


EMC TEST REPORT

Applicant..... : GUANGDONG TECHFINE ELECTRONIC CO., LTD.
Address..... : 3rd Floor, Building 1, No.6, Foluo Road, Luocun, Shishan Town, Nanhai District, Foshan, Guangdong
Manufacturer..... : GUANGDONG TECHFINE ELECTRONIC CO., LTD.
Address..... : 3rd Floor, Building 1, No.6, Foluo Road, Luocun, Shishan Town, Nanhai District, Foshan, Guangdong
Factory..... : GUANGDONG TECHFINE ELECTRONIC CO., LTD.
Address..... : 3rd Floor, Building 1, No.6, Foluo Road, Luocun, Shishan Town, Nanhai District, Foshan, Guangdong
Product Name..... : Uninterruptible Power Supply
Brand Name..... : Techfine
Model No. : 2000VA, 650VA, 800VA, 1200VA, 1500VA
(For model difference refer to section 2)
Measurement Standard..... : EN IEC 62040-2: 2018
EN IEC 61000-3-2: 2019+A1: 2021, EN 61000-3-3: 2013+A2: 2021
Receipt Date of Samples.... : January 14, 2023
Date of Tested..... : February 07, 2023 to March 15, 2023
Date of Report..... : July 11, 2023

This report shows that above equipment is technically compliant with the requirements of the standards above. All test results in this report apply only to the tested sample(s). Without prior written approval of Dongguan Nore Testing Center Co., Ltd, this report shall not be reproduced, except in full.


Prepared by

Rose Hu / Project Engineer


Approved by

Iori Fan / Authorized Signatory

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1. Summary of Test Result

EMISSION			
Standard	Test Item	Result	Remarks
EN IEC 62040-2: 2018	Conducted Emission	PASS	---
	Conducted Emissions(Network ports)	N/A	---
	Radiated Emission	PASS	---
EN IEC 61000-3-2: 2019+A1: 2021	Harmonic Current Emission	PASS	---
EN 61000-3-3: 2013+A2: 2021	Voltage Fluctuations & Flicker	PASS	---
IMMUNITY(EN IEC 62040-2: 2018)			
Standard	Test Item	Result	Remarks
IEC 61000-2-2: 2002	Low Frequency Signals	N/A	---
IEC 61000-4-2: 2008	Electrostatic Discharges (ESD)	PASS	---
IEC 61000-4-3: 2006+A1: 2007+A2: 2010	Continuous RF Electromagnetic Field Disturbances	PASS	---
IEC 61000-4-4: 2012	Electrical Fast Transients/Burst (EFT/B)	PASS	---
IEC 61000-4-5: 2014	Surges	PASS	---
IEC 61000-4-6: 2013	Continuous Induced RF Disturbances	PASS	---
IEC 61000-4-8: 2009	Power Frequency Magnetic Field	N/A	---
Note: N/A means not applicable.			

2. General Description of EUT

Product Information	
Product name:	Uninterruptible Power Supply
Main Model Name:	2000VA, 1200VA
Additional Model Name:	650VA, 800VA, 1500VA
Model Difference:	These models have the same electrical mechanical and physical construction. Their differences are model name, power, PCB Layout and shell of appearance due to marketing purpose. Details see next page.
S/N:	230105 0001
Brand Name:	Techfine
Hardware version:	Not stated
Software version:	Not stated
Rating:	Input: AC 230V, 50/60Hz, 10A Max Output: AC 230V, 7A
Category:	C2
Operation Frequency:	Below 108MHz
Typical arrangement:	Table-top
I/O Port:	Refer to the user manual
Accessories Information	
Adapter:	N/A
Cable:	Power cord: 0.66m, unshielded, undetachable
Other:	N/A
Additional Information	
Note:	According to the model differences, all tests were performed on model 2000VA and 1200VA.
Remark:	All the information above are provided by the manufacturer. More detailed feature of the EUT please refers to the user manual.

Model difference:

Model	2000VA	1500VA	1200VA	800VA	650VA
Max power	2000VA	1500VA	1200VA	800VA	650VA
Max constant power	1200W	900W	720W	480W	360W

Revision History

1. This report was an additional report based on original report NTC2301264EV00.
2. Compared with the original report, this report has added trade mark. Details as below:

Before change	After change
Trade mark: N/A	Trade mark: Techfine

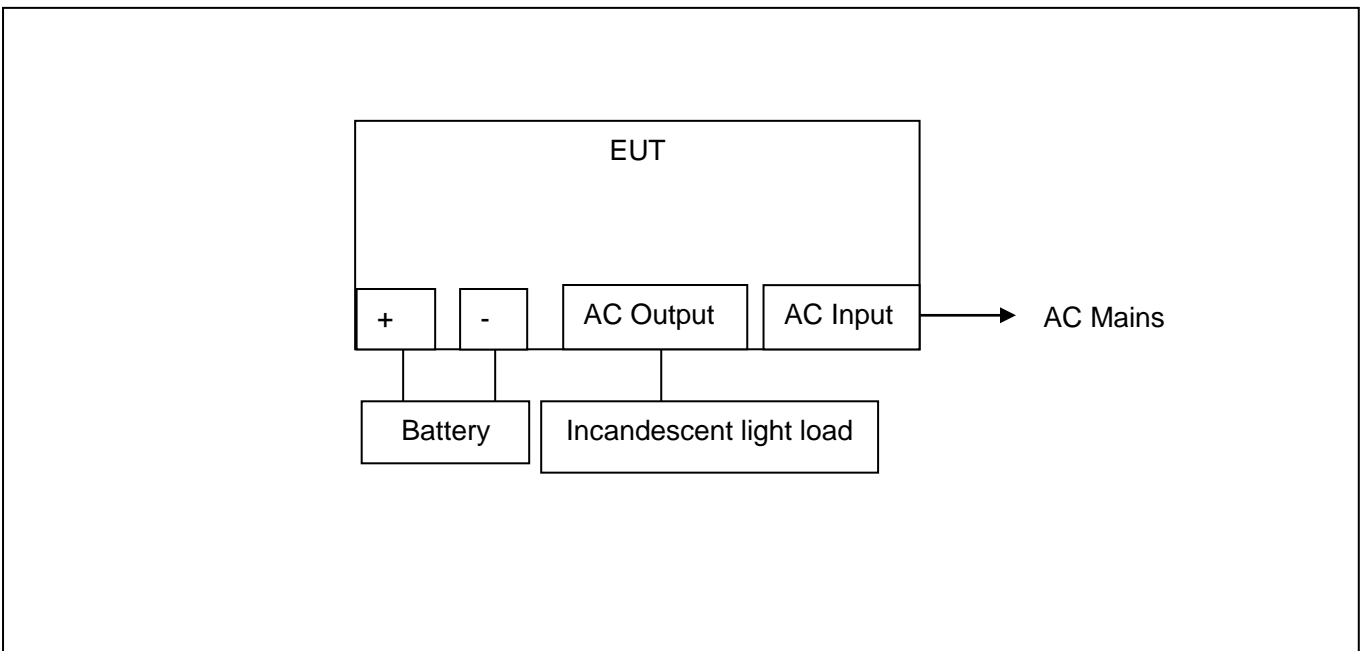
3. According to the change, the test result will not be affected, thus, all of the original test data were continued to be referenced, details refer to the report.

3. Configuration of EUT

Description of Test Modes

Test Mode		Description
1.	Normal operation mode	Connect the EUT to AC Mains and incandescent lamp, and make it work normally.
2.	Stored energy operation mode	Disconnect the EUT from AC Mains, in the stored energy operation mode, connect it to the battery and incandescent lamp, and make it work at Stored energy operation mode normally.

Block Diagram of Configuration



Note:

- a. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
- b. Grounding was established in accordance with the manufacturer’s requirements and conditions for the intended use.

4. Description of Support Device

No.	Equipment	Brand	M/N	S/N	Cable Specification	Remarks
1.	Battery	---	---	---	---	Provided by the Lab.
2.	Incandescent lamp	---	---	---	---	Provided by the Lab.

5. Test Facility

Test Site 1	:	Dongguan Nore Testing Center Co., Ltd. (Dongguan NTC Co., Ltd.)
Accreditations and Authorizations	:	<p>The Laboratory has been assessed and proved to be in compliance with CNAS/CL01 Listed by CNAS, August 13, 2018 The Certificate Registration Number is L5795. The Certificate is valid until August 13, 2024</p> <p>The Laboratory has been assessed and proved to be in compliance with ISO17025 Listed by A2LA, November 01, 2017</p> <p>The Certificate Registration Number is 4429.01 The Certificate is valid until December 31, 2023 Listed by FCC, November 06, 2017 Test Firm Registration Number: 907417</p> <p>Listed by Industry Canada, June 08, 2017 The Certificate Registration Number is 46405-9743A</p>
Test Site Location	:	Building D, Gaosheng Science and Technology Park, Hongtu Road, Nancheng District, Dongguan City, Guangdong Province, China
Test Site 2	:	Shenzhen Nore Testing Center Co., Ltd.
Test Site Location	:	South, No. 1, Building 10, Maqueling Industrial Zone, Nanshan Shenzhen, Guangdong, 518057, China

6. Test Conditions

No.	Test Item	Test Mode	Test Voltage	Tested by	Remarks
1.	Conducted Emission	1	AC 230V / 50Hz	Park	See note 1
2.	Conducted Emission (Network Ports)	---	---	---	---
3.	Radiated Emission	1-2	AC 230V / 50Hz DC 12V	Park	See note 1
4.	Harmonic Current Emission	1	AC 230V / 50Hz	Chris	See note 1
5.	Voltage Fluctuations & Flicker	1	AC 230V / 50Hz	Chris	See note 1
6.	Electrostatic Discharges (ESD)	1-2	AC 230V / 50Hz DC 12V	Desn	See note 2
7.	Continuous RF Electromagnetic Field Disturbances	1-2	AC 230V / 50Hz DC 12V	Leon	See note 1
8.	Electrical Fast Transients/Burst (EFT/B)	1	AC 230V / 50Hz	Desn	See note 1
9.	Surges	1	AC 230V / 50Hz	Desn	See note 1
10.	Continuous Induced RF Disturbances	1	AC 230V / 50Hz	Leon	See note 1
11.	Power Frequency Magnetic Field	---	---	---	---

Note:

1. The testing climatic conditions for temperature, humidity, and atmospheric pressure are within: 15~35°C, 30~70%, 86~106kPa
2. The testing climatic conditions for temperature, humidity, and atmospheric pressure are within: 15~35°C, 30~60%, 86~106kPa
3. Only the worst data was recorded in the report.
4. DC 12V come from battery.

7. Measurement Uncertainty

No.	Test Item	Frequency	Uncertainty	Remarks
1.	Conducted Emission (AC mains)	9KHz ~ 150KHz	± 3.04 dB	---
		150KHz ~ 30MHz	± 2.52 dB	---
2.	Conducted Emission (Asymmetric mode) Wired network Port	150KHz ~ 30MHz	± 2.52 dB	---
3.	Conducted Emission (Asymmetric mode) Antenna Port	150KHz ~ 30MHz	± 2.52 dB	---
4.	Conducted Differential Voltage Emissions	30 ~ 2150MHz	± 2.52 dB	---
5.	Radiated Emission	30MHz ~ 1GHz	± 5.04 dB	---
		1GHz ~ 6GHz	± 5.23 dB	---

Note:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The measurement uncertainty levels above are estimated and calculated according to CISPR 16-4-2.

8. Measurement Bandwidths

No.	Frequency Range (MHz)	Peak Level (kHz)	Quasi-Peak Level (kHz)	Average Level (kHz)
1.	0.01 ~ 0.15	0.3	0.2	0.2
2.	0.15 ~ 30.0	10.0	9.0	9.0
3.	30 ~ 1000	100.0	120.0	120.0
4.	Above 1000	1000.0	N/A	1000.0

Note: Measurements were made using the bandwidths and detectors specified by the standard. No video filter was used.

9. Deviations and Abnormalities from Standard Conditions

No additions, deviations and exclusions from the standard.

10. Sample Calculations

Conducted Emission						
Freq. (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Over (dB)	Detector
0.1580	55.50	10.60	66.10	79.00	-12.90	QP
Where, Freq. = Emission frequency in MHz Reading Level = Spectrum Analyzer/Receiver Reading Corrector Factor = Insertion loss of LISN + Cable Loss + RF Switching Unit attenuation Measurement = Reading + Corrector Factor Limit = Limit stated in standard Margin = Measurement - Limit Detector = Reading for Quasi-Peak / Average / Peak						

Radiated Emission						
Freq. (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
30.9700	45.09	-9.79	35.30	50.00	-14.70	QP
Where, Freq. = Emission frequency in MHz Reading Level = Spectrum Analyzer/Receiver Reading Corrector Factor = Antenna Factor + Cable Loss - Pre-amplifier Measurement = Reading + Corrector Factor Limit = Limit stated in standard Over = Margin, which calculated by Measurement - Limit Detector = Reading for Quasi-Peak / Average / Peak						

11. Conducted Emission Measurement

LIMITS

Limits for conducted disturbance for the mains power ports:

Frequency (MHz)	<input type="checkbox"/> Category C1 (dBuV)		<input checked="" type="checkbox"/> Category C2 (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 to 0.5	66 to 56	56 to 46	79	66
0.5 to 5	56	46	73	60
5 to 30	60	50	73	60

Note: 1. The limit decreases linearly with the logarithm of the frequency.
2. The lower limit shall apply at the transition frequencies.

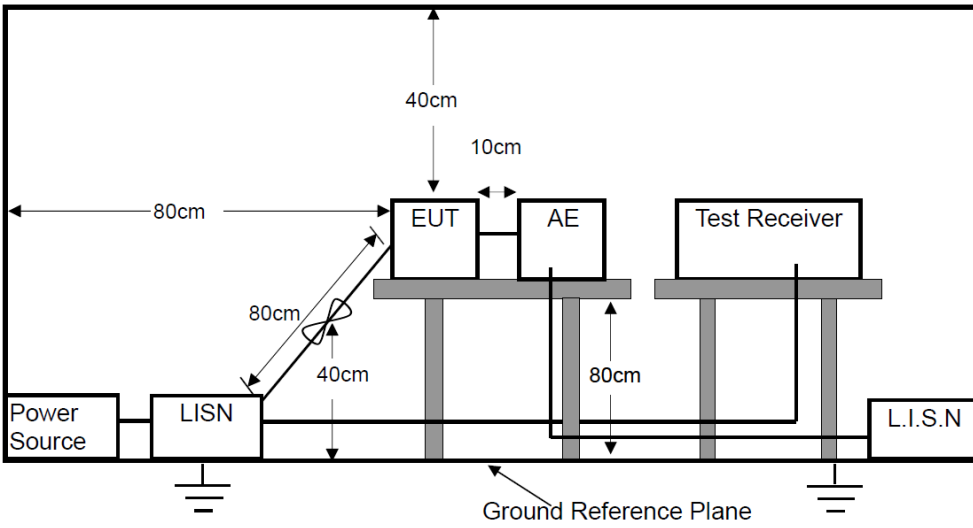
Limits for conducted disturbance for wired network ports:

Frequency (MHz)	<input type="checkbox"/> Category C1 (dB(uV))		<input type="checkbox"/> Category C2 (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 to 0.5	84 to 74	74 to 64	97 to 87	84 to 74
0.5 to 30	74	64	87	74

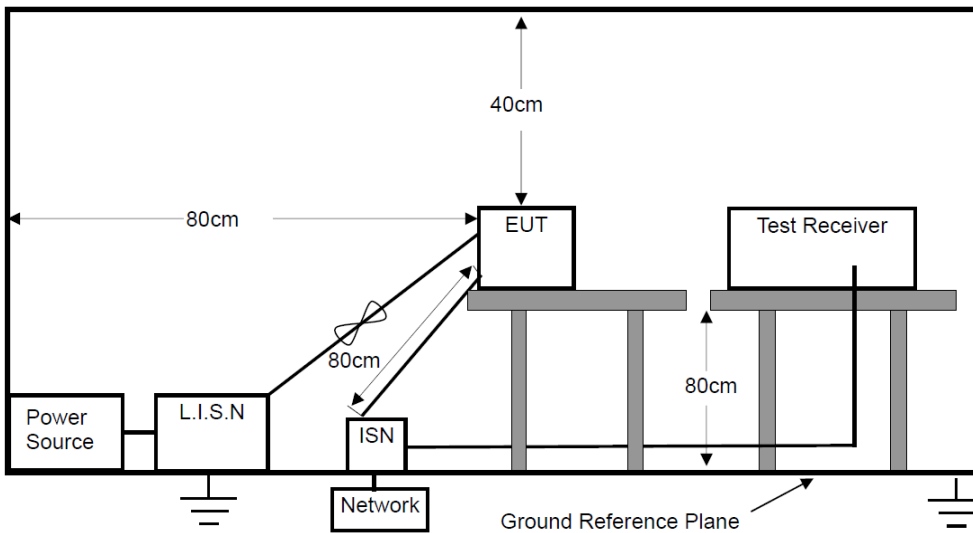
Note: 1. The limit decreases linearly with the logarithm of the frequency.
2. The lower limit shall apply at the transition frequencies.

BLOCK DIAGRAM OF TEST SETUP

Conducted disturbance at the mains power ports



Conducted disturbance for at the network ports



TEST PROCEDURES

- a. The EUT was placed on a wooden table 0.8m height from the metal ground plan and 0.4m from the conducting wall of the shielding room and it was kept at 0.8m from any other grounded conducting surface.
- b. Configure the EUT and support devices as per section 3.
- c. All I/O cables and support devices were positioned as per EN IEC 62040-2.
- d. Connect mains power port of the EUT to a line impedance stabilization network (LISN) and wired network port to Asymmetric Artificial Network (AAN).
- e. Connect all support devices to the other LISN and AAN, if needed.
- f. Turn on the EUT and all support devices, and make it run stably.
- g. Set the detector and measurement bandwidth of test-receiver system as per CISPR 16-1-1.
- h. Scan the frequency range from 150KHz to 30MHz at both sides of mains terminal for conducted interference checking
- i. Repeat the above scans in each mode and record the test data.

TEST RESULTS

PASS

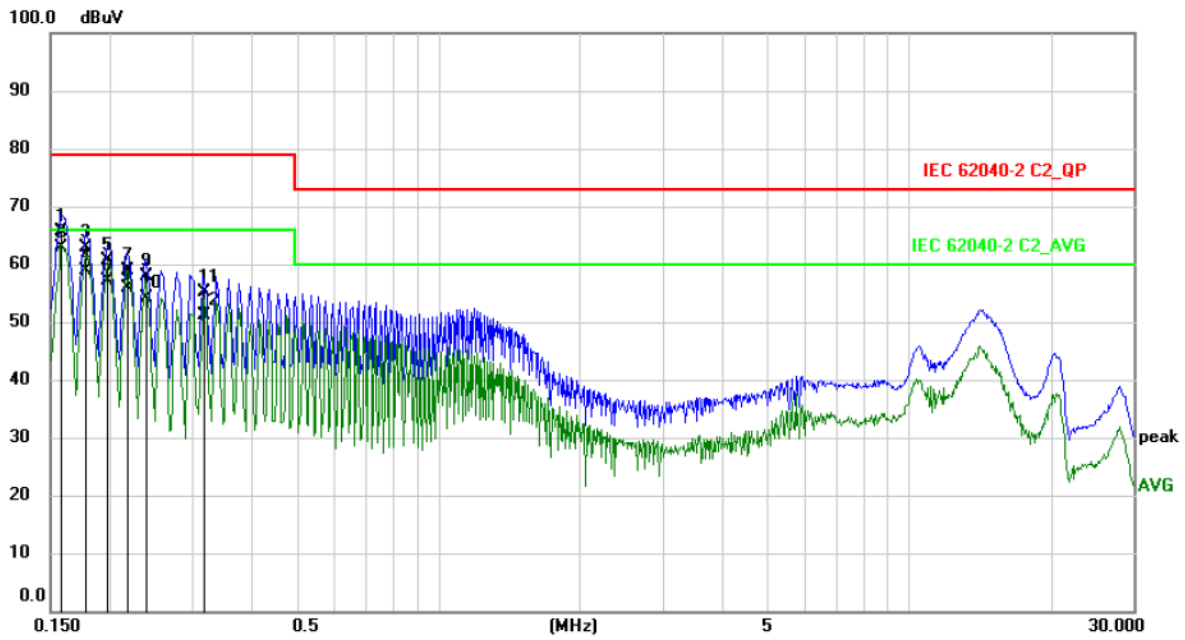
Please refer to the following pages.

