



Technical Report No. 68.402.17.0818.01
Dated 2017-08-25

Client: Lead Opto-Technology Co., Limited

Address: A5&A8 Buildings, Luoshan Industrial Park, Pinghu Town, Longgang District, Shenzhen, China.

Attn.: Ms. Amy

Sample Description: Solar LED Light

Model No.: LSD-SWL-7W-Butterfly, LSD-SWL-6.8W-Butterfly, LSD-SWL-3.2W-Butterfly, LSD-SWL-2W-Butterfly, LSD-SWL-1.5W-Butterfly, LSD-SWL-2W-Crown, LSD-SLL-3S-Diamond, LSD-SGL-2W-XCrown, LSD-SWL-1.5WPlus-Butterfly, LSD-SWL-4WPlus-Butterfly, LSD-SWL-1.5W-Butterfly-SP

Ref. Model No.: LSD-SGL-Flame, LD-SFL-10W-Leadpad

Supplier: Lead Opto-Technology Co., Limited

Country of origin: CHINA

Exported to: Europe

Location of Testing: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch

Sample Received Date: 2017-07-26, 2017-08-21

Test Period: From 2017-07-26 to 2017-08-08
From 2017-08-21 to 2017-08-23

Test Requested and Conclusion: Test according to RoHS (Restriction of Hazardous Substances) directive 2011/65/EU on submitted samples

- Heavy Metal (Pb, Cd, Hg and CrVI) Content **PASS**
- Polybrominated Biphenyls (PBBs) and Polybrominated Diphenyl Ethers (PBDEs) Content **PASS**

Test Result: Refer to the following page(s)

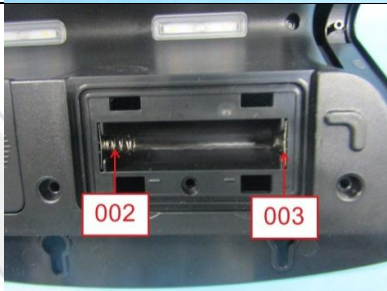
Remark: --The result relates only to the items tested.

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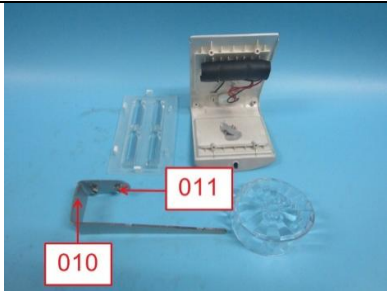
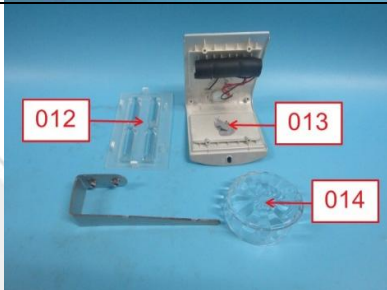
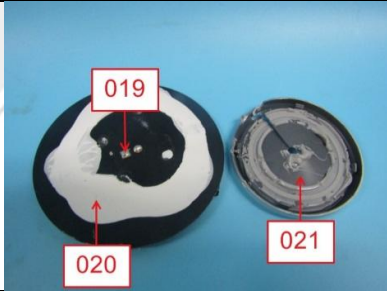
TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
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Building 12&13, Zhiheng Wisdomland Business Park,
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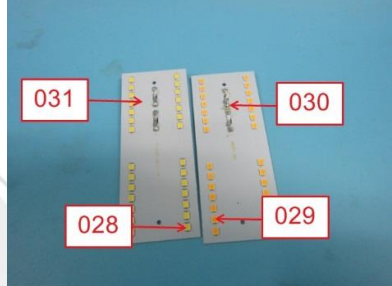
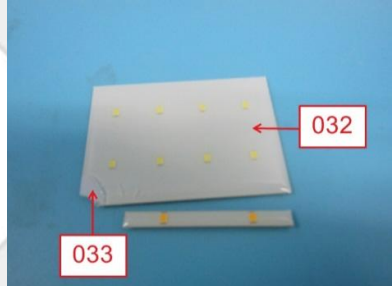
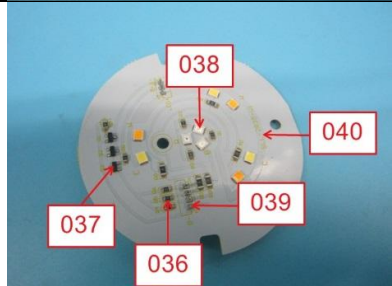
1. TESTED SUBJECT DESCRIPTION

