TEST REPORT

Application No.:	SHEM2310006675MI
Applicant:	Acrel Co., Ltd.
Address of Applicant:	No.253, Yulv Road, Jiading, Shanghai, China
Manufacturer:	Acrel Co., Ltd.
Address of Manufacturer:	No.253, Yulv Road, Jiading, Shanghai, China
Factory:	Jiangsu Acrel Electrical Manufacturing. Co., Ltd.
Address of Factory:	No.5, Dongmeng Road, Nanzha, Jiangyin, Jiangsu, China
Equipment Under Test (EUT):	
EUT Name:	Three Phase prepayment meter
Model No.:	DTSY1352, DTSY1352-NK, ADL300EY, ADL300EY-NK
Standard(s) :	IEC 61326-1: 2020
Date of Receipt:	2023-10-24
Date of Test:	2023-10-31 to 2023-11-09
Date of Issue:	2023-11-13
Test Result:	**Pass***

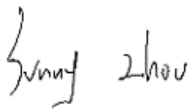
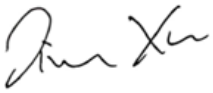
* In the configuration tested, the EUT complied with the standards specified above.

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

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Revision Record			
Version	**Description**	**Date**	**Remark**
00	Original	2023-11-13	/

Authorized for issue by:				
Tested By		 **Sunny Zhou/Project Engineer**		
Approved By		 **Jim Xu/Reviewer**		

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2 Test Summary

Emission Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Conducted Emissions at AC Mains Power Port (150kHz-30MHz)	IEC 61326-1: 2020	CISPR 11:2015	Group 1 Class B	Pass
Radiated Emission (30MHz-1GHz)		CISPR 11:2015	Group 1 Class B	Pass
Harmonic Current Emission		IEC 61000-3-2:2018	N/A	N/A*
Voltage Fluctuations and Flicker		IEC 61000-3-3:2015	Clause 5	Pass

N/A*: Not applicable, please refer to section 6.3 of this report for more details.

Immunity Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Electrostatic Discharge	IEC 61326-1: 2020	IEC 61000-4-2:2008	4kV Contact Discharge, 8kV Air Discharge	Pass
Radiated Immunity (80MHz-1GHz, 1.4GHz-6GHz)		IEC 61000-4-3:2006	10V/m 80MHz to 1GHz, 3V/m 1.4GHz to 6GHz, Modulation: 1kHz,80% Amp. Mod, 1% increment	Pass
Electrical Fast Transients Burst at AC Mains Power Port		IEC 61000-4-4:2012	2kV,5/50ns Tr/Td,5kHz Repetition Frequency	Pass
Electrical Fast Transients&Burst at Signal Port		IEC 61000-4-4:2012	2kV,5/50ns Tr/Td,5kHz Repetition Frequency	Pass
Conducted Immunity at AC Mains Power Port (150kHz-80MHz)		IEC 61000-4-6:2013	3 Vrms: 0.15MHz - 80MHz,80%,1kHz Amp. Mod.	Pass
Conducted Immunity at Signal Port (150kHz-80MHz)		IEC 61000-4-6:2013	3 Vrms: 0.15MHz - 80MHz,80%,1kHz Amp. Mod.	Pass
Surge at AC Mains Power Port		IEC 61000-4-5:2014	1.2/50μs Tr/Td, 1.0kV Line to Line, 2.0kV Line to Ground	Pass
Surge at Signal Port		IEC 61000-4-5:2014	1.2/50μs Tr/Td, 1.0kV Line to Line, 2.0kV Line to Ground	Pass
Power Frequency Magnetic Field		IEC 61000-4-8:2009	50Hz, 60Hz 30A/m	Pass
Voltage Dips and Interruptions		IEC 61000-4-11:2020	0% of UT (Supply Voltage) for 1 Cycle; 40% of UT for 10 Cycles; 0% of UT for 250 Cycles; 70% of UT for 25 Cycles;	Pass

Note1: There are series models mentioned in this report and they are the similar in electrical and electronic characters. Only the model DTSY1352 was tested since their difference was model number.

Note2: The test data is based on SHEM231000667301 that issued by SGS.

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4 General Information

4.1 Details of E.U.T.

Power supply:	3*220/380V 3*10(80A) 50Hz ⩽10W Test voltage: AC220V/50Hz

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Laptop	LENOVO	L460	-

4.3 Measurement Uncertainty & Decision Rule

Measurement Uncertainty:

No.	Item	Measurement Uncertainty (U_{Lab})	U_{CISPR}
1	Conducted Emission at mains port using AMN	3.4dB (9kHz to 150kHz)	3.8dB (9kHz to 150kHz)
		2.9dB (150kHz to 30MHz)	3.4dB (150kHz to 30MHz)
2	Conducted Emission at mains port using VP	2.2dB (9kHz to 30MHz)	2.9dB (9kHz to 30MHz)
3	Conducted Emission at telecommunication port using AAN	4.6dB (150kHz to 30MHz)	5.0dB (150kHz to 30MHz)
4	Radiated Power	3.4dB (30MHz to 300MHz)	4.5dB (30MHz to 300MHz)
5	Radiated emission	5.7dB (30MHz-1GHz)	6.3dB (30MHz-1GHz)
		4.8dB (1GHz-6GHz)	5.2dB (1GHz-6GHz)
		5.0dB (6GHz-18GHz)	5.5dB (6GHz-18GHz)
6	Radiated disturbance (disturbance current in a LLAS)	2.6dB (9kHz to 30MHz)	3.3dB (9kHz to 30MHz)

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Decision Rule:

• CISPR 16-4-2 for emission measurements is as below described.

Pass means the test result passed the test standard requirement, please find the detailed decision rule in the report relative section.

U_{LAB} less than U_{CISPR}, therefore:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

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4.4 Test Location

All tests were performed at:
SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab
588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China
Tel: +86 21 6191 5666 Fax: +86 21 6191 5678

No tests were sub-contracted.

Note:

1. SGS is not responsible for wrong test results due to incorrect information (e.g., max. internal working frequency, antenna gain, cable loss, etc) is provided by the applicant. (If applicable).
2. SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (If applicable).
3. Sample source: sent by customer.

4.5 Test Facility

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

• A2LA (Certificate No. 6332.01)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the American Association for Laboratory Accreditation(A2LA).

• FCC (Designation Number: CN1301)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

• ISED (CAB Identifier: CN0020)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. EMC Laboratory has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.
Company Number: 8617A

• VCCI (Member No.: 3061)

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-13868, C-14336, T-12221, G-10830 respectively.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

4.8 EMS Monitor

Visual: Monitor the work status

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5 Equipment List

Conducted Emissions at AC Mains Power Port (150kHz-30MHz)					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
EMI test receiver	Rohde & Schwarz	ESR7	SHEM162-1	2022/12/20	2023/12/19
Line impedance stabilization network	SCHWARZBECK	NSLK8127	SHEM061-1	2022/12/20	2023/12/19
Line impedance stabilization network	EMCO	3816_2	SHEM019-1	2022/12/20	2023/12/19
Pulse limiter	Rohde & Schwarz	ESH3-Z2	SHEM029-1	2022/12/20	2023/12/19
Shielding Room	ZHONGYU	8*4*3M	SHEM079-2	2020/12/20	2023/12/19
CE test Cable	/	/	SHEM172-1	2022/12/20	2023/12/19
Test Software	ESE	e3	Version: 6.191211	N/A	N/A
3 Phase LISN	SCHWARZBECK	NNLK 8129 RC	SHME035-4	2023/9/19	2024/9/18

Radiated Emission (30MHz-1GHz)					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
EMI test receiver	Rohde & Schwarz	ESU40	SHEM051-1	2022/12/20	2023/12/19
EMI test receiver	Rohde & Schwarz	ESR7	SHEM201-1	2023/8/01	2024/7/31
CONTROLLER	INNCO	CO2000	SHEM047-1	N/A	N/A
ANTENNA MAST	INNCO	MA400-EP	SHEM047-2	N/A	N/A
TURN DEVICE	INNCO	DE 3600-RH	SHEM047-3	N/A	N/A
Broadband UHF-VHF ANTENNA	SCHWARZBECK	VULB9168	SHEM048-1	2023/9/3	2025/9/2
Broadband UHF-VHF ANTENNA	SCHWARZBECK	VULB9168	SHEM202-1	2023/4/17	2025/4/16
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2023/5/6	2026/5/5
Pre-amplifier	HP	8447D	SHEM236-1	2022/12/22	2023/12/21
Pre-amplifier	HP	8447D	SHEM143-1	2022/12/20	2023/12/19
RE test Cable	/	/	SHEM217-2	2023/5/9	2024/5/8
Test Software	ESE	e3	Version: 6.191211	N/A	N/A
Semi/Fully Anechoic	TIANDE	9*6*6M	SHEM198-1	2021/05/27	2024/05/26

Harmonic Current Emission					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
Harmonic & Flicker test system	DEWETRON	DEWE2-A4	SHEM274-1	2023-08-01	2024-07-31

Voltage Fluctuations and Flicker					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
Harmonic & Flicker test system	DEWETRON	DEWE2-A4	SHEM274-1	2023-08-01	2024-07-31

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Electrostatic Discharge					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
Electrostatic Discharge Simulator	TESEQ	NSG 437	SHEM041-2	2023/8/01	2024/7/31
Electrostatic Discharge Simulator	3CTEST	EDS20H	SHEM199-1	2022/12/20	2023/12/19

Radiated Immunity (80MHz-1GHz, 1.4GHz-6GHz)					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
Signal generator	Rohde & Schwarz	SMB100A	SHEM194-1	2022/12/20	2023/12/19
Power Meter	Rohde & Schwarz	NRP	SHEM057-1	2023/8/01	2024/7/31
Power meter sensor	Rohde & Schwarz	NRP-Z91	SHEM057-3	2023/8/01	2024/7/31
Antenna	SCHWARZBECK	STLP9128D	SHEM130-1	N/A	N/A
Antenna	SCHWARZBECK	STLP9149	SHEM131-1	N/A	N/A
Amplifier	MILMEGA	AS0840-55-55	SHEM133-1	2022/12/20	2023/12/19
Amplifier	MILMEGA	80RF1000-250	SHEM132-1	2022/12/20	2023/12/19
Amplifier	Rohde & Schwarz	BBA150-E60	SHEM171-1	2022/12/20	2023/12/19
Power meter sensor	Rohde & Schwarz	NRP-Z22	SHEM136-1	2023/8/01	2024/7/31
ElectroMagnetic Field Probe	ETS-Lindgren	HI-6105	SHEM134-1	2023/8/24	2024/8/23
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2023/5/6	2026/5/5
Test Software	Rohde & Schwarz	EMC32	Version: 10.20.01	N/A	N/A

Electrical Fast Transients Burst at AC Mains Power Port					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
Immunity Test System	EMC PARTNER	TRA3000 F-S-D-V	SHEM163-1	2022/12/20	2023/12/19
Test Software	EMC-PARTNER	GENECS	Version: 3.29	N/A	N/A
Immunity Test System	TESEQ	NSG 3060	SHEM224-1	2023/8/01	2024/7/31
Coupling / Decoupling Network (CDN)	TESEQ	CDN 3061	SHEM224-3	2023/8/01	2024/7/31
EFT & Surge Generator	PRIMA	PRM61045TB	SHEM200-1	2023/9/28	2024/9/27
CDN for EFT & Surge	PRIMA	PRM-CDN	SHEM200-2	2023/9/28	2024/9/27

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Electrical Fast Transients&Burst at Signal Port					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
Immunity Test System	EMC PARTNER	TRA3000 F-S-D-V	SHEM163-1	2022/12/20	2023/12/19
Test Software	EMC-PARTNER	GENECS	Version: 3.29	N/A	N/A
Immunity Test System	TESEQ	NSG 3060	SHEM224-1	2023/8/01	2024/7/31
Coupling / Decoupling Network (CDN)	TESEQ	CDN 3061	SHEM224-3	2023/8/01	2024/7/31
Capacitive Coupling Clamp	EM TEST	HFK	SHEM026-2	2022/12/20	2023/12/19
EFT & Surge Generator	PRIMA	PRM61045TB	SHEM200-1	2023/9/28	2024/9/27
CDN for EFT & Surge	PRIMA	PRM-CDN	SHEM200-2	2023/9/28	2024/9/27
Capacitive coupling clamp	PRIMA	EFT-CLAMP	SHEM200-4	2022/12/20	2023/12/19

