

Applicant: ZHEJIANG RAMBO INTELLIGENT TECHNOLOGY CO LTD
Daxi Industrial Zone, Daxi Town, Wenling City, Zhejiang Province,
P.R.China

Manufacturer: ZHEJIANG RAMBO INTELLIGENT TECHNOLOGY CO LTD
Daxi Industrial Zone, Daxi Town, Wenling City, Zhejiang Province,
P.R.China

Product Name: Solar Water Pump

Brand Name: N/A

Model Name: See pate two

Ratings: Maximum flow: 6m³/h, Voltage: 110V, Power:1100W

Date of Receipt: July 02,2021

Date of Review: July 02,2021 to July 13,2021

Review Standard: EN 55014-1:2017+A11:2020+A11:2020, EN 55014-2:2015,
EN IEC 61000-3-2:2019, EN 61000-3-3:2013+A1:2019

Review Result: PASS

Prepared by :

Approved by :



Model:

Z3SS0.5-28-12-80, Z3SS1.2-56-24-120, Z3SS1.7-109-48-500, Z3SS2.2-180-110-1100,
Z4SS1.7-70-48-500, Z4SS2.0-95-72-750, Z4SS2.0-110-110-1100, Z3HS0.5-28-12-80,
Z3HS1.2-56-24-120, Z3HS1.7-109-48-500, Z3HS2.2-180-110-1100, Z4HS1.7-70-48-500,
Z4HS2.0-95-72-750, Z4HS2.0-110-110-1100, Z3PC3-25-24-200, Z3PC3.5-47-48-400,
Z3PC3.5-95-72-750, Z3PC3.8-123-110-1100, Z3PC3.8-180-110-1500, Z4PC6-32-48-400,
Z4PC6-56-72-750, Z4PC6-84-110-1100, Z4PC6-112-110-1300, Z4PC6-135-110-1500,
Z4PC9-45-110-750, Z4PC9-58-110-1100, Z4PC9-71-110-1300, Z4PC9-85-110-1500,
Z4PC13-49-110-1100, Z4PC13-60-110-1500, Z3SC4.8-135-110-1500,
Z4SC5.2-198-110-1500, Z3PC3.5-95-110-750-A/D, Z3PC3.8-180-200-1500-A/D,
Z4PC6-84-150-1100-A/D, Z4PC6-135-200-1500-A/D, Z4PC6-175-300-2200-A/D,
Z4PC9-125-300-2200-A/D, Z4PC13-63-200-1500-A/D, Z4PC13-110-300-2200-A/D,
Z3SC4.8-95-110-750-A/D, Z3SC4.8-110-150-1100-A/D, Z3SC4.8-130-200-1500-A/D,
Z4SC5.2-198-200-1500-A/D, Z4SC5.2-255-300-2200-A/D, Z4SC5.2-275-300-2500-A/D,
Z4SC19-60-300-2200-A/D, Z4/6SC36-22-200-1500-A/D, Z4/6SC36-38-300-2200-A/D,
Z4/6SC36-45-300-2500-A/D

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1. GENERAL INFORMATION

1.1 Description of EUT

Product Name: Solar Water Pump
Model Name: Z4PC6-84-110-1100
Serial Number: N/A
Power Supply: 110V
Applicant: ZHEJIANG RAMBO INTELLIGENT TECHNOLOGY CO LTD
Daxi Industrial Zone, Daxi Town, Wenling City, Zhejiang
Province, P.R.China
Manufacturer: ZHEJIANG RAMBO INTELLIGENT TECHNOLOGY CO LTD
Daxi Industrial Zone, Daxi Town, Wenling City, Zhejiang
Province, P.R.China

1.2 Description of Review Facility

Site Description : Shanghai Global Testing Services Co., Ltd.
Name of Firm : Shanghai Global Testing Services Co., Ltd.
Site Location : Floor 2nd, Building D-1, No. 128, Shenfu Road, Minhang
District, Shanghai, China.

The site and apparatus are constructed in conformance with the requirements of ANSI C63.4, CISPR 16-1-1 and other equivalent standards.

1.3 Measurement Uncertainty

Conducted Emission Expanded Uncertainty : U = 1.26 dB
Radiated Emission Expanded Uncertainty : U = 3.02 dB

2. TECHNICAL SUMMARY

2.1 SUMMARY OF STANDARDS AND TEST RESULTS

The EUT have been tested according to the applicable standards as referenced below:

EMISSION (EN 55014-1:2017+A11:2020)		
Test Item	Test Standard	Results
Mains Terminal Continuous Disturbance Voltage	EN 55014-1	P
Mains Terminal Discontinuous Disturbance Voltage	EN 55014-1	N/A
Disturbance Power	EN 55014-1	N/A
Radiated Emission	EN 55014-1	P
Harmonic Current Emissions	EN IEC 61000-3-2:2019	N/A
Voltage Fluctuations and Flicker	EN 61000-3-3:2013+A1:2019	N/A

IMMUNITY (EN 55014-2:2015)		
Test Item	Basic Standard	Results
Electrostatic discharge Immunity	IEC 61000-4-2:2008	P
RF Electromagnetic Field Immunity	IEC 61000-4-3:2006+A1:2007 +A2:2010	P
Electrical Fast Transient/Burst Immunity	IEC 61000-4-4:2012	P
Surge Immunity	IEC 61000-4-5:2014	P
Injected Current	IEC 61000-4-6:2013+Cor 1:2015	P
Voltage Dips	IEC 61000-4-11:2004	P

Note: P means pass, F means failure, N/A means not applicable

2.2 Description of Performance Criteria

The variety and the diversity of the apparatus within the scope of this standard make it difficult to define precise criteria for the evaluation of the immunity test results.

If, as result of the application of the tests defined in this standard, the apparatus becomes dangerous or unsafe, the apparatus shall be deemed to have failed the test.

A functional description and a definition of performance criteria, during or as a consequence of the EMC testing, shall be provided by the manufacturer and noted in the test report, based on the following criteria:

2.2.1 Performance 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, when the apparatus is used as intended. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

2.2.2 Performance 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, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed however. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

2.2.3 Performance 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 instructions for use.

3. TEST EQUIPMENT LIST

Mains Terminal Continuous Disturbance Voltage				
Equipment	Manufacturer	Model	Serial No.	Next Cal.
Shielding Room	CHENGYU	5m×4m×3m	CR	Sep 13, 2021
EMI Test Receiver	R&S	ESCI7	100787	Nov 24,2021
Artificial Mains Network	TESEQ	NNB 51	33285	Nov 24,2021

Radiated Disturbance Test				
Equipment	Manufacturer	Model	Serial No.	Next Cal.
3m Semi-anechoic Chamber	CHENGYU	9.2×6.25×6.15m	SAR	Sep 13,2021
EMI Test Receiver	R&S	ESCI7	100787	Nov 24,2021
EMC Shielding room	Changzhou FeiTe	8 x 5 x 3 mm	Nil	Dec 24, 2021
Broadband Log Antenna	Schwarzbeck	VULB 9163	9163-561	Dec 24, 2021

Harmonic Current Emissions				
Equipment	Manufacturer	Model	Serial No.	Next Cal.
Harmonic Currents and Flick Tester	APS	ECTS-3120T	550029	Dec 24, 2021

Voltage Fluctuations and Flicker Test				
Equipment	Manufacturer	Model	Serial No.	Next Cal.
Harmonic Currents and Flick Tester	APS	ECTS-3120T	550029	Dec 24, 2021

Electrostatic Discharge Immunity Test				
Equipment	Manufacturer	Model	Serial No.	Next Cal.
ESD Generator	SCHAFFNER	NSG 438	849	Nov 24,2021

RF Electromagnetic Field Immunity				
Equipment	Manufacturer	Model	Serial No.	Next Cal.
Radiated Immunity Test System	TESEQ	ITS 6006	37546	Oct 10, 2021
Power Meter	TESEQ	PMR 6006	73819	Oct 10, 2021
Power Amplifier	MILMEGA	AS1860-50	1066592	Oct 10, 2021
Log Periodic Antenna	Schwarzbeck	STLP 9128 D	9128 D 048	Dec 24, 2021
Field Probe	ETS-Lindgren	HI-6105	00161798	Dec 08, 2021



Electrical Fast Transient/Burst Immunity Test				
Equipment	Manufacturer	Model	Serial No.	Next Cal.
EFT/SURGE Generator	TESEQ	NSG 3060	1468	Nov 24,2021
Single Phase Coupling/decoupling Network	TESEQ	CDN 3061	1404	Nov 24,2021

Surge Immunity Test				
Equipment	Manufacturer	Model	Serial No.	Next Cal.
EFT/SURGE Generator	TESEQ	NSG 3060	1468	Nov 24,2021
Single Phase Coupling/decoupling Network	TESEQ	CDN 3061	1404	Nov 24,2021

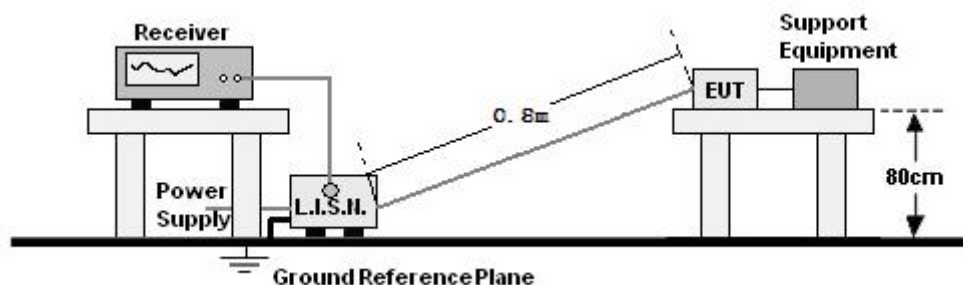
Injected Current Immunity Test				
Equipment	Manufacturer	Model	Serial No.	Next Cal.
Conducted Immunity Test System	TESEQ	NSG 4070	25795	Nov 24,2021
Coupling/Decoupling Network	TESEQ	CDN M116S	35371	Nov 24,2021

Voltage Dips Immunity Test				
Equipment	Manufacturer	Model	Serial No.	Next Cal.
EFT/SURGE Generator	TESEQ	NSG 3060	1468	Nov 24,2021
Single Phase Coupling/decoupling Network	TESEQ	CDN 3061	1404	Nov 24,2021

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and has been calibrated by accredited calibration laboratories.

4. MAINS TERMINAL CONTINUOUS DISTURBANCE VOLTAGE

4.1 DIAGRAM OF TEST SETUP



4.2 APPLICABLE STANDARD

EN 55014-1:2017+A11:2020

4.3 LIMITS FOR CONDUCTED DISTURBANCE

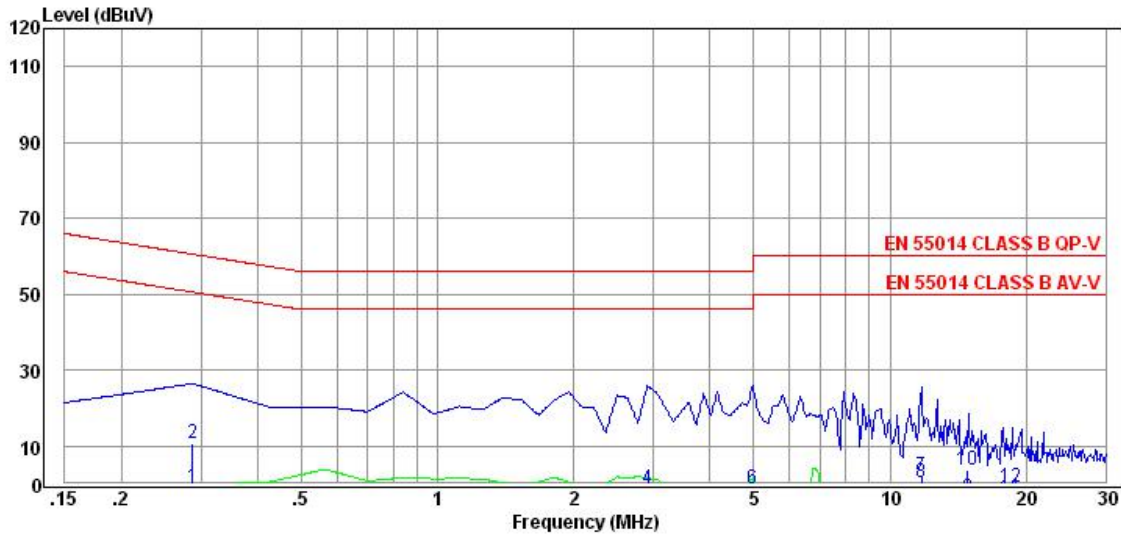
Frequency Range (MHz)	Limits dB(μ V)	
	Quasi-peak	Average
0.15 ~ 0.5	66-56	59-46
0.5 ~ 5	56	46
5 ~ 30	60	50

Note: Decreasing linearly with the logarithm of the frequency from.

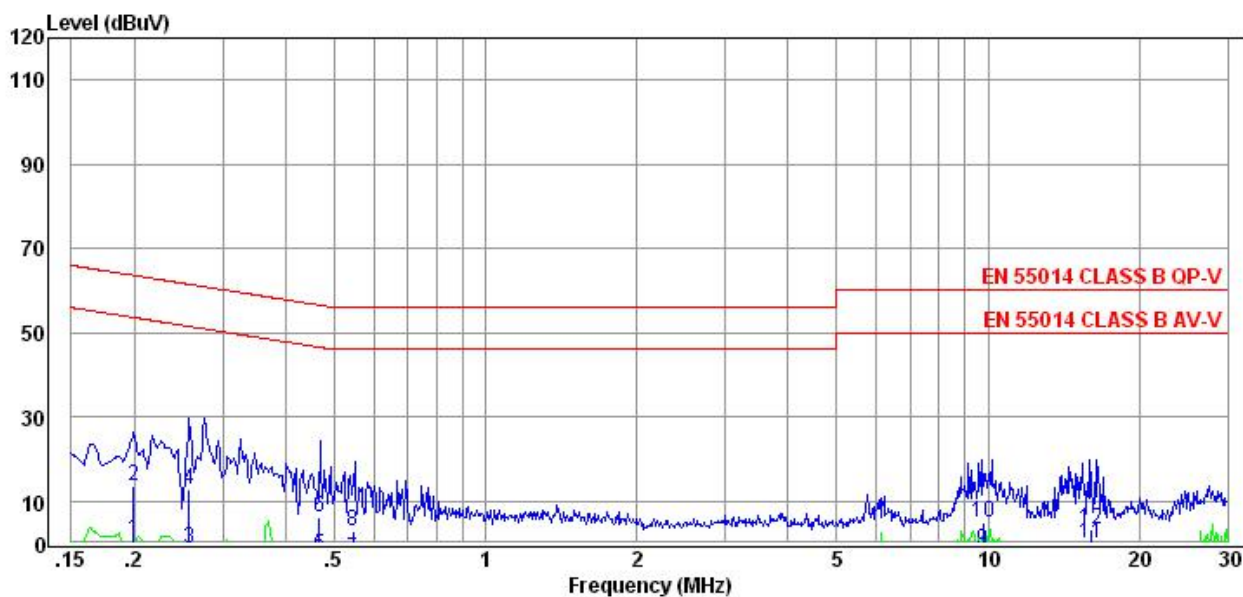
4.4 TEST RESULT

Temperature :	22°C	Humidity :	53%
Test Model :	Operating	Power Supply :	110V

LINE:

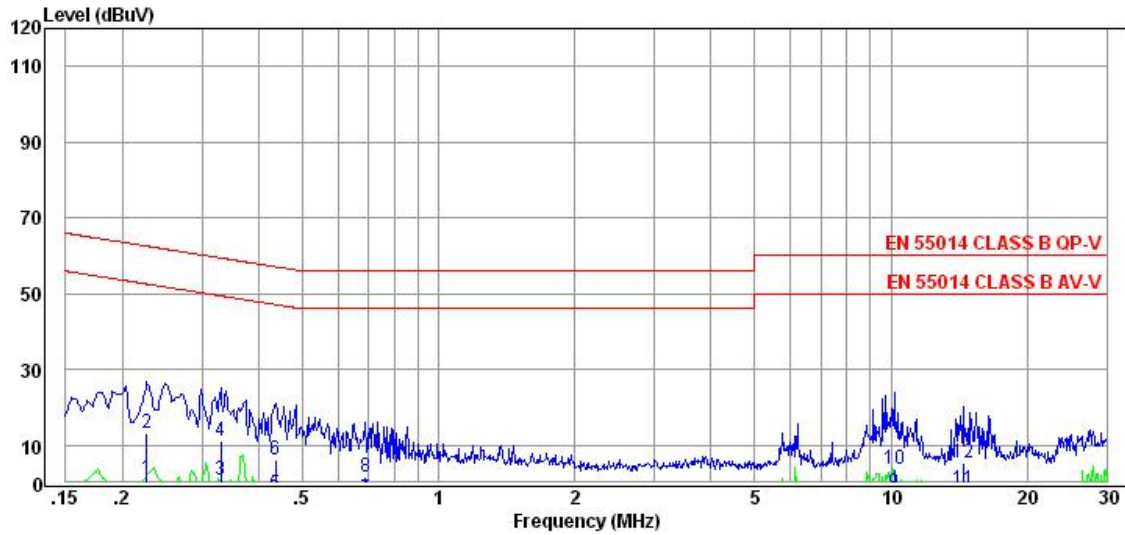


Freq MHz	Reading dBuV	C.F dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Detector
0.29	-10.32	9.66	-0.66	50.59	51.25	Average
0.29	1.24	9.66	10.90	60.59	49.69	QP
2.91	-15.64	9.90	-5.74	46.00	51.74	Average
2.91	-10.99	9.90	-1.09	56.00	57.09	QP
4.97	-15.47	9.92	-5.55	46.00	51.55	Average
4.97	-11.31	9.92	-1.39	56.00	57.39	QP
11.74	-7.92	10.09	2.17	50.00	47.83	Average
11.74	-9.71	10.09	0.38	60.00	59.62	QP
14.87	-13.88	10.07	-3.81	50.00	53.81	Average
14.87	-6.18	10.07	3.89	60.00	56.11	QP
18.59	-13.68	10.13	-3.55	50.00	53.55	Average
18.59	-10.76	10.13	-0.63	60.00	60.63	QP

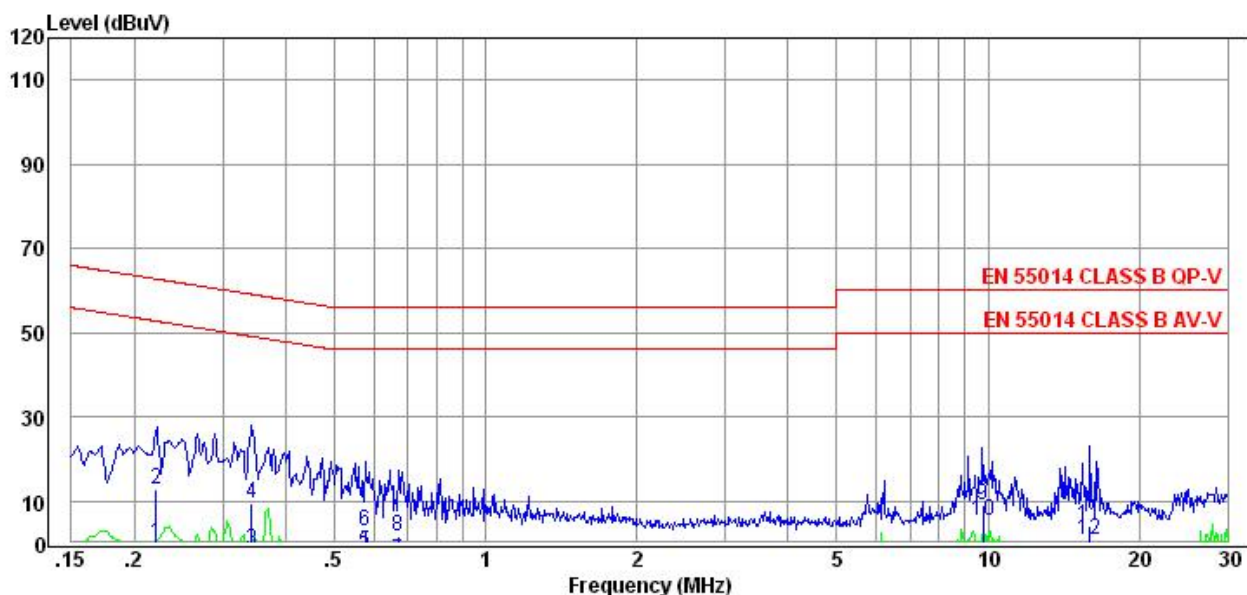


Freq MHz	Reading dBuV	C.F dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Detector
0.20	-8.76	9.57	0.81	53.62	52.81	Average
0.20	3.94	9.57	13.51	63.62	50.11	QP
0.26	-10.68	9.63	-1.05	51.51	52.56	Average
0.26	3.04	9.63	12.67	61.51	48.84	QP
0.47	-12.57	9.65	-2.92	46.55	49.47	Average
0.47	-3.47	9.65	6.18	56.55	50.37	QP
0.55	-13.56	9.68	-3.88	46.00	49.88	Average
0.55	-6.92	9.68	2.76	56.00	53.24	QP
9.78	-11.62	10.07	-1.55	50.00	51.55	Average
9.78	-5.16	10.07	4.91	60.00	55.09	QP
16.01	-10.06	10.12	0.06	50.00	49.94	Average
16.01	-6.65	10.12	3.47	60.00	56.53	QP

NEUTRAL:



Freq MHz	Reading dBuV	C.F dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Detector
0.23	-8.41	9.60	1.19	52.59	51.40	Average
0.23	3.73	9.60	13.33	62.59	49.26	QP
0.33	-9.02	9.65	0.63	49.44	48.81	Average
0.33	1.29	9.65	10.94	59.44	48.50	QP
0.44	-12.63	9.62	-3.01	47.12	50.13	Average
0.44	-3.58	9.62	6.04	57.12	51.08	QP
0.69	-13.77	9.68	-4.09	46.00	50.09	Average
0.69	-7.91	9.68	1.77	56.00	54.23	QP
10.19	-12.48	10.09	-2.39	50.00	52.39	Average
10.19	-6.17	10.09	3.92	60.00	56.08	QP
14.43	-11.85	10.04	-1.81	50.00	51.81	Average
14.43	-4.62	10.04	5.42	60.00	54.58	QP



Freq MHz	Reading dBuV	C.F dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Detector
0.22	-9.79	9.60	-0.19	52.76	52.95	Average
0.22	3.02	9.60	12.62	62.76	50.14	QP
0.34	-11.41	9.63	-1.78	49.14	50.92	Average
0.34	0.05	9.63	9.68	59.14	49.46	QP
0.58	-11.63	9.68	-1.95	46.00	47.95	Average
0.58	-6.87	9.68	2.81	56.00	53.19	QP
0.67	-13.97	9.68	-4.29	46.00	50.29	Average
0.67	-7.91	9.68	1.77	56.00	54.23	QP
9.78	-0.89	10.09	9.20	50.00	40.80	Average
9.78	-4.60	10.09	5.49	60.00	54.51	QP
15.96	-5.94	10.14	4.20	50.00	45.80	Average
15.96	-9.18	10.14	0.96	60.00	59.04	QP

4.5 TEST CONCLUSION

PASS

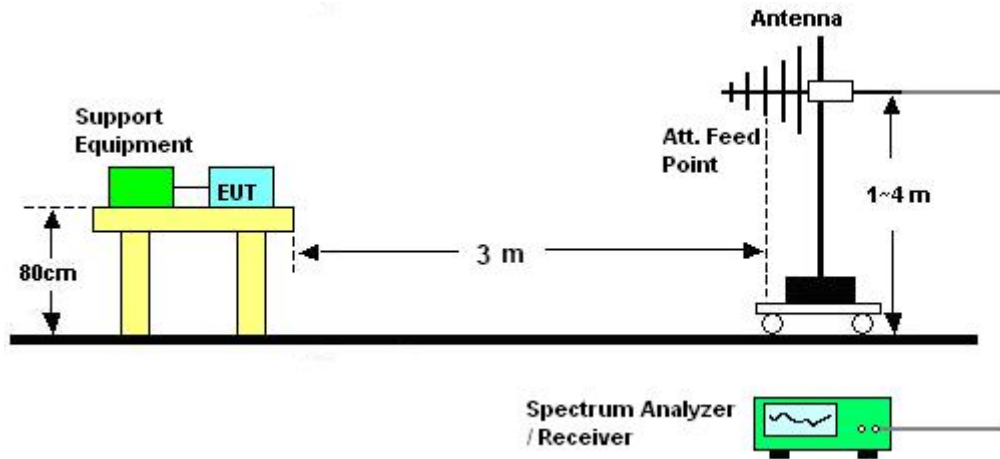


5. MAINS TERMINAL DISCONTINUOUS DISTURBANCE VOLTAGE

N/A

6. RADIATED DISTURBANCE TEST

6.1 DIAGRAM OF TEST SETUP



6.2 APPLICABLE STANDARD

EN 55014-1:2017+A11:2020

6.3 LIMITS FOR RADIATED DISTURBANC

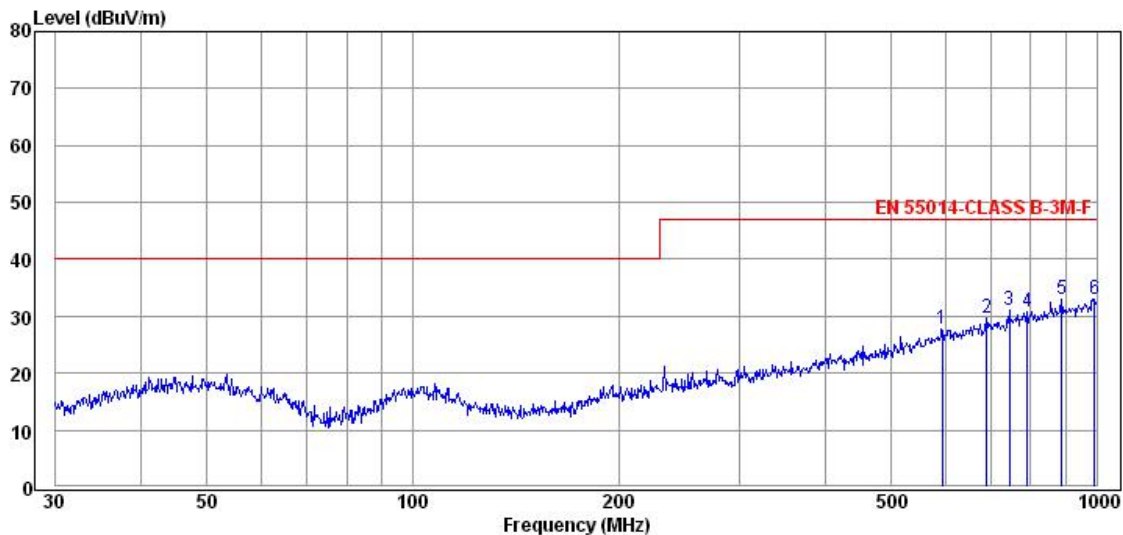
Frequency (MHz)	10 m measuring distance	3 m measuring distance
	Quasi-peak dB(uV/m)	Quasi-peak dB(uV/m)
30 ~ 230	30	40
230 ~ 1000	37	47

NOTE 1- At the transition frequency, the more stringent limit shall apply.

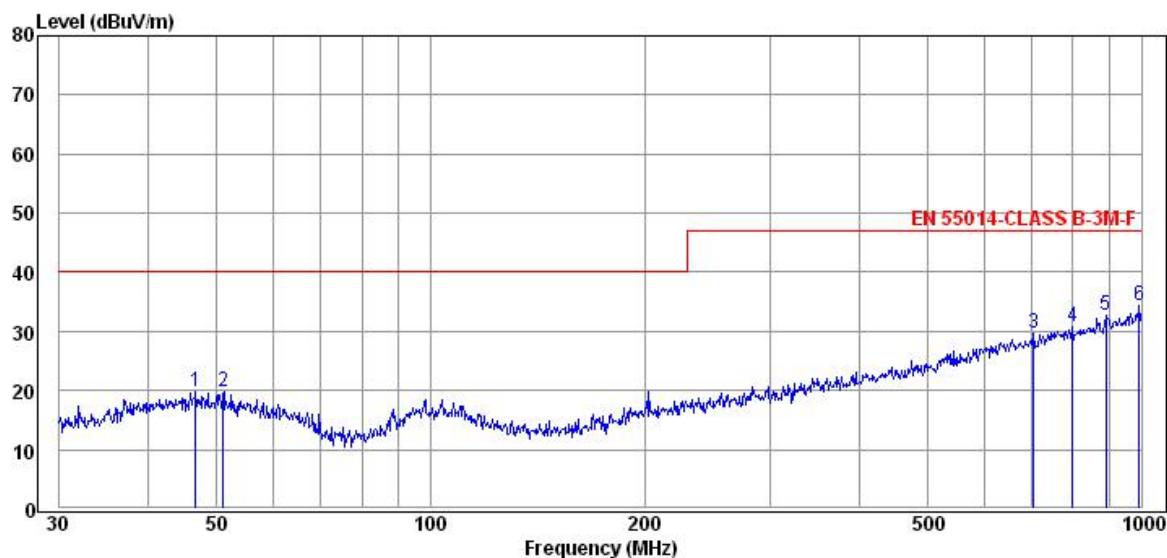
6.4 TEST RESULT

Temperature : 22°C Humidity : 53%
 Test Model : Operating Power Supply : 110V

H:

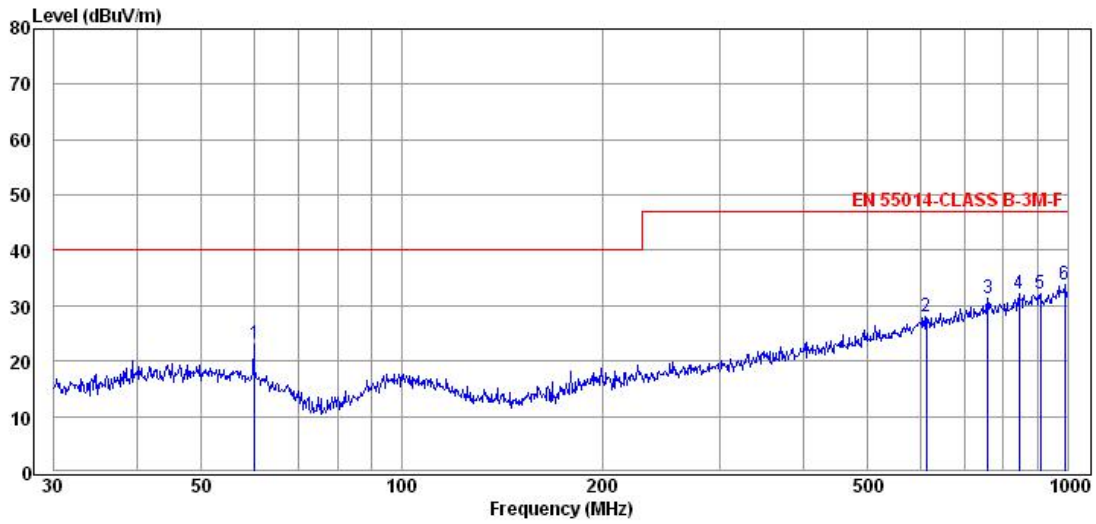


Freq MHz	Reading dBuV	C.F dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Detector
593.66	4.09	23.57	27.66	47.00	19.34	Peak
690.07	5.05	24.68	29.73	47.00	17.27	Peak
745.30	5.29	25.74	31.03	47.00	15.97	Peak
790.98	4.58	26.30	30.88	47.00	16.12	Peak
887.81	5.19	27.85	33.04	47.00	13.96	Peak
993.01	4.02	28.92	32.94	47.00	14.06	Peak

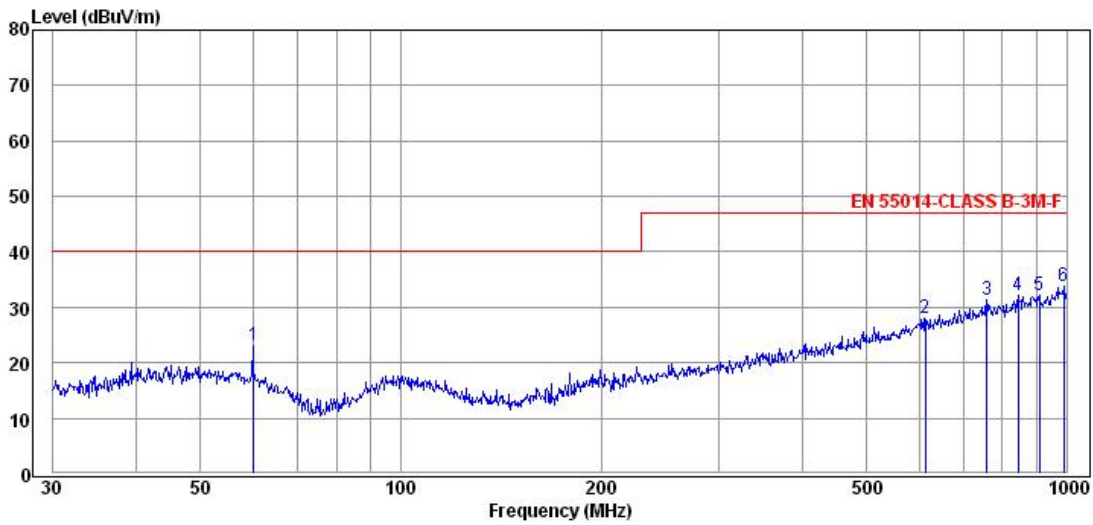


Freq MHz	Reading dBuV	C.F dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Detector
46.61	3.75	15.92	19.67	40.00	20.33	Peak
51.04	3.76	15.92	19.68	40.00	20.32	Peak
704.95	4.83	24.89	29.72	47.00	17.28	Peak
799.50	4.47	26.40	30.87	47.00	16.13	Peak
891.02	4.76	27.89	32.65	47.00	14.35	Peak
993.01	5.38	28.92	34.30	47.00	12.70	Peak

V:



Freq MHz	Reading dBuV	C.F dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Detector
60.03	9.11	14.00	23.11	40.00	16.89	Peak
613.85	4.27	23.82	28.09	47.00	18.91	Peak
759.28	5.39	26.00	31.39	47.00	15.61	Peak
845.91	5.03	27.13	32.16	47.00	14.84	Peak
910.15	4.03	28.05	32.08	47.00	14.92	Peak
989.57	4.93	28.88	33.81	47.00	13.19	Peak



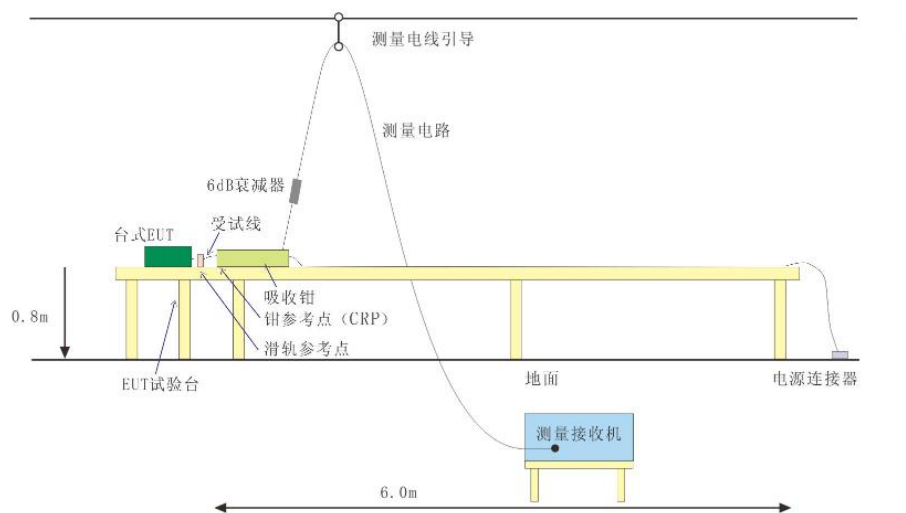
Freq MHz	Reading dBuV	C.F dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Detector
46.34	3.92	15.92	19.84	40.00	20.16	Peak
49.88	3.68	15.92	19.60	40.00	20.40	Peak
59.86	11.14	14.00	25.14	40.00	14.86	Peak
755.39	4.76	25.94	30.70	47.00	16.30	Peak
839.18	5.64	27.01	32.65	47.00	14.35	Peak
1000.00	3.73	29.03	32.76	47.00	14.24	Peak

6.5 TEST CONCLUSION

PASS

7. DISTURBANCE POWER

7.1 DIAGRAM OF TEST SETUP



7.2 APPLICABLE STANDARD EN 55014-1:2017+A11:2020

7.3 LIMITS FOR DISTURBANCE POWER

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

7.4 TEST RESULT

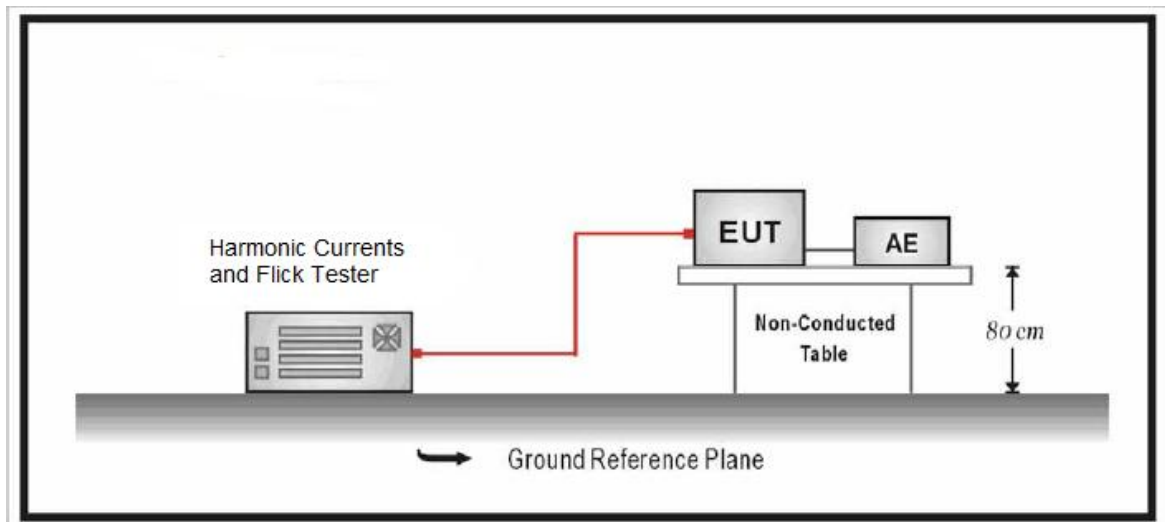
N/A

7.5 TEST CONCLUSION

N/A

8. HARMONIC CURRENT EMISSION TEST

8.1 DIAGRAM OF TEST SETUP



8.2 APPLICABLE STANDARD

EN IEC 61000-3-2:2019 (Class A)

8.3 HARMONIC CURRENT LIMITS

Limits for Class A equipment	
Harmonics Order n	Max. permissible harmonics current A
Odd harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
$15 \leq n \leq 39$	$0.15 \times 15/n$
Even harmonics	
2	1.08
4	0.43
6	0.30
$8 \leq n \leq 40$	$0.23 \times 8/n$

8.4 TEST RESULTS

Temperature : 22°C

Humidity : 50%

Test Model : Operating

Power Supply : 110V



Harmonics Results							
Harmonic	Status	Avg (A)	Avg L(A)	Avg %ofL	Peak (A)	Peak L(A)	Peak %ofL
1	PASS	0.19846	No Limit	N/A	0.24107	No Limit	N/A
2	PASS	2E-06	1.08	0.000195	0.00012	1.62	0.007393
3	PASS	0.18353	2.3	7.979566	0.22356	3.45	6.48
4	PASS	2E-06	0.43	0.000579	0.00012	0.645	0.018673
5	PASS	0.1706	1.14	14.96491	0.20503	1.71	11.99006
6	PASS	2E-06	0.3	0.000659	0.00012	0.45	0.026856
7	PASS	0.15255	0.77	19.81169	0.1794	1.155	15.53247
8	PASS	1E-06	0.23	0.000407	6.4E-05	0.345	0.018518
9	PASS	0.13059	0.4	32.6475	0.14887	0.6	24.81167
10	PASS	1E-06	0.184	0.000679	0.00017	0.276	0.061888
11	PASS	0.10641	0.33	32.24545	0.1162	0.495	23.47475
12	PASS	0	0.15333	0.000223	6.4E-05	0.23	0.027959
13	PASS	0.08159	0.21	38.85143	0.08483	0.315	26.92857
14	PASS	0	0.13143	0.000326	6.4E-05	0.19715	0.03263
15	PASS	0.05777	0.15	38.516	0.05873	0.225	26.10133
16	PASS	0	0.115	0.000151	6.5E-05	0.1725	0.037701
17	PASS	0.03649	0.13235	27.57084	0.03824	0.19853	19.26055
18	PASS	0	0.10222	0.000168	6.4E-05	0.15333	0.041951
19	PASS	0.01926	0.11842	16.26246	0.02214	0.17763	12.46636
20	PASS	0	0.092	0	0	0.138	0
21	PASS	0.00935	0.10714	8.724939	0.01265	0.16071	7.871943
22	PASS	0	0.08364	0	0	0.12545	0
23	PASS	0.01044	0.09783	10.66997	0.01845	0.14674	12.57539
24	PASS	0	0.07667	0	0	0.115	0
25	PASS	0.01455	0.09	16.17111	0.02036	0.135	15.07778
26	PASS	0	0.07077	0	0	0.10615	0
27	PASS	0.01623	0.08333	19.47488	0.01879	0.125	15.03286
28	PASS	0	0.06571	0	0	0.09857	0
29	PASS	0.01522	0.07759	19.61952	0.01595	0.11638	13.70522
30	PASS	0	0.06133	0	0	0.092	0
31	PASS	0.01234	0.07258	17.00307	0.01293	0.10887	11.88006
32	PASS	0	0.0575	0	0	0.08625	0
33	PASS	0.00846	0.06818	12.40195	0.00997	0.10227	9.745387
34	PASS	0	0.05412	0	0	0.08118	0
35	PASS	0.00482	0.06429	7.495411	0.00647	0.09643	6.706385
36	PASS	0	0.05111	0	0	0.07667	0
37	PASS	0.00301	0.06081	4.945322	0.00643	0.09122	7.047189
38	PASS	0	0.04842	0	0	0.07263	0
39	PASS	0.00385	0.05769	6.674582	0.00766	0.08654	8.855069
40	PASS	0	0.046	0	0	0.069	0

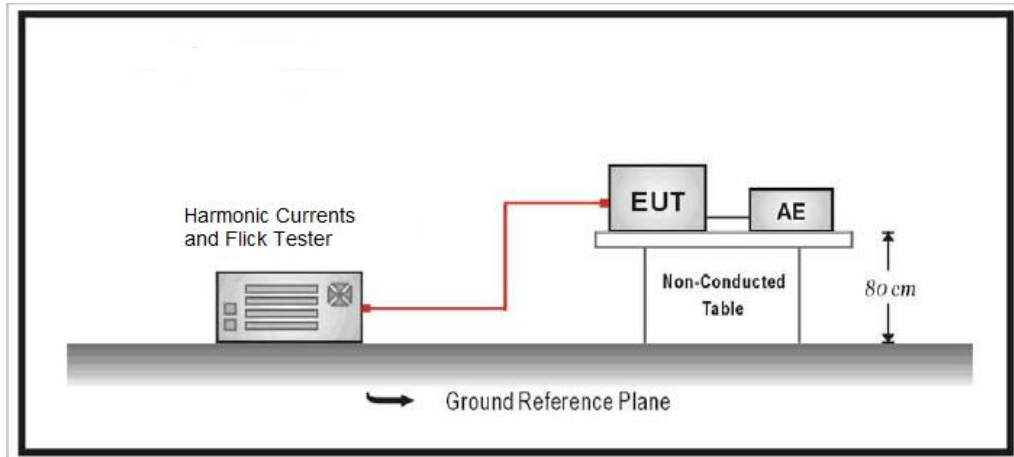


8.5 TEST CONCLUSION

PASS

9. VOLTAGE FLUCTUATIONS AND FLICKER TEST

9.1 DIAGRAM OF TEST SETUP



9.2 APPLICABLE STANDARD

IEC 61000-3-3:2013

9.3 VOLTAGE FLUCTUATIONS AND FLICKER EMISSION LIMITS

Test Item	Limit	Note
P_{st}	1.0	Short-term flicker indicator
P_{lt}	0.65	Long-term flicker indicator
$T_{dt}(ms)$	500	Maximum time that dt exceeds 3%
$d_{max}(\%)$	4%	Maximum relative voltage change
$d_c(\%)$	3.3%	Relative steady-state voltage change

9.4 TEST RESULTS

Temperature : 22°C

Humidity : 53%

Test Model : Operating

Power Supply : 110V

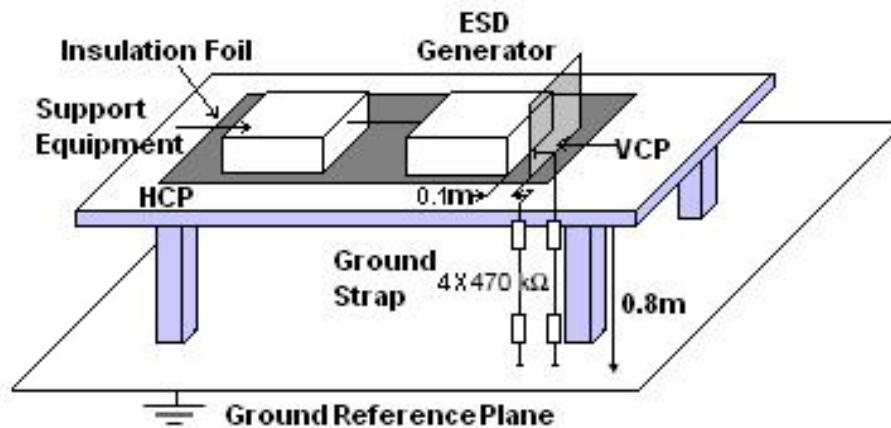
Test Parameter	Limit	Measurement Value	Verdict
P_{st}	1.0	0.0823	Pass
P_{lt}	0.65	0.040	Pass
T_{dt}	0.5	0.000	Pass
$D_{max} (\%)$	4%	0.0525%	Pass
$D_c (\%)$	3.3%	0.0121%	Pass

9.5 TEST CONCLUSION

PASS

10. ELECTROSTATIC DISCHARGE IMMUNITY TEST

10.1 DIAGRAM OF TEST SETUP



10.2 APPLICABLE STANDARD

IEC 61000-4-2:2008, Contact Discharge: $\pm 2\text{kV}$, $\pm 4\text{kV}$;

Air Discharge: $\pm 2\text{kV}$, $\pm 4\text{kV}$, $\pm 8\text{kV}$

10.3 SEVERITY LEVELS AND PERFORMANCE CRITERION

10.3.1 Severity levels

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

10.3.2 Performance criterion: B

10.4 TEST RESULT

Temperature : 25°C Humidity : 45%
 Test Model : Operating Power Supply : 110V

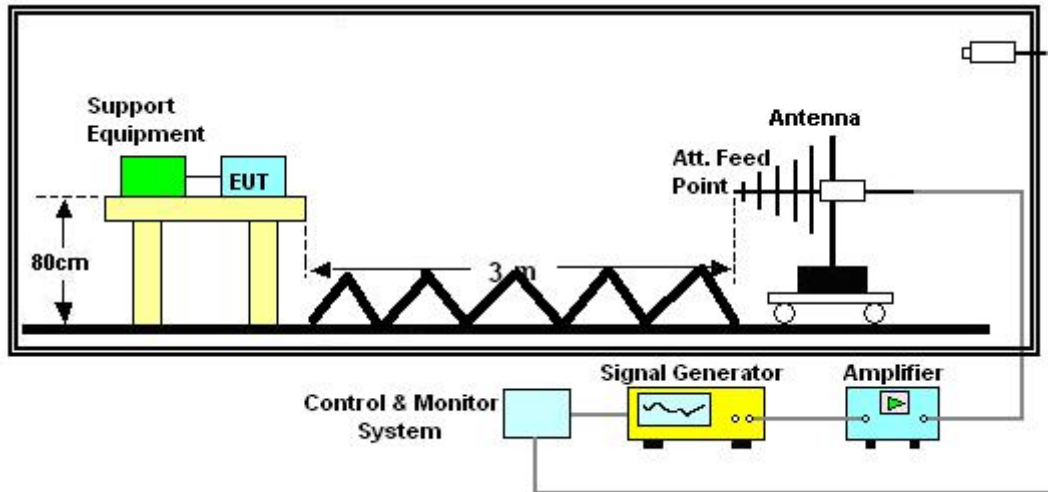
Air Discharge Voltage: $\pm 2\text{kV}$, $\pm 4\text{kV}$, $\pm 8\text{kV}$			
Contact Discharge Voltage: $\pm 2\text{kV}$, $\pm 4\text{kV}$			
Contact Discharge: For each point positive 10 times and negative 10 times discharge			
Air Discharge: For each point positive 10 times and negative 10 times discharge			
Location	Point	Kind	Result
Around the EUT	4	C (VCP)	P
Around the EUT	4	C (HCP)	P
Metal part of EUT	10	C	P
Gap	/	A	P
NOTE 1 – C (Contact Discharge), A(Air Discharge);			
NOTE 2 – HCP (Horizontal Coupling Plane), VCP (Vertical Coupling Plane).			

10.5 TEST CONCLUSION

PASS

11. RF ELECTROMAGNETIC FIELD IMMUNITY TEST

11.1 Diagram of Test Setup



11.2 Applicable Standard

IEC 61000-4-3: 2006+A1:2007+A2:2010;

Field Strength: 3 V/m, Test Value: 80-1000 MHz Modulation: 80% AM 1 kHz

11.3 Severity Levels and Performance Criterion

11.3.1 Severity levels

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

11.3.2 Performance criterion: A

11.4 Test Result

Temperature : 24°C Humidity : 55%
 Test Model : Operating Power Supply : 110V

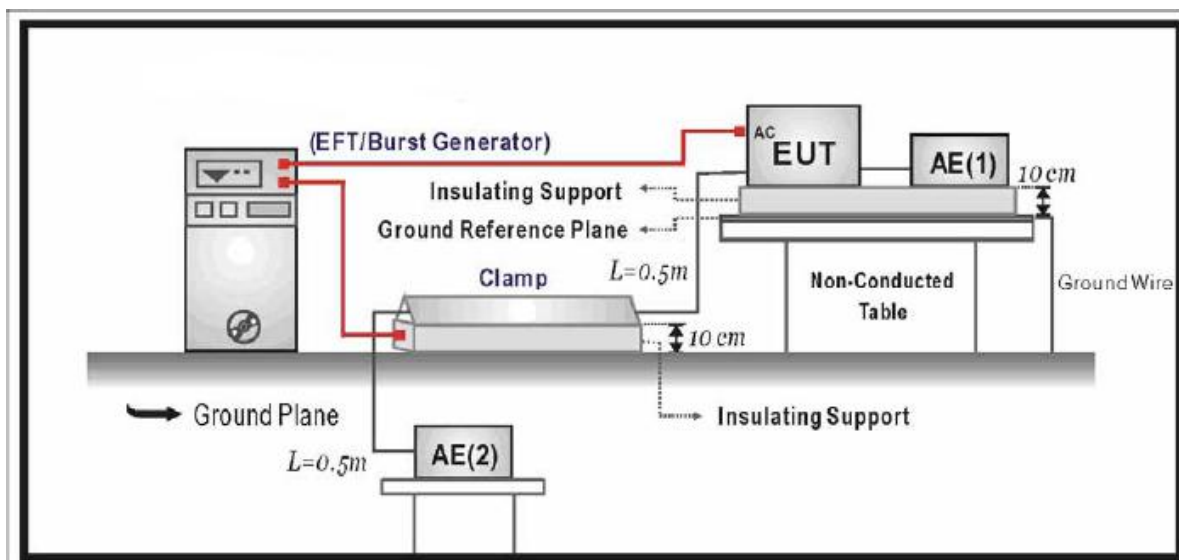
Frequency Range		80 MHz to 1000 MHz,	
Modulation		80% AM 1 kHz	
Steps		1 %	
Dwell Time		3 s	
Field Strength		3V/m	
Antenna Polarization		Horizontal	Vertical
EUT Position	Front	P	P
	Rear	P	P
	Right	P	P
	Left	P	P
	Floor	—	—
	Top	—	—

11.5 TEST CONCLUSION

PASS

12. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

12.1 DIAGRAM OF TEST SETUP



12.2 APPLICABLE STANDARD

IEC 61000-4-4:2012, Test Value: ± 1.0 kV, 5/50ns, 5kHz)

12.3 SEVERITY LEVELS AND PERFORMANCE CRITERION

12.3.1 SEVERITY LEVELS

Open circuit output test voltage and repetition rate of the impulses				
Level	On power port, PE		On I/O (input/output) signal, data and control ports	
	Voltage peak kV	Repetition rate kHz	Voltage peak kV	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
Xa	Special	Special	Special	Special

Note 1: Use of 5kHz repetition rates is traditional; however, 100kHz is closer to reality. Product committees should determine which frequencies are relevant for specific products or product types.

Note 2: With some products, there may be no clear distinction between power ports and I/O ports, in which case it is up to product committees to make this determination for test purposes.

“Xa” is an open level. The level has to be specified in the dedicated equipment specification.

12.3.2 PERFORMANCE CRITERION: B

12.4 TEST RESULTS

Temperature : 24°C Humidity : 55%
Test Model : Operating Power Supply : 110V

Location	Voltage kV	Repetition rate kHz	Duration of Test (seconds)	Inject Method	Result
AC power ports	±1	5	120	Direct	P
DC power ports	--	--	--	--	--
Signal line and Control line	--	--	--	--	--

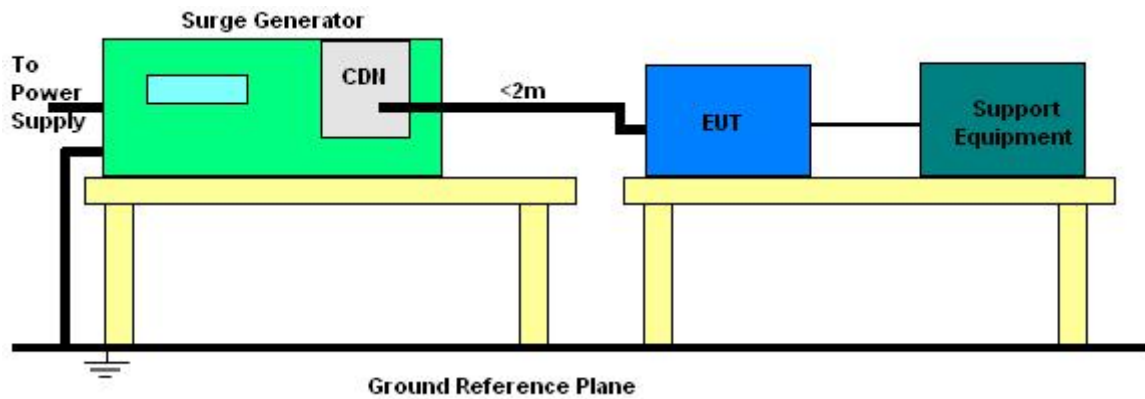
NOTE – “--” means the item is no applicable.

12.5 TEST CONCLUSION

PASS

13. SURGE IMMUNITY TEST

13.1 Diagram of Test Setup



13.2 Applicable Standard

IEC 61000-4-5:2014, Line to line: 1kV; Line to earth: 2kV

13.3 Severity Levels and Performance Criterion

13.3.1 Severity levels

Test Level	Power Supply Coupling Mode	
	Line to Line kV	Line to Earth kV
1	NA	0.5
2	0.5	1.0
3	1.0	2.0
4	2.0	4.0
X	Special	Special

13.3.2 Performance criterion: B

13.4 Test Result

Temperature : 24°C

Humidity : 55%

Test Model : Operating

Power Supply : 110V

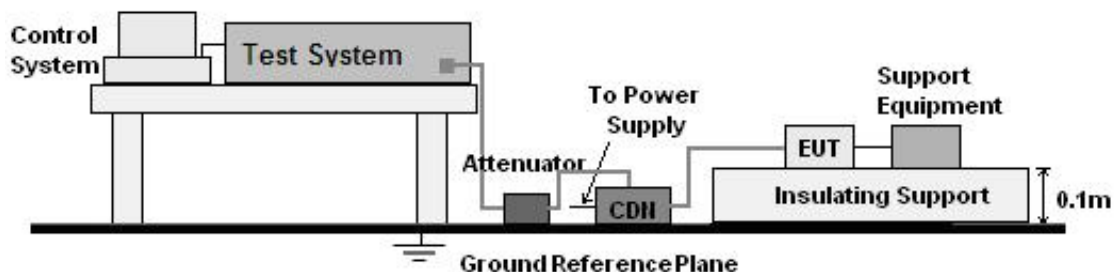
Location	Polarity		Phase Angle	No. of Pulse	Pulse Voltage (kV)	Result
L-N	+	-	0	5	1	P
	+	-	90	5	1	P
	+	-	180	5	1	P
	+	-	270	5	1	P
DC power ports	--	--	--	--	--	--
Signal line and Control line	--	--	--	--	--	--

NOTE "--" means the item is no applicable.

13.5 TEST CONCLUSION**PASS**

14. INJECTED CURRENT IMMUNITY TEST

14.1 Diagram of Test Setup



14.2 APPLICABLE STANDARD

IEC 61000-4-6:2013+Cor 1:2015, Test Value : 0.15-230MHz, 3V Modulation, 80%AM 1kHz

14.3 SEVERITY LEVELS AND PERFORMANCE CRITERION

14.3.1 Severity levels

Frequency Range 0.15 MHz – 80 MHz		
Level	Voltage Level (e.m.f.)	
	U0 dB(μV)	U0 (V)
1.	120	1
2.	130	3
3.	140	10
Xa	Special	
Xa is an open level.		

14.3.2 Performance criterion: A

14.4 TEST RESULTS

Temperature : 24°C Humidity : 55%
 Test Model : Operating Power Supply : 110V

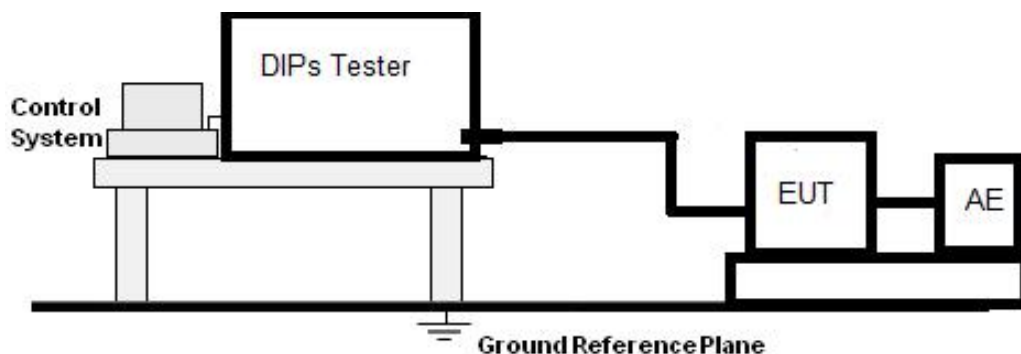
Frequency Range(MHz)	Injected Position	Strength (Unmodulated)	Criterion	Results
0.15 ~ 230	AC Mains	3V(r.m.s.)	A	P

14.5 TEST CONCLUSION

PASS

15. VOLTAGE DIPS

15.1 DIAGRAM OF TEST SETUP



15.2 APPLICABLE STANDARD

IEC 61000-4-11: 2004, Test Value: Voltage dips: 0% during half cycle; 40% during 10 cycles; 70% during 25 cycles.

15.3 SEVERITY LEVELS AND PERFORMANCE CRITERION

15.3.1 Preferred severity levels and durations for voltage dips

Class ^a	Test level and durations for voltage dips (ts) (50Hz/60Hz)				
Class 1	Case-by-case according to the equipment requirements				
Class 2	0% during ½ cycle	0% during 1 cycle	70% during 25/30 ^c cycles		
Class 3	0% during ½ cycle	0% during 1 cycle	40% during 10/12 ^c cycles	70% during 25/30 ^c cycles	80% during 250/300 ^c cycles
Class X ^b	X	X	X	X	X

a Classes as per IEC 61000-2-4.

b To be defined by product committee. For equipment connected directly or indirectly to the public network, the levels must not be less severe than Class 2.

c “25/30 cycles” means “25 cycles for 50Hz test” and “30 cycles for 60Hz test”.

15.3.2 Preferred severity levels and durations for short interruptions:

Class ^a	Test level and durations for short interruptions (ts) (50Hz/60Hz)
Class 1	Case-by-case according to the equipment requirements
Class 2	0% during 250/300 ^c cycles
Class 3	80% during 250/300 ^c cycles
Class X ^b	X

a Classes as per IEC 61000-2-4.
 b To be defined by product committee. For equipment connected directly or indirectly to the public network, the levels must not be less severe than Class 2.
 c “250/300 cycles” means “250 cycles for 50Hz test” and “300 cycles for 60Hz test”.

15.3.3 Performance criterion:

Voltage dips: 0% during half cycle: C
 40% during 10 cycles: C
 70% during 25 cycles: C

15.4 TEST RESULTS

Temperature : 24°C Humidity : 55%
 Test Model : Operating Power Supply : 110V

Test level (%U _t)	Voltage Dips in %U _t	Duration (cycles)	Phase (in angle)	Voltage phenomenon	Result
0	100	0.5	0°, 45°, 90°, 135°, 180°, 225°, 270°, 315°	Dips	P
40	60	10	0°, 45°, 90°, 135°, 180°, 225°, 270°, 315°	Dips	P
70	30	25	0°, 45°, 90°, 135°, 180°, 225°, 270°, 315°	Dips	P

15.5 TEST CONCLUSION

PASS

----End of the report----

Type of equipment, model: Solar Water Pump

Details of:

View:

- general
- front
- rear
- right
- left
- top
- bottom



Details of:

View:

- general
- front
- rear
- right
- left
- top
- bottom



Details of:

View:

general

front

rear

right

left

top

bottom



Details of:

View:

general

front

rear

right

left

top

bottom



Details of:

View:

general

front

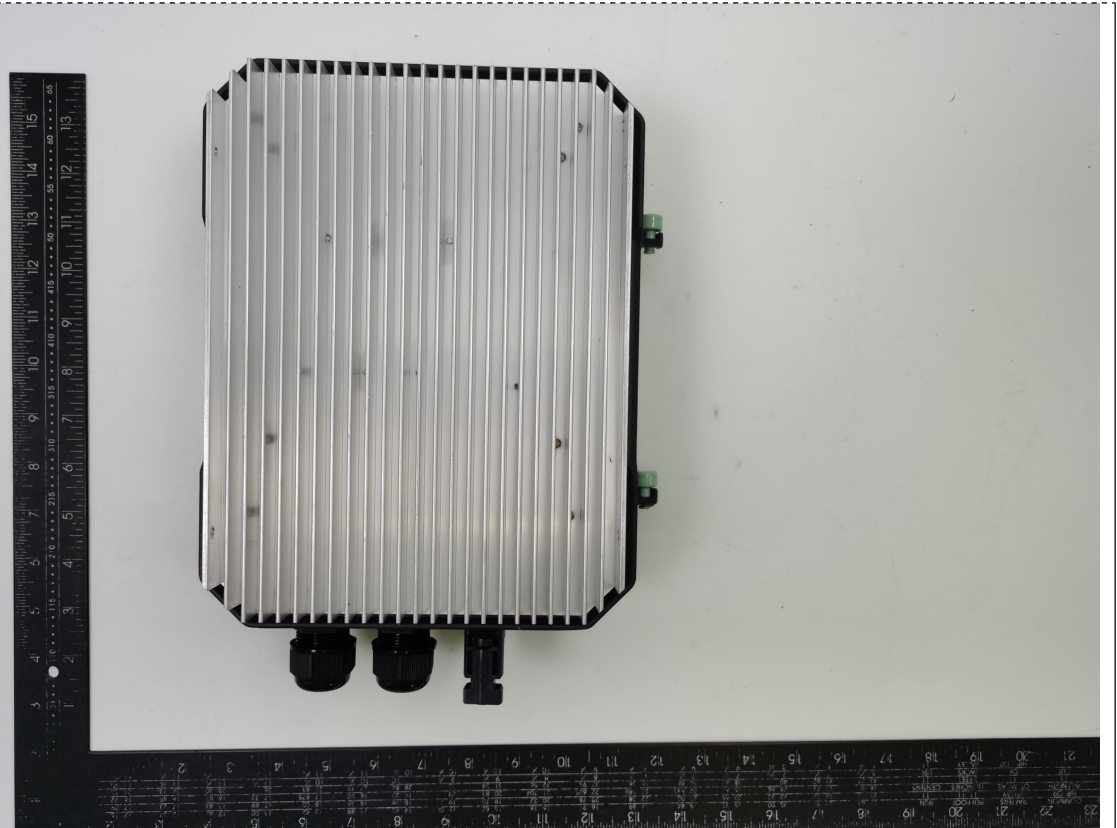
rear

right

left

top

bottom



Details of:

View:

general

front

rear

right

left

top

bottom



Details of:

View:

general

front

rear

right

left

top

bottom



Details of:

View:

general

front

rear

right

left

top

bottom



Details of:

View:

general

front

rear

right

left

top

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