ETSI EN 301 489-1 & -17 Test Report

Product Name:	Rainproof intelligent power supply
Model Number:	BV-ISLR240S24
Applicant:	Blueview Elec-optic Tech Co., Ltd.

KeySense Testing & Certification International Co., Ltd.

1-3F, Lab Building, No.29 District, ZhongKai Hi-Tech Industrial Development Park, Huizhou, Guangdong, China

Test Report of EMC			
Product name	Rainproof intelligent power supply		
Model number	BV-ISLR240S24		
Applicant	**Name**	Blueview Elec-optic Tech Co., Ltd.	
	Address	No.1000, Section 2, 2nd Konggang Road, Southwest Aviation Industrial Development Zone, Shuangliu District, Chengdu City, Sichuan Province, P.R.China	
Manufacturer	**Name**	Blueview Elec-optic Tech Co., Ltd.	
	Address	No.1000, Section 2, 2nd Konggang Road, Southwest Aviation Industrial Development Zone, Shuangliu District, Chengdu City, Sichuan Province, P.R.China	
Factory	**Name**	Blueview Elec-optic Tech Co., Ltd.	
	Address	No.1000, Section 2, 2nd Konggang Road, Southwest Aviation Industrial Development Zone, Shuangliu District, Chengdu City, Sichuan Province, P.R.China	
Trade Name			
Receipt date	Feb 24, 2022	**Quantity**	1
Standard	ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-17 V3.2.4 (2020-09)		
Test period	Feb 25, 2022- Mar 10, 2022	**Issue Date**	Mar 23, 2022
Test result	The device described above is tested by KeySense Testing & Certification International Co., Ltd. The measurement results were contained in this test report and KeySense Testing & Certification International Co., Ltd. was assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliance with the ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-17 V3.2.4 (2020-09) requirements. This report applies to above tested sample only and shall not be reproduced in part without written approval of KeySense Testing & Certification International Co., Ltd.		

Tested by: Bing.He	**Sign:**	**Date:** 2022.3.23	
Reviewed by: Jack.Li	**Sign:**	**Date:** 2022.3.23	(Stamp)
Approved by:Tony.Xu (General manager)	**Sign:**	**Date:** 2022.3.23	

Contents

1 SUMMARY OF STANDARDS AND RESULTS

1.1 Standard description

ETSI EN 301 489-1 V2.2.3 (2019-11): ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU.

ETSI EN 301 489-17 V3.2.4 (2020-09): ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU.

1.2 Compliance with ETSI EN301 489-1 & ETSI EN301 489-17

CLAUSE	TEST PARAMETER	APPLICATION	BASIC STANDARF OR TEST METHOD	RESULTS
EMC emission				
8.2	Radiated emission	Enclosure of ancillary equipment	EN 55032:2015+A11:2020	**PASS**
8.3	Conducted emission	DC power input/output port	EN 55032:2015+A11:2020	**N/A**
8.4	Conducted emission	AC mains input/output port	EN 55032:2015+A11:2020	**PASS**
8.5	Harmonic Current Emissions	AC mains input port	EN IEC 61000-3-2:2019	**PASS**
8.6	Voltage Fluctuation & Flicker	AC mains input port	EN 61000-3-3:2013+A1:2019	**PASS**
8.7	Conducted emission	Wired network port	EN 55032:2015+A11:2020	**N/A**
Immunity				
9.2	RF electromagnetic field	Enclosure	EN IEC 61000-4-3:2020	**PASS**
9.3	Electrostatic Discharge	Enclosure	EN 61000-4-2: 2009	**PASS**
9.4	Fast transients common mode	Signal, wired network and control ports, DC and AC power ports	EN 61000-4-4: 2012	**PASS**
9.5	RF Common mode	Signal, wired network and control ports, DC and AC power ports	EN 61000-4-6: 2014+AC: 2015	**PASS**
9.7	Voltage dips and interruptions	AC mains power input ports	EN IEC 61000-4-11:2020	**PASS**
9.8	Surges, line to line and line to ground	AC mains power input ports, wired network ports	EN 61000-4-5: 2014	**PASS**

2 GENERAL INFORMATION

2.1 Description of Device(EUT)

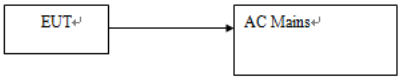
Product Name	:	Remote Control
Model Number	:	BV-ISLR240S24
Modulation	:	O-QPSK(DSSS)
Operation Frequency	:	2405MHz～2480MHz
Number of channel	:	16 Channels
Antenna and Gain	:	External antenna , 3.4dBi Gain
Test Voltage	:	AC 230V/50Hz

2.2 EUT operating mode(s)

To achieve compliance applied standard specification, the following mode(s) were made during compliance testing:

Operating mode 1	Full Load

2.3 Block Diagram of connection between EUT and simulators



2.4 Test Facility

Site Description: 1-3F, Lab Building, No.29 District, ZhongKai Hi-Tech Industrial Development Park, Huizhou, Guangdong, China

Name of Firm: KeySense Testing & Certification International Co., Ltd.

EMC Lab: Certificated by CNAS, CHINA

Registration No.:L9678

Date of registration: Feb 07, 2017

2.5 Measurement Uncertainty(95% confidence levels, k=2)

Test Item	Uncertainty
Uncertainty for Conduction emission test in shielding room	2.5dB(150kHz to 30MHz)
Uncertainty for Radiation Emission test in 3m chamber	4.14dB(30M~1GHz,Polarize:V)
	4.25dB(30M~1GHz,Polarize:H)

2.6 Test Equipments

2.6.1 For Conducted Emission at the Mains Terminals Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal .Interval
Receiver	R&S	ESR3	102054	2021.12.06	1 year
LISN	AFJ	LS16	16011618383	2021.09.01	1 year

2.6.2 For radiated emission test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Receiver	R&S	ESR3	102055	2021.12.06	1 year
Trilog-boardband antenna	SCHWARZBECK	VULB 9163D	9163961	2019.05.18	3 years
Receiver	R&S	ESR7	101661	2021.12. 06	1 year
Horn antenna	Schwarzbeck	BBHA 9120D	9120D-1590	2019.05.18	3 years

2.6.3 For Harmonics Current Emission Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Harmonic & Flicker analyzer	California Instruments	100-CTS-230	1626A00278	2021.09.07	1 year
Programmable power supply	California Instruments	5001iX-CTS-400	1629A02598	2021.09.01	1 year

2.6.4 For Voltage Fluctuations & Flicker Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Harmonic & Flicker analyzer	California Instruments	100-CTS-230	1626A00278	2021.09.07	1 year
Programmable power supply	California Instruments	5001iX-CTS-400	1629A02598	2021.09.01	1 year

2.6.5 For Electrostatic discharge immunity Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Electrostatic discharge generator	Noiseken	ESS-L1611	ESS1643151	2021.08.28	1 year

2.6.6 For Radio Frequency Electromagnetic Field Immunity (R/S) Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Signal generator	R&S	SMC100A	105651	2021.12.06	1 year
Power amplifier	PRANA	MT400	1507-1746	2021.12.06	1 year
Trilog-boardband antenna	SCHWARZBECK	STLP 9128E	9128ES-136	2019.09.02	3years
Power amplifier	PRANA	SV70	1602-1820	2021.12.06	1 year
Horn antenna	Schwarzbeck	BBHA 9120E	BBHA9120E698	2020.10.25	3 years

2.6.7 For Electrical fast transient immunity Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
EFT generator	Noiseken	FNS-AX3-A16C	FNS1621762	2021.09.01	1 year
Capacitive coupling cDischarge	Noiseken	15-00009A	FNS15Y1753	2021.09.01	1 year

2.6.8 For Surge immunity Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Surge generator	Noiseken	LSS-6230A	LSS1634248	2021.09.01	1 year
Telecom lines CDN	Noiseken	LSS-INJ6401 TEL	LSS1654360	2021.09.01	1 year
Interconnection lines unit	Noiseken	LSS-INJ6401 SIG	LSS1654361	2021.09.01	1 year

2.6.9 For Radio frequency Continuous conducted disturbance Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Signal generator	R&S	SMC100A	105651	2021.12.06	1 year
Power amplifier	PRANA	DR220	1602-1819	2021.12.06	1 year
CND	TESEQ	M016	43434	2021.09.01	1 year

2.6.10 For Power magnetic field immunity test

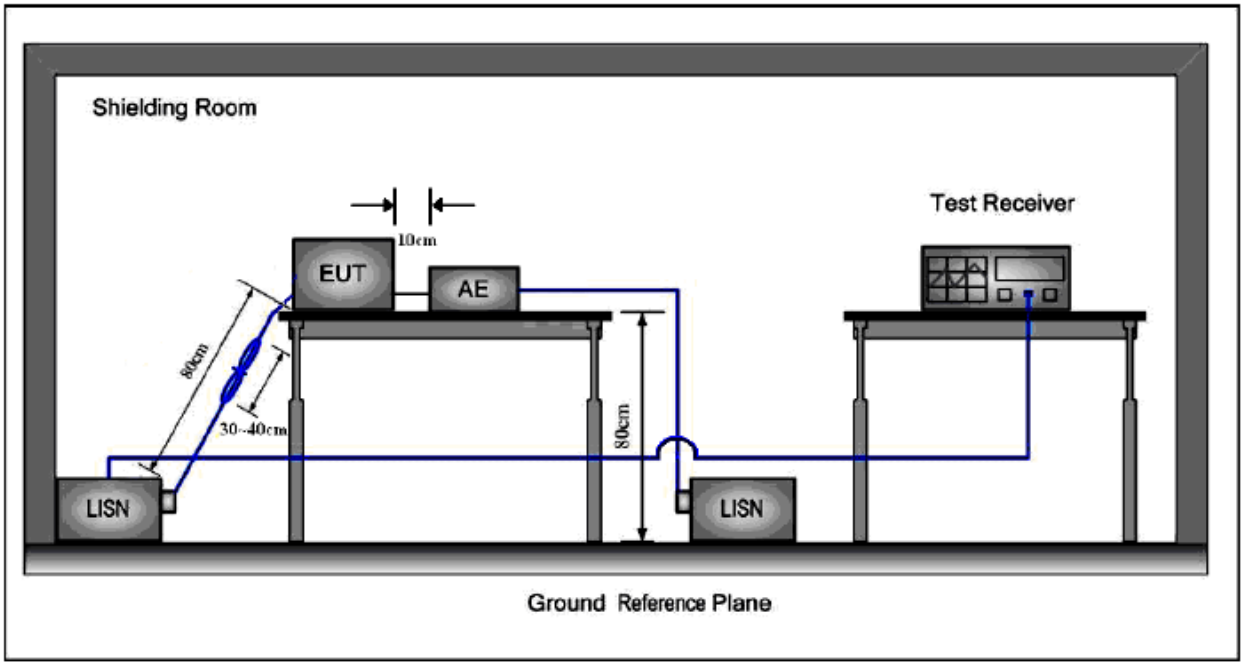
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Power magnetic field simulator	NARDA	PMM-1008	010WT60502	2021.09.01	1 year

2.6.11 For Voltage dips and interruptions immunity Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Dips simulator	Noiseken	VDS-2002	VDS1510396	2021.09.01	1 year

3 CONDUCTED EMISSION AT THE MAINS TERMINALS TEST

3.1 Block Diagram of Test Setup



3.2 Test Standard

EN 55032: 2015/A11 2020, Class B

3.3 Limits of mains terminal disturbance voltage

Frequency MHz	Limits dB(μV)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66 ~ 56	56 ~ 46
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

NOTE 1 The lower limit shall apply at the transition frequencies.

