EMC TEST REPORT

EN IEC 61000-6-2:2019
EN IEC 61000-6-4:2019
MEASUREMENT AND TEST REPORT
For

SHENZHEN JUST MOTION CONTROL ELECTROMECHANICS CO.,LTD.
Building B, Jiayu Science Park, Jin'an Road, Matian Street, Guangming District, Shenzhen China.

Product Name:	JASM SERIES AC SERVO MOTOR
Model/Type No.:	See page 2
Prepared By:	Guangdong Lintek Certification Group Co., Ltd. Room 318, No.116-2, Guanlan Road, Fucheng Street, Longhua District, Shenzhen, Guangdong, China
Report Number:	LTR24052271E01
Tested Date:	May 22, 2024 to May 30, 2024
Issued Date:	May 30, 2024

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Approved(Manager): Kevin Chen

Guangdong Lintek Certification Group Co., Ltd.
Approved

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1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	SHENZHEN JUST MOTION CONTROL ELECTROMECHANICS CO.,LTD.
Address of applicant:	Building B, Jiayu Science Park, Jin'an Road, Matian Street, Guangming District, Shenzhen China.
Manufacturer:	SHENZHEN JUST MOTION CONTROL ELECTROMECHANICS CO.,LTD.
Address of manufacturer:	Building B, Jiayu Science Park, Jin'an Road, Matian Street, Guangming District, Shenzhen China.
Factory:	SHENZHEN JUST MOTION CONTROL ELECTROMECHANICS CO.,LTD.
Address of factory:	Building B, Jiayu Science Park, Jin'an Road, Matian Street, Guangming District, Shenzhen China.

General Description of E.U.T

EUT Name:	JASM SERIES AC SERVO MOTOR
Trademark:	杰美康机电 JUST MOTION CONTROL
Model No.:	See page 2
Model Difference:	All models have same essentially identical design except for their dimension, shape, power and color
Test Model No.:	130JASM530220K-17BCW
Power Rating:	Input: 230Vac 50/60Hz

Remark:

1.2 Test Standards

The following Declaration of Conformity report of EUT is prepared in accordance with

EN IEC 61000-6-2:2019;
EN IEC 61000-6-4:2019;
EN IEC 61000-3-2:2019+A1:2021;
EN 61000-3-3:2013+A2:2021+AC:2022-01

The objective of the manufacturer is to demonstrate compliance with the described standards above.

1.3 Test Summary

For the EUT described above. The standards used were EN IEC 61000-6-4 Class B for Emissions & EN IEC 61000-6-2 for Immunity.

Table 1 : Tests Carried Out Under EN IEC 61000-6-4

Standard	Test Items	Status
EN IEC 61000-6-4	Disturbance Voltage at The Mains Terminals (150KHz To 30MHz)	√
	Radiated Disturbances (30MHz To 1000MHz)	√

√ Indicates that the test is applicable

× Indicates that the test is not applicable

Table 2 : Tests Carried Out Under EN IEC 61000-3-2; EN 61000-3-3

Standard	Test Items	Status
EN IEC 61000-3-2	Harmonic Current Test	√
EN 61000-3-3	Voltage Fluctuations and Flicker Test	√

√ Indicates that the test is applicable

× Indicates that the test is not applicable

Table 3 : Tests Carried Out Under EN IEC 61000-6-2

Standard	Test Items	Status
EN 61000-4-2	Electrostatic discharge Immunity	√
EN IEC 61000-4-3	Radiated Susceptibility (80MHz to 1GHz)	√
EN 61000-4-4	Electrical Fast Transient/Burst Immunity	√
EN 61000-4-5	Surge Immunity	√
EN 61000-4-6	Conducted Susceptibility (150kHz to 80MHz)	√
EN 61000-4-8	Power Frequency Magnetic Field Immunity (50/60Hz)	√
EN IEC 61000-4-11	Voltage Dips, Short Interruptions Immunity	√

√ Indicates that the test is applicable

× Indicates that the test is not applicable

1.4 Test Methodology

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

2 - SYSTEM TEST CONFIGURATION

2.1 Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

2.2 EUT Exercise Software

The EUT exercising program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The software offered by manufacture, can let the EUT being normal operation.

2.3 Special Accessories

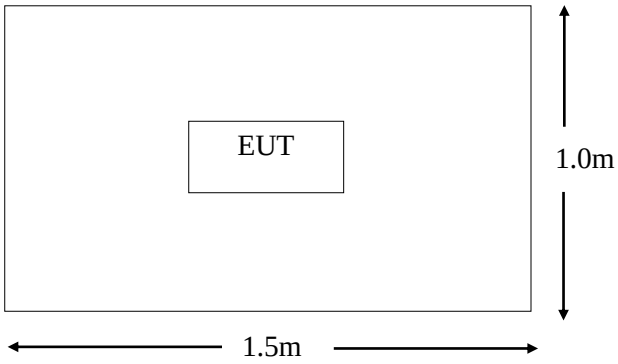
As shown in section 2.5, interface cable used for compliance testing is shielded as normally supplied by Guangzhou Monster Sports Co., Ltd. and its respective support equipment manufacturers.

2.4 Equipment Modifications

The EUT tested was not modified by YouBest.

EUT

2.5 Test Setup Diagram



2.6 General Description of Test Auxiliary

EUT Description:	Manufacturer	Model No.	Certificate
Laptop	DELL	INSPIRON 3420	CE

3 - DISTURBANCE VOLTAGE AT THE MAINS TERMINALS

3.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

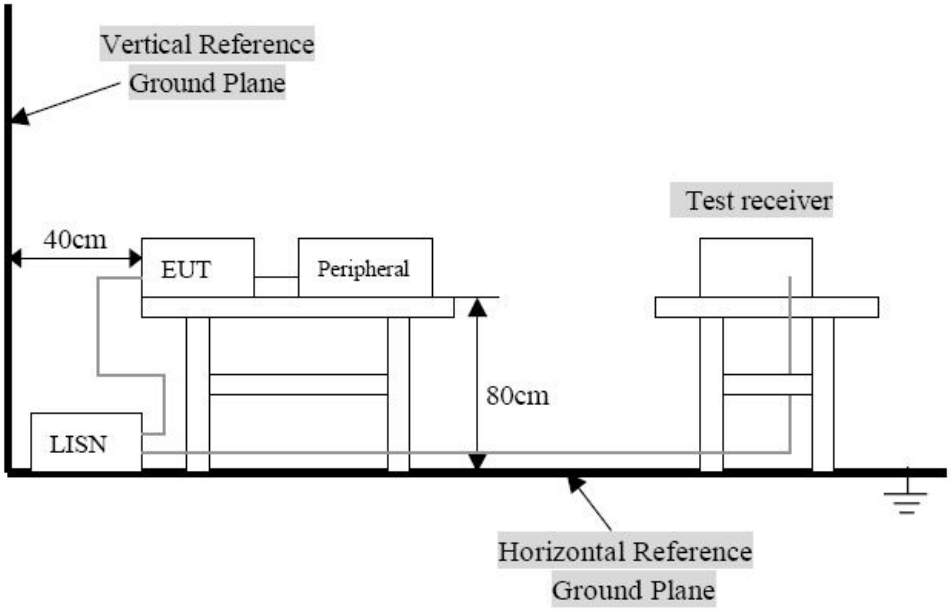
The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is 3.4 dB.

3.2 Limit of Disturbance Voltage At The Mains Terminals (Class B)

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

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

3.3 EUT Setup



3.4 Instrument Setup

The test receiver was set with the following configurations:

Test Receiver Setting:

Frequency Range……150 KHz to 30 MHz
Detector……..Peak & Quasi-Peak & Average
Sweep Speed……Auto
IF Band Width……..9 KHz

3.5 Test Procedure

During the conducted emission test, the EUT power cord was connected to the auxiliary outlet of the first Artificial Mains.

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance YBg all installation combination.

All data was recorded in the peak detection mode. Quasi-peak and Average readings were only performed when an emission was found to be marginal (within -10 dB μV of specification limits). Quasi-peak readings are distinguished with a "**QP**". Average readings are distinguished with a "**AV**".

