



## EMC TEST REPORT

EN 55014-1:2006+A1:2009+A2:2011

EN 55014-2:1997+A1:2001+A2:2008

EN 61000-3-2:2014

EN 61000-3-3:2013

### MEASUREMENT AND TEST REPORT

For

Shenzhen Blueocean Industry Co., Ltd.

Room 0827, block C, No.5 Exchange Square, Southern China city, Pinghu, Longgang District, Shenzhen

**Model:**

BO-18QY,BO-315QY,BO-515QY,BO-715QY,BO-1015QY,BO-730QY,BO-1030QY,  
BO-2030QY,BO-3APT,BO-5APT,BO-7APT,BO-10APT,BO-5AYT,BO-10AYT,  
BO-20AYT,BO-30AYT,BO-50AYT,BO-100AYT,BO-5AMT,BO-10AMT,BO-20AMT,  
BO-30AMT,BO-50AMT,BO-100AMT,BO-200AMT.

April 02, 2015

<b>This Report Concerns:</b>	<b>Equipment Type:</b>
Original Report	Ozone disinfection machine
<b>Test Engineer:</b>	Wesker/ <i>Wesker</i>
<b>Report Number:</b>	TH15CR-175E
<b>Test Date:</b>	April 01~02,2015
<b>Reviewed By:</b>	Prince/ <i>[Signature]</i>
<b>Approved By:</b>	Bing/ <i>[Signature]</i>
<b>Prepared By:</b>	<b>Shenzhen Tian Hai Test Technology Co.,Ltd.</b> FL.1, No.2 BLDG,Yalian Industrial Zone, Wuhe Road, Bantian street, Longgang District, Shenzhen Tel : +86-755-86615100 Fax: +86-755-86615105

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior written consent of TianHai Compliance Testing Laboratory Ltd.

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# 1 - GENERAL INFORMATION

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## 1.1 Product Description for Equipment under Test (EUT)

### Client Information

Applicant:	<b>Shenzhen Blueocean Industry Co., Ltd.</b>
Address of applicant:	Room 0827, block C, No.5 Exchange Square, Southern China city, Pinghu, Longgang District, Shenzhen
Manufacturer:	<b>Shenzhen Blueocean Industry Co., Ltd.</b>
Address of Manufacturer:	Room 0827, block C, No.5 Exchange Square, Southern China city, Pinghu, Longgang District, Shenzhen

### General Description of E.U.T

EUT Name:	Ozone disinfection machine
Model No.:	BO-18QY,BO-315QY,BO-515QY,BO-715QY,BO-1015QY,BO-730QY,BO-1030QY,BO-2030QY,BO-3APT,BO-5APT,BO-7APT,BO-10APT,BO-5AYT,BO-10AYT,BO-20AYT,BO-30AYT,BO-50AYT,BO-100AYT,BO-5AMT,BO-10AMT,BO-20AMT,BO-30AMT,BO-50AMT,BO-100AMT,BO-200AMT.
Ratings:	Input: AC 120-220V, 50/60Hz , 0.61A ,135W
Trade Mark:	--
Note:	All models share the same circuit diagram,just with different the size of disinfection.All test performance on:BO-730QY.

Remark: \* *The test data gathered are from the production sample provided by the manufacturer.*

## 1.2 Test Standards

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

EN 55014-1:2006+A1:2009+A2:2011

EN 55014-2:1997+A1:2001+A2:2008

EN 61000-3-2:2014

EN 61000-3-3:2013

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

### 1.3 Test Summary

For the EUT described above. This apparatus is subdivided into category II according to the section 4.2 of EN 55014-2:1997+A1:2001+A2:2008. So according to section 7.2.2 of this standard, the immunity test item applicable to this EUT is listed in table 3.

Table 1 : Tests Carried Out Under EN 55014-1:2006+A1:2009+A2:2011

Standard	Test Items	Status
EN 55014-1:2006+A1:2009+A2:2011	Conducted Emission (150kHz to 30MHz)	√
EN 55014-1:2006+A1:2009+A2:2011	Disturbance Power (30MHz To 300MHz)	x
EN 55014-1:2006+A1:2009+A2:2011	Radiated Disturbances (30MHz To 1000MHz)	√
EN 55014-1:2006+A1:2009+A2:2011	Click	x

√ Indicates that the test is applicable  
x Indicates that the test is not applicable

Table 2 : Tests Carried Out Under EN 61000-3-2:2014/ EN 61000-3-3: 2013

Standard	Test Items	Status
EN 61000-3-2: 2014	Harmonic Current Test	√
EN 61000-3-3: 2013	Voltage Fluctuations and Flicker Test	√

√ Indicates that the test is applicable  
x Indicates that the test is not applicable

Table 3 : Tests Carried Out Under EN 55014-2:1997+A1:2001+A2:2008

Standard	Test Items	Status
EN61000-4-2:2008	Electrostatic discharge Immunity	√
EN61000-4-3:2010	Radiated Susceptibility (80MHz to 1GHz)	x
EN61000-4-4:2004	Electrical Fast Transient/Burst Immunity	√
EN61000-4-5:2005	Surge Immunity	√
EN61000-4-6:2008	Conducted Susceptibility (150kHz to 230MHz)	√
EN61000-4-11:2009	Voltage Dips, Short Interruptions Immunity	√

√ Indicates that the test is applicable  
x Indicates that the test is not applicable

### 1.4 Test Methodology

All measurements contained in this report were conducted with CISPR 16-1: 2002, radio disturbance and immunity measuring apparatus, and CISPR16-2: 2002, Method of measurement of disturbances and immunity.

