

TEST REPORT

Report No...... : **KS2212S5639E**

FCC ID..... : **2A49V-QE02D**

Applicant..... : **Guangzhou Keyshop Sci&Tech Co., Ltd.**

Address..... : Building B,No.29 Kefeng road,Science city,Hi-tech development zone,Guangzhou,China

Manufacturer..... : Guangzhou Keyshop Sci&Tech Co., Ltd.

Address..... : Building B,No.29 Kefeng road,Science city,Hi-tech development zone,Guangzhou,China

Product Name..... : **PORTABLE POWER STATION**

Trade Mark..... : N/A

Model/Type reference..... : **QE02D,QE02C,QE02F,QE0B**

Standard..... : **FCC Rules and Regulations Part 18**

Date of Receipt..... : December 13, 2022

Date of Test Date..... : December 13, 2022~January 07, 2023

Date of issue..... : January 07, 2023

Test result..... : **Pass**

Prepared by:
(Printed Name + Signature) Pai Zheng *Pai Zheng*

Approved by:
(Printed Name + Signature) Sky Dong *Sky Dong*

Testing Laboratory Name..... : **KSIGN(Guangdong) Testing Co., Ltd.**

Address..... : West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China

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1 TEST SUMMARY

1.1 Test Standards

The tests were performed according to following standards:

[FCC Rules and Regulations Part 18 Subpart C \(Section 18.307\)](#): Conducted limits.

[FCC Rules and Regulations Part 18 Subpart C \(Section 18.305\)](#): Field strength limits.

[FCC MP-5](#):FCC Methods of Measurements of Radio Noise Emissions from Industrial, Scientific, and Medical equipment

1.2 Report Version

Revised No.	Date of issue	Description
01	January 07, 2023	Original

TRF No. FCC Part 18_R2

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1.3 Address of the test laboratory

KSIGN(Guangdong) Testing Co., Ltd.

West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China

1.4 Test Facility

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

CNAS-Lab Code: L13261

KSIGN(Guangdong) Testing Co., Ltd. has been assessed and proved to be in Compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No.: 5457.01

KSIGN(Guangdong) Testing Co.,Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

ISED#: 25693 CAB identifier.: CN0096

KSIGN(Guangdong) Testing Co., Ltd. has been listed by Innovation, Science and Economic Development Canada to perform electromagnetic emission measurement.

FCC-Registration No.: 294912 Designation Number: CN1328

KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

1.5 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Radiated Emission:

Temperature:	24 ° C
Humidity:	45 %
Atmospheric pressure:	950-1050mbar

AC Power Conducted Emission:

Temperature:	25 ° C
Humidity:	46 %
Atmospheric pressure:	950-1050mbar

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1.6 Summary of measurement results

FCC RULES	Description of test	Result	Test Engineer
§ 18.307 (b)	Conducted emissions test	Pass	Jax Yang
§ 18.305 (b)	Radiated emission test	Pass	Chad Lin

Note:

1. Pass: The EUT complies with the essential requirements in the standard

Fail: The EUT does not comply with the essential requirements in the standard

All indications of Pass/Fail in this report are opinions expressed by KSIGN(Guangdong) Testing Co., Ltd. based on interpretations and/or observations of test results Measurement Uncertainties were not taken into account and are published for informational purposes only.

2. N/A: means this test item is not applicable for this device according to the technology characteristic of device.

1.7 Statement of the measurement uncertainty

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.06 dB	(1)
Conducted Disturbance	0.15~30MHz	2.14 dB	(1)
Radiated Emission	9~30MHz	2.20dB	(1)

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

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2 GENERAL INFORMATION

2.1 Product Description

Product Name:	PORTABLE POWER STATION
Trade Mark:	N/A
Model/Type reference:	QE02D, QE02C, QE02F, QE0B
Model Different:	The product model is named according to the market demand. The difference between models is in appearance, color, model name. Other power supply modes, internal structures, circuits and key components are the same, which will not affect the safety and electromagnetic compatibility performance.
Hardware version:	V1.0
Software version:	V1.0
Test samples ID:	KS2212S5639E-1# (Engineer sample), KS2212S5639E-2# (Normal sample)
Power supply(Adaptor):	Input: AC 100-240V, 50/60Hz 2.5A Max Output: DC 26V, 6.92A 179.92W
Power supply(Battery):	DC 22.4V, 45Ah(1008Wh)
Wireless Charging(Output):	Wireless Charging × 2: 5W, 10W(Max)
Operation frequency:	110KHz - 205KHz
Modulation type:	FSK
Antenna type:	Loop coil antenna
Antenna Gain:	0 dBi
Note: 1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.	

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2.2 Description of the test mode

Equipment under test was operated during the measurement under the following conditions:

Charging and communication mode

Test Modes:		
Mode 1	Two Coil wireless simultaneous charging mode(10W)	Recorded
Mode 2	Two Coil wireless simultaneous charging mode(5W)	Recorded
Mode 3	Coil 1-Wireless charging mode(10W)	Recorded
Mode 4	Coil 1-Wireless charging mode(5W)	Recorded
Mode 5	Coil 2-Wireless charging mode(10W)	Recorded
Mode 6	Coil 2-Wireless charging mode(5W)	Recorded
Mode 7	Standby	Pre-tested

Note: All test modes were pre-tested, The Mode 1 was the worst case and only the data of the worst case record in this report.

2.3 Special Accessories

Follow auxiliary equipment(s) test with EUT that provided by the manufacturer or laboratory is listed as follow:

Description	Manufacturer	Model	Technical Parameters	Certificate	Provided by
Adapter	/	SOY-2600692-094-A	Input:AC100-240V,50/60Hz,2.5A Max Output:DC 26V,6.92A 179.92W	FCC	manufacturer
Wireless charging load	/	EESON	5W/10W	FCC	laboratory

2.4 Modifications

No modifications were implemented to meet testing criteria.

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2.5 Equipments Used during the Test

Transmitter spurious emissions & Receiver spurious emissions					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
1	EMI Test Receiver	R&S	ESR	102525	03/04/2023
2	High Pass Filter	Chengdu E-Microwave	OHF-3-18-S	0E01901038	03/04/2023
3	High Pass Filter	Chengdu E-Microwave	OHF-6.5-18-S	0E01901039	03/04/2023
4	Spectrum Analyzer	HP	8593E	3831U02087	03/04/2023
5	Ultra-Broadband logarithmic period Antenna	Schwarzbeck	VULB 9163	01230	12/04/2023
6	Loop Antenna	Beijin ZHINAN	ZN30900C	18050	03/04/2023
7	Spectrum Analyzer	R&S	FSV40-N	101798	03/04/2023
8	Horn Antenna	Schwarzbeck	BBHA 9120 D	2023	03/29/2023
9	Pre-Amplifier	Schwarzbeck	BBV 9745	9745#129	03/04/2023
10	Pre-Amplifier	EMCI	EMC051835SE	980662	03/04/2023

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
1	LISN	R&S	ENV432	1326.6105.02	03/04/2023
2	EMI Test Receiver	R&S	ESR	102524	03/04/2023
3	Manual RF Switch	JS TOYO	/	MSW-01/002	03/04/2023

Note: 1)The Cal.Interval was one year.