3.6 Summary of Test Results

According to the data in section 3.6, the EUT complied with the EN IEC 61000-6-3 Conducted margin, with the *worst* margin reading of:

3.7 Disturbance Voltage Test Data

Temperature (℃)	22~25
Humidity (%RH)	50~60
Barometric Pressure (mbar)	950~1000
EUT	JASM SERIES AC SERVO MOTOR
M/N	130JASM530220K-17BCW
Operating Mode	Normal Operation

Test data see following pages

3.8 Test Equipment List and Details

No.	Instrument no.	Equipment	Manufacturer	Model No.	S/N	Last Calculator	Due Calculator
1	YB-EMC001	EMI Test Receiver	R&S	ESCI	100687	2024-05-06	2025-05-05
2	YB-EMC020	Teo Line Single Phase Module	SCHWARZBECK	NSLK8128	8128247	2024-05-06	2025-05-05
3	YB-EMC032	10dB attenuator	ELECTRO-METRICS	EM-7600	836	2024-05-06	2025-05-05

3.9 Test Result

PASS

4 - RADIATED DISTURBANCES

4.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is 4.0 dB.

4.2 Limit of Radiated Disturbances (Class B)

Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dB μ V/m)
30 ~ 230	3	40
230 ~ 1000	3	47

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.

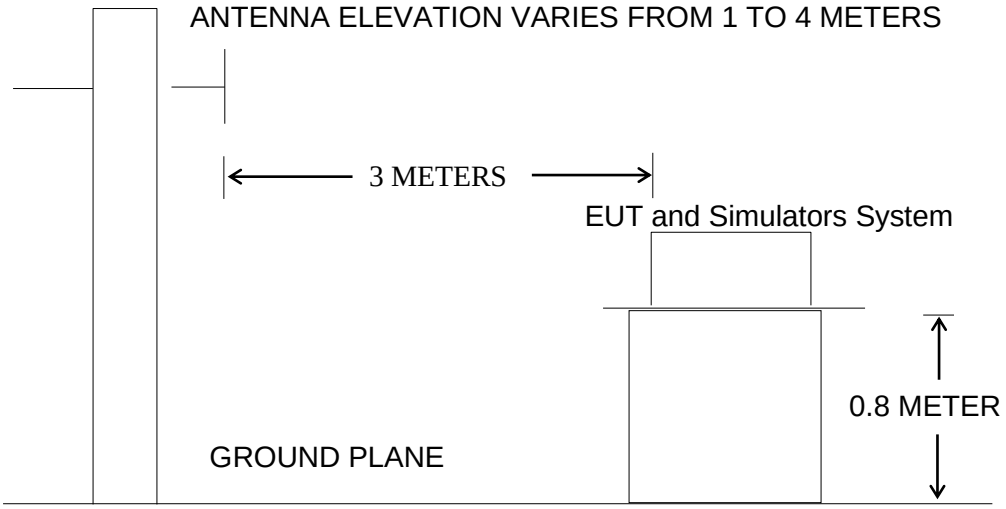
4.3 EUT Setup

The radiated emission tests were performed in the open area 3-meter test site, YBg the setup accordance with the CISPR 16-1-1:2006, CISPR16-2-3:2010. The specification used was EN IEC 61000-6-4 Class B limits.

The EUT was placed on the center of the test table.

Maximum emission emitted from EUT was determined by manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation and the levels in the final result of the test were recorded with the EUT running in the operating mode that maximum emission was emitted.

Block diagram of test setup (In chamber)



4.4 Test Receiver Setup

According to EN IEC 61000-6-3 rules, the frequency was investigated from 30 to 1000 MHz. During the radiated emission test, the test receiver was set with the following configurations:

Test Receiver Setting:

Detector……..Peak & Quasi-Peak
IF Band Width……..120KHz
Frequency Range……30MHz to 1000MHz
Turntable Rotated……0 to 360 degrees

Antenna Position:

Height……1m to 4m
Polarity……....Horizontal and Vertical

4.5 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.
All data was recorded in the peak detection mode. Quasi-peak readings performed only when an emission was found to be marginal (within -10 dBμV of specification limits), and are distinguished with a "**QP**" in the data table.

4.6 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dBμV means the emission is 7dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Limit – Corr. Ampl.

4.7 Radiated Emissions Test Result

Temperature (℃)	22~25
Humidity (%RH)	50~55
Barometric Pressure (mbar)	950~1000
EUT	JASM SERIES AC SERVO MOTOR
M/N	130JASM530220K-17BCW
Operating Mode	Normal Operation

4.8 Test Equipment List and Details

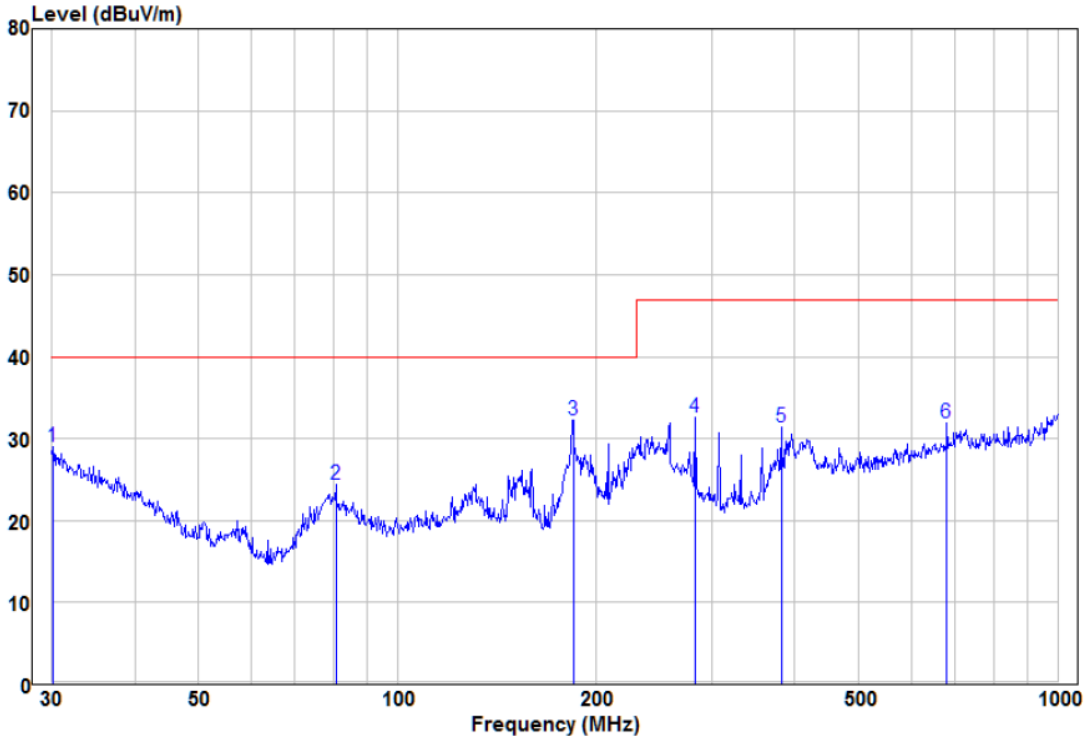
No.	Instrument no.	Equipment	Manufacturer	Model No.	S/N	Last Calculator	Due Calculator
1	YB-EMC001	EMI Test Receiver	R&S	ESCI	100687	2024-05-06	2025-05-05
3	YB-EMC018	TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9163	9163-324	2024-05-06	2025-05-05

