DEPARTMENT OF
ELECTRICAL AND ELECTRONIC ENGINEERING

TEST REPORT ON SOLAR STREET LIGHT SYSTEM (30W)
SUPPLIED BY MIND TOUCH LIMITED

REF. NO.: BRTC 1101-98089(iii)/EEE/2019-20 Date: 21/10/2019
CLIENT'S REF.: Nil Date: 19/10/2019

Bangladesh University of
Engineering and Technology, Dhaka

তড়িৎ ও ইলেকট্রনিক কৌশল বিভাগ
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Date: November 2, 2019

The tests are conducted and the report is prepared by the Department of Electrical and Electronic Engineering of Bangladesh University of Engineering and Technology (BUET), Dhaka-1205.

02/11/2019

Head of the Department
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1. INTRODUCTION

The Managing Director, Mind Touch Limited requested Bureau of Research, Testing and Consultation (BRTC), Bangladesh University of Engineering and Technology (BUET) to perform standard tests on Street Light System as per IDCOL requirements. In response to the request, performance tests were carried out on the supplied sample in the Department of Electrical and Electronic Engineering, BUET.

2. SAMPLE SPECIFICATIONS

One set of 30 W street light system was supplied to BUET, as described in Table 2.1 below, having one sample of LED light, one sample of a charge controller and one sample of battery. The lot size and the mode of sampling were unknown.

Table 2.1: Specification Details of the Street Light System

	Package Description				
SN	**Supplier**	**Manufacturer**	**Package Name**	**Component**	**Name Plate Data**
1.	Mind Touch Limited	EverExceed	MT-EVAL-30W	LED	Solar Street Light: 30W Model: MT-EVAL-30W Voltage: 12V LED Power: 30W Brand: EverExceed Made in China 1905170003-30W
				Controller	Model: MT-ESLC-M10D Controller: 12V10A LED Current: 50-100mA Max LED Voltage: 50V Serial: C19091203
				Battery	Lithium Iron Phosphate Battery MT-LLS-12V30Ah Nominal Capacity: 30Ah Nominal Voltage: 12.8V Limited Charging Voltage: 14.6V Discharge Cut-off Voltage: 10V Limited Charging Current: 10A

3. RESULTS

Measured data of the street light package are shown in Tables 3.1, 3.2 and 3.3. Test results are also compared with IDCOL technical specifications (where applicable) in each case. The system was found to be IP 65 protected.

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3.1 LED Street Light

The LED street light was powered by a DC power supply. Lumen was measured using Labsphere's Integrating Sphere and luminous efficacy was calculated. The test results of the supplied LED lamp are provided in Table 3.1.Test results are compared with IDCOL technical specifications. The Photometric measurement report generated by Labsphere's Integral™ Light Measurement Platform is attached in Appendix-A.

Table 3.1: Test Results of the Street Light

Sl. No	Features	Observation /Test Results	Compliance /Non-compliance (with IDCOL)
1.	Measured Power (W)	30.04	Comply
2.	Luminous Efficacy (lm/W)	138.1 (> 90 lm/W)	Comply
3.	(a) Ambient Temperature (°C) (b) Heat Sink Temperature (°C) (after 1 hr) (c) Heat Sink Temperature Rise (°C)	31.2 40.4 9.2 (<20° C)	Comply
4.	Deviation of Power Consumption from Rated Power (%) @ voltage: 10.3 V @ voltage: 12.0 V @ voltage: 14.0V	 -9.0 -9.0 -9.6 (within ±15%)	Comply
5.	Type of LED light	White LED	Comply
6.	Color Rendering Index (CRI)	80.98 (> 70)	Comply

Comments

The overall performance of the street light was found to be satisfactory as per IDCOL technical specifications.

3.2 Charge Controller

Various parameters of the Charge Controller were measured under specific test conditions, which are included in Table 3.2. Test results are compared with IDCOL technical specifications.

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Table 3.2: Test Results of the Charge Controller

Sl. No	Features	Observation/Test Results	Compliance /Non-compliance (with IDCOL)
1.	MPPT mechanism	Present	Comply
2.	Maximum Drawn Self-Current	With indicator LEDs lit: 18mA (≤ 50mA)	Comply
3.	Factory preset set points of the charge controller for the particular battery to be used	Factory preset set points present for the particular battery used	Comply
4.	Input Current Rating	Controllable through remote device	Comply
5.	Maximum Voltage withstand capacity at PV input terminal when battery and load are disconnected	The charge controller could withstand 25V DC without causing any damage.	Comply
6.	Labeling on charge controller casing	Present	Comply
7.	Battery high voltage disconnect (HVD)	14.2 V (Controllable through remote device)	Comply
8.	Reverse current leakage protection	Protected	Comply
9.	LVD maximum current handling capacity	LVD device has to handle 150% of the maximum expected continuous load	Comply
10.	Short-circuit protection	(a) Protected against load terminal shorted (b) Protected against panel terminal shorted	Comply
11.	Reverse polarity protection	(a) Panel End: Protected (b) Battery End: Protected	Comply
12.	Current handling capacity at PV, Battery and Load Terminals	120% of rated current needs to be sustained for 1 hour without the charge controller being damaged.	Comply
13.	Low voltage disconnect (LVD): (a) Disconnect voltage (b) Reconnect voltage	(a) 10.07 V (b) 13.0 V (Both controllable through remote device)	Comply
14.	Nominal Voltage	12.0 V	Comply
15.	Efficiency of the Charge Controller	Avg. Discharging efficiency: 91.2% Avg. Charging efficiency: 95.0% (> 90%)	Comply

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COMMENTS

The charge controller satisfies the IDCOL technical requirements.

