

PSE EMC TEST REPORT

for

Product: Portable power station

Model: Apower1000, Apower2000, Apower1000Pro, Apower2000Pro,BS041

Report No.: KEYS23080915001PE-02

Issued for

Zhejiang Zhenneng Technology Co.,Ltd

**Floor 1, No. 1818-1, South Taihu Avenue, Balidian Town, WuxingDistrict,
Huzhou City, Zhejiang Province**

Issued by

Guangdong KEYS Testing Technology Co., Ltd.

**6 / f, Building B, Chuangyigu Industrial Park, No.5 Hehe Street, Songxi Road,
Hengkeng, Liaobu, Dongguan City**

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1. TEST CERTIFICATION

Product:	Portable power station
Trade mark	N/A
Model:	Apower1000, Apower2000, Apower1000Pro, Apower2000Pro,BS041
Applicant :	Zhejiang Zhenneng Technology Co.,Ltd
Address:	Floor 1, No. 1818-1, South Taihu Avenue, Balidian Town, WuxingDistrict, Huzhou City, Zhejiang Province
Manufacturer:	Zhejiang Zhenneng Technology Co.,Ltd
Address:	Floor 1, No. 1818-1, South Taihu Avenue, Balidian Town, WuxingDistrict, Huzhou City, Zhejiang Province
Test Date:	August 9, 2023 to August 18, 2023
Issued Date:	August 18, 2023
Test Voltage:	DC Input: DC12-48V; AC Input: AC110-230V, 50/60Hz Capacity :32V,320000mAh, 1024Wh; AC Output: 110V/230V, 50Hz/60 Hz; DC Output*2: DC13V,18A; Car charger outlet : DC 12~24V,18A; USB-C 1 Output: 5-12V/2.4A,22.5W Max; USB-C 2 Output: 5-20V/5A,100W Max; USB Output*4: 5V/2.4A, 9V/2A,12V/1.5A;
Applicable Standards:	J 55032 (H29)

The above equipment has been tested by Guangdong KEYS Testing Technology Co., Ltd. and found compliance with the requirements in the technical standards mentioned above. The test results presented in this report only relate to the product/system tested. The Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Test Engineer:

Technical Manager:

Sunny Li/Engineer



Jason Zhan /Manager

2. TEST SUMMARY

EMISSION			
Standard	Item	Result	Remarks
J 55032 (H29)	Conducted emission (Mains Port)	PASS	Meet Class B limit
	Radiated emission	PASS	Meet Class B limit

Note: 1) The test result verdict is decided by the limit of test standard.

2) The information of measurement uncertainty is available upon the customer's request.

3. TEST SITE

3.1. TEST FACILITY

Guangdong KEYS Testing Technology Co., Ltd.

Address: 6 / f, Building B, Chuangyigu Industrial Park, No.5 Hehe Street, Songxi Road,
Hengkeng, Liaobu, Dongguan City.

3.2. MEASUREMENT UNCERTAINTY

Parameter	Uncertainty
Temperature	$\pm 1^{\circ} \text{C}$
Humidity	$\pm 5\%$
DC and Low Frequency Voltages	$\pm 3\%$
Conducted Emission(150KHz-30MHz)	$\pm 3.60\text{dB}$
Radiated Emission(30MHz-1GHz)	$\pm 4.76\text{dB}$
Radiated Emission (1GHz-18GHz)	$\pm 4.44\text{dB}$

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

3.3. LIST OF TEST AND MEASUREMENT INSTRUMENTS

3.3.1. For conducted emission at the mains terminals test

Name of Equipment	Manufacturer	Model	Serial No.	Calibration Due
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	Sep. 19, 2023
Artificial Mains Network	Rohde&Schwarz	L2-16B	000WX31025	Sep. 19, 2023
Artificial Mains Network	Rohde&Schwarz	ENV216	101342	Sep. 19, 2023

3.3.2. For radiated emission test (30MHz-1GHz)

Name of Equipment	Manufacturer	Model	Serial No.	Calibration Due
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	Sep. 19, 2023
Bilog Antenna	SCHWARZBECK	VULB 9168	9168-572	Sep. 21, 2023
Preamplifier (low frequency)	SCHWARZBECK	BBV 9475	9745-0013	Sep. 19, 2023

