EMC Test Report

Client Name	:	**Acrel Co., Ltd.**
Client Address	:	**No.253, Yulv Road, Jiading, Shanghai, China**
Product Name	:	**Power Meter**
Report Date	:	**Apr. 04, 2023**

Shenzhen Anbotek Compliance Laboratory Limited

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TEST REPORT

Applicant	:	Acrel Co., Ltd.
Manufacturer	:	Jiangsu Acrel Electrical Manufacturing. Co., Ltd
Product Name	:	Power Meter
Test Model No.	:	ACR10R
Reference Model No.	:	ACR10R-D10TE, ACR10R-D16TE, ACR10R-D24TE, ACR10R-D36TE, ACR10R-D16TES, ACR10R-D24TES, ACR10R-D36TES, ACR10R-D10TE3, ACR10R-D16TE3, ACR10R-D24TE3, ACR10R-D36TE3, ACR10R-D110RE3, ACR10R-D120RE3, ACR10R-D140RE3, ACR10R-D190RE3, ACR10R-D10TE3S, ACR10R-D16TE3S, ACR10R-D24TE3S, ACR10R-D36TE3S, ACR10R-D10TE4, ACR10R-D16TE4, ACR10R-D24TE4, ACR10R-D36TE4, ACR10R-D110RE4, ACR10R-D120RE4, ACR10R-D140RE4, ACR10R-D190RE4, ACR10R-D10TE4S, ACR10R-D16TE4S, ACR10R-D24TE4S, ACR10R-D36TE4S, ACR10R-D10TE4S/CE, ACR10R-D16TE4S/CE, ACR10R-D24TE4S/CE, ACR10R -D36TE4S/CE, ACR10R-E4S/CE, ACR10R-E3S/CE, ACR10R-ES/CE, ACR10RH
Trade Mark	:	N.A.
Rating(s)	:	AC 3*230/400V, AC 3*400V, Freq:50Hz Power input max, 10VA

Test Standard(s) : **EN IEC 61326-1: 2021;**
EN IEC 61000-3-2: 2019+A1:2021;
EN 61000-3-3: 2013+A1:2019+A2:2021;
(IEC 61000-4-2; IEC 61000-4-3; IEC 61000-4-4;
IEC 61000-4-5; IEC 61000-4-6; IEC 61000-4-8; 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 of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the EN IEC 61326-1, EN IEC 61000-3-2, 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: Mar. 16, 2023

Date of Test: Mar. 16~Mar. 27, 2023

Prepared By: Yee Huang
(Yee Huang)

Approved & Authorized Signer: KingKong Jin
(KingKong Jin)

1. General Information

1.1. Client Information

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

1.2. Description of Device (EUT)

Product Name	:	Power Meter
Test Model No.	:	ACR10R
Reference Model No.	:	ACR10R-D10TE, ACR10R-D16TE, ACR10R-D24TE, ACR10R-D36TE, ACR10R-D16TES, ACR10R-D24TES, ACR10R-D36TES, ACR10R-D10TE3, ACR10R-D16TE3, ACR10R-D24TE3, ACR10R-D36TE3, ACR10R-D110RE3, ACR10R-D120RE3, ACR10R-D140RE3, ACR10R-D190RE3, ACR10R-D10TE3S, ACR10R-D16TE3S, ACR10R-D24TE3S, ACR10R-D36TE3S, ACR10R-D10TE4, ACR10R-D16TE4, ACR10R-D24TE4, ACR10R-D36TE4, ACR10R-D110RE4, ACR10R-D120RE4, ACR10R-D140RE4, ACR10R-D190RE4, ACR10R-D10TE4S, ACR10R-D16TE4S, ACR10R-D24TE4S, ACR10R-D36TE4S, ACR10R-D10TE4S/CE, ACR10R-D16TE4S/CE, ACR10R-D24TE4S/CE, ACR10R -D36TE4S/CE, ACR10R-E4S/CE, ACR10R-E3S/CE, ACR10R-ES/CE, ACR10RH (Note: All samples are the same except the model number & appearance, so we prepare “ACR10R” for test only.)
Trade Mark	:	N.A.
Test Power Supply	:	AC 230V,50Hz
Test Sample No.	:	1-1-1
Product Description	:	N/A
Remark: (1) For a more detailed features description, please refer to the manufacturer’s specifications or the User’s Manual. (2)The test report 18250EC30021601-M1 supersedes the test report 18250EC30021601 which is withdrawn.		

1.3. Auxiliary Equipment Used During Test

N/A		

1.4. Description of Test Mode

Pretest Mode	Description
Mode 1	On

For Mode 1 Block Diagram of Test Setup



1.5. Test Summary

Test Items	Test Mode	Status
Power Line Conducted Emission Test	Mode 1	P
Radiated Emission Test (Below 1 GHz)	Mode 1	P
Radiated Emission Test (Above 1GHz)	/	N
Harmonic Current Test	Mode 1	P
Voltage Fluctuations & Flicker Test	Mode 1	P
Electrostatic Discharge Immunity Test	Mode 1	P
RF Field Strength Immunity Test	Mode 1	P
Electrical Fast Transient/Burst Immunity Test	Mode 1	P
Surge Immunity Test	Mode 1	P
Injected Currents Susceptibility Test	Mode 1	P
Power frequency Magnetic Field Immunity Test	/	N
Voltage Dips and Interruptions Immunity Test	Mode 1	P
P) Indicates “PASS”. F) Indicates “Fail”. N) Indicates “Not applicable”.		

1.6. Test Equipment List

☒ Power Line Conducted Emission Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	100055	Oct. 23, 2022	1 Year
2.	Three Phase V-type Artificial Power Network	CYBERTEK	EM5040DT	E215040DT001	Jul. 05, 2022	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Oct. 13, 2022	1 Year
4.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Oct. 22, 2022	1 Year
5.	Software Name EZ-EMC	Ferrari Technology	ANB-03A	N/A	N/A	N/A

☒ Radiated Emission Test (Below 1 GHz)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Oct. 13, 2022	1 Year
2.	Pre-amplifier	Schwarzbeck	BBV-9745	9745-075	Oct. 23, 2022	1 Year
3.	Bilog Broadband Antenna	SCHWARZBECK	VULB 9163	01109	Oct. 16, 2022	3 Year
4.	Software Name EZ-EMC	Ferrari Technology	EMEC-3A1	N/A	N/A	N/A

☐ Radiated Emission Test (Above 1GHz)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	Rohde & Schwarz	ESR26	101481	Oct. 23, 2022	1 Year
2.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Oct. 23, 2022	1 Year
3.	Pre-amplifier	SONOMA	310N	186860	Oct. 23, 2022	1 Year
4.	Software Name EZ-EMC	Ferrari Technology	ANB-03A	N/A	N/A	N/A
5.	EMI Preamplifier	SKET Electronic	LNPA-0118G-45	SKET-PA-002	Oct. 13, 2022	1 Year
6.	Double Ridged Horn Antenna	SCHWARZBECK	BBHA 9120D	02555	Oct. 16, 2022	3 Year

Address:1/F.,Building D,Sogood Science and Technology Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.
Tel:(86) 0755-26066440 Fax:(86) 0755-26014772 Email:service@anbotek.com
Hotline 400-003-0500 www.anbotek.com.cn

☒ Harmonic Current and Flicker Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Programmable AC Power source	IVYTECH	APS-5005A	632734	Oct. 23, 2022	1 Year
2.	Harmonic and Flicker Analyzer	EMC-PARTNER	HMONICS 1000-1P	164	Oct. 23, 2022	1 Year
3.	Harmonics-1000	N/A	Ed.3.0+4.0	N.A	N/A	N/A

☒ Electrostatic Discharge Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Simulators	emtest	ESD NX30.1	11936	Mar. 17, 2023	1 Year

☒ RF Field Strength Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal Generator	Agilent	N5181A	MY50143107	Apr. 20, 2022	1 Year
2.	Power Meter	Agilent	E4417A	MY45101384	May 14, 2022	1 Year
3.	Amplifier	Micotop	MPA-80-1000-600	MPA2110318	Apr. 20, 2022	1 Year
4.	Amplifier	Micotop	MPA-1000-6000-100	MPA2110327	Apr. 20, 2022	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	Apr. 20, 2022	1 Year
8.	Power Sensor	KEYSIGHT	E9323A	MY53100007	Apr. 20, 2022	1 Year
9.	Electric field Probe	Narda S.T.S /PMM	EP 601	811ZX10351	Apr. 29, 2022	1 Year
10.	Software	EMtrace	EM 3	/	N/A	N/A

☒ Electrical Fast Transient/Burst Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Surge Generator	TESEQ	NSG 3060	1480	Oct. 23, 2022	1 Year
2.	CDN	TESEQ	CDN 3061	1408	Oct. 23, 2022	1 Year
3.	EFT-Clamp	PRIMA	EFT-Clamp	/	Oct. 13, 2022	1 Year

☒ Surge Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Combined Wave Lightning Surge Simulator	3Ctest	CCS600	ES3771702	Jul. 05, 2022	1 Year
2.	Three Phase Power Coupling Network	3Ctest	SEPN69100T	ES0801757	Jul. 05, 2022	1 Year
3.	Telecom port surge generator	PMI	TW101	190411	May 13, 2022	1 Year

☒ Injected Currents Susceptibility Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	C/S Conducted Immunity Test System	FRANKONIA	CIT-10	126A1196/2012	Oct. 23, 2022	1 Year
2.	CDN	FRANKONIA	CDN - M2+M3	A2210178/2012	Oct. 23, 2022	1 Year
3.	6dB Attenuator	FRANKONIA	DAM 26W	1172202	Oct. 23, 2022	1 Year
4.	CIT-10	FRANKONIA	Version1.1.7	N/A	N/A	N/A
5.	EM-Clamp	FRANKONIA	EMCL-20	18101728-0103	May 17, 2022	1 Year

☐ Power frequency Magnetic Field Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Power Frequency Magnetic Field Generator	EVERFINE	EMS61000-8K	906002	Oct. 23, 2022	1 Year

☒ Voltage Dips and Interruptions Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	CYCLE SAG Simulator	PRIMA	DRP61011AG	PR12046234	Oct. 23, 2022	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

Performance 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, v/ithout 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.

Performance 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.

Performance 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.

2. Power Line Conducted Emission Test

2.1. Test Standard and Limit

Test Standard:	EN IEC 61326-1

☐ **Limits for conducted emission at the AC mains power ports of Class A Group 1 equipment**

Frequency range (MHz)	Rated power≤20KVA		20KVA<Rated power≤75KVA		75KVA<Rated power	
	QP(dBuV)	AVG(dBuV)	QP(dBuV)	AVG(dBuV)	QP(dBuV)	AVG(dBuV)
0.15 ~ 0.50	79	66	100	90	130	120
0.50 ~ 5.00	73	60	86	76	125	115
5.00 ~ 30.00	73	60	90 ~ 73*	80 ~ 60*	115	105

Remark:
(1) The lower limit shall apply at the transition frequencies.
(2) The limit decreases linearly with the logarithm of the frequency in the range 5.00 MHz to 30.00 MHz.

☐ **Limits for conducted emission at the DC power ports of Class A Group 1 equipment**

Frequency range (MHz)	Rated power≤20KVA		20KVA<Rated power≤75KVA		75KVA<Rated power	
	QP(dBuV)	AVG(dBuV)	QP(dBuV)	AVG(dBuV)	QP(dBuV)	AVG(dBuV)
0.15 ~ 5.00	97 ~ 89*	84 ~ 76*	116 ~ 106*	106 ~ 96*	132 ~ 122*	122 ~ 112*
5.00 ~ 30.00	89	76	106 ~ 89*	96 ~ 76*	122 ~ 105*	112 ~ 92*

Remark:
The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 30.00 MHz.

☒ **Limits for conducted emission at the AC mains power ports of Class B Group 1 equipment**

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15 ~ 0.50	66 ~ 56*	56 ~ 46*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

Remark:
(1) The lower limit shall apply at the transition frequencies.
(2) The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

☐ **Limits for conducted emission at the DC power ports of Class B Group 1 equipment**

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15 ~ 0.50	84 ~ 74*	74 ~ 64*
0.50 ~ 30.00	74	64

Remark:
The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

☐ **Limits for conducted emission at the AC mains power ports of Class B Group 2 equipment**

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15 ~ 0.50	66 ~ 56*	56 ~ 46*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

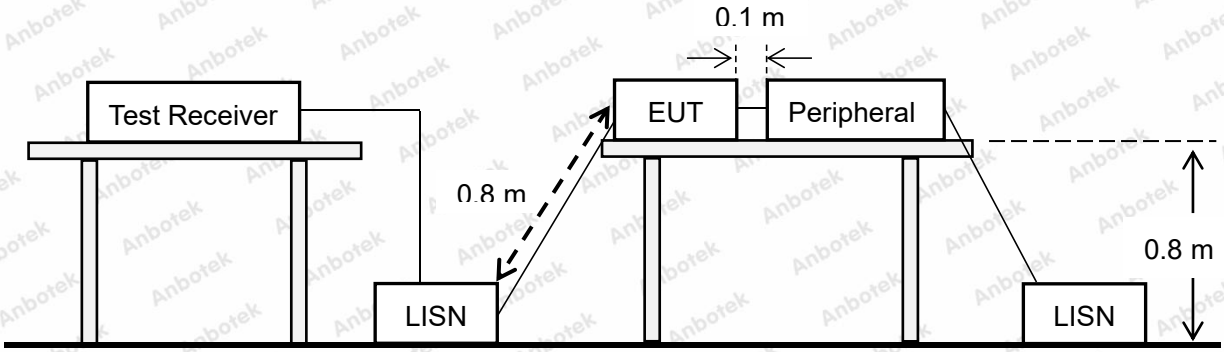
Remark:
(1) The lower limit shall apply at the transition frequencies.
(2) The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

☐ **Limits for conducted emission at the AC mains power ports of Class A Group 2 equipment**

Frequency range (MHz)	Limit of Rated power≤75KVA (dBuV)		Limit of Rated power>75KVA (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 ~ 0.50	100	90	130	120
0.50 ~ 5.00	86	76	125	115
5.00 ~ 30.00	90 ~ 73*	80 ~ 60*	115	105

Remark:
(1) The lower limit shall apply at the transition frequencies.
(2) The limit decreases linearly with the logarithm of the frequency in the range 5.00 MHz to 30.00 MHz.

