



1 Cover Page

RF Exposure Evaluation Report

Application No.: SHEM1902011145CR
FCC ID: 2ASN7-LOGGER1000
IC: 24895-LOGGER1000
Applicant: SUNGROW POWER SUPPLY Co., Ltd
Address of Applicant: No.1699 Xiyou Rd., New & High Technology Industrial Development Zone,
Hefei, P.R. China
Manufacturer: SUNGROW POWER SUPPLY Co., Ltd
Address of Manufacturer: No.1699 Xiyou Rd., New & High Technology Industrial Development Zone,
Hefei, P.R. China
Factory: SUNGROW POWER SUPPLY Co., Ltd
Address of Factory: No.1699 Xiyou Rd., New & High Technology Industrial Development Zone,
Hefei, P.R. China
Equipment Under Test (EUT):
EUT Name: DataLogger
Model No.: Logger1000
Trade mark: Sungrow
Standard(s) : FCC Rules 47 CFR §2.1091
KDB447498 D01 General RF Exposure Guidance v06
RSS-102 Issue 5 (March 2015)
Date of Receipt: 2019-02-26
Date of Test: 2019-03-12 to 2019-04-03
Date of Issue: 2019-04-25

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

Parlan Zhan

Parlan Zhan
E&E Section Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.



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Attention: To check the authenticity of testing /inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
Testing Center EMC Laboratory

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Revision Record			
Version	Description	Date	Remark
00	Original	2019-04-25	/

Authorized for issue by:				
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		Vincent Zhu /Project Engineer		
		Parlam Zhan		
		Parlam Zhan /Reviewer		



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3 General Information

3.1 General Description of E.U.T.

Power supply:	DC 24V
Test voltage:	DC 24V

2.4G WiFi

Antenna Gain	-0.17dBi & 3dBi
Antenna Type	Dipole Antenna & PCB Antenna
Channel Spacing	5MHz
Modulation Type	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels	802.11b/g/n(HT20):11 802.11n(HT40):7
Operation Frequency	802.11b/g/n(HT20): 2412MHz to 2462MHz 802.11n(HT40): 2422MHz to 2452MHz

5G WiFi

Antenna Gain	3.82dBi & 3dBi
Antenna Type	Dipole Antenna & PCB Antenna
DFS Function	Slave without Radar detection

3.2 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shanghai Branch

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China.

Tel: +86 21 6191 5666

Fax: +86 21 6191 5678

3.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **NVLAP (Certificate No. 201034-0)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the National Voluntary Laboratory Accreditation Program(NVLAP). Certificate No. 201034-0.

- **FCC –Designation Number: CN5033**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

Designation Number: CN5033. Test Firm Registration Number: 479755.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

IC Registration No.: 8617A-1. CAB identifier: CN0020.

- **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-13868, C-14336, T-12221, G-10830 respectively.

4 Test Standards and Limits

4.1 FCC Radiofrequency radiation exposure limits:

According to §1.1310, the limit for general population/uncontrolled exposures

Frequency	Power density(mW/cm ²)	Averaging time(minutes)
300MHz~1.5GHz	$f/1500$	30
1.5GHz~100GHz	1.0	30

4.2 IC Radiofrequency radiation exposure limits:

According to RSS-102 section 2.5.2, RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);

- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

For 2.4G device, the limit of worse case is 2.68 W

For 5G device, the limit of worse case is 4.53 W

5 Measurement and Calculation

5.1 Maximum transmit power

The Power Data is based on the RF Test Report SHEM190201114501 & SHEM190201114502

2.4G WiFi

Test Mode	Test Channel	Ant	Power [dBm]	Power [mW]
11B	2412	Ant1	15.35	34.28
11B	2437	Ant1	16.23	41.98
11B	2462	Ant1	15.50	35.48
11G	2412	Ant1	14.23	26.49
11G	2437	Ant1	15.22	33.27
11G	2462	Ant1	14.55	28.51
11N20SISO	2412	Ant1	14.00	25.12
11N20SISO	2437	Ant1	14.94	31.19
11N20SISO	2462	Ant1	14.28	26.79
11N40SISO	2422	Ant1	13.46	22.18
11N40SISO	2437	Ant1	14.02	25.23
11N40SISO	2452	Ant1	14.07	25.53