Sample Number	Item Name	Tested Material Description	Photo
001	Case	Black plastic case	
002	Spring	Silvery metal spring	
003	Plate	Silvery metal plate	
004	Glue	Translucent glue	
005	Case	White plastic case	
006	Coating	Silvery coating	
007	Case	Silvery metal case	
008	Parts	White plastic	
009	Case	Beige plastic case	

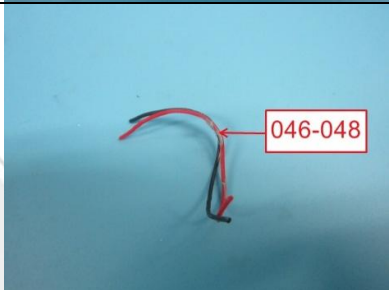
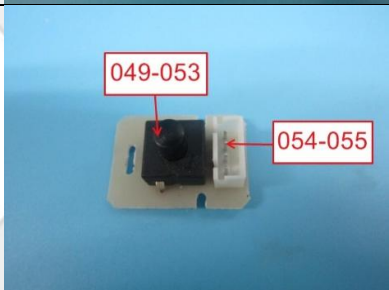
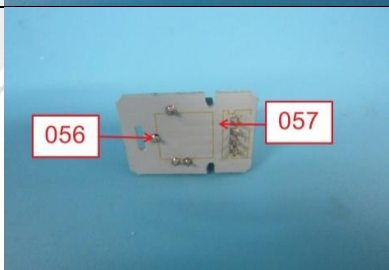
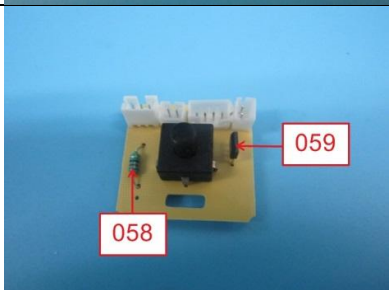
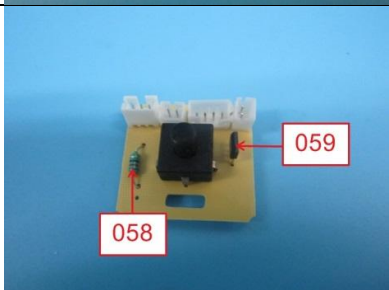
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Sample Number	Item Name	Tested Material Description	Photo
010	Plate	Silvery coated silvery metal plate	
011	Nut	Silvery coated silvery metal nut	
012	Plate	Transparent plastic plate	
013	Glue	Gray glue	
014	Case	Transparent plastic case	
015	Paper	Brown paper	
016	Foam	Black foam	
017	Gasket	White soft plastic gasket	
018	Button	White soft plastic button	
019	Glue	White glue	
020	Solder	Silvery metal solder	
021	Case	Dark gray plastic case	
022	Plate	Transparent plastic plate	
023	Paper	Black coated light brown paper	
024	Solder	Silvery metal solder	
025	Material	Blue/Black material	
026	PCB unit	Black coated green PCB board	

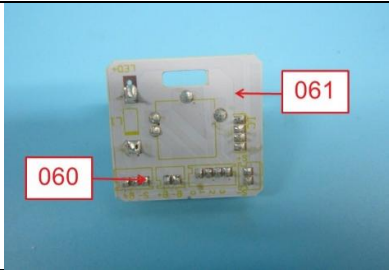
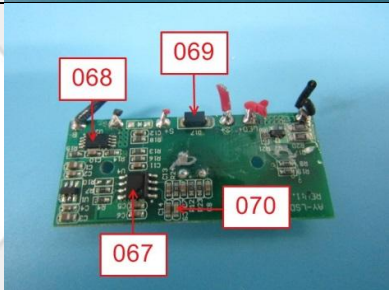
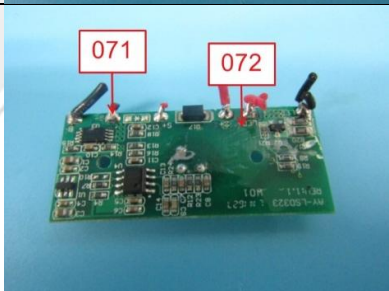
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Sample Number	Item Name	Tested Material Description	Photo
027	Gasket	Black foam gasket	
028	Parts	Yellow/White body	
029		Orange/White body	
030		Silvery metal solder	
031	Plate	Black coated silvery metal plate	
032	Plate	Transparent plastic plate	
033	PCB unit	White PCB board	
034	Solder	Silvery metal solder	
035	PCB unit	White/ Light brown PCB board	
036	SMD resistor	White printed black body	
037	EC	Black body with pin	
038	Parts	Transparent /White body	
039	Solder	Silvery metal solder	
040	PCB unit	White/Brown PCB board	