2.2. Test Setup



2.3. Test Procedure

The table-top EUT is placed on a non-conductive table 0.8 m above the horizontal ground reference plane, and the back of the EUT is 0.4 m away from the vertical ground reference plane, and at least 0.8 m from any other metal surface or ground plane. The floor-standing EUT is placed on an insulating support 0.1 m above the horizontal ground reference plate, at least 0.8 m away from other metal objects.

Connect EUT to the power mains through an LISN. Where the mains cable supplied by the manufacturer is longer than 1 m, the excess should be folded at the center into a bundle no longer than 0.4 m, so that its length is shortened to 1 m. All the peripherals are connecting to the other LISN.

The initial testing identified the frequency that has the highest disturbance relative to the limit while operating the EUT in typical modes of operation and cable positions in a test setup representative of typical system configuration.

The identification of the frequency of highest disturbance with respect to the limit was found by investigating disturbances at a number of significant frequencies. The probable frequency of maximum disturbance had been found and that the associated cable and EUT configuration and mode of operation had been identified.

Set the test-receiver to quasi peak detect function and average detect function, and to measure the conducted emissions values.

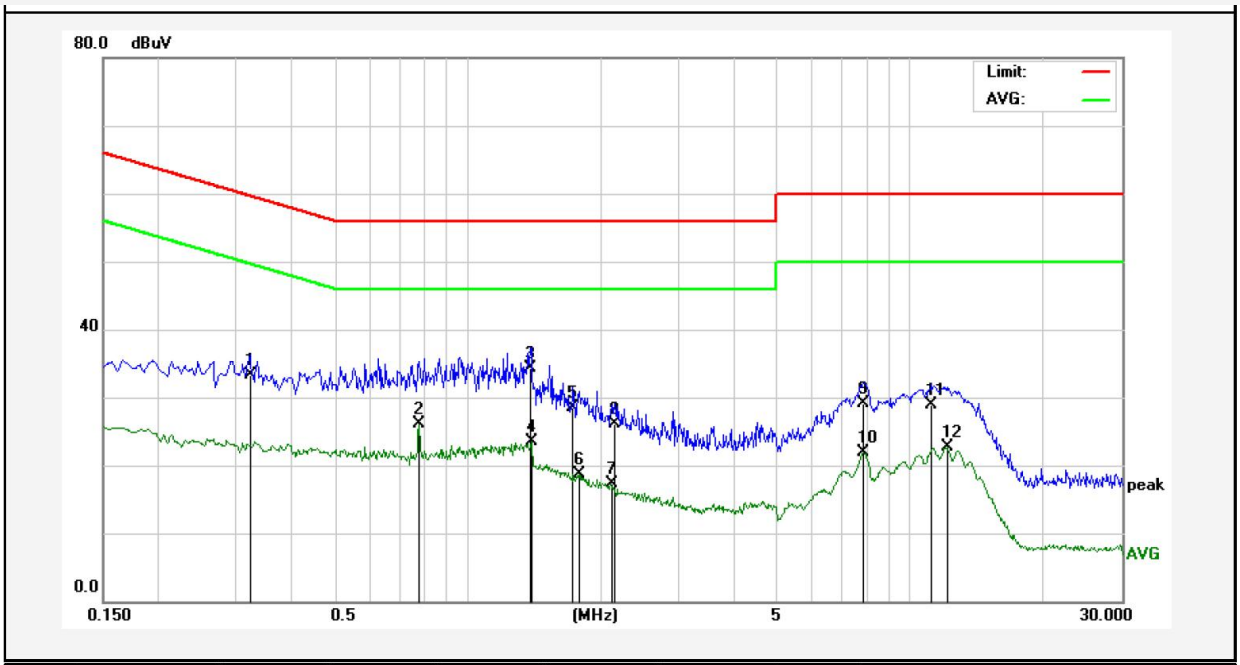
2.4. Test Results

PASS

The test curves are shown in the following pages.

Power Line Conducted Test Data

Test Site: 1# Shielded Room
Test Specification: AC 230V,50Hz
Comment: Live Line
Temp.: 23.5℃ Hum.: 45%

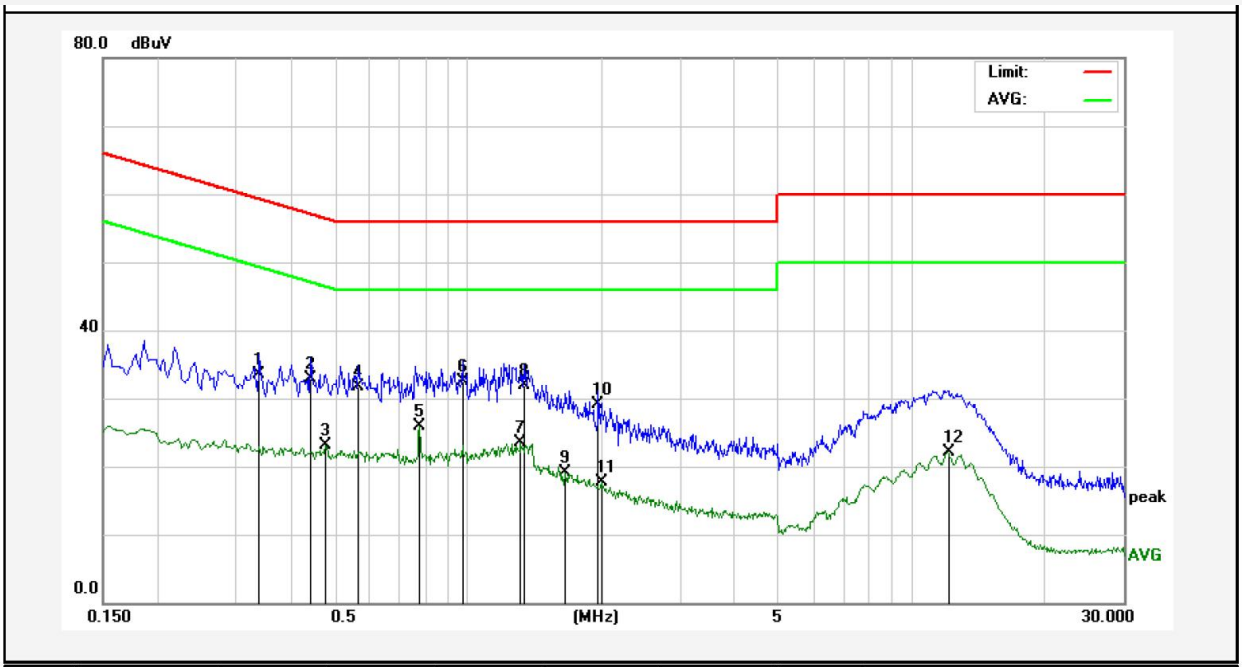


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.3220	23.54	9.77	33.31	59.65	-26.34	QP	
2	0.7780	16.18	9.84	26.02	46.00	-19.98	AVG	
3	1.3820	24.50	9.85	34.35	56.00	-21.65	QP	
4	1.3900	13.58	9.85	23.43	46.00	-22.57	AVG	
5	1.7340	18.69	9.85	28.54	56.00	-27.46	QP	
6	1.7900	8.92	9.86	18.78	46.00	-27.22	AVG	
7	2.1020	7.46	9.86	17.32	46.00	-28.68	AVG	
8	2.1500	16.29	9.86	26.15	56.00	-29.85	QP	
9	7.8180	19.35	9.82	29.17	60.00	-30.83	QP	
10	7.8180	11.99	9.82	21.81	50.00	-28.19	AVG	
11	11.1940	19.09	9.86	28.95	60.00	-31.05	QP	
12	12.1180	12.75	9.89	22.64	50.00	-27.36	AVG	

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

Power Line Conducted Test Data

Test Site: 1# Shielded Room
Test Specification: AC 230V,50Hz
Comment: Neutral Line
Temp.: 23.5℃ Hum.: 45%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.3379	23.81	9.76	33.57	59.25	-25.68	QP	
2	0.4420	23.13	9.80	32.93	57.02	-24.09	QP	
3	0.4780	13.23	9.82	23.05	46.37	-23.32	AVG	
4	0.5660	21.95	9.85	31.80	56.00	-24.20	QP	
5	0.7780	16.03	9.84	25.87	46.00	-20.13	AVG	
6	0.9700	22.58	9.85	32.43	56.00	-23.57	QP	
7	1.3099	13.69	9.85	23.54	46.00	-22.46	AVG	
8	1.3340	22.13	9.85	31.98	56.00	-24.02	QP	
9	1.6500	9.22	9.85	19.07	46.00	-26.93	AVG	
10	1.9660	19.28	9.85	29.13	56.00	-26.87	QP	
11	1.9940	7.87	9.85	17.72	46.00	-28.28	AVG	
12	12.0260	12.17	9.88	22.05	50.00	-27.95	AVG	

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

3. Radiated Emission Test (Below 1 GHz)

3.1. Test Standard and Limit

Test Standard	EN IEC 61326-1

☐ **Limit for radiated emissions at frequencies up to 1 GHz for class A Group 1 equipment**

Frequency (MHz)	Limit of Rated power≤20KVA（3m）	Limit of Rated power＞20KVA（3m）
	Quasi-peak（dBuV/m）	Quasi-peak（dBuV/m）
30 ~ 230	50	60
230 ~ 1000	57	60
Remark: The lower limit shall apply at the transition frequencies.		

☒ **Limit for radiated emissions at frequencies up to 1 GHz for class B Group 1 equipment**

Frequency (MHz)	Distance (Meters)	Field Strengths Limit (dBμV/m)
30 ~ 230	3	40
230 ~ 1000	3	47
Remark: The lower limit shall apply at the transition frequencies.		

☐ **Limit for radiated emissions at frequencies up to 1 GHz for class B Group 2 equipment**

Frequency (MHz)	Limit（3m）		
	QP (dBμV/m)	AVG (dBμV/m)	QP (dBμA/m)
0.15 ~ 30	-	-	39 ~ 3*
30 ~ 80.872	40	35	-
80.872 ~ 81.848	60	55	-
81.848 ~ 134.786	40	35	-
134.786 ~ 136.414	60	55	-
136.414 ~ 230	40	35	-
230 ~ 1000	47	42	-
Remark: (1) The lower limit shall apply at the transition frequencies. (2) The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 30 MHz.			

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☐ **Limit for radiated emissions at frequencies up to 1 GHz for class B Group 2 equipment**

Frequency (MHz)	Limit（3m）	
	QP (dBμV/m)	QP (dBμA/m)
0.15 ~ 0.49	-	82
0.49 ~ 1.705	-	72
1.705 ~ 2.194	-	77
2.194 ~ 3.95	-	68
3.95 ~ 11	-	68 ~ 28.5*
11 ~ 20	-	28.5
20 ~ 30	-	18.5
30 ~ 47	78	-
47 ~ 53.91	60	-
53.91 ~ 54.56	60	-
54.56 ~ 68	60	-
68 ~ 80.872	73	-
80.872 ~ 81.848	88	-
81.848 ~ 87	73	-
87 ~ 134.786	70	-
134.786 ~ 136.414	80	-
136.414 ~ 156	70	-
156 ~ 174	84	-
174 ~ 188.7	60	-
188.7 ~ 190.979	70	-
190.979 ~ 230	60	-
230 ~ 400	70	-
400 ~ 470	73	-
470 ~ 1000	70	-

Remark:

(1) The lower limit shall apply at the transition frequencies.

(2) The limit decreases linearly with the logarithm of the frequency in the range 3.95 MHz to 11 MHz.