NOTE 2 The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50MHz.

3.4 Operating Condition of EUT

Test date	Ambient temperature	Relative humidity	Atmospheric pressure
Feb 25, 2022	21°C	55%	101.0kPa

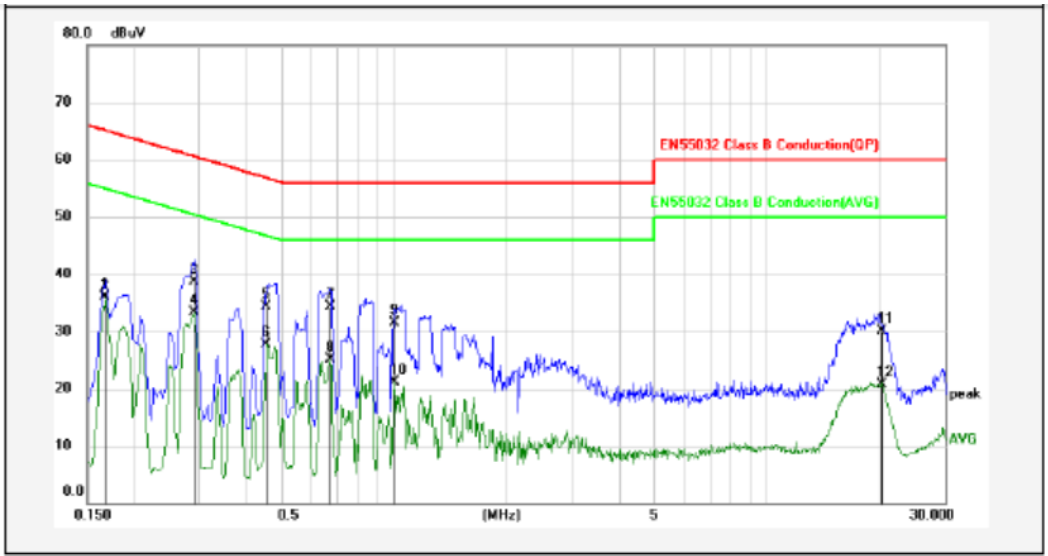
3.5 Test Procedure

The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power connected to the power mains through a line impedance stabilization network (L.I.S.N. #1). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N.#2).This provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). The side of power line was checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to EN 55032 Class B on conducted Disturbance test.

The bandwidth of the test receiver (R&S Test Receiver ESR) is set at 9kHz.
The frequency range from 150kHz to 30MHz is checked.

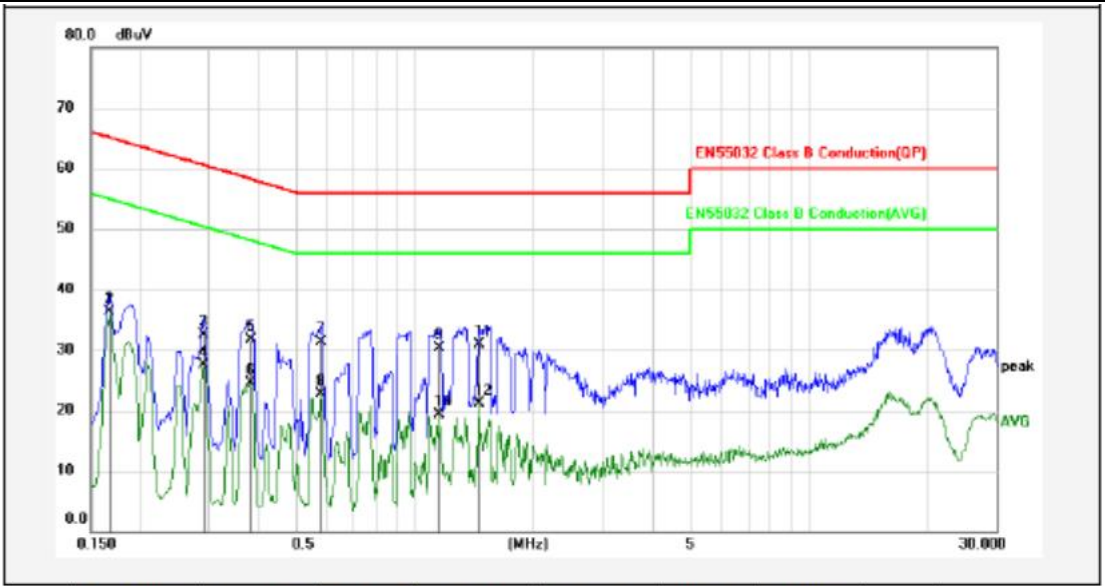
3.6 Test Data

EUT:	Rainproof intelligent power supply	Model Name:	BV-ISLR240S24
Test Mode:	FULL LOAD	Test Date:	2022.02.25
Phase:	N	Test Voltage:	AC 230V/50Hz
Operator:	Bing.He	Note:	



No.	Frequency (MHz)	Reading (dBuV)	Lisn/Isn (dB)	Cab_L (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1680	25.44	10.44	0.22	36.10	65.06	-28.96	QP	
2	0.1680	25.20	10.44	0.22	35.86	55.06	-19.20	AVG	
3	0.2895	28.12	10.44	0.24	38.80	60.54	-21.74	QP	
4	0.2895	22.59	10.44	0.24	33.27	50.54	-17.27	AVG	
5	0.4560	23.62	10.44	0.24	34.30	56.77	-22.47	QP	
6	0.4560	17.02	10.44	0.24	27.70	46.77	-19.07	AVG	
7	0.6720	23.73	10.44	0.23	34.40	56.00	-21.60	QP	
8	0.6720	14.51	10.44	0.23	25.18	46.00	-20.82	AVG	
9	1.0050	20.82	10.45	0.23	31.50	56.00	-24.50	QP	
10	1.0050	10.40	10.45	0.23	21.08	46.00	-24.92	AVG	
11	20.2965	19.10	10.8	0.2	30.10	60.00	-29.90	QP	
12	20.2965	9.80	10.8	0.2	20.80	50.00	-29.20	AVG	

EUT:	Rainproof intelligent power supply	Model Name:	BV-ISLR240S24
Test Mode:	FULL LOAD	Test Date:	2022.02.25
Phase:	L	Test Voltage:	AC 230V/50Hz
Operator:	Bing.He	Note:	

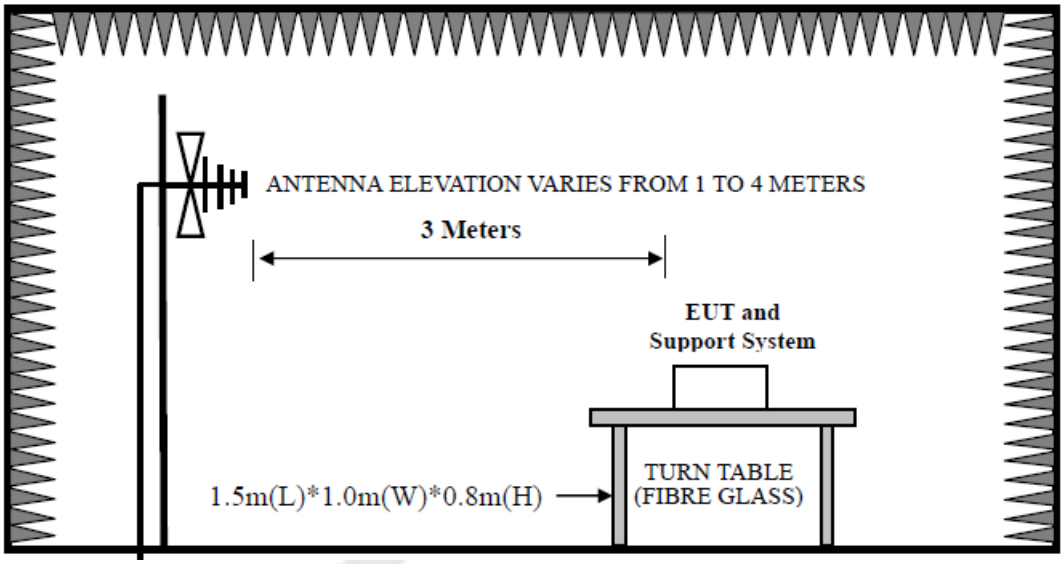


No.	Frequency (MHz)	Reading (dBuV)	Lisn/Isn (dB)	Cab_L (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1680	25.74	10.44	0.22	36.40	65.06	-28.66	QP	
2	0.1680	25.74	10.44	0.22	36.40	55.06	-18.66	AVG	
3	0.2908	21.82	10.44	0.24	32.50	60.50	-28.00	QP	
4	0.2908	16.83	10.44	0.24	27.51	50.50	-22.99	AVG	
5	0.3840	21.02	10.44	0.24	31.70	58.19	-26.49	QP	
6	0.3840	13.74	10.44	0.24	24.42	48.19	-23.77	AVG	
7	0.5774	20.72	10.44	0.24	31.40	56.00	-24.60	QP	
8	0.5774	12.02	10.44	0.24	22.70	46.00	-23.30	AVG	
9	1.1578	19.62	10.45	0.23	30.30	56.00	-25.70	QP	
10	1.1578	8.58	10.45	0.23	19.26	46.00	-26.74	AVG	
11	1.4500	20.32	10.46	0.22	31.00	56.00	-25.00	QP	
12	1.4500	10.51	10.46	0.22	21.19	46.00	-24.81	AVG	

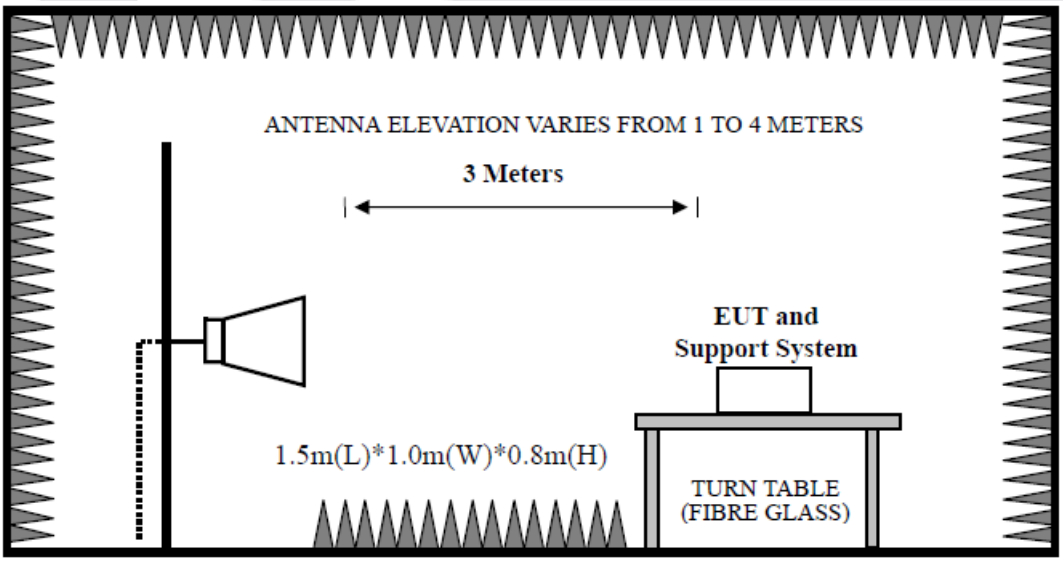
4 RADIATED EMISSION TEST

4.1 Block Diagram of Test Setup

30~1000MHz:



Above 1GHz:



4.2 Test Standard

EN 55032: 2015/A11 2020, Class B

4.3 Limits for radiated disturbance

Frequency MHz	Distance	Limits dB(μV)/m Class B Quasi Peak Level
30 ~ 230	3m	40
230 ~ 1000	3m	47
1000 ~ 3000	3m	70 (Peak) 50 (Average)
3000 ~ 6000	3m	74 (Peak) 54 (Average)

4.4 Operating Condition of EUT

Test date	Ambient temperature	Relative humidity	Atmospheric pressure
Feb 25, 2022	21°C	55%	101.0kPa

4.5 Test Procedure

The EUT was placed on a turn table which was 0.8 m above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 m away from the receiving antenna which was mounted on an antenna tower. The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 m to 4 m for both horizontal and vertical polarizations.

