EMC Test Report

Applicant: China Leadshine Technology Co.,Ltd.

Product: DC SERVO DRIVER

Model: Refer to the section 1.5.4

Add value.
Inspire trust.

In accordance with EN IEC 61800-3

Prepared for: China Leadshine Technology Co.,Ltd.
15-20/F, Block B, Nanshan I Valley, No.3157, Shahe West Road, Nanshan District, 518055 Shenzhen, PEOPLE'S REPUBLIC OF CHINA

COMMERCIAL-IN-CONFIDENCE

Report Number: 6877224004202

RESPONSIBLE FOR	NAME	SIGNATURE	DATE
Approved by	Trevor You		2025-04-25
Prepared by	Dawi Xu		2025-04-25

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service control rules.

EXECUTIVE SUMMARY
A sample of this product was tested and found to be in compliance with EN IEC 61800-3:2018, EN IEC 61800-3:2023.

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch

Building 12 & 13, Zhiheng Wisdomland Business Park, Guankou Erlu, Nantou, Nanshan District, Shenzhen, 518052 China

Phone: +86 755 8828 6998
Fax: +86 755 8828 5299
www.tuvsud.cn

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Contents

1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	2025-04-25

1.2 Introduction

The information contained in this report is intended to show verification of the EMC Qualification Approval Testing of the requirements of the standards for the tests listed in Section 1.3.

Applicant	China Leadshine Technology Co.,Ltd.
Address	15-20/F, Block B, Nanshan I Valley, No.3157, Shahe West Road, Nanshan District, 518055 Shenzhen, PEOPLE'S REPUBLIC OF CHINA
Manufacturer	Same as applicant
Address	Same as applicant
Model Number(s)	Refer to section 1.5.4
Product Type	DC SERVO DRIVER
Brand name	雷赛智能 Leadshine® Leadshine®
Date of Receipt of EUT	2024-06-13
Start of Test	2024-06-13
Finish of Test	2024-07-09
Name of Engineer(s)	Dawi Xu

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with EN IEC 61800-3:2018 shown below.

Specification	Clause	Test Description	Result	Comments
EN IEC 61800-3:2018	6.3.1.2	Conducted Disturbance voltage at Mains Terminals**	Pass	/
EN IEC 61800-3:2018	6.3.1.3	Radiated disturbance	Pass	/
EN IEC 61800-3:2018	6.2.2	Communication notches*	N/A	/
EN IEC 61800-3:2018	6.2.3	Harmonic current emissions*	N/A	/
EN IEC 61800-3:2018	6.2.4	Flicker*	N/A	/
EN IEC 61800-3:2018	5.2.2	Harmonics and commutation notches/voltage distortion immunity test*	N/A	/
EN IEC 61800-3:2018	5.2.3	Voltage deviations, dips and short interruptions*	N/A	/
EN IEC 61800-3:2018	5.2.4	Voltage unbalance and frequency variations*	N/A	/
EN IEC 61800-3:2018	5.3	Electrostatic discharge immunity test	Pass	/
EN IEC 61800-3:2018	5.3	Radiated, radio-frequency, electromagnetic field immunity test	Pass	/
EN IEC 61800-3:2018	5.3	Electrical fast transient /burst immunity test	Pass	a, e
EN IEC 61800-3:2018	5.3	Surge immunity test	Pass	b, f
EN IEC 61800-3:2018	5.3	Immunity to conducted disturbances, induced by radio-frequency fields	Pass	e

a Power ports with current rating < 100 A: direct coupling using the coupling and decoupling network. Power ports with current rating ≥ 100 A: direct coupling or capacitive clamp without decoupling network. If the capacitive clamp is used, the test level shall be 4 kV/5 kHz. The chosen test method shall be stated in the test report.
b Applicable only to power ports with current consumption < 63 A during light load test conditions as specified in 5.1.3 of EN IEC 61800-3:2018.
e Applicable only to ports or interfaces with cables whose total length according to the manufacturer's functional specification may exceed 3 m.
f Applicable only to ports with cables whose total length according to the manufacturer's functional specification may exceed 30 m. In the case of a shielded cable, a direct coupling to the shield is applied. This immunity requirement does not apply to fieldbus or other signal interfaces where the use of surge protection devices is not practical for technical reasons. The test is not required where normal functioning cannot be achieved because of the impact of the coupling/decoupling network on the equipment under test (EUT).
*: Those tests are not applied to DC device.
**: This test is not applied to DC device, which was not specified hereafter apply only to grid connected power convertors (GCPCs) intended for assembly into photovoltaic power generating systems. This test is for cautions purpose only.

A brief summary of the tests carried out in accordance with EN IEC 61800-3:2023 shown below.

Specification	Clause	Test Description	Result	Comments
EN IEC 61800-3:2023	6.5.1.1	Conducted Disturbance voltage at Mains Terminals	Pass	/
EN IEC 61800-3:2023	6.5.1.3	Radiated disturbance	Pass	g
EN IEC 61800-3:2023	Annex B (informative)	Communication notches*	N/A	/
EN IEC 61800-3:2023	6.3.1	Harmonic current emissions*	N/A	/
EN IEC 61800-3:2023	6.3.2	Flicker*	N/A	/
EN IEC 61800-3:2023	5.2.1	Harmonics immunity test*	Pass	/
EN IEC 61800-3:2023	5.2.2	Voltage deviations, dips and short interruptions*	Pass	/
EN IEC 61800-3:2023	5.2.3	Frequency variations*	Pass	/
EN IEC 61800-3:2023	5.3	Electrostatic discharge immunity test	Pass	/
EN IEC 61800-3:2023	5.3	Radiated, radio-frequency, electromagnetic field immunity test	Pass	/
EN IEC 61800-3:2023	5.3	Electrical fast transient /burst immunity test	Pass	a, e
EN IEC 61800-3:2023	5.3	Surge immunity test	Pass	b, f
EN IEC 61800-3:2023	5.3	Immunity to conducted disturbances, induced by radio-frequency fields	Pass	e

a Power ports with current rating < 100 A: direct coupling using the coupling and decoupling network. Power ports with current rating ≥ 100 A: direct coupling or capacitive clamp without decoupling network. If the capacitive clamp is used, the test level shall be 4 kV/5 kHz. The chosen test method shall be stated in the test report.
b Applicable only to power ports with current consumption < 63 A during light load test conditions as specified in 5.3 of EN IEC 61800-3:2023.
e Applicable only to ports or interfaces with cables whose total length according to the manufacturer's functional specification may exceed 3 m.
f Applicable only to ports with cables whose total length according to the manufacturer's functional specification may exceed 30 m. In the case of a shielded cable, a direct coupling to the shield is applied. This immunity requirement does not apply to fieldbus or other signal interfaces where the use of surge protection devices is not practical for technical reasons. The test is not required where normal functioning cannot be achieved because of the impact of the coupling/decoupling network on the equipment under test (EUT).
g because the highest frequency of the internal sources of the EUT is less than 108MHz, the measurement only is made up to 1GHz.
*: Those tests are not applied to DC device.

1.4 Test Conditions

1.4.1 Environmental Conditions

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment.
The climatic conditions during the tests were within the following limits:

Temperature	**Humidity**	**Atmospheric pressure**
0 °C – 28.7 °C	5%-45%	860 hPa – 1013 hPa

If explicitly required in the basic standard or applied product standard the climatic values are recorded and documented separately in this test report.

1.4.2 Performance Criteria

Item	Acceptance (performance) criterion [a]		
	A	B	C
General system performance	No noticeable changes of the operating characteristic Operating as intended, within specified tolerance	Noticeable changes (visible or audible) of the operating characteristic Self-recoverable	Shutdown, changes in operating characteristics Triggering of protective devices [b] Not self-recoverable
Special system performance Torque generating behaviour	Torque deviation within specified tolerances	Temporary torque deviation outside specified tolerances Self-recoverable	Loss of torque Not self-recoverable
Sub-component performance Operation of power electronics and driving circuits	No malfunction of a power semiconductor	Temporary malfunction which cannot cause unintended shut-down of the PDS	Shut-down, triggering of protective devices b No loss of stored program No loss of user program No loss of settings Not self-recoverable
Sub-component performance Information processing and sensing functions	Undisturbed communication and data exchange to external devices	Temporarily disturbed communication, but no error reports of the internal or external devices which could cause shut-down	Errors in communication, loss of data and information No loss of stored program, no loss of user program No loss of settings. Not self-recoverable
Sub-component performance Operation of displays and control panels	No changes of visible display information, only slight light intensity fluctuation of LEDs, or slight movement of characters	Visible temporary changes of information, undesired LED illumination	Shut down, permanent loss of information, or unpermitted operating mode, obviously wrong display information No loss of stored program, no loss of user program No loss of settings

a Acceptance criteria A, B, C – False starts are not acceptable. A false start is an unintended change from the logical state "STOPPED" which can make the motor run.
b Acceptance criterion C – The function can be restored by operator intervention (manual reset). Opening of fuses is allowed for line-commutated converters operating in inverting mode.

1.5 Product Information and general remarks

1.5.1 Technical Description

Ratings : Refer to model list
Protection Class : Class II

1.5.2 Test Configuration

Test Configuration	Description
DC operated	DC 24V, DC 70V

1.5.3 Modes of Operation

Test Mode	Description
TM1	Continuous operation mode with high frequency output (Input: 24Vdc).
TM2	Continuous operation mode with high frequency output (Input: 70Vdc).
The EUT has multiple work modes, the worst test result is listed in the report.	

1.5.4 General product information and other remarks:

This report is based on report 6877224004201 for changing the nomenclature of ELD3 series
from

M: EtherCAT with RJ45 Housing
H: EtherCAT with Molex Housing

to

M: without Housing
H: with Housing

There is no any change with the actual product except for the nomenclature mentioned above, therefore, the original test results are still valid, no additional test was needed.

Model list:

LD3M series, ELD3 series (see Table 1-Nomenclature for details)

Table 1-Nomenclature

Nomenclature

LD3M	-	(EC)	70	10	-	(a)	(b)
I		II	III	IV		V	VI

I Series designation

LD3M: LD3M series (Chinese series)

II Communication type

CAN: CAN BUS
EC: EtherCAT

III Input Voltage

70: 24-70VDC

48: 24-48VDC

IV Output Rated Current

01: 1Arms

05: 5Arms

10: 10Arms

20: 20Arms

V Product code (not relevant to product construction)

(a): XXXXXXXXXX

The model number may include a “XXXXXXXXXX”, Where “XXXXXXXXXX” can be blank or combination of any alphanumeric and/or symbols that represents product code.

VI Customer code (not relevant to safety construction)

(b): XXXXXXXXXX

The model number may include a suffix “XXXXXXXXXX”, Where “XXXXXXXXXX” can be blank or combination of any alphanumeric and/or symbols that represents customer identity.

Nomenclature

ELD3	-	(EC)	70	10	B	M	-	(a)	-	(b)
I		II	III	IV	V	VI		VII		VIII

I Series designation
- ELD3: ELD3 Series DC Servo Drives (Overseas series)

II Communication ports
- CAN: CAN BUS
- EC: EtherCAT
- RS: Pulse and Modbus

III Input Voltage
- 70: 24-70VDC
- 48: 24-48VDC

IV Output Rated Current
- 01: 1Arms
- 05: 5Arms
- 10: 10Arms
- 20: 20Arms

V Brake Output
- B: With Brake Output
- Blank: Without Brake Output

VI Housing
- M: without Housing
- H: with Housing

VII Product code (not relevant to product construction)
- (a): XXXXXXXXXX
  The model number may include a “XXXXXXXXXX”, Where “XXXXXXXXXX” can be blank or combination of any alphanumeric and/or symbols that represents product code.

VI Customer code (not relevant to safety construction)
- (b): XXXXXXXXXX
  The model number may include a suffix “XXXXXXXXXX”, Where “XXXXXXXXXX” can be blank or combination of any alphanumeric and/or symbols that represents customer identity.

ELD3 series are alternative models of LD3 series.
All models of full functions version of ELD3 and LD3 series are similar with circuit diagram and construction, except communication port, components IGBT, heat sink, bus capacitor, and minor components values are different because of different use purpose or loading.

By evaluation, model ELD3-EC7020BM was selected for testing and other models are deemed to fulfill relevant EMC requiremeng without further testing.

As client decelerated EUT is belong to Category C2 and First environment.

1.5.5 Auxiliary Equipment Used during Test

Name	Model	Manufacturer	S/N
Motor	LVM06002 (0.2KW)	China Leadshine	38855000131700 62
Power line EMI Filter (Input)	SGAA1-6A2	Shen Gu Dian zi	/
BAT BOX	231001738	/	/

1.5.6 Cables Used for EUT during Test

Port	Length (Manufacture Specific)	Type of Cable
DC Power Cable for Drive	>1.5m	Unshielded
Moto Cable for Drive	<2.0m	Shielded
Control Line for Motor	<2.0m	Unshielded
Remark: as the manufacturer declares that the other ports of the product except for above ports are not used in the normal working mode, so the other ports(such as RJ45 ports) are not considered in this report.		

1.6 Deviations from the Standard

No deviations from the applicable test standard were made during testing.

1.7 Test Location

Location 1:

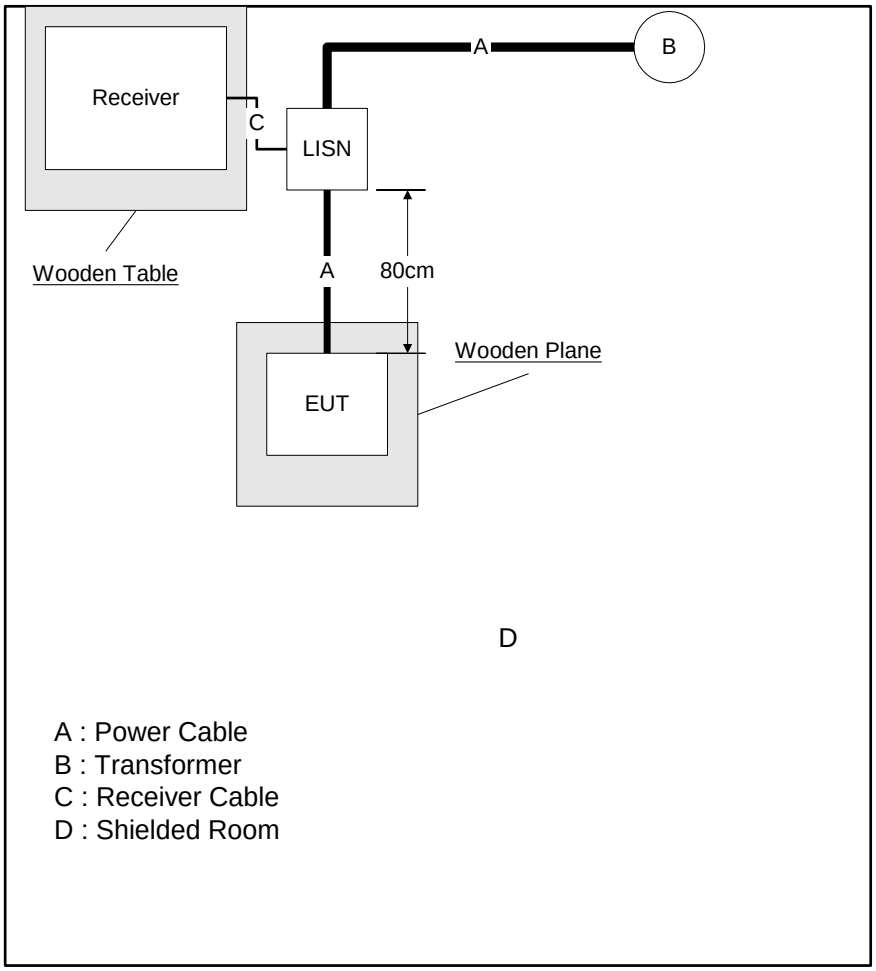
TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Address: Building 12 & 13, Zhiheng Wisdomland Business Park,
Guankou Erlu, Nantou, Nanshan District, Shenzhen, 518052 China

2 Test Details

2.1 Disturbance voltage at Mains Terminals

2.1.1 Test Method

The EUT was placed on a non-conductive table 0.8m above a reference ground plane.
All power was connected to the EUT through the 50 Ω/50 µH Artificial Mains Network (AMN).
Conducted disturbance voltage measurements on mains lines were made at the output of the AMN. The AMN was placed 0.8m from the boundary of the EUT and bonded to the reference ground plane.