M/N: 2000VA	Testing Voltage: AC 230V / 50Hz
Phase: L1	Detector: QP & AVG
Test Mode: 1	

Conducted Emission Measurement

Date: 2023/3/14

Time: 16:40:48



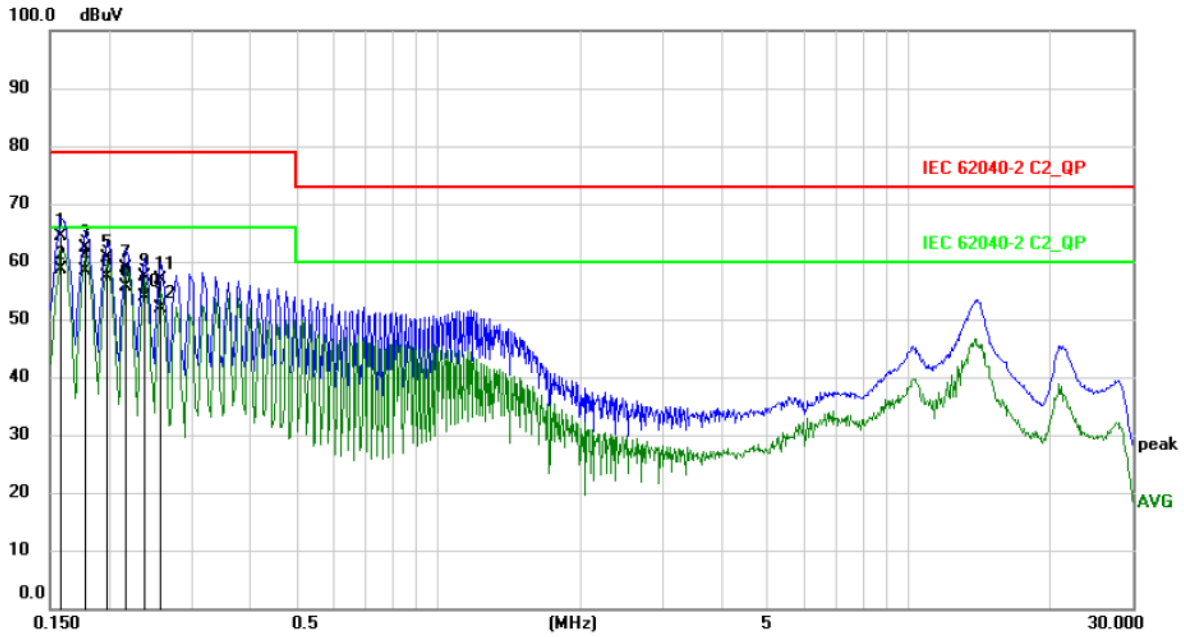
No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
	MHz	dBuV	dB	dBuV	dBuV	dB		
1	0.1580	55.00	10.60	65.60	79.00	-13.40	QP	
2 *	0.1580	52.20	10.60	62.80	66.00	-3.20	AVG	
3	0.1780	52.20	10.60	62.80	79.00	-16.20	QP	
4	0.1780	48.40	10.60	59.00	66.00	-7.00	AVG	
5	0.1985	50.00	10.60	60.60	79.00	-18.40	QP	
6	0.1985	46.60	10.60	57.20	66.00	-8.80	AVG	
7	0.2179	48.30	10.60	58.90	79.00	-20.10	QP	
8	0.2179	45.30	10.60	55.90	66.00	-10.10	AVG	
9	0.2379	47.30	10.60	57.90	79.00	-21.10	QP	
10	0.2379	43.60	10.60	54.20	66.00	-11.80	AVG	
11	0.3180	44.60	10.60	55.20	79.00	-23.80	QP	
12	0.3180	40.60	10.60	51.20	66.00	-14.80	AVG	

M/N: 2000VA	Testing Voltage: AC 230V / 50Hz
Phase: N	Detector: QP & AVG
Test Mode: 1	

Conducted Emission Measurement

Date: 2023/3/14

Time: 16:46:21



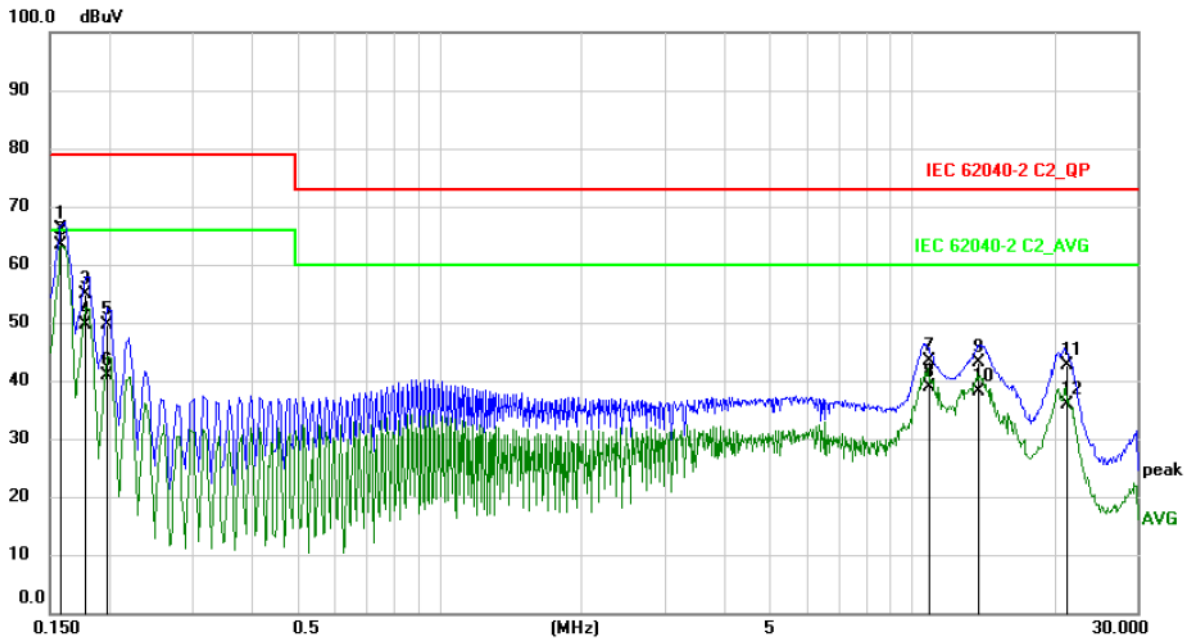
No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
	MHz	dBuV	dB	dBuV	dBuV	dB		
1	0.1580	53.90	10.60	64.50	79.00	-14.50	QP	
2 *	0.1580	48.10	10.60	58.70	66.00	-7.30	AVG	
3	0.1776	51.70	10.60	62.30	79.00	-16.70	QP	
4	0.1776	47.70	10.60	58.30	66.00	-7.70	AVG	
5	0.1975	50.00	10.60	60.60	79.00	-18.40	QP	
6	0.1975	46.70	10.60	57.30	66.00	-8.70	AVG	
7	0.2174	48.40	10.60	59.00	79.00	-20.00	QP	
8	0.2174	45.10	10.60	55.70	66.00	-10.30	AVG	
9	0.2379	46.90	10.60	57.50	79.00	-21.50	QP	
10	0.2379	43.40	10.60	54.00	66.00	-12.00	AVG	
11	0.2575	46.20	10.60	56.80	79.00	-22.20	QP	
12	0.2575	41.30	10.60	51.90	66.00	-14.10	AVG	

M/N: 1200VA	Testing Voltage: AC 230V / 50Hz
Phase: L1	Detector: QP & AVG
Test Mode: 1	

Conducted Emission Measurement

Date: 2023/3/14

Time: 17:14:37



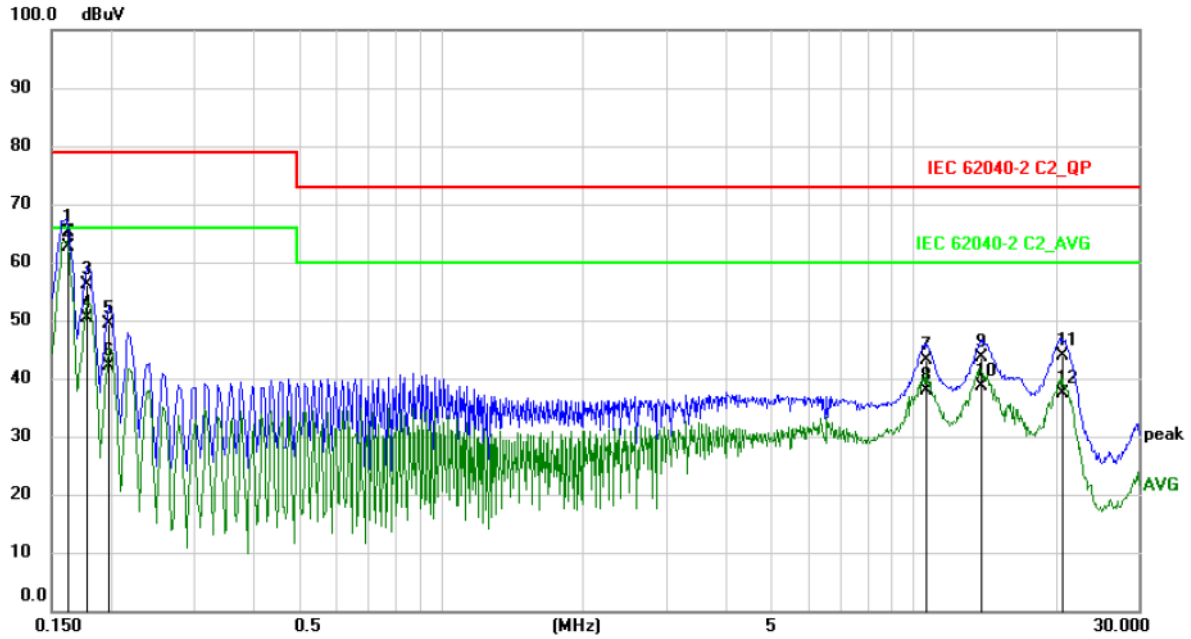
No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
	MHz	dBuV	dB	dBuV	dBuV	dB		
1	0.1580	55.50	10.60	66.10	79.00	-12.90	QP	
2 *	0.1580	52.80	10.60	63.40	66.00	-2.60	AVG	
3	0.1779	44.20	10.60	54.80	79.00	-24.20	QP	
4	0.1779	39.00	10.60	49.60	66.00	-16.40	AVG	
5	0.1980	39.00	10.60	49.60	79.00	-29.40	QP	
6	0.1980	30.40	10.60	41.00	66.00	-25.00	AVG	
7	10.8338	32.57	10.73	43.30	73.00	-29.70	QP	
8	10.8338	28.27	10.73	39.00	60.00	-21.00	AVG	
9	13.8259	32.46	10.74	43.20	73.00	-29.80	QP	
10	13.8259	27.46	10.74	38.20	60.00	-21.80	AVG	
11	21.1500	31.93	10.77	42.70	73.00	-30.30	QP	
12	21.1500	25.13	10.77	35.90	60.00	-24.10	AVG	

M/N: 1200VA	Testing Voltage: AC 230V / 50Hz
Phase: N	Detector: QP & AVG
Test Mode: 1	

Conducted Emission Measurement

Date: 2023/3/14

Time: 17:19:46



No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
	MHz	dBuV	dB	dBuV	dBuV	dB		
1	0.1620	54.60	10.60	65.20	79.00	-13.80	QP	
2 *	0.1620	52.10	10.60	62.70	66.00	-3.30	AVG	
3	0.1779	45.60	10.60	56.20	79.00	-22.80	QP	
4	0.1779	39.80	10.60	50.40	66.00	-15.60	AVG	
5	0.1980	38.90	10.60	49.50	79.00	-29.50	QP	
6	0.1980	31.50	10.60	42.10	66.00	-23.90	AVG	
7	10.6339	32.37	10.73	43.10	73.00	-29.90	QP	
8	10.6339	27.27	10.73	38.00	60.00	-22.00	AVG	
9	13.8858	32.96	10.74	43.70	73.00	-29.30	QP	
10	13.8858	27.86	10.74	38.60	60.00	-21.40	AVG	
11	20.6619	33.03	10.77	43.80	73.00	-29.20	QP	
12	20.6619	26.73	10.77	37.50	60.00	-22.50	AVG	

12. Radiated Emission Measurement

LIMITS

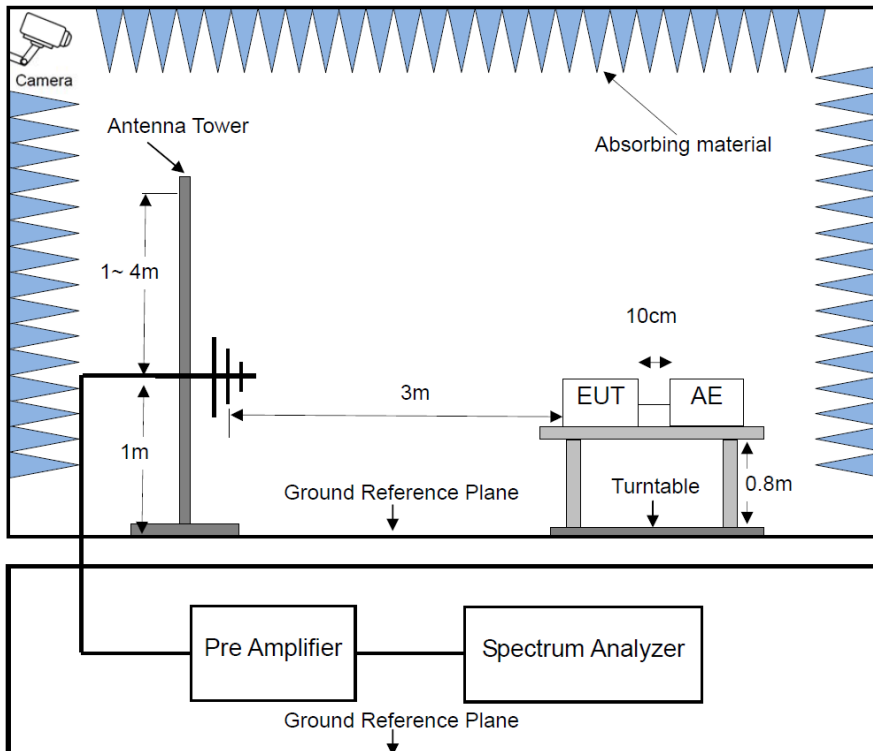
Below 1GHz:

Frequency (MHz)	<input type="checkbox"/> Category C1		<input checked="" type="checkbox"/> Category C2	
	Quasi-peak dB(uV/m)		Quasi-peak dB(uV/m)	
	At 3m	At 10m	At 3m	At 10m
30 to 230	40	30	50	40
230 to 1000	47	37	57	47

Note 1. The lower limit shall apply at the transition frequency.

BLOCKDIAGRAM OF TEST SETUP

Below 1GHz:



TEST PROCEDURES

- a. The EUT was placed on a rotatable wooden table top 0.8m above ground.
- b. The EUT was set 3m away from the receiving antenna which was mounted on the top of a variable height antenna tower.
- c. Configure the EUT and support devices as per section 3.
- d. All I/O cables and support devices were positioned as per EN IEC 62040-2.
- e. Connect mains power port of the EUT to the outlet socket under the turntable and connect all other support devices to other outlet socket under the turntable.
- f. Turn on the EUT and all support devices, and make it run stably.
- g. Set the detector and measurement bandwidth of test-receiver system as per CISPR 16-1-1.
- h. Scan the frequency range from 30MHz to 1000MHz for radiation emissions checking.
- i. Emissions were scanned and measured rotating the EUT from 0 to 360 degrees and positioning the antenna from 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- j. Repeat the above scans in each mode and channel and record the test data.

TEST RESULTS

PASS

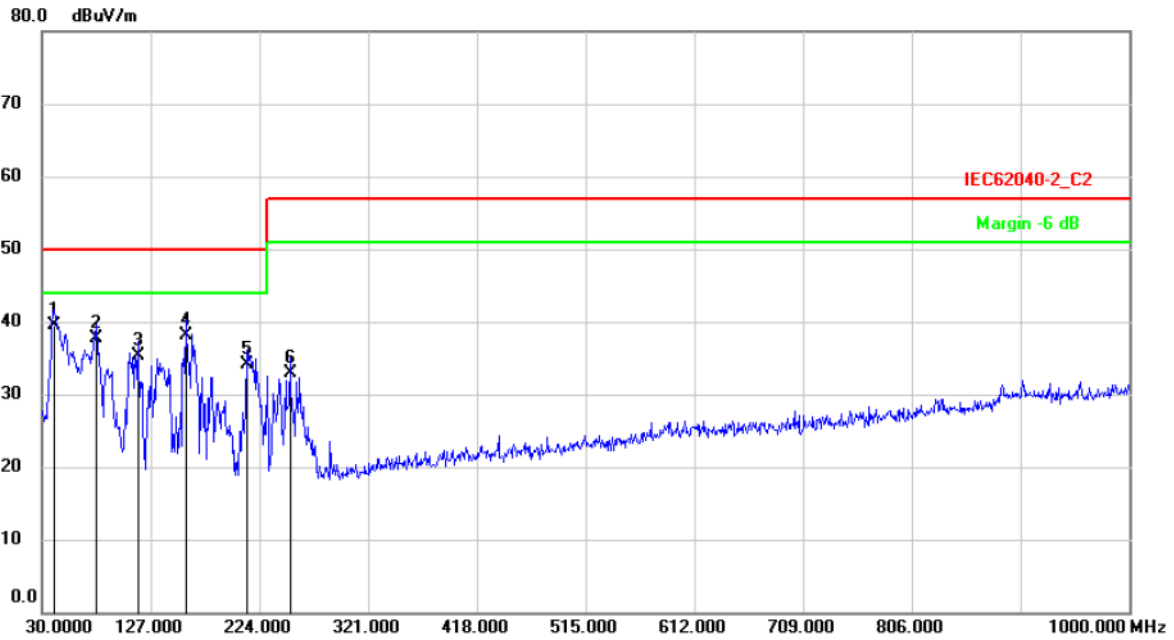
Please refer to the following pages of the worst case.