4.9 Test Result

PASS

Radiated Emission Test Data

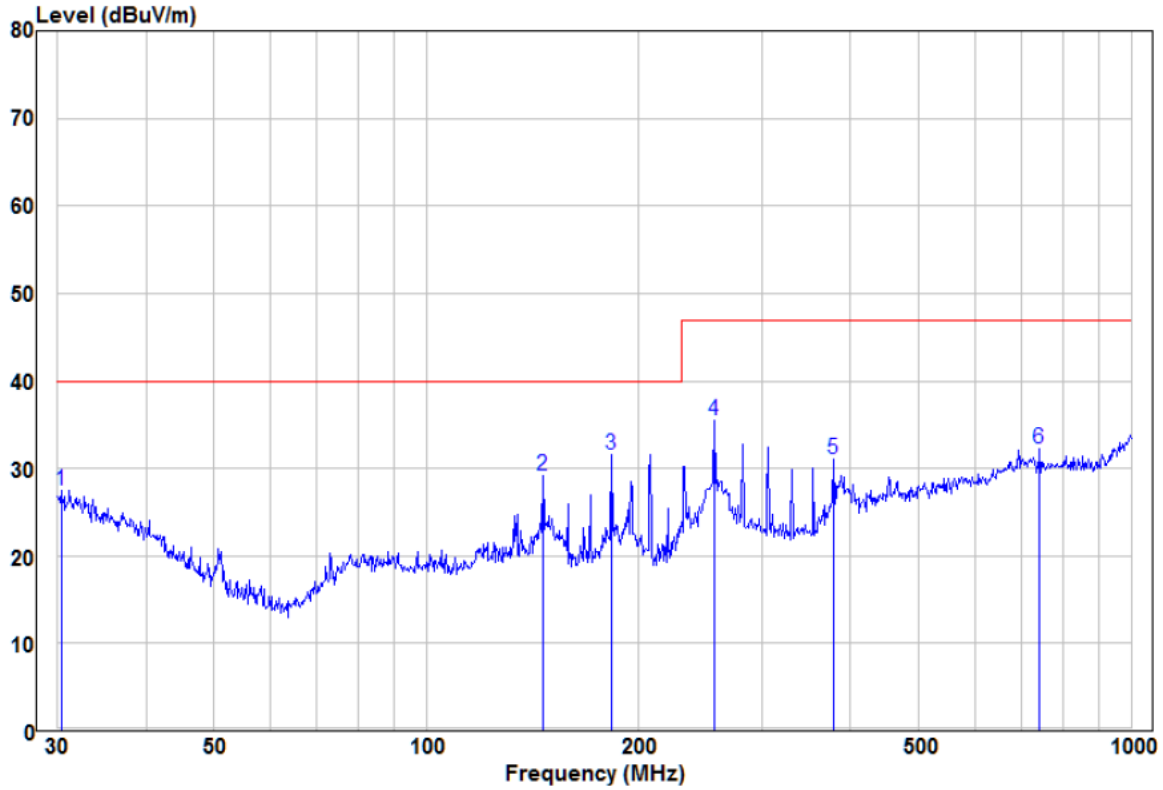
EUT:	JASM SERIES AC SERVO MOTOR
M/N:	130JASM530220K-17BCW
Operating Condition:	Normal Operation
Test Site:	3m CHAMBER
Operator:	Sunny Yuan
Comment:	Polarization: Horizontal



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	30.11	10.58	18.37	28.95	40.00	-11.05	Peak	HORIZONTAL
2	80.64	14.62	9.80	24.42	40.00	-15.58	Peak	HORIZONTAL
3 pp	184.49	24.10	8.17	32.27	40.00	-7.73	Peak	HORIZONTAL
4	281.99	21.42	11.13	32.55	47.00	-14.45	Peak	HORIZONTAL
5	381.25	17.61	13.70	31.31	47.00	-15.69	Peak	HORIZONTAL
6	679.96	12.10	19.73	31.83	47.00	-15.17	Peak	HORIZONTAL

Radiated Emission Test Data

EUT:	JASM SERIES AC SERVO MOTOR
M/N:	130JASM530220K-17BCW
Operating Condition:	Normal Operation
Test Site:	3m CHAMBER
Operator:	Sunny Yuan
Comment:	Polarization: Vertical



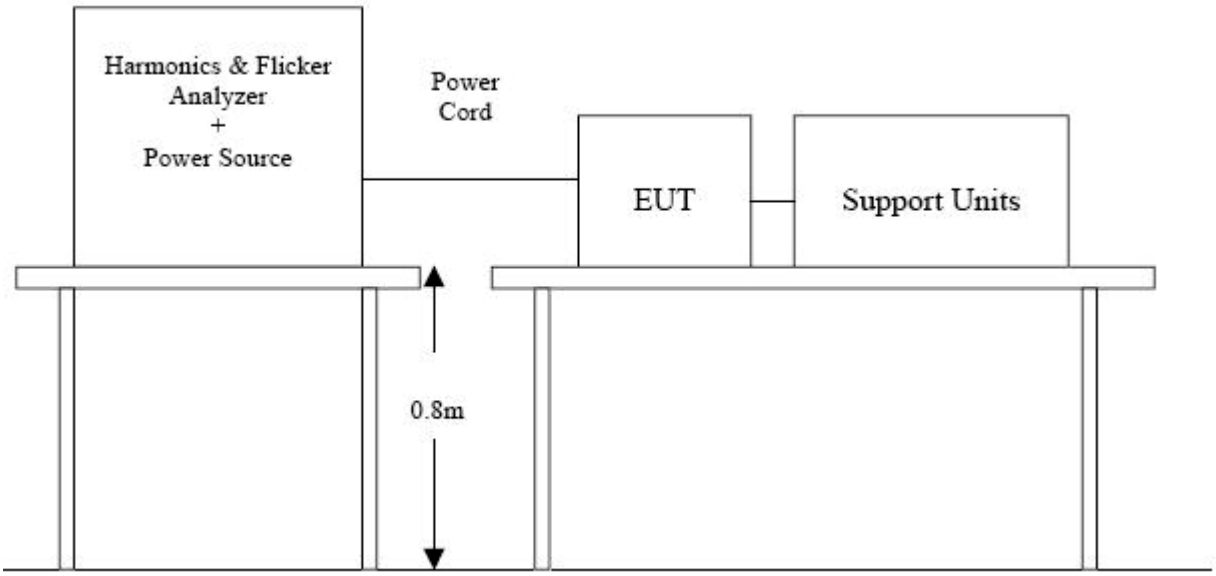
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	30.32	9.16	18.30	27.46	40.00	-12.54	Peak	VERTICAL
2	146.37	20.83	8.31	29.14	40.00	-10.86	Peak	VERTICAL
3 pp	183.20	23.41	8.22	31.63	40.00	-8.37	Peak	VERTICAL
4	256.52	25.16	10.29	35.45	47.00	-11.55	Peak	VERTICAL
5	378.58	17.42	13.64	31.06	47.00	-15.94	Peak	VERTICAL
6	742.26	11.91	20.37	32.28	47.00	-14.72	Peak	VERTICAL

5– HARMONIC CURRENT TEST

5.1 Application of Harmonic Current Emission

Compliance to these standards ensures that tested equipment will not generate harmonic currents at levels that cause unacceptable degradation of the main environment. This directly contributes to meeting compatibility levels established in other EMC standards, which defines compatibility levels for low-frequency conducted disturbances in low-voltage supply systems.

5.2 Block Diagram of Test Setup:



5.3 Test Procedure:

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

5.4 Test Equipment List and Details

No.	Instrument no.	Equipment	Manufacturer	Model No.	S/N	Last Calculator	Due Calculator
1	YB-EMC035	HRMONICS&FLICKR E ANALYSER	VOLTECH	PM6000	200006700433	2024-05-06	2025-05-05

5.5 Test Result

Basic Standard:	EN IEC 61000-3-2 Quasi-stationary
Observation time	150s
Windows width:	10 periods - (EN 61000-4-7)
Temperature:	22~23 (℃)
Humidity:	50~54 (%RH)
Barometric Pressure:	950~1000 (mbar)
Operating Mode:	Normal Operation
Test Result:	Pass
Note:	/