3.3.3. For radiated emission test (1GHz above)

Name of Equipment	Manufacturer	Model	Serial No.	Calibration Due
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	Sep. 19, 2023
Spectrum Analyzer	Agilent	E4407B	MY45109572	Oct. 12, 2023
Horn Antenna	SCHWARZBECK	9120D	9120D-1246	Sep. 26, 2023
LOW NOISE AMPLIFIER	ZHINAN	ZN3380C	15002	Sep. 19, 2023

4. EUT DESCRIPTION

Product	Portable power station
Model	Apower1000
Supplied Voltage	DC Input: DC12-48V; AC Input: AC110-230V, 50/60Hz Capacity :32V,320000mAh, 1024Wh; AC Output: 110V/230V, 50Hz/60 Hz; DC Output*2: DC13V,18A; Car charger outlet : DC 12~24V,18A; USB-C 1 Output: 5-12V/2.4A,22.5W Max; USB-C 2 Output: 5-20V/5A,100W Max; USB Output*4: 5V/2.4A, 9V/2A,12V/1.5A;
Power	--

I/O PORT

I/O PORT TYPES	Q'TY	TESTED WITH
AC Port	1	<input checked="" type="checkbox"/>
DC Port	1	<input type="checkbox"/>

Models Difference

All series models are identical, except for model name and battery capacity difference for trading purpose

Note :

The report is based on previous report with no.: KEYS23052902001PE-02 dated on June 2, 2023 issued by KEYS lab to do below amendment. Except as specified below. Others do not any change and not need to do any testing.

-Change application and manufacturer information from “Shenzhen Uapow Co.,Limited / 4th Floor, Building B5B, Yingzhan Industrial Park, Longtian Street,Pingshan District, Shenzhen” to “Zhejiang Zhenneng Technology Co.,Ltd / Floor 1, No. 1818-1, South Taihu Avenue, Balidian Town, WuxingDistrict, Huzhou City, Zhejiang Province “.

-Add model “BS041”.

5. TEST METHODOLOGY

5.1. TEST MODE

The EUT was tested together with the thereafter additional components, and a configuration, which produced the worst emission levels, was selected and recorded in this report.

The following test mode(s) were assessed.

Test Items		Test Mode
Emission	Conducted Emission	AUX Play, BT Play
	Radiated Emission	AUX Play, BT Play

5.2. EUT SYSTEM OPERATION

1. Set up EUT with the support equipment.
2. Make sure the EUT work normally during the test.

6. SETUP OF EQUIPMENT UNDER TEST

6.1. DESCRIPTION OF SUPPORT UNITS

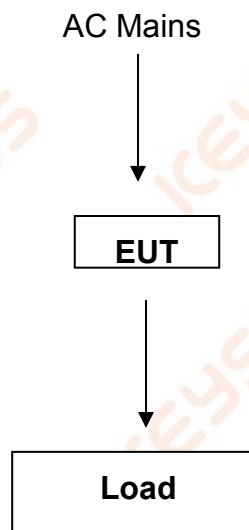
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Equipment	Model	Serial No.	FCC ID	Trade Name	Data Cable	Power Cord
1.	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Note: 1) All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.

2) Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

6.2. CONFIGURATION OF SYSTEM UNDER TEST



(EUT: Portable power station)

7. EMISSION TEST

7.1. CONDUCTED EMISSION MEASUREMENT

7.1.1. LIMITS

FREQUENCY (MHz)	Class A		Class B	
	Quasi-peak dB(μ V)	Average dB(μ V)	Quasi-peak dB(μ V)	Average dB(μ V)
0.15 - 0.5	79	66	66-56	56-46
0.5 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

Note: 1) The lower limit shall apply at the transition frequencies.

