




Prüfbericht-Nr.: <i>Test Report No.:</i>	50306626 012	Auftrags-Nr.: <i>Order No.:</i>	244347689	Seite 1 von 15 <i>Page 1 of 15</i>
Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	2177511	Auftragsdatum: <i>Order date.:</i>	2021-07-19	
Auftraggeber: <i>Client:</i>	Ginlong technologies Co., Ltd. No.57 Jintong Road, Binhai, (seafront), Industrial Park, Xiangshan Ningbo, 315712 Zhejiang, P.R. China			
Prüfgegenstand: <i>Test item:</i>	Grid-connected PV Inverter			
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	Refer to next page			
Auftrags-Inhalt: <i>Order content:</i>	TÜV Rheinland EMC service			
Prüfgrundlage: <i>Test specification:</i>	EN 61000-6-1:2007	EN 61000-6-3:2007+A1	EN 61000-6-2:2005	
	EN 61000-6-4:2007+A1	IEC 61000-6-1:2005	IEC 61000-6-3:2006+A1	
	IEC 61000-6-2:2005	IEC 61000-6-4:2006+A1	BS EN 61000-6-1:2007	
	BS EN 61000-6-2:2005	BS EN 61000-6-3:2007+A1	BS EN 61000-6-4:2007+A1	
Wareneingangsdatum: <i>Date of receipt:</i>	2021-09-03			
Prüfmuster-Nr.: <i>Test sample No.:</i>	244347689-1-1			
Prüfzeitraum: <i>Testing period:</i>	Refer to test report			
Ort der Prüfung: <i>Place of testing:</i>	Refer to clause 1.1			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shanghai) Co., Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von: / tested by: Jie Min (Trainee) / Stefan Zhao (Trainer) 	genehmigt von: / authorized by: Hexiong Liu 			
Datum: / Date: 2021-09-29	Datum: / Date: 2021-09-29			
Stellung: / Position: Supervisor/Senior project engineer	Stellung: / Position: Department manager			
Sonstiges / Other:	Refer to next page for details.			
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>	Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>			
<p>* Legende: P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet Legend: P(ass) = passed a.m. test specifications(s) F(ail) = failed a.m. test specifications(s) N/A = not applicable N/T = not tested</p>				
<p>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i></p>				

V05

Prüfbericht - Nr.: 50306626 012

Seite 2 von 15

Test Report No.:

Page 2 of 15

Model list:

New model			Original model
S5-GC50K-LV			Solis-50K-LV-5G
S5-GC60K-LV			Solis-60K-LV-5G
S5-GC80K			Solis-80K-5G
S5-GC100K S5-GC100K-HV	S5-GC100K-AU	S5-GC100K-SA	Solis-100K-HV-5G
S5-GC110K S5-GC110K-BHV	S5-GC110K-AU	S5-GC110K-SA	Solis-110K-BHV-5G
S5-GC125K-HV	S5-GC125K-HV-AU		Solis-125K-HV-5G

Identities and differences:

1. In electrical characteristics, the above new models have the same circuit diagram and hardware configure. The differences among them are the software setting, AC output powers on the rating labels and mechanical aspects.
2. Compared with the original models which were already EMC tested in the reports 50306626 001&003&006, the DC input current and AC output current on the labels are revised accordingly.
3. Additionally, the requirements of BS standards are identical to those of EN standards respectively.

With the consideration of the same and differences, the radiated disturbance test was performed on following model with product configure specified by the manufacturer:

No.	Model	Radiated disturbance
1.	S5-GC125K-HV	√

Prüfbericht - Nr.: 50306626 012
Test Report No.:

Seite 3 von 15
Page 3 of 15

TEST SUMMARY

5.1.1 RADIATED EMISSION

Result:

Passed

Contents

1	TEST SITES	5
1.1	TEST FACILITIES.....	5
2	GENERAL PRODUCT INFORMATION	6
2.1	PRODUCT FUNCTION AND INTENDED USE	6
2.2	RATINGS AND SYSTEM DETAILS.....	6
2.3	INDEPENDENT OPERATION MODES.....	9
2.4	NOISE GENERATING AND NOISE SUPPRESSING PARTS.....	9
2.5	SUBMITTED DOCUMENTS	9
3	TEST SET-UP AND OPERATION MODES	10
3.1	PRINCIPLE OF CONFIGURATION SELECTION.....	10
3.2	PHYSICAL CONFIGURATION FOR TESTING	10
3.3	TEST OPERATION AND TEST SOFTWARE.....	10
3.4	SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT.....	10
3.5	COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE	10
4	CONFORMITY DECISION RULE	10
5	TEST RESULTS EMISSION	11
5.1	EMISSION IN THE FREQUENCY RANGE ABOVE 30 MHz	11
5.1.1	<i>Radiated emission</i>	11
6	PHOTOGRAPHS OF THE TEST SET-UP.....	14
7	LIST OF TEST AND MEASUREMENT INSTRUMENTS.....	15
8	LIST OF FIGURES.....	15
9	LIST OF PHOTOGRAPHS	15

Prüfbericht - Nr.: 50306626 012
Test Report No.:

Seite 5 von 15
Page 5 of 15

1 Test Sites

1.1 Test Facilities

Laboratory : Shanghai Testing & Inspection Institute for Electrical Equipment
Address: No. 505, Wuning Road, Shanghai 200063, P.R. China

The used test equipment is in accordance with CISPR 16-1 series standards for measurement of radio interference.

The performed tests have been conducted by “Shanghai Testing & Inspection Institute for Electrical Equipment” under supervision of TÜV Rheinland’s engineer.

Refer to Clause 7 for test and measurement instruments.

Prüfbericht - Nr.: 50306626 012

Test Report No.:

Seite 6 von 15

Page 6 of 15

2 General Product Information

2.1 Product Function and Intended Use

The EUT (equipment under test) is an ordinary grid-connected PV inverter that converts the DC energy from PV modules to AC energy. For the further information, refer to the user's manual.

2.2 Ratings and System Details

List 1

Model name	S5-GC50K-LV	S5-GC60K-LV
PV Input		
Max.DC input power (kW)	84	112
Max. DC input voltage (V)	1100	
Nominal DC voltage (V)	450	
Start-up voltage (V)	195	
MPPT voltage range (V)	180-1000	
Full load MPPT voltage range (V)	400-850	
Max. input current (A)	10*32 A	
Max. short circuit current for each MPPT (A)	10*50 A	
MPPT number/max input strings number	6/12	8/16
AC Output		
Rated output power (kW)	50	60
Max. apparent output power (kVA)	55	66
Max. output power (kW)	55	66
Rated grid voltage (V)	3/(N)/PE, 220 V	
Rated grid frequency (Hz)	50/60	
Grid frequency range (Hz)	45-55Hz or 55-65Hz	
Rated grid output current (A)	131.2	157.5
Max. output current (A)	144.3	173.2
Protective class	I	

Prüfbericht - Nr.: 50306626 012

Seite 7 von 15

Test Report No.:

Page 7 of 15

List 2

Model name	S5-GC100K-AU	S5-GC110K-AU	S5-GC125K-HV-AU	S5-GC100K-SA	S5-GC110K-SA
PV Input					
Max.DC input power (kW)	140			/	
Max. DC input voltage (V)	1100				
Nominal DC voltage (V)	600		720		600
Start-up voltage (V)	195				
MPPT voltage range (V)	180-1000				
Full load MPPT voltage range (V)	550-850		580-850		550-850
Max. input current (A)	10*32				
Max. short circuit current for each MPPT (A)	10*50				
MPPT number/max input strings number	10/20				
AC Output					
Rated output power (kW)	100	110	125	100	110
Max. apparent output power (kVA)	100	110	125	110	121
Max. output power (kW)	100	110	125	110	121
Rated grid voltage (V)	3/N/PE, 230/400V	3/N/PE, 230/400V	3/PE, 480 V	3/N/PE, 230/400V	
Rated grid frequency (Hz)	50/60			50	
Grid frequency range (Hz)	45-55Hz or 55-65Hz			45-55	
Rated grid output current (A)	/			144.3	167.1/158.8
Max. output current (A)	144.3	158.8	150.4	158.8	174.7
Protective class	I				

