

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua District, Shenzhen, China

Telephone: +86 Fax: +86 Website: ww

+86-755-26648640 +86-755-26648637 www.cqa-cert.com

Report Template Version: V03 Report Template Revision Date: Mar. 1st, 2017

Test Report

Report No. :	CQASZ20210500031EX-03			
Applicant:	SHENZHEN POWEROAK NEWENER CO., LTD			
Address of Applicant:	Room 701-3, Building B, CADRE Building, Tongsha Road, Nanshan District, Shenzhen City, Guangdong Province, P.R.China			
Manufacturer:	SHENZHEN POWEROAK NEWENER CO., LTD			
Address of Manufacturer:	Room 701-3, Building B, CADRE Building, Tongsha Road, Nanshan District, Shenzhen City, Guangdong Province, P.R.China			
Equipment Under Test (EU	Т):			
Product:	Portable Power Station			
Test Model No.:	EP500			
All Model No.:	EP500			
Brand Name:	1			
FCC ID:	2AYT3-EP500			
Standards:	47 CFR Part 15, Subpart C			
Date of Test:	May 25, 2021 – Jun. 10, 2021			
Date of Issue:	Jun. 10, 2021			
Test Result :	PASS*			
Tested By: _	lewis zhou			
	(Lewis Zhou)			
Reviewed By: _	Timo Lei			
	(Timo Lei)			
	Sheek, Luc			
Approved By: _				
	(Sheek Luo)			

* In the configuration tested, the EUT complied with the standards specified above.

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CQA, this report can't be reproduced except in full.



1 Version

Revision History Of Report

Report No.	Version	Version Description	
CQASZ20210500031EX-03	Rev.01	Initial report	Jun. 10, 2021



2 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15, Subpart C Section 15.203	ANSI C63.10 2013	PASS
AC Power Line Conducted Emission	Line ed an 47 CFR Part 15, Subpart C Section 15.207		PASS
20dB Occupied Bandwidth	OdB Occupied47 CFR Part 15, Subpart C SectionBandwidth15.215 (c)		PASS
Radiated Spurious Emissions	47 CFR Part 15, Subpart C Section 15.209	ANSI C63.10 2013	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15, Subpart C Section 15.209	ANSI C63.10 2013	PASS



Report No.: CQASZ20210500031EX-03

3 Contents

Page

1	VE	RSION	2
2	TE	ST SUMMARY	3
3	С	DNTENTS	4
4	GI	ENERAL INFORMATION	5
	4.1	CLIENT INFORMATION	5
	4.2	GENERAL DESCRIPTION OF EUT	5
	4.3	Test Environment	6
	4.4	DESCRIPTION OF SUPPORT UNITS	6
	4.5	STATEMENT OF THE MEASUREMENT UNCERTAINTY	7
	4.6	TEST LOCATION	8
	4.7	Test Facility	8
	4.8	DEVIATION FROM STANDARDS	8
	4.9	OTHER INFORMATION REQUESTED BY THE CUSTOMER	8
	4.10	EQUIPMENT LIST	9
5	TE	ST RESULTS AND MEASUREMENT DATA	. 10
	5.1	ANTENNA REQUIREMENT	. 10
	5.2	CONDUCTED EMISSIONS	11
	5.3	20dB Occupy Bandwidth	14
	5.4	RADIATED SPURIOUS EMISSION	. 15
6	Pł	IOTOGRAPHS - EUT TEST SETUP	. 19
7	Pł	IOTOGRAPHS - EUT CONSTRUCTIONAL DETAILS	21



4 General Information

4.1 Client Information

Applicant:	SHENZHEN POWEROAK NEWENER CO., LTD	
Address of Applicant:	Room 701-3, Building B, CADRE Building, Tongsha Road, Nanshan District, Shenzhen City, Guangdong Province, P.R.China	
Manufacturer:	SHENZHEN POWEROAK NEWENER CO., LTD	
Address of Manufacturer:	Room 701-3, Building B, CADRE Building, Tongsha Road, Nanshan District, Shenzhen City, Guangdong Province, P.R.China	

4.2 General Description of EUT

Product Name:	Portable Power Station		
All Model No.:	EP500		
Test Model No.:	EP500		
Trade Mark:	N/A		
Hardware Version:	V1.0		
Software Version:	1		
Operation Frequency:	125kHz -152kHz		
Modulation Type:	MSK		
Antenna Type:	Loop coil antenna		
Antenna Gain:	0 dBi		
Power Supply:	DC 51.2V from battery 5120Wh 100Ah Input : 100-120VAC 50/60Hz 15A max DC55-145VDC 20AMAX Output: AC*4: 100-120VAC 50/60Hz, 2000W Total Aviation Sockets*1: 12VDC, 30A USB-A*1: 5VDC, 2A, USB-A*1: 5VDC ,1A, USB-A*2: 5VDC ,2A, 9VDC,2A ,12VDC 1.5A USB-C*1: 5V-15VDC 3A 20VDC 5A Cigarette lighter*1: 12VDC, 10A DC 5521*2: 12VDC, 10A Wireless Charging*2: 5/7.5/10/15W Total		

Note: For more detailed features description, please refer to the manufacturer's specifications or the User's Manual.



