DEPARTMENT OF
ELECTRICAL AND ELECTRONIC ENGINEERING

TEST REPORT ON A 30W SOLAR STREET LIGHT SAMPLE SUPPLIED BY MIND TOUCH LIMITED

BRTC REF. NO.: 1102-33244/EEE/2020-21
CLIENT'S REF. NO.: client letter

DATE: 31/03/2021
DATE: 25/03/2021

Bangladesh University of
Engineering and Technology, Dhaka

তড়িৎ ও ইলেকট্রনিক কৌশল বিভাগ
বাংলাদেশ প্রকৌশল বিশ্ববিদ্যালয়, ঢাকা-১২০৫
ফ্যাক্স/ফোন ঃ+৮৮০-২-৯৬৬৮০৫৪ (সরাসরি)
পিএবিএক্স ঃ+৮৮০-২-৫৫১৬৭১০০, ৫৫১৬৭২৮-৫৭/৬১৫০, ৬১৪২
ফ্যাক্স ঃ+ ৮৮০-২-৯৬৬৮০৫৪

Department of Electrical & Electronic Engineering
Bangladesh University of Engineering and Technology
Dhaka-1205, Bangladesh
Fax/Phone: +880-2-9668054 (Direct)
PABX :+880-2-55167100, 55167228-57, Ext.-6150, 6142
E-mail : headeee@eee.buet.ac.bd

TEST REPORT ON A 30W SOLAR STREET LIGHT SAMPLE SUPPLIED BY MIND TOUCH LIMITED

BRTC REF. NO.: 1102-33244/EEE/2020-21 DATE: 31/03/2021
CLIENT'S REF. NO.: letter dated DATE: 25/03/2021

Date: 15/04/2021

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

19/4/2021

Head of the Department
Department of Electrical and Electronic Engineering
Bangladesh University of Engineering and Technology (BUET)
Dhaka-1205, Bangladesh

তড়িৎ ও ইলেকট্রনিক কৌশল বিভাগ
বাংলাদেশ প্রকৌশল বিশ্ববিদ্যালয়, ঢাকা-১২০৫
ফ্যাক্স/ফোন ৪৮৮০-২-৯৬৬৮০৫৪ (সরাসরি)
পিএবিএক্স ৪৮৮০-২-৫৫১৬৭১০০, ৫৫১৬৭২২৮-৫৭(এক্সটেনশন, ৬১৪২
ফ্যাক্স ৪৮৮০-২-৯৬৬৮০৫৪

Department of Electrical & Electronic Engineering
Bangladesh University of Engineering and Technology
Dhaka-1205, Bangladesh
Fax/Phone: +880-2-9668054 (Direct)
PABX :+880-2-55167100, 55167228-57, Ext.-6150, 6142
E-mail : headeee@eee.buet.ac.bd

TEST REPORT ON A 30W SOLAR STREET LIGHT SAMPLE SUPPLIED BY MIND TOUCH LIMITED

BRTC REF. NO.: 1102-33244/EEE/2020-21 DATE: 31/03/2021
CLIENT'S REF. NO.: letter dated DATE: 25/03/2021

1. INTRODUCTION

Mr. Md. Al Amin, Managing Director, Mind Touch Limited, 42 Senpara Parbata, Mirpur 10, Dhaka-1216, sent a request letter, dated 25/04/2021, to the Bureau of Research, Testing and Consultation (BRTC) of Bangladesh University of Engineering and Technology (BUET) to perform tests on a standalone 30W Solar Street Lamp as per SREDA standard including the IP65 test and provide the test report. In response to the request, tests were carried out on the supplied sample of the 30W Solar Street Lamp according to relevant standards in the laboratories of the Department of Electrical and Electronic Engineering (EEE), BUET, and the report has been prepared based on the findings of the tests.

2. SAMPLE SPECIFICATIONS

One set of standalone 30W Solar Street Lamp was supplied to the laboratory of the Department of EEE, BUET. The set consisted of one LED street light, one solar charge controller, and one battery. The lot size and the mode of sampling are unknown. Table 1 gives the detail of the supplied system.

Table 1: Detail of the supplied 30W Solar Street Light System

SL.	Package	Component	Capacity	Model	Manufacturer	Supplier
1	Street Light-30W	LED	30 Watt	MT-S-EVAL-30W	EverExeed Corporation	Mind Touch Limited
2		Charge Controller	15A	MT-S-ESLC-M15D		
3		Battery	53A	MT-S-LLS-12V53Ah		

2.1 Nameplate data of the LED street light

The nameplate data printed on a piece of paper and attached to the body of the supplied LED street light are shown in Table 2.1.