2)The cable loss has calculated in test result which connection between each test instruments.

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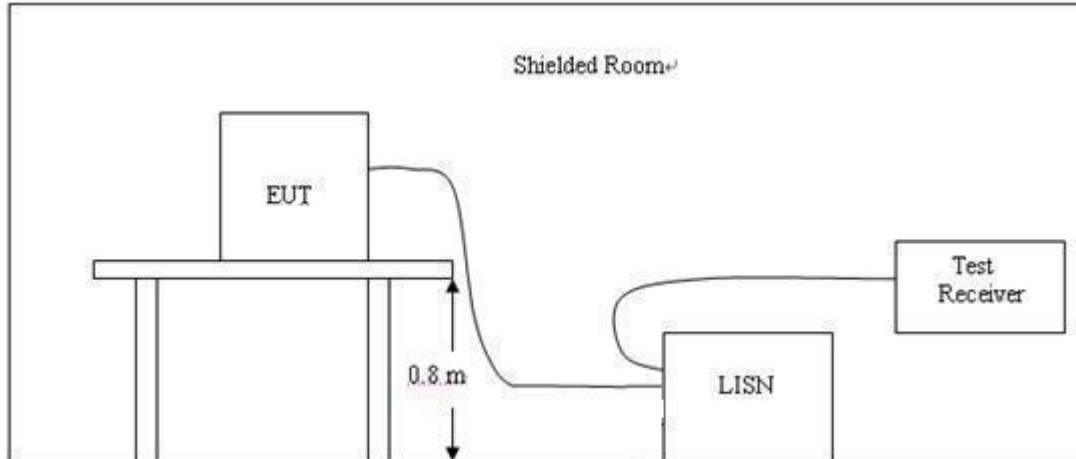
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3 TEST CONDITIONS AND RESULTS

3.1 AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

- 1, The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. 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 as per ANSI C63.10.
- 2, Support equipment, if needed, was placed as per ANSI C63.10.
- 3, All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4, If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5, All support equipments received AC power from a second LISN, if any.
- 6, The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7, Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.

AC Power Conducted Emission Limit

For intentional device, according to § 18.307(a) AC Power Conducted Emission Limits is as following:

Frequency range (MHz)	Limit (dBuV)	
	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.

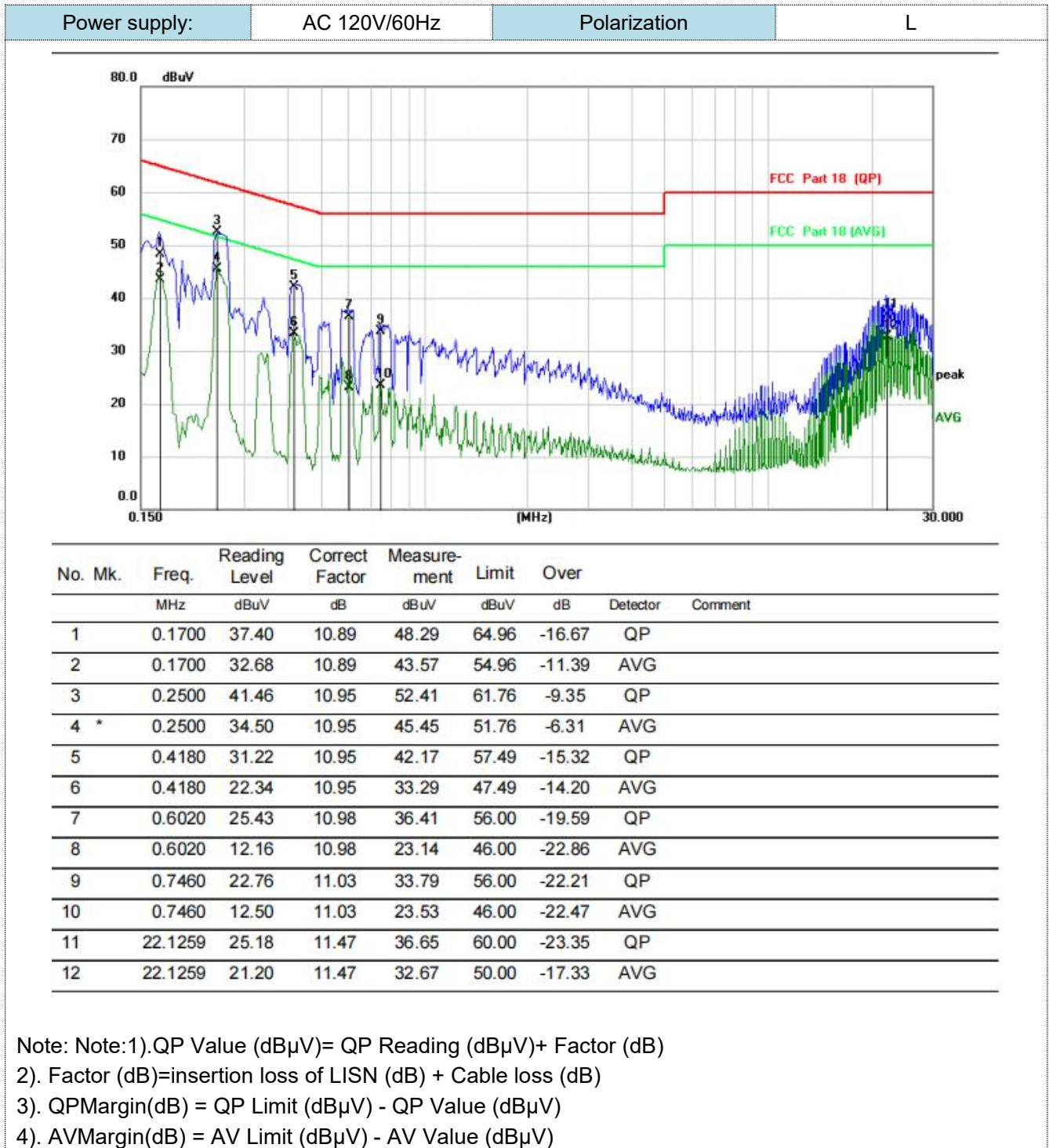
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TEST RESULTS

