Test Report issued under the responsibility of:

TEST REPORT
IEC 61215 Series: 2021
Terrestrial photovoltaic (PV) modules – Design qualification and type approval

Report Number. ..... :	GCTC2025WT0176-01-02
Date of issue ..... :	2025-08-07
Total number of pages ..... :	66
Name of Testing Laboratory preparing the Report ..... :	Guoce Testing Technology (Suzhou) Co., Ltd.
Applicant's name ..... :	MEM PANEL SOLAR ENERJİ VE SANAYİ TİCARET A. Ş
Address ..... :	Organize Sanayi Bölgesi 3. Cadde NO:4 Onikişubat, Kahramanmaraş, Türkiye
Test specification:	
Standard ..... :	☒ IEC 61215-1:2021 ☒ IEC 61215-2:2021 ☒ IEC 61215-1-1:2021 ☐ IEC 61215-1-2:2021 ☐ IEC 61215-1-3:2021 ☐ IEC 61215-1-4:2021
Test procedure ..... :	CB Scheme
Non-standard test method ..... :	N/A
TRF template used ..... :	IECEE OD-2020-F1:2021, Ed.1.4
Test Report Form No. ..... :	IEC61215F_SE
Test Report Form(s) Originator .... :	TÜV SÜD Product Service GmbH
Master TRF ..... :	2021-08-31

This report is not valid as a CB Test Report unless signed by an approved IECEE Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

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 Issuing NCB. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description ..... :	Photovoltaic (PV) Module(s)
Trade Mark ..... :	MEM SOLAR
Address ..... :	Organize Sanayi Bölgesi 3.Cadde NO:4 Onikişubat, Kahramanmaraş , Türkiye
Manufacturer ..... :	MEM PANEL SOLAR ENERJİ VE SANAYİ TİCARET A. Ş
Model/Type reference ..... :	With Mono-crystalline Silicon Solar Cells:(double glass half-cell, N type) M66H8NTP (xxx=600~630w, in steps of 5W, 132 cells)
Ratings ..... :	Max. System voltage: 1500V Maximum Over-Current Protection: 35A

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):

☒	**CB Testing Laboratory:**	Guoce Testing Technology (Suzhou) Co., Ltd.	
Testing location/ address.....:		2/F., Building 11, No.18, YaoFeng East Road, Mudu, Wuzhong District, Suzhou, Jiangsu, China	
Tested by (name, function, signature).....:		Project Engineer Bin Cao	Bin Cao
Approved by (name, function, signature)...:		Reviewer Lichun Qian	Lichun Qian
☐	**Testing procedure: CTF Stage 1:**		
Testing location/address.....:			
Tested by (name, function, signature).....:			
Approved by (name, function, signature)...:			
☐	**Testing procedure: CTF Stage 2:**		
Testing location/address.....:			
Tested by (name + signature).....:			
Witnessed by (name, function, signature) .:			
Approved by (name, function, signature)...:			
☐	**Testing procedure: CTF Stage 3 or 4:**		
Testing location/address.....:			
Tested by (name, function, signature).....:			
Witnessed by (name, function, signature) .:			
Approved by (name, function, signature)...:			

Supervised by (name, function, signature) :		

List of Attachments (including a total number of pages in each attachment):	
	attachment number / number of pages
Installation manual	Attachment 1 / 25 pages
Drawings mechanical	Attachment 2 / 1 pages
Circuit diagram	N/A
Photographs	Attachment 6 / 3 pages
Component datasheets / certificates	Attachment 3: certificate of junction box, 6 page. Attachment 4: certificate of cable, 6 page. Attachment 5: certificate of connector, 7 page.
Others:	Attachment 7: CDF No. GCTC2025WT0176.01, 11 pages
Product Description Sheet (Manufacturers and type references)	Annex 1 / 6 pages
Test table for verifying other stabilization procedure	Annex 2 / 2 pages
Lower and higher output power modules	Annex 3 / 3 pages

Summary of testing:

This report includes qualification test results for a basic BOM and also extension to alternative materials. The retest guideline IEC 62915 was used to evaluate the below extensive changes. The test results are presented within this test report.

- Basic qualification tests were performed on double-glass mono-crystalline 1/2 cut cell (210*182mm) module M66H8NTP-610(BOM1) as a representative model type, the tests of low class and high class of this BOM were performed on model M66H8NTP-630 and M66H8NTP-630;

Tests performed (name of test and test clause):	**Testing location:**
All tests of IEC 61215-2:2021 excluding: Test of cord anchorage (MQT 14.2) Stress-specific stabilization - BO LID (MQT 19.3) Bending test (MQT 22) The above tests are not applicable to the test samples in this project, or relevant tests are exempted according to the requirements of IEC TS 62915	Guoce Testing Technology (Suzhou) Co., Ltd. 2/F., Building 11, No.18, YaoFeng East Road, Mudu, Wuzhong District, Suzhou, Jiangsu, China

Summary of compliance with National Differences (List of countries addressed):

The text of IEC 61215-1:2021 was approved by CENELEC as EN 61215-1:2021 without any modification.

The text of IEC 61215-1-1:2021 was approved by CENELEC as EN 61215-1-1:2021 without any modification.

The text of IEC 61215-2:2021 was approved by CENELEC as EN 61215-2:2021without any modification.

☒ **The product fulfils the requirements of_ EN 61215-1:2021, EN 61215-1-1:2021, EN 61215-2:2021_**

Use of uncertainty of measurement for decisions on conformity (decision rule) :

☐ No decision rule is specified by the IEC standard, when comparing the measurement result with the applicable limit according to the specification in that standard. The decisions on conformity are made without applying the measurement uncertainty ("simple acceptance" decision rule, previously known as "accuracy method").

☐ Other: (to be specified, for example when required by the standard or client, or if national accreditation requirements apply)

Information on uncertainty of measurement:
The uncertainties of measurement are calculated by the laboratory based on application of criteria given by OD-5014 for test equipment and application of test methods, decision sheets and operational procedures of IECEE.
IEC Guide 115 provides guidance on the application of measurement uncertainty principles and applying the decision rule when reporting test results within IECEE scheme, noting that the reporting of the measurement uncertainty for measurements is not necessary unless required by the test standard or customer.

Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

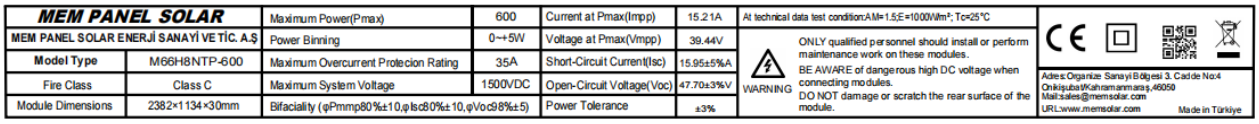
Statement concerning the uncertainty of the measurement systems used for the tests by lab

As per IEC 61215-1:2021 sub-clause 7.2.2, the measurement uncertainty for *P*max, the measurement uncertainty for *V*OC and the measurement uncertainty for *I*SC are used to make decisions on conformity.

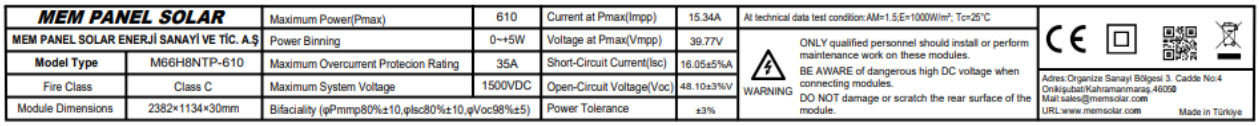
Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

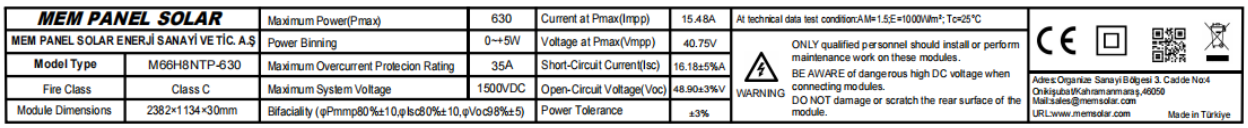
(Note: The marking plate represents all models covered by this report except for difference in electrical ratings and model designation. See “General product information” for electrical ratings for all models. As there will be other lower wattages to be covered under same report which follows same back label format.)



M66H8NTP-600



M66H8NTP-610



M66H8NTP-630

Marking plate

Test item particulars..... :	N/A
Accessories and detachable parts included in the evaluation..... :	N/A
Mounting system used..... :	Refer to installation manual
Other options included..... :	N/A
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:

P_{max} – Maximum power	HF – Humidity Freeze
V_{mp} – Maximum power voltage	DH – Damp Heat
I_{mp} – Maximum power current	TC – Thermal Cycling
I_{sc} – Short circuit current	α – Current temperature coefficient
V_{oc} – Open circuit voltage	β – Voltage temperature coefficient
FF – Fill factor	δ – power temperature coefficient
STC – Standard Test Conditions (25°C, 1 000 W/m²)	TCO – Transparent conductive oxide TRF – Test report form
MQT – Module Quality Tests	$V_{FMrated}$ – Rated diode(s) forward voltage
VFM – Measured diode(s) forward voltage	NP – Nameplate
P_{max} (Lab) – the measured maximum power of each module	P_{max} (NP) – the minimum rated nameplate power of each module without tolerances
$\bar{P}_{max}$ (Lab) – the arithmetic average of the measured maximum power of the modules	V_{oc} (Lab) – the measured maximum V_{oc}
I_{sc} (Lab) – the measured maximum I_{sc}	V_{oc} (NP) – the maximum rated nameplate V_{oc} of each module without tolerances
I_{sc} (NP) – the maximum rated nameplate I_{sc} without tolerances	P_{max4}(NP) – the maximum rated nameplate power of each lowest power class module, without tolerances
m_1 – the measurement uncertainty in % of laboratory for P_{max}	m_2 – the measurement uncertainty in % of laboratory for V_{oc}
m_3 – the measurement uncertainty in % of laboratory for I_{sc}	t_1 – the manufacturer's rated lower production tolerance in % for P_{max}
t_2 – the manufacturer's rated upper production tolerance in % for V_{oc}	t_3– the manufacturer's rated upper production tolerance in % for I_{sc}
r – P_{max} measurement reproducibility	t_4 – the manufacturer's rated upper production tolerance in % for P_{max4}(NP)
φV_{oc} - open-circuit voltage bifaciality coefficient	φP_{max} - the maximum power bifaciality coefficient
φI_{sc} – the short circuit current bifaciality coefficient	BSI - for stress on bifacial modules, corresponding to 1 000 W/m² on the module front and 300 W/m² on the module rear
BNPI - for bifacial modules, corresponding to 1 000 W/m² on the module front and 135 W/m² on the module rear	RTE – Relative thermal endurance index
RTI – Relative temperature index	
TI – Temperature index	

Testing Dates (YYYY-MM-DD)	
Date of first test item received ..... :	2025-04-30
Dates of tests (beginning/end)..... :	2025-05-06/ 2025-06-24

GENERAL REMARKS:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. **This TRF has been created in cooperation with CTL ETF-9 and German National Committee (DKE).** **The originator's responsibility of this TRF in IECEE CB Scheme has been assigned to TÜV SÜD Product Service GmbH.** Throughout this report a ☐ comma / ☒point is used as the decimal separator.	
Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :	☐ Yes ☒ Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (factories) ..... :	MEM PANEL SOLAR ENERJİ VE SANAYİ TİCARET A. Ş Organize Sanayi Bölgesi 3. Cadde NO:4 Onikişubat, Kahramanmaraş, Türkiye

PRODUCT ELECTRICAL RATINGS:				
Monofacial Module：				
Module type	/	/	/	/
Voc [V] / Tolerance	/	/	/	/
Vmp [V]	/	/	/	/
Isc [Adc] / Tolerance	/	/	/	/
Imax [Adc]	/	/	/	/
Pmp [W] / Tolerance	/	/	/	/
Maximum system voltage [V]	/	/	/	/
Maximum Over-Current Protection Rating [A]	/	/	/	/
Module type	/	/	/	/
Voc [V] / Tolerance	/	/	/	/
Vmp [V]	/	/	/	/
Isc [Adc] / Tolerance	/	/	/	/
Imax [Adc]	/	/	/	/
Pmp [W] / Tolerance	/	/	/	/

Maximum system voltage [V]	/	/	/	/
Maximum Over-Current Protection Rating [A]	/	/	/	/
Note: /				

Bifacial Module:

—	Module type	M66H8NTP-600	M66H8NTP-630	M66H8NTP-610	
STC condition	P_{max} [W] /Tolerance	600	630	610	
	V_{oc} [V] /Tolerance	47.70	48.90	48.10	
	I_{sc} [Adc] /Tolerance	15.95	16.18	16.05	
	V_{mp} [V]	39.44	40.75	39.77	
	I_{mp} [Adc]	15.21	15.48	15.34	
BNPI condition	P_{max} [W] /Tolerance	664	698	675	
	V_{oc} [V] /Tolerance	48	49.20	48.40	
	I_{sc} [Adc] /Tolerance	17.67	17.92	17.78	
Bifaciality coefficient	φP_{max}	80±10%	80±10%	80±10%	
	φV_{oc}	99±1%	99±1%	99±1%	
	φI_{sc}	80±10%	80±10%	80±10%	
—	Maximum system voltage [V]	1500	1500	1500	
—	Maximum Over-Current Protection Rating [A]	35	35	35	

GENERAL PRODUCT INFORMATION AND OTHER REMARKS:

Modifications:

☒ Initial module design qualification

☐ Extension of module design qualification

☐ Original test report ref. No. .....:

Model differences and modification:

☒ Test programs for crystalline silicon PV modules	☐ Test programs for thin-film PV modules
☐ 4.2.1 Modification to frontsheet	☐ 4.3.1 Modification to frontsheet
☐ 4.2.2 Modification to encapsulation system	☐ 4.3.2 Modification to encapsulation system
☒4.2.3 Modification to cell technology	☐ 4.3.3 Modification to front contact (e. g. TCO)
☐ 4.2.4 Modification to cell and string interconnect material or technique	☐ 4.3.4 Modification to cell technology
☐ 4.2.5 Modification to backsheet	☐ 4.3.5 Modification to cell layout
☐ 4.2.6 Modification to electrical termination	☐ 4.3.6 Modification to back contact
☐ 4.2.7 Modification to bypass diode	☐ 4.3.7 Modification to edge deletion
☐ 4.2.8 Modification to electrical circuitry	☐ 4.3.8 Modification to interconnect material or technique
☐ 4.2.9 Modification to edge sealing	☐ 4.3.9 Modification to backsheet
☐ 4.2.10 Modification to frame and/or mounting structure	☐ 4.3.10 Modification to electrical termination
☐ 4.2.11 Change in PV module size	☐ 4.3.11 Modification to bypass diode
☒ 4.2.12 Higher or lower output power (by 10 % or more) with the identical design and size and using the identical cell process	☐ 4.3.12 Modification to edge sealing
☐ 4.2.13 Increase of over-current protection rating	☐ 4.3.13 Modification to frame and/or mounting structure
☐ 4.2.14 Increase of system voltage	☐ 4.3.14 Change in PV module size
☐ 4.2.15 Change in cell fixing tape	☐ 4.3.15 Higher or lower output power (by 10 % or more) with the identical design and size
	☐ 4.3.16 Increase of over-current protection rating
	☐ 4.3.17 Increase of system voltage

Note: The clause references modifications extracted from IEC 62915

MODULE GROUP ASSIGNMENT:

Sample #	Sample Group ID	Type/model	Sample S/N	Remark
1	A	M66H8NTP-610	492130I2508913	N/A
2	B	M66H8NTP-610	492131I2502930	
3	C	M66H8NTP-610	492131I2504215	
4	C	M66H8NTP-610	492131I2501498	
5	D	M66H8NTP-610	492131I2505267	
6	D	M66H8NTP-610	492131I2501427	
7	E	M66H8NTP-610	492130I2599019	
8	E	M66H8NTP-610	492131I2505242	
9	F	M66H8NTP-610	492130I2509149	
10	F	M66H8NTP-610	492130I2509772	
11	F	M66H8NTP-610	492308I2504282	
12	F	M66H8NTP-610	492310I2501598	
23	High1	M66H8NTP-630	492131I2502974	
24	High2	M66H8NTP-630	492131I2599003	
25	Low1	M66H8NTP-600	481715I2505236	
26	Low2	M66H8NTP-600	481716I2505990	

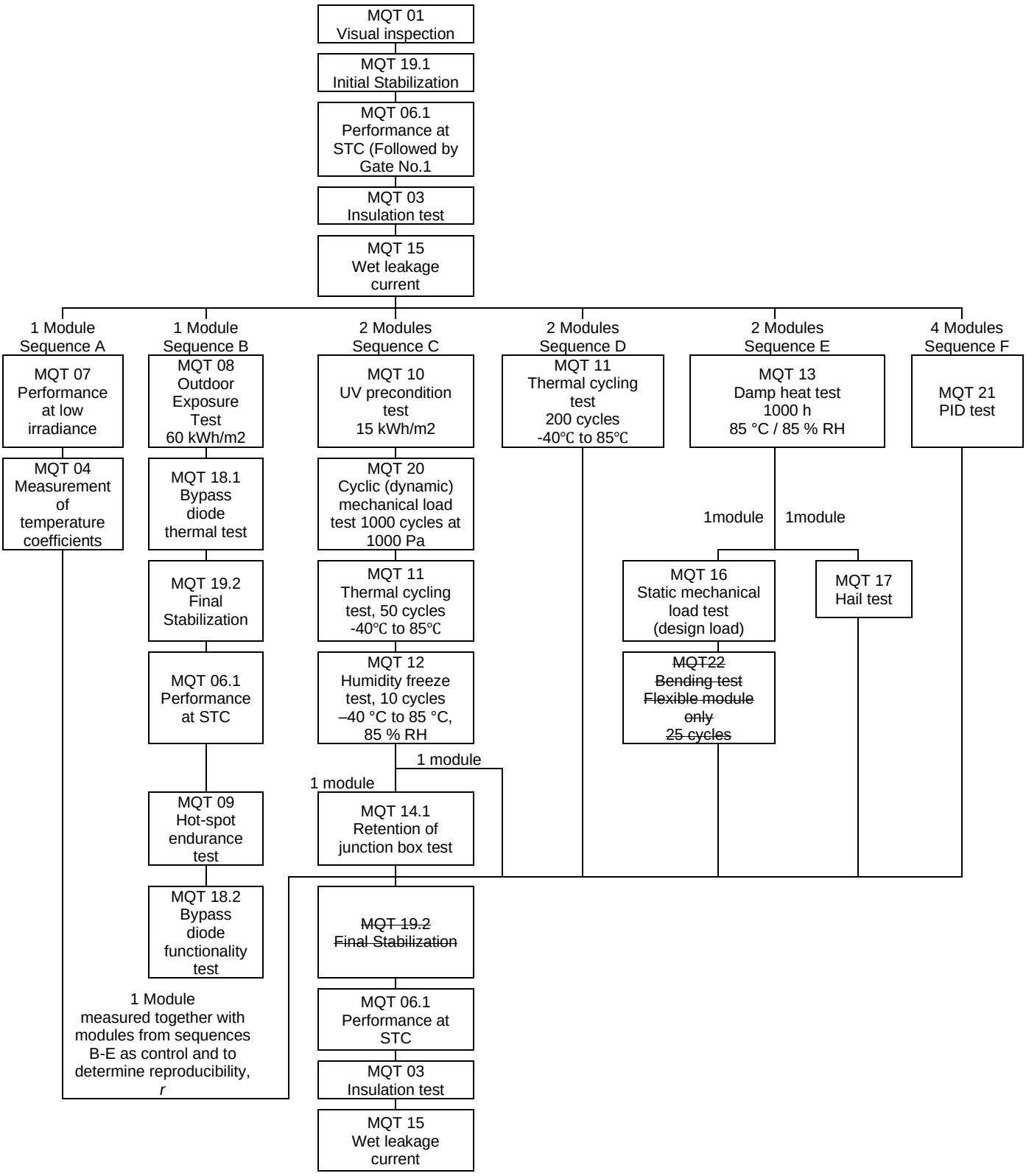
Supplementary information:

Note (1) Use the “General product information” field to give any information on model differences within a product type family covered by the test report and to describe the range of electrical and safety ratings, if the TRF covers a type family of modules.

Note (2) Use Annex 1 to list the used materials and components of the module (manufacturer/supplier and type reference).

Note (3) The module numbers/identifiers are set in accordance to IEC 62915 Photovoltaic (PV) modules – Retesting for type approval, design and safety qualification, Annex A3

11	**TEST FLOW (if it is not a full test, strikethrough non-performed test)** Note: Deviations from test sequence are possible but must be documented.



IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

5. MARKING AND DOCUMENTATION			—
5.1	**Name Plate**		P
	All electrical data is shown as relative to standard test conditions (1 000 W/m², 25 °C, AM 1,5 according to IEC TS 61836).	Marked on label	P
	International symbols are used where applicable.	Marked on label	P
	The module includes clear and indelible markings:		P
	a. Name, registered trade name or registered trade mark of manufacturer	MEM PANEL SOLAR ENERJİ VE SANAYİ TİCARET A.Ş	N/A
	b. Type or model number designation	Marked on label	P
	c. Serial number (unless marked on other part of product)	Provided under superstrate near the top rail of frame	P
	d. Date and place of manufacture, alternatively serial number allowing to trace the date and place of manufacture;	Serial number allowing to trace the date and place of manufacture	P
	e. Maximum system voltage	1500V DC	P
	f. Class of protection against electrical shock	Class II	P
	g. Voltage at open-circuit or Voc including tolerances.	Marked on label	P
	h. Current at short-circuit or Isc including tolerances	Marked on label	P
	i. Module maximum power or Pmax including tolerances	Marked on label	P
5.2	**Documentation**		P
5.2.1	Minimum requirements		P
	Modules are supplied with documentation describing the methods of electrical and mechanical installation as well as the electrical ratings of the module	Refer to manual document	P
	The documentation states the class of protection against electrical shock under which the module has been qualified and any specific limitations required for that class.	Refer to manual document	P
	The documentation assures that installers and operators receive appropriate and sufficient documentation for safe installation, use, and maintenance of the PV modules.	Refer to manual document	P
5.2.2	Information given in the documentation		P
	a. All information required under 5.1 e) to i)	Marked on label	P

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict
	b. Overcurrent protection device type and rating are e.g. given in IEC 60269-6	Marked on label	P
	Maximum series/parallel module configuration is recommended	Refer to manual document	P
	c. Manufacturer's stated tolerance for Voc, Isc and maximum power output under standard test conditions	Refer to manual document	P
	d. Temperature coefficient for voltage at open-circuit	Refer to manual document	P
	e. Temperature coefficient for maximum power	Refer to manual document	P
	f. Temperature coefficient for short-circuit current	Refer to manual document	P
	All electrical data mentioned above shown as relative to standard test conditions (1 000 W/m^2, 25 °C, AM 1,5 according to IEC TS 61836)	Marked on label	P
	g. Nominal module operating temperature (NMOT) is specified	Refer to manual document	P
	h. Performance at NMOT (MQT 06.2) is specified	Refer to manual document	P
	i. Performance at low irradiance (MQT 07) is specified	Refer to manual document	P
	j. International symbols used where applicable	Refer to manual document	P
	k. Compliance checked by inspection and MQT 04 through MQT 07	Refer to manual document	P
	l. The electrical documentation includes a detailed description of the electrical installation wiring method to be used	—	
	m. The minimum cable diameters for modules intended for field wiring	Refer to manual document	P
	n. Any limitations on wiring methods and wire management that apply to the wiring compartment or box;	Refer to manual document	P
	o. The size, type, material and temperature rating of the conductors to be used	Refer to manual document	P
	p. Type of terminals for field wiring	Refer to manual document	P
	q. limitations to the mounting situation (e.g., slope, orientation, mounting means, cooling)	Refer to manual document	P
	r. statement indicating the fire rating(s) and the applied standard and the limitations to that rating (e.g., installation slope, sub-structure or other applicable installation information)	Refer to manual document	P

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict
	s. A statement indicating the design load per each mechanical means for securing the module as evaluated during the static mechanical load test according to MQT 16. At discretion of the manufacturer the test load and/or the safety factor γ_m may be noted, too	Refer to manual document	P
	The installation instructions include relevant parameters specified by manufacturer or the following statement or the equivalent: *"Under normal conditions, a photovoltaic module is likely to experience conditions that produce more current and/or voltage than reported at standard test conditions. Accordingly, the values of I_{SC} and V_{OC} marked on this module should be multiplied by a factor of 1,25 when determining component voltage ratings, conductor current ratings, and size of controls connected to the PV output."*	Refer to manual document	P
5.2.3	Assembly instructions		—
	Provided with a product shipped in subassemblies, detailed and adequate to the degree required to facilitate complete and safe assembly of the product	—	N/A
Supplementary information: —			

7. PASS CRITERIA						P
7.2	**Power output and electric circuitry**					—
7.2.1	Verification of rated label values (Gate No. 1)					—
	Manufacturer's tolerances and Laboratory uncertainties					P
		t_1	t_2	t_3	t_4	—
	manufacturer's rated lower/upper production tolerance in %	3	3	3	3	
		m_1	m_2	m_3		
	measurement uncertainty in % of the laboratory	2.6	1.0	2.4		
	Laboratory reproducibility r .....:	0.9%				
	After stabilization, each individual module meets the requirements					P
	P_{max} ..... :	See Table 03				P
	V_{oc} ..... :	See Table 03				P
	I_{sc}:..... :	See Table 03				P
	After stabilization the arithmetic average $\bar{P}_{max}$ $\bar{P}_{max}$ of all modules meet the requirements.	See Table 03				P

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict
7.2.2	Maximum power degradation during type approval testing (Gate #2)		P
	At the end of each test sequence or for sequence B after bypass diode test, each test sample meets the requirements for P_{max}	See each Table of the test	P
7.2.3	Electrical circuitry		P
	Samples do not exhibit an open-circuit during the tests	—	P
7.3	**Visual defects**		P
	There is no visual evidence of a major defect.	—	P
7.4	**Electrical safety**		P
	The insulation test (MQT 03) requirements are met at the beginning and the end of each sequence	See each Table of the test	P
	The wet leakage current test (MQT 15) requirements met at the beginning and at the end of each sequence	See each Table of the test	P
	Specific requirements of the individual tests are met	—	N/A
Supplementary information: —			

4. TESTING OVERVIEW			—
	Initial examination	All modules	P
4.1	Visual inspection (MQT 01)) .....:	See Table 01	P
4.19.5	Initial stabilization (MQT 19.1) .....:	See Table 02	P
4.6	Performance at STC & BNPI (MQT 06.1)	See Table 03	P
4.3	Insulation test (MQT 03) .....:	See Table 04	P
4.15	Wet leakage current test (MQT 15) .....:	See Table 05	P

Sequence A	**1 Module**	Sample 1	P
4.7	Performance at low irradiance (MQT 07).....:	See Table 06	P
4.4	Measurement of temperature coefficients (MQT 04) .....:	See Table 07	P

Sequence B	**1 Module**	Sample 2	P
4.8	Outdoor exposure test (MQT 08).....:	See Table 08	P
4.18.1	Bypass diode thermal test (MQT 18.1)		P
	Maximum allowed junction temperature .....:	—	—