M/N: 2000VA	Testing Voltage: AC 230V / 50Hz
Polarization: Horizontal	Detector: QP
Test Mode: 2	Distance: 3m

Radiated Emission Measurement

Date: 2023/3/13

Time: 15:13:19



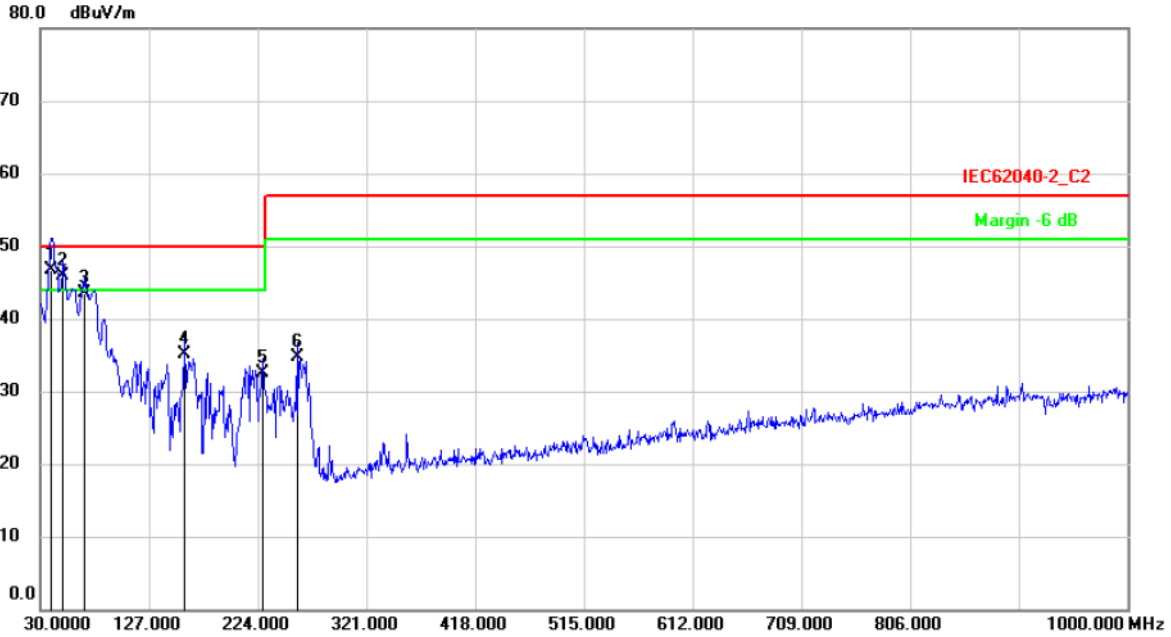
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	*	40.6699	47.44	-7.84	39.60	50.00	-10.40	QP	
2		78.5000	49.66	-11.96	37.70	50.00	-12.30	QP	
3		115.3600	43.71	-8.41	35.30	50.00	-14.70	QP	
4		158.0399	48.73	-10.53	38.20	50.00	-11.80	QP	
5		212.3600	41.66	-7.56	34.10	50.00	-15.90	QP	
6		251.1600	39.34	-6.34	33.00	57.00	-24.00	QP	

M/N: 2000VA	Testing Voltage: AC 230V / 50Hz
Polarization: Vertical	Detector: QP
Test Mode: 2	Distance: 3m

Radiated Emission Measurement

Date: 2023/3/13

Time: 15:18:44



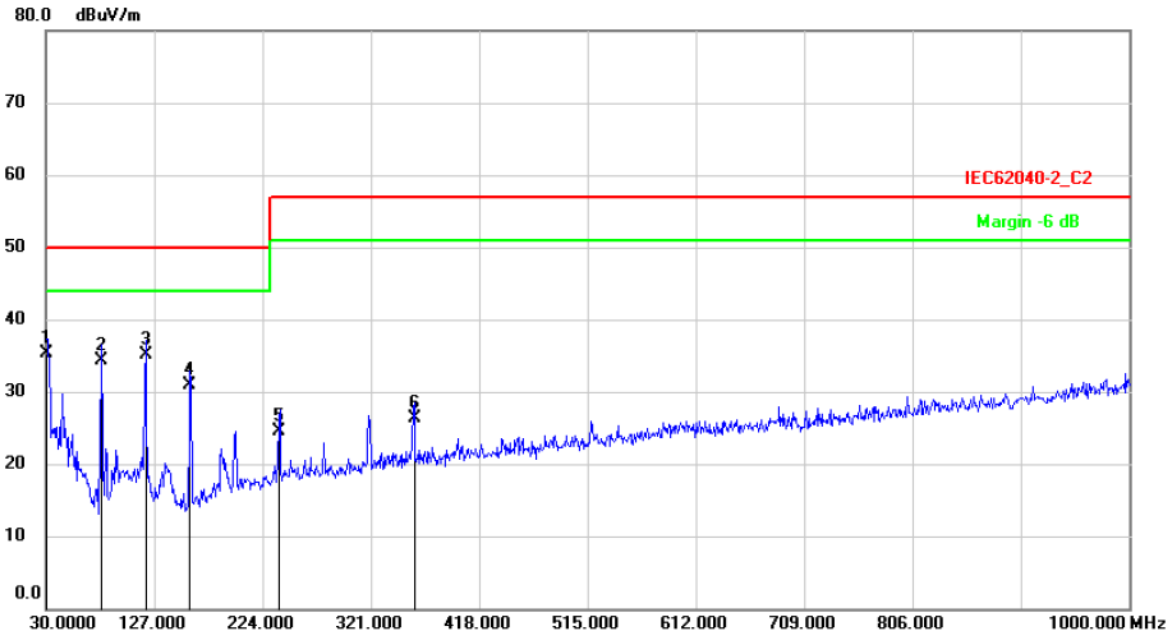
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	*	39.7000	54.63	-7.93	46.70	50.00	-3.30	QP	
2	!	50.3700	52.97	-6.97	46.00	50.00	-4.00	QP	
3		69.7699	54.07	-10.47	43.60	50.00	-6.40	QP	
4		159.0100	46.28	-11.08	35.20	50.00	-14.80	QP	
5		227.8800	40.56	-8.06	32.50	50.00	-17.50	QP	
6		258.9200	41.89	-7.19	34.70	57.00	-22.30	QP	

M/N: 1200VA	Testing Voltage: AC 230V / 50Hz
Polarization: Horizontal	Detector: QP
Test Mode: 2	Distance: 3m

Radiated Emission Measurement

Date: 2023/3/13

Time: 16:30:20



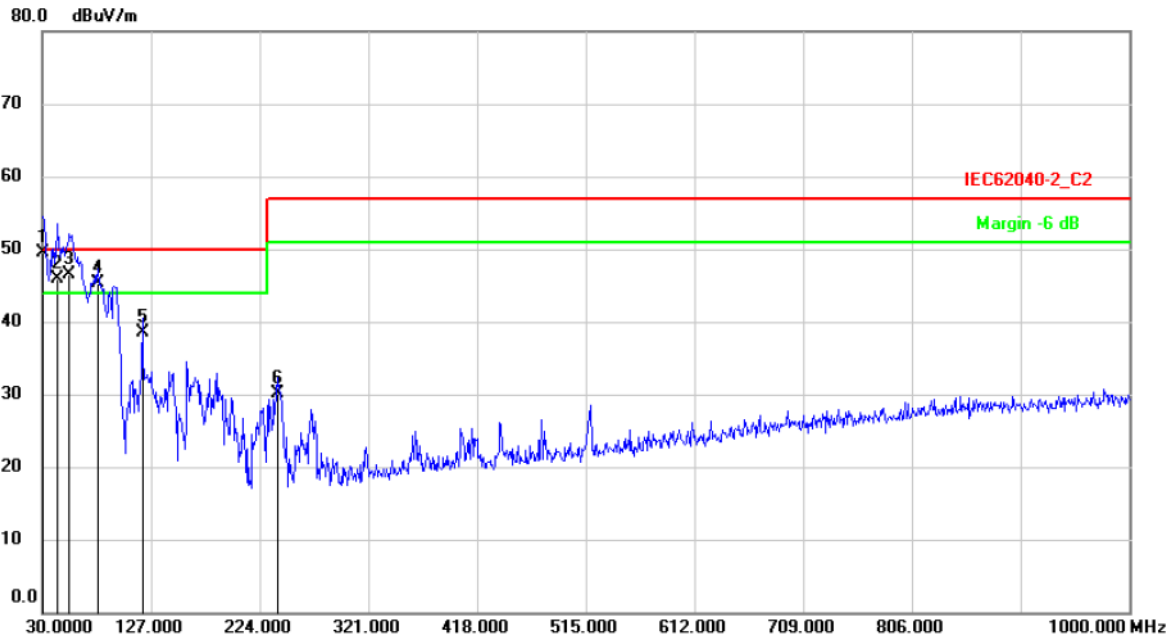
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	*	30.9700	45.09	-9.79	35.30	50.00	-14.70	QP	
2		79.4700	46.23	-11.83	34.40	50.00	-15.60	QP	
3		119.2400	44.47	-9.27	35.20	50.00	-14.80	QP	
4		159.0100	41.39	-10.49	30.90	50.00	-19.10	QP	
5		238.5500	31.28	-6.68	24.60	57.00	-32.40	QP	
6		359.8000	30.41	-4.01	26.40	57.00	-30.60	QP	

M/N: 1200VA	Testing Voltage: AC 230V / 50Hz
Polarization: Vertical	Detector: QP
Test Mode: 2	Distance: 3m

Radiated Emission Measurement

Date: 2023/3/13

Time: 16:35:54



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	*	30.9700	59.75	-10.15	49.60	50.00	-0.40	QP	
2	!	43.5800	53.56	-7.66	45.90	50.00	-4.10	QP	
3	!	54.2500	54.14	-7.64	46.50	50.00	-3.50	QP	
4	!	79.4700	57.69	-12.29	45.40	50.00	-4.60	QP	
5		119.2400	49.55	-11.05	38.50	50.00	-11.50	QP	
6		239.5200	37.85	-7.65	30.20	57.00	-26.80	QP	

13. Harmonic Current Emission Measurement

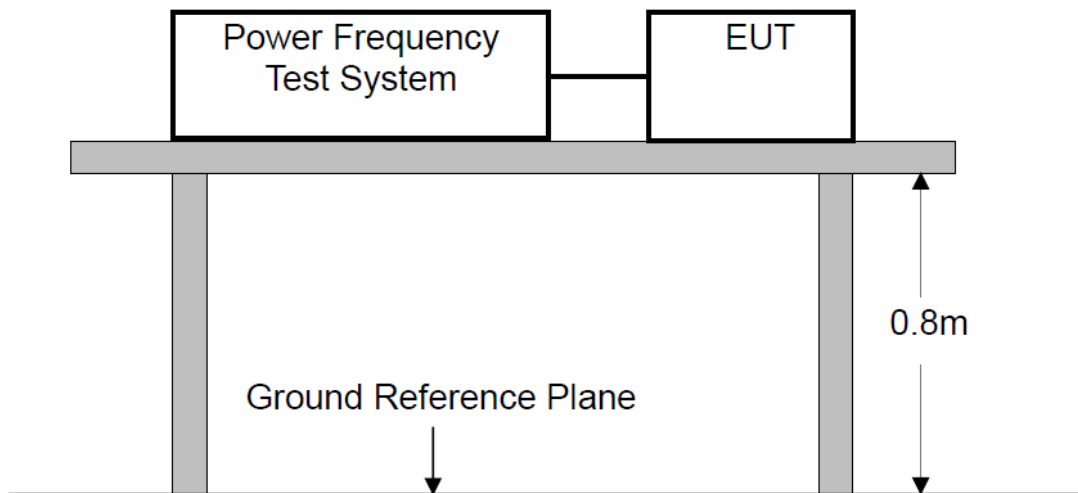
LIMITS

Limit of Harmonic Current Emission

Limits for Class A equipment		Limits for Class D equipment		
Harmonics order h	Maximum permissible harmonics Current A	Harmonics order n	Maximum permissible harmonics current per watt mA/W	Maximum permissible harmonics current A
Odd harmonics		-	-	-
3	2.30	3	3.4	2.30
5	1.14	5	1.9	1.14
7	0.77	7	1.0	0.77
9	0.40	9	0.5	0.40
11	0.33	11	0.35	0.33
13	0.21	13	-	-
15 ≤ h ≤ 39	0.15 × 15/h	15 ≤ h ≤ 39	3.85/h	0.15 × 15/h
Even harmonics		-	-	-
2	1.08	-	-	-
4	0.43	-	-	-
6	0.30	-	-	-
8 ≤ h ≤ 40	0.23 × 8/h	-	-	-

Note: The limits above are not specified for equipment with a rated input power of 75W or less (other than lighting equipment).

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

- a. The EUT was placed on a wooden table 0.8m above ground.
- b. Configure the EUT and support devices as per section 3.
- c. Turn on the EUT and all support devices, and make it run stably.
- d. Set the EUT to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.
- e. Classify the EUT as follows:
 - Class A: Balanced three-phase equipment, Household appliances excluding equipment as Class D, Tools excluding portable tools, Dimmers for incandescent lamps, audio equipment, equipment not specified in one of the three other classes.
 - Class B: Portable tools; Arc welding equipment which is not professional equipment.
 - Class C: Lighting equipment.
 - Class D: Equipment having a specified power less than or equal to 600W of the Personal computers and personal computer monitors and television receivers
- f. Set correspondent test program and measurement time of the test system to measure the current harmonics emanated from EUT, and then record the test data.

TEST RESULTS

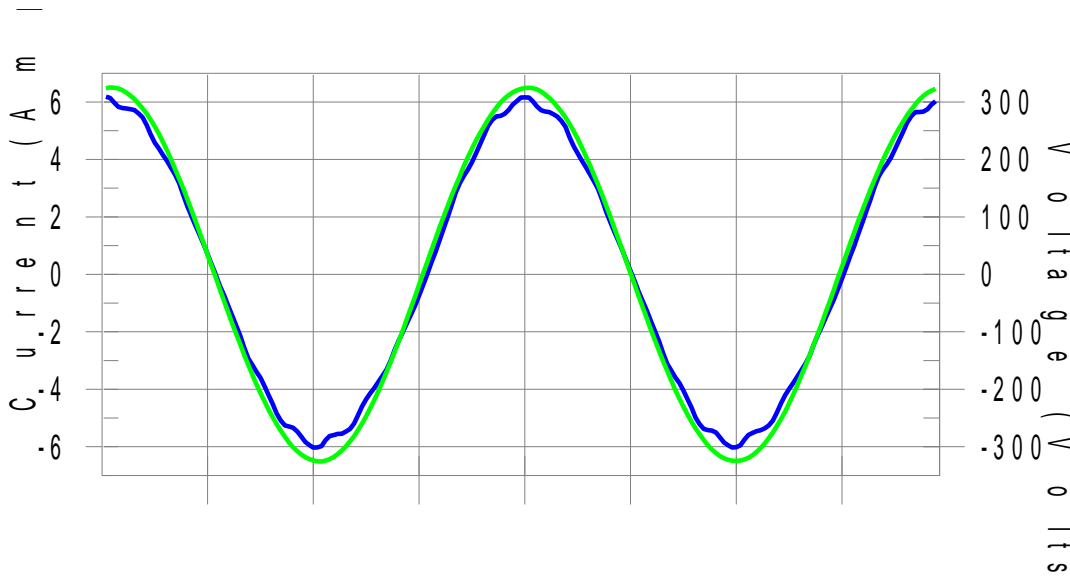
PASS

Please refer to the following pages.

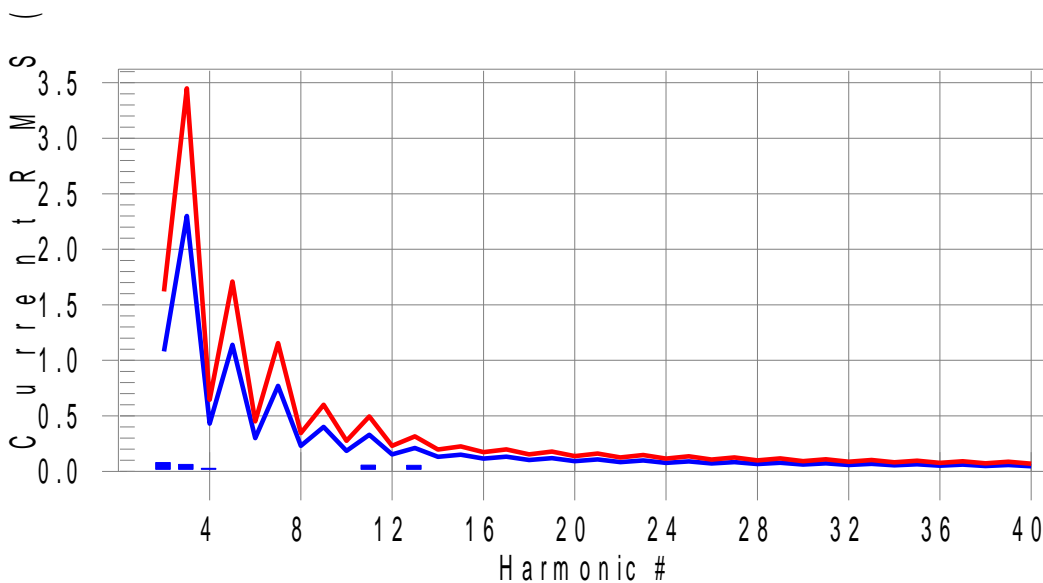
Harmonics – Class-A per IEC 61000-3-2 (Run time) incl. inter-harmonics

EUT: Uninterruptible Power Supply
 Test category: Class-A (European limits)
 Test date: 2023/2/13 Start time: 9:32:11
 Test duration (min): 2.5 Data file name: H-000052.cts_data
 Comment: Normal operation mode
 Customer: TECHFINE
 M/N: 2000VA
 Test Result: Pass Source qualification: Normal

Current & voltage waveforms



Harmonics and Class A limit line European Limits



Test result: Pass Worst harmonics H13-17.8% of 150% limit, H13-26.1% of 100% limit

Current Test Result Summary (Run time)

EUT: Uninterruptible Power Supply Tested by: Chris
Test category: Class-A (European limits) Test Margin: 100
Test date: 2023/2/13 Start time: 9:32:11 End time: 9:34:52
Test duration (min): 2.5 Data file name: H-000052.cts_data
Comment: Normal operation mode
Customer: TECHFINE
M/N: 2000VA
Test Result: Pass Source qualification: Normal
THC(A): 0.134 I-THD(%): 3.2 POHC(A): 0.015 POHC Limit(A): 0.251

Highest parameter values during test:

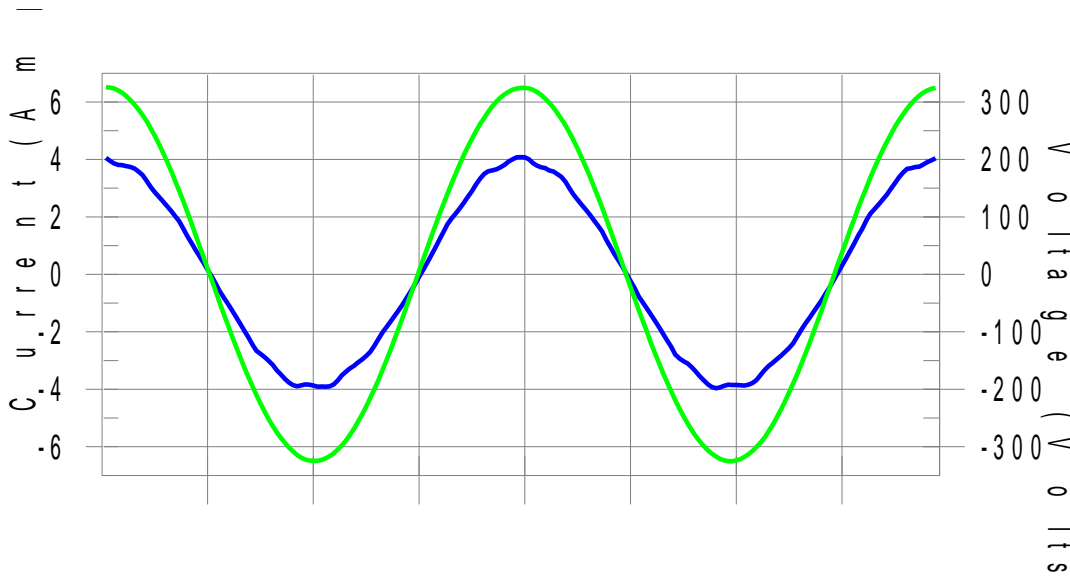
V_RMS (Volts): 230.02	Frequency(Hz): 50.00
I_Peak (Amps): 6.222	I_RMS (Amps): 4.218
I_Fund (Amps): 4.216	Crest Factor: 1.480
Power (Watts): 969.5	Power Factor: 0.999