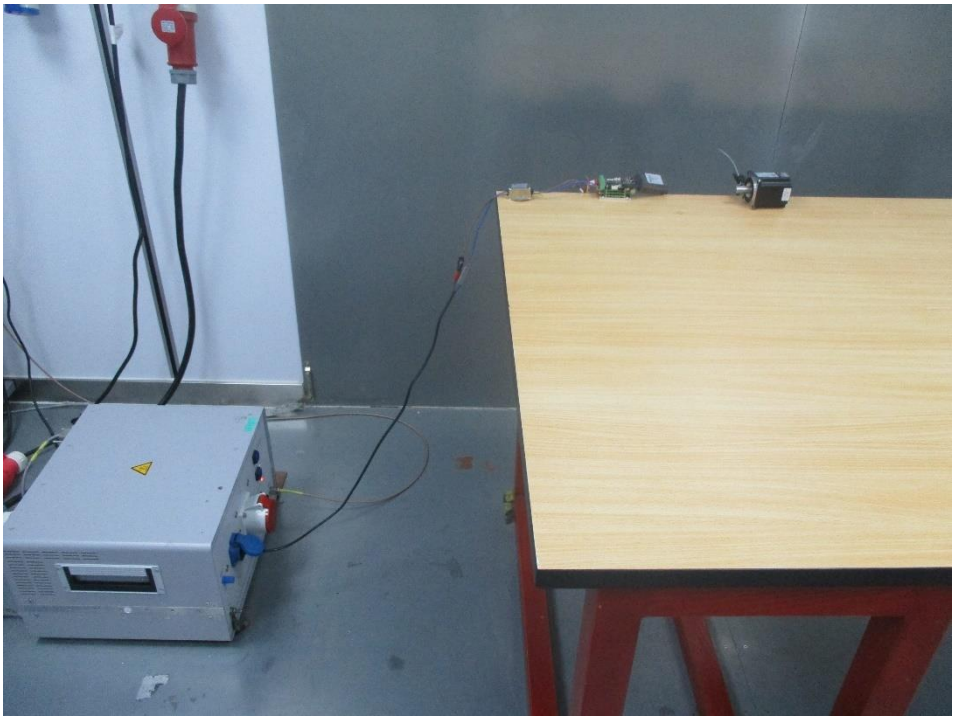
2.1.2 Specification Limits

	Category C1		Category C2	
Frequency range MHz	Quasi-peak dB(µV)	Average dB(µV)	Quasi-peak dB(µV)	Average dB(µV)
0.15 – 0.50	66 Decreasing linearly with logarithm of frequency to 56	56 Decreasing linearly with logarithm of frequency to 46	79	66
0.50 – 5	56	46	73	60
5 – 30	60	50	73	60
At the transition frequency, the more stringent limit shall apply.				

	Category C3			
	I ≤ 100A		100A ≤ I	
Frequency range MHz	Quasi-peak dB(µV)	Average dB(µV)	Quasi-peak dB(µV)	Average dB(µV)
0.15 – 0.50	100	90	130	120
0.50 – 5	86	76	125	115
5 – 30	90 Decreasing linearly with logarithm of frequency to 73	80 Decreasing linearly with logarithm of frequency to 60	115	105
At the transition frequency, the more stringent limit shall apply.				

Remark for test data:
*Level=Reading Level + Correction Factor
**Correction Factor=Cable Loss + LISN Factor
(The Reading Level is recorded by software which is not shown in the sheet)

2.1.3 Test setup



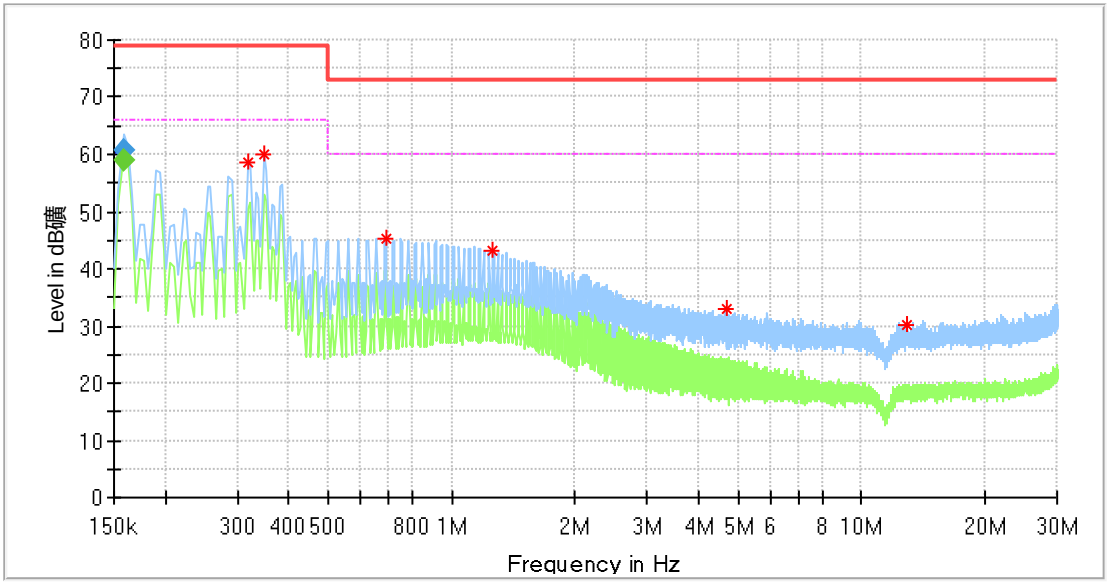
2.1.4 Test Location

This test was carried out in shielded room.

2.1.5 Test result

Conducted Emission(150kHz-30MHz)

M/N:	ELD3-EC7020BM
Operating Condition:	TM1
Comment:	Power Line, +
Remark:	DC 24V
Test Date:	2024-06-13



Critical_Freqs

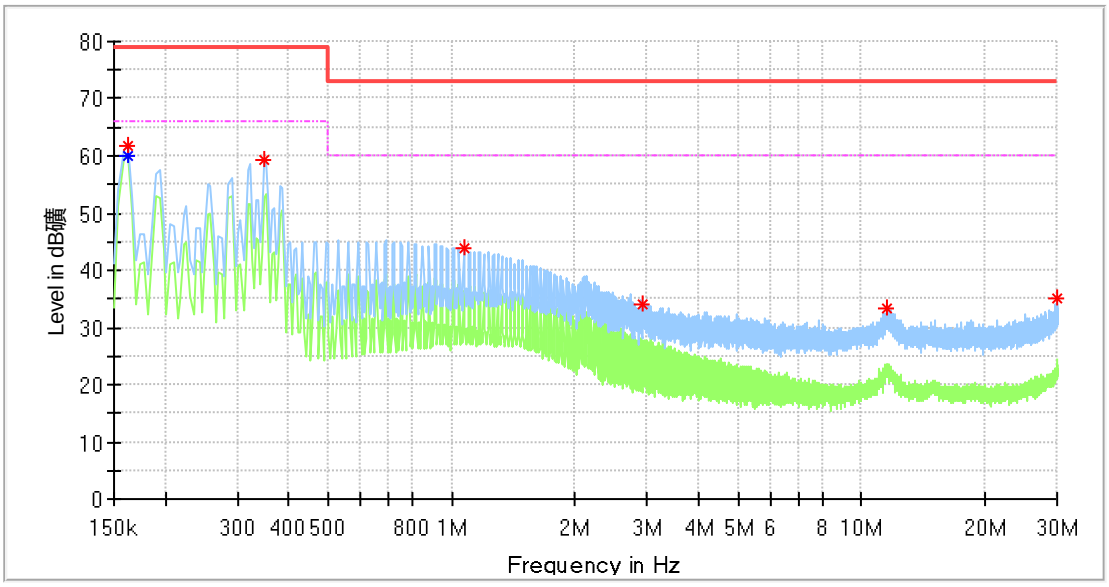
Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.158000	---	60.19	66.00	5.81	+	10.27
0.318000	58.68	---	79.00	20.32	+	10.28
0.350000	59.86	---	79.00	19.14	+	10.28
0.690000	45.14	---	73.00	27.86	+	10.31
1.262000	43.33	---	73.00	29.67	+	10.33
4.690000	32.99	---	73.00	40.01	+	10.55
12.922000	30.28	---	73.00	42.72	+	11.14

Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.158000	---	59.03	66.00	6.97	+	10.27
0.158000	60.83	---	79.00	18.17	+	10.27

Conducted Emission(150kHz-30MHz)

M/N: ELD3-EC7020BM
Operating Condition: TM1
Comment: Power Line, -
Remark: DC 24V
Test Date: 2024-06-13

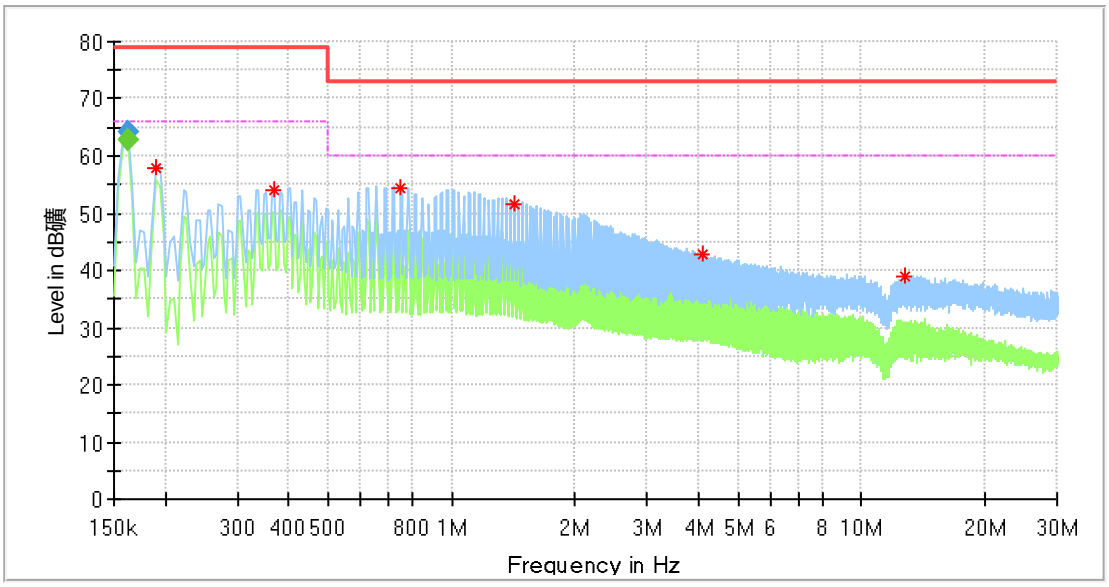


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.162000	---	59.98	66.00	6.02	-	10.21
0.162000	61.88	---	79.00	17.12	-	10.21
0.350000	59.40	---	79.00	19.60	-	10.16
1.074000	43.74	---	73.00	29.26	-	10.21
2.930000	34.18	---	73.00	38.82	-	10.35
11.546000	33.34	---	73.00	39.66	-	11.29
30.000000	34.98	---	73.00	38.02	-	12.66

Conducted Emission(150kHz-30MHz)

M/N: ELD3-EC7020BM
Operating Condition: TM2
Comment: Power Line, +
Remark: DC 70V
Test Date: 2024-06-13



Critical_Freqs

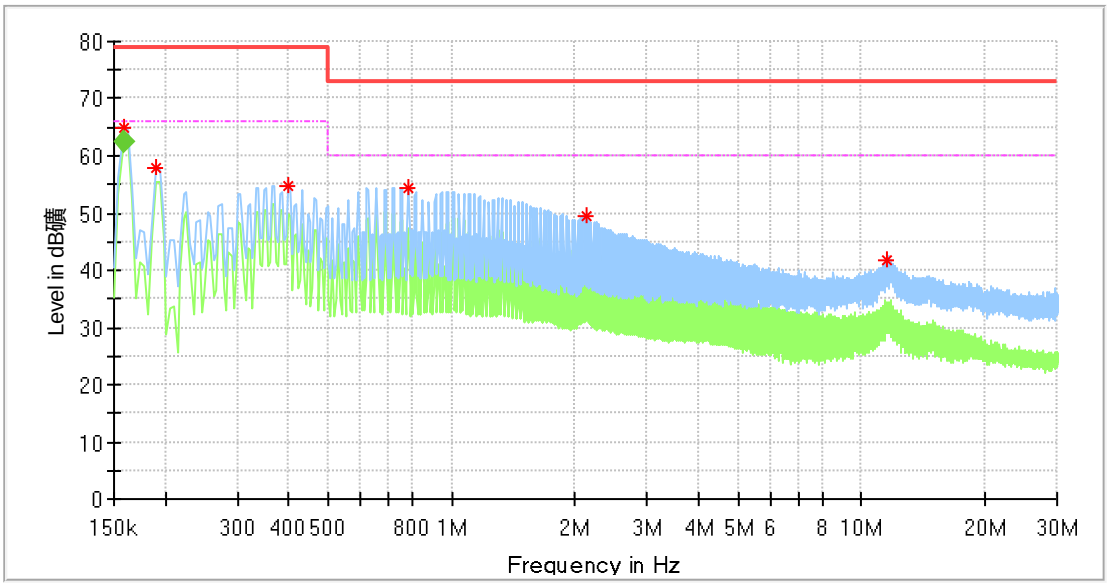
Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.161500	---	63.16	66.00	2.84	+	10.27
0.190000	57.99	---	79.00	21.01	+	10.27
0.370000	54.05	---	79.00	24.95	+	10.28
0.750000	54.47	---	73.00	18.53	+	10.31
1.426000	51.71	---	73.00	21.29	+	10.33
4.078000	42.88	---	73.00	30.12	+	10.50
12.814000	38.81	---	73.00	34.19	+	11.14

Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.161500	---	62.89	66.00	3.11	+	10.27
0.161500	64.19	---	79.00	14.81	+	10.27

Conducted Emission(150kHz-30MHz)

M/N: ELD3-EC7020BM
Operating Condition: TM2
Comment: Power Line, -
Remark: DC 70V
Test Date: 2024-06-13



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.158000	---	62.93	66.00	3.07	-	10.21
0.158000	65.05	---	79.00	13.95	-	10.21
0.190000	57.74	---	79.00	21.26	-	10.22
0.398000	54.61	---	79.00	24.39	-	10.16
0.782000	54.26	---	73.00	18.74	-	10.19
2.126000	49.37	---	73.00	23.63	-	10.27
11.534000	41.77	---	73.00	31.23	-	11.29

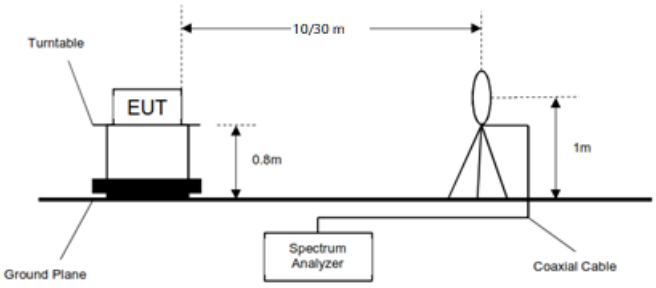
Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.158000	---	62.50	66.00	3.50	-	10.21

2.2 Electromagnetic Radiated disturbance (150 kHz - 30 MHz)

2.2.1 Test Method

Field strength measurements are made in the frequency range of 9 kHz to 30 MHz using a calibrated loop antenna, positioned with its plane vertical at the specified distance from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT.
The lowest of the loop shall be 1 m above the ground.
This method is applicable for radiated radio-noise measurements from all units, cables, power cords, and interconnect cabling or wiring.
For certain applications, the loop antenna plane may also need to be positioned horizontally at the specified distance from the EUT.
The RBW setting on test receiver was 9 kHz, IF RBW 10 kHz.



2.2.2 Specification Limits

Electromagnetic Radiated disturbance limits at measuring distance of 10 m	
Frequency range MHz	Quasi-peak dB(µA/m)
0.15≤f< 0.49	13.5
0.49≤f< 3.95	3.5
3.95≤f< 20	-11.5
20≤f< 30	-21.5
At the transition frequency, the more stringent limit should apply.	

Remark for test data:
*Level=Reading Level + Correction Factor
**Correction Factor=Antenna Factor + Cable Loss
(The Reading Level is recorded by software which is not shown in the sheet)

In case of interference, the radiation shall be measured at a distance of 10 m from the boundary of the installation if interference occurs in the first environment, or at a distance of 30 m from the boundary of the installation if interference occurs in the second environment.

2.2.3 Test Setup

N/A

2.2.4 Test Location

N/A

2.2.5 Test Results

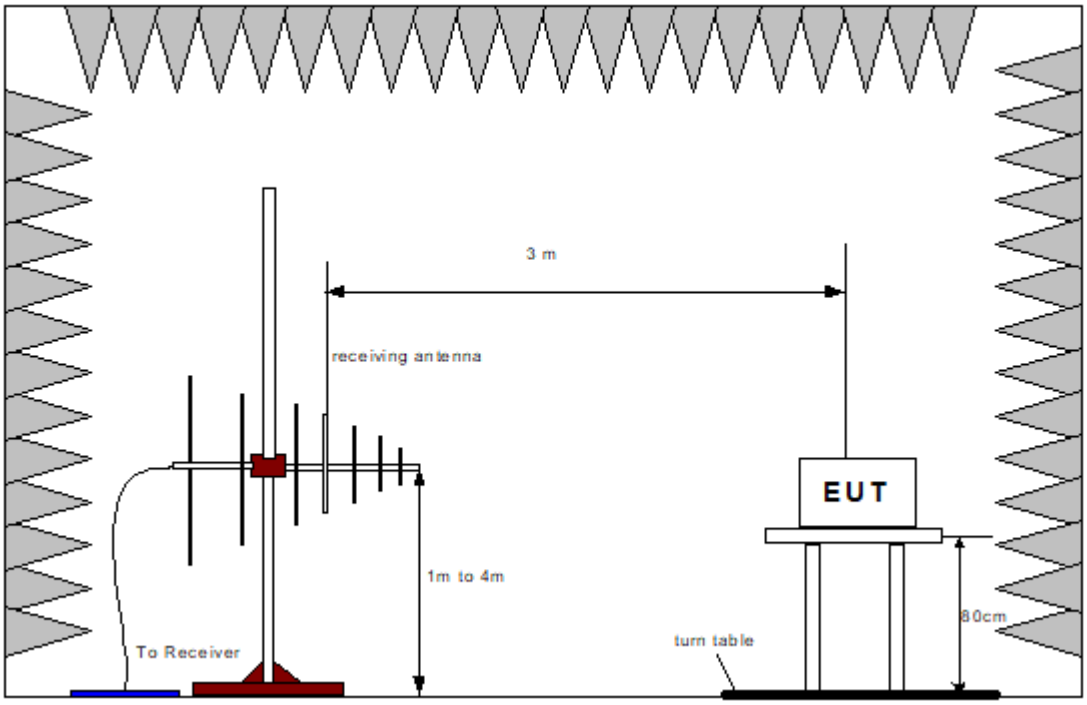
N/A

Remark: This test is only applied for PDS of category C4.

