



EMC Test Report

Certificate No. : TBC-C-202212-0163-2-V1
Report No. : TBR-C-202212-0163-2-V1
Applicant : China Leadshine Technology Co., Ltd.
Equipment Under Test (EUT)
EUT Name : Stepper Drive
Model No. : DM556E
Serial Model No. : DMD5056E, DM556E-*,DM556E-**,DM556E-***, (* is number from "0" to "9" or "A" to "Z")
Brand Name :  **Leadshine**  雷曼智能
Receipt Date : 2022-12-30
Test Date : 2023-01-03 to 2023-01-05
Issue Date : 2025-09-29
Standards : EN IEC 61000-6-4:2019
EN IEC 61000-6-2:2019

Conclusions : **PASS**

In the configuration tested, the EUT complied with the standards specified above.
The EUT technically complies with the 2014/30/EU Directive requirements.

Test By :


 Ming Yu

Reviewed By :


Joy Yang

Approved By :


Ivan Su



This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

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Revision History

Report No.	Version	Description	Issued Date
TBR-C-202212-0163-2	Rev.01	Initial issue of report	2023-02-07
TBR-C-202212-0163-2-V1	Rev.02	Add the Model Number	2025-09-29



1. General Information

1.1. Client Information

Applicant	:	China Leadshine Technology Co., Ltd.
Address	:	15-20/F, Block B, Nanshan I Valley, No.3157, Shahe West Road, Nanshan District, Shenzhen, China
Manufacturer	:	China Leadshine Technology Co., Ltd.
Address	:	15-20/F, Block B, Nanshan I Valley, No.3157, Shahe West Road, Nanshan District, Shenzhen, China

1.2. General Description of EUT (Equipment Under Test)

EUT Name	:	Stepper Drive
Model(s)	:	DM556E, DMD5056E, DM556E-*,DM556E-**,DM556E-***, (* is number from "0" to "9" or "A" to "Z")
Model Difference	:	All of these models have the same PCB layout and circuit, they are just sold to different customers, so only DM556E is used for testing.
Fx	:	≤108 MHz
Power Supply	:	DC 18-50V



1.3. Description of Operating Mode

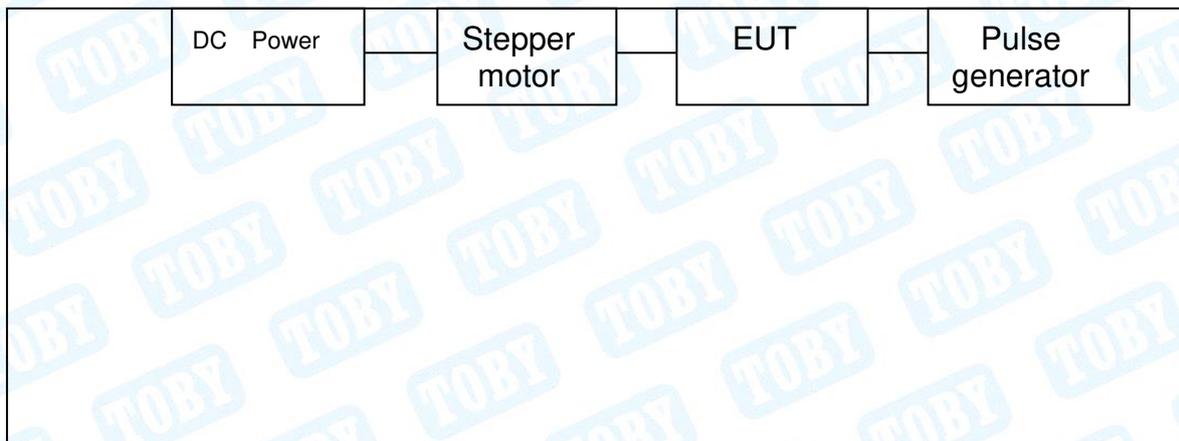
To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Working Mode

The EUT system operated these modes were found to be the worst case during the pre-scanning test as Following:

For EMI Test	
Final Test Mode	Description
Mode 1	Working Mode
For EMS Test	
Final Test Mode	Description
Mode 1	Working Mode

1.4. Block Diagram Showing The Configuration of System Tested



1.5. Description of Support Units

Equipment Information				
Name	Model	S/N	Manufacturer	Used “√”
Stepper motor	57CM23	----	----	√
Pulse generator	----	----	----	√
DC Power	----	----	----	√
Cable Information				
Number	Shielded Type	Ferrite Core	Length	Note
----	----	----	----	
----	----	----	----	

Note: Stepper motor and Stepper Drive Matching test, Above auxiliary prototype are provide by the Applicant.

1.6. Performance Criterion

Criterion A: The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended.

Criterion B: After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the equipment is used as intended.

Criterion C: Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer’s instructions.