3.3 CAPACITY TEST OF BATTERY

The capacity test was carried out over five cycles of charging and discharging.

During charging, the battery was charged at a DC current of 6.0 A following the standard procedure of charging lithium iron phosphate battery. The charging continued until the battery terminal voltage reached 14.6 V.

During discharging, the battery was discharged at a constant DC current of 6.0 A. The discharging was continued until the battery terminal voltage reached 10.0 V. For this purpose, the battery terminal voltage was measured at regular intervals since the start of discharging. Table 3.3 shows the results of the capacity test for the sample.

Table 3.3: Capacity Test Results for 30Ah Battery Sample

Cycle No.	Voltage at the Discharge of Start (V)		Discharge Current (A)	Temperature (°C)	Discharge Period (Hrs)	Battery Capacity (Ah)
	Without Load	With Load				
1.	14.33	13.63	6.0	34.0	6.57	39.42
2.	14.30	13.65	6.0	31.9	6.60	39.60
3.	14.15	13.42	6.0	30.9	5.82	34.92
4.	13.98	13.38	6.0	31.4	5.80	34.80
5.	13.97	13.48	6.0	33.1	5.92	35.52

The average battery capacity at measured temperature was found to be 36.85 Ah.

COMMENTS

The supplied lithium iron phosphate battery sample was tested at the laboratory and the average capacity of the battery was obtained to be about 36.85 Ah at the measured temperature.

3.4 OVERALL SUMMARY OF THE STREET LIGHT SYSTEM

The overall performance of the street light system is found to be satisfactory.

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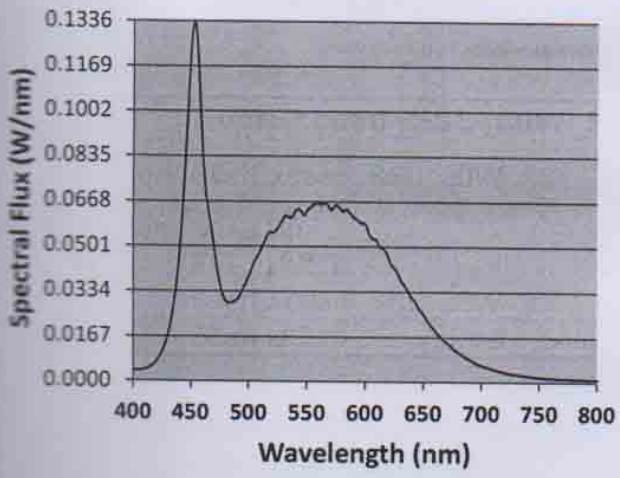
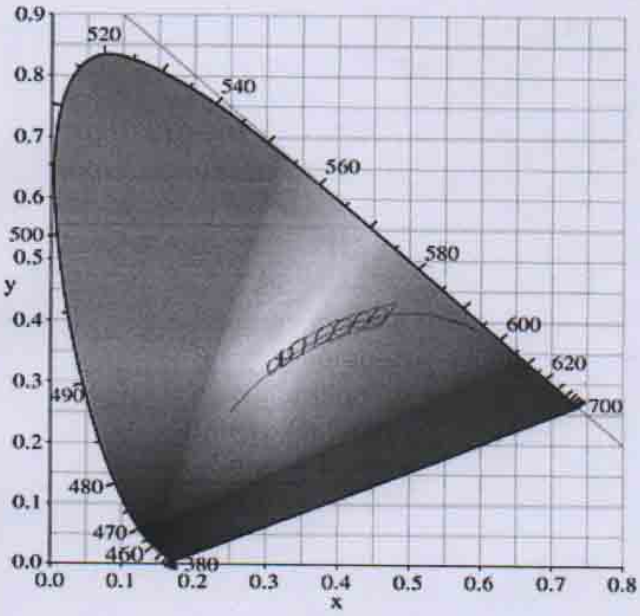
Appendix-A (Photometric Measurement Report)

Generated by Labsphere's Integral™ Light Measurement Platform

EverExceed_SSL_30W_S3		10-22-19	
Description	EverExceed_SSL_30W_S3	Test Time	12:29 PM
		Integration Time	248
Orientation	Base Up	Scans Averaged	3
Test by	EEE, BUET	Saturation	81%
Notes	EverExceed_SSL_30W_S3	Sphere Geometry	4π
Scan ID	Scan id 225 Everx_SSL_30W_S3	Sphere Temp	27.02

Relative Spectral Power Distribution





Lumens	Watts	Volts	Amps	Efficacy	PF	THD
4147.8	30.035	28.880	1.04	138.098027		

CCT		CRI		x		y		Duv		u'		v'	
5970.0		80.975		0.3222		0.3389		0.0036		0.2007		0.4749	
R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
78.7	86.5	90.3	79.6	79.1	80.1	87	66.5	-0.86	66.5	77.5	54.3	80.9	94.8

Head of the Department