TÜV NORD (Hangzhou) Co., Ltd.

Room B409, Building 1, No.9,
Jiuhuan Road, Shangcheng,
District, Hangzhou City, Zhejiang
Province, 310019, P.R. China

Phone: +86 (0) 571 8538 6989
Fax: +86 (0) 571 8538 6986

hzpcert@tuv-nord.com
www.tuv-nord.com/cn

Test Report

No. TRPVP01062/26P/07

Commission Testing
according to IEC 61215-2 / EN IEC 61215-2

Applicant: **Lanzhou University**

No. 222 Tianshui South Road, Lanzhou, Gansu Province, P. R. China, 730000

File No.: PVP01062/26P-07

Designed: by: Bella Liu 数字签名者：bella liu 日期：2026.01.23 12:39:18 +08'00'

(Project Engineer)

Reviewed: by: Henry Huang 数字签名者：Henry Huang 日期：2026.01.23 13:25:10 +08'00'

(Technical Certifier)

TÜVNORD

Test Report

File No.: PVP01062/26P-07 Test Report No.: TRPVP01062/26P/07

Applicant ..... :	**Lanzhou University** No. 222 Tianshui South Road, Lanzhou, Gansu Province, P. R. China, 730000
Manufacturer ..... :	**Lanzhou University** No. 222 Tianshui South Road, Lanzhou, Gansu Province, P. R. China, 730000
Order No. ..... :	HZHZPVP01062/26P
Date of Application ..... :	2026-01-14
Product ..... :	Perovskite Solar Minimodule
General Information • Maximum System Voltage.... : • Electrical Protection Class.... : • Fire Safety Class ..... :	 N/A N/A N/A
Type of examination ..... :	Commission testing only
Testing Period ..... :	2026-01-20
Responsible Testing Laboratory :	**Zhejiang HJE Co., LTD** 3F - 4F, Building 1, No. 3556 Linggongtang Road, Nanhu District, Jiaxing, Zhejiang, China

Test results listed in this test report refer exclusively to the mentioned test sample.

The submitted test samples as described in the reports hereunder are based on the requirements:
IEC 61215-2:2021 / EN IEC 61215-2:2021 “Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 2: Test procedures”

List of contents

Summary of testing
According to the application from clients, perform current-voltage measurements on 1 perovskite solar module according to IEC 61215-2:2021.

General remarks

Test item particulars:	
Accessories and detachable parts included in the evaluation .....:	N/A
Options included .....:	N/A
Abbreviations used in the report:	
HF - Humidity Freeze	TC - Thermal Cycling
DH - Damp Heat	EL - Electroluminescence
STC - Standard Test Conditions (1000W/m^2, AM1.5, 25°C)	BNPI - Bifacial nameplate irradiance, corresponding to 1000W/m^2 on the module front and 135 W/m^2 on the module rear
BSI - Bifacial stress irradiance, corresponding to 1000W/m^2 on the module front and 300W/m^2 on the module rear	aBSI - Applied bifacial stress irradiance, corresponding to 1000W/m^2 on the module front and more than 300W/m^2 or the manufacturer's claimed irradiance value on the module rear
P_{max} - Maximum power	I_{sc} - Short circuit current
V_{oc} - Open circuit voltage	I_{mp} - Maximum power current
V_{mp} - Maximum power voltage	FF - Fill factor
φ - Bifaciality refers to the ratios between the main I-V characteristics of the rear side and the front side of a bifacial device, typically at Standard Test Conditions (STC) unless otherwise specified. It is quantified with reference to bifaciality coefficients, namely as φ.	
φP_{max} - Maximum power bifaciality coefficient	φI_{sc} - Short circuit current bifaciality coefficient
φV_{oc} - Open-circuit voltage bifaciality coefficient	α - Current temperature coefficient
β - Voltage temperature coefficient	γ - Power temperature coefficient
Possible test case verdicts:	
Test case does not apply to the test object .....:	Not Applicable (N/A)
Test object does meet the requirement .....:	Pass (P)
Test object does not meet the requirement .....:	Fail (F)
Other remarks:	
The test verdicts presented in this report relate only to the object tested. This report shall not be reproduced except in full, without the written approval of the issuing testing laboratory. Sample #-front: Exposure under 1000W/m^2 on the front side with no irradiance on the rear side. Sample #-rear: Exposure under 1000W/m^2 on the rear side with no irradiance on the rear side. Sample #-BNPI: Exposure under BNPI on the front side with no irradiance on the rear side. "(see Annex #)" refers to additional information appended to the report. "(see Table #)" refers to a table appended to the report. Power degradation data expressed in negative value indicates a reduction of maximum power output. Power degradation data expressed in positive value indicates an increment of maximum power output. Throughout this report, a point is used as the decimal separator.	