Conducted Immunity at AC Mains Power Port (150kHz-80MHz)					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
Signal generator	Rohde & Schwarz	SMB100A	SHEM194-1	2022/12/20	2023/12/19
Power Amplifier	HAEFFLY	PAMP250	SHEM023-1	2022/12/20	2023/12/19
6dB Attenuator	HUAXIANG	DTS50-6dB-1G-A	SHEM123-2	2022/12/20	2023/12/19
Power Meter	Rohde & Schwarz	NRP	SHEM057-1	2023/8/01	2024/7/31
Power meter sensor	Rohde & Schwarz	NRP-Z91	SHEM057-3	2023/8/01	2024/7/31
CDN	LUTHI	L-801 M1	SHEM023-5	2022/12/20	2023/12/19
CDN	LUTHI	L-801 M2/M3	SHEM023-6	2022/12/20	2023/12/19
Shielding Room	ZHONGYU	5*3*3M	SHEM079-6	2022/12/20	2025/12/19
Coupling and Decoupling Network	Teseq	CDN M016	SHEM168-1	2023/8/01	2024/7/31
RF Generator	SCHAFFNER	NSG 2070	SHEM221-1	2022/8/02	2024/8/01
Test Software	Rohde & Schwarz	EMC32	Version: 10.20.01	N/A	N/A
Coupling clamp	LUTHI	EM 101	SHEM027-1	2023/06/05	2024/06/04

Conducted Immunity at Signal Port (150kHz-80MHz)					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
Signal generator	Rohde & Schwarz	SMB100A	SHEM194-1	2022/12/20	2023/12/19
Power Amplifier	HAEFFLY	PAMP250	SHEM023-1	2022/12/20	2023/12/19
6dB Attenuator	HUAXIANG	DTS50-6dB-1G-A	SHEM123-2	2022/12/20	2023/12/19
Coupling clamp	LUTHI	EM 101	SHEM027-1	2023/06/05	2024/06/04
Power Meter	Rohde & Schwarz	NRP	SHEM057-1	2023/8/01	2024/7/31
Power meter sensor	Rohde & Schwarz	NRP-Z91	SHEM057-3	2023/8/01	2024/7/31
Shielding Room	ZHONGYU	5*3*3M	SHEM079-6	2022/12/20	2025/12/19
RF Generator	SCHAFFNER	NSG 2070	SHEM221-1	2022/8/02	2024/8/01
Test Software	Rohde & Schwarz	EMC32	Version: 10.20.01	N/A	N/A

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Surge at AC Mains Power Port					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
Immunity Test System	EMC PARTNER	TRA3000 F-S-D-V	SHEM163-1	2022/12/20	2023/12/19
Test Software	EMC-PARTNER	GENECS	Version: 3.29	N/A	N/A
Immunity Test System	TESEQ	NSG 3060	SHEM224-1	2023/8/01	2024/7/31
Coupling / Decoupling Network (CDN)	TESEQ	CDN 3061	SHEM224-3	2023/8/01	2024/7/31
EFT & Surge Generator	PRIMA	PRM61045TB	SHEM200-1	2023/9/28	2024/9/27
CDN for EFT & Surge	PRIMA	PRM-CDN	SHEM200-2	2023/9/28	2024/9/27

Surge at Signal Port					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
Immunity Test System	EMC PARTNER	TRA3000 F-S-D-V	SHEM163-1	2022/12/20	2023/12/19
Test Software	EMC-PARTNER	GENECS	Version: 3.29	N/A	N/A
Immunity Test System	TESEQ	NSG 3060	SHEM224-1	2023/8/01	2024/7/31
Coupling / Decoupling Network (CDN)	TESEQ	CDN 3061	SHEM224-3	2023/8/01	2024/7/31
EFT & Surge Generator	PRIMA	PRM61045TB	SHEM200-1	2023/9/28	2024/9/27
CDN for EFT & Surge	PRIMA	PRM-CDN	SHEM200-2	2023/9/28	2024/9/27
Data coupling network 4 line	EM TEST	CNV 504	SHEM026-3	2022/12/20	2023/12/19
Telecom surge (10 / 700us) extension unit	TESEQ	NSG 3060-TS-EXT	SHEM224-2	2023/8/01	2024/7/31
CDN for unsymmetrical interconnection lines (1.2/50us)	SCHAFFNER	CDN 117	SHEM224-5	2023/8/01	2024/7/31
CDN for symmetric datalines & Resistor network (Surge 1.2/50 or 10/700 us)	SCHAFFNER	CDN 118 & INA172	SHEM224-6 & SHEM224-7	2023/8/01	2024/7/31

Power Frequency Magnetic Field					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
Compliance Test System	AMETEK	PACS-1	SHEM024-2	2023/8/01	2024/7/31
AC Power Source 5KVA	AMETEK	5001iX	SHEM025-2	2023/8/01	2024/7/31
Current transformer for magnetic field coil	EM TEST	MC2630	SHEM026-7	2023/06/05	2024/06/04
Current transformer for magnetic field coil	EM TEST	MC26100	SHEM026-8	2023/06/05	2024/06/04
Magnetic field coil	EM TEST	MS100	SHEM026-9	2023/06/05	2024/06/04

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Voltage Dips and Interruptions					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
3 phase voltage dips & interruptions simulator	LIONCEL	VDS-1132A / TGL-332 / TGL-332 / TGL-332	SHME 143-1 / SHME 143-2 / SHME 143-3 / SHME 143-4	2023/5/6	2024/5/5

General used equipment					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
Digital pressure meter	YONGZHI	DYM3-01	SHEM082-1	2021-01-22	2024-01-21
Temperature&humidity recorder	ShangHai weather meter work	ZJ 1-2B	SHEM042-9~10	2022-12-31	2023-12-30
Temperature&humidity recorder	ShangHai weather meter work	ZJ 1-2B	SHEM042-5	2023-07-23	2024-07-22
Digital Temperature& humidity recorder	Jianda Renke	RS-WS-N01-6J	SHEM247-1~8	2023-01-13	2024-01-12
Digital Multimeter	FLUKE	17B+	SHEM271-1	2023-07-19	2024-07-18
Autoformer regulator	Guangzhou bao de	TDGC2-5KVA	SHEM150-1	N/A	N/A
Multi-purpose tong tester	FLUKE	317	SHEM001-2	2022-11-14	2023-11-13

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6 Emission Test Results

6.1 Conducted Emissions at AC Mains Power Port (150kHz-30MHz)

Test Requirement: IEC 61326-1: 2020

Test Method: CISPR 11:2015

Limit:

0.15M-0.5MHz	66dB(μV)-56dB(μV) quasi-peak, 56dB(μV)-46dB(μV) average
0.5M-5MHz	56dB(μV) quasi-peak, 46dB(μV) average
5M-30MHz	60dB(μV) quasi-peak, 50dB(μV) average
Detector:	Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz

6.1.1 E.U.T. Operation

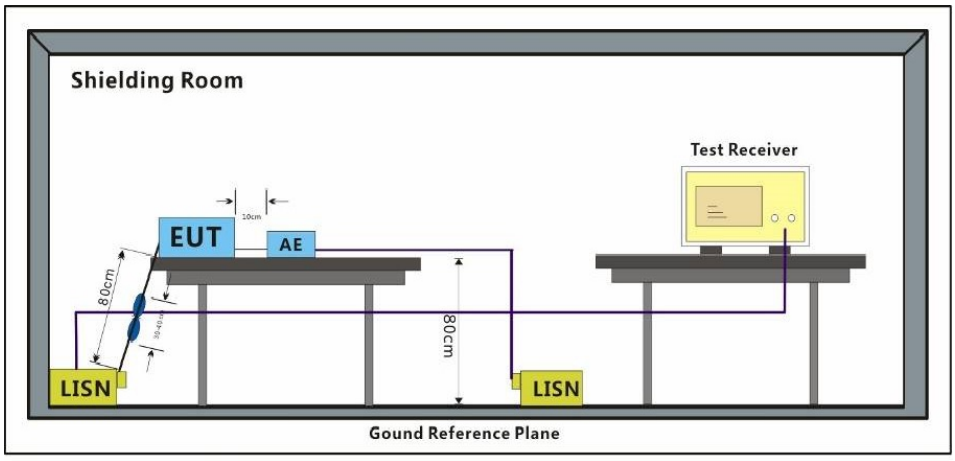
Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

6.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Normal working_keep the EUT working continual

6.1.3 Test Setup Diagram



6.1.4 Measurement Procedure and Data

Frequency range: 150kHz-30MHz

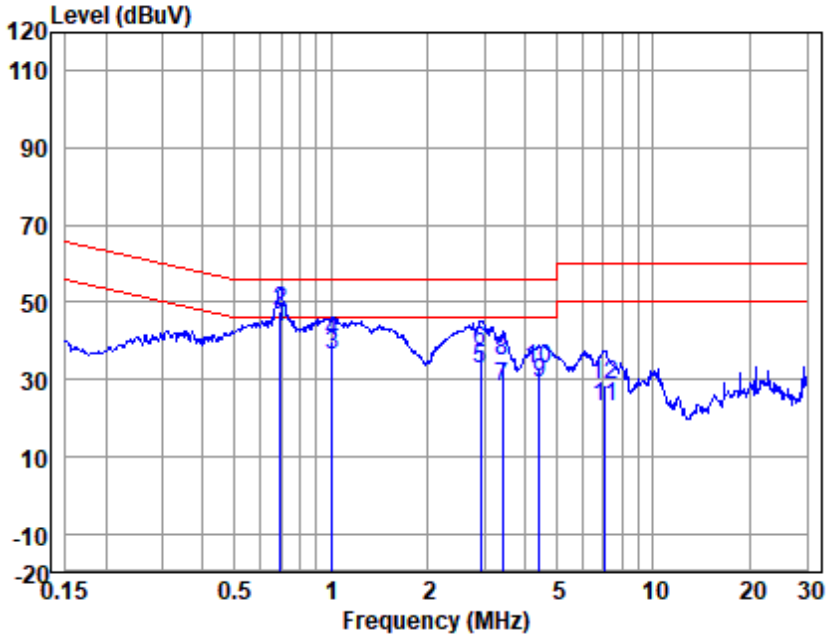
An initial pre-scan was performed with peak detector. Quasi-Peak or Average measurement were performed at the frequencies with maximized peak emission were detected.

The red line show in graphic is the limit in standard used in this section.

Measured Level = Read level + Cable Loss + LISN Factor

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Test Mode: 00; Line: Live line #1



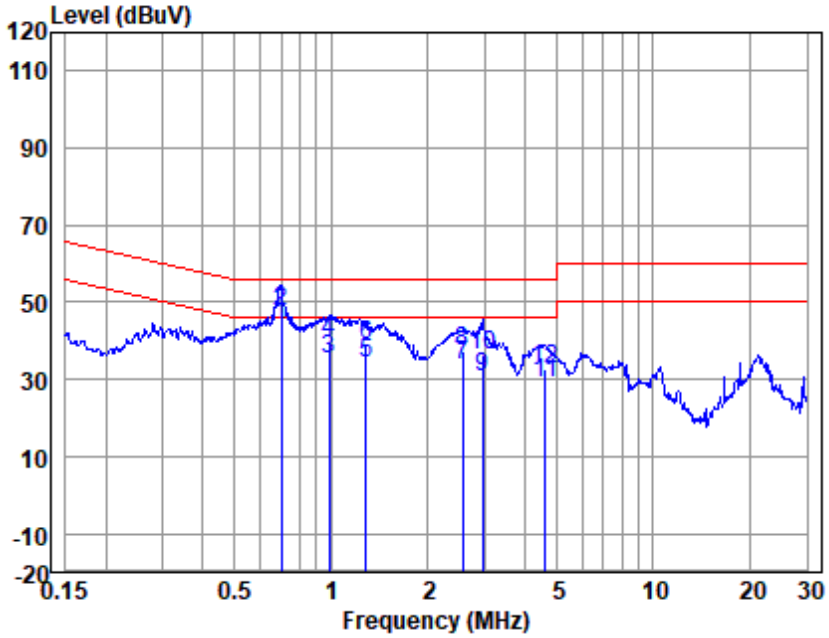
LISN : LINE
EUT/Project No : 06673MI
Test Mode : 00

	Freq	Read level	LISN Factor	Cable Loss	Emission Level	Limit	Over Limit	Remark
	(MHz)	(dBuV)	(dB)	(dB)	(dBuV)	(dBuV)	(dB)	
1	0.70	33.72	0.00	9.86	43.58	46.00	-2.42	Average
2	0.70	37.73	0.00	9.86	47.59	56.00	-8.41	QP
3	1.01	26.45	0.10	9.86	36.41	46.00	-9.59	Average
4	1.01	29.90	0.10	9.86	39.86	56.00	-16.14	QP
5	2.92	22.47	0.14	9.87	32.48	46.00	-13.52	Average
6	2.92	27.11	0.14	9.87	37.12	56.00	-18.88	QP
7	3.42	18.04	0.16	9.87	28.07	46.00	-17.93	Average
8	3.42	24.67	0.16	9.87	34.70	56.00	-21.30	QP
9	4.43	18.77	0.19	9.91	28.87	46.00	-17.13	Average
10	4.43	22.57	0.19	9.91	32.67	56.00	-23.33	QP
11	7.10	12.55	0.20	9.98	22.73	50.00	-27.27	Average
12	7.10	18.45	0.20	9.98	28.63	60.00	-31.37	QP

Notes: Emission Level = Read Level +LISN Factor + Cable loss

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Test Mode: 00; Line: Live line #2



