CENTRE OF TESTING SERVICE INTERNATIONAL

OPERATE ACCORDING TO ISO/IEC 17025

TEST REPORT

RoHS 2011/65/EU

Test Report Number : CNB3170118-00213-C

CTS (Ningbo) Testing Service Technology Co., Ltd.

Fl.1 & 8 West, Bldg. B, No. 66, Qingyi Rd.,Hi-Tech Zone, Ningbo, Zhejiang, China

PHONE +86-574-87912121 FAX +86-574-87907993

TEST REPORT

REPORT No. : CNB3170118-00213-C
DATE : Feb. 17, 2017
PAGE : 1 of 12

Table of contents

CTS (Ningbo) Testing Service Technology Co., Ltd.
Fl.1 & 8 West, Bldg. B, No. 66, Qingyi Rd.,Hi-Tech Zone, Ningbo, Zhejiang, China
Tel：+86-574-87912121 (16 lines) Fax：+86-574-87907993
Complaint line：+86-574-87908003 E-mail：cts@cts-lab.com

TEST REPORT

REPORT No. : CNB3170118-00213-C
DATE : Feb. 17, 2017
PAGE : 2 of 12

1 General Information

1.1 Application Details

Name	:	Venlinear Ltd
Address	:	Suite G18,6-9 The Square,Stockley Park,Heathrow,Uxbridge,UB11 1FW,UK
Contact	:	Ben
Telephone	:	+447519155651
Fax	:	+447519155651
Mobile telephone	:	+447519155651
Email	:	ben@venlinear.com

1.2 Manufacturer & Buyer

Manufacturer name	:	Venlinear Ltd
Address	:	Suite G18,6-9 The Square,Stockley Park,Heathrow,Uxbridge,UB11 1FW,UK
Contact	:	Ben
Telephone	:	+447519155651
Fax	:	+447519155651
Mobile telephone	:	+447519155651
Email	:	ben@venlinear.com
Buyer name	:	/

1.3 Description of the Test Item

Sample name	:	Solar String Light, Retro Bulb Light, LED Silver Bulb Light, LED Copper Wire Light
Model No.	:	VL1569, VL1568, VL1570, VL1554, VL1555, VL1598 VL1213, VL1214, VL1273, VL1343, VL1344, VL1345, VL1436, VL1437, VL1458, VL1459, VL1504, VL1505, VL1506, VL1749, VL1750, VL1751, VL1961, VL1962, VL1963, VL1964, VL1965, VL1966, VL1967, VL1968, VL1969, VL1970, VL1971, VL1972, VL1973, VL1974, VL1975, VL1976, VL1977, VL1978, VL1979, VL1980, VL1981, VL1982, VL1983, VL1984, VL1985, VL1986, VL1987, VL1988, VL1989, VL1990, VL1991, VL1992, VL1993, VL1994, VL1995, VL1996 VL1567, VL1826, VL1832, VL1936, VL1937, VL1938, VL1939,

TEST REPORT

REPORT No. : CNB3170118-00213-C
DATE : Feb. 17, 2017
PAGE : 3 of 12

VL1940, VL1941, VL1942, VL1943, VL1944, VL1945, VL1946, VL1947, VL1948, VL1949, VL1950, VL1951, VL1952, VL1953, VL1954, VL1955, VL1956, VL1957, VL1958, VL1959, VL1960

Brand name : /
Condition of sample(s) : EFFECTIVE

2 Test results

2.1 General Information

2.1.1 Sample Receiving Date

Jan. 20, 2017

2.1.2 Testing Period

Jan. 20, 2017 to Feb. 14, 2017

2.1.3 Test Requested

In accordance with the RoHS Directive 2011/65/EU Annex II.