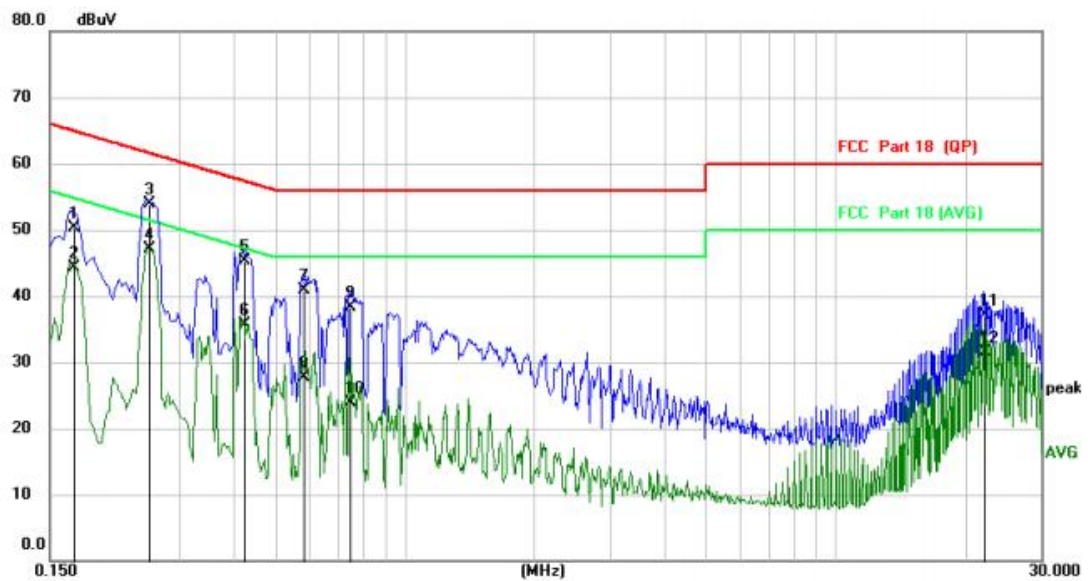
1. Both 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz power supply have been tested, only the worst result of 120 VAC, 60 Hz was reported as below:



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Power supply: AC 120V/60Hz Polarization N



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV	Limit dBuV	Over dB	Detector	Comment
1	0.1700	39.89	10.49	50.38	64.96	-14.58	QP	
2	0.1700	33.74	10.49	44.23	54.96	-10.73	AVG	
3	0.2540	43.34	10.52	53.86	61.63	-7.77	QP	
4 *	0.2540	36.53	10.52	47.05	51.63	-4.58	AVG	
5	0.4220	34.66	10.62	45.28	57.41	-12.13	QP	
6	0.4220	25.06	10.62	35.68	47.41	-11.73	AVG	
7	0.5820	30.15	10.71	40.86	56.00	-15.14	QP	
8	0.5820	16.94	10.71	27.65	46.00	-18.35	AVG	
9	0.7460	27.50	10.75	38.25	56.00	-17.75	QP	
10	0.7460	13.21	10.75	23.96	46.00	-22.04	AVG	
11	22.1180	25.40	11.70	37.10	60.00	-22.90	QP	
12	22.1180	19.74	11.70	31.44	50.00	-18.56	AVG	

- Note: Note:1).QP Value (dBμV)= QP Reading (dBμV)+ Factor (dB)
 2). Factor (dB)=insertion loss of LISN (dB) + Cable loss (dB)
 3). QPMargin(dB) = QP Limit (dBμV) - QP Value (dBμV)
 4). AVMargin(dB) = AV Limit (dBμV) - AV Value (dBμV)

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3.2 Radiated Emission

Limit

The specification used was with the FCC Part 18.305 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

Per FCC MP-5 2.2.5 The antenna height shall be set at around 2 meters

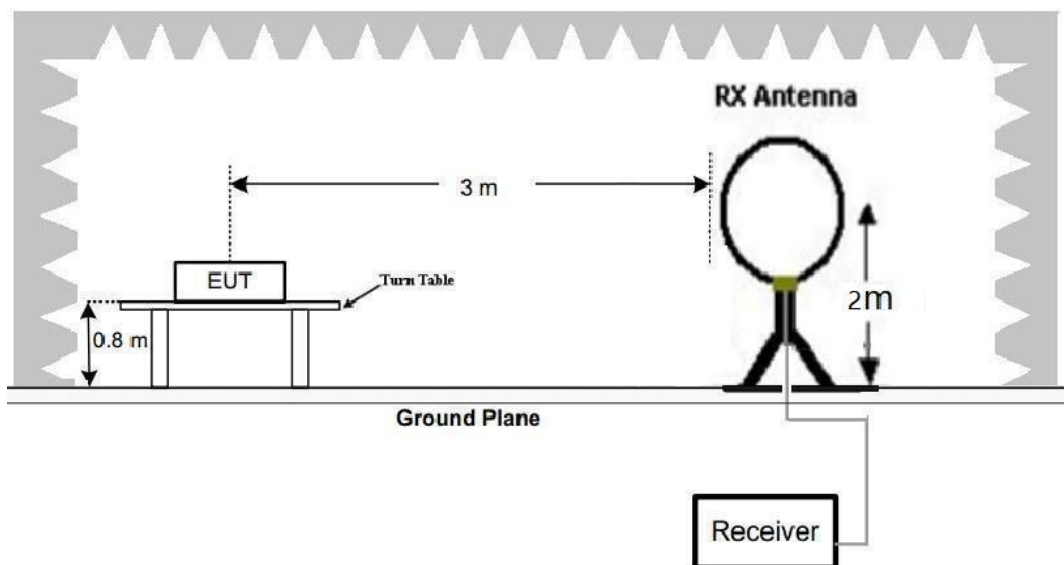
Radiated emission limits

Frequency (MHz)	Test Distance (Meters)	Radiated (dB μ V/m)	Radiated (μ V/m)
0.009-30	3	103.50	15 (at 300m)
30-1000	3	63.5	15 (at 300m)

Note: Emission level dB μ V/m for 0.009-30MHz = $20\lg(15) + 40\lg(300/3)$ dB μ V/m = 103.5 dB μ V/m
 Emission level dB μ V/m for 30MHz-1000MHz = $20\lg(15) + 20\lg(300/3)$ dB μ V/m = 63.5 dB μ V/m

TEST CONFIGURATION

1. Radiated Emission Test Set-Up, Frequency Below 30MHz



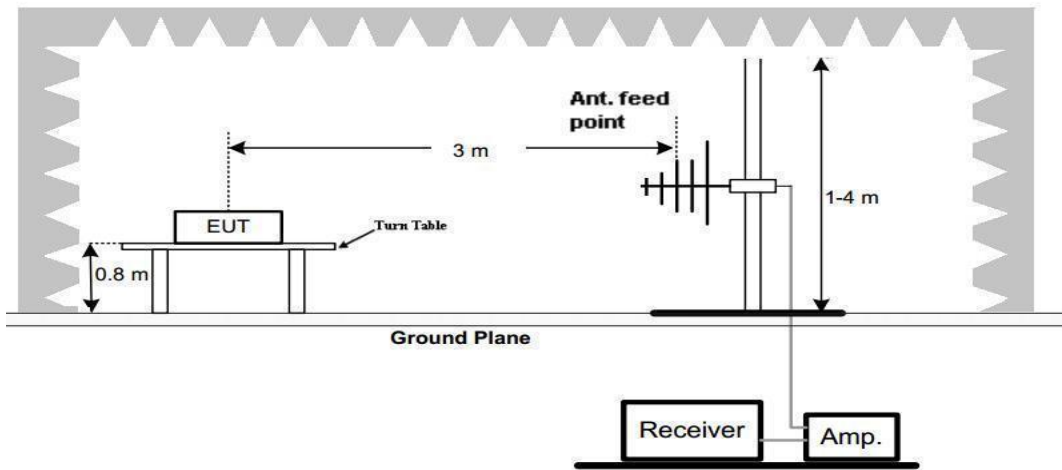
2. Radiated Emission Test Set-Up, Frequency below 1000MHz