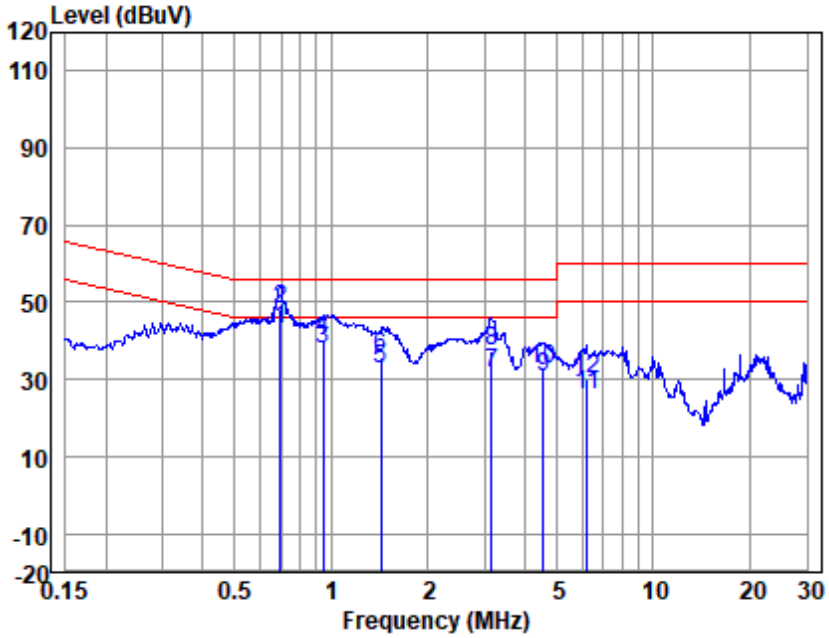
LISN : LINE
EUT/Project No : 06673MI
Test Mode : 00

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.70	33.85	0.10	9.86	43.81	46.00	-2.19	Average
2	0.70	37.86	0.10	9.86	47.82	56.00	-8.18	QP
3	0.99	25.50	0.00	9.86	35.36	46.00	-10.64	Average
4	0.99	29.84	0.00	9.86	39.70	56.00	-16.30	QP
5	1.28	24.48	0.04	9.86	34.38	46.00	-11.62	Average
6	1.28	28.83	0.04	9.86	38.73	56.00	-17.27	QP
7	2.55	23.94	0.10	9.87	33.91	46.00	-12.09	Average
8	2.55	27.56	0.10	9.87	37.53	56.00	-18.47	QP
9	2.96	20.91	0.10	9.87	30.88	46.00	-15.12	Average
10	2.96	26.10	0.10	9.87	36.07	56.00	-19.93	QP
11	4.62	18.95	0.10	9.93	28.98	46.00	-17.02	Average
12	4.62	22.78	0.10	9.93	32.81	56.00	-23.19	QP

Notes: Emission Level = Read Level +LISN Factor + Cable loss

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Test Mode: 00; Line: Live line #3



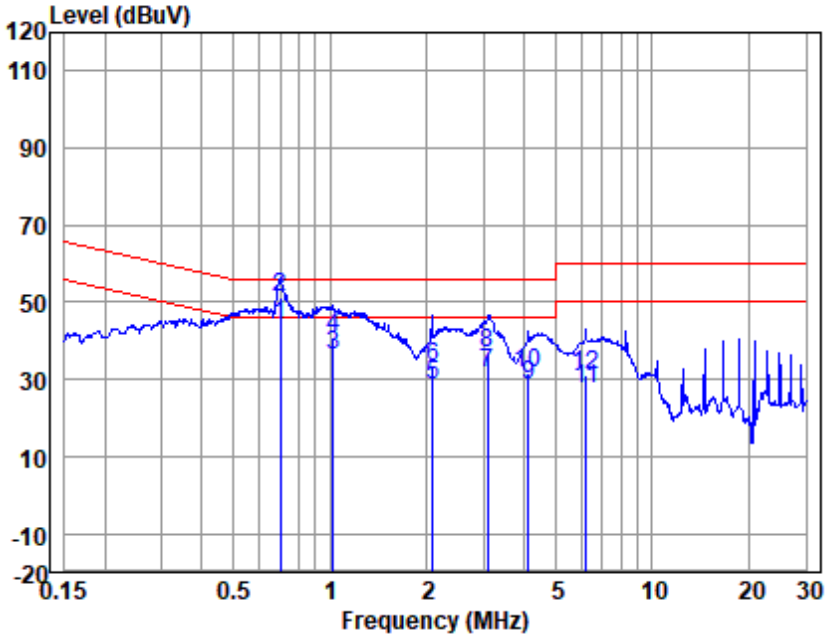
LISN : LINE
EUT/Project No : 06673MI
Test Mode : 00

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.70	33.19	0.10	9.86	43.15	46.00	-2.85	Average
2	0.70	38.10	0.10	9.86	48.06	56.00	-7.94	QP
3	0.95	27.84	0.10	9.86	37.80	46.00	-8.20	Average
4	0.95	30.33	0.10	9.86	40.29	56.00	-15.71	QP
5	1.43	22.51	0.10	9.86	32.47	46.00	-13.53	Average
6	1.43	26.06	0.10	9.86	36.02	56.00	-19.98	QP
7	3.16	21.60	0.10	9.87	31.57	46.00	-14.43	Average
8	3.16	27.19	0.10	9.87	37.16	56.00	-18.84	QP
9	4.55	20.49	0.10	9.93	30.52	46.00	-15.48	Average
10	4.55	22.86	0.10	9.93	32.89	56.00	-23.11	QP
11	6.22	15.58	0.17	9.97	25.72	50.00	-24.28	Average
12	6.22	19.88	0.17	9.97	30.02	60.00	-29.98	QP

Notes: Emission Level = Read Level +LISN Factor + Cable loss

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Test Mode: 00; Line: Neutral Line



LISN : NEUTRAL
EUT/Project No : 06673MI
Test Mode : 00

	Freq	Read level	LISN Factor	Cable Loss	Emission Level	Limit	Over Limit	Remark
	(MHz)	(dBuV)	(dB)	(dB)	(dBuV)	(dBuV)	(dB)	
1	0.70	33.98	0.10	9.86	43.94	46.00	-2.06	Average
2	0.70	41.41	0.10	9.86	51.37	56.00	-4.63	QP
3	1.02	26.34	0.10	9.86	36.30	46.00	-9.70	Average
4	1.02	30.82	0.10	9.86	40.78	56.00	-15.22	QP
5	2.08	18.52	0.20	9.86	28.58	46.00	-17.42	Average
6	2.08	22.97	0.20	9.86	33.03	56.00	-22.97	QP
7	3.09	21.44	0.20	9.87	31.51	46.00	-14.49	Average
8	3.09	26.68	0.20	9.87	36.75	56.00	-19.25	QP
9	4.14	18.61	0.20	9.88	28.69	46.00	-17.31	Average
10	4.14	21.49	0.20	9.88	31.57	56.00	-24.43	QP
11	6.22	17.29	0.20	9.97	27.46	50.00	-22.54	Average
12	6.22	20.78	0.20	9.97	30.95	60.00	-29.05	QP

Notes: Emission Level = Read Level +LISN Factor + Cable loss

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6.2 Radiated Emission (30MHz-1GHz)

Test Requirement: IEC 61326-1: 2020

Test Method: CISPR 11:2015

Limit:

FREQUENCY (MHz)	dB(μV/m) (at 10m)	dB(μV/m) (at 3m)
30MHz-230MHz	30	40
230MHz-1GHz	37	47
Detector: Peak for pre-scan (120kHz resolution bandwidth) 30M to 1000MHz		

6.2.1 E.U.T. Operation

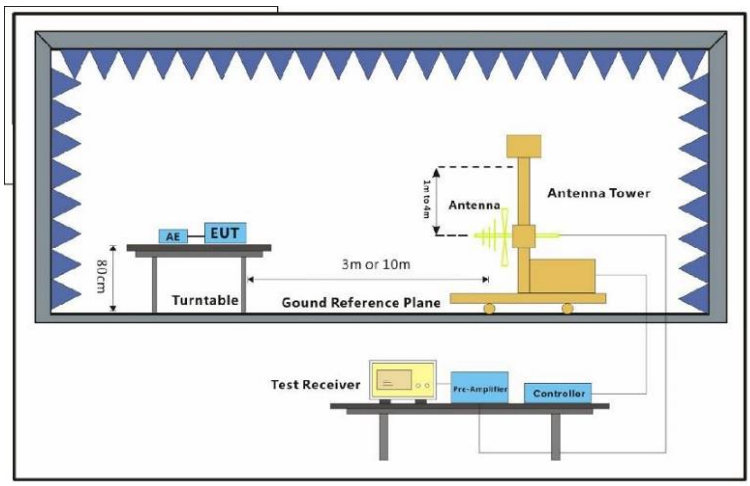
Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

6.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Normal working_keep the EUT working continual

6.2.3 Test Setup Diagram



6.2.4 Measurement Procedure and Data

Frequency range: 30MHz-1GHz

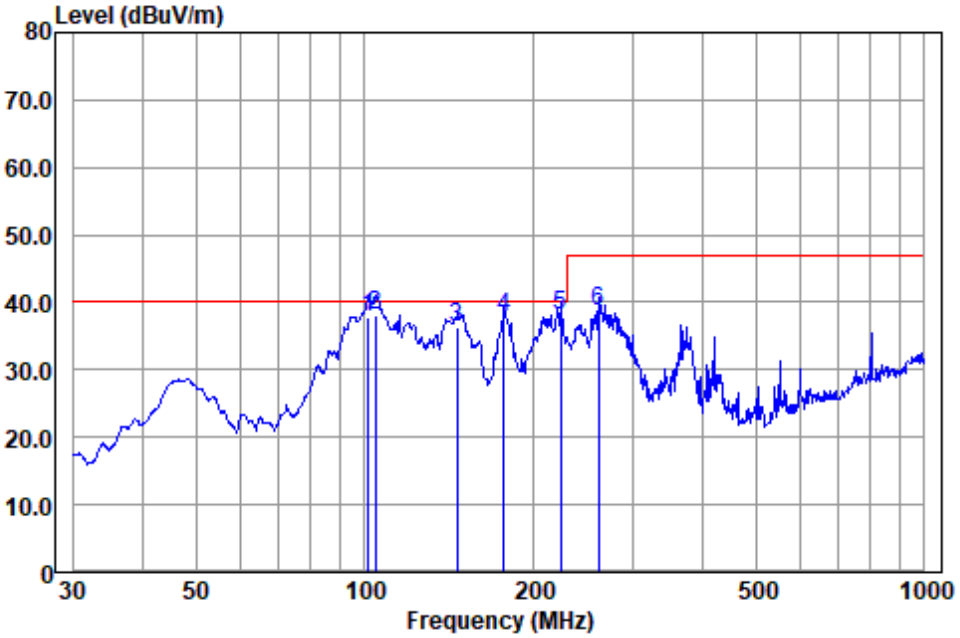
An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities.

The red line show in graphic is the limit in standard used in this section.

Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

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Test Mode: 00; Polarity: Horizontal



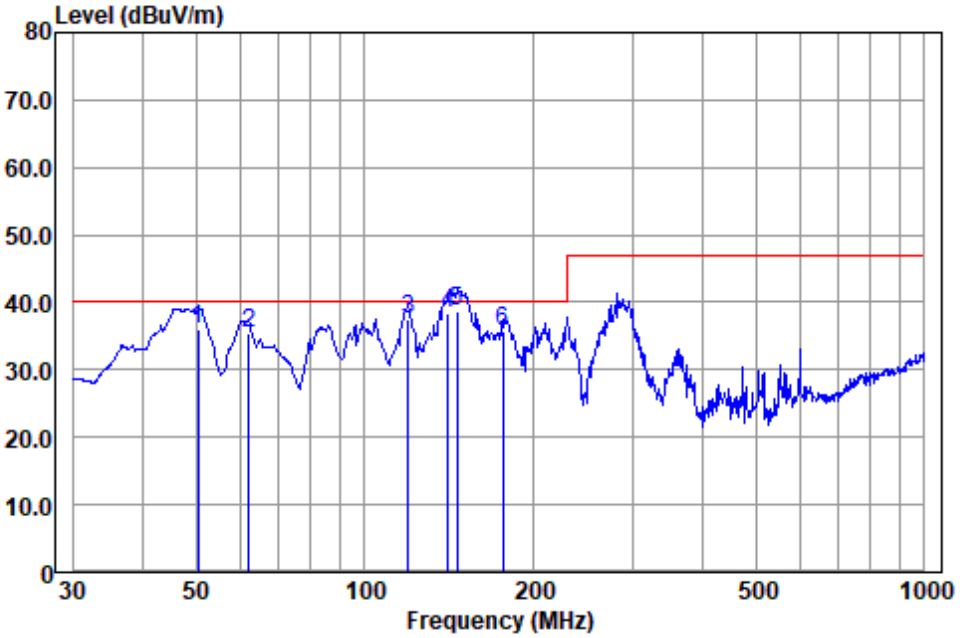
Antenna Polarity :HORIZONTAL
EUT/Project :6673MI
Test mode :00

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	101.644	53.77	9.30	1.71	27.10	37.68	40.00	-2.32	QP
2	104.536	53.89	9.50	1.72	27.10	38.01	40.00	-1.99	QP
3	146.374	48.85	12.60	1.95	27.10	36.30	40.00	-3.70	QP
4	177.509	50.73	11.60	2.17	26.83	37.67	40.00	-2.33	QP
5	223.733	52.49	9.66	2.65	26.80	38.00	40.00	-2.00	QP
6	261.058	51.37	11.24	3.00	26.85	38.76	47.00	-8.24	QP

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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Test Mode: 00; Polarity: Vertical



Antenna Polarity :VERTICAL
EUT/Project :6673MI
Test mode :00

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	50.409	47.69	13.20	1.46	26.20	36.15	40.00	-3.85	QP
2	61.995	48.07	11.90	1.55	26.19	35.33	40.00	-4.67	QP
3	119.436	51.85	11.00	1.80	27.10	37.55	40.00	-2.45	QP
4	141.000	51.65	12.00	1.93	27.10	38.48	40.00	-1.52	QP
5	146.374	51.33	12.60	1.95	27.10	38.78	40.00	-1.22	QP
6	176.269	48.51	11.80	2.15	26.85	35.61	40.00	-4.39	QP

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

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6.3 Harmonic Current Emission

Test Requirement: IEC 61326-1: 2020
Test Method: IEC 61000-3-2:2018

Remark: N/A.