2.1.4 Test Method

1. X-Ray Fluorescence Spectrometry method in reference to IEC 62321-3-1:2013.

2. Chemical test method

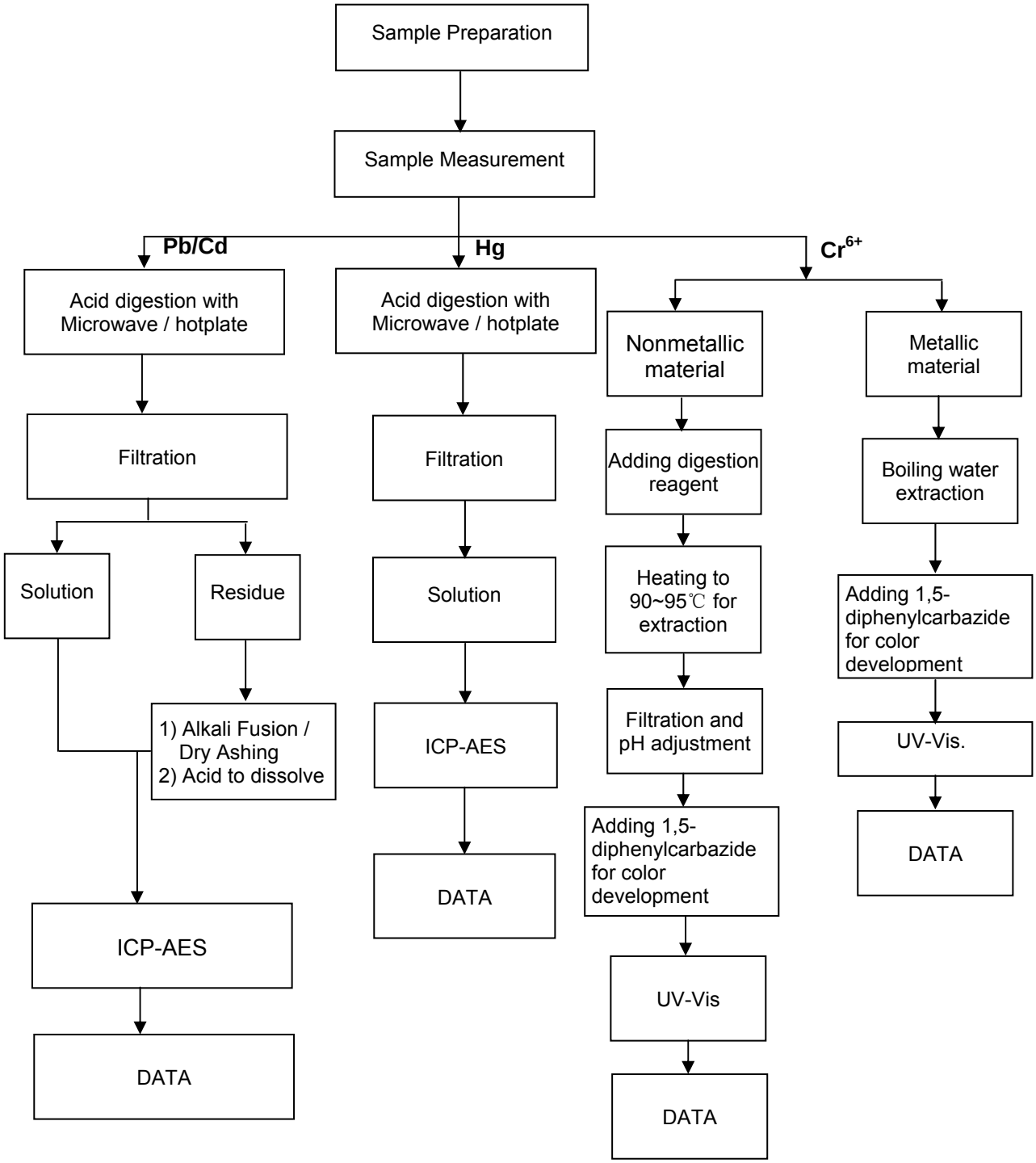
Test Item(s)	Sample preparation	Test Method	Test Instrument
Lead (Pb)	With reference to IEC 62321-2:2013	With reference to IEC 62321-5:2013	ICP-AES
Cadmium (Cd)		With reference to IEC 62321-5:2013	ICP-AES
Mercury (Hg)		With reference to IEC 62321-4:2013	ICP-AES
Chromium Ⅵ (Cr Ⅵ)		With reference to IEC 62321:2008 IEC 62321-7-1:2015	UV-Vis
PBBs		With reference to IEC 62321-6:2015	GC-MS
PBDEs			