Table 2.1: Nameplate data of the LED street light unit

Brand	EverExceed
Model	MT-S-EVAL-30W

তড়িৎ ও ইলেকট্রনিক কৌশল বিভাগ
বাংলাদেশ প্রকৌশল বিশ্ববিদ্যালয়, ঢাকা-১২০৫
ফ্যাক্স/ফোন ৪+৮৮০-২-৯৬৬৮০৫৪ (সরাসরি)
পিএবিএক্স ৪+৮৮০-২-৫৫১৬৭১০০, ৫৫১৬৭২৮-৫৭(১৫৭০, ৬১৪২
ফ্যাক্স ৪+ ৮৮০-২-৯৬৬৮০৫৪

Department of Electrical & Electronic Engineering
Bangladesh University of Engineering and Technology
Dhaka-1205, Bangladesh
Fax/Phone: +880-2-9668054 (Direct)
PABX :+880-2-55167100, 55167228-57, Ext.-6150, 6142
E-mail : headeee@eee.buet.ac.bd

TEST REPORT ON A 30W SOLAR STREET LIGHT SAMPLE SUPPLIED BY MIND TOUCH LIMITED

BRTC REF. NO.: 1102-33244/EEE/2020-21 DATE: 31/03/2021
CLIENT'S REF. NO.: letter dated DATE: 25/03/2021

LED Power	30W
Voltage	12 V
	Made in China

2.2 Nameplate data of the charge controller unit

The nameplate data, printed on a piece of paper and attached to the body, of the supplied charge controller unit are shown in Table 2.2.

Table 2.2: Nameplate data of the charge controller unit

Brand	EverExceed
Controller Type	MPPT Solar Charge Controller
Model	MT-S-ESLC-M15D
Rated Voltage	12 V
Maximum Charging Current	15 A
Maximum LED Voltage	50 V
LVD Point	10.0 V
LVR Point	12.0 V
HVD Point	14.4 V
	Made in China

2.3 Nameplate data of the battery unit

The nameplate data, printed on a piece of paper and attached to the body, of the Lithium Iron Phosphate battery unit are shown in Table 2.3.

Table 2.3: Nameplate data of the battery unit

Brand	EverExceed
Model	MT-S-LLS-12V53Ah
Battery Type	Lithium Iron Phosphate Battery
Nominal Voltage	12.8V

তড়িৎ ও ইলেকট্রনিক কৌশল বিভাগ
বাংলাদেশ প্রকৌশল বিশ্ববিদ্যালয়, ঢাকা-১২০৫
ফ্যাক্স/ফোন ৪+৮৮০-২-৯৬৬৮০৫৪ (সরাসরি)
পিএবিএক্স ৪+৮৮০-২-৫৫১৬৭১০০, ৫৫১৬৭২৮-৫৭(১৫১০, ৬১৪২
ফ্যাক্স ৪+ ৮৮০-২-৯৬৬৮০৫৪

Department of Electrical & Electronic Engineering
Bangladesh University of Engineering and Technology
Dhaka-1205, Bangladesh
Fax/Phone: +880-2-9668054 (Direct)
PABX :+880-2-55167100, 55167228-57, Ext.-6150, 6142
E-mail : headeee@eee.buet.ac.bd

TEST REPORT ON A 30W SOLAR STREET LIGHT SAMPLE SUPPLIED BY MIND TOUCH LIMITED

BRTC REF. NO.: 1102-33244/EEE/2020-21 DATE: 31/03/2021
CLIENT'S REF. NO.: letter dated DATE: 25/03/2021

Nominal Capacity	53 Ah
HVD	14.4 ±2
LVD	10 V
LVR	12 V
Limited Charging Current	15 A
	Made in China

3. RESULTS

Measured data of the supplied Solar Street Light System are shown in Tables 3.1, 3.2 and 3.3 for the LED light unit, the charge controller unit and the battery unit, respectively. Test results are also compared with SREDA technical specifications (where applicable) in each case.

3.1 IP65 TEST

Degree of protection provided by the enclosure of the solar street light system was tested according to IEC standard 60529. The following two tests were carried out:

(i) Test for protection against solid foreign objects
(ii) Test for protection against water

3.1.1 TEST FOR PROTECTION AGAINST SOLID FOREIGN OBJECTS

The test was carried out using a dust chamber that was built in-house, incorporating the basic principle shown in IEC standard 60529. The amount of talcum powder used was ~2 kg per cubic meter of test chamber volume. Fans and a blower were used to maintain the talcum powder in suspension. The test was continued for a period of 8 hrs.
After the end of the test period, the protection enclosure was inspected for accumulation of talcum power.

COMMENT

The protection is satisfactory as no talcum powder accumulation was found inside the enclosure.