1.7. Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

Test	Parameters	Expanded Uncertainty (U_{Lab})	Expanded Uncertainty (U_{Cispr})
Conducted Emission	Level Accuracy: 9kHz~150kHz 150kHz to 30MHz	± 3.50 dB ± 3.10 dB	± 4.0 dB ± 3.6 dB
Radiated Emission	Level Accuracy: 9kHz to 30 MHz	± 4.60 dB	N/A
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	± 4.50 dB	± 5.2 dB
Radiated Emission	Level Accuracy: Above 1000MHz	± 4.20 dB	N/A
Mains Harmonic	Voltage	$\pm 3.11\%$	N/A
Voltage Fluctuations & Flicker	Voltage	$\pm 3.25\%$	N/A

1.8. Test Facility

The testing report were performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at 1A/F., Building 6, Rundongsheng Industrial Zone, Longzhu, Xixiang, Bao'an District, Shenzhen, Guangdong, China. At the time of testing, the following bodies accredited the Laboratory:

CNAS (L5813)

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

A2LA Certificate No.: 4750.01

The laboratory has been accredited by American Association for Laboratory Accreditation(A2LA) to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories for the technical competence in the field of Electrical Testing. And the A2LA Certificate No.: 4750.01.FCC Accredited Test Site Number: 854351.

IC Registration No.: (11950A)

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A. CAB identifier: CN0056.



2. TEST Results Summary

EMISSION		
Description of test items	Standards	Results
Conducted disturbance at mains terminals	EN IEC 61000-6-4:2019	N/A
Radiated Disturbance	EN IEC 61000-6-4:2019	Pass
Harmonic current emissions	EN IEC 61000-3-2:2019+A1:2021	N/A
Voltage fluctuation and flicker	EN 61000-3-3:2013+A2:2021	N/A
IMMUNITY		
Description of test items	Standards	Results
Electrostatic Discharge (ESD)	EN 61000-4-2: 2009	Pass
Continuous RF Electromagnetic Field Disturbances	EN IEC 61000-4-3:2020	Pass
EFT/B Immunity	EN 61000-4-4: 2012	N/A
Surge Immunity	EN 61000-4-5:2014+A1:2017	N/A
Conducted RF Immunity	EN 61000-4-6: 2014	N/A
Power frequency magnetic field	EN 61000-4-8: 2010	N/A
Voltage dips, >95% reduction	EN IEC 61000-4-11:2020	N/A
Voltage dips, 30% reduction		
Voltage interruptions		
Note: N/A is an abbreviation for Not Applicable.		



3. Test Equipment Used

Radiation Emission Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due Date
Spectrum Analyzer	Rohde & Schwarz	FSV40-N	102197	Jun. 23, 2022	Jun. 22, 2023
EMI Test Receiver	Rohde & Schwarz	ESPI	100010/007	Jun. 23, 2022	Jun. 22, 2023
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Feb. 27, 2022	Feb.26, 2024
Horn Antenna	ETS-LINDGREN	3117	00143207	Feb. 26, 2022	Feb.25, 2024
Horn Antenna	SCHWARZBECK	BBHA 9170	1118	Feb. 26, 2022	Feb.25, 2024
Loop Antenna	SCHWARZBECK	FMZB 1519 B	1519B-059	Feb. 26, 2022	Feb.25, 2024
Pre-amplifier	SONOMA	310N	185903	Feb. 26, 2022	Feb.25, 2023
Pre-amplifier	HP	8449B	3008A00849	Feb. 26, 2022	Feb.25, 2023
HF Amplifier	Tonscend	TAP0184050	AP21C806129	Sep.01.2022	Aug. 31, 2023
Discharge Immunity Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due Date
ESD Tester	TESEQ	NSG437	304	Jun. 24, 2022	Jun. 23, 2023
Radiated Immunity Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due Date
Gestockte Log.-Per.-Breitband-antenna Stacked Log.-Per.-Broadband	SCHWARZBECK	STLP 9129	162	N/A	N/A
Electric field probe	Narda	EP 601	811ZX01000	Mar. 02, 2022	Mar. 01, 2023
Signal Generator	Agilent	N5181A	MY50141953	Sep.01.2022	Aug. 31, 2023
EPM Series Power Meter	KEYSIGT	N1914A	MY61180020	Jun. 22, 2022	Jun. 21, 2023
Power Sensor	KEYSIGT	E9301A	MY61130007	Jun. 22, 2022	Jun. 21, 2023
Power Sensor	KEYSIGT	E9301A	MY61130011	Jun. 22, 2022	Jun. 21, 2023
Radio Frequency Switch	Tonscend	JS0806s	21E8060428	N/A	N/A
Microwave Power amplifier	Micotop	MPA-80-1000-250	MPA2105144	Jun. 23, 2022	Jun. 22, 2023
Microwave Power amplifier	Micotop	MPA-1000-6000-100	MPA2105150	Jun. 23, 2022	Jun. 22, 2023



