Test Verification of Conformity

Verification Number: 210902250SHA-V1

On the basis of the tests undertaken, the sample<s> of the below product have been found to comply with the requirements of the referenced specification<s>/standard<s> at the time the tests were carried out. This verification is part of the full test report<s> and should be read in conjunction with it <them>.

Applicant Name & Address:	Greensun Solar Energy Tech. Co., Ltd Room B-1006, Room B-1007, Woye Garden Commercial Building, No. 81 Ganquan Road, Shushan District, Hefei City, Anhui Province
Product Description:	Utility-Interactive Micro Inverter
Ratings & Principle Characteristics:	See Appendix (Specifications table)
Models/Type References:	See Appendix (Specifications table)
Brand Name:	WVC
Relevant Standards:	VDE-AR-N 4105:2018 conjunction with DIN VDE V 0124-100 :2020
Verification Issuing Office Name & Address:	Intertek Testing Services Shanghai Building No.86, 1198 Qinzhou Road (North), Shanghai 200233, China
Date of Tests:	2021-06-22 to 2021-08-17
Test Report Number(s):	210902250SHA-001

Additional information in Appendix.

Signature

Name: Jonny Jing
Position: Manager
Date: 2021-09-29

APPENDIX: Test Verification of Conformity

This is an Appendix to Test Verification of Conformity Number: 210902250SHA-V1

Manufacturer:	Same as applicant

Specifications table			
Model	WVC-350W	WVC-300W	Hedy
Input:			
Vmax PV (Vdc)	60	60	100
Isc PV (absolute Max.) (A)	20	15	7
Number MPP trackers	1	1	1
Number input strings	1	1	1
Max. PV input current(A)	14	13.6	6
MPPT voltage range (Vdc)	25 to 60	25 to 60	60 to 100
Output			
Normal Voltage(V)	☒1/N/PE 230Vac ☐3 φ /N/PE 230/400Vac		
Frequency (Hz)	☒50 Hz ☐60Hz		
Current (Max. continuous) (A)	1.52	1.3	1.3
Power rating (W)	350	300	300
Power Rating (VA)	350	300	300
Power factor /rated	≥0.99	≥0.99	≥0.99
others			
Protective class	Class I		
Ingress protection (IP)	IP 65		
Temperature (°C)	-40°C to +50°C		
Inverter Isolation	☐Non-isolated ☒High frequency isolated		
Overvoltage category	OVC III (AC Main), OVC II (PV)		
Weight (kg)	0.82		
Dimensions (WxHxD) (mm)	165 x 176 x 38		

Annex E4: Verification of Conformity for power generation units

Verification of Conformity for power generation units	No.: **210902250SHA-V1**			
Manufacturer	Dongguan Kaideng Energy Technology Co., Ltd. 4 th floor, Fuyuan business building, no. 1, Lane 13, xin'an maiyuan Road, Chang 'an town, Dongguan City, Guangdong, China.			
Type power generation unit	Utility-Interactive Micro Inverter			
Model		Hedy	WVC-300W	WVC-350W
Assessment values	Max. active power P_{Emax}	300 W	300 W	350 W
	Max. apparent power S_{Emax}	300 VA	300 VA	350 VA
	Rated voltage	230Vac	230Vac	230Vac
Rated values	Rated current (AC) I_r	1.3 A	1.3 A	1.52
	Initial short-circuit AC current	1.3 A	1.3 A	1.55
Network connection rules	**VDE-AR-N 4105 "Power generation systems connected to the low-voltage network"** Technical minimum requirements for connection and parallel operation of power generation systems connected to the low voltage network			
Firmware version	WVC300R3-55-100-433-c3 for Hedy and WVC-300W WVC350R3-55-100-433-c3 for WVC-350W			

Annex E.5 Test report "Network interactions" for power generation units

Extract from the test report on the certificate of units		210902250SHA-001				
Manufacturer:		Dongguan Kaideng Energy Technology Co., Ltd. 4 th floor, Fuyuan business building, no. 1, Lane 13, xin'an maiyuan Road, Chang 'an town, Dongguan City, Guangdong, China.				
Manufacturer indications:		System type	WVC-350W			
		Max. active power P_{Emax}	350 W			
		Rated voltage	230Vac			
Measurement period		2021-06-22 to 2021-08-17				
Rapid voltage changes			N/A			
Connection without provisions (regarding the primary energy carrier)			k_i = 0.52			
Most adverse case when switching between generator levels			N/A			
Connection at nominal conditions (of the primary energy carrier)			k_i = 1.02			
Disconnection at rated power			k_i = 1.01			
Worst value of all switching operations			k_{imax} = 1.02			
Flicker	Angle of network impedance Ψ_k:	32°	30°	50°	70°	85°
	Long-term flicker strength P_{lt}:	0.26	N/A	N/A	N/A	N/A
	Initial flicker factor c_Ψ:	N/A	N/A	N/A	N/A	N/A