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Calculated junction temperature .....:	—	—
	Final measurements.....:	See Table 09	P
4.18.2	Bypass diode functionality test (MQT 18.2) .....:	See Table 10	P
4.19.6	Final stabilization (MQT 19.2).....:	See Table 10.1 – 10.3	P
4.9	Hot spot endurance test (MQT 09) .....:	See Table 11	P
Sequence C	**2 Modules**	Samples 3,4	P
4.10	UV preconditioning test (MQT 10) .....:	See Table 13.1 - 13.2	P
4.20	Cyclic (dynamic) mechanical load test (MQT 20)	See Table 14	P
4.11	Thermal cycling test 50 cycles (MQT 11).....:	See Table 15	P
4.12	Humidity-freeze test (MQT 12).....:	See Table 16	P
Sequence C1	**1 Module**	Sample 3	P
4.14.2	Retention of junction box on mounting surface (MQT 14.1) .....:	See Table 17	P
4.14.3	Test of cord anchorage (MQT 14.2)		N/A
4.14.3.1	The junction box, separate from the module, shall be tested to IEC 62790 "Test of cord anchorage" and shall meet the requirements therein .....:	See list of attachments	P
Sequence D	**2 Modules**	Samples 5,6	P
4.11	Thermal cycling test 200 cycles (MQT 11) .....:	See Table 18	P
Sequence E	**2 Modules**	Samples 7,8	P
4.13	Damp heat test (MQT 13) .....:	See Table 19	P
4.19.6	~~Final stabilization (MQT 19.2).....:~~	~~See Table 23.3~~	N/A
Sequence E1	**1 Module**	Sample 7	P
4.16	Static mechanical load test (MQT 16).....:	See Table 20	P
4.22	~~Bending test (MQT 22).....:~~	~~See Table 20~~	N/A

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict
Sequence E2	**1 Module**	Sample 8	P
4.17	Hail test (MQT 17)	See Table 21	P
Sequence F	**4 Modules**	Samples 9,10,11,12	P
4.21	Potential induced degradation test (MQT 21)	See Table 22	P
4.19.6	~~Final stabilization (MQT 19.2) .....:~~	~~See Table 23.4, 23.6, 23.7~~	N/A
	Final measurement	All modules for Sequence C, D, E, F; Control module for Sequence A	P
4.19.6	~~Final stabilization (MQT 19.2) .....:~~	~~See Table 23.1 - 23.2~~	N/A
4.6	Performance at STC&BNPI (MQT 06.1) .....:	See Table 23.3,-23.5	P
4.3	Insulation test (MQT 03) .....:	See Table 23.6	P
4.15	Wet leakage current test (MQT 15) .....:	See Table 23.7	P

TABLE 01: MQT 01 ini: Initial Visual inspection		
Test Date [YYYY-MM-DD]..... :	2025-05-06	—
Sample #	Nature and position of initial findings – comments or attach photos	—
1	No visual defects found	P
2	No visual defects found	P
3	No visual defects found	P
4	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
12	No visual defects found	P
23	No visual defects found	P
24	No visual defects found	P
Supplementary information: —.		

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE 02: MQT 19.1 ini: Initial stabilization							
TABLE 02.1: MQT 06.1 ini: Performance at STC before initial stabilization							
Test Date [YYYY-MM-DD]..... :			2025-05-06				—
Test method..... :			☒ Solar simulator ☐ Natural sunlight				—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	Result
1	15.61	48.61	14.91	40.91	610.0	80.41	—
2	15.72	48.67	14.93	41.04	612.6	80.07	—
3	15.76	48.68	14.94	41.02	613.0	79.89	—
4	15.72	48.64	14.93	41.04	612.8	80.16	—
5	15.72	48.58	14.91	41.04	612.1	80.15	—
6	15.72	48.67	14.94	41.03	612.9	80.13	—
7	15.75	48.67	14.94	41.04	613.1	79.96	—
8	15.73	48.60	14.95	41.01	612.9	80.14	—
9	15.67	48.64	14.88	41.02	610.4	80.11	—
10	15.67	48.61	14.88	40.99	610.1	80.12	—
11	15.67	48.70	14.82	41.43	614.0	80.49	—
12	15.68	48.73	14.85	41.43	615.3	80.50	—
Supplementary information: —							

TABLE 02.2: MQT 19.1: Initial Stabilization procedure							
Light exposure method ..... :			☐ Solar simulator ☒ Natural sunlight				
Stabilization criterion x per IEC 61215-1-x ..... :			1%				
Sample #	1	Test Date (YYYY-MM-DD) start/end .....:			2025-05-06/2025-05-13		
Test cycle	Integrated irradiation (kWh/m^2)	Irradiance (W/m^2)	Module temperature (°C)	Resistive load(Ω)	P_{max} (W) at the end of cycle	(P_{max} – P_{min}) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	610.0	—	—
1	5.2	>500	—	2.7	609.1	—	—
2	5.3	>500	—	2.7	608.3	0.28	Yes
3	—	—	—	—	—	—	—
Sample #	2	Test Date (YYYY-MM-DD) start/end .....:			2025-05-06/2025-05-13		
Test cycle	Integrated irradiation (kWh/m^2)	Irradiance (W/m^2)	Module temperature (°C)	Resistive load(Ω)	P_{max} (W) at the end of cycle	(P_{max} – P_{min}) / $P_{average}$ (%)	Stable (Yes/No)

IEC 61215-1							
Clause	Requirement + Test				Result - Remark		Verdict
Initial	—	—	—	—	612.6	—	—
1	5.2	>500	—	2.7	611.4	—	—
2	5.3	>500	—	2.7	610.1	0.41	Yes
3	—	—	—	—	—	—	—
Sample #	3	Test Date (YYYY-MM-DD) start/end .....:			2025-05-06/2025-05-13		
Test cycle	Integrated irradiation (kWh/m^2)	Irradiance (W/m^2)	Module temperature (°C)	Resistive load(Ω)	P_{max} (W) at the end of cycle	($P_{max} – P_{min}$) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	613.0	—	—
1	5.2	>500	—	2.7	612.3	—	—
2	5.3	>500	—	2.7	611.5	0.24	Yes
3	—	—	—	—	—	—	—
Sample #	4	Test Date (YYYY-MM-DD) start/end .....:			2025-05-06/2025-05-13		
Test cycle	Integrated irradiation (kWh/m^2)	Irradiance (W/m^2)	Module temperature (°C)	Resistive load(Ω)	P_{max} (W) at the end of cycle	($P_{max} – P_{min}$) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	612.8	—	—
1	5.2	>500	—	2.7	612.1	—	—
2	5.3	>500	—	2.7	611.3	0.25	Yes
—	—	—	—	—	—	—	—
Sample #	5	Test Date (YYYY-MM-DD) start/end .....:			2025-05-06/2025-05-13		
Test cycle	Integrated irradiation (kWh/m^2)	Irradiance (W/m^2)	Module temperature (°C)	Resistive load(Ω)	P_{max} (W) at the end of cycle	($P_{max} – P_{min}$) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	612.1	—	—
1	5.2	>500	—	2.7	611.2	—	—
2	5.3	>500	—	2.7	610.5	0.26	Yes
3	—	—	—	—	—	—	—
Sample #	6	Test Date (YYYY-MM-DD) start/end .....:			2025-05-06/2025-05-13		
Test cycle	Integrated irradiation (kWh/m^2)	Irradiance (W/m^2)	Module temperature (°C)	Resistive load(Ω)	P_{max} (W) at the end of cycle	($P_{max} – P_{min}$) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	612.9	—	—
1	5.2	>500	—	2.7	612.1	—	—
2	5.3	>500	—	2.7	611.2	0.28	Yes
3	—	—	—	—	—	—	—

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

Sample #	7	Test Date (YYYY-MM-DD) start/end .....:			2025-05-06/2025-05-13		
Test cycle	Integrated irradiation (kWh/m^2)	Irradiance (W/m^2)	Module temperature (°C)	Resistive load(Ω)	P_{max} (W) at the end of cycle	($P_{max} – P_{min}$) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	613.1	—	—
1	5.2	>500	—	2.7	612.1	—	—
2	5.3	>500	—	2.7	611.4	0.28	Yes
3	—	—	—	—	—	—	—
Sample #	8	Test Date (YYYY-MM-DD) start/end .....:			2025-05-06/2025-05-13		
Test cycle	Integrated irradiation (kWh/m^2)	Irradiance (W/m^2)	Module temperature (°C)	Resistive load(Ω)	P_{max} (W) at the end of cycle	($P_{max} – P_{min}$) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	612.9	—	—
1	5.2	>500	—	2.7	612.2	—	—
2	5.3	>500	—	2.7	611.0	0.31	Yes
3	—	—	—	—	—	—	—
Sample #	9	Test Date (YYYY-MM-DD) start/end .....:			2025-05-06/2025-05-13		
Test cycle	Integrated irradiation (kWh/m^2)	Irradiance (W/m^2)	Module temperature (°C)	Resistive load(Ω)	P_{max} (W) at the end of cycle	($P_{max} – P_{min}$) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	610.4	—	—
1	5.2	>500	—	2.7	609.2	—	—
2	5.3	>500	—	2.7	608.5	0.31	Yes
3	—	—	—	—	—	—	—
Sample #	10	Test Date (YYYY-MM-DD) start/end .....:			2025-05-06/2025-05-13		
Test cycle	Integrated irradiation (kWh/m^2)	Irradiance (W/m^2)	Module temperature (°C)	Resistive load(Ω)	P_{max} (W) at the end of cycle	($P_{max} – P_{min}$) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	610.1	—	—
1	5.2	>500	—	2.7	609.3	—	—
2	5.3	>500	—	2.7	608.1	0.33	Yes
3	—	—	—	—	—	—	—
Sample #	11	Test Date (YYYY-MM-DD) start/end .....:			2025-05-06/2025-05-13		
Test cycle	Integrated irradiation (kWh/m^2)	Irradiance (W/m^2)	Module temperature (°C)	Resistive load(Ω)	P_{max} (W) at the end of cycle	($P_{max} – P_{min}$) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	614.0	—	—
1	5.2	>500	—	2.7	613.4	—	—

IEC 61215-1							
Clause	Requirement + Test			Result - Remark			Verdict
2	5.3	>500	—	2.7	611.9	0.34	Yes
3	—	—	—	—	—	—	—
Sample #	12	Test Date (YYYY-MM-DD) start/end .....:			2025-05-06/2025-05-13		
Test cycle	Integrated irradiation (kWh/m^2)	Irradiance (W/m^2)	Module temperature (°C)	Resistive load(Ω)	P_{max} (W) at the end of cycle	(P_{max} – P_{min}) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	615.3	—	—
1	5.2	>500	—	2.7	614.3	—	—
2	5.3	>500	—	2.7	613.1	0.36	Yes
3	—	—	—	—	—	—	—
Supplementary information: —							
Supplementary information: —							

TABLE 03: MQT 06.1 initial: Performance at STC after initial stabilization (Front side)		
Test Date [YYYY-MM-DD] ..... :	2025-05-13	—
P_{max} lower limit (W) ..... :	See table below: Pmax [W] – Min calc.	—
$\bar{P}_{max}$ (lab) lower limit (W) ..... :	587.400	—
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 ..... :	☒ Solar simulator ☐ 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	15.60	16.110	48.51	48.729	14.88	40.87	608.3	569.778	80.38	P
2	15.71	16.110	48.51	48.729	14.91	40.91	610.1	569.778	80.05	P
3	15.76	16.110	48.60	48.729	14.93	40.95	611.5	569.778	79.84	P
4	15.70	16.110	48.57	48.729	14.91	41.00	611.3	569.778	80.15	P
5	15.69	16.110	48.58	48.729	14.90	40.96	610.5	569.778	80.09	P
6	15.71	16.110	48.57	48.729	14.93	40.93	611.2	569.778	80.12	P
7	15.73	16.110	48.60	48.729	14.93	40.95	611.4	569.778	79.95	P
8	15.71	16.110	48.53	48.729	14.94	40.90	611.0	569.778	80.12	P
9	15.65	16.110	48.54	48.729	14.85	40.97	608.5	569.778	80.10	P
10	15.64	16.110	48.55	48.729	14.86	40.93	608.1	569.778	80.09	P

IEC 61215-1										
Clause	Requirement + Test						Result - Remark			Verdict
11	15.64	16.110	48.64	48.729	14.80	41.33	611.9	569.778	80.43	P
12	15.64	16.110	48.71	48.729	14.84	41.33	613.1	569.778	80.46	P
Average	—						610.579	—	—	—
Supplementary information: The limit values are calculated considering manufacturer's tolerances ***t*** of rated nameplate values and laboratory measurement uncertainties ***m***.										

TABLE 03.1: MQT 06.1: Performance at STC after initial stabilization (Back side)										
Test Date [YYYY-MM-DD]..... :	2025-05-13									—
Test method……..:	☒ Solar simulator ☐ Natural sunlight									—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	φI_{sc}	φV_{oc}	φP_{max}	Result
1	11.73	48.19	11.50	41.75	480.3	84.98	0.7517	0.9934	0.7895	1
2	11.74	48.25	11.60	41.59	482.5	85.20	0.7471	0.9946	0.7908	2
3	11.64	48.24	11.65	41.47	483.3	86.08	0.7384	0.9926	0.7903	3
4	11.74	48.34	11.59	41.55	481.6	84.85	0.7477	0.9951	0.7877	4
5	11.70	48.17	11.58	41.55	481.2	85.37	0.7459	0.9914	0.7882	5
6	11.57	48.21	11.62	41.63	483.6	86.70	0.7367	0.9925	0.7913	6
7	11.56	48.40	11.49	41.72	479.6	85.74	0.7345	0.9959	0.7844	7
8	11.50	48.26	11.52	41.68	480.0	86.47	0.7320	0.9943	0.7856	8
9	11.73	48.25	11.40	41.86	477.3	84.31	0.7498	0.9940	0.7844	9
10	11.58	48.19	11.46	41.68	477.6	85.56	0.7406	0.9926	0.7853	10
11	11.74	48.31	11.62	41.75	485.1	85.53	0.7506	0.9932	0.7928	11
12	11.71	48.38	11.63	41.65	484.4	85.51	0.7485	0.9932	0.7901	12
Supplementary information: —										

TABLE 03.2: 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]..... :	2025-05-13	—
P_{max} lower limit (W) ..... :	See table below: P_{max} [W] – Min calc.	—
$\bar{P}_{max}$ (lab) lower limit (V) ..... :	650.056	—
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.	—

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

Test method .....:	☒ Solar simulator ☐ 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	17.24	17.847	48.61	49.035	16.46	40.78	671.1	630.555	80.09	—
2	17.37	17.847	48.64	49.035	16.50	40.84	674.0	630.555	79.76	—
3	17.43	17.847	48.66	49.035	16.51	40.84	674.4	630.555	79.53	—
4	17.36	17.847	48.61	49.035	16.50	40.85	674.0	630.555	79.85	—
5	17.38	17.847	48.59	49.035	16.48	40.90	674.0	630.555	79.79	
6	17.38	17.847	48.61	49.035	16.51	40.83	674.1	630.555	79.78	—
7	17.40	17.847	48.66	49.035	16.52	40.79	674.0	630.555	79.60	—
8	17.38	17.847	48.61	49.035	16.52	40.82	674.3	630.555	79.82	—
9	17.31	17.847	48.65	49.035	16.42	40.93	672.2	630.555	79.80	—
10	17.31	17.847	48.65	49.035	16.45	40.83	671.7	630.555	79.78	—
11	17.27	17.847	48.84	49.035	16.37	41.29	676.0	630.555	80.15	—
12	17.31	17.847	48.81	49.035	16.41	41.27	677.2	630.555	80.15	—
Average	—						673.927	—	—	—

Supplementary information: The limit values are calculated considering manufacturer's tolerances ***t*** of rated nameplate values and laboratory measurement uncertainties ***m***.

TABLE 04: MQT 03: Initial Insulation test				
Test Date [YYYY-MM-DD] .....:	2025-05-13			—
Test Voltage applied [V] .....:	8000/1500			—
Size of module [m²] .....:	2.70			—
Required Resistance [MΩ] .....:	>14.81			—
Sample #	Measured	Dielectric breakdown		Result
	MΩ	Yes (description)	No	
1	26100	—	☒	P
2	25300	—	☒	P
3	22700	—	☒	P
4	24900	—	☒	P
6	21100	—	☒	P

IEC 61215-1				
Clause	Requirement + Test	Result - Remark		Verdict
7	24800	—	☒	P
8	20700	—	☒	P
9	28300	—	☒	P
10	21500	—	☒	P
11	26600	—	☒	P
12	21900	—	☒	P
Supplementary information: —				

TABLE 05: MQT 15: Initial Wet leakage current test		
Test Date [YYYY-MM-DD] .....:		2025-05-13
Test Voltage applied [V] .....:		1500
Solution temperature [°C].....:		23.8
Solution resistivity [Ω cm] .....:		2471
Size of module [m²] .....:		2.70
Sample #	Required Resistance [MΩ]	Measured [MΩ]
01	>14.81	7130
02	>14.81	5470
03	>14.81	5310
04	>14.81	4220
06	>14.81	9670
07	>14.81	5890
08	>14.81	3870
09	>14.81	10250
10	>14.81	7640
11	>14.81	5230
12	>14.81	11510
Supplementary information: —		

TABLE 06: MQT 07 - Performance at low irradiance			
Test Date [YYYY-MM-DD] ..... :	2025-05-21		—
Test method ..:	☐ Outdoor measurement		—
	Ambient air temperature [°C]:	—	
	Irradiance [W/m^2]:	—	
	Module temperature [°C]:	—	

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

	☒ Data corrected to a 25°C cell temperature and 200 W/m^2 irradiance	
	☐ Directly measured	—

Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]
01-F	3.16	46.17	2.98	40.53	120.82	82.76
01-B	2.41	45.76	2.29	40.54	92.86	84.16

Supplementary information: —.

TABLE 07: MQT 04 - Measurement of temperature coefficients				
Test Date [YYYY-MM-DD] .....:		2025-05-21		—
Ambient air temperature [°C] high/low .....:		65.2/25.0		—
Irradiance [W/m^2] high/low.....:		Corrected to 1000		—
Module temperature [°C] high/low.....:		65.2/25.1		—
Sample #	α [%/°C]	β [%/°C]	δ [%/°C]	—
01	0.0293	-0.2716	-0.3484	—
Supplementary information: —				

TABLE 08: MQT 08 - Outdoor exposure test		
Test Date [YYYY-MM-DD] start/end .....:	2025-05-13/ 2025-06-09	—
Sample #	02	—
Total irradiation dosage [kWh/m^2] .....:	60.2	—
Angle of tilt the test module .....:	35°	—
Electrical load:	☒ Restive load ☐ MPPT	—
Supplementary information: —		

Table 08.1: MQT 01: Visual inspection after outdoor exposure test		
Test Date [YYYY-MM-DD].....:	2025-06-09	—
Sample #	Nature and position of initial findings – comments or attach photos	—
02	No major visual defects	P
Supplementary information: —		

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

Table 08.2: MQT 15: Wet leakage current test after outdoor exposure test			
Test Date [YYYY-MM-DD] .....:	2025-06-09		—
Test Voltage applied [V] .....:	1500		—
Solution temperature [°C] .....:	23.1		—
Size of module [m²] .....:	2.70		—
Solution resistivity [Ω cm].....:	2471		—
Sample #	Measured [MΩ]	Limit [MΩ]	Result
02	6432	≥12.86	P
Supplementary information: —			

Table 08.3: MQT 02 - Maximum power determination after outdoor exposure test - Optional						
Test Date [YYYY-MM-DD].....:	—					—
Module temperature [°C].....:	—					—
Irradiance [W/m²) .....:	—					—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]
—	—	—	—	—	—	—
—	—	—	—	—	—	—
—	—	—	—	—	—	—
Supplementary information: —						

Table 08.4: MQT 03 - Insulation test after outdoor exposure test - Optional					
Test Date [YYYY-MM-DD].....:	—				—
Test Voltage applied [V] .....:	—				—
Size of module [m²] .....:	—				—
Required Resistance [MΩ].....:	—				—
Sample #	Measured	Required (MΩ)	Dielectric breakdown		Result
	(MΩ)	(MΩ)	Yes (description)	No	
—	—	—	—	—	—
Supplementary information: —.					

TABLE 09: MQT 18: Bypass diode thermal test		
Test Date [YYYY-MM-DD] start/end .....:	2025-06-11	—
Sample #	02	—
Module temperature [°C].....:	75±5	—

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

Number of diodes in junction box ..... :	3				—
Diode manufacturer ..... :	/				—
Diode type designation ..... :	/				—
Max. permissible junction temperature, T_{Jmax} [°C] (according to diode datasheet) ..... :	200				—
Detailed description of sample preparation procedure ..... :	performed on full module				—
Step 1, Determination of V_D versus T_J characteristic					—
Diode 1	30 ± 2 °C	50 ± 2 °C	70 ± 2 °C	90 ± 2 °C	
Ambient temperature of the junction box ... :	28.74	51.02	68.78	89.4	
Pulsed current.....:	19.4	19.4	19.4	19.4	
Voltage drop [V] .....:	0.4384	0.4156	0.3963	0.3759	
V_D versus T_J characteristic .....:	V_D = -0.0010 T_J + 0.4681				—
Max. permissible junction temperature Tj_{max} [°C] (according to diode datasheet) ..... :	200				—
Diode 2	30 ± 2 °C	50 ± 2 °C	70 ± 2 °C	90 ± 2 °C	
Ambient temperature of the junction box ... :	28.56	50.98	68.54	89.34	
Pulsed current.....:	19.4	19.4	19.4	19.4	
Voltage drop [V] .....:	0.4362	0.4127	0.3936	0.3723	
V_D versus T_J characteristic .....:	V_D = -0.0011 T_J + 0.4663				—
Max. permissible junction temperature Tj_{max} [°C] (according to diode datasheet) ..... :	200				—
Diode 3	30 ± 2 °C	50 ± 2 °C	70 ± 2 °C	90 ± 2 °C	
Ambient temperature of the junction box ... :	28.64	51.32	68.30	89.49	
Pulsed current.....:	19.4	19.4	19.4	19.4	
Voltage drop [V] .....:	0.4357	0.4125	0.3935	0.3724	
V_D versus T_J characteristic .....:	V_D = -0.0010 T_J + 0.4657				—
Max. permissible junction temperature Tj_{max} [°C] (according to diode datasheet) ..... :	200				—
Step 2, Bypass diode thermal test					
	Diode 1	Diode 2	Diode 3	Result	
Current flow applied [A] ..... :	19.4	19.4	19.4	19.4	
Max. diode surface temperature allowed Tj_{max} [°C] :	200	200	200	—	
Voltage drop, V_D [V] after 1h..... :	0.3012	0.2907	0.2977	—	
Calculated max. junction temperature Tj_{calc} [°C] .... :	166.9	159.6	168.0	—	

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

$T_{Jcalc} < T_{Jmax}$ (test passed)? yes/no .....:	Yes	Yes	Yes	P
Current flow (1.25 * I_{sc}) [A] .....:	24.25	24.25	24.25	—
Bypass diode remain(s) functional (yes/no) .....:	Yes	Yes	Yes	P
Remarks: See Table 12 for the test details of bypass diode functionality test. 3 Diodes are considered as representative number. These diodes have to be selected as worst case. In case that additional bypass diodes tests are performed the results shall be listed in an attachment.				

TABLE 09.1: MQT 01 - Visual inspection after bypass diode thermal test		
Test Date [YYYY-MM-DD]..... :	2025-06-11	—
Sample #	Nature and position of initial findings – comments or attach photos	—
02	No major visual defects	P
Supplementary information: —		

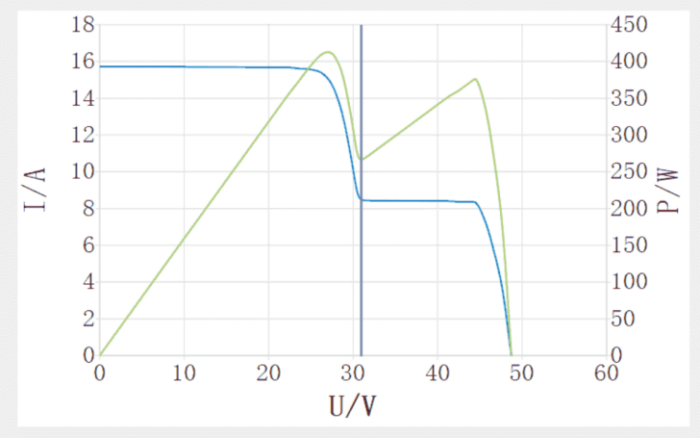
TABLE 09.2: MQT 15 - Wet leakage current test after bypass diode thermal test			
Test Date [YYYY-MM-DD] ..... :	2025-06-11		—
Test Voltage applied [V]..... :	1500		—
Solution temperature [°C] ..... :	21.2		—
Size of module [m²] ..... :	2.70		—
Solution resistivity [Ω cm]..... :	2532		—
Sample #	Measured [MΩ]	Limit [MΩ]	Result
02	6180	>14.81	P
Supplementary information: —			

TABLE 09.3: MQT 02 – Max. power determination after bypass diode thermal test - Optional							
Test Date [YYYY-MM-DD].....:	—						—
Module temperature [°C].....:	—						—
Irradiance [W/m²) .....:	—						—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	—
—	—	—	—	—	—	—	—
Supplementary information: —.							

TABLE 09.4: MQT 03 - Insulation test after bypass diode thermal test - Optional		
Test Date [YYYY-MM-DD].....:	—	—
Test Voltage applied [V] .....:	—	—
Size of module [m²] .....:	—	—

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

Required Resistance [MΩ]..... :			—		—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
—	—	—	—	—	—
Supplementary information: —					

TABLE 10: MQT 18.2 - Bypass diode functionality test after bypass diode thermal test				
Test Date [YYYY-MM-DD]..... :	2025-06-11			—
☐ Method A				—
Ambient temperature [°C] ……:	—			—
Current flow applied [A] ……..……:	—			—
Sample #	VFM	$V_{FMrated}$	VFM = (N × $V_{FMrated}$) ± 10 %	Result
02	—	—	☐ Yes ☐ No	—
Supplementary information: —				
☒ Method B				—
	IV curve after shading			Result
2-Diode 1				P

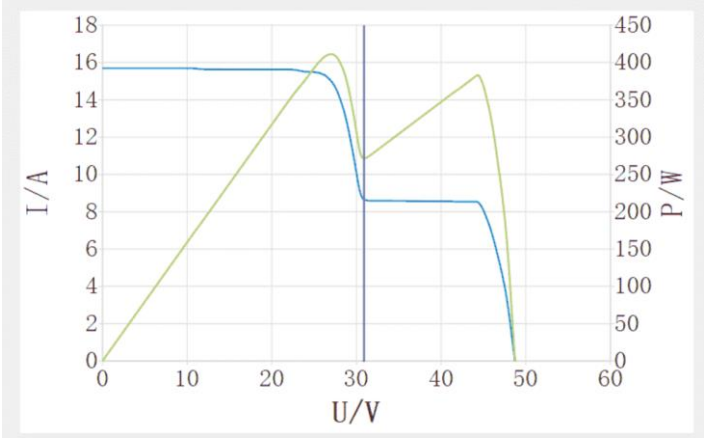
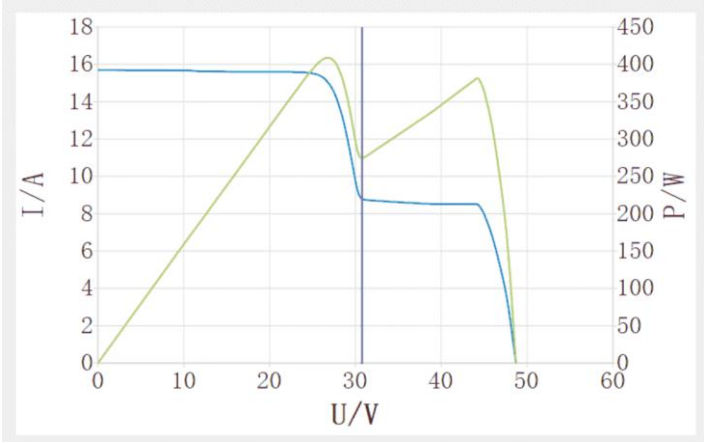
IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict
2-Diode 2			P
2-Diode 3			P
Supplementary information: —			

TABLE 11: MQT 09 - Hot-spot endurance test		
Test Date [YYYY-MM-DD] start/end .....:	2025-06-13/2025-06-14	—
Sample #	02	—
Procedure of technology .....:	☒ wafer-based technologies (WBT) MQT 09.1 ☐ monolithically integrated (MLI) thin film technologies MQT 09.2	—
Cell interconnection circuit .....:	☐ S ☒ SP ☐ PS	—
Type of light source .....:	☐ Pulse solar simulator ☒ Steady state solar simulator ☐ Natural sunlight	—
Module temperature at thermal equilibrium [°C] .:	57.9	—

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE 11.1: MQT 09 - Hot-spot endurance test for WBT						
Selected hot-spot cells.....:	Low	Low	Low	High	Permanent	—
	5A	6A	1N	2T	—	
Shading rate [%].....:	50	55	50	55	—	—
Max. measured cell temperature in each cell [°C]:	144.87	150.64	146.66	139.87	—	—
Test duration of each shading [h] .....:	1	1	1	1	—	—
Irradiance during shading [W/m²] ……..... :	1233	1233	1233	1233	—	—

Supplementary information: For bifacial modules, determination of the cell shading percent and the prolonged exposure are performed at the elevated irradiance BSI. If double-side illumination is used to produce BSI, both the back and the front of the cell are shaded in the same way. During cell selection, any cell that is permanently shaded by a module feature (such as the junction box) is added to the list of selected cells

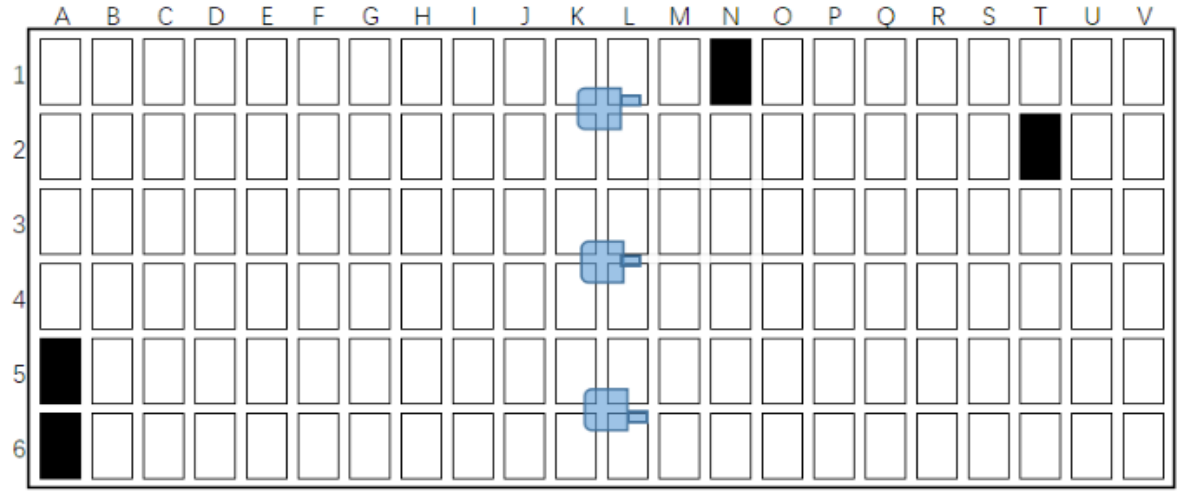


TABLE 11.2: MQT 09 - Hot-spot endurance test for MLI		
Selected hot-spot cells.....:	—	—
Number of cells shaded .....:	—	—
Max. measured cell temperature [°C] .....:	—	—
Test duration during shading [h] .....:	—	—
Irradiance during shading [W/m²] ……..... .....:	—	—
Supplementary information: —		

TABLE 11.3: MQT 01 - Visual inspection after hot-spot endurance test		
Test Date [YYYY-MM-DD].....:	2025-06-14	—
Sample #	Nature and position of initial findings – comments or attach photos	—

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

02	No major visual defects found	P
Supplementary information: —		

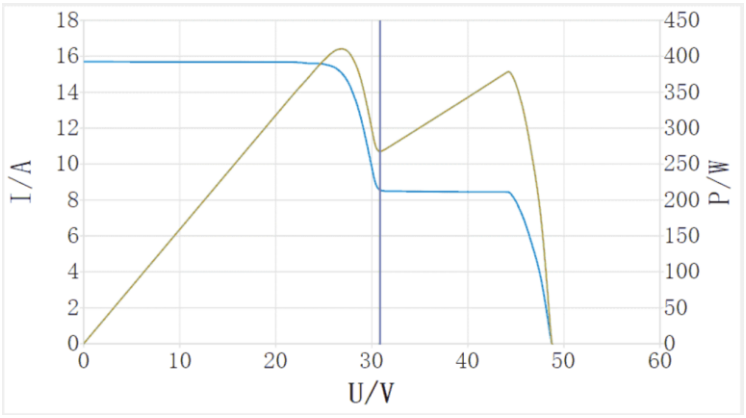
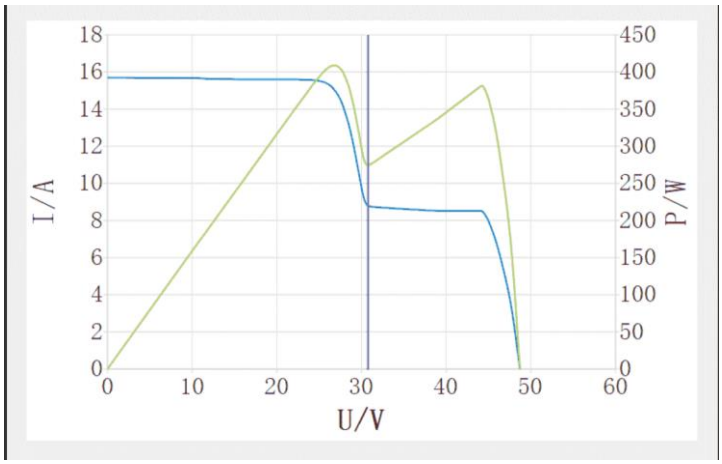
TABLE 11.4: MQT 02 - Maximum power determination after hot-spot endurance test							
Test Date [YYYY-MM-DD]:	2025-06-14						—
Module temperature [°C]:	Corrected to 25						—
Irradiance [W/m²):	Corrected to 1000or G_{BNPI}						—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	—
02-F	15.53	48.18	14.78	40.60	600.1	80.20	—
02-B	11.63	48.23	11.46	41.73	478.4	85.25	—
Supplementary information: —							

TABLE 11.5: MQT 03 - Insulation test after hot-spot endurance test				
Test Date [YYYY-MM-DD]:	2025-06-14			—
Test Voltage applied [V]:	8000/1500			—
Size of module [m²]:	2.70			—
Required Resistance [MΩ]:	>14.81			—
Sample #	Measured	Required	Dielectric breakdown	Result
	MΩ	MΩ	Yes (description) / No	
02	24600	>14.81	— / ☒	P

TABLE 11.6: MQT 15 - Wet leakage current test after hot-spot endurance test			
Test Date [YYYY-MM-DD]:	2025-06-14		—
Test Voltage applied [V]:	1500		—
Solution temperature [°C]:	22.3		—
Size of module [m²]:	2.70		—
Solution resistivity [Ω cm]:	2453		—
Sample #	Measured [MΩ]	Limit [MΩ]	Result
02	5360	>14.81	P
Supplementary information: —			

TABLE 12: MQT 18.2 - Bypass diode functionality test after Hot-spot endurance test		
Test Date [YYYY-MM-DD]:	2025-06-14	—

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

☐ Method A				—
Ambient temperature [°C] .....:	—			—
Current flow applied [A] .....:	—			—
Sample #	VFM	$V_{FMrated}$	VFM = (N × $V_{FMrated}$) ± 10 %	Result
02	—	—	☐ Yes ☐ No	—
Supplementary information: —				
☒ Method B				—
02#	IV curve after shading			Result
Diode 1				P
Diode 2				P

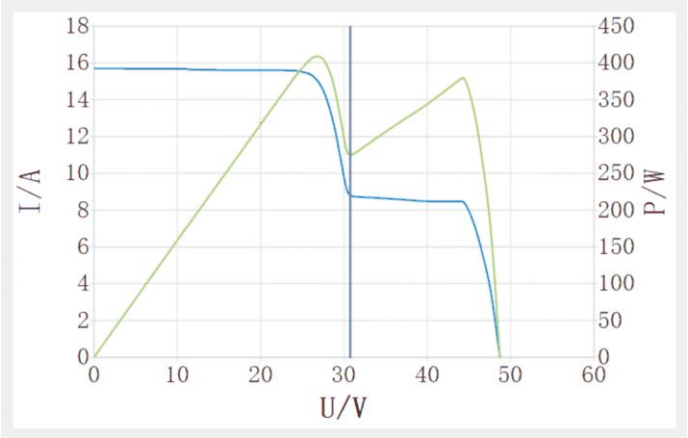
IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict
Diode 3			P

TABLE 13.1: MQT 10 - UV preconditioning test (Front side)		
Test Date (YYYY-MM-DD) start/end .....:	2025-05-13/ 2025-05-16	—
Module temperature [°C] ..... :	60±5	—
UV irradiance (280-400nm) [W/m²] ..... :	190.4	—
UV dose (280-320nm) [kWh/ m²] ..... :	13.3	—
Module operation condition ..... .:	☐ Short circuited ☒ Open circuited	—
Supplementary information: —		

TABLE 13.2: MQT 10 - UV preconditioning test (Back side)		
Test Date (YYYY-MM-DD) start/end .....:	2025-05-16/2025-05-19	—
Module temperature [°C] ..... :	60±5	—
UV irradiance (280-400nm) [W/m²] ..... :	190.4	—
UV dose (280-320nm) [kWh/ m²] ..... :	13.3	—
Module operation condition ..... .:	☐ Short circuited ☒ Open circuited	—
Supplementary information: For bifacial modules repeat the procedure of UV irradiation on the rear-side of the modules.		

TABLE 13.3: MQT 01 - Visual inspection after UV preconditioning test		
Test Date [YYYY-MM-DD].....:	2025-05-19	—
Sample #	Nature and position of initial findings – comments or attach photos	—
03	No major visual defects found	P
04	No major visual defects found	P

TABLE 13.4: MQT 15 - Wet leakage current test after UV preconditioning test		
Test Date [YYYY-MM-DD]..... :	2025-05-19	—

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

Test Voltage applied [V] ..... :	1500	—
Solution temperature [°C].....:	20.7	—
Size of module [m²] ..... :	2.70	—
Solution resistivity [Ω cm]..... :	2503	—

Sample #	Measured [MΩ]	Required Resistance [MΩ]	Result
03	5130	>14.81	P
04	4890	>14.81	P

Supplementary information: —

TABLE 13.5: MQT 02 – Max. power determination after UV preconditioning test - Optional

Test Date [YYYY-MM-DD].....:	—	—
Module temperature [°C].....:	—	—
Irradiance [W/m²].....:	—	—

Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	Result
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—

Supplementary information: —

TABLE 13.6: MQT 03 - Insulation test after UV preconditioning test - Optional

Test Date [YYYY-MM-DD].....:	—	—
Test Voltage applied [V] .....:	—	—
Size of module [m²] .....:	—	—
Required Resistance [MΩ].....:	—	—

Sample #	Measured		Dielectric breakdown		Result
	[MΩ]		Yes (description)	No	
—	—	—	—	—	—
—	—	—	—	—	—

Supplementary information: —

TABLE 14: MQT 20 - Cyclic (dynamic) mechanical Load test

Test Date [MM/DD/YYYY]……....:	2025-05-19/2025-05-20	—
Sample #	03,04	—
Temperature of tested module(°C):	28.4-29.6	—
Maximum pressure (Pa) :	1000	—

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

Pressure tolerance(Pa) :	±100	—
Monitoring current (A) :	0.1	—
Rate per minute(cycles) :	4	—
Number of cycles …….:	1000	—
Pressure provider (Air pressure or vacuum)……..:	Air pressure	—
Cell and alive part broken/ not	Not	P
Current continuous (continuous/ disconnection occurred)	Continuous	P
Supplementary information: —		

TABLE 14.1: MQT 01 - Visual inspection after Cyclic (dynamic) mechanical Load test		
Test Date [YYYY-MM-DD].....:	2025-05-21	—
Sample #	Nature and position of initial findings – comments or attach photos	—
03	No major visual defects found	P
04	No major visual defects found	P
Supplementary information: —		

TABLE 14.2: MQT 15 - Wet leakage current test after Cyclic (dynamic) mechanical Load test			
Test Date [YYYY-MM-DD]..... :	2025-05-21		—
Test Voltage applied [V] ..... :	1500		—
Solution temperature [°C] …….:	23.6		—
Size of module [m²] ..... :	2.70		—
Solution resistivity [Ω cm] …….:	2568		—
Sample #	Measured [MΩ]	Required Resistance [MΩ]	Result
03	5930	>14.81	P
04	5170	>14.81	P
Supplementary information: —			

TABLE 15: MQT 11 - Thermal cycling 50 test			
Test Date [YYYY-MM-DD] start/end ..... :	2025-05-21/ 2025-05-29		—
Total cycles (50).....:	50		—
Weight attached (N) .....:	5		—
Applied current (A) .....:	During the heat up cycle from -40 °C to 80 °C	18.4	—
	Other stages	0.1	—

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

Dwell time at high temperature……..:	20min	—
Dwell time at low temperature……:	20min	—

Sample #	Open circuits (yes/no)	—
03	No	P
04	No	P

Supplementary information: —

TABLE 15.1: MQT 01 - Visual inspection after thermal cycling 50 test

Test Date [YYYY-MM-DD].....:	2025-05-29	—

Sample #	Nature and position of initial findings – comments or attach photos	—
03	No major visual defects found	P
04	No major visual defects found	P

Supplementary information: —

TABLE 15.2: MQT 15 - Wet leakage current test after thermal cycling 50 test

Test Date [YYYY-MM-DD]..... :	2025-05-29	—
Test Voltage applied [V] ..... :	1500	—
Solution temperature [°C] ……..:	22.7	—
Size of module [m²] ..... :	2.70	—
Solution resistivity [Ω cm] ……..:	2476	—

Sample #	Measured [MΩ]	Required Resistance [MΩ]	Result
03	4710	>14.81	P
04	4620	>14.81	P

Supplementary information: —

TABLE 15.3: MQT 03 – Max. power determination after thermal cycling 50 test - Optional

Test Date [YYYY-MM-DD].....:	—	—
Module temperature [°C].....:	—	—
Irradiance [W/m²) .....:	—	—

Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]
—	—	—	—	—	—	—
—	—	—	—	—	—	—

Supplementary information: —

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE 15.4: MQT 03 - Insulation test after thermal cycling 50 test - Optional				
Test Date [YYYY-MM-DD]..... :	—			—
Test Voltage applied [V] ..... :	—			—
Size of module [m²] ..... :	—			—
Required Resistance [MΩ]..... :	—			—
Sample #	Measured	Dielectric breakdown		Result
	[MΩ]	Yes (description)	No	
—	—	—	—	—
—	—	—	—	—
Supplementary information: —				

TABLE 16: MQT 16 - Humidity freeze 10 test		
Test Date [YYYY-MM-DD] start/end .....:	2025-05-29/ 2025-06-08	—
Total cycles (10) ..... :	10	—
Applied current (A) ..... :	0.1	—
Dwell time at high temperature ..... :	20.5h	—
Dwell time at low temperature..... :	35min	—
Sample #	Open circuits (yes/no)	—
03	No	P
04	No	P
Supplementary information: —		

TABLE 16.1: MQT 01 - Visual inspection after humidity freeze 10 test		
Test Date [YYYY-MM-DD].....:	2025-06-08	—
Sample #	Nature and position of initial findings – comments or attach photos	—
03	No major visual defects found	P
04	No major visual defects found	P
Supplementary information: —		

TABLE 16.2: MQT 15 - Wet leakage current test after humidity freeze 10 test		
Test Date [YYYY-MM-DD].....:	2025-06-08	—
Test Voltage applied [V] .....:	1500	—

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

Solution temperature [°C]……..:	23.3	—
Size of module [m²] .....:	2.70	—
Solution resistivity [Ω cm].....:	2461	—

Sample #	Measured [MΩ]	Limit [MΩ]	Result
03	4990	>14.81	P
04	4380	>14.81	P

Supplementary information: —

TABLE 16.3: MQT 02 - Maximum power determination after humidity freeze 10 test -Optional						
Test Date [YYYY-MM-DD].....:	—					—
Module temperature [°C].....:	—					—
Irradiance [W/m²) .....:	—					—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]
—	—	—	—	—	—	—
—	—	—	—	—	—	—

Supplementary information: —

TABLE 16.4: MQT 03 Insulation test after humidity freeze 10 test -Optional					
Test Date [YYYY-MM-DD].....:	—				—
Test Voltage applied [V] .....:	—				—
Size of module [m²] .....:	—				—
Required Resistance [MΩ].....:	—				—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
—	—	—	—	—	—
—	—	—	—	—	—

Supplementary information: —

TABLE 17.1: MQT 14.1 Retention of junction box on mounting surface		
Test Date [YYYY-MM-DD] start/end .....:	2025-06-09	—
Sample #	03	—
Supplementary information: —		

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE 17.2: MQT 01 - Visual inspection after retention of junction box on mounting surface		
Test Date [YYYY-MM-DD]..... :	2025-06-09	—
Sample #	Nature and position of initial findings – comments or attach photos	—
03	No major visual defects found	P
Supplementary information: —.		

TABLE 17.3: MQT 15 - Wet leakage current test after retention of junction box on mounting surface			
Test Date [YYYY-MM-DD]..... :	2025-06-09		—
Test Voltage applied [V] ..... :	1500		—
Solution temperature [°C].....:	23.6		—
Size of module [m²]	2.70		—
Solution resistivity [Ω cm]..... :	2522		—
Sample #	Measured [MΩ]	Limit [MΩ]	Result
03	5180	>14.81	P
Supplementary information: —			

TABLE 17.4: MQT 14.2 - Test of cord anchorage						—
Sample #	—					—
☐ Junction boxes intended to be used with cables specified by the manufacturer						—
—	Cable diameter, [mm]	Tension Force, [N]	Permissible displacement, [mm]	Measured displacement, [mm]		Result
Pull test	—	—	2mm	—		—
—	Cable diameter, [mm]	Torque Force, [Nm]	Permissible angle [°]	Measured angle [°]		Result
Torque test	—	—	45°	—		—
☐ Junction boxes intended to be used with generic cables						—
—	Anchorage diameter range [mm]	Test mandrel [mm]	Tension Force, [N]	Permissible displacement [mm]	Measured displacement [mm]	Result
Pull test	Min —	—	—	2mm	—	—
—	Anchorage diameter range [mm]	Test mandrel [mm]	Torque Force [Nm]	Permissible angle [°]	Measured angle [°]	Result
Torque test	Max —	—	—	45°	—	—

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information: —			
TABLE 17.5: MQT 01 - Visual inspection after retention of test of cord anchorage			—
Test Date [YYYY-MM-DD].....:	—		—
Sample #	Nature and position of initial findings – comments or attach photos		—
—	—		—
Supplementary information: —			
TABLE 17.6: MQT 15 - Wet leakage current test after retention of test of cord anchorage			—
Test Date [YYYY-MM-DD]..... :	—		—
Test Voltage applied [V] ..... :	—		—
Solution temperature [°C].....:	—		—
Solution resistivity [Ω cm] .....:	—		—
Size of module [m²]	—		—

Sample #	Measured [MΩ]	Required Resistance [MΩ]	Result
—	—	—	—

Supplementary information: —			
TABLE 17.7: MQT 03 - Insulation test after test of cord anchorage			—
Test Date [YYYY-MM-DD]..... :	—		—
Test Voltage applied [V] ..... :	—		—
Size of module [m²] ..... :	—		—
Required Resistance [MΩ]..... :	—		—

Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
—	—	—	—	—	—

Supplementary information: —			

TABLE 18: MQT 11 - Thermal cycling 200 test			
Test Date [YYYY-MM-DD] start/end .....:	2025-05-13/ 2025-06-14		—
Total cycles (200).....:	200		—
Weight attached (N) .....:	5		—
Applied current (A) .....:	During the heat up cycle from –40 °C to 80 °C	18.4	—

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

	Other stages	0.1	—
Dwell time at high temperature .....:	20min		—
Dwell time at low temperature.....:	20min		—

Sample #	Open circuits (yes/no)	—
05	No	P
06	No	P

Supplementary information: —

TABLE 18.1: MQT 01 - Visual inspection after thermal cycling 200 test		
Test Date [YYYY-MM-DD].....:	2025-06-14	—

Sample #	Nature and position of initial findings – comments or attach photos	—
05	No major visual defects found	P
06	No major visual defects found	P

Supplementary information: —

TABLE 18.2: MQT 15 - Wet leakage current test after thermal cycling 200 test		
Test Date [YYYY-MM-DD].....:	2025-06-14	—
Test Voltage applied [V] .....:	1500	—
Solution temperature [°C].....:	22.3	—
Size of module [m²].....:	2.70	—
Solution resistivity [Ω cm].....:	2453	—

Sample #	Measured [MΩ]	Limit [MΩ]	Result
05	8740	>14.81	P
06	4060	>14.81	P

Supplementary information: —

TABLE 19: MQT 13 - Damp heat 1000 test		
Test Date [YYYY-MM-DD] start/end .....:	2025-05-09/ 2025-06-19	—
Total hours (1000h) .....:	1000	—

Sample #	Open circuits (yes/no)	—
07	No	P
08	No	P

Supplementary information: —

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE 19.1: MQT 01 - Visual inspection after damp heat 1000 test		
Test Date [YYYY-MM-DD]..... :	2025-06-19	—
Sample #	Nature and position of initial findings – comments or attach photos	—
07	No major visual defects found	P
08	No major visual defects found	P
Supplementary information: —		

TABLE 19.2: MQT 15 - Wet leakage current test after damp heat 1000 test			
Test Date [YYYY-MM-DD]..... :	2025-06-19		—
Test Voltage applied [V]..... :	1500		—
Solution temperature [°C]..... :	21.4		—
Size of module [m²] ..... :	2.70		—
Solution resistivity [Ω cm]..... :	2518		—
Sample #	Measured [MΩ]	Limit [MΩ]	Result
07	6320	>14.81	P
08	4170	>14.81	P
Supplementary information: —			

TABLE 19.3: MQT 02 - Maximum power determination after damp heat 1000 test - Optional							
Test Date [YYYY-MM-DD]..... :	—						—
Module temperature [°C]..... :	—						—
Irradiance [W/m²) ..... :	—						—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	Result
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
Supplementary information: —							

TABLE 19.4: MQT 03 - Insulation test after damp heat 1000 test - Optional					
Test Date [YYYY-MM-DD]..... :	—				—
Test Voltage applied [V] ..... :	—				—
Size of module [m²]	—				—
Sample #	Measured	Required Resistance	Dielectric breakdown		Result
	[MΩ]	[MΩ]	Yes (description)	No	
—	—	—	—	—	—

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

—	—	—	—	—	—
Supplementary information: —					

TABLE 20: MQT 16 Static mechanical load test			
Sample # :	07		—
Design load (front side/ back side)..... :	3600/ 1600Pa		—
Safety factors ..... :	1.5		—
Test Date [YYYY-MM-DD].....	2025-06-19		—
Mounting method ..... :	Mounting with clamps		—
Load applied to..... :	front side	back side	—
Mechanical load [Pa].....:	5400	2400	—
First cycle time (start/end).....:	08:30/09:30	09:30/10:30	—
Intermittent open-circuit (yes/no) .....:	No	No	P
Second cycle time (start/end) .....:	10:30/11:30	11:30/12:30	—
Intermittent open-circuit (yes/no) .....:	No	No	P
Third cycle time (start/end) .....:	12:30/13:30	13:30/14:30	—
Intermittent open-circuit (yes/no) .....:	No	No	P
Supplementary information: —			

TABLE 20.1: MQT 01 - Visual inspection after static mechanical load test		
Test Date [YYYY-MM-DD].....:	2025-06-19	—
Sample #	Nature and position of initial findings – comments or attach photos	—
07	No major visual defects found	P
Supplementary information: —		

TABLE 20.2: MQT 15 - Wet leakage current test after static mechanical load test			
Test Date [YYYY-MM-DD].....:	2025-06-19		—
Test Voltage applied [V] ..... :	1500		—
Solution temperature [°C]..... :	23.4		—
Size of module [m²] .....:	2.70		—
Solution resistivity [Ω cm].....:	2479		—
Sample #	Measured [MΩ]	Limit [MΩ]	Result
07	5730	>14.81	P
Supplementary information: —			

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE 21: MQT 17 - Hail impact test							
Test Date [YYYY-MM-DD] ..... :	2025-06-19						—
Sample #	08						—
Ice ball size [mm] ..... :	1	2	3	4	5	6	—
	24.82	24.72	24.69	24.89	24.62	24.82	
	7	8	9	10	11	—	
	24.74	24.62	24.54	24.72	24.82	—	
Ice ball weight [g] ..... :	1	2	3	4	5	6	—
	7.50	7.43	7.39	7.42	7.51	7.19	
	7	8	9	10	11	—	
	7.20	7.24	7.25	7.32	7.45	—	
Ice ball velocity [m/s] ..... :	1	2	3	4	5	6	—
	22.09	23.12	23.56	23.40	22.74	22.58	
	7	8	9	10	11	—	
	22.64	22.55	22.39	23.12	23.24	—	

TABLE 21.1: MQT 01 - Visual inspection after hail impact test		
Test Date [YYYY-MM-DD] ..... :	2025-06-19	—
Sample #	Nature and position of initial findings – comments or attach photos	—
08	No major visual defects found	P
Supplementary information: —		

TABLE 21.2: MQT 15 - Wet leakage current test after hail impact test			
Test Date [YYYY-MM-DD] ..... :	2025-06-19		—
Test Voltage applied [V] ..... :	1500		—
Solution temperature [°C] ..... :	23.6		—
Size of module [m²] ..... :	2.70		—
Solution resistivity [Ω cm] ..... :	2431		—
Sample #	Measured [MΩ]	Required Resistance [MΩ]	Result
08	4530	>14.81	P
Supplementary information: —			

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE 22: MQT 21 -Potential induced degradation test		—
Test Date [MM/DD/YYYY] start/end.....:	2025-05-13/2025-05-18	—
Chamber air temperature (°C) ..... :	85	—
Chamber relative humidity (% RH) ..... :	85	—
Test duration hours (h) ..... :	96	—

Sample #	Applied voltage stress (V) and polarities	—
09	1500/+	P
10	1500/+	P
11	1500/-	P
12	1500/-	P

Supplementary information: —

TABLE 22.1: MQT 01 - Visual inspection after potential induced degradation test		
Test Date [YYYY-MM-DD].....:	2025-05-18	—

Sample #	Nature and position of initial findings – comments or attach photos	—
09	No major visual defects found	P
10	No major visual defects found	P
11	No major visual defects found	P
12	No major visual defects found	P

Supplementary information: —

TABLE 22.2: MQT 15 - Wet leakage current test after potential induced degradation test		
Test Date [YYYY-MM-DD]..... :	2025-05-18	—
Test Voltage applied [V].....:	1500	—
Solution temperature [°C].....:	22.7	—
Size of module [m²] ..... :	2.70	—
Solution resistivity [Ω cm] .....:	2563	—

Sample #	Measured [MΩ]	Required Resistance [MΩ]	Result
09	9170	≥14.81	P
10	8360	≥14.81	P
11	5180	≥14.81	P
12	10960	≥14.81	P

Supplementary information: —

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE 23: MQT 19.2: Final stabilization							
TABLE 23.1: MQT 06.1: Performance at STC							
Test Date [YYYY-MM-DD] ..... :	—						—
Test method ..... :	☐ Solar simulator ☐ Natural sunlight						—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	Result
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
Supplementary information: —							

TABLE 23.2: MQT 19.1 Final Stabilization procedure							
☒ IEC 61215-1-2 ☒ IEC 61215-1-3 ☒ IEC 61215-1-4							
Light exposure method:	☐ Solar simulator ☒ Natural sunlight						
Stabilization criterion x per IEC 61215-1-x :	1%						
Sample #	—	Test Date (YYYY-MM-DD) start/end . :			—		
Test cycle	Integrated irradiation (kWh/m²)	Irradiance (W/m²)	Module temperature (°C)	Resistive load	P_{max} (W) at the end of cycle	$(P_{max} – P_{min}) / P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	—	—	—
1	—	—	—	—	—	—	Yes
2	—	—	—	—	—	—	—
3	—	—	—	—	—	—	—
4	—	—	—	—	—	—	—
Sample #	—	Test Date (YYYY-MM-DD) start/end			—		

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

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	—	—	—	—	—	—	—
1	—	—	—	—	—	—	Yes
2	—	—	—	—	—	—	—
3	—	—	—	—	—	—	—
4	—	—	—	—	—	—	—
Sample #	—	Test Date (YYYY-MM-DD) start/end .....:			—		
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	—	—	—	—	—	—	—
1	—	—	—	—	—	—	Yes
2	—	—	—	—	—	—	—
3	—	—	—	—	—	—	—
4	—	—	—	—	—	—	—
Sample #	—	Test Date (YYYY-MM-DD) start/end . :			—		
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	—	—	—	—	—	—	—
1	—	—	—	—	—	—	Yes
2	—	—	—	—	—	—	—
3	—	—	—	—	—	—	—
4	—	—	—	—	—	—	—
Sample #	—	Test Date (YYYY-MM-DD) start/end			—		
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	—	—	—	—	—	—	—
1	—	—	—	—	—	—	Yes
2	—	—	—	—	—	—	—
3	—	—	—	—	—	—	—
4	—	—	—	—	—	—	—
Sample #	—	Test Date (YYYY-MM-DD) start/end .....:			—		

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

Test cycle	Integrated irradiation (kWh/m²)	Irradiance (W/m²)	Module temperature (°C)	Resistive load	P_{max} (W) at the end of cycle	(P_{max} – P_{min}) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	—	—	—
1	—	—	—	—	—	—	Yes
2	—	—	—	—	—	—	—
3	—	—	—	—	—	—	—
4	—	—	—	—	—	—	—
Sample #	—	Test Date (YYYY-MM-DD) start/end . :			—		
Test cycle	Integrated irradiation (kWh/m²)	Irradiance (W/m²)	Module temperature (°C)	Resistive load	P_{max} (W) at the end of cycle	(P_{max} – P_{min}) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	—	—	—
1	—	—	—	—	—	—	Yes
2	—	—	—	—	—	—	—
3	—	—	—	—	—	—	—
4	—	—	—	—	—	—	—
Sample #	—	Test Date (YYYY-MM-DD) start/end			—		
Test cycle	Integrated irradiation (kWh/m²)	Irradiance (W/m²)	Module temperature (°C)	Resistive load	P_{max} (W) at the end of cycle	(P_{max} – P_{min}) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	—	—	—
1	—	—	—	—	—	—	Yes
2	—	—	—	—	—	—	—
3	—	—	—	—	—	—	—
4	—	—	—	—	—	—	—
Sample #	—	Test Date (YYYY-MM-DD) start/end .....:			—		
Test cycle	Integrated irradiation (kWh/m²)	Irradiance (W/m²)	Module temperature (°C)	Resistive load	P_{max} (W) at the end of cycle	(P_{max} – P_{min}) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	—	—	—
1	—	—	—	—	—	—	Yes
2	—	—	—	—	—	—	—
3	—	—	—	—	—	—	—
4	—	—	—	—	—	—	—
Sample #	—	Test Date (YYYY-MM-DD) start/end . :			—		

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

Test cycle	Integrated irradiation (kWh/m²)	Irradiance (W/m²)	Module temperature (°C)	Resistive load	P_{max} (W) at the end of cycle	(P_{max} – P_{min}) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	—	—	—
1	—	—	—	—	—	—	Yes
2	—	—	—	—	—	—	—
3	—	—	—	—	—	—	—
4	—	—	—	—	—	—	—
Sample #	—	Test Date (YYYY-MM-DD) start/end			—		
Test cycle	Integrated irradiation (kWh/m²)	Irradiance (W/m²)	Module temperature (°C)	Resistive load	P_{max} (W) at the end of cycle	(P_{max} – P_{min}) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	—	—	—
1	—	—	—	—	—	—	Yes
2	—	—	—	—	—	—	—
3	—	—	—	—	—	—	—
4	—	—	—	—	—	—	—

Supplementary information: —

☐ Other stabilization procedures

Sample #	Test Date (YYYY-MM-DD) start/end
—	—
—	—
—	—
—	—

Test method description: —

Supplementary information: —

TABLE 23.3: MQT 06.1: Final Performance at STC							P
Test Date [YYYY-MM-DD] ..... :	2025-06-23						—
Test method	☒ Solar simulator ☐ Natural sunlight						—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	Result
01	15.57	48.46	14.86	40.82	606.3	80.37	P
03	15.62	48.03	14.92	40.50	604.3	80.55	P
04	15.53	48.54	14.82	40.70	603.2	80.02	P

IEC 61215-1							
Clause	Requirement + Test			Result - Remark			Verdict
05	15.67	48.42	14.93	40.74	608.3	80.17	P
06	15.68	48.46	14.91	40.84	609.0	80.17	P
07	15.63	47.64	14.79	40.13	593.7	79.72	P
08	15.57	47.68	14.82	40.07	593.9	80.00	P
09	15.64	48.53	14.76	40.94	604.1	79.57	P
10	15.63	48.42	14.83	40.82	605.5	80.00	P
11	15.64	48.50	14.75	40.56	598.1	78.86	P
12	15.64	48.58	14.65	40.89	599.0	78.87	P
Supplementary information: —							

TABLE 23.4: MQT 06.1: Final Performance at STC (Back side)										
Test Date [YYYY-MM-DD] ..... :	2025-06-23									—
Test method	☒ Solar simulator ☐ Natural sunlight									—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	φI_{sc}	φV_{oc}	φP_{max}	Result
01	11.72	48.12	11.48	41.74	479.2	84.97	0.7528	0.9929	0.7903	—
03	11.67	47.57	11.65	41.06	478.4	86.17	0.7471	0.9905	0.7917	—
04	11.75	47.75	11.62	41.06	477.1	85.04	0.7566	0.9837	0.7909	—
05	11.73	47.97	11.52	41.68	480.1	85.33	0.7486	0.9906	0.7893	—
06	11.49	48.02	11.38	41.50	472.5	85.67	0.7347	1.0080	0.7959	—
07	11.43	47.96	11.46	41.32	473.4	86.36	0.7341	1.0059	0.7971	—
08	12.17	48.49	11.20	42.41	475.1	80.49	0.7782	0.9991	0.7865	—
09	12.06	48.33	11.25	42.30	475.9	81.67	0.7712	0.9982	0.7859	—
10	11.84	48.33	11.53	41.47	478.1	83.55	0.7572	0.9965	0.7994	—
11	11.85	48.24	11.54	41.46	478.6	83.72	0.7580	0.9931	0.7990	—
12	11.72	48.12	11.48	41.74	479.2	84.97	0.7528	0.9929	0.7903	—
Supplementary information: —										

TABLE 23.5: MQT 06.1: Final Performance at BNPI			P
Test Date [YYYY-MM-DD] ..... :	2025-06-23		—
Test method	☒ Simulator	☐ Natural sunlight	—

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmax [W]	FF [%]	Pmax [W] (Lab _GateNo.1)	Power Degradation [%]	Result
01	17.25	48.44	16.45	40.67	669.2	80.09	671.1	-0.28	P
03	17.30	48.06	16.52	40.36	666.7	80.19	674.4	-1.15	P
04	17.13	48.38	16.38	40.59	665.0	80.24	674.0	-1.35	P
05	17.32	48.72	16.44	40.85	671.6	79.57	674.0	-0.36	P
06	17.35	48.38	16.47	40.78	671.7	80.04	674.1	-0.36	P
07	17.26	47.75	16.28	40.22	655.0	79.48	674.0	-2.90	P
08	17.25	47.87	16.41	40.09	658.0	79.70	674.3	-2.48	P
09	17.30	48.60	16.32	40.84	666.4	79.27	672.2	-0.87	P
10	17.29	48.41	16.40	40.66	667.0	79.70	671.7	-0.71	P
11	17.29	48.66	16.21	40.68	659.3	78.37	676.0	-2.53	P
12	17.29	48.64	16.20	40.79	660.8	78.59	677.2	-2.48	P

Supplementary information: Pmax [W] (Lab_GateNo.1) is calculated by considering the reproducibility *r* of control module.

TABLE 23.6: MQT 03 fin: Final Insulation test					P
Test Date [YYYY-MM-DD] ..... :			2025-06-24		—
Test Voltage applied [V] ..... :			8000/1500		—
Size of module [m²] ..... :			2.70		—
Sample #	Required	Measured	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
01	>14.81	30710	—	☒	P
03	>14.81	44930	—	☒	P
04	>14.81	25590	—	☒	P
05	>14.81	18650	—	☒	P
06	>14.81	38360	—	☒	P
07	>14.81	28560	—	☒	P
08	>14.81	23410	—	☒	P
09	>14.81	21110	—	☒	P
10	>14.81	40090	—	☒	P
11	>14.81	35560	—	☒	P

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict

12	>14.81	24100	—	☒	P
Supplementary information: —					

TABLE 23.7: MQT 15 fin: Final Wet leakage current test			P
Test Date [YYYY-MM-DD] ..... :		2025-06-24	—
Test Voltage applied [V] ..... :		1500	—
Solution temperature [°C]..... :		20.9	—
Size of module [m²] ..... :		2.70	—
Solution resistivity [Ω cm]..... :		2513	—
Sample #	Measured [MΩ]	Limit [MΩ]	Result
01	6350	>14.81	P
03	5110	>14.81	P
04	4620	>14.81	P
05	10180	>14.81	P
06	3970	>14.81	P
07	6530	>14.81	P
08	3560	>14.81	P
09	10580	>14.81	P
10	6940	>14.81	P
11	5710	>14.81	P
12	10480	>14.81	P
Supplementary information: —			

IEC 61215-2

Annex 1: Product Description Sheet (Manufacturers and type references)

A1.1	MODULE TYPE/S
	With Mono-crystalline Silicon Solar Cells: a) M66H8NTP-xxxW (xxx=600~630w, in steps of 5W, 132 cells)

A1.2	MODULE DESIGN	
	Module dimensions (L x W x H) [mm] ..... :	a) 2384*1134*30
	Weights(kg)..... :	a) 33.1
	Front/Rear cover bonding classification ..... :	☒ rigid/flexible: for series a) ☐ flexible/flexible

A1.3	SOLAR CELL	
	Cell type reference ..... :	**JA Solar Technol**ogy Co. Ltd. Type: 16BB N-type Mono cell JTPV Type: 16BB N-type Mono cell
	Cell dimensions L x W x T (± %) [mm] ..... :	210*182 (±1.5)
	Cell thickness [µm] ..... :	130 (±13)
	Cell area [cm²] ..... :	382.2

A1.4	IDENTIFICATION OF MATERIALS	
	Front cover..... :	for double-glass series: **XINYI/KIBING/ÇAĞDAŞ/EUROPEN** Type: Double coated glass Thickness:2.0mm
	Rear cover ..... :	for double-glass series: **XINYI/KIBING/ÇAĞDAŞ/EUROPEN** Type: Double coated glass Thickness:2.0mm

IEC 61215-2		
	Encapsulation material front side .....:	**FIRST** Material: EP304 (EPE) + F406PS (EVA) Thickness: 0.30 ~ 0.75 mm **SVECK** Material: SV-15296P/SV-15297P (EVA) / CO-556/CO-557 (EPE) / SE-556/ SE-557 (POE) Thickness: 0.45 ~ 0.75 mm **UPS** Material: EU307 (EVA), EPET306 (EPE), PT306 (POE) Thickness: 0.30 ~ 0.75 mm **CAPSUNN** Material: CPS-V-001 (EVA), CPS-E-001 (EPE), CPS-P-001 (POE) Thickness: 0.30 ~ 0.75 mm **SOLINE** Material: EVASOL, EPESOL, POESOL Thickness: 0.30 ~ 0.75 mm
	Encapsulation material back side.....:	**FIRST** Material: EP304 (EPE) + F406PS (EVA) Thickness: 0.30 ~ 0.75 mm **SVECK** Material: SV-15296P/SV-15297P (EVA) / CO-556/CO-557 (EPE) / SE-556/ SE-557 (POE) Thickness: 0.45 ~ 0.75 mm **UPS** Material: EU307 (EVA), EPET306 (EPE), PT306 (POE) Thickness: 0.30 ~ 0.75 mm **CAPSUNN** Material: CPS-V-001 (EVA), CPS-E-001 (EPE), CPS-P-001 (POE) Thickness: 0.30 ~ 0.75 mm **SOLINE** Material: EVASOL, EPESOL, POESOL Thickness: 0.30 ~ 0.75 mm
	Frame parts .....:	**JA Solar Technology Co. Ltd.** Material: Anodized aluminum alloy. Type: 6005-T6 **Xuchu** Material: Anodized aluminum alloy. Type: 6005-T6 **Yonz&Yongzhen** Material: Anodized aluminum alloy. Type: 6005-T6 **Panda** Material: Anodized aluminum alloy. Type: 6005-T6 **Arkat** Material: Anodized aluminum alloy. Type: 6005-T6
	Mounting parts.....:	N/A

IEC 61215-2		
	Adhesive for frame .....:	**Shanghai Huitian New Material Co.,Ltd.** Material: Silicone Sealant Type: HT906Z **Tonsan** Material: Silicone Sealant Type: 1527
	Edge sealing.....:	N/A
	Internal wiring .....:	N/A
	Cell connector.....:	**JA Solar Technology Co. Ltd.** Type: φ0.40 x 6mm, φ0.30 x 5mm, Sn60/Pb40, Base Cu **TELISON** Type: φ0.40 x 6mm, φ0.30 x 5mm, Sn60/Pb40, Base Cu **JUREN** Type: φ0.40 x 6mm, φ0.30 x 5mm, Sn60/Pb40, Base Cu
	String connector .....:	**JA Solar Technology Co. Ltd.** Type: Sn60/Pb40, Base Cu Dimension= 0.26mm **TELISON** Type: Sn60/Pb40, Base Cu Dimension= 0.26mm **JUREN** Type: Sn60/Pb40, Base Cu Dimension= 0.26mm
	Soldering material.....:	N/A
	Fluxing agent .....:	**ASAHI** Type: ANX-3012, SF105, SF180F
	Junction box.....:	**JA Solar Technology Co. Ltd.** Type: PVJB-JA-005, DC1500V, 30A, IP68, -40°C to 85°C **QC Solar (Suzhou) Corporation** Type: 3Qxy, DC1500V, 30A, IP68, -40°C to 85°C **ZHEJIANG TWINSEL ELECTRONIC TECHNOLOGY CO., LTD.** Type: PV-SY030, DC1500V, 30A, IP68, -40°C to 85°C **Ekinler Endüstri San. ve Tic. A.S.** Type: JBB, DC1500V, 30A, IP68, -40°C to 85°C **SCON Endüstri San. ve Tic. A.Ş.** Type: MAX, DC1500V, 30A, IP68, -40°C to 85°C

IEC 61215-2		
	Cable .....:	**JA Solar Technology Co. Ltd.** Type: H1Z2Z2-K, DC1500V, -40°C to 90°C **QC Solar (Suzhou) Corporation** Type: 4mm2/ IEC 62930, DC1500V, -40°C to 90°C **ZHEJIANG TWINSEL ELECTRONIC TECHNOLOGY CO., LTD.** Type: H1Z2Z2-K, 1x4 mm2 PV Cable, DC1500V, -40°C to 90°C **EGE KABLO ENDUSTRİ MALZ. SAN. VE TİC. A.Ş.** Type: H1Z2Z2-K PV Cable 4mm², DC1500V, -40°C to 90°C **SCON Endüstri San. ve Tic. A.Ş.** Type: HALOGEN FREE LOW SMOKE PV CABLE 1x4 mm2, DC1500V, -40°C to 90°C
	Connector .....:	**QC Solar (Suzhou) Corporation** Type: QC4.10-cds, DC1500V, 35A, IP68 **ZHEJIANG TWINSEL ELECTRONIC TECHNOLOGY CO., LTD.** Type: PV-SY02, DC1500V, 30A, IP68 **STAUBLI** Type: PV-KST4-EVO2, DC1500V, 30A, IP68 **Suzhou Xtong Photovoltaic Tech. Co. Ltd.** Type: PV-XT101.1, DC1500V, 30A, IP68
	Bypass diode .....:	**SCON Endüstri San. ve Tic. A.Ş.** Type: 40SQ045, Schottky Max junction temperature 200°C **ZHEJIANG TWINSEL ELECTRONIC TECHNOLOGY CO., LTD.** Type: SBRB3050TS Max junction temperature 200°C **JA Solar Technology Co. Ltd.** Type: MK5045 Max junction temperature 200°C **QC Solar (Suzhou) Corporation** Type: QCM5045 Max junction temperature 200°C
	Potting material.....:	**Shanghai Huitian New Material Co.,Ltd.** Type: 5299W,5299W-S **Minghao** Type: MH-3667-A-B, White **Tonsan** Type:1521, White

IEC 61215-2		
	Adhesive for junction box .....:	**Shanghai Huitian New Material Co.,Ltd.** Material: Silicone Sealant Type: HT906Z, White **Minghao** Type:MH-3667-A-B, White **Tonsan** Type:1527, White
	Additional material (e. g. fixing tape, insulation tape).....:	Flux agent: **ASAHI** Type: ANX-3012, SF105, SF180F

A1.5	**MODULE DESIGN - MINIMUM DISTANCES**	
	Between cells.....:	2.0mm
	Between cell and accessible surfaces.....:	13.00mm
	Between any current carrying part and accessible surfaces .....:	13.00mm

A1.6	**MODULE DESIGN - ELECTRICAL CONFIGURATION**	
	Total number of cells .....:	a) 132
	Serial-parallel connection of cells .....:	a) 66-2
	Cells per bypass diode .....:	a) 44
	No. of bypass diodes .....:	3

IEC 61215-2

Annex 2: Test table for verifying other alternative stabilization procedure

Step 1: Alternative stabilization				—
Test Date (YYYY-MM-DD) start/end: —				—
Test method description: —				—
	—	—	—	—
Power before alternative stabilization (W)	—	—	—	—
Power after alternative stabilization (W)	—	—	—	—
Supplementary information: —				
Step 2: Light exposure				—
☐ Simulator ☐ Natural sunlight				
Abbreviation: Regarding light source “S” for Solar simulator and “N” for Natural sunlight				

Sample M10	Test Date (YYYY-MM-DD) start/end.....:	—

Test cycle	Light source	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	—	—	—	—	—	—	—	—
1	—	—	—	—	—	—	—	—
2	—	—	—	—	—	—	—	—
Supplementary information: —								

Sample M11	Test Date (YYYY-MM-DD) start/end.....:	—

Test cycle	Light source	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	—	—	—	—	—	—	—	—
1	—	—	—	—	—	—	—	—
2	—	—	—	—	—	—	—	—
Supplementary information: —								

Sample M12	Test Date (YYYY-MM-DD) start/end.....:	—

Test cycle	Light source	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	—	—	—	—	—	—	—	—
1	—	—	—	—	—	—	—	—
2	—	—	—	—	—	—	—	—
Supplementary information: —								

IEC 61215-2

Step 3: Stabilization determination				—
	Sample M10	Sample M11	Sample M12	Result
Stable power P_{max1} after alternative stabilization (W)	—	—	—	—
Stable power P_{max2} after light exposure (W)	—	—	—	—
Power change P_{max2} to P_{max1} (%)	—	—	—	—
Allowed power change P_{max2} to P_{max1} (%)	—	—	—	—
Is alternative stabilization method valid? (Yes/No)	—	—	—	—
Supplementary information: —				

IEC 61215-2

Annex 3: Lower and higher output power modules

TABLE A.4.1 Performance at STC before initial stabilization (Front side)							
Test Date [YYYY-MM-DD]..... :	2025-05-06						—
Test method..... :	☒ Solar simulator ☐ Natural sunlight						—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	Result
23-High1	15.98	49.08	15.27	41.50	633.9	80.80	—
24-High2	15.94	49.13	15.27	41.49	633.3	80.85	—
25-Low1	15.48	47.94	47.92	12.58	602.9	81.25	—
26-Low2	15.49	47.93	47.98	12.57	603.2	81.27	—
Supplementary information: The limit value is calculated through considering the tolerance of rated label values and lab measurement uncertainty.							

TABLE A.4.2 Performance at STC before initial stabilization (Back side)							
Test Date [YYYY-MM-DD]..... :	2025-05-06						—
Test method..... :	☒ Simulator ☐ Natural sunlight						—
Sample #	I_{sc} [A]	V_{oc} [V]	Sample #	I_{sc} [A]	V_{oc} [V]	Sample #	I_{sc} [A]
23-High1	12.30	48.62	11.87	41.57	493.6	82.57	—
24-High2	12.36	48.46	11.83	41.79	494.3	82.56	—
25-Low1	11.66	48.49	11.44	42.19	482.5	85.33	—
26-Low2	11.65	48.47	11.49	41.95	482.0	85.38	—
Supplementary information: The limit value is calculated through considering the tolerance of rated label values and lab measurement uncertainty.							

TABLE A.4.3 Performance at BNPI before initial stabilization							
Test Date [YYYY-MM-DD]..... :	2025-05-06						—
Test method..... :	☒ Solar simulator ☐ Natural sunlight						—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	Result
23-High1	17.61	49.46	16.84	41.71	702.3	80.62	—
24-High2	17.65	49.26	16.91	41.45	700.8	80.62	—
25-Low1	47.82	17.96	45.61	14.61	666.6	77.61	—
26-Low2	47.84	17.94	45.61	14.62	666.8	77.69	—
Supplementary information: The limit value is calculated through considering the tolerance of rated label values and lab measurement uncertainty.							

IEC 61215-2

TABLE A.4.4: MQT 19.1 ini: Initial Stabilization procedure

Light exposure method	☐ Solar simulator ☒ Natural sunlight	—
Stabilization criterion x per IEC 61215-1-x ..	1%	—

Sample #	23	Test Date (YYYY-MM-DD) start/end ..... :			2025-05-06/2025-05-13		
Test cycle	Integrated irradiation (kWh/m^2)	Irradiance (W/m^2)	Module temperature (°C)	Resistive load (Ω)	P_{max} (W) at the end of cycle	($P_{max} – P_{min}$) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	633.9	—	—
1	5.2	>500	—	2.7	632.4	—	—
2	5.3	>500	—	2.7	632.2	0.27	Yes
3	—	—	—	—	—	—	—
4	—	—	—	—	—	—	—

Sample #	24	Test Date (YYYY-MM-DD) start/end .....:			2025-05-06/2025-05-13		
Test cycle	Integrated irradiation (kWh/m^2)	Irradiance (W/m^2)	Module temperature (°C)	Resistive load (Ω)	P_{max} (W) at the end of cycle	($P_{max} – P_{min}$) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	633.3	—	—
1	5.2	>500	—	2.7	632.8	—	—
2	5.3	>500	—	2.7	632.4	0.14	Yes
3	—	—	—	—	—	—	—
4	—	—	—	—	—	—	—

Sample #	25	Test Date (YYYY-MM-DD) start/end ..... :			2025-05-06/2025-05-13		
Test cycle	Integrated irradiation (kWh/m^2)	Irradiance (W/m^2)	Module temperature (°C)	Resistive load(Ω)	P_{max} (W) at the end of cycle	($P_{max} – P_{min}$) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	602.9	—	—
1	5.2	＞500	—	2.7	602.7	—	—
2	5.3	＞500	—	2.7	601.8	0.18	Yes
3	—	—	—	—	—	—	—
4	—	—	—	—	—	—	—

Sample #	26	Test Date (YYYY-MM-DD) start/end ..... :			2025-05-06/2025-05-13		
Test cycle	Integrated irradiation (kWh/m^2)	Irradiance (W/m^2)	Module temperature (°C)	Resistive load(Ω)	P_{max} (W) at the end of cycle	($P_{max} – P_{min}$) / $P_{average}$ (%)	Stable (Yes/No)
Initial	—	—	—	—	603.2	—	—
1	5.2	＞500	—	2.7	602.8	—	—
2	5.3	＞500	—	2.7	602.2	0.17	Yes

IEC 61215-2							
3	—	—	—	—	—	—	—
4	—	—	—	—	—	—	—
Supplementary information: None.							

TABLE A.4.5: MQT 6.1 Performance at STC after initial stabilization							
Test Date [YYYY-MM-DD] ..... :	2025-05-13						—
	Lower end power class				Higher end power class		—
P_{max}(lab) (W) ..... :					≥ 598.267		—
$\bar{P}_{max}$(lab) (W) ..... :					≥ 616.77		—
P_{max4}(la) (W) ..... :							
V_{oc}(lab) (V) ..... :					≤ 49.955		—
I_{sc} (lab) (A) ..... :					≤ 16.591		—
Test method ..... :	☒ Solar simulator ☐ Natural sunlight						—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	Result
23-High1	15.91	49.25	15.24	41.48	632.2	80.72	P
23-High1	15.91	49.25	15.24	41.48	632.2	80.72	P
Average	—				632.3	—	P
25-Low1	15.45	47.99	47.79	12.59	601.8	81.15	P
26-Low2	15.48	47.94	47.82	12.59	602.2	81.14	P
Average	—				602.0	—	P
Supplementary information: The limit value is calculated through considering the tolerance of rated label values and lab measurement uncertainty.							

TABLE A.4.6 Performance at STC before initial stabilization (Back side)							
Test Date [YYYY-MM-DD] ..... :	2025-05-13						—
Test method ..... :	☐ Simulator ☒ Natural sunlight						—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	Result
25-Low1	11.66	48.49	11.44	42.19	482.5	85.33	—
26-Low2	11.65	48.47	11.49	41.95	482.0	85.38	—

IEC 61215-2							
23-High1	12.28	48.65	11.84	41.58	492.5	82.48	—
24-High2	12.28	48.60	11.87	41.48	492.4	82.48	—
Supplementary information: The limit value is calculated through considering the tolerance of rated label values and lab measurement uncertainty.							

TABLE A.4.7: MQT 6.1 Performance at BNPI after initial stabilization							P
Test Date [YYYY-MM-DD] ..... :	2025-05-13						—
Test method ..... :	☐ Simulator ☒ Natural sunlight						—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	Result
25-Low1	47.82	17.96	45.61	14.61	666.6	77.61	—
26-Low2	47.84	17.94	45.61	14.62	666.8	77.69	—
23-High1	17.56	49.49	16.89	41.42	699.8	80.53	—
24-High2	17.56	49.51	16.91	41.40	700.0	80.54	—
Supplementary information: The limit value is calculated through considering the tolerance of rated label values and lab measurement uncertainty.							

----------END OF TEST REPORT---------