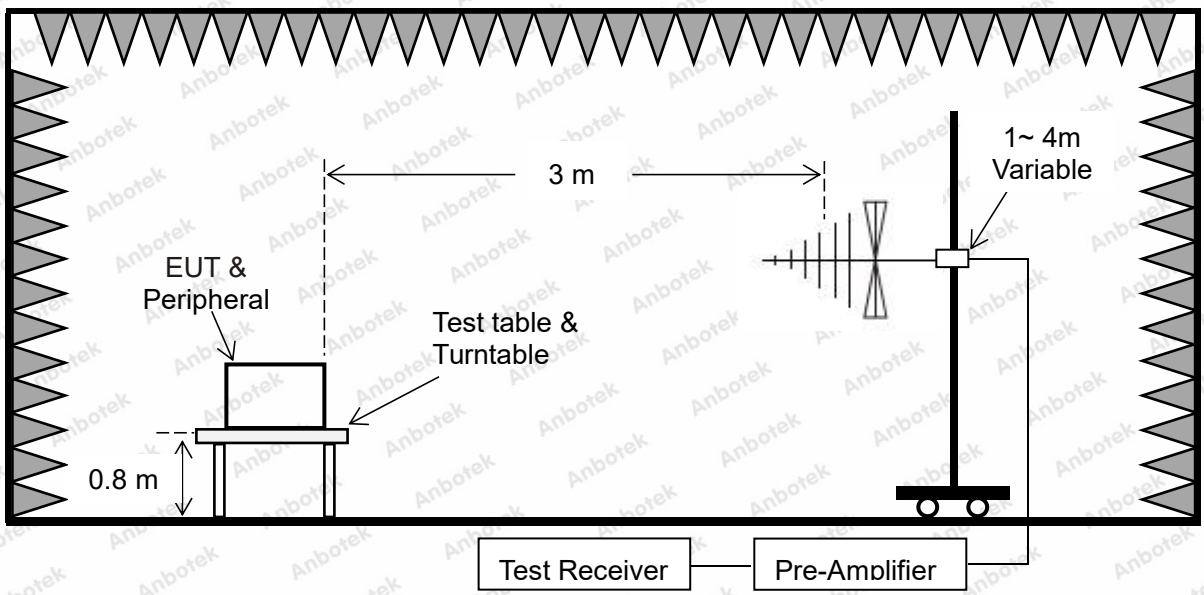
☐ **Limit for radiated emissions at frequencies up to 1 GHz for class A EDM and arc welding equipment**

Frequency (MHz)	Distance (Meters)	Field Strengths Limit (dBμV/m)
30 ~ 230	3	90 ~ 70*
230 ~ 1000	3	70

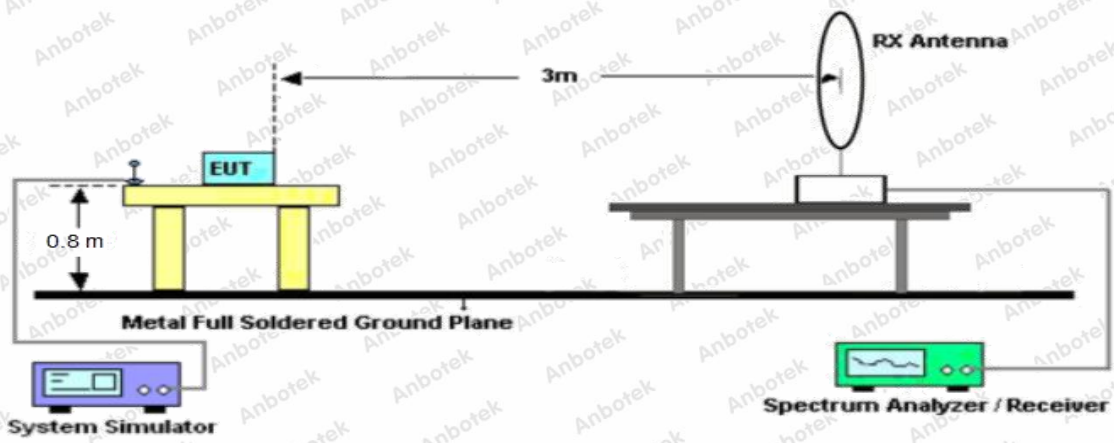
Remark:
The limit decreases linearly with the logarithm of the frequency in the range 30 MHz to 230 MHz.

3.2. Test Setup

30 MHz-1 GHz



0.15 MHz-30 MHz



3.3. Test Procedure

The table-top EUT is placed on a non-conductive table 0.8 m above the horizontal ground reference plane. The floor-standing EUT is placed on an insulating support 0.1 m above the horizontal ground reference plane.

The EUT was set 3 m away from the receiving antenna that was mounted on a non-conductive mast. The antenna can move up and down between 1 to 4 m to find out the maximum emission level(The height of the loop antenna is fixed at 1.5m).

The turntable can rotate 360 degree to determine the position of the maximum emission level.

The initial testing identified the frequency that has the highest disturbance relative to the limit while operating the EUT in typical modes of operation and cable positions in a test setup representative of typical system configuration.

The identification of the frequency of highest emission with respect to the limit was found by investigating emissions at a number of significant frequencies. The probable frequency of maximum emission had been found and that the associated cable and EUT configuration and mode of operation had been identified.

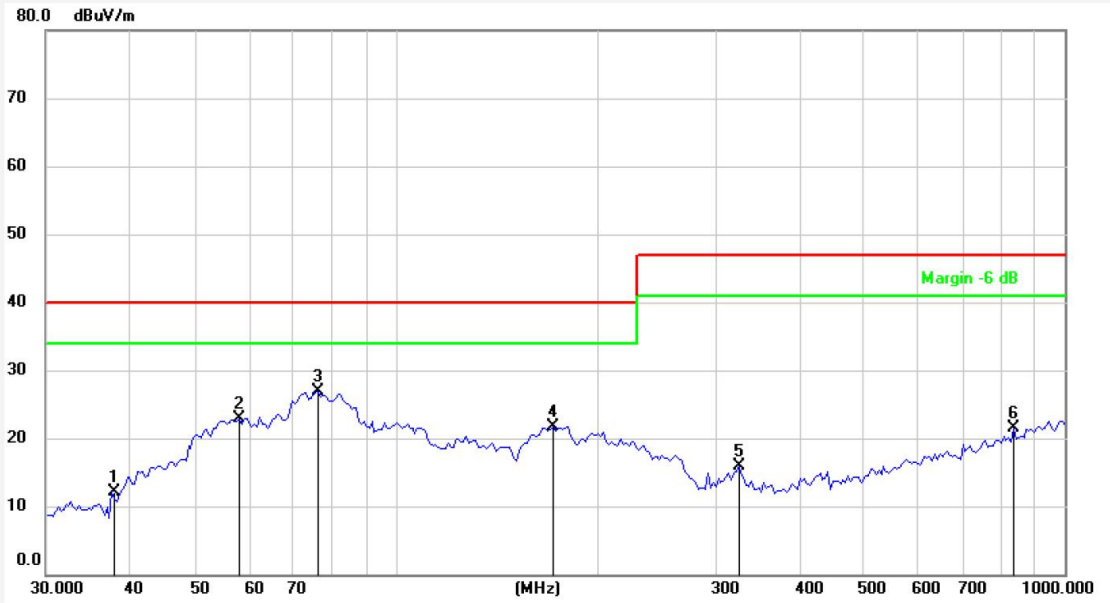
In the test frequency range of 0.15MHz-30MHz, the analytical bandwidth of the receiver is set to 9KHz, and in the test frequency range of 30MHz-1000MHz, the analytical bandwidth of the receiver is set to 120KHz.

3.4. Test Results

PASS

The test curves are shown in the following pages.

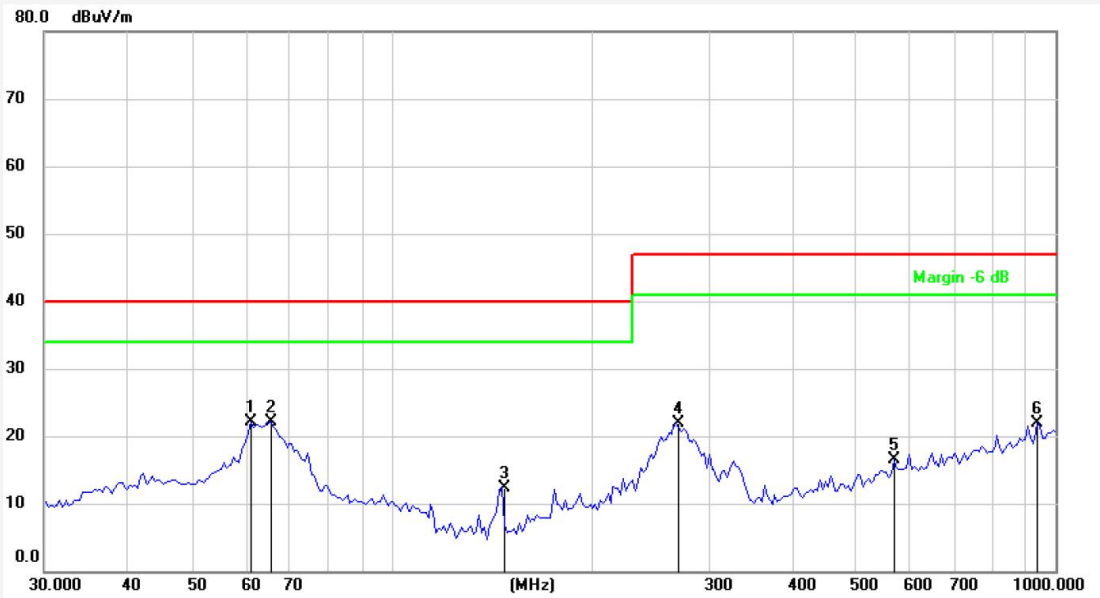
Test item:	Radiation Test	Polarization:	Horizontal
Standard:	(RE)EN IEC 61326-1	Power Source:	AC 230V,50Hz
Frequency Range:	30MHz ~ 1000MHz	Temp.(℃)/Hum.(%RH):	23.5(℃)/48%RH
Distance:	3m		



No.	Freq. (MHz)	Reading (dBuV)	Factor ()	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	37.6798	29.46	-17.41	12.05	40.00	-27.95	QP			
2	58.4074	40.52	-17.61	22.91	40.00	-17.09	QP			
3	76.6463	48.50	-21.68	26.82	40.00	-13.18	QP			
4	171.6933	41.59	-19.84	21.75	40.00	-18.25	QP			
5	325.5958	30.13	-14.22	15.91	47.00	-31.09	QP			
6	839.1818	26.89	-5.35	21.54	47.00	-25.46	QP			

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

Test item:	Radiation Test	Polarization:	Vertical
Standard:	(RE)EN IEC 61326-1	Power Source:	AC 230V,50Hz
Frequency Range:	30MHz ~ 1000MHz	Temp.(℃)/Hum.(%RH):	23.5(℃)/48%RH
Distance:	3m		



No.	Freq. (MHz)	Reading (dBuV)	Factor ()	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	61.5618	40.45	-18.31	22.14	40.00	-17.86	QP			
2	66.0342	42.16	-20.08	22.08	40.00	-17.92	QP			
3	146.6304	33.58	-21.20	12.38	40.00	-27.62	QP			
4	268.4853	37.45	-15.61	21.84	47.00	-25.16	QP			
5	570.6100	25.46	-8.94	16.52	47.00	-30.48	QP			
6	940.4801	25.92	-4.08	21.84	47.00	-25.16	QP			

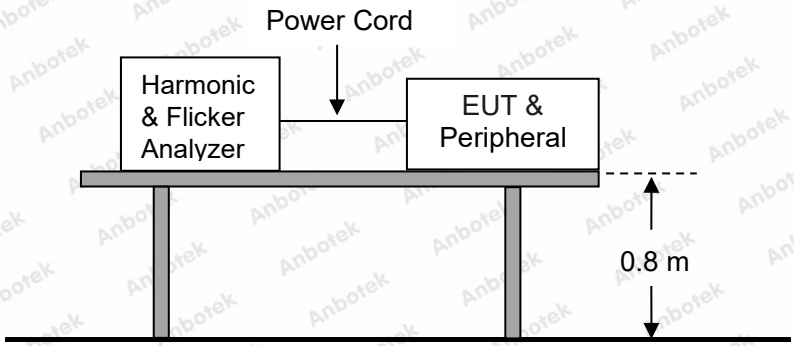
Note: Result= Reading + Factor Over Limit=Result-Limit

4. Harmonic Current Test

4.1. Test Standard

Test Standard:	EN IEC 61000-3-2

4.2. Test Setup



4.3. Test Procedure

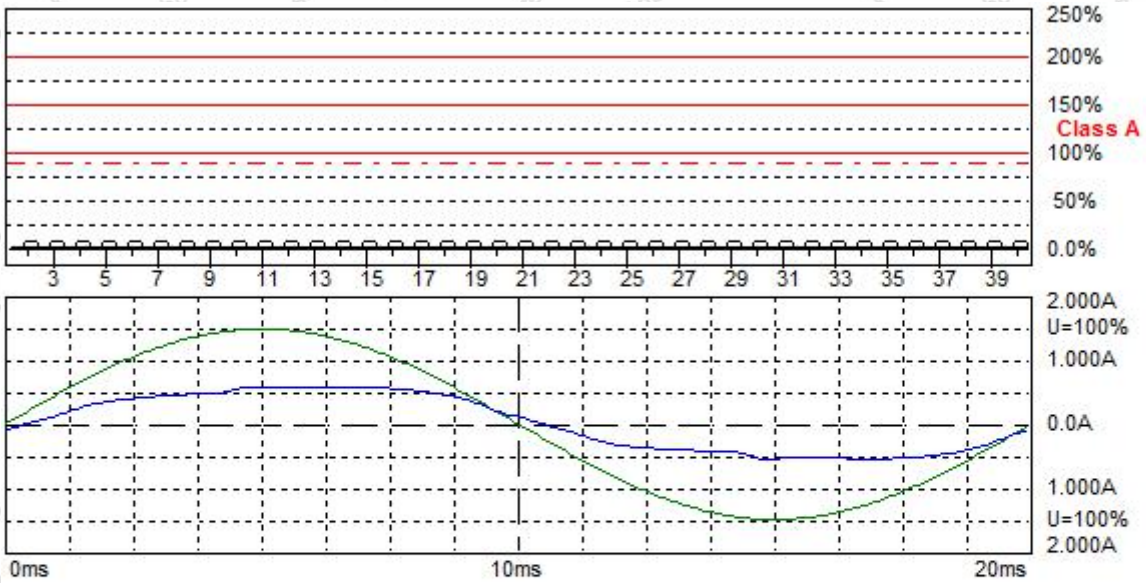
The table-top EUT is placed on the top of a wooden table 0.8 m above the ground (0.1 m for the floor-standing EUT) and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn. The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the necessary for the EUT to be exercised.