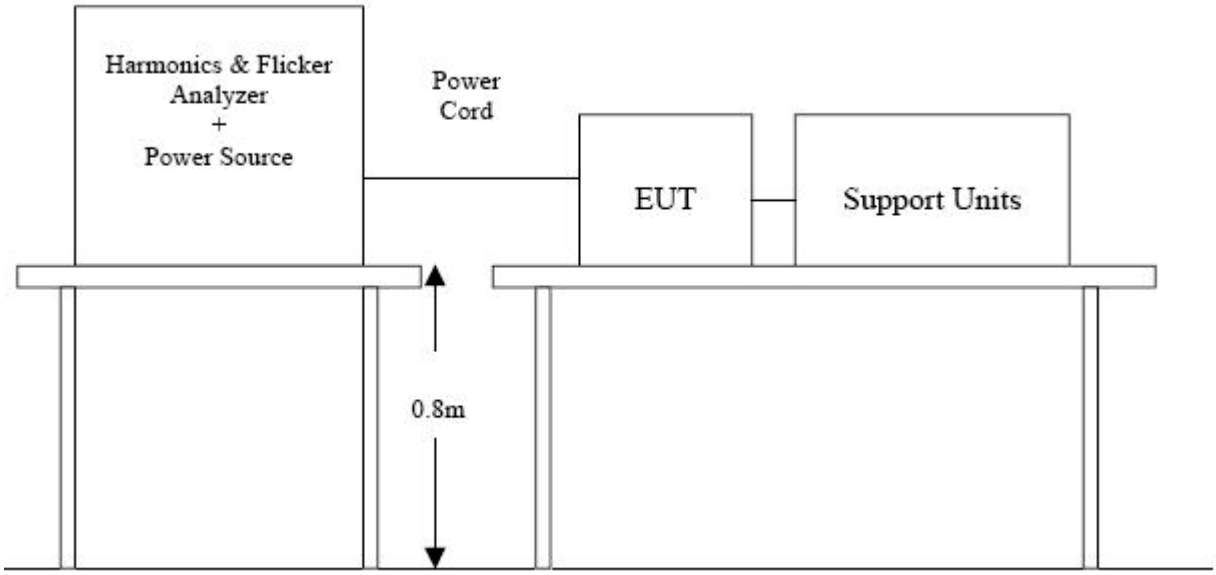
6 – VOLTAGE FLUCTUATIONS AND FLICKER TEST

6.1 Application and Limit of Voltage Fluctuations and Flicker Test

Compliance to these standards ensures that tested equipment will not generate flickers and voltage change at levels that cause unacceptable degradation of the main environment. This directly contributes to meeting compatibility levels established in other EMC standards, which defines compatibility levels for low-frequency conducted disturbances in low-voltage supply systems.

Test Item	Limit	Remark
Pst	1.0	Pst means short-term flicker indicator.
Plt	0.65	Plt means long-term flicker indicator.
Tdt (ms)	500	Tdt means maximum time that dt exceeds 3 %.
dmax (%)	4%	dmax means maximum relative voltage change.
dc (%)	3.3%	dc means relative steady-state voltage change

6.2 Block Diagram of Test Setup:



6.3 Test Procedure:

1. The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.
2. During the flick measurement, the measure time shall include that part of whole operation cycle in which the EUT produce the most unfavorable sequence of voltage changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

6.4 Test Equipment List and Details

No.	Instrument no.	Equipment	Manufacturer	Model No.	S/N	Last Calculator	Due Calculator
1	YB-EMC035	HRMONICS&FLICKRE ANALYSER	VOLTECH	PM6000	200006700433	2024-05-06	2025-05-05

6.5 Test Result

Basic Standard:	EN 61000-3-3
Short time (Pst)	10 min
Observation time	10 min (1 Flicker measurement)
Temperature:	22~23 (℃)
Humidity:	50~54 (%RH)
Barometric Pressure:	950~1000 (mbar)
Operating Mode:	Normal Operation
Test Result:	Pass

Maximum Flicker results			
Test Item	**EUT values**	**Limit**	**Result**
Pst	0.086	1.000	PASS
dc [%]	0.012	3.300	PASS
dmax [%]	0.157	4.000	PASS
dt [ms]	0	500	PASS

7- IMMUNITY TEST DESCRIPTION

7.1 General Description

Product Standard	EN IEC 61000-6-1	
Basic Standard, Specification, and Performance Criterion required	EN 61000-4-2	Electrostatic Discharge – ESD: 8kV air discharge, 4kV Contact discharge, Performance Criterion B
	EN 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test – RS: 80 ~ 1000 MHz, 3V/m, 80% AM (1kHz), Performance Criterion A
	EN 61000-4-4	Electrical Fast Transient/Burst - EFT, Power line: 1kV, Signal line: 0.5kV, Performance Criterion B
	EN 61000-4-5	Surge Immunity Test: 1.2/50 us Open Circuit Voltage, 8 /20 us Short Circuit Current, Power Line: line to line 1 kV, line to ground 2 kV Signal line: line to ground: outdoor: 1kV indoor: 0.5kV Performance Criterion B
	EN 61000-4-6	Conducted Radio Frequency Disturbances Test – CS: 0.15 ~ 80 MHz, 3Vrms, 80% AM, 1kHz, Performance Criterion A
	EN 61000-4-11	Voltage Dips: 1) 0% residual for 0.5 cycle, Performance Criterion B 2) 70% residual for 25 cycles, Performance Criterion C Voltage Interruptions: 0% residual for 250 cycles, Performance Criterion B is required for EUT with battery back-up Performance Criterion C is required for EUT without battery back-up

7.2 The phenomena allowed during and after test in each criterion are clearly stated in the following table

Performance criteria		
Criteria	**During test**	**After test**
A	Shall operate as intended. May show degradation of performance (see note1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 2). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.
B	May show loss of function (one or more). May show degradation of performance (see note 1). No unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 2). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 2).

NOTE 1:
Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 2:
No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect form the apparatus if used as intended.

7.3 Deviations from the standard

No deviations from EN IEC 61000-6-1 were made when performing the tests described in this report.

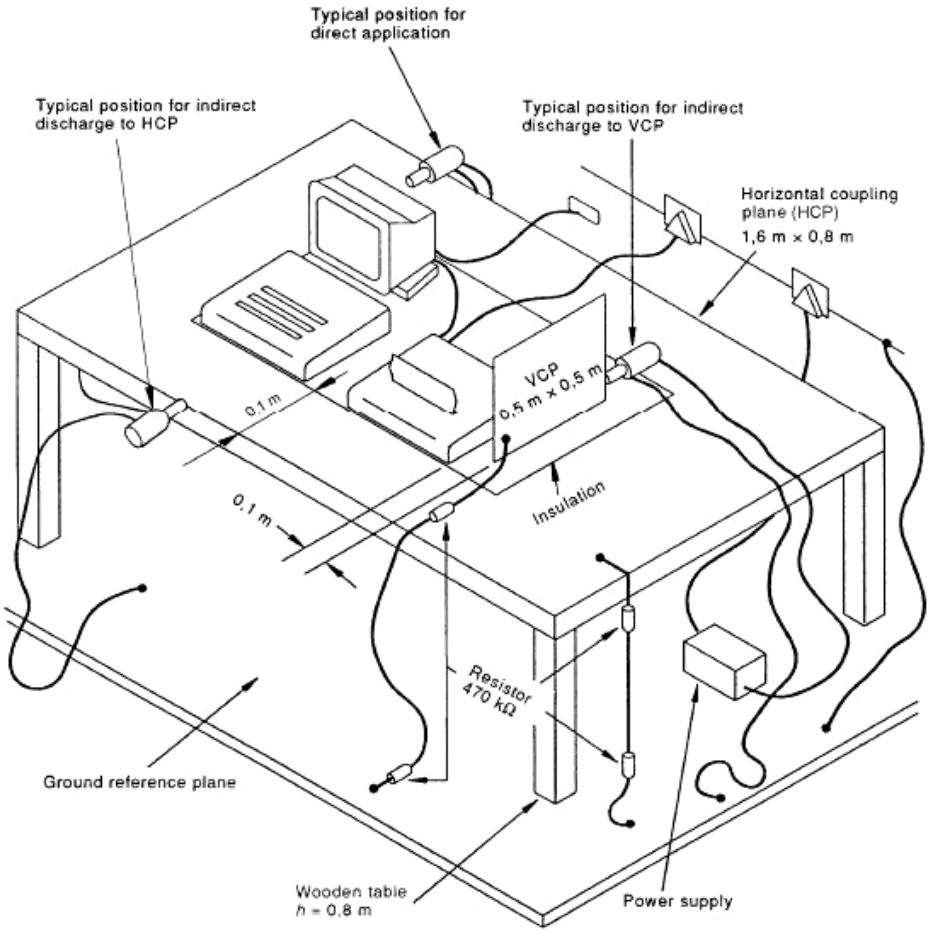
8- IMMUNITY TEST RESULTS

8.1 Electrostatic Discharge Immunity Test

8.1.1 Test Specification

Basic Standard:	EN 61000-4-2
Test Level:	± 2, 4, 8 kV (Air Discharge) ± 2, 4 kV (Contact Discharge) ± 2, 4 kV (Indirect Contact HCP) ± 2, 4 kV (Indirect Contact VCP)
Temperature:	22~23 (℃)
Humidity:	50~54 (%RH)
Barometric Pressure:	950~1000 (mbar)
Operating Mode:	Normal Operation

8.1.2 Test Setup



8.1.3 Test Procedure

1. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
2. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
3. The time interval between two successive single discharges was at least 1 second.
4. The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the EUT.
5. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
6. Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without caYBg mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.
7. At least ten single discharges (in the most sensitive polarity) were applied to the Horizontal Coupling Plane at points on each side of the EUT. The ESD generator was positioned horizontally at a distance of 0.1 meters from the EUT with the discharge electrode touching the HCP.
8. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane in sufficiently different positions that the four faces of the EUT were completely illuminated. The VCP (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the EUT.

