




Test Report issued under the responsibility of:



TEST REPORT	
Report Number	6208316B.50
Date of issue	2024-12-12
Total number of pages	42
DEKRA Branch	DEKRA Testing and Certification (Shanghai) Ltd.
Applicant's name	JA Solar Technology Co., Ltd.
Address	No.123 Xinxing Road, 055550 Ningjin County, Hebei Province, PEOPLE'S REPUBLIC of CHINA
Test specification:	
Standard	IEC 61215-2: 2021 IEC TS 63342: 2022
Test procedure	Client specified
Non-standard test method	N/A
Test Report Form No.	DEKRA Specified Test_1.0
Test Report Form(s) Originator	DEKRA Testing and Certification (Shanghai) Ltd.
Master TRF	2022-12-30
General disclaimer:	
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 Testing Laboratory. This report does not entitle to carry any test mark.	

Report No.: 6208316B.50

Test item description :	Photovoltaic (PV) Module(s)	
Trademark :		
Manufacturer	JA Solar Technology Co., Ltd.	
Model/Type reference :	JAM66D45-XXX/LB	
Ratings :	Refer to page 6	
Testing procedure and testing location:		
<input checked="" type="checkbox"/>	DEKRA Branch:	DEKRA Testing and Certification (Shanghai) Ltd.
Location/ address	No.16, Lane 1288, Luoning Road, Baoshan District, Shanghai, 200949, P.R.China	
Tested by (name, function, signature) :	Christy Zhu	
Approved by (name, function, signature) .. :	Kevin Lu	
<input type="checkbox"/>	Testing procedure: CTF Stage 1:	
Testing location/ address		
Tested by (name, function, signature) :		
Approved by (name, function, signature) .. :		
<input type="checkbox"/>	Testing procedure: CTF Stage 2:	
Testing location/ address		
Tested by (name + signature) :		
Witnessed by (name, function, signature) . :		
Approved by (name, function, signature) .. :		
<input type="checkbox"/>	Testing procedure: CTF Stage 3:	
<input type="checkbox"/>	Testing procedure: CTF Stage 4:	
Testing location/ address		
Tested by (name, function, signature) :		
Witnessed by (name, function, signature) . :		
Approved by (name, function, signature) .. :		
Supervised by (name, function, signature) :		

Report No.: 6208316B.50

List of Attachments (including a total number of pages in each attachment):	
	attachment number / number of pages
Installation manual	
Drawings mechanical	
Circuit diagram	
Photographs of test sample	Annex 1 / 2 pages
Component datasheets / certificates	
Others:	
Product Description Sheet (Manufacturers and type references)	
IV curve for STC measurement	
EL-images	Annex 4 / 6 pages
List of measurement equipment	Annex 2 / 1 page
Statement of test uncertainty	Annex 3 / 1 page
History report	
Summary of testing:	
Tests performed (name of test and test clause): Visual inspection (MQT 01) Initial stabilization (MQT 19.1) Performance at STC (MQT 06.1) Insulation test (MQT 03) Wet leakage current test (MQT 15) Hail test (MQT 17) B-O CID preconditioning LETID Detection test EL images	Testing location: DEKRA Testing and Certification (Shanghai) Ltd. No.16, Lane 1288, Luoning Road, Baoshan District, Shanghai, 200949, P.R. China

Copy of marking plate:

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Report No.: 6208316B.50

Possible test case verdicts: - test case does not apply to the test object..... : N/A - test object does meet the requirement : P (Pass) - test object does not meet the requirement : F (Fail)
Abbreviations used in the report: Pmax – Maximum power Vmp – Maximum power voltage Imp – Maximum power current Isc – Short circuit current Voc – Open circuit voltage FF – Fill factor STC – Standard Test Conditions (25°C, 1 000 W/m²) LETID – Light and elevated temperature induced degradation MQT – Module Quality Tests
Testing Dates (YYYY-MM-DD) Date of first test item received : 2024-10-30 Dates of tests (beginning/end)..... : 2024-11-07 / 2024-11-25

GENERAL REMARKS:		
According to the inquiry, test procedure was in accordance with IEC 61215-2:2021, IEC TS 63342:2022. Test procedure is according to client's requirements. Test results are documented within this test report.		
BOM 1		
Object	Manufacturer / trademark	Type / model
Solar cell	JA Solar	n-type, 182x105±1.5mm
Front Cover	Xinyi	2.0mm
Rear Cover	Xinyi	2.0mm
Encapsulant	First	EP304/F406PS
Cell interconnector	JA	Sn60%Pb40%
String connector	JA	Sn60%Pb40%
Frame	JA	6005-T6
Adhesive for Junction box and frame	Huitian	HT906Z
Potting materials (junction box)	Huitian	5299W-S
Junction Box	JA	PVJB-JA-005
Bypass diode	Yangjie	MK5045
	Daoming	MK5045
	China Recourses Microelectronics	MK5045
Cables	JA	H1Z2Z2-K, 1x4mm ²
Connectors	QC Solar	QC 4.10-351
Flux	SHENZHEN EMBRACE GLORY	880B-8
BOM2		
Object	Manufacturer / trademark	Type / model
Solar cell	JA Solar	n-type, 182x105±1.5mm
Front Cover	Flat	2.0mm
Rear Cover	Flat	2.0mm
Encapsulant	Sveck	CO-556/SV-15296P
Cell interconnector	JA	Sn60%Pb40%
String connector	JA	Sn60%Pb40%
Frame	JA	6005-T6
Adhesive for Junction box and frame	Tianchen	HT-8258
Potting materials (junction box)	Tianchen	HT-6360A/HT-6360B

Report No.: 6208316B.50

Junction Box	JA	PVJB-JA-005
Bypass diode	Yangjie	MK5045
	Daoming	MK5045
	China Recourses Microelectronics	MK5045
Cables	JA	H1Z2Z2-K, 1x4mm ²
Connectors	QC Solar	QC 4.10-351
Flux	Vital	WTO-PV105A

BOM3

Object	Manufacturer / trademark	Type / model
Solar cell	JA Solar	n-type, 182x105±1.5mm
Front Cover	Almaden	2.0mm
Rear Cover	Almaden	2.0mm
Encapsulant	HIUV	P507/S201MT1
Cell interconnector	JA	Sn60%Pb40%
String connector	JA	Sn60%Pb40%
Frame	JA	6005-T6
Adhesive for Junction box and frame	Huitian	HT906Z
Potting materials (junction box)	Huitian	5299W-S
Junction Box	JA	PVJB-JA-005
Bypass diode	Yangjie	MK5045
	Daoming	MK5045
	China Recourses Microelectronics	MK5045
Cables	JA	H1Z2Z2-K, 1x4mm ²
Connectors	QC Solar	QC 4.10-351
Flux	Costar	FD-309

"(See Enclosure #)" refers to additional information appended to the report.

"(See appended table)" refers to a table appended to the report.

Throughout this report a comma / point is used as the decimal separator.

Name and address of factory (factories)..... :	JA Solar (Xingtai) Co., Ltd. No. 1688, Chang An Road, Xingtai Economic Development Area 054000 Xingtai City, Hebei China Hefei JA Solar Technology Co., Ltd. No. 999, Changning Road, Hi-tech Zone, 230088 Hefei City, Anhui China
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Report No.: 6208316B.50

PRODUCT ELECTRICAL RATINGS:				
Module type	JAM66D45-610/LB			
Voc [V] /Tolerance	48.10±3%			
Vmp [V]	39.77			
Imp [A]	15.34			
Isc [A] /Tolerance	16.05±5%			
Pmp [W] /Tolerance	610±3%			
Maximum system voltage [V]	1500			
Maximum Over-Current Protection Rating [A]	30			
Note: N/A				

Report No.: 6208316B.50

MODULE GROUP ASSIGNMENT:			
Sample #	Type/model	Sample S/N	Remark
1	JAM66D45-610/LB	2450107812021031	Control
2	JAM66D45-610/LB	2450107812023192	HI
3	JAM66D45-610/LB	2450107812023176	HI
4	JAM66D45-610/LB	2450107812021070	HI
5	JAM66D45-610/LB	2450107812020737	Control
6	JAM66D45-610/LB	2450107812023187	LeTID
7	JAM66D45-610/LB	2450107812020965	LeTID
8	JAM66D45-610/LB	2450107812020751	LeTID
9	JAM66D45-610/LB	2450107812023191	LeTID
10	JAM66D45-610/LB	2450107812023147	LeTID
11	JAM66D45-610/LB	2450107812023190	LeTID
Supplementary information: N/A			

TESTING OVERVIEW			
4.1	Visual inspection (MQT 01)	See Table 01	P
4.19	Initial stabilization (MQT 19.1)	See Table 02-02.5	—
4.3	Insulation test (MQT 03)	See Table 03	P
4.15	Wet leakage current test (MQT 15)	See Table 04	P
	EL Images	See Table 05	—
4.17	Hail test (MQT 17)	See Table 06-06.7	P
	B-O LID preconditioning via current injection (CID)	See Table 07-07.7	P
	1 st LeTID detection	See Table 08-08.7	P
	2 nd LeTID detection	See Table 09-09.7	P

Report No.: 6208316B.50

TABLE 01: MQT 01 ini: Initial Visual inspection			
Test Date [YYYY-MM-DD]..... :		2024-11-07	—
Sample #	Nature and position of initial findings – comments or attach photos		Result
1	No visual defects found.		P
2	No visual defects found.		P
3	No visual defects found.		P
4	No visual defects found.		P
5	No visual defects found.		P
6	No visual defects found.		P
7	No visual defects found.		P
8	No visual defects found.		P
9	No visual defects found.		P
10	No visual defects found.		P
11	No visual defects found.		P
Supplementary information: N/A			