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Test Procedure

1. Below 1GHz measurement the EUT is placed on a turntable which is 0.8m above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. Radiated emission test frequency band from 9KHz to 1000MHz.
6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Bilog Antenna	3

7. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-30MHz	RBW=10KHz/VBW=30KHz, Sweep time=Auto	QP
30MHz-1GHz	RBW=100KHz/VBW=300KHz, Sweep time=Auto	QP

TEST RESULTS

For 9 KHz-30MHz

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9KHz-150KHz

Face



No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		0.0114	25.37	-9.09	16.28	103.50	-87.22	peak
2		0.0192	32.11	-9.05	23.06	103.50	-80.44	peak
3		0.0396	38.47	-8.90	29.57	103.50	-73.93	peak
4		0.0839	60.94	-9.05	51.89	103.50	-51.61	peak
5		0.0891	62.12	-8.92	53.20	103.50	-50.30	peak
6	*	0.1415	74.27	-9.49	64.78	103.50	-38.72	peak

Remark:

Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor

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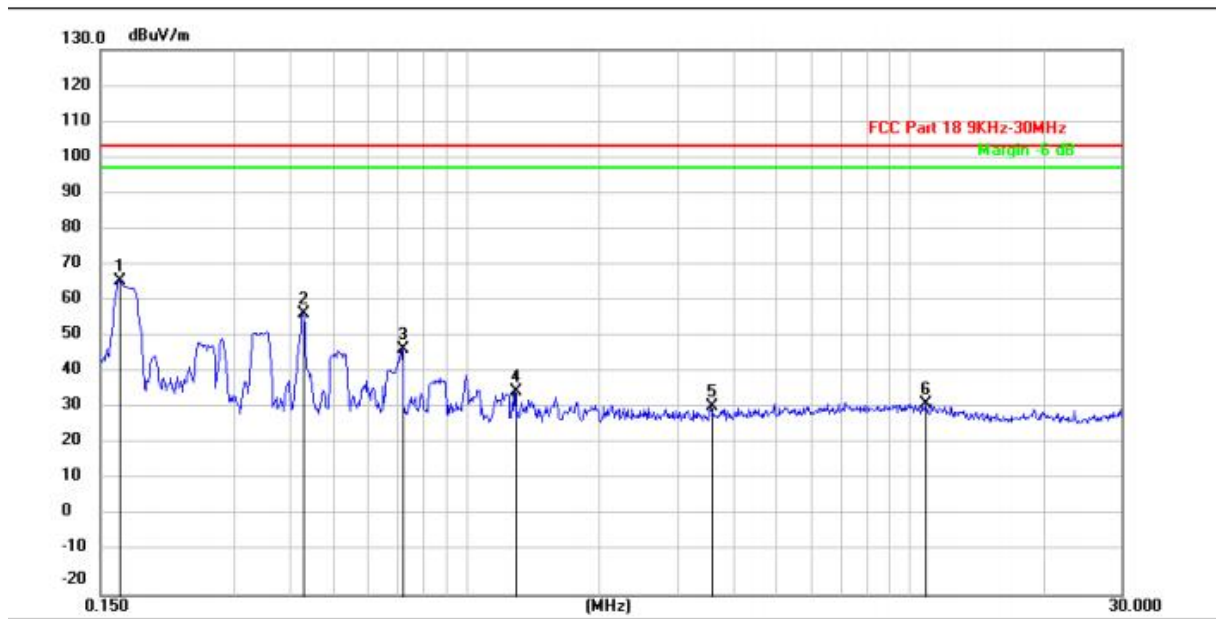
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150KHz-30MHz

Face



No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1	*	0.1654	75.80	-9.33	66.47	103.50	-37.03	peak
2		0.4301	66.82	-9.24	57.58	103.50	-45.92	peak
3		0.7160	56.86	-9.17	47.69	103.50	-55.81	peak
4		1.2892	45.17	-9.14	36.03	103.50	-67.47	peak
5		3.5654	41.39	-9.42	31.97	103.50	-71.53	peak
6		10.8992	42.06	-9.39	32.67	103.50	-70.83	peak

Remark:

Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor

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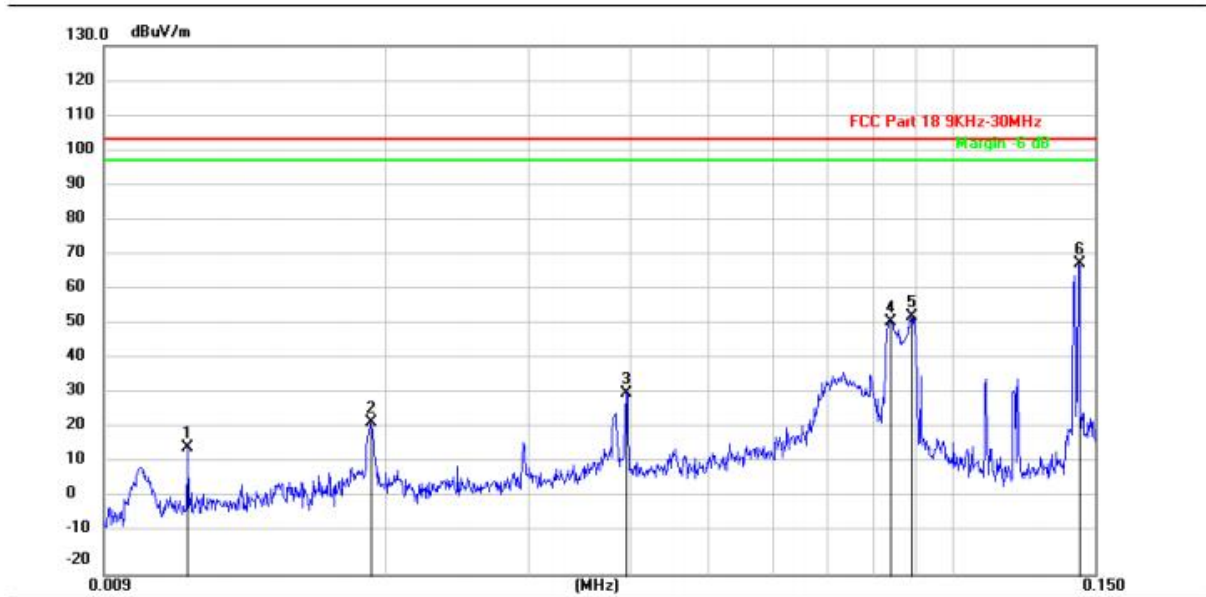
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9KHz-150KHz