There is no need for Harmonics test to be performed on this product (rated power is less than 75W) in accordance with IEC 61000-3-2:2018.

For further details, please refer to Clause 7 of IEC 61000-3-2 which states:

"For the following categories of equipment, limits are not specified in this standard.

- equipment with a rated power of 75W or less, other than lighting equipment."

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6.4 Voltage Fluctuations and Flicker

Test Requirement: IEC 61326-1: 2020
Test Method: IEC 61000-3-3:2015

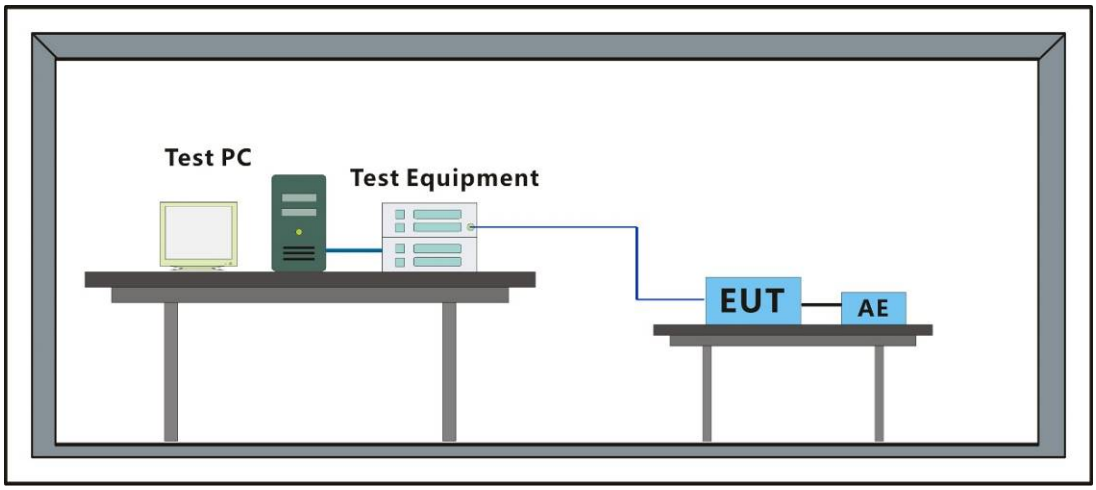
6.4.1 E.U.T. Operation

Operating Environment:
Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

6.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Normal working_keep the EUT working continual

6.4.3 Test Setup Diagram



6.4.4 Measurement Procedure and Data

Test Mode:00

Maximum Flicker results

	L1	L2	L3	Limit	Result
Pst	0.182	0.161	0.183	1.00	PASS
Plt	0.150	0.143	0.180	0.65	PASS
dc [%]	0.008	0.009	0.009	3.30	PASS
dmax [%]	0.861	0.883	0.830	6.00	PASS
dt [s]	0.000	0.000	0.000	0.50	PASS

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7 Immunity Test Results

Performance Criteria Description in EN IEC 61326-1:2021

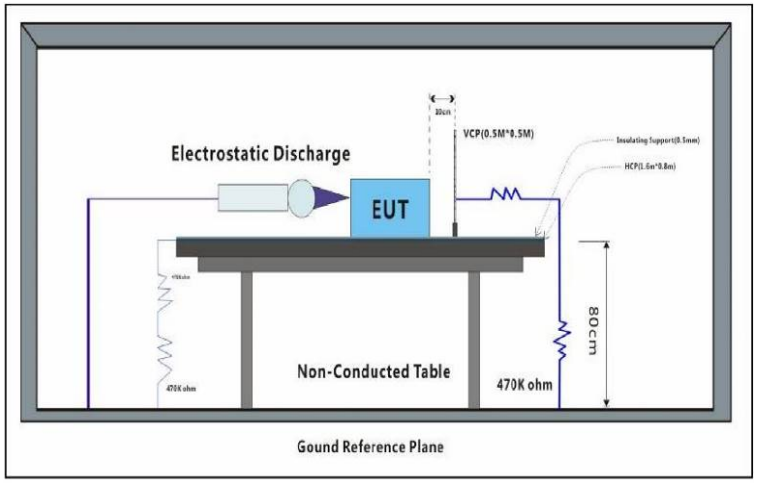
Criterion A	The equipment shall continue to operate as intended during and after the test. No DEGRADATION OF PERFORMANCE or LOSS OF FUNCTION is allowed below a PERFORMANCE LEVEL specified in the user documentation, when the equipment is used as intended. In the case of applying immunity tests with continuous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

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7.1 Electrostatic Discharge

Test Requirement: IEC 61326-1: 2020
Test Method: IEC 61000-4-2:2008

7.1.1 Test Setup Diagram



7.1.2 E.U.T. Operation

Operating Environment:
Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

7.1.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Normal working_keep the EUT working continual

7.1.4 Test Condition and Results:

Performance Criterion:B
Discharge Impedance:330 Ω / 150 pF
Discharge Voltage:Air Discharge:8 kV,Contact Discharge:4 kV, VCP/HCP:4 kV
Polarity:Positive & Negative
Number of Discharge:Minimum 10 times at each test point
Discharge Mode:Single Discharge
Discharge Period:1 second minimum
Test Point 1: All insulated enclosure & seams.
Test Point 2: All accessible metal parts of the enclosure.
Test Point 3: All sides.

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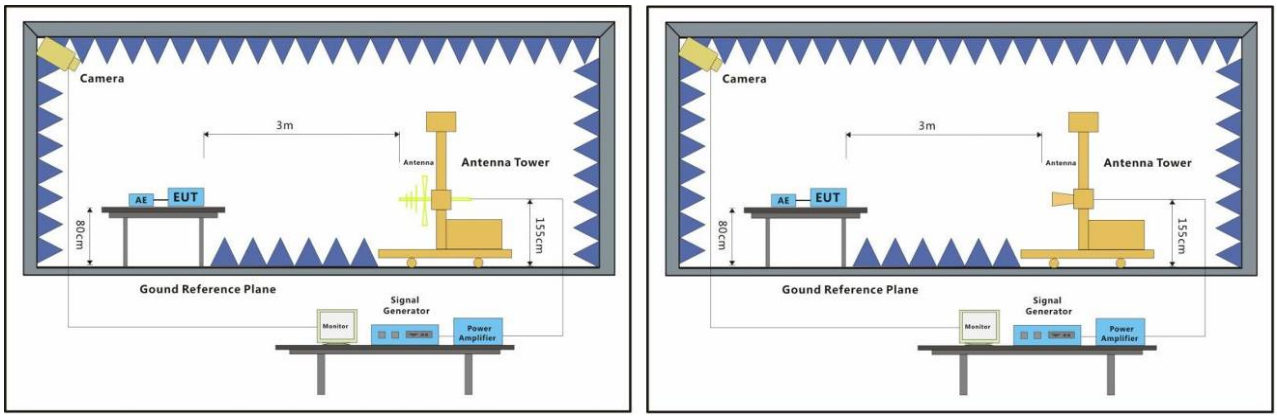
Discharge type	Level (kV)	Polarity	Test Point	Result / Observations
Air Discharge	2,4,8	+	1	A
Air Discharge	2,4,8	-	1	A
Contact Discharge	4	+	2	A
Contact Discharge	4	-	2	A
Horizontal Coupling	4	+	3	A
Horizontal Coupling	4	-	3	A
Vertical Coupling	4	+	3	A
Vertical Coupling	4	-	3	A
A: No degradation in the performance of the EUT was observed				

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7.2 Radiated Immunity (80MHz-1GHz, 1.4GHz-6GHz)

Test Requirement: IEC 61326-1: 2020
Test Method: IEC 61000-4-3:2006

7.2.1 Test Setup Diagram



7.2.2 E.U.T. Operation

Operating Environment:
Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

7.2.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Normal working_keep the EUT working continual

7.2.4 Test Condition and Results:

Performance Criterion:A
Frequency Range:80MHz to 1GHz, 1.4GHz to 6GHz.
Antenna Polarisation:Vertical and Horizontal
Modulation:1kHz,80% Amp. Mod,1% increment
Test Distance:3m

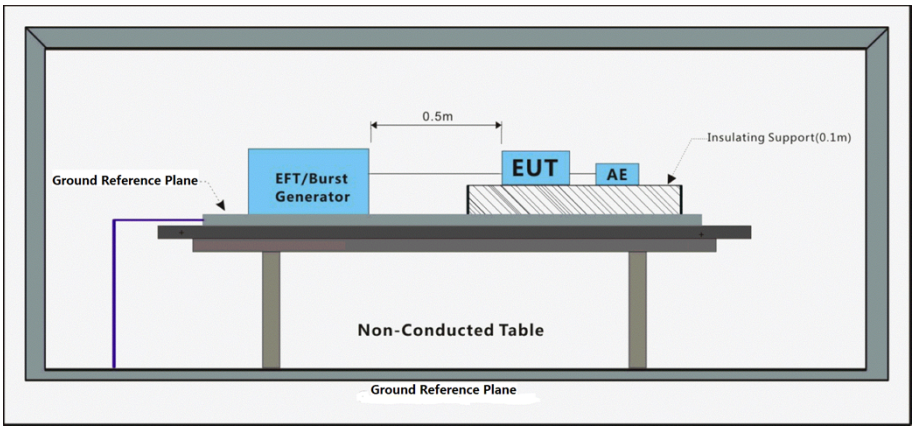
Frequency	Level (V/m)	EUT Face	Dwell time	Result / Observations
80MHz-1GHz	10	Front	3s	A
80MHz-1GHz	10	Back	3s	A
80MHz-1GHz	10	Left	3s	A
80MHz-1GHz	10	Right	3s	A
80MHz-1GHz	10	Top	3s	A
80MHz-1GHz	10	Underside	3s	A
1.4GHz-6GHz	3	Front	3s	A
1.4GHz-6GHz	3	Back	3s	A
1.4GHz-6GHz	3	Left	3s	A
1.4GHz-6GHz	3	Right	3s	A
1.4GHz-6GHz	3	Top	3s	A
1.4GHz-6GHz	3	Underside	3s	A
A: No degradation in the performance of the EUT was observed				

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7.3 Electrical Fast Transients Burst at AC Mains Power Port

Test Requirement: IEC 61326-1: 2020
Test Method: IEC 61000-4-4:2012

7.3.1 Test Setup Diagram



7.3.2 E.U.T. Operation

Operating Environment:
Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

7.3.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Normal working_keep the EUT working continual

7.3.4 Test Condition and Results:

Performance Criterion:B
Repetition Frequency:5kHz
Burst Period:300ms
Test Duration:2 minute per level & polarity
Test Level:1.0kV
Polarity:Positive & Negative