4. Radiated Emission Test

4.1. Test Standard and Limit

4.1.1. Test Standard

EN IEC 61000-6-4:2019

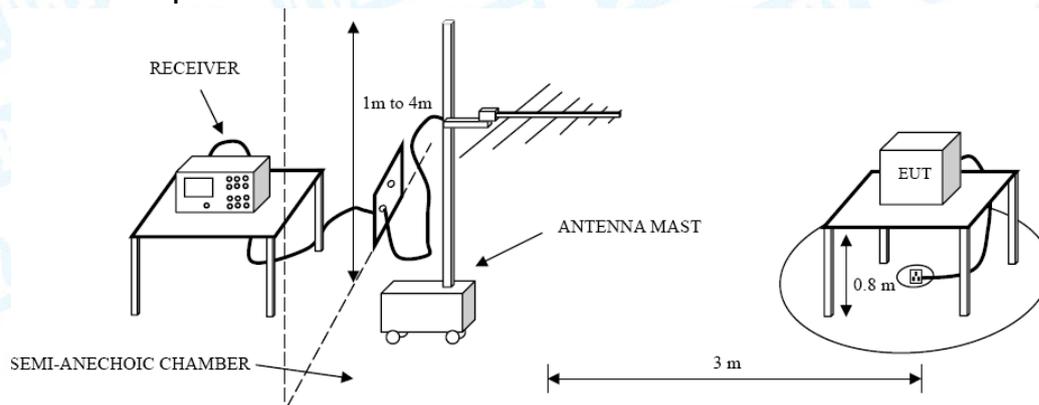
4.1.2. Test Limit

Radiated Disturbance Test Limit

Frequency	Limit (dB μ V/m)
	Quasi-peak Level
30MHz~230MHz	50
230MHz~1000MHz	57

Remark: 1. The lower limit shall apply at the transition frequency.
2. The test distance is 3m.

4.2. Test Setup



4.3. Test Procedure

The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m. The table was rotated 360 degrees to determine the position of the highest radiation.

The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

The initial step in collecting radiated emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range.

If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.



4.4. Deviation From Test Standard

No deviation

4.5. Test Data

Please refer to the Attachment A.



5. Electrostatic Discharge Immunity Test

5.1. Test Requirements

5.1.1. Test Standard

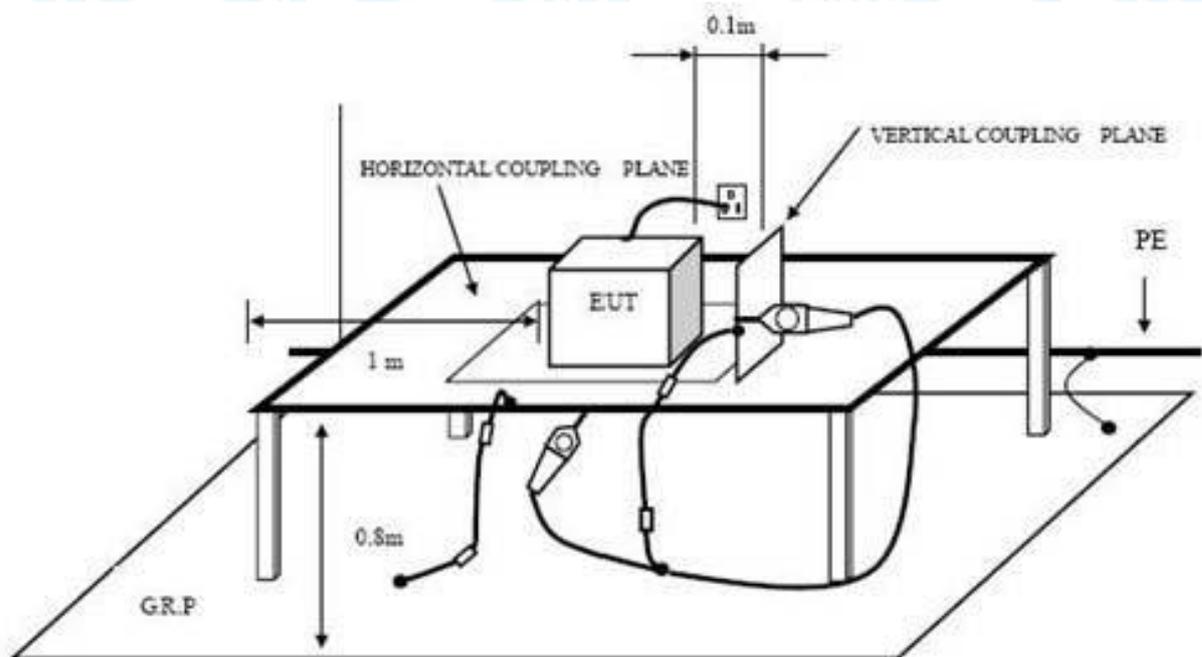
EN IEC 61000-6-2:2019 (EN 61000-4-2:2009)