4.4. Test Results

PASS

The test curves are shown in the following pages.

Harmonic Current Test Result Summary (Run time)



Harmonic Emission - IEC 61000-3-2 , EN 61000-3-2 , (EN60555-2)

Urms =	229.5	V	P =	96.01	W	THC =	0.055	A	Range: 2 A
Irms =	0.430	A	pf =	0.974					V-nom: 230 V

Test aborted, Result: PASSED

HAR-1000 EMC-Partner

Full Bar : Actual Values

Empty Bar : Maximum Values

Blue : Current , Green : Voltage , Red : Failed

Harmonic Current Test Result Summary (Run time)

Urms =	229.5V	Freq =	50.000	Range:	2 A
Irms =	0.430A	Ipk =	0.594A	cf =	1.382
P =	96.01W	S =	98.62VA	pf =	0.974
THDi =	13.0 %	THDu =	0.10 %	Class A	

Test - Time : 3min (100 %)

Test aborted, Result: PASSED

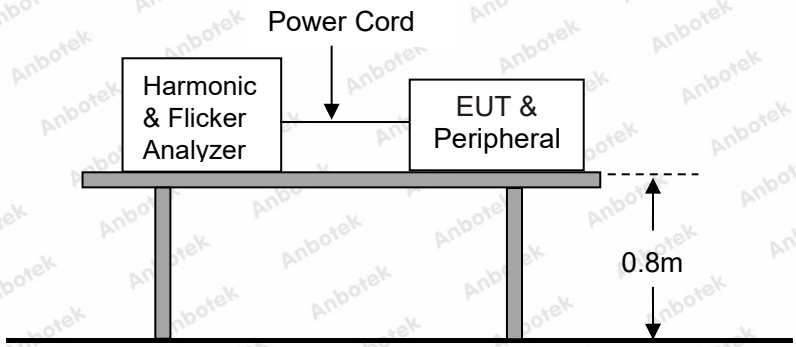
Order	Freq. Status	Iavg	Iavg%L	Irms	Irms%	Irms%L	Imax	Imax%L	Limit
	[Hz]	[A]	[%]	[A]	[%]	[%]	[A]	[%]	[A]
1	50	0.3693		0.4236	98.580		0.4230		
2	100	0.0073	0.6782	0.0076	1.7614	0.7008	0.0076	0.7008	1.0800
3	150	0.0485	2.1097	0.0514	11.960	2.2344	0.0513	2.2291	2.3000
4	200	0.0000	0.0000	0.0002	0.0568	0.0568	0.0011	0.2555	0.4300
5	250	0.0089	0.7840	0.0092	2.1307	0.8031	0.0092	0.8031	1.1400
6	300	0.0000	0.0000	0.0018	0.4261	0.6104	0.0023	0.7731	0.3000
7	350	0.0095	1.2298	0.0100	2.3295	1.3000	0.0100	1.3000	0.7700
8	400	0.0000	0.0000	0.0013	0.3125	0.5838	0.0020	0.8492	0.2300
9	450	0.0056	1.4016	0.0059	1.3636	1.4648	0.0057	1.4343	0.4000
10	500	0.0000	0.0000	0.0009	0.1989	0.4644	0.0015	0.7961	0.1840
11	550	0.0064	1.9288	0.0067	1.5625	2.0345	0.0067	2.0345	0.3300
12	600	0.0000	0.0000	0.0009	0.1989	0.5573	0.0011	0.7165	0.1533
13	650	0.0000	0.0000	0.0043	0.9943	2.0345	0.0043	2.0345	0.2100
14	700	0.0000	0.0000	0.0007	0.1705	0.5573	0.0011	0.8359	0.1314
15	750	0.0000	0.0000	0.0045	1.0511	3.0111	0.0045	3.0111	0.1500
16	800	0.0000	0.0000	0.0005	0.1136	0.4246	0.0009	0.7430	0.1150
17	850	0.0000	0.0000	0.0011	0.2557	0.8301	0.0013	1.0145	0.1324
18	900	0.0000	0.0000	0.0005	0.1136	0.4777	0.0006	0.5971	0.1022
19	950	0.0000	0.0000	0.0040	0.9375	3.4017	0.0040	3.4017	0.1184
20	1000	0.0000	0.0000	0.0002	0.0568	0.2654	0.0002	0.2654	0.0920
21	1050	0.0000	0.0000	0.0009	0.1989	0.7975	0.0010	0.9115	0.1071
22	1100	0.0000	0.0000	0.0002	0.0568	0.2919	0.0004	0.4379	0.0836
23	1150	0.0000	0.0000	0.0018	0.4261	1.8717	0.0018	1.8717	0.0978
24	1200	0.0000	0.0000	0.0001	0.0284	0.1592	0.0002	0.3184	0.0767
25	1250	0.0000	0.0000	0.0007	0.1705	0.8138	0.0007	0.8138	0.0900
26	1300	0.0000	0.0000	0.0001	0.0284	0.1725	0.0002	0.3450	0.0708
27	1350	0.0000	0.0000	0.0009	0.1989	1.0254	0.0009	1.0254	0.0833
28	1400	0.0000	0.0000	0.0001	0.0284	0.1858	0.0002	0.3715	0.0657
29	1450	0.0000	0.0000	0.0006	0.1420	0.7867	0.0006	0.7867	0.0776
30	1500	0.0000	0.0000	0.0001	0.0284	0.1990	0.0002	0.3981	0.0613
31	1550	0.0000	0.0000	0.0004	0.0852	0.5046	0.0005	0.6727	0.0726
32	1600	0.0000	0.0000	0.0001	0.0284	0.2123	0.0004	0.6369	0.0575
33	1650	0.0000	0.0000	0.0007	0.1705	1.0742	0.0007	1.0742	0.0682
34	1700	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.4511	0.0541
35	1750	0.0000	0.0000	0.0001	0.0284	0.1899	0.0001	0.1899	0.0643
36	1800	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.2388	0.0511
37	1850	0.0000	0.0000	0.0006	0.1420	1.0037	0.0006	1.0037	0.0608
38	1900	0.0000	0.0000	0.0001	0.0284	0.2521	0.0002	0.5042	0.0484
39	1950	0.0000	0.0000	0.0002	0.0568	0.4232	0.0002	0.4232	0.0577
40	2000	0.0000	0.0000	0.0001	0.0284	0.2654	0.0001	0.2654	0.0460

5. Voltage Fluctuations & Flicker Test

5.1. Test Standard

Test Standard:	EN 61000-3-3

5.2. Test Setup



5.3. Test Procedure

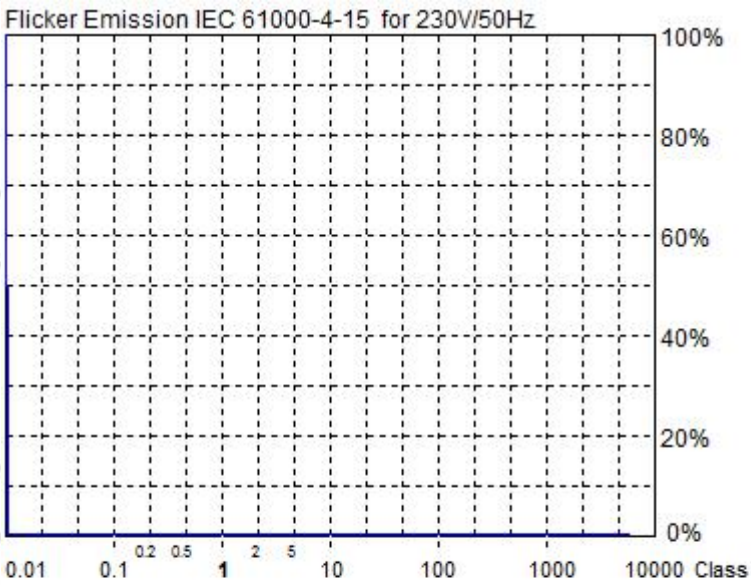
The table-top EUT is placed on the top of a wooden table 0.8 m above the ground (0.1 m for the floor-standing EUT) and operated to produce the most unfavorable sequence of voltage changes under normal conditions during the flicker measurement. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

5.4. Test Results

PASS

The test curves are shown in the following pages.

Flicker Test Summary (Run time)



Actual Flicker (Fli):	**0.00**
Short-term Flicker (Pst):	**0.07**
Limit (Pst):	1.00
Long-term Flicker (Plt):	**0.00**
Limit (Plt):	0.65
Maximum Relative Volt. Change (dmax):	**0.00%**
Limit (dmax):	4.00%
Relative Steady-state Voltage Change (dc):	**0.00%**
Limit (dc):	3.00%
Tmax 3.00% (dt):	**0.00ms**
Limit (dt>Lim):	200ms

Flicker Emission - IEC 61000-3-3 , EN 61000-3-3

Urms =	229.3	V	P =	95.47	W
Irms =	0.428	A	pf =	0.973	

Range: 2 A
V-nom: 230 V

Test aborted, Result: PASSED

HAR-1000 EMC-Partner

Full Bar : Actual Values
Empty Bar : Maximum Values
Circles : Average Values
Blue : Current , Green : Voltage , Red : Failed

Urms =	**229.3V**	**Freq =**	**50.000**	**Range:**	**2 A**
Irms =	**0.428A**	**Ipk =**	**0.574A**	**cf =**	**1.342**
P =	**95.47W**	**S =**	**98.09VA**	**pf =**	**0.973**

Test - Time : 10 x 1min = 10min (100 %)

LIN (Line Impedance Network) : L: 0.24ohm +j0.15ohm N: 0.16ohm +j0.10ohm

Limits :	**Plt :**	**0.65**	**Pst :**	**1.00**	
		dmax :	**4.00 %**	**dc :**	**3.00 %**
		dtLim:	**3.00 %**	**dt>Lim:**	**200ms**

Test aborted, Result: PASSED

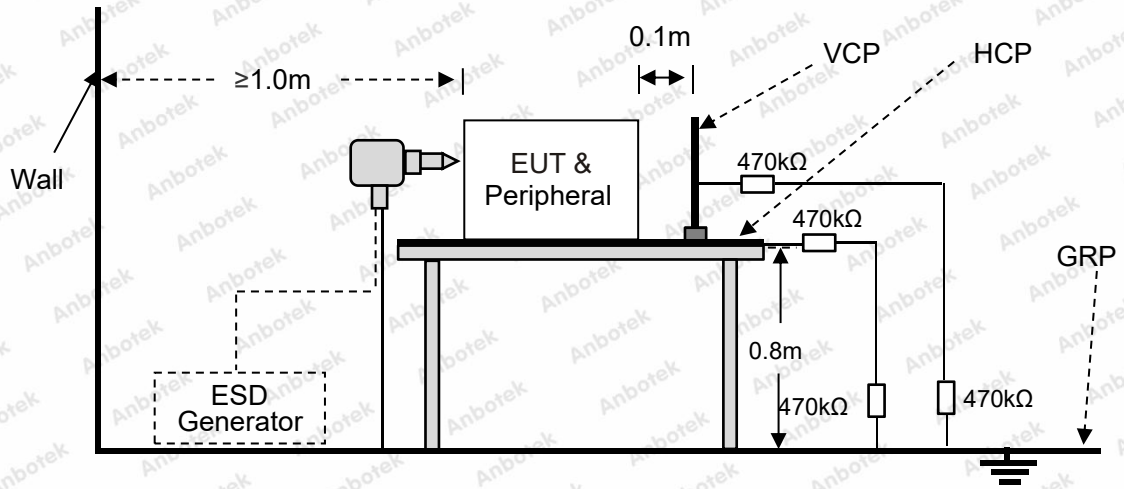
	dmax [%]	dc [%]	dt>Lim [ms]
1	0.000	0.000	0.000

6. Electrostatic Discharge Immunity Test

6.1. Test Specification

Test Standard :	EN IEC 61326-1	
Basic standard :	IEC 61000-4-2: 2008	
Performance criteria:	B	
Test Level :	± 8kV (Air Discharge)	± 4kV (Contact Discharge)

6.2. Test Setup



6.3. Test Procedure

a. In the case of air discharge testing, the climatic conditions shall be within the following ranges:
- Ambient temperature: 15°C to 35°C;
- Relative humidity: 30% to 60%;
- Atmospheric pressure: 86 kPa (860 mbar) to 106 kPa (1060 mbar)

b. In the case of contact discharges, the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

c. In the case of painted surface covering a conducting substrate, the following procedure shall be adopted: - If the coating is not declared to be an insulating coating by the equipment manufacturer, then the pointed tip of the generator shall penetrate the coating so as to make contact with the conducting substrate. - Coating declared as insulating by the manufacturer shall only be submitted to the air discharge. - The contact discharge test shall not be applied to such surfaces.

d. In the case of air discharges, the round discharge tip of the discharge electrode shall be approached as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator (discharge electrode) shall be removed from the EUT. The generator is then retriggered for a new single discharge. This procedure shall be repeated until the discharges are completed. In the case of an air discharge test, the discharge switch, which is used for contact discharge, shall be closed.

e. The test voltage shall be increased from the minimum to the selected test severity level, in order to determine any threshold of failure. The final test level should not exceed the product specification value in order to avoid damage to the equipment.

f. The test shall be performed with both air discharge and contact discharge. The test shall be performed with single discharges. On each pre-selected point at least 10 single discharges (in the most sensitive polarity) shall be applied. For the time interval between successive single discharges an initial value of 1 s is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.

g. Ensure that the applied charge on the EUT has been dis-charged before next ESD pulse.