2.3 Electromagnetic Radiated disturbance (30 MHz - 1000 MHz)

2.3.1 Test Method

The EUT was set up on site, a pre-scan of the EUT emissions profile was made while varying the antenna-to-EUT azimuth (left, right, front, rear) and antenna-to-EUT polarization using a peak detector; measurements were taken at a 3m distance. Using the pre-scan list of the highest emissions detected, their bearing and associated antenna polarization, the EUT was then formally measured using Quasi-Peak and Average detectors, as appropriate. The readings were maximized by adjusting the antenna height, polarization, in accordance with the specification.

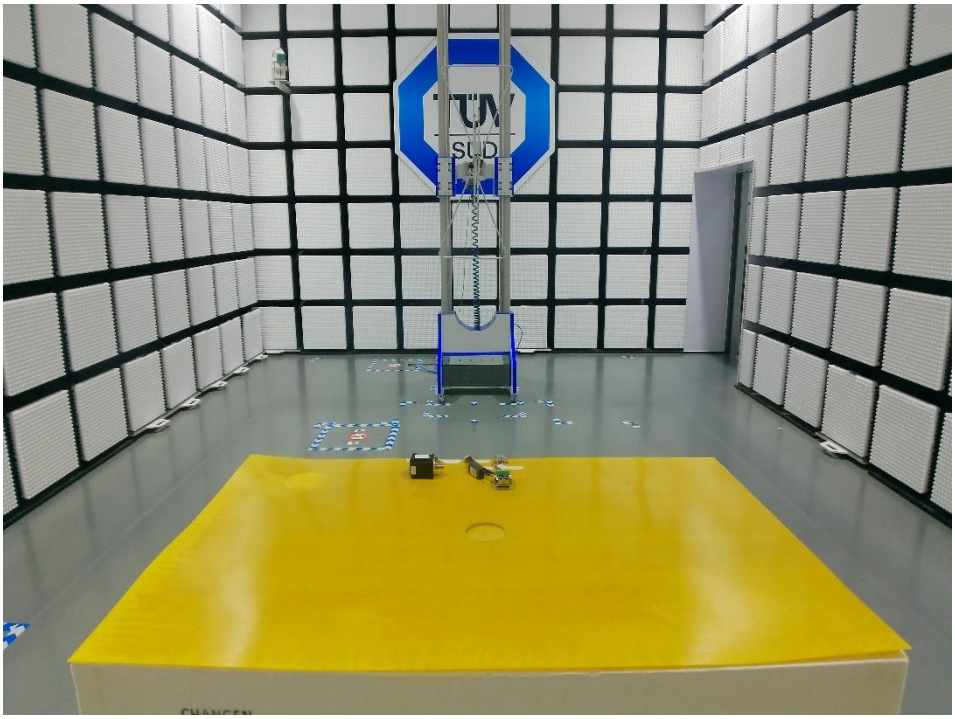


2.3.2 Specification Limits

	Electric field strength component Quasi-peak dB(μV/m)			
Frequency band MHz	Measurement distance 10 m[a]		Measurement distance 3 m[a]	
	Category 1	Category 2	Category 1	Category 2
30 ≤ f ≤ 230	30	40	40	50
230 < f ≤ 1 000	37	47	47	57
a. For selection of measurement distance, see 6.3.1.3.3.				

Remark for test data:
*Level=Reading Level + Correction Factor
**Correction Factor=Antenna Factor + Cable Loss
(The Reading Level is recorded by software which is not shown in the sheet)

2.3.3 Test setup



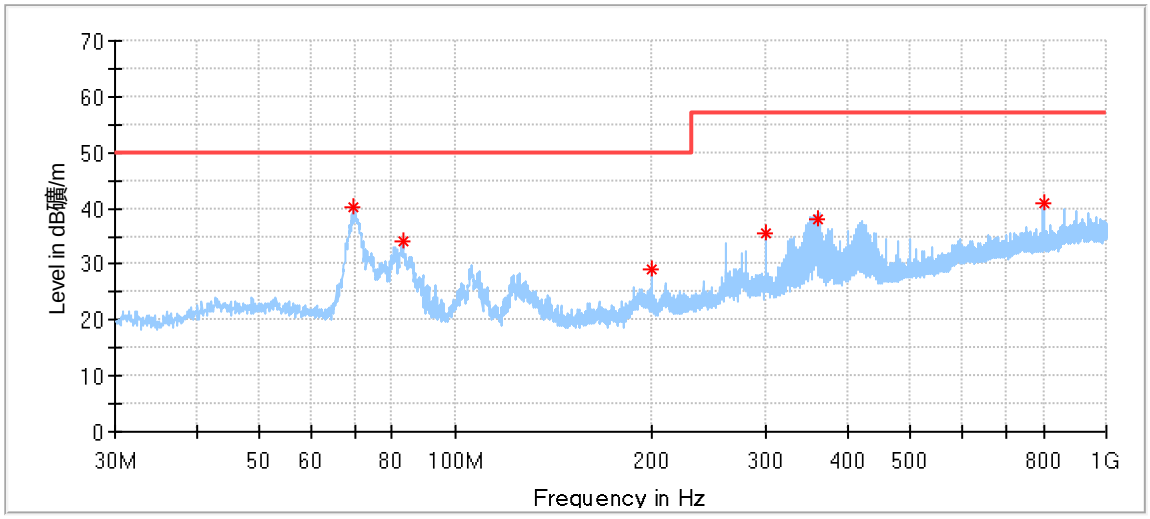
2.3.4 Test Location

This test was carried out in 3m anechoic chamber.

2.3.5 Test Results

Radiated Electromagnetic Emissions 30MHz-1000MHz

M/N: ELD3-EC7020BM
Operating Condition: TM1
Comment: Horizontal
Remark: DC 24V
Test Date: 2024-06-13

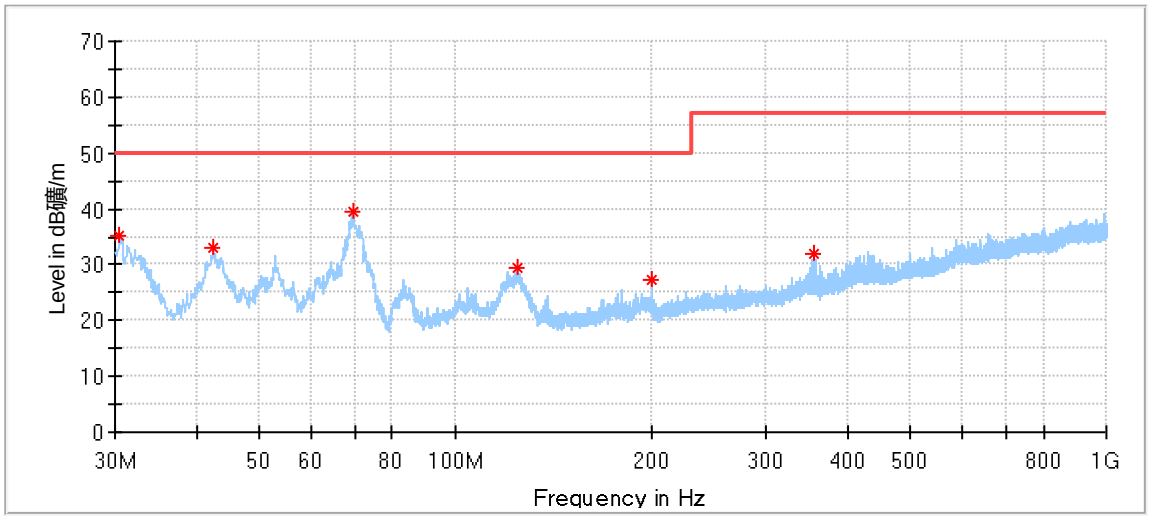


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
69.877778	40.09	50.00	9.91	200.0	H	15.0	13.86
83.026667	34.23	50.00	15.77	200.0	H	15.0	11.71
199.965556	29.06	50.00	20.94	100.0	H	61.0	16.33
300.037222	35.54	57.00	21.46	100.0	H	218.0	18.66
359.746111	37.98	57.00	19.02	100.0	H	42.0	19.68
800.018333	40.91	57.00	16.09	100.0	H	89.0	27.42

Radiated Electromagnetic Emissions 30MHz-1000MHz

M/N: ELD3-EC7020BM
Operating Condition: TM1
Comment: Vertical
Remark: DC 24V
Test Date: 2024-06-13

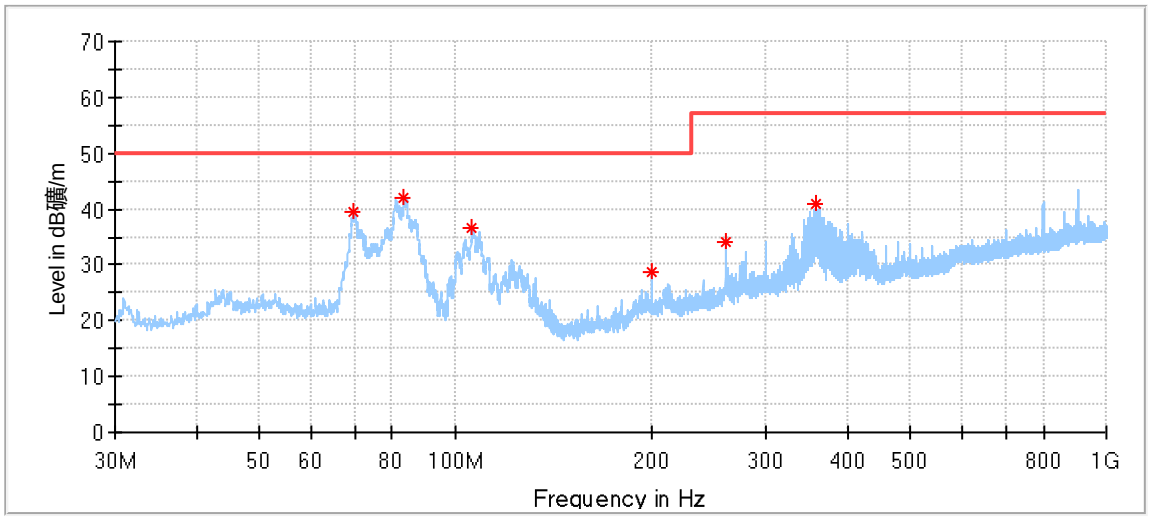


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
30.485000	35.28	50.00	14.72	100.0	V	86.0	13.99
42.448333	33.10	50.00	16.90	100.0	V	49.0	17.18
69.770000	39.48	50.00	10.52	100.0	V	270.0	13.91
124.575000	29.42	50.00	20.58	100.0	V	40.0	13.49
200.019444	27.27	50.00	22.73	200.0	V	115.0	16.32
354.842222	32.08	57.00	24.92	200.0	V	87.0	20.33

Radiated Electromagnetic Emissions 30MHz-1000MHz

M/N: ELD3-EC7020BM
Operating Condition: TM2
Comment: Horizontal
Remark: DC 70V
Test Date: 2024-06-13

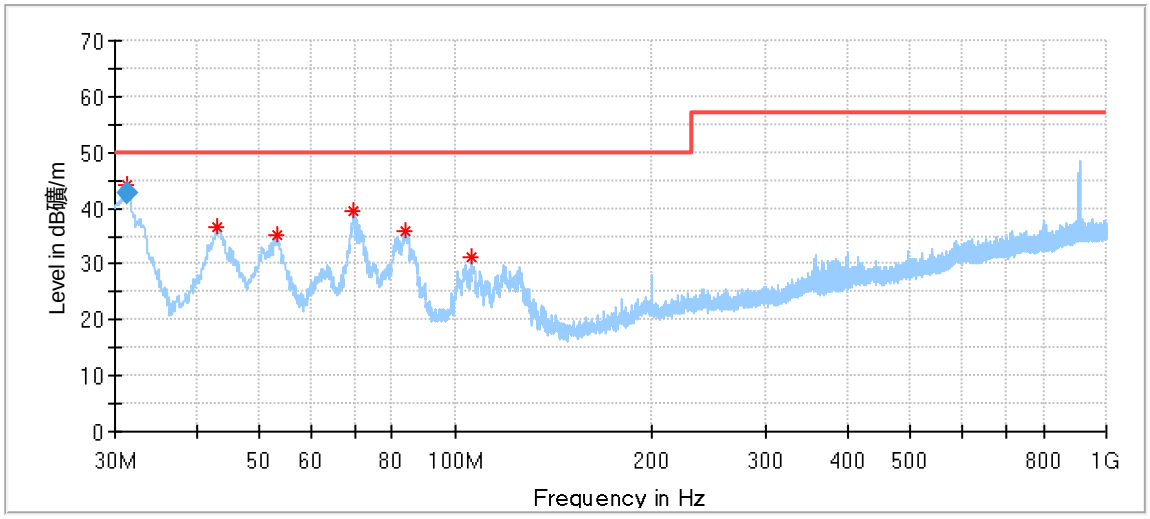


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
69.716111	39.40	50.00	10.60	200.0	H	4.0	13.94
83.350000	41.97	50.00	8.03	200.0	H	0.0	11.81
106.198889	36.77	50.00	13.23	200.0	H	0.0	16.26
199.965556	28.89	50.00	21.11	100.0	H	31.0	16.33
259.997778	34.11	57.00	22.89	100.0	H	44.0	17.75
357.536667	40.92	57.00	16.08	100.0	H	55.0	19.98

Radiated Electromagnetic Emissions 30MHz-1000MHz

M/N: ELD3-EC7020BM
Operating Condition: TM2
Comment: Vertical
Remark: DC 70V
Test Date: 2024-06-13



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
31.401111	44.32	50.00	5.68	100.0	V	104.0	13.84
42.987222	36.44	50.00	13.56	100.0	V	114.0	17.25
53.064444	35.14	50.00	14.86	100.0	V	40.0	17.96
69.716111	39.53	50.00	10.47	200.0	V	99.0	13.94
83.727222	35.76	50.00	14.24	200.0	V	62.0	11.92
106.091111	31.30	50.00	18.70	200.0	V	72.0	16.26

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
31.401111	42.60	50.00	7.40	100.0	V	104.0	13.84

2.4 Commutation notches emission

2.4.1 Test Method

Commutation notches are measured on the power ports using an oscilloscope
They are produced by controlled line-commutated converters.

2.4.2 Specification Limits

Maximum allowable depth of commutation notches		
	First environment	Second environment
Maximum notch depth	20 % Class C of IEC 60146-1-1 or comply with the requirements of the local supply authority	40 % Class B of IEC 60146-1-1 or agreement with the user

2.4.3 Test Setup

N/A

2.4.4 Test Location

This test was carried out in EMS Test Location.

2.4.5 Test Results

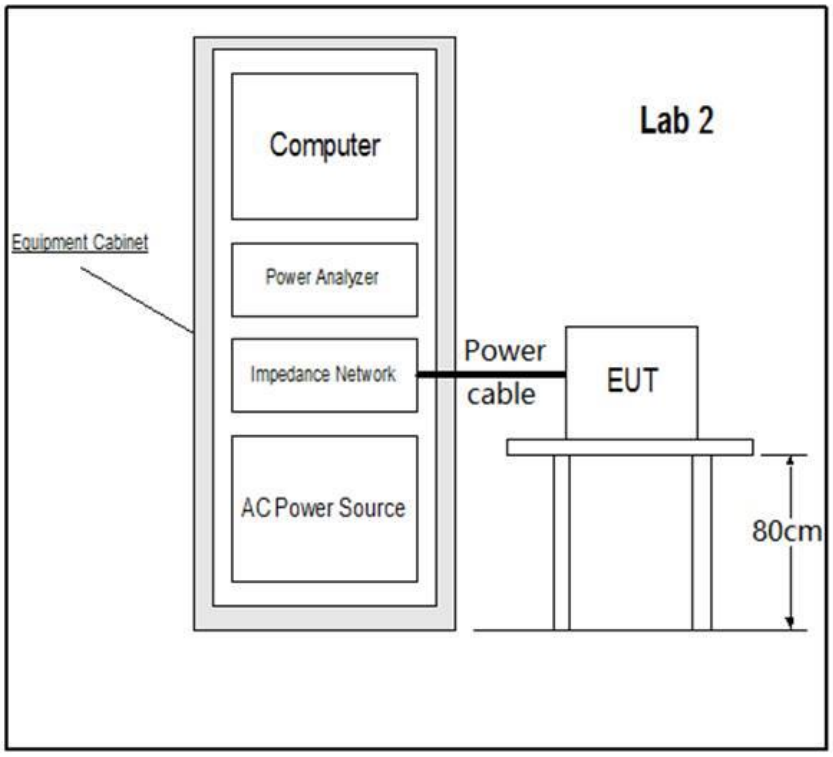
According to the operating curve of input port, there are no commutation notches signal. No test need be applied on this product.

