Test Report issued under the responsibility of:

DEKRA

TEST REPORT
IEC TS 62804-1-1:2020
Photovoltaic (PV) modules –Test methods for the detection of potential-induced degradation – Part 1-1: Crystalline silicon – Delamination

Report Number..... :	6114340B.52
Date of issue..... :	2022-10-17
Total number of pages..... :	42
DEKRA Branch..... :	DEKRA Testing and Certification (Shanghai) Ltd.
Applicant's name..... :	Chint New Energy Technology Co., Ltd.
Address..... :	No.1 Jisheng Road, Jianshan New Zone, 314415 Haining City Zhejiang, China
Test specification:	
Standards..... :	IEC TS 62804-1-1:2020
Test procedure..... :	DTA
Non-standard test method..... :	N/A
Test Report Form No..... :	PID_B
Test Report Form(s) Originator.... :	DEKRA Testing and Certification (Shanghai) Ltd.
Master TRF..... :	2019-05-20

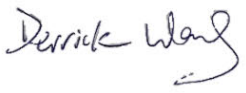
General disclaimer:

The test results presented in this report relate only to the object tested.

Test item description ..... :	Photovoltaic (PV) Modules
Trade Mark ..... :	ASTRONERGY ASTRONERGY
Manufacturer ..... :	Chint New Energy Technology Co., Ltd.
Model/Type reference ..... :	CHSM66M-HC-xxx (xxx=645-675, in steps of 5, 132 cells) CHSM60M-HC-xxx (xxx=590-610, in steps of 5, 120 cells) CHSM72M-HC-xxx (xxx=520-555, in steps of 5, 144 cells) CHSM66M-HC-xxx (xxx=480-510 in steps of 5, 132 cells) CHSM54M-HC-xxx (xxx=390-415 in steps of 5, 108 cells) CHSM72M-HC-xxx (xxx=425-455, in steps of 5, 144 cells) CHSM60M-HC-xxx (xxx=355-380, in steps of 5, 120 cells) CHSM78M-HC-xxx (xxx=585-605 in steps of 5, 156 cells) CHSM66N-HC-xxx (xxx=655-690 in steps of 5, 132 cells) CHSM60N-HC-xxx (xxx=595-625, in steps of 5, 120 cells) CHSM78N-HC-xxx (xxx=585-615 in steps of 5, 156 cells) CHSM72N-HC-xxx (xxx=550-565, in steps of 5, 144 cells) CHSM54N-HC-xxx (xxx=405-425 in steps of 5, 108 cells) CHSM60N-HC-xxx (xxx=450-470, in steps of 5, 120 cells) CHSM66M/LV-HC-xxx (xxx=645-675, in steps of 5, 132 cells) CHSM60M/LV-HC-xxx (xxx=590-610, in steps of 5, 120 cells) CHSM72M/LV-HC-xxx (xxx=520-555, in steps of 5, 144 cells) CHSM66M/LV-HC-xxx (xxx=480-510 in steps of 5, 132 cells) CHSM54M/LV-HC-xxx (xxx=390-415 in steps of 5, 108 cells) CHSM72M/LV-HC-xxx (xxx=425-455, in steps of 5, 144 cells) CHSM60M/LV-HC-xxx (xxx=355-380, in steps of 5, 120 cells) CHSM78M/LV-HC-xxx (xxx=585-605 in steps of 5, 156 cells) CHSM66N/LV-HC-xxx (xxx=655-690 in steps of 5, 132 cells) CHSM60N/LV-HC-xxx (xxx=595-625, in steps of 5, 120 cells) CHSM78N/LV-HC-xxx (xxx=585-615 in steps of 5, 156 cells) CHSM72N/LV-HC-xxx (xxx=550-565, in steps of 5, 144 cells) CHSM54N/LV-HC-xxx (xxx=405-425 in steps of 5, 108 cells) CHSM60N/LV-HC-xxx (xxx=450-470, in steps of 5, 120 cells)
Ratings ..... :	Refer to Annex 1.

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

☒	**DEKRA Branch:**	DEKRA Testing and Certification (Shanghai) Ltd.
Location/adress ..... :		No. 16, Lane 1288, Luoning Road, Baoshan District, Shanghai
☒	**Associated Testing Laboratory:**	Shanghai Institute of Quality Inspection and Technical Research 900 Jiangyue Rd., Shanghai, China

Tested by (name, function, signature) ..... :	Derrick Wang	
Approved by (name, function, signature) ..... :	Kevin Lu	

List of attachments (including a total number of pages in each attachment):	
	attachment number / number of pages
Installation manual:	
Drawings mechanical:	
Circuit diagram:	
Photographs:	Annex 2/1 page
Component datasheets / certificates	
Others:	
CDF	Annex 1/21 pages
IV curve	Annex 3/2 pages
EL images	Annex 4/3 pages
List of measurement equipment	Annex 5/1 page
Statement of test uncertainty	Annex 6/1 page

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
Visual inspection Maximum power determination Wet leakage current test Damp heat test Potential Induced Degradation test	Shanghai Institute of Quality Inspection and Technical Research 900 Jiangyue Rd., Shanghai, China

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:	α – Current temperature coefficient
Pmax – Maximum power	β – Voltage temperature coefficient
Vmp – Maximum power voltage	δ – power temperature coefficient
Imp – Maximum power current	NMOT – Nominal Module Operating Temperature (20°C, 800 W/m²)
Isc – Short circuit current	VFMrated – Rated diode(s) forward voltage
Voc – Open circuit voltage	NP – Nameplate
FF – Fill factor	
STC – Standard Test Conditions (25°C, 1 000 W/m²)	t_1 – the manufacturer's rated lower production tolerance in % for Pmax
PID- potential-induced degradation (±1500V, 85% RH, 85 °C, Stress method A)	t_2 – the manufacturer's rated upper production tolerance in % for Voc
VFM – Measured diode(s) forward voltage	t_3– the manufacturer's rated upper production tolerance in % for Isc
m_1 – the measurement uncertainty in % of laboratory for Pmax	r – Pmax measurement reproducibility
m_2 – the measurement uncertainty in % of laboratory for Voc	m_3 – the measurement uncertainty in % of laboratory for Isc
Testing Dates (YYYY-MM-DD)	
Date of first test item received..... :	2022-07-11
Dates of tests (beginning/end)..... :	2022-07-14/ 2022-09-08

GENERAL REMARKS:

This report will be proceeded to replace certificate No. 31-121149 REV.1 which we hereby declare invalid
The original test report 6114340B.51 dated on 2022-05-20 was modified on 2022-10-17 to include the following changes:

Power range extension for previously approved model types
CHSM72M-HC-xxx (xxx=520-555, in steps of 5, 144 cells)
CHSM66M-HC-xxx (xxx=480-510, in steps of 5, 132 cells)
CHSM54M-HC-xxx (xxx=390-415, in steps of 5, 108 cells)
CHSM78M-HC-xxx (xxx=585-605, in steps of 5, 156 cells)
Remark:After technical review, no test consider necessary for power range extension.

New module Types extension:
CHSM66N-HC-xxx (xxx=655-690, in steps of 5, 132 cells)
CHSM60N-HC-xxx (xxx=595-625, in steps of 5, 120 cells)
CHSM78N-HC-xxx (xxx=585-615, in steps of 5, 156 cells)
CHSM72N-HC-xxx (xxx=550-565, in steps of 5, 144 cells)
CHSM54N-HC-xxx (xxx=405-425, in steps of 5, 108 cells)
CHSM60N-HC-xxx (xxx=450-470, in steps of 5, 120 cells)
Remark: The verification test were performed on module type CHSM66N-HC-670 as reprerentative.

CHSM66M/LV-HC-xxx (xxx=645-675, in steps of 5, 132 cells)
CHSM60M/LV-HC-xxx (xxx=590-610, in steps of 5, 120 cells)
CHSM72M/LV-HC-xxx (xxx=520-555, in steps of 5, 144 cells)
CHSM66M/LV-HC-xxx (xxx=480-510, in steps of 5, 132 cells)
CHSM54M/LV-HC-xxx (xxx=390-415, in steps of 5, 108 cells)
CHSM72M/LV-HC-xxx (xxx=425-455, in steps of 5, 144 cells)
CHSM60M/LV-HC-xxx (xxx=355-380, in steps of 5, 120 cells)
CHSM78M/LV-HC-xxx (xxx=585-605, in steps of 5, 156 cells)
CHSM66N/LV-HC-xxx (xxx=655-690, in steps of 5, 132 cells)
CHSM60N/LV-HC-xxx (xxx=595-625, in steps of 5, 120 cells)
CHSM78N/LV-HC-xxx (xxx=585-615, in steps of 5, 156 cells)
CHSM72N/LV-HC-xxx (xxx=550-565, in steps of 5, 144 cells)
CHSM54N/LV-HC-xxx (xxx=405-425, in steps of 5, 108 cells)
CHSM60N/LV-HC-xxx (xxx=450-470, in steps of 5, 120 cells)
Remark: The module types are with 1000V Max. system voltage. The verification test were performed on module types with 1500V Max. system voltage. After technical review, no test consider necessary.

