EMC REPORT

Product Type:	Water Pumps(Submersible Pump)
Model No.:	See Appendix I
Trademark:	/
Applicant:	Tianjin Streampumps Industry Co., Ltd. No.17, Xeda Jimei Ind. Park Xiqing Economic Development Area, Tianjin, China
Manufacturer:	Tianjin Streampumps Industry Co., Ltd. No.17, Xeda Jimei Ind. Park Xiqing Economic Development Area, Tianjin, China
Report Number:	OViSCE2104-032E
Testing Standard:	EN 55014-1:2017+A11:2020, EN 55014-2:2015, EN IEC 61000-3-2:2019, EN 61000-3-3:2013+A1:2019
Date of Test:	Apr. 15, 2021 to Apr. 22, 2021
Date of Report:	Apr. 23, 2021
Test Result:	☒ Positive ☐ Negative

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TEST REPORT DESCRIPTION

Applicant	:	Tianjin Streampumps Industry Co., Ltd
Manufacturer	:	Tianjin Streampumps Industry Co., Ltd
Trade Mark	:	/
EUT	:	Water Pumps(Submersible Pump)
Model No	:	See Appendix I
Power Supply	:	220-240 V, 50/60Hz, Tmax:40℃
Remark	:	Use SVQ2200(F) do all the tests

Measurement Procedure Used:

EN 55014-1:2017+A11:2020, EN 55014-2:2015,
EN IEC 61000-3-2:2019,
EN 61000-3-3:2013+A1:2019
(IEC 61000-4-2:2008, IEC 61000-4-3:2020, IEC 61000-4-4:2012 RLV,
IEC 61000-4-5:2014+AMD1:2017 CSV, IEC 61000-4-6:2013, IEC 61000-4-11:2020 RLV)

The device described above is tested by Zhejiang European African Testing&Certification Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Zhejiang European African Testing&Certification Co., Ltd. is assumed full of responsibility for the accuracy and completeness of these measurements.
Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the EN 55014-1, EN 61000-3-2, EN 61000-3-3 and EN 55014-2 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Zhejiang European African Testing&Certification Co., Ltd.

Prepared by : Caroline Chen
(Caroline Chen)

Reviewer by : Sam Jin
(Sam Jin)

Approved by : Lily LI
(Lily LI)

1. TEST RESULTS SUMMARY

Test Results Summary

	Test Items	Test Results
1	Power Line Conducted Emission Test	PASS
2	Disturbance Power Test	PASS
3	Harmonic Current Test	PASS
4	Voltage Fluctuations & Flicker Test	PASS
5	Electrostatic Discharge Test	PASS
6	Radio Frequency Electromagnetic Fields	PASS
7	Electrical Fast Transient/Burst Test	PASS
8	Surge Test	PASS
9	Injected Currents Susceptibility Test	PASS
10	Voltage Dips And Interruptions Test	PASS

2.GENERAL INFORMATION

2.1.Report Information

2.1.1. This report is not a certificate of quality, it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that Zhejiang European African Testing&Certification Co., Ltd. approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that Zhejiang European African Testing&Certification Co., Ltd. in any way guarantees the later performance of the product/equipment.

2.1.2. The sample/s mentioned in this report is/are supplied by applicant, Zhejiang European African Testing&Certification Co., Ltd. Therefore assumes no responsibility for the accuracy of information on the brand names, model number, origin of manufacture or any information supplied.

Additional copies of the report are available to the applicant at an additional fee. No third part can obtain a copy of this report through Zhejiang European African Testing&Certification Co., Ltd., unless the applicant has authorized Zhejiang European African Testing&Certification Co., Ltd. in writing to do so.

2.2.Description of Device (EUT)

Description	:	Water Pumps(Submersible Pump)
Number Model	:	SVQ2200(F)
Applicant	:	Tianjin Streampumps Industry Co., Ltd
Address	:	No.17, Xeda Jimei Ind. Park Xiqing Economic Development Area, Tianjin, China
Manufacturer	:	Tianjin Streampumps Industry Co., Ltd
Address	:	No.17, Xeda Jimei Ind. Park Xiqing Economic Development Area, Tianjin, China

2.3. Test Facility

Site Description

Tested by	:	Zhejiang European African Testing&Certification Co., Ltd.
Site Location	:	4th Floor, Building 4, No. 888 Donghuan Road, Development Zone, Taizhou City, Zhejiang P.R.China

2.4. Test Uncertainty

Conducted Emission Uncertainty = ±2.66dB

Radiated Emission Uncertainty = ±3.26dB

2.5. Test Condition

Test Mode: ON

2.6. Test Conditions

Temperature: 22℃-28℃

Relative Humidity: 45%-68%

2.7.Performance Criterion

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.

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. During the test, degradation of performance is allowed, however. No change of actual operating state or stored data is allowed, of 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.

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 INSTRUCMENT USED

3.1. For Power Line Conducted Emission Test (In Shielding Room)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	ROHDE&SCHWARZ	ESCS30	828985/018	2020.07.15	1 Year
2.	LISN	ROHDE&SCHWARZ	ESH2-Z5	834549/005	2020.07.15	1 Year
3.	50Ω Coaxial Switch	ANRITSU	MP59B	M20531	2020.07.15	1 Year
4.	Pulse Limiter	ROHDE&SCHWARZ	ESH3-Z2	100006	2020.07.15	1 Year
5.	Voltage Probe	ROHDE&SCHWARZ	TK9416	N/A	NCR	NCR

3.2. For Disturbance Power Test (In Shielding Room)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum analyzer	ADVANTEST	R3261C	51720141	2020.07.15	1 Year
2.	EMI Test receiver	R&S	ESS	92822-1	2020.07.15	1 Year
3.	Pre Amplifier	Anritsu	MH648A	0983	2020.07.15	1 Year
4.	Absorbing Clamp	R&S	MDS-21	837/23	2020.07.15	1 Year
5.	Absorbing Clamp	R&S	MDS-21	837/24	2020.07.15	1 Year
6.	Absorbing Clamp	Kyoritsu	KT-20	8220	2020.07.15	1 Year
7.	RF Selector	TOYO	NS4000	432099	NCR	NCR
8.	Remote Controller	TOYO	MAC	N/A	NCR	NCR

3.3. For Harmonic / Flicker Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal Conditioning Unit	SCHAFFNER	CCN1000-1	23980/7	2020.07.15	1 Year
2.	Signal Phase Impedance Network	SCHAFFNER	INA2152	0929-2	2020.07.15	1 Year
3.	5KVA AC Power Source	SCHAFFNER	NSG1007	2983332	2020.07.15	1 Year

3.4. For Electrostatic Discharge Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Tester	Noiseken	ESS-200AX	0223	2020.07.15	1 Year

3.5. For Radio Frequency Electromagnetic Fields Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	RF Power Meter Dual Channel	BOONTON	4232A	10539	2020.07.15	1 Year
2.	50ohm Diode Power Sensor	BOONTON	51011EMC	34236/34238	2020.07.15	1 Year
3.	Broad-band horn Antenna	SCHWARZBECK	BBHA9120 L3F	332	2020.07.15	1 Year
4.	Power Amplifier	PRANA		N/A	2020.07.15	1 Year
5.	Power Amplifier	MILMEGA	AS0102-55	N/A	2020.07.15	1 Year
6.	Signal Generator	AEROFLEX	20238	N/A	2020.07.15	1 Year
7.	Field Strength Meter	HOLADAY	HI-6005	N/A	2020.07.15	1 Year
8.	RS232 Fiber optic modem	HOLADAY	HI-4413P	N/A	2020.07.15	1 Year
9.	Log.-per. Antenna	SCHWARZBECK	VULP9118E	N/A	2020.07.15	1 Year

3.6. For Electrical Fast Transient/Burst Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Ultra Compact Simulator	EM TEST	UCS500M6	0500-19	2020.07.15	1 Year