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.079	1.080	7.3	0.080	1.620	5.0	Pass
3	0.063	2.300	2.7	0.064	3.450	1.9	Pass
4	0.026	0.430	6.1	0.027	0.645	4.2	Pass
5	0.011	1.140	N/A	0.012	1.710	N/A	Pass
6	0.008	0.300	N/A	0.009	0.450	N/A	Pass
7	0.010	0.770	N/A	0.011	1.155	N/A	Pass
8	0.005	0.230	N/A	0.006	0.345	N/A	Pass
9	0.008	0.400	N/A	0.008	0.600	N/A	Pass
10	0.005	0.184	N/A	0.008	0.276	N/A	Pass
11	0.057	0.330	17.3	0.058	0.495	11.8	Pass
12	0.005	0.153	N/A	0.010	0.230	N/A	Pass
13	0.055	0.210	26.1	0.056	0.315	17.8	Pass
14	0.006	0.131	N/A	0.010	0.197	N/A	Pass
15	0.010	0.150	N/A	0.011	0.225	N/A	Pass
16	0.002	0.115	N/A	0.003	0.173	N/A	Pass
17	0.004	0.132	N/A	0.004	0.198	N/A	Pass
18	0.001	0.102	N/A	0.002	0.153	N/A	Pass
19	0.003	0.118	N/A	0.003	0.178	N/A	Pass
20	0.001	0.092	N/A	0.002	0.138	N/A	Pass
21	0.004	0.107	N/A	0.004	0.161	N/A	Pass
22	0.001	0.084	N/A	0.002	0.125	N/A	Pass
23	0.010	0.098	N/A	0.010	0.147	N/A	Pass
24	0.001	0.077	N/A	0.002	0.115	N/A	Pass
25	0.009	0.090	N/A	0.009	0.135	N/A	Pass
26	0.001	0.071	N/A	0.002	0.107	N/A	Pass
27	0.004	0.083	N/A	0.004	0.125	N/A	Pass
28	0.001	0.066	N/A	0.001	0.099	N/A	Pass
29	0.002	0.078	N/A	0.002	0.116	N/A	Pass
30	0.001	0.061	N/A	0.001	0.092	N/A	Pass
31	0.001	0.073	N/A	0.001	0.109	N/A	Pass
32	0.001	0.058	N/A	0.001	0.086	N/A	Pass
33	0.002	0.068	N/A	0.002	0.102	N/A	Pass
34	0.001	0.054	N/A	0.001	0.081	N/A	Pass
35	0.002	0.064	N/A	0.002	0.096	N/A	Pass
36	0.001	0.051	N/A	0.001	0.077	N/A	Pass
37	0.001	0.061	N/A	0.002	0.091	N/A	Pass
38	0.001	0.048	N/A	0.001	0.073	N/A	Pass
39	0.002	0.058	N/A	0.002	0.087	N/A	Pass
40	0.001	0.046	N/A	0.001	0.069	N/A	Pass

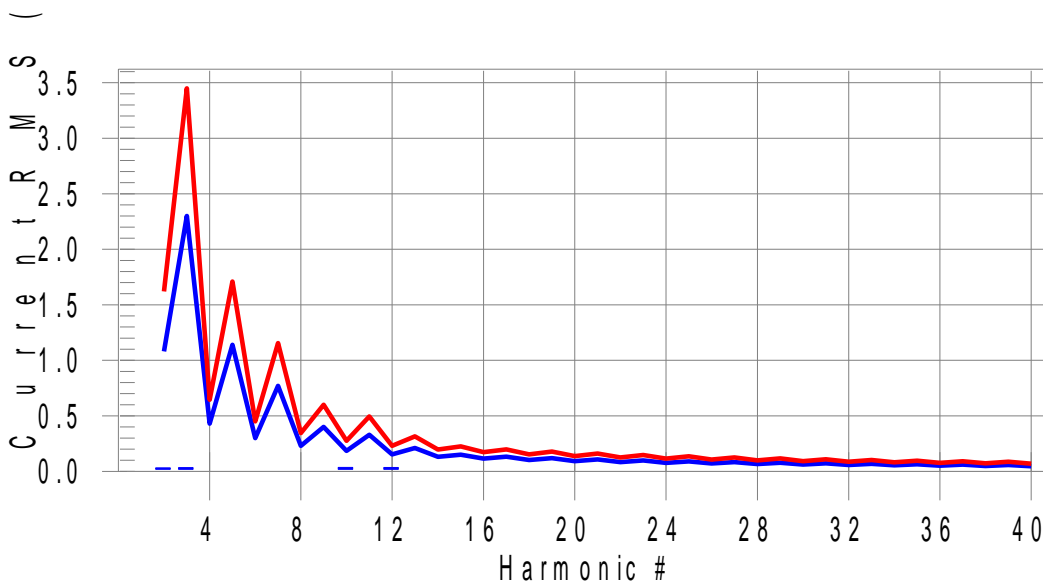
Harmonics – Class-A per IEC 61000-3-2 (Run time) incl. inter-harmonics

EUT: Uninterruptible Power Supply
 Test category: Class-A (European limits)
 Test date: 2023/2/13 Start time: 9:57:03
 Test duration (min): 2.5 Data file name: H-000054.cts_data
 Comment: Normal operation mode
 Customer: TECHFINE
 M/N: 1200VA
 Test Result: Pass Source qualification: Normal

Current & voltage waveforms



Harmonics and Class A limit line European Limits



Test result: Pass Worst harmonics H12-15.5% of 150% limit, H12-22.7% of 100% limit

Current Test Result Summary (Run time)

EUT: Uninterruptible Power Supply Tested by: Chris
Test category: Class-A (European limits) Test Margin: 100
Test date: 2023/2/13 Start time: 9:57:03 End time: 9:59:44
Test duration (min): 2.5 Data file name: H-000054.cts_data
Comment: Normal operation mode
Customer: TECHFINE
M/N: 1200VA
Test Result: Pass Source qualification: Normal
THC(A): 0.071 I-THD(%): 2.5 POHC(A): 0.009 POHC Limit(A): 0.251

Highest parameter values during test:

V_RMS (Volts): 230.05	Frequency(Hz): 50.00
I_Peak (Amps): 4.130	I_RMS (Amps): 2.812
I_Fund (Amps): 2.811	Crest Factor: 1.469
Power (Watts): 646.6	Power Factor: 1.000

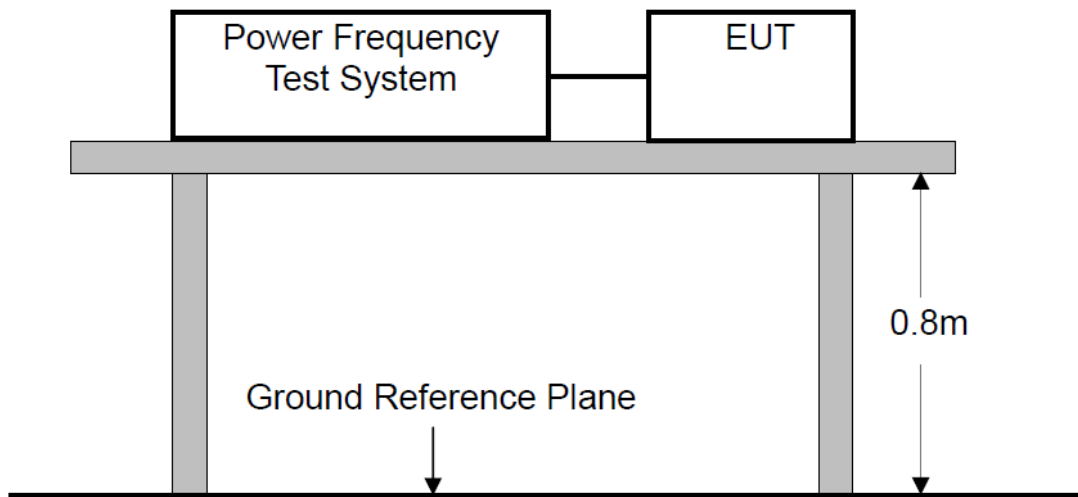
Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.032	1.080	2.9	0.033	1.620	2.0	Pass
3	0.034	2.300	1.5	0.035	3.450	1.0	Pass
4	0.012	0.430	N/A	0.012	0.645	N/A	Pass
5	0.006	1.140	N/A	0.006	1.710	N/A	Pass
6	0.003	0.300	N/A	0.004	0.450	N/A	Pass
7	0.004	0.770	N/A	0.005	1.155	N/A	Pass
8	0.004	0.230	N/A	0.005	0.345	N/A	Pass
9	0.005	0.400	N/A	0.007	0.600	N/A	Pass
10	0.036	0.184	19.6	0.037	0.276	13.4	Pass
11	0.004	0.330	N/A	0.007	0.495	N/A	Pass
12	0.035	0.153	22.7	0.036	0.230	15.5	Pass
13	0.003	0.210	N/A	0.005	0.315	N/A	Pass
14	0.005	0.131	N/A	0.006	0.197	N/A	Pass
15	0.002	0.150	N/A	0.002	0.225	N/A	Pass
16	0.002	0.115	N/A	0.003	0.173	N/A	Pass
17	0.001	0.132	N/A	0.002	0.198	N/A	Pass
18	0.001	0.102	N/A	0.002	0.153	N/A	Pass
19	0.002	0.118	N/A	0.003	0.178	N/A	Pass
20	0.001	0.092	N/A	0.004	0.138	N/A	Pass
21	0.006	0.107	N/A	0.007	0.161	N/A	Pass
22	0.001	0.084	N/A	0.003	0.125	N/A	Pass
23	0.006	0.098	N/A	0.006	0.147	N/A	Pass
24	0.001	0.077	N/A	0.002	0.115	N/A	Pass
25	0.003	0.090	N/A	0.003	0.135	N/A	Pass
26	0.001	0.071	N/A	0.001	0.107	N/A	Pass
27	0.001	0.083	N/A	0.001	0.125	N/A	Pass
28	0.001	0.066	N/A	0.001	0.099	N/A	Pass
29	0.001	0.078	N/A	0.001	0.116	N/A	Pass
30	0.001	0.061	N/A	0.001	0.092	N/A	Pass
31	0.001	0.073	N/A	0.001	0.109	N/A	Pass
32	0.001	0.058	N/A	0.001	0.086	N/A	Pass
33	0.001	0.068	N/A	0.001	0.102	N/A	Pass
34	0.001	0.054	N/A	0.001	0.081	N/A	Pass
35	0.001	0.064	N/A	0.001	0.096	N/A	Pass
36	0.001	0.051	N/A	0.001	0.077	N/A	Pass
37	0.001	0.061	N/A	0.001	0.091	N/A	Pass
38	0.001	0.048	N/A	0.001	0.073	N/A	Pass
39	0.001	0.058	N/A	0.001	0.087	N/A	Pass
40	0.001	0.046	N/A	0.001	0.069	N/A	Pass

14. Voltage Fluctuations & Flicker Measurement

LIMIT

Test Item	Limit	Remarks
P_{st}	1.0	P_{st} = Short-term flicker indicator
P_{lt}	0.65	P_{lt} = Long-term flicker indicator
T_{dt}	500ms	T_{dt} = Maximum accumulated time that dt with a deviation exceeding 3,3 %
$d_{max}(\%)$	4%	d_{max} = Maximum relative voltage change
$d_c(\%)$	3.3%	d_c = Maximum relative steady-state voltage change

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURE

- a. The EUT was placed on a wooden table 0.8m above ground.
- b. Configure the EUT and support devices as per section 3.
- c. Turn on the EUT and all support devices, and make it run stably.
- d. Set the EUT to produce the most unfavorable sequence of voltage changes under normal operating conditions.
- e. Set correspondent test program and measurement time of the test system to measure the most unfavorable sequence of voltage changes from EUT, and then record the test data.

TEST RESULTS

PASS

Please refer to the following page.

15. Performance Criteria for Immunity

The performance criteria are referred to the test standard: EN IEC 62040-2

Performance criteria for immunity tests

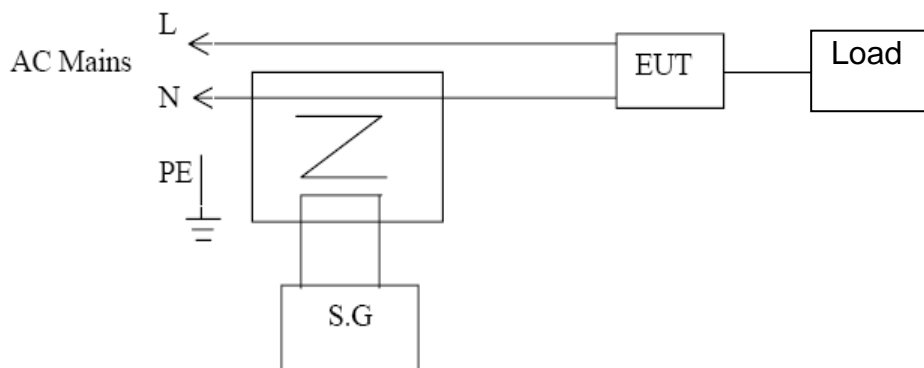
---	Criterion A	Criterion B
External and internal indications and metering	Change only during test	Change only during test
Control signals to external devices	No change	Change only temporarily in consistency with the actual Uninterruptible Power Supply mode of operation
Mode of operation	No change	Change only temporarily

16. Low Frequency signals measurement

TEST LEVEL

Disturbing voltage (rms) V	Single-phase (rms) V	Single-phase (rms) V
10	10	10

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

- The EUT was placed on a wooden table 0.8m height from the metal ground plan.
- Configure the EUT and support devices as per section 3.
- Turn on the EUT and all support devices, and make it run stably.
- For input AC power port of the EUT, the EUT was injection to the AC power cables(L or N) by using a signal generator device, and at a single sinusoidal disturbing voltage of 10V.
- Repeat the above steps in each mode and record the test result.

TEST RESULTS

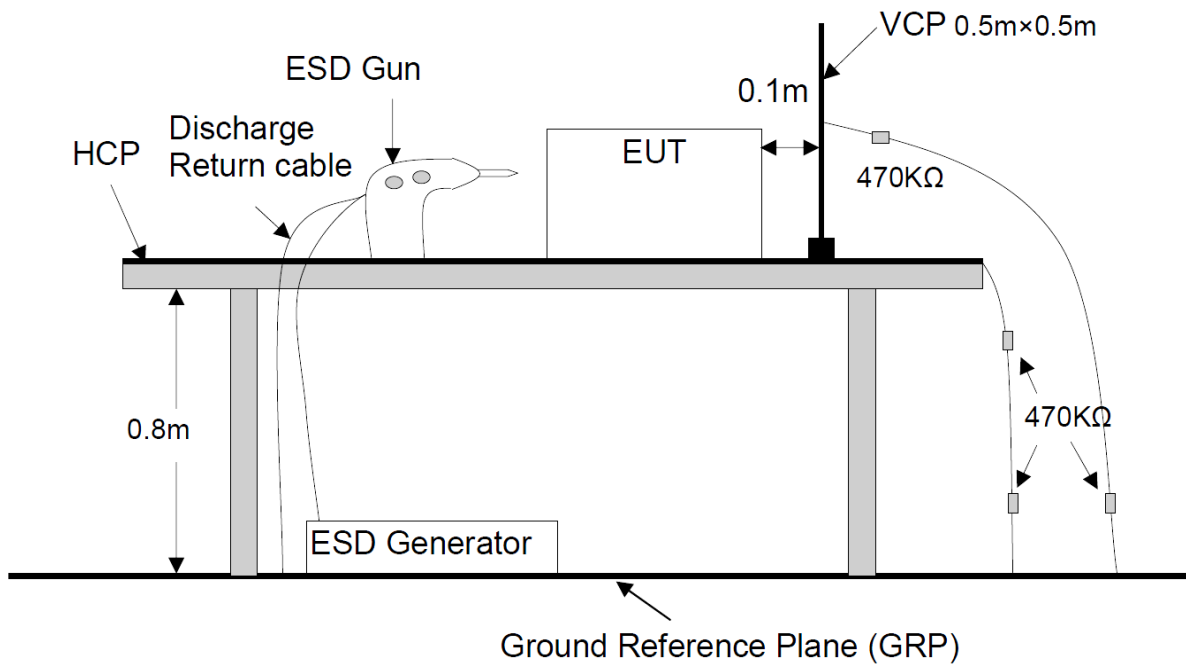
Not Applicable.

17. Electrostatic Discharge Measurement

TEST LEVEL

Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1	±2.0	±2.0
2	±4.0	±4.0
3	±6.0	±8.0
4	±8.0	±15.0
X	Special	Special
Note:	"x" is an open level.	

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

Air Discharge:

Air discharges at slots and apertures and insulating surfaces. On those parts of the EUT where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur. Such points are tested using the air discharge method. This investigation should be restricted to those area normally handled by the user. A minimum of 10 single air discharges shall be applied to the selected test point for each such area.

Contact Discharge:

Contact discharges to the conductive surfaces and coupling planes. The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points shall be subjected to at least 20 indirect discharges to the center of the front edge of the Horizontal Coupling Plane (HCP). The remaining three test points shall each receive at least 20 direct contact discharges. If no direct contact test points are available, then at least 200 indirect discharges shall be applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.

- a. The EUT was placed on a wooden table 0.8m height from the ground.
- b. The EUT was located 0.1m minimum from all side of the HCP (dimensions 1.6m x0.8m).
- c. Configure the EUT and support devices as per section 3.
- d. The support units were located 30cm away from the EUT, but direct support unit was/were located at same location as EUT on the HCP and keep at a distance of 10cm with EUT.
- e. Turn on the EUT and all support devices, and make it run stably.
- f. The time interval between two successive single discharges was at least 1 second. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- g. Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.

- h. At least ten single discharges (in the most sensitive polarity) were applied at the front edge of each HCP opposite the center point of each unit of the EUT and 0.1 meters from the front of the EUT. The long axis of the discharge electrode was in the plane of the HCP and perpendicular to its front edge during the discharges.
- i. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane (VCP) in sufficiently different positions that the four faces of the EUT were completely illuminated. The VCP (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the EUT.
- j. Repeat the above steps in each mode and record the test result.

MINIMUM REQUIREMENT:

Description	Level	Performance Criterion
Contact Discharge	±4.0KV	B
Air Discharge	±8.0KV	B

TEST RESULT

PASS

Please refer to the following pages.

Electrostatic Discharge Test Results

Ambient Condition:	Temp.: 22°C	R.H.: 55%	Air Pressure : 101 kPa
Test Specifications	Test level:	±2, 4 KV for Contact Discharge ±2, 4, 8 KV for Air Discharge	
	Discharge impedance:	330ohm / 150pF	
	NO. of discharges:	10 times at each test point for each polarity at least	
	Polarity:	Positive / Negative	
	Discharge mode:	Single	
	Interval time of discharges:	≥1s	
Required Performance Criterion	B		
Tested mode	1-2		
Test Point	Kind A-Air Discharge C-Contact Discharge	Result (Performance Criterion)	
Surface of EUT	A/C	A	
Metal, Screw	C	A	
AC Out port, Button, Screen	A	A	
Indirect Discharge (VCP)	C	A	
Indirect Discharge (HCP)	C	A	
<p>Note: 1. A: During the test, the EUT did not show any abnormality. 2. For the two models, the test results are the same.</p>			

ESD TEST POINT

(★ Air Discharge; ☆ Contact Discharge)



18. Continuous RF Electromagnetic Field Disturbances Measurement

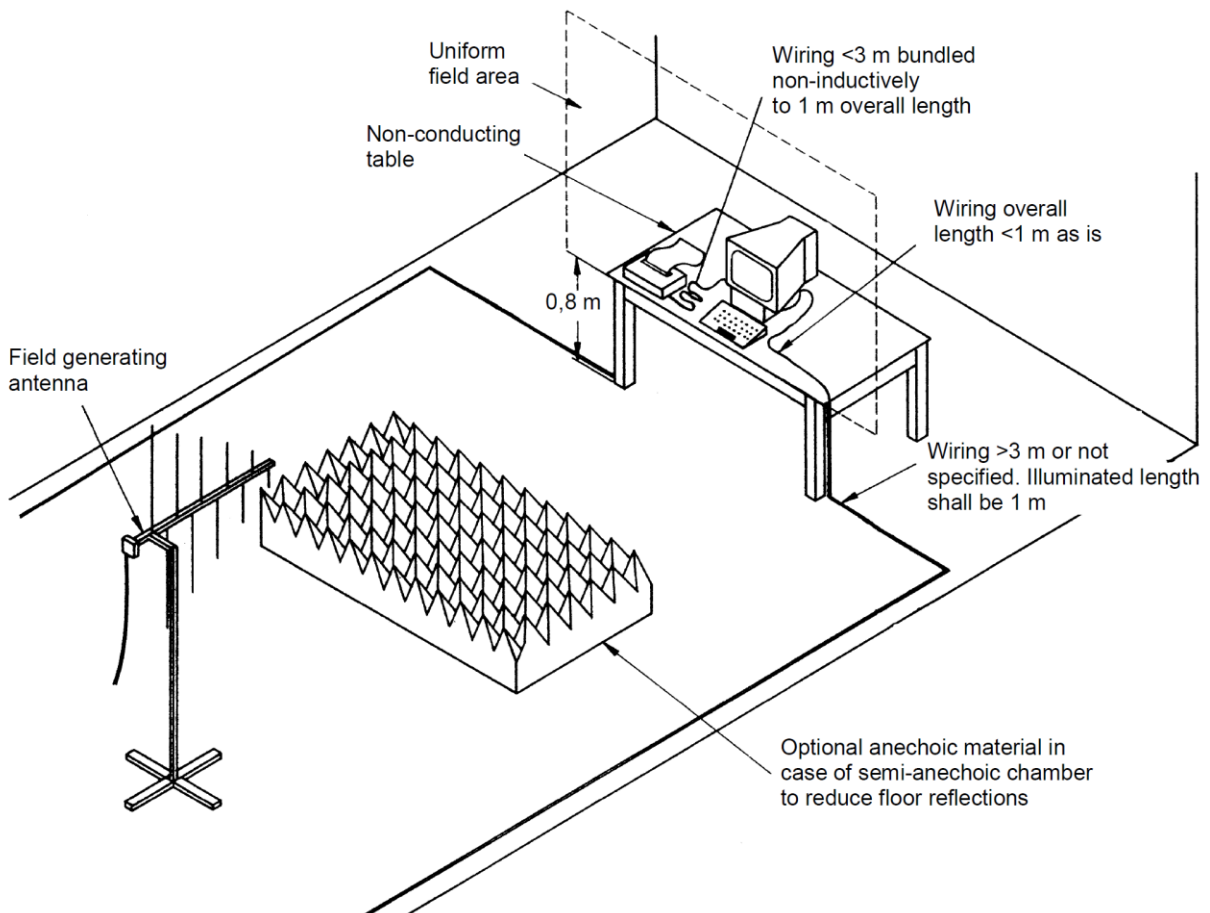
TEST LEVEL

Level	Field Strength V/m
1	1
2	3
3	10
X*	Special

Note: "x" is an open test level and the associated field strength may be any value.