6.4. Test Results

PASS

Please refer to the following page.

Electrostatic Discharge Test Results

Test Result:	☒ Pass ☐ Fail	Temperature:	22.3℃
Power Supply:	AC 230V,50Hz	Humidity:	46%

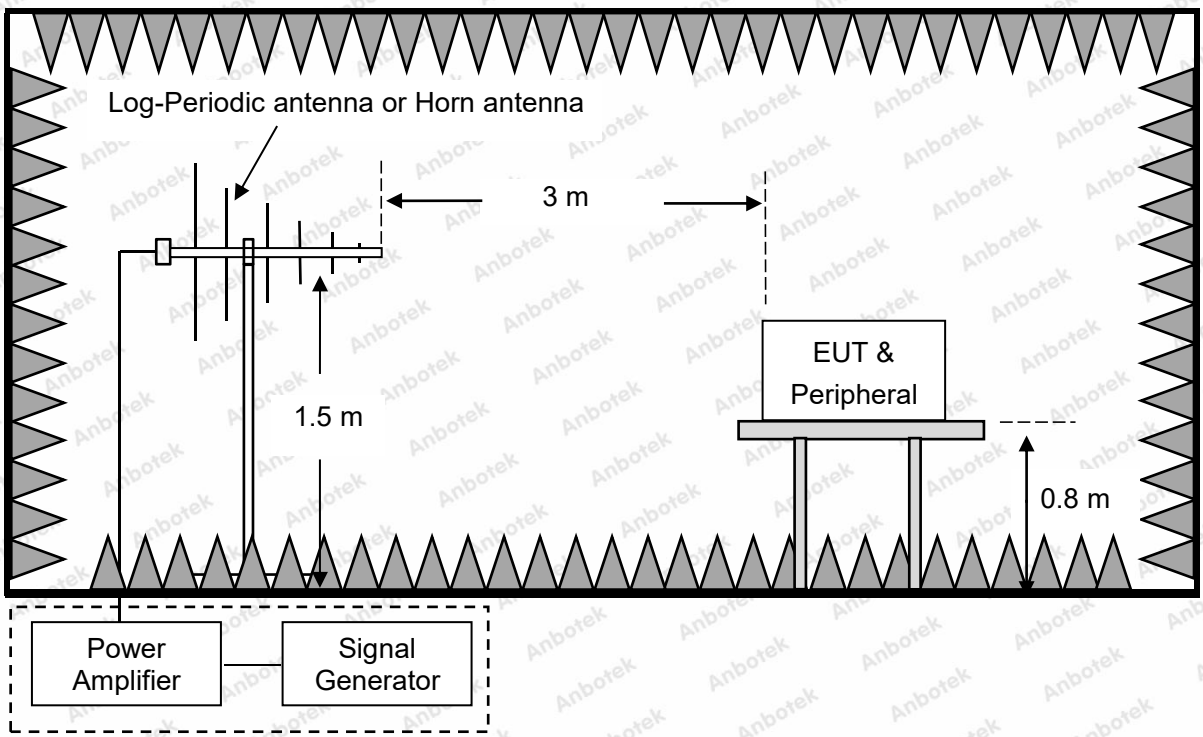
Location		Kind A-Air Discharge C-Contact Discharge	Result
Air discharge: ±2.0 kV, ±4.0 kV, ±8.0 kV		Contact discharge: ±4.0 kV	
Slot	4 points	A	☒A ☐B ☐C
Screen	4 points	A	☒A ☐B ☐C
Button	4 points	A	☒A ☐B ☐C
Metal	4 points	C	☒A ☐B ☐C
Lan port	4 points	C	☒A ☐B ☐C
HCP	4 points	C	☒A ☐B ☐C
VCP of the front	4 points	C	☒A ☐B ☐C
VCP of the rear	4 points	C	☒A ☐B ☐C
VCP of the left	4 points	C	☒A ☐B ☐C
VCP of the right	4 points	C	☒A ☐B ☐C
Note: N/A			

7. RF Field Strength Immunity Test

7.1. Test Specification

Test Standard:	EN IEC 61326-1	
Basic standard:	IEC 61000-4-3: 2020	
Test level:	☒ Basic Requirements	80MHz - 1GHz & 3V/m; Performance criteria:A 1.4GHz - 6GHz & 3V/m; Performance criteria:A
	☐ Requirements for industrial sites	80MHz - 1GHz & 10V/m; Performance criteria:A 1.4GHz - 6GHz & 3V/m; Performance criteria:A
	☐ Requirements for controlled electromagnetic environment	80MHz - 1GHz & 1V/m; Performance criteria:A 1.4GHz - 6GHz & 1V/m; Performance criteria:A
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	

7.2. Test Setup



7.3. Test Procedure

The procedure defined in this part requires the generation of electromagnetic fields within which the test sample is placed and its operation observed. To generate fields that are useful for simulation of actual (field) conditions may require significant antenna drive power and the resultant high field strength levels. To comply with local regulations and to prevent biological hazards to the testing personnel, it is recommended that these tests be carried out in a shielded enclosure or semi-anechoic chamber.

a. The antenna is placed 3 m from the equipment. The required field strength is determined by placing the field strength meter(s) on top of or directly alongside the equipment under test and monitoring the field strength meter via a remote field strength indicator outside the enclosure while adjusting the continuous-wave to the antenna.

b. The test shall normally be performed with the generating antenna facing each side of the EUT. When equipment can be used in different orientations (i.e. vertical or horizontal) all sides shall be exposed to the field during the test. When technically justified, some EUTs can be tested by exposing fewer faces to the generating antenna. In other cases, as determined for example by the type and size of EUT or the frequencies of test, more than four azimuths may need to be exposed.

c. The polarization of the field generated by each antenna necessitates testing each selected side twice, once with the antenna positioned vertically and again with the antenna positioned horizontally.

d. The step size of the frequency is set to 1%. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised and to be able to respond. However, the dwell time should not exceed 5 s at each of the frequencies during the scan.

7.4. Test Results

PASS

Please refer to the following page.

RF Field Strength Susceptibility Test Results

Test Result:	☒ Pass ☐ Fail	Temperature:	22.9℃
Power Supply:	AC 230V,50Hz	Humidity:	51%

Frequency Range	Antenna Polarity	R.F. Field Strength	Dwell Time	Azimuth	Result
80 MHz ~ 1000 MHz	H / V	☐ 10 V/m ☒ 3 V/m ☐ 1 V/m	1s	Front Rear Left Right	☒ A ☐ B ☐ C
1.4 GHz ~ 6 GHz	H / V	☒ 3 V/m ☐ 1 V/m	1s	Front Rear Left Right	☒ A ☐ B ☐ C
Note: N/A					

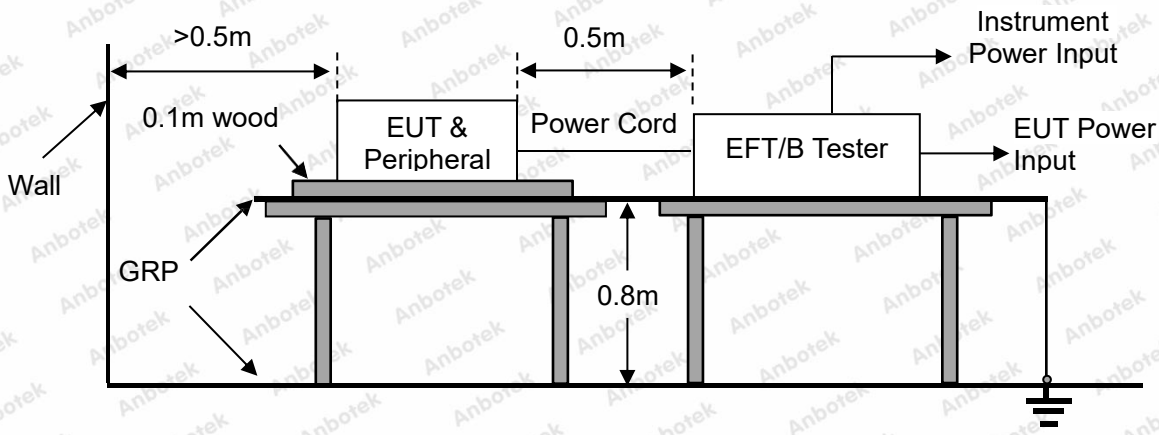
8. Electrical Fast Transient/Burst Immunity Test

8.1. Test Specification

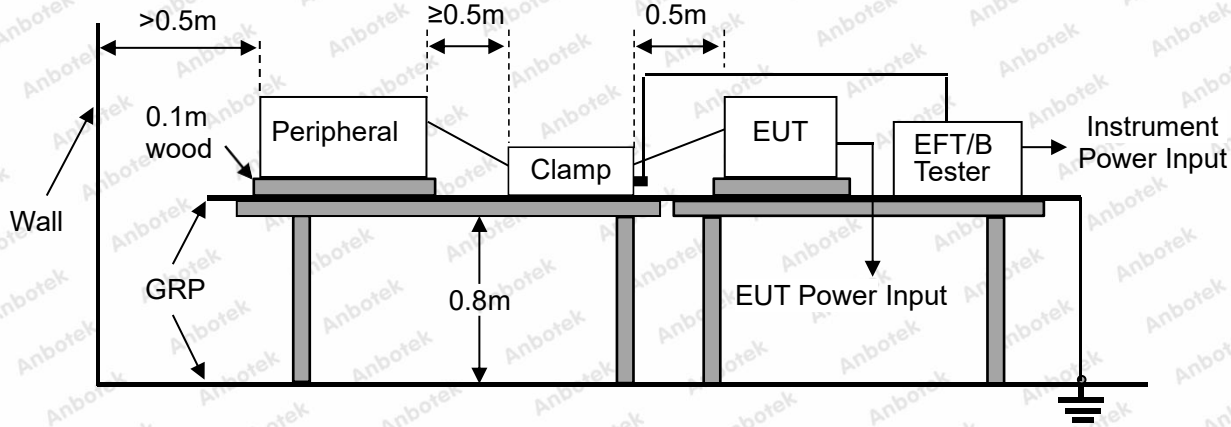
Test Standard:		EN IEC 61326-1
Basic standard:		IEC 61000-4-4: 2012
Performance criteria:		B
Test Level	☒ Basic Requirements	☒ 1 kV, AC mains power ports
		☐ 1 kV, DC power ports
		☐ 0.5 kV, I/O ports(Including functional earth)
		☐ 1 kV, I/O ports(Connected directly to mains supply)
	☐ Requirements for industrial sites	☐ 2 kV, AC mains power ports
		☐ 2 kV, DC power ports
		☐ 1 kV, I/O ports(Including functional earth)
		☐ 2 kV, I/O ports(Connected directly to mains supply)
	☐ Requirements for controlled electromagnetic environment	☐ 1 kV, AC mains power ports
		☐ 1 kV, DC power ports
		☐ 0.5 kV, I/O ports(Including functional earth)

8.2. Test Setup

AC mains power ports and DC network power ports:



I/O ports:



8.3. Test Procedure

The table-top EUT is placed on a table that is 0.8 m height, a ground reference plane is placed on the table, and uses 0.1 m insulation between the EUT and ground reference plane. The floor-standing EUT is placed on a ground reference plane and insulated from it by an insulating support with a thickness of 0.1 m. This reference ground plane shall project beyond the EUT by at least 0.1 m 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 0.5 m.

All cables to the EUT shall be placed on the insulation support 0.1 m above the ground reference plane. Cables not subject to electrical fast transients shall be routed as far as possible from the cable under test to minimize the coupling between the cables.

8.4. Test Results

PASS

Please refer to the following page.

Electrical Fast Transient/Burst Test Results

Test Result:	☒ Pass ☐ Fail	Temperature:	22.5℃
Power Supply:	AC 230V,50Hz	Humidity:	48%

Ports	Polarity	Inject Time(s)	Test Voltage (kV)	Result
AC mains power ports	±	120 s	☒ 1.0 kV ☐ 2.0 kV	☒A ☐B ☐C
DC power ports	±	120 s	☐ 1.0 kV ☐ 2.0 kV	☐A ☐B ☐C
I/O ports	±	120 s	☐ 0.5 kV ☐ 1.0 kV	☐A ☐B ☐C

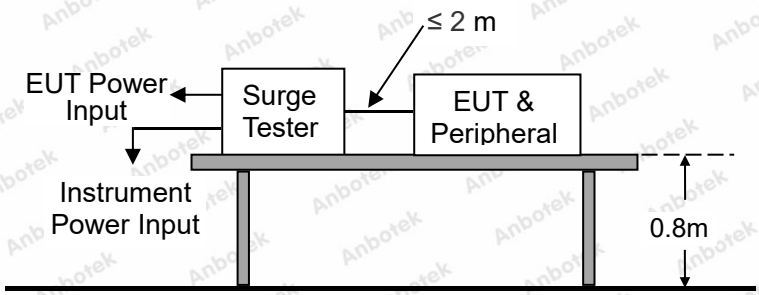
Note: N/A

9. Surge Immunity Test

9.1. Test Specification

Test Standard:		EN IEC 61326-1
Basic standard:		IEC 61000-4-5: 2014+A1:2017
Performance criteria:		B
Test level:	☒ Basic Requirements	☒ AC mains power ports; Line - Line/0.5KV; Line - Ground/1KV
		☐ DC power ports; Line - Line/0.5KV; Line - Ground/1KV
		☐ I/O ports(Including functional earth); Line - Ground/1KV
		☐ I/O ports(Connected directly to mains supply); Line - Line/0.5KV; Line - Ground/1KV
	☐ Requirements for industrial sites	☐ AC mains power ports; Line - Line/1KV; Line - Ground/2KV
		☐ DC power ports; Line - Line/1KV; Line - Ground/2KV
		☐ I/O ports(Including functional earth); Line - Ground/1KV
		☐ I/O ports(Connected directly to mains supply); Line - Line/1KV; Line - Ground/2KV
	☐ Requirements for controlled electromagnetic environment	☐ AC mains power ports; Line - Line/0.5KV; Line - Ground/1KV
Number of surges		5 (for each combination of parameters)
Repetition rate		1 minute / time
Polarity:		Positive / Negative
Phase angle:		90°, 270° (Only AC mains power ports)

9.2. Test Setup



9.3. Test Procedure

Table-top EUT is placed on a table of 0.8 m heights above a metal ground reference plane. Floor standing EUT is placed on a ground reference plane and insulated from it by an insulating support with a thickness of 0.1 m. The length of the power cord between the EUT and the coupling/decoupling network is not more than 2 m, and the length of the interconnection line between the EUT and the coupling/decoupling network is not more than 2 m. The tests were done at repetition rate 1 per minute.