5.1.2. Test Level

Discharge Impedance:	330 ohm/ 150pF
Discharge Voltage:	Air Discharge: 2kV/4kV/8kV(Direct) Contact Discharge: 2kV/4kV (Direct /Indirect)
Polarity:	Positive& Negative
Number of Discharge:	Air Discharge: min.20 times at each test point Contact Discharge: min.200 times in total
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum

5.1.3. Performance criterion: B

5.2. Test Setup



INDIRECT DISCHARGE SETUP



5.3. Test Procedure

5.3.1. Air Discharge:

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

5.3.2. Contact Discharge:

All the procedure shall be same as air discharge. Except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

5.3.3. Indirect discharge for horizontal coupling plane

At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit (if applicable) of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

5.3.4. Indirect discharge for vertical coupling plane

At least 10 single discharges (in the most sensitive polarity) shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

5.4. Deviation From Test Standard

No deviation

5.5. Test Data

Please refer to the Attachment B.



6. Radiated Electromagnetic Field Immunity Test

6.1. Test Requirements

6.1.1. Test Standard

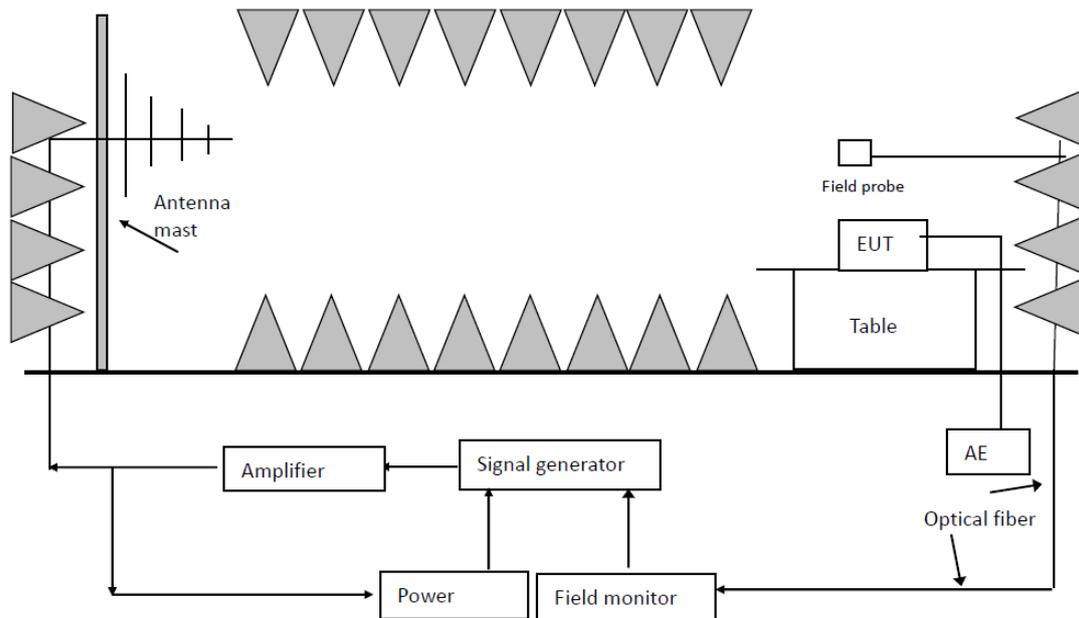
EN IEC 61000-6-2:2019 (EN IEC 61000-4-3:2020)

6.1.2. Test Level

Port	Test Specification
Enclosure Port	80-1000MHz 10 V/m 80 % AM (1kHz)
	1400-2000MHz 3 V/m 80 % AM (1kHz)
	2000-2700MHz 1 V/m 80 % AM (1kHz)

6.1.3. Performance criterion: A

6.2. Test Setup



6.3. Test Procedure

The EUT are placed on a table, which is 0.8 meter high above the ground. The EUT is set 3 meters away from the transmitting antenna, which is mounted on an antenna tower.



Both horizontal and vertical polarization of the antenna is set on test. Each of the four sides of the EUT must be faced this transmitting antenna and measured individually.

In order to judge the EUT performance, a camera is used to monitor its screen.

All the scanning conditions are as following:

Condition of Test	Remark		
Fielded strength	10V/m	3V/m	1V/m
Radiated signal	Modulated	Modulated	Modulated
Scanning frequency	80-1000MHz	1400-2000MHz	2000-2700MHz
Dwell time	3 Sec.	3 Sec.	3 Sec.

6.4. Deviation From Test Standard

No deviation

6.5. Test Data

Please refer to the Attachment C.