BLOCK DIAGRAM OF TEST SETUP

Normal Test:



TEST PROCEDURES

- a. The testing was performed in a fully anechoic chamber.
- b. The EUT and necessary support devices were placed on a turn table which is 0.8 meter above ground.
- c. EUT was set 3 meters away from the transmitting antenna which is mounted on an antenna tower.
- d. Configure the EUT and support devices as per section 3.
- e. Turn on the EUT and all support devices, and make it run stably.
- f. Set horizontal and vertical polarization of the antenna to test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually.
- g. All the scanning conditions are as follows:
- h. Repeat the above steps in each mode and record the test result.

MINIMUM REQUIREMENT

Description	Level	Frequency	Performance Criterion
RF Field Strength Susceptibility	10V/m	80~1000MHz	A

TEST RESULTS

PASS

Please refer to the following page.

RF Field Strength Susceptibility Test Results				
Ambient Condition	Temp.: 23°C	R.H.: 53%	Air Pressure: 105 kPa	
Test Specifications	Fielded Strength:	10V/m		
	Modulation:	1kHz sine wave, 80%AM		
	Frequency Size:	1% of preceding frequency value		
	Dwell Time:	1s		
	Mode:	Swept test		
Required Performance Criterion	A			
Tested mode	1-2			
Frequency (MHz)	Level (V/m)	Antenna polarity	Side	Result (Performance Criterion)
80-1000	10	Horizontal	Front	A
			Left	A
			Right	A
			Back	A
		Vertical	Front	A
			Left	A
			Right	A
			Back	A
Note: 1. A: During the test, the EUT did not show any abnormality. 2. For the two models, the test results are the same.				

19. Electrical Fast Transient/Burst Measurement

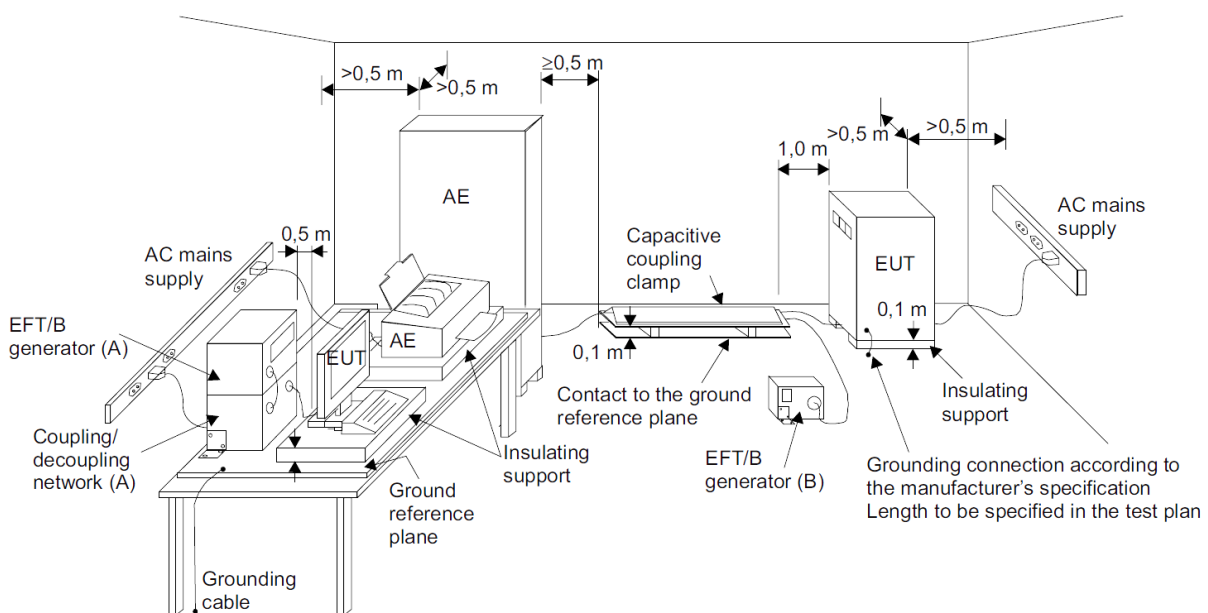
TEST LEVEL

Open circuit output test voltage and repetition rate of the impulses				
Level	On AC input/output power ports, DC port		DC interface port, Network ports	
	Voltage peak (KV)	Repetition rate (KHz)	Voltage peak (KV)	Repetition rate (KHz)
1	0.5	5 or 100	0.25	5 or 100
2	1	5 or 100	0.5	5 or 100
3	2	5 or 100	1	5 or 100
4	4	5 or 100	2	5 or 100
X	Special	Special	Special	Special

Note

1. The use of 5 KHz repetition rates is traditional; however, 100 KHz is closer to reality. Product committees should determine which frequencies are relevant for specific products or product types.
2. With some products, there may be no clear distinction, between power ports and I/O ports, in which case it is up to product committees to make this determination for test purposes.
3. "X" is an open level. The level has to be specified in the dedicated equipment specification.

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

- f. The EUT was placed on the insulating support 0.8m above the reference ground plane.
- g. Configure the EUT and support devices as per section 3.
- h. Turn on the EUT and all support devices, and make it run stably.
- i. For input and output AC power port of the EUT, the EUT was connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines. The coaxial output of the EFT generator to the terminals on the EUT should not exceed 0.5 meter. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 minutes.
- j. For signal ports of the EUT, the EUT was connected to the power mains, and the signal line through a coupling device which couples the EUT interference signal to signal line. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 minutes.
- k. Repeat the above steps in each mode and record the test result.

MINIMUM REQUIREMENT

Description	AC input/output power ports	Network ports
Test Level	2.0KV	2.0KV
Repetition frequency	5kHz	5kHz
Impulse Wave-shape	5/50ns (Tr/Th)	5/50ns (Tr/Th)
Performance Criterion	B	B

TEST RESULTS

PASS

Please refer to the following page.

(The AC output port of this test item was carried out on Shenzhen Nore Testing Center Co., Ltd)

Electrical Fast Transient/Burst Test Results

Ambient Condition	Temp.: 23°C	R.H.: 50%	Air Pressure: 101 kPa
Test Specifications	Test Level:	±2kv for AC input/output power ports ±2kv for network ports	
	Repetition Frequency:	5kHz;	
	Duration:	15ms	
	Period:	300ms	
	Impulse wave shape:	5/50ns (Tr/Th)	
	Test Duration:	≥1min	
Required Performance Criterion	B		
Test mode	1		
Coupling mode and port	<input checked="" type="checkbox"/> AC Mains <input checked="" type="checkbox"/> Direct Coupling <input type="checkbox"/> Control line <input type="checkbox"/> Capacitive <input type="checkbox"/> DC line <input type="checkbox"/> Signal line		
Test Line (Input/Output ports)	Test Voltage	Result (Performance Criterion)	
L	±2KV	A	
N	±2KV	A	
PE	±2KV	A	
L、N	±2KV	A	
L、PE	±2KV	A	
N、PE	±2KV	A	
L、N、PE	±2KV	A	
AC Output port	±2KV	A	

Note : 1. A: During the test, the EUT did not show any abnormality.
 2. For the two models, the test results are the same.

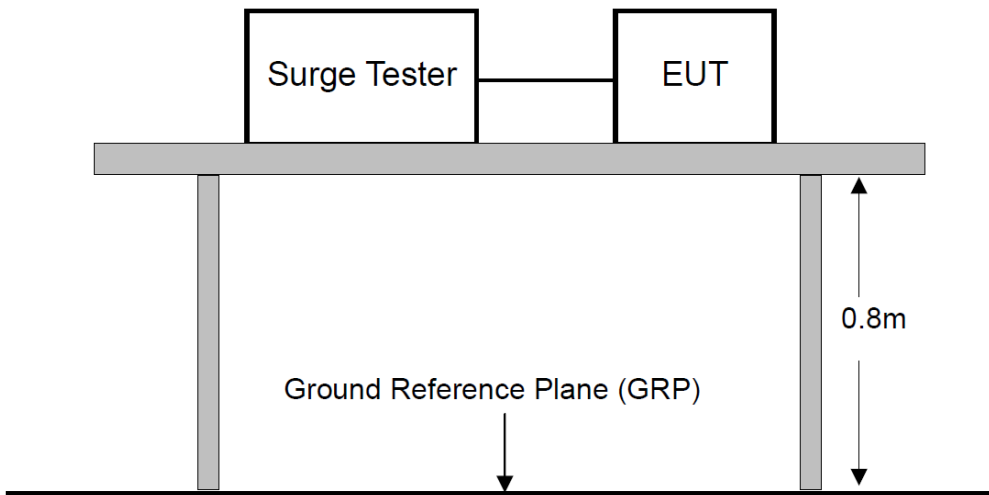
20. Surge Measurement

TEST LEVEL

Level	Open-Circuit Test Voltage (kV)	
	AC input/output power ports, DC port	
	Line to Line	Line to Earth
1	-	0.5
2	0.5	1
3	1	2
4	2	4
X	Special	Special

Note: "X" can be any level, above, below or in between the others. The level shall be specified in the dedicated equipment specification.

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

- a. The EUT was placed on the wooden table 0.8m above the ground.
- b. Configure the EUT and support devices as per section 3.
- c. Turn on the EUT and all support devices, and make it run stably.
- d. The surge is applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.
- e. For test applied to unshielded un-symmetrically operated interconnection lines of EUT, the surge was applied to the lines via the capacitive coupling. The coupling / decoupling networks didn't influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.
- f. For test applied to unshielded symmetrically operated interconnection / telecommunication lines of EUT, the surge was applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor were not specified. The interconnection line between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.
- g. Five positive and five negative (polarity) pulses at specified phase angles with a 1min repetition rate are conducted during test.
- h. Repeat the above steps in each mode and record the test result.

MINIMUM REQUIREMENT

Description	AC input/output power ports	
	Line to Line	Line to Earth
Test Level	1.0kV	2.0kV
Wave-Shape	1.2/50(8/20)us	1.2/50(8/20)us
Performance Criterion	B	B

Note: *: Surges are applied with primary protection fitted. Where possible, use the actual primary protector intended to be used in the installation. Where the surge coupling network for the 10/700 (5/320) μ s waveform affects the functioning of high speed data ports, the test shall be carried out using a 1,2/50 (8/20)us waveform and appropriate coupling network.

TEST RESULTS

PASS

Please refer to the following page.

(The AC output port of this test item was carried out on Shenzhen Nore Testing Center Co., Ltd)

Surge Immunity Test Results

Ambient Condition	Temp.: 23°C	R.H.: 48%	Air Pressure: 101 kPa
Test Specifications	Wave-shape:	1.2/50 us (Tr/Th) / 8/20 us (Tr/Th) for input/output power port	
	Test Level:	±1.0kV for Line to Line ±2.0kV for Line to Earth	
	Phase angle:	0°, 180°, 90° and 270°	
	Polarity:	Positive / Negative	
	NO. of pulse:	5 positive / 5 negative	
	Pulse repetition rate:	1 time per minute / maximum	
	Generator source impedance:	2 ohm / power supply network 12 ohm / power supply network to ground 42 ohm / other lines to ground /	
Required Performance Criterion	B		
Test mode	1		
Test Line (Input port)	Phase Angle	Test Voltage	Result (Performance Criterion)
L-N	0°, 180°, 90°, 270°	±1KV	A
L-PE	0°, 180°, 90°, 270°	±2KV	A
N-PE	0°, 180°, 90°, 270°	±2KV	A

Note : 1. A: During the test, the EUT did not show any abnormality.
2. For the two models, the test results are the same.

21. Continuous Induced RF Disturbances Measurement

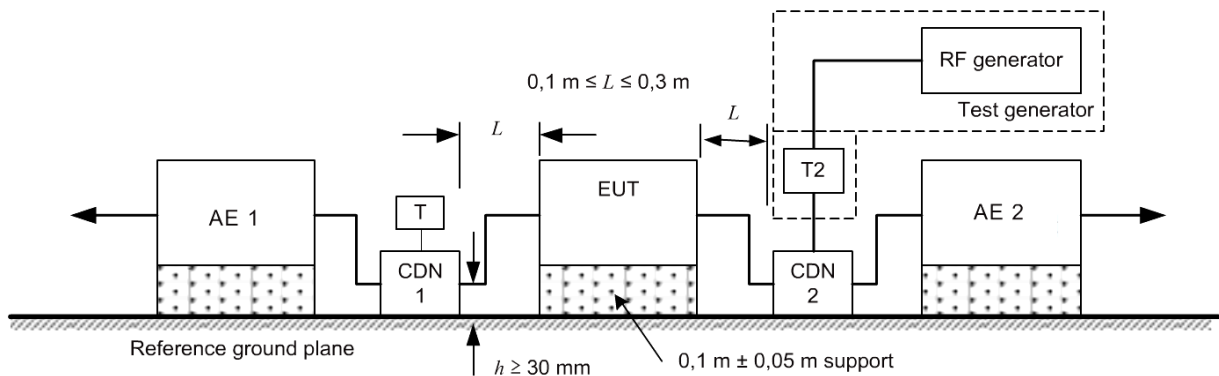
TEST LEVEL

AC input/output power ports, DC port, DC interface, Network ports	
Level	Field Strength V
1	1
2	3
3	10
X	Special

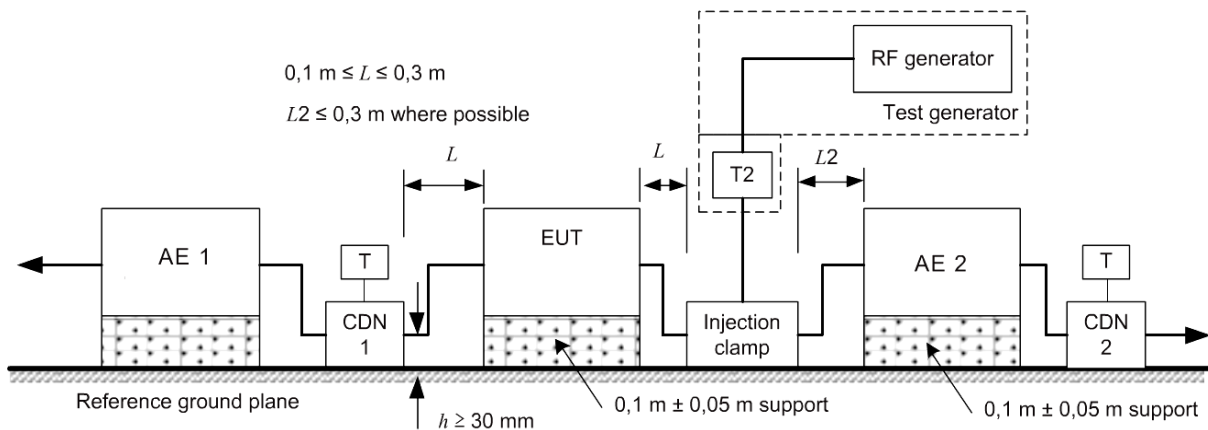
Note*: Where the amplitude of a test level varies over a given frequency range, it changes linearly with respect to the logarithm of the frequency.

BLOCK DIAGRAM OF TEST SETUP

CDN Test:



Clamp Test:



TEST PROCEDURES

- a. The EUT was placed on the insulating support 0.1m above the ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
- b. Configure the EUT and support devices as per section 3.
- c. Turn on the EUT and all support devices, and make it run stably.
- d. The disturbance signal described below is injected to EUT through CDN.
- e. The frequency range is swept from 150 KHz to 10 MHz using 3V signal level, from 10 MHz to 30 MHz using 3V to 1V changes linearly, from 30 MHz to 80 MHz using 1V signal level, and with the disturbance signal 80% amplitude modulated with a 1KHz sine wave.
- f. Repeat the above steps in each mode and record the test result.

MINIMUM REQUIREMENT

AC input/output power ports			Network ports		
Frequency ranges (MHz)	Test Level V(r.m.s)	Performance Criterion	Frequency ranges (MHz)	Test Level V(r.m.s)	Performance Criterion
0.15 to 80	10	A	0.15 to 80	10	A

TEST RESULTS

PASS

Please refer to the following page.

Injected Currents Susceptibility Test Results

Ambient Condition	Temp.: 25°C	R.H.: 53%	Air Pressure:105 kPa
Test Specifications	Test Level:	10 V (r.m.s)	
	Modulation:	1kHz sine wave, 80%AM	
	Step Size:	1% of preceding frequency value	
	Dwell Time:	1s	
	Mode:	Swept test	
Required Performance Criterion	A		
Test mode	1		
Test Line (Input port)	Frequency (MHz)	Level(V)	Result (Performance Criterion)
Mains port	0.15~80	10	A
-	-	-	-

Note : 1. A: During the test, the EUT did not show any abnormality.
2. For the two models, the test results are the same.

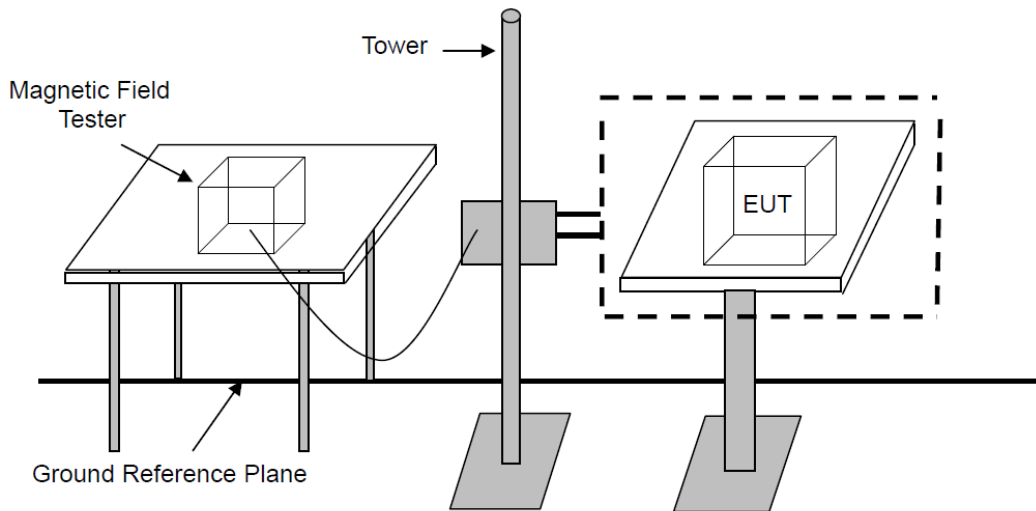
22. Power Frequency Magnetic Field Measurement

TEST LEVEL

Level	Magnetic field strength A/m
1	1
2	3
3	10
4	30
5	100
X*	Special

Note*: "x" can be any level, above, below or in-between the other levels. This level can be given in the product specification.