Side



No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		0.0114	25.37	-9.09	16.28	103.50	-87.22	peak
2		0.0192	32.30	-9.05	23.25	103.50	-80.25	peak
3		0.0396	40.40	-8.90	31.50	103.50	-72.00	peak
4		0.0839	60.94	-9.05	51.89	103.50	-51.61	peak
5		0.0891	62.12	-8.92	53.20	103.50	-50.30	peak
6	*	0.1415	77.59	-9.45	68.14	103.50	-35.36	peak

Remark:

Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor

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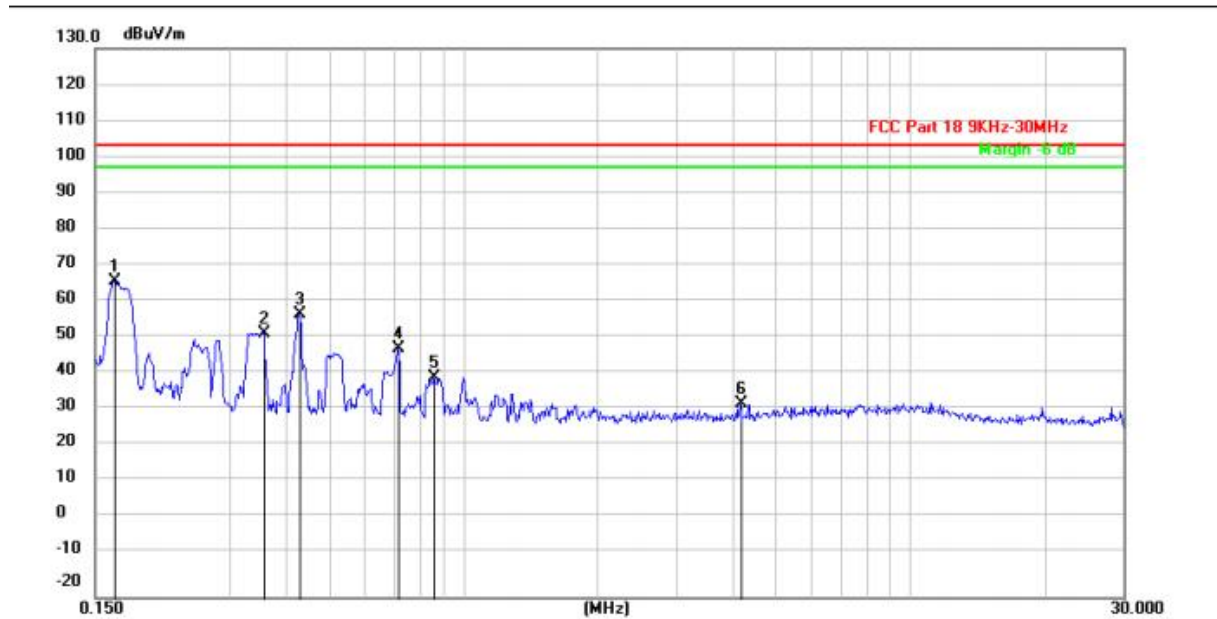
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150KHz-30MHz

Side



No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1	*	0.1658	75.80	-9.33	66.47	103.50	-37.03	peak
2		0.3574	61.58	-9.26	52.32	103.50	-51.18	peak
3		0.4298	66.66	-9.24	57.42	103.50	-46.08	peak
4		0.7148	57.08	-9.17	47.91	103.50	-55.59	peak
5		0.8609	49.33	-9.13	40.20	103.50	-63.30	peak
6		4.1597	42.38	-9.45	32.93	103.50	-70.57	peak

Remark:

Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor

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For 30MHz-1GHz

Horizontal



No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		53.9953	35.82	-16.48	19.34	63.50	-44.16	QP
2		84.9101	38.02	-20.59	17.43	63.50	-46.07	QP
3	*	136.1253	58.03	-21.36	36.67	63.50	-26.83	QP
4		208.3610	51.52	-17.64	33.88	63.50	-29.62	QP
5		268.2969	48.20	-15.39	32.81	63.50	-30.69	QP
6		399.5903	45.99	-10.93	35.06	63.50	-28.44	QP

Note:1).Level (dBμV/m)= Reading (dBμV)+ Factor (dB/m)

2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin(dB) = Limit (dBμV/m) - Level (dBμV/m)

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Vertical



No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		30.8102	56.07	-18.98	37.09	63.50	-26.41	QP
2		55.3759	53.16	-16.76	36.40	63.50	-27.10	QP
3	*	141.1812	63.56	-21.28	42.28	63.50	-21.22	QP
4		268.8621	55.07	-15.38	39.69	63.50	-23.81	QP
5		399.1701	53.08	-10.94	42.14	63.50	-21.36	QP
6		441.5877	50.71	-10.42	40.29	63.50	-23.21	QP

Note:1).Level (dBuV/m)= Reading (dBuV)+ Factor (dB/m)

2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin(dB) = Limit (dBuV/m) - Level (dBuV/m)

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3.3 Antenna Requirement

Refer to statement below for compliance.

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Antenna Information

The antenna used in this product is a Coil Antenna, which permanently attached. It conforms to the standard requirements.

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4. Test Setup Photos of the EUT

Radiated Measurement (Below 30MHz)



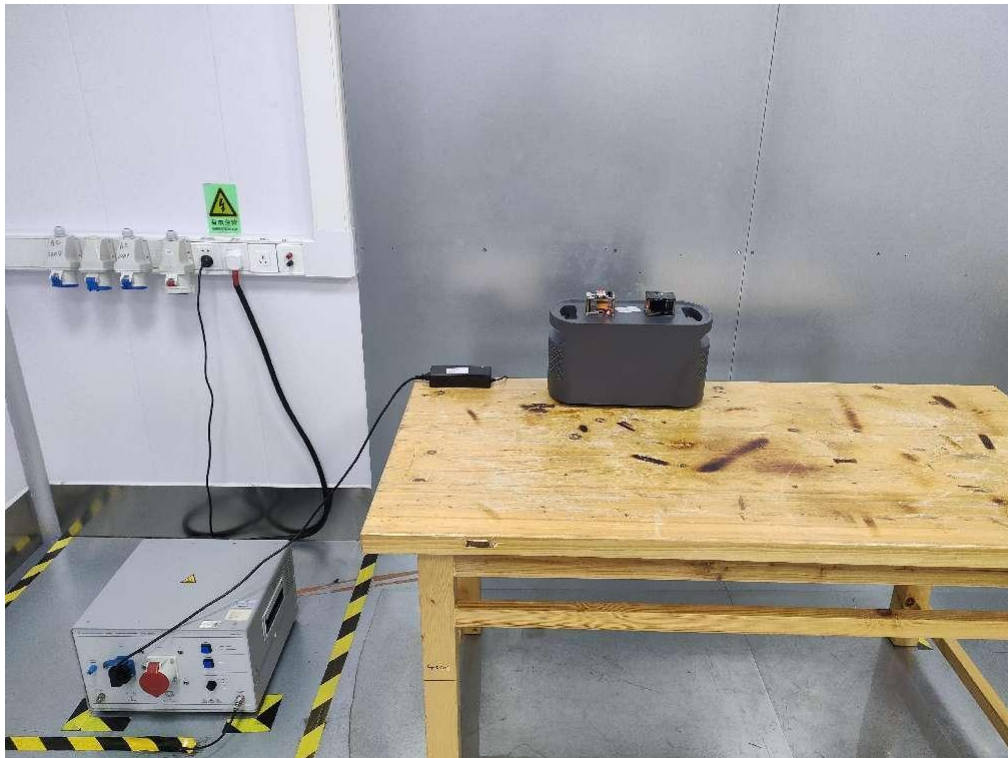
Radiated Measurement (Above 30MHz)