7. Photographs - Constructional Details

Photo 1 Appearance of EUT

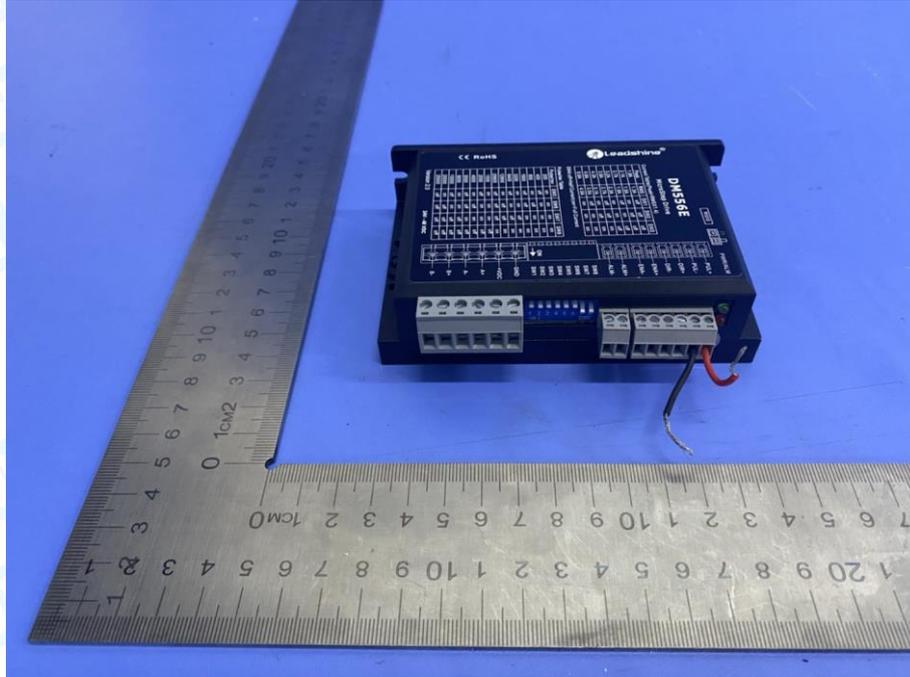


Photo 2 Appearance of EUT

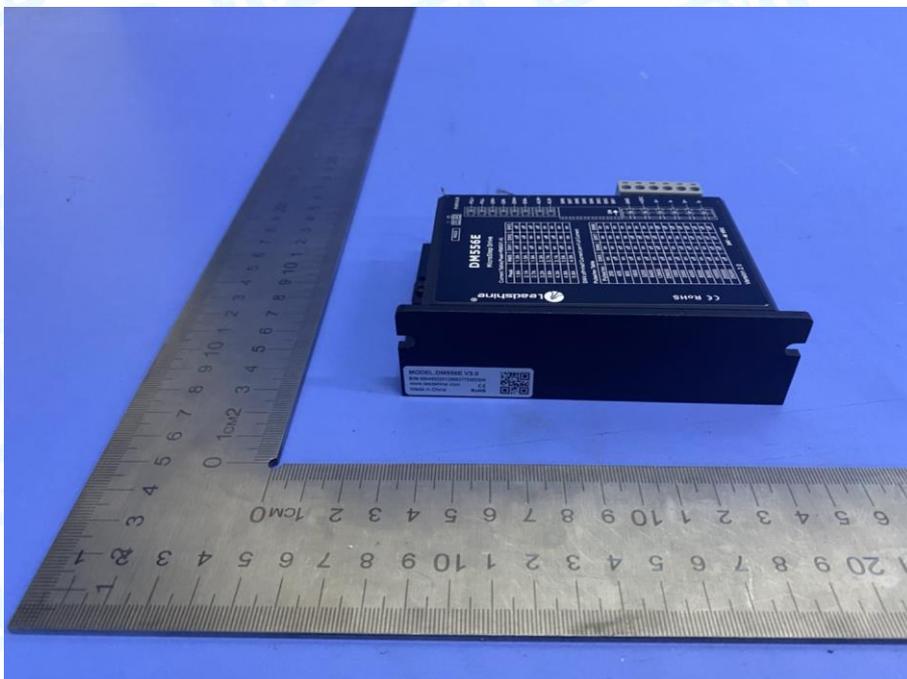


Photo 3 Appearance of EUT

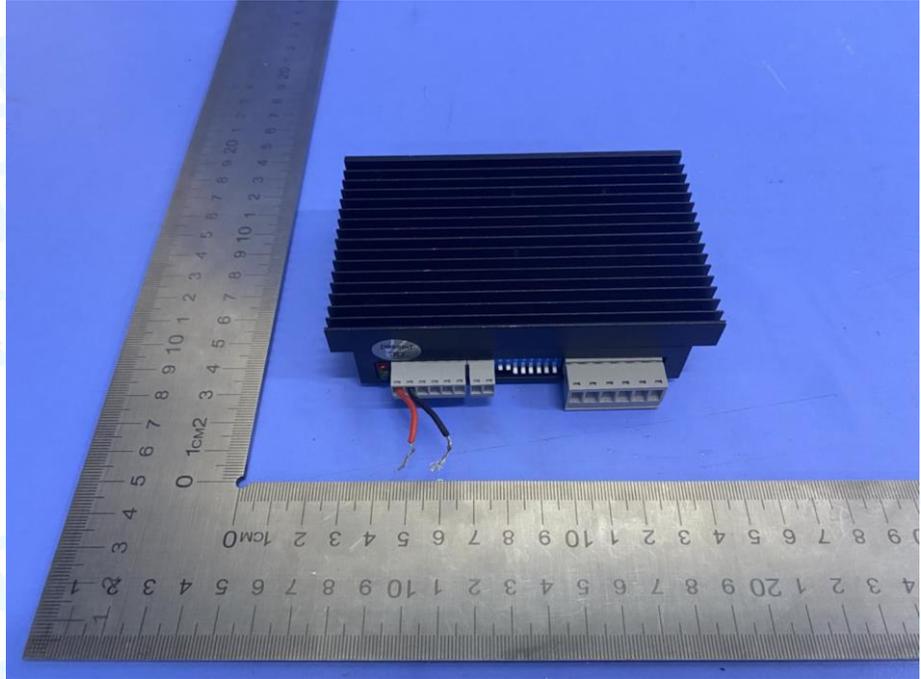