2) The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

7.1.2. TEST PROCEDURES

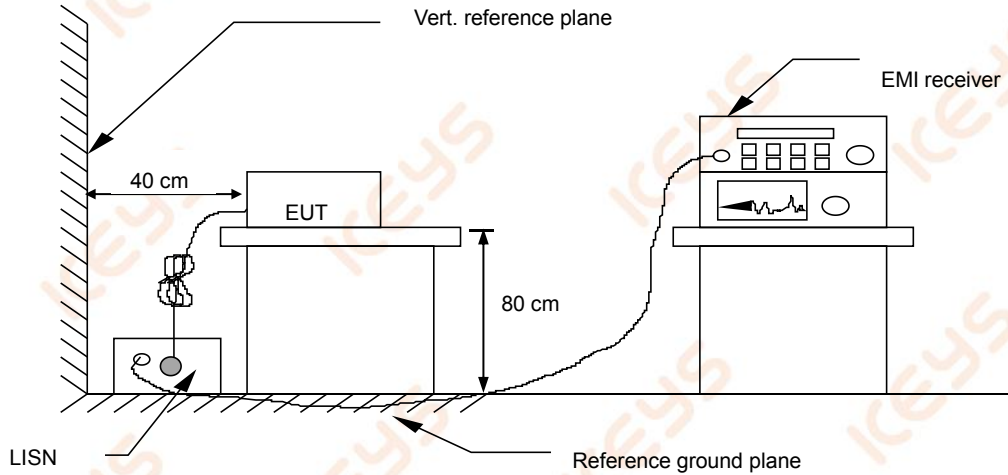
The EUT and Support equipment, if needed, was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane. When the EUT is floor standing equipment, it is placed on the ground plane, which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane. The EUT should be 0.8 m apart from the AMN, where the mains cable supplied by the manufacturer is longer than 1 m, the excess should be folded at the centre into a bundle no longer than 0.4 m, Details please refer to test setup photography.

The Receiver scanned from 150 kHz to 30 MHz for emissions in each of the test modes. During the above scans, the emissions were maximized by cable manipulation.

A scan was taken on both of the power lines, Line and neutral, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. The test data of the worst-case condition(s) was recorded.

Note: Test Software Name: e3, Software Version: 1.0.0.0.

7.1.3. TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.1.4. TEST RESULT

Product name	Portable power station	Tested By	Brian
Model	Apower1000	Detector Function	Peak / Quasi-peak/AV
Test Mode	Full Load	6 dB Bandwidth	9 kHz
Environmental Conditions	24.2°C, 54.5 % RH, 101.1 kPa	Test Result	Pass

Note:

L = Line Line, N = Neutral Line

Freq. = Emission frequency in MHz

Reading level (dB μ V) = Receiver reading

Corr. Factor (dB) = attenuator + Cable loss

Level (dB μ V) = Reading level (dB μ V) + Corr. Factor (dB)

Limit (dB μ V) = Limit stated in standard

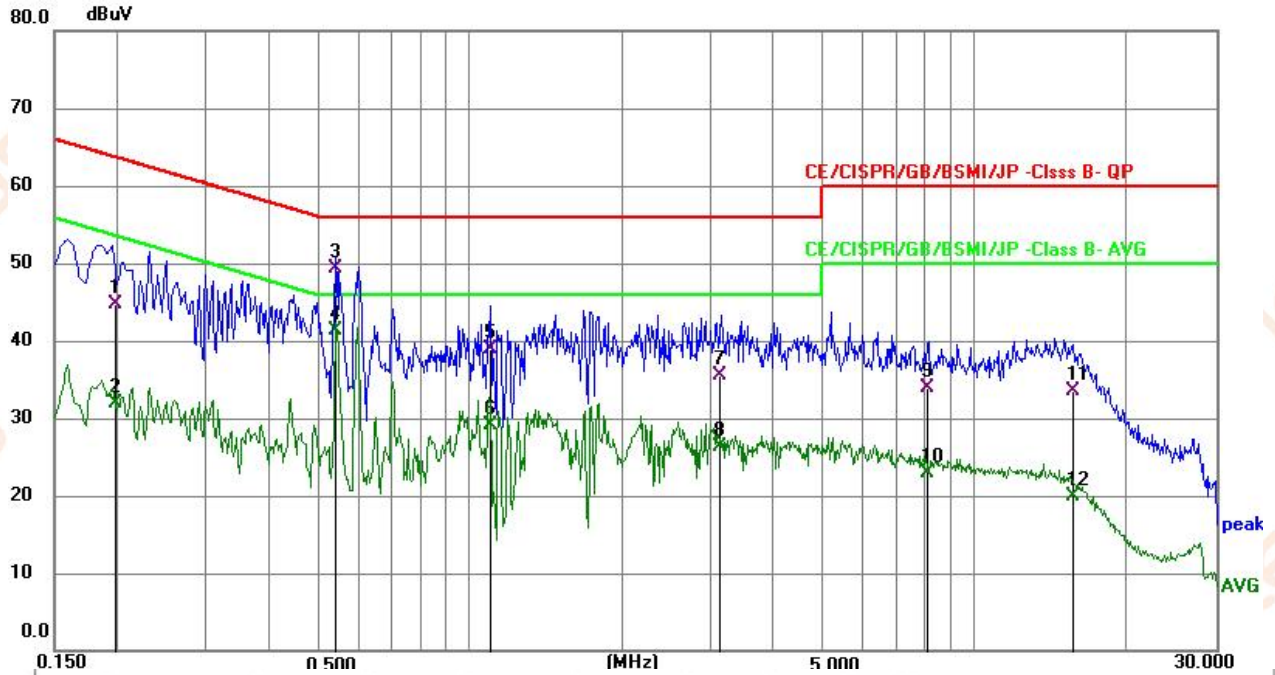
Over Limit (dB) = Level (dB μ V) – Limit (dB μ V)