## 1.5 Test Equipment List and Details

No.	Equipment	Manufacturer	Model No.	S/N	Calculator date	Calculator due date
1	EMI Test Receiver	R&S	ESCI	100687	2014-04-07	2015-4-06
2	EMI Test Receiver	R&S	ESPI	100097	2014-04-07	2015-4-06
3	Amplifier	HP	8447D	1937A02492	2014-04-07	2015-4-06
4	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	7101	2014-04-07	2015-4-06
5	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	7102	2014-04-07	2015-4-06
6	Power Clamp	SCHWARZ BECK	MDS-21	3812	2014-04-07	2015-4-06
7	Positioning Controller	C&C	CC-C-1F	MF7802113	N/A	N/A
8	Electrostatic Discharge Simulator	TESEQ	NSG437	125	2014-04-07	2015-4-06
9	Fast Transient Burst Generator	SCHAFFNER	MODULA6150	34572	2014-04-07	2015-4-06
10	Fast Transient Noise Simulator	Noiseken	FNS-105AX	31485	2014-04-07	2015-4-06
11	Color TV Pattern Generator	PHILIPS	PM5418	TM209947	N/A	N/A
12	Power Frequency Magnetic Field Generator	EVERFINE	EMS61000-8K	608002	2014-04-07	2015-4-06
13	Capacitive Coupling Clamp	TESEQ	CDN8014	25096	2014-04-07	2015-4-06
14	High Field Biconical Antenna	ELECTRO-METRICS	EM-6913	166	2014-4-14	2015-4-13
15	Log Periodic Antenna	ELECTRO-METRICS	EM-6950	811	2014-4-14	2015-4-13
16	Remote Active Vertical Antenna	ELECTRO-METRICS	EM-6892	304	2014-4-14	2015-4-13
17	TRILOG Broadband Test-Antenna	SCHWARZ BECK	VULB9163	9163-324	2014-4-14	2015-4-13
18	Horn Antenna	SCHWARZ BECK	BBHA9120A	B08000991-0001	2014-4-14	2015-4-13
19	Teo Line Single Phase Module	SCHWARZ BECK	NSLK8128	D-69250	2014-04-07	2015-4-06
20	Electricity bridge	Zentech	100 LCR METER	803024	2014-04-07	2015-4-06
21	RF Current Probe	FCC	F-33-4	80	N/A	N/A
22	Signal Generator	HP	8647A	3349A02296	2014-04-07	2015-4-06
23	Microwave Amplifier	HP	8349B	2627A00994	2014-04-07	2015-4-06
24	Triple-Loop Antenna	EVERFINE	LLA-2	607004	2014-04-07	2015-4-06

## 2 - SYSTEM TEST CONFIGURATION

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### 2.1 Justification

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

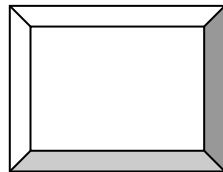
### 2.2 EUT Exercise Software

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

### 2.3 Equipment Modifications

The EUT tested was not modified by TH.

### 2.4 Basic Configuration of Test System



EUT

### 2.5 Test Setup Diagram



## 3 - DISTURBANCE VOLTAGE AT THE MAINS TERMINALS

### 3.1 Measurement Uncertainty

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

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

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

Frequency Range (MHz)	Limits ( dBuV)	
	Quasi-Peak	Average
0.150~0.500	66~56	59~46
0.500~5.000	56	46
5.000~30.00	60	50

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

### 3.3 EUT Setup

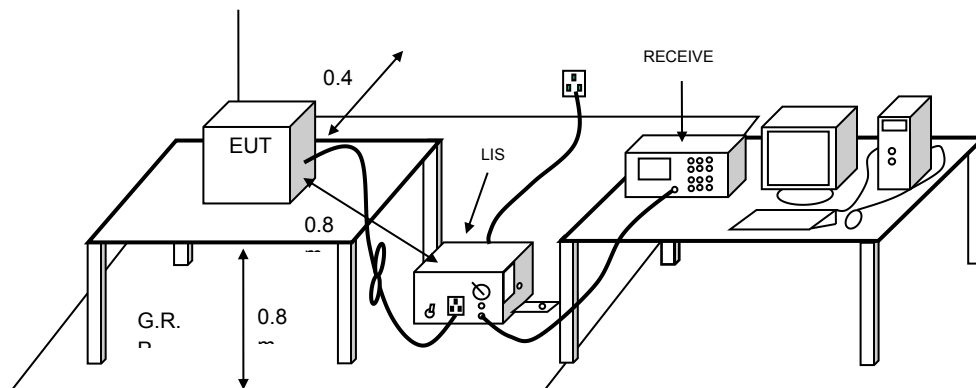
The setup of EUT is according with CISPR 16-1: 2002, CISPR16-2: 2002 measurement procedure. See following test setup figure. The specification used was the EN 55014-1 limits.

The EUT was placed center and the back edge of the test table.

The AV cables were draped along the test table and bundled to 30-40cm in the middle.

The spacing between the peripherals was 10 cm.

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





### 3.4 Instruments Setup

The test receiver was set with the following configurations:

Test Receiver Setting:

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

### 3.5 Test Procedure

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

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

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

### 3.6 Summary of Test Results

According to the data in section 3.6, the EUT complied with the EN 55014-1 Conducted margin, which represented worst margin reading.