Remark: This test is not applied on product； its input circuit is diode rectifiers.

2.5 Harmonic current emissions

2.5.1 Test Method

Harmonic current test should be conducted with the user's operation control or automatic programs set to the mode expected to produce the maximum total harmonic current under normal operating conditions.
Specific test conditions for the measurement of harmonic currents associated with some types of equipment are given in test equipment list.



2.5.2 Specification Limits

Limits for class A Equipment	
Harmonic order n	Maximum permissible harmonic current A
Odd harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
15≤ n≤ 39	0.15(15/n)
Even harmonics	
2	1.08
4	0.43
6	0.30
8≤ n ≤40	0.23(8/n)

2.5.3 Test Setup

N/A

2.5.4 Test Location

N/A

2.5.5 Test Results

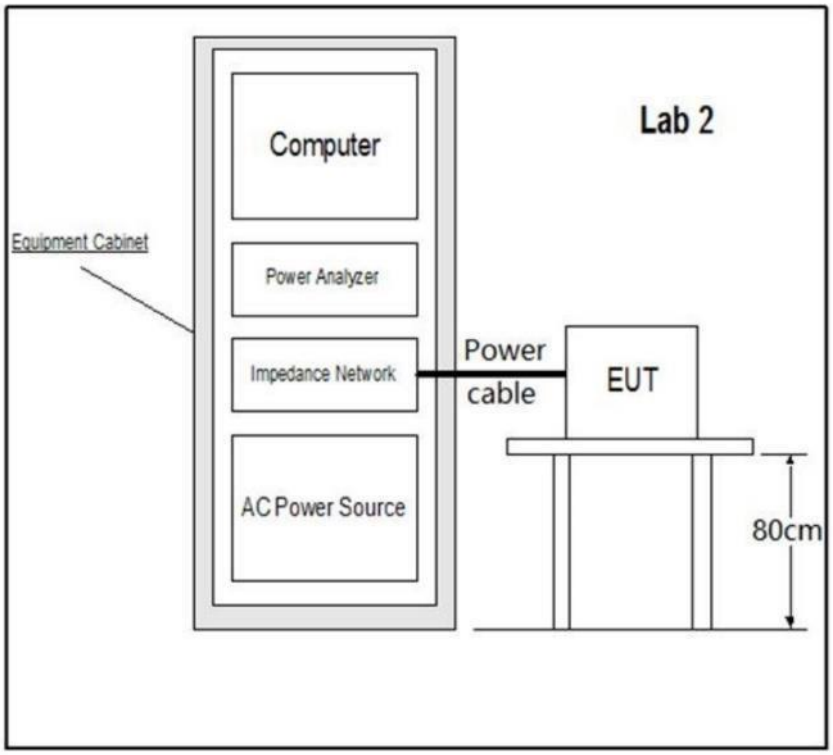
N/A

Remark: This test is applied for PDS with AC input , but this product belongs to BDM and with DC input.

2.6 Flicker

2.6.1 Test Method

Flicker test should be conducted with the user's operation controls or automatic programs set to the mode expected to produce the most unfavorable sequence of voltage change, using only those combinations of controls and programmes which are mentioned by the manufacturer in the instruction manual, or are otherwise likely to be used.



2.6.2 Specification Limits

The value of *P*st shall not be greater than 1.0
The value of *P*lt shall not be greater than 0.65
*T*max, the accumulated time value of *d*(t) with a deviation exceeding 3.3% during a single voltage change at the EUT terminals, shall not exceed 500ms
The maximum relative steady-state voltage change, *d*c, shall not exceed 3.3%
The maximum relative voltage change *d*max, shall not exceed

a) 4% without additional conditions

b) 6% for equipment which is:

- Switched manually, or
- Switched automatically more frequently than twice per day, and also has either a delayed start, or manual restart, after a power supply interruption

c) 7% for equipment which is:

- Attended whilst in use, or
- Switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart or manual restart, after a power supply interruption

2.6.3 Test Setup

N/A

2.6.4 Test Location

N/A

2.6.5 Test Results

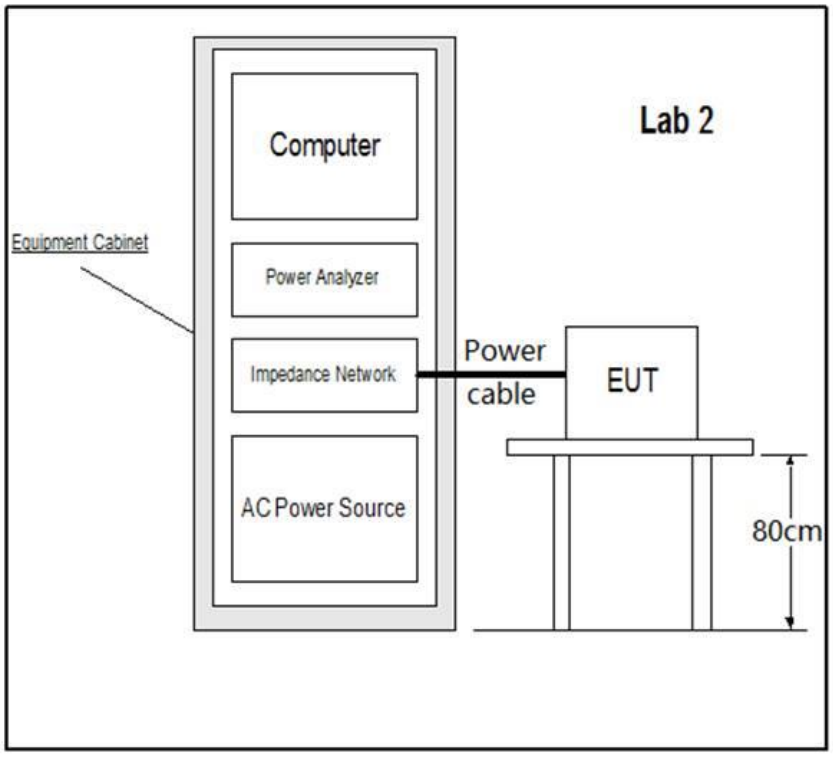
N/A

Remark: This test is applied for PDS with AC input , but this product belongs to BDM and with DC input.

2.7 Harmonics and commutation notches/voltage distortion

2.7.1 Test Method

Harmonics and commutation notches/voltage distortion immunity test should be conducted with the user's operation control or automatic programs set to the mode expected to produce the maximum total harmonic current under normal operating conditions.
Specific test conditions for the measurement of Harmonics and commutation notches/voltage distortion immunity tests associated with some types of equipment are given in test equipment list.



2.7.2 Specification Limits

For Low voltage PDSs (voltage distortion)

Minimum immunity requirements for total harmonic distortion					
	First environment		Second environment		
	Reference document	Level	Reference document	Level	Performance (acceptance) criterion
Harmonics – THD	IEC 61000-2-2	8%	IEC 61000-2-4 Class 3	12%	A

Minimum immunity requirements for individual harmonic						
First environment			Second environment			
Phenomenon Harmonic order		level			level	Performance (acceptance) criterion
2	IEC 61000-4-13 class 2	3%	2	IEC 61000-4-13 class 3	5%	A
3		8%	3		9%	
4		1.5%	4		2%	
5		9%	5		12%	
Even orders 6≤ n≤ 50		Not requirement	Even orders 6≤ n≤ 50		1.5%	
7		7.5%	7		10%	
9		2.5%	9		4%	
11		5%	11		7%	
13		1.5%	13		7%	
15		Not requirement	15		3%	
17		3%	17		6%	
19		2%	19		6%	
21		Not requirement	21		2%	
23		2%	23		6%	
25		2%	25		6%	
27		Not requirement	27		2%	
29		1.5%	29		5%	
31		1.5%	31		3%	
33		Not requirement	33		2%	
35		1.5%	35		3%	
37		1.5%	37		3%	
39		Not requirement	39		2%	

Minimum immunity requirements for commutation notches on power ports of low voltage					
	First environment		Second environment		Performance (acceptance) criterion
	Reference document	Level	Reference document	Level	
Commutation notches	(None)	No requirement	IEC 60146-1-1 Class B	Depth = 40 %, total area = 250 in % degrees	A

For PDSs of rated voltage above 1 000 V (voltage distortion)

Main power port

Phenomenon	First environment	Second environment	Performance (acceptance) criterion
Harmonics (THD and individual harmonic orders)	IEC 61000-2-4 Class 3	Value of the compatibility level	A
Harmonics short term (< 15 s)	IEC 61000-2-4 Class 2	1,5 times the value of the permanent compatibility levels	A
Commutation notches	IEC 60146-1-1	Depth = 40% U_{LWM} (class B) Area [a] = 125 in per cent degrees (class C)	A
a Class C of IEC 60146-1-1 is appropriate for the primary side of the transformer.			

For Auxiliary power port

The auxiliary power ports of PDSs shall sustain the immunity levels for the second environment given in Table above while meeting the performance criteria in those tables.

2.7.3 Test Setup

N/A

2.7.4 Test Location

N/A

2.7.5 Test Results

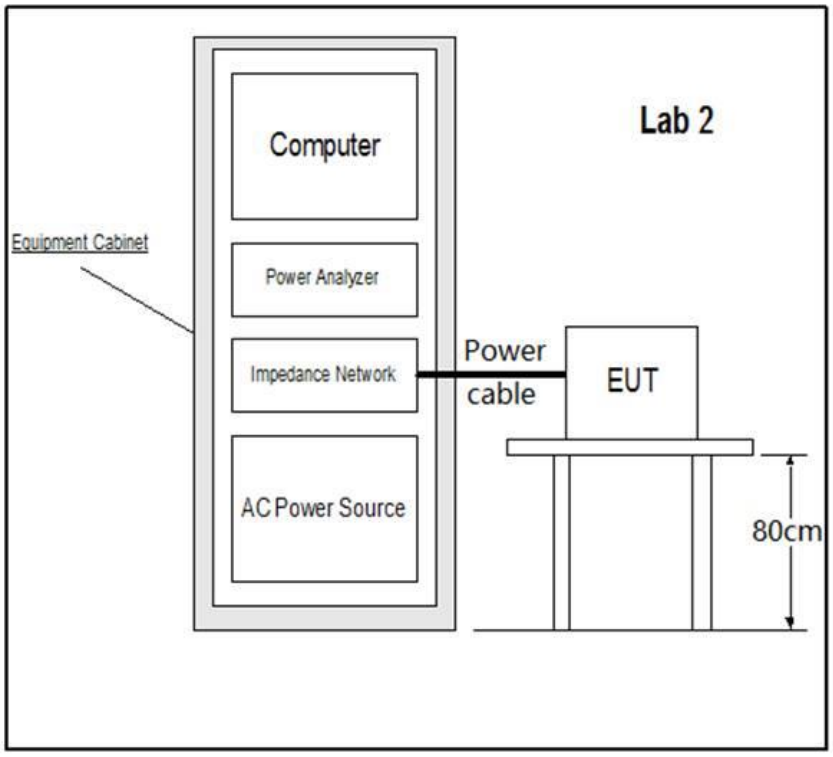
N/A

Remark: This test is applied for EUT with AC input, but this product with DC input.

2.8 Voltage unbalance and frequency variations immunity test

2.8.1 Test Method

Voltage unbalance and frequency variations immunity test should be conducted with the user's operation control or automatic programs set to the mode expected to produce the maximum total harmonic current under normal operating conditions.
Specific test conditions for the measurement of Voltage unbalance and frequency variations immunity tests associated with some types of equipment are given in test equipment list.



2.8.2 Specification Limits

Minimum immunity requirements for voltage unbalance and frequency variations

For low voltage

	First environment		Second environment		
	Reference document	Level	Reference document	Level	Performance (acceptance) criterion
Voltage unbalance [a]	IEC 61000-2-2	2 % negative sequence component	IEC 61000-2-4 Class 3	3 % negative sequence component	A
Frequency variations	IEC 61000-2-2	±2 %	IEC 61000-2-4	±2 % ±4 % where the supply is separated from public supply networks	A
Frequency rate of change		1 %/second		±1 %/s 2 %/s where the supply is separated from public supply network	A
a Not relevant for single phase PDSs. b In case of test, use test time of 30 s ± 5 s.					

For above 1000 V

	Reference document	Level	Performance (acceptance) criterion
Voltage unbalance	IEC 61000-2-4 Class 2	2 % negative sequence component	A
Frequency variations	IEC 61000-2-4 Class 3	±2 % ±4 % where the supply is separated from public supply networks	A
Frequency rate of change		±1 %/s 2 %/s where the supply is separated from public supply network	A

For Auxiliary power port

	Reference document	Level	Performance (acceptance) criterion
Voltage unbalance	IEC 61000-2-4 Class 3	3 % negative sequence component	A
Frequency variations	IEC 61000-2-4 Class 3	±2 % ±4 % where the supply is separated from public supply networks	A

2.8.3 Test Setup

N/A

2.8.4 Test Location

N/A

2.8.5 Test Results

N/A

Remark: This test is applied for EUT with AC input , but this product with DC input.

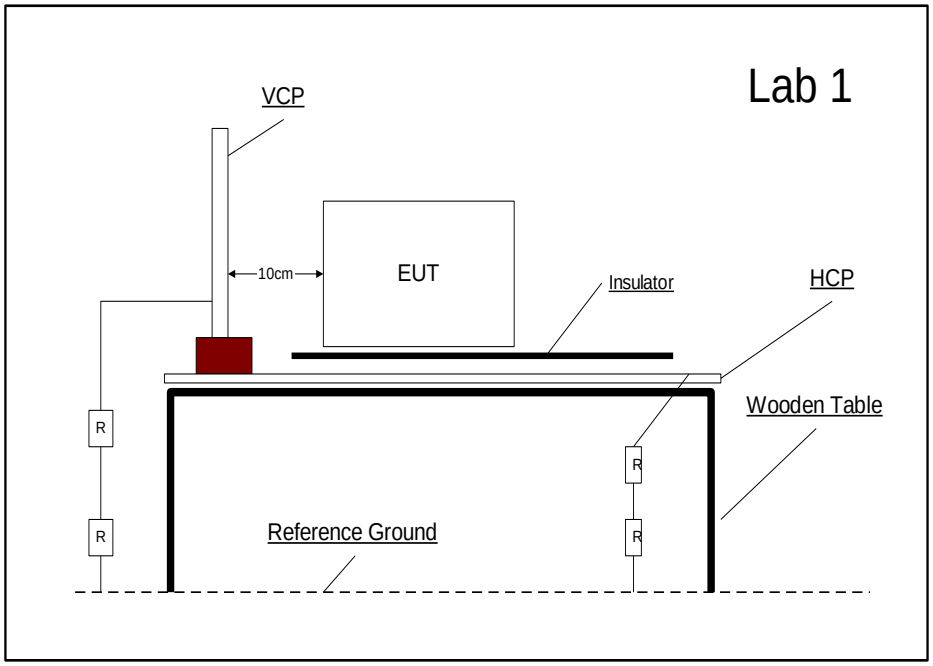
2.9 Electrostatic discharge immunity test

2.9.1 Test Method

The equipment under test including associated cabling was configured on but insulated from, using a 0.5mm isolator, a horizontal coupling plane fitted to the top of a 0.8m non-conductive table for table-top equipment; and on a 0.1m insulated support for floor standing equipment; above a ground reference plane all within a test laboratory.

Using the air discharge method for non-metallic parts, contact discharge method for metallic parts with both vertical and horizontal couple plane discharge methods for the sides of the equipment under test, the required electrostatic discharge voltage levels in both voltage polarities were applied at the detailed pulse repartition rate.

During this testing any anomalies in the equipment under tests performance was recorded.