The EUT was tested in the Chamber Site. It was pre-scanned with a Peak detector from the spectrum, and all the final readings from the test receiver were measured with the Quasi-Peak detector.

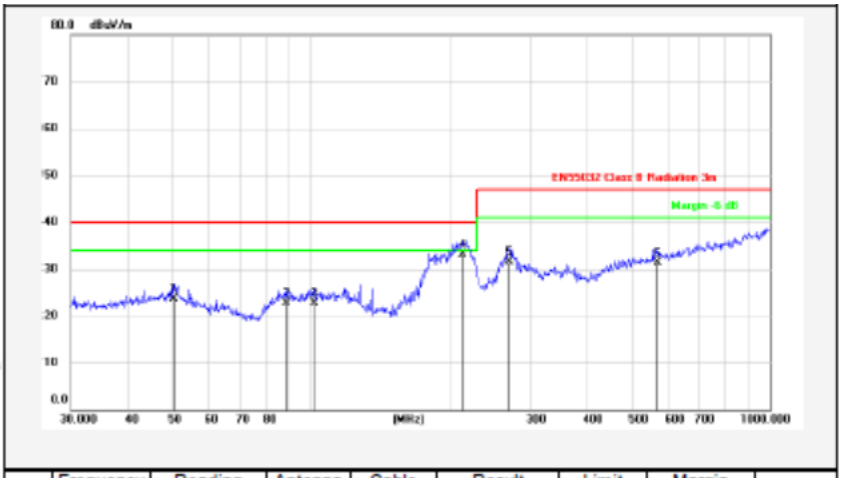
The bandwidth setting on the test receiver was 120 kHz.

The bandwidth of the Spectrum's VBW is set at 1MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure above 1GHz.

4.6 Test Data

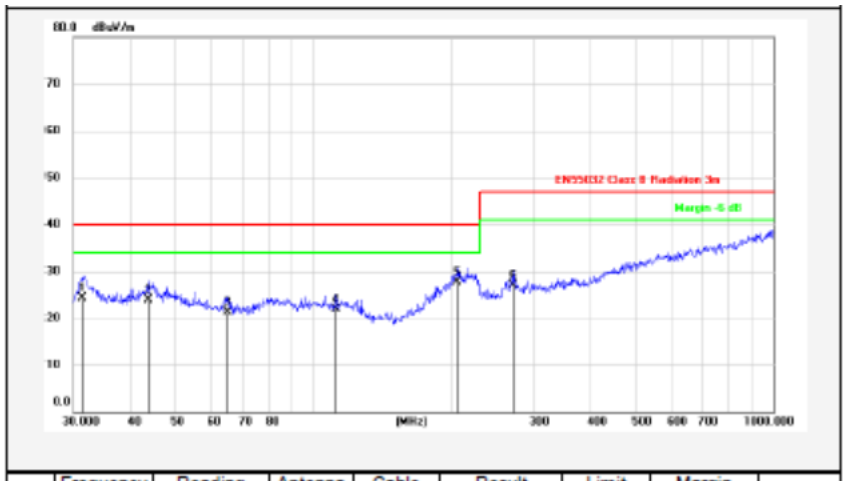
30-1000MHz

EUT:	Rainproof intelligent power supply	Model Name:	BV-ISLR240S24
Test Mode:	FULL LOAD	Test Date:	2022.02.25
Polarization:	Horizontal	Test Voltage:	AC 230V/50Hz
Operator:	Bing.He	Note:	



No.	Frequency (MHz)	Reading (dBuV/m)	Antenna (dB/m)	Cable (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	50.2324	8.10	14.06	1.54	23.70	40.00	-16.30	QP
2	88.3421	10.59	10.14	1.97	22.70	40.00	-17.30	QP
3	101.6443	8.08	12.63	2.09	22.80	40.00	-17.20	QP
4	213.7633	18.48	11.73	2.89	33.10	40.00	-6.90	QP
5	270.3747	14.84	13.46	3.2	31.50	47.00	-15.50	QP
6	568.6127	8.62	18.04	4.64	31.30	47.00	-15.70	QP

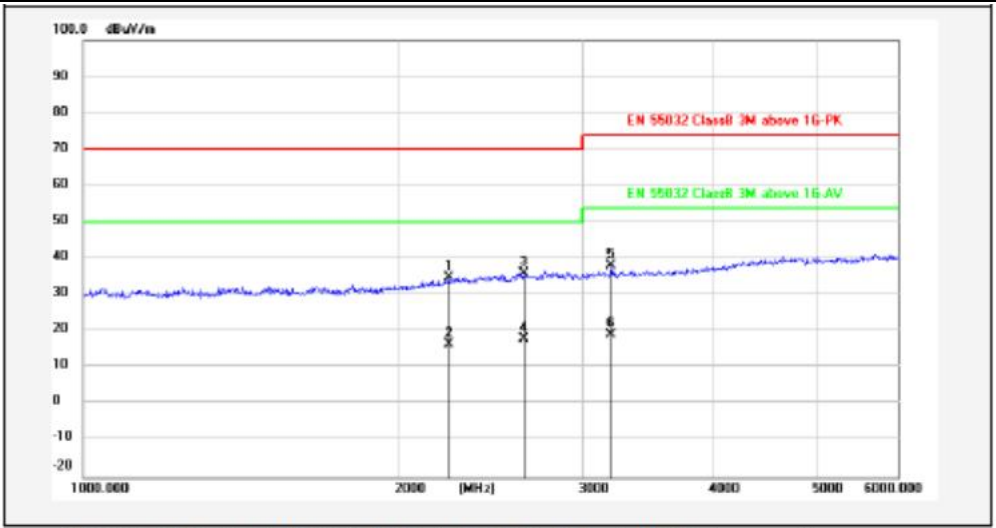
EUT:	Rainproof intelligent power supply	Model Name:	BV-ISLR240S24
Test Mode:	FULL LOAD	Test Date:	2022.02.25
Polarization:	Vertical	Test Voltage:	AC 230V/50Hz
Operator:	Bing.He	Note:	



No.	Frequency (MHz)	Reading (dBuV/m)	Antenna (dB/m)	Cable (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	31.2893	11.05	11.93	1.32	24.30	40.00	-15.70	QP
2	43.6584	8.74	13.73	1.43	23.90	40.00	-16.10	QP
3	65.1145	8.02	11.76	1.62	21.40	40.00	-18.60	QP
4	111.7379	7.87	11.9	2.13	21.90	40.00	-18.10	QP
5	205.6751	13.23	11.59	2.88	27.70	40.00	-12.30	QP
6	272.2776	10.73	13.27	3.2	27.20	47.00	-19.80	QP

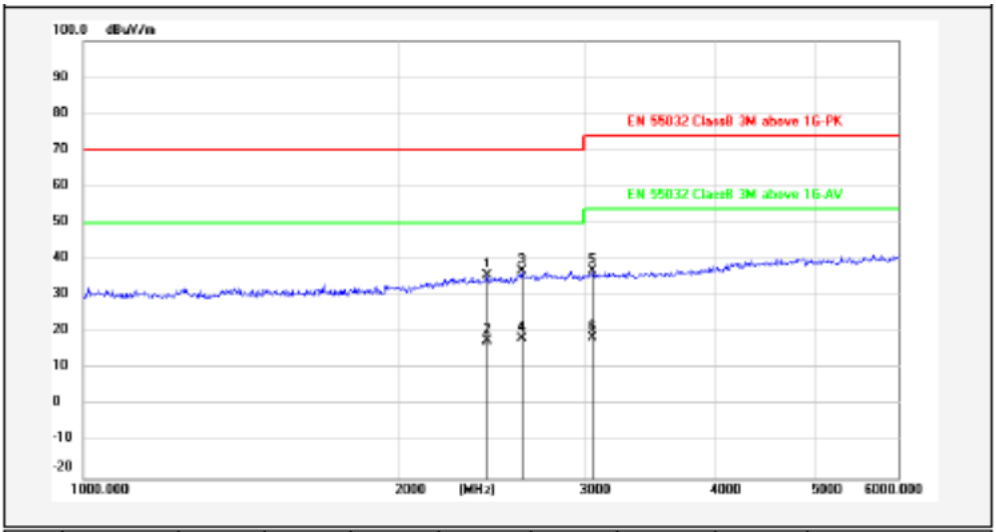
1-6GHz

EUT:	Rainproof intelligent power supply	Model Name:	BV-ISLR240S24
Test Mode:	Bluetooth Mode	Test Date:	2022.02.25
Polarization:	Horizontal	Test Voltage:	AC 230V/50Hz
Operator:	Bing.He	Note:	



No.	Frequency (MHz)	Reading (dBuV/m)	Antenna. (dB/m)	Cable. (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2231.576	42.51	26.69	-34.35	34.85	70.00	-35.15	peak	
2	2231.576	24.16	26.69	-34.35	16.50	50.00	-33.50	AVG	
3	2631.490	41.70	27.76	-33.51	35.95	70.00	-34.05	peak	
4	2631.490	23.65	27.76	-33.51	17.90	50.00	-32.10	AVG	
5	3187.600	43.37	28.31	-33.72	37.96	74.00	-36.04	peak	
6	3187.600	24.51	28.31	-33.72	19.10	54.00	-34.90	AVG	

