



TEST REPORT

EN IEC 61800-3: 2018

Adjustable speed electrical power drive systems -- Part 3: EMC requirements and specific test methods

Report Reference No..... : **CHTEE24010224**



Date of issue..... : Jan. 18, 2024

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Testing Laboratory Name : **Shenzhen Huatongwei International Inspection Co., Ltd.**

Address..... : Building 7, Baiwang Idea Factory, No.1051, Songbai Road, Yangguang Community, Xili Subdistrict, Nanshan District, Shenzhen, Guangdong, China

Testing location/ procedure : Full application of Harmonised standards
 Partial application of Harmonised standards
 Other standard testing methods

Applicant's name : **China Leadshine Technology Co., Ltd.**

Address..... : 15-20/F, Block B, Nanshan I Valley, No.3157, Shahe West Road, Nanshan District, Shenzhen

Test specification:

Standard : **EN IEC 61800-3: 2018**

Test Report Form No. : HTWEMCCE_1C

TRF Originator..... : Shenzhen Huatongwei International Inspection Co., Ltd.

Master TRF..... : Dated 2021-01

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Test item description : **EL7-EC Series AC Servo Drives**

Trade Mark : 

Model/Type reference..... : L7N-1000S

Listed Models : L7N-(a)100(b)(c), EL7-EC100(a)(b), L6N-(a)100(b)(c), EL6-EC100(a)(b), L7N-(a)400(b)(c), EL7-EC400(a)(b), L6N-(a)400(b)(c), EL6-EC400(a)(b), L7N-(a)750(b)(c), EL7-EC750(a)(b), L6N-(a)750(b)(c), EL6-EC750(a)(b), L7N-(a)1000(b)(c), EL7-EC1000(a)(b), L6N-(a)1000(b)(c), EL6-EC1000(a)(b)

Ratings..... : See page 6 for details

Result..... : **Pass**

EMC -- TEST REPORT

Test Report No. : CHTEE24010224	Jan. 18, 2024 Date of issue
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Equipment under Test : EL7-EC Series AC Servo Drives

Model /Type : L7N-1000S

Listed Models : L7N-(a)100(b)(c), EL7-EC100(a)(b), L6N-(a)100(b)(c), EL6-EC100(a)(b), L7N-(a)400(b)(c), EL7-EC400(a)(b), L6N-(a)400(b)(c), EL6-EC400(a)(b), L7N-(a)750(b)(c), EL7-EC750(a)(b), L6N-(a)750(b)(c), EL6-EC750(a)(b), L7N-(a)1000(b)(c), EL7-EC1000(a)(b), L6N-(a)1000(b)(c), EL6-EC1000(a)(b)

Applicant : **China Leadshine Technology Co.,Ltd.**

Address : 15-20/F, Block B, Nanshan I Valley, No.3157, Shahe West Road, Nanshan District, Shenzhen

Manufacturer : **China Leadshine Technology Co.,Ltd.**

Address : 15-20/F, Block B, Nanshan I Valley, No.3157, Shahe West Road, Nanshan District, Shenzhen

Test Result according to the standards on page 4:	Pass
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The test report merely corresponds to the test sample.
 It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1.	<u>TEST STANDARDS.....</u>	4
2.	<u>SUMMARY.....</u>	5
2.1.	General Remarks	5
2.2.	Equipment Under Test	5
2.3.	Short description of the Equipment under Test (EUT)	5
2.4.	EUT operation mode	7
2.5.	EUT configuration	7
2.6.	Performance level	7
3.	<u>TEST ENVIRONMENT.....</u>	9
3.1.	Address of the test laboratory	9
3.2.	Test Facility	9
3.3.	Environmental conditions	9
3.4.	Test Description	10
3.5.	Statement of the measurement uncertainty	11
3.6.	Equipments Used during the Test	11
4.	<u>TEST CONDITIONS AND RESULTS.....</u>	15
4.1.	Radiated Emission	15
4.2.	Conducted disturbance	20
4.3.	Harmonic current	24
4.4.	Voltage Fluctuation and Flicker	29
4.5.	Commutation notches	33
4.6.	Electrostatic discharge	33
4.7.	Radiated, radio-frequency, electromagnetic field	36
4.8.	Electrical fast transients / Burst	38
4.9.	Surge	41
4.10.	Conducted disturbances induced by radio-frequency fields	43
4.11.	Immunity to Harmonics and commutation notches/voltage distortion	46
4.12.	Immunity to Voltage deviation (Variations, changes, fluctuations), dips and short interruptions	48
4.13.	Immunity to Voltage unbalance and frequency variations	49
5.	<u>EXTERNAL AND INTERNAL PHOTOS OF THE EUT.....</u>	50
5.1.	External Photos of the EUT	50
5.2.	Internal photos of the EUT	52

1. TEST STANDARDS

The tests were performed according to following standards:

[EN IEC 61800-3: 2018](#) Adjustable speed electrical power drive systems -- Part 3: EMC requirements and specific test methods

2. SUMMARY

2.1. General Remarks

Date of receipt of test sample : _____ Dec. 19, 2023 _____

Testing commenced on : _____ Dec. 19, 2023 _____

Testing concluded on : _____ Dec. 29, 2023 _____

2.2. Equipment Under Test

Power supply system utilised

Power supply voltage : 230V / 50 Hz 120V / 60Hz
 12 V DC 24 V DC
 Other (specified in blank below)

_____ 230Va.c. 50Hz _____

2.3. Short description of the Equipment under Test (EUT)

The EUT is a EL7-EC Series AC Servo Drives.

According to EN 61800-3, the EUT intended for use in the first environment, environment that includes residential premises and establishments directly connected without intermediate transformers to a low-voltage power supply network which supplies buildings used for residential purposes. PDS of category C2

Model list:

Model	Rated input	Rated output
L7N-(a)100(b)(c), EL7-EC100(a)(b), L6N-(a)100(b)(c), EL6-EC100(a)(b)	1PH AC 200-240VAC, 50/60Hz, 1.7A	3PH AC 0-240VAC, 0-500Hz, 1.2A
L7N-(a)400(b)(c), EL7-EC400(a)(b), L6N-(a)400(b)(c), EL6-EC400(a)(b)	1PH AC 200-240VAC, 50/60Hz, 5.0A	3PH AC 0-240VAC, 0-500Hz, 3.5A
L7N-(a)750(b)(c), EL7-EC750(a)(b), L6N-(a)750(b)(c), EL6-EC750(a)(b)	1PH AC 200-240VAC, 50/60Hz, 7.9A	3PH AC 0-240VAC, 0-500Hz, 5.5A
L7N-(a)1000(b)(c), EL7-EC1000(a)(b), L6N-(a)1000(b)(c), EL6-EC1000(a)(b)	1PH AC 200-240VAC, 50/60Hz, 8.8A	3PH AC 0-240VAC, 0-500Hz, 7A
<p>Remark:</p> <ol style="list-style-type: none"> (a): 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. (b): 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. (c): 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. Model L7N-(a)100(b)(c), EL7-EC100(a)(b), L6N-(a)100(b)(c), EL6-EC100(a)(b) are identical except for model name. Model L7N-(a)400(b)(c), EL7-EC400(a)(b), L6N-(a)400(b)(c), EL6-EC400(a)(b) are identical except for model name. Model L7N-(a)750(b)(c), EL7-EC750(a)(b), L6N-(a)750(b)(c), EL6-EC750(a)(b) are identical except for model name. Model L7N-(a)1000(b)(c), EL7-EC1000(a)(b), L6N-(a)1000(b)(c), EL6-EC1000(a)(b) are identical except for model name. 		

If no otherwise specified, all tests performed at the model: L7N-1000S

2.4. EUT operation mode

The equipment under test was operated during the measurement under the following conditions:

Test program (customer specific)

Emissions tests.....: According to EN 61800-3, searching for the highest disturbance.

Immunity tests: According to EN 61800-3, searching for the highest susceptibility.

Harmonic current.....: According to EN 61800-3. searching for the highest disturbance

Voltage fluctuation.....: According to EN 61800-3 searching for the highest disturbance

2.5. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

■ - supplied by the manufacturer

○ - supplied by the lab

■ AC SERVO MOTOR

M/N : ACM2-08010H2

China Leadshine Technology Co.,

Manufacturer : Ltd.

■ EMI FILTER

M/N : High& Low Corp.

Manufacturer : 06S4-2D4742228.0334C2-Q

2.6. Performance level

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test relative to a performance criteria defined by its manufacturer or the requestor of the test, or agreed between the manufacturer and the purchaser of the product. Examples of functions defined by the manufacturer to be evaluated during testing include, but are not limited to, the following:

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

Definition related to the performance level:

- based on the used product standard
- based on the declaration of the manufacturer, requestor or purchaser

Criteria to prove the acceptance of a PDS against electromagnetic disturbances

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.			

