

PV magazine Indoor Test Report

Supplier	Astronergy
Product	CHSM66RN(DG)/F-BH-615
Date	18 February 2025
Version	1.1



Overview of the Indoor Test

Description

The Indoor Test is a series of inspection and tests designed to characterize the performance of the PV module products before they are installed in the outdoor field.

The tests are conducted at CEA's parent company's Intertek state of the art laboratory in Zhejiang, China.

The results of the inspections are used to derive a grade number for each test and an average grade for all tests, except UVID, which is optional.

The detailed methodology can be found in the Appendix of this report.

Tests

Visual inspection	Modules are inspected for visual defects according to widely accepted industry criteria.
EL inspection	Modules are inspected for EL defects (electroluminescence) according to widely accepted industry criteria.
Low irradiance Performance	The performance loss of a module in low irradiance conditions is measured.
Pmax Temperature Coefficient	The Pmax temperature coefficient is measured, which determines the performance loss at high temperatures.
PID (Potential Induced Degradation)	The sensitivity of a module to degradation due to voltage stress is measured in a special chamber.
UVID (optional) (Ultraviolet Induced Degradation)	The sensitivity of a module to degradation due to UV light is measured in a special chamber.
Bifaciality Ratio	The bifaciality ratio of all samples is measured to compare against nameplate.

Product and Sample Details

Test sample information

Sample #	Serial number
1	A212260642J86001883
2	A212260642J86001891
3	A212260642J86001899
4	A212260642J86001890
5	A212260642J86001897
6	A212260642J86001879
7	A212260642J86001886

Product information

Model	CHSM66RN(DG)/F-BH-615
Cell technology	TOPCon
Cell number	132
Cell format	210x182 mm
Number of busbars	16
Junction box	IP68, 3 bypass diodes
Laminate construction	Glass
Bifaciality ratio	80±10%

Front side



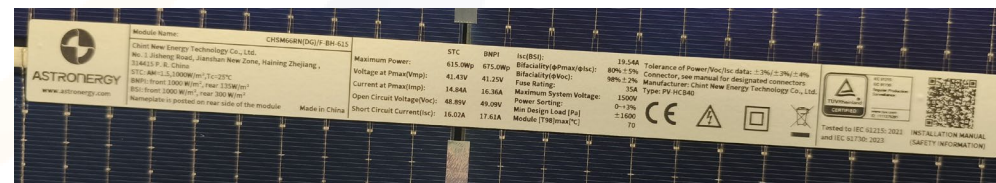
Rear side



Other information

Sample selection method	Sample provided by supplier, without random selection
Intertek lab report	Attached

Nameplate Label



Product Datasheet



ASTRONERGY

ASTRO N7

CHSM66RN(DG)/F-BH
Bifacial Series

605~630W

Warranty

15 15-year Product Warranty | 30 30-year Linear Power Warranty



99.00% | 87.40% | 84.95%

TOPCon 4.0
Novel upgrade, enhancing module efficiency

SMBB Design
Enhancing current collection, minimizing power loss

Low Voc Design
Increasing modules per string, lower BOS cost

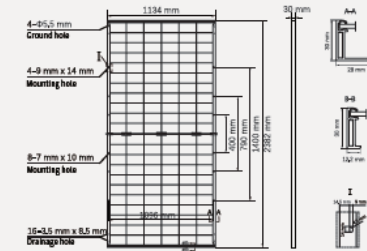
Bifacial Power Generation
Maximizing bifaciality, boosting backside power output

2024
Tier 1
BloombergNEF
Underwritten by
International Insurer

605~630W POWER RANGE | **0~+3%** POWER SORTING | **23.3%** MAX. MODULE EFFICIENCY | **≤ 1.0%** FIRST YEAR POWER DEGRADATION | **≤ 0.4%** YEAR 2-30 POWER DEGRADATION

Mechanical Specifications

Outer dimensions (L x W x H)	2382 x 1134 x 30 mm
Cell type	n-type mono-crystalline
No. of cells	132 (6*22)
Frame technology	Aluminum, silver anodized
Front / Back glass	2.0±2.0 mm
Cable length (Including connector)	Portrait: (+350 mm, -250 mm); Customized length
Cable diameter (IEC/UL)	4 mm ² / 12 AWG
^① Maximum mechanical test load	5400 Pa (front) / 2400 Pa (back)
Connector type (IEC/UL)	HCB40 (Standard) / MC4-EVO2A (Optional)
Module weight	32.6 kg
Packing unit	36 pcs / box
Weight of packing unit (for 40'HQ container)	1231 kg
Modules per 40' HQ container	720 pcs (Subject to sales contract)



^① Refer to Astronergy crystalline installation manual or contact technical department.
 Maximum Mechanical Test Load=1.5×Maximum Mechanical Design Load.

Electrical Specifications

STC: Irradiance: 1000W/m², Cell Temperature 25° C, AM=1.5

Rated output (P _{mpp} / Wp)	605	610	615	620	625	630
Rated voltage (V _{mpp} / V)	41.18	41.31	41.43	41.56	41.69	41.82
Rated current (I _{mpp} / A)	14.69	14.77	14.84	14.92	14.99	15.07
Open circuit voltage (V _{oc} / V)	48.59	48.74	48.89	49.04	49.19	49.34
Short circuit current (I _{sc} / A)	15.86	15.94	16.02	16.11	16.19	16.27
Module efficiency	22.4%	22.6%	22.8%	23.0%	23.1%	23.3%

BNPI: Irradiance: front: 1000W/m², rear: 135W/m², Cell Temperature 25° C, AM=1.5

Rated output (P _{mpp} / Wp)	665	670	675	680	685	690
Rated voltage (V _{mpp} / V)	41.00	41.13	41.25	41.37	41.49	41.61
Rated current (I _{mpp} / A)	16.22	16.29	16.36	16.44	16.51	16.58
Open circuit voltage (V _{oc} / V)	48.79	48.94	49.09	49.14	49.19	49.24
Short circuit current (I _{sc} / A)	17.45	17.53	17.61	17.72	17.83	17.94

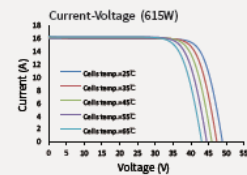
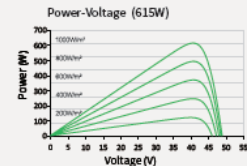
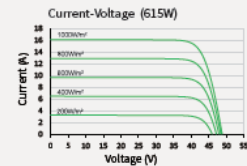
Temperature Ratings (STC)

Temperature coefficient (P _{mpp})	-0.29%/°C
Temperature coefficient (I _{sc})	+0.043%/°C
Temperature coefficient (V _{oc})	-0.25%/°C

Operating Parameters

Bifaciality (P _{mpp})	80±5%
Junction box IP rating	IP 68
Max. series fuse rating	35 A
Max. system voltage (IEC/UL)	1500V _{oc}