CTS (Ningbo) Testing Service Technology Co., Ltd.
Fl.1 & 8 West, Bldg. B, No. 66, Qingyi Rd.,Hi-Tech Zone, Ningbo, Zhejiang, China
Tel：+86-574-87912121 (16 lines) Fax：+86-574-87907993
Complaint line：+86-574-87908003 E-mail：cts@cts-lab.com

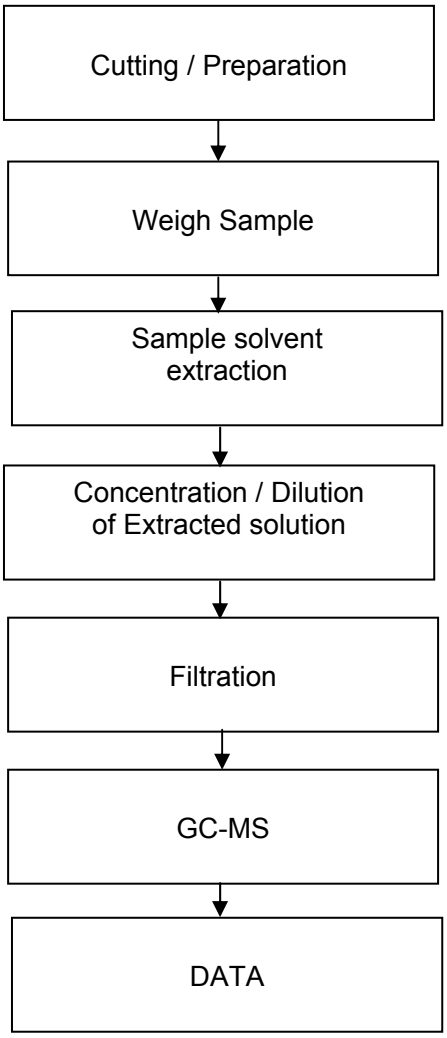
TEST REPORT

REPORT No. : CNB3170118-00213-C
DATE : Feb. 17, 2017
PAGE : 4 of 12

2.1.5 Chemical Test Method Flow Chart



PBBs / PBDEs



2.1.6 Conclusion

Based on the performed tests on submitted samples, the results of Lead, Cadmium, Mercury, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE) comply with the limits as set by RoHS Directive 2011/65/EU Annex II; recasting 2002/95/EC.

CTS (Ningbo) Testing Service Technology Co., Ltd.
Fl.1 & 8 West, Bldg. B, No. 66, Qingyi Rd.,Hi-Tech Zone, Ningbo, Zhejiang, China
Tel：+86-574-87912121 (16 lines) Fax：+86-574-87907993
Complaint line：+86-574-87908003 E-mail：cts@cts-lab.com

TEST REPORT

REPORT No. : CNB3170118-00213-C
DATE : Feb. 17, 2017
PAGE : 6 of 12

2.2 Test Results

2.2.1 Test results of all parts by EDXRF and chemical confirmation

No.	Sample Description	Results					Chemical Confirmation Result (Unit=mg/kg)
		Pb	Cd	Hg	Cr	Br	
1	Semi-transparent plastic cover	P	P	P	P	P	/
2	White plastic cover	P	P	P	P	P	/
3	Transparent plastic cover	P	P	P	P	P	/
4	White semi-transparent plastic cover	P	P	P	P	P	/
5	Black plastic cover	P	P	P	P	P	/
6	Transparent plastic bushing	P	P	P	P	P	/
7	Black plastic jacket	P	P	P	P	P	/
8	Green plastic jacket	P	P	P	P	P	/
9	Transparent soft plastic bushing	P	P	P	P	P	/
10	CE sticker	P	P	P	P	P	/
11	White adhesive	P	P	P	P	P	/
12	Transparent cable jacket	P	P	P	P	P	/
13	Red cable jacket	P	P	P	P	P	/
14	Green cable jacket	P	P	P	P	P	/
15	Slivery wire	P	P	P	P	/	/
16	Copper-colored wire	P	P	P	P	/	/
17	Silvery metal spring of battery base	P	P	P	P	/	/
18	Silvery metal wafer of battery base	P	P	P	P	/	/
19	Black metal screw	P	P	P	P	/	/
20	Slivery metal screw	P	P	P	P	/	/
21	Slivery metal cover	P	P	P	P	/	/
22	Grey metal cover	P	P	P	P	/	/
23	Soldering tin and solder	P	P	P	P	/	/
24	Photo coupler	P	P	P	P	P	/