9.4. Test Results

PASS

Please refer to the following page.

Surge Immunity Test Results

Test Result:	☒ Pass ☐ Fail	Temperature :	22.5℃
Power Supply :	AC 230V,50Hz	Humidity :	48%

Location	Polarity	Phase Angle	Number of Pulse	Pulse Voltage (kV)	Result
☒ AC power port					
L1-L2	±	☒0° ☒90° ☒180° ☒270°	5	☒ 0.5 kV ☐ 1 kV	☒A ☐B ☐C
L1-L3	±	☒0° ☒90° ☒180° ☒270°	5	☒ 0.5 kV ☐ 1 kV	☒A ☐B ☐C
L2-L3	±	☒0° ☒90° ☒180° ☒270°	5	☒ 0.5 kV ☐ 1 kV	☒A ☐B ☐C
L1-N	±	☒0° ☒90° ☒180° ☒270°	5	☒ 0.5 kV ☐ 1 kV	☒A ☐B ☐C
L2-N	±	☒0° ☒90° ☒180° ☒270°	5	☒ 0.5 kV ☐ 1 kV	☒A ☐B ☐C
L3-N	±	☒0° ☒90° ☒180° ☒270°	5	☒ 0.5 kV ☐ 1 kV	☒A ☐B ☐C
L1-GND	±	☒0° ☒90° ☒180° ☒270°	5	☒ 1 kV ☐ 2 kV	☒A ☐B ☐C
L2-GND	±	☒0° ☒90° ☒180° ☒270°	5	☒ 1 kV ☐ 2 kV	☒A ☐B ☐C
L3-GND	±	☒0° ☒90° ☒180° ☒270°	5	☒ 1 kV ☐ 2 kV	☒A ☐B ☐C
N-GND	±	☒0° ☒90° ☒180° ☒270°	5	☒ 1 kV ☐ 2 kV	☒A ☐B ☐C
Note: N/A					

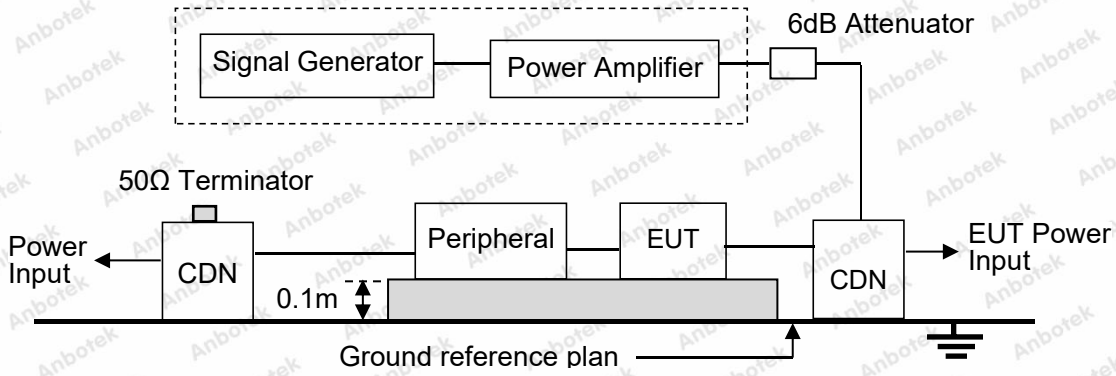
10. Injected Currents Susceptibility Test

10.1. Test Specification

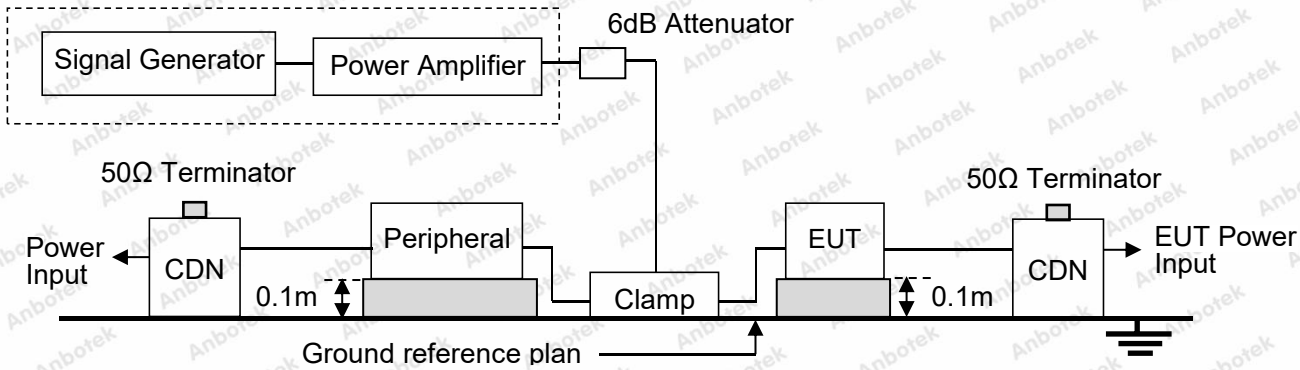
Test Standard:		EN IEC 61326-1
Basic standard:		IEC 61000-4-6: 2013
Performance criteria:		A
Frequency range:		0.15MHz - 80MHz
Test level:	☒ Basic Requirements	3V
	☐ Requirements for industrial sites	3V
	☐ Requirements for controlled electromagnetic environment	1V
Modulation:		AM 80%, 1kHz sine-wave
Frequency Step:		1% of fundamental

10.2. Test Setup

CDN injection:



Clamp injection:



10.3. Test Procedure

a. The EUT and peripheral are placed on an insulating support of 0.1 m height above a ground reference plan. The distance between EUT and CDN is 0.1 m to 0.3 m. All cables exiting the EUT are supported at a height of at least 30 mm above the ground reference plan.

b. The frequency range is swept from 150 kHz to 80MHz, with the signal 80% amplitude modulated with a 1 kHz sine wave. The rate of sweep did not exceed 1.5x 10-3 decade/s. The frequency range is swept incrementally. The step size was 1% of fundamental from 0.15MHz to 80MHz.

c. The dwell time at each frequency isn't less than the time necessary for the EUT to be able to respond.

10.4. Test Results

PASS

Please refer to the following page.

Injected Currents Susceptibility Test Results

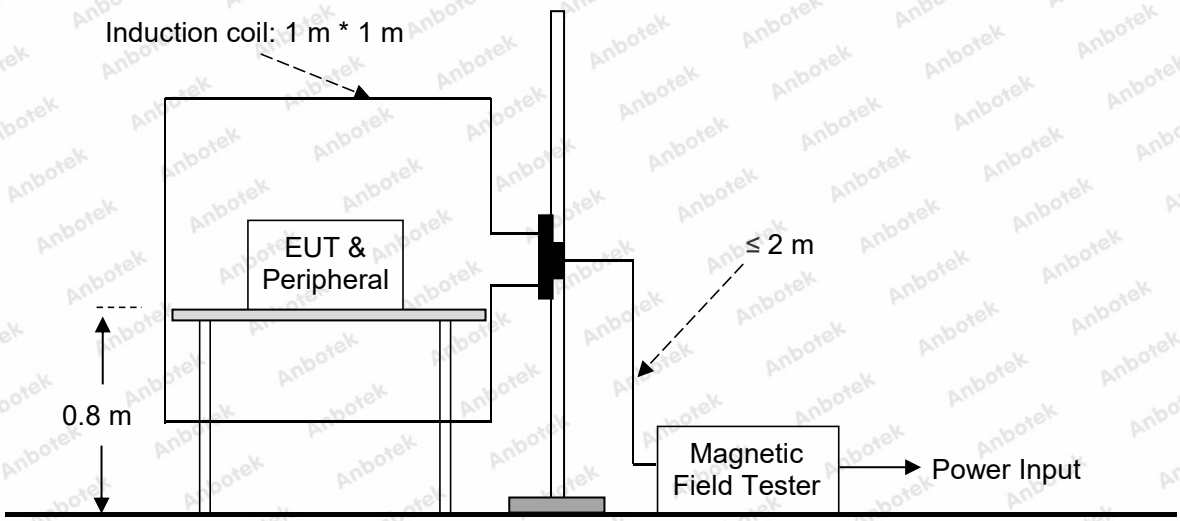
Test Result:	☒ Pass ☐ Fail	Temperature:	22.5℃
Power Supply:	AC 230V,50Hz	Humidity:	48%
Frequency Range (MHz)	Injected Position	Voltage (Un-modulated)	Result
☒ Basic Requirements			
0.15 ~ 80	☒ AC Mains ☐ DC power ☐ I/O ports	3V	☒A ☐B ☐C
☐ Requirements for industrial sites			
0.15 ~ 80	☐ AC Mains ☐ DC power ☐ I/O ports	3V	☐A ☐B ☐C
☐ Requirements for controlled electromagnetic environment			
0.15 ~ 80	☐ AC Mains ☐ DC power ☐ I/O ports	1V	☐A ☐B ☐C
Note: N/A			

11. Power Frequency Magnetic Field Immunity Test

11.1. Test Specification

Test Standard:	EN IEC 61326-1	
Basic Standard	IEC 61000-4-8: 2009	
Performance criteria	A	
Test level	☒ Basic Requirements	3 A/m
	☐ Requirements for industrial sites	30 A/m

11.2. Test Setup



11.3. Test Procedure

Table-top EUT is placed on a table that is 0.8 m height. Floor standing EUT is placed on a ground reference plane and insulated from it by an insulating support with a thickness of 0.1 m.

The EUT is placed in the middle of an induction coil. The proximity method is used when the EUT does not fit into the standard inductive coil

11.4. Test Results

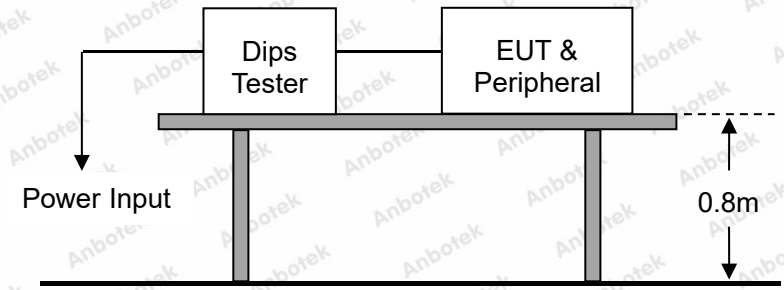
Not applicable.

12. Voltage Dips and Interruptions Immunity Test

12.1. Test Specification

Test Standard:	EN IEC 61326-1	
Basic standard:	IEC 61000-4-11: 2020	
Test level:	☒ Basic Requirements	☒ 0%, 0.5 period, Criterion B
		☒ 0%, 1 periods, Criteria B
		☒ 70%, 25 periods, Criteria C
		☒ 0%, 250 periods, Criteria C
	☐ Requirements for industrial sites	☐ 0%, 1 period, Criterion B
		☐ 40%, 10 periods for 50Hz, Criteria C
		☐ 70%, 25 periods for 50Hz, Criteria C
		☐ 0%, 250 periods for 50Hz, Criteria C

12.2. Test Setup



12.3. Test Procedure

a. Where the equipment has a rated voltage the following shall apply:
- If the voltage range does not exceed 20% of the lower voltage specified for the rated voltage range, a single voltage within that range may be specified as a basis for test level specification.
- In all other cases, the test procedure shall be applied for both the lowest and highest voltages declared in the voltage range.
b. Test Conditions
- Select operated voltage and frequency of EUT - Test of interval: 10 sec.
- Level and duration: Sequence of 3 dips/interrupts.
- Voltage rise (and fall) time: 1.5 μs.
c. Changes to occur at 0 degree crossover point of the voltage waveform.

12.4. Test Results

PASS

Please refer to the following page.