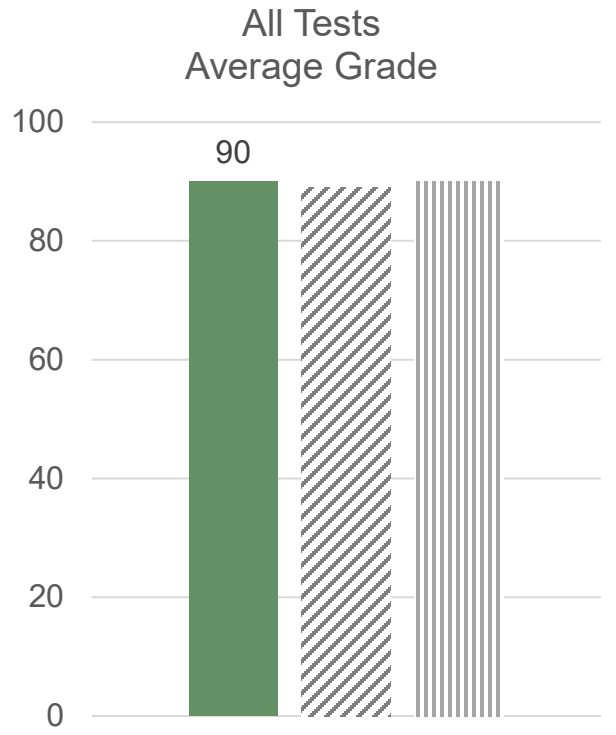
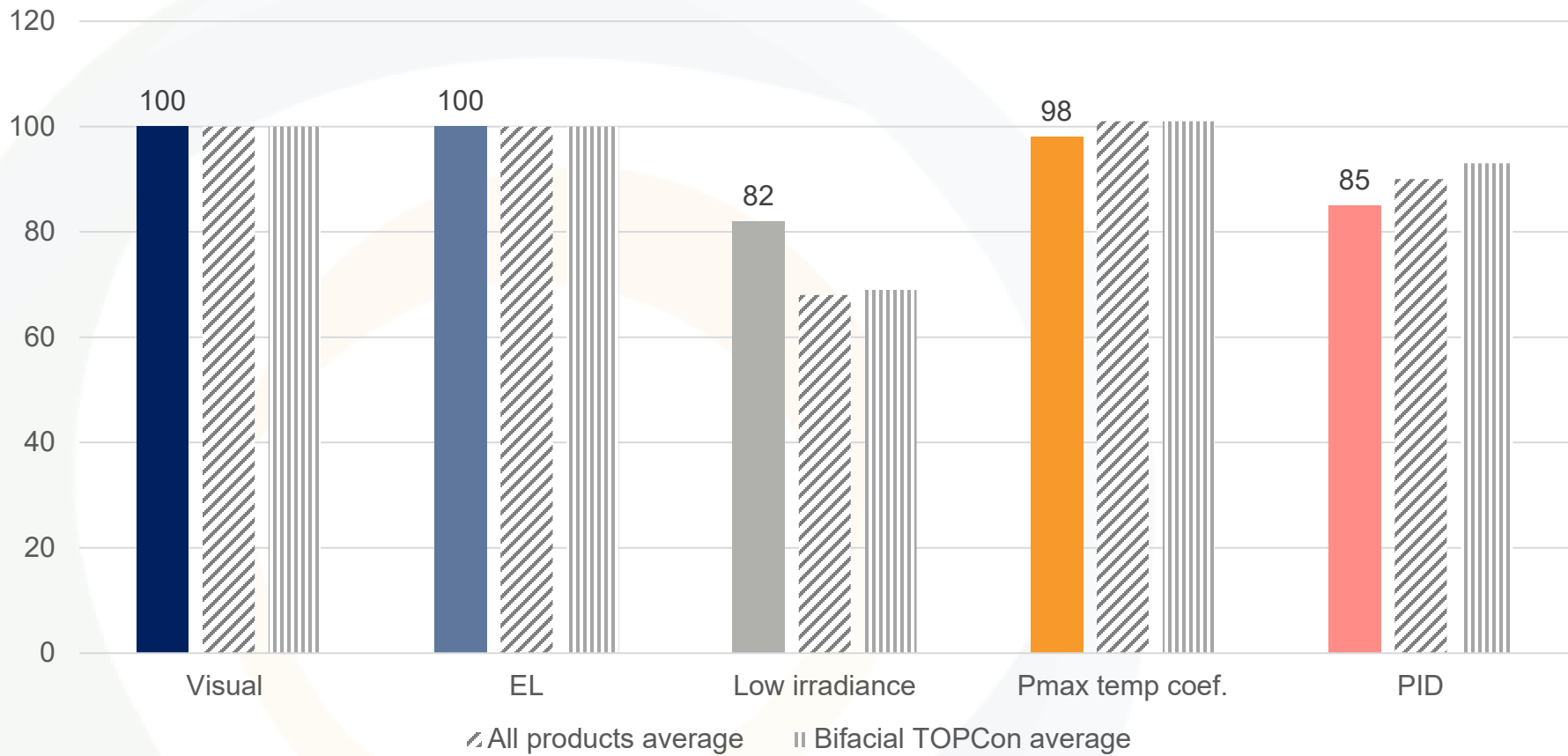
Curve



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 www.astronergy.com

2024.10

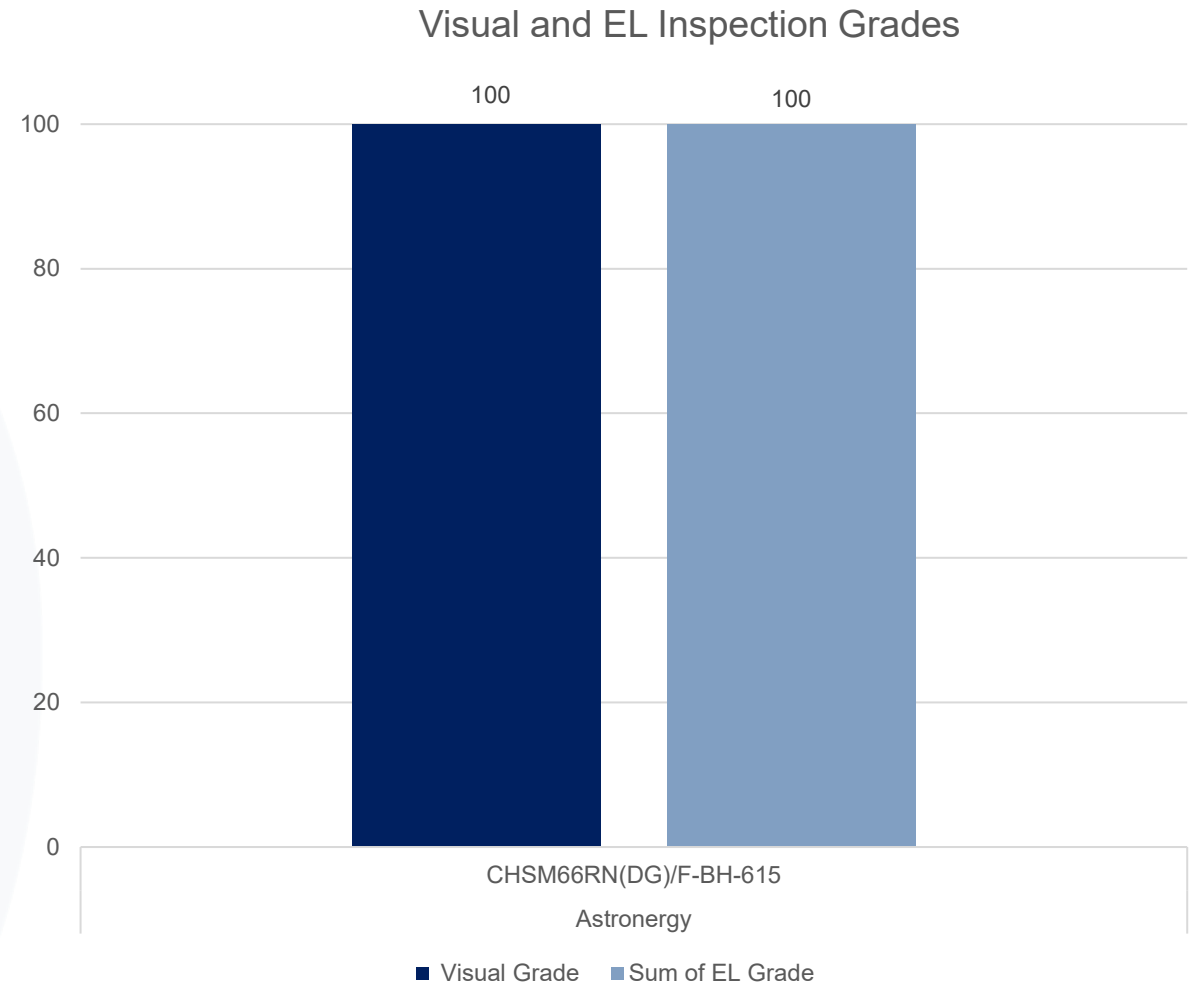
Test Grading Overview



Individual test grades are compared to the average grades for products installed since 2022.
 All products average: the average grade of all products.
 Bifacial TOPCon average: the average grade of all Bifacial TOPCon products.
 The All Tests Average Grade does **not** include the UVID test, as it is optional and not performed for all products.