8.1.4 Test Equipment List and Details

No.	Instrument no.	Equipment	Manufacturer	Model No.	S/N	Last Calculator	Due Calculator
1	YB-EMC008	Electrostatic Discharge Simulator	TESEQ	NSG437	125	2024-05-06	2025-05-05

8.1.5 Performance Criterion Required & Test Result

Table 1: Electrostatic Discharge Immunity (Air Discharge)

Test Level			Test Points	Observation Performance	Criterion Required
±2 kV	±4kV	±8kV			
☒	☒	☒	Gap	A	B
☒	☒	☒	Other	A	B

Table 2: Electrostatic Discharge Immunity (Direct Contact)

Test Level			Test Points	Observation Performance	Criterion Required
±2 kV	±4kV	±8kV			
☒	☒	☐	Shell	A	B
☒	☒	☐	Screw	A	B
☒	☒	☐	Other	A	B

Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP)

Test Level			Test Points	Observation Performance	Criterion Required
±2 kV	±4kV	±8kV			
☒	☒	☐	Front Side	A	B
☒	☒	☐	Back Side	A	B
☒	☒	☐	Left Side	A	B
☒	☒	☐	Right Side	A	B

Table 4: Electrostatic Discharge Immunity (Indirect Contact VCP)

Test Level			Test Points	Observation Performance	Criterion Required
±2 kV	±4kV	±8kV			
☒	☒	☐	Front Side	A	B
☒	☒	☐	Back Side	A	B
☒	☒	☐	Left Side	A	B
☒	☒	☐	Right Side	A	B

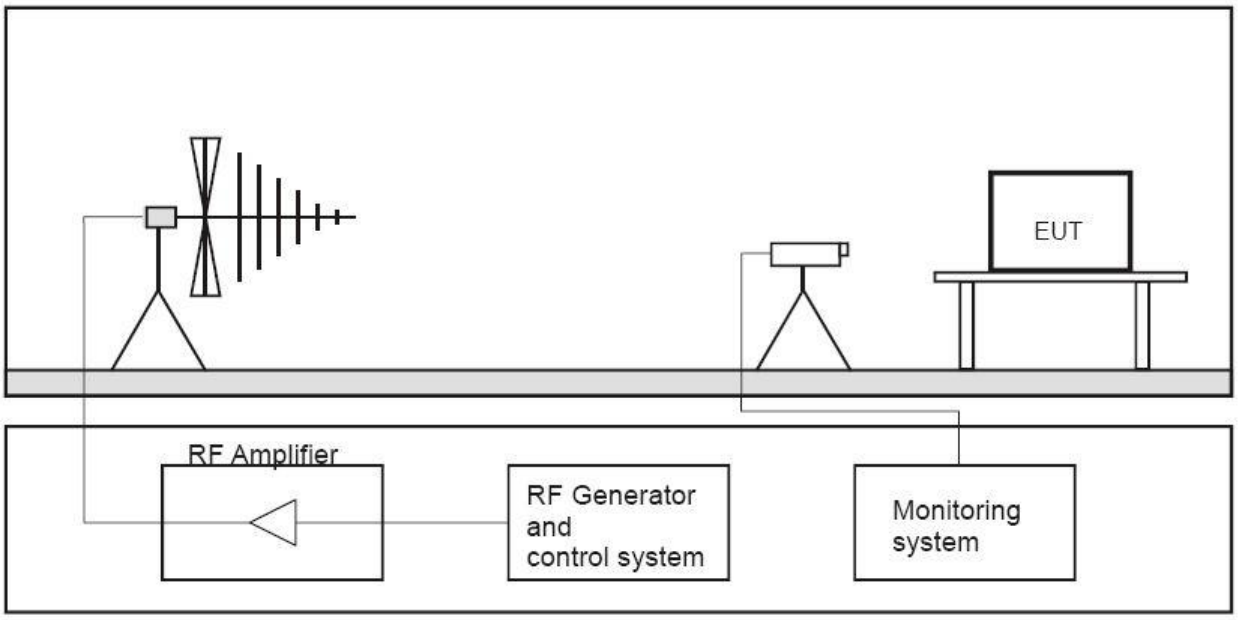
Test Result: Pass

8.2 Radiated Susceptibility Test

8.2.1 Test Specification

Basic Standard:	EN 61000-4-3
Frequency Range:	80~1000MHz
Modulation:	Amplitude 80%, 1kHz sinewave
Test Level:	3V/m
Temperature:	22~23 (℃)
Humidity:	50~54 (%RH)
Barometric Pressure:	950~1000 (mbar)
Operating Mode:	Normal Operation

8.2.2 Test Setup



8.2.3 Test Procedure

1. The testing was performed in a fully-anechoic chamber.
2. The frequency range is swept from 80 MHz to 1000 MHz, with the signal 80% amplitude modulated with a 1kHz sine wave.
3. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised and to respond, but shall in no case be less than 0,5s.
4. The field strength level was 3V/m.
5. The test was performed with the EUT exposed to both vertically and horizontally polarized

fields on each of the four sides.

8.2.4 Test Equipment List and Details

No.	Equipment	Manufacturer	Model No.	S/N	Calibration Date	Next Calibration Date
1	3M Chamber & Accessory Equipment	ETS-LINDGREN	FACT-3	3510	2024-05-06	2025-05-05
2	ESG Vector signal generators	Agilent	E4438C	MY45095744	2024-05-06	2025-05-05
3	Power Amplifier	AR	150W1000	0322288	2024-05-06	2025-05-05
4	Power Amplifier	AR	25S1G4A	0321112	2024-05-06	2025-05-05
5	TRILOG Broadband Antenna	schwarzbeck	VULB 9136	401	2024-05-06	2025-05-05
6	Horn Antenna	ETS-LINGREN	3117	00057407	2024-05-06	2025-05-05
7	3M Chamber & Accessory Equipment	ETS-LINDGREN	FACT-3	3510	2024-05-06	2025-05-05
8	Spectrum Analyzer	Agilent	E4440A	MY46185649	2024-05-06	2025-05-05
9	TRILOG Broadband Antenna	schwarzbeck	VULB 9136	401	2024-05-06	2025-05-05
10	Multi device Controller	ETS-LINGREN	2090	00057230	2024-05-06	2025-05-05
11	Horn Antenna	ETS-LINGREN	3117	00057407	2024-05-06	2025-05-05
12	Microwave Preamplifier	Agilent	8449B	3008A02425	2024-05-06	2025-05-05

8.2.5 Performance Criterion Required & Test Result

Frequency Band (MHz)	Test Level	Test Points	Observation Performance	Criterion Required
80-1000	3V/m	Front Side	A	A
80-1000	3V/m	Rear Side	A	A
80-1000	3V/m	Left Side	A	A
80-1000	3V/m	Right Side	A	A