QP = Quasi-Peak

AV = Average

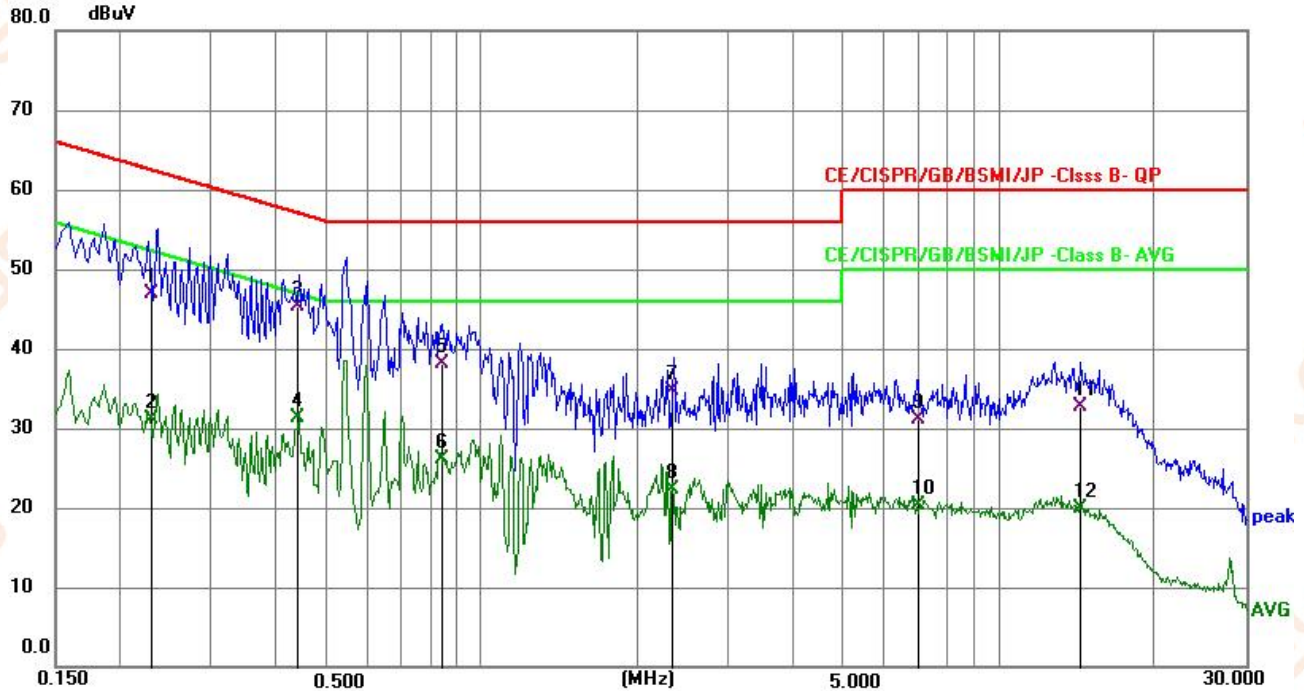
Please refer to the following diagram:

Line: Full Load



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1985	35.02	9.70	44.72	63.67	-18.95	QP	P	
2	0.1985	22.12	9.70	31.82	53.67	-21.85	AVG	P	
3	0.5415	39.63	9.64	49.27	56.00	-6.73	QP	P	
4 *	0.5415	31.58	9.64	41.22	46.00	-4.78	AVG	P	
5	1.0982	29.42	9.54	38.96	56.00	-17.04	QP	P	
6	1.0982	19.64	9.54	29.18	46.00	-16.82	AVG	P	
7	3.1495	25.95	9.61	35.56	56.00	-20.44	QP	P	
8	3.1495	16.63	9.61	26.24	46.00	-19.76	AVG	P	
9	8.0864	24.30	9.61	33.91	60.00	-26.09	QP	P	
10	8.0864	13.23	9.61	22.84	50.00	-27.16	AVG	P	
11	15.6696	23.79	9.75	33.54	60.00	-26.46	QP	P	
12	15.6696	10.23	9.75	19.98	50.00	-30.02	AVG	P	