Module group assignment

Perovskite solar module

Sample #	Serial number	Dimension (l x w)	Remark
1	M8#	60mm x 60mm	Maximum power determination

Clause	Requirement + Test	Result - Remark	Verdict

Test result overview

Perovskite solar module

Initial examinations			—
MQT 02	Maximum power determination..... :	See table 4.2	—

IEC 61215-2 / EN IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict

Test results of IEC 61215-2 / EN IEC 61215-2

Perovskite solar module

4.2 Maximum power determination - MQT 02							—
Test date [YYYY-MM-DD] .....:	2026-01-20						—
Test method .....:	☒ Solar simulator / ☐ Natural sunlight						—
Module temperature [°C] .....:	25±5						—
Irradiance [W/m²] .....:	1000						—
Sample #	I_{sc} [mA]	V_{oc} [V]	I_{mp} [mA]	V_{mp} [V]	P_{max} [mW]	FF [%]	η [%]
1-forward	59.334	10.692	56.897	9.050	514.91	81.16	23.95
1-reverse	59.310	10.771	56.803	9.150	519.75	81.36	24.17

Supplementary information:

The tests are performed according to client's application.

During this maximum power determination, the spectral mismatch was not considered. And the lab did not perform light soaking procedure prior to measurements.

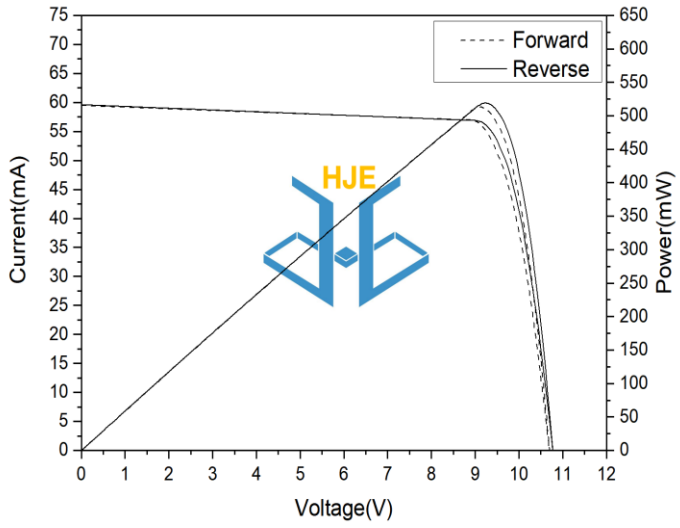
η [%] = Pmax [W] / area [m²] / 1000 [W/m²] x 100% (designated illuminated area: 21.5 cm²).

The measurements were performed with a steady state solar simulator class AAA according to IEC 60904-9:2020.

Sample#-forward: The electrical resistance of solar simulator was scanned from 0 to +∞.

Sample#-reverse: The electrical resistance of solar simulator was scanned from +∞ to 0.

And the IV measurement characteristic was listed as below:



Annex 1: List of measurement equipment

No.	Equipment	Identification	calibration date
1	Steady-state simulator	HJE-017	2025-11-09
2	Reference Solar Cell	HJE-029	2025-02-20
3	Steel ruler	HJE-094	2025-12-30
4	Infrared thermometer gun	HJE-009	2025-06-05
5	Manual image measuring instrument	HJE-159	2025-09-22

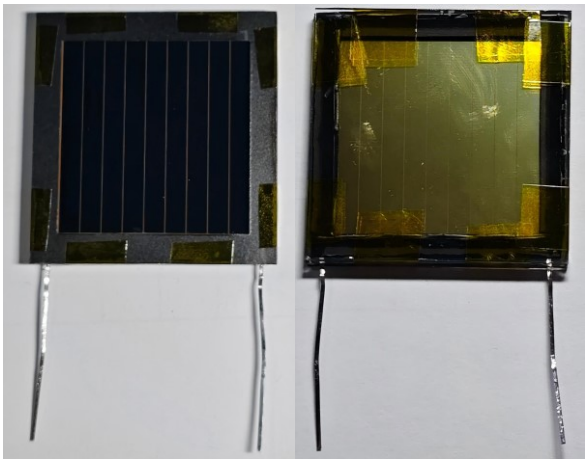
Annex 2: Statement of the estimated uncertainty of the test results

The total measuring uncertainty of P_{max} is 3.5%, k=2

The total measuring uncertainty of I_{sc} is 3.5%, k=2

The total measuring uncertainty of V_{oc} is 0.8%, k=2

Annex 3: photos



Overview

----- End of test report -----