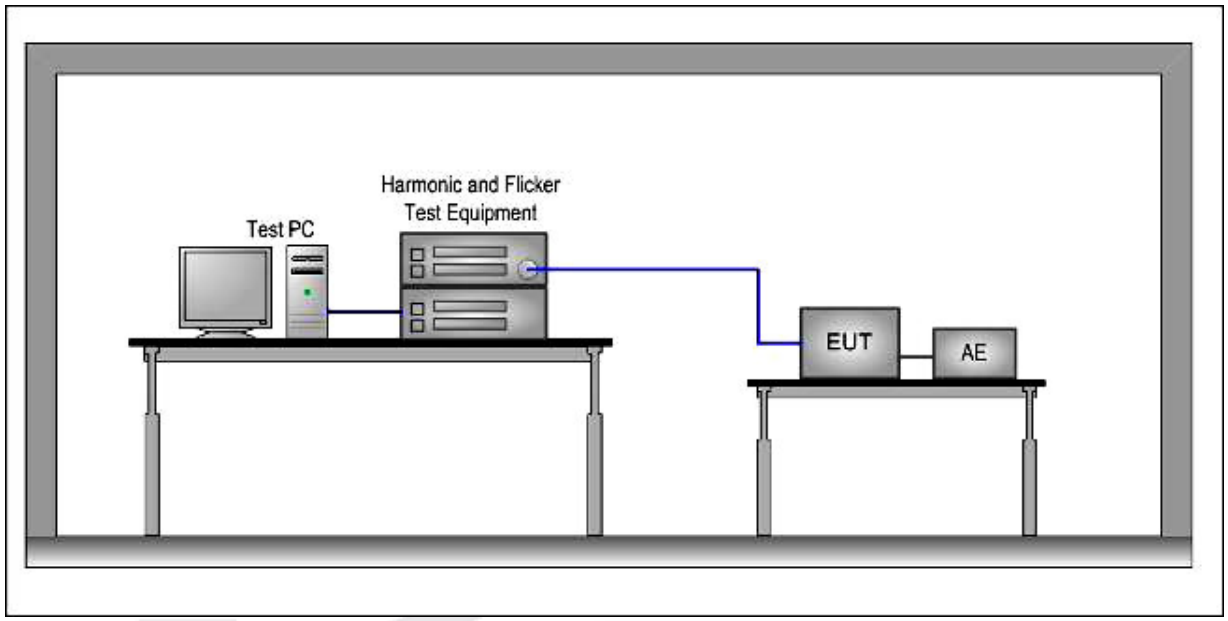
EUT:	Rainproof intelligent power supply	Model Name:	BV-ISLR240S24
Test Mode:	Discharge	Test Date:	2022.02.25
Polarization:	Vertical	Test Voltage:	AC 230V/50Hz
Operator:	Bing.He	Note:	



No.	Frequency (MHz)	Reading (dBuV/m)	Antenna. (dB/m)	Cable. (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2427.643	42.43	27.35	-34.04	35.74	70.00	-34.26	peak	
2	2427.643	24.39	27.35	-34.04	17.70	50.00	-32.30	AVG	
3	2622.077	42.55	27.75	-33.53	36.77	70.00	-33.23	peak	
4	2622.077	24.18	27.75	-33.53	18.40	50.00	-31.60	AVG	
5	3064.394	42.12	28.24	-33.52	36.84	74.00	-37.16	peak	
6	3064.394	23.98	28.24	-33.52	18.70	54.00	-35.30	AVG	

5 HARMONIC CURRENT EMISSION TEST

5.1 Block Diagram of Test Setup



5.2 Test Standard

EN IEC 61000-3-2:2019, Class A

5.3 Limits of Harmonic Current

Limits for Class A equipment	
Harmonic order n	Maximum permissible harmonic current A
Odd harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
15≤n≤39	0.15 15/n
Even harmonics	
2	1.08
4	0.43
6	0.30
8≤n≤40	0.23 8/n

Remark: If the EUT power level is below 75 Watts and therefore has no defined limits.

5.4 Operating Condition of EUT

Test date	Ambient temperature	Relative humidity	Atmospheric pressure
Feb 28, 2022	21°C	55%	101.0kPa

The details of test modes are as follows：

No.	Test Mode
1.	FULL LOAD

5.5 Test Procedure

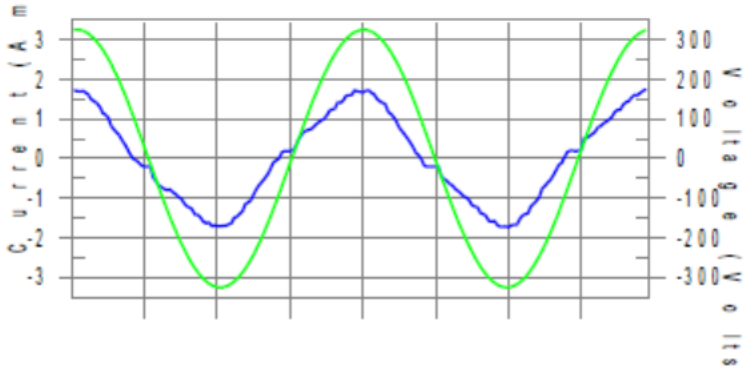
The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.

The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the necessary for the EUT to be exercised.

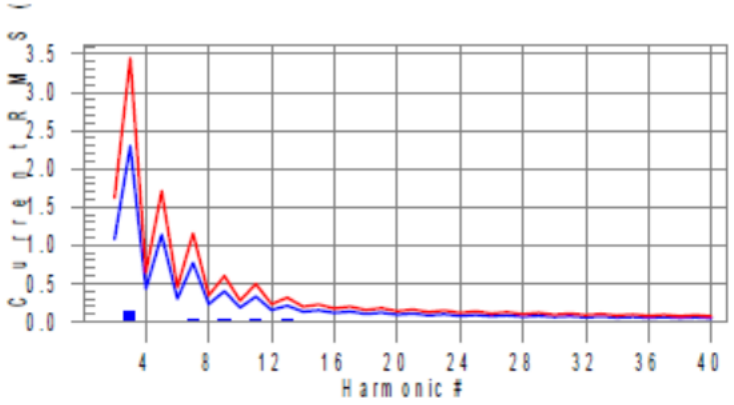
5.6 Test Data

Test Result: Pass **Source qualification: Normal**

Current & voltage waveforms



Harmonics and Class A limit line **European Limits**



Test result: Pass **Worst harmonics H31-9.8% of 150% limit, H31-14% of 100% limit**

Test Result: Pass Source qualification: Normal
THC(A): 0.137 I-THD(%): 12.1 POHC(A): 0.023 POHC Limit(A): 0.251

Highest parameter values during test:

V_RMS (Volts):	230.51	Frequency(Hz):	50.00
I_Peak (Amps):	1.824	I_RMS (Amps):	1.142
I_Fund (Amps):	1.132	Crest Factor:	1.635
Power (Watts):	257.0	Power Factor:	0.977

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.002	1.080	N/A	0.003	1.620	N/A	Pass
3	0.130	2.300	5.7	0.133	3.450	3.9	Pass
4	0.001	0.430	N/A	0.002	0.645	N/A	Pass
5	0.009	1.140	0.8	0.012	1.710	0.7	Pass
6	0.001	0.300	N/A	0.001	0.450	N/A	Pass
7	0.014	0.770	1.9	0.018	1.155	1.5	Pass
8	0.000	0.230	N/A	0.000	0.345	N/A	Pass
9	0.017	0.400	4.2	0.017	0.600	2.9	Pass
10	0.000	0.184	N/A	0.000	0.276	N/A	Pass
11	0.017	0.330	5.3	0.018	0.495	3.6	Pass
12	0.000	0.153	N/A	0.000	0.230	N/A	Pass
13	0.014	0.210	6.9	0.015	0.315	4.7	Pass
14	0.000	0.131	N/A	0.000	0.197	N/A	Pass
15	0.008	0.150	5.6	0.010	0.225	4.4	Pass
16	0.000	0.115	N/A	0.001	0.173	N/A	Pass
17	0.006	0.132	N/A	0.012	0.198	N/A	Pass
18	0.000	0.102	N/A	0.001	0.153	N/A	Pass
19	0.009	0.118	7.5	0.009	0.178	5.1	Pass
20	0.000	0.092	N/A	0.000	0.138	N/A	Pass
21	0.010	0.107	9.7	0.011	0.161	6.9	Pass
22	0.000	0.084	N/A	0.000	0.125	N/A	Pass
23	0.010	0.098	9.8	0.010	0.147	6.9	Pass
24	0.000	0.077	N/A	0.000	0.115	N/A	Pass
25	0.003	0.090	N/A	0.010	0.135	N/A	Pass
26	0.000	0.071	N/A	0.001	0.107	N/A	Pass
27	0.008	0.083	9.6	0.010	0.125	7.6	Pass
28	0.000	0.066	N/A	0.001	0.099	N/A	Pass
29	0.008	0.078	9.9	0.011	0.116	9.4	Pass
30	0.000	0.061	N/A	0.000	0.092	N/A	Pass
31	0.010	0.073	14.0	0.011	0.109	9.8	Pass
32	0.000	0.058	N/A	0.000	0.086	N/A	Pass
33	0.004	0.068	N/A	0.008	0.102	N/A	Pass
34	0.000	0.054	N/A	0.000	0.081	N/A	Pass
35	0.008	0.064	12.8	0.009	0.096	9.7	Pass
36	0.000	0.051	N/A	0.000	0.077	N/A	Pass
37	0.004	0.061	N/A	0.005	0.091	N/A	Pass
38	0.000	0.048	N/A	0.000	0.073	N/A	Pass
39	0.001	0.058	N/A	0.005	0.087	N/A	Pass
40	0.000	0.046	N/A	0.000	0.069	N/A	Pass

Test Result: Pass **Source qualification: Normal**

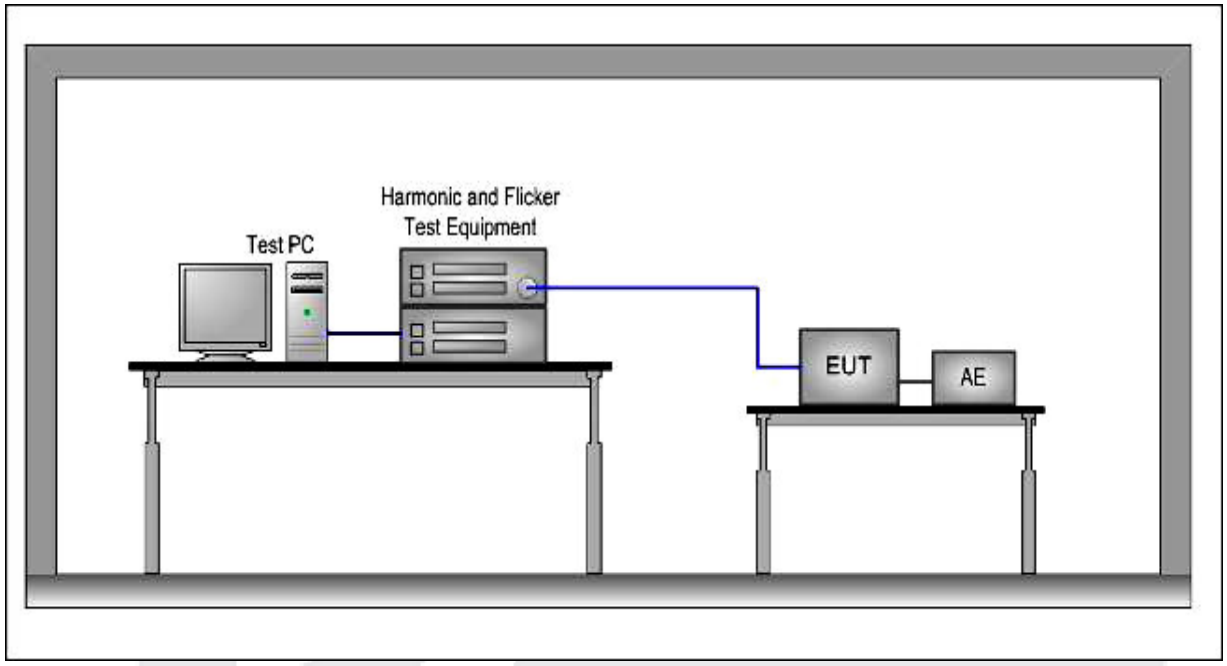
Highest parameter values during test:

Voltage (Vrms):	230.51	Frequency(Hz):	50.00
I_Peak (Amps):	1.824	I_RMS (Amps):	1.142
I_Fund (Amps):	1.132	Crest Factor:	1.635
Power (Watts):	257.0	Power Factor:	0.977