Voltage Dips and Interruptions Test Results

Test Result:	☒ Pass ☐ Fail	Temperature :	21.1℃
Power Supply :	AC 230V,50Hz	Humidity :	44%
Test Level % UT	Voltage Dips & Short Interruptions % UT	Duration (in periods)	Result
☒ Basic Requirements			
0	100	0.5P	☒A ☐B ☐C
0	100	1P	☒A ☐B ☐C
70	30	25P	☒A ☐B ☐C
☐ Requirements for industrial sites			
0	100	1P	☐A ☐B ☐C
40	60	10P	☐A ☐B ☐C
70	30	25P	☐A ☐B ☐C
Test Level % UT	Voltage Dips & Short Interruptions % UT	Duration (in periods)	Result
0	100	250P	☐A ☐B ☒C
Note: N/A			

APPENDIX I -- TEST SETUP PHOTOGRAPH

Photo of Power Line Conducted Emission Test

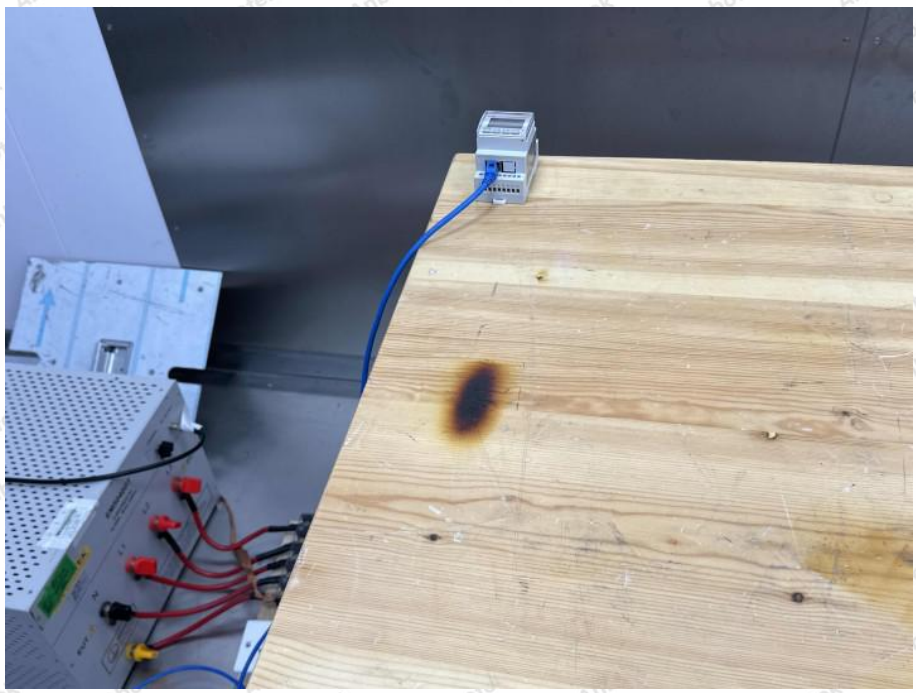


Photo of Radiated Emission Test (Below 1 GHz)