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Building 7, Baiwang Idea Factory, No.1051, Songbai Road, Yangguang Community, Xili Subdistrict, Nanshan District, Shenzhen, Guangdong, China
Phone: 86-755-26715499 E-mail: cs@szhtw.com.cn

3.2. Test Facility

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

FCC-Registration No.: 762235

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration No: 762235.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 950-1050mbar

3.4. Test Description

Emission Measurement		
Radiated Emission	EN IEC 61800-3: 2018	PASS
Conducted Disturbance	EN IEC 61800-3: 2018	PASS
Harmonic Current	EN IEC 61800-3: 2018 IEC 61000-3-2:2018 IEC 61000-3-12: 2011	PASS
Voltage Fluctuation and Flicker	EN IEC 61800-3: 2018 IEC 61000-3-3:2013+A1:2017 IEC 61000-3-11: 2000:	PASS
Commutation Notches	EN IEC 61800-3: 2018	PASS
Immunity Measurement		
Electrostatic Discharge	EN IEC 61800-3: 2018 IEC 61000-4-2:2008	PASS
RF Field Strength Susceptibility	EN IEC 61800-3: 2018 IEC 61000-4-3:2020	PASS
Electrical Fast Transient/Burst Test	EN IEC 61800-3: 2018 IEC 61000-4-4: 2012	PASS
Surge Test	EN IEC 61800-3: 2018 IEC 61000-4-5: 2014+A1: 2017	PASS
Conducted Susceptibility Test	IEC 61800-3: 2017 IEC 61000-4-6: 2013	PASS
Immunity to Harmonics and commutation notches/voltage distortion	EN IEC 61800-3: 2018 IEC 61000-2-4: 2002 IEC 60146-1-1: 2009	PASS
Immunity to Voltage deviation dips and short interruptions	EN IEC 61800-3: 2018 IEC 61000-2-4: 2002 IEC 60146-1-1: 2009	PASS
Immunity to Voltage unbalance and frequency variations	EN IEC 61800-3: 2018 IEC 61000-2-4: 2002	PASS

Remark:

1. "N/A" denotes test is not applicable in this Test Report
2. The measurement uncertainty is not included in the test result.

3.5. Statement of the measurement uncertainty

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

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.22 dB	(1)
Conducted Disturbance	0.15~30MHz	3.25 dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.6. Equipments Used during the Test

● Radiated Emission 30M-1GHz							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Semi-Anechoic Chamber	ETS	HTWE0086	SAC-3	CT-2668	2022/2/17	2025/2/16
●	EMI Test Receiver	R&S	HTWE0401	ESR3	102806	2023/5/23	2024/5/22
●	Ultra-Broadband Antenna	SCHWARZBECK	HTWE0530	VULB9163	945	2022/5/23	2025/5/22
●	Pre-Amplifier	R&S	HTWE0533	SCU01F	100363	2023/4/8	2024/4/7
●	Test Software	R&S	N/A	EMC32	N/A	N/A	N/A

● Conducted Emission							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	EMI Test Receiver	R&S	HTWE0111	ESCI	101247	2023/8/30	2024/8/29
●	Artificial Mains	SCHWARZBECK	HTWE0113	NNLK 8121	573	2023/8/18	2024/8/17
●	Protection Network	SCHWARZBECK	HTWE0567	VTSD9561FN	00899	2023/8/18	2024/8/17
○	ISN	FCC	HTWE0148	FCC-TLISN-T2-02	20371	2023/8/18	2024/8/17
○	ISN	FCC	HTWE0150	FCC-TLISN-T8-02	20375	2023/8/18	2024/8/17
●	Test Software	R&S	N/A	EMC32	N/A	N/A	N/A

● Harmonic Current Emissions							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Harmonic And Flicker Analyzer	EM TEST	HTWE0519	DPA 500N	P210524803 7	2023/5/23	2024/5/22
●	Purified Power Source	EM TEST	HTWE0520	ACS 500N6	P212825446 8	2023/5/23	2024/5/22
●	Test Software	EM TEST	N/A	net.control	N/A	N/A	N/A

● Harmonic Current Emissions, Voltage Fluctuations and Flicker							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Harmonic And Flicker Analyzer	EM TEST	HTWE0018	DPA503S1	0500-10	2023/8/22	2024/8/21
●	Purified Power Source	CALIFORNIA INSTRUMENTS	HTWE0019	HFS500	54513	2023/8/22	2024/8/21
●	Test Software	EM TEST	N/A	DPA	N/A	N/A	N/A

● Electrostatic Discharge							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	ESD Simulator	EM TEST	HTWE0500	esd NX30.1	11971	2023/5/26	2024/5/25

● Radiated, radio-frequency, electromagnetic field							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Anechoic Chamber	CRT	HTWE0418	8.0*5.0*4.0m	CRTSAC84 5	2023/3/18	2028/3/17
●	Signal Generator	R&S	HTWE0276	SMB100A	114360	2023/5/23	2024/5/22
●	Amplifier	R&S	HTWE0277	BBA150-BC500	102664	2023/6/5	2024/6/4
●	Amplifier	R&S	HTWE0395	BBA150 D400	104197	2023/6/5	2024/6/4
●	Amplifier	R&S	HTWE0396	BBA150 E400	104198	2023/6/5	2024/6/4
●	Power Head	R&S	HTWE0278	NRP18A	101010	2023/5/23	2024/5/22
●	Power Head	R&S	HTWE0389	NRP18A	101386	2023/3/29	2024/3/28
●	Transmit Antenna	Schwarzbeck	HTWE0280	STLP9129	00044	2023/8/25	2024/8/24
●	Field Probe	ETS-LINDGREN	HTWE0321	HI-6153	00130812	2023/11/16	2024/11/17
●	Test Software	R&S	N/A	EMC32	N/A	N/A	N/A

● Electrical fast transient/burst immunity test							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Transient immunity simulator	EM TEST	HTWE0512	compact NX5	P21252540 08	2023/5/23	2024/5/22
●	3-Phase Coupling Network	EM TEST	HTWE0516	coupling NX5	P21282544 84	2023/5/23	2024/5/22
●	Coupling Clamp	EM TEST	HTWE0513	CCI	P21252538 35	2023/5/23	2024/5/22
●	Test Software	EM TEST	N/A	ISM IEC	N/A	N/A	N/A

● Surge							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Transient immunity simulator	EM TEST	HTWE0512	compact NX5	P2125254008	2023/5/23	2024/5/22
●	3-Phase Coupling Network	EM TEST	HTWE0516	coupling NX5	P2128254484	2023/5/23	2024/5/22
○	4-Lines Coupling Network	EM TEST	HTWE0514	DCD 5 SR-4-1	P2128254471	2023/5/23	2024/5/22
○	8-Lines Coupling Network	EM TEST	HTWE0515	DCD 5 ST-4-1	P2128254472	2023/5/23	2024/5/22
●	Test Software	EM TEST	N/A	ISM IEC	N/A	N/A	N/A

● Voltage Dips and Interruptions							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Transient immunity simulator	EM TEST	HTWE0512	compact NX5	P2128254484	2023/5/23	2024/5/22
●	Motor Driven Voltage Transformer	EM TEST	HTWE0008	MV2616	0301-11	2023/5/23	2024/5/22
●	Test Software	EM TEST	N/A	ISM IEC	N/A	N/A	N/A

● Conducted disturbances induced by radio-frequency fields							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Signal Generator	R&S	HTWE0603	SMC100A	108535	2023/5/23	2024/5/22
●	Amplifier	R&S	HTWE0606	BBA150-A125	104839	2023/5/23	2024/5/22
●	6db Attenuator	Bird	HTWE0622	150-A-FFN6	2129	2023/4/8	2024/4/7
●	Power Head	R&S	HTWE0604	NRP6AN	101713	2023/5/23	2024/5/22
●	Power Head	R&S	HTWE0605	NRP6AN	101714	2023/5/23	2024/5/22
●	CDN	EMTEST	HTWE0609	CDN M2/M3PE 16A	00083	2023/8/18	2024/8/17
●	Test Software	R&S	N/A	EMC32	N/A	N/A	N/A
○	EM Clamp	FCC	HTWE0616	F-203I	196034	2023/5/23	2024/5/22
○	CDN	Schwarzbeck	HTWE0607	CDN-T8RJ45	00035	2023/8/18	2024/8/17
○	CDN	Schwarzbeck	HTWE0608	CDN M1 16A	00032	2023/8/18	2024/8/17
○	CDN	Schwarzbeck	HTWE0610	CDN M4PE 32A	00006	2023/8/18	2024/8/17
○	CDN	Schwarzbeck	HTWE0611	CDN M5PE 63A	00006	2023/8/18	2024/8/17
○	CDN	Schwarzbeck	HTWE0612	CDN M5 125A	00008	2023/8/18	2024/8/17
○	CDN	Schwarzbeck	HTWE0613	CDN T2	00024	2023/8/18	2024/8/17
○	CDN	Schwarzbeck	HTWE0614	CDN T4 RJ45	00003	2023/8/18	2024/8/17
○	CDN	Schwarzbeck	HTWE0615	CDN S1 BNC	00013	2023/8/18	2024/8/17
○	current clamp	FCC	HTWE0618	F-120-9A	196028	2023/5/23	2024/5/22

● Power Frequency Magnetic Field Susceptibility							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Current Transformer	EM TEST	HTWE0009	MC2630	D5101	2023/8/18	2024/8/17
●	Magnetic Coil	EM TEST	HTWE0010	MS100	0500-19	2023/8/18	2024/8/17

4. TEST CONDITIONS AND RESULTS

4.1. Radiated Emission

For test instruments and accessories used see section 3.6.