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.062	0.461	13.37	OK
3	0.452	2.074	21.77	OK
4	0.035	0.461	7.66	OK
5	0.038	0.922	4.16	OK
6	0.018	0.461	3.94	OK
7	0.069	0.691	9.93	OK
8	0.009	0.461	1.90	OK
9	0.047	0.461	10.11	OK
10	0.011	0.461	2.48	OK
11	0.034	0.230	14.75	OK
12	0.013	0.230	5.78	OK
13	0.015	0.230	6.60	OK
14	0.005	0.230	2.14	OK
15	0.008	0.230	3.56	OK
16	0.005	0.230	2.17	OK
17	0.009	0.231	3.78	OK
18	0.006	0.230	2.42	OK
19	0.008	0.230	3.56	OK
20	0.010	0.230	4.21	OK
21	0.009	0.230	3.69	OK
22	0.004	0.230	1.72	OK
23	0.011	0.230	4.68	OK
24	0.004	0.230	1.94	OK
25	0.010	0.230	4.39	OK
26	0.005	0.230	2.27	OK
27	0.009	0.230	3.81	OK
28	0.004	0.230	1.58	OK
29	0.011	0.230	4.80	OK
30	0.003	0.230	1.15	OK
31	0.013	0.230	5.77	OK
32	0.002	0.230	1.01	OK
33	0.010	0.230	4.21	OK
34	0.002	0.230	0.90	OK
35	0.013	0.230	5.71	OK
36	0.002	0.230	0.98	OK
37	0.009	0.230	3.85	OK
38	0.003	0.230	1.21	OK
39	0.008	0.230	3.53	OK
40	0.006	0.230	2.62	OK

6 VOLTAGE FLUCTUATIONS & FLICKER TEST

6.1 Block Diagram of Test Setup



6.2 Test Standard

EN 61000-3-3:2013+A1:2019

6.3 Limits of Voltage Fluctuation and Flick

Test Item	Limit	Note
Pst	1.0	Pst means Short-term flicker indicator
Plt	0.65	Plt means long-term flicker indicator
Tmax	500ms	Tmax means maximum time that d(t) exceeds 3.3%
dmax(%)	4%	dmax means maximum relative voltage change.
dc(%)	3.3%	dc means relative steady-state voltage change.

6.4 Operating Condition of EUT

Test date	Ambient temperature	Relative humidity	Atmospheric pressure
Feb 28, 2022	21°C	55%	101.0kPa

The details of test modes are as follows：

No.	Test Mode
1.	FULL LOAD

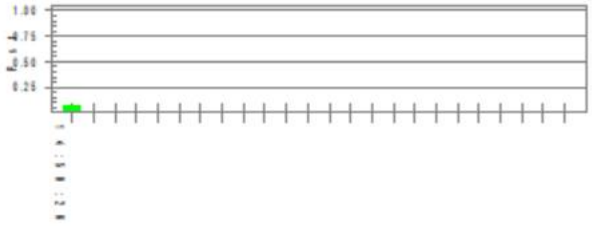
6.5 Test Procedure

The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal conditions During the flick measurement, the measure time shall include that part of whole operation changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

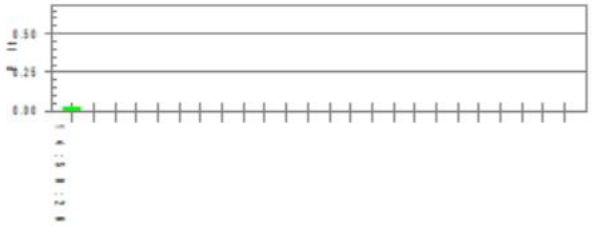
6.6 Test Data

Test Result: Pass Status: Test Completed

Pst and limit line European Limits



Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt):	230.47			
T-max (mS):	0	Test limit (mS):	500.0	Pass
Highest dc (%):	0.00	Test limit (%):	3.30	Pass
Highest dmax (%):	0.00	Test limit (%):	4.00	Pass
Highest Pst (10 min. period):	0.084	Test limit:	1.000	Pass
Highest Plt (2 hr. period):	0.028	Test limit:	0.650	Pass

7 IMMUNITY TEST RESULT

Description of Performance Criteria:

Performance criteria A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

For audio output device: The measured acoustic interference ratio and/or the measured electrical interference during the test shall be -20dB or better(see note1)

Performance criteria B

During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test.

After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.

If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criteria C

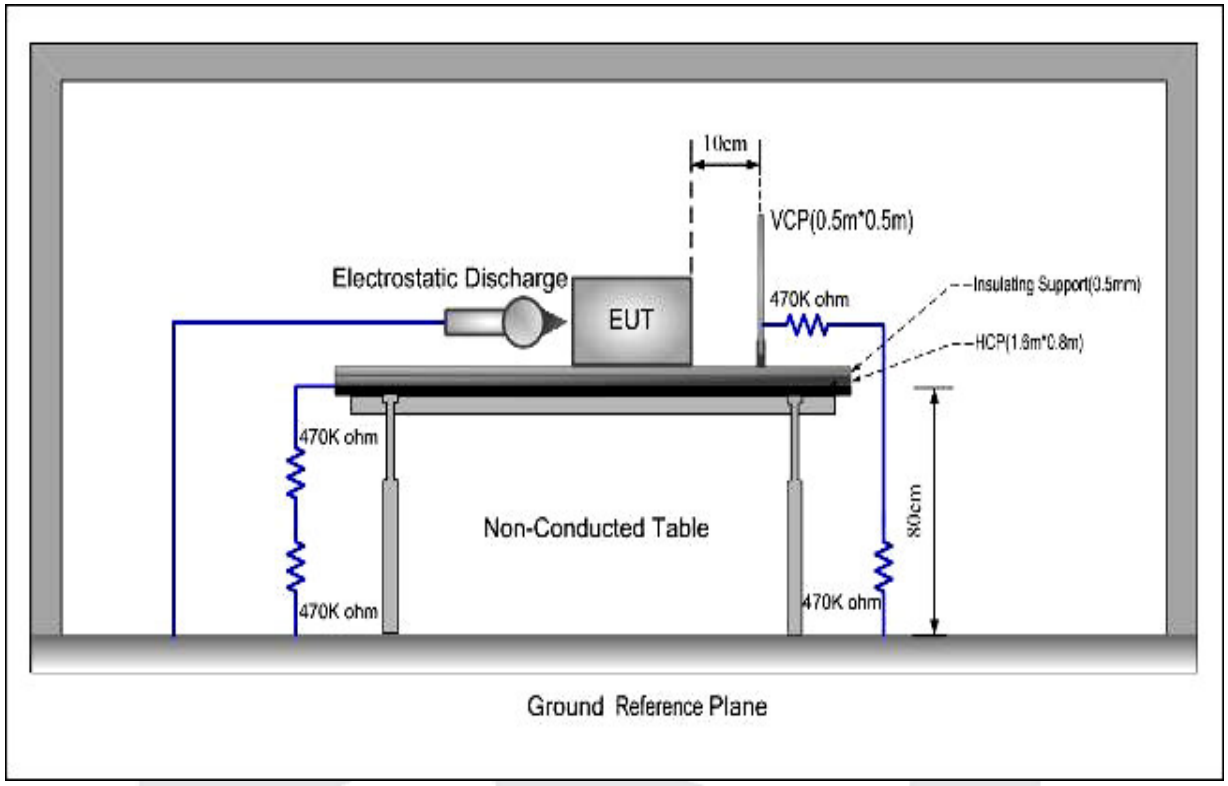
Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed.

Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

Note 1: This performance criterion only using for Continuous inducted RF disturbances and Continuous RF electromagnetic field disturbances item.

8 ELECTROSTATIC DISCHARGE Immunity TEST

8.1 Block Diagram of Test Setup



8.2 Test Standard

EN 61000-4-2: 2009

(Severity Level 1&2&3 for Air Discharge at 2kV 4kV 8kV;

Severity Level 1&2 for Contact Discharge at 2kV 4kV)

8.3 Operating Condition of EUT

The details of test modes are as follows：

No.	Test Mode
1.	FULL LOAD

8.4 Test Procedure

8.4.1 Air Discharge:

The test was applied on non-conductive surfaces of EUT. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the discharge electrode was removed from the EUT. The generator was re-triggered for a new single discharge and repeated 20 times for each pre-selected test point. This procedure was repeated until all the air discharge completed.

8.4.2 Contact Discharge:

All the procedure was same as Section 8.5.1. except that the generator was re-triggered for a new single discharge and repearted 50 times for each pre-selected test point. The tip of the discharge electrode was touch the EUT before the discharge switch was operated.

8.4.3 Indirect discharge for horizontal coupling plane

At least 20 single discharges were applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

8.4.4 Indirect discharge for vertical coupling plane

At least 20 single discharge were applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