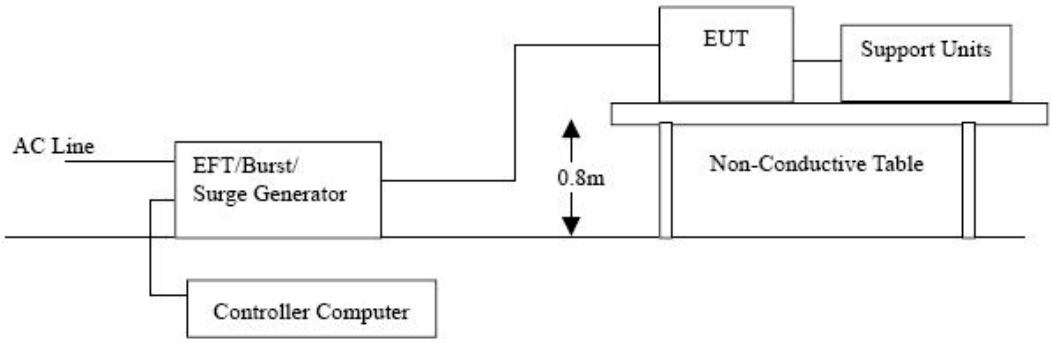
Test Result: Pass

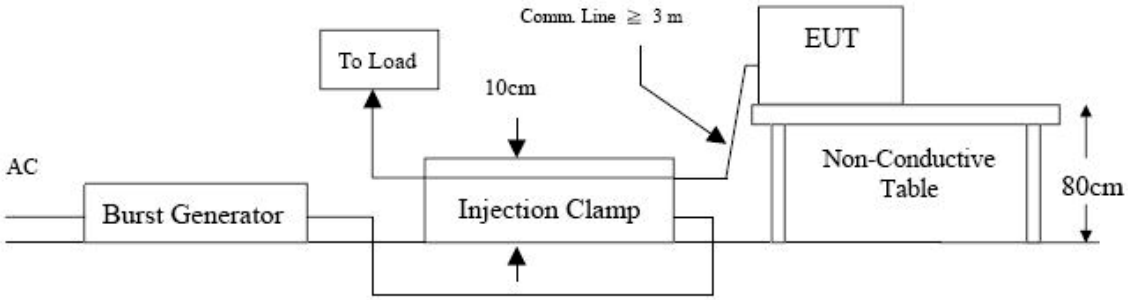
8.3 Electrical Fast Transient/Burst Immunity Test

8.3.1Test Specification

Basic Standard :	EN 61000-4-4
Test Level:	±1 kV for AC Power Line ±0.5 kV for Communication Line (If applicable)
Impulse Frequency:	5kHz
Impulse Wave-shape:	5/50ns
Burst Duration:	15ms
Burst Period:	300ms
Test Duration:	1 min.
Temperature:	22~23 (℃)
Humidity:	50~54 (%RH)
Barometric Pressure:	950~1000 (mbar)
Operating Mode:	Normal Operation

8.3.2 Test Setup





8.3.3 Test Procedure

1. Both positive and negative polarity discharges were applied.
2. The length of the “hot wire” from the coaxial output of the EFT generator to the terminals on the EUT should be 0.5m.
3. The duration time of each test sequential was 1 minute.
4. The transient/burst waveform was in accordance with EN 61000-4-4, 5/50ns.

8.3.4 Test Equipment List and Details

No.	Instrument no.	Equipment	Manufacturer	Model No.	S/N	Last Calculator	Due Calculator
1	YB-EMC009	Fast Transient Burst Generator	SCHAFFNER	MODULA6150	34572	2024-05-06	2025-05-05

8.3.5 Performance Criterion Required & Test Result

Voltage	Test Points	Observation Performance	Criterion Required
±1kV	L	A	B
±1kV	N	A	B
±1kV	Earth	A	B
±1kV	L+N	A	B
±1kV	L+N+Earth	A	B
±0.5kV	Control Line	/	/
±0.5kV	DSL (RJ11)	/	/
±0.5kV	LAN (RJ45)	/	/

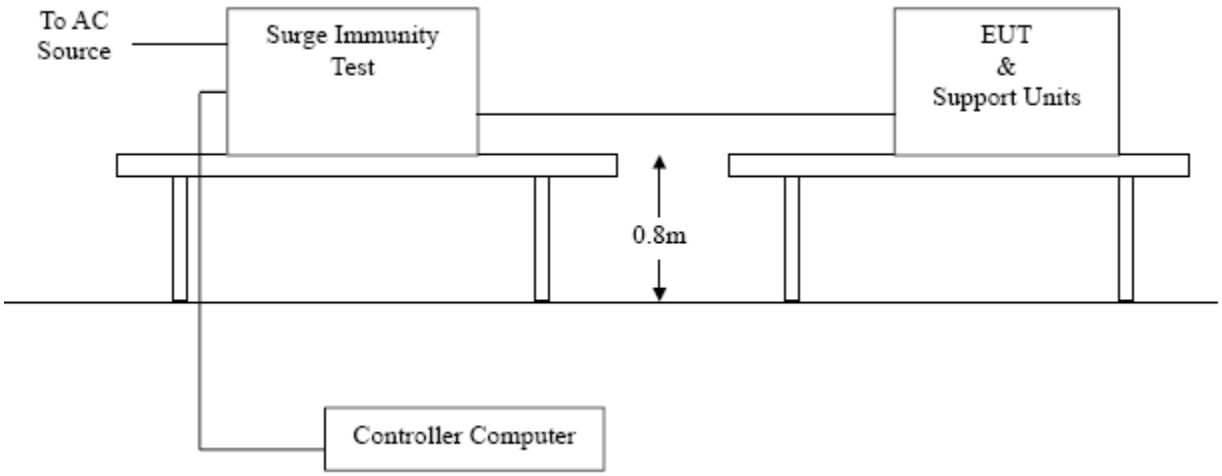
Test Result: Pass

8.4 Surge Immunity Test

8.4.1 Test Specification

Basic Standard :	EN 61000-4-5
Test Level:	± 0.5, 1 kV (Line to Line) for AC Power Line ±0.5, 1, 2 kV (Line(s) to Ground) for AC Power Line ± 0.5 kV for unshielded unsymmetrically operated interconnection lines (If applicable)
Wave-Shape:	Combination Wave 1.2/50 us Open Circuit Voltage 8/20 us Short Circuit Current
Generator Impedance:	42 ohm between signal line and ground 2 ohm between networks
Phase Angle:	0° /90°/180°/270°
Pulse Repetition Rate:	1 time / min
Number of Tests:	5 positive and 5 negative at selected points
Temperature:	22~23 (℃)
Humidity:	50~54 (%RH)
Barometric Pressure:	950~1000 (mbar)
Operating Mode:	Normal Operation

8.4.2 Test Setup



8.4.3 Test Procedure

1. For EUT power supply:
   The surge is applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.
2. For test applied to unshielded unsymmetrically operated interconnection lines of EUT: (If applicable)
   The surge was applied to the lines via the capacitive coupling. The coupling / decoupling networks didn't influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.

8.4.4Test Equipment List and Details

No.	Instrument no.	Equipment	Manufacturer	Model No.	S/N	Last Calculator	Due Calculator
1	YB-EMC009	Fast Transient Burst Generator	SCHAFFNER	MODULA6150	34572	2024-05-06	2025-05-05

8.4.5 Performance Criterion Required & Test Result

Voltage	Test Points	Observation Performance	Criterion Required
±1kV	L-N	A	B
±2kV	L-PE	A	B
±4kV	N-PE	A	B
±0.5kV	Control Line	/	/
±0.5kV	DSL (RJ11)	/	/
±0.5kV	LAN (RJ45)	/	/

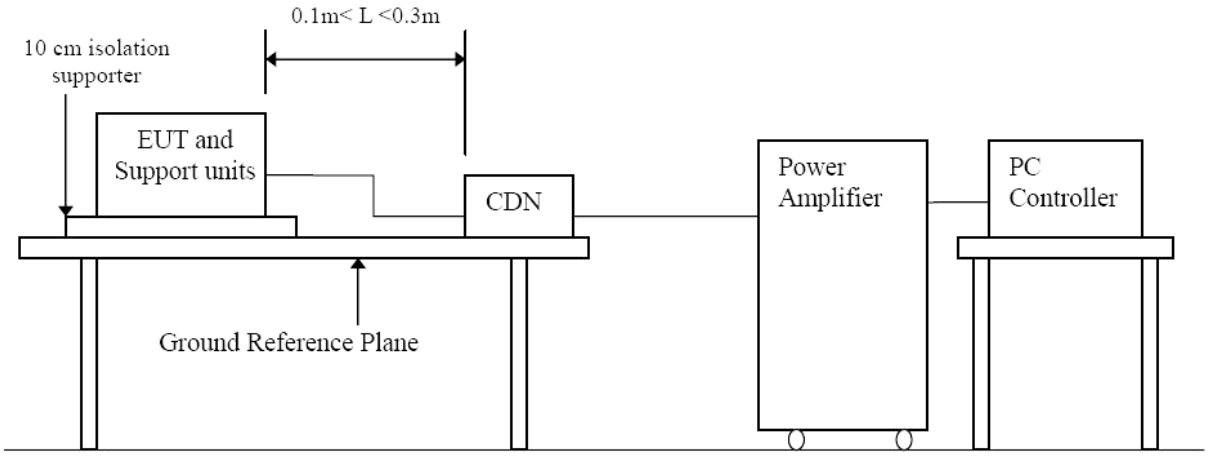
Test Result: Pass

8.5 Conducted Susceptibility Test

8.5.1 Test Specification

Basic Standard:	EN 61000-4-6
Test Level:	3Vr.m.s
Frequency Range:	0.15~80MHz
Modulation:	Amplitude 80%, 1kHz sinewave
Frequency Step:	1 % of preceding frequency value
Temperature:	22~23 (℃)
Humidity:	50~54 (%RH)
Barometric Pressure:	950~1000 (mbar)
Operating Mode:	Normal Operation