TABLE 02: MQT 19.1 ini: Initial stabilization							
TABLE 02.1: MQT 06.1 ini: Performance at STC before initial stabilization (Front side)							
Test Date [YYYY-MM-DD]..... :		2024-11-07					—
Test method..... :		<input checked="" type="checkbox"/> Solar simulator <input type="checkbox"/> Natural sunlight					—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	Result
1	15.594	48.691	14.797	41.360	612.000	80.60	P
2	15.619	48.721	14.761	41.331	610.106	80.18	P
3	15.614	48.757	14.823	41.435	614.178	80.68	P
4	15.613	48.729	14.823	41.439	614.236	80.74	P
5	15.596	48.681	14.831	41.349	613.228	80.77	P
6	15.608	48.759	14.800	41.437	613.273	80.58	P
7	15.622	48.721	14.802	41.398	612.789	80.51	P
8	15.606	48.740	14.786	41.422	612.471	80.52	P
9	15.613	48.758	14.819	41.504	615.057	80.79	P
10	15.608	48.659	14.822	41.387	613.429	80.77	P
11	15.606	48.776	14.822	41.440	614.244	80.69	P
Supplementary information: N/A							

Report No.: 6208316B.50

TABLE 02.2: MQT 19.1: Initial Stabilization procedure							
Light exposure method					<input checked="" type="checkbox"/> Solar simulator <input type="checkbox"/> Natural sunlight		
Stabilization criterion x per IEC 61215-1-x					1		
Sample #	1	Test Date (YYYY-MM-DD) start/end			2024-11-07 / 2024-11-08		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} - P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	612.000	—	—
1	5	1000	50±10	MPPT	610.387	—	-
2	5	1000	50±10	MPPT	609.655	0.38	Yes
3	-	-	-	-	-	-	-
4	-	-	-	-	-	—	—
Sample #	2	Test Date (YYYY-MM-DD) start/end			2024-11-07 / 2024-11-08		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} - P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	610.106	—	—
1	5	1000	50±10	MPPT	608.759	—	-
2	5	1000	50±10	MPPT	608.090	0.33	Yes
3	-	-	-	-	-	-	-
4	-	-	-	-	-	—	—
Sample #	3	Test Date (YYYY-MM-DD) start/end			2024-11-07 / 2024-11-08		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} - P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	614.178	—	—
1	5	1000	50±10	MPPT	613.150	—	-
2	5	1000	50±10	MPPT	612.281	0.31	Yes
3	-	-	-	-	-	-	-
4	-	-	-	-	-	—	—
Sample #	4	Test Date (YYYY-MM-DD) start/end			2024-11-07 / 2024-11-08		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} - P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	614.236	—	—
1	5	1000	50±10	MPPT	612.670	—	-
2	5	1000	50±10	MPPT	612.019	0.36	Yes
3	-	-	-	-	-	-	-

Report No.: 6208316B.50

4	-	-	-	-	-	—	—
Supplementary information:							
<input type="checkbox"/> Other stabilization procedures							
Sample #	Test Date (YYYY-MM-DD) start/end						
1							
2							
3							
4							
Test method description:							
Supplementary information: N/A							

TABLE 02.3: MQT 06.1 ini: Performance at STC after initial stabilization (Front side)										
Test Date [YYYY-MM-DD]..... :					2024-11-08					—
P _{max} lower limit (W)					See table below: P _{max} [W] – Min calc.					—
P _{max} (lab) lower limit (V)					597.818					—
V _{oc} (lab) upper limit (V)					See table below: V _{oc} [V] Max. calc.					—
I _{sc} (lab) upper limit (A)					See table below: I _{sc} [A] Max. calc.					—
Test method..... :					<input checked="" type="checkbox"/> Solar simulator <input type="checkbox"/> Natural sunlight					—
Sample #	I _{sc} [A]		V _{oc} [V]		I _{mp} [A]	V _{mp} [V]	P _{max} [W]		FF [%]	Result
	Meas.	Max. calc.	Meas.	Max. calc.			Meas.	Min. calc.		
1	15.557	16.532	48.671	49.202	14.773	41.268	609.655	579.883	80.514	—
2	15.581	16.532	48.701	49.202	14.745	41.239	608.090	579.883	80.138	—
3	15.579	16.532	48.728	49.202	14.802	41.363	612.281	579.883	80.658	—
4	15.580	16.532	48.702	49.202	14.806	41.335	612.019	579.883	80.661	—
Average	—						610.511	597.883	—	—
Supplementary information: The limit values are calculated considering manufacturer's tolerances t of rated nameplate values and laboratory measurement uncertainties m .										

Report No.: 6208316B.50

TABLE 02.4: MQT 06.1 ini: Performance at STC after initial stabilization (Back side)							
Test Date [YYYY-MM-DD]..... :			2024-11-08				—
Test method..... :			<input checked="" type="checkbox"/> Solar simulator		<input type="checkbox"/> Natural sunlight		—
Sample #	I _{sc} [A]	V _{oc} [V]	I _{mp} [A]	V _{mp} [V]	P _{max} [W]	FF [%]	Result
1	12.046	48.331	10.908	42.570	464.351	79.76	—
2	12.129	48.363	10.893	42.549	463.505	79.02	—
3	12.152	48.392	10.843	42.675	462.725	78.69	—
4	12.055	48.376	10.616	42.964	456.118	78.21	—
5	12.169	48.319	10.824	42.589	460.969	78.40	—
6	12.030	48.365	10.880	42.520	462.616	79.51	—
7	12.027	48.351	10.711	42.771	458.096	78.77	—
8	12.106	48.367	10.698	42.814	458.001	78.22	—
9	12.116	48.387	10.786	42.757	461.156	78.66	—
10	11.990	48.300	10.805	42.661	460.961	79.60	—
11	12.162	48.386	10.826	42.647	461.675	78.45	—
Supplementary information: N/A							

TABLE 02.5: MQT 06.1: Performance at BNPI (front side irradiance 1 000 W/m², backside irradiance 135 W/m², 25 °C, AM 1.5) after initial stabilization							
Test Date [YYYY-MM-DD]..... :			2024-11-08				—
Test method..... :			<input checked="" type="checkbox"/> Solar simulator		<input type="checkbox"/> Natural sunlight		—
Sample #	I _{sc} [A]	V _{oc} [V]	I _{mp} [A]	V _{mp} [V]	P _{max} [W]	FF [%]	Result
1	17.207	48.851	16.316	41.343	674.549	80.25	—
2	17.239	48.880	16.281	41.305	672.487	79.81	—
3	17.233	48.903	16.351	41.398	676.873	80.32	—
4	17.227	48.880	16.344	41.410	676.794	80.38	—
5	17.219	48.824	16.360	41.308	675.796	80.39	—
6	17.226	48.910	16.321	41.398	675.661	80.20	—
7	17.241	48.851	16.325	41.333	674.765	80.12	—
8	17.231	48.892	16.312	41.378	674.949	80.12	—
9	17.232	48.906	16.345	41.480	677.971	80.45	—
10	17.226	48.808	16.339	41.370	675.951	80.40	—
11	17.224	48.911	16.350	41.387	676.676	80.32	—
Supplementary information: N/A							

Report No.: 6208316B.50

TABLE 03: MQT 03: Initial Insulation test				
Test Date [YYYY-MM-DD]	2024-11-08			—
Test Voltage applied [V]	8000/1500			—
Size of module [m ²]	2.70			—
Required Resistance [MΩ].....	14.81			—
Sample #	Measured	Dielectric breakdown		Result
	MΩ	Yes (description)	No	
1	>5000	-	No	P
2	>5000	-	No	P
3	>5000	-	No	P
4	>5000	-	No	P
5	>5000	-	No	P
6	>5000	-	No	P
7	>5000	-	No	P
8	>5000	-	No	P
9	>5000	-	No	P
10	>5000	-	No	P
11	>5000	-	No	P
Supplementary information: The insulation tester can measure up to 5000MΩ.				

TABLE 04: MQT 15: Initial Wet leakage current test			
Test Date [YYYY-MM-DD]	2024-11-08		—
Test Voltage applied [V]	1500		—
Solution temperature [°C].....	23.3		—
Solution resistivity [Ω cm]	2053		—
Size of module [m ²]	2.70		—
Sample #	Required Resistance [MΩ]	Measured [MΩ]	Result
1	14.81	>5000	P
2	14.81	>5000	P
3	14.81	>5000	P
4	14.81	>5000	P
5	14.81	>5000	P
6	14.81	>5000	P
7	14.81	>5000	P
8	14.81	>5000	P
9	14.81	>5000	P

Report No.: 6208316B.50

10	14.81	>5000	P
11	14.81	>5000	P
Supplementary information: The insulation tester can measure up to 5000MΩ.			

TABLE 05: Initial EL-images		
Test Date [YYYY-MM-DD]	2024-11-08	—
Current applied:	I _{sc}	—
Sample #	Remarks	—
1	No significant defects found.	—
2	No significant defects found.	—
3	No significant defects found.	—
4	No significant defects found.	—
5	No significant defects found.	—
6	No significant defects found.	—
7	No significant defects found.	—
8	No significant defects found.	—
9	No significant defects found.	—
10	No significant defects found.	—
11	No significant defects found.	—
Supplementary information: N/A		

TABLE 06: MQT 17 - Hail impact test							
Test Date [YYYY-MM-DD].....:	2024-11-08						—
Sample #	2						—
Ice ball size [mm]	1	2	3	4	5	6	—
	35.2	35.2	35.3	35.3	35.0	35.4	
	7	8	9	10	11	—	
Ice ball weight [g]	1	2	3	4	5	6	—
	20.68	20.67	20.58	20.12	20.52	20.37	
	7	8	9	10	11	—	
Ice ball velocity [m/s].....:	1	2	3	4	5	6	—
	26.9	27.1	28.0	27.2	27.2	27.5	
	7	8	9	10	11	—	
Ice ball velocity [m/s].....:	28.1	27.3	27.3	27.4	27.5	—	
Number of impact locations	11						—

Supplementary information: (impact location descriptions)