VCP:

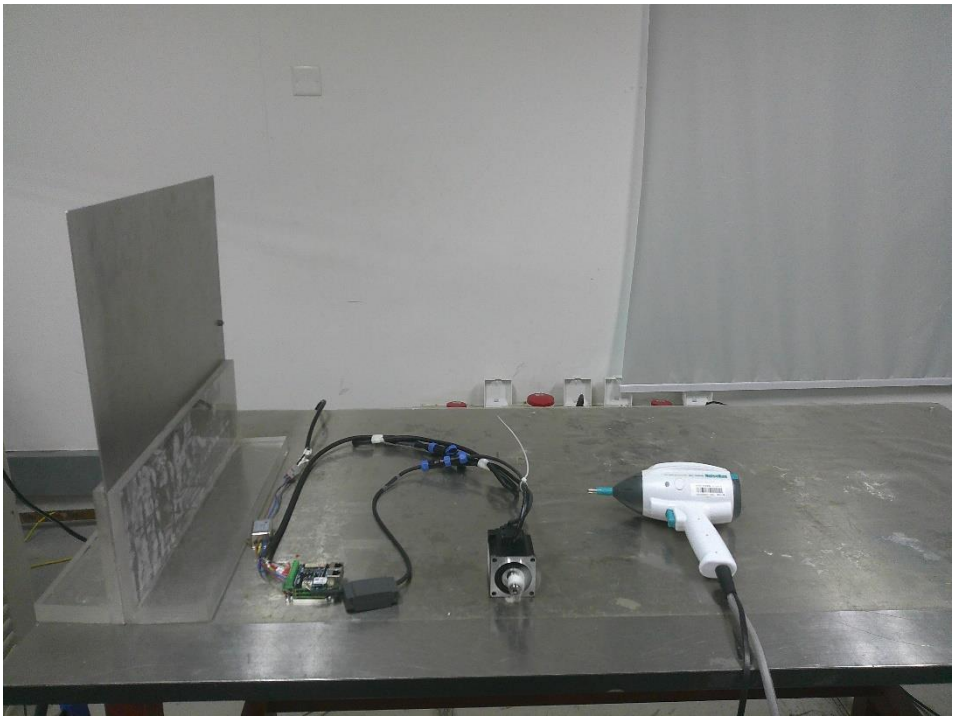
Vertical Coupling Plane 0.5 x 0.5 m HCP: Horizontal Coupling Plane 0.95 x 1.6 m

R. Ground : 2 x 2 m R : 470 KΩ

2.9.2 Specification Limits

Required Test Levels				Performance Criteria
Discharge type	Discharge Level (kV)		Number of discharges per location (each polarity)	
	Positive	Negative		
Air – Direct	8	8	10	B
Contact – Direct	4	4	10	B
Contact – Indirect	4	4	10	B

2.9.3 Test setup



2.9.4 Test Location

This test was carried out in EMS Test Location.

2.9.5 Test Results

Test model: M/N: ELD3-EC7020BM

Results for Configuration and Mode: TM1/TM2

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.

Test date: 2024-06-26

Test Point	Discharge	Results: Met Performance Criteria									
		2kV		4kV		6kV		8kV		15kV	
		+	-	+	-	+	-	+	-	+	-
HCP	Contact	N/A	N/A	A	A	N/A	N/A	N/A	N/A	N/A	N/A
VCP	Contact	N/A	N/A	A	A	N/A	N/A	N/A	N/A	N/A	N/A
Each conductive location touchable by hand	Contact	N/A	N/A	A	A	N/A	N/A	N/A	N/A	N/A	N/A
Each nonconductive location touchable by hand	Air	N/A	N/A	N/A	N/A	N/A	N/A	A	A	N/A	N/A
N/A	Not Applicable										

Due to the product will be enclosed by cabinet before marking, so its enclosure did not test except the ports.

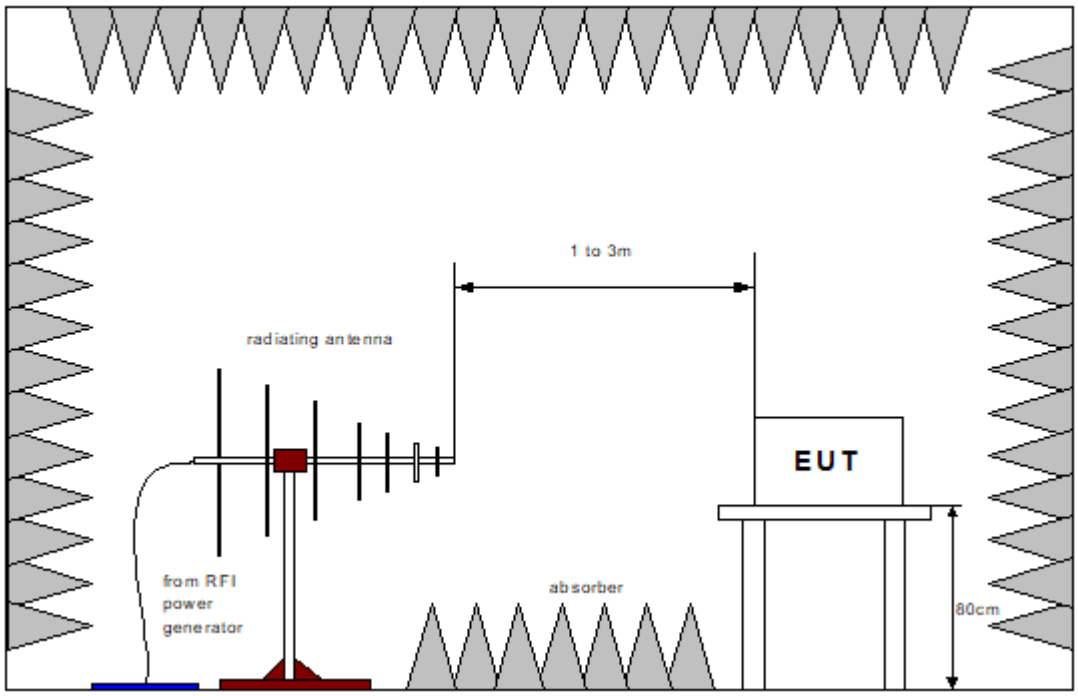
2.10 Enclosure Port - Radio-frequency electromagnetic field Amplitude modulated

2.10.1 Test Method

The equipment under test including associated cabling was configured, on a 0.8 m non-conductive floor for Floor-Stand equipment and on a 0.8 m insulated support for floor standing equipment; with a pre-calibrated semi anechoic chamber.

All four sides of the equipment under test were subjected to the required RF field strength, modulated as described, swept over the frequency range of test with the antenna positioned in both horizontal and vertical polarizations.

During this testing any anomalies in the equipment under tests performance was recorded.



2.10.2 Specification Limits

EN IEC 61800-3:2018:
For first environment:

Required Test Levels					Performance Criteria
Frequency Range (MHz)	Level (V/m)	Modulation	Step Size (%)	Dwell (s)	
80 to 1000	3	AM (80 %,1 kHz, sine wave)	1	>=1	A
1400 to 2000	3	AM (80 %,1 kHz, sine wave)	1	>=1	A
2000 to 2700	1	AM (80 %,1 kHz, sine wave)	1	>=1	A
Supplementary information: Note 1. EUT powered at one of the Nominal input voltages and frequencies					

For second environment:

Required Test Levels					Performance Criteria
Frequency Range (MHz)	Level (V/m)	Modulation	Step Size (%)	Dwell (s)	
80 to 1000	10	AM (80 %,1 kHz, sine wave)	1	>=1	A
1400 to 2000	3	AM (80 %,1 kHz, sine wave)	1	>=1	A
2000 to 2700	1	AM (80 %,1 kHz, sine wave)	1	>=1	A
Supplementary information: Note 1. EUT powered at one of the Nominal input voltages and frequencies					

EN IEC 61800-3:2023:
For first environment:

Required Test Levels					Performance Criteria
Frequency Range (MHz)	Level (V/m)	Modulation	Step Size (%)	Dwell (s)	
80 to 1000	3	AM (80 %,1 kHz, sine wave)	1	>=1	A
1400 to 6000	3	AM (80 %,1 kHz, sine wave)	1	>=1	A
Supplementary information: Note 1. EUT powered at one of the Nominal input voltages and frequencies					

For second environment:

Required Test Levels					Performance Criteria
Frequency Range (MHz)	Level (V/m)	Modulation	Step Size (%)	Dwell (s)	
80 to 1000	10	AM (80 %,1 kHz, sine wave)	1	>=1	A
1400 to 6000	3	AM (80 %,1 kHz, sine wave)	1	>=1	A
Supplementary information: Note 1. EUT powered at one of the Nominal input voltages and frequencies					

2.10.3 Test Setup

2.10.4 Test Location

This test was carried out in EMS Test Location.

2.10.5 Test Results

Test model: M/N: ELD3-EC7020BM

Results for Configuration and Mode: TM1/TM2

Performance assessment of the EUT made during this test: *Pass.*

Detailed results are shown below.

Date of Test :2024-07-09

Tabulated Results for RF Electromagnetic Field 80 - 1000 MHz					
Side of the equipment under test	Antenna polarization	Test Level	Dwell Time	Measuring distance	Results
All sides	Horizontal	10 V/m	1 s	3 m	A
All sides	Vertical	10 V/m	1 s	3 m	A

Tabulated Results for RF Electromagnetic Field 1400 - 6000 MHz					
Side of the equipment under test	Antenna polarization	Test Level	Dwell Time	Measuring distance	Results
All sides	Horizontal	3 V/m	1 s	3 m	A
All sides	Vertical	3 V/m	1 s	3 m	A

Remark: No observable change.
The higher test level is required by manufacturer.

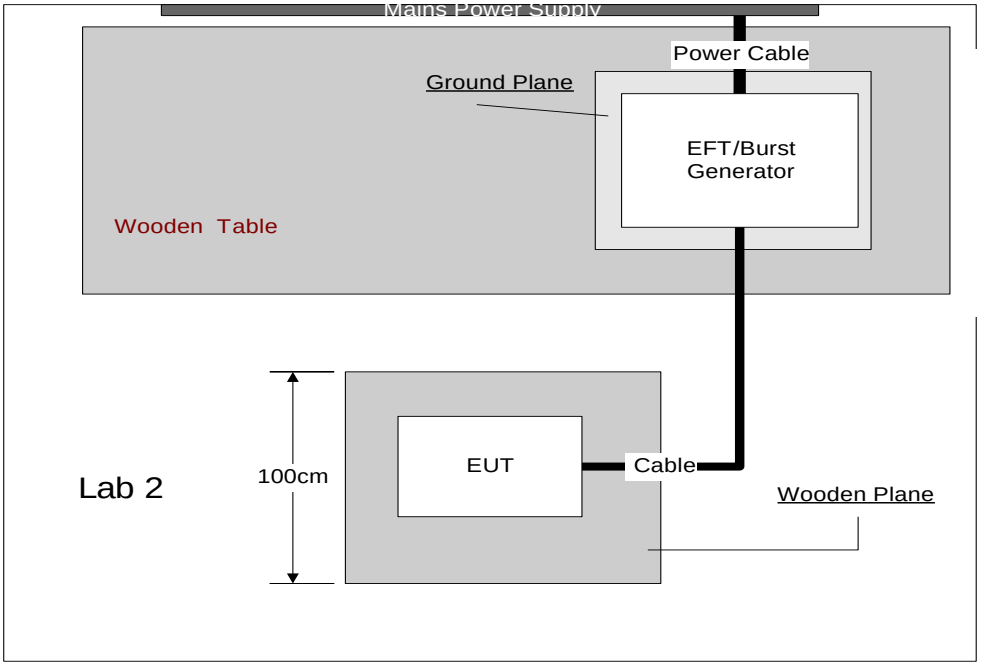
2.11 Fast transients immunity test

2.11.1 Test Method

The equipment under test including associated cabling was configured on but insulated from, using a 0.1 m isolator, a horizontal coupling plane fitted to the top of a 0.8 m non-conductive table for table-top equipment; and on a 0.1 m insulated support for floor standing equipment; above a ground reference plane all within a test laboratory.

Using a CDN for power ports, capacitive coupling clamp for signal and control ports and a 33nF coupling capacitor for earth ports, the required fast transient burst voltage levels in both voltage polarities were applied at the detailed pulse repartition rate and duration of test.

During this testing any anomalies in the equipment under tests performance was recorded.



2.11.2 Specification Limits

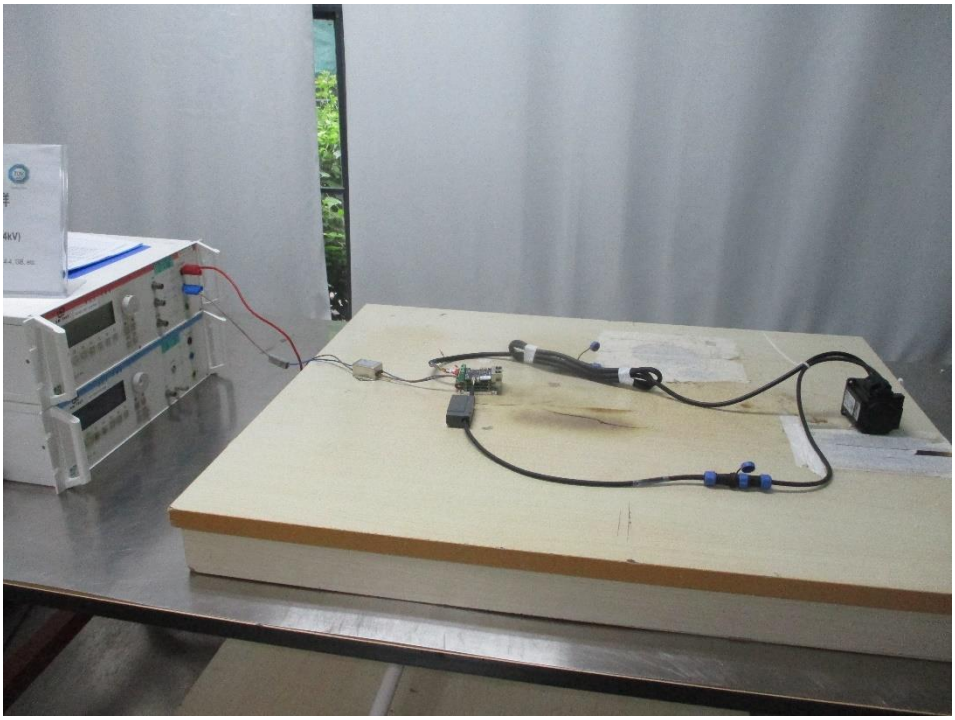
For first environment

Required Test Levels Input and output a.c. power ports					Performance Criteria
Line Under Test	Level (kV)	Repetition Rate (kHz)	Test Duration	Coupling Method	
Power ports (except auxiliary DC power ports below 60 V)	± 1.0	5 kHz	2 min per polarity	Direct	B
Power interfaces	± 1.0	5 kHz	2 min per polarity	Clamp	B
Ports for process measurement control lines and signal interfaces Auxiliary DC power ports below 60 V	± 0.5	5 kHz	2 min per polarity	Clamp	B
Power ports with current rating < 100 A: direct coupling using the coupling and decoupling network. Power ports with current rating ≥ 100 A: direct coupling or capacitive clamp without decoupling network. If the capacitive clamp is used, test level shall be 2 kV/5 kHz. The chosen test method shall be stated in the test report.					

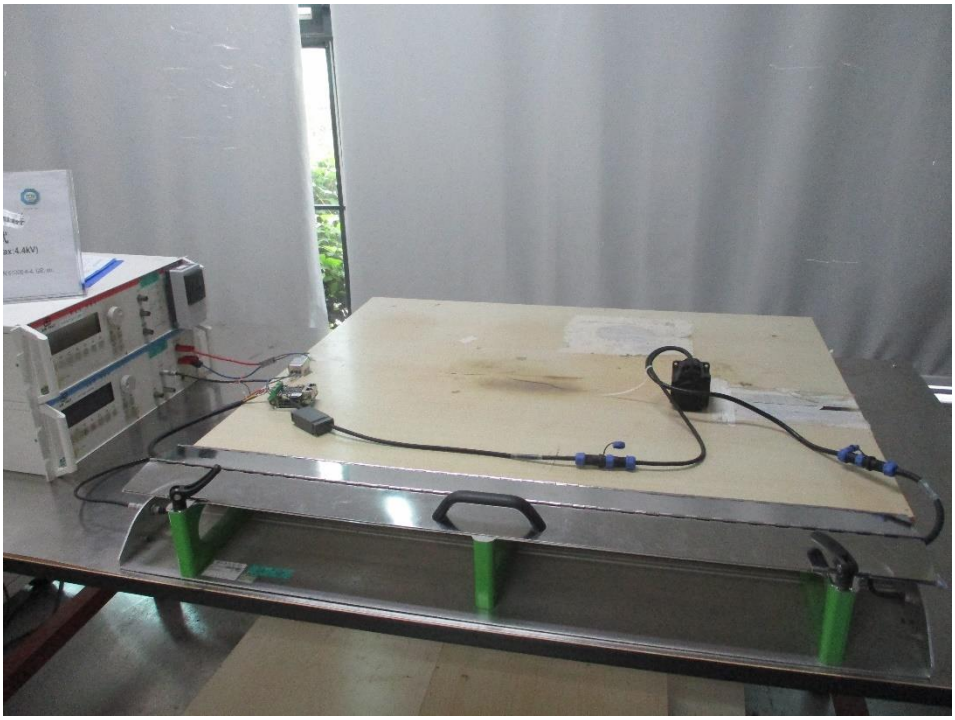
For second environment

Required Test Levels Input and output a.c. power ports					Performance Criteria
Line Under Test	Level (kV)	Repetition Rate (kHz)	Test Duration	Coupling Method	
Power ports (except auxiliary DC power ports below 60 V)	± 2.0	5 kHz	2 min per polarity	Direct	B
Power interfaces	± 2.0	5 kHz	2 min per polarity	Clamp	B
Signal interfaces	± 1	5 kHz	2 min per polarity	Clamp	B
Ports for process measurement control lines and signal interfaces Auxiliary DC power ports below 60 V	± 2	5 kHz	2 min per polarity	Clamp	B
Power ports with current rating < 100 A: direct coupling using the coupling and decoupling network. Power ports with current rating ≥ 100 A: direct coupling or capacitive clamp without decoupling network. If the capacitive clamp is used, test level shall be 2 kV/5 kHz. The chosen test method shall be stated in the test report.					