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Conducted Emission



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5. PHOTOS OF THE EUT

External



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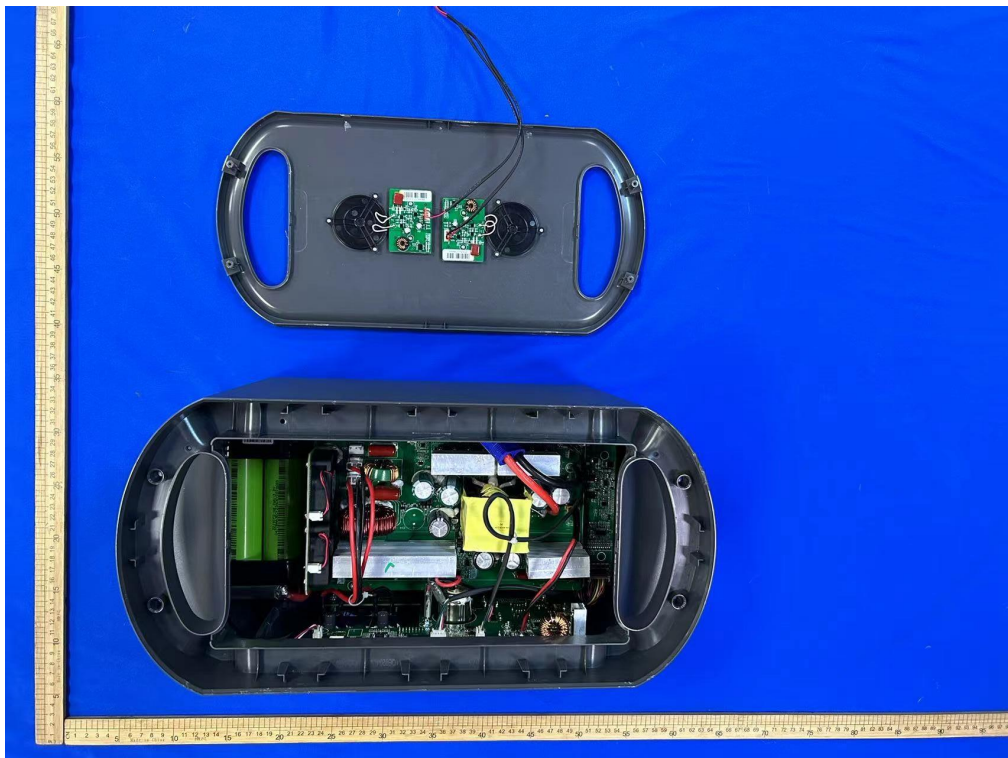


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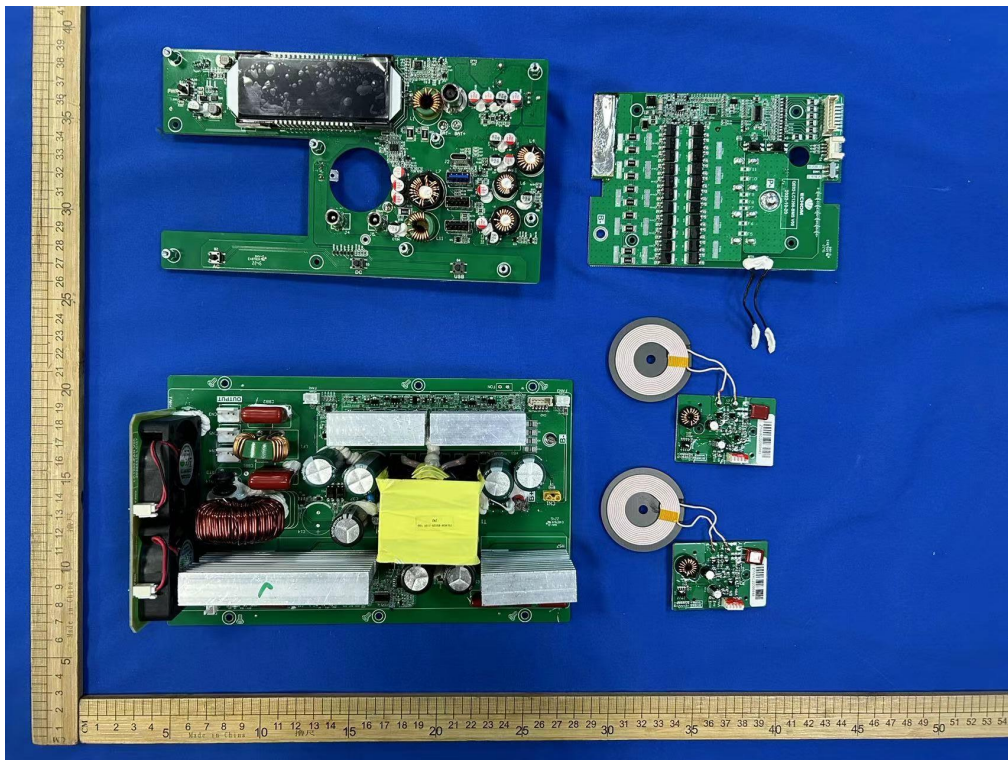
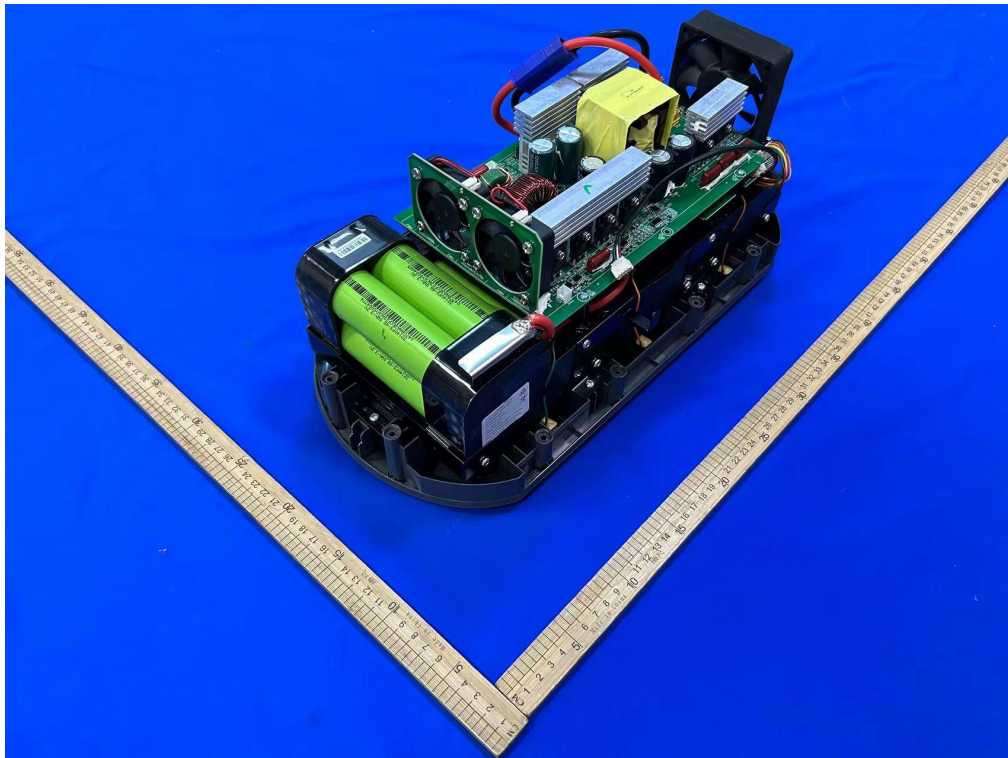
Internal