TEST REPORT

REPORT No. : CNB3170118-00213-C
DATE : Feb. 17, 2017
PAGE : 7 of 12

No.	Sample Description		Results					Chemical Confirmation Result (Unit=mg/kg)
			Pb	Cd	Hg	Cr	Br	
25	Toggle switch	Metal cover	P	P	P	P	/	/
26		Silvery metal wafer	P	P	P	P	/	/
27		Pin	P	P	P	P	/	/
28		Black plastic	P	P	P	P	P	/
29		Spring	P	P	P	P	/	/
30		Fiberboard	P	P	P	P	P	/
31	LED	Transparent body	P	P	P	P	P	/
32		Pin	P	P	P	P	/	/
33		Yellow encapsulation material	P	P	P	P	P	/
34	PCB	Base material	P	P	P	P	P	/
35		Copper foil	P	P	P	P	/	/
36	Color wheel resistor	Yellow body	P	P	P	P	P	/
37		Pin	P	P	P	P	/	/
38	Color wheel resistor	Green body	P	P	P	P	P	/
39		Pin	P	P	P	P	/	/
40	Aluminum electrolytic capacitor	Black plastic jacket with white printing	P	P	P	P	P	/
41		Silvery metal cover	P	P	P	P	/	/
42		Pin	P	P	P	P	/	/
43		Capacitor anode film	P	P	P	P	P	/
44		Capacitor cathode film	P	P	P	P	P	/
45		Paper film	P	P	P	P	P	/
46	Solar panels	Black coating	P	P	P	P	P	/
47		Black glass	P	P	P	P	P	/

CTS (Ningbo) Testing Service Technology Co., Ltd.
Fl.1 & 8 West, Bldg. B, No. 66, Qingyi Rd.,Hi-Tech Zone, Ningbo, Zhejiang, China
Tel：+86-574-87912121 (16 lines) Fax：+86-574-87907993
Complaint line：+86-574-87908003 E-mail：cts@cts-lab.com

TEST REPORT

REPORT No. : CNB3170118-00213-C
DATE : Feb. 17, 2017
PAGE : 8 of 12

Note : P = Below Limit (Pass)
F = Over Limit (Fail)
X = Inconclusive
N.D. = not detected (less than MDL)
1mg/kg=1ppm=0.0001%

Remarks:
(1) Results are obtained by EDXRF for primary screening, and further chemical testing is recommended to be performed, if the concentration exceeds the below warning value according to IEC 62321-3-1:2013.

Element	Polymer Materials	Metallic Materials	Electronic Materials
Pb	P ⩽ 500 < X < 1300 ⩽ F	P ⩽ 500 < X < 1300 ⩽ F	P ⩽ 500 < X < 1300 ⩽ F
Cd	P ⩽ 50 < X < 130 ⩽ F	P ⩽ 50 < X < 130 ⩽ F	X < 130 ⩽ F
Hg	P ⩽ 500 < X < 1300 ⩽ F	P ⩽ 500 < X < 1300 ⩽ F	P ⩽ 500 < X < 1300 ⩽ F
Cr	P ⩽ 700 < X	P ⩽ 700 < X	P ⩽ 500 < X
Br	P ⩽ 250 < X	/	P ⩽ 250 < X

(2) Chemical Confirmation Result acceptable Limit and Method Detect Limit:

Test items	Lead (Pb)	Cadmium (Cd)	Mercury (Hg)	Chromium Ⅵ (CrⅥ) by alkaline extraction	Chromium Ⅵ (CrⅥ) by boiling water extraction#	PBBs	PBDEs
Unit	mg/kg	mg/kg	mg/kg	mg/kg	μg/cm^2	mg/kg	mg/kg
Method Detection Limit	2	2	2	2	0.10	5	5
Acceptable Limit	1000	100	1000	1000	---	1000	1000

Note : 1. #=a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 μg/cm^2. The sample coating is considered to contain CrVI.
b. The sample is negative for CrVI if CrVI is N.D. (concentration less than 0.10 μg/cm^2). The coating is considered a non-CrVI based coating.
c. The result between 0.10 μg/cm^2 and 0.13 μg/cm^2 is considered to be inconclusive unavoidable coating variations may influence the determination.
2. Cr(VI) results represent status of the sample at the time of testing.

CTS (Ningbo) Testing Service Technology Co., Ltd.
Fl.1 & 8 West, Bldg. B, No. 66, Qingyi Rd.,Hi-Tech Zone, Ningbo, Zhejiang, China
Tel：+86-574-87912121 (16 lines) Fax：+86-574-87907993
Complaint line：+86-574-87908003 E-mail：cts@cts-lab.com

TEST REPORT

REPORT No. : CNB3170118-00213-C
DATE : Feb. 17, 2017
PAGE : 9 of 12

2.2.2 Test results by chemical analysis

Test items		Lead (Pb)	Cadmium (Cd)	Mercury (Hg)	Chromium Ⅵ (CrⅥ) by alkaline extraction	Chromium Ⅵ (CrⅥ) by boiling water extraction#	PBBs	PBDEs
Unit		mg/kg	mg/kg	mg/kg	mg/kg	μg/cm^2	mg/kg	mg/kg
Acceptable Limit		1000	100	1000	1000	---	1000	1000
48	Black cable jacket	11	N.D.	N.D.	N.D.	N.A.	N.D.	N.D.

Note : 1. Specimens, which requested to determine Cadmium, Mercury and Lead content, have been dissolved completely.

2. N.D. = not detected (less than MDL)

3. N.A. = not applicable

4. 1 mg/kg=1 ppm=0.0001%

5. #=a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 μg/cm^2. The sample coating is considered to contain CrVI.
   b. The sample is negative for CrVI if CrVI is N.D. (concentration less than 0.10 μg/cm^2). The coating is considered a non-CrVI based coating.
   c. The result between 0.10 μg/cm^2 and 0.13 μg/cm^2 is considered to be inconclusive unavoidable coating variations may influence the determination.

6. Cr(VI) results represent status of the sample at the time of testing.

CTS (Ningbo) Testing Service Technology Co., Ltd.
Fl.1 & 8 West, Bldg. B, No. 66, Qingyi Rd.,Hi-Tech Zone, Ningbo, Zhejiang, China
Tel：+86-574-87912121 (16 lines) Fax：+86-574-87907993
Complaint line：+86-574-87908003 E-mail：cts@cts-lab.com