Add a new manufacturer plant:
Name: Chint Solar (HaiNing) Co., Ltd.
Address: No. 2 Jisheng Road, Jianshan New Zone, 314415 Haining City Zhejiang, China

Extend to alternative components and materials:

Object	Manufacturer / trademark	Type / model	Technical data / ratings
Front cover	1.Flat Glass Group Co., Ltd 2.Anhui Flat Solar Glass Co.,Ltd. 3.Zhejiang Jiafu Glass Co., Ltd 4.Flat (Vietnanm) Co., Ltd.	External AR Coating Glass	Thickness = 3.2mm/4.0
Rear cover	Jolywood (Suzhou) Sunwatt Co., Ltd.	FFC-JW3020(plus)	Thickness: 315μm± 10% System Voltage: 1500VDC
Encapsulation material	1. Hangzhou First Applied Material Co., Ltd. 2. First Material Science (Thailand) CO.,Ltd. 3.First (Chuzhou) Advanced Material Co.,Ltd.	TF4(between cells and rear cover)	Unit gram=400~560 g/m2
		F406PS(between cells and rear cover)	Unit gram=400~560 g/m2

Solar cell	Chint New Energy Technology Co., Ltd.	1.4 CHSC-210N12SBN	210mm x105mm x150μm (±15 μm)
		1.5 CHSC-182N11SBN	182mm x91mm x150μm (±15 μm)
Cell connectors	Chint New Energy Technology Co., Ltd.	Sn60Pb40	Φ(mm)/ L(mm) x T(mm)=0.32/ 0.68 x 0.17
String connectors	Suzhou Boneed Photovoltic technology co. LTD.	Sn60Pb40 (Black)	L(mm) X T(mm) : 4.0 x 0.35/0.3 5.0 x 0.35/0.3 6.0 x 0.35/0.3 7.0 x 0.35/0.3
Frame parts	Chint New Energy Technology Co., Ltd	Anodized Aluminium Alloy 6005-T6	H(mm) x W(mm):Long side1:30x33x1.3/1.3/1.4 Short side1:30x33x1.3/1.3/1.4 Short side2:30x16.2x1.3/1.3/1.4
			H(mm) x W(mm): Long side: 35x35x1.4/1.5/1.5 Short side : 35x16.5x1.4/1.5/1.5 (with wave on side A/ no waveon side A)
Adhesive (frame)	Jiangsu Tianchen New Materials Co., Ltd.	HT-8258 Color: White and Black	Silicon
Fluxing agent	Shenzhen Yik Shing Tat Industrial Co., Ltd.	GOLF703-C	
Fixing tape	Cybrid Technologies Inc	FF-3665(T75)	

Junction Box Combination 2			
Object	Manufacturer / trademark	Type / model	Technical data / ratings
Junction box	Main license holder: Chint New Energy Technology Co., Ltd.	CHS3xyz (x=2; y=1 or 2 or 3; z=1 or 2)	Rated Voltage = 1500V Rated Current = 20A for CHS3xyz (y=1); 25A for CHS3xyz (y=2); 30A for CHS3xyz (y=3); Reverse Current = 50A
	Factory 1: Ningbo Minghe New Energy Technology Co., Ltd.		
	Factory 2: Zhejiang Chuangyuan Photovoltaic Technology Co., Ltd.		
	Factory 3: ZHEJIANG XINHUI PHOTOVOL TAIC TECHNOLO GY CO., LTD		
Cable 1	Ningbo Kibor Wire & Cable Co., Ltd.	62930 IEC 131 1x1,5…10mm2 HALOGEN FREE LOW SMOKE	System Voltage = 1500V 1 x 4,0mm2; 1 x 6,0mm2
Cable 2	Zhejiang Chuangyuan Photovoltaic Technology Co., Ltd.	62930 IEC 131 1X4,0mm2 HALOGEN FREE LOW SMOKE	System Voltage = 1500V 1 x 4,0mm2
Cable 3	Zhejiang Chint Cable Co., Ltd.	62930 IEC 131 1X2,5…6mm2 HALOGEN FREE LOW SMOKE	System voltage: 1500V, 1 x 4,0mm2; 1 x 6,0mm2
Connectors1	Chint New Energy Technology Co., Ltd.	PV-HCB40	Rated Voltage (DC) = 1500V Rated Current = 40A
Connectors 2	Stäubli Electrical Connectors AG	PV-KST4-EVO2/xy_UR; PV-KBT4-EVO2/xy_UR	Max. Voltage = 1500V Max. Current = 45A
		PV-KST4-EVO2A/xy; PV-KBT4-EVO2A/xy	
Bypass diode 1	Yangzhou Yangjie Electronic Technology Co., Ltd.	25SQ045	Tj max=200°C Rated

	PAN JIT INTERNATIONAL INC. Sangdest Microelectronics (Nanjing) CO., LTD Hangzhou Daoming Microelectronics Co., Ltd		current=20A (for CHS3xyz (y=1))
Bypass diode 2	Yangzhou Yangjie Electronic Technology Co., Ltd. PAN JIT INTERNATIONAL INC. Ningbo Minghe New Energy Technology Co.,Ltd.	30SQ045-SL (3)	Tj max=200°C Rated current=25A (for CHS3xyz (y=2))
Bypass diode 3	Yangzhou Yangjie Electronic Co., Ltd. PAN JIT INTERNATIONAL INC.	40SQ045 (3) 40SQ045-SL (3)	Tj max=200°C Rated current=30A (for CHS3xyz (y=3))
Bypass diode 4	Hangzhou Daoming Microelectronics Co., Ltd.	30SQ045-SL	Tj max=200°C Rated current=25A (for CHS3xyz (y=2))
Adhesive 1	Hangzhou Zhijiang Silicone Chemical Co., Ltd.	JS-606 Color: White and Black	Silicon
Adhesive 2	TONSAN ADHESIVE, INC.	1527 Color: White and Black	Silicon
Adhesive 3	Shanghai Huitian New Chemical Material Co., Ltd.	HT906Z Color: White and Black	Silicon
Adhesive 4	Chengdu Guibao Science and Technology Co.,Ltd	888A Color: White and Black	Silicon
Adhesive 5	Jiangsu Tianchen New Materials Co., Ltd.	HT-8258 Color: White and Black	Silicon
Adhesive 6	TONSAN ADHESIVE, INC.	1581 Color: White and Black	Silicon
Adhesive 7	Shanghai Huitian New Chemical Material Co., Ltd.	9661 Color: White and Black	Silicon
Adhesive 8	Hangzhou Zhijiang Silicone Chemical Co., Ltd.	JS-606CHUN	Silicon
Potting material 1	Shanghai Huitian New Chemical Material Co., Ltd.	5299W/5299W-S Color: White and Black	Silicon
Potting material 2	TONSAN ADHESIVE, INC. Advanced Material Co., Ltd	1533 Color: White and Black	Silicon
Potting material 3	Hangzhou Zhijiang Silicone Chemicals Co., Ltd.	JS-1184 Color: White and Black	Silicon
Potting material 4	Chengdu Guibao Science&Technology Co.,Ltd.	4808 Color: White and Black	Silicon
Potting material 5	Jiangsu Tianchen New Materials Co., Ltd.	HT-6360A/HT-6360B Color: White and Black	Silicon

Remark:After technical review, no test consider necessary for above amterials extension.

Potential-induced degradation test condition:±1500V, 85% RH, 85 °C, 300h, Severity A.

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

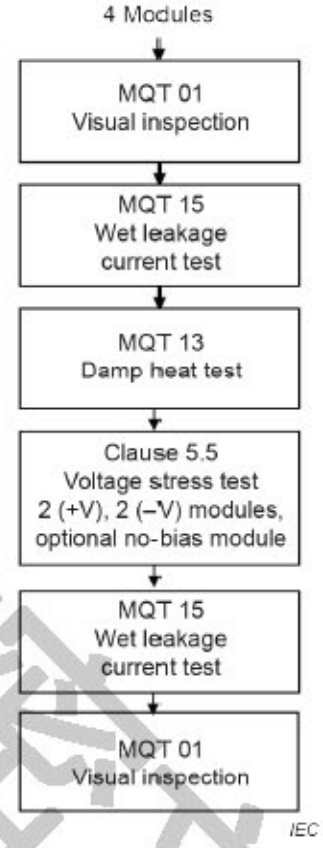
Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

Name and address of factory (factories)..... :	Name: Chint New Energy Technology Co., Ltd. Address: No.1 Jisheng Road, Jianshan New District, 314415 Haining City Zhejiang, China Name: Chint New Energy Technology (Yancheng) Co., Ltd. Address: No.8 Fengyang Road, Dafeng District, 224100 Yancheng City Jiangsu, China Name: Chint New Energy Technology (Jiuquan) Co.,

	Ltd. Address: 15 Jingwu Road, Jiuquan economic and Technological Development Zone, Suzhou District, Jiuquan City Gansu, China Name: Chint Solar (HaiNing) Co., Ltd. Address: No. 2 Jisheng Road, Jianshan New Zone, 314415 Haining City Zhejiang, China

PRODUCT ELECTRICAL RATINGS:				
Module type	CHSM66N-HC-670	-	-	-
Voc [V]	46.44 ±3%	-	-	-
Vmp [V]	38.54	-	-	-
Imax [Adc]	17.38	-	-	-
Isc [Adc]	17.88 ±5%	-	-	-
Pmp [W]	670 ±3%	-	-	-
Maximum system voltage [V]	1500	-	-	-
Maximum Over-Current Protection Rating [A]	30	-	-	-
Note: Refer to Annex 1 for other types.				

TEST Sequence:



Remark: Figure 1 of standard IEC TS 62804-1-1: 2020

4. Testing Overview			
4.1	Visual inspection (10.1)	See Table 01	P
4.2	Maximum power determination (10.2).....	See Table 02	P
	EL-images.....	See Table 03	P
4.15	Wet leakage current test (10.15)	See Table 04	P
4.13	Damp heat test (10.13).....	See Table 05	P
-	Potential Induced Degradation (PID) test	See Table 06	P

Module group assignment:

Sample #	Sample Group ID	Type/model	Sample S/N	Remark
6131138-1	REF	CHSM66N-HC-670	829001140209100178	Ref
6131138-2	PID	CHSM66N-HC-670	829001140209100181	+1500V
6131138-3	PID	CHSM66N-HC-670	829001140209100182	+1500V
6131138-4	PID	CHSM66N-HC-670	829001140209100183	-1500V
6131138-5	PID	CHSM66N-HC-670	829001140209100184	-1500V
Remarks: N/A				

Table 01: MQT 01 – Initial Visual inspection			
Test Date (YYYY-MM-DD)..... :		2022-07-14	—
Sample # 6131138-1	Findings.....	☐ Yes..... ☒ No	P
	Nature and position of findings – comments or attach photos		—
Sample # 6131138-2	Findings.....	☐ Yes..... ☒ No	P
	Nature and position of findings – comments or attach photos		—
Sample # 6131138-3	Findings.....	☐ Yes..... ☒ No	P
	Nature and position of findings – comments or attach photos		—
Sample # 6131138-4	Findings.....	☐ Yes..... ☒ No	P
	Nature and position of findings – comments or attach photos		—
Sample # 6131138-5	Findings.....	☐ Yes..... ☒ No	P
	Nature and position of findings – comments or attach photos		—
Supplementary information: N/A			

Table 02: MQT 02 – Initial Maximum power determination							
Test Date [YYYY-MM-DD].....		2022-07-14					—
Irradiance (W/m2)		1000					—
Module temperature (°C)		Corrected to 25					—
Test method.....		☒ Simulator ☐ Natural sunlight					—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Result
6131138-1	17.904	46.414	17.015	39.249	667.821	80.37	—
6131138-2	17.932	46.322	17.082	39.155	668.834	80.52	—
6131138-3	17.896	46.328	17.051	39.167	667.844	80.55	—
6131138-4	17.874	46.330	17.053	39.183	668.176	80.68	—
6131138-5	17.920	46.304	17.057	39.211	668.812	80.60	—
Supplementary information: N/A							

Table 03: Initial EL-images		
Test Date (YYYY-MM-DD)..... :	2022-07-14	—
Current applied.....	Isc ± 5%	—
Sample	Remarks	—
6131138-1	N/A	—
6131138-2	N/A	—
6131138-3	N/A	—
6131138-4	N/A	—
6131138-5	N/A	—
Supplementary information: N/A		

Table 04: MQT 15 – Initial Wet leakage current test			
Test Date [YYYY-MM-DD]..... :	2022-07-14		—
Test Voltage applied [V] ..... :	1500		—
Solution temperature [°C] ..... :	22.4		—
Size of module [m²]..... :	3.1		—
Sample #	Required Resistance [MΩ]	Measured [MΩ]	Result
6131138-1	12.9	>5000	P
6131138-2	12.9	>5000	P
6131138-3	12.9	>5000	P
6131138-4	12.9	>5000	P
6131138-5	12.9	>5000	P
Supplementary information: The insulation tester can measure up to 5000MΩ.			