E.5 Test report “Network interactions” for power generation units

(5.2.4)	TABLE: Harmonics										P	
Harmonics												
P/P_n [%]	0	10	20	30	40	50	60	70	80	90	100	Limit
Order No.	I/In [%]											
2	0.00	0.08	0.25	0.47	0.38	0.28	0.20	0.21	0.17	0.23	0.34	--
3	0.01	0.08	0.09	0.09	0.08	0.09	0.17	0.11	0.19	0.20	0.21	--
4	0.00	0.10	0.09	0.03	0.03	0.05	0.14	0.17	0.15	0.16	0.15	--
5	0.01	0.43	0.68	0.84	0.83	0.89	0.90	0.89	0.92	0.99	1.06	--
6	0.00	0.02	0.11	0.08	0.09	0.09	0.11	0.14	0.17	0.20	0.21	--
7	0.00	0.09	0.10	0.24	0.27	0.26	0.28	0.27	0.31	0.38	0.46	--
8	0.00	0.02	0.05	0.03	0.05	0.07	0.07	0.09	0.08	0.07	0.04	--
9	0.00	0.01	0.08	0.06	0.07	0.09	0.09	0.08	0.09	0.10	0.10	--
10	0.00	0.04	0.04	0.05	0.04	0.02	0.09	0.10	0.04	0.04	0.10	--
11	0.00	0.02	0.05	0.06	0.12	0.13	0.14	0.12	0.14	0.15	0.17	--
12	0.00	0.01	0.02	0.02	0.03	0.04	0.03	0.02	0.02	0.02	0.02	--
13	0.00	0.01	0.02	0.01	0.04	0.05	0.06	0.06	0.08	0.10	0.11	--
14	0.00	0.04	0.10	0.12	0.09	0.04	0.06	0.09	0.06	0.06	0.07	--
15	0.00	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	--
16	0.00	0.03	0.07	0.07	0.06	0.04	0.02	0.04	0.04	0.04	0.05	--
17	0.00	0.01	0.05	0.02	0.06	0.08	0.06	0.03	0.03	0.05	0.05	--
18	0.00	0.01	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.01	--
19	0.00	0.01	0.03	0.02	0.04	0.05	0.04	0.02	0.01	0.02	0.02	--
20	0.00	0.01	0.02	0.02	0.03	0.04	0.05	0.04	0.02	0.02	0.04	--
21	0.00	0.01	0.02	0.01	0.01	0.02	0.03	0.02	0.02	0.02	0.02	--
22	0.00	0.02	0.04	0.03	0.03	0.07	0.12	0.13	0.08	0.05	0.02	--
23	0.00	0.01	0.05	0.02	0.03	0.06	0.08	0.06	0.04	0.05	0.04	--
24	0.00	0.01	0.03	0.02	0.02	0.03	0.02	0.02	0.01	0.01	0.01	--
25	0.00	0.01	0.05	0.01	0.02	0.04	0.04	0.03	0.05	0.06	0.05	--
26	0.00	0.03	0.22	0.24	0.20	0.18	0.16	0.11	0.04	0.04	0.13	--
27	0.00	0.01	0.02	0.02	0.03	0.04	0.04	0.02	0.01	0.02	0.02	--
28	0.01	0.04	0.16	0.16	0.16	0.15	0.15	0.09	0.04	0.03	0.09	--
29	0.00	0.01	0.09	0.06	0.03	0.10	0.13	0.11	0.07	0.08	0.08	--
30	0.01	0.01	0.06	0.05	0.05	0.06	0.04	0.03	0.02	0.03	0.05	--
31	0.00	0.01	0.09	0.07	0.04	0.08	0.12	0.08	0.08	0.08	0.05	--
32	0.00	0.05	0.34	0.25	0.20	0.09	0.08	0.16	0.20	0.24	0.33	--
33	0.00	0.01	0.02	0.02	0.02	0.01	0.03	0.04	0.04	0.04	0.03	--
34	0.00	0.08	0.32	0.27	0.22	0.15	0.08	0.06	0.09	0.14	0.21	--
35	0.00	0.02	0.06	0.05	0.03	0.01	0.02	0.04	0.04	0.03	0.01	--
36	0.01	0.01	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	--
37	0.00	0.03	0.05	0.03	0.02	0.02	0.03	0.03	0.03	0.02	0.01	--
38	0.00	0.18	0.10	0.11	0.10	0.14	0.17	0.18	0.18	0.19	0.20	--
39	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	--
40	0.00	0.08	0.05	0.04	0.04	0.05	0.06	0.07	0.08	0.08	0.09	--