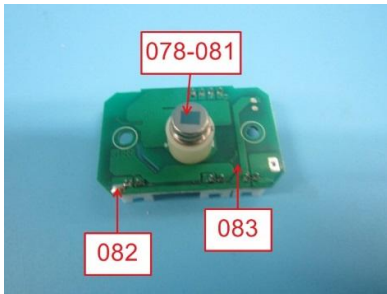
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Sample Number	Item Name	Tested Material Description	Photo
041	USB interface	White plastic shell	
042		Silvery metal pin	
043	Wire	White soft plastic wire jacket	
044		Gray soft plastic wire jacket	
045		Silvery metal wire	
046	Wire	Red soft plastic wire jacket	
047		Black soft plastic wire jacket	
048		Silvery metal wire	
049	Button parts	Black plastic contact point	
050		Black plastic shell	
051		Silvery metal button	
052		Silvery metal spring	
053		Silvery metal pin	
054	USB interface	White plastic shell	
055		Silvery metal pin	
056	Solder	Silvery metal solder	
057	PCB unit	White/Beige PCB board	
058	Resistor	Multi-color printed blue body with pin	
059	Triode	Black body with pin	

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Sample Number	Item Name	Tested Material Description	Photo
060	Solder	Silvery metal solder	
061	PCB unit	White/Brown PCB board	
062	Button parts	Black plastic contact point	
063		Silvery metal shell	
064		Silvery metal plate	
065		Black plastic base	
066		Silvery metal pin	
067	IC	Black body with pin	
068	IC	Black body with pin	
069	EC	Black body with pin	
070	SMD capacity	Brown/silvery body	
071	Solder	Silvery metal solder	
072	PCB unit	Green PCB board	
073	Capacity	Black printed silvery metal shell	
074		Black soft plastic	
075		Brown paper with liquid	
076		Silvery metal foil	
077		Black plastic base	

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Sample Number	Item Name	Tested Material Description	Photo
078	Parts	Multi-color printed transparent glass	
079		Silvery metal	
080		White plastic base	
081		Silvery metal pin	
082	Solder	Silvery metal solder	
083	PCB unit	Green PCB board	
084	Gasket	White plastic gasket	
085	Screw	Silvery metal screw	
086		Silvery metal screw	

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2. TEST RESULTS

2.1. SCREENING

Test method: With reference to EN 62321-1:2013, EN 62321-2:2014 and EN 62321-3-1:2014, analyzed by Energy Dispersive X-ray Fluorescence Spectrometers (XRF).

Sample No.	Total Cadmium	Total Chromium	Total Mercury	Total Lead	Total Bromine
001	BL	BL	BL	BL	BL
002	BL	Inconclusive ^(a)	BL	BL	N.A.
003	BL	BL	BL	BL	N.A.
004	BL	BL	BL	BL	BL
005	BL	BL	BL	BL	BL
006	BL	BL	BL	BL	BL
007	BL	BL	BL	BL	N.A.
008	BL	BL	BL	BL	BL
009	BL	BL	BL	BL	BL
010	BL	Inconclusive ^(a)	BL	Inconclusive ^(a)	N.A.
011	BL	Inconclusive ^(a)	BL	BL	N.A.
012	BL	BL	BL	BL	BL
013	BL	BL	BL	BL	BL
014	BL	BL	BL	BL	BL
015	BL	BL	BL	BL	BL
016	BL	BL	BL	BL	BL
017	BL	BL	BL	BL	BL
018	BL	BL	BL	BL	BL
019	BL	BL	BL	BL	BL
020	BL	BL	BL	BL	N.A.
021	BL	BL	BL	BL	BL
022	BL	BL	BL	BL	BL
023	BL	BL	BL	BL	Inconclusive ^(a)
024	BL	BL	BL	BL	N.A.
025	BL	BL	BL	BL	BL
026	BL	BL	BL	BL	Inconclusive ^(a)
027	BL	BL	BL	BL	BL
028	BL	BL	BL	BL	BL
029	BL	BL	BL	BL	BL
030	BL	BL	BL	BL	N.A.
031	BL	BL	BL	BL	N.A.
032	BL	BL	BL	BL	BL
033	BL	BL	BL	BL	Inconclusive ^(a)
034	BL	BL	BL	BL	N.A.
035	BL	BL	BL	BL	BL
036	BL	BL	BL	BL	BL