Photo 4 Internal of EUT

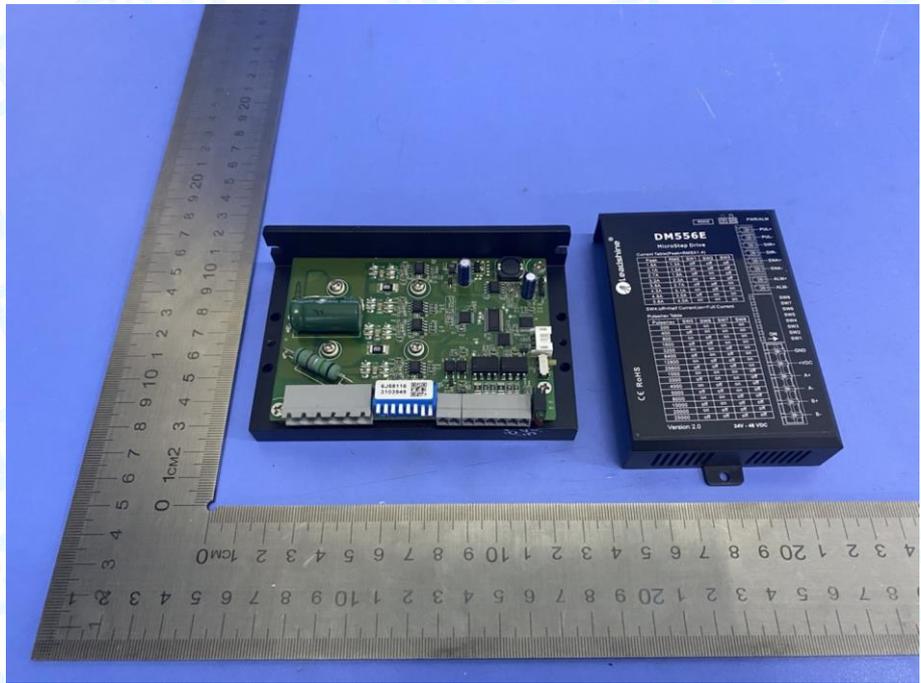


Photo 5 Appearance of PCB

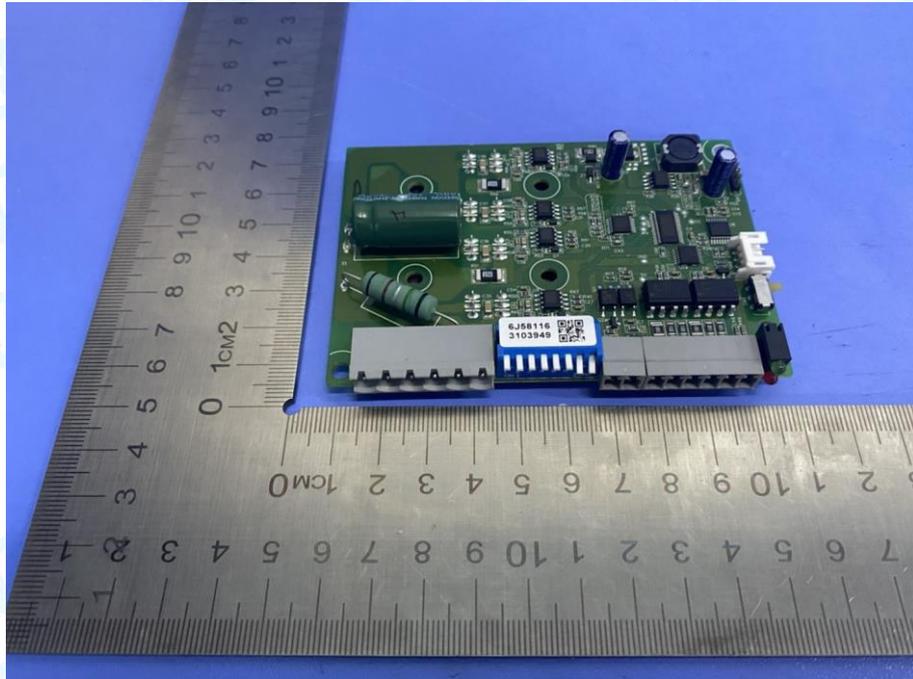
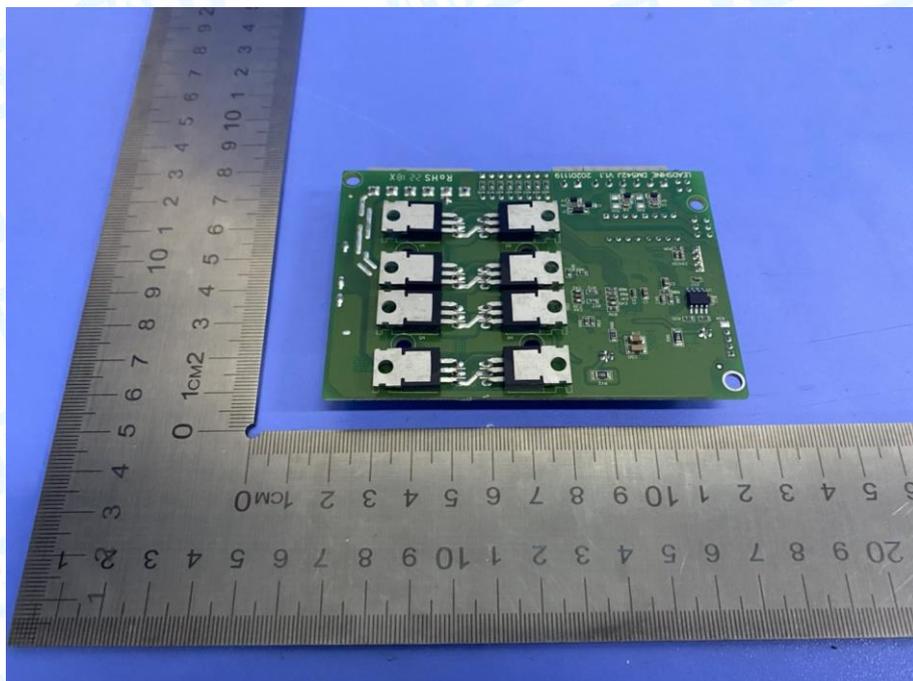


Photo 6 Appearance of PCB

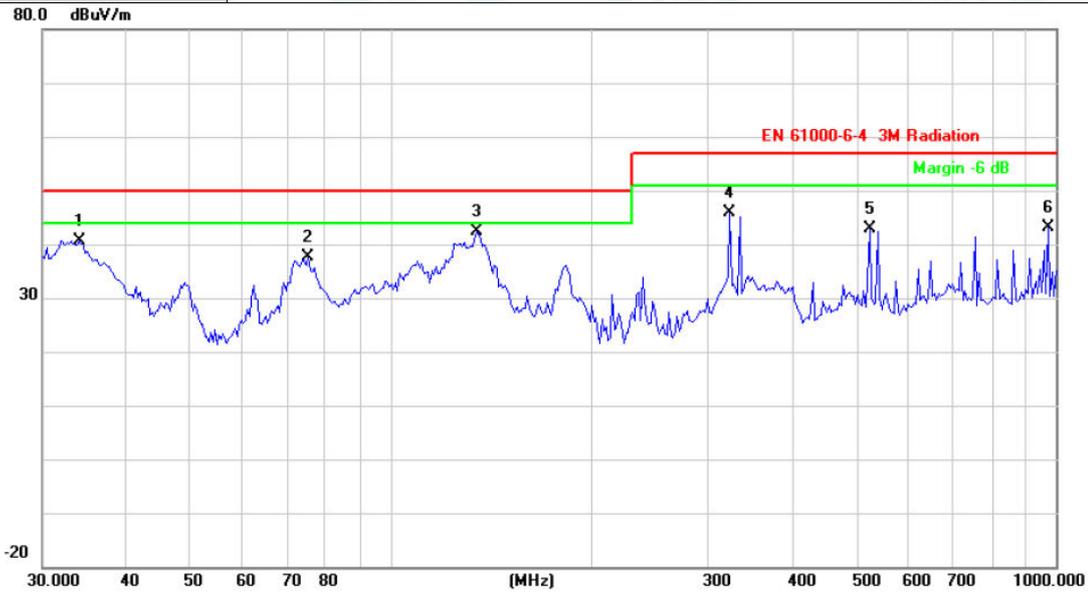


RF Field Strength Susceptibility Test Setup



Attachment A--Radiated Emission Test Data (Below 1G)

Temperature:	23.5°C	Relative Humidity:	46%
Pressure:	1010 hPa		
Test Voltage:	DC 48V		
Ant. Pol.	Horizontal		
Test Mode:	Mode 1		
Remark:	N/A		