3.1.2 TEST FOR PROTECTION AGAINST WATER

তড়িৎ ও ইলেকট্রনিক কৌশল বিভাগ
বাংলাদেশ প্রকৌশল বিশ্ববিদ্যালয়, ঢাকা-১২০৫
ফ্যাক্স/ফোন ৪৮৮০-২-৯৬৬৮০৫৪ (সরাসরি)
পিএবিএক্স ৪৮৮০-২-৫৫১৬৭১০০, ৫৫১৬৭২২৮-৫৭/৬১৫০, ৬১৪২
ফ্যাক্স ৪৮ ৮৮০-২-৯৬৬৮০৫৪

Department of Electrical & Electronic Engineering
Bangladesh University of Engineering and Technology
Dhaka-1205, Bangladesh
Fax/Phone: +880-2-9668054 (Direct)
PABX :+880-2-55167100, 55167228-57, Ext.-6150, 6142
E-mail : headeee@eee.buet.ac.bd

TEST REPORT ON A 30W SOLAR STREET LIGHT SAMPLE SUPPLIED BY MIND TOUCH LIMITED

BRTC REF. NO.: 1102-33244/EEE/2020-21 DATE: 31/03/2021
CLIENT'S REF. NO.: letter dated DATE: 25/03/2021

The test was made by spraying the enclosure from all practicable direction with a stream of water from a test nozzle according to IEC standard 60529. The internal diameter of the nozzle was ~6.3 mm and the delivery rate was 12.5 L/min ± 5%. The stream of water was sprayed using the nozzle at ~2.5 m distance for ~4 minutes.

The protection enclosure was inspected to check whether water entered inside it.

COMMENT

The protection is satisfactory as water did not enter inside the enclosure. The enclosure of the solar street light fulfills the requirement of IP65.

3.2 The LED street light

The LED street light was placed inside the integrating sphere photometer from Labsphere, connected and controlled with its Integral™ light measurement platform, and tested for its Luminous Efficacy. The results of the test are provided in Table 3.1.

Table 3.1: Test results of the LED street light unit

Sl. No	Features	Observation /Test Results	Compliance /Non-compliance (with SREDA)
1.	Measured Input Voltage (V)	12.0	-
2.	Measured Input Current (A)	2.55	-
3.	Measured Power (W)	30.6	Comply (10W to 50W)
4.	Luminous Efficacy (Lm/W)	154.17	Comply (> 100 lm/W)
5.	(a) Ambient Temperature (°C)	34°C	Comply (<20° C)
	(b) Heat Sink Temperature (°C)	45.5°C	
	(c) Heat Sink temperature Rise (°C)	11.5°C	
6.	Deviation of Power Consumption from the rated condition (%)		Comply (within ±15%)

তড়িৎ ও ইলেকট্রনিক কৌশল বিভাগ
বাংলাদেশ প্রকৌশল বিশ্ববিদ্যালয়, ঢাকা-১২০৫
ফ্যাক্স/ফোন ৪৮৮০-২-৯৬৬৮০৫৪ (সরাসরি)
পিএবিএক্স ৪৮৮০-২-৫৫১৬৭১০০, ৫৫১৬৭২২৮-৫৭(এক্সটেনশন), ৬১৪২
ফ্যাক্স ৪৮ ৮৮০-২-৯৬৬৮০৫৪

Department of Electrical & Electronic Engineering
Bangladesh University of Engineering and Technology
Dhaka-1205, Bangladesh
Fax/Phone: +880-2-9668054 (Direct)
PABX :+880-2-55167100, 55167228-57, Ext.-6150, 6142
E-mail : headeee@eee.buet.ac.bd

TEST REPORT ON A 30W SOLAR STREET LIGHT SAMPLE SUPPLIED BY MIND TOUCH LIMITED

BRTC REF. NO.: 1102-33244/EEE/2020-21 DATE: 31/03/2021
CLIENT'S REF. NO.: letter dated DATE: 25/03/2021

Sl. No	Features	Observation /Test Results	Compliance /Non-compliance (with SREDA)
	(a) Input voltage (10.0 V)	-1.75	
	(b) Input voltage (12.0 V)	-2.45	
	(c) Input voltage (14.0 V)	-2.26	
7.	Type of LED light	White	-
8.	Color Rendering Index (CRI)	71.59	Comply (>70)

COMMENT:

The overall performance of the supplied LED street light unit was found to be SATISFACTORY as per SREDA requirements.

3.3 The charge controller unit

Performance of the charge controller unit was tested according to IEC standard 62509:2016. The results are provided in Table 3.2.