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

- a. The EUT was placed on the middle of an induction coil(1*1m), under which is a 0.1m-thick insulating support.
- b. Configure the EUT and support devices as per section 3.
- c. All cables of the EUT were exposed to the magnetic field for 1m of their length.
- d. X, Y and Z polarization of the induction coil are set on test, so that each side of the E.U.T. is affected by the magnetic field. If not possible as the EUT size, change the position of the EUT is permitted.
- e. Repeat the above steps in each mode and record the test result.

MINIMUM REQUIREMENT

Fielded Strength	30A/m
Frequency	50Hz or 60Hz
Performance Criterion	A

TEST RESULTS

Not applicable.

23. Measuring Devices and Test Equipment

For Conducted Emission Measurement (AC Mains)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	101152	Mar. 13, 2023	1 Year
2.	L.I.S.N	Rohde & Schwarz	ENV 216	101317	Mar. 13, 2023	1 Year
3.	L.I.S.N	Rohde & Schwarz	ESH2-Z5	893606/014	Mar. 13, 2023	1 Year
4.	RF Switching Unit	Compliance Direction Systems Inc.	RSU-M2	38311	Mar. 13, 2023	1 Year
5.	Test Software	EZ	EZ EMC NTC-3A1.1	N/A	N/A	N/A

For Conducted Emission Measurement (Network Ports)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	101152	Mar. 13, 2023	1 Year
2.	L.I.S.N	Rohde & Schwarz	ENV 216	101317	Mar. 13, 2023	1 Year
3.	AAN	Schwarzbeck	NTFM 8158	CAT5-8158-0006	Mar. 13, 2023	1 Year
4.	AAN	Schwarzbeck	NTFM 8158	CAT6-8158-0009	Mar. 13, 2023	1 Year
5.	RF Switching Unit	Compliance Direction Systems Inc.	RSU-M2	38311	Mar. 13, 2023	1 Year
6.	Test Software	EZ	EZ EMC NTC-3A1.1	N/A	N/A	N/A

For Radiated Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI7	100837	Mar. 13, 2023	1 Year
2.	Spectrum Analyzer	Rohde & Schwarz	FSU26	200409/026	Mar. 13, 2023	1 Year
3.	Antenna	Schwarzbeck	VULB9162	9162-010	Mar. 13, 2022	2 Year
4.	Loop Antenna	Schwarzbeck	FMZB 1513	1513-272	Mar. 13, 2022	2 Year
5.	Horn Antenna	COM-Power	AH-118	071078	Mar. 13, 2022	2 Year
6.	Pre-Amplifier	HP	HP 8447D	1145A00203	Mar. 13, 2023	1 Year
7.	Pre-Amplifier	HP	HP 8449B	3008A00964	Mar. 13, 2023	1 Year
8.	Chamber	SAEMC	9*7*7m	N/A	Apr. 21, 2021	2 Year
9.	Test Software	EZ	EZ EMC NTC-3A1.1	N/A	N/A	N/A

 For Harmonic / Flicker Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Power Frequency Analyzer	California Instruments	PACS-1	72846	Mar. 13, 2023	1 Year
2.	5KVA AC Power Source	California Instruments	5001iX	60137	Mar. 13, 2023	1 Year
3.	Software	California Instruments	CTS 4.2.5 V4.29.0	N/A	N/A	N/A

 For Electrostatic Discharge Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Tester	TESEQ	NSG 437	432	Mar. 23, 2022	1 Year

For RF Electromagnetic Field Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal Generator	Agilent	N5181A	MY47070160	Mar. 13, 2023	1 Year
2.	RF Switch	SKET	N/A	N/A	N/A	N/A
3.	Power Amplifier	SKET	HAP801000M_250W	201804008	N/A	N/A
4.	Power Amplifier	SKET	HAP0103G_75W	201804009	N/A	N/A
5.	Power Amplifier	SKET	HAP0306G_50W	201804010	N/A	N/A
6.	Power Meter	Agilent	E4419B	GB40201469	Mar. 13, 2023	1 Year
7.	Power Sensor	Agilent	E9304A	MY41498919	Mar. 13, 2023	1 Year
8.	Power Sensor	Agilent	E9300A	US39211259	Mar. 13, 2023	1 Year
9.	E-Field Probe	Narda	EP-601	N/A	Mar. 13, 2023	1 Year
10.	Antenna	Schwarzbeck	STLP 9129	9129071	N/A	N/A
11.	Audio Analyzer	Rohde & Schwarz	UPV	100894	Mar. 13, 2023	1 Year
12.	Chamber	Chengyu	7*5*3.5m	N/A	Apr. 25, 2021	3 Year
13.	Test Software	SKET	SKET_RS V1.5.0.1	N/A	N/A	N/A

 For Electrical Fast Transient /Burst Immunity Test (Shenzhen Nore Testing Center Co., Ltd)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Burst Tester	HAEFELY	AXOS5	177723	Mar. 28, 2022	1 Year
2.	Coupling Clamp	HAEFELY	N/A	N/A	Mar. 28, 2022	1 Year
3.	Test Soft	VNC	VNC Viewer 5.0.5	N/A	N/A	N/A

 For Electrical Fast Transient /Burst Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Burst Tester	EM TEST	UCS 500N7	V1104108683	Mar. 13, 2023	1 Year
2.	Coupling Clamp	EM TEST	HFK	0311-94	Mar. 13, 2023	1 Year
3.	Test Soft	EM TEST	lec. Control V5.1.5.0	N/A	N/A	N/A

For Surge Measurement (Shenzhen Nore Testing Center Co., Ltd)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Surge Tester	HAEFELY	AXOS5	177723	Mar. 28, 2022	1 Year
2.	Test Soft	VNC	VNC Viewer 5.0.5	N/A	N/A	N/A

 For Surge Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Surge Tester	EM TEST	UCS 500N7	V1104108683	Mar. 13, 2023	1 Year
2.	Test Soft	EM TEST	lec. Control V5.1.5.0	N/A	N/A	N/A

 For Injected Currents Immunity Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal generator	IFR	2023A	2023051280	Mar. 13, 2023	1 Year
2.	Power Amplifier	SCHAFFNER	CBA9425	1022	Mar. 13, 2023	1 Year
3.	6dB 50Watt Attenuator	SCHAFFNER	ATN6025	N/A	Mar. 13, 2023	1 Year
4.	CDN	Lioncel	CDN-M3-16	0170703	Mar. 13, 2023	1 Year
5.	CDN	Lioncel	CDN-M2-16	0170708	Mar. 13, 2023	1 Year
6.	CDN	CDSI	ADN-M5/AF5	8105001	Mar. 13, 2023	1 Year
7.	EM Clamp	CDSI	EMCL-22	8192007	Mar. 13, 2023	1 Year
8.	Directional Coupler	SCHAFFNER	255	19184	Mar. 13, 2023	1 Year
9.	Audio Analyzer	Rohde & Schwarz	UPV	100894	Mar. 13, 2023	1 Year
10.	Test Software	EZ	EZ_CS B-3.1	N/A	N/A	N/A

 For Power Frequency magnetic field immunity Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal Generator	EVERFINE	EMS61000-8K_V200	N/A	Mar. 13, 2023	1 Year
2.	Adjustable Magnetic field Coil	EVERFINE	MFC-4	N/A	Mar. 13, 2023	1 Year
3.	Test Software	EVERFINE	MS V2.00.142	N/A	N/A	N/A

24. Photographs of Test Configuration

Photo of Conducted Emission Measurement

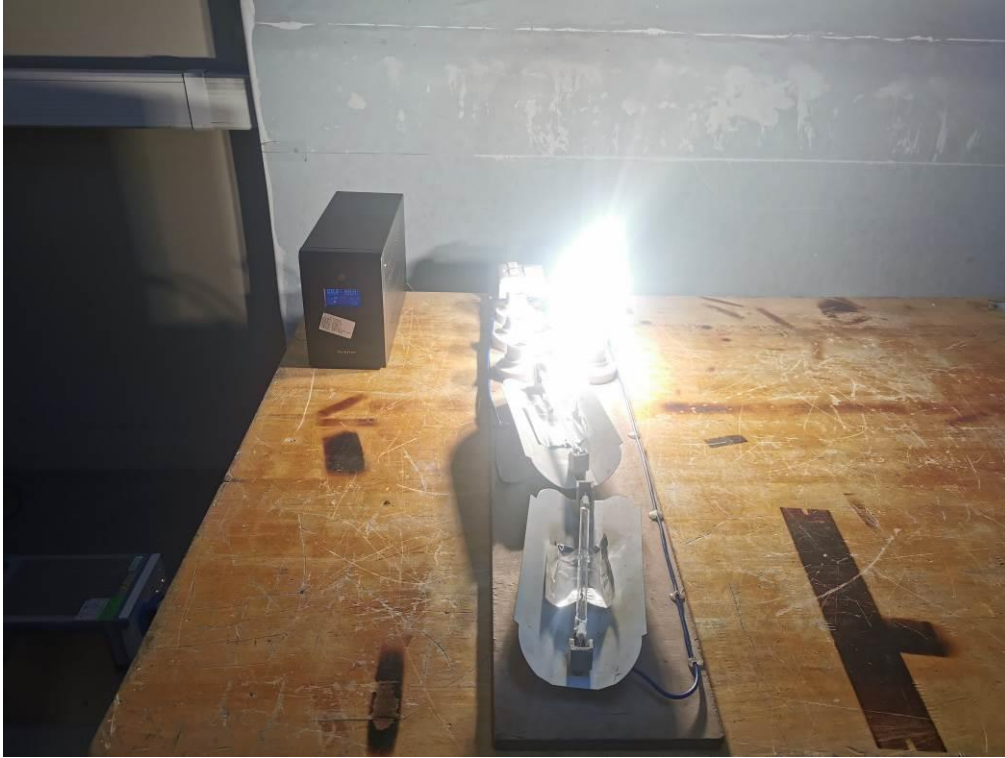


Photo of Radiated Emission Measurement



Photo of Harmonic / Flicker Measurement

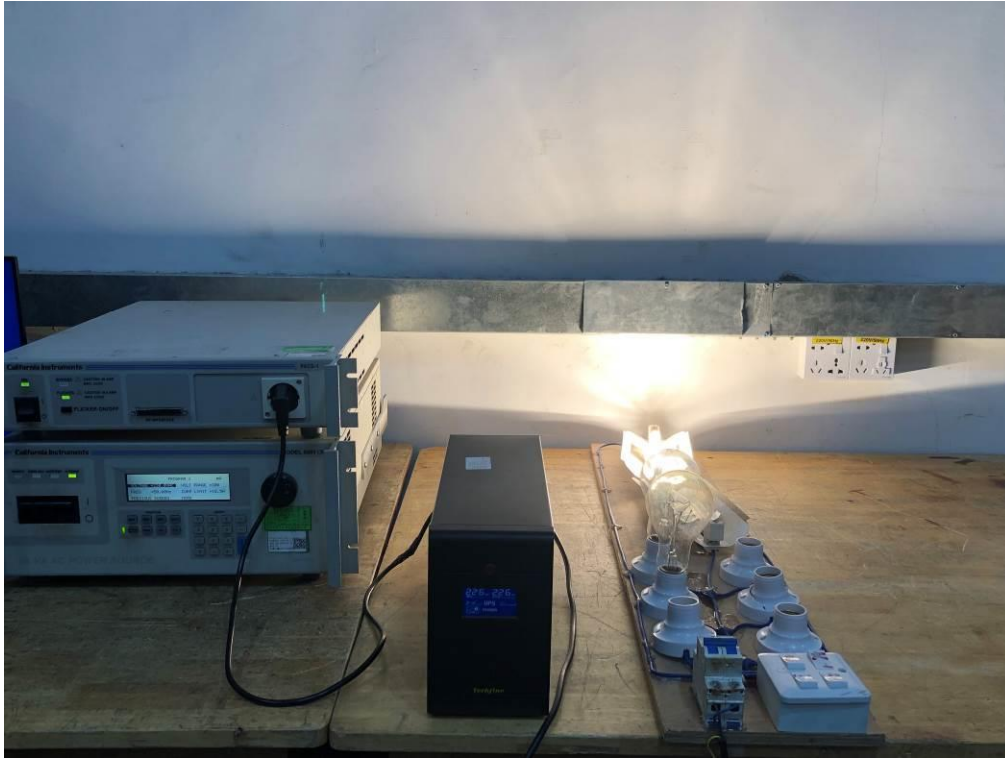


Photo of Electrostatic Discharge Measurement

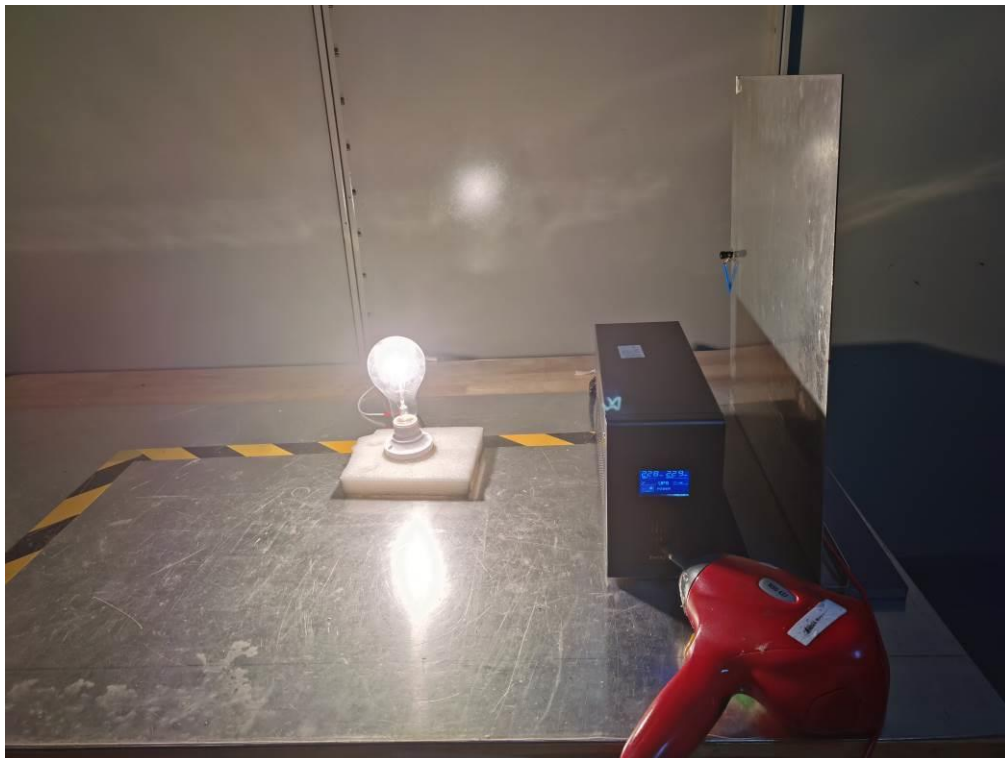


Photo of Continuous RF Electromagnetic Field Disturbances Measurement



Photo of Electrical Fast Transients / Burst and Surge Measurement

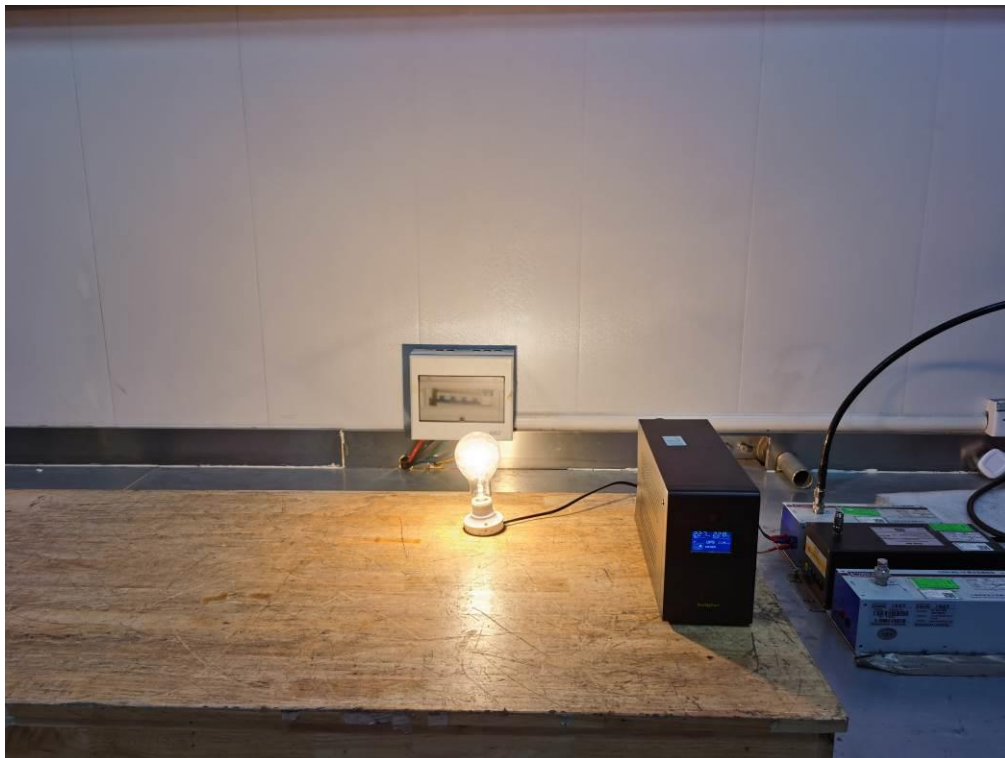
AC Output port:



AC Input port:



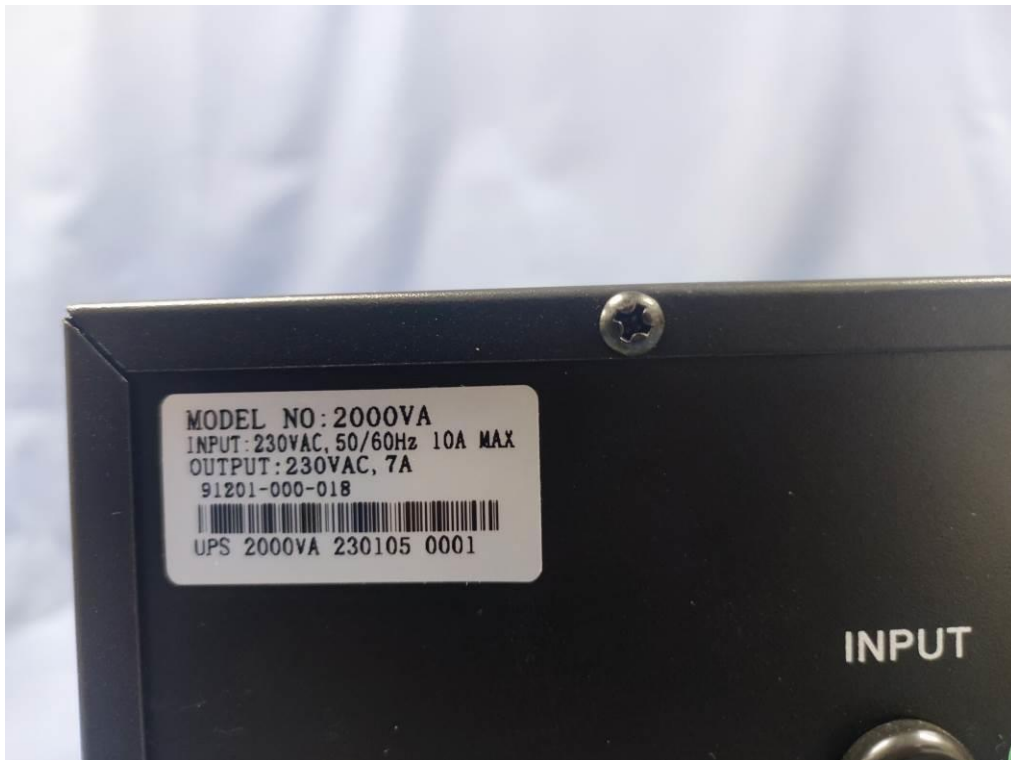
Photo of Continuous Induced RF Disturbances Measurement