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Sample No.	Total Cadmium	Total Chromium	Total Mercury	Total Lead	Total Bromine
037	BL	BL	BL	BL	BL
038	BL	BL	BL	BL	BL
039	BL	BL	BL	Inconclusive ^(a)	N.A.
040	BL	BL	BL	BL	Inconclusive ^(a)
041	BL	BL	BL	BL	BL
042	BL	BL	BL	Inconclusive ^(a)	N.A.
043	BL	BL	BL	BL	BL
044	BL	BL	BL	BL	BL
045	BL	BL	BL	Inconclusive ^(a)	N.A.
046	BL	BL	BL	BL	BL
047	BL	BL	BL	BL	BL
048	BL	BL	BL	Inconclusive ^(a)	N.A.
049	BL	BL	BL	BL	BL
050	BL	BL	BL	BL	BL
051	BL	BL	BL	BL	N.A.
052	BL	BL	BL	BL	N.A.
053	BL	BL	BL	BL	N.A.
054	BL	BL	BL	BL	BL
055	BL	BL	BL	BL	N.A.
056	BL	BL	BL	BL	N.A.
057	BL	BL	BL	BL	BL
058	BL	BL	BL	BL	BL
059	BL	BL	BL	BL	Inconclusive ^(a)
060	BL	BL	BL	BL	N.A.
061	BL	BL	BL	BL	Inconclusive ^(a)
062	BL	BL	BL	BL	BL
063	BL	BL	BL	BL	N.A.
064	BL	Inconclusive ^(a)	BL	BL	N.A.
065	BL	BL	BL	BL	BL
066	BL	BL	BL	BL	N.A.
067	BL	BL	BL	BL	BL
068	BL	BL	BL	BL	Inconclusive ^(a)
069	BL	BL	BL	BL	Inconclusive ^(a)
070	BL	BL	BL	BL	BL
071	BL	BL	BL	BL	N.A.
072	BL	BL	BL	BL	BL
073	BL	BL	BL	BL	N.A.
074	BL	BL	BL	BL	BL
075	BL	BL	BL	BL	BL
076	BL	BL	BL	BL	N.A.

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Sample No.	Total Cadmium	Total Chromium	Total Mercury	Total Lead	Total Bromine
077	BL	BL	BL	BL	BL
078	BL	BL	BL	BL	BL
079	BL	Inconclusive ^(a)	BL	OL ^(a)	N.A.
080	BL	BL	BL	BL	BL
081	BL	BL	BL	BL	N.A.
082	BL	BL	BL	BL	N.A.
083	BL	BL	BL	BL	Inconclusive ^(a)
084	BL	BL	BL	BL	BL
085	BL	Inconclusive ^(a)	BL	BL	N.A.
086	BL	Inconclusive ^(a)	BL	BL	N.A.

Note:

- “BL” denotes below limit
- “OL” denotes over limit
- “N.A.” denotes not applicable
- “(a)” denotes further confirmation test was conducted, results are listed in 2.2 and 2.3.
- XRF screening limits in mg/kg for regulated elements in various matrices

ELEMENT	POLYMER		
	BL	INCONCLUSIVE	OL
Cd	$X < (70-3\sigma)$	$(70-3\sigma) < X < (130+3\sigma)$	$X > (130+3\sigma)$
Pb	$X < (700-3\sigma)$	$(700-3\sigma) < X < (1300+3\sigma)$	$X > (1300+3\sigma)$
Hg	$X < (700-3\sigma)$	$(700-3\sigma) < X < (1300+3\sigma)$	$X > (1300+3\sigma)$
Br	$X < (300-3\sigma)$	$X > (300-3\sigma)$	NA
Cr	$X < (700-3\sigma)$	$X > (700-3\sigma)$	NA

ELEMENT	METAL		
	BL	INCONCLUSIVE	OL
Cd	$X < (70-3\sigma)$	$(70-3\sigma) < X < (130+3\sigma)$	$X > (130+3\sigma)$
Pb	$X < (700-3\sigma)$	$(700-3\sigma) < X < (1300+3\sigma)$	$X > (1300+3\sigma)$
Hg	$X < (700-3\sigma)$	$(700-3\sigma) < X < (1300+3\sigma)$	$X > (1300+3\sigma)$
Cr	$X < (700-3\sigma)$	$X > (700-3\sigma)$	NA