TEST REPORT

REPORT No. : CNB3170118-00213-C
DATE : Feb. 17, 2017

7. The method detect limit for each hazardous substances, and determined individual PBBs and individual PBDEs are:

Method Detect Limit		
Heavy Metals	Lead (Pb)	2 mg/kg
	Cadmium (Cd)	2 mg/kg
	Mercury (Hg)	2 mg/kg
	Chromium Ⅵ (CrⅥ) by alkaline extraction	2 mg/kg
	Chromium Ⅵ (CrⅥ) by boiling water extraction	0.10μg/cm^2
PBBs	Monobromobiphenyl	5 mg/kg
	Dibromobiphenyl	5 mg/kg
	Tibromobiphenyl	5 mg/kg
	Tetrabromobiphenyl	5 mg/kg
	Pentabromobiphenyl	5 mg/kg
	Hexabromobiphenyl	5 mg/kg
	Heptabromobiphenyl	5 mg/kg
	Octabromobiphenyl	5 mg/kg
	Nonabromodiphenyl	5 mg/kg
	Decabromodiphenyl	5 mg/kg
PBDEs	Monobromodiphenyl ether	5 mg/kg
	Dibromodiphenyl ether	5 mg/kg
	Tibromodiphenyl ether	5 mg/kg
	Tetrabromodiphenyl ether	5 mg/kg
	Pentabromodiphenyl ether	5 mg/kg
	Hexabromodiphenyl ether	5 mg/kg
	Heptabromodiphenyl ether	5 mg/kg
	Octabromodiphenyl ether	5 mg/kg
	Nonabromodiphenyl ether	5 mg/kg
	Decabromodiphenyl ether	5 mg/kg

Written by: Jessie Inspected by: Susei Approved by: Jan

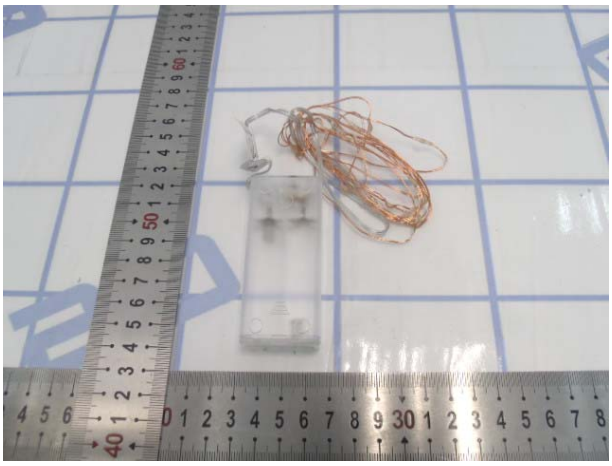
End of Report

CTS (Ningbo) Testing Service Technology Co., Ltd.
Fl.1 & 8 West, Bldg. B, No. 66, Qingyi Rd.,Hi-Tech Zone, Ningbo, Zhejiang, China
Tel：+86-574-87912121 (16 lines) Fax：+86-574-87907993
Complaint line：+86-574-87908003 E-mail：cts@cts-lab.com