4.3 Test Environment

Operating Environment:		
Temperature:	25.0 °C	
Humidity:	53 % RH	
Atmospheric Pressure:	1010mbar	
Test Mode:		
Mode 1	Charging (DC port)	
Mode 2	Charging (adapter)	
Mode 3	AC*4(2000W max)	
Mode 4	DC 12V *2	
Mode 5	USB*5	
Mode 6	Wireless charging*2(5W*2)	
Mode 7	Wireless charging*2(7.5W*2)	
Mode 8	Wireless charging*2(10W*2)	
Mode 9	Wireless charging*2(15W*2)	
Mode 10	Mode 3+ Mode 4+ Mode 5+ Mode 9	
Note:		
The mode f was the worst case	and only the data of the worst case record in this report	

4.4 Operation channel list

Channel	Frequency(KHz)	
Low	125	
Middle	139	
High	152	

Test channel

4.5 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.	emark	FCC certification
Wireless			Provide by	_
electronic Load	-	-	laboratory	



4.6 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate.

The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities.

The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the **Shenzhen Huaxia Testing Technology Co., Ltd.** quality system acc. to DIN EN ISO/IEC 17025.

Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

No.	Item	Uncertainty	Notes
1	Radiated Emission (Below 1GHz)	±5.12dB	(1)
2	Radiated Emission (Above 1GHz)	±4.60dB	(1)
3	Conducted Disturbance (0.15~30MHz)	±3.34dB	(1)
4	Radio Frequency	3×10 ⁻⁸	(1)
5	Duty cycle	0.6 %.	(1)
6	Occupied Bandwidth	1.1%	(1)
7	RF conducted power	0.86dB	(1)
8	RF power density	0.74	(1)
9	Conducted Spurious emissions	0.86dB	(1)
10	Temperature test	0.8°C	(1)
11	Humidity test	2.0%	(1)
12	Supply voltages	0.5 %.	(1)
13	time	0.6 %.	(1)
14	Frequency Error	5.5 Hz	(1)

Hereafter the best measurement capability for CQA laboratory is reported:

(1)This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



4.7 Test Location

Shenzhen Huaxia Testing Technology Co., Ltd,

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua District, Shenzhen, China

4.8 Test Facility

The test facility is recognized, certified, or accredited by the following organizations: • IC Registration No.: 22984-1

The 3m Semi-anechoic chamber of Shenzhen Huaxia Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

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

• CNAS (No. CNAS L5785)

CNAS has accredited Shenzhen Huaxia Testing Technology Co., Ltd. Shenzhen Branch EMC Lab 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.

• A2LA (Certificate No. 4742.01)

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4742.01.

• FCC Registration No.: 522263

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.:522263

4.9 Deviation from Standards

None.

4.10 Other Information Requested by the Customer

None.



4.11 Equipment List

Test Equipment	Manufacturer	Model No.	Instrument No.	Calibration Date	Calibration Due Date
EMI Test Receiver	R&S	ESR7	CQA-005	2020/09/22	2021/09/21
Spectrum analyzer	R&S	FSU26	CQA-038	2020/10/24	2021/10/23
Preamplifier	MITEQ	AFS4-00010300-18- 10P-4	CQA-035	2020/09/22	2021/09/21
Preamplifier	MITEQ	AMF-6D-02001800- 29-20P	CQA-036	2020/10/29	2021/10/28
Loop antenna	Schwarzbeck	FMZB1516	CQA-087	2020/10/24	2021/10/23
Bilog Antenna	R&S	HL562	CQA-011	2020/09/22	2021/09/21
Horn Antenna	R&S	HF906	CQA-012	2020/09/22	2021/09/21
Horn Antenna	Schwarzbeck	BBHA 9170	CQA-088	2020/09/22	2021/09/21
Coaxial Cable (Above 1GHz)	CQA	N/A	C019	2020/09/22	2021/09/21
Coaxial Cable (Below 1GHz)	CQA	N/A	C020	2020/09/22	2021/09/21
Antenna Connector	CQA	RFC-01	CQA-080	2020/09/22	2021/09/21
RF cable(9KHz~40GHz)	CQA	RF-01	CQA-079	2020/09/22	2021/09/21
Power divider	MIDWEST	PWD-2533-02-SMA- 79	CQA-067	2020/09/22	2021/09/21
EMI Test Receiver	R&S	ESPI3	CQA-013	2020/09/22	2021/09/21
LISN	R&S	ENV216	CQA-003	2020/11/01	2021/10/30
Coaxial cable	CQA	N/A	CQA-C009	2020/09/22	2021/09/21

Note:

The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.



5 Test results and Measurement Data

5.1 Antenna Requirement

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:



The antenna is Loop coil Antenna. The best case gain of the antenna is 0 dBi.



