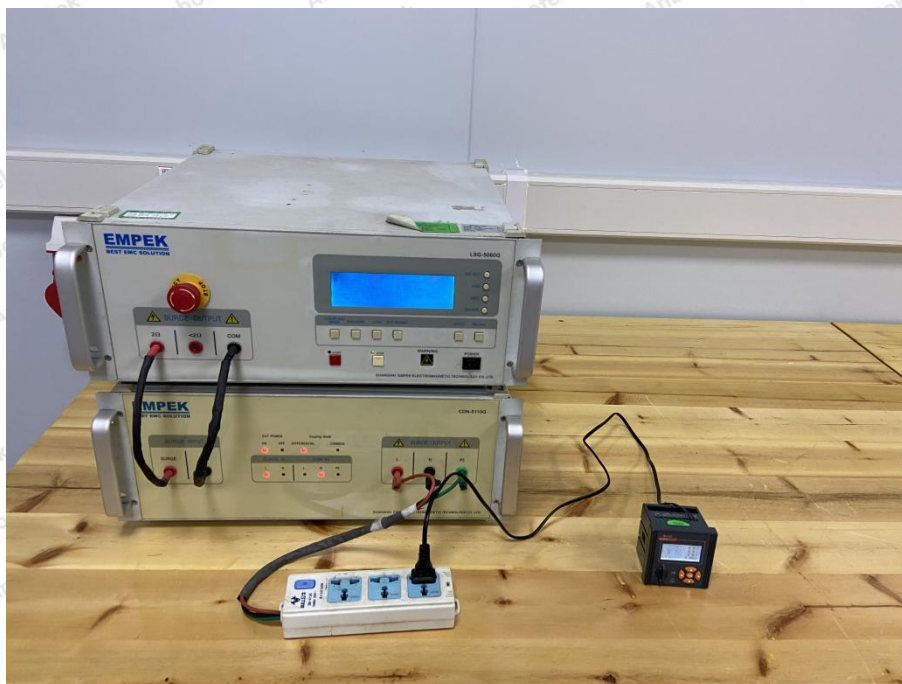


Photo of Injected currents susceptibility Test