TRF No. FCC Part 18_R2

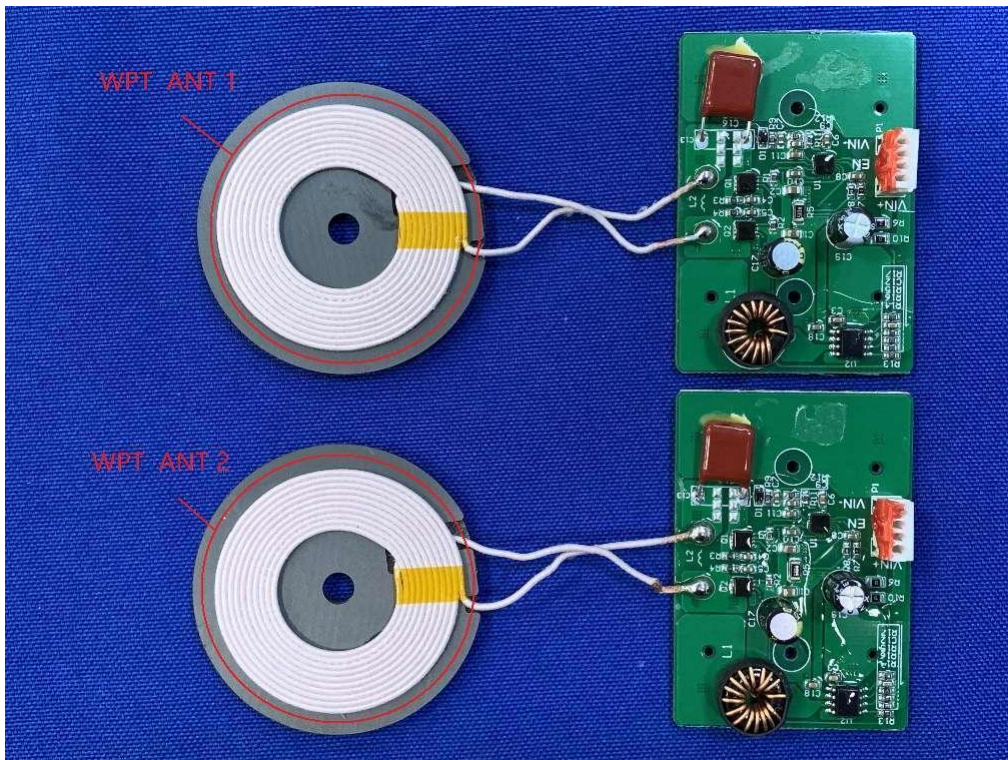
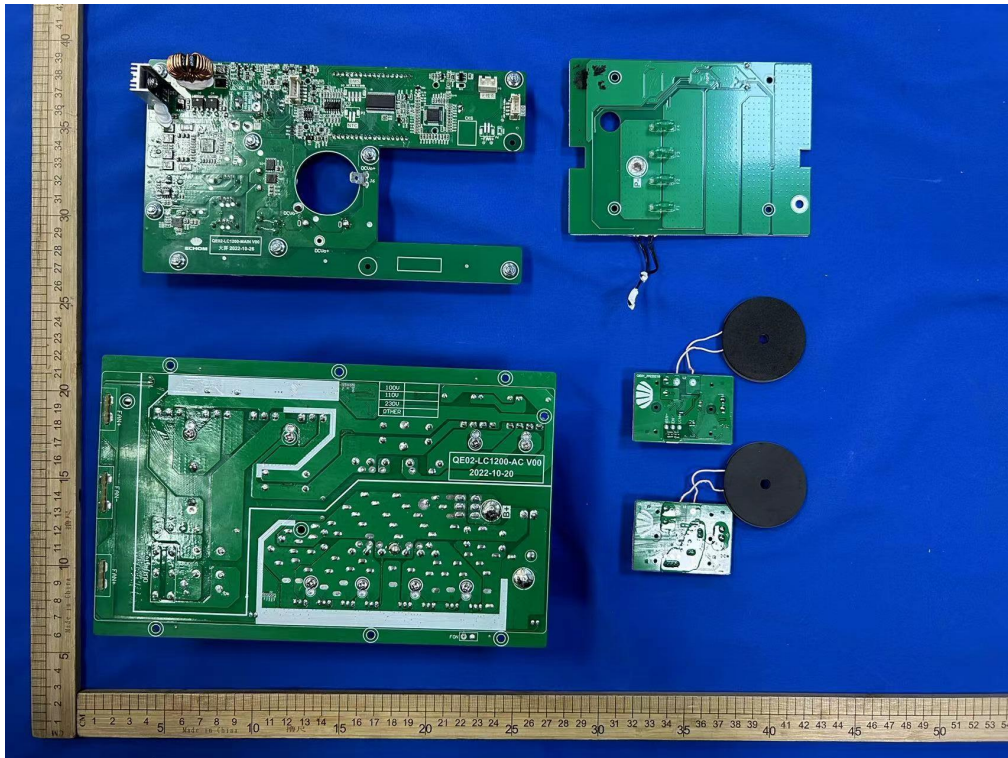
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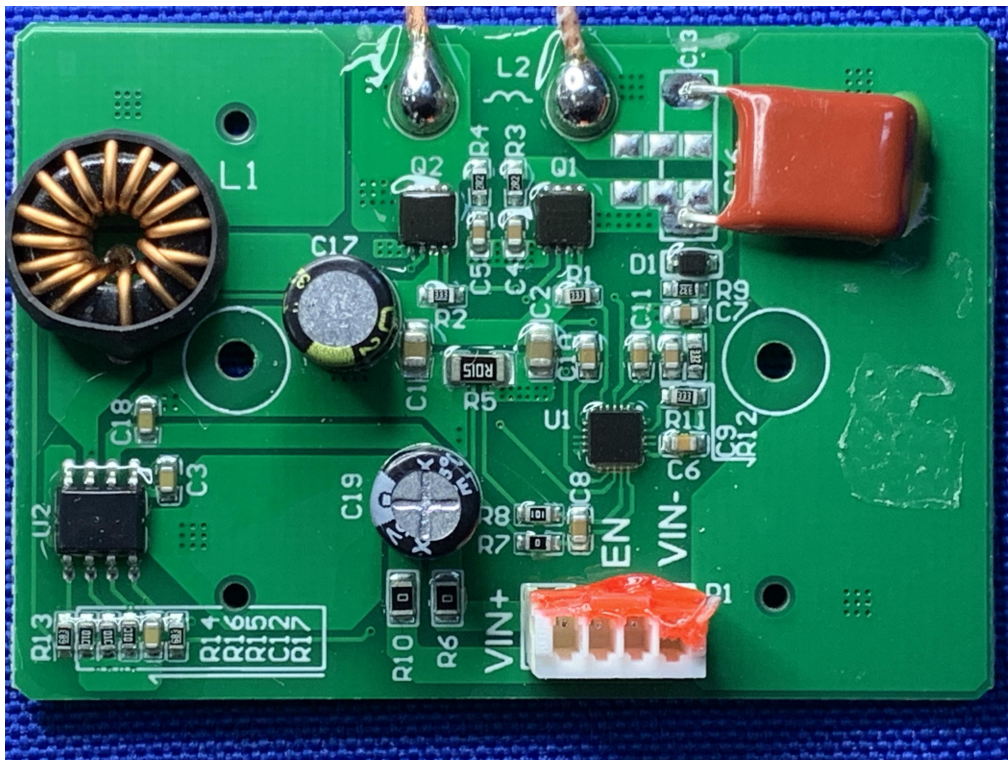