2.11.3 Test setup



For DC port



Power or Signal interfaces

2.11.4 Test Location

This test was carried out in EMS Test Location.

2.11.5 Test Results

Test model: M/N: ELD3-EC7020BM

Results for Configuration and Mode: TM1/TM2

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.

Test date: 2024-06-26

For second environment

Tabulated Results for Fast Transient Burst Immunity					
Line under test	Test Level	Repetition Rate	Test Duration	Coupling Method	Result
Power line	±2.0 kV	5 kHz	2 min	Clamp	Pass/A
Signal line	± 1.0 kV	5 kHz	2 min	Clamp	Pass/A
Power Interfaces	± 2 kV	5 kHz	2 min	Clamp	Pass/A

Remark: During testing No observable change;
The Signal line and Power interfaces are the connection lines to the motor.
The higher test level is required by manufacturer.

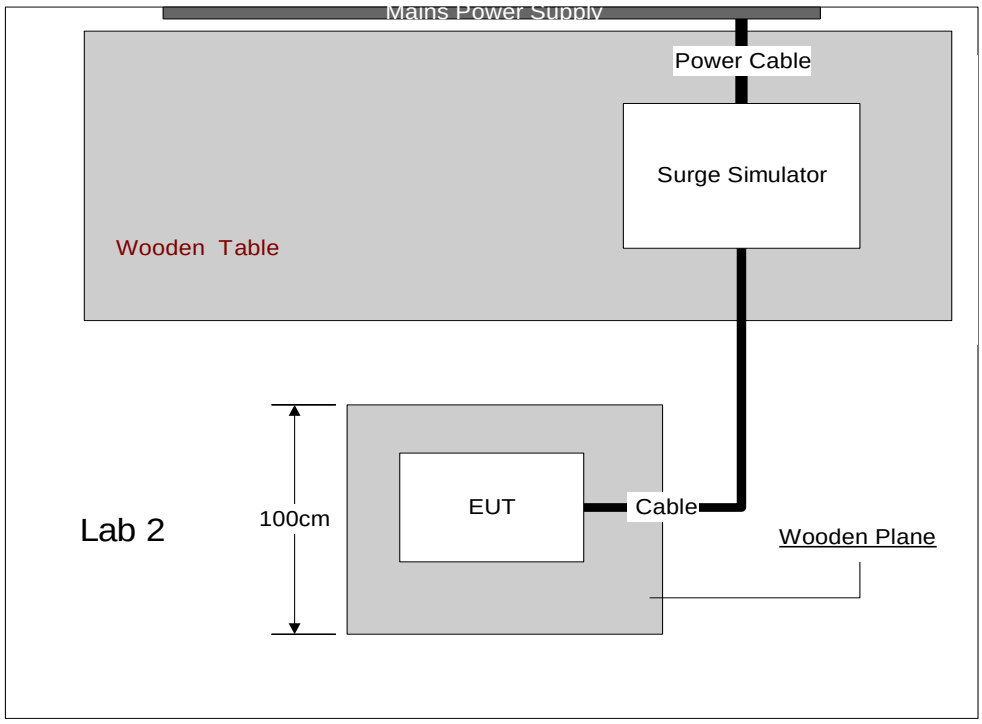
2.12 Surges immunity test

2.12.1 Test Method

The equipment under test including associated cabling was configured, on a 0.8 m non-conductive table for table-top equipment and on a 0.1 m insulated support for floor standing equipment above a ground reference plane all within a test laboratory.

Using CDNs for power ports and appropriate coupling methods for applicable signal and control ports, the required number of surges was applied for each surge voltage level using both positive and negative surge voltage polarities. Surges were applied at the power line frequency phase angles and repartition rates detailed.

During this testing any anomalies in the equipment under tests performance was recorded.



2.12.2 Specification Limits

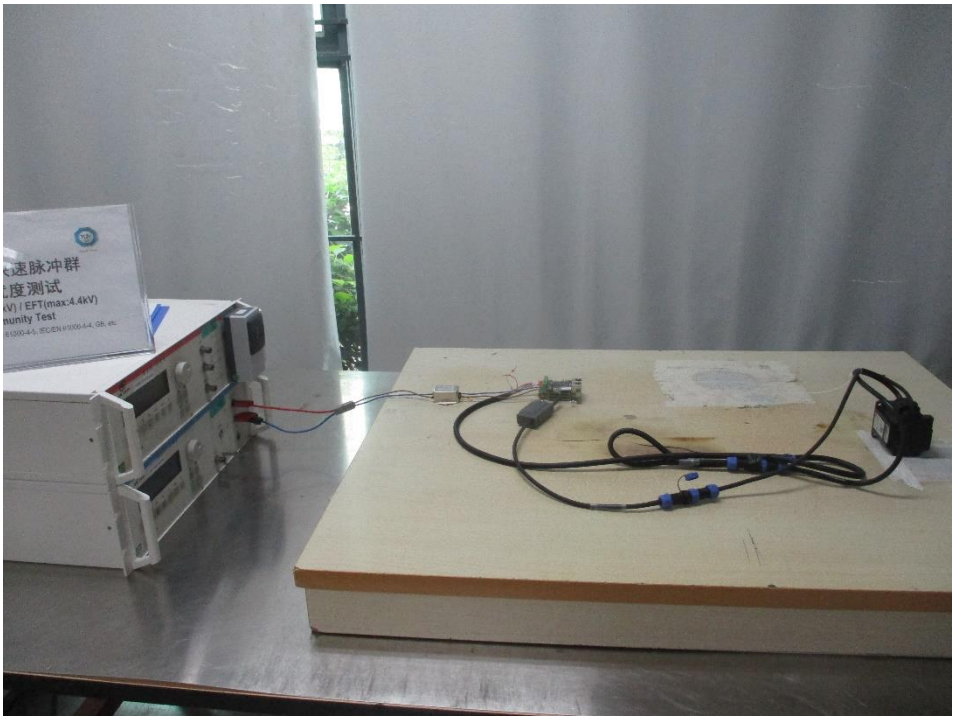
For first environment

Required Test Levels Input and output a.c. power ports		Performance Criteria
Line Under Test	Level (V)	
Power ports (except auxiliary DC power ports below 60 V)	1.2/50 µs, 8/20 µs ± 1.0 kV[a] ±2.0 kV[b]	B
Applicable only to power ports with current consumption < 63 A during light load test conditions as specified in 5.1.3 of standards. a: Coupling line-to-line. b:Coupling line-to-earth.		

For second environment

Required Test Levels Input and output a.c. power ports		Performance Criteria
Line Under Test	Level (V)	
Power ports (except auxiliary DC power ports below 60 V)	1.2/50 µs, 8/20 µs ± 1.0 kV[a] ±2.0 kV[b]	B
measurement control lines and signal interfaces Auxiliary DC power ports below 60 V [c]	1.2/50 µs, 8/20 µs ± 1.0 kVa	B
Applicable only to power ports with current consumption < 63 A during light load test conditions as specified in 5.1.3 of standards. a: Coupling line-to-line. b: Coupling line-to-earth. C: Applicable only to ports with cables whose total length according to the manufacturer's functional specification may exceed 30 m. In the case of a shielded cable, a direct coupling to the shield is applied. This immunity requirement does not apply to fieldbus or other signal interfaces where the use of surge protection devices is not practical for technical reasons. The test is not required where normal functioning cannot be achieved because of the impact of the coupling/decoupling network on the equipment under test (EUT).		

2.12.3 Test setup



2.12.4 Test Location

This test was carried out in EMS Test Location.

2.12.5 Test Results

Test model: M/N: ELD3-EC7020BM

Results for Configuration and Mode: TM1/TM2

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.

Test date: 2024-06-27

For second environment

Tabulated Results for Surge Immunity (Power Ports)							
Line Name	Coupling	Level	Polarity	Phase Angle	No of Pulses	Repetition Rate	Result
Power line	Positive to Negative	-1.0kV	NEGATIVE	-	5	60 sec	Pass
	Positive to Negative	+1.0kV	POSITIVE	-	5	60 sec	Pass

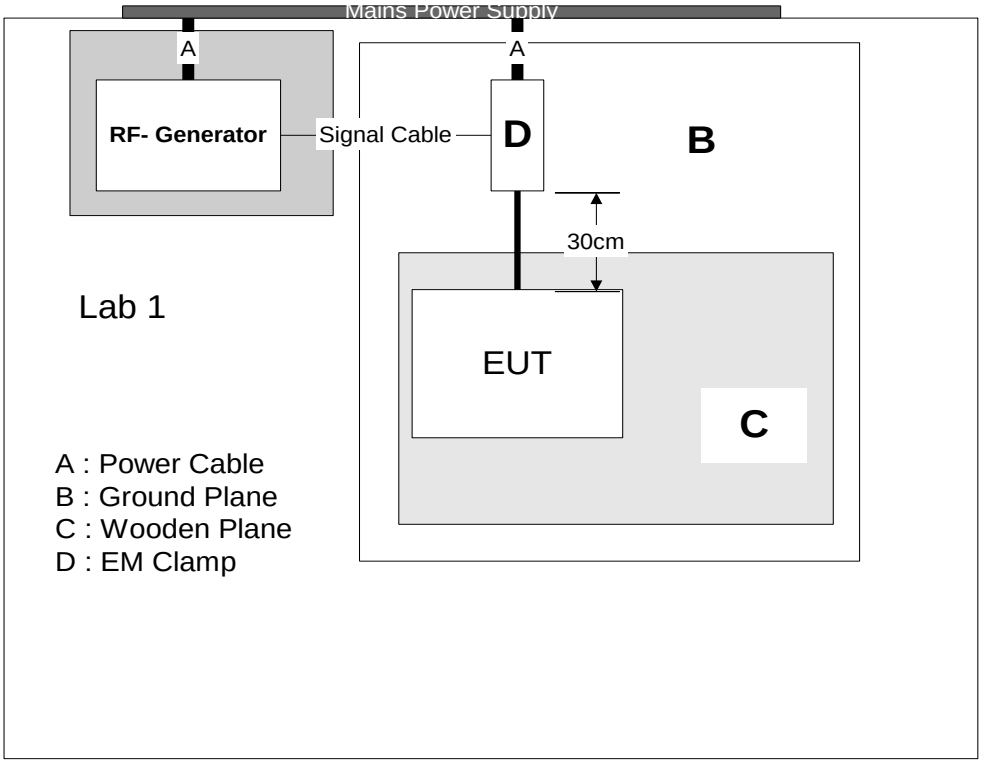
Remark: Temporary degradation of performance (rotate speed of the motor changed) during testing.

2.13 Injected currents immunity test

The equipment under test was configured, on but insulated from, using a 0.1 m isolator, a horizontal coupling plane fitted to the bottom of a 0.1 m non-conductive table for test equipment, above a ground reference plane all within a test laboratory.

All associated cabling was configured, on but insulated from, using a 50 mm isolator, the same horizontal coupling plane as the equipment under test.

Using CDNs, EM Clamps or current clamps as appropriate, the power ports and applicable signal and control ports were subjected to the required, pre calibrated RF injected signal strength, modulated as described, swept over the frequency range of test.
During this testing any anomalies in the equipment under tests performance was recorded.



2.13.1 Specification Limits

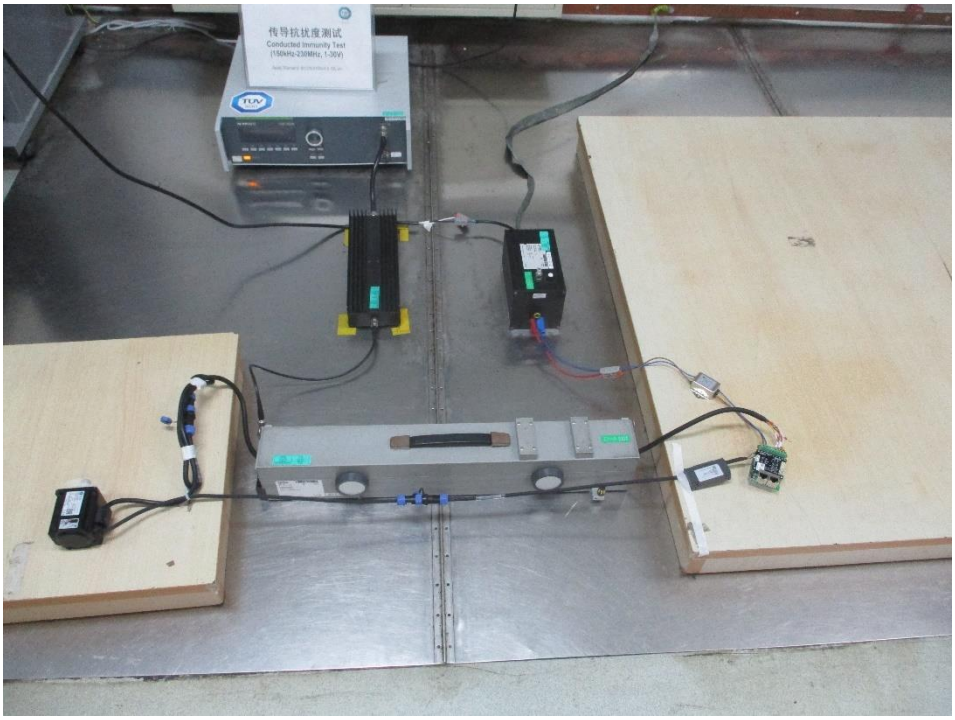
For first environment

Required Test Levels Input and output a.c. power ports						Performance Criteria
Line Under Test	Frequency Range (MHz)	Level (V)	Modulation	Step Size (%)	Dwell (s)	
Power ports (except auxiliary DC power ports below 60 V)	0.15 to 80	3	AM (80 %,1 kHz, sine wave)	1	3	A
Power interfaces	0.15 to 80	3	AM (80 %,1 kHz, sine wave)	1	3	A
Ports for process measurement control lines and signal interfaces Auxiliary DC power ports below 60 V	0.15 to 80	3	AM (80 %,1 kHz, sine wave)	1	3	A
Applicable only to ports or interfaces with cables whose total length according to the manufacturer's functional specification may exceed 3 m.						

For second environment

Required Test Levels Input and output a.c. power ports						Performance Criteria
Line Under Test	Frequency Range (MHz)	Level (V)	Modulation	Step Size (%)	Dwell (s)	
Power ports (except auxiliary DC power ports below 60 V)	0.15 to 80	10	AM (80 %,1 kHz, sine wave)	1	3	A
Power interfaces	0.15 to 80	10	AM (80 %,1 kHz, sine wave)	1	3	A
Signal interfaces	0.15 to 80	10	AM (80 %,1 kHz, sine wave)	1	3	A
Ports for process measurement control lines and signal interfaces Auxiliary DC power ports below 60 V	0.15 to 80	10	AM (80 %,1 kHz, sine wave)	1	3	A
Applicable only to ports or interfaces with cables whose total length according to the manufacturer's functional specification may exceed 3 m.						

2.13.2 Test setup



2.13.3 Test Location

This test was carried out in EMS Test Location.

2.13.4 Test Results

Test model: M/N: ELD3-EC7020BM

Results for Configuration and Mode: TM1/TM2

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.

Test date: 2024-06-25

For second environment

Tabulated Results for Injected current						
Line under test	Test Level	Step	Dwell Time	Coupling Method	Modulation	Result
Power line	10V	1%	3s	CDN	1kHz, 80%	Pass/A
Signal port	10V	1%	3s	EM-Clamp	1kHz, 80%	Pass/A
Power Interfaces	10V	1%	3s	EM-Clamp	1kHz, 80%	Pass/A

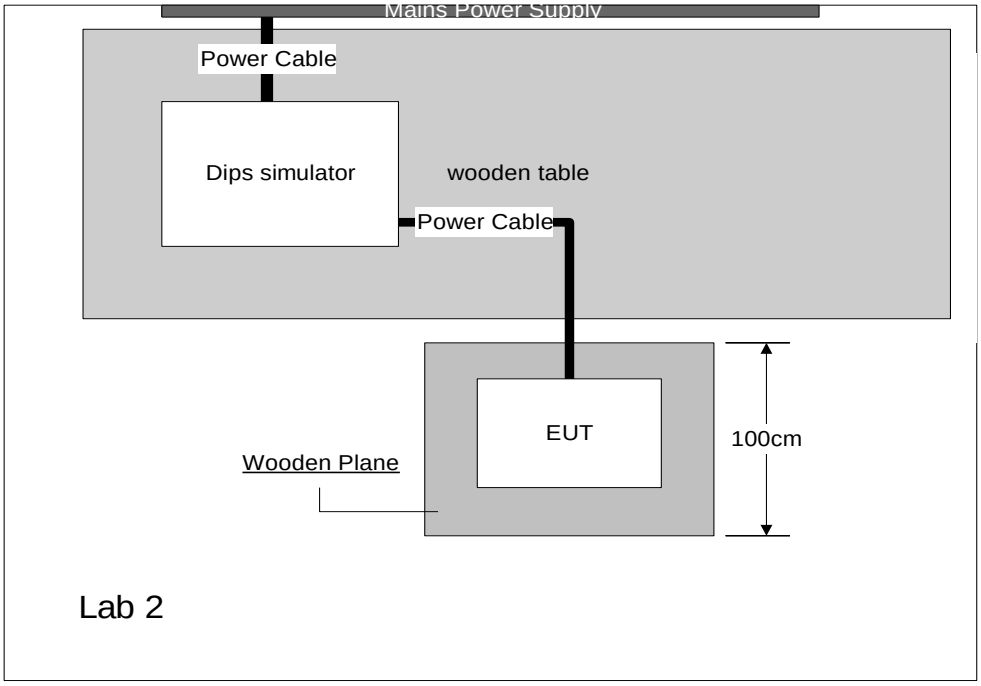
Remark: During testing No observable change;
The Signal line and Power interfaces are the connection lines to the motor.
The higher test level is required by manufacturer.