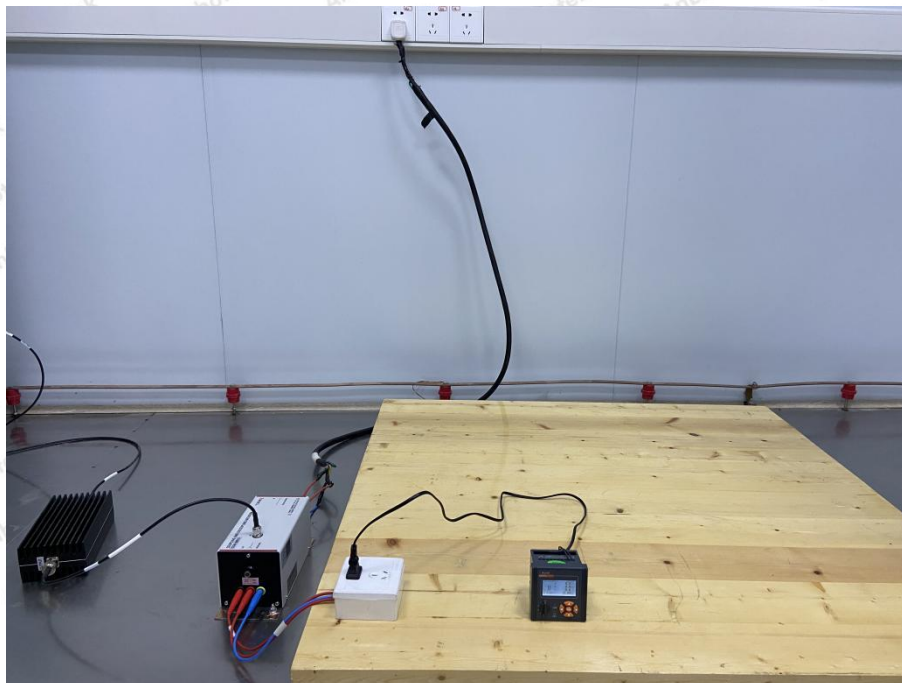
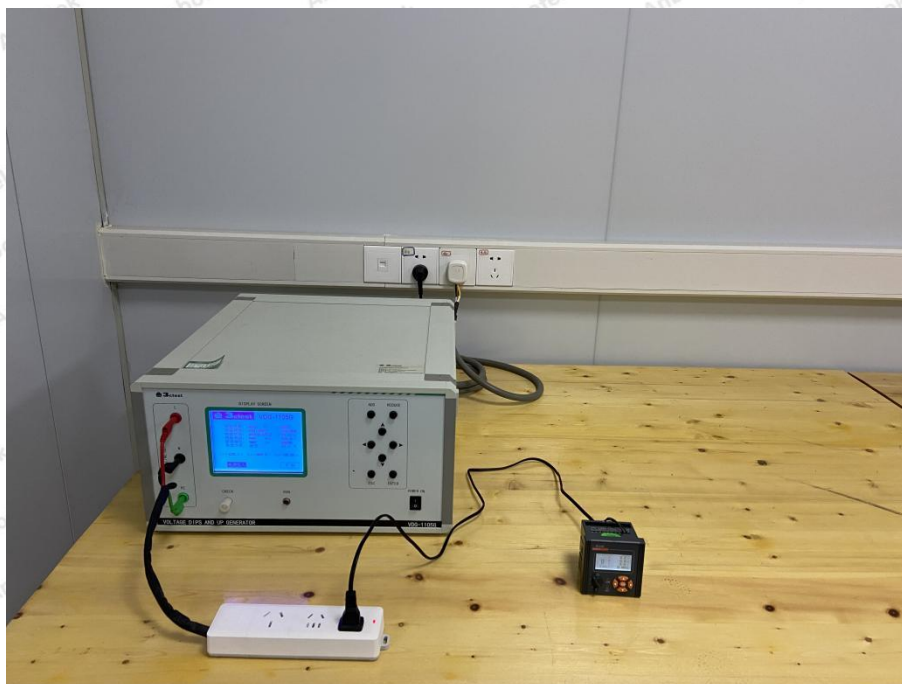
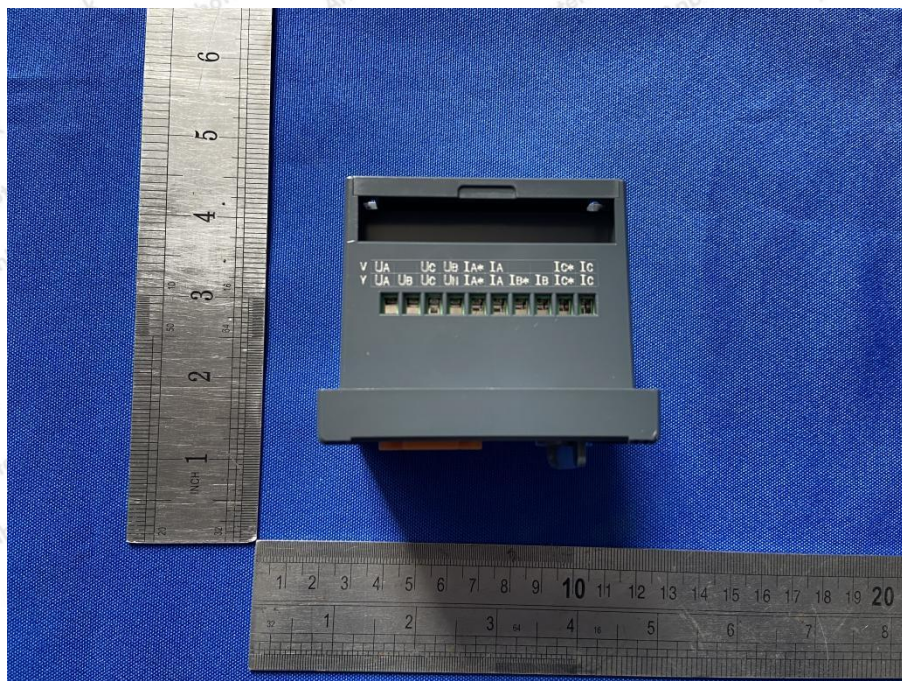