ELEMENT	COMPLEX MATERIAL		
	BL	INCONCLUSIVE	OL
Cd	$X < (50-3\sigma)$	$(50-3\sigma) < X < (150+3\sigma)$	$X > (150+3\sigma)$
Pb	$X < (500-3\sigma)$	$(500-3\sigma) < X < (1500+3\sigma)$	$X > (1500+3\sigma)$
Hg	$X < (500-3\sigma)$	$(500-3\sigma) < X < (1500+3\sigma)$	$X > (1500+3\sigma)$
Br	$X < (250-3\sigma)$	$X > (250-3\sigma)$	NA
Cr	$X < (500-3\sigma)$	$X > (500-3\sigma)$	NA

2.2. POLYBROMINATED BIPHENYLS AND POLYBROMINATED DIPHENYL ETHERS CONTENT

Test Method: With reference to EN 62321-6:2015, extracted by toluene and analyzed by Gas Chromatography and Mass Spectrometry (GC-MS). [Reporting Limit: 5mg/kg]

Test Item		Result [mg/kg]		RoHS Requirement [mg/kg]
		Sample 023	Sample 026+033+040	
PBBs	Monobromobiphenyl	< 5	< 5	Sum of PBBs < 1000
	Dibromobiphenyl	< 5	< 5	
	Tribromobiphenyl	< 5	< 5	
	Tetrabromobiphenyl	< 5	< 5	
	Pentabromobiphenyl	< 5	< 5	
	Hexabromobiphenyl	< 5	< 5	
	Heptabromobiphenyl	< 5	< 5	
	Octabromobiphenyl	< 5	< 5	
	Nonabromobiphenyl	< 5	< 5	
	Decabromobiphenyl	< 5	< 5	
	Sum of PBBs	< 5	< 5	
PBDEs	Monobromodiphenyl Ether	< 5	< 5	Sum of PBDEs < 1000
	Dibromodiphenyl Ether	< 5	< 5	
	Tribromodiphenyl Ether	< 5	< 5	
	Tetrabromodiphenyl Ether	< 5	< 5	
	Pentabromodiphenyl Ether	< 5	< 5	
	Hexabromodiphenyl Ether	< 5	< 5	
	Heptabromodiphenyl Ether	< 5	< 5	
	Octabromodiphenyl Ether	< 5	< 5	
	Nonabromodiphenyl Ether	< 5	< 5	
	Decabromodiphenyl Ether	< 5	< 5	
	Sum of PBDEs	< 5	< 5	

Note:

- “mg/kg” denotes miligram per kilogram
- “<” denotes less than

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(Continued)

Test Item		Result [mg/kg]		RoHS Requirement [mg/kg]
		Sample 059+068+069	Sample 061+083	
PBBs	Monobromobiphenyl	< 5	< 5	Sum of PBBs < 1000
	Dibromobiphenyl	< 5	< 5	
	Tribromobiphenyl	< 5	< 5	
	Tetrabromobiphenyl	< 5	< 5	
	Pentabromobiphenyl	< 5	< 5	
	Hexabromobiphenyl	< 5	< 5	
	Heptabromobiphenyl	< 5	< 5	
	Octabromobiphenyl	< 5	< 5	
	Nonabromobiphenyl	< 5	< 5	
	Decabromobiphenyl	< 5	< 5	
	Sum of PBBs	< 5	< 5	
PBDEs	Monobromodiphenyl Ether	< 5	< 5	Sum of PBDEs < 1000
	Dibromodiphenyl Ether	< 5	< 5	
	Tribromodiphenyl Ether	< 5	< 5	
	Tetrabromodiphenyl Ether	< 5	< 5	
	Pentabromodiphenyl Ether	< 5	< 5	
	Hexabromodiphenyl Ether	< 5	< 5	
	Heptabromodiphenyl Ether	< 5	< 5	
	Octabromodiphenyl Ether	< 5	< 5	
	Nonabromodiphenyl Ether	< 5	< 5	
	Decabromodiphenyl Ether	< 5	< 5	
	Sum of PBDEs	< 5	< 5	

Note:

- “mg/kg” denotes miligram per kilogram
- “<” denotes less than

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2.3. HEAVY METAL CONTENT

Test method: With reference to EN 62321-4:2014, EN 62321-5:2014, EN 62321-7-1:2015 and EN 62321-7-2:2017, analyzed by Inductively Coupled Plasma Optical Emission Spectrometer (ICP-OES) and UV-Vis spectrophotometer. [Reporting Limit: 2 mg/kg for Cadmium; 10 mg/kg for Hexavalent Chromium, Lead and Mercury.]