TABLE 05: MQT 13 - Damp heat test		
Test Date [YYYY-MM-DD] start/end ..... :	2022-07-14 / 2022-08-26	—
Total hours (1000h) ..... :	1000	—
Sample #		—
6131138-2	—	—
6131138-3	—	—
6131138-4	—	—
6131138-5	—	—
Supplementary information: N/A		

TABLE 05.1: MQT 01 - Visual inspection after damp heat test		
Test Date [YYYY-MM-DD]..... :	2022-08-26	—
Sample #	Nature and position of initial findings – comments or attach photos	—
6131138-2	No major visual defects found	P
6131138-3	No major visual defects found	P
6131138-4	No major visual defects found	P
6131138-5	No major visual defects found	P
Supplementary information: N/A		

TABLE 05.2: MQT 02 - Maximum power determination after damp heat test							
Test Date [YYYY-MM-DD].....	2022-08-26						—
Irradiance (W/m2)	1000						—
Module temperature (°C)	Corrected to 25						—
Test method.....	☒ Simulator ☐ Natural sunlight						—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Degradation [%]
6131138-2	17.966	46.128	17.149	38.117	653.677	78.88	-2.27
6131138-3	17.965	46.108	17.153	38.089	653.347	78.87	-2.17
6131138-4	17.958	46.123	17.094	38.193	652.867	78.82	-2.29
6131138-5	17.965	46.136	17.060	38.301	653.406	78.83	-2.30
Supplementary information: N/A							

TABLE 05.3: MQT 15 - Wet leakage current test after damp heat test			
Test Date [YYYY-MM-DD]..... :	2022-08-26		—
Test Voltage applied [V] ..... :	1500		—
Solution temperature [°C] ..... :	23.1 °C		—
Size of module [m²]..... :	3.1		—
Required Resistance [MΩ] ..... :	12.9		—
Sample #	Measured [MΩ]	Limit [MΩ]	Result
6131138-2	>5000	12.9	P
6131138-3	>5000	12.9	P
6131138-4	>5000	12.9	P
6131138-5	>5000	12.9	P
Supplementary information: The insulation tester can measure up to 5000MΩ.			

Table 06: MST 53 - Potential Induced Degradation (PID) test		
Test Date (YYYY-MM-DD) start/end..... :	2022-08-28 / 2022-09-08	—
Total hours ..... :	300	—
Sample #	Test voltage [V]	—
6131138-2	+1500	
6131138-3	+1500	
6131138-4	-1500	
6131138-5	-1500	
Supplementary information:		

Table 06.1: MQT 01 –Visual inspection after PID test			
Test Date [YYYY-MM-DD]..... :		2022-09-08	—
Sample # 6131138-2	Findings..... :	☐ Yes.....☒ No	P
	Nature and position of findings – comments or attach photos	-	—
Sample # 6131138-3	Findings..... :	☐ Yes.....☒ No	P
	Nature and position of findings – comments or attach photos	-	—
Sample # 6131138-4	Findings..... :	☐ Yes.....☒ No	P
	Nature and position of findings – comments or attach photos	-	—
Sample # 6131138-5	Findings..... :	☐ Yes.....☒ No	P
	Nature and position of findings – comments or attach photos	-	—
Supplementary information: N/A			

Table 06.2: MST 03 –Maximum power determination after PID 300 test							
Test Date [YYYY-MM-DD].....	2022-09-08						—
Irradiance (W/m2)	1000						—
Module temperature (°C)	Corrected to 25						—
Test method.....	☒ Simulator ☐ Natural sunlight						—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	FF [%]	Degradation [%]
6131138-2	17.959	46.133	17.135	37.839	648.386	78.26	-3.06
6131138-3	17.968	46.136	17.141	37.734	646.837	78.03	-3.15
6131138-4	17.963	46.119	17.140	37.980	648.323	78.26	-2.97
6131138-5	17.969	46.145	17.192	37.689	647.945	78.14	-3.12
Supplementary information: N/A							

Table 06.3: EL-images after PID test		
Test Date [YYYY-MM-DD]	2022-09-08	—
Current applied	Isc ± 5%	—
Sample	Remarks	—
6131138-2	N/A	—
6131138-3	N/A	—
6131138-4	N/A	—
6131138-5	N/A	—
Supplementary information: N/A		

Table 06.4: MST 17 - Wet leakage current test after PID test			P
Test Date [YYYY-MM-DD] :	2022-09-08		—
Test Voltage applied [V] :	1500		—
Solution temperature [°C] :	20.7		—
Size of module [m²] :	3.1		—
Sample #	Required Resistance [MΩ]	Measured [MΩ]	Result
6131138-2	12.9	>5000	P
6131138-3	12.9	>5000	P
6131138-4	12.9	>5000	P
6131138-5	12.9	>5000	P
Supplementary information: N/A			

Annex 1: Constructional Data Form (CDF)

Produkte *Products*		DEKRA
Our Reference 6114340B.52		**Appendix No.** 1
Constructional Data Form (CDF) for Photovoltaic (PV) Modules		Page 1 of 21

License Holder.....:	Chint New Energy Technology Co., Ltd.
(full address)	No.1 Jisheng Road, Jianshan New Zone, 314415 Haining City Zhejiang, China
Type of Product .....:	Photovoltaic (PV) Module(s)
CDF No. .....:	6114340B.52
Trademark .....:	ASTRONERGY ASTRONERGY
Manufacturer 1 .....:	Chint New Energy Technology Co., Ltd.
(full address)	No.1 Jisheng Road, Jianshan New Zone, 314415 Haining City Zhejiang, China
Manufacturer 2 .....:	Chint New Energy Technology (Yancheng) Co., Ltd.
(full address)	No.1 Tonghui Road, Dafeng District, 224100 Yancheng City Jiangsu, China
Manufacturer 3 .....:	Chint New Energy Technology (Jiuquan) Co., Ltd.
(full address)	15 Jingwu Road, Jiuquan economic and Technological Development Zone, Suzhou District, Jiuquan City Gansu, China
Manufacturer 4 .....:	Chint Solar (HaiNing) Co., Ltd.
(full address)	No. 2 Jisheng Road, Jianshan New Zone, Haining Zhejiang, 314415 P. R. China
Model/Type reference .....:	CHSM66M-HC-xxx (xxx=645-675, in steps of 5, 132 cells) CHSM60M-HC-xxx (xxx=590-610, in steps of 5, 120 cells) CHSM72M-HC-xxx (xxx=520-555, in steps of 5, 144 cells) CHSM66M-HC-xxx (xxx=480-510 in steps of 5, 132 cells) CHSM54M-HC-xxx (xxx=390-415 in steps of 5, 108 cells) CHSM72M-HC-xxx (xxx=425-455, in steps of 5, 144 cells) CHSM60M-HC-xxx (xxx=355-380, in steps of 5, 120 cells) CHSM78M-HC-xxx (xxx=585-605 in steps of 5, 156 cells) CHSM66N-HC-xxx (xxx=655-690 in steps of 5, 132 cells) CHSM60N-HC-xxx (xxx=595-625, in steps of 5, 120 cells) CHSM78N-HC-xxx (xxx=585-615 in steps of 5, 156 cells) CHSM72N-HC-xxx (xxx=550-565, in steps of 5, 144 cells) CHSM54N-HC-xxx (xxx=405-425 in steps of 5, 108 cells) CHSM60N-HC-xxx (xxx=450-470, in steps of 5, 120 cells) CHSM66M/LV-HC-xxx (xxx=645-675, in steps of 5, 132 cells) CHSM60M/LV-HC-xxx (xxx=590-610, in steps of 5, 120 cells) CHSM72M/LV-HC-xxx (xxx=520-555, in steps of 5, 144 cells) CHSM66M/LV-HC-xxx (xxx=480-510 in steps of 5, 132 cells) CHSM54M/LV-HC-xxx (xxx=390-415 in steps of 5, 108 cells) CHSM72M/LV-HC-xxx (xxx=425-455, in steps of 5, 144 cells) CHSM60M/LV-HC-xxx (xxx=355-380, in steps of 5, 120 cells) CHSM78M/LV-HC-xxx (xxx=585-605 in steps of 5, 156 cells) CHSM66N/LV-HC-xxx (xxx=655-690 in steps of 5, 132 cells) CHSM60N/LV-HC-xxx (xxx=595-625, in steps of 5, 120 cells) CHSM78N/LV-HC-xxx (xxx=585-615 in steps of 5, 156 cells) CHSM72N/LV-HC-xxx (xxx=550-565, in steps of 5, 144 cells) CHSM54N/LV-HC-xxx (xxx=405-425 in steps of 5, 108 cells)

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CHSM60N/LV-HC-xxx (xxx=450-470, in steps of 5, 120 cells)

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Module family A	**With cut mono c-Si cell from original cell dimension 210mmx210mm:**			
Module type	CHSM66M-HC-xxx		CHSM66M/LV-HC-xxx	
Maximum System Voltage [VDC]	1500		1000	
Dimensions (lxwxh) [mm]	2384 x 1303 x 35			
Module area [m²]	3.11			
Module weight [Kg]	35.7			
Over-current protection rating[A]:	30			
Classification (IEC 61730).....	Class II			
Fire rating.....	Class C			
Pollution degree.....	I			
Min- creepage distance [mm].....	10.4			
Number of solar cells	132			
Cells per bypass diode	44			
Pmp [W] Tolerance: ±3%	Voc [V] Tolerance: ±3%	Isc [A] Tolerance: ±5%	Vmp [V]	Imp [A]
675	46.28	18.68	38.42	17.58
670	46.08	18.63	38.23	17.54
665	45.88	18.58	38.05	17.50
660	45.68	18.53	37.85	17.45
655	45.48	18.48	37.65	17.41
650	45.28	18.43	37.45	17.36
645	45.08	18.38	37.25	17.32
Module type	CHSM60M-HC-xxx		CHSM60M/LV-HC-xxx	
	1500		1000	
Maximum System Voltage [VDC] :	1500			
Dimensions (lxwxh) [mm]:	2172 x 1303 x 35			
Module area [m²] :	2.83			
Module weight [Kg] :	32.5			
Over-current protection rating[A]:	30			
Classification (IEC	Class II			