5G WiFi

Test Mode	Test Channel	Ant	Power [dBm]	Power [mW]
11A	5180	Ant1	15.55	35.89
11A	5220	Ant1	14.98	31.48
11A	5240	Ant1	15.13	32.58
11A	5260	Ant1	15.43	34.91
11A	5280	Ant1	14.9	30.90
11A	5320	Ant1	15.17	32.89
11A	5500	Ant1	13.51	22.44
11A	5600	Ant1	14.71	29.58
11A	5700	Ant1	14.66	29.24
11A	5745	Ant1	14.1	25.70
11A	5785	Ant1	14.84	30.48
11A	5825	Ant1	14.73	29.72
11N20	5180	Ant1	15.48	35.32
11N20	5220	Ant1	14.78	30.06
11N20	5240	Ant1	14.98	31.48
11N20	5260	Ant1	15.25	33.50
11N20	5280	Ant1	14.71	29.58



11N20	5320	Ant1	15.42	34.83
11N20	5500	Ant1	13.63	23.07
11N20	5600	Ant1	14.67	29.31
11N20	5700	Ant1	13.8	23.99
11N20	5745	Ant1	13.83	24.15
11N20	5785	Ant1	14.58	28.71
11N20	5825	Ant1	14.42	27.67
11N40	5190	Ant1	14.97	31.41
11N40	5230	Ant1	14.66	29.24
11N40	5270	Ant1	14.75	29.85
11N40	5310	Ant1	14.73	29.72
11N40	5510	Ant1	12.58	18.11
11N40	5590	Ant1	13.03	20.09
11N40	5670	Ant1	13.15	20.65
11N40	5755	Ant1	14.04	25.35
11N40	5795	Ant1	14.32	27.04
11AC20	5180	Ant1	14.7	29.51
11AC20	5220	Ant1	14.52	28.31
11AC20	5240	Ant1	14.6	28.84
11AC20	5260	Ant1	13.81	24.04
11AC20	5280	Ant1	14.04	25.35
11AC20	5320	Ant1	14.1	25.70
11AC20	5500	Ant1	12.73	18.75
11AC20	5600	Ant1	13.83	24.15
11AC20	5700	Ant1	13.8	23.99
11AC20	5745	Ant1	12.82	19.14
11AC20	5785	Ant1	13.4	21.88
11AC20	5825	Ant1	13.5	22.39
11AC40	5190	Ant1	14.56	28.58
11AC40	5230	Ant1	14.23	26.49
11AC40	5270	Ant1	13.56	22.70
11AC40	5310	Ant1	13.76	23.77
11AC40	5510	Ant1	12.48	17.70
11AC40	5590	Ant1	13.05	20.18
11AC40	5670	Ant1	13.24	21.09
11AC40	5755	Ant1	13.14	20.61
11AC40	5795	Ant1	13.32	21.48
11AC80	5210	Ant1	13.73	23.60



11AC80	5290	Ant1	13.32	21.48
11AC80	5530	Ant1	11.76	15.00
11AC80	5610	Ant1	11.78	15.07
11AC80	5775	Ant1	13.43	22.03

5.2 MPE Calculation

For FCC:

According to the formula $S = PG/4\pi R^2$, we can calculate S which is MPE.

Note:

- 1) P_d = Power density in mW/cm^2
- 2) P_{out} = Output power to antenna in mW
- 3) G = gain of antenna in linear scale
- 4) R = min. separation distance between the antenna and the user.

2.4 G WiFi:

The max. antenna gain is 3 dBi

Max. Conducted Power $P(mW)$	Gain in Linear Scale G	Operation Distance $R(cm)$	Power Density (mW/cm^2)	Limit (mW/cm^2)	Result
41.98	1.995	20	0.01666	1	Pass

5G WiFi:

The max. antenna gain is 3.82 dBi

Max. Conducted Power $P(mW)$	Gain in Linear Scale G	Operation Distance $R(cm)$	Power Density (mW/cm^2)	Limit (mW/cm^2)	Result
35.89	2.410	20	0.01721	1	Pass

2.4GHz and 5GHz WiFi modules can simultaneous transmitting, so the maximum rate of MPE is $0.01666/1 + 0.01721/1 = 0.03387 \leq 1.0$

According to the KDB447498 section 7.2 determine the device is exclusion from SAR test.

For IC:

2.4 G WiFi:

$$E.I.R.P. = P \times G = 0.04198 \times 3 = 0.126W < 2.68W$$

5G WiFi:

$$E.I.R.P. = P \times G = 0.03589 \times 3.82 = 0.137W < 4.53W$$

2.4GHz and 5GHz WiFi modules can simultaneous transmitting, so the maximum rate of MPE is $0.126/2.68 + 0.137/4.53 = 0.077 \leq 1.0$

So the device is exclusion from SAR test.

--End of the Report--