4.1.1. Description of the test location

Test location: SAC2

Date of test: Dec. 19, 2023

Operator: Chuanfeng Li

4.1.2. Limits of disturbance (PDS in the second environment, PDS of category C2)

Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dB μ V/m)
30 ~ 230	3	50
230 ~ 1000	3	57

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

(2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

4.1.3. Description of the test set-up

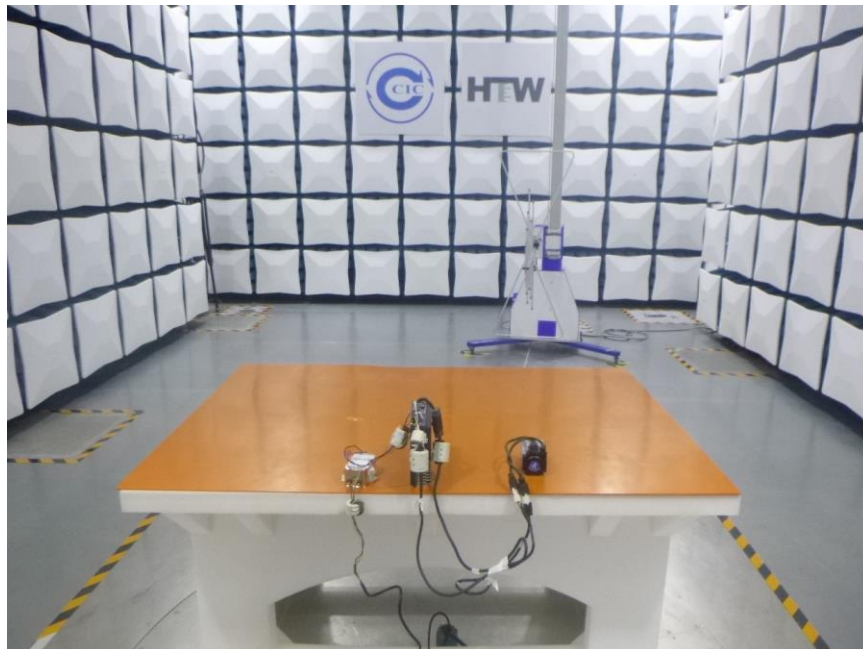
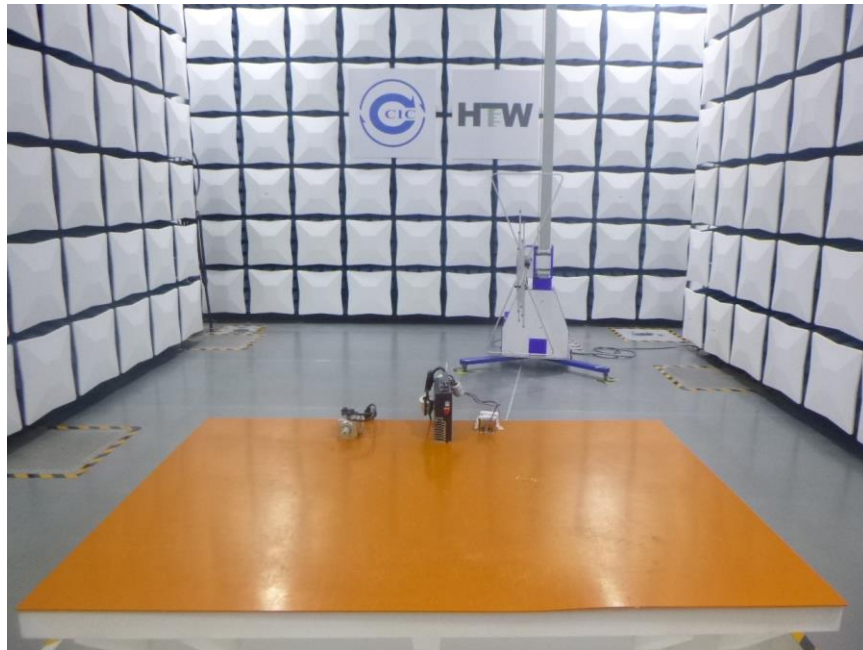
4.1.3.1. Operating Condition

The EUT is no load test with motor during the test, and the results of the maximum emanation are recorded.

4.1.3.2. Test Configuration and Procedure

EUT is tested in Semi-Anechoic Chamber. EUT is placed on a nonmetal table which is 0.8m meter above a grounded turntable. The turntable can rotate 360 degrees to determine the azimuth of the maximum emission level. EUT is set 3 or 10 meters away from the center of receiving antenna. The antenna can move up and down from 1 to 4 meter to find out the maximum emission level. Both horizontal and vertical polarizations of the antenna are set on the test.

4.1.3.3. Photos of the test set-up



4.1.4. Test result

The requirements are **Fulfilled**

Band Width: 120kHz

Frequency Range: 30MHz to 1000MHz

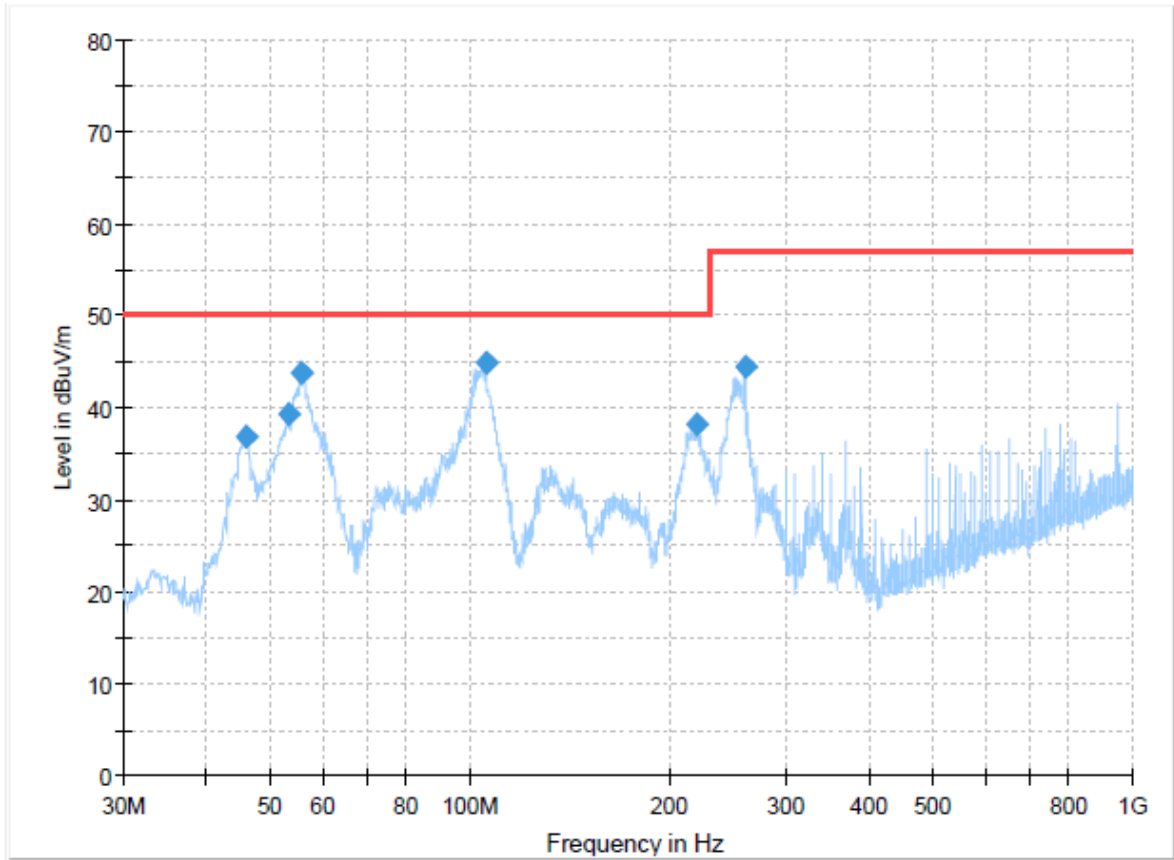
Remarks: The limits are kept. For detailed results, please see the following page(s).

Margin=limit-level

Level=read values+transducer

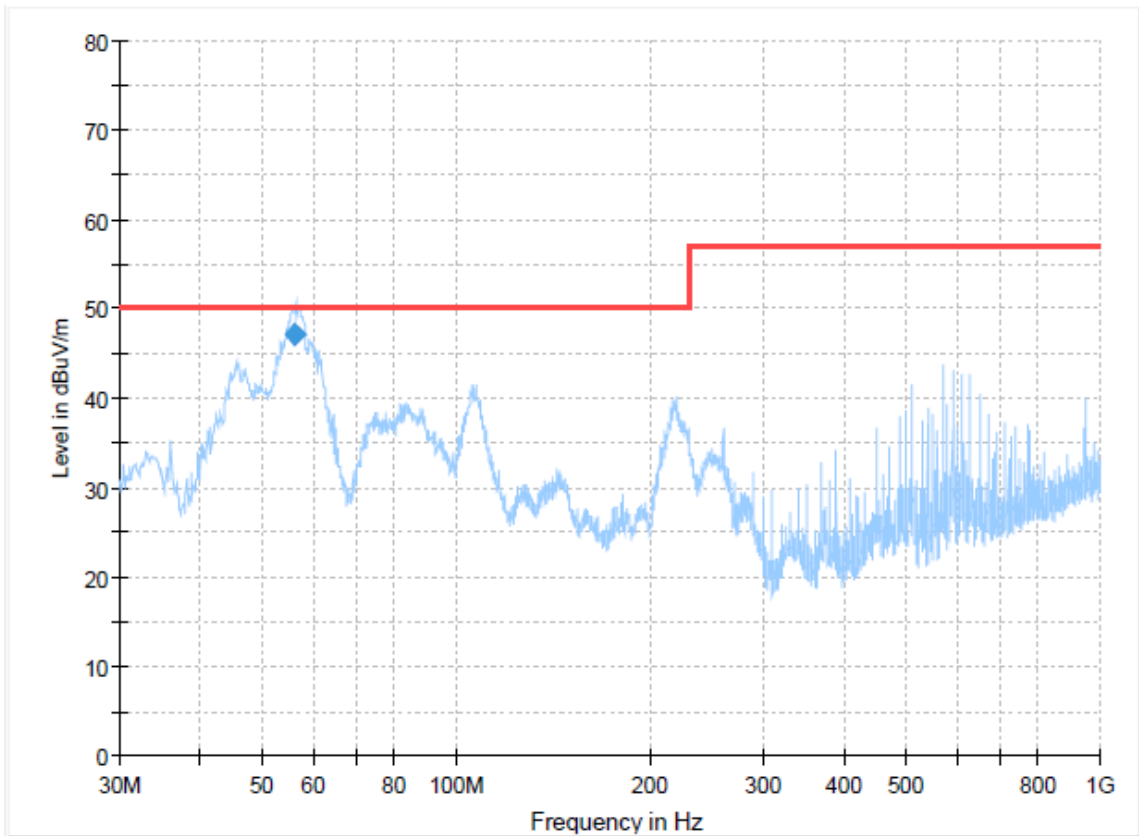
Transducer=antenna factor+pre-amplifier factor+cable loss

AC 230V/50Hz



Final Result

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
46.0050	36.84	50.00	13.16	300.0	H	66.0	-8.8
53.4013	39.23	50.00	10.77	300.0	H	85.0	-9.0
55.8263	43.70	50.00	6.30	300.0	H	42.0	-9.1
105.7813	44.83	50.00	5.17	300.0	H	224.0	-10.7
219.9988	38.13	50.00	11.87	100.0	H	64.0	-10.5
260.0113	44.39	57.00	12.61	100.0	H	326.0	-8.5



Final Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
56.1325	47.11	50.00	2.89	100.0	V	17.0	-9.1

4.2. Conducted disturbance

For test instruments and accessories used see section 3.6.

4.2.1. Description of the test location

Test location: Shielded room No. 5

Date of test: Dec. 19, 2023

Operator: Chuanfeng Li

4.2.2. Limits of disturbance (PDS in the second environment, PDS of category C2)

Limit of conducted disturbance at the mains ports

Frequency Range (MHz)	Limits (dBuV)	
	Quasi-Peak	Average
0.150~0.500	79	66
0.500~5.000	73	60
5.000~30.000	73	60

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

(2) These limits do not apply to power ports operating above 1000V

4.2.3. Description of the test set-up

4.2.3.1. Operating Condition

The EUT is no load test with motor during the test, and the results of the maximum emanation are recorded.

4.2.3.2. Test Configuration and Procedure

For the main ports:

EUT is placed on a nonmetal table above the grounded reference plane. Connect the power line of the EUT to the LISN which is connected to receiver by coaxial line, then disturbance signals can be detected by the receiver.

4.2.3.3. Photo of the test set-up



4.2.4. Test result

The requirements are **Fulfilled**

Band Width: 9kHz

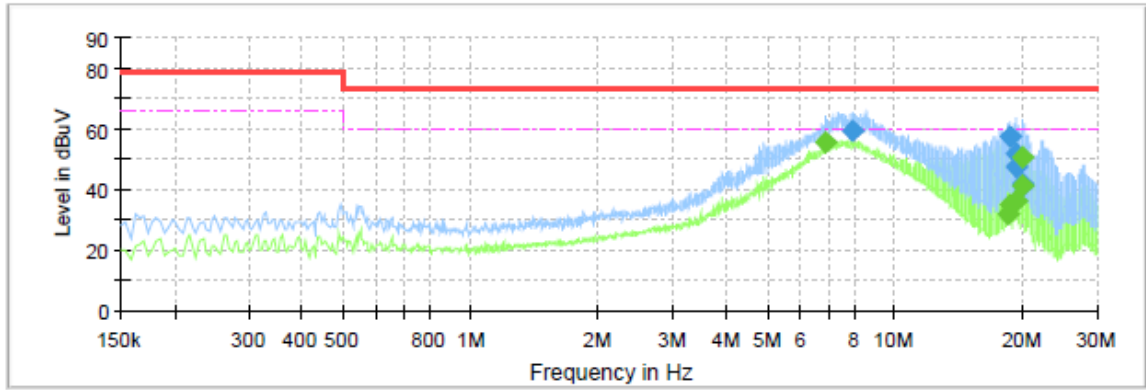
Frequency Range: 150kHz to 30MHz

Remarks: The limits are kept. For detailed results, please see the following page(s).

Margin=limit-level

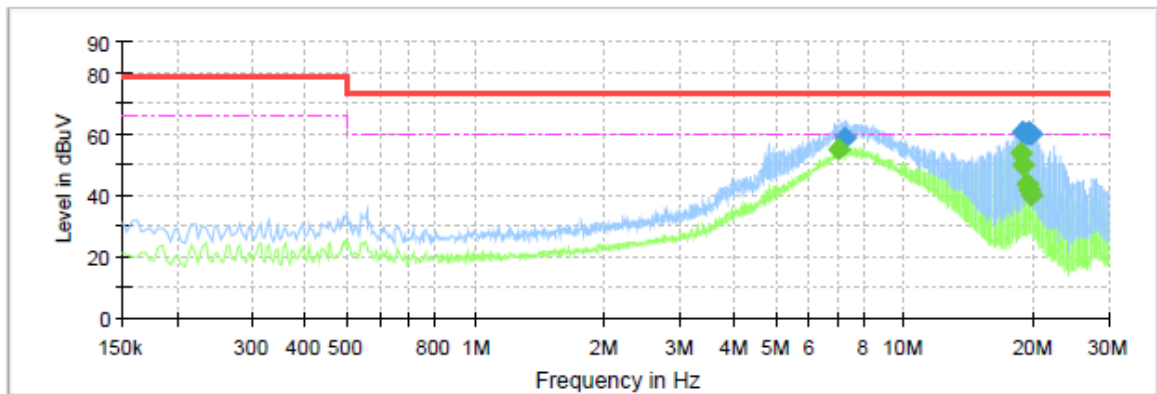
Level=read values+transducer

Transducer=insertion loss of LISN+cable loss+insertion loss of pulse limiter



Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr. (dB)
6.8805	---	55.66	60.00	4.34	L1	11.1
7.9715	59.41	---	73.00	13.59	L1	11.1
18.5405	---	31.89	60.00	28.11	L1	11.4
18.6035	---	34.73	60.00	25.27	L1	11.4
18.6485	57.30	---	73.00	15.70	L1	11.4
19.2595	---	36.20	60.00	23.80	L1	11.4
19.3045	52.03	---	73.00	20.97	L1	11.4
19.4115	47.36	---	73.00	25.64	L1	11.4
19.9115	---	41.24	60.00	18.76	L1	11.4
19.9555	42.18	---	73.00	30.82	L1	11.4
20.0195	---	50.38	60.00	9.62	L1	11.4
20.0645	41.26	---	73.00	31.74	L1	11.4



Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr. (dB)
7.0355	---	55.26	60.00	4.74	N	10.9
7.2875	58.61	---	73.00	14.39	N	10.9
18.7925	---	54.03	60.00	5.97	N	11.0
18.8915	60.58	---	73.00	12.42	N	11.0
18.9005	---	49.99	60.00	10.01	N	11.0
19.0035	60.86	---	73.00	12.14	N	11.0
19.4475	59.72	---	73.00	13.28	N	11.0
19.4485	---	44.05	60.00	15.95	N	11.0
19.6675	---	42.14	60.00	17.86	N	11.0
19.6685	60.33	---	73.00	12.67	N	11.0
19.7805	60.30	---	73.00	12.70	N	11.0
19.8885	---	39.73	60.00	20.27	N	11.0

4.3. Harmonic current

For test instruments and accessories used see section 3.6.

4.3.1. Description of the test location

Test location: Shielded room

Date of test: Dec. 19, 2023

4.3.2. Limits of harmonic current

Test configuration and procedure see clause 7.1 of standard IEC 61000-3-2:2018.

4.3.3. Description of the test set-up

4.3.3.1. Operating Condition

The EUT is no load test with motor during the test, and the results of the maximum emanation are recorded.

4.3.3.2. Test Configuration and Procedure

Test configuration and procedure see clause 6.3.2 and Appendix C of standard IEC 61000-3-2:2018.

4.3.3.3. Photo of the test set-up



4.3.4. Test result

The test results are **Fulfilled**

Remarks: The limits are kept. For detailed results, please see the following page(s).

Average harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	221.261E-3			
2	11.001E-3	1.019	1.08	PASS
3	131.666E-3	5.725	2.30	PASS
4	10.942E-3	2.545	430.00E-3	PASS
5	127.224E-3	11.160	1.14	PASS
6	10.373E-3	3.458	300.00E-3	PASS
7	122.506E-3	15.910	770.00E-3	PASS
8	9.824E-3	4.271	230.00E-3	PASS
9	116.010E-3	29.002	400.00E-3	PASS
10	8.827E-3	4.797	184.00E-3	PASS
11	108.572E-3	32.901	330.00E-3	PASS
12	7.993E-3	5.213	153.33E-3	PASS
13	100.076E-3	47.655	210.00E-3	PASS
14	6.838E-3	5.202	131.43E-3	PASS
15	90.720E-3	60.480	150.00E-3	PASS
16	5.956E-3	5.180	115.00E-3	PASS
17	81.000E-3	61.201	132.35E-3	PASS
18	4.652E-3	4.551	102.22E-3	PASS
19	70.727E-3	59.726	118.42E-3	PASS
20	3.760E-3	4.087	92.00E-3	PASS
21	60.765E-3	37.810	160.71E-3	PASS
22	2.676E-3	3.199	83.64E-3	PASS
23	50.734E-3	34.573	146.74E-3	PASS
24	1.849E-3	2.412	76.66E-3	PASS
25	41.461E-3	30.712	135.00E-3	PASS
26	1.110E-3	1.568	70.77E-3	PASS
27	32.532E-3	26.026	124.99E-3	PASS
28	717.573E-6	1.092	65.71E-3	PASS
29	24.880E-3	21.377	116.39E-3	PASS
30	967.592E-6	1.578	61.33E-3	PASS
31	18.118E-3	16.642	108.87E-3	PASS
32	1.110E-3	1.930	57.50E-3	PASS
33	13.095E-3	12.804	102.27E-3	PASS
34	1.438E-3	2.657	54.12E-3	PASS
35	9.794E-3	10.156	96.44E-3	PASS
36	1.559E-3	3.051	51.11E-3	PASS
37	8.772E-3	9.617	91.21E-3	PASS
38	1.573E-3	3.249	48.42E-3	PASS
39	9.179E-3	10.607	86.53E-3	PASS
40	1.533E-3	3.334	46.00E-3	PASS

Maximum harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	223.254E-3			
2	20.281E-3	1.252	1.62	PASS
3	135.260E-3	3.921	3.45	PASS
4	20.023E-3	3.104	645.00E-3	PASS
5	130.567E-3	7.635	1.71	PASS
6	18.988E-3	4.220	450.00E-3	PASS
7	125.675E-3	10.881	1.15	PASS
8	17.891E-3	5.186	345.00E-3	PASS
9	119.039E-3	19.840	600.00E-3	PASS
10	16.117E-3	5.840	276.00E-3	PASS
11	111.179E-3	22.460	495.00E-3	PASS
12	14.537E-3	6.321	229.99E-3	PASS
13	102.407E-3	32.510	315.00E-3	PASS
14	12.465E-3	6.323	197.15E-3	PASS
15	92.577E-3	41.145	225.00E-3	PASS
16	10.723E-3	6.216	172.50E-3	PASS
17	82.617E-3	41.615	198.52E-3	PASS
18	8.542E-3	5.571	153.33E-3	PASS
19	72.007E-3	40.538	177.63E-3	PASS
20	6.882E-3	4.987	138.00E-3	PASS
21	61.829E-3	38.473	160.71E-3	PASS
22	5.088E-3	4.056	125.46E-3	PASS
23	51.580E-3	35.150	146.74E-3	PASS
24	3.691E-3	3.210	114.99E-3	PASS
25	42.098E-3	31.184	135.00E-3	PASS
26	2.827E-3	2.663	106.16E-3	PASS
27	33.112E-3	26.491	124.99E-3	PASS
28	2.235E-3	2.267	98.57E-3	PASS
29	25.585E-3	21.983	116.39E-3	PASS
30	2.561E-3	2.784	92.00E-3	PASS
31	19.001E-3	17.453	108.87E-3	PASS
32	2.644E-3	3.066	86.25E-3	PASS
33	14.153E-3	13.839	102.27E-3	PASS
34	2.937E-3	3.617	81.18E-3	PASS
35	11.126E-3	11.537	96.44E-3	PASS
36	3.038E-3	3.962	76.66E-3	PASS
37	10.069E-3	11.039	91.21E-3	PASS
38	3.102E-3	4.272	72.63E-3	PASS
39	10.193E-3	11.779	86.53E-3	PASS
40	2.852E-3	4.134	69.00E-3	PASS

Maximum harmonic voltage results

Hn	Ueff [V]	Ueff [%]	Limit [%]	Result
1	220.52	100.236		
2	143.67E-3	0.065	0.2	PASS
3	392.88E-3	0.179	0.9	PASS
4	50.20E-3	0.023	0.2	PASS
5	27.20E-3	0.012	0.4	PASS
6	37.63E-3	0.017	0.2	PASS
7	63.05E-3	0.029	0.3	PASS
8	30.07E-3	0.014	0.2	PASS
9	63.90E-3	0.029	0.2	PASS
10	18.43E-3	0.008	0.2	PASS
11	60.04E-3	0.027	0.1	PASS
12	19.88E-3	0.009	0.1	PASS
13	75.57E-3	0.034	0.1	PASS
14	13.18E-3	0.006	0.1	PASS
15	63.76E-3	0.029	0.1	PASS
16	20.55E-3	0.009	0.1	PASS
17	78.81E-3	0.036	0.1	PASS
18	10.60E-3	0.005	0.1	PASS
19	59.86E-3	0.027	0.1	PASS
20	20.43E-3	0.009	0.1	PASS
21	68.83E-3	0.031	0.1	PASS
22	10.43E-3	0.005	0.1	PASS
23	56.58E-3	0.026	0.1	PASS
24	11.69E-3	0.005	0.1	PASS
25	60.50E-3	0.027	0.1	PASS
26	15.50E-3	0.007	0.1	PASS
27	41.34E-3	0.019	0.1	PASS
28	11.67E-3	0.005	0.1	PASS
29	41.60E-3	0.019	0.1	PASS
30	11.56E-3	0.005	0.1	PASS
31	29.97E-3	0.014	0.1	PASS
32	9.92E-3	0.005	0.1	PASS
33	25.07E-3	0.011	0.1	PASS
34	9.46E-3	0.004	0.1	PASS
35	21.39E-3	0.010	0.1	PASS
36	15.60E-3	0.007	0.1	PASS
37	20.75E-3	0.009	0.1	PASS
38	9.68E-3	0.004	0.1	PASS
39	21.51E-3	0.010	0.1	PASS
40	13.69E-3	0.006	0.1	PASS

4.4. Voltage Fluctuation and Flicker

For test instruments and accessories used see section 3.6.

4.4.1. Description of the test location

Test location: Shielded room

Date of test: Dec. 19, 2023

4.4.2. Limits of voltage fluctuation and flicker

Test configuration and procedure see clause 5 of standard IEC 61000-3-3:2013+A1:2017.

4.4.3. Description of the test set-up

4.4.3.1. Operating Condition

The EUT is no load test with motor during the test, and the results of the maximum emanation are recorded.

4.4.3.2. Test Configuration and Procedure

Test configuration and procedure see clause 6 and Annex A or Annex B of standard IEC 61000-3-3:2013+A1:2017.

4.4.3.3. Photo of the test set-up



4.4.4. Test result

The requirements are **Fulfilled**

Remarks: The limits are kept. For detailed results, please see the following page(s).

Maximum Flicker results

	EUT values	Limit	Result
Pst	0.040	1.00	PASS
Plt	0.029	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.080	4.00	PASS
dt [s]	0.000	0.50	PASS

Detail Flicker data

Flicker measurement 1	EUT values	Limit	Result
Pst	0.040	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.080	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 2	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.050	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 3	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.053	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 4	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.054	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 5	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.047	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 6	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.053	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 7	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.053	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 8	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.048	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 9	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.053	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 10	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.053	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 11	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.050	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 12	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.051	4.00	PASS
dt [s]	0.000	0.50	PASS

4.5. Commutation notches

For test instruments and accessories used see section 3.6.

4.5.1. Description of the test set-up

4.5.1.1. Operating Condition

The EUT is no load during the test, and the results of the maximum emanation are recorded.