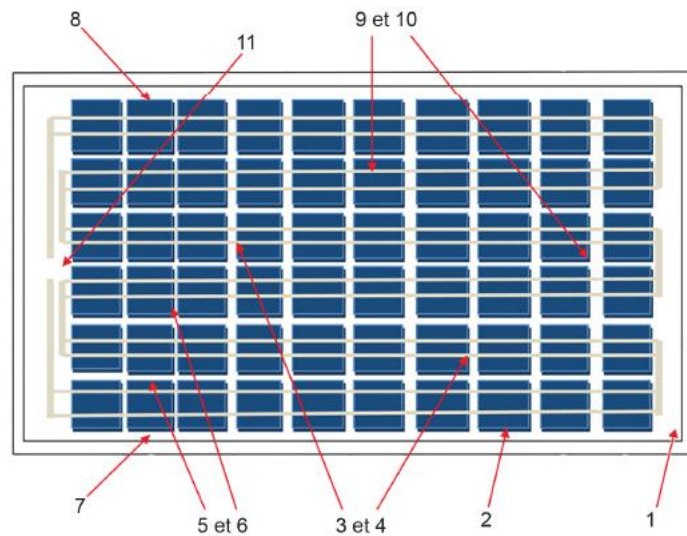


TABLE 06: MQT 17 - Hail impact test							
Test Date [YYYY-MM-DD].....:	2024-11-08						—
Sample #	3						—
Ice ball size [mm]	1	2	3	4	5	6	—
	35.0	35.1	35.0	35.0	35.2	35.5	
	7	8	9	10	11	—	
	35.2	35.0	35.2	35.4	35.3	—	
Ice ball weight [g]	1	2	3	4	5	6	—
	20.87	20.87	20.61	20.78	20.19	21.07	
	7	8	9	10	11	—	
	20.20	20.76	20.38	20.39	20.42	—	
Ice ball velocity [m/s].....:	1	2	3	4	5	6	—
	27.9	28.0	27.0	27.2	27.3	27.8	
	7	8	9	10	11	—	
	27.9	27.1	27.8	27.1	27.7	—	
Number of impact locations	11						—

Supplementary information: (impact location descriptions)

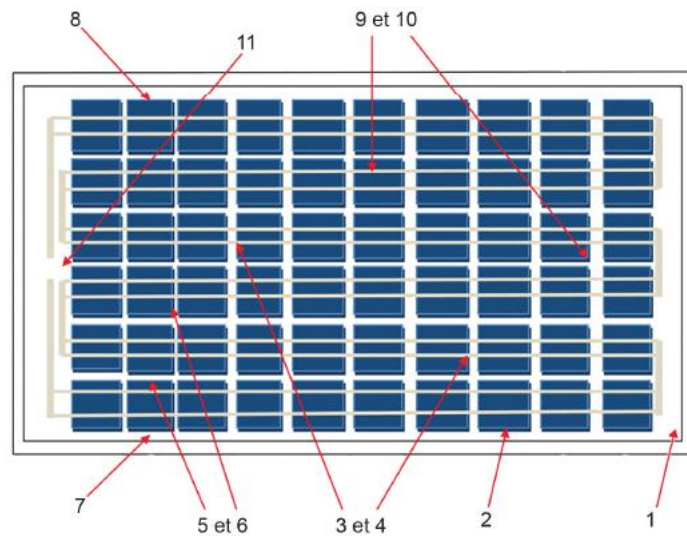


TABLE 06: MQT 17 - Hail impact test							
Test Date [YYYY-MM-DD]	2024-11-08						—
Sample #	4						—
Ice ball size [mm]	1	2	3	4	5	6	—
	35.0	35.3	35.4	35.2	35.2	35.2	
	7	8	9	10	11	—	
	35.0	35.1	35.1	34.9	35.4	—	
Ice ball weight [g]	1	2	3	4	5	6	—
	20.93	21.09	21.19	21.01	20.34	20.53	
	7	8	9	10	11	—	
	21.01	21.06	21.27	21.18	20.41	—	
Ice ball velocity [m/s]	1	2	3	4	5	6	—
	27.6	27.6	27.0	27.6	27.0	27.4	
	7	8	9	10	11	—	
	27.4	28.1	27.3	28.0	27.0	—	
Number of impact locations	11						—
Supplementary information: (impact location descriptions)							
Supplementary information:							
<p>The diagram shows a rectangular solar panel grid with 11 impact locations marked by red arrows. The locations are numbered as follows: 1 (bottom right), 2 (bottom right-1), 3 et 4 (bottom center), 5 et 6 (bottom left), 7 (bottom left), 8 (top left), 9 et 10 (top center), and 11 (top right).</p>							

Report No.: 6208316B.50

TABLE 06.1: MQT 01 Visual inspection after Hail impact test		
Test Date [YYYY-MM-DD]..... :	2024-11-08	—
Sample #	Nature and position of initial findings – comments or attach photos	—
2	No visual defects found.	P
3	No visual defects found.	P
4	No visual defects found.	P
Supplementary information: N/A		

TABLE 06.2: MQT 06.1: Performance at STC after Hail impact test (Front side)								
Test Date [YYYY-MM-DD]..... :	2024-11-08							—
Test method..... :	<input checked="" type="checkbox"/> Solar simulator <input type="checkbox"/> Natural sunlight							—
Irradiance [W/m ²]..... :	1000							—
Module temperature [°C]..... :	25							—
Sample #	I _{sc} [A]	V _{oc} [V]	I _{mp} [A]	V _{mp} [V]	P _{max} [W]	FF [%]	Degradation [%]	Result
2	15.555	48.674	14.749	41.242	608.271	80.34	0.03	P
3	15.573	48.689	14.740	41.510	611.861	80.70	-0.07	P
4	15.576	49.700	14.803	41.306	611.451	78.99	-0.09	P
Supplementary information: N/A								

TABLE 06.3: MQT 06.1: Performance at STC after Hail impact test (Back side)								
Test Date [YYYY-MM-DD]..... :	2024-11-08							—
Test method..... :	<input checked="" type="checkbox"/> Solar simulator <input type="checkbox"/> Natural sunlight							—
Irradiance [W/m ²]..... :	1000							—
Module temperature [°C]..... :	25							—
Sample #	I _{sc} [A]	V _{oc} [V]	I _{mp} [A]	V _{mp} [V]	P _{max} [W]	FF [%]	Degradation [%]	Result
2	12.135	48.335	10.899	42.486	463.051	78.95	-0.10	P
3	12.193	48.200	10.899	42.322	461.270	78.49	-0.31	P
4	12.001	48.291	10.586	43.052	455.751	78.64	-0.08	P
Supplementary information: N/A								

TABLE 06.4: MQT 06.1: Performance at BNPI after Hail impact test								
Test Date [YYYY-MM-DD]				2024-11-08				—
Test method				<input checked="" type="checkbox"/> Solar simulator		<input type="checkbox"/> Natural sunlight		—
Irradiance [W/m ²]				1000				—
Module temperature [°C]				25				—
Sample #	I _{sc} [A]	V _{oc} [V]	I _{mp} [A]	V _{mp} [V]	P _{max} [W]	FF [%]	Degradation [%]	Result
2	17.295	48.806	16.351	41.165	673.086	79.74	0.09	P
3	17.314	48.721	16.480	41.107	677.446	80.31	0.08	P
4	17.218	48.714	16.369	41.299	676.021	80.60	-0.11	P
Supplementary information: N/A								

TABLE 06.5: MQT 03 Insulation test after Hail impact test						
Test Date [YYYY-MM-DD]				2024-11-08		—
Test Voltage applied [V]				8000/1500		—
Size of module [m ²]				2.70		—
Sample #	Required	Measured	Dielectric breakdown		Result	
	MΩ	MΩ	Yes (description)	No		
2	14.81	>5000	-	No	P	
3	14.81	>5000	-	No	P	
4	14.81	>5000	-	No	P	
Supplementary information: The insulation tester can measure up to 5000MΩ.						

TABLE 06.6: MQT 15 Wet leakage current test after Hail impact test				
Test Date [YYYY-MM-DD]		2024-11-08		—
Test Voltage applied [V]		1500		—
Solution temperature [°C]		23.3		—
Size of module [m ²]		2.70		—
Solution resistivity [Ω cm]		2053		—
Sample #	Measured [MΩ]	Limit [MΩ]	Result	
2	>5000	14.81	P	
3	>5000	14.81	P	
4	>5000	14.81	P	
Supplementary information: The insulation tester can measure up to 5000MΩ.				

TABLE 06.7: EL-images after Hail impact test		
Test Date [YYYY-MM-DD]..... :	2024-11-08	—
Current applied..... :	I _{sc}	—
Sample	Remarks	
2	No significant defects found.	—
3	No significant defects found.	—
4	No significant defects found.	—
Supplementary information: N/A		

TABLE 07: B-O LID preconditioning via current injection (CID)		
Test Date [YYYY-MM-DD]..... :	2024-11-08 / 2024-11-09	—
Applied current (A)	15.608; 15.622; 15.606; 15.613; 15.608; 15.606	—
Module temperature [°C]..... :	48.3	—
Total hours (h)	24	—
Sample #	Nature and position of initial findings – comments or attach photos	Result
6	No visual defects found.	P
7	No visual defects found.	P
8	No visual defects found.	P
9	No visual defects found.	P
10	No visual defects found.	P
11	No visual defects found.	P
Supplementary information: N/A		

TABLE 07.1: MQT 01 Visual inspection after CID preconditioning		
Test Date [YYYY-MM-DD]..... :	2024-11-11	—
Sample #	Nature and position of initial findings – comments or attach photos	
6	No visual defects found.	P
7	No visual defects found.	P
8	No visual defects found.	P
9	No visual defects found.	P
10	No visual defects found.	P
11	No visual defects found.	P
Supplementary information: N/A		

Report No.: 6208316B.50

TABLE 07.2: MQT 06.1: Performance at STC after CID preconditioning (Front side)								
Test Date [YYYY-MM-DD]				2024-11-11				—
Test method				<input checked="" type="checkbox"/> Solar simulator		<input type="checkbox"/> Natural sunlight		—
Irradiance [W/m ²]				1000				—
Module temperature [°C]				25				—
Sample #	I _{sc} [A]	V _{oc} [V]	I _{mp} [A]	V _{mp} [V]	P _{max} [W]	FF [%]	Degradation [%]	Result
6	15.597	48.753	14.691	41.744	613.254	80.65	0.00	P
7	15.609	48.684	14.700	41.695	612.919	80.66	0.02	P
8	15.593	48.725	14.668	41.726	612.024	80.55	-0.07	P
9	15.601	48.719	14.712	41.770	614.526	80.85	-0.09	P
10	15.593	48.614	14.709	41.727	613.766	80.97	0.05	P
11	15.596	48.733	14.711	41.716	613.676	80.74	-0.09	P
Supplementary information: N/A								

TABLE 07.3: MQT 06.1: Performance at STC after CID preconditioning (Back side)								
Test Date [YYYY-MM-DD]				2024-11-11				—
Test method				<input checked="" type="checkbox"/> Solar simulator		<input type="checkbox"/> Natural sunlight		—
Irradiance [W/m ²]				1000				—
Module temperature [°C]				25				—
Sample #	I _{sc} [A]	V _{oc} [V]	I _{mp} [A]	V _{mp} [V]	P _{max} [W]	FF [%]	Degradation [%]	Result
6	12.017	48.359	10.763	42.990	462.726	79.63	0.02	P
7	12.015	48.311	10.605	43.221	458.353	78.96	0.06	P
8	12.094	48.324	10.581	43.267	457.803	78.34	-0.04	P
9	12.105	48.371	10.671	43.190	460.878	78.71	-0.06	P
10	11.977	48.251	10.667	43.245	461.296	79.82	0.07	P
11	12.149	48.340	10.705	43.094	461.331	78.55	-0.07	P
Supplementary information: N/A								

TABLE 07.4: MQT 06.1: Performance at BNPI after CID preconditioning (Front side)								
Test Date [YYYY-MM-DD]				2024-11-11				—
Test method				<input checked="" type="checkbox"/> Solar simulator		<input type="checkbox"/> Natural sunlight		—
Irradiance [W/m ²]				1000				—
Module temperature [°C]				25				—
Sample #	I _{sc} [A]	V _{oc} [V]	I _{mp} [A]	V _{mp} [V]	P _{max} [W]	FF [%]	Degradation [%]	Result
6	17.188	48.895	16.201	41.703	675.628	80.39	0.00	P
7	17.208	48.827	16.192	41.685	674.974	80.33	0.03	P
8	17.189	48.857	16.212	41.619	674.717	80.34	-0.03	P
9	17.194	48.878	16.212	41.784	677.422	80.60	-0.08	P
10	17.185	48.791	16.223	41.684	676.236	80.65	0.04	P
11	17.184	48.865	16.214	41.705	676.206	80.53	-0.07	P
Supplementary information: N/A								

TABLE 07.5: MQT 03 Insulation test after CID preconditioning						
Test Date [YYYY-MM-DD]				2024-11-11		—
Test Voltage applied [V]				8000/1500		—
Size of module [m ²]				2.70		—
Sample #	Required	Measured	Dielectric breakdown		Result	
	MΩ	MΩ	Yes (description)	No		
6	14.81	>5000	-	No	P	
7	14.81	>5000	-	No	P	
8	14.81	>5000	-	No	P	
9	14.81	>5000	-	No	P	
10	14.81	>5000	-	No	P	
11	14.81	>5000	-	No	P	
Supplementary information: The insulation tester can measure up to 5000MΩ.						

TABLE 07.6: MQT 15 Wet leakage current test after CID preconditioning			
Test Date [YYYY-MM-DD]		2024-11-11	—
Test Voltage applied [V]		1500	—
Solution temperature [°C].....		22.5	—
Size of module [m²]		2.70	—
Solution resistivity [Ω cm].....		2131	—
Sample #	Measured [MΩ]	Limit [MΩ]	Result
6	>5000	14.81	P
7	>5000	14.81	P
8	>5000	14.81	P
9	>5000	14.81	P
10	>5000	14.81	P
11	>5000	14.81	P
Supplementary information: The insulation tester can measure up to 5000MΩ.			

TABLE 07.7: EL-images after CID preconditioning			
Test Date [YYYY-MM-DD].....		2024-11-11	—
Current applied.....		I _{sc}	—
Sample	Remarks		
6	No significant defects found.		—
7	No significant defects found.		—
8	No significant defects found.		—
9	No significant defects found.		—
10	No significant defects found.		—
11	No significant defects found.		—
Supplementary information: N/A			

Report No.: 6208316B.50

TABLE 08: 1 st LETID Detection		
Test Date [YYYY-MM-DD] start/end	2024-11-11 / 2024-11-18	—
Applied current = 2 * (I _{sc} - I _{mp}) [A]	1.616;1.640;1.640;1.588;1.572;1.568	—
Period for each cycle (hours)	162	—
Climatic chamber condition [°C].....	75±3	—
Temperature corrected dark voltage V _{d,avg} has achieved its minimum value [Y/N]	54.2	N
Sample	Remarks	—
6	—	
7	—	
8	—	
9	—	
10	—	
11	—	
Supplementary information: N/A		

TABLE 08.1: MQT 01 Visual inspection after 1 st LETID Detection		
Test Date [YYYY-MM-DD].....	2024-11-18	—
Sample #	Nature and position of initial findings – comments or attach photos	—
6	No visual defects found.	P
7	No visual defects found.	P
8	No visual defects found.	P
9	No visual defects found.	P
10	No visual defects found.	P
11	No visual defects found.	P
Supplementary information: N/A		

Report No.: 6208316B.50

TABLE 08.2: MQT 06.1: Performance at STC after 1 st LETID Detection (Front side)								—
Test Date [YYYY-MM-DD]				2024-11-18				—
Test method				<input checked="" type="checkbox"/> Solar simulator <input type="checkbox"/> Natural sunlight				—
Irradiance [W/m ²]				1000				—
Module temperature [°C]				25				—
Sample #	I _{sc} [A]	V _{oc} [V]	I _{mp} [A]	V _{mp} [V]	P _{max} [W]	FF [%]	Degradation [%]	Result
6	15.585	48.711	14.584	41.918	611.323	80.53	-0.32	P
7	15.594	48.656	14.563	41.828	609.158	80.28	-0.59	P
8	15.580	48.702	14.554	41.806	608.455	80.19	-0.66	P
9	15.586	48.672	14.597	41.945	612.256	80.71	-0.46	P
10	15.579	48.564	14.582	41.816	609.766	80.59	-0.60	P
11	15.581	48.685	14.585	41.819	610.927	80.40	-0.54	P
Supplementary information: N/A								

TABLE 08.3: MQT 06.1: Performance at STC after 1 st LETID Detection (Back side)								—
Test Date [YYYY-MM-DD]				2024-11-18				—
Test method				<input checked="" type="checkbox"/> Solar simulator <input type="checkbox"/> Natural sunlight				—
Irradiance [W/m ²]				1000				—
Module temperature [°C]				25				—
Sample #	I _{sc} [A]	V _{oc} [V]	I _{mp} [A]	V _{mp} [V]	P _{max} [W]	FF [%]	Degradation [%]	Result
6	12.007	48.345	10.667	43.251	461.381	79.48	-0.27	P
7	12.001	48.293	10.506	43.363	455.573	78.61	-0.55	P
8	12.080	48.293	10.485	43.391	454.964	77.99	-0.66	P
9	12.099	48.353	10.577	43.413	459.183	78.49	-0.43	P
10	11.970	48.229	10.562	43.404	458.436	79.41	-0.55	P
11	12.144	48.307	10.622	43.182	458.683	78.19	-0.65	P
Supplementary information: N/A								

TABLE 08.4: MQT 06.1: Performance at BNPI after 1 st LETID Detection (Front side)								—
Test Date [YYYY-MM-DD]				2024-11-18				—
Test method				<input checked="" type="checkbox"/> Solar simulator <input type="checkbox"/> Natural sunlight				—
Irradiance [W/m ²]				1000				—
Module temperature [°C]				25				—
Sample #	I _{sc} [A]	V _{oc} [V]	I _{mp} [A]	V _{mp} [V]	P _{max} [W]	FF [%]	Degradation [%]	Result
6	17.217	48.859	16.056	41.933	673.272	80.04	-0.35	P
7	17.225	48.793	16.069	41.771	671.209	79.86	-0.53	P
8	17.218	48.817	16.082	41.682	670.347	79.75	-0.68	P
9	17.211	48.842	16.063	41.997	674.576	80.24	-0.50	P
10	17.209	48.776	16.114	41.734	672.505	80.12	-0.51	P
11	17.212	48.819	16.072	41.866	672.853	80.08	-0.56	P
Supplementary information: N/A								

TABLE 08.5: MQT 03 Insulation test after 1 st LETID Detection						
Test Date [YYYY-MM-DD]				2024-11-18		—
Test Voltage applied [V]				8000/1500		—
Size of module [m ²]				2.70		—
Sample #	Required	Measured	Dielectric breakdown		Result	
	MΩ	MΩ	Yes (description)	No		
6	14.81	>5000	-	No	P	
7	14.81	>5000	-	No	P	
8	14.81	>5000	-	No	P	
9	14.81	>5000	-	No	P	
10	14.81	>5000	-	No	P	
11	14.81	>5000	-	No	P	
Supplementary information: The insulation tester can measure up to 5000MΩ.						

TABLE 08.6: MQT 15 Wet leakage current test after 1st LETID Detection			
Test Date [YYYY-MM-DD]		2024-11-18	—
Test Voltage applied [V]		1500	—
Solution temperature [°C].....		23.2	—
Size of module [m ²]		2.70	—
Solution resistivity [Ω cm].....		2352	—
Sample #	Measured [MΩ]	Limit [MΩ]	Result
6	>5000	14.81	P
7	>5000	14.81	P
8	>5000	14.81	P
9	>5000	14.81	P
10	>5000	14.81	P
11	>5000	14.81	P
Supplementary information: The insulation tester can measure up to 5000MΩ.			

TABLE 08.7: EL-images after 1st LETID Detection			
Test Date [YYYY-MM-DD].....		2024-11-18	—
Current applied.....		0.1I _{sc} & I _{sc}	—
Sample	Remarks		
6	No significant defects found.		—
7	No significant defects found.		—
8	No significant defects found.		—
9	No significant defects found.		—
10	No significant defects found.		—
11	No significant defects found.		—
Supplementary information: N/A			

Report No.: 6208316B.50

TABLE 09: 2nd LETID Detection		
Test Date [YYYY-MM-DD] start/end	2024-11-18 / 2024-11-25	—
Applied current = 2 * (I _{sc} - I _{mp}) [A]	2.001; 2.062; 2.051; 1.980; 1.994; 1.993	—
Period for each cycle (hours)	162	—
Climatic chamber condition [°C].....	75±3	—
Temperature corrected dark voltage V' _{d,avg} has achieved its minimum value [Y/N]	50.5	Y
Sample	Remarks	—
6	—	
7	—	
8	—	
9	—	
10	—	
11	—	
Supplementary information: N/A		

TABLE 09.1: MQT 01 Visual inspection after 2nd LETID Detection		
Test Date [YYYY-MM-DD].....	2024-11-25	—
Sample #	Nature and position of initial findings – comments or attach photos	—
6	No visual defects found.	P
7	No visual defects found.	P
8	No visual defects found.	P
9	No visual defects found.	P
10	No visual defects found.	P
11	No visual defects found.	P
Supplementary information: N/A		

Report No.: 6208316B.50

TABLE 09.2: MQT 06.1: Performance at STC after 2 nd LETID Detection (Front side)								—
Test Date [YYYY-MM-DD]				2024-11-25				—
Test method				<input checked="" type="checkbox"/> Solar simulator <input type="checkbox"/> Natural sunlight				—
Irradiance [W/m ²]				1000				—
Module temperature [°C]				25				—
Sample #	I _{sc} [A]	V _{oc} [V]	I _{mp} [A]	V _{mp} [V]	P _{max} [W]	FF [%]	Degradation [%]	Result
6	15.570	48.707	15.570	39.186	610.123	80.45	-0.51	P
7	15.611	48.692	14.751	41.470	611.723	80.48	-0.17	P
8	15.600	47.721	14.755	41.391	610.731	82.04	-0.28	P
9	15.531	48.644	14.587	41.867	610.713	80.84	-0.71	P
10	15.605	48.579	14.577	41.944	611.416	80.65	-0.33	P
11	15.603	48.770	14.815	41.445	614.015	80.69	-0.04	P
Supplementary information: N/A								

TABLE 09.3: MQT 06.1: Performance at STC after 2 nd LETID Detection (Back side)								—
Test Date [YYYY-MM-DD]				2024-11-25				—
Test method				<input checked="" type="checkbox"/> Solar simulator <input type="checkbox"/> Natural sunlight				—
Irradiance [W/m ²]				1000				—
Module temperature [°C]				25				—
Sample #	I _{sc} [A]	V _{oc} [V]	I _{mp} [A]	V _{mp} [V]	P _{max} [W]	FF [%]	Degradation [%]	Result
6	11.985	48.331	10.659	43.198	460.451	79.49	-0.47	P
7	12.011	48.339	10.701	42.745	457.413	78.78	-0.15	P
8	12.087	48.201	10.592	43.138	456.915	78.43	-0.24	P
9	11.955	48.311	10.775	42.470	457.611	79.23	-0.77	P
10	12.107	48.254	10.580	43.387	459.031	78.57	-0.42	P
11	12.155	48.366	10.822	42.623	461.261	78.46	-0.09	P
Supplementary information: N/A								

Report No.: 6208316B.50

TABLE 09.4: MQT 06.1: Performance at BNPI after 2 nd LETID Detection (Front side)								—
Test Date [YYYY-MM-DD]				2024-11-25				—
Test method				<input checked="" type="checkbox"/> Solar simulator		<input type="checkbox"/> Natural sunlight		—
Irradiance [W/m ²]				1000				—
Module temperature [°C]				25				—
Sample #	I _{sc} [A]	V _{oc} [V]	I _{mp} [A]	V _{mp} [V]	P _{max} [W]	FF [%]	Degradation [%]	Result
6	17.213	48.841	16.050	41.895	672.417	79.98	-0.48	P
7	17.234	48.836	16.166	41.675	673.712	80.05	-0.16	P
8	17.222	48.879	16.149	41.707	673.519	80.01	-0.21	P
9	17.206	48.811	16.097	41.824	673.237	80.16	-0.70	P
10	17.212	48.784	16.024	42.015	673.251	80.18	-0.40	P
11	17.218	48.896	16.032	42.156	675.823	80.27	-0.13	P
Supplementary information: N/A								

TABLE 09.5: MQT 03 Insulation test after 2 nd LETID Detection						
Test Date [YYYY-MM-DD]				2024-11-25		—
Test Voltage applied [V]				8000/1500		—
Size of module [m ²]				2.70		—
Sample #	Required	Measured	Dielectric breakdown		Result	
	MΩ	MΩ	Yes (description)	No		
6	14.81	>5000	-	No	P	
7	14.81	>5000	-	No	P	
8	14.81	>5000	-	No	P	
9	14.81	>5000	-	No	P	
10	14.81	>5000	-	No	P	
11	14.81	>5000	-	No	P	
Supplementary information: The insulation tester can measure up to 5000MΩ.						

Report No.: 6208316B.50

TABLE 09.6: MQT 15 Wet leakage current test after 2nd LETID Detection			
Test Date [YYYY-MM-DD]		2024-11-25	—
Test Voltage applied [V]		1500	—
Solution temperature [°C].....		22.1	—
Size of module [m ²]		2.70	—
Solution resistivity [Ω cm].....		2452	—
Sample #	Measured [MΩ]	Limit [MΩ]	Result
6	>5000	14.81	P
7	>5000	14.81	P
8	>5000	14.81	P
9	>5000	14.81	P
10	>5000	14.81	P
11	>5000	14.81	P
Supplementary information: The insulation tester can measure up to 5000MΩ.			

Report No.: 6208316B.50

Annex 1: Photographs of test sample

Module type: JAM66D45-610/LB



Fig. 1: front view of test sample



Fig. 2: rear view of test sample



Fig. 3: view of solar cell



Fig. 4: view of type label



Fig. 5: view of closed junction box



Fig. 6: HI test image of Sample No. 3

Report No.: 6208316B.50

Annex 2: List of measurement equipment

List of Measurement Equipment:				
Measurement / testing	Testing / measuring equipment / material used, (Equipment ID)	Range used	Last Calibration date	Calibration due date
Visual inspection	Visual inspection bench BS-PV 010	-	-	-
	Illumination photometer BS-PV 036	2000lx	2024-02-27	2025-02-26
Maximum power determination	Pulse solar simulator BS-PV 057	A+AA+	2024-07-29	2025-07-28
	Electrical Load BS-PV 057-02	-15V~420V -50A~50A	2024-07-29	2025-07-28
	Reference Module BS-PV 057-03	-	2024-07-08	2025-07-07
Insulation test	Insulation tester BS-PV 090	Test voltage: 0~10kV Result range: 0~50000MΩ	2024-05-22	2025-05-21
Performance at STC	Pulse solar simulator BS-PV 057	A+AA+	2024-07-29	2025-07-28
Wet leakage current	Water tank BS-PV 047-01	22 ± 2°C	2024-05-22	2025-05-21
	Insulation resistance tester BS-PV 090	Test voltage: 0~10kV Result range: 0~50000MΩ	2024-05-22	2025-05-21
	Conductivity meter BS-PV 047-02	0~1999μs/cm, 10.0~40.0°C	2024-05-22	2025-05-21
Hail test	Hail tester BS-PV 050-01	-	2024-06-03	2025-06-02
	Electrical balance BS-PV 050-02	220g/0.01g	2024-05-22	2025-05-21
	Digital Caliper BS-PV 050-03	0-150mm	2024-06-16	2025-06-15
Stabilization	Pulse solar simulator BS-PV 057	A+AA+	2024-07-29	2025-07-28
	Electrical Load BS-PV 057-02	-15V~420V -50A~50A	2024-07-29	2025-07-28

Report No.: 6208316B.50

Annex 3: Statement of test uncertainty

The total measuring uncertainty of Pmpp is $\leq 2.47\%$

The total measuring uncertainty of Isc is $\leq 2.35\%$

The total measuring uncertainty of Voc is ≤ 0.84

Annex 4: EL image

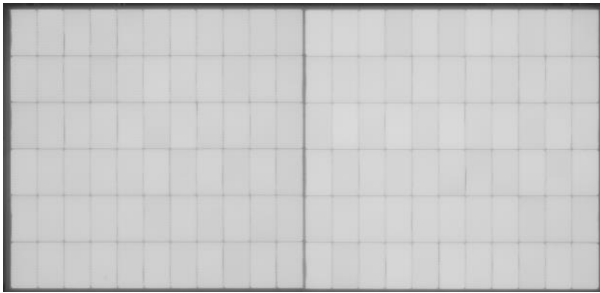


Fig. 7: Initial EL image(I_{sc}) of Sample No. 1

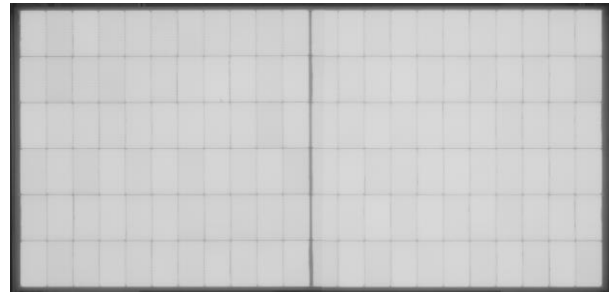


Fig. 8: Initial EL image(I_{sc}) of Sample No. 2

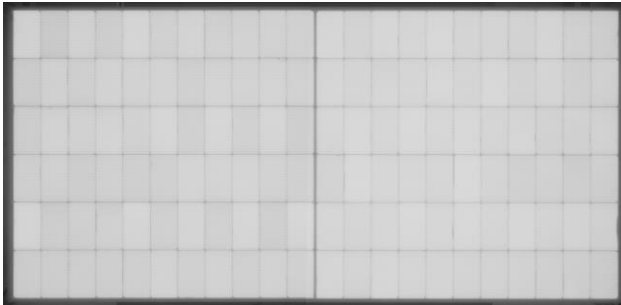


Fig. 9: Initial EL image(I_{sc}) of Sample No. 3

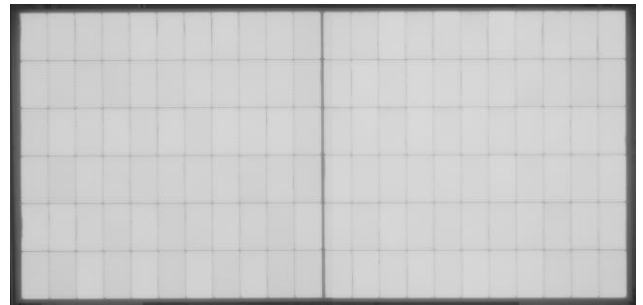


Fig. 10: Initial EL image(I_{sc}) of Sample No. 4

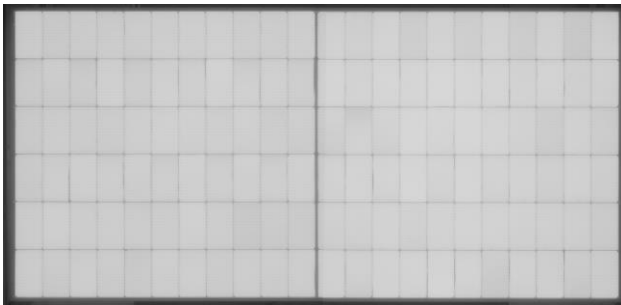


Fig. 11: EL image(I_{sc}) after CID of Sample No. 5

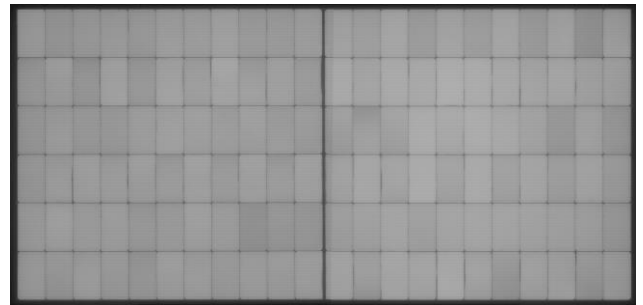


Fig. 12: EL image($0.1 I_{sc}$) after CID of Sample No. 5

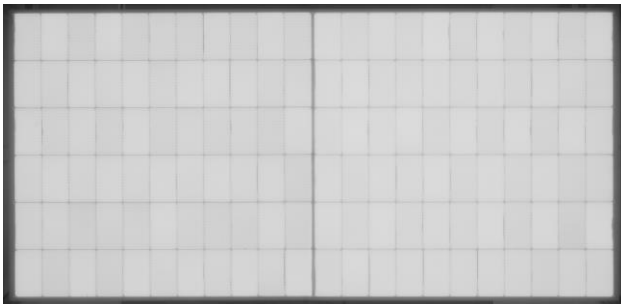


Fig. 13: EL image(I_{sc}) after CID of Sample No. 6

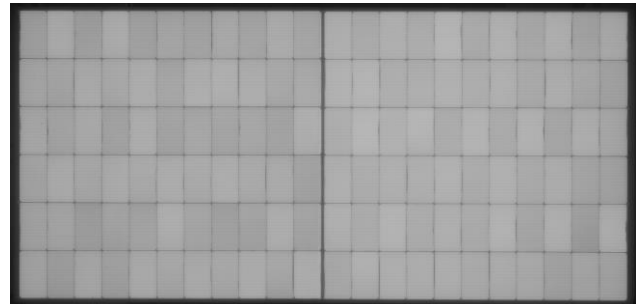


Fig. 14: EL image($0.1 I_{sc}$) after CID of Sample No. 6

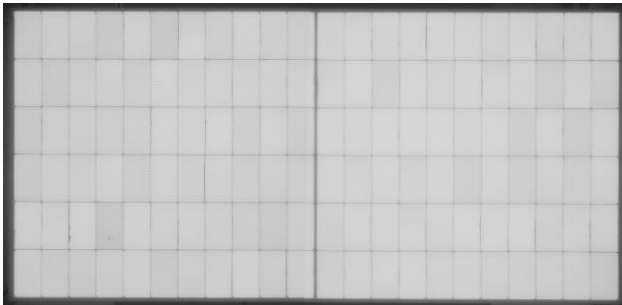


Fig. 15: EL image(I_{sc}) after CID of Sample No. 7

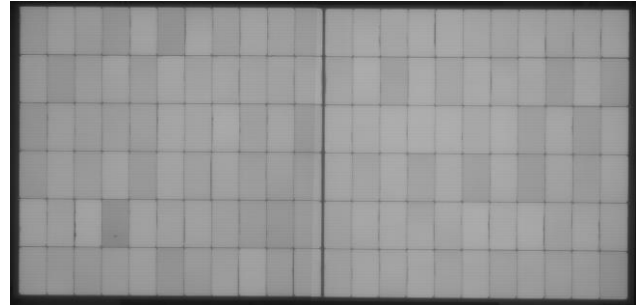


Fig. 16: EL image($0.1 I_{sc}$) after CID of Sample No. 7

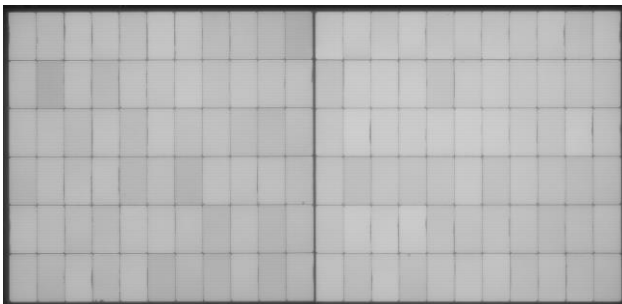


Fig. 17: EL image(I_{sc}) after CID of Sample No. 8

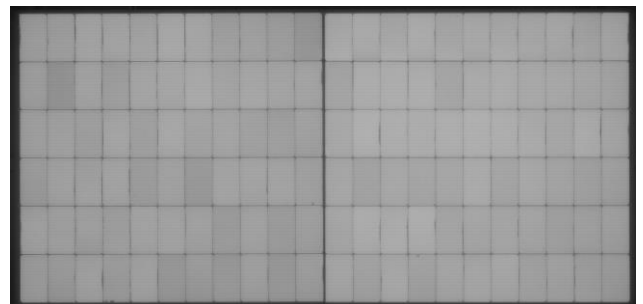


Fig. 18: EL image($0.1 I_{sc}$) after CID of Sample No. 8

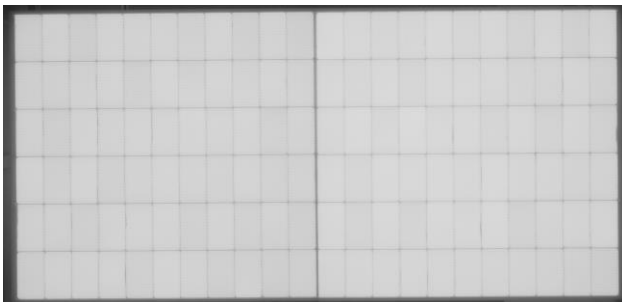


Fig. 19: EL image(I_{sc}) after CID of Sample No. 9

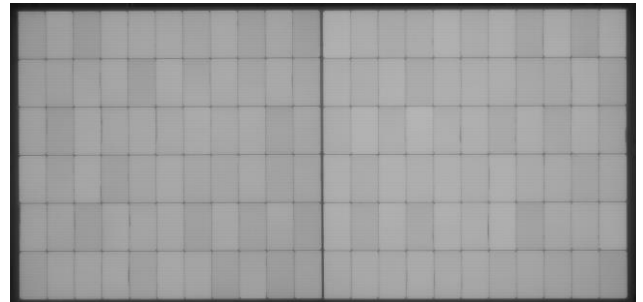


Fig. 20: EL image($0.1 I_{sc}$) after CID of Sample No. 9

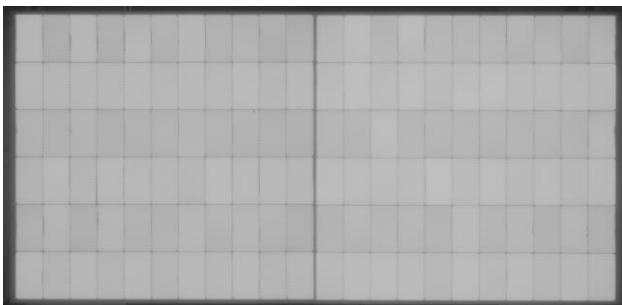


Fig. 21: EL image(I_{sc}) after CID of Sample No. 10

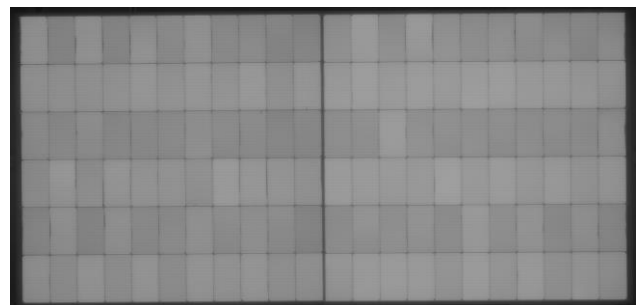


Fig. 22: EL image($0.1 I_{sc}$) after CID of Sample No. 10

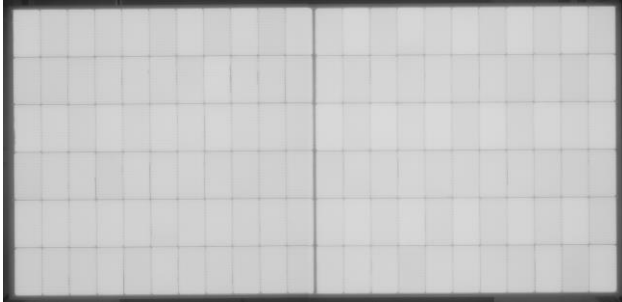


Fig. 23: EL image(I_{sc}) after CID of Sample No. 11

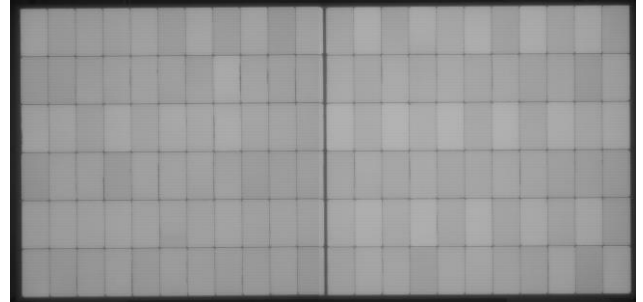


Fig. 24: EL image($0.1 I_{sc}$) after CID of Sample No. 11

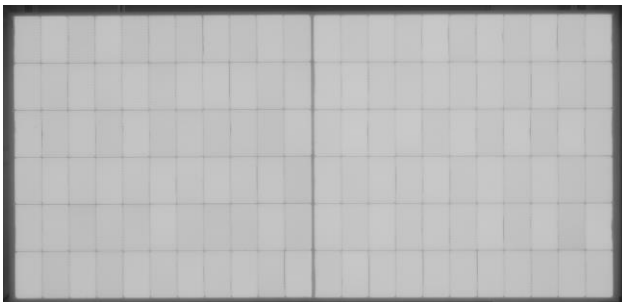


Fig. 25: EL image(I_{sc}) after 1st LeTID of Sample No. 6

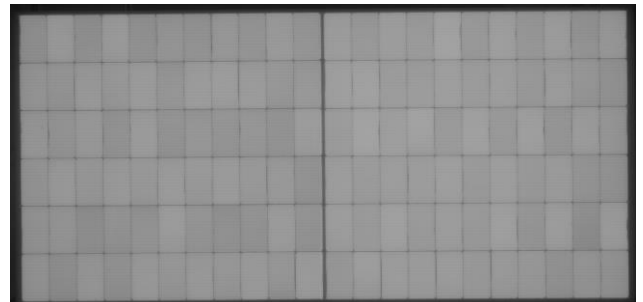


Fig. 26: EL image($0.1 I_{sc}$) after 1st LeTID of Sample No. 6

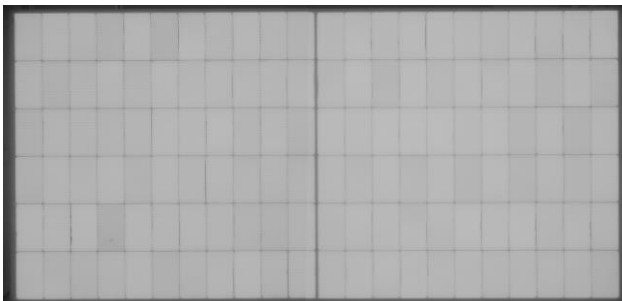


Fig. 27: EL image(I_{sc}) after 1st LeTID of Sample No. 7

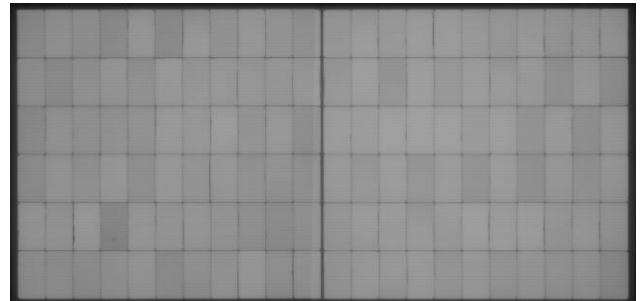


Fig. 28: EL image($0.1 I_{sc}$) after 1st LeTID of Sample No. 7

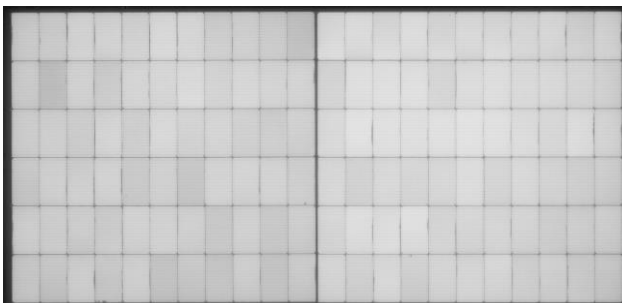


Fig. 29: EL image(I_{sc}) after 1st LeTID of Sample No. 8

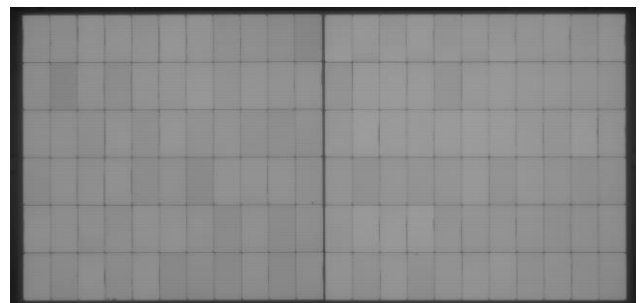


Fig. 30: EL image($0.1 I_{sc}$) after 1st LeTID of Sample No. 8

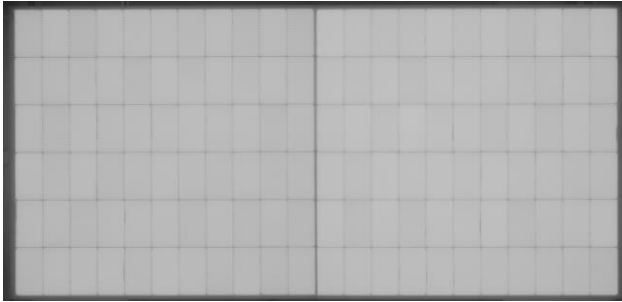


Fig. 31: EL image(I_{sc}) after 1st LeTID of Sample No. 9

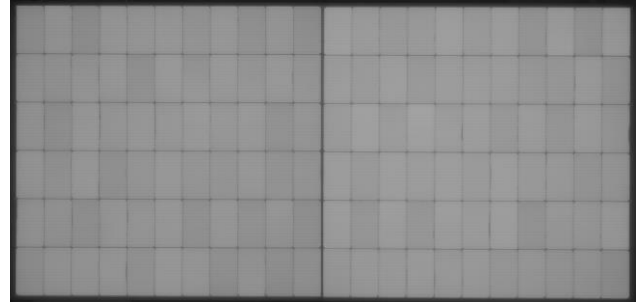


Fig. 32: EL image($0.1 I_{sc}$) after 1st LeTID of Sample No. 9

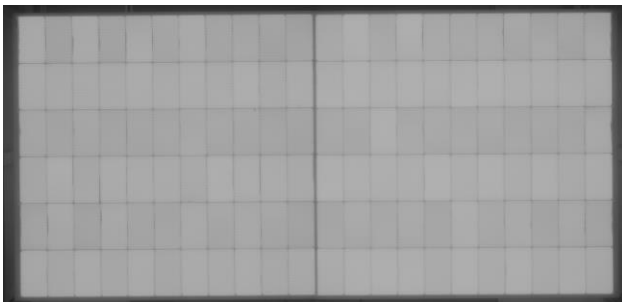


Fig. 33: EL image(I_{sc}) after 1st LeTID of Sample No. 10

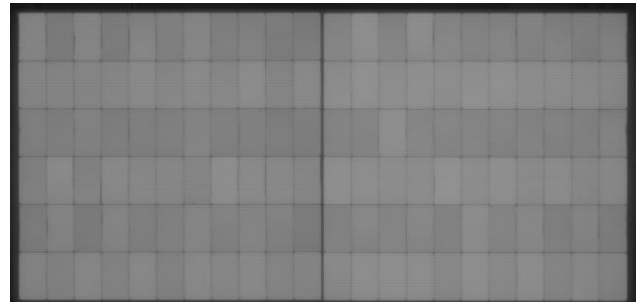


Fig. 34: EL image($0.1 I_{sc}$) after 1st LeTID of Sample No. 10

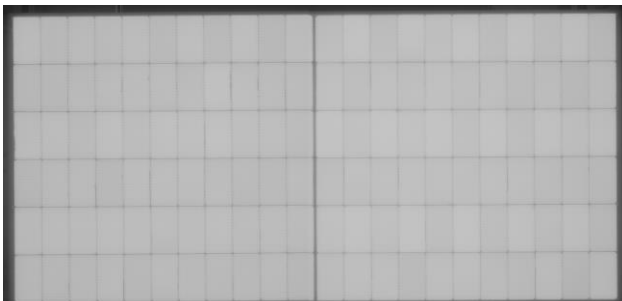


Fig. 35: EL image(I_{sc}) after 1st LeTID of Sample No. 11

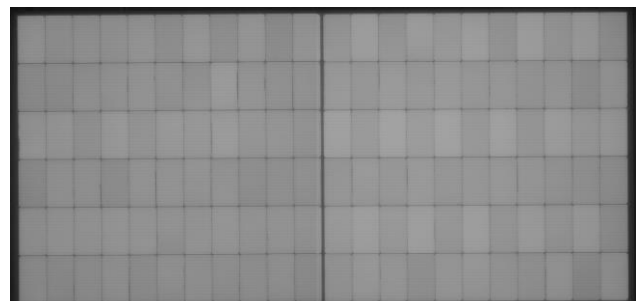


Fig. 36: EL image($0.1 I_{sc}$) after 1st LeTID of Sample No. 11

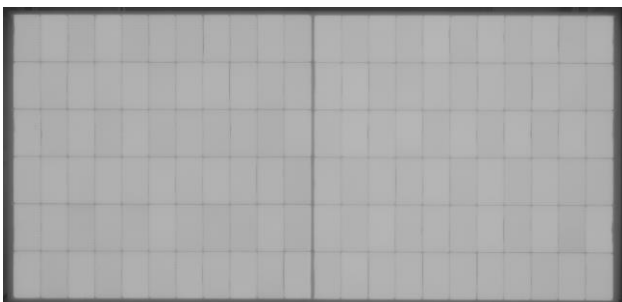


Fig. 37: EL image(I_{sc}) after 2nd LeTID of Sample No. 6

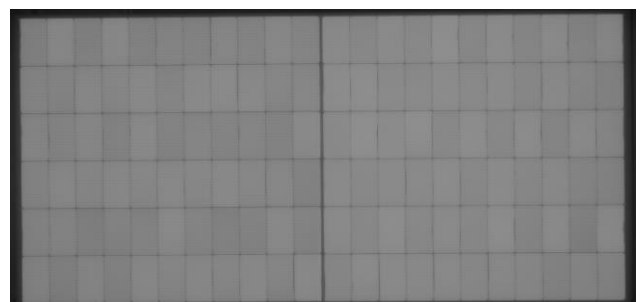


Fig. 38: EL image($0.1 I_{sc}$) after 2nd LeTID of Sample No. 11

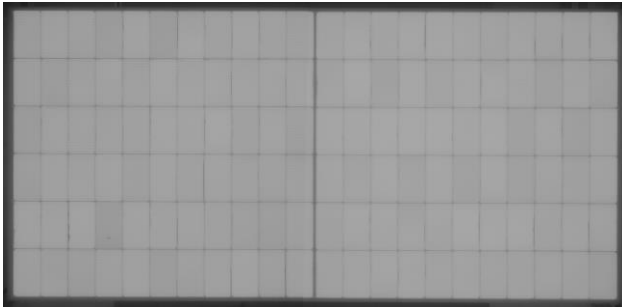


Fig. 39: EL image(I_{sc}) after 2nd LeTID of Sample No. 7

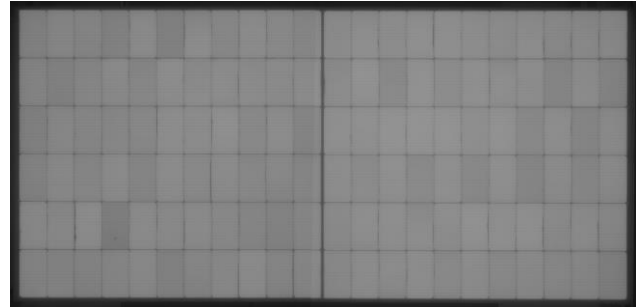


Fig. 40: EL image($0.1 I_{sc}$) after 2nd LeTID of Sample No. 11

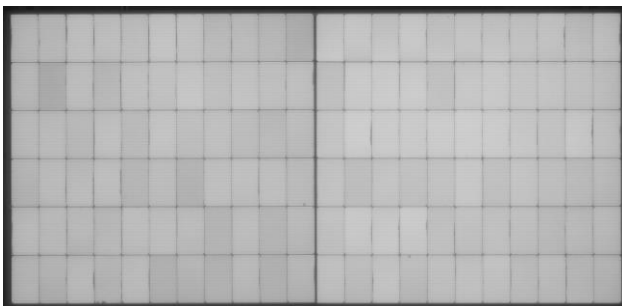


Fig. 41: EL image(I_{sc}) after 2nd LeTID of Sample No. 8

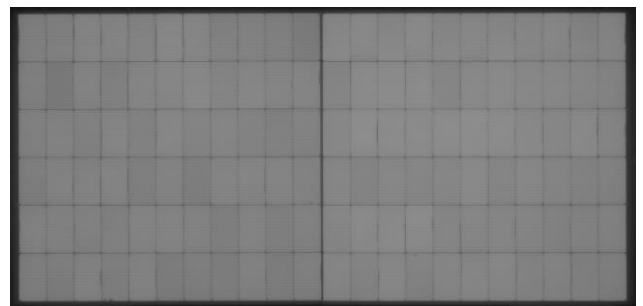


Fig. 42: EL image($0.1 I_{sc}$) after 2nd LeTID of Sample No. 11

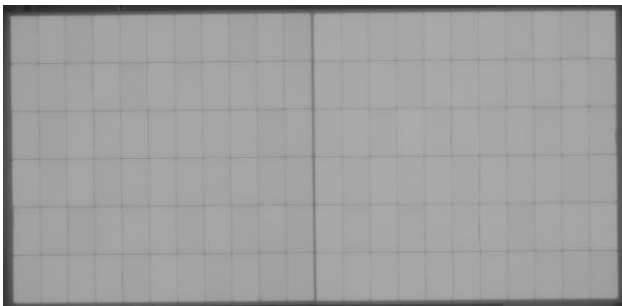


Fig. 43: EL image(I_{sc}) after 2nd LeTID of Sample No. 9

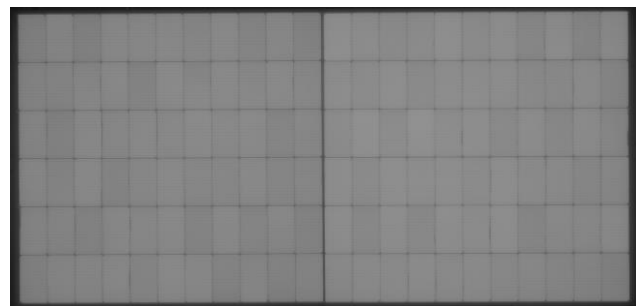


Fig. 44: EL image($0.1 I_{sc}$) after 2nd LeTID of Sample No. 11

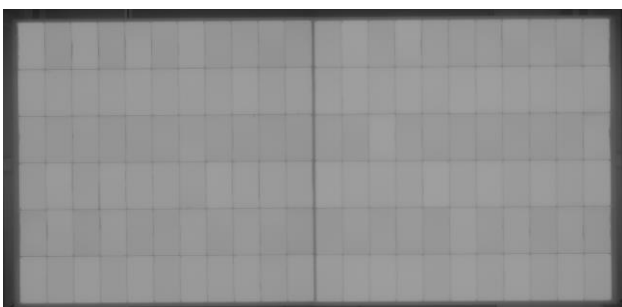


Fig. 45: EL image(I_{sc}) after 2nd LeTID of Sample No. 10

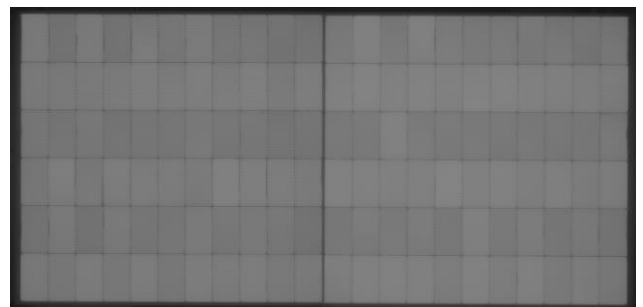


Fig. 46: EL image($0.1 I_{sc}$) after 2nd LeTID of Sample No. 11

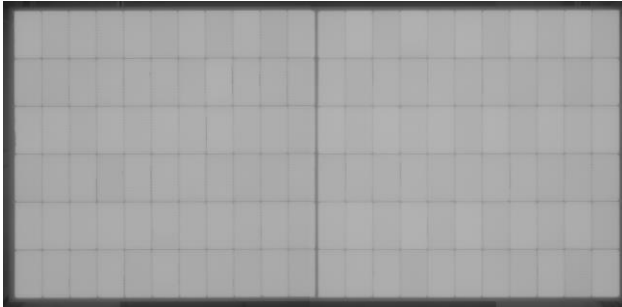


Fig. 47: EL image(I_{sc}) after 2nd LeTID of Sample No. 11

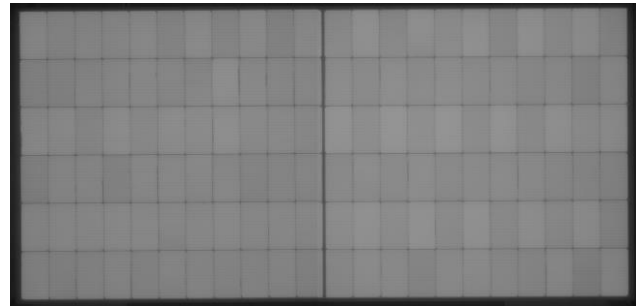


Fig. 48: EL image($0.1 I_{sc}$) after 2nd LeTID of Sample No. 11

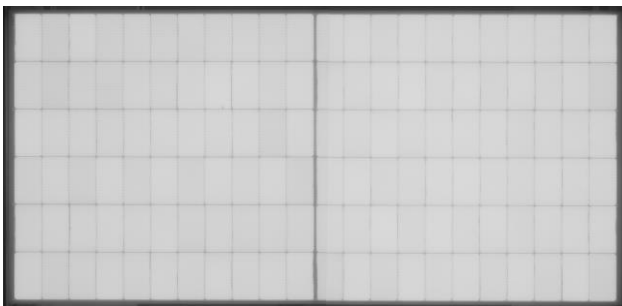


Fig. 49: EL image after HI of Sample No. 2

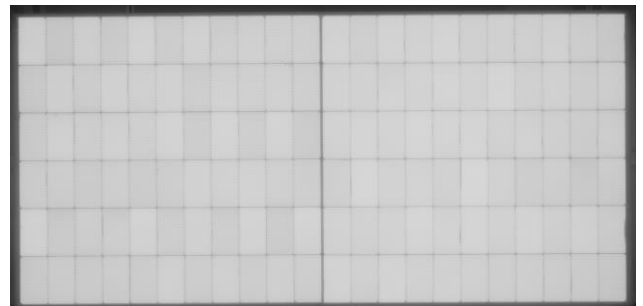


Fig. 50: EL image after HI of Sample No. 3

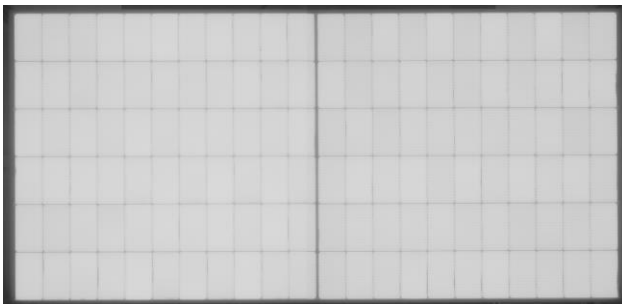


Fig. 51: EL image after HI of Sample No. 4