Neutral:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.2291	37.19	9.70	46.89	62.48	-15.59	QP	P	
2	0.2291	21.33	9.70	31.03	52.48	-21.45	AVG	P	
3 *	0.4393	35.76	9.63	45.39	57.07	-11.68	QP	P	
4	0.4393	21.63	9.63	31.26	47.07	-15.81	AVG	P	
5	0.8420	28.52	9.63	38.15	56.00	-17.85	QP	P	
6	0.8420	16.51	9.63	26.14	46.00	-19.86	AVG	P	
7	2.3454	25.08	9.69	34.77	56.00	-21.23	QP	P	
8	2.3454	12.67	9.69	22.36	46.00	-23.64	AVG	P	
9	6.9826	21.51	9.53	31.04	60.00	-28.96	QP	P	
10	6.9826	10.68	9.53	20.21	50.00	-29.79	AVG	P	
11	14.4543	22.88	9.77	32.65	60.00	-27.35	QP	P	
12	14.4543	10.07	9.77	19.84	50.00	-30.16	AVG	P	

Remark:

1.All possible modes of operation were investigated, and testing at two nominal voltages of 230V/50Hz and 110V/60Hz, only the worst case emissions reported.

7.2. RADIATED EMISSION MEASUREMENT

7.2.1. LIMITS

FREQUENCY (MHz)	Class A(At 3m)	Class B(At 3m)
	Quasi-peak dB(μ V/m)	Quasi-peak dB(μ V/m)
30 ~ 230	50	40
230 ~ 1000	57	47

Note: 1) The lower limit shall apply at the transition frequencies.

2) Emission level (dB μ V/m) = 20 log Emission level (μ V/m).

7.2.2. TEST PROCEDURE

The equipment was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane. When the EUT is floor standing equipment, it is placed on the ground plane which has a 0.1 m non-conductive covering to insulate the EUT from the ground plane.

The antenna was placed at 3 meter away from the EUT. The antenna connected to the spectrum analyzer via a cable and at times a pre-amplifier would be used.

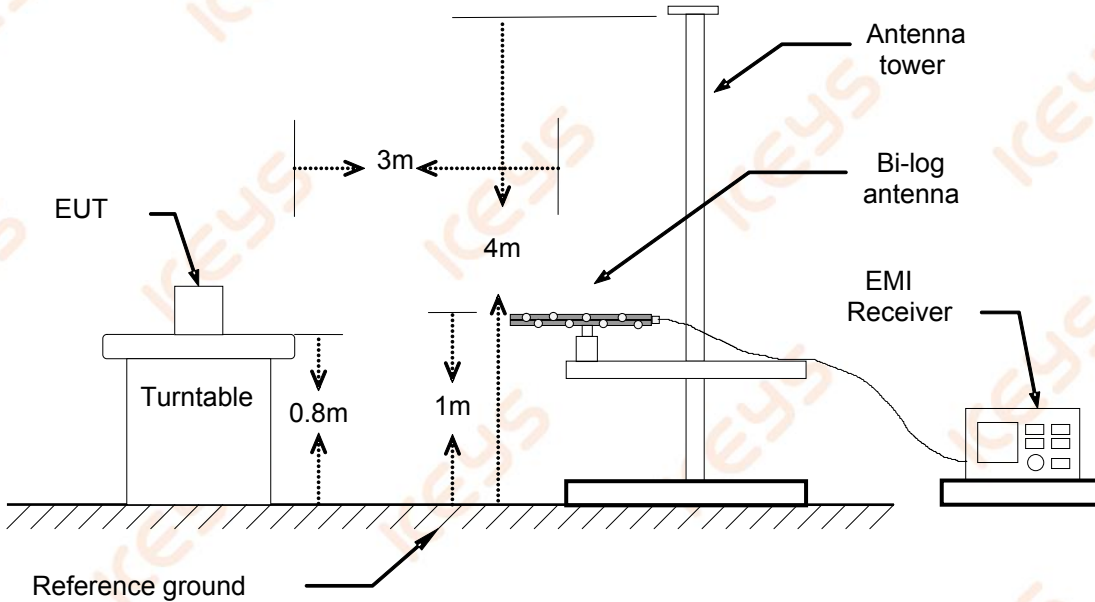
The analyzer / receiver quickly scanned from 30 MHz to 1000 MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.