(5.2.4)	TABLE: Harmonic current limit test (EN 61000-3-2)						P
Model							
Harmonic	L1		--		--		Limits -A
	Magnitude (A)	% of I	Magnitude (A)	% of I	Magnitude (A)	% of I	
02	0.00	--	--	--	--	--	1.08
03	0.00	--	--	--	--	--	2.30
04	0.00	--	--	--	--	--	0.43
05	0.02	--	--	--	--	--	1.14
06	0.00	--	--	--	--	--	0.30
07	0.01	--	--	--	--	--	0.77
08	0.00	--	--	--	--	--	0.23
09	0.00	--	--	--	--	--	0.40
10	0.00	--	--	--	--	--	0.18
11	0.00	--	--	--	--	--	0.33
12	0.00	--	--	--	--	--	0.15
13	0.00	--	--	--	--	--	0.21
14	0.00	--	--	--	--	--	0.13
15	0.00	--	--	--	--	--	0.15
16	0.00	--	--	--	--	--	0.12
17	0.00	--	--	--	--	--	0.13
18	0.00	--	--	--	--	--	0.10
19	0.00	--	--	--	--	--	0.12
20	0.00	--	--	--	--	--	0.09
21	0.00	--	--	--	--	--	0.11
22	0.00	--	--	--	--	--	0.08
23	0.00	--	--	--	--	--	0.10
24	0.00	--	--	--	--	--	0.08
25	0.00	--	--	--	--	--	0.09
26	0.00	--	--	--	--	--	0.07
27	0.00	--	--	--	--	--	0.08
28	0.00	--	--	--	--	--	0.07
29	0.00	--	--	--	--	--	0.08
30	0.00	--	--	--	--	--	0.06
31	0.00	--	--	--	--	--	0.07
32	0.00	--	--	--	--	--	0.06
33	0.00	--	--	--	--	--	0.07
34	0.00	--	--	--	--	--	0.05
35	0.00	--	--	--	--	--	0.06
36	0.00	--	--	--	--	--	0.05
37	0.00	--	--	--	--	--	0.06
38	0.00	--	--	--	--	--	0.05
39	0.00	--	--	--	--	--	0.06
40	0.00	--	--	--	--	--	0.05
THD	--	1.37	--	--	--	--	--

Annex E.7 Requirements to the Test Report on the NS protection

Extract from the test report for the NS protection "Determination of electric properties"		210902250SHA-001
Test report NS Protection		
Type of NS protection:	Central NS protection	Further manufacturer indications
Software version:	--	
Manufacturer:	--	
Measurement period:	--	

	Inverter(s)		
Protective function	Set value	Tripping value	Tripping value NS protection
Rise-in-voltage protection U >>	1.25 * U_n	--	--
Rise-in-voltage protection U >	1.10 * U_n	--	--
Voltage drop protection U <	0.8 * U_n	--	--
Voltage drop protection U <	0.45 * Un	--	--
Frequency decrease protection f <	47.5Hz	--	--
Frequency increase protection f >	51.5Hz	--	--

[a] The tripping time includes the period from the limit value violation U/f until the tripping signal to the interface switch.
When planning the power generation system, the response time of the interface switch shall be added to the maximum time value obtained as indicated above.
The disconnection time (sum of tripping time of the NS protection plus response time of the interface switch) shall not exceed 200 ms
* Longest disconnection of the rise-in-voltage protection as a moving 10-minute-average.

☐ **For integrated NS protection**

Assigned to power generation unit of type	
Type integrated interface switch	
Response time of interface switch for integrated NS protection	

Verification of the entire functional chain "integrated NS protection – interface switch" has resulted in successful disconnection.

NOTE1: Un=230V

Remark:

The sample<s> covered in this VOC are incomplete in functional features or limited in performance capabilities and are intended for use and evaluation in other products. See test report for detail information.

Signature

Name: Jonny Jing
Position: Manager
Date: 2021-09-29