3.7. For Surge Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Surge Tester	HAEFELY	PSURGE4.1	080107-04	2020.07.15	1 Year

3.8. For Injected Currents Susceptibility Test

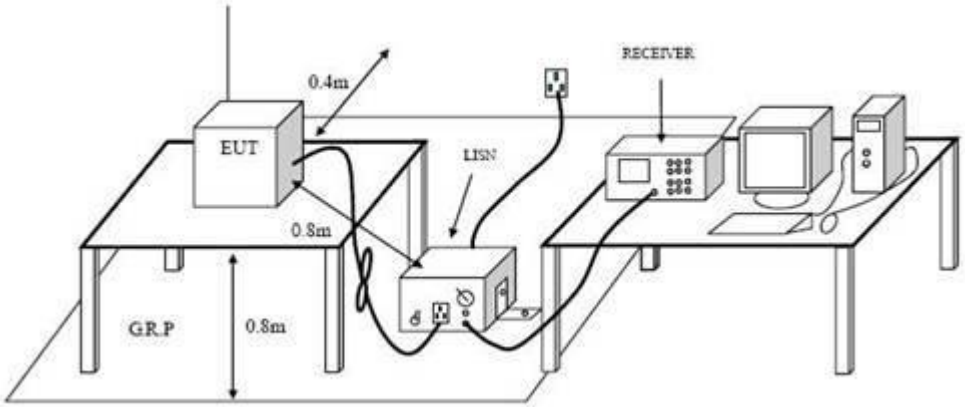
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal Generator	IFR	2032	203002/100	2020.07.15	1 Year
2.	Amplifier	A&R	150W1000	301584	2020.07.15	1 Year

3.9. For Voltage Dips and Interruptions Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Dips Tester	HEAFELY	PLINE 1610	083732-18	2020.07.15	1 Year

4. POWER LINE CONDUCTED EMISSION TEST

4.1. Block Diagram of Test Setup



4.2. Test Standard

EN 55014-1:2017+A11:2020

4.3. Power Line Conducted Emission Limit

Frequency	At AC Mains Terminals		At Load Terminals	
	Quasi-peak Level dB(μV)	Average Level dB(μV)	Quasi-peak Level dB(μV)	Average Level dB(μV)
150 kHz~500 kHz	66 ~ 56	59 ~ 46	80	70
500kHz~5MHz	56	46	74	64
5MHz~30MHz	60	50	74	64

Remark: Decreasing linearly with logarithm of frequency.

4.4. EUT Configuration on Test

The following equipments are installed on RF LINE VOLTAGE test to meet EN 55014-1 requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

4.5. Water Pumps(Submersible Pump)(EUT)

Model Number: V1500(F),QDX1.5-12-0.25(F)
Manufacturer: Tianjin Streampumps Industry Co., Ltd

4.6. Operating Condition of EUT

4.6.1. Setup the EUT as shown in Section 4.1.

4.6.2. Turn on the power of all equipments.

4.6.3. Let the EUT work in test mode (on) and test it.

4.7. Test Procedure

The EUT is put on the ground and connected to the AC mains through a Line Impedance Stabilization Network (L.I.S.N.). This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are checked to find out the maximum conducted emission according to the EN 55014-1 regulations during conducted emission test.

The bandwidth of the test receiver (R&S Test Receiver ESCS30) is set at 10 kHz.

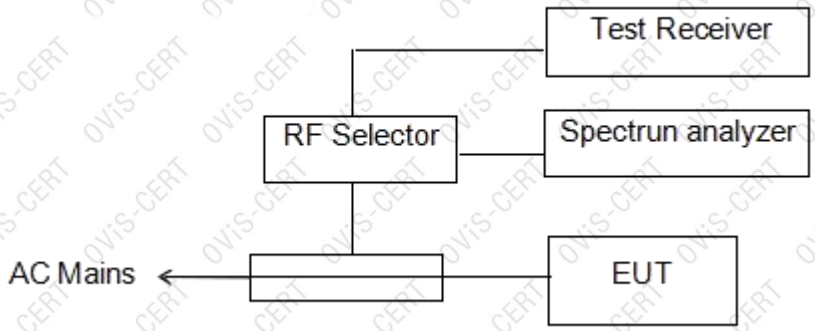
The frequency range from 150 kHz to 30 MHz is checked.

4.8. Power Line Conducted Emission Test Results

PASS.

5. DISTURBANCE POWER TEST

5.1. Block Diagram of Test Setup



5.2. Disturbance Power Test Standard and Limit

5.2.1. Test Standard

EN 55014-1:2017+A11:2020

5.2.2. Test Limit

All emanations from devices or system including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:

Frequency MHz	Interference Power Limits (dBpW)	
	Quasi-peak Value	Average Value
30 ~ 300	45 Increasing Linearly with Frequency to 55	35 Increasing Linearly with Frequency to 45

5.3. EUT Configuration on Test

The EN 55014-1 regulations test method must be used to find the maximum emission during radiated emission test.

The configuration of EUT is the same as used in conducted emission test. Please refer to Section 4.3.

5.4. Operating Condition of EUT

Same as conducted test which is listed in section 4.4. Except the test set up replaced by section 5.1

5.5. Test Procedure

The EUT is placed on the ground and away from other metallic surface at least 0.4m. It is connected to the power mains through an extension cord of 6m min. The absorber clamp clamps the cord and moves from the far end to the EUT to measure the disturbing energy emitted from the cord.

The bandwidth of the test receiver(R&S Test Receiver ESS) is set at 120kHz.

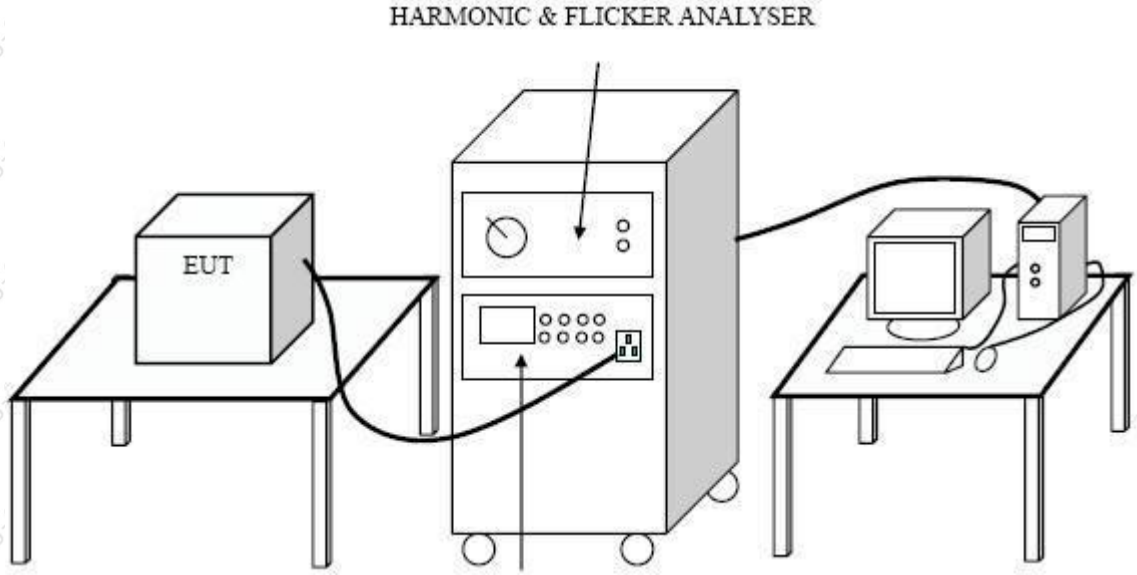
All the test results are listed in Section 5.6.

5.6. Test Results

PASS.

6. HARMONIC CURRENT TEST

6.1. Block Diagram of Test Setup



6.2. Test Standard

EN IEC 61000-3-2:2019, Class A

6.3. Operating Condition of EUT

Same as Section 4.4.except the test set up replaced by Section 6.1.

6.4. Test Results

PASS.

7. VOLTAGE FLUCTUATIONS & FLICKER TEST

7.1. Block Diagram of Test Setup

Same as Section 6.1.

7.2. Test Standard

EN 61000-3-3:2013+A1:2019

7.3. Operating Condition of EUT

Same as Section 6.3

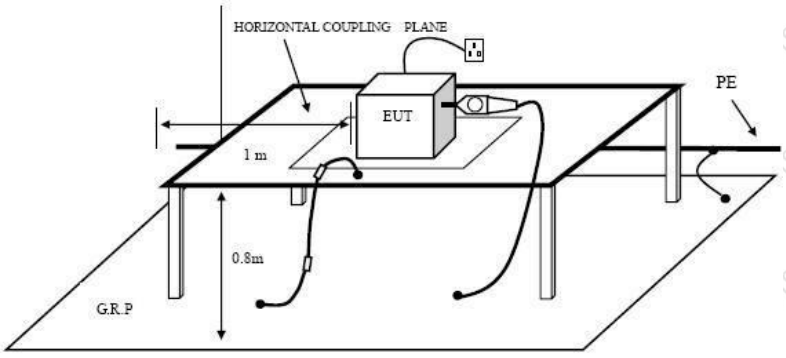
7.4. Test Results

PASS.

8. ELECTROSTATIC DISCHARGE TEST

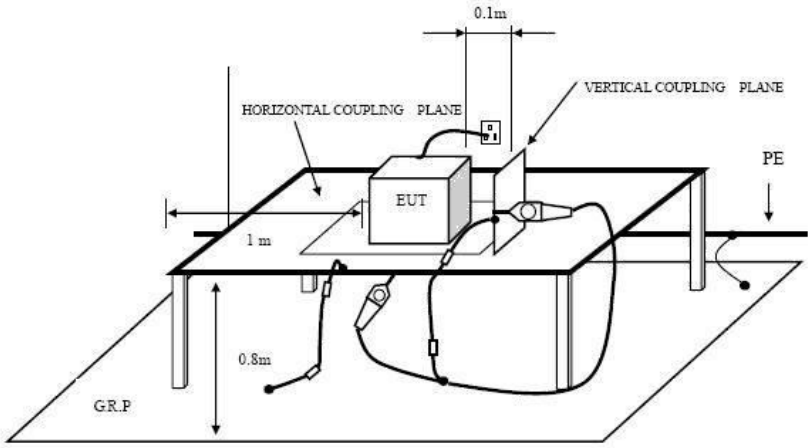
8.1. Block Diagram of Test Setup

8.1.1. Block Diagram of ESD Test Setup (Direct Discharge)



DIRECT DISCHARGE SETUP

8.1.2. Block Diagram of ESD Test Setup (Indirect Discharge)



INDIRECT DISCHARGE SETUP

8.2. Test Standard

EN 55014-2:2015 (EN 61000-4-2:2009)

Severity Level 3 for Air Dischar ge at 8kV

Severity Level 2 for Contact Discharge at 4k

8.3. Severity Levels and Performance Criterion

8.3.1. Severity level

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

8.3.2. Performance criterion: **B**

8.4. EUT Configuration on Test

The configurations of EUT are listed in Section 4.4.

8.5. Operating Condition of EUT

8.5.1.Setup the EUT as shown in Section 8.1.

8.5.2.Turn on the power of all equipments.

8.5.3.Let the EUT work in test mode (ON) and test it.

8.6. Test Procedure

8.6.1. Air Discharge:

This test is done on non-conductive surfaces. 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.

8.6.2. Contact Discharge:

All the procedure shall be same as Section 8.6.1. Except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

8.6.3. Indirect discharge for horizontal coupling plane

At least 20 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

8.6.4. Indirect discharge for vertical coupling plane

At least 20 single discharges 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.

8.7. Test Results

PASS.

Please refer to the following page.

Electrostatic Discharge Test Results

Zhejiang European African Testing&Certification Co., Ltd.

Date: Apr. 20,2021

Applicant :	Tianjin Streampumps Industry Co., Ltd	Test Date :	Apr. 20,2021
EUT :	Water Pumps(Submersible Pump)	Temperature :	24℃
M/N :	SVQ2200(F)	Humidity :	52%
Power Supply :	AC 230V, 50Hz	Test Mode :	ON
Test Engineer :	Martina		

Air Discharge: ±8kV discharge. For each point positive 10 times and negative 10 times

Contact Discharge: ±4kV

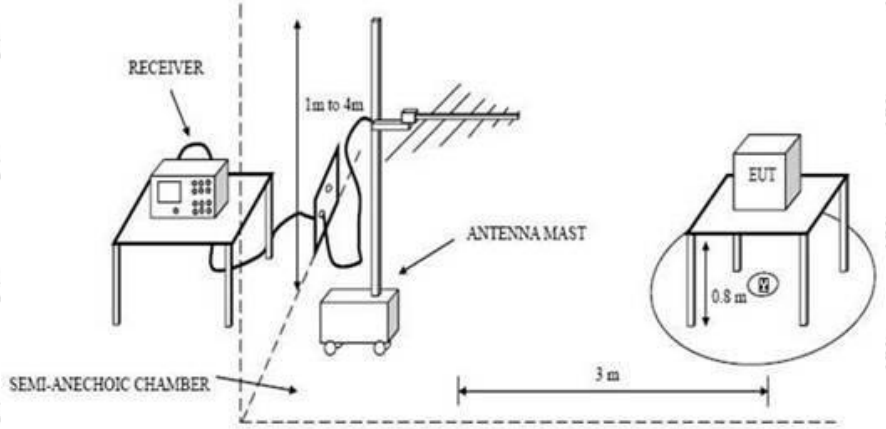
Location		**Kind** A-Air Discharge C-Contact Discharge	Result
Slots	10 points	A	PASS
Surface	10 points	A	PASS
Screw	5 points	C	PASS
HCP	5 points	C	PASS
VCP	5 points	C	PASS
Remark :			

Discharge should be considered on Contact and Air and Horizontal Coupling Plane (HCP) and Vertical Coupling Plane (VCP).

Reviewer: Sam Tan

9. RF FIELD STRENGTH SUSCEPTIBILITY TEST

9.1. Block Diagram of Test Setup



9.2. Test Standard

EN 55014-2:2015 (EN 61000-4-3:2006+A2:2010)

Severity Level: 2, 3V/m

9.3. Severity level and Performance criterion

9.3.1. Severity level

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

Performance criterion : **A**

9.4. EUT Configuration on Test

The configuration of EUT is listed in Section 4.4.

9.5. Operating Condition of EUT

Setup the EUT as shown in Section 6.1. The operating condition of EUT is listed in section 4.5.

9.6. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter 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 EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD camera is used to monitor the EUT. All the scanning conditions are as follows :

Condition of Test	Remarks
1. Fielded Strength	3 V/m (Severity Level 2)
2. Radiated Signal	Modulated
3. Scanning Frequency	80-1000 MHz,1.4-6GHz
4. Sweeping time of radiated	0.0015 decade/s
5. Dwell Time	1 Sec.

9.7. Test Results

PASS

Please refer to the following page.

RF Field Strength Susceptibility Test Results

Zhejiang European African Testing&Certification Co., Ltd.

Date: Apr. 20,2021

Applicant	:	Tianjin Streampumps Industry Co., Ltd	Test Date	:	Apr. 20,2021
EUT	:	Water Pumps(Submersible Pump)	Temperature	:	24℃
M/N	:	SVQ2200(F)	Humidity	:	52%
Test Engineer	:	Martina	Test Mode	:	ON
			Frequency Range	:	/

Modulation: ☒ AM ☐ Pulse ☐ none ☐ 1 kHz 80%

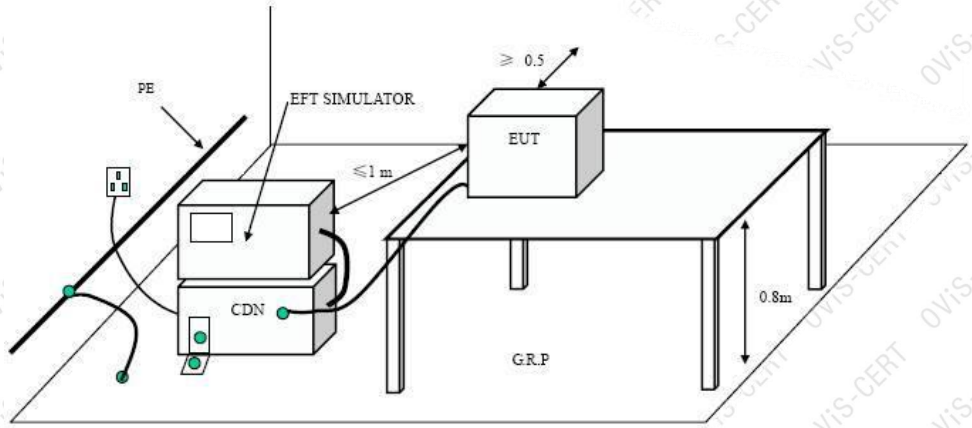
Criterion : A

Frequency Range:	80-1000 MHz,1.4-6GHz	
Steps	1%	1%
	Horizontal	Vertical
Front	Pass	Pass
Right	Pass	Pass
Rear	Pass	Pass

Reviewer: Sam Shi

10. ELECTRICAL FAST TRANSIENT/BURST TEST

10.1. Block Diagram of Test Setup



10.2. Test Standard

EN 55014-2:2015 (EN 61000-4-4:2012)

Severity Level 2 at 1kV

10.3. Severity Levels and Performance Criterion

10.3.1. Severity level

Open Circuit Output Test Voltage ±10%		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1.	0.5 kV	0.25 kV
2.	1 kV	0.5 kV
3.	2 kV	1 kV
4.	4 kV	2 kV
X	Special	Special

10.3.2. Performance criterion: **B**

10.4. EUT Configuration on Test

The configurations of EUT are listed in Section 4.4.

10.5. Operating Condition of EUT

10.5.1. Setup the EUT as shown in Section 10.1.

10.5.2. Turn on the power of all equipments.

10.5.3. Let the EUT work in test mode (ON) and test it.

10.6. Test Procedure

The EUT is put on the table which is 0.8 meter high above the ground. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between the EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

10.6.1. For input and output AC power ports:

The EUT is connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 mins.

10.6.2. For signal lines and control lines ports:

It's unnecessary to test.

10.6.3. For DC output line ports:

It's unnecessary to test.

10.7. Test Results

PASS.

Please refer to the following page.

Electrical Fast Transient/Burst Test Results

Zhejiang European African Testing&Certification Co., Ltd.

Date: Apr. 20,2021

Applicant :	Tianjin Streampumps Industry Co., Ltd	Test Date :	Apr. 20,2021
EUT :	Water Pumps(Submersible Pump)	Temperature :	24℃
M/N :	SVQ2200(F)	Humidity :	52%
Power Supply :	AC 230V, 50Hz	Test Mode :	ON
Test Engineer :	Martina		

Inject Place : AC Mains

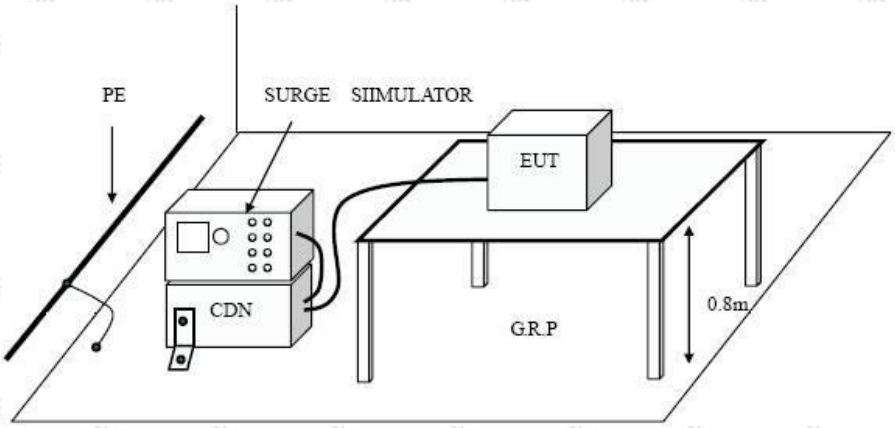
Inject Line	Voltage kV	Inject Time(s)	Inject Method	Results	Inject Line	Voltage kV	Inject Time(s)	Inject Method	Results
L	±1	120	Direct	PASS	L+N+ PE	±1	120	Direct	PASS
N	±1	120	Direct	PASS					
PE	±1	120	Direct	PASS					

Remark:

Reviewer: Sam Chu

11. ELECTRICAL FAST TRANSIENT/BURST TEST

11.1. Block Diagram of Test Setup



11.2. Test Standard

EN 55014-2:2015 (EN 61000-4-5:2014+A1:2017)

Severity Level: Line to Line: Level 2, 1kV

11.3. Severity Levels and Performance Criterion

11.3.1. Severity level

Severity Level	Open-Circuit Test Voltage kV
1	0.5
2	1.0
3	2.0
4	4.0
*	Special

Performance criterion: **B**

11.4. EUT Configuration on Test

The configurations of EUT are listed in Section 4.4

11.5. Operating Condition of EUT

11.5.1. Setup the EUT as shown in Section 11.1.

11.5.2. Turn on the power of all equipments.

11.5.3. Let the EUT work in test mode (ON) and test it.

11.6. Test Procedure

1) Set up the EUT and test generator as shown on Section 11.1.
2) For line to line coupling mode, provide a 1.0kV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points, and for active line / neutral line to ground are same except test level is 2kV.
3) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
4) Different phase angles are done individually.
5) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

11.7. Test Results

PASS.

Please refer to the following page.

Surge Immunity Test Results

Zhejiang European African Testing&Certification Co., Ltd.

Date: Apr. 20,2021

Applicant :	Tianjin Streampumps Industry Co., Ltd	Test Date :	Apr. 20,2021
EUT :	Water Pumps(Submersible Pump)	Temperature :	24℃
M/N :	SVQ2200(F)	Humidity :	52%
Power Supply :	AC 230V, 50Hz	Test Mode :	ON
Test Engineer :	Martina		

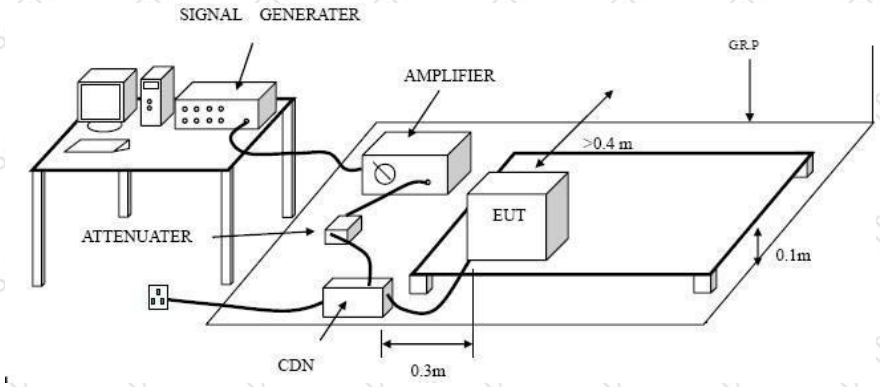
Location	Polarity	Phase Angle	No of Pulse	Pulse Voltage (kV)	Result
L+N	±	0	5	1.0	PASS
	±	90	5	1.0	PASS
	±	180	5	1.0	PASS
	±	270	5	1.0	PASS
L+PE N+PE	±	0	5	2.0	PASS
	±	90	5	2.0	PASS
	±	180	5	2.0	PASS
	±	270	5	2.0	PASS

Remark:

Reviewer: Sam Jin

12. INJECTED CURRENTS SUSCEPTIBILITY TEST

12.1. Block Diagram of Test Setup



12.2. Test Standard

EN 55014-2:2015 (EN 61000-4-6:2014+AC:2015)
Severity Level 2 at 3V (rms), 0.15MHz ~ 230MHz

12.3. Severity Levels and Performance Criterion

12.3.1. Severity level

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

12.3.2. Performance criterion: **A**

12.4. EUT Configuration on Test

The configurations of EUT are listed in Section 4.4

12.5. Operating Condition of EUT

12.5.1. Setup the EUT as shown in Section 12.1.

12.5.2. Turn on the power of all equipments.

12.5.3. Let the EUT work in test mode (ON) and test it.

12.6. Test Procedure

1) Set up the EUT and test generator as shown on Section 12.1.
2) Let the EUT work in test mode and test it.
3) The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
4) The disturbance signal described below is injected to EUT through CDN.
5) The EUT operates within its operational mode(s) under intended climatic conditions after power on.
6) The frequency range is swept from 150kHz to 230MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1 kHz sine wave. Suitable for over 1m refrigerators
7) The rate of sweep shall not exceed 1.5*10-3decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
8) Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion

12.7. Test Results

PASS.

Please refer to the following page.

Injected Currents Susceptibility Test Results

Zhejiang European African Testing&Certification Co., Ltd.

Date: Apr. 21,2021

Applicant :	Tianjin Streampumps Industry Co., Ltd	Test Date :	Apr. 21,2021
EUT :	Water Pumps(Submersible Pump)	Temperature :	24℃
M/N :	SVQ2200(F)	Humidity :	52%
Power Supply :	AC 230V, 50Hz		
Test Engineer :	Martina		

Frequency Range (MHz)	Injected Position	Strength	Criterion	Result
0.15 ~ 230	AC Line	3V(rms), Unmodulated	A	PASS

Remark: 1. Modulation Signal:1kHz 80% AM

2. Standard Applied :

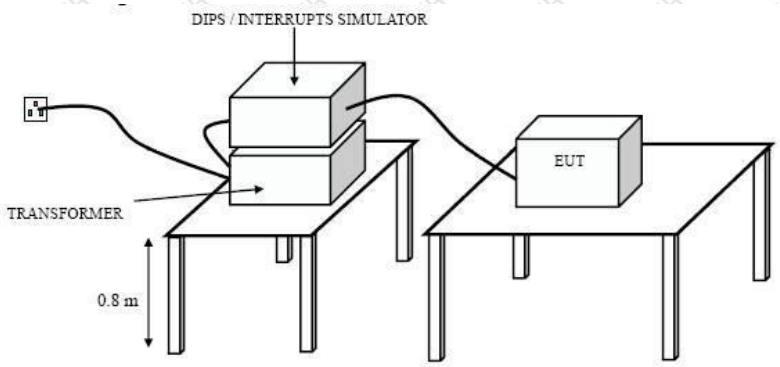
EN 61000-4-6:2014

Note:

Reviewer: Sam Chn

13. VOLTAGE DIPS AND INTERRUPTIONS TEST

13.1. Block Diagram of Test Setup



13.2. Test Standard

EN 55014-2:2015 (EN 61000-4-11:2004+A1:2017)

13.3. Severity Levels and Performance Criterion

13.3.1. Severity level

Test Level $\%U_T$	Voltage dip and short interruptions $\%U_T$	Duration (in period)
0	100	0.5
40	60	10
70	30	25

13.3.2. Performance criterion: **C**

13.4. EUT Configuration on Test

The configurations of EUT are listed in Section 4.4.

13.5. Operating Condition of EUT

13.5.1. Setup the EUT as shown in Section 13.1.

13.5.2. Turn on the power of all equipments.

13.5.3. Let the EUT work in test mode (ON) and test it.

13.6. Test Procedure

1) Set up the EUT and test generator as shown on Section 13.1.

2) The interruptions are introduced at selected phase angles with specified duration.

3) Record any degradation of performance.

13.7. Test Results

PASS.

Please refer to the following page.

Voltage Dips and Interruptions Test Results

Zhejiang European African Testing&Certification Co., Ltd.

Date: Apr. 21,2021

Applicant :	Tianjin Streampumps Industry Co., Ltd	Test Date :	Apr. 21,2021
EUT :	Water Pumps(Submersible Pump)	Temperature :	24℃
M/N :	SVQ2200(F)	Humidity :	52%
Power Supply :	AC 230V, 50Hz	Test Engineer :	Martina

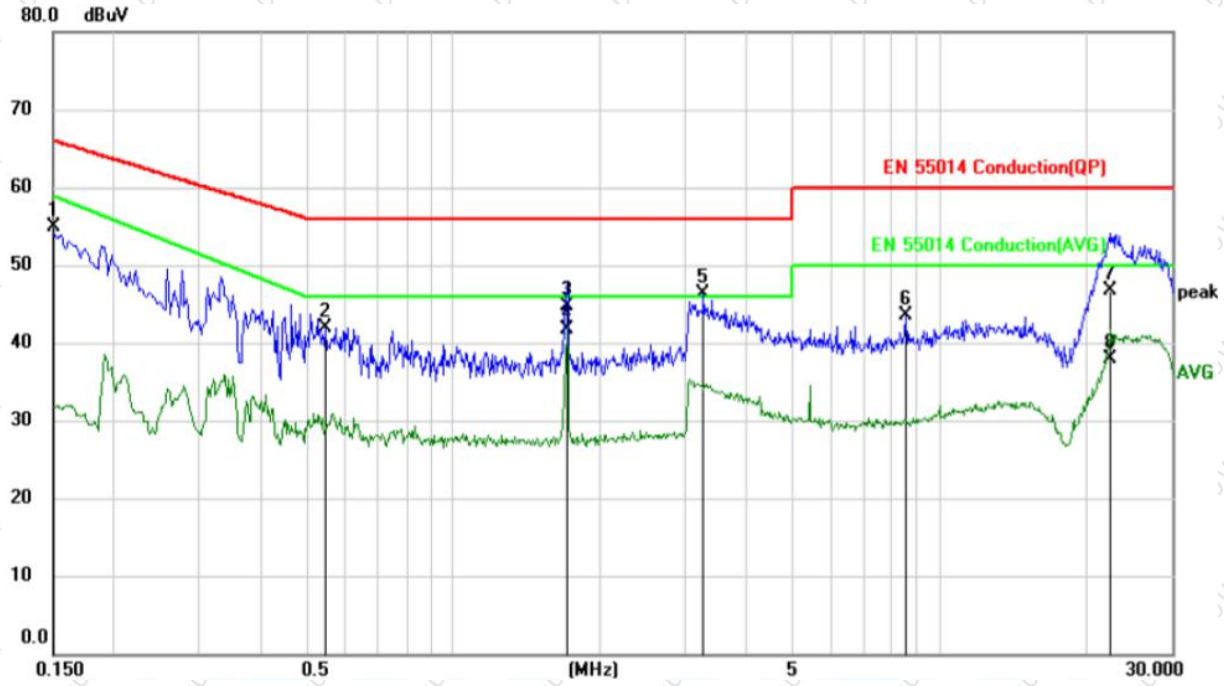
Test Model: ON

Test Level % U_T	Voltage Dips & Short Interruptions % U_T	Duration (in period)	Phase Angle	Criterion	Result
		50Hz			
0	100	0.5P	0°~360°	B	PASS
40	60	10P	0°~360°	B	PASS
70	30	25P	0°~360°	C	PASS

Remark: U_T is the rated voltage for the equipment.

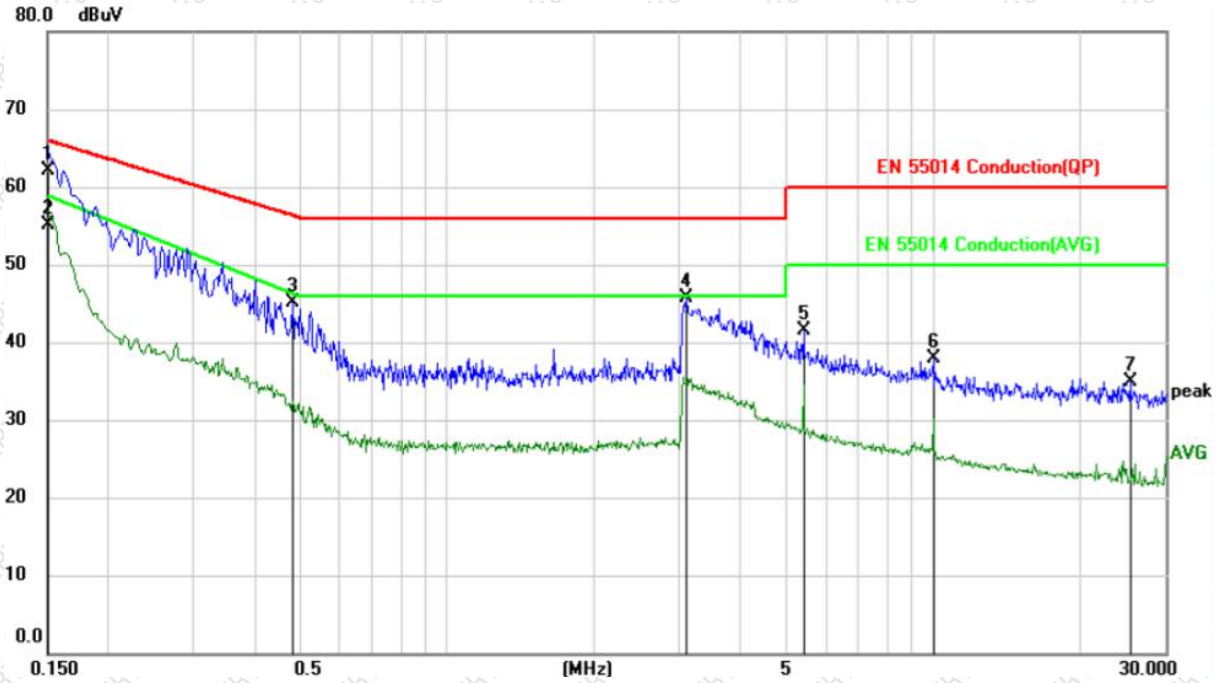
Reviewer: Sam Jin

Job No.:		Power Source :	AC 230V
Standard:	EN 55014	Temp.(℃)/Hum.(%RH)	24 ℃/52%RH
Test item:	Conducted Test	Date:	2021/04/22
EUT:	Water Pumps(Submersible Pump)	Time:	
Model:	SVQ2200(F)	Test By:	Martina
Note:	L		



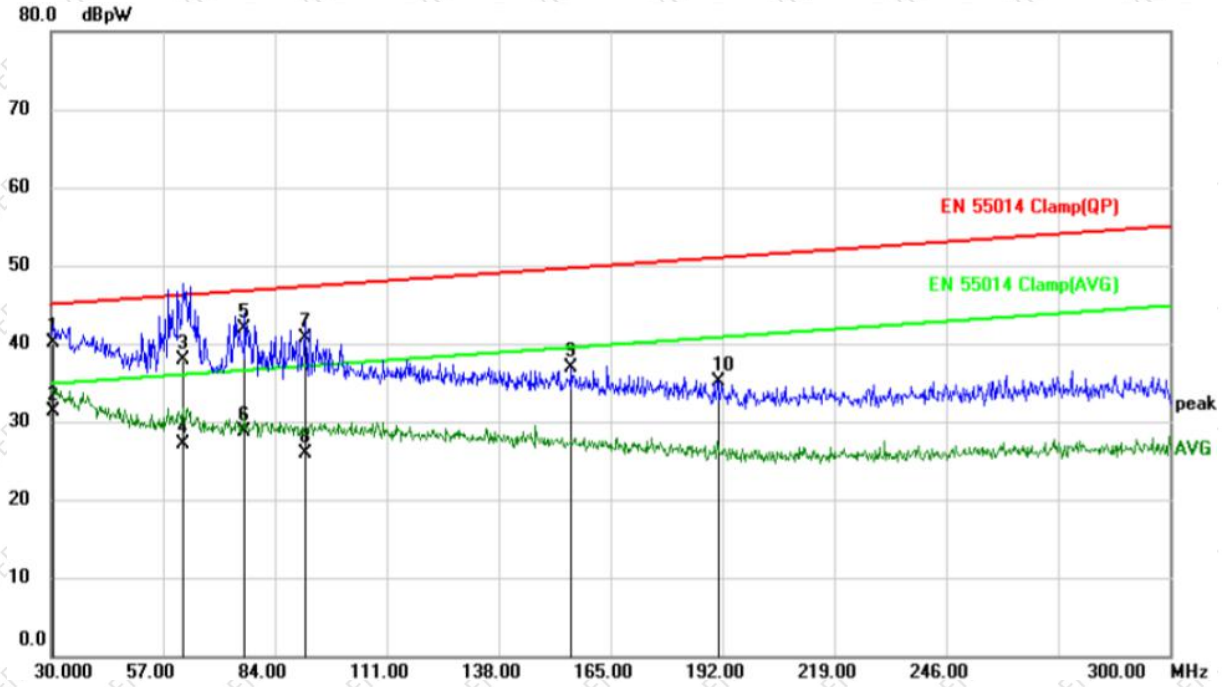
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1500	45.01	9.80	54.81	66.00	-11.19	peak	
2		0.5460	32.17	9.80	41.97	56.00	-14.03	peak	
3		1.7130	34.98	9.73	44.71	56.00	-11.29	QP	
4	*	1.7130	31.88	9.73	41.61	46.00	-4.39	AVG	
5		3.2640	36.48	9.74	46.22	56.00	-9.78	peak	
6		8.5350	33.72	9.80	43.52	60.00	-16.48	peak	
7		22.4760	37.02	9.75	46.77	60.00	-13.23	QP	
8		22.4760	28.09	9.75	37.84	50.00	-12.16	AVG	

Job No.:		Power Source :	AC 230V
Standard:	EN 55014	Temp.(℃)/Hum.(%RH)	24 ℃/52%RH
Test item:	Conducted Test	Date:	2021/04/22
EUT:	Water Pumps(Submersible Pump)	Time:	
Model:	SVQ2200(F)	Test By:	Martina
Note:	N		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1500	52.25	9.80	62.05	66.00	-3.95	QP	
2	*	0.1500	45.32	9.80	55.12	59.00	-3.88	AVG	
3		0.4800	35.28	9.80	45.08	56.34	-11.26	peak	
4		3.0989	35.91	9.74	45.65	56.00	-10.35	peak	
5		5.4120	31.79	9.80	41.59	60.00	-18.41	peak	
6		9.9990	28.17	9.80	37.97	60.00	-22.03	peak	
7		25.3410	25.24	9.70	34.94	60.00	-25.06	peak	

Job No.:		Power Source :	AC 230V
Standard:	EN 55014	Temp.(℃)/Hum.(%RH)	24 ℃/52%RH
Test item:	Conducted Test	Date:	2021/04/22
EUT:	Water Pumps(Submersible Pump)	Time:	
Model:	SVQ2200(F)	Test By:	Martina
Note:	AC Line		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Position	
		MHz	dBpW	dB	dBpW	dBpW	dB	Detector	cm	Comment
1		30.5600	18.69	21.33	40.02	45.02	-5.00	QP		
2	*	30.5600	9.93	21.33	31.26	35.02	-3.76	AVG		
3		62.1200	20.92	16.99	37.91	46.19	-8.28	QP		
4		62.1200	10.08	16.99	27.07	36.19	-9.12	AVG		
5		76.8800	25.02	16.92	41.94	46.74	-4.80	QP		
6		76.8800	11.77	16.92	28.69	36.74	-8.05	AVG		
7		91.4400	23.63	16.99	40.62	47.28	-6.66	QP		
8		91.4400	8.95	16.99	25.94	37.28	-11.34	AVG		
9		155.5600	21.29	15.61	36.90	49.65	-12.75	peak		
10		191.0399	20.70	14.46	35.16	50.96	-15.80	peak		

Appendix I

Model number

SPK530,SPK530A(F),SPK450,SPK450A(F) ,SPK450B(F),SPT500(F),SPT750B(F) ,SPT1100A(F), KBZ21.5,KBZ31.5,KBZ22.2,KBZ32.2,KBZ23.7,KBZ33.7,KBZ35.5,KBZ43.7,KBZ45.5,KBZ47.5,KBZ411,KBZ415,KBZ67.5,KBZ611,KBZ615,SPSN250(F),SPSN750(F),SPSN1100(F),SV25-10-1.5(F), SV9-10-0.9F,SVX15-7-0.75(F),SVX10-12-1.1(F),SQD1.5-12-0.25L(F),SQD1.5-17-0.37L(F), SQD1.5-25-0.55L(F),SQD3-18-0.55L(F),SQD10-12-0.55L(F) ,SQD15-7-0.55L(F),SQD1.5-32-0.75L(F),SQD3-24-0.75L(F),SQD15-10-0.75L(F),SQD8-18-0.75L(F),SQD10-16-0.75L(F),SQD15-10-0.75L(F), SQD15-7-0.55L(F),SQD25-6-0.75L(F),SQD30-6-0.75L(F),SQD3-30-1.1L(F),SQD14-16-1.1L(F) , SQD15-14-1.1L(F) ,SQD15-32-0.75L(F),SQD25-6-0.75L(F),SQD40-6-1.1L(F),SQX8-18-0.75L, SQX10-16-0.75L,SQX30-6-0.75L,SQX3-30-1.1L,SQX14-16-1.1L,SQX15-14-1.1L,SQX40-6-1.1L, SQX25-12-1.5L,SQX40-9-1.5L,SPC180(F),SPC250(F),SPC370(F),SPC400(F),SPC550(F),SPC750(F),SPC1100(F) ,SPC-Y1,SPC-Y1.5,SPC-Y2.2,SPC-1.5-Y1F,SPC2-Y1.5F,SPC-3-Y2.2F,SPC2-60/6-1.1(F),SPC3-18-0.55(F),SPC3-24-0.75(F),SPC5-10-0.25(F),SPC6-32-1.5(F),SPC6-7-0.18(F), SPC7-8-0.25(F),SPC8-20-1.5,SPC9-6-0.45F ,SPC10-15-0.9F,SPC10-10-0.55(F),SPC10-18-1.1S, SPC10-18-1.1F,SPC10-16-0.75(F) ,SPC15-15-1.1(F),SPC25-12/1.5,SPC30-6-0.75(F), SPC37-4-0.75(F),SPC40-7-1.1(F),SPC40-9-1.5(F),SPC60-18-5.5,SPC6-18-0.75(F),SPC6-28/2-1.1(F),SPC6-28/2-1.1A(F),SPC2-40/4-0.75F,SPC2-50/5-0.9(F),SPC2-60/6-1.1(F),SPC5-30/3-1.1(F), SPC5-40/4-1.5(F),SPC5-50/5-2.2(F),SPC3-65/6-2.2(F) ,SPC6-28/2-1.1A(F),SPC6-39/3-1.5A(F), SPC4-60/4-2.2A(F),SVQ180(F),SVQ250(F),SVQ370F,SVQ450AF,SVQ450(F),SVQ750(F), SVQ1100(F),SVQ1500(F),SVQ1500A,SVQ2200(F),SVQ2200A,SVD750F,SVD1100(F),SVD1300(F), SVD1800(F),SVD2200(F),SWVSD55(F),SWVSD75(F),SWVSD110(F),SWVSD55A,SWVSD75A, SWVS75(F),SWVS110(F) ,SWVS75A ,SVSC25-10-2.2,SVSC35-10-3,SWQ10-10-0.75G, SWQ12-10-1.1G ,SWQ15-15-1.5G,SWQ25-10-1.5G,SWQ9-22-2.2G,SWQ25-15-2.2G,SWQ45-9-2.2G,SWQ20-22-3G,SWQ35-15-3G,SWQ43-13-3G,SWQ25-22-4G,SWQ45-17-4G,SWQ45-20-5.5G, SWQ65-15-5.5G,SWQ20-40-7.5G,SWQ45-22-7.5(F),SWQ45-25-7.5G,SWQ100-15-7.5G, SWQ10-10-0.75T,SWQ12-10-1.1T,SWQ15-15-1.5T ,SWQ25-15-2.2G,SWQ35-15-3T,SWQ45-17-4T, SWQD6-12-0.55(F),SWQD6-16-0.75(F) ,SWQD10-10-0.75(F),SWQD15-9-1.1(F),SWQD7-15-1.1(F) , SWQ6-16-0.75,SWQ10-10-0.75,SWQ7-15-1.1,SWQ18-15-1.5,SWQ25-7-1.5,SWQ9-22-2.2, SWQ25-15-2.2,SWQ42-9-2.2,SWQ15-30-3,SWQ25-20-3,SWQ43-13-3,SWQ50-10-3,SWQ40-15-4, SWQ60-10-4,SWQ15-40-5.5,SWQ30-30-5.5,SWQ65-15-5.5 ,SWQ65-20-7.5,SWQ80-15-7.5, SWQ100-10-7.5,SWQ100-25-11,SWQ130-15-11,SWQ150-13-11,SWQ180-11-11,SWQ300-7-11, SWQ360-6-11,SWQ100-30-15,SWQ150-17-15,SWQ180-15-15,SWQ250-11-15,SWQ400-7-15, SWQ100-35-18.5,SWQ180-20-18.5,SWQ250-15-18.5,SWQ350-10-18.5,SWQ100-40-22, SWQ130-30-22,SWQ180-25-22,SWQ250-18-22,SWQ400-10-22,SWQ18-15-1.5(F),SVP180(F), SVP250(F),SVP370(F) ,SPP2.5-26/3-0.55F,SPP2-5.5-0.18F,SPP2-4.5-0.1,SPP100(F),SPP120, SPP250(F),SPP370B,SPP250A(F) ,SPP370A(F),SPP370(F),PVX10,PVX10T,PVX10-1(F),

PVX10-1T(F), PVX12-1(F),PVX12-1T(F),PCMD-12S(F),PCMD-12T(F),PCMD-14S(F),PCMD-14T(F), PCMD-17S,PCMD-17T(F),PCMD-20S(F),PCMD-20T(F),PCMD-14S,PCMD-14T,75TMP-2.15, 75TMP-2.25,100TMP-2.4,50TPS(F)-2.12,50TPS(F)-2.15,50TPS(F)-2.4,SVS700F,SVSP1100, S95C-1500(T),SNQ200,SNQ250 ,SPA200,SPA250,SPA350,SPA400,SPA500,SPA550,SPA750, SPA900 ,SPB250,SPB400,SPB500,SPB550,SPB650,SPB750,SPB900,SPB1100,SGP250,SGP400, SGP500,SGPS500,SGP550,SGP750,SGP900,SGW400,SGW550,SGW750,SGW900,SGW1100, SGW400N-1,SGW550N-1,SGW750N-1,SGW900N-1,SGW1100N-1,SGW400N-2,SGW550N-2, SGW750N-2,SGW900N-2,SGW1100N-2,SGW400-P,SGW550-P,SGW750-P ,SGW900-P,SGW1100-P,SPA200N ,SPA250N,SPA350N,SPA400N,SPA500N,SPA550N,SPA750N,SPA900N,SPA1100N, SPB400N,SPB550N,SPB750N,SPB900N,SPB1100N ,SGW400N,SGW550N,SGW750N,SGW900N, SGW1100N ,SPW400N ,SPW550N,SPW750N,SPW900N,SPW1100N ,SPW400,SPW550,SPW750, SPW900,SPW1100 ,SPWS400,SPWS550,SPWS650,SPWS750,SPWS810,SPWS900,SPWS1100, SPU400,SPU550,SPU750,SPU900,SPU1100,SPM250,SPM400,SPM500,SPM750,SPM900, SPM1100,SSM400,SSM550,SSM750,SSM900 ,SSM1100,SQ250AN,SQ400AN,SQ550AN,SQ750AN,SQ900AN,SQ1100AN,SQ2501A,SQ4001A,SQ5001A,SQ5501A,SQ7501A,SQ4001B,SQ5501B, SQ7501B,SQ9001B,SQ45013,SQ250,SQ400,SQ2501A ,SQ9001A,SQ11001A,SQ11001B,SKQ30HM,SKQ35HM,SKQ90015,SNR350-1 ,SNR350-2,SPA250S,SPA400S,SPA550S,SPA750S,SPA900S, SPB400S,SPB550S,SPB750S,SPB900S,SPB1100S,SPA250SD,SPA400SD,SQ110035HM,SQ30HM,SQ35HM,SHS1000-IN,SHS1200 -IN,SHP1000-IN,SHP1200-IN,SHP1000,SHP1200,SHO1000, SHO1200,2SP,2.5SP,3SQ3,3SP(T)2,3SP(T)3,3SP(T)4,3SP2-15B,3SP2-21B,3SP2-27B,3SP2-38B, 3SP2.5-11B,3SP2.5-16B,3SP2.5-21B,3SP2.5-26B ,3SP2.5-37B,3SPC2-15,3SPC2-21,3SPC2-33, 3SPC2-21B, 3SPC2-33B,3.5SP(T)2,3.5SP(T)3,3.5SP(T)4 ,3.5SP(T)6,4SPC4-10,4SPC4-13,4SP(T)2, 4SP(T)3,4SP(T)4,4SP(T)6,4SP(T)8,4SP(T)10,4SP(T)12,5SP(T)10,5SP(T)15,5SP(T)22,5SP(T)30, 6SP(T)15,6SP(T)25,6SP(T)35,6SP(T)45,4SG(T)2,4SG(T)3 ,4SG(T)5,4SG(T)8,4SG(T)14,6CS(S)17, 6CS(S)30,6CS(S)46,6CS(S)60,8CS77,8CS95,6SR(T)18 ,6SR(T)30,6SR(T)45,6SR(T)60,SCM3, SCM5,SCM6,SCM8 ,SCM7A ,SCM8A,SCM4,5SM208,3SKM75,3SKM100,4SKM100,4SKM150, 4SKM200,3SNK(M),4SNK(M),SQGDA,3SQGD,4SQGD,SVPM180,SVPM280,SVPM350, SVPM350-2,WL,WL600A

...End of Models...

Appendix II
Photo documentation
Water Pumps(Submersible Pump)
SVQ2200(F)

Detail of: SVQ2200(F)

View:

[ ] general

[ ] front

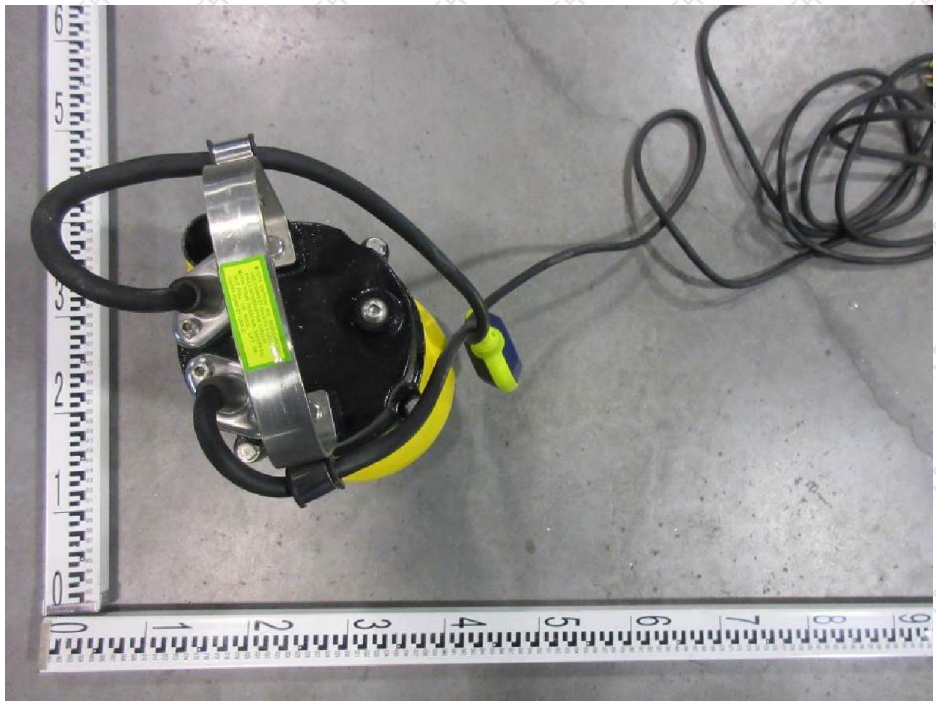
[ ] rear

[ ] right

[ ] left

[X] top

[ ] bottom



Detail of: SVQ2200(F)

View:

[X] general

[ ] front

[ ] rear

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Appendix II
Photo documentation
Water Pumps(Submersible Pump)
SVQ2200(F)

Detail of: SVQ2200(F)

View:

[X] general

[ ] front

[ ] rear

[ ] right

[ ] left

[ ] top

[ ] bottom

OVIS-CERT

REMARKS

1. This report is invalid without the seal of special stamp for OViS test report and invalid if altered.

2. The copy of this report is invalid without a new seal of special stamp for OViS test report and invalid if altered.

3. This report is invalid without seals or signatures of Tester,Checker and Approval.

4. If there is no special announcement in this report,the informat ion of producer and samples is not identified by OViS,the customer is responsible for truth of the samples.

5. Objections to the test report must be submitted to OViS within 15 days.

6. The test results shown in this report is only applicable for the samples supplied directly by the customer and accepted by the test organization,the customer shall not propagandize improperly without permission by OViS.

7. “P” means “pass” , “F” means “fail”, “N/A” or “—” means “not applicable” and “ / ”means “not test”.

Address: 4th Floor, Building 4, No. 888 Donghuan Road,Development Zone,
Taizhou City, Zhejiang P.R.China
Tel: 400-8008-959
Post Code: 318000
E-mail:info@ovis-lab.com
http://www.ovis-lab.com