Prüfbericht - Nr.: 50306626 012

Seite 8 von 15

Test Report No.:

Page 8 of 15

List 3

Model name	S5-GC100K	S5-GC110K	S5-GC125K-HV	S5-GC80K	S5-GC100K-HV	S5-GC110K-BHV
PV Input						
Max. DC input voltage (V)	1100					
Nominal DC voltage (V)	600		720	600		720
Start-up voltage (V)	195					
MPPT voltage range (V)	180-1000					
Full load MPPT voltage range (V)	550-850		580-850	550-850		
Max. input power per MPPT (kW)	21			/	/	/
Max. input current (A)	10*32			9*32	10*32	
Max. short circuit current for each MPPT (A)	10*50			9*50	10*50	
MPPT number/max input strings number	10/20			9/18	10/20	
AC Output						
Rated output power (kW)	100	110	125	80	100	110
Max. apparent output power (kVA)	110	121	137.5	88	110	121
Max. output power (kW)	110	121	137.5	88	110	121
Rated grid voltage (V)	3/N/PE, 220/380V,230/400V		3/PE, 480 V	3/N/PE, 220/380 V, 230/400 V	3/PE, 480 V	3/PE, 540 V
Rated grid frequency (Hz)	50/60					
Grid frequency range (Hz)	45-55 Hz / 55-65 Hz					
Rated grid output current (A)	152.0/144.3	167.1/158.8	150.4	121.6/115.5	120.3	117.6
Max. output current (A)	167.1	183.8	165.4	133.7	132.3	129.4
Protective class	I					

Prüfbericht - Nr.: 50306626 012
Test Report No.:

Seite 9 von 15
Page 9 of 15

2.3 Independent Operation Modes

The basic operation modes are: “On” or “Off”.
Refer to operation manual for further information.

2.4 Noise Generating and Noise Suppressing Parts

Refer to the circuit diagram for further information.

2.5 Submitted Documents

Circuit diagram and rating labels.

3 Test Set-up and Operation Modes

3.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible emission level. The test conditions were adapted accordingly in reference to the instructions for use.

Refer to the related paragraph of this report.

3.2 Physical Configuration for Testing

Refer to the related paragraph of this report.

3.3 Test Operation and Test Software

Refer to the related paragraph of this report.

3.4 Special Accessories and Auxiliary Equipment

During the tests, the auxiliary equipment was used as following.

Auxiliary equipment	Manufacturer	Model
PV simulator	Chroma	62150H-600S × 2

3.5 Countermeasures to achieve EMC Compliance

No special measure is employed to achieve the requirement.

4 Conformity Decision Rule

For all EMI tests included in this report, as measurement uncertainties are less than the values U_{CISPR} given in CISPR 16-4-2, compliance with the limits is determined by comparing measurement results directly with corresponding limits without taking into consideration of measurement uncertainties.

5 Test Results EMISSION

5.1 Emission in the Frequency Range above 30 MHz

5.1.1 Radiated emission

Result:

Passed

Date of testing	: 2021-09-03
Test procedure	: EN 61000-6-3:2007+A1 and CISPR 16-2-3:2006
Frequency range	: 30 – 1000 MHz (see Note)
Limits	: Quasi-peak limits (10 m measurement distance): 30 – 230 MHz, 30 dB μ V/m; 230 – 1000 MHz, 37 dB μ V/m
Kind of test site	: Semi-anechoic Chamber
Test distance	: 10 m
Test voltage	: Input: DC 600 V; Output: AC 380 V, 50 Hz
Operational mode	: Continuously operated
Ambient condition	: Temperature: 25.0 °C ; Relative humidity: 51 %
Expanded measurement uncertainty ($k=2$)	: Horizontal polarization: 4.69 dB (30 - 200 MHz) 4.78 dB (200 - 1000 MHz) Vertical polarization: 4.66 dB (30 - 200 MHz) 4.85 dB (200 - 1000 MHz)