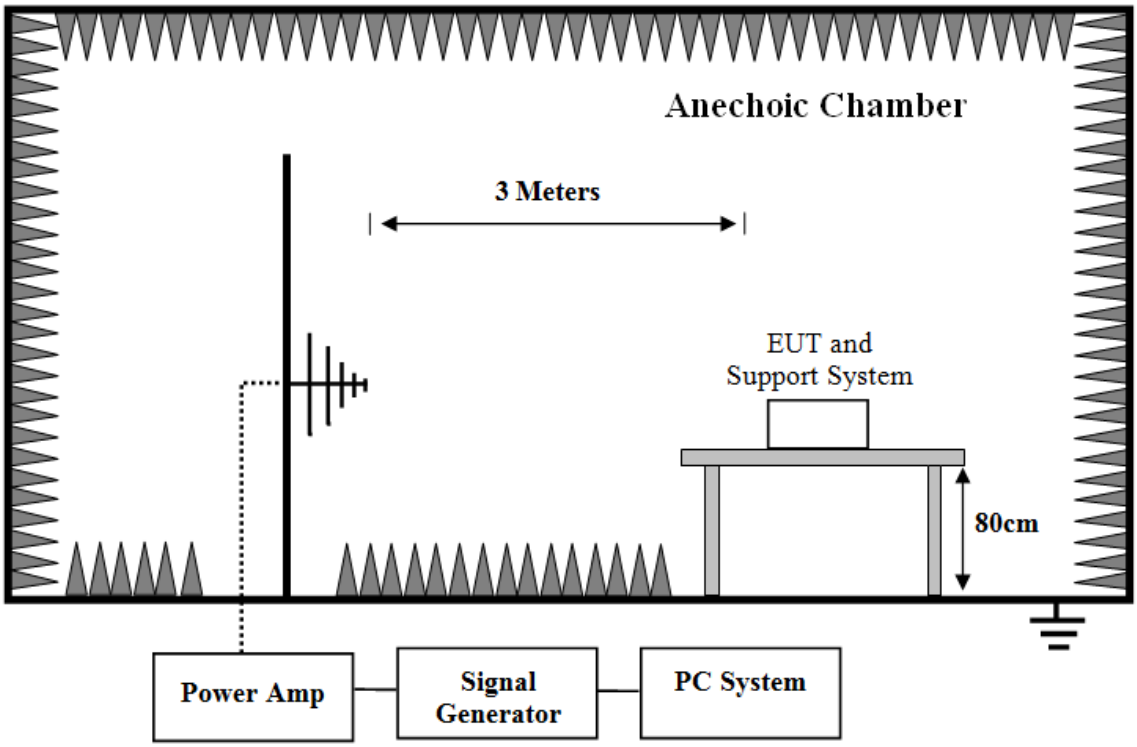
8.5 Test Data

Electrostatic Discharge Immunity Test Results

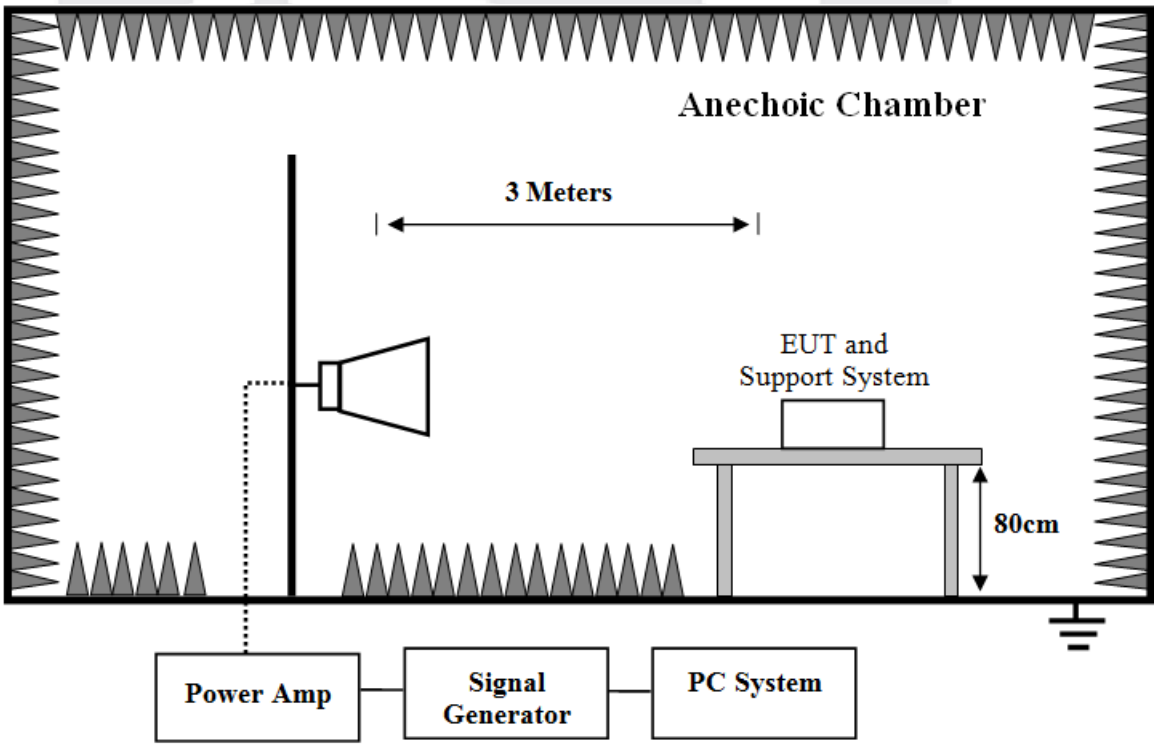
Discharge Location		**Type of discharge**	**Result**
HCP	4 points	Contact	Pass
VCP	4 points	Contact	Pass
Metal Shell	1points	Contact	Pass
Gap	1 points	Air	Pass
Remark: 1. There screen was flasshing during the test, but self-recoverable after test. *2. Discharge should be considered on Contact and Air and Horizontal Coupling Plane (HCP) and Vertical Coupling Plane (VCP).*			

9 Radio Frequency Electromagnetic Field Immunity(R/S) Test

9.1 Block Diagram of Test Setup



Frequency Range：80-1000MHz



Frequency Range：1000- 6000MHz

9.2 Test Standard

EN IEC 61000-4-3:2020
Frequency Range：80-1000MHz,1000- 6000MHz
Severity Level 2 at 3V/m

9.3 Operating Condition of EUT

The details of test modes are as follows：

No.	Test Mode
1.	FULL LOAD

9.4 Test Procedure

The field sensor is placed on the EUT table (0.8 meter above the ground) which is 3 meters away from the transmitting antenna. Through the signal generator, power amplifier and transmitting antenna to produce a uniformity field strength (3V/m measured by field sensor) around the EUT table from frequency range specified and records the signal generator‘s output level at the same time for whole measured frequency range. Then, put EUT and its simulators on the EUT turn table and keep them 3 meters away from the transmitting antenna which is mounted on an antenna tower and fixes at 1 meter height above the ground. Using the recorded signal generator’s output level to measure the EUT from frequency range specified and both horizontal & vertical polarization of antenna must be set and measured. Each of the four sides of EUT must be faced this transmitting antenna andmeasures individually.

All the scanning conditions are as follows：

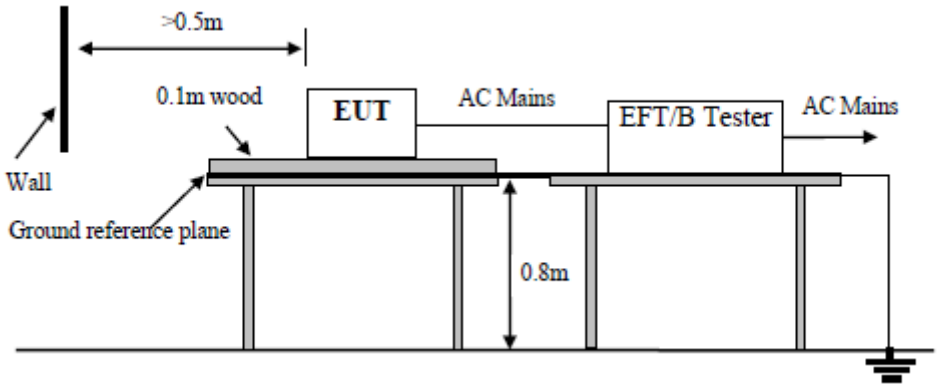
Test Level	
Frequency	80-1000MHz; 1000-6000MHz
Test level	3V/m (Severity Level 2)
Antenna polarization	Horizontal & Vertical
Modulation	80%, 1kHz Amplitude Modulation
Steps increment	1%

9.5 Test Data

Required Performance: A			Actual Performance: A		
Frequency Rage : 80 MHz -1000MHz ,1000-6000MHz			Test Level: 3V/m		
Modulation: ☑ AM ☐ Pulse ☐ none 1 kHz 80%					
EUT Position	Polarization: Horizontal		Polarization: Vertical		Result
	Required	Observation	Required	Observation	(Pass / Fail)
Front	A	A	A	A	Pass
Right	A	A	A	A	Pass
Rear	A	A	A	A	Pass
Left	A	A	A	A	Pass
Performance: The EUT was no change compared with initial operation during the test.					

10 Electrical Fast Transient/Burst Immunity Test

10.1 . Block Diagram of Test Setup



10.2 Test Standard

EN 61000-4-4: 2012

10.3 Operating Condition of EUT

The details of test modes are as follows：

No.	Test Mode
1.	FULL LOAD

10.4 Test Procedure

The EUT and its simulators were placed 0.1 m high above the ground reference plane which was a minimum 2m*2m metallic sheet with 0.65mm minimum thickness. This reference ground plane shall project beyond the EUT by at least 0.1 m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

For power input port:

The EUT was connected to the power mains by using a coupling device which coupled the EFT interference signal to AC power lines. Both polarities of the test voltage were applied during compliance test and the duration of the test were 2mins.

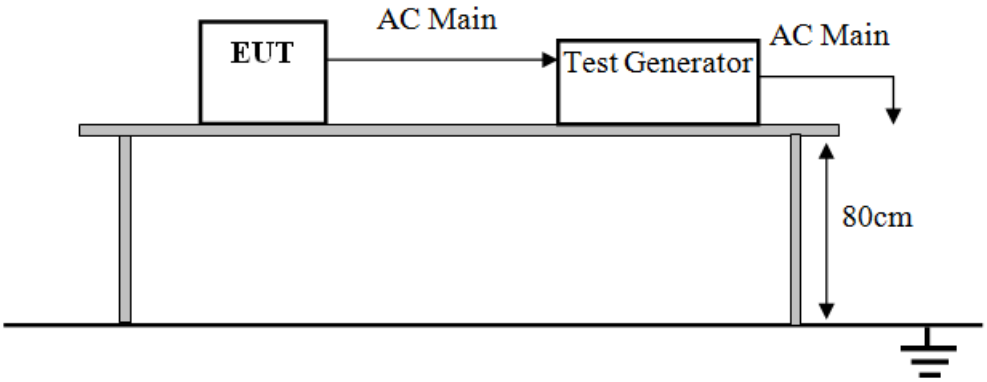
10.5 Test Data

Electrical fast transient Test Results

Coupling Ports		Coupling Voltage	Inject Method	Result
AC Power Ports	L-N	±1 kV	Direct	Pass
AC Power Ports	L-PE	±1 kV	Direct	Pass
AC Power Ports	N-PE	±1 kV	Direct	Pass
Signal Line		±0.5 kV	Capacitive CDischarge	N/A
Remark: There screen was flasshing during the test, but self-recoverable after test.				

11 SURGE Immunity TEST

11.1 Block Diagram of Test Setup



11.2 Test Standard

EN 61000-4-5: 2014

11.3 Operating Condition of EUT

The details of test modes are as follows：

No.	Test Mode
1.	FULL LOAD

11.4 Test Procedure

2Ω effective output impedance of the generator was used for L-N test.12Ω effective output impedance of the generator was used for L-PE,N-PE test.

5 positive and 5 negative (polarity) tests were applied successively synchronized to the voltage phase, 90°, 270°to L-N respectively. The repetition rate was 1 per minute during test.

(1). For input and AC power ports:
The EUT was connected to the power mains by using a coupling device which coupled the surge interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration was 1 minute.
(2). For signal lines and control lines ports:
None.
(3). For DC input and DC output power ports:
None.

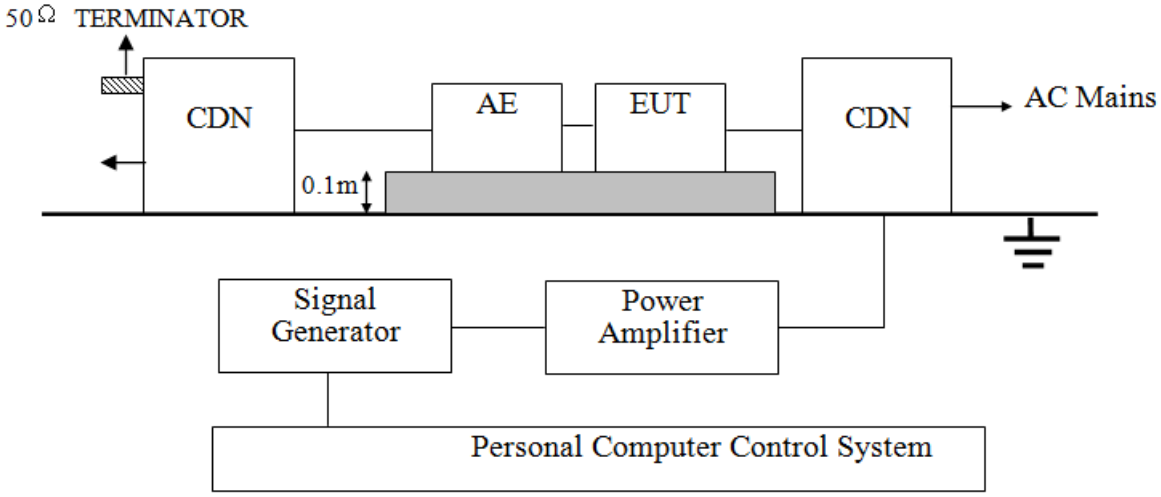
11.5 Test Data

Surge Immunity Test Results

Coupling Ports		Coupling Voltage	Coupling Phase / Result			
			0°	90°	180°	270°
AC power ports	L-N	+/-1kV Direct	Pass	Pass	Pass	Pass
AC power ports	L-PE	+/-2kV Direct	Pass	Pass	Pass	Pass
AC power ports	N-PE	+/-2kV Direct	Pass	Pass	Pass	Pass
Tuner Port		+/-0.5kV	N/A			
Remark: There was no change compared with initial operation during the test.						