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61730) :				
Fire rating:	Class C			
Pollution degree:	I			
Min- creepage distance [mm]:	10.4			
Number of solar cells	120			
Cells per bypass diode	40			
Pmp [W] Tolerance: ±3%	Voc [V] Tolerance: ±3%	Isc [A] Tolerance: ±5%	Vmp [V]	Imp [A]
610	41.90	18.62	34.80	17.54
605	41.70	18.57	34.60	17.50
600	41.50	18.52	34.40	17.45
595	41.30	18.47	34.20	17.40
590	41.10	18.42	34.00	17.36
Module family B	**With cut mono c-Si cell from original cell dimension 182mmx182mm:**			
Module type	CHSM72M-HC-xxx		CHSM72M/LV-HC-xxx	
Maximum System Voltage [VDC]	1500		1000	
Dimensions (lxwxh) [mm]	2256x1133x35/2278x1134x35			
Module area [m²]	2.56/2.58			
Module weight [Kg]	27.2			
Over-current protection rating[A]:	25			
Classification (IEC 61730).....	Class II			
Fire rating.....	Class C			
Pollution degree.....	I			
Min- creepage distance [mm].....	10.4			
Number of solar cells	144			
Cells per bypass diode	48			
Pmp [W] Tolerance: ±3%	Voc [V] Tolerance: ±3%	Isc [A] Tolerance: ±5%	Vmp [V]	Imp [A]
550	50.10	13.90	42.10	13.06
545	49.90	13.81	41.93	13.00
540	49.70	13.72	41.76	12.93

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535	49.50	13.61	41.60	12.86
530	49.30	13.52	41.43	12.79
525	49.10	13.43	41.26	12.72
520	48.90	13.34	41.09	12.65

Module type	CHSM66M-HC-xxx	CHSM66M/LV-HC-xxx
Maximum System Voltage [VDC] :	1500	1000
Dimensions (lxwxh) [mm]:	2073 x 1133 x 35	
Module area [m²] :	2.35	
Module weight [Kg] :	25.1	
Over-current protection rating[A]:	25	
Classification (IEC 61730) :	Class II	
Fire rating:	Class C	
Pollution degree :	I	
Min- creepage distance [mm]:	10.4	
Number of solar cells	132	
Cells per bypass diode	44	

Pmp [W] Tolerance: ±3%	Voc [V] Tolerance: ±3%	Isc [A] Tolerance: ±5%	Vmp [V]	Imp [A]
500	45.78	13.81	38.47	13.00
495	45.58	13.71	38.30	12.92
490	45.38	13.60	38.13	12.85
485	45.18	13.50	37.96	12.78
480	44.98	13.41	37.79	12.79

Module type	CHSM54M-HC-xxx	CHSM54M/LV-HC-xxx
Maximum System Voltage [VDC] :	1500	1000
Dimensions (lxwxh) [mm]:	1708 x 1133 x 30/35 1722 x 1134 x 30/35	
Module area [m²] :	1.94/1.95	
Module weight [Kg] :	21.5	
Over-current protection rating[A]:	25	
Classification (IEC 61730) :	Class II	

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Fire rating:	Class C			
Pollution degree:	I			
Min- creepage distance [mm]:	10.4			
Number of solar cells	108			
Cells per bypass diode	36			
Pmp [W] Tolerance: ±3%	Voc [V] Tolerance: ±3%	Isc [A] Tolerance: ±5%	Vmp [V]	Imp [A]
410	37.40	13.88	31.43	13.05
405	37.20	13.76	31.26	12.96
400	37.00	13.65	31.09	12.86
395	36.80	13.52	30.92	12.77
390	36.60	13.40	30.76	12.68
Module type	CHSM78M-HC-xxx		CHSM78M/LV-HC-xxx	
Maximum System Voltage [VDC] :	1500		1000	
Dimensions (lxwxh) [mm]:	2465 x 1134 x 35			
Module area [m^2] :	2.8			
Module weight [Kg] :	/			
Over-current protection rating[A]:	25			
Classification (IEC 61730) :	Class II			
Fire rating:	Class C			
Pollution degree:	I			
Min- creepage distance [mm]:	10.4			
Number of solar cells	156			
Cells per bypass diode	52			
Pmp [W] Tolerance: ±3%	Voc [V] Tolerance: ±3%	Isc [A] Tolerance: ±5%	Vmp [V]	Imp [A]
605	54.64	14.01	45.92	13.18
600	54.44	13.93	45.75	13.11
595	54.24	13.85	45.58	13.05
590	54.04	13.77	45.41	12.99
585	53.84	13.68	45.25	12.93

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Module family C	**With cut mono c-Si cell from original cell dimension 166mmx166mm:**			
Module type	CHSM72M-HC-xxx		CHSM72M/LV-HC-xxx	
Maximum System Voltage [VDC]	1500		1000	
Dimensions (lxwxh) [mm]	2094 x 1038 x 35			
Module area [m²]	2.17			
Module weight [Kg]	23.5			
Over-current protection rating[A]:	20			
Classification (IEC 61730)	Class II			
Fire rating	Class C			
Pollution degree	I			
Min- creepage distance [mm]	10.4			
Number of solar cells	144			
Cells per bypass diode	48			
Pmp [W] Tolerance: ±3%	Voc [V] Tolerance: ±3%	Isc [A] Tolerance: ±5%	Vmp [V]	Imp [A]
455	49.35	11.44	41.51	10.96
450	49.05	11.37	41.32	10.89
445	48.80	11.30	41.05	10.84
440	48.50	11.24	40.85	10.77
435	48.25	11.16	40.65	10.70
430	47.99	11.10	40.45	10.63
425	47.73	11.03	40.25	10.56
Module type	CHSM60M-HC-xxx		CHSM60M/LV-HC-xxx	
Maximum System Voltage [VDC] :	1500		1000	
Dimensions (lxwxh) [mm]:	2073 x 1133 x 35			
Module area [m²] :	2.35			
Module weight [Kg] :	25.1			
Over-current protection rating[A]:	25			
Classification (IEC 61730) :	Class II			
Fire rating:	Class C			

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Pollution degree:	I			
Min- creepage distance [mm]:	10.4			
Number of solar cells	132			
Cells per bypass diode	44			
Pmp [W] Tolerance: ±3%	Voc [V] Tolerance: ±3%	Isc [A] Tolerance: ±5%	Vmp [V]	Imp [A]
380	41.34	11.49	34.51	11.01
375	41.05	11.42	34.28	10.94
370	40.75	11.35	33.98	10.89
365	40.41	11.29	33.73	10.82
360	40.14	11.21	33.49	10.75
355	39.80	11.15	33.24	10.68
Module type	CHSM60M-HC-xxx		CHSM60M/LV-HC-xxx	
Maximum System Voltage [VDC] :	1500		1000	
Dimensions (lxwxh) [mm]:	2073 x 1133 x 35			
Module area [m^2] :	2.35			
Module weight [Kg] :	25.1			
Over-current protection rating[A]:	25			
Classification (IEC 61730) :	Class II			
Fire rating:	Class C			
Pollution degree:	I			
Min- creepage distance [mm]:	10.4			
Number of solar cells	132			
Cells per bypass diode	44			
Pmp [W] Tolerance: ±3%	Voc [V] Tolerance: ±3%	Isc [A] Tolerance: ±5%	Vmp [V]	Imp [A]
380	41.34	11.49	34.51	11.01
375	41.05	11.42	34.28	10.94
370	40.75	11.35	33.98	10.89
365	40.41	11.29	33.73	10.82
360	40.14	11.21	33.49	10.75
355	39.80	11.15	33.24	10.68

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Module family D	**With cut N-type cell from original cell dimension 210mmx210mm:**			
Module type	CHSM66N-HC-xxx		CHSM66N/LV-HC-xxx	
Maximum System Voltage [VDC]	1500		1000	
Dimensions (lxwxh) [mm]	2384x1303 x35			
Module area [m²]	3.11			
Module weight [Kg]	/			
Over-current protection rating[A]:	30			
Classification (IEC 61730).....	Class II			
Fire rating.....	Class C			
Pollution degree.....	1			
Min- creepage distance [mm].....	10.4			
Number of solar cells	132			
Cells per bypass diode	44			
Pmp [W] Tolerance: ±3%	Voc [V] Tolerance: ±3%	Isc [A] Tolerance: ±5%	Vmp [V]	Imp [A]
690	47.78	18.19	39.65	17.40
685	47.57	18.11	39.48	17.35
680	47.37	18.03	39.31	17.30
675	47.17	17.96	39.14	17.24
670	46.96	17.88	38.97	17.19
665	46.76	17.80	38.81	17.14
660	46.56	17.72	38.64	17.08
655	46.36	17.64	38.47	17.03
Module type	CHSM60N-HC-xxx		CHSM60N/LV-HC-xxx	
Maximum System Voltage [VDC] :	1500		1000	
Dimensions (lxwxh) [mm]:	2172 x 1303 x 35			
Module area [m²] :	2.83			
Module weight [Kg] :	/			
Over-current protection rating[A]:	30			

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Classification (IEC 61730) :	Class II			
Fire rating:	Class C			
Pollution degree :	I			
Min- creepage distance [mm]:	10.4			
Number of solar cells	120			
Cells per bypass diode	40			
Pmp [W] Tolerance: ±3%	Voc [V] Tolerance: ±3%	Isc [A] Tolerance: ±5%	Vmp [V]	Imp [A]
625	43.43	18.10	36.04	17.34
620	43.22	18.02	35.87	17.28
615	43.02	17.94	35.70	17.23
610	42.82	17.85	35.53	17.17
605	42.61	17.77	35.36	17.11
600	42.41	17.68	35.20	17.05
595	42.21	17.60	35.03	16.99
Module family F	**With cut N-type cell from original cell dimension 182mmx182mm:**			
Module type	CHSM78N-HC-xxx		CHSM78N/LV-HC-xxx	
Maximum System Voltage [VDC] :	1500		1000	
Dimensions (lxwxh) [mm]:	2465x1134 x35			
Module area [m²] :	2.80			
Module weight [Kg] :	/			
Over-current protection rating[A]:	25			
Classification (IEC 61730) :	Class II			
Fire rating:	Class C			
Pollution degree :	I			
Min- creepage distance [mm]:	10.4			
Number of solar cells	156			
Cells per bypass diode	52			
Pmp [W] Tolerance: ±3%	Voc [V] Tolerance: ±3%	Isc [A] Tolerance: ±5%	Vmp [V]	Imp [A]
615	55.22	14.03	45.64	13.48
610	55.02	13.96	45.47	13.42