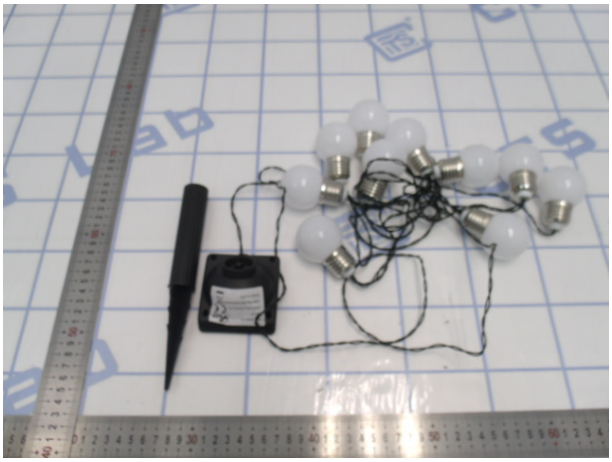
TEST REPORT

REPORT No. : CNB3170118-00213-C
DATE : Feb. 17, 2017
PAGE : 11 of 12

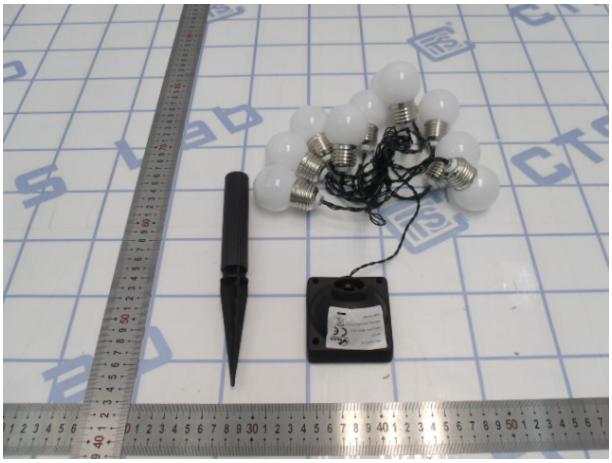
3 Sample Reference Photo



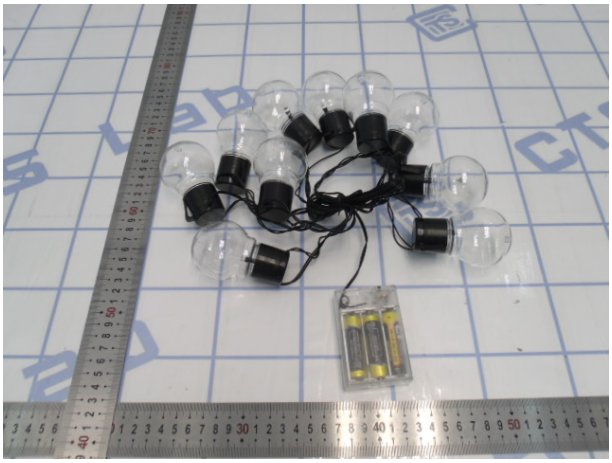
1-6



2-6



3-6

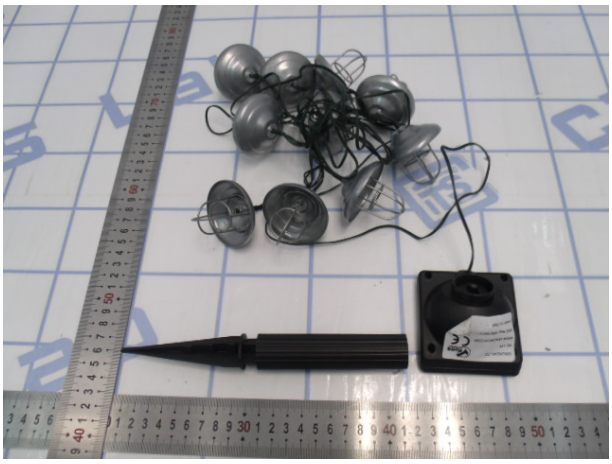


4-6

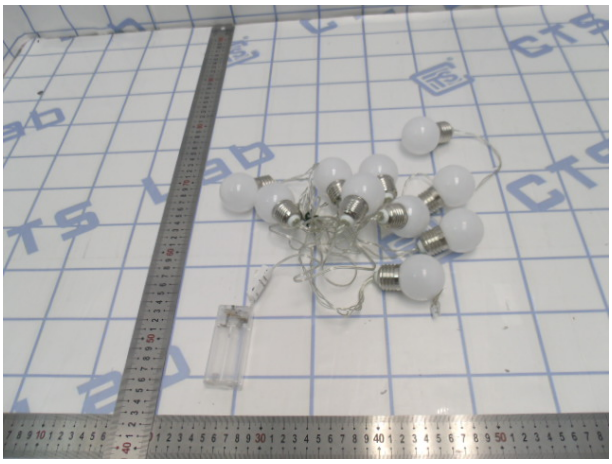
CTS (Ningbo) Testing Service Technology Co., Ltd.
Fl.1 & 8 West, Bldg. B, No. 66, Qingyi Rd.,Hi-Tech Zone, Ningbo, Zhejiang, China
Tel：+86-574-87912121 (16 lines) Fax：+86-574-87907993
Complaint line：+86-574-87908003 E-mail：cts@cts-lab.com

TEST REPORT

REPORT No. : CNB3170118-00213-C
DATE : Feb. 17, 2017
PAGE : 12 of 12



5-6



6-6

CTS (Ningbo) Testing Service Technology Co., Ltd.
Fl.1 & 8 West, Bldg. B, No. 66, Qingyi Rd.,Hi-Tech Zone, Ningbo, Zhejiang, China
Tel：+86-574-87912121 (16 lines) Fax：+86-574-87907993
Complaint line：+86-574-87908003 E-mail：cts@cts-lab.com