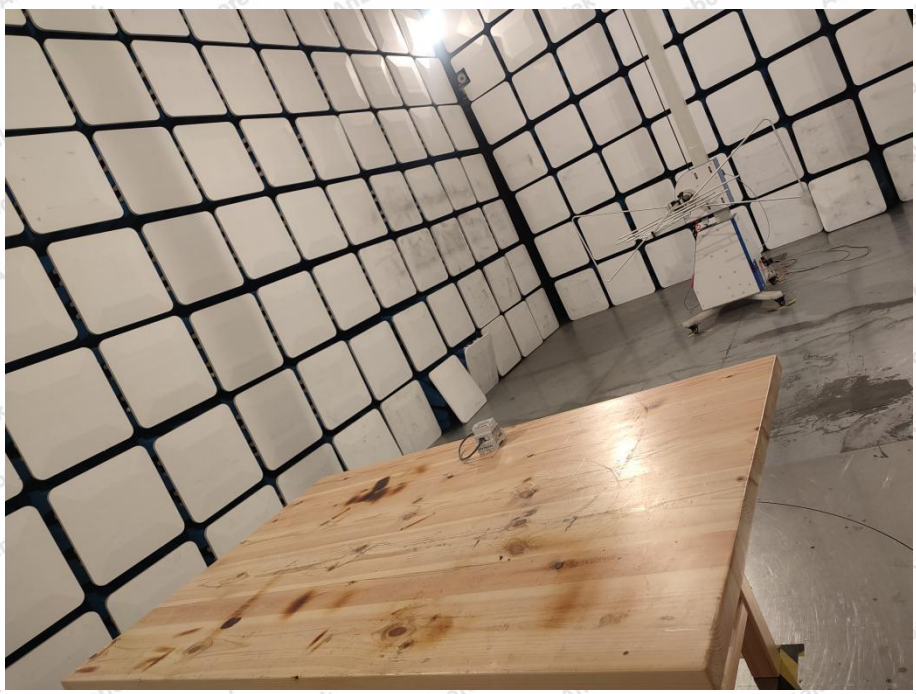


Photo of Harmonic Current And Flicker Test

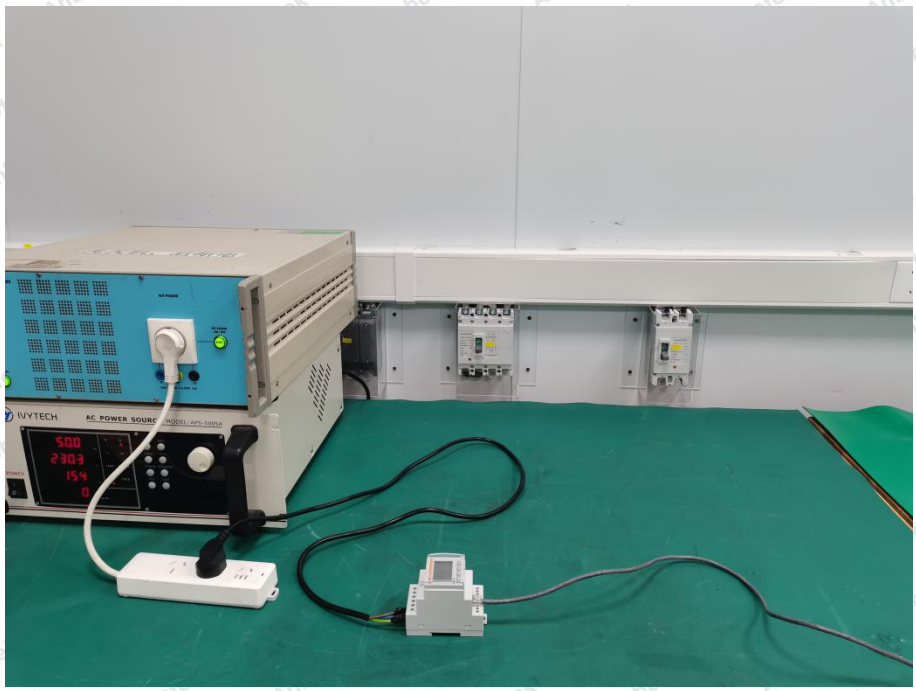


Photo of Electrostatic Discharge Immunity Test

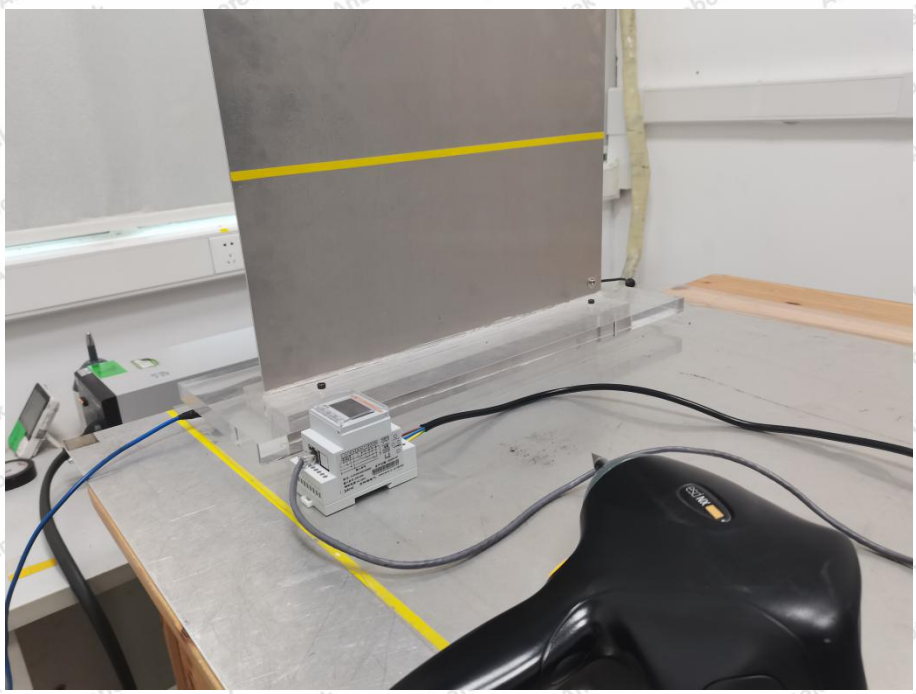


Photo of RF Field Strength Immunity Test

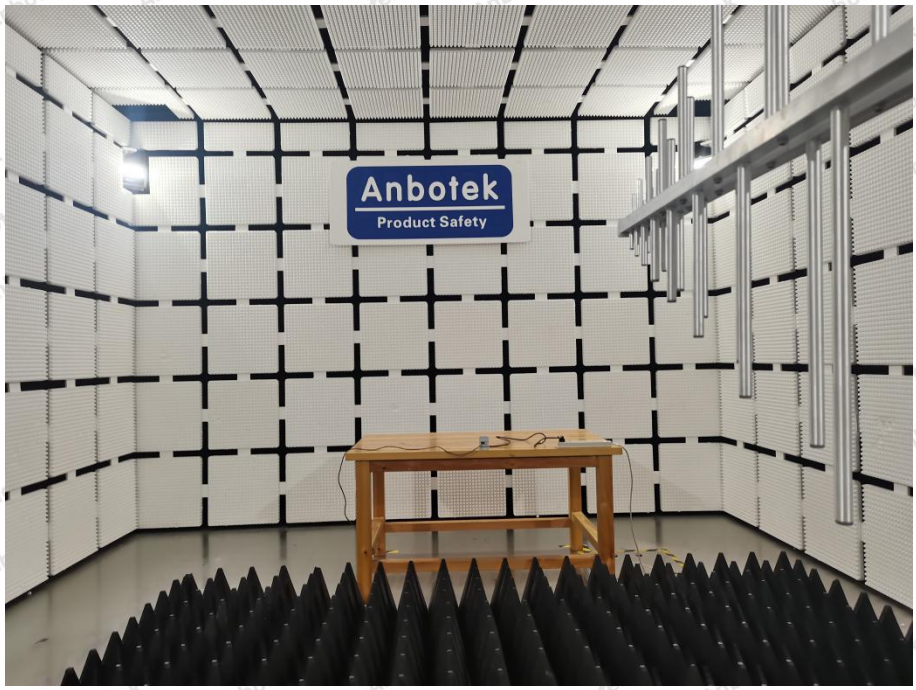


Photo of Electrical Fast Transient/Burst Immunity Test



Photo of Surge Immunity Test



Photo of Injected Currents Susceptibility Test

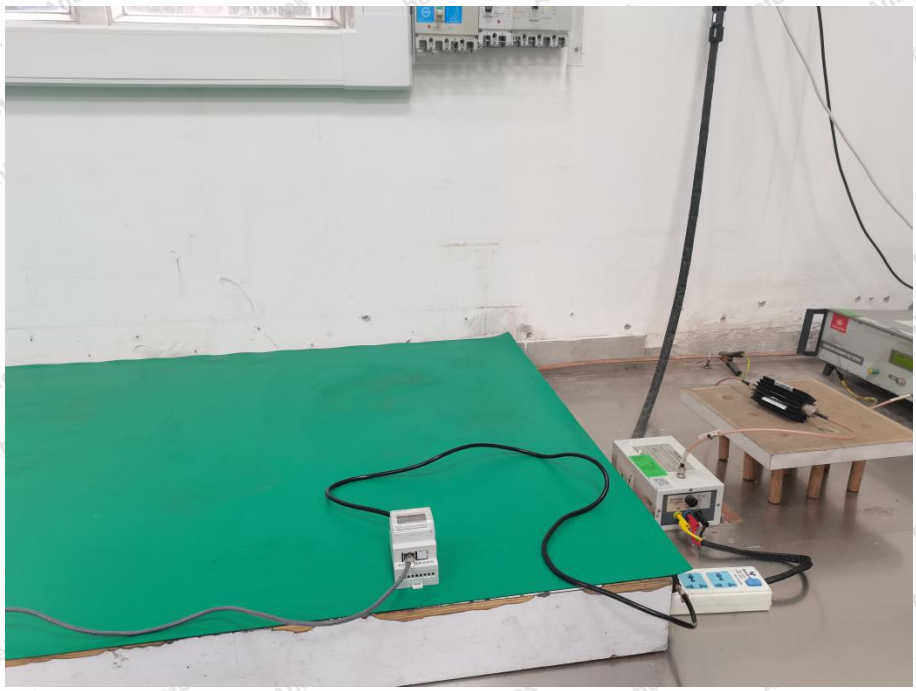


Photo of Voltage Dips and Interruptions Immunity Test



APPENDIX II -- Photo documentation

Photo 1

Top



Photo 2

Front

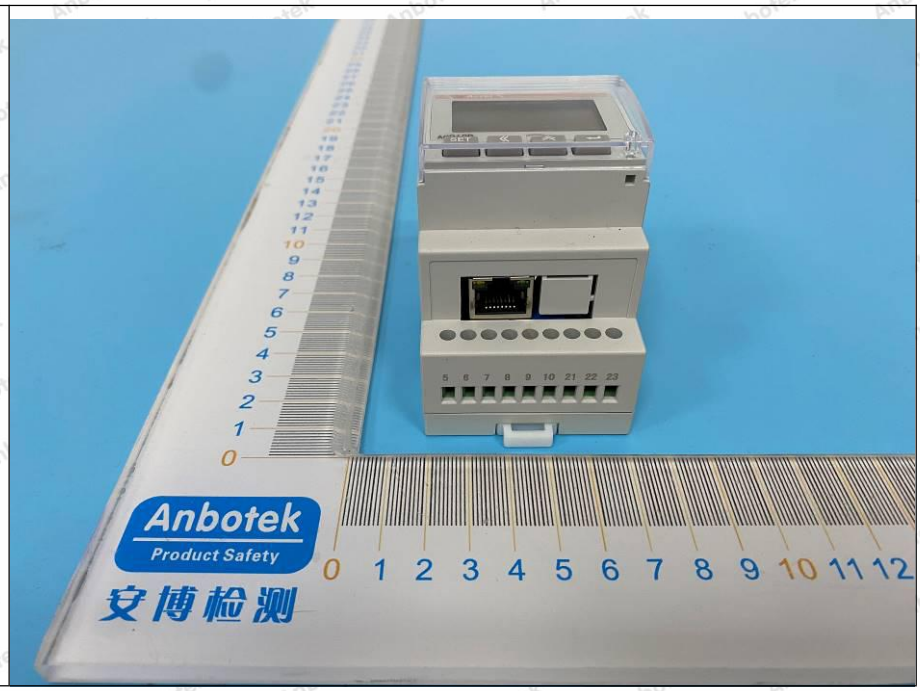


Photo 3

Side

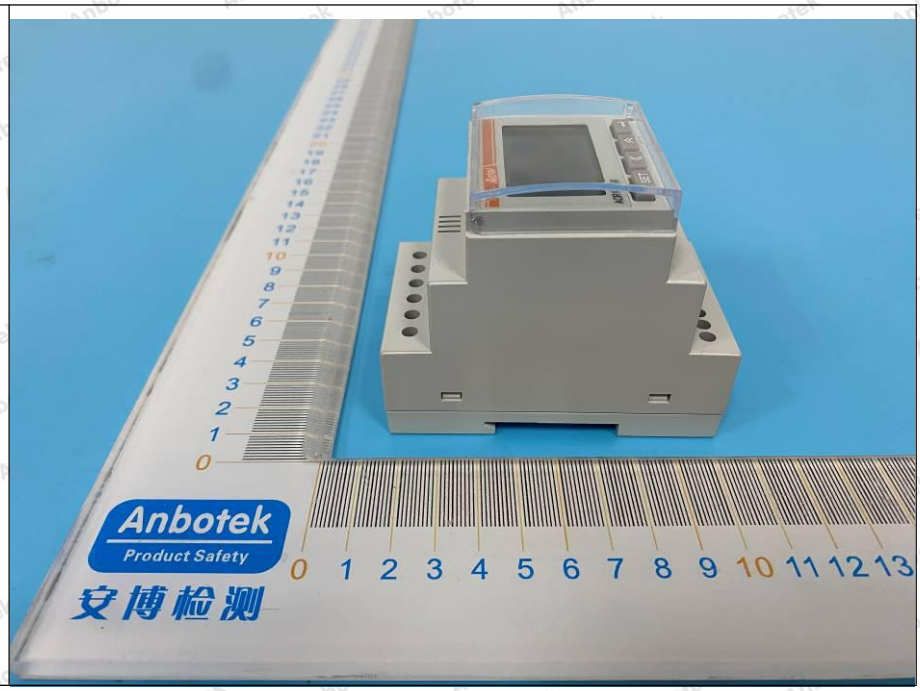


Photo 4

Rear

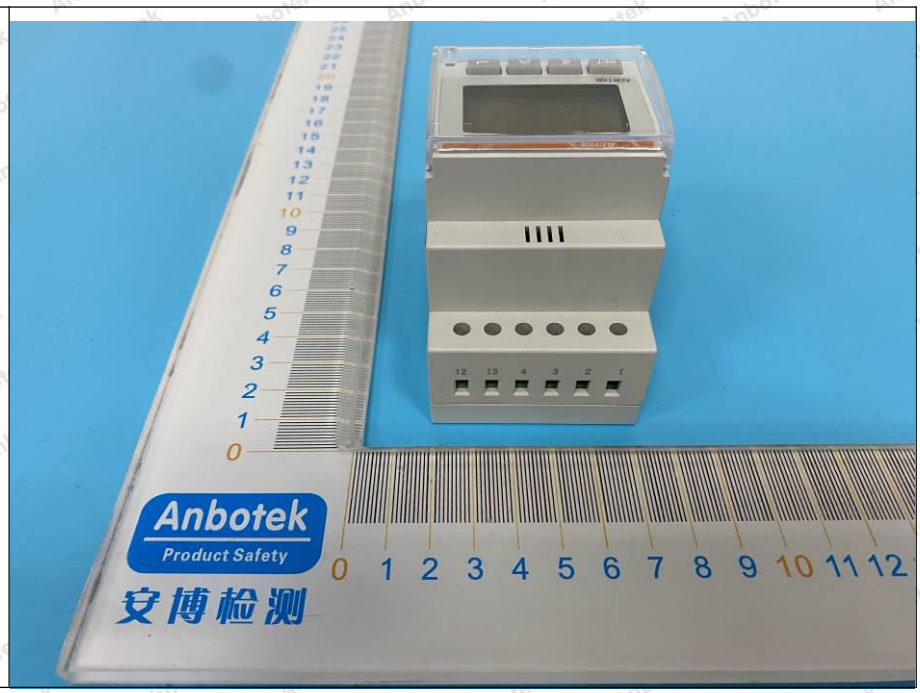


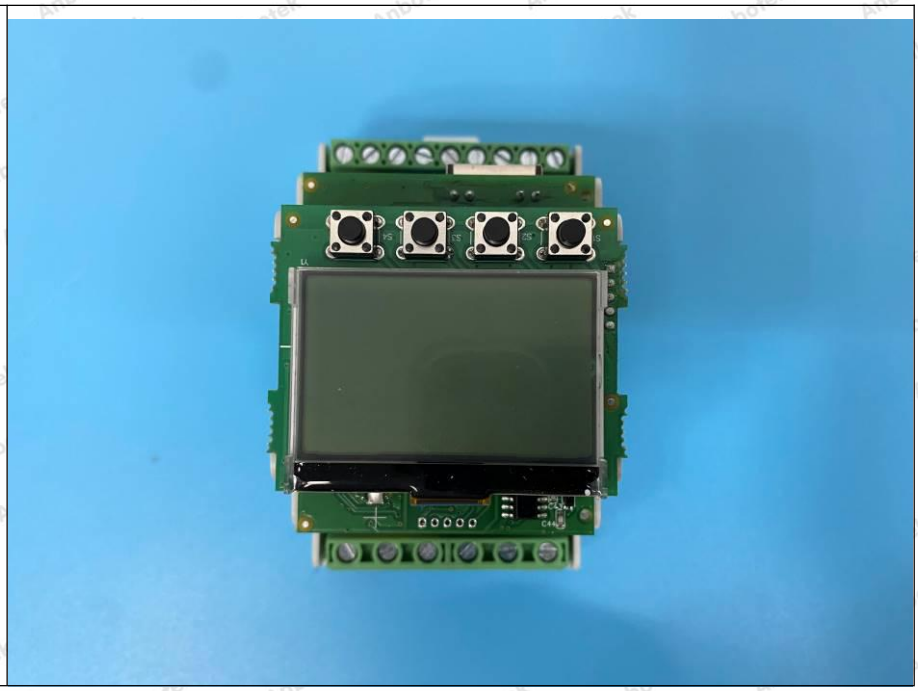
Photo 5 **Internal**	

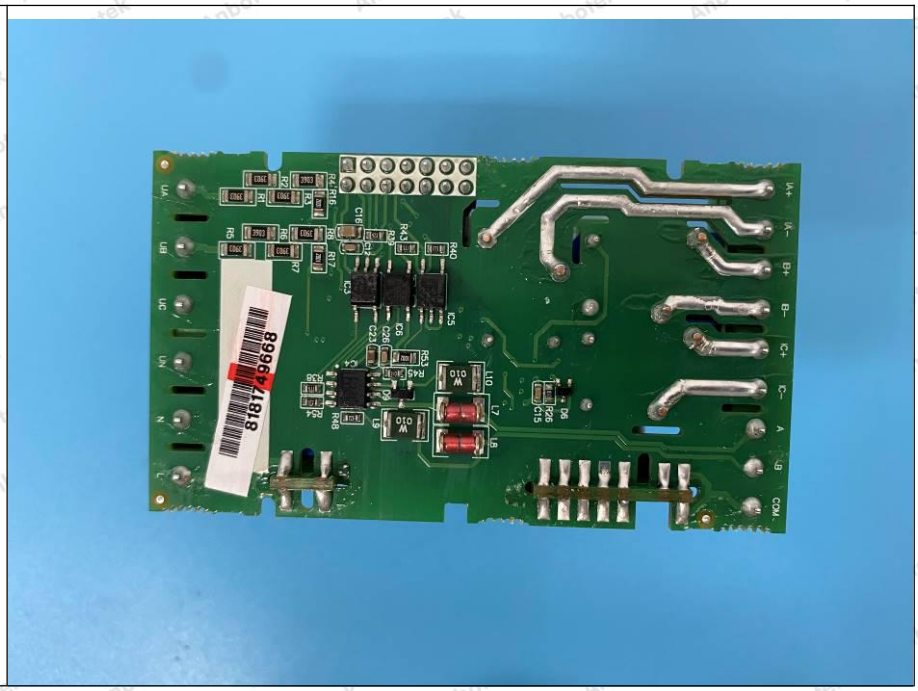
Photo 6 **Internal**	

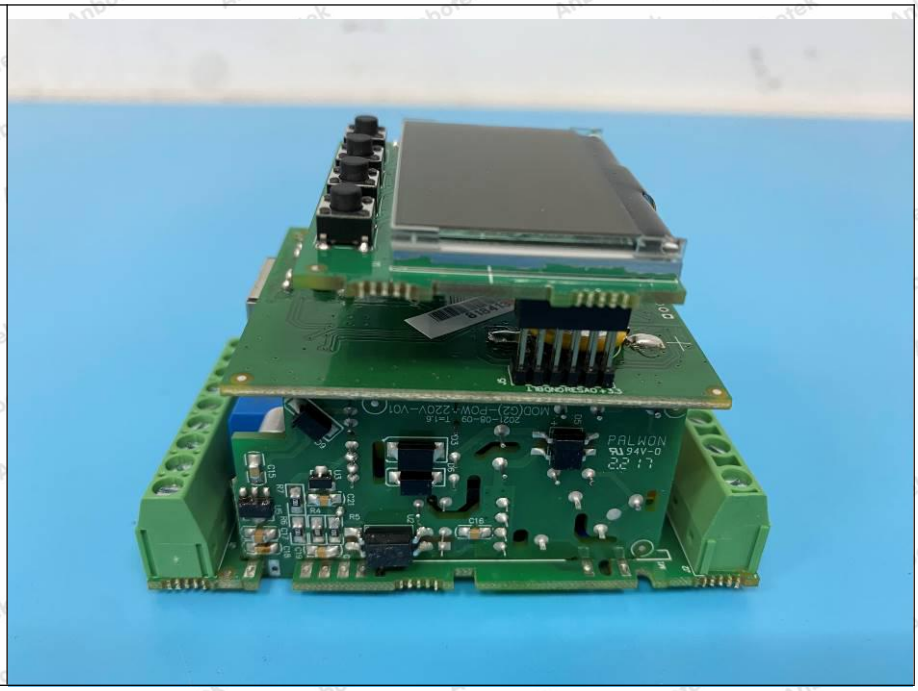
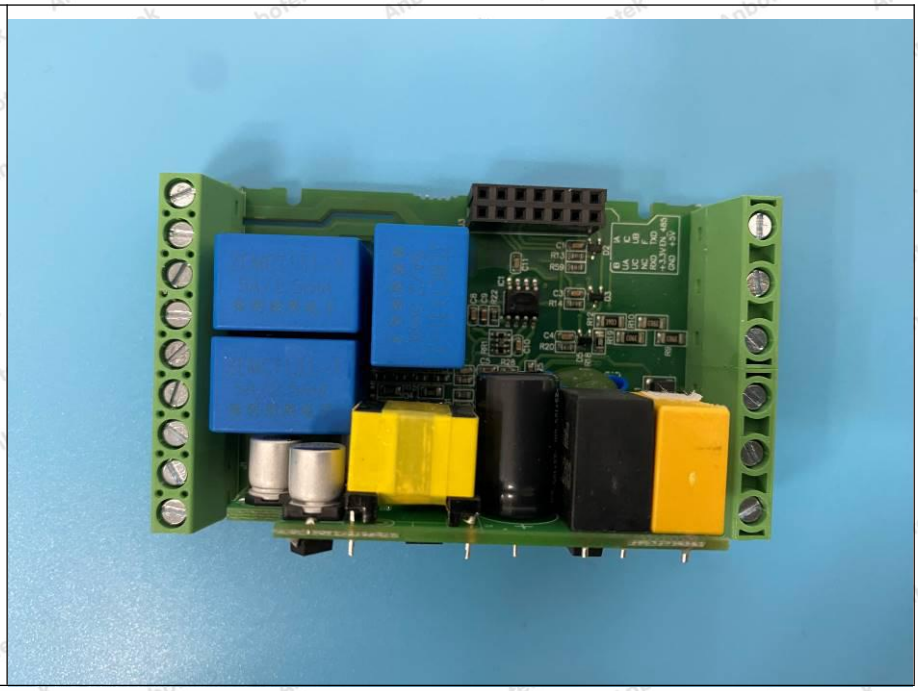
Photo 7 **Internal**	

Photo 8 **Internal**	

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 ----------