During the above scans, the emissions were maximized by cable manipulation. Each modes is measured, recorded at least the six highest emissions. The emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and only Q.P. reading is presented.

The test data of the worst-case condition(s) was recorded.

Note: Test Software Name: e3, Software Version: 8.2.1.0.

7.2.3. TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration

7.2.4. TEST RESULT

Product name	Portable power station	Antenna Distance	3 m
Model	Apower1000	Antenna Pole	Vertical / Horizontal
Test Mode	Full Load	Detector Function	Peak / Quasi-peak
Environmental Conditions	24.2°C, 54.5 % RH, 101.1 kPa	6 dB Bandwidth	120 kHz
Tested by	Brian	Test Result	Pass

Note:

Freq. = Emission frequency in MHz

Reading level (dB μ V) = Receiver reading(dB μ V)

Corr.Factor (dB/m)=Antenna factor(dB/m)+Cable loss(dB)-Preamplifier Factor(dB)

Measurement (dB μ V/m)=Reading level(dB μ V)+ Corr. Factor (dB/m)

Limit (dB μ V/m) = Limit stated in standard

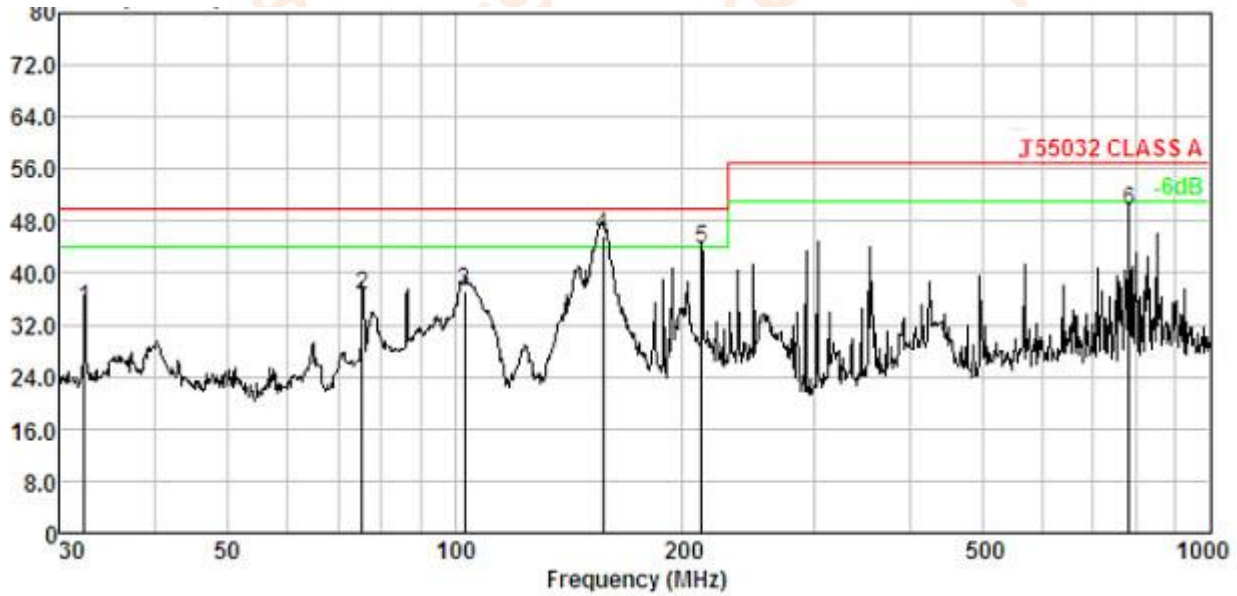
Over Limit (dB) = Measurement (dB μ V/m) – Limit (dB μ V/m)

QP = Quasi-Peak

The highest frequency of the internal sources of the EUT was less than 108 MHz, so the measurement was only made up to 1 GHz.