25. Photographs of the EUT

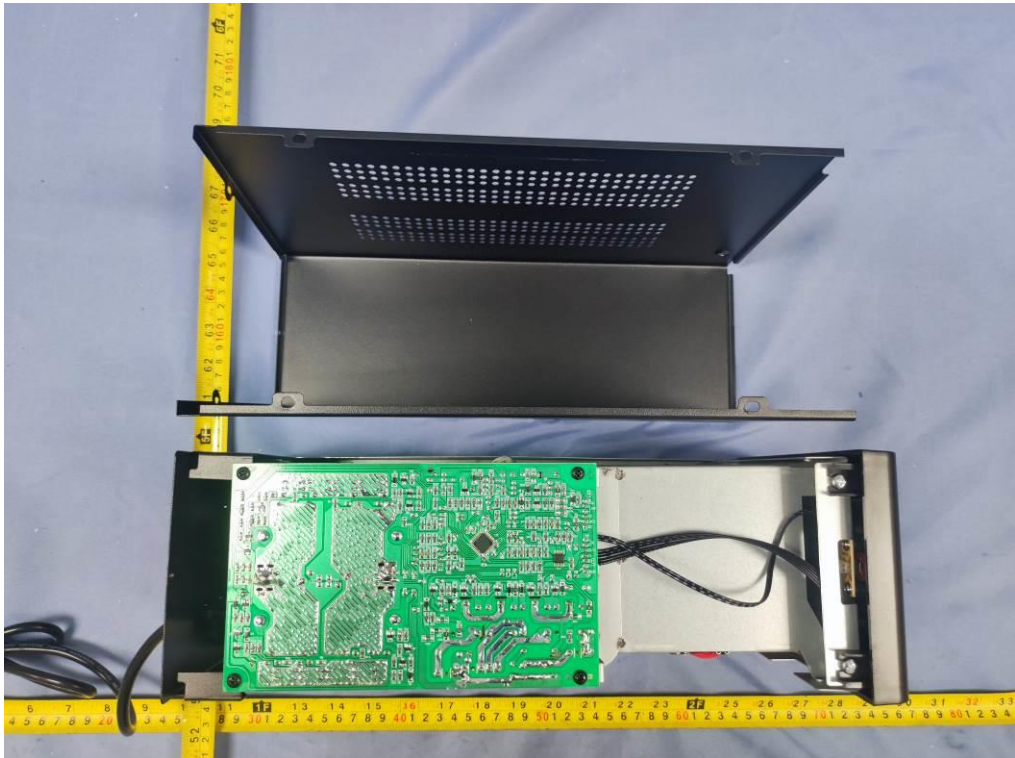
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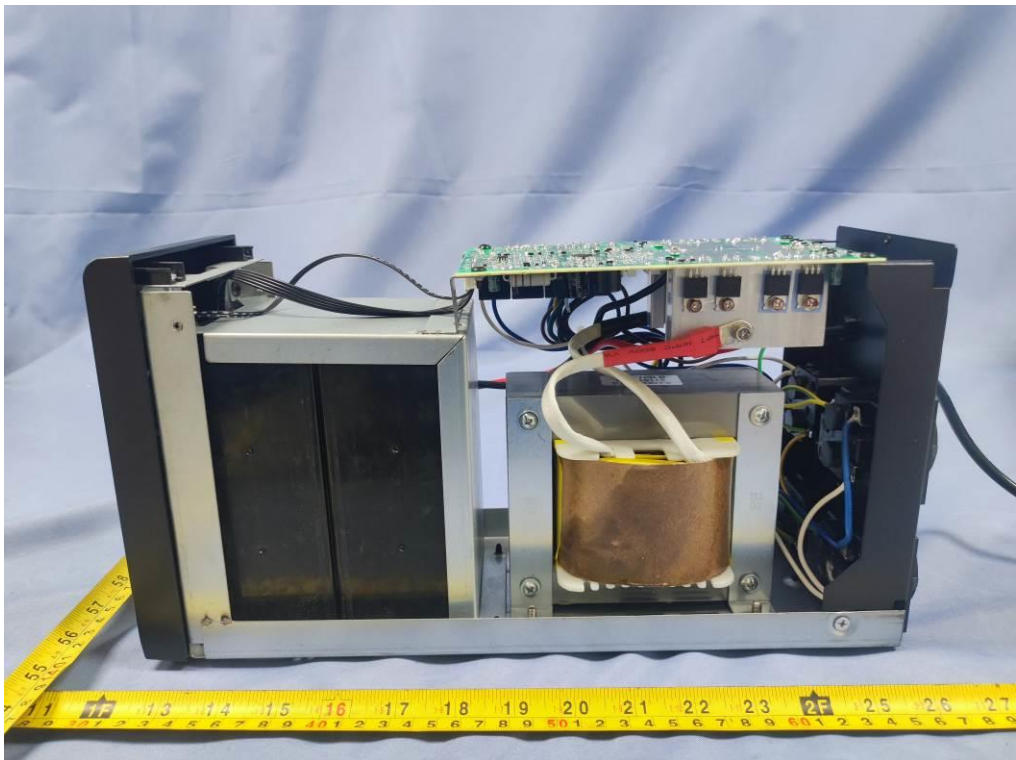
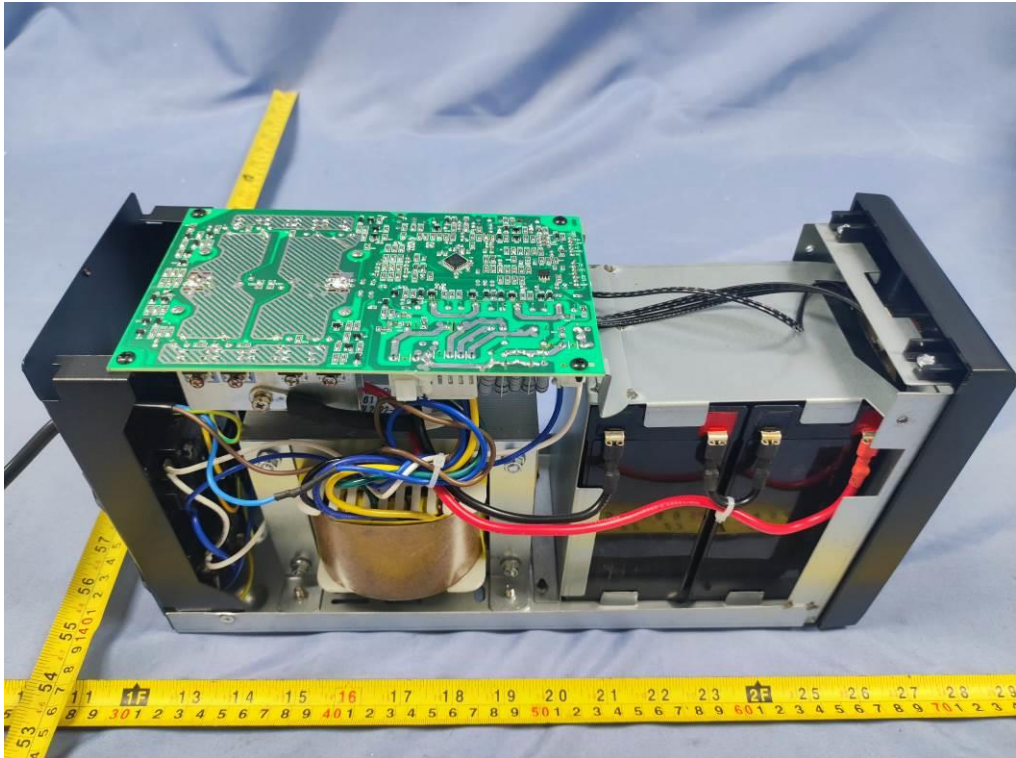


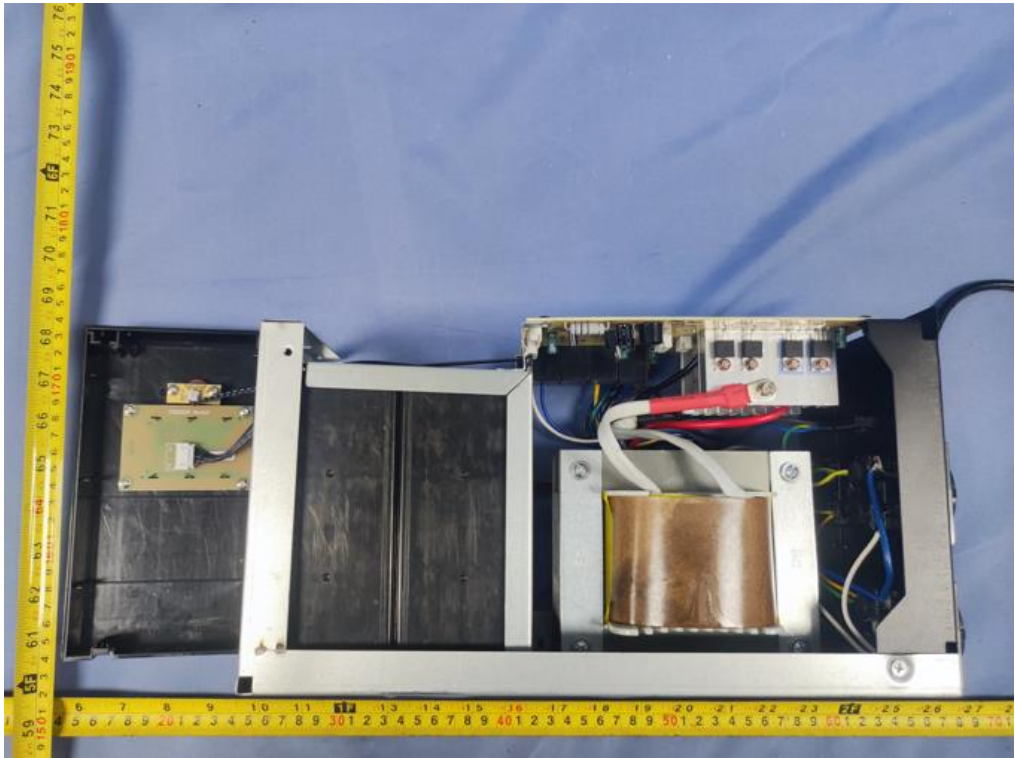
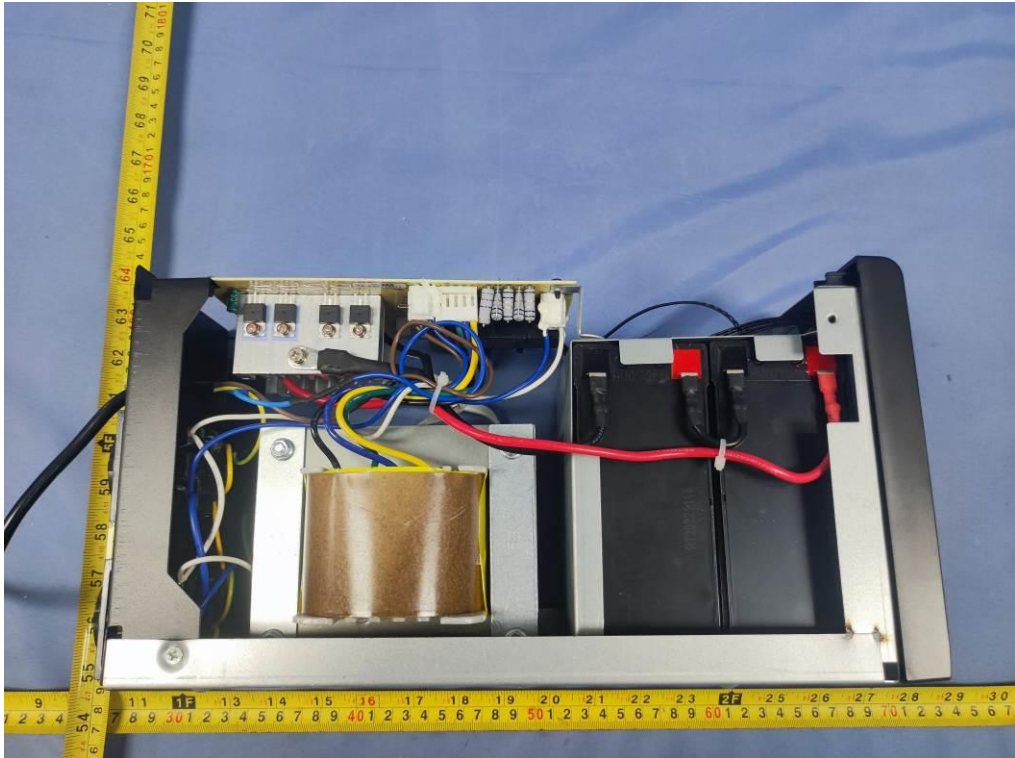


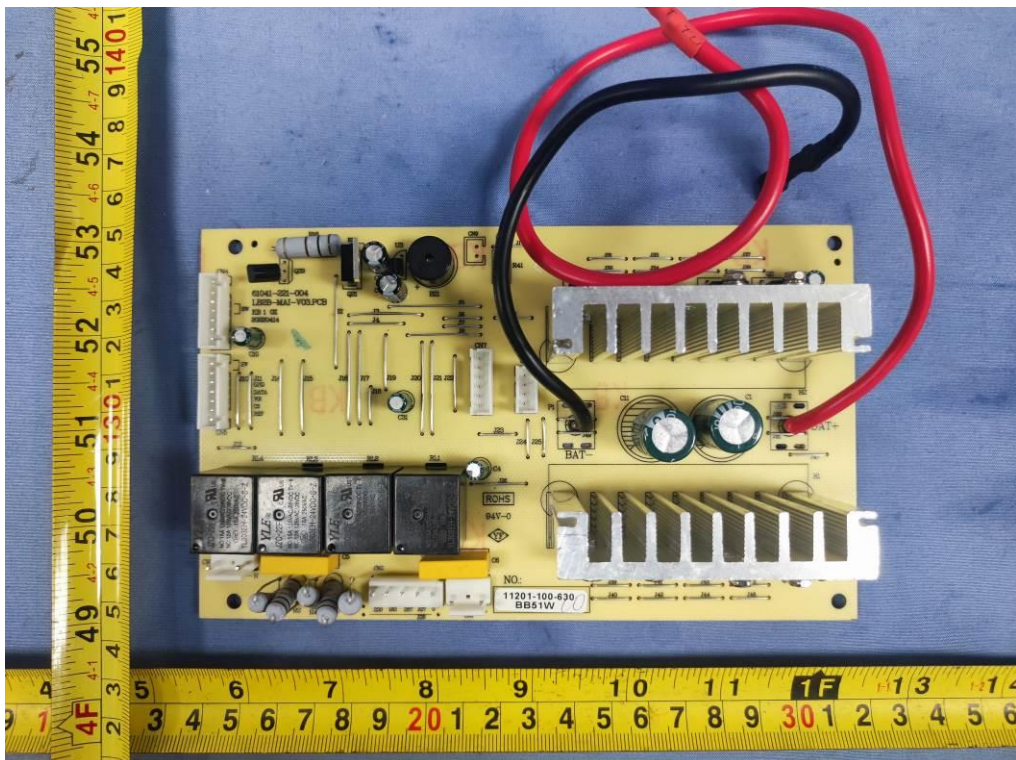
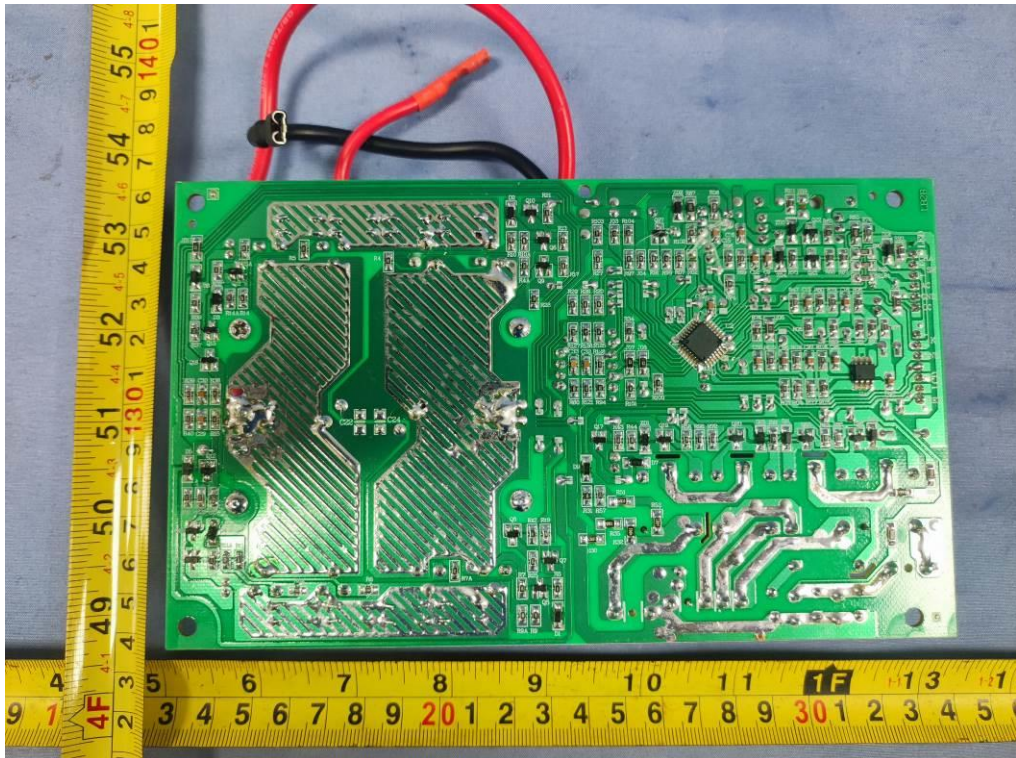