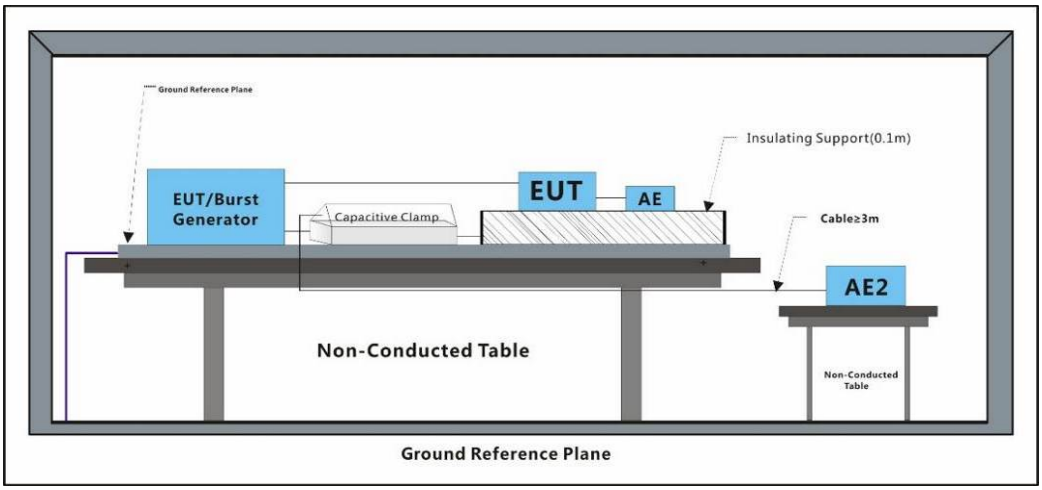
Test Line	Level (kV)	Polarity	CDN/Clamp	Result / Observations
AC power port	2	+	CDN	A
AC power port	2	-	CDN	A
A: No degradation in the performance of the EUT was observed				

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7.4 Electrical Fast Transients&Burst at Signal Port

Test Requirement: IEC 61326-1: 2020
Test Method: IEC 61000-4-4:2012

7.4.1 Test Setup Diagram



7.4.2 E.U.T. Operation

Operating Environment:
Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

7.4.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Normal working_keep the EUT working continual

7.4.4 Test Condition and Results:

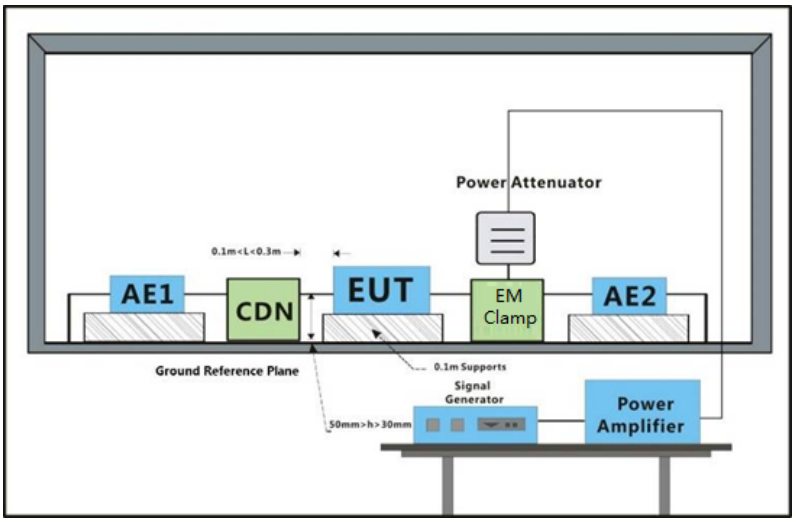
Performance Criterion: B
Repetition Frequency: 5kHz
Burst Period: 300ms
Test Duration: 2 minute per level & polarity
Polarity: Positive & Negative

Test Line	Level (kV)	Polarity	CDN/Clamp	Result / Observations
Signal port	2	+	Clamp	A
Signal port	2	-	Clamp	A
A: No degradation in the performance of the EUT was observed				

7.5 Conducted Immunity at AC Mains Power Port (150kHz-80MHz)

Test Requirement: IEC 61326-1: 2020
Test Method: IEC 61000-4-6:2013

7.5.1 Test Setup Diagram



7.5.2 E.U.T. Operation

Operating Environment:
Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

7.5.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Normal working_keep the EUT working continual

7.5.4 Test Condition and Results:

Performance Criterion: A
Frequency Range: 0.15MHz to 80MHz
Modulation: 80%, 1kHz Amplitude Modulation
Step Size: 1%

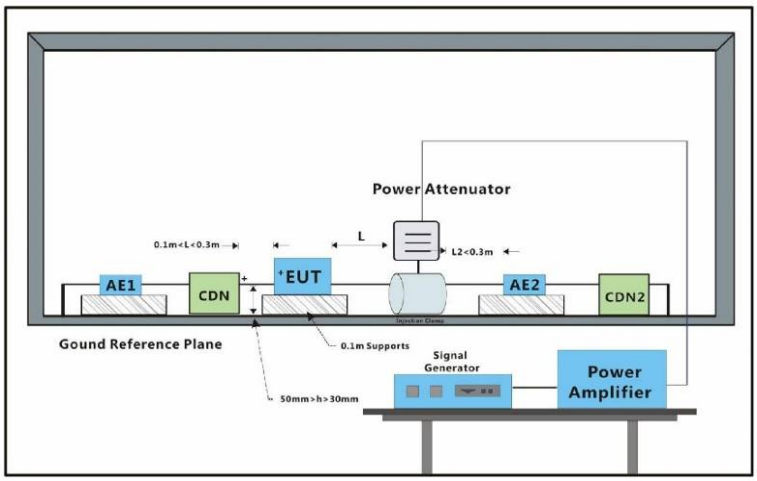
Cable port	Level (Vrms)	CDN/Clamp	Dwell time	Result / Observations
AC power port	3(0.15MHz-80MHz)	EM Clamp	3s	A
A: No degradation in the performance of the EUT was observed				

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7.6 Conducted Immunity at Signal Port (150kHz-80MHz)

Test Requirement: IEC 61326-1: 2020
Test Method: IEC 61000-4-6:2013

7.6.1 Test Setup Diagram



7.6.2 E.U.T. Operation

Operating Environment:
Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

7.6.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Normal working_keep the EUT working continual

7.6.4 Test Condition and Results:

Performance Criterion: A
Frequency Range: 0.15MHz to 80MHz
Modulation: 80%, 1kHz Amplitude Modulation
Step Size: 1%

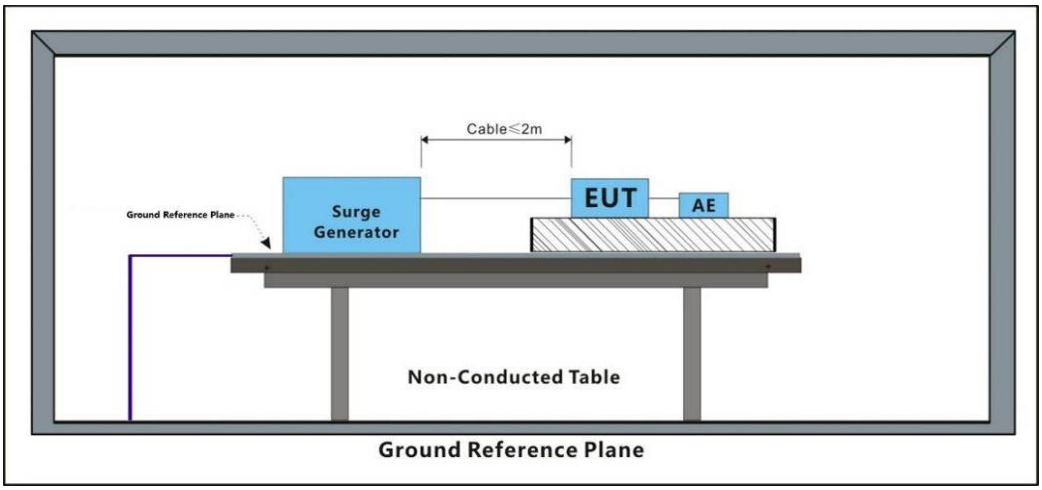
Cable port	Level (Vrms)	CDN/Clamp	Dwell time	Result / Observations
signal line	3(0.15MHz-80MHz)	CDN	3s	A
A: No degradation in the performance of the EUT was observed				

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7.7 Surge at AC Mains Power Port

Test Requirement: IEC 61326-1: 2020
Test Method: IEC 61000-4-5:2014

7.7.1 Test Setup Diagram



7.7.2 E.U.T. Operation

Operating Environment:
Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

7.7.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Normal working_keep the EUT working continual

7.7.4 Test Condition and Results:

Performance Criterion:B
Interval:60s between each surge
Polarity:Positive & Negative
Generator source impedance:2Ω
CDN coupling impedance(Line-to-ground):10Ω
Trigger Mode:Internal
No. of surges:5 positive at 0°,90°,180°,270° 5 negative at 0°,90°,180°,270°.

Test Level:±0.5, 1kV Live to Neutral, ±1, 2kV Live, Neutral to Earth

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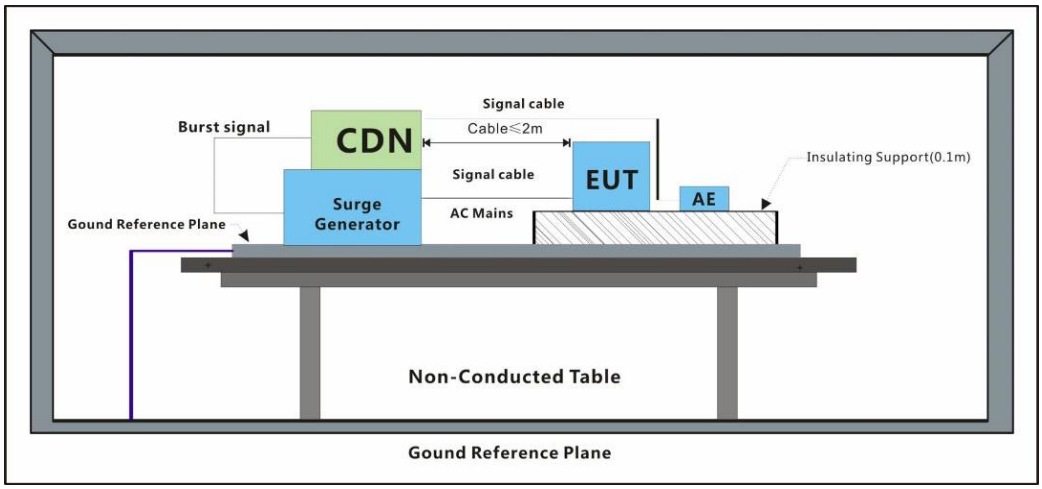
Test Line	Level (kV)	Polarity	Phase (deg)	Result / Observations
L-N	1	+	0°	A
L-N	1	-	0°	A
L-N	1	+	90°	A
L-N	1	-	90°	A
L-N	1	+	180°	A
L-N	1	-	180°	A
L-N	1	+	270°	A
L-N	1	-	270°	A
L-PE	2	+	0°	A
L-PE	2	-	0°	A
L-PE	2	+	90°	A
L-PE	2	-	90°	A
L-PE	2	+	180°	A
L-PE	2	-	180°	A
L-PE	2	+	270°	A
L-PE	2	-	270°	A
N-PE	2	+	0°	A
N-PE	2	-	0°	A
N-PE	2	+	90°	A
N-PE	2	-	90°	A
N-PE	2	+	180°	A
N-PE	2	-	180°	A
N-PE	2	+	270°	A
N-PE	2	-	270°	A
A: No degradation in the performance of the EUT was observed				

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7.8 Surge at Signal Port

Test Requirement: IEC 61326-1: 2020
Test Method: IEC 61000-4-5:2014

7.8.1 Test Setup Diagram



7.8.2 E.U.T. Operation

Operating Environment:
Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

7.8.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Normal working_keep the EUT working continual

7.8.4 Test Condition and Results:

Performance Criterion: B
Interval: 60s between each surge
Polarity: Positive & Negative
Generator source impedance: 2Ω
CDN coupling impedance:40Ω
Trigger Mode: Internal
No. of surges: 5 positive 5 negative.