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605	54.82	13.86	45.31	13.35
600	54.62	13.78	45.14	13.29
595	54.42	13.70	44.98	13.23
590	54.22	13.62	44.81	13.17
585	54.02	13.54	44.64	13.10

Module type	CHSM72N-HC-xxx	CHSM72N/LV-HC-xxx
Maximum System Voltage [VDC] :	1500	1000
Dimensions (lxwxh) [mm]:	2278x1134x35	
Module area [m²] :	2.58	
Module weight [Kg] :	/	
Over-current protection rating[A]:	25	
Classification (IEC 61730) :	Class II	
Fire rating:	Class C	
Pollution degree :	I	
Min- creepage distance [mm]:	10.4	
Number of solar cells	144	
Cells per bypass diode	48	

Pmp [W] Tolerance: ±3%	Voc [V] Tolerance: ±3%	Isc [A] Tolerance: ±5%	Vmp [V]	Imp [A]
565	50.70	14.00	42.25	13.37
560	50.55	13.90	42.13	13.29
555	50.40	13.80	42.00	13.21
550	50.25	13.70	41.88	13.13

Module type	CHSM54N-HC-xxx	CHSM54N/LV-HC-xxx
Maximum System Voltage [VDC] :	1500	1000
Dimensions (lxwxh) [mm]:	1722x1134 x30	
Module area [m²] :	1.95	
Module weight [Kg] :	/	
Over-current protection rating[A]:	25	
Classification (IEC 61730) :	Class II	

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Fire rating:	Class C			
Pollution degree :	I			
Min- creepage distance [mm]:	10.4			
Number of solar cells	108			
Cells per bypass diode	36			
Pmp [W] Tolerance: ±3%	Voc [V] Tolerance: ±3%	Isc [A] Tolerance: ±5%	Vmp [V]	Imp [A]
425	38.20	13.98	32.10	13.24
420	38.00	13.87	31.93	13.15
415	37.80	13.76	31.76	13.06
410	37.60	13.65	31.60	12.98
405	37.40	13.54	31.43	12.89
Module type	CHSM60N-HC-xxx		CHSM60N/LV-HC-xxx	
Maximum System Voltage [VDC] :	1500		1000	
Dimensions (lxwxh) [mm]:	1903x1134x30			
Module area [m^2] :	2.16			
Module weight [Kg] :	/			
Over-current protection rating[A]:	25			
Classification (IEC 61730) :	Class II			
Fire rating:	Class C			
Pollution degree :	I			
Min- creepage distance [mm]:	10.4			
Number of solar cells	120			
Cells per bypass diode	40			
Pmp [W] Tolerance: ±3%	Voc [V] Tolerance: ±3%	Isc [A] Tolerance: ±5%	Vmp [V]	Imp [A]
470	42.15	14.01	35.42	13.27
465	41.95	13.91	35.25	13.19
460	41.75	13.81	35.08	13.11
455	41.55	13.71	34.92	13.03
450	41.35	13.60	34.75	12.95

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List of Critical Components (add lines for multiple material sources)

Object	Manufacturer / trademark	Type / model	Technical data / ratings	Standard	Certificates
Front cover	Xinyi PV Products(Anhui) Holdings Ltd.	External AR Coating Glass	Thickness = 3.2mm	—	—
	1. Flat Glass Group Co., Ltd. 2. Anhui Flat Solar Glass Co., Ltd. 3. Zhejiang Jiafu Glass Co., Ltd. 4. Flat (Vietnanm) Co., Ltd.	External AR Coating Glass	Thickness = 3.2mm/4.0	—	—
Rear cover	Suzhou First PV Material CO., LTD.	BEC-301D	Thickness=0.300±0.02mm System voltage=1500V	—	—
	Jolywood (Suzhou) Sunwatt Co., Ltd.	FFC-JW3020(plus)	Thickness: 315μm± 10% System Voltage: 1500VDC	—	—
Encapsulation material	Hangzhou First Applied Material Co., Ltd.	F406PS	Thickness=0.55±0.05mm Thickness=0.50±0.05 mm Thickness=0.60±0.05 mm	—	—
		F806W	Thickness=0.50±0.05 mm Thickness=0.45±0.05 mm Thickness=0.55±0.05 mm Thickness=0.60±0.05 mm	—	—
	1. Hangzhou First Applied Material Co., Ltd. 2. First Material Science (Thailand) CO.,Ltd. 3. First (Chuzhou) Advanced Material Co.,Ltd.	TF4 (close to front cover)	Uit gram=380~560 g/m2	—	—
		F806W	Uit gram=380~560 g/m2	—	—
Solar cell	Chint New Energy Technology Co., Ltd. /M.L.T. Solar Energy Products CO., LTD	1.1 CHSC-210M12SB-PT	210mm x105mm x 175μm (±17.5 μm)	—	—
		1.2 CHSC-182M11SB-PT	182mm x91mm x 175μm (±17.5 μm)	—	—
		1.3 CHSC-166M9SB-PT	166mm x83mm x 175μm (±17.5 μm)	—	—
		1.4 CHSC-210N12SB-N	210mm x105mm x 150μm (±15 μm)	—	—
		1.5 CHSC-182N11SB-N	182mm x91mm x 150μm (±15 μm)	—	—
Cell connectors	Chint New Energy Technology Co., Ltd.	Sn60Pb40	Φ=0.29mm /0.30mm/0.32mm/ 0.35mm/0.4mm	—	—

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Object	Manufacturer / trademark	Type / model	Technical data / ratings	Standard	Certificates
			Φ / L(mm) X T(mm)= 0.35/ 0.75 x 0.18 Φ / L(mm) X T(mm)= 0.38/ 1 x 0.18 Φ (mm)/ L(mm) X T(mm)= 0.32/ 0.68 x 0.17 (Round dimensions for front surface; Flat dimensions for back surface)	—	—
			Triangular dimension L(mm)xT(mm)/ Transitional length (mm)/ Flat dimension L(mm)xT(mm)=0.4x0.35/1.5±0.5/0.75x0.18	—	—
String connectors	Hangzhou Xiaoshan Jianghai Industrial Co., Ltd.	Sn60Pb40	L(mm) X T(mm): 4.0 x 0.35/0.3 5.0 x 0.35/0.3 6.0 x 0.35/0.3/0.4 7.0 x 0.35/0.3 8.0 x 0.35/0.3	—	—
	Suzhou Boneed Photovoltic technology co. LTD.	Sn60Pb40 (Black)	L(mm) X T(mm) : 4.0 x 0.35/0.3 5.0 x 0.35/0.3 6.0 x 0.35/0.3 7.0 x 0.35/0.3	—	—
Frame parts	Chint New Energy Technology Co., Ltd.	Anodized Aluminium Alloy 6005-T6 Oxide layer thickness: AA10/AA15 Black & Silver	H(mm) x W(mm): 35x35	—	—
			H(mm) x W(mm) x T(mm): Long side: 35x33x1.4 Short side: 35x15x1.4/ 35x23.1x1.4	—	—
			H(mm) x W(mm): Long side: 35x33x1.2/1.3/1.5 Short side 1:35x16.8x1.2/1.3/1.5 Short side 2: 35x33x1.2/1.3/1.5 (with wave on side A/ no wave on side A)	—	—

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Object	Manufacturer / trademark	Type / model	Technical data / ratings	Standard	Certificates
			H(mm) x W(mm): Long side: 30x33x1.4/1.3/1.4 Short side 1: 30x23.1x1.0/1.0/1.4 Short side 2: 30x33x1.0/1.0/1.4 (with wave on side A/ no wave on side A)	—	—
			H(mm) x W(mm): Long side1:30x33x1.3/1.3/1.4 Short side1:30x33x1.3/1.3/1.4 Short side2:30x16.2x1.3/1.3/1.4	—	—
			H(mm) x W(mm): Long side: 35x35x1.4/1.5/1.5 Short side : 35x16.5x1.4/1.5/1.5 (with wave on side A/ no wave on side A)	—	—
Adhesive (frame)	Hangzhou Zhijiang Silicone Chemical Co., Ltd	JS-606	Silicon	—	—
	Tonsan Adhesives Co., Ltd.	1527 Color: Black and White	Silicon	—	—
	Shanghai Huitian New Chemical Material Co., Ltd.	906Z Color: Black and White	Silicon	—	—
	Chengdu Guibao Science&Technology Co.,Ltd.	888A Color: Black and White	Silicon	—	—
	Jiangsu Tianchen New Materials Co., Ltd.	HT-8258 Color: White and Black	Silicon	—	—
Fluxing agent	Asahi solder technology (wuxi) company limited	SF105	—	—	—
	Shenzhen Tong fang Electronic New Material Co., Ltd.	AATF9800-MBB	—	—	—
	Shenzhen Yik Shing Tat Industrial Co., Ltd.	GOLF703-C	—	—	—

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Object	Manufacturer / trademark	Type / model	Technical data / ratings	Standard	Certificates
Fixing tape	Shanghai Hyperion Adhesive Material Co.,ltd	9966	—	—	—
	Wuxi Crown Code information Technology Co., Ltd.	GM-UV-200	—	—	—
	Cybrid Technologies Inc	FF-3665(T75)	—	—	—
(Optional) Accessories				—	—