2.14 Voltage deviations, dips and short interruptions immunity test

2.14.1 Test Method

The equipment under test including associated cabling was configured, on a 0.8 m non-conductive table for table-top equipment and on a 0.1 m insulated support for floor standing equipment above a ground reference plane all within a test laboratory.

Using a programmable power supply the equipment under test was subjected to the detailed supply voltage dips and interruptions. The required supply phase synchronization and test repetition rate, detailed, was controlled by the programmable power supply.
During this testing any anomalies in the equipment under tests performance was recorded.



2.14.2 Specification Limits

For voltage deviations, dips and short interruptions on power ports of low voltage

Voltage Dips			
Volts Remaining in % UT	Duration		Performance Criteria
	50Hz	60Hz	
0	1 cycle	1 cycle	C
40	10 cycles	12 cycles	C
70	25 cycles	30 cycles	C
80	250 cycles	300 cycles	C
0	250 cycles	300 cycles	C
Voltage deviations			
Voltage deviations (> 60 s)	±10 %		A
UT is the rated voltage of the Equipment Under Test			

For voltage deviations, dips and short interruptions on main power ports of rated voltage above 1 000 V

Voltage Dips			
Volts Remaining in % UT	Duration		Performance Criteria
	50Hz	60Hz	
0	1 cycle	1 cycle	C
40	10 cycles	12 cycles	C
70	25 cycles	30 cycles	C
80	250 cycles	300 cycles	C
0	250 cycles	300 cycles	C
Voltage deviations			
Voltage deviations exceeding 1 min	±10 %		A
Voltage deviations not exceeding 1 min	+10 % to –15 %		A
UT is the rated voltage of the Equipment Under Test			

For voltage deviations, dips and short interruptions on auxiliary low voltage power ports

Voltage Dips			
Volts Remaining in % UT	Duration		Performance Criteria
	50Hz	60Hz	
0	1 cycle	1 cycle	C
40	10 cycles	12 cycles	C
70	25 cycles	30 cycles	C
80	250 cycles	300 cycles	C
0	250 cycles	300 cycles	C
Voltage deviations			
Voltage deviations exceeding 1 min	±10 %		A
Voltage deviations not exceeding 1 min	+10 % to –15 %		A
UT is the rated voltage of the Equipment Under Test			

2.14.3 Test setup

N/A

2.14.4 Test Location

N/A

2.14.5 Test Results

N/A

3 Test Equipment Information

3.1 General Test Equipment Used

Conducted Emission 1# Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 3	68-4-74-14-001	101782	1	2025-5-13
LISN	Rohde & Schwarz	ENV4200	68-4-87-14-001	100249	1	2025-5-13
LISN	Rohde & Schwarz	ENV432	68-4-87-16-001	101318	1	2025-5-13
LISN	Rohde & Schwarz	ENV216	68-4-87-14-002	100326	1	2025-5-12
ISN	Rohde & Schwarz	ENY81	68-4-87-14-003	100177	1	2025-5-13
ISN	Rohde & Schwarz	ENY81-CA6	68-4-87-14-004	101664	1	2025-5-13
High Voltage Probe	Schwarzbeck	TK9420(VT9420)	68-4-27-14-001	9420-584	1	2025-5-12
RF Current Probe	Rohde & Schwarz	EZ-17	68-4-27-14-002	100816	1	2025-5-13
Attenuator	Shanghai Huaxiang	TS2-26-3	68-4-81-16-003	080928189	1	2025-5-11
Cable	OUQIAO	RG142	68-4-90-19-004-A20	----	----	----
Test software	Rohde & Schwarz	EMC32	68-4-90-14-003-A10	Version9.15.00	N/A	N/A
Shielding Room	TDK	CSR #1	68-4-90-19-004	----	3	2025-10-15

Radiated Emission 2# Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 7	68-4-74-19-001	102176	1	2025-5-13
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	68-4-80-14-002	707	1	2024-7-18
Horn Antenna	Rohde & Schwarz	HF907	68-4-80-14-005	102294	1	2025-5-27
Loop Antenna	Rohde & Schwarz	HFH2-Z2	68-4-80-14-006	100398	1	2025-8-6
Pre-amplifier	Rohde & Schwarz	SCU 18	68-4-29-14-001	102230	1	2025-5-11
Attenuator	Mini-circuits	UNAT-6+	68-4-81-21-001	15542	1	2025-5-11
Cable	HUBER-SUHNER	RG214	68-4-90-14-001-A20	----	----	----
Cable	HUBER-SUHNER	RG214	68-4-90-14-001-A21	----	----	----
Cable	JUNFLON	MWX221	68-4-90-14-001-A22	----	----	----
3m Semi-anechoic chamber	TDK	SAC-3 #1	68-4-90-14-001	----	3	2026-10-25
Test software	Rohde & Schwarz	EMC32	68-4-90-14-001-A10	Version10.35.02	N/A	N/A

Electrostatic Discharge Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
Electrostatic Discharge Simulator	Noiseken	ESS-2002	68-4-75-14-007	ESS0615075	1	2025-6-14

Radiated Immunity Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
Signal Generator	Rohde & Schwarz	SMB100A	68-4-48-14-002	177600	1	2025-5-11
Power Amplifier	Rohde & Schwarz	BBA100	68-4-28-14-001	101238	1	2025-5-12
Power Amplifier	Rohde & Schwarz	BBA150	68-4-28-14-002	101671	1	2025-5-12
Power Amplifier	Rohde & Schwarz	BBA150-E100	68-4-28-17-001	102640	1	2025-5-12
Log-Periodic Antenna	Rohde & Schwarz	HL046E	68-4-80-14-009	100160	N/A	N/A
Microwave Log-Periodic Antenna	Rohde & Schwarz	STLP 9149	68-4-80-17-001	9149-453	N/A	N/A
Power Meter	Rohde & Schwarz	NRP2	68-4-32-14-001	103497	1	2025-5-12
Average Power Sensor	Rohde & Schwarz	NRP-Z91	68-4-32-14-001-A01	102538	1	2025-5-12
Average Power Sensor	Rohde & Schwarz	NRP-Z91	68-4-32-14-001-A02	102539	1	2025-5-12
Starprobe Laser-Powered Probe	AMPLIFIER RESEARCH	FL7006/KIT	68-4-27-14-003	0433720	1	2024-8-13
Audio Analyzer	Rohde & Schwarz	UPV	68-4-74-18-001	104348	1	2025-5-11
Cable	OUQIAO	18DLB8	68-4-90-14-002-A20	----	----	----
Fully Anechoic Chamber	TDK	8X4X4	68-4-90-14-002	--	3	2024-9-2
Test software	Rohde & Schwarz	EMC32	68-4-90-14-002-A11	Version 9.15.03	N/A	N/A

Electrical Fast Transients Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
Immunity simulator	EMTEST	UCS 500N7	68-4-75-14-001	P1313116005	1	2025-5-12
7kV Coupling network 3-phase	EMTEST	CNI 503B5	68-4-75-14-001-A07	P1425134991	1	2025-5-12
Capacitive Coupling Clamp	EMTEST	HFK	68-4-75-14-001-A01	P1426135389	1	2025-5-12
Test software	EMTEST	iec.control	68-4-75-14-001-A10	Version 5.3.1	N/A	N/A

Surges Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
Immunity simulator	EMTEST	UCS 500N7	68-4-75-14-001	P1313116005	1	2025-5-12
7kV Coupling network 3-phase	EMTEST	CNI 503B5	68-4-75-14-001-A07	P1425134991	1	2025-5-12
Telecom Surge Module	EMTEST	Tsurge 7	68-4-75-14-001-A08	P1420134206	1	2025-5-13
4kV coupling/decoupling network	EMTEST	CNV 504 N1	68-4-75-14-001-A02	P1420134192	1	2025-5-12
4kV CDN for 8 telecom lines	EMTEST	CNV 508 S1	68-4-75-14-001-A03	P1431137565	1	2025-5-12
Test software	EMTEST	iec.control	68-4-75-14-001-A10	Version 5.3.1	N/A	N/A

Conducted Immunity Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
Continuous Wave Simulator	EMTEST	CWS 500N1	68-4-75-14-002	P1420134224	1	2025-5-13
Attenuator	EMTEST	ATT6/80	68-4-75-14-002-A01	P1402129090	1	2025-5-11
CDN	EMTEST	CDN-M2/M3	68-4-75-14-002-A02	P1420134163	1	2025-5-13
CDN	EMTEST	CDN-M4	68-4-75-14-002-A03	P1346125919	1	2025-5-13
Electromagnetic Injection Clamp	EMTEST	EM101	68-4-75-14-002-A04	P1411132453	1	2025-5-12
Current injection probe	TESEQ	CIP 9136A	68-4-27-22-001	63664	1	2025-5-12
Test software	EMTEST	icd.control	68-4-75-14-002-A10	Version 5.2.9	N/A	N/A

4 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

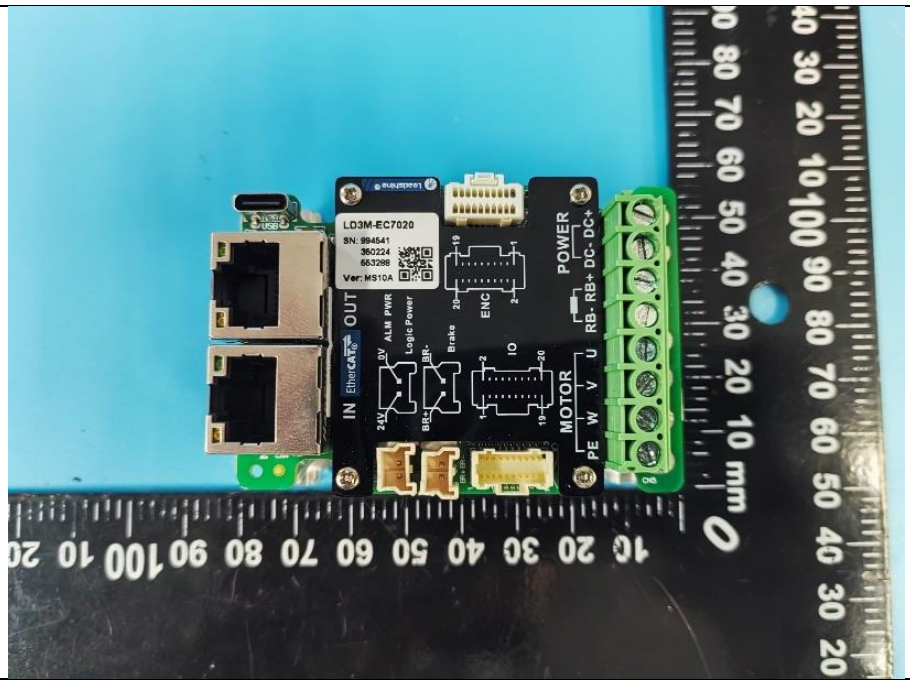
System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Radiated Emission in new 3m chamber 30MHz-1000MHz	Horizontal: 4.63dB; Vertical: 4.78dB;
Uncertainty for Conducted Emission 150kHz-30MHz	3.58dB
Uncertainty for Harmonic test	1.25%
Uncertainty for Flicker test	1.12%
Uncertainty for RS test	1.71dB
Uncertainty for CS test	1.40dB (CDN), 3.22dB (EM Clamp)
Uncertainty for ESD test	The immunity measurement system uncertainty is within standard requirement and is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%.
Uncertainty for EFT test	
Uncertainty for Surges test	
Uncertainty for Voltage Dips, Voltage Variations and Short Interruptions Test	

Measurement Uncertainty Decision Rule

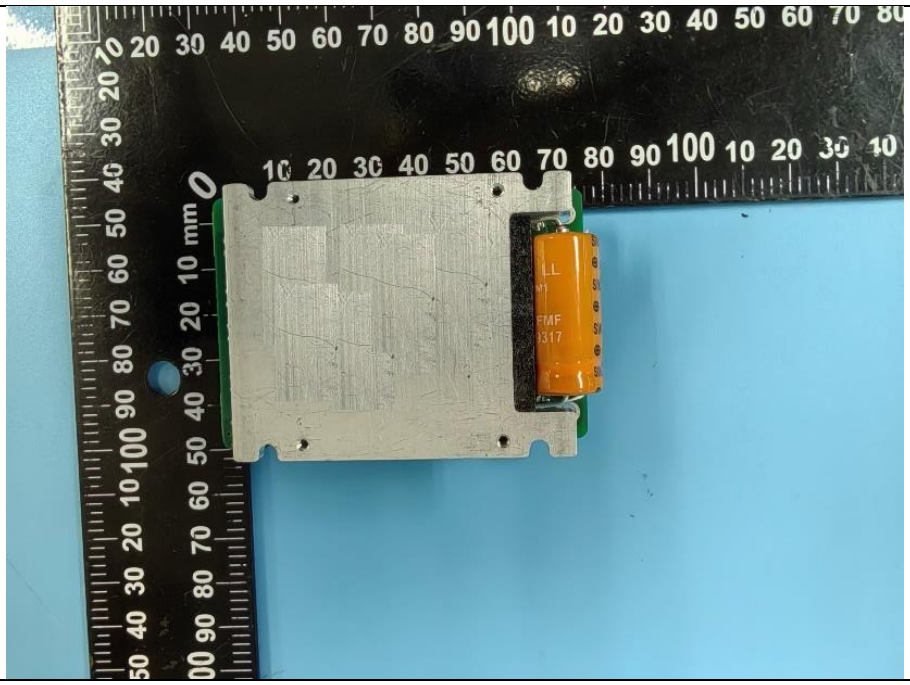
Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2023, clause 4.3.3 and 4.3.4.

5 Photographs

Details of: Outlook view (representative model: ELD3-EC7020BM)



Details of: Outlook view (representative model: ELD3-EC7020BM)



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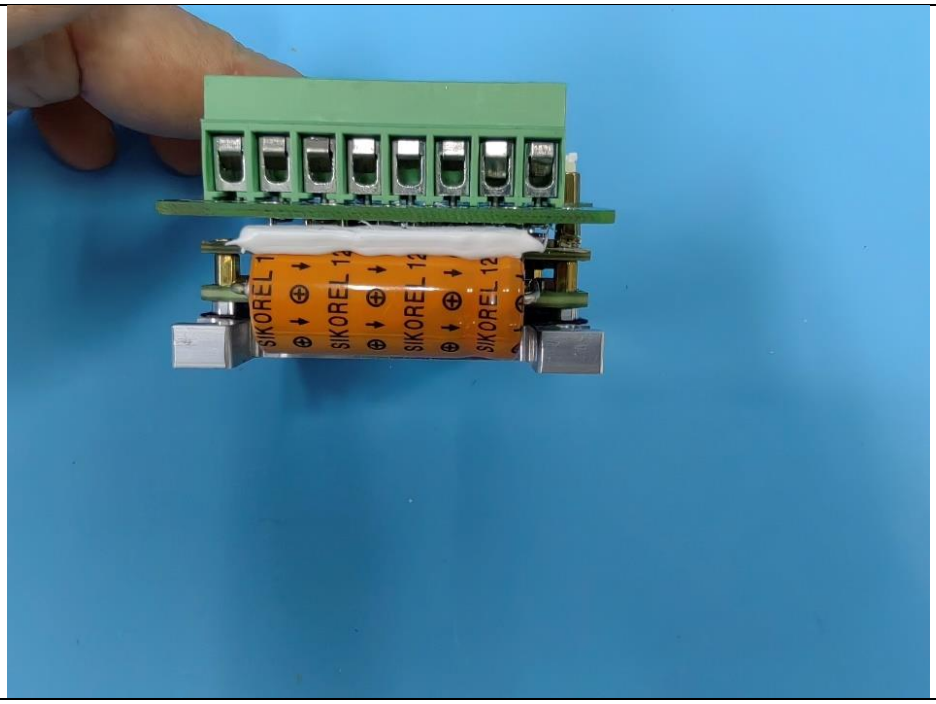

