EN 61800-3:2004/A1:2012

EMC MEASUREMENT AND TEST REPORT

FOR

STARMATRIX GROUP INC.

NO.59, ZHONGSHAN WEST ROAD, ZHENJIANG, JIANGSU, CHINA

MODEL: **CLEVER-POOL/220V、CLEVER-POOLM/220V**

March 25, 2015

This Report Concerns: ☒ Original Report	**Equipment Type:** CLEVER-POOL ENERGY SAVER
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Test Date:	March 17, 2015 to March 25, 2015
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Test model: CLEVER-POOL/220V

GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The product that is produced by ***STARMATRIX GROUP INC.*** The Application Model are ***CLEVER-POOL/220V***、***CLEVER-POOLM/220V,*** or the "EUT" as referred to in this report is a ***CLEVER-POOL ENERGY SAVER.*** The test model: ***CLEVER-POOL/220V.***

Objective

In order to meet the EMC requirements approved by CENELEC, the following standards will be cited:

1. EN 61800-3:2004/A1:2012, Adjustable speed electrical power drive systems — Part 3: EMC requirements and specific test methods.

Note: The test data is only valid for the test sample. There is possible deviation from the original test data for other products

Equipment Modifications

No modification to the EUT were made by China Ceprei (Sichuan) Laboratory to make sure the EUT comply with applicable limits.

Test model: CLEVER-POOL/220V

1 –EN 61800-3:2004/A1:2012

3.1 Continuous Disturbance Voltage at Mains Terminal.

3.1.1 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Last Cal. Date	Cal. Period
Albatross Projects GmbH	Shield Room	Site 1	---	2014.10	2 Year
R&S	EMI Test Receiver	ESU40	1302	2014.11	1 Year
R&S	Artificial Mains	ENV216	3560	2014.2	2 Year
R&S	EMI Test System Cabinet	---	---	N/A	N/A
R&S	EMI Test Software	EMC32	---	N/A	N/A

***Statement of Traceability: China Ceprei (Sichuan) Laboratory** certifies that all calibrations have been performed using suitable standards traceable to the CHINA SCEIENTIFIC MEASUREMENT INSTITUTE.

1.1.2 Description of Measurement Conditions

Temperature: 21℃
Humidity: 58%
Pressure: 1033mbar
Electromagnetic environment: normal

1.1.3 Limits of Continuous Disturbance Voltage at Mains Terminal.

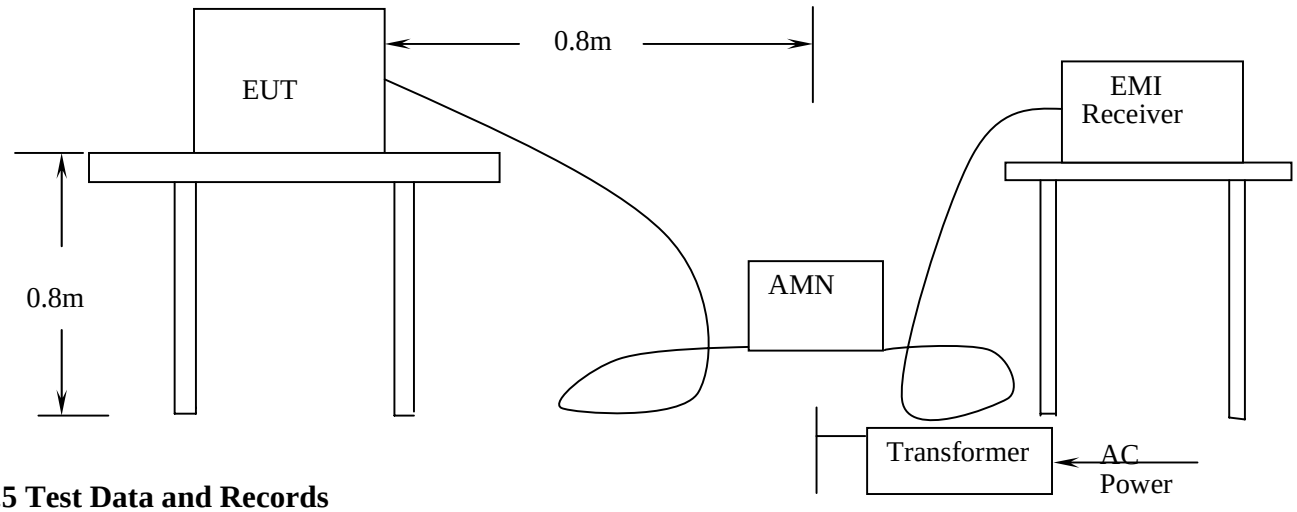
Equipment type	Frequency range MHz	Limit values dBμV	
		Quasi-peak	Average
Household appliance	0.15 to 0.50	66-56 [a]	59 to 46 [a]
	0.50 to 5	56	46
	5 to 30	60	50
[a] Decreasing linearly with logarithm of the frequency.			

Note: If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver with an average detector need not be carried out.

Test model: CLEVER-POOL/220V

1.1.4 Configuration

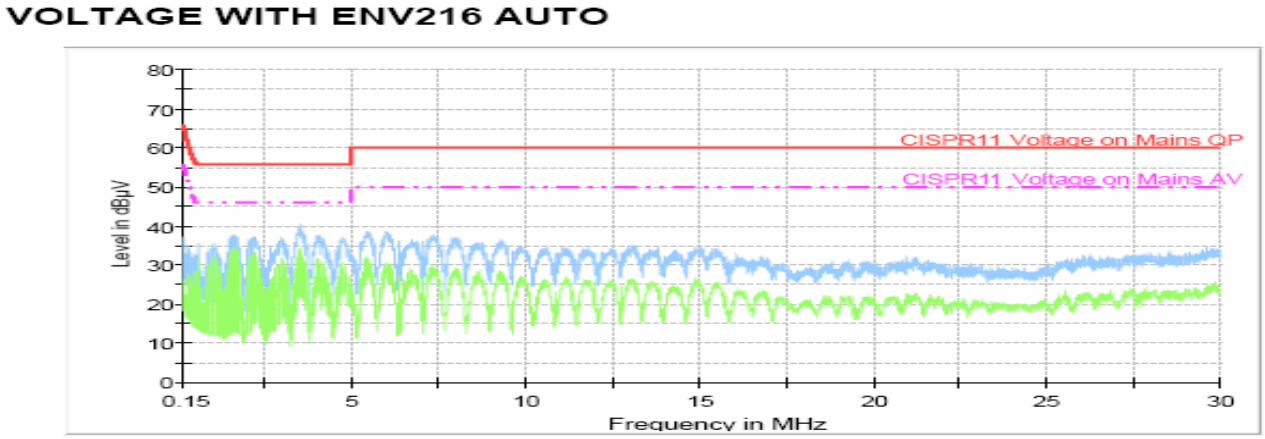
The configuration is in accordance with the requirement in EN61800-3, the sketch map as follow:



3.1.5 Test Data and Records

PASSED

L1&N:



Conducted disturbance at the Mains Terminals			
Frequency	Amplitude	Detector	Limit
MHz	dBµV	QP/Ave/Peak	dBµV
0.15 to 0.50	*	**QP**	66-56 [a]
0.50 to 5	*	**QP**	56
5 to 30	*	**QP**	60
* Means the disturbance power level 6dB lower than limits.			

3.1.6 Verdict

The EUT met the requirement.

Test model: CLEVER-POOL/220V

1.2 Radiated disturbances

1.2.1 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Last Cal. Date	Cal. Period
Albatross Projects GmbH	Anechoic Chamber	---	9290832	2014.10	2 Year
R&S	Ultra-broadband Antennas	HL562	---	2014.1	2 Year
Inn-co GmbH	Antenna Towers	---	---	N/A	N/A
R&S	EMI Test Receiver	ESU40	1302	2014.11	1 Year
Inn-co GmbH	Turntable	DS2000S-1t		N/A	N/A
Inn-co GmbH	Controller	CO 2000	10806L	N/A	N/A
R&S	EMI Test Software	EMC32	---	N/A	N/A
R&S	EMI Test System Cabinet	---	---	N/A	N/A

***Statement of Traceability: China Ceprei (Sichuan) Laboratory** certifies that all calibrations have been performed using suitable standards traceable to the CHINA SCEIENTIFIC MEASUREMENT INSTITUTE.

1.2.2 Description of Measurement Conditions

Temperature: 20℃
Humidity: 60%
Pressure: 1033mbar
Electromagnetic environment: normal

3.2.3 Limits of radiated disturbances of class at a measuring distance of 3m.

Frequency range MHz	Quasi-peak limits(3m) dB(μV/m)
30 to 230	40
230 to 1000	47
NOTE: The lower limit shall apply at the transition frequency. NOTE: Additional provisions may be required for cases where interference occurs.	

Test model: CLEVER-POOL/220V

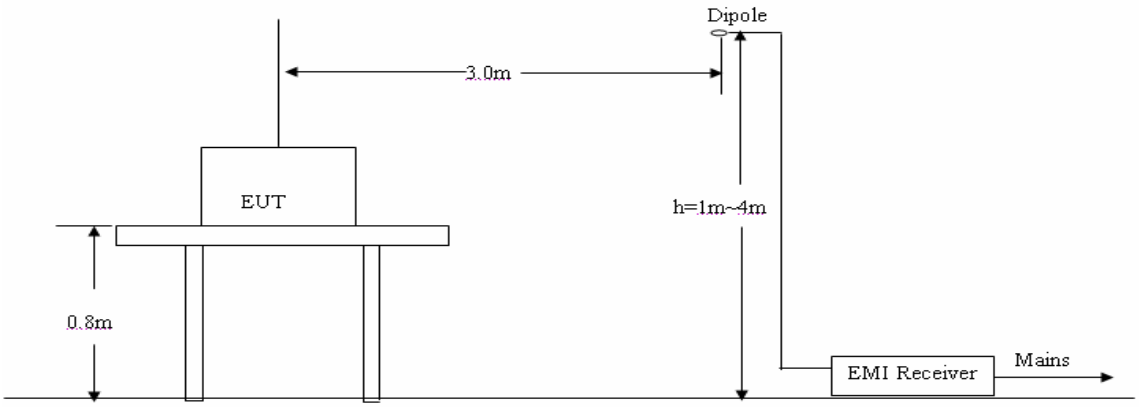
1.2.4 Test procedure and the test set-up

Procedure

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m semi/full-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be retested one by one using the quasi- peak method or average method as specified and then reported In Data sheet peak mode and QP mode.

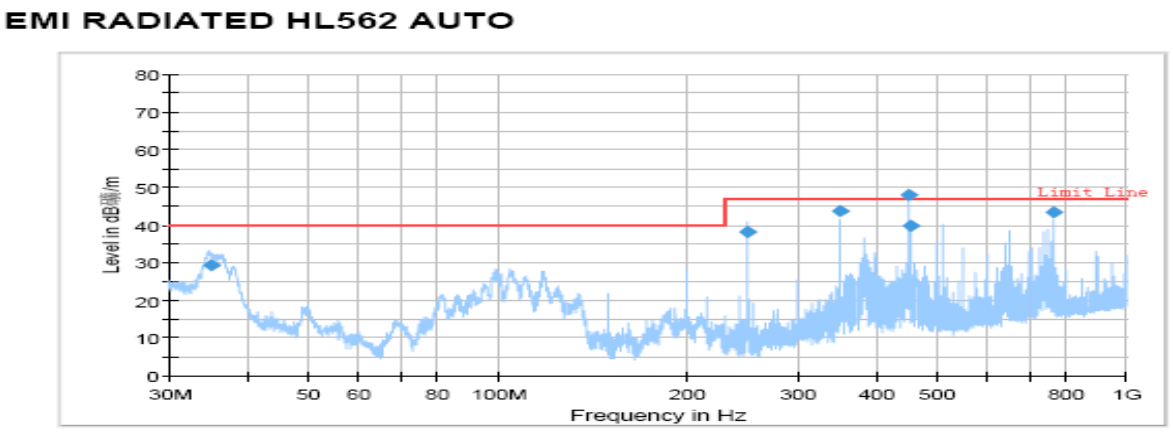
Set-up

The configuration is in accordance with the requirement in EN61800-3, the sketch map as follow:



1.2.5 Test Data and Records

Passed



Test model: CLEVER-POOL/220V

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
34.976000	29.2	1000.00	120.000	100.0	V	252.0	-15.9	10.8	40.0
250.004500	38.2	1000.00	120.000	100.0	H	131.0	-27.3	8.8	47.0
350.051500	43.7	1000.00	120.000	144.0	V	181.0	-24.9	3.3	47.0
450.058500	45.9	1000.00	120.000	116.0	H	252.0	-22.5	1.1	47.0
455.151000	40.0	1000.00	120.000	123.0	V	252.0	-22.3	7.0	47.0
768.073000	43.3	1000.00	120.000	174.0	H	0.0	-16.5	3.7	47.0

1.2.6 Verdict

The EUT met the requirement.

2- Description of 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 (or permissible loss of performance) 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 manufacture, 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 (or permissible loss of performance) 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. If the minimum performance level or the permissible performance loss is not specified by the manufacture, 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.

Test model: CLEVER-POOL/220V

2.1 SURGES

2.1.1 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Last Cal. Date	Cal. Period
Noise Laboratory CO., LTD	Surge Lite	LSS-6030	9099E00350	2014.11	2 Year

***Statement of Traceability: China Ceprei (Sichuan) Laboratory** certifies that all calibrations have been performed using suitable standards traceable to the CHINA SCEIENTIFIC MEASUREMENT INSTITUTE.

4.1.2 Description of Measurement Conditions

Temperature: 21℃
Humidity: 58%
Pressure: 1033mbar
Electromagnetic environment: normal

2.1.3 Test procedure and the test set-up

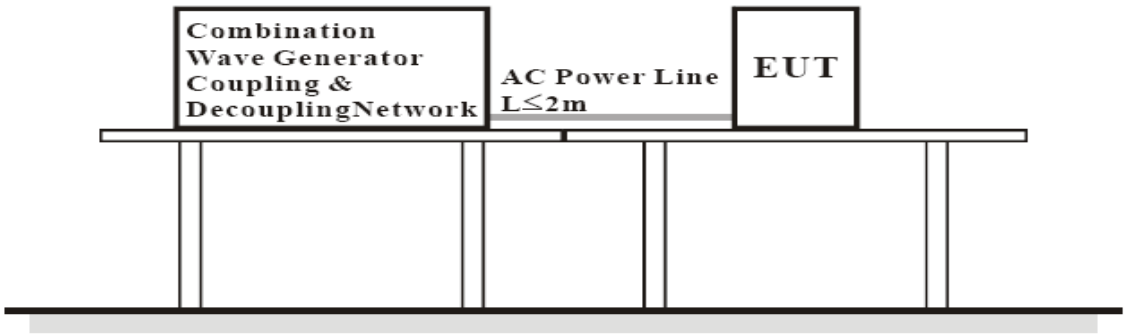
Procedure

a. For EUT power supply:
The surge is to be 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 shall be 2 meters in length (or shorter).

b. For test applied to unshielded unsymmetrically operated interconnection lines of EUT:
The surge is applied to the lines via the capacitive coupling. The coupling / decoupling networks shall not influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

c. For test applied to unshielded symmetrically operated interconnection / telecommunication lines of EUT:
The surge is applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor cannot be specified. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

Set-up



Test model: CLEVER-POOL/220V

2.1.4 Test Data and Records

Level	Voltage	Poll	Path	Pass	Fail
1	**1kV**	+	L1- N	**B**	
2	**2kV**	+	L1- PE N- PE	**B**	

2.1.5 Verdict

The EUT was working as normal, so they met the requirement of performance criteria B.

Test model: CLEVER-POOL/220V

2.2 ESD

2.2.1 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Last Cal. Date	Cal. Period
Shanghai Sanki	Electrostatic Discharge tester	ESD-320	0329501C	2014.6	2 Year

***Statement of Traceability: China Ceprei (Sichuan) Laboratory** certifies that all calibrations have been performed using suitable standards traceable to the CHINA SCEIENTIFIC MEASUREMENT INSTITUTE.

2.2.2 Description of Measurement Conditions

Temperature: 21℃
Humidity: 58%
Pressure: 1033mbar
Electromagnetic environment: normal

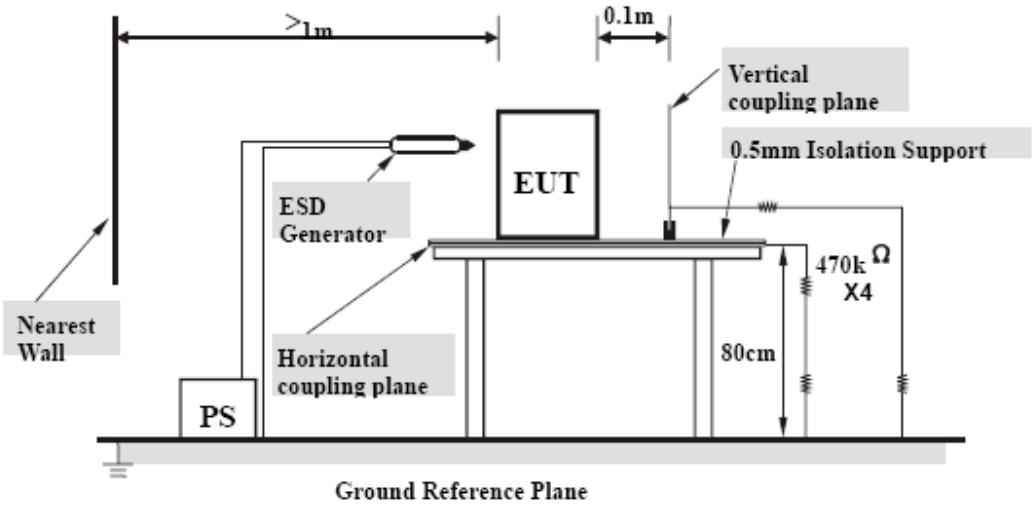
2.2.3 Test procedure and the test set-up

Procedure

a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
c. The time interval between two successive single discharges was at least 1 second.
d. 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.
e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
f. Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing 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.
g. At least ten single discharges (in the most sensitive polarity) were applied at the front edge of each Horizontal Coupling Plane opposite the center point of each unit of the EUT and 0.1 meters from the front of the EUT. The long axis of the discharge electrode was in the plane of the HCP and perpendicular to its front edge during the discharge.
h. 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.

Test model: CLEVER-POOL/220V

Set-up



2.2.4 Test Data and Records

Air Discharge

Test Levels																
EN61000-4-2 Test Points	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV	-10 kV	+10 kV	-12.5 kV	+12.5 kV	-15 kV	+15 kV	-20 kV	+20 kV
EUT Front Side	**B**	**B**	**B**	**B**	**B**	**B**	**B**	**B**								
EUT Top Side	**B**	**B**	**B**	**B**	**B**	**B**	**B**	**B**								
EUT Back Side	**B**	**B**	**B**	**B**	**B**	**B**	**B**	**B**								
EUT Left Side	**B**	**B**	**B**	**B**	**B**	**B**	**B**	**B**								
EUT Right Side	**B**	**B**	**B**	**B**	**B**	**B**	**B**	**B**								

Test model: CLEVER-POOL/220V

Direct Contact

Test Levels																
EN61000-4-2 Test Points	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV	-10 kV	+10 kV	-12.5 kV	+12.5 kV	-15 kV	+15 kV	-20 kV	+20 kV
EUT Front Side	**B**	**B**	**B**	**B**												
EUT Top Side	**B**	**B**	**B**	**B**												
EUT Back Side	**B**	**B**	**B**	**B**												
EUT Left Side	**B**	**B**	**B**	**B**												
EUT Right Side	**B**	**B**	**B**	**B**												

2.2.5 Verdict

The EUT was working as normal, so they met the requirement of performance criteria B.

Test model: CLEVER-POOL/220V

2.3 EFT/B

2.3.1 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Last Cal. Date	Cal. Period
Shanghai Sanki	E.F.TB Generator	8014	069504E	2013.6	2 Year

***Statement of Traceability: China Ceprei (Sichuan) Laboratory** certifies that all calibrations have been performed using suitable standards traceable to the CHINA SCEIENTIFIC MEASUREMENT INSTITUTE.

2.3.2 Description of Measurement Conditions

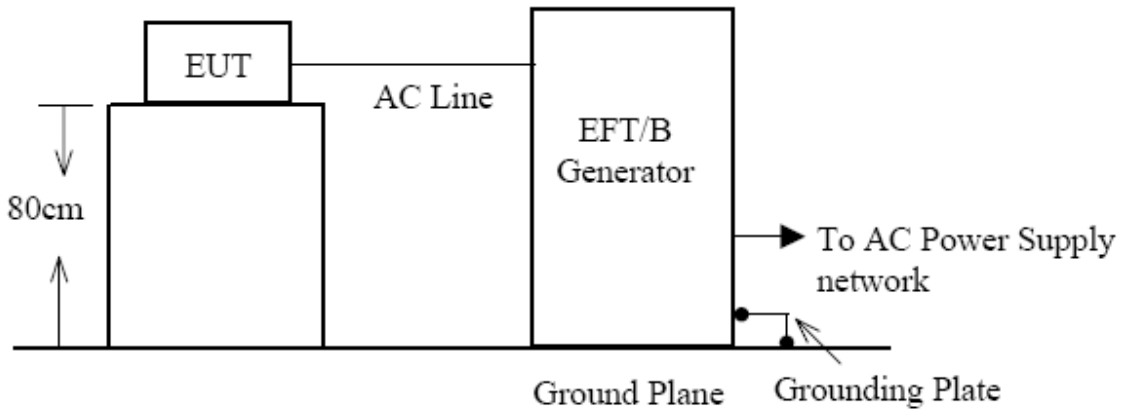
Temperature: 21℃
Humidity: 58%
Pressure: 1033mbar
Electromagnetic environment: normal

2.3.3 Test procedure and the test set-up

Procedure

a. Both positive and negative polarity discharges were applied.
b. The length of the "hot wire" from the coaxial output of the EFT generator to the terminals on the EUT should not exceed 1 meter.
c. The duration time of each test sequential was 1 minute.
d. The transient/burst waveform was in accordance with EN 61000-4-4, 5/50ns.

Set-up



Test model: CLEVER-POOL/220V

2.3.4 Test Data and Records

The EUT was tested that it worked at the normal state.

Test Levels (kV)									
EN61000-4-4 Test Points		+0.25	-0.25	+0.5	-0.5	+1.0	-1.0	+2.0	-2.0
Power Port of EUT	L 1	A	A	A	A	A	A		
	N	A	A	A	A	A	A		
	PE	A	A	A	A	A	A		
	L1+N+PE	A	A	A	A	A	A		

2.3.5 Verdict

The EUT was working as normal, so it met the requirement of performance criteria B.

Test model: CLEVER-POOL/220V

2.4 INJECTED CURRENTS

2.4.1 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Last Cal. Date	Cal. Period
Giga-tronics	Synthesized RF Signal Generator	6061A	5130304	2014.2	2 Year
QF	Broadband Power Amplifier	QF3860	---	2014.2	2 Year
QF	Millivoltmeter	QF2281	92028	2014.2	2 Year

***Statement of Traceability: China Ceprei (Sichuan) Laboratory** certifies that all calibrations have been performed using suitable standards traceable to the CHINA SCEIENTIFIC MEASUREMENT INSTITUTE.

2.4.2 Description of Measurement Conditions

Temperature: 22℃
Humidity: 59%
Pressure: 1033mbar
Electromagnetic environment: normal

2.4.3 Configuration

The configuration in accordance with the requirement in EN61000-4-6, see the photo in appendix.

2.4.4 Test Data and Records

EN61000-4-6 Test Points	Frequency range MHz	Levels	Voltage Level (e.m.f.)V	Pass	Fail
Power lines and control Lines and signal lines	0.15-80MHz	1	1		
		2	3	A	
		3	10		
		X	Special		

2.4.5 Verdict

The EUT was working as normal, so they met the requirement of performance criteria A.

Test model: CLEVER-POOL/220V

2.5VOLTAGE DIPS AND INTERRUPTIONS

2.5.1 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Last Cal. Date	Cal. Period
Noise Laboratory CO., LTD	Voltage Dip Simulator	VDS-220B	2199D00098	2014.10	2 Year

***Statement of Traceability: China Ceprei (Sichuan) Laboratory** certifies that all calibrations have been performed using suitable standards traceable to the CHINA SCEIENTIFIC MEASUREMENT INSTITUTE.

2.5.2 Description of Measurement Conditions

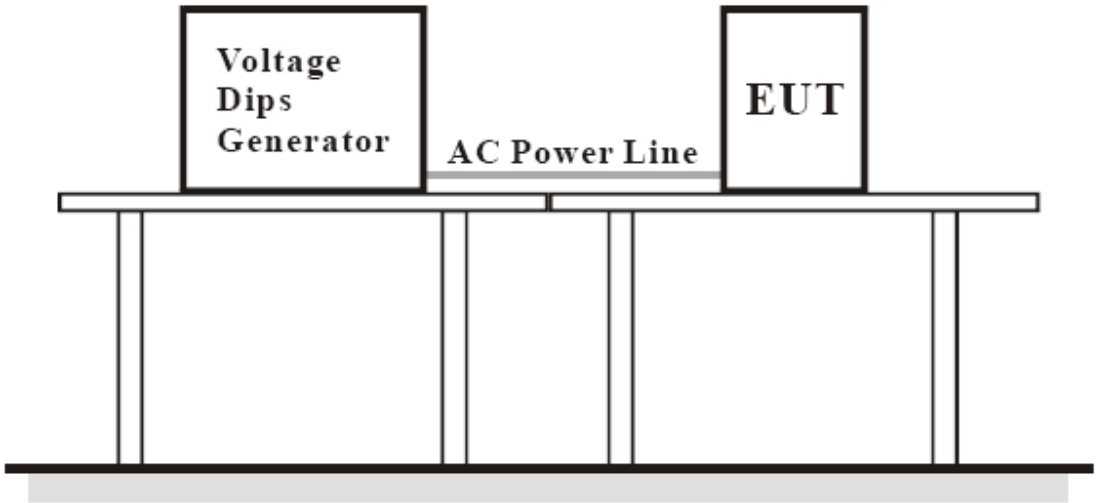
Temperature: 21℃
Humidity: 58%
Pressure: 1033mbar
Electromagnetic environment: normal

2.5.3 Test procedure and the test set-up

Procedure

The EUT shall be tested for each selected combination of test levels and duration with a sequence of tree dips/interruptions with intervals of 10 s minimum (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.

Set-up



Test model: CLEVER-POOL/220V

2.5.4 Test Data and Records

Environmental phenomena		Test level in % U_T	Pass	Fail
Interruptions		0	**C**	
Voltage dips in % U_T	10	90	**C**	
	20	80	**C**	
	30	70	**C**	
	40	60	**C**	
	50	50	**C**	
	60	40	**C**	
	70	30	**C**	
	80	20	**C**	
	90	10	**C**	

2.5.5 Verdict

The EUT was working as normal, so they met the requirement of performance criteria C.

Test model: CLEVER-POOL/220V

2.6 Radio-frequency electromagnetic field

2.6.1 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Last Cal. Date	Cal. Period
R&S	Signal Generator	SMR-40	1104	2014.11	1 Year
QF	Broadband Power Amplifier	QF3860	---	2014.2	2 Year
QF	Millivoltmeter	QF2281	92028	2014.2	2 Year
Albatross Projects GmbH	Anechoic Chamber	---	9290832	2014.10	2 Year
R&S	Ultra-broadband Antennas	HL562	---	2014.1	2 Year
Inn-co GmbH	Antenna Towers	---	---	N/A	N/A
Inn-co GmbH	Turntable	DS2000S-1t	---	N/A	N/A
Inn-co GmbH	Controller	CO 2000	10806L	N/A	N/A

***Statement of Traceability: China Ceprei (Sichuan) Laboratory** certifies that all calibrations have been performed using suitable standards traceable to the CHINA SCEIENTIFIC MEASUREMENT INSTITUTE.

2.6.2 Description of Measurement Conditions

Temperature: 20℃
Humidity: 60%
Pressure: 1033mbar
Electromagnetic environment: normal

2.6.3 Test procedure and the test set-up

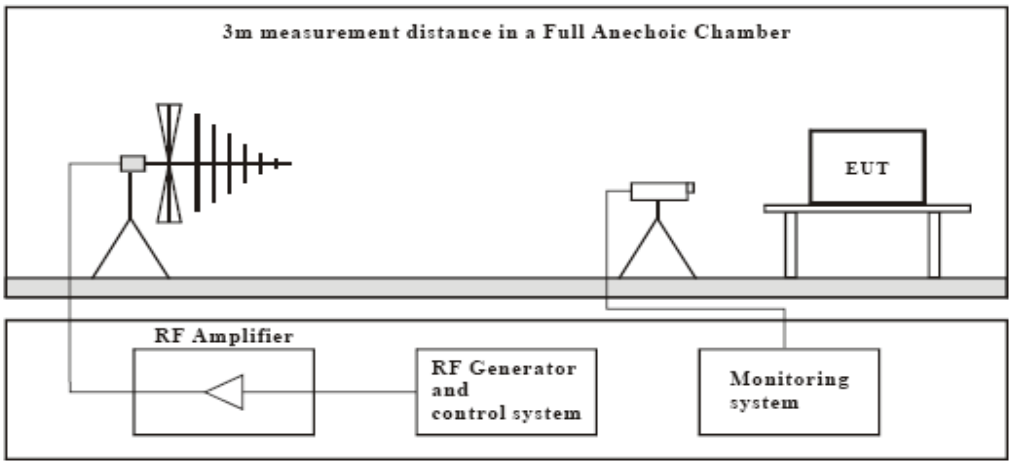
Procedure

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

a. The testing was performed in a fully-anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.
b. The frequency range is swept from 80 MHz to 1000 MHz with the signal 80% amplitude modulated with a 1kHz sinewave. The rate of sweep did not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1 % of preceding frequency value.
c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
d. The field strength level was 3V/m.
e. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

Test model: CLEVER-POOL/220V

Set-up



2.6.4 Test Data and Records

Frequency Range (MHz)	Front Side (3 V/m)		Rear Side (3 V/m)		Left Side (3 V/m)		Right Side (3 V/m)	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000	A	A	A	A	A	A	A	A

2.6.5 Verdict

The EUT was working as normal, so it met the requirement of performance criteria A.

Test model: CLEVER-POOL/220V

2.7.1 HARMONIC CURRENT

2.7.1 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Last Cal. Date	Cal. Period
EMC-PARTNER	Harmonics and Flicker Analyzer	HARMONIC S-1000	HAR1000-40	2012.7	3 Year

***Statement of Traceability: China Ceprei (Sichuan) Laboratory** certifies that all calibrations have been performed using suitable standards traceable to the CHINA SCEIENTIFIC MEASUREMENT INSTITUTE.

2.7.2 Limits

Temperature: 21℃
Humidity: 58%
Pressure: 1033mbar
Electromagnetic environment: normal

2.7.3 Test procedure and the test set-up

Procedure

a. 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.

b. The classification of EUT is according to section 5 of EN 61000-3-2. The EUT is classified as follows:

Class A: Balanced three-phase equipment, Household appliances excluding equipment as Class D, Tools excluding portable tools, Dimmers for incandescent lamps, audio equipment, equipment not specified in one of the three other classes.

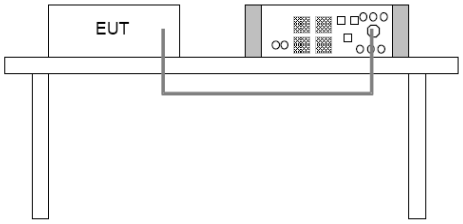
Class B: Portable tools. Arc welding equipment which is not professional equipment

Class C: Lighting equipment, including dimming devices.

Class D: Equipment having a specified power less than or equal to 600 W of the following types: Personal computers and personal computer monitors.

c. 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.

Set-up



Test model: CLEVER-POOL/220V

2.7.4 Test Data and Records

Order	Freq. [Hz]	Irms [A]	Imax [A]	Limit [A]	Status
2	100	0.3204	0.3830	1.0800	
3	150	1.5472	1.6556	2.3000	
4	200	0.0458	0.1343	0.4300	
5	250	0.5264	0.5493	1.1400	
6	300	0.0381	0.0443	0.3000	
7	350	0.1740	0.1770	0.7700	
8	400	0.0046	0.0275	0.2300	
9	450	0.0839	0.0839	0.4000	
10	500	0.0046	0.0214	0.1840	
11	550	0.0519	0.0534	0.3300	
12	600	0.0046	0.0107	0.1533	
13	650	0.0336	0.0351	0.2100	
14	700	0.0015	0.0122	0.1314	
15	750	0.0259	0.0290	0.1500	
16	800	0.0015	0.0076	0.1150	
17	850	0.0214	0.0229	0.1324	
18	900	0.0031	0.0076	0.1022	
19	950	0.0183	0.0198	0.1184	
20	1000	0.0015	0.0061	0.0920	
21	1050	0.0168	0.0168	0.1071	
22	1100	0.0015	0.0061	0.0836	
23	1150	0.0137	0.0137	0.0978	
24	1200	0.0015	0.0061	0.0767	
25	1250	0.0122	0.0122	0.0900	
26	1300	0.0015	0.0046	0.0708	
27	1350	0.0107	0.0107	0.0833	
28	1400	0.0000	0.0046	0.0657	
29	1450	0.0092	0.0092	0.0776	
30	1500	0.0000	0.0046	0.0613	
31	1550	0.0076	0.0092	0.0726	
32	1600	0.0000	0.0046	0.0575	
33	1650	0.0076	0.0076	0.0682	
34	1700	0.0000	0.0046	0.0541	
35	1750	0.0061	0.0076	0.0643	
36	1800	0.0000	0.0046	0.0511	
37	1850	0.0061	0.0061	0.0608	
38	1900	0.0000	0.0046	0.0484	
39	1950	0.0061	0.0061	0.0577	
40	2000	0.0000	0.0046	0.0460	

Result: PASSED

2.7.5 Verdict

The EUT met the requirement.

Test model: CLEVER-POOL/220V

2.8 VOLTAGE FLUCTUATIONS

2.8.1Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Last Cal. Date	Cal. Period
EMC-PARTNER	Harmonics and Flicker Analyzer	HARMONIC S-1000	HAR1000-40	2012.7	3 Year

***Statement of Traceability: China Ceprei (Sichuan) Laboratory** certifies that all calibrations have been performed using suitable standards traceable to the CHINA SCEIENTIFIC MEASUREMENT INSTITUTE.

2.8.2 Limits

- The value of *Pst* shall not be greater than 1.0;
- The value of *Plt* shall not be greater than 0.65;
- The value of *d(t)* during a voltage change shall not exceed 3.3% for more than 500ms;
- The relative steady-state voltage change, *dc*, shall not exceed 3.3%;
- The maxim relative voltage change, *dmax*, shall not exceed 4%.

Notes:

Pst: Short-term flicker indicator The flicker severity evaluated over a short period (in minutes); Pst=1 is the conventional threshold of irritability;

Plt: long-term flicker indicator; the flicker severity evaluated over a long period (a few hous) Using successive Pst values;

dc: the relative steady-state voltage change ;

dmax: maximum relative voltage change ;

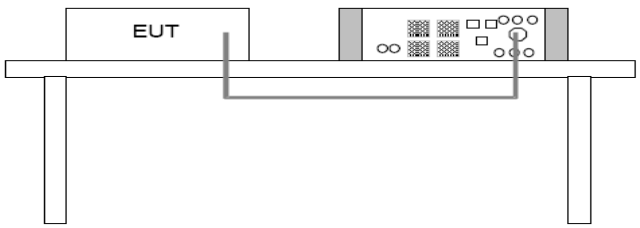
d(t): the value during a voltage change .

2.8.3 Test procedure and the test set-up

Procedure

a. 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.
b. 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.

Set-up



Test model: CLEVER-POOL/220V

2.8.4 Test Data and Records

Flicker and Voltage Fluctuation	Limit	Value
Short-term flicker Indicator Pst	1.0	0.287
Long -term flicker Indicator Plt	0.65	0.412
Relative Steady-state Voltage Change dc [%]	3.3	1.135
Maximum Relative Voltage Change dmax [%]	4.0	1.346
Relative Voltage Change Characteristic dt [s]	0.50	0.000

Result: PASSED

2.8.5 Verdict

The EUT met the requirement.

APPENDIX A - PHOTOGRAPH

Test model: CLEVER-POOL/220V

Notice

1. This test report shall be invalid without the cachet of the testing laboratory.

2. This copied report shall be invalid without the sealed cachet of the testing laboratory.

3. This report shall be invalid without tester signature, reviewer signature and approver signature.

4. This report is invalid if altered.

5. Client shall put forward demurrer within 15days after receipt of report. The testing laboratory shall refuse disposal if exceeded the time limit.

6. The test results presented in this report relate only to the object tested.

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