Visual inspection and EL inspection

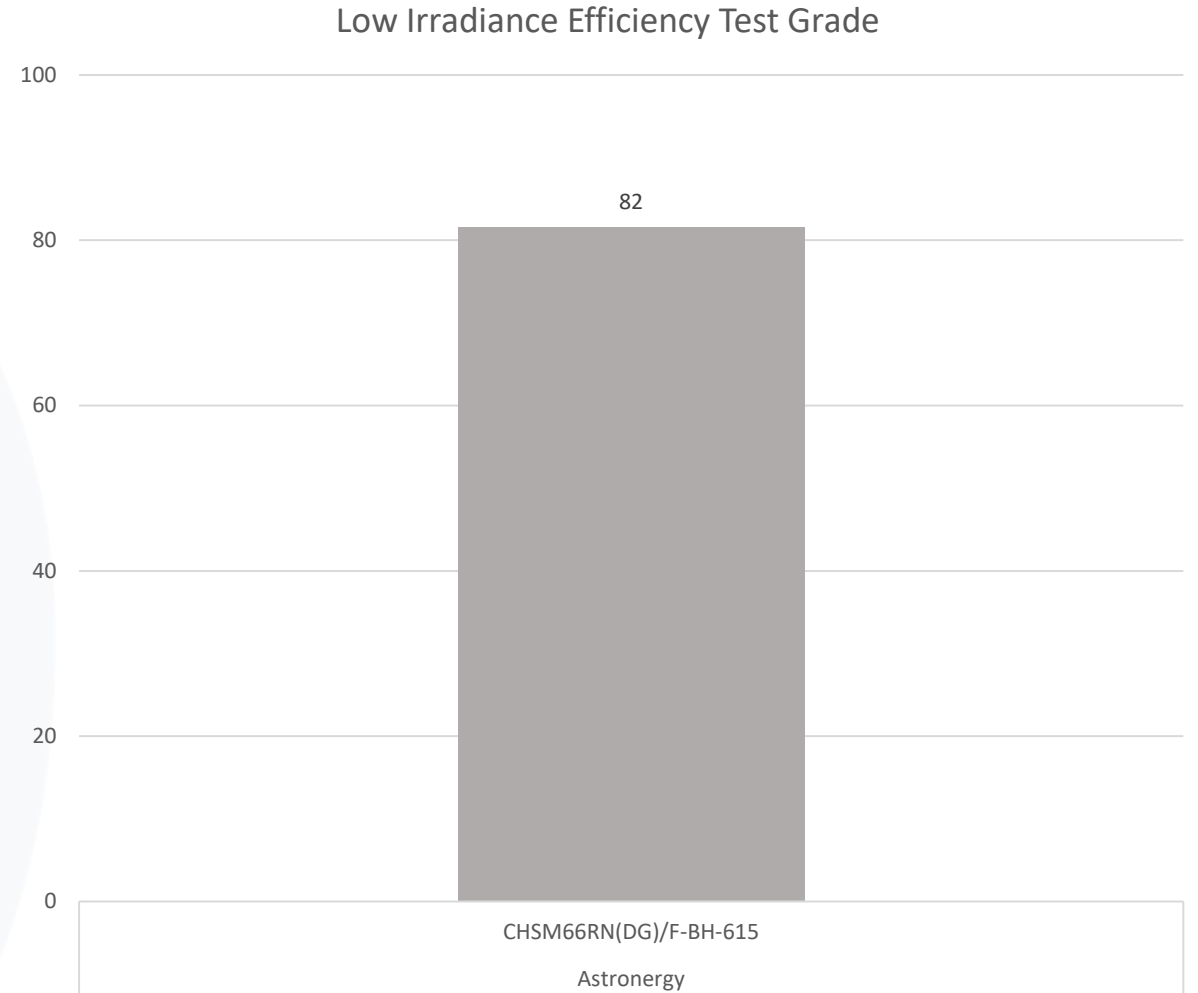
CHSM66RN(DG)/F-BH-615	Visual inspection	EL inspection
Sample 1	None	None
Sample 2	None	None
Sample 3	None	None
Sample 4	None	None
Sample 5	None	None
Sample 6	None	None
Sample 7	None	None
Score	0	0
Grade	100	100



All 6 modules of each product sample lot have undergone visual inspection, according to CEA's quality criteria for visual inspection.

Low irradiance efficiency loss test

CHSM66RN(DG)/F-BH-615	Front side low irradiance efficiency loss (%)
Sample 1	
Sample 2	
Sample 3	
Sample 4	1.51
Sample 5	
Sample 6	
Sample 7	
Grade	82

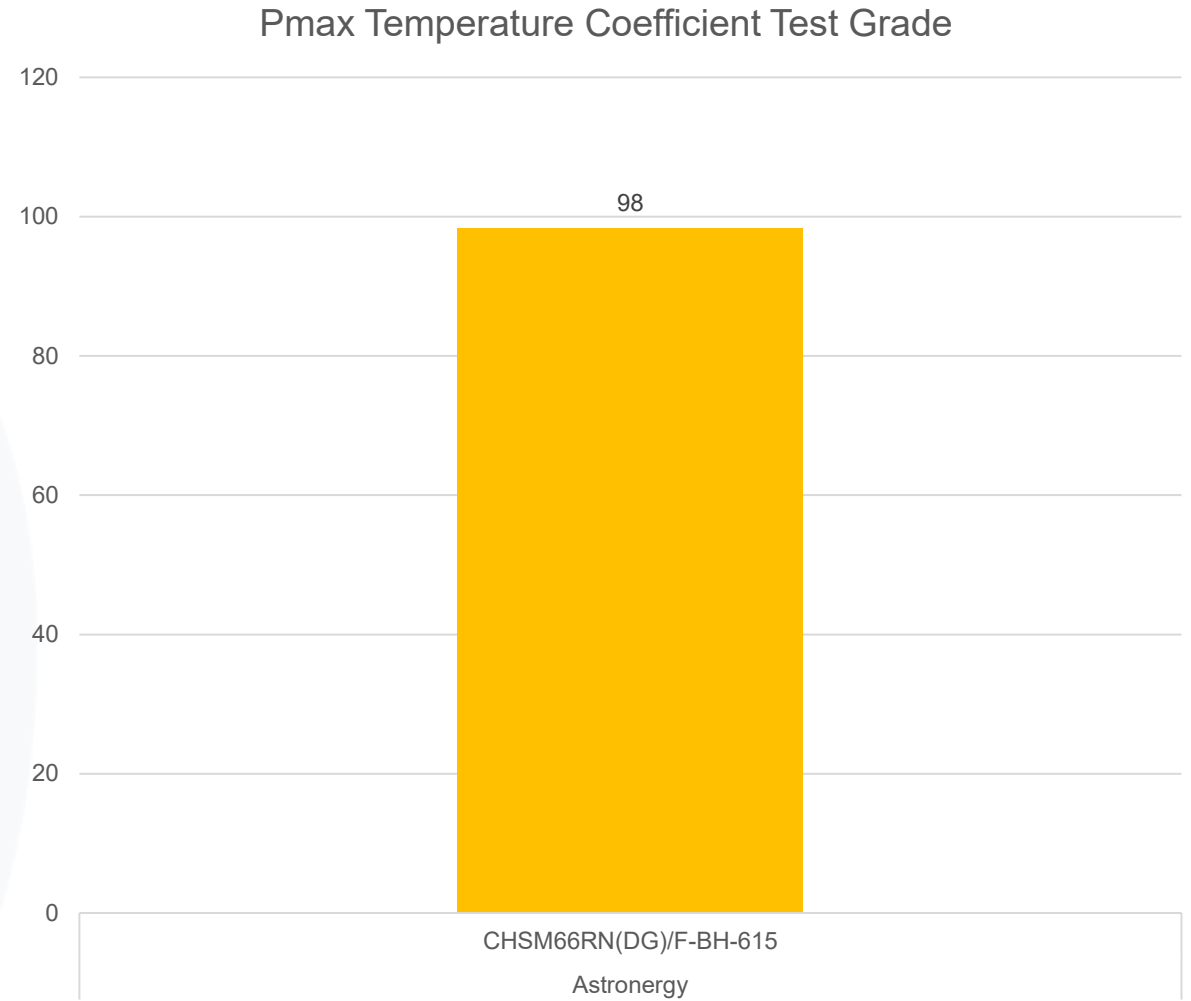


The efficiency loss is calculated by the following formula:

$$\text{Efficiency loss} = 1 - \left[\left(\frac{P_{\text{max at low irradiance conditions}}}{P_{\text{max at STC}}} \right) \times \left(\frac{1,000}{200} \right) \right]$$

Pmax temperature coefficient test

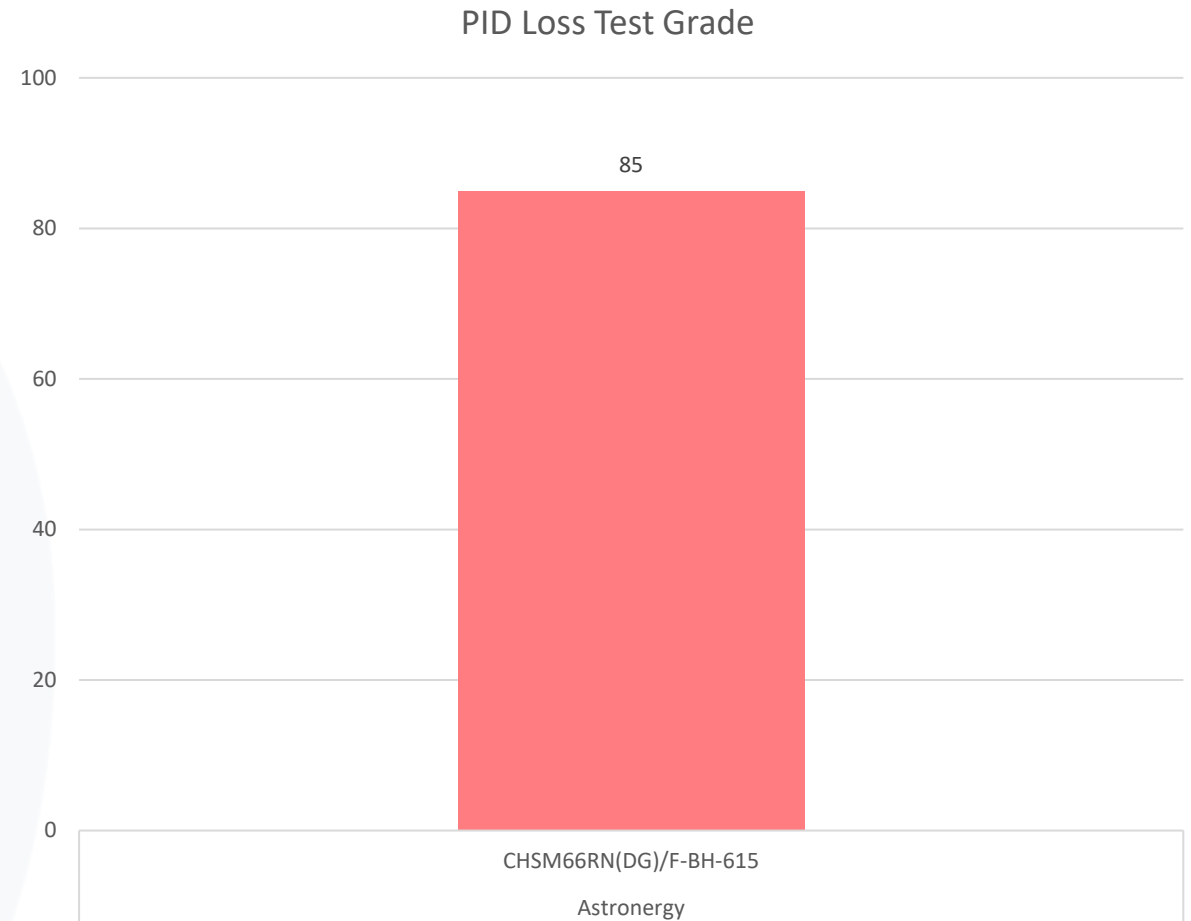
CHSM66RN(DG)/F-BH-615	Pmax Temperature coefficient (%/°C)
Sample1	
Sample2	
Sample3	
Sample4	-0.308
Sample5	
Sample6	
Sample 7	
Grade	98