8.5.2 Test Setup



8.5.3 Test Procedure

1. The test was performed with the test generator connected to each of the coupling and decoupling devices in turn, while the other non-excited RF input ports of the coupling devices are terminated by a 50-ohm load resistor.
2. The frequency range was swept from 150 kHz to 80 MHz, YBg the signal level established during the setting process and with a disturbance signal of 80 % amplitude. The signal was modulated with a 1 kHz sine wave, paYBg to adjust the RF signal level or the switch coupling devices as necessary. The sweep rate was 1.5 x 10-3 decades/s. Where the frequency range is swept incrementally, the step size was 1 % of preceding frequency value from 150 kHz to 80 MHz.
3. The dwell time at each frequency was less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies such as clock frequency(ies) and harmonics or frequencies of dominant interest, was analyzed separately.
4. Attempts was made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.

8.5.4 Test Equipment List and Details

No.	Instrument no.	Equipment	Manufacturer	Model No.	S/N	Last Calculator	Due Calculator
1	YB-EMC026	RF POWER AMPLIFIER	FRANKONIA	FLL-75	1020A1109	2024-05-06	2025-05-05
2	YB-EMC027	CDN	FRANKONIA	CDN M2+M3	A3027019	2024-05-06	2025-05-05
3	YB-EMC029	6DB Attenuator	FRANKONIA	TRUVAPE	1001698	2024-05-06	2025-05-05
4	YB-EMC030	EM Injection clamp	FCC	F-203I-23mm	091536	2024-05-06	2025-05-05

8.5.5 Performance Criterion Required & Test Result

Frequency Band (MHz)	Voltage (Vrms)	Test Points	Observation Performance	Criterion Required
0.15-80	3	L1,L2,L3-N-PE	A	A

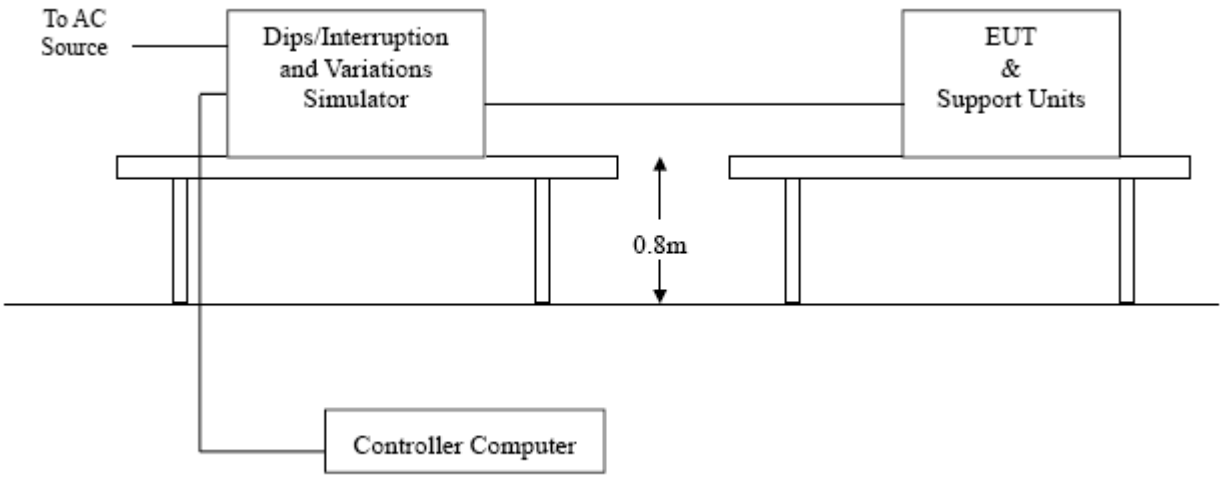
Test Result: Pass

8.6 Voltage Dips, Short Interruptions Immunity Tests

8.6.1 Test Specification

Basic Standard:	EN 61000-4-11
Test Level:	Voltage Dips: 1) 0% residual voltage for 0.5 cycle, 2) 70% residual voltage for 25 cycles, Voltage Interruptions: 0% residual voltage for 250 cycles
Interval between event:	10 seconds
Phase Angle:	0°/180°
Test cycle:	3 times
Temperature:	22~23 (℃)
Humidity:	50~54 (%RH)
Barometric Pressure:	950~1000 (mbar)
Operating Mode:	Normal Operation

8.6.2 Test Setup



8.6.3 Test Procedure

The EUT was tested for each selected combination of test levels and duration with a sequence of 3 dips/interruptions with intervals of 10s (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the voltage waveform.

8.6.4 Test Equipment List and Details

No.	Instrument no.	Equipment	Manufacturer	Model No.	S/N	Last Calculator	Due Calculator
1	YB-EMC009	Fast Transient Burst Generator	SCHAFFNER	MODULA6150	34572	2024-05-06	2025-05-05

8.6.5 Performance Criterion Required & Test Result

Ut: Voltage dip and short interruptions			
Voltage (% Residual)	**Duration (Period)**	**Observation Performance**	**Criterion Required**
0	0.5	A	B
70	25	B	C
0	250	C	C