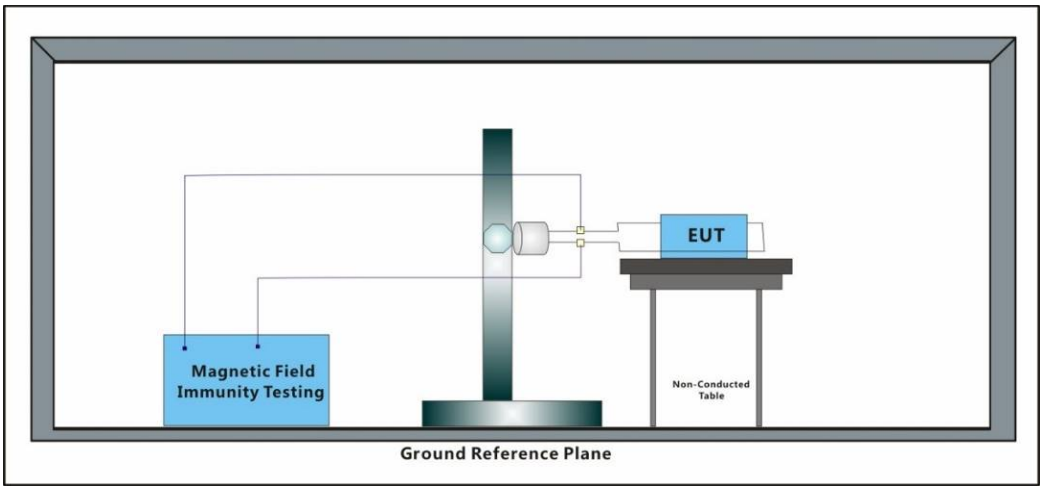
Test Line	Level (kV)	Polarity	Result / Observations
Line to line (Signal)	1	+	A
Line to line (Signal)	1	-	A
Line to ground (Signal)	2	+	A
Line to ground (Signal)	2	-	A
A: No degradation in the performance of the EUT was observed			

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7.9 Power Frequency Magnetic Field

Test Requirement: IEC 61326-1: 2020
Test Method: IEC 61000-4-8:2009

7.9.1 Test Setup Diagram



7.9.2 E.U.T. Operation

Operating Environment:
Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

7.9.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Normal working_keep the EUT working continual

7.9.4 Test Condition and Results:

Performance Criterion: A

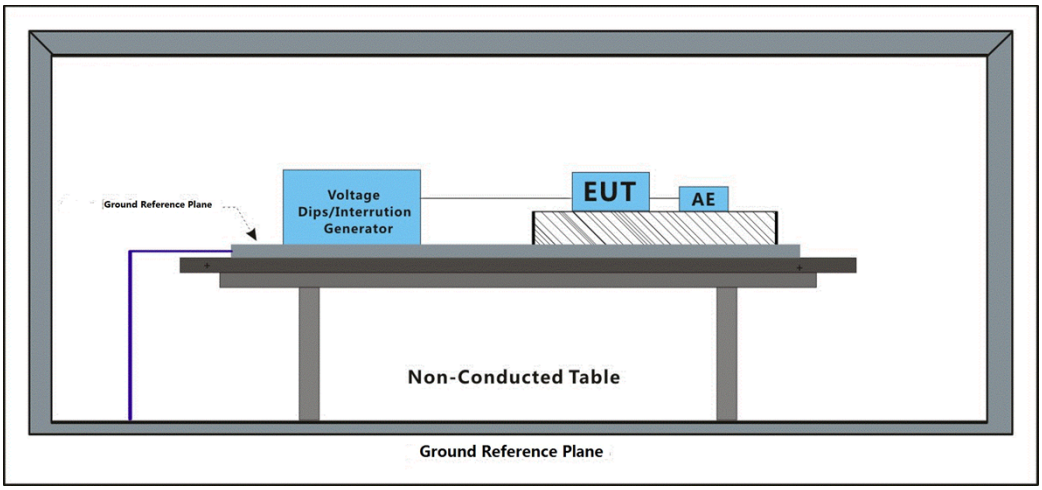
Frequency	Level (A/m)	Axial	Magnetic Field Type	Result / Observations
50Hz/60Hz	30	X	Continuous filed	A
50Hz/60Hz	30	Y	Continuous filed	A
50Hz/60Hz	30	Z	Continuous filed	A
A: No degradation in the performance of the EUT was observed				

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7.10 Voltage Dips and Interruptions

Test Requirement: IEC 61326-1: 2020
Test Method: IEC 61000-4-11:2020

7.10.1 Test Setup Diagram



7.10.2 E.U.T. Operation

Operating Environment:
Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

7.10.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Normal working_keep the EUT working continual

7.10.4 Test Condition and Results:

Performance Criterion:
0% of UT (Supply Voltage) for 1 Cycle:B;
40% of UT for 10 Cycles:C;
70% of UT for 25 Cycles:C;
0% of UT for 250 Cycles:C;
No. of Dips / Interruptions:3 per Level
Time between dropout:10s

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Level % UT	Phase (deg)	Duration	No. of Dips / Interruptions	Result / Observations
0	0°	1 Cycle	3	A
0	180°	1 Cycle	3	A
40	0°	10 Cycles	3	A
40	180°	10 Cycles	3	A
70	0°	25 Cycles	3	A
70	180°	25 Cycles	3	A
0	0°	250 Cycles	3	C
0	180°	250 Cycles	3	C
A: No degradation in the performance of the EUT was observed C: During test, the EUT stop working. After test, the EUT restart by operator.				

8 Test Setup Photo

Conducted Emissions at AC Mains Power Port (150kHz-30MHz)

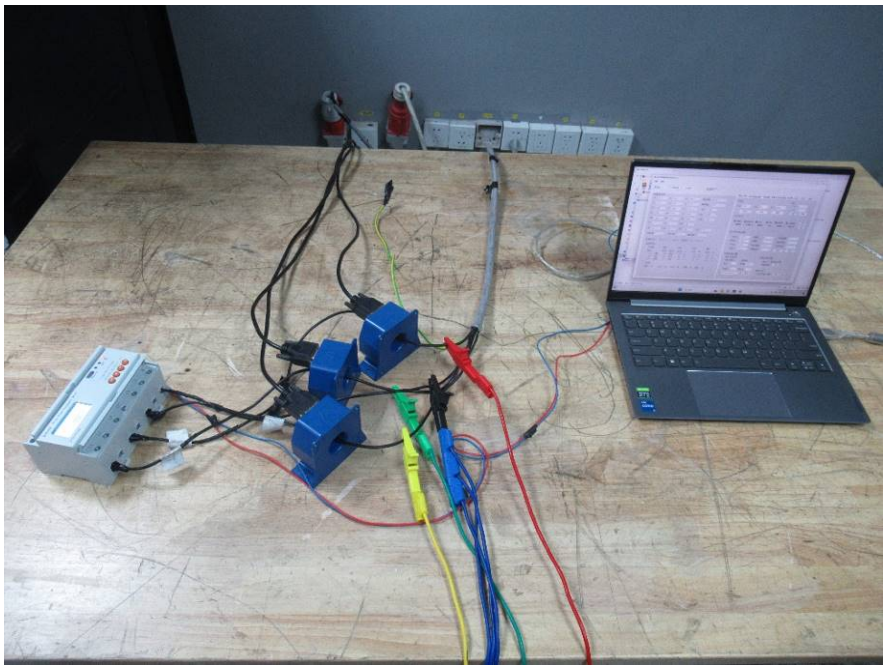


Radiated Emission (30MHz-1GHz)

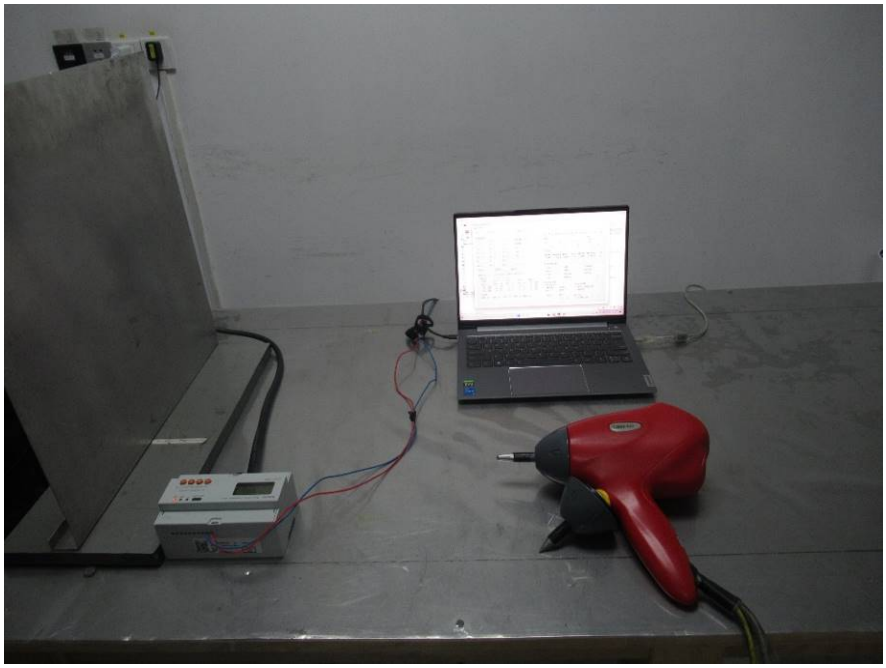


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Voltage Fluctuations and Flicker



Electrostatic Discharge



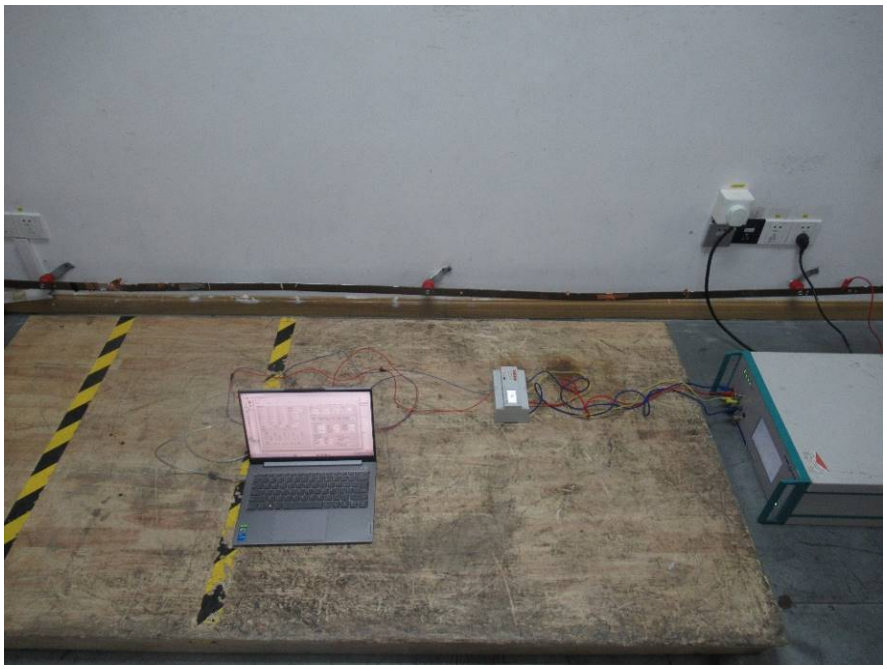
Radiated Immunity (80MHz-1GHz, 1.4GHz-6GHz)



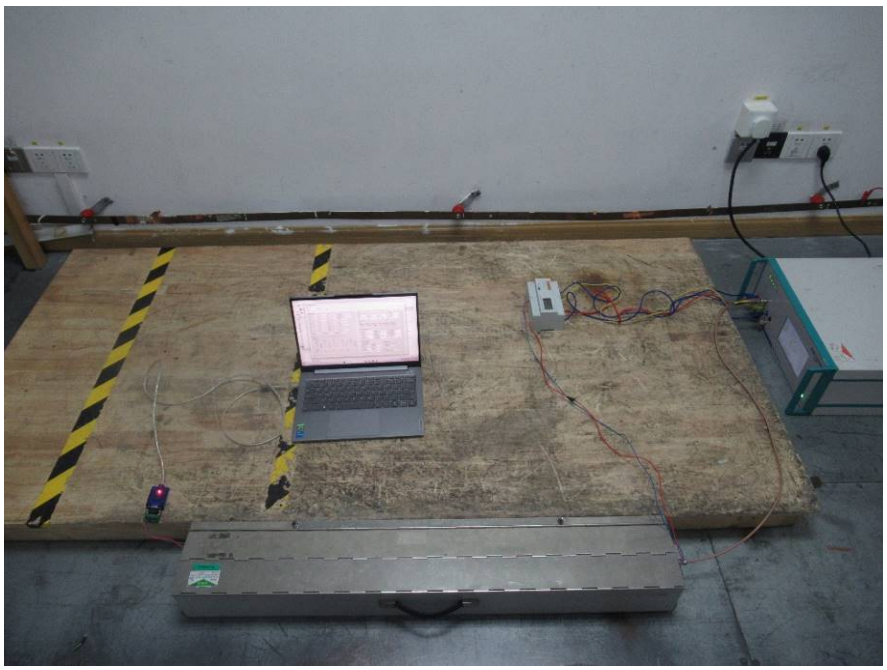


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Electrical Fast Transients Burst at AC Mains Power Port