Test Requirement:	47 CFR Part 15C Section 15.207					
Test Method:	ANSI C63.10: 2013					
Test Frequency Range:	150kHz to 30MHz					
Limit:		Limit (dBuV)				
	Frequency range (MHZ)	Quasi-peak	Average			
	0.15-0.5	66 to 56*	56 to 46*			
	0.5-5	56	46			
	5-30	60	50			
	* Decreases with the logarithm of the frequency.					
	 The mains terminal disturbance voltage test was conducted in a shielded room. The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50µH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane. The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. 					
	and all of the interface cat	oles must be changed	according to			
Test Setup:	ANSI C63.10: 2013 on con	iducted measurement.				
	Shielding Room	AE UISN2 + AC Ma Ground Reference Plane	Test Receiver			
Test Mode:	Mode 10					
Test Results:	Pass					



Measurement Data



Remark:

- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.
- 3. If the Peak value under Average limit, the Average value is not recorded in the report.







Remark:

- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.
- 3. If the Peak value under Average limit, the Average value is not recorded in the report.



5.3 20dB Occupy Bandwidth



Test Result:

Frequency	20dB emission bandwidth		
(KHz)	(KHz)		
139	8.286		





5.4 Radiated Spurious Emission

•							
Test Requirement:	47 CFR Part 15C Section 15.209						
Test Method:	ANSI C63.10 2013						
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)						
Receiver Setup:	Frequency Detector RBW VBW Rema						Remark
	0.009MHz-0.090MHz Peak			10kHz	10kHz		Peak
	0.009MHz-0.090MH	Average	10kHz	10kHz		Average	
	0.090MHz-0.110MH	Quasi-peak	10kHz	z	30kHz	Quasi-peak	
	0.110MHz-0.490MH	Peak	10kHz	z	30kHz	Peak	
	0.110MHz-0.490MH	z	Average	10kHz		30kHz	Average
	0.490MHz -30MHz		Quasi-peak	10kHz	z	30kHz	Quasi-peak
	30MHz-1GHz		Quasi-peak	100 kH	łz	300kHz	Quasi-peak
			Peak	1MHz	1MHz 3MHz		Peak
	Above TGHZ		Peak	1MHz	2	10Hz	Average
Limit:	Fraguanay	Fie	eld strength	Limit		Pomark	Measurement
	Frequency	(mio	crovolt/meter)	(dBuV/m)	Remark		distance (m)
	0.009MHz-0.490MHz	2	400/F(kHz)	-		-	300
	0.490MHz-1.705MHz	24000/F(kHz)		-	-		30
	1.705MHz-30MHz 30MHz-88MHz 88MHz-216MHz 216MHz-960MHz 960MHz-1GHz Above 1GHz		30	-		-	30
			100	40.0	Q	uasi-peak	3
			150	43.5	Q	uasi-peak	3
			200	46.0	Q	uasi-peak	3
			500	54.0	Q	uasi-peak	3
			500	54.0	0 Average		3
	Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emissio limit applicable to the equipment under test. This peak limit applies to the tota peak emission level radiated by the device.						ak radio rage emission es to the total
Test Setup:							
0.8 m	EUT Jurn Table Ground Pla	ane		x Antenna			
Figure 1. Below 30MHz							



Report No.: CQASZ20210500031EX-03

Test Receiver	Antenna Tower	Horn Antenna Tower Horn Antenna Tower Horn Antenna Tower Ground Reference Plane Test Receiver
Figure 2. 30MHz to 1GHz Figure 3. Above 1 GHz		
Test Procedure:	 The EUT was play Maximum proced from 1m to 4m ar the highest emiss And also, each polarization of rec Repeat above pro completed. 	ced on a turn table which is 0.8m above ground plane. Iure was performed by raising the receiving antenna nd rotating the turn table from 0° to 360° to acquire ions from EUT emission was to be maximized by changing the æiving antenna both horizontal and vertical. pocedures until all frequency measurements have been
Test Results:	Pass	

WORST-CASE RADIATED EMISSION BELOW 30 MHz

Frequency	Reading	Polar	Antenna Factor	Cable Loss	Emission Levels	Limits at 3m	Detector Mode
(MHz)	(dBµV/m)	Loop	(dB/m)	(dB)	(dBµV/m)	(dBµV/m)	
0.114(F)	47.62	Loop	23.62	0.01	71.25	106.17	PK
0.114(F)	46.32	Loop	23.61	0.01	69.94	86.17	AV
0.110	32.55	Loop	23.44	0.01	56.00	106.78	PK
0.110	32.48	Loop	23.63	0.01	56.12	86.78	AV
0.485	36.52	Loop	25.13	-0.17	61.48	73.71	QP
1.158	34.26	Loop	27.15	-0.25	61.16	66.33	QP
2.178	34.28	Loop	23.72	-0.24	57.76	69.54	QP

Remark:

- 1. Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 2. The test limit distance is 3m limit.
- 3. PK means Peak Value, QP means Quasi Peak Value, AV means Average Value.
- 4. F means Fundamental Frequency.













6 Photographs - EUT Test Setup







Report No.: CQASZ20210500031EX-03



Conducted Emission





7 Photographs - EUT Constructional Details

External Photos of EUT

























Internal Photos of EUT



































































Report No.: CQASZ20210500031EX-03



The End

Page:38 of 38