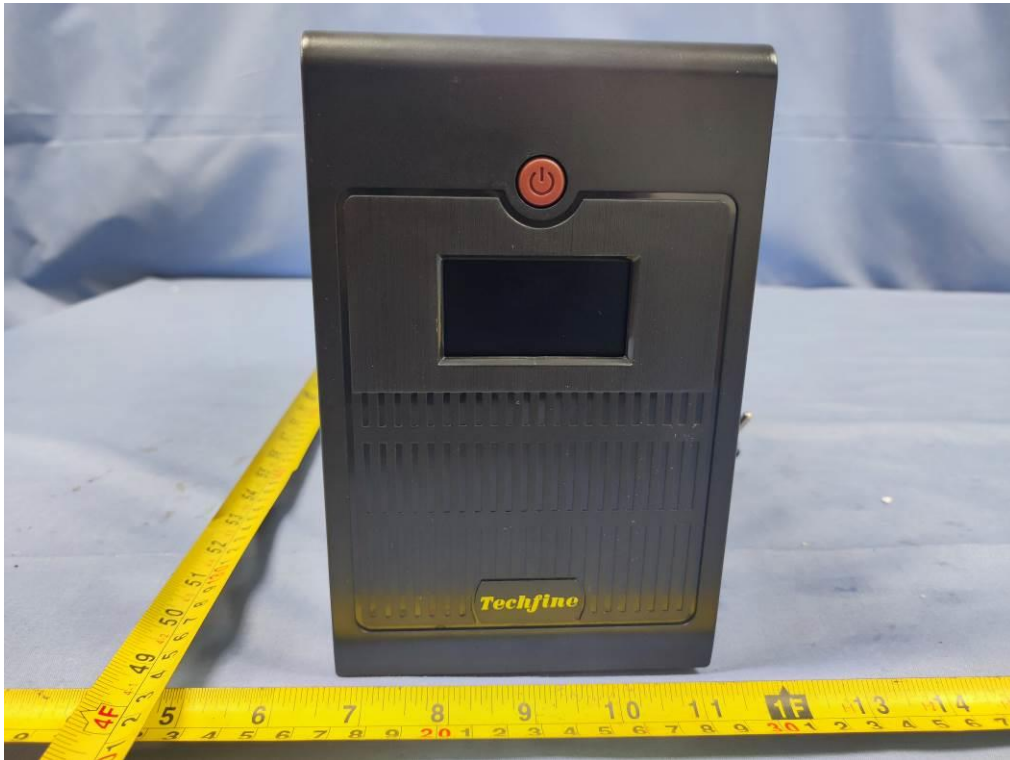




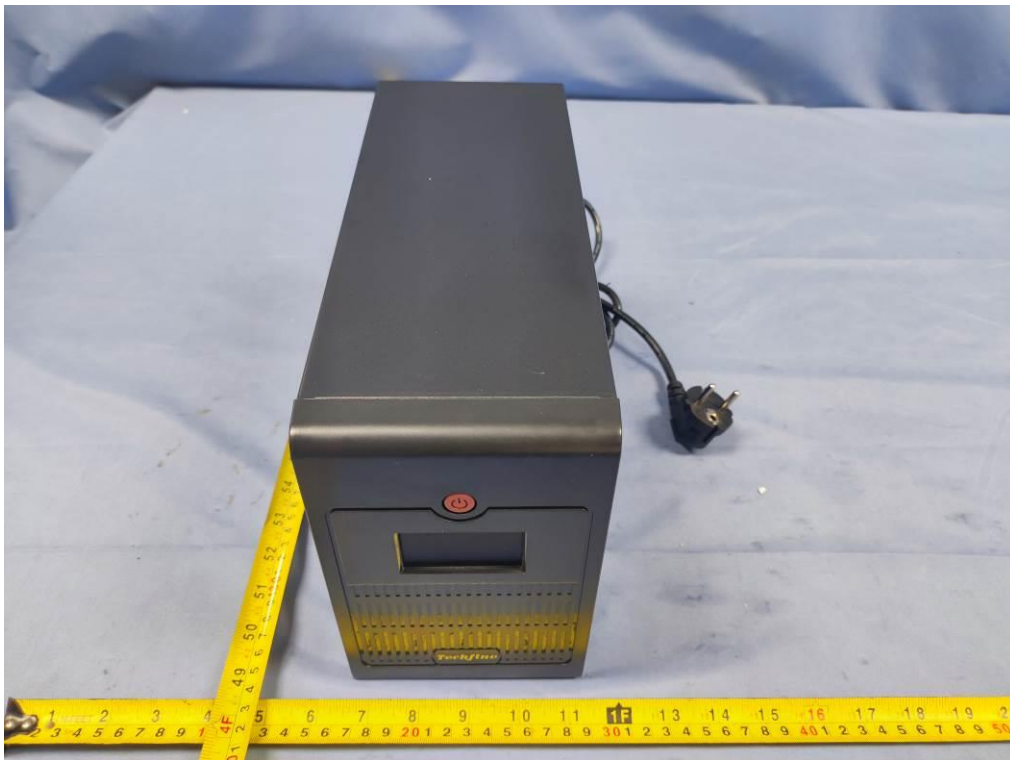


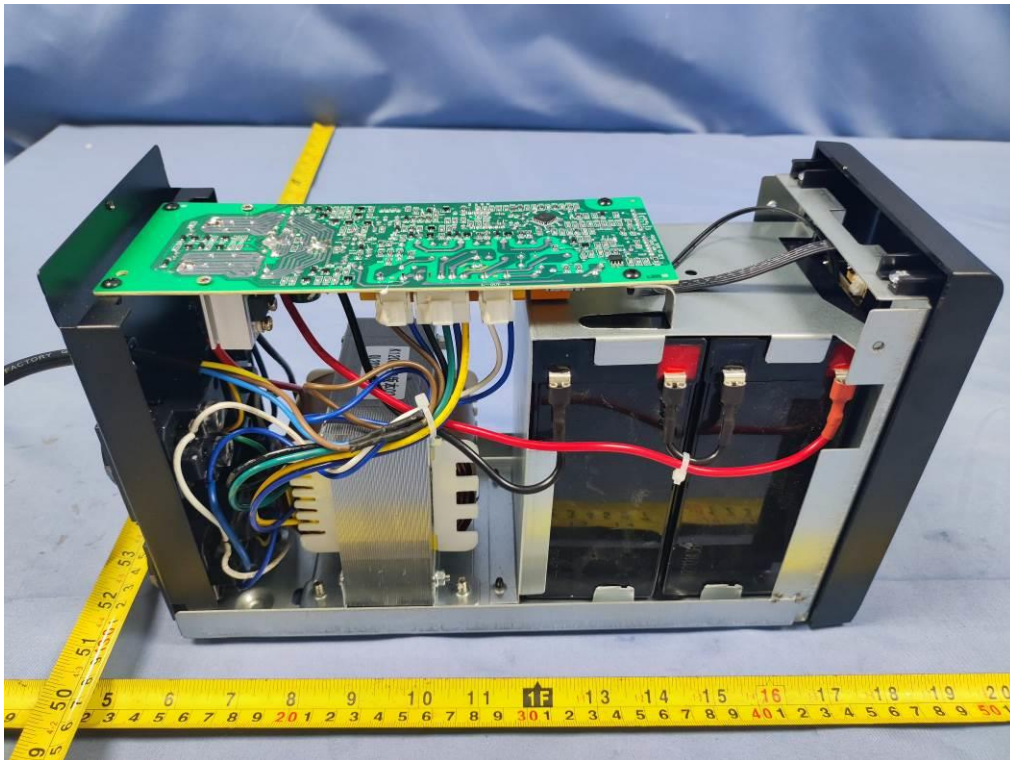
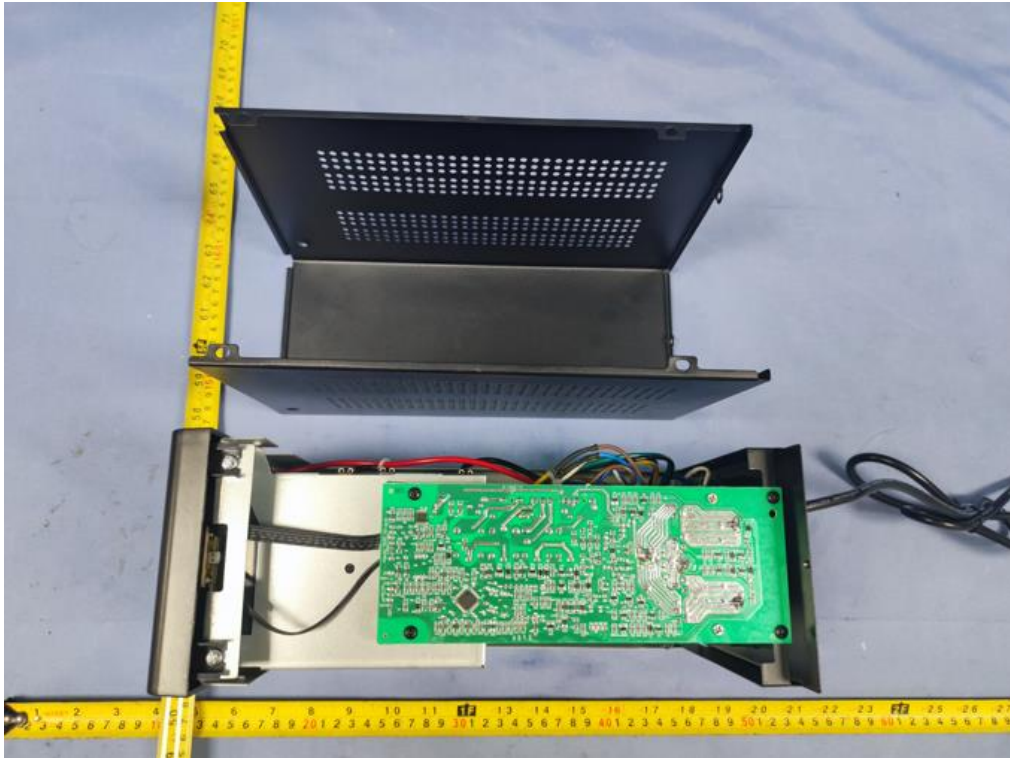


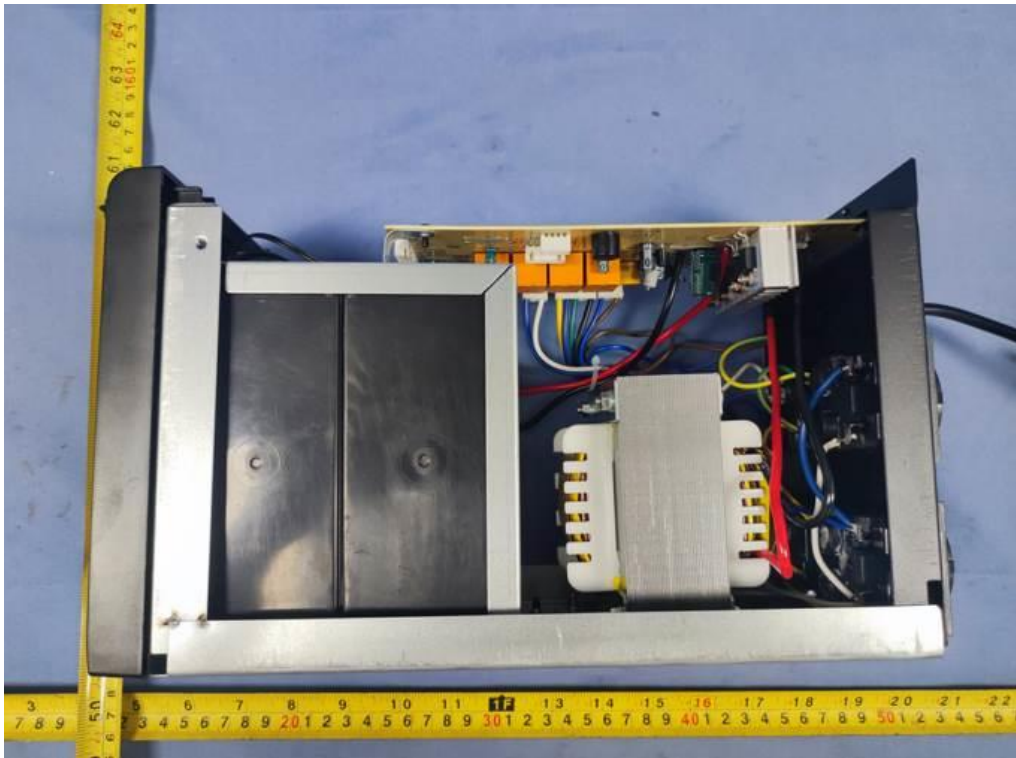
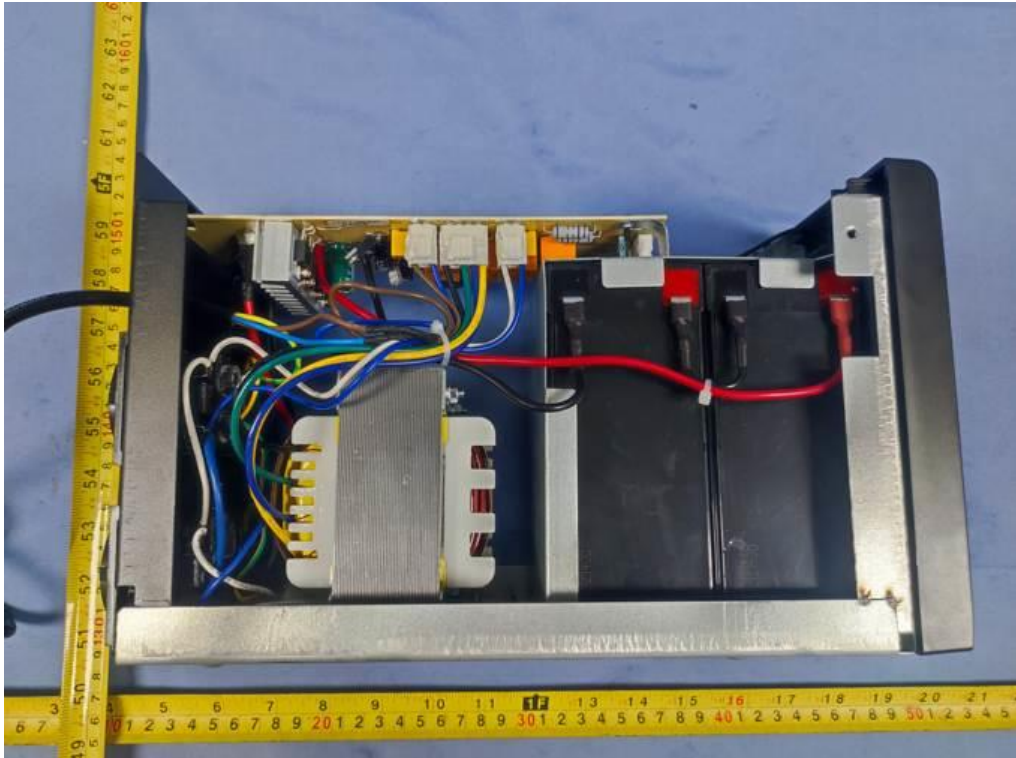
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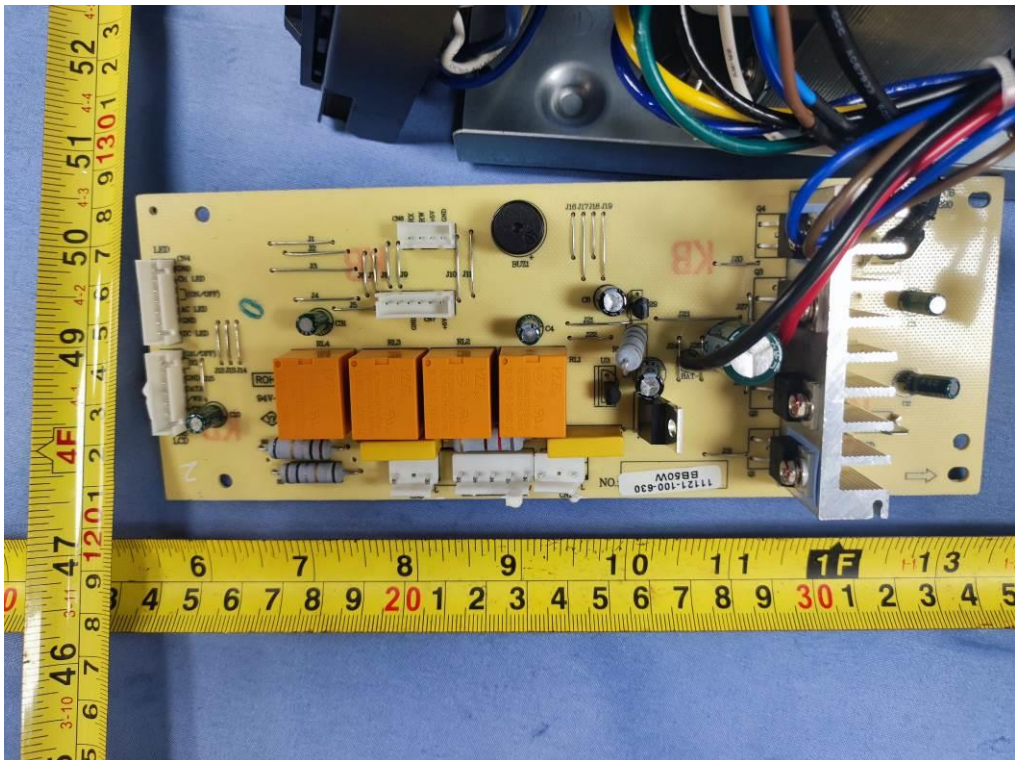
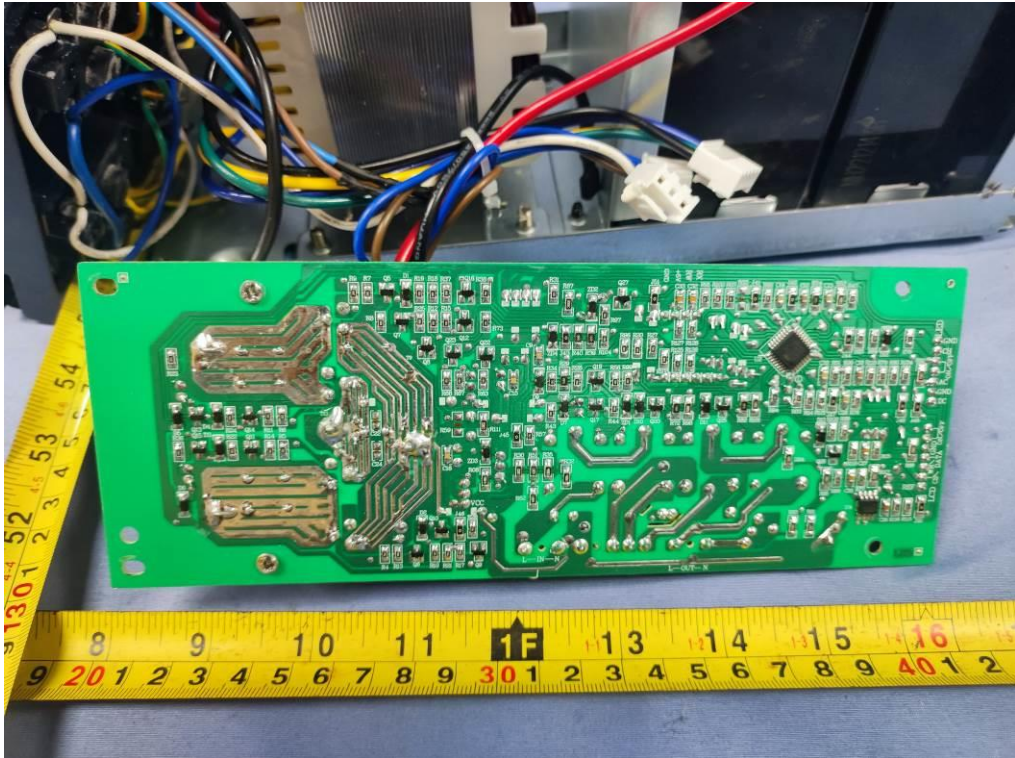


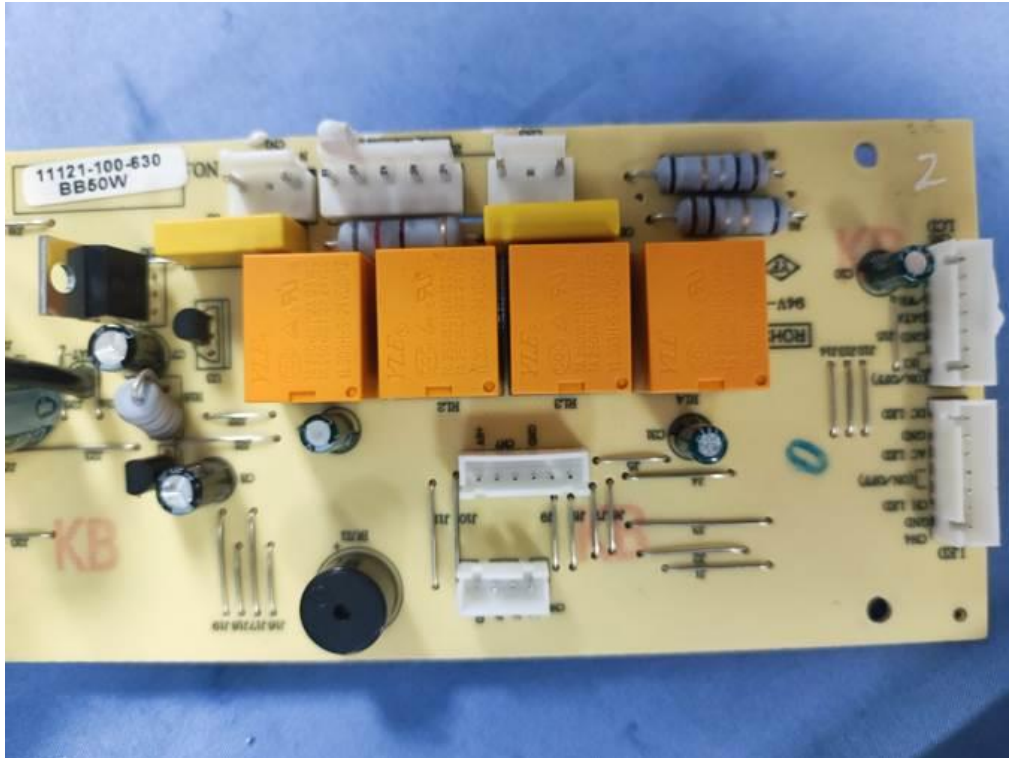












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