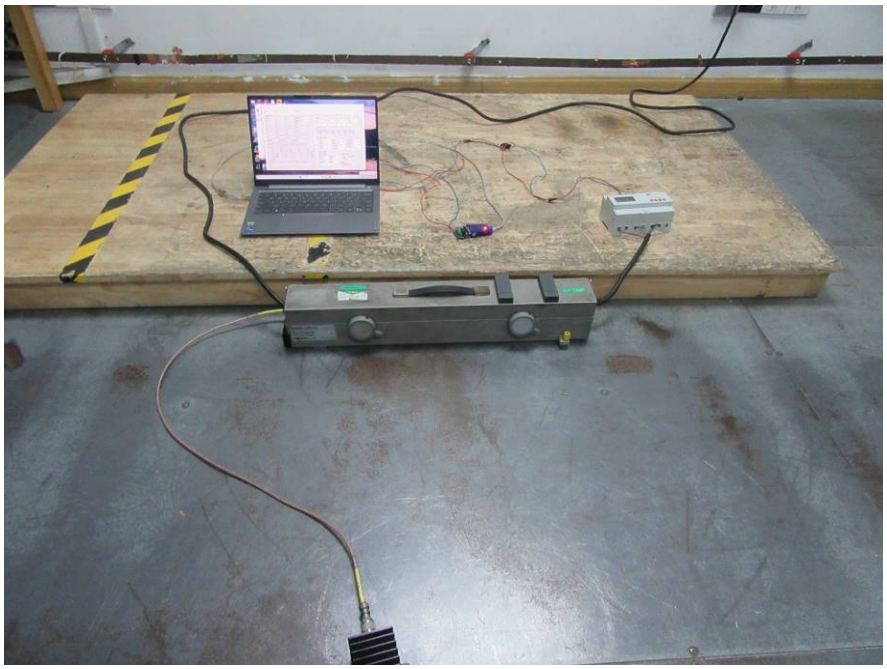


Electrical Fast Transients&Burst at Signal Port

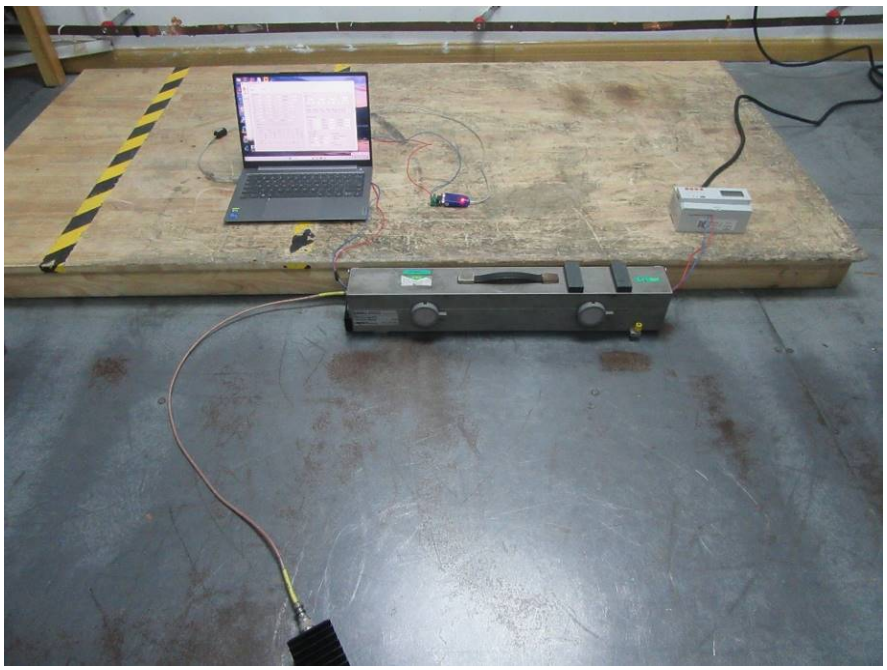


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Conducted Immunity at AC Mains Power Port (150kHz-80MHz)

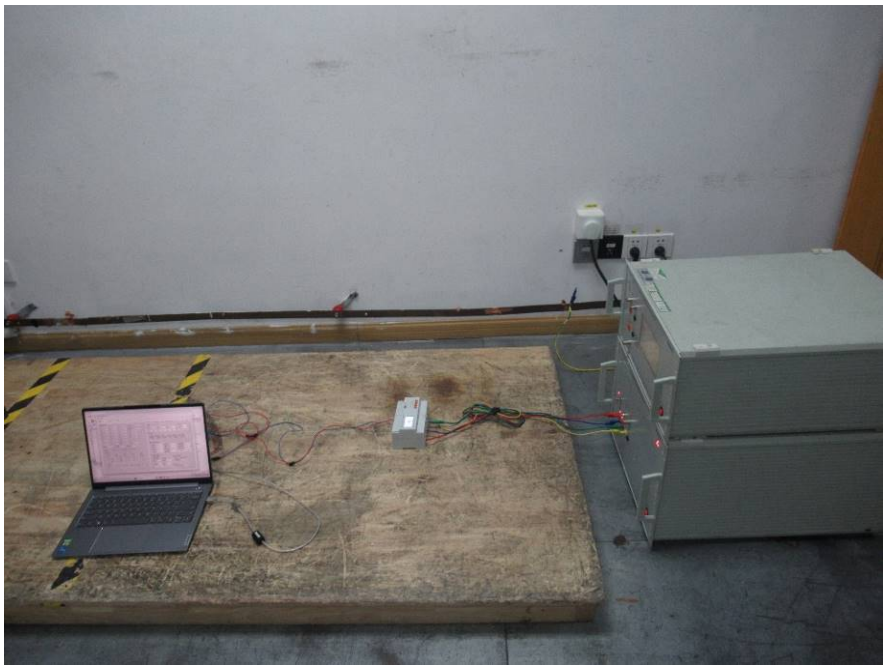


Conducted Immunity at Signal Port (150kHz-80MHz)

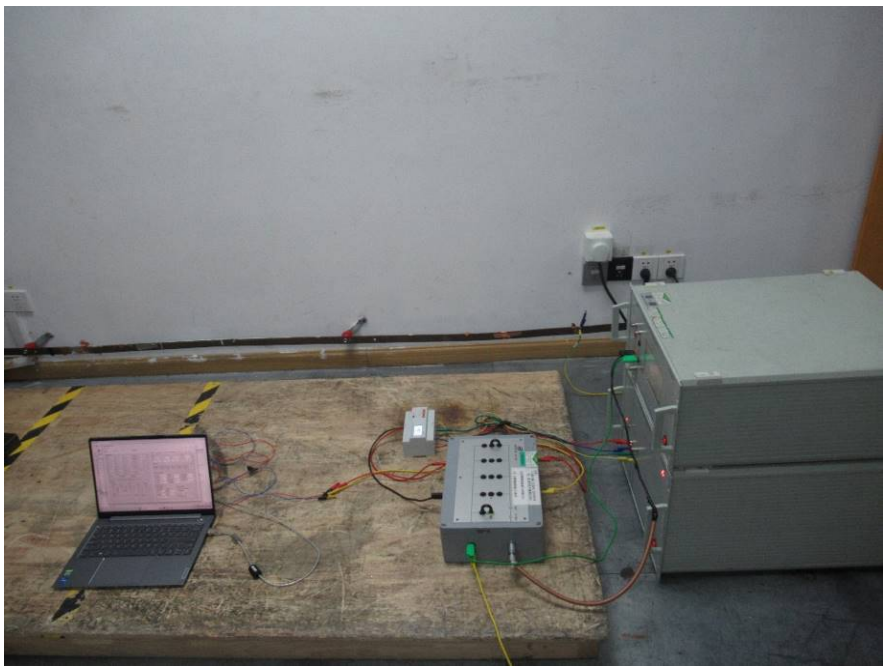


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Surge at AC Mains Power Port



Surge at Signal Port



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Power Frequency Magnetic Field



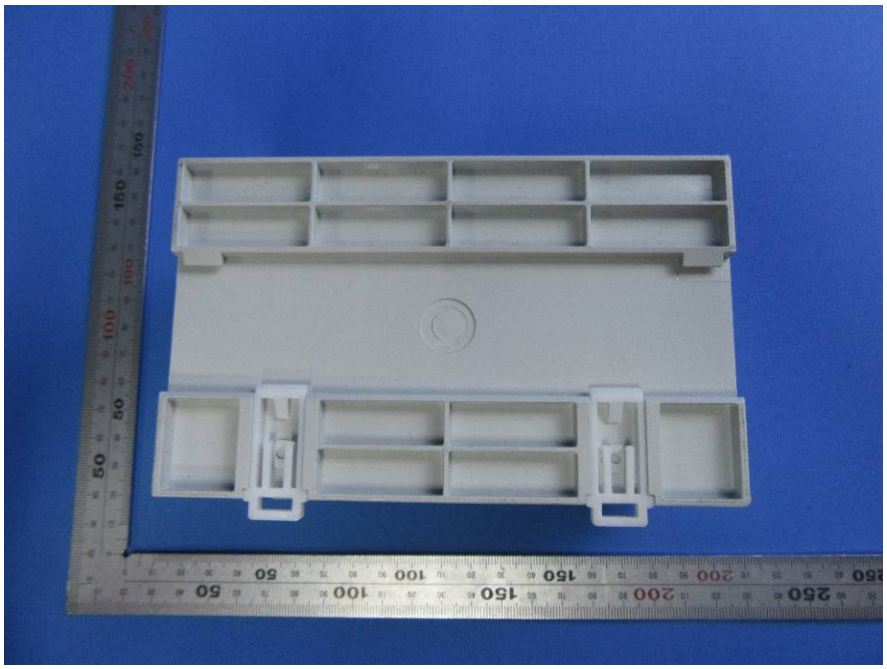
Voltage Dips and Interruptions

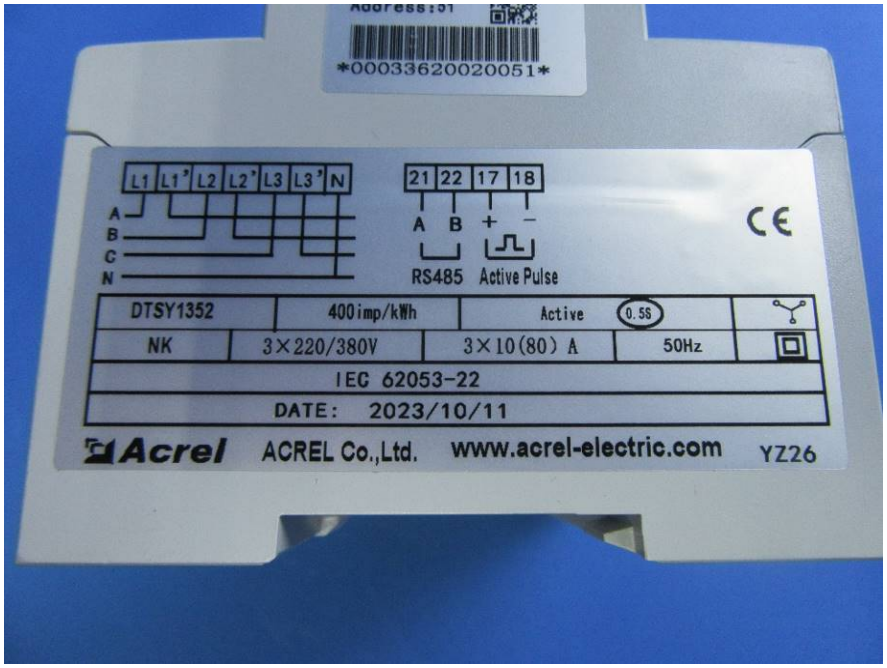


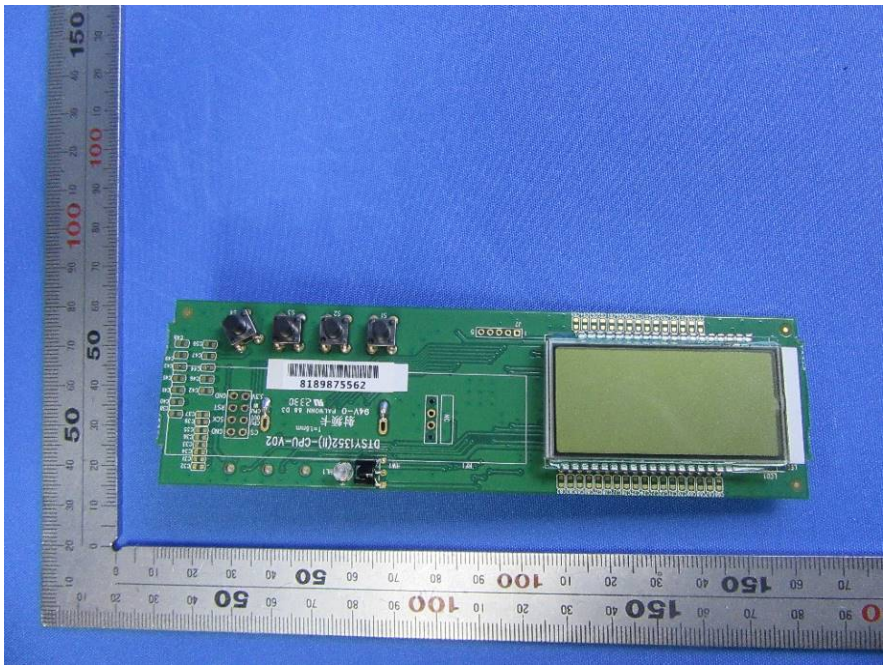
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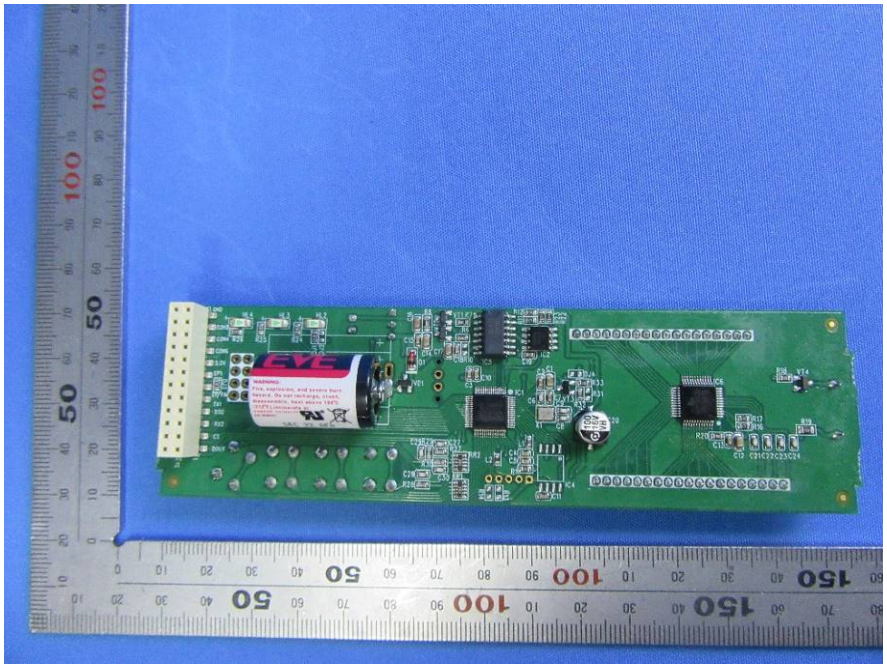
9 EUT Constructional Details (EUT Photos)