Sample No.	Result [mg/kg]			
	Total Cadmium	Hexavalent Chromium	Total Mercury	Total Lead
002	--	Negative	--	--
010	--	Negative	--	<10
011	--	Negative	--	--
039	--	--	--	90.4
042	--	--	--	40.6
045	--	--	--	<10
048	--	--	--	<10
064	--	Negative	--	--
079	--	Negative	--	<10
085	--	Negative	--	--
086	--	Negative	--	--

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RoHS Requirement	100	1000	1000	1000
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Note:

- “mg/kg” denotes milligram per kilogram
- “<” denotes less than
- “Negative” denotes the absence of Cr(VI) coating.
- “--” denotes tested by XRF, result is listed in 2.1



TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
TÜV SÜD Group

Prepared by:

Ken Li

Ken Li
Project Handler



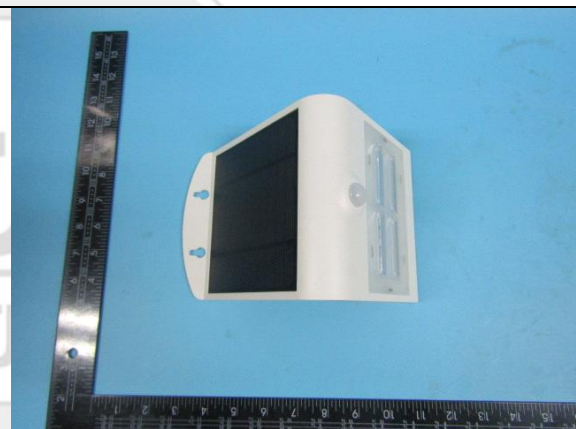
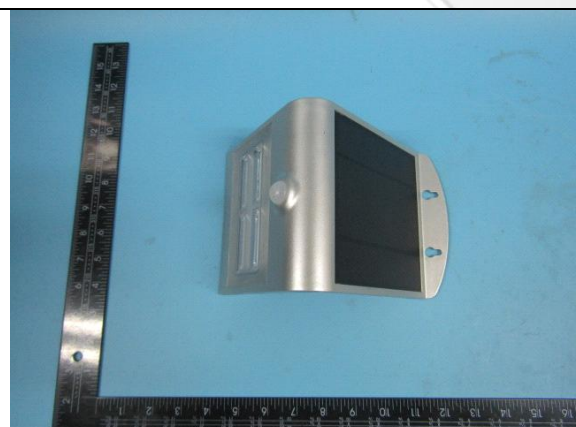
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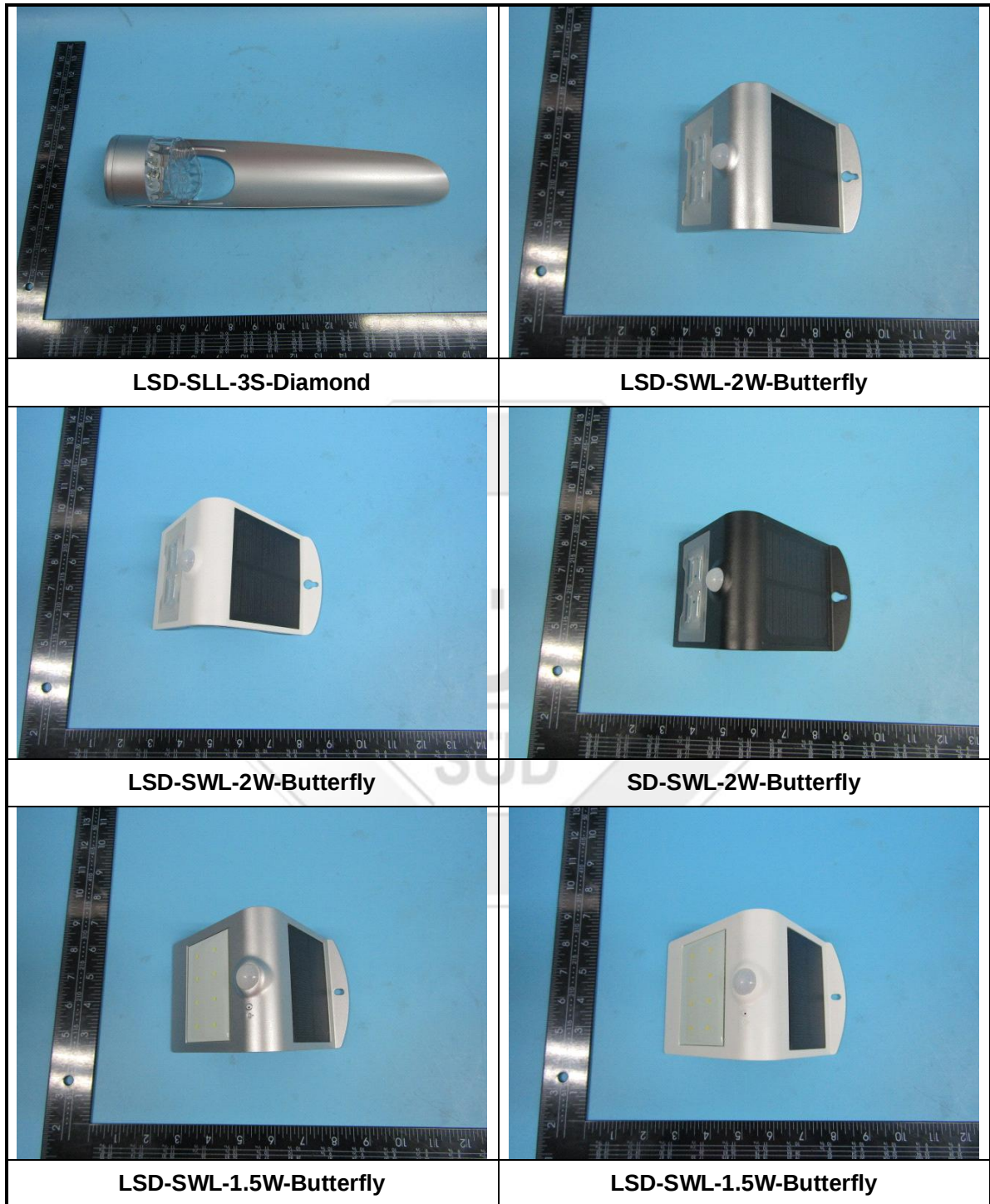
Vic Wei