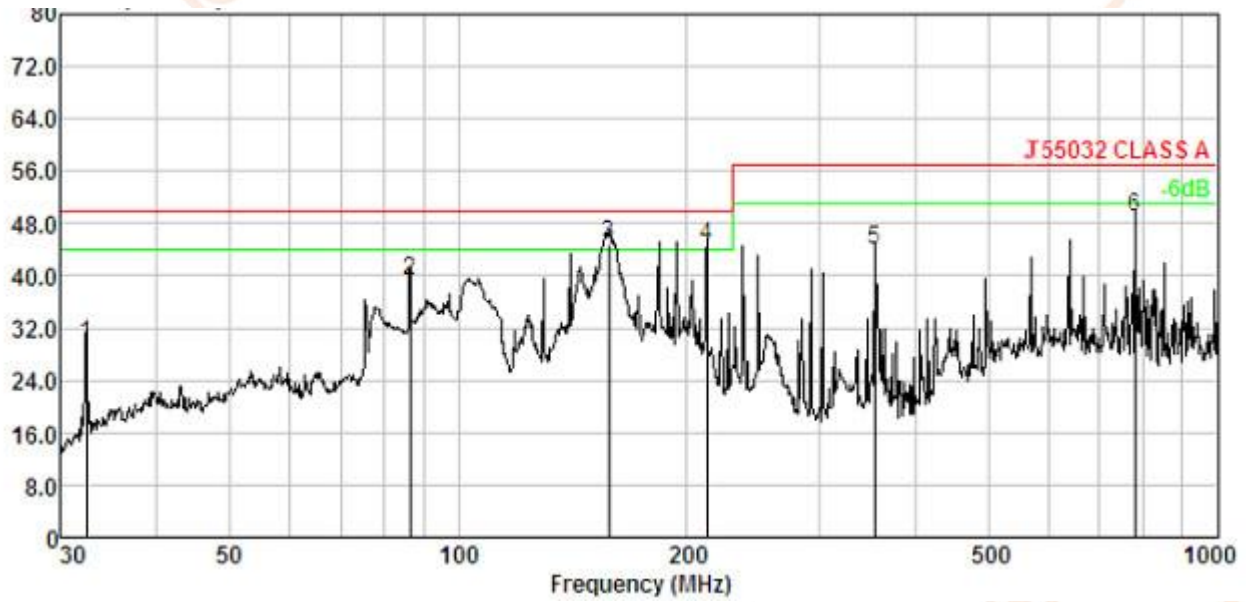
Please refer to the following diagram:

Vertical: Full Load



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	32.293	1.12	13.22	50.16	30.00	34.50	50.00	-15.50	QP
2.	75.446	1.89	9.77	55.23	30.29	36.60	50.00	-13.40	QP
3.	103.080	2.17	10.50	55.03	30.40	37.30	50.00	-12.70	QP
4.	157.007	2.55	13.89	59.98	30.55	45.87	50.00	-4.13	QP
5.	212.270	2.83	10.62	60.82	30.65	43.62	50.00	-6.38	QP
6.	782.345	4.01	21.51	55.04	31.10	49.46	57.00	-7.54	QP

Horizontal:

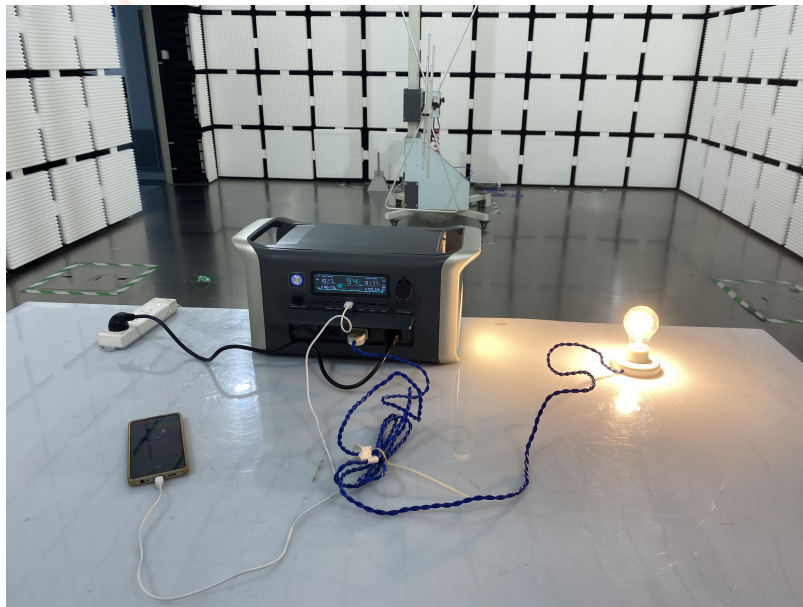


No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	32.406	1.12	13.22	45.18	30.00	29.52	50.00	-20.48	QP
2.	86.503	2.01	8.87	58.71	30.34	39.25	50.00	-10.75	QP
3.	158.112	2.56	13.88	59.10	30.55	44.99	50.00	-5.01	QP
4.	213.015	2.83	10.63	61.87	30.65	44.68	50.00	-5.32	QP
5.	354.183	3.29	14.30	57.22	30.83	43.98	57.00	-13.02	QP
6.	779.607	4.00	21.48	54.64	31.10	49.02	57.00	-7.98	QP

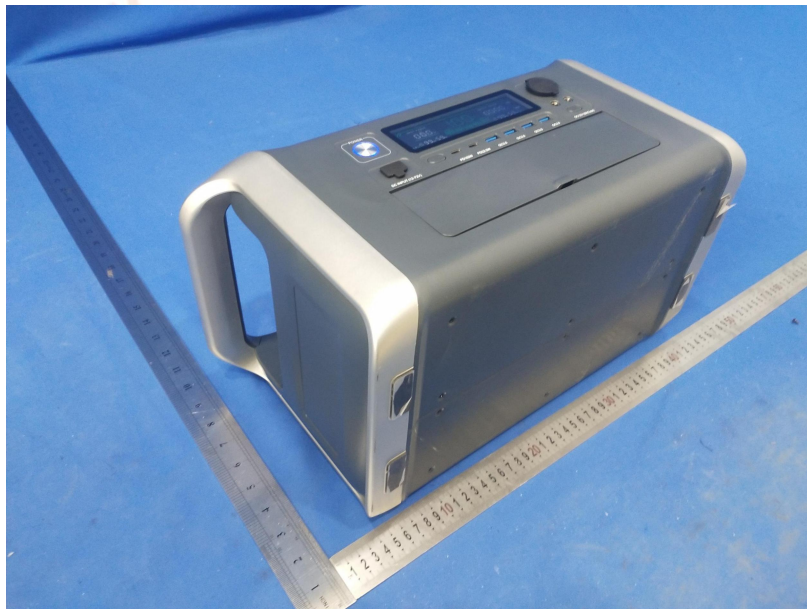
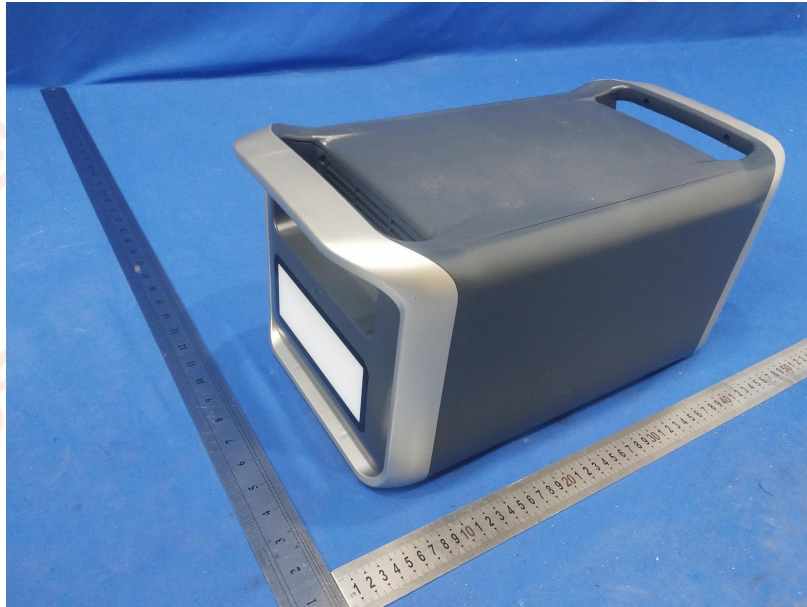
8. PHOTOGRAPHS OF THE TEST CONFIGURATION CONDUCTED EMISSION TEST



RADIATED EMISSION TEST



9. PHOTOGRAPHS OF EUT





— End of report —