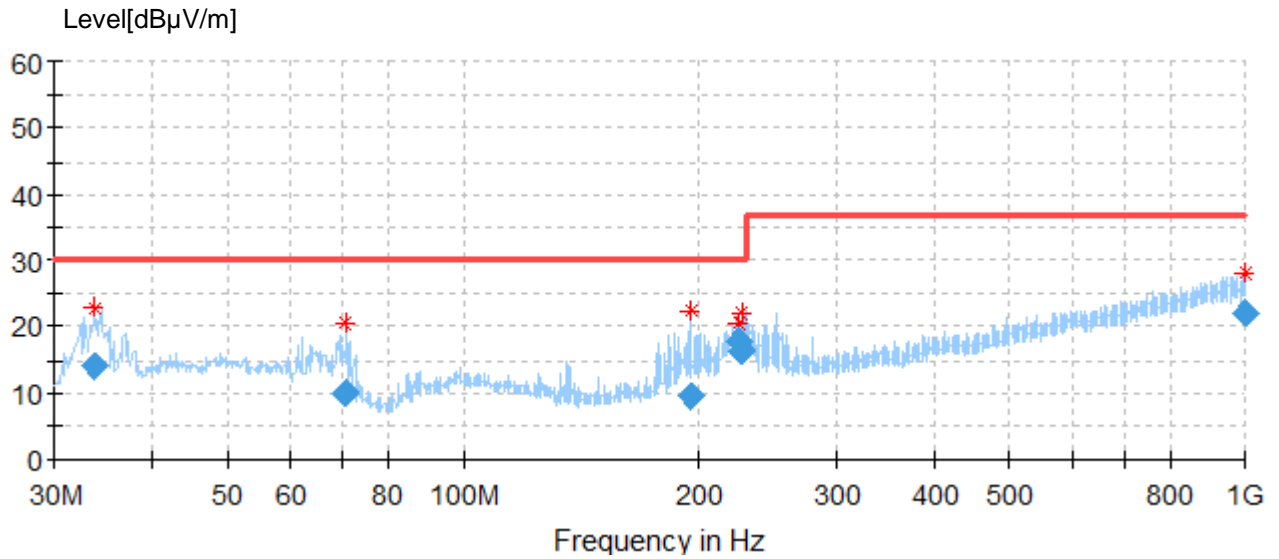
The radiated disturbance was measured in the frequency range from 30 MHz to 1000 MHz according to EN 61000-6-3:2007+A1.

The test setup was made according to EN 61000-6-3:2007+A1 in a semi-anechoic chamber. The test distance from the receiving antenna to the EUT is 10 m. The normalized site attenuation of the semi-anechoic chamber is regularly calibrated to ensure the radiated disturbance test results are valid. During the test, the EUT was placed on a 0.8 m wooden table above the turntable. The turntable can be rotated 360° around and the receiving antenna was varied from 1 m to 4 m to find the maximum disturbance. The test was performed with the antenna both in horizontal and vertical polarizations.

The following figures were those measured and recorded by a test receiver. The curves in the figure were those measured with a peak detector. The symbol “◆” in the figures are those of quasi-peak value which were measured in final measurement. Quasi-peak detector measurement was only performed at those critical frequencies obtained during the test with peak detector.

Note: The highest frequency of the internal sources of the EUT is less than 108 MHz, so this measurement was only performed up to 1 GHz.