Vic Wei
Designated Reviewer

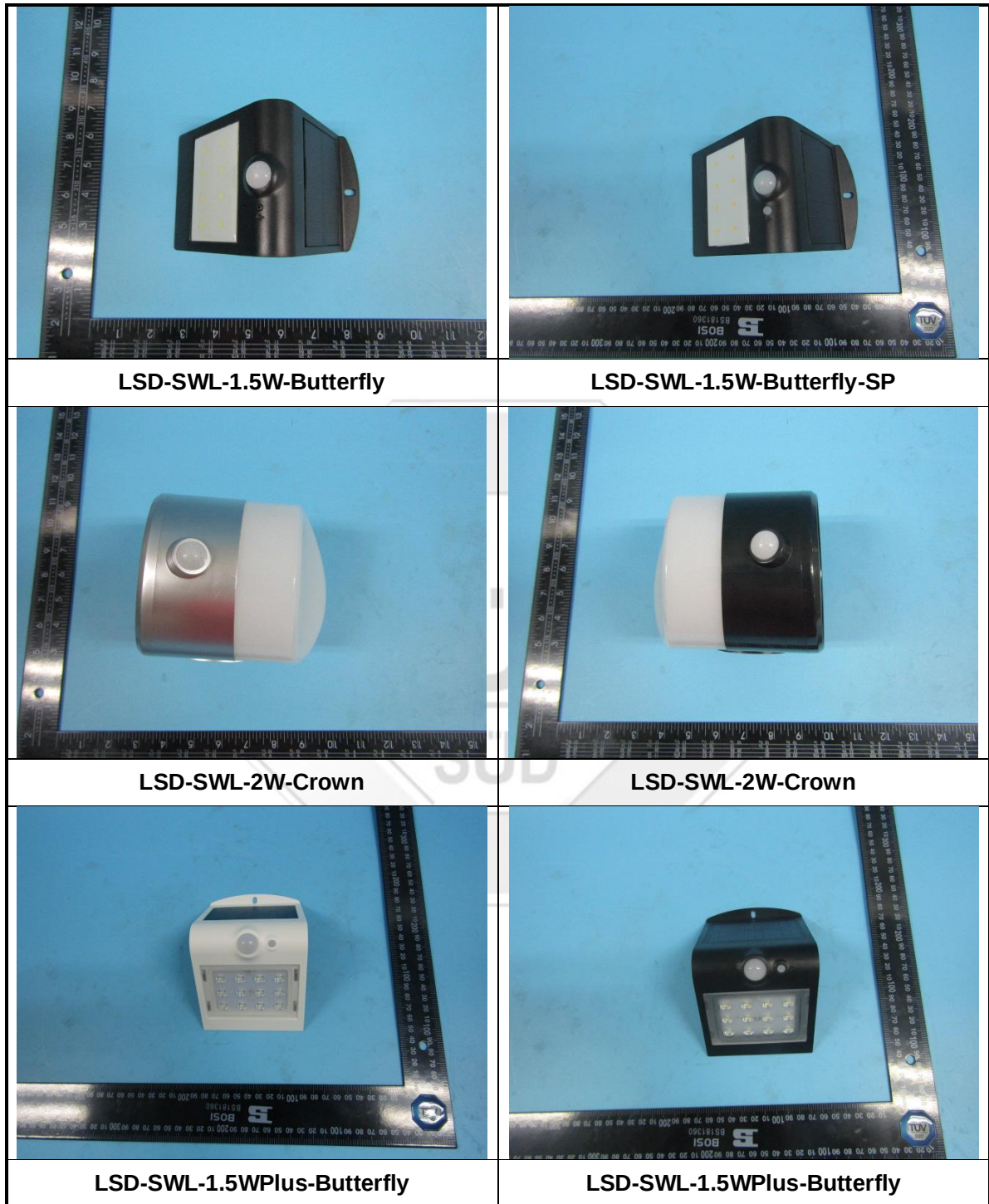
APPENDIX I:

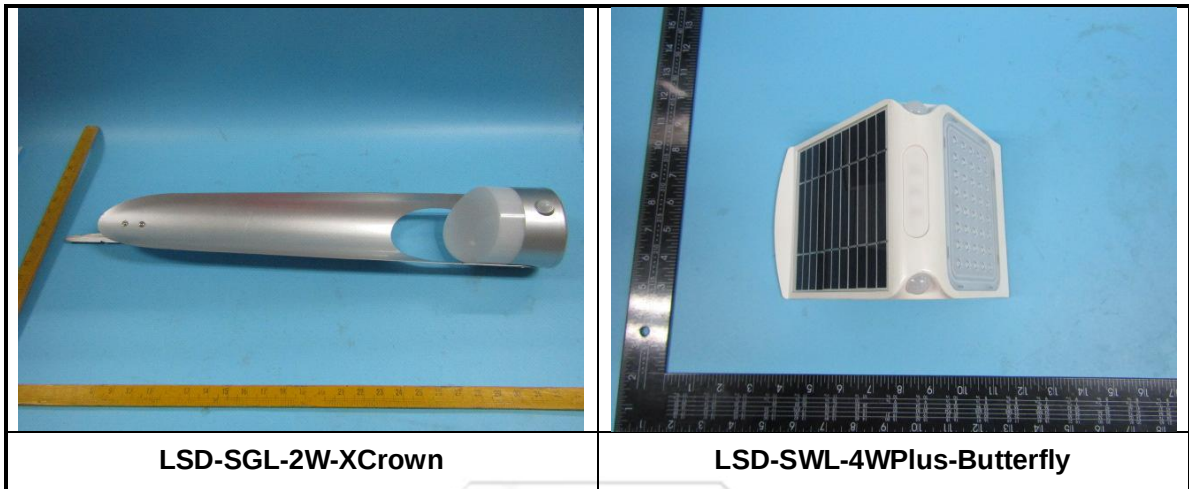
Photos of submitted products

	
LSD-SWL-7W-Butterfly	LSD-SWL-6.8W-Butterfly
	
LSD-SWL-7W-Butterfly	LSD-SWL-3.2W-Butterfly
	
LSD-SWL-3.2W-Butterfly	LSD-SWL-3.2W-Butterfly



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APPENDIX II

According to client's declaration, the tested material of the product Solar LED Light (Model No.: LSD-SWL-7W-Butterfly, LSD-SWL-6.8W-Butterfly, LSD-SWL-3.2W-Butterfly, LSD-SWL-2W-Butterfly, LSD-SWL-1.5W-Butterfly, LSD-SWL-2W-Crown, LSD-SLL-3S-Diamond, LSD-SGL-2W-XCrown, LSD-SWL-1.5WPlus-Butterfly, LSD-SWL-4WPlus-Butterfly, LSD-SWL-1.5W-Butterfly-SP) would be produced below products:

