



CE TEST REPORT

for

Electric Actuator

Model: TS05-230S

Other models see the list on Page 4 of the report

Prepared for: Ningbo Star Win Actuators Manufacture Co., LTD.
No.16, Guofan Road, Sanheng Development Zone, Fenghua Area,
Ningbo City, China(315504)

Prepared by: Shenzhen EZT Testing Technology Co.,Ltd
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Report Number: EZT20190418096ER

Date of Test: Apr.11,2019-Apr.19,2019

Date of Issue: Apr.19,2019

Mark Dan.

Tested By _____

Mark Dan



Reviewed By _____

Steven

The results detailed in this test report relate only to the specific sample(s) tested. It is the Application's responsibility to ensure that all production units are manufactured with equivalent EMC characteristics. This report is not to be reproduced except in full, without written approval from EZT Testing Technology.



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1.0 General Information

1.1 Client Information

Application:	Ningbo Star Win Actuators Manufacture Co., LTD.
Address of Application:	No.16, Guofan Road, Sanheng Development Zone, Fenghua Area, Ningbo City, China(315504)
Manufacturer:	Ningbo Star Win Actuators Manufacture Co., LTD.
Address of Manufacturer:	No.16, Guofan Road, Sanheng Development Zone, Fenghua Area, Ningbo City, China(315504)

1.2 General Description of E.U.T.

Product Name:	Electric Actuator
Model:	TS05-230S
Additional Model:	BLF230-5, BFL230-5
Trade Mark:	N/A
Power Supply:	230V~50/60Hz 5W
Remark:	--

Model Difference:	N/A
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1.3 Test Facility:

Name of Test Lab:	Shenzhen EZT Testing Technology Co.,Ltd
Address of Test Lab:	4F, Jinxin Business Building , No.4151 Songbai Road, Matian Street, Guangming New District, Shenzhen City, Guangdong, China.
Telephone:	+86-0755-33150178
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2.0 List Test Equipments					
Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
Conducted emission					
EMI Test Receiver	ESCS30	100139	R&S	July 24, 2018	July 23, 2019
LISN	LS16C	16010222119	AFJ	July 24, 2018	July 23, 2019
Absorption power clamp	ZN23201	0811	Da Ze technology	July 24, 2018	July 23, 2019
Radiated emission					
EMI Test Receiver	ESCS30	100139	R&S	July 24, 2018	July 23, 2019
Spectrum Analyzer	FSEM	1079.8500.30	R&S	July 24, 2018	July 23, 2019
Amplifier	8447D	2727A05017	H.P.	July 24, 2018	July 23, 2019
Antenna	VULB9163	N/A	SCHWARZBECK	July 24, 2018	July 23, 2019
Amplifier	EM30265	07032613	EM Electronics Corporation	July 24, 2018	July 23, 2019
Positioning Controller	CC-C-1F	MF7802140	C & C LAB	July 24, 2018	July 23, 2019
Harmonic & Flicker					
Harmonics Flicker Test System	PACS-1	72305	CI	July 24, 2018	July 23, 2019
5K VA AC Power source	5001iX	56060	CI	July 24, 2018	July 23, 2019
Electrostatic Discharge					
Electostatic Discharge Generator	ESD61002AG	PR12092502	Prima	July 24, 2018	July 23, 2019
Continuous radiated disturbances					
Signal Generator	2022D	119246/003	Maconi	July 24, 2018	July 23, 2019
Power Amplifier	A00181-1000	9801-112	M2S	July 24, 2018	July 23, 2019
Power Amplifier	AC8113/800-250A	9801-179	M2S	July 24, 2018	July 23, 2019
Power Antenna	CBL6140A	1204	SCHAFFNER	July 24, 2018	July 23, 2019
EFT/Surge/Dip					
Fast Transient Burst Simulator	EFT61004BG	PR12074375	Prima	July 24, 2018	July 23, 2019
Lightning Surge Generator	SUG61005BG	PR12125534	Prima	July 24, 2018	July 23, 2019
CYCLE SAG SIMULATOR	DRP61011AG	PR12106201	Prima	July 24, 2018	July 23, 2019
Continuous conducted disturbances					
Signal Generator	2022D	119246/003	Maconi	July 24, 2018	July 23, 2019



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Power Amplifier	A00181-1000	9801-112	M2S	July 24, 2018	July 23, 2019
CDN	M3-8016	003683	MEB	July 24, 2018	July 23, 2019
Power-frequency Magnetic field					
Continuous Wave Simulator	UCS 500 M4	0304-42	EM TEST	July 24, 2018	July 23, 2019
Power Source Network	MV 2616	0104-14	EM TEST	July 24, 2018	July 23, 2019
Current Transformer	MC2630	--	EM TEST	July 24, 2018	July 23, 2019
Magnetic Coil	MS100	0304-42	EM TEST	July 24, 2018	July 23, 2019

N/A=not applicable



3.0 Technical Details

3.1 Investigations Requested

Perform Electromagnetic Interference [EMI] & Electromagnetic Susceptibility [EMS] tests for CE Marking

3.2 Test Standards

EN 55014-1:2017	Electromagnetic compatibility- Requirements for household appliances, electric tools and similar apparatus. Part 1: Emission
EN61000-3-2:2014	Electromagnetic compatibility(EMC)- Part 3-2:Limits-Limits for harmonic current emissions(equipment input current $\leq 16A$ per phase)
EN 61000-3-3:2013	Electromagnetic compatibility (EMC)- Part 3-3:Limits-Limitation of voltage changes, Voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current $\leq 16A$ per phase and not subject to conditional connection
EN 55014-2:2015	Electromagnetic compatibility- Requirements for household appliances, electric tools and similar apparatus. Part 2: Immunity-Product family standard

3.3 Performance Criteria

- Criterion A The apparatus shall continue to operate as intended during the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer. The minimum level may be instead of that, either being derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.
- Criterion B The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer. During the test, degradation of performance is allowed, however, no change of actual operating state or stored data is allowed. The minimum level may be instead of that, either being derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.
- Criterion C Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls, or by any operation specified in the instruction for use.

For further performance criteria details, please refer to Table 14 in EN 55014-2.



3.4 Test standards and Results Summary Tables

Test Condition	Test Requirement	Test Method	Test Result
EMISSION Results Summary			
Conducted Emission on AC Mains, 150KHz to 30MHz	EN 55014-1:2017	EN 55014-1:2017	Pass
Disturbance Power Test, 30 MHz to 300MHz	EN 55014-1:2017	EN 55014-1:2017	Pass
Radiated Emissions, 30MHz to 1000MHz	EN 55014-1:2017	EN 55014-1:2017	Pass
Harmonic Emissions on AC supply	EN61000-3-2:2014	EN61000-3-2:2014	Pass
Voltage fluctuations on AC supply	EN 61000-3-3:2013	EN 61000-3-3:2013	Pass
IMMUNITY Results Summary			
Electrostatic Discharge	EN 55014-2:2015	EN 61000-4-2: 2009	Pass
RF field strength susceptibility	EN 55014-2:2015	EN 61000-4-3: 2010	Pass
Electrical Fast transients /Burst Immunity	EN 55014-2:2015	EN 61000-4-4:2004+A1:2010	Pass
Surge	EN 55014-2:2015	EN 61000-4-5: 2006	Pass
Conducted susceptibility	EN 55014-2:2015	EN 61000-4-6: 2009	Pass
Dips/Voltage Interruption Variation	EN 55014-2:2015	EN 61000-4-11: 2004	Pass

Note: N/A=Not applicable

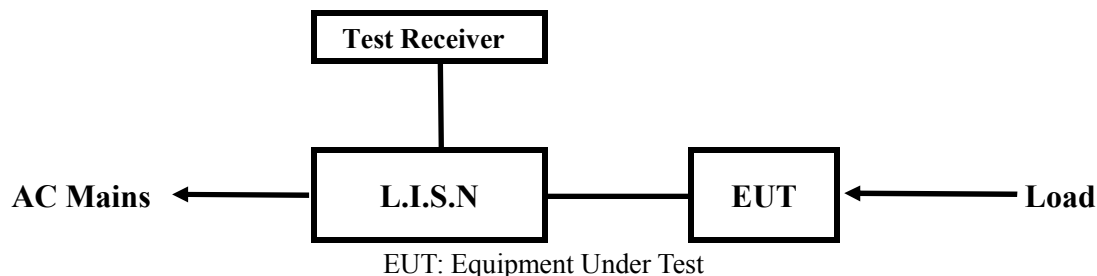
3.5 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	MU
1.	Temperature	$\pm 0.1^{\circ}\text{C}$
2.	Humidity	$\pm 1.0\%$
3.	Spurious emissions, conducted	$\pm 3.70\text{dB}$
4.	All emissions, radiated	$\pm 4.50\text{dB}$

4.0 Electromagnetic Interference Test results

4.1 Power Line Conducted Emission Test

4.1.1 Schematics of the test



4.1.2 Test Method and test Procedure

The test was performed in accordance with EN 55014-1

4.1.3 Test Equipment

Please refer to the Section 2

4.1.4 Power line conducted Emission Limit

Frequency(MHz)	Limits dB(μ V)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66.0~56.0*	59.0~46.0*
0.50 ~ 5.00	56.0	46.00
5.00 ~ 30.00	60.0	50.00

- Notes:
1. *decreasing linearly with logarithm of frequency.
 2. The lower limit shall apply at the transition frequencies

4.1.5 Photo documentation of the test set-up

Please refer to the Section 7

4.1.6 Test specification:

Environmental conditions: Temperature: 23° C Humidity: 50% Atmospheric pressure: 103kPa

Frequency range: 0.15 MHz – 30 MHz

4.1.7 Test result

Min. limit margin > 10dB from 0.15 MHz-30 MHz

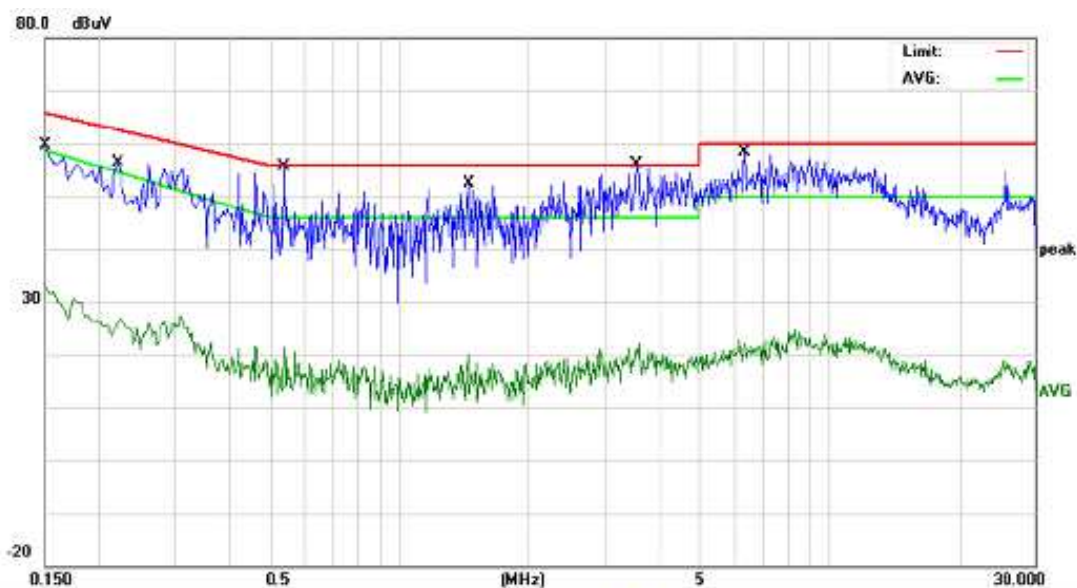
**A Conducted Emission on Live Terminal of the power line (150kHz to 30MHz)**

EUT Description: Electric Actuator

Operation Mode: Normal operation mode

Test Result: PASS

Start Frequency	Stop Frequency	Step	IF BW	Detector	Final M-Time
0.15MHz	30MHz	4.5KHz	10KHz	QP+AV	1s



Site site #1

Phase: L1

Temperature: 26

Limit: EN5514 Conduction(QP)

Power: AC 230V/50Hz

Humidity: 60 %

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1500	43.16	10.45	53.61	65.99	-12.38	QP	
2		0.1500	21.55	10.45	32.00	58.99	-26.99	AVG	
3		0.2220	36.73	10.38	47.11	62.74	-15.63	QP	
4		0.2220	16.35	10.38	26.73	54.76	-28.03	AVG	
5		0.5420	38.05	10.53	48.58	56.00	-7.42	QP	
6		0.5420	14.83	10.53	25.36	46.00	-20.64	AVG	
7		1.4500	38.90	10.51	49.41	56.00	-6.59	QP	
8		1.4500	13.39	10.51	23.90	46.00	-22.10	AVG	
9	*	3.5740	40.61	10.56	51.17	56.00	-4.83	QP	
10		3.5740	14.96	10.56	25.52	46.00	-20.48	AVG	
11		6.3820	40.60	10.54	51.14	60.00	-8.86	QP	
12		6.3820	15.39	10.54	25.93	50.00	-24.07	AVG	

*:Maximum data x:Over limit f:over margin

(Reference Only)

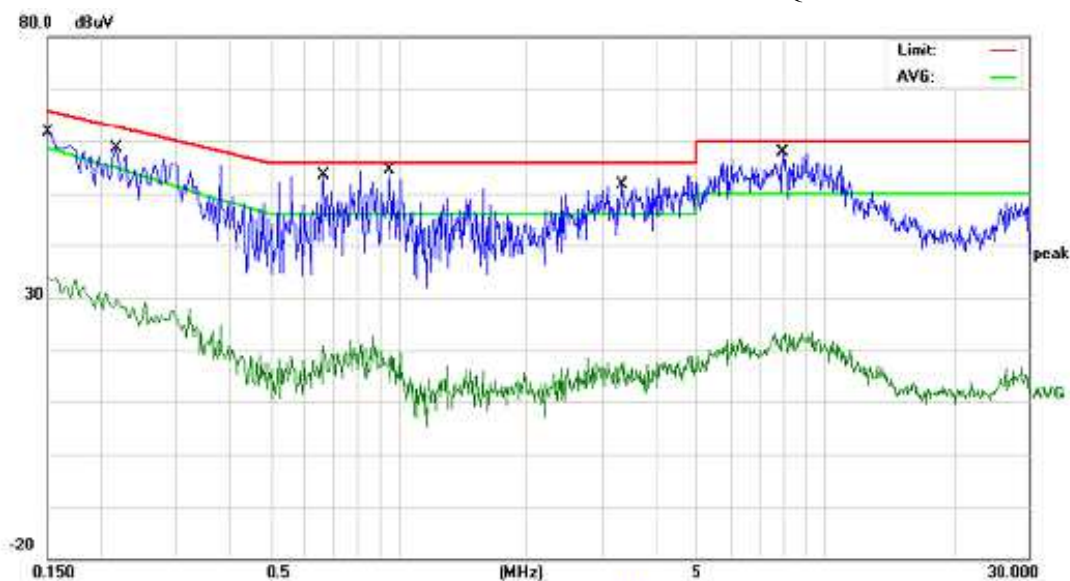
**B Conducted Emission on Neutral Terminal of the power line (150kHz to 30MHz)**

EUT Description: Electric Actuator

Operation Mode: Normal operation mode

Test Result: PASS

Start Frequency	Stop Frequency	Step	IF BW	Detector	Final M-Time
0.15MHz	30MHz	4.5KHz	10KHz	QP+AV	1s



Site site #1

Limit: EN5514 Conduction(QP)

Phase: N

Power: AC 230V/50Hz

Temperature: 26

Humidity: 60 %

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.1500	44.10	10.45	54.55	65.99	-11.44	QP	
2		0.1500	22.76	10.45	33.21	58.99	-25.78	AVG	
3		0.2180	38.53	10.36	48.89	62.89	-14.00	QP	
4		0.2180	18.22	10.36	28.58	54.96	-26.38	AVG	
5	*	0.6700	43.93	10.84	56.77	56.00	-2.77	QP	
6		0.6700	22.75	10.84	33.59	46.00	-12.41	AVG	
7		0.9500	43.95	10.72	54.67	56.00	-1.33	QP	
8		0.9500	18.65	10.72	29.37	46.00	-16.63	AVG	
9		3.3580	38.63	10.56	49.19	56.00	-6.81	QP	
10		3.3580	13.13	10.56	23.69	46.00	-22.31	AVG	
11		7.9860	39.07	10.48	49.55	60.00	-10.45	QP	
12		7.9860	14.03	10.48	24.51	50.00	-25.49	AVG	

*:Maximum data x:Over limit l:over margin

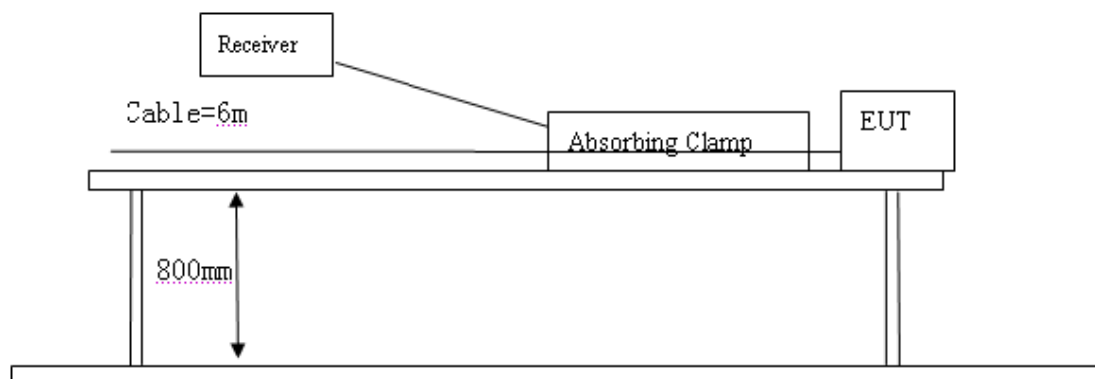
(Reference Only)

4.2 Disturbance Power Test

4.2.1 Test Method:

The test was performed in accordance with EN 55014-1

Block diagram of Test setup



4.2.2 Test Equipment

Please refer to the Section 2

4.2.3 Power line conducted Emission Limit

Frequency(MHz)	Limits dB(pW)	
	Quasi-peak Level	Average Level
30 ~ 300	45~55	35~45

- Notes:
1. *decreasing linearly with logarithm of frequency.
 2. The lower limit shall apply at the transition frequencies

4.2.4 Photo documentation of the test set-up

Please refer to the Section 7

4.2.5 Test specification:

Environmental conditions: Temperature: 23° C Humidity: 50% Atmospheric pressure: 103kPa

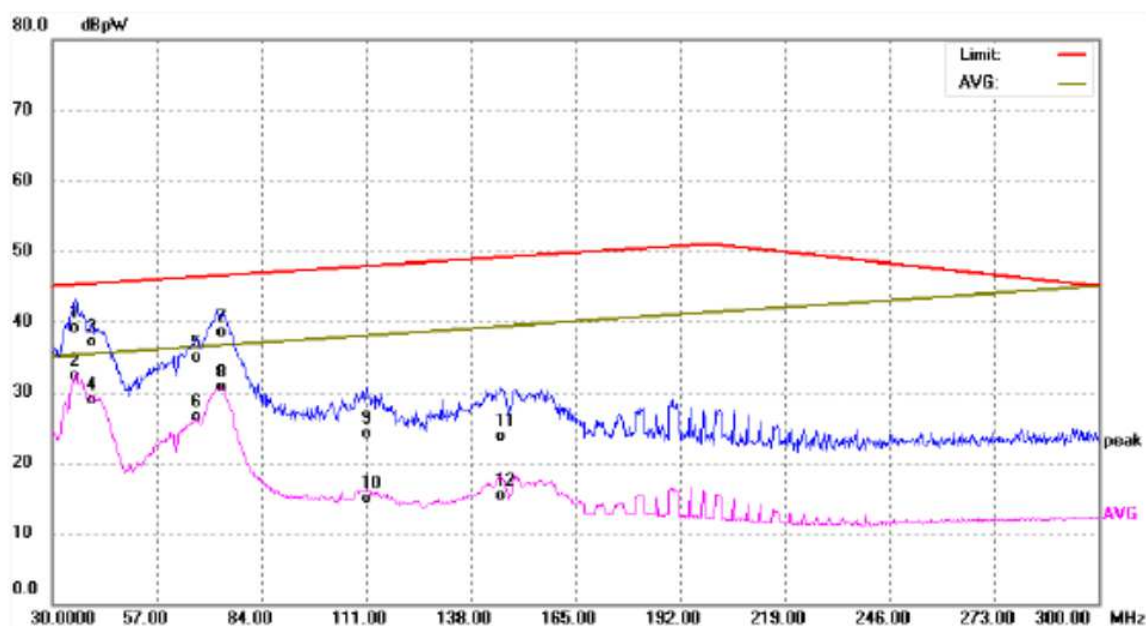
Frequency range: 30 MHz – 300 MHz

4.2.6 Test result

Min. limit margin 7.84dB at 67.4375MHz

A. Conducted Disturbance Power on AC Line (30MHz to 300MHz)

EUT Description: Electric Actuator
Operation Mode: Normal operation mode
Test Result: PASS

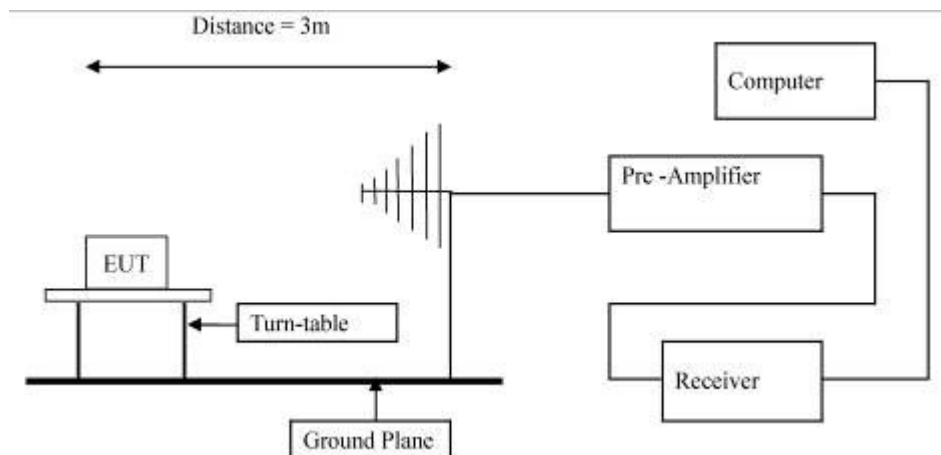


No.	Freq. (MHz)	Reading (dBpW)	Factor (dB)	Result (dBpW)	Limit (dBpW)	Margin (dB)	Detector
1	36.3000	12.60	26.59	39.19	45.22	-6.03	QP
2	36.3000	5.68	26.59	32.27	35.23	-2.96	AVG
3	40.3200	11.57	25.57	37.14	45.36	-8.22	QP
4	40.3200	3.37	25.57	28.94	35.38	-6.44	AVG
5	67.5000	11.15	23.72	34.87	46.32	-11.45	QP
6	67.5000	2.86	23.72	26.58	36.39	-9.81	AVG
7	73.9200	14.78	23.78	38.56	46.55	-7.99	QP
8	73.9200	7.01	23.78	30.79	36.63	-5.84	AVG
9	111.0000	0.70	23.39	24.09	47.86	-23.77	QP
10	111.0000	-8.52	23.39	14.87	38.00	-23.13	AVG
11	145.6200	1.07	22.56	23.63	49.08	-25.45	QP
12	145.6200	-7.24	22.56	15.32	39.28	-23.96	AVG

4.3 Radiated Emission Test

4.3.1 Test Method: The test was performed in accordance to EN 55014-1

4.3.2 Block diagram of Test setup



4.3.3 Radiated Emission Limit

Frequency Range (MHz)	Distance (m)	Quasi-Peak limits (dB μ V/m)
30-230	3	40.00
230-1000	3	47.00

Note: The lower limit shall apply at the transition frequencies

4.3.4 Photo documentation of the test set-up

Please refer to the Section 7

4.3.5 Test Equipment:

Please refer to the Section 2

4.3.6 Test specification:

Environmental conditions: Temperature 24° C Humidity: 52% Atmospheric pressure: 103kPa

4.3.7 Test result

Min. limit margin 5.09dB at 138.8575MHz

Remarks: According to the EN 55014-1



A. Radiated Emission In Horizontal (30MHz----1000MHz)

EUT Description:

Operation Mode:

Test Result:

Frequency (MHz)	Level@3m (dBμV/m)	Antenna Polarity	Limit@3m (dBμV/m)
		H	
		H	

-The test data shows much less than the limit, no necessary take down the records.

B. Radiated Emission In Vertical (30MHz----1000MHz)

EUT Description:

Operation Mode:

Test Result:

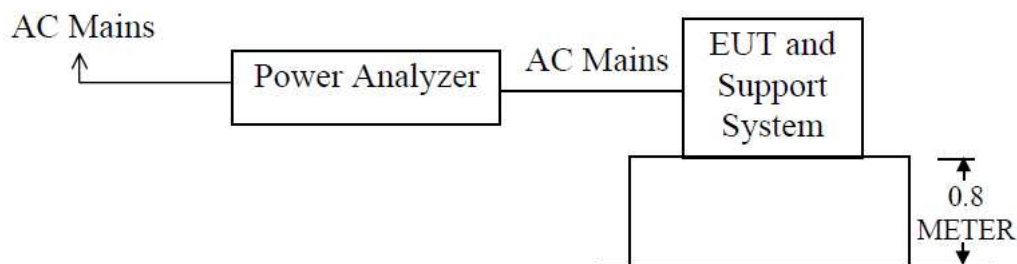
Frequency (MHz)	Level@3m (dBμV/m)	Antenna Polarity	Limit@3m (dBμV/m)
138.8575	34.91	V	40.00

4.4 Harmonic Current Emissions

4.4.1 EUT Operating Mode

Normal operation mode

4.4.2 Block Diagram of Test Setup.



This test was performed as per EMC Basic Standard EN61000-3-2 Class A

4.4.3 Test Equipment

Please refer to Section 2 this report.

4.4.4 Test specification:

Environmental conditions: Temperature: 23° C Humidity: 54% Atmospheric pressure: 103kPa

4.4.5 Results

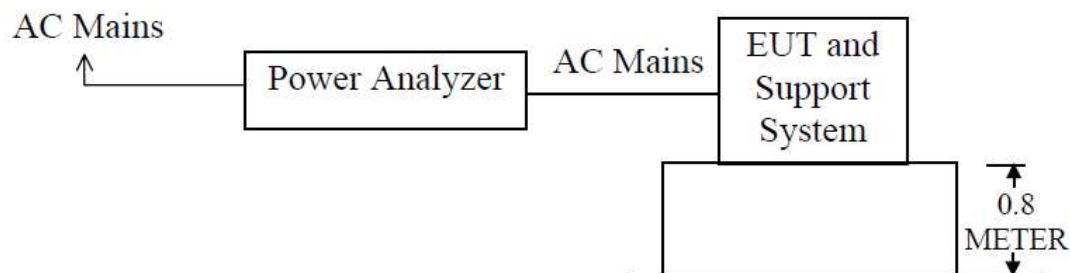
Port	EUT Operating mode	Result (Passed / Failed)
AC Input	Normal operation mode	Pass

4.5 Flicker and Voltage Fluctuation

4.5.1 EUT Operating Mode

Normal operation mode

4.5.2 Block Diagram of Test Setup.





This test was performed as per EMC Basic Standard EN 61000-3-3

4.5.3 Limits of Voltage Fluctuation and Flicks Measurement

Test Item	Limit	Note
P_{st}	1.0	Pst means short-term flicker indicator
P_{lt}	0.65	Plt means long-term flicker indicator
T_{dt} (ms)	200	Tdt means maximum time that dt exceeds 3%.
d_{max} (%)	4	Dmax means maximum relative voltage change.
dc (%)	3	Dc means relative steady-state voltage change.

4.5.4 Test Equipment

Please refer to Section 2 this report.

4.5.5 Test specification:

Environmental conditions: Temperature: 23° C Humidity: 54% Atmospheric pressure: 103kPa

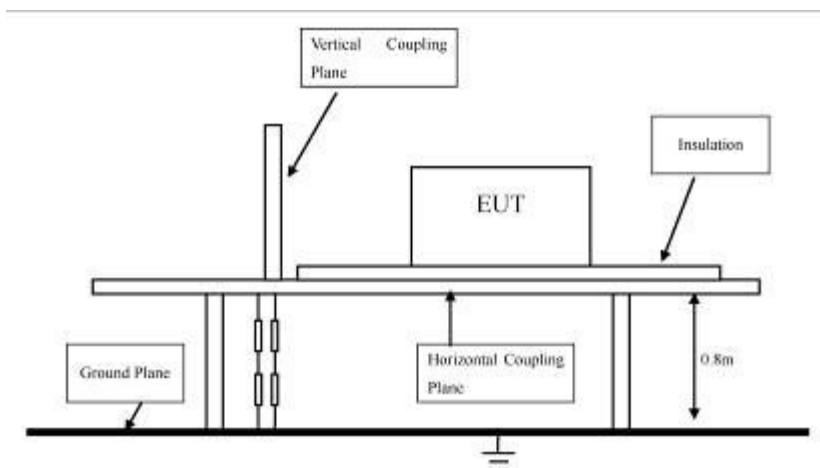
4.5.6 Results

Port	EUT Operating mode or operating mode no.	Result (Passed / Failed)
AC Input	Normal operation mode	Pass

5.0 Immunity Test

5.1 Electrostatic Discharge

5.1.1 Schematic of the test



5.1.2 Test method

The test was performed in accordance with EN 61000-4-2

5.1.3 Test severity

$\pm 4\text{kV}$ for direct & in-direct Contact Discharge

$\pm 8\text{kV}$ for air Discharge

Performance Criterion Require: **B**

5.1.4 Test Equipment

Please refer to Section 2 this report.

5.1.5 Test specification:

Environmental conditions: Temperature: 23°C Humidity: 54% Atmospheric pressure: 103kPa

5.1.6 Operation mode: Normal operation mode

5.1.7 Discharge location

- HCP
- VCP
- Shell

5.1.8 Test Result Pass

5.2 RF field strength susceptibility (80MHz----- 1000MHz)

5.2.1 Test Method:

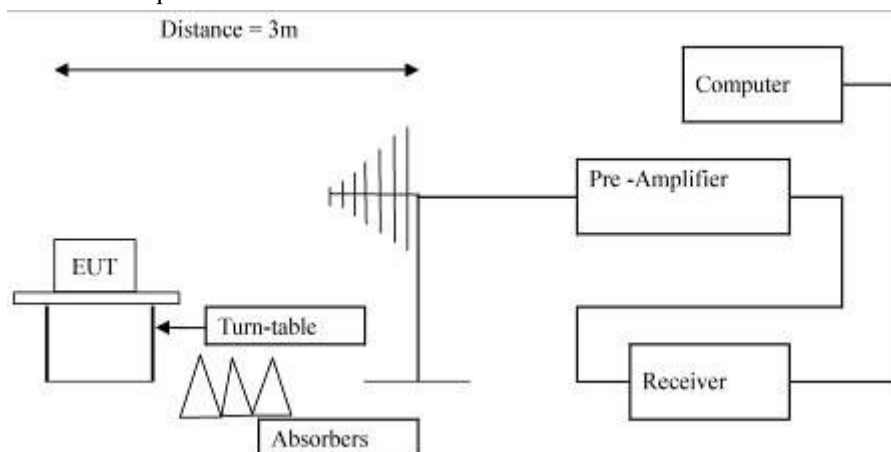
The test was performed in accordance with EN 61000-4-3

Severity: Level 2 (3V/m)

Modulation: 1 KHz 80% AM

Performance Criterion Require: A

Block diagram of Test setup



5.2.2 Test Equipment

Please refer to Section 2 this report.

5.2.3 Test specification:

Environmental conditions: Temperature: 23° C Humidity: 54% Atmospheric pressure: 103kPa

5.2.4 Operation mode: Normal operation mode

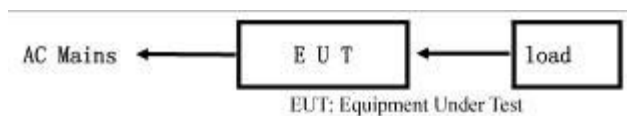
5.2.5 Test Result:

Please refer to the following table for individual results.

Frequency (MHz)	Radiation to	Polarity	Level (V/m)	Dwell Time(s)	Sweep Rate (%)	Results
80-1000	Front	Horizontal	3	1	1	Pass
80-1000	Rear	Horizontal	3	1	1	Pass
80-1000	Left	Horizontal	3	1	1	Pass
80-1000	Right	Horizontal	3	1	1	Pass
80-1000	Front	Vertical	3	1	1	Pass
80-1000	Rear	Vertical	3	1	1	Pass
80-1000	Left	Vertical	3	1	1	Pass
80-1000	Right	Vertical	3	1	1	Pass

5.3 Electrical Fast Transient/Burst (EFT/B) immunity test

5.3.1 Schematics of the test



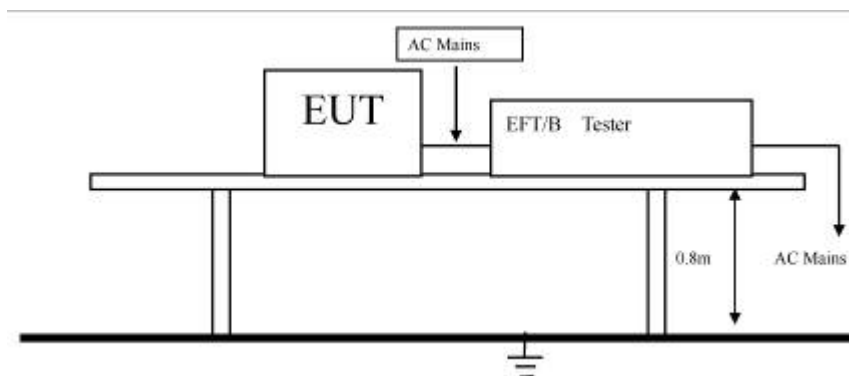
5.3.2 Test Method

The test was performed in accordance with EN 61000-4-4

Severity: Level 2 (1kV)

Performance Criterion Require: **B**

Block diagram of Test setup



5.3.3 Test Equipment

Please refer to Section 2 this report.

5.3.4 Test specification:

Environmental conditions: Temperature: 22° C Humidity: 54% Atmospheric pressure: 103kPa

5.3.5 Operation mode: Normal operation mode

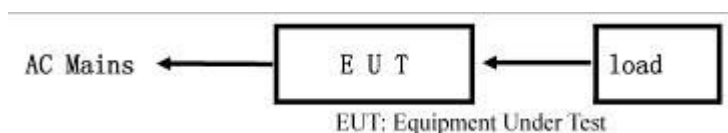
5.3.6 Test Results

Inject location: AC mains

Inject Line	Voltage kV	Inject Times (s)	Method	Results
L	± 1	120	Direct	Pass
N	± 1	120	Direct	Pass
L、N	± 1	120	Direct	Pass
L、E	± 1	120	Direct	N/A
N、E	± 1	120	Direct	N/A
L、N、E	± 1	120	Direct	N/A

5.4 Surge test

5.4.1 Schematics of the test



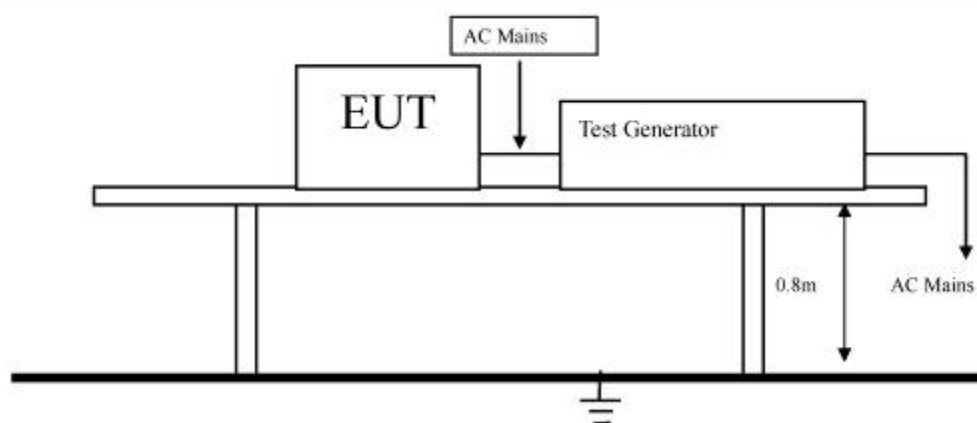
5.4.2 Test Method:

The test was performed in accordance with EN 61000-4-5

Severity: Level 2

Performance Criterion Require: B

Block diagram of Test setup



5.4.3 Test Equipment

Please refer to Section 2 this report.

5.4.4 Test specification:

Environmental conditions: Temperature: 22° C Humidity: 54% Atmospheric pressure: 103kPa

5.4.5 Operation mode: Normal operation mode

5.4.6 Test Results

5 pulses for each polarity and test voltage, and repetition rate is 1 per min.

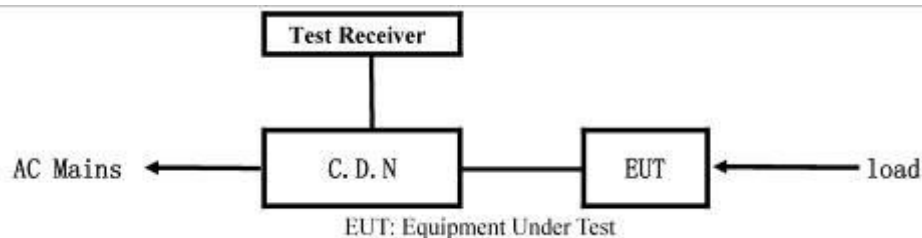
Location	Polarity	0°	90°	180°	270°	Results
L-N	+1 KV	N/A	n.r.r.	N/A	N/A	Pass
	-1 KV	N/A	N/A	N/A	n.r.r.	Pass
L-PE	+2 KV	N/A	n.r.r.	N/A	N/A	N/A
	-2 KV	N/A	N/A	N/A	n.r.r.	N/A
N-PE	+2 KV	N/A	n.r.r.	N/A	N/A	N/A
	-2 KV	N/A	N/A	N/A	n.r.r.	N/A

Remark: 1) n.r.r. = no reaction recognized, N/A = not applicable.

2) Performance Criteria A Observed.

5.5 Conducted Immunity test

5.5.1 Schematics of the test



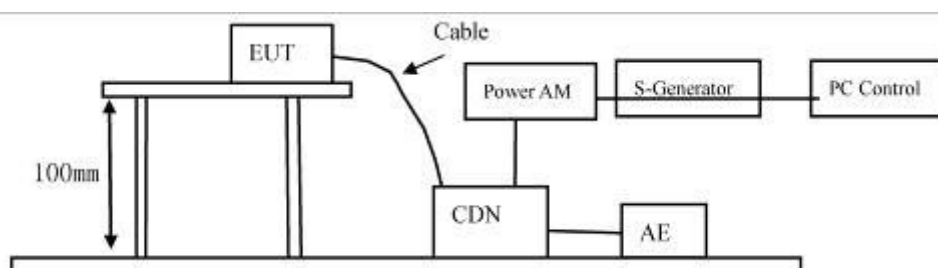
5.5.2 Test Method

The test was performed in accordance with EN 61000-4-6

Severity: Level 2 (3 V rms),

Performance Criterion Require: A

Block diagram of Test setup



5.5.3 Test Equipment

Please refer to Section 2 this report.

5.5.4 Test specification:

Environmental conditions: Temperature: 23° C Humidity: 54% Atmospheric pressure: 103kPa

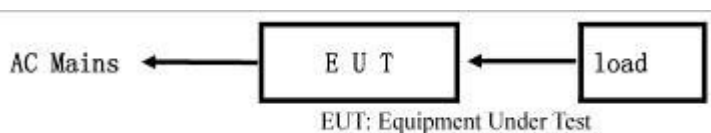
5.5.5 Operation mode: Normal operation mode

5.5.4 Test Results:

Frequency Range (MHz)	Injected Position	Strength	Criterion	Result
0.15 - 80	AC Line	3V (rms) Unmodulated	A	Pass
80-230	AC Line	3V (rms) Unmodulated	A	Pass

5.6 Voltage Dips/Interruptions immunity test

5.6.1 Schematics of the test

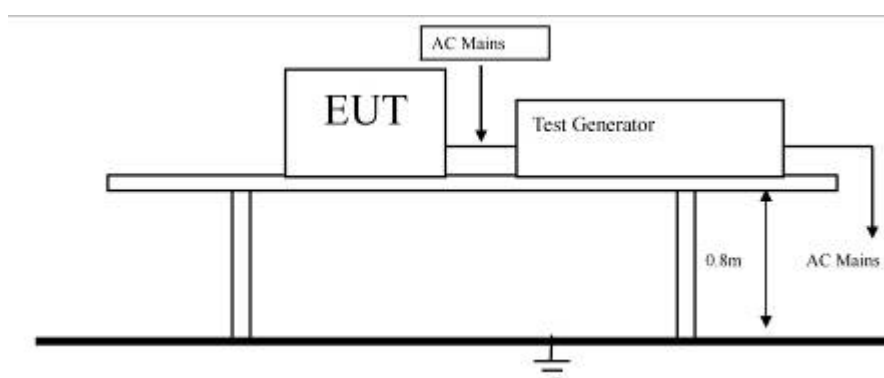


5.6.2 Test Method:

The test was performed in accordance with EN 61000-4-11

Performance Criterion Require: C&B

Block diagram of Test setup



5.6.3 Test Equipment

Please refer to Section 2 this report.

5.6.4 Test specification:

Environmental conditions: Temperature: 23° C Humidity: 54% Atmospheric pressure: 103kPa

5.6.5 Operation mode: Normal operation mode

5.6.6 Test Result:

Test Level % Ut	Voltage dips & short interruptions % Ut	Duration(in period)	Phase Angle	Criterion	Result
50Hz					
0	100	0.5P	0° - 360°	B	Pass
40	60	10P	0° - 360°	C	Pass
70	30	25P	0° - 360°	C	Pass
60Hz					
0	100	0.5P	0° - 360°	B	Pass
40	60	12P	0° - 360°	C	Pass



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70	30	30P	0° - 360°	C	Pass
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6.0 CE Label

6.1 label specification

Text of the mark is black or white in color and is left justified. Labels are printed in indelible ink on permanent adhesive backing and shall be affixed at a conspicuous location on the EUT or silk-screened onto the EUT.



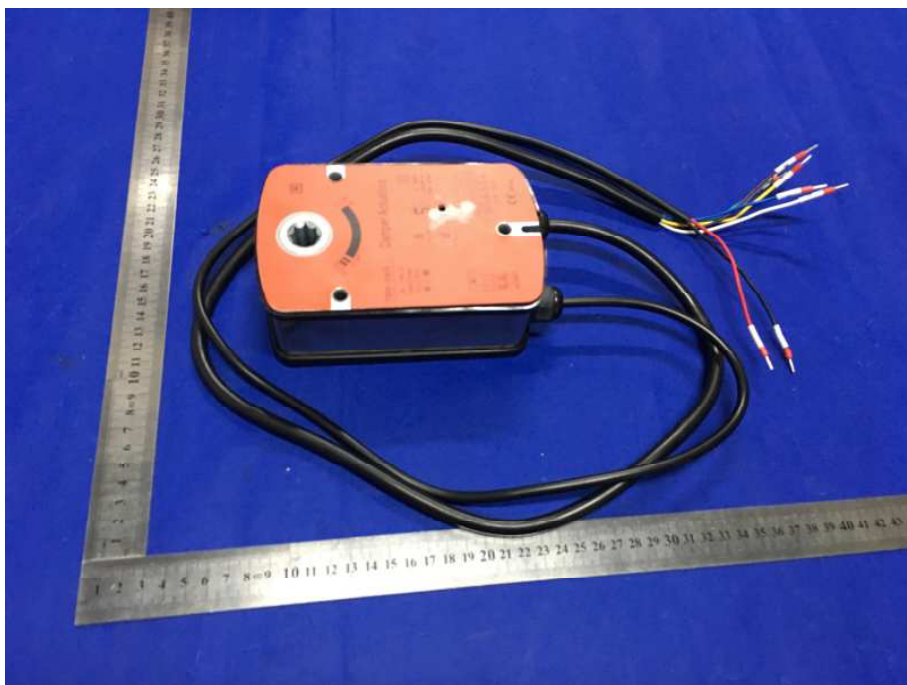
6.2 Mark Location: On the product body

7.0 Photos of testing

Conducted emission



8.0 Photos of EUT



--End of the report--