The Pmax Temperature Coefficient is measured according to IEC standards.

PID Test

CHSM66RN(DG)/F-BH-615	Front side PID loss (%)
Sample 1	
Sample 2	
Sample 3	
Sample 4	
Sample 5	1.14
Sample 6	
Sample 7	
Grade	85



The PID loss is the front side power degradation after testing at 1500 V for 96 hours. After PID stressing, the sample is light soaked for one day outdoors to recover any PID-p (polarization) effect. The remaining degradation is due to other causes, such as sodium ion migration.

Bifaciality Ratio

CHSM66RN(DG)/F-BH-615	Bifaciality ratio (%)
Sample 1	80.90%
Sample 2	80.93%
Sample 3	80.13%
Sample 4	80.64%
Sample 5	80.24%
Sample 6	79.46%
Sample 7	81.00%
Nameplate	80±10%
Average	80.47%

The bifaciality ratio test result is not graded. The results are listed for informational purposes.

The bifaciality ratio is calculated from the following formula:

Bifaciality ratio = (Pmax rear surface / Pmax front surface) x 100%

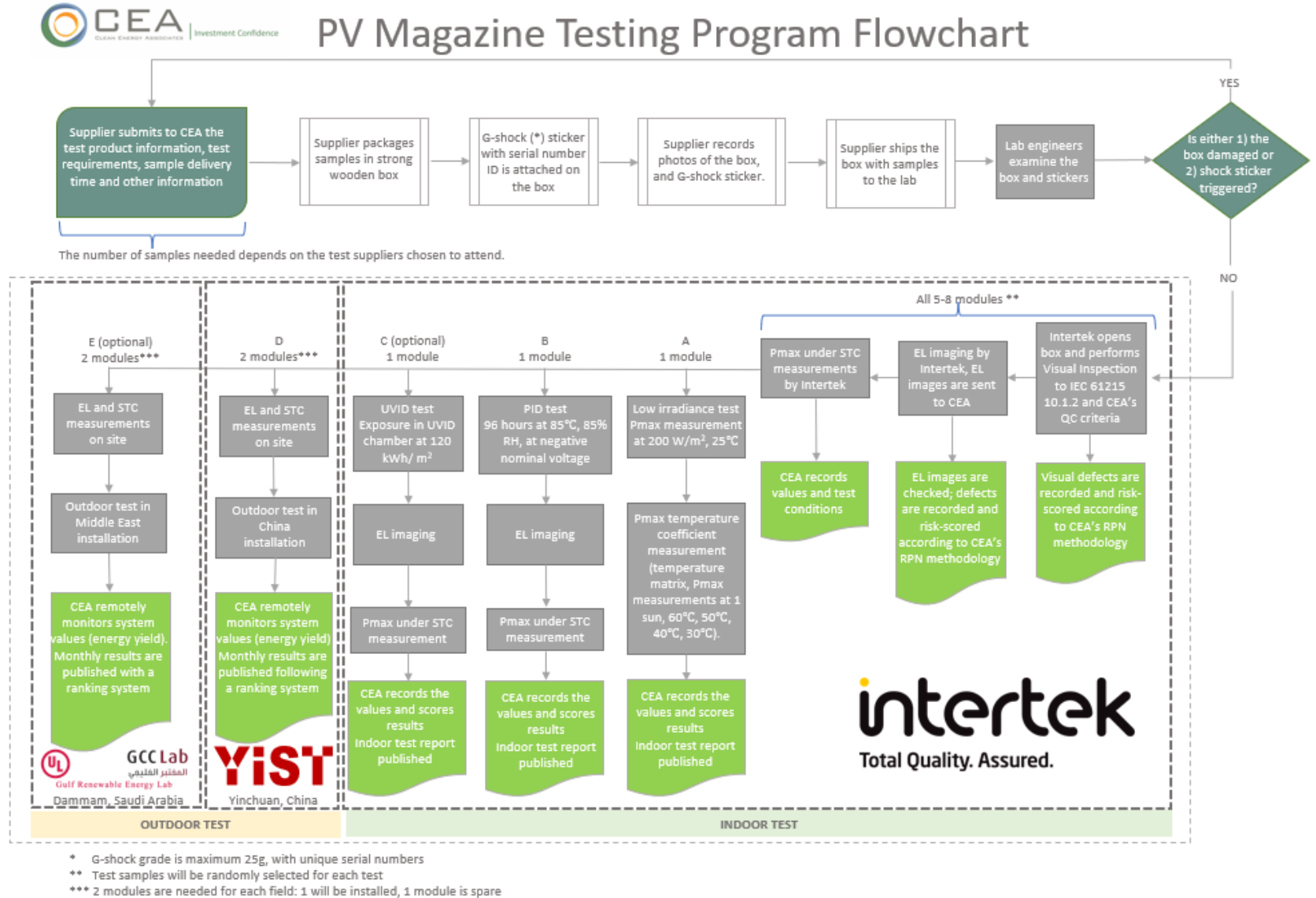
Appendix

Methodology and Scoring System

Test Flowchart and Protocol

The flowchart is a high-level description of the testing procedure, describing the steps, and tests to be applied.

Detailed checklists and instructions created by CEA are delivered to all the testing partners.



Grading Methodology - 1

Test/inspection grading system overview

For every product, all samples are shipped to the Intertek laboratory and then 2 samples are shipped from the lab to each outdoor test field to conduct the tests and inspections according to the above flowchart.

The table describes the inspections and tests applied on all products.

	Test/inspection	# of samples	Method	Values	Average grade weight	Grades
1	Visual inspection	5-8	Inspection	RPN Scores	10%	1-100
2	EL image inspection	5-8	Inspection	RPN Scores	10%	1-100
3	Low irradiance efficiency loss	1	Test	%	25%	1-100
4	Pmax Temperature coefficient	1	Test	%/°C	25%	1-120
5	PID loss	1	Test	%	30%	1-100
6	UVID120 (optional)	1	Test	%	NA	1-100
7	Outdoor installation and yield measurement	2-4	Energy Yield Monitoring	Monthly kWh/kWp	NA	NA

The RPN (risk priority number) scoring method has been developed by CEA and is used to evaluate and create risk scores of Visual and EL defects.

The weights are used to calculate the average grade for tests 1-5.

Grading Methodology - 2

A number within the 1-100/120 range will be used to grade the results, so that the overall ranking of the products will reflect general industry practices and requirements:

Grading System

	Grade range:	120	100	90	80	70	60	50	40	30	20	10	0
1	Visual inspection (RPN scores)	NA	0	0.74	2.20	4.39	7.30	10.94	15.30	20.39	26.20	32.74	≥ 40
2	EL image (RPN scores)	NA	0.00	2.03	4.62	7.75	11.43	15.65	20.43	25.75	31.62	38.03	≥ 45.00
3	Low irradiance loss	NA	≤ -2.00%	-0.02%	1.78%	3.41%	4.87%	6.16%	7.27%	8.21%	8.98%	9.58%	≥ 10.00%
4	Pmax Temp. coefficient	≥ -0.200%	-0.300%	-0.343%	-0.382%	-0.417%	-0.448%	-0.475%	-0.498%	-0.517%	-0.532%	-0.543%	≤ -0.550%
5	PID loss	NA	≤ 0.0%	0.7%	1.6%	2.7%	4.0%	5.5%	7.2%	9.1%	11.2%	13.5%	≥ 16.0%
6	UVID120 (optional)	NA	≤ 0.00%	0.60%	1.20%	1.80%	2.40%	3.00%	3.60%	4.20%	4.80%	5.40%	≥ 6.00%

The Visual and EL Inspection RPN scores are divided by the number of samples, to normalize the score, as the total number of samples may vary.

The correspondence of the scores/test results to the grades follows a binomial or linear relationship, anchored to certain key values that are generally accepted in the PV industry. For example, a PID loss of 5%, which is the pass/fail threshold of the related IEC standard, will give a grade close to 50. Grades below 50 indicate a product performance that is below a generally acceptable threshold.

Test Report

Applicant 1 : Clean Energy Associates (China) Limited
Room 1206, 300 Yan'an West Road, Jing'an District, Shanghai, China

Applicant 2 : Pv magazine group GmbH & Co. KG
Kurfürstendamm 64 | 10707 Berlin, Germany

Product : Crystalline Silicon Terrestrial Photovoltaic Module

Manufacturer : ASTRONERGY Solar

Model No. of Manufacturer : CHSM66RN(DG)/F-BH-615

No. of Sample : See the attached sheets

Date of receipt of test item : 12/19/2024

Date (s) of performance of test : 12/31/2024~02/11/2025

Date of issue : 02/18/2025

Testing Laboratory : Intertek Testing Services Zhejiang Ltd.

Location : Building 2, Juanhu Science and Technology Innovation Park, No. 500
Shuiyueting East Road, Haining, Zhejiang, China

Service Requested : Testing

Method : See **General remarks** in next page

Result : See the attached sheets

Conclusion : The testing of submitted sample is **complied with** the above
standards/requirements. See general remarks in page 2 for details.

***** End of page *****

Prepared and checked by:
Intertek Testing Services
Zhejiang



Andrew He
Engineer
PV Division

Reviewed by
Intertek Testing Services
Zhejiang



Ken Gu
Reviewer
PV Division

- The results reported in this test report shall refer only to the sample actually checked and shall not refer or be deemed to refer to bulk from which such a sample may be said to have been obtained.
- This report shall not be reported except in full without prior authorization from Intertek.
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Test Report

GENERAL INFORMATION	
Test item particulars:	
Accessories and detachable parts included in the evaluation	-
Options included	-
Possible test case verdicts:	-
Abbreviations used in the report:	
Imp – Maximum power current	Voc – Open circuit voltage
Isc - Short circuit current	FF – Fill Factor
Pmp – Maximum power	α – Current temperature coefficient
Vmp – Maximum power voltage	β – Voltage temperature coefficient
STC – Standard Test Conditions	δ – power temperature coefficient
Possible test case verdicts:	
- test case does not apply to the test object	N/A
- test object does meet the requirement.....	Pass (P)
- test object does not meet the requirement.....	Fail (F)
General remarks:	
<p>The test results 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. "(see Enclosure #)" refers to additional information appended to the report. "(see appended table)" refers to a table appended to the report.</p> <p>Throughout this report a point is used as the decimal separator.</p> <p>Test method: IEC 61215-2:2021 Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 2: Test procedures</p> <ul style="list-style-type: none"> • Power determination at STC • Wet Leakage Test • Insulation Test • Electroluminescence (EL) Test • Low Irradiance measurement at 200 W/m² • Module Temperature Coefficient Test <p>IEC TS 62804-1 Photovoltaic (PV) modules – Test methods for the detection of potential-induced degradation</p> <ul style="list-style-type: none"> • Potential induced degradation test (PID) <p>. According to the applicant's requirement ,this test report 250200025SHA-002A1 is issued to entirely replace the test report 250200025SHA-002 for deleting the UVID test.</p>	

Test Report

General Product information:			
Sample assignment:			
Sample No.	SN	Model No.	Remarks
0241219-01-001	A212260642J86001883	CHSM66RN(DG)/F-BH-615	Flash+EL
0241219-01-002	A212260642186001891	CHSM66RN(DG)/F-BH-615	Flash+EL
0241219-01-003	A212260642186001899	CHSM66RN(DG)/F-BH-615	Flash+EL
0241219-01-004	A212260642J86001890	CHSM66RN(DG)/F-BH-615	Control
0241219-01-005	A212260642J86001897	CHSM66RN(DG)/F-BH-615	LOW、 Temperature Coefficient
0241219-01-006	A212260642186001879	CHSM66RN(DG)/F-BH-615	PID
0241219-01-008	A212260642J86001886	CHSM66RN(DG)/F-BH-615	Flash+EL

Test Report

TABLE Potential induced degradation test (PID)							P
IEC 61215-2 MQT01 - Visual inspection (Initial)							P
Test Date [YYYY-MM-DD]:	2024-12-31						—
Sample#	Nature and position of initial findings – comments or attach photos						—
0241219-01-006	No major visual defect.						P
Supplementary information: N/A							
IEC 61215-2 MQT 02 – Maximum power determination (initial)							—
Test Date [YYYY-MM-DD]:	2024-12-31						—
Module temperature [°C]:	Corrected to 25						—
Irradiance [W/m²]:	1000						—
Sample#	Voc [V]	Isc [A]	Pmp [W]	Vmp [V]	Imp [A]	FF [%]	
0241219-01-004front	48.670	16.226	611.376	41.322	14.795	77.42	
0241219-01-004rear	48.512	15.223	492.987	41.460	11.891	66.76	
0241219-01-006front	48.685	16.279	610.767	41.373	14.763	77.06	
0241219-01-006rear	48.428	15.189	485.333	41.396	11.724	65.98	
Supplementary information: N/A							
IEC 61215-2 MQT 03 – Insulation test (initial)							P
Test Date [YYYY-MM-DD]..... :	2024-12-31						—
Test Voltage applied [V]	8000/1500						—
Sample #	Measured	Required	Dielectric breakdown			Result	
	MΩ	MΩ	Yes (description)		No		
0241219-01-006	>1000	14.8	-		No	P	
Supplementary information: Size of module[m²]: 2.70							
IEC 61215-2 MQT 15 – Wet leakage current test (initial)							P
Test Date [YYYY-MM-DD]..... :	2024-12-31						—
Maximum system voltage (V)	1500						—
Test voltage applied Vtest (V d.c.)	1500						—
Solution resistivity (Ω·cm)	< 3500 Ω cm at 22 ± 2°C						P
Solution temperature (°C)	22 ± 2°C						P
Sample##	Measured[MΩ]		Required[MΩ]				
0241219-01-006	>1000		14.8		P		
Supplementary information: Size of module [m²]: 2.70							
IEC 61730-2 MST 13 – Ground continuity test (initial)							P
Test Date [YYYY-MM-DD]..... :	2024-12-31						—

Test Report

Maximum over-current protection rating (A)		35					—
Current applied (A)		87.5					—
Location of designated grounding point		Frame					—
Location of second contacting point		Frame					—
Sample# #		Resistance (mΩ)					—
0241219-01-006		21					P
EL Test (Initial)							—
Test Date [YYYY-MM-DD].....		2024-12-31					—
Please check attached photos for details.							
Supplementary information: N/A							
PID test							—
Test Date [MM/DD/YYYY] / start - end ... :		2025-01-05~2025-01-09					—
Total time		96 hours					—
Voltage applied between current carry parts and grounding		-1500					—
Temperature		85°C±2°C					—
Humidity		85%±3%					—
Supplementary information: N/A							
IEC 61215-2 MQT01 - Visual inspection (after PID test)							P
Test Date [YYYY-MM-DD]:		2025-01-09					—
Sample#		Nature and position of initial findings – comments or attach photos					—
0241219-01-006		No major visual defect.					P
Supplementary information: N/A							
IEC 61215-2 MQT 02 – Maximum power determination (after PID test)							—
Test Date [YYYY-MM-DD]:		2025-01-09					—
Module temperature [°C]:		Nature and position of initial findings – comments or attach photos					—
Irradiance [W/m²]:		1000					—
Sample#	Pmp change rate after this test [%]	Voc [V]	Isc [A]	Pmp [W]	Vmp [V]	Imp [A]	FF [%]
0241219-01-004front	-	48.637	16.218	610.914	41.273	14.802	77.45
0241219-01-004rear	-	48.487	15.217	493.759	41.466	11.908	66.92
0241219-01-006front	-1.22	48.684	15.900	603.322	41.293	14.611	77.94
0241219-01-006rear	-0.65	48.450	14.798	482.163	41.391	11.649	67.25
Supplementary information: N/A							
IEC 61215-2 MQT 03 – Insulation test (after PID test)							P
Test Date [YYYY-MM-DD].....		2025-01-09					—

Test Report

Test Voltage applied [V]			8000/1500		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
0241219-01-006	>1000	14.8	-	No	P
Supplementary information: Size of module[m ²]: 2.70					
IEC 61215-2 MQT 15 – Wet leakage current test (after PID test)					P
Test Date [YYYY-MM-DD]..... :			2025-01-09		—
Maximum system voltage (V)			1500		—
Test voltage applied V _{test} (V d.c.)			1500		—
Solution resistivity (Ω·cm)			< 3500 Ω cm at 22 ± 2°C		P
Solution temperature (°C)			22 ± 2°C		P
Sample##			Measured[MΩ]	Required[MΩ]	—
0241219-01-006			>1000	14.8	P
Supplementary information: Size of module [m ²]: 2.70					
EL Test (after PID test)					—
Test Date [YYYY-MM-DD]..... :			2025-01-09		—
Please check attached photos for details.					
Supplementary information: N/A					

TABLE Performance at STC					P	
IEC 61215-1 - Visual inspection					P	
Test Date [YYYY-MM-DD]:	2024-12-31 for 0241219-01-001, 0241219-01-002, 0241219-01-003 2025-02-11 for 0241219-01-008				—	
Sample#	Nature and position of initial findings – comments or attach photos				—	
0241219-01-001	No major visual defect.				P	
0241219-01-002	No major visual defect.				P	
0241219-01-003	No major visual defect.				P	
0241219-01-008	No major visual defect.				P	
Supplementary information: N/A						
IEC 61215-2 MQT 06 – Performance at STC					—	
Test Date [YYYY-MM-DD]:	2024-12-31 for 0241219-01-001, 0241219-01-002, 0241219-01-003 2025-02-11 for 0241219-01-008				—	
Module temperature [°C]:	Corrected to 25				—	
Irradiance [W/m ²] :	1000				—	
Sample#	Voc[V]	Isc [A]	Pmp [W]	Vmp [V]	Imp [A]	FF [%]
0241219-01-001front	48.792	16.082	612.969	41.403	14.805	78.12

Test Report

0241219-01-001rear	48.555	15.018	495.900	41.500	11.949	68.01
0241219-01-002front	48.645	16.243	609.599	41.279	14.768	77.15
0241219-01-002rear	48.406	15.232	493.374	41.453	11.902	66.92
0241219-01-003front	48.647	16.117	611.315	41.259	14.816	77.97
0241219-01-003rear	48.451	15.118	489.853	41.449	11.818	66.87
0241219-01-008front	48.468	16.708	612.261	41.397	14.790	75.61
0241219-01-008rear	48.407	15.782	495.917	41.395	11.980	64.91

Supplementary information: NA

IEC 61215-2 MQT 03 – Insulation test (initial)					P
Test Date [YYYY-MM-DD]		2024-12-31 for 0241219-01-001, 0241219-01-002, 0241219-01-003			—
		2025-02-11 for 0241219-01-008			
Test Voltage applied [V]		8000/1500			—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
0241219-01-001	>1000	14.8	-	No	P
0241219-01-002	>1000	14.8	-	No	P
0241219-01-003	>1000	14.8	-	No	P
0241219-01-008	>1000	14.8	-	No	P

Supplementary information: Size of module[m²]: 2.70

IEC 61215-2 MQT 15 – Wet leakage current test (initial)					P
Test Date [YYYY-MM-DD]		2024-12-31 for 0241219-01-001, 0241219-01-002, 0241219-01-003			—
		2025-02-11 for 0241219-01-008			
Maximum system voltage (V)		1500			—
Test voltage applied Vtest (V d.c.)		1500			—
Solution resistivity (Ω·cm)		< 3500Ω cm at 22 ± 2°C			P
Solution temperature (°C)		22 ± 2°C			P
Sample#	Measured[MΩ]	Required[MΩ]			
0241219-01-001	>1000	14.8		P	
0241219-01-002	>1000	14.8		P	
0241219-01-003	>1000	14.8		P	
0241219-01-008	>1000	14.8		P	

Supplementary information: Size of module [m²]: 2.70

Test Report

TABLE Performance at various irradiance								—
Test Date [YYYY-MM-DD]			2025-01-09					—
Test method			<input checked="" type="checkbox"/> Simulator <input type="checkbox"/> Natural sunlight					—
Sample #	Irradiance [W/m ²]	Loss of relative efficiency with respect to STC [%]	Voc [V]	Isc [A]	Pmp [W]	Vmp [V]	Imp [A]	FF [%]
0241219-01-005	1000(front)	-	48.667	16.239	610.339	41.321	14.771	77.23
	1000(rear)	-	48.549	15.163	489.719	41.436	11.819	66.52
	200(front)	-1.51	46.004	3.236	120.229	40.454	2.972	80.76
	200(rear)	-2.86	45.756	2.571	95.143	40.349	2.358	80.88

TABLE Temperature Coefficient(Pmp)		—
Test Date [YYYY-MM-DD]		2025-01-09
Test method		<input checked="" type="checkbox"/> Simulator <input type="checkbox"/> Natural sunlight
Sample #	Temperature coefficient[%]	
0241219-01-005	-0.3077	

Test Report

Annex 1: List of measurement equipment

Clause	Measurement / testing	Testing / measuring equipment / material used, (Equipment ID)	Range used	Calibration due date
IEC 61215-2 MQT01	Visual inspection	Lamp	-	NA
		Digital Luxmeter EZ6330	-	2025-08-11
		Digital caliper, measuring tape EZ6286	-	2025-07-12
		Camera	-	NA
IEC 61215-2 MQT02	Maximum power determination	Solar Simulator EZ4446	-	2025-08-02
		Standard solar module EZ6770	-	2025-07-03
IEC 61215-2 MQT04	Temperature Coefficient	Solar Simulator EZ4446	-	2025-08-02
		Temperature control chamber EZ4446-4	-	2025-10-16
		Standard solar module EZ6770	-	2025-07-03
IEC 61215-2 MQT03	Insulation test	Comprehensive safety test instrument EZ1096	-	2025-07-08
IEC 61215-2 MQT15	Wet leakage current test	Comprehensive safety test instrument EZ1096	-	2025-07-08
		Conductivity meter EZ5723	-	2025-06-24
IEC TS 62804-1	PID	PID test system EZ6648	-	2025-09-02
		Climate chamber EZ6217	-	2025-12-15
IEC 61215-2 MQT 19	UV test	UV Chamber EZ6520	-	2025-07-19
IEC 61730-2 MST13	Ground continuity test	Comprehensive safety test instrument EZ1096	-	2025-07-08

Test Report

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

Statement of the estimated uncertainty of the I/V test, K=2.

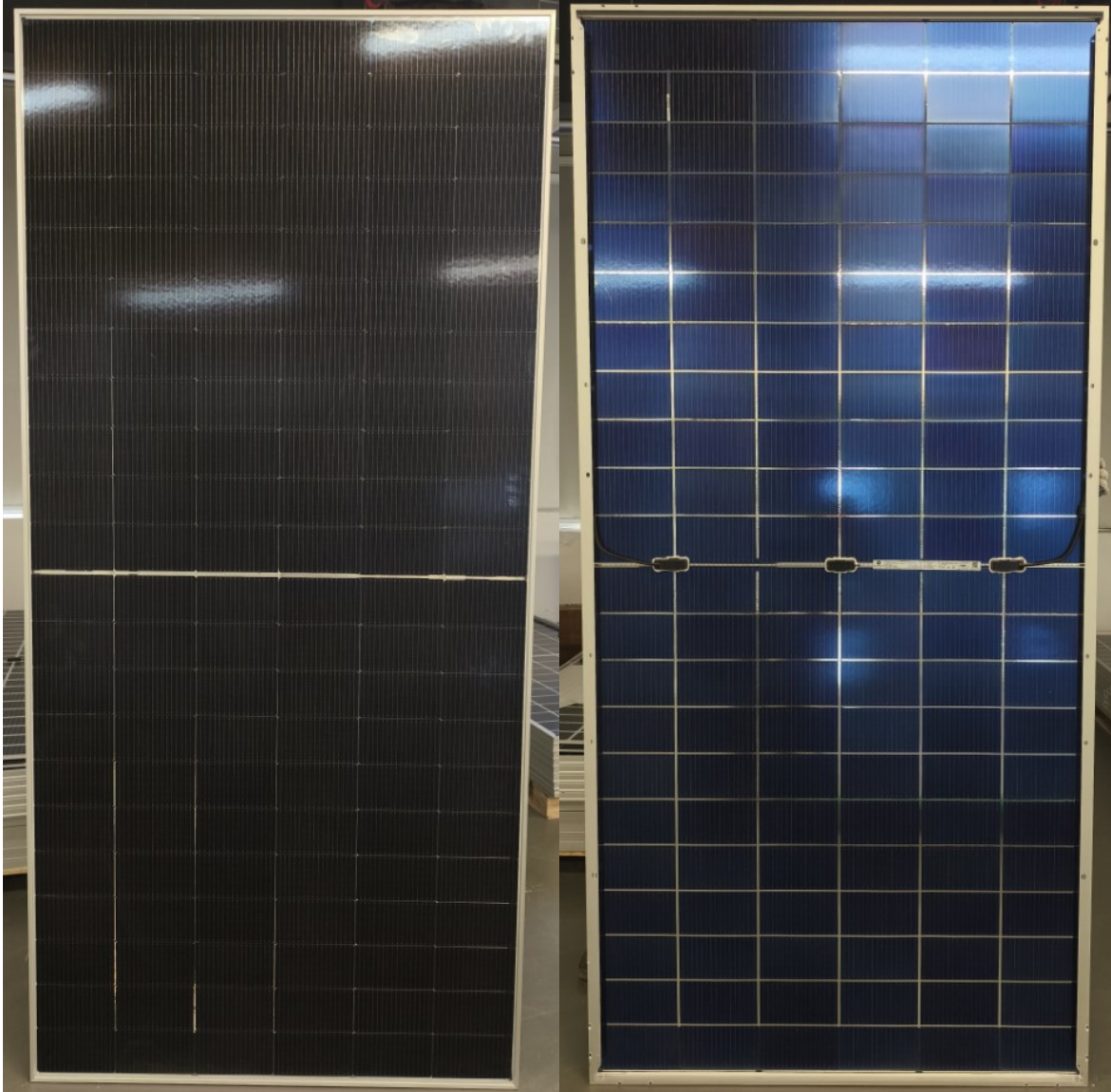
U(Isc)=2.2%

U(Voc)=1.04%

U(Pmax)=2.4%

Test Report

Annex 3: Photos of module

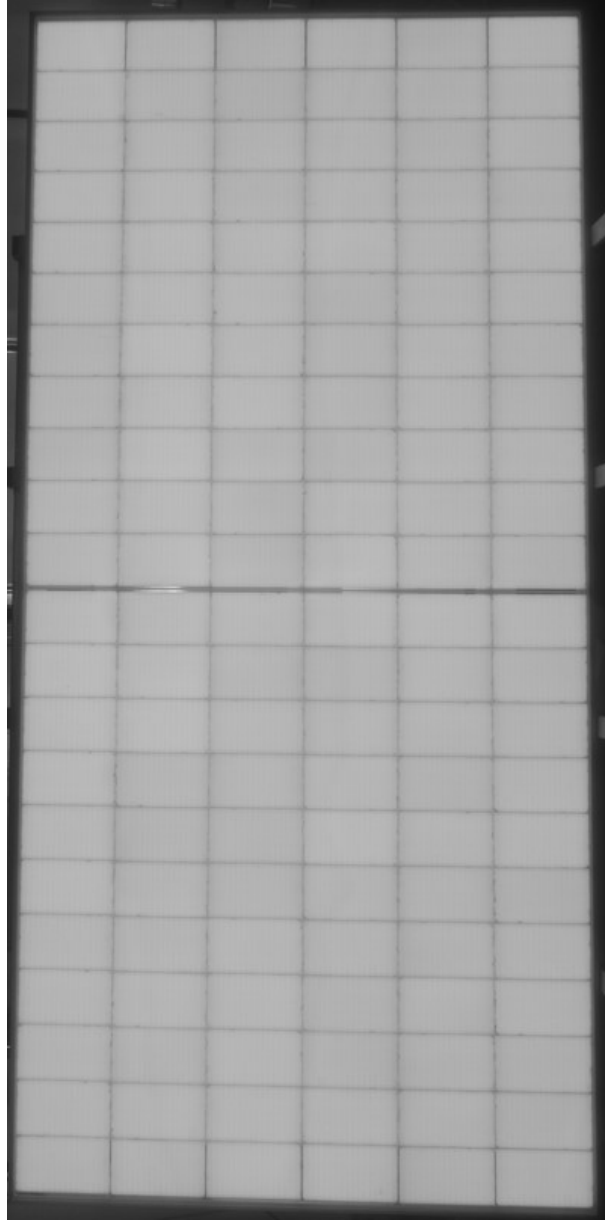


Test Report

Annex 4: Photo of EL test

Sample# 0241219-01-001

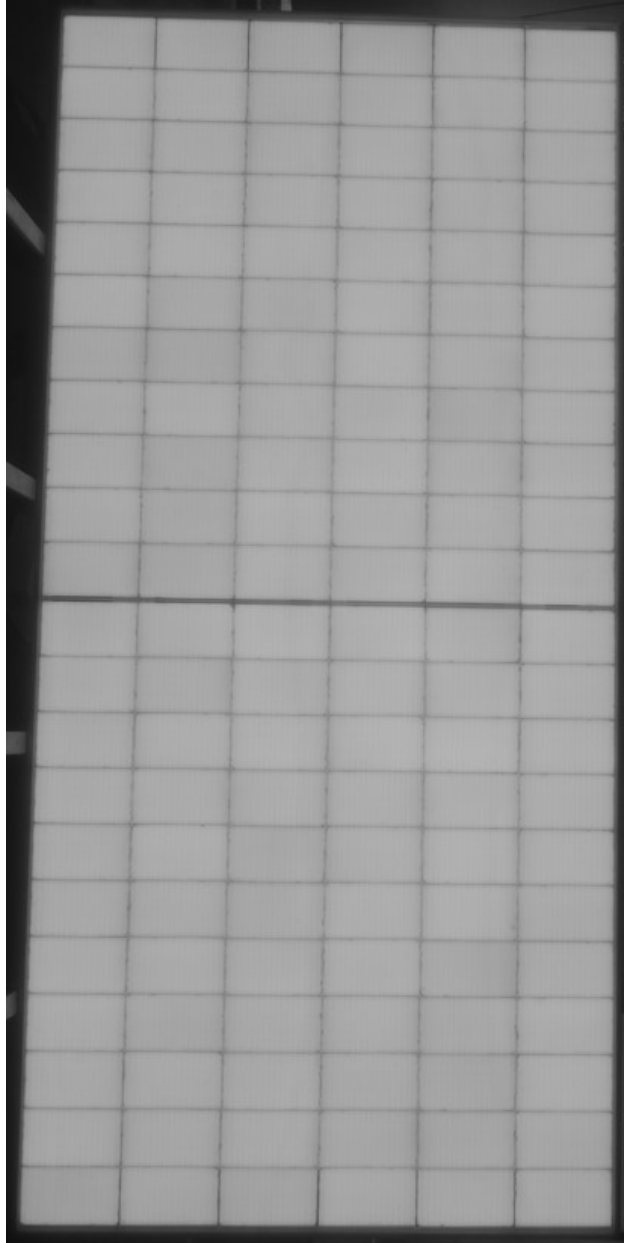
As received



Test Report

Sample# 0241219-01-002

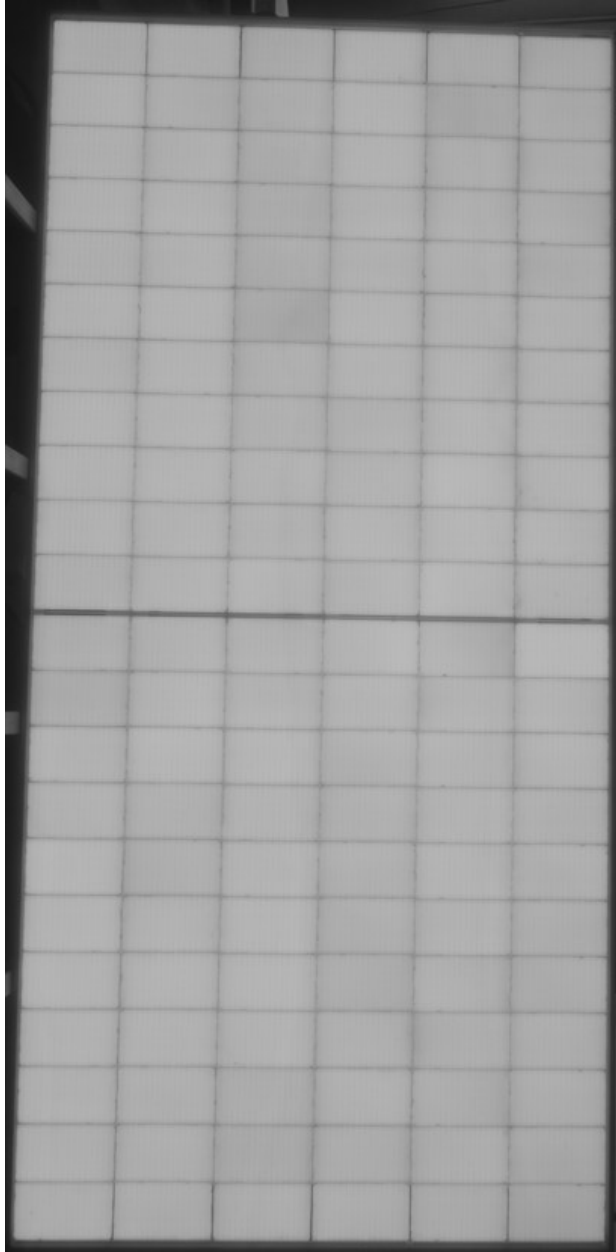
As received



Test Report

Sample# 0241219-01-003

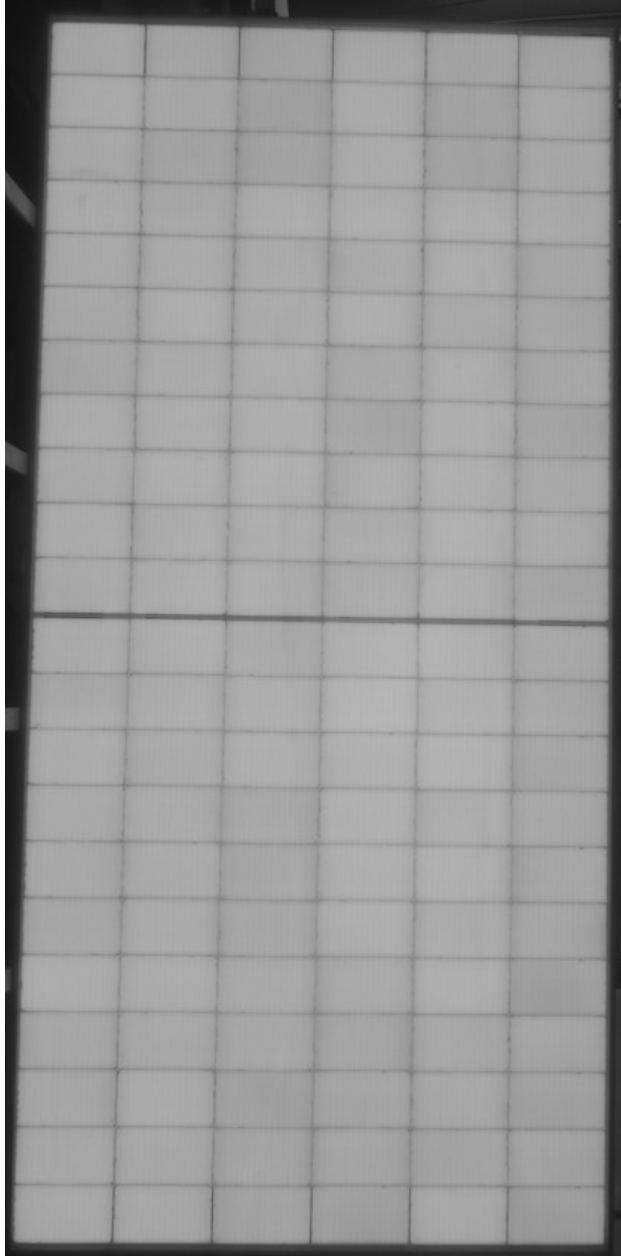
As received



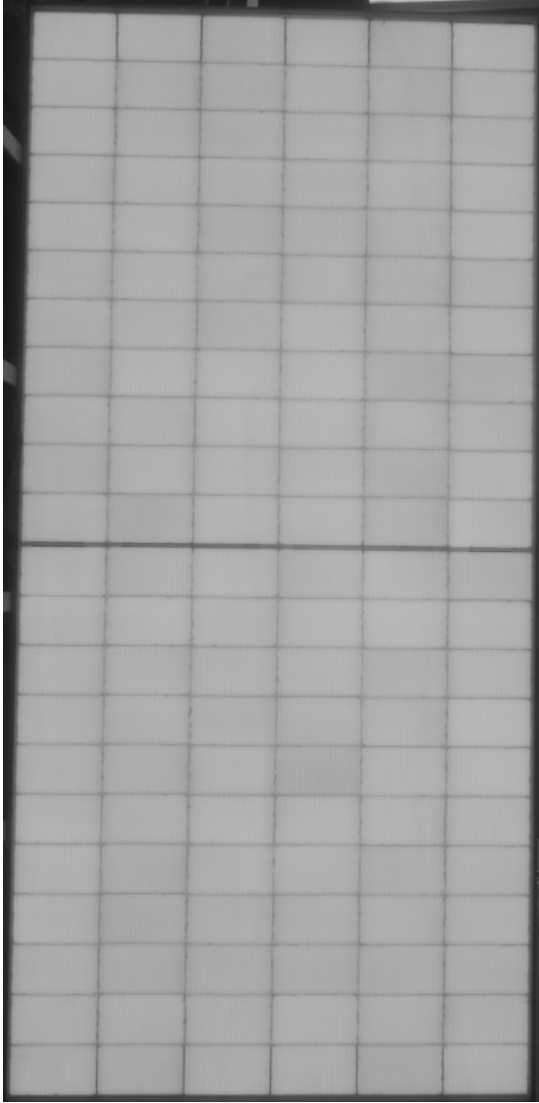
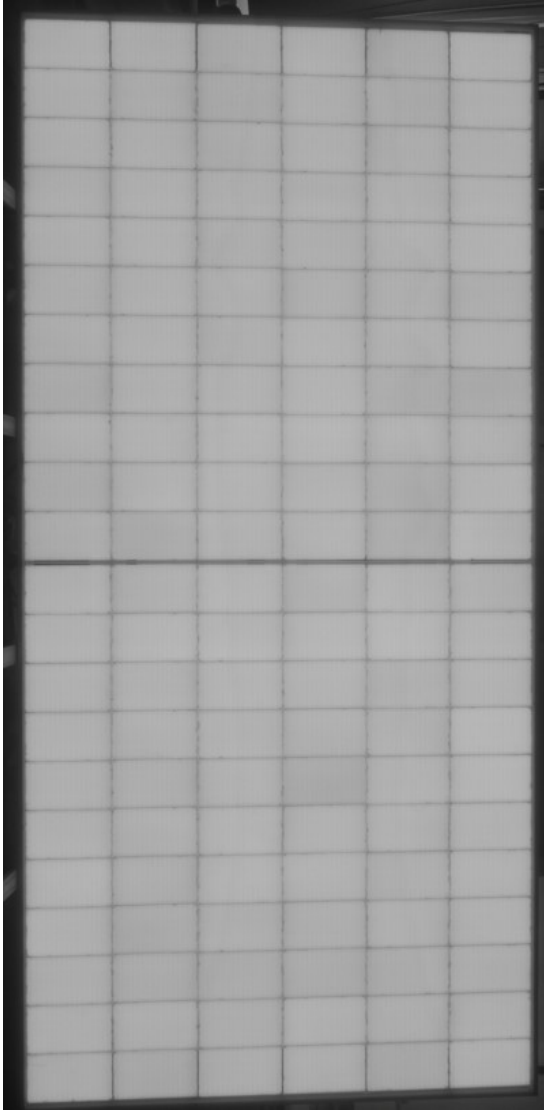
Test Report

Sample# 0241219-01-005

As received



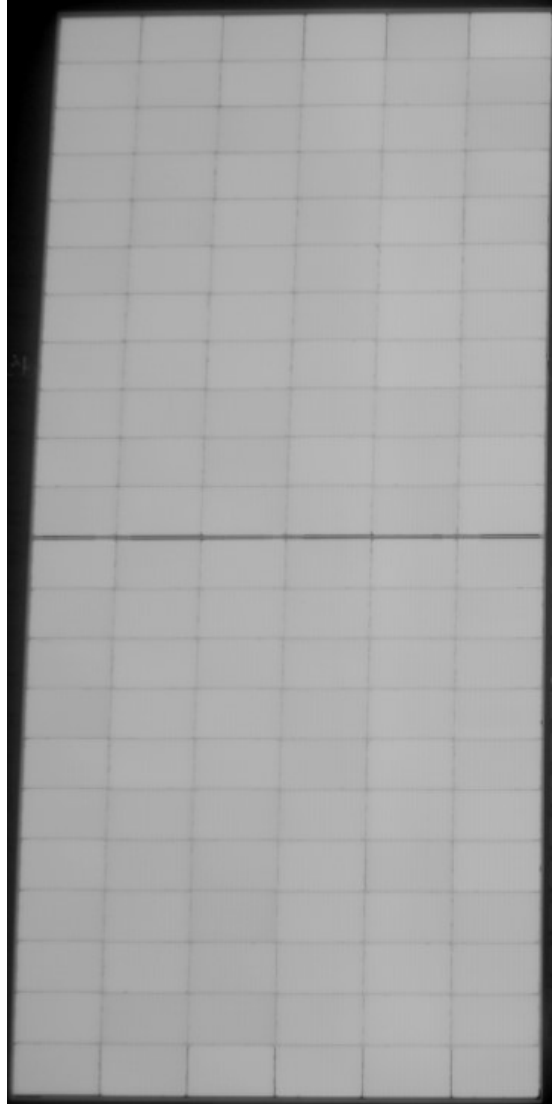
Test Report

Sample# 0241219-01-006	
Before PID	After PID
	

Test Report

Sample# 0241219-01-008

As received



-- END OF REPORT --



Thank You

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