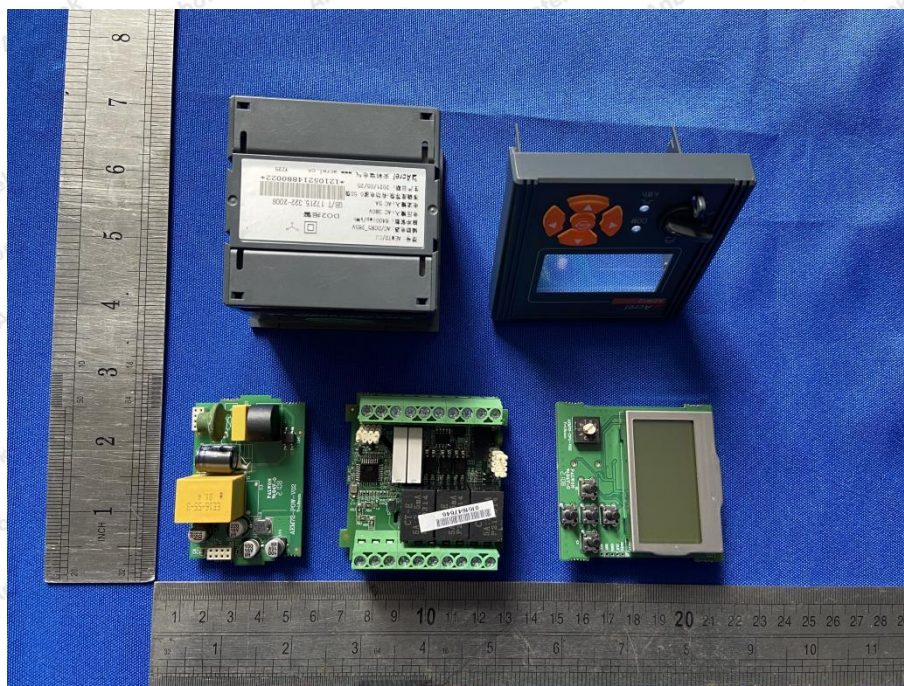
Photo of Voltage Dips and Interruptions Test

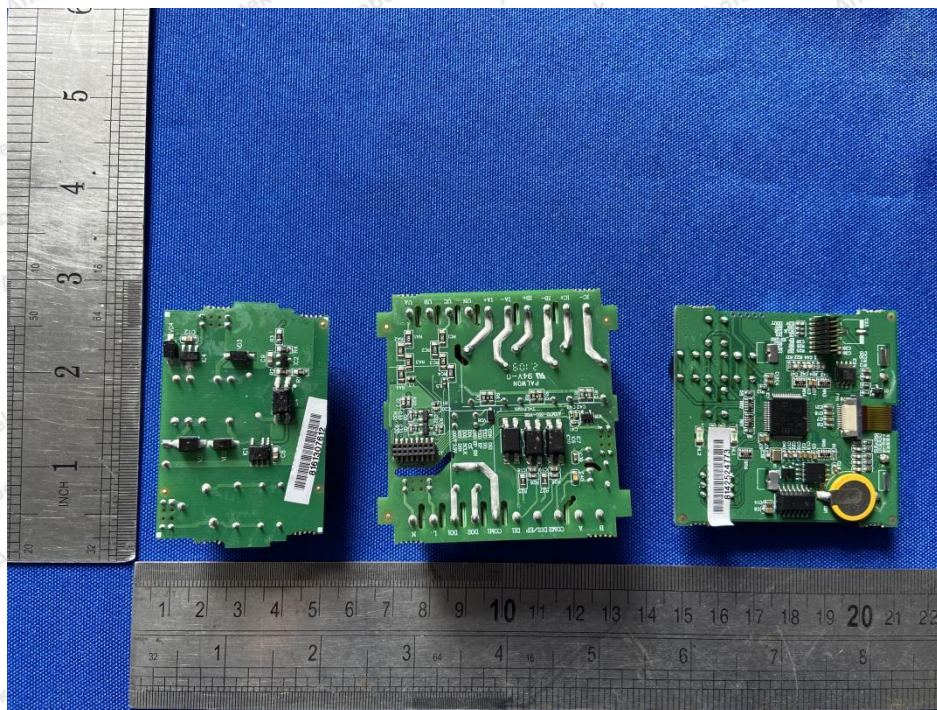


APPENDIX II -- EXTERNAL PHOTOGRAPH



APPENDIX III -- INTERNAL PHOTOGRAPH





CE Label

1. The CE conformity marking must consist of the initials 'CE' taking the following form:

If the CE marking is reduced or enlarged, the proportions given in the above graduated drawing must be respected.

2. The CE marking must have a height of at least 5 mm except where this is not possible on account of the nature of the apparatus.

3. The CE marking must be affixed to the product or to its data plate. Additionally it must be affixed to the packaging, if any, and to the accompanying documents.

4. The CE marking must be affixed visibly, legibly and indelibly.

It must have the same height as the initials 'CE'.

----- End of Report -----