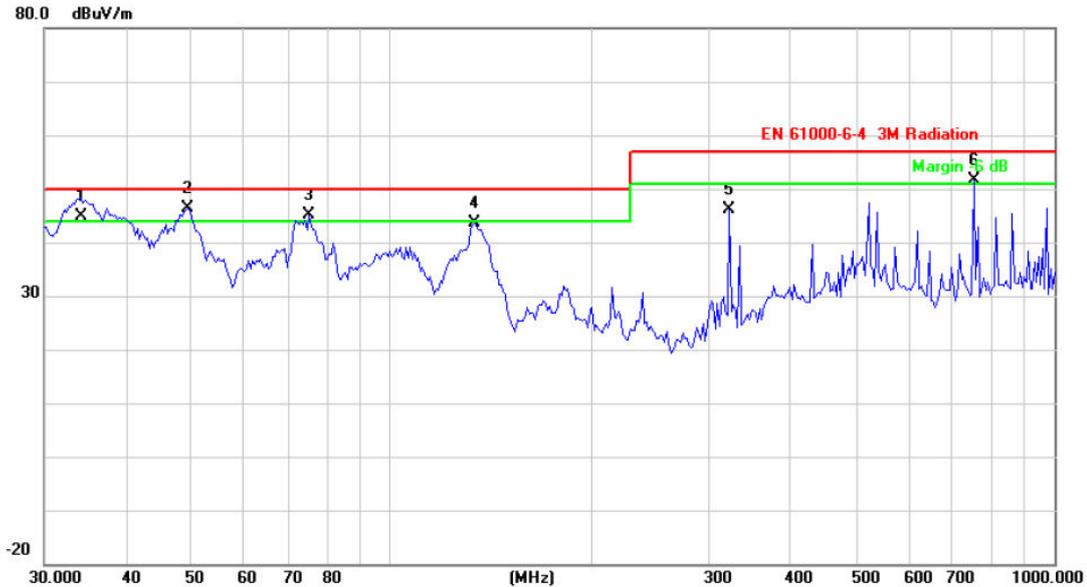
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		34.0365	52.39	-11.74	40.65	50.00	-9.35	peak
2		75.1822	53.88	-16.22	37.66	50.00	-12.34	peak
3	*	134.5592	57.03	-14.72	42.31	50.00	-7.69	peak
4		323.3204	53.94	-8.15	45.79	57.00	-11.21	peak
5		524.5541	46.14	-3.23	42.91	57.00	-14.09	peak
6		972.3374	39.50	3.56	43.06	57.00	-13.94	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)



Temperature:	23.5°C	Relative Humidity:	46%
Pressure:	1010 hPa		
Test Voltage:	DC 48V		
Ant. Pol.	Vertical		
Test Mode:	Mode 1		
Remark:	N/A		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measurement dBuV/m	Limit dBuV/m	Over dB	Detector
1	!	34.0365	56.74	-11.74	45.00	50.00	-5.00	QP
2	*	49.3594	63.08	-16.74	46.34	50.00	-3.66	peak
3	!	75.1822	61.28	-16.22	45.06	50.00	-4.94	peak
4		133.6188	58.31	-14.73	43.58	50.00	-6.42	peak
5		323.3204	54.34	-8.15	46.19	57.00	-10.81	peak
6	!	755.3872	50.96	0.57	51.53	57.00	-5.47	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. QuasiPeak (dBμV/m) = Corr. (dB/m) + Read Level (dBμV)
3. Margin (dB) = QuasiPeak (dBμV/m) - Limit QPK (dBμV/m)



Attachment B--Electrostatic Discharge Test Data

Temperature :	24.3°C	Humidity :	52%
Power supply :	DC 48V	Test Mode :	Mode 1
Pressure :	1008		
Required Performance Criteria: B			
Air Discharge: $\pm 2/\pm 4/\pm 8$ kV Contact Discharge: $\pm 2/\pm 4$ kV			
Location	Test Level (kV)	Judgment	Result
/	± 2 kV ± 4 kV ± 8 kV	/	PASS
C1	± 2 kV ± 4 kV	A	
/		/	
/		/	
HCP	± 4 kV	A	
VCP	± 4 kV	A	



Attachment C--RF Field Strength Susceptibility Test Data

Temperature : 23.7°C	Humidity : 50%						
Power supply : DC 48V	Test Mode : Mode 1						
Pressure : 1008							
Required Performance Criteria: A							
Position	Frequency Range 1		Frequency Range 2		Frequency Range 3		Result
	80~1000MHz		1400~2000MHz		2000~2700MHz		
	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	
Front	A	A	A	A	A	A	PASS
Right	A	A	A	A	A	A	
Rear	A	A	A	A	A	A	
Left	A	A	A	A	A	A	
Remark:							
1) Criteria A: There was no change operated with initial operating during the test. 2) Criteria B: The EUT function loss during the test, but self-recoverable after the test. 3) Criteria C: The system shut down during the test.							

-----END OF REPORT-----