12 Injected Currents Susceptibility TEST

12.1 Block Diagram of Test Setup



12.2 Test Standard

EN 61000-4-6: 2014+AC: 2015

12.3 Operating Condition of EUT

The details of test modes are as follows：

No.	Test Mode
1.	FULL LOAD

12.4 Test Procedure

The EUT were placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) was placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT were as short as possible, and their height above the ground reference plane were between 30 and 50 mm (where possible).

The frequency range was swept from 0.15 MHz - 10 MHz, 10 MHz – 30 MHz and 30 MHz – 80MHz using 3V, 3 V - 1V, 1V signal level, and with the disturbance signal 80% amplitude modulated with a 1KHz sine wave.

The rate of sweep shall not exceed 1.5*10-3decades/s.Where the frequency was swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.

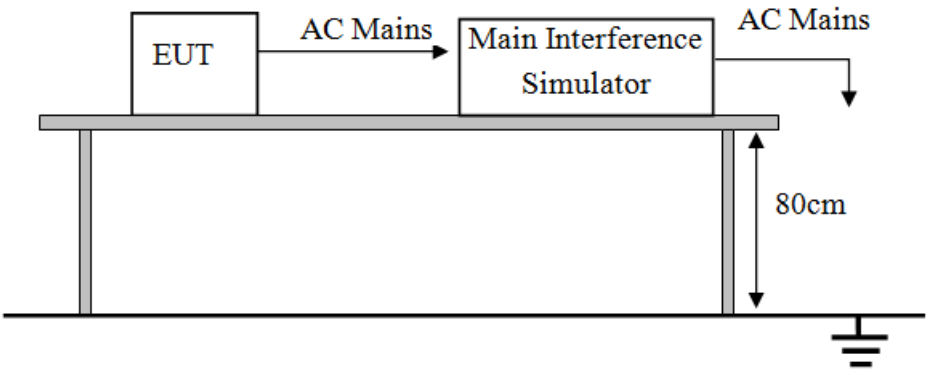
12.5 Test Data

Injected Currents Susceptibility Test Result

Required Performance: A			Actual Performance: A		
Modulation Signal: 1kHz, 80% AM					
Frequency Range (MHz)	Injected Position	Voltage Level (r.m.s)	Required	Observation	Result (Pass / Fail)
0.15 - 80	AC mains	3V	A	A	PASS
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
Performance: There was no change compared with initial operation during the test.					

13 VOLTAGE DIPS AND INTERRUPTIONS TEST

13.1 Block Diagram of Test Setup



13.2 Test Standard

EN IEC 61000-4-11:2020

13.3 Severity Levels and Performance Criterion

Test category	reduction	Periods	Performance criterion
Voltage dips	＞95%	0.5P	B
Voltage dips	30%	25P/30P	C
Voltage interruptions	＞95%	250P/300P	C

13.4 Operating Condition of EUT

The details of test modes are as follows:

No.	Test Mode
1.	FULL LOAD

13.5 Test Procedure

1) The interruptions are introduced at selected phase angles with specified duration.

2) Record any degradation of performance.

13.6 Test Data

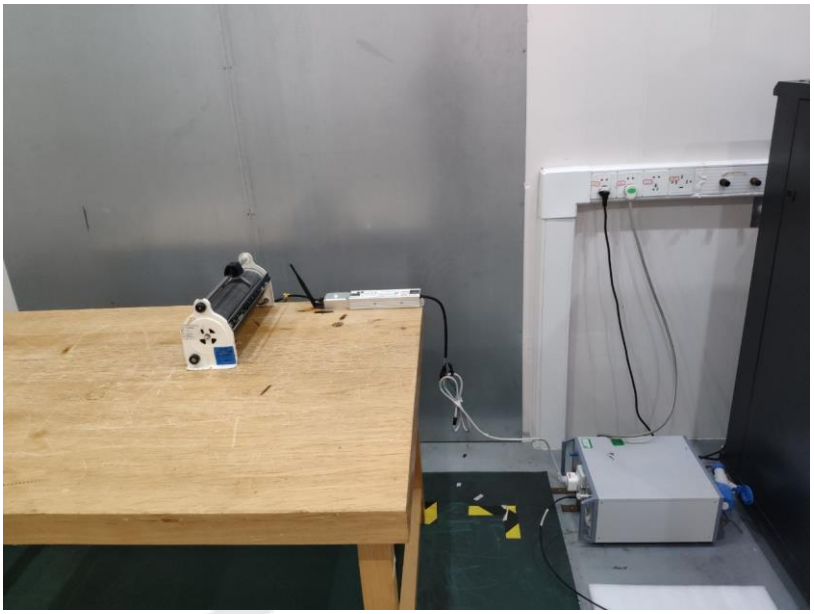
Voltage Dips and Short Interruptions Immunity Test Result AC 230V/50Hz

Test Level % UT	Voltage Dips & Short Interruptions % UT	Duration (in period)	Criterion	Result
0	100	0.5P	B	PASS
70	30	25P	C	PASS
0	100	250P	C	PASS

Remark: There screen was flasshing during the test, but self-recoverable after test.