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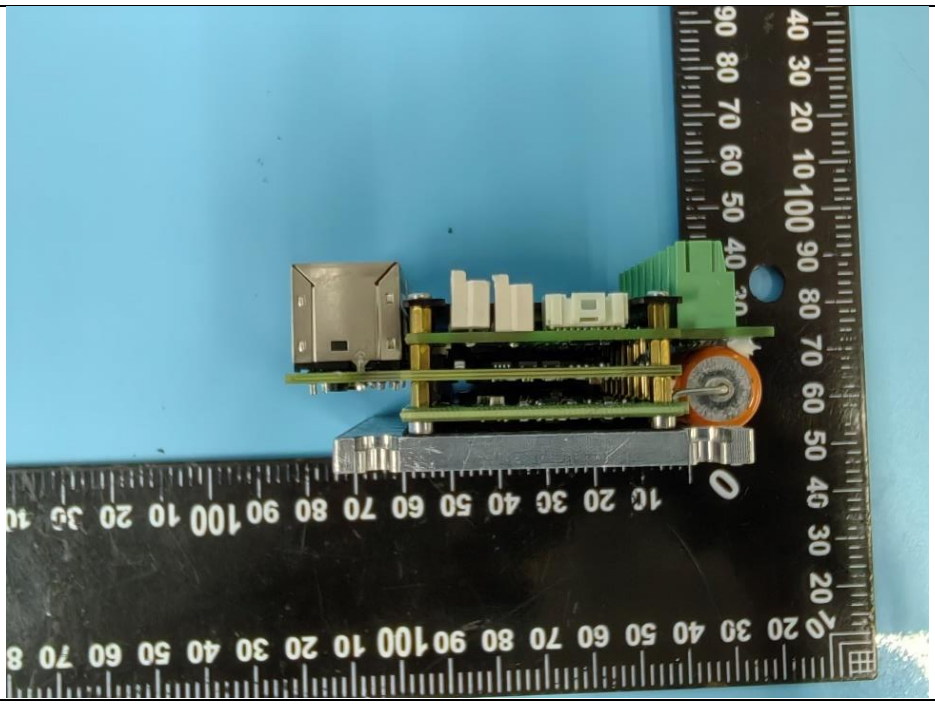
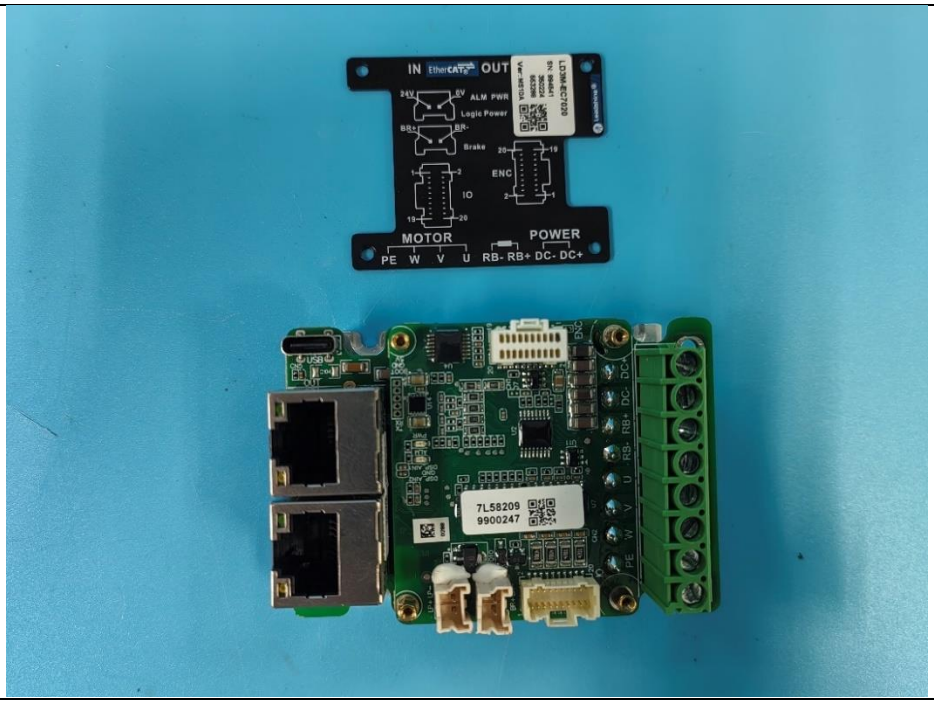


Details of: Internal view (representative model: ELD3-EC7020BM)



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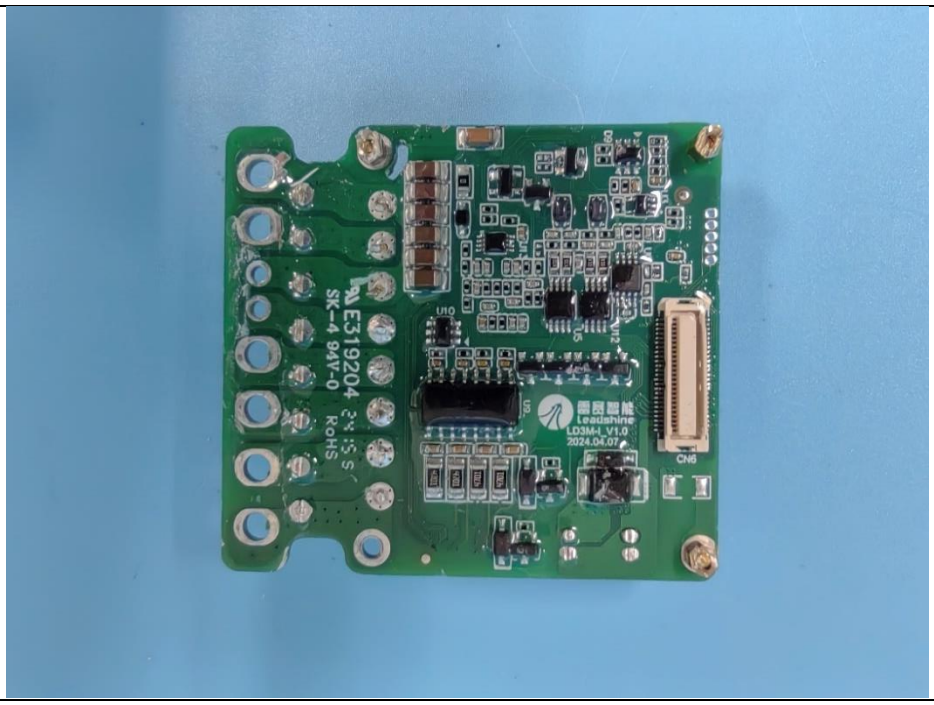
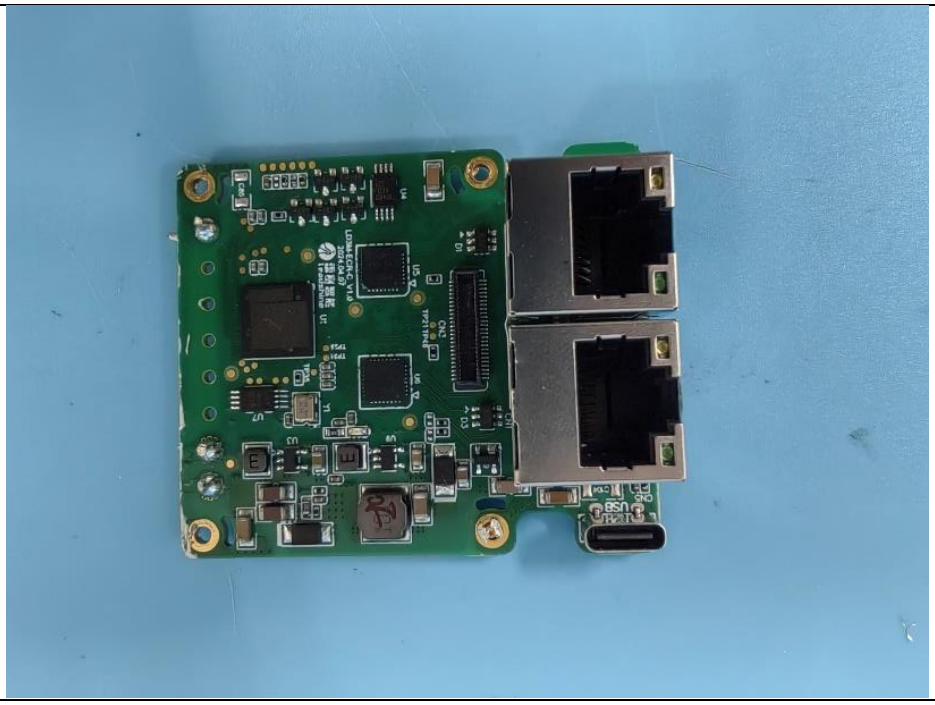
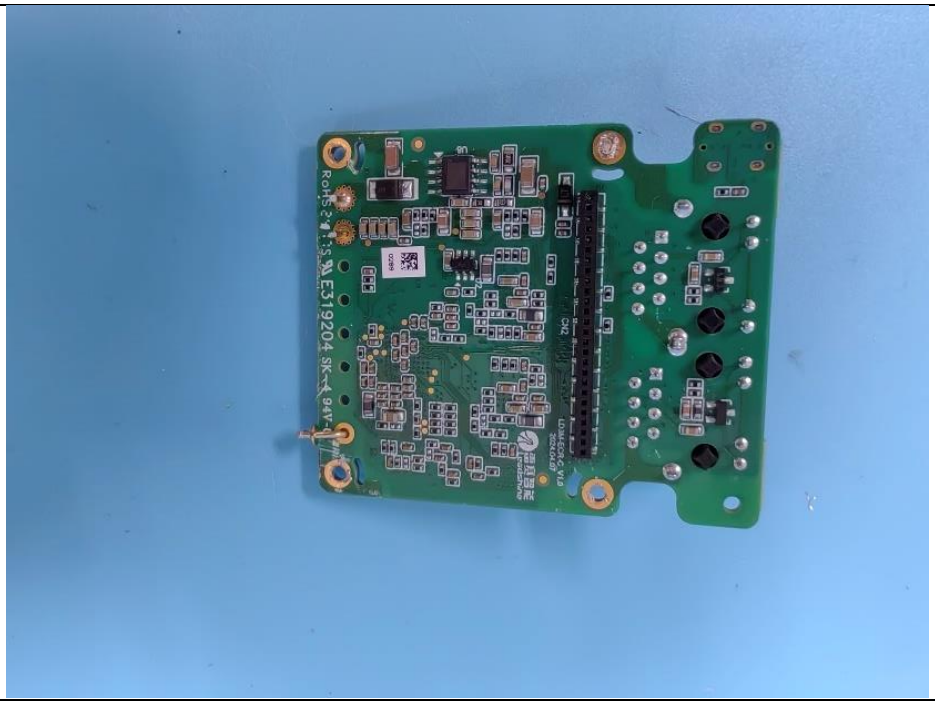


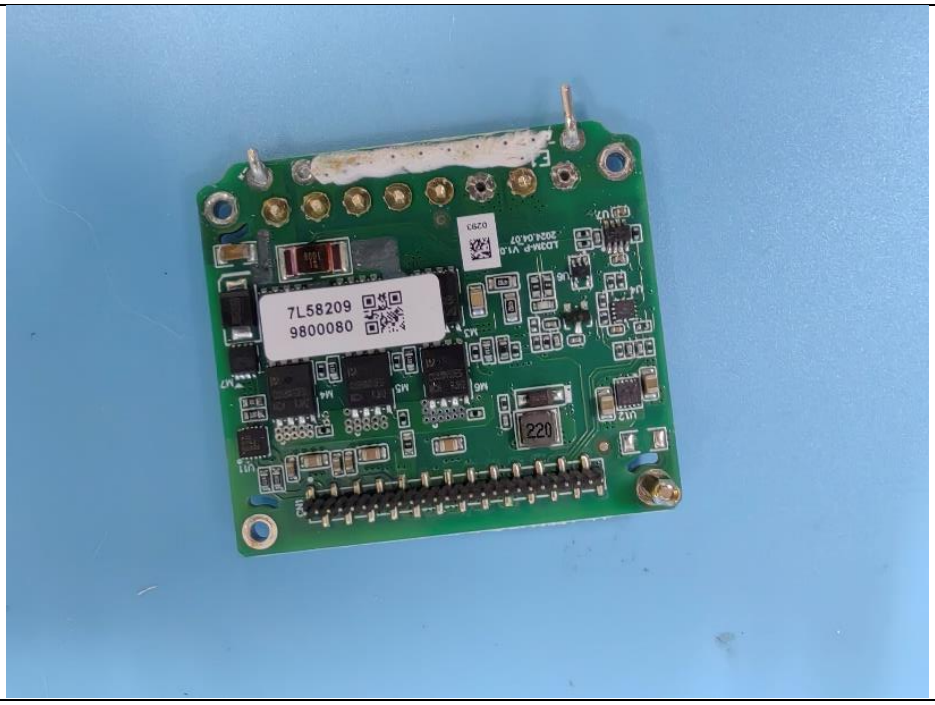
Details of: Internal view (representative model: ELD3-EC7020BM)



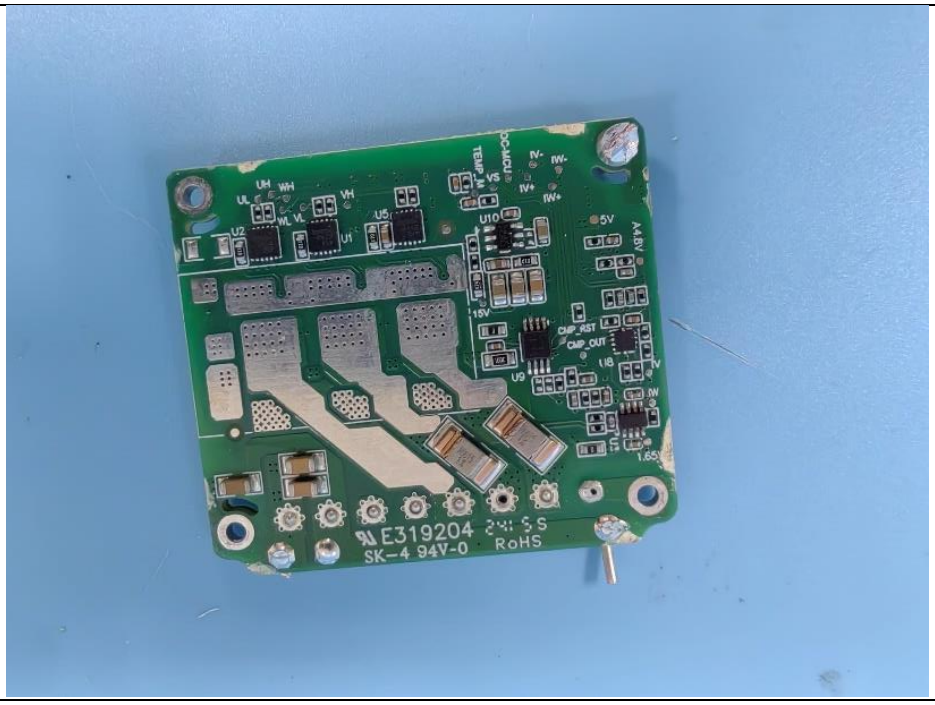
Details of: Internal view (representative model: ELD3-EC7020BM)



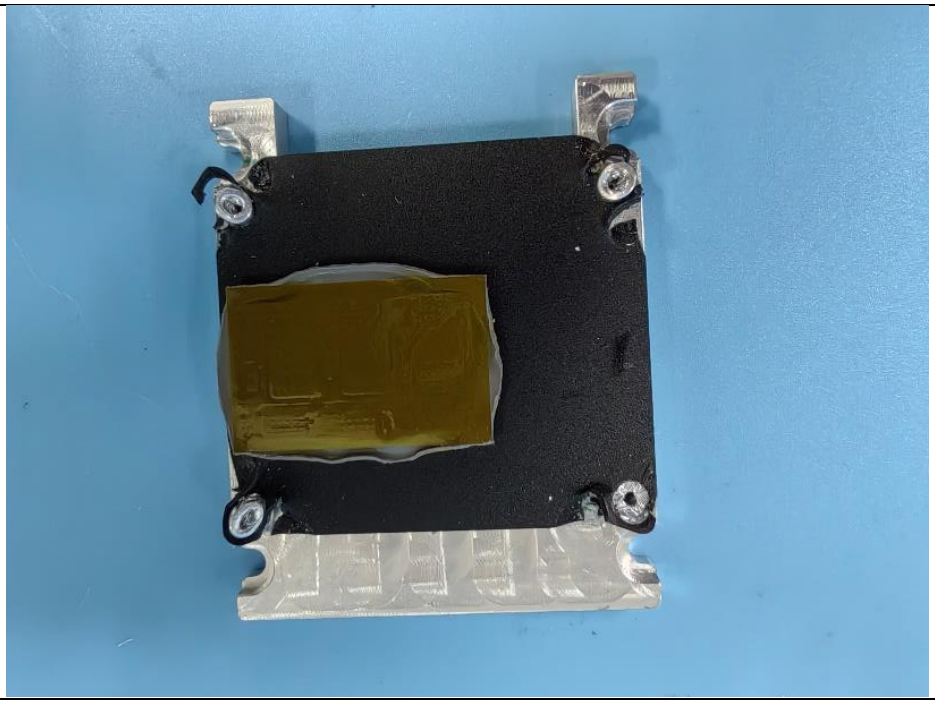
Details of: Internal view (representative model: ELD3-EC7020BM)



Details of: Internal view (representative model: ELD3-EC7020BM)



Details of: Internal view (representative model: ELD3-EC7020BM)



---END OF TEST REPORT---