Test Result: Pass

APPENDIX A - EUT PHOTOGRAPHS

Fig.01

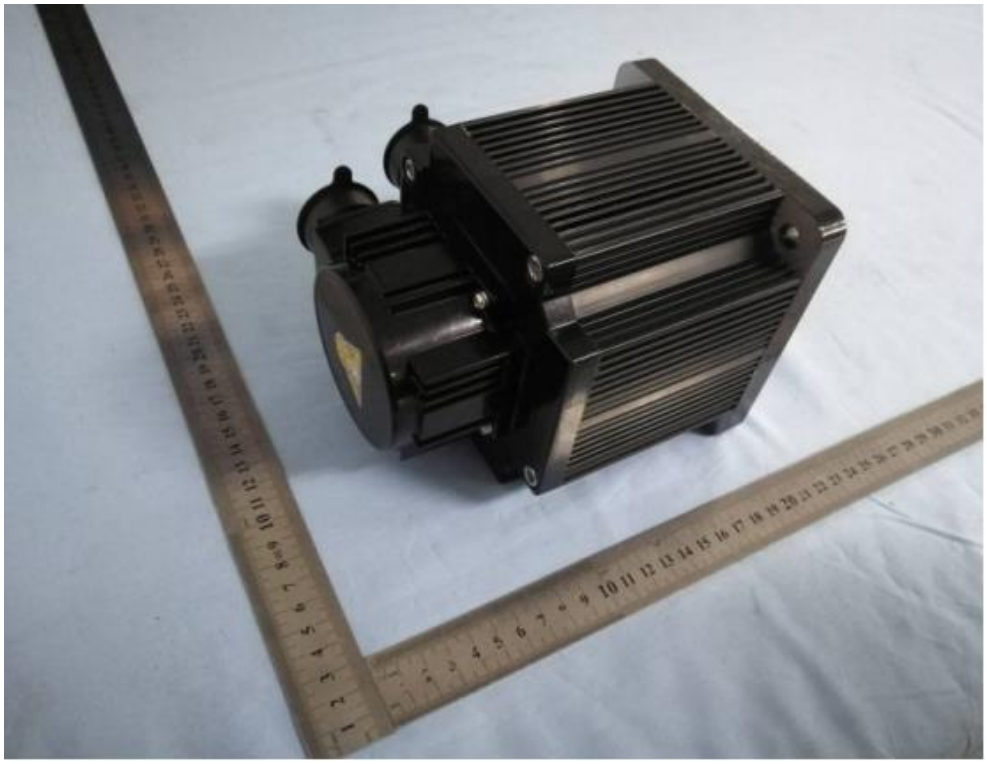


Fig.02

Fig.03

Fig.04

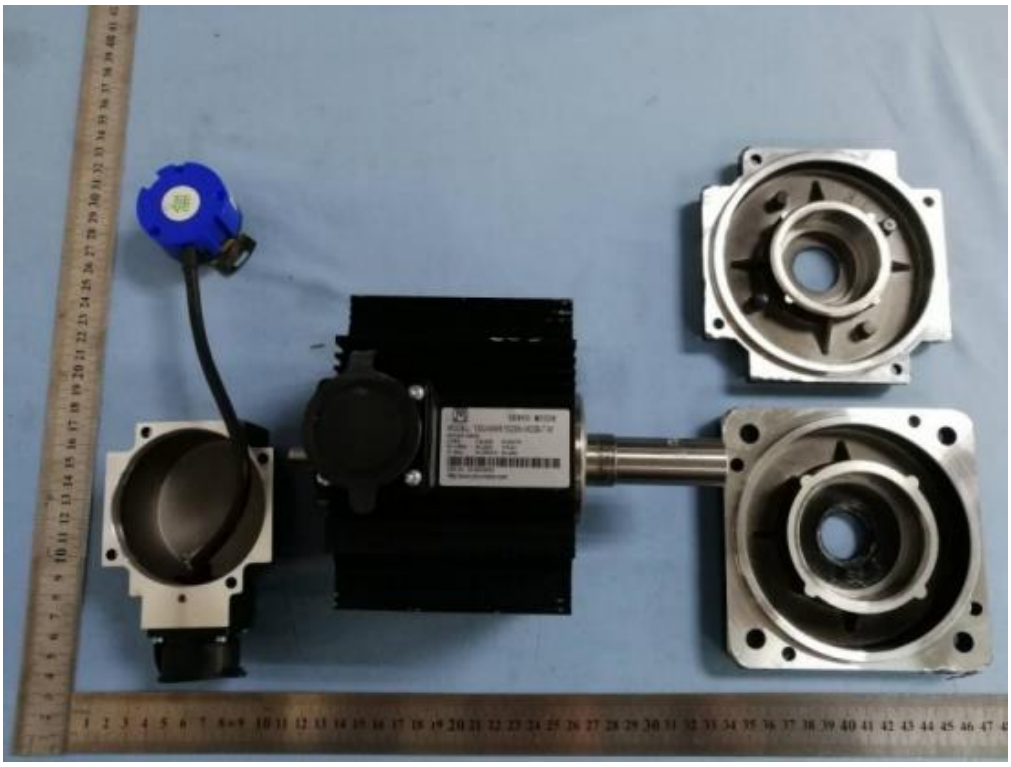


Fig.05

Fig.06

Fig.07

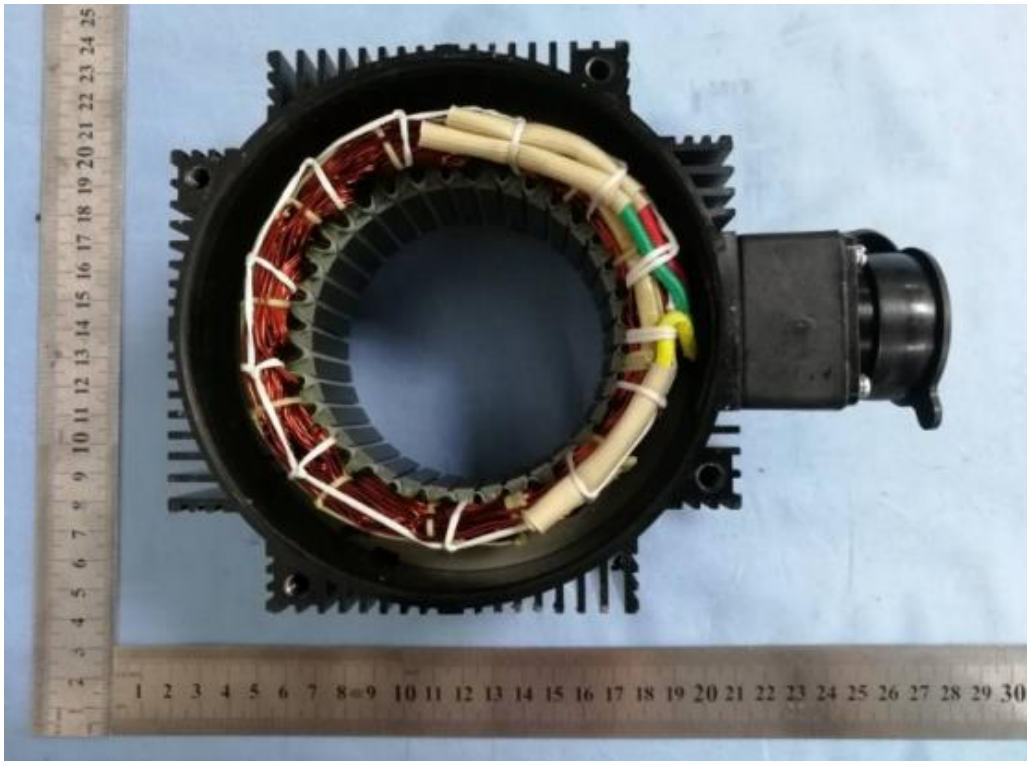


Fig.08

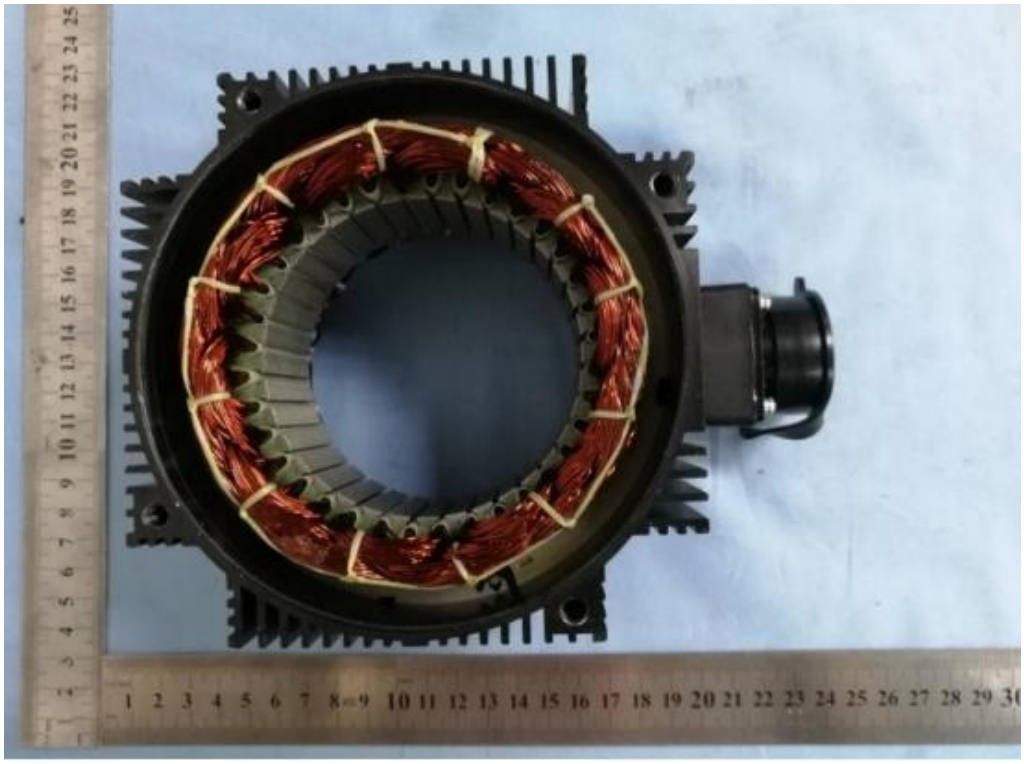


Fig.09

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