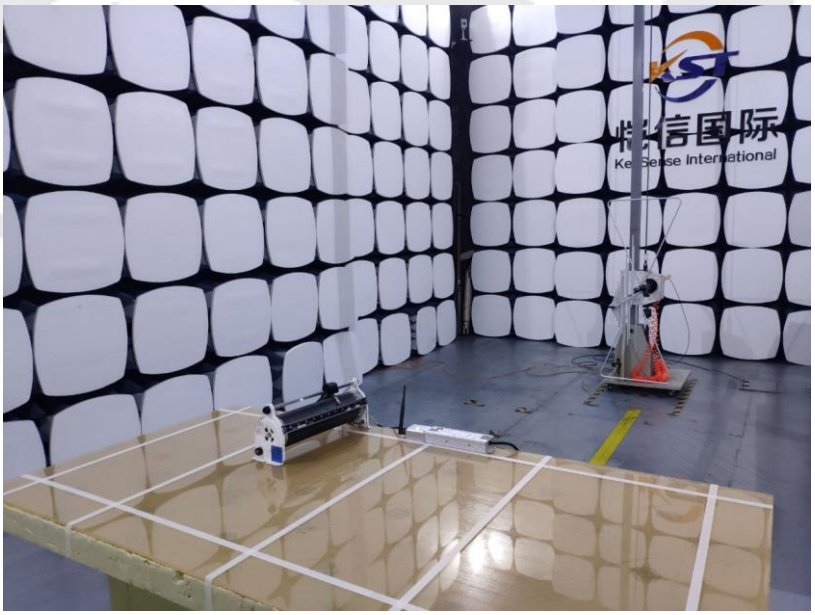
14 Test setup photo

Conducted disturbance at mains terminals Test

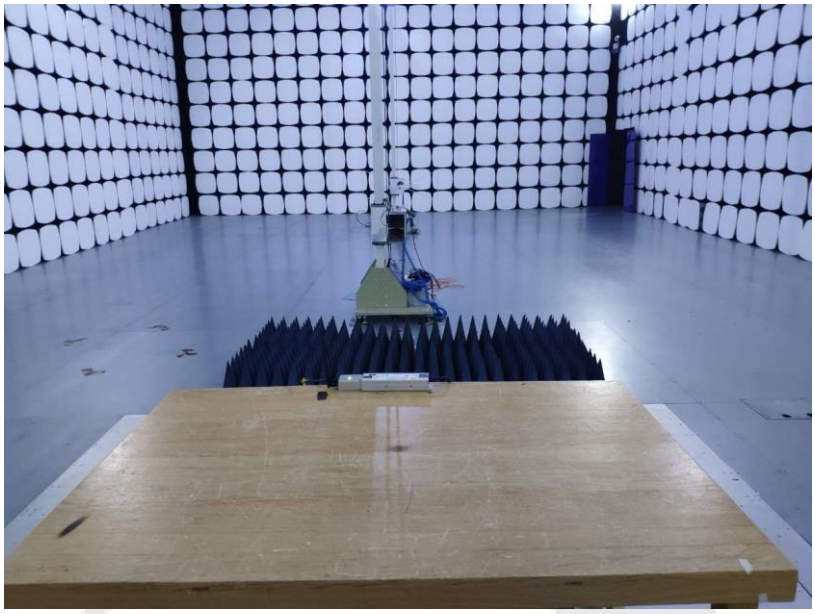


Radiated Disturbance Test

30-1000MHz



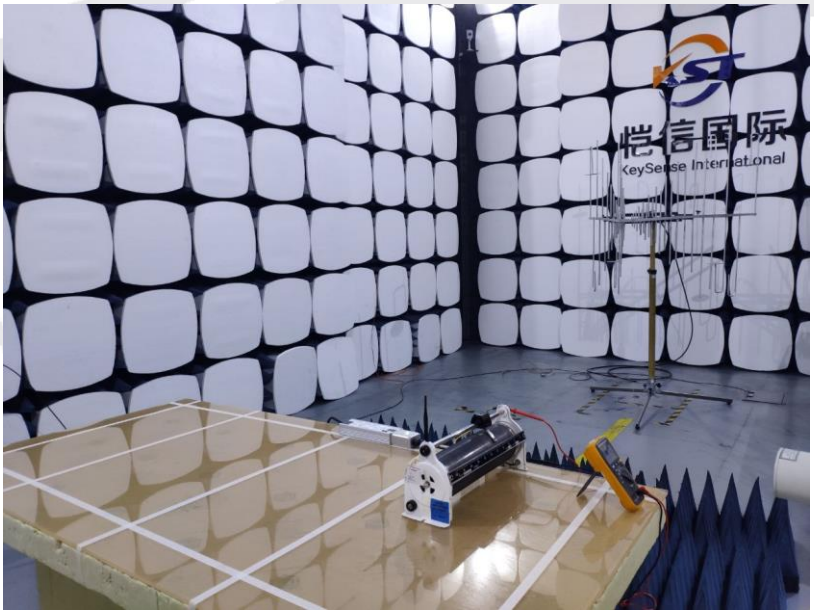
1000-6000MHz



Harmonic current emission & Voltage fluctuations &flicker Test

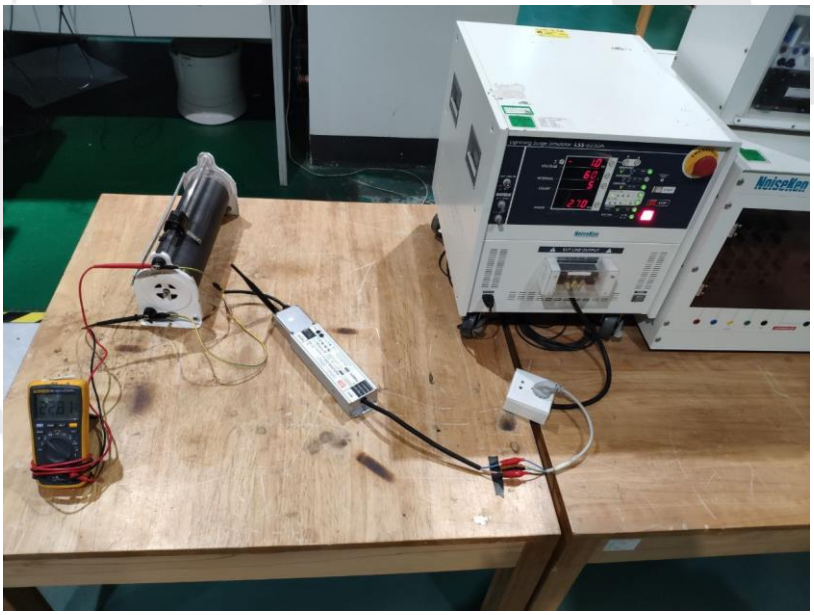
Electrostatic discharge Test

Radio-frequency Continuous radiated disturbance Test

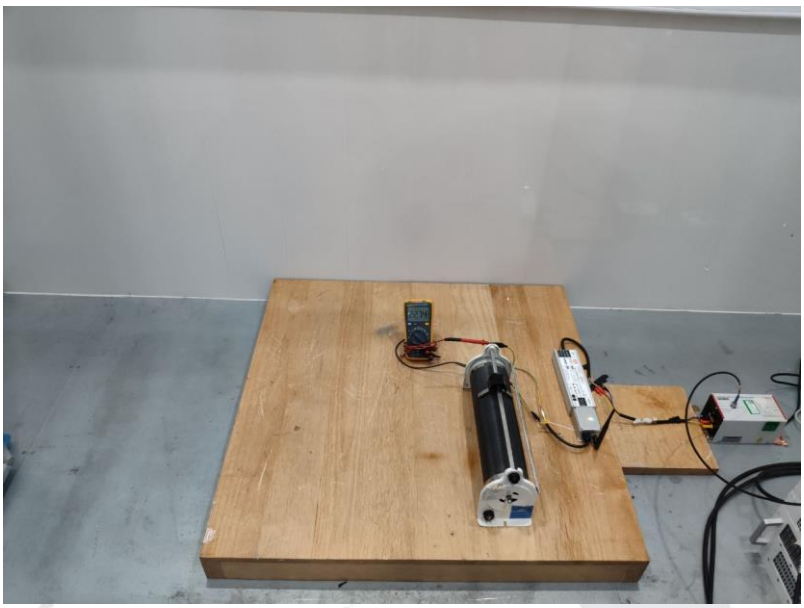


Electrical fast transient Test

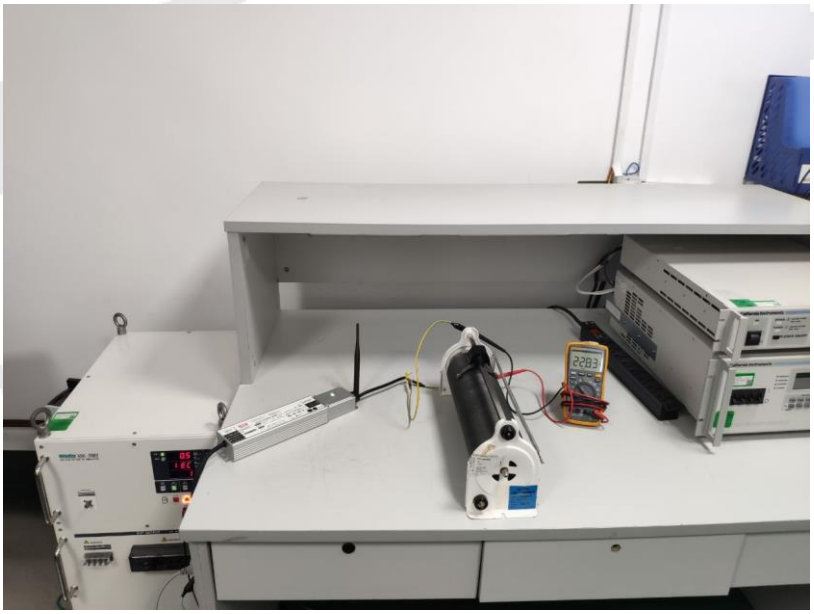
Surge Test



Radio-frequency, Continuous conducted disturbance Test

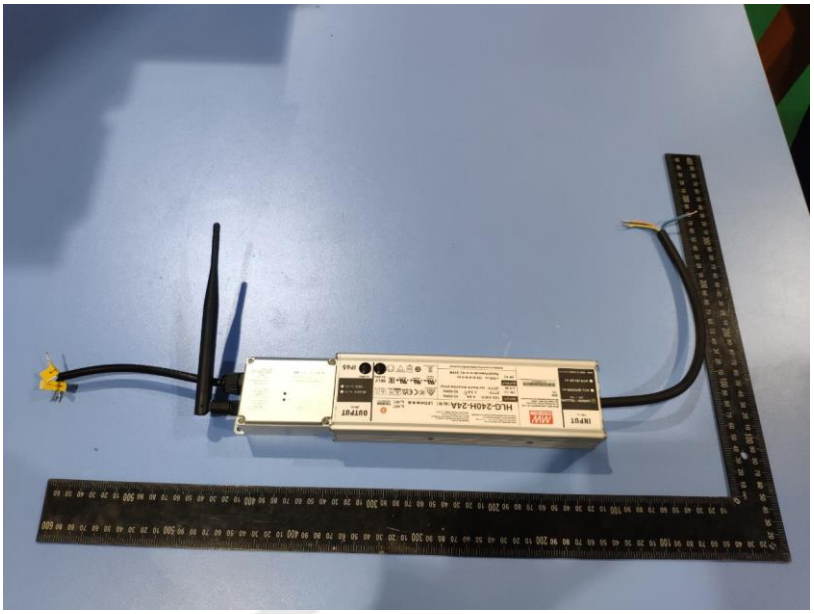


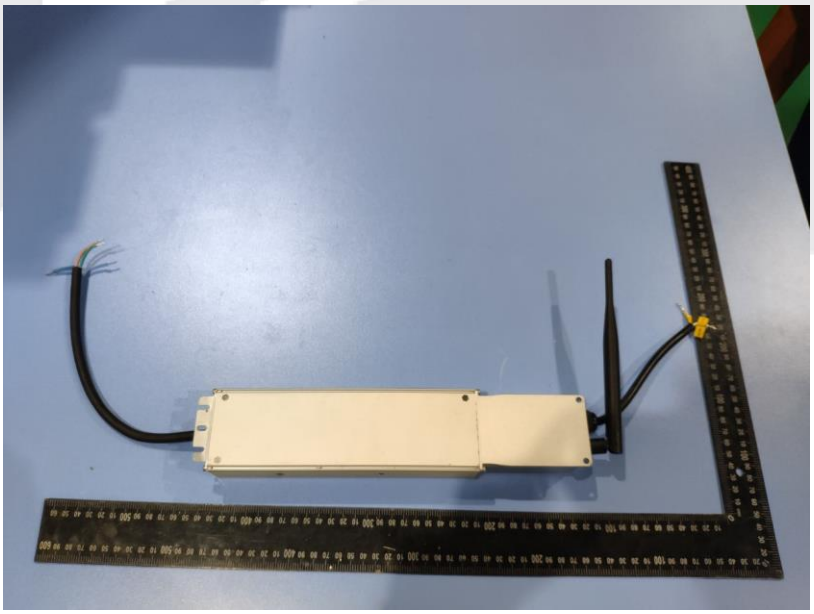
Voltage dips & interruption Test



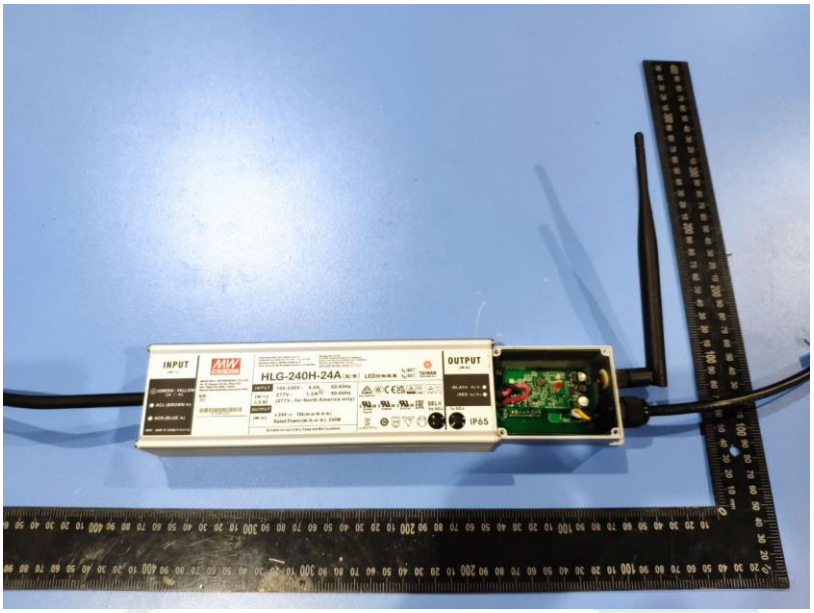
15 PHOTOS OF THE EUT

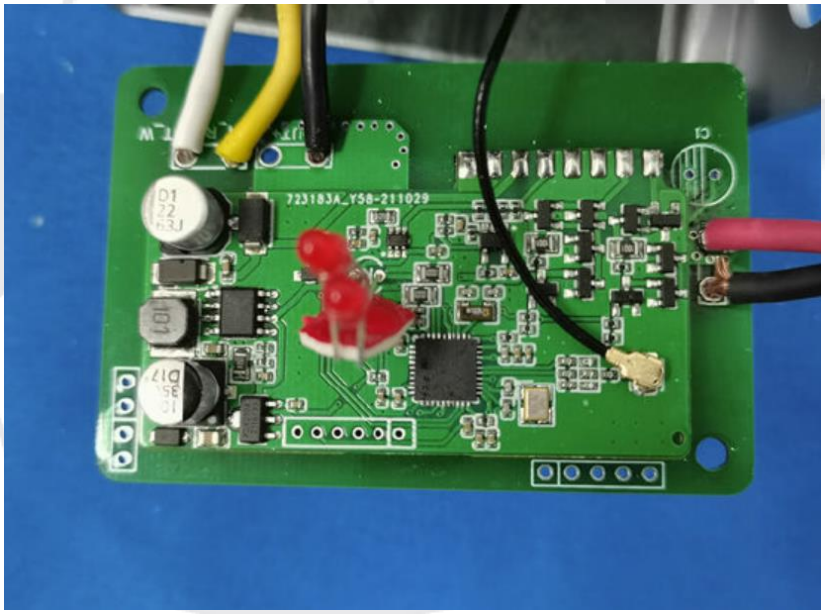
External photos





Internal photos





..... End of Report .....

Statement

1. The calibration and measurement of test equipments used in our laboratory are traceable to National primary standard of measurement and BIPM.
2. The report is invalid without the special test seal of the company.
3. The test report is invalid without the signature of main tester,examiner and approver.
4. The report is invalid if altered and added or deleted.
5. The test results in this report only apply to the tested samples.
6. This test report shall not be reproduced except in full, without the written approval of our laboratory.
7. “☆”item cannot be Accredited by CNAS.
8. Any objections must be raised to KeySense within 15days since the date when report is received.

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