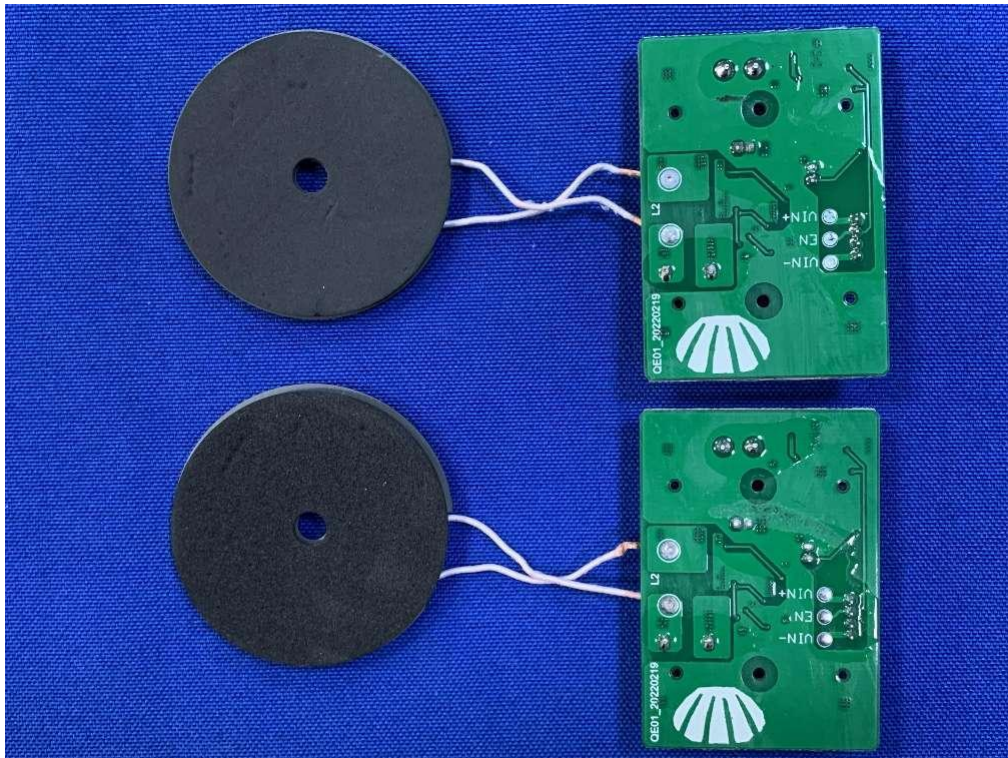
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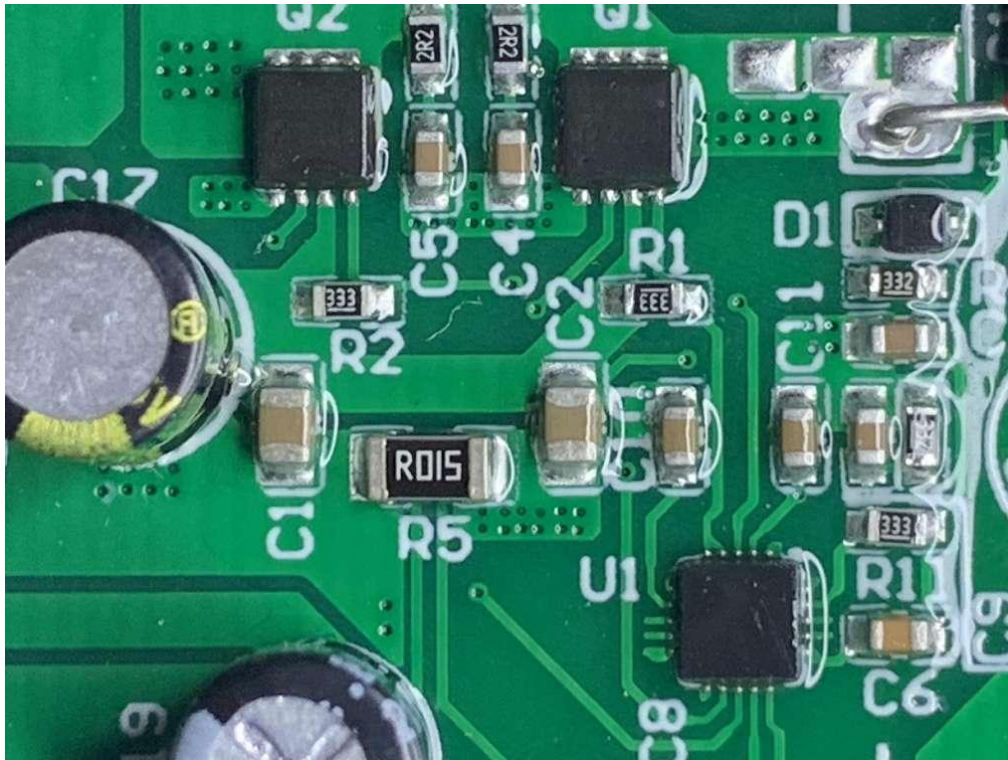
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***** End of Report *****