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Object	Manufacturer / trademark		Type / model	Technical data / ratings	Standard	Certificates
Junction Box Combination						
Junction box	Main license holder	Chint New Energy Technology Co., Ltd.	CHS2x (x=3 or 4 or 7 or 8 or 10 or 12)	Rated Voltage = 1500V Rated Current = 18A for CHS2x (x=3 or 7); 22A for CHS2x (x=4 or 8); 25A for CHS2x (x=10 or 12); Reverse Current = 50A	IEC 62790: 2014 EN 62790: 2015	—
	Factory 1	Ningbo Minghe New Energy Technology Co., Ltd.				—
	Factory 2	Zhejiang Chuangyuan Photovoltaic Technology Co., Ltd.				—
	Factory 3	ZHEJIANG XINHUI PHOTOVOLTAIC TECHNOLOGY CO., LTD.				—
Cable 1	Ningbo Kibor Wire & Cable Co., Ltd.		H1Z2Z2-k 1x2,5…4,0mm2	Rated Voltage (DC) = 1500V Rated Current = N/A	EN 50618:2014	—
Cable 2	Wuxi Xinhongye Wire & Cable Co., Ltd.		H1Z2Z2-K 1x1,5...35mm2	Max. Voltage = 1500V Max. Current = 40A	EN 50618:2014	—
Cable 3	Zhejiang Chuangyuan Photovoltaic Technology Co., Ltd.		H1Z2Z2-K 1X4,0mm2	System Voltage = 1500V Max. Current = N/A	EN 50618:2014	
Connectors 1	Chint New Energy Technology Co., Ltd.		HCB40	Rated Voltage (DC) = 1500V Rated Current = 40A	IEC 62852: 2014	
Connectors 2	Stäubli Electrical Connectors AG		PV-KST4-EVO 2/xy_UR; PV-KBT4-EVO 2/xy_UR	Max. Voltage = 1500V Max. Current = 45A	IEC 62852:2014	
Bypass diode 1	Yangzhou Yangjie Electronic Technology Co., Ltd.		25SQ045 (3)	Tj max=200°C Rated current=18A (for CHS2x (x=3 or 7))	—	—
	PAN JIT INTERNATIONAL INC.				—	—
Bypass diode 2	Yangzhou Yangjie Electronic Technology Co., Ltd.		30SQ045-SL (3)	Tj max=200°C Rated current=22A (for CHS2x (x=4 or 8))	—	—
	PAN JIT INTERNATIONAL INC.				—	—

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Object	Manufacturer / trademark	Type / model	Technical data / ratings	Standard	Certificates
Bypass diode 3	Yangzhou Yangjie Electronic Co., Ltd.	40SQ045 (3)	Tj max=200°C Rated current=25A (for CHS2x (x=10 or 12))	—	—
	PAN JIT INTERNATIONAL INC.	40SQ045-SL (3)		—	—
Adhesive 1	Hangzhou Zhijiang Silicone Chemical Co., Ltd.	JS-606 Color: White and Black	Silicon	—	—
Adhesive 2	Beijing Tonsan New Material Technology Co., Ltd.	1527 Color: White and Black	Silicon	—	—
Adhesive 3	Shanghai Huitian New Chemical Material Co., Ltd.	906Z/HT906Z Color: White and Black	Silicon	—	—
Adhesive 4	Chengdu Guibao Science and Technology Co.,Ltd	GB 888A Color: White and Black	Silicon	—	—
Potting material 1	Shanghai Huitian New Chemical Material Co., Ltd.	5299W/5299W-S Color: White and Black	Silicon	—	—
Potting material 2	Beijing Tonsan New Material Technology Co., Ltd.	1521 Color: White and Black	Silicon	—	—
Potting material 3	Hangzhou Zhijiang Silicone Chemicals Co., Ltd.	JS-1184 Color: White and Black	Silicon	—	—
Potting material 4	Chengdu Guibao Science&Technology Co.,Ltd.	4808 Color: White and Black	Silicon	—	—
Junction Box Combination 2					
Junction box	Main license holder: Chint New Energy Technology Co., Ltd. / Factory 1: Ningbo Minghe New Energy Technology Co., Ltd.	CHS3xyz (x=2; y=1 or 2 or 3; z=1 or 2)	Rated Voltage = 1500V Rated Current = 20A for CHS3xyz (y=1); 25A for CHS3xyz (y=2); 30A for CHS3xyz (y=3); Reverse Current = 50A	IEC 62790: 2020 EN 62790: 2020	—

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Object	Manufacturer / trademark	Type / model	Technical data / ratings	Standard	Certificates
	Factory 2: Zhejiang Chuangyuan Photovoltaic Technology Co., Ltd. Factory 3: ZHEJIANG XINHUI PHOTOVOLTAIC TECHNOLOGY CO., LTD.				
Cable 1	Ningbo Kibor Wire & Cable Co., Ltd.	62930 IEC 131 1x1,5…10mm2 HALOGEN FREE LOW SMOKE	System Voltage = 1500V 1 x 4,0mm2; 1 x 6,0mm2	IEC 62930:2017	—
Cable 2	Zhejiang Chuangyuan Photovoltaic Technology Co., Ltd.	62930 IEC 131 1X4,0mm2 HALOGEN FREE LOW SMOKE	System Voltage = 1500V 1 x 4,0mm2	IEC 62930:2017	—
Cable 3	Zhejiang Chint Cable Co., Ltd.	62930 IEC 131 1X2,5…6mm2 HALOGEN FREE LOW SMOKE	System voltage: 1500V, 1 x 4,0mm2; 1 x 6,0mm2	IEC 62930:2017	—
Connectors 1	Chint New Energy Technology Co., Ltd.	PV-HCB40	Rated Voltage (DC) = 1500V Rated Current = 40A	EN 62852:2015+A1 IEC 62852:2014+A1	—
Connectors 2	Stäubli Electrical Connectors AG	PV-KST4-EVO2/xy_UR; PV-KBT4-EVO2/xy_UR PV-KST4-EVO2A/xy; PV-KBT4-EVO2A/xy	Max. Voltage = 1500V Max. Current = 45A	IEC 62852:2014	—
Bypass diode 1	Yangzhou Yangjie Electronic Technology Co., Ltd. PAN JIT INTERNATIONAL INC. Sangdest Microelectronics (Nanjing) CO., LTD.	25SQ045	Tj max=200°C Rated current=20A (for CHS3xyz (y=1))	—	—

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Object	Manufacturer / trademark	Type / model	Technical data / ratings	Standard	Certificates
	Hangzhou Daoming Microelectronics Co., Ltd.				
Bypass diode 2	Yangzhou Yangjie Electronic Technology Co., Ltd.	30SQ045-SL (3)	Tj max=200°C Rated current=25A (for CHS3xyz (y=2))	—	—
	PAN JIT INTERNATIONAL INC.				
	Ningbo Minghe New Energy Technology Co.,Ltd.				
Bypass diode 3	Yangzhou Yangjie Electronic Co., Ltd.	40SQ045 (3)	Tj max=200°C Rated current=30A (for CHS3xyz (y=3))	—	—
	PAN JIT INTERNATIONAL INC.	40SQ045-SL (3)			
Bypass diode 4	Hangzhou Daoming Microelectronics Co., Ltd.	30SQ045-SL	Tj max=200°C Rated current=25A (for CHS3xyz (y=2))	—	—
Adhesive 1	Hangzhou Zhijiang Silicone Chemical Co., Ltd.	JS-606 Color: White and Black	Silicon	—	—
Adhesive 2	TONSAN ADHESIVE, INC.	1527 Color: White and Black	Silicon	—	—
Adhesive 3	Shanghai Huitian New Chemical Material Co., Ltd.	HT906Z Color: White and Black	Silicon	—	—
Adhesive 4	Chengdu Guibao Science and Technology Co.,Ltd	888A Color: White and Black	Silicon	—	—
Adhesive 5	Jiangsu Tianchen New Materials Co., Ltd.	HT-8258 Color: White and Black	Silicon	—	—
Adhesive 6	TONSAN ADHESIVE, INC.	1581 Color: White and Black	Silicon	—	—
Adhesive 7	Shanghai Huitian New Chemical Material Co., Ltd.	9661 Color: White and Black	Silicon	—	—
Adhesive 8	Hangzhou Zhijiang Silicone Chemical Co., Ltd.	JS-606CHUN	Silicon	—	—

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Object	Manufacturer / trademark	Type / model	Technical data / ratings	Standard	Certificates
Potting material 1	Shanghai Huitian New Chemical Material Co., Ltd.	5299W/5299W-S Color: White and Black	Silicon	—	—
Potting material 2	TONSAN ADHESIVE, INC.	1533 Color: White and Black	Silicon	—	—
Potting material 3	Hangzhou Zhijiang Silicone Chemicals Co., Ltd.	JS-1184 Color: White and Black	Silicon	—	—
Potting material 4	Chengdu Guibao Science&Technology Co.,Ltd.	4808 Color: White and Black	Silicon	—	—
Potting material 5	Jiangsu Tianchen New Materials Co., Ltd.	HT-6360A/HT-6360B Color: White and Black	Silicon	—	—

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Annex 2: Photos of modules

Module type: CHSM66M-HC-650

Fig. 1: front view of test sample

Fig. 2: rear view of test sample

Fig. 3: view of closed junction box

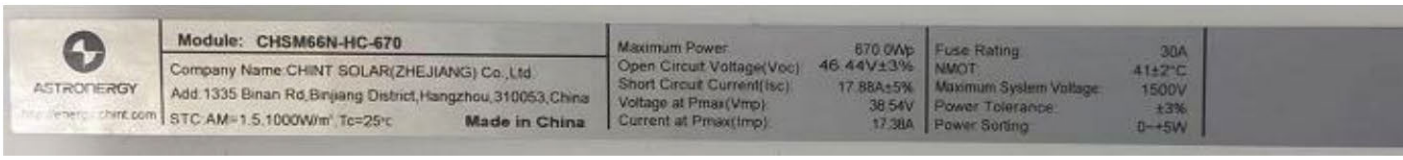

Fig. 4: view of type label

Annex 3: IV Curve

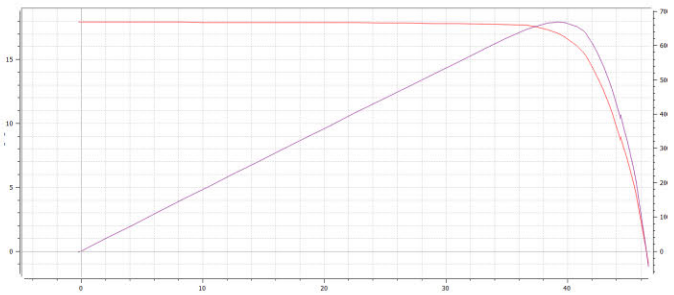

Figure 5 Initial IV curve of sample No.6131138-1

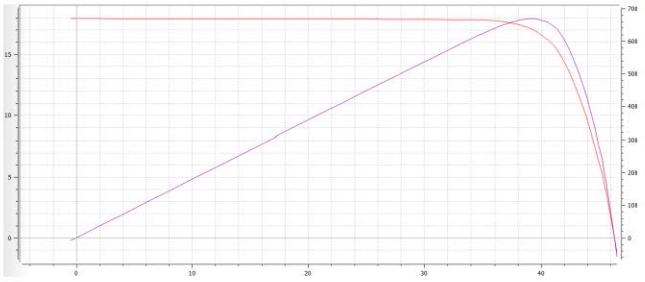

Figure 6 Initial IV curve of sample No. 6131138-2

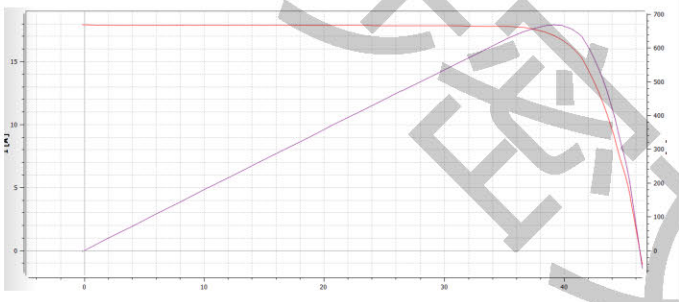

Figure 7 Initial IV curve of sample No. 6131138-3

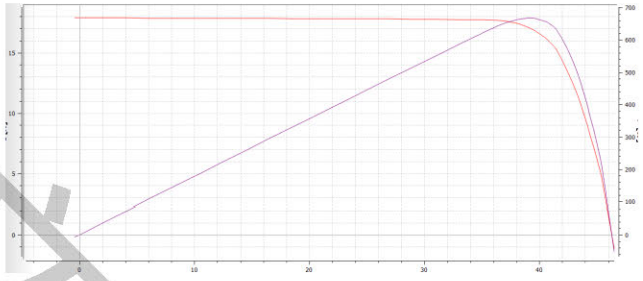

Figure 8 Initial IV curve of sample No. 6131138-4

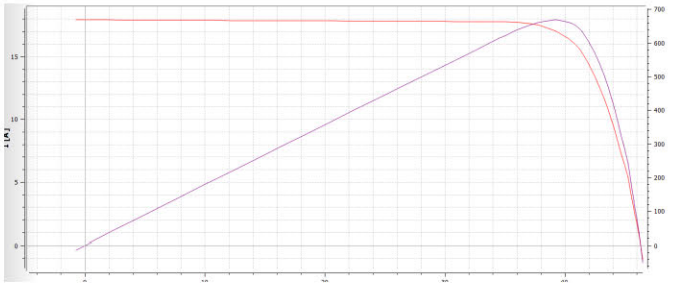

Figure 9 Initial IV curve of sample No. 6131138-5

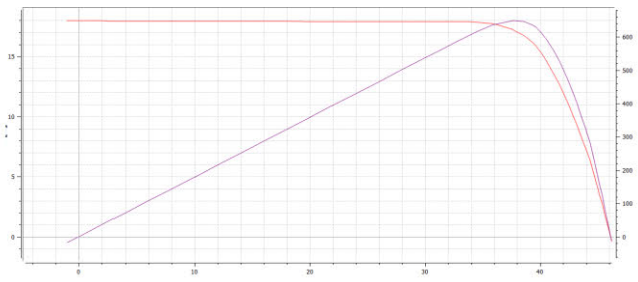

Figure 10 final IV curve of sample No. 6131138-2

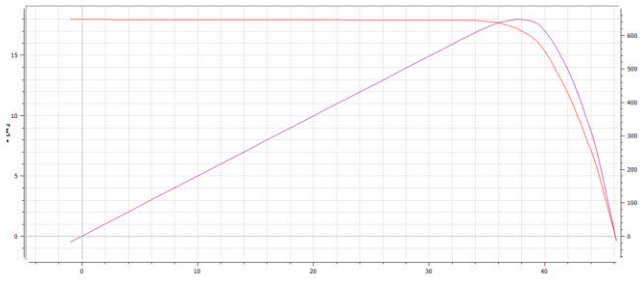

Figure 11 final IV curve of sample No. 6131138-3

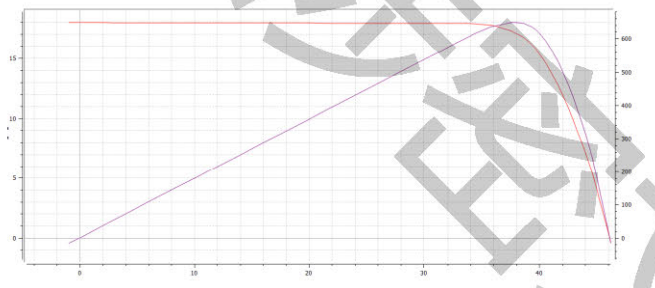

Figure 12 final IV curve of sample No. 6131138-4

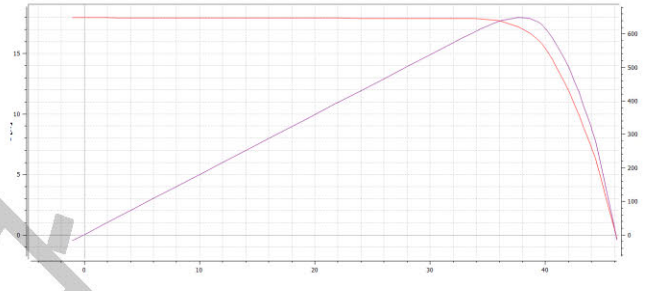

Figure 13 final IV curve of sample No. 6131138-5

Annex 4 EL images

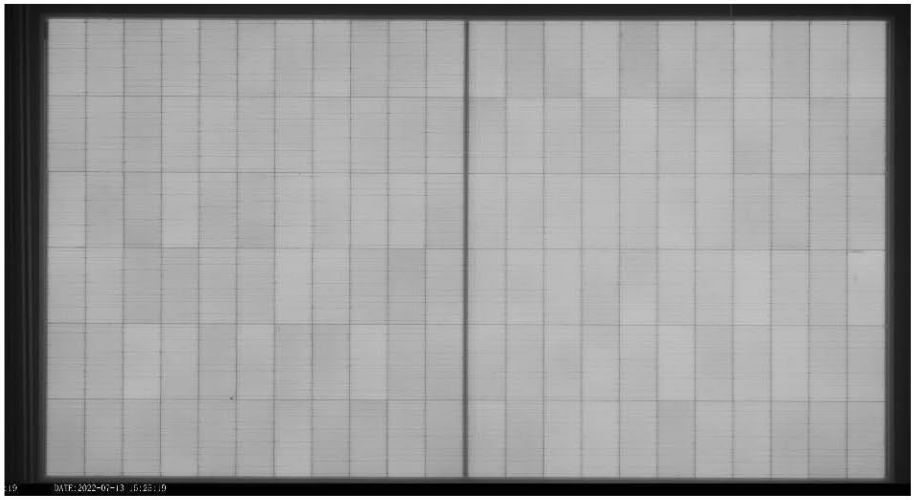

Figure 14 Initial EL image of sample No. 6131138-1

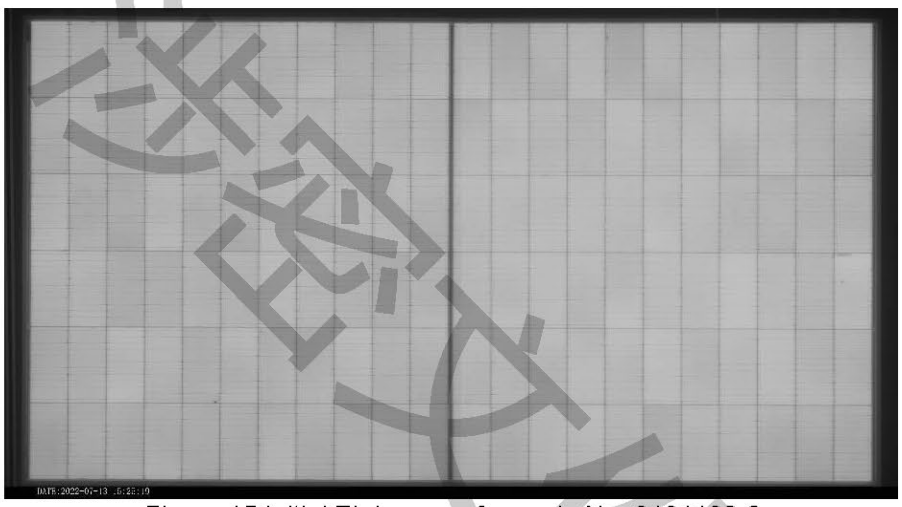

Figure 15 Initial EL image of sample No. 6131138-2

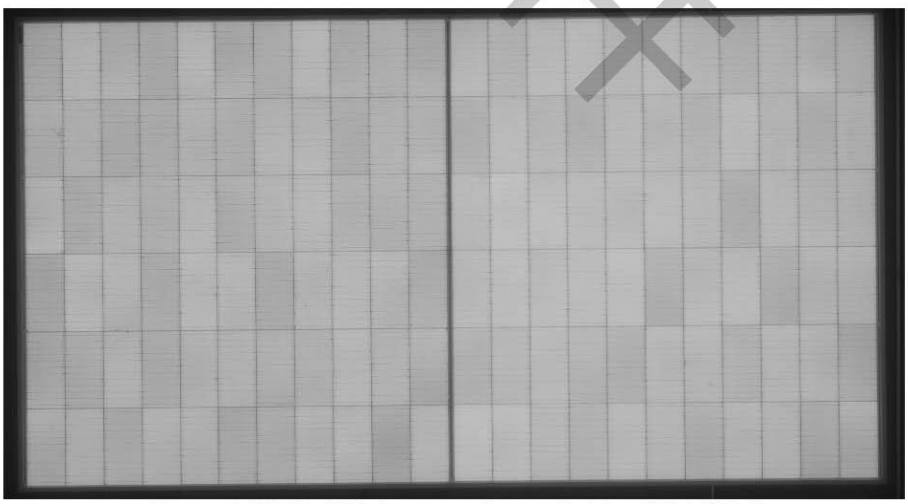

Figure 16 Initial EL image of sample No. 6131138-3

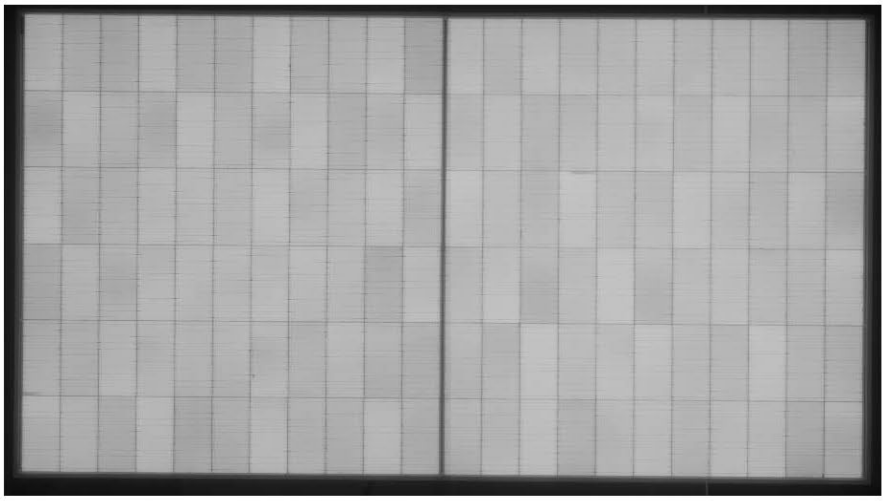

Figure 17 Initial EL image of sample No. 6131138-4

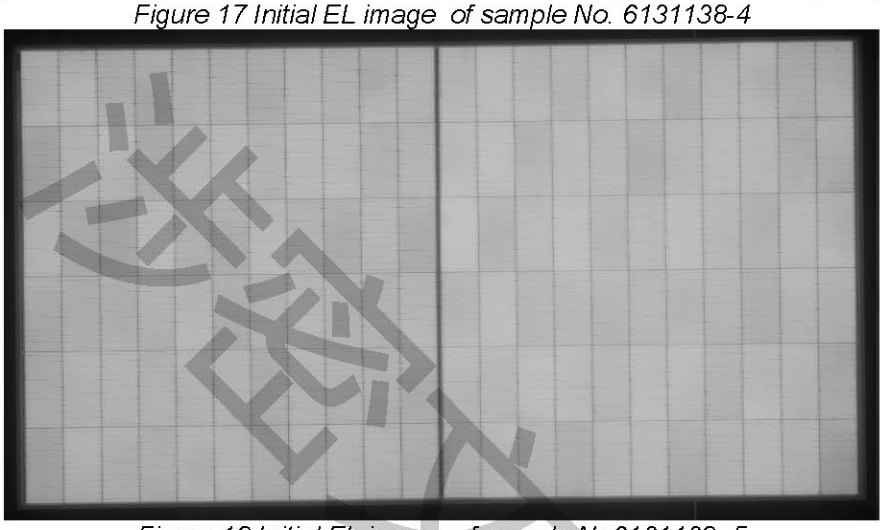

Figure 18 Initial EL image of sample No6131138-.5

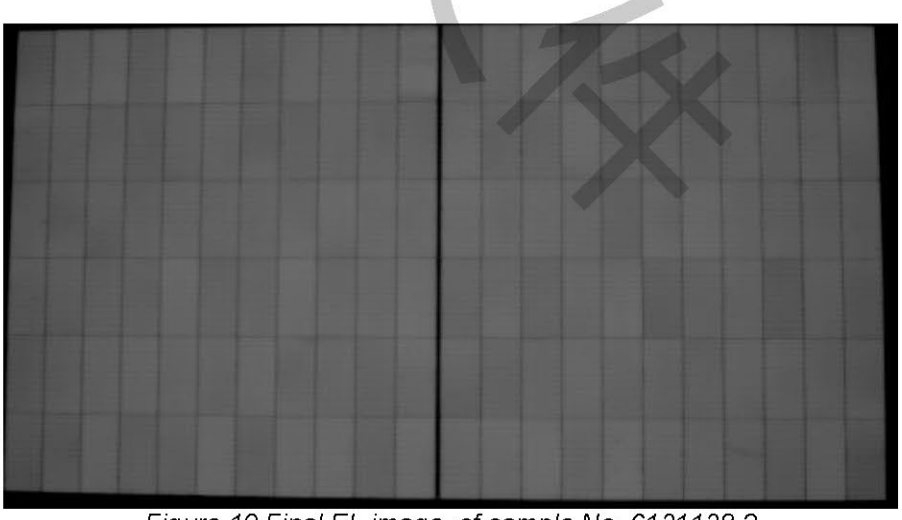

Figure 19 Final EL image of sample No. 6131138-2

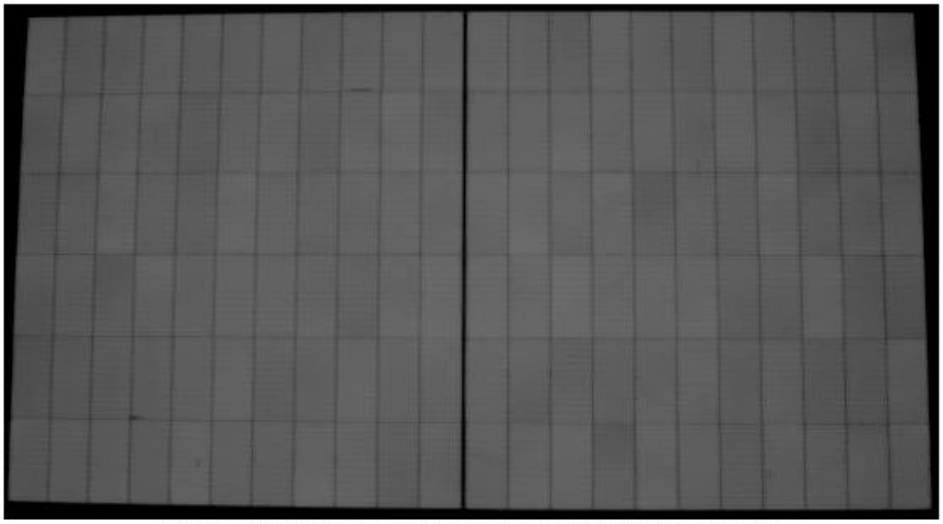

Figure 20 Final EL image of sample No. 6131138-3

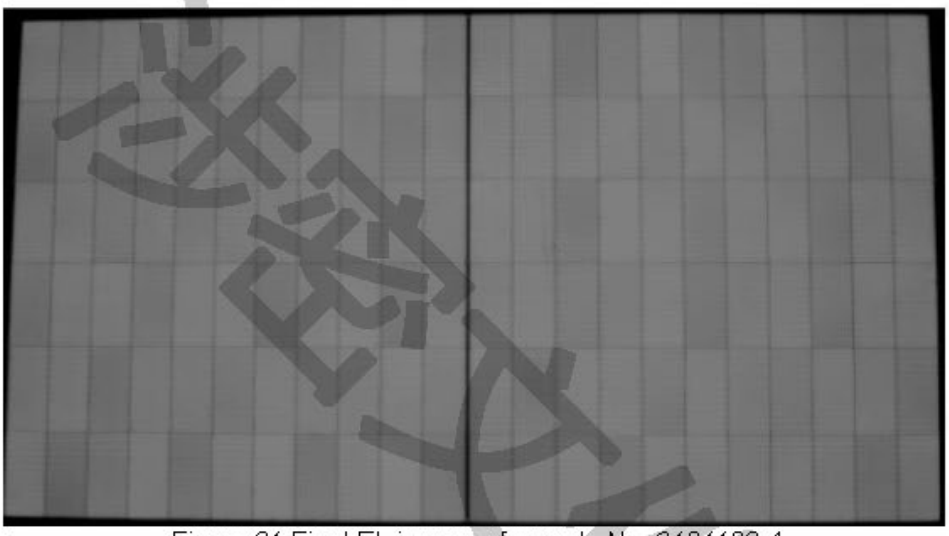

Figure 21 Final EL image of sample No. 6131138-4

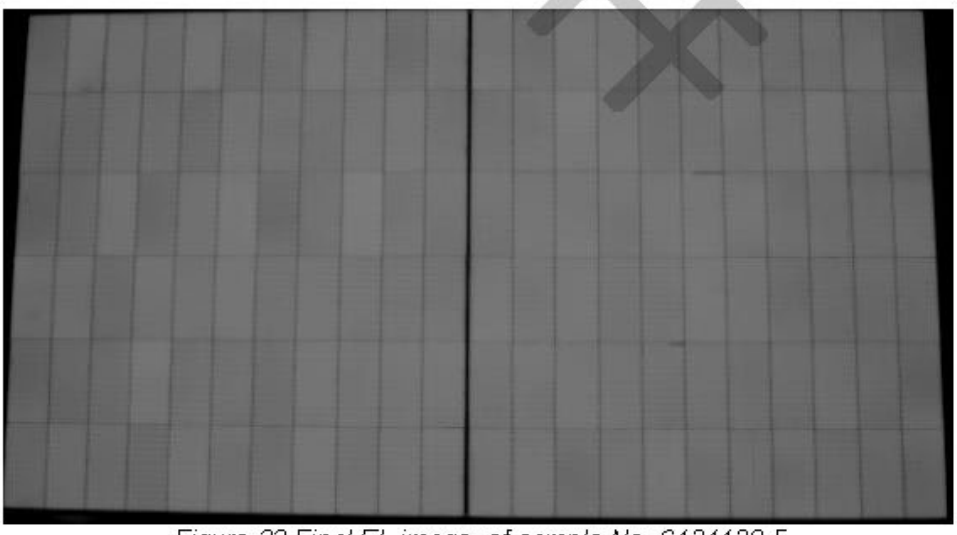

Figure 22 Final EL image of sample No. 6131138-5

Annex 5: 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	2022-03-03	2023-03-02
Maximum power determination	Solar Simulator BS-PV 057-01	A+A+A+	2022-08-18	2023-08-17
	Electronic Load BS-PV 057-02	-15 V~420 V -50 A~50 A	2022-08-18	2023-08-17
	WPVS reference cell BS-PV 057-03	-	2021-10-25	2022-10-24
Wet leakage current test	Insulation test system BS-PV 047-01	22°C	2022-06-06	2023-06-05
	Insulation resistance tester BS-PV 090	Test voltage: 0~10kV Result range: 0~50000MΩ	2022-06-06	2023-06-05
	Conductivity meter BS-PV 047-02	0~1999μs/cm, 10.0~40.0°C	2022-06-06	2023-06-05
Damp heat test	Climate Chamber BS-PV 053	-60~125°C	2022-06-06	2023-06-05
EL	EL Test System BS-PV 026	-	2022-03-30	2023-03-29
	Power supply BS-PV 029	0-80V, 0~20A	2022-06-23	2023-06-22
PID	PID test system BS-PV 015	-2000V~+2000V	2022-03-30	2023-03-29
	Climate chamber BS-PV 056	-60~125°C 20%~98%RH	2022-06-06	2023-06-05

Annex 6: Statement of test uncertainty

The total measuring uncertainty of Pmpp is ≤ 2.6%
The total measuring uncertainty of Isc is ≤ 2.3%
The total measuring uncertainty of Voc is ≤ 1.1%