Table 3.2: Test results of the charge controller unit

Sl. No	Features	Observation/Test Results
1.	MPPT mechanism	Present
2.	Maximum Drawn Self-Current	With indicator LEDs lit: 14 mA
3.	Factory preset set points of the charge controller for the particular battery to be used.	Present
4.	Input Current Rating	PV module short circuit current unknown

তড়িৎ ও ইলেকট্রনিক কৌশল বিভাগ
বাংলাদেশ প্রকৌশল বিশ্ববিদ্যালয়, ঢাকা-১২০৫
ফ্যাক্স/ফোন ঃ+৮৮০-২-৯৬৬৮০৫৪ (সরাসরি)
পিএবিএক্স ঃ+৮৮০-২-৫৫১৬৭১০০, ৫৫১৬৭২২৮-৫৭/৬১৫০, ৬১৪২
ফ্যাক্স ঃ+ ৮৮০-২-৯৬৬৮০৫৪

Department of Electrical & Electronic Engineering
Bangladesh University of Engineering and Technology
Dhaka-1205, Bangladesh
Fax/Phone: +880-2-9668054 (Direct)
PABX :+880-2-55167100, 55167228-57, Ext.-6150, 6142
E-mail : headeee@eee.buet.ac.bd

TEST REPORT ON A 30W SOLAR STREET LIGHT SAMPLE SUPPLIED BY MIND TOUCH LIMITED

BRTC REF. NO.: 1102-33244/EEE/2020-21 DATE: 31/03/2021
CLIENT'S REF. NO.: letter dated DATE: 25/03/2021

Sl. No	Features	Observation/Test Results
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
6.	Labeling on charge controller casing	Present
7.	Battery high voltage disconnect (HVD)	14.34V (controllable through remote device)
8.	Reverse current leakage protection	Protected
9.	Short-circuit protection	(a) Protected against load terminal shorted (b) Protected against panel terminal shorted
10.	LVD maximum current handling capacity	LVD device handled 150% of the maximum expected continuous load
11.	Current handling capacity at PV, Battery and Load Terminals	100% of rated current (15A) was sustained for 1 hour without the charge controller being damaged
12.	Reverse polarity protection	(a) Panel End: Protected (b) Battery End: Protected
13.	Low voltage disconnect (LVD):	(both controllable through remote device)
	(a) Disconnect voltage	(a) 10.14 V
	(b) Reconnect voltage	(b) 14.34 V
14.	Nominal Voltage	12V
15.	Efficiency of the Charge Controller	Avg. Discharging efficiency: 95.63% Avg. Charging efficiency: 93.44%

তড়িৎ ও ইলেকট্রনিক কৌশল বিভাগ
বাংলাদেশ প্রকৌশল বিশ্ববিদ্যালয়, ঢাকা-১২০৫
ফ্যাক্স/ফোন ৪৮৮০-২-৯৬৬৮০৫৪ (সরাসরি)
পিএবিএক্স ৪৮৮০-২-৫৫১৬৭১০০, ৫৫১৬৭২২৮-৫৭(৬১৫০, ৬১৪২
ফ্যাক্স ৪৮ ৮৮০-২-৯৬৬৮০৫৪

Department of Electrical & Electronic Engineering
Bangladesh University of Engineering and Technology
Dhaka-1205, Bangladesh
Fax/Phone: +880-2-9668054 (Direct)
PABX :+880-2-55167100, 55167228-57, Ext.-6150, 6142
E-mail : headeee@eee.buet.ac.bd

TEST REPORT ON A 30W SOLAR STREET LIGHT SAMPLE SUPPLIED BY MIND TOUCH LIMITED

BRTC REF. NO.: 1102-33244/EEE/2020-21 DATE: 31/03/2021
CLIENT'S REF. NO.: letter dated DATE: 25/03/2021

COMMENT:

The overall performance of the charge controller unit was found to be SATISFACTORY.

3.4 Capacity test of the battery unit

The capacity test was carried out over five cycles of charging and discharging of the battery unit. During charging, the battery was charged following the standard procedure of charging Lithium Iron Phosphate ($LiFePO_4$) battery. During discharging, the battery was discharged at a constant DC current of 10.6 A. The discharging was tried to be continued until the battery terminal voltage reached close to 10.0 V. Table 3.3 shows the results of this test.

Table 3.3: Capacity test results of the battery unit

Cycle No.	Voltage at the start of Discharge (V)		Discharge Current (A)	Average Temperature (°C)	Discharge Period (Hrs)	Battery Capacity (Ah) at Measured Temperature
	Without Load	With Load				
1.	13.88	13.21	10.6	31	5.38	57.03
2.	13.83	13.18	10.6	30.9	5.28	55.97
3.	13.53	13.11	10.6	31.6	5.30	56.18
4.	13.67	13.17	10.6	31.6	5.31	56.29
5.	13.47	12.99	10.6	31.85	5.28	55.97

COMMENT:

The average capacity of the supplied battery at measured temperature was found to be 56.29 Ah which is which is 6.2% greater than the rated value (53Ah). Hence, the overall performance of the supplied battery unit was found to be SATISFACTORY as per SREDA requirements.

4 OVERALL COMMENT

The overall performance of the supplied Standalone Solar Street Lamp was found to be SATISFACTORY as per SREDA requirements.