### 3.7 Disturbance Voltage Test Data

Temperature ( °C )	15~35
Humidity ( %RH )	30~60
Barometric Pressure ( mbar )	860~1060
EUT	Ozone disinfection machine
M/N	BO-730QY
Operating Mode	ON

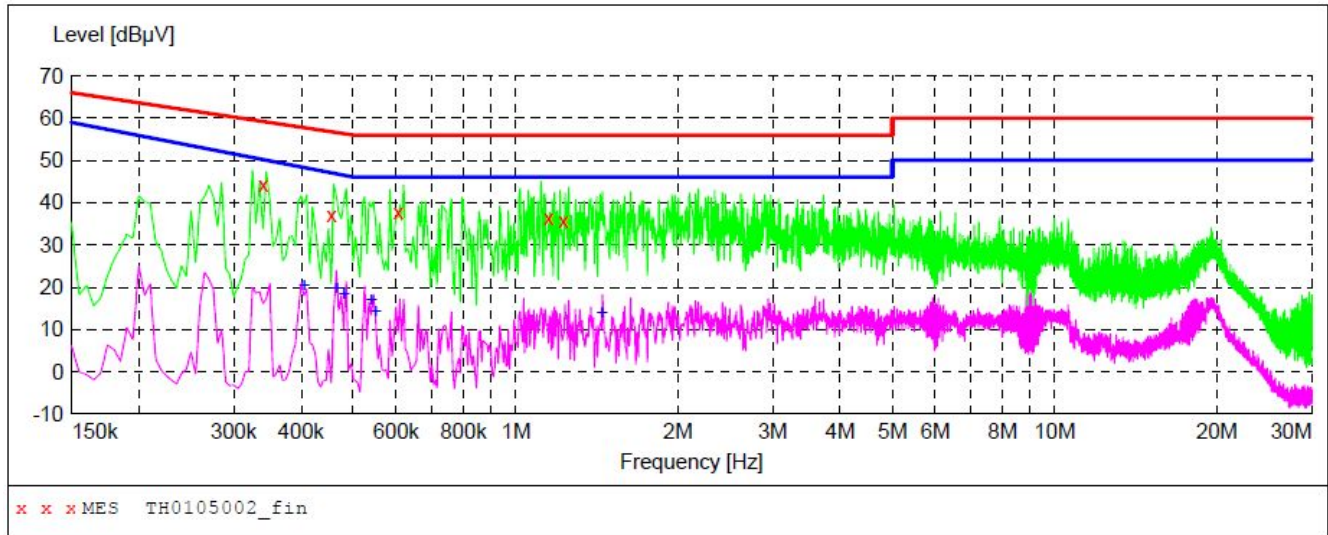
Test data see following pages

### 3.8 Test Result

**Pass**

## Disturbance Voltage Test Data

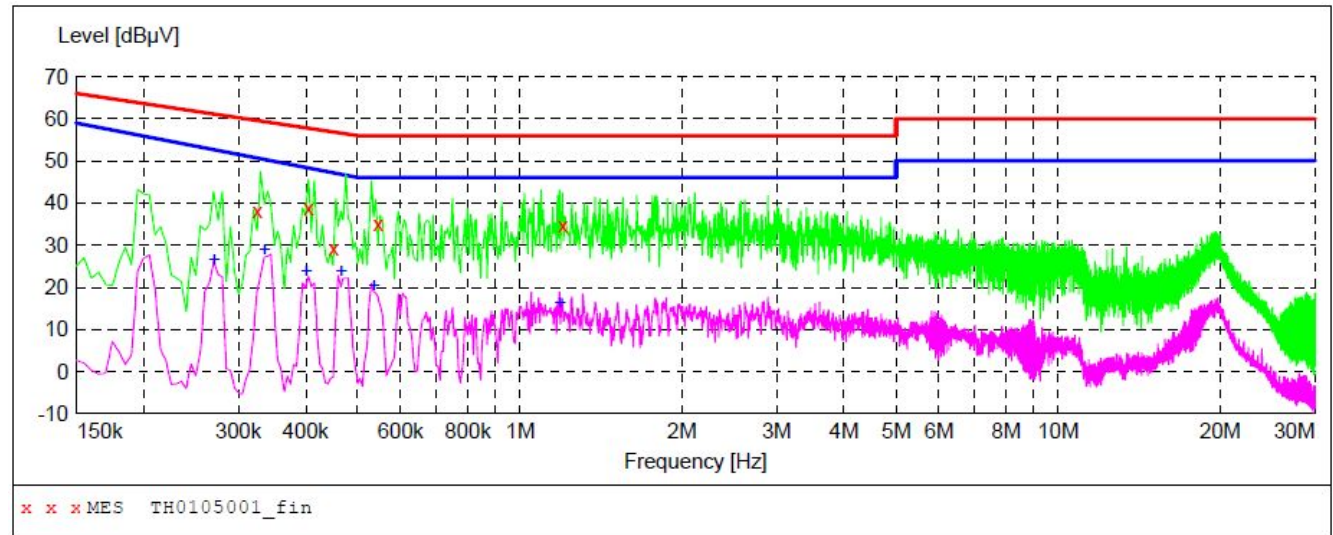
EUT: Ozone disinfection machine M/N: BO-730QY  
 Operating Condition: ON  
 Test Site: Shielded Room  
 Operator: Wesker  
 Test Specification: AC 220V 50Hz  
 Comment: Live Line  
 Start of Test: 04/02/15 10:25 Tem:24°C Hum:60%



Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.340000	44.20	10.7	59	15.0	QP	L1	GND
0.455000	37.20	10.4	57	19.6	QP	L1	GND
0.605000	37.90	10.3	56	18.1	QP	L1	GND
1.150000	36.30	10.3	56	19.7	QP	L1	GND
1.225000	35.70	10.3	56	20.3	QP	L1	GND
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.405000	20.20	10.5	48	28.1	AV	L1	GND
0.465000	19.80	10.4	47	27.0	AV	L1	GND
0.480000	18.20	10.4	46	28.2	AV	L1	GND
0.540000	16.80	10.3	46	29.2	AV	L1	GND
0.550000	14.10	10.3	46	31.9	AV	L1	GND
1.445000	13.90	10.3	46	32.1	AV	L1	GND