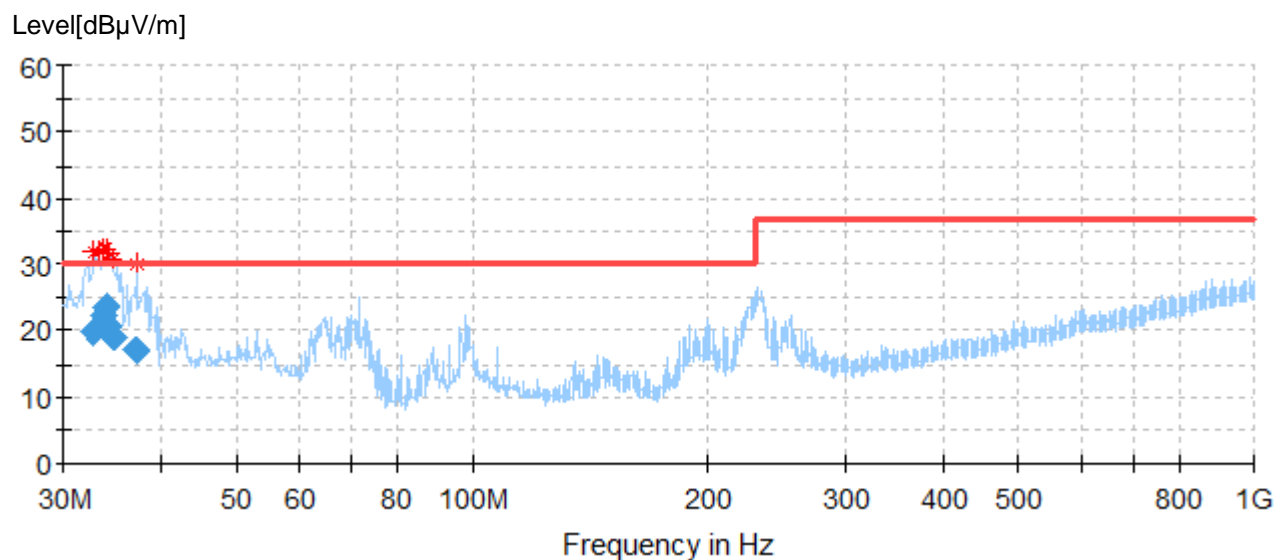
Figure 1: Spectral diagram and measurement results, 30 – 1000MHz, Horizontal polarization for model S5-GC125K-HV



Final measurement results:

Frequency (MHz)	QuasiPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
33.758750	14.23	30.00	15.77	1000.0	120.000	400.0	H	106.0
70.497500	9.98	30.00	20.02	1000.0	120.000	200.0	H	161.0
195.748750	9.63	30.00	20.37	1000.0	120.000	300.0	H	-126.0
225.212500	17.67	30.00	12.33	1000.0	120.000	400.0	H	-113.0
227.031250	16.18	30.00	13.82	1000.0	120.000	300.0	H	-103.0
999.272500	21.88	37.00	15.12	1000.0	120.000	200.0	H	-175.0

Figure 2: Spectral diagram and measurement results, 30 – 1000MHz, Vertical polarization for model S5-GC125K-HV



Final measurement results:

Frequency (MHz)	QuasiPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
32.788750	19.75	30.00	10.25	1000.0	120.000	300.0	V	-101.0
33.273750	20.90	30.00	9.10	1000.0	120.000	100.0	V	-20.0
33.758750	22.22	30.00	7.78	1000.0	120.000	300.0	V	99.0
34.001250	23.38	30.00	6.62	1000.0	120.000	100.0	V	95.0
34.365000	20.38	30.00	9.62	1000.0	120.000	300.0	V	-142.0
34.728750	19.17	30.00	10.83	1000.0	120.000	200.0	V	97.0
37.153750	16.97	30.00	13.03	1000.0	120.000	100.0	V	143.0

Prüfbericht - Nr.: 50306626 012
Test Report No.:

Seite 14 von 15
Page 14 of 15

6 Photographs of the Test Set-Up

Photograph 1: Set-up for measurement of radiated emission



7 List of Test and Measurement Instruments

No.	Equipment/software name	Model	Inventory No.	Cal. due date
1.	EMI test receiver	ESU 40	0441-1939	04.07.2022
2.	Broadband antenna	VULB9163	E9163-902	15.03.2022
3.	Pre-amplifier	SCU-01	0341-0166	30.06.2022
4.	Barometer	DYM3	04L6177	05.04.2022
5.	Hygrometer	42280	E10147791	19.10.2022

8 List of Figures

Figure 1: Spectral diagram and measurement results, 30 – 1000MHz, Horizontal polarization for model S5-GC125K-HV 12
Figure 2: Spectral diagram and measurement results, 30 – 1000MHz, Vertical polarization for model S5-GC125K-HV 13

9 List of Photographs

Photograph 1: Set-up for measurement of radiated emission 14

End of test report