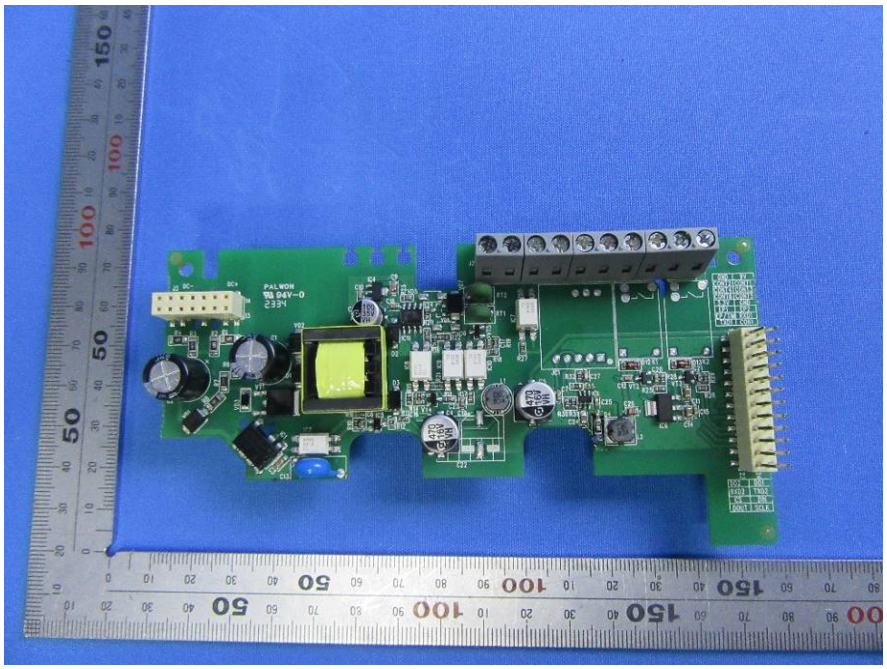


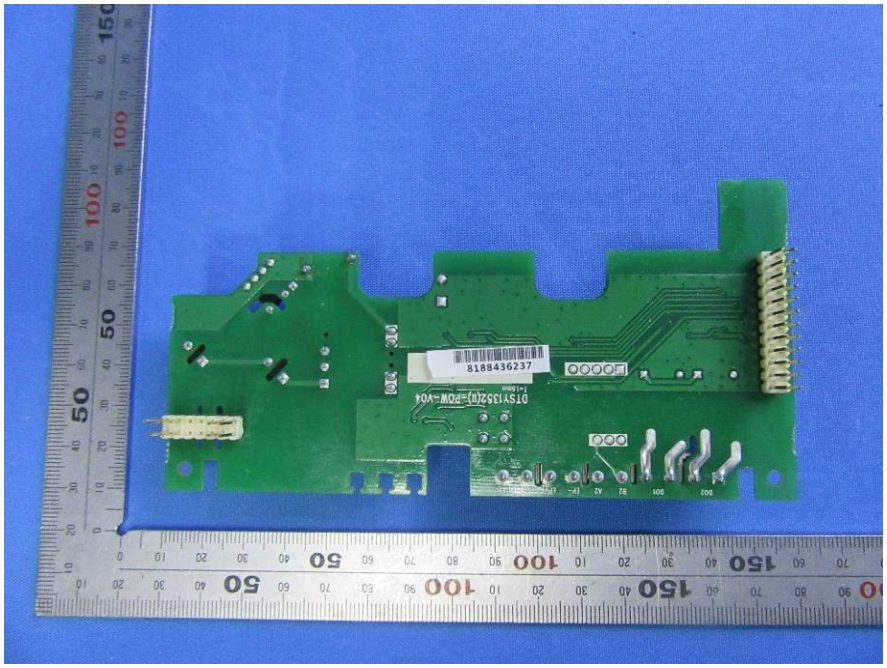


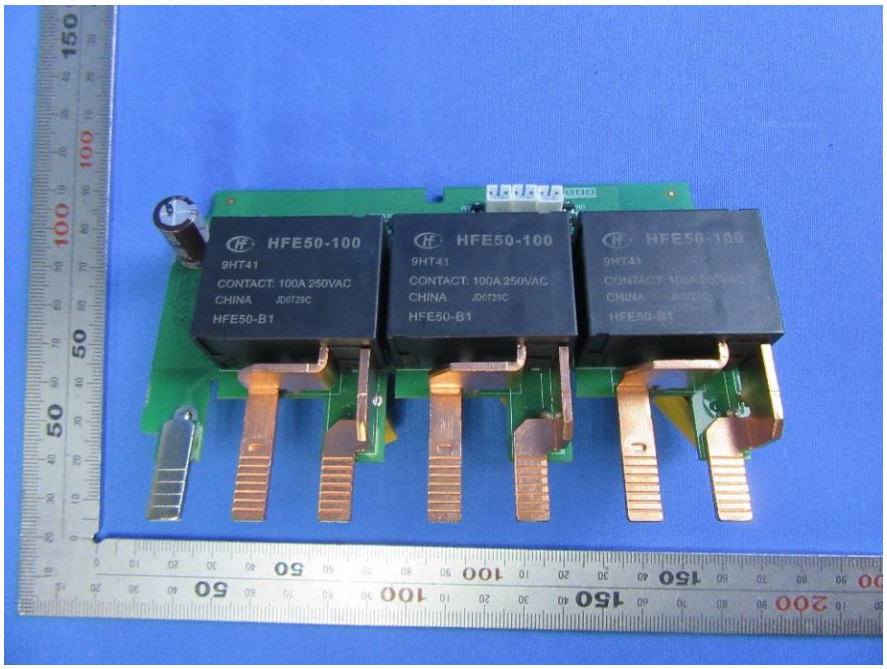

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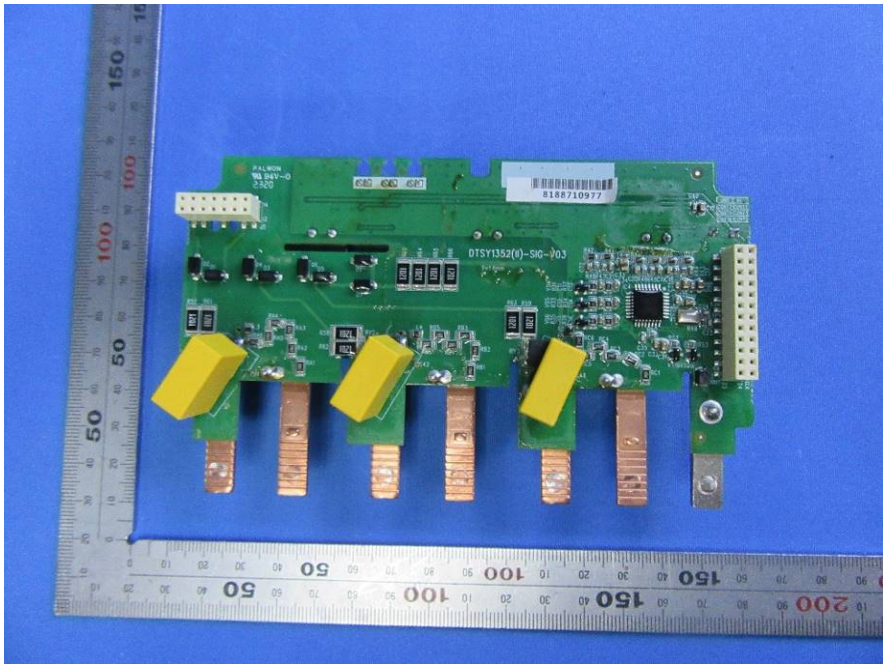

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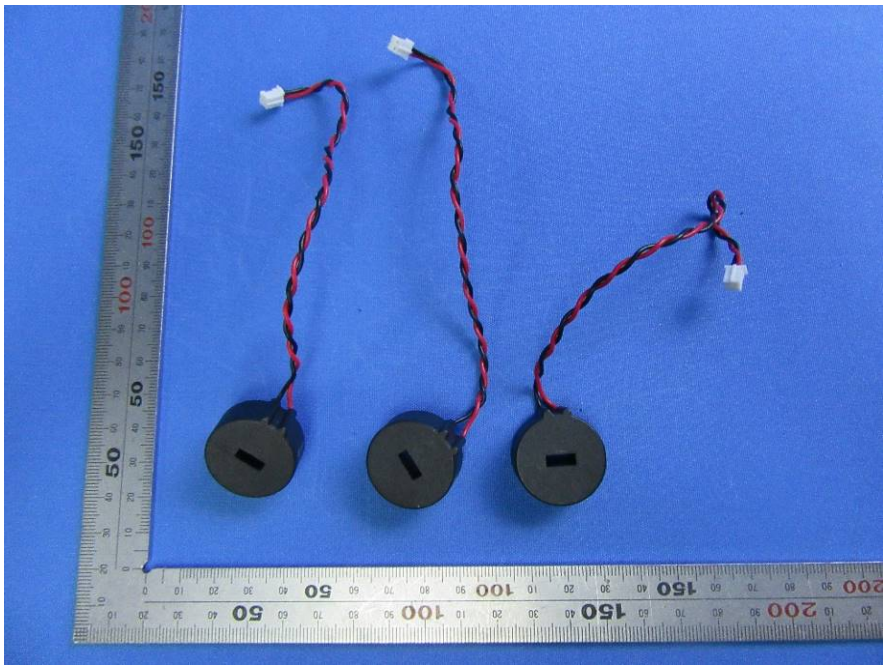


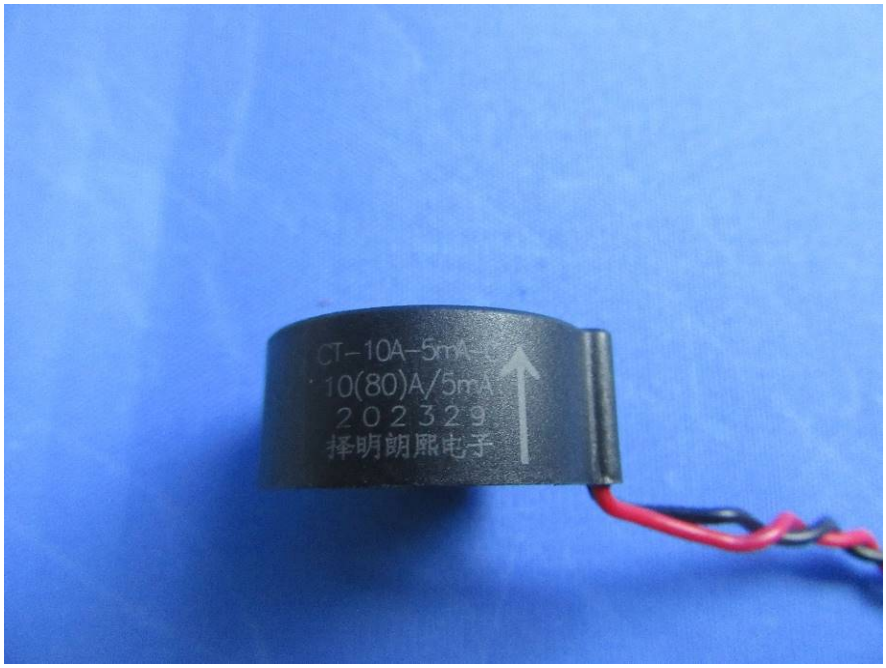



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