## Disturbance Voltage Test Data

EUT: Ozone disinfection machine M/N: BO-730QY  
 Operating Condition: ON  
 Test Site: Shielded Room  
 Operator: Wesker  
 Test Specification: AC 220V 50Hz  
 Comment: Neutral Line  
 Start of Test: 04/02/15 10:27 Tem:24°C Hum:60%



Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.325000	38.20	10.7	60	21.4	QP	N	GND
0.405000	38.90	10.5	58	18.9	QP	N	GND
0.450000	29.20	10.4	57	27.7	QP	N	GND
0.545000	35.10	10.3	56	20.9	QP	N	GND
1.200000	34.70	10.3	56	21.3	QP	N	GND
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.270000	26.50	10.9	53	26.2	AV	N	GND
0.335000	29.00	10.7	50	21.3	AV	N	GND
0.400000	23.90	10.5	48	24.5	AV	N	GND
0.465000	23.70	10.4	47	23.1	AV	N	GND
0.535000	20.50	10.3	46	25.5	AV	N	GND
1.185000	16.30	10.3	46	29.7	AV	N	GND

## 4 - RADIATED DISTURBANCES

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### 4.1 Measurement Uncertainty

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

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

### 4.2 Limit of Radiated Disturbances (Class B)

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

Note: (1) The tighter limit shall apply at the edge between two frequency bands.  
(2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

### 4.3 EUT Setup

The radiated emission tests were performed in the open area 3-meter test site, using the setup accordance with the CISPR 16-1: 2002, CISPR16-2: 2002. The specification used was EN 55022 Class B limits.

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

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

### 4.4 Test Receiver Setup

According to EN 55013 rules, the frequency was investigated from 30 to 1000 MHz. During the radiated emission test, the test receiver was set with the following configurations:

Test Receiver Setting:

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

Antenna Position:

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

#### 4.5 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the peak detection mode. Quasi-peak readings performed only when an emission was found to be marginal (within -10 dB $\mu$ V of specification limits), and are distinguished with a "QP" in the data table.

#### 4.6 Corrected Amplitude & Margin Calculation

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

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

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

$$\text{Margin} = \text{Class B Limit} - \text{Corr. Ampl.}$$

#### 4.7 Radiated Emissions Test Result

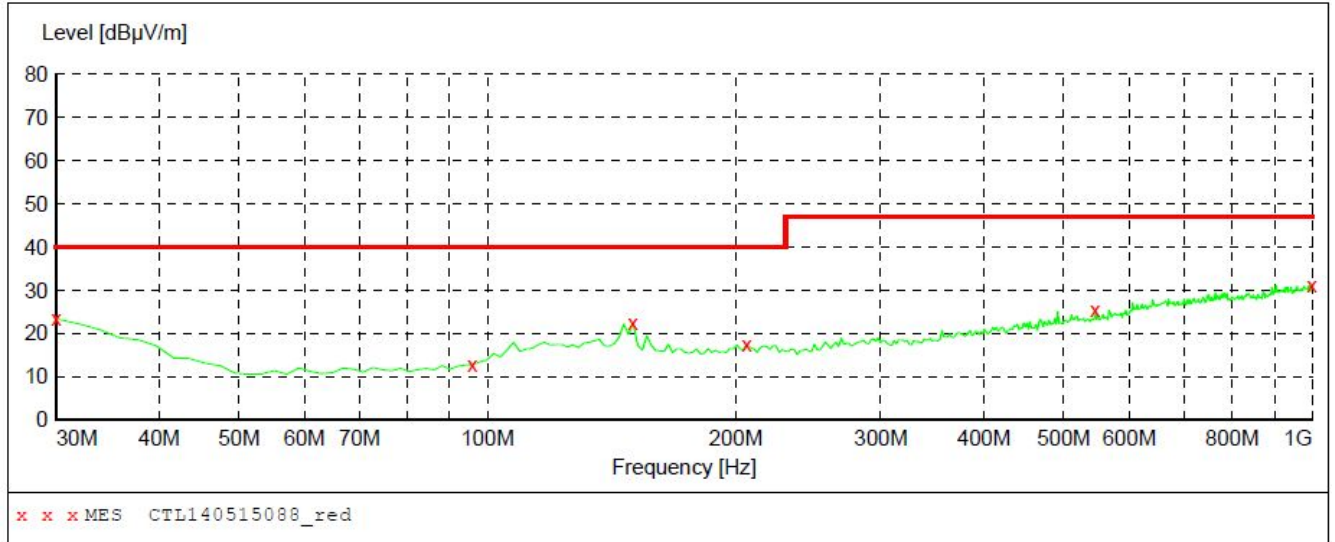
Temperature ( °C )	15~35
Humidity ( %RH )	30~60
Barometric Pressure ( mbar )	860~1060
EUT	Ozone disinfection machine
M/N	BO-730QY
Operating Mode	0N

#### 4.8 Test Result

**PASS**

## Radiated Emission Test Data

EUT: Ozone disinfection machine M/N:BO-730QY  
 Operating Condition: ON  
 Test Site: 3m CHAMBER  
 Operator: Wesker  
 Test Specification: AC 220V 50Hz  
 Comment: Polarizations: Horizontal Tem:26°C Hum:60%  
 Start of Test: 04/02/15/ 10:35