4.5.2. Test result

The EUT has met the requirements of EN 61800-3 Commutation notches of AC power ports.

4.6. Electrostatic discharge

For test instruments and accessories used see section 3.6.

4.6.1. Description of the test location and date

Test location: Shielded room No. 8

Date of test: Dec. 25, 2023

Operator: JIAN. LI

4.6.2. Severity levels of electrostatic discharge

4.6.2.1. Severity level: Contact Discharge at $\pm 4\text{KV}$ Air Discharge at $\pm 8\text{KV}$

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

4.6.2.2. Performance criterion: **B**

4.6.3. Description of the test set-up

4.6.3.1. Operating Condition

The EUT is no load during the test, and the results of the maximum susceptible results are recorded.

4.6.3.2. Test Configuration and Procedure:

Air Discharge:

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

Contact Discharge:

- All the procedure shall be same as air discharge, except using the acute discharge tip. The top end of the Electrostatic Discharge simulator is touch the EUT all the time when the simulator is re-triggered for a new single discharge and repeated 25 times for each pre-selected test point.

Indirect Discharge:

- The vertical coupling plane(VCP) is placed 0.1m away from EUT. The top end of Electrostatic Discharge simulator should aim at the center of one border of the VCP for at least 25 times discharge.
- The top end of Electrostatic Discharge simulator should place at the point 0.1m away from EUT on the horizontal coupling plane(HCP). At least 25 times discharge should be done for every pre-selected point around EUT.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

4.6.3.3. Photo of the test set-up

4.7. Radiated, radio-frequency, electromagnetic field

For test instruments and accessories used see section 3.6.

4.7.1. Description of the test location and date

Test location: Shielded room No.7

Date of test: Dec. 22, 2023

Operator: Jianjun.Liang

4.7.2. Severity levels of radiated, radio-frequency, electromagnetic field

4.7.2.1. Severity level: 10 V/m

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

4.7.2.2. Performance criterion: A

4.7.3. Description of the test set-up

4.7.3.1. Operating Condition

The EUT is no load during the test, and the results of the maximum susceptible results are recorded.

4.7.3.2. Test Configuration and Procedure

EUT and its auxiliary instrument are placed on a turntable which is 0.8 meter above ground. The front tip of the transmitting antenna mounted on an antenna mast is set 3 meter away from the EUT. During the test, each of the four sides of EUT will face the transmitting antenna with the turntable cycled. Both horizontal and vertical polarization of the antenna are set on test and measured individually.

In order to judge the performance of the EUT, a set of monitor system is used.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

4.7.3.3. Photo of the test set-up



4.7.4. Test specification:

- Frequency range: ■ 80 MHz to 1000 MHz
- Field strength: ■ 10 V/m
- Frequency range: ■ 1.4GHz to 2.0 GHz
- Field strength: ■ 1V/m
- Frequency range: ■ 2.0 GHz to 2.7GHz
- Field strength: ■ 1 V/m
- Frequency step: ■ 1 % with 1s dwell time
- Antenna polarisation: ■ horizontal ■ vertical

4.7.5. Test result

The requirements are **Fulfilled**

Performance Criterion: **A**

Remarks: During the test no deviation was detected to the selected operation mode(s).

4.8. Electrical fast transients / Burst

For test instruments and accessories used see section 3.6.

4.8.1. Description of the test location and date

Test location: Shielded room No. 8

Date of test: Dec. 25, 2023

Operator: JIAN. LI

4.8.2. Severity levels of electrical fast transients / Burst

4.8.2.1. Severity level: $\pm 2\text{kV}$ for AC power supply lines, $\pm 2\text{kV}$ for Power/Signal interfaces

Open circuit output test voltage and repetition rate of the impulses				
Level	On power port, PE		On I/O signal, data and control ports	
	V peak(KV)	Repetition rate (kHz)	Voltage peak	Repetition rate (kHz)
1	0.5	5 or 100	0.25	5 or 100
2	1	5 or 100	0.5	5 or 100
3	2	5 or 100	1	5 or 100
4	4	5 or 100	2	5 or 100
X	Special	Special	Special	Special

4.8.2.2. Performance criterion: **B**

4.8.3. Description of the test set-up

4.8.3.1. Operating Condition

The EUT is no load during the test, and the results of the maximum susceptible results are recorded.

4.8.3.2. Test Requirements

EUT and its simulators shall be placed 0.1m high above the ground reference plane which is a minimum 1mx1m with minimum 0.65mm thickness. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

4.8.3.3. Test Configuration and Procedure

For AC power input lines:

EUT is connected to coupling/decoupling network which couples the EFT signal to power input lines. During the test, both polarities of the test voltage should be applied and the duration of the test can't be less than 1mins.

For Signal Line and Control Line:

Coupling clamp is directly placed on the ground reference plane with its metallic bottom contacting the plane. The signal lines and control lines of EUT are put through the coupling clamp which couples the EFT signal to these lines. During the test, both polarities of the test voltage should be applied and the duration of the test can't be less than 1mins.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

4.8.3.4. Photo of the test set-up



4.8.4. Test specification:

Coupling network: 0.5 kV 1 kV 2 kV 4 kV

Coupling clamp: 0.5 kV 1 kV 2 kV

Burst frequency: 5.0 kHz

Coupling duration: 60 s

Polarity: positive negative

4.8.5. Coupling points

Cable description: AC power line, Power/Signal interfaces

Screening: screened unshielded

Status: passive active

Signal transmission: analogue digital

Length: Signal line great than 3m

4.8.6. Test result

The requirements are **Fulfilled**

Performance Criterion: **B**

Remarks: During the test no deviation was detected to the selected operation mode(s).

4.9. Surge

For test instruments and accessories used see section 3.6.

4.9.1. Description of the test location and date

Test location: Shielded room No. 8

Date of test: Dec. 25, 2023

Operator: JIAN. LI

4.9.2. Severity levels of surge

4.9.2.1. Severity level: Line to line: $\pm 1\text{KV}$ Line to earth: $\pm 2\text{KV}$

Level	Test Voltage (KV)
1	0.5
2	1.0
3	2.0
4	4.0
x	Special

4.9.2.2. Performance Criterion: **B**

4.9.3. Description of the test set-up

4.9.3.1. Operating Condition

The EUT is no load during the test, and the results of the maximum susceptible results are recorded.

4.9.3.2. Test Configuration and Procedure

In this test, the 1.2/50us & 8/20us surge generator must be used for AC power ports. The voltage for line to earth coupling mode is twice of that for line to line. At least 5 positive and 5 negative (polarity) surges signal with a maximum 1/min repetition rate are injected to AC power lines from 4 different phase angles (0°, 90°, 180°, 270°) during the test.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

4.9.3.3. Photo of the test set-up



4.9.4. Test specification:

Pulse amplitude-Power line sym.: 0.5 kV 1 kV 2 kV 4 kV
Source impedance: 2 Ω + 18μF

Pulse amplitude-Power line unsym.: 0.5 kV 1 kV 2 kV 4 kV
Source impedance: 12 Ω + 9μF

Signal line 0.5 kV 1 kV 2 kV 4 kV

Number of surges: 5 Surges/Phase angle

Phase angle: 0 ° 90 ° 180 ° 270 °

Repetition rate: 60 s

Polarity: positive negative

4.9.5. Coupling points

Cable description: AC power line

Screening: screened unscreened
Status: passive active
Signal transmission: analogue digital
Length: Signal line great than 3m

4.9.6. Test result

The requirements are **Fulfilled** Performance Criterion: **B**

Remarks: During the test no deviation was detected to the selected operation mode(s).

4.10. Conducted disturbances induced by radio-frequency fields

For test instruments and accessories used see section 3.6.

4.10.1. Description of the test location and date

Test location: Shielded room No. 8

Date of test: Dec. 25, 2023

Operator: Junxu.Lin

4.10.2. Severity levels of conducted disturbances induced by radio-frequency fields discharge

4.10.2.1. Severity Level: 10V

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

4.10.2.2. Performance Criterion: **A**

4.10.3. Description of the test set-up

4.10.3.1. Operating Condition

The EUT is no load during the test, and the results of the maximum susceptible results are recorded.

4.10.3.2. Test Configuration and Procedure

For AC power port:

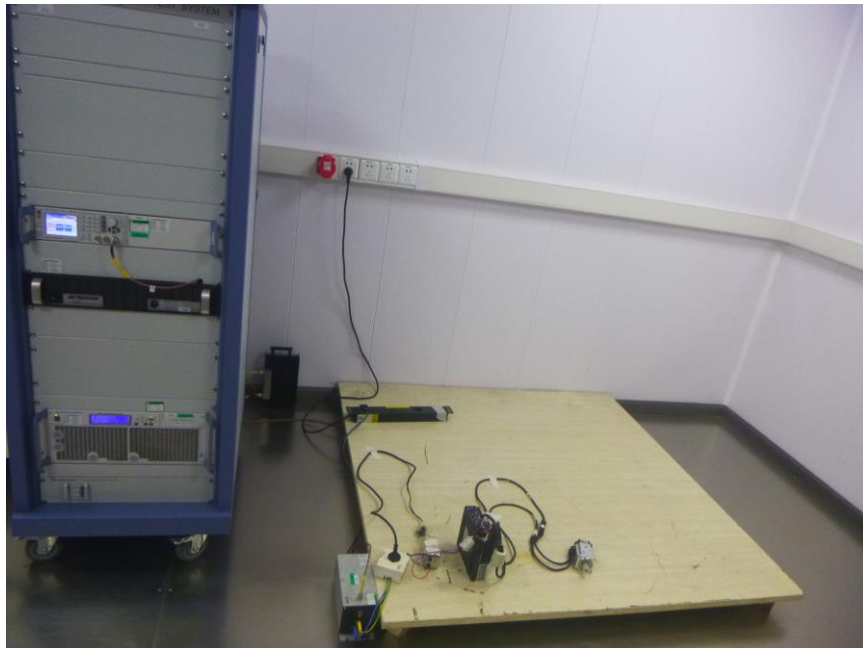
EUT is placed on an insulating support of 0.1m high above a ground reference plane. It must be 0.3m away the CDN (coupling and decoupling network) of which the bottom is made of metallic material and placed directly on the ground plane. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible). The disturbance signal amplified by amplifier is injected to EUT through CDN.

For Signal Line and Control Line:

EUT is placed on an insulating support of 0.1m high above a ground reference plane. The EM clamp is directly placed on the ground reference plane with its metallic bottom contacting the plane. Cables between EUT and auxiliary equipment are put through the EM clamp. The disturbance signal amplified by amplifier is injected to EUT through EM clamp.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

4.10.3.3. Photo of the test set-up



4.10.4. Test specification:

- Frequency range: 0.15 MHz to 80 MHz
- Test voltage: 10 V
- Modulation:
 - AM: 80 %
 - sinusoidal 1kHz
- Frequency step: 1 % with 1s dwell time

4.10.5. Coupling points

Cable description : AC power line, Power/Signal interfaces

- Screening: screened unscreened
- Status: passive active
- Signal transmission: analogue digital
- Length: Signal line great than 3m

4.10.6. Test result

The requirements are **Fulfilled**

Performance Criterion: **A**

Remarks: During the test no deviation was detected to the selected operation mode(s).

4.11. Immunity to Harmonics and commutation notches/voltage distortion

For test instruments and accessories used see section 3.6.

4.11.1. Description of the test location and date

Test location: Shielded room

4.11.2. Description of the test set-up

4.11.2.1. Operating Condition

The EUT is no load during the test, the applied level was presented in the below table. The set-up and test methods were according to IEC 61000-2-4, IEC 60146-1-1.

4.11.3. Test result

The EUT has met the requirements of Performance Criterion A for Immunity to harmonics and commutation notches/voltage distortion.

Table 1 Minimum immunity requirements for total Harmonics distortion on power ports of low voltage PDS

Phenomenon	Reference document	Level	Performance(acceptance) criterion	Conclusion
Harmonics THD	IEC61000-2-4 Class 3	12%	A	Pass

Table 2 Minimum immunity requirements for commutation notches on power ports of low voltage PDS

Phenomenon	Reference document	Level	Performance(acceptance) criterion	Conclusion
Commutation notches	IEC 60146-1-1 Class B	Depth=40%, Total area=250 in % degrees	A	Pass

Table 3 Minimum immunity requirements for individual harmonic orders on power ports of low voltage PDS

Phenomenon harmonic orders	Reference document	Level	Performance(acceptance) criterion	Conclusion
2	IEC 61000-4-13 class 3	5%	A	Pass
3		9%		
4		2%		
5		12%		
Even orders \ $6 \leq h \leq 50$		1,5%		
7		10%		
9		4%		
11		7%		
13		7%		
15		3%		
17		6%		
19		6%		
21		2%		
23		6%		
25		6%		
27		2%		
29		5%		
31		3%		
33		2%		
35		3%		
37	3%			
39	2%			

4.12. Immunity to Voltage deviation (Variations, changes, fluctuations), dips and short interruptions

For test instruments and accessories used see section 3.6.

4.12.1. Description of the test location and date

Test location: Shielded room

4.12.2. Description of the test set-up

4.12.2.1. Operating Condition

The EUT is no load during the test, the applied level was presented in the below table. The set-up and test methods were according to IEC 61000-2-4, IEC 61000-2-1.

4.12.3. Test result

The EUT has met the requirements of Performance Criterion A & C for Immunity to Voltage deviation (Variations, changes, fluctuations), dips and short interruptions.

Table 1

Minimum immunity requirements for Voltage deviation, dips and short interruptions on power ports of low voltage PDS

Phenomenon	Reference document	Level		Performance(acceptance) criterion	Conclusion
Voltage deviations	IEC61000-2-4 Class 2	±10%		A	Pass
Voltage dips	IEC 61000-4-11 class 3 or IEC 61000-4-34 class 3	Volts remaining 0% 40% 70% 80%	Cycles 1 10/12 25/30 250/300	C	Pass
short interruptions	IEC 61000-4-11 class 3 or IEC 61000-4-34 class 3	Volts remaining 0%	Cycles 250/300	C	Pass

4.13. Immunity to Voltage unbalance and frequency variations

For test instruments and accessories used see section 3.6.

4.13.1. Description of the test location and date

Test location: Shielded room

4.13.2. Description of the test set-up

4.13.2.1. Operating Condition

The EUT is no load during the test, the applied level was presented in the below table. The set-up and test methods were according to IEC 61000-2-4.

4.13.3. Test result

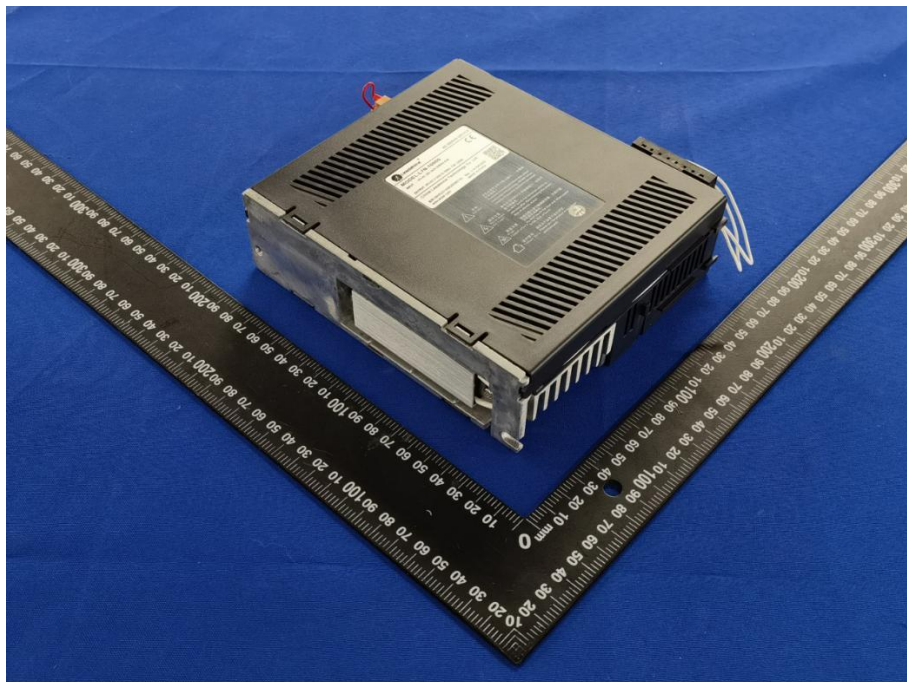
The EUT has met the requirements of Performance Criterion A for Immunity to Voltage unbalance and frequency variations

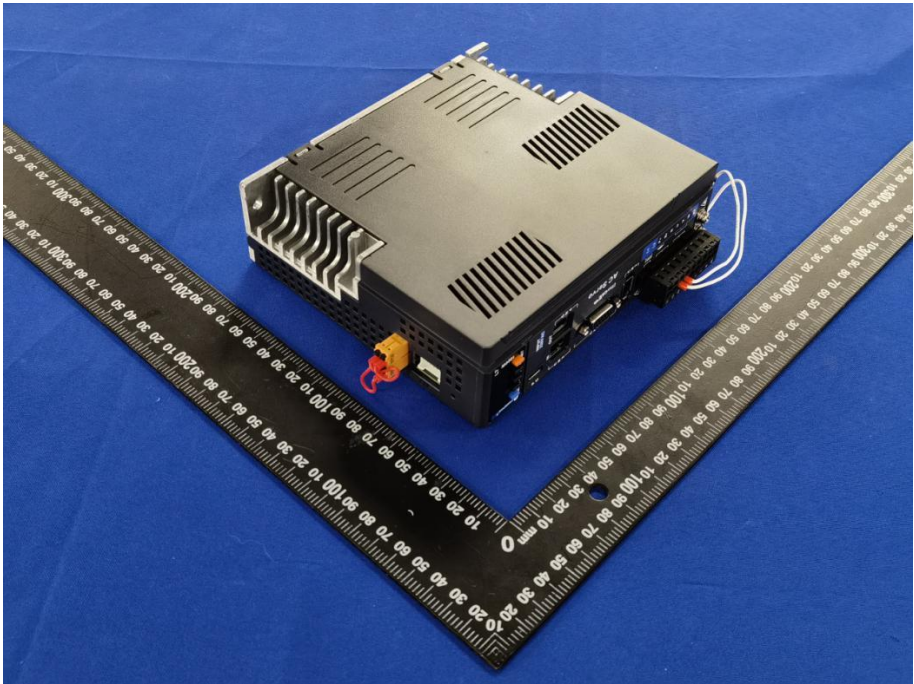
Table 1
Minimum immunity requirements for voltage unbalance and frequency variations on power ports of low voltage PDS

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

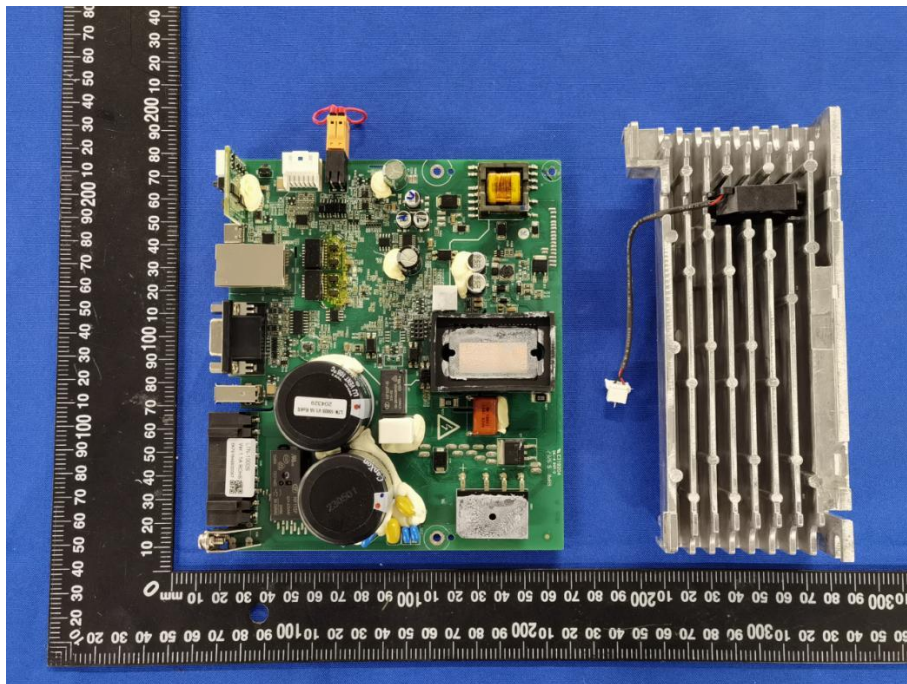
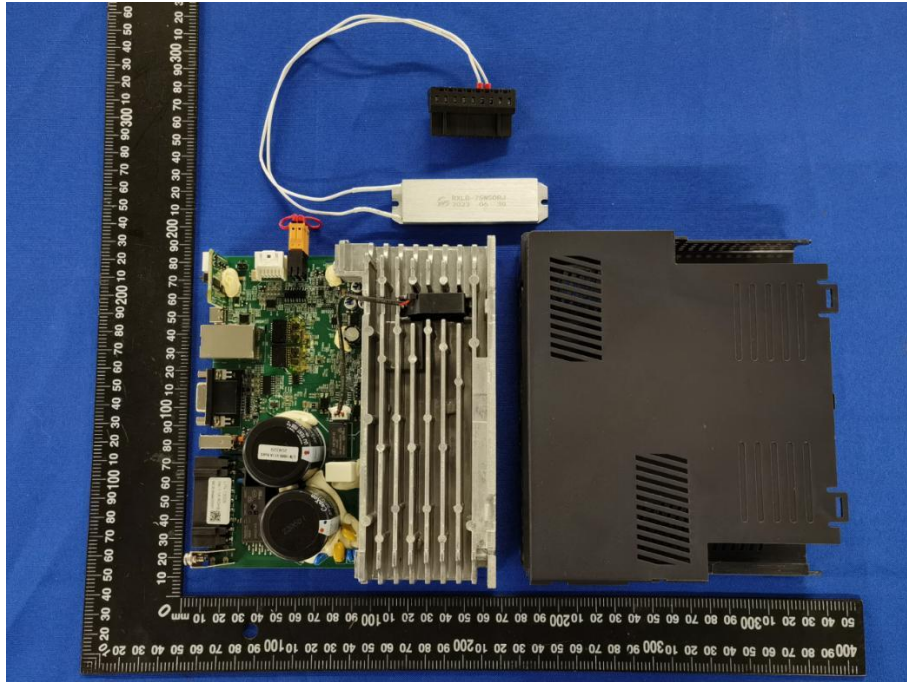
5. External and Internal Photos of the EUT

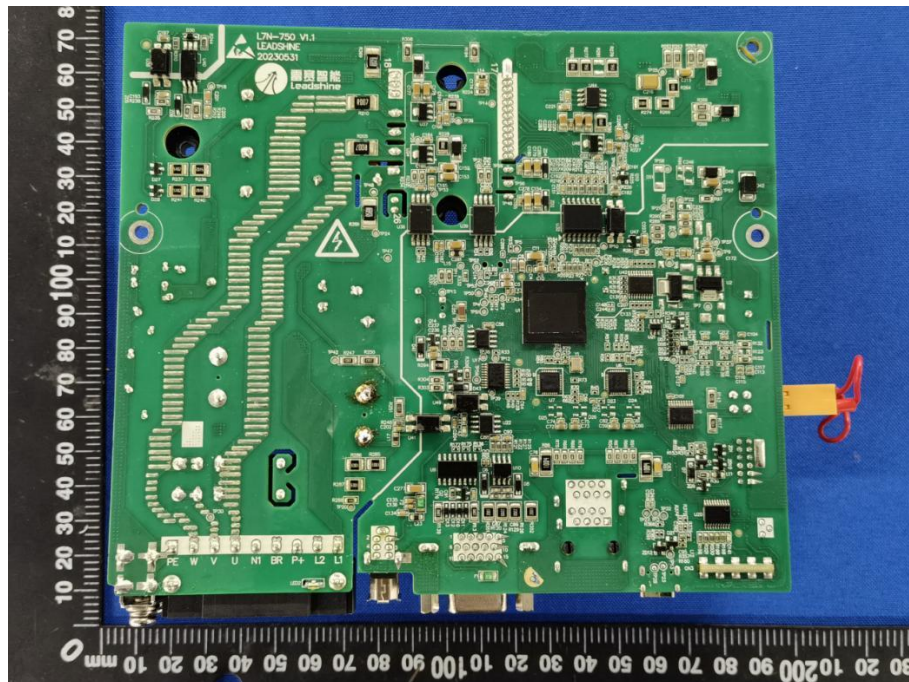
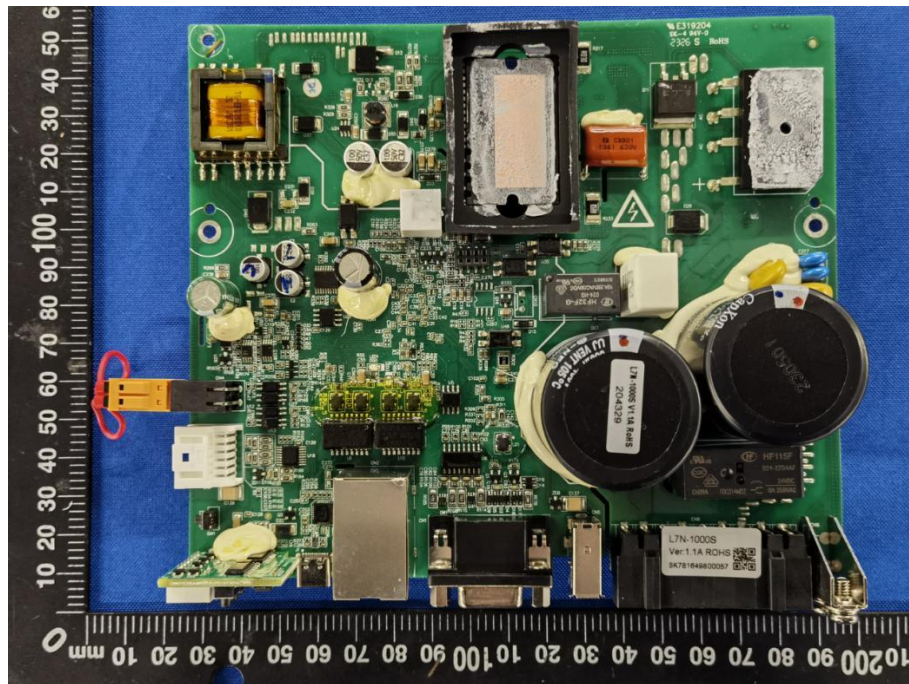
5.1. External Photos of the EUT





5.2. Internal photos of the EUT





.....**End of Report**.....