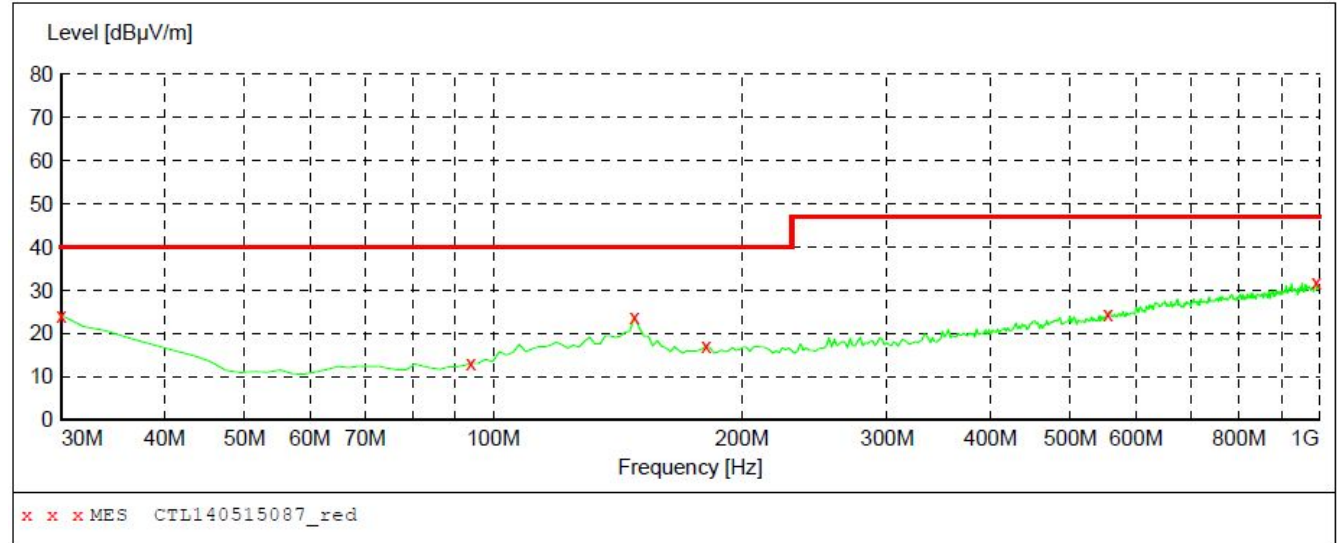


Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	23.40	21.1	40.0	16.6	---	0.0	0.00	HORIZONTAL
95.960000	12.70	10.6	40.0	27.3	---	0.0	0.00	HORIZONTAL
150.280000	22.40	14.1	40.0	17.6	---	0.0	0.00	HORIZONTAL
206.540000	17.50	14.3	40.0	22.5	---	0.0	0.00	HORIZONTAL
546.040000	25.40	20.9	47.0	21.6	---	0.0	0.00	HORIZONTAL
1000.000000	31.20	27.4	47.0	15.8	---	0.0	0.00	HORIZONTAL



## Radiated Emission Test Data

EUT: Ozone disinfection machine M/N: BO-730QY  
 Operating Condition: ON  
 Test Site: 3m CHAMBER  
 Operator: Wesker  
 Test Specification: AC 220V 50Hz  
 Comment: Polarizations: Vertical Tem:26°C Hum:60%  
 Start of Test: 04/02/15/ 10:37



Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	24.20	21.1	40.0	15.8	---	0.0	0.00	VERTICAL
94.020000	13.10	10.2	40.0	26.9	---	0.0	0.00	VERTICAL
148.340000	23.80	14.2	40.0	16.2	---	0.0	0.00	VERTICAL
181.320000	17.10	13.3	40.0	22.9	---	0.0	0.00	VERTICAL
555.740000	24.50	21.1	47.0	22.5	---	0.0	0.00	VERTICAL
992.240000	31.70	27.2	47.0	15.3	---	0.0	0.00	VERTICAL

## 5 - HARMONIC CURRENT TEST (EN 61000-3-2)

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### 5.1 Application of Harmonic Current Emission

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

### 5.2 Measurement Data

Standard used	EN/IEC 61000-3-2 A14 (2014) Quasi-stationary - Equipment class B
Observation time	150s
Windows width:	10 periods - (EN/IEC 61000-4-7 Edition 2000)
EUT	Ozone disinfection machine
M/N	BO-730QY
Operating Mode	On

### 5.3 Test Results

The EUT was subjected to the Harmonic Current test required by EN 61000-3-2:2014.

### 5.4 Test Result

**PASS**



## 6 - VOLTAGE FLUCTUATIONS AND FLICKER TEST (EN 61000-3-3)

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### 6.1 Application of Voltage Fluctuations and Flicker Test

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

### 6.2 Measurement Data

Standard used	EN/IEC 61000-3-3 Flicker
Short time (Pst)	10 min
Observation time	10 min (1 Flicker measurement)
Flickermeter	AC 220V/50Hz
EUT	Ozone disinfection machine
M/N	BO-730QY
Operating Mode	On
Test Result	PASS

### Maximum Flicker results

	EUT values	Limit	Result
Pst	0.009	1.00	PASS
dc [%]	0.002	3.30	PASS
dmax [%]	0.021	4.00	PASS
dt [s]	0.000	0.50	PASS

### 6.3 Test Results

The EUT was subjected to the voltage fluctuations and flicker test required by EN 61000-3-3: 2013.

## **7 - EN 55014-2 MEASUREMENT INSTRUMENTATION**

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### **7.1 Electrostatic Discharge Test System**

An EM TEST DITOC0103Z ESD simulator is used for all testing. It is capable of applying Electrostatic discharges in both contact discharge modes to 4 kV and air discharge modes to 8 kV in both positive and negative polarities. This is in accordance with the IEC 61000-4-2 basic EMC publication.

### **7.2 Electrical Fast Transient/Burst Immunity Test System**

An EM Test UCS 500-M6 Immunity test system is used for all testing. It is capable of applying fast transients to the AC line at any phase angle with respect to the AC line voltage wave form and to attached cables via a capacitive coupling clamp in accordance with the IEC 61000-4-4 basic EMC publication.

### **7.3 Surge Immunity Test System**

An EM Test UCS 500-M6 Immunity test system is used for all testing. Both positive and negative polarities of voltage up to 2kV were applied to the AC input lines. The coupling network defined in the standard was used.

### **7.4 Conducted Susceptibility Test System**

An IFR 2032A signal generator and a set of Amplifier Research test system are used for the testing. EUT was tested from 0.15 MHz to 230 MHz with 1kHz sine wave, 80% modulation with 3Vr.m.s. CDN coupling and de-coupling networks was tested. During the tests, injected was applied to power line by using CDNs-6.2.2 method, and I/O lines was injected by using clamp injection-6.2.3.method.

### **7.5 Voltage Dips, Short Interruptions Immunity Tests System**

An EM Test UCS 500-M6 Immunity test system is used for all testing. Test level as described in IEC 61000-4-11, section 5, titled "Test Levels".

## 7.6 Equipment Test Table

IEC 61000-4-2: 1995 specifies that a tabletop EUT shall be placed on a non-conducting table which is 80 centimeters above a ground reference plane and that floor mounted equipment shall be placed on a insulating support approximately 10 centimeters above a ground plane. During the tests, the EUT is positioned over a ground reference plane in conformance with this requirement.

For tabletop equipment, a 1.6 by 0.8-meter metal sheet (HCP) is placed on the table and connected to the ground plane via a metal strap with two 470 k Ohms resistors in series. The EUT and attached cables are isolated from this metal sheet by *0.5-millimeter* thick insulating material. A Vertical Coupling Plane (VCP) grounded on the ground plane through the same configuration as in the HCP is used.

IEC 61000-4-3 and IEC 61000-4-4 specify that a tabletop EUT be placed on a non-conducting table 80 centimeters above a ground reference plane and that floor-mounted equipment shall be placed on an insulating support approximately 10 centimeters above a ground plane. During the IEC 61000-4-3 tests, the EUT is positioned on a table in a shielded semi-anechoic test chamber to reduce reflections from the internal surfaces of the chamber. During the IEC 61000-4-4 tests, the EUT is positioned on a table over a ground reference plane in conformance with this requirement.

## 7.7 Instrument Calibration

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications.

Extensive engineering efforts have been made to ensure test data reliability through Quality Control and regular equipment calibration schedules. However, the application of radio frequency fields and voltages are not without an unavoidable level of uncertainty. These include inaccuracies in antenna factors, chamber imperfections and possible test generator output uncertainties.

## **8 - EN 55014-2 TEST PROCEDURES**

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### **8.1 EUT and Cable Placement**

The EUT and any peripherals are located at the center of the table for tabletop devices and in the center of the ground plane with the insulating support for floor-standing devices. The standards require that interconnecting cables to be connected to available ports of the unit and that the placement of the unit and the attached cables simulate a typical installation so far as to be practical.

### **8.2 Application of Electrostatic Discharge Immunity Test**

The test is conducted in the following order according to the basic standard IEC 61000-4-2: Air Discharge, Direct Contact Discharge, Indirect Contact Horizontal Coupling Plane Discharge, and Indirect Contact Vertical Coupling Plane Discharge. The Electrostatic Discharge test levels are set and discharges for the different test modes are set appropriately. The Electrostatic Discharge is applied to the conductive surface of the computer in which the EUT is enclosed, and along all seams and control surfaces on the computer. When a discharge occurs and an error is caused, the type of error, discharge level and location is recorded.

### **8.3 Application of Electrical Fast Transient/Burst Immunity Test**

The EUT was arranged for Power Line Coupling and for I/O Line Coupling through a capacitive clamp, where applicable. (Note: The I/O coupling test using a capacitive clamp is performed on the I/O interface cables that are longer in length than 3 meters.) A metal ground plane 2.4 meter by 2.0 meter was placed between the floor and the table and is connected to the earth by a 2.0 meter ground rod. The ground rod is connected to the test facility's electrical earth.

### **8.4 Application of Surge Immunity Test**

The EUT was setup as described in IEC 61000-4-5 and the test shall be performed according to the test plan.

### **8.5 Application of Conducted Susceptibility Test**

The EUT was setup according to the IEC 61000-4-6 and the test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn while the other non-excited RF input ports of the coupling devices are terminated by a 50  $\Omega$  load resistor. The frequency range is 150kHz to 230 MHz.

### **8.6 Application of Voltage Dips, Short Interruptions Immunity Tests**

The EUT was setup according to the IEC 61000-4-11 and the test shall be done as the procedure described in the standard.

### **8.7 Deviations from the Standard**

No deviations from EN 55014-2 were made when performing the tests described in this report.

## 9 - TEST DATA

### 9.1 Electrostatic Discharge Immunity Test (IEC 61000-4-2)

Temperature ( °C )	15~35
Humidity ( %RH )	30~60
Barometric Pressure ( mbar )	860~1060
EUT	Ozone disinfection machine
M/N	BO-730QY
Operating Mode	On

Table 1: Electrostatic Discharge Immunity (Air Discharge)

IEC 61000-4-2 Test Points	Test Levels									
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV	-15 kV	+15 kV
Slots 4 points	A	A	A	A	A	A	A	A	/	/
Button 6 points	A	A	A	A	A	A	A	A	/	/
Shell 8 points	A	A	A	A	A	A	A	A	/	/

Table 2: Electrostatic Discharge Immunity (Direct Contact)

IEC 61000-4-2 Test Points	Test Levels									
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV	-15 kV	+15 kV
N/A	/	/	/	/	/	/	/	/	/	/

Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP)

IEC 61000-4-2 Test Points	Test Levels									
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV	-15 kV	+15 kV
Front Side	A	A	A	A	/	/	/	/	/	/
Back Side	A	A	A	A	/	/	/	/	/	/
Left Side	A	A	A	A	/	/	/	/	/	/
Right Side	A	A	A	A	/	/	/	/	/	/

Table 4: Electrostatic Discharge Immunity (Indirect Contact VCP)

IEC 61000-4-2 Test Points	Test Levels									
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV	-15 kV	+15 kV
Front Side	A	A	A	A	/	/	/	/	/	/
Back Side	A	A	A	A	/	/	/	/	/	/
Left Side	A	A	A	A	/	/	/	/	/	/
Right Side	A	A	A	A	/	/	/	/	/	/

## 9.2 Electrical Fast Transient/Burst Immunity Test (IEC 61000-4-4)

Temperature ( °C )	15~35
Humidity ( %RH )	30~60
Barometric Pressure ( mbar )	860~1060
EUT	Ozone disinfection machine
M/N	BO-730QY
Operating Mode	On

IEC 61000-4-4 Test Points		Test Levels (kV)							
		+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
Power Supply  Power Line of EUT	L1	A	A	A	A	/	/	/	/
	L2	A	A	A	A	/	/	/	/
	Earth	/	/	/	/	/	/	/	/
	L1+L2	A	A	A	A	/	/	/	/
	L1 + Earth	/	/	/	/	/	/	/	/
	L2 + Earth	/	/	/	/	/	/	/	/
	L1+L2+Earth	/	/	/	/	/	/	/	/

## 9.3 Surge Immunity Test (IEC 61000-4-5)

Temperature ( °C )	15~35
Humidity ( %RH )	30~60
Barometric Pressure ( mbar )	860~1060
EUT	Ozone disinfection machine
M/N	BO-730QY
Operating Mode	On

Level	Voltage	Poll	Path	Pass	Fail
1	0.5kV	±	L-N	A	/
2	1kV	±	L-N	A	/
3	2kV	±	L-PE, N-PE	/	/
4	4kV	±	L-N, L-PE, N-PE	/	/

## 9.4 Conducted Susceptibility Test (IEC 61000-4-6)

**Frequency Range (MHz):** 0.15~80MHz

**Modulation:** Amplitude 80%, 1kHz sinewave

**Severity Level:** 3Vr.m.s.

Temperature ( °C )	15~35
Humidity ( %RH )	30~60
Barometric Pressure ( mbar )	860~1060
EUT	Ozone disinfection machine
M/N	BO-730QY
Operating Mode	On

Level	Voltage Level (e.m.f.) U <sub>0</sub>	Pass	Fail
1	1	/	/
2	3	A	/
3	10	/	/
X	Special	/	/

## 9.5 Voltage Dips, Short Interruptions Immunity Tests (IEC 61000-4-11)

Temperature ( °C )	15~35
Humidity ( %RH )	30~60
Barometric Pressure ( mbar )	860~1060
EUT	Ozone disinfection machine
M/N	BO-730QY
Operating Mode	On

Level	U2	td	Phase Angle	N	Pass	Fail
1	95%	10ms	0/90/180/270	3	B	/
2	30%	1000ms	0/90/180/270	3	C	/
3	60%	200ms	0/90/180/270	3	C	/

Note:

- The apparatus shall continue to operate as intended during and after the test. The manufacturer specifies some minimum performance level. The performance level may be specified by the manufacturer as a permissible loss of performance.
- The apparatus shall continue to operate as intended after the test. This indicates that the EUT does not need to function at normal performance levels during the test, but must recover. Again some minimal performance is defined by the manufacture. No change in operating state or loss or data is permitted.
- Temporary loss of function is allowed. Operation of the EUT may stop as long as it is either automatically reset or can be manually restored by operation of the controls.

## 10 - TEST RESULTS

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The following tests were performed on the EUT supplied by the applicant; the actual test results are contained within the Test Data section of this report.

### 10.1 IEC 61000-4-2 Electrostatic Discharge Immunity Test Configuration

The EUT was subjected to the electrostatic discharge tests required by EN 55014-2 and all lower levels specified in IEC 61000-4-2.

*The EUT continued to perform as intended during and after the application of the ESD. Test setup photographs presented in Appendix C.*

### 10.2 IEC 61000-4-4 Electrical Fast Transient/Burst Immunity Test Configuration

The EUT was subjected to the electrical fast transient tests required by EN 55014-2 and all lower levels specified in IEC 61000-4-4.

*The EUT continued to perform as intended during and after the application of the EFT/B. Test setup photographs presented in Appendix C.*

### 10.3 IEC 61000-4-5 Surge Immunity Test Configuration

The EUT was subjected to the Surge Immunity tests required by EN 55014-2 and all lower levels specified in IEC 61000-4-5.

*The EUT continued to perform as intended during and after the application of the Surge Immunity Test. Test setup photographs presented in Appendix C.*

### 10.4 IEC 61000-4-6 Conducted Susceptibility Test Configuration

The EUT was subjected to the Conducted Susceptibility tests required by EN 55014-2 and all lower levels specified in IEC 61000-4-6.

*The EUT continued to perform as intended during and after the application of the Conducted Susceptibility Test. Test setup photographs presented in Appendix C.*

### 10.5 IEC 61000-4-11 Voltage Dips, Short Interruptions Immunity Tests Configuration

The EUT was subjected to the Voltage Dips/Interruptions tests required by EN 55014-2 and all lower levels specified in IEC 61000-4-11.

*The EUT continued to perform as intended during and after the application of the Voltage Dips/Interruptions Test. Test setup photographs presented in Appendix C.*



## APPENDIX A - PRODUCT LABELING

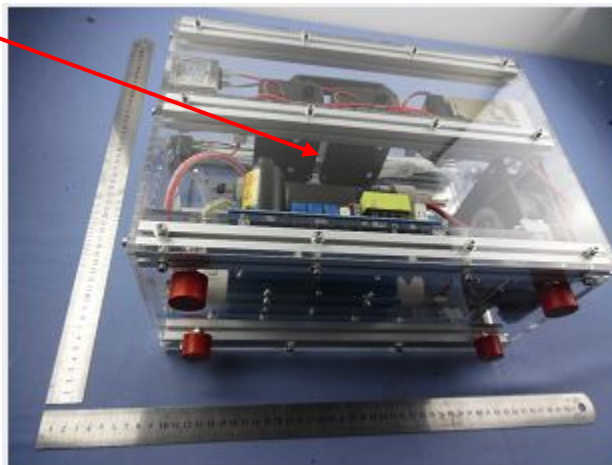
---

### CE Marking Label Specification

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

### Proposed Label Location on EUT

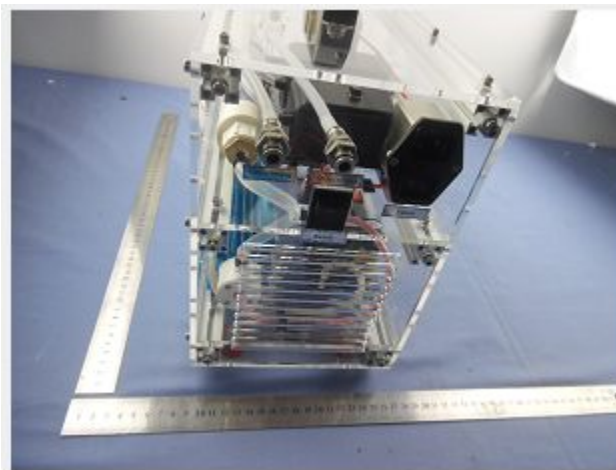
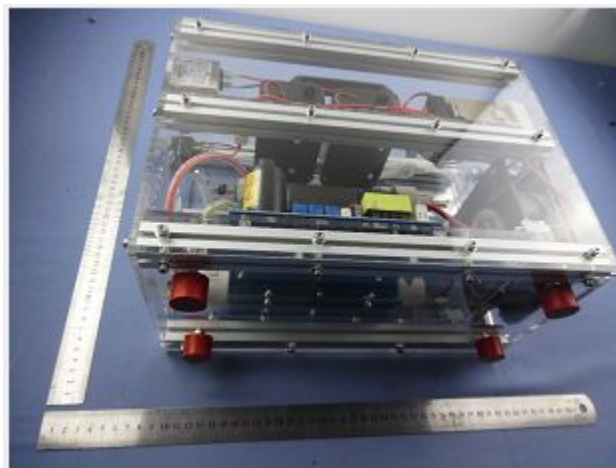
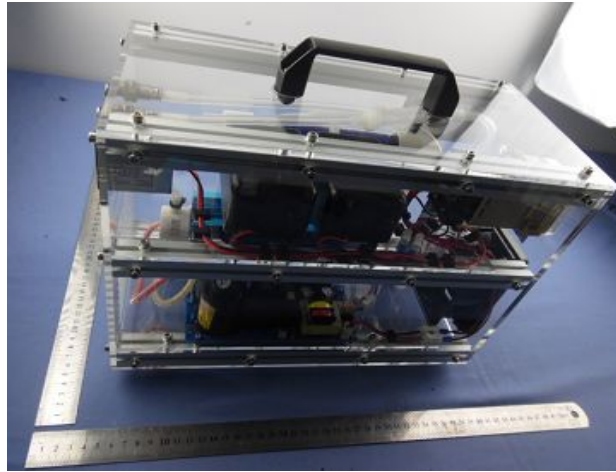
Proposed CE Marking Location



## APPENDIX B - EUT PHOTOGRAPHS

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### EUT –Whole View



## APPENDIX C - TEST SETUP PHOTOGRAPHS

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\*\*\*\*\*END OF THE REPORT\*\*\*\*\*





**China National Accreditation Service for Conformity Assessment**

**LABORATORY ACCREDITATION CERTIFICATE**

**(Registration No. CNAS L5885 )**

**Shenzhen Tianhai Test Technology Co., Ltd.**

1/F., East Building, Yalian Haoshida Industrial Zone, No.5022, Wuhe Road, Bantian  
Street, Longgang District, Shenzhen, Guangdong, China

*is accredited to ISO/IEC 17025:2005 General Requirements for the  
Competence of Testing and Calibration Laboratories(CNAS-CL01  
Accreditation Criteria for the Competence of Testing and Calibration  
Laboratories) for the competence of testing.*

*The scope of accreditation is detailed in the attached appendices bearing the same  
registration number as above. The appendices form an integral part of this  
certificate.*

Date of Issue: 2012-10-29

Date of Expiry: 2015-10-28

Date of Initial Accreditation: 2012-10-29

Date of Update: 2014-03-27

Signed on behalf of China National Accreditation Service  
for Conformity Assessment

China National Accreditation Service for Conformity Assessment (CNAS) is authorized by Certification and Accreditation Administration of the People's Republic of China (CNCA) to operate the national accreditation schemes for conformity assessment. CNAS is the signatory to International Laboratory Accreditation Cooperation Multilateral Recognition Arrangement (ILAC MRA) and Asia Pacific Laboratory Accreditation Cooperation